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FLORA
OF
BRITISH INDIA.

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THE
FLORA OF BRITISH INDIA.

BY

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ASIATIC SOCIETY OF BENGAL.

ASSISTED BY VARIOUS BOTANISTS.

PART I.

RANUNCULACEÆ TO POLYGALEÆ.

PUBLISHED UNDER THE AUTHORITY OF THE SECRETARY OF STATE FOR
INDIA IN COUNCIL.



LONDON :

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TO

HIS GRACE THE DUKE OF ARGYLL, K.T., F.R.S.,

SECRETARY OF STATE FOR INDIA,
PRESIDENT OF THE GEOLOGICAL SOCIETY OF LONDON;
&c. &c. &c.

MY LORD DUKE,

The fact of this first part of the "Flora of British India" appearing during your Grace's tenure of office, and under your instructions, affords me the welcome opportunity of following a time-honoured custom in dedicating that work to you. And I congratulate myself on being so circumstanced, since I am thus enabled to express my respect for your high scientific attainments and for those original observations and writings which have appeared during the long period that has elapsed since I first enjoyed the privilege of friendly intercourse with your Grace, which long antedates your scientific career and my official connexion with you.

I am,

Your Grace's faithful and obedient servant,

JOS. D. HOOKER.

ROYAL GARDENS, KEW,
March 15, 1872.

PREFACE.

THE Flora of British India is intended to comprise within a moderate compass brief descriptions, ordinal, generic and specific, of the Flowering plants and Ferns hitherto found within the British territories in India, together with those of Kashmir and Western Tibet; countries which, though outside that territory, belong to botanical regions included within it, which have been geographically and botanically explored by officers employed almost exclusively in the Indian service, and which are habitually visited by Indian tourists and travellers. It was originally intended to have included the Floras of Afghanistan and Beluchistan, as was done in the fragmentary "Flora Indica," commenced in 1855 by Dr. T. Thomson and myself; but the plants of these countries having been recently included in Boissier's excellent "Flora Orientalis," and belonging to quite another botanical region (the Occidental Asiatic), this intention has been abandoned.

At the outset it must be stated, that in a work of this scope, neither fulness nor completeness are attainable in the present state of science. British Indian Botany is represented by some 12-14,000 species, and by hundreds of thousands of specimens, collected over an area of one and a half millions of square miles, in tropical, temperate, and frigid climates, and at all elevations, from the sea-level to 19,000 ft. Of this vast assemblage, not a twelfth part has hitherto been brought together in any one general work on Indian plants. The descriptions of such as are well described, are scattered through innumerable British and foreign journals, or contained in Local Floras, or works on general Botany; a very large number are described so incompletely or inaccurately, that they can only be recognised after an inspection of the original specimens; and very many are altogether undescribed. In short, there is no quarter of the globe so rich in plants, and from which such a mass of materials has been collected and deposited in European

museums; and yet of which so little of the Natural History, and especially the Botany, has been systematically brought together. Under these circumstances an exhaustive Flora would be a work of many years and many volumes; and it is as a hand-book to what is already known, and a pioneer to more complete works, that the present is put forward.

For an account of the materials upon which it is founded, the reader is referred to the Introductory Essay to the Flora Indica alluded to above, which contains a history of Indian Botany up to 1855, together with an essay on the climates and physical features of India, and on its divisions into Botanico-Geographical provinces. Since the date of its publication, no great systematically arranged collections of Indian plants, such as those of Wallich, Wight, Stocks, Strachey, and Winterbottom, &c. &c., have been added to these; though many very valuable local collections have been made; amongst which the Malaccan Herbarium of the late Dr. Maingay, and the South Indian of Major Beddome, present the most novelty and interest. Since that period, too, the vast Herbaria of Griffith and Falconer have been made over to Kew by the late East Indian Government, and though in a ruinous condition from damp and vermin, have been arranged and distributed; Wight's invaluable original Herbarium has been added to that of Kew, by private gift from that veteran botanist, and its duplicates also distributed from this establishment; and Rottler's own Herbarium has been transferred from the Museum of King's College, London, and liberally presented to Kew by order of the Council of that Institution. The value of these last two collections, as containing the type specimens of plants described in so many old and modern works, cannot be over-estimated.

The plan approved by his Grace the Secretary of State for India, for bringing out this Flora, viz., of associating with myself a number of competent botanists, whose names will appear in the headings of the pages they (wholly or in part) shall contribute, will, it is hoped, enable me to bring it out with reasonable celerity; whilst the adoption of as concise a style and phraseology* as is consistent with clearness, and the

* In these matters my Flora of the British Islands has been followed; the style there adopted having been suggested by the requirements of the Professors of Botany in the Scotch Universities, and approved by them, seemed to me to be equally applicable to a more extended.

avoidance of repetition in the descriptions and remarks on each species, will enable me to compress the whole into a portable form.

With regard to citations of previous works, and references to authors, these have been reduced to what appears to be most useful and desirable for working and especially Indian botanists. As a rule, all Indian Floras are quoted, as also the work wherein the species was first described under the name it bears; the chief exceptions to the latter are in cases where the author has redescribed the plant in a subsequent better known general work, when the latter alone is cited.*

I have been compelled to confine the citations of numbered distributed collections to Wallich's; to have introduced the numbers of Wight's, Jacquemont's, Hohenacker's, Strachey and Winterbottom's, Griffith's, Falconer's, Helfer's, Maingay's, Thwaites's, Hooker fil. and Thomson's, and other collections that have been distributed from Kew and elsewhere, would have added at least another volume to the work, and would have prolonged indefinitely the time and cost of its production. All such references, if not checked in the proofs, as well as in the MS., are sure to abound in errors; as do indeed the collections themselves, requiring in such cases the introduction of cross references, discussions and critical notes, essential for the verification of specimens, but not necessarily of species. More-

* Thus De Candolle's fragmentary "Systema" is not quoted for plants subsequently included in his universally used "Prodromus;" nor Boissier's inaccessible "Diagnoses Plantarum Orientalium" for those subsequently included in his great work, the "Flora Orientalis." The interposition of a semicolon between the author's name and that of the work cited, indicates that the plant was not first described in that work; its absence indicates that it was.

With regard to the vexed question, whether to attach to a species the name of the author who first described it, or of him who first put it into the genus to which I think that it belongs, I have adopted the latter alternative, chiefly on the principle that a right comprehension of genera is of higher importance than the power of describing a species. The number of species described by authors who cannot determine their affinities, increases annually, and I regard the naturalist who puts a described plant into its proper position in regard to its allies, as rendering a greater service to science than its describer, when he either puts it into a wrong place, or throws it into any of those chaotic heaps miscalled genera, with which systematic works still abound. I however admit, that no laws or usages embrace all cases of disputed authority or priority, and that the best hitherto proposed are open to great abuses; but after many years' experience I find that the plan which, in common with the majority of botanists, I have followed, is open to the fewest objections, and does justice to the greatest and most deserving number of naturalists.

over, such references would not have proved of the smallest use to the Indian resident and traveller, for whom this work is specially intended.

And here I must caution botanists against an over-reliance upon the names attached to the Indian collections which have been distributed from Kew, first by myself, and latterly by the keeper of the herbarium, between 1855 and 1870. These collections originally comprised about half a million of specimens, which had been accumulating for upwards of thirty years, principally in the India House (where a great number were wholly destroyed by damp and vermin), at Kew, and at the Linnean Society, and consisted chiefly of the collections of Griffith, Falconer, Helfer, Royle, G. Thomson, T. Thomson and myself, Law, Stocks, Dalzell, and Gibson, together with the remainder of Wallich's, and latterly Wight's. From these, after arrangement, upwards of 380,000 specimens were distributed in sets to public and private museums in Europe, India, and America, every specimen bearing a ticket with the name of the locality and collector, and that of the plant, as far as it could be approximately determined. I have no reason to suppose that these collections contain more errors in nomenclature than do similar ones; but, as was explicitly stated when they were sent out, such names are not to be regarded as authoritative.

The area over which each species is distributed, is indicated by districts; these districts or geographical areas being botanical regions, which coincide in the main so closely with the well recognized territorial divisions of India, that a strict definition of them is unnecessary: an account of their limits and physical features will be found in the Introductory Essay to the *Flora Indica*, and its accompanying maps.

It has been a source of most sincere regret to me that a combination of circumstances has prevented the continuation of the Indian Flora upon the originally contemplated and more extended plan, under the joint authorship of my old friend and fellow-traveller, Dr. Thomson, and myself. Other duties in our respective services necessitated its postponement for a very long period, until indeed it became obvious that years were not left to us, even could we have commanded sufficient leisure, to finish so laborious an undertaking.

FLORA OF BRITISH INDIA.

ORDER I. **RANUNCULACEÆ.** (By Hooker f. & Thomson.)

Annual or perennial herbs, rarely shrubs. *Leaves* radical or alternate (opposite in *Clematidæ*). *Stipules* 0, or adnate to the petiole, rarely free. *Flowers* regular or irregular, 1-2-sexual, rarely bracteate. *Disk* very rarely present (*Pæonia*). *Sepals* 5 or more, rarely 2-4, deciduous (persistent in *Pæonia*), often petaloid, imbricate (valvate in *Clematis*). *Petals* 0, or 3-5 or more, hypogynous, imbricate, often minute or deformed. *Stamens* hypogynous; anthers usually adnate and dehiscing laterally. *Carpels* usually many, free, 1-celled; stigma simple; ovules one or more on the ventral suture, anatropous, erect with a ventral or pendulous with a dorsal raphe. *Fruit* of numerous 1-seeded achenes, or many-seeded follicles, rarely a berry. *Seed* small, albumen copious; embryo minute.—**DISTRIB.** Abundant in temperate and cold regions; genera 30, known species about 300.

TRIBE I. *Clematidæ*. Erect or climbing shrubs. *Leaves* opposite. *Sepals* petaloid, valvate. *Carpels* 1-ovuled; ovule pendulous. *Fruit* of many achenes.

Petals 0	1. CLEMATIS.
Petals many, linear	2. NAVAVELIA.

TRIBE II. *Anemonæ*. Herbs. *Leaves* radical or alternate. *Sepals* petaloid, imbricate. *Carpels* 1-ovuled; ovule pendulous. *Fruit* of many achenes.

Petals 0, flowers involucrate	3. ANEMONE.
Petals 0, flowers not involucrate	4. THALICTRUM.
Petals 5-15, with a nectariferous pit	5. CALLIANTHEMUM.
Petals 5-16, with no nectariferous pit	6. ADONIS.

TRIBE III. *Ranunculeæ*. Herbs. *Leaves* radical or alternate. *Sepals* herbaceous, imbricate. *Carpels* 1-ovuled; ovules erect. *Fruit* of many achenes.

Sepals 3-5, deciduous, petals usually 5	7. RANUNCULUS.
Sepals 5, persistent, petals 10-15	8. OXYGRAPHIS.

TRIBE IV. *Helleboreæ*. Herbs or undershrubs. *Leaves* alternate. *Sepals* petaloid or herbaceous, imbricate. *Carpels* several, many-ovuled. *Fruit* of 1 or more follicles (berried in *Actæa*).

Flowers regular solitary or paniced.

- | | |
|---|-------------------------|
| Petals 0, leaves undivided | 9. <i>CALTHA</i> . |
| Petals 0, leaves palmately divided | 10. <i>CALATHODES</i> . |
| Petals small, carpels long-stalked | 12. <i>COPTIS</i> . |
| Petals small, carpels sessile, flowers yellow | 11. <i>TROLLIUS</i> . |
| Petals small, carpels sessile, flowers white | 13. <i>ISOPYRUM</i> . |
| Petals as large as the sepals, all spurred | 14. <i>AQUILEGIA</i> . |

Flowers regular racemed.

- | | |
|---|-------------------------|
| Carpels solitary, berried when ripe | 17. <i>ACTÆA</i> . |
| Carpels 4-8, follicular when ripe | 18. <i>CIMICIFUGA</i> . |

Flowers irregular.

- | | |
|-----------------------------------|-------------------------|
| Posterior sepal spurred | 15. <i>DELPHINIUM</i> . |
| Posterior sepal vaulted | 16. <i>ACONITUM</i> . |

TRIBE V. **Pæoniæ**. Herbs or undershrubs. *Sepals* herbaceous imbricate. *Carpels* several, several-ovuled, girt by a fleshy disk. *Fruit* of coriaceous few-seeded follicles.

19. *PÆONIA*.

1. **CLEMATIS**, Linn.

Woody, usually climbing undershrubs. *Leaves* opposite, usually compound, exstipulate, petioles often twining. *Inflorescence* axillary or terminal. *Sepals* usually 4, (to 8) petaloid, valvate. *Petals* 0. *Stamens* many. *Carpels* many, each with 1 pendulous ovule. *Fruit* a head of sessile or stalked achenes, with long feathery styles, except in Sect. *Viticella*.—**DISTRIB.** All temperate climates, rarer in the tropics; species about 100.

SECT. I. **Viticella**, DC. *Achenes* beaked, without feathery styles.

1. **C. Cadmia**, Ham. ex Wall. Cat. 4669; H. f. & T. Fl. Ind. 5; C. sulcata, Wall. Cat. 4667. *Thalictrum bracteatum*, Roxb. Fl. Ind. ii. 671.

E. BENGAL in tropical jungles, and along the base of the HIMALAYA, from the Kosi to Assam. **BIRMA**, Griffith.

A slender subherbaceous climber. *Leaves* 3-nately decompose; leaflets 1-2 in. ovate-oblong, glabrous, base oblique or cordate. *Flowers* axillary, solitary; peduncle long, with two leafy bracts about the middle. *Sepals* 5 to 6, $\frac{2}{3}$ to 1 in. spreading, linear-oblong, blue. *Achenes* many, large, broadly ovate, beak long straight, young silky.

SECT. II. **Chelopsis**, DC. *Achenes* with long feathery styles. *Flowers* in axillary fascicles; pedicels 1-fld.

2. **C. Napaulensis**, DC. Syst. i. 164; leaves ternately divided, pedicels with 2 connate bracts at or near the middle. H. f. & T. Fl. Ind. 6; Wall. Cat. 4680. *C. montana*, Don Prodr. 192 (not of others).

TEMPERATE HIMALAYA from Garwhal to Bhotan.

A slender nearly glabrous climber. *Leaflets* 1-2 in., elliptic-lanceolate, sometimes very narrow, entire toothed or 3-lobed, 3-nerved, lateral oblique. *Flowers* many, pedicels shorter than the leaves; bracts forming a 2-lipped cup, in which the bud is sessile. *Sepals* 4, oblong, silky outside. *Filaments* glabrous, tapering from a broad flat base; anthers short. *Achenes* flat, margined, hairy.

3. **C. montana**, Ham. ex DC. Syst. i. 164; leaves ternately divided, pedicels naked, stamens glabrous. Wall. Pl. As. Rar. iii. t. 217; H. f. & T. Fl. Ind. 5. *C. Pundwana*, Wall. Cat. 4862. *C. anemoniflora*, Don Prodr. 192; *Anemone curta*, Wall. Cat. 4690.

TEMPERATE HIMALAYA from the Indus to the Bramaputra, ascending to 12,000 ft., always above 8500 ft. in Sikkim. KHASIA HILLS above 4000 ft.

A woody climber, glabrous or silky. *Leaves* fascicled at the nodes; leaflets ovate, toothed or incised, usually acute. *Flowers* 2 to 4 in. diam., often scented, white or pinkish or yellowish; pedicels exceeding the leaves. *Sepals* 4, elliptic, acute or obtuse, glabrous or silky outside. *Filaments* narrow-linear; anthers short. *Achenes* flat, glabrous; receptacle pilose.

4. **C. barbellata**, Edgew. in *Trans. Linn. Soc. xx.* 25; leaves once ternately divided; pedicels naked, anthers softly bearded on the back. *Hook. Bot. Mag. t.* 4794; *H. f. & T. Fl. Ind. 5.* *C. nepaulensis*, Royle *Ill.* 51 (not of others).

WESTERN TEMPERATE HIMALAYA in Garwhal and Kumaon, Royle, &c.

A woody climber, glabrous or nearly so. *Leaflets* ovate-lanceolate, acute, toothed or lobed. *Flowers* large, dull purple. *Sepals* oblong, acuminate, pubescent on both surfaces, margins villous. *Filaments* broadly linear, 1-nerved, often ciliate with long hairs; anther-cells introrse. *Achenes* glabrous.

5. **C. acutangula**, *H. f. & T. Fl. Ind. 5*; leaves 2-pinnate, pedicels 2-bracteate at the base rarely in the middle, anthers softly hairy.

KHASIA HILLS, near Molim, alt. 5000 ft. Griffith, *H. f. & T.*

A slender, hardy woody climber. *Stem* angled, deeply furrowed, slightly hairy. *Leaflets* 1-2 in., ovate or ovate-lanceolate, acute, crenate or 3-lobed. *Flowers* brownish-yellow; pedicels 1-3-nate, short. *Sepals* oblong, acute, pubescent outside. *Filaments* narrow-linear, 1-nerved, pilose; anthers introrse. *Achenes* flat, margined, pubescent.—Intermediate between this and the following section.

SECT. III. **Flammula**, DC. *Achenes* with long feathery tails. *Flowers* in axillary panicles.

* *Sepals* spreading from the base.

† *Filaments* glabrous; connective of anthers not produced.

6. **C. smilacifolia**, Wall. in *Asiat. Researches*, xiii. 414; *Cat.* 4683; glabrous, leaves large usually simple ovate or cordate coriaceous entire or remotely serrate. *Bot. Mag. t.* 4259; *H. f. & T. Fl. Ind. 6.* *C. subpeltata*, Wall. *Pl. As. Rar. i. t.* 20; *Cat.* 4868. *C. Munroana*, Wight *Ill. i.* 5, t. 1. *C. smilacina*, Blume *Bijl. 1.*

HIMALAYA from Sikkim eastwards, ascending to 5000 ft. KHASIA HILLS; CONCAN; TRAVANCOR; AVA.—DISTRIB. Java, Borneo, Philippines.

A tall, glabrous, woody climber. *Leaves* 3-10 by 1-7 in., rarely once ternate, upper smaller, narrower and cuneate at the base. *Panicles* 6-12 in. *Flowers* 1-1½ in. diam. *Sepals* 4-5, coriaceous, oblong, at length reflexed, outside dull-brown tomentose, inside deep purple. *Filaments* membranous, linear, glabrous, inner shorter with longer anthers; connective produced. *Achenes* flat, pubescent, margins broad.

7. **C. triloba**, Heyne in *Roth. Nov. Sp.* 251; silky, leaves small simple or once ternate entire or 1-3-toothed or -lobed. DC. *Prodr. i.* 8; *W. & A. Prodr. i.* 2; *H. f. & T. Fl. Ind. 7.*

Mountains of the Mawal district of the DEKKAN and W. CONCAN.

An extensive climber. *Leaves* or *leaflets* 1-2 in., elliptic-ovate or cordate, 3-nerved. *Panicle* many-flowered; lower bracts leafy. *Flowers* 1½-2 in. diam., white. *Sepals* 4-6, membranous, oblong, silky outside. *Filaments* narrow-linear, glabrous.

8. **C. grata**, Wall. *Cat.* 4668; *Pl. As. Rar. i. t.* 98; hoary pubescent, leaves simply pinnate. *H. f. & T. Fl. Ind. 7.*

SUBTROPICAL and TEMPERATE HIMALAYA, from Kumaon westwards, alt. 2-8000 ft.—DISTRIB. Afghanistan, China, trop. Africa.

A woody climber. *Stem* deeply furrowed. *Leaflets* about 5, 1-2 in., broadly ovate or cordate, acuminate, inciso-serrate or 3-lobed, villous on both surfaces or glabrate above. *Panicles* often exceeding the leaves, decompose. *Flowers* $\frac{3}{4}$ -1 in. diam., cream-coloured. *Sepals* tomentose outside. *Filaments* narrow-linear; anthers short. *Achenes* densely pubescent.—Variable in habit and pubescence.

9. **C. Gouriana**, Roxb. *Fl. Ind.* ii. 670; usually glabrous, leaves pinnate 2-pinnate or 2-ternate, flowers very small in dense panicles. *DC. Prodr.* i. 3; *Wall. Cat.* 4673; *W. & A. Prodr.* 2; *Wight Ic.* t. 933-4; *H. f. & T. Fl. Ind.* 8. *C. cana*, *Wall. Cat.* 4672. *C. Javana*, *DC. Prodr.* i. 7.

Hilly districts from the WESTERN HIMALAYA, alt. 1-3000 ft. to CEYLON and the EASTERN PENINSULA.—DISTRIB. Java, Philippines.

An extensive climber, young parts pubescent. *Leaflets* membranous, ovate-oblong or cordate, acuminate, shining above, sometimes pubescent beneath. *Panicles* usually exceeding the leaves. *Flowers* $\frac{3}{4}$ - $\frac{1}{2}$ in. diam., yellowish or greenish-white. *Sepals* obovate or oblong, revolute, puberulous, edges tomentose. *Filaments* narrow-linear. *Achenes* narrow-oblong, hairy.—Resembles *C. vitalba*, and is very variable; two forms with many intermediates are widely diffused, one with larger leaflets tomentose below and less shining above, the other with leaves glabrous on both surfaces.

10. **C. puberula**, *H. f. & T.*; pubescent, leaves pinnate, leaflets simple or 3-sect, flowers small few (3-9) in a lax panicle.

WESTERN TEMPERATE HIMALAYA, from Simla to Garwhal; KHASIA HILLS, alt. 2-4000 ft.

Climbing *stem* deeply grooved, slender, downy. *Leaflets* membranous, 1-1 $\frac{1}{2}$ in., ovate-lanceolate, entire or remotely toothed, pubescence scattered. *Panicles* shorter than the leaves; pedicels slender. *Sepals* $\frac{1}{2}$ in., linear-oblong, acute, 3-nerved, silky outside. *Filaments* narrow-linear; anthers short. *Achenes* silky.—Confounded in *Fl. Ind.* with *C. nutans*.

†† *Filaments glabrous; connective of anther more or less produced.*

11. **C. hedyсарifolia**, *DC. Syst.* i. 148; nearly glabrous, leaves simply pinnate, leaflets reticulate, connective much produced. *H. f. & T. Fl. Ind.* 7 (excl. citation of *Bot. Reg.*).

CONCAN, *Law*; BELGAUM, *Ritchie*; PEGU, *Hore* (in *Brit. Mus.*).

A woody climber. *Leaflets* 3-5, 2-4 in., coriaceous, ovate or cordate, acuminate, entire or coarsely toothed. *Panicles* many-flowered. *Flowers* $\frac{3}{4}$ in. diam. *Sepals* 4-5, long-acuminate. *Anther-cells* marginal. *Achenes* hairy, margins tubercled.

12. **C. apiculata**, *H. f. & T.*; pubescent, leaves 3-foliolate long petioled, connective very shortly produced.

KHASIA HILLS; Nunklow, *Griffith*; Churra, *H. f. & T.*

A woody climber. *Leaflets* short-stalked, ovate-oblong, acute, base rounded, coarsely toothed from the middle upwards. *Panicles* many-flowered. *Flowers* small. *Sepals* $\frac{3}{4}$ - $\frac{1}{2}$ in., oblong, tomentose outside. *Filaments* broadly linear, short, scarcely exceeding the anthers. *Achenes* broadly oval, hairy.

††† *Filaments hairy; connective of anther not produced.*

13. **C. graveolens**, *Lindl. in Journ. Hort. Soc.* i. 307; glabrous except the flowers, leaves pinnately decompose, sepals elliptic obtuse. *C. parvifolia*, *H. f. & T. Fl. Ind.* 9 (not of *Edgeworth*).

WESTERN TEMPERATE HIMALAYA, from Marri to Kulu and Kumaon, alt. 6-11,000 ft.

A slender climber. *Leaflets* $\frac{1}{2}$ -1 in., toothed or incised, or 3-lobed or -partite, terminal segment oblong, acute or obtuse. *Panicles* 3-7-flowered; upper flowers often

solitary with a pair of pinnate leafy bracts on the peduncle. *Flowers* $1\frac{1}{2}$ –2 in. diam., pale yellow, odour heavy. *Sepals* pubescent outside, densely tomentose inside. *Filaments* narrow-linear. *Achenes* pubescent.—Resembles the European *C. Flammula*.

14. **C. orientalis**, *L.*; glabrous, glaucous, leaves pinnate or 2-pinnate, sepals ovate acuminate. *H. f. & T. Fl. Ind.* 9.

WESTERN HIMALAYA, dry inner valleys from the Indus to Kumaon, ascending to 14,000 ft. WESTERN TIBET, *T. T.*—DISTRIB. Temp. Asia, from Persia to Manchuria.

A large woody climber, branchlets sometimes puberulous. *Leaflets* 1–2 in., orbicular to ovate-lanceolate or lanceolate, entire toothed or cut. *Panicles* many-flowered. *Flowers* $1\frac{1}{2}$ in. diam., yellow or mottled with purple. *Sepals* 4, villous outside or on both surfaces, edges tomentose. *Filaments* membranous, tapering from a broad base, silky or ciliate. *Achenes* oblong, silkily hairy.—Very variable.

VAR. 1. *acutifolia*; leaves oblong-lanceolate acute or acuminate, flowers usually large. *C. tenuifolia*, *Royle Ill.* 51. *C. graveolens*, *Hook. Bot. Mag.* t. 4495 (not of *Lindl.*). *C. parvifolia*, *Edgew. in Linn. Trans.* xx. 25. *C. Ispahanica*, *Boiss. Fl. Orient.* i. 3 (*flowers small*). *C. longicaudata*, *Ledeb. Fl. Ross.* i. 3.

VAR. 2. *obtusifolia*; usually very glaucous, leaves oblong obtuse, flowers small or middle-sized. *C. glauca*, *Willd.*

VAR. 3. *latifolia*; glaucous, leaves orbicular or oval obtusely lobed, flowers middle-sized. *C. globosa*, *Royle Ill.* 51. *C. albida*, *Klotzsch in Bot. Reis. Pr. Wald.* t. 40.

15. **C. Wightiana**, *Wall. Cat.* 4674; softly downy, leaves pinnate, sepals broadly ovate. *W. & A. Prodr.* 2; *Wight Ic.* t. 935; *H. f. & T. Fl. Ind.* 10.

Hills of the DEKKAN, ORISSA, CONCAN and NILGHIRI, ascending to 7000 ft., *Wight, &c.*

A large woody climber. *Leaflets* usually 5, 2 in., orbicular- or ovate-cordate, 3–5-lobed, densely villous and brown below, at length glabrate above. *Flowers* 2–2 $\frac{1}{2}$ in. diam., in decomposed panicles. *Sepals* 4, brown tomentose outside. *Filaments* narrow-linear, silky below the middle, glabrous at the base and tip; anthers short. *Achenes* silky.

** Sepals erect, with recurved tips. Filaments hairy; connective not produced.

16. **C. nutans**, *Royle Ill.* 51; silkily pubescent, leaves decompositely pinnate. *H. f. & T. Fl. Ind.* 10.

WESTERN SUBTROPICAL HIMALAYA, from the Sutlej to Kumaon, alt. 2–5000 ft., *Royle, &c.* KHASIA HILLS, at Nurtiung, alt. 4000 ft., *H. f. & T.* BEHAR, on Parasnath, alt. 2000 ft.

Stem furrowed, slender, woody, climbing. *Leaflets* 1–3 in., ovate oblong or lanceolate, deeply acutely or obtusely 3–5-lobed, rarely entire. *Flowers* $1\frac{1}{2}$ –3 in. diam., in much branched many-flowered panicles, pale yellow. *Sepals* oblong, many-nerved, silky outside. *Filaments* narrow-linear, silky below the middle, tapering upwards; anthers short. *Achenes* large, ovate, silky-hairy.

17. **C. acuminata**, *DC. Syst.* i. 148; glabrous except the flowers, leaves once ternate, rarely simple. *Don Prodr.* 192; *Wall. Cat.* 4670; *H. f. & T. Fl. Ind.* 11.

TEMPERATE HIMALAYA, from Garwhal to Bhotan. Upper ASSAM, Mishmi and Patkay, *Griffith*.

A large, woody, slender, branched climber. *Leaflets* 3–5 in., ovate or ovate-lanceolate, acuminate, shining, quite entire or minutely distantly toothed. *Flowers* 1–1 $\frac{1}{2}$ in. diam., in decomposed (sometimes few-flowered) panicles. *Sepals* oblong-lanceolate, more or less pubescent outside, suberect or spreading. *Filaments* narrow linear, ciliate with long spreading hairs throughout. *Achenes* silky.—The following varieties may prove species :—

VAR. 1. *Wallichii*; more slender, leaflets smaller narrower more membranous, flowers fewer larger, buds tomentose.—W. Himalaya, Nipal, Bhotan.

VAR. 2. *Sikkimenis*; leaflets larger, coriaceous, flowers very numerous, smaller, buds glabrous except the margins of the sepals.—Sikkim, alt. 5–7000 ft., *H. f. & T. Mishmi and Naga hills, Griffith*.

18. **C. connata**, *DC. Prodr.* i. 4; glabrous, leaves pinnate, sepals not ribbed, filamentstapering to a point. *Wall. Cat.* 4679; *H. f. & T. Fl. Ind.* 11. *C. venosa*, *Royle Ill.* 51; *C. amplexicaulis*, *velutina and gracilis, Edgew. in Trans. Linn. Soc. xx.* 24

TEMPERATE HIMALAYA, from Hazara to Sikkim, alt. 4–10,000 ft.

A large woody climber, young parts with scattered hairs. *Leaflets* 3–7, distant, 2–4 in., broadly ovate-cordate, coarsely serrate or sub-3-lobed. *Flowers* in many-flowered panicles. *Sepals* oblong, subacute, pubescent outside, densely tomentose inside. *Filaments* narrow-linear below, hairy; anthers short. *Achenes* silky-pubescent.—Closely allied to *C. Buchananiana*, but smoother, smaller flowered, and leaflets narrower; petioles often connate into a coriaceous or woody flat expansion.

19. **C. Buchananiana**, *DC. Syst.* i. 140; hoary or coarsely hairy, leaves simply pinnate, sepals ribbed, filaments linear. *H. f. & T. Fl. Ind.* 10.

Throughout the TEMPERATE HIMALAYA, alt. 5–10,000 ft. *MISHMI, Griffith*.

A large woody climber. *Leaflets* 5–7, 2–3 in., broadly ovate or suborbicular-cordate, obtuse or acute, coarsely serrate or 3–5-lobed. *Flowers* 2–3 in. diam., in branched many-flowered panicles, often sweet-scented. *Sepals* linear-oblong, many-ribbed, tomentose on both surfaces. *Filaments* densely hairy; anthers elongate. *Achenes* densely hairy.—Very variable, roughly divisible as follows:—

VAR. 1. *rugosa*; stem tomentose, leaves rugose and reticulate white and hoary especially beneath. *C. Buchananiana*, *Wall. Cat.* 4677.

VAR. 2. *vitifolia* (sp. *Wall. Cat.* 4676); stem pubescent, leaves membranous slightly pubescent.

VAR. 3. *tortuosa* (sp. *Wall. Cat.* 4675); stem with long soft fibrous hairs, leaves glabrous or veins only silky.

20. **C. grewiaeflora**, *DC. Syst.* i. 140; densely tomentose, leaves simply pinnate, filaments filiform above. *Don Prodr.* 191; *Wall. Cat.* 4678; *H. f. & T. Fl. Ind.* 10.

LOWER TEMPERATE AND SUBTROPICAL HIMALAYA, alt. 3–5000 ft., from Kumaon to Bhotan.

A large woody climber. *Leaflets* 3–5, 3–4 in., broadly ovate-cordate, more or less serrate, usually deeply 5-lobed. *Panicles* many-flowered. *Sepals* 1½ in., oblong, densely tomentose outside, pubescent inside. *Filaments* 1 in., narrow-linear below, covered with soft spreading hairs; anthers very long, narrow, twisted after flowering.

DOUBTFUL SPECIES.

C. LOASEFOLIA, *DC. Syst.* i. 140; flowerless, doubtless either *C. grewiaeflora* or *Wightiana*.

C. LOASIFOLIA, *Don Prodr.* 191. Probably *C. Buchananiana*.

C. SCABIOSÆFOLIA, *DC. Syst.* i. 154. India? *Herb. Mus. Paris.*

C. VILLOSA, *DC. Syst.* i. 154. India? *Herb. Mus. Paris.*

C. COMOSA, *DC. Syst.* i. 156. India? *Herb. Mus. Paris.* (*C. triloba*?)

C. GROSSA, *Wall. Cat.* 4671 (not of *Benth.*), Ava; too imperfect for determination.

2. **NARAVELIA**, *DC.*

Climbing shrubs. *Flowers* in axillary 1-flowered peduncles. *Leaves* 3-foliolate, terminal leaflet generally transformed into a tendril. *Sepals*

4-5. *Petals* 6-12, narrow, longer than the calyx. *Achenes* narrow, long stipitate, with long-bearded styles.—DISTRIB. Two E. Asiatic species.

1. **N. zeylanica**, DC. *Syst.* i. 167; more or less pubescent, leaflets broad-ovate, sepals linear-spathulate. *Wall. Cat.* 4687; *W. & A. Prodr.* 2; *H. f. & T. Fl. Ind.* 3. *Atragene zeylanica*, L.; *Roxb. Cor. Pl.* ii. t. 188; *Fl. Ind.* ii. 670.

Tropical forests of the HIMALAYA, from E. Nepal eastward, BENGAL, ASSAM, E. AND W. PENINSULAS, CEYLON.—DISTRIB. Java.

Leaflets usually cordate at the base, entire or coarsely toothed, often tomentose below, sometimes pubescent on the nerves only. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. *Sepals* pubescent outside, twice as long as the glabrous petals.

2. **N. laurifolia**, *Wall. Cat.* 4685; glabrous, leaflets narrow, acuminate, base usually acute, petals very long linear not spathulate. *H. f. & T. Fl. Ind.* 3. *N. Finlaysonian*, *Wall. Cat.* 468 (achenes diseased, subulate, beardless, corky, seedless).

EASTERN PENINSULA; Mergui to Malacca and Penang.—DISTRIB. Eastward to the Philippines.

3. ANEMONE, Linn.

Perennial herbs. *Leaves* radical, lobed or divided. *Flowers* on 1- or more-flowered simple or branched scapes; involucre 3-partite, bracts free or connate. *Sepals* 4-20, petaloid, imbricate. *Petals* 0. *Stamens* many, outer sometimes deformed or petaloid. *Carpels* many; ovule 1, pendulous. *Fruit* a head of sessile achenes, with short or long naked or bearded styles.—DISTRIB. Cold and temperate regions, very rare in the S. hemisphere; species 80.

SECT. I. **Pulsatilla**, DC. *Achenes* with long feathery styles.

1. **A. albana**, *Stev. in Mem. Soc. Hist. Nat. Mosc.* iii. 264; softly hairy, leaves pinnatisect, sepals erect. DC. *Prodr.* i. 17; *H. f. & T. Fl. Ind.* 19. *A. Wallichiana*, *Royle Ill.* 52.

WEST TIBET, above 15,000 ft., *Jacquemont*, &c.—DISTRIB. N. Asia, from Armenia to Baikal.

Densely tufted. *Rootstock* thick, woody, clothed with old leaf-sheaths. *Leaf-segments* pinnatifid; ultimate broadly linear, incised. *Scape* 6 in., fruiting 12 in. *Invol. leaves* connate at the base, 3-fid or pinnatifid above. *Flowers* solitary, nodding, dull red-brown. *Sepals* with erect tips, silky outside, about as long as the stamens.—Probably an alpine state of the European *A. pratensis*, but the invol. is less divided. Tibetan specimens are usually smaller than the Siberian, but not always.

SECT. II. **Eriocephalus**, *H. f. & T.* *Achenes* with short styles, imbedded in dense wool.

2. **A. biflora**, DC. *Syst.* i. 201; rootstock tuberous, scape glabrous, leaves 3-partite or 3-foliolate, segments rounded, flowers 1-3 small. *H. f. & T. Fl. Ind.* 20. *A. Gordschakowii*, *Kar. & Kir. in Pl. Soong.*, No. 14.—*Griff. It. notes*, 349.

KASHMIR; in dry stony places, alt. 4-6000 ft.—DISTRIB. Turkestan and E. to Persia. *Scape* 2-8 in., slender, usually quite glabrous. *Radical leaves* long-petioled; segments suborbicular or broadly cuneate, palmately-lobed or partite. *Invol. leaves* sessile, lobed to the middle. *Flowers* dull red; pedicels pubescent, lateral with a 2-leaved involucre, the terminal naked.

3. **A. rupicola**, *Camb. in Jacq. Voy. Bot.* 5, t. 2; rootstock long slender woody, scape silky, leaves 3-partite, segments acutely toothed or cut, flowers 1-2 large. *H. f. & T. Fl. Ind.* i. 20.

Inner alpine valleys of the HIMALAYA, from Gores and Kashmir to Sikkim, alt. 12-15,000 ft., *Jacquemout*, &c.

Scape 12 in. softly silky. *Radical leaves* long-petioled, segments more or less petioled, sharply incised or 3-lobed. *Invol. leaves* almost sessile, 3-lobed to the middle; segments toothed and cut. *Flowers* showy; lateral pedicels involuclate. *Sepals* 1-1½ in., broadly oval, downy outside. *Achenes* in an oval head.—Variable in pubescence and acuteness of leaf-lobes.

VAR. 1. *sericea*; leaves coarsely toothed, softly silky.

VAR. 2. *glabriuscula*: nearly glabrous, leaves sharply cut.

4. **A. vitifolia**, *Ham. ex DC. Syst.* i. 210; rootstock stout woody, scape branched many-flowered, leaves orbicular-cordate. *Don Prodr.* 193; *Hook. Bot. Mag.* t. 3376; *Wall. Cat.* 4695; *H. f. & T. Fl. Ind.* 20.

TEMPERATE HIMALAYA, alt. 5-10,000 ft.; in Sikkim found only on the inner ranges. MISHMI, *Griffith*.

Stem 1-3 ft., stout, erect, branched. *Radical leaves* 4-8 in. diam., deeply 5-lobed, glabrous above, densely tomentose beneath; lobes sharply lobulate and cut. *Invol. leaves* petiolate, like the radical. *Flowers* 1½-2 in. diam., white, in decomposed cymes; lateral peduncles involuclate. *Sepals* 5-8, silky outside. *Achenes* in large heads.—Habit of *A. japonica*, but leaves 3-foliolate.

SECT. III. **Anemonanthea**, *DC.* *Achenes* tipped by a short style, not imbedded in wool, oblong cylindric or slightly compressed.

5. **A. Griffithii**, *H. f. & f. Fl. Ind.* 21; rootstock horizontal woody, invol. leaves like the radical long petioled free, scape 1-2-flowered.

EAST HIMALAYA, Lachen valley in Sikkim, alt. 8-9000 ft., *H. f.*; BHOTAN, near Chuka, alt. 6000 ft., and MISHMI HILLS, *Griffith*.

A small plant. *Leaves* 3-partite; segments cuneate at the base, tapering upwards to a point, 3-lobed; lobes inciso-crenate. *Flowers* 1 in. diam., white or pinkish.—Habit of *A. nemorosa*, L., and *A. ranunculoides*, L.

6. **A. Falconeri**, *Thoms. in Hook. Ic. Pl.* t. 899; rootstock short stout fibrous, invol. leaves small sessile connate, flowers solitary. *H. f. & T. Fl. Ind.* 21. *Hepatica* sp. *Falc. in Royle Ill.* 25 (*in note*).

WEST TEMPERATE HIMALAYA, in shady woods; Kashmir, *Falconer*; Kishtwar, *Thomson*; Hazara, *J. L. Stewart*.

Softly hairy. *Radical leaves* many, long-petioled, 3-partite; segments ovate-cuneate, lobed. *Scapes* 3-6 in.; *invol. leaves* oblong, entire or obtusely 3-lobed. *Flowers* ½-1 in. diam., white, shortly pedicelled. *Achenes* oblong, angled, silky.—Habit of *Hepatica*, but flowers pedicelled.

7. **A. obtusiloba**, *Don Prodr.* 194; rootstock woody fibrous, radical leaves 3-partite, segments broad sessile, invol. leaves small sessile free, scape 1-3-flowered. *H. f. & T. Fl. Ind.* 22. *A. Govaniana*, *Wall. Cat.* 4688. *A. discolor*, *Royle Ill.* 52, t. 11, f. 1. *A. micrantha*, *Klotzsch in Bot. Reis. Pr. Waldem.* t. 38. *A. mollis*, *Wall. Cat.* 4689, *in part*.

TEMPERATE AND ALPINE HIMALAYA, from Kashmir to Sikkim, alt. 9-15,000 ft.

Densely tufted, glabrate or softly hairy. *Rootstock* clothed with old leaf-sheaths. *Radical leaves* many, stalked, suborbicular, deeply cordate; segments broad, cuneate, variously cut and lobed, rarely shortly petiolate. *Scapes* 6-12 in., 1-3-flowered; invol. leaves 3-fid. *Flowers* white purplish or golden; pedicels long, slender. *Sepals* silky

outside, generally lead-coloured near the claw. *Achenes* strigose, rarely glabrous.—Very variable in size, hairiness, and colour of flower; the most abnormal form is described as var. *glabra* in Fl. Ind. from W. Tibet (*Winterbottom*), it is quite glabrous with very many golden sepals.

8. **A. rupestris**, *Wall. Cat.* 4696; slightly hairy, rootstock stout fibrous, radical leaves 3-partite, segments narrow petioled, invol. leaves small sessile free, scape 1-3-flowered. *H. f. & T. Fl. Ind.* 21.

ALPINE HIMALAYA, from Kashmir and Hazara to Sikkim; ascending to 15,000 ft., *Wallich*, &c.

Probably a state of *A. obtusiloba*, but smaller, more slender, less hairy, with narrower segments to the more cut leaves. The Sikkim specimens have more divided leaves and hooked glabrous achenes, but the latter are immature.—*Flower* golden yellow.

9. **A. trullifolia**, *H. f. & T. Fl. Ind.* 22; densely hairy, rootstock stout fibrous, radical leaves oval 3-lobed, invol. leaves small sessile free, scape 1-3-flowered.

ALPINE EASTERN HIMALAYA, Sikkim, alt. 11-15,000 ft., *Hooker f.*; Bhotan, *Griffith*.

Probably another form of *A. obtusiloba*, with more entire leaves, and more silky hairs, the flowers are golden yellow and achenes densely strigose.—Amongst Strachey's specimens of *A. obtusiloba*, are some with similarly entire leaves, but they are longer-petioled and less hairy than in *A. trullifolia*.

10. **A. rivularis**, *Ham. in DC. Syst. i.* 211 (*not of Wall. Cat.*); silky pubescent, rootstock stout woody, radical leaves 3-partite, segments lobed and serrate, invol. leaves large free, cymes many-flowered. *Don Prodr. i.* 93; *H. f. & T. Fl. Ind.* 23. *A. hispida*, *Wall. Cat.* 4694. *A. Wightiana*, *Wall. Cat.* 4697; *W. & A. Prodr.* 3; *Wight Ic. t.* 936. *A. dubia*, *Wall. Cat.* 4698; *W. & A. Prodr.* 3. *A. geraniifolia*, *Wall. Cat.* 4693.

Temperate regions above 5000 ft. throughout INDIA, and CEYLON.

Stem 1-3 ft., branched. *Radical leaves* long-petioled, 3-6 in. diam.; segments cuneate at the base, broadly oval or trapezoid, deeply 3-lobed, lobes cut and serrate. *Cyme* compound; branches spreading, elongate, 2-bracteolate; invol. leaves large, 3-partite, ultimate segments linear-oblong, acutely inciso-serrate. *Flowers* 1-1½ in. diam., white or bluish outside. *Sepals* 5-8, silky outside. *Achenes* large, oblong; style hooked.—A monster with the inflorescence or leafy umbel often 6 in. diam., is common in the W. Himalaya.

SECT. IV. **Omalocarpus**, *DC.* *Achenes* with a short style, not imbedded in wool, much compressed, almost winged. (Flowers usually many in the umbels; pedicels not involuclate.)

* *Flowers in simple umbels (sometimes compound in 12, polyanthes).*

11. **A. demissa**, *H. f. & T. Fl. Ind.* 23; softly hairy, leaves 3-partite, segments petiolate, scapes decumbent.

ALPINE EASTERN HIMALAYA; Sikkim, alt. 13-16,000 ft., *Hooker f.*

Rootstock woody, clothed with old leaf-sheaths. *Leaves* 1 in. diam., orbicular; segments cuneate-obovate, variously cut. *Scapes* 6-16 in., stout; invol. leaves small, 3-lobed. *Flowers* 3-6, 1 in. diam., bluish. *Achenes* very flat, orbicular, glabrous; style deflexed.

12. **A. polyanthes**, *Don Prodr.* 194; densely silky, leaves 5-7-lobed, scapes erect. *H. f. & T. Fl. Ind.* 24. *A. longiscapa*, *Wall. Cat.* 4691. *A. scaposa*, *Edgew. in Trans. Linn. Soc. xx.* 27. *A. villosa*, *Royle Ill.* 52. *A. Govaniana*, *Ib.* p. 45 (*not of Wall. & Don*).

INNER HIMALAYA, alt. 10–12,000 ft.; from Kashmir to Sikkim, Wallich, &c.

Rootstock stout, woody. *Stem* 1–2 ft. *Leaves* long-petioled, 2–4 in. diam., reniform-cordate; lobes broad, cuneate, 3-fid and crenate. *Umbels* many-flowered, simple or with the side branches divided and involuclate: invol. leaves cuneate-oblong, variable, more or less cut. *Flowers* 1 in. diam., white. *Achenes* broadly oval, with a sharp straight beak.—Perhaps only a form of *A. narcissiflora*, with less cut leaves, more compound umbel, and differently shaped achenes.

13. *A. narcissiflora*, L.; DC. *Prodr.* i. 21; densely villous, leaves palmately 5-partite, segments deeply cut into linear lobes, scapes erect. *H. f. & T. Fl. Ind.* 24.

KASHMIR, Falconer, *Winterbottom*.—DISTRIB. Alps of S. and Central Europe, W. Asia, Siberia, N. W. America.

Very similar to and probably connected by intermediates with *A. polyanthes*, but smaller, 1 ft. high; leaves 1–2 in. diam.; flowers simply umbelled, and achenes nearly orbicular with an incurved beak.

** *Flowers in umbels or cymes* (see 12, *polyanthes*).

14. *A. tetrasepala*, Royle *Ill.* 53; glabrate, leaves deeply 5-lobed, achenes obovate-oblong with a hooked beak. *H. f. & T. Fl. Ind.* 24.

WESTERN HIMALAYA, Marti, Kashmir and Kishtwar, alt. 8–11,000 ft.

Rootstock woody; crown fibrous; buds, petioles, and young leaves woolly. *Radical leaves* 3–10 in. diam., long-petioled, coriaceous, reniform or cordate, deeply 5-lobed; segments acute, entire lobed or inciso-serrate. *Cyme* often thrice branched, contracted or effuse and 1 foot long; invol. leaves large, broadly cuneate, sharply toothed. *Flowers* white.—A large robust species allied to *A. polyanthes*.

15. *A. elongata*, Don *Prodr.* 194; pubescent, leaves 3-partite, achenes broadly oval with a short straight beak. *H. f. & T. Fl. Ind.* 25. *A. rivularis*, Wall. *Cat.* 4692 (not of others).

TEMPERATE HIMALAYA, Garwhal, alt. 10,000 ft., Str. & Winterb.; Nipal, Wallich; KHASIA HILLS, alt. 5000 ft., *H. f. & T.*

Rootstock small, fibrous. *Stem* 2–3 ft., slender, pubescent. *Radical leaves* 2–4 in. diam., long-petioled, orbicular, base cordate, with a few soft hairs chiefly below; lateral segments deeply 2-lobed, mid-segment 3-lobed; lobes acute, inciso-dentate. *Cymes* elongate, few-flowered, twice or thrice divided, fascicles 2–3-flowered. *Invol. leaves* oblong or broad-cuneate, variously toothed. *Flowers* white.—Remarkable for the elongate stems and scapes.

4. **THALICTRUM**, Linn.

Erect, usually rigid, perennial herbs. *Leaves* compound; petioles sheathing, often auricled or stipuled. *Flowers* panicled or racemed, often polygamous. *Sepals* 4–5, petaloid, imbricate. *Petals* 0. *Stamens* many. *Carpels* few or many; ovule 1, pendulous. *Fruit* a small head of sessile or stalked achenes; style persistent or deciduous.—DISTRIB. Temperate and cold northern regions, very rare in the S.; species 50.

SECT. I. **Physocarpum**, DC. *Achenes* stalked, laterally compressed, flat or inflated. *Leaves* ternately decomposed, or in 6, *pauciflorum* 2-ternately divided.

1. *T. elegans*, Wall. *Cat.* 4728; stem 8–12 in., leaves 2–3 in. glaucous beneath, flowers small, anthers short mucronate, achenes long-stalked ventral suture winged. Royle *Ill.* 51; *H. f. & T. Fl. Ind.* 13; Edgew. in *Trans. Linn. Soc.* xx. 26.

SUBALPINE HIMALAYA, from Hazara to Sikkim, alt. 10–13,000 ft.

Leaves decomposed; leaflets small, suborbicular, 3-lobed or -partite; segments obovate. *Panicle* sparingly branched; branches almost racemose. *Flowers* very small, green-purple. *Filaments* filiform. *Achenes* 6–12, shorter than their stalks, obliquely obovate, membranous; stigma sublateral, incurved.

2. ***T. platycarpum***, *H. f. & T. Fl. Ind.* 13; stems 8–18 in., leaves 2–3 in. glandular-puberulous beneath, flowers small, anthers long not pointed, achenes short-stalked strongly 3-ribbed on each side.

ALPINE HIMALAYA and WEST TIBET, rare; Nubra, *H. Strachey*; Hundes, *Str. & Wint.*; Badrinath and Chur in GARHWAL, *Falconer*.

Habit and appearance of *T. elegans*, but more wiry, branches of panicle longer and more leafy, and segments of leaves sharper. *Flowers* greenish. *Achenes* 4–10, glabrous, broadly obovate, dorsal suture nearly straight.—Probably an alpine state of *T. cultratum*.

3. ***T. cultratum***, *Wall. Cat.* 3715; *Pl. As. Rar.* ii. 26; stem 2–4 ft., leaves large, flowers greenish-white, anthers with a long point, achenes short-stalked 3-ribbed on each side. *T. Chelidonii* β , *H. f. & T. Fl. Ind.* 13.

TEMPERATE HIMALAYA, from Kashmir to Sikkim, alt. 8–12,000 ft.

Glabrous, branched. *Leaf-sheaths* with small auricles; leaflets $\frac{1}{4}$ – $\frac{1}{2}$ in., obovate-cuneate, membranous, glabrous or slightly pubescent below, obtusely 3-lobed, lobes mucronate, of the upper leaves acute. *Panicles* lax. *Sepals* $\frac{1}{2}$ in. *Achenes* glabrous, $\frac{1}{2}$ -obovate; dorsal suture straight; style straight or hooked.

4. ***T. Chelidonii***, *DC. Prodr.* i. 11; stem 2–8-flowered, leaves large, flowers large lilac or purple, anthers shortly mucronate, achenes long-stalked membranous reticulate, style incurved. *T. Chelidonii* γ cysticarpum, *H. f. & T. Fl. Ind.* 14. *T. cysticarpum*, *Wall. Cat.* 3714; *Pl. As. Rar.* ii. t. 129.

TEMPERATE HIMALAYA, alt. 8–12,000 ft.; from Kulu to Sikkim.

Usually much-branched. *Leaflets* of the lower leaves 1 in diam., orbicular-cordate, 3–4-crenate or -lobed, glabrous and pale beneath; floral leaflets sharply toothed. *Panicle* with long rigid branches; pedicels often 1 in., rigid, tips deflexed, especially in fruit. *Flowers* 1 in. diam. *Sepals* elliptic, obtuse. *Achenes* numerous, as long as their stalk.—Mucronate bulbils often occur in the leaf axils; monstrous states have many or all the achenes enlarged and seedless.

5. ***T. reniforme***, *Wall. Cat.* 3716; *Pl. As. Rar.* ii. 26; glandular when young, stem 3–6 ft., leaves large, flowers small greenish-white, anthers with a long point, achenes long-stalked puberulous 3-ribbed on each side, style straight. *T. Chelidonii* α reniforme, *H. f. & T. Fl. Ind.* 13. *T. neurocarpum*, *Royle III.* 51.

TEMPERATE HIMALAYA, from Kulu to Sikkim, alt. 8–10,000 ft.

Usually much-branched. *Leaf-sheaths* expanding into adnate stipules; principal divisions with white deciduous stipellæ at the base; leaflets 1–1 $\frac{1}{2}$ in. diam., orbicular-cordate, often slightly 3-lobed, pale and softly pubescent beneath, floral smaller and more sharply toothed. *Panicle* lax, decomposed. *Flowers* smaller than in the two last, $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. *Sepals* very deciduous. *Achenes* 6–8, as long as their stalks, $\frac{1}{2}$ -obovate, dorsal suture straight.

6. ***T. pauciflorum***, *Royle III.* 52; glabrous, stem 1–2 ft., leaves subsessile 2-ternate, flowers small, anthers shortly pointed, achenes short-stalked, 3-nerved on each side, style straight. *H. f. & T. Fl. Ind.* 14. *T. secundum* and *T. macrostigma*, *Edgew. in Trans. Linn. Soc.* xx. 26.

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 7–13,000 ft.

Stem branched. *Leaves* small, uniform in size all up the stem; leaflets obovate-cuneate, 3-4-lobed, reticulate, pale beneath, all petioled, mid-leaflets longest-petioled. *Panicle* with 1 or few flowers at the ends of long branches. *Sepals* 3-nerved, ovate, acute. *Achenes* 3-5, obovate, dorsal suture straight.

SECT. II. **Euthalictrum**, DC. *Achenes* not compressed, oval or oblong, sessile or stalked (see 11, *alpinum*, and 14, *Punduanum*).

* *Achenes* elongate, more or less stipitate. *Anthers* with a very short beak or 0.

7. **T. virgatum**, H. f. & T. *Fl. Ind.* 14; leaves subsessile simply ternate, flowers small white, achenes many small erect acute at each end ribbed, stigma straight.

EASTERN HIMALAYA, inner valleys of Sikkim, alt. 6-10,000 ft., Hook. f. BHOTAN, Griffith (It. notes, 284).

Glabrous. *Stem* erect, 1-1½ ft. *Leaflets* ½-1 in., coriaceous, reticulate, orbicular, 5-7-lobed, base cuneate, glaucous beneath. *Panicle* decomposed, spreading, bracts minute. *Anthers* not beaked. *Achenes* 10-25, very short-stalked.

8. **T. rutæfolium**, H. f. & T. *Fl. Ind.* 14; glabrous, weak, straggling, leaves decomposedly pinnate, flowers racemed very small greenish, achenes few many-ribbed oblong curved, style incurved.

WESTERN TIBET, alt. 10-14,000 ft., Thomson; interior of Sikkim, alt. 12,000 ft., Hook. f.

More or less glaucous. *Stem* 1-2 ft. *Leaf-sheath* auricled; divisions stipellate; leaflets very small, 3-lobed or -partite, base cuneate. *Panicle* with long rigid simple branches; pedicels spreading or deflexed. *Anthers* short; shortly beaked. *Achenes* shortly stipitate, abruptly deflexed, beaked by the style.—The Sikkim specimens are greener and more luxuriant than the Tibetan, and have longer achenes.

9. **T. pedunculatum**, Edgew. in *Trans. Linn. Soc.* xx. 27; leaves 3-ternate, flowers large white, achenes elongate strongly ribbed, style incurved. H. f. & T. *Fl. Ind.* 15; Griff. *Itin. not.* 348.

WESTERN TEMPERATE HIMALAYA; Simla to Kaffristan, alt. 6-8000 ft., Edgeworth, &c.

Glabrous. *Stem* 1-2 ft. *Leaves* long-petioled, primary and secondary divisions long-stalked; leaflets membranous, 1 in. diam., orbicular or cuneate-obovate, 3-7-lobed. *Panicle* terminal; pedicels long. *Sepals* variable in size, ¼-1 in., oblong, obtuse, twice as long as the stamens. *Anthers* not pointed, short. *Achenes* ½-¾ in., linear-oblong, tapering at both ends.—Griffith's Kaffristan specimens are larger flowered than the Himalayan.

10. **T. rostellatum**, H. f. & T. *Fl. Ind.* 15; diffusely branched, leaves ternately decomposed, flowers small white, achenes tapering into a straight beak half their length, tip hooked.

TEMPERATE HIMALAYA, alt. 7-11,000 ft., rare, from Simla, Jacquemont, &c., to Sikkim, Hook. f.

** *Achenes* short, oblong, ribbed, subsessile (stalked in 11, *alpinum* and 14, *Punduanum*).

† *Leaves* simple, once or twice ternate, or pinnate (rarely 2-pinnate).

11. **T. alpinum**, L.; DC. *Prodr.* i. 12; small, slender, leaves all radical pinnate rarely 2-pinnate, flowers racemed, achenes oblong striate subsessile or stipitate. H. f. & T. *Fl. Ind.* 18. *T. microphyllum* and *T. marginatum*, Royle *Ill.* 51. *T. acaule*, Camb. in Jacq. *Voy. Bot.* t. i. A.

ALPINE HIMALAYA and WEST TIBET, alt. 10-17,000 ft.—DISTRIB. North Alpine and Arctic regions.

A slender, tufted, glabrous perennial. *Stem* 3-6 in. *Leaflets* small, rounded, 3-lobed or almost 3-partite, glaucous beneath. *Scapes* simple, rarely forked; pedicels short, reflexed in fruit; bracteoles oblong, obtuse, membranous. *Flowers* greenish. *Anthers* beaked. *Achenes* few.—The length of the stalk of the achene varies in both European and Indian specimens.

12. **T. rotundifolium**, *DC. Syst.* i. 185; leaves simple, stipules free, filaments filiform, achenes with a straight beak hooked at the tip. *DC. Prodr.* 193; *Wall. Cat.* 2713; *Pl. As. Rar.* t. 264; *H. f. & T. Fl. Ind.* 19.

NIPAL, *Hamilton, Wallich.*

Stem erect, 1 ft.; roots fibrous. *Leaves* long-petioled, 2-3 in. diam., orbicular or reniform, with many shallow toothed lobes, membranous, much reticulate, scabrous on both surfaces; stipules oblong. *Panicle* few-flowered. *Achenes* immature.

13. **T. Dalzellii**, *Hook. Ic. Pl.* t. 866; leaves 3-foliolate rarely 2-ternate, stipules free, panicle subsimple, filaments clavate, achenes with a long straight beak hooked at the tip. *H. f. & T. Fl. Ind.* 10; *Dalz. & Gibs. Bombay Flora*, 2.

Mountains of the WESTERN PENINSULA; Harichander, *Dalzell*; Bababuden hills in Malabar, *Law.*

Stem erect, 1 ft. *Leaves* slightly sheathing at the base; leaflets $1\frac{1}{2}$ -2 in. diam., reniform, deeply cordate, 7-9-lobed, lobes crenate or toothed; stipules oblong. *Panicle* small, branches few. *Flowers* white, fascicled at the ends of the branches. *Achenes* many, sessile, ribbed.

14. **T. Punduanum**, *Wall. Cat.* 3712; *Pl. As. Rar.* ii. 26; leaves 2-ternate, sheaths auricled, panicle much branched, filaments filiform, achenes many small ribbed, beak long straight hooked at the tip. *H. f. & T. Fl. Ind.* 18.

TEMPERATE WESTERN HIMALAYA; wet rocks of Garwhal and Kumaon, alt. 4500-7000 ft. KHASIA HILLS, rocks near Churra, alt. 3-4000 ft.

Stem 2 ft., erect. *Leaves* long-petioled, upper 3-foliolate; leaflets 1-2 in. diam., orbicular or oval, base cordate or truncate 5-lobed, crenate, glaucous or tomentose beneath, lateral oblique; stipules 0. *Panicle* nearly leafless. *Flowers* white. *Achenes* sessile or stalked, beak nearly their own length.—Two well-marked varieties.

VAR. 1. *glaucum*; leaves membranous, glabrous and glaucous beneath, achenes sessile glabrous.—W. Himalaya and Khasia.

VAR. 2. *glandulosum*; leaves coriaceous viscidly pubescent beneath, achenes more or less stalked glandular-hairy.—Khasia, with the former.

†† *Leaves ternately or pinnately decompose.*

15. **T. saniculæforme**, *DC. Prodr.* i. 12; small, leaf subsolitary, 3-4-ternate, stipules almost free, filaments filiform, anthers short mucronate, achenes many small ribbed with a long straight beak hooked at the tip. *H. f. & T. Fl. Ind.* 15. *T. radiatum*, *Royle Ill.* 52.

TEMPERATE HIMALAYA; on wet rocks and tree trunks, from Simla and Kunawer to Sikkim (alt. 8000 ft.).

Erect, 6-12 in., wiry, glabrous; root fibrous. *Radical leaf* often equalling the panicle, long-petioled, stem leaves few; leaflets $\frac{1}{2}$ -1 in., orbicular or oval, base cuneate, membranous, glaucous beneath, 3-lobed or -partite, lobes rounded or mucronate. *Flowers* small, white. *Achenes* sessile, oblong, as long as their beak.—Omitted in Wallich's Catalogue, but distributed by him.

16. **T. Javanicum**, *Blume Bijdr.* 2; tall, leaves ternately decompose, stipules adnate membranous fimbriate, filaments club-shaped, anthers not

pointed, achenes large strongly ribbed, beak short hooked. *Miquel Fl. Ned. Ind.* i. pt. 2, 5. *T. glyphocarpum*, *W. & A. Prodr.* 2; *Wight Ic.* t. 48; *H. f. & T. Fl. Ind.* 16.

TEMPERATE HIMALAYA, from Simla to Sikkim, alt. 6-12,000 ft. KHASIA HILLS, alt. 5-6000 ft.; Parushath in BEHAR, alt. 4000 ft.; mountains of the WESTERN PENINSULA and CEYLON.—DISTRIB. JAVA.

Stem 2-3 ft., erect, glabrous; roots fibrous. *Leaves* without stipels; leaflets membranous, $\frac{1}{4}$ - $\frac{3}{4}$ in. diam., membranous, orbicular or oval, obtusely 3-7-toothed at the tip, base rounded or cordate, more or less glaucous beneath. *Panicle* branched. *Flowers* often clustered at the ends of the branches, small, white. *Achenes* 8-15, large, oblong.

17. **T. foliolosum**, *DC. Syst.* i. 175; tall, leaves pinnately decompound, sheaths auricled, filaments filiform, anthers beaked, achenes few acute at both ends sharply ribbed. *Don Prodr.* 192; *Wall. Cat.* 3711; *Royle Ill.* 51; *H. f. & T. Fl. Ind.* 16.

TEMPERATE HIMALAYA, alt. 5-8000 ft. KHASIA HILLS, alt. 4-6000 ft.

Stem 4-8 ft., glabrous. *Leaves* very much divided, without stipels; leaflets $\frac{1}{8}$ - $\frac{1}{4}$ in., rarely 1 in., orbicular. *Panicle* much branched; bracts small. *Flowers* polygamous, white pale green or dingy purple. *Achenes* usually 2-5, small, oblong.

18. **T. minus**, *L.*; *DC. Prodr.* i. 13; tall, leaves decompoundly pinnate exstipulate, filaments filiform, anthers elongate apiculate, achenes tapering at both ends ribbed tipped by the oblong oblique style. *H. f. & T. Fl. Ind.* 16.

Inner valleys of the TEMPERATE HIMALAYA, and in WEST TIBET, alt. 9-12,000 ft.—DISTRIB. Europe, N. Asia, Abyssinia, S. Africa.

Stem 2-4 ft., erect. *Leaves* sheathing, principal divisions with or without stipels; leaflets very variable, orbicular oval or oblong, 3-lobed; lobes crenate or toothed. *Panicle* much branched, leafless or nearly so. *Flowers* dingy purple. *Achenes* 5-8, oblong.—We have again compared extensive suites of European, N. Asiatic, and Indian specimens, with the aid of Regel's monograph, and find no reason for modifying the views expressed in *Flora Indica*, that all our Indian forms are referable to one species which is very variable in foliage, but constant in flowers.—The most prominent Indian varieties are:—

VAR. 1. *vulgare*; glabrous, leaflets small $\frac{1}{4}$ - $\frac{1}{2}$ in. *T. minus*, *Boiss. Fl. Orient.* i. 8.—The common European form, less common in Tibet than the following.

VAR. 2. *fatidum* (*sp. L.*); glandular-pubescent especially on the leaves beneath, leaflets as in *vulgare*. *T. minus* β glandulosum, *Koch.* *T. vaginatum*, *Royle Ill.* 52.

VAR. 3. *majus* (*sp. Jacq.*); glabrous, often glaucous; leaflets 1 in., achenes rather shorter and broader than in the common form. *T. kemense*, *Fries.* *T. Maxwellii*, *Royle Ill.* 52.—Kunawer, *Royle*, &c. *Kafiristan*, *Griffith.*—Indian specimens have acutely 3-lobed leaflets, exactly agreeing with *T. kemense*, *Fr.* In foliage it often closely resembles *T. flavum*.

5. **CALLIANTHEMUM**, C. A. Meyer.

A stemless perennial. *Leaves* all radical, 2-pinnate or decompound, *Scapes* 1-flowered. *Sepals* 5, deciduous. *Petals* 5-15, with a nectariferous pit on the claw. *Stamens* numerous. *Carpels* many; style short; ovule 1, pendulous. *Fruit* of many subglobose achenes tipped by the short style.—DISTRIB. Two species, a European and Siberian, and the following:—

1. **C. cachemirianum**, *Camb. in Jacq. Voy. Bot.* 5, t. 3. *C. pimpineloides*, *H. f. & T. Fl. Ind.* 26. *Ranunculus pimpinelloides*, *Don in Royle Ill.* 53.

INNER RANGES OF THE HIMALAYAS, alt. 9–13,000 ft., from Kashmir, *Jacquemont*, to Sikkim, *Hook. f.*

Densely tufted, glabrous, glaucous; root fibrous. *Leaves* very numerous, long-petioled, segments rounded, 2–3-sect; pinules orbicular, deeply cut. *Scapes* 2–4 in., shorter than the leaves. *Flowers* 1–1½ in. diam., white. *Sepals* broadly elliptic. *Petals* 8–12, 3 times larger than the sepals, oblong-cuneate, retuse. *Achenes* few, large, ovoid, obtuse, rugose.

6. ADONIS, Linn.

Annual or perennial herbs. *Leaves* much divided. *Sepals* 5–8, petaloid, coloured, imbricate. *Petals* 5–16, yellow or red, eglandular. *Carpels* many; style short; ovule 1, pendulous. *Fruit* a spike or head of many achenes tipped with a short persistent style.—DISTRIB. 3 or 4 European and Asiatic species.

SECT. I. **Adonia**, DC. Annual erect herbs, with leafy stems and scarlet flowers.

1. **A. æstivalis**, L.; DC. *Prodr.* i. 24; petals spreading, achenes angular, with a tooth on the inner angle near the beak. *W. & A. Prodr.* i. 3; *H. f. & T. Fl. Ind.* 25. *A. Inglisii*, *Royle Ill.* 53.

WESTERN HIMALAYA, in cornfields, from Kumaon to Kashmir, Hazara, and Peshawur.—DISTRIB. Temperate Europe and Asia.

An erect annual, 1–2 ft., simple or branched, nearly glabrous. *Leaves* decompositely-pinnate, segments filiform. *Flowers* solitary at the ends of the branches, variable in size, scarlet with a dark purple eye. *Achenes* in an ovoid or oblong head, deeply pitted. —Differs from *A. autumnalis* in the spreading petals, but there are many intermediates. The achenes afford a very variable character, too much used in dividing varieties of this into species.

2. **A. scrobiculata**, Boiss. *Fl. Orient.* i. 17; petals spreading, achenes angular surrounded near-the broad base by a flattened almost winged collar.

WEST HIMALAYA, Kishtwar, *Stewart*.—DISTRIB. Afghanistan.

Doubtfully distinct from *A. æstivalis*, and only by the achenes which are more sharply angled, less pitted, and rough with small tubercles; the upper achenes seem to lose the basal wing. *A. marginata*, Bienert in *Herb. Bunge*, seems to be the same plant.

SECT. II. **Consoligo**. Perennial herbs, with golden yellow flowers.

3. **A. chrysocyathus**, H. f. & T.; petals at length spreading, achenes not angular turgid, style tapering revolute. *A. pyrenaica*, H. f. & T. *Fl. Ind.* 26 (not of DC.). CHRYSOCYATHUS (gen.), *Falconer in Royle Ill. introd.* xxx.

WESTERN ALPINE HIMALAYA, in Chamba and Kashmir, *Jacquemont*; WESTERN TIBET in Deotsu and Guge, *Strachy & Winterb.*

Rootstock scaly, horizontal. *Stems* several, erect, leafy, flowering 6–9 in., fruiting 15 in. *Radical leaves* petioled, 3–6 in., deltoid, pinnately decompositely, segments narrow-linear or subcuneate. *Flowers* golden-yellow, 2 in. and more diam., buds globose. *Sepals* 7–8, obovate, acute, many-nerved. *Petals* 16–24, twice as long as the sepals, narrow-obovate, obtuse. *Achenes* in a dense head, ¾ in. diam., glabrous, flattened anteriorly, dorsally convex and obtusely keeled.—The foliage and flowers closely resemble those of *A. pyrenaica*, to which in the absence of fruits we formerly referred it, and from which it differs in the numerous much smaller achenes.

7. **RANUNCULUS**, Linn.

Annual or perennial herbs. Leaves entire lobed or dissected. *Stipules* membranous or 0. *Flowers* usually paniced, white or yellow. *Sepals* 3-5, caducous, imbricate in bud. *Petals* usually 5, rarely 0, often glandular near the base. *Stamens* many. *Carpels* many; styles short; ovule 1 ascending. *Fruit* a head or spike of beaked or apiculate achenes.—DISTRIB. All temperate and cold regions; species about 160.

SECT. I. **Batrachium**. Water plants. *Flowers* white. *Achenes* transversely wrinkled, sometimes obscurely.

1. **R. aquatilis**, L.; var. *trichophyllus*; leaves all submerged capillaceo-multifid, stipules $\frac{1}{2}$ -adnate, auricles large, flowers small, stamens few. *R. aquatilis*, *Don in. Royle Ill.* 54; *H. f. & T. Fl. Ind.* 29.

WEST HIMALAYA, from Kumaon to the Indus. EAST AND WEST TIBET. Plains of the PUNJAB, as far south as Delhi and Saharunpore.—DISTRIB. Temperate N. and S. hemispheres.

The Indian forms have been identified by Mr. Baker with *trichophyllus*, and its sub-varieties *Drouetii* and *pantothrix*. Large flowered specimens from Hanle in Tibet differ from true *aquatilis* chiefly in the absence of floating leaves. A small greener terrestrial variety grows in the Punjab. Floating leaves are invariably absent in the Indian plant.

SECT. II. **Ceratocephalus**, Mœnch (genus). Annual herbs. *Flowers* yellow. *Achenes* gibbous at the sides, with a long terminal beak.

2. **R. falcatus**, L.; leaves 3-fid or pinnatifid, scapes longer than the leaves 1-flowered. *Ceratocephalus falcatus*, *Pers.*; *H. f. & T. Fl. Ind.* 28. *C. orthoceras*, *DC.*; *Deless. Ic. sel.* i. t. 23. *Anemone cynosurus*, *Griff. Ic. Pl.* iv. t. 660, f. 1.

TEMPERATE HIMALAYA, from Kishtwar westwards. PUNJAB, dry grassy places at Peshawur, *Stewart*.—DISTRIB. S. E. Europe and W. Asia.

Glabrous or a little woolly. *Leaves* all radical, segments narrow-linear, entire or 3-fid; petiole margined, tapering downwards. *Scapes* 1 or more, 1-3 in., longer than the leaves. *Flowers* small. *Stamens* 5-15. *Achenes* with the beak straight or curved.—A very variable little plant, of which 7 or 8 species have been made; Boissier reduces them to 2, a hooked and straight beaked, having never seen intermediates, of which we have seen many.

SECT. III. **Hecatonia**, *DC.* Perennial, rarely annual. *Flowers* yellow (in the Indian species). *Achenes* smooth or granular, not muricated or tubercled, shortly beaked.

* Radical or all the leaves undivided (except sometimes in 7, *pulchellus*).

3. **R. Lingua**, L.; tall, erect, glabrous, leaves lanceolate, flowers large, petals 5. *DC. Prodr.* i. 32; *H. f. & T. Fl. Ind.* 30.

WEST HIMALAYA; Kashmir Lake, *Jacquemont*, &c.—DISTRIB. Temperate N. hemisphere.

Rootstock creeping. *Stem* 2-3 ft., hollow. *Leaves* 4-8 in., sessile, $\frac{1}{2}$ -amplexicaul, entire or remotely toothed, veins parallel, venules reticulate. *Flowers* subpaniced. *Achenes* pitted; beak, broad, flat.

4. **R. reniformis**, *Wall. Cat.* 4709; erect, stem softly hairy, leaves broadly oval or orbicular coarsely toothed, petals 12-15. *W. & A. Prodr.* 3; *Wight Ill.* i. t. 2; *Ic.* t. 75; *H. f. & T. Fl. Ind.* 30.

Higher mountains of the WESTERN PENINSULA, *Wight*, &c.

Rootstock stout, horizontal, densely fibrous. *Stem* 1-1½ ft.; branches few, 1-flowered. *Radical leaves* 1-3 in., thick, base truncate or cordate, glabrate or sparsely setose; cauline few, narrow, bracteiform. *Flowers* 1 in. diam. *Petals* obovate-oblong. *Achenes* oblong, tumid, in a globose head; beak straight.

5. ***R. sagittifolius***, *Hook. Ic. Pl.* t. 173; erect, glabrous above, leaves oblong-cordate or sagittate crenate, petals 5. *H. f. & T. Fl. Ind.* 30. *R. hastatus*, *Walker mss. ex Wight Ill.* i. 5.

Mountains of CEYLON, above 6000 ft., *Walker*, &c.

Rootstock-creeping. *Stem* erect, with scattered hairs near the base. *Radical leaves* long-petioled, base deeply cordate with rounded lobes; cauline narrow-lanceolate, inciso-dentate or almost pinnatifid. *Petals* nearly orbicular. *Achenes* as in *R. reniformis*.—Distinguished from *R. reniformis* chiefly by the few petals; the leaves are very variable in both. *R. javanicus*, Bl., is closely allied, but quite glabrous.

6. ***R. Gymbalariae***, *Pursh. Fl. Bor. Am.* ii. 392; creeping, glabrous, leaves oblong or orbicular 3-5-lobed, or -partite, petals 5-8. *H. f. & T. Fl. Ind.* 31.

WEST TIBET, between 7000 and 17,000 ft., *Thomson*. Interior of SIKKIM, alt. 14,000 ft., *Hook. f.*—DISTRIB. Persia, Siberia, Arctic and cold temperate N. America, Cordillera of N. and S. America.

Rootstock with long rooting runners; stem 0. *Leaves* ¼-½ in. diam., base rounded or slightly cordate. *Scape* erect, leaflets 1-8-flowered; bracts at the forks, linear. *Flowers* ¼-½ in. diam. *Sepals* spreading or reflexed. *Achenes* many, small, obovate, compressed, gibbous at the back, sides longitudinally 3-ribbed; beak straight or hooked.—Variable in foliage and form of heads of fruit, and stolons sometimes absent.

7. ***R. pulchellus***, *C. A. Mey. in Led. Fl. Alt.* ii. 333; erect, glabrous hairy or silky, leaves elliptic oblong entire or 3-7-toothed or lobed, petals 5. *H. f. & T. Fl. Ind.* 31. *R. salsuginosus*, *Wall. Cat.* 4708 (not of *Don*). *R. flammula*, *Don in Royle Ill.* 53 (not of *Linn.*). *R. nephelegenes*, *Edgew. in Trans. Linn. Soc.* xx. 28.

ALPINE HIMALAYA, in the inner ranges from Sikkim westward, and in WESTERN TIBET, from 10-18,000 ft.—DISTRIB. Afghanistan, Siberia, Mongolia.

Stem 3-12 in., simple or with a few 1-flowered branches. *Leaves* glabrous or pubescent, sometimes palmately lobed; cauline lanceolate, often entire. *Flowers* ½ in. diam. *Sepals* elliptic, often black-tipped. *Petals* broadly obovate. *Achenes* in an oblong head, small, inflated, glabrous; style nearly straight.—Common and very variable, states with broad deeply cut leaves pass into glabrous achened states of *R. pedatifidus*. The *R. longicaulis*, *C. A. Meyer*, is another variety.

VAR. 1. *typicus*; leaves glabrous or slightly pubescent.

VAR. 2. *sericeus*; leaves densely silky. *R. membranaceus*, *Royle Ill.* 53.

8. ***R. lobatus***, *Jacq. ex Camb. in Jacq. Voy. Bot.* 5, t. i. B; decumbent, glabrous, leaves orbicular crenate coriaceous, petals 5. *H. f. & T. Fl. Ind.* 31. *R. salsuginosus*, *Don in Royle Ill.* 53 (not of *Wall. Cat.*).

ALPINE HIMALAYA, in the inner ranges, alt. 12-16,000 ft. from Zanskar to Sikkim, and in WEST TIBET, *Jacquemont*, &c.

Rootstock giving off weak decumbent leafy stems 2-3 in., not stoloniferous. *Radical leaves* ½-1 in. diam., long-petioled, rounded or cordate at the base; cauline similar but shorter petioled, often 3-toothed. *Flowers* ¾-1 in. diam. *Sepals* oval. *Petals* broadly obovate. *Achenes* in an oval head, slightly compressed, beaked by the long straight style.—Distinguished from *R. pulchellus* by the diffuse stem, large fleshy cauline leaves and large flower, but intermediates occur.

** Leaves lobed or much divided. Achenes turgid, not margined, compressed in 10, *Chærophyllus* (see 7, *pulchellus*).

9. **R. hyperboreus**, *Rollb.*; stem creeping stoloniferous, leaves 3-7-lobed or capillaceo-multifid, flowers small solitary, petals scarcely exceeding the sepals.

Inner-regions of the ALPINE HIMALAYA, from Sikkim to Kashmir, and in WESTERN TIBET, alt. 14-17,000 ft.—DISTRIB. Arctic and Alpine Northern regions.

A small glabrous perennial, terrestrial or floating. *Leaves* orbicular or reniform, base sometimes cuneate, lobed to the middle or base. *Sepals* reflexed. *Petals* obovate. *Achenes* in dense heads, very small, oval, beaked by the short style.—Minute specimens without stolons are undistinguishable from *R. pygmaeus*, Vahl.

VAR 1. *typicus*; creeping on moist ground, leaves very small 3-lobed to about the middle, base rounded or cuneate, head of achenes small. *R. hyperboreus*, *H. f. & T. Fl. Ind.* 32.

VAR. 2. *natans*, Regel; floating, leaves $\frac{1}{2}$ -1 in. diam., reniform 5-7-lobed, heads of achenes large. *R. natans*, *C. A. Meyer*; *R. radicans*, *H. f. & T. Fl. Ind.* 32 (in part).

VAR. 3. *radicans*; creeping in moist soil, leaves rounded or reniform 5-7-partite, heads of fruit large. *R. radicans*, *C. A. Meyer*; *H. f. & T. Fl. Ind.* 32 (in part); *R. radicans a typicus*, Regel.

VAR. 4. *multifidus*; floating, leaves capillaceo-multifid like *R. aquatilis*. *R. Purshii*, *Hook. Fl. Bor. Am.* *R. radicans* γ *multifidus*, Regel.—Ladak, Stewart.

10. **R. Chærophyllus**, *Linn.*; erect, pubescent or villous, leaves ternately partite rarely entire, achenes compressed in an oblong head, beak long straight. *H. f. & T. Fl. Ind.* 33.

WESTERN TIBET, mountains of Hasora, alt. 12,000 ft., *Winterbottom*.—DISTRIB. S. Europe, Asia Minor, Persia.

Rootstock tuberous, with thick fibres. *Stem* 6-12 in., simple or with 2-4 long 1-flowered branches. *Radical leaves* rarely oval and entire, usually with 3-partite or variously cut segments, cauline few 3-partite or linear and entire. *Flowers* 1 in. diam. *Sepals* spreading. *Achenes* many, oval.

11. **R. affinis**, *Br.*; erect or diffuse, hairy, leaves pedately 5-9-lobed, achenes in oblong heads inflated, beak straight. *R. cæspitosus*, *Wall. Cat.* 4701; *H. f. & T. Fl. Ind.* 33. *R. pedatifidus*, *Led. (not Smith)*. *R. dahuricus*, *Turcz.*

Inner ranges of the TEMPERATE and ALPINE HIMALAYA, from Sikkim to Balti, alt. 11-16,000 ft.; and in WESTERN TIBET.—DISTRIB. Temperate and Arctic Asia and America.

Stems 6-12 in., often many, from a perennial, slender, branched rootstock. *Radical leaves* reniform, $\frac{1}{2}$ -1 in. diam., lobed to the middle or base, lobes oblong or linear; lower cauline with narrower segments, upper entire or 3-5-partite. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. *Sepals* silky. *Achenes* small, scarcely compressed.—Hardly different from the Siberian *R. amoenus*, *Led. (R. pedatifidus, Sm.)*

12. **R. hirtellus**, *Royle Ill.* 53; erect or decumbent, pubescent, leaves 3-partite, achenes in an oblong or globose head inflated, style straight or hooked. *H. f. & T. Fl. Ind.* 34. *R. attenuatus*, *nervosus choorensis and glabratus*, *Royle Ill.* 53.

TEMPERATE and SUBALPINE WESTERN HIMALAYA, ascending to 14,000 ft. (a dwarf large flowered state).

Rootstock densely fibrous. *Stems* many, 1-1 $\frac{1}{2}$ ft., branched, many-flowered (except the alpine forms). *Radical leaves* 1 $\frac{1}{2}$ -2 in. diam., reniform, lateral segments often deeply 2-lobed; cauline palmately 3-5-partite. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. *Sepals* with appressed hairs. *Achenes* many, glabrous or hairy.—Very variable, and closely allied

to the European *R. auricomus*, but the achenes are smaller, less compressed, are in an oval head, and the radical leaf appears never to be entire.

13. *R. nivalis*, *Linn.*; small, erect, 1-flowered, shaggy above, leaves 3-5-lobed or -partite, sepals shaggy. *H. f. & T. Fl. Ind.* 35.

ALPINE HIMALAYA. Tunkra pass in Sikkim, alt. 16,000 ft., *Hook. f.*—DISTRIB. Arctic Europe, Asia, and America.

Rootstock small. *Stems* subsolitary, 1-3 in., glabrous below. *Radical leaves* glabrous, segments 3-lobed; lower cauline petioled, upper sessile.—Apparently the same as the arctic plant, but not found in fruit.

14. *R. sceleratus*, *Linn.*; annual, erect, glabrous, leaves 3-partite, achenes many in an oblong head small obtuse or apiculate. *Don Prodr.* 195; *Royle Ill.* 53; *H. f. & T. Fl. Ind.* 35. *R. indicus*, *Roxb. Fl. Ind.* ii. 657; *Wall. Cat.* 4699.

River banks in BENGAL and NORTHERN INDIA; marshes of Peshawar; warm valleys of the HIMALAYA (unknown south of the Nerbudda).—DISTRIB. Throughout the North temperate zone.

Stem 1-3 ft., often stout, fleshy and branched, rarely puberulous above. *Leaves* with cuneate cut segments, cauline sessile. *Flowers* $\frac{1}{4}$ – $\frac{1}{3}$ in. diam. *Sepals* reflexed, nearly equalling the oblong petals. *Receptacle* oblong, hairy.

*** Leaves deeply divided. *Achenes* flattened, with an intramarginal rib. (See 20, *muricatus*.)

15. *R. diffusus*, *DC.*; diffuse or prostrate, hairy, leaves 3-partite, achenes in globose heads dotted, receptacle of fruit small. *Don Prodr.* 195; *H. f. & T. Fl. Ind.* 36. *R. napaulensis*, *DC. Prodr.* i. 39. *R. trilobatus*, *Don Prodr.* 194. *R. geranioides*, *Blume Bijdr.* 2. *R. hydrocotyloides*, *Wall. Cat.* 4703. *R. mollis*, *Wall. Cat.* 4704; *Don in Royle Ill.* 53. *R. obtectus*, *Wall. Cat.* 4705. *R. vitifolius*, *Royle Ill.* 53. *R. subpinnatus*, *W. & A. Prodr.* 4; *Wight Ic.* t. 49; *H. f. & T. Fl. Ind.* 36.

TEMPERATE HIMALAYA, from the Chenab to Bhotan, alt. 6-10,000 ft. Higher mountains of the WESTERN PENINSULA.—DISTRIB. Sumatra, Java.

Perennial, covered with spreading hairs; nodes at times rooting. *Leaves* softly hairy, segments cuneate, of lower leaves often stalked. *Peduncles* 1-flowered, terminal or leaf-opposed. *Flowers* $\frac{1}{2}$ –1 in. diam. *Sepals* hairy. *Achenes* ovate, compressed, with an intramarginal rib at a variable distance from the acute margin; style short, straight or hooked.—Peninsula specimens have usually larger flowers and more divided leaves.—Near *R. repens*, L.

16. *R. lætus*, *Wall. Cat.* 4702; erect, appressedly hairy, leaves 3-partite, achenes in a globose head not dotted, receptacle of fruit oblong glabrous. *H. f. & T. Fl. Ind.* 36 (excl. syn. *R. riparius*, *Edgew.*); *Royle Ill.* 53. *R. distans*, *Royle Ill.* 53. *R. brevirostris*, *Edgew. in Trans. Linn. Soc.* xx. 28.

TEMPERATE HIMALAYA and WESTERN TIBET. Common on the inner ranges only of SIKKIM.—DISTRIB. Afghanistan.

Rootstock woody. *Stem* 1-2 ft., usually much branched, many-flowered; hairs white. *Radical leaves* 2-4 in. diam.; segments cuneate-obovate, deeply cut; cauline sessile. *Flowers* 1 in. diam. *Sepals* villous. *Achenes* many, oval, margined, rather large; style short, straight, broad at the base.—Closely allied to and perhaps a var. of *R. acris*, L.

17. *R. pensylvanicus*, *Linn.*; erect, hirsute, leaves ternatisect, achenes in oblong or globose heads, not dotted, receptacle pilose. *R. fibrosus*, *Wall. Cat.* 4706; *Hook. f. & T. Fl. Ind.* 37. *R. chinensis*, *Bunge*; *H. f. & T. Fl. Ind.* 38. *R. riparius*, *Edgew. in Trans. Linn. Soc.* xx. 28. *Ranunculi*, sp. *Griff. Ic. Pl.* iv. t. 661.

Swamps and rice fields in NIPAL, *Wallich*; banks of the SUTLEJ at Ludiana, and GANGES at Bhojpur, *Edgeworth*. ASSAM, and KHASIA HILLS, up to 6000 ft., *H. f. & T.*—DISTRIB. N. China, Amur-land, N. America.

Stem 2-3 ft., prostrate and rooting at the base only, branched. *Radical leaves* long-petioled, leaflets long-stalked, 3-partite and deeply cut into linear segments; cauline shorter petioled, upper subsessile. *Flowers* about 1 in. diam. *Sepals* reflexed. *Achenes* many, large, with an intramarginal rib and short straight beak.—Very variable in the shape of the head of achenes, and in the prominence and position of their intramarginal rib; but a large suite of specimens convinces us of the specific identity of all the forms.

SECT. IV. **Echinella**, DC. Annual, rarely perennial. *Flowers* small, yellow. *Achenes* echinate or tubercled (rarely smooth in 20, *muricatus*).

18. **R. flaccidus**, *H. f. & T. Fl. Ind.* 38; perennial, tufted, prostrate, leaves reniform or orbicular crenate glabrous, achenes beaked, rough with small tubercles.

TEMPERATE HIMALAYA, in the upper forest region, from Kumaon to Bhotan, alt. 9-10,000 ft.

Patches large, dense, green, appressed to the ground; stems filiform; nodes often rooting. *Leaves* $\frac{1}{2}$ in. diam. or less, 3-5-crenate. *Flowers* minute, $\frac{3}{8}$ in. diam., solitary, leaf-opposed. *Sepals* reflexed, nearly equalling the petals. *Achenes* 6-12, pubescent, oval, not much compressed, beak short reflexed.

19. **R. Wallichianus**, *W. & A. Prodr.* i. 4; perennial, prostrate, hairy, leaves ternatipartite, achenes compressed orbicular tubercled.—*Wight Ic.* t. 937; *H. f. & T. Fl. Ind.* 38. *R. pinnatus*, *Wight Ill.* i. 6, not of *Poiret*.

Temperate zone of the mountains of CEYLON and NILGHIRI.

Stems spreading and rooting at the nodes from the perennial rootstock, hirsute, rarely glabrate. *Radical leaves* 1-1 $\frac{1}{2}$ in. diam.; segments stalked, obovate-cuneate, sharply cut and toothed; cauline 3-partite. *Peduncles* 1-flowered, leaf-opposed and terminal. *Flowers* $\frac{1}{2}$ in. diam. *Sepals* reflexed, much shorter than the petals. *Achenes* flattened, margined, both dotted and tubercled.

20. **R. muricatus**, *Linn.*; annual, erect or diffuse, glabrous, rarely hairy, leaves 3-fid, achenes oval flattened tubercled or spinous, rarely smooth. *H. f. & T. Fl. Ind.* 39. *R. Cabulicus*, *Boiss. Diagn. ser.* 2, 9.

Swampy places, at low elevations, in the PUNJAB-HIMALAYA, and in the plains at PESHAWUR and AMBALLAH.—DISTRIB. Europe, W. Asia, temperate N. America.

Stems 4-12 in. *Leaves* 1-2 in. diam., lobes irregularly cut, base rounded or cordate, of the upper cuneate. *Flowers* $\frac{1}{2}$ - $\frac{1}{4}$ in. diam., solitary and leaf-opposed, or terminal and panicled. *Sepals* reflexed, rather shorter than the petals. *Achenes* in a large globose head, $\frac{1}{2}$ in. long, tubercles scattered over the flattened sides, or confined to near the intramarginal rib; beak straight, compressed, ribbed, tip hooked.

21. **R. arvensis**, *Linn.*; annual, erect, much branched, glabrous, or silky above, radical leaves cuneate or obovate 3-5-toothed, cauline 3-partite, achenes few large obliquely obovate not margined, densely spinous. *Wall. Cat.* 4700; *Royle Ill.* 53; *H. f. & T. Fl. Ind.* 39. *R. tuberculatus*, DC. *Prodr.* i. 41.

WESTERN HIMALAYA, from Kashmir to Kumaon.—DISTRIB. Europe, Asia Minor, Afghanistan, Western Siberia.

Stem solitary, 6-24 in. *Leaves* variable, lowest 1-2 in., soon withering, segments of cauline cut into linear lobes. *Flowers* $\frac{1}{2}$ in. diam. *Sepals* appressed to and half the length of the petals. *Achenes* 5-10, usually clothed with hooked spines; style straight or hooked.

DOUBTFUL AND EXCLUDED SPECIES.

R. vestitus, Wall. Cat. 4707. The specimens consist of a few long-petioled radical leaves.

R. bulbosus, L. (*H. f. & T. Fl. Ind.* 37). Probably intercalated by mistake amongst Royle's Indian Plants. It has been found by no one else.

8. **OXYGRAPHIS**, Bunge.

Dwarf perennial glabrous stemless plants, with 1-flowered scapes. *Leaves* entire. *Flowers* regular, yellow. *Sepals* 5, persistent, enlarged after flowering. *Petals* 10–15, with a nectariferous pit on the claw. *Stamens* many. *Achenes* many, membranous, in a globose head, beaked by the straight subulate persistent style. *Seed* erect.—A genus of two species, differing from *Ranunculus* in the persistent sepals.

1. **O. glacialis**, Bunge *En. Pl. Alt.* 35; leaves elliptic-oblong, scape solitary. *H. f. & T. Fl. Ind.* 27. *Ficaria glacialis*, Fisch.

ALPINE HIMALAYA; Kumaon, *Strachey & Winterb.*; Sikkim, alt. 16–18,000 ft., *Hook. f.*—DISTRIB. Siberia, Dahuria.

Root fibrous. *Leaves* $\frac{1}{2}$ – $1\frac{1}{2}$ in., somewhat fleshy, obtuse, entire or crenate; petiole as long, sheathing at the base. *Scape* erect, 1–4 in., thickened upwards. *Flowers* $\frac{3}{4}$ in. diam. *Sepals* elliptic, obtuse. *Petals* 12–15, narrow-oblong, twice as long as the sepals.

2. **O. polypetala**, *H. f. & T. Fl. Ind.* 27; leaves orbicular crenate-lobed, scapes usually several. *Ranunculus polypetalus*, *Royle Ill.* 54, t. 11, f. 2. *Calthanthemum Endlicheri*, *Walp. Rep.* i. 33.

INNER ALPINE and TIBETAN HIMALAYA, from Kashmir to Kumaon, alt. 12–15,000 ft. Small, tufted; roots fibrous. *Leaves* $\frac{1}{3}$ –2 in. diam., membranous, base cordate, sometimes with 3 crenate lobes. *Scapes* 2–4 in., weak. *Flowers* 1 in. diam. *Petals* oblong-spathulate. *Achenes* as in *O. glacialis*.

9. **CALTHA**, Linn.

Herbs with stout creeping rootstocks. *Leaves* chiefly radical, ovate or cordate. *Flowers* few, terminal, regular, white or yellow. *Sepals* 5 or more, petaloid, deciduous, imbricate. *Petals* 0. *Stamens* many. *Carpels* several, sessile. *Follicles* many, many-seeded. *Seeds* many, 2-seriate, with a prominent raphe and thick funicle.—DISTRIB. N. and S. temp. regions; sp. 5–6.

1. **C. palustris**, Linn.; stem branched leafy, leaves reniform or deltoid with spreading lobes. *H. f. & T. Fl. Ind.* 40. *C. Himalensis*, *Don Prodr.* 195; *Royle Ill.* 54. *C. Govaniana*, *Wall. Cat.* 4710; *Royle Ill.* 54. *C. paniculata*, *Wall. Cat.* 4711.

Marshes of the WESTERN TEMPERATE HIMALAYA, from Kashmir to Nipal, alt. 8–10,000 ft.—DISTRIB. Temperate Europe, Asia, and N. America.

Rootstock stout, densely fibrous. *Stem* stout, 6–24 in. *Radical leaves* long-petioled, 2–5 in. diam., entire or finely or coarsely toothed; upper sessile. *Flowers* 1–2 in. diam. *Follicles* variable in number and length of style.—The leaves are never quite entire in Indian specimens, and are often more closely- and smaller-toothed than in European.

VAR. 1. *normalis*; flower yellow.

VAR. 2. *alba*; flowers white.—*C. alba*, *Jacq. ex Camb. in Jacq. Voy. Bot.* vi. t. 4.

2. **C. scaposa**, *H. f. & T. Fl. Ind.* 40; leaves all radical oval, scapes many 1-flowered.

EASTERN ALPINE HIMALAYA, Sikkim, in marshes, alt. 15–17,000 ft., *Hook. f.*

Rootstock densely fibrous. *Leaves* all radical, 1–1½ in. diam., long-petioled, obtuse, base deeply cordate, entire or finely repand-crenate. *Scapes* many, 3–6 in. *Flowers* 1 in. diam. *Sepals* 5–6, oval, somewhat persistent. *Follicles* many, stalked.

10. **CALATHODES**, H. f. & T.

A perennial, erect, leafy herb. *Leaves* palmatipartite. *Flowers* terminal, regular, large. *Sepals* 5, golden-yellow, deciduous. *Petals* 0. *Carpels* many; ovules 8–10, 2-seriate towards the base of the carpel. *Fruit* unknown.—Intermediate between *Caltha* and *Trollius*, having the apetalous flowers of the former, and divided leaves of the latter.

1. **C. palmata**, H. f. & T. *Fl. Ind.* 41.

EASTERN TEMPERATE HIMALAYA, Sikkim, alt. 10,000 ft., *Hook. f.*

Stem 1–2 ft., simple or branched. *Leaves* 2–4 in. diam., radical soon withering; cauline 3-partite, segments cuneate at the base, deeply 3-lobed, lobes acuminate incisolate, petiole with a basal inflated membranous sheath. *Flowers* nearly 2 in. diam.

11. **TROLLIUS**, Linn

Erect, perennial herbs. *Leaves* palmate. *Flowers* terminal, regular, globose or subglobose. *Sepals* 5 or more, petaloid, coloured. *Petals* 5 or more, small, clawed, blade with a basal pit. *Stamens* very many. *Carpels* 5 or more, sessile; ovules many, 2-seriate. *Seeds* angled, testa coriaceous.—*DISTRIB.* 9 species, N. temperate and arctic.

1. **T. acaulis**, *Lindl. in Bot. Reg.* 1842; *Misc.* 56, and 1843, t. 82; stem leafy above the middle, petals short-clawed. *H. f. & T. Fl. Ind.* 41. *T. pumilis*, *Royle Ill.* 54 (not of *Don*).

WESTERN ALPINE HIMALAYA, from Kumaon to Kashmir, alt. 11–13,000 ft.

Rootstock stout, fibres thick. *Stem* simple, 3–6 in. in flower, 12 or more in fruit, base clothed with fibres. *Leaves* appearing with or after the flowers; radical long-petioled, palmate-5-partite, segments oblong lanceolate, incised; cauline 1–3, similar; base of petiole sheathing. *Flowers* 2 in. diam., solitary. *Sepals* 6–8, broad-oval, spreading, obtuse or entire. *Petals* 12–16, shorter than the stamens; blade oblong. *Carpels* many, ripe 1 in., membranous, wrinkled, style persistent. Very near *T. laxus*, *Salisb. (americanus, DC.)*, and *patulus*, *Salisb.*

2. **T. pumilus**, *Don Prodr.* 195; cauline leaves few, all below the middle of the stem, petals long-clawed.—*H. f. & T. Fl. Ind.* 41.

ALPINE HIMALAYA, in the interior ranges; Kumaon, alt. 14,000 ft.; Nipal; Sikkim, alt. 15–17,000 ft.

Rootstock horizontal. *Stems* 6–12 in., naked above, base clothed with old leaves. *Leaves* 1–2 in. diam., radical long-petioled, orbicular, coriaceous, 5-partite; segments broad-obovate 3-lobed, toothed, base cuneate. *Flowers* 1 in. diam., solitary. *Sepals* 5–6, rounded, tip obtuse, notched, subsistent. *Petals* 10–12, equalling the filaments, blade cuneate-oblong, obtuse, tip thickened. *Follicles* many, membranous, beaked by the short style.

12. **COPTIS**, *Salisb.*

Small stemless herbs; rootstock perennial. *Leaves* ternatisect. *Flowers* regular, small, white, on slender leafless scapes. *Sepals* 5–6. *Petals* 5–6, clawed, hooded or linear. *Carpels* few or many, pedicelled, spreading;

ovules many. *Follicles* many-seeded. *Seeds* with a black crustaceous testa.—**DISTRIB.** North temperate zone; species 6.—Genus too nearly allied to *Isopyrum*.

1. **C. Teeta**, Wall. in *Trans. Med. & Phys. Soc. Calc.* viii. 347; *H. f. & T. Fl. Ind.* 42; *Griff. Journ.* 37; *Notul.* iv. 733, *l.c.* iv. t. 660, f. 2.

MISHMI Mts., east of Assam, in the temperate region.

Rootstock horizontal, golden yellow, woody, densely fibrous, very bitter. *Leaves* glabrous; petioles 6–12 in.; leaflets 2–3 in., ovate-lanceolate, pinnatifid, lobes incised, terminal largest. *Scape* slender, equalling the leaves. *Flowers* 1–3, pedicelled, bracts leafy. *Sepals* $\frac{1}{2}$ in., oblong-lanceolate, acute. *Petals* narrow, ligulate, obtuse, $\frac{2}{3}$ shorter than the sepals.—Characters taken chiefly from Wallich's description; Griffiths' specimens are in leaf only. The very bitter rootstock is much used as a drug in Bengal.

13. ISOPYRUM, Linn.

Small stemless herbs; annual, or rootstock perennial. *Leaves* decomposed. *Flowers* regular, white, few or solitary, on leafless or leafy slender scapes. *Sepals* 5–6, petaloid, deciduous. *Petals* 5, variable, very small or 0. *Stamens* 10 or more. *Carpels* 2–20, sessile; ovules 3 or more. *Follicles* few or many-seeded. *Seeds* with a smooth or granulated testa, crustaceous.—**DISTRIB.** North temperate regions; species 7.

1. **I. adiantifolium**, *H. f. & T. Fl. Ind.* 42; cauline leaves opposite or whorled compound, petals long-clawed, carpels 3.

TEMPERATE EASTERN HIMALAYA, outer moist valleys of Sikkim, alt. 7500 ft., *Hook. f.*, &c.

Rootstock slender, horizontal, scaly. *Radical leaves* long-petioled, stipellate at the top of the petiole; terminal segment simple, lateral compound; leaflets 5–7-petiolulate, $\frac{1}{4}$ – $\frac{1}{2}$ in., cuneate at the base, obtuse, crenate. *Flowers* $\frac{1}{2}$ in. diam.

2. **I. thalictroides**, Linn.; cauline leaves alternate 3-lobed or 3-foliolate, petals hooded shortly clawed, carpels 2–4 *DC. Prodr.* i. 48; *H. f. & T. Fl. Ind.* 43. *I. anemonoides*, *Kar. & Kir. En. Pl. Soong.* No. 55.

TEMPERATE WESTERN HIMALAYA, north of Kashmir, *Winterbottom*; Lahul.—**DISTRIB.** Afghanistan, Siberia, E. Europe.

Rootstock horizontal, fibrous or scaly. *Stem* 4–8 in., slender. *Radical leaves* 2–3-ternate; leaflets 2–3-lobed, cuneate at the base, membranous. *Flowers* $\frac{1}{2}$ in. diam., in few-flowered terminal panicles. *Sepals* oval, obtuse. *Petals* with a filiform claw. *Follicles* 2–4, oval, beaked by the style.—The petals are very variable in European specimens.

3. **I. grandiflorum**, *Fisch. in DC. Prodr.* i. 48; leaves all radical 2–4 times ternatisect, carpels 3–7. *Wall. Cat.* 9123; *Royle Ill.* 54, t. 11, f. 3; *H. f. & T. Fl. Ind.* 43. *I. microphyllum*, *Royle Ill.* l.c. f. 4.

WESTERN ALPINE HIMALAYA, from Kumaon to Balti, alt. 13–17,000 ft.—**DISTRIB.** Siberia.

Stems densely tufted; rootstock stout, clothed with rigid bristles. *Leaves* long-petioled; petiole auricled at the sheathing base; leaflets small, cuneate-obovate, 2–3-lobed. *Scapes* 3–4 in., equalling the leaves, with 2 small subopposite bracts. *Flower* solitary, 1–1 $\frac{1}{4}$ in. diam.

14. AQUILEGIA, Linn.

Erect, perennial-rooted herbs. *Leaves* ternately compound. *Flowers* regular, handsome, drooping, white purple or yellow. *Sepals* 5, regular,

coloured, deciduous. *Petals* 5, funnel-shaped, produced into a spur at the base. *Stamens* many, inner reduced to scales. *Carpels* 5 or more, sessile; ovules many. *Follicles* many-seeded. *Seeds* with a crustaceous testa.—**DISTRIB.** North temperate zone; species 5 or 6, with many subspecies and varieties.

1. **A. vulgaris**, L.; glabrous or pubescent, stem usually branched, leaves biternately compound, lobes incised sessile or petiolulate, sepals larger than the carpels and stamens, spur of petals gradually narrowed to the point.

WESTERN TEMPERATE and SUBALPINE HIMALAYA.—**DISTRIB.** Temp. Europe and Asia

SUBSP. 1. VULGARIS proper; glabrous or slightly pubescent, sepals ovate obtuse, spur hooked as long as the blade of the petal.—*A. vulgaris*, DC. &c.—Tibetan region.

SUBSP. 2. VISCOSA; habit, &c. of *vulgaris* proper, but smaller, odorous, and covered with glandular hairs.—*A. viscosa*, Gouan, &c.—Western Tibet, abundant.

SUBSP. 3. PUBIFLORA; softly pubescent, sepals ovate-lanceolate tapering to a fine point, spur short much curved.—*A. pubiflora*, Wall. Cat. n. 4714; Royle Ill. t. 55.—Temperate outer Himalaya.

SUBSP. 4. ALPINA; pubescent or glandular, leaflets generally much cut, flowers very large, sepals obtuse or subacute, spur nearly straight.—*A. alpina*, L., &c.; Deless. Ic. i. t. 48. *A. glandulosa*, Fisch. in DC. Prodr. i. 50.—Alpine region of the West Himalaya.

SUBSP. 5. PYRENAICA; softly pubescent or glandular often glaucous, flowers often white and sweet-scented, sepals ovate acute, spur very long slender straight or hooked. *A. pyrenaica*, DC. Prodr. i. 50. *A. Kanawarensis*, Camb. in Jacq. Voy. Bot. t. 5; Bot. Mag. t. 4493. *A. Moorcroftiana*, Wall. Cat. n. 4713; Royle Ill. 55. *A. Olympica*, Boiss. Fl. Orient. i. 71. *A. glauca*, Lindl. Bot. Reg. xxvi. t. 46. *A. fragrans*, Benth. in Maudsl. Bot. iv. t. 151.—Alpine and temperate western Himalaya and Tibet, alt. 10–14,000 ft.

SUBSP. 6. JUCUNDA; stem simple, 4–8 in. leafless or with one small leaf, flower very large dark purple, sepals very broadly ovate, spur short much incurved.—*A. jucunda*, Fisch. & Mey.; Led. Fl. Ross. i. 736.—Kashmir.

15. DELPHINIUM, Linn.

Annual or perennial erect herbs. *Leaves* palmately lobed. *Flowers* racemed or paniced, irregular, white blue or purplish. *Sepals* 5, free or cohering at the base, dorsal spurred behind. *Petals* 2–4, small; spurs of the 2 dorsal developed within that of the sepal; 2 lateral spurless or 0. *Stamens* many. *Follicles* 1–7. *Seeds* many, testa wrinkled or plaited.—**DISTRIB.** N. temperate zone; species about 40, very variable.

* Spur cylindric or inflated (not subulate or conical).

1. **D. uncinatum**, H. f. & T.; leaves 5-partite, segments inciso-pinnatifid, flowers $\frac{1}{2}$ in. long, spur inflated hooked obtuse. *D. penicillatum*, H. f. & T. Fl. Ind. 48, not of Boissier. *D. vestitum*, Boiss. Fl. Or. i. 92, not of Wall. & Royle.

Salt range of the PUNJAB, Vicary, and WEST HIMALAYA, from Banahal to Marri; on dry hills, Winterbottom, &c.

Stem 1–2 ft., simple or sparingly branched, pubescent or glabrous, few-leaved. *Radical leaves* 2 in. *Flowers* in long many-flowered densely glandular-hairy or glabrous racemes. *Spur* equalling or shorter than the flower, more or less incurved. *Anterior petals* deeply 2-fid, densely hairy. *Follicles* 3, straight.

A West Asiatic form, which we formerly identified with *D. penicillatum* of Boissier, who, however, with far better materials before him, considers it distinct. The glabrous form was found at the Margala pass, near Rawal Pindi, by Major Vicary.

2. **D. incanum**, *Royle Ill.* 55; leaves 3-partite, segments, multifid, flowers $1\frac{1}{4}$ in. long, spur almost straight cylindric. *H. f. & T. Fl. Ind.* 50.

WESTERN TEMPERATE HIMALAYA, from Gores and Kashmir to Kunawer, alt. 6-8000 ft.

Stems $1\frac{1}{2}$ -3 ft.; simple below, leafy, hoary all over. *Radical leaves* soon withering, 2 in. diam., segments subpinnatifid, lobes linear or incised; cauline subsessile. *Racemes* simple or compound, terminal, long and dense flowered; pedicels 1 in.; bracteoles 2, linear. *Flowers* large, bright blue. *Sepals* pubescent outside, shorter than the spur. *Anterior petals* 2-fid, hairy. *Follicles* 3, puberulous.

** Spur subulate.

† *Radical leaves divided to, or almost to the base* (see 8, *elatum*).

3. **D. saniculæfolium**, *Boiss. Fl. Orient.* i. 91; stem 1-2 ft., racemes long many-flowered, flowers about $\frac{1}{2}$ in. long pale blue. *H. f. & T. Fl. Ind.* 49.

WESTERN PUNJAB, on dry hills from the Indus to the Jelam, *Fleming*.—DISTRIB. Afghanistan.

Branches rigid, spreading, hoary with appressed pubescence or glabrate. *Leaves* $1\frac{1}{2}$ -3 in. diam., firm, lateral segments deeply 2-lobed, lobes all cuneate and cut. *Pedicels* straight, spur rather larger than the pale blue flowers. *Anterior petals* 3-fid, white, back hairy. *Follicles* 3, glabrous or pubescent.

4. **D. denudatum**, *Wall. Cat.* No. 4719; stem 2-3 ft., racemes many-flowered, flowers nearly 1 in. long. *H. f. & T. Fl. Ind.* 49. *D. pauciflorum*, *Royle Ill.* 55 (not of *Don*).

WEST TEMPERATE HIMALAYA, from Kashmir to Kumaon in grassy places.

Stem branched, glabrous or downy above. *Radical leaves* 2-6 in. diam., orbicular, 5-9-partite; segments cuneate-obovate, 2-pinnatifid, lobes oblong or linear-oblong; cauline few, uppermost 3-partite, segments linear entire. *Flowers* pale blue, in lax much-branched racemes; bracts linear; pedicels 2-bracteolate. *Sepals* pubescent outside, yellow with blue margins. *Anterior petals* deeply 2-fid, hairy on both surfaces. *Follicles* 3, inflated, glabrous or sparsely hairy.

5. **D. cæruleum**, *Jacq. ex Camb. in Jacq. Voy. Bot.* 7, t. 6; stem 3-12 in. much branched, racemes few-flowered, flowers 1 in. or more long. *H. f. & T. Fl. Ind.* 57.

ALPINE HIMALAYA, from Kumaon to Sikkim, attaining alt. 17,000 ft. in the latter country.

Stem branched from the base, leafy, spreading. *Leaves* suborbicular, $1\frac{1}{4}$ - $1\frac{1}{2}$ in. diam., 5-7-lobed, lobes cuneate-oblong, incised or pinnatifid, segments linear. *Flowers* solitary, in long branches, or few in a loose raceme, pale blue, hairy. *Sepals* shorter than the nearly straight spur. *Anterior petals* obovate or obcordate, a little hairy. *Follicles* 5, hairy.

†† *Radical leaves orbicular or reniform, palmate to the middle* (or base in 8, *D. elatum*).

6. **D. dasycaulon**, *Fresen. Mus. Senk.* ii. 272; stem softly tomentose, flowers bright-blue, spur shorter than the sepal. *H. f. & T. Fl. Ind.* 50; *Dalz. & Gibs. Bombay Fl.* 2; *Oliver Fl. Trop. Afr.* i. 11.

Mountains of the DEKKAN near Junir, *Stocks, &c.*—DISTRIB. Abyssinia.

Stem $1\frac{1}{2}$ -3 ft., branched, few-leaved. *Radical leaves* 3-6 in. diam., 5-fid to the middle, pale and veined beneath, lobes broadly trapezoid, 3-fid, segments incised; cauline 5-partite, segments narrower, inciso-pinnatifid. *Racemes* lax, compound; lower bracts 2 in., leafy, oblong or lanceolate, upper linear; pedicels 1-2 in., ebracteolate. *Flowers* bright-blue, inodorous. *Sepals* $\frac{1}{3}$ -1 in., with a bearded dorsal pale spot. *Spur* conic,

slightly curved, nearly $\frac{1}{2}$ as long as the sepal. *Anterior petals* 2-fid. *Follicles* $\frac{3}{4}$ in., tomentose.

7. **D. altissimum**, *Wall. Plant. As. Rar.* ii. t. 128; *Cat.* 4718; stem sparsely hairy glabrous below, racemes lax few-flowered, flowers deep blue or purple, spur longer than the sepals. *Griff. It. Notes* 54 (No. 827); *H. f. & T. Fl. Ind.* 51.

CENTRAL HIMALAYA; Nipal, *Wallich*. KHASIA HILLS, above 5000 ft., *Griffith*, &c.

Stem 2-4 ft., much-branched, few-leaved, hairs spreading. *Radical leaves* 3-6 in. diam., pale beneath, 5-7-fid, lobes broadly cuneate, 3-lobed, coarsely toothed; cauline sessile, 3-lobed or entire; petiole 1 ft. and under. *Racemes* long, lax, few-flowered; pedicels often 2 in.; bracts and bracteoles linear. *Flowers* large, very fetid, hairy outside. *Spur* subulate, incurved. *Anterior petals* 2-lobed, hairy; posterior, dark-purple, 2-toothed. *Follicles* 3, pubescent.

8. **D. elatum**, *L.*; stem glabrous or hairy, racemes dense-flowered, flowers pale blue or purplish, spur equalling the sepals. *D. ranunculifolium*, *Wall. Cat.* 4716; *H. f. & T. Fl. Ind.* 51. *D. incisum*, *Wall. Cat.* 4717. *D. pyramidale*, *Royle Ill.* 56. *D. Hoffmeisteri*, *Klotzsch Bot. Reise Pr. Wald.* t. 39.

WEST TEMPERATE HIMALAYA, in the inner and Tibetan valleys, alt. 10-12,000 ft.; from Kumaon to Kashmir.

Stem 2-4 ft., sparingly branched. *Leaves* 4-6 in. diam., rounded or reniform, pale beneath, 5-7-lobed or partite, segments cuneate-oblong, 3-lobed or variously cut. *Racemes* much branched, elongate; pedicels 1-3 in.; lower bracts leafy, 3-lobed or partite; bracteoles linear. *Flowers* hairy outside. *Sepals* elliptic, obtuse. *Spur* subulate. *Follicles* 3.

VAR. 1. *ranunculifolium*; leaves 5-lobed to about the middle, segments broadly cuneate.

VAR. 2. *incisum*; leaves 5-partite, segments narrow incised.

*** Spur inflated, conical. Flowers large; sepals connivent, membranous.

9. **D. vestitum**, *Wall. Cat.* 4715; stem hispid, leaves palmately 5-7-lobed, flowers in long dense racemes. *Royle Ill.* 55; *H. f. & T. Fl. Ind.* 52. *D. rectivenium*, *Royle Ill.* 56.

WEST and CENTRAL TEMPERATE HIMALAYA, alt. 8-12,000 ft., from Nipal to Kunawer.

Stem 1 $\frac{1}{2}$ -3 ft., simple below, hairs spreading or reflexed. *Radical leaves* 6-12 in. diam., lobes rounded, cut or toothed; petiole 6-12 in.; cauline 2-3, smaller. *Raceme* often 1 ft., simple or sparingly branched below; pedicels 1-3 in.; bracts linear or lanceolate, lower sometimes 3-lobed; bracteoles 2 above the middle. *Flowers* dense, large, hairy. *Sepals* membranous, broad, rounded, equalling or exceeding the conical incurved spur. *Follicles* 3.

10. **D. Cashmirianum**, *Royle Ill.* 55, t. 12; stem glabrous strigose or softly hairy, leaves palmately 5-7-lobed, lobes sharply cut, flowers in lax corymb. *H. f. & T. Fl. Ind.* 52 (*excl. syn. D. Jacquemontianum, Camb.*).

WEST TIBET and TIBETAN HIMALAYA, from Kumaon to Kashmir, alt. 11-16,000 ft.

Stem 1-1 $\frac{1}{2}$ ft., few-leaved, glabrous or softly or hispidly hairy. *Radical leaves* 2-4 in. diam., lobes cuneate-ovate, acute, 3-lobed and cut; cauline 3-5-partite. *Branches of corymb* terminating in few-flowered racemes, upper bracts lanceolate; bracteoles linear. *Sepals* 1 in. or more long, hairy, equalling or exceeding the straight conical spur. *Follicles* 3-7, downy.—The strigose states are best distinguished from small plants of *D. vestitum*, by the inflorescence and size of the flowers.

11. **D. viscosum**, *H. f. & T. Fl. Ind.* 52; stem covered with soft brown tomentum, leaves reniform palmately 5-7-lobed, lobes obtusely crenate, flowers corymböse.

ALPINE EAST HIMALAYA; Sikkim, alt. 12-16,000 ft., *Hook. f.*

Stem 1-2 ft., branched from the base. *Leaves* 2-4 in. diam., at length glabrate, lobed to near the middle. *Flowers* solitary or few at the ends of the branches of the corymb; bracts 3-partite; bracteoles linear-oblong. *Sepals* $\frac{3}{4}$ in., broadly oval, pale blue, purple, tomentose, membranous, equalling the conical incurved spur. *Follicles* 3, glabrous, ciliate on the suture.

12. **D. glaciale**, *H. f. & T. Fl. Ind.* 53; stem softly hairy, leaves 3-partite, lobes deeply multifid, flowers in lax corymbs.

ALPINE EAST HIMALAYA; Sikkim, alt. 16-18,000 ft., *Hook. f.*

Stem 3-6 in., simple, leafy. *Leaves* 2-3 in. diam., segments broadly cuneate. *Corymbs* few-flowered; bracts leafy; bracteoles many on the long pedicels, linear, or cut into linear lobes. *Flowers* large, hairy. *Sepals* exceeding 1 in., orbicular, membranous, longer than the short straight conical spur. *Follicles* 4-5, $\frac{1}{4}$ in. long.—Whole plant of a rank musk odour.

13. **D. Brunonianum**, *Royle Ill.* 56; stem glabrous or downy below glandular-pubescent above, leaves 5-fid to the middle, lobes sharply cut or toothed, flowers corymböse. *H. f. & T. Fl. Ind.* 53; *Hook. Bot. Mag.* t. 5461. *D. Jacquemontianum*, *Camb. in Jacq. Voy. Bot.* 8, t. 7. *D. moschatum*, *Munro in H. f. & T. Fl. Ind.* 53.

ALPINE WEST TIBET, alt. 14,000 ft.

Stem 6-12 in., simple below, leafy. *Leaves* 3-4 in. diam., lobes cuneate-ovate; petioles very long. *Flowers* large, pale-blue, hairy; corymbs sometimes compound; bracts 3-5-partite, upper simple, oblong or linear. *Sepals* 1 in., membranous, orbicular, veined; longer than the conic spur. *Follicles* 5-6, $\frac{3}{4}$ in., viscidly pubescent: whole plant musky.—*D. moschatum* was distinguished by the colour and texture of the posterior petal, which proves to be very variable.

D. SCABRIFLORUM, *Don in Mém. Wern. Soc.* iii. 412 (*D. Carela*, *Don Prodr.* 195), appears to differ from *D. altissimum* and *vestitum* chiefly in the glabrous follicles; it is described from Nipal specimens of Wallich, but none thus named exist in the Wallichian Herbarium.

Fragments of a *Delphinium* closely allied to *D. incanum* were brought by Dr. Hooker from Tibet, north of Sikkim; it differs from *D. incanum* in the slightly notched petals, and may be new.

D. pauciflorum, *Don Prodr.* 106, is doubtless the cultivated *D. ajacis* or common Larkspur.

16. **ACONITUM**, Linn.

Perennial, erect, rarely twining herbs. *Leaves* palmatipartite, rarely entire. *Flowers* irregular, racemed, blue purple white or yellow. *Sepals* 5, petaloid, posterior (helmet) vaulted, the rest flat, 2 anterior narrower than the lateral. *Petals* 2-5; 2 posterior clawed, limb hooded and enclosed in the helmet, 3 lower small or obsolete. *Stamens* many. *Follicles* 3-5 sessile. *Seeds* many; testa spongy, rugose or wrinkled.—**DISTRIB.** North temp. zone, species about 183.

The roots of all the species, except *A. Lycototum*, *A. heterophyllum*, and certain forms of *A. Napellus*, are poisonous, and called Bikh or Bish by the Hill people. We have omitted the characters taken from the petals (which are over much relied on by systematists) because they are so variable and so difficult of exact discrimination in dried specimens.

The genus *NIRBISIA* of Don (*Gen. Syst. Gard.* i. 63) was founded on an indeterminate species of this genus.

1. **A. uncinatum**, *Linn.*; stem twining, leaves palmately 3-5-fid, flowers paniced, helmet with a short blunt dorsal cone, testa plaited. *DC. Prodr.* i. 60. *A. variegatum*, *H. f. & T. Fl. Ind.* 56 (*not of L.*).

EAST TEMPERATE HIMALAYA; Sikkim, Lachooing valley, alt. 9000 ft., *Hook. f.*

Stem several feet long, very slender, weak, sparingly branched, glabrous or puberulous. *Leaves* 3-4 in. broad, lobes cuneate-ovate sharply cut and toothed; bracts similar. *Flowers* 3-1 in. long, in open large panicles, yellowish or bluish green. *Helmet* much arched, bluntly beaked in front. *Spur* reflexed. *Follicles* 5, glabrous.—Specimens too scanty for correct identification.

2. **A. Lycotconum**, *Linn.*; stem erect much branched, leaves palmately deeply 5-9-lobed, racemes branched, helmet with a short beak and long cylindric or conical dorsal prominence, testa plaited. *DC. Prodr.* i. 57; *H. f. & T. Fl. Ind.* 72. *A. læve*, *Royle Ill.* 56.

WEST TEMPERATE HIMALAYA; Kumaon to Kashmir, alt. 7-10,000 ft.—DISTRIB. Europe, N. Asia.

Stems 3-6 ft., glabrous or pubescent. *Leaves* 6-10 in. diam., lobes cuneate-ovate, sharply cut, lower long petioled, upper sessile. *Racemes* long, tomentose; bracts minute. *Flowers* pale yellow or dull purple, variable in size. *Follicles* 3, spreading.

3. **A. luridum**, *H. f. & T. Fl. Ind.* 55; stem erect simple, leaves palmately 5-fid below the middle, raceme simple, helmet with a long straight beak and broad dome-like dorsal prominence, testa smooth.

ALPINE EAST HIMALAYA; Sikkim, alt. 14,000 ft., *Hook. f.*

Stem 2-3 ft., slightly pubescent, few-leaved. *Radical leaves* 2-3 in. diam., segments cuneate-ovate, 3-fid and coarsely crenate, petiole long; cauline 2-5-partite. *Raceme* ½-1 ft., pedicels short; lower bracts leafy, sessile, 3-5-partite, upper entire. *Flowers* dull red. *Sepals* brown-tomentose. *Follicles* 3-5, erect.

4. **A. palmatum**, *Don Prodr.* 196; stem erect simple below, leaves reniform deeply 5-lobed, panicle few-flowered, helmet much vaulted shortly beaked, testa plaited. *Wall. Cat.* 4723; *Royle Ill.* 57; *H. f. & T. Fl. Ind.* 56; *A. lethale*, *Griffith Notul.* iv. 732.

TEMPERATE HIMALAYA, from Sikkim to Garwhal, alt. 8-10,000 ft.; MISHMI, *Griffith*.

Stem 2-5 ft., leafy, glabrous. *Leaves* 4-6 in. diam., sinus shallow; segments cuneate-ovate, deeply sharply cut; petioles long. *Flowers* large, greenish-blue, pedicels long. *Helmet* rather higher than broad. *Follicles* 5, 1-1½ in. long, glabrous.

5. **A. ferox**, *Wall. in Seringe Mus. Helvet.* i. 160, & in *DC. Prodr.* i. 64 (*not of Plant. As. Rar.*); stem erect simple below, leaves rounded or oval palmately 5-fid, raceme terminal dense-flowered, helmet vaulted with a short sharp beak, testa plaited. *Wall. Cat.* 4721, *B, C, D*; *H. f. & T. Fl. Ind.* 56. *A. virosum*, *Don Prodr.* 196.

TEMPERATE SUBALPINE HIMALAYA, from Sikkim to Garwhal, alt. 10-14,000 ft.

Stem 3-6 ft., puberulous, leafy. *Leaves* 3-6 in.; lobes cuneate-ovate, incised. *Raceme* 6-12 in., simple or sparingly branched below, tomentose; pedicels 1-2 in., thickened at the top; bracts pinnatifid; bracteoles linear. *Flowers* large, pale dirty blue. *Helmet* about twice as long as high. *Follicles* 5, erect, usually densely villous, glabrous in some Garwhal specimens.

6. **A. Napellus**, *Linn.*; stem erect simple, leaves palmatipartite, segments linear multifid, raceme simple few- or many-flowered, helmet shallow, tapering to a slender beak, testa smooth. *DC. Prodr.* i. 62; *H. f. & T. Fl. Ind.* 57.

TEMPERATE ALPINE HIMALAYA, from 10,000 ft. to the highest limit of vegetation in the N.W. provinces.—DISTRIB. Temp. and arctic Europe, Asia, and America.

Stem 6 in.—3 ft., often decumbent in small states, glabrous or slightly pubescent. *Leaves* very variable in size, ultimate divisions linear. *Racemes* simple or sparingly compound; bracts entire or 3-fid. *Flowers* $\frac{3}{4}$ –1 in. long, bright or dull greenish-blue. *Helmet* three times as long as high. *Follicles* 3–5, in the Indian forms hairy.—An extremely variable plant, of which we have vainly attempted to refer the Indian forms to those indicated by Regel. The small alpine forms closely resemble the arctic American forms of *A. delphinifolium*. The roots of vars. 1 and 2 are poisonous, but those of 3 and 4 are eaten by the Bhotas.

VAR. 1. NAPELLUS proper; stem 2–3 ft. leafy, raceme dense flowered.

VAR. 2. RIGIDUM; stem 2–3 ft. few-leaved, leaves firm subcoriaceous with spreading falcate sharp teeth, racemes lax few-flowered, tomentose. *A. dissectum*, *Don Prodr.* 197; *Wall. Cat.* 4724; *Royle Ill.* 54. *A. ferox*, *Wall. Cat.* 4721 A; *Plant. As. Rar.* t. 41.

VAR. 3. MULTIFIDUM; stem 6–12 in. erect or decumbent few-leaved, leaves 1–2 in. diam. many-lobed to the base, lobes cut into linear segments; racemes lax few- or many-flowered. *A. multifidum*, *Royle Ill.* 56. *A. oliganthemum*, *Kern. Nov. Pl. Sp. Dec.* ii. 23.

VAR. 4. ROTUNDIFOLIUM; like var. 3, but leaves not divided to the base. *A. rotundifolium*, *Kar. & Kir.*; *Led. Fl. Ross.* n. 1740. *A. Tianschanicum*, *Osk. & Rupr. Sert. Tian. in Mem. Acad. St. Petersburg.* 1869.

7. **A. heterophyllum**, *Wall. Cat.* 4722; stem erect leafy, leaves broad ovate or orbicular-cordate more or less 5-lobed and-toothed, upper entire amplexicaul, raceme many-flowered, helmet shortly beaked, testa smooth. *Royle Ill.* 56, t. 13; *H. f. & T. Fl. Ind.* 58. *A. cordatum*, *Royle Ill.* 56. *A. Atees*, *Royle in Journ. As. Soc. Bengal*, i. 459.

WEST TEMPERATE HIMALAYA, from Kumaon to Hasora, alt. 8–13,000 ft.

Stem 1–3 ft., simple or branched from the base, glabrous below, puberulous above. *Leaves* 2–4 in., acute or obtuse; cauline sharply toothed, the lowest long petioled and not amplexicaul. *Racemes* often paniced; bracts sharply toothed, upper 3-fid or entire. *Flowers* more than 1 in. long, bright blue, greenish blue with purple veins. *Helmet* half as high as long. *Follicles* 5, downy.—Root much valued in India, according to Royle, as a febrifuge and tonic.

17. ACTÆA, Linn.

An erect perennial herb. *Leaves* alternate, ternately compound. *Flowers* small, in short crowded racemes. *Sepals* 3–5, rather unequal, petaloid. *Petals* 4–10, small, spatulate, or 0. *Stamens* many, filaments slender. *Carpel* 1, many-ovuled; stigma sessile, dilated. *Berry* many-seeded. *Seeds* depressed; testa coriaceous, smooth.

1. **A. spicata**, *Linn.*; leaflets ovate-lanceolate entire or 3-lobed acutely serrate. *DC. Prodr.* i. 65; *H. f. & T. Fl. Ind.* 59. *A. acuminata*, *Wall. Cat.* 4726; *Royle Ill.* 57.

TEMPERATE HIMALAYA, from Bhotan, *Griffith*, to Hazara.—DISTRIB. Europe, N. Asia, N. America. (Bane-berry.)

Stem 2–3 ft., erect, from a woody horizontal rootstock, covered at the base with leafless sheaths. *Leaves* 1 ft.; leaflets $\frac{1}{2}$ –2 in. *Racemes* 1–3 in.; pedicels filiform. *Flowers* $\frac{1}{4}$ in. diam., white. *Berry* elliptic or subglobose; black in the European and Himalayan form, white and red in the American.

18. CIMICIFUGA, Linn.

Erect perennial herbs. *Leaves* 2–5-ternately divided. *Flowers* in long slender racemes, regular. *Sepals* 4–5, deciduous, petaloid. *Petals* (or trans-

formed stamens) 1-8, small, clawed, 2-horned at the tip. *Stamens* many, filaments slender. *Carpels* 1-8, many-ovuled. *Fruit* of many-seeded follicles. *Seeds* compressed, testa smooth or scaly.—DISTRIB. Europe, N. Asia, N. America; species about 8.

1. **C. foetida**, Linn.; leaflets ovate or lanceolate serrate glabrous or downy, racemes paniced. *H. f. & T. Fl. Ind.* 59. *C. frigida*, Royle *Ill.* 57. *Actæa cimicifuga*, L.; *DC. Prodr.* i. 64. *A. frigida*, Wall. *Cat.* 4725.

TEMPERATE HIMALAYA, from Bhotan, Griffith, to Gores and Kashmir; alt. 7-12,000 ft.—DISTRIB. E. Europe, Siberia.

Stem 3-6 ft., leafy, branched, glabrous below, tomentose above. *Leaflets* 2-3 in., pale beneath, terminal often 3-lobed. *Racemes* rarely simple. *Flowers* small, yellowish. *Petals* more or less 2-fid. *Follicles* 4-8, $\frac{1}{2}$ in. long.

19. **PÆONIA**, Linn.

Erect, stout, leafy, perennial herbs or undershrubs. *Leaves* alternate, compound. *Flowers* large, solitary or paniced, white or red. *Sepals* 5, herbaceous, persistent. *Petals* 5-10, larger than the sepals. *Stamens* many, *Carpels* 1-5, girt below by a fleshy disk, many-seeded. *Fruit* of 1 or more coriaceous few-seeded follicles. *Seeds* large, subglobose, testa thick; albumen fleshy.—DISTRIB. N. temp. zone; species 3-4.

1. **P. emodi**, Wall. *Cat.* 4727; flowers usually in the axils of the upper leaves long peduncled, follicles 1 rarely 2. Royle *Ill.* 57; Hook. f. in *Bot. Mag. t.* 5719. *P. officinalis*, H. f. & T. *Fl. Ind.* 60 (not of L.).

WEST TEMPERATE HIMALAYA; alt. 5-10,000 ft., from Kumaon to Hazara.

Erect, 1-2 ft., glabrous. *Leaves* 6-12 in., once or twice ternatisect; leaflets decurrent, entire or incised, ultimate segments oblong or lanceolate, acute or acuminate, glabrous, glaucous beneath. *Flowers* 3-8; buds globose; bracts 2-3, leafy, appressed to the calyx. *Sepals* rounded, outer with a leafy point. *Follicles* ovoid, obtuse, strigose or glabrous.—The specimens from the outer Himalaya are usually 1-carpellary, from the inner 2-carpellary.

VAR. 1. **EMODI** proper; follicles strigose with yellow-brown hairs.

VAR. 2. **GLABRATA**; follicles glabrous.—Very near the Siberian *P. albiflora*, but monocarpellary.

ORDER II. **DILLENACEÆ**. (By Hooker f. & Thomson.)

Trees shrubs or herbs, sometimes climbing. *Leaves* alternate, simple, entire or toothed (pinnatipartite in *Acrotrema*), exstipulate with sheathing petioles, or more rarely with lateral deciduous stipules. *Flowers* yellow or white, often showy. *Sepals* 5, imbricate, persistent. *Petals* 5 (rarely 3 or 4) deciduous. *Stamens* many, hypogynous, many-seriate; anthers innate, with lateral slits or terminal pores. *Carpels* 1 or more, free or cohering in the axis; styles always distinct; ovules amphitropous, solitary or few and ascending, or many and attached to the ventral suture. *Fruit* of follicles, or indehiscent and subbaccate. *Seeds* solitary or many, arillate, testa crustaceous, raphe short, albumen fleshy; embryo minute, next the hilum.—DISTRIB. Chiefly tropical; species about 200.

TRIBE I. **Dellimeæ**. *Filaments* thickened upwards; anthers short, cells remote oblique.

Carpel solitary	1. DELIMA.
Carpels 2-5	2. TETRACERA.

TRIBE II. **Dilleniæ**. Filaments not thickened upwards; anthers with parallel cells.

Carpels 3; stemless herbs, leaves all radical large	3. ACROTREMA.
Carpels 3; trees or shrubs	4. SCHUMACHERIA.
Carpels 5-20; seeds arillate	5. WORMIA.
Carpels 5-20; seeds not arillate	6. DILLENIA.

1. **DELIMA**, Linn.

A woody climber. *Leaves* very scabrid, parallel-veined. *Flowers* many, in terminal panicles, hermaphrodite, white. *Sepals* 5. *Petals* 2-5. *Stamens* many; filaments dilated upwards; cells much diverging. *Ovary* solitary, subglobose, narrowed into a subulate style; ovules 2-3, ascending. *Follicles* ovoid, coriaceous, 1-seeded. *Seed* with a cupular toothed aril.

1. **D. sarmentosa**, Linn.; DC. *Prodr.* i. 69; Wall. *Cat.* 6632; Bot. Mag. t. 3058. *Tetracera sarmentosa*, Willd.; Roxb. *Fl. Ind.* ii. 645. *Leontoglossum scabrum*, Hance, in Walp. *Ann.* iii. 812.

Eastern tropical India, from ASSAM to SINGAPORE.—DISTRIB. Eastern Archipelago.

Leaves 3-5 in., obovate ovate or broadly lanceolate, obtuse or acute, strongly nerved, quite entire serrate or crenate, appressed pilose. *Flowers* $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., in tomentose or pilose spreading panicles that are often leafy. *Sepals* reflexed.—A very variable plant indeed.

VAR. 1. GLABRA; fruit glabrous.

VAR. 2. HEBECARPA; fruit hairy. *D. hebecarpa*, DC. *Prodr.* i. 70; Deless. *Ic. Sel.* t. 72; Wall. *Cat.* 6633. *D. intermedia*, Blume.

2. **TETRACERA**, Linn.

Trees or climbing shrubs, smooth scabrid or pubescent. *Leaves* with parallel lateral veins. *Flowers* in terminal or lateral panicles, hermaphrodite or partially 1-sexual. *Sepals* 4-6, spreading. *Petals* 4-6. *Stamens* many, filaments dilated upwards, anther-cells distant. *Carpels* 3-5; ovules many, 2-seriate. *Follicles* coriaceous, shining. *Seeds* 1-5, with a fimbriated or toothed aril.—DISTRIB. All tropical; species about 24.

1. **T. lævis**, Vahl *Symb.* iii. 71; glabrous, leaves smooth, sepals silky inside glabrous outside, follicles 1-2-seeded. DC. *Prodr.* i. 68; Wall. *Cat.* 6627; H. f. & T. *Fl. Ind.* 62. *T. Rheedii*, DC. *Prodr.* i. 68; W. & A. *Prodr.* 5; Wight *Ic. t.* 70 *T. trigyna*, Roxb. *Fl. Ind.* ii. 645. *T. sericea*, Bl. *Byd.* 3.

WESTERN PENINSULA; forests of Malabar; and in CEYLON.—DISTRIB. Java to Borneo.

Branches angular. *Leaves* 3-5 in., oblong or lanceolate, glabrous, entire or remotely toothed, veins rather distant. *Panicles* terminating leafy branches, few- or many-flowered. *Sepals* broadly oval.

2. **T. Assa**, DC. *Prodr.* i. 68; young branches strigose, leaves glabrous or hairy on the nerves beneath, sepals glabrous on both surfaces, ciliolate, follicles 3-5-seeded. Wall. *Cat.* 6629; W. & A. *Prodr.* 5 in note; H. f. & T. *Fl. Ind.* 63.

EASTERN BENGAL and EASTERN PENINSULA from Chittagong to Singapore.—DISTRIB. Java, Philippines.

Leaves 2-4 in., oblong, serratures remote. *Sepals* broadly oval.

3. **T. Euryandra**, *Vahl Symb.* iii. 71; young branches tomentose, leaves rigid, shining above, pubescent beneath, panicle few-flowered, sepals pubescent outside and densely ciliate, follicles 2-3-seeded. *DC. Prodr.* i. 68; *Roxb. Fl. Ind.* ii. 646; *H. f. & T. Fl. Ind.* 63. *T. lucida*, *Wall. Cat.* 6631.

EASTERN PENINSULA; Malacca and Singapore.—DISTRIB. Moluccas and New Caledonia.

Branches angular. *Leaves* 2-5 in., elliptic-oblong and obtuse, or oblong lanceolate and mucronate, entire or subdentate at the tip; petiole short. *Panicle* terminal, leafy, many-flowered. *Sepals* ovate-oblong.

4. **T. macrophylla**, *Wall. Cat.* 6628 (by error *macrocarpa*); young branches pubescent, leaves rigid scabrid on both surfaces, panicle decompound many-flowered, sepals puberulous outside, follicles 1-seeded. *H. f. & T. Fl. Ind.* 63.

EASTERN PENINSULA, Malacca and Singapore.

3. **ACROTREMA**, Jack.

Stemless perennial herbs, with horizontal woody rootstocks. *Leaves* large, gland-dotted, entire toothed or pinnatipartite, with sheathing deciduous stipules. *Scape* usually short, axillary, clothed with membranous imbricated scales. *Flowers* in short racemes, yellow. *Sepals* 5. *Petals* 5. *Stamens* 15-50, in 3 bundles which alternate with the carpels; filaments filiform; anthers erect, cells dehiscing from the middle to the tip. *Carpels* 3, slightly cohering in the axis; styles subulate, recurved; ovules 2 or more. *Fruit* of 3 follicles, bursting irregularly. *Seed* with a membranous aril, testa crustaceous pitted.—DISTRIB. Species about 8, all Indian.

A remarkable genus of very variable species. The descriptions apply to adult foliage only, all have the young leaves silky.

* Carpels 1-2-seeded.

1. **A. costatum**, *Jack. in Mal. Misc. ex Hook. Bot. Misc.* ii. 82; leaves obovate base sagittate toothed, flowers 8-10 in lax racemes, stamens 15. *Wall. Cat.* 1117 A; *H. f. & T. Fl. Ind.* 65. *A. Wightianum*, *W. & A. Prodr.* 6; *Wight Ill.* t. 9.

EASTERN PENINSULA, from Moulmein to Singapore.

Leaves 3-6 by $1\frac{1}{2}$ -2½ in., rough with stiff hairs, toothed and densely ciliate, veins beneath pale and hairy; petiole short. *Scape* shorter than the leaves, setose; pedicels much longer than the linear bracts. *Ovules* collateral ascending.—In the Flora Indica Travancore is given as a habitat for this species on the faith of a single specimen in the Wightian Herbarium fastened in the same sheet, *A. Arnottianum*, and collected by Koenig, who, though he formed most of his collections in the Madras Peninsula, also visited the Straits of Malacca.

** Carpels many-seeded.

† *Leaves* not pinnate or pinnatifid.

2. **A. Arnottianum**, *Wight Ill.* 9, t. 3; leaves obovate-oblong obtuse base rounded or cordate sharply toothed, scape many-flowered. *H. f. & T. Fl. Ind.* 64. *A. costatum*, *Wall. Cat.* 1117 B. *A. Wightianum*, *Wall. Cat.* 3669 (not of *W. & A.*).

WESTERN PENINSULA, Malabar and Travancore.

Leaves 6-12 by 3-5 in., ciliate and covered with long distant soft hairs, otherwise glabrous; petioles 1-3 in., broadly winged, but not to the base. *Racemes* axillary, 2-3 in.; pedicels 2-4 in., clothed with long hairs. *Sepals* nearly $\frac{1}{2}$ in.

3. **A. uniflorum**, *Hook. Ic. Plant.* t. 157; leaves obovate-oblong base cordate entire or toothed scabrid on both surfaces, scape 1-2-flowered, very short, stamens 30-50. *H. f. & T. Fl. Ind.* 64; *Thwaites Enum.* 2. *A. bullatum*, and *A. sylvaticum*, *Thw. l.c.* 2 & 3.

Central and Southern Provinces of CEYLON, in shady moist places, alt. 2-4000 ft.

Leaves 4-9 by 1-3 in., tapering to the cordate base; petiole $\frac{1}{2}$ -2 in., narrowly winged. *Flowers* small, pedicels 1-2 in.—A very variable plant of which the following varieties seem the best marked:—

VAR. 1. PETIOLARIS, *Thw. l.c.*; leaves narrow obovate, petioles 2-3 in.

VAR. 2. ROTUNDATUM, *Thwaites, l.c.*; leaves very broad nearly entire, hairs stiffish, petioles very short.

VAR. 3. BULLATUM; leaves narrow softly silky bullate, petioles very short, pedicels appressed hairy.—*A. bullatum*, *Thw. l.c.*

VAR. 4. APPENDICULATUM; leaves deeply serrate at the very base, almost lyrate, petioles short.

VAR. 5. SYLVATICUM; leaves minutely pilose hirsute with rigid hairs on the nerves beneath, base deeply cordate, petiole and pedicels short.—*A. sylvaticum*, *Thw. l.c.*

4. **A. Walkeri**, *Wight ex Thwaites Enum. Ceyl. Pl.* 3; leaves narrowly obovate-oblong bullate sharply toothed ciliate laxly hairy above, base auricled, raceme very short, stamens about 15. *Hook. Bot. Mag.* t. 5353.

Central Province of CEYLON, alt. 2-4000 ft., *Thwaites*.

Leaves 2-4 by $\frac{1}{2}$ -1 $\frac{1}{2}$ in., rugose, dull red and hairy on the veins beneath; petiole very short. *Racemes* axillary; pedicels 1-2 in., laxly villous.

VAR. ARGYRONEURON, *Thwaites, l.c.* 398; leaves larger, midrib and veins above white.

5. **A. intermedium**, *Thwaites Enum.* 3; leaves obovate-lanceolate acute crenate-toothed coarsely hairy above, base auricled, petiole margined, racemes short, subsessile, pedicels and calyx hirsute, stamens about 40.

Bank of streams Ambagamowa district of CEYLON, *Thwaites*.

Rootstock elongate. *Leaves* 6-12 by 1-2 in., more or less hirsute above, and appressed hairy on the veins beneath; petiole 1-1 $\frac{1}{2}$ in., margined.

6. **A. lanceolatum**, *Hook. Ic. Pl. under t.* 157; leaves very narrowly lanceolate sinuate-toothed, glabrous above, scape very short, stamens about 40. *H. f. & T. Fl. Ind.* 65; *Thw. Enum.* 3.

Kittool Galle, in CEYLON.

Rootstock short. *Leaves* 4-12 by $\frac{1}{2}$ -1 in., acute, appressed-hairy on the costa and nerves beneath; petiole $\frac{1}{4}$ -1 in., hairy, margined. *Pedicels* 1-2 in., hirsute

7. **A. Gardneri**, *Thwaites Enum.* 3; leaves narrowly spatulate acute sinuate with inflexed rigid teeth glabrous above substrigose on the veins beneath, scape very short, stamens about 15.

Between Galle and Ratnapoora, CEYLON, by banks of streams, *Thwaites*.

Rootstock horizontal. *Leaves* 2-4 by $\frac{1}{4}$ - $\frac{1}{2}$ in., base auricled, nerves beneath with appressed hairs. *Racemes* short; pedicels 1-2 in., with appressed hairs.—Very near *A. lanceolatum*, but differing in the number of stamens, perhaps not a constant character.

8. **A. Thwaitesii**, *H. f. & T. in Kew Journ. Bot.* viii. 241, t. 4 A.; leaves lanceolate pinnatifid to or beyond the middle, hairy above and on the nerves beneath, scape very short, stamens about 20.

In the Dolosbage district, CEYLON, *Thwaites*.

Rootstock small, short. *Leaves* 3-6 by 1-1½ in., segments linear-oblong, acute, entire or toothed; petioles very short. *Pedicels* 1-1½ in., slender, pilose. *Sepals* hirsute.

9. **A. dissectum**, *Thwaites in Hook. Kew Journ. Bot.* viii. 242, t. 4 B.; leaves lanceolate interruptedly pinnatisect, softly hairy, scape very short.

At Hinidoon Korle, CEYLON, *Thwaites*.

Rootstock horizontal. *Leaves* 2-4 by 1-1½ in., larger segments acutely lobed, with two or more pairs of very small segments between each pair, white and silky beneath, segments sometimes petiolulate. *Pedicels* slender, with spreading hairs. *Flowers* very small, ½ in. diam.

10. **A. lyratum**, *Thwaites in Hook. Kew Journ.* viii. 242; leaves linear-oblong obtuse lyrate-pinnatifid toothed, glabrous except the nerves beneath, base cordate, scape long naked below, pedicels glabrous, stamens about 35.

At Hinidoon Korle, in CEYLON, *Thwaites*.

Rootstock stout, ascending. *Leaves* 3-12 by 2-4 in., coriaceous, terminal segment equalling ⅓ of the whole leaf, lateral segments 3-5 pair, small, rounded, adnate by a broad base, deflected, sharply toothed; petiole margined. *Scape* 1-3 in.; bracts recurved; pedicels 1 in., often recurved. *Sepals* glabrous or puberulous. *Flowers* about ½ in. diam.

4. **SCHUMACHERIA**, Vahl.

Erect or sarmentose shrubs, branches flexuous. *Leaves* coriaceous, lateral nerves many, very strong. *Flowers* yellow, 2-bracteolate, in axillary or terminal secund simple or paniced spikes. *Sepals* 5. *Petals* 5. *Stamens* indefinite, many-seriate, unilateral, filaments very short united into a short oblique cylindric posticous column; anther-cells dehiscing longitudinally. *Carpels* 3, distinct, pilose; styles filiform-subulate; ovules solitary. *Ripe carpels* indehiscent. *Seed* erect, subglobose, arillate, testa crustaceous.—
DISTRIB. All Cinghalese.

1. **S. angustifolia**, *H. f. & T. Fl. Ind.* 66; leaves oblong-lanceolate tapering to a fine point serrate, spikes axillary simple or paniced shorter than the leaves. *Thw. Enum.* 4.

At Hinidoon Korle, in CEYLON, abundant.

Branches slender, young silky, old glabrous. *Leaves* 4-6 by 1-1½ in., glabrous and shining above, puberulous on the veins beneath, base rounded or narrowed; petiole ½ in. *Spikes* 1-2 in.

2. **S. alnifolia**, *H. f. & T. Fl. Ind.* 66; leaves broadly oval acute or subacute sinuate or toothed, spikes axillary paniced shorter than the leaves. *Thw. Enum.*

Forests in the Ambagamowa and Hunasgiria Districts of CEYLON, *Thwaites*.

Branches strigose, old glabrous. *Leaves* 4-6 by 2-4 in., base obtuse, glabrous above, beneath strigose on the nerves, and pubescent or glabrate between them; petiole scarid or hirsute. *Spikes* 1-2 in.

VAR. 1. *SCABRA*, *Thw. l.c.*; leaves scarid with distant rigid hairs.

VAR. 2. DENTATA, *Wight. mss.*; *Thw. l.c.*; leaves acutely coarsely toothed beneath and the petioles hirsute.

VAR. 3. SUBGLABRA, *Thw. l.c.*; leaves subglabrous beneath.

3. **S. castaneæfolia**, *Vahl, in Act. Hafn.* vi. 122; leaves broadly oblong crenate or sinuate, spikes in much branched terminal panicles longer than the leaves. *Wight Ill.* i. 9, t. 4; *H. f. & T. Fl. Ind.* 66; *Thw. Enum.* 4.

In the Saffragam and Galle Districts of CEYLON.

Branches hoary, at length glabrate. Leaves 4-10 by 2-4 in., usually obtuse at both ends, but sometimes acute at either, glabrous above, hoary on the veins beneath. Panicle sometimes leafy. Flowers variable in size.

5. WORMIA, Rottb.

Trees, sometimes lofty, or shrubs. Leaves broad; lateral nerves many, strong, parallel; petioles usually with deciduous stipular wings. Flowers large, in terminal racemes or panicles. Sepals 5. Petals 5. Stamens indefinite, in several series, nearly free; anthers linear, erect, cells opening by 2 pores. Carpels 5-10, scarcely cohering in the axis; ovules numerous. Fruit of indehiscent or follicular 3- or more-seeded carpels. Seeds with a fleshy aril.—DISTRIB. Tropical Asia and Australia, and one in Madagascar; species about 9.

SECT. I. **Capellia**, *Blume* (genus). Inner row of stamens much longer than the outer and arching over them.

1. **W. suffruticosa**, *Griff. Notul.* iv. 706; *Ic.* iv. t. 649, f. 1; leaves oval- or elliptic-lanceolate sharply toothed, petiole broadly winged. *W. excelsa*, *H. f. & T. Fl. Ind.* 67. (*excl. syn.*) *W. subsessilis*, *Miq. Fl. Ned. Ind. Suppl.* i. 618; *Ann. Mus. Lugd. Bot.* i. 315, t. 9.

EASTERN PENINSULA, at Malacca and Singapore.—DISTRIB. Extends to Borneo and Banka.

A shrub or small tree, young parts floccose. Leaves 4-12 by 2-5 in., acute or rounded at each end, coriaceous, glabrous, with scattered hairs on the veins beneath; petioles $\frac{1}{2}$ -2 in., wing entire. Flowers 4 in. diam., bright yellow, in leaf-opposed simple or forked racemes; pedicels alternate, $\frac{1}{2}$ -1 in., top thickened. Sepals ovate, obtuse, subequal, persistent. Petals obovate, crenulate. Carpels about 7, 3-5-seeded.—*W. excelsa*, with which we had confounded this (*Fl. Ind. l.c.*) is distinguished by its crenate leaves and narrow petiolar wing.

2. **W. oblonga**, *Wall. Cat.* 951; leaves oval or oblong entire or subcrenate, petiole scarcely winged. *H. f. & T. Fl. Ind.* 67.

EASTERN PENINSULA; Penang, Malacca, and Singapore.

A tree, bark black; young parts tomentose, old glabrate. Leaves 4-8 by 2-4 in., coriaceous, glabrous when mature; petiole 1-2 in. Flowers 3-4 in. diam., in terminal leafy flexuous few-flowered paniced racemes; pedicels 1 in., thickened upwards, tomentose. Sepals orbicular, young covered with appressed yellow pubescence, mature glabrate. Carpels 8-10.—Very near *W. excelsa*, Jack.

SECT. II. **Euwormia**. Filaments all erect and nearly equal in length.

3. **W. triquetra**, *Rottb. Nov. Act. Hafn.* ii. 532, t. 3; leaves broadly oval repand-toothed or sinuate, petioles with broad membranous sheathing deciduous stipular wings. *H. f. & T. Fl. Ind.* 67; *Thw. Enum.* 4. *W. den-*

tata, *DC. Prodr.* i. 75. *Dillenia dentata*, *Thunb. in Trans. Linn. Soc.* i. 201, t. 20.

Moist warm parts of CEYLON, up to 2000 ft.

A tree, bark black, young parts hoary. *Leaves* 5-8 by 4-5 in., tip obtuse or subtruncate, base rounded; petiole 2-3 in. *Flowers* 2 in. diam., white, in subterminal leaf-opposed secund few-flowered racemes; pedicels 1 in., thickened upwards. *Carpels* 5, indehiscent, 1-2-seeded.

4. **W. pulchella**, *Jack, Mal. Misc. ex Hook. Comp. Bot. Mag.* i. 221; leaves obovate obtuse, nerves distant, petiole slightly margined. *H. f. & T. Fl. Ind.* 68.

EASTERN PENINSULA: Malacca, *Griffith.*—DISTRIB. Sumatra.

A small tree; branches dark grey, glabrous. *Leaves* 4-5 by 2-3 in., quite entire, coriaceous, tip obtuse, truncate or retuse, mucronate, base acute, nerves rather distant; petiole 1 in., channelled, base slightly sheathing. *Flowers* 2 in. diam., on axillary leaf-opposed ebracteate peduncles. *Sepals* broadly ovate, glabrous. *Follicles* 5, few-seeded. *Seeds* few, aril red pulpy.

6. **DILLENIA**, Linn.

Trees. *Leaves* broad, with conspicuous parallel lateral nerves. *Flowers* large, solitary or fascicled, yellow or white. *Sepals* 5, spreading. *Petals* 5, broad. *Stamens* nearly free; anthers linear, bursting by small slits or pores; inner erect or recurved introrse, outer recurved extrorse. *Carpels* 5-20, cohering in the axis; ovules indefinite. *Fruit* globose, formed of the matured indehiscent carpels inclosed in the thickened calyx. *Seeds* naked or immersed in pulp, exarillate.—DISTRIB. Tropical Asia; species 12.

SECT. I. **Eudillenia**. *Leaves* persistent. *Flowers* white, (always?) appearing with the leaves, solitary or racemed, terminal or leaf-opposed.

1. **D. indica**, *Linn.*; leaves lanceolate serrate, flowers solitary very large, sepals fleshy. *Hamilton in Trans. Linn. Soc.* xv. 99. *D. speciosa* and *D. elliptica*. *Thunb. in Trans. Linn. Soc.* i. 200; *DC. Prodr.* i. 76; *Wall. Cat.* 943; *W. & A. Prodr.* 5; *Wight Ic.* 823; *H. f. & T. Fl. Ind.* 69.

Tropical forests in the WESTERN PENINSULA, Behar and Ceylon, and the HIMALAYA, from Nipal to Assam. EASTERN PENINSULA from Silhet to Singapore.—DISTRIB. Malay Archipelago.

A round headed tree, branchlets tomentose. *Leaves* 8-10 by 2-4 in., fascicled at the ends of the branches, acute, veins close-set, glabrous above, pubescent especially on the nerves beneath. *Flowers* 6 in. diam., subterminal. *Sepals* orbicular, thick and fleshy. *Petals* white, obovate. *Inner stamens* arching over the outer. *Seeds* compressed, margins hairy.

2. **D. ovata**, *Wall. Cat.* 945; leaves ovate denticulate, flowers solitary, sepals thick. *H. f. & T. Fl. Ind.* 70.

EASTERN PENINSULA; Pinang, *Wallich, &c.*

A tree, branches softly tomentose. *Leaves* 8 by 5 in., acute or subacute, base rounded and suboblique, glabrous or pubescent on the nerves above, softly pubescent beneath; petiole 1-1½ in., tomentose. *Flowers* on terminal or leaf-opposed peduncles 2 in. long—Colour of flower unknown.

3. **D. meliosmæfolia**, *H. f. & T.*; leaves obovate-oblong acuminate serrate, flowers 1-2 terminal, sepals densely tomentose.

EASTERN PENINSULA; Malacca, *Griffith.*

A tree; bark grey, striated; branchlets densely clothed with fulvous tomentum.

Leaves 6-8 by $2\frac{1}{2}$ - $3\frac{1}{2}$ in., base acute, pilose on the nerves above, shortly hairy especially on the nerves beneath, nerves 16-18 on each side, oblique, terminating in short sharp serratures; petiole 1 in., brown, hairy. *Peduncles* 1- $1\frac{1}{2}$ in., densely clothed with brown tomentum. *Sepals* nearly $1\frac{1}{2}$ in., ovate.—Only two specimens seen, with imperfect flowers.

4. **D. bracteata**, *Wight Ic. t. 358*; leaves oblong crenate, flowers racemed, sepals suborbicular silky. *Wormia bracteata*, *H. f. & T. Fl. Ind. 68*; ? *D. repanda*, *Roxb. Fl. Ind. ii. 652*.

WESTERN PENINSULA; mountains of Maiseur.

A tree, young branches silky-pubescent. *Leaves* densely fascicled, 3-6 by $1\frac{1}{2}$ -3 in., coriaceous, subacute or obtuse, shining above, puberulous on the nerves beneath. *Racemes* 1-2 in., few-flowered, subterminal or leaf-opposed. *Flowers* $2\frac{1}{2}$ -3 in. diam. *Stamens* all equal, anthers 2-porose. *Carpels* 5, membranous, indehiscent.—Roxburgh's description of *D. repanda*, a native of Hindostan, differs but little from the above in the retuse repand smooth leaves, 5-7-flowered raceme, and villous calyx; we know of no specimen or drawing.

5. **D. retusa**, *Thunb. in Trans. Linn. Soc. 200, t. 19*; leaves obovate-oblong truncate or retuse quite entire or sinuate-toothed, flowers 1-3 on a peduncle. *Lamk. Ill. t. 492*; *DC. Prodr. i. 76*; *Wall. Cat. 6625*; *W. & A. Prodr. 6*; *Thw. Enum. 5*. *D. integra*, *Thunb. l.c. 199, t. 18*; *DC. l.c.*; *Wormia integra*, *H. f. & T. Fl. Ind. 68*.

Warmer parts of CEYLON, up to 2000 ft.

A tree; branchlets hairy, soon glabrous. *Leaves* 4-6 by 2-3 in., coriaceous, glabrous, base acute; petiole 1 in. *Flowers* subterminal, 3 in. diam., white; peduncle 2 in. *Petals* obovate. *Stamens* all erect, anthers 2-porose. *Fruit* $1\frac{1}{2}$ in. diam., of 5 carpels.

SECT. II. **Colbertia**, *Salisb. (genus)*. *Branchlets* scabrid. *Leaves* deciduous. *Flowers* appearing before the leaves, yellow, axillary or from the scars, solitary or paniced.

6. **D. aurea**, *Sm. Exot. Bot. t. 92, 93*; leaves obovate-crenate, flower solitary 4-5 in. diam., adult sepals glabrous glaucous. *DC. Prodr. i. 76*; *Wall. Cat. 6624*; *H. f. & T. Fl. Ind. 70*. *D. ornata*, *Wall. Pl. As. Rar. i. 21, t. 23*; *Cat. 947*. *D. speciosa*, *Griff. Notul. iv. 703*. *Colbertia obovata*, *Blume Bijl. 6*.

Tropical forests along the base of the HIMALAYA from Bhotan to Nipal. EASTERN PENINSULA, in Pegu, Martaban, Mergui and the Andaman Islands.—DISTRIB. Java to Borneo.

A spreading tree, bark grey. *Leaves* 1 ft., tapering to the base, distantly crenate-toothed, glabrous above, softly pubescent beneath. *Flowers* terminating axillary short shoots; peduncle 1 in. *Sepals* when young villous. *Carpels* 8-12. *Fruit* with the calyx as large as a small apple.

7. **D. pulcherrima**, *Kurz in Journ. As. Soc. Beng. 1871, 46*; leaves broadly obovate sinuate glabrous above, flowers 4 in. diam. solitary or geminate, adult sepals silky.

Tropical forests of PEGU, *Kurz*.

A large tree; bark grey; young parts silky. *Leaves* 9-18 by 6-12 in., orbicular or cordate, rarely narrowed at the base, nerves ending in marginal points, glabrous above, pale and sparsely pilose beneath; petiole 1-2 in., $\frac{1}{2}$ -amplexicaul, deeply channelled. *Flowers* on short axillary shoots; peduncles $1\frac{1}{2}$ -2 in., silky, ebracteate, *Sepals* elliptic. *Petals* narrow-obovate.—Nearly allied to *D. aurea*, but leaves larger, nerves less close, and petals narrower.

8. **D. scabrella**, *Roxb. Hort. Beng.* 43; *Fl. Ind.* ii. 653; leaves obovate-oblong toothed scabrid above, flowers fascicled $1\frac{1}{2}$ –2 in. diam., sepals glabrous. *Wall. Pl. As. Rar.* i. 20, t. 22; *Cat.* 944; *H.f. & T. Fl. Ind.* 70. *D. pilosa*, *Ham. in Trans. Linn. Soc.* xv. 102 (not of *Roxb.*).

Forests of ASSAM and SILHET, ascending to 3000 ft. in the Khasia hills.

A tree; bark grey; young parts hairy. *Leaves* 6–10 by 4–6 in., obtuse, tomentose beneath; petiole 1–2 in., $\frac{1}{2}$ -amplexicaul at the dilated base. *Flowers* 3–5 together, sweet-scented, pedicels 2 in., with scattered bracts near the middle. *Sepals* glabrous. *Carpels* 5–7.

9. **D. parviflora**, *Griff. Notul.* iv. 784; leaves obovate-oblong, scabrid above, margins undulate denticulate, flowers 2–4 rarely solitary $1\frac{1}{2}$ –2 in. diam., sepals silky. *Kurz in Journ. As. Soc. Beng.* 1871, 45.

Forests of TENASSERIM, MERGUI, PEGU and the ANDAMAN ISLANDS.

A tall tree; bark grey, rugged; young parts silky or tomentose. *Leaves* 7–12 by 4–5 in., acute or abruptly acuminate, rigidly hirsute or softly tomentose beneath, reticulated between the nerves; petiole 1–1 $\frac{1}{2}$ in., pubescent, $\frac{1}{2}$ -amplexicaul. *Flowers* on wart-like lateral branchlets; pedicels 1–1 $\frac{1}{2}$ in., ebracteolate, tomentose. *Sepals* elliptic, obtuse, silky, two inner less so. *Petals* obovate-spathulate. *Stigmas* 5–8.

10. **D. pentagyna**, *Roxb. Cor. Pl.* i. t. 20; *Fl. Ind.* ii. 652; leaves oblong-lanceolate acute strongly serrate, petiole short broadly winged, flowers umbelled 1 in. diam., sepals glabrous. *Graham Cat. Bomb. Pl.* 2; *W. & A. Prodr.* 5; *H.f. & T. Fl. Ind.* 71. *D. augusta* and *D. pilosa*, *Roxb. Fl. Ind.* ii. 652. *Colbertia Coromandeliana*, *DC. Prodr.* i. 75; *Wall. Cat.* 949. *C. augusta*, *Wall. Cat.* 948.

Forests throughout India, from Oude and BEHAR to ASSAM, in the WESTERN PENINSULA and PEGU (absent from Ceylon).

A spreading tree; bark grey; branches rough and scarred; young parts very silky. *Leaves* 1–2 by $\frac{1}{2}$ –1 ft., subsessile or tapering into a broad $\frac{1}{2}$ -amplexicaul petiole 1–2 in. long, young silky pubescent, old glabrous. *Flowers* 5–8; pedicels 1–2 in., ebracteolate. *Sepals* elliptic, glabrous. *Petals* obovate. *Carpels* 5.

11. **D. grandifolia**, *Wall. Cat.* 946; leaves oblong-lanceolate acute serrate, petiole 5–6 in. hardly winged, *H.f. & T. Fl. Ind.* 71.

EASTERN PENINSULA; at Pinang and Malacca.

Very similar to *D. pentagyna*, but leaves softly hairy above, densely tomentose beneath, and petioles 5–6 in. also densely tomentose. The specimens in *Wall. Herb.* are very imperfect.

12. **D. floribunda**, *H.f. & T. Fl. Ind.* 71; leaves broadly elliptic glabrous above obtuse at both ends-subentire, petiole not winged, flowers umbelled about 1 in. diam. *Colbertia floribunda*, *Wall. Cat.* 950.

EASTERN PENINSULA, Martaban, *Wallich*.

A tree. *Leaves* 18 by 10 in., obtuse at both ends, glabrous above, downy on the nerves beneath; petiole about 3 in., glabrous, ebracteolate.—Two leaves and a truncation of wood with a few withered flowers are all that represent this species in the Wallichian Herbarium.

ORDER III. MAGNOLIACEÆ. (By Hooker f. & Thomson.)

Trees or shrubs, sometimes climbing, often aromatic, wood-tissue with glandular markings. *Leaves* alternate, quite entire or toothed, stipulate or not. *Flowers* axillary and terminal, often showy, white yellow or red,

sometimes unisexual. *Sepals* and *petals* very deciduous, hypogynous, arranged in whorls of 3 (in *Euptelea* absent). *Stamens* indefinite, hypogynous, filaments flattened or terete, free or monadelphous; anthers basifixed, adnate cells bursting longitudinally. *Carpels* indefinite, free or partly cohering in one whorl or in several on an elongate axis; styles short or rarely long, stigmatose on the inner surface; ovules 2 or more, or the ventral suture anatropous or amphitropous. *Fruit* of berried or follicular rarely woody indehiscent carpels, which are sometimes arranged in a cone. *Seeds* solitary or few, sometimes pendulous from a long funicle, testa single and crustaceous, or double, the outer fleshy; albumen granular or fleshy and oily; embryo minute, cotyledons spreading, radicle short blunt next the hilum.—**DISTRIB.** Chiefly natives of the tropical and temperate Asiatic mountains, and United States, a few are Australian; species about 70.

TRIBE I. **Trochodendreeæ.** Perianth absent.

1. EUPTELEA.

TRIBE II. **Winterææ.** *Stipules* 0. *Perianth* double. *Carpels* in one whorl.

2. ILLICIUM.

TRIBE III. **Magnoliææ.** Erect trees or shrubs. *Stipules* conspicuous, convolute and sheathing the young foliage, deciduous.

Gynophore sessile.

Carpels of fruit indehiscent, deciduous 3. TALAUMA.

Carpels of fruit dehiscing dorsally. Ovules 2. 4. MAGNOLIA.

Carpels of fruit dehiscing dorsally. Ovules 6 or more 5. MANGLIETIA.

Gynophore stalked 6. MICHELIA.

TRIBE IV. **Schizandreeæ.** Climbing shrubs. *Leaves* exstipulate.

Carpels of fruit spiked 7. SCHIZANDRA.

Carpels of fruit capitate 8. KADSURA.

1. EUPTELEA, Sieb. and Zucc.

A shrub. *Leaves* alternate, deciduous, toothed; petiole sheathing; stipules 0. *Flowers* pedicelled, polygamo-dioecious. *Sepals* and *petals* 0. *Stamens* 15–20, in one whorl. *Carpels* as many as the stamens, pedicelled, obovate, much compressed, winged, indehiscent; stigma sessile, decurrent from the tip to opposite the insertion of the ovule. *Fruit* of indehiscent dry flat winged 1–4-seeded carpels. *Seeds* closely packed; testa hard, coriaceous; albumen granular; embryo minute.—**DISTRIB.** 2 species, the following and a Japanese.

1. **E. pleiosperma**, H. f. & T. in *Proc. Linn. Soc.* vii. 240, t. 2.

MISHMI HILLS, near the top of Mount Thumathaga, Griffith.

A shrub; branches smooth, spotted with white; buds lateral and terminating short lateral shoots, enclosed in hard black shining scales. *Leaves* 3–4 by 2–3 in., broad elliptic, acutely toothed, acute at both ends, glabrous, pale beneath, nerves very oblique; petiole $1\frac{1}{2}$ in., channelled above, dilated at the base.—Specimens imperfect.

2. ILLICIUM, Linn.

Evergreen aromatic shrubs or small trees. *Leaves* quite entire, pellucid-dotted. *Flowers* 2-sexual, solitary or fascicled, yellow or purplish. *Sepals*

3-6. *Petals* 9 or more, 3- many-seriate. *Stamens* indefinite, filaments thick; anthers adnate, introrse. *Ovaries* indefinite, 1-seriate, 1-ovuled; style subulate, recurved. *Fruit* of spreading compressed hard follicles. *Seeds* compressed, testa hard shining, albumen fleshy.—DISTRIB. N. America, China, Japan, India; species about 5.

1. **I. Griffithii**, *H.f. & T. Fl. Ind.* 74; leaves elliptic-lanceolate, perianth-segments about 24.

Copes in BHOTAN and the KHASIA HILLS, alt. 4-5000 ft., *Griffith*, &c.

A shrub, branches angular, glabrous. *Leaves* 2-4 by 1-2 in., acute at both ends, coriaceous, shining. *Flowers* 1½ in. diam. *Sepals* 6, orbicular. *Petals* 18, outer oval, inner smaller and narrower. *Carpels* with a thin fleshy epicarp, woody endocarp, and short subulate incurved beak.—Specimens in bud and fruit only,

2. **I. majus**, *H.f. & T.*; leaves obovate-oblong or lanceolate, perianth-segments about 16.

TENASSERIM, on the Thoug Gain range, alt. 5500 ft., *Lobb*.

A shrub, 30 ft. *Leaves* 4-6 by 1½-2 in., sharply acuminate, coriaceous, glabrous, shining above; petiole 1 in. *Flowers* pink. *Pedicels* 1-3 in., subterminal, solitary or fascicled. *Sepals* and *petals* orbicular, ciliate, inner broad-oval. *Filaments* short, broader than the oblong anthers. *Ovaries* spreading. *Fruit* unknown.

3. **TALAUMA**, Juss.

Trees or shrubs. *Leaves* and inflorescence of *Magnolia*. *Sepals* 3. *Petals* 6 or more, in 2 or more whorls. *Stamens* very numerous, many-seriate; anthers linear, introrse. *Gynophore* sessile. *Ovaries* indefinite, 2-ovuled, spiked or capitate, stigmas decurrent. *Carpels* woody, separating from the woody axis at the ventral suture, and leaving the seeds suspended from the latter by an elastic cord. *Seeds* of *Magnolia*.—DISTRIB. Tropics of E. Asia and S. America, and in Japan; species about 15.

1. **T. Hodgsoni**, *H.f. & T. Fl. Ind.* 74; leaves obovate-oblong acute or obtuse glabrous, ovaries glabrous, fruit ovoid, carpels sharply beaked. *H.f. Ill. Him. Pl.* t. 6.

Forests of the SIKKIM HIMALAYA and of the KHASIA HILLS, alt. 4-5000 ft.

A lofty evergreen tree. *Leaves* 8-20 by 4-9 in., coriaceous, petiole 1-2 in. *Flowers* white, odorous; peduncle short, thick; buds subglobose, 2-3 in. diam. *Fruit* 4-6 in.; carpels 1½ by 1 in.; pits of the axis deep, nearly square.

2. **T. Rabaniana**, *H.f. & T. Fl. Ind.* 75; leaves lanceolate glabrous, ovaries glabrous, fruit ovoid, carpels shortly beaked. *Liriodendron liliifera*, *Roxb. Fl. Ind.* ii. 654.

Forests of the KHASIA HILLS, alt. 4000 ft., *H.f. & T.*

A lofty tree. *Leaves* 8-12 by 2-4 in.; petiole 1 in. *Fruit* 4-6 in., longer than broad; pits of the axis shallow, elongated.

3. **T. lanigera**, *H.f. & T.*; leaves lanceolate acute at both ends, glabrous, ovaries densely woolly, ripe fruit unknown.

EASTERN PENINSULA, *Griffith*.

A tree. *Leaves* 12 by 5 in.; petiole 1 in., thickened below. *Flowers* large, odorous; peduncle densely tomentose. *Sepals* 3, tomentose, at length glabrate. *Petals* about 8, oblong, fleshy, exceeding the sepals. *Carpels* (immature) densely woolly, beak glabrous.

4. **T. mutabilis**, *Blume Fl. Jav. Magnol.* 24, t. 10-12; leaves elliptic or lanceolate acuminate usually pilose or downy beneath, fruit ovoid;

carpels 9-12 coriaceous tubercled, beak short recurved. *H. f. & T. Fl. Ind.* 74. *Manglietia Candollei*, *Wall. Cat.* 6497 (not of *Blume*).

EASTERN PENINSULA, from Moulmein to Pinang.—DISTRIB. Java.

A shrub, 6-9 ft. (*Blume*) or tree: bark brown. *Leaves* 6-12 by 2-4 in., glabrous above, rarely so beneath, base acute; petiole 1-2 in., thickened below. *Flowers* large, white; peduncle stout, silky or woolly. *Sepals* 3, 1-2 in., oval, thick, greenish. *Petals* 6, obovate. *Fruit* 2 in.

4. **MAGNOLIA**, Linn.

Trees or shrubs. *Leaves* evergreen or deciduous; buds enveloped in the convolute stipules, which are connate in pairs. *Flower* large, terminal. *Sepals* 3. *Petals* 6-12, 2-4-seriate. *Stamens* numerous, many-seriate, filaments flat; anthers adnate, introrse. *Gynophore* sessile. *Carpels* many, imbricated on a long axis, 2-ovuled, persistent; stigmas decurrent on the ventral suture. *Fruit* an elongated axis, with persistent adnate 1-2-seeded dorsally dehiscent follicles. *Seeds* pendulous from the carpels by a long cord; outer walls of testa fleshy; albumen oily.—DISTRIB. Temp. N. America, temp. and trop. E. Asia and Japan; species about 15.

1. **M. Campbellii**, *H. f. & T. Fl. Ind.* 77; leaves deciduous elliptic ovate or oblong acute or acuminate membranous, flowers appearing before the leaves white or rose, carpels obtuse not beaked. *H. f. Ill. Him. Pl.* t. 4, 5. *Griff. Ic.* iv. t. 656.

EASTERN HIMALAYA, forests of Sikkim and Bhotan, alt. 8-10,000 ft.

A lofty tree; branches black. *Leaves* 4-12 by 2-4 in., glabrous above, glaucous pubescent or silky beneath, base cordate rounded or oblique; petiole 1 in. *Flowers* 6-10 in. diam. *Petals* 9-12. *Fruit* 6-8 in.

2. **M. globosa**, *H. f. & T. Fl. Ind.* 77; leaves deciduous? ovate acute or obtuse shortly mucronate glaucous beneath, buds globose appearing with the leaves, carpels shortly beaked.

Inner ranges of the SIKKIM HIMALAYA, alt. 9-10000 ft.

A small tree; branches brown, young tomentose, old glabrous. *Leaves* 5-9 by 3-6 in., nerves beneath tomentose. *Flowers* 4-5 in. diam., white, odorous; buds 1½ in. diam. *Petals* 6. *Fruit* 2-3 in. long.

3. **M. Griffithii**, *H. f. & T.*; leaves persistent oblong acute pale beneath, buds oblong appearing with the leaves, carpels obtuse not beaked.

Forests of UPPER ASSAM, near Sadya, *Griffith*.

An evergreen tree; young branches and buds silky tomentose, finally glabrate. *Leaves* 10-14 by 5-6 in., coriaceous, glabrous above, nerves a little rough beneath; petiole ½ in. *Flower-buds* 2 in., enclosed in silky bracts. *Carpels* 1-2-seeded.—The number of ovules is doubtful, and the plant may be a *Manglietia*.

4. **M. sphenocarpa**, *Roxb. Cor. Pl.* iii. t. 266; leaves evergreen oblong obtuse or subacute glabrous on both sides or puberulous beneath, buds globose appearing with the leaves, carpels very long-beaked. *Wall. Cat.* 975; *H. f. & T. Fl. Ind.* 78. *Liriodendron grandiflorum*, *Roxb. Fl. Ind.* ii. 653. *Michelia macrophylla*, *Don Prodr.* 226.

TROPICAL HIMALAYAN forests, from Nipal to Assam, KHASIA HILLS, and CHITTAGONG, alt. 3000 ft.

Evergreen; young parts hoary, at length glabrate. *Leaves* 8-16 by 3-6 in., tapering to the base, thick, coriaceous; petiole 1-2 in. *Flowers* white, fragrant; buds 2 in. diam. *Petals* 6, oval, fleshy. *Fruit* 8-16 in.; beak of carpels compressed, 1 in or more.

There is an undescribed *Magnolia* or *Manglietia* in Herb. Hook. from Bhotan (Booth) too incomplete for description.

5. **MANGLIETIA**, Blume.

Trees; foliage and inflorescence of *Magnolia*. *Sepals* 3. *Petals* 6 or more, 2- or more-seriate. *Stamens* very numerous, many-seriate; anthers linear, adnate, introrse. *Gynophore* sessile. *Ovaries* many, cohering in an ovoid head; stigma decurrent on the ventral suture; ovules 6 or more. *Fruit* ovoid, head of carpels persistent dehiscing dorsally. *Seeds* as in *Magnolia*.—**DISTRIB.** Mountains of tropical Asia; species 5.

1. **M. insignis**, *Blume Fl. Jav. Magnol.* 23; leaves lanceolate acute or acuminate, fruit a dense oblong spike of carpels. *H. f. & T. Fl. Ind.* 76. *Magnolia insignis*, *Wall. Tent. Fl. Nep.* t. 1; *Pl. As. Rar.* ii. t. 182; *Cat.* 973.

NIPAL, alt. 6-10,000 ft. KHASIA HILLS, alt. 3-6000 ft.

A lofty tree, wholly glabrous except a few brown hairs on the tips of the bud-scales. *Leaves* 4-8 by 1-2½ in., coriaceous, shining above, pale beneath, petiole ¾-1 in. *Flowers* odorous, pale pink; buds 2 in., ovoid-oblong. *Pistils* 9. *Fruit* 3-4 in., bright purple when fresh.

VAR. 1. LATIFOLIA: leaves 4-6 by 2-2½ in., elliptic-lanceolate acute.

VAR. 2. ANGUSTIFOLIA: leaves 6-8 by 1-2 in., lanceolate acuminate.

2. **M. Caveana**, *H. f. & T. Fl. Ind.* 76; leaves obovate-oblong obtuse or mucronate, fruit an ovoid or subglobose spike of carpels.

Forests of the KHASIA HILLS, alt. 2-3000 ft., *H. f. & T.*

A lofty tree, glabrous everywhere. *Leaves* 8-10 by 3-4 in., coriaceous, glaucous beneath, reticulated when dry; petiole 2 in. *Flowers* unknown. *Carpels* rounded at the back. *Seeds* 2-6.

6. **MICHELIA**, Linn.

Trees. *Leaves* as in *Magnolia*. *Flowers* axillary, solitary (terminal in *M. Cathcartii*). *Sepals* and *petals* similar, 9-15 or more, 3- or more-seriate. *Stamens* as in *Magnolia*. *Gynophore* stalked. *Carpels* in a loose spike, stigma decurrent; ovules 2 or more. *Fruit* a lax or dense elongate spike of coriaceous dorsally dehiscing carpels. *Seeds* of *Magnolia*.—**DISTRIB.** About 12 species; temp. and trop. Mts. of India.

* *Flowers terminal*.

1. **M. Cathcartii**, *H. f. & T. Fl. Ind.* 79; leaves oblong-lanceolate acuminate, nerves hairy on both surfaces, perianth-segments 9. *H. f. Ill. Him. Pl.* t. 7.

Temperate forests of the SIKKIM HIMALAYA, alt. 5-6000 ft.

A lofty tree; young branches densely silky. *Leaves* 4 by 1½ in., thin, subcoriaceous, pale beneath; petiole ½ in. *Flowers* 1 in. diam., white. *Sepals* and *petals* oblong, inner gradually smaller. *Carpels* sessile, densely imbricate; rachis 2-4 in.

** *Flowers axillary*. *Ovules* 3 or more (see also 8, *nilagirica*).

2. **M. Champaca**, L.; leaves ovate-lanceolate tapering to a long point, flowers yellow, segments of perianth 15-20, ovaries pubescent. *DC. Prodr.* i. 79; *Wall. Cat.* 969 (except K); *Roxb. Fl. Ind.* ii. 656; *W. & A. Prodr.* i. 6; *Wight Ill.* i. 13; *Blume Fl. Jav. Magnol.* t. 1; *H. f. & T. Fl. Ind.* 79. *M. rufinervis*, *DC. l.c.* 79; *M. Doldsopa*, *Ham. ex DC. l.c.*; *Don Prodr.* 226; *Wall. Tent. Fl. Nep.* t. 3; *Cat.* 971; *M. aurantiaca*, *Wall. Cat.* 6492; *Plant. As. Rar.* t. 147. *M. Rheedii*, *Wight Ill.* i. 14, t. 5, f. 6.

Commonly cultivated, but wild in the forests of the TEMPERATE HIMALAYA, from Nipal eastward; and in PEGU, TENASSERIM, the NILGHIRIS and TRAVANCOR.—DISTRIB. *Java (Champi).*

A tall tree; branchlets pubescent. *Leaves* 8–10 by $2\frac{1}{2}$ –4 in., shining above, pale and glabrous or puberulous beneath; petiole 1–1½ in. *Flowers* 2 in. diam., pale yellow or orange, very fragrant; peduncle short; buds silky. *Sepals* oblong, acute. *Petals* linear. *Fruit* 3–4 in., carpels subsessile.

3. **M. excelsa**, *Blume Fl. Jav. Magnol.* 9; leaves oblong or oblong-lanceolate acute silky-brown beneath, flowers white, segments of perianth about 12, ovaries pubescent. *Wall. Cat.* 6494; *Wight Ill.* i. 14; *H. f. & T. Fl. Ind.* 80; *Griff. Ic.* iv. 655. *Magnolia excelsa*, *Wall. Tent. Fl. Nep.* t. 2.

TEMPERATE HIMALAYA, alt. 5000 ft., from Nipal to Bhotan, and in the KHASIA HILLS.

A lofty tree; young parts softly brown-bairy. *Leaves* 5–8 by 2–3 in., acute, glabrous above; petiole 1 in. *Flowers* 4–5 in. diam.; buds 2 in., silky-brown. *Sepals* obovate. *Petals* gradually narrower. *Fruit* 5–8 in.; carpels subsessile, rather distant.

4. **M. lanuginosa**, *Wall. Tent. Fl. Nep.* 8, t. 5; *Cat.* 6493; leaves oblong or lanceolate, glabrous above white and tomentose beneath, flowers white, segments of perianth about 18, ovaries densely woolly. *H. f. & T. Fl. Ind.* 80. *M. velutina*, *DC. Prodr.* i. 79.

TEMPERATE HIMALAYA, alt. 5–7000 ft., from Nipal to Bhotan, and in the KHASIA HILLS.

A small or large tree; young parts densely white- or grey-tomentose. *Leaves* 6–10 by 2–3½ in.; petiole ½ in. *Flowers* 3–4 in. diam.; buds 1½ in. *Sepals* narrow-obovate, obtuse. *Inner petals* narrower, acute. *Fruit* 4–5 in.; carpels obovate, stalked, distant. —Wallich describes this as a tall tree flowering in spring. In Sikkim it forms a large bush, flowering in autumn.

5. **M. kisopa**, *Ham.; DC. Prodr.* i. 79; leaves lanceolate or oblong-lanceolate glabrous, flowers pale yellow, segments of perianth about 12, ovaries densely pubescent. *Wall. Tent. Fl. Nep.* t. 4; *Cat.* 970; *Don Prodr.* 226; *H. f. & T. Fl. Ind.* 81.

TEMPERATE HIMALAYA, alt. 5–7000 ft., from Nipal to Kumaon.

A tall tree; bark grey, young parts clothed with appressed grey pubescence, soon glabrous. *Leaves* 5–6 by 1½–2 in., acute or acuminate, glabrous on both surfaces; petiole 1 in. *Flowers* ¾–1 in. diam.; buds puberulous. *Sepals* narrow-obovate. *Petals* scarcely narrower than the sepals. *Fruit* 3–4 in.; carpels sessile.

*** *Flowers axillary. Ovules 2, superposed.*

6. **M. oblonga**, *Wall. Cat.* 972; leaves obovate-oblong glabrous glaucous beneath, flowers white, segments of perianth about 12. *H. f. & T. Fl. Ind.* 81; *M. lactea*, *Wall. Cat.* 6491.

Forests of the KHASIA HILLS and ASSAM.

A tree; branches glabrous. *Leaves* 4–6 by 2–2½ in., obtusely acuminate; petiole ¾–1 in. *Flower-buds* about 1 in., glabrous. *Sepals* 1½ in., narrow-obovate. *Petals* lanceolate. *Carpels* sessile.—An imperfectly known species.

7. **M. punduana**, *H. f. & T. Fl. Ind.* 81; leaves oblong abruptly acuminate glabrous, flowers white, segments of perianth about 9, ovaries densely pubescent. *Magnolia punduana*, *Wall. Cat.* 974.

Forests of the KHASIA HILLS, alt. 3–5000 ft.

A tall tree; young parts brown-silky, soon glabrate. *Leaves* 4–6 by 2 in., base acute or obtuse; petiole ¼–¾ in. *Flowers* 1½–2 in. diam.; buds ¾–1 in., silky. *Segments of perianth* obovate, outer obtuse, inner acute. *Fruit* 3–4 in.; carpels sessile.

8. **M. nilagirica**, *Zenk. Plant. Ind.* t. 20; leaves oblong elliptic- or obovate-lanceolate acute at both ends or tip mucronate glabrous or puberulous only on the nerves beneath, flowers white, segments of perianth 9-12, ovules 2 or 4-5. *Wight Ill.* i. 14; *Ic.* t. 938; *H. f. & T. Fl. Ind.* 82; *Thwaites Enum.* 5. *M. Pulneyensis*, *Wight Ill.* i. 14, t. 5 (except figs. 5 and 6).

Higher mountains, alt. 5-6000 ft., of the WESTERN PENINSULA (var. 1) and of CEYLON (var. 2).

A tall tree, or shrub at high elevations, young parts silky. *Leaves* 2-4 in. *Flowers* 3-4 in. diam.; buds $\frac{1}{2}$ -1 $\frac{1}{4}$ in., ovoid, pubescent. *Perianth-segments* obovate, inner acute. *Fruit* 2-3 in.; carpels sessile.—There is some confusion in the descriptions of the Ceylon and Nilghiri plants. Zenker describes *M. nilagirica* as 1-ovuled; Wight, (Illustr.) repeats this, but (Icones) figures 2 ovules and describes 4. Wight further describes (Illustr.) *M. Walkeri* as 2-ovuled, and *ovalifolia* as 3-ovuled, whilst under *glauca* he makes no mention of the ovules. His *M. Pulneyensis* is figured with yellow flowers, and 4 ovules, and may be *M. Champaca*.—The following varieties are possibly species:—

VAR. 1. WIGHTII; a tree, leaves 3-5 by 1 $\frac{1}{2}$ -2 in. elliptic green below, segments of perianth usually 12, ovules 4-5.—*M. ovalifolia*, *Wight Ill.* i. 13.

VAR. 2. WALKERI; leaves 2-3 by 1-1 $\frac{1}{2}$ in. oblong or obovate-oblong glaucous below, segments of perianth usually 9, ovules 2, superposed.—*M. Walkeri* and *M. glauca*, *Wight Ill.* i. 13, 14.

7. SCHIZANDRA, Michaux.

Climbing glabrous shrubs. *Leaves* exstipulate. *Flowers* unisexual, white, yellow or reddish, axillary, or in the axils of scales near the base of short lateral leafy branches. *Sepals* and *petals* 9-12, imbricate in about 3 series. ♂ *Stamens* 5-15 or more, in a spiral series, filaments very short, free or subconnate, often fleshy; anthers free or subimmersed in a fleshy head of confluent filaments, cells small, remote. ♀ *Ovaries* many, densely imbricated; stigma sessile; *ovules* 2. *Fruit* a slender spike of globose indehiscent fleshy 1-seeded carpels. *Seeds* 1-2, suspended, albumen fleshy, testa crustaceous; embryo minute.—DISTRIB. U. States, mountains of temperate and tropical India and Java; species about 6.

* *Filaments monadelphous below, free above.*

1. **S. grandiflora**, *H. f. & T.*; leaves ovate or oblong-lanceolate acuminate distantly toothed, flowers 1 in. diam., fruit 6-9 in., carpels scarlet fusiform on a cylindric fleshy axis. *Sphærostema grandiflorum*, *H. f. & T. Fl. Ind.* 84. *Kadsura grandiflora*, *Wall. Tent. Fl. Nep.* t. 14; *Cat.* 4985 *A in part.*

TEMPERATE HIMALAYA, from Simla to Bhotan, alt. 6-10,000 ft.

A woody glabrous climber. *Leaves* 3-6 by 1-2 in., rather fleshy, base acute, pale beneath; petiole 1-1 $\frac{1}{2}$ in. *Flowers* solitary, pinky-white, odorous; pedicel 1-2 in. *Filaments* cylindric above; anthers ovoid, connective thickened, cells lateral or subextrorse.

2. **S. elongata**, *H. f. & T.*; leaves ovate acute or acuminate minutely cartilaginous-toothed, flowers $\frac{2}{3}$ in. diam., fruit 2-3 in., carpels on a slender axis. *Sphærostema elongatum*, *Blume Fl. Jav. Schiz.* t. 5; *H. f. & T. Fl. Ind.* 85. *S. grandiflorum*, *Wall. Cat.* 4983, *A in part*, & *C.*

TEMPERATE HIMALAYA, from Nipal to Sikkim, alt. 5-6000 ft.; KHASIA HILLS.—DISTRIB. Java.

A woody climber; branches slender. *Leaves* 3-4 by 1 $\frac{1}{2}$ -2 in., pale or glaucous beneath; petiole $\frac{1}{2}$ -1 in. *Flowers* fascicled or solitary, $\frac{1}{4}$ - $\frac{3}{4}$ in. diam., yellowish; pedi-

cels 1-1½ in., slender. *Stamens* as in *S. grandiflora*.—Confounded with *S. grandiflora* by Wallich (under 4985), but more slender, flowers smaller. The fruit is not so stalked as in Blume's figure, but we believe this to be a variable character.

**** *Anthers sessile in cavities of the fleshy head of filaments.***

3. ***S. propinqua*, H. f. & T.**; leaves ovate-lanceolate serrate-toothed, flowers small, pedicels long, fruit 6 in. long, axis fleshy. *Sphærostema propinquum*, *Blume Fl. Jav. Schiz.* 16; *Wall. Cat.* 4986; *H. f. & T. Fl. Ind.* 85. *Kadsura propinqua*, *Wall. Tent. Fl. Nep.* 15.

HIMALAYA, from Nipal to Kumaon, alt. 4-6000 ft.

A woody climber. *Leaves* 3-5 by 1½ in., base rounded or cuneate; petiole ½ in. *Flowers* small, yellow or orange, solitary or fascicled; buds ¼-½ in. diam.; pedicels ½ in., bracteolate. *Anthers* slightly protruded. *Carpels* as in *S. grandiflora*.

4. ***S. axillaris*, H. f. & T.**; leaves lanceolate or oblong-lanceolate tapering to a fine point, entire or remotely toothed, flowers ½ in. diam., pedicels very short bracteolate, fruit 1-2 in. long. *Sphærostema axillare*, *Blume Fl. Jav. Schiz.* t. 3; *H. f. & T. Fl. Ind.* 86.

KHASIA HILLS, alt. 4-5000 ft.—DISTRIB. Java.

A slender climber. *Leaves* 3 by 1½-1¾ in., base cuneate or rounded; petiole ½ in. *Flowers* dull scarlet, axillary; bracteoles imbricating. *Stamens* as in *S. propinqua*. *Carpels* small.

8. **KADSURA**, Kæmpfer.

Characters of *Schizandra*, but ripe carpels arranged in a globose head, ovules sometimes 4.—DISTRIB. temp. and subtrop. Asia; species about 7.

1. ***K. Roxburghiana*, Arn. in Jard. Mag. Zool. & Bot. ii. 546; leaves ovate or oblong acute or acuminate, filaments connate in a column. *H. f. & T. Fl. Ind.* 83. *Kadsura japonica*, *Wall. Tent. Fl. Nep.* t. 12; *Cat.* 4987 *A, B (partly), not of Jussieu.* *Uvaria heteroclita*. *Roxb. Fl. Ind.* ii. 663.**

SUBTROPICAL FORESTS of SIKKIM, ASSAM, SILHET, and the KHASIA HILLS, ascending to 5000 ft.

A stout rambling climber; bark very rough. *Leaves* 3-6 by 1½-3 in., fleshy; petiole ½ in. *Flowers* ½ in. diam.; pedicels ¾-1 in., stout, bracteolate to or below the middle. *Outer filaments* short, free above, inner wholly connate. *Ovules* 2. *Fruit* 1-2 in. diam. *Carpels* many, as large as a bean, base cuneate, top rounded.

2. ***K. Wightiana*, Arn. l.c.** ii. 546; leaves broadly ovate acute or obtuse, filaments free, ovules usually 4. *H. f. & T. Fl. Ind.* 84; *Thwaites Enum.* 5.

Mountains of MALABAR, *Wight*, and of CEYLON, alt. 2-3000 ft.

A woody climber. *Leaves* 2-3 by 1-2 in., pale beneath, base cuneate. *Flowers* ½ in. diam., pale yellow-green; pedicels 1-2 in., stout, with several bracteoles. *Fruit* like *K. Roxburghiana*.

There is in Herb. Kew. an imperfect specimen of a Malacca *Kadsura* collected by Griffith (see *Notul.* iv. 714, *l.c.* iv. t. 651, f. 1 & 2); it may be *K. scandens*, Blume, distinguished by its mucronate fruit.

ORDER IV. **ANONACEÆ.** (By Hooker f. & Thomson.)

Trees or shrubs, often climbing and aromatic. *Leaves* alternate, exstipulate, simple, quite entire. *Flowers* 2- rarely 1-sexual. *Sepals* 3, free or connate, usually valvate. *Petals* 6, hypogynous, 2-seriate, or the inner absent. *Stamens* many, rarely definite, hypogynous, closely packed on the torus, filaments short or 0; anthers adnate, cells extrorse or sublateral,

connective produced into an oblong dilated or truncate head. *Ovaries* 1 or more, apocarpous, very rarely (*Anona*) syncarpous with distinct stigmas, style short or 0; ovules 1 or more. *Fruit* of 1 or more sessile or stalked 1- or many-seeded usually indehiscent carpels. *Seeds* large; testa crustaceous or coriaceous; albumen dense, ruminate, often divided almost to the axis into 4 series of horizontal plates; embryo small or minute, cotyledons divaricating.—**DISTRIB.** Tropics of the Old World chiefly; genera about 40 with 400 species, the determination of which is exceedingly difficult.

TRIBE I. Uvarieæ. *Petals* 2-seriate, one or both series imbricate in bud. *Stamens* many, close-packed; their anther-cells concealed by the overlapping connectives. *Ovaries* indefinite.

- Flowers 1-sexual; ovules many; torus conical 1. STELECHOCARPUS.
 Flowers 2-sexual; ovules many, rarely few; torus almost flat 2. UVARIA.
 Flowers 1-2-sexual; ovule solitary 3. ELIPEIA.

TRIBE II. Unoneæ. *Petals* valvate or open in bud, spreading in flower, flat or concave at the base only, inner subsimilar or 0. *Stamens* many, close-packed, their anther-cells concealed by the overlapping connectives. *Ovaries* indefinite.

* *Petals conniving at the concave base and covering the stamens and ovaries.*

- Ovaries 1-3, many-ovuled; peduncles not hooked 4. CYATHOCALYX.
 Ovaries many, 2-ovuled; peduncles hooked 5. ARTABOTRYS.
 Ovaries many; ovules 4 or more; peduncles straight 6. DREPANANTHUS.

** *Petals flat; spreading from the base.*

- Ripe carpels indehiscent.
 Ovules many, 2 seriate; petals lanceolate 7. CANANGA.
 Ovules many, 2 seriate; petals broad-ovate 8. CYATHOSTEMMA.
 Ovules 2-6, 1-seriate on the ventral suture 9. UNONA.
 Ovules 1-2, basal or subbasal 10. POLYALTHIA.
 Ripe carpels follicular 11. ANAXAGOREA.

*** *Inner petals valvate, tip incurved.*

12. POPOWIA.

TRIBE III. Mitrephoreæ. *Petals* valvate in bud, outer spreading; inner dissimilar, concave, connivent, arching over the stamens and pistil. *Stamens* many, close-packed, anther-cells concealed by the overlapping connectives. *Ovaries* indefinite.

* *Inner petals not clawed.*

- Inner petals smaller than the outer 13. OXYMITRA.
 Inner petals much larger than the outer 14. PHEANTHUS.

** *Inner petals clawed, usually smaller than the outer.*

- Ovules 1-2, near the base of the ovary 15. GONIOTHALAMUS.
 Ovules many 16. MITREPHORA.

TRIBE IV. Xylopiæ. *Petals* valvate in bud, thick and rigid, connivent, inner similar but smaller, rarely 0. *Stamens* many, close-packed, anther-cells concealed by the produced connectives. *Ovaries* indefinite.

- Ovules solitary; fruit fleshy, of many connate carpels 16.* ANONA.
 Ovules 2-∞; outer petals broad; torus convex 17. MELODORUM.
 Ovules 2-∞; outer petals narrow; torus flat or concave 18. XYLOPIA.

TRIBE V. **Miliuseæ**. *Petals* imbricate or valvate in bud. *Stamens* often definite, loosely imbricate, anther-cells not concealed by the overlapping connectives. *Ovaries* solitary or indefinite.

* *Ovaries indefinite*.

Petals valvate, inner largest; ovules definite	19. MILIUSA.
Petals valvate, inner largest; ovules indefinite	20. SACCOPETALUM.
Petals valvate, subequal; ovules 4-8	21. ALPHONSEA.
Petals valvate, inner shortest; ovules 2-4	22. OROPHEA.
Petals imbricate, subequal; ovules 2-8	23. BOCAGEA.

** *Ovaries solitary*.

Outer petals valvate, inner imbricate	24. KINGSTONIA.
All the petals valvate	25. LONCHOMERA.

1. **STELECHOCARPUS**, Blume.

A tree. *Leaves* coriaceous. *Flowers* dioecious, fascicled, axillary or on the old wood. *Sepals* 3, small, elliptic or orbicular, imbricate. *Torus* conical. *Stamens* indefinite, connective dilated, truncate. *Ovaries* indefinite, ovoid; stigma sessile; ovules 6 or more. *Ripe carpels* large, berried, globose, 4-6-seeded.—DISTRIB. Species 1 or 2, Malayan.

1. **S. Burahol**, Blume *Fl. Jav. Anon.* 48, t. 23 & 25 C.; leaves oblong-lanceolate acute or acuminate glabrous. *H. f. & T. Fl. Ind.* 95.

SINGAPORE, Lobb.—DISTRIB. Java.

A tall tree; branches black, glabrous. *Leaves* 5-8 by $1\frac{1}{2}$ -3 in., base acute; petiole $\frac{1}{2}$ in. ♀ *flowers* many, 1 in. diam.; ♂ much smaller; pedicels with scaly bracteoles, of ♂ 1 in., slender, of ♀ 2-3 in., stout, clavate, bracteolate below the middle. We collected a similar plant, but flowerless, near Chittagong.

2. **UVARIA**, Linn.

Scandent or sarmentose shrubs, usually stellately pubescent. *Flowers* terminal or leaf-opposed, rarely axillary, cymose fascicled or solitary, yellow purple or brown. *Sepals* 3, often connate below, valvate. *Petals* 6, orbicular oval or oblong, imbricate in 2 rows, sometimes connate at the base. *Stamens* indefinite; top of connective ovoid-oblong truncate or subfoliaceous. *Torus* depressed, pubescent or tomentose. *Ovaries* indefinite, linear-oblong; style short, thick; ovules many, 2-seriate, rarely few or 1-seriate. *Ripe carpels* many, dry or berried, few or many-seeded.—DISTRIB. Many tropical Asiatic and a few African species.

SECT. I. Outer stamens flat, subfoliaceous, often imperfect.

* Peduncles 1-2-flowered, leaf-opposed, rarely terminal (2-4-flowered in 3, *dulcis* and 7, *Lobbiana*).

a. *Leaves below and buds appressed tomentose*.

1. **U. purpurea**, Blume *Bijd.* 11: *Fl. Jav. Anon.* 13, t. 1 & 13 A; leaves cuneate- or oblong-lanceolate acute or acuminate cordate, stellate tomentose beneath, buds tomentose enclosed in 2 large bracts, carpels oblong or cylindric mucronate tomentose, dorsally 2-keeled. *Wall. Cat.* 6485, excl. *E. & G.*; *H. f. & T. Fl. Ind.* 95. *U. grandiflora*, Roxb. *Fl. Ind.* ii. 665; *Wall. Pl. As. Rar.* ii. t. 121; *Wight & Arn. Prodr.* 9. *Unona grandiflora*, DC. *Prodr.* i. 90.

From PEGU, *Wallich*, to SINGAPORE, *Lobb*, and PENANG, *Phillips*.—DISTRIB. Eastward to the Philippines.

Shrubby, sarmentose; young parts stellately pubescent. *Leaves* 6–12 by 2–4 in., tapering downwards from above the middle, young pubescent above, soon glabrous and shining; nerves many, parallel, close-set near the petiole, which is $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* 3–3 in. diam., rarely geminate, terminal or leaf-opposed, purple, odorous; bracts orbicular, deciduous; peduncle 1–1 $\frac{1}{2}$ in. *Sepals* ovate, acute. *Carpels* many, stalked, subtorulose; stalk 1–1 $\frac{1}{2}$ in.

2. **U. Hamiltoni**, *H. f. & T. Fl. Ind.* 96; leaves oblong-obovate long acuminate pubescent above tomentose beneath, buds tomentose, peduncle 1-bracteolate, carpels subglobose or broad ovoid tomentose not keeled. *Wall. Cat.* 6485, *E*.

FORESTS of the SIKKIM TERAI, BEHAR near Monghir, and ASSAM, *Hamilton*.

Shrubby, sarmentose or scandent; branches rough, tomentose. *Leaves* 5–8 by 2–3 $\frac{1}{2}$ in., tapering to the rounded or cordate base; petiole $\frac{3}{8}$ – $\frac{1}{2}$ in. *Flowers* 2 in. diam., solitary or geminate, leaf-opposed; pedicel 1 in., tomentose. *Sepals* connate below, short, broad, obtuse, mucronate. *Petals* broad-oval, densely tomentose on both surfaces. *Carpels* many, $\frac{3}{4}$ –1 in., transversely grooved when dry; stalk 1 in.

3. **U. dulcis**, *Dunal Anon.* 90 t. 13; leaves oval or oblong subacute puberulous above, woolly beneath, buds globose tomentose, peduncle with several bracteoles about the middle short 1–4-flowered. *DC. Prodr.* i. 88; *H. f. & T. Fl. Ind.* 98. *U. Javana*, *Dunal l.c.* 91; *Blume Fl. Jav. Anon.* t. 3.

MALACCA, *Griffith, Maingay*; TENASSERIM, *Brandis*.

A large woody climber; young branches densely tomentose. *Leaves* 3–5 by 1 $\frac{1}{2}$ –2 $\frac{1}{2}$ in., base rounded or subcordate, slightly repand; petiole $\frac{3}{8}$ – $\frac{1}{2}$ in. *Flowers* 2 in. diam., subumbellate, greenish, odorous; peduncle $\frac{1}{2}$ – $\frac{3}{4}$ in., leaf-opposed, short, woody; bracts several; pedicels bracteolate about the middle. *Petals* oblong, subacute, tomentose on both sides.—Allied to *U. macrophylla*.

4. **U. spheocarpa**, *H. f. & T. Fl. Ind.* 99; leaves narrow-obovate or cuneate-oblong, shining above stellate-tomentose beneath, peduncle 1-flowered, bracts orbicular scaly imbricate, carpels obovate-cuneate sessile warted. *Thwaites Enum.* 6; *Beddome Ic. Pl. Ind. Or.* t. 80.

Forests of CEYLON, ascending to 15,000 ft., *Walker*, &c.

A large shrub, climbing? *Leaves* 3–5 by 1 $\frac{1}{4}$ –2 $\frac{1}{4}$ in., shortly petioled, long-acuminate, base obtuse or retuse, above sparsely hairy, midrib tomentose. *Flowers* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., greenish-brown; peduncles $\frac{1}{2}$ in., leaf-opposed. *Petals* broadly oblong, tomentose. *Carpels* 1 in. diam., obovate-cuneate.

β. Leaves buds and carpels with loose spreading hairs.

5. **U. hirsuta**, *Jack Mal. Misc. ex Hook. Bot. Misc.* ii. 87; leaves oblong with scattered hairs above and stellate hairs beneath, peduncle 1- rarely 2-flowered, bracts large deciduous basal, carpels long-stalked warted hairy. — *Blume Fl. Jav. Anon.* t. 5; *Wall. Cat.* 6458 (excl. *C*); *H. f. & T. Fl. Ind.* 99. *U. trichomalla*, *Blume l.c.* 42 t. 18; *Roxb. Fl. Ind.* ii. 665.

PENANG, *Jack*; SINGAPORE, *Lobb*.—DISTRIB. Sumatra, Java.

A woody sarmentose shrub; young branches softly hairy. *Leaves* 5–6 by 1 $\frac{1}{2}$ –2 $\frac{1}{2}$ in., base rounded or cordate; petiole $\frac{1}{2}$ in. *Flowers* 1 $\frac{1}{2}$ in. diam., red; buds globose, hairy; peduncles 1 in., terminal or lateral, softly hairy, articulate near the base; bract $\frac{1}{2}$ in. *Sepals* large, orbicular, connate. *Petals* oblong, downy. *Carpels* 1–1 $\frac{1}{2}$ in., oblong or ovate-oblong, beak obscurely keeled—"deep orange, rugose, densely stellate-pilose," *Maingay mss.*

γ. *Leaves glabrous, except on the nerves.*

6. **U. bracteata**, *Roxb. Fl. Ind.* ii. 660; leaves oblong or obovate-oblong acute or shortly acuminate, peduncle 1-2-flowered, bract median leafy petioled, carpels subsessile oblong obtuse young tomentose. *Wall. Cat.* 6468; *H. f. & T. Fl. Ind.* 100. *U. Gomeziana. A. DC. Mem. Anon.* 27; *Wall. Cat.* 6459.

EASTERN BENGAL, from Silhet, *Roxburgh*; to Tenasserim, *Wallich*.

A large woody climber; young branches tomentose. *Leaves* 4-7 by $1\frac{3}{4}$ -2 $\frac{1}{2}$ in., base rounded, thin, firm, glabrous except the midrib and nerves beneath; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., tomentose. *Flowers* $\frac{1}{2}$ in. diam., pale yellow; peduncles $\frac{1}{2}$ in., leaf-opposed; bract $\frac{1}{2}$ in., oblong or ovate. *Sepals* connate to the middle, pubescent. *Carpels* 1-2 in.

7. **U. Lobbiana**, *H. f. & T. Fl. Ind.* 100; leaves oblong or obovate-oblong obtuse acute or mucronate glabrous, peduncle 2-4-flowered, bract small cordate amplexicaul at the fork, carpels obliquely ovoid long-stalked tubercled.

MALACCA, *Griffith, Maingay*, and SINGAPORE, *Lobb*.

A large woody climber; branchlets pubescent. *Leaves* 4-7 by $1\frac{3}{4}$ -3 in., base rounded or subcordate, thin, coriaceous, midrib and under surface with sometimes a few stellate hairs; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* 1 in. diam., purplish-brown; buds globose; peduncles terminal and leaf-opposed, pedicels bracteolate; bracts and bracteoles about $\frac{1}{2}$ in. *Sepals* connate for $\frac{2}{3}$ their length into a wavy cup. *Petals* broad-oval, tomentose, warted on both surfaces. *Carpels* 1 in., tomentose.—Near *U. ptychocalyx*, *Miq.*

** Peduncles 3-6-flowered, leaf-opposed. (See 3, *dulcis* and 7, *Lobbiana*.)

8. **U. macrophylla**, *Roxb. Fl. Ind.* ii. 663; leaves oblong or obovate-oblong abruptly acuminate, glabrous or stellate-pubescent beneath, peduncle many-flowered, bracts small oval basal, carpels ovoid or oblong glabrous sessile or stalked. *Wall. Pl. As. Rar.* t. 122; *Cat.* 6487; *H. f. & T. Fl. Ind.* 97; *Beddome Ic. Pl. Ind. Or.* t. 81. *U. cordata*, *Wall. Cat.* 6486. *Guatteria cordata*, *Dunal Anon.* 129 t. 30; *DC. Prodr.* i. 93.

EASTERN BENGAL, from Silhet to Ava and Singapore; South-Eastern districts of CEYLON.—DISTRIB. Java.

A large sarmentose shrub; young parts tomentose. *Leaves* 6-12 by 3-6 in., base cordate, nerves above tomentose; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* $1\frac{1}{2}$ in. diam., reddish-brown; peduncles 1 in., and bracts tomentose; pedicels short; bracteole supramedian. *Petals* broad-oval, pubescent. *Carpels* 1-1 $\frac{1}{2}$ in., berried, sometimes shorter than their stalk.—The Borneo and Philippine specimens formerly identified with this, we refer to *U. ovalifolia*, *Blume*.

9. **U. semecarpifolia**, *H. f. & T. Fl. Ind.* 97; leaves oblong or obovate-oblong obtuse or mucronate rarely acute very thick stellate-pubescent beneath, peduncle 3-6-flowered, bracts at the forks scaly, carpels shortly stalked smooth tomentose.—*Thwaites Enum.* 6; *Beddome Ic. Pl. Ind. Or.* t. 82.

MALACCA, *Griffith*; tropical forests of Central and S. E. CEYLON.

A woody climber; branches tomentose. *Leaves* 6-10 by 2 $\frac{1}{2}$ -4 $\frac{1}{2}$ in., slightly cordate, nerves above pubescent; petiole $\frac{1}{4}$ in. *Flowers* 1-1 $\frac{1}{2}$ in. diam., greenish-brown; peduncles $\frac{1}{2}$ in., leaf-opposed, tomentose. *Petals* broad-oval, hoary. *Carpels* 1 in. diam., subglobose.—Malacca specimens have more distant nerves than Ceylon ones.

10. **U. ptychocalyx**, *Miq. Ann. Mus. Lugd. Bat.* ii. 4; leaves oblong or obovate-oblong obtuse or abruptly acuminate stellately hairy beneath at length glabrous, peduncle 2-3-flowered with a large leafy bract at the base

of each pedicel and a bracteole under the calyx, carpels stalked subglobose rough densely tomentose.

Forests of PEGU, *Maclelland*, &c.—DISTRIB. Sumatra, Java?

A woody climber; bark dark grey, rugged; young parts densely tomentose. *Leaves* 4–12 by 2–5 in., slightly cordate, midrib and nerves above tomentose; petiole $\frac{1}{2}$ – $\frac{1}{4}$ in. *Flowers* $1\frac{1}{4}$ in. diam., dull red-purple; pedicels $\frac{1}{2}$ – $\frac{1}{4}$ in.; bract $\frac{1}{2}$ –1 in. long, ovate, tomentose. *Sepals* connate halfway up into a densely tomentose cup, margins subuplicate. *Petals* fleshy, oval or obovate-oblong, obtuse, tubercular, pubescent. *Carpels* size of a cherry; stalk $1\frac{1}{2}$ in.

*** Peduncles axillary, 1-flowered.

11. **U. subrepanda**, *Wall. Cat.* 6483; leaves oblong or obovate-oblong acute glabrous above pubescent beneath at length glabrous, peduncles slender stellately pubescent bracteolate about the middle and base. *H. f. & T. Fl. Ind.* 101.

SINGAPORE, *Wallich*.

A shrub; branches very slender, young parts pubescent. *Leaves* membranous, midrib pubescent above. *Peduncles* 1 in.; bracteoles concave.—A very imperfectly known plant.

SECT. II. Stamens all cuneate; connective truncate or capitate or hardly produced beyond the cells.

* *Flowers 1 inch or more in diameter.*

12. **U. macropoda**, *H. f. & T. Fl. Ind.* 101; leaves 3–6 in. oblong or lanceolate acute or acuminate glabrous, buds tubercled beaked, carpels oblong granulate 3-quetrous very long stalked. *Thwaites Enum.* 6; *Beddome Ic. Pl. Ind. Or.* t. 79.

Forests in Central and Eastern CEYLON, *Walker*, &c.

A large woody climber; branchlets glabrous or with sparse stellate scales. *Leaves* 3–6 by 1–2 in., shining above, pale beneath; petiole $\frac{1}{4}$ in. *Flowers* 2 in. diam., reddish brown, terminal or leaf-opposed; peduncle scurfy. *Sepals* granular, tomentose inside, orbicular, mucronate. *Petals* oblong. *Carpels* 15–30, 1–2 in., berried, scarlet; stalk 3–6 in., clavate.

13. **U. Narum**, *Wall. Cat.* 6473; leaves 3–8 in. oblong-lanceolate or narrow-oblong acute or shortly acuminate glabrous, buds globose stellate-tomentose, carpels ovoid or oblong smooth slender-stalked. *W. & A. Prodr.* 9; *Wight Ill.* 1, t. 6; *H. f. & T. Fl. Ind.* 102; *Thwaites Enum.* 6. *Unona Narum*, *Dunal Anon.* 99; *DC. Prodr.* i. 89.

Forests of the WESTERN PENINSULA; central province of CEYLON, ascending to 4000 ft.

A large woody climber; branches glabrous. *Leaves* 3–6 by $1\frac{1}{4}$ – $1\frac{3}{4}$ in., shining above; petiole $\frac{1}{4}$ in., glabrous. *Flowers* $1\frac{1}{2}$ in. diam., terminal or leaf-opposed, solitary, reddish or dingy green; pedicels $1\frac{1}{2}$ in., filiform, glabrous. *Sepals* orbicular, subacute. *Petals* sometimes 7–8, oval or oblong, connate below. *Carpels* 1 in., scarlet, subtorulose, glabrous; stalk 1–2 in.

VAR. 1. *Eunarium*; leaves 3–6 in., more oblong-lanceolate.

VAR. 2. *macrophylla*; leaves 6–9 in., lanceolate, carpels on longer thicker angular stalks.—*U. lurida*, var. β , *H. f. & T. Fl. Ind.* 101; *Wall. Cat.* 6473; *Dalz. & Gibs. Fl. Bombay*, 3.

14. **U. lurida**, *H. f. & T. Fl. Ind.* 101 (*excl. var. β*); leaves oblong or oblong-lanceolate acute or acuminate, glabrous and shining on both surfaces, buds globose rough glandular, fruit unknown.

Northern slopes of the KHASIA HILLS, alt. 2000 ft., *H. f. & T.*

A large woody climber; young parts with stellate scales. *Leaves* 3-8 by 1-2½ in., base rounded or acute, paler beneath; petiole ½ in. *Flowers* 2 in. diam., solitary or geminate; peduncles 1 in., stellately pubescent. *Petals* broad-obovate, obtuse.—Possibly a state of *U. Narum*.

15. **U. zeylanica**, *L.*; leaves lanceolate or oblong-lanceolate acute or acuminate thickly coriaceous quite glabrous, buds very small subglobose, carpels subsessile ovoid or globose hoary.—*Dunal Anon.* 88; *DC. Prodr.* i. 88; *H. f. & T. Fl. Ind.* 102; *Thwaites Enum.* 6; *Beddome Ic. Pl. Ind. Or.* t. 78. *U. coriacea*, *Vahl Symb.* iii. 72. *U. lutea*, *Wall. Cat.* 6462 (not of *Roeb.*). *U. Heyneana*, *W. & A. Prodr.* 8 (not of *Wall.*). *Guatteria Malabarica*, *Dunal Anon.* 134. *G. montana*, *DC. Prodr.* i. 94.

MALABAR, TRAVANCOR, and CEYLON.

A large woody climber; branchlets tomentose. *Leaves* 2½-3½ by ¾-1½ in., base acute, dark green and shining above, red or pale beneath; petiole very short. *Flowers* 1 in. diam., solitary or geminate, dull red; peduncles ½ in., terminal or leaf-opposed, tomentose; bracts several, scaly. *Petals* oblong, acute. *Carpels* ½ in.

16. **U. pauciovulata**, *H. f. & T.*; leaves elliptic or oblong obtuse or obtusely acuminate glabrous shining above paler and scaberulous beneath pubescent on the strong nerves, racemes terminal few-flowered, carpels globose mammillate tomentose long-stalked.

MALACCA, Maingay.

A flexuous shrub; branchlets bracts sepals and petals externally brown-tomentose or scurfy. *Leaves* 2-5 by 1-2½ in., rigid, coriaceous, base rounded or cordate, nerves many spreading; petiole ⅓ in. *Flowers* 1½ in. diam.; peduncle short, stout, 1-3-flowered; bracts orbicular; buds globose. *Sepals* ¼ in., orbicular, connate to the middle. *Outer petals* 1½ in., orbicular-oblong, very coriaceous, glabrous within; inner as long, narrower. *Torus* flattish. *Ovaries* linear, with stellate scales, base solid; style cylindric, stigma obtuse; ovules 1-3 superposed. *Carpels* 12-15, ¼-½ in. diam., 1-2 seeded; stalk ½-¾ in., slender. *Seeds* horizontal, compressed, testa shining.

** *Flowers small, ½ inch or less in diameter.*

17. **U. micrantha**, *H. f. & T. Fl. Ind.* 103; leaves oblong-lanceolate obtusely acuminate glabrous coriaceous, petiole very short, buds globose pubescent, carpels glabrous granulate. *Guatteria micrantha*, *A. DC. Mem.* 42; *Wall. Cat.* 6449. *Polyalthia fruticans*, *A. DC. l.c.* 42; *Wall. Cat.* 6430.

EASTERN PENINSULA; from Ava and Tenasserim, to Penang.

A large woody climber; young parts tomentose. *Leaves* 2-3 by ¾-1½ in., base acute, midrib above and under surface when young slightly hairy. *Flowers* ½-¾ in. diam., white; peduncles 1-3, ¼ in., tomentose; bracteoles 2-3, orbicular. *Sepals* pubescent outside, persistent, not much imbricated. *Carpels* 15-20, ¼-½ in., stalk as long.

18. **U. sumatrana**, *H. f. & T.*; leaves elliptic-oblong or oblong-lanceolate membranous long-acuminate tip obtuse or acute glabrous, petiole very short, flowers minute fascicled. *Anaxagorea sumatrana*, *Miq. Fl. Ind. Bat. Suppl.* i. 382.

ANDAMAN ISLANDS, *Kurz.*

Branches slender, rough, young brown-tomentose. *Leaves* 3-6 by ¾-1½ in., base rounded or subacute, midrib above tomentose; petiole very short, tomentose. *Flowers* terminal or leaf-opposed, tomentose; bracteole submedian, small, orbicular, tomentose. *Sepals* ovate, acute. *Petals* twice as long; broad-ovate.

19. **U. parviflora**, *H. f. & T. Fl. Ind.* 103; leaves oblong usually acuminate membranous pellucid-dotted, petiole ½-¾ in., buds minute globose, peduncles 1-4-flowered with several bracts.

PENANG, *Phillips*.

A slender woody climber; branchlets glabrous; buds tomentose. *Leaves* 4-6 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., base acute, nerves reticulate. *Flowers* very minute; peduncle about $\frac{1}{2}$ in., leaf-opposed or nearly so; bracts alternate; pedicels $\frac{1}{2}$ - $\frac{1}{2}$ in., puberulous; bracteole submedian, linear-oblong. *Sepals* orbicular, pubescent. *Petals* ovate, acute.

U. *SCLEROCARPA*, A. DC. *Mem. Anon.* 27; *Wall. Cat.* 6461, from Moulmein, is a very doubtful plant, of which the flower is unknown and fruit immature.

3. **ELLIPEIA**, H. f. & T.

Characters of *Uvaria*, but differing in the oblong style, solitary ventral or subbasal ovule, and 1-seeded carpels.—*DISTRIB.* Malayan Peninsula and Archipelago; species 5 or 6—Reduced to *Uvaria* by Baillon.

1. **E. cuneifolia**, H. f. & T. *Fl. Ind.* 104; leaves oblong or bovate-oblong abruptly acuminate glabrous above tomentose beneath, flowers in terminal panicles, carpels tomentose oblong obtuse. *Hook. Ic. Pl.* t. 1025.

MALACCA, *Griffith, Maingay*.

Branches woody, brown-tomentose. *Leaves* 6-8 by 2-3 in., firm, coriaceous, base rounded or subcordate, shining above except the tomentose midrib; petiole $\frac{1}{2}$ in. *Pedicels* $\frac{1}{2}$ in., densely tomentose; bracts at each fork oblong or ovate; bracteole under the calyx, orbicular. *Flowers* $1\frac{1}{2}$ in. diam., densely tomentose. *Carpels* $\frac{1}{2}$ -3 in., with a lateral mucro; stalk 1 in.

2. **E. ferruginea**, H. f. & T.; leaves oblong or obovate acute or obtuse appressed pubescent above densely stellate tomentose beneath, flowers solitary terminal or leaf-opposed, carpels stellate-tomentose. *Uvaria ferruginea*, *Ham.*; H. f. & T. *Fl. Ind.* 96.

Forests of AVA at Meaday, *Hamilton*; and PEGU, *Kurz*.

Scandent; branches slender, brown-tomentose. *Leaves* 3-6 by $1\frac{1}{2}$ - $3\frac{1}{2}$ in.; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in., brown-tomentose. *Flowers* $1\frac{1}{2}$ - $1\frac{1}{2}$ in. diam., grey-pubescent; peduncle $\frac{1}{2}$ - $\frac{1}{2}$ in.; bracts submedian, oblong or lanceolate, deciduous. *Sepals* $\frac{1}{2}$ in., broad-ovate, acute. *Petals* $\frac{3}{4}$ in., oval. *Carpels* many, shortly stalked.—M. Kurz sends detached fruits, from which the description is taken.

3. **E. glabra**, H. f. & T.; leaves oblong or elliptic-oblong shortly acuminate quite coriaceous glabrous on both surfaces, cymes axillary 3-5-flowered, carpels subglobose, stalk slender.

MALACCA, *Maingay*.

A tree; branchlets and inflorescence brown-pubescent. *Leaves* 4-5 $\frac{1}{2}$ by $1\frac{1}{2}$ -2 in., base rounded or acute, rigid above, hardly shining, beneath rather paler, veins strong arched; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in., glabrous. *Flowers* $1\frac{1}{2}$ in. diam., cymes 1- $1\frac{1}{2}$ in.; peduncle very short; pedicels longer; bracteole oblong, $\frac{1}{2}$ -plexicaul, recurved. *Sepals* $\frac{1}{2}$ in., ovate-lanceolate, acute, recurved. *Petals* flat, not clawed, outer 1 in. obovate-lanceolate, sub-acute; inner shorter, obovate, obtuse. *Ovaries* glabrous below, solid and strigose above; ovule 1, erect (*Maingay*). *Carpels* $\frac{3}{4}$ in., walls thin; stalk $\frac{3}{4}$ -1 $\frac{1}{2}$ in., slender. *Seed* oblong, pale, girt with a deep longitudinal furrow.—Very different in habit from its congeners.

4. **E. nervosa**, H. f. & T.; branches glabrous, leaves elliptic-oblong or lanceolate finely acuminate coriaceous glabrous pale, nerves beneath strong oblique, flowers solitary extra-axillary polygamous, carpels glabrous stalk stout.

MALACCA, *Maingay*.

Branches stout. *Leaves* 6-10 by 2 $\frac{1}{2}$ -3 in., base acute, nerves very oblique, faint above; *

petiole $\frac{1}{2}$ in., thickened, glabrous. *Flowers* $\frac{3}{4}$ in. diam., silky-pubescent, solitary, leaf-opposed; peduncle short, stout; bracts basal. *Sepals* broad-ovate, obtuse. *Petals* spreading, imbricate (Maingay), outer obovate-oblong, obtuse; inner rather shorter, oblong. *Stamens* in δ very many, in γ few. *Ovaries* many, curved, top rounded. *Unripe carpels* $\frac{3}{4}$ in., narrow-ovoid, curved, narrowed at either end, fleshy.

4. **CYATHOCALYX**, Champion.

Trees. *Leaves* glabrous. *Flowers* fascicled terminal or leaf-opposed. *Sepals* free or united into a 3-lobed cup. *Petals* 6, 2-seriate, valvate in bud, subequal, bases concave conniving, blade flat spreading. *Stamens* indefinite, long-cuneate, truncate; anther-cells linear, dorsal. *Ovaries* solitary (or 2-3 in *C. ? Maingay*), on a concave torus; stigma large, peltate; ovules many. *Ripe carpels* berried.—DISTRIB. Tropical India; species 3

1. **C. zeylanicus**, Champ.; *H. f. & T. Fl. Ind.* 127; leaves oblong-lanceolate acuminate, calyx truncate remotely 3-toothed, carpel oblong or subglobose. *Thwaites Enum.* 9; *Beddome Ic. Pl. Ind. Or.* t. 47.

Central and southern provinces of CEYLON, Walker.

A tree; branches glabrous; bark dark, buds golden-pubescent. *Leaves* 6-10 by 2-3 in., base acute; petiole $\frac{1}{4}$ in. *Flowers* 1-3, fascicled on a short woody peduncle, pale green; pedicels $\frac{1}{2}$ -1 in. *Petals* $2\frac{1}{2}$ by $1\frac{1}{2}$ in., brown-pubescent. *Carpels* $2\frac{1}{2}$ in. diam., berried. *Seeds* compressed, 1 in., sides transversely rugose, testa red-brown, bony.—We have removed the Mergui plant of Griffith (No. 1032) to the following.

2. **C. martabanicus**, *H. f. & T.*; leaves ovate or oblong acuminate, calyx acutely 3-lobed to the middle, carpel oval.

Forests of PEGU, TENASSERIM and MARTABAN.

A tree; branches smooth, glabrous, young puberulous. *Leaves* 6-8 by 2-4 in.; petiole $\frac{1}{4}$ in. *Flowers* 1-3 together, leaf-opposed; pedicels very short, pubescent. *Calyx* pubescent. *Petals* $\frac{3}{4}$ -1 in., inner shortest and narrowest. *Carpel* 3 by $1\frac{1}{2}$ in.

3. **C. ? Maingay**, *H. f. & T.*; leaves glabrous broad-elliptic or elliptic-oblong, tip $\frac{1}{2}$ in. abruptly caudate linear obtuse, buds subglobose silky, carpels very large thick subglobose sessile.

MALACCA, Maingay.

A tree; branchlets nearly glabrous. *Leaves* 5-7 by 2-3 in., base obtuse or subacute, membranous, beneath concolorous, nerves slender; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Flowers* 2 in. diam., several on a short pubescent axillary bracteate peduncle. *Sepals* almost free, ovate, acute, densely pubescent. *Outer petals* obovate, rusty pubescent; inner rather smaller and narrower. *Connective* not prolonged. *Ovaries* 2-3; ovules 10, 2-seriate. *Carpels* 2-3 $\frac{1}{2}$ by $1\frac{1}{4}$ -3 in., subverrucose, pubescent, at length glabrous. *Seeds* many, broad, flattened, imbricate in 2 series; testa bony.—Referred to near *Artabotrys* and *Cananga* by Maingay; a very doubtful member of this genus. *Petals* valvate below, imbricate above.

5. **ARTABOTRYS**, R. Brown.

Sarmentose or scandent shrubs. *Leaves* shining. *Flowers* solitary or fascicled, usually on woody usually hooked recurved branches (peduncles). *Sepals* 3, valvate. *Petals* 6, 2-seriate, bases concave connivent, limb spreading, flat subterete or clavate. *Stamens* oblong or cuneate; connective truncate or produced; anther-cells dorsal. *Torus* flat or convex. *Ovaries* few or many; style oblong or columnar; ovules 2, erect, collateral. *Ripe carpels* berried.—DISTRIB. Tropical Africa and Eastern Asia.

* *Limb of petals broad-lanceolate or elliptic-oblong.*

1. **A. odoratissimus**, *R. Br. in Bot. Reg.* 423. not of *Blume*; leaves oblong or lanceolate glabrous, petals glabrous when expanded, carpels glabrous. *Wall. Cat.* 6415; *W. & A. Prodr.* 10; *H. f. & T. Fl. Ind.* 128. *A. hamatus*, *Blume Fl. Jav. Anon.* 60, t. 29, 31 C. *Unona hamata*, *Dunal Anon.* 106, t. 17; *DC. Prodr.* i. 90. *Uvaria odoratissima and hamata*, *Roxb. Fl. Ind.* ii. 666.

Southern parts of the WESTERN PENINSULA, and in CEYLON; cultivated throughout India—DISTRIB. Java, S. China.

A glabrous shrub; branches long. *Leaves* 2–8 by 1–2 in. *Flowers* yellow, solitary or geminate. *Petals* 1–1½ in., nearly equal, young pubescent, especially at the base. *Carpels* obovate-oblong, yellow, odorless.

2. **A. Kurzii**, *H. f. & T.*; leaves obovate-oblong obtuse or obtusely mucronate or elliptic and acute at both ends, glabrous except the pilose nerves and midrib, flowers on solitary slender (not hooked) peduncles, petals grey-pubescent, carpels glabrous.

Forests of PEGU, *Kurz*.

Shrubby, sarmentose; young parts brown-tomentose. *Leaves* 2½–6 by 1½–2½ in., shining above, pale below; petiole ½ in. *Flowers* extra-axillary; peduncle ½ in., strigose. *Sepals* ½ in., triangular, acuminate. *Petals* about 1½ in., limb oblong, subacute or obtuse, grey-pubescent; inner rather shorter. *Carpels* (unripe) many.—The peduncles, which are not hooked in flower, may become so in fruit.

3. **A. zeylanicus**, *H. f. & T. Fl. Ind.* 128; leaves oblong or lanceolate acute or obtusely acuminate glabrous, peduncle leaf-opposed, sepals as broad as long, petals tomentose, carpels tomentose. *Beddome Ic. Pl. Ind. Or.* t. 48.

Forests of MALABAR, CANARA, Central and Southern CEYLON.

A woody climber; branchlets puberulous. *Leaves* 4–6 by 1½–2½ in.; petiole ½ in. *Flowers* brown-tomentose; pedicels ½ in., pubescent. *Sepals* puberulous, ¼ in. long. *Petals* 1¼–1½ in., inner shorter and narrower; limb flat, lanceolate. *Carpels* broad obovoid, mucronate.

4. **A. crassifolius**, *H. f. & T.*; leaves elliptic or oblong obtuse subacute or obtusely mucronate, coriaceous glabrous or pilose beneath, petiole very thick, peduncles reflexed woody, petals and carpels densely tomentose.

EASTERN PENINSULA, from Martaban, *Brandis*, to Malacca, *Griffith*.

A large woody climber; branchlets tomentose. *Leaves* 6 by 2½–3 in., base acute or obtuse, lucid above, pale and strongly nerved beneath; petiole ½ in., glabrous. *Pedicels* ½ in., brown-tomentose. *Sepals* ovate-lanceolate, and petals densely tomentose; the latter 1½ by 1½ in., inner shorter and half the width. *Ovaries* sparingly hairy; style cylindric. *Carpels* many, 1¼ in., obovoid, very thick, glabrous, granulate; stalk hardly any.

5. **A. pleurocarpus**, *Maingay mss.*; leaves elliptic or oblong-lanceolate or oblanceolate caudate-acuminate membranous glabrous, flowers fascicled, peduncles falcate, petals subequal elliptic-oblong obtuse, ovaries glabrous, carpels pubescent broad elliptic.

MALACCA, *Maingay*.

A scandent shrub; branches slender, glabrous. *Leaves* 5–8 by 1¾–2 in., base acute, pale, finely reticulate on both surfaces, nerves slender, spreading; petiole ½–¾ in. *Peduncles* ½ in., densely pubescent. *Sepals* ¾ in., broad-ovate, obtuse or subacute. *Petals* flat, pubescent on both surfaces; outer 1–1½ in., inner rather smaller. *Connective* apiculate. *Ovaries* many, slender. *Carpels* ¾ in., mammillate, obscurely grooved, narrowed into the short stout stalk. *Seeds* 2, testa stony.

**** Limb of outer or all the petals linear, narrow-oblong or subclavate.**

6. **A. speciosus**, Kurz. mss. in *Hb. Kew.*; leaves oblong obtusely acuminate thick rigid glabrous, peduncles flattened woody reflexed, outer petals linear-lanceolate tapering from the base, inner much narrower, ovaries glabrous.

ANDAMAN ISLANDS, Kurz.

Scandent; bark grey, rugged, reticulate; leaf-buds silky. *Leaves* 5-8 by 2-3 in., shining above, dull beneath; petiole $\frac{1}{4}$ in. *Flowers* fascicled towards the end of the pubescent peduncles. *Sepals* $\frac{1}{4}$ in., ovate, acute or acuminate, thick, rigid, puberulous outside, glabrous within. *Outer petals* 2 by $\frac{1}{4}$ in., appressed pubescent, claw concave; inner much contracted above the orbicular concave claw, narrow-linear. *Torus* strigosa. *Fruit* unknown.

7. **A. Maingayi**, H. f. & T.; leaves elliptic acuminate at both ends glabrous tip caudate, petiole slender, peduncle falcate glabrous, outer petals linear-oblong, inner rather smaller, ovaries glabrous, carpels sessile glabrous.

MALACCA, Maingay.

Branches black, glabrous, slender. *Leaves* 4-6 by $1\frac{1}{2}$ -2 in., thin, concolorous and finely reticulate on both surfaces. *Flowers* 1 in. diam., fascicled; peduncle $\frac{1}{2}$ -1 $\frac{1}{2}$ in., hoary-pubescent. *Sepals* $\frac{1}{2}$ in., obtuse. *Outer petals* 1-1 $\frac{1}{4}$ by $\frac{1}{4}$ - $\frac{1}{2}$ in., obtuse, concave; base small, suborbicular; inner smaller and narrower. *Ovaries* 3-4, ovoid *Carpels* 2 $\frac{1}{2}$ by $1\frac{1}{2}$ in., elliptic globose, mammillate, yellow, walls thick. *Seeds* 2, plano-convex, testa stony.

8. **A. caudatus**, Wall. Cat. 6417; leaves oblong-lanceolate obtusely caudate-acuminate glabrous, peduncles short woody recurved many-flowered, outer petals narrow-linear not contracted above the square claw. H. f. & T. *Fl. Ind.* 129.

KHASIA HILLS, Wallich.

A woody climber; old branches glabrous, young pubescent. *Leaves* 3-5 by 1-2 in., membranous, shining; petiole $\frac{1}{2}$ in. *Sepals* short, acute. *Petals* $1\frac{1}{4}$ in., flattened, tomentose; inner similar, rather smaller.—Only known from Wallich's specimen in Herb. Linn. Soc.

9. **A. burmanicus**, Alph. DC. Mem. 36; leaves oblong obtusely caudate-acuminate softly pubescent beneath, peduncles woody usually 1-flowered tomentose, limb of petals subulate 3-quetrous, carpels glabrate. Wall. Cat. 6428; H. f. & T. *Fl. Ind.* 129. *Ropalopetalum uniflorum*, Griff. Notul. iv. 717.

AVA, Wallich; TENASSERIM, Griffith.

A large woody climber; branches slender, young tomentose. *Leaves* 3-7 by 1-2 $\frac{1}{2}$ in., membranous, glabrous above, except the midrib, nerves subhirsute beneath. *Flowers* about $\frac{1}{2}$ in. long; peduncles obliquely leaf-opposed, old woody and hooked. *Petals* grey-pubescent. *Carpels* $\frac{3}{4}$ in. obovate-oblong.

10. **A. suaveolens**, Blume *Fl. Jav. Anon.* 62, t. 30, 31 D; leaves oblong-lanceolate acuminate shining above glabrous on both surfaces or sparsely hairy on the midrib beneath, peduncles woody recurved many-flowered, flowers fascicled bracteolate, limb of petals cylindric or sub-clavate, carpels sessile smooth. Wall. Cat. 6416; H. f. & T. *Fl. Ind.* 129; *Unona suaveolens*, Blume *Bijd.* 17.

From SILHET to MALACCA.—DISTRIB. Eastwards to the Philippines.

A large woody climber; branches dark, striate, young silky. *Leaves* 3-5 by 1-1 $\frac{1}{2}$ in., base acute, pale beneath; petiole $\frac{1}{4}$ in. *Flowers* about $\frac{1}{2}$ in. long, yellowish, odorous; bracts subulate, deciduous. *Petals* grey-pubescent. *Carpels* small, oblong.

6. **DREPANANTHUS**, Maingay, mss.

Trees. Leaves large, pubescent beneath. *Racemes* short, fascicled on woody truncal tubercles. *Sepals* 3, nearly free. *Petals* 6, valvate, 2-seriate, subequal; bases concave, connivent; limb erect or spreading, broad or narrow. *Stamens* many, cuneate, truncate; anthers linear, cells lateral; connective not produced. *Ovaries* 4-12; stigma subsessile; ovules 4 or more, 2-seriate. *Carpels* globose, several-seeded.

1. **D. pruniferus**, *Maingay mss.*; leaves oblong abruptly acuminate rusty-pubescent beneath, sepals nearly equalling the petals, limb and base of petals nearly equal, both broad obtuse.

MALACCA, *Maingay*

A tree; branches stout, woody, pubescent. *Leaves* 8-12 by 4-5 in., base obliquely rounded or cordate, very coriaceous, opaque above, veins many, strong; petiole $\frac{1}{4}$ in., very stout. *Flowers* 1 in. diam., rusty tomentose peduncles $\frac{1}{2}$ -1 in., stout, scarred, pedicels $\frac{3}{4}$ in., stout; bract oblong, median. *Sepals* $\frac{3}{4}$ in., broad-ovate, acute. *Petals* constricted in the middle. *Ovaries* 8-12, silky; ovules many. *Carpels* $1\frac{1}{2}$ in. diam., sessile, pruinose. *Seeds* horizontal.

2. **D. ramuliflorus**, *Maingay mss.*; leaves oblong obtuse pubescent beneath, sepals much shorter than the petals, limb of petals slender linear much longer than their broad base.

MALACCA, *Maingay*.

A lofty tree. *Leaves* as in *O. pruniferus*, but tip more obtuse, base less cordate. *Flowers* $\frac{1}{2}$ in. long; peduncles densely crowded, very short; pedicels $\frac{1}{10}$ in., equalling the broad ovate acute sepals, both rusty pubescent. *Petals* with a pale silky base, and incurved grey terete obtuse limb, grooved on the inner face. *Ovaries* 6-10, pilose, 4-6-ovuled. *Carpels* (ripe?) $\frac{3}{4}$ in., sessile, obtuse, densely silky-tomentose; walls thick.

7. **CANANGA**, Rumph.

Tall trees. *Leaves* large. *Flowers* large, yellow, solitary or fascicled on short axillary peduncles. *Sepals* 3, ovate or triangular, valvate. *Petals* 6, 2-seriate, subequal or inner smaller, long, flat, valvate. *Stamens* linear, anther-cells approximate extrorse; connective produced into a lanceolate acute process (truncate in 3? *monosperma*). *Ovaries* many; style oblong (or 0?); stigmas subcapitate; ovules numerous, 2-seriate. *Ripe carpels* many, berried, stalked or sessile. *Seeds* many, testa crustaceous, pitted, sending spinous processes into the albumen—DISTRIB. All Malayan.—Reduced to *Unona* by Baillon (*Hist. Pl. i* 209), but besides the marked characters of flowers and stamens, ovules and seeds, the habit is very different. Baillon also retains the name of *Cananga* for the American plants erroneously referred by Aublet to Rumph's *Cananga*.

1. **C. odorata**, *H. f. & T. Fl. Ind.* 130; leaves ovate-oblong finely acuminate puberulous beneath, petals 3 in. subequal narrow-linear, carpels glabrous long-stalked. *Uvaria odorata*, *Lam. Ill. t.* 495, f. 1; *Roab. Fl. Ind.* ii. 661; *Wall. Cat.* 6457; *W. & A. Prodr.* 8; *Blume Fl. Jav. Anon.* t. 9; *Griff. Notul.* iv. 712; *U. farcta*, *Wall. Cat.* 6460; *U. axillaris*, *Roab. Fl. Ind.* ii. 667; *Unona odorata* and *U. leptopetala*, *Dunal Anon.* 108 and 114; *DC. Prodr.* i 90 and 91; *Deless. Ic. Sel.* t. 88.

AVA and TENASSERIM, *Wallich*.—DISTRIB. Java, Philippines. Cultivated throughout India and the tropics.

A tall tree; trunk straight; bark smooth, ash; shoots glabrous. *Leaves* 5-8 by 2-3 in., most puberulous on the veins beneath, base rounded, margins waved; petiole $\frac{1}{2}$ in. *Flowers* 3 in. long, usually 3-nate, drooping, yellow, odorous; peduncles solitary or several from old scars; pedicels 1 in., recurved, hoary, with a few basal and a median scaly bract. *Petals* $\frac{1}{2}$ in., base broad, silky when young. *Carpels* about 12, $\frac{1}{2}$ - $\frac{3}{4}$ in., ovoid or obovoid, black, 6-12-seeded.

2. **C. virgata**, *H. f. & T.*; leaves elliptic-oblong obtusely acuminate, petiole and nerves beneath pubescent, inner petals much smaller than the outer, carpels sessile densely tomentose. *Unona virgata*, *Bl. Bijdr.* 14; *Miquel Fl. Ned. Ind.* i. pt. 2, 42. *Uvaria virgata*, *Bl. Fl. Jav. Anon.* 43, t. 19 and 25 B.

MALACCA, *Maingay*.—DISTRIB. Java.

A large tree; branches rather slender, pale, ultimate puberulous. *Leaves* 4-8 by 2-3 $\frac{1}{2}$ in., base subacute, thin, pale, membranous, above hardly shining, midrib puberulous and nerves faint, below concolorous, midrib arching, nerves distinct; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., pubescent. *Flowers* $\frac{3}{4}$ -1 in. diam., greenish-brown, 3-nate, axillary, tomentose. *Sepals* $\frac{1}{2}$ in., ovate-lanceolate, acute. *Petals* subulate-lanceolate from a broad base; inner flat above, concave below with glabrous red ridges. *Connective* of outer stamens truncate, of inner with a long recurved beak. *Ovaries* 4-6, hirsute; ovules many, 2-seriate; stigma sessile. *Torus* conic, truncate, hairy. *Carpels* 2-3 in., ovoid-oblong, top rounded, walls very thick; base contracted. *Seeds* many, horizontal, 2-seriate.

3. ? **C. monosperma**, *Hook f. & T.*; branchlets and leaves quite glabrous, leaves elliptic obtuse acute or obtusely acuminate, nerves many slender nearly horizontal, petals pubescent, outer broad oblong, inner oblong-lanceolate, carpels small glabrous mammillate short-stalked 1-seeded.

MALACCA, *Maingay*.

A tree; branches slender, pale; branchlets and buds glabrous. *Leaves* 3-6 by 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in., thin, coriaceous, base subacute, concolorous, petiole $\frac{1}{4}$ in. *Flowers* axillary, $\frac{3}{4}$ in. diam., solitary, cernuous; peduncle $\frac{1}{4}$ - $\frac{1}{2}$ in., glabrous, curved, bract basal. *Sepals* broad-ovate, very small. *Petals* hoary, obtuse, inner as long but much narrower than the outer. *Anthers* truncate. *Torus* convex, hairy. *Ovaries* very many, silky; style 0; ovules several, sub-2-seriate. *Carpels* $\frac{1}{2}$ in., very obliquely globose, or broader than long; walls thin, stout. *Seed* a little compressed, shining, pitted.

8. CYATHOSTEMMA, Griffith.

A shrub. ? *Flowers* subglobose in much-branched axillary pendulous cymes from the old wood. *Sepals* 3, connate, hirsute. *Petals* 6, 2-seriate, short, base fleshy, inner rather smaller, all valvate at the base, tips imbricate. *Torus* flat, margin convex. *Stamens* many, linear; anthers subintrorse, process of connective oblique incurved. *Ovaries* many; style cylindric, glabrous, notched; ovules many, 2-seriate. *Ripe carpels* turgid, many-seeded.

1. **C. viridiflorum**, *Griff. Notul.* iv. 707; *Ic.* iv. t. 650; leaves obovate-oblong or oblong-lanceolate acuminate or apiculate glabrous.

EASTERN PENINSULA, *Griffith*; PENANG, *Maingay*; North ANDAMAN, *Kurz*.

Wood remarkable (*Griffith Notul. l.c.*), aromatic, pith small, wood cruciately 4-lobed. *Leaves* 4-8 by 2-3 in., base rounded or subacute, petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in. diam.; cymes brown-tomentose; bract submedian, oblong. *Sepals* broader than long. *Petals* acute, base contracted, of inner most so, tomentose, granular. *Ovaries* densely tomentose. *Carpels* 1-1 $\frac{1}{4}$ in., oblong, smooth, glabrous; stalk as long, stout.—*Kurz's* specimens have leaves only, but these and the wood agree with *Griffith's*.

9. **UNONA**, Linn.

Trees or shrubs, erect or climbing. *Flowers* often solitary, axillary terminal or leaf-opposed. *Sepals* 3, valvate. *Petals* 6, valvate or open in æstivation, 2-seriate; 3 inner sometimes absent. *Torus* flat or slightly concave. *Stamens* cuneate; anther-cells linear, extrorse, top of connective subglobose or truncate. *Ovaries* numerous; style ovoid or oblong, recurved, grooved; ovules 2-8, 1-seriate (rarely sub-2-seriate). *Ripe carpels* many, usually elongate and constricted between the seeds. *Seeds* few or many.—**DISTRIB.** Tropical Asia and Africa; species about 25.

SECT. I. **Desmos**, H. f. & T. *Petals* 6.

* *Flowers axillary.*

1. **U. elegans**. *Thwaites Enum.* 398; erect, leaves narrow oblong-lanceolate long-acuminate glabrous, glaucous beneath, petals glabrous (when mature), carpels deeply constricted between the seeds. *Beddome Ic. Pl. Ind. Or. t.* 50.

Forests of Hinidoon Pattoo, CEYLON, *Thwaites*.

A much branched shrub or tree; branches rugose, slender; young golden-silky. *Leaves* 3-5½ by ½-1½ in.; petiole ¼ in. *Peduncle* ¼-½ in., slender; bracts 1-2, minute. *Sepals* ½ in., ovate, acute, glabrous. *Outer petals* 1¼-1½ in., oblong-lanceolate, acuminate, pubescent when very young only; inner narrower, shorter.

2. **U. zeylanica**, H. f. & T. *Fl. Ind.* 132; erect, leaves narrowly oblong-lanceolate acute or obtusely taper-pointed coriaceous glabrous, petals glabrous, carpels constricted between the seeds. *Thwaites Enum.* 9; *Beddome Ic. Pl. Ind. Or. t.* 74.

Central province of CEYLON, ascending to 3000 ft., *Walker, &c.*

A small glabrous shrub, 3-6 ft., bark grey, rugged; young buds pubescent. *Leaves* 5-8 by 1½-2 in., base acute; petiole ½ in. *Flowers* yellow-green, base red inside; peduncles 1-3, ½ in.; bracts minute, deciduous, basal. *Sepals* small, oblong-lanceolate, puberulous. *Petals* 1½ by ½ in., coriaceous, lanceolate, inner shorter and narrower. *Carpels* stalked; joints 1-4, ovoid.

3. **U. Dunali**, *Wall. Cat.* 6425; climbing, leaves oblong-lanceolate acuminate glabrous shining above glaucous beneath, petals glabrous, carpels constricted between the seeds. H. f. & T. *Fl. Ind.* 131 (excl. the Concan plant).

Forests of CHITTAGONG at Sitakund, H. f. & T.; PENANG, *Wallich*.

A large glabrous climber, bark spotted white. *Leaves* 3-4½ by ½-2 in., with scattered hairs on the midrib beneath, base rounded cordate or acute; petiole ½ in. *Flowers* pale yellow; peduncle 2-flowered, pubescent; bracts 2-3, basal, scaly. *Sepals* ovate, acute. *Petals* 1½ in., lanceolate; inner shorter, narrower. *Ovules* 4-6. *Carpels* of 1-3 ovoid joints.—The Concan specimens referred here in *Fl. Ind.* are referable to *U. discolor* var. *lævigata*, having leaf-opposed peduncles.

4. **U. pannosa**, *Dalz. in Hook. Kew Journ. Bot.* iii. 207; erect, leaves ovate-lanceolate glabrous above pubescent beneath, petals tomentose, carpels ovoid not constricted between the seeds. H. f. & T. *Fl. Ind.* 135; *Beddome Ic. Pl. Ind. Or. t.* 52; *Uvaria mollis*, *Wall. Cat.* 6475.

Forests of CONCAN, *Dalzell*; and TRAVANCOR, *Wight, &c.*

A tree; young parts puberulous. *Leaves* 2½-4 by ¾-1½ in., thin, pellucid-dotted, base rounded or acute. *Flowers* brown-tomentose; peduncles very short; bracts 1 or more, scaly. *Sepals* ovate, acute. *Petals* 1½-2 in., lanceolate, inner narrower and shorter. *Ovules* 2-4. *Carpels* ¾ in., subsessile, obtuse at both ends, pubescent. *Seeds* 1-3, large, shining.

** *Flowers solitary, extra-axillary, terminal, or leaf-opposed.*

5. **U. dumosa**, *Roxb. Fl. Ind.* ii. 670; climbing, leaves oblong or obovate obtuse or acute glabrous above tomentose beneath, peduncle 1-flowered, sepals cordate, petals large obovate-spathulate, carpels constricted between the seeds. *Wall. Cat.* 6429; *H. f. & T. Fl. Ind.* 131.

Forests of SILHET, *Roxburgh*, &c.; MALACCA, *Maingay*.

A woody climber; branchlets brown-tomentose. *Leaves* 3-5 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., brown or yellow beneath, thin, parallel-nerved, base rounded or cordate; petiole $\frac{1}{4}$ in. *Flowers* large, pendulous, yellow-green; peduncles 1-1 $\frac{1}{2}$ in., terminal or leaf-opposed, slender, tomentose; bract submedian, small, ovate, tomentose. *Sepals* $\frac{1}{2}$ in. broad, acute, nerved. *Petals* 3 by 1-1 $\frac{1}{2}$ in., broad-spathulate, nerved, inner rather smaller. *Carpels* (according to *Roxburgh*) of 2-3 1-seeded joints.

6. **U. Desmos**, *Dunal Anon.* 112; shrubby, leaves oblong acute or acuminate, glabrous above finely pubescent beneath, peduncle 1-flowered slender, sepals ovate acuminate, petals 1 in. broad ovate-lanceolate, carpels constricted between the seeds. *H. f. & T. Fl. Ind.* 134; *U. cochinchinensis*, *DC. Prodr.* i. 91. *U. pedunculosa*, *Alph. DC. Mem.* 28; *Wall. Cat.* 6422. *U. fulva*, *Wall. Cat.* 6427.

FROM ASSAM to SINGAPORE, *Wallich*.—DISTRIB. Cochin-China.

A spreading shrub; branches slender, white-dotted, young golden-silky. *Leaves* 3-8 by $1\frac{1}{2}$ -3 in., thickly coriaceous, midrib above slightly hairy, base rounded; petiole $\frac{1}{2}$ in., pubescent. *Flowers* large, pale yellow, odorous, pendulous; peduncle 2-8 in., usually $\frac{1}{2}$ - $\frac{3}{4}$ in. above the axil; bracts submedian, linear-oblong, deciduous. *Petals* coriaceous, appressed pubescent, nerved, outer $2\frac{1}{2}$ by 1 in., inner shorter and narrower. *Ovules* 4-6. *Carpels* stalked; joints 1-6, glabrous, subglobose.

7. **U. discolor**, *Vahl Symb.* ii. 63, t. 36; shrubby, leaves oblong or oblong-lanceolate acute glabrous above sometimes pubescent beneath, peduncle 1-flowered slender, sepals ovate-lanceolate, petals $\frac{1}{2}$ in. broad lanceolate from a broad base, carpels moniliform. *DC. Prodr.* i. 90; *Wall. Cat.* 6420 (partly); *Roxb. Fl. Ind.* ii. 669; *W. & A. Prodr.* 9; *H. f. & T. Fl. Ind.* 133; *Beddome Ic. Pl. Ind. Or.* t. 51; *U. cordifolia*, *Roxb. Fl. Ind.* ii. 602? *U. Dunalii*, *H. f. & T. Fl. Ind.* 131 (the Concan plant); *Dalz. & Gibbs. Fl. Bomb.* 3 (not of *Wallich*).

Tropical forests from SIKKIM, ASSAM, and SILHET, to ARRACAN and MALACCA, ORISSA, and CONCAN.—DISTRIB. Malayan Archipelago (all the forms.)

A spreading or sarmentose shrub; branches slender, leafy; young pubescent, rough with white tubercles. *Leaves* 2-8 by 1-2 $\frac{1}{2}$ in., shining above, glaucous beneath, base rounded or subcordate; petiole $\frac{1}{4}$ in. *Flowers* yellow, odorous; peduncles 1-2 in., leaf-opposed or nearly so; bract submedian, oblong or lanceolate, deciduous. *Petals* 2 in. or more, silky pubescent or glabrate. *Ovules* 5-6. *Carpels* stalked, joints 1-6, fleshy.

VAR. 1. *pubiflora*; leaves 5-7 in., oblong acute base often cordate, flowers silky.

VAR. 2. *laevigata*; leaves 3-4 in., oblong or lanceolate acute base rounded, flowers almost glabrous.—*U. chinensis*, *DC. Prodr.* i. 90. *U. undulata*, *Wall. Pl. As. Rar.* iii. t. 265.—Perhaps cultivated only in India, common in the Archipelago and China.

VAR. 3. *pubescens*; leaves as in *a*, but densely pubescent beneath.

VAR. 4. *latifolia*; leaves 3-5 by 2-2 $\frac{1}{2}$ in., broad-oval acute, flowers silky

8. **U. Lawii**, *H. f. & T. Fl. Ind.* 132; leaves oblong-lanceolate acute or acuminate thin glabrous above pale and downy beneath, peduncle 1-flowered slender, sepals ovate-lanceolate, petals not $\frac{1}{2}$ in. broad narrow from a broad base, carpels moniliform. *Beddome Ic. Pl. Ind. Or.* t. 73.

MALABAR, *Wight*; CONCAN, *Law*.

A woody climber?; branches slender, young softly pubescent. *Leaves* 2-4 $\frac{1}{2}$ by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., puberulous above when young only, base rounded or slightly cordate; petiole $\frac{1}{2}$ in., pubescent. *Flowers* solitary; peduncle 1 in. leaf-opposed or nearly so, bract

submedian, oblong, minute. *Sepals* pubescent outside. *Petals* 2-3 in., very long and narrow, base broad orbicular, appressed-pubescent, inner a little longer. *Ovules* 2-3. *Carpels* short-stalked, joints 1-3, ovoid.

9. **U. latifolia**, *H. f. & T.*; arboreous, leaves broad-oval or orbicular obtuse or mucronate glabrous above softly grey-tomentose beneath, peduncle very short, sepals connate at the base ovate acute, petals subequal oblong acute contracted at the base.

Hill forests of the Saluen river, MARTABAN, *Brandis*.

A large tree; branchlets grey-tomentose. *Leaves* 2-4 in., base truncate or subcordate; nerves many, oblique, parallel; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in. *Flowers* appressed-silky, densely fasciated; peduncle with usually a small submedian oblong nerved deciduous bract. *Sepals* $\frac{1}{2}$ in., striated. *Petals* $1\frac{1}{2}$ in. *Ovules* 3-4. *Fruit* unknown.

10. **U. viridiflora**, *Beddome Ic. Pl. Ind. Or.* 34, t. 158; climbing, leaves ovate-lanceolate acuminate appressed pubescent beneath, peduncle slender with a cordate bract, sepals ovate free, petals narrow lanceolate.

Anamallay forests in TRAVANCOR, *Beddome*.

A gigantic climber; branchlets golden-pubescent. *Leaves* 3-5 by $1\frac{1}{2}$ in., membranous, base rounded or cordate, above at length glabrous, whitish beneath; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in. *Peduncle* axillary or supra-axillary, 1-2 in.; bract pubescent, median, deciduous. *Flowers* $2\frac{1}{2}$ -3 in. long, bright green. *Sepals* $\frac{3}{4}$ in., membranous, nerved. *Outer petals* $2\frac{1}{2}$ -3 by $\frac{1}{2}$ - $\frac{3}{4}$ in., inner rather shorter and narrower, all membranous, nerved, reticulate, silky.—Described from *Beddome l.c.*

*** *Flowers solitary at the base of a leafy shoot.*

11. **U. præcox**, *H. f. & T. Fl. Ind.* 136; arboreous, leaves broad lanceolate acuminate, flowers pendulous from a slender naked peduncle, sepals linear-oblong acute, petals linear glabrous.

Miku hills in UPPER ASSAM, *Simons*.

A tree; branches slender. *Leaves* (very young and thin) 2-3 in., probably much larger when mature. *Flowers* from the axils of fallen leaves; peduncle 1 in. *Sepals* $\frac{3}{8}$ in. long. *Petals* $2\frac{1}{2}$ -3 by $\frac{1}{2}$ in. *Ovary* glabrous; *ovules* 2-3.—A remarkable species of which we have seen but one specimen.

**** *Flowers fasciated on woody abbreviated truncal shoots or tubercles.*

12. **U. stenopetala**, *H. f. & T. Fl. Ind.* 136; leaves oblong-lanceolate broadest above the middle acute or acuminate glabrous above pale beneath, sepals subconnate below narrow-linear, petals subequal very narrow linear.

MOULMEIN and SINGAPORE, *Lobb*.

A tree; young branches rather pubescent. *Leaves* 4-6 by $1\frac{1}{4}$ - $1\frac{3}{4}$, base oblique, pubescent along the midrib beneath; petiole $\frac{1}{12}$ in. *Peduncles* $\frac{1}{4}$ - $\frac{1}{2}$ in., with 1-2 small basal scaly bracts. *Sepals* pubescent. *Petals* 2-3 by $\frac{1}{2}$ in., puberulous. *Ovaries* 4-7, villous; *ovules* about 5.—The Javan habitat cited in *Flora Indica* is erroneous, the species having been collected at Singapore.

13. **U. cauliflora**, *H. f. & T. Fl. Ind.* 137; leaves lanceolate or linear-oblong acute or long acuminate glabrous and shining above brown-pubescent beneath, sepals ovate-lanceolate tomentose, petals narrow linear.

SINGAPORE, *Lobb*.

A tree?; branchlets tomentose. *Leaves* 5-6 by $1\frac{1}{4}$ - $1\frac{3}{4}$, base rounded; petiole $\frac{1}{12}$ in. and midrib tomentose. *Peduncles* $\frac{1}{4}$ in., tomentose. *Sepals* $\frac{1}{2}$ in. *Petals* $2\frac{1}{2}$ by $\frac{1}{4}$ - $\frac{3}{4}$ in., dull red, inner rather narrower. *Ovules* 3 or 4.

14. **U. pycnantha**, *H. f. & T.*; branchlets softly pubescent, leaves elliptic-oblong or oblong-lanceolate obtusely acuminate glabrous above, midrib puberulous beneath, sepals ovate, petals $\frac{1}{2}$ in. subequal linear obtuse, bases of inner concave.

MALACCA, Maingay.

Branchlets rather stout, pubescence pale yellow-brown. *Leaves* 6-9 by $2\frac{1}{2}$ - $3\frac{1}{2}$ in., firm, coriaceous, pale brown on both surfaces, base obtuse or rounded, beneath pale with prominent lax arching veins; petiole $\frac{1}{2}$ in., pubescent. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., tubercles $1\frac{1}{2}$ in. diam.; peduncles $\frac{1}{2}$ in., and sepals brown pubescent; bracts 0. *Sepals* $\frac{1}{2}$ in., acute. *Petals* $\frac{1}{2}$ - $\frac{3}{4}$ in., hoary silky outside, glabrate inside, base not dilated, flat; inner rather narrower, base concave. *Torus* columnar, flat-topped, glabrous. *Ovules* 2, superposed.

15. **U. crinita**, *H. f. & T.*; branches densely tomentose, leaves oblong elliptic-oblong or oblanceolate-oblong acuminate glabrous, midrib and nerves pubescent beneath, sepals ovate-lanceolate, petals 6 in. subequal narrow strap-shaped, carpels globose velvety.

MALACCA, Maingay.

Branches slender; pubescence long, soft, spreading, rufous. *Leaves* 4-9 by $1\frac{1}{4}$ - $2\frac{1}{2}$ in., membranous, pale, base 2-lobed, nerves very indistinct, puberulous chiefly on the prominent nerves beneath; petiole $\frac{1}{2}$ in., tomentose. *Flowers* in dense masses, crinite from the numerous pendulous petals; peduncles $\frac{1}{2}$ - $\frac{3}{4}$ in. and sepals rusty tomentose; tubercle 1-2 in. diam.; bract 0, or linear and infra-median. *Sepals* $\frac{3}{4}$ in., spreading, subulate from a broad ovate base. *Petals* $\frac{1}{2}$ in. broad at the dilated base, flat and again dilated and as broad about the middle, finely pubescent, 1-nerved, acuminate; inner a little shorter and narrower. *Torus* columnar, truncate. *Ovaries* strigose; ovules 3-5, 1-seriate; stigma punctiform. *Carpels* $\frac{3}{4}$ in. diam., rufous; stalk very short.

16. **U. desmantha**, *H. f. & T.*; branchlets softly pubescent, leaves elliptic-oblong or -lanceolate or oblanceolate acutely or obtusely acuminate puberulous beneath, sepals ovate, petals $1\frac{1}{2}$ in. subequal linear obtuse, carpels globose.

MALACCA, Maingay.

A small tree; pubescence soft, pale yellow-brown. *Leaves* 3-7 by $1\frac{1}{4}$ -2 in., base subacute, coriaceous, opaque above, nerves obscure, beneath paler, nerves distinct oblique; petiole $\frac{1}{2}$ in., tomentose. *Flowers* $2\frac{1}{2}$ in. diam., pale red, densely crowded; tubercles 1-2 in. diam.; peduncles $\frac{3}{4}$ in., puberulous, bract 0. *Sepals* $\frac{1}{6}$ in., acute. *Petals* sparsely hoary, tapering to the tip, base not dilated; inner rather narrower. *Stamens*, *torus* and *ovaries* nearly as in *U. pycnantha*, but ovules 3-5, superposed. *Carpels* $\frac{1}{2}$ in. diam., dark, glabrous; stalk $1\frac{1}{4}$ in.

SECT. II. **Dasymaschalon**. *Petals* 3; inner series wanting.

17. **U. longiflora**, *Roxb. Fl. Ind. ii. 668*; shrubby, leaves lanceolate or linear-oblong acute or acuminate glabrous glaucous beneath, petiole slender, peduncles axillary 1-flowered, sepals small, petals 6 in. long cohering by their margins, *Wall. Cat. 6419*; *H. f. & T. Fl. Ind. 134*.

Forests of ASSAM, the KHASIA HILLS below 3000 ft., and CHITTAGONG.

A slender sparingly branched glabrous shrub or tree; buds golden-silky. *Leaves* 6-15 by 2-4 in., pellucid-dotted, base rounded or acute; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Flowers* elongated, silky when young, soon glabrous; peduncles 1-10 in.; bracts subbasal, linear, minute, pubescent. *Sepals* rounded, mucronate. *Petals* 3, narrow-linear, $\frac{1}{2}$ in. broad at base, taper-pointed. *Ovules* 2-4. *Carpels* stalked, moniliform; joints 1-4, ovoid or oblong.

18. **U. Dasymaschala**, *Blume Fl. Jav. Anon. 55, t. 27*; shrubby, leaves oblong acute or acuminate rarely obtuse glabrous above glaucous beneath, petiole very short, peduncle axillary 1-flowered, sepals small silky, petals 2-3 by $\frac{1}{2}$ in. linear from a broad base.—*Alph. DC. Mem. Anon. 28*; *Wall. Cat. 6421*; *H. f. & T. Fl. Ind. 135*.

FROM AVA TO SINGAPORE. *Wallich, &c.*—DISTRIB. Sumatra, Java.

An erect or sarmentose shrub; bark dark; branches glabrous or pubescent. *Leaves*

5-9 by 2-4 in., usually broadest above the middle, red-brown beneath; petiole $\frac{1}{2}$ in. *Flowers* pendulous; peduncles 1-2 in., slender, top subclavate; bracts 1 or more, minute, basal. *Petals* appressed-pubescent, young silky, keeled internally. *Ovules* 6-7. *Carpels* moniliform, joints oblong.

VAR. 1. *Blumei*; branches glabrous, leaves pale below glabrous or nearly so.—U. Alphonssi, Wall. Cat. 6426.

VAR. 2. *Wallichii*; branches brown-tomentose, leaves glaucous and purple-tinged below.—Wall. Cat. 6241.

10. **POLYALTHIA**, Blume.

Trees or shrubs; habit of *Unona*. *Sepals* 3, valvate or subimbricate. *Petals* 6, 2-seriate, ovate or elongated, flat or the inner vaulted. *Torus* convex. *Stamens* cuneate; anther-cells extrorse, remote. *Ovaries* indefinite; style usually oblong; ovules 1-2, basal and erect, or subbasal and ascending. *Ripe carpels* 1-seeded, berried.—DISTRIB. Tropical Asia and (1 sp.) Australia; species about 30.—Reduced to *Unona* by Baillon (Hist. des Plantes, 212) probably with good reason.

SECT. I. **Monoon**, Miquel. *Flowers* hermaphrodite. *Petals* flat. *Ovule* solitary, basal, erect.

a Flowers axillary or in the old leaf-axils or on woody tubercles.

* *Petals* linear.

1. **P. longifolia**, Benth. & H. f. Gen. Pl. i. 25; branches glabrous, leaves narrow lanceolate glabrous taper-pointed undulate, flowers subumbelled, petals $\frac{3}{4}$ -1 in. long. *Guatteria longifolia*, Wall. Cat. 6442; W. & A. Prodr. 10; Wight Ic. t. 1; H. f. & T. Fl. Ind. 139; Thwaites Enum. 10. *Uvaria longifolia*, Lam.; Roxb. Fl. Ind. ii. 664.

TANJORE, Wight; drier parts of CEYLON.—Cultivated throughout the hotter parts of India.

A lofty tree; branches slender. *Leaves* 5-8 by 1-2 in., membranous, base acute rarely rounded, shining above, pellucid-dotted; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* numerous, dense, yellow-green; peduncles $\frac{1}{2}$ in. or less, hoary; pedicels 1-2 in., densely racemose, slender; bracts minute, linear, basal. *Petals* narrow-linear. *Carpels* $\frac{3}{4}$ in., ovoid, obtuse at both ends; stalk $\frac{1}{2}$ in., stout, glabrous.

2. **P. bifaria**, Benth. & H. f. l.c.; young branches softly pubescent, leaves lanceolate acuminate glabrous above downy beneath, flowers solitary. *Guatteria bifaria*, A. DC. Mem. 41; Wall. Cat. 6447; H. f. & T. Fl. Ind. 139.

PEGU, Wallich.

A tree. *Leaves* 5 by 1 $\frac{1}{2}$ in., base acute, pellucid-dotted; petiole $\frac{1}{2}$ in. *Petals* linear-lanceolate. *Carpels* ovoid, long-stalked.—Wallich's solitary specimen is in Herb. Linn. Soc. and is flowerless. A. De Candolle describes it as differing from *P. cerasoides* only in the linear petals. We suspect it to be a mixture of the flower of *P. simiarum* with the foliage of *P. cerasoides*.

3. **P. coffeoides**, Benth. & H. f. l.c.; branches glabrous, leaves lanceolate or oblong-lanceolate taper-pointed undulate glabrous, flowers solitary, petals 1-1 $\frac{1}{2}$ in. *Beddome* Ic. Pl. Ind. Or. t. 53. *Guatteria coffeoides*, Thwaites Enum. 10; H. f. & T. Fl. Ind. 141.

Forests of the WYNAAD, *Beddome*; and CEYLON, *Thwaites*.

A tree; branches spreading. *Leaves* 4-7 by 1-2 $\frac{1}{2}$ in., membranous, pellucid-dotted; petiole $\frac{1}{2}$ in. *Flowers* greenish-yellow, rarely on woody tubercles of the trunk; peduncles $\frac{1}{2}$ -1 $\frac{1}{2}$ in., downy, articulate at the base. *Sepals* suborbicular. *Petals* broadly

linear-lanceolate, glabrous. *Carpels* nearly 1 in., ovoid, glabrous, dark purple; stalk their own length.

4. **P. fragrans**, *Benth. & H. f. l.c.*; young branches hoary, leaves ovate-oblong or oblong-lanceolate glabrous or puberulous beneath, peduncles few- or many-flowered, petals $1\frac{1}{2}$ by $\frac{1}{2}$ in. *Beddome Ic. Pl. Ind. Or. t. 54.* *Guatteria fragrans*, *Dalz. in Hook. Kew Journ. Bot. iii. 206*; *H. f. & T. Fl. Ind. 142.*

Forests of MALABAR, *Wight*; SOUTH CONCAN, *Law, &c.*

A tree. *Leaves* 4-9 by 2-5 in., membranous, lateral nerves many oblique close-set and parallel; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Flowers* fragrant; peduncles in the axils of fallen leaves or on woody ramal tubercles, cymose, usually many-flowered, tomentose; pedicels 1 in., slender; bract orbicular, infra-median. *Sepals* small, orbicular. *Petals* linear, hoary. *Carpels* $1\frac{1}{2}$ in., broad-ovoid, hoary, walls thin brittle; stalk as long.—There are in *Hb. Wight.* detached petals apparently of this species upwards of 2 in. long.

5. **P. simiarum**, *Benth. & H. f. l.c.*; branches glabrous, leaves ovate-oblong or oblong-lanceolate quite glabrous, flowers fascicled, inner petals 1-1 $\frac{1}{4}$ in. *Guatteria simiarum*, *Ham.*; *Wall. Cat. 6440*; *H. f. & T. Fl. Ind. 142.* *G. fasciculata*, *Wall. mss. Voigt Hort. Sub. Calc. 16.*

Forests of ASSAM, SILHET, PEGU and MARTABAN, *Hamilton, Wallich, &c.*

A tree; buds puberulous. *Leaves* 4-8 by 2-5 in., membranous; lateral nerves close, parallel; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Flowers* in the old axils or on woody tubercles; peduncles 1 in., slender, hoary, naked above; bracts 1-2, scaly, basal. *Sepals* very short, orbicular. *Petals* linear, puberulous, glabrous within, outer $\frac{1}{2}$ shorter than the inner. *Carpels* $1\frac{1}{2}$ in., ovoid, fleshy, glabrous, orange; stalk as long.

6. **P. hypoleuca**, *H. f. & T.*; quite glabrous, leaves elliptic or elliptic-lanceolate obtusely acuminate, shining above white beneath, flowers solitary or fascicled, sepals obsolete, petals subequal $\frac{1}{2}$ in. narrowly linear-oblong obtuse.

SINGAPORE, *Maingay*.—DISTRIB. Borneo?

Branches pale, youngest puberulous. *Leaves* $2\frac{1}{2}$ -6 by 1-1 $\frac{3}{4}$ in., base acute, thick, rigid, pale and nerveless above, midrib beneath puberulous, nerves many obscure sub-horizontal; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Flowers* small, axillary, suberect; peduncle $\frac{1}{5}$ in., stout; bracts 2, basal, cucullate. *Sepals* forming an inconspicuous disk. *Peta's* hoary on both surfaces, base concave, not dilated. *Torus* conical. *Ovaries* about 6, pubescent. *Carpels* $\frac{3}{4}$ in., elliptic-oblong, top rounded, glabrous, shining, walls thin; stalk short, slender. *Seed* grooved and pitted.—Other (imperfect?) carpels are mammillate with longer thicker stalks and contain a stony pitted nucleus, connected with the walls by stout fibres.—Very near *U. hypoglaucæ*, *Miq.*, of Sumatra, but carpels elliptic-oblong and twice as long.

** *Petals ovate or ovate-lanceolate or elliptic.*

7. **P. acuminata**, *Thwaites Enum. 399*; young branches brown-tomentose, leaves elliptic- or obovate-oblong abruptly taper-pointed glabrous above, midrib and veins pubescent beneath, flowers 1-3 on woody tubercles petals 2 by 1 in., thick. *Beddome Ic. Pl. Ind. Or. t. 57.*

Near Ratnapoora in CEYLON, *Thwaites.*

A tree; bark silver-grey. *Leaves* 6-12 by $2\frac{1}{2}$ -3 in., shining above, pale beneath, nerves strong, parallel; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Flowers* 3-4 in. diam., greenish-yellow; pedicels 1 in., stout; bract submedian, densely tomentose. *Petals* 2 by 1 in., broad-lanceolate, thickly coriaceous, pubescent, strongly nerved when dry. *Carpels* often as large as a cherry; broad-ovoid, tomentose; stalk as long.

8. **P. cerasoides**, *Benth. & H. f. l.c.*; young branches tomentose, leaves lanceolate or oblong-lanceolate acuminate glabrous above softly pu-

bescent beneath, peduncles on axillary tubercles 1-3-flowered, petals $\frac{1}{2}$ in. *Uvaria cerasoides*, *Roxb. Corom. Pl. i. t. 33*; *Fl. Ind. ii. 666*. *Guatteria cerasoides*, *Dun. Mem. Anon. 127*; *DC. Prodr. i. 93*; *Wall. Cat. 6436*; *H. f. & T. Fl. Ind. 139*; *Dalz. & Gibs. Bomb. Fl. 3*.

Dry forests on Eastern exposures, from BEHAR to TRAVANCOR, *Hamilton, Wight, &c.* A tree; bark light-grey; branches glabrous with age. *Leaves* 3-8 by 1-2 in., membranous, base acute or rounded, dark green above. *Peduncles* $\frac{1}{2}$ in., woody; pedicels $\frac{1}{2}$ -1 in., slender, with a few basal imbricating scales, and sometimes 2-3 oblong or ovate bracts $\frac{1}{4}$ - $\frac{1}{2}$ in. long. *Petals* ovate-oblong, dirty green, thickly coriaceous. *Carpels* size of a small cherry, dark-red; stalk 1 in.

9. **P. Korinti**, *Benth. & H. f. l.c.*; young branches glabrous or sub-pilose, leaves variable ovate to elliptic-oblong acute or acuminate coriaceous glabrous, flowers axillary solitary, inner petals $\frac{1}{2}$ in. oval. *Guatteria Korinti*, *Dunal*; *DC. Prodr. i. 94*; *W. & A. Prodr. 10*; *Wight Ic. t. 398*; *H. f. & T. Fl. Ind. 141*. *G. acutiflora*, *Wall. Cat. 6438 excl. D.*

WESTERN PENINSULA, from Vizagapatam, *Cleghorn*, southwards; warmer parts of CEYLON, very common.

A spreading shrub; bark grey. *Leaves* 2-4 by 1-2 in., firmly coriaceous, pellucid-dotted, shining above, glabrous or sparsely pilose on the midrib beneath, strongly reticulate; petiole $\frac{1}{2}$ in. *Peduncles* 1-2 in., strigose, bract submedian. *Petals* thickly coriaceous, inner rather the longest. *Carpels* $\frac{1}{2}$ in., subglobose.

10. **P. Jenkinsii**, *Benth. & H. f. l.c.*; young shoots brown-tomentose, leaves oblong-lanceolate glabrous, flowers axillary solitary rarely geminate, outer petals $1\frac{2}{3}$ by $\frac{1}{2}$ in. *Guatteria Jenkinsii*, *H. f. & T. Fl. Ind. 141*.

Forests of ASSAM; SILHET; EASTERN PENINSULA; ANDAMANS, *Kurz*.—DISTRIB. Sumatra.

A tree; branches spreading, glabrous. *Leaves* 4-7 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., firm, shining above, pale beneath, base rounded acute or oblique; petiole $\frac{1}{2}$ in. *Flowers* large, spreading; pedicels $\frac{1}{2}$ -1 in., erect, bracts 2-3, scaly, basal, and a mesian and an apical one which are oval and deciduous. *Petals* broad-lanceolate, narrowed to a claw, thinly coriaceous, inner shorter and narrower. *Carpels* $\frac{3}{4}$ in., oblong, glabrous; stalk as long.—Nearly allied to *Monoon canangioides*, *Miq.*

11. **P. nitida**, *Benth. & H. f. l.c.*; young branches puberulous, leaves oblong or lanceolate glabrous obtuse or acute, bracts $\frac{1}{2}$ -amplexicaul, sepals connate to the middle, petals 1 in. long. *Guatteria nitida*, *A. DC. Mem. 41*; *Wall. Cat. 6439*; *H. f. & T. Fl. Ind. 143*.

TAVOY, *Wallich*; SINGAPORE, *Lobb*.

A tree; bark grey, rugged, dotted with white lenticels. *Leaves* 8-12 by 3-5 in., thinly coriaceous, shining above, pale beneath, nerves strong oblique; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Flowers* axillary; pedicel 1 in., bracts 1-2, oval, submedian. *Sepals* $\frac{1}{2}$ in., orbicular, pubescent. *Petals* oval, thickly coriaceous, tomentose, inner a little shorter. *Carpels* large, subglobose, stalked.—*Flower* described from the Singapore specimen, the fruit from Tavoyan.

12. **P. magnoliæflora**, *Maingay mss.*; branchlets rusty-tomentose, leaves large narrow obovate-oblong obtuse or acuminate glabrous except the midrib above membranous, base cordate, bracts $\frac{1}{2}$ -amplexicaul, sepals connate to the middle, outer petals elliptic.

MALACCA, *Maingay*.

A tree; branches stout. *Leaves* 10-13 by 3-5 in., opaque above, beneath paler, nerves strong many arched; petiole $\frac{1}{2}$ in., stout. *Flowers* large, greenish-white; peduncle short stout curved; bracts broad-ovate acute. *Sepals* silky tomentose. *Outer petals* fleshy, concave, hairy, tips imbricate; inner 2-2 $\frac{1}{2}$ in., oblong, constricted

in the middle. *Torus* glabrous. *Ovaries* hirsute. *Carpels* (unripe) $1\frac{1}{2}$ in., ovoid or oblong, gibbous, pubescent, beaked; stalk stout.—A magnificent species, referred to a new genus in Maingay's mss. Colour, odour, &c. of flower like a *Magnolia*.

β Flowers extra-axillary on the terminal branchlets, or on small truncal tubercles.

13. **P. biglandulosa**, *Benth. & H. f. l.c.*; young branches silky, leaves elliptic or oblong acute or acuminate glabrous above appressed pubescent beneath, basal margins recurved and glandular, peduncle solitary leaf-opposed.—*Guatteria biglandulosa*, *Blume Fl. Jav. Anon.* t. 51; *H. f. & T. Fl. Ind.* 143.

MALACCA, *Griffith*, &c.—DISTRIB. Sumatra and Malay Archipelago.

A scandent shrub. *Leaves* 4–6 by $1\frac{1}{2}$ –3 in., shining above, glaucous beneath, base subacute; nerves 7 on each side, strong, curved, rather distant, parallel; petiole $\frac{1}{2}$ in. *Flowers* unknown. *Carpels* 1 in., oblong, mucronate, dark purple, subglabrous; stalk a little longer.—Griffith's specimens correspond to *Beddome's* description and to *Miquel's* var. α. *Carpels* 1-seeded according to *Miquel*.

14. **P. suberosa**, *Benth. & H. f. l.c.*; young branches pubescent, leaves oblong obtuse glabrous above puberulous beneath, peduncles 1–2 on a short woody extra-axillary tubercle, petals $\frac{3}{4}$ in. long.—*Beddome Ic. Pl. Ind. Or.* t. 56. *Uvaria suberosa*, *Roab. Cor. Pl.* i. t. 34; *Fl. Ind.* ii. 567. *Guatteria suberosa*, *DC. Prodr.* i. 93; *Wall. Cat.* 6437; *W. & A. Prodr.* 10; *H. f. & T. Fl. Ind.* 140.

Forests of BENGAL, the WESTERN PENINSULA, TENASSERIM, and CEYLON.—DISTRIB. Java? Philippines (this or a closely allied species).

A small tree or shrub; bark corky, rugged, grey; young branches slender, often spotted white. *Leaves* $2\frac{1}{2}$ –5 by 1 – $1\frac{3}{4}$ in., usually obtuse at both ends, or base sub-oblique, thin, glabrous beneath in age; petiole $\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ –1 in., solitary, rarely geminate, pubescent, bracts inframedian. *Sepals* small, pubescent. *Petals* $\frac{1}{2}$ in., oval, silky outside, red-brown, outer shorter. *Carpels* pisiform, young silky, ripe glabrous; stalk their own length.

15. **P. sclerophylla**, *H. f. & T.*; glabrous, leaves oblong or ovate or linear-oblong obtusely acuminate rigid reticulate and shining on both surfaces, peduncles fascicled on small truncal tubercles, sepals ovate, petals linear-oblong obtuse inner rather smaller.

MALACCA, *Maingay*.

A tree. *Leaves* 6–8 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., base rounded or acute, nerves conspicuous and midrib quite glabrous on both surfaces; petiole $\frac{1}{2}$ in. *Flowers* 2 in. diam., greenish; tubercles $\frac{1}{2}$ –1 in. diam., globose; peduncles 1 – $1\frac{1}{2}$ in., stout, rusty-pubescent; bracts small median, orbicular. *Sepals* short, obtuse. *Petals* $1\frac{1}{2}$ in., base slightly concave, puberulous on both surfaces. *Torus* broad, flat, border raised. *Ovaries* pilose, shorter than the cylindric style. *Carpels* 1 – $1\frac{1}{2}$ in., elliptic-oblong, obtuse at both ends walls thin, smooth; stalk as long, slender. *Seed* oblong, testa fibrous shining pale.

SECT. II. **Eupolyalthia**. *Flowers* hermaphrodite. *Petals* flat. *Ovules* 2, superposed, subbasal, ascending.

* *Flowers* extra-axillary, often leaf-opposed.

16. **P. cinnamomea**, *H. f. & T. Fl. Ind.* 138; young branches brown-tomentose, leaves lanceolate or oblanceolate glabrous above, young pubescent beneath, peduncles solitary or geminate, petals $\frac{3}{4}$ in. oblong acute. *Guatteria cinnamomea* and *G. multinervis*, *Wall. Cat.* 6444 and 6445.

PENANG and SINGAPORE, *Wallich*.

A tree; bark grey, rugged. *Leaves* 6-10 by 2-3½ in., tapering downwards from the middle or above it, base obtuse or subcordate; petiole ½ in. *Peduncles* ¼-½ in., extra-axillary, brown-tomentose; bracts scaly, basal. *Sepals* small, ovate, acute. *Petals* thick, silky outside. *Carpels* 1 in. diam., globose, short-stalked, densely brown-tomentose.

17. **P. Moonii**, *Thwaites Enum.* 9; young branches pubescent, leaves subsessile lanceolate long acuminate glabrous above puberulous beneath, peduncles solitary slender glabrous, petals small inner suborbicular. *Beddome Ic. Pl. Ind. Or.* t. 83.

At Caltura and Regiam Corle in CEYLON, *Thwaites*.

A shrub, 8-10 ft.; branches slender. *Leaves* 2-6 by ¾-2 in., tapering to the obliquely rounded base, thin, midrib pubescent beneath; petiole not ⅓ in. *Flowers* red, ½ in. diam.; pedicels 1-1½ in., often leaf-opposed, nearly glabrous; bracts 3, minute, glabrous. *Sepals* small, ovate, acuminate. *Outer petals* acute; inner larger, suborbicular, obtuse. *Carpels* pisiform or oblong, reddish, short stalked, 1-2-seeded.

18. **P. rufescens**, *H. f. & T.*; young branches densely tomentose, leaves subsessile narrow-oblong acute or acuminate, base obliquely cordate glabrous except on the midrib beneath, peduncles solitary stout tomentose, petals ¼ in. ovate-oblong.

Cochin in MALABAR, *Wight*.

A tree. *Leaves* 3-7 by 1-1¾ in., shining above, pale below; petiole glabrous. *Flowers* ½-¾ in. diam., brown-tomentose; peduncles ½-1 in., often leaf-opposed, jointed and minutely bracteate at the base. *Sepals* small, broadly ovate, acute. *Petals* oblong, subacute, thick, outer twice? as big as the inner. *Ovaries* densely silky.

19. **P. persicæfolia**, *Benth. & H. f. l.c.*; young branches pubescent, leaves subsessile lanceolate taper-pointed glabrous above puberulous beneath, peduncles solitary or fascicled pubescent, petals ⅓-½ in. long. *Beddome Ic. Pl. Ind. Or.* t. 55. *Guatteria persicæfolia*, *H. f. & T. Fl. Ind.* 140.

CEYLON, near Galle, *Champion*.

A shrub. *Leaves* 2-4 by ¾-1¼ in., firm, coriaceous, base slightly oblique, pale beneath; nerves inconspicuous; petiole hardly ⅓ in. *Peduncle* very short, woody, extra-axillary, 2-3 flowered; pedicels ¼-½ in. *Sepals* ovate, acute, strigose. *Petals* suborbicular, thickly coriaceous, appressed-pubescent, inner much the largest. *Carpels* about 10, pisiform, granulate, puberulous; stalk very short; torus small.

20. **P. macrophylla**, *H. f. & T.*; young branches tomentose, leaves lanceolate taper-pointed rigid glabrous and shining above softly pubescent beneath, flowers solitary subsessile. *Guatteria macrophylla*, *Blume Bijdr.* 19; *Fl. Jav. Anon* 96. *G. brevipetala*, *Miq. Fl. Ned. Ind. Suppl.* i. 381.

MOULMEIN, *Falconer*; ANDAMANS, *Kurz*.—DISTRIB. Sumatra, Java, Borneo.

A tree. *Leaves* 6-9 by 2-3 in., thickly coriaceous, almost silvery beneath with stellate pubescence; nerves distant, prominent, arched, looping within the margin; petiole ¼-½ in., tomentose. *Peduncles* ⅓ in., generally ½ in. above the leaf axil; bracts strigose. *Sepals* ovate, acute, strigose. *Petals* ½ in., oblong, acute, strigose, glabrous inside; inner rather larger, very concave. *Torus* conical. *Fruit* unknown.—The two flowers we have examined are male. *Miquel* describes his as bisexual; *Blume* does not say which; so this character is possibly not constant.

** Flowers axillary or in the axils of old leaves.

21. **P. cauliflora**, *H. f. & T. Fl. Ind.* 138; branches glabrous, leaves lanceolate obtusely acuminate glabrous above, nerves and midrib beneath downy, flowers 2-3 fascicled in the old axils, peduncles slender downy, petals 1 in., linear. *Uvaria cauliflora*, *Wall. Cat.* 6476.

SINGAPORE, Wallich.

A much branched tree; buds tomentose. *Leaves* 3-6 by 1-1½ in., narrowed to the subobtus base, nerves reticulate; petiole ½-¾ in. *Peduncles* 1½-2 in., filiform, downy; bracts basal. *Sepals* ovate, subacute, appressed pubescent. *Petals* of equal length; coarsely villous, outer rather broader. *Torus* cylindric, truncate. *Ovaries* strigose. *Fruit* unknown.

22. **P. obliqua**, H. f. & T. *Fl. Ind.* 138; young parts puberulous, leaves subsessile linear-oblong obtusely acuminate base obliquely cordate shining and glabrous on both surfaces, peduncles solitary, petals ¼ in. oblong obtuse.

MALACCA, Griffith.

A tree; branches twiggy, slender, glabrous. *Leaves* 4-6 by 1-1½ in., tapering to the base, firm, coriaceous, paler beneath; petiole ½ in. *Flowers* ½ in. diam., axillary; peduncles ¼-1 in.; bract submedian. *Sepals* small, orbicular. *Petals* subequal, thickly coriaceous, silky outside. *Carpels* pisiform, dark brown; stalk ½ in.

SECT. III. **Trivalvaria**, Miquel. *Inner petals* very concave or vaulted.

23. **P. costata**, H. f. & T.; young branches tomentose, leaves oblong or oblong-lanceolate acuminate or acute rigidly coriaceous glabrous above silvery and downy beneath, flowers solitary shortly peduncled. *Uvaria* costata, Wall. *Cat.* 6480. *Guatteria costata*, H. f. & T. *Fl. Ind.* 143.

MARTABAN, Wallich.

A tree. *Leaves* 5-6 by 1½-2½ in., base acute, deep green above; nerves oblique, nearly straight, nervules conspicuous. *Peduncles* ¼ in., extra-axillary. *Sepals* ovate, persistent in fruit, subconnate at the base. *Fruit* unknown.—A very imperfectly known species.

24. **P. argentea**, H. f. & T.; branches glabrous, leaves oblong-lanceolate acute or acuminate glabrous or both surfaces silvery beneath, peduncles 1-3 on short woody tubercles. *Guatteria pallida*, H. f. & T. *Fl. Ind.* 143 (*not of Blume*).

Forests of ASSAM and SILHET, H. f. & T.

A shrub; branches spreading, young hardly puberulous. *Leaves* 4-8 by 1½-2½ in., base rounded or acute, thin, coriaceous; nerves distant, arched; petiole ¼ in. *Flowers* supra-axillary, minute, polygamo-dioecious; ♂ as in *P. macrophylla*, but smaller; ♀ with many densely pubescent ovaries and a few imperfect stamens; bracts many, minute, strigose. *Carpels* many, ¾ in., oblong, granulate, glabrous; stalk ½ in.—An apparent congener of *P. macrophylla*, but the flowers are so young that it is hardly useful to introduce the details given in *Flora Indica*.

25. **P. ? aberrans**, Maingay; branches glabrous, leaves elliptic-lanceolate taper-pointed membranous glaucous beneath nerves faint, flowers subterminal, petals orbicular-ovate outer largest, carpels small oblong 2-seeded.

MALACCA, Maingay.

A climbing shrub; branches black, slender. *Leaves* 4-5 by 1½-1¾ in., rather shining above, nerves spreading reticulate on both surfaces; petiole ½ in., slender. *Flowers* 1 in. diam., erect; peduncle 1½ in., slender; bracts minute, median or infra-median. *Sepals* ½ in., broad-ovate, obtuse, glabrous. *Outer petals* ½ in., pubescent on both surfaces; inner ovate, acute, very concave, tips imbricate in bud. *Ovaries* pilose; cell far above the base; ovules 1-2, superposed. *Carpels* ½-¾ in., elliptic-oblong, cylindric, smooth, purple, top rounded, walls thin. *Seeds* 2, superposed.—Referred also doubtfully to *Elliptea* by Maingay, from whose mss. the description of the flower is taken.

GUATTERIA MEMBRANACEA, *A. DC. Mem. Anon.* 41; *H. f. & T. Fl. Ind.* 142, of which there are no specimens in the Wallichian Herbarium, is no doubt a *Polyalthia*, differing from *P. nitida*, apparently only in the slightly pubescent leaves.

11. **ANAXAGOREA**, St. Hilaire.

Trees or shrubs. *Flowers* small, greenish, leaf-opposed. *Sepals* 3, valvate, connate at the base. *Petals* 6, subequal, 2-seriate, valvate, thin, flat. *Torus* convex. *Stamens* indefinite; anther-cells extrorse or sublateral; connective with a terminal process. *Ovaries* few or many; style variable; ovules 2, subbasal, collateral, ascending. *Ripe carpels* follicular; stalk clavate. *Seeds* 1-2, exarillate, testa shining.—**DISTRIB.** Tropical Asia and America; species about 6.

1. **A. luzonensis**, *A. Gray, Bot. U. S. Expl. Exped.* 27; glabrous, leaves membranous oblong abruptly obtusely acuminate, flowers solitary leaf-opposed, bracts 1-2 amplexicaul. *A. zeylanica*, *H. f. & T. Fl. Ind.* 144; *Thwaites Enum.* 10; *Beddome Ic. Pl. Ind. Or.* t. 46.

Tropical forests of PEGU, RANGOON, the ANDAMANS, MALACCA, and CEYLON.—**DISTRIB.** Philippines.

A shrub. *Leaves* 3-6 by $1\frac{1}{2}$ -2 in., base acute, light green, paler beneath; nerves distant, oblique; petiole $\frac{1}{4}$ in. *Flowers* 1 in. diam.; peduncle $\frac{1}{4}$ in. *Sepals* ovate, obtuse. *Petals* ovate or oblong. *Stamens* all similar and fertile. *Ovaries* 2-4, ovoid-oblong. *Carpels* $1\frac{1}{2}$ in., spatulate, obtuse, obliquely mucronate, glabrous, rather rugose.—Allied closely to *A. javanica*, Blume, which has 8-10 carpels and elongated inner stamens.

12. **POPOWIA**, Endl.

Trees. *Flowers* small, extra-axillary or leaf-opposed. *Sepals* 3, ovate, valvate. *Petals* 6, valvate in 2 series; outer like the sepals, spreading; inner thick, concave, connivent, acute or tip usually inflexed. *Stamens* indefinite or subdefinite, short, cuneate; anther-cells dorsal, remote. *Carpels* about 6, ovoid; style large, oblong or subclavate, straight or recurved; ovules 1-2 on the ventral suture, rarely 1 basal erect. *Ripe carpels* berried, globose or ovoid, stalked.—**DISTRIB.** About 8 species, Asiatic, African, and Australian.

1. **P. Beddomeana**, *H. f. & T.*; leaves membranous lanceolate or oblong-lanceolate long acuminate lower ovate acute smooth above granulate and tomentose on the veins beneath, flowers extra-axillary, outer petals larger than the inner. *P. ramosissima*, *Beddome Ic. Pl. Ind. Or.* t. 75 (*excl. synon.*).

Mountains of TRAVANCOR, *Beddome*.

A much branched tree; young parts densely brown-tomentose. *Leaves* 2-3 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., lower 2 by 1 in., base acute, smooth above; petiole very short. *Flower-buds* $\frac{1}{2}$ in. diam., globose, villous; peduncles $\frac{1}{12}$ - $\frac{1}{8}$ in., tomentose; bract median. *Sepals* acute, connate below. *Petals* thick, glabrous inside, densely tomentose outside; outer very broad ovate; inner convex, tip not inflexed; claw broad, short. *Stamens* indefinite. *Ovaries* 4-5; ovules 1-2.

2. **P. ramosissima**, *H. f. & T. Fl. Ind.* 105; leaves ovate or oblong acute glabrous above tomentose on the midrib and veins beneath, flowers leaf-opposed, outer petals smaller than the inner. *Guatteria ramosissima*, *Wall. Cat.* 7294, 8006.

PENANG, Wallich.

A spreading much branched tree; bark glabrous; young parts brown-tomentose. *Leaves* 2-4 by 1-2 in., thin, coriaceous, base rounded; petiole $\frac{1}{4}$ in., tomentose. *Flowers* solitary or geminate, minute, globose; peduncles $\frac{1}{2}$ - $\frac{1}{4}$ in.; bract small, submedian. *Sepals* ovate, pilose. *Outer petals* smaller than the sepals, ovate; inner ovate, acute. *Stamens* about 18. *Carpels* many, densely strigose; ovules 1-2.

3. **P. Helferi**, *H. f. & T.*; leaves narrow-oblong abruptly acutely or obtusely acuminate glabrous above puberulous on the midrib beneath, flowers extra-axillary? outer petals smaller than the inner.

King's Island, TENASSERIM, Helfer.

A small spreading tree; branchlets coarsely hairy. *Leaves* $2\frac{1}{2}$ -5 by 1-1 $\frac{1}{2}$ in., base rounded or suboblique; petiole $\frac{1}{2}$ in., subpilose. *Flowers* minute, globose; peduncles $\frac{1}{2}$ - $\frac{1}{4}$ in., tomentose. *Sepals* and (rather larger) *outer petals* ovate, strigose; inner petals orbicular, concave, densely strigose, tip inflexed. *Stamens* 15. *Carpels* 6, densely strigose: ovule solitary, subbasal.—We have examined but one bud.

4. **P. pauciflora**, *Maingay mss.*; branchlets strigose, leaves elliptic-lanceolate finely acuminate membranous minutely granulate midrib and veins beneath sparsely appressed pilose, flowers extra-axillary, outer petals much smaller than the inner, carpels pisiform.

MALACCA, Maingay.

Branches slender, dark-grey. *Leaves* 5-7 by 1 $\frac{1}{2}$ -2 in., base acute, surfaces similar opaque; nerves very oblique; petiole $\frac{1}{10}$ in. *Flowers* $\frac{1}{2}$ in. diam., solitary or in pairs, outside the leaf-axil, rusty-strigose; peduncles $\frac{1}{2}$ - $\frac{1}{4}$ in.; bract basal. *Sepals* minute, ovate. *Outer petals* like the sepals, glabrous inside; inner thrice as large, suborbicular, concave, tip inflexed. *Stamens* many. *Ovaries* 6, gibbous, strigose; style subclavate; ovule erect. *Carpels* pisiform, subsessile, glabrous, purple. *Testa* rugose.

5. **P. foetida**, *Maingay mss.*; branchlets tomentose, leaves elliptic-lanceolate caudate-acuminate glabrous above tomentose beneath, flowers axillary outer petals a little smaller than the inner, carpels very large.

MALACCA, Maingay.

A large tree; branches pale, leaves beneath petioles inflorescence and carpels covered with yellow-grey tomentum. *Leaves* 5-7 by 2-2 $\frac{1}{2}$ in., base acute, thin firm with midrib above puberulous; nerves many, strong beneath, reaching the margin; petiole $\frac{3}{8}$ - $\frac{1}{2}$ in., thickened. *Flowers* $\frac{1}{2}$ in. diam., buds globose; peduncles $\frac{1}{2}$ in. *Sepals* minute, obtuse. *Outer petals* elliptic-ovate, obtuse, yellow; inner smaller, base excavated, margin thick, triquetrous, apiculate. *Stamens* about 30, connective produced backwards. *Ovaries* about 6, strigose, 2-ovuled; style rather slender. *Carpels* 2-3 by 1 $\frac{1}{2}$ -2 in., sessile, oblong, cylindric, top rounded, 1 seeded. *Seed* 1 $\frac{1}{2}$ -2 in., oblong; testa bony, smooth.

6. **P. nervifolia**, *Maingay mss.*; branchlets densely tomentose, leaves oblong or elliptic-oblong shortly acuminate substrigose on the short midrib and nerves beneath, flowers extra-axillary 2-3-nate silky villous, outer petals like the sepals half as large as the inner, carpels $\frac{1}{2}$ in.

MALACCA, Maingay.

Branches black; branchlets rusty-tomentose. *Leaves* 6-8 by 2-3 in., firm, coriaceous, base subacute, opaque, under-surface pale; nerves prominent, rather remote, very oblique: petiole $\frac{3}{8}$ - $\frac{1}{2}$ in., rusty-pubescent. *Flowers* $\frac{3}{4}$ in. diam., peduncles $\frac{1}{2}$ - $\frac{1}{4}$ in., stout, clothed with large ovate obtuse clasping hirsute bracts. *Sepals* orbicular-ovate. *Petals* broadly elliptic-ovate, very thick, outer $\frac{1}{2}$ in., inner coriaceous, tip 3-quetrous, glabrous within. *Ovaries* many, slender, hirsute; ovule 1, erect. *Carpels* many, $\frac{1}{2}$ in., elliptic-oblong, smooth, apiculate, walls thin; stalk short stout. *Seed* oblong, testa pale shining.—Allied to *Xylopia* in the conniving triquetrous inner petals (*Maingay*).

7. **P. tomentosa**, *Maingay mss.*; branchlets and leaves beneath softly hirsute, leaves oblong or oblong-lanceolate acute or acuminate puberulous above, base cordate, flowers small extra-axillary softly villous, outer petals larger than the inner.

MALACCA, *Maingay*.

A tree; branches black, rugose. Leaves 3-5 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., rather thin, opaque, dirty green above, pale and greenish beneath under the soft brown hairs; petiole $\frac{1}{2}$ in. Flowers $\frac{1}{2}$ in. diam., subsessile. Sepals broad-ovate, connate, hardly larger than the sepals. Outer petals suborbicular, very thick, glabrous within; inner smaller, very concave, obovate, connivent. Torus flat. Stamens about 25. Ovaries 7-9, glabrous; style equalling the ovary; ovules 2 superposed. Ripe? carpels $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., globose, hairy, at length glabrous, smooth, blood red, 2-seeded; stalk $\frac{1}{4}$ in., stout.

13. OXYMITRA, Blume.

Climbing shrubs. Leaves parallel-nerved, nervules transverse, not forming intra-marginal loops. Flowers leaf-opposed or extra-axillary. Sepals 3, valvate, connate below. Petals 6, valvate in 2 rows, outer large, long, flat or triquetrous and narrow, leathery, more or less spreading or connivent; inner much smaller, ovate-lanceolate or oblong (long and narrow in *O. stenopetala* and *glauca*), conniving over the stamens and ovaries. Stamens many, linear-oblong or cuneate, truncate; anther-cells dorsal, remote (small and ovoid in *O. glauca*). Ovaries oblong, strigose; style oblong or clavate, recurved; ovules 1-2, subbasal, ascending. Ripe carpels 1-seeded, stalked.—DISTRIB. About 18 species, Asiatic and African.

1. **O. latifolia**, *H. f. & T. Fl. Ind.* 145; leaves ovate or obovate obtuse, base cordate glabrous above, softly pubescent beneath, peduncles 1-bracteate in the middle, carpels long-stalked pubescent.

PENANG, *Phillips*; MALACCA, *Maingay*.

A large woody climber, branches rusty-tomentose. Leaves 6-12 by 4-7 in., coriaceous, shining above, tomentose on the nerves and midrib beneath; petiole $\frac{1}{2}$ in. Flowers supra-axillary; pedicel $\frac{1}{2}$ - $\frac{1}{2}$ in., rusty tomentose; bracts ovate or oblong. Sepals orbicular, connate into a 3-lobed cup. Outer petals 1-1 $\frac{1}{2}$ in., tomentose, ovate-lanceolate, tips triquetrous; inner $\frac{1}{2}$ in., broad-ovate, shortly clawed. Carpels red-purple, golden-pubescent. Ripe carpels red-purple.

2. **O. Maclellandii**, *H. f. & T.*; leaves oblong-lanceolate acute, base rounded or subcordate, above glabrous except the midrib, beneath glaucous and appressed pubescent, peduncle ebracteate.

RANGOON, *Maclelland*, &c.

A large (climbing?) shrub, young branches appressed-tomentose, old glabrate. Leaves 8-10 by 2 $\frac{1}{2}$ -3 in., covered above with microscopic scales, reddish beneath; petiole $\frac{1}{2}$ in. Flowers supra-axillary, solitary; pedicel $\frac{1}{2}$ in., appressedly brown-pubescent. Sepals $\frac{1}{2}$ in., ovate, acuminate. Outer petals 1 $\frac{1}{2}$ in., oblong, obtuse, coriaceous; inner $\frac{1}{2}$ - $\frac{3}{4}$ in., oblong, connivent, flat, with a slight oval basal concavity. Ovaries oblong, densely strigose; style oblong.

3. **O. affinis**, *H. f. & T.*; branchlets densely rusty-tomentose, leaves oblong or obovate-oblong obtuse or subacute, base cordate, above opaque and puberulous, beneath glaucous and rusty-pubescent, peduncle bracteate in the middle, sepals foliaceous, carpels elliptic pubescent shortly-stalked.

MALACCA, *Maingay*.

Branches black. Leaves 5-9 by 2-3 $\frac{1}{4}$ in., thin; nerves rusty pubescent above, beneath distinct spreading; petiole $\frac{1}{4}$ in. Flowers supra-axillary, nodding, solitary, 1 in. long;

peduncle $\frac{1}{4}$ in., short, curved; bracts large, orbicular, veined. *Sepals* $\frac{1}{2}$ in., orbicular-ovate, acute, veined, tomentose, twice as broad and half as long as the ovate-lanceolate triquetrous acute outer petals, which are excavated at the base, pubescent outside, glabrous within. *Inner* petals glabrous, rather shorter than the outer, connate into an acute cone, claw short. *Ovaries* 1-ovuled. *Carpels* $\frac{1}{2}$ in., acute; stalk short.—Near *O. Maclellandii*.

4. ***O. stenopetala***, *H. f. & T.*; leaves lanceolate acute at both ends, glabrous above glaucous beneath, petals all long and narrow.

MARTABAN, *Falconer*.

A woody climber; young branches and flowers appressed-pubescent. *Leaves* 9-12 by 2-3 in. *Flowers* supra-axillary. *Sepals* $1\frac{1}{2}$ in., ovate, acute. *Petals* tapering from an ovate base to a long fine point, outer 2 by $\frac{1}{2}$ in., inner $\frac{1}{4}$ shorter, connivent.—Habit of the genus, but differs in the long inner petals.

5. ***O. unonæfolia***, *H. f. & T. Fl. Ind.* 146; leaves oblong abruptly caudate-acuminate glabrous and shining above very glaucous beneath, carpels oblong stalked glabrous. *Guatteria unonæfolia*, *A. DC. Mem.* 41; *Wall. Cat.* 6435.

TENASSERIM, at TAVOY, *Wallich*.

A woody glabrous climber; buds with appressed golden pubescence. *Leaves* 5-7 by 2-3 in., base rounded or subacute; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Peduncles* extra-axillary; flowers imperfect. *Sepals* persistent, broad-ovate, brown-pubescent. *Carpels* 5-6, apiculate, dark-brown; stalk $\frac{1}{4}$ in.—Referred here from its similarity in foliage, &c., to *Oxymitra*.

6. ***O. glauca***, *H. f. & T. Fl. Ind.* 146; leaves oblong obtuse or acute at both ends glabrous very glaucous beneath, outer petals very long and narrow, carpels stalked small obtuse at both ends.

PENANG, *Phillips*; MALACCA, *Maingay*.

A slender glabrous (climbing?) shrub; buds slightly pubescent. *Leaves* 3-5 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., base usually rounded. *Sepals* minute, acute, deciduous. *Fruiting peduncles* 1 in., almost leaf-opposed. *Outer petals* 1 in., narrow-linear, triquetrous; inner very small, triquetrous. *Anther-cells* ovoid, top of connective large, trapezoid. *Ovaries* hirsute; ovule 1 erect; style curved, clavate. *Carpels* many, $\frac{1}{2}$ in. diam., subglobose, dark-brown, smooth; stalk as long.

7. ***O. fornicata***, *H. f. & T. Fl. Ind.* 146; leaves lanceolate or oblong-lanceolate acute or acuminate glabrous above glaucous and hoary-pubescent beneath, carpels narrow-oblong mucronate short-stalked. *Uvaria fornicata*, *Roxb. Fl. Ind.* ii. 662. *U. Roxburghiana*, *Wall. Cat.* 6423 *A* (not *B*).

Forests of ASSAM, SILHET, MERGUI, and PENANG?

A climbing shrub, young branches leaves pedicels and carpels brown-tomentose. *Leaves* 4-6 by 1-2 in., base rounded; petiole $\frac{1}{2}$ in. *Flowers* pale yellow, supra-axillary; peduncles $\frac{1}{4}$ - $\frac{3}{4}$ in.; bract median, oblong, deciduous. *Sepals* $\frac{1}{2}$ - $\frac{3}{4}$ in., ovate-lanceolate, membranous, veined, appressed-pubescent. *Outer petals* 2 in., oblong lanceolate, thin, tomentose, about 5-nerved; inner $\frac{1}{2}$ in., ovate, acute, connivent. *Carpels* $\frac{3}{8}$ - $\frac{1}{2}$ in., stalk very short, stout.

8. ***O. filipes***, *H. f. & T.*; branchlets slender and leaves beneath hirsute, leaves oblong or oblong-lanceolate acuminate, peduncles very long filiform, flowers very slender.

MALACCA, *Maingay*.

A climbing shrub; branches brown, clothed with soft spreading hairs. *Leaves* 4-6 by $1\frac{1}{4}$ -2 in., thin, base cordate, opaque above with slender puberulous veins, hardly glaucous beneath; petiole $\frac{1}{4}$ in. *Flowers* 2-2 $\frac{1}{2}$ in. long; peduncles 3-4 in., supra-

axillary, puberulous; bracts minute, median. *Sepals* $\frac{1}{4}$ in., ovate, acute, rusty-pubescent. *Outer petals* with a short broad concave base, and almost filiform pubescent blade; inner $\frac{1}{3}$ in., oblong, subulate-acuminate. *Ovaries* silky; style short, stigma clavate; ovule 1. *Carpels* $\frac{1}{3}$ in., elliptic, beaked, red, walls thin, pubescent; stalk $\frac{1}{4}$ in.

14. **PHEANTHUS**, H. f. & T.

Trees or climbers. *Flowers* solitary terminal or in extra-axillary fascicles. *Sepals* 3, small, valvate. *Petals* 6, valvate in 2 rows; outer small like the sepals; inner large, flat, coriaceous. *Stamens* numerous, narrow-oblong, truncate or capitate, anther-cells dorsal, distant. *Carpels* numerous; style clavate, grooved ventrally. *Ovules* 1-2, subbasal, ascending. *Ripe carpels* stalked, 1-seeded.—**DISTRIB.** Species 3, Malayan.

1. **P. nutans**, H. f. & T. *Fl. Ind.* 147; leaves oblong or lanceolate acute or acuminate glabrous above except the midrib softly pubescent beneath, carpels oblong puberulous stalked. *Uvaria nutans*, Wall. *Cat.* 6481. *U. tripetala*, Roxb. *Fl. Ind.* ii. 667. *U. ophthalmica*, Roxb. ex Don. *Gen. Syst.* i. 93.

MALACCA AND SINGAPORE, Wallich, &c.—**DISTRIB.** Moluccas.

A climber; young branches brown-tomentose. *Leaves* 4-6 by $1\frac{1}{2}$ - $2\frac{1}{4}$ in., base acute; petiole $\frac{1}{2}$ in., pubescent. *Flowers* terminal or lateral, solitary or 2-3 together, fetid, yellowish, purple at the base inside; peduncles 1-2 in., tomentose; bracts several, small, linear. *Inner petals* $\frac{3}{4}$ -1 in., ovate-oblong, pubescent, 5-7-ribbed. *Carpels* $\frac{1}{4}$ in., beaked; stalks equal their length.

? 2. **P. malabaricus**, Beddome *Ic. Pl. Ind. Or.* t. 76; leaves oblong-lanceolate taper-pointed glabrous except the midrib below, flowers axillary or extra-axillary solitary.

Wynaad jungles, MALABAR, Beddome.

Young part ferruginous. *Leaves* 4-7 by 1-2 in., base rounded or cordate; petioles very short, pubescent. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., red; peduncles $\frac{1}{4}$ - $\frac{1}{2}$ in.; bracts 2, minute, basal. *Sepals* orbicular-ovate, acute. *Outer petals* twice as large as the sepals, narrower; inner twice as large as the outer, cymbiform, fleshy, inflexed tips contiguous. *Style* short, clavate; ovules 1-2 on the ventral suture.—Foliage of *Goniiothalamus*.

15. **GONIOTHALAMUS**, Blume.

Small trees or shrubs. *Leaves* with small nerves, forming intramarginal loops. *Flowers* solitary or fascicled, axillary or extra-axillary; peduncles with basal scaly distichous bracts. *Sepals* 3, valvate. *Petals* 6, valvate in 2 series; outer thick, flat; inner smaller, shortly clawed, cohering in a vaulted cap over the stamens and ovary. *Stamens* many, linear-oblong; anther-cells remote, dorsal, connective produced into an oblong or truncate process. *Ovaries* many; style simple or 2-fid; ovules solitary or 2 superposed, subbasal. *Ripe carpels* 1-seeded.—**DISTRIB.** About 14 species, natives of Eastern tropical Asia and its islands.

A very difficult genus (reduced to *Oxymitra*, in Baillon's *Hist. des Plantes*, 237), many species of which require further study. The dimensions of the flower increase rapidly, and those given in the diagnosis are supposed to be the mature ones.—Thwaites' sectional characters taken from the persistence of the calyx and form of the style are probably the best, but not available in all the specimens at our disposal.

I. Outer petals glabrous or very slightly pubescent.

+ *Leaves* oblong or lanceolate; outer petals $1\frac{1}{2}$ in. or more.

1. **G. Thwaitesii**, H. f. & T. *Fl. Ind.* 106; leaves glabrous oblong obtusely acuminate, peduncles axillary, sepals broadly ovate obtuse per-

sistent, outer petals broadly clawed, style subulate, carpels ovoid shortly stalked. *Thwaites Enum.* 7; *Beddome Ic. Pl. Ind. Or.* t. 58.

TRAVANCOR, *Wight*; CEYLON, alt. 2-4000 ft.

A small tree; branches glaucous, leafy; buds brown-pubescent. *Leaves* $3\frac{1}{2}$ -6 by $1\frac{1}{4}$ - $2\frac{1}{2}$ in., coriaceous, dark-green above, paler beneath, margins subrecurved, nerves subdistant; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* green; peduncles $\frac{2}{3}$ -1 in., subclavate. *Sepals* $\frac{1}{2}$ in., glabrous, reticulate when dry. *Outer petals* $1\frac{1}{4}$ - $1\frac{1}{2}$ in., glabrous, ovate-lanceolate, tapering to a rather obtuse tip; inner subsericeous; cone of tips acute, $\frac{1}{2}$ in. *Carpels* $\frac{1}{2}$ - $\frac{2}{3}$ in., obtuse at both ends.

2. **G. Gardneri**, *H. f. & T. Fl. Ind.* 107; leaves narrow lanceolate glabrous, peduncles 1-2 axillary, sepals ovate acute persistent, outer petals hardly clawed, style subulate, carpels oblong subglabrous short-stalked.—*Thwaites Enum.* 7; *Beddome Ic. Pl. Ind. Or.* t. 60.

CEYLON; in forests, alt. 2-4000 ft., *Walker*, &c.

A shrub, 8-10 ft.; branches leafy, glabrous; buds brown-pubescent. *Leaves* 5-10 by 1-2 in., coriaceous, dark-green and shining above, pale beneath, nerves close set; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* yellow-green; peduncles $\frac{1}{4}$ - $\frac{1}{2}$ in. *Sepals* glabrous, reticulate when dry. *Outer petals* glabrous, oblong-lanceolate, longer and narrower than in *G. Thwaitesii*. *Carpels* 1 in.; style subulate.

3. **G. Griffithii**, *H. f. & T. Fl. Ind.* 110; leaves oblong obtusely acuminate glabrous, peduncles axillary recurved, sepals large obtuse or subacute persistent?, outer petals long-acuminate scarcely clawed, style subulate, carpels subglobose glabrescent short-stalked.

MERGUI, *Griffith*.

A tree; branches glabrous, black or grey. *Leaves* 6-12 by $2\frac{1}{2}$ -3 in., coriaceous, base acute, shining above, paler beneath; petiole $\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ in., axillary or from the old wood. *Sepals* $\frac{1}{4}$ - $\frac{2}{3}$ in., thin, reticulate when dry, connate below. *Outer petals* 2- $2\frac{1}{2}$ in., glabrous, lanceolate from a broad base; inner $\frac{1}{2}$ - $\frac{2}{3}$ in.; cone sharp, triquetrous. *Anthers* with an acute process. *Ovaries* strigose; style long, subulate. *Carpels* $\frac{1}{2}$ in. diam.

4. **G. Hookeri**, *Thwaites Enum.* 6; leaves oblong or ovate-oblong shortly obtusely acuminate glabrous, peduncles axillary or cauline, sepals broad acute persistent, outer petals not clawed, style subulate, carpels ovoid short-stalked.—*Beddome Ic. Pl. Ind. Or.* t. 66.

CEYLON; Hinidoon and Reigam Corles, alt. 1000 ft., *Thwaites*.

A small tree; branches glabrous. *Leaves* 6-13 by $2\frac{1}{2}$ -5 in., thick, coriaceous, base acute or rounded, paler beneath; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Flowers* pale green, solitary or fascicled; peduncles $\frac{1}{4}$ - $\frac{2}{3}$ in. *Sepals* $\frac{2}{3}$ in., connate below, reticulate when dry. *Outer petals* 2 in., glabrous, broad-lanceolate, base rounded, slightly contracted above the middle; inner tomentose within, cone $\frac{3}{4}$ in. high. *Carpels* size of a small bean.

†† *Leaves oblong or lanceolate; outer petals 1 in. or less.*

5. **G. sesquipetalis**, *H. f. & T. Fl. Ind.* 108; leaves linear-oblong or lanceolate abruptly obtusely acuminate glabrous margin recurved when dry, sepals ovate acute persistent, outer petals lanceolate, cone of inner long, carpels ovoid glabrous very short-stalked. *Guatteria sesquipetalis*, *Wall. Pl. As. Rar.* iii. t. 266; *Cat.* 6446. *O. macrophylla*, *A. DC. Mem.* 42 (not of *Blume*) *Wall. Cat.* 6451.

From SIKKIM to ASSAM, and the KHASIA HILLS to TENASSERIM.

A glabrous shrub, 2-4 ft. *Leaves* 9-13 by 2- $3\frac{1}{2}$ in., coriaceous, minutely pellucid-punctate, shining above, paler beneath; petiole $\frac{1}{2}$ in. *Flowers* greenish-yellow; peduncles $\frac{1}{4}$ - $\frac{1}{2}$ in., axillary or supra-axillary. *Sepals* $\frac{1}{2}$ in., glabrous. *Outer petals* 1 in.,

lanceolate, glabrous; inner pubescent, cone $\frac{3}{4}$ in. Ovaries golden-strigose, narrow, equalling the cylindric recurved style. Carpels 3-4 or 8-10, $\frac{3}{8}$ in., mucronate, granulate, orange-red.

6. **G. Walkeri**, *H. f. & T. Fl. Ind.* 109; leaves narrowly linear-oblong obtusely acuminate glabrous, peduncles axillary, sepals ovate acute persistent, outer petals ovate-lanceolate, style clavate 2-lobed.—*Thwaites Enum.* 8 and 398.

CEYLON; in the Singhe Rajah forest, *Walker, &c.*

A small tree; branches glabrous. Leaves 10-13 by 2-5 in., coriaceous, base acute, very aromatic, dark green and shining above, pale beneath. Flowers red, sparsely pubescent; peduncles $\frac{1}{2}$ - $\frac{3}{4}$ in., axillary. Sepals $\frac{1}{2}$ in., enlarging in fruit. Outer petals $\frac{3}{8}$ in.; inner $\frac{1}{4}$ - $\frac{1}{2}$ in.—“The fragrant roots contain camphor and are chewed by the Cinghalese.” *Thu.*—Very near to *G. sesquipetalis*. The description of the flower is taken from Thwaites.

+++ Leaves obovate-oblong, widening upwards to above the middle.

7. **G. Thomsoni**, *Thwaites Enum.* 7; leaves obovate-oblong abruptly long-acuminate glabrous, flowers solitary or binate axillary or truncal, sepals acute persistent, outer petals $1\frac{1}{2}$ in. lanceolate, style with 2 filiform segments, carpels ovoid short-stalked. *Beddome Ic. Pl. Ind. Or.* t. 59.

CEYLON; forests between Galle and Ratnapoora, *Thwaites*.

A small glabrous bush, $1\frac{1}{2}$ -3 ft. Leaves 6-12 by $1\frac{1}{2}$ - $3\frac{1}{2}$ in., base acute, bright green above, pale beneath; petiole $\frac{1}{4}$ in. Flowers yellow, glabrous, often close to the ground; peduncles $\frac{1}{2}$ - $\frac{3}{4}$ in., slender, tip decurved. Sepals $\frac{1}{4}$ in., lanceolate. Outer petals $1\frac{1}{2}$ in., taper-pointed, base rounded; cone of inner broad, $\frac{1}{2}$ in. high. Ovaries elongate, equaling the style. Carpels $\frac{1}{2}$ in., 1-seeded.

8. **G. wynaadensis**, *Beddome Ic. Pl. Ind. Or.* i. 13, t. 61; leaves narrowly obovate-oblong abruptly acuminate glabrous, peduncles axillary or truncal, sepals persistent? outer petals $\frac{1}{2}$ in. broad ovate, style elongate 2-lobed, carpels oblong. *Atrategia, Beddome*.

WESTERN PENINSULA; Wynaad, alt. 2500-5000 ft., *Beddome*.

An erect shrub; shoots puberulous. Leaves 8-11 by 3 in., thin, membranous, base acute, shining above, paler beneath; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. Flowers $\frac{3}{4}$ -1 in. long, glabrate; buds brown-pubescent; peduncles $\frac{1}{2}$ - $\frac{3}{4}$ in. Sepals orbicular, obtuse or acute. Outer petals conspicuously veined; inner half as long, vaulted. Torus and ovaries hairy; ovule 1. Ripe carpels $\frac{1}{2}$ -1 in. long, mucronate; stalk $\frac{1}{8}$ in.—We have seen but one specimen.

9. **G. macrophyllus**, *H. f. & T.*; leaves narrow-obovate-oblong acuminate glabrous coriaceous, peduncles supra-axillary, sepals acute persistent, outer petals 1- $1\frac{1}{2}$ in. oblong-lanceolate, style slender, carpels pisiform subsessile.—*Polyalthia macrophylla, Blume Fl. Jav. Anon.* 79, t. 39.

MALACCA, *Griffith, Maingay*.—DISTRIB. Java.

A shrub or tree; branches glabrous; bark grey. Leaves 10-18 by 3-5 in., coriaceous, base rounded or acute, pale beneath; petiole $\frac{3}{4}$ -1 in. Flowers green, glabrous; peduncles $\frac{1}{2}$ - $\frac{3}{4}$ in., glabrous. Petals, outer acute or acuminate; inner obtuse, ciliate, cone $\frac{1}{2}$ in., depressed, triquetrous. Ovaries 12-18, glabrous, 1-ovuled. Carpels size of a pea, ovoid, mucronate.—Our specimens are in fruit with a bud.

II. Outer petals softly pubescent or tomentose.

* Leaves oblong or obovate-oblong.

10. **G. Simonsii**, *H. f. & T. Fl. Ind.* 108; leaves narrowly obovate-oblong caudate-acuminate glabrous above brown pubescent beneath, peduncles axillary, sepals acute persistent, style cylindric, carpels oblong.

KHASIA HILLS; alt. 2-3000 ft., *Simons*, &c.

A small tree; young branches, midrib and nerves beneath, peduncles and petals brown-tomentose. *Leaves* 9-15 by 3-5 in., nerves strong; petiole $\frac{1}{2}$ in. *Flowers* 1-1 $\frac{1}{2}$ in. long; peduncles $\frac{1}{4}$ - $\frac{1}{2}$ in. *Sepals* $\frac{1}{2}$ in., ovate. *Outer petals* 1 $\frac{1}{2}$ -2 in. long, oblong-lanceolate; cone of inner $\frac{1}{2}$ in. long, triquetrous, acute. *Connective* acute, glabrous. *Carpels* $\frac{1}{2}$ in., on a much elongated torus, mucronate.

11. **G. giganteus**, *H. f. & T. Fl. Ind.* 109: leaves oblong long and obtusely acuminate glabrous above puberulous beneath with a sharply keeled midrib, peduncles from the old axils, sepals broadly ovate obtuse, outer petals flat, style filiform, tip clavate.—*Uvaria gigantea*, *Wall. Cat.* 6469 A, B (*in part*).

PENANG and SINGAPORE, *Wallich*, &c.—DISTRIB. Philippines.

Branches glabrous, white; buds brown-tomentose. *Leaves* 6-10 by 1 $\frac{3}{4}$ -3 in., coriaceous, base acute, dark green and shining above, pale beneath; petiole $\frac{1}{2}$ in. *Flowers* very large; peduncles 1-1 $\frac{1}{2}$ in., subclavate, spreading or pendulous, puberulous. *Sepals* $\frac{3}{4}$ in., ovate, subobtusely, pubescent. *Outer petals* 3-4 by 1 $\frac{1}{2}$ -3 in., oblong, shortly clawed, pubescent on both surfaces; inner densely golden tomentose, cone $\frac{3}{4}$ in.

12. **G. malayanus**, *H. f. & T. Fl. Ind.* 107: leaves narrow-oblong taper-pointed glabrous, peduncles axillary solitary, sepals connate to the middle acute, outer petals flat, style slender, carpels narrow-oblong glabrate stalked. *Uvaria* sp. *Griff. Notul.* iv. 710.

MALACCA, *Griffith*.

Bark white; shoots brown-tomentose. *Leaves* 6-9 by 1 $\frac{1}{2}$ -3 in., base acute or rounded, shining and dark green above, paler and lurid beneath, veins subhorizontal, faint; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* greenish; peduncles $\frac{1}{2}$ - $\frac{3}{4}$ in., deflexed, brown-silky. *Sepals* $\frac{1}{2}$ in., broad ovate, pubescent. *Outer petals* 1 in., ovate lanceolate, acute, clawed, young silky on both surfaces with a triangular glabrous basal area, back keeled; inner united into a short acute tomentose cone. *Ovaries* silky; ovules 3-5. *Carpels* 1 in., corky (golden-pubescent when immature); stalk $\frac{1}{4}$ in. *Seeds* 1-3, testa hispidulous; funicle broad, flat.—*G. Stingelandtii*, *Scheffer*, of Java, is perhaps the same.

13. **G. fulvus**, *H. f. & T.*; leaves narrowly obovate-oblong obtuse or acute glabrous, peduncles axillary solitary, sepals free subacute, outer petals flat, style cylindric glabrous.

MALACCA, *Griffith*.

Branches slender, black. *Leaves* 8-9 by 2 $\frac{1}{2}$ -3 $\frac{1}{2}$ in., thin, glabrous, pellucid-dotted, base acute, nerves oblique; petiole $\frac{1}{4}$ in., appressed-pubescent. *Flowers* 1 in. long; peduncles $\frac{1}{4}$ in., puberulous. *Sepals* $\frac{1}{2}$ in., broad ovate. *Outer petals* 1 $\frac{1}{2}$ -2 in., lanceolate from a broad base, taper pointed, brown-silky, slightly keeled on the back; cone $\frac{1}{2}$ in., short, triquetrous, obtuse.—*Flower of G. malayanus*; leaves more like *G. Simonsii*.

14. **G. cardiopetalus**, *H. f. & T. Fl. Ind.* 107; leaves narrow-oblong or obovate-oblong abruptly acuminate glabrous margin waved, peduncles supra-axillary solitary or superposed, sepals orbicular free, outer petals cucullate clawed, style slender 2-fid. *Beddome Ic. Pl. Ind. Or.* t. 62. *Uvaria* obovata, *Heyne ex Wall. Cat.* 6471. *Polyalthia cardiopetala*, *Dalz. in Hook. Kew Jour. Bot.* ii. 39. *Atrategia Thomsoni*, *Bedd.*

Mountains of CANARA, *Heyne*, &c.

A small tree; branches slender, leafy. *Leaves* 6-9 by 2-3 in., thin, coriaceous, base acute; petiole $\frac{1}{2}$ in. *Flowers* 1 in. diam.; peduncles $\frac{1}{4}$ - $\frac{1}{2}$ in. *Sepals* small, pubescent. *Outer petals* $\frac{1}{2}$ - $\frac{3}{4}$ in., oblong, densely brown-tomentose; inner $\frac{1}{2}$ shorter, tomentose.

** *Leaves lanceolate.*

15. **G. reticulatus**, *Thwaites Enum.* 7, 398; leaves lanceolate or very narrowly oblong acuminate glandular-dotted glabrous above sparsely strigose

beneath, peduncles supra-axillary, sepals broad ovate acute deciduous, style clavate 2-lobed, carpels oblong or globose rusty-pubescent. *Beddome Ic. Pl. Ind. Or. t. 64.*

CEYLON; forests between Galle and Ratnapoora, *Thwaites*.

A shrub, 6-8 ft.; bark black, young branches strigose. *Leaves* 6-11 by 1-2½ in., membranous, reticulate; petiole ¼ in., deeply grooved, almost winged. *Flowers* ¾ in. long, red- or yellow-brown; pedicels ¼ in., very slightly supra-axillary, deflexed. *Ovaries* densely red-strigose, style large. *Carpels* ½ in. long, acute, 1-2-seeded; stalk ½ in.

16. **G. salicinus**, *H. f. & T. Fl. Ind.* 106; leaves narrow-lanceolate acuminate glandular-dotted glabrous above sparsely strigose beneath, peduncles shortly supra-axillary, sepals deciduous, style 2-lobed. *Thwaites Enum. 7; Beddome Ic. Pl. Ind. Or. t. 65.*

CEYLON; in forests near Adam's Peak, alt. 2-3000 ft.

A shrub, 10-12 ft.; branches dark, slender, leafy; young parts, petioles, pedicels, and sepals densely brown-strigose. *Leaves* 3-4½ by ½-1 in.; petiole ¼ in. *Flowers* yellow-brown or red; peduncles ¼ in. *Sepals* ¼ in., ovate, acuminate. *Outer petals* ½-¾ in., oblong-lanceolate, tomentose; cone of inner ¼ in. high.

17. **G. Wightii**, *H. f. & T. Fl. Ind.* 106; leaves lanceolate acute at both ends glabrous on both surfaces pellucid-dotted, peduncles axillary, sepals persistent, outer petals ovate acute, style oblong tip dilated, carpels oblong glabrous. *Wall. Cat. 9089; Beddome Ic. Pl. Ind. Or. t. 63.*

Forests of TRAVANCOR, *Wight, &c.*

Branches glabrous, leafy, buds sub-silky. *Leaves* 3-5 by ¾-1½ in., thin, bright-green above, brownish beneath; petiole ⅛-¼ in. *Flowers* ½ in. diam., peduncles ½-1 in., subclavate. *Sepals* ½ in., broad-ovate, subacute, puberulous. *Outer petals* 1 in., appressed brown-pubescent; inner ½ in., cone short, brown silky inside. *Carpels* ⅔ in.; stalk ½ in.

16. MITREPHORA, Blume.

Trees. *Leaves* coriaceous, strongly ribbed, plaited in veneration. *Flowers* usually terminal or leaf-opposed, sometimes 1-sexual. *Sepals* 3, orbicular or ovate. *Petals* 6, 2-seriate, valvate; outer ovate, thin, veined; inner clawed, vaulted and cohering. *Stamens* oblong-cuneate; above anther-cells dorsal, remote. *Carpels* oblong; style oblong or clavate, ventrally furrowed; ovules 4 or more, 2-seriate. *Ripe carpels* globose or ovoid, stalked or subsessile.—DISTRIB. Species about 10; tropical Asiatic.

1. **M. tomentosa**, *H. f. & T. Fl. Ind.* 113; leaves ovate or oblong-lanceolate obtuse acute or acuminate, glabrous and shining above except the hairy midrib, softly tomentose beneath, flowers cymose shortly pedicelled bisexual leaf-opposed, carpels subglobose tomentose long-stalked.

From ASSAM, *Jenkins*; to CHITTAGONG, *H. f. & T.*

Branchlets tomentose. *Leaves* 3-6 by 1½-3 in., base rounded, finely reticulate beneath; petiole ⅔-¼ in. *Cymes* few-flowered, densely tomentose; bracts basal, large, orbicular; pedicels ¼-½ in.; bracteole submedian. *Flowers* 2 in. diam. *Sepals* broad-ovate, acute. *Outer petals* 1 in., acute; inner broad ovate. *Carpels* 1 in. diam.; pedicel 1-1½ in.

2. **M. obtusa**, *Blume Fl. Jav. Anon.* 32, t. 10 and 14 C; branches glabrescent, leaves ovate or oblong acute or mucronate glabrate beneath, flowers long-pedicelled 2-sexual on terminal and leaf-opposed tomentose peduncles, carpels as in *M. tomentosa* but smaller. *H. f. & T. Fl. Ind.* 113. *Uvaria obtusa*, *Blume Bijl.*; *Wall. Cat.* 6484.

PENANG, Wallich; MALACCA, Maingay.—DISTRIB. Java.

A tall much branched tree. *Leaves* 2-5 by 1-2½ in., coriaceous, base rounded, young pubescent beneath and on the midrib above, old glabrous and shining on both surfaces. *Flowers* 1 in. diam., bracts several, distichous, linear; pedicels 1-2 in., slender; bracteole minute, supra-median. *Outer petals* ½ in., yellowish, veins purple, velvety outside; inner smaller, ovate, obtuse, pubescent outside, densely tomentose inside, claw slender.

3. **M. Heyneana**, *Thwaites Enum.* 8; leaves ovate-lanceolate narrowed to an obtuse tip glabrous shining above, flowers 2-sexual shortly pedicelled solitary or in leaf-opposed subracemose cymes, carpels ovoid or subglobose subsessile. *Beddome Ic. Pl. Ind. Or.* t. 77. *Uvaria Heyneana*, *Wall. Cat.* 6463. *U. lutea* β, *W. & A. Prodr.* 8. *Orophea Heyneana*, *H. f. & T. Fl. Ind.* 110.

CARNATIC, at Courtalam, Heyne, &c., and CEYLON, Thwaites.

Branches glabrous; buds pubescent. *Leaves* 2-4 by 1-1½ in., firm, coriaceous, base rounded, finely reticulate beneath; petioles ½-¾ in. *Flowers* 1½ in. diam.; peduncle very short; bracts minute distichous; pedicels ¼ in., bracteole small, appressed. *Sepals* minute, orbicular. *Outer petals* ¾ in., yellow, cuneate-lanceolate, taper-pointed, downy on both sides; inner yellow with red spots, ½ in. long, trapezoid, acute, villous. *Carpels* 6-9, ½ in., strigose in flower, hoary when ripe, 1-3-seeded.

4. **M. ? excelsa**, *H. f. & T. Fl. Ind.* 114; young parts stellate-pubescent, leaves obovate-oblong acute shining above pubescent beneath, flowers small 2-sexual shortly pedicelled in short cymes in the old axils. *Uvaria excelsa*, *Wall. Cat.* 6477.

PENANG, Wallich.

Leaves 6-8 by 2-3½ in., base cordate, finely reticulate beneath, nerves oblique, conspicuous; petiole ¼ in. *Flowers* small, white, in 2-3-flowered cymes, tomentose. *Sepals* orbicular. *Outer petals* very thick, broad ovate, acute; inner thick, arched, rather contracted at the base.—Genus doubtful, the flowers being immature.

5. **M. reticulata**, *H. f. & T.*; leaves narrowly obovate-oblong obtusely acuminate glabrous above except the midrib puberulous beneath, flowers monœcious, pedicels fascicled axillary, carpels globose. *Uvaria reticulata*, *Blume Fl. Jav. Anon.* 50, t. 24. *Pseuduvaria reticulata*, *Miq. Fl. Ind. Bat.* i. pt. 2. 33.

TENASSERIM, Helfer.—DISTRIB. Java.

A small tree, 25 ft.; young branches hoary. *Leaves* 4-8 by 1½-2½ in., base acute, conspicuously reticulate beneath, nerves parallel; petiole ½-¾ in. *Pedicels* 3-6, slender, ½-1½ in., pubescent; bracts basal; bracteole median, minute, ovate. *Sepals* minute, ovate, obtuse. *Petals*, outside and margins tomentose, outer very small, subacute; inner ¼ in., trapezoid; claw narrow, erect. ♀ with 6 staminodes in 3 pairs. *Ovaries* pilose, 4-ovuled. *Carpels* 4 seeded.—Helfer's specimens differ from Blume's figure only in the rather longer petiole, all are male (like Blume's), but Maingay says the species is monœcious.

6. **M. Maingayi**, *H. f. & T.*; branchlets buds and peduncles rusty-pubescent, leaves oblong or elliptic-oblong acuminate glabrous shining above, flowers 2-sexual long-peduncled, bract concave median, carpels ovoid stalked.

MALACCA, Maingay.

A small tree. *Leaves* 3-7 by 1½-2½ in., rather rigid, pale, base rounded or acute, minutely reticulate, nerves strong beneath arching upwards; petiole ½-¾ in., pubescent. *Flowers* 1½ in. diam., cernuous, yellow with red blotches; buds globose, brown-villous; peduncles ¾-1 in., ascending, slender, and small broad sepals brown-tomentose. *Petals*

pubescent; outer 1 in., obovate-oblong, shortly broadly clawed, undulate; inner much smaller, cordate; claw long-linear. *Torus* urceolate pilose. *Ovaries* pilose, 8-10-ovuled, style clavate. *Carpels* (unripe) $\frac{3}{4}$ in., rusty-tomentose, top rounded; stalk $\frac{1}{2}$ in., stout.

7. **M. grandiflora**, *Beddome Ic. Pl. Ind. Or. t. 101*; young parts golden-pubescent, leaves elliptic or ovate-lanceolate shining above glabrescent beneath, peduncles 2-3-flowered leaf-opposed, flowers 2-sexual, carpels globose.

Ghats near Coloor and Gairsoppah, in S. CANARA, *Beddome*.

A handsome tree. *Leaves* 4-5 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., thin, coriaceous, axils of nerves beneath hairy and glandular; petiole $\frac{1}{2}$ in. *Flowers* 2-3 in. diam., ferruginous, subsessile; buds globose; bract close to flower. *Sepals* small. *Outer petals* broadly elliptic, acute, first white, turning yellow; inner smaller, deciduous, claw broad, back triangular, white streaked with red. *Carpels* globose, size of a hazel, 1-seeded, tomentose.—We have seen no specimen.

16.* **ANONA**, Linn.

Trees or shrubs. *Flowers* solitary or fascicled, terminal or leaf-opposed. *Sepals* 3, small, valvate. *Petals* 3-6, valvate in 2 series, or the inner series wanting; outer triquetrous, base concave. *Stamens* numerous; anther-cells narrow, dorsal, contiguous, top of connective ovoid. *Ovaries* many, subconnate; style oblong; ovule 1, erect. *Ripe carpels* confluent into a many-celled ovoid or globose many-seeded fruit.—DISTRIB. A large American and African genus, of which various fruiting species or varieties are naturalized in the Old World.

A. squamosa, Linn.; *DC. Prodr. i. 85*; leaves oblong obtuse or acuminate glaucous beneath and pubescent when young, fruit tubercled. *Roxb. Fl. Ind. ii. 657*; *W. & A. Prodr. 7*; *Wall. Cat. 6490*; *H. f. & T. Fl. Ind. 115*; *Rheede Hort. Mal. iii. 29*.

Naturalized especially in the WESTERN PENINSULA.—DISTRIB. Tropical America.—(The Custard Apple of India, and Sweet Sop of the W. Indies)

A small tree. *Leaves* 2-3 by $\frac{3}{4}$ - $1\frac{1}{2}$ in., membranous, usually obtuse, base acute. *Flowers* solitary 1 in. long, pubescent. *Petals* 3, narrow-oblong. *Fruit* fleshy, areolate.

A. reticulata, Linn.; *DC. Prodr. i. 85*; leaves oblong or oblong-lanceolate quite glabrous smooth or roughish beneath, fruit smooth lightly areolate. *Roxb. Fl. Ind. iii. 657*; *Wall. Cat. 6489*; *W. & A. Prodr. 7*; *H. f. & T. Fl. Ind. 115*; *Rheede Hort. Mal. iii. t. 30, 31*.

Naturalized in BENGAL and elsewhere. DISTRIB. Tropical America. (Bullock's-heart or Custard Apple of the W. Indies.)

A small tree. *Leaves* 5-8 by $1\frac{1}{2}$ -2 in., base acute; petiole $\frac{1}{2}$ in. *Flowers* 2-3 together on lateral peduncles. *Outer petals* as in *A. squamosa*; inner very small, narrow-oblong. *Fruit* subglobose, roughish outside, with pentagonal areoles.

17. **MELODORUM**, Dunal.

Climbing shrubs. *Leaves* with strong parallel nerves. *Flowers* terminal axillary and leaf-opposed, solitary fascicled or paniced; buds triquetrous. *Sepals* 3, small, valvate, connate below. *Petals* 6, valvate in 2 rows; outer plano-convex or trigonous; inner triquetrous above, hollowed below on the inner face. *Stamens* many; anther-cells dorsal, contiguous; top of connective ovoid or quadrate. *Carpels* many, free; style oblong; ovules 2 or more.

Ripe carpels berried. — **DISTRIB.** Species about 18; Tropical Asia and Africa.

SECT. I. *Melodorum* proper. *Outer petals* oblong-ovate or ovate-lanceolate. *Ovaries* tomentose; ovules many. *Seeds* smooth, often with a raised marginal wing.

* Leaves very pubescent or tomentose beneath.

† Leaves pubescent on both surfaces.

1. ***M. rubiginosum***, *H. f. & T. Fl. Ind.* 116; leaves oblong obtuse acute or abruptly acuminate glabrous except the tomentose midrib above, pubescent beneath, outer petals 1-1½ in. narrow-oblong, carpels ovoid or globose tomentose stalked. *Uvaria rubiginosa*, *A. DC. Mem.* 26; *Wall. Cat.* 6465. *U. nervosa* and *U. fulva*, *Wall. Cat.* 6479, 6427.

From SILHET and CHITTAGONG, *H. f. & T.*, to TENASSERIM, *Wallich*.

A large climber; branchlets brown-tomentose. *Leaves* 3-12 by 2-5 in., rather membranous; petiole ½-1 in. *Flowers* axillary or in terminal 5-6 flowered leafless panicles, brown-tomentose; pedicels 1-1½ in.; bracts 1-2, supra-median, small, ovate. *Sepals* short, broad. *Outer petals* oblong, acuminate, tomentose outside, hoary within; inner narrower, ovate, base concave, limb triquetrous. *Carpels* 1-1½ in.; stalk as long or longer. *Seeds* shining.

2. ***M. latifolium***, *Dunal; H. f. & T. Fl. Ind.* 117; leaves ovate or oblong obtuse coriaceous densely pubescent beneath, outer petals ¾ in. oblong-ovate, carpels large ovoid beaked, stalks thick. *Wall. Cat.* 9411. *M. mollissimum*, *Miquel Fl. Ind. Bat. Suppl.* i. 354. *Uvaria latifolia*, *Blume Fl. Jav. Anon.* t. 15.

MALACCA, *Griffith*; SINGAPORE, *Maingay*. — **DISTRIB.** Sumatra, Java, Philippines.

Very near *M. rubiginosum*, but leaves very coriaceous, more tomentose and obtuse, young downy above, flowers smaller broader and shorter, in larger panicles. *Carpels* 3 in., oblong, densely rusty-tomentose, young warted beaked, old smooth; stalks longer.

3. ***M. lanuginosum***, *H. f. & T. Fl. Ind.* 117; leaves lanceolate or oblong-lanceolate acute or acuminate rarely obtuse glabrous except the midrib above densely woolly beneath, outer petals 1½-2 in. villous, carpels globose tomentose. *Uvaria lanuginosa*, *Wall. Cat.* 6454.

PENANG and SINGAPORE, *Wallich*; MALACCA, *Maingay*.

A rambling shrub, densely brown-tomentose. *Leaves* 6-8 by 1¾-2¾ in., lower on the branches smaller, base rounded; petiole ½-¾ in. *Flowers* terminal or leaf-opposed, in short 3-4-flowered cymes; bracts small, oblong, deciduous; pedicels ½-1 in., bracteole ovate basal. *Sepals* ½ in., ovate. *Outer petals* oblong, tapering to an obtuse point; inner a little shorter, hoary, narrow, base concave, limb long triquetrous. *Carpels* 1 in. diam.; stalk ½ in. *Seeds* dimidiate-oblong, shining.

4. ***M. manubriatum***, *H. f. & T. Fl. Ind.* 118; leaves 3-5 in. oblong or oblong-lanceolate acute or acuminate glabrous except the midrib above, densely brown-tomentose beneath, outer petals ¾-1 in., carpels subglobose densely tomentose. *Uvaria manubriata*, *Wall. Cat.* 6456.

PENANG and MALACCA, *Wallich*, &c.

A woody climber, young branches petioles inflorescence and carpels densely brown-tomentose. *Leaves* 3-5 by 1½-1¾ in., base rounded; petiole ¼ in. *Flowers* 1-3, fascicled, terminal or leaf-opposed, pedicels ½-¾ in.; bracts oblong, infra-median. *Sepals* nearly ¼ in., ovate, acute. *Outer petals* ovate-oblong, obtuse; inner a little shorter, dull purple, ovate-lanceolate, hoary, glabrous within. *Carpels* ½-¾ in., obtuse; stalk rather longer.

5. **M. verrucosum**, *H. f. & T. Fl. Ind.* 119; leaves 3-5 in. oblong or lanceolate acute or obtuse glabrous except the midrib above, softly pubescent beneath, nerves close-set, carpels subglobose densely warted.

KHASIA HILLS, alt. 1-5000 ft., *H. f. & T.*

A large woody climber, young branches and flowers tomentose. *Leaves* 3-5 by $1\frac{1}{4}$ -2 in., base hardly rounded, petiole $\frac{3}{4}$ -1 in. *Flowers* 1-5, fascicled, terminal or leaf-opposed, buds shorter and broader than in other species; bracts ovate or oblong, acute, median. *Sepals* ovate, acute. *Outer petals* $\frac{3}{4}$ in., ovate, acute, slightly keeled inside; inner triangular-oblong, acute, hoary, concave except at the triquetrous tip. *Carpels* 2 in. diam., pubescent; stalk 4-8 in.—Griffith's t. 652 (of *Icones* iv.), which is not referred to in the "Notulæ," may belong to this species, but the venation differs much.

6. **M. Griffithii**, *H. f. & T. Fl. Ind.* 120; leaves 3-5 in. narrow oblong or lanceolate obtuse or subacute glabrous except the midrib above, rusty-pubescent beneath, tip often retuse, outer petals $\frac{1}{2}$ in. *Fissistigma scandens*, *Griff. Not.* iv. 706.

TENASSERIM, *Griffith*.

A climbing shrub; bark dark grey, spotted white; young branches and flowers tomentose. *Leaves* 3-5 by $1\frac{1}{4}$ - $1\frac{3}{4}$ in., base rounded; petiole $\frac{1}{4}$ in. *Flowers* 2-4 in., sub-terminal in leaf-opposed fascicles terminating a short peduncle; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in.; bracteole median, orbicular, small. *Sepals* orbicular, obtuse. *Outer petals* $\frac{1}{2}$ in.; inner a little shorter, red-brown, glabrous or puberulous.—Resembles *Uvaria sphaerocarpa*, Bl., which is a *Melodorum*, but the flower of that plant and the fruit of this are unknown.

7. **M. bicolor**, *H. f. & T. Fl. Ind.* 119; leaves 4-8 in. oblong or lanceolate, lower on each branch obtuse upper acute glabrous except the midrib above silky beneath, outer petals 1 in., carpels globose subglabrous. *Uvaria bicolor*, *Roxb. Fl. Ind.* ii. 662 (not of *Wall. Cat.*).

From the base of the SIKKIM HIMALAYA and KHASIA HILLS to ASSAM and AVA.

A large woody climber; young branches and flowers tomentose. *Leaves* 4-8 by 2-3 in.; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in. *Flowers* 1-3, in leaf-opposed fascicles; pedicels $\frac{1}{4}$ -1 in.; bracteole small, basal. *Sepals* ovate. *Outer petals* villous, ovate-lanceolate; inner rather shorter and narrower, glabrous, red. *Carpels* 1 in. diam, mucronate; stalk $\frac{1}{4}$ - $\frac{1}{2}$ in.—Very near *M. manubriatum*, but with usually larger, more obtuse leaves, more lateral flowers, and more globose shorter-stalked fruit.

8. **M. Maingayi**, *H. f. & T.*; branchlets pubescent, leaves broad-elliptic or oblong rounded at both ends or tip apiculate glabrous above glaucous and finely pubescent beneath, flowers $1\frac{1}{2}$ in. solitary, calyx orbicular, carpels oblong straight-beaked.

PENANG, *Maingay*.

A scandent shrub; branches black. *Leaves* 3-5 by $1\frac{1}{2}$ -2 in., hard, coriaceous, red-brown when dry, opaque above with a slender downy midrib, nerves many, much diverging, slender; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in. *Flowers* axillary, cernuous, appressed brown pubescent; buds with a swollen base $\frac{1}{4}$ in. diam. and trigonous curved beak; pedicel $\frac{1}{4}$ - $\frac{1}{2}$ in., stout, curved; bract small, broad, half-amplexicaul. *Calyx* a disk $\frac{1}{4}$ in. diam. *Outer petals* flat but keeled down the middle inside, compressed 3-gonous; base excavated; inner very small, triangular-ovate, glabrous. *Stamens* very many, small, truncate. *Torus* conical, low, top depressed. *Ovaries* about 6, silky; stigma subsessile. *Carpels* $1\frac{1}{2}$ -2 by $\frac{3}{4}$ in., rusty puberulous, walls thick; stalk $\frac{1}{2}$ in., stout, straight. *Seeds* $\frac{1}{2}$ in., many, 2-seriate, horizontal; testa shining, not margined.

9. **M. cylindricum**, *Maingay, mss.*; branches rusty-pubescent, leaves oblong elliptic or elliptic-lanceolate acuminate glabrous above brown and

puberulous beneath, flowers $\frac{1}{2}$ in. solitary, calyx obtusely triangular, carpels cylindric rough ends rounded.

MALACCA, Maingay.

Branches very dark. *Leaves* 3-4 $\frac{1}{2}$ by 1 $\frac{1}{4}$ -1 $\frac{3}{4}$, base rounded, coriaceous, hard, midrib slender, puberulous, nerves many slender diverging; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., pubescent. *Flowers* axillary, cernuous; buds short, pyramidal, appressed brown-pubescent; peduncle short, thick, bract obscure. *Calyx* $\frac{1}{4}$ in. diam. *Outer petals* triangular-ovate, 3-quetrous, base excavated; inner very small indeed, triangular, glabrous. *Torus* as in *M. Maingayi*. Top of *connective* orbicular. *Ovaries* 4-6, silky-pubescent. *Ripe carpels* 1-1 $\frac{3}{4}$ by $\frac{1}{2}$ - $\frac{3}{4}$ in., curved, brown-pubescent, walls very thin; stalk $\frac{1}{2}$ in., stout. *Seeds* many, $\frac{1}{2}$ in. long, 2-seriate, horizontal, testa shining, not margined; aril small, cartilaginous.

** Leaves glabrous or minutely sparsely pubescent beneath. (See also *Maingayi* and *cylindricum*.)

† *Flowers in terminal or leaf-opposed cymes or fascicles.*

10. **M. Wallichii**, *H. f. & T. Fl. Ind.* 118; leaves narrow oblong-lanceolate acute or acuminate sparsely pilose beneath veins distant, outer petals $\frac{3}{4}$ in. carpels subglobose tomentose.—*Uvaria bicolor*, *Wall. Cat.* 6466, not of *Roxb.*

EASTERN BENGAL, in ASSAM and SILHET, *Wallich, &c.*

A large woody climber, young parts with slight golden pubescence. *Leaves* 4-7 by 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in., base rounded, pale beneath and hairy chiefly on the midrib and distant nerves; petiole $\frac{1}{2}$ in. *Flowers* 1-3, in terminal or leaf-opposed fascicles; pedicels $\frac{1}{2}$ in.; bracts 1-2, ovate, basal. *Sepals* small, ovate. *Outer petals* oblong-lanceolate; inner one-third shorter, hoary, brown-purple. *Carpels* (mature?) $\frac{1}{2}$ in. diam., obliquely mucronate; stalk 1 in.

11. **M. polyanthum**, *H. f. & T. Fl. Ind.* 121; leaves narrow oblong or lanceolate usually acute at both ends minutely pubescent beneath, outer petals $\frac{1}{4}$ in. *Uvaria polyantha*, *Wall. Cat.* 6467.

Forests of the KHASIA HILLS, SILHET, and ASSAM.

A large woody climber; branches blackish, glabrous. *Leaves* 3-4 by 1-1 $\frac{1}{2}$ in. or 8-10 by 2-3 $\frac{1}{2}$ in., acute or sharply acuminate, pale beneath; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., glabrate. *Flowers* small, 3-7, in leaf-opposed cymes; peduncle short, woody, hoary, soon glabrate; pedicels $\frac{1}{4}$ in., with a basal scale and a median orbicular deciduous bracteole. *Sepals* ovate, subacute, hoary. *Outer petals* ovate, silky outside; inner about half the size, pubescent without, glabrous within.

12. **M. rufinerve**, *H. f. & T. Fl. Ind.* 121; leaves 6-10 in. long obtuse or acute glabrous glaucous beneath, flowers minute.

EASTERN BENGAL; forests between Silhet and Cachar, *H. f. & T.*

A large woody climber; branches glabrous; buds golden-pubescent. *Leaves* 6-10 by 2 $\frac{1}{2}$ -4 in., base rounded or retuse; petiole glabrous, $\frac{1}{2}$ - $\frac{3}{4}$ in. *Buds* minute, in pubescent leaf-opposed cymes; pedicels $\frac{1}{4}$ in.; bracteole small, median.—A very distinct species, in an immature condition.

†† *Flowers axillary, solitary, or appearing racemose only through the fall of the floral leaves.*

13. **M. prismaticum**, *H. f. & T. Fl. Ind.* 121; leaves 5-9 in. oblong rounded or abruptly acuminate glabrous brown beneath, sepals connate, outer petals narrow 2 in., carpels oblong obtuse tubercled glabrous.—*Uvaria prismatica*, *Wall. Cat.* 6455. *Pyramidanthe rufa*, *Miq. Ann.* ii. 39.

PENANG. MALACCA and SINGAPORE, *Wallich, &c.*—DISTRIB. BORNEO.

A large woody climber; branches black, glabrous; buds puberulous. *Leaves* 5-9 by $2\frac{1}{2}$ -4 in., much smaller at the base of the branches, thickly coriaceous, base rounded, puberulous on the midrib beneath; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Flowers* axillary, solitary; pedicel $\frac{1}{2}$ in.; bracteoles small, linear, subbasal. *Calyx* a slightly 3-lobed cup. *Outer petals* 2 in. tapering from a common base to a long triquetrous point, rusty-pubescent outside, hoary inside; inner $\frac{3}{4}$ -1 in., ovate, acute, glabrate, concave except the triquetrous tip. "*Ovaries* 4-6, strigose, 4- or more-ovuled," Maingay. *Carpels* $\frac{1}{2}$ -1 $\frac{1}{2}$ in. long; stalk $\frac{1}{2}$ -1 $\frac{1}{2}$ in.

14. **M. fulgens**, *H. f. & T. Fl. Ind.* 120; leaves 3-4 in. oblong-lanceolate acuminate glabrous except the midrib above pale and appressed pubescent beneath, outer petals $\frac{1}{2}$ in. ovate concave, carpels subglobose silky shining.—*Uvaria fulgens* and *Myristica Finlaysonianae*, *Wall. Cat.* 6482 and 6793.

MALACCA and SINGAPORE.—DISTRIB. Borneo, Philippines.

A large woody climber (small tree, *Maingay*); branches glabrous, young silky. *Leaves* 2-4 by 1-1 $\frac{1}{2}$ in., base rounded or subacute; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., silky. *Flowers* tawny-orange, solitary or in subracemose terminal panicles (through the fall of the floral leaves); pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in., golden-tomentose; bracteoles 2-3, linear, upper suborbicular. *Sepals* orbicular, acute. *Outer petals* $\frac{1}{2}$ in., ovate, golden-silky outside, hoary within, with a large concave glabrous basal area; inner oblong, acute, glabrous. *Anthers* purple, appendage long. *Ovaries* strigose. *Ripe carpels* 1 $\frac{1}{2}$ in. "*Seeds* flattened not scrobiculate," *Maingay*.

SECT. II. **Kentia**. *Flowers* axillary, solitary. *Outer petals* orbicular, with broad much thickened margins. *Ovaries* glabrous, pellucid-glandular; ovules definite or indefinite. *Seeds* pitted.

15. **M. elegans**, *H. f. & T. Fl. Ind.* 122; leaves lanceolate acuminate glabrous above paler and puberulous beneath, carpels oblong or subglobose. *Uvaria elegans*, *Wall. Cat.* 6474 A.

PENANG, *Wallich*; MALACCA, *Maingay*.

A climber; branches slender, glabrous, black; buds brown-pubescent. *Leaves* 3-4 by 1-1 $\frac{1}{2}$ in., coriaceous, base rounded or acute; petiole $\frac{1}{2}$ in. glabrous. *Peduncles* slender; bracteoles 2-3, minute, basal. *Sepals* small, ovate, acute, persistent. *Outer petals* $\frac{1}{2}$ in., ovate, subacute, brown silky outside, hoary inside; inner much smaller, ovate, thick, back keeled, fringed round the basal hollow, triquetrous and hoary above the middle. *Ovaries* 8-10-ovuled. *Carpels* $\frac{1}{2}$ in., stalk as long.—Very like *M. Kentii*, *H. f. & T.*, of Java (*Polyalthia*, *Blume*), but that plant is 2-ovuled.

16. **M. pisocarpum**, *H. f. & T. Fl. Ind.* 123; leaves broad-ovate or oblong emarginate glabrous above reticulate and puberulous beneath, carpels pisiform granulate glabrate. *Uvaria mabiformis*, *Griff. Notul.* iv. 709.

MALACCA, *Griffith*.

A shrub, probably climbing; branches glabrous; buds golden-silky. *Leaves* 1 $\frac{1}{2}$ -3 by 1 $\frac{1}{4}$ -1 $\frac{3}{4}$ in., coriaceous, base rounded or subacute; petiole $\frac{1}{2}$ in. *Peduncles* $\frac{1}{4}$ - $\frac{1}{2}$ in., slender, hardly downy; bracteoles 2, minute, scale-like, basal; buds subglobose, obtusely triquetrous. *Sepals* small, ovate, acute. *Outer petals* $\frac{1}{2}$ in. broad, ovate, suborbicular, golden-silky outside, hoary inside; inner about half as long, narrow-oblong. *Ovaries* 2-ovuled. *Carpels* $\frac{1}{4}$ in. diam., globose; stalk the same length. "*Seeds* 2, scrobiculate, arilled," *Maingay*.

18. **XYLOPIA**, Linn.

Trees or shrubs. *Leaves* coriaceous. *Flowers* axillary, solitary cymose or fascicled; buds triquetrous, conic, often slender. *Sepals* 3, valvate, connate. *Petals* 6, elongate, valvate in 2 series; outer flat or concave; inner nearly

as long, 3-gonous, concave at the base only. *Torus* flat, or hollow and enclosing the carpels. *Stamens* oblong, truncate or connective produced; anther-cells remote or contiguous, usually septate, with a large pollen-grain in each cellule. *Ovaries* 1 or more; style long, clavate; ovules 2-6 or more, 1-2-seriate. *Ripe carpels* long or short, continuous or moniliform, usually several-seeded.—*DISTRIB.* Tropics generally; species 30-40.—Closely allied to *Melodorum*, but very different in habit.

SECT. I. Habzella, Alph. DC. (Gen.). *Torus* flat or slightly concave. *Ripe carpels* cylindric or obovoid.

1. **X. ferruginea, H. f. & T. Fl. Ind.** 123 (*Habzella*); leaves narrow-oblong acute glabrous and shining above glaucous beneath and rusty-pubescent on the veins, peduncles solitary or geminate, carpels cylindric slender subtorulose. *Artabotrys malayana, Griff. Notul.* iv. 713.

MALACCA, *Griffith, Maingay.*

A flexuous ramose shrub; branchlets rusty-pubescent. *Leaves* 5-7 by $1\frac{1}{2}$ -2 in., base oblique rounded or subcordate, much reticulate; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* pendulous, yellow, fragrant; peduncles $\frac{3}{4}$ -1 $\frac{1}{2}$ in., rusty-pubescent. *Sepals* ovate, acute. *Outer petals* $\frac{1}{2}$ in., taper-pointed, yellow-tomentose; inner shorter, narrower, triquetrous above, base contracted. *Anthers* with a long narrow process, cells septate. *Ovaries* many golden strigose. *Carpels* $\frac{1}{2}$ -4 in., blood-red. *Seeds* ovoid, aril 0.

2. **X. oxyantha, H. f. & T. Fl. Ind.** 124 (*Habzella*); leaves ovate or oblong abruptly acuminate glabrous glaucous below, peduncles fascicled axillary. *Uvaria oxyantha, Wall. Cat.* 6478.

SINGAPORE, *Wallich.*

A tree; branches glabrous; young parts puberulous. *Leaves* 7-8 by $2\frac{1}{2}$ -3 $\frac{1}{2}$ in.; petiole $\frac{1}{2}$ in. *Flowers* more than 1 in. long, peduncles $\frac{1}{2}$ -1 in., appressed downy. *Sepals* broad-ovate. *Outer petals* $1\frac{1}{2}$ -1 $\frac{1}{2}$ in., narrow-linear, pubescence yellowish appressed, back slightly keeled.

3. **X. malayana, H. f. & T. Fl. Ind.** 125; leaves oblong obtusely acuminate glabrous reticulate beneath, peduncles very short 3-5-flowered, sepals united to the middle, carpels cylindric-oblong obtuse pubescent. *Parartabotrys sumatrana, Miq. Fl. Ned. Ind. Suppl.* i. 374.

MALACCA, *Griffith.*—*DISTRIB.* Sumatra.

A tree; branches slender, glabrous; buds pubescent. *Leaves* 3-5 by $1\frac{1}{2}$ -2 in., coriaceous, base acute, pale-brown when dry beneath; petiole $\frac{1}{2}$ - $\frac{1}{4}$ in. *Flowers* $\frac{1}{2}$ -1 in. long, triquetrous; peduncles axillary, 1-bracteate; pedicels short and brown-tomentose. *Sepals* ovate, acute. *Outer petals* linear, inner shorter. *Connective* prolonged; anther-cells septate. *Ovaries* 5-7, strigose, 2-ovuled (6-ovuled, *Maingay*). *Carpels* $\frac{1}{2}$ -1 in., many-seeded; stalk short, thick.

4. **X. obtusifolia, H. f. & T.**; leaves oblong obtuse or retuse glabrous and shining above brown-silky beneath, cymes subracemose, sepals acute united to the middle.

MALACCA, *Griffith.*

A tree; branches glabrous; buds rather silky. *Leaves* 2-3 by $1-1\frac{1}{2}$ in., coriaceous, base acute; petiole $\frac{1}{2}$ - $\frac{1}{4}$ in. *Flowers* like those of *X. malayana* in shape and size, brown-silky. *Cymes* $\frac{1}{2}$ -1 in.; pedicels $\frac{1}{4}$ in., rather silky, with a median and basal bracteole. *Ovules* 4-5.

5. **X. fusca, Maingay mss.**; branches glabrous, leaves small elliptic- or linear-oblong obtuse coriaceous glabrous, nerves faint reticulate, flowers

solitary racemed or fascicled, pedicel and subtire calyx rarely pubescent, petals brown-silky, ovaries 4-5.

MALACCA, Maingay.

A tree; branches rather stout black, tips and very young leaves silky, shining. *Leaves* 2-3 by $\frac{3}{4}$ -1 in., base acute, opaque above, rather darker beneath, midrib sometimes puberulous; petiole $\frac{1}{2}$ in., stout. *Flowers* $\frac{3}{4}$ in., pendent; peduncle $\frac{1}{2}$ -1 in., stout, curved; bracts few, minute; pedicels short, stout, ebracteolate. *Petals* shining; outer linear from a rather broader base, concave; inner rather shorter, narrower, 3-gonous, base excavated. Top of *connective* oblong; anther-cells not septate, lateral. *Ovaries* cohering in a cone on the slightly concave torus, golden silky; style short, subulate; ovules 10-12, 2-seriate.

6. **X. magna**, *Maingay mss.*; leaves oblong or ovate-oblong obtuse or acute glabrous above softly pubescent beneath coriaceous, flowers solitary or racemes terminal, sepals united beyond the middle, carpels obliquely ovoid or obovoid compressed puberulous.

MALACCA, Maingay.

A tree; branches black, glabrous, branchlets pubescent. *Leaves* 3-6 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., base obtuse or rounded, thick, above dull, beneath very opaque, brown, nerves faint; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Flowers* 5 in. long, white, slender; peduncles very short. *Sepals* united into a broad acutely-lobed cup, ferruginous. *Petals* hoary, subequal; outer very narrow, subulate, flat; inner more slender, base concave. *Torus* concave. *Anthers* rose-coloured, slender, cells septate, tip orbicular. *Ovaries* strigose; style slender, stigma hairy; ovules 4. *Carpels* $1\frac{1}{2}$ in., walls thick; stalk very short; torus $\frac{3}{4}$ in. diam. *Seeds* about 4, superposed, arillate, testa osseous.

SECT. II. **Euxylopia**. *Torus* much hollowed, bearing the stamens outside and enclosing the ovaries.

7. **X. parvifolia**, *H. f. & T. Fl. Ind.* 125; leaves oblong-lanceolate acuminate glabrous shining above pale beneath, pedicels fascicled clothed with bracteoles, sepals united to the middle, carpels obovoid or oblong subsessile pubescent. *Thwaites Enum.* 9; *Beddome Ic. Pl. Ind. Or.* t. 43. *Patonia parvifolia*, *Wight Ill.* 19.

Southern parts of CEYLON.

A tree; young branches brown-pubescent. *Leaves* 2-3 by $\frac{3}{4}$ -1 $\frac{1}{4}$ in., coriaceous, base acute; petiole $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in. long, in axillary 3-5 flowered subsessile fascicles, pubescence brown appressed; pedicels very short; bracteoles orbicular, the upper close to the calyx. *Sepals* acute. *Ovaries* 5, 4-6-ovuled. *Carpels* 1-1 $\frac{1}{2}$ in. *Seeds* oblong, smooth; imbedded in pulp (arillate?).—(*Patonia Walkeri*, *Wight Ill. l.c.*, is a species of *Diospyros*.)

8. **X. nigricans**, *H. f. & T. Fl. Ind.* 125; leaves broad lanceolate obtusely acuminate glabrous shining above pale beneath, peduncles 2-3 together axillary, bracteoles 2-3 deciduous, sepals free, carpels as in *X. parvifolia*. *Thwaites Enum.* 9, 398; *Beddome Ic. Pl. Ind. Or.* t. 44.

CEYLON; at Trincomalee, *Glenie*; and in the Doombura district, *Thwaites*.

A tree; branches glabrous; young puberulous. *Leaves* 2-3 by 1-1 $\frac{1}{2}$ in., thin, coriaceous, base acute; petiole $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in. long, pubescence ochreous, appressed; pedicels $\frac{3}{8}$ - $\frac{1}{2}$ in., short, slender, downy. *Ovaries* 5, about 4-ovuled.

9. **X. Championii**, *H. f. & T. Fl. Ind.* 126; leaves lanceolate or oblong-lanceolate acuminate pellucid-dotted glabrous and shining above puberulous beneath, peduncles solitary, sepals united almost to the tips, carpels oblong 5-ribbed short-stalked. *Thwaites Enum.* 9; *Beddome Ic. Pl. Ind. Or.* t. 45.

CEYLON; Ambagamowa and Ratnapoora districts, *Gardner*, &c.

A tree; branches slender, glabrous; buds rather silky. *Leaves* 3-5 by 1-1½ in., thin, coriaceous, base acute, pale beneath; petiole ¼-½ in. *Flowers* 1 in. long, pale ochreous or reddish, tomentose, triquetrous, broader than in its congeners; pedicels ½ in., brown-silky; bracteoles 2-3, minute, basal. *Calyx* slightly 3-lobed. *Petals* triquetrous above; inner narrower, one-third shorter. *Ovary* solitary, 4-ovuled. *Carpels* 1½ in. *Seeds* enveloped in pulp.

10. **X. caudata**, *H. f. & T. Fl. Ind.* 125; leaves oblong or lanceolate long obtusely acuminate tip mucronate glabrous except the midrib above silky beneath, peduncles 1-3 very short axillary bracteolate at the base and under the calyx, sepals connate at the base, carpels subglobose or ovoid pubescent short-stalked. *Guatteria?* *caudata*, *Wall. Cat.* 6452.

SINGAPORE, *Wallich*; MALACCA, *Griffith*.

A small leaved, much branched shrub, or small tree; branchlets hoary. *Leaves* 1½-3½ by ¾-1 in., thin, coriaceous, pellucid-punctate, grey beneath; petiole ⅙-⅓ in. *Flowers* ½-¾ in. long, subsessile. *Sepals* hoary. *Petals* silky, about equal in length, very slender. *Ovaries* 2, silky hairy, 2-ovuled; styles long, clavate, glabrous, exserted. *Carpels* 2-3, ½ in., 2-seeded.

11. **X. pustulata**, *H. f. & T.*; branches pustulate, leaves small elliptic glabrous tip narrowed obtuse dark beneath, nerves faint, peduncles solitary or geminate very short, sepals united to the middle.

MALACCA, *Maingay*.

A tree?; branches pale, minutely white-dotted, glabrous. *Leaves* 1-2 by ¾-1 in., base acute, coriaceous, thick, hardly shining above with obscure veins, reddish-brown and reticulate beneath, nerves and venules all alike; petiole ½ in. *Flowers* ½ in. long, many, axillary, pendent; bracts basal, orbicular, ciliate, deciduous; buds obtuse. *Sepals* short, ovate, subacute, rusty-pubescent. *Petals* densely appressed pubescent; outer linear from a rather broader concave base, obtuse; inner much narrower, rather shorter, trigonous with a broader excavated base. *Stamens* outside the torus, linear; anther-cells long, septate, top of connective rounded. *Ovaries* 5-8, sunk in the concave top of the torus, strigose; style slender, clavate; ovules several.

12. **X. Maingayi**, *H. f. & T.*; branches rusty-pubescent, leaves small elliptic or elliptic-oblong glabrous subacute or obtusely acuminate, nerves very finely reticulate, flowers solitary, peduncles very short and calyx rusty-tomentose, buds hooked, ovaries many.

MALACCA, *Maingay*.

A tree; branches minutely white-dotted. *Leaves* 2-3 by 1-1½ in., base subacute, coriaceous, pale above, darker beneath, nerves very slender reticulate on both surfaces; petiole slender, ¼-½ in. *Flowers* 1-1½ in. long, pendent, pale-orange; peduncle very short, stout, curved, and calyx rusty-tomentose; bracteoles 2-3, orbicular, persistent. *Sepals* connate to the middle. *Outer petals* flat, very narrow, subacute, base concave, silky tomentose; inner as long, very narrow, 3-gonous, base excavated. *Anther-cells* septate, tip of connective rose-coloured, rounded. *Ovaries* about 9, immersed in the torus, style glabrate; ovules 6.

13. **X. dicarpa**, *H. f. & T.*; branches glabrous, leaves elliptic-lanceolate obtuse or obtusely acuminate glabrous, nerves very finely reticulate, flowers solitary or geminate, pedicels short and calyx glabrous, sepals connate to the middle, ovaries 2.

SINGAPORE, *Maingay*.

A tree?; branches dark, minutely dotted. *Leaves* 3-4½ by 1½-1¾ in., base acute, firm, coriaceous; nerves oblique, finely reticulate on both surfaces; petiole ¼ in. *Flowers* 1½ in., pendent, peduncle very stout; bracteoles 1-3, orbicular, amplexicaul. *Sepals* obtuse, tubercled. *Petals* hoary, outer narrow from a rather broader base,

concave; inner narrower, 3-gonous. *Stamens* many, inner imperfect; anther-cells septate; tip of connective rounded. *Ovary* sunk in the torus, pilose; style short; ovules many.

14. **X. elliptica**, *Maingay* mss.; branches glabrous, leaves small elliptic obtuse membranous glabrous, tip rounded, nerves faint reticulate, flowers small solitary erect pubescent, sepals subacute united to the middle, ovaries 1-3.

MALACCA, *Maingay*.

A lofty tree; trunk thick; branches glabrous, almost black; branchlets pubescent. *Leaves* $1\frac{1}{2}$ -2 by $1\frac{1}{4}$ - $1\frac{1}{2}$ in., base obtuse or acute, pale on both surfaces, browner beneath; petiole $\frac{1}{4}$ in., puberulous. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in., slender; peduncle half as long or shorter, and calyx rusty-pubescent; bracts median, minute. *Petals* pale brown-tomentose; outer linear subulate, from a rather broad base, concave; inner trigonous, base excavated. *Stamens* minute. *Ovaries* sunk in the deeply urceolate torus, hidden amongst long white hairs; ovules 4-6.

19. MILIUSA, Leschenault.

Trees or shrubs. *Flowers* 1-2-sexual, green or red, axillary or extra-axillary, solitary fascicled or cymose. *Sepals* 3, small, valvate. *Petals* 6, valvate in 2 series; outer smaller, like the sepals; inner cohering when young by the margins, at length free. *Torus* elongated, cylindric. *Stamens* definite or indefinite; anthers subdidymous; cells contiguous, ovoid, ex-torse; connective hardly apiculate. *Ovaries* indefinite, linear-oblong; style oblong or very short; ovules 1-2, rarely 3-4. *Ripe carpels* globose or oblong, 1-many-seeded.—DISTRIB. Species 7; all Indian.

1. **M. macrocarpa**, *H. f. & T. Fl. Ind.* 150; leaves lanceolate or narrow-oblong long-acuminate glabrous shining above, flowers bisexual? solitary or in leafy cymes, sepals and outer petals large ovate $\frac{1}{3}$ in., carpels glabrous long-stalked.

SIKKIM-HIMALAYA; KHASIA HILLS, *Simons*.

A small tree; branches glabrous. *Leaves* 4-9 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., thin, coriaceous, pale beneath; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in. *Flowers* subterminal or leaf-opposed; peduncle 2-3 in., clavate upwards. *Outer petals* ovate, glabrous, granulate outside, edges and inside appressed-pubescent; inner $\frac{3}{4}$ in., lengthening much after expansion, glabrous, ciliate. *Ovaries* oblong, silky; style oblong, glabrous; ovules 1-2. *Carpels* 1 in., dark-purple, fleshy; stalk as long, 1-seeded, or 2-seeded and twice as broad.—Differs from its congeners in the large sepals and outer petals; inner petals very small in bud.

2. **M. indica**, *Lesch. in A. DC. Mem. Soc. Genev.* v. 36; leaves ovate or ovate-cordate obtuse or lanceolate and acute or acuminate glabrous or pubescent beneath, flowers 2-sexual axillary solitary, inner petals oblong subacute, carpels pisiform sessile. *W. & A. Prodr.* 10; *Wall. Cat.* 6433; *H. f. & T. Fl. Ind.* 148; *Beddome Ic. Pl. Ind. Or.* t. 85. *M. montana*, *Gardner ex Fl. Ind. l.c.*; *Thwaites Enum.* 4; *Beddome l.c.* t. 84.

MALABAR, MAISOR, and CEYLON, in the Central Province, *Gardner*.

A much branched very variable shrub; branches strigose, tomentose or glabrate. *Leaves* 1- $2\frac{1}{2}$ by $\frac{3}{4}$ - $1\frac{1}{4}$ in., base generally oblique, coriaceous; petiole obsolete. *Flowers* greenish, purple near the base; pedicel $\frac{1}{4}$ - $\frac{3}{4}$ in., slender; bracteoles several, basal. *Outer petals* equalling or 2-3 times exceeding the oblong subacute inner. *Ovaries* 1-2-ovuled.

VAR. 1. *tomentosa*; branchlets and leaves beneath tomentose, carpels pubescent.

VAR. 2. *strigose*; branchlets and leaves beneath strigose, carpels glabrous.

VAR. 3. *montana*; branchlets and much smaller leaves glabrous.

3. **M. zeylanica**, *Gard. ex H. f. & T. Fl. Ind.* 149; leaves oblong-lanceolate obtuse acute or acuminate young puberulous beneath, flowers 2-sexual axillary solitary, inner petals narrow oblong taper-pointed, carpels pisiform subsessile. *Thwaites Enum.* 61; *Beddome Ic. Pl. Ind. Or.* t. 89.

CEYLON; southern parts of the Island, *Walker, &c.*

A small tree; branches rugose, young strigose or downy. *Leaves* 2-4 by 1-1½ in., coriaceous, rigid, base somewhat oblique rounded or retuse, midrib downy above, when old glabrous on both surfaces; petiole ½-¾ in., strigose. *Flowers* ¾-1 in. long; peduncle short, downy; bracteoles several, basal. *Sepals* and *outer petals* oblong, hardly acute, softly ciliate; inner petals narrow-oblong, greenish-yellow, base purple.— Closely allied to *M. indica*; but leaves longer and petals narrower.

4. **M. Wightiana**, *H. f. & T. Fl. Ind.* 149; leaves narrow-oblong or oblong-lanceolate obtusely acuminate glabrous, shining above, flowers polygamous axillary, inner petals oblong subacute, carpels pisiform or oblong glabrous granulate. *Beddome Ic. Pl. Ind. Or.* t. 86.

Hill forests of TINIVELLY and TRAVANCOR, *Wight, &c.*

A small tree, bark rough; branches glabrous. *Leaves* 2-4 by ¾-1 in., thin, coriaceous, pale beneath; petiole ½ in. *Flowers* like those of *M. indica*; peduncles 1-2 in., slender; bracteoles 1-2, minute, basal. *Ovaries* 1-2-ovuled. *Carpels* 1-2-seeded; stalks as long or longer.

5. **M. Roxburghiana**, *H. f. & T. Fl. Ind.* 150; leaves oblong or oblong-lanceolate abruptly acuminate shining above glabrous or tomentose beneath, flowers 1-3 together diceious axillary, inner petals ovate obtuse, carpels ovoid or pisiform and glabrous. *M. Wallichiana*, *H. f. & T. l.c.* 149. *Uvaria dioica*, *Roxb. Fl. Ind.* ii. 659. *Guatteria globosa*, *A. DC. Mem. Soc. Genev.* v. 43; *Wall. Cat.* 6448. *Hyalostemma Roxburghiana*, *Wall. Cat.* 6434; *Griff. Ic. Pl. Ind. Or.* iv. t. 653.

SIKKIM, ASSAM, and the KHASIA HILLS to TENASSERIM.

A small tree; branches softly pubescent; leaves beneath pedicels and calyx glabrous or densely pubescent. *Leaves* 3-6 by 1-2 in., thin, coriaceous, lower on the branch smaller, subobtuse; petiole obsolete. *Pedicels* ½-1½ in., sometimes on a short peduncle, slender; bracts several, linear. *Sepals* lanceolate. *Inner petals* 1 in., ovate, obtuse, blood-red, veins dark. *Carpels* 1- rarely 2-seeded; stalk ¾ in.

6. **M. velutina**, *H. f. & T. Fl. Ind.* 151; leaves ovate or oblong acute or acuminate tomentose on both surfaces, flowers 2-sexual subracemose, inner petals ovate, carpels ovoid downy short-stalked. *Beddome Ic. Pl. Ind. Or.* t. 87. *Uvaria velutina*, *Dunal Anon.* 91. *U. villosa*, *Roxb. Fl. Ind.* ii. 664. *Guatteria velutina*, *A. DC. Mem. Soc. Genev.* v. 42; *Wall. Cat.* 6441.

GARHWAL, BEHAR, MALWAH, ORISSA, MALABAR, and PEGU.

A large tree; young branches densely tomentose. *Leaves* 3-6 by 2-4 in., lower on the branches smaller and often obtuse, base obliquely cordate; petiole ½ in. *Flowers* 3-6, in leaf-opposed cymes or in short few-leaved branches; pedicels 2-4 in., slender, tomentose; bracts minute, basal deciduous. *Sepals* and *outer petals* small, ovate; inner petals ½ in., ovate, dark brown, glabrous inside. *Carpels* size of a cherry.

7. **M. nilagirica**, *Beddome Ic. Pl. Ind. Or.* t. 88; leaves lanceolate linear-lanceolate or elliptic taper-pointed glabrous, peduncles axillary glabrous, inner petals broadly ovate-lanceolate, stamens 8 1-seriate, carpels pisiform glabrous.

Northern slopes of the NILGIRIS, alt. 5000 ft., *Beddome.*

A large shrub; branches glabrous. *Leaves* 2-4 by ¾-1½ in., narrowed and obtusely pointed at both ends, coriaceous; petiole ¼-½ in. *Flowers* ½ in. long; peduncles

$\frac{1}{2}$ –1 in.; bracteoles 2–3, basal. *Sepals* and *outer petals* subequal, ciliate; inner petals glabrous except the thickened margin near the tip. *Ovaries* about 13, glabrous; style oblong or globose; ovules 1–2. *Carpels* pisiform; stalks $\frac{1}{2}$ – $\frac{1}{4}$ in.

20. **SACCOPETALUM**, Bennett.

Trees. *Leaves* deciduous. *Flowers* axillary, solitary or fascicled. *Sepals* 3, small, valvate. *Petals* 6, valvate in 2 series; outer small, like the sepals; inner much larger, erect or conniving, base saccate. *Stamens* indefinite; anther-cells dorsal, contiguous; connective produced into a conspicuous appendage. *Ovaries* indefinite; ovules 6 or more. *Ripe carpels* subglobose.—**DISTRIB.** Species 5, Eastern Asiatic, with one Australian.—Reduced to *Miliusa* by Baillon (*Hist. des Plantes*, 244).

1. **S. longiflorum**, *H. f. & T. Fl. Ind.* 151; leaves ovate-oblong or oblong-lanceolate acuminate glabrous above appressed pubescent beneath, peduncles very short solitary in the old axils, inner petals oblong-lanceolate, carpels glabrous.

EASTERN BENGAL, near Purneah, *Hamilton*.

A tree; branchlets puberulous. *Leaves* 8 by 3 in., thin, coriaceous, appressed-pubescent beneath; petiole $\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ in.; downy. *Sepals* and *outer petals* $\frac{1}{2}$ in., oblong; inner petals $1\frac{1}{2}$ in., tapering to an obtuse point, thin, downy, base subsaccate. *Carpels* $1\frac{1}{2}$ in. diam., berried, black; stalk $\frac{3}{4}$ in.

2. **S. tomentosum**, *H. f. & T. Fl. Ind.* 152; leaves ovate or ovate-oblong acute glabrous above except the midrib pubescent or tomentose beneath, flowers cymose, peduncles long, inner petals oblong obtuse. *Bed-dome Ic. Pl. Ind. Or.* t. 49. *Uvaria tomentosa*, *Roxb. Cor. Pl.* i. t. 35; *Fl. Ind.* ii. 667; *Wall. Cat.* 6472; *W. & A. Prodr.* 8.

Terai of NEPAL at Gorakpore, ORISSA, and BEHAR, from the CONCAN to TRAVANCOR.

A large tree; branchlets tomentose. *Leaves* 4–6 by $2\frac{1}{2}$ –3 in., sometimes glabrous when old, base obliquely cordate, pale beneath; petiole $\frac{1}{2}$ in. *Flowers* few, in leaf-opposed or subterminal cymes, appearing with the leaves in short leafy branches; peduncles 2–3 in., slender, downy. *Sepals* and *outer petals* $\frac{1}{2}$ in.; inner petals $\frac{3}{4}$ in., oblong, obtuse, downy. *Carpels* 1 in. diam., purple, 3–4-seeded; stalk $\frac{1}{2}$ in.—Intermediate between *Miliusa* and *Saccopetalum*.

3? **S. sclerocarpum**, *H. f. & T.*; leaves ovate or oblong obtuse or obtusely acuminate glabrous.—*Uvaria sclerocarpa*, *A. DC. in Mem. Genev.* v. 27; *Wall. Cat.* 6461; *H. f. & T. Fl. Ind.* 103.

MARTABAN, *Wallich*.

A tree, branches glabrous. *Leaves* 4–5 by $2\frac{1}{2}$ – $2\frac{1}{4}$ in., thin, coriaceous, base a little ciliate. *Unripe carpels* $\frac{1}{2}$ – $\frac{3}{4}$ in., ovoid, subacute, glabrous; stalks rather longer.—A very imperfectly known plant; certainly not a *Uvaria*.

21. **ALPHONSEA**, H. f. & T.

Lofty trees. *Leaves* thick, coriaceous, glabrous shining. *Flowers* small or middle-sized, in leaf-opposed rarely extra-axillary peduncled fascicles. *Sepals* 3, small, valvate. *Petals* 6, valvate in 2 series, larger than the sepals, equal or the inner rather smaller. *Torus* cylindric or hemispheric. *Stamens* indefinite, loosely packed; anther-cells dorsal, contiguous; connective apiculate. *Ovaries* 1 or more; style oblong or depressed; ovules 4–8, in 2

series on the ventral suture. *Carpels* subsessile or stalked.—**DISTRIB.** Species 3, all Indian.—Baillon Hist. 215, unites this genus with *Bocagea*.

1. **A. ventricosa**, *H. f. & T. Fl. Ind.* 152; leaves narrow-oblong long-acuminate glabrous shining above, flowers in fascicled short racemes, pedicels $\frac{1}{2}$ –1 in. bracteolate at the base and middle, carpels tomentose long-stalked.—*Uvaria ventricosa*, *Roxb. Fl. Ind.* ii. 658; *Wall. Cat.* 6453.

ASSAM, CHITTAGONG, ANDAMANS, PENANG.

A lofty tree; branches glabrous, young brown-tomentose. *Leaves* 6–10 by $1\frac{1}{2}$ –4 in., base rounded or subacute, young pubescent on the midrib, pale and conspicuously veined beneath; petiole $\frac{1}{4}$ in., puberulous. *Flowers* numerous, greenish-white, odorous; racemes tomentose; pedicels $\frac{1}{2}$ –1 in., with an ovate median and basal bracteole. *Sepals* small, broad ovate, connate below. *Petals* $\frac{3}{4}$ in., ovate-oblong, brown-tomentose outside. *Ovaries* about 10, villous; style oblong. *Carpels* 1– $1\frac{1}{2}$ in. diam.; ovoid or subglobose; stalk nearly as long.

2. **A. lutea**, *H. f. & T. Fl. Ind.* 153; leaves ovate-oblong glabrous obtusely acuminate, flowers subcapitate, carpels tomentose subsessile. *Thwaites Enum.* 399; *Beddome Ic. Pl. Ind. Or.* t. 91. *Uvaria lutea*, *Roxb. Cor. Pl. i.* t. 36; *Fl. Ind.* ii. 666 (not of Wall. nor W. & A.). *Uvaria Russellii*, *Wall. Cat.* 6464.

From SILHET to PEGU, *Beddome*; mountains of ORISSA; CEYLON, Reigam Corle, *Thwaites*.

A tree; young branches brown-pubescent. *Leaves* 3–5 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., base rounded, pale and conspicuously nerved beneath with puberulous costa and nerves; petiole $\frac{1}{2}$ – $\frac{1}{4}$ in., and midrib at first pubescent. *Flowers* in dense leaf-opposed fascicles; peduncle and very short pedicels densely brown-tomentose. *Sepals* orbicular. *Petals* $\frac{1}{2}$ in., ovate, densely tomentose. *Ovaries* about 10, densely villous; style oblong. *Carpels* 1– $1\frac{1}{2}$ in., broad ovoid, obtuse at both ends; stalk very short.

3. **A. zeylanica**, *H. f. & T. Fl. Ind.* 153 (incorrect as to fruit); leaves lanceolate acute or long acuminate glabrous shining above, flowers few in leaf-opposed or extra-axillary fascicles, carpels smooth, tomentose stalked. *Beddome Ic. Pl. Ind. Or.* t. 90. *Uvaria lutea* var. *a*, *W. & A. Prodr.* 8 (excl. syn.). *Guatteria acutifolia*, *Wall. Cat.* 6438 D.

TRAVANCOR, at Courtalam, *Wight*; CEYLON, Central Province, alt. 3–4000 ft., *Walker*, &c.

A tree; young branches downy. *Leaves* $2\frac{1}{2}$ –4 by $\frac{3}{4}$ –1 in., tip rather obtuse, midrib puberulous beneath when young; petiole $\frac{1}{2}$ – $\frac{1}{4}$ in., slender. *Flowers* yellow-green; peduncle very short, tomentose; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., pubescent; bracteole small, basal. *Petals* $\frac{1}{2}$ – $\frac{3}{4}$ in., downy outside, glabrous within. *Ovaries* 5; style depressed. *Carpels* 1– $1\frac{1}{2}$ in. diam., subglobose; stalk 1– $1\frac{1}{2}$ in., stout.

4. **A. sclerocarpa**, *Thwaites Enum.* 11; leaves lanceolate obtuse glabrous, flowers fascicled on a very short extra-axillary peduncle, pedicels short carpels bony warted subsessile tomentose.

CEYLON, at Haragam, &c., *Thwaites*.

A tree; branches glabrous; buds brown-tomentose. *Leaves* 2–3 $\frac{1}{2}$ by $\frac{3}{4}$ – $1\frac{1}{2}$ in., base acute, pale beneath; petiole $\frac{1}{2}$ – $\frac{1}{4}$ in. *Flowers* numerous, ochreous-yellow; pedicels $\frac{1}{4}$ in., brown-pilose, with a basal and median bracteole. *Sepals* very small. *Petals* $\frac{1}{4}$ in., hairy outside. *Stamens* 15, 2–3-seriate. *Ovaries* 3–5; style depressed. *Carpels* 1–2 in., yellow, ovoid or subglobose; stalk short.

5. **A. madraspatana**, *Beddome Ic. Pl. Ind. Or.* t. 92; leaves lanceolate elliptic-ovate or oblong obtuse, flowers fascicled on leaf-opposed or supra-axillary peduncles, carpels ovoid.

By streams in MAISOR and the CARNATIC, *Beddome*.

An umbrageous tree. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., much reticulated beneath; petioles $\frac{1}{2}$ in., glabrous or puberulous. *Flowers* 1-6, bright yellow; peduncles very short; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in., puberulous; bracteole infra-median. *Sepals* small, ovate. *Petals* $\frac{3}{8}$ in., puberulous outside. *Stamens* 12, 2-seriate. *Ovaries* 3-4; style subglobose, slightly curved; ovules about 8; 2-seriate. *Carpels* yellow-tomentose.

6. **A. Maingayi**, *H. f. & T.*; leaves elliptic-oblong or lanceolate obtusely or subacutely acuminate shining above reticulate and pubescent beneath, flowers solitary or in loose supra-axillary racemes, ripe carpels very short-stalked tomentose.

MALACCA, *Maingay*.

A middle sized or lofty tree; branches black, young rusty-tomentose. *Leaf* 3-7 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., base acute or rounded, hard, coriaceous, pale yellow-brown, rusty beneath, petiole $\frac{3}{8}$ - $\frac{1}{2}$ in., rusty. *Flowers* $\frac{3}{4}$ in. diam.; peduncles $\frac{1}{2}$ - $1\frac{1}{2}$ in. and very short pedicels rusty-tomentose; bracts small. *Sepals* $\frac{1}{10}$ in. *Outer petals* ovate, recurved, pubescent outside; inner similar but rather smaller. *Torus* 6-angled. *Filaments* broad short fleshy; anther cells small, diverging below. *Stigma* sessile; ovules about 20. *Carpels* 2 by 1 in., obtuse, smooth. *Seeds* many, smooth.

7. **A. elliptica**, *H. f. & T.*; leaves elliptic or elliptic-ovate acuminate shining above glabrous reticulate, nerves very slender, flowers solitary or in 2-3-flowered racemes, peduncle short multibracteate.

MALACCA, *Maingay*.

A tree?; branches rugose, quite glabrous. *Leaves* 3-5 by $1\frac{1}{4}$ - $1\frac{3}{4}$ in., tip acute or obtuse, base acute, thin, coriaceous, nearly concolorous, nerves about 5 on a side, venules reticulate on both surfaces; petiole $\frac{3}{8}$ - $\frac{1}{2}$ in. *Flowers* $\frac{3}{4}$ in. diam.; peduncles very short, bracts many short orbicular persistent; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in., slender, curved, bracteoles minute, median. *Petals* appressed-pubescent; outer broad-ovate, revolute; inner rather smaller. *Stamens* imbricate in several series, apiculate; anther-cells oblong. *Ovaries* linear-oblong, silky; stigma subsessile; ovules many, 2-seriate.

22. **OROPHEA**, Blume.

Trees or shrubs. *Flowers* usually small, axillary solitary, fascicled or cymose. *Sepals* 3, valvate. *Petals* 6, valvate in 2 series; outer ovate; inner clawed, cohering by their margins into a mitriform cap. *Stamens* definite, 6-12, ovoid, fleshy; anther-cells dorsal, large, contiguous. *Ovaries* 3-15; style short or 0; ovules 4. *Ripe carpels* 1- or more-seeded (very long in *O. enterocarpa*).—DISTRIB. Species about 16; all Eastern Asiatic.—Intermediate between *Mitrephora* and *Bocagea*, having the perianth of the former and stamens of the latter.

1. **O. uniflora**, *H. f. & T. Fl. Ind.* 111; leaves elliptic-oblong or lanceolate obtusely acuminate glabrous, peduncles solitary axillary, stamens 12 2-seriate, carpels globose glabrous short-stalked. *Beddome Ic. Pl. Ind. Or.* t. 69.

Forests of TRAVANCOR at Courtalam, *Wight*.

A shrub or small tree; branches glabrous; buds pubescent. *Leaves* $1\frac{1}{2}$ - $2\frac{1}{2}$ by $\frac{3}{4}$ -1 in., thin, coriaceous, base acute, pale beneath; petiole $\frac{1}{2}$ in. *Flowers* solitary; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in., slender; bracteoles several, minute, basal, and 1 median. *Sepals* minute, orbicular, ciliate. *Outer petals* $\frac{1}{2}$ in., ovate or orbicular, membranous, glabrate; inner $\frac{1}{4}$ in., trapezoid, tapering into the narrow claw. *Ovaries* 6; ovules 2. *Carpels* $\frac{1}{2}$ in. diam., brown-black.

2. **O. zeylanica**, *H. f. & T. Fl. Ind.* 111; leaves ovate or oblong shortly and obtusely acuminate glabrous, peduncles solitary or fascicled

axillary, stamens 6, carpels globose glabrous short-stalked. *Thwaites Enum.* 8; *Beddome Ic. Pl. Ind. Or.* t. 70.

Forests of CANARA and COORG, *Stocks*, &c.; and CEYLON in the Central Province, *Thwaites*.

A small tree or shrub; branchlets yellow-pubescent. *Leaves* 2-3½ by 1-1¾ in., thin, coriaceous, base suboblique rounded or retuse, young puberulous beneath; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* greenish-brown, $\frac{1}{2}$ in. diam.; peduncles 1-2 in., 1-4-flowered, slender, pubescent; peduncle with a basal bract. *Sepals* and *outer petals* orbicular, acute, veined, downy; inner petals larger, trapezoid, glabrous, margins pubescent. *Carpels* $\frac{1}{2}$ in. diam.

3. **O. Thomsoni**, *Beddome in Trans. Linn. Soc.* xxv.; *Ic. Plant. Ind. Or.* t. 67; leaves ovate-oblong obtusely taper-pointed glabrous, peduncle axillary 3-flowered strigose, stamens 10-12 2-seriate, carpels pisiform.

Anamally forests, TRAVANCOR, alt. 1500-2000 ft., *Beddome*.

A small tree. *Leaves* 1-1½ -2 by 1-1½ in., midrib beneath pubescent; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in. *Peduncle* and pedicels very short; bracteoles minute basal. *Sepals* and *outer petals* strigose; inner pubescent, especially inside. *Ovaries* 5-6, hairy; ovules 2.

4. **O. erythrocarpa**, *Beddome in Trans. Linn. Soc.* xx. 5; *Ic. Pl. Ind. Or.* t. 68; leaves oblong abruptly acuminate glabrous above pubescent beneath, peduncles axillary or supra-axillary 3-4-flowered tomentose, stamens 12, 6 outer rather imperfect, carpels oblong.

Anamally forests in TRAVANCOR, alt. 1500-2500 ft., *Beddome*.

A middle sized tree; branchlets softly pubescent. *Leaves* 2-3½ by 1-2 in., thin, coriaceous, most pubescent on the midrib beneath; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in., pubescent. *Flowers* very small; peduncle 1 in., tomentose; bracts many, minute, imbricate below the fruit or flower; pedicels with a linear basal and a supra-median bracteole. *Sepals* orbicular. *Outer petals* ovate, acute, margins and outer surface pubescent; inner $\frac{1}{4}$ in., claw glabrous, limb trapezoid hairy. *Ovaries* 6, densely strigose; ovules 2. *Carpels* red. *Seed* solitary, scrobiculate.

5. **O. polycarpa**, *A. DC. in Mem. Soc. Genev.* v. 39; leaves ovate-oblong or lanceolate obtusely acuminate glabrous, peduncles axillary or supra-axillary slender 1-3-flowered sparsely hairy, stamens 6, carpels pisiform glabrous long-stalked. *H. f. & T. Fl. Ind.* 111; *Wall. Cat.* 6431; *Griffith Ic. Pl. Ind. Or.* iv. t. 654.

MARTABAN, *Wallich*; ANDAMANS, *Kurz*.

A tree?; branchlets slender, pubescent. *Leaves* 4-5 by 1-1¾ in., thin, coriaceous, points long, shining above; petiole $\frac{1}{2}$ in. *Peduncles* 1-2 in., slender; bracts several, small, remote, linear. *Sepals* ovate, acute, ciliate. *Outer petals* orbicular, ciliate; inner twice as large, tip and margins downy. *Carpels* 9-12; stalk nearly as long.—Our specimens have bud and fruit only.

6. **O. acuminata**, *A. DC. in Mem. Soc. Genev.* v. 39; leaves oblong or lanceolate long and finely acuminate glabrous above softly pubescent on the midrib and veins beneath, peduncle 1-3-flowered axillary or supra-axillary slender, stamens 6. *H. f. & T. Fl. Ind.* 112; *Wall. Cat.* 6432.

TENASSERIM, *Wallich*.

A tree; branches slender, young densely pubescent. *Leaves* 4-6 by 1-1¾ in., thin, conspicuously reticulate beneath; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in., pubescent. *Peduncles* 1 in., pubescent; bracts several, subulate, hairy. *Sepals* minute, ovate-lanceolate, densely hairy. *Outer petals* small, ovate, thin, hairy; inner as in *O. zeylanica*. *Ovaries* 6, densely strigose; ovules 2.

7. **O. Brandisii**, *H. f. & T.*; leaves obovate-lanceolate tapering to a very slender point glabrous above hairy beneath, peduncles 2-3-flowered supra-axillary slender, stamens 12, 3 fertile and 9 imperfect.

MARTABAN and PEGU, *Brandis*; PEGU, *Kurz*.

Branches softly brown-tomentose. *Leaves* 6-8 by 2-3 in., thin, point very slender, base narrow rounded or subcordate; petiole $\frac{1}{2}$ in., hairy. *Flowers* $\frac{3}{4}$ in. diam.; peduncles 1-1 $\frac{1}{2}$ in., pubescent; bract solitary basal. *Sepals* ovate-lanceolate, taper-pointed, softly hairy. *Outer petals* $\frac{3}{4}$ in., ovate, tomentose, veined on both surfaces; inner $\frac{3}{4}$ in., claw long narrow, limb subclavate thickened, slightly hairy, compressed, grooved in front. *Anther-cells* large, obtusely apiculate. *Ovaries* 6, oblong, softly villous with white hairs; style oblong, glabrous; ovule 1 on the ventral suture.

8. **O. enterocarpa**, *Maingay mss.*; quite glabrous, leaves elliptic or oblong lanceolate caudate-acuminate membranous. peduncles filiform supra-axillary, carpels very slender subtorulose.

MALACCA, very rare, *Maingay*.

A tree; branchlets slender, black. *Leaves* 2-4 $\frac{1}{2}$ by 1-1 $\frac{1}{2}$ in., base acute or rounded, very thin, nerves slender; petiole $\frac{1}{2}$ in. *Flowers* $\frac{3}{4}$ in. diam., nodding; peduncle $\frac{1}{2}$ -1 in., 1-flowered; bracteole minute. *Sepals* minute. *Outer petals* ovate, acute, pubescent; inner as long, silky, claws equalling the conical cap. *Stamens* 6, with 6 staminodes. *Ovaries* about 6, cylindric, 2-4-ovuled, hirsute. *Carpels* 4-6, 3-5 by $\frac{1}{2}$ - $\frac{3}{4}$ in., red. *Seeds* 2-4, linear-oblong, 1-seriate.—A very curious fruit.

23. **BOCAGEA**, St. Hilaire.

Trees. *Leaves* shining, and branches glabrous. *Flowers* small, terminal axillary or fascicled on woody tubercles, 1-2-sexual. *Sepals* orbicular or ovate, imbricate. *Petals* 6, imbricate in 2-series, nearly equal, usually orbicular, concave. *Stamens* 6-21, imbricate in 2 or more series, broadly oblong thick, fleshy; anther-cells dorsal, oblong; connective produced. *Ovaries* 3-6; style short, stigma obtuse or capitate ovules 1 or 2-8 on the ventral suture. *Ripe carpels* globose, stalked.—DISTRIB. Species about 12, tropical Asiatic and American.

1. **B. elliptica**, *H. f. & T.*; leaves narrow-oblong obtuse or acute, flowers monœcious, sepals ciliate, stamens 12-18, ovaries 3. *Uvaria elliptica*, *A. DC. in Mem. Soc. Genev.* v. 27; *Wall. Cat.* 6470, 7421. *Sageræa elliptica*, *H. f. & T. Fl. Ind.* 93. *Diospyros?* frondosa, *Wall. Cat.* 4125.

TENASSERIM to PENANG, *Wallich*; MALACCA, *Maingay*.

A tree; young branches angular. *Leaves* 8-12 by 2 $\frac{1}{2}$ -4 in., thick, coriaceous, base acute obtuse rounded or cordate, nerves spreading; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* axillary and solitary or fascicled on cauline tubercles, small, red, "monœcious," *Maingay*; pedicels $\frac{1}{2}$ in., bracteoles several, basal, and 1 orbicular median. *Sepals* glabrous. *Petals* $\frac{1}{2}$ in. long, ovoid, ciliate. *Connective* subquadrate, anthers extrorse, *Maingay*. *Ovaries* glabrous, ovules about 8. *Carpels* 1 in. diam., globose, smooth, several seeded; stalk very short.

2. **B. Thwaitesii**, *H. f. & T.*; leaves narrow-oblong obtuse, flowers fascicled on the large branches 2-sexual, sepals glabrous, stamens about 21, ovaries 3, stigma 2-lobed. *Sageræa Thwaitesii*, *H. f. & T. Fl. Ind.* 94; *Thwaites Enum.* 6; *Beddome Ic. Pl. Ind. Or.* t. 41.

CEYLON; Ambagamowa and Saffragam districts, *Thwaites*.

A tree. *Leaves* 8-12 by 3-4 $\frac{1}{2}$ in., thick, coriaceous, base rounded, pale beneath; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Flowers* pale orange; pedicels 2-4 in.; bracteoles minute, basal. *Sepals* short, very obtuse. *Petals* $\frac{1}{2}$ in., orbicular, glabrous, outer larger. *Stamens* reddish. *Carpels* 1 in. diam., subsessile.

3. **B. Dalzellii**, *H. f. & T.*; leaves narrow-oblong acute or obtuse, flowers 2-sexual in fascicles of 1-15 on woody tubercles, stamens 12-18,

ovaries 3-5, stigma entire. *Guatteria laurifolia*, *Graham Cat. Bombay Pl. 4*. *Sageræa laurina*, *Dalz. in Hook. Kew Journ. Bot. iii. 207*; *Bombay Flor. 2*; *H. f. & T. Fl. Ind. 93*. *S. Dalzelli*, *Beddome Ic. Pl. Ind. Or. t. 42*.

Forests of the CONCAN, *Graham*; and TRAVANCOR, *Beddome*.

A middle-sized tree. *Leaves* 5-9 by $1\frac{1}{2}$ -2 in., thick, coriaceous, base acute or rounded; petiole $\frac{1}{4}$ in. *Flowers* crowded, white; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in.; bracteoles several, scaly, basal. *Sepals* orbicular. *Petals* $\frac{1}{2}$ in., broad-ovate. *Outer stamens* sometimes without anthers. *Ripe carpels* 1 in. diam., globose, glabrous, subsessile.

4. **B. coriacea**, *H. f. & T.*; leaves ovate-lanceolate acute or subacute, flowers 1-3 2-sexual, stamens 9, ovaries 1-2. *Orophea coriacea*, *Thwaites Enum. 8*; *Beddome Ic. Pl. Ind. Or. t. 71*.

CEYLON, Central Province, alt. 3000 ft., *Thwaites*.

A middle-sized tree. *Leaves* 3-6 by $1\frac{1}{4}$ - $2\frac{1}{2}$ in., thick, coriaceous, base rounded, dark green above, pale beneath; petiole $\frac{1}{2}$ - $\frac{1}{4}$ in. *Flowers* $\frac{1}{2}$ in. diam., terminal in cauline pedicels $\frac{1}{4}$ in., bracteoles basal, strigose. *Sepals* minute, deltoid, ciliate. *Petals* orbicular, outer purple outside, orange-brown inside; inner connivent, dark purple. *Ovaries* 2-ovuled. *Carpels* $\frac{1}{2}$ in. diam., obliquely subglobose, glabrous, subsessile.—We remove this and the following from *Orophea* to *Bocagea* on account of the habit and apparently imbricate outer petals; the inner petals have no claws

5. **B. obliqua**, *H. f. & T.*; leaves oblong or lanceolate acute or acuminate, flowers 1-3 together 2-sexual terminal or cauline, pedicels very short, stamens 6 in 2 series, ovaries 3. *Orophea? obliqua*, *H. f. & T. Fl. Ind. 112*; *Thwaites Enum. 8*; *Beddome Ic. Pl. Ind. Or. t. 72*.

CEYLON, in the Galle and Ratnapoora districts, *Gardner, &c.*

A middle-sized tree. *Leaves* 4-5 by $1\frac{1}{4}$ -2 in., coriaceous, base oblique, pale beneath; petiole $\frac{1}{2}$ in. *Flowers* minute, purple. *Sepals* ciliate. *Petals* orbicular, outer spreading, inner connivent (imbricate or subvalvate, *Thw.*) *Ovaries* 2-ovuled, stigmas depressed. *Carpels* $\frac{1}{2}$ in. diam., red-brown.

24. KINGSTONIA, H. f. & T.

A tree. *Flowers* fascicled on cauline tubercles, 2-sexual. *Sepals* 3, bases connate ovate, acute persistent. *Petals* 6; outer ovate, valvate; inner smaller, oblong, imbricate. *Stamens* about 12, filaments half the length of the extrorse anther-cells; connective obliquely truncate. *Ovary* 1; stigma sessile peltate, crenate; ovules few. *Ripe carpel* globose. *Seeds* several, 2-seriate.

1. **K. nervosa**, *H. f. & T.*; leaves elliptic or linear-oblong acuminate glabrous or puberulous on the nerves beneath.

MALACCA, *Maingay*.

Branches woody, young rusty-pubescent. *Leaves* 4-8 by 2-3 in., base rounded, thin, coriaceous, opaque; nerves many oblique strong; petiole $\frac{1}{2}$ in., pubescent. *Flowers* $\frac{1}{4}$ in. long, in fascicles of 8-10; peduncles $\frac{1}{2}$ - $\frac{1}{4}$ in., slender, rusty-pubescent; bracts small orbicular, basal, imbricate. *Sepals* $\frac{1}{2}$ in., ferruginous. *Petals* ashy-pubescent, subacute; inner one-third smaller. *Carpels* 1 in. diam., on stout woody peduncles, densely rusty-tomentose: walls very thick.—Differs from *Bocagea* in the valvate not orbicular outer petals, smaller inner, solitary carpel, and pubescent branches.

25. LONCHOMERA, H. f. & T.

A tree. *Leaves* shining. *Flowers* small, in axillary fascicles. *Sepals* 3, broad-ovate, acute. *Petals* 6, in 2 series; outer lanceolate, flat, spreading,

valvate; inner smaller and broader. *Stamens* 8-12, loosely imbricate, broadly cuneate, thick; anther-cells lateral, introrse. *Torus* small, slightly concave, pubescent. *Ovary* solitary, glabrous, sessile, contracted into a very short style, stigma subcapitate; ovules 2, superposed. "*Ripe carpels* elliptic, apiculate, succulent, glabrous, 2-seeded. *Seeds* plano-convex; testa osseous." *Maingay*.

1. **L. leptopoda**, *H. f. & T.*; leaves oblong or elliptic obtusely acuminate or acute.

MALACCA, Maingay.

A middle-sized tree; branches black, young granulate. *Leaves* $2\frac{1}{4}$ -4 by $1-1\frac{1}{2}$ in., concolorous, hardly shining, thin, coriaceous, base rounded or acute, reticulate on both surfaces, nerves very slender, subhorizontal; petiole $\frac{1}{4}$ in., slender, naked. *Flowers* $\frac{1}{2}$ in. long; peduncles 2-6, $\frac{1}{2}$ - $\frac{3}{4}$ in., hoary; bracts small, basal, obtuse. *Sepals* connate below, tomentose. *Petals* tomentose on both surfaces, inner like the outer but one-third shorter and much broader. *Ovary* ovoid.—The fruits enclosed in a cover with the specimens do not accord with Maingay's character (see Genus), they are $1\frac{1}{4}$ - $1\frac{1}{2}$ in. long, elliptic-ovoid, top rounded, base rather contracted, walls obscurely warted. *Seed* oblong-cylindric, apparently enclosed in a dry aril which adheres vertically to one side of the cavity; albumen horny, slightly ruminated; embryo half the length of the seed, cotyledons linear-oblong, thin; radicle cylindric, $\frac{1}{4}$ the length of the cotyledons.

ORDER V. MENISPERMACEÆ. (By Hooker f. & Thomson.)

Climbing or twining rarely sarmentose shrubs. *Leaves* alternate, entire or lobed, usually palminerved; stipules 0. *Flowers* small or minute, solitary fascicled cymose or racemed, diœcious, sometimes 3-bracteolate. *Sepals* 6 (rarely 1-4, or 9-12), usually free, imbricate in 2-4 series, outer often minute. *Petals* 6 (rarely 0 or 1-5), free or connate. ♂ FLOWERS: *Stamens* hypogynous, usually one opposite each petal, filaments free or connate; anthers free or connate, 2-celled. *Rudimentary carpels* small or 0. ♀ FLOWERS: *Staminodes* 6 or 0. *Ovaries* 3 (rarely 1, or 6-12); style terminal, simple or divided; ovules solitary (2 in *Fibraurea*), usually amphitropous. *Ripe carpels* drupaceous, with the style-scar subterminal, or by excentric growth subbasal. *Seed* usually hooked or reniform, often curved round an intrusion of the endocarp (*condyle* Miers), albumen even or ruminant or 0; cotyledons flat or semiterete, foliaceous or fleshy, appressed or spreading.—A large tropical Order; genera 32; species about 100.

In this Order we adhere to the classification of the genera, and limitation of the species, adopted in our *Flora Indica* (1855), at variance as these are with our friend Mr. Miers' views (*Contributions to Botany*, iii., 1871); this we do after the careful examination of the Order by Bentham and Hooker (*Gen. Plant.* 1862), a further study of the Indian species by one of us in their native jungles and in the Calcutta Botanic Garden, and a review of Eichler's valuable monograph of the Brazilian species in Martius' *Flora Brasiliensis* (1864). The divergence between Mr. Miers' conclusions and our own amounts to his adopting for the Indian plants of the Order, 6 tribes, 26 genera, and upwards of 90 species, as against our 4 tribes, 19 genera, and 35 species. We are far from affirming that a few of our 35 species may not embrace two or more, but we find no evidence of this in the materials upon which Mr. Miers and ourselves have worked.

TRIBE I. Tinosporeæ. *Flowers* 3-merous. *Ovaries* usually 3. *Drupe*s with a subterminal rarely ventral or subbasal style-scar. *Seed* oblong or subglobose; albumen copious or scanty; cotyledons foliaceous, usually spreading laterally.

* Drupes with a terminal or subterminal style-scar.

Sepals 12; filaments connate	1. ASPIDOCARYA.
Sepals 6; filaments connate	2. PARABÆNA.
Sepals 6; petals 6; filaments free	3. TINOSPORA.
Sepals 9; petals 6; filaments free	4. TINOMISCIMUM.
Sepals 6; petals 0; filaments free	5. FIBRAUREA.

* Drupes with a subbasal style-scar.

Sepals 6; filaments all connate	6. ANAMIRTA.
Sepals 9; outer filaments free	7. COSCINIUM.

TRIBE II. **Cocculeæ.** *Flowers* 3-merous. *Ovaries* usually 3. *Drupe* with a subbasal rarely subterminal style-scar. *Seed* horse-shoe shaped, albumen copious; embryo slender, cotyledons linear or slightly dilated.

Petals 6, minute; ovaries 3-12; style subulate	8. TILIAGORA.
Petals 5-8; ovaries 3; styles compressed	9. LIMACIA.
Petals 6; ovaries 3-6; styles subulate	10. COCCULUS.
Petals 6; ovaries 3; styles forked	11. PERICAMPYLUS.

TRIBE III. **Cissampelideæ.** *Flowers* 3-5-merous. *Ovaries* usually solitary. *Drupe* with a subbasal style-scar; endocarp dorsally muricate or echinate. *Seed* horse-shoe shaped, albumen scanty; embryo linear, cotyledons appressed.

Sepals 6-10, free; petals of ♂ and ♀ 3-5 free	12. STEPHANIA.
Sepals 4, free; petals of ♂ 4 connate, of ♀ 1	13. CISSAMPELOS.
Sepals 4-8, connate; petals of ♂ 4-8 connate, of ♀ 1	14. CYCLEA.
Sepals 4-8, connate; petals of ♂ 0, of ♀ 2 saccate	15. LOPHOPHYLLUM.

TRIBE IV. **Pachygoneæ.** *Flowers* usually 3-merous. *Ovaries* usually 3. *Drupe*s with a subbasal or ventral style-scar. *Seed* curved hooked or inflexed, albumen 0; cotyledons thick fleshy.

Sepals, petals and stamens, 6 each	16. PACHYGONE.
Sepals and petals 6 each; stamens 9	17. PYCNARRHENA.
Sepals 9-12; petals and stamens 6 each	18. HÆMATOCARPUS.
Sepals 8; petals 2; stamens 4	19. ANTITAXIS.

1. **ASPIDOCARYA**, H. f. & T.

A climber. *Flowers* in slender panicles. *Sepals* 12, 2-4-seriate, inner broader. *Petals* 6, short, cuneate. **MALE fl.:** *Anthers* 6, encircling the top of the staminal column, bursting transversely. **FEMALE fl.:** *Staminodes* 6, clavate. *Ovaries* 3; stigmas subcapitate. *Drupe*s dorsally compressed, style-scar terminal; endocarp much compressed, keeled dorsally, not intruded, margins winged, toothed. *Seed* oblong, flat; cotyledons foliaceous, base divaricate, then parallel.

1. **A. uvifera**, H. f. & T. *Fl. Ind.* 180; leaves subpeltate ovate-cordate, *Miers Contrib.* iii. 58, t. 99.

Subtropical forests of SIKKIM, alt. 1-5000 ft., H. f. & T.

Branches slender, terete. *Leaves* 4-6 by 3-6 in., long-acuminate, tip obtuse, base sometimes subsagittate, nerves beneath hairy; petiole 3-4 in., cylindric. *Panicles* 4-8 in., pubescent. *Sepals* greenish, ciliate. *Petals* concave. *Drupe*s $\frac{3}{4}$ -1 in.; endocarp woody, fragile.

2. **PARABÆNA**, Miers.

A climber, juice milky. *Flowers* in axillary dichotomous cymes. *Sepals* 6, subequal. *Petals* much smaller. **MALE fl.:** *Anthers* 6, horizontal, encircling

the top of the staminal column, bursting transversely. FEMALE fl.: *Staminodes* 6, cylindric-*Ovaries* 3; styles subulate, recurved. *Drupe*s ovoid, style-scar subterminal; endocarp subglobose, dorsally spinulose, ventrally concave. *Seed* pitted, curved, ventrally concave; cotyledons foliaceous, ovate, spreading.

1. **P. sagittata**, *Miers Contrib.* iii. 57, t. 98: leaves cordate or sagittate obtusely acuminate. *H. f. & T. Fl. Ind.* 181. *P. oleracea*, petiophylla and ferruginea, *Miers in Tayl. Ann. Ser.* 2, vii. 39. *Cissampelos sagittata*, *Ham. ex Wall. Cat.* 4983. *C. oleracea*, *Wall. Cat.* 4984.

Tropical forests from NIPAL and the KHASIA HILLS, to AWA and CHITTAGONG.

Glabrous pubescent or softly tomentose; branchlets grooved. *Leaves* 2-8 by 2-4 in., 5-7-nerved, young sinuate-toothed, older entire; petiole 3-4 in. *Cymes* usually geminate, many-flowered. *Flowers* minute. *Sepals* subacute. *Petals* obovate-cuneate, tip often 3-lobed. *Drupe*s greenish.

3. TINOSPORA, Miers.

Climbing shrubs. *Flowers* in axillary or terminal racemes or panicles. *Sepals* 6, 2-seriate, inner larger membranous. *Petals* 6, smaller. MALE fl.: *Stamens* 6, filaments free, tips thickened; anther-cells obliquely adnate, bursting obliquely. FEMALE fl.: *Staminodes* 6, clavate. *Ovaries* 3; stigmas forked. *Drupe*s 1-3, dorsally convex, ventrally flat; style-scar subterminal; endocarp rugose, dorsally keeled, ventrally concave. *Seed* grooved ventrally or curved round the intruded sub-2-lobed endocarp, albumen ventrally ruminate; cotyledons foliaceous, ovate, spreading.—DISTRIB. Species about 8, tropical Asiatic and African.

1. **T. tomentosa**, *Miers Contrib.* iii. 33; leaves orbicular-cordate, more or less 3-lobed pubescent above tomentose beneath. *H. f. & T. Fl. Ind.* 183. *Cocculus tomentosus*, *Coleb. in Trans. Linn. Soc.* xiii. 50; *Wall. Cat.* 4956. *Menisp. tomentosum*, *Roxb. Fl. Ind.* iii. 813.

Tropical thickets in BENGAL, Roxburgh, and AWA, Wallich.

Bark pustular; shoots tomentose. *Leaves* 3-6 in. diam., tomentose on both surfaces; petiole as long. *Racemes* usually simple, solitary or fascicled. *Flowers* fascicled in the axils or deciduous bracts. *Drupe*s pisiform, orange-yellow, endocarp tubercled.

2. **T. malabarica**, *Miers Contrib.* iii. 32; leaves ovate-cordate acuminate pubescent above almost woolly beneath. *H. f. & T. Fl. Ind.* 183. *Menisp. malabaricum*, *Lamk. Cocculus malabaricus*, *DC. Prodr.* i. 97; *Wall. Cat.* 4969; *Rheede Hort. Mal.* vii. t. 19.

WESTERN PENINSULA; SIKKIM; KHASIA HILLS and CHITTAGONG.

Branchlets clothed with white hairs. *Leaves* 3-6 in. diam., 7-nerved; petiole 4 in., terete, hairy. *Racemes* 3-6 in.; flowers green. *Drupe*s red.—Miers distinguishes the Khasia and Chittagong specimens as var. *scabridula*.

3. **T. crispa**, *Miers Contrib.* iii. 34; leaves ovate-cordate or oblong acuminate glabrous stamens adnate to the base of the petals, drupe elliptic-oblong. *H. f. & T. Fl. Ind.* 183. *Menispermum crispum*, *L. M. verrucosum*, *Roxb. Fl. Ind.* iii. 808. *M. tuberculatum*, *Lamk. Cocculus crispus*, *DC. Prodr.* i. 97. *C. verrucosus*, *Wall. Cat.* 4966 A, B.

From SILHET and ASSAM to PEGU and MALACCA.—DISTRIB. Malay Islands.

Bark warted; shoots glabrous. *Leaves* 2-6 by 1-4 in., entire or repand, sometimes subsagittate, basal lobes distant; petiole 1-3 in. *Racemes* 4-8 in., on the old wood, solitary or fascicled. *Flowers* 2-3 in the axils of ovate fleshy bracts, $\frac{1}{2}$ in. long, green, campanulate

Anthers square. *Drupe*s size of an olive, pale yellow.—Miers distinguishes the Khasia plant as var. *nitidiuscula*, probably a distinct species.

4. **T. cordifolia**, *Miers Contrib.* iii. 31; leaves cordate glabrous, stamens free, ripe carpels pisiform. *T. palminervis*, *Miers l.c.* 31. *Menisp. cordifolium*, *Willd.*; *Roxb. Fl. Ind.* iii. 811. *Cocculus cordifolius*, *DC. Prodr.* i. 97; *Wall. Cat.* 4955; *W. & A. Prodr.* 12; *Wight Ic.* t. 385, 486. *C. convolvulaceus*, *DC. Prodr.* i. 97. *C. verrucosus*, *Wall. Cat.* 4966 C, D, E; *Rheede Hort. Mal.* vii. t. 21.

Throughout tropical India, from KUMAON to ASSAM and BURMA, and from BEHAR and CONCAN to CEYLON and the CARNATIC.

Bark corky; shoots glabrous. *Leaves* 2–4 in. diam., acute or acuminate; petiole $1\frac{1}{2}$ –3 in. *Racemes* exceeding the leaves, axillary terminal or on the old wood; bracts subulate. *Flowers* yellow, males fascicled, females usually solitary, glabrous. *Petals* cuneate. *Anthers* oblong. *Drupe*s size of a pea or small cherry, red.

5. ? **T. uliginosa**, *Miers Contrib.* iii. 35; leaves ovate or ovate-oblong acuminate, base rounded or subcordate, veins reticulate, drupe as in *T. crispa*, but endocarp thinner.

SINGAPORE, *Maingay*.

Maingay's mss. contain an excellent analysis of the fruit of this and *T. crispa*, and the only difference between them that I perceive is that the endocarp of this is thin and crustaceous, with a deeper longitudinal groove; the cotyledons are somewhat crumpled in both. The leaves are less shining than in the original *T. uliginosa* of Java, the fruit of which is undescribed.

4. **TINOMISCIMUM**, Miers.

A scandent shrub, juice milky. *Flowers* racemed. *Sepals* 9, with 3 bracts. *Petals* 6, oblong, margins incurved. MALE fl.: *Stamens* 6, filaments flattened; anthers oblong, adnate, bursting vertically. *Rudimentary carpels* 3. FEM. fl.: unknown. *Drupe*s much compressed, ovoid-oblong, style-scar terminal; endocarp much compressed, dorsally convex, ventrally flat or slightly concave, not intruded. *Seed* almost flat, oblong; cotyledons quite flat, nearly as broad as the thin layer of albumen, very thin, closely appressed; radicle short cylindric.—DISTRIB. 3 E. Asiatic species.

1. **T. petiolare**, *Miers Contrib.* iii. 45, t. 94; leaves ovate-oblong coriaceous. *H. f. & T. Fl. Ind.* 205. *Cocculus petiolaris*, *Wall. Cat.* 6964.

PENANG, *Wallich*; SINGAPORE, *Maingay*.

Young shoots brown-tomentose. *Leaves* 4–6 by $2\frac{1}{2}$ –4 in., ovate-oblong, obtuse or acuminate, glabrous, very coriaceous, base truncate or rounded, reticulate between the 3–5-nerves; petiole 3–4 in. *Racemes* 4–10 in., on tubercles in the upper racemes, or alternate along the branches, brown-tomentose; flowers minute, solitary or fascicled; pedicels short. *Sepals* puberulous. *Petals* notched. *Drupe*s $\frac{3}{4}$ –1 in., endocarp thick woody.—Foliage very similar indeed to that of *Fibraurea tinctoria*, but nervules beneath prominent, reticulate.

There are two flowerless plants in Hook. Herb., both collected by Griffith, and perhaps species of *Tinomisium*; one has membranous elliptic-lanceolate acuminate leaves, and fruit 1 in. long, with a very woody endocarp; the other has broad ovate-cordate acuminate membranous leaves, and similar but flatter fruit with a thin endocarp; this last closely resembles *T. javanicum*, Miers.

5. **FIBRAUREA**, Loureiro.

A lofty climbing glabrous shrub. *Leaves* ovate or oblong, coriaceous, 3-nerved. *Flowers* in large axillary panicles, diœcious. *Sepals* 6, with

3 minute bracts, inner larger. *Petals* 0. MALE fl.: *Stamens* 6, filaments clavate; anthers terminal, adnate, cells spreading, bursting vertically. FEMALE fl.: *Staminodes* 6. *Ovaries* 3, ovoid, 2 ovuled; stigma sessile, punctiform. *Drupe*s 3, 1-seeded, oblong, terete, style-scar subterminal; endocarp oblong, dorsally convex, ventrally flattened and channelled, hardly intruded. *Seed* oblong, terete, reniform on a transverse section, albumen copious, horny; cotyledons foliaceous, longitudinally curved, oblong, very thin; radicle short, cylindric.

1. **F. tinctoria**, Lour. *Fl. Coch.* ii. 769; leaves 3-nerved from the base or above the base. *H. f. & T. Fl. Ind.* 204. *F. tinctoria*, fasciculata, and chloroleuca, *Miers Contrib.* iii. 41, 42, t. 93. *Cocculus Fibraurea*, DC. *Prodr.* i. 99.

PENANG, *Phillips*; MALACCA, *Griffith*.—DISTRIB. Cochin-China, Borneo.

Branches pale; bark lax. *Leaves* 4–7 by 2–4 in., elliptic-ovate or oblong, thick, coriaceous, obtusely acuminate, shining above, pale beneath, 3-plinerved from the base or above it; petiole $1\frac{1}{2}$ –3 in., striate, subangular. *Panicles* often fascicled, much branched from the base, buds globose; fruiting panicle 1 ft., woody; peduncles $\frac{1}{2}$ –1 in. *Drupe*s 1 in.—We await evidence of there being more than one known species of this genus, pending which we adhere to the opinion expressed in *Flora Indica*. *Leaves* like those of *Tinomisium petiolare*, but not reticulate beneath. As Griffith (mss in Herb. Hook.) correctly observes, there are 2 superposed ovules in each ovary, of which the upper only becomes a seed.

6. **ANAMIRTA**, Colebrooke.

A climbing shrub. *Flowers* paniced. *Sepals* 6, with 2 appressed bracts. *Petals* 0. MALE fl.: *Anthers* sessile, on a stout column, 2-celled bursting transversely. FEM. fl.: *Staminodes* 9, clavate, 1-seriate. *Ovaries* 3, on a short gynophore; stigma subcapitate, reflexed. *Drupe*s on a 3-fid gynophore, obliquely ovoid, dorsally gibbous, style-scar subbasal; endocarp woody. *Seed* globose, embracing the subglobose hollow intruded endocarp, albumen dense, of horny granules; embryo curved, cotyledons narrow-oblong thin, spreading.

1. **A. Cocculus**, W. & A. *Prodr.* i. 446; leaves ovate or ovate-cordate rarely oblong-ovate. *H. f. & T. Fl. Ind.* 185. *A. paniculata*, Coleb. *A. flavescens* and *toxifera*, *Miers Contrib.* iii. 51. *Menisp. Cocculus*, Linn.; *Roxb. Fl. Ind.* iii. 807. *M. heteroclitum*, *Roxb. l.c.* 817. *Cocculus lacunosus*, DC. *Prodr.* i. 97. *C. suberosus*, DC. *l.c.*; W. & A. *Prodr.* i. 11; *Wall. Cat.* 4954. *C. populifolius*, DC. *l.c.*

EASTERN BENGAL; KHASIA HILLS; ASSAM; and from CONCAN and ORISSA to CEYLON.—DISTRIB. Malayan Islands.

Bark corky; shoots stout, glabrous, striate. *Leaves* 4–8 in. long, as broad or narrower, acute or acuminate, base rarely acute, glabrous above, hairy in the nerve-axils beneath, base 3-nerved; petiole 2–6 in. *Panicles* on the old branches, 1–1½ ft., pendulous. *Flowers* $\frac{1}{4}$ in. diam., glabrous. *Sepals* deciduous. *Drupe*s $\frac{3}{8}$ in., black, glabrous.

7. **COSCINIUM**, Colebrooke.

Climbing shrubs. *Flowers* in dense globose heads. *Sepals* 6, with a bract, orbicular. *Petals* 3, large, spreading, elliptic. MALE fl.: *Stamens* 6, filaments cylindric, 3 inner connate to the middle; anthers adnate, outer 1- inner 2-celled, bursting vertically. FEM. fl.: *Staminodes* 6. *Ovaries* 3–6, subglobose; styles subulate, reflexed. *Drupe*s globose; endocarp bony. *Seed* globose,

embracing a globose intrusion of the endocarp; albumen fleshy, ruminate in the ventral face; embryo straight, cotyledons orbicular, spreading, thin sinuate, laciniate, or fenestrate.—DISTRIB. Species 2; tropical Asiatic.

1. **C. fenestratum**, *Colebrooke in Trans. Linn. Soc.* xiii. 65; leaves slightly peltate suborbicular yellow-tomentose beneath, heads umbelled, cotyledons laciniate. *Miers in Hook. Bot. Mag.* t. 4658; *Contrib.* iii. 22, t. 88; *H. f. & T. Fl. Ind.* 178. *C. Wallichianum and Wightianum*, *Miers in Tayl. Ann. Ser.* 2, vii. 37. *Menisp. fenestratum*, *Gærtn.; DC. Prodr.* i. 103; *Roxb. Fl. Ind.* iii. 809. *Cocculus Blumeanus*, *Wall. Cat.* 4971 (*partly*). *Pereira medica*, *Lindl. Fl. Med.* 370.

WESTERN PENINSULA, *Herb. Wight.*; MALACCA, *Maingay*; SINGAPORE, *Wallich*; CEYLON, Central and Southern provinces. (Specimens all imperfect.)

Young shoots hoary-tomentose. *Leaves* 5-7 by 4-6 in., young oblong-deltoid obscurely peltate, acuminate, glabrous above, hoary and reticulate beneath; petiole 3-5 in. *Heads* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; pedicels 1 in. *Flowers* green. *Petals* orbicular, acute, and sepals persistent. *Drupes* 1-3, $\frac{1}{2}$ in. diam., subglobose, villous.—Perhaps 3 species are confounded here; Wight's has smaller broader and more membranous leaves, whiter beneath; the Malayan are more tomentose.

2. **C. Blumeanus**, *Miers Contrib.* iii. 23; leaves deeply peltate thick coriaceous ovate or oblong white-tomentose beneath, heads racemed. *H. f. & T. Fl. Ind.* 179. *Cocculus Blumeanus*, *Wall. Cat.* 5971 (*partly*).

PENANG, SINGAPORE AND MALACCA, *Wallich, &c.*

Branches woolly. *Leaves* 7-12 by 3-6 in., peltate, obtuse or acuminate, dark green and shining above; petiole 3-5 in. *Racemes* 3-4 in., stout, tomentose, peduncles 1 in.

Maingay's collection contains fruits of a *Cosciniun* from Malacca, of which he describes the cotyledons as fenestrate; the carpels are $1\frac{1}{4}$ - $1\frac{1}{2}$ in. diam., globose, bright yellow, sarcocarp very thick, endocarp woody; seed $\frac{3}{4}$ in. diam., albumen so hard that we have failed to remove the cotyledons so as to verify Maingay's description; it was accompanied with leaves and flowers of *Fibraurea* (Distrib. Hb. Maingay, 115).

A fourth species in Maingay's herbarium has leaves like *C. fenestratum*, but more peltate, pale brown beneath, with very appressed pubescence; a similar plant grows in Java and Sumatra.

8. **TILLIACORA**, Colebrooke.

A climbing shrub. *Flowers* in axillary panicles, diœcious or polygamous. *Sepals* 6, 2-seriate, outer much smaller. *Petals* 6, minute, cuneate. MALE fl.: *Stamens* 6, filaments subcylindric; anthers adnate, bursting vertically. FEM. fl.: *Rudimentary carpels* 3. *Ovaries* 3-12; styles short, subulate. *Drupes* obovoid, pedicelled, subcompressed, style-scar subbasal; endocarp thin, obscurely ribbed, grooved on both sides. *Seed* hooked, albumen oily, ruminate; cotyledons linear, fleshy, plano-convex, appressed.

1. **T. racemosa**, *Coleb. in Trans. Linn. Soc.* xiii. 67; leaves ovate or ovate-cordate acuminate. *Miers Contrib.* iii. 76, t. 104. *T. fraternaria*, cuspidiformis and abnormalis, *Miers l.c.* 77, 78. *T. acuminata*, *Miers in Tayl. Ann. Ser.* 2, vi. 39; *H. f. & T. Fl. Ind.* 187. *Menisp. acuminatum and radiatum*, *Lamk.* *M. polycarpum*, *Roxb. Fl. Ind.* iii. 816. *Cocculus acuminatus*, *DC. Prodr.* i. 99; *W. & A. Prodr.* i. 12. *C. radiatus*, *DC. l.c.* 99. *D. polycarpus*, *Wall. Cat.* 4958 (*excl. K. L.*)—*Rheede Hort. Mal.* vii. t. 3.

Throughout tropical India, from OUDE and BENGAL, to CONCAN, ORISSA, CEYLON and SINGAPORE.—DISTRIB. Java.

Branches glabrous. *Leaves* 3-6 by $1\frac{1}{2}$ - $3\frac{1}{2}$ in., ovate, acuminate, glabrous, base acute truncate rounded or subcordate, thin, margin undulate; petiole $\frac{1}{2}$ -1 in. *Panicles* 6-12 in., hoary, at length glabrous; branches 1 in., male 3-7-flowered, female simple 1-flowered; bracts oblong or subulate; flowers yellow. *Drupe* $\frac{1}{2}$ in., red.—Mr. Miers (Contributions, l.c.) attributes to us the error of substituting in the Flora Indica the specific name of *acuminata* for Colebrooke's prior name of *racemosa*; in this we followed his paper in Taylor's Annals.

9. LIMACIA, Loureiro.

Climbing shrubs. *Flowers* in panicles. *Sepals* 6, 2-seriate, outer smaller. *Petals* 6 (or 3?) much smaller, auricled, embracing the stamens. MALE fl.: *Stamens* 3-9; anthers adnate, bursting vertically. FEM. fl.: *Staminodes* 6, clavate. *Ovaries* 3; styles short, compressed. *Drupe* obovoid or reniform, style-scar subbasal; endocarp 3-celled, 2 lateral cells empty. *Seed* elongate, embracing the intruded endocarp; embryo slender, cotyledons elongate, $\frac{1}{2}$ -terete, appressed.—DISTRIB. Tropical Asia and Africa.

* *Sepals* 8-12, inner imbricate. HYPSEPA, Miers.

1. **L. cuspidata**, H. f. & T. *Fl. Ind.* 189; leaves ovate or oblong-lanceolate acuminate glabrous. *Cocculus cuspidatus*, Wall. *Cat.* 4960. *Hypserpa cuspidata*, prævaricata, pauciflora and uniflora, Miers *Contrib.* iii. 102-107, t. 108.

Tropical forests of EASTERN BENGAL, the EASTERN PENINSULA, and CEYLON.—DISTRIB. Malayan Archipelago.

Branchlets striate, pubescent. *Leaves* 2-5 by 1-2 in., thin, shining, 3-nerved, base rounded or cuneate, old glabrous; petiole $\frac{1}{2}$ -1 in. *Panicles* axillary and supra-axillary, solitary or geminate, female simple shorter; bracts minute, subulate. *Drupe* $\frac{1}{2}$ in. long.

** *Sepals* 6-9, inner valvate or subvalvate.

2. **L. triandra**, Miers *Contrib.* iii. 112; leaves oblong-lanceolate acute glabrous, panicles 1- $1\frac{1}{2}$ in. racemed shorter than the leaves, stamens 3. H. f. & T. *Fl. Ind.* 188. L. Amherstiana and Wallichiana, Miers l.c. 112, 113. Menisp. triandrum, Roxb. *Fl. Ind.* iii. 816. *Cocculus triandrus*, Colebrooke in *Trans. Linn. Soc.* xii. 64; Wall. *Cat.* 4962, 4959 C, 4958 L.

FROM PEGU and TENASSERIM to PENANG.

Branches puberulous, then glabrate. *Leaves* 2-4 by $\frac{3}{4}$ - $\frac{1}{2}$ in., thin, triplinerved, base rounded; petiole $\frac{1}{2}$ in. *Panicle* puberulous; bracts minute, deciduous, 3-5-flowered; flowers very minute, yellow. *Outer sepals* minute, inner oblong. *Filaments* cuneate-oblong, fleshy; anther-cells spreading.

3. **L. oblonga**, Miers *Contrib.* iii. 109; branches pubescent, leaves oblong or lanceolate glabrous, panicle 3-8 in., stamens 6.—H. f. & T. *Fl. Ind.* 189. *Cocculus oblongus*, Wall. *Cat.* 4963.

PENANG, MALACCA, and SINGAPORE, Wallich, &c.

Pubescence fulvous. *Leaves* 3-8 by 1- $4\frac{1}{2}$ in., acute or acuminate, base subacute or rounded; petiole $\frac{3}{4}$ - $1\frac{1}{2}$ in., and nerves beneath pubescent. *Panicles* supra-axillary; female solitary, males 2-3 superposed, branches 1-2 in. *Outer sepals* minute, inner thick, tomentose, subvalvate. *Drupe* subglobose.

4. **L. velutina**, Miers *Contrib.* iii. 110; stem velvety, leaves oblong or ovate-oblong tomentose beneath or on both surfaces, panicles few-flowered, stamens 6. H. f. & T. *Fl. Ind.* 189. L. distincta and inornata, Miers l.c. iii. t. 109. *Cocculus velutinus*, Wall. *Cat.* 4970.

From MERGUI to MALACCA, PENANG and SINGAPORE, &c.

Pubescence yellowish. *Leaves* 2-6 by $\frac{3}{4}$ -4 in., variable, obtuse acute or rounded, base rounded or acute, triple-nerved, usually glabrous above; petiole $\frac{1}{2}$ -1 in. *Panicles* axillary or supra-axillary, solitary few or many, tomentose, flowers villous. *Inner sepals* orbicular, valvate. *Drupe*s 1 in. long, obovoid, compressed, glabrous.

Aristega lævifolia, Miers Contrib. iii. 376, t. 151, a plant collected by Helfer in the Andamans, or in Moulmein, and of which male flowers alone are known, is probably a 3-petalous *Limacia*.

10. COCCULUS, DC.

Climbing or sarmentose shrubs, rarely suberect. *Petiole* not dilated at the base. *Flowers* paniced. *Sepals* 6, 2-seriate, outer smaller. *Petals* 6, smaller, usually auricled. MALE fl.: *Stamens* embraced by the petals, anthers subglobose, cells bursting transversely. FEM. fl.: *Staminodes* 6 or 0. *Ovaries* 3-6; styles usually cylindric. *Drupe*s laterally compressed; endocarp horseshoe-shaped, dorsally keeled and tubercled, sides excavate. *Seed* curved, albumen fleshy; embryo annular, cotyledons linear, flat, appressed.—DISTRIB. All warm climates.

1. **C. macrocarpus**, W. & A. Prodr. 13; leaves suborbicular glabrous long-petioled, panicles 6-12 in., drupes obovoid-oblong. *H. f. & T. Fl. Ind.* 191; *Wight Ill.* i. t. 7. *Diploclisia macrocarpa*, *lepida*, *inclyta* and *pic-tinervis*, Miers Contrib. iii. 280-284, t. 127. *Quinio cocculoides*, Schlecht. in *Linnaea* xxvi. 732.

From the CONCAN southwards, and in CEYLON.—DISTRIB. China.

Branchlets dark grey, striate. *Leaves* 2-3 in., rather broader than long, 5-nerved, obtuse retuse or rarely acute, subrepand, glaucous beneath, base truncate or cordate; petiole 2-4 in. *Panicles* chiefly in the old branches; flowers corymbose or fascicled, or axillary. *Sepals* membranous, and 3-lobed petals streaked with purple. *Drupe* 1 in., endocarp thin, woody.

2. **C. laurifolius**, DC. Prodr. i. 100; a tree, leaves lanceolate short-petioled shining, panicles axillary shorter than the leaves. *Deless. Ic. Sel.* i. t. 97; *Wall. Cat.* 4965; *H. f. & T. Fl. Ind.* 191. *Menisp. laurifolium*, *Roxb. Fl. Ind.* iii. 815. *Holopeira laurifolia*, *australis* and *fusiformis*, Miers Contrib. iii. 276.

SUBTROPICAL HIMALAYA, alt. 2500 ft., from Nipal to Jammu, Wallich, &c.—DISTRIB. Japan, Java (cult.?).

Trunk short; branches pendulous, angled, striate, smooth, branchlets bearded at the base. *Leaves* 3-6 by 1-1 $\frac{1}{2}$ in., coriaceous, acute or acuminate, 3-nerved; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in. *Panicles* 1-2 in., solitary or 2 superposed, corymbose, male largest; bracts and flowers minute. *Sepals* acute. *Petals* 2-lobed. *Styles* reflexed. *Drupe*s minute, globose; endocarp fragile, rugose.

3. **C. villosus**, DC. Prod. i. 98; branchlets villous, leaves ovate-oblong subdeltoïd villous, male fl. in short panicles, fem. 1-3 axillary rarely racemed. *Wall. Cat.* 4957; *W. & A. Prod.* 13; *H. f. & T. Fl. Ind.* 193. *C. sepium*, *Coleb. in Trans. Linn. Soc.* xiii. 58. *C. hastatus* and *aristochiæ*, DC. l.c. 98. *Menisp. villosum*, Lamk. (not Roxb.). *M. hirsutum*, Linn.; *Roxb. Fl. Ind.* iii. 814. *M. myosotoides*, Linn. *Holopeira villosa*, *læviuscula* and *auriculata*, Miers Contrib. iii. 271-273, t. 126.

Throughout tropical and subtropical India, from the base of the HIMALAYA to MALABAR and PEGU (absent in the Eastern Peninsula and Ceylon).—DISTRIB. Trop. Africa.

Leaves 2-3 by 1 $\frac{1}{2}$ -2 in., sometimes sublanceolate, retuse or obtuse and mucronate, sometimes 3-lobed, base subcordate or truncate, young villous on both surfaces; pe-

tiole $\frac{1}{2}$ in. *Panicles* loosely villous; bracts minute, linear. *Drupe*s black-purple, endocarp acutely keeled, tubercled.

4. **C. mollis**, Wall. Cat. 4973; branchlets pubescent, leaves ovate acute or acuminate white and villous beneath, panicles few-flowered. *Nephroica mollis*, Miers Contrib. iii. 265.

NIPAL, Wallich; KHASIA HILLS, alt. 5000 ft., H. f. & T.

Branchlets striate. *Leaves* 2-4 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., of shoots often obtuse, base cordate or truncate, bright green above, at length glabrate; petiole $\frac{3}{4}$ -1 in. *Panicles* axillary or nearly so, on a tomentose tubercle, shorter than the leaves, males irregular cymose, cymes 4-7-flowered, bracts filiform; females 1-3-flowered. *Petals* notched. *Drupe*s pisiform, compressed; endocarp keeled, with 4 rows of tubercles.

5. **C. Leæba**, DC. Prodr. i. 99; branchlets puberulous, leaves linear-oblong oblong or trapezoid entire or lobed glabrate, flowers fascicled in the axils, females subsolitary. H. f. & T. Fl. Ind. 192; Miers Contrib. iii. 2^e 6. *C. lævis*, Wall. Cat. 4975. *C. glabra*, W. & A. Prodr. i. 13; Miers l.c. 257. *C. recisus*, Miers l.c. 258.

Drier parts of Western India; the PUNJAB, SINDH, and the CARNATIC.—DISTRIB. Afghanistan, Arabia, trop. and subtrop. Africa.

Branchlets long, slender. *Leaves* $\frac{1}{2}$ - $1\frac{1}{2}$ by $\frac{1}{4}$ - $\frac{3}{8}$ in., very variable, angles rounded, sometimes 3-5-lobed, usually obtuse and mucronate, base cuneate or rounded, young hoary, old often glaucous on both surfaces; pedicels $\frac{1}{8}$ - $\frac{1}{4}$ in. *Flowers* fascicled on woody tubercles, pedicels 1-flowered, males dense. *Drupe*s $\frac{1}{12}$ - $\frac{1}{8}$ in.

11. PERICAMPYLUS, Miers.

A climbing shrub. *Leaves* subpeltate, petioles slender, articulate. *Flowers* in axillary cymes. *Sepals* 6, with 3 bracts, outer smaller, inner spatulate. *Petals* 6, cuneate. MALE fl.: *Stamens* 6, filaments cylindric; anthers adnate, bursting transversely. FEMALE fl.: *Staminodes* 6, clavate. *Ovaries* 3; styles 2-partite, segments subulate. *Drupe*s subglobose; endocarp horseshoe-shaped, dorsally crested and echinate, sides excavated. *Seed* curved; cotyledons elongate flat, scarcely broader than the radicle.

1. **P. incanus**, Miers Contrib. iii. 118, t. 3; leaves suborbicular obtuse acute or retuse. *P. aduncus*, *assamicus* and *membranaceus*, Miers l.c. 119-122. *Cocculus incanus*, Coleb. in Trans. Linn. Soc. xiii. 57. *Cissampelos mauritiana*, Wall. Cat. 4980 (not of DC.). *Menisp. villosum*, Roxb. Fl. Ind. iii. 812 (not of Lamk.).

SIKKIM, ASSAM, the KHASIA HILLS, CHITTAGONG and throughout the EASTERN PENINSULA.—DISTRIB. Java.

Branchlets tomentose, then glabrate. *Leaves* 2-4 in. diam., base truncate or subcordate; petiole 1-2 in. *Cymes* 2-3-chotomous, often many and superposed; peduncles 1-2 in., axillary, many-flowered; bracts subulate. *Sepals* villous. *Petals* acute or obtuse, margins incurved. *Drupe*s red.

12. STEPHANIA, Loureiro.

Climbing shrubs. *Leaves* usually peltate. *Flowers* in axillary, cymose umbels. MALE fl.: *Sepals* 6-10, free, ovate or obovate. *Petals* 3-5, obovate, fleshy. *Antthers* 6, connate, encircling the top of the staminal column, bursting transversely. FEM. fl.: *Sepals* 3-5. *Petals* of the male. *Staminodes* 0. *Ovary* 1; style 3-6-partite. *Drupe* glabrous; endocarp compressed, horseshoe-shaped, dorsally tubercled, sides hollowed and perforated. *Seed* almost annular; cotyledons long, slender, $\frac{1}{2}$ -terete, appressed.—DISTRIB. Tropics of the Old World.

1. **S. hernandifolia**, Walp. *Rep.* i. 96; branchlets glabrous, leaves ovate or subdeltoid acute obtuse or acuminate, umbels capitate. *H. f. & T. Fl. Ind.* 196; *Miers Contrib.* iii. 222. *S. intertexta*, latifolia, and hypoglaucæ, *Miers l.c.* 224, 226, 227. *Cissampelos hernandifolia*, Willd.; *DC. Prodr.* i. 100; *Roxb. Fl. Ind.* iii. 842; *Wall. Cat.* 4977 D, E, F, G, H, K. *C. discolor*, *DC. l.c.* i. 101. *C. hexandra*, *Roxb. l.c.* iii. 842. *Clypea hernandifolia*, W. & A. *Prod.* i. 14; *Wight Ic.* t. 939.

From NIPAL to CHITTAGONG, SINGAPORE, and CEYLON.—DISTRIB. Malay Islands, trop. Australia, Africa.

Branchlets striate. *Leaves* 3–6 in. diam., base truncate or subcordate, glabrous or thinly pubescent below only or on both surfaces, pale or glaucous beneath; petiole $1\frac{1}{2}$ –4 in. *Peduncles* axillary, short or long; rays 8–12, with subulate bracts. *Sepals* obovate, obtuse. *Petals* 3–4. *Drupe* red.—There are two marked varieties, the Northern and Eastern, with peduncles and leaves beneath more or less pubescent, and the Western one with these parts nearly glabrous.

2. **S. elegans**, H. f. & T. *Fl. Ind.* 195; branchlets glabrous, leaves elongate-deltoid acuminate base truncate or cordate, umbels lax long-peduncled. *Miers Contrib.* iii. 227.

SUBTROPICAL HIMALAYA from KUMAON to SIKKIM, alt. 6–7000 ft.; KHASIA HILLS, H. f. & T.

Branches slender, angled. *Leaves* $2\frac{1}{2}$ –4 by 1–2 $\frac{1}{2}$ in., sometimes obtuse, thin, coriaceous, pale beneath; petiole 1–2 in., slender. *Umbels* with many rays, sometimes branched; flowers purple or greenish, odour heavy. *Sepals* acuminate. *Petals* obovate. *Drupe* small, red.

3. **S. rotunda**, Lour. *Fl. Coch.* 747; branchlets glabrous, leaves broad-ovate or suborbicular often repand or sinuate-lobed glabrous, umbels in lax cymes. *H. f. & T. Fl. Ind.* 197; *Miers Contrib.* iii. 215. *C. longa* (*Khasia specimens*), japonica, Roxburghiana, glabra and glandulifera, *Miers l.c.* 213–220, t. 119. *Cocculus Roxburghianus*, *Wall. Cat.* 4972 (not of DC.); W. & A. *Prodr.* i. 450 in note. *C. Finlaysonianus*, *Wall. Cat.* 4974. *Cissampelos glabra*, *Roxb. Fl. Ind.* iii. 840. *Clypea Wightii*, *Arn. in Wight Ill.* i. 22.

TROPICAL and TEMPERATE HIMALAYA, ascending to 7000 ft., from SINDH eastward to the KHASIA HILLS and PEGU. Southern hills of the WESTERN PENINSULA.—DISTRIB. Siam, Cochinchina.

Roots subglobose. *Leaves* 3–7 in. diam., obtuse acute or acuminate, pale beneath, petiole 3–9 in. *Peduncles* variable, usually slender, of the females stout; rays of umbels long or short; bracts subulate; flowers $\frac{1}{2}$ – $\frac{1}{4}$ in. diam., yellow. *Sepals* narrow cuneate, puberulous. *Petals* shorter. *Drupe* pisiform.

13. CISSAMPELOS, Linn.

Suberect or climbing shrubs. *Leaves* often peltate. MALE fl.: cymose. *Sepals* 4, (5–6) erose. *Petals* 4, connate, forming in 4-lobed cup. *Anthers* 4, connate, encircling the top of the staminal column, bursting transversely. FEM. fl.: racemed, crowded in the axils of leafy bracts. *Sepals* 2 (or sepal and petal 1 each), 2-nerved, adnate to the bracts. *Staminodes* 0. *Ovary* 1; style short, 3-fid or 3-toothed. *Drupe* ovoid, style-scar subbasal; endocarp horseshoe-shaped, compressed, dorsally tubercled, sides excavated. *Seed* curved; embryo slender; cotyledons narrow, $\frac{1}{2}$ -terete, appressed.—DISTRIB. All hot climates.

1. **C. Pareira**, Linn.; climbing, leaves orbicular-reniform or cordate, male cymes long-peduncled many flowered hairy, female racemes with

large reniform or orbicular bracts, drupes subglobose hirsute. *DC. Prodr.* i. 100; *H. f. & T. Fl. Ind.* 198; *Miers Contrib.* iii. 139, *C. caapeba*, *Linn.*; *Roxb. Fl. Ind.* iii. 842. *C. convolvulacea*, *Willd.*; *Wall. Cat.* 4979; *W. & A. Prodr.* i. 14; *Roxb. l.c.* 842. *C. orbiculata*, discolor, and hirsuta, *Buch.*; *DC. l.c.* 101. *C. hernandifolia*, *Wall. Cat.* 4979, partly. *C. obtecta*, *Wall. Cat.* 4981. *C. diversa*, elata, grallatoria, eriantha, and delicatula, *Miers l.c.* 187-197. *C. subpeltata*, *Thwaites Enum.* 13 and 399, *Miers l.c.* 195. *Menisp. orbiculatum*, *Linn.* *Cocculus orbiculatus*, *DC. l.c.* 98. *C. villosus*, *Wall. Cat.* 4957 in part, and *C. membranaceus*, 4967 (diseased state).

Tropical and subtropical India, from SINDH and the PUNJAB to CEYLON and SINGAPORE.—DISTRIB. Cosmopolitan in warm regions.

A lofty climber; branchlets rarely glabrous. *Leaves* 1-4 in. diam., usually peltate, obtuse and mucronate, rarely acute, base truncate or more or less cordate; petiole equalling the leaf or longer. *Male cymes* $\frac{1}{2}$ -1 $\frac{1}{2}$ in. (sometimes replaced by a shoot with small leaves and small axillary cymes), axillary or nearly so, usually 2-3 superposed, decompound; bracts minute, rarely foliaceous; peduncle slender, pubescent tomentose or hirsute. *Fem. racemes* 1-2, axillary; bracts lax or densely imbricate, usually hoary, sometimes petioled; pedicels very short. *Ovaries* rarely glabrate. *Drupe* $\frac{1}{2}$ in. diam., scarlet.—A careful reconsideration of the materials discussed in "Flora Indica," with many additional specimens, and an eight years' further familiarity in India with both native and cultivated forms, convince us that the view taken in the above work (which is that of Eichler, Benthams, and Thwaites) is not invalidated by the vigorous attacks of our friend Mr. Miers.

14. **CYCLEA**, Arnott.

Climbing shrubs. *Leaves* usually peltate. *Flowers* in axillary panicles; MALE fl.: *Sepals* 4-8, connate into an inflated 4-5-lobed calyx. *Petals* 4-8, more or less connate into a 4-5-lobed corolla. *Anthers* 4-6, connate, crowning the staminal column, bursting transversely. FEM. fl.: *Sepal* 1, oblong. *Petal* 1, orbicular. *Ovary* 1; style short, 3-5-lobed, lobes radiating. *Drupe* ovoid, style-scar subbasal; endocarp horseshoe-shaped, dorsally tubercled, sides convex 2-locellate (as in *Limacia*). *Seed* curved; cotyledons slender, $\frac{1}{2}$ -terete, appressed.—DISTRIB. Tropical Asia.

1. **C. Burmanni**, *Miers Contrib.* iii. 239, t. 121; leaves peltate elongate-deltoid acuminate base cordate or subsagittate subrepand, calyx subglobose 6-8-lobed, corolla urceolate subentire. *H. f. & T. Fl. Ind.* 201. *Cocculus Burmanni*, *DC. Prodr.* i. 96. *Clypea Burmanni*, *W. & A. Prodr. in part*; *Burm. Fl. Zeyl.*, t. 101. *Rhaptomeris Burmanni*, *Miers in Tayl. Ann. Ser.* 2, vii. 41.

CONCAN, Gibson; and CEYLON, ascending to 2600 ft.

Branches pilose or glabrate. *Leaves* 2-4 by $\frac{3}{4}$ -2 in., thin, coriaceous, shining above, usually pubescent beneath; petiole $\frac{1}{2}$ -1 $\frac{1}{4}$ in. *Panicles* equalling or exceeding the leaves, many-flowered, pubescent. *Male fl.* and *drupe* pilose. *Calyx* much exceeding the corolla.

2. **C. peltata**, *H. f. & T. Fl. Ind.* 201; leaves peltate deltoid acute or subacute, calyx campanulate 4-lobed, corolla an irregularly 4-lobed cup. *Miers Contrib.* iii. 236. *C. barbata*, versicolor, *Arnottii*, laxiflora and debiliflora, *Miers l.c.* 237-242. *Menisp. peltatum*, *Lamk.* *Cocculus peltatus*, *DC. Prodr.* i. 96. *Cissampelos discolor*, *Wall. Cat.* 4892, in part. *C. barbata*, *Wall. Cat.* 4978. *Clypea Burmanni*, *W. & A. Prodr.* i. 74 in part. *Cyclea Burmanni*, *Arnott in Wight Ill.* i. 22. *Rhaptomeris Burmanni*, *Miers in Tayl. Ann. Ser.* 2, vii. 41. *Rheede Hort. Mal.* vii. t. 49.

From ASSAM and the KHASIA HILLS eastwards; and throughout the WESTERN and EASTERN PENINSULA and CEYLON.—DISTRIB. Java, &c.

Branches grooved, sparsely clothed with reflexed hairs or glabrate. *Leaves* 2-6 by 2-4 in., thin, coriaceous, acute or obtuse, subrepand, ciliate, above glabrous or sparsely pilose, usually pubescent beneath; petiole 1-2½ in. *Panicles* equalling or exceeding the leaves; males sometimes 1 ft.; fem. much shorter; bracts oblong or subulate; *male flowers* hispid or glabrous. *Calyx* much exceeding the corolla. *Drupe* pilose.—The synonymy of this species is much confused with that of *C. Burmanni*, and owing to some of the authentic specimens being flowerless these may require revision.

15. **LOPHOPHYLLUM**, Griffith.

Characters of *CYCLEA*, but male flowers apetalous and female with 2 opposite fleshy saccate sepals.

1. **L. bicristatum**, *Griff. Not. Pl. Asiat. part iv.* 313. t. 491; *It. Notes.* 114 No. 190, and 165 No. 854; leaves broadly cordate acuminate 7-9-nerved. *Peraphora robusta*, *Miers Contrib.* iii. 245, t. 122. *Cyclea populi-folia*, *H. f. & T. Fl. Ind.* 202.

EASTERN HIMALAYA, in SIKKIM and BHOTAN, *Griffith, &c.*; KHASIA HILLS, *H. f. & T.*

A tall climber; bark white; branchlets pubescent. *Leaves* 4-6 by 3-6 in., firm, coriaceous, glabrous above, pilose with rigid hairs and reticulate beneath; petiole 2-4 in., cylindric, pubescent, base and tip thickened. *Panicles* slender, decomposed, fascicled, tomentose. *Calyx* globose, 4-lobed. *Anthers* 4-5, connate into a peltate disk. *Drupe* ¼ in. diam., subglobose; endocarp with 3 series of hooked spines on each edge.

16. **PACHYGONE**, Miers.

A climbing shrub. *Flowers* axillary, racemed, diœcious. *Sepals* 6, 2-seriate, outer smaller. *Petals* 6, much smaller, base auricled embracing the filament. MALE fl.: *Stamens* 6, filament incurved; anthers subglobose, didymous, bursting transversely. *Rudimentary carpels* 3, minute. FEM. fl.: *Staminodes* 6. *Ovaries* 3; styles stout, horizontal. *Drupe* reniform, style-scar subbasal; endocarp reniform, rugulose. *Seed* horseshoe-shaped. albumen 0; cotyledons ½-cylindric, very thick, hard; radicle very short.

1. **P. ovata**, *Miers Contrib.* iii. 331, t. 135; leaves ovate-oblong or subtrapezoid, male racemes exceeding the leaves. *H. f. & T. Fl. Ind.* 203. *P. Plukenetii*, *concinna*, *adversa*, and *odorifera*, *Miers l.c.* 330-334. *Cissampelos ovata*, *Poir.*; *DC. Prodr.* i. 102. *C. Plukenetii*, *DC. l.c.* i. 97; *W. & A. Prodr.* i. 14; *Wight Ic.* t. 824, 825. *C. Wightianus*, *Wall. Cat.* 4959 A. *C. officinarum*, *Pluk.* *Koon zeylanicus*, *Gœrtn. Fruct.* ii. 486, t. 180.

Dry maritime places in the CARNATIC and CEYLON.—DISTRIB. Java and Timor.

A lofty climber; branches tomentose. *Leaves* 1½-2 by ¾-1¼ in., thick, coriaceous, obtuse retuse or mucronate, base cuneate or rounded, 3-5-nerved, glabrous; petiole ½-¾ in., with a basal ring of hairs; tip thickened. *Racemes* slender, pubescent, females shortest; peduncles very short. *Flowers* minute, male in the axils of subulate bracts, female solitary. *Petals* 2-toothed. *Drupe* pisiform.

17. **PYCNARRHENA**, Miers.

Suberect or climbing shrubs. *Flowers* axillary, fascicled or shortly paniced, diœcious. MALE fl.: *Sepals* 6, with 3 bracts, inner larger orbicular. *Petals* 6, small, lobed. *Stamens* 9, filaments very short; anthers subdidymous, bursting transversely. FEM. fl.: unknown. *Drupe* broadly oblong, sub-

gibbous, style-scar lateral; endocarp subreniform. *Seed* slightly concave ventrally, albumen 0: cotyledons oblong, $\frac{1}{2}$ -terete, very thick, slightly incurved, radicle minute, ventral.—**DISTRIB.** Two species, an Indian and Bornean.

1. **P. pleniflora**, *Miers Contrib.* iii. 353, t. 141; leaves oblong-lanceolate quite glabrous. *P. planiflora*, *H. f. & T. Fl. Ind.* 206. *Cocculus planiflorus*, *Wall. Cat.* 4961 (error for *pleniflorus*).

SILHET, Wallich.

Branches striate, puberulous. *Leaves* 5–7 by $1\frac{3}{4}$ – $2\frac{1}{2}$ in., thin, coriaceous, obtusely acuminate, puberulous on the midrib beneath, reticulate; nerves prominent beneath, arching within the margin; petiole $\frac{3}{4}$ in., top clavate. *Flowers* almost capitate; peduncles $\frac{1}{2}$ – $\frac{1}{4}$ in., pubescent, 1–2-flowered, with 2 basal and a median bract. *Drapes* $\frac{1}{4}$ in., smooth—*P. mecistophylla*, *Miers l.c.* 353, from Assam (Griffith), described from leaves only, does not appear to us to be congeneric.

18. **HÆMATOCARPUS**, Miers.

A strong glabrous climber. *Leaves* very coriaceous, 3-nerved. *Flowers* in axillary racemes, diœcious. **MALE fl.**: *Sepals* 9–12 with 3 bracts, large. *Petals* 6, base minutely auricled. *Stamens* 6, free; anther-cells 2, remote on the face of a large galeate dilated connective, bursting obliquely. *Rudimentary carpels* 3, minute. **FEM. fl.**: unknown. *Drapes* 1–4, large, ovoid fleshy, oblong, stalked, style-scar subbasal; endocarp coriaceous, oblong, adherent. *Seed* oblong, albumen 0; embryo large, cotyledons accumbent, folded on themselves, very thick, $\frac{1}{2}$ -terete, obtuse; radicle short, stout, inferior.

1. **H. Thomsoni**, *Miers Contrib.* iii. 325, t. 134; leaves oblong obtusely acuminate. *F. comptus and incusus*, *Miers l.c.* 326, 327. *Baterium validum*, *Miers in Tayl. Annal. Ser.* 3, xiii. 124. *Fibraurea? hæmatocarpa*, *H. f. & T. Fl. Ind.* 204.

SIKKIM-HIMALAYA and KHASIA HILLS, alt., 3–4000 ft., Griffith, &c.

Branches stout, pale. *Leaves* 3–4 by $1\frac{1}{2}$ –2 in., base obtuse or acute, pale or glabrous beneath, nerves reticulate; petiole slender, $\frac{3}{4}$ –1 in. *Racemes* supra-axillary, solitary or several, slender, branches short; *flowers* small; pedicels slender. *Sepals* ciliate. *Petals* concave. *Fruiting racemes* woody, 1–3 in.; torus globose with 4–6 scars. *Drapes* $1\frac{1}{2}$ –2 in., smooth, suboblique; stalks $\frac{1}{2}$ in., stout; sarcocarp hard, blood-red; mesocarp traversed by stout vessels from the thin crustaceous endocarp.

19. **ANTITAXIS**, Miers.

A shrub. *Leaves* penninerved. *Flowers* in axillary fascicles, diœcious. **MALE fl.**: *Sepals* 8, in decussate pairs; outer small; 2 next obovate; 4 inner larger, orbicular, imbricate. *Petals* 2, obovate. *Stamens* 4, filaments clavate; anthers 1-celled, subglobose, bursting transversely. **FEM. fl.**: unknown. *Drapes* 1–3, subglobose, style-scar ventral; endocarp thin, fragile, subreniform-oblong. *Seed* subglobose, concave ventrally, albumen 0; cotyledons oblong, $\frac{1}{2}$ -terete, slightly incurved, very thick; radicle minute, ventral.—**DISTRIB.** Eastern Archipelago.

1. **A. fasciculata**, *Miers Contrib.* iii. 336, t. 142; leaves oblong acuminate glabrous, petiole tomentose. *Cocculus lucidus*, *Teysm. & Ben. Nat. Tijdsch.* iv. 397.

MALACCA, Griffith.—DISTRIB. Java.

Branches rigid, flexuous, smooth; young pubescent. *Leaves* $3\frac{1}{2}$ –4 by $1\frac{1}{2}$ – $1\frac{3}{4}$ in., subcoriaceous, base rounded, concolorous, shining above, paler beneath with reticulate veins; petiole $\frac{3}{4}$ in. *Peduncles* of male numerous, $\frac{1}{2}$ – $\frac{3}{4}$ in., slender, glabrous. *Flowers* minute. *Drupe* tomentose.—A very anomalous genus.

ORDER VI. BERBERIDEÆ. (By Hooker f. & Thomson.)

Usually shrubby, sometimes climbing, glabrous plants. *Leaves* simple or compound, with articulate segments; buds scaly. *Stipules* very rare (*Berberis*). *Flowers* often globose, regular, solitary or in simple or compound racemes, usually yellow or white. *Sepals* and *petals* free, hypogynous, very caducous, 2–many-seriate, in 3–rarely 4–6-nary whorls, imbricate, or the sepals rarely valvate. *Stamens* 4–6 (rarely 8) opposite the petals, free or connate; anthers adnate, erect, dehiscing by lateral or dorsal slits, or by 2 revolute or ascending lids or valves. *Carpels* 1–3, rarely more, oblong; style short or 0, stigma dilated or conic or oblong; ovules usually indefinite on the ventral suture or covering the walls of the ovary, anatropous rarely orthotropous. *Ripe carpels* dry or fleshy, dehiscent or not. *Seeds* with a crustaceous fleshy or bony testa; albumen copious, dense; embryo minute or long, straight or curved, radicle next the hilum.—DISTRIB. Genera about 20, with 200 species, chiefly temperate and mountain plants.

TRIBE I. Lardizabaleæ. *Stem* usually climbing. *Flowers* unisexual or polygamous. *Carpels* 3. *Seeds* usually large, testa bony.

An erect shrub. Leaves pinnate	1. DECAISNEA.
Climbing shrubs. Leaves digitate. Stamens monadelphous	2. PARVATIA.
Stamens free	3. HOLBELLIA.

TRIBE II. Berbereæ. *Stem* 0 or erect. *Flowers* hermaphrodite. *Carpel* 1. *Seeds* usually small.

Ovules erect, basal. Shrubs. Fruit berried	4. BERBERIS.
Ovules superposed along the ventral suture.	
Leaves decomposed. Ovules few	5. EPIMEDIUM.
Leaves simple, palmate. Ovules many	6. PODOPHYLLUM.

1. DECAISNEA, H. f. & T.

An erect shrub. *Leaves* unequally pinnate, petiole jointed at base. *Flowers* racemose, monœcious. *Sepals* 6, narrow, taper-pointed, subimbricate in 2 rows. *Petals* 0. **MALE fl.:** *Stamens* 6, monadelphous; anthers oblong, connective subulate. **FEM. fl.:** *Staminodes* 6, small, free. *Ovaries* 3, sessile, oblong; stigma subsessile, oblong; ovules many, 2-seriate. *Fruit* of 3 spreading fleshy many-seeded follicles. *Seeds* large, compressed, testa bony.

D. insignis, H. f. & T. in *Proc. Linn. Soc.* 1854, ii. 349; *Fl. Ind.* 213; leaflets opposite ovate or ovate-lanceolate long acuminate. *Hook. f. Ill. Him. Pl.* t. 10. *Slackea insignis*, *Griff. Itin.* Not. 187.

Forests of the EASTERN HIMALAYA, alt. 6–10,000 ft.; in Bhotan, Griffith, and Sikkim, H. f.

Stem naked, erect, simple, or forked. *Leaves* 2–3 ft., subterminal on the few short branches. *Leaflets* 6–8 pair, 3–5 by $1\frac{1}{2}$ –3 in., thin, glaucous beneath; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.

Racemes 1 ft., horizontal, fascicled, terminal or leaf-opposed. *Flowers* 1 in. long, pendulous, yellow-green; pedicels as long; bracts small, subulate, deciduous. *Follicles* 3 in., cylindric, obtuse, recurved, edible.

2. **PARVATIA**, Decaisne.

A large climbing shrub. *Leaves* alternate, 3-foliolate. *Flowers* racemed, monœcious. *Sepals* 6, 2-seriate, 3 outer valvate. *Petals* 6, lanceolate, much smaller. MALE fl.: *Stamens* 3, monadelphous; anthers oblong, apiculate. FEM. fl.: *Staminodes* 6, minute, free. *Ovaries* 3; stigma sessile, oblong, acute; ovules many, covering the walls of the ovary, mixed with long hairs. *Fruit* of 3, berried, indehiscent, many-seeded carpels. *Seeds* imbedded in pulp.

1. **P. Brunoniana**, Decaisne in *Archiv. Mus.* i. 190, t. 12 A; leaflets ovate or ovate-lanceolate acuminate rarely obtuse. *H. f. & T. Fl. Ind.* 214. *Stauntonia Brunoniana*, Wall. *Cat.* 4592.

ASSAM AND KHASIA HILLS, alt. 3-4000 ft., Wallich, &c.

Bark of old branches pale corky, of young smooth. *Petioles* 3-5 in. *Leaflets* 3-5 by 1-2½ in., base subacute or rounded, shining above, glaucous below; petiole of mid-leaflet 1 in., of lateral ½ in. *Peduncles* 2-4 in., fascicled on scaly tubercles, rigid, slender; pedicels spreading; bracteoles basal, minute, linear. *Flowers* greenish-white; male ½, female ¾ in. long. *Carpels* ½ in., obtuse at both ends, granulate.—Assam specimens have more membranous and obtuse leaves, less glaucous beneath.

3. **HOLBÆLLIA**, Wall.

A climbing shrub. *Leaves* digitate. *Flowers* monœcious, in axillary fascicles or racemes. *Sepals* 6, 2-seriate; 3 outer valvate. *Petals* 6, minute, orbicular. MALE fl.: *Stamens* 6, free; anthers apiculate. FEM. fl.: *Staminodes* 6, minute. *Ovaries* 3; stigmas oblong; ovules many, covering the walls of the ovary. *Fruit* of 3, berried, many-seeded carpels. *Seeds* imbedded in pulp.

1. **H. latifolia**, Wall. *Tent. Fl. Nep.* 24, t. 16; leaflets ovate or oblong, lanceolate or linear in young plants, acuminate.

HIMALAYA, alt. 4-9000 ft., from Bhotan to Kumaon; KHASIA HILLS alt. 4000 ft.; UPPER ASSAM, at low elevations.

Trunk sometimes 4-6 in. diam., bark corky when old. *Leaves* 3-9-foliolate; leaflets 3-6 by ½-2 in., base rounded or acute, shining above, pale and reticulate beneath; petiole of mid-leaflet its own length, of the lateral shorter. *Peduncles* solitary or fascicled. *Flowers* subcorymbose, purplish-green, sweet-scented; male ½-¾ in., fem. larger. *Carpels* 2-3 in., sessile or short-stalked, oblong, obtuse at both ends; very variable. The characters of the seed require confirmation.

VAR. 1. *latifolia*, leaflets 3-5 ovate or oblong, seeds straight obovoid.—*H. latifolia*, Wall. *l.c.*; Decaisne in *Archiv. Mus.* i. 194, t. 12, B; *H. f. & T. Fl. Ind.* 215. *H. acuminata*, Lindl. in *Journ. Hort. Soc.* ii. 313. *Stauntonia latifolia* Wall. *Cat.* 4950.

VAR. *angustifolia*, leaflets 7-9 narrow- or linear-lanceolate, seeds curved.—*H. angustifolia*, Wall. *Tent.*, t. 17; Decaisne and *H. f. & T. l.c.* *Stauntonia angustifolia*, Wall. *Cat.* 4951.

4. **BERBERIS**, Linn.

Shrubs; wood yellow. *Leaves* pinnate or simple and then fascicled in the axils of 3-5-partite spines. *Flowers* yellow, hermaphrodite, fascicled, racemed or solitary. *Sepals* 6, with 2-3 appressed bracts, imbricate in 2

series. *Petals* 6, imbricate in 2 series, usually with 2 basal glands inside. *Stamens* 6, free; anther-cells opening by recurved valves. *Ovary* simple; stigma peltate, sessile or on a short style; ovules few, basal, erect. *Berry* few-seeded.—**DISTRIB.** Species about 50, natives of N. temperate regions, subtropical Asia, the Andes, and temperate S. America.

SECT. I. Mahonia. *Leaves* unequally pinnate; leaflets opposite.

1. **B. nepalensis**, *Spreng. Syst. Veg.* ii. 120; leaflets oblong ovate or lanceolate spinous-toothed palmately 3-5-nerved, racemes dense flowered. *Wall. Cat.* 1480; *H. f. & T. Fl. Ind.* 219. *B. miccia*, *Ham.*; *Don Prodr.* 205. *B. acanthifolia*, *Wall.*; *Don Syst. Gard.* i. 118. *Mahonia nepalensis*, *DC. Prodr.* i. 109; *Deless. Ic. Sel.* ii. t. 4.

TEMPERATE HIMALAYA, alt. 4-8000 ft.; from Garwhal to Bhotan; KHASIA HILLS alt. 4-5000 ft.; MERGUI, *Griffith*; NILGHIRI Mts, alt. 5-8000 ft.—**DISTRIB.** Japan?

Stem erect, 3-20 ft., subsimple, leafy near the top only. *Leaves* 6-18 in.; sheath with 2 subulate stipules; leaflets 2-12 pair, 1-5 in., coriaceous, sessile, articulate with the petiole. *Racemes* 3-12 in., erect; bracts 1-2 in., various; bracteoles oblong or ovate. *Flowers* fascicled; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in. slender. *Berry* $\frac{1}{3}$ - $\frac{1}{2}$ in., violet, glaucous, bitter.—Probably *B. Bealii* of Japan is not different.

VAR. 1. *nepalensis* proper; leaflets usually narrow-oblong or ovate-lanceolate, berry elliptic. *B. nepalensis* *L.c.* Northern and Eastern India.

VAR. 2. *Leschenaultii*; leaflets broader, berry globose. *B. Leschenaultii*, *Wall. Cat.* 1479; *Wight L.c.* t. 940. Nilghiries.

SECT. II. Berberis proper. *Leaves* simple, fascicled in the axils of 3-5-partite (rarely simple) spines (reduced leaves).

* *Flowers* racemed, corymbose or subumbelled.

2. **B. vulgaris**, *L.*; leaves more or less deciduous obovate spinulose-serrate, flowers racemed, petals subentire, stigma sessile discoid. *H. f. & T. Fl. Ind.* 220.

WESTERN HIMALAYA, alt. 8-12,000 ft., from Nipal to Marri, and in WESTERN TIBET.—**DISTRIB.** Temp. Europe and N. Asia.

An extremely variable plant.

VAR. 1. *vulgaris* proper; 8-10 ft., leaves 2-3 in. quite deciduous long petioled broad oblong-lanceolate or obovate acutely serrate, racemes exceeding the leaves pendulous simple not glaucous, flowers large, berries oblong-ovoid compressed red, seeds 2-5. *DC. Prodr.* i. 105.—Kashmir and Kishtwar, alt. 5-1000 ft.

VAR. 2. *cratægina* (*sp.* *DC. Prodr.* i. 106); a small bush, leaves 1-2½ in. coriaceous and persistent entire or spinulose, racemes elongate, berries oblong or subspherical. *B. emarginata*, *Willd.*; *sphærocarpa*, *Kar. & Kir.*; *heteropoda*, *Schrenk*; *turcomaniæ*, *Karel.*—Balti, & Kashmir, alt. 8-10,000 ft.

VAR. 3. *ætnensis* (*sp.* *Presl. Flor. Sic.* i. 28); low, rigid, robust, leaves 1-1½ in. obovate obtuse or mucronate rarely lanceolate spinulose serrate rarely entire, nerves prominent, racemes suberect or nodding rather exceeding the leaves.—*B. Kunawarensis*, *Royle II.* 64.—Simla to Balti, alt. 6-12,000 ft.

VAR. 4. *brachybotrys* (*sp.* *Edgew. in Trans. Linn. Soc.* xx. 29); branches robust, often glaucous, leaves $\frac{1}{2}$ -1½ in. hardly coriaceous obovate or lanceolate spinulose-serrate or entire, racemes short many-flowered subcorymbose.—From Sikkim to Simla, alt. 6-12,000 ft.

VAR. 5. *cretica* (*sp.* *Linn.*); low or prostrate, densely branched, leaves $\frac{1}{2}$ -1 in. rigid coriaceous angled spinulose-serrate or lobulate, margin thickened, racemes longer or shorter than the leaves.—(*B. vulgaris* var. *australis*, *Boiss.* *B. Thunbergii*, *DC.*) Garwhal to Balti, alt. 9-11,000 ft.

3. **B. umbellata**, *Wall. Cat.* 1475; leaves more or less deciduous obovate sparingly serrulate, flowers subumbellate on a long naked peduncle, berries oblong, stigma flat sessile. *Don Syst. Gard.* i. 116; *H. f. & T. Fl. Ind.* 224. *B. aristata*, *DC. Prodr.* i. 106; *Hook. Bot. Mag.* t. 25-49.

TEMPERATE HIMALAYA, alt. 9-11,000 ft., from Kumaon to Bhotan.

An erect straggling shrub, 8-10 ft.; branches slender, rigid, leafy. *Leaves* 1-2 in., submembranous, green or glaucous beneath. *Flowers* like those of *B. vulgaris*.

4. **B. aristata**, *DC. Syst.* ii. 8; erect, leaves evergreen or nearly so, obovate or oblong entire or with few distant spinous teeth, flowers in compound often corymbose racemes, berries tapering into a short style, stigma small subglobose. *H. f. & T. Fl. Ind.* 224.

TEMPERATE HIMALAYA, alt. 6-10,000 ft.; from Bhotan to Kunawar. NILGHIRI Mts. and CEYLON, alt. 6-7000 ft.

As variable as *B. vulgaris*.

VAR. 1. *aristata*, purple, leaves 1-3 in. broad obovate or oblong elliptic acute or awned entire or spinulose-serrate towards the tip green or glaucous beneath, racemes compound, flowers large, pedicels red. *DC. Prodr.* i. 106; *Royle Ill.* 64; *Wall. Cat.* 1474. *B. tinctoria*, *Lesch.*; *W. & A. Prodr.* i. 16; *Deless. Ic. Sel.* ii. t. 2; *Wight Ill.* t. 8. *B. chitria*, *Ham.*; *Don Prodr.* 204; *Bot. Reg.* t. 729. *B. angustifolia*, *Roxb. Hort. Beng.* 87.—Nipal to Sirmore.

VAR. 2. *floribunda* (*sp. Wall. mss. Cat.* 1474); leaves smaller, flowers on long peduncles, racemes subsimple or subumbellate. *B. petiolaris*, *Wall. under Cat.* 1474; *Don Syst. Gard.* i. 115. *B. affinis* and *ceratophylla*, *Don l.c.* *B. coriaria*, *Royle mss.*; *Lindl. in Bot. Reg. N.S.* xiv. t. 46. *B. umbellata*, *Lindl. l.c.* 1844 t. 44 (*not of Wall.*).—Kumaon to Kunawar.

VAR. 3. *micrantha*; leafy, leaves 1-3 in. very coriaceous obovate-lanceolate coarsely spinulose-toothed, racemes long nodding, flowers small. *Wall. Cat.* 1474.—Bhotan to Garwhal.

5. **B. Lycium**, *Royle Ill.* 64; *Trans. Linn. Soc.* xvii. 94; bark white, leaves subsessile subpersistent lanceolate or narrow obovate-oblong usually quite entire pale not lacunose glaucous beneath, raceme elongate, berries ovoid, style conspicuous, stigma capitate. *H. f. & T. Fl. Ind.* 225.

WESTERN HIMALAYA, in dry hot places; alt. 3-9000 ft., from Garwhal to Hazara.

An erect rigid shrub, 6-8 ft. *Leaves* $1\frac{1}{2}$ - $2\frac{1}{2}$ by $\frac{1}{3}$ - $\frac{1}{2}$ in., coriaceous, mucronate, very spinulose, bright green above, venation lax. *Racemes* simple or compound, often corymbose, drooping, longer than the leaves. *Berry* violet.—Very distinct in its ordinary state, but some forms appear to pass into *B. aristata*, and others into *B. asiatica*.

6. **B. asiatica**, *Roxb. in DC. Syst.* ii. 13; bark pale, spines 5-fid small, leaves orbicular or broad obovate subtentire or coarsely spinous lacunose white beneath, racemes short corymbose, berries with a distinct style, stigma capitate. *Roxb. Fl. Ind.* ii. 182; *Deless. Ic. Sel.* ii. t. 1; *Wall. Cat.* 1477 (*excl. syn. tinctoriæ*). *B. hypoleuca*, *Lindl. Journ. Hort. Soc.* ii. 246.

Dry valleys of the HIMALAYA, alt. 3-7500 ft.; from Bhotan to Garwhal. BEHAR, on Parasnath, alt. 3500 ft., *Edgeworth.*—DISTRIB. Afghanistan.

An erect stout branched bush, 3-6 ft. *Leaves* 1-3 in., rarely acute, thickly coriaceous, very strongly reticulate beneath. *Racemes* peduncled or subsessile; flowers rather small, $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. *Berry* red or black, glaucous, often large, eatable.

** *Peduncles fascicled, 1-flowered.*

7. **B. Wallichiana**, *DC. Prodr.* i. 107; leaves evergreen lanceolate or oblong-lanceolate, flowers many in a fascicle, berry ovoid or oblong. *Wall.*

Plant. As. Rar. iii. t. 243; *Cat.* 1478, *H. f. & T. Fl. Ind.* 225. *B. asiatica*, *Griff. Ic. Pl. Ind. Or.* iv. t. 1648.

TEMPERATE HIMALAYA in forests, alt. 8–10,000 ft., from Nipal, *Wallich*, to Bhotan, *Griffith*; KHASIA HILLS, alt. 5–6000 ft.

VAR. 1. *atroviridis* (*sp. Wall. mss.*); branches angular, leaves $1\frac{1}{2}$ –4 in. lanceolate or narrow obovate, berries black-purple shining. *B. Wallichiana*, *DC. l.c.*—Nipal to Bhotan.

VAR. 2. *microcarpa*; branches angled or deeply grooved, leaves as in Var. 1, but smaller and sometimes quite entire, berries $\frac{1}{4}$ in. elliptic-oblong, style short, stigma small.—Khasia hills.

VAR. 3. *latifolia*; leaves 1–2 in. broadly obovate or elliptic-oblong, flowers as in Var. 1.—Skirts of woods, alt. 8–10,000 ft. in Sikkim.

VAR. 4. *pallida*; leaves 2–3 in. narrow lanceolate spinulose pale and glaucous beneath, fascicles few-flowered.—Bhotan, *Griffith*.

8. **B. insignis**, *H. f. & T. Fl. Ind.* 226; erect, spines very few, leaves evergreen large solitary or geminate elliptic or linear-lanceolate shining on both surfaces spinous toothed, pedicels short thick, berries ovoid, stigma sessile.

Humid forests of the EASTERN HIMALAYA, alt. 7–10,000 ft.; from E. Nipal, *H. f.*, to Bhotan, *Griffith*.

A beautiful holly-like bush, 4–6 ft. *Leaves* 3–7 in., rather remote; petiole short. *Flowers* 3–20 in a fascicle, golden-yellow; pedicels $\frac{1}{2}$ –1 in., curved. *Petals* 2-fid. *Berries* $\frac{1}{3}$ in., black.

9. **B. ulicina**, *H. f. & T. Fl. Ind.* 227; glaucous, robust, densely spiny, leaves fascicled pungent margins thickened, pedicels very short, berries small, stigma sessile.

WESTERN TIBET; stony dry places in Nubra, alt. 14–16,000 ft., *T. T.*

A small shrub, 1–2 ft.; branches short, stout; spines stout, rigid, base dilated. *Leaves* $\frac{1}{2}$ in., rigidly coriaceous, crowded, 1–2-toothed on each side. *Flowers* $\frac{1}{5}$ in. diam., orange-yellow, densely crowded. *Petals* 2-fid. *Ovary* obscurely glandular, 4-ovuled. *Berry* black, glaucous.

*** *Peduncles solitary (rarely 2–3), 1-flowered.*

10. **B. angulosa**, *Wall. Cat.* 1475 *in part*; young shoots puberulous, leaves small obovate or obovate-lanceolate puberulous, margins thickened, peduncle exceeding the leaves stout curved, outer sepals equalling the inner, berries broad pendulous.

TEMPERATE HIMALAYA, Nipal, *Wallich*; Sikkim, alt. 11–13,000 ft., *H. f.*

A shrub, 4 ft.; branches strict leafy; spines 3–5-fid. *Leaves* 1–1 $\frac{1}{2}$ in., fascicled, thin, coriaceous, usually quite entire, opaque above, rather shining beneath; nerves subparallel. *Flowers* rather large. *Outer sepals* broad. *Petals* entire. *Berries* $\frac{1}{3}$ – $\frac{1}{2}$ in., globose or broad-oblong, red, 5–7-seeded, edible; stigma sessile or style short; peduncle stout, curved.

11. **B. macrosepala**, *H. f. in Bot. Mag.* t. 4744; erect or prostrate, glabrous, leaves obovate-oblong coarsely spinulose-toothed, margins thickened, peduncle slender, outer sepals equalling the inner, berries large ovoid. *H. f. & T. Fl. Ind.* 228.

Interior of the SIKKIM HIMALAYA, alt. 12–13,000 ft., *H. f.*

A small shrub, 2–4 ft.; branches spreading; spines slender equalling the leaves. *Leaves* fascicled, $\frac{1}{2}$ –1 in., usually glaucous beneath. *Flowers* rather large, peduncle curved, glabrous. *Berries* $\frac{1}{2}$ – $\frac{3}{4}$ in., red, 6–10-seeded; stigma sessile.

12. **B. concinna**, *H. f. in Bot. Mag.* t. 4744; prostrate, much branched, branches slender red glabrous, leaves small obovate spinous-toothed white

beneath margin thickened, peduncles slender, outer sepals half as long as the inner, berries large oblong. *H. f. & T. Fl. Ind.* 229.

Interior valleys of SIKKIM; HIMALAYA, alt. 12–13,000 ft. *H. f.*

A small shrub, 1–3 ft., often forming appressed cushions, conspicuous for the deep green upper and white under surface of its small deciduous leaves; spines equalling the leaves or shorter, 3-fid, slender. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., tip rounded or truncate. *Peduncle* exceeding the leaves. *Flowers* bright-orange. *Berries* $\frac{1}{3}$ – $\frac{3}{4}$ in., pendulous, compressed, many-seeded.

Doubtful species are (1) a shrub like *B. concinna* and referred to it as var. β in *Fl. Ind.*, with angled and lobed spinous toothed leaves, found at 9–10,000 ft. in Kumaon and Garwhal. (2) A Sikkim (alt. 9000 ft.) species allied to the above, in flower and young leaf only, with obovate-lanceolate entire awned leaves, and fascicled or subumbelled flowers on a slender peduncle.

5. EPIMEDIUM, Linn.

Herbs; rootstock creeping. *Leaves* ternately compound. *Flowers* white or coloured, racemose or panicle. *Sepals* 8, petaloid, in 2 opposite series, outer smaller. *Petals* 4, opposite the sepals, hooded or spurred. *Stamens* 4, opposite the petals; anther-cells opening by recurved valves. *Ovary* 1; style subulate, continuous with the dorsal suture, stigma dilated; ovules few or many, 2-seriate on the ventral suture. *Capsule* elongate, unequally 2-valved, smaller valve deciduous, leaving the seeds attached to the persistent larger. *Seeds* few, aril fleshy.—DISTRIB. Species about 8; temp. Europe and Asia.

E. elatum, *Morr. & Dne. in Ann. Sc. Nat. Sér.* 2, ii. 356; leaves 2–3-ternate, leaflets ovate-cordate, sepals ovate-lanceolate acute, filaments equalling the ovary, ovules 2–3. *Dne. in Jacq. Voy. Bot.* 9, t. 8; *H. f. & T. Fl. Ind.* 231.

WESTERN HIMALAYA, KASHMIR, BANAHAL and KISHITWAR, alt. 6–8000 ft., *Jacquemont*, &c.

Stem 2–3 ft., slender, glabrous. *Leaves* 6–12 in.; leaflets 1–2½ in., lateral oblique, membranous, spinulose-toothed. *Panicle* glabrous or glandular; bracts minute. *Flowers* $\frac{1}{4}$ in. diam., yellow-white. *Anthers* linear. *Ovary* linear; style slender persistent. *Capsule* membranous. *Seeds* 2–3, reniform, black.

6. PODOPHYLLUM, Linn.

Scapigerous herbs; rootstock creeping, scaly, 2-leaved. *Leaves* peltate, palmately lobed. *Flowers* large, white or rose-coloured. *Sepals* 3–6, petaloid. *Petals* 6–9 (rarely 4). *Stamens* as many or twice as many as the petals; anther-cells opening by slits. *Ovary* simple; stigma large, sessile, peltate; ovules many, on a broad ventral placenta. *Fruit* berried, many-seeded. *Seeds* obovoid, imbedded in pulp.—DISTRIB. A N. American and a Himalayan species.

1. **P. emodi**, *Wall. Cat.* 814; scape supra-axillary, stamens usually 6. *Royle. Ill.* 64 and 379 in note; *H. f. & T. Fl. Ind.* 232. *P. hexandrum*, *Royle l.c.*; *Dne. in Jacq. Voy. Bot.* ii. t. 9.

Interior ranges of the HIMALAYA, alt. 9–14,000 ft., from SIKKIM to HAZARA, descending to 6000 ft. in KASHMIR.

Stem or scape 6–12 in., erect, stout, herbaceous. *Leaves* 2, vernal, alternate, long-petioled, plaited and deflexed in venation, 6–10 in. diam., orbicular, 3–5-lobed to the

middle or base; lobes cuneate, acutely serrate. *Peduncle* terminal in bud, then apparently supra-axillary or inserted on the petiole of the upper leaf. *Flowers* 1-1½ in. diam. *Sepals* very deciduous. *Petals* 6, sometimes 4 (*Royle*), obovate-oblong. *Berry* 1-2 in., ellipsoid, red, edible.

ORDER VII. **NYMPHÆACEÆ.** (By Hooker f. & Thomson.)

Aquatic perennial herbs. *Leaves* usually floating, often peltate, margins involute in veneration. *Scapes* 1-flowered, naked. *Floral-whorls* all free, hypogynous or adnate to a fleshy disk that surrounds or envelops the carpels. *Sepals* 3-5. *Petals* 3-5, or many. *Stamens* many. *Carpels* 3 or more in one whorl, free or connate or irregularly sunk in pits of the disk; stigmas as many as carpels, peltate or decurrent; ovules few, or many and scattered over the walls of the cells, anatropous or orthotropous. *Fruit* formed of the connate carpels, or of separate and indehiscent carpels, or of the enlarged turbinate flat-topped disk with the nut-like carpels sunk in its crown. *Seeds* naked or arilled; albumen floury or 0; embryo enclosed in the enlarged amniotic sac.—**DISTRIB.** Temperate and tropical; genera 8, species 30-40.

SUBORDER I. **Cabombeæ.** *Sepals* and *petals* 3 each, free. *Carpels* free. *Ovules* few. *Seeds* albuminous.

1. BRASENIA.

SUBORDER II. **Nymphææ.** *Sepals* 4-6. *Petals* and *stamens* indefinite. *Carpels* confluent with one another or with the disk into one ovary. *Ovules* many. *Seeds* albuminous.

Sepals, *petals* and *stamens* ½-superior, inserted on the disk, which is confluent with the carpels

2. NYMPHÆA.

Sepals inferior; *petals* superior; *carpels* sunk in the torus . . .

3. BARCLAYA.

Sepals, *petals* and *stamens* superior. *Carpels* sunk in the torus . . .

4. EURYALE.

SUBORDER III. **Nelumbiææ.** *Sepals* 4-5. *Petals* and *stamens* indefinite. *Carpels* irregularly scattered, sunk in pits of the turbinate disk. *Ovules* 1-2. *Seed* exalbuminous.

5. NELUMBium.

1. **BRASENIA**, Schreber.

A slender aquatic, with a creeping rootstock. *Stem* branched. *Leaves* alternate, peltate, floating; petioles and peduncles clothed with mucus. *Flower* red, peduncles axillary. *Sepals* 3. *Petals* 3, linear. *Stamens* 12-18; anthers linear, slits lateral. *Disk* small. *Ovaries* 6-18, cylindric; stigma dilated, villous; ovules 2-3, pendulous from the walls of the ovary. *Carpels* coriaceous, indehiscent. *Seeds* albuminous.

1. **B. peltata**, *Pursh.*; leaves elliptic-oblong, peduncles pubescent. *H. f. & T. Fl. Ind.* i. 246. *Hydropeltis purpurea*, *Richard*; *DC. Prodr.* 112; *Griff. Itin. Notes*, 160.

BHOTAN near Punaka, alt. 6000 ft., *Griffith*; KHASIA HILLS near Nonkreem, alt. 4500 ft., *H. f. & T.*—**DISTRIB.** Eastern N. America; Eastern Australia.

Leaves 2-4 in. *Flowers* 1 in. diam. *Sepals* pubescent. *Petals* rose-red.

2. **NYMPHÆA**, L.

Large herbs; rootstock creeping. *Flowers* expanded, large, floating on long radical scapes. *Sepals* 4, adnate to the base of the disk. *Petals* in many series, inner successively transformed into stamens, all adnate to the disk. *Filaments* petaloid; anthers small, linear, slits introrse. *Ovaries* many, in 1 series, sunk in the fleshy disk and with it forming a many-celled ovary crowned by the connate radiating furrowed stigmas; ovules many, anatropous. *Fruit* a spongy berry ripening under water. *Seeds* minute, buried in pulp, enclosed in a sac-like fleshy aril.—**DISTRIB.** Species 20; most temperate and tropical regions.

1. **N. alba**, Linn.; leaves cordate quite entire, flowers white, anthers without appendages, stigmatic rays about 16 with cylindric appendages. *H. f. & T. Fl. Ind.* 241.

KASHMIR LAKE, alt. 5300 ft.—**DISTRIB.** Europe, Siberia.

Leaves 5–10 in. diam., suborbiculate, lobes contiguous. *Sepals* linear or ovate-oblong, nerves reticulate. *Petals* about 10, outer linear-oblong, equalling the sepals. *Pollen* echinulate. *Seeds* minute, striate and punctate.

VAR. *Kashmiriana*, *H. f. & T. l.c.*; ovaries pubescent or villous. *N. Cachemeriana*, Cambess. in *Jacq. Voy. Bot.* ii. t. 10; *N. alba*, var. *Kosteletzkyi*, *Planch. in Ann. Sc. Nat. Sér.* 3, xix. 33.—Kashmir, *Jacquemont*.

2. **N. Lotus**, Linn.; leaves sharply sinuate-toothed, flowers white rose or red, sepals obtuse ribbed, anthers without appendages, stigmatic rays with clubbed appendages. *H. f. & T. Fl. Ind.* 241. *N. rubra*, *Roxb. Fl. Ind.* ii. 576; *W. & A. Prodr.* 17; *Wight Ill.* i. t. 10; *Wall. Cat.* 7255. *N. Devoniensis*, *Hook. Bot. Mag.* t. 4665. *N. edulis*, *DC.*; *Roxb. Fl. Ind.* ii. 578; *Wall. Cat.* 7254.

Common throughout the warmer parts of India.—**DISTRIB.** Africa, Hungary, Java, Philippine Islands.

Leaves 6–12 in. broad; young sagittate. *Flowers* 2–10 in. broad, very variable in colour. *Sepals* oblong, 5–10-ribbed. *Petals* linear or ovate-oblong. *Filaments* broadly dilated at the base; pollen smooth. *Seeds* broadly ellipsoid, rough.

VAR. *pubescens*, *H. f. & T. Fl. Ind.* 241; leaves puberulous or pubescent beneath, flowers smaller. *N. pubescens*, *Willd.*; *W. & A. Prodr.* 17 and 447; *Wall. Cat.* 7256; *N. sagittata*, *Edgew. in Trans. Linn. Soc.* xx. 29.

3. **N. stellata**, *Willd.*; leaves quite entire or obtusely sinuate-toothed, flowers variously coloured, petals acute or taper-pointed, anthers with long appendages, stigmatic rays terminating in short horns without appendages. *H. f. & T. Fl. Ind.* i. 243.

Common throughout the warmer parts of India.—**DISTRIB.** Africa.

Leaves orbicular or elliptic, often blotched with purple beneath, lobes acute or obtuse. *Flowers* 1–10 in. diam., blue, white, rose, or purple, slightly odorous. *Sepals* many-veined, not ribbed, often streaked with fine short purple lines. *Petals* 10–30, linear-oblong or lanceolate. *Stamens* 10–50; pollen smooth. *Stigmatic rays* 10–30. *Seeds* substrate.

VAR. 1. *cyanea*, *H. f. & T. l.c.*; flowers medium-sized blue scarcely odorous.—*N. cyanea*, *Roxb. Fl. Ind.* iii. 577; *W. & A. Prodr.* i. 17; *Wall. Cat.* 7253, *A. D.* *N. stellata* β , *Bot. Mag.* t. 2058.

VAR. 2. *parviflora*, *H. f. & T. l.c.*; flowers usually smaller blue.—*N. stellata*, *Willd.*; *W. & A. Prodr.* i. 17; *Wall. Cat.* 7253, *C & E.*

VAR. 3. *versicolor*, *H. f. & T. l.c.*; flowers larger white blue purple or flesh-coloured, stamens very many.—*N. versicolor*, *Roxb. Hort. Beng.* 41; *Fl. Ind.* ii. 577; *Bot. Mag.* t. 1189; *Wall. Cat.* 7257. *N. punctata*, *Edgew. in Trans. Linn. Soc.* xx. 29. *N. Edgeworthii* and *N. Hookeriana*, *Lehm. der Gatt. Nymph.* 7 and 21.

4. **N. pygmæa**, Aiton; very small, leaves oblong-orbicular or quite entire, lobes acute, flowers white, stamens without appendages, stigmatic rays 4-8 broad ovate spoon-shaped. *Bot. Mag.* t. 1525; *H. f. & T. Fl. Ind.* 244.

KHASIA HILLS, Jenkins, in marshes at Nonkreem, alt. 5600 ft., *H. f. & T.*—DISTRIB. Siberia, N. China.

Rootstock woolly with soft black hairs. *Leaves* 1-2 in. long, lobes diverging. *Flowers* $1\frac{1}{2}$ -2 in. diam. *Calyx* base square; sepals 4, obtuse. *Petals* about 10, obtuse. *Stamens* 3-4-seriate; pollen subgranular.

3. **BARCLAYA**, Wallich.

An aquatic herb; rootstock short, villous. *Leaves* linear-oblong, hastate, floating. *Peduncles* extra-axillary. *Flowers* red or purplish. *Sepals* 5, inserted at the base of the ovary. *Petals* numerous, 3-seriate, united into a tube that is confluent with the carpels. *Stamens* many-seriate, inserted on a ring within the corolla-tube; anthers pendulous from recurved filaments, outer imperfect. *Ovaries* about 10, confluent, top conical; styles conniving into a 10-rayed cone, stigmatiferous within; ovules many, orthotropous, parietally scattered. *Berry* globose, pulpy, crowned with the corolla-tube and annular torus. *Seeds* spheric, echinate, albumen floury; embryo minute.

1. **B. longifolia**, Wall. in *Trans. Linn. Soc.* xv. 442, t. 18; *Hook. Ic. Pl.* t. 809, 810; *Griff. Notul.* 218, t. 57; *H. f. & T. Fl. Ind.* 246.

BIRMA and from PEGU to MERGUI.

Leaves 6-8 by $1-1\frac{1}{2}$ in., membranous, smooth or pubescent beneath; petiole as long, slender. *Flowers* $\frac{1}{2}$ - $1\frac{1}{2}$ in. long, dull green outside, red or purple within, inodorous. *Fruit* as large as a cherry.

4. **EURYALE**, Salisb.

A densely prickly aquatic; rootstock thick. *Leaves* orbicular, corrugate. *Flowers* violet, partially submerged. *Sepals* 4, erect, inserted on the edge of the torus above the carpels. *Petals* numerous, 3-5-seriate, shorter than the petals. *Stamens* many, many-seriate, fascicled in eights; filaments linear; pollen spheric, 3-nucleate. *Ovary* 8-celled, sunk in the dilated top of the torus; stigma discoid, depressed, concave; ovules few, parietal. *Berry* spongy, crowned with the persistent sepals. *Seeds* 8-20, aril pulpy; testa thick, black, albumen mealy, embryo small.

1. **E. ferox**, Salisb.; *Roxb. Cor. Plant.* iii. t. 244; *Bot. Mag.* t. 1447; *H. f. & T. Fl. Ind.* 245. *E. indica* and *E. ferox*, *Planch. Etudes Nymph.* 29. *Anneslia spinosa*, *Roxb. Fl. Ind.* ii. 573.

OUDE; JHEELS of EASTERN BENGAL, and KASHMIR LAKE.—DISTRIB. China.

Rootstock short. *Leaves* 1-4 ft. diam., elliptic or orbicular, green above, downy and red or purple beneath, with strong spiny ribs. *Flowers* 1-2 in. long, bright red inside, green and shining outside. *Berry* 2-4 in. diam. *Seeds* from a pea to a cherry in size, much eaten roasted.

5. **NELUMBium**, Juss.

An erect large, water herb with milky juice; rootstock stout, creeping. *Leaves* raised high above the water, peltate. *Flowers* rose-red white or yellow. *Sepals* 4-5, inserted on the top of the scape, caducous. *Petals* and stamens many, hypogynous, many-seriate, caducous. *Anthers* with a clubbed

appendage. *Ovaries* many, 1-celled, sunk in the flat top of an obconic fleshy torus, attachment lateral; style very short, exserted, stigma terminal, dilated; ovules 1-2, pendulous. *Carpels* ovoid, loose in the cavities of the enlarged spongy torus; pericarp bony, smooth. *Seed* filling the carpel, testa spongy, albumen 0; cotyledons fleshy, thick, enclosing the large folded plumule.—**DISTRIB.** Species 2, one Asiatic and Australian; the other W. Indian.

1. **N. speciosum**, Willd.; *Wight & Arn. Prodr.* i. 16; *Roxb. Fl. Ind.* 647; *Wight Ill.* i. t. 9; *H. f. & T. Fl. Ind.* 247. *N. asiaticum*, *Rich. in Ann. Mus.* xvii. 249, t. 9. *Nelumbo Indica*, *Poir. Encycl.* iv. 453. *Cyamus Nelumbo*, *Smith Exot. Bot.* i. 59, t. 31, 32. *C. mysticus*, *Salisb. Ann. Bot.* ii. 75. *Nymphæa Nelumbo*, *Linn.*

Throughout India, extending as far to the N.W. as KASHMIR.—**DISTRIB.** Persia, Malay Islands, China, Japan, Tropical Australia.

Peduncles and *petioles* 3-6 ft. high, full of spiral vessels, smooth or with small scattered prickles. *Leaves* 2-3 ft. diam., membranous, glaucous, cupped. *Flowers* 4-10 in. diam., white or rose. *Petals* elliptic, concave, veined. *Fruiting torus* 2-4 in. diam. *Ripe carpels* from the size of a pea to a small cherry.

ORDER VIII. PAPAVERACEÆ. (By Hooker f. & Thomson.)

Annual or perennial herbs; juice usually milky or coloured. *Leaves* radical or alternate, stipules 0. *Flowers* often large, nodding in bud, regular, hermaphrodite; perianth and stamens very caducous. *Sepals* 2, hypogynous, concave. *Petals* 4, 2-seriate, large, crumpled. *Stamens* very many, filaments slender; anthers erect, slits lateral. *Ovary* 1-celled, or 2-4-celled by the produced placentas; style short or 0; stigmas radiating, connate and opposite the placentas, or free and alternating with them; ovules many-seriate, parietal, anatropous. *Carpels* dehiscent by pores or valves. *Seeds* many, small, albumen oily and fleshy; embryo minute, 2-lobed or 2-fid.—**DISTRIB.** About 17 genera and 65 species, chiefly natives of the N. Temp. Zone.

The European genera *Glaucium* and *Ramaria*, both natives of Afghanistan, have not been found in the British possessions.

* Capsule usually short, opening by short valves or pores.

Stigmas 4 or more, radiating on a sessile disk	1. PAPAVER.
Stigmas 4-6, radiating from the top of a depressed style	1.* ARGEMONE.
Stigmas 4-6, decurrent on the top of the style	2. MECONOPSIS.

** Capsule short or long, dehiscent throughout its length.

Ovary 1-celled; stigma sessile, 4-6-lobed	3. CATHARTIA.
Ovary 1-celled; style erect, stigma 2-4-lobed	4. STYLOPHORUM.

1. PAPAVER, Linn.

Annual or perennial herbs, juice milky. *Leaves* lobed or cut. *Flowers* on long peduncles. *Ovary* 1-celled; stigma discoid or pyramidal with radiating lobes opposite the placentas which project into the cell. *Capsule* short, opening by small valves under the lobes of the persistent stigma. *Seeds* small, pitted.—**DISTRIB.** Species about 12, temp. Europe and Asia, with an Australian and a S. African representative.

1. **P. nudicaule**, *L.*; perennial, hairy, flowers orange-yellow, capsule obovoid hispid. *H. f. & T. Fl. Ind.* 249.

WESTERN TIBET, alt. 16–17,000 ft., *T. T.*, &c.—DISTRIB. Afghanistan, Mts. of Central and Northern Europe, N. Asia, Arctic regions.

Rootstock scaly. *Leaves* 2–4 in., all radical, obovate or oblong, pinnatifid; lobes linear-oblong, hairy. *Scapes* several, 4–12 in. *Flowers* 2–3 in. diam. *Sepals* densely hairy.

2. **P. hybridum**, *L.*; leaves 2–3-pinnatifid sparingly hispid, filaments dilated upwards, capsule subglobose hispid, stigma convex rays 4–8.

PUNJAB near Peshawur, *Vicary*; JELAM valley, *Jacquemont*.—DISTRIB. Afghanistan, W. Asia, N. Africa, Europe.

Annual, sparingly branched, 10–18 in. *Leaves* more or less cut into linear awned segments; radical petioled, cauline sessile. *Flower* 1–2 in. diam., scarlet, with a black disk. *Sepals* hairy, obtuse. *Capsule* $\frac{1}{2}$ in. long. *Stigmatic rays* reaching or exceeding the edge of the disk.

3. **P. Rhœas**, *L.*; leaves 1–2-pinnatifid, filaments filiform, capsule subglobose glabrous, stigma convex rays 8–12.

KASHMIR, *Falconer*, &c.—Europe, W. Asia, N. Africa.

Annual, branched, hispid, 1–2 ft. *Leaf-lobes* more or less cut, ascending, awned. *Scapes* with spreading or appressed hairs. *Flowers* 3–4 in. diam., scarlet; pairs of petals unequal. *Stigmatic rays* overlapping. *Capsule* stalked.

4. **P. dubium**, *L.*; leaves 1–2-pinnatifid, filaments filiform, capsule obovoid glabrous, stigma 6–12-rayed. *H. f. & T. Fl. Ind.* 250. *P. glabrum*, *Royle Ill.* 67.

WESTERN HIMALAYA from Garwhal to Hazara, in cornfields.—DISTRIB. Afghanistan, Europe, W. Asia.

Habit of *P. Rhœas*, but often glabrous, and leaf segments usually narrower; hairs of scape appressed. *Petals* scarlet, in unequal pairs. *Capsule* sessile.

P. SOMNIFERUM, *L.*; leaves oblong amplexicaul lobed toothed and serrate, filaments slightly dilated, capsule globose, glabrous, stigmatic rays 5–12. *Roxb. Fl. Ind.* ii. 571; *W. & A. Prodr.* 17; *Wall. Cat.* 8118; *H. f. & T. Fl. Ind.* 250. *P. amœnum*, *Lindl. in Bot. Reg.* xxv. *Misc.* 56.

Cultivated throughout India.—DISTRIB. Cultivated in temp. and warm regions of Europe, Asia, and N. Africa.

Annual, 2–4 ft., glaucous, simple, rarely branched, usually quite glabrous. *Leaves* ovate-oblong or linear-oblong. *Flower* large, white purple or scarlet. *Sepals* glabrous. *Capsule* 1 in. diam., stalked. *Seeds* white or black.—*Opium poppy*.

P. orientale, *L.*, and *P. Argemone*, *L.*, are common garden plants in India.

1.* ARGEMONE, Linn.

An erect prickly annual; juice yellow. *Flowers* bright yellow. *Sepals* 2–3. *Petals* 4–6. *Stamens* indefinite. *Ovary* 1-celled; style very short, stigma 4–7-lobed; ovules many, on 4–7 parietal placentas. *Capsule* short, dehiscing at the top by short valves, that alternate with the stigmas and placentas. *Seeds* many.—DISTRIB. A small American genus, of which the following species is naturalized throughout India.

**A. MEXICANA*, *L.*; leaves sessile $\frac{1}{2}$ -amplexicaul sinuate-pinnatifid variegated green and white. *Roxb. Fl. Ind.* ii. 571; *W. & A. Prodr.* i. 18; *Wight Ill.* t. 11; *Wall. Cat.* 8126; *H. f. & T. Fl. Ind.* 251.

By roadsides and in fields throughout India.

A robust herb, sometimes half-woody below, 2-4 ft., with spreading branches. *Leaves* 3-7 in. *Flowers* 1-3 in. diam. *Sepals* horned at the top. *Capsule* $\frac{3}{4}$ -1 $\frac{1}{2}$ in. long, terete, usually bristly, elliptic or oblong.

2. **MECONOPSIS**, Viguier.

Perennial herbs; juice yellow. *Leaves* entire or lobed. *Flowers* solitary or racemed, large, blue yellow or purple. *Sepals* 2. *Petals* 4. *Ovary* 1-celled; style distinct, stigmatic lobes radiating on its clubbed extremity. *Capsule* ovoid or elongate, with short valves below the persistent style. *Seeds* many, small, rugose.—**DISTRIB.** Mountains of the N. hemisphere; species about 10.

* *Scapes* radical, 1-flowered.

1. **M. simplicifolia**, *H. f. & T. Fl. Ind.* 252; softly hairy, leaves lanceolate entire or few-toothed. *Hook. f. Ill. Him. Pl.* t. 8. *Papaver simplicifolium*, *Don Prodr.* 196; *Wall. Cat.* 8125.

SUBALPINE HIMALAYA, Nipal, *Wallich*; Sikkim, alt. 12-14,000 ft., *H. f.*

Root stout, fusiform; neck villous. *Leaves* many, 2-3 in., tapering into a petiole. *Scapes* stout, clothed with deflexed hairs. *Flowers* 2-3 in. diam., blue-purple. *Sepals* hispid. *Ovary* cylindric; style $\frac{1}{4}$ in., stigmas 5-8. *Capsule* 2 in., linear-oblong, covered with deciduous hairs.

2. **M. horridula**, *H. f. & T. Fl. Ind.* 252; prickly, leaves lanceolate subentire.

SIKKIM HIMALAYA, alt. 14-17,000 ft., *H. f.*

Stem 0, or short. *Leaves* 3-5 in., obtuse or acute. *Scapes* 4-8 in., many, rigid, erect, densely prickly. *Flowers* 1 $\frac{1}{2}$ in. diam., blue-purple. *Sepals* bristly. *Capsule* $\frac{1}{2}$ -1 in., prickly, obovate or oblong; style $\frac{1}{4}$ in., stigma conical.—Possibly a state of *M. aculeata*. In abnormal flowers the petals are sometimes many and linear.

** *Stems* leafy. *Flowers* racemed or paniced.

3. **M. aculeata**, *Royle Ill.* 67, t. 15; prickly, leaves irregularly pinnatifid, flowers blue-purple, capsules short prickly and bristly. *Wall. Cat.* 8122; *H. f. & T. Fl. Ind.* 253; *Hook. Bot. Mag.* t. 5456. *M. Gul. Walde-mani*, *Klotzsch. Reis. Pr. Wald.* t. 36.

WESTERN HIMALAYA, from Kashmir to Kumaon; alt. 11-15,000 ft.

Stem 1-2 ft., smooth, except the short scattered prickles. *Leaves* 4-8 in., oblong or lanceolate, long-petioled; cauline sessile. *Flowers* 2-3 in. diam.; pedicels slender, prickly in fruit. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in., densely prickly, obconic-obovate or oblong; style half as long.

4. **M. robusta**, *H. f. & T. Fl. Ind.* 253; glaucous, sparsely hairy, leaves pinnatifid, capsule linear-oblong 7-8-valved clothed with spreading bristles. *Wall. Cat.* 8121, 8124.

TEMPERATE HIMALAYA, alt. 8-10,000 ft.; from Nipal, *Wallich*, to Kumaon.

Stem 4-6 ft. *Leaves* 8-14 in., pinnate, lobes pinnatifid, long-petioled, cauline sessile. *Flowers* 2-3 in. diam., colour unknown, in subracemose panicles; pedicels 3-4 in., densely clothed with reflexed bristles under the flower, elongating in fruit. *Sepals* bristly. *Capsule* 1 $\frac{1}{2}$ in., densely bristly, at length glabrous; style slender.

5. **M. nipalensis**, *DC. Prodr.* i. 121; stellately pubescent and laxly hairy, leaves sinuate-lobed or pinnatifid, flowers golden yellow, sepals

setose, capsule obovate-oblong 8-10-valved. *Wall. Cat.* 8123 A; *H. f. & T. Fl. Ind.* 253; *H. f. Ill. Him. Pl.* t. 9. *Papaver paniculatum*, *Don Prodr.* 197.

TEMPERATE HIMALAYA, alt. 10-12,000 ft.; Nipal, *Wallich*, Sikkim, *H. f.*

Stem 3-5 ft., stout, erect, nearly simple; young parts clothed with soft golden villous hairs. *Leaves* 10-16 in., oblong or lanceolate, softly pubescent when young. *Flowers* 2-3½ in. diam., in elongated nearly simple racemes. *Sepals* densely tomentose and bristly. *Capsule* 1½-2 in., clothed with appressed hairs and stellate down; style ½ in.

6. **M. Wallichii**, *Hook. Bot. Mag.* t. 4668; slender, stellately pubescent and softly hairy, leaves pinnatifid, flowers much paniced purple, sepals not setose, capsule elliptic-oblong 5-valved. *Wall. Cat.* 8123 B; *H. f. & T. Fl. Ind.* 254.

TEMPERATE HIMALAYA, alt. 9-10,000 ft.; in Nipal, *Wallich*, and Sikkim, *H. f.*

Stem 4-6 ft., branched. *Leaves* 8-12 in., oblong or obovate-lanceolate, glaucous beneath; long-petioled. *Flowers* 1½-2 in. diam., many; pedicels short. *Sepals* densely pubescent. *Capsule* 1 in., elliptic-oblong, 5-valved, densely bristly.—There is much confusion in the Wallichian Herbarium amongst the specimens of the three last species (which are included in his numbers 8123, 8124 and 8125), and which we suspect may be reduced to two; and we are further not sure to which *Don's Papaver paniculatum* belongs.

3. **CATHCARTIA**, Hook. f.

A perennial softly hairy herb; juice yellow. *Leaves* long-petioled, cordate, lobed. *Flowers* racemed, golden-yellow. *Sepals* 2. *Petals* 4. *Ovary* 1-celled; stigma sessile, 4-6-lobed; ovules many, on 4-6 parietal placentas. *Capsule* cylindric, dehiscing throughout its length by valves between the placentas which remain attached to the persistent stigma. *Seeds* strophiole.

1. **C. villosa**, *Hook. f. in Bot. Mag.* t. 4596; *H. f. & T. Fl. Ind.* 254.

SIKKIM HIMALAYA, alt. 10-12,000 ft., *H. f.*

Stem 10-18 in., sparingly branched. *Leaves* 1-3 in. diam., long-petioled; 3-5-lobed, lobes variously cut; cauline shorter petioled and less divided, uppermost sessile. *Flowers* few, 2-3 in. diam., in few-flowered racemes; pedicels slender, curved. *Capsules* 2-3 in., slender, erect, valves membranous.

4. **STYLOPHORUM**, Nuttall.

Perennial herbs; juice yellow. *Leaves* pinnatifid. *Flowers* yellow or red. *Sepals* 2. *Petals* 4. *Ovary* 1-celled; style erect, stigmas 2-4, ascending, papillose on the inner surface; ovules many, on 2-4 parietal placentas. *Capsule* ovoid-oblong or linear, dehiscing by 2-4 valves between the placentas which remain attached to the persistent stigmas.—DISTRIB. Species 4-5, temperate European and Asiatic.

1. **S. lactucoides**, *Benth. & Hook. f. Gen. Pl.* 53; laxly hairy, leaves runcinate pinnatifid, flowers yellow. *Dicranostigma lactucoides*, *H. f. & T. Fl. Ind.* 255.

Inner ranges of the GARWHAL HIMALAYA, alt. 11,000 ft., *Strach. & Wintero.*

Rootstock stout, woody. *Stem* 6-10 in. *Leaves* numerous, 3-5 in., glaucous beneath, segments broad ovate, hairy on both surfaces; petiole winged; cauline sessile. *Scapes* 3-4, slender. *Flowers* few, 2 in. diam., pedicels slender. *Sepals* pilose, tips horned.

ORDER IX. **FUMARIACEÆ.**

Annual or perennial herbs; juice watery. *Leaves* usually divided, segments not jointed. *Flowers* small, racemed, irregular, hermaphrodite. *Sepals* 2, small, scale-like, deciduous. *Petals* 4, in usually very dissimilar pairs; 2 outer larger, one or both gibbous or spurred; 2 inner smaller, erect, tips often coherent. *Stamens* 6, in 2 bundles (4, free in *Hypecoum*), opposite the outer petals; anther of central stamen in each bundle 2-celled, of lateral 1-celled. *Ovary* 1-celled; style long or short, stigma obtuse or lobed; ovules 2 or more, amphitropous, parietal. *Fruit* a 2-valved, many-seeded capsule, or an indehiscent 1-seeded nut. *Seeds* albuminous, raphe sometimes appendaged; embryo minute.—**DISTRIB.** Genera 7; species about 100, natives of the temp. and warm regions of the N. hemisphere.

Stamens 4, free	1. HYPECOUM.
Stamens 6, diadelphous.	
Outer petals both spurred; capsule many-seeded	2. DICENTRA.
One outer petal spurred; capsule many-seeded	3. CORYDALIS.
One outer petal spurred; fruit indehiscent, nut 1-seeded	4. FUMARIA.

1. HYPECOUM, Tournefort.

Low annual glaucous herbs. *Leaves* pinnatisect. *Flowers* yellow white or purplish. *Sepals* 2, small. *Petals* 4, spreading, 2 outer flat or slightly concave, obovate, obtuse or obtusely 3-toothed; 2 inner 3-lobed, midlobe concave. *Stamens* 4, free, opposite the petals, with sometimes a stalked gland at the base of each; anthers 2-celled. *Ovary* 1-celled, septate within; style short, stigmas 2, glandular at the tips; ovules many, on 2 parietal placentas. *Capsule* slender, transversely septate within, breaking up into joints or longitudinally 2-valved. *Seeds* compressed.—**DISTRIB.** Species 4-5; natives of the Mediterranean region and temperate Asia.

1. **H. procumbens, Linn.**; leaves 2-3-pinnatisect, flowers yellow, outer petals 3-lobed, midlobe of inner toothed or fimbriate. *H. f. & T. Fl. Ind.* 275.

Drier parts of the PUNJAB, Peshawur, *Vicary*; Mooltan, *Edgeworth*; Salt Range, *Fleming*, &c.—**DISTRIB.** W. Asia, Mediterranean region.

Stems many, procumbent, 3-12 in., slender. *Leaves* 2-4 in., segments linear or oblong, cut; upper sessile, whorled. *Flowers* few, $\frac{1}{2}$ in. diam., pedicelled. *Inner petals* with the lateral segments linear-oblong, obtuse, midlobe entire retuse or 2-fid. *Fruit* $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., $\frac{1}{2}$ in. broad, curved, subcompressed, at length breaking up into 1-seeded joints.

2. **H. leptocarpum, H. f. & T. Fl. Ind.** 276; leaves 2-pinnatisect, flowers pale purple, outer petals obtuse, midlobe of inner oblong cucullate.

Sandy soil in WEST TIBET, alt. 9-12,000 ft., *T. T.*; interior of the SIKKIM HIMALAYA, alt. 12-14,000 ft., *H. f.*

Stems many, procumbent, 6-12 in., much branched. *Leaves* many, 2-4 in., pinnæ $\frac{1}{2}$ in., distant; pinnules oblong, sharply cut; uppermost linear, whorled. *Flowers* $\frac{1}{2}$ - $\frac{1}{4}$ in. diam., pedicels slender. *Inner petals* lobed almost to the middle. *Fruit* $\frac{1}{2}$ in., very slender, breaking up into 1-seeded joints.

2. DICENTRA, Borkhaus.

Glabrous, perennial rooted, climbing, slender herbs. *Leaves* decomposed, petiole ending in a branched tendril. *Flowers* yellow or purple, in leaf-opposed

pendulous racemes or corymbs. *Sepals* 2, small. *Petals* 4, connivent; 2 outer oblong, concave, base saccate; 2 inner clawed, tips cohering, keeled. *Stamens* 6, diadelphous from the base or from above the middle; mid-anther of each bundle 2-celled, lateral 1-celled. *Ovary* 1-celled; style filiform, stigma 2-lobed; ovules many, on 2 parietal placentas. *Capsule* dehiscent by 2 membranous (rarely fleshy) longitudinal valves, which leave the seed-bearing placentas attached to the stigma. *Seeds* small, beaked, arillate or not.—**DISTRIB.** Several species, natives of temp. N. Asia and N. America.

1. **D. torulosa**, *H. f. & T. Fl. Ind.* 272; peduncles 6–8-flowered corymbose or subumbellate, bracts fimbriate, capsule narrow torulose, seeds opaque.

KHASIA HILLS, alt. 4–6000 ft., *Griffith*, &c.

Stem 8–10 ft. *Leaf-segments* $\frac{1}{2}$ –1 in., ovate to linear-lanceolate. *Flowers* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, golden-yellow; pedicels $\frac{1}{2}$ in.; bracts as long, membranous, linear. *Filaments* with a short basal spur. *Capsule* $1\frac{1}{2}$ –3 in., linear. *Seeds* 1-seriate, granulate; aril 2-lobed.

2. **D. Roylei**, *H. f. & T. Fl. Ind.* 273; peduncles 2–4-flowered, bracts lanceolate, capsule narrow not torulose, seeds shining.

TEMPERATE HIMALAYA, alt. 5–6000 ft., from Bhotan *Griffith*, to Simla, *Lady Dalhousie*. KHASIA HILLS, *Griffith*, &c.

Similar to *D. torulosa*, but more slender, 2–4 ft. *Flowers* $\frac{3}{4}$ –1 in. long, yellow, sometimes tinged purple; pedicels $\frac{1}{2}$ –1 in., longer than the lanceolate membranous bracts. *Capsule* 1– $1\frac{1}{2}$ by $\frac{1}{5}$ in. *Seeds* 2-seriate, black; aril small.

3. **D. scandens**, *Walp. Rep.* i. 118; peduncles 8–12-flowered, bracts very small, capsule membranous lanceolate, seeds smooth shining. *H. f. & T. Fl. Ind.* 273. *Macrocapnos scandens*, *Royle*. *Dielytra scandens*, *Don Prodr.* 198.

TEMPERATE HIMALAYA; alt. 5–6000 ft., from Nipal, *Wallich*, to Garwhal, *Edgeworth*.

Stem slender, flexuous, angled. *Leaves* alternate, segments $\frac{1}{2}$ –1 in., oval oblong or orbicular. *Flowers* $\frac{3}{4}$ –1 in. long, yellow or purple; peduncle 2–3 in., slender, often leafy; pedicels $\frac{1}{2}$ –1 in.; bracts linear. *Capsule* 1– $1\frac{1}{4}$ in., acute at both ends, style $\frac{1}{2}$ – $\frac{3}{4}$ in., valves membranous. *Seeds* finely granulate at the back.

4. **D. thalictrifolia**, *H. f. & T. Fl. Ind.* 273; peduncle 8–12-flowered, bracts very small, capsule fleshy ovate-cordate, seeds granulate. *Dactylicapnos thalictrifolia*, *Wall. Tent.* 51, t. 89; *Cat.* 1426; *Sweet Brit. Fl. Gard. Ser.* 2, t. 127.

TEMPERATE HIMALAYA, alt. 4–8000 ft., from Nipal, *Wallich*, to Bhotan, *Griffith*; KHASIA HILLS at the Kala Pani Bungalow, alt. 5000 ft., *H. f. & T.*

Very similar to *D. scandens* and possibly not distinct specifically, but the capsule is broader, $\frac{3}{4}$ in. long, thick, fleshy, very tardily dehiscent, the style is stouter, and the seeds finely granulate near the hilum and coarsely so on the back.—It is common in Sikkim, and the pods are drier and most dehiscent at higher elevations.

3. CORYDALIS, DC.

Erect or prostrate herbs, usually perennial rooted. *Leaves* lobed or cut, upper sometimes opposite. *Flowers* racemed, rarely subumbellate, small, white blue yellow or purple. *Sepals* 2, small. *Petals* 4, erect, or conniving; 2 outer dissimilar, anterior flat or concave, posterior gibbous or spurred at the base; 2 inner clawed, tips free or cohering, keeled. *Stamens* 6, diadelphous; posterior bundle with a basal spur enclosed in the petal-spur; mid-anther of each bundle 2-celled, lateral 1-celled. *Ovary* 1-celled; style fili-

form, stigmas 2 minute or dilated; ovules 2 or more, on 2 parietal placentas. *Capsule* ovoid oblong elliptic or linear, valves 2 membranous leaving the seed-bearing placentas attached to the style. *Seeds* small, beaked, aril fleshy or 0.—**DISTRIB.** Species about 70, temp. European and Asiatic, with a few N. American and Cape species.

SECT. I. Erect leafy branched fibrous-rooted herbs. *Capsule* narrow linear. *Seeds* 1-seriate.

1. ***C. ophiocarpa***, *H. f. & T. Fl. Ind.* 259; leaves 2-pinnatisect, racemes lax many-flowered terminal and leaf-opposed, posticous petal equaling or exceeding the broad obtuse spur tip flat obcordate, antieous linear concave, capsule tortuous.

Moist valleys of the SIKKIM-HIMALAYA, alt. 9000 ft., *H. f.*

Stem 2-3 ft., slender, branched. *Leaves* 4-8 in., glaucous beneath, pinnæ 1-2 in., pinnules obovate-oblong, segments obtuse, mucronate, glaucous beneath. *Flowers* yellow; bracts minute, subulate, entire. *Sepals* orbicular, fimbriate. *Posticous petal* curved; lateral united below the tip. *Style* slender, equalling the many-ovuled ovary. *Capsule* 1 in. *Seeds* small, black, shining, punctate; funicle thickened.

2. ***C. flaccida***, *H. f. & T. Fl. Ind.* 260; tall, leaves 3-4 pinnatisect, racemes terminal and axillary many-flowered, posticous petal twice as long as the curved conical spur, tip spathulate 2-lobed, pod straight.

Moist valleys of the SIKKIM-HIMALAYA, alt. 11-12,000 ft., *H. f.*

Stem 2-3 ft., stout, erect, branched. *Leaves* 6-12 in., membranous; pinnæ 2 in.; pinnules subsessile, ovate or orbicular, obtuse, not glaucous beneath; lobes rounded, apiculate. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, brown-purple; racemes 2-6 in.; lower bracts leafy, median cut or lobed, upper narrow. *Sepals* ovate, acute, toothed. *Posticous petal* plano-convex, tip rounded winged. *Style* slender, twice as long as the linear ovary. *Capsule* 1-1 $\frac{1}{2}$ in., linear.

3. ***C. leptocarpa***, *H. f. & T. Fl. Ind.* 260; diffuse, leaves 2-ternately pinnatisect, racemes long-peduncled 2-7-flowered leaf-opposed, posticous petal concave acuminate much shorter than the slender curved spur, pod erect straight torulose.

EASTERN HIMALAYA, in Bhotan, *Griffith*; Sikkim, alt. 8000 ft., *H. f.*

Stem 6-12 in., weak, branched, decumbent. *Leaves* 3-6 in., long-petioled, membranous, segments broadly obovate, deeply cut, lobes rounded, glaucous or not beneath. *Flowers* 1-1 $\frac{1}{2}$ in. long, dull purple; bracts obovate or oblong-cuneate, cut. *Sepals* minute, oblong, fimbriate. *Posticous petal* concave, narrow oblong, tip winged; antieous spathulate, acuminate. *Style* slender, half as long as the linear ovary. *Capsule* 1-1 $\frac{1}{2}$ in., narrow linear. *Seeds* 1-seriate, black, shining, smooth; aril broad, 2-lobed.

SECT. II. Root fibrous. Pod short, elliptic obovate lanceolate or subglobose. *Seeds* 2-seriate.

* Root bulbous. or rootstock elongate, stem simple. Radical leaves few or 0; cauline opposite alternate or whorled. Racemes undivided.

4. ***C. rutæfolia***, *Sibth. Flor. Græc.* t. 667; leaves opposite or whorled 2-3-ternately cut, raceme erect 6-12-flowered, bracts entire, outer petals not keeled equalling or shorter than the inflated obtuse spur. *H. f. & T. Fl. Ind.* 262. *C. diphylla*, *Wall. Cat.* 1430; *Tent. Fl. Nep.* 54. *C. pauciflora*, *Edgew. in Trans. Linn. Soc.* xx. 30. *C. longipes*, *Don Prodr.* 198 (not of DC.).

C. *Hamiltoniana*, *Don Syst. Gard.* i. 142. C. *Griffithii*, *Boiss. Diagn. Ser.* 2, No. 1, p. 15; *Griffith. Ic. Pl. Ind. Or.* t. 658, f. 23.

WESTERN HIMALAYA, alt. 6–10,000 ft., from Kumaon to Marri, *Fleming*.—DISTRIB. Mts. of the Levant, W. Asia, and Soongaria.

Rootstock slender. Stem 3–8 in., erect, simple. Leaves 2–3, subsessile; segments small rounded in much-divided leaves, more commonly $\frac{1}{4}$ –1 in., ovate-oblong or linear, entire or lobed, much veined. Flowers $\frac{3}{4}$ –1 in. long, bright purple, tips dark; bracts oblong or lanceolate, veined, shorter than the pedicels. Sepals minute. Style shorter than the oblong ovary; stigma dilated. Capsule $\frac{1}{4}$ in., ovate-oblong.

VAR. 1; posticous petal dilated upwards very obtuse mucronate or emarginate.

VAR. 2; posticous petal narrow concave acute.—C. *verticillaris*, *DC. Prodr.* i. 126.

5. **C. cachemiriana**, *Royle Ill.* 69, t. 16, f. 1; radical leaves palmately 3–5-partite, cauline usually alternate 3–6-partite, flowers subumbellate, lower bracts 3-fid, posticous petal about equalling the curved spur. *H. f. & T. Fl. Ind.* 263.

TEMPERATE AND SUBALPINE HIMALAYA, alt. 9–12,000 ft., from Sikkim, *H. f.*, to Kashmir, *Royle*.

Bulb small, scaly. Stem 2–6 in. Radical leaves long-petioled, early withering; cauline near the top of the stem, subsessile; lobes $\frac{1}{2}$ –1 in., linear, entire. Flowers $\frac{1}{2}$ –1 in. long, bright blue with dark-blue tips; racemes terminal, 3–8-flowered; bracts exceeding the pedicels. Sepals minute. Posticous petal concave, acute or acuminate. Capsule linear-oblong, pendulous or deflexed.

6. **C. polygalina**, *H. f. & T. Fl. Ind.* 263; simple, leaves cauline alternate, pinnate, racemes axillary and terminal 5–10-flowered, lower bracts 3-fid, posticous petal shorter than the straight obtuse cylindric spur.

SIKKIM-HIMALAYA, alt. 14–16,000 ft., *H. f.*

Root and radical leaves unknown. Cauline leaves 1–2 in., subsessile, pinnæ in 5–6 pairs, lower 3–5-partite; segments 1 in., narrow-linear, coriaceous, parallel-veined. Flowers $\frac{3}{4}$ in., yellow with a dark purple spot; pedicels very short; upper bracts lanceolate. Posticous petal vaulted, acute, wing narrow. Capsule $\frac{1}{3}$ – $\frac{1}{2}$ in., oblong.—Allied to *C. rutafolia*, but distinguished by the habit, alternate leaves, axillary racemes, and winged tips of the petals.

7. **C. juncea**, *Wall. Tent. Fl. Nip.* 54, t. 42; *Cat.* 1429; erect, slender, leaflets or leaves few narrow, racemes terminal many-flowered, bracts linear entire, posticous petals longer than the short obtuse spur. *H. f. & T. Fl. Ind.* 264.

TEMPERATE HIMALAYA, alt. 12–14,000 ft.; Nipal, *Wallich*; Sikkim, *H. f.*

Stem 1–1 $\frac{1}{2}$ ft. Leaves $\frac{1}{4}$ –1 in., linear-lanceolate, bract-like. Flowers $\frac{1}{3}$ – $\frac{1}{2}$ in. long, bright yellow with purple tips; racemes 2–3 in.; pedicels $\frac{1}{4}$ – $\frac{3}{8}$ in., slender; bracts half as long. Posticous petal very convex, back broadly winged. Capsules (unripe) $\frac{1}{4}$ in., oblong, in much elongate racemes, pedicels deflexed.

** Root fusiform. Stem or scape simple, rarely divided, leafless or with 1–2 leaves. Leaves chiefly radical. Racemes simple. Spur equalling or exceeding the petals.

8. **C. crithmifolia**, *Royle Ill.* 68; leaves all radical 2–3-pinnatisect, segments narrow or broad, raceme terminal many-flowered, bracts narrow much exceeding the pedicels. *H. f. & T. Fl. Ind.* 264; *Walp. Rep.* i. 120 (as *C. epithymifolia*, by error).

SUBALPINE AND TEMPERATE HIMALAYA, ascending to 14,000 ft., from Garwhal, *Munro*, to Kunawur, *Jacquemont*, &c.

Stem 3–12 in., rather stout, leafless. Leaves 1–4 in. diam., orbicular, pinnæ long-

petioled, segments linear and entire, or broad and cut into narrow lobes; petiole equaling the stem. *Flowers* 1 in. long, pale yellow, tip purple; raceme 1-3 in. long; bracts 1-2 in. *Posticous petal* vaulted, acute, half as long as the slender spur. *Capsules* small, oblong, pedicel recurved.

9. **C. Falconeri**, *H. f. & T.*; erect, radical leaves 2-pinnate cauline 2 opposite, racemes terminal many-flowered lax or dense, bracts linear-lanceolate entire or cut, lowest 3-fid or pinnatifid exceeding the pedicels.

WESTERN TIBET; at Deotsu, *Falconer*.

Rootstock woody, base covered with withered leaf-sheaths. *Stem* 6-15 in., simple. *Radical leaves* few, long-petioled; pinnae 1-2 pair, shortly-petioled; pinnules 3-partite; segments narrow, 3-nerved; cauline leaves above the middle of the stem, sessile or petioled, 2-pinnate, lanceolate, 3-nerved. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, yellow?, with purple tips; racemes 1-2 in. *Posticous petal* vaulted, acute, back winged, equalling the cylindric slightly hooked spur. *Capsule* $\frac{1}{2}$ in., oblong, much longer than the persistent style; pedicel deflexed. *Seeds* black, shiny.

10. **C. elegans**, *Wall. Cat.* 1435; erect or decumbent, radical leaves pinnate cauline low down on the stem, racemes terminal, 6-14-flowered, bracts large cuneate-oblong acuminate equalling or exceeding the pedicels, flowers very broad. *H. f. & T. Fl. Ind.* 265.

WESTERN HIMALAYA, alt. 13-14,000 ft.; from Kumaon, *Blinkworth*, to Deotsu, *Falconer*.

Rootstock stout, woody. *Stem* 6-12 in., simple, base clothed with withered sheaths. *Radical leaves* 3-4 in., petiole as long; pinnae 2-5 pair, 1 in. long, subsessile, orbicular, base cuneate, deeply 5-7-lobed, segments obtuse or mucronate. *Flowers* 1 in. long (yellow with purple tips?). *Posticous petals* very convex, broadly ovate, subacute, back wing very broad, equalling the wide conical very obtuse spur. *Capsules* small, oblong; pedicels spreading or deflexed.—A rare and imperfectly known plant; its flowers are very broad.

11. **C. Govaniana**, *Wall. Tent. Fl. Nip.* 55; *Cat.* 1431; stem stout, radical leaves many oblong 2-pinnatisect cauline 1-2 or 0, racemes terminal dense many-flowered, bracts broadly cuneate exceeding the pedicels cut above the middle. *Royle Ill.* t. 16, f. 2; *H. f. & T. Fl. Ind.* 261.

WESTERN HIMALAYA, alt. 8-12,000 ft.; from Kumaon, *Govan*, to Kashmir, *T. T.*

Rootstock woody, often branched, crowned with withered leaf-sheaths. *Stem* 1-2 ft., as thick as the thumb, almost naked or with 1-2 leaves near the top. *Radical leaves* nearly equalling the stem, long-petioled, pinnules cuneate-lanceolate, cut into linear segments, 2 near the base. *Flowers* 1 in. long, bright yellow; racemes 2-4 in. *Posticous petal* very convex, back wing very broad, limb shorter than the curved slender spur. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in.; style persistent, half its length.

12. **C. tibetica**, *H. f. & T. Fl. Ind.* 265; small, decumbent, glabrous or subpilose, glaucous; radical leaves many pinnatisect, cauline 1 or 0, racemes terminal short 4-12-flowered, bracts lanceolate and entire or ovate-oblong and cut.

WESTERN TIBET; alt. 14-17,000 ft., from Gugi, *Strach. & Wint.*, to Balti, *T. T.*

Rootstock prostrate, densely crowned with withered sheaths. *Stem* 2-6 in., weak, tufted, decumbent, rarely forked with a leaf at the fork. *Radical leaves* 3-4 in., oblong; pinnae $\frac{1}{2}$ - $\frac{3}{4}$ in., orbicular or oval, cut to the base. *Flowers* $\frac{3}{4}$ in., pale yellow, tips brown or green. *Posticous petal* winged at the back, equalling the straight spur. *Capsule* $\frac{1}{2}$ in., narrow oblong, about equalling the persistent style; pedicel deflexed. *Seeds* few, smooth.—Perhaps an alpine state of *C. Moorcroftiana*.

*** Root fusiform. Stem branched (simple in 13, *Moorcroftiana* and 14, *Gortschakovi*). Racemes often divided. Spur equalling or exceeding the petals. (See also 24, *crassifolia*.)

13. **C. Moorcroftiana**, Wall. Cat. 1432; stout, erect, glaucous, more or less glandular, leaves 2-3-pinnatisect, racemes many-flowered simple or branched, bracts linear or lanceolate entire or lobed. *H. f. & T. Fl. Ind.* 266.

WESTERN TIBET; alt. 10-17,000 ft., from Gugi, *Strach. & Wint.*, to Balti, *Moorcroft*.—DISTRIB. Afghanistan.

Rootstock stout, woody, densely clothed with withered sheaths. *Stem* 6-18 in., naked or leafy, simple or divided. *Leaves* 3-8 in., oblong, pinnæ ovate or orbicular, variously cut and lobed. *Flowers* $\frac{3}{4}$ in. long, yellow, tips purple. *Posticous petal* obtuse, back broadly keeled, equalling the straight obtuse spur. *Capsule* $\frac{1}{2}$ in., narrow elliptic, acute at both ends; style persistent, half as long. *Seeds* black, shining.

14. **C. Gortschakovi**, Schrenk. *Enum. Plant. Soongar.* 100; stem erect quite glabrous leafy, radical leaves decompound glaucous, pinnules petioled, racemes dense many-flowered terminal and axillary, bracts leafy incised. *Ledeb. Fl. Alt.* i. 746; *H. f. & T. Fl. Ind.* 267.

TIBETAN HIMALAYA, from Gugi, *Strach. & Wint.*, to Kashmir, *T. T.*, and Hasora, *Jacquemont*, &c.—DISTRIB. Soongaria.

Rootstock woody. *Stem* 1-2 ft., simple or branched. *Radical leaves* 6-12 in., leaves long-petioled, ovate, pinnæ and pinnules petioled, segments incised. *Flowers* $\frac{3}{4}$ -1 in. long, yellow, tips purple. *Posticous petal* equalling the straight obtuse spur, dorsal wing broad or narrow. *Capsule* and *seeds* of *C. Moorcroftiana*.—We have fragments of a plant from Tibet, N. of Nipal, apparently intermediate between this and the last species. The Soongarian specimens of this have simple stems and larger flowers than the Himalayan.

15. **C. ramosa**, Wall. Cat. 1434; stem procumbent weak branched, leaves decompound segments linear, racemes terminal many lax many-flowered, bracts cut into linear lobes. *H. f. & T. Fl. Ind.* 267.

ALPINE HIMALAYA, alt. 12-15,000 ft., from Sikkim, *H. f.*, to Kashmir, *T. T.*

Glaucous. *Stem* 1-2 ft. (dwarf at high elevations), often leafy, flexuous. *Radical leaves* few or many, long-petioled, 2-3 times divided, ultimate segments small narrow-oblong or linear. *Flowers* $\frac{1}{2}$ in. long, yellow; racemes 1-5 in. *Posticous petal* dorsally winged, hooded, equalling or shorter than the obtuse spur. *Capsules* obovate-oblong, obtuse; style persistent, pedicels deflexed. *Seeds* shining.

VAR. 1. *glauca*; leaves very glaucous, segments very narrow, wing of posticous petal broad subentire.

VAR. 2. *vaginans*; leaves membranous less glaucous, segments broader, wing of posticous petal lacerate.

VAR. 3. *nana*; dwarf, alpine, leaves subsessile, wing of posticous petal very narrow.

16. **C. sibirica**, Pers. *Synops.* ii. 70; subglaucous, branched, prostrate, leaves 2-3-pinnate, segments 3-5 broad-ovate deeply cut, racemes lax few-flowered terminating long slender branches, bracts small cut into narrow lobes, spur recurved, seeds shining. *H. f. & T. Fl. Ind.* 268. *C. Impatiens*, Fisch. in *DC. Prodr.* i. 128. *C. longipes*, DC.; Wall. Cat. 1433; *Tent. Fl. Nip.* t. 42 (*bad, not of Don Prodr.*). *C. filiformis*, Royle *Ill.* 65.

HIMALAYA, alt. 7-14,000 ft., from Sikkim to Garwhal; KHASIA HILLS, alt. 6000 ft.—DISTRIB. Eastern Siberia.

Stem 1-2 ft., weak, much branched, leafy. *Leaves* membranous. *Flowers* yellow, $\frac{1}{2}$ in. long. *Posticous petal* hooded, acute, equalling or exceeding the very broad conic

obtuse spur. *Capsule* $\frac{1}{4}$ – $\frac{1}{2}$ in., linear, or linear obovate, style very short.—Very variable, and possibly a form of *C. ramosa*. Wallich's figure of *C. longipes* is unlike his specimen or those of any other plant, and is probably made up of several allied species.

17. **C. cornuta**, *Royle Ill.* 69; glaucous, decumbent, branched, leaves 2-3-pinnate, pinnæ cuneate-obovate or oblong, racemes terminal many-flowered dense elongate, bracts small entire or cut, spur straight or tip hooked, seeds opaque. *H. f. & T. Fl. Ind.* 269. *C. debilis*, *Edgew. in Trans. Linn. Soc.* xx. 30.

TEMPERATE HIMALAYA, alt. 8-10,000 ft., from Kumaon, *Strach. & Wint.*, to Kashmir, *T. T.*

Habit of *C. ramosa* and *sibirica*. *Leaves* long-petioled, ultimate segments 3-5-fid, lobes rounded. *Flowers* $\frac{1}{2}$ – $\frac{3}{4}$ in., yellow, tips purple; racemes 1-3 in. *Posticous petal* convex, acute, dorsally winged, shorter than the cylindric spur. *Capsules* variable, linear obovate or obovate-oblong; style short, persistent; pedicels short deflexed.

18. **C. chærophylla**, *DC. Prodr.* i. 128; stem erect leafy branched, leaves deltoid decompound, racemes terminal panicle, lower bracts leafy, spur slender. *Wall. Cat.* 1428; *Tent. Fl. Nip.* t. 40 (spur too short); *Don Prodr.* 198; *H. f. & T. Fl. Ind.* 269. *C. geraniifolia*, *H. f. & T. Fl. Ind.* 269.

TEMPERATE HIMALAYA, alt. 6-10,000 ft.; from Sikkim to Kumaon.

Stem 2-4 ft., branched above. *Leaves* pale beneath; lower and radical 6-10 in., long-petioled, upper subsessile, lower pinnæ petioled, second and third decurrent, ultimate segments oblong, acute or acuminate. *Flowers* $\frac{3}{4}$ in., golden-yellow, slender; bracts oval or oblong, cut, upper entire. *Posticous petal* concave, acute, dorsal wing narrow, shorter than the spur. *Capsules* $\frac{1}{2}$ in., broad-linear or linear-obovate, spreading; pedicels short. *Seeds* few, shining.—*C. geraniifolia* is a large lax leafy state, with much-cut bracts and more acute segments, found in humid districts of Sikkim.

*** Root fusiform. Stem simple or branched. Spur short saccate (except 24, *crassifolia*).

† *Leaves* 2-3-pinnatisect or decompound.

19. **C. latiflora**, *H. f. & T. Fl. Ind.* 370; dwarf, glaucous, stem simple, leaves 2-3-pinnate cauline 2 opposite, flowers 3-6 subumbellate, bracts linear.

ALPINE HIMALAYA; Tunkra pass in Sikkim, alt. 15,000 ft., *H. f.*

Rootstock slender, 6-12 in., with many membranous oblong mucronate scales $\frac{1}{2}$ –1 in. long. *Stem* or scape 2-4 in. *Leaves* many, 1-2 in., ovate or ovate-deltoid, long-petioled; pinnæ petioled, alternate, small, linear-oblong, acute. *Flowers* $\frac{3}{4}$ in. long, very broad, pale blue, tips yellow; bracts $\frac{1}{2}$ –1 in., equalling the pedicels. *Posticous petal* broadly winged, much larger than the obtuse spur.

20. **C. stricta**, *Stephan*; stout erect, simple or branched, leaves thick, 2-pinnate sheaths rigid, cauline similar, alternate, racemes short simple or branched, bracts small subulate, capsules linear pendulous. *Led. Fl. Alt.* iii. 244; *Ik. Fl. Ross.* t. 56. *C. astragalina*, *H. f. & T. Fl. Ind.* 270.

WESTERN TIBET, alt. 14-16,000 ft. in Nari, *Jacquemont*, and Ladak, *T. T.*—DISTRIB. Altai Mts.

Rootstock crowned with rigid shining leaf-bases. *Stem* 1-2 ft. *Leaves* many, 3-6 in., petioles long, oval or oblong, glaucous, pinnules cut into linear-oblong lobes. *Flowers* $\frac{3}{4}$ – $\frac{1}{2}$ in., yellow; pedicels short, slender, pendulous; bracts white, membranous. *Sepals* lanceolate from a broad ovate obliquely cordate fimbriate base. *Posticous petal* nearly flat, abruptly acuminate, margins membranous, tip recurved. *Capsules* 1-1 $\frac{1}{2}$ in.; style short, rigid. *Seeds* large shining.

21. **C. meifolia**, *Wall. Tent. Flor. Nip.* 52, t. 41; *Cat.* 1427; stem stout erect leafy, leaves decompound segments linear or capillary, racemes

many-flowered dense, lower bracts leafy pectinate, capsules oblong. *DC. Prodr.* i. 128; *H. f. & T. Fl. Ind.* 271. *C. Hoffmeisteri*, *Klotzsch in Pr. Wald. Reise*, t. 35.

HIMALAYA, alt. 12-15,000 ft., from Sikkim to Kunawur.

Rootstock stout, branched. *Stems* 6-18 in., simple or branched. *Leaves* very many, 4-8 in., oblong, segments crowded acuminate. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in., yellow, tips purple; racemes 1-2 in.; lower pedicels often elongate. *Posticous petal* obtuse, dorsal wing broad, twice as long as the obtuse spur. *Capsules* $\frac{1}{2}$ in., pedicel curved. *Seeds* 4-6 shining.

†† *Leaves* simply pinnate or trisect.

22. **C. flabellata**, *Edgew. in Trans. Linn. Soc.* xx. 30; glaucous, stem erect rigid much-branched, leaves pinnate, pinnæ 4-6 pair flabelliform, racemes strict paniced dense-flowered, bracts very small, capsules linear. *H. f. & T. Fl. Ind.* 271.

WEST TIBET and TIBETAN HIMALAYA, alt. 9-12,000 ft., from Kumaon, *Edgeworth*, to Gilgit, *Winterbottom*.

Stem 2-3 ft., striate. *Leaves* 6-8 in.; pinnæ distant, $\frac{1}{2}$ -1 $\frac{1}{2}$ in. diam., crenate or lobed. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in., yellow, curved, racemes 2-6 in. long; pedicels very short. *Posticous petal* obtuse, cucullate, twice as long as the decurved inflated spur. *Capsule* $\frac{1}{2}$ -1 in., spreading or deflexed; style slender. *Seeds* 8-10, dotted, shining.

23. **C. adiantifolia**, *H. f. & T. Fl. Ind.* 271; glaucous, stems many-branched, leaves pinnate, pinnæ 2-5 pair orbicular or reniform, racemes terminal dense many-flowered, bracts subulate exceeding the buds, capsules linear.

WESTERN TIBET; Zanskar (not Kishtwar as in *Fl. Ind.*), alt. 12-14,000 ft., *T. T.*

Rootstock stout, woody, crowned with withered sheaths. *Stems* 6-18 in., branched from the base. *Leaves* 3-6 in., linear-oblong; pinnæ remote, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., entire crenate or 3-5-lobed, base cuneate or cordate. *Flowers* $\frac{3}{4}$ -1 in., yellow, tips brown; racemes 1-3 in.; pedicels very short. *Sepals* membranous, long-subulate, base lacerate. *Posticous petal* nearly straight, slender, abruptly acuminate, much longer than the inflated obtuse incurved spur. *Capsule* 1 in., acuminate at both ends; style straight.—Very near *C. flabellata*, but smaller, pinnæ often cordate, and bracts setaceous like soft hairs.

24. **C. crassifolia**, *Royle Ill.* 69; glaucous, stem simple, leaves thick reniform 3-5-lobed or -partite, racemes terminal dense-flowered simple or branched, bracts leafy obovate-lanceolate or spatulate entire, capsules subglobose inflated. *H. f. & T. Fl. Ind.* 261. *C. crassissima*, *Cambess. in Jacq. Voy. Bot.* 12, t. 11; *Thoms. in Hook. Kew Journ. Bot.* v. 17, and ix. t. 9. *C. physocarpa*, *Cambess. l.c.* t. 12.

WEST TIBET and TIBETAN HIMALAYA, alt. 14-17,000 ft., from Kunawur to Balti.

Rootstock prostrate, woody. *Stem* 3-8 in. *Radical leaves* few, 2-5 in. diam., early withering, almost fleshy, long-petioled; lobes crenate or again lobed, with petioled lobulate or palmati-partite (rarely pinnate) segments; cauline 1-3, subsessile. *Flowers* $\frac{3}{4}$ -1 $\frac{1}{4}$ in., white or yellowish, variegated with purple, racemes 1-3 in. long. *Posticous petal* broad, obtuse, wingless, equalling the cylindric incurved spur. *Capsule* 1 in. diam.; style short, persistent.

4. FUMARIA, Linn.

Annual, rarely perennial herbs, usually branched, often scandent. *Leaves* much divided, segments very narrow. *Flowers* small, white, rose-coloured or purplish, in terminal or leaf-opposed racemes. *Sepals, petals and stamens* of *Corydalis*. *Ovary* 1-celled; style filiform, stigma entire or shortly lobed;

ovules 2, on 2 placentas. *Fruit* indehiscent, globose, 1-seeded.—**DISTRIB.** Species about 8; usually agrarian weeds of the temperate regions of the Old World.

1. ***F. parviflora*, Lamk. sub-sp. VAILLANTII, Loisel (sp.)**; diffuse, leaf-segments flat, racemes lax-flowered, sepals lanceolate much smaller than the corolla-tube, pedicels exceeding the bracts, fruit globose rugose when dry rounded at the top with 2 pits.

INDOGANGETIC plain, Lower HIMALAYA and NILGHIRI Mts., a weed of cultivation.—**DISTRIB.** : of the genus.

Pale green, much branched. *Racemes* 1-2 in. *Flowers* $\frac{1}{4}$ - $\frac{1}{3}$ in., whitish or rose-coloured, tips purple.

ORDER X. CRUCIFERÆ. (By Hooker f. & T. Anderson.)

Herbs, rarely undershrubs; juice watery, often pungent. *Leaves* cauline and radical, the latter in a rosette, cauline alternate, exstipulate. *Flowers* racemed, rarely solitary on scapes, or axillary. *Sepals* 4, free, 2 lateral (opposite the placentas) often large and saccate at the base, imbricate. *Petals* 4, free, hypogynous, placed crosswise, imbricate. *Stamens* 6 (rarely 1, 2, or many); 2 outer opposite the lateral sepals; 4 inner longer, in opposite pairs. *Disk* with usually 4 glands opposite the sepals. *Ovary* 2-celled by a placental membrane, or 1-celled, or with superimposed cellules; style short or 0; stigma simple or with 2 lobes opposite the placentas; ovules 1-2 or ∞ , 2-seriate on two parietal placentas, rarely solitary and erect. *Fruit* either a 2-celled 2-valved pod, the valves deciduous and leaving the seeds on the persistent placentas (*replum*), or indehiscent, or transversely jointed. *Seeds* small, albumen 0; cotyledons large, plano-convex or longitudinally concave or folded, foliaceous in germination; radicle turned up on the back of one cotyledon (*incumbent*), or facing the edges of both (*accumbent*).—**DISTRIB.** Genera 172; species about 1200; natives chiefly of temperate regions of the Old World.

Series A.

Pods long or short, dehiscing throughout their length, terete, 4-angled or compressed dorsally (parallel to the septum).

TRIBE I. Arabidææ. *Pods* narrow, long. *Seeds* usually 1-seriate. *Cotyledons* accumbent. (Pods sometimes short in 2, *Parrya*, 5, *Nasturtium* and 10, *Notoceras*; seeds 2-seriate in *Arabis glabra*, and in some species of 2, *Parrya*.)

* *Sepals* narrow, erect. *Valves* without horns or appendages. *Stigmas* erect, connate or decurrent on the style (2-lobed in some species of 2, *Parrya*).

Erect branched hoary herbs 1. MATTHIOLA.
Low alpine tufted scapigerous herbs 2. PARRYA.

** *Sepals* broad or narrow. *Stigma* undivided or shortly 2-lobed. (See also 2, *Parrya*.)

Sepals erect, lateral saccate.—Hoary leafy erect herbs 3. CHEIRANTHUS.
Anthers of long stamens 1-celled.—A minute herb 4. ATELANTHERA.
Sepals spreading, not saccate; pods tumid, seeds minute 2-seriate. *Flowers* usually yellow 5. NASTURTIIUM.
Sepals not saccate; pods 4-angled; seeds 1-seriate. *Flowers* yellow 6. BARBAREA.

- Sepals erect, not saccate; pods flat, strongly nerved; seeds flattened.—Flowers white or rose 7. *ARABIS*.
 Sepals not saccate; pods of *Arabis* but hardly nerved, usually acute; stamens simple.—Flowers white or purple 8. *CARDAMINE*.
 Sepals spreading, not saccate; long stamens bent above the middle.—A minute herb; flowers few, purple ? 9. *LOXOSTEMON*.

*** *Valves with horns or appendages.*

- Pods short, valves septate within 10. *NOTOCERAS*.

TRIBE II. **Alyssineæ.** *Pods* short, broad. *Seeds* usually 2-seriate. *Cotyledons* accumbent. (Pod sometimes long and seeds 1-seriate in 11, *Farsetia*, and cotyledons rarely incumbent in 13, *Draba*. See also 2, *Parrya*.)

* *Pods 2-celled, many-seeded; seeds compressed, often winged.*

- Pods sessile; seeds 1-seriate 11. *FARSETIA*.

** *Pods 1-2-celled, 2-many-seeded; valves often tumid; seeds 2-seriate, rarely winged.* (Sepals never saccate; flowers white or yellow.)

- Stamens often appendaged; pods usually orbicular and 4-seeded.
 —Hoary herbs 12. *ALYSSUM*.

- Stamens not appendaged; pods longer than broad, many-seeded.
 Petals entire.—Hoary herbs 13. *DRABA*.

- Characters of *Draba* but petals 2-fid 14. *EROPHILA*.
 Sepals short, spreading.—Glabrous herbs 15. *COCHLEARIA*.

TRIBE III. **Sisymbrieæ.** *Pods* usually sessile, long, narrow. *Seeds* usually 1-seriate (2-seriate in 19, *Eutrema*); cotyledons straight, flat, incumbent.

* *Stigmatic-lobes erect, free, or connate in a cone.*

- Pod rigid, terete. Flowers white or purple 16. *MALCOLMIA*.

** *Stigma capitate emarginate or shortly 2-lobed.*

- Stamens with a broad basal scale 17. *LEPIDOSTEMON*.

- Sepals erect or spreading; pod many seeded, valves 1-3-nerved; seeds usually 1-seriate.—Hairs simple or 0 18. *SISYMBRIUM*.

- Sepals short, erect; pods terete, valves 1-ribbed; seeds usually 2-seriate.—Glabrous herbs 19. *EUTREMA*.

- Sepals long; pods compressed.—Leaves quite entire glabrous glaucous 20. *CONRINGIA*.

- Sepals erect; valves keeled.—Hairs appressed forked 21. *ERYSIMUM*.

- Sepals suberect; pods linear-lanceolate, flattened; seeds few.—A fleshy herb 22. *CHRISTOLEA*.

TRIBE IV. **Camelineæ.** *Pods* short or long. *Seeds* usually 2-seriate; cotyledons flat, incumbent. (See also 13, *Draba*.)

- Seeds few, large.—Tufted scapigerous herbs 23. *BRAYA*.

TRIBE V. **Brassiceæ.** *Pods* short or long; cotyledons longitudinally folded or deeply grooved.

* *Stigma capitate, truncate or 2-lobed.*

- Pods long; seeds 1-seriate 24. *BRASSICA*.

- Pods long, compressed; seeds 2-seriate 25. *DIPLOTAXIS*.

- Pods short, turgid, beaked; seeds 2-seriate 26. *ERUCA*.

** *Stigmas connate, forming an erect cone.*

Pods long.—A glaucous large herb or undershrub 27. *MORICANDIA*.

Series B.

Pods short, dehiscing throughout their length, compressed laterally (at right angles to the septum). (Pod indehiscent in 31, *Megacarpæa*.)

TRIBE VI. **Lepidineæ**. *Cotyledons* incumbent, straight curved or longitudinally folded.

Pods many-seeded; valves not winged 28. *CAPELLA*.

Pods few-seeded; valves winged or not 29. *LEPIDIUM*.

Pods 2-seeded; valves with 2 dorsal crests 30. *DILOPHIA*.

TRIBE VII. **Thlaspidæ**. *Cotyledons* accumbent, straight.

Pods indehiscent, 2-seeded.—Tall herbs of umbelliferous habit . 31. *MEGACARPÆA*.

Pods compressed notched; valves winged or keeled 32. *THLASPI*.

Pods elliptic or oblong, acute; valves keeled 33. *IBERIDELLA*.

Series C.

Pods short, indehiscent, not jointed, usually hard, either 1-celled and 1-seeded, or with 2-4 1-seeded cellules in parallel series.

TRIBE VIII. **Isatidæ**. Characters of the series.

Pods 1-celled, oblong or linear, wing thick.—Glaucous herbs . 34. *ISATIS*.

Pods 1-celled, cymbiform, wing incurved.—Glaucous herbs . . 35. *TAUSCHERIA*.

Pods 1-celled, small oblong, with a thin wing.—A glandular twiggly undershrub 36. *DIPTERYGIUM*.

Pods 1-celled, wingless, globose with a subulate style.—A hairy herb 37. *NESLIA*.

Pods 2-celled, obliquely beaked 38. *EUCLIDIUM*.

Series D.

Pods long or short, transversely jointed; joints indehiscent, or the lower 2-valved or reduced to a pedicel for the upper.

TRIBE IX. **Cakilineæ**. Characters of the series.

Lower joint of pods a seedless pedicel, upper globose 1-seeded . 39. *CRAMBE*.

Lower joint of pods a seedless pedicel, upper 2-celled, 2-seeded 40. *PHYSORHYNCHUS*.

Series E.

Pods long, not jointed, indehiscent, either 1-celled and many-seeded, or breaking up into many 1-celled 1-seeded indehiscent fragments.

TRIBE X. **Raphanæ**. Characters of the series.

Pods long, terete, hollow or septate; seeds globose, 2-3-celled . 41. *RAPHANUS*.

Pods short, curved, 4-angled, 2-3-celled, moniliform 43. *GOLDBACHIA*.

Pods short, curved, many-celled 43. *CHORISPORA*.

1. **MATTHIOLA**, Br.

Annuals, or small undershrubs, with hoary and sometimes stellate pubescence. *Leaves* entire or sinuate. *Flowers* rather large, purple; bracts 0. *Sepals* erect, lateral saccate at the base. *Petals* spreading, claws long. *Pod*

long, narrow, cylindric or flattened; septum thick; stigma small, erect, lobes parallel, thickened or with short horns at the base. *Seeds* 1-seriate, flattened, with a narrow membranous wing.—DISTRIB. About 30 species; natives of the Mediterranean region, Arabia and Western and Central Asia.

M. incana, the common Stock, and *M. tristis* are cultivated in the gardens of N. India.

1. **M. odoratissima**, *Br. in Hort. Kew. ed. 2. iv. 120*; leaves petioled lower obovate upper lanceolate sinuate or pinnatisect rarely entire. *DC. Prodr. i. 134*; *Bot. Mag. 1711*; *Poiss. Fl. Orient. i. 149*; *Griff. It. Notes, 282, n. 767*; *H. f. & T. in Journ. Linn. Soc. v. 134*.

WEST TIBET in dry stony places, ascending to 12,000 feet.—DISTRIB. Westward to Asia Minor and the Caucasus.

A perennial, 1–2 ft.; hoary with stellate pubescence; root woody. *Racemes* long, erect; flowers few, large, purple, fragrant. *Petals* $\frac{3}{4}$ –1 in.; limb linear-oblong or strap-shaped, waved or twisted. *Pods* 4 in., erect, rigid, flattened. *Seeds* as broad as the septum.

2. **PARRYA**, *Br.*

Small tufted herbs; rootstock thick, perennial, many-headed. *Leaves* linear or spatulate, entire sinuate or pinnatifid. *Flowers* large, white or purple, racemed or on scapes. *Sepals* erect, lateral sometimes saccate at the base. *Pod* much flattened, short and broad or elongated and narrow; valves smooth, with a midrib; septum entire or divided, membranous or hyaline; style short; stigma-lobes erect, decumbent. *Seeds* 1–2-seriate, much flattened, with a membranous wing or wingless.—DISTRIB. Species about 10, arctic or high alpine.

1. **P. exscapa**, *Mey. in Led. Fl. Alt. iii. 38*; leaves spatulate obtuse entire or slightly toothed, scapes 1-flowered, seeds winged. *Led. Ic. Fl. Alt. t. 86*; *H. f. & T. in Journ. Linn. Soc. v. 135*.

WEST TIBET, alt. 15–18,000 ft.—DISTRIB. Altai Mts.

Stemless, glabrous or puberulous. *Flowers* purple, scapes shorter than the leaves. *Pods* $\frac{1}{2}$ –3 in. long, narrow, drooping. *Stigma* sessile. *Seeds* 1–2-seriate; wing broad, membranous.

2. **P. macrocarpa**, *Br. in Parry's Voy. app. 270*; leaves entire or sinuate-toothed, flowers corymbose, scapes much exceeding the leaves, pods linear, seeds winged. *Led. Fl. Ross. i. 131*; *Hook. Fl. Bor. Am. i. t. 15*; *H. f. & T. in Journ. Linn. Soc. v. 135*. *Neurotoma nudicaule and scapigerum*, *DC. Prodr. i. 156*.

Alpine region of WEST TIBET, alt. 15–18,000 ft.—DISTRIB. Afghanistan, Altai, arctic Europe Asia and America.

Slightly rough, very rarely glabrous. *Leaves* tufted, thick, petioled, lanceolate. *Flowers* large; scapes 6–12 in., rigid, many-flowered. *Pods* erect, linear, acute; valves strongly veined, rough. *Seeds* 1-seriate, much flattened.

3. **P. platycarpa**, *H. f. & T. Journ. Linn. Soc. v. 136*; leaves spatulate or obovate quite entire, scapes short few-flowered, pods ovate, seeds not winged.

EASTERN HIMALAYA, in the Tibetan region of SIKKIM, alt. 16–17,000 ft., *H. f.*

Rootstock covered with spongy old petioles. *Leaves* leathery, glabrous or with hairy

margins; petiole long, base sheathing. *Scapes* pilose, thick, sometimes bearing 1 or 2 small leaves. *Pods* $\frac{3}{4}$ –1 $\frac{1}{4}$ in., tapering into the short thick style; valves thin, convex, not veined, midrib distinct. *Seeds* few.

4. **P. lanuginosa**, *H. f. & T. Journ. Linn. Soc.* v. 136; leaves spatulate coarsely toothed, scapes woolly 8–12-flowered, pods ovate-lanceolate, seeds not winged.

WEST TIBET; in Gugi, alt. 17,500 ft., *Strach. & Winterb.*

Small, densely woolly. *Scapes* erect, 2 in.; flowers small, racemose. *Sepals* spreading, woolly. *Petals* broadly spatulate, undulate or crisped. *Pods* acute, about $\frac{3}{4}$ in., outline waving; septum very narrow, sometimes 0.

3. CHEIRANTHUS, Linn.

Hoary herbs, or undershrubs, with appressed bipartite hairs. *Leaves* oblong-linear, entire or toothed. *Flowers* large, yellow or purple, racemed. *Sepals* erect, lateral saccate at the base. *Petals* clawed. *Pod* 4-angled, compressed; valves 1-nerved; septum membranous; stigmatic-lobes short, spreading. *Seeds* 1-seriate, flattened, without a border; cotyledons accumbent, very rarely incumbent.—DISTRIB. Species about 12, natives of temp. Europe, N. Africa, W. Asia, and arctic America.

The Wall-flower, *C. Cheiri*, is cultivated in gardens in N. India, but is not indigenous.

1. **C. parryoides**, *Kurz. mss.* (name only); hoary, leaves linear-oblong entire all radical, flowers purple, style $\frac{1}{8}$ in.

WEST TIBET; in Spiti, *Stoliczka*.

Rootstock covered with withered petioles. *Leaves* all radical, 2–3 in., rounded at the tip, clothed with fine dense tomentum. *Scapes* about 9 in., many-flowered, elongating during flowering. *Pedicels* $\frac{3}{4}$ –1 in., erect, tomentose. *Sepals* $\frac{1}{2}$ in., hairy, purple, with a glabrous narrow membranous fringe. *Petals* $\frac{1}{2}$ in., claw and base of the blade dark purple. *Pods* (immature) curved and undulate, densely tomentose; style $\frac{1}{12}$ in., glabrous.

2. **C. himalayensis**, *Camb. in Jacq. Voy. Bot.* 14, t. 13; leaves linear-spathulate entire lobed or rarely subpinnatifid, flowers violet or purplish, pods hairy, stigma sessile. *C. himalaicus*, *H. f. & T. Journ. Linn. Soc.* v. 137.

WEST TIBET; amongst rocks and loose stones, alt. 15–17,000 ft.

Rootstock much divided. *Stems* 2–6 in., numerous, leafy, tomentose. *Leaves* somewhat tufted. *Flowers* numerous, in rather dense terminal racemose heads, fragrant. *Sepals* short, lanceolate, obtuse, lateral scarcely saccate at the base. *Petals* twice the length of the sepals, broadly spatulate, retuse. *Pods* $\frac{3}{4}$ –1 $\frac{1}{2}$ in., linear, compressed; valves with thickened margins. *Seeds* numerous, sub-2 seriate.

3. **C. Stewartii**, *T. Anders.*; leaves spatulate toothed at the tip, flowers buff then purple, pods glabrous, stigma sessile.

WEST TIBET, near Ladak, at 15–16,500 ft. elevation, *Stewart*.

Like the preceding but differing in its glabrous pods and less divided leaves. *Stems* numerous, slender, erect in flower, depressed and spreading in fruit. *Lower leaves* $\frac{1}{2}$ –1 in., subcoriaceous, woolly; upper smaller, linear, entire. *Racemes* terminal, subcapitate, fruiting 3 in. *Sepals* oblong, $\frac{1}{12}$ in. *Petals* $\frac{1}{2}$ in., broadly spatulate. *Pods* 1–1 $\frac{1}{4}$ by $\frac{1}{4}$ in., erect, secund, linear, tapering at both ends; valves flat, herbaceous; stigma broad; midrib and reticulated veins distinct. *Seeds* small, ovate-oblong, sub-2-seriate; cotyledons accumbent.

4. **C. albiflorus**, *T. Anders.*; leaves subspathulate or linear-lanceolate entire or sublobed, petals white, pods tomentose, style short. *Cheiranthi* sp. *H. f. & T. in Journ. Linn. Soc.* v. 138, *in note*.

Zanskar in WEST TIBET, alt. 12–16,000 ft., *T. T.*

A small, hoary, minutely tomentose, tufted perennial. *Stems* slender, covered below by withered petioles. *Lower leaves* loosely tufted; upper linear-lanceolate, entire, rarely toothed. *Flowers* in short, close racemes. *Sepals* linear, tomentose; border narrow, glabrous, membranous. *Petals* spathulate, obtuse or slightly retuse, white. Very young *Pods* linear, densely tomentose, many-seeded; style short, glabrous.

4. **ATELANTHERA**, *H. f. & T.*

A minute slender annual, slightly rough with bipartite appressed hairs. *Leaves* few, linear, entire. *Flowers* small, subsessile. *Sepals* erect, equal at the base. *Petals* narrowly spathulate, emarginate. *Anthers* of all the stamens with a short claw at the tip, of the long stamens 1-celled. *Pod* linear, compressed; septum membranous; style short; stigma 2-lobed. *Seeds* 1-seriate, flattened, without a border.

1. **A. perpusilla**, *H. f. & T. Journ. Linn. Soc.* v. 138; pods few erect nearly 1 in. long, valves faintly nerved.

Zanskar in WEST TIBET, *T. T.*

5. **NASTURTIIUM**, *Br.*

Terrestrial or aquatic, branched, glabrous or hairy herbs. *Leaves* entire lobed or pinnatifid. *Flowers* small, yellow, rarely white, sometimes bracteate. *Sepals* short, spreading, equal at the base. *Petals* short, narrowed at the base, scarcely clawed, or 0. *Stamens* 2, 4 or 6. *Pod* long or short, almost cylindric; valves faintly 1-nerved; septum thin, transparent; style variable, short or long and slender, stigma entire or 2-lobed. *Seeds* small, turgid, 2-seriate or irregularly 1-seriate; cotyledons accumbent.—*DISTRIB.* Species about 20, temp. and tropical.

1. **N. officinale**, *Br. in Hort. Kew.* ed. 2, iv. 110; aquatic, stem creeping and floating, leaves pinnate, leaflets sinuate-lobed, flowers white. *DC. Prodr.* i. 137; *Griff. Itin. Notes*, 275, n. 660; *H. f. & T. in Journ. Linn. Soc.* v. 130. (*Watercress*.)

ROHILKUND, *T. T.*; PUNJAB, *Stewart*; also found near all the hill stations, but probably introduced.—*DISTRIB.* Afghanistan; temp. Europe and Asia.

Stem much branched. *Leaves* pinnate, the upper with 3–7 pinnules and a terminal one, the lower cut into 3 repand segments. *Flowers* small, in short racemes. *Petals* longer than the sepals. *Pods* $\frac{1}{2}$ –1 in., stalked, spreading or bent upwards. *Seeds* small, 2-seriate.

2. **N. palustre**, *DC. Syst. Veg.* ii. 191; suberect, radical leaves pinnatifid, flowers bracteate yellow, pods short thick. *N. terrestre*, *Br. in Hort. Kew.* ed. 2, iv. 110; *H. f. & T. Journ. Linn. Soc.* v. 158. *N. heterophyllum*, *Don Prodr. Fl. Nep.* 202.

Abundant in the TEMPERATE HIMALAYA, ascending to 10,000 ft.; and in N.W. INDIA; rare in ASSAM and BENGAL.—*DISTRIB.* Many temperate regions.

Stems weak, smooth, slightly hairy. *Radical leaves* numerous, petioled; lobes broad, often sinuate-toothed, terminal larger, ovate-lanceolate, much toothed; cauline subsessile, deeply toothed or pinnatifid. *Flowers* small, in long lax racemes. *Petals* about equalling the sepals. *Pods* $\frac{1}{2}$ – $\frac{1}{4}$ in., slightly curved when ripe, pedicels either horizontal or deflexed. *Seeds* crowded, 2-seriate.

3. **N. indicum**, *DC. Syst. Veg.* ii. 199; erect, radical leaves deeply pinnatifid, flowers bracteate or ebracteate yellow, pods long narrow. *H. f. & T. Journ. Linn. Soc.* v. 138. *N. madagascariense*, *W. & A. Prodr.* 19; *Wight Ill.* t. 13. *N. heterophyllum*, *Blume Bijl.* 50. *Sinapis divaricata*, *Roxb. Fl. Ind.* iii. 123.

Common in damp places throughout India from CEYLON to MISHMI and KASHMIR.—DISTRIB. Malayan Archipelago; Philippines, China, Japan.

A rough hairy or sometimes glabrous annual. *Stem* 6–12 in., erect, striated, branching from near the base. *Lower leaves* petioled, rarely entire, lobes generally toothed; upper lyrate, frequently with small auricles. *Racemes* long, many-flowered. *Flowers* small. *Petals* equalling the sepals. *Pods* cylindric $\frac{1}{2}$ – $\frac{3}{4}$ in., spreading or ascending. *Seeds* very numerous, small, rugose, 2-seriate.—Some of the states of this variable plant closely resemble *N. palustre*, but have longer and less turgid pods.

VAR. *benghalense*; *DC. Syst.* ii. 198 (*Sp.*); flowers bracteate, bracts sessile leaf-like shorter than the pedicels linear-lanceolate variously toothed or entire. *H. f. & T. in Journ. Linn. Soc.* v. 139.—Eastern Bengal, Sikkim, and the Hooghly; Assam and Silhet to Chittagong, Tenasserim.—(China.)

4. **N. montanum**, *Wall. Cat.* 4778 (*partly*); radical leaves sinuate-pinnatifid, flowers bracteate yellow, pods short turgid. *H. f. & T. Journ. Linn. Soc.* v. 139. *Sinapis pusilla*, *Roxb. Fl. Ind.* iii. 125.

Subtropical Himalaya from SIKKIM to the PUNJAB, ascending to 7000 ft; the KHASIA HILLS and BURMA.—DISTRIB. Java, China, Japan.

An annual much resembling *N. indicum*, but less robust, with larger smoother less divided leaves. *Pods* 1–1½ in., slender, not turgid.

6. BARBAREA, Br.

Perennial or biennial branched leafy herbs with angled stems and lyrate-pinnatifid leaves. *Flowers* yellow. *Sepals* suberect, subequal at the base. *Petals* with a broad claw. *Pod* long, linear, compressed, 4-angled, many-seeded; valves hard, stout; usually strongly keeled. *Seeds* small, 1-seriate, ovoid, without a margin; cotyledons accumbent.—DISTRIB. Species about 20, chiefly European.

1. **B. vulgaris**, *Br. Hort. Kew.* ed. 2, iv. 109; perennial, usually branched, pods strongly keeled. *DC. Prodr.* i. 140; *H. f. & T. in Journ. Linn. Soc.* v. 139.

Temperate and subalpine HIMALAYA and W. TIBET; alt. 6–10,000 ft.—DISTRIB. Europe, W. Asia, N. and S. Africa, Australia.

Stiff, erect, smooth. *Stems* 9–18 in., furrowed, green, leafy. *Lower leaves* petioled, lyrate-pinnate, terminal lobe large subrotund; upper leaves sessile, obovate, entire sinuate or pinnatifid at the base, lowest lobes auricled stem-clasping. *Pods* $\frac{3}{4}$ –1½ in., numerous in a crowded raceme, narrow-linear, rigid; pedicels erect or spreading; style about $\frac{1}{4}$ in., stout, straight.

VAR. 1. *taurica*, *DC. Syst.* ii. 207 (*Sp.*); upper leaves ovate entire or toothed, pedicels of the ripe pods almost horizontal, pods erect stout rigid a little curved, style rather long and slender. *Griff. Itin. Notes* 306 n. 1047–1503. *B. Iberica*, *DC. l.c.* 208; *B. arcuata*, *Reichenb. Ic. Fl. Germ.* t. 48; *B. præcox*, *Fries. Nov.* 206, in *Herb. Kew.* (not of others).—Kashmir and W. Tibet, alt. 6–10,000 ft. (Afghanistan, W. Asia, and throughout Europe.)—The fully ripe pods of Afghan specimens vary from $\frac{3}{4}$ –1½ in.

VAR. 2. *sicula*, *Presl. del. Prag.* (*Sp.*); less robust, lower leaves lyrate, terminal lobes ovate, lateral often wanting, upper leaves pinnate, segments linear, pedicels less spreading, pods straight narrow compressed subtorulose, style short almost as broad as the pod.—*B. intermedia*, *Boreau Flor. Cent. France*, ii. 40.—W. Tibet and Temperate Himalaya, alt. 6–17,000 ft; Nilghiri Mts. (Asia Minor, S. Europe.)

2. **B. elata**, *H. f. & T. Journ. Linn. Soc.* v. 140; biennial, simple, pods faintly 1-nerved.

Inner ranges of SIKKIM, alt. 11–13,000 ft., always near villages, *H. f.*

Glabrous or sparsely hairy. *Stem* 2–3 ft., stout, generally simple, striated. *Radical leaves* lyrate-pinnatifid, terminal lobe oblong obtuse sinuate; cauline leaves auricled, obovate, entire sinuate-lobed or coarsely toothed. *Racemes* very long, few-flowered. *Petals* bright yellow. *Pedicels* erect, thick, shorter than the pod. *Pods* $\frac{1}{2}$ – $\frac{3}{4}$ in., thick, turgid; style short, distinct; valves convex, midrib indistinct.

7. **ARABIS**, Linn.

Glabrous or pubescent annuals or perennials, sometimes with stellate pubescence. *Radical leaves* spathulate, often rosulate; cauline sessile, entire or toothed. *Flowers* racemed, ebracteate, white rarely purple or rose-coloured. *Sepals* short, erect, lateral saccate. *Petals* entire, usually clawed. *Pod* long, slender, linear, compressed; valves smooth, flat, keeled or ribbed; septum linear, membranous; stigma subsessile. *Seeds* ovoid or orbicular, compressed, margined or wingless, 1- or sub-2-seriate; cotyledons accumbent.—**DISTRIB.** Species about 130, abundant in N. Asia, Europe, and N. America, rare in the S. hemisphere.

* *Cauline leaves* many, auricled at the base. *Flowers* racemose. *Pods* glabrous. *Seeds* 2-seriate.

1. **A. glabra**, *Crantz. Stirp. Austr.* 36; stem 1–3 ft., radical leaves obovate-oblong hispid with stellate hairs, flowers small, pods erect crowded glabrous. *H. f. & T. Journ. Linn. Soc.* v. 140. *A. perfoliata*, *Lam.*; *Boiss. Fl. Orient.* i. 167. *Turritis glabra*, *DC. Prodr.* i. 142. *Reich. Ic. Fl. Germ. t.* 44, f. 4346. *T. rigida*, *Wall. Cat.* 4783.

Western Himalaya, from KUMAON to KASHMIR, alt. 6–10,000 ft.—**DISTRIB.** Temp. Europe, Asia, N. America; Alps of Australia.

A stiff, erect, glaucous annual or biennial. *Stem* generally simple, striated, glabrous or slightly hairy at the base. *Radical leaves* spreading, soon withering, entire or sinuate-toothed or pinnately lobed, rough on both surfaces; cauline oblong-lanceolate, entire, auricled, glabrous. *Flowers* straw-coloured or white. *Fruiting racemes* much elongated. *Pods* 2–3½ in., pedicelled, narrow, linear; valves flat, 1-nerved; septum crumpled. *Seeds* 2-seriate.

** *Cauline leaves* many, auricled at the base. *Flowers* racemose. *Pods* usually hairy. *Seeds* 1-seriate.

2. **A. auriculata**, *Lam. Dict.* i. 219; annual, stellately hairy, leaves sinuate-toothed, cauline with obtuse or apiculate basal lobes, flowers small, stigma sessile. *Rich. Ic. Fl. Germ. t.* 39, f. 4334; *H. f. & T. Journ. Linn. Soc.* v. 141. *A. Montbretiana* and *A. Aucheri*, *Boiss. l.c.* 169, 170.

In KASHMIR, alt. 5–6000 ft., *T. T.*—**DISTRIB.** Afghanistan, W. Asia, Mediterranean

Stem 3–12 in., erect, simple or somewhat branched. *Radical leaves* spreading, petioled, ovate-oblong, obtuse; cauline ovate-oblong, obtuse, toothed. *Racemes* elongate, lax. *Flowers* white. *Pods* 1–1½ in., hairy?, narrow, straight, slender; stigma small; pedicel $\frac{1}{2}$ in., stout, erect or spreading. *Seeds* 1-seriate, very small.

3. **A. alpina**, *Linn.*; annual, hoary with forked or stellate hairs, leaves coarsely toothed, cauline with obtuse basal lobes, flowers large, pods erect or ascending. *DC. Prodr.* i. 142; *H. f. & T. in Journ. Linn. Soc.* v. 141.

A. albida, Stev.; *DC. l.c.* 142. *A. pterosperma*, Edgew. in *Trans. Linn. Soc.* xx. 33.

Western Himalaya, from KUMAON to MARRI, alt. 5–12,000 ft.—DISTRIB. Alpine and arctic Europe, Asia, N. America, Abyssinia.

Stems simple, or slightly branched. *Leaves* oblong-lanceolate, obtuse, seldom entire, radical spreading, petioled; cauline sessile. *Flowers* $\frac{1}{2}$ in. diam, white. *Sepals* glabrous. *Petals* spatulate, with long claws. *Pods* $1\frac{1}{2}$ – $2\frac{1}{2}$ in., narrow-linear, erect when young, often spreading when ripe; pedicels slender, glabrous or hairy.—The Indian specimens differ from the more western in the glabrous sepals.

4. ***A. amplexicaulis***, Edgew. in *Trans. Linn. Soc.* xx. 31; hispidly pilose, leaves coarsely toothed, cauline with obtuse basal auricles, pods horizontal or drooping, flowers large. *H. f. & T. in Journ. Linn. Soc.* v. 142.

Western Himalaya, from KUMAON to KASHMIR, alt. 4500–9000 ft.

A perennial resembling *A. alpina*, but larger, more robust, leaves broader, and horizontal on almost drooping pods. *Stem* 6–24 in., suberect, simple or slightly branched, hirsute, especially below. *Radical leaves* $1\frac{1}{2}$ –4 in. long, obovate-oblong; cauline sessile. *Racemes* long, lax, many-flowered. *Flowers* white. *Pods* linear, acute; style slender elongated. *Seeds* larger than those of *A. alpina*, wingless.

*** Cauline leaves many (few in *A. taraxicifolia*), not auricled at the base. Flowers racemed. Pods glabrous. Seeds 1-seriate.

5. ***A. tibetica***, *H. f. & T. Journ. Linn. Soc.* v. 143; perennial, stellately hairy, leaves lobed or toothed, flowers small, pods suberect falcate. *A. Thomsoni*, *H. f. l.c.*

—In KASHMIR and WESTERN TIBET, alt. 9–16,000 ft. *T. T.*, &c.

Stems 4–8 in., numerous, suberect, branched, leafy. *Radical leaves* rosulate, petioled, obovate or spatulate, more or less hairy; upper cauline sessile, lanceolate or narrowly spatulate, coarsely toothed or entire. *Flowers* numerous, white or pale pink. *Sepals* acute, sparsely stellately hairy. *Petals* twice as long as the sepals, spatulate, claw short. *Pods* $1\frac{1}{2}$ in., narrow-linear, falcate, glabrous; valves veined; midrib distinct. *Seeds* small, not margined.—The fruiting specimens referred in *Journ. Linn. Soc.* to *A. Thomsoni* belong probably to a *Sisymbrium*.

6. ***A. glandulosa***, Kar. & Kir. *En. Pl. Soong. in Bull. Soc. Imp. Mosc.* xv. 147; annual, glandular, leaves pinnatifid, flowers small, pods suberect obtuse. *H. f. & T. in Journ. Linn. Soc.* v. 143.

Tibetan region of SIKKIM, alt. 14–16,000 ft., *H. f.*; WESTERN TIBET near Ladak, *Stewart*.—DISTRIB. Soongaria.

Stem short, spreading, prostrate, leafy. *Radical leaves* $\frac{1}{2}$ –1 in., petioled; cauline $\frac{1}{4}$ – $\frac{1}{2}$ in., sessile, linear, or entire. *Petals* $\frac{1}{2}$ in., spatulate, claw short, pale rose or white. *Pods* 1 in., linear; style short tapering; pedicel short, thick, erect; valves concave, veined, with a faint midrib. *Seeds* small, oblong, slightly flattened, not margined.

7. ***A. taraxicifolia***, *Anders.*; annual, hairy, stems spreading, radical leaves many long-petioled lyrate-pinnatifid or lobed, flowers few distant, pedicels slender, pods very narrow, style long acute.

PUNJAB; in sandy places near Peshawur, *Stewart*.

Stems 6–9 in., numerous, almost leafless, weak, glabrous above, subhispid near the base. *Radical leaves* rough, hairy; terminal lobe large, rounded, entire, rarely toothed; lateral short, narrow, entire obtuse; petiole 2–3 in.; cauline leaves few, sessile, oblong-lanceolate, entire or sinuate-toothed. *Sepals* pubescent or glabrous. *Petals* $\frac{1}{2}$ in., narrow-oblong, pale rose or white; pedicels slender, spreading or suberect, glabrous. *Pods* $1\frac{1}{2}$ – $2\frac{1}{2}$ in., suberect horizontal or decurved, linear, flattened, glabrous; pedicel $\frac{1}{2}$ –1 in.; valves thin, veinless.—Closely allied to *A. arenosa*, L., but differs in the form of the leaves and length of the pod.

**** Flowers in leafless scapes.

8. **A. nuda**, *Belang. Voy. Ic.* (without number or description); leaves all radical obovate-oblong entire or toothed, flowers small, pods erect glabrous. *Boiss. in Ann. Sc. Nat. Sér.* 2, xvii. 54; *H. f. & T. Journ. Linn. Soc.* v. 142. *Arabis scapigera*, *Boiss. Ann. Sc. Nat. Sér.* 2, xvii. 54. *Sisymbrium nudum*, *Boiss. Fl. Orient.* i. 214.

KASHMIR, alt. 5600–6000 ft., *T. T.*—DISTRIB. Afghanistan to Asia Minor, and N. Syria.

A small annual, with slightly hairy leaves. *Scapes* several, 1–5 in., erect, rigid and not spreading, many-flowered, glabrous or slightly hairy at the base. *Flowers* yellow. *Sepals* equal, obtuse, green, glabrous. *Petals* twice as long as the sepals. *Pods* 1–1½ in. on very short thick pedicels, straight or curved, linear, much flattened, obtuse; valves with a distinct midrib and prominent veins. *Seeds* not margined; cotyledons accumbent (hence an *Arabis*, but most closely allied to *Sys. thalianum*).

8. CARDAMINE, Linn.

Annual or perennial, glabrous or slightly pubescent, often flaccid herbs. *Leaves* entire lobed or pinnate. *Flowers* white, pale-purple or violet, very rarely yellow. *Sepals* equal at the base. *Petals* clawed. *Pod* narrow-linear, compressed, tapering at both ends; valves with a distinct midrib, opening elastically; septum membranous; stigma simple or 2-lobed. *Seeds* flattened, without a border, 1-seriate; cotyledons accumbent.—DISTRIB. About 60 species, natives of the N. and S. temperate regions.

* *Leaves not deeply lobed or pinnatisect.*

1. **C. violacea**, *Wall. Cat.* 4782; stem stout simple erect, leaves sessile amplexicaul lanceolate toothed, flowers large violet, style long. *H. f. & T. in Journ. Linn. Soc.* v. 145.

Temperate region, central NIPAL, *Wallich*.

Stem 2–5 ft. *Leaves* 3–5 in., tapering to the tip, auricles sagittate. *Flowers* racemed, ½–¾ in. broad. *Pods* ¾ in., on thickened pedicels, erect, tapering at both ends; style ¼ in.

2. **C. circæoides**, *H. f. & T. Journ. Linn. Soc.* v. 144; annual, almost glabrous, slender, leaves petioled cordate obtuse, flowers small white, style short.

Moist woods in the interior of SIKKIM, alt. 5–7000 ft., *J. D. H.*

Stem 6–12 in., simple or slightly branched. *Leaves* thin, radical on much longer stalks than the cauline, sinuate-toothed, lower lobes rounded. *Racemes* few-flowered. *Pods* 1 in., on short pedicels, erect or spreading, narrow-linear; stigma broad.

** *Radical leaves trifoliolate.*

3. **C. africana**, *Linn.*; perennial, leaflets petioled crenate-serrate, flowers dull white, funicles not winged. *H. f. & T. Journ. Linn. Soc.* v. 144. *C. borbonica*, *Pers.*; *DC. l.c.*; *Thwaites Enum.* 399; *W. & A. Prodr.* 20; *Wight Ic.* t. 941. *C. anteniquana*, *DC. l.c.* *C. Wightiana*, *Wall. Cat.* 4781.

Mountain woods of the WESTERN PENINSULA, and CEYLON.—DISTRIB. S. temp. and tropical Africa; Bourbon.

Stem 6–24 in., decumbent or erect, sparsely hispid or glabrous. *Leaves* long-petioled; leaflets broadly ovate, acute or obtuse, the lateral oblique at the base. *Racemes* few-flowered. *Flowers* small. *Pods* 1½ in., erect or ascending, tapering at both ends; pedicels ¼–¾ in.

4. **C. trifoliolata**, *H. f. & T. Journ. Linn. Soc.* v. 145; succulent, leaflets subsessile 3-lobed, flowers pale lilac, funicles not winged. *Griff. It. Notes* 121, No. 259.

Mossy streams in the forests of BHOTAN, alt. 5500 ft., *Griffith*.

A small fleshy annual; rootstock short, creeping; stems 4-5 in., simple, erect. *Radical leaves* on long very slender petioles, leaflets small, rounded, sparsely hairy above, glabrous beneath, lobes obtusely pointed; cauline few, shortly petioled, some times simple. *Racemes* subcorymbose, few flowered. *Sepals* small, obovate, glabrous, margin membranous. *Petals* $\frac{1}{4}$ in. long, obovate, scarcely clawed.

*** *Radical leaves (or all) pinnatisect.*

5. **C. subumbellata**, *Hook. mss.*; perennial, young parts with spreading hairs, leaflets petioled irregularly lobed and crenate, flowers small yellowish-white, pods irregularly corymbose narrow lanceolate acute few-seeded. *C. hirsuta* var. *subumbellata*, *Dalzell in Hook. Kew Journ. Bot.* 1852, 294. *C. nilagirica*, *Schlecht. in Herb. Hohenack.* No. 1493.

Shaded woods in the CONCAN, MALABAR, and CEYLON.

Slender, diffuse, very like *C. hirsuta* var. *sylvatica*, but young parts laxly strigose with spreading hairs, inflorescence corymbose, flowers more yellow, and pods broader. *Stem* 3-10 in., branching from the roots. *Leaflets* 3-6 by $\frac{1}{4}$ -1 $\frac{1}{2}$ in. *Pods* $\frac{3}{4}$ -1 in., sometimes solitary and axillary, 6-10-seeded. *Seeds* broad-oblong, remote; funicle dilated.

6. **C. hirsuta**, *Linn.*, var. *sylvatica*, *Link. (sp.)*; annual, glabrous, leaflets petioled, petioles not auricled, flowers small white, stamens 6, pods racemed erect acute or obtuse. *C. hirsuta*, *H. f. & T. in Journ. Linn. Soc.* v. 146; *Wall. Cat.* 4780. *C. debilis*, *Don Prodr.* 201.

All temperate regions of India; and a weed of the cold season in Bengal.—DISTRIB. General.

Stem suberect or decumbent, 3-12 in. *Leaflets* orbicular-ovate, toothed, and angled; of the upper leaves narrow. *Petals* narrow, erect, twice as long as the very small sepals. *Pods* $\frac{1}{2}$ -1 in.; style very short, except in var. *oxycarpa*.

VAR. *oxycarpa* (not *C. oxycarpa*, Boiss.); diffusely branched, pods acuminate, style slender.—Hilly districts, common.

7. **C. impatiens**, *Linn.*; annual, erect, glabrous, leaflets shortly petioled, petioles auricled, flowers small white, stamens 6, pods erect. *H. f. & T. Journ. Linn. Soc.* v. 146; *Griff. It. Notes* 218, n. 99. *C. pectinata* *DC. Syst. Veg.* ii. 264.

Temperate Himalaya from SIKKIM to KASHMIR, alt. 5-12,000 ft.—DISTRIB. Afghanistan, temp. Europe and Asia

Stems stiff, 6-12 in. *Leaves* pinnate; leaflets small, ovate-oblong or lanceolate, obtusely 3-5 lobed; auricles of the stem-leaves sagittate. *Petals* linear, erect, very minute, white, often 0. *Pods* 1 in., erect, very slender, linear, acute; style subulate; valves smooth.

8. **C. pratensis**, *Linn.*; perennial, glabrous, leaflets in equidistant pairs angled shortly petioled, flowers large white or lilac, pods linear erect. *H. f. & T. Journ. Linn. Soc.* v. 145.

Hassora in WESTERN TIBET, *Winterbottom*.—DISTRIB. N. and W. Asia, Europe, Abyssinia, N. America.

Stem 1 ft.; rootstock sometimes bearing small fleshy tubers. *Leaves* pinnate; leaflets of the radical leaves orbicular or ovate, terminal larger; those of the cauline leaves linear-oblong, entire. *Flowers* corymbose when young. *Petals* spreading, three times as long as the sepals. *Pods* 1 in.; style short.

9. **C. Griffithii**, *H. f. & T. Journ. Linn. Soc.* v. 146; perennial, erect, leaflets sessile entire or sinuate, lowest pair at the base of the petiole, flowers large deep lilac. *Griff. Itin. Notes*, 188, n. 996.

Wet places near Lamu in BHOTAN, *Griffith*.

Rootstock creeping; stem 1 ft., angled and grooved. Leaflets in 3-6 pairs, ovate oblong or rounded.—The specimens have no flowers, but Griffith has recorded their size and colour.

10. **C. elegantula**, *H. f. & T. Journ. Linn. Soc.* v. 146; very small, annual, branched, leaflets linear-oblong in 5-7 remote pairs, flowers white or rose, pods filiform. *Hutchinsia* sp. *Griff. It. Notes*, 195, n. 1079.

Wet rocks Chuka in BHOTAN, alt. 6500 ft., *Griffith*.

Pale green, tender. Stem 2-3 in., slender. Leaves glabrous, pinnate; leaflets petiolulate, small, fleshy, linear-oblong, sublobed angled or quite entire. Racemes lengthened, 2-9-flowered. Petals white or rose, broadly clawed, thrice as long as the small glabrous sepals. Pods $\frac{3}{4}$ in., narrow-linear, on very slender, filiform, spreading or drooping pedicels; style short, a little narrower than the pods.

11. **C. macrophylla**, *Willd. Sp. Pl.* iii. 484; stout, erect, perennial, leaflets ovate or lanceolate crenate-lobed or pinnatifid, flowers large white or deep violet, pods with very thick margins. *DC. Prodr.* i. 152; *H. f. & T. Journ. Linn. Soc.* v. 145. *C. polyphylla*, *Don Prodr. Fl. Nep.* 201. *Dentaria dasyloba*, *Turcz. in Bull. Soc. Imp. Mosq.* xxx. n. 103.

Temperate Himalaya, alt. 7-12,000 ft., from SIKKIM to KASHMIR.—DISTRIB. N. Asia, Japan.

Leafy, glabrous or slightly pubescent; rootstock creeping; stem simple, herbaceous, 1-2½ ft., smooth, striated. Leaves all pinnate; leaflets $\frac{1}{2}$ -3 in., 3-5 pairs, acuminate or obtuse. Racemes erect, many-flowered. Pods $\frac{1}{2}$ -1½ in., erect, tapering at both ends; valves smooth, flat; style $\frac{1}{8}$ in., rigid.

VAR. 1. *dentariæfolia*; lateral leaflets lanceolate or ovate-lanceolate crenate or serrate obtuse, flowers large white or violet, pods $\frac{1}{2}$ -1¼ in.—*C. macrophylla*, *Led. Fl. Ross.* i. 128.—From Kumaon to Kashmir.

VAR. 2. *foliosa*; lateral leaflets narrow-lanceolate acuminate subpinnatifid, flowers white, pods 1-1½ in. pale coloured—*C. foliosa*, *Wall. Cat.* 4779.—Kumaon and Kashmir. The smallest state of the species.

VAR. 3. *lobata*; leaflets ovate-lanceolate irregularly and coarsely lobed or cut, lobes obtuse, flowers and pods as in var. *foliosa*, but the plant larger.—Kashmir, 6000 ft.; Western Tibet, 13,000 ft.

VAR. 4. *sikkimensis*; tall and coarse, leaflets ovate-lanceolate obtusely serrate, flower large deep violet, pods large and broad 1¾ in. long pale brown.—Inner ranges of Sikkim, 7000-13,000 ft. (The Lepchas use the leaves and young stems of this variety as a pot-herb.)

19. **LOXOSTEMON**, *H. f. & T.*

A diminutive tender annual, with a few petiolate, usually 3-foliolate, leaves. Flowers small, corymbose, lilac. Sepals spreading, equal at the base. Petals broadly spathulate, clawed. Filaments of the long stamens thickened at the tip and recurved. Pod linear; stigma sessile, 2-lobed.

Closely allied to *Cardamine*, but in the absence of ripe fruit its place cannot be determined with certainty.

1. **L. pulchellus**, *H. f. & T. Journ. Linn. Soc.* v. 147.

SIKKIM, in moist grassy places, alt. 10-13,000 ft., *H. f.*

Stem slender, filiform, flexuous, glabrous, springing from a mass of toothed root-bulbils. Leaves generally 3-foliolate, rarely in 2 pairs; leaflets subsessile, linear, entire, apiculate. Corymb 3-6-flowered.

10. **NOTOCERAS**, Br.

A small, stiff, depressed, branched, hoary herb, with bipartite adpressed pubescence. *Flowers* white, in leaf-opposed racemes. *Sepals* equal at the base. *Petals* small, linear-oblong. *Pod* rigid, almost indehiscent, linear-oblong, terete; valves with a prominent keel prolonged at the tip into a horn; internally pitted opposite the seeds; style short; stigma capitate. *Seeds* 1-seriate, small, compressed, wingless; cotyledons accumbent.

1. **N. Canariense**, Br. in *Hort. Kew. ed.* 2, iv. 117; *Griff. Itin. Not.* 230, n. 225; *H. f. & T. Journ. Linn. Soc.* iv. 147. *N. hispanicum*, DC.; *Deless. Ic. Sel.* ii. t. 17.

Fields and sandy places in the PUNJAB, Vicary, &c.—DISTRIB. Westward to the Canary Islands.

Stems 6–8 in., spreading and branching from the base. *Leaves* linear-oblong, entire. *Racemes* short, many-flowered. *Sepals* covered with adpressed hairs. *Pods* $\frac{1}{4}$ in., subsessile, erect, hoary. *Seeds* 4–8.

11. **FARSETIA**, Desv.

Hoary or tomentose much branched twiggy undershrubs or herbs. *Leaves* small, linear-oblong, entire. *Flowers* white pink or yellow, spiked or racemed. *Sepals* erect, connivent, lateral saccate at the base. *Petals* with long claws. *Pods* sessile, linear or elliptic, much flattened; valves convex, plane or with a midrib; septum membranous. *Seeds* 1–2-seriate, suborbicular, broadly winged; cotyledons accumbent.—DISTRIB. About 20 species, natives of S. Europe, W. Asia, and N. Africa.

1. **F. Jacquemontii**, *H. f. & T. Journ. Linn. Soc.* v. 148; flowers large, buds elliptic, sepals acute, pods narrow-linear. *Griff. Itin. Notes*, 218, n. 105.

Sandy places in the PUNJAB and SINDH.—DISTRIB. Afghanistan and Beluchistan.

An erect, rather rigid, hoary perennial, covered with closely adpressed hairs attached at their middle. *Stems* 12–18 in., branches virgate. *Leaves* $\frac{1}{4}$ –1 in., linear-oblong or linear. *Sepals* strigose. *Petals* half as long again as the sepals. *Pods* $1\frac{1}{2}$ –2 by $\frac{1}{8}$ – $\frac{1}{4}$ in., compressed; valves flat, nerveless or faintly 1-nerved; stigma short, suberect. *Seeds* 2-seriate—It is impossible to determine from Burman's figure whether this is the *Arabis helecophila*, DC.

2. **F. Hamiltonii**, *Royle Ill.* 71; flowers small, buds small subglobose, sepals obtuse. *H. f. & T. Journ. Linn. Soc.* v. 148. *F. linearis*, *Dcaisne* in *Ann. Sc. Nat. Sér.* 2, xvii. 150; *Hook. Ic. Pl.* t. 808. *Cheiranthus Farsetia*, *Wall. Cat.* 4081. *Arabis incanescens*, *Munro, Plants of Agra*, 6.

Upper GANGETIC PLAIN and the PUNJAB, from Agra Westwards.—DISTRIB. Afghanistan, Arabia, Algeria.

More rigid and woody than *F. Jacquemontii*, covered with denser and finer closely adpressed pubescence; branches long, erect, virgate. *Leaves* linear, very narrow. *Flowers* in long spicate racemes. *Sepals* strigose, margins scarious. *Petals* obovate, a little longer than the sepals, pink. *Pod* $\frac{1}{2}$ –1 by $\frac{1}{8}$ in., linear; valves almost nerveless; septum transparent; style slender. *Seeds* 1-seriate.—Closely allied to *F. longisiliqua*, Dcne., of Egypt and Arabia, but has smaller flowers and shorter pods. *F. linearis*, Dcne., is certainly identical with the Indian plant although the Algerian specimens have a slightly longer style, and a more 2-lobed stigma.

3. **F. ægyptiaca**, *Turr. diss. Fars.* i. t. 1, ex DC. *Syst.* ii. 287; flowers large, buds cylindric, sepals obtuse, pod elliptic-oblong. *H. f. & T. Journ.*

Linn. Soc. v. 147; *Griff. Itin. Notes*, 366, n. 11. F. ovalis, *Boiss. Diag.* viii. 32. F. Edgeworthii, *H. f. & T. Journ. Linn. Soc.* v. 147.

PUNJAB, in the Salt range, *Edgeworth, &c.*—DISTRIB. Afghanistan, Arabia, N. Africa.

A rigid, hoary undershrub, with forked virgate branches. *Leaves* linear. *Flowers* spicate, distant. *Calyx* cylindrical. *Sepals* $\frac{1}{4}$ – $\frac{1}{3}$ in., hoary. *Petals* linear, obtuse, twice as long as the sepals. *Pods* $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{8}$ – $\frac{1}{4}$ in., erect, broad, elliptic-oblong; valves flat, midrib indistinct or sometimes prominent; style very short. *Seeds* usually 2-seriate.

12. **ALYSSUM**, Linn.

Small branching herbs or undershrubs, often rigid, pubescent, hoary, stellate or scaly. *Leaves* linear, entire. *Flowers* small, yellow or white, in ebracteate racemes. *Sepals* short, erect or spreading, equal at the base. *Petals* with short claws, entire or 2-fid. *Filaments* often winged or with tooth-like appendages. *Pods* short, flattened parallel to the septum or turgid, orbicular elliptic ovate obovate or oblong; valves flat or concave or convex in the centre and flat at the margin; septum membranous, entire or perforated; style varying in length. *Seeds* 2–10, flattened; cotyledons accumbent.—DISTRIB. Species about 90, natives of S. Europe, Central Asia, and Southern Siberia.

Alyssum (*Kæniga*) *maritimum* is cultivated in gardens in N.-W. India.

1. **A. minimum**, *Willd. Sp. Pl.* iii. 464; leaves linear-oblong or obovate, filaments winged, valve of pod tumid in the centre. *Boiss. Fl. Orient.* i. 281; *H. f. & T. Journ. Linn. Soc.* v. 148.

KASHMIR, alt. 4–6000 ft., *T. T.*—DISTRIB. Afghanistan, W. Asia, S. Europe.

A hoary herb, with numerous stiff stems or branches 6–8 in. long, spreading from the base, ascending, everywhere except the petals and pods covered with stellate hairs or scales. *Racemes* many-flowered, lengthening during flowering. *Petals* minute, linear, white or faintly yellow. *Filaments* with entire or toothed wings. *Pods* as long as their pedicels, orbicular, slightly notched, glabrous; style very short, acute.

2. **A. canescens**, *DC. Prodr.* i. 164; leaves narrow-linear, filaments not winged, valve of pod flat. *H. f. & T. Journ. Linn. Soc.* v. 149. *A. tenuifolium*, *DC. Syst.* ii. 322. *Pilotrichum canescens* and *elongatum*, *C. A. Mey. in Led. Fl. Alt.* iii. 66; *Ic. Pl. Ross.* t. 273.

Western Himalaya in KUMAON, and WESTERN TIBET, alt. 14–17,000 ft.; *T. T.*, &c.—DISTRIB. S. Siberia.

A small, very hoary, tomentose plant; woody stems short tufted. *Leaves* 1 in., densely tufted, obtuse, erect. *Racemes* corymbose, elongating in the fruit. *Petals* orbicular-obovate, twice as long as the sepals, white. *Pods* $\frac{1}{2}$ in., erect, on short filiform pedicels, ovate, tomentose; style slender, half the length of the pod; stigma capitate. *Seeds* 2, not margined.

13. **DRABA**, Linn.

Small tufted herbs with stellate pubescence. *Leaves* entire, radical rosulate. *Flowers* white or yellow, rarely purple, in short ebracteate racemes, or corymbs. *Sepals* short, equal at the base. *Petals* entire or emarginate, claws short. *Filaments* simple. *Pods* compressed or turgid, elliptic oblong or ovoid, rarely linear; valves flat, rarely convex; septum membranous; style short or long. *Seeds* 2-seriate, ovoid, compressed, not margined; cotyledons accumbent, rarely incumbent.—DISTRIB. Species about 80, natives of N. temp., arctic, and alpine regions, and of the Andes of S. America.

SECT. I. **Aizopsis**. *Rootstock* stout, with many crowded tufts of rosulate leaves, which are rigid, ciliate, with a stout midrib beneath.

1. **D. glacialis**, *Adams in Mem. Soc. Nat. Mosq.* v. 106; leaves linear, scapes naked, flowers yellow, pods twisted, style distinct. *DC. Prodr.* i. 167; *H. f. & T. Journ. Linn. Soc.* v. 150. *D. setosa*, *Royle Ill.* 71. *D. elegans*, *Boiss. Fl. Orient.* i. 300.

WESTERN TIBET and KUNAWAR, alt. 10–15,000 ft.—DISTRIB. Arctic Asia and America, Soongaria, Rocky Mts.

Root slender, woody; branches many, prostrate, tufted, covered below with withered leaves. *Leaves* densely tufted, rather rigid, entire, rough and ciliated. *Scapes* 1–5 in., numerous, erect, stiff. *Flowers* crowded near the summit of the scape. *Pedicels* and *calyx* glabrous. *Pods* $\frac{1}{2}$ – $\frac{3}{4}$ in., erect, ovate-lanceolate, acute, glabrous.—Scarcely distinct from *D. alpina*, L.

SECT. II. **Chrysodraba**. *Root* or *rootstock* stout, with many crowded tufts of leaves. *Leaves* not rigid, without a strong midrib beneath, setose or tomentose. *Flowers* yellow.

2. **D. alpina**, *Linn.*; perennial, leaves densely rosulate oblong spathulate or lanceolate, scape leafless or 1-leaved, pods elliptic glabrous straight. *H. f. & T. Journ. Linn. Soc.* v. 150. *D. radicans*, *Royle Ill.* 71. *D. alpicola*, *Klotzsch in Reise Pr. Waldem.* 128, t. 36, f. 1 (bad). (*D. algida*, *Adams*; *Adamsii*, *Led.*; *ochroleuca*, *Bunge*; *polytricha*, *Led.*)

Alpine Himalaya from SIKKIM to KASHMIR and in WESTERN TIBET, alt. 12–17,000 ft.—DISTRIB. Alps of W. Asia, N. Europe, the Rocky Mts. and Arctic regions.

Stems densely tufted, short or 6–10 in. *Leaves* $\frac{1}{4}$ –1 in., covered with mixed simple and branched hairs, or glabrous with ciliate margins. *Scapes* $\frac{1}{2}$ –6 in., 1–10-flowered. *Flowers* rather large, subcapitate. *Sepals* usually glabrous. *Pods* $\frac{1}{2}$ – $\frac{3}{4}$ in., shortly racemose, 4–10-seeded; pedicels suberect, hairy or glabrous, long; style very short.

3. **D. elata**, *H. f. & T. Journ. Linn. Soc.* v. 150: annual, leaves loosely rosulate spathulate obtuse, scapes with distant leaves, pods ovate- or oblong-lanceolate acute twisted.

Subalpine inner ranges of SIKKIM, alt. 11–13,000 ft., *H. f.*

Erect, 9–15 in., sparingly covered with simple and stellate hairs. *Radical leaves* petioled, entire or rarely toothed. *Flowers* numerous, subcapitate. *Sepals* $\frac{3}{4}$ in., hairy, margin scarious. *Petals* twice as long, ovate-oblong, clawed. *Pods* in long lax racemes, once or twice twisted, glabrous when ripe; pedicels $\frac{1}{2}$ in., spreading or suberect, pilose, lower often bracteate.

4. **D. incompta**, *Steven in Bull. Soc. Nat. Hist. Mosc.* iii. 268; perennial, leaves rosulate oblong, scapes naked, pod elliptic-oblong slightly curved not twisted. *DC. Prodr.* i. 168; *Deless. Ic.* ii. 44; *D. tibetica*, *var. γ* Winterbottomi, *H. f. & T. in Journ. Linn. Soc.* v. 152.

WESTERN TIBET, alt. 11–13,000 ft., *Falconer, Winterbottom*.—DISTRIB. Persia, Caucasus.

A small very tomentose, hoary plant, with short naked branches from the crown of the root, ending in tufts of leaves. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., all tufted, oblong. *Scapes* $\frac{1}{4}$ – $\frac{1}{2}$ in., pubescent, scarcely lengthening in fruit. *Pods* glabrous; style short, bent or straight.—The fruit of this plant was unknown when it was referred as a variety to *D. tibetica*; those of *Falconer's* specimens recently added to the Kew Herbarium have ripe pods, which are similar to those of the Persian and Caucasian plant.

SECT. IV. **Leucodraba**. *Rootstock* biennial or perennial, with many tufts of radical leaves. *Leaves* soft, flat. *Flowers* white.

5. **D. incana**, *Linn.*; *DC. Prodr.* i. 170; stem leafy rarely branched, leaves usually toothed, pods elliptic-lanceolate acute hoary longer than their pedicel. *Reich. Ic. Fl. Germ.* t. 14; *H. f. & T. in Journ. Linn. Soc.* v. 151. *D. himalayensis*, *Klotzsch in Bot. Reis. Pr. Wald.* 127, t. 34 B (bad). (*D. confusa*, *Ehr.*; *gracilis*, *Led.*)

Alpine Himalaya, from SIKKIM to WESTERN TIBET, alt. 10–17,000 ft.—DISTRIB. Alpine and arctic N. Europe, Asia and America, Fuegia.

Hoary. *Stems* 1–10 in., erect. *Radical leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., loosely tufted or spreading, elliptic or oblong-lanceolate or narrow-spathulate; cauline distant, sessile, ovate- or oblong-lanceolate, toothed or rarely entire. *Flowers* small, white. *Petals* twice the length of the sepals, obovate, notched. *Pods* racemed, compressed, sometimes twisted, tomentose; pedicels $\frac{1}{8}$ – $\frac{1}{4}$ in., erect, pubescent; stigma subsessile.

The Tibetan and Himalayan specimens possess the characters of *D. confusa*, *Ehr.*, usually having toothed cauline leaves, and stellately pubescent pods.

6. **D. lasiophylla**, *Royle Ill.* p. 71; stem sparsely leafy, radical leaves crowded soft white, pods elliptic-lanceolate much twisted shorter and broader than in *D. incana*. *Boiss. Fl. Orient.* i. 301; *H. f. & T. Journ. Linn. Soc.* v. 151. *D. glomerata*, *Royle Ill.* 71.

Alpine Himalaya and Western Tibet, from SIKKIM to KUNAWUR and LADAK, alt. 12–18,000 ft.—DISTRIB. Turkistan.

Very like the preceding, but more hairy, and with shorter less leafy stems, and leaves in closer tufts. *Radical leaves* $\frac{5}{8}$ – $\frac{1}{2}$ in., oval-oblong or oblong-lanceolate. *Stems* simple, erect, with 1–3 sessile lanceolate leaves. *Flowers* small, white, subcapitate. *Fruiting racemes* elongate or subcapitate; pedicels very short. *Pods* once to three times twisted.—Very closely allied to *D. stellata*, *Jacq.*, of the European Alps (*D. siliquosa*, *M. A. B.*, is probably identical), scarcely differing except in the twisted pod.

7. **D. fiadnitzensis**, *Wulf. in Jacq. Misc.* i. 147, and 17, f. 1; small, glabrous or pilose, leaves densely rosulate lanceolate, scape slender leafless or 1-leaved, pods elliptic-oblong or lanceolate straight glabrous. *DC. Prodr.* i. 169; *Reich. Ic. Fl. Germ.* xiii. f. 4237. *D. Wahlenbergii*, *Hartm. Scand. ed.* i. 249; *H. f. & T. Journ. Linn. Soc.* v. 151 (*D. helvetica*, *Schleich*; *lapponica*, *Wahl.*; *androsæcea*, *Willd.*).

Western Himalaya in KUMAON and KUNAWUR, and in WESTERN TIBET, alt. 13–18,000 ft.—DISTRIB. Alpine and arctic Europe, Asia and America.

Leaves $\frac{5}{8}$ – $\frac{1}{2}$ in., margins ciliate. *Scapes* 1–4 in., erect. *Flowers* few, capitate. *Petals* short, scarcely clawed, white. *Pods* scarcely racemed; style very short.—“We have adopted the first name given to this species, which is that of the Carpathian plant, with which the Indian quite agrees,” *T. Anderson*.

VAR. 1. *homotricha*; leaves stiffly ciliate glabrous or with simple hairs. *D. Wahlenbergii*, var. *homotricha*, *Led. Fl. Ross.* i. 150; *H. f. & T. l.c.* 151 (*D. lactea*, *Kar. & Kir.*; *D. altaica*, *Bunge*).—S. Piti and Nubra.

VAR. 2. *heterotricha*; leaves with mixed simple and stellate hairs. *D. Wahlenbergii*, var. *heterotricha*, *Led. Fl. Ross.* i. 150; *D. pygmaea*, *Turc.*

8. **D. tibetica**, *H. f. & T. Journ. Linn. Soc.* v. 152; loosely tufted, woolly or hoary, leaves spatulate-lanceolate entire, scapes slender usually leafless, pods hoary shorter than their slender pedicels.

Inner ranges of the SIKKIM HIMALAYA, and WESTERN TIBET; alt. 13–15,000 ft.

Leaves $\frac{1}{4}$ –1 in., nearly all radical, entire. *Scapes* 3–8 in., numerous, erect, flexuose, rarely with 1 or 2 sessile lanceolate leaves. *Flowers* subcapitate, rather large, white; pedicels $\frac{1}{4}$ –1 in., slender, erect. *Pods* $\frac{5}{8}$ – $\frac{1}{2}$ in. long, racemed, elliptic or linear-lanceolate, flat or twisted; style very variable in length.—Both the following varieties (especially the first) are too closely allied to *D. lasiophylla* and *D. incana*.

VAR. 1. *Thomsonii*, H. f. & T. l.c.; leaves laxly or scarcely tufted hoary and tomentose, pods linear-lanceolate not twisted, style short and stout—Zanskar, *Thomson*.

VAR. 2. *sikkimensis*, H. f. & T. l.c.; leaves closely tufted except in very luxuriant young shoots very woolly, pods long linear-lanceolate or short and elliptic twisted, style long slender.—Sikkim at 16,000 ft., *H. f.*

SECT. IV. **Drabella**. Annual. *Scapes* or *stems* leafy. *Flowers* white or yellow.

9. **D. muralis**, *Linn.*; stellately hispid, stems filiform flexuous, cauline leaves broad elliptic-ovate coarsely toothed, petals white minute, fruiting racemes very long, pods horizontal oblong or elliptic on long capillary spreading pedicels. *Boiss. Fl. Orient.* i 302.

KASHMIR, alt. 5600 ft.—DISTRIB. Asia Minor, N. Africa, Europe.

An erect, simple or branched very slender annual; rather rough with short simple or forked hairs. *Radical leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., few, rosulate, obovate, entire or toothed; cauline few, sessile, auricled or not. *Flowers* in a short raceme. *Petals* small, narrow, entire, white. *Pods* racemed, $\frac{3}{8}$ – $\frac{1}{2}$ in., quite flat, glabrous or scaberulous, stigma subsessile. *Seeds* about 12.

10. **D. ellipsoidea**, *H. f. & T. in Journ. Linn. Soc.* v. 153; stems flexuous prostrate short interlaced, leaves toothed, flowers minute white, fruiting racemes very short, flowers minute white, pods elliptic-oblong very flat obtuse, stigma sessile.

SIKKIM-HIMALAYA, a weed in radish fields, alt. 15–16,000 ft., *H. f.*

Much depressed, hairy, leafy. *Leaves* $\frac{1}{4}$ –1 in., linear-oblong. *Pods* racemed, $\frac{1}{8}$ – $\frac{1}{2}$ in., equalling or shorter than their curved pedicels, flat, stellately pubescent; style 0.—Differs remarkably from *D. muralis* in its habit, flexuous branches, and short fruiting racemes.

11. **D. linearis**, *Boiss. in Ann. Sc. Nat. Ser. 2, xvii.* 167; *Fl. Orient.* i. 203; stem simple erect, leaves entire or nearly so, flowers rather large white, fruiting racemes long, pods erect linear. *D. stenocarpa*, *H. f. & T. Journ. Linn. Soc.* v. 153.

Das Kirim in temperate WESTERN TIBET, *Winterbottom*.—DISTRIB. Mountains of Persia.

Stem 6–12 in., scaberulous. *Radical leaves* rosulate, linear-oblong or obovate, thickly clothed with forked hairs; cauline 2–5. *Petals* narrow-cuneate, entire. *Pods* $\frac{3}{8}$ – $\frac{3}{4}$ in., in long racemes, on slender smooth ascending pedicels, tapering at both ends, straight; stigma sessile. *Seeds* many.—Near *D. muralis* but stiffer, with much longer and racemed pods.

12. **D. gracillima**, *H. f. & T. Journ. Linn. Soc.* v. 153; hoary, scapes or stems many weak ascending, leaves subentire, flowers small yellow, racemes long, pods linear erect.

Temperate SIKKIM-HIMALAYA, alt. 10–13,000 ft., *H. f.*

Stems 4–12 in. *Radical leaves* spreading, spatulate; cauline few, near the base, sessile, ovate. *Scapes* numerous, filiform, flexuose. *Pods* $\frac{1}{2}$ in., erect, tapering at both ends, compressed, straight or curved, glabrous; racemes occupying almost the whole length of the stem; pedicels $\frac{1}{2}$ in., filiform, spreading or deflexed, the lowest often twice the length of the uppermost. *Seeds* numerous.

14. **EROPHILA**, DC.

Small, delicate annuals, with entire spreading root-leaves. *Flowers* usually small, white, on slender scapes. *Sepals* erect, equal at the base. *Petals*

obovate, 2-fid. *Filaments* free, without appendages. *Pod* oblong, elliptic or linear, compressed; valves membranous, flat or convex; septum membranous; style very short. *Seeds* numerous, small, 2-seriate; funicles filiform.—**DISTRIB.** Species 5, European and W. Asiatic.

1. ***E. vulgaris*, DC.** *Draba verna*, Linn.; *H. f. & T. in Journ. Linn. Soc.* v. 149; *Griff. Itin. Notes* 239, No. 312; 243, No. 364; 365, No. 7; *Ic. iv. t.* 611.

KASHMIR; alt. 5–6000 ft.—**DISTRIB.** Afghanistan, W. Asia, Europe.

Leaves all radical, spreading on the ground, ovate or oblong, entire or toothed, slightly hairy. *Scapes* 2–8 in., erect, glabrous. *Pods* $\frac{1}{2}$ in., elliptic-oblong, at least twice as long as broad; pedicels long, slender.

15. **COCHLEARIA**, Linn.

Glabrous, often fleshy annual or perennial herbs. *Leaves* entire or pinnatifid. *Flowers* white, rarely yellow or violet, corymbose or in short racemes, rarely solitary on scapes. *Sepals* spreading, equal at the base. *Petals* entire, shortly clawed. *Filaments* without appendages or teeth. *Pods* globose ovoid or oblong; valves convex, turgid. *Seeds* 2-seriate, rarely 1-seriate, compressed, without wings; cotyledons accumbent.—**DISTRIB.** Species about 25, natives of N. temp. and Asiatic regions.

1. ***C. flava*, Ham. Hort. Bengh.** 48; annual, diffusely branched, leaves pinnatifid, pods globose. *Hook. Ic. Pl. t.* 805; *H. f. & T. Journ. Linn. Soc.* v. 154. *C. alyssoides*, DC *Prodr.* i. 172. *Camelina* Caisir, *Wall. Cat.* 4802. *Alyssum cochlearioides*, *Roth.*

Upper and lower GANGETIC valleys, from the Soane westwards to KURNAUL.

Erect, rarely depressed, glabrous, 1 ft. high. *Root* long, fusiform. *Leaves* 4–5 in., lanceolate, lobes sinuate-toothed, lower petioled, upper smaller shorter petioled, auricled. *Racemes* numerous, long. *Flowers* small, yellow; pedicels $\frac{1}{10}$ in. *Pods* smooth, about $\frac{1}{2}$ in. diam.; valves membranous; hemispheric, nerveless; style short, thick. *Seeds* small, numerous, rugose, funicles filiform.

2. ***C. himalaica*, H. f. & T. Journ. Linn. Soc.** v. 154; small, prostrate, leaves long-petioled oblong-ovate, flowers racemed, pod elliptic.

Inner ranges of the SIKKIM-HIMALAYA, alt. 14–16,000 ft., *H. f.*

A dwarf, prostrate, smooth, leafy, fleshy annual?, with long fusiform slender root. *Leaves* coarsely toothed. *Flowers* small, in short bracteate racemes. *Sepals* persistent, slightly hairy. *Pods* slightly compressed, bent, pubescent, 3–5 seeded; valves thin, membranous; septum disappearing in the ripe fruit.—*Cochlearia altaica* (*Taphrospermum altaicum*, C.A.M.) very closely resembles this, but differs in the shape of the leaves, pods and seeds.

3. ***C. scapiflora*, H. J. & T. in Journ. Linn. Soc.** v. 154; stemless, rootstock very stout, leaves linear-lanceolate or spatulate, scapes 1-flowered, pods obliquely elliptic-oblong.

By melting snow-rills in the SIKKIM-HIMALAYA, *H. f.*, and in WESTERN TIBET alt. 15–18,000 ft., *Strach. & Wintert.*,

Small, stemless, fleshy, glabrous. *Leaves* tapering at the base into a long flat petiole, entire or with a few broad sharp teeth. *Scapes* $1\frac{1}{2}$ in., flaccid. *Flowers* large, pale lilac. *Sepals* glabrous, persistent. *Pods* $\frac{3}{4}$ – $\frac{1}{2}$ in. long; septum evanescent.

16. **MALCOLMIA**, Br.

Branching herbs, pubescence simple or stellate. *Leaves* entire or pinnatifid. *Flowers* in lax racemes, white or purple. *Sepals* erect, equal at the base. *Petals* linear, claws long. *Filaments* free, the longer ones sometimes united in pairs. *Pods* elongate, cylindric, hard and dehiscent late; peduncle usually thickened; valves 3-nerved; septum membranous; stigma erect, lobes often united into an acute cone or decurrent along the short style. *Seeds* 2-seriate towards the base of the pod, oblong, not margined; cotyledons incumbent.—**DISTRIB.** About 20 species, natives of W. Asia and the Mediterranean region.

* *Pods linear, elongate.*

1. **M. africana**, Br. *Hort. Kew. ed.* 2, iv. 121; leaves oblong or lanceolate toothed, flowers many small, pods straight hispid. *DC. Prodr.* i. 187; *Griffith Itin. Notes* 260, No. 513; *H. f. & T. in Journ. Linn. Soc.* v. 155.

Fields and waste places in the PUNJAB, KASHMIR, and WESTERN TIBET, ascending to 13,000 ft.—**DISTRIB.** W. Asia, Mediterranean region.

Stout, leafy, annual, 1½ ft., rough with stiff forked and simple hairs; branches many, long, somewhat spreading. *Leaves* 1–6 in., petioled. *Flowers* near the ends of the branches. *Petals* obovate-oblong, twice as long as the persistent sepals, purple or white. *Fruiting racemes* 6–12 in. long; pedicels $\frac{1}{2}$ in., erect, as thick as the pods. *Pods* 2–3 in. long, narrow, linear, very rough with short forked hairs; valves prolonged into a short blunt horn; stigma short, conical, tapering to an acute point.—Varies greatly in pubescence, size of the leaves, and length and thickness of the pedicels and pods.—A very rough variety with small flowers has been distinguished as *β stenopetala* (*M. stenopetala*, Led.)

2. **M. torulosa**, Boiss. *Fl. Orient.* i. 225; leaves narrow toothed or pinnatifid, flowers small, pods torulose usually contorted or recurved. *Sisymbrium torulosum*, Desf. *Fl. Atlant.* ii. 84, t. 159; *DC. Prodr.* i. 195; *H. f. & T. in Journ. Linn. Soc.* v. 163. *S. contortuplicatum*, *DC. Prodr.* l.c.

PUNJAB at Peshawur, *Stewart*.—**DISTRIB.** Westwards to Syria and N. Africa.

A depressed annual or biennial, with numerous spreading and ascending stiff, stout branches, 6 or 8 in. long, hispid with stiff spreading simple or forked hairs, rarely glabrous. *Radical leaves* 1–3 in., numerous, oblong-lanceolate, acute; cauline shorter and less divided. *Flowers* small, subsessile, white. *Pods* $\frac{3}{4}$ –1 in., on very short thick pedicels, slender, straight recurved or contorted, hispid. *Seeds* small, oblong, 1-seriate.

** *Pods long or short, subulate.*

3. **M. strigosa**, Boiss. *Fl. Orient.* i. 224; glabrous or hispid below only, leaves oblong-lanceolate repand or toothed, pods 1–1½ in. long.—*H. f. & T. in Journ. Linn. Soc.* v. 155.

In the Salt range, PUNJAB, *Fleming, Stewart*.—**DISTRIB.** Afghanistan, Beluchistan, Persia.

A stout, depressed or suberect, rough, hairy annual, soon dividing into a few rather rigid short branches 6–18 in. long. *Radical leaves* long-petioled, spreading on the ground, 2 or 3 in. long; cauline shorter and more entire. *Flowers* numerous, sessile, in racemes 2–12 in. *Petals* about $\frac{1}{2}$ in., sometimes twisted, linear, dark purple, rarely white, limb broader than the claw. *Pods* terete, stout, thickened at the base, tapering to an obtuse point, spreading horizontally or decurved; base with short branching and long spreading forked hairs, less hispid above. *Seeds* sub-2-seriate at the base of the pod, 1-seriate above.

17. **LEPIDOSTEMON**, H. f. & T.

A dwarf annual with a short leafy unbranched stem. *Leaves* narrow, toothed. *Flowers* yellow, on long subcorymbose pedicels. *Sepals* short, equal at the base. *Stamens* free; all the filaments with a broad appendage. *Pods* linear, elongate; valves smooth; septum entire, hyaline, nerveless; style very short; stigma 2-lobed. *Seeds* 1-seriate, oblong, flattened, with long slender free cords.

1. **L. pedunculatus**, H. f. & T. in *Journ. Linn. Soc.* v. 156.

Interior valleys of SIKKIM-HIMALAYA; rocky hills at Tungu, alt. 14–15,000 ft., H. f.

A dwarf alpine of peculiar habit, 1 in. high, covered with soft forked hairs. *Stem* erect, simple. *Leaves* numerous, $\frac{1}{4}$ – $1\frac{1}{2}$ in., oblong or narrowly spatulate, deeply sharply toothed. *Flowers* numerous, rather large, subcorymbose; pedicels $\frac{3}{4}$ in., erect, downy. *Sepals* erect, pilose, persistent. *Petals* short, obovate, emarginate. *Pods* $\frac{1}{2}$ in. (immature) erect, downy. *Seeds* unknown; affinity hence doubtful.

18. **SISYMBRIUM**, Linn.

Glabrous hairy or tomentose or hoary annual or biennial herbs. *Leaves* entire lobed pinnatifid or pinnatisect. *Flowers* yellow, white or rose-coloured, in lax often bracteate racemes. *Sepals* short or elongate, equal at the base or the lateral saccate. *Petals* with long claws. *Stamens* free; filaments all simple. *Pods* elongate, cylindric or compressed, rarely tetragonal; valves convex, usually 3-nerved; septum membranous; style short, stigma 2-lobed. *Seeds* generally numerous, 1-seriate, not margined, with filiform cords; cotyledons incumbent.—DISTRIB. Species about 80, chiefly European and Oriental, with a few representatives in most temperate regions.

SECT. I. **Arabidopsis**. *Flowers* white purple or rose-coloured. *Valves* of the terete or compressed pod 1-nerved or nerveless.—(Distinguishable from *Arabis* by the cotyledons only.)

* *Cauline leaves sagittate*.

1. **S. mollissimum**, C. A. Mey. in *Led. Fl. Alt.* iii. 140; glabrous or hairy, leaves entire or toothed, flowers capitate ebracteate, pods slender erect glabrous, pedicels slender. *Led. Ic. Fl. Ross.* t. 262; H. f. & T. *Journ. Linn. Soc.* v. 160.

Temperate Himalaya, from SIKKIM to KASHMIR, alt. 8–10,000 ft. (to 16,000 in Sikkim); WESTERN TIBET, alt. 12–14,000 ft.—DISTRIB. Altai.

An erect rigid biennial or perennial. *Stem* solitary or 2 or 3 from the same root, 9–18 in. high, simple or with a few stiff erect branches. *Leaves* 1–2 in., shortly petioled, obovate-lanceolate; cauline oblong, sagittate and stem-clasping, gradually smaller upwards. *Flowers* purple or white, racemes elongate and lax in the fruit; pedicels slender, erect, $\frac{1}{4}$ – $\frac{1}{2}$ in. *Pods* 1– $1\frac{1}{2}$ in., straight; valves convex; veins indistinct; style short, slender.

VAR. *glaberrima*; all parts glabrous or only the lower part of the stem puberulous.—Western Himalaya, Thomson; Western Tibet, Falconer.

2. **S. himalaicum**, H. f. & T. *Journ. Linn. Soc.* v. 160; hispidly tomentose, leaves sinuate-toothed, flowers racemed bracteate, pods erect or spreading glabrous or pubescent.

Temperate HIMALAYA, from Sikkim to Kashmir, alt. 10–12,000 ft.

Like the preceding, but smaller and more branched, hirsute, with mixed simple and

stellate hairs. *Stem* erect, with numerous spreading or ascending stiff branches. *Leaves* radical petioled; upper clasping the stem by sagittate auricles. *Pods* 1-1½ in. long, terete, straight; pedicels short, stout, spreading, each with a leaf-like bract at the base; valves striate.

3. **S. foliosum**, *H. f. & T. in Journ. Linn. Soc.* v. 160; sparsely hairy, leaves broad toothed, flowers racemed glabrous, pods slender curved glabrous much compressed.

KASHMIR, alt. 5-7000 ft., *Thomson*.

A suberect or decumbent herbaceous much branched annual, with scattered stellate hairs, 6-12 in. high. *Radical leaves* soon withering, spatulate, shortly petioled; cauline larger, 1-2½ in. long, oblong or obovate, sessile, auricles long sagittate stem-clasping, coarsely toothed. *Flowers* small, white, ebracteate; pedicels ¼ in., slender, usually spreading, sometimes ascending or deflexed. *Pods* 1½ in., in long racemes, spreading, ascending or the lower sometimes deflexed, straight or curved, with a few stellate hairs; valves thin, flattened, striate.

** *Leaves not pinnatifid; cauline not sagittate or auricled.*

4. **S. Thalianum**, *Gay & Monn. in Gaud. Fl. Helv.* iv. 348; annual, radical leaves petioled obovate, flowers small white, pedicels very slender, pods very slender suberect curved glabrous compressed, seeds flattened. *Boiss. Fl. Orient.* i. 214; *H. f. & T. Journ. Linn. Soc.* v. 163. *Arabis Thaliana*, *Linn.*; *DC. Prodr.* i. 144; *Conringia Thaliana*, *Reich. Ic. Fl. Germ.* t. 60, f. 4380.

Temperate Himalaya, from BHOTAN to KASHMIR, and in WESTERN TIBET; alt. 5-10,000 ft.; PUNJAB, *Stewart*.—DISTRIB. Temp. Europe, Asia, Abyssinia.

An erect, slender, branching annual, 4-12 in. high, slightly hispid with scattered spreading simple and forked hairs or glabrous. *Leaves* 1-3 in., toothed or entire; cauline few, remote, sessile, generally entire. *Racemes* slender, elongate; pedicels ½-1 in., spreading or ascending. *Pods* ½-1 in., narrow linear; valves convex, 1-nerved; style short. *Seeds* very small; cotyledons obliquely incumbent.

5. **S. lasiocarpum**, *H. f. & T. Journ. Linn. Soc.* v. 163; annual, slender, erect, hispidly pubescent, leaves small radical obovate-spathulate, flowers lilac, pedicels short, pods short straight terete densely pubescent. *Griffith Itin. Notes* 188, No. 991.

Lammoo and Panya in BHOTAN, *Griffith*.

Simple, rigid, 9-18 in., hoary and pubescent with mixed simple and stellate hairs. *Radical leaves* ½-1 in. long, few, shortly petioled, sinuate-toothed; cauline small, sessile, obovate. *Flowers* small. *Sepals* pubescent. *Pods* ¾ in., erect; valves convex, nerveless; style very short.

6. **S. rupestre**, *Edgew. in Trans. Linn. Soc.* xx. 33; annual, erect, branched, hoary, radical leaves linear-oblong sinuate-toothed, cauline sometimes cordate at the base, flowers shortly pedicelled, pods subterete glabrous or puberulous, slender. *H. f. & T. in Journ. Linn. Soc.* v. 162.

In the dry region of the WESTERN HIMALAYA, from Kumaon to Kashmir, alt. 8-14,000 ft.; Piti in WESTERN TIBET, *Thomson*.

Stem 6-18 in., stiff, branching; hairs forked, with a few scattered stellate ones. *Radical leaves* shortly petioled, ½-1 in.; cauline sessile, entire or toothed. *Racemes* few-flowered, bracteate throughout or towards the base; fruiting elongate, lax. *Flowers* purple or white. *Sepals* pubescent; pedicels ½-¾ in., puberulous. *Pods* 1½-1¾ in., erect or spreading, compressed; valves with an indistinct central vein.

7. **S. humile**, *C. A. Mey. in Led. Fl. Alt.* iii. 137; perennial, dwarf, hoary, diffuse, radical leaves oblong, cauline petioled, flowers shortly pedi-

celled, pods straight terete torulose. *Led. Ic. Fl. Ross.* t. 147; *H. f. & T. Journ. Linn. Soc.* v. 163.

WESTERN TIBET, alt. 12–15,000 ft., *Winterbottom*, &c.—DISTRIB. Siberia, arctic America.

Subhispid, hoary, rarely green and glabrous; rootstock woody. Stem 1–8 in., decumbent or ascending, simple or branched. *Radical leaves* $\frac{1}{2}$ –1 in., many, crowded, sinuate-toothed or entire, cauline small. *Flowers* rather large, white or lilac. *Sepals* erect, pubescent or glabrous. *Pods* $\frac{1}{2}$ –1 in., pedicels short erect, cylindric, subhispid or glabrous, veins obscure.

8. **S. strictum**, *H. f. & T. Journ. Linn. Soc.* v. 161; annual, erect, hoary, leaves linear-oblong sinuate-toothed, cauline sessile, pedicels slender, pods erect curved terete slender glabrous, valves costate. *Malcolmia stricta*, *Camb. in Jacq. Voy. Bot.* i. 16, t. 16.

WESTERN HIMALAYA, from KUMAON to KASHMIR, alt. 5–10,000 ft.; WESTERN TIBET, *Winterbottom*, *Falconer*.

Stem 9–24 in., simple, rigid, scabrous. *Leaves* 1–1 $\frac{1}{2}$ in. long, lower narrowed into a short petiole; upper gradually diminishing along the stem, lanceolate, subentire. *Racemes* at first dense, elongate and lax in fruit. *Flowers* small, pale rose-coloured. *Pods* 1–2 in., narrow, on spreading or ascending pubescent pedicels $\frac{1}{2}$ in. long; valves convex, with a prominent midrib; style short, tapering.

9. **S. axillare**, *H. f. & T. Journ. Linn. Soc.* v. 162; small, annual, depressed, leafy, radical leaves spatulate lobed or toothed, cauline sessile, flowers white bracteate, pedicels slender, pods very slender, valves nerveless. *Griff. Itin. Notes* 195, No. 1074.

BHUTAN, on dry rocks and walls near Chupcha, alt. 8000 ft., *Griffith*; inner ranges of Sikkim, alt. 8–10,000 ft., *H. f.*

Diffuse, slender, subhispid or tomentose, branches prostrate leafy 3–6 in. long. *Radical leaves* shortly petioled, 1 in. long; cauline $\frac{1}{2}$ – $\frac{3}{4}$ in., ovate or oblong, rounded at the tip. *Flowers* rather large, solitary in the axils of the upper leaves; fruiting raceme elongate, lax, leafy; pedicels long, spreading or ascending. *Pods* $\frac{1}{2}$ in., terete, straight or slightly curved; subtorulose.—The Bhotan and Sikkim specimens agree in all essential characters, but the Bhotan ones from growing in a dry situation are smaller and much more hoary than those from Sikkim, where they were found in shady forests.

*** *Leaves pinnatifid.*

10. **S. Wallichii**, *H. f. & T. Journ. Linn. Soc.* v. 158; perennial, hispidly hairy, radical leaves small runcinately lyrate, flowers small white or rose, pedicels filiform, pods long very slender. *Arabis? leptocarpa*, *Wall. Cat.* 4784.

Dry parts of the WESTERN HIMALAYA, from KUMAON to KASHMIR, alt. 5–7000 ft.; SALT RANGE, *Stewart*.—DISTRIB. Afghanistan.

Stem 6–18 in., rough and hairy, especially near the base, with simple forked and stellate hairs, slender, erect. *Radical leaves* 1–3 in., crowded, spreading; terminal lobe large; cauline few, short, $\frac{1}{2}$ –1 $\frac{1}{2}$ in., linear-lanceolate, pinnatifid or almost entire. *Flowers* white, changing to pale pink. *Fruiting racemes* long, lax, terminal; pedicels $\frac{1}{2}$ –1 in., spreading. *Pods* 2–3 $\frac{1}{2}$ in., spreading, curved, glabrous; valves slightly convex, midrib distinct; style short, tapering.

11. **S. minutiflorum**, *H. f. & T. Journ. Linn. Soc.* v. 158; annual, puberulous, very slender, much branched, leaves pinnately cut into few linear segments, flowers minute white, pods small narrow, stigma sessile. *Boiss. Fl. Orient.* i. 215; *Griff. Itin. Notes* 314, No. 1166.

ZANSKAR in WESTERN TIBET, *Thomson*.—DISTRIB. Afghanistan.

Stem 2–9 in., stellately hairy, tortuous. *Leaves* small, thick. *Flowers* in numerous

terminal racemes. *Fruiting racemes* elongate; pedicels $\frac{1}{3}$ – $\frac{1}{2}$ in., spreading, as thick as the rachis. *Pods* $\frac{1}{2}$ in., straight or slightly curved; septum flat. *Seeds* very minute, oblong—Boissier remarks that the seeds are unknown. There are numerous ripe pods in Griffith's specimens in the Kew Herbarium. The cotyledons are incumbent.

SECT. II. **Sophia**. *Flowers* yellow, pedicelled, ebracteate. *Pod* cylindric or flat, valves 1-nerved.

12. **S. Sophia**, Linn.; annual, erect, glabrous or pubescent, leaves 2-3-pinnatisect, flowers small, pedicels slender. *Reich. Ic. Fl. Germ.* t. 74, f. 4405; *H. f. & T. Journ. Linn. Soc.* v. 158.

PUNJAB, in the Salt Range and near Peshawur; Temperate Himalaya from KUMAON to KASHMIR, alt. 5-7000 ft.; WESTERN TIBET, alt. 9-14,000 ft.—DISTRIB. Westward, throughout Europe, N. Africa, and in N. and S. America.

Stem 1-2 ft., finely tomentose and somewhat hoary, or quite glabrous; branches ascending. *Leaves* numerous; segments short, linear. *Flowers* small, pale yellow. *Fruiting racemes* elongate, lax, terminal. *Pods* 1 in., spreading, or erect, on long pedicels, cylindric, subcompressed, curved, subtorulose; midrib prominent; stigma subsessile.

SECT. III. **Irio**. *Flowers* yellow, pedicelled, ebracteate. *Pods* terete, valves 3-nerved.

* *Fruiting pedicels* as broad as the pod.

13. **S. Columnæ**, Jacq. *Fl. Austr.* t. 323; annual, tall, glabrous or hairy below, leaves runcinate, sepals erect, valves of pod not ribbed. *Boiss. Fl. Orient.* i. 216; *H. f. & T. Journ. Linn. Soc.* v. 157.

Western Himalaya, from KUMAON to KASHMIR, ascending to 10,000 ft.; WESTERN TIBET, alt. 9-14,000 ft.—DISTRIB. Westward to Central Europe.

Stem 3 ft., stout, erect, slightly branching, subhispid with spreading or reflexed hairs, or all glabrous and glaucous. *Leaves* sometimes almost entire; segments toothed, from ovate-oblong to lanceolate; terminal lobe angled; of the upper leaves hastate. *Flowers* large, pale yellow. *Sepals* glabrous. *Pods* 3-4 in., spreading, very slender, curved, glabrous or slightly hairy; pedicel very stout; valves striated, indistinctly costate; style thickened, $\frac{1}{12}$ in.

14. **S. pannonicum**, Jacq. *Coll.* i. 70; *Ic. Pl. Rar.* t. 123; annual, hispid or glabrate, leaves runcinate-pinnatisect, sepals spreading, valves of pod 3-nerved. *Boiss. Fl. Orient.* i. 217; *H. f. & T. Journ. Linn. Soc.* v. 257. *S. septulatum*, DC. *Syst.* ii. 471.

Hassora in WESTERN TIBET, alt. 8000 ft., *Winterbottom*.

Stem rather tall, stiff, often simple below, and divaricately branched above. *Leaf-segments* nearly all similar, toothed or entire, of the lower leaves broad, of the upper, narrow-linear. *Flowers* large, pale yellow. *Sepals* glabrous, caducous. *Pods* 3-4 in., on short very thick pedicels, spreading or ascending, straight, obtuse, glabrous; septum membranous, projecting transversely between the seeds; style subelongate, thick; stigma large, 2-lobed.

** *Fruiting pedicels* slender.

15. **S. Irio**, Linn.; annual or biennial, tall, glabrous, leaves runcinate-pinnatifid, segments not auricled, flowers minute, pedicels slender, young pods overtopping the raceme, old 3-nerved, stigma sessile. *Reich. Ic. Fl. Germ.* t. 75, f. 4408; *H. f. & T. Journ. Linn. Soc.* v. 157. *S. irioides*, Boiss. *Fl. Orient.* i. 218; *H. f. & T. Journ. Linn. Soc.* v. 157.

In Northern India, from RAJPOOTANA to the PUNJAB.—DISTRIB. Afghanistan and westwards to the Canary Islands.

Stem 1-3 ft. tall, quite glabrous, or slightly pubescent near the base. *Leaves* petioled, pinnatifid or pinnatifid; segments remote, spreading, toothed; terminal large, sometimes hastate. *Flowers* yellow. *Pods* 1½-2 in., slender, erect, glabrous, subterulose; valves 3-nerved; pedicels ¼-½ in., ascending, curved.—*S. irioides* is said to be distinguished by a character that seems to be of no value. All the large flowered specimens resembling and previously referred to *S. Irio* are referable to *S. Læselii*. Boissier's authentic specimen of *S. irioides* is unique; its flowers are described as double the size of those of *S. Irio* and the style as elongated.

16. **S. Læselii**, *Linn.*; annual, tall, erect, reversedly hairy or glabrate, leaves sublyrately runcinate not auricled, flowers large, pedicels slender, pods slender terete not overtopping the raceme, style slender. *Reich. Ic. Fl. Germ. t.* 76, f. 4409; *H. f. & T. Journ. Linn. Soc. v.* 156: *Leptocarpæa Læselii*, *DC.—Griffith Itin. Notes* 314, No. 1155.

KASHMIR; alt. 5-7000 ft., *Thomson.*—DISTRIB. Westward to Central Europe.

Stem branched, and lower leaves hispid with simple recurved hairs or subglabrous. *Leaves* petioled; segments toothed; terminal lobe very large, hastate. *Flowers* numerous, pale yellow, not surmounted by the young pods. *Pods* 1-1½ in., slightly curved, glabrous; pedicels ascending, slender, ½ the length of the pod; style short, with a distinct 2-lobed stigma.

SECT. IV. **Alliaria.** *Flowers* white. *Pods* terete, valves 1-3-nerved. *Seeds* smooth or striate.

17. **S. Alliaria**, *Scop. Carn. ed. 2, n.* 825; annual or biennial, tall, erect, leaves long-petioled, lower reniform, upper cordate toothed, pods long, pedicel stout, valves 3-nerved. *H. f. & T. Journ. Linn. Soc. v.* 163. *Alliaria officinalis*, *Andrzj.*; *Reich. Ic. Fl. Germ. t.* 60, f. 379. *Erysimum Alliaria*, *Linn.*

Western Himalaya; from KUMAON to KASHMIR, alt. 6-10,000 ft.—DISTRIB. Westward to W. Europe.

Stem 1-3 ft., subsimple, glabrous or sparsely hairy below. *Radical leaves* 2-3 in. diam., coarsely repand-crenate or toothed, upper ovate-cordate or deltoid, crenate. *Flowers* small, in lax racemes. *Pods* 1½-2 in.; pedicels stout, ¼ in., spreading, subcylindric, straight, glabrous; valves 3-nerved, midrib stout. *Seeds* oblong, striate and dotted.

18. **S. deltoideum**, *H. f. & T. in Journ. Linn. Soc. v.* 163; tall, erect, glabrous, leaves all petioled deltoid-ovate toothed, pods short, pedicels long, valves 1-nerved.

Eastern Himalaya; SIKKIM, in the inner ranges, alt. 11-13,000 ft., *H. f.*

Stem 2-4 ft., stout. *Leaves* thin, 1½-3 in. diam., scarcely longer than broad. *Flowers* large, white. *Pods* ½-¾ in., pedicels as long, not thickened, spreading, stout, suberect, straight or curved, taper pointed; valves convex strongly keeled; septum flat. *Seeds* large, linear-oblong, smooth.—Perhaps an *Eutrema*.

19. **EUTREMA**, Br.

Glabrous leafy biennial or perennial herbs. *Leaves* entire or serrate, radical on long petioles, upper shortly petioled or sessile. *Flowers* white, corymbose. *Sepals* short, erect, equal at the base. *Filaments* entire. *Pods* linear or linear-oblong, terete; valves convex; style short. *Seeds* few, wingless, irregularly 1-2-seriate.—DISTRIB. Species 5, arctic Siberian and Himalayan.—Nearly allied to the section *Alliaria* of *Sisymbrium*.

1. **E. himalaicum**, *H. f. & T. Journ. Linn. Soc.* v. 164; stout, erect, leafy, cauline leaves sessile amplexicaul, flowers subcapitate in branched racemes.

Temperate SIKKIM HIMALAYA, alt. 10-13,000 ft., *H. f.*

A stout erect simple herb 18 in. high, glabrous or with a few hairs along the margins of the leaves and petioles. *Leaves* all entire, obtuse, radical long-petioled, oblong or ovate-cordate; cauline ovate or ovate-lanceolate, auricled at the base. *Flowers* rather large, white, in numerous terminal heads. *Pods* racemed, suberect; pedicels long, spreading. The ripe fruit is unknown.—Differs from the Soongarian *Smelowskia* (*Eutrema*) *integrifolia* only by its auricled cauline leaves.

2. **E. primulæfolium**, *H. f. & T. Journ. Linn. Soc.* v. 164; stemless, glabrous, radical leaves tufted, scapes leafy bracteate. *Sisymbrium primulæfolium*, *Thoms. in Hook. Kew. Journ. Bot.* iv. t. 10, and v. p. 18.

Wet rocks in the Western Himalaya, from KUMAON to KASHMIR, alt. 6-11,000 ft., *Thomson, &c.*

Root thick, fusiform, perennial. *Leaves* 3-6 in., all radical, petioled, broadly spatulate, toothed above the middle. *Scapes* numerous, usually shorter than the leaves, with a few leaf-like obovate bracts $\frac{1}{4}$ -1 in. long. *Flowers* small, white. *Sepals* oblong, persistent. *Pods* $\frac{1}{2}$ -1 in., cylindric, curved, smooth; valves membranous, finely reticulate.

20. CONRINGIA, Reichb.

Glabrous, glaucous annuals. *Leaves* entire, oblong, auricled. *Flowers* racemose, ebracteate, yellow. *Sepals* elongate, equal at the base or the lateral saccate. *Petals* elongate, clawed. *Pods* elongated, linear, compressed or acutely tetragonal; valves 1-3-nerved, smooth or torulose; stigma simple or 2-lobed. *Seeds* 1-seriate, oblong, not margined; cotyledons incumbent.—DISTRIB. Species 6, natives of W. Asia and S. Europe.

Closely allied to *Sisymbrium*, but with the habit of *Brassica*.

1. **C. planisiliqua**, *Fisch. & Mey. Ind. Sem. Hort. Petrop.* 32; radical leaves petioled linear-oblong, cauline sessile. *Erysimum planisiliquum*, *Ledeb.* *Sisymbrium planisiliquum*, *H. f. & T. Journ. Linn. Soc.* v. 159.

WESTERN TIBET, alt. 10-14,000 ft., *Thomson*.—DISTRIB. Westwards to Persia, Soongaria and Armenia.

Stem erect, 1-2 ft. *Radical leaves* few, 2-3 in., obtuse, cauline with cordate amplexicaul bases. *Flowers* small; pedicels $\frac{1}{2}$ in., slender. *Pods* 3-4 in., racemed, erect, narrow linear; valves slightly convex over the seeds.

21. ERYSIMUM, Linn.

Herbs, often hoary with appressed forked hairs. *Leaves* linear or oblong, entire or sinuate-toothed, base never auricled. *Flowers* yellow, rarely purple, ebracteate. *Sepals* erect, equal or the lateral gibbous at the base. *Petals* clawed. *Filaments* simple. *Pods* elongate, narrow, compressed tetragonal or terete; valves linear, 1-nerved, frequently keeled; septum membranous or corky; style short or long; stigma 2-lobed, capitate. *Seeds* numerous, 1-seriate, oblong, not margined; cotyledons incumbent.—DISTRIB. Species about 80, chiefly European and Oriental.

A genus in many respects intermediate between *Cheiranthus* and *Sisymbrium*. The Indian species are very difficult of discrimination, and little confidence can be placed in their diagnoses. They stand here as described 12 years ago in the Linnean Journal, since which time no materials of importance for their elucidation have been received.

* *Diffusely branched ; ripe pods horizontal, subsessile ; pedicel short, stout.*

1. ***E. repandum***, Linn. ; annual, hoary with close appressed hairs, leaves lanceolate repand-toothed or entire, flowers $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., pods rigid or flexuous obtusely 4-angled glabrous narrowed up to the truncate stigma, pedicel $\frac{1}{2}$ in. as thick as the pod. *H. f. & T. in Journ. Linn. Soc.* v. 164 ; *Boiss. Fl. Orient.* i. 189.

KASHMIR, alt. 5–7000 ft., *Winterbottom*.—DISTRIB. Persia, and westward to E. Europe and N. Africa.

Very variable in stature and robustness ; hairs 2-partite with a few trifid ones intermixed. Boissier separates from it the Afghan plant (*E. Griffithii*, Boiss.) which was united with it in the Linnean Journal, on account of its entire leaves subcompressed pod and bracteate flowers.

** *Dwarf species ; rootstock much divided giving off short crowded branches. Pods 1–2 in. long.*

2. ***E. deflexum***, *H. f. & T. in Journ. Linn. Soc.* v. 165 ; hoary, hairs all appressed, leaves linear-spathulate slightly toothed, flowering branches short, fruiting deflexed with ascending tips, pedicels equalling the sepals, pods very narrow linear erect tetragonal acute, style distinct.

Alpine SIKKIM-HIMALAYA, at Kongra Lama, alt. 13–15,000 ft., *H. f.*

Easily distinguished by its small size and curious ramification, the stems that spring from the many crowned rootstock are 3–5 in. long, and bent down to the earth when fruiting, their pod-bearing tips alone ascending. Leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. Flowers $\frac{1}{3}$ in. diam., ochreous-yellow. Pods $1\frac{1}{2}$ –2 by $\frac{1}{4}$ – $\frac{1}{2}$ in. broad, narrowed into a style $\frac{1}{6}$ in. long ; replum with slender flat sides, septum rather spongy. Seeds with very short funicles.

3. ***E. funiculosum***, *H. f. & T. in Journ. Linn. Soc.* v. 165 ; hairs appressed, leaves linear-lanceolate, fruiting branches erect, pods fascicled erect linear-lanceolate compressed, valves obscurely keeled, style short conic, funicle very slender.

Alpine Sikkim Himalaya ; at Kongra Lama, alt. 14–16,000 ft., *H. f.*

Root stout ; stock dividing into a tuft of short branches and very short flowering shoots. Hairs chiefly fixed by the middle, a few are 3-furcate. Flowers as in *E. deflexum*. Pods $\frac{3}{4}$ in. long, broader and flatter and less keeled than in any other Indian species, sparsely appressed hairy. Seeds with capillary strict funicles as long as themselves ; valves membranous, acute above, narrowed to a tapering base.

*** *Stem stout, erect, leafy ; pods $\frac{1}{2}$ –3 in. long.*

4. ***E. hieracifolium***, Linn. ; stout or slender, green, hairs chiefly 2-forked appressed, leaves oblong sinuate-toothed upper sessile, flowers $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., pedicels equalling the sepals, pods strict erect narrow tetragonal scaberulous, pedicel stout upcurved, midrib strong, style short stout or slender. *E. strictum*, *Gærtn.* ; *H. f. & T. in Journ. Linn. Soc.* v. 166. *E. robustum*, *Don Prodr.* 202 ; *Wall. Cat.* 4789. *E. patens* and *E. gracile*, *Gay Monog. Erys.* 9.

Central and Western Himalaya, from NIPAL, *Wallich*, to MARRI, *Fleming*, alt. 6–13,000 ft.—DISTRIB. Siberia, Caucasus, N. Europe.

Very variable, easily recognised amongst its Indian congeners by slender strict quite erect narrow linear pods, with upcurved stout pedicels, and distinct rather slender style.

5. ***E. pachycarpum***, *H. f. & T. in Journ. Linn. Soc.* v. 167 ; stem very robust tall angled branched, hairs scattered chiefly appressed 3-forked, leaves petioled lanceolate sinuate-toothed, pedicels much shorter than the sepals, flowers $\frac{1}{3}$ in. diam., pods spreading very stout 4-angled on very thick

pedicels $\frac{1}{4}$ in. long minutely hairy, style thick $\frac{1}{12}$ in., valves obtuse at both ends.

Temperate SIKKIM-HIMALAYA, in Lacken valley and Tungu, alt. 10–13,000 ft., *H. f.*

A remarkably stout, tall, erect plant, $1\frac{1}{2}$ –2 ft. high. *Stem* many-angled; branches, long. *Flowers* bright orange yellow. *Petals* obovate-spathulate. *Pods* 2–2 $\frac{1}{2}$ by $\frac{1}{4}$ in.; valves obtusely keeled, obtuse at both ends; stigma large, capitate. *Seeds* small.

6. ***E. odoratum***, *Ehr. ?*; *H. f. & T. in Journ. Linn. Soc.* v. 166; erect, robust, stem angular above, leaves oblong or lanceolate sinuate-toothed or entire scaberulous, flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., pedicels half as long as the sepals.

KASHMIR, alt. 5–7000 ft., and WESTERN TIBET, alt. 9000 ft.

Hairs on the upper leaf-surface appressed, fixed by the middle, with a few 3-furcate ones, on the lower both are mixed.

7. ***E. altaicum***, *C. A. Meyer ?*; *H. f. & T. in Journ. Linn. Soc.* v. 167; hoary with appressed hairs, stem short erect rather slender angled, leaves petioled linear-lanceolate entire or sinuate-toothed, radical sometimes run-cinate, flowers large $\frac{1}{3}$ – $\frac{1}{2}$ in. diam., pedicels shorter than the sepals.

WESTERN HIMALAYA and WESTERN TIBET, alt. 7–10,000 ft., *Jacquemont*, &c.—*TRIB.* Caucasus; Altai Mts.

**** *Stem* sub-simple, stout, erect, leafy; *Pods* 3–5 in. long.

8. ***E. Thomsoni***, *H. f. in Journ. Linn. Soc.* v. 165; tall, hoary with 3-furcate hairs, leaves small linear-lanceolate obscurely toothed, pods 3–4 in. long very narrow $\frac{1}{10}$ in. broad, pedicel stout $\frac{1}{3}$ – $\frac{1}{2}$ in., valves acute hoary acutely keeled, style $\frac{1}{12}$ in.

Western Himalaya; KUNAWUR, alt. 8–12,000 ft., *Thomson*.

Best distinguished by its hoary branched habit, small narrow acute leaves, very long pods with acutely keeled valves and rather long style.—There is a smaller plant collected by Winterbottom in Kashmir on the Baramula pass, but it is not in fruit.

9. ***E. longisiliquum***, *H. f. & T. in Journ. Linn. Soc.* v. 166; annual?, tall, erect, robust, glabrous, stem acutely angled, leaves lanceolate obscurely toothed, pedicels shorter than the sepals, pods spreading very slender linear, valves with a prominent keel, style $\frac{1}{10}$ – $\frac{1}{8}$ in. stout, pedicels $\frac{1}{2}$ in.

Temperate SIKKIM-HIMALAYA; at Tungu, alt. 10–13,000 ft., *H. f.*

The tall robust habit, acutely angled stem, size of flower, and very long spreading pods (4–5 by $\frac{1}{10}$ in.) best distinguish this.

22. **CHRISTOLEA**, Camb.

A glabrous or pubescent perennial. *Leaves* fleshy, entire or coarsely toothed. *Flowers* in a loose ebracteate raceme. *Sepals* short, suberect, lateral slightly saccate at the base. *Pods* linear-lanceolate, flattened; valves smooth 1-nerved; stigma minute, conical, subentire. *Seeds* few, sub-2-seriate, flattened, not margined; cotyledons linear, incumbent.

1. ***C. crassifolia***, *Cambess. in Jacq. Voy. Bot.* 17, t. 17; leaves cuneate-obovate acute or obtuse, deeply toothed towards the tip. *H. f. & T. in Journ. Linn. Soc.* v. 167.

WESTERN TIBET; alt. 12–15,000 ft., abundant.

A much branched, fragile herb; hairs simple; branches decumbent, stout. *Flowers* $\frac{1}{2}$ in. diam.; pedicels $\frac{1}{2}$ in., hairy, erect. *Petals* $\frac{1}{2}$ in., yellow with a purple base. *Pods* subsecund, 1–1 $\frac{1}{2}$ in., erect, flat, acute at both ends, nearly glabrous.

23. **BRAYA**, Sternb. & Hoppe.

Small tufted glabrous or hoary pubescent alpine perennials, with a branching rootstock. *Leaves* mostly radical, spatulate or linear, entire or toothed. *Flowers* purple, rose-coloured or white, solitary or racemed. *Sepals* short, equal at the base. *Pods* ovate-oblong or linear, subcylindric or slightly compressed; valves convex, 1-nerved; style short or long; stigma capitate. *Seeds* usually 2-seriate, few or many ovoid, wingless.—**DISTRIB.** Species 12, alpine and arctic regions, the Andes.

1. **B. uniflora**, *H. f. & T. in Journ. Linn. Soc.* v. 168; glabrous, leaves linear-spathulate quite entire, scapes short 1-flowered.

WESTERN TIBET; in Nubra, alt. 15–17,000 ft., *Thomson*.

Rootstock stout, fleshy, covered with bleached petioles, branched at the crown. *Leaves* fleshy, 1 in., petioled. *Scapes* many, about equalling the leaves. *Pods* linear, $\frac{3}{4}$ – $\frac{1}{2}$ in.; septum 2-nerved; style short. *Seeds* sub-2-seriate, many.

2. **B. alpina**, *Sternb. & Hoppe*; glabrous, leaves linear-spathulate, flowers capitate. *Deless. Ic. Select.* ii. t. 22. *B. Thomsoni*, *H. f. in Journ. Linn. Soc.* v. 168. *B. ? oxycarpa*, *H. f. & T. l.c.* 169.

WESTERN TIBET; Piti, alt. 12–13,000 ft., *Thomson, Stewart*.—**DISTRIB.** European high Alps, arctic regions.

Root stout, fleshy, long. *Leaves* tufted, $\frac{1}{2}$ in. *Scapes* 1–4 in., leafless, or with few linear leaves. *Flowers* white or purple; pedicels $\frac{1}{2}$ in. *Pods* erect, linear- or elliptic-lanceolate, straight or curved, acute, glabrous; style usually long and slender. *Seeds* 1–2-seriate.—Very variable; the arctic American *B. glabella* is hardly distinct from it.

3. **B. rosea**, *Bunge*; *Led. Fl. Ross.* i. 194; glabrous or puberulous, leaves narrowly linear-oblong, flowers crowded corymbose, pods very short elliptic. *H. f. & T. in Journ. Linn. Soc.* v. 169.

Alpine Himalaya, from SIKKIM to KUNAWUR, alt. 15–17,000 ft.; WESTERN TIBET, alt. 14–18,000 ft.—**DISTRIB.** Altai Mts. and arctic Siberia.

Very similar to *B. alpina*, differing chiefly in the shorter pods ($\frac{1}{7}$ – $\frac{1}{8}$ in.), and leafless scapes. *Seeds* 8–12 in each capsule; style variable in length.

4. **B. tibetica**, *H. f. & T. in Journ. Linn. Soc.* v. 168; hoary or pubescent, leaves narrow-linear, scapes naked, flowers subcapitate, petals minute, pods short ovate.

WESTERN TIBET; alt. 13–18,000 ft., *Thomson*.

Rather rigid, purplish; rootstock much divided, clothed with withered petioles. *Leaves* erect, rarely spatulate, with 2–3 spreading teeth about the midrib; margins ciliate, rarely glabrous. *Scapes* many, 2–2 $\frac{1}{2}$ in., rarely 1-leaved. *Sepals* hairy, edges membranous, white or red. *Petals* hardly exceeding the sepals. *Pods* $\frac{1}{8}$ in. long, rarely glabrous; style long.

24. **BRASSICA**, Linn.

Glabrous or hispid herbs; rootstock often woody. *Leaves* large, pinnatifid or lyrate, rarely entire. *Flowers* yellow, in long racemes. *Sepals* erect or spreading, lateral usually saccate at the base. *Pods* elongate, terete or angular, often with an indehiscent 1-seeded beak; valves convex, 1–3-nerved, lateral nerves flexuose; style beaked or ensiform; stigma truncate or 2-lobed. *Seeds* 1-seriate, globose or subcompressed; cotyledons incumbent, concave or conduplicate, the radicle within the longitudinal fold.—**DISTRIB.** Species about 80; temperate regions of the Old World.

SECT. I. **Melanosinapis**. *Sepals* spreading. *Pods* terete or sub-tetragonal; valves 1-nerved; beak slender, seedless.

1. **B. nigra**, Koch.; leaves all petioled, lower lyrate, upper entire, racemes naked, pods slender appressed to the stem. *H. f. & T. in Journ. Linn. Soc.* v. 170. *Sinapis nigra*, Linn.; Wall. Cat. 4790. *S. erysimoides*, Roxb. *Fl. Ind.* iii. 123.

Cultivated in various parts of India and Tibet.

Annual, 2-3 ft. high, rigid, branched, more or less hispid. *Leaves* 4-8 in. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., bright yellow. *Pod* $\frac{1}{4}$ - $\frac{1}{2}$ in., subulate; valves keeled, torulose; cells 3-5-seeded. *Seeds* oblong.

SECT. II. **Eubrassica**. *Sepals* erect. *Pod* sessile, cylindric, beak 0 or conical, seedless; valves 1-nerved. (The Cabbage, *B. oleracea*, with its cultivated forms, the Kale, Sprouts, Cole-rabi, Cauliflower and Broccoli, belong to this section.)

2. **B. campestris**, Linn.; erect, lower leaves lyrate, upper auricled, flowers corymbose, beak of pod flat seedless. *H. f. & T. in Journ. Linn. Soc.* v. 169. *Sinapis brassicata*, Linn. *S. dichotoma* and *S. glauca*, Roxb. *Fl. Ind.* iii. 117, 118.

Cultivated throughout India.

An erect, stout, simple or branched, glabrous or slightly hispid annual, 1-3 ft. high. *Leaves* large, petioled, more or less pinnatifid, upper oblong or lanceolate. *Flowers* large, bright yellow; pedicels $\frac{3}{4}$ in., ascending or spreading. *Pods* $1\frac{1}{2}$ -3 in., glabrous, suberect; valves with midrib and flexuous veins. *Seeds* small, smooth, pale or dark.

SUBSP. 1. **CAMPESTRIS** proper; root tuberous, leaves glaucous, radical hispid, upper glabrous, petals persistent till the corymb lengthens.—(*Swedish Turnip*).

SUBSP. 2. **NAPUS**, Linn. (sp.); root fusiform, leaves all glabrous and glaucous, petals deciduous before the corymb lengthens.—(*Rape, Cole seed*; yields *Colza* and *Carcel oils*.)

SUBSP. 3. **RAPA**, Linn. (sp.); root tuberous, lower leaves hispid not glaucous, upper glaucous and glabrous, petals deciduous.—*Common Turnip*.

3. **B. trilocularis**, H. f. & T. in *Journ. Linn. Soc.* v. 170; lower leaves lyrate, cauline amplexicaul auricled, pods pendulous long-beaked 3-4-valved. *Sinapis trilocularis*, Roxb. *Fl. Ind.* iii. 121.

Subtropical Central and Eastern Himalaya, NIPAL, SIKKIM, and ASSAM, in fields.

Habit of subspecies *Napus*, but easily distinguished by the remarkable pendulous 3-4-celled and valved pods, which are $2\frac{1}{2}$ -3 in. long; beak $1\frac{1}{2}$ in., terete, tapering; valves with midrib and flexuous lateral nerve. *Seeds* large, globose, smooth, pale or dark.

4. **B. quadrivalvis**, H. f. & T. in *Journ. Linn. Soc.* v. 169; habit and foliage of *B. trilocularis*, but pods smaller, on erect short pedicels, 4-celled and valved, beak flattened.

Cultivated fields of *B. campestris* in the UPPER GANGETIC valley; banks of the Soane, H. f.

SECT. III. **Brassicoides**. *Sepals* erect. *Pods* sessile, beak seed-bearing; valves 1-ribbed.

5. **B. Tournefortii**, Gouan; Boiss. *Fl. Orient.* i. 393; radical leaves hispid runcinate-lyrate, cauline linear-lanceolate, flowers small pale yellow, pods short compressed. *B. Stocksii*, H. f. & T. in *Journ. Linn. Soc.* v. 171.

UPPER GANGETIC valley; between Ajmir and Delhi, Jacquemont; WESTERN TIBET (cultivated), Edgeworth.—DISTRIB. Westward to Spain and Italy.

An erect, branching, hispid or glabrate annual, 1 ft. high. *Radical leaves* petioled, crowded, spreading on the ground, hispid with white hairs, lobes toothed; cauline entire or pinnatifid. *Pods* $2\frac{1}{4}$ in., erect, glabrous, linear, compressed, torulose, beak $\frac{3}{4}$ in., linear, slightly tapering, obtuse, usually 1 seeded; valves with a central and many distant lateral nerves. *Seeds* compressed.

SECT. IV. **Ceratosinapis.** *Sepals* spreading. *Pods* slightly compressed, beak subulate usually seedless; valves 3-ribbed. *Seeds* globose.

6. **B. juncea**, *H. f. & T. in Journ. Linn. Soc.* v. 170; erect, glabrous, lower leaves oblong-lanceolate toothed, upper narrow, pods suberect torulose, beak long seedless, lateral nerves flexuous. *B. Willdenovii*, *Boiss. in Ann. Sc. Nat.* 1842, p. 88. *Sinapis juncea*, *Linn.* *S. integrifolia*, *Willd.* *S. ramosa*, *rugosa*, and *cuneifolia*, *Roxb. Fl. Ind.* iii. 119-124.

Cultivated in India abundantly.—DISTRIB. Cult. westward to Egypt, and eastward to China.

A tall erect branching annual, rarely glaucous, or hispid (at the base only). *Lower leaves* petioled, sometimes pinnatifid; upper lanceolate, toothed, subsessile. *Flowers* bright yellow. *Pods* $\frac{1}{2}$ in., linear-lanceolate; beak straight, flattened, $\frac{1}{2}$ in.; valves with a prominent midrib. *Seeds* small, dark, rugose.

7. **B. alba**, *H. f. & T.*; stem hispid, leaves pubescent pinnatisect, upper segments confluent, pods spreading cylindric torulose usually hirsute, beak very long, decurrent along the pod, 1-seeded. *B. foliosa*, *Willd. Enum.* 688. *Sinapis alba*, *Linn.*

Cultivated fields at Ferozepore in the PUNJAB, *Thomson*.—DISTRIB. From Syria eastward throughout S. Europe.

An erect annual, 2 ft. high, with a hispid or rarely glabrous stem. *Leaves* all petioled, usually hispid; segments ovate, toothed or lobulate. *Pods* about 1 in., stalked, spreading, cylindric, beak half as long, flattened, sometimes 2 seeded, valves and base of the beak white with hispid hairs.

Sinapis patens, *Roxb. Fl. Ind.* iii. 124, is a *Nasturtium*.

25. DIPILOTAXIS, DC.

Annual or biennial branching herbs. *Leaves* pinnatifid. *Flowers* yellow pink or purple. *Sepals* spreading, equal at the base. *Pods* elongate, linear, compressed, sometimes with a short 1-seeded beak; valves 1-nerved; style generally slender, stigma simple or 2-lobed. *Seeds* numerous, 2-seriate, oblong, compressed or subglobose; cotyledons incumbent, conduplicate.—DISTRIB. Species about 20; Mediterranean region, Western and Central Asia.

A genus closely allied to *Brassica* but differing in the flat pods, biseriate seeds, often pilose sepals, and pink or purple flowers.

1. **D. Griffithii**, *H. f. & T.*; hispid, lower leaves oblong entire or cut, flowers large, pedicels slender, style very stout. *Brassica Griffithii*, *H. f. & T. in Journ. Linn. Soc.* v. 171; *Boiss. Flor. Orient.* i. 389.

Kalebag in the Salt Range of the PUNJAB, *Fleming*.—DISTRIB. Afghanistan and Beluchistan.

A robust, erect, branched annual, 1-3 ft. high, hispid especially below with spreading or reflexed hairs. *Lower leaves* shortly petioled, oblong or oblong-lanceolate, entire toothed lobed or pinnatifid; upper lanceolate, less divided. *Flowers* purplish or white. *Pods* $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., erect, linear.—Dr. Anderson was disposed to unite with this *D. acris*, *Boiss. (Hesperis, Forsk.)* a native of Arabia and N. Africa.

26. **ERUCA**, Tourn.

Erect branching herbs. *Leaves* lyrate-pinnatifid. *Flowers* lilac or yellow, veined with violet. *Sepals* erect, lateral saccate at the base. *Petals* veined. *Pods* closely adpressed to the axis, ovoid-oblong, turgid, terete, with a large ensiform seedless beak; valves concave, 3-nerved; stigma simple. *Seeds* numerous, 2-seriate, globose; cotyledons conduplicate. — **DISTRIB.** Three species, inhabiting the Mediterranean region and W. Asia.

1. **E. sativa**, Lamk.; *Brassica Eruca*, Linn; *H. f. & T. in Journ. Linn. Soc.* v. 171. *B. erucoides*, Roxb. *Fl. Ind.* iii. 117.

Cultivated places in NORTHERN and CENTRAL INDIA, the WESTERN HIMALAYA, ascending to 10,000 ft., and UPPER GANGETIC valley.—**DISTRIB.** Westward to the Canaries.

Glaucous, glabrous, or subhispid. *Stem* 6–18 in. *Leaves* variously toothed, rarely obovate and subentire. *Flowers* large, pale yellow or white and veined. *Sepals* often tipped with hairs. *Pods* 1 in., erect and appressed to the stem; pedicels shorter than the calyx; valves twice as long as the broad flattened peak.

27. **MORICANDIA**, DC.

Smooth glaucous branched herbs, often woody at the base. *Leaves* entire, amplexicaul or pinnatisect. *Flowers* rather large, violet, purple or rose colored. *Sepals* erect, lateral saccate at the base. *Petals* clawed. *Pods* linear, elongate, subtetragonal, with or without a flattened 1-seeded beak; valves flat or bluntly keeled, 1–rarely many-nerved; stigmatic lobes united into a short cone. *Seeds* numerous, 1–2-seriate, compressed, sometimes winged; cotyledons incumbent, conduplicate.—**DISTRIB.** Species about 5, natives of the Mediterranean region, Arabia, and W. Asia.

1. **M. arvensis**, DC. *Syst. Veg.* ii. 626; glaucous, glabrous, leaves obovate obtuse, cauline amplexicaul, pods tetragonal compressed, beak broad, seeds small sub-2-seriate. *H. f. & T. in Journ. Linn. Soc.* v. 172. *Brassica arvensis*, Linn.

Stewart.—**DISTRIB.** Westward to Persia, Arabia, and the Mediterranean region.

Biennial, or a perennial of short duration. *Leaves* 2–4 in., shortly petioled; cauline ovate or oblong with large clasping auricles. *Flowers* few, large, shortly pedicelled, in a loose long raceme. *Petals* rose-coloured, much larger than the sepals. *Pods* 2–3 in., very narrow, erect; valves nerved; style usually broad, thickened, acute, sometimes long and slender.

2. **M. tortuosa**, *H. f. & T. in Journ. Linn. Soc.* v. 172; leaves elliptic-oblong, cauline sessile, pods long subcylindric, beak cylindric acute, seeds 1-seriate. *Douepia tortuosa*, Cambess. in *Jacq. Voy. Bot.* 18, t. 18.

Salt plains of the PUNJAB, West of the Indus, *Jacquemont*; **SALT RANGE**, *Fleming*. An erect, glaucous, glabrous, branched perennial, 1–2 ft. high. *Stem* below thick, woody, sometimes tortuose. *Leaves* thick, mucronate, entire or crenate-sinuate; lower 3–5 in., narrowed into a broad petiole. *Flowers* few, large, erect, scattered along a lengthened raceme. *Petals* pale rose-coloured, nearly twice the length of the sepals. *Pods* erect, or ascending, linear; beak $\frac{1}{2}$ in.; style short, conical, pointed; valves convex, striated, margins prominent. *Seeds* subglobose.

28. **CAPSELLA**, Mœench.

Small branched annuals or perennials. *Radical leaves* entire or pinnatifid. *Flowers* small, white, raceme l. *Sepals* spreading, equal at the base. *Petals* short. *Pods* obcordate cuneate ovate or oblong, laterally compressed; valves convex or boat-shaped; septum very narrow; style short. *Seeds* numerous, 2-seriate, narrowly margined; cotyledons incumbent.—**DISTRIB.** Species 6, natives of N. and S. temperate regions.

1. **C. Bursa-pastoris**, Mœench.; leaves rosulate pinnatifid, pod triangular or obcordate. *H. f. & T. in Journ. Linn. Soc.* v. 172.

Cultivated places throughout temperate India.—**DISTRIB.** A weed of cultivation.

Glabrous or hairy; hairs branched; root long, tapering. *Stems* 6–16 in., branched. *Leaves* pinnatifid, rarely entire, upper lobe triangular, cauline auricled. *Flowers* $\frac{1}{10}$ in. diam. *Pods* $\frac{1}{4}$ – $\frac{1}{2}$ in.; pedicels slender; style short; valves smooth. *Seeds* many, oblong, punctate.

2. **C. elliptica**, C. A. M.; *Led. Fl. Ross.* i. 199; annual, glabrous, stems slender decumbent and ascending, leaves entire or pinnatifid, pods ovate-oblong truncate. *H. f. & T. in Journ. Linn. Soc.* v. 172. *C. procumbens*, Boiss. *Fl. Orient.* i. 340. *Hutchinsia procumbens*, Desv.

WESTERN TIBET, alt. 14,000 ft., Thomson.—**DISTRIB.** Westward to S. Europe and N. Africa (Australia, Chili, perhaps introduced).

Stems 2–10 in., numerous from the root, filiform, flexuous. *Leaves* $\frac{1}{2}$ – $\frac{1}{2}$ in., radical petioled, oblong or spatulate; upper more sessile, linear, entire. *Flowers* minute, white, in elongating racemes with a capillary rachis. *Pods* distant, $\frac{3}{4}$ – $\frac{1}{2}$ in., on long capillary horizontal pedicels; valves boat-shaped. *Seeds* many, minute.

3. **C. Thomsoni**, *H. f. in Journ. Linn. Soc.* v. 173; perennial, hoary-tomentose, branches spreading from the root, leaves pinnatisect, racemes leafy, pod broadly oblong truncate at both ends. *Hutchinsia tibetica*, Thomson in Hook. *Ic. Pl.* t. 900.

WESTERN TIBET, alt. 16–18,000 ft., Nubra, Strachey; Ladak, Thomson.

Root long, fusiform, almost woody, crowned by a short stock that emits many prostrate leafy branches, 2–6 in. long, with ascending tips. *Leaves* sessile, $\frac{1}{4}$ – $\frac{1}{2}$ in., linear-oblong, segments lanceolate. *Flowers* crowded, white, in the axils of leafy bracts, very shortly pedicelled. *Pods* $\frac{1}{4}$ in.; valves much compressed, obscurely keeled veined; stigma sessile, minute. *Seeds* numerous, very small, funicles slender.—A very curious plant, quite unlike its congeners, with the habit of the Siberian *Hutchinsia calycina*, Desv. (*Smelowskia*, C. A. M.)

29. **LEPIDIDIUM**, Linn.

Diffuse or erect herbs, undershrubs or shrubs, with entire or divided leaves. *Flowers* small, white, ebracteate. *Sepals* short, equal at the base. *Petals* sometimes 2–4 or 0. *Stamens* 6, 4, or 0. *Pods* ovate or oblong, rarely globose, usually orbicular, laterally much compressed, tip notched or entire; valves boat-shaped, keeled or winged; septum narrow, membranous. *Seeds*, solitary in each cell; cotyledons incumbent (in the Indian species).—**DISTRIB.** Species about 80, chiefly European and Asiatic.

SECT. I. **Cardamum**. *Pods* ovate or oblong, notched at the tip; valves winged. *Cotyledons* divided.

1. **L. sativum**, Linn.; erect, radical leaves 2-pinnatisect, pods orbicular-ovate, wings narrow. *H. f. & T. in Journ. Linn. Soc.* v. 174 (Cress.).

Cultivated throughout India and Western Tibet.

A glabrous erect annual, 6–18 in. *Radical leaves* long-petioled; cauline sessile and usually entire. *Flowers* small, in long racemes, white. *Pods* deeply notched; pedicels appressed.—Not known in an indigenous state.

SECT. II. **Cardaria**. *Pod* transversely oblong, tip entire; valves turgid, wingless.

2. **L. Draba**, Linn.; pubescent, perennial, leaves oblong repand-toothed, upper with sagittate auricles. *H. f. & T. in Journ. Linn. Soc.* v. 173. *L. chalapense*, Schrenk., and *L. repens*, Boiss. *Fl. Orient.* i. 356.

A weed of cultivation in the PUNJAB—DISTRIB. Westwards to Europe.

Stem 1–3 ft., simple or branched, flexuous. *Leaves* 1–3 in., lower petioled, upper with converging auricles. *Flowers* $\frac{1}{4}$ in. diam., white, in branched panicles. *Pod* $\frac{1}{2}$ in., deltoid with rounded angles, constricted between the papillose valves, of which one is often imperfect; pedicels spreading.

SECT. III. **Lepidiasstrum**. *Pod* elliptic or ovoid, tip entire; valves wingless.

3. **L. latifolium**, Linn.; perennial, erect, glaucous, radical leaves oblong serrate, pod ovoid. *H. f. & T. in Journ. Linn. Soc.* v. 173.

WESTERN TIBET, abundant. DISTRIB. Europe, N. and W. Asia, N. Africa.

An erect, branched, glabrous or pubescent leafy almost shrubby herb, 2–4 ft. high. *Radical leaves* petioled, often 1 ft. long, upper cauline sessile. *Flowers* minute, in short densely paniced bracteate corymbs. *Pods* $\frac{1}{2}$ in. long; pedicels short, spreading.

VAR. **PLATYCARPA**, Trautv.; leaves rather fleshy entire indistinctly 3 nerved, flowers capitate, pods orbicular slightly pilose and reticulate.—WESTERN TIBET, Thomson, Stewart.

SECT. IV. **Dileptium**. *Pod* elliptic or oblong, tip retuse or notched; valves keeled, wingless or winged at the tip only.

4. **L. ruderale**, Linn.; annual, lower leaves 2-pinnatifid, flowers apetalous diandrous, pod orbicular-oblong flat, valves winged at the tip. *H. f. & T. Journ. Linn. Soc.* v. 175.

Temperate WESTERN TIBET, alt. 7–13,000 ft., Thomson.—DISTRIB. Westward throughout Europe.

Erect or diffuse, glabrous or pubescent. *Radical leaves* much divided, segments narrow; upper cauline linear, entire. *Flowers* minute in terminal and lateral corymbs. *Pod* $\frac{1}{4}$ – $\frac{1}{2}$ in.; pedicels slender, diverging. *Seeds* compressed.

5. **L. capitatum**, *H. f. & T. in Journ. Linn. Soc.* v. 175; prostrate, leafy, leaves sessile upper cuneate-oblong toothed beyond the middle, flowers tetrandrous in dense lateral capitate racemes, pods of *L. ruderale*. *L. incisum*, Edgew. in *Trans. Linn. Soc.* xx. 33 (not of Ledebour).

Temperate and subalpine Himalāya, from SIKKIM to KUMAON, alt. 10–14,000 ft.

Glabrous or glandular-pubescent; branches 6–8 in., stout. *Radical leaves* shortly petioled, pinnatisect; lobes oblong. *Petals* scarcely exceeding the sepals. *Pods* $\frac{1}{2}$ in., ovate, scarcely notched; valves keeled, wingless, sessile. *Seeds* mucilaginous when moistened.

30. **DILOPHIA**, Thoms.

A dwarf glabrous fleshy herb, with a long tapering perennial root, and tufted spatulate or linear, entire or toothed leaves. *Flowers* numerous, small,

white, in densely contracted sessile subumbellate racemes. *Sepals* spreading, equal at the base. *Petals* spatulate, retuse or toothed. *Pods* very short compressed on the 4 sides, obcordate; valves gibbous at the back, with a double crest; septum broad, perforated, ultimately disappearing. *Seeds* 2-4 in each cell, oblong, wingless, on short thickened cords; cotyledons incumbent.

1. **D. salsa**, Thoms. in Hook. *Kew Journ. Bot.* v. 20, and iv. t. 12.

In salt marshes in WESTERN TIBET, alt. 12-17,000 ft.—DISTRIB. Tian Schan Mts.

Root simple, giving off many stout spreading stems at the crown. *Sepals* and *petals* persisting round the opening pods.—Specimens collected by Baron Von Eстен Sacken in the Tian Schan Mts., and which Ruprecht described in his *Sertum Tianshanicum*, differ but slightly from the Tibetan ones.

31. **MEGACARPÆA**, DC.

Large coarse perennial herbs, with a thick fleshy root and stem, and large 2-pinnate radical leaves. *Flowers* racemed or subcorymbose, white or violet coloured. *Sepals* equal at the base. *Petals* oblong, entire. *Stamens* 6 or numerous, filaments not toothed. *Pods* large; indehiscent, didymous, much flattened at the sides; valves orbicular, broadly winged; stigma sessile. *Seeds* large, solitary in each cell, much flattened, not winged; cotyledons accumbent.—DISTRIB. Species 3, 2 Tibetan the 3rd Caspian.

1. **M. polyandra**, Benth. in Hook. *Kew Journ. Bot.* 1855, vii. 356, t. 7; leaf-segments incised and toothed, stamens 10-16, pods notched at the base and tip, lobes orbicular. *H. f. & T. in Journ. Linn. Soc.* v. 176.

WESTERN TIBET; Balti, alt. 10,500 ft., *Winterbottom*; Western Himalaya, KUMAON, alt. 12,000 ft., *Strachey & Winterbottom*.

Root as thick as the wrist, annulate. *Stem* 1-2 ft., as thick as the thumb below, branched above. *Leaves* 1-2 ft., a span broad; segments very irregular, sharply toothed. *Inflorescence* much branched, puberulous; flowers cup-shaped, $\frac{3}{4}$ in. diam., shorter than their pedicels, white. *Filaments* stout, fleshy, subulate. *Ovary* broadly obovate, base dilated into the fleshy lobed disk; stigma, entire, discoid. *Pod* 2 in. diam., wings nearly as broad as the cell, veined. *Seed* reniform.

2. **M. bifida**, Benth. *l.c.* 357; leaf-segments lanceolate quite entire, stamens 7-11, pods deeply 2-lobed, lobes obovate at length conniving. *H. f. & T. in Journ. Linn. Soc.* v. 176.

WESTERN TIBET, in the Kishengunga valley, alt. 7400 ft., *Winterbottom*; Deotsu, *Falconer*.

Stem 12-18 in., stout, stiff, erect. *Leaves* with decurrent quite entire lobes 2-3 in. long, acute or acuminate. *Pods* 2-3 in. diam., lobes broadly obliquely obovate, sinus acute, wings equalling $\frac{3}{4}$ of the cell.—Specimens very imperfect, *Winterbottom* has only a fragment of a leaf well preserved, with quite entire lobes. *Falconer's* specimens are so shrivelled as to be hardly recognizable, and the accompanying leaves, which are toothed, probably belong to *M. polyandra*.

32. **THLASPI**, Linn.

Annual or perennial herbs. *Leaves* entire or toothed, the upper often clasping the stem. *Flowers* racemose, small, white or rarely pale rose. *Sepals* small, erect, equal at the base. *Petals* equal or nearly so. *Pod* orbicular obovate or obcordate, laterally compressed, emarginate, rarely acute; valves boat-shaped, keeled or broadly winged; septum narrow, membranous,

style short or long. *Seeds* 2 or more in each cell, not winged; radicle accumbent.—**DISTRIB.** Species about 30; natives of temperate Europe, Asia, and N. America.

1. **T. arvense**, *Linn.*; glabrous, annual, erect, leaves obovate oblong toothed, cauline amplexicaul, seeds concentrically grooved. *H. f. & T. in Journ. Linn. Soc.* v. 176.

A weed of cultivation throughout the temperate and subalpine HIMALAYA, ascending to 14,000 ft.—**DISTRIB.** Europe, Asia, always in cultivated places.

Stem 6–18 in., simple or corymbosely branched above. *Radical leaves* petioled, soon withering; cauline 4 in., oblong-lanceolate, usually acute, toothed; auricles sagittate. *Fruiting racemes* elongate; pedicels spreading, a little longer than the pods. *Pods* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., much flattened, obovate-orbicular, wing very broad, notch deep, sometimes closed by the overlapping of the sides. *Seeds* 5–6 in each cell.

2. **T. cardiocarpum**, *H. f. & T. in Journ. Proc. Linn. Soc.* 176; annual, erect, leaves broadly oblong obscurely toothed, cauline amplexicaul, seeds smooth.

KASHMIR, alt. 5–9000 ft.—**DISTRIB.** Afghanistan.

Slightly glaucous, less robust than the preceding. *Stem* 6–12 in.; branches basal, few, tall, erect. *Radical leaves* shortly petioled; cauline ovate or oblong, obtuse, erect; auricles broadly sagittate. *Racemes* elongate in fruit, pedicels $\frac{1}{4}$ in. *Pods* broadly notched at the tip; valves with a membranous reticulated wing, broad and rounded above. *Seeds* 4–5 in each cell.—Closely allied to and perhaps identical with *T. Kotschyannum*, Boiss., of which we have not seen ripe fruit.

3. **T. alpestre**, *Linn.*; perennial, tufted, radical leaves oblong or ovate, cauline cordate amplexicaul, pods triangular-obcordate, seeds smooth. *H. f. & T. in Journ. Linn. Soc.* v. 177. *T. cochleariforme*, DC. *T. Griffithianum*, Boiss. *Fl. Orient.* i. 329.

Temperate and subalpine HIMALAYA and WESTERN TIBET from SIKKIM to KASHMIR, alt. 7–12,000 ft.; in Sikkim only on the dry inner ranges.—**DISTRIB.** Alps of Europe, Asia, America; Andes.

Stem 4–12 in., stiff, glabrous, somewhat glaucous, erect, simple or branched. *Rootstock* often branching and shortly creeping near the surface. *Radical leaves* sometimes almost orbicular, cauline oblong or obovate-cordate; auricles small obtuse. *Flowers* rather large, white; racemes much elongated in fruit; pedicels horizontal, as long as the pods. *Pods* $\frac{1}{4}$ in., narrowed at the base, broadly not deeply notched; valves compressed, wing very narrow below, broader above; angles rounded, outer often sharp; style equalling the notch or projecting beyond it. *Seeds* 4–8 in each cell.

4. **T. cochlearioides**, *H. f. & T. in Journ. Linn. Soc.* v. 177; small, decumbent, glabrous, perennial, radical leaves very long-petioled orbicular-ovate, scape flexuous decumbent few-flowered, pods oblong curved and twisted.

Interior of the Sikkim Himalaya, alt. 14–16,000 ft., *H. f.*

Somewhat fleshy. *Rootstock* slender, branching above and sparingly covered with the fibrous bases of the old petioles. *Stems* few, 1–2 in., weak, decumbent or suberect, with 2 or 3 small sessile ovate leaves. *Radical leaves* loosely tufted, petioles slender, slightly toothed, under side pitted. *Flowers* small, white, in a short corymb. *Pods* $\frac{1}{2}$ in., racemose, emarginate; valves compressed, narrowly bordered; style short, slender.

33. **IBERIDELLA**, Boiss.

Glabrous herbs or small undershrubs, branching from the base. *Leaves* alternate, rarely opposite, upper generally amplexicaul with sagittate auri-

cles. *Flowers* white or rose-coloured, racemose. *Sepals* erect, lateral saccate at the base. *Petals* equal. *Pod* compressed, oblong-lanceolate, acute; valves keeled, without wings; septum narrow, membranous; style elongate. *Seeds* 2 to 6 in each cell, not margined; cotyledons obliquely accumbent.—**DISTRIB.** Species 6, W. Asiatic.

1. **I. Andersoni**, *H. f. & T. in Journ. Linn. Soc.* v. 177; radical leaves short petioled tufted ovate-oblong, cauline oblong obtuse.

Western Himalaya in KUMAON, *Strachey and Winterbottom*; and GARHWAL, *T. Anderson*; alt. 12–16,000 ft., in wet grassy places.

Root slender, branching above. *Stems* erect, 2–4 in. high, simple or branched from the base; flowerless shoots weak, decumbent. *Radical leaves* indistinctly toothed; cauline with small cordate auricles; leaves of the barren shoots broadly ovate or almost orbicular, shortly petioled. *Flowers* numerous, racemed, rather large, white or pale rose. *Pods* (immature) $\frac{1}{4}$ in., much flattened, narrow, lanceolate, curved, acute; valves wingless; style very short, acute, tapering from the base.

34. **ISATIS**, Linn.

Erect, tall, branching annuals or biennials, with petioled radical leaves; cauline sessile sagittate. *Flowers* small, yellow, in loose terminal racemes. *Sepals* equal at the base, spreading. *Petals* equal, entire. *Pod* flat, oblong, obovate or cuneate-oblong rarely suborbicular, 1-celled, indehiscent; centre hard, often depressed; margin membranous foliaceous or thickened; stigma sessile. *Seed* solitary, pendulous, oblong; cotyledons incumbent, rarely accumbent.—**DISTRIB.** Species about 30, natives of the Mediterranean region, and Central and W. Asia.

1. **I. tinctoria**, *Linn.*; biennial, radical leaves entire or coarsely toothed, cauline glabrous, pods cuneate-oblong 1-ribbed, pedicel not thickened at the tip. *H. f. & T. in Journ. Linn. Soc.* v. 178.

Cultivated places; WESTERN TIBET, *Falconer*.—**DISTRIB.** Westward to Europe and the Canary Islands.

Erect, somewhat glaucous and glabrous with a few hairs near the base. *Stem* $1\frac{1}{2}$ –3 ft., stout, thick, much branched above. *Radical leaves* 2–5 in., petioled, from obovate to oblong-lanceolate, cauline narrow, 1–2 in. long, entire, auricles acute, sagittate. *Flowers* small, yellow, racemed in a many-branched panicle; pedicels glabrous, very slender, recurved after flowering. *Pods* $\frac{1}{2}$ – $\frac{3}{4}$ in., glabrous, rounded at the tip, tapering to the base; midrib thickened at the centre of the pod.

2. **I. costata**, *C. A. Mey. in Led. Fl. Alt.* iii. 204; annual, glaucous, radical leaves obovate or oblong entire, cauline ciliate, pods elliptic-oblong 3-ribbed, pedicel thickened at the tip. *H. f. & T. in Journ. Linn. Soc.* v. 170.

WESTERN TIBET; valley of the Kishengunga in Balti, alt. 4–7000 ft., *Winterbottom*; Gores, *Falconer*.—**DISTRIB.** Altai mountains, Soongaria, Caspian region to the Volga.

Stem 3 ft., thick, erect, branched above. *Radical leaves* 3–5 in., tip rounded, base tapering into a short petiole; cauline linear-oblong, 2–4 in., uppermost linear, $\frac{1}{2}$ in., margins and midrib beneath ciliate. *Racemes* loosely paniced; pedicels glabrous, spreading or recurved, subsecund. *Pods* $\frac{1}{2}$ in., rounded at the tip, glabrous.

35. **TAUSCHERIA**, Fisch.

An erect, glabrous, branching annual. *Leaves* entire, stem-clasping. *Flowers* small, yellow, in corymbose panicles. *Sepals* erect, equal at the

base. *Pods* short, boat-shaped, concave above, convex below, centre crustaceous, indehiscent, 1-celled with a broad wing folded inwards at the edges and prolonged into a short triangular style. *Seed* solitary, pendulous from the top of the cell, cotyledons incumbent.

1. **T. lasiocarpa**, DC. *Prodr.* i. 210. *T. desertorum*, Led. *Ic. Pl. Fl. Ross.* t. 139; *Royle Ill.* 72, t. 17; *H. f. & T. in Journ. Linn. Soc.* v. 178.

KUNAWUR in the Western Himalaya and WESTERN TIBET, alt. 10–13,000 ft.—DISTRIB. Soongaria and the Caspian region.

Stem 1 ft., seldom branching from below. *Leaves* ovate-oblong, radical subpetioled, cauline with cordate auricles. *Flowers* in a loose corymbose panicle; pedicels recurved in fruit. *Pods* $\frac{1}{2}$ in., thickly glandular-hairy.—All the Tibetan and Himalayan specimens have pubescent pods and hence belong to var. *lasiocarpa*; plants with glabrous pods occur in Soongaria and the Caspian region, apparently associated with var. *lasiocarpa*.

36. **DIPTERYGIUM**, Dcne.

A virgate rigid much branched shrub with the habit of a *Cleome*, the branches ending in few-flowered racemes. *Leaves* small, ovate-oblong, entire. *Flowers* small, few, in bracteate racemes. *Sepals* short, equal at the base. *Stamens* free; filaments entire, 1-celled, ellipsoid, compressed laterally, indehiscent, coriaceous, surrounded by a membranous wing. *Seed* solitary, erect, winged; cotyledons concave, incumbent.

1. **D. glaucum**, Decaisne in *Ann. Sc. Nat. Sér.* 2, iv. 67; *H. f. & T. in Journ. Linn. Soc.* v. 179; *Boiss. Fl. Orient.* i. 417. *Isatis spartioides*, Edgew. mss.

In the PUNJAB, near Mooltan, *Edgeworth*.—DISTRIB. Arabia, N.E. Africa.

A shrub, 6–12 in., with many divaricate branches, glabrous, or the leaves and stem slightly rough with viscid glands. *Leaves* few, $\frac{3}{8}$ – $\frac{1}{2}$ in. long, shortly petioled. *Flowers* subsessile; bracts scaly, $\frac{1}{10}$ in. *Pods* $\frac{1}{2}$ in., transversely wrinkled, drooping.

37. **NESLIA**, Desv.

An annual herb, with branched pubescence. *Leaves* entire or sinuate-toothed, cauline sagittate. *Flowers* small, yellow, in ebracteate paniced racemes. *Sepals* spreading, equal at the base. *Petals* entire. *Pods* shortly stalked, subglobose, slightly flattened, coriaceous, indehiscent. *Seed* solitary; cotyledons incumbent.

1. **N. paniculata**, Desv. *Journ.* iii. 162; *H. f. & T. in Journ. Linn. Soc.* v. 179; *Boiss. Fl. Orient.* i. 371.

In the PUNJAB-HIMALAYA, from Hazara to the Beas, *Stewart*; KASHMIR, alt. 5–6000 ft.—DISTRIB. In fields; Persia, Western Asia, temperate Europe.

Stem 1–1 $\frac{1}{2}$ ft., erect, rather slender, simple below. *Radical leaves* 1–2 in., oblong-lanceolate, cauline shorter, auricles sagittate. *Flowers* numerous, on long slender spreading glabrous pedicels. *Pods* a little broader than long, reticulated, glabrous; style slender, sharp.

38. **EUCLIDIUM**, Br.

Branching, leafy, rigid annuals, with forked or branched pubescence. *Leaves* entire coarsely toothed or pinnatifid. *Flowers* small, white, in terminal or lateral, ebracteate racemes. *Sepals* spreading, equal at the base. *Pods* small, erect, subsessile, subglobose, crowned by an oblique subulate beak,

hard and crustaceous, indehiscent, rarely dehiscent, 2-celled; septum thick. *Seeds* 2, oblong, pendulous; cotyledons accumbent or obliquely incumbent.—
DISTRIB. Species 2, central and western Asia.

1. **E. syriacum**, *R. Br. in Hort. Kew. ed. 2*, iv. 74; *H. f. & T. in Journ. Linn. Soc.* v. 179; *Boiss. Fl. Orient.* i. 386; *Griff. Itin. Notes* 272, No. 631.

KASHMIR, alt. 5–6000 ft., *Winterbottom*; PUNJAB, at Peshawur, *Stewart*.—DISTRIB. Westwards to central Europe.

Diffuse, much branched, 4–12 in. high, with 2–3-furcate hairs or glabrous; branches stout, rigid when old. *Leaves* 1–4 in., petioled, oblong-lanceolate. *Flowers* distantly subspicate; pedicels very short, much thickened in fruit. *Pods* $\frac{1}{2}$ in. long, pitted, hairy; beak (style) stout, obliquely reflexed, mucronate.

39. CRAMBE, Tourn.

Stout herbs or undershrubs, glabrous or pilose. *Leaves* pinnate lyrate or toothed. *Racemes* elongate, ebracteate, usually paniced. *Flowers* conspicuous, white. *Sepals* spreading, equal at the base; filaments of the longer stamens frequently toothed at the top. *Pods* indehiscent, articulate, the upper joint globose, 1-celled, 1-seeded; lower seedless forming a pedicel to the upper joint. *Seed* globose, pendulous from the incurved tip of the funicle, which rises from the base of the cell; cotyledons conduplicate.—
DISTRIB. Species about 20, European and temp. Asiatic.

1. **C. cordifolia**, *Stev. in Mem. Soc. Nat. Mosq.* iii. 267; *H. f. & T. in Journ. Linn. Soc.* v. 180; *Boiss. Fl. Orient.* i. 405. *C. Kotschyana*, *Boiss. Orient.* i. 406.

KUNAWUR in the Western Himalaya, and in WESTERN TIBET, alt. 10–14,000 ft.—
DISTRIB. Westward to Persia and the Caucasus.

A tall stout bristly hairy perennial. *Stem* striated. *Rootstock* thick. *Radical leaves* on stout petioles, 1–2 in., petiole striated and dilated at the base, rounded and cordate, lacinate and variously toothed; cauline on shorter petioles, ovate elliptic or rhomboid, toothed or lobed. *Racemes* loosely paniced. *Pods* globose, upper part pisiform, crustaceous.—Some Tibetan specimens have broader petals and shorter stamens (with the filaments of the long stamens almost simple) than are found in the Affghan and Caucasian; but these plants agree in all other respects. *Stocks* says the root is eaten in Beluchistan.

40. PHYSORHYNCUS, Hook.

A glabrous, glaucous, leafy undershrub. *Leaves* fleshy, lower petioled, upper auricled. *Flowers* large, white, in elongated distantly flowered ebracteate racemes. *Sepals* erect, equal at the base. *Pods* indehiscent 2-jointed, the lower joint longitudinally 2-celled, seedless, with small spurious valves; upper joint large, ovoid, with a long conical beak (style) 2-celled, with thick lacunose walls; cells 2–4-seeded; septum thin; stigma subcapitate. *Seeds* flattened, pendulous from the side of the cells; cotyledons conduplicate.

1. **P. brahvicus**, *Hook. Ic. Pl.* t. 821 and 822, *Boiss. Fl. Orient.* i. 403 (with syn.). *P. chamærapistrum*, *Boiss. l.c.*

PUNJAB, in the Salt Range, *Vicary*.—DISTRIB. Westwards to Southern Persia.

An erect perennial, about 2 ft. high. *Leaves* 1–4 in., ovate-oblong, entire- or repand-toothed, tip rounded or acute, lower petioled; cauline narrowed at the base, slightly decurrent and auricled, uppermost linear-lanceolate. *Pedicels* erect, $\frac{1}{4}$ in., a little thickened at the top. *Pods* $\frac{1}{2}$ – $\frac{3}{4}$ in.

41. **RAPHANUS**, Linn.

Coarse, rough or glabrous annuals or biennials. *Leaves* lyrate-pinnate or pinnatifid. *Flowers* large, yellow, white or pale lilac, veined with purple, in long ebracteate racemes. *Sepals* erect, lateral ones saccate at the base. *Pods* indehiscent, elongate, terete, thick, continuous or constricted, with a long tapering pointed beak, continuous within or filled with pith separating the seeds. *Seeds* pendulous, globose; cotyledons conduplicate.—**DISTRIB.** Species about 6, European and Asiatic.

1. **R. sativus**, L.; *DC. Prodr.* i. 228; lower leaves lyrate. (Radish.)

Cultivated throughout India, and up to 16,000 ft. in the Himalaya.—**DISTRIB.** With cultivation throughout the temperate and warm zones.

Root fleshy, variable in size and form. *Leaves* roughly pilose. *Flowers* variable, usually white or lilac with purple veins. *Pods* terete, continuous, 1 in. to 2 ft. (*R. caudatus*, L.).—The variety (*R. caudatus*), with whip-like pods as long as the entire plant, is commonly cultivated in Western India and the Punjab. The younger Linnaeus (*Pl. Rar. Hort. Upsal*, Dec. i. t. 10, [an excellent figure] gives Java as the country from whence the seeds of *caudatus* were received, under the name "Mougri." *R. Raphanistrum*, Linn., can scarcely be distinguished from *R. sativus*, and is probably only the wild state of it.

42. **GOLDBACHIA**, DC.

A glabrous, glaucous, branched annual. *Lower leaves* petioled, upper auricled. *Flowers* small, pale rose, in elongate, ebracteate racemes. *Sepals* erect, equal at the base. *Pods* coriaceous, indehiscent, tetragonal, slightly constricted between the seeds, but scarcely jointed, curved, tapering above into a broad flattened beak; cells 2 or 3, superimposed in one row, each 1-seeded. *Seeds* oblong, pendulous; cotyledons incumbent.

1. **G. lævigata**, *DC. Syst.* ii. 577; radical leaves many ovate-oblong sinuate-toothed. *H. f. & T. in Journ. Linn. Soc.* v. 180; *Boiss. Fl. Orient.* i. 243. *G. torulosa*, *DC. l.c.*

KASHMIR, alt. 5000 ft., *Jacquemont*; common in the PUNJAB.—**DISTRIB.** Westward to S. Russia.

Stem 9–15 in. high. *Radical leaves* 4–5 in.; cauline lanceolate, usually slightly toothed, shortly auricled. *Pods* pendulous, $\frac{1}{2}$ in. long, reticulately veined, costate at the angles; pedicels rather slender, reflexed, shorter than the pods.—*Boissier* describes a variety, *B. ascendens*, having erect pods, with reflexed pedicels. The numerous Indian specimens examined have all drooping pods, with the exception of one from Afghanistan, in which the lower pods are ascending.

43. **CHORISFORA**, DC.

A small, branching or tufted, glandular or hairy herb. *Leaves* entire or pinnatisect. *Flowers* yellow or purple, in few-flowered ebracteate racemes; pedicels lengthened, usually thickening after flowering. *Sepals* erect, lateral saccate at the base. *Pod* elongate, cylindric, torulose, indehiscent, with a lengthened beak; cells numerous, 2-seriate, 1-seeded; lobes of the stigma erect; cotyledons accumbent.—**DISTRIB.** About 7 species, natives of Western Asia.

1. **C. tenella**, *DC. Syst. Veg.* ii. 435; annual, leaves oblong-lanceolate or spatulate, flowers purplish, pedicels very short, pods obscurely toru-

lose, style rigid subulate. *H. f. & T. in Journ. Linn. Soc.* v. 181; *Boiss. Fl. Orient.* ii. 143.

Western Himalaya and the Punjab; KASHMIR, alt. 5–7000 ft., *T. T.*; SALT RANGE, *Fleming.*—DISTRIB. Central Asia and westward to Asia-Minor.

Pilose or rough glandular, rarely glabrous. *Stem* 6–9 in., much branched from the base. *Leaves* shortly petioled; lower sometimes pinnatifid; upper entire or toothed. *Flowers* small, remote, purple (like those of *Malcolmia africana*). *Racemes* much elongate in fruit. *Pods* 1½ in., ascending, slender, curved, transverse-jointed, not constricted between the seeds, beak long subulate; pedicels ½–¾ in., spreading, ultimately as thick as the pods.

2. ***C. sibirica*, DC. Syst.** ii. 437; annual, glandular-hairy, leaves interruptedly pinnatifid, pedicels slender, pods slender curved torulose moniliform, beak slender subulate. *H. f. & T. in Journ. Linn. Soc.* v. 181.

Hasora in WESTERN TIBET, *Winterbottom.*—DISTRIB. Western and Altaian Siberia.

A straight spreading herb, 6–8 in., with numerous branches from the base. *Leaves* narrow; lobes equal, entire or lobulated, acute; terminal long, lanceolate. *Flowers* rather large, yellow, few, very remote in lengthened racemes. *Pods* 1 in., usually curved; cells 2-seriate, opposite, or one row a little higher than the other, but never alternate, pedicels more slender than the pods, ascending or sometimes arched.

3. ***C. sabulosa*, Camb. in Jacq. Voy. Bot.** 15, t. 15; perennial, glandular-hairy, leaves entire toothed or pinnatifid, flowers yellow or purplish, pedicels very slender, pods irregularly deeply torulose, joints gibbous, beak short slender. *H. f. & T. in Journ. Linn. Soc.* v. 181; *Boiss. Fl. Orient.* i. 144; *Griff. Itin. Notes* 306, n. 1054. *C. elegans*, *Camb. l.c.* 15, t. 14.

Western Himalaya, from KUNAWUR to KASHMIR; and WESTERN TIBET, alt. 10–17,000 ft.—DISTRIB. Afghanistan.

Root thick, fleshy, fusiform, branching at the crown. *Leaves* all radical, tufted, petioled, oblong-lanceolate, lobes obtuse. *Racemes* springing from among the leaves, dense at first, soon elongating to 6–9 in. *Flowers* large. *Pods* ½–¾ in. long, straight, curved or twisted; cells opposite or almost alternate, tuberculated; pedicels erect, slender, thickened at the top, as long as the pod.

ORDER XI. **CAPPARIDÆ.** (By Hooker f. & Thomson.)

Herbs shrubs or trees, erect or climbing. *Leaves* simple or palmately 3–9-foliolate; stipules 2 or 0, sometimes spinescent. *Inflorescence* indefinite; flowers solitary racemed corymbose or umbelled, regular or irregular, usually 2-sexual. *Sepals* 4, free or connate, valvate or imbricate, rarely open in bud. *Petals* 4 (rarely 2 or 0), hypogynous or seated on the disk, imbricate or open in bud. *Stamens* 4 or more, hypogynous or perigynous, or at the base of or on a long or short gynophore. *Disk* 0, or tumid, or lining the calyx-tube. *Ovary* sessile or stalked, 1-celled; style short or 0, stigma depressed or capitate; ovules indefinite, on 2–4 parietal placentas amphio- or campy-lotropous. *Fruit* capsular or berried. *Seeds* angled or reniform, exalbuminous; embryo incurved.—DISTRIB. Genera 23, species 300, chiefly tropical.

An order with various abnormal genera.—*Cratæva* has petals inserted on a large disk; *Mærua* and *Niebuhria* (which want petals) are calycifloral; *Cadaba* has a unilateral disk (bundle of filaments?). *Roydsia*, with 6 sepals, a 3-locular ovary, 3 subulate styles, axile placentation and a straight embryo, though included here, might well form the type of a distinct Order.

TRIBE I. **Cleomeæ**. Herbs. *Fruit capsular*.

- Stamens sessile on the disk. Petals imbricate in bud . . . 1. **CLEOME**.
 Stamens on the gynophore. Petals open in bud . . . 2. **GYNANDROPSIS**.

TRIBE II. **Cappareæ**. Shrubs or trees. *Fruit berried or capsular*.

- Calyx tube lined by the disk, lobes valvate.
 Petals 0. Fruit ovoid . . . 3. **NIEBUHRIA**.
 Petals 4. Fruit moniliform . . . 4. **MÆRUA**.
 Sepals 4, open in bud. Disk hemispheric . . . 5. **CRATÆVA**.
 Sepals 4, 2-seriate, imbricate, or 2 outer valvate.
 Stamens 4-6, inserted high on the gynophore . . . 6. **CADABA**.
 Stamens 8-∞, inserted at the base of the gynophore . . . 7. **CAPPARIS**.
 Sepals 6, 2-seriate. Ovary 3-celled; styles 3 . . . 8. **ROYDSIA**.

1. **CLEOME**, Linn.

Herbs. *Leaves* simple or digitately 3-9-foliolate. *Flowers* racemed, yellow rose or purple. *Sepals* 4, spreading. *Petals* 4, regular or ascending. *Stamens* 4-8, sessile on the disk. *Ovary* sessile or with a short gynophore; style short or 0; ovules many, on 2 parietal placentas. *Capsule* oblong or linear, valves 2 separating from the seed-bearing placentas. *Seeds* reniform.—**DISTRIB.** Species about 80, chiefly tropical.

C. heptaphylla, L., a W. Indian species, is cultivated in India; it is a tall hairy viscid annual, with prickly stems, 7 leaflets, large purple flowers, and a long gynophore.

* *Leaves simple*.

1. **C. monophylla**, Linn.; *DC. Prodr.* i. 239; leaves oblong-lanceolate puberulous penninerved, bracts petiolate, stamens 6. *Wall. Cat.* 6965; *W. & A. Prodr.* 21; *Roxb. Fl. Ind.* iii. 129; *Thwaites Enum.* 14; *Oliv. Fl. Trop. Afric.* i. 76. *C. cordata*, *DC. l.c.*—*Burm. Zeyl.* t. 100, f. 3.

Western Peninsula from BEHAR and the CONCAN to CEYLON, in fields and waste places.—**DISTRIB.** Tropical Africa.

Stem 1-2 ft., erect, branched. *Leaves* 1-2 in., base rounded or cordate. *Flowers* $\frac{1}{2}$ -1 in. long, dull purple; racemes elongating in fruit. *Petals* long-clawed, ascending. *Capsules* 2-4 in., striate, subsessile or shortly stalked. *Seeds* rugose.

2. **C. papillosa**, Steud. *Nomencl. ed.* 2, i. 382; hairy, often glandular, leaves ovate-cordate obtuse strigose papillose penninerved, bracts small sessile, stamens 6. *Oliv. Fl. Trop. Afric.* i. 76; *Edgew. l.c.* vi. 184. *C. gracilis*, *Edgew. in Journ. As. Soc. Beng.* xvi. 1212.

Arid districts of SINDH and WESTERN PUNJAB.—**DISTRIB.** Abyssinia, Kordofan, Arabia.

Stem 6-12 in., erect, branched, strong scented. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., lower long-petioled, upper subsessile. *Flowers* very small, pinkish at length dirty yellow; racemes elongate in fruit; bracts oblong, upper pedicels ebracteate. *Capsules* 1-1 $\frac{1}{2}$ in., subsessile, very slender, finely striate. *Seeds* glabrous, granulate.

3. **C. quinquenervia**, *DC. Prodr.* i. 239; viscid, leaves suborbicular palmately 5-nerved softly pubescent, bracts leafy, stamens 4 or 6. *T. Anders. in Journ. Linn. Soc. v. Suppl.* 3; *Griff. Itin. Not.* 323, n. 1261. *C. Noreana*, Boiss. *Fl. Orient.*

Arid districts of SINDH and WESTERN PUNJAB, *Griffith, &c.*—**DISTRIB.** Afghanistan, Persia, Arabia.

Stem 6-12 in., erect; branches spreading from the base, rigid woody, strongly

aromatic. *Leaves* 1 in. diam., obtuse or acute, base cordate or rounded, margins and long petioles glandular. *Flowers* small; racemes elongate in fruit; bracts usually subsessile, rarely narrow, upper sometimes 0. *Capsules* 1-1½ by ½ in., sessile, narrow-oblong, acute at both ends; hairs short rigid with tubercled bases, mixed with soft black glandular hairs. *Seeds* minute, smooth.—Anderson describes 6 stamens, we find only 4.

4. **C. Stocksiana**, Boiss. *Fl. Orient.* i. 414; glandular above, leaves ovate or obovate tubercled palmately 3-nerved, bracts small or leafy, stamens 6; filaments clavate. *Griff. Itin. Notes* 225, n. 183.

Rocky hills in SINDH, *Stocks*.—DISTRIB. Beluchistan.

Perennial; branches spreading from the base, erect or ascending, white, glabrous, rough below, densely glandular and tubercled above. *Leaves* 1 in., fleshy, acute or obtuse; petiole 1-1½ in. *Flowers* small, pale purple, at length yellow; racemes short or long, densely glandular. *Petals* obovate-spathulate, clawed. *Capsules* 1½ by ½ in., broad-linear, subsessile, pendulous, striate. *Seeds* large, brown hairy.

5. **C. simplicifolia**, H. f. & T.; prostrate, strigose, leaves obovate-oblong or lanceolate, bracts leafy, stamens 10-12, filaments filiform. *Polanisia simplicifolia*, Camb. in *Jacq. Voy. Bot.* 20, t. 20; *Dalzell & Gibs. Bomb. Fl.* 8. *P. burtporensis*, Munro in *Wight Ic.* t. 1072. *C. monophylla*, Law in *Graham Cat. Bomb. Pl.* 7.

NORTHERN INDIA, near Burtpore, *Munro*; drier parts of the DEKKAN and CONCAN.

Annual, 6-18 in., much branched from the base. *Leaves* 1-2 in., obtuse or acute, all scaberulous, hairs with scale-like bases. *Flowers* ¼ in., violet, in elongating leafy racemes. *Filaments* filiform. *Capsule* ¾-1¼ in., subsessile, torulose; beak ½ in. *Seeds* large, brown, smooth.

** *Leaves compound. Stamens* 6.

6. **C. tenella**, Linn. f.; DC. *Prodr.* i. 240; glabrous, leaves 3-foliolate, leaflets linear, capsule subsessile glabrous. *W. & A. Prodr.* 21; *Wall. Cat.* 6966; *Oliv. Fl. Trop. Afric.* i. 78. *C. angustifolia*, A. Rich. *Fl. Seneg.* 20.

Driest parts of the CARNATIC, *Heyne, &c.*—DISTRIB. Trop. Africa.

Annual, 3-12 in.; branches many, slender, spreading. *Leaflets* equalling or exceeding the petiole. *Flowers* minute, purplish, in few-flowered racemes; bracts simple or 3-foliolate. *Capsules* 1-1¼ in., linear. *Seeds* minute, smooth.—Indian specimens are rather smaller than African.

7. **C. brachycarpa**, Vahl ex DC. *Prodr.* i. 240; musky, glandular and rough, leaves 3-5-foliolate upper simple, leaflets obovate or oblong, capsule scaberulous. *T. Anders. in Journ. Linn. Soc. v. Suppl.* 4; *Edgew. Ic.* vi. 184; *Oliv. Fl. Trop. Afric.* i. 77. *C. Ruta*, Camb. in *Jacq. Voy. Bot.* 19, t. 19. *C. Vahlia*, *Fresen.*; and *diversifolia*, *Hochst.*

N.W. INDIA, from Agra, *Jamieson*, westward to Peshawur, *Stewart*; SINDH, *Stocks*.—DISTRIB. Arabia, Abyssinia.

Perennial, 6-12 in., branched from the base. *Leaflets* ¼-½ in., lower petioled, floral subsessile. *Flowers* ¼-½ in. long, yellow, long-peduncled, in leafy racemes. *Capsules* ½ in., oblong. *Seeds* minute, smooth.

8. **C. aspera**, Kœnig ex DC. *Prodr.* i. 241; branches glabrous prickly, leaves 3-foliolate; leaflets equalling or exceeding the petioles, flowers axillary, capsule sessile slender torulose. *W. & A. Prodr.* 22; *Wall. Cat.* 6967; *Wight Ic.* t. 287. *C. diffusa*, *Roxb. Fl. Ind.* iii. 129.

WESTERN PENINSULA and CEYLON; common in sandy soil.

Annual, 6-18 in.; branches many from the root, prickles minute. *Leaflets* ¼-½ in.

Flowers $\frac{1}{4}$ in. long, dull yellow, solitary, long-pedicelled. *Capsules* 1-1 $\frac{1}{2}$ in., sessile, slender, beaked. *Seeds* large, glabrous, transversely rugose.

9. **C. Burmanni**, *W. & A. Prodr.* 22; branches glabrous prickly, leaves 3-foliolate, leaflets shorter than the petiole obovate or oblong-lanceolate, flowers axillary, capsule stalked terete. *Polanisia dodecandra*, *DC. l.c.* 242.—*Burm. Thes. Zeyl.* t. 100, f. 1 (*not good*).

Fields of the CARNATIC, and in CEYLON, *Kœnig*, &c.

Annual, 6-18 in.; branches many from the root. *Leaflets* 1 in., acute or obtuse. *Flowers* $\frac{1}{4}$ in., solitary, purple. *Capsules* 2 in., terete, glabrous, striate, tapering at both ends; stalk $\frac{1}{2}$ - $\frac{1}{6}$ in., slender. *Seeds* glabrous, transversely rugose.—*C. ciliata*, *Sch. & Th.*, of tropical Africa approaches this very closely.

*** *Leaves compound.* *Stamens* 10- ∞ .

10. **C. felina**, *Linn. f. Suppl.* 300; rough with rigid scale-like hairs, leaves 3-foliolate, leaflets obovate, flowers axillary long-pedicelled, stamens 28-32, capsule glabrous. *Polanisia felina*, *DC. Prodr.* i. 242; *Wall. Cat.* 6971; *W. & A. Prodr.* 22 (*excl. syn. Hort. Malab.*).

Southern provinces of the CARNATIC, *Kœnig*, &c.

Annual, erect, 1-2 ft., much branched. *Leaflets* $\frac{1}{2}$ -1 in., obtuse, equalling or shorter than the petiole. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, solitary, purple. *Calyx* and *corolla* bristly outside. *Filaments* filiform. *Capsule* 1-1 $\frac{1}{2}$ by $\frac{1}{8}$ in., compressed, linear-oblong, acute at both ends, striate. *Seeds* large, glabrous, tubercled.

11. **C. viscosa**, *Linn.*; softly pubescent, leaves 3-5-foliolate, leaflets ovate or obovate, flowers racemed long-pedicelled, stamens 12-20, capsule glandular-pubescent. *Roxb. Fl. Ind.* ii. 128. *C. icosandra*, *Linn.* *Polanisia viscosa*, *DC. Prodr.* i. 242; *Wall. Cat.* 6968. *Polanisia icosandra*, *W. & A. Prodr.* 22; *Wight Ic.* t. 2.—*Rheede Hort. Mal.* ix. t. 33.

Abundant throughout tropical and warm India, and the rest of the world.

Annual, erect, 1-3 ft., hairs simple and glandular mixed. *Leaflets* equalling or shorter than the petiole, upper usually subsessile. *Flowers* $\frac{1}{2}$ in. long, yellow. *Petals* reflexed. *Capsule* 2-3 $\frac{1}{2}$ in., striate, narrowed to the tip. *Seeds* small, granular.

12. **C. Chelidonii**, *Linn. f. Suppl.* 300; glabrous or sparsely scabrid, leaves 5-9-foliolate, leaflets obovate or oblong, flowers racemose then corymbose long-pedicelled, stamens very many, capsule glabrous. *Roxb. Fl. Ind.* iii. 127. *Polanisia Chelidonii*, *DC. Prodr.* i. 242; *W. & A. Prodr.* 22; *Wight Ic.* t. 319; *Wall. Cat.* 6969; *Dalz. & Gibs. Bomb. Fl.* 8. *P. heterophylla*, *Wall. Cat.* 6970. *P. Schraderi* and *Leschenaultii*, *DC.* *Corynanthra pulchella*, *Schrad.*

Moist places from the N. Circars, *Roxburgh*, and POONAH, *Jacquem.*, southwards.—*DISTRIB.* Java.

Annual, erect, 1-3 ft., much branched, glabrous or with few bristles. *Leaves* long-petioled, pubescence appressed, scabrid; leaflets 1-1 $\frac{1}{2}$ in., obtuse or acute. *Flowers* $\frac{3}{4}$ -in. diam., regular, rosy; bracts small, simple or 3-foliolate. *Petals* sessile, ovate. *Filaments* clavate above. *Capsule* 2-4 in., slender, tapering at both ends, striate. *Seed* rather large, pale brown, muricate.

2. GYNANDROPSIS, DC.

An annual glandular-pubescent or glabrate herb. *Leaves* 5-foliolate, long-petioled. *Flowers* racemed. *Sepals* 4, spreading. *Petals* 4, spreading, long-clawed, open in bud. *Stamens* 6, filaments adnate below to the slender gynophore, spreading above. *Ovary* stalked, ovules many. *Capsule* elon-

gate, stalked; valves 2, separating from the seed-bearing placentas. *Seeds* reniform, black, scabrous.

1. **G. pentaphylla**, DC. *Prodr.* i. 238; leaflets broad-obovate acute or obtuse entire or serrulate. *W. & A. Prodr.* 21; *Wall. Cat.* 6964. Cleome pentaphylla, *Linn.*; *Roxb. Fl. Ind.* ii. 126.—*Rheede Hort. Mal.* ix. t. 34.

Abundant throughout the warm parts of India and all tropical countries.

Erect, branched, 1-3 ft. *Leaflets* 1-2 in. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., white or purplish, in glutinous racemes; bracts 3-foliate. *Capsules* 2-4 in., nearly glabrous, striated.

3. NIEBUHRIA, DC.

Trees or shrubs, unarmed. *Leaves* 1-5-foliate; stipules setaceous. *Flowers* solitary or corymbose. *Calyx-tube* ovoid; limb 4-cleft, valvate. *Petals* 0. *Stamens* indefinite, united on the gynophore at about the level of the top of calyx-tube; filaments filiform, exserted. *Ovary* stipitate, 1-celled; ovules many on 2 parietal placentas; stigma subsessile. *Berry* ovoid, 1-seeded. *Seed* large; cotyledons fleshy involute.—*DISTRIB.* Species about 8, tropical African and Asiatic.

1. **N. linearis**, DC. *Prodr.* i. 244; glabrous, leaves 3-5-foliate, leaflets ovate oblong linear or lanceolate, flowers racemed. *Wall. Cat.* 6975; *W. & A. Prodr.* 23; *Wight Ic.* t. 176; *Hook. Ic. Pl.* t. 124. Capparis apetalā, *Roth. Nov. Sp.* 238. *C. linifolia*, *Roxb. Hort. Beng.* 41. *Cratæva apetalā*, *Spreng. Syst.* ii. 448.

Hilly parts of the CARNATIC, *Roth*, *Wight*, &c.

A small tree, bark pale grey. *Leaflets* 1-2 by $\frac{1}{2}$ -1 in., equalling the petiole of the leaf, minutely wrinkled, shortly petiolulate; 5 and linear in young plants. *Racemes* 1-2 in., terminal, few-flowered. *Calyx* $\frac{1}{2}$ in., persistent. *Berry* $\frac{1}{2}$ - $\frac{3}{4}$ in., ovoid or subglobose, 1-3-seeded; stalk 1-1 $\frac{1}{2}$ in.

4. MÆRUA, Forskahl.

Climbing shrubs. *Leaves* simple. *Flowers* corymbose. *Calyx-tube* lined by a disk; lobes 4, valvate. *Petals* 4 (in the Indian species), smaller than the calyx-lobes, ovate, inserted on the edge of the disk. *Stamens* many, inserted high up on the gynophore, filaments exserted. *Ovary* long stalked, 1-celled, or 2-celled by the cohesion of the placentas; ovules many, on 2-4 parietal placentas. *Berry* fleshy, elongate, moniliform, 1- or more-seeded. *Cotyledons* fleshy, involute.—*DISTRIB.* Species about 20, tropical Asiatic and African.

1. **M. arenaria**, *H. f. & T.*; glabrous or pubescent, leaves broad-ovate acute or oblong and obtuse or retuse, corymbs terminal or on lateral shoots, petals lanceolate acute.

WESTERN HIMALAYA, and CENTRAL INDIA, abundant: var. 2. GANGETIC PLAIN, about Delhi and Agra.

A large woody climber. *Leaves* $\frac{1}{2}$ -3 in. *Flowers* $\frac{3}{4}$ -1 in. long, white. *Calyx-tube* dilated upwards, about $\frac{1}{2}$ as long as the limb. *Berry* 2-5 in., deeply constricted between the seeds—*M. oblongifolia* of Arabia and Africa differs only in the cylindrical calyx-tube equalling its limb.

VAR. 1. glabra; glabrous and glaucous except the margins of the calyx-lobes. *Nieuburia arenaria* and *oblongifolia*, DC. *Prodr.* i. 244; *Wall. Cat.* 6976; *W. & A. Prodr.* 24 in part; *Hook. Ic. Pl.* t. 127. *Capparis heteroclyta*, *Roxb. Fl. Ind.* ii. 570.

VAR. 2. scabra; young shoots and upper leaves scabrous, calyx softly pubescent. *M. scabra* and *oblongifolia*, *Camb. in Jacq. Voy. Bot.* 22, t. 23, 24. *Nieuburia oblongifolia*, *Royle Ill.* 73.

5. **CRATÆVA**, Linn.

Trees. Leaves 3-foliolate. *Flowers* large, yellow or purplish, polygamous. *Sepals* 4, cohering below with the convex lobed disk. *Petals* 4, long-clawed, open in bud. *Stamens* indefinite, adnate to the base of the gynophore. *Ovary* on a slender stalk, 1-celled; stigma sessile, depressed; ovules many, on 2 parietal placentas. *Berry* fleshy. *Seeds* imbedded in pulp.—**DISTRIB.** Species about 6, tropical and cosmopolitan.

1. **C. religiosa**, *Forst.*; *DC. Prodr.* i. 243; leaflets ovate or ovate-lanceolate appearing with the large greenish yellow at length purplish flowers. *Capparis 3-foliata*, *Roxb. Fl. Ind.* ii. 571.

Near streams in MALABAR and CANARA; cultivated elsewhere in India.—**DISTRIB.** Trop. Africa.

A spreading, unarmed, deciduous tree. *Leaves* long-petioled; leaflets 3–6 by $1\frac{1}{4}$ – $2\frac{1}{4}$ in., abruptly or gradually acuminate, pale beneath. *Flowers* 2–3 in. diam., in terminal corymbs. *Petals* ovate or oblong, obtuse or acute; claw $\frac{1}{4}$ as long as the limb. *Berry* 1–2 in. diam., many-seeded.—Very variable. Intermediates may be found between the following varieties. The form of the ovary and fruit does not always correspond with that of the leaflets. Imperfect specimens of a Mergui species of Griffith, with large broad obtuse thick coriaceous leaves, may be different.

VAR. 1. Nurvala; leaflets ovate-lanceolate taper-pointed, berry ovoid. *C. Nurvala*, *Ham. in Trans. Linn. Soc.* xv. 122; *Wall. Cat.* 6973; *W. & A. Prodr.* 23.—*Rheede Hort. Malab.* iii. t. 42.

VAR. 2. Roxburghii; leaves small ovate-lanceolate abruptly acuminate, berry globose. *C. Roxburghii*, *Br. in Denh. & Clapp. Travels, App.* 224; *W. & A. Prodr.* 23; *Hook. Ic. Pl.* t. 178. *C. odora*, *religiosa* and *unilocularis*, *Ham. l.c.*; *Wall. Cat.* 6972.

6. **CADABA**, Forskahl.

Unarmed shrubs. *Leaves* simple or 3-foliolate. *Flowers* solitary corymbose or racemed. *Sepals* 4, unequal, 2-seriate, 2 outer valvate. *Petals* 4, or 2, rarely 0, clawed, hypogynous. *Disk* equalling the petal-claw, trumpet-shaped or spatulate, with a tubular claw. *Stamens* 4–6, unilateral on the slender gynophore; filaments filiform, exserted, spreading. *Ovary* long-stalked, 1-celled; stigma sessile; ovules many on 2–4 parietal placentas. *Fruit* fleshy, slender, cylindric, berried or dehiscing tardily upwards by 2 valves, which leave the pulpy placentas. *Seeds* subglobose, testa cartilaginous; cotyledons convolute.—**DISTRIB.** Species about 12, tropical and subtropical African and Asiatic.

1. **C. trifoliata**, *W. & A. Prodr.* 24; leaves palmately 3-foliolate, leaflets oblong or lanceolate, petals 2, stamens 6, fruit tardily dehiscent. *C. triphylla*, *Wight in Hook. Bot. Misc.* 296, *Suppl.* t. 37. *Strœmeria trifoliata*, *Roxb. Fl. Ind.* ii. 79. *Desmocarpus missionis*, *Wall. Cat.* 6798.

Southern parts of the CARNATIC, *Berry*, &c. Drier parts of CEYLON.

A rigid branched shrub, bark brown, shoots rather hairy. *Leaflets* 2 in.; petioles $\frac{3}{4}$ –1 in. *Flowers* 2–3 in. diam., in few-flowered, axillary and terminal corymbs. *Sepals* pale green, membranous, oblong, outer $1\frac{1}{4}$ in. *Petals* 2 in., yellowish-white, limb sub-orbicular. *Disk-limb* bright yellow, recurved. *Capsule* 2–4 in., valves brittle.

2. **C. indica**, *Lamk.*; *DC. Prodr.* i. 244; leaves simple ovate or oblong acute obtuse or mucronate, petals 4 limb oblong, stamens 4, fruit dehiscent. *Wall. Cat.* 6977; *W. & A. Prodr.* 24; *Dalz. & Gibs. Bomb. Fl.* 9. *Strœmeria tetrandra*, *Vahl*; *Roxb. Fl. Ind.* ii. 78. *Cleome fruticosa*, *Linn.*

WESTERN PENINSULA, from Guzerat and the Concan southwards, on old walls and in waste dry places.

A straggling much branched shrub, glabrous or pubescent. *Leaves* 1-1½ in. *Flowers* 1 in. diam., greenish white, in few-flowered terminal corymbs; bracts small, subulate. *Sepals* ovate. *Claw of petals* narrow. *Disk* broad, funnel-shaped, smooth, fimbriate. *Fruit* 1-1½ in., cylindric; pulp orange.

3. *C. farinosa*, *Foršk.*; *DC. Prodr.* i. 244; hoary, leaves ovate or oblong obtuse, petals 4 limb narrow spatulate, stamens 5, fruit indehiscent? *Deless. Ic. Sel.* iii. t. 8; *Oliv. Fl. Trop. Afric.* i. 89. *C. Dubia*, *DC. l.c.*

Dry places in the PUNJAB at Multan, *Edgeworth*; and SINDH, *Stocks*.—DISTRIB. Arabia, trop. Africa.

A straggling, much branched, wiry shrub. *Leaves* ¼-½ in. rarely 1 in. *Flowers* as in *C. indica* but petals very narrow. *Fruit* ½-1½ in., cylindric—*Delessert's Icones* represents 6 stamens, we find 5 only.

4. *C. heterotricha*, *Stocks in Hook. Ic. Pl.* t. 839; glaucous and pulverulent, leaves broad obovate or orbicular, petals 4 limb suborbicular, stamens 5.

SINDH; on rocks near Cape Monze, *Stocks*.

A small rigid branched tree, 10-20 ft., young parts often glandular. *Leaves* 1 in. *Flowers* ½ in. diam., in terminal dense corymbs. *Sepals* ovate, acute. *Limb of petals* equalling the claw. *Claw of disk* slender, tubular, limb small, oblong, crenate. *Fruit* unknown.

7. CAPPARIS, Linn.

Trees or shrubs, erect decumbent or climbing, unarmed or with stipulary thorns. *Leaves* simple, rarely 0. *Flowers* white or coloured, often showy. *Sepals* 4, free, imbricate in 2 series, or 2 outer subvalvate. *Petals* 4, sessile, imbricate. *Stamens* indefinite, inserted on the torus at the base of the long gynophore. *Ovary* stalked, 1-4-celled; stigma sessile; ovules many, on 2-6 parietal placentas. *Fruit* fleshy, rarely bursting by valves. *Seeds* many, imbedded in pulp, testa crustaceous or coriaceous; cotyledons convolute. —DISTRIB. Species. 120, natives of all warm climates, except N. America.

SECT. I. *Flowers* solitary, axillary. (*Flowers* sometimes fascicled in 3, *zeylanica*, and 4, *Heyneana*.)

1. *C. spinosa*, *Linn.*; leaves orbicular, pale green not shining acute, obtuse or retuse, thorns straight hooked or 0, flowers large, fruit ribbed often dehiscing. *Oliv. Fl. Trop. Afric.* i. 95. (Caper plant.)

Hot WESTERN HIMALAYAN valleys Eastward to Nipal; WEST. TIBET, ascending to 13,000 ft.; SINDH; PUNJAB; and WESTERN PENINSULA in the Mahableshwar hills.—DISTRIB. Afghanistan, West Asia, Europe, N. Africa, Australia, Sandwich Islands.

A branched shrub, glabrous or hoary, branches prostrate or trailing. *Leaves* 1-2 in., orbicular or broad ovate. *Flowers* white, with purple filaments; pedicels equalling or exceeding the leaves; fruit 1½-2 in., ovoid or oblong.

VAR. 1. *galeata*; armed, glabrous, often glaucous, leaves fleshy, anticous sepal very saccate. *C. galeata*, *Fres.*—Maritime, from Sindh to Arabia, and E. Africa.

VAR. 2. *rupestris*; unarmed, leaves suborbicular fleshy. *C. rupestris*, *Sibth. Flor. Græc.* t. 487; *Wall. Cat.* 7001 (no locality and perhaps not Indian).

VAR. 3. *vulgaris*; armed, young parts downy. *C. obovata*, *Royle Ill.* 73; *Cambess. in Jacq. Voy. Bot.* t. 21. *C. Murrayana*, *Graham Cat. Bombay Pl.* 9; *Wight Ill.* t. 379; *Dalz. & Gibs. Bomb. Fl.* 9 (*C. Ægyptiaca*, *Linn.* *C. herbacea*, *Willd.*).—The common Indian and Oriental form.

VAR. 4. *leucophylla*, *DC. Prodr.* i. 246 (*sp.*); floccose all over with white pubescence, *Deless. Ic. Sel.* iii. t. 10. *C. nepalensis*, *Wall. Cat.* 6979.—Confined in India to the lower Himalayan valleys, also Persian.

2. **C. grandiflora**, Wall. Cat. 6984; branches tomentose, leaves ovate acute mucronate shining above pubescent beneath, flowers large, pedicels short, ovary glabrous. *C. pyrifolia*, W. & A. Prodr. 25 (not of Lamk. & DC.); Wight Ic. t. 1047.

Eastern slopes of the NILGHIRI MTS., Wight.

A dense branched spreading shrub, 2-3 ft.; thorns recurved. Leaves 1 in., short-petioled, pubescence brown. Flowers 3 in. diam.; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in. Petals broadly obovate-cuneate, almost truncate. Ovary narrow-oblong, furrowed. Fruit 2 in., glabrous, oblong, beaked.

3. **C. zeylanica**, Linn. (not DC. nor W. & A.); glabrous, armed, leaves broad ovate to lanceolate usually acute and mucronate reticulate beneath, flowers large, pedicels slender, ovary pubescent. Willd Sp. Pl. ii. 1132; Wall. Cat. 6789. *C. acuminata*, Roxb. Fl. Ind. ii. 566 (not Willd.). *C. brevispina*, DC.; W. & A. Prodr. 24; Thwaites Enum. 15; Hook. Ic. Pl. t. 126; Dalz. & Gibs. Bombay Fl. 9. *C. Wallichiana*, W. & A. Prodr. 25; Wall. Cat. 6987. (*C. Rheedii* and *rotundifolia*, Rottb.)

Common in the CARNATIC and MALABAR; occasional in the Western DEKKAN; dry parts of CEYLON.

A rigid, wiry, much branched shrub; shoots sometimes puberulous. Leaves $1\frac{1}{2}$ -3 by $\frac{1}{2}$ - $1\frac{1}{2}$ in., coriaceous, shining above, sometimes pubescent beneath. Flowers 2 in. diam., white, solitary or 2-3 on a short shoot; 2 lower petals yellowish, changing to red brown; pedicels 1-2 in. Ovary oblong. Fruit 2 in., ovoid, smooth.—*C. zeylanica*, DC., is probably *C. tenera* or *acuminata*.

4. **C. Heyneana**, Wall. Cat. 6985; unarmed or thorns minute, leaves ovate or lanceolate acute or acuminate reticulate beneath, flowers solitary or fascicled, pedicels slender 1-bracteate, ovary tomentose. W. & A. Prodr. 25. *C. formosa*, Dalz. in Hook. Kew Journ. ii. 40; Dalz. & Gibs. Bomb. Fl. 9.—*Rheede Hort. Mal.* vi. t. 57.

From S. CONCAN and CANARA, to TRAVANCOR; CEYLON, Thwaites (2509 in part).

An erect shrub; young parts floccose. Leaves 3-6 by $\frac{1}{4}$ -3 in., base acute, coriaceous, old shining above. Flowers 4-5 in. diam., white pale blue or lilac, solitary or 2-3; pedicels 1-2 in., terminal; bracts linear. Sepals obtuse, tomentose inside. Petals obovate, 2 lower close together with a yellow basal spot. Fruit (immature) $1\frac{1}{2}$ in., ovoid, beaked.

5. **C. divaricata**, Lamk.; DC. Prodr. i. 252; glabrous, thorns straight, leaves linear-oblong or ovate obtuse mucronate 5-7-nerved at the base. flowers solitary, pedicels slender, ovary glabrous ribbed. Wall. Cat. 6988 B (not A); W. & A. Prodr. 27; Wight Ic. t. 889. *C. stylosa*, DC.; Wall. Cat. 6980; W. & A. Prodr. 25; Dalz. & Gibs. Bomb. Fl. 10.

The DEKKAN, and CARNATIC at Tanjore and Coimbatore.

A shrub or small tree, branches spreading, glabrous or shoots hoary. Leaves $1\frac{1}{2}$ -3 by $\frac{1}{4}$ -1 in., thick, coriaceous; petiole short. Flowers $2\frac{1}{2}$ in. diam.; buds beaked; pedicels $\frac{1}{2}$ -1 in. Sepals very concave, ovate. Petals narrowly obovate-spathulate. Fruit 2-3 in. diam., subglobose, 5-6-ribbed, tubercled, obtusely beaked.—Originally described from young plants with slender branches and narrow leaves. Graham describes the flower as red.

SECT. II. Flowers umbelled, racemed, corymbose or panicled.

* Flowers in simple corymbs (sometimes compound in 9, versicolor, or racemose in 13, grandis).

6. **C. aphylla**, Roth; DC. Prodr. i. 246; glabrous, thorns in pairs

straight, leaves (only on young shoots) glabrous linear pungent, buds pubescent, stamens 18-20. *Wall. Cat.* 6983; *W. & A. Prodr.* 27; *Dalz. & Gibs. Bomb. Fl.* 9; *Oliv. Fl. Trop. Afric.* i. 95. (*C. Sodada*, *Br. Sodada decudua*, *Forsk.*)

Driest places in the PUNJAB, GUZERAT, RAJPUTANA, the DEKKAN and S. CARNATIC.—*DISTRIB.* Arabia, Egypt, N. trop. Africa.

A dense much branched shrub; branches slender, glabrous. *Flowers* 1 in. diam., red-brown, in many-flowered corymbs on short lateral shoots. *Outer sepals* subvalvate, ciliate; inner very saccate. *Fruit* $\frac{1}{2}$ - $\frac{3}{4}$ in., glabrous, long-beaked.

7. *C. diversifolia*, *W. & A. Prodr.* 27; glabrous, thorns recurved base broad, leaves glabrous linear or oblong-lanceolate, flowers $1\frac{1}{2}$ in. purple, ovary glabrous. *Hook. Ic. Pl.* t. 181. *C. reticulata*, *Klein. ex Wall. Cat.* 6986. *C. divaricata*, *Wall. Cat.* 6988, *A (not B)*. *C. cærulea*, *Heyne ex Wall. Cat. l.c.*

WESTERN PENINSULA, in Travancore.

A shrub, branches zigzag, young puberulous. *Leaves* $1\frac{1}{2}$ -2 by $\frac{1}{4}$ - $\frac{3}{4}$ in., uppermost usually (rarely all) twice as long and ovate-lanceolate, coriaceous, shining above; petiole $\frac{3}{8}$ in. *Flowers* $1\frac{1}{2}$ in., in few-flowered terminal subsessile corymbs; pedicels subclavate, puberulous. *Sepals* ovate, acute. *Petals* broad-obovate. *Ovary* narrow-oblong. *Fruit* $1\frac{1}{2}$ in., ovoid, smooth, many-seeded.

8. *C. trinervia*, *H. f. & T.*; branches brown-tomentose, thorns recurved, leaves glabrous broad-lanceolate 3-plinerved, sepals orbicular tomentose, ovary glabrous.

TENASSERIM, *Helper*; TAVOY, *Parish*

Climbing?, branches long. *Leaves* 2-3 by $\frac{3}{8}$ -1 in.; nervules transverse, few; petiole and midrib brown tomentose. *Flowers* $1\frac{1}{4}$ -2 in. diam., in terminal many-flowered corymbs; pedicels 1- $1\frac{1}{2}$ in., lower with foliaceous bracts, upper with minute ones. *Ovary* ovoid, acute; gynophore $1\frac{1}{2}$ in. *Fruit* unknown.

9. *C. versicolor*, *Griffith Notul.* iv. 577; branches glabrous, thorns short recurved, leaves glabrous lanceolate or oblong-lanceolate obtusely acuminate obscurely penninerved, sepals ovate glabrous, ovary glabrous.

TENASSERIM, *Griffith*.—*DISTRIB.* Java.

Climbing; branches flagelliform. *Leaves* 2-3 by $\frac{3}{4}$ -1 in., tip retuse, glabrous and shining above, pale beneath; petiole $\frac{1}{4}$ in., puberulous. *Flowers* 2 in. diam., white then rose; buds globose, glabrous; corymbs simple, terminal, with the lower flowers axillary, or few-flowered and disposed in lateral racemes 1- $1\frac{1}{2}$ in. long; pedicel 1 in. *Outer sepals* very convex, inner petioled. *Ovary* ovoid, gynophore $1\frac{1}{2}$ in.—Perhaps *C. salaccensis*, Blume, of which we have seen no authentic specimen.

10. *C. Moonii*, *Wight Ill.* 35; branches glabrous, thorns recurved, leaves oblong obtuse or subacute with a callous tip glabrous, flowers 4-5 in. diam., sepals orbicular, ovary glabrous. *Thwaites Enum.* 16.

CONCAN, *Stocks*, &c.; CEYLON, ascending to 3000 ft.

A large woody climber, branches flagellate. *Leaves* 3-6 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., coriaceous, shining above, pale beneath. *Flowers* white, in 6-12-flowered almost leafless terminal corymbs, with sometimes a solitary axillary flower; pedicels 1-2 in., stout. *Outer sepals* orbicular, convex, much imbricated. *Petals* subpilose. *Gynophore* 3-4 in. *Fruit* 2-4 in. diam., obovoid or subglobose. *Seeds* many, size of a large bean.—Probably a large flowered state of *C. Roxburghii*. *Thwaites'* character of the long funicle is altogether inconstant.

11. *C. Roxburghii*, *DC. Prodr.* i. 247; young branches hoary-pubescent, thorns recurved, leaves glabrous obovate-oblong obtuse acute or acuminate, flowers 2 in. diam., sepals orbicular, ovary glabrous. *W. & A.*

Prodr. 26; *Wight Ic.* t. 1048; *Thwaites Enum.* 15. *C. corymbosa*, *Roxb. Fl. Ind.* ii. 569. *C. bisperma*, *Wight Cat.* 104 (not *Roxb.*).

Forests of the WESTERN GHATS and CARNATIC.

A large woody climber; pubescence ashy or yellow, minute, deciduous. *Leaves* $1\frac{1}{2}$ – $2\frac{1}{2}$ by 1 – $1\frac{1}{2}$ in., base acute, shining and glabrous above, pale beneath. *Flowers* white, arranged as in *C. Moonii*; buds usually tomentose. *Petals* broadly obovate-cuneate. *Gynophore* $1\frac{1}{2}$ – 2 in. *Fruit* 1 – 2 in. diam., globose.

12. ***C. grandis***, *Linn. f.*; *DC. Prodr.* i. 248; branches pubescent, thorns 0 or recurved, leaves broad-ovate or obovate acute obtuse or retuse silky beneath, buds pubescent, ovary glabrous. *Wall. Cat.* 6996; *W. & A. Prodr.* 27; *Dalz. & Gibs. Bomb. Fl.* 10. *C. maximus*, *Roth*; *Wall. Cat.* 6995. *C. bisperma*, *Roxb. Fl. Ind.* ii. 568; *W. & A. Prodr.* 26 (excl. syn. *Wight Cat.*, & *Kleen.*). *C. obovata*, *Ham.* and *racemifera*, *DC. l.c.* 248.

Hill forests of the CARNATIC, DEKKAN, and CEYLON.

A tree. *Leaves* 2–3 by $1\frac{1}{2}$ – 2 in., base acute, glabrous above and the old on both surfaces; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Flowers* $\frac{3}{4}$ – 1 in. diam., white, in terminal corymbs or racemes, lower with leafy upper with deciduous bracts; pedicels 1 in. *Petals* narrow-obovate obliquely ascending. *Gynophore* 1 in. sometimes only $\frac{1}{2}$ or $\frac{1}{2}$ in. *Fruit* size of a nutmeg, subglobose, purple, smooth, 2–6-seeded.

** Flowers in simple umbels.

13. ***C. orbiculata***, *Wall. mss. in Herb. Linn. Soc.*; branches pilose, thorns recurved from a broad downy base, leaves suborbicular truncate retuse or mucronate papillose and hairy above tomentose beneath, flowers small, ovary glabrous.

Segain hills, BIRMA, *Wallich, Griffith.*

A much branched rigid spreading shrub. *Leaves* $\frac{3}{4}$ – 1 in. broad, obscurely trapezoid, base cordate; hairs above papillose; petiole very short. *Flowers* umbelled, peduncle 1 – 2 in., 1-leaved at the tip; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., slender, spreading. *Perianth* absent. *Ovary* oblong, acute; gynophore less than $\frac{1}{2}$ in.

14. ***C. pedunculosa***, *Wall. Cat.* 6993; branches pubescent, thorns recurved, leaves glabrous suborbicular obtuse or retuse penninerved, sepals equalling the oblong petals, ovary glabrous. *Hook. Ic. Pl.* t. 128; *Dalz. & Gibs. Bomb. Fl.* 9. *C. sepiaria*, *Wall. Cat.* 6993, *G.*

WESTERN PENINSULA, *Russell*; near Tanjore, in the CARNATIC, *Wight*; CONCAN, *Stocks*, &c.

A spreading branched shrub; branches wiry, at length glabrous. *Leaves* $\frac{3}{4}$ – $1\frac{1}{2}$ by $\frac{1}{2}$ – 1 in., base cordate, shining above; petiole very short. *Flowers* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., in 2–6-flowered terminal or axillary and shortly ($\frac{1}{8}$ – $\frac{1}{4}$ in.) peduncled umbels; pedicels 1 – $1\frac{1}{2}$ in., slender. *Sepals* reflexed in flower. *Ovary* oblong; gynophore 1 in. *Fruit* size of a cherry, globose, several-seeded.

15. ***C. longispina***, *H. f. & T.*; branches pubescent, thorns long acicular, leaves ovate-cordate acute rarely obtuse pubescent beneath, sepals equalling the oblong petals.

A spreading much-branched shrub; branches slender, wiry, softly pubescent. *Leaves* $\frac{3}{4}$ – $1\frac{1}{2}$ by $\frac{1}{2}$ – $\frac{3}{4}$ in., glabrous above; petiole very short. *Flowers* exactly as of *C. pedunculosa*, in sessile terminal umbels. *Fruit* (mature?) size of a pea.—Possibly a state of *C. pedunculosa*, though differing much in thorns pubescence and leaf-form.

16. ***C. parviflora***, *H. f. & T.*; branches unarmed, thorns 0, leaves glabrous lanceolate or oblong-lanceolate acute or acuminate, flowers small, buds glabrous, sepals and petals oblong, ovary glabrous.

Shewageri hills in the CARNATIC, *Wight*.

A spreading wiry much branched shrub (or tree?). *Leaves* $1\frac{1}{2}$ –3 by $\frac{1}{2}$ – $\frac{1}{4}$ in., base narrow but cordate; petiole short, broad. *Flowers* not $\frac{1}{2}$ in. diam., in axillary or sub terminal 3–6-flowered subsessile or shortly peduncled umbels; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., slender. *Petals* oblong. *Ovary* oblong, gynophore $\frac{1}{2}$ in. *Fruit* pisiform.

17. **C. sepiaria**, *Lin.*; *DC. Prodr.* i. 247; branches hoary or tomentose, thorns recurved, leaves ovate oblong obovate or oblong-lanceolate subacute or retuse penninerved downy (rarely glabrous) beneath, sepals oblong, petals narrow, ovary glabrous. *Roxb. Fl. Ind.* ii. 568; *Wall. Cat.* 6993; *W. & A. Prodr.* 26; *Camb. in Jacq. Voy. Bot.* t. 22; *Dalz. & Gibs. Bombay Fl.* 10.

Dry places throughout India, from the PUNJAB and SINDH to BIRMA, PEGU, the CARNATIC, and CEYLON (at Jaffna, *Gardner*).—DISTRIB. Philippines.

A spreading wiry branched shrub. *Leaves* $\frac{3}{4}$ – $1\frac{1}{4}$ by $\frac{1}{2}$ – $\frac{3}{4}$ in.; petiole $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ – $\frac{1}{2}$ in. diam., white, in many-flowered sessile or shortly peduncled umbels; pedicels slender, $\frac{1}{2}$ – $\frac{3}{4}$ in. *Ovary* ovoid, pointed; gynophore $\frac{1}{4}$ – $\frac{1}{2}$ in. *Fruit* pisiform, black.

VAR. 1. *vulgaris*; branches softly tomentose, leaves broad.

VAR. 2. *incanescens*; *DC. Prodr.* i. 247 (sp.), branches rigid wiry, hoary, white, leaves oblong, *Wall. Cat.* 6994; *W. & A. Prodr.* 26; *Hook. Ic. Pl.* t. 123. *C. stylosa* β , *DC. l.c.*

VAR. 3. *retusella*; *Thwaites Enum.* 16, 400 (sp.); branches brown-tomentose, leaves ovate or oblong-lanceolate, glabrous beneath, tip tapering retuse, umbels few-flowered, gynophore longer.—Ceylon, near Kandy, *Thwaites*.

*** Flowers in racemose or paniced rarely solitary umbels or corymba.

18. **C. pumila**, *Champion in Hook. Kew Journ. Bot.* iii. 260; young branches puberulous, thorns recurved, leaves glabrous oblong-lanceolate acuminate, stamens about 20, buds globose glabrous. *Benth. Fl. Hong-Kong*, 18. *C. punctata*, *Wall. Cat.* 7002.

KHASIA HILLS, alt. 2–3000 ft.—DISTRIB. E. China.

A shrub, twigs sarmentose or climbing. *Leaves* 2– $3\frac{1}{2}$ by $\frac{3}{4}$ – $1\frac{1}{4}$ in., base acute, obscurely penninerved; petiole $\frac{1}{4}$ in., pubescent. *Flowers* $\frac{1}{2}$ in. diam.; white, in few-flowered corymb or umbels arranged in large terminal panicles; pedicel $\frac{1}{2}$ – $\frac{1}{4}$ in. *Petals* oblong. *Ovary* ovoid-oblong, glabrous; gynophore $\frac{1}{4}$ in. *Fruit* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., globose, glabrous.

19. **C. floribunda**, *Wight Ill.* i. 33, t. 14; branches glabrous, thorns 0 or recurved, leaves glabrous oblong rounded at both ends retuse apiculate, stamens about 8, buds globose glabrous. *C. malabarica*, *Wall. Cat.* 7000. *C. oligandra*, *Griffith Notul.* iv. 577.

MALABAR, *Heyne*; ORISSA, *Cleghorn*; TENASSERIM, *Griffith*, &c. CEYLON in the Doombesa district, *Thwaites*.—DISTRIB. Philippines.

A large woody climber; branches slender. *Leaves* 3–5 by $\frac{3}{4}$ – $1\frac{3}{4}$ in., coriaceous, shining above, obscurely penninerved below. *Flowers* $\frac{1}{2}$ in. diam., white; umbels many-flowered, in large terminal panicles; pedicels $\frac{1}{4}$ –1 in. *Sepals* reflexed in flower. *Petals* oblong. *Ovary* ovoid, acute; gynophore $\frac{1}{2}$ in. *Fruit* 1 in. diam., globose, smooth, several-seeded.

20. **C. assamica**, *H. f. & T.*; branches glabrous, thorns minute straight or slightly curved, leaves glabrous lanceolate or oblong-lanceolate acuminate reticulate beneath, flowers racemed, buds very small globose.

ASSAM, *Griffith*.

Erect?; branches slender. *Leaves* 4–6 by $1\frac{1}{2}$ –2 in., base acute, pale below. *Flowers* in terminal many-flowered racemes, 3–4 in. long, which bear many subulate empty

bracts at the base, and at the top a tuft of the same probably enclosing a leaf-bud; buds immature, each in the axil of a subulate bract; pedicel $\frac{1}{4}$ in. *Sepals* 4, imbricate in pairs.

SECT. III. *Flowers* seriate in vertical lines on the branches.

21. **C. multiflora**, *H. f. & T.*; branches glabrate, thorns 0, leaves large glabrous broad-lanceolate or oblong taper-pointed, flowers small, sepals glabrous.

Tropical valleys in E. NIPAL, and SIKKIM; BHOTAN, *Griffith*; Hookhoom valley in BIRMA, *Griffith*.

A large woody climber; branches long, slender. *Leaves* 6–12 by 2–5 in., thin, base acute, pale beneath; upper 2–4 in., often bractlike and very deciduous; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Flowers* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., supra-axillary to the leaf or bracts, forming a leafy or naked 4- or more-flowered raceme; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. *Petals* obovate-oblong. *Ovary* glabrous. *Fruit* pisiform or larger, 1–3-seeded.

22. **C. horrida**, *Linn. f.*; *DC. Prodr.* i. 246; young leaves buds and shoots brown-tomentose, thorns stout broad-based recurved, leaves ovate obovate or oblong acute obtuse or mucronate at length shining above, petals oblong ciliate, ovary glabrous acute. *Wall. Cat.* 6981; *W. & A. Prodr.* 26; *Wight Ic. t.* 173; *Dalz. & Gibs. Bombay Fl.* 10. *C. zeylanica*, *Roeb. Fl. Ind.* ii. 567 (not of *Linn.*). *C. formosa*, *Wall. Cat.* 6982 *A.* *C. acuminata*, *Willd.*; *Wall. Cat.* 6990 *C* (not *A* or *B*). *C. tenuiflora* and *quadriflora*, *DC. l.c.* 247. *C. erythrodasys*, *Miq. Fl. Ind. Bat.* i. pt. 2, 99. *Capparis* sp. *Griff. Ic. Pl. Ind. Or.* iv. t. 698.

GANGETIC VALLEY, &c., as far N. as Saharunpore; WESTERN PENINSULA, CHITTAGONG to PEGU; CEYLON.—DISTRIB. Java, Philippines.

Shrubby, climbing. *Leaves* $1\frac{1}{2}$ –4 by $\frac{3}{4}$ –2 in., tip pungent, at length shining above and usually much reticulate. *Flowers* $1\frac{1}{2}$ –2 in., white or purplish; buds globose; pedicels supra-axillary, $\frac{1}{2}$ –1 in., upper longer. *Fruit* 1– $1\frac{1}{2}$ in. diam., obovoid or subglobose, smooth, obtusely 4 angled, red-brown, many-seeded.

23. **C. acuminata**, *Willd.*; *DC. Prodr.* i. 247; young shoots and leaves beneath brown-tomentose, thorns straight or curved, leaves at length glabrous broad-ovate obtusely acuminate, buds globose downy, flowers small. *C. zeylanica*, *W. & A. Prodr.* 25 (not of *Linn.*, but perhaps of *DC. Prodr.*).

Western Peninsula, CARNATIC? *Klein in Herb. Wight.*

Erect?; branches slender. *Leaves* $1\frac{1}{2}$ –2 by 1– $1\frac{1}{4}$ in., obtusely acuminate, membranous; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Flowers* 2–4 in a series, white, axillary; pedicels $\frac{1}{2}$ –1 in. downy.—The specimen in *Herb. Wight.* is the only one known. It differs from *C. horrida* in the thorns and small white flowers. The original ticket bears the manuscript name *ferruginea* of Klein, corrected by himself to *acuminata*, *Willd.*, no doubt from corresponding specimens sent to Europe; the locality is unknown.

24. **C. olacifolia**, *H. f. & T.*; young branches brown-pubescent, thorns straight or slightly curved, leaves glabrous ovate-lanceolate taper-pointed, tip acute obtuse or mucronate, flowers large, buds ovoid glabrous, sepals oblong ciliate, ovary pubescent. *C. acuminata*, *Wall. Cat.* 6990 *A, B* (not *C*, nor of *Willd.*). *Capparis*, 1149, *Griff. Itin. Notes*, 199.

Tropical Himalayan valleys, from NIPAL, *Wallich*, to ASSAM, *Griffith*, &c.

An erect shrub, 6–8 ft.; branches long, leafy, old glabrous. *Leaves* 3–6 by 1– $2\frac{1}{2}$ in., base rounded or subacute, shining above, midrib of young puberulous. *Flowers* $1\frac{1}{2}$ in. diam., (white, anthers blue) 2–3 in a series, axillary; buds acute, glabrous or puberulous. *Sepals* margined. *Petals* narrowly obovate-oblong, pubescent. *Fruit* $\frac{3}{4}$ in. diam., globose, sharply beaked, black, smooth, shining.

25. **C. sabiæfolia**, *H. f. & T.*; branches glabrous, thorns 0, leaves glabrous oblong-lanceolate taper-pointed, pedicels 1-2 supra-axillary.

KHASIA HILLS, alt. 4-6000 ft., *H. f. & T.*

A shrub; branches slender. *Leaves* 3-4 by 1-1½ in., base acute. *Pedicels* about ½ in., slender, flowers unknown. *Fruit* pisiform, 1-2-seeded.

26. **C. viminea**, *H. f. & T.*; branches glabrous, thorns 0 or small conical curved, leaves glabrous abruptly taper-pointed acute or obtuse, sepals ovate margins tomentose, petals oblong tomentose outside.

Tropical valleys of SIKKIM, BHOTAN, ASSAM, and TENASSERIM.

An erect shrub; branches long, slender. *Leaves* 2½-4½ by 1-2 in., thin; petiole ½ in. *Flowers* 1 in. diam.; white, 2-5 in a series, axillary, pedicels ½-1 in. *Fruit* ½ in. diam., globose, purple, glabrous, several-seeded.

27. **C. tenera**, *Dalz. in Hook. Kew Journ. Bot. ii. 14*; branches glabrous, thorns hooked, leaves glabrous ovate obovate or oblong acute or abruptly acuminate, flowers small, sepals ovate, margins tomentose, petals tomentose outside.

From ASSAM to BIRMA and TENASSERIM; CANARA, CONCAN and CEYLON (Kandy, *Thwaites*).

A woody climber, branches slender. *Leaves* 1½-3 by ¾-1½ in., young very thin. *Flowers* ¼-½ in. diam., 1-3 in a series, axillary; pedicels ¾-1½ in., slender, glabrous. *Fruit* pisiform, few-seeded. The following vars. all pass one into another.

VAR. 1. *Dalzellii*; leaves ovate-lanceolate very membranous, flowers often solitary.—*C. tenera*, *Dalz. l.c.*

VAR. 2. *zeylanica*; leaves ovate, old firm and coriaceous, flowers 2-3 in a series.—*C. uncinata*, *Wall. Cat. 6998*. *C. tetrasperma*, *Thwaites Enum. 15*;

VAR. 3. *latifolia*; leaves obovate-oblong abruptly acuminate, old coriaceous, flowers 4-6 in a series.—*C. oxyphylla*, *Wall. Cat. 6997 (not of Miquel)*.

28. **C. Finlaysoniana**, *Wall. Cat. 6992 B (not A)*; branches glabrous, thorns very small nearly straight, leaves glabrous broad lanceolate obscurely reticulate above, sepals lanceolate acute glabrous.

SINGAPORE, *Wallich, &c.*—DISTRIB. Sumatra, Borneo.

An erect? glabrous shrub. *Leaves* 6-8 by 1½-3 in.; coriaceous, smooth, shining, pale and yellow when dry below. *Flowers* (buds only) on the young branches supra-axillary, solitary or 2 in a series, appearing racemed when the leaves fall away; pedicels ½-¾ in. slender. *Fruit* (immature) ovoid-oblong, glabrous, ribbed, long-pedicelled.—Flowers of Bornean specimens rose-coloured. Buds and flowers larger than in *C. micracantha* and leaves not evidently cordate at base.

29. **C. micracantha**, *DC Prodr. i. 247*; branches glabrous, thorns very small conic straight, leaves oblong or broad-lanceolate shining and very reticulate above, sepals oblong acute ciliate. *Blume Bijdr. 52*; *Miq. Fl. Ned. Ind. i. pt. 2, 99*. *C. callosa*, *Blume l.c. 53*. *C. conspicua* and *C. Finlaysoniana*, *Wall. Cat. 6991 and 6992 A (not B)*.

PEGU, TENASSERIM, *Wallich, &c.*—DISTRIB. Siam, Java, Timor, Philippines.

A large shrub or small tree; bark smooth. *Leaves* 4-8 by 2-3½ in., coriaceous, lower obtuse at both ends, upper narrowed towards the rounded or subcordate base, tip acute callous, pale beneath; petiole ¾-½ in. *Flowers* 1½ in. diam., 2-4 in a series, supra-axillary; pedicels ½ in. or less. *Petals* 1 in., oblong. *Ovary* glabrous. *Fruit* 2-3 in., ovoid or subglobose, smooth.

Inflorescence unknown.

30. **C. flavicans**, *Wall. Cat. 7003*; branches tomentose, thorns 0, leaves glabrous oblong or obovate-oblong obtuse or retuse and mucronate 3-5 plinerved, fruit solitary.

BIRMA, at Genanghuen and Selainmew, *Wallich*.

Shrubby, branches spreading, tomentum appressed. *Leaves* $1\frac{1}{2}$ – $1\frac{1}{2}$ by $\frac{3}{4}$ –1 in., base rounded or subcordate; midrib with 2 oblique veins from about the middle; petiole $\frac{1}{2}$ in., pubescent. *Fruit* 1 in., subglobose, tomentose, many-seeded; stalk as long.

31. **C. glauca**, *Wall. Cat.* 7005; branches hoary-pubescent, thorns recurved, leaves glabrous narrow obovate-oblong obtuse or retuse penninerved.

BIRMA, common near Pagodas at Pegamew, *Wallich*.

A shrub; branches rigid, spreading. *Leaves* $1\frac{1}{2}$ – $1\frac{3}{4}$ by $\frac{1}{2}$ – $\frac{3}{4}$ in., coriaceous, tapering to the acute base, pale and glaucous beneath; petiole $\frac{1}{2}$ in., pubescent. *Flowers* probably umbelled, on stout axillary peduncles about $\frac{1}{2}$ in. long. *Fruit* pisiform, glabrous, 1–2-seeded; stalk $\frac{1}{2}$ in.; gynophore very short.

C. VARIABILIS, *Wall. Cat.* 7004, without flower or fruit, is indeterminable and not a *Capparis*.

C. MOLLUSCULA, *Wall. Cat.* 7006, is a *Cansjera*.

An undescribed Sikkim species allied to *C. floribunda*, is figured amongst the Cathcart drawings (in Kew Library), with flowers $1\frac{1}{2}$ in. diam., many stamens, and a longer gynophore.

8. ROYDSIA, Roxb.

Large unarmed woody climbers, branches spotted white. *Leaves* simple. *Flowers* yellow, racemed or paniced. *Calyx* 6-partite, segments 2-seriate, tips a little imbricate. *Petals* 0. *Stamens* indefinite, inserted above the base of the short cylindric gynophore. *Ovary* ovoid, 3-celled from the prolongation of the placentas; style 3, subulate, stigmas small terminal; ovules many, 2-seriate in the angles of the cells. *Fruit* fleshy, with a woody 3-valved 1-celled endocarp, 1-seeded. *Seed* erect, cotyledons fleshy, unequal, longitudinally folded, the larger embracing the smaller.—**DISTRIB.** Species 3, tropical Asiatic.

1. **R. suaveolens**, *Roxb. Cor. Pl.* iii. t. 289; *Fl. Ind.* ii. 643; leaves oblong or oblong-lanceolate acute or abruptly acuminate, endocarp of fruit smooth. *Wall. Cat.* 4200; *Griff. Notul.* iv. 578.

Tropical forests of SIKKIM, *H. f.*, and BHOTAN, *Griffith*; KHASIA HILLS, *Roxburgh*, &c.

Branches glabrous or slightly pubescent. *Leaves* 6–12 by 2–5 in., glabrous, coriaceous, bright green above, pale below; petiole $\frac{3}{4}$ –1 in. *Flowers* $\frac{3}{4}$ in. diam., pale yellow, sweet-scented, in long simple axillary or paniced terminal racemes; buds tomentose; bracts small, subulate, equalling the short pedicels. *Drupe* $1\frac{1}{2}$ in., ovoid, scurfy, orange-coloured; pulp yellow; stalk short stout.

2. **R. obtusifolia**, *H. f. & T.*; leaves oblong obtuse at both ends, endocarp of fruit triquetrous muricate with long soft prickles.

RANGOON, *M' Clelland*.

Branches glabrous. *Leaves* 3–5 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., thickly coriaceous; petiole $\frac{3}{4}$ in. *Racemes* in terminal panicles; flowers unknown. *Drupe* 2 in., oblong, scurfy; stalk short, stout.

R. PARVIFLORA, *Griff. Notul.* iv. 578; *Ic. Pl. Ind. Or.* t. 606, f. 6, belongs to *Tiliaceæ*.

ORDER XII. RESEDACEÆ. (By Hooker f. & Thomson.)

Herbs rarely shrubs. *Leaves* alternate, entire or pinnatisect; stipules 0, or minute and glandular. *Flowers* small, spiked or racemed, bracteate.

Calyx persistent, 4-7-partite, often irregular; sepals imbricate in bud. *Petals* 2-7, hypogynous, entire or lobed, equal or the posticous larger, open in bud. *Disk* conspicuous, hypogynous (0 in *Oligomeris*). *Stamens* usually many, seated on the disk, free or connate, equal or unequal. *Ovary* 1-celled, of 2-6 connate carpels, often lobed at the top and open between the lobes which bear the sessile stigmas; ovules on 2-6 parietal placentas, amphitropous or campylotropous. *Fruit* capsular (a berry in *Ochradenus*), open at the top. *Seeds* many, reniform, albumen 0; embryo curved or folded, cotyledons incumbent.—DISTRIB. Europe, N. Asia, N. and S. Africa; genera 6; species 20.

- | | |
|---|----------------|
| Petals 4-7, lobed; ovary syncarpous | 1. RESEDA. |
| Petals 2; ovary syncarpous | 2. OLIGOMERIS. |
| Petals 0; ovary syncarpous; fruit a berry | 3. OCHRADENUS. |

1. RESEDA, Linn.

Herbs. *Leaves* entire, lobed, or pinnatifid; stipules glandular. *Calyx* 4-7-partite. *Petals* 4-7, clawed, unequal, multifid, posticous one with a membrane above the claw. *Disk* broad, dilated posticously. *Stamens* 10-40. *Ovary* sessile or stalked; placentas 3. *Capsule* many-sided, open at the top.—DISTRIB. Species 26, N. Africa, W. Asia.

The European *R. luteola* is found in Afghanistan, and *R. odorata* (mignonette), (*R. nilgherrensis*, J. Mull. Monog. Resed. 131), is commonly cultivated.

1. ***R. pruinosa***, *Delile Fl. Egypt.* 152; papillose, lower leaves lanceolate, upper 3-5-partite, flowers very small subsessile, bracts minute. *R. bracteata*, *Boiss. Fl. Orient.* 433; *J. Mull. Monog.* 154.

Hills in the WESTERN PUNJAB, *Vicary*, &c.—DISTRIB. Eastward to Egypt.

An erect perennial, 1-1½ ft. *Leaves* 1-2 in., upper with linear segments. *Racemes* terminal, 6-9 in., dense; bracts subulate, deciduous. *Capsules* oblong or ovoid, short, widely gaping.

2. ***R. Aucheri***, *Boiss. Fl. Orient.* i. 434; glabrous or slightly papillose, leaves obovate-spathulate acute or obtuse, flowers small, bracts linear-lanceolate. *J. Mull. Monog.* 146.

SINDH, *Stocks*.—DISTRIB. Eastwards to Persia.

A branched perennial, 1-2 ft. *Leaves* 1-2 in., tapering into a long petiole. *Racemes* terminal, dense; flowers yellowish. *Capsules* as in *R. pruinosa*.

2. OLIGOMERIS, Cambess.

Herbs. *Leaves* linear, fascicled. *Flowers* small, spiked. *Calyx* 4-partite. *Petals* 2, free or connate. *Disk* 0. *Stamens* 3-8, free or monadelphous. *Ovary* 4-lobed, top open, placentas 4; ovules many. *Capsule* subglobose, angled, 4-pointed.—DISTRIB. Species 4; 3 S. African, and the following.

1. ***O. glaucescens***, *Cambess. in Jacq. Voy. Bot.* 23, t. 25; leaves narrow-linear, stipules minute subulate, spike dense-flowered, flowers minute, capsule deeply 4-lobed. *O. dispersa* β, *J. Mull. Monog.* 215. *Reseda oligandra*, *Edgew. in Journ. As. Soc. Calc.* vii. 764, and *Hook. Lond. Journ. Bot.* ii. 203.

SINDH, and PUNJAB, from the Jumna eastward, common; rare in the CONCAN hills.—DISTRIB. Westward to Spain and the Canaries.

An annual, erect, glaucous, much branched herb, 6-12 in.; branches erect. *Leaves* 1-2 in. *Spikes* terminal, flowers greenish-white. *Capsule* very small, membranous. *Seeds* minute, shining.

3. **OCHRADENUS**, Delile.

Much branched shrubs; branches slender. *Leaves* small, linear. *Flowers* spiked or racemed, often polygamous. *Calyx* 5-partite. *Petals* 0. *Disk* unilateral. *Stamens* 10-20, inserted within the disk. *Ovary* ovoid, closed at the top, 3-beaked; ovules many, on 3 placentas. *Berry* many-seeded.—**DISTRIB.** Species 2, a Spanish and the following.

1. **O. baccatus**, Delile *Fl. Æg.* 15, t. 31, f. 1; leaves fleshy scattered linear-spathulate, racemes terminal, flowers minute. *J. Mull. Monog.* 94; *Boiss. Fl. Orient.* i. 422; *Griff. It. Notes*, 228, No. 208.

SINDH, Vicary, &c.—**DISTRIB.** Westwards to Syria and Egypt.

Shrubby, 6-12 ft.; branches glabrous, leafless when old. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; stipules minute or 0. *Racemes* rigid; flowers yellowish, 1-2-sexual. *Stamens* 10-12. *Berry* small, white. *Seeds* few, large.

ORDER XIII. **VIOLACEÆ**. (By Hooker f. & Thomson.)

Herbs or shrubs. *Leaves* alternate, entire or pinnatisect, stipulate. *Flowers* regular or irregular, 2-bracteolate. *Sepals* 5, persistent, equal or unequal, imbricate in bud. *Petals* 5, hypogynous, equal or unequal, imbricate or contorted in bud. *Stamens* 5, filaments short, broad; anthers free or connate, connective broad, produced beyond the cells. *Ovary* sessile, 1-celled; style simple, stigma capitate truncate or cupular entire or lobed; ovules many, on 3 parietal placentas, anatropous. *Fruit* a 3-valved capsule, rarely a berry. *Seeds* small, albumen fleshy; embryo straight, cotyledons flat.—**DISTRIB.** Genera 21, species 240; natives of temp. and trop. regions.

TRIBE I. **Violææ**. *Corolla* irregular; lower petal dissimilar. *Staminodes* 0. *Capsule* loculicidal.

Sepals produced at the base 1. **VIOLA**.

Sepals not produced at the base 2. **IONIDIUM**.

TRIBE II. **Alsodeleæ**. *Corolla* regular. *Staminodes* 0. *Fruit* a berry or loculicidal capsule.

3. **ALSOIDEIA**.

1. **VIOLA**, Linn.

Herbs, rarely shrubby below. *Flowers*, on 1-, rarely 2-flowered peduncles, often dimorphic, some large petalled which ripen few seeds, others small petalled or apetalous and very prolific. *Sepals* produced at the base. *Petals* erect or spreading, lower largest, spurred or saccate at the base. *Anthers* connate, connectives of two lower often spurred at the base. *Style* clavate or truncate, tip straight or oblique, stigma obtuse lobed or cupular. *Capsule* 3-valved. *Seeds* ovoid or globose.—**DISTRIB.** Species about 100, all temp. regions.

The Pansy or Heartsease (*Viola tricolor*) occurs occasionally in India, as an escape from cultivation.

* Stigma obliquely 2-lobed, not beaked; lobes short, spreading.

1. **V. biflora**, L.; glabrous or pubescent, leaves reniform, stipules ovate or oblong, flowers yellow, sepals linear-obtuse, spur very short. **V.**

Wallichiana, *Ging. in DC. Prodr.* i. 300. *V. reniformis*, *Wall. Cat.* 1443; *Royle Ill.* 74, t. 18, f. 2; *Roxb. Fl. Ind. Ed. Wall.* ii. 457.

TEMPERATE HIMALAYA from Kashmir to Sikkim, alt. 6–11,000 ft.—DISTRIB. N. Asia, Caucasus, Europe.

Rootstock slender. *Stem* 3–12 in., erect or decumbent. *Leaves* 1–2 in. diam., crenate, cauline 2–3.

** Stigma terminal, truncate, dilated depressed orbicular or lobed.

2. **V. Patrini**, *DC. Prodr.* i. 293; glabrous or pubescent, stemless, without stolons, leaves triangular ovate oblong or linear-crenate or serrate, base hastate cordate or cuneate, stipules linear adnate, flowers lilac, sepals lanceolate, spur saccate. *Wall. Cat.* 1445. *V. primulifolia*, *Linn. in part*; *Roxb. Fl. Ind.* i. 650. *V. grandifolia* and *V. mysorensis*, *Wall. Cat.* 1446, 1447. *V. chinensis* and *V. cæspitosa*, *Don Prodr.* 205. *V. nilagirica*, *Turc. in Bull. Mosc.* xxxvi. 536. *V. Walkerii*, *Wt. Ill.* i. 42, t. 18. *V. Patrini* var. *nepaulensis*, *DC. l.c.*

TEMPERATE HIMALAYA, alt. 4–8000 ft. from Kashmir to Bhotan; WESTERN TIBET; KHASIA HILLS; hills of the WESTERN PENINSULA, and CEYLON.—DISTRIB. Afghanistan, N. Asia, Japan, Mid. Russia.

Very variable. *Rootstock* woody. *Leaves* very variable, largest 3–4 by 1–2 in., narrowest 3–4 by $\frac{1}{2}$ –1 in.; petiole 2–4 in., often winged. *Stipules* entire. *Flowers* $\frac{1}{2}$ – $\frac{1}{2}$ in. diam. *Style* nearly straight, slender; stigma 3-lobed, margined. *Capsule* straight, $\frac{1}{4}$ – $\frac{1}{2}$ in.; valves narrow, acute.

3. **V. diffusa**, *Ging. in DC. Prodr.* i. 298; softly hairy, stemless, stoloniferous, leaves elliptic-ovate obtuse crenate base cuneate rarely cordate, stipules free narrow toothed, sepals subacute, spur globose. *Wall. Cat.* 1444. *V. tenuis*, *Benth. in Hook. Lond. Journ. Bot.* i. 482.

SUBTROPICAL HIMALAYA from Nipal to Mishmi, in fields, alt. 3–5000 ft.; KHASIA MTS.—DISTRIB. China.

Perennial. *Leaves* tufted, 1– $\frac{1}{2}$ in., pale green; petiole broadly winged, rarely equalling the blade. *Stolons* short, sometimes floriferous. *Flowers* pale-purple. *Style* slender, narrowed-downwards from the 2-lobed margined obscurely-beaked stigma.

4. **V. Hookeri**, *T. Thoms.*; glabrous or young parts pilose, stem and stolons short, leaves orbicular-reniform broadly crenate, petiole not winged, stipules narrow free toothed or lacerate, sepals obtuse or acute, spur saccate.

EASTERN HIMALAYA; Bhotan, alt. 6–7000 ft., *Griffith*; Sikkim, alt. 8–11,000 ft., *H. f.*

Rootstock slender. *Leaves* $\frac{1}{2}$ –1 $\frac{1}{2}$ in., rather fleshy, crenatures very broad and shallow; petiole 1–3 in., slender. *Flowers* white or very pale blue, small. *Style* slender, narrowed downwards from the 3-lobed obscurely beaked stigma. *Capsules* small.—Perhaps two species are mixed here, and if so they occur in both the Sikkim and Bhotan collections; one is small, very hairy when young, with more reniform leaves and shorter obtuse sepals; the other is larger, almost wholly glabrous, with more ovate minutely gland-dotted leaves having rounded sometimes overlapping basal auricles, and acute sepals; of this latter some of Griffith's specimens are marked as from East Bengal (Khasia hills), but through an obvious transposition of tickets.

5. **V. distans**, *Wall. Cat.* 4022, and in *Trans. Med. Phys. Soc. Calc.* vii. 227; glabrous or nearly so, stolons or stems usually long leafy and flowering, leaves ovate- or deltoid-cordate usually acute crenate-serrate, stipules entire or fimbriate, sepals acute, spur saccate, capsule linear-oblong

many-seeded. *V. Wightiana* var. *glabra*, *Thwaites Enum.* 20. *V. Notoniana*, *Wall. Cat.* 1449. *V. Metziana*, *Hohen. Pl. Exsicc.* No. 1501.

TEMPERATE HIMALAYA, from Nipal to Bhotan, alt. 5-10,000 ft.; KHASIA HILLS, alt. 4-6000 ft. PULNEY and NILGHIRI MTS.; CEYLON, alt. 6-7000 ft.—DISTRIB. Java?

Rootstock slender or stout. *Stems* 1-14 in., usually long and trailing. *Leaves* $\frac{3}{4}$ -1 $\frac{1}{2}$ in., very variable, sinus broad or narrow, shallow or deep; petals not winged. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., pale lilac or blue. *Style* slender, narrowed downwards from the obscurely 3-lobed stigma. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in., valves acute.—It is very difficult to distinguish this from *V. serpens*, by leaf or flower, and the characters of the stigma and fruit are probably sexual; some of the synonyms quoted under each may apply to the other.

VAR. 1. *distans* proper; stipules nearly entire. *V. serpens*, *Wall. Cat.* 1441 (not of *Fl. Ind.*). ? *V. palmaris*, *Buch in DC. Prodr.* i. 298, *Don Prodr.* 205.—Nipal, Khasia hills.

VAR. 2. *fimbriata*; stipules lacerate or fimbriate.—Sikkim.

VAR. 3. *acaulis*; stemless, stipules fimbriate.—Sikkim, alt. 7-9000 ft.

*** Stigma very oblique or quite lateral, often minute and perforated.

6. ***V. serpens***, *Wall. in Roxb. Fl. Ind. Ed. Wall.* ii. 449 (not of *Cat.*), and in *DC. Prodr.* i. 296; hirsute or glabrous, stolons or stems usually long leafy and flowering, leaves ovate-cordate obtuse or acute crenate-serrate, stipules toothed or fimbriate, spur saccate, sepals acute, capsules globose few-seeded. *Royle Ill.* 74, t. 18, f. 1; *W. & A. Prodr.* 32. *V. Wightiana* var. *pubescens*, *Thwaites Enum.* 20. *V. pilosa*, *Blume Bijdr.* 57.

Moist woods, &c., throughout the TEMPERATE HIMALAYA, KHASIA HILLS, PULNEY and NILGHIRI MTS., and CEYLON, alt. 5-7000 ft. ? MOULMEIN, *Parish*.—DISTRIB. Java, China.

Leaves 1-2 in., sinus open or closed, shallow or deep. *Flowers* from the main stem $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; those from the axils of the cauline leaves small or minute. *Capsules* often pubescent.—As variable in habit and foliage as *V. distans*, from which the stigma alone distinguishes the glabrous forms when these are not in fruit, and we suspect that these differences are sexual, the stigmas of the smaller fertile flowers appearing to be more truncate than those of the large flowers. The N.W. India specimens are shorter-stemmed than those from moister districts. *V. Griffithiana*, Boiss., of Afghanistan, differs in the more cylindric spur and swollen style above with rounded top, and in the more evident beak. *V. hirta*, L., differs chiefly in the latter character and obtuse sepals.

VAR. 1. *glabra*; glabrous and very stoloniferous. ? *V. Hamiltoniana*, *Don Prodr.* 206.

VAR. 2. *canescens*, *Wall. Cat.* 1442 (sp.), and in *Roxb. Fl. Ind. Ed. Wall.* ii. 450; often stemless, hoary or pubescent. *V. Wightiana*, *Wall. Cat.* 4021. *V. Royleana*, *Wall. Cat.* 1448. *V. Griffithiana*, Boiss. *Fl. Orient.* i. 456.

VAR. 3. *confusa*, *Benth. Fl. Hongk.* 20 (sp.); stemless or nearly so, stolons 0. *V. Wightiana*, *Wt. Ic.* t. 943. *V. aspera*, *Ging. in DC. Prodr.* i. 295.

7. ***V. odorata***, L.; glabrate or pubescent, stem 0, stolons slender, leaves tufted broadly ovate cordate obtuse crenate, stipules entire or toothed, sepals very obtuse, spur nearly straight short subcylindric, style inflated above, stigma decurved. Boiss. *Fl. Orient.* i. 458. (Sweet Violet.)

KASHMIR, alt. 5-6000 ft., *Falconer, T. T.*—DISTRIB. Europe, N. Africa, N. and W. Asia.

Rootstock stout. *Stems* very short or 0. *Leaves* (in the Kashmir plant) $\frac{1}{2}$ -1 in. diam., tip rounded, nearly glabrous; stipules subulate-lanceolate. *Sepals* rounded at the tip.

8. **V. canina**, var. *sylvatica*, Fries. (sp.); rootstock short or 0, flowering stems from a short central axis, leaves ovate-cordate obtuse crenate-serrate, stipules leafy fimbriate, sepals acute or acuminate, spur straight or hooked, style of *V. odorata*. Boiss. *Fl. Orient.* i. 459.

KASHMIR and KISHTWAR, alt. 4-8000 ft., Jacquemont, &c.—DISTRIB. N. Asia, and westward to the Atlantic.

Best distinguished from *V. odorata* by the acute or acuminate sepals.

9. **V. Falconeri**, H. f. & T.; stem 0 or very short, stolons or branches stout erect 6-10 in., leaves large ovate-cordate very broadly crenate and very large foliaceous toothed stipules densely covered with black glands, flowers $\frac{3}{4}$ in. diam., sepals subulate-lanceolate, spur saccate, anther-spurs exceeding the cells.

KASHMIR, Falconer.

A very remarkable species, resembling *V. acuminata*, Led. (a form of *canina*), of Siberia and Manchuria, but with much larger flowers and gland-dotted leaves.

10. **V. kunawarensis**, Royle *Ill.* 75, t. 18, f. 3; small, glabrous, stemless, stolons 0, leaves tufted oblong obtuse subentire base cuneate, sepals short tips rounded, spur short obtuse, style clavate, stigma subhorizontal hardly beaked.

WESTERN TIBET and TIBETAN HIMALAYA, from Kumaon to Balti, alt. 11-15,500 ft.—DISTRIB. Afghanistan.

Rootstalk slender, woody, much branched. Leaves tufted, $\frac{1}{2}$ - $\frac{3}{4}$ in., tapering into the slender petiole, pale green. Flowers $\frac{1}{4}$ - $\frac{1}{3}$ in. diam., purple. Capsules elliptic, acute.

11. **V. cinerea**, Boiss. *Fl. Orient.* i. 454; small, glabrous, stems short diffuse branched, leaves elliptic-ovate or lanceolate acute obscurely crenate, base acute, stipules leafy fimbriate, flowers small axillary, sepals lanceolate aristate, spur very short, style clavate compressed, stigma lateral of 2 oblong parallel disks.

Dry hilly region of the PUNJAB and SINDH, common.—DISTRIB. Afghanistan, Persia, Arabia.

Slightly powdery. Stems 1-6 in. Leaves $\frac{1}{2}$ - $\frac{1}{2}$ in., apiculate, petioles as long. Peduncles slender, bracts subulate. Flowers $\frac{1}{4}$ in. diam. Capsules $\frac{1}{8}$ - $\frac{1}{4}$ in., elliptic, acute.

V. APETALA, Roxb. ? Wall. *Cat.* 1440, resembles an apetalous form of *A. Patrini*.

V. DUBIA, Wall. *Cat.* 1450, is probably a form of *V. serpens*.

2. IONIDIUM, Ventenat.

Herbs or undershrubs. Leaves alternate, rarely opposite. Flowers axillary, orange or purple. Sepals 5, subequal, not produced at the base. Petals 5, lower larger, clawed, saccate or spurred at the base. Anthers connate or free, 2 or 4 of them gibbous or spurred at the back. Ovary ovoid; style clavate, incurved, stigma oblique. Capsule 3-valved, subglobose, few-seeded. Seeds globose, testa crustaceous.—DISTRIB. Species about 40, chiefly tropical American.

1. **I. suffruticosum**, Ging. in DC. *Prodr.* i. 311; glabrous or pubescent, leaves linear or lanceolate serrate-toothed, flowers solitary. Wall. *Cat.* 1439; W. & A. *Prodr.* 32; Wight *Ill.* t. 19; Ic. t. 308. I. enneaspermum, DC.; Wall. *Cat.* 1438; W. & A. *Prodr.* 33. I. Wightianum, Wall. *Cat.* 4020. I. leptorhizum, DC.; W. & A. l.c. I. heterophyllum and erectum, DC. l.c. 308, 311. I. hexaspermum, Dalz. in Hook. *Kew Journ.* iv. 342; Bomb. *Fl.* 12. *Viola suffruticosa* and *enneasperma*, Roxb. *Fl. Ind.* i. 649; Ed. Wall. ii. 417. V. frutescens and erecta, Roth. *Nov. Sp.* 168.

Abundant from BUNDELKUND and AGRA, to BENGAL and CEYLON.—DISTRIB. Tropical Asia, Africa, and Australia.

Very variable, 6–12 in., perennial; branches diffuse, woody. *Leaves* $1\frac{1}{2}$ –2 by $\frac{1}{2}$ – $\frac{3}{4}$ in., subsessile; stipules subulate, gland-tipped. *Flowers* red; pedicels shorter than the leaves. *Petals* variable, 4 oblong acute or mucronate, the 5th with a long claw, and large oval or orbicular limb. *Seeds* striate.

2. ***I. ramosissimum***, *Thwaites Enum.* 21; leaves closely imbricate narrow-linear quite entire glaucous, flowers solitary.

CEYLON, banks of the Mahawelliganga at Havagam, *Thwaites*.

Shrubby, suberect, 6–8 in., branches suberect. *Leaves* 1– $1\frac{1}{2}$ in., mucronate, veinless, margins recurved. *Flowers* as in *I. suffruticosum*.

3. **ALSODEIA**, Thouars.

Trees or shrubs. *Leaves* alternate (rarely opposite), distichous; secondary nerves often numerous and parallel. *Stipules* rigid. *Flowers* small, axillary or terminal, solitary fascicled cymose or racemose, regular; peduncles with many bracts. *Sepals* 5, subequal, rigid. *Petals* 5, subequal, sessile. *Stamens* 5, inserted inside or on an annular disk; connective produced into a long or short often broad membranous appendage. *Ovary* ovoid; style straight, stigma terminal; ovules few or many. *Capsule* 3-valved, few-seeded. *Seeds* glabrous in the E. Ind. species.—DISTRIB. Species about 40, chiefly tropical American.

SECT. I. ***Doryctandra***, Hassk. (Gen.). *Stamens* exserted, filaments slender; anthers cohering in a cone.

1. ***A. Roxburghii***, Wall. Cat. 7189 (*Pentaloba* ?); branchlets pubescent on one side, leaves glabrous small elliptic or cuneate lanceolate obtuse subnervate perforate at the nerve axils beneath, flowers fascicled glabrous. *Arn. in Mag. Zool. and Bot.* ii. 343. *Vareca heteroclita*; *Roxb. Fl. Ind.* i. 648. *Doryctandra Roxburghii*, Hassk. in *Retzia.* i. 126.

OUDE, *Genl. Martin*; SILHET, *Wallich*; ANDAMANS, *Kurz*.

A small shrub; branchlets compressed. *Leaves* 1– $1\frac{1}{2}$ by $\frac{1}{4}$ – $\frac{3}{4}$ in., sessile, pale beneath, nerves few, venules obsolete. *Stipules* $\frac{1}{2}$ in., subulate from a broad base. *Flowers* subsessile, $\frac{1}{10}$ in. diam., white. *Sepals* unequal, obtuse. *Petals* linear, tips revolute. *Disk* 10-toothed. *Filaments* glabrous; anthers white, narrow-linear, almost as long as the filaments, base of cells tomentose; appendage oblong, obtuse. *Ovary* glabrous; style filiform, pubescent. *Capsule* 1, few-seeded.

SECT. II. *Stamens* included; anthers free. *Disk* cupular.

* Ovary and style glabrous.

2. ***A. bengalensis***, Wall. in *Trans. Med. and Phys. Soc. Calc.* vii. 224; glabrous, leaves elliptic-lanceolate serrulate, nerve-axils beneath bearded, stipules slender, flowers fascicled, filaments very short, tip of connective short broad. *Pentaloba* ? *bengalensis*, Wall. Cat. 4896; *Arn. in Mag. Zool. and Bot.* ii. 542.

SILHET, *Wallich*, *Griffith*; ANDAMANS, *Kurz*.

A shrub or small tree? *Leaves* 3–5 by $1\frac{1}{4}$ – $2\frac{1}{2}$ in., shining, tip obtuse; petiole $\frac{1}{2}$ in. *Stipules* $\frac{1}{2}$ in., narrow lanceolate. *Peduncles* $\frac{1}{2}$ – $\frac{3}{4}$ in., 1-flowered, glabrous or puberulous; bracts minute, basal, ovate, subacute. *Flowers* $\frac{1}{2}$ in. diam., glabrous. *Sepals* broad, ovate, $\frac{1}{2}$ the length of the oblong-ovate petals. *Disk* thick, 5-lobed. *Anthers* glabrous, oblong. *Capsule* $\frac{1}{2}$ in., quite glabrous, 3–4-seeded.

3. **A. zeylanica**, *Thwaites Enum.* 21; branchlets puberulous, leaves elliptic-lanceolate obscurely serrulate, nerve-axils beneath bearded, stipules broad-subulate, flowers fascicled, filaments very short, tip of connective short broad. *Pentaloba zeylanica*, *Arn. in Mag. Zool. and Bot.* ii. 543.

MALABAR, *Herb. Wight.*; COCHIN, *Johnstone*; CEYLON, in the Ratnapoora district, *Gardner, &c.*

Very closely allied to *A. bengalensis* and perhaps a variety of it, but the branchlets are puberulous, the stipules broader, the leaves more obscurely serrulate, the flowers on shorter pedicels, that are crowded on stout peduncles, and the petals are more linear.—*A. obtusa*, Korth., and *A. Brownii*, Korth., come very near to this and *A. bengalensis*.

4. **A. Wallichiana**, *H. f. & T.*; quite glabrous, leaves petioled large linear- or oblong-lanceolate acuminate obscurely serrulate, nerve-axils beneath not bearded, flowers 2–3 together axillary peduncled quite glabrous. *Pentaloba macrophylla*, *Wall. Cat.* 4024.

PENANG, *Porter*.

Branches stout. *Leaves* 7–12 by 3–4 in., coriaceous, shining, yellow when dry; nerves strong, many, arching; petiole stout, $\frac{1}{2}$ – $\frac{3}{4}$ in. *Stipules* $\frac{1}{2}$ – $\frac{3}{4}$ in., linear-lanceolate, glabrous. *Peduncles* $\frac{1}{2}$ – $2\frac{1}{2}$ in., usually 2 together, glabrous, with many small ovate-subulate basal bracts and bracteoles. *Flowers* $\frac{1}{2}$ in. diam, erect. *Sepals* ovate, acute, very rigid, glabrous. *Petals* ovate-oblong, rigid, twice as long as the sepals. *Disk* cupular, membranous, entire or obscurely 5-lobed. *Filaments* subulate, flattened, dilated below, adnate to the disk; anthers oblong, cells gibbous at the outer base, tip of connective suborbicular broader than the cells. *Ovary* globose; style glabrous, short, stigma truncate 3-lobed; ovules 6. *Capsule* $\frac{1}{2}$ in., glabrous.

5. **A. racemosa**, *H. f. & T.*; glabrous, leaves elliptic or elliptic-obovate acuminate serrulate, nerve-axils beneath not bearded, petiole puberulous, flowers in erect axillary racemes, filaments subulate.

ASSAM, *Herb. Griffith*.

Branches strict, glabrous. *Leaves* 3–4 by $1\frac{1}{2}$ – $1\frac{3}{4}$ in., rather oblique, membranous, base subacute; nerves slender, arching; petiole $\frac{1}{4}$ in., slender. *Stipules* $\frac{1}{6}$ in., ovate, acuminate. *Racemes* 2–3 in., simple, erect, strict, stout, flowering throughout their length; bracteate and 2 bracteolate at the base of each short pedicel; bracts like the stipules, persistent, bracteoles minute. *Flowers* horizontal, $\frac{1}{2}$ in. diam. *Sepals* ovate, subciliate. *Petals* twice as long, oblong, obtuse. *Filaments* subulate, connate at the base with the disk into a cup, glabrous; anthers ovate, tip of connective broad, subacute, cells hairy at the base. *Ovary* 6-ovuled.

** Ovary and style pubescent or tomentose.

† *Leaves glabrous or nearly so.*

6. **A. Griffithii**, *H. f. & T.*; branchlets and petioles puberulous, leaves elliptic-oblong acuminate serrulate glabrous, nerve-axils beneath bearded, flowers fascicled on short branched peduncles, filaments very short, tip of connective broad orbicular.

BIRMA, near the Serpentine mines in the Hookoom valley, *Griffith*.

Branches stout. *Leaves* 8–10 by 3–4 in., shining above, midrib beneath with a few short hairs or glabrous; petiole $\frac{1}{2}$ in., stout. *Stipules* $\frac{1}{2}$ in., oblong-lanceolate, hard, pubescent. *Peduncles* clustered, very stout. *Flowers* crowded, $\frac{1}{2}$ in. diam., pubescent. *Sepals* broadly ovate, half as long as the petals. *Disk* fleshy, 5-lobed. *Filaments* very short; anthers with a short spur at the outer base of each cell, and a very large orbicular membranous ciliate tip to the connective, which is broader than the anther. *Ovary* and style hairy.—This resembles a Philippine Island species (Cuming, n. 1074) which has glabrous flowers, also the *A. macrophylla*, Don (of Timor) which has an acuminate tip to the connective.

7. **A. lanceolata**, *Wall. Cat.* 4023 (Pentaloba); glabrous, leaves narrow-lanceolate acuminate obscurely serrulate, nerve-axils beneath unbearded, flowers in short cymes pubescent, filaments longer than the anthers, tip of connective subulate. *Vareca lanceolata*, *Roxb. Fl. Ind.* i. 648.

PENANG, *Jack., Porter, &c.*

An erect shrub. *Leaves* 5-7 by 1-2 in., smooth and shining on both surfaces, subsessile, base narrowed. *Stipules* $\frac{1}{2}$ in., subulate from a broad base, or lanceolate, glabrous. *Flowers* pale yellow, shortly pedicelled. *Sepals* ovate, obtuse. *Petals* twice as long, linear-lanceolate, subacute. *Filaments* glabrous, adnate to the 5-lobed disk; anthers ovate, contracted into the acuminate tip of the connective. *Ovary* and style densely villous. *Capsule* $\frac{1}{2}$ in., pubescent or glabrate, several-seeded.

8. **A. Maingayi**, *H. f. & T.*; glabrous, leaves subsessile elliptic or elliptic-lanceolate or obovate-oblong shortly acuminate serrulate, nerves strong, axils beneath not bearded, flowers in peduncled axillary cymes crowded pubescent, sepals oblong, stamens tomentose.

MALACCA, *Griffith, Maingay.*

A tree? *Leaves* very variable in size and shape, the longest narrow-lanceolate, 10 by 2 in.; the broadest 5 by 3 in., shortly oblong tending to become obovate, often somewhat oblique, base rounded or acuminate, young pilose; nerves many, strong, arching and inosculating within the margin. *Stipules* $\frac{1}{2}$ in., subulate-lanceolate. *Cymes* with stout glabrous peduncles $\frac{1}{2}$ -1 in. long, dichotomously branched. *Flowers* $\frac{1}{2}$ in. diam., sessile or pedicelled. *Sepals* broadly oblong, ciliolate. *Petals* rather longer, obtuse, bearded down the centre on both surfaces. *Filaments* adnate to the cup-shaped 10-lobed disk, broad, stout, tomentose within; anthers small, ovoid, connective pubescent, with a glabrous short obtuse membranous tip.

†† *Branchlets and leaves tomentose.*

9. **A. mollis**, *H. f. & T.*; softly tomentose, leaves obovate- or oblong-lanceolate acuminate obscurely toothed, flowers in dense axillary tomentose cymes, outer sepals large orbicular, filaments pubescent above.

TENASSERIM, *Griffith, Helfer.*

A shrub, branches and leaves thickly tomentose beneath with short spreading hairs. *Leaves* 6-10 by 2-2 $\frac{1}{2}$ in., acute or acuminate, often oblique, membranous, pubescent above with a tomentose midrib; petiole $\frac{1}{2}$ in. *Stipules* $\frac{1}{4}$ - $\frac{1}{2}$ in., subulate-lanceolate, pilose. *Cymes* peduncled or subsessile. *Flowers* $\frac{1}{2}$ in. diam., subsessile, crowded, ochreous. *Sepals* very unequal, inner oblong. *Petals* narrow, erect, rigid, with revolute tips, hairy upwards. *Filaments* inserted on the cupular 10-15-lobed disk; anthers shorter, ovate, narrowed into the short acute tip of the connective. *Ovary* 6-ovuled. *Capsule* $\frac{1}{2}$ in., densely pubescent.—Very near *A. dasycaula*, Miquel, of Sumatra, but much more densely tomentose.

10. **A. echinocarpa**, *Korthals. in Ned. Kruidk. Arch.* i. 359; densely tomentose, leaves obovate or oblong-lanceolate long acuminate usually coarsely toothed, flowers in densely tomentose axillary cymes, outer sepals oblong, capsules thickly clothed with felted brown-tomentose branched fibres. *Miquel Fl. Ned. Ind.* i. pt. 2, 116. *Medusa anguifera*, *Lour. Fl. Coch.* 406.

MALACCA, *Griffith, Maingay.*—DISTRIB. Sumatra, Cochin-China.

Very similar to *A. mollis* in foliage, stipules, and structure of the flowers, disk, stamens and ovary, but the leaves are shorter-petioled and usually more deeply toothed, the cymes shorter, the sepals all oblong, filaments glabrous, and the fruits form spherical balls 1-2 in. diam. of matted branched filaments which arise from the capsule, whose valves are $\frac{3}{4}$ in. long. *Seeds* few, large.

SECT. III. **Scyphellandra**, *Thwaites* (Gen.). *Stamens* included; anthers free. *Disk* reduced to 5 scales, one at the back of each anther.

11. **A. virgata**, *Thwaites* (*Scyphellandra*); twigs pubescent with curled hairs, leaves small petioled ovate or oblong toothed glabrous obtuse at both ends.

Hot dry parts of CEYLON, *Thwaites*.

A small shrub. *Leaves* very variable, $\frac{3}{8}$ –1½ in.; petiole pubescent. *Stipules* minute, lanceolate. *Flowers* subsolitary, axillary, peduncled or subsessile, $\frac{1}{2}$ in. diam., whitish. *Petals* sessile, linear-oblong, twice as long as the broadly ovate obtuse ciliolate sepals. *Anthers* subsessile, tip of the connective petaloid, much exceeding the cells, ovate, subacute. *Ovary* small glabrous; style slender, stigma minutely 3-lobed; ovules one on each placenta. *Capsule* 3-valved. *Seeds* subglobose.

ORDER XIV. **BIXINEÆ**. (By Hooker f. & Thomson.)

Trees or shrubs. *Leaves* alternate; stipules minute or 0. *Inflorescence* various. *Flowers* regular, 1–2-sexual. *Sepals* 4–5, rarely 2–6, imbricate, free or connate and bursting irregularly, usually deciduous. *Petals* 4–5 or 0, imbricate or contorted in bud, deciduous. *Stamens* usually hypogynous; anthers 2-celled, bursting by slits or pores. *Disk* thickened, often glandular. *Ovary* 1-, rarely several-celled; style and stigmas free or united; ovules parietal, amphitropous or anatropous. *Fruit* dry or fleshy, indehiscent or valvular, valves bearing the seeds in the middle. *Seeds* arillate or testaceous, albumen fleshy; embryo axile, cotyledons foliaceous often cordate.—**DISTRIB.** Chiefly tropical; genera 30; species 160.

TRIBE I. Bixææ. *Petals* broad, contorted, without a scale or basal appendage. *Anthers* bursting by pores or short slits.

Capsule almost 3–5-celled. *Leaves* compound 1. COCHLOSPERMUM.
Capsule 2-valved. *Leaves* simple 1* BIXA.

TRIBE II. Flacourtieæ. *Petals* small, imbricate or 0. *Anthers* short, bursting by slits.

Flowers 2-sexual. *Petals* 4–6. *Stamens* indefinite 2. SCOLOPIA.
Flowers 2-sexual. *Petals* 5–6. *Stamens* 5–6 3. ERYTHROSPERMUM.
Flowers usually diœcious. *Petals* 0. *Ovary* 2–8-celled 4. FLACOURTIA.
Flowers diœcious. *Petals* 0. *Ovary* 1-celled. *Seeds* glabrous 5. XYLOSMA.
Flowers diœcious. *Petals* 0. *Ovary* 1-celled. *Seeds* hairy 6. ABERIA.

TRIBE III. Pangieæ. *Flowers* diœcious. *Petals* with an adnate scale or basal appendage.

Sepals connate. *Stamens* very many 7. GYNOCARDIA.
Sepals connate. *Stamens* 5 8. TRICHADENIA.
Sepals free. *Stamens* 5–8 9. HYDNOCARPUS.

1. **COCHLOSPERMUM**, Kunth.

Trees or shrubs, juice yellow or red. *Leaves* digitately lobed or divided. *Flowers* large, yellow, 2-sexual. *Sepals* 5, deciduous. *Petals* 5, large, contorted in bud. *Stamens* many, on an eglandular disk; anther-cells with pores or short slits. *Ovary* globose, almost 3–5-celled; style simple, stigma toothed; ovules very many, on 3–5 parietal placentas. *Capsule* 3–5-valved, endocarp membranous. *Seeds* cochleate; testa hard, woolly; embryo curved.—**DISTRIB.** About 11 species, all tropical.

1. **C. Gossypium**, DC. *Prodr.* i. 527; leaves palmately 3-5-lobed tomentose beneath, lobes acute entire. *Wall. Cat.* 1843; *Wight in Hook. Bot. Misc.* ii. 357, *Suppl.* t. 18; *W. & A. Prodr.* 87; *Planch. in Hook. Kew Journ. Bot.* vi. 306. *Bombax gossypium*, Linn.; *Roxb. Fl. Ind.* iii. 169.

— Dry hills GARHWAL, BUNDELKUND, BEHAR, ORISSA and the DEKKAN; also commonly planted near temples.

A small naked tree; branchlets tomentose. *Leaves* 3-8 in. diam., old glabrous; petiole slender. *Flowers* 4-5 in. diam., in few-flowered terminal panicles, golden yellow. *Sepals* silky. *Petals* obovate, notched. *Capsule* 2-3 in., 5-lobed.

1* **BIXA**, Linn.

A tree. *Leaves* simple; stipules minute. *Flowers* in terminal panicles, 2-sexual. *Sepals* 5, imbricate, deciduous. *Petals* 5, contorted in bud. *Anthers* opening by 2 terminal pores. *Ovary* 1-celled; style slender, curved, stigma notched; ovules many, on 2 parietal placentas. *Capsule* loculicidally 2-valved, placentas on the valves. *Seeds* many, funicle thick, testa pulpy; albumen fleshy; embryo large, cotyledons flat.

B. ORELLANA, L.; *Roxb. Fl. Ind.* ii. 31; *W. & A. Prodr.* 31. (Anatto.)

Cultivated throughout INDIA, and the tropics generally, for the red dye afforded by the testa.—Native of America.

A small evergreen tree. *Leaves* 4-8 by 2½-5 in., cordate, acuminate, glabrous; petiole slender, 2-3 in. *Flowers* 2 in. diam., purple or white. *Capsule* 1½ in., ovoid or subglobose, base intruded, softly prickly.

2. **SCOLOPIA**, Schreber.

Trees, spinous in India, spines often compound. *Leaves* alternate, entire; stipules minute or 0. *Flowers* small, racemed, axillary, 2-sexual. *Sepals* 4-6, slightly imbricate in bud. *Petals* 4-6, subsimilar, imbricate in bud. *Stamens* many; anthers ovoid, opening by slits, connective produced. *Ovary* 1-celled; style erect, stigma entire or lobed; ovules few, on 3-4 parietal placentas. *Berry* 2-4-seeded. *Seeds* with long funicles, testa hard; cotyledons foliaceous.—DISTRIB. Species about 15; Australian, Asiatic, and African.

1. **S. rhinantha**, Clos. in *Ann. Sc. Nat. Sér.* 4, viii. 252; leaves lanceolate or oblong-lanceolate crenulate 5-plinerved, petiole 2-glandular at the top, racemes pubescent, sepals and petals 4 each, fruit pisiform 2-6-seeded. *Miquel Fl. Ned. Ind.* i. pt. 2, 107. *Phoberos rhinantha*, Benn. *Pl. Jav. Rar.* 187, t. 39. *P. macrophylla*, W. & A. *Prodr.* 30. *Flacourtia inermis*, Wall. *Cat.* 6673 G, H, only.

MALACCA, Griffith.—DISTRIB. Java, Borneo.

A tree. *Leaves* 3-6 by 1¼-2¼ in., coriaceous, shining, base rounded or acute, teeth glandular; petiole ½ in. *Racemes* 3-4 in.; flowers 1- or more-bracteate. *Sepals* downy. *Petals* twice as long, glabrous, ciliate. *Connective* of anthers glabrous. *Ovary* globose.

2. **S. Roxburghii**, Clos. *l.c.* 250; leaves oblong-lanceolate acuminate subcrenate glabrous 3-5-plinerved at the base, petiole 2-glandular at the top or not, racemes softly pubescent, sepals and petals 6 each, fruit olive-formed. *Miq. Fl. Ned. Ind.* i. pt. 2, 107. *Phoberos Roxburghii*, Benn. *Pl. Jav. Rar.* 192. *Ludia spinosa*, Roxb. *Fl. Ind.* ii. 507. *Flacourtia stigma-rota*, Wall. *Cat.* 6678, in part.

MERGUI, *Griffith*.—DISTRIB. Sumatra.

Spines on trunk compound. *Leaves* 4-5 by $1\frac{1}{2}$ - $2\frac{1}{4}$ in., coriaceous, shining above; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in. *Racemes* axillary, 1 in.; flowers yellow, solitary, bracts deciduous. *Disk* pubescent. *Connective* ciliate.

3. **S. crenata**, *Clos. l.c.* 250; leaves ovate or oblong-lanceolate obtusely or acutely acuminate subcrenate glabrous obscurely 3-5-plinerved, petiole $\frac{1}{2}$ - $\frac{1}{2}$ in., racemes axillary glabrous or puberulous, sepals and petals 5-6 each, fruit globose green (dry size of a cherry). *S. pseudo-crenata*, *acuminata*, *chinensis*, *lanceolata*, and *crassipes*, *Clos. l.c.* *S. sæva*, *Hance in Ann. Sc. Nat. Sér.* 4, xviii. 182. *Phoberos crenatus*, *W. & A. Prodr.* 29; *Dalz. & Gibs. Bomb. Fl.* 11. *P. lanceolatus* and *P. Wightianus*, *W. & A. Prodr.* 30. *P. acuminatus*, *Hookerianus*, and *Arnottianus*, *Thwaites Enum.* 17 and 400. *Flacourtia sapida* and *crenata*, *Wall. Cat.* 6675 H, 6679.

MALABAR, CANARA, MAISOR, and CEYLON, in hilly districts.—DISTRIB. China and Philippines.

Branches of young trees armed, of old unarmed. *Leaves* 2-6 by 1-2 in., base acute, teeth glandular, shining above, pale and reticulate beneath; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in. *Racemes* 1-3 in., terminal flowers at times corymbose; bracts deciduous; pedicels 1-3-flowered. *Connective* of anthers glabrous.—Excessively variable. *S. dasyanthera*, *Bennett*, united with this by *Clos*, is a different species.

4. **S. Gærtneri**, *Thwaites Enum.* 400; leaves oblong to orbicular obtuse or acute glabrous, petiole very short, racemes simple, sepals and petals 5 each, fruit pisiform red fleshy. *S. pusilla*, *Moon. Cat.*; *Clos. l.c.* 251. *Limonia pusilla*, *Gærtn. Fruct.* i. 279, t. 58, f. 4.

CEYLON, from the sea coast to 1500 ft.

A tree, spines compound on the trunk, simple or 0 on the branches. *Leaves* 1-3 by $\frac{1}{2}$ -2 in., coriaceous, base rounded cordate or subacute, thin, reticulate on both surfaces; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in.

3. ERYTHROSPERMUM, Lamarck.

Trees or shrubs. *Leaves* alternate, quite entire. *Flowers* racemed fascicled or paniced, 2-sexual. *Sepals* 4-6, imbricate in bud. *Petals* 4-6, usually small. *Stamens* 4-6; anthers lanceolate-sagittate, connective dilated. *Ovary* 1-celled; style short, stigma entire or 3-4-fid; ovules many, on 3-4 parietal placentas. *Capsule* coriaceous, 3-4-valved; valves bearing the seeds on the middle. *Seeds* few, testa coriaceous or fleshy; embryo incurved.—DISTRIB. Species 6, all Mascarene but the following.

1. **E. phytolaccoides**, *Gard. in Calc. Journ. Nat. Hist.* vii. 9; glabrous, leaves elliptic-lanceolate acuminate entire or subserrate, flowers 5-merous. *Thwaites Enum.* 18.

CEYLON, in the Ambamagowa and Ratnapoora districts.

A tree, 30-40 ft. *Leaves* $3\frac{1}{2}$ -8 by $1\frac{1}{2}$ -3 in., shining above, base acute; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Racemes* axillary and terminal, simple or paniced, many-flowered. *Flowers* $\frac{1}{2}$ in. diam., white. *Sepals* ovate, obtuse, equalling the ovate-oblong ciliate petals. *Anthers* large, on very short filaments. *Capsule* globose, 3-4-valved, $\frac{1}{2}$ in. diam., 1-2-seeded. *Seeds* globose; testa red.

4. FLACOURTIA, Commers.

Trees or shrubs, often spinous. *Leaves* toothed or crenate. *Flowers* small, dioecious, rarely 2-sexual. *Sepals* 4-5, small, imbricate. *Petals* 0. *Stamens* many; anthers versatile. *Ovary* on a glandular disk; styles 2 or

more, stigmas notched or 2-lobed; ovules usually in pairs on each placenta. *Fruit* indehiscent, endocarp hard, with as many cells as seeds. *Seeds* obovoid, testa coriaceous; cotyledons orbicular.—**DISTRIB.** About 12 species, natives of the Old World, some are cultivated in various tropical countries.

After a long study of extensive suites of specimens, we find ourselves quite unable to distinguish the forms of several species of this genus, and especially of 5, 6, 7, and 8, which are all excessively variable.

* *Leaves usually more or less lanceolate and acuminate.*

1. **F. sumatrana**, *Planch. mss. in Herb. Hook.*; unarmed, leaves oblong acuminate base cordate glabrous obtusely gland-serrate, nerves beneath pubescent, lowest close-set, flowers racemed diœcious, stigmas 2-lobed. *Wall. Cat.* 6678 A, in part. ? *Ludia foetida*, *Roxb.*

TENASSERIM, *Helper*.—**DISTRIB.** Sumatra.

Young branches only puberulous. *Leaves* 5–10 by $2\frac{1}{2}$ – $4\frac{1}{2}$ in., thin, coriaceous, shining above; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., and midrib below pubescent. *Racemes* axillary, fascicled, short. *Disk* cupular. *Ovary* 4–7-celled; styles 4–7. *Fruit* small, oblong.

2. **F. inermis**, *Roxb. Cor. Pl.* iii. 16, t. 222; *Fl. Ind.* iii. 833; unarmed, leaves ovate or oblong-lanceolate acute or acuminate obtusely serrate glabrous, flowers 2-sexual in fascicled pubescent racemes, stigmas 2-lobed. *Jack. Mal. Misc.*, and in *Hook. Bot. Misc.* i. 289; *Wall. Cat.* 6673, excl. G, H, I; *W. & A. Prodr.* 29. ? *F. quintuplinervis*, *Turcz. in Bull. Mosc.* xxxvi. 353.

SILHET, SINGAPORE, PENANG, *Jack, &c.*, cultivated in India.—**DISTRIB.** Sumatra.

Young branches puberulous. *Leaves* 4–8 by $2-3\frac{1}{2}$ in., base acute or rounded shining, thin, coriaceous, midrib below pubescent; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Disk* covered with fleshy orange glands. *Ovary* 5-celled, cells 2-ovuled; stigmas 4–8, 2-lobed. *Fruit* size of a cherry, red, acid, pyrenes 8–10.

3. **F. montana**, *Grah. Cat. Bomb. Pl.* 10; branches spinous, flowering unarmed, softly pubescent, leaves oblong or oblong-lanceolate obtusely acuminate crenate glabrous above hairy beneath, base 3–5-plinerved, flowers diœcious in fascicled densely pubescent racemes. *Dalz. & Gibs. Bomb. Fl.* 10. *F. inermis*, *Miq. Pl. Hohen. not Roxburgh.*

CANARA and CONCAN, *Dalzell, &c.*

A very thorny tree. *Leaves* 5–7 by $2-3\frac{1}{2}$ in., coriaceous, base rounded or acute, shining above, glabrate beneath when old; petiole $\frac{1}{2}$ in., and costa beneath tomentose. *Disk* of ♂ glandular. *Fruit* slightly acid, size of a cherry.—There is another *F. montana*, of Zippel (*Linnaea* xv. 176) from Timor.

4. **F. mollis**, *H. f. & T.*; flowering branches softly pubescent, leaves oblong or oblong-lanceolate acute or acuminate crenate-toothed glabrous except the midrib above downy beneath, flowers diœcious ♂ in racemes almost umbellate.

TENASSERIM, *Griffith, Helper.*

A tree; bark smooth, grey. *Leaves* 4–6 by $1\frac{1}{2}$ –2 in., base rounded or acute, pinnerved; petiole $\frac{1}{2}$ in. *Fl.* ♀ and fruit unknown.

5. **F. Rukam**, *Zoll. & Moritz. Verz.* 33; unarmed, young branches pubescent, leaves oblong or oblong-lanceolate, quite glabrous acute or acuminate coarsely glandular-crenate, flowers diœcious umbelled, stigmas 6–8 capitate emarginate. *Clos in Ann. Sc. Nat. Sér.* 4, viii. 216; *Miq. Fl. Ned. Ind.* i. pt. 2, 104. *F. cataphracta*, *Blume Bijl.* 55 (not of *Roxb.*).

MALACCA or MERGUI, *Griffith*.—**DISTRIB.** Philippine Islands. Much cultivated for its fruit.

A tree. *Leaves* 3-5 by $1\frac{1}{2}$ -2 in, firm, coriaceous, base acute or rounded, pinnately-nerved; petiole $\frac{1}{4}$ in. *Umbels* fascicled, 4-flowered, subsessile, pubescent. *Styles* erect, remote. *Fruit* size of a large cherry.

6. **F. Cataphracta**, *Roxb. in Willd. Sp. Pl.* iv. 830; *Cor. Pl.* iii. t. 222; *Fl. Ind.* iii. 834: branches white-dotted glabrous young armed, leaves oblong or oblong-lanceolate long acuminate quite glabrous crenate-serrate, flowers diœcious in irregular glabrous racemes, stigmas 4-6 capitate. *Wall. Cat.* 6674 (excl. C); *Clos l.c.* (not of *Roth.*, *Blume* or *Dalzell*?). *F. Jangomas*, *Miq.* *Stigmarosa Jangomas*, *Lour.* *Roumea Jangomas*, *Spreng.* *Spina spinarum*, *Rumph. Amb. Cap.* 43, p. 38, xix. t. 1, 2.

From LOWER BENGAL and ASSAM to CHITTAGONG, MALACCA, and SINGAPORE.—*DISTRIB.* Malay Islands, China.—Commonly cultivated.

A small tree; spines compound. *Leaves* 2-4 by $1-1\frac{1}{2}$ in., membranous, lower on the branches often obtuse; petiole $\frac{1}{4}-\frac{1}{2}$ in. *Ovary* flask-shaped, neck contracted. *Flowers* very small, $\frac{1}{4}-\frac{1}{2}$ in. diam. *Fruit* the size of a small plum, purple, very acid.—*Clos* errs in considering this a native of Africa; *Bojer* (*Hort. Maur.*) attributes it to India, and *Roxburgh* gives it a well-known Bengali name (*Paniala*). The description in the Bombay Flora is too brief for identification.

** *Leaves usually oblong obovate or orbicular, obtuse or, obtusely pointed, rarely elliptic-lanceolate.*

7. **F. Ramontchi**, *L'Herit. Stirp.* 59, t. 30, 31; armed, branchlets glabrous or pubescent, leaves very variable elliptic-oblong obovate or sub-orbicular, obtusely serrate or crenate, flowers diœcious in short branched glabrous racemes, stigmas 5-11 free or connate. *W. & A. Prodr.* 29; *Dalz. & Gibs. Bomb. Fl.* 10.

Common throughout India, wild or cultivated.—*DISTRIB.* Madagascar, the Eastern Archipelago.

We are quite unable to define the various forms brought together under the names of *F. Ramontchi* and *sapida*, and which include either several species, or one that spreads all over India, and varies much, presenting however the following principal varieties or species.

VAR. 1. Ramontchi proper; leaves glabrous 2-3 in. membranous elliptic ovate or oblong coarsely crenate, racemes very slender glabrous or nearly so. *F. Ramontchi*, *Wall. Cat.* 6677; *Wight Cat.* 108; *lc.* t. 85; *Oliv. Fl. Trop. Afr.* i. 120.—Common in the Peninsula.

VAR. 2. sapida; leaves 1-2 in. membranous or coriaceous glabrous or pubescent on the costa beneath and petiole elliptic broadly oblong cuneate-obovate or suborbicular, peduncles stouter pubescent.—*F. sapida*, *Roxb. Cor. Pl.* 1. t. 69; *Fl. Ind.* iii. 835; *W. & A. Prodr.* 29; *Wall. Cat.* 6675 C.—Common in the Western Ghats and elsewhere in the Peninsula.

VAR. 3. latifolia; branches robust glabrous, leaves large 3-5 in. glabrous coriaceous broadly elliptic-oblong or orbicular, costa below and petiole puberulous, nerves strong very oblique, racemes very short pubescent, stigmas sessile.—Carnatic, Nilgherries.

VAR. 4. occidentalis; branchlets petioles leaves often beneath and sometimes above and racemes tomentose or velvety, leaves 1-2 in. broadly oblong orbicular or obovate rarely elliptic or ovate, base rounded cuneate or cordate.—Probably a distinct species. *Wall. Cat.* 6675, excl. B, C, H, & K. ? *F. Perottetiana*, *Clos in Ann. Sc. Nat. Sér. 4.* viii. 218.—From BEHAR and the DEKKAN, northward and westward to Oude, Rohilkund, and the Punjab; abundant—(Beluchistan).

VAR. 5. racemulifera; leaves small $1\frac{1}{4}-1\frac{1}{2}$ in. membranous glabrous elliptic-oblong crenulate-serrate puberulous, petiole short, flowers very small diœcious in short glabrous erect strict many-flowered racemes $\frac{1}{2}-1$ in. long very shortly pedicelled, bracteoles broad.—*Herb. Madras*, *Wall. Cat.* 6675 K, male flower only; *Wight Cat.* 107. ? *F. sepia* *ria* *B frondosa*, *Clos in Ann. Sc. Nat. Sér. 4.* viii. 217.—A very curious form, or probably

different species. Wallich's specimens and four in Wight's Herb. are all we have seen, and these are male.

8. ***F. septaria***, *Roxb. Cor. Pl.* i. 48, t. 68; *Fl. Ind.* iii. 835; shrubby, very thorny, thorns usually bearing flowers and fruit, leaves small obcordate obovate or oblong or cuneate-obovate or orbicular crenate-serrate, when old rigid coriaceous and shining, flowers dioecious solitary or few in nearly glabrous racemes, stigmas 3-4. *W. & A. Prodr.* 29; *Wall. Cat.* 6676; *Dalz. & Gibs. Bomb. Fl.* 11. *F.* obcordata, *Roxb. Fl. Ind.* iii. 835. *H. cordifolia* and *rotundifolia*, *Roxb. Hort. Beng.* 73. *Sideroxylon spinosum*, *Willd. Sp. Pl.* i. 1091; *Rheede Hort. Mal.* v. t. 39.

Dry jungles throughout BENGAL, the WESTERN PENINSULA, and CEYLON.—DISTRIB. Java.

A very rigid thorny bush. *Leaves* $\frac{1}{2}$ -3 in., usually more or less cuneate at the base; when larger and more membranous or more elliptic it is difficult to distinguish this from *F. Ramontchi* vars. 1 and 2. *Flower* generally solitary or twin in a very imperfect raceme, very small. *Male sepals* ovate, obtuse; *female* orbicular. *Stigmas* usually separate, on very short styles. *Drupe* size of a large pea.

FLACOURTIA WIGHTIANA, *Wall. Cat.* 6672 is a *Scepa*. *F. NIVEA*, *Moon. Cat.* 70 is *Flueggea leucopyrus*, Wt.

5. **XYLOSMA**, Forster.

Characters of *Flacourtia*, but ovary with 2, rarely 3-6 few-ovuled parietal placentas, a usually entire very short style, capitate stigma (in the Indian species) and globose 2-8-seeded berry.—DISTRIB. Species about 25, natives of all tropical regions.

1. ***X. longifolium***, *Clos in Ann. Sc. Nat. Sér.* 4, viii. 231; leaves linear- or elliptic- or oblong-lanceolate acuminate obtusely serrate, nerves spreading, ♂ flowers in short racemes, rarely in long panicles, bracts ovate acuminate. *Flacourtia ferox*, *Wall. mss. in Voigt. Hort. Suburb. Calc.* 84.

WESTERN HIMALAYA on the outer ranges, ascending on 5000 ft., from Kumaon, *Strach. and Wint.*, to Marri, *Stewart*. ASSAM, at Nowgong and Gowahatty, *Jenkins*, &c.

A glabrous bush; branches rather long, slender. *Leaves* 4-9 by $1\frac{1}{2}$ -2 $\frac{1}{4}$ in., coriaceous, shining above, base acute, rarely obtuse; nerves 8-12 on each side the midrib; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Racemes* usually very short, $\frac{1}{2}$ in., and crowded in the leaf axils, sessile, many-flowered, glabrous or puberulous, rarely elongate and branched. *Flowers* solitary or fascicled, $\frac{1}{2}$ in. diam. *Berry* glabrous, $\frac{1}{2}$ in. diam.—The specimens with paniced inflorescence occur amongst those from Assam.

2. ***X. controversum***, *Clos l.c.*; leaves elliptic or elliptic-oblong (rarely lanceolate) acuminate obtusely serrate, nerves very oblique, flowers paniced puberulous, bracts linear-oblong. *Flacourtia Cataphracta*, *Wall. Cat.* 6674 C.

NIPAL, *Wallich*. KHASIA HILLS, *Griffith*; Churra, alt. 3-4000 ft., *H. f. & T.*

Very near *X. longifolium*, especially the form of that species with paniced male flowers; best distinguished by the usually shorter (3-6 in.) leaves, often more membranous, with invariably very oblique nerves and fewer of them on each side (6-8). The sepals are equal or unequal, and the character of the bracts is perhaps not a very good one. The fruit is alike in both.

3. ***X. latifolium***, *H. f. & T.*; leaves broadly elliptic-oblong obtuse or acute obtusely serrate or subentire, nerves few very oblique, petiole

pubescent, ♂ flowers in small branched slender pubescent few-flowered panicles, sepals minute orbicular ciliate.

Bababooden hills in MAISOR, Law, Stocks.

A large thorny tree, twigs petioles and inflorescence finely downy. *Leaves* 2-5 by 1-2½ in., hardly coriaceous, base acute, nerves 4 or 5 on each side, the 2 lower running nearly throughout the blade; petiole ½-¾ in. ♂ *Panicles* ½-1 in., very slender, sparingly branched; bracts linear-oblong. *Fruit* very small, about ½ in. diam. with 4 placentas; style very distinct, stigma capitate 4-lobed.

6. ABERIA, Hochst.

Trees or shrubs, often spinous. *Leaves* entire or toothed, exstipulate. *Flowers* axillary, dioecious; ♂ subracemose, fascicled, or umbellate, ♀ solitary or fascicled. *Sepals* 5-8, tomentose, subvalvate. *Petals* 0. *Disk* of ♀ glandular. *Stamens* numerous; anthers short. *Ovary* 1-celled; styles 2-5, short, spreading, stigma notched or truncate; ovules 2-6 on each of 2-7 parietal placentas. *Berry* globose, tomentose. *Seeds* pubescent or tomentose, compressed, imbedded in pulp; cotyledons flat, broad.—Species 5, all but the following African.

1. **A. Gardneri**, *Clos in Ann. Sc. Nat. Sér.* 4, viii. 236; leaves ovate elliptic or elliptic-lanceolate acuminate entire or toothed pubescent above tomentose beneath. Roumea hebecarpa, *Gard. in Calc. Journ. Nat. Hist.* vii. 9; *Thwaites Enum.* 18.

CEYLON, at Condasalle, Maturatte, &c., Gardner, &c.

A tree, 16-20 ft.; branches pale, twigs reddish, tomentose. *Leaves* 2-5 by ½-2 in.; midrib and very oblique veins red, base acute or rounded; petiole ¼-½ in. *Flowers* ½ in. diam.; ♂ umbelled on very short peduncles; ♀ solitary or few together. *Filaments* equalling the lanceolate, acute sepals. *Styles* hairy; stigmas fimbriate. *Fruit* 1 in. diam.—The name of *hebecarpa* was not adopted by Clos, because all the species of *Aberia* have pubescent fruit.

7. GYNOCARDIA, R. Br.

A perfectly glabrous tree. *Leaves* quite entire. *Flowers* axillary or terminal, fascicled, dioecious. *Calyx* cup-shaped, 5-toothed or bursting irregularly. *Petals* 5, with a ciliate scale opposite each. FL ♂: *Stamens* many; anthers basifixed, linear. *Ovary* 0. FL ♀: *Staminodes* 10-15, villous. *Ovary* globose, 1-celled; styles 5, stigmas large cordate; ovules many, on 5 parietal placentas. *Berry* subglobose, rind thick, hard, rough. *Seeds* obovoid, immersed in pulp, testa thick; albumen oily; cotyledons flat, subreniform, radicle ovoid.

1. **G. odorata**, R. Br. in *Roxb. Cor. Pl.* 95, t. 299; quite glabrous, leaves oblong or linear oblong abruptly acuminate shining above. *Bennett Pl. Jav. Rar.* 207. *Chaukmoogra odorata*, *Roxb. Fl. Ind.* iii. 835. *Chil-moria dodecandra*, *Hamilt. in Trans. Linn. Soc.* xiii. 500.

From SIKKIM and the KHASIA HILLS eastwards to CHITTAGONG, RANGOON, and TENASSERIM.

Branches slender, flexuous. *Leaves* bifarious, largest 6-10 by 3-4 in., smallest 4-6 by 1½-2 in., coriaceous, strongly reticulate beneath; petiole ¼-1 in. *Flowers* sweet scented, yellowish, in very large fascicles on the trunk, solitary or few together in the leaf axils, very variable in size, ½-2 in. diam., the females largest; peduncles 1-3 in.; bracts basal, minute. *Calyx* coriaceous. *Filaments* woolly. *Fruit* 3-5 in. diam. *Seeds* 1 in. long.

8. **TRICHADENIA**, Thwaites.

A tall tree. *Leaves* long-petioled, alternate, coriaceous. *Stipules* foliaceous, deciduous. *Flowers* in short axillary racemes or panicles. *Calyx* very coriaceous. *Petals* 5, imbricate, with an adnate scale on each. *FL. ♂*: *Stamens* 5; anthers linear. *FL. ♀*: *Staminodes* 0. *Ovary* 1-celled; styles 3, very short, stigmas subcapitate; ovules solitary on 3 parietal placentas. *Berry* spherical, 1-3-seeded. *Seeds* large, testa bony, albumen oily; cotyledons foliaceous, rugose.

1. **T. zeylanica**, Thwaites in Hook. *Kew. Journ. Bot.* vii. 196, t. 7; *Enum.* 19; leaves oblong acuminate sinuate-toothed finely pubescent on the nerves beneath, racemes tomentose.

CEYLON; central province, alt. 3000 ft., Thwaites.

A very large tree; branchlets very stout, inflorescence and petioles tomentose. *Leaves* 5-12 by 2-4 in., base rounded; petiole 2-3 in.; nerves beneath very strong. *Racemes* 3-5 in. *Flowers* $\frac{1}{2}$ in. diam., pale green. *Fruit* $1\frac{1}{2}$ -3 in. diam. *Seed* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.

9. **HYDNOCARPUS**, Gærtner.

Trees. *Leaves* alternate, serrate or entire, transverse venules numerous; stipules deciduous. *Flowers* solitary or in irregular axillary few-flowered racemes or fascicles, diœcious. *Sepals* 5, equal or unequal, imbricate in bud. *Petals* 5, with a scale opposite each. *FL. ♂*: *Stamens* 5-8; anthers reniform, connective broad. *Ovary* 0 or rudimentary. *FL. ♀*: *Stamens* as in the ♂ but without pollen, or reduced to staminodes. *Ovary* 1-celled; stigmas 3-6, sessile or subsessile, spreading, dilated, lobed; ovules many, on 3-6 parietal placentas. *Berry* globose, rind hard, many seeded. *Seeds* many, imbedded in pulp, testa crustaceous, striate, albumen oily; cotyledons very broad, flat. *DISTRIB.* Species about 6, tropical Asiatic.

1. **H. venenata**, Gærtn. *Fruct.* i. 288, t. 60, f. 3; leaves lanceolate or oblong- or elliptic-lanceolate, flowers $\frac{1}{2}$ in. diam. racemed pentandrous, sepals subequal orbicular, scales villous much smaller than the orbicular petals, fruit the size of a walnut. *Blume Mus. Bot.* i. 15. *H. inebrians*, Vahl *Symb.* iii. 100; *DC. Prodr.* i. 257; Thwaites *Enum.* 18.

CEYLON, by banks of rivers, ascending to 2000 ft.

A large tree; branchlets puberulous or silky. *Leaves* 5-7 by 1-2 $\frac{1}{2}$ in., obscurely serrate, coriaceous; nerves very oblique; petiole $\frac{1}{2}$ in., stout. *Racemes* 1 in. or less, densely tomentose; buds $\frac{1}{2}$ in. diam. *Sepals* rather shorter than the petals, ciliate, tomentose on the back. *Stamens* equalling the glabrous petals. *Fruit* densely tomentose. *Seeds* grooved, ridges rough.

2. **H. Wightiana**, Blume *Rumph.* iv. 22; leaves elliptic- or oblong-lanceolate long acuminate entire or serrate, flowers 1 in. diam. racemed pentandrous, 3 inner sepals larger, petals ciliate twice as long as the ovate fimbriate scales, ♀ flowers with imperfect stamens, fruit the size of a small apple. *Blume Mus. Bot.* i. 15; *Dalz. & Gibs. Fl. Bomb.* 11. *H. inebrians*, Wall. *Cat.* 6670; *Wight III.* i. t. 16; *Bennett Pl. Jav. Rar.* 207. *Munnicksia*, *Dennst. Clav. Hort. Mal.*—? *Rheede Hort. Malab.* i. 65, t. 36 (fruit represented as rough with large tubercles).

• WESTERN PENINSULA, from the S. Concan along the coast ranges.

A tall tree; twigs usually brown pubescent (rarely glabrate) as are the racemes. *Leaves* 4-9 by 1 $\frac{1}{2}$ -4 in., coriaceous or membranous, sometimes deeply obtusely serrate

or toothed, base round acute or subcordate; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* solitary or racemed, white. *Sepals* green, pubescent. *Stamens* villous at the base, equalling the petals. *Ovary* densely pubescent. *Fruit* 2–4 in. diam., tomentose. *Seeds* obtusely angular.

3. **H. alpina**, *Wight Ic. t.* 942; leaves elliptic oblong or more or less lanceolate obtusely acuminate or subacute quite entire, flowers 1 in. diam. racemed pentandrous, sepals equal, petals oblong-lanceolate glabrous equalling the linear scales, ♀ flowers with linear oblong obtuse staminodes.

Moist valleys of the NILGHIRI MTS., *Wight*; CEYLON, *Thwaites*.

A tree 70–100 ft.; twigs glabrous or nearly so. *Leaves* very variable, young red, old deep green, 4–7 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., glabrous; petiole $\frac{1}{2}$ in. *Flowers* racemed on very thick branched jointed peduncles and long pedicelled (in the Ceylon specimens), pedicels 1– $1\frac{1}{2}$ in. *Stamens* shorter than the petals. *Stigma* 5-lobed. *Fruit* globose, size of an apple, brown tomentose. *Seeds* imbedded in white pulp, testa hard.—Description chiefly from *Wight*.

4. **H. octandra**, *Thwaites in Hook. Kew Journ. Bot.* vii. 197; *Enum.* 19; leaves elliptic or elliptic- or ovate- or oblong-lanceolate obtusely acuminate quite entire, flowers $\frac{1}{2}$ in. diam. fascicled octandrous, sepals unequal, petals twice as long as the rounded silky scales, ♀ fl. with imperfect stamens, fruit 2–3 in. diam.

Ambamagowa district, CEYLON, alt. 2500 ft., *Thwaites*.

A tree 40–50 ft.; branchlets tomentose. *Leaves* 3– $4\frac{1}{2}$ by $1\frac{1}{4}$ – $1\frac{3}{4}$ in., glabrous above, puberulous beneath with stellate hairs and glandular dots; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in. *Flowers* 2–8 in a fascicle; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. *Sepals* oblong, obtuse. *Petals* orbicular, concave, ciliate. *Stamens* exceeding the petals. *Ovary* oblong; placentas 4, each 6-ovuled; stigmas 4. *Berry* woody, subtomentose, few or many-seeded.

5. **H. castanea**, *H. f. & T.*; perfectly glabrous, leaves linear-oblong acuminate red-brown when dry quite entire much reticulated, petiole $\frac{3}{4}$ –1 in., ♀ flowers $\frac{3}{4}$ in. diam., sepals equal, scales lingulate silky equalling the linear-oblong petals, ovary ovoid beaked, fruit as large as an orange.

King's Island, ANDAMANS, by the sides of torrents, *Helper*; MALACCA, *Griffith*.

A middle-sized tree. *Branches* stout, angular, smooth, black when dry. *Leaves* 8–14 by 2– $3\frac{1}{2}$ in., sides at base very unequal, one acute, the other rounded, thickly coriaceous, shining, strongly veined on both surfaces, nerves 6–10 on each side; petiole $\frac{3}{4}$ –1 in., much thickened at the top, quite glabrous. *Flowers* ♀ (only seen) apparently solitary, axillary, sweet-scented; peduncles $\frac{3}{4}$ in., and orbicular concave sepals densely rusty-pubescent. *Petals* longer than the sepals, concave, obtuse, quite glabrous; scales subacute, rigid, narrower than the petals. *Staminodes* 5, erect, glabrous, oblong, lanceolate, obtuse, much shorter than the scales. *Ovary* villous, contracted into a conical beak; stigma sessile. "*Fruit* size of an orange, globose, rugose, brown, angled at the top, flesh granular hard, placentas several. *Seeds* large angular, testa double, outer subcoriaceous cellular, inner as thick." *Griff. mss.*

There is a Burmese species apparently of this genus collected by Griffith, but in too immature a state for description.

ORDER XV. PITTOSPOREÆ. (By Hook. f. & Thoms.)

Erect or climbing trees or shrubs. *Leaves* alternate or subverticillate quite entire (very rarely toothed); exstipulate. *Flowers* usually hermaphrodite, terminal or axillary, imbricate. *Petals* 5, hypogynous, imbricate. *Torus* small. *Stamens* 5, opposite the sepals; anthers versatile,

Ovary 1-celled, with 2-5 parietal placentas, or 2-5-celled by the projection of the placentas; style simple, stigma terminal 2-5-lobed; ovules many, parietal or axile, anatropous. *Fruit* capsular or indehiscent. *Seeds* usually many, albumen copious; embryo small, radicle next the hilum.—**DISTRIB.** Genera 9; species about 90, chiefly Australian.

1. **PITTOSPORUM**, Banks.

Erect trees or shrubs. *Sepals* free or connate below. *Petals* erect, claws connivent or connate. *Stamens* 5, erect; anthers 2-celled, introrse, bursting by slits. *Ovary* sessile or shortly stalked, incompletely 2-3-celled; ovules 2 or more on each placenta. *Capsule* 1-celled, woody; 2- rarely 3-valved; valves placentiferous in the middle. *Seeds* smooth, imbedded in pulp.—**DISTRIB.** Species about 50, subtropical Asiatic, Australian and Oceanic.

* Capsule 3-valved, twice as long as broad.

1. **P. glabratum**, Lindl. in *Journ. Hort. Soc.* i. 230; leaves obovate oblong or lanceolate, flowers in lax terminal corymbs, peduncles glandular-pubescent.—*Benth. Fl. Hongkong*, 19.

KHASIA HILLS, in thickets above 4000 ft., Griffith, &c.—**DISTRIB.** Amoy and Hongkong.

A straggling shrub, branches whorled. *Leaves* 2-4 by $\frac{3}{8}$ -1 $\frac{1}{4}$ in., glabrous, usually acuminate, base acute, white beneath. *Flowers* $\frac{3}{8}$ in., pale yellow. *Sepals* sometimes connate below, ovate, pubescent. *Ovary* linear-oblong, pubescent, style as long. *Capsule* 1 in. or more, obovoid-oblong, many-seeded.—In Griffith's Herb. there are specimens marked as from Sikkim, but probably through misplacement of tickets. Chinese specimens are usually quite glabrous, but the peduncles are now and then downy.

** Capsule 2-valved, when ripe broader than long.

† *Leaves and branches glabrous (except 3, tetraspermum).*

2. **P. humile**, H. f. & T.; dwarf, leaves lanceolate, racemes subumbellate few-flowered much shorter than the leaves, sepals obtuse, ovary glabrous.

KHASIA HILLS, banks of the Borpani river, alt. 5000 ft., H. f. & T.

A small, much branched shrub, 1-2 ft., glabrous. *Leaves* 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ by $\frac{1}{4}$ - $\frac{3}{8}$ in., short-petioled, obtuse or subacute, margins recurved. *Racemes* $\frac{1}{2}$ -1 in., slightly pubescent; pedicels $\frac{1}{8}$ - $\frac{1}{4}$ in., pubescent; bracts as long, linear. *Flowers* $\frac{1}{8}$ in., yellow-green. *Sepals* $\frac{1}{2}$ in., ovate, obtuse. *Petals* oblong. *Capsule* subglobose, scarcely compressed, 2-valved.

3. **P. tetraspermum**, W. & A. *Prodr.* 154; leaves broad-ovate to lanceolate acute, flowers in terminal many-flowered umbels, rays short simple or 2-fid, sepals ovate acute ciliate, ovary tomentose. *Wight Ic.* t. 971 (stigma bad).

NILGHIRI MTS.; and CEYLON, central province, alt. 5-7000 ft.

A large shrub or tree; branches often umbelled, young puberulous. *Leaves* 1 $\frac{1}{2}$ -4 by $\frac{3}{8}$ -2 in., glabrous, shining above, pale below, coriaceous, acute at both ends. *Umbels* sessile or shortly peduncled, rays many, $\frac{1}{8}$ in., short, bracteolate, glabrous or pubescent. *Flowers* $\frac{1}{2}$ in. long, yellow green. *Style* glabrous, 2-lobed. *Capsule* globose, glabrous, 2-valved, 4-seeded.—Very closely allied to *P. nilghirens*.

4. **P. nilghirens**, W. & A. *Prodr.* 154; leaves broad-ovate oblong or lanceolate, flowers in slender glabrous terminal 3-8-flowered corymbs, sepals ovate acute subciliate, ovary tomentose. *Wight Ill.* i. t. 70.

NILGHIRI Mts., above 5000 ft.

A small tree. *Leaves* 1-4 by $\frac{1}{2}$ -2 in., acute or obtuse, shining above, thinly coriaceous, base tapering. *Corymbs* several together; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in., spreading; bracteoles minute, subulate. *Style* glabrous. *Capsule* subglobose, subcompressed, 2-valved, 6-seeded.—Very closely allied to states of the African *P. Senacia*, Putt.

5. ***P. Ceylanicum***, *Wight Ill.* 173; leaves narrow-obovate, flowers in terminal peduncled or compound corymbs, sepals ovate acute subciliate, ovary pubescent. *Thwaites Enum.* 68 (*excl. most syn.*).

CEYLON; in the Oova district, alt. 3-5000 ft.

A small tree; branches leafy, glabrous. *Leaves* 3-4 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., obtuse or subacute, base tapering; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Peduncles* several, 2-3 in., glabrous; bracteoles small, ovate, at the base of the pedicels. *Flowers* $\frac{1}{2}$ in., greenish-white. *Style* glabrous. *Capsule* subglobose, compressed, 2-valved.—An imperfectly known species which turns black in drying.

6. ***P. floribundum***, *W. & A. Prodr.* 154; leaves lanceolate or oblong-lanceolate acute or acuminate, margins waved, flowers small pubescent in much-branched terminal compound corymbs, sepals ovate, ovary pubescent. *Royle Ill.* 77; *Wall. Cat.* 8127; *Dalz. & Gibs. Bomb. Fl.* 44. ? *P. densiflorum*. *Putt. Monog.* 9. *Senacia nepalensis*, *DC. Prodr.* i. 347. *Celastrus verticillata*, *Roxb. Fl. Ind.* 624, *Ed. Wall.* ii. 391.

Subtropical HIMALAYA, from Sikkim to Garwhal, ascending to 5000 ft. KHASIA HILLS and MISHMI; WESTERN PENINSULA, Concan to the Nilghiri Mts.

A small tree; branches often umbelled. *Leaves* 2-8 by 1-3 in., glabrous, shining, pale below, coriaceous. *Corymbs* sometimes leafy below; branches 1-3 in., spreading, glabrous or pubescent. *Flowers* numerous, yellow. *Sepals* obtuse or acute, subciliate. *Style* glabrous. *Capsules* piiform, glabrous, about 6-seeded.—Nilghiri specimens are usually broader and shorter leaved than Himalayan. The African *P. Mannii*, H. f., is nearly allied, but has a glabrous ovary.

†† *Young branches pubescent or tomentose. Ovary tomentose in all.*

7. ***P. dasycaulon***, *Miquel in Herb. Hohenack.* 775; leaves lanceolate or oblong-lanceolate glabrous or midrib beneath downy, flowers in dense much-branched terminal compound tomentose corymbs, sepals ovate acute.

WESTERN PENINSULA; hills of Canara (*pl. Hohenack.*); Belgaum, *Ritchie*; Concan, *Gibson*.

A shrub or small tree; branchlets densely tomentose. *Leaves* 2 $\frac{1}{2}$ -4 by 1-1 $\frac{1}{2}$ in., pale green when dry, thin, coriaceous, margin subundulate; young petioles tomentose. *Flowers* white. *Sepals* ciliate. *Anthers* bright yellow. *Capsule* large, compressed, densely tomentose before dehiscence, about 6-seeded.—Flowers much larger than in *P. floribundum*: closely allied to *P. abyssinicum*, Hochst.

8. ***P. eriocarpum***, *Royle Ill.* 77; leaves ovate obovate or broad lanceolate obtuse or acute, young floccose on both surfaces, flowers in many compound many-flowered often umbellate corymbs, sepals lanceolate densely tomentose. *Wall. Cat.* 8129, 8131, 9074.

WESTERN HIMALAYA; in Garwhal and Kumaon, alt. 3-7000 ft.

A small tree; branches subverticillate, spreading; young tomentose. *Leaves* very variable, 3-8 by 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in., adult pubescent beneath. *Peduncles* 1-2 in., bracteoles subulate. *Flowers* $\frac{1}{2}$ in. long, pale yellow. *Ovary* tomentose; style short, glabrous. *Capsules* rather large, tomentose, many-seeded, valves woody.

9. ***P. ferrugineum***, *Ait.*; *DC. Prodr.* i. 346; leaves lanceolate or oblong-lanceolate acute or acuminate, young rusty pubescent, flowers very small in many terminal subsimple corymbose racemes, sepals narrow very

acuminate. *Wall. Cat.* 8128; *Benth. Fl. Austral.* i. 112. *P. ferrugineum* and *Rumphii*, *Putterl. Monog.* 7, 8.

EASTERN PENINSULA, from Moulmein to Singapore, *Wallich*, &c.—DISTRIB. Eastern Archipelago, Australia.

A spreading much branched tree; young branches rusty-pubescent. *Leaves* $2\frac{1}{2}$ –4 by 1–2 in., thin, coriaceous, adult glabrous and shining above, glabrous or pubescent beneath. *Petioles* 1 in., rusty-pubescent. *Flowers* $\frac{1}{4}$ in. long, greenish white. *Ovary* rusty-tomentose; style very short, glabrous. *Capsule* slightly compressed, rough, about 4-seeded.—Aiton's locality (Guinea) is no doubt an error.

ORDER XVI. **POLYGALEÆ.** (By Alfred W. Bennett, F.L.S.)

Annual or perennial herbs, erect or scandent shrubs, or timber trees. *Leaves* alternate (rarely whorled) or occasionally reduced to scales or 0, simple, quite entire. *Stipules* 0. *Flowers* irregular, 2-sexual, 3-bracteate. *Sepals* 5, unequal, 2 inner often petaloid (*wing-sepals*), deciduous or persistent, imbricate in bud. *Petals* 5 or 3, distinct, unequal, the inferior usually keel-shaped. *Stamens* 8 (in *Salomonina* 4–5, in *Trigonistrum* 5) hypogynous, filaments united into a sheath, more rarely distinct; anthers opening by terminal pores, rarely by slits. *Ovary* free, 1–3-celled; style generally curved, stigma capitate; ovules 1 or more in each cell, anatropous. *Fruit* generally a 2-celled, 2-seeded, loculicidal capsule; or indehiscent and 1-seeded, or (in *Trigonistrum*) of 3 indehiscent carpels. *Seed* usually strophiolate, albuminous, rarely exalbuminous.—DISTRIB. The whole world except New Zealand, chiefly in warm regions; genera 16; species 450–500.

Herbs or (more rarely) erect shrubs. Capsule loculicidal, 2-celled.

Stamens 8, united; 2 interior sepals aliform 1. **POLYGALA.**

Stamens 4–5, united; sepals petaloid, nearly equal 2. **SALOMONIA.**

Climbing shrubs.

Stamens 8, united; fruit 1-celled, indehiscent, samaroid 3. **SECURIDACA.**

Trees or erect shrubs.

Stamens 5, united; fruit of 3 samaroid carpels 4. **TRIGONISTRUM.**

Stamens 8, distinct; fruit 1-celled, not winged 5. **XANTOPHYLLUM.**

1. **POLYGALA**, Linn.

Herbs or more rarely shrubs. *Leaves* alternate. *Sepals* usually persistent; 2 inner larger, usually petaloid. *Petals* 3, united at the base with the staminal sheath, the inferior keel-shaped and generally crested. *Stamens* 8, filaments united for their lower half into a split sheath; anthers opening by pores. *Ovary* 2-celled; ovules 1 in each cell, pendulous. *Capsule* 2-celled, loculicidal, 2-seeded. *Seeds* almost always strophiolate and albuminous.—DISTRIB. Conterminous with the order, except Tasmania. About 250 species.

SECT. I. **Chamæbuxus**, *Tourn.* (genus). Shrubs with large handsome flowers. *Calyx* deciduous. *Keel* crested. *Seeds* with a large strophiole, exalbuminous.

1. **P. arillata**, *Hamilt. in Don Prodr.* 199; shrubby, leaves lanceolate or oblong-lanceolate, flowers yellow in drooping racemes or panicles. *Wall. Pl. As. Rar.* t. 100; *Cat.* 4191; *Griff. Notul.* iv. 535, t. 507; *Ic. Pl. Ind. Or.* t. 597. *Chamæbuxus arillata* and *paniculata*, *Hassk. in Miq. Ann. Mus. Bot.* i. 153, 154.

SUBTROP. and TEMP. HIMALAYA, from Nipal eastward, alt. 2–6000 ft. KHASIA Mts., alt. 4–5000 ft. WESTERN PENINSULA, AYA, CEYLON.—DISTRIB. Malayan Archipelago, S. China.

An erect pubescent or nearly glabrous shrub, 4–8 ft. *Leaves* 4–6 by $\frac{3}{4}$ – $2\frac{1}{2}$ in., lanceolate obovate-lanceolate or elliptic-oblong, acuminate; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in. long, in usually paniced racemes; bracts linear, deciduous. *Sepals* very unequal, caducous, upper very concave, 2 lower small, ovate; wings very large, ovate, red-purple. *Corolla* yellow; keel amply crested, united to the lateral petals for half their length. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in., broad-reniform, rather fleshy, rugose when dry. *Seeds* large, globose; cotyledons fleshy.

SECT. II. Herbs. *Flowers* small. *Calyx* deciduous after flowering. *Keel* not crested. *Seeds* albuminous.

2. **P. triphylla**, Ham. in Don Prodr. 200; annual, glabrous, leaves spatulate or elliptic long-petioled, racemes terminal many-flowered leafless.

TEMP. HIMALAYA, alt. 4–8000 ft.; from Sirmore to Sikkim. KHASIA Mts., Griffith; CENTRAL INDIA, Vicary; AYA and BIRMA, Wallich.

Stem slender, 2–10 in, erect or ascending, weak. *Leaves* $\frac{1}{2}$ – $2\frac{1}{2}$ in., membranous, glabrous, obtuse or subacute, contracted into the petiole. *Racemes* $1\frac{1}{2}$ –2 in., slender. *Flowers* $\frac{1}{2}$ in., second; bracts deciduous. *Outer sepal* small, ovate, acute; upper larger; wings petaloid, elliptic, equalling the corolla. *Keel* hooded, with 2 inflated terminal lobes; lateral petals narrow. *Capsule* $\frac{1}{10}$ – $\frac{1}{8}$ in., orbicular, entire, narrowly winged. *Seeds* black, slightly hairy; strophiole galeate, with 2 minute appendages.—Capsules in some (diseased?) Moulmein specimens, with unequal lobes, and irregular much-veined wings.

VAR. 1. *triphylla proper*; leaves small orbicular or spatulate, flowers pink. Royle Ill. t. 19 D; P. hyalina, Wall. Cat. 4181; Semeiocardium Hamiltonii, Hassk. in Miq. Ann. Mus. Bot. i. 151.

VAR. 2. *glaucescens*, Wall. Cat. 4182 (Sp.); leaves much larger 1–2 in. elliptic, flowers yellow. P. furcata, Royle Ill. t. 19, B. Semeiocardium hyalinum and glaucescens, Hassk. l.c.

SECT. III. Herbs, sometimes woody at the base. *Calyx* persistent. *Keel* crested. *Seeds* albuminous.

* Bracts persistent, at least till the flower expands.

† Undershrubs. *Racemes* axillary. *Wings* petaloid, membranous. *Strophiole* 2-appendiculate.

3. **P. javana**, DC. Prodr. i. 327; stems closely pubescent, leaves obovate or obovate-lanceolate mucronate, racemes many-flowered, bracts triangular-ovate, wings triangular. W. & A. Prodr. i. 38; Thwaites Enum. 22; Hassk. in Miq. Ann. Mus. Bot. i. 180. P. ceylanica, Heyne in Wall. Cat. 4183. ? P. tinctoria Vahl; Hassk. l.c. 181.

WESTERN PENINSULA and CEYLON.—DISTRIB. Java.

A much branched undershrub; branches stout, strict, erect or spreading, leafy. *Leaves* $\frac{3}{4}$ – $1\frac{1}{2}$ in., usually obovate and apiculate, finely pubescent on both surfaces; petiole very short. *Racemes* $\frac{1}{2}$ –3–4 in., sessile, stiff, few- or many-flowered, densely pubescent. *Flowers* $\frac{1}{2}$ – $\frac{1}{2}$ in. long; pedicels pubescent; bracts small, ovate. *Outer sepals* subequal; wings broadly triangular-ovate, angles rounded, exceeding the orbicular notched pubescent shortly stipitate capsule. *Seeds* very hairy; strophiole galeate, appendages ovate, equalling the seed.

4. **P. crotalarioides**, Ham. in Don Prodr. 199; stems villous with spreading hairs, leaves elliptic or oblong-obovate apiculate hairy ciliate,

racemes very short, bracts subulate, wings obovate. *DC. Prodr.* i. 327. *Wall. Pl. As. Rar.* ii. 185; *Cat.* 4176, and β pygmæa, *Cat.* 4176 D (a dwarf form). *Royle Ill.* t. 19 C; *Hassk. in Miq. Mus. Bot.* i. 161.

TEMP. HIMALAYA, alt. 4-7000 ft., from Chamba to Sikkim; KHASIA MTS.

Stems 4-8 in., erect or ascending, leafy. *Leaves* 1-2 in., tip rounded, mucronate or not; petiole very short. *Racemes* very short, dense-flowered, rarely terminal. *Flowers* $\frac{1}{4}$ - $\frac{1}{2}$ in. long, very shortly pedicelled; bracts minute. *Wings* with rounded tips, twice as long as the capsule. *Capsule* broader than long, notched, strongly ciliate. *Seeds* hairy; strophiole with 2 small ovate appendages.

†† *Herbs.* *Wings* petaloid, membranous. *Strophiole* without appendages.

5. ***P. abyssinica***, *Fresen. in Mus. Senk.* ii. 273; perennial, stems erect, glabrous, leaves narrow-linear, racemes terminal long lax-flowered, bracts ovate, seeds covered with long hairs. *Oliv. Fl. Trop. Afric.* i. 130. *P. Gerardiana*, *Wall. Cat.* 4187; *Hassk. in Miq. Ann. Mus.* i. 173. *P. scabra*, *Edgew. in Trans. Linn. Soc.* xx. 33.

SUBTROP. and TEMP. HIMALAYA, alt. 3-8000 ft., from Marri to Kumaon, *Jacquemont*, &c.; PUNJAB at Moulton, *Edgeworth*.—DISTRIB. Afghanistan; Abyssinia to Natal.

Branches 8-18 in., very numerous, slender, ascending from a woody stock, twiggy. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., very narrow, acuminate, scarcely petioled. *Raceme* 2-6 in., very slender, naked. *Flowers* $\frac{1}{2}$ in. long, secund or subsecund; bracts caducous, narrow-ovate, margins membranous as are the outer sepals. *Wings* obovate, obtuse, nerved. *Capsule* obovate, emarginate, narrowly winged. *Seeds* densely hairy, hairs longer than the seed; strophiole galeate.

6. ***P. leptalea***, *DC. Prodr.* i. 325; perennial, stems erect glabrous, habit of *P. abyssinica*, but racemes dense-flowered, flowers smaller, seeds silky. *Wall. Cat.* 4189; *Benth. Fl. Austral.* i. 139; *Hassk. in Miq. Ann. Mus.* i. 173. *P. oligophylla*, *DC. l. c.* 325; *Wall. Cat.* 4188. *P. discolor*, *Ham. in Don Prodr.* 199.

SUBTROP. HIMALAYA, from Kashmir to Nipal; BEHAR; KHASIA MTS., ascending to 4000 ft.; NILGHIRI MTS.; RANGOON, AYA, CEYLON,—DISTRIB. Australia.

Very similar to *P. abyssinica*. *Stems* deeply furrowed. *Lower leaves* often oblong-lanceolate. *Racemes* 1-2 in., naked. *Flowers* $\frac{1}{4}$ - $\frac{1}{2}$ in., subsecund; bracts twice as long as the buds, deciduous immediately after the flower expands. *Wings* much narrowed below. *Strophiole* small, galeate.

7. ***P. Hohenackeriana***, *Fisch. & Mey. Ind. Sem. Hort. Petrop.* iv. 42; hoary, stems many short from a perennial stock, leaves oblong lanceolate or obovate-lanceolate obtuse or subacute, racemes short terminal many-flowered, upper outer sepal much the largest obtuse, wings broad elliptic obtuse very membranous, capsule very broadly winged. *P. Hohenackeriana* var. *Stocksiana*, *Boiss. Fl. Orient.* i. 472. *P. supina* var. *Hohenackeriana*, *Regel Pl. Raddi* t. 7, 6, 12.

WESTERN PUNJAB, Attock, *Vicary*; Waziristan, ascending to 3500 ft., *Stewart*.—DISTRIB. Afghanistan and Beluchistan, Persia, Caucasus.

Stems 2-3 in., much branched from the base, suberect, hoary or pubescent. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., pale, hoary, at length glabrous, nerveless. *Racemes* $\frac{1}{4}$ - $\frac{1}{2}$ in., subsessile, dense-flowered. *Flowers* drooping, nearly $\frac{1}{2}$ in. long; pedicels short, bracts small. *Sepals* with broad scarious margins, upper linear-obovate, 2 lateral very small oblong obtuse; wings white, veins very delicate not anastomosing. *Capsule* $\frac{1}{2}$ in.; glabrous, orbicular, with a broad membranous wing. *Seeds* densely silky; strophiole with 2 appendages.

8. ***P. persicariæfolia***, *DC. Prodr.* i. 326; annual, erect, leaves linear or elliptic-lanceolate, racemes terminal and extra-axillary, pedicels slender,

bracts subulate, wings broad-obovate. *Wall. Pl. As. Rar.* ii. t. 184, *Cat.* 4185; *Hassk. in Miq. Ann. Mus.* i. 176; *Oliver Fl. Trop. Afric.* i. 129. *P. Wallichiana*, *Wight Ill.* i. t. 22 A. *P. granulata*, *Hassk. l.c.* 179. *P. Buchanani*, *Ham. in Don Prodr.* 199.

TEMP. and SUBTROP. HIMALAYA, alt. 5-9000 ft.; from Simla to E. Nipal. KHASIA MTS., alt. 2-4000 ft.; WESTERN PENINSULA, from the Dekkan to Travancor.—DISTRIB. Trop. Africa and Australia.

An erect or ascending slightly pubescent very much branched slender herb, 6-16 in. *Leaves* 1-2 in., flaccid, hardly petioled. *Racemes* 1-2 in., slender, lax-flowered. *Flowers* $\frac{1}{4}$ in. long; bracts small, subulate, pedicels curved. *Wings* orbicular-obovate or elliptic, obtuse, rather longer than the elliptic notched ciliate capsule. *Seeds* villous; strophiole small, galeate.

9. ***P. erioptera*, DC. Prodr.** i. 326; annual, erect or decumbent, leaves linear linear-oblong or obovate, racemes axillary or extra-axillary few-flowered, wings obliquely oblong, with a strong green midrib. *Wall. Cat.* 4173 A; *Deless. Ic. Sel.* iii. t. 15. *P. Vahlia*, *DC. l.c.* 326; *W. & A. Prodr.* i. 366. *P. obtusata*, *DC. l.c.* *P. tomentosa*, *Vahl ex Heyne mss.* *P. triflora*, *Oliv. Fl. Trop. Afric.* i. 128 (not of Linn.).

The PUNJAB; SCINDE; BEHAR; the WESTERN PENINSULA; AVA; BURMA.—DISTRIB. Arabia, trop. Asia and Africa, (St. Vincent, introduced?).

Very variable in habit; branches numerous, erect or spreading from the base, stout or slender, 4-10 in. high. *Leaves* $\frac{1}{2}$ -1 in. long, from obovate or almost obcordate to very narrow-linear. *Racemes* very short, $\frac{1}{2}$ - $\frac{1}{2}$ in., few-flowered. *Flowers* $\frac{1}{2}$ - $\frac{1}{4}$ in.; pedicels slender; bracts minute. *Wings* always membranous in fruit, glabrous or pubescent, longer than the ovate notched pubescent capsule. *Seeds* densely hairy; strophiole galeate and inappendiculate.—Aden specimens have the root so woody as to appear perennial.

+++ *Herbs.* *Wings herbaceous.* *Strophiole in- or 3-appendiculate.*

10. ***P. glaucoides*, Linn. (not of Wight)**; stems wiry pubescent excessively numerous from a perennial stock, leaves elliptic or elliptic-lanceolate, racemes extra-axillary with slender peduncles 2-3 flowered equalling the leaves or shorter, outer-sepals acuminate, wings oblong acute. *DC. Prodr.* i. 326; *Wall. Cat.* 4171. ? *P. confusa*, *Hassk. l.c.* 165.

CEYLON; on banks at Newera Ellia.

Stems 4-8 in., pubescent or pilose. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., glabrous or pilose, usually mucronate. *Racemes* about equalling the leaves. *Flowers* $\frac{1}{2}$ - $\frac{1}{4}$ in. long; pedicels slender, sometimes longer; bracts subulate. *Outer sepals* subequal, ciliate; wings green, oblique. *Capsule* broadly obcordate or didymous. *Seeds* somewhat curved, slightly hairy; strophiole half the length of the seed, 3-appendiculate.—The two following forms of this plant are probably distinct species.

VAR. 1. *hirsutula*, Arn. *Pugill.* 4 (sp.); leaves broadly elliptic-ovate acute flat opaque. *P. elongata* β *hirsutula*, *Thwaites Enum.* 22; *P. hypoglaucula*, *Hassk. in Miq. Ann. Mus.* i. 169.

VAR. 2; leaves linear-oblong acute shining nerved. *P. rosmarinifolia* and *micro-nata*, *Thwaites Enum.* 22. *P. arvensis* β , *Thwaites l.c.* 400.

11. ***P. elongata*, Klein in Willd. Sp. Pl.** iii. 879; annual, erect or ascending, slender, leaves linear or linear-oblong obtuse acute or mucronate, racemes extra-axillary many-flowered longer than the leaves, outer sepals lanceolate acuminate, wings very oblique. *Wall. Cat.* 4168; *DC. Prodr.* i. 332; *W. & A. Prodr.* 38; *Thwaites Enum.* 22; *Hassk. in Miq. Ann. Mus.* i. 172. *P. Wightiana*, *Wall. Cat.* 4190; *W. & A. Prodr.* 38; *Hassk. l.c.* *P. campestris*, *Dalz. in Hook. Kew Journ. Bot.* ii. 40; *Dalz. &*

Gibs. Fl. Bomb. 13 (not of Benth.). *P. macrostachya* and *eumekes*, Hassk. l.c. 171, 172.

WESTERN PENINSULA, from the Concan southwards. CEYLON, Walker.

Stems 6–10 in., branching from the base, glabrous pilose or pubescent. *Leaves* $\frac{3}{10}$ – $\frac{1}{2}$ in., acuminate, margins thickened, costa prominent beneath, upper surface often shining. *Racemes* 3–5 in., laxly many-flowered. *Flowers* $\frac{1}{2}$ in., yellow; pedicels slender; bracts minute. *Outer sepals* subequal; wings equalling the corolla, falcate, obovate or hatchet-shaped, acute obtuse or acuminate. *Capsule* didymous, narrower upwards, narrowly winged, notched, glabrous. *Seeds* villous; strophiole galeate, appendages 3, very small.—*P. Wightiana* is the narrower leaved form.

12. *P. chinensis*, Linn.; annual, erect or diffuse, leaves from orbicular-oblong or obovate to narrow linear, racemes short axillary and extra-axillary dense-flowered, flowers horizontal or pendulous, outer sepals small ovate, wings very oblique acute. *P. arvensis*, Willd. *Sp. Pl.* iii. 876; *DC. Prod.* i. 326; *Roxb. Fl. Ind.* iii. 218; *W. & A. Prodr.* i. 36; *Thwaites Enum.* 400. ? *P. prostrata*, Willd. l.c. 896; *DC. l.c.* 333. *P. Rothiana*, W. & A. *Prodr.* i. 37; *Hassk. in Miq. Ann. Mus.* i. 162. *P. Tranquebarica*, Mart. ex Hb. Wight. 135; *W. & A. Prodr.* i. 37. *P. glaucoides*, Wight in Wall. Cat. 4171 (not of Linn.). *P. grandiflora*, Hb. Wight., Wall. Cat. 4175. *P. brachystachya*, DC. l.c. 326 (not of Blume). *P. procumbens*, Roth Nov. Sp. 329; *DC. l.c.* 326. *P. exigua*, Hassk. l.c. 173.

Throughout India, from the PUNJAB to PEGU, and in the WESTERN PENINSULA, and CEYLON.—DISTRIB. Trop. Asia and Australia.

A most variable, usually procumbent, leafy, rather stout herb; 3–10 in. high, glabrous or pubescent. *Leaves* excessively variable, $\frac{1}{2}$ –2 in. long, sometimes quite obovate, at others almost orbicular, rather thick and coriaceous, glabrous, ciliate, hoary, or pubescent, margins usually flat, opaque. *Racemes* much shorter than the leaves, truncate, almost capitate. *Flowers* $\frac{1}{5}$ – $\frac{1}{4}$ in. long. *Wings* longer than the suborbicular notched ciliate narrowly winged capsule, green, falcate, obovate, acute, margins membranous. *Crest* of corolla often small. *Seeds* silky; strophiole with 3 very short appendages.—Linnaeus having described the crest as unbearded, this was not identified by De Candolle with Willdenow's *arvensis*, but was placed in another section of the genus. The specimens in the Linn. Herb. are however decisive. It is linked by either intermediate or mimicking forms with various other species.

VAR. triflora, Linn. (*Sp.*), racemes elongate, sometimes twice as long as the leaves, lax-flowered. *P. multibracteata*, Wall. Cat. 4174. *P. ramosa*, Hb. Wight., Wall. Cat. 4177. *P. ciliata*, Hb. Wight. *P. Kleinii*, Hassk. in *Miq. Ann. Mus.* i. 158.—Chiefly in the Western Peninsula.

VAR. brachystachya, Blume Bijl. 59 (*Sp.*, not of DC.); stems very slender prostrate, leaves very narrow glabrous, racemes very slender few-flowered, flowers minute, $\frac{1}{10}$ in. long. *Hassk. in Miq. Ann. Mus.* i. 157. Malacca, Griffith. Western Peninsula? (*P. glabra*, Heyne in Herb. Wight.) (Java).—Perhaps a distinct species, the flowers are remarkably small and the habit is peculiar.

13. *P. rosmarinifolia*, W. & A. *Prodr.* i. 37; annual, stems many slender erect or decumbent, leaves narrow linear, racemes axillary and extra-axillary short erect few-flowered, flowers shortly pedicelled erect, outer sepals acute, wings obliquely obovate acuminate, capsules ciliate. *Thwaites Enum.* 22, 400. *P. Tranquebarica*, Wight in Wall. Cat. 4169. ? *P. Arnottiana*, Steud. *Nomencl.* 370; *Hassk. in Miq. Ann. Mus.* i. 159. *P. triflora*, Hassk. l.c. 175 (not Linn.). *P. linarifolia*, Heyne according to Hassk. l.c.

Southern parts of the WESTERN PENINSULA and CEYLON.

Stems many from the root, 4–18 in., twiggly, pubescent. *Leaves* $\frac{1}{2}$ –2 in., glabrous or

pubescent, narrow-linear very rarely oblong or narrowed to the base erect, or suberect, margin often thickened or recurved, midrib strong. *Flowers* $\frac{1}{2}$ in. long, few, green, erect, which gives a remarkable habit to the plant. *Capsule* as in *P. chinensis* but usually hairy on the surfaces as well as on the margins.—The erect leaves and flowers seem to afford a good character for this.

** Bracts caducous (before flowering). Strophiole 3-appendiculate.

14. **P. sibirica**, L.; stems many slender ascending from a perennial stock, leaves from orbicular to elliptic-lanceolate and linear shining margins often recurved, racemes axillary and extra-axillary sub-erect laxly few- or many-flowered, outer sepals subequal oblong ovate or lanceolate, crest usually large, wings obliquely oblong or obovate obtuse or acute, capsule rather broadly winged glabrous not ciliate. *DC. Prodr.* i. 324; *Ledeb. Ic.* t. 448. *P. japonica*, *Houtt. Syst.* 8, t. 62, f. 1; *DC. l.c.*; *Hassk. in Miq. Ann. Mus.* i. 181. *P. vulgaris*, *Thunb. Fl. Jap.* 277 (not of *Linn.*). *P. elegans*, *Wall. Cat.* 4186; *Hassk. l.c.* 176. *P. myrsinites*, *Royle Ill.* t. 19 A. *P. Khasiana*, *Hassk. l.c.* 176. *P. monopetala*, *Camb. in Jacq. Voy. Bot.* t. 27; *Polyg. sp.* 3, *Griff.*; *Notul.* iv. 337, *Ic. Pl.* t. 597.

TEMP. and SUBTROP. HIMALAYA, alt. 1–6000 ft. (8000 in Sikkim), from the Punjab and N. W. frontier to Bhotan; Khasia Mts., alt. 4–6000 ft.; NILGHIRI Mts. (var. 1); CEYLON (var. 2).—DISTRIB. China, Japan, Siberia.

Very variable, but quite distinct from any other Indian species, usually best recognised by the shining reticulate upper surfaces of the elliptic-lanceolate leaves, and slender extra axillary racemes, rather large ($\frac{1}{2}$ – $\frac{3}{4}$ in.) and conspicuous erect flowers; but all these characters are excessively variable.—*Stems* 3–18 in., pubescent. *Leaves* $\frac{1}{2}$ –2 in. *Racemes* 1–3 in.; bracts deciduous or persistent. *Outer sepals* short or long, obtuse acute or acuminate. *Wings* straight or oblique, membranous or subherbaceous, obtuse or acute, rarely acuminate. *Capsules* always glabrous, with a broader wing than in *P. chinensis*. *Seeds* pilose; strophiole with usually 3 short appendages.

* VAR. 1. *Heyneana*, *Wall. Cat.* 4184 (*Sp.*); stouter, leaves linear oblong coriaceous, midrib stout, margins usually strongly recurved, wings herbaceous acuminate, appendages of the strophiole larger.—*W. & A. Prodr.* i. 38. *Hassk. in Miq. Ann. Mus.* i. 160.—Pulney and NILGHIRI Mts. Obviously a form of *P. japonica*, from which some specimens are hardly distinguishable.

VAR. 2. *macrolophos*, *Hassk. in Miq. Ann. Mus.* i. 167 (*Sp.*); stems 1–2 ft. very slender, leaves 1–1 $\frac{1}{2}$ in. broadly elliptic or lanceolate subacute flat, nerves obscure, outer sepals acuminate, wings herbaceous. *P. glomerata* and *pedunculosa*, *Thwaites Enum.* 400 (not of *Lour.*). Ceylon, Adam's Peak, &c., alt. 4–7000 ft.—A very large form, quite unlike the usual states.

15. **P. telephioides**, *Willd. Sp. Pl.* iii. 876; annual, stems prostrate short leafy, leaves small glabrous often imbricate very thick obovate or oblong obtuse or acute, flowers very small fascicled on very short extra-axillary peduncles, outer sepals acute, wings herbaceous oblique acuminate, capsule glabrous margined not ciliate. *DC. Prodr.* i. 332; *W. & A. Prodr.* i. 36? *P. serpyllifolia*, *Poir. Dict.* v. 499; *DC. l.c.* 326. *P. buxiformis*, *Hassk. in Miq. Mus. Bot.* i. 161.

WESTERN PENINSULA, Carnatic and Travancor; CEYLON.—DISTRIB. Indian Archipelago, China, Philippines.

Stems very many from an annual woody root, not exceeding 2–4 in. high in our numerous specimens from various collectors; pubescent. *Leaves* sessile, $\frac{1}{2}$ – $\frac{3}{4}$ in., margins usually recurved. *Flowers* $\frac{1}{10}$ in. long. *Capsule* $\frac{1}{12}$ in. long and broad, deeply notched, valves margined. *Seeds* minute, silky; strophiole minutely appendaged.—A very distinct species, easily recognised by its dwarf stature, the thick short leaves, small flowers and fruit, and glabrous small capsule that is not winged.

16. **P. glomerata**, *Lour. Fl. Coch.* 426; stems tall erect or ascending, leaves large from broad-ovate and oblong to elliptic lanceolate and linear, racemes extra-axillary very short, 2-3-flowered flowers drooping; outer sepals acuminate, wings herbaceous hatchet-shaped acuminate and awned, capsule narrowly winged strongly ciliate. *DC. Prodr.* i. 326. *P. densiflora*, *Blume Bijl.* 59; *Hassk. in Miq. Mus. Bot.* i. 166. *P. depauperata*, *Wall. Cat.* 4180.

EASTERN HIMALAYA, hot valleys of Sikkim, alt. 1-6000 ft.; OUDE; ASSAM; KHASIA MTS., alt. 0-5000 ft.; TENASSERIM—DISTRIB. Eastern Archipelago, China.

Stems many from a woody stock, 1-2 ft. high, densely pubescent, curved. *Leaves* very variable, $1\frac{1}{2}$ - $2\frac{1}{2}$ in., flat, glabrous or hairy, not veined, sessile or shortly petioled, sometimes cordate. *Racemes* scattered, small; peduncles shorter than the flowers, which are $\frac{1}{4}$ - $\frac{1}{3}$ in. long, green. *Outer sepals* subequal, acute, ciliate. *Crest* very small. *Capsule* $\frac{1}{2}$ in. broad and long, 2-lobed. *Seeds* large, silky, obovoid; strophiole with 3 short appendages.—Thwaites's specimen named *glomerata* resembles it in habit, but differs totally in the capsule and seed; they no doubt belong to a large state of *P. japonica* (see var. *elata*).

DOUBTFUL SPECIES.

P. linearifolia, Willd. Sp. Pl. iii. 877 (linearifolia, DC. Prodr. i. 326).

P. procumbens, Roth. Nov. Sp. 329; DC. Prodr. i. 326.—Ind. Or.

P. varians, Mart. DC. l.c. 332.—Bengal.

P. umbrosa, Mart. DC. l.c.—Bengal.

P. macropetala, Hassk. l.c., perhaps *P. japonica* var. 2.

2. SALOMONIA, Lour.

Leafy diffuse annuals, or (Sect. EPIRHIZANTHES) parasites, with leaves reduced to scales. *Flowers* minute, in dense terminal spikes. *Sepals* nearly equal, 2 interior somewhat larger. *Petals* 3, united at the base with the staminal tube, the inferior keel-shaped, galeate, not crested. *Stamens* 4-5, filaments united for their lower half into a sheath; anthers opening by pores. *Ovary* 2-celled, each cell with one pendulous ovule. *Capsule* much compressed laterally, 2-celled, loculicidal, margins toothed. *Seeds* albuminous, not or scarcely strophiolate.—DISTRIB. Species about 8, natives of Eastern tropical Asia and tropical Australia.

SECT. I. *Salomonias*, DC. Stems leafy.

1. **S. cantoniensis**, *Lour. Fl. Coch.* 14; stem winged, leaves cordate-ovate shortly petioled, spikes rather lax, capsule with triangular teeth. *Wall. Cat.* 4192; *DC. Prodr.* i. 334; *Benth. Fl. Hongk.* 44; *Miq. Flor. Ned. Ind.* i. pt. 2, 127; *Hassk. in Miq. Ann. Mus.* i. 144. *S. subrotunda*, *Hassk. l.c.*—*Salomonias*, sp. 3 in *Griff. Notul.* iv. 539.

EASTERN BENGAL; ASSAM; KHASIA MTS., alt. 0-4000 ft.; EASTERN PENINSULA.—DISTRIB. Malayan Archipelago.

A weedy erect much-branched diffuse annual, 3-6 in. *Leaves* large, paler beneath. *Spikes* numerous, terminal, lax below, denser above. *Bracts* minute, early deciduous. *Flowers* minute, quite sessile. *Sepals* linear-subulate. *Petals* united below, the two lateral shorter than the keel. *Capsule* very small, broader than long, armed with a row of recurved triangular teeth. *Seeds* black, shining, not strophiolate.

2. **S. ciliata**, *DC. Prodr.* i. 334; stem furrowed, leaves sessile cordate-amplexicaul ciliate, spike very dense, capsule with filiform teeth. *S. cor-*

data, *Arn. Pug. Ind.* 4; *Wight. Ill.* i. t. 22 C; *Thwaites Enum.* 22 (excl. *synons.*); *Hassk. in Miq. Ann. Mus. Lugd.-Bat.* i. 145. ? *S. angulata*, *Griff. Notul.* iv. 539. *Polygala ciliata*, *Linn.*

CEYLON, in swampy ground.

Stouter than *S. cantoniensis*. Stem erect, glabrous, furrowed, scarcely winged. Leaves small, strongly ciliate. Flowers crowded, small, pink, sessile. Sepals lanceolate, ciliate. Capsule small, broader than long, with a row of red filiform teeth. Seeds black, shining, with a small membranous strophiole.—Wight and Arnott are in error in taking *Linnæus's Polygala ciliata* for a true *Polygala*. The specimen in *Herb. Burman.* in the British Museum, clearly shows it to be a *Salomonina*, and identical with *Arnott's S. cordata*.

3. ***S. oblongifolia***, *DC. Prodr.* i. 354; leaves elliptic or ovate-lanceolate not ciliate, teeth of capsule filiform. *Hassk. in Miq. Ann. Mus. Lugd.-Bat.* i. 147; *Arn. Pug. Ind.* 4; *Deless. Ic. Sel.* iii. t. 19. *S. sessiliflora*, *Ham. in Don Prodr.* 201. *S. obovata*, *Wight Ill.* i. t. 22 B. *S. canarana*, *rigida*, ? *Horneri*, ? *uncinata* and ? *setosa-ciliata*, *Hassk. l.c.* 147, 148, 149. ? *S. stricta*, *Sieb. et Zucc. Abh. d. k. baier. Akad. d. Wiss.* iv. 2, 152. *S. leptostachya*, *Wall. Cat.* 4193. *Polygala canarana* and *Arnottiana*, *Hassk. l.c.*

SUBTROP. HIMALAYA, from Nipal to Sikkim; KHASIA MTS.; EASTERN and WESTERN PENINSULAS; CEYLON.—DISTRIB. Malayan Archipelago, Australia.

A simple or branched annual. Leaves larger than in *S. ciliata*, sessile, not cordate, margins with a few long distant hairs. Bracts linear, often persistent at time of flowering. Flowers crowded, small, pink. Sepals nearly equal, lanceolate, slightly ciliate. Lateral petals much shorter than keel. Capsule small, with a row of red teeth. Seeds black, shining, not strophiolate.—Very near the last, but probably distinct.

4. ***S. edentula***, *DC. Prodr.* i. 334; stem much-branched winged, leaves cordate-triangular very shortly petioled, capsule scarcely toothed. *Hassk. in Miq. Ann. Mus. Lugd.-Bat.* i. 146; *Wall. Cat.* 4194. *S. petiolata*, *Ham. in Don Prodr.* 200.

NIPAL, *Wallich*.

A low, glabrous annual. Spikes lax below, denser above. Flowers minute. Bracts minute, deciduous. Sepals very small, ovate. Lateral petals broad and nearly as long as the galeate keel. Capsule very small, membranous, not ciliate, minutely toothed. Seeds black, shining, not strophiolate.

SECT. II. ***Epirhizanthos***, *Blume* (gen.). Parasitic; leaves 0 or reduced to scales.

5. ***S. aphylla***, *Griff. in Trans. Linn. Soc.* xix. 342. *S. parasitica*, *Griff. Notul.* iv. 538. *S. tenella*, *Hook. f. in Trans. Linn. Soc.* xxiii. 158.

MALACCA and TENASSERIM, *Griffith*.—DISTRIB. Borneo.

A brown parasite, associated with *Thismia Brunoniana* and a *Burmannia* (*Griff.*). Stem 3–6 in., ascending, sparingly divided. Leaves reduced to a few distant brown scales. Spikes numerous, elongated, very dense. Bracts minute, persistent after flowering. Flowers minute, brown. Sepals distinct, broadly ovate. Capsule membranous, broader than long, not ciliate. Seeds minute, black, with a small appendiculate strophiole.

3. **SECURIDACA**, *Linn.*

Shrubs, almost always scandent. Flowers in terminal or axillary usually compound racemes. Sepals deciduous, 2 inner (wings) larger and petaloid. Lateral petals nearly or quite distinct from the galeate crested keel, superior petals 0. Stamens 8, filaments united; anthers 2-celled, dehiscing by

oblique pores. *Ovary* 1-celled, 1-ovuled. *Fruit* a 1-celled samara, 1-seeded, wing broad coriaceous. *Seeds* exalbuminous, estrophiolate. — **DISTRIB.** Species about 25; most numerous in tropical America, rarer in tropical Africa and Asia.

1. **S. Tavoyana**, *Wall. Cat.* 4196; leaves elliptic or obovate-oblong minutely pubescent beneath, flowers in loose subcorymbose panicles, wings elliptic. *S. scandens*, *Ham. in Wall. Cat.* 4195 (not of Jacq.); *Hassk. in Miq. Ann. Mus.* i. 190. *S. paniculata*, *Wall. (not of Lamk.)*. *S. inappendiculata*, *Hassk. Pl. Jav. Rar.* 295. *Lophostylis javanica*, *Miq. Fl. Ned. Ind.* i. pt. 2, 128.

EASTERN BENGAL, from Silhet and Chittagong to Rangoon. — **DISTRIB.** Java, China.

A large woody scandent shrub; branches striate, branchlets puberulous. *Leaves* 3-5 by $1\frac{1}{2}$ -2 in., generally acuminate, glabrous, paler beneath. *Flowers* $\frac{1}{4}$ in., the lower with considerably longer ($\frac{1}{2}$ in.) pedicels than the upper. Outer *sepals* nearly equal, ovate, shortly ciliate; wings elliptic, obtuse. *Lateral petals* adnate at the base to the keel, truncate; keel with a conspicuous but scarcely fimbriate crest. *Ovary* orbicular; style unilateral, curved at right angles near the tip. *Samara* $2\frac{1}{2}$ -3 $\frac{1}{4}$ in.; nucleus very rugose; wing very large and strongly veined, oblique, tip rounded, margin entire, veins arched.

2. **S. bracteata**, *A. W. Benn.*; leaves elliptic puberulous beneath, flowers in paniced racemes, wings orbicular, wing of fruit strongly veined.

MALACCA, *Maingay*.

A large scandent shrub; branches terete, hoary-pubescent. *Leaves* elliptic, acuminate, margins revolute when dry, beneath finely pubescent glaucous. *Flowers* $\frac{1}{2}$ in., pedicels $\frac{1}{3}$ in. *Bracts* ovate, acuminate, pubescent, persistent after flowering. Outer *sepals* nearly equal, large ovate, very hairy, ciliate: wings scarcely twice as long, pubescent externally. *Lateral petals* truncate; keel with a recurved, plaited crest. *Ovary* orbicular; style curved. *Fruit* unknown. *Samara* 3-3 $\frac{1}{4}$ in., similar to that of *S. Tavoyana*, but contracted for a longer space above the nucleus.

4. **TRIGONIASTRUM**, *Miquel*.

A shrub or small tree. *Leaves* hoary beneath. *Flowers* in slender terminal panicles. *Petals* 5, unequal, the inferior keel-shaped. *Stamens* 5, filaments united into a sheath. *Ovary* densely hairy, 3-locular; ovules pendulous, solitary in each cell. *Fruit* of 3 samaroid ultimately almost distinct carpels. *Seeds* 1 in each carpel, not strophiolate.

1. **T. hypoleucum**, *Miq. Fl. Ned. Ind. Suppl.* i. 395. *Isopteris penangiana*, *Wall. Cat.* 7261.

PENANG *Porter*; **MALACCA** *Maingay*.

Branches slender, terete; branchlets hoary. *Leaves* 4-7 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., elliptic-lanceolate, obtusely acuminate, pale beneath and with very fine adpressed pubescence; petiole $\frac{1}{10}$ - $\frac{1}{8}$ in. *Panicles* much branched, lax, slender. *Flowers* $\frac{1}{4}$ in. diam., shortly pedicelled, tomentose. *Sepals* 5, 2 anterior rather larger. *Ovary* densely hairy. *Samara* 2 in. long, membranous, dimidiate-obovate, strongly reticulate, shining; nucleus small.

5. **XANTHOPHYLLUM**, *Roxburgh*.

Timber-trees. *Leaves* large, coriaceous, generally yellow-green. *Sepals* 5, nearly equal. *Petals* 5 or 4, nearly equal, the inferior keel-shaped, not crested. *Stamens* 8, distinct, 2 hypogynous, 6 attached to the base of the petals. *Ovary* stipitate, 1-celled; style curved; ovules various in number

and insertion. *Fruit* 1-celled, indehiscent, 1-seeded. *Seeds* exalbuminous, estrophiolate.—**DISTRIB.** Species about 15. Most abundant in the Archipelago and Malacca; a few species are Continental Indian, and one is N. Australian.

* Ovules 4-8, rarely more (8-14 in *X. affine*).

1. *X. flavescens*, Roxb. *Cor. Pl.* iii. t. 248; leaves coriaceous elliptic-lanceolate not glaucous beneath yellow-green when dry, panicle diffuse closely pubescent, sepals unequal, ovary and style strigose, fruit glabrous. *W. & A. Prodr.* 39. *X. paniculatum*, *Miquel Fl. Ned. Ind. Suppl.* i. 393. *X. Arnottianum*, undulatum, and *Roxburghianum*, *Wight Ill.* i. 50; *Beddome Flor. Sylvat. (Anal.)* t. 3.—*Rheede Hort. Malab.* iv. t. 23.

EAST BENGAL; Silhet, and Chittagong. **WESTERN PENINSULA.** CEYLON.—**DISTRIB.** Sumatra, Java.

A timber tree. *Leaves* 4-7 by $1\frac{1}{2}$ -3 in., shining above, less so and veins much reticulated beneath, with 5-7 principal nerves on each side, and more or less scattered perforated glands (which are sometimes absent) at the axils of the nerves or elsewhere. *Flowers* $\frac{3}{4}$ -1 in. long, yellow; pedicels very variable, $\frac{1}{2}$ - $\frac{3}{4}$ in. *Sepals* unequal, suborbicular, finely tomentose. *Ovary* globose, densely strigose; ovules 4, 2 erect and 2 pendulous, or more numerous and subhorizontal. *Fruit* globose, $\frac{3}{8}$ in. diam., and upwards, walls very thick, green.—Very variable. I am unable to distinguish between Roxburgh's *flavescens* and *virens*, both usually having pitted glands on the leaf beneath, except by the long pedicels of the latter, the Ceylon specimens of which have 4 ovules, and the Silhet ones usually the same, whilst the Peninsula ones vary 4-9, and Sumatran specimens are 4-ovuled.

VAR. 1. *flavescens proper*; leaves broad, panicle close axillary or terminal, pedicels short, ovules 4-12. Chittagong and Western Peninsula (Sumatra, Java).

VAR. 2. *angustifolium*, *Wight Ill.* 50, t. 23 (*sp.*); leaves narrower, ovules usually 4. *Beddome Fl. Sylvat. Anal. Gen.* t. 3.

VAR. 3. *virens*, Roxb. *Cor. Pl.* t. 248 (*sp.*); panicles short supra-axillary, pedicels very slender, ovules 4. *X. flavescens*, Roxb. ?; *Wight l.c.*; *Beddome Fl. Sylvat. Anal. Gen.* t. 3. Ceylon, Silhet; Paupanassum hills (Travancor ?), alt. 2-3000 ft., *Beddome*.

2. *X. affine*, *Korth. in Mig. Ann. Mus.* i. 271; leaves coriaceous oblong- or elliptic-lanceolate not glaucous beneath yellow-green when dry, panicles axillary and terminal diffuse tomentose, sepals unequal, ovary glabrous, style strigose. *X. flavescens*, *Wall. Cat.* 4198, not of Roxb.

EASTERN PENINSULA; Tenasserim to Malacca and Penang, *Wullich, &c.*—**DISTRIB.** Sumatra, Java, Borneo.

So like the *X. flavescens*, that the larger leaves, rather larger flowers, more tomentose calyx, and glabrous larger ovary, alone distinguish it in the dried state. The ovules vary from 8-14, and the fruit is quite glabrous, green, globose and thick-walled.

3. *X. glaucum*, *Wall. Cat.* 4199; branches very slender, leaves usually membranous elliptic or lanceolate acuminate glaucous beneath, nerves very numerous 8-10 on each side, panicle large open lax, branches long tomentose, calyx pubescent or tomentose, ovary and style strigose, fruit glabrous. *Hassk. in Mig. Ann. Mus.* i. 193.

EASTERN PENINSULA; Rangoon and Tenasserim in moist places.

A small tree; branches terete, very slender, dark red brown, glabrous. *Leaves* 3-4 by $1-1\frac{1}{4}$ in., rather abruptly acuminate, quite glabrous, finely reticulate; petiole slender, $\frac{1}{4}$ in. *Panicle* 1 ft., with long spreading very slender tomentose simple branches. *Flowers* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., and slender pedicels pubescent, pale when dry. *Ovary* sessile, covered with dense strigose hairs, ovules 4. *Fruit* much smaller than in *X. flavescens*, $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., quite smooth and glabrous.—Easily distinguished by its

slender habit, and glaucous membranous leaves, which are very pale beneath, with numerous slender much reticulated veins.

4. **X. Griffithii**, *Hook. f.*; branches usually robust, leaves very coriaceous elliptic or elliptic-lanceolate acute or acuminate with few (5-6) principal nerves on each side glaucous beneath, panicle spreading tomentose, calyx pubescent, ovary and style strigose.

MERGUI, *Griffith, Helfer*; MALACCA, *Maingay*.

Very much more robust than *X. glaucum*, with very coriaceous leaves, 3-5 in. long; branches very dark brown, smooth, terete; branchlets often extra-axillary with two opposite lateral coriaceous oblong scales at the base (persistent first leaves of the bud). *Flowers* nearly $\frac{1}{2}$ in. long, on short stout pedicels, smaller in the Mergui specimens, and darker when dry. *Sepals* orbicular ovate, subequal. *Petals* linear-spathulate, glabrous, except the pubescent keel. *Ovary* sessile and style strigose, ovules 4. *Fruit* in a Mergui species the size of a pea, slightly pubescent, shining (perhaps immature).

Large leaved specimens of this or a closely allied species, gathered in the Andamans by Helfer, but without flowers, resemble the leaves of *X. acuminatissimum*, Miquel.

5. **X. Maingayi**, *Hook. f.*; branches very slender, leaves membranous elliptic-lanceolate obtusely caudate-acuminate not glaucous beneath, principal nerves 5-6 on each side, racemes slender simple and paniced, calyx pubescent, ovary and style strigose, fruit densely pubescent.

MALACCA, *Griffith, Maingay*.

Branches glabrous, pale yellow-brown, branchlets tomentose. *Leaves* 2-3 by $1\frac{1}{4}$ - $1\frac{1}{2}$ in., pale green when dry, sometimes almost white beneath, but scarcely glaucous; petiole very slender, $\frac{1}{10}$ - $\frac{1}{8}$ in. *Racemes* 1-2 in., axillary and terminal, the latter often paniced, branches very slender finely pubescent with pale buff down. *Flowers* lax, $\frac{1}{2}$ in. long; pedicels short, slender. *Sepals* unequal, orbicular-ovate, obtuse, buff-pubescent. *Petals* glabrous, except the keel. *Ovary* and style strigose, ovules 4. *Fruit* $\frac{3}{4}$ in. diam., globose; walls thick, rugose when dry.

** Ovules numerous. (See also 2. *X. affine*.)

† *Flowers* paniced.

6. **X. stipitatum**, *A. W. Benn.*; branches very slender, leaves membranous elliptic obtusely caudate-acuminate glaucous beneath, nerves indistinct, racemes sparingly branched pubescent, calyx puberulous ciliate, ovary cottony stipitate.

MALACCA, *Maingay*.

Branchlets glabrous, dull brown. *Leaves* 2 by $\frac{3}{4}$ in., dull pale leaden-brown when dry, rather coriaceous, shining above, opaque beneath, with very obscure nerves; petiole $\frac{1}{10}$ in. *Panicle* sparingly branched; branches long, slender. *Flowers* $\frac{1}{2}$ in. long, dull red, shorter than the slender pedicels. *Sepals* subequal, broadly oblong, obscurely puberulous. *Petals* about twice as long, ciliate when young. *Filaments* villous below the middle. *Ovary* narrowed into a glabrous stipes, and base of style loosely clothed with white cottony hairs; ovules 10-12.

7. **X. rufum**, *A. W. Benn.*; branchlets stout and leaves beneath rusty or rufous pubescent, leaves very coriaceous elliptic-ovate or oblong acuminate, nerves beneath few very stout, panicle large and calyces red-tomentose, ovary and style densely villous, fruit pubescent.

MALACCA, *Maingay*.

A large timber tree; branchlets very stout, densely tomentose. *Leaves* 5-7 by $1\frac{1}{2}$ -3 in., clothed beneath with soft spreading pubescence, especially on the costa and nerves (6 on each side), pale yellow when dry, upper surface opaque, under paler;

petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. Panicle 6–10 in., branches stout, densely clothed with yellow-brown tomentum; branchlets and calyces ruddy, brown. Flowers $\frac{3}{4}$ in. long; pedicels shorter than the sepals, bracts large, oblong. Sepals subequal, coriaceous, orbicular, deciduous, densely tomentose within and without. Petals three times as long, narrowly falcate-lanceolate, glabrous, except the broad tomentose keel. Filaments pilose at the base. Ovary sessile, rigid (when dry) and style densely pubescent to the top; ovules 14–16. Fruit dry (immature obscurely angled).

†† Flowers racemose, racemes rarely paniced.

8. *X. obscurum*, A. W. Benn.; branchlets stout, leaves very thickly coriaceous stout-petioled oblong obtuse glabrous dark brown when dry, racemes very short stout axillary few-flowered, calyx glabrous ciliate, ovary and style glabrous.

SINGAPORE, Maingay.

A large timber tree; branchlets woody, glabrous. Leaves 5–7 by 2–4 in., exceedingly thick, shining above, nerves 8–10 on each side reticulate, dark brown when dry; petiole $\frac{1}{4}$ in., very stout. Racemes 1–1 $\frac{1}{2}$ in., stout, suberect, dark, few-flowered. Flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. long. Sepals unequal, orbicular, tips minutely ciliate. Petals all spatulate, subequal, glabrous, except on the claw and pubescent keel. Ovary ovoid and style quite glabrous; ovules 15–16 (Maingay).

9. *X. insigne*, A. W. Benn.; branchlets stout glabrous, leaves long-petioled very coriaceous ovate or elliptic-oblong obtuse glabrous, racemes simple short stout axillary and terminal, pedicels curved, sepals ciliate, ovary sessile and style glabrous.

MALACCA, Maingay.

A tree, not lofty; trunk thick; branchlets quite glabrous. Leaves 5–6 by 1 $\frac{3}{4}$ –2 $\frac{1}{2}$ in., base acute, dark brown when dry, shining above, nerves 6–8 on each side, loosely reticulate; petiole $\frac{1}{2}$ –1 in., very thick. Racemes 3–4 in., sometimes paniced at the ends of the branches. Flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. long, handsome, almost black when dry. Sepals unequal, suborbicular, puberulous. Petals spatulate, subequal, except the keel which is larger and silky near the tip; claw pubescent. Ovary ovoid; style slightly curved; ovules 12–14.

10. *X. ellipticum*, Korth. in *Miq. Ann. Mus.* i. 276; wholly glabrous, leaves rather coriaceous elliptic or elliptic-lanceolate obtusely caudate-acuminate not glaucous beneath strongly reticulate, racemes simple stout suberect, calyx ovary style and thin-walled fruit perfectly glabrous.

MALACCA, Griffith.—DISTRIB. Borneo.

Branchlets slender or stout. Leaves 3–4 by 1–1 $\frac{1}{2}$ in., glossy above, very strongly reticulated on both surfaces, principal nerves about 6 on each side, pale brown when dry; petiole $\frac{1}{4}$ in. Racemes 1–3 in., rachis rather stout, angled. Flowers $\frac{1}{4}$ in. long, almost black when dry; pedicels equalling the calyx. Sepals orbicular, subequal, very coriaceous. Petals twice as long, very narrow, all quite glabrous. Filaments glabrous. Ovary and slender style perfectly glabrous; ovules 12–14. Fruit $\frac{1}{4}$ in. diam., sessile, chestnut-brown when dry with thin crustaceous walls.—There is a very faint pubescence on the buds and pedicels of the Bornean specimens.

ORDER XVII. FRANKENIACEÆ. (By M. P. Edgeworth, F.L.S.)

Annual or perennial herbs or undershrubs, with articulate branches. Leaves opposite, small, exstipulate. Flowers small, solitary in the forks of the branches, regular, hermaphrodite. Calyx gamosepalous, persistent with 4–6 divisions, induplicate valvate in bud. Petals equalling the sepals in number, hypogynous, free; claw with an adherent scale, imbricated in bud.

Stamens 4 or more, free, or connate at the base; anthers versatile, 2-celled. *Ovary* free, sessile, 1-celled; style slender, stigma 2-5-lobed; ovules many in two rows, amphitropous with the micropyle below; funicles slender. *Capsule* enclosed in the persistent calyx, opening by as many valves as there are placentas. *Seeds* oblong or ovoid, hilum sub-terminal, raphe linear, testa crustaceous; embryo straight, in the centre of mealy albumen.—A single genus, with about 12 species, natives of dry sandy and especially saline tracts.

1. **FRANKENIA**, Linn.

1. **F. pulverulenta**, Linn.; annual, prostrate, leaves obovate retuse or hoary beneath, calyx glabrous.—*Boiss. Fl. Orient.* i. 779.

Plains of the PUNJAB and SINDH, on Sola land.—*DISTRIB.* Eastward to S. Europe, Senegal, and S. Africa

A slender, exceedingly branched, diffuse herb; branches wiry, leafy, 6-18 in. long. *Leaves* $\frac{1}{2}$ - $\frac{1}{4}$ in., very shortly petioled. *Flowers* pink, shorter than the leaves. *Calyx* cylindric, strongly ribbed. *Petals* small.

ORDER XVIII. **CARYOPHYLLÆ.** (By M. P. Edgeworth, F.L.S., & J. D. Hooker.)

Herbs, rarely undershrubs; branches opposite, usually jointed and thickened at the joints. *Leaves* opposite, quite entire or serrulate, often connate; stipules scarious or 0. *Flowers* rarely 1-sexual. *Sepals* 4-5, free or connate, imbricate in bud. *Petals* 4-5, rarely 0, inserted on a hypogynous ring, rarely perigynous. *Stamens* 8 or 10, rarely fewer, inserted with the petals; anthers 2-celled, cells parallel opening lengthwise. *Disk* small and annular, or elongated into a gynophore, or broken up into glands. *Ovary* free, 1-celled, or imperfectly 3-5-celled; styles 2-5, free, or connate into a single style, stigmatose on the inner side; ovules 2 or many, on slender basal funicles, or with the funicles united into a column, amphitropous. *Capsule* membranous or crustaceous, rarely fleshy, opening by valves equal in number or double that of the styles, rarely indehiscent or bursting irregularly. *Seeds* few or many, rarely solitary, reniform globose obovoid or flattened on one side; hilum marginal or central, albumen mealy, rarely fleshy; embryo usually more or less curved and surrounding the albumen, nearly straight in the discoid seeds, cotyledons narrow incumbent, rarely accumbent.—*DISTRIB.* Cosmopolitan, but chiefly Arctic, Alpine, European and W. Asiatic; Genera 35, species about 800.

TRIBE I. Silenææ. *Calyx* gamosepalous, 4-5-lobed. *Petals* clawed and *stamens* inserted on an elongate gynophore (rarely sessile). *Styles* free.—*Stipules* 0.

Subtribe 1. **DIANTHÆÆ.** Capsule dehiscent; styles 2. Seeds peltate, hilum facial; embryo straight.

<i>Calyx</i> bracteate, striate	1. DIANTHUS.
<i>Calyx</i> bracteate or not, 5-15-nerved	2. TUNICA.

Subtribe 2. **DRYPIDÆÆ.** Capsule indehiscent. Hilum lateral; embryo curved.

<i>Calyx</i> 5-15-nerved. <i>Styles</i> 2	3. ACANTHOPHYLLUM.
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Subtribe 3. **LYCHNIDÆ.** Capsule bursting by short or long valves. Hilum lateral; embryo annular.

- Calyx 5-nerved. Capsule 1-celled, deeply 4-valved; styles 2-3 4. **Gypsophila.**
 Calyx veined. Capsule shortly 4-valved; styles 2 5. **Saponaria.**
 Calyx 10-∞-nerved. Capsule partially 3-celled, shortly 3-6-valved; styles 3 6. **Silene.**
 Calyx 10-nerved. Fruit fleshy; styles 3 7. **Cucubalus.**
 Calyx 10-nerved. Capsule shortly 4-5- or 8-10-valved; styles 5 8. **Lychnis.**

TRIBE II. Alsineæ. *Sepals* free, or connate at the base only. *Petals* subsessile and *stamens* inserted on an annular disk, rarely perigynous. *Styles* free.

* *Stipules* 0. *Sepals* free. *Stamens* hypogynous.

- Petals* jagged. Capsule cylindric or conic, 6-valved. *Styles* 3.
 Seeds many, compressed 9. **Holosteum.**
Petals notched or entire. Capsule cylindric or conic, 8-10-valved. *Styles* 3-5, opposite the sepals. Seeds many . . . 10. **Cerastium.**
Petals 2-fid. Capsule globose ovoid or oblong. *Styles* 3-5.
 Seeds few or many 11. **Stellaria.**
Petals entire. Capsule depressed, 1-seeded *Styles* 2 . . . 12. **Brachystemma.**
Petals entire or lacerate. Capsule of *Stellaria*. *Styles* usually 2-3. Seeds many 13. **Arenaria.**
Petals entire, minute or 0. Capsule 4-5-valved. *Stamens* and styles 4 or 5 opposite the sepals 14. **Sagina.**

** *Stipules* 0. *Sepals* connate below into an obconic tube, bearing the *stamens*.

- Petals* 0. 15. **Thylacospermum.**

*** *Stipules* scarious. *Sepals* free.

- Petals* entire. *Styles* 3 or 5. Capsules 3- or 5-valved . . . 16. **Spergula.**

TRIBE III. Polycarpææ. *Sepals* free. *Petals* subsessile and *stamens* inserted on an annular disk. *Styles* 3-2, combined. *Stipules* scarious, rarely obsolete.

- Sepals* not keeled. *Petals* 2-6-fid 17. **Drymaria.**
Sepals keeled. *Petals* entire. *Style* 3-fid 18. **Polycarpon.**
Sepals scarious, not keeled. *Stigma* 3-toothed 19. **Polycarpææ.**

1. **DIANTHUS**, Linn.

Herbs, usually perennial. *Leaves* linear. *Flowers* terminal, solitary or in paniced cymes. *Calyx* tubular, 5-toothed, nely striated (with 7-9 or 11 nerves to each tooth); base embraced by 2 or more imbricating bracts. *Petals* with a long claw; blade entire or toothed or fimbriate, claw without a scale. *Stamens* 10. *Disk* a long-stalked gynophore. *Ovary* 1-celled; *styles* 2. *Capsule* cylindric oblong or ovoid, 4-toothed or valved. *Seeds* orbicular or discoid, plane or concave, imbricated on the columnar placenta; embryo straight, excentric.—**DISTRIB.** Species about 70, natives of the N. temp. zone exclusive of Western N. America.

D. chinensis L. (*D. glaucus*, Hb. Ham, in Wall. Cat. 656) is commonly cultivated in India.

* Petals entire crenate or toothed, not fimbriate.

† Petals smooth, surface not bearded.

1. **D. Caryophyllus**, Linn.; leaves channelled, margin quite even, cymes loosely panicled, bracts 4 broadly obovate mucronate 3–4 times shorter than the calyx, petals toothed and crenate. (Carnation or Clove Pink.)

PUNJAB at Attok, *Falconer*; ? Balti, alt. 7–8000 ft., *Thomson*.—DISTRIB. Westward to mid-Europe.

Perennial, glabrous, glaucous; stems 18–24 in., branched and leafy below. *Leaves* 4–6 by $\frac{1}{2}$ in. *Flowers* 1–1 $\frac{1}{2}$ in. diam., fragrant. *Calyx* 1–1 $\frac{1}{2}$ in., teeth acute. *Petals* obovate, rosy, teeth $\frac{1}{2}$ – $\frac{3}{4}$ the length of the blade. *Capsule* ovoid.—*Thomson's* Balti specimens are very old, and if properly referred here, belong to a form with more numerous bracts.

2. **D. Falconeri**, *Edgew.*; leaves channelled serrulate, flowers solitary, bracts 4 rarely 6 broad-ovate long-cuspidate 3–4 times shorter than the calyx, petals finely toothed.

WESTERN TIBET; Astor and Deotsu, *Falconer*, &c.

Shrubby below; stems 1–2 ft., stout, rigid, dichotomously branched. *Leaves* 3–6 by $\frac{1}{2}$ in., 1–3-nerved. *Flowers* smaller than in *D. Caryophyllus*. *Calyx* 2 in., strongly striate; bracts suddenly contracted into the long cusp.

3. **D. Cachemiricus**, *Edgew.*; leaves channelled, margin thickened serrulate, flowers solitary or few, bracts 4 lanceolate with a long ensiform often foliaceous point sometimes equalling the calyx.

KASHMIR, *Falconer*.

Stems much branched from the base, more slender than *D. Falconeri*, erect. *Leaves* 1–1 $\frac{1}{2}$ in., very narrow, midrib beneath stout. *Bracts* with either very slender points or long leafy ones. *Calyx* 1 in., teeth ovate-lanceolate, acuminate, margins scarious. *Petals* large, obovate; blade $\frac{1}{2}$ – $\frac{3}{4}$ by 1 in., margin toothed or almost entire.

4. **D. anatolicus**, *Boiss. Fl. Orient. i* 489; small, slender, leaves very narrow margin much thickened serrulate, bracts 6 (4–8) very broad cuspidate $\frac{1}{2}$ – $\frac{3}{4}$ shorter than the calyx.

WESTERN TIBET, *Falconer*; Dras, 8–10,000 ft., *Thomson*.—DISTRIB. Armenia.

Densely tufted; stock woody, short, much branched; stems 6–10 in., very slender, strict, 1- or more-flowered. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., rigid, slender, with a very thick midrib and margin. *Bracts* with sometimes foliaceous points. *Calyx* $\frac{1}{2}$ in., teeth subacute. *Petals* rosy, blade small, broad, crenate-toothed.

5. **D. Jacquemontii**, *Edgew.*; leaves narrow, radical serrulate, cauline with thickened obscurely serrulate margins, bracts 4 very broad obtuse acute or cuspidate $\frac{1}{2}$ the length of the calyx, calyx-teeth pungent.

WESTERN HIMALAYA, Kashmir, alt. 5–6000 ft., *Jacquemont*, &c.

Stems 4–10 in., many from a tufted woody stock, rather slender. *Leaves* 1–1 $\frac{1}{2}$ in., coriaceous, green when dry, flat above, acute. *Flowers* usually solitary. *Bracts* suddenly contracted into a point which is sometimes thickened and quite obtuse. *Calyx* $\frac{3}{4}$ –1 in., teeth long, with rigid tips. *Petals* broad, rather deeply toothed. Near *D. Liboschitzianus*, *Seringe*, of the Caucasus, but differs in the toothed petals.

6? **D. deltoides**, *L.*; glabrous, leaves linear acute obscurely serrulate, bracts 2, calyx $\frac{1}{2}$ in., petals toothed.

WESTERN TIBET; *Lance*.—DISTRIB. (of *D. deltoides*, Western Europe).

Specimens very imperfect, but apparently identical with the European plant, which varies from glabrous to pubescent, and very much in the length of the bracts, which in *Lance's* specimen are $\frac{1}{2}$ – $\frac{3}{4}$ the length of the calyx, and coloured.

†† *Surface of petals bearded or pubescent.*

7. **D. Seguieri**, Vill. ; Boiss. *Fl. Orient.* i. 504 ; leaves broad, flowers usually fascicled, bracts 4-6 $\frac{1}{2}$ - $\frac{2}{3}$ the length of the calyx, with leafy points.

WESTERN TIBET, Ladak, *Stewart*.—DISTRIB. Siberia, Caucasus, Greece.

Stem 6-10 in., leafy, erect, simple or paniculately branched. *Leaves* strict, linear, obscurely 5-nerved. *Flowers* usually surrounded with leafy bracts below the 4-6 ovate abruptly cuspidate ones, which are themselves often tipped with an herbaceous point. *Calyx-teeth* mucronate. *Petals* rosy, blade obovate acutely toothed.

** Petals fimbriate.

8. **D. fimbriatus**, *Bieberst.* ; Boiss. *Fl. Orient.* i. 495 ; rigid, leaves rather broad subacute obscurely serrulate, bracts 6-8 short broad-ovate acute, calyx $\frac{3}{4}$ -1 in., petals fimbriate for $\frac{1}{2}$ the length of the blade.

WESTERN TIBET ; *Falconer*.—DISTRIB. N. Persia, Caucasus.

Stock stout, woody, often elongate, much branched and suffruticose ; stems many, strict, erect, 6-10 in., 1-flowered. *Leaves* $\frac{3}{4}$ -1 $\frac{1}{2}$ in., rigid, erect. *Bracts* $\frac{1}{2}$ the length of the calyx, sometimes cuspidate. *Calyx-teeth* long, lanceolate, pungent. *Petals* white, fading into lilac or pink.

9. **D. angulatus**, *Royle Ill.* 79 ; rigid, leaves linear acute serrulate, bracts 4-6 ovate acuminate or the lower cuspidate, calyx $\frac{1}{2}$ - $\frac{2}{3}$ in., petals fimbriate for $\frac{1}{2}$ the length of the blade.

WESTERN HIMALAYA, from Kunawar to Kishtwar, and in Piti and Zanskar, alt. 7-13,000 ft.

Quite similar to *D. fimbriatus*, and probably a variety of that plant, with the bracts often coloured and varying exceedingly in length, from $\frac{1}{4}$ - $\frac{1}{2}$ the length of the calyx, which rarely exceeds $\frac{1}{2}$, and never $\frac{3}{4}$ of an inch.

VAR. 1. bracts rather lax ovate suddenly cuspidate.

VAR. 2. bracts with a foliaceous point $\frac{1}{2}$ - $\frac{3}{4}$ the length of the calyx, leaves dark green, cauline 3 in., petals less deeply cut. Habit of *D. deltoides*.—Kishtwar.

VAR. 3. *incertus*, Jacquem. Herb. (sp.) ; bracts 4 rarely 6 lax ovate acuminate $\frac{1}{2}$ - $\frac{3}{4}$ the length of the calyx, petals not so deeply cut.—Kunawar.

10. **D. crinitus**, *Smith* ; Boiss. *Fl. Orient.* i. 496 ; bracts 4-8 lanceolate long-acuminate, calyx 1-1 $\frac{1}{2}$ in., teeth long lanceolate, petals fimbriate nearly to the base of the blade.

WESTERN PUNJAB ; Salt Range, *Fleming*, &c. ; Peshawur, *Vicary*, &c. WESTERN TIBET, *Falconer*.—DISTRIB. Beluchistan, Turkestan, and westward to the Levant.

Suffruticose below ; branches rigid, 8-18 in., few flowered. *Leaves* rigid, acute, cauline usually shorter than the joints. *Bracts* $\frac{1}{2}$ - $\frac{3}{4}$ the length of the calyx, acute or cuspidate. *Petals* white, sweet-scented, segments capillary.

D. barbatus, Linn., is enumerated by Royle, together with *D. caucasicus*, Sims, but both are unknown to us as Indian plants.

2. **TUNICA**, Scopoli.

Annual or perennial slender herbs. *Calyx* tubular, 5- (15-) toothed, with or without imbricate bracts. *Petals* 5, clawed, gradually widening into the entire or emarginate limb. *Stamens* 10. *Torus* small. *Ovary* 1-celled ; styles 2 ; ovules numerous. *Capsule* oblong, dehiscing by 4 teeth, many-seeded. *Seeds* discoid or orbicular, peltate ; embryo straight.—DISTRIB. About 10 species, chiefly South European and West Asiatic.

1. **T. stricta**, Bunge; Boiss. *Fl. Orient.* i. 521; annual, erect, leaves linear-spathulate, margins scabrous, cauline linear, flowers subsolitary ebracteate, calyx 5-ribbed. *Ledeb. Ic. Fl. Ross.* t. 5.

KASHMIR, Falconer, &c.—DISTRIB. Soongaria, Altai, Persia, Asia Minor.

Glabrous, 12-18 in., branched from the base. *Radical leaves* $\frac{1}{4}$ - $\frac{1}{2}$ in., many, short cymes strict, and their branches slender quite erect. *Flowers* $\frac{1}{4}$ in. long; pedicels often exceeding the glabrous turbinate calyx. *Petals* white, linear-oblong, entire. *Seeds* boat-shaped, wrinkled on the edges and keel.

3. **ACANTHOPHYLLUM**, C. A. Meyer.

Perennial, densely tufted acerose or spiny-leaved herbs or shrubs. *Flowers* solitary or in paniced or fascicled cymes, the lateral or all with 2-6 bracts. *Calyx* tubular or turbinate, 5-toothed or lobed, 5-15-nerved. *Petals* 5, exserted, narrow, spathulate; claw long, widening into the entire or notched limb. *Stamens* 10. *Disk* short or produced into a short gynophore. *Ovary* 1-celled, 4-10-ovuled; styles 2. *Capsule* ovoid or oblong, indehiscent or with 4 small teeth, 1-2-seeded. *Seeds* subreniform, laterally compressed, hilum marginal; embryo annular.—DISTRIB. About 17 species; natives of Western and Central Asia, most numerous in Afghanistan.

1. **A. macrodon**, Edgew.; hoary, leaves spinous, flowers solitary, bracts 4 linear with scarious margins.

Wazaristan in the PUNJAB, Stewart.—DISTRIB. Afghanistan, Griffith.

A tufted excessively spinous herb, minutely pubescent. *Leaves* horizontal, $\frac{1}{4}$ - $\frac{1}{2}$ in., rigid with acerose tips, pale green, flat above, convex on the back, $\frac{1}{8}$ - $\frac{1}{2}$ in. diam. at the base. *Flowers* rosy, $\frac{1}{2}$ in. long, terminal; bracts squarrose, pungent, recurved, reaching as high as the calyx-lobes. *Calyx* cylindric, hoary, lobes subulate-lanceolate, recurved, acerose, with very narrow scarious edges. *Petals* narrow.

4. **GYPSOPHILA**, Linn.

Perennial or annual, often glaucous herbs, rarely shrubby. *Leaves* usually flat, very rarely subulate. *Flowers* in paniced cymes, rarely solitary in the forks. *Calyx* turbinate tubular or campanulate, 5-toothed or -lobed, with 5 broad green nerves and membranous interspaces. *Petals* 5, claw narrow; limb entire or notched, without (rarely with) a scale. *Disk* small. *Ovary* 1-celled; styles 2 (rarely 3); ovules many. *Capsule* 4-valved to or below the middle, few- or many-seeded. *Seeds* subreniform, hilum lateral; embryo annular.—DISTRIB. Species about 50, European and W. Asiatic.

SECT. I. **Pseudacanthophyllum**. Undershrubs. *Leaves* pungent or acerose. *Calyx* ovoid or oblong-campanulate.

1. **G. Stewartii**, Thoms.; puberulous, leaves $\frac{1}{4}$ in. subulate acerose, convex beneath, flowers subcapitate, bracts equalling the calyx-tube.

Wazaristan in the PUNJAB, alt. 3-4000 ft., Stewart.—DISTRIB. Afghanistan (Turuk valley).

A small green densely tufted spinous perennial. *Leaves* spreading, flat above, points glabrous polished. *Cymes* on short peduncles, 8-15-flowered; bracts narrow-subulate. *Calyx* $\frac{1}{4}$ in., ovoid, glabrous, 5-ribbed; teeth long, slender, subulate. *Petals* half as long again as the calyx; blade pink, linear-oblong.—Closely allied to *G. erinacea*, Boiss. (of Afghanistan), but much smaller, with crowded flowers, and glabrous calyces with longer subulate teeth.

SECT. II. **Heterochroa**. Herbs. *Leaves* flat. *Calyx* campanulate 5-fid.

2. **G. sedifolia**, Kurz. in *Flora*, 1872, 285; perennial, tufted, hoary all over, leaves linear obtuse, cymes capitate. G. Tibetica, H. f. & T. *Herb. Ind. Or.*

WESTERN TIBET, Zanskar and Dras, alt. 9–13,000 ft., Thomson.

Root very stout, woody, with very many short tufted pointed decumbent branches. Stems pale. Leaves fascicled, $\frac{1}{4}$ in., nerveless, rather thick, pruinose. Heads of cymes $\frac{1}{4}$ – $\frac{1}{2}$ in., on elongated branches 1–3 in. diam.; bracts linear, obtuse. Calyx $\frac{1}{2}$ in., 5-lobed, teeth obtuse, margins scarious. Capsule not exceeding the calyx. Seeds cochleate.

3. **G. cerastioides**, Don *Prodr.* 213; perennial, hoary-pubescent, branches many decumbent, leaves obovate-spathulate, cymes lax. *Acosmia rupestris*, Benth. in Wall. *Cat.* 644; *Camb. in Jacq. Voy. Bot.* 26, t. 28. *Timæosia rupestris*, Klotzsch in Bot. Reis. Pr. Waldem. 138, t. 33 (styles 3).

TEMPERATE HIMALAYA from Kashmir and Kunawar to Sikkim, alt. 6–12,000 ft.

Very variable in size; branches 4–10 in. Leaves $\frac{1}{2}$ –2 by $\frac{1}{4}$ – $\frac{3}{4}$ in., radical petioled, cauline sessile, all ciliate. Cymes usually lax, with leafy bracts. Flowers sessile or pedicelled, very variable in size, $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. Calyx $\frac{1}{4}$ in., campanulate, pubescent; lobes obtuse, strongly ciliate with curved hairs. Petals lilac, spathulate, 3-nerved. Styles 2–3. Seeds broad, black, tubercled.

5. **SAPONARIA**, Linn.

Annual or perennial herbs. Leaves flat. Flowers in dichotomous cymes. Calyx more or less tubular, ovoid or oblong, 5-toothed, nerves obscure. Petals 5, clawed; limb entire or notched, with or without a basal scale. Stamens 10. Disk small, or produced into a gynophore. Ovary 1-celled, or imperfectly 2–3-celled; styles 2, rarely 3; ovules many. Capsule ovoid or oblong, rarely subglobose, 4-toothed. Seeds reniform or subglobose, hilum marginal; embryo annular.—DISTRIB. Species about 30, chiefly Mediterranean and W. Asiatic.

1. **S. Vaccaria**, Linn.; radical leaves oblong, cauline sessile, base rounded or cordate, calyx-teeth triangular margins scarious, petals short erose. Wall. *Cat.* 1503. *S. Vaccaria and oxyodonta*, Boiss. *Fl. Orient.* i. 525. *S. perfoliata*, Roxb. *Fl. Ind.* ii. 445. *Gypsophila Vaccaria*, W. & A. *Prodr.* 42.

In wheatfields throughout INDIA, and in TIBET.—DISTRIB. A weed of cultivation.

A tall, robust, simple or sparingly branched perfectly glabrous annual, 12–24 in. high. Leaves 1–3 by $\frac{1}{2}$ – $\frac{3}{4}$ in., acute, cauline linear-oblong. Cymes corymbose, many-flowered. Flowers erect; pedicels slender. Calyx $\frac{1}{4}$ in., with 5 broad green nerves, ventricose in fruit. Petals rosy, obovate. Capsule included, broadly ovoid. Seeds large, globose, black, granulate.

6. **SILENE**, Linn.

Annual or perennial herbs. Flowers solitary or cymose, often secund on the branches of the cyme. Calyx more or less inflated, ovoid campanulate clavate or tubular, 5-toothed or cleft, 10- rarely many-nerved. Petals 5; claw narrow; limb entire bifid or lacinate, usually with two basal scales. Stamens 10, 5 usually adnate to the petals. Disk usually produced into a long gynophore. Ovary incompletely 3- (rarely 1-) celled; styles 3 (rarely 5); ovules numerous. Capsule 3–6-toothed or valved. Seeds reniform, usually tubercled, hilum marginal; embryo annular.—DISTRIB. Species about 250, chiefly natives of temperate Europe and Asia.

The following escapes from cultivation occur in Indian collections.

S. Armeria, L. in the Nilgherries and Canara (Plant. Hohenack. No. 615).—*S. noctiflora*, L. (Wall. Cat. 624, from Herb. Wight., without habitat).—*S. colorata*, Poiret; (*S. intrusa*, W. & A. Prodr. 42; Wight Ill. i. t. 26); Nilghiris and Garwhal.

SUBGEN. I. **Behen**. *Petals* imbricate in bud. *Calyx* usually inflated, 10- or 20-nerved, reticulately veined.

1. ***S. inflata***, Smith: glaucous, cymes many-flowered, bracts scarious, calyx 20-nerved, petals deeply cloven. Wall. Cat. 623; Boiss. Fl. Orient. i. 628. *S. Wallichiana*, Klotzsch in Bot. Reis. Pr. Waldem. 139, t. 30. *S. Cucubalus*, Wib. in Rohrb. Monog. *Silene*, 84. *Cucubalus Behen*, Linn.

TEMPERATE HIMALAYA, elev. 5-11,500 ft., from Nipal to the Indus.—DISTRIB. Temperate Asia, Europe, and N. Africa.

Perennial, 2-5 ft., erect or ascending, glabrous or pubescent. Leaves 1-3 in., ovate obovate or oblong, cauline sessile; margins denticulate. Flower $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., drooping white. Calyx ovoid, base intruded, teeth broadly triangular. Petals white, with two gibbosities in the place of scales. Capsule globose, gynophore short. Seeds concave in front, convex on the base, tubercled in lines.

SUBGEN. II. ***Silene proper***. *Petals* contorted in æstivation. *Calyx* with 10 anastomosing nerves, or 20, 30, or 60 simple nerves, not reticulately veined.

SECT. I. **Conosilene**. *Calyx* 20-, 30-, or 60-nerved, in fruit conical from a broad base.—Annuals.

2. ***S. conoidea***, Linn.; glandular-pubescent, cauline leaves oblong or lanceolate acute, flowers panicle, calyx-base intruded, teeth subulate-lanceolate, $\frac{1}{2}$ its length, petals obovate, capsules ovoid contracted above sessile. Boiss. Fl. Orient. i. 580; Wall. Cat. 625.

WESTERN HIMALAYA; from Kumaon to the Indus, alt. 1-8000 ft.; and from Oude to the PANJAB, in the plains. WEST TIBET; Ladak, alt. 8-11,000 ft.—DISTRIB. Westward to the Atlantic ocean.

Erect, 6-18 in., dichotomously branched. Leaves 2-4 in., radical spatulate, cauline sometimes very narrow, sessile. Calyx 1 in. inflated in fruit. Petals pink, small, entire or erose; claw auricled; scales 2. Capsule crustaceous, shining. Seeds cochleate, with 5 dorsal and as many lateral rows of tubercles.

SECT. II. **Scorpioides**. *Calyx* 10-nerved.—Annuals (the Indian species). Flowers in unilateral racemes.

3. ***S. gallica***, Linn.; annual, laxly pilose, glandular above, cauline leaves linear-oblong or spatulate, cyme simple, flowers unilateral, calyx-base rounded, teeth subulate-lanceolate $\frac{1}{2}$ its length, capsule subsessile ovoid. Boiss. Fl. Orient. i. 590.

GARHWAL, Falconer; CARNATIC, Wight:—an introduced weed.—DISTRIB. A weed of cultivation.

Erect, 8-18 in., clothed especially above with spreading hairs. Leaves $\frac{3}{4}$ -1 $\frac{1}{2}$ in. Racemes many-flowered. Flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. long, second, lower pedicelled, upper sessile. Calyx ovoid, 10-striate, contracted above. Petals small, red (or white), emarginate; scales 2. Filaments villous below. Seeds minute, striate-tuberculate, not grooved, face flat with an ear-shaped depression.

3. ***S. apetala***, Willd. Sp. Pl. ii. 307; annual, hoary-pubescent, cauline leaves linear-oblong, flowers subracemose, calyx campanulate, base obconic, teeth short lanceolate acute, margins scarious, petals included, capsule globose, shortly stipitate. Boiss. Fl. Orient. i. 596.

PANJAB; Peshawur, *Vicary, Stewart*.—DISTRIB. Westwards to Spain.

Stem 6–24 in., simple or branched. *Leaves* 1–1½ in., acuminate, ciliolate. *Cymes* irregular, loosely racemose; peduncles exceeding the calyx; bracts acute. *Calyx* 1–½ in.; with broad green hairy nerves; teeth short. *Petals* 0, or minute, spatulate. bright red. *Seeds* flat, channelled, with a double corrugated margin.

SECT. III. **Auricularia.** *Calyx* 10-nerved, contracted towards the base. *Petals* with the claw toothed or auricled on both sides.—Perennials. Flowers solitary or in few-flowered elongate paniced cymes.

4. **S. Moorcroftiana**, *Wall. Cat.* 626; perennial, finely pubescent, cauline leaves linear or linear-lanceolate, flowers 1–3 terminal or subterminal, calyx tubular-clavate viscid, base intruded, teeth short obtuse with scarious margins, capsule ovoid shorter than the gynophore. *Benth. in Royle Ill.* 79; *Rohrb. Monog. Silene*, 129.

WESTERN HIMALAYA, alt. 10–13,000 ft.; from Garwhal to Kashmir. WESTERN TIBET, alt. 9–16,000 ft.—DISTRIB. Afghanistan.

Stems many from a woody stock, densely tufted; flowering branches erect, 6–18 in., slender, simple or dichotomous at the top. *Radical leaves* spatulate-lanceolate, acute; cauline shorter, acuminate acute or obtuse. *Flowers* erect. *Calyx* 1–1½ in., slender below the middle; nerves 10, dark. *Petals* exserted, claw auricled with a long acute tooth; limb 2-partite, segments ligulate, dirty red or white, involute when withering, scales 2, long. *Capsule* with the gynophore as long as itself. *Seeds* compressed, not channelled, with 5 rows of dorsal and as many lateral tubercles.

VAR. 1. taller, more slender, 2–3-flowered.—Tibet.

VAR. 2. dwarf, leaves linear, pedicels longer than the bracts.

5. **S. arenosa**, *C. Koch. in Linnæa*, xv. 711; annual, slender, glaucous, viscid above, leaves narrow, margins revolute, flowers in sparse much-divaricating cymes, calyx clavate, base intruded, teeth lanceolate-ciliate, capsule oblong equalling the gynophore. *S. leyseroides* and *S. salsa*, *Boiss. Fl. Orient.* i. 603.

WESTERN PANJAB, common at Peshawur, Attock, &c. *Vicary, Stewart*.—DISTRIB. Afghanistan, Persia, Armenia.

Very slender, excessively branched from the base, minutely pubescent, glandular above. *Leaves* shorter than the internodes, ¾–1½ in., rigid, acuminate. *Flowers* erect or inclined; pedicels ¼–1 in., capillary. *Calyx* ½–¾ in., slender, 10-ribbed; teeth with scarious margins. *Petals* with an oblong 2-fid blade, lobes linear, claw auricled; scales 2, small, lanceolate.—Flowers open at night.

6. **S. tenuis**, *Willd.*; perennial, glabrous or viscid, leaves narrow linear or lanceolate, flowers in short racemes, calyx campanulate, base rounded or truncate, teeth obtuse, petals 2-partite auricled, capsule oblong, gynophore short. *Rohrb. Monog. Silene*, 186. *S. graminifolia*, *Oth. in DC. Prodr.* i. 368, not of *Ledeb.* *S. Gul-Waldemarii*, *Klotzsch Bot. Reis. Pr. Waldem.* 140, t. 31. *S. repens*, *Boiss. Fl. Orient.* i. 614 (? of *Patrin*): *Ledeb. Ic. Fl. Ross.* t. 425. *S. anæna*, *Linn. Sp. Pl. ed. 1* (not of *ed. 2*).

WESTERN HIMALAYA, alt. 8–12,000 ft., from Kunawar to Kashmir, *Jacquemont*. WESTERN TIBET, *Falconer*.—DISTRIB. Northern and Arctic Asia.

Stems many from the root, erect or ascending, 4–18 in., slender, simple, naked when tall. *Leaves* 1–3 in., acute or acuminate, often oiliate, flat, radical slightly dilated upwards. *Flowers* often whorled, sometimes secund, inclined or nodding; pedicels ¼–½ in.; bracts short, whorled, subulate. *Calyx* ¾–1 in.; membranous, 10-nerved, teeth spreading. *Petals* dirty-yellow or brown; scales short, oblong; claw ciliate. *Capsule* twice the length of the gynophore. *Seeds* with 5 dorsal and as many lateral rows of tubercles.

VAR. *dasyphylla*, *Turcz. Fl. Baic. Dah.* i. 207 (sp.), densely pubescent, leaves more coriaceous not ciliate. *Lahul, Jæschke*.

SECT. IV. **Otites**. *Calyx* 10-nerved, cylindric or contracted towards the base. *Petals* not auricled at the sides, with or without scales at the top of the claw.—Perennials. Flowers in opposite panicle or racemed cymes.

7. **S. Falconeriana**, Benth. in Royle Ill. 79, t. 20; perennial, stout, erect, pubescent below, leaves linear-lanceolate serrulate-ciliate, flowers in short uniform opposite cymes, calyx cylindric narrow, base intruded, teeth short obtuse, petals very narrow spathulate, tip rounded or notched, capsule ovoid longer than the gynophore. *Rohrb. Monog. Silene*, 202.

WESTERN HIMALAYA, from Kumaon to Kunawar, alt. 3–9000 feet, Royle, &c.

Stems 1–2 ft., several from the woody stalk, simple or branched, closely pubescent below. *Leaves* $1\frac{1}{2}$ – $2\frac{1}{2}$ in., narrow, pubescent or glabrous on both surfaces. *Inflorescence* 1– $1\frac{1}{2}$ ft. long, lax, of opposite or whorled cymes or branched racemes. *Flowers* erect or inclined; pedicels slender; bracts minute. *Calyx* $\frac{1}{2}$ in., slightly dilated upwards in flower, much so in fruit, membranous, nerves 10, green; teeth not margined with white; base truncate. *Petals* white, without scales or auricles. *Capsules* ovoid, twice or thrice the length of the gynophore. *Seeds* minute, granulate, sides flat or convex, back channelled.

8. **S. Griffithii**, Boiss. Fl. Orient. i. 637; perennial, robust, densely pubescent, tomentose or villous, leaves oblong or ovate-lanceolate, radical petioled, flowers in opposite few-flowered cymes, calyx cylindric, teeth acute, base rounded or truncate, petals 2-partite, lobes 3–6-fid, scales 0, capsule oblong, gynophore short. *S. Webbiana*, Wall. Cat. 627. *S. multifida*, Edgew. in Trans. Linn. Soc. xx. 34. *Carpophora Hoffmeisteri*, Klotzsch in Bot. Reise Pr. Wald. 139, t. 32. *S. viscosa*, Pers.; Benth. in Royle Ill. 79. *Mcandryum Griffithii*, Rohrb. in Linnæa, xxxvi. 248; *Monog. Silene*, 232. *S. viscosa* lusulus 3, and β suaveolens, Kar. & Kir. (sp.), Rohrb. Monog. Silene, 205.

WESTERN HIMALAYA, from Garwhal to Cabul and Kishtwar, alt. 7–11,000 ft.—DISTRIB. Afghanistan, Soongaria.

Very variable in pubescence, from hoary to almost woolly. *Stems* 12–18 in., simple or divided, very robust. *Leaves* $2\frac{1}{2}$ –4 by $\frac{3}{4}$ – $1\frac{1}{2}$ in., radical spathulate-lanceolate, narrowed into a broad petiole; cauline sessile, sometimes cordate at the base, more or less pubescent on both surfaces. *Flowers* in opposite irregularly 3-flowered cymes, shortly pedicelled. *Calyx* $\frac{3}{4}$ –1 in., glandular, hardly dilated above except in fruit, teeth not margined with white, nerves 10, green. *Petals* more or less laciniate, without scales or auricles. *Petals* white. *Capsule* four times as long as the gynophore. *Seeds* immature, apparently like those of *S. Falconeriana*.—Very closely allied to *S. viscosa*, L., with which it is united by Benth and Rohrbach.

9. **S. kunawarensis**, Benth. in Royle Ill. 79; perennial, puberulous or quite glabrous, slender, leaves narrow-spathulate or lanceolate, flowers in opposite distant pairs or cymes, pedicels slender, calyx glabrous cylindric or subclavate, base intruded, teeth short obtuse with scarious margins, petals deeply 2-fid, scales oblong, capsule ovoid twice as long as the gynophore.

WESTERN HIMALAYA, in the Tibetan regions of Kunawar and Piti, alt. 10,000 ft., Royle, Jacquemont, &c.

Branches tufted from a prostrate stock; flowering ones slender, 6–12 in., usually glabrous above. *Leaves* 1– $1\frac{1}{2}$ in., very narrow, minutely pubescent on both surfaces. *Flowers* rather few and scattered, nodding, pedicels slender, equalling the calyx. *Calyx* $\frac{1}{2}$ – $\frac{3}{4}$ in., membranous, quite glabrous or the teeth pubescent, clavate in fruit, 10-nerved. *Petals* with 2 linear-oblong scales and no auricles. *Capsule* pale. *Seeds* dorsally channelled, sides nearly flat, hardly tubercled.

10. **S. Webbiana**, Wall. Cat. 627; tall, slender, minutely pubescent, cauline leaves broadly ovate-cordate amplexicaul acuminate 5–9-nerved,

cymes lax opposite long-peduncled, calyx glandular cylindric, teeth lanceolate-subulate, base truncate intruded, capsule narrow oblong, rather longer than the gynophore. *S. viridiflora*, var. *Rohrb. Monog. Silene*, 215.

WESTERN HIMALAYA, Sirmur, *Webb*.

We have seen but one specimen, itself a fragment, 16 in. tall, of what is evidently a tall spare lax-flowered species of a plant resembling closely *S. viridiflora*, Linn.—*Leaves* 1½ in. broad, puberulous on both surfaces. Branches of panicle (peduncles of cymes) 3–6 in., terminated by two ovate foliaceous bracts. *Flowers* drooping; pedicels ½–¾ in., densely tomentose. *Calyx* ¾ in., very slender, 10-nerved, ventricose in fruit; teeth with scarious edges. *Petals* long, greenish-white; limb bifid, lobes ligulate; scales 2. *Filaments* glabrous. *Ovary* cylindric, top globose; styles 3. *Capsule* immature, cylindric-oblong.

SECT. V. **Cucubaloideæ.** *Calyx* cylindric, rounded at the base, pale, membranous. *Petals* without auricles at the sides.—Scandent or subscandent slender lax perennials. *Flowers* in very lax few-flowered paniced cymes.

11. **S. ? Stracheyi**, *Edgew.*; glabrous, flaccid, subscandent, leaves petioled lanceolate acuminate membranous, cymes 3-flowered bracteate, calyx membranous, teeth broad with orbicular tips, capsule half the length of the gynophore.

TEMPERATE HIMALAYA, Piti river, Kumaon, alt. 7500 ft., *Strach. & Winterb.* Sikkim in woods, Lachen river, alt. 9–10,000 ft., *J. D. H.*

Habit and foliage of *Cucubalus baccifer*, but glabrous or nearly so, leaves longer petioled. *Calyx* cylindric, and ovary with a very long gynophore and 5-lobed callous tip, indicating a 5-valved dehiscence.—*Stems* shining. *Leaves* 2–2½ by ½–¾ in., ciliolate, with an intramarginal nerve. *Pedicels* ½–1 in., very slender, minutely pubescent. *Calyx* ¾ in., pale, with 10 green nerves and anastomosing veins between them above; teeth hyaline, contracted below the orbicular ciliolate tips. *Petals* white, very narrow; claw not auricled; limb retuse or 2-lobed. *Filaments* glabrous; anthers short, didymous.—An exceedingly curious plant, intermediate between *Silene* and *Cucubalus*, perhaps better referred to the latter genus.

12. **S. khasiana**, *Rohrb. in Linnæa*, xxxvi. 259; glandular pubescent above, subscandent, leaves sessile ovate acuminate, flowers solitary and in terminal 2–3-flowered bracteate cymes, calyx shortly cylindric, teeth broad acute, base rounded, capsule oblong, gynophore very short.

KHASIA MTS., at Molim and Moflong, alt. 5–6000 ft., *H. f. & T.*

A straggling brittle hardly flaccid herb, with rather robust branches. *Leaves* 1–2 in., not membranous, 3–5-nerved at the base, paler beneath, glabrous or sparsely pubescent, ciliolate. *Flowers* erect; pedicels ½–1 in., strict. *Calyx* ½ in., with 10 broad nerves and no veins. *Petals* pale pink; claw cuneate; limb 2-partite, obtuse; scales small. *Filaments* glabrous; anthers didymous. *Capsule* broad, with very small teeth. *Seeds* dorsally rounded, sides convex striate-tuberculate.

7. CUCUBALUS, Linn.

A diffuse subscandent herb. *Leaves* ovate-lanceolate. *Flowers* in 1–3-flowered leafy cymes or solitary in the forks of the branches. *Calyx* broadly campanulate, 10-nerved, 5-toothed. *Petals* 5; claw narrow toothed at the top; limb 2-fid with 2 scales at its base. *Stamens* 10. *Disk* produced into a short gynophore. *Ovary* 1-celled, 3-septate at the base; styles 3; ovules many. *Fruit* globose, tip crowned with an entire callus, shining, dry or fleshy, at length fragile and bursting irregularly. *Seeds* reniform, shining; hilum lateral; embryo annular.

1. **C. bacciferus**, Linn.; Boiss. *Fl. Orient.* i. 657.

TEMPERATE HIMALAYA, from Kashmir, alt. 5-8000 ft. to Sikkim, alt. 8-12,000 ft. KHASIA MTS., at the Boga Pani, alt. 5000 ft., *H. f. & T.*—DISTRIB. Westwards to South Europe; W. Siberia.

A rambling herb, more or less pubescent with curly white hairs. *Leaves* 1-2 by $\frac{3}{4}$ -1 in., membranous, ciliate, narrowed into the petiole, upper sessile. *Flowers* drooping; pedicel $\frac{3}{4}$ -1 in., tomentose. *Calyx* $\frac{1}{2}$ in., base rounded; teeth large, broad, subacute, ciliate; nerves obscure, veins reticulate. *Petals* greenish-white, 2-lobed. *Anthers* didymous. *Fruit* the size of a pea, black.

8. **LYCHNIS**, Linn.

Herbs, with the habit of *Silene*, but capsule 1-celled, and styles usually 5 (3-5).—DISTRIB. Species about 30, natives of Arctic and Temperate northern regions, and of the Andes of S. America.

The following species of *Lychnis* are, with the exception of *L. Coronaria*, extremely difficult to limit, the characters of habit, nervation of the calyx, form and division of the petals, and superficial markings of the seed, being all very variable. The division into winged- and wingless-seeded is far from good; the contrast between the reniform granulate, and the angled and winged seeds, is indeed strong, but analogy with other genera would suggest, that some of the wingless species are but forms of winged ones. We cannot follow Rohrbach and others in separating *Melandryum* from *Lychnis* proper; the capsule dehiscing variously in the same species, and several true *Melandrya* having crested seeds.

SECT. I. **Pseudagrostemma**. *Petals* with stiff 2-toothed scales at the claw. *Capsule* 5-valved, valves quite entire.

1. **L. Coronaria**, Lamk.; uniformly softly tomentose with silky white wool. Boiss. *Fl. Orient.* i. 658.

KASHMIR VALLEY, abundant in groves and fields, Jacquemont, &c.—DISTRIB. W. Asia, S. Europe.

Stem 1-2 ft., sparingly branched. *Leaves* 3-5 in., spatulate-lanceolate, cauline oblong. *Flowers* on long pedicels. *Calyx* $\frac{3}{4}$ -1 in., turbinate, 10-nerved; teeth contorted to the left. *Petals* 1 in. and upwards, broadly obcordate, red purple. *Capsule* subsessile, included. *Seeds* biconvex, equally striate-tuberculate.

SECT. II. **Melandryum**. *Petals* with membranous scales. *Capsule* 4-5-valved, valves entire or 2-fid.

* *Stem* scape-like, 1- rarely 2-3-flowered. *Seeds* compressed or angled, winged, not granulate or tubercled; wing thick or inflated.

2. **L. apetalá**, Linn.; stem short glandular-pubescent 1- rarely 2-3-flowered, calyx inflated subglobose with broad purple-brown nerves, petals with a very short emarginate or bifid limb, carpophore very short or 0. *Melandryum apetalum*, Rohrb. in *Linnaea*, xxxvi. 217. M. Falconeri, Rohrb. l.c. 220.

ALPINE HIMALAYA and TIBET, alt. 12-17,000 ft.; and to 18,000 ft. in Sikkim.—DISTRIB. Arctic regions, mountains of N. Europe, Asia, and America.

Stems tufted, 2-6 in., often curved. *Leaves* radical linear-lanceolate or spatulate, obtuse or acute; cauline 1-2 pair. *Flowers* nodding. *Calyx* $\frac{1}{2}$ - $\frac{3}{4}$ in long, mouth contracted, more open in fruit, membranous, pale between the broad dark nerves, which are variable in disposition, simple or sparingly branched, the secondary free or uniting with the primary in the short broad calyx-teeth. *Petals* excessively variable in length and breadth and in the subentire crenate or lobed scales, purplish. *Capsule* turgid; valves

bifid, erect or recurved; carpophore glabrous or tomentose, always very short. *Seeds* very variable, $\frac{1}{8}$ – $\frac{1}{5}$ in. diam., with a narrow or broad wing.—I cannot distinguish *L. Falconeri*, Rohr., even as a permanent variety; it is characterized as having a more open calyx in fruit.

VAR. pallida, stems usually 2-flowered, calyx very pale with green undefined veins.—Western Tibet, *Falconer*, *Henderson*.

3. *L. nigrescens*, Edgew.; stem simple glandular-pubescent 1-flowered, calyx inflated subglobose with broad purple-brown nerves, petals with a short retuse limb, carpophore $\frac{1}{6}$ – $\frac{1}{4}$ the length of the capsule brown-tomentose. *L. tristis*, *Herb. Ind. Or. H. f. & T.* *Melandryum macrorrhizum*, *Rohrb. in Linnæa*, xxxvi. 228, *not of Royle*.

ALPINE SIKKIM HIMALAYA, alt. 11–16,000 ft., *J. D. H.*

Similar in many respects to *L. apetalata*, but stem more leafy, calyx larger and more inflated, almost $\frac{3}{8}$ in. diam., with broader more membranous-edged teeth, and a very different carpophore. The nerves of the calyx are simple and free in all the specimens, and the seeds are like those of the rather narrow-winged forms of *L. apetalata*.—Rohrbach is certainly in error in describing this as wingless-seeded, and in referring it to Royle's *L. macrorrhiza*.

4. *L. himalayensis*, Edgew.; stem very slender elongate 1–3-flowered minutely pubescent, leaves usually very slender, calyx broadly oblong with slender black-purple nerves, petals with a very small blade, carpophore very short pubescent or 0, seeds angular very small narrowly-winged. *L. apetalata*, *var. himalayensis*, *Rohrb. in Linnæa*, xxxvi. 22. *L. apetalata*, *var. gracilis*, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 11–14,000 ft., *J. D. H.* WESTERN TIBET; *Falconer*; *Sassar*, alt. 15–17,000 ft., *T. T.*

Probably only a slender form of *L. apetalata*, but easily distinguished by its size (8–16 in.), slenderness, long narrow leaves, narrower smaller calyx $\frac{1}{2}$ – $\frac{3}{4}$ in. long, with usually more slender and free veins, which however sometimes unite in the teeth, and small seeds which are pale in Thomson's specimens, black in Hooker's and Falconer's.

** Seeds turgid, reniform, wingless, granulate tubercled or echinulate.

† Stem short, single- rarely 2-flowered.

5. *L. macrorrhiza*, Royle; Benth. in Royle Ill. 80 (not of Rohrb.); stem short simple 1-flowered and leaves closely glandular-pubescent, leaves obovate-spathulate, calyx broadly oblong inflated pale, nerves faint free or united in the calyx-teeth, petals short, carpophore stout brown-tomentose. *L. madens*, *Jacq. mss.*

ALPINE WESTERN HIMALAYA, and WESTERN TIBET; *Kunawar*, *Royle*, *Jacquemont*; *Parang Pass*, alt. 15–16,000 ft., *T. T.*; *Topi dhunga*, alt. 15,000 ft., *Strach. & Winterb.*

Whole plant 4–6 in., resembling *L. apetalata*, but leaves broader and more densely pubescent, pale, obtuse or subacute. Calyx $\frac{1}{2}$ – $\frac{3}{4}$ in. Petals apparently deep purple; limb short, 2-fid. Seeds pale chestnut, absolutely wingless, minutely granulate concentrically, back rounded.—Royle's specimens are very imperfect, but I think referable to this.

†† Stem elongate, simple or branched; leaves narrow, linear-lanceolate (rarely ovate in *L. Cachemiriana*).

6. *L. brachypetala*, Hort. Berol.; stem 1–2 ft. slender hoary simple few or many-flowered, leaves very narrow grass-like glabrous or minutely pubescent, flowers nodding opposite or in short few-flowered opposite cymes, calyx ovoid pale with 10 dark or green simple free or connected nerves, petals very short pale 2-partite, carpophore short glabrous or pubescent or 0, seeds

reniform dark granulate. *Melandryum brachypetalum*, *Fenzl in Led. Fl. Ross*, i. 326. *Var. tibetanum*, *Rohrb. in Linnæa*, xxxvi. 232.

ALPINE HIMALAYA; from Sikkim, alt. 12-15,000 ft., *J. D. H.*, to Kinnawar, *Jacquemont*; and WESTERN TIBET, alt. 10-15,000 ft., *Str. & Winterb.*, *Thomson*, &c.—DISTRIB. Siberia, Daluria, Mongolia.

Stems strict, very rarely divided except at the base. *Leaves* 2-5 in., rarely $\frac{1}{2}$ in. broad. *Flowers* often in distant pairs towards the top of the stem; pedicel strict, 2-bracteolate. *Calyx* $\frac{1}{2}$ in. long, pale with dark or green nerves, which are very variable; teeth spreading in fruit. *Petals* pale-red or dirty white, included or slightly exserted; claw glabrous or ciliate, obtusely auricled. *Seeds* minute. *Capsule* with simple or 2-fid teeth.—The nerves of the calyx are sometimes united at the tips, at others free; at times simple, and again the secondaries branch and unite with the primaries.

7. ***L. multicaulis***, *Wall. Cat.* 622; stems 2-3 ft. strict laxly pubescent above, leaves linear-lanceolate, glabrous or puberulous margins scaberulous, flowers very few in elongate racemes nodding, calyx oblong-campanulate, nerves green or brown united in the teeth, petals short, limb minute toothed, carpophore short pubescent or 0, seeds reniform dark granulate. *Benth. in Royle Ill.* 80. *Melandryum multicaule*, *Rohrb. in Linnæa*, xxxvi. 226.

TEMPERATE HIMALAYA; Nipal, *Wallich*; Kumaon, 10-12,000 ft., *Edgew.*; Sikkim, alt. 11,000 ft., *J. D. H.* (flower rather large, calyx green).

A much taller plant than *L. brachypetala*, inhabiting lower levels, with sparser inflorescence, longer pedicelled fewer flowers and usually broader leaves; but probably only a lowland form; also very near *L. nutans*, *Royle*. *Wallich's* and *Edgeworth's* specimens have calyces $\frac{1}{2}$ in. long, with purple nerves; the Sikkim ones have larger calyces, $\frac{1}{2}$ in. long, with broader green nerves; in both the venation is very variable. *Styles* 3-5 and capsule 5-6- or 8-10-cleft.

8. ***L. Cachemeriana***, *Royle*; *Benth. in Royle Ill.* 80; stem robust erect strict simple hoary, leaves from ovate to lanceolate scaberulous, flowers large erect or nodding in subterminal contracted cymes, calyx green oblong, teeth acute, nerves many anastomosing, claw of petals woolly, limb 2-fid, lobes cut, carpophore broad densely woolly, seeds reniform granulate. *Melandryum indicum*, *var. fimbriatum* (a form), *Rohrb. in Linnæa*, xxxvi. 235.

KASHMIR, *Royle*, &c.

An erect rigid species, with strict rarely spreading cymes. *Leaves* very variable, 2-3 by $\frac{1}{2}$ - $\frac{3}{4}$ in. *Calyx* membranous, $\frac{3}{4}$ -1 in. long, teeth acute or acuminate. *Petals* white or pale, blade about $\frac{1}{2}$ in. long. *Carpophore* about $\frac{1}{2}$ as long as the 5-fid capsule.—Probably only a form of *L. indica*, as regarded by *Rohrbach*, but the calyx-lobes are usually much more acute.

9. ***L. Stewartii***, *Edgew.*; stem short, wiry, hoary below pubescent above leafy, leaves very narrow linear spreading 1-nerved, flowers few small solitary in the upper leaf axils nodding, calyx oblong pubescent, nerves green faint free or united, teeth rounded, petals obovate with a very short 2-partite white limb, carpophore densely woolly, styles 3 very short.

WESTERN HIMALAYA; Upper Chenab and Chamba river, alt. 8-11,000 ft., *Stewart*.

A very curious little species, probably polygamo-dioecious, of which there are but scanty specimens, without seed, somewhat resembling *Stellaria graminea* in foliage, and quite unlike any other Indian species of the genus. *Stem* 4-6 in., rigid, slender, upper part and pedicels viscidly tomentose. *Leaves* 2 by $\frac{1}{8}$ - $\frac{1}{4}$ in., rigid, keeled by the solitary stout midrib, margins recurved. *Pedicels* solitary or in opposite pairs, pubescent, with two linear bracts above the middle. *Calyx* $\frac{1}{2}$ in. long, membranous, pubescent, teeth scarious, edges with long curled cilia. *Petals* with the claw very

broad, auricled, exceeding the calyx; limb small, recurved; appendages notched. Capsule exceeding the calyx, 10-cleft.

+++ *Stem elongate, usually laxly dichotomously branched (simple in L. inflata). Leaves ovate elliptic or lanceolate.*

10. **L. inflata**, Wall. Cat. n. 618; minutely pubescent, stem simple erect 1-3-flowered leafy, leaves elliptic or lanceolate lower petioled, flowers large terminal drooping, calyx very inflated pale with dark brown nerves, teeth rounded, petals with a broad claw 2 large appendages and a short rounded limb, carpophore short woolly, seeds reniform compressed, back furnished with rows of long soft setæ. *Benth. in Royle Ill.* 80. *Melandryum inflatum*, Rohrb. in *Linnaea* xxxvi. 225. *Agrostemma inflata*, Don Gen. Syst. i. 417.

WESTERN TEMPERATE HIMALAYA; Kumaon, *Blinkworth*.

Stem rather stout, 10-16 in., glandular-pubescent above, nodes swollen. *Leaves* 1½-2½ by ¾-¾ in., acute or acuminate. *Pedicels* slender, ebracteolate. *Calyx* ¾ in. long, nearly as broad, membranous; nerves free or uniting in or below the broad hyaline rounded teeth, which are not ciliate.—A very curious and distinct form, the seeds of which are quite peculiar. It is singular that it should have escaped the notice of all collectors in Kumaon since the days of Blinkworth, the first explorer of the Flora of that region.

11. **L. indica**, *Benth. in Royle Ill.* 81; finely-pubescent, stem leafy diffusely dichotomously branched, leaves elliptic or ovate-lanceolate or orbicular, panicle lax many-flowered, calyx oblong inflated, nerves green or brown, lobes short rounded, carpophore short broad pubescent, petals with a 2-fid or fimbriate limb, seeds reniform granulate.

TEMPERATE HIMALAYA, alt. 5500-10,000 ft., from Nipal to Marri.

A tall dichotomously branched spreading weak herb, 2-3 ft. high; stem below sometimes as thick as a swan's quill. *Leaves* variable, more or less ovate-lanceolate, lower petioled, largest 4 in. long, membranous, flaccid. *Flowers* drooping when young, in open or contracted paniced glandular-hairy cymes; pedicels ebracteate. *Calyx* ½-¾ in. long, glandular-pubescent; nerves 10-15, free or combined, simple or branched; teeth broad, obtuse rarely acute. *Petals* very variable, usually white inside and purplish outside; appendages short, obtuse, often crisped. *Capsule* ovoid, teeth 5, simple or bifid. *Seeds* minute, very dark, the granulations on the back stronger than on the sides.

VAR. 1. indica proper; petals with a short 2-fid blade, lobes entire or 2-toothed, styles usually 3. *Silene indica*, Roxb. Hort. Beng. 34; Fl. Ind. ii. 447; Wall. Cat. 264 in part. *Melandryum indicum var. genuinum*, Rohrb. in *Linnaea*, xxxvi. 234.

VAR. 2. fimbriata, Wall. Cat. 619 (Sp.); petals with a longer lacerate or fimbriate blade, the lobes linear 2-fid, styles usually 5. *Benth. in Royle Ill.* 80, t. 20 B. *L. erio-stemon*, Wall. Cat. n. 620. *Melandryum indicum var. fimbriatum*, Rohrb. l.c.

12. **L. nutans**, *Benth. in Royle Ill.* 80; finely pubescent, stems diffusely dichotomously branched, leaves ovate or elliptic-lanceolate or orbicular, panicle lax few-flowered, calyx globose inflated, nerves green or brown, lobes short rounded, carpophore short pubescent or 0, petals with a short purple crenulate limb, seeds reniform granulate tubercled on the back. *Melandryum nutans*, Rohrb. in *Linnaea*, xxxvi. 229. *L. ciliata*, Wall. Cat. n. 621.

TEMPERATE HIMALAYA, from Sikkim to Kunawar, alt. 7500-11,000 ft.; Marri, alt. 10-12,000 ft.

Very closely allied to *L. indica*, but apparently a smaller plant, more flaccid, with a shorter more globose calyx, and short crenulate corolla-limb. The upper leaves are sometimes orbicular-cordate.

13. ***L. pilosa***, *Edgew. in Trans. Linn. Soc.* xx. 34; clothed especially above with long spreading flaccid hairs, stem erect or diffusely branched, leaves ovate or elliptic-lanceolate, panicle lax few-flowered, calyx oblong, nerves green, lobes short, petals with a 2-lobed limb, lobes bifid, carpophore short or long, seeds reniform, granulate on the sides, back with long processes. *Melandryum nutans* (a form), *Rohrb. in Linnæa*, xxxvi. 229.

WESTERN TEMPERATE HIMALAYA, from Garwhal to Kashmir, alt. 9–12,000 ft., *Royle, Edgeworth, &c.*

Very closely allied to *L. nutans*, if not, as Rohrbach considers, a variety of that plant; it is best distinguished by the long flaccid hairs, and echinate dorsal face of the seeds; the latter character is not a very good one, as a passage can be established between the seed of *L. indica* in which the dorsal granulations are but little larger than the lateral, through that of *L. nutans* to that of *L. pilosa*. There are two forms of this species, the original, with the calyx nearly an inch long and a long woolly carpophore; and another with smaller calyx (altogether like that of *L. nutans*), and a short carpophore. The styles are 5.

14. ***L. cancellata***, *Jacquem. mss.*; densely hoary-pubescent, stem erect, simple, leaves elliptic-lanceolate or orbicular, panicle contracted few-flowered, flowers suberect, calyx 5-lobed to below the middle viscid glandular, lobes subacute, petals with an auricled claw and short 4-fid limb, carpophore woolly, seeds granulate.

KUNAWAR, alt. 11–12,000 ft., *Jacquemont, Royle, &c.*

Erect, rather slender, covered with close-set often rather long and spreading hairs, glandular above. *Leaves* very variable, 1–2 in. long, radical petioled, cauline sessile, acute or acuminate. *Flowers* in rather distant pairs, shortly pedicelled, inclined. *Calyx* $\frac{3}{4}$ –1 in. long, subcampanulate, green, densely tomentose or woolly; nerves 10, meeting in the segments, broad, green; lobes oblong, erect or somewhat spreading, ciliate, tips often recurved. *Petals* with the claw woolly, limb about $\frac{1}{4}$ in. long; scales 2-fid. *Stamens* woolly. *Styles* 4–5.—The deeply cleft calyx is the best mark for this species, but possibly not a good one, as I observe some irregularity in the divisions, suggesting an abnormal condition of that organ.

The following Indian species of *Lychnis* contained in the Kew Herbarium are in too imperfect a condition for determination.

L. PUMILA, *Royle; Benth. in Royle Ill.* 80; *Rohrb. in Linnæa*, xxxvi. 227 (*Melandryum*).

L. CUNEIFOLIA, *Royle; Rohrb. l.c.*; a densely tomentose short large-rooted species, with spatulate leaves, in a very young state from Kunawar.

MELANDRYUM INTRUSUM, *Rohrb. in Linnæa*, xxxvi. 242, is unquestionably *Silene colorata*, an introduced plant, alluded to at p. 218.

There is a *Lychnis* in the Herbarium differing from any of the above described Indian species, in the upper leaves being linear and rounded at the tip; its flower resembles that of *L. indica*. I have seen scraps only from the Shiri Pass in Tibet, collected by Heyde, and from Dr. Stewart (locality uncertain but probably from Tibet).

9. HOLOSTEUM, Linn.

Annual glandular herbs. *Leaves* narrow. *Flowers* in terminal umbel-like cymes. *Sepals* 5. *Petals* 5, toothed or notched. *Stamens* 3–5, rarely 10. *Ovary* 1-celled; styles 3 (–5); ovules many. *Capsule* subcylindric, with twice as many short terminal valves as there are styles. *Seeds* peltate, concavo-convex, dorsally compressed, rough; embryo horse-shoe shaped.—**DISTRIB.** Species 3. Europe and W. Asia.

This genus is distinguished from *Arenaria* and *Stellaria* more by habit than by any easily defined character.

1. **H. umbellatum**, Linn.; leaves rosulate petioled elliptic-oblong. Boiss. *Fl. Orient.* i. 709.

KASHMIR, Jacquemont, &c.—DISTRIB. W. Asia, N. Africa, Europe.

Stem 4–8 in., very slender, branched below. Leaves $\frac{1}{4}$ –1 in. Flowers few, erect; pedicels $\frac{1}{2}$ in., deflexed after flowering, erect after fruiting; bracts small, membranous. Sepals white, obtuse, edges scarious. Petals rather longer, $\frac{1}{4}$ in., white or pale pink. Stamens and styles often 3 each. Capsules exceeding the sepals. Seeds black.

10. CERASTIUM, Linn.

Pubescent rarely glabrous herbs, often glandular, annual or perennial. Leaves usually small. Flowers white, in terminal dichotomous cymes. Sepals 5, rarely 4. Petals as many, rarely 0, notched or 2-fid, rarely quite entire or cut. Stamens 10, rarely 5 or fewer, hypogynous. Ovary 1-celled; styles usually 3–5; ovules many. Capsule cylindric, often curved, with twice as many short valves as styles. Seeds compressed, not arillate; embryo annular.—DISTRIB. Species about 40, all natives of temperate and cold regions.

Cerastium like *Holosteum* is with difficulty distinguished by technical characters from *Arenaria* and *Stellaria*.

SECT. I. **Dichodon**. Styles usually 3.

1. **C. trigynum**, Villars; perennial, tufted, stem procumbent with alternating hairy lines or glabrous, leaves oblong-lanceolate glabrous, cymes 1–3-flowered, bracts herbaceous with membranous edges. Boiss. *Fl. Orient.* i. 715. *Stellaria cerastioides*, Linn. *Sp. Pl.* 604. *Diplodon cerastioides*, Reichenb. *Ic. Fl. Germ.* f. 4915.

ALPINE WESTERN HIMALAYA, alt. 11–17,000 ft., from Kulu to Kashmir, and in WESTERN TIBET, Royle, Jacquemont, &c.—DISTRIB. Afghanistan, Siberia, W. Asia, Arctic regions, Alps of Europe.

Nearly glabrous. Leaves $\frac{1}{4}$ – $\frac{1}{2}$ in., distant, obtuse, often recurved. Flowers $\frac{1}{2}$ in. diam.; pedicels very slender, glandular-pubescent, fruiting reflexed. Sepals linear-oblong, spreading, 1-nerved. Petals deeply 2-fid. Styles usually 3. Seeds with 8 rows of dorsal tubercles.—Altogether intermediate between *Cerastium* and *Stellaria*.

SECT. II. **Strephodon**. Styles 5. Valves of the capsule convolute or recurved at the tip, margins not revolute.

2. **C. dahuricum**, Fisch. in Spreng. *Pugill.* ii. 65; tall, glabrous or pubescent below, leaves large oblong sessile or auricled, petals twice as long as the sepals, claws bearded, capsule straight, seeds tubercled. Boiss. *Fl. Orient.* i. 717.

WESTERN TEMPERATE HIMALAYA, alt. 10–11,000 ft., from Kumaon, Str. & Wint. to Marri, Stewart.—DISTRIB. Dahuria, Siberia, Persia, Caucasus.

Perennial. Stem stout, ascending amongst shrubs to 12 ft., shining. Leaves $1\frac{1}{2}$ –2 in., connate, obtuse or acute, margined. Cymes with divaricating branches and pedicels, which later are slender, ebracteolate. Flowers $\frac{3}{4}$ in. diam. Sepals elliptic-oblong, subacute, shining, with narrow scarious edges. Petals twice as long, obcordate, 2-lobed. Capsule twice as long as the calyx, striate, many-nerved; valves revolute.

3. **C. indicum**, Wight & Arn. *Prodr.* 43; slender, glandular-pubescent, leaves subsessile elliptic ovate or lanceolate acute, petals a little exceeding the calyx, capsule straight, teeth recurved. Thwaites *Enum.* 24; Wight *Ill.* i. t. 26.

WESTERN PENINSULA, Nilghiri and Pulney Mts., Wight, &c. CEYLON, alt. 6–7000 ft., Thwaites.

Perennial. *Stems* very slender, flaccid, 1-2 ft. *Leaves* 1-1½ in., membranous, not margined, ciliate, obscurely petioled. *Flowers* few, in terminal dichotomous cymes; pedicels divaricate, tomentose. *Sepals* ½ in., oblong lanceolate, acute, margins narrowly scarious. *Capsules* rather longer than the sepals.—There is a specimen marked as Mauritian in Herb. Benth., but I suspect it is Indian; it has, however, rather longer petals.

SECT. III. **Orthodon.** *Styles* 5. *Valves of the capsule* straight or slightly spreading; margins revolute or recurved.

4. ***C. vulgatum*, Linn.**; annual or perennial, tomentose or hairy, glandular above, lower leaves spatulate, upper oblong ovate or lanceolate obtuse or acute, petals equalling the calyx, rarely 0 or larger, capsules much exceeding the calyx often curved. *Wight & Arn. Prodr.* 43.

Throughout the temperate and subalpine regions of INDIA and CEYLON, ascending to 15,000 ft. in Sikkim and Western Tibet.—DISTRIB. Temperate N. Europe and Asia; introduced into various countries.

Stems 6-12 in., erect or suberect, simple or branched, stout or slender. *Cymes* various, few or many-flowered, open or crowded or subcapitate or subumbellate. *Flowers* ½-¾ in. diam., sometimes apetalous or 5-androus. *Capsule* very variable in length, and seeds in amount of granulation or tuberculation.

VAR. 1. *glomerata*, Thuillier; annual, pubescence dense spreading, leaves obtuse, cymes at first subcapitate, fruiting pedicels suberect shorter than the sepals, bracts all herbaceous, sepals acute densely hairy, margins narrowly membranous.

VAR. 2. *trivialis*, Link; annual or perennial, cymes usually open, leaves usually lanceolate or obovate-lanceolate acute, pubescence shorter less spreading, bracts all herbaceous, sepals lanceolate, margin narrowly membranous.

VAR. 3. *grandiflora*, Don Prodr. 216 (sp.); annual, flaccid, stems 6-10 in., lower leaves obovate-spatulate, upper oblong, cymes open, bracts herbaceous, pedicels slender, petals twice as long as the calyx.—*C. napalense*, Wall. Cat. 628. Temperate Himalaya, alt. 6-10,000 ft.

? VAR. 4. *tibetica*; dwarf, densely tufted, leaves oblong or elliptic, cymes few-flowered, bracts all herbaceous, flowers as in var. 3. *grandiflora*.—Sassar pass, alt. 16-17,000 ft., T. Thomson; Ladak, Stewart. Perhaps a new species, but the specimens are very few.

? VAR. 5. *membranacea*, Jacq. mss. (sp.); stem slender erect, leaves oblong-lanceolate acute, cymes few-flowered, bracts with broad scarious edges, pedicels slender, petals larger than the broadly scarious-edged coloured sepals.—Kunawar, between Hooking-ghat and Doubling, Jacquemont.—Perhaps a different species or a small state of the following, but we have only 2 stems.

5. ***C. Thomsoni*, Hook. f.**; clothed with spreading glandular hairs, stems slender erect, leaves all linear-oblong subacute cymes few-flowered, bracts with narrow scarious edges, pedicels slender, flowers large, sepals oblong-lanceolate subacute coloured below the scarious tips, much smaller than the broadly-obovate petals.

TEMPERATE WESTERN HIMALAYA; Kishtwar, alt. 11-12,000 ft., T. Thomson; Kupaon, alt. 10,000 ft., Strach. & Wint.; Lahul, Jaeschke.

We were at first disposed to regard this as the *C. grandiflorum*, Don, because of the size of the flower: but that plant having broadly obovate lower leaves is no doubt Wallich's *C. napalense* (a var. of *triviale*), which has further much smaller flowers and a very different habit from this. *Stems* 6-12 in., quite erect, rather slender, copiously hairy, branched at the very base only. *Leaves* ¾-1½ in., straight, the very lowest soon withering and more obovate. *Cymes* subumbellate. *Flowers* ½-¾ in. diam., with broad petals. *Fruit* unknown.

11. STELLARIA, Linn.

Herbs of various habit. *Leaves* various. *Flowers* in dichotomous cymes, more rarely solitary and terminal, white. *Petals* 5, rarely 4, 2-fid or 2-partite or 0. *Stamens* 10, rarely 8, hypogynous or perigynous. *Disk* annular or divided into glands. *Ovary* 1- rarely 3-celled; styles 3 or rarely 2-5; ovules many, rarely few. *Capsule* short, splitting to below the middle or to the base into as many entire or 2-fid valves as there are styles. *Seeds* compressed, tubercled granulate or nearly smooth; embryo annular.—**DISTRIB.** Species about 70, natives of all cold and temperate regions.

SECT. I. *Schizostegium*, Fenzl. Subscandent or decumbent herbs. *Ovary* 3-celled. *Capsule* 1-2-seeded.

1. ***S. crispata*, Wall.** *Cat.* 633; tall, glabrous, pubescent above, leaves large sessile oblong or linear-oblong from a cordate base long-acuminate, edges crisped, flowers small. *S. monosperma*, *Don Prodr.* 215.

TEMPERATE HIMALAYA, alt. 6-10,000 ft., from Sikkim to Kashmir; KHASIA MTS., alt. 5-6000 ft.

Root of fleshy fusiform fibres. *Stem* 2-4 ft., 4-angled, shining with a line of fine hairs, nodes often hairy. *Leaves* 2-9 in., often broadest beyond the middle, pale beneath, rather coriaceous, nerves very faint, one intramarginal, tips very slender, margin scarcely thickened, more or less crisped. *Cymes* much branched, pubescent, peduncles and pedicels divaricate, very slender. *Sepals* $\frac{1}{2}$ in., oblong-lanceolate, acuminate, margin narrowly scarious. *Petals* as long or twice as long as the sepals. *Seeds* 1 or 2, granulate.

2. ***S. paniculata*, Edgew. in Trans. Linn. Soc. xx. 35**; tall, glabrous or ciliate, leaves petioled lanceolate or elliptic long-acuminate, flowers very small pubescent. *S. media*, *Wight Cat.* 145, not of Linn.

WESTERN TEMPERATE HIMALAYA, alt. 7-11,000 ft.; Sikkim, *J. D. H.*; Kumaon to Sirmur, *Royle*, *Edgeworth*, &c. KHASIA MTS., alt. 5000 ft., *Griffith*, &c. NILGHIRI MTS., *Wight*, &c.

Nearly glabrous or laxly pubescent throughout. *Stem* 2 ft. high and more, decumbent or suberect, weak, shining, with a line of hairs above. *Leaves* $1\frac{1}{2}$ -5 in., very variable in shape, membranous, long or shortly acuminate, nerves spreading, one intramarginal. *Cymes* glandular pubescent, much branched; peduncles and pedicels very slender, spreading. *Sepals* pubescent, oblong-lanceolate, acute, $\frac{1}{2}$ - $\frac{3}{4}$ in. *Petals* notched, shorter than the sepals. *Capsule* equalling the calyx. *Seeds* wrinkled.

3. ***S. drymarioides*, Thwaites Enum. 24**; procumbent, rooting, glabrous below, glandular-pubescent above, leaves petioled orbicular or broadly elliptic acute or apiculate, flowers small densely pubescent.

CEYLON; Harpootelle pass, alt. 4000 ft., *Walker*, *Thwaites*,

Stems slender, flaccid, 4 angled; branches erect. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in. diam., with a few scattered hairs; petals $\frac{1}{10}$ - $\frac{1}{8}$ in.; nerves spreading. *Cymes* with long slender spreading peduncles and pedicels, the latter often thickened upwards. *Petals* 2-fid, half as long as the sepals. *Disk* 5-lobed. *Capsule* included, 1-seeded.—Closely allied to *S. paniculata* and probably a broad-leaved state of that plant, the foliage and habit closely resemble *Drymaria cordifolia*, which may at once be distinguished by the nervation of the leaf.

SECT. II. *Malachium*, Fries. *Sepals* free to the base. *Stamens* hypogynous. *Styles* usually 5. *Ovary* 1-celled. *Capsule* with 5 2-fid valves, many-seeded.

4. ***S. aquatica*, Scopoli**; slightly glandular above, stem diffuse decumbent angular, leaves ovate-cordate. *Cerastium aquaticum*, *Linn.* *Malachium aquaticum*, *Fries*; *Boiss. Fl. Orient.* i. 731.

TEMPERATE HIMALAYA; from Nipal to Marri, alt. 4-8000 ft.—DISTRIB. N. and W. Asia, N. Africa, Europe.

Perennial. *Stem* 1-3 ft, brittle, branched, often trailing over bushes. *Leaves* 1-1½ in., membranous, lower shortly petioled, acute, sometimes ciliate. *Flowers* ½ in. diam., axillary. *Sepals* lanceolate, enlarged in fruit. *Petals* with diverging lobes. *Capsule* 1 in., ovoid, rather exceeding the sepals; peduncle deflexed, curved at the tip. *Seeds* globose, tubercled.

SECT. III. *Stellaria* proper. *Sepals* free to the base. *Stamens* hypogynous or subperigynous. *Ovary* 1-celled; styles 2-3. *Capsule* with 4-6 entire valves. *Seeds* numerous, rarely few.

5. *S. media*, Linn.; stem procumbent with a line of hairs, leaves ovate acuminate lower petioled upper sessile, cymes many-flowered, sepals green subacute or obtuse, petals shorter than the glandular sepals or 0, stamens 3-10, styles 3, seeds opaque strongly tubercled or echinate. *Wall. Cat.* 631; *Wight Ic. t.* 947; *Boiss. Fl. Orient. i.* 707. *S. monogyna*, Don *Prodr.* 215. *Alsinella Wallichiana*, Benth. in *Wall. Cat.* 630.

Throughout the PANJAB, and temperate regions of India, ascending in the HIMALAYA to 12,000 ft., and in WESTERN TIBET to 14,500 ft. Ceylon; Newera Ellia, probably introduced.—DISTRIB. All Arctic and N. temperate regions, a doubtful native elsewhere.

A very common and most variable weed. *Stems* 6 in. 2 ft., generally much branched, flaccid, green. *Leaves* ½-1 in., lower long-petioled, ovate or cordate, upper sessile, elliptic or lanceolate. *Flowers* axillary and in terminal cymes, ½-¾ in. diam.; pedicels slender, glabrous or glandular-pubescent. *Sepals* obtuse or subacute, hairy glandular or covered with raised points. *Capsule* ovoid, longer than the sepals. *Seeds* brown, acutely tubercled.—*Flowers* 4-merous and apetalous in Alpine Sikkim specimens.

6. *S. sikkimensis*, Hook. f.; decumbent, stems shining below, much branched laxly pubescent or villous with spreading hairs, leaves small sessile ovate or ovate-lanceolate rarely cordate, cymes terminal many-flowered, sepals lanceolate acuminate pilose much exceeding the 2-partite petals, stamens 10, styles 3, capsule not exceeding the sepals.

SIKKIM HIMALAYA; common, alt. 5-9000 ft., *Herb. Griffith, J. D. H.*

Often forming matted tufts, clothed with flaccid brown spreading hairs. *Leaves* ¾-2 in., spreading recurved or reflexed, acute, very shortly-petioled, opaque, hairy on both surfaces and ciliate. *Flowers* ½ in. diam.; pedicels rather longer than the sepals, spreading, decurved in fruit. *Sepals* with broad scarious margins. *Capsule* elongate ovoid, rather longer than the sepals; valves 5, entire. *Seeds* many, minute, opaque, scarcely tubercled—Subalpine specimens have more coriaceous deflexed leaves, with strongly recurved margins. Nearly allied to *S. saxatilis*, but less perigynous, more laxly hairy, and cymes much shorter peduncled and terminal.

7. *S. semivestita*, Edgew.; more or less woolly, stem elongate stout decumbent much branched leafy, leaves spreading and recurved subulate, peduncles axillary much exceeding the leaves, sepals lanceolate acuminate with broad scarious margins shorter than the petals, stamens 10, styles 3.

WESTERN TEMPERATE HIMALAYA; Kumaon, alt. 6-8000 ft.; Lohoo-ghat and Dadouka Taola, T. Thomson; Chaur, Strach. & Wint.

Forming large compact or lax tufts. *Stems* 6-18 in., terete below; branches ascending, crowded, very leafy, white with woolly hairs. *Leaves* ¾-2 in., gradually recurved from a broad base, 1-nerved, woolly on both surfaces or glabrate. *Flowers* ½ in. diam.; peduncles 1 in., very woolly. *Sepals* ½ in., very acuminate, back striate, tomentose. *Petals* 2-partite, rather broad. *Fruit* unknown.

8. *S. Webbiana*, Wall. Cat. 642 (Leucostemma); glabrous, stem slender decumbent branched leafy, leaves spreading linear or acicular, pedicels

axillary capillary very long, sepals lanceolate acuminate much shorter than the 2 fid petals, stamens 8, styles 2. *Benth. in Royle Ill.* 81, t. 21, f. 2.

WESTERN TEMPERATE HIMALAYA, alt. 5-6000 ft., from Kumaon to Sirmur, *Blinkworth*, &c.

Stems zigzag, 6-12 in., 4-angled. *Leaves* $\frac{1}{2}$ in., shining, with long acicular points, 1-nerved, sessile, rather rigid. *Flowers* axillary, suberect, $\frac{1}{2}$ in. diam.; pedicels strict, 1-2 in., erect in fruit. *Sepals* shining, $\frac{1}{4}$ in.; back striate, margins broadly scarious shining. *Petals* 2-fid to about the middle, lobes narrow obtuse. *Capsule* equalling the sepals, ovoid, 6-valved. *Seeds* pale-brown, reniform, compressed, back echinate with long processes.

9. **S. latifolia**, *Benth. in Wall. Cat.* 643 (*Leucostemma*); glabrous below, tomentose above, stems decumbent flaccid laxly tufted, leaves subsessile margins acuminate, lower broad-ovate or cordate, upper elliptic, pedicels very slender, sepals oblong or subulate-lanceolate much shorter than the 2-fid petals, stamens 8, styles 2, capsule much shorter than the sepals. *Benth. in Royle Ill.* 81, t. 21, f. 1.

WESTERN TEMPERATE HIMALAYA, alt. 6-8000 ft.; Kumaon, *Blinkworth*, &c.; Garwhal, *Falconer*.

Stems 2-10 in., flexuous, 4-angled, glabrous, shining except the young, which are laxly tomentose, much branched. *Leaves*; lower, $\frac{1}{4}$ - $\frac{3}{8}$ in., almost orbicular at times, shortly petioled, suddenly mucronate, margins thickened, veins diverging, upper smaller narrower. *Flowers* $\frac{1}{2}$ in. diam.; pedicels terminal and in the uppermost axils, capillary, glabrous. *Sepals* green, with a narrow scarious border. *Petals* 2-fid to about the middle, lobes oblong obtuse. *Capsule* short, ovoid, included, membranous, hyaline, apparently bursting irregularly. *Seeds* orbicular, brown, nearly smooth.

10. **S. bulbosa**, *Wulf.*; rhizome slender creeping tuberiferous, stem slender simple with a line of hairs, leaves few obovate or elliptic-lanceolate subacute, pedicel solitary subterminal capillary erect, sepals 4-5 much shorter than the broad petals. *DC. Prodr.* i. 397; *Cesati in Linnæa*, xxxii. 253, t. 1. *Kraschninnikowia rupestris*, *Turcz. in Led. Fl. Ross.* i. 373.

TEMPERATE HIMALAYA, in woods at the roots of trees; Bhotan, *Griffith*; Sikkim, alt. 10-12,000 ft., *J. D. H.* Jamu to Marri, alt. 6-9000 ft., *Jacquemont*, *Thomson*, &c.—
DISTRIB. Siberia, Carinthia, N. Italy.

A very peculiar and interesting little plant in respect of structure and distribution, confined to Carinthia and Transylvania in Europe, and to Siberia and the Himalayas in Asia. *Stem* 1-5 in., erect, very slender. *Leaves* 2-6 pairs, 1-1 $\frac{1}{2}$ in. long, rather fleshy, sessile or contracted into a petiole; margins sometimes ciliate; midrib slender, nerves very obscure. *Flowers* often dimorphic, the lower on the plant from the inferior pedicels or rhizomes being minute apetalous and ripening seeds, the subterminal large, $\frac{1}{2}$ in. diam, rarely or not producing seed. *Sepals* herbaceous, oblong-lanceolate or lanceolate, $\frac{1}{2}$ - $\frac{3}{4}$ in. shorter than the white petals. *Anthers* purple. *Styles* filiform. *Capsule* 8-angled, 4-valved to the base. *Seeds* few, large, tuberculate.—The seeds of Siberian specimens have long processes on the back.

11. **S. tibetica**, *Kurz in Regensb. Flora.* 1872, 285; whole plant densely glandular-pubescent, stem ascending rather robust, leaves sessile oblong subacute or acute, cymes erect peduncled few-flowered, peduncle and pedicels stout, bracts ovate coriaceous, sepals much shorter than the petals, elliptic acute margins submembranous.

WESTERN TIBET; on limestone rocks near Trantse Lundo, in Karnag, alt. 14-17,000 ft., *Dr. Stoliczka*.

Stem 3-5 in., cylindric, base glabrous shining. *Leaves* suberect, $\frac{1}{2}$ - $\frac{3}{4}$ in., opaque, midrib slender, nerves obscure. *Cymes* axillary and terminal, robust; pedicels longer or shorter than the flowers, the lateral 2-bracteolate. *Flowers* $\frac{1}{2}$ in. diam., erect. *Calyx*

rounded at the base, quite free. *Petals* half as long again as the sepals, 2-fid to the middle. *Filaments* slender, hypogynous. *Disk* 0. *Styles* 3, slender; ovules numerous, *Capsule* broadly ovoid, shorter than the sepals, 6-valved, inserted by a very narrow base. *Seeds* (unripe) apparently solitary, large, muricate.

SECT. IV. **Larbræa**, *St. Hil.* *Sepals* more or less connate at the base into an obconic tube. *Stamens* 8-10, perigynous; filaments linear or subulate, not suddenly dilated at the base. *Ovary* 1-celled; styles 3, rarely 4. *Capsule* 4-6-valved; valves entire. *Seeds* numerous.—Usually flaccid laxly caespitose herbs.

* *More or less pubescent woolly or silky.*

12. **S. lanata**, *Hook. f.*; stems slender decumbent glabrous below, branches pedicels sepals and leaves beneath densely woolly, leaves spreading and recurved linear-oblong, sepals small oblong acute, petals minute, stamens 8, styles 3, capsule twice as long as the sepals.

SIKKIM HIMALAYA, alt. 9-14,000 ft., in gravelly places, *J. D. H.*

Stems laxly tufted, very slender, 8-12 in., below cylindric and shining; branches 4-angled and leaves beneath clothed with snow-white soft wool. *Leaves* $\frac{1}{4}$ - $\frac{3}{8}$ in., sessile or subcordate at the base, opaque above, 1-nerved, narrowed to the point, but hardly acuminate, dull green. *Cymes* few-flowered, terminal. *Flowers* $\frac{1}{8}$ in. diam.; pedicels rather longer than the leaves, erect in fruit, rarely deflexed. *Sepals* with narrow scarious margins. *Petals* very obscure, 2-fid or 2-partite, lobes slender. *Capsule* oblong-ovoid, 4-6-valved. *Seeds* brown, reniform, granulate.

13. **S. longissima**, *Wall. Cat.* 632; stems slender decumbent glabrous below, branches pedicels and leaves softly silky, leaves sessile linear-oblong or lanceolate spreading or recurved, pedicels slender, sepals narrow-lanceolate equalling the 2-partite petals, stamens 10, capsule shorter than the sepals 5-cleft. *S. patens*, *Don Prodr.* 215. *S. Fenzliana* and *S. mollis*, *Klotzsch in Bot. Reis. Pr. Waldem.* p. 141, t. 29.

TEMPERATE HIMALAYA, alt. 8-12,000 ft., from Sikkim, *J. D. H.*, to Sirmur, *Jaquemont*.

Stems 6-18 in., much-branched, laxly tufted, cylindric below, 4-angled above, upper parts and leaves on both surfaces and peduncles clothed with long lax silky hairs. *Leaves* $\frac{3}{4}$ -1 in., sessile, acute, flat, opaque, 1-nerved. *Flowers* $\frac{1}{4}$ in. diam., axillary or in terminal few-flowered cymes; peduncle erect, $\frac{1}{4}$ -1 in.; bracts with scarious edges. *Sepals* $\frac{1}{2}$ in., glabrous, with broad scarious margins. *Petals* with rather broad segments, usually deeply 2-partite. *Filaments* slender. *Capsule* ovoid, 5-valved. *Seeds* dark-brown, minute, turgid, tubercled.—*Klotzsch's L. Fenzlii* is distinguished by the more deeply divided petals and by being less pubescent.

14. **S. saxatilis**, *Hamilt. in Wall. Cat.* 634; stem long decumbent shining, upper parts densely soft tomentose, leaves subsessile ovate elliptic or oblong rarely cordate acute tomentose on both surfaces, cymes axillary, sepals tomentose exceeding the 2-partite petals, stamens 10, styles 3-4, capsules equalling the sepals. *Don Prodr.* 215.

TEMPERATE EASTERN and CENTRAL HIMALAYA; Nipal, *Wallich*; Bhotan, in wet places, alt. 5-7000 ft., *Griffith*. KHASIA Mts., alt. 5-6000 ft., *Simons*, &c.—DISTRIB. Java, Siberia, Japan.

Stems 2-3 ft., laxly tufted, cylindric; pubescence of the upper parts, leaves and inflorescence close dense almost woolly, sometimes very thick and closely appressed. *Leaves* $\frac{1}{2}$ -1 in., sessile or very shortly petioled, midrib faint. *Cymes* on slender peduncles, usually from the forks, very slender, subumbellately branched, pedicels 1-1 $\frac{1}{4}$ in., divaricating; bracts linear-subulate. *Flowers* $\frac{1}{2}$ in. diam. *Sepals* almost woolly, oblong, acute, margin very narrowly membranous. *Petals* 2-partite. *Filaments* slender. *Capsule* 5-valved. *Seeds* almost black, tubercled.—Some Bhotan specimens have very

densely tomentose cordate thick almost coriaceous leaves. The Javanese have recurved much more glabrous and acute leaves.

**** Glabrous, or leaves ciliolate towards the base only.**

15. **S. graminea**, Linn.; glabrous, stem very slender (rarely short) suberect 4-angled, leaves sessile narrow linear-oblong acute, margins thickened smooth often ciliate towards the base, cymes terminal branched or reduced to one flower, sepals linear-oblong 3-nerved margin narrow equaling the petals, stamens 10, capsule shorter than the sepals. *Boiss. Fl. Orient.* i. 707.

WESTERN TIBET; alt. 11-15,000 ft., *T. Thomson*.—DISTRIB. Afghanistan to W. Europe.

Everywhere glabrous except the margins of the leaf towards its base. *Stems* 3-10 in., suberect or decumbent and tufted, shining, 4-angled. *Leaves* $\frac{1}{4}$ -1 in., sessile, narrowed at the base, sides almost parallel, opaque, somewhat glaucous, midrib and nerves obscure, margins thickened, quite smooth, sometimes undulate. *Cymes* spreading; pedicels very slender, divaricating, $\frac{1}{4}$ -1 in.; bracts oblong-lanceolate, with broadly scarious margins. *Flowers* erect, about $\frac{1}{3}$ in. diam. *Sepals* green, shining, obtuse or acute. *Petals* 2-partite. *Filaments* slender. *Styles* 3. *Capsule* always shorter than the sepals, 5-6-valved. *Seeds* orange-brown, granulate.

VAR. *montioides*; stems short densely tufted, leaves small short, cyme reduced to 1 flower.—Alt. 15-17,000 ft.

16. **S. glauca**, *Withering*; quite glabrous, stem suberect or erect 4-angled, leaves sessile oblong or linear-lanceolate acuminate, margins thickened perfectly glabrous, pedicels subsolitary terminal and axillary slender spreading in fruit, sepals linear-oblong half as long as the broad 2-lobed petals, stamens 10, capsule equalling the sepals. *Boiss. Fl. Orient.* i. 708.

WESTERN TEMPERATE HIMALAYA; Lahul, *Jaeschke*; WESTERN TIBET, Indus valley, *T. Thomson*.—DISTRIB. Siberia, W. Asia, Europe, Greenland.

Perennial. *Stems* 1-2 ft., slender. *Leaves* 1-2 in., sessile, base rounded, ascending or erecto-patent, midrib distinct, nerves obscure. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; pedicels rather stout, strict, 1-3 in.; bracts membranous. *Sepals* oblong or lanceolate-oblong, acute or acuminate, green, 3-nerved, margins broadly scarious. *Filaments* slender. *Capsule* broadly ovoid, equalling the sepals, on rather spreading pedicels. *Seeds* strongly granulate.

17. **S. uliginosa**, Linn.; glabrous or with a few hairs at the base of the leaves, stems slender 4-angled, leaves sessile small ovate or oblong, lanceolate, cymes axillary and terminal, pedicels at length deflexed, sepals lanceolate acute, petals minute or 0, stamens 10, styles 3, capsule equalling or a little exceeding the sepals. *Boiss. Fl. Orient.* i. 708. *S. thymifolia*, *Wall. Cat.* 636 (apetalous, leaves short broad). *S. aquatica*, *Poll.*; *Wall. Cat.* 635 (glaucous, leaves oblong).

TEMPERATE and ALPINE HIMALAYA; in wet places, from 4-10,000 ft. (to 16,000 ft. in Sikkim), common. KHASIA Mts., alt. 5-6000 ft. NILGHIRI Mts., *Wight*.—DISTRIB. Temperate N. Hemisphere.

Annual, very variable in size and habit, much branched, very leafy and copiously flowering, often glaucous. *Stem* 6-18 in., erect or diffuse. *Leaves* rarely $\frac{1}{2}$ in., with often thickened sometimes undulate margins and mucronate tip. *Cymes* slender, peduncles short or long; bracts scarious. *Flowers* $\frac{1}{2}$ in. diam., sometimes solitary, pedicels slender. *Calyx-tube* obscure. *Filaments* slender. *Capsule* ovoid, 6-valved. *Seeds* small, minutely tubercled.

18. **S. subumbellata**, *Edgew.*; perfectly glabrous, stem very slender ascending, leaves sessile linear or elliptic-oblong acute, cymes terminal or

flowers solitary, pedicels capillary deflexed in fruit, flowers very small, sepals ovate-lanceolate acute, petals 0, stamens 5, styles 3, capsule cylindric twice as long as the sepals.

Interior of the SIKKIM HIMALAYA, alt. 12–16,000 ft., *J. D. H.* WESTERN TIBET; Nubra, alt. 11–15 000 ft., *T. Thomson*.

Stems 6 in. high in Nubra specimens very slender simple, stouter shorter and more tufted in the Sikkim ones. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., with thickened margin and tip, not mucronate. *Flowers* $\frac{1}{2}$ in. diam.; pedicels $\frac{1}{2}$ –1 in.; bracts scarious. *Calyx* base obscure; sepals green, strongly 3-nerved, with broad scarious margins. *Filaments* slender. *Styles* short. *Capsule* $\frac{1}{2}$ in. long, straight, 5-valved. *Seeds* pale brown, distinctly granulate.—Very near the Baikal *S. umbellata*, Turcz. (Led. Flor. Ross. i. 394), but the bracts are not numerous and crowded, and the seeds are not perfectly smooth, but strongly granulate.

19. ***S. depauperata***, *Edgew.*; quite glabrous, stems slender flexuous red-brown, leaves spreading and recurved sessile oblong-lanceolate acute, pedicels few axillary and terminal elongate curved wiry, flowers small, calyx with a broad turbinate base, sepals lanceolate acute petals 0, styles 3 very short, capsule 6-valved, seeds few.

ALPINE SIKKIM HIMALAYA; Yeumtong in gravelly places, alt. 15,000 ft., *J. D. H.*

A very singular little species, of which there are but few specimens, all gathered in one spot. *Stems* 3–4 in., wiry, flexuous, 4-angled, dark red brown. *Leaves* few, $\frac{1}{4}$ – $\frac{1}{2}$ in., in distant pairs. *Pedicels* $\frac{1}{2}$ –1 in. long, wiry, flexuous. *Calyx* base large and broad; sepals $\frac{1}{2}$ in., dark green with broad scarious edges. *Filaments* linear. *Ovary* short, ovoid; styles 3, very short. *Capsule* shorter than the sepals.—The structure of the flower approaches that of Sect. *Adenonema*.

SECT. V. ***Adenonema***, *Bunge*. *Sepals* connate at the broad base. *Petals* minute or 0, rarely equalling the sepals. *Stamens* 8–10, perigynous; filaments dilated at the base. *Disk* glandular. *Ovary* 1-celled; styles 3. *Capsule* 3–5-valved. *Seeds* 1 or few or many.—Densely tufted Alpine herbs.

20. ***S. decumbens***, *Edgew. in Trans: Linn. Soc. xx. 35*; laxly or densely tufted, usually very shining, stems stout or slender and pedicels densely pubescent or villous, branches sparse or closely imbricate often fascicled in axillary globose tufts, ovate or oblong or lanceolate-subulate acicular-pointed (rarely acute or obtuse) 1-nerved, margins thickened glabrous or ciliate, flower. solitary or cymose, sepals 4–5 oblong-lanceolate, petals usually very short 2-partite narrow, capsule shorter than the sepals, seeds 2–8 opaque nearly smooth suborbicular.

ALPINE AND SUBALPINE HIMALAYA, in rocky and gravelly places, alt. 11–15,000 ft. (18,000 ft. in Sikkim).

A very common and variable Alpine Himalayan plant, allied to *S. petraea*, Bunge, but at once distinguished by its shorter shining less rigid leaves, and denser pubescence.—We are quite unable to distinguish the following varieties specifically, though var. 4 is less connected by intermediates than the others, and may be different.

a. Flowers solitary.

VAR. 1; tufts large lax shining 6–18 in. broad, leaves $\frac{1}{2}$ in. usually imbricate often in axillary tufts usually ovate-subulate, sepals 5, petals minute.—*S. petraea*, *Herb. Ind. Or. H. f. & T. (not of Bunge)*.—Sikkim and Kunawar.

VAR. 2. *Edgeworthii*; tufts lax shining, stems slender, leaves sparse slender spreading $\frac{1}{2}$ in. subulate-lanceolate, petals minute.—*S. decumbens*, *Edgew. l.c.*—Kumaon.

VAR. 3. *minor*; stems slender 2–4 in., leaves shining or not $\frac{1}{2}$ in. ovate- or lanceolate-subulate often in axillary fascicles, sepals 4, petals minute.—Sikkim.

VAR. 4. *Stracheyi*; stems slender 2–4 in., leaves $\frac{1}{2}$ in. not shining ovate-subulate,

petals equalling the 5 sepals.—Kumaon, alt. 12–13,000 ft., *Str. & Wint.* (with *S. & W.* No. 6).

VAR. 5. *pulvinata*; forming dense globose or cushion-like masses, opaque or shining, leaves densely imbricate ovate-subulate or the lower oblong and rounded at the tip usually ciliate, sepals 4–5 coriaceous.—Garwhal, at great elevations, 16–18,000 ft., *Str. & Wint.*; WESTERN TIBET, *T. Thomson*; Sikkim, *J. D. H.*

b. Flowers cymose.

VAR. 6. *polyantha*; tufts dense shining, stem stout, leaves $\frac{1}{4}$ – $\frac{1}{2}$ in., ovate- or lanceolate-subulate ciliate or pubescent, cymes sessile many-flowered, sepals 5, petals minute.—Kashmir, *Royle*; Sikkim, *J. D. H.*

VAR. 7. *acicularis*; stems lax and leaves very shining, leaves erecto-patent rigid narrow subulate-lanceolate keeled, margins smooth, cymes peduncled lax many-flowered, bracts large concave scarious, sepals 4–5, petals minute.—Sikkim, at Tungu, alt. 12–14,000 ft.

12. BRACHYSTEMMA, Don.

A diffuse subscentent branching herb. *Leaves* lanceolate. *Flowers* numerous, in axillary or terminal panicles. *Sepals* 5, subscarious. *Petals* 5, minute, narrow and quite entire. *Stamens* 10, 5 without anthers. *Ovary* 1-celled; styles 2; ovules 4. *Capsule* globose, depressed, 4-valved, 1-seeded. *Seed* reniform or globose, tuberculate.

1. ***B. calycinum*,** *Don Prodr.* 646; *Fenzl in Endl. Atakt.* t. 16.

TEMPERATE CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 4–7000 ft., *J. D. H.*; Bhotan, *Griffith*; KHASIA Mts., alt. 3000 ft.

Glabrous *Stems* 6–8 ft., clambering amongst bushes, 4-angled, shining, brittle. *Leaves* $1\frac{1}{4}$ –3 in., petioled, ovate-lanceolate, acute, glabrous beneath, triple-nerved, margins obscurely crenulate. *Cymes* 3–6 in., pedicelled, terminating lateral branches or axillary; bracts linear; pedicels slender. *Flowers* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. *Sepals* oblong-lanceolate. *Petals*, *stamens* and *pistil* all very small compared with the scarious sepals.

13. ARENARIA, Linn.

Annual or perennial, often tufted herbs. *Leaves* broad or narrow. *Flowers* white or pink, solitary or in dichotomous cymes. *Sepals* 5. *Petals* 5, entire lacerate or refuse, never 2-fid or 2-partite, rarely 0. *Stamens* 5, perigynous or subhypogynous. *Stamens* 10, rarely 5, hypogynous or more often inserted on the perigynous lobed or annular disk. *Ovary* 1-celled; styles 3–4 (rarely 2); ovules usually many. *Capsule* short, rarely exceeding the sepals, valves 2–6. *Seeds* compressed or turgid, smooth or tubercled.—**DISTRIB.** Species about 130, all natives of cold and temperate regions.

A. Capsule with as many valves (usually 3) as there are styles.

SECT. I. *Alsine*. Annual or perennial herbs. *Leaves* in the Indian species broad flat. *Flowers* small, cymose white. *Calyx* not thickened at the base. *Styles* 3. *Seeds* compressed, striate or granulate.

1. ***A. trichotoma*,** *Royle mss.*; perennial erect, dichotomously branched, branches long strict spreading finely pubescent, leaves glabrous linear or linear-oblong from a broad sessile base, cymes long peduncled trichotomous, pedicels slender, bracts scarious, petals equalling or exceeding the ovate-oblong acute broadly-margined sepals, seeds 3–5 orbicular compressed.

WESTERN TEMPERATE HIMALAYA; Kunawar, alt. 8–10,000 ft., *Jacquemont*, *Royle*, &c.—**DISTRIB.** Afghanistan.

Nearly glabrous, 1– $1\frac{1}{2}$ ft. *Stems* rather stout and flexuous at the base; branches terete,

very strict. *Leaves* $\frac{1}{2}$ – $1\frac{1}{4}$ in. in distant pairs, or spuriously whorled, subacute, thick, opaque, 1-nerved, acute, margins somewhat recurved. *Cymes* very lax, strict, slender, branches and pedicels very long; bracts and bracteoles small. *Flowers* $\frac{1}{4}$ in. diam., erect. *Calyx* rounded and not hardened at the base; sepals quite glabrous, obscurely 1-nerved. *Styles* 3, slender. *Capsule* subglabrous, 3-valved. *Seeds* striolate, muc¹ compressed, pale red-brown.

2. **A. Meyeri**, Boiss. *Fl. Orient.* i. 682 (Alsine); annual, fastigiate dichotomous, clothed with spreading glandular hairs, leaves suberect subulate 7-nerved, pedicels short, sepals rigid subulate-lanceolate strongly nerved, petals very short, seeds small granulate.

PANJAB, near Peshawur, Vicary, Stewart.—DISTRIB. Afghanistan, and westward to Syria and Asia Minor.

A small rigid erect annual, 4–6 in. *Stems* cylindric. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., more or less recurved. *Calyx* $\frac{1}{4}$ in. long; base rounded or subacute; sepals erect, rigid, green, slightly recurved, pungent, outer 5-, inner 3-nerved, nerves and margins white. *Petals* ovate-oblong. *Stamens* sometimes 6 and 7. *Styles* 3. *Capsule* oblong, much shorter than the sepals, 3-valved. *Seeds* red-brown, orbicular reniform, compressed.

3. **A. foliosa**, Royle mss.; quite glabrous, loosely tufted, stems much branched, branches slender leafy, leaves very narrow linear subacute spreading often flexuous 1–3-nerved, cymes long-peduncled subumbellate, bracteoles short ovate, sepals ovate-lanceolate acuminate strongly 3-nerved shorter than the entire petals, capsule ovoid rather longer than the sepals, valves recurved, seeds reniform dorsally granulate. Alsine Roylei, Fenzl in *Herb. Benth.*

WESTERN SUBALPINE HIMALAYA, alt. 9–13,000 ft., from Garwhal to Kashmir, Royle, Jacquemont, &c.

Perennial, branched from the base; branches 2–6 in., loosely or densely leafy. *Leaves* $\frac{1}{4}$ – $\frac{3}{8}$ in., usually spreading, never rigid or pungent, not $\frac{1}{8}$ in. broad, bright green. *Peduncles* sparingly leafy, strict, erect; bracts and bracteoles coriaceous, acute, concave; pedicels equalling or exceeding the sepals. *Calyx* rounded and not indurated at the base; sepals $\frac{1}{2}$ in., coriaceous, pungent, nerves much raised, inner with scarious edges. *Capsule* 3-valved. *Seeds* small, pale brown.—Perhaps a form of *A. juniperina*, Fenzl (Boiss. *Fl. Orient.* i. 677), a native of Persia and W. Asia.

4. **A. kashmirica**, Edgew.; glandular-pubescent rarely glabrous, densely tufted, stems much branched, branches leafy, leaves narrowly linear-subulate acute spreading strongly 3-nerved, cymes peduncled subumbellate, bracteoles ovate-subulate strongly nerved, sepals ovate-lanceolate acuminate strongly 3-nerved shorter than the entire petals, capsule ovoid rather longer than the sepals, valves recurved.

WESTERN TEMPERATE HIMALAYA, alt. 6–7000 ft., T. Thomson; Lahul, Jaeschke; WESTERN TIBET, Falconer.

Very similar to *A. foliosa*, but usually glandular-pubescent throughout, leaves more subulate and rigid, very strongly nerved, lateral nerves often marginal, and bracts very different; flowers smaller; pedicels often shorter than the sepals; petals longer; the capsule and seeds are similar.

B. Capsule with twice as many valves as there are styles.

SECT. II. **Eremogoneæ**. Perennials, usually densely tufted. *Leaves* crowded, subulate rigid setaceous or grass-like. *Sepals* often hardened at the base. Disk-glands usually large.

* *Peduncles elongate. Flowers usually cymose.*

5. **A. festucoides**, Benth. in Royle *Ill.* 81, t. 21, f. 3; densely tufted,

leaves densely crowded subulate pungent rigid recurved 1-nerved beneath ciliolate, peduncles 1- or few-flowered glandular-pubescent, sepals lanceolate or subulate-lanceolate straight or recurved 1-3-nerved, margins broadly scarious shorter than the petals, capsule oblong 5-6-valved to the base shorter than the sepals, seeds flat with a narrow fimbriate wing.

WESTERN ALPINE HIMALAYA, from Kumaon to Kunawar; alt. 11-13,000 ft., *Royle, Jacquemont*, &c. WESTERN TIBET, Karnali river, alt. 15,500 ft., *Strach. & Wint.*

Very variable in stature, 2-8 in. *Leaves* with axillary fascicles, $\frac{1}{4}$ - $1\frac{1}{2}$ in., shining, rather concave above, usually recurved, pungent, margin ciliolate, nerve strong beneath. *Peduncle* 1-6 in., erect or curved, leafy, 1- rarely 2-5-flowered, always very glandular; bracts ovate-subulate, with broadly scarious margins; pedicels shorter or longer than the sepals. *Calyx* scarcely thickened at the base; sepals $\frac{1}{4}$ to nearly $\frac{1}{2}$ in., from ovate-lanceolate to subulate lanceolate, sometimes falcate, long acuminate, pungent, margin broadly scarious, back green with 3 approximate nerves, glabrous or glandular-pubescent. *Petals* sometimes twice as long as the sepals, obovate, variable in length and breadth. *Capsule* coriaceous, rarely equalling the sepals. *Seeds* very flat, pale.

VAR. *imbricata*; smaller, stems very short densely tufted, leaves $\frac{1}{2}$ in., peduncles very short. ? *A. imbricata*, *M. Bieb. Fl. Taur. Cauc.* i. 344, which differs only in the capsule exceeding the sepals.—*Ledebour* and *Boissier (Fl. Orient. i. 673)*, both refer *A. imbricata* to *Alsine*, but the capsule in original specimens is distinctly 6-valved.

6. ***A. Griffithii***, *Boiss. Fl. Orient. i. 697*; suffruticose, tufted, glabrous or glandular, leaves densely crowded short subulate pungent rigid straight or recurved 1-nerved beneath ciliolate, peduncle several-flowered, sepals ovate acute concave obscurely nerved shorter than the petals, capsule globose 6-valved shorter than the sepals.

WESTERN TIBET; Dras valley, alt. 8-10,000 ft., *T. Thomson*.—DISTRIB. Afghanistan.

A more robust species than *A. festuoides*, with usually shorter though quite as rigid leaves, short concave ovate-subulate bracts, more numerous and smaller flowers, calyx rounded and much thickened at the base, broader sepals, and a globose or very broadly ovoid coriaceous capsule.

** *Flowers always solitary, sessile or very shortly pedicelled.*

7. ***A. musciformis***, *Wall. Cat. 6401*; glabrous, most densely tufted, root long woody, stem very short densely leafy, leaves subulate spreading and recurved rigid minutely ciliate, flowers sessile solitary, sepals oblong-lanceolate acute 3-nerved rather shorter and narrower than the linear obovate petals.

ALPINE EASTERN and WESTERN TIBET, alt. 16-18,000 ft., *Webb, Jacquemont*; Balch pass, *Strach. & Winterb.*; Karakoram and Parang passes, &c., *T. Thomson*; Tibetan Sikkim, alt. 15-16,000 ft., *J. D. H.*

Forming matted hard tufts; roots very long, strong, woody. *Leaves* subsquarrose when dry pale green, $\frac{1}{2}$ - $\frac{3}{4}$ in., with broad sheathing scarious bases, 1-nerved below. *Flowers* sessile, solitary, $\frac{1}{2}$ in. diam. *Calyx* narrow subtruncate and hardened at the base; sepals green with broad scarious margins, outer 3-, inner 1-nerved. *Petals* persistent, tip rounded. *Filaments* long, slender. *Styles* 3, slender. *Capsule* apparently never fertilized in the specimens collected, small, globose, 5-6-valved to the base.—The leaves of the Sikkim specimen are $\frac{1}{2}$ in., which is longer than those of the Western Himalaya.

8. ***A. polytrichoides***, *Edgew.*; most densely tufted, branches together with the most densely imbricating leaves cylindric, leaves short spreading and recurved subulate from a broad scarious sheathing base rigid pungent, channelled in front convex on the back, margins thickened obscurely ciliate towards the base, flowers minute subsessile, sepals broadly elliptic obtuse. petals larger broadly obovate, capsule broad equalling the sepals.

Tibetan region of the SIKKIM HIMALAYA, alt. 14–17,000 ft., *J. D. H.*

Forming hemispherical moss-like tufts of densely packed cylindric stems 1–4 in. long, clothed with old leaves below, together with these about $\frac{1}{2}$ in. diam. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., bright green, shining. *Peduncles* lengthening a little in fruit. *Calyx* rounded and much thickened at the base; sepals $\frac{1}{10}$ in., very obtuse, concave, without scarious margins, obscurely 3-nerved. *Petals* broader and longer than the sepals, obovate. *Filaments* slender. *Styles* 3. *Capsule* broadly ovoid, coriaceous, 1-celled, shortly 5–6-valved. *Seeds* small, black, rather angular, nearly smooth.

9. ***A. monticola***, *Edgew.*; glabrous, very densely tufted, branches densely leafy, leaves short spreading and recurved subulate from a broad scarious sheathing base rigid tip acicular margin thickened minutely ciliate, midrib prominent on both surfaces, floral larger lanceolate-subulate scarious, flowers large sessile, sepals ovate-lanceolate acuminate with 3 close-set green nerves in the axis much smaller than the broad obovate petals.

Tibetan region of the SIKKIM HIMALAYA, alt. 15–16,000 ft., *J. D. H.*

Forming large subsquarrose green patches, 6–12 in. broad; roots long, woody; branches with the leaves about $\frac{3}{8}$ in. diam. *Leaves* $\frac{1}{2}$ in., rigid, midrib very strong, bright green, shining. *Flowers* $\frac{3}{4}$ in. diam., bracteate by the 2 upper pairs of leaves. *Calyx* truncate, not thickened at the base; sepals $\frac{1}{2}$ in., nerves very strong, approximate. *Petals* $\frac{1}{2}$ in. long, persistent, white, shortly clawed. *Filaments* slender. *Styles* 3, slender. *Capsule* apparently never fertilized, small, subglobose, 6-valved.

10. ***A. pulvinata***, *Edgew.*; densely tufted, branches densely leafy, leaves short subulate from a scarious sheathing base semi-cylindric mucronate margin not thickened strongly ciliate, midrib usually obsolete, flowers sessile, sepals ovate-lanceolate subacute with 3 close-set nerves in the axis much smaller than the obovate petals.

Tibetan region of the SIKKIM HIMALAYA, alt. 15–18,000 ft., *J. D. H.*

Forming small subglobose densely compacted subsquarrose tufts; branches with the leaves on $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., pale green. *Leaves* spreading and recurved, $\frac{1}{4}$ – $\frac{1}{2}$ in., very strongly ciliate, almost fimbriate towards the base, flat above, back convex up to the tip, which is abruptly mucronate. *Flowers* $\frac{1}{2}$ in. diam., not bracteate by the enlarged upper leaves (as in *A. monticola*). *Calyx* rounded and thickened at the base; sepals with hard scarious margins, about half as large as the petals. *Disk-glands* distinct. *Filaments* slender. *Styles* 3, slender. *Capsule* ovoid, about $\frac{1}{4}$ in., shorter than the sepals, 6-valved. *Seeds* obovate-reniform, nearly smooth, pale.

11. ***A. oreophila***, *Hook. f.*; nearly glabrous, densely tufted, stems short densely leafy, leaves spreading and recurved rigid narrowly linear-subulate from a broad sheathing base semi-cylindric acute margins not thickened quite glabrous, midrib obsolete, flowers very shortly pedicelled, sepals nearly orbicular concave nerveless half as long as the narrow obovate-spathulate petals.

Tibetan region of the SIKKIM HIMALAYA, alt. 18,000 ft., *J. D. H.*

Forming small subglobose densely compacted tufts; branches with the leaves $\frac{1}{4}$ – $\frac{3}{4}$ in. diam. *Leaves* nearly $\frac{1}{2}$ in. long, spreading, nearly flat above, convex to the tip beneath; uppermost pair short, bract-like, ciliolate. *Flowers* $\frac{1}{2}$ in. diam., solitary; pedicel shorter than the calyx, stout, puberulous. *Calyx* rounded and somewhat thickened at the base; sepals coriaceous, ciliolate. *Petals* very narrow, tip rounded. *Filaments* slender. *Disk-glands* prominent. *Styles* short. *Capsule* broadly ovoid, obtuse, rather exceeding the sepals, coriaceous, 6-valved to the base. *Seeds* ear-shaped.

14. ***A. globiflora***, *Wall. Cat.* 639; densely tufted, stems short pubescent densely leafy, leaves spreading subulate-lanceolate pungent from a narrow membranous base concave 1-nerved, margin scaberulous, flowers globose,

pedicels short pubescent with several pairs of ovate pungent bracts, sepals orbicular-oblong palmately veined rather shorter than the orbicular-ovate petals. *Fenzl in Ann. Mus. Wien.* i. 60, t. 7. *Cherleria grandiflora*, *Don Prodr.* 214.

Alpine region of the NIPAL HIMALAYA, at Gosain-than, *Wallich*.

Forming small compact hemispherical tufts; roots long, fusiform. *Stems* 1-2 in. *Leaves* 3 in., rigid, base ciliate. *Flowers* $\frac{1}{2}$ in. diam., peduncle about as long, with 2-3 pairs of concave bracts. *Calyx* rounded at the base; sepals membranous, margins very thin, erose. *Petals* retuse. *Filaments* very rigid, subulate, cohering into an annular disk at the base. *Ovary* spherical; styles 2-3, short. *Capsule* much shorter than the sepals, membranous, 6-valved.—*Don* describes the flowers as rose-coloured, which we cannot affirm, and the stigmas as capitate, which is not the case, nor do we find the capsule to be 3-celled, as *Don* says it is.

13. **A. densissima**, *Wall. Cat.* 640; densely tufted, stems clothed with the imbricating leaf-bases, leaves recurved subulate-lanceolate from a narrow base pungent concave nerveless keeled below, margin quite smooth, flowers axillary solitary shortly pedicelled, bracts elliptic concave mucronate, sepals ovate half as long as the very narrow petals. *Fenzl in Mus. Wien.* i. 60, t. 7. *Cherleria juniperina*, *Don Prodr.* 214.

Alpine? region of the NIPAL HIMALAYA, Gosain-than, *Wallich*.

Forming large compact tufts; roots long, woody. *Stems* crowded, 3-4 in., densely leafy, rigid, fragile. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., almost deflexed, shining. *Flowers* very small. *Sepals* subacute, $\frac{1}{10}$ in. long. *Petals* linear-spathulate. *Capsule* globose.

SECT. IV. **Euthalia**. Lax or tufted, usually perennial. *Leaves* ovate or oblong, broad, never subulate. *Flowers* cymose or solitary. *Disk* usually conspicuous. *Capsule* 6-valved. *Seeds* numerous, rarely few.

* *Cymes* few- or many- rarely 1-flowered.

14. **A. serpyllifolia**, *Linn.*; annual, stem pubescent all round excessively branched, branches decumbent or suberect, leaves subsessile ovate acuminate 1-3-nerved ciliate, cymes many-flowered, bracts leafy, sepals 3-5-ribbed pubescent. *Boiss. Fl. Orient.* i. 701; *Wall. Cat.* 637. *A. Wallichiana*, *Seringe in Wall. Cat.* 638.

SUBTROPICAL and TEMPERATE HIMALAYA, from Nipal to Kashmir; ROHILKUND and the PANJAB, alt. 1-11,000 ft.; WESTERN TIBET, alt. 11-13,000 ft., *T. Thomson*.—*DISTRIB.* Afghanistan, Temp. Europe and Asia.

Branching from the root, many-flowered; branches 2-10 in., slender, dichotomously branched, leafy, hairs often recurved. *Leaves* $\frac{1}{4}$ - $\frac{1}{2}$ in., rather rigid. *Flowers* $\frac{3}{4}$ -1 in. diam.; pedicels slender, strict, erect in flower, erect or spreading in fruit. *Sepals* ovate-lanceolate much exceeding the petals. *Capsule* 6-valved, ovoid, about as long as the sepals. *Seeds* tubercled.

15. **A. neelgerrensis**, *Wight & Arn. Prodr.* 43; annual, stem pubescent on one side much branched, branches decumbent, leaves subsessile elliptic or obovate obtuse or mucronulate 1-nerved ciliate, cymes few- or many-flowered, bracts leafy, sepals ovate acute 1-nerved, nerve pubescent.

NORTH-WEST HIMALAYA, alt. 5-10,000 ft., from Jamu to Kashmir, *Jacquemont*, &c. NILGHIRI Mts., *Wight*, &c.

Very similar to *A. serpyllifolia*, but of laxer habit, leaves more elliptic often petiolate sometimes obovate, branches chiefly hairy on one side, sepals usually broader and seeds less tubercled, but these characters are far from satisfactory.—*Wight and Arnott* describe the petals as longer than the sepals, which is not a constant character, and the styles as varying from 2-4.

16. **A. orbiculata**, *Royle mss.*; biennial or perennial?, branches very slender nearly glabrous decumbent, leaves sessile or shortly petioled orbicular or elliptic obtuse or apiculate 1-nerved, petiole ciliate, sepals ovate or lanceolate 1-nerved glabrous.

TEMPERATE HIMALAYA, from Bhotan, *Griffith*, and Sikkim, alt. 8–13,000 ft., to Kashmir, alt. 5–8000 ft.

Much more slender and less dichotomously branched than *A. serpyllifolia*, to which it is closely allied. *Branches* 2–10 in., thinly pubescent chiefly on one side. *Leaves* $\frac{1}{2}$ – $\frac{1}{4}$ in., nearly glabrous. *Flowers* solitary or in few-flowered cymes. *Sepals* about $\frac{1}{2}$ in., nerve often faint. *Petals* shorter than the sepals. *Seeds* many, smooth.—Apparently very near the West Asiatic *A. rotundifolia*, M. Bieb. (Boiss. Fl. Orient. i. 700), but the branches do not root, and the cymes are much fewer-flowered.

** *Flowers solitary*.—Usually small tufted large-flowered alpine species.

17. **A. ciliolata**, *Edgew.*; perennial, hairy, eglandular, laxly tufted, stems short leafy pubescent, leaves ovate or oblong acute cuspidate or acuminate nerveless fringed with long flexuous jointed hairs, flowers large solitary sessile or shortly pedicelled, sepals lanceolate acute ciliate shorter than the broadly obovate white petals.

SIKKIM HIMALAYA; alt. 15–17,000 ft., *J. D. H.*

Perennial, forming rather lax patches; roots fibrous. *Stems* matted, 2–3 in., with 2 obscure lines of hairs. *Leaves* spreading, $\frac{1}{4}$ in., sometimes elliptic, rather thick, obscurely 1-nerved, shining when old, margin obscurely thickened, hairs brown when dry, sometimes scattered over the surfaces, but chiefly confined to the margin. *Flowers* nearly $\frac{1}{2}$ in. diam.; pedicels shorter than the leaves, very pubescent, ebracteate. *Calyx* rather rounded at the base; sepals of the texture of the leaves, edges hardly membranous, nerve obscure. *Petals* with rounded tips. *Filaments* subulate, flattened, connate at the base. *Styles* 3, slender. *Capsule* imperfect, small, globose, 6-valved.

18. **A. glanduligera**, *Edgew.*; densely glandular-pubescent, stems short laxly tufted suberect, leaves lax ovate or elliptic-oblong acute or acuminate flat, nerves obscure, flowers solitary pedicelled terminal erect or inclined, calyx rounded at the base, sepals spreading and recurved linear acute or obtuse glandular much smaller than the obovate rosy petals, capsule 6-valved shorter than the sepals

ALPINE HIMALAYA; Kashmir, *Falconer*; Barji Kang pass, Kumaon, alt. 14,500 ft., *Strach. & Wint.*; interior of Sikkim, alt. 14–18,000 ft., *J. D. H.*

Allied to *A. ciliolata*, and of the same habit, but smaller and densely glandular-pubescent, without the long flexuous articulate hairs of that plant, having also much smaller flowers. *Stems* numerous from the root, 1–2 in., rather stout shining and glabrous below, laxly leafy. *Leaves* $\frac{1}{2}$ – $\frac{1}{4}$ in., pale green, glandular on both surfaces, soft, opaque, margins hardly thickened. *Flowers* $\frac{1}{2}$ – $\frac{1}{4}$ in. diam.; pedicel usually shorter, slender. *Calyx* thickened at the base; sepals with membranous margins. *Filaments* flattened and united at the base in a glandular ring. *Styles* 3. *Capsule* membranous, few-seeded. *Seeds* pale.

19. **A. Stracheyi**, *Edgew.*; quite glabrous, stems short laxly tufted suberect, leaves lax narrow linear-oblong acute or acuminate flat, nerves obscure, flowers solitary pedicelled terminal erect or inclined, sepals suberect lanceolate acuminate smaller than the obovate petals, capsule 6-valved shorter than the sepals.

WESTERN TIBET, north of Kumaon, near Rakas Tal, alt. 15,500 ft., *Strach. & Winterb.*; Ladak, *Stewart*.

This belongs to the same group as *A. glanduligera* and *ciliolata*, and may be recognised by being perfectly glabrous. *Stems* 1–2 in., ascending, simple. *Leaves* fleshy,

$\frac{1}{4}$ – $\frac{1}{2}$ in., very pale when dry, tip acute rather cartilaginous, margins not thickened, midrib very obscure. *Flower* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; pedicel short, stout, ebracteate. *Sepals* coriaceous. *Petals* apparently white. *Seeds* small, somewhat ear-shaped, pale, opaque, nearly smooth.

20. **A. melandryoides**, *Edgew.*; glandular-pubescent, stems laxly tufted suberect, leaves lax oblong-elliptic or oblong-lanceolate obtuse coriaceous 1-nerved, flowers terminal solitary pedicelled nodding, calyx truncate at the base, sepals erecto-recurved obtuse glandular much shorter than the linear rose-coloured petals, capsule 4–6-valved exceeding the calyx.

SIKKIM HIMALAYA, alt. 14–18,000 ft., *J. D. H.*

Perennial; roots slender fibrous. *Stem* 2–4 in. long, laxly fascicled, branched from the base; branches cylindric, erect or ascending, simple or sparingly divided, naked below. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., in rather distant pairs, sessile, dull green or purplish, glandular on both surfaces, almost fleshy. *Flowers* solitary, terminal, rarely axillary, $\frac{3}{4}$ –1 in. diam., pedicel short and curved in flower, densely glandular, much elongated strict and erect in fruit. *Calyx* subcampanulate, thickened at the base; sepals $\frac{1}{2}$ in. long, narrow, green, nerveless, margins not membranous. *Petals* very variable, sometimes $\frac{3}{4}$ in. long, tip rounded. *Filaments* slender. *Disk-glands* inconspicuous. *Styles* 2–3. *Capsule* ovoid, exceeding the calyx, 4- or 6-valved, membranous. *Seeds* large, irregularly formed, testa pale spongy (young seeds orbicular and broadly winged).—A very curious plant, with something of the habit of *Stellaria cerastioides*, very glandular, with pink or purplish flowers. It unites this section with the following. The testa is very lax and appears in the immature seed as a broad white wing around the undeveloped nucleus.

SECT. V. **Lepyrodiclis**, *Fenzl* (gen.). Flaccid usually tall herbs. *Leaves* broad, flat. *Petals* often erose or lacerate. *Flowers* cymose. *Disk* annular or obsolete. *Styles* 2, rarely 3. *Capsules* 2–6-valved, membranous, 1–6-seeded. *Seeds* with a thick or tubercled testa.—This section is usually upheld as a genus and described as having a distinct disk, 2–3-valved capsule, and only 2–4 seeds, but we find none of these characters to hold good.

21. **A. holosteoides**, *Edgew.*; a tall slender flaccid glabrous or puberulous much branched herb, leaves linear or linear-oblong from a broad sessile cordate base acute or acuminate, cymes few-flowered, pedicels slender divaricate, sepals obtuse and petals very variable, tip retuse not lacerate, capsule 2–6-valved 1–6-seeded, seeds large tubercled. *Lepyrodiclis holosteoides*, *Fenzl in Ledeb. Fl. Ross.* i. 359; *Boiss. Fl. Orient.* i. 686. *Gouffea crassiuscula*, *Camb. in Jacq. Voy. Bot.* t. 30.

WESTERN TEMPERATE HIMALAYA and WESTERN TIBET, from Kumaon to Kashmir, alt. 7–12,000 ft., *Jacquemont*, &c.—DISTRIB. Afghanistan, Soongaria, and Westward to Asia Minor.

Whole plant glabrous or glandular-pubescent. *Stem* 2–3 ft., much dichotomously branched, shining and striate when dry. *Leaves* 1–3 in., spreading, midrib and very oblique nerves exceedingly slender. *Cymes* pedicelled. *Flowers* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., white, nodding; pedicels $\frac{1}{2}$ – $\frac{1}{2}$ in., ebracteate. *Calyx* not thickened at the base; sepals from linear-lanceolate to broadly ovate-oblong, green with membranous edges, glabrous or very hairy and glandular at the back. *Petals* equalling or exceeding the sepals, linear-spathulate or broadly obovate, notched or retuse. *Filaments* with broad flattened free bases. *Disk* 0. *Styles* 2–3, filiform, elongate. *Capsule* subglobose, shorter than the calyx, very membranous, variable in size, 2–6-valved to the base. *Seeds* on tumid funicles, variable in number and size, turgid, red brown or blackish, with concentric rows of acute tubercles; cotyledons long flattened, radicle short.—We do not find the subhypogynous gland described by *Fenzl* (in *Ledebour*, l.c.), nor any disk in this and the two following species. A most variable plant, especially in the sepals petals capsule and number of seeds.

22. **A. Benthami**, *Edgew.*; tall, slender, flaccid, glandular-pilose, much branched, leaves sessile ovate acute hairy on both surfaces, cymes few- or many-flowered, pedicels slender divaricate, sepals oblong- or linear-lanceolate, petals obovate-spathulate lacerate, capsule 2-6-valved. *Adenostemma glandulosum*, *Benth. in Wall. Cat.* 645.

TEMPERATE HIMALAYA; Kumaon, *Blinkworth*; Sikkim, alt. 10-12,000 ft., *J. D. H.* Stems 2-3 ft. high, clothed with spreading jointed glandular hairs. *Leaves* $\frac{3}{4}$ -1 $\frac{1}{2}$ in., the lower petioled, midrib indistinct, nerves obsolete, margins ciliate. *Cymes* peduncled. *Flowers* $\frac{1}{2}$ in. diam., nodding; pedicels slender, deflexed in fruit, ebracteate. *Calyx* not thickened at the base; sepals very glandular, erect and recurved, green with narrow membranous margins. *Petals* longer than the calyx, white. *Disk* obsolete. *Filaments* slender, dilated below, but hardly connate. *Styles* usually 2, not so capillary as in *A. holosteoides*. *Capsule* usually 4-valved, smaller than the calyx. *Seeds* few, with a thick spongy opaque hardly tubercled testa.

23. **A. debilis**, *Hook. f.*; stems solitary or laxly tufted flaccid glandular-pilose sparingly branched or simple, leaves sessile elliptic-ovate obtuse hairy especially above, flowers solitary terminal or in few-flowered cymes, pedicels divaricate, sepals linear-lanceolate petals obovate, tip erose.

ALPINE SIKKIM HIMALAYA; alt. 14-16,000 ft. *J. D. H.*

Very like a small form of *A. Benthami*, but smaller in all its parts; leaves more obtuse; flowers not $\frac{1}{2}$ in. diam.; petals not lacerate and broader, merely irregularly toothed at the tip; filaments much shorter inserted on an evident thickened annular disk—Small states come very near *A. glanduligera*, which however may at once be distinguished by the large flower acute leaves and the petals.

24. **A. tenera**, *Edgew.*; glabrous or pubescent, stems filiform flaccid intricately branched, leaves long-petioled elliptic or ovate- or oblong-lanceolate acute, flowers small axillary, pedicels capillary, sepals ovate-oblong or lanceolate acute half as long as the linear quite entire petals. *Lepyrodiclis tenera*, *Boiss. Fl. Orient.* i. 669.

WESTERN TEMPERATE HIMALAYA; Kishtwar and Banahal, alt. 6-8000 ft., *T. Thomson*.—DISTRIB. Afghanistan.

A very slender intricately tufted annual, with stems 2-3 ft. long. *Leaves* scattered, membranous, $\frac{1}{2}$ - $\frac{3}{4}$ in., petiole often longer than the blade, capillary. *Flowers* usually axillary, $\frac{3}{8}$ - $\frac{1}{2}$ in. diam.; pedicels divaricate, $\frac{1}{2}$ -1 in. *Sepals* variable in form, erect and conniving in flower, then spreading, ciliate at the back. *Petals* white, gradually dilated upwards. *Filaments* very slender, hardly united at the base. *Disk* obsolete. *Capsule* globose, smaller than the sepals, usually 4-valved and 4-seeded. *Seeds* subglobose, with concentric series of acute tubercles.—In the Afghan specimens the petals appear lacerate, but it is exceedingly difficult to lay them out after being dried without rupturing the apices.

14. **SAGINA**, Linn.

Small annual or perennial herbs. *Leaves* subulate, connate at the base; stipules 0. *Flowers* solitary, small, axillary and terminal, pedicelled. *Sepals* 4-5. *Petals* 4-5, entire or 0. *Stamens* 4, 5, 8, 10, perigynous. *Ovary* 1-celled; styles 4-5 (and valves of capsule) opposite the sepals; ovules numerous. *Capsule* 4-5-valved to the base. *Seeds* reniform.—DISTRIB. Temperate regions; species 8.

1. **S. procumbens**, *Linn.*; perennial, stems many tufted, primary shoots flowerless, lateral slender with fascicled usually procumbent and rooting branches, sepals 4-5 spreading in fruit, petals very small. *Boiss. Fl. Orient.* i. 662.

TEMPERATE and ALPINE HIMALAYA, and WESTERN TIBET, alt. 7-14,000 ft., ascending to 16,000 ft. in Sikkim.—DISTRIB. N. and S. Temperate Zones.

Whole plant 1-6 in., bright green. *Leaves* glabrous or ciliate, usually mucronate. *Flowers* globose, green, rarely 5-merous, $\frac{1}{2}$ in. diam., pedicels erect or curved at the tip. *Sepals* obtuse. *Capsule* a little longer than the sepals.

VAR. pentamera; flowers pentamerous.—This may be referable to *S. Linnæi*, Presl. (*saxatilis*, Wimmer), but differs in the short petals.

15. **THYLACOSPERMUM**, Fenzl.

A most densely tufted herb. *Leaves* minute, most densely imbricate, short, acute; stipules 0. *Flowers* solitary, sessile in the tips of the branches. *Calyx-tube* obconic, 4-5-lobed, lobes suberect. *Petals* 4-5, small, obovate-spathulate. *Stamens* 8-10, inserted on the edge of a disk lining the calyx-tube. *Ovary* 1-celled; styles 2-3, filiform; ovules few. *Capsule* coriaceous, spherical, 4-6-valved. *Seeds* few, large, with a soft loose cellular testa.

1. *T. rupifragrum*, Schrenk. *Periandra cæspitosa*, Cambess. in Jacq. *Voy. Bot.* 27 and t. 29 (Flourensia). *Bryomorpha rupifraga*, Kar. & Kir. *Enum. Pl. Soong.* *Arenaria rupicola*, Fenzl in Ledeb. *Fl. Ross* i. 780.

ALPINE WESTERN TIBET, alt. 15-18,000 ft., Jacquemont, &c.—DISTRIB. Soongaria.

Forming large hemispheric cushions a foot across and more, quite glabrous. *Leaves* $\frac{1}{4}$ - $\frac{1}{2}$ in., suberect, or spreading most densely 5-fariously imbricate, ovate, acuminate, pungent, shining, nerveless, back convex, concave above with thickened margins. *Flowers* $\frac{1}{10}$ in. diam. *Capsules* shining, 4- or irregularly 6-valved. *Seeds* very large, irregularly compressed, almost white.—A very singular plant in habit, closely allied to *Arenaria densissima*, &c.

16. **SPERGULA**, Linn.

Annual or perennial herbs, with forked or fascicled branches. *Leaves* opposite, often with leafy buds in their axils, whence the foliage appears to be whorled; stipules small, scarious. *Flowers* in peduncled paniced cymes. *Sepals* 5. *Petals* 5, entire. *Stamens* 5 or 10, rarely fewer, inserted on a perigynous disk. *Ovary* 1-celled; styles 3 or 5, ovules many. *Capsule* with 3 or 5 entire valves. *Seeds* compressed, margined or winged.—DISTRIB. Weeds of cultivated grounds; species 2-3.

The valves of the capsule are described as opposite to the sepals, but this does not hold good where there are but 3 valves and 5 sepals.

* Leaves apparently whorled.

1. *S. arvensis*, Linn.; green, leaves in false whorls linear-subulate $\frac{1}{2}$ -terete grooved beneath rather fleshy, petals obtuse white, seeds keeled or narrowly winged granulate or papillose. *Boiss. Fl. Orient.* i. 731.

Cultivated fields in various cool parts of INDIA; and throughout the Northern hemisphere.

Pubescent or glandular. *Stems* $\frac{1}{2}$ -2 ft., branched from the root, geniculate. *Leaves* $\frac{1}{2}$ -2 in., slender, spreading. *Flowers* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., subumbellate; pedicels slender, spreading or deflexed. *Sepals* ovate, obtuse. *Petals* white. *Capsule* subglobose, shining. *Seeds* black.

2. *S. pentandra*, Linn.; glaucous, leaves in false whorls linear-subulate terete not grooved beneath, petals lanceolate-acute white, seeds plano-compressed smooth, wing often as broad as the striate nucleus. *Boiss. Fl. Orient.* i. 731. *Arenaria flaccida*, Roxb. *Fl. Ind.* ii. 447.

In the same situations as *S. arvensis*, and with the same distribution.

I am unable to distinguish this in a dried state from the preceding. I find 3 styles very frequently, as described by Roxburgh, which does away with the difference between the genera *Spergula* and *Spergularia*, to which latter the following species belongs.

**** Leaves opposite.**

3. ***S. rubra*, Linn.** (*Arenaria*); suberect or prostrate, glandular-pubescent, leaves simply opposite linear flat, stipules cleft, sepals lanceolate-obtuse, petals pink or white, seeds wingless scabrid, margin somewhat thickened. *Spergularia rubra*, *St. Hil.*; *Boiss. Fl. Orient.* i. 732.

Plains of the PANJAB, *Edgeworth, &c.*—DISTRIB. N. and W. Asia, Europe.

Root fusiform, annual. *Stems* much branched from the base, 4–8 in. *Leaves* $\frac{1}{2}$ –1 in., fleshy; stipules broad, silvery. *Flowers* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., subglobose; pedicels divaricate or deflexed. *Sepals* green, with membranous borders, obtuse. *Petals* obovate, obtuse; shorter than the sepals. *Stamens* 5 or 10. *Styles* 3. *Capsule* ovoid, longer than the sepals. *Seeds* pale-brown, irregularly reniform or pyriform. This is usually referred to another genus *Spergularia*, Persoon (*Lepigonum*, Fries), which differs from *Spergula* in having only 3 styles; but the prevalence of 3 styles in the typical species of *Spergula* in India, renders this character valueless as a generic one.

17. **DRYMARIA**, Willd.

Diffuse or suberect dichotomously branching herbs. *Leaves* opposite, flat; stipules small, often fugacious. *Flowers* axillary or terminal, solitary or cymose. *Sepals* 5, herbaceous. *Petals* 5, 2–6-fid. *Stamens* 5, rarely fewer, slightly perigynous. *Ovary* 1-celled; style 3-fid; ovules few or numerous. *Capsule* 3-valved. *Seeds* globose, reniform or compressed, hilum lateral, embryo curved.—DISTRIB. Species 16, all Tropical American except the following and an Australian species.

1. ***D. cordata*, Willd.**; glabrous, leaves ovate-cordate elliptic or orbicular petioled, petals 2-lobed shorter than the sepals. *Wight & Arn. Prodr.* 359. *D. extensa*, *Wall. Cat.* 647. *Cerastium cordifolium*, *Roxb. Fl. Ind.* ii. 458.

Tropical and subtropical INDIA and CEYLON, extending westwards to the Panjab and ascending the Himalaya to 7000 ft. in Sikkim.—DISTRIB. Tropical Asia, Africa, and America.

A diffuse glabrous shrub, branched from the base; branches 1–3 ft., slender. *Leaves* 3–5-nerved from the base, mucronate; petioles variable; stipule of several bristles. *Flowers* $\frac{1}{2}$ – $\frac{1}{4}$ in. diam., in axillary and terminal cymes; pedicels slender; bracts with membranous edges. *Calyx* obconic at the very base; sepals oblong, with 3 strong nerves, and membranous margins. *Petals* 2-lobed to below the middle, lobes narrow not exceeding the sepals. *Stamens* 3–5. *Style* short; ovules 3 or more. *Capsule* ovoid, 3-gonous, shortly pedicelled, 3-valved to the base; 1- ∞ -seeded. *Seeds* orbicular, compressed, muricate.

18. **POLYCARPON**, Linn.

Diffuse or dichotomously branched, glabrous or pubescent herbs. *Leaves* flat, opposite, appearing whorled from the presence of axillary fascicles of leaves; stipules scarious. *Flowers* small, in crowded many-flowered cymes with scarious bracts. *Sepals* 5, keeled. *Petals* 5, small, hyaline, entire or toothed. *Stamens* 3–5. *Ovary* 1-celled; style short, 3-fid; ovules numerous. *Seeds* ovoid, hilum subbasal; embryo almost straight or incurved, cotyledons incumbent or oblique.—DISTRIB. Species about 6, natives of various tropical and warm climates.

1. **P. Lœflingiae**, *Benth. & Hook. f. Gen. Pl.* i. 153, *in note*; glabrous or more or less pubescent, leaves cuneate linear oblong or spatulate, cymes terminal or in the forks, petals linear truncate tip toothed. *P. depressa*, *DC. Prodr.* iii. 375. *P. lanuginosa*, *Wall. Cat.* 1515 b and ? *P. Benthamii*, 1514. *Lœflingia indica*, *Retz. Obs.* 38; *Roxb. Fl. Ind.* i. 165; *Pharnaceum depressum*, *Linn. Mant. n.* 564. *Hapalosa Lœflingiae*, *Wall. Cat.* 6962; *Wight & Arn. Prodr.* 358.

Throughout the hotter parts of INDIA, in fields and waste places.—DISTRIB. Tropical Asia and Africa.

A weed, erect or diffuse; branches 6–10 in. *Leaves* $\frac{1}{4}$ – $\frac{3}{4}$ in., acute or obtuse. *Cymes* fascicled or paniced. *Flowers* $\frac{1}{4}$ in. diam. *Sepals* subequal, obtusely keeled. *Petals* entire or notched. *Seeds* subcylindric, hilum lateral and subbasal; embryo nearly straight.

19. **POLYCARPÆA**, Lamk.

Annual or perennial, usually erect herbs. *Leaves* flat, opposite, or appearing whorled from the presence of axillary fascicles of leaves; stipules scarious. *Flowers* numerous, in effuse or contracted or capitate cymes. *Sepals* 5, scarious and often coloured, rarely scarious at the margins only. *Petals* 5, entire 2-toothed or with the margins erose. *Stamens* 5, subperigynous, free or cohering together and with the petals into a tube. *Ovary* 1-celled; style slender 3-fid or 3-dentate; ovules numerous. *Capsule* 3-valved. *Seeds* obovoid or compressed. *Embryo* curved, rarely straight.—DISTRIB. Species about 24, natives of warm climates.

1. **P. corymbosa**, *Lamk. Ill. n.* 2798; hoary tomentose or glabrescent, leaves narrow linear or subulate pseudo-verticillate, stipules lanceolate or subulate, cymes terminal, sepals lanceolate very acute much exceeding the capsules. *DC. Prodr.* iii. 374; *Wall. Cat.* 1571; *Wt. Ic. t.* 712; *W. & A. Prodr.* 358. *P. spadicea*, *Lamk. DC. Lc.* 374; *W. & A.* 357; *Wall. Cat.* 1512 b; *Wt. in Hook. Comp. Bot. Mag.* ii. t. 6. *P. densiflora*, *Wall. Cat.* 1513. *P. indica*, *Lamk. Encycl. v.* 483. *Paronychia subulata*, *Lamk. Encycl. v.* 25. *Achyranthes corymbosa*, *Linn.*; *Willd.* *Celosia corymbosa*, *Willd.*? *Roxb. Fl. Ind. i.* 681. *Mollia spadicea* and *corymbosa*, *Willd.*? *Spreng. Syst. i.* 795. *Lahaya spadicea* and *corymbosa*, *Schult.*? *Syst. v.* 405; *Burm. Zeyl. t.* 65, f. 2.—*Rheede Hort. Mal. t.* 66.

WESTERN PENINSULA, and Ceylon, CENTRAL and N.W. INDIA, and SINDH, ascending the WESTERN HIMALAYA to 7000 ft.; BIRMA, *Wallich*.—DISTRIB. Tropical Asia, Africa, Australia, and America.

An erect or decumbent annual or perennial herb, 6–12 in. high, much dichotomously branched. *Leaves* $\frac{1}{2}$ –1 in., acuminate acute or obtuse, much exceeding the stipules. *Flowers* $\frac{1}{2}$ in. diam., in dense excessively branched silvery cymes. *Sepals* scarious, white or coloured, glabrous or pilose, much exceeding the petals and the capsule.—Dr. Wight found it impossible (*Ill. ii.* 44) to separate *P. spadicea* from *P. corymbosa*, even as a well marked variety, and we may add that we have equally failed to discriminate either those species or their synonymy.—The following seems to be a well-marked form, to which the name *spadicea* might have been applied with propriety.

VAR. *aurea*, *Wight Ill. ii.* 44, t. 110; smaller, densely tomentose, excessively branched, flowers much smaller highly-coloured.

2. **P. diffusa**, *Wight & Arn. in Ann. Nat. Hist.* iii. 91; glabrous, slender, leaves narrow-linear or subulate pseudo-verticillate, sepals ovate-lanceolate very acute not much exceeding the petals or capsule. *Wight Ill. ii.* 44.

WESTERN PENINSULA; near Tuticoreen, *Wight*.

Branches 6–18 in. high. *Leaves* obtuse, $\frac{1}{4}$ – $\frac{1}{2}$ in.; stipules lanceolate. *Cymes* puberulous, lax, very many-flowered. *Flowers* $\frac{1}{12}$ in. long.

3. **P. spicata**, *Wight & Arn. in Ann. Nat. Hist.* iii. 91; annual, glabrous, leaves obovate-spathulate radical rosulate, cymes densely fasciated or semiumbellate, flowers subspicate, sepals lanceolate or ovate-lanceolate acute much exceeding the petals and capsule. *P. staticæformis*, *Hochst. & Steud.*

WESTERN PENINSULA, at Tuticoreen, *Wight*; SINDH, *Stocks*.—DISTRIB. Arabia, Egypt, N. Australia.

A small herb 2–5 in. high; branches strict, filiform, erecto-patent from the root, bearing tufts of leaves and umbelled cymes. *Leaves* petioled, $\frac{1}{4}$ – $\frac{1}{2}$ in., rather fleshy, nerveless; stipules scarious, lacerate. *Cymes* $\frac{1}{2}$ in. diam., long peduncled. *Flowers* subsecund, crowded, $\frac{1}{8}$ in. long, bracts and sepals acute, scarious, white, with a highly coloured broad herbaceous midrib. *Petals* very small, oblong, obtuse. *Capsule* rather more than half the length of the sepals. *Seeds* shining.

ORDER XIX. PORTULACÆ. (By W. T. Thiselton Dyer, F.L.S.)

Herbs, rarely undershrubs. *Leaves* opposite or alternate, entire; nodes with scarious or hairy appendages, rarely naked. *Inflorescence* various. *Sepals* 2, imbricate. *Petals* 4–5, hypogynous or perigynous, free (or united below), fugacious. *Stamens* 4– ∞ , inserted with (rarely upon) the petals, filaments slender; anthers 2-celled. *Ovary* free, or $\frac{1}{2}$ -inferior, 1-celled; style 2–8-fid, divisions stigmatose; ovules 2– ∞ , on basal funicles or a central column, amphitropal. *Capsule* with transverse or 2–3-valvular dehiscence. *Seeds* 1– ∞ , compressed; embryo curved round a mealy albumen.—DISTRIB. Cosmopolitan, chiefly American; genera 15, species about 125.

Ovary half-adnate	1. PORTULACA.
Ovary free	2. TALINUM.

1. PORTULACA, Linn.

Diffuse, usually succulent, annual or perennial herbs. *Leaves* with scaly or hairy nodal appendages. *Flowers* terminal, surrounded by a whorl of leaves, solitary or clustered. *Sepals* connate below, the free part deciduous. *Petals* 4–6, perigynous or epipetalous. *Ovary* $\frac{1}{2}$ -inferior; style 3–8-fid; ovules ∞ . *Capsule* crustaceous, dehiscing transversely. *Seeds* ∞ , reniform.—DISTRIB. Tropical regions, chiefly American; one or two are cosmopolitan weeds extending to temperate regions; species 16.

* Leaves flat.

1. **P. oleracea**, *Linn.*; nodal appendages scarious minute or 0, leaves cuneate-oblong. *Roxb. Fl. Ind.* ii. 463; *W. & A. Prodr.* 356. *P. lævis*, *Ham. in Wall. Cat.* 6841. *P. suffruticosa*, *Thw. Enum.* 24 (not of *Wight*).

Throughout INDIA, ascending to 5000 ft. in the Himalayas.—DISTRIB. All warm climates.

An annual usually prostrate herb, $\frac{1}{2}$ –1 ft., subsucculent and glabrous. *Leaves* $\frac{1}{4}$ – $1\frac{1}{2}$ in., rounded-truncate; petiole very short. *Inflorescence* of few-flowered terminal heads, either solitary, or in dichotomous cymes. *Flowers* sessile, with a few ovate, pointed, scarious scales. *Petals* 5, about equalling the sepals, yellow. *Stamens* 8–12. *Style* 3–8-fid. *Seeds* tubercled-punctate.—An excellent salad.

VAR. erecta; erect, leaves spathulate-linear brighter green; *P. oleracea*, *var. sylvestris*, *Hb. Royle* (not of *DC.*).—N.W. India.

2. **P. Wightiana**, Wall. Cat. 6845; nodal appendages whorled scarious, leaves oblong or ovate-lanceolate. *W. & A. Prodr.* 356.

WESTERN PENINSULA; in the Carnatic, and CEYLON.

Stems much branched, prostrate, stunted; the approximate joints naked below, clothed with scarious appendages, and sparingly leafy above. *Leaves* $\frac{1}{2}$ in., alternate, acute, margins recurved; nodal appendages about six in a whorl, equalling the leaves, imbricate, lanceolate, acute, persistent. *Flowers* terminal, solitary, sessile, surrounded by a few leaves and tufted appendages. *Sepals* about $\frac{1}{2}$ in., broadly ovate-lanceolate. *Petals* 5, obovate, with netted veins. *Stamens* 5 (or more?) shorter than the petals. *Style* filiform, 4-fid to $\frac{1}{2}$ its length. *Seeds* numerous, granulate.

3. **P. quadrifida**, Linn.; annual, nodal appendages pilose, leaves ovate or ovate-lanceolate. *Wight Ill.* ii. t. 109; Wall. Cat. 6843. *P. meridiana*, Linn.; Roxb. *Fl. Ind.* ii. 463. *P. geniculata*, Royle *Ill.* 221. *Illecebrum verticillatum*, Burm. *Ind.* 66; *Rheede Hort. Mal.* x. t. 31.

Throughout the warmer parts of INDIA and CEYLON.—DISTRIB. Tropical Asia and Africa.

Stems diffuse, filiform, rooting at the nodes. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., opposite, very shortly petioled; nodal appendages more or less copious. *Flowers* terminal, solitary. *Calyx-tube* $\frac{1}{2}$ –immersed in the extremity of the axis, surrounded by a 4-leaved involucre and long silky hairs. *Petals* 4 (yellow). (*Stamens* 8–12.) *Style* filiform, 4-fid to the middle. *Seeds* minutely tubercled.—Stunted specimens have the habit of *Polygonum herniarioides* which has been mistaken for this species.

** Leaves terete.

4. **P. tuberosa**, Roxb. *Hort. Beng.* 91; *Fl. Ind.* ii. 464; perennial stems short spreading from a tuberous root. *P. cristata*, Ham. and pilosa, *Hb. Madr. in Wall. Cat.* 6844, not of Linn.

BEHAR, Hamilton; SINDH, Stocks; WESTERN PENINSULA; CEYLON.

Root 2–3 in., slightly fusiform, with a few branches towards the extremity, villous. *Stems* 2–3 in., spreading. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., alternate, fleshy, linear; nodal appendages $\frac{1}{2}$ in., of sparingly tufted brown hairs. *Flowers* (yellow) in small terminal clusters, surrounded by about 8 leaves and tufted hairs. *Stamens* 20– ∞ . *Style* filiform, 5-cleft. *Seeds* black, granular.—Closely allied to the Australian *P. napiformis*, F. Muell.

5. **P. suffruticosa**, Wight in Wall. Cat. 6842; annual, stems erect. *W. & A. Prodr.* 356.

WESTERN PENINSULA, Wight.

Root annual, woody, divided. *Stem* about 1 ft., subligneous at the base, breaking up into numerous ascending branches. *Leaves* about $\frac{1}{2}$ in., acute; nodal appendages setose, scanty, very short, brown. *Flowers* in small terminal clusters, surrounded by about 8 leaves, and setose appendages equalling about $\frac{1}{2}$ the base of the capsule. (*Stamens* about 16. *Style* 5-cleft to the middle, *W. & A.*) *Seeds* very small, with concentric rows of minute tubercles.—Allied to the tropical African *P. foliosa*, Ker, which differs chiefly in habit, from the production of lateral flower-bearing shoots overtopping the primary terminal heads.

2. TALINUM, Adans.

Succulent herbs or shrubs. *Leaves* flat, exstipulate. *Flowers* racemed or paniced. *Petals* 5, hypogynous. *Stamens* ∞ . *Ovary* superior; style 3-fid; ovules ∞ . *Capsule* globose or ovoid, 2–3 valved. *Seeds* subglobose or compressed, strophiolate.—DISTRIB. Warm countries throughout the world.

1. **T. cuneifolium**, Willd.; Roxb. *Fl. Ind.* ii. 465. *T. indicum*, *W. & A. Prodr.* 356; Wall. Cat. 6847:

NIPAL, Wallich; WESTERN PENINSULA, Wight.—DISTRIB. Arabia, Africa.

Stems shrubby, erect, striate. *Leaves* 1-2 in., cuneiform-obovate, uppermost mucronate. *Flowers* in a terminal subdichotomously branched panicle, with small acuminate membranous-edged bracts; pedicels decurved in fruit. *Petals* 4, purple. *Sepals* $\frac{1}{2}$ in. long, broadly ovate, margins membranous, rather obtuse. *Style* very short, 3-fid. *Capsule* globose, about $\frac{1}{4}$ in. diam.

ORDER XX. TAMARISCINÆ. (By W. T. Thiselton Dyer, F.L.S.)

Undershrubs, bushes, or small trees. *Leaves* alternate, very minute, often scale-like, exstipulate, rarely sheathing, sometimes fleshy or impress-punctate. *Flowers* solitary or in spiked or paniced racemes, regular, rarely 1-sexual. *Sepals* and *petals* each 5, rarely 4, imbricate, free or connate below. *Stamens* 5-10- ∞ , inserted on the disk, free or connate below; anthers versatile. *Disk* hypogynous or subperigynous, 10-glandular. *Ovary* free, 1-celled, or imperfectly septate; styles 2-5, free or connate, or stigmas 3-5, sessile; ovules 2- ∞ on each basal placenta, anatropous, raphe ventral, micropyle inferior. *Capsule* 3-valved. *Seeds* erect, plumed or winged; albumen floury, subfleshy or 0; embryo straight, cotyledons flat.—DISTRIB. Cold, temperate and hot regions, often in saline or sandy plains; genera 5, species about 40.

Stamens free, styles 3 1. TAMARIX.
Stamens connate, stigmas sessile 2. MYRICARIA.

1. TAMARIX, Linn.

Bushes or small trees. *Leaves* scale-like, amplexicaul or sheathing. *Inflorescence* of lateral or terminal spikes or dense racemes; flowers white or pink. *Stamens* 4, 5, 8 or 10; anthers apiculate. *Disk* more or less lobed from varying confluence of the glands. *Ovary* narrowed upwards; styles 3-4, short, dilated into the stigmas; placentas basal; ovules many. *Seeds* with a sessile plume, exalbuminous; embryo ovoid.—DISTRIB. Of the Order; species about 20.

* Stamens 5.

1. **T. gallica**, Linn.; leaves not sheathing smooth subulate or scale-like acute, disk 5-lobed.

Throughout INDIA from the N.W. HIMALAYA to BURMA and CEYLON, near rivers and along the sea coast.—DISTRIB. W. and S. shores of Europe, N. and Tropical Africa, S. Asia.

A bush or small tree; branches slender. *Flowers* $\frac{1}{2}$ in. diam., shortly pedicelled in slender paniced spike-like racemes. *Sepals* triangular-ovate, much shorter than the petals. Glands of *disk* more or less coalescing in pairs. *Ovary* sub-3-gonous, subsessile; styles 3, articulated to the ovary, slightly connate.—Divided into numerous species differing in minute and uncertain characters.

VAR. 1. *indica*, Willd. in Act. Nat. Cur. Berol. iv. 214 (sp.); usually green, branchlets divaricate, leaves semi-amplexicaul, lobes of the disk entire or nearly so. T. *indica*, Kæn. ex Roxb. Fl. Ind. ii. 100 (excl. syn.). T. *gallica*, Wight Ill. t. 24 A. T. *epacroides*, Sm. in Rees Cycl. T. *articulata*, Wall. Cat. 3756 a and d.—Common.

VAR. 2. *Pallasii*, Desv. in Ann. Sc. Nat. iv. 349 (sp.); glaucescent or glaucous, branchlets erect, leaves shortly decurrent, lobes of the disk deeply emarginate. Boiss. Fl. Orient. i. 773. T. *ramosissima*, Ledeb. Ic. Fl. Ross. t. 256.—Western Tibet, alt. 8-12,000 ft.

2. **T. salina**, Dyer; leaves cordiform subamplexicaul strongly impress-punctate.

WESTERN PANJAB; Salt Range at Caffir Kote and Esakhail, Fleming.

A glabrous glaucous shrub, with the habit of *T. passerinoides*, Del.; Boiss. *Fl. Orient.* i. 778. *Bracts* linear, equalling the flowers in length. *Stamens* equalling the ovary; filaments dilated at the base, confluent with the disk-glands. *Stigmas* sessile. *Capsule* not seen.

3. **T. dioica**, *Roxb. Hort. Beng.* 22; *Fl. Ind.* ii. 101; leaves sheathing, flowers dicecious in rather short dense peduncled spikes. *Griff. Notul.* iv. 465, ic. 577, f. 2; *Wall. Cat.* 1241; *W. & A. Prodr.* 40; *Boiss. Fl. Orient.* i. 777. *T. articulata*, *Wall. Cat.* 3756, b & c (not of Vahl).

From SINDH and the PANJAB to ASSAM, the WESTERN PENINSULA and BIRMA, near rivers and on the sea coast.

A small tree. *Branches* with drooping extremities; ultimate branchlets elongate, patent-fastigate. *Leaves* glabrous, green, obliquely truncate and acuminate. *Spikes* paniced, 1-2 in., about equalling their peduncles. *Bracts* triangular, acuminate. *Flowers* $\frac{1}{2}$ in. diam., pink. *Stamens* inserted in the notches of the 5-lobed disk; anthers purple.

4. **T. articulata**, *Vahl, Symb.* ii. 48, t. 32; hoary with impress-punctate glands, leaves sheathing, spikes lax usually sessile. *Boiss. Fl. Orient.* i. 777. *T. orientalis*, *Forsk. Descr.* 206. *T. Pharas*, *Ham. ex Wall. Cat.* 3758. *Thuya aphylla*, *Linn. Amœn. Acad.* iv. 295.

Abundant in SINDH and the PANJAB; often cultivated.—DISTRIB. Beluchistan and westward to Egypt and S. Africa.

A bush or coniferous-looking tree. *Branchlets* fastigate, elongate, slender, cylindric, jointed. *Leaves* reduced to a very short sheath with a minute tooth. *Spikes* slender, more or less interrupted. *Bracts* sheathing, acute. *Flowers* $\frac{1}{2}$ in. diam., subsessile. *Stamens* inserted in alternate notches of the 10-lobed disk.—The Cape form is *T. usneoides*, E. Mey.

** Stamens 10. (*Pleiandræ*. Bge.)

5. **T. ericoides**, *Rottl. in Nov. Act. Nat. Cur. Berol.* iv. 214. t. 4; leaves impunctate sheathing-amplexicaul, glands of the disk separating the filaments. *T. mucronata*, *Smith in Rees Cycl.* *T. tenacissima*, *Ham. ex Wall. Cat.* 3757. *Myricaria vaginata*, *Desv. in Ann. Sc. Nat.* iv. 350. *Trichaurus ericoides*, *W. & A. Prodr.* 40; *Wight Ill.* t. 24 B; *Ic.* 22; *Camb. in Jacq. Voy. Bot.* 58, t. 70.

CENTRAL INDIA, BENGAL, the WESTERN PENINSULA and CEYLON.

A shrub; stems slender, branchlets fastigate. *Leaves* minute, scale-like, ovate-lanceolate, acuminate. *Flowers* $\frac{1}{4}$ in. diam., pale rose-pink, in terminal racemes 4-6 in. *Stamens* not exceeding the petals, alternately long and short. *Capsule* $\frac{1}{2}$ in.—Approaches *Myricaria* in habit.

6. **T. stricta**, *Boiss. Fl. Orient.* i. 778; hoary with impress-punctate glands, leaves closely sheathing, glands of the disk passing into the slightly dilated bases of the filaments.

SINDH, *Stocks*.—DISTRIB. Beluchistan.

Habit of *T. articulata*, Vahl, from which according to Boissier it is distinguished by the thicker branchlets more remote leaves and subsessile stigmas, besides the different number of stamens.

2. MYRICARIA, Desv.

Fastigate shrubs. *Leaves* small, narrow, sessile, often crowded. *Inflorescence* of lateral or terminal spike-like racemes; flowers rose-pink. *Stamens* 10, alternately long and short, monadelphous. *Disk* almost obsolete. *Ovary* tapering with 3 sessile stigmas; placentas basal, very short, adnate to the middle of the valves; ovules many. *Seeds* exalbuminous with a usually

stalked plume; embryo ovoid.—DISTRIB. Europe, Mid-Asia; known species 4?

1. **M. germanica**, *Desv. in Ann. Sc. Nat.* iv. 349; bracts ovate-lanceolate 3-4 times as long as the pedicels, sepals free lanceolate, stamens connate for half their length. *M. bracteata*, *Royle Ill.* 214, t. 44; *Boiss. Fl. Orient.* i. 763. *M. Hoffmeisteri*, *Klotz. Reis. Pr. Waldem.* 120, t. 25 (plume sessile). *Tamarix germanica*, *Linn.*

TEMPERATE and ALPINE HIMALAYA; from SIKKIM to KUMAON, alt. 10-14,000 ft.—DISTRIB. Westward to Europe.

A bush, 4-8 ft. *Stems* slender, striate, glaucous-green when young. *Leaves* linear-lanceolate. *Racemes* 1-18 in., spiked, lateral or terminal. *Bracts* with broadly membranous margins. *Sepals* about equalling the petals.

VAR. *prostrata*, Benth. and Hook. f. *Gen. Pl.* i. 161 (sp.); prostrate, branchlets ascending, often very short with closely imbricate leaves, seed-plume sessile.—A very Alpine form.

2. **M. elegans**, *Royle Ill.* 214; bracts ovate about twice as long as the pedicels, sepals connate below, stamens connate for one-fourth of their length. *M. germanica* var. *longifolia*, *Herb. Ind. Or. H. f. & T.*

WESTERN HIMALAYA and WESTERN TIBET, from Garwhal, alt. 11,500 ft., *Royle, &c.*, to Ladak, &c., alt. 6-15,000 ft., *T. Thomson*.

A bush, with smooth striate slender stems. *Leaves* oblong-ovate, narrowed at the base. *Racemes* 3 in., lateral, lax. *Bracts* short, acuminate, with narrowly membranous margins. *Sepals* much shorter than the petals, obtusely triangular at the apex.

ORDER XXI. ELATINEÆ. (By W. T. Thiselton Dyer, F.L.S.)

Minute semi-aquatic or terrestrial herbs or undershrubs. *Leaves* opposite or whorled, entire or serrate, stipulate. *Flowers* small, axillary, solitary or cymose. *Sepals* and *petals* each 2-5, free, imbricate in bud. *Stamens* as many or twice as many as the sepals, hypogynous, free; anthers versatile. *Ovary* free; cells and styles 2-5, stigmas capitate; ovules many, on the inner angles of the cells, anatropous, raphe lateral or ventral. *Capsule* septicidal; valves flat concave or incurved, separating from the axis and septa. *Seeds* straight or curved, raphe on the concave side, testa often rugose, albumen scanty or 0; embryo cylindric, straight or curved, cotyledons small.—DISTRIB. Scattered over the world; genera 2, known species about 20.

Sepals obtuse, aquatic herbs 1. ELATINE.
Sepals acute, flowers usually 5-merous 2. BERGIA.

1. ELATINE, Linn.

Minute aquatic tender creeping herbs. *Leaves* opposite or whorled. *Flowers* very small, axillary, usually only one to each node. *Sepals* 2-4, membranous obtuse. *Petals* 2-4. *Ovary* globose. *Capsule* membranous; septa evanescent after bursting or adhering to the axis. *Seed* cylindric, straight or curved, ridged and pitted.—DISTRIB. Temperate and subtropical regions; species about 6.

1. **E. americana**, *Arn. in Edin. Journ. Nat. Sc.* i. 431; flowers sessile or nearly so, stamens longer than the sepals.

NILGHIRI MTS., *Schmidt*.—DISTRIB. N. America (usually dimerous), N. Zealand, Australia.

Prostrate on mud in patches 1-3 in. broad. *Stems* rooting at the nodes, with numerous opposite or alternate ultimately ascending branches. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., opposite, ovate-lanceolate, narrowed to the base, entire, minutely scabrid; stipules scarious, acute, incise-serrate. *Flowers* fully $\frac{1}{2}$ in. diam. *Sepals* 3, 2 slightly herbaceous. *Petals* 3, twice as long as the sepals, with a mid-vein. *Seeds* about 12 in each cell, slightly curved.—*Asa Gray, Gen. Ill.* t. 95, represents entire stipules united at the base and sepals exceeding the pistil; American specimens disagree with the figure in these respects and agree with the Indian plant.

2. ***E. ambigua***, *Wight in Hook. Bot. Misc.* ii. 103, t. 5; flowers pedicelled, stamens shorter than the sepals. *W. & A. Prodr.* 41; *Wight Ill.* t. 25 B; *Seubert in Nov. Act. Nat. Cur.* xxi. t. 2, f. 11-14.

WESTERN PENINSULA, *Wight*.—DISTRIB. Fiji Islands.

Habit of *E. americana*, Arn. *Leaves* oblong-lanceolate. *Sepals*, *petals* and *stamens* each 3.—Probably should be united with the preceding and *E. triandra*, Schk. (which differs in the absence of the superior petal). The aggregate species would have a cosmopolitan range.

2. **BERGIA**, Linn.

Annuals or undershrubs, erect, decumbent, or diffusely branched, often pubescent. *Leaves* opposite, serrate, or sometimes quite entire. *Flowers* solitary or in more or less dense axillary fascicles, minute, usually 5-merous. *Sepals* with a herbaceous midrib and more or less membranous margins, acute. *Ovary* ovoid. *Capsule* subcrustaceous, septicidal or septitragal.—DISTRIB. Warm countries throughout the world; known species about 14.

1. ***B. odorata***, *Edgew. in Journ. Asiat. Soc. Beng.* vii. 765 (1838); pubescent-glandular, flowers fascicled pedicelled 2-8 together. *Lancretia suffruticosa*, *Delile Fl. Egypt.* 69. *B. suffruticosa*, *Fenzl in Denks. Bot. Gesell.* iii. 183; *Boiss. Fl. Orient.* i. 783.

SIKH STATES at Balawati, *Edgeworth*; SINDH at Kurrachee, *Stocks*.—DISTRIB. Trop. Africa, Egypt.

Woody, diffuse, 1 ft. or less, aromatic, with papery deciduous bark. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., sessile, thick, elliptic or ovate, margins crenate-serrate, often reflexed. *Flowers* $\frac{1}{4}$ in. long, on branches barren below. *Sepals* 5, ovate, herbaceous, serrulate. *Petals* obovate. *Stamens* 10, filaments dilated below. *Ovary* grooved; styles 5, one-half the length of the ovary. *Capsule* 5-celled. *Seeds* numerous, minute, shining, slightly curved.—A very variable plant. Smells of chamomile.

2. ***B. æstivosa***, *W. & A. Prodr.* 41; nearly glabrous, flowers solitary or 2-4 together. *Elatine æstivosa*, *Wight Ic.* t. 222. *Spergula æstivosa*, *Kæn. ex Wall. Cat.* 6963.

PANJAB, *Thomson*; Moulтан, *Edgeworth*.

Branches slender, divaricate. *Leaves* narrow-obovate or oblong, faintly serrate. *Flowers* pink, on branches with almost linear leaves barren above. *Sepals* lanceolate, acute, denticulate, with membranous margins.—Probably only a variety of *B. odorata*, but distinct in habit.

3. ***B. ammannioides***, *Roxb. Hort. Beng.* 34; *Fl. Ind.* ii. 457; annual, flowers in dense subverticillate fascicles, stamens 3-5. *Roth. Nov. Pl. Sp.* 219; *Wight in Hook. Bot. Misc.* iii. 93, *Suppl.* t. 28; *Ill.* i. t. 25 A.; *Wall. Cat.* 655; *Boiss. Fl. Orient.* i. 472. *B. pentandra*, *Guill. & Perr. Fl. Seneg.* 42, t. 12. *Elatine ammannioides*, *W. & A. Prodr.* 41. *Sagina ammannioides*, *Woll. Cat.* 7504.

Throughout INDIA and CEYLON; in marshy places.—DISTRIB. Afghanistan, Persia, Tropical Asia, Africa, and Australia.

Stems 3–12 in., erect or with the lower branches decumbent, smooth or thinly pubescent-hispid, the stem-hairs often glandular-capitate. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., sessile, linear, lanceolate or oblanceolate, tapering below, sharply serrate, acute. *Flowers* $\frac{1}{2}$ in., sessile or shortly pedicelled. *Sepals* 5, lanceolate, denticulate. *Petals* and *stamens* 5. *Ovary* oblong, deeply grooved. *Capsule* 3–6-celled; valves with incurved edges, dehiscing from a central axis. *Seeds* numerous, ovoid.

VAR. *trimeræ*; Fisch. & Mey. in Linnæa, x. 74 (sp.); flowers trimerous. *B. ammannioides* β flor. triandr.; *Wight in Hook. Bot. Misc.* iii. 93, t. 28, f. 1 and 2; *Lechea verticillata*, Willd. ex DC. *Prod.* i. 286.—Western Peninsula and Ceylon.

4. ***B. verticillata***, Willd.; *Roxb. Fl. Ind.* ii. 456; glabrous, stems procumbent rooting, stamens 10. *Thw. Enum.* 23. *Elatine* (B) *verticillata*, W. & A. *Prodr.* 41. *B. aquatica*, *Roxb. Corom. Pl.* ii. 22, t. 142; *Boiss. Fl. Orient.* ii. 783. *B. capensis*, Linn.; *Rheede Hort. Mal.* ix. t. 78.

WESTERN PENINSULA, CEYLON and RANGOON.—DISTRIB. Widely spread in the tropics but absent from S. Africa.

A glabrous rather succulent annual aquatic herb, $\frac{1}{2}$ –1 ft. *Leaves* 1–1 $\frac{1}{2}$ in., spreading, elliptic-lanceolate, tapering at either end, acute, faintly crenate-serrate; stipules narrowly deltoid, toothed, acute. *Sepals* 5, narrow-lanceolate, obliquely acuminate, midrib herbaceous. *Petals* 5. *Capsule* globose-ovoid. *Seeds* minute, slightly curved, ribbed and transversely rugose.—Not a native of the Cape, Linnæus's original name has therefore been suppressed.

ORDER XXII. HYPERICINEÆ. (By W. T. Thiselton Dyer, F.L.S.)

Herbs or shrubs, rarely trees. *Leaves* opposite, often punctate with pellucid glands or dark glandular dots, entire or glandular-toothed; stipules 0. *Flowers* solitary or cymose, terminal, rarely axillary. *Sepals* and *petals* each 5, rarely 4; petals contorted in bud. *Stamens* ∞ , or rarely definite, 3- or 5-adelphous, rarely free or all connate; anthers versatile. *Ovary* 3–5-carpellary, 1- or 3–5-celled; styles as many, filiform, free or united; ovules few or ∞ , on parietal or axile placentas, anatropous, raphe lateral or superior. *Fruit* capsular or baccate. *Seeds* exalbuminous; embryo straight or curved.—DISTRIB. Temp., and mountains of warm regions; genera 8, species about 210.

TRIBE 1. **Hypericeæ**. *Capsule* dehiscing septicidally or at the placentas. *Seeds* not winged.

Flowers 4-merous	1. ASCYRUM.
Flowers 5-merous	2. HYPERICUM.

TRIBE 2. **Cratoxyleæ**. *Capsule* dehiscing loculicidally. *Seeds* winged.

1. ASCYRUM, Linn.

Herbs or shrubs. *Leaves* small, entire. *Flowers* terminal, nearly solitary, yellow, 4-merous. *Sepals* leafy, the 2 outer largest. *Stamens* slightly connate or free. *Ovary* 1-celled. *Capsule* 2–4-valved, dehiscing at the placentas.—DISTRIB. Except the endemic Indian species confined to N. Amer. and the Antilles; species 6.

1. ***A. filicaule***, Dyer.—*Hypericum filicaule*, H. f. & T. ms.

TEMPERATE SIKKIM HIMALAYA; Lachoong valley, alt. 12,000 ft., J. D. H.

A perennial herb. *Stems* 3-6 in., slender, cylindric, faintly 2-edged, rooting at the base. *Leaves* $\frac{1}{2}$ in. or less, subsessile, broadly elliptic, obtuse, pellucid-punctate, margins wavy. *Flowers* $\frac{1}{2}$ in. diam., solitary. *Sepals* oblong, obtuse, outermost exceeding the petals. *Styles* 3, $\frac{1}{12}$ in., rather shorter than the ovary.

2. **HYPERICUM**, Linn.

Herbs, shrubs, or small trees. *Leaves* usually sessile. *Flowers* cymose, yellow, terminal, or axillary. *Sepals* 5. *Petals* 5, usually oblique. *Ovary* 1-celled with 3 or 5 parietal, or 3-5-celled with axile placentas; styles free or united; ovules ∞ , rarely few. *Capsule* septical, or dehiscing at the placentas.—**DISTRIB.** Temperate regions; species 160.

H. calycinum, L., from S. Europe, occurs as a garden plant.

H. chinense, L.; *H. monogynum*, Willd.; *Roxb. Fl. Ind.* iii. 400, is said to be known only as a cultivated plant. It is found in Indian gardens; the leaves are elliptical and obtuse, and the styles united throughout. *Hypericum salicifolium*, Sieb. & Zucc., of Japan is probably not distinct from this.

SECT. I. Androsæmineæ, Spach. *Sepals* 5, unequal. *Petals* deciduous. *Stamens* 5-adelphous at the base. *Ovary* 5-celled.—(Commonly shrubs with few and large flowers.)

* *Styles longer than the ovary (unknown in 1).*

1. **H. Griffithii**, *H. f. & T. ms.*; leaves ovate subcordate, cymes corymbose, sepals small narrowly deltoid, styles 5.

BHOTAN, Dimree-nuddee, alt. 6400 ft., *Griffith*.

A shrub, young branches terete. *Leaves* 2-4 $\frac{1}{2}$ in., obtuse, younger lanceolate acute, firm, glaucous below with prominent reticulate nerves. *Sepals* $\frac{1}{2}$ in. long, acute. *Capsule* $\frac{1}{3}$ - $\frac{1}{2}$ in. long.—Flowers unknown; habit that of *H. grandifolium*, Choisy.

2. **H. mysorensis**, Heyne in *Wall. Cat.* 4808; leaves oblong-lanceolate decussate approximate, sepals ovate, styles exceeding the stamens. *H. myrtifolia*, *Spach Suit. Buff.* v. 428? *Norisia mysorensis*, *Wight Ic.* t. 56.

WESTERN PENINSULA; on the hills from the Concan to the Pulneys, alt. 3-4000 ft. **CEYLON**, *Walker*, &c.

A glabrous shrub 4-6 ft. high (Gardner); young branches 4-angled. *Leaves* 1-2 in., tapering to an amplexicaul base, with slender ascending veins and pellucid striæ. *Cymes* terminal, 3-flowered; flowers 2-2 $\frac{3}{4}$ in. diam. *Sepals* $\frac{1}{2}$ in., acute. *Petals* obliquely oblanceolate, twice the length of the stamens. *Styles* twice as long as the ovary. *Capsule* about $\frac{1}{2}$ in.—The allied Abyssinian *H. gnidiæfolium*, Rich., has styles $\frac{2}{3}$ united.

3. **H. cernuum**, *Roxb. Hort. Beng.* 59, *Roxb. Fl. Ind.* iii. 400; leaves elliptic to ovate-lanceolate, glaucous beneath, sepals ovate, styles slightly exceeding the stamens. *Camb. in Jacq. Voy. Bot.* t. 23. *H. oblongifolium*, *Choisy Prodr. Hyp.* 42, t. 4. *H. speciosum*, *Wall. Cat.* 4803. *H. Govanianum*, *Wall. Cat.* 4815 (sepals linear-lanceolate).

WESTERN TEMPERATE HIMALAYA; from Kumaon to Sirmur, alt. 5-7000 ft.

A glabrous shrub, 3-6 ft.; branches cylindric, glaucous when young. *Leaves* 1-3 in., sessile, minutely dotted. *Cymes* terminal, 3-5-flowered; flowers 2 in. diam., white, then yellowish. *Sepals* $\frac{1}{2}$ in., acute. *Petals* obovate, longer than the stamens. *Styles* twice the length of the ovary. *Capsule* $\frac{1}{2}$ in., conical.

4. **H. cordifolium**, *Choisy in DC. Prodr.* i. 545; leaves oblong-lanceolate cordate coriaceous glaucous beneath, sepals lanceolate. *H. bracteatum*, *Wall. Cat.* 4804; *Pl. Asiat. Rar.* t. 220. *H. acutum*, *Wall. Cat.* 4807.

CENTRAL HIMALAYA; Nipal, *Wallich*; Kumaon, at Ramari, alt. 4500 ft., *Strach. & Wint.*

A glabrous shrub, 1-2 ft.; branches long, slender, brown; branchlets subtetragonous. *Leaves* 1-2 in., coriaceous, opaque with translucent lines, penninerved with one or two lateral veins and midrib darkly marked below. *Cymes* many-flowered; flowers $1\frac{1}{2}$ in. diam. *Sepals* $\frac{1}{4}$ - $\frac{1}{2}$ in. *Petals* obliquely obovate. *Stamens* equalling the styles, $\frac{2}{3}$ the length of the petals. *Styles* $1\frac{1}{2}$ times as long as the ovary.

5. **H. lysimachioides**, *Wall. Cat.* 4817; leaves ovate subsessile glaucous beneath with dark veins, sepals linear-lanceolate. *H. coriaceum*, *Royle III.* 131.

WESTERN TEMPERATE HIMALAYA; from Kumaon, alt. 8-9000 ft., to Wardwan, alt. 5-6500 ft., *Stewart.*

A glabrous shrub, branchlets subtetragonous. *Leaves* $\frac{3}{4}$ -1 $\frac{3}{4}$ in., acute or rather obtuse, penninerved, the veins connected marginally, pale and black-dotted beneath. *Cymes* loose, leafy, 2-3-chotomous; flowers 1 in. diam. *Sepals* $\frac{1}{2}$ in. *Petals* lanceolate. *Styles* slightly longer than the ovary, not exceeding the stamens. *Capsule* about $\frac{1}{4}$ in.

** *Styles not longer than the ovary.*

6. **H. Hookerianum**, *W. & A. Prodr.* 99; branches terete, leaves ovate to ovate-oblong, sepals obovate, styles recurved exceeding the stamens. *Wight Ic.* 949. *H. oblongifolium*, *Hook. Bot. Mag.* t. 4949.

SIKKIM HIMALAYA, alt. 8-12,000 ft., *J. D. H.*; MISHMI, *Griffith*; KHASIA MTS., alt. 4-6000 ft., *Lobb.*, &c.; NILGIRIS, *Wight*, &c.

A glabrous shrub 6-8 ft.; branches red-brown. *Leaves* 1- $\frac{4}{5}$ in., sessile or very shortly stalked, obtuse, mucronate, firm, glaucous or rusty beneath, faintly pellucid-punctate. *Cymes* few-flowered or corymbose, leafy-bracteate; flowers about 2 in. diam., golden-yellow. *Sepals* $\frac{1}{2}$ - $\frac{1}{2}$ in. *Petals* obliquely-obovate, longer than the stamens. *Styles* $\frac{1}{2}$ in., shorter than the ovary. *Capsule* $\frac{3}{4}$ in., obtusely conical to egg-shaped.

VAR. *Leschenaultii*, Choisy in DC. *Prodr.* i. 145 (sp.); Deless. *Ic. Sel.* iii. t. xxvii.; sepals acute. *H. triflorum*, *Blume, Fl. Ned. Ind.* 142. *H. oblongifolium*, *Wall. Cat.* 4810 (not of Choisy). *H. Choisianum*, *Wall. Cat.* 4805.—Nipal, *Wallich*; Sikkim, alt. 8000 ft., *J. D. H.*—DISTRIB. Java.

7. **H. patulum**, *Thunb. Fl. Jap.* 295, t. 17; branches spreading pyramidally 2-edged, leaves elliptic-lanceolate, sepals elliptic obtuse, styles exceeding the stamens. *Wall. Cat.* 4809; *Hook. Bot. Mag.* 5693; *Don Prodr.* 218. *H. Uralum*, *Ham. ex Don l.c.*; *Bot. Mag.* t. 2375; DC. *Prodr.* 218. *H. oblongifolium*, *Wall. Pl. Asiat. Rar.* t. 244 (not of Choisy in *Wall. Cat.*).

Throughout the TEMP. HIMALAYA (Sikkim excepted); alt. 3-7000 ft., from Bhotan, *Griffith*, to Simla, *Lady Dalhousie*, and Chamba, *Stewart*. KHASIA MTS., alt. 5-6000 ft.; YUNAN, *J. Anderson*.—DISTRIB. Japan, Formosa.

A glabrous shrub, 1-3 ft., with brownish bark and numerous red, stiffly patent branches. *Leaves* 1-2 $\frac{1}{2}$ in., distichous, very shortly petioled, acute, black-dotted and glaucescent or rusty beneath, pellucid punctate and striate, margins reflexed. *Cymes* few-flowered, terminal; peduncles 2-bracteate; flowers 1 in. diam. *Sepals* $\frac{1}{2}$ in. *Petals* orbicular, twice the length of the stamens. *Styles* equalling the ovary. *Capsule* $\frac{1}{2}$ in., obtusely conical.—Nearly allied to *H. Hookerianum* but smaller, more rigid, and with smaller flowers.

VAR. *attenuatum*, Choisy in DC. *Prodr.* i. 545; more slender in every part.

8. **H. tenuicaule**, *H. f. & T. ms.*; branches diffuse slender terete, leaves elliptic or ovate pellucid striate, flowers solitary or geminate, sepals elliptic, styles not exceeding the stamens.

TEMPERATE SIKKIM HIMALAYA; Lachen valley, alt. 8000 ft., *J. D. H.*

A glabrous shrub. *Leaves* 1-1 $\frac{1}{2}$ in., tapering below, subacute, pale and glandular-dotted

beneath. *Flowers* $1\frac{1}{2}$ in. diam., usually exceeded by lateral leafy shoots. *Sepals* about $\frac{1}{2}$ in., obtuse. *Petals* obliquely obovate, twice the length of the stamens. *Styles* scarcely $\frac{1}{2}$ in., about as long as the ovary. *Capsule* $\frac{1}{2}$ in.—Perhaps a variety of *H. patulum*, but distinct in habit.

9. **H. reptans**, *H. f. & T. ms.*; stems shrubby prostrate diffuse rooting, flowers terminal solitary.

TEMPERATE SIKKIM HIMALAYA, alt. 9–11,000 ft., *J. D. H.*

Branches slender, two-edged, reddish-brown. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., approximate, elliptic-oblong, obtuse, with short pellucid striæ. *Flowers* $1\frac{1}{2}$ in. diam. *Sepals* about $\frac{1}{2}$ in., elliptic, obtuse. *Petals* obovate. *Stamens* hardly exceeding the ovary. *Styles* $\frac{1}{2}$ in., equalling the ovary, tips recurved. *Capsule* $\frac{1}{2}$ in., globose. *Seeds* minute, apiculate at both ends.

SECT. II. **Hyperinæ**, *Spach.* *Sepals* 5, connate at the base, equal or unequal. *Petals* persistent. *Stamens* 3-adelphous at the base. *Ovary* 3-celled.

* *Margins of the sepals eglandular.*

10. **H. perforatum**, *Linn.*; stem erect 2-edged, leaves oblong or ovate pellucid-punctate, sepals linear acute.

TEMPERATE WESTERN HIMALAYA; from Kumaon, alt. 6–9000 ft., to Kashmir, alt. 3–6500 ft.—DISTRIB. Europe, N. Africa, N.W. Asia.

A perennial herb. *Stems* 18 in., with slender stolons, branched above. *Leaves* $\frac{3}{4}$ in., obtuse, with radiating veins, paler beneath with black dots. *Cymes* corymbose, 3-choctomously branched; flowers 1 in. *Sepals* $\frac{1}{2}$ in. *Petals* with black-glandular edges. *Styles* twice the length of the ovary, equalling the stamens. *Capsule* $\frac{1}{2}$ in., egg-shaped.

VAR. *debile*, Royle, ms.; stem weak, leaves oblong-linear.

11. **H. Sampsoni**, *Hance in Seem. Journ. of Bot.* iii. 378; stems erect cylindric, leaves oblong connate pellucid-punctate, sepals oblong obtuse.

KHASIA MOUNTAINS, Nowgong, *Simons*.—DISTRIB. S. China, Formosa.

A perennial herb. *Stems* 1 ft. *Leaves* $1\frac{1}{2}$ –2 in., obtuse, glaucescent beneath. *Cymes* lax; flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. *Sepals* black-punctate. *Petals* about equalling the sepals. *Styles* very short. *Capsule* ovoid, covered with oval resinous vesicles.—Approaches *H. erectum*, Thb., of Japan, which is destitute of vesicles and has the leaves amplexicaul.

12. **H. petiolulatum**, *H. f. & T. ms.*; stems erect slender cylindric, leaves shortly petioled ovate elliptic, flowers small, sepals linear unequal, styles very short exceeded by the stamens.

SIKKIM HIMALAYA, alt. 9000 ft., *J. D. H.*

Stems 9–15 in., branched from the base; branches weak, simple. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., rather distant, obtuse, glaucescent beneath with dark pellucid dots, margins wavy. *Cymes* 3-flowered; flowers $\frac{1}{2}$ in. long. *Sepals* $\frac{1}{2}$ – $\frac{3}{4}$ in., acute, not pellucid-punctate. *Capsule* with numerous glandular lines.

13. **H. humifusum**, *Linn.*; stems procumbent 2-edged, leaves sessile elliptic to ovate approximate, sepals lanceolate unequal, styles $\frac{1}{2}$ the length of the ovary. *H. rubrum*, *Wight ms.*

NILGHIRIS, *Wight*.—DISTRIB. Europe, Atlantic Isles, S. Africa.

A glabrous perennial herb. *Stems* about 6 in., numerous, red. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., pellucid-punctate and as well as the sepals with black intramarginal glands. *Cymes* terminal, few-flowered. *Flowers* $\frac{1}{3}$ – $\frac{1}{2}$ in. diam.

** *Margins of the sepals with gland-tipped teeth.*

14. **H. elodeoides**, *Choisy in DC. Prodr.* i. 552; stems stout usually

simple, leaves oblong or ovate acute firm, sepals with long teeth, petals glandular-striate. *H. adenophorum*, Wall. Cat. 4812. *H. nervosum*, Don Prodr. 219.

TEMPERATE HIMALAYA; from Sikkim, alt. 7–12,000 ft., to Sirmur, alt. 7–8000 ft.; KHASIA MTS., alt. 4–6000 ft.; ASSAM and BURMA, Griffith.

Stems 1–2 ft., stoloniferous, glabrous, terete. Leaves 1–1½ in., approximate, stem-clasping, uppermost glandular-fringed at the base, closely pellucid-punctate. Cymes paniculate; flowers ¾ in. Sepals ¼ in., lanceolate, acute, with black intramarginal glands. Petals exceeding the calyx. Styles 3, ¼ in., at least twice the length of the ovary, spreading, not exceeding the stamens. Capsule ½ in.—A very variable plant, allied to the European *H. montanum*, L., which is puberulous with a denser cyme and shorter sepaline teeth. *H. intermedium*, Steud., of Abyssinia and Asia Minor, has shorter teeth but a very open cyme.

15. ***H. napaulense***, Choisy in DC. Prodr. i. 552; stems weak with numerous branches, leaves ovate to ovate-lanceolate obtuse thin, sepals with short teeth, petals eglandular or nearly so. *H. pallens*, Don Prodr. 219. *H. setosum*, Wall. Cat. 4814. *H. Wightianum*, Wall. Cat. 4010; W. & A. Prodr. 99; Wight. Ill. i. 43.

TEMPERATE HIMALAYA; from Sikkim, alt. 10–12,000 ft. to Kashmir, alt. 7–8000 ft.; BURMA, Griffith.—WESTERN PENINSULA, Nilghiri and Pulney Mts., Wight, &c.

Stems slender, diffuse or prostrate, cylindric, obscurely 2-edged. Leaves ½–¾ in., sessile and stem-clasping, or slightly petioled, glaucous beneath and closely pellucid-punctate. Cymes few-flowered, loose; flowers ½ in. Sepals lanceolate. Petals longer than the calyx. Styles ½ in., about equalling the ovary, exceeding the stamens. Capsule ½ in.—Perhaps only a variety of *H. elodeoides*.

16. ***H. monanthemum***, H. f. & T. ms.; stems simple, leaves broadly elliptic or ovate, sepals dark-glandular-striate, petals linear twice the length of the sepals, styles half the length of the ovary.

SIKKIM HIMALAYA; Lachen and Lachoong Valleys, alt. 11–12,000 ft., J. D. H.

Stems 4 in.–1 ft., erect, 2-edged, reddish brown. Leaves ¾ in., sessile, obtuse, pellucid striate-punctate, with a few black marginal dots beneath. Cymes 1–3-flowered; flowers with a pair of glandular fringed bracts. Sepals linear-lanceolate. Styles ½ in., equalling the stamens. Capsule ¼ in., ovoid.

SECT. III. **Brathydinæ**, Spach. Sepals 5, Petals persistent. Stamens connate at the base. Ovary 1-celled.

17. ***H. japonicum***, Thunb. Fl. Jap. 295, t. 31; stems diffuse or ascending, leaves 3-nerved, cyme dichotomous elongated, sepals 3-nerved. Wall. Cat. 4811. Royle Ill. t. 24. *H. pusillum*, Choisy in DC. Prodr. i. 549. *Brathys nepalensis*, Blume Mus. Bot. ii. 19. *H. calycatum*, Jacq. Herb. (sepals foliaceous).

TEMPERATE AND SUBTROPICAL HIMALAYA, from Sikkim to Garwhal; alt. 2–5000 ft. KHASIA MTS.; ASSAM, SILHET, BURMA; EASTERN and WESTERN PENINSULA and CEYLON.—DISTRIB. New Zealand, Australia, Japan, China, Java.

Annual. Stems 1–15 in., tufted or prostrate, glabrous, 4-angled. Leaves ½ in. or less, stem-clasping, oval or ovate, pellucid-punctate. Flowers ¼ in. diam., yellow. Bracts and sepals linear-lanceolate, entire, acute, glandular and pellucid-punctate at the apex. Petals equalling the calyx. Styles ½ the length of the ovary. Capsule ½ in. Seeds ribbed and transversely striate.—*H. humifusum* is distinguished by its 2-edged stems, 3 celled ovary, and leaves with intra-marginal black dots.

18. ***H. Lalandii***, Choisy in DC. Prodr. i. 550; stems slender simple, leaves approximate below appressed with revolute margins 1-nerved, cyme

close often few-flowered, sepals with one prominent nerve. *H. fœtidum*, *H. f. & T. ms.*

KHASIA MTS., alt. 5–6000 ft., *Lobb*, &c.—DISTRIB. S. Africa, Lower Guinea.

Annual. Smell remarkably fœtid, like bad orange-peel. *Stems* 6–18 in., slender, simple, tufted. *Leaves* $\frac{1}{2}$ in., or less, rather thick, faintly pellucid-punctate. *Sepals* elliptic-oblong. *Styles* $\frac{1}{2}$ the length of the ovary.—Probably a variety of *H. japonicum*, but identical with the African plant.

SECT. IV. **Elodeineæ**, *Spach.* *Stamens* definite (9), cohering for $\frac{1}{3}$ their length into 3 bundles separated by (entire) hypogynous scales.

19. **H. breviflorum**, *Wall. Cat.* 4876; stems usually simple cylindric lower $\frac{2}{3}$ bare, flowers in 1–3 short axillary cymes.

KHASIA MTS., alt. 5000 ft.; *SILHET*, *Wallich*.

Stems $1\frac{1}{2}$ ft. *Leaves* narrow elliptic, black-dotted beneath. *Flowers* white. *Sepals* very short, ovate-linear, obtuse. *Anthers* vesicular-apiculate. *Styles* $\frac{3}{4}$ the length of the ovary, recurved. *Capsule* $\frac{1}{2}$ in., ovoid.—The allied *H. petiolatum*, *Walt.*, of N. America and Japan has cylindric capsules.

3. **CRATOXYLON**, *Blume.*

Shrubs or trees. *Leaves* entire, usually papery. *Inflorescence* axillary or, terminal, cymose. *Sepals* and *petals* each 5. *Stamens* 3- or 5-adelphous, with fleshy hypogynous glands alternating with the bundles. *Ovary* 3-celled; styles distinct; ovules 4– ∞ in each cell. *Capsule* 3-valved.—DISTRIB. Tropical Asia; species about 12.

SECT. I. **Ancistrolobus**, *Spach.* *Petals* subpersistent, inappendiculate. *Stamens* 3-adelphous, hypogynous; glands more or less cucullate.

1. **C. polyanthum**, *Korth. Verhand. Nat. Gesch. Bot.* 175, t. 36; leaves elliptic to oblong, cymes 1–3-flowered axillary or slightly supra-axillary, petals glandular-veined.

BIRMA and the EASTERN PENINSULA.—DISTRIB. China (*C. biflorum*), Philippines, Borneo.

A glabrous aromatic shrub, with compressed branchlets. *Leaves* 1–4 in., pellucid-punctate and black-dotted beneath. *Flowers* $\frac{1}{2}$ in. diam., pink. *Sepals* $\frac{1}{2}$ in. long, $\frac{1}{3}$ in. when in fruit, elliptic, obtuse. *Hypogynous glands* sometimes obsolete. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, exceeding the sepals. *Seeds* 3, $\frac{1}{4}$ in. long, with an oblique unilateral wing.

VAR. 1. *ligustrinum*, *Blume Mus. Bot.* ii. 16 (sp.); leaves narrowed at both ends acute. *C. lanceolatum*, *Miq. Fl. Ned. Ind. Supp.* i. 500. *Ancistrolobus ligustrinus*, *Spach, Suit. Buff.* v. 361. *A. brevipes*, *Turcz. Bull. Mosc.* 1858, i. 383. *Hypericum pulchellum*, *Wall. Cat.* 4821. Pegu, Malacca, S. Andamans, *Kurz*.

VAR. 2. *Wightii*, *Bl. l.c.* 18 (sp.). *Leaves* broadly oval mostly obtuse. *Ancistrolobus*, sp. *Wight Ill.* i. 111. *Hypericum horridum*, *Wall. Cat.* 4822. *Elodea*, sp., *Griff. Notul.* iv. 569. Tenasserim, Mergui, *Griffith*; Tavoy, *Wallich*.

2. **C. neriifolium**, *Kurz in Journ. Asiat. Soc. Beng.* 1872, pt. ii. 293; leaves narrow-oblong sessile, cymes 3-flowered in a short terminal panicle *Hypericum neriifolium*, *Wall. Cat.* 4824.

BIRMAH, Teiyet, *Griffith*; Pegu, Promé hills, *Wallich*; CHITTAGONG, *H. f. & T.*

A shrub, 10 ft. *Leaves* 3–6 in., by $\frac{3}{4}$ – $1\frac{1}{4}$ in., slightly cordate, tapering to the apex. *Panicle* 3 in. *Hypogynous glands* with the reflexed margin mucronate. *Capsule* $\frac{1}{2}$ in., hardly exceeding the calyx.—Agrees otherwise with *C. polyanthum* and closely allied

3. **C. arborescens**, *Blume Mus. Bot.* ii. 17; leaves oblong-obovate or elliptic, cymes forming a pyramidal panicle, petals glandular-dotted. *Hypericum arborescens*, *Vahl Symb.* ii. 86, t. 43. *H. coccineum*, *Wall. Cat.* 4823. *Ancistrolobus glaucescens*, *Turcz. Bull. Mosc.* 1858, i. 383. *Vismia? arborescens*, *Choisy Prod. Hyp.* 36.

MOULMEIN, *Lobb*; MALACCA, *Griffith, Maingay*; SINGAPORE, *Anderson*.—DISTRIB. Java, Borneo.

A bush? *Leaves* 3-4½ in. by 1½-2 in., coriaceous. *Panicle* 4-9 in. long. *Flowers* ½ in. diam., scarlet. *Capsule* ½ in. long; *seeds* ½ in. long, with an equilateral wing.

SECT. II. **Tridesmis**, *Spach*. *Petals* not persistent, with a basal squamule. *Stamens* 3- or 5-adelphous.

4. **C. formosum**, *Benth. & Hook. f. Gen. Pl.* i. 166; branchlets alternate spreading, hypogynous glands triangular attenuate, fruit pedicels drooping. *Tridesmis formosa*, *Korth. Verh. Nat. Gesch. Bot.* 179, t. 37. *T. ochroides*, *Spach, Suit. Buff.* v. 359. *Elodea formosa*, *Jack in Hook. Journ. Bot.* i. 374.

MALACCA, Mt. Ophir, *Griffith*; SINGAPORE, *Maingay*; S. ANDAMAN, *Kurz*.—DISTRIB. Borneo, Philippines.

A very large tree with habit of a *Cerasus*. *Leaves* 2-3½ in., decussate, elliptic or oblong-elliptic, papery, glabrous. *Cymes* in the axils of fallen leaves, shortly racemose; flowers white. *Sepals* not accrescent, ¼ the length of the petals. *Basal squamule* of the petals usually rounded. *Stamens* 3-adelphous. *Styles* dimorphic. *Capsule* ¾ by ½ in., triquetrous. *Seeds* ½ in. long, with a very obtuse, obovate, unilateral wing.

5. **C. Maingayi**, *Dyer*; branchlets spreading opposite, hypogynous glands triangular, fruit pedicels ascending.

PENANG, *Maingay*.

A tree above 30 ft., with a very thick stem. *Leaves* 2-3½ by 1-1½ in., elliptic, tapering at both ends, acuminate, midrib reddish-brown beneath, papery, glabrous. *Cymes* in the axils of the often persistent old leaves. *Petals* with black-dotted veins; basal squamule acute. *Stamens* 3-adelphous. *Styles* filiform, as long as petals (but probably dimorphic). *Capsule* ½ in. long, ⅓ in. broad, slender, cylindric. *Seeds* ½ in. long, with an oblong unilateral wing.

6. **C. prunifolium**, *Dyer*; branchlets opposite ascending, leaves pubescent, hypogynous glands very short obtuse transversely grooved. *Hypericum prunifolium*, *Wall. Cat.* 7276. *Tridesmis pruniflora*, *Kurz in Journ. Asiat. Soc. Beng.* 1872, pt. ii. 293.

MOULMEIN, *Wallich*.

Stems woody, compressed, rather rigid. *Flowers* precocious, in small, lax, axillary fascicles; pedicels and calyx closely pubescent. *Sepals* ½ the length of the petals. *Basal squamule* of the petals acute. *Stamens* 3-adelphous. *Fruit* not seen.

ORDER XXIII. GUTTIFERÆ. (By T. Anderson, F.L.S.)

Trees or shrubs, abounding in a yellow or greenish juice. *Leaves* opposite, coriaceous or membranous, rarely whorled or stipulate. *Flowers* axillary or terminal, solitary fascicled subracemose or paniced, white yellow or red. *Flowers* regular, diœcious, polygamous or hermaphrodite. *Sepals* 2-6, imbricate or in decussate pairs. *Petals* 2-6 (rarely more, or 0), usually much imbricated or contorted. MALE fl.: *Stamens* usually indefinite, hypogynous; filaments free or variously connate, monadelphous or in as many bundles as there are petals; anthers various. FEMALE fl.: *Staminodes* various. *Ovary* 1-2-∞-celled; style slender, short or 0 (2 in *Pacciloneuron*), stigmas as many

as the cells free or connate, sometimes peltate; ovules 1-2 or ∞ , axile or erect from the base of the cell. *Fruit* usually baccate and indehiscent. *Seeds* large, albumen 0; embryo consisting of a large radicle (*tigellus*) with small or obsolete cotyledons, or of thick free or consolidated cotyledons with a very short inferior radicle.—A large tropical family, common in Asia and America, rare in Africa, of 24 genera and 250 species.

MAMMEA AMERICANA, Linn., the Mammee apple of the West Indies is occasionally cultivated in Indian gardens; it belongs to the tribe *Calophylleæ*, and is distinguished by its valvately 2-partite calyx which is quite entire in the bud.

The following account of the British Indian *Guttiferæ* was drawn up by Dr. Thos. Anderson, late Superintendent of the Calcutta Botanic Garden, shortly before his death in 1870. For the reduction of *Xanthochymus* to *Garcinia* I am answerable, as also for several new species from Maingay's Malacca collections and other sources, and for the reference to Heddom's and Lanessan's works—all such additions are either enclosed between [] or signed with my initials.—J. D. Hooker.

TRIBE I. *Garcinieæ*. *Ovary*-cells 1-ovuled; stigma sessile or subsessile, peltate, entire or with radiating lobes. *Berry* indehiscent. *Embryo* of a solid tigellus with minute cotyledons or 0.

- | | |
|---|-----------------|
| Calyx of 4 or 5 sepals | 1. GARCINIA. |
| Calyx closed in bud, bursting into 2 valves | 2. OCHROCARPUS. |

TRIBE II. *Calophylleæ*. *Ovary* with 1, 2 or 4 erect ovules; style slender (rarely styles 2), stigma peltate or 4-fid or acute. *Fruit* fleshy, rarely dehiscent. *Embryo* of two fleshy free or consolidated cotyledons, with a small radicle.

- | | |
|---|------------------|
| Ovary 1-celled, 1-ovuled; style 1, stigma peltate | 3. CALOPHYLLUM. |
| Ovary 1-celled, 4-ovuled; style 1, stigma 4-fid | 4. KAYEA. |
| Ovary 2-celled, 4-ovuled; style 1, stigma peltate | 5. MESUA. |
| Ovary 2-celled, 4-ovuled; styles 2, stigmas acute | 6. PÆCILONEURON. |

1. GARCINIA, Linn.

(Including *XANTHOCHYMUS*, Roxb.)

Trees, usually with yellow juice. *Leaves* evergreen, coriaceous, very rarely stipulate. *Flowers* solitary fascicled or paniced, axillary or terminal, polygamous. *Sepals* 4-5, decussate. *Petals* 4-5, imbricate. **MALE fl.:** *Stamens* ∞ , free or collected into a ring or an entire globose or conical 4-5-lobed mass, usually surrounding a rudimentary ovary; anthers sessile or on short thick filaments, 2- rarely 4-celled, adnate or peltate, dehiscing by slits or pores or circumsciss. **FEMALE or HERMAPHRODITE fl.:** *Staminodes* 8- ∞ , free or connate. *Ovary* 2-12-celled; stigma sessile or subsessile, peltate, entire or lobed, smooth or tubercled; ovules solitary in each cell; attached to the inner angle of the cell. *Berry* with a coriaceous rind. *Seeds* with a pulpy aril.—**DISTRIB.** Tropical Asia, Africa, and Polynesia; species about 50.

[Kurz (Journ. As. Soc. Bengal. xxxvii. 64) rightly states that *Xanthochymus* cannot be kept distinct from *Garcinia*, for that both 4- and 5-merous flowers occur in *X. pictorius*.—J. D. H.]

SUBGENUS I. *Garcinia* proper. *Sepals* and *Petals* 4 each.

Series A. Stigma divided into rays, or deeply 4-lobed (unknown in *G. bancana*).

* Stamens of male flowers in 4 masses or in a 4-lobed mass surrounding the rudimentary ovary; anthers oblong, dehiscing vertically.

1. ***G. Mangostana*, Linn.**; leaves elliptic-oblong acuminate, nerves very numerous horizontal, petiole short thick, male fl. $1\frac{1}{2}$ in. diam. yellow-red or purple, stamens in 4 masses, stigma sessile. *DC. Prodr.* i. 560; *Roxb. Fl. Ind.* ii. 618; *Hook. Bot. Mag.* t. 4847; *Chois. Guttif. Ind.* 33; *Planch. & Trian. Mem. Guttif.* 170; [*Lanessan Mem. Garcin.* 15].

Native and cultivated in the MALAYAN PENINSULA and SOUTHERN TENASSERIM.—**DISTRIB.** Malay Archipelago, cult. in Ceylon and a few spots in the Madras Presidency.

A small conical tree 20–30 ft.; branches many, decussate. *Leaves* 6–10 by $2\frac{1}{2}$ – $4\frac{1}{4}$ in., very coriaceous; nerves regular, close, inarching with an intramarginal one. **MALE** fl. in 3–9-flowered terminal fascicles; pedicels short. *Sepals* orbicular, concave, persistent. *Petals* broad-ovate, fleshy. *Stamens* indefinite. **HERMAPH.** fl. 2 in. diam., solitary or geminate at the tips of the young branches; pedicels $\frac{1}{2}$ in., thick, woody. *Sepals* and *petals* as in the male. *Stamens* many, filaments slender, connate below. *Ovary* 4–8-celled. *Stigma* sessile, 8-rayed; ovules solitary. *Berry* as large as an orange, smooth, dark purple; pericarp firm, spongy. *Seeds* large, flattened; aril very fleshy, white, juicy.

2. ***G. cornea*, Linn.**; leaves oblong or oblong-lanceolate, petiole $\frac{1}{2}$ in., male fl. $\frac{3}{4}$ in. diam. pale-green, stamens in a 4-lobed mass, style short. *DC. Prodr.* i. 561; *Roxb. Fl. Ind.* ii. 629; *Wight Ic.* t. 105; *Wall. Cat.* 4852 in part; *Chois. Guttif. Ind.* 33; *Planch. & Trian. Mem. Guttif.* 170; [*Lanessan Mem. Garcin.* 20]. *G. affinis*, *Wall. Cat.* 4852, –3, and –4 in part, not of *W. & A.* *Discostigma fabrile*, *Miquel Fl. Ned. Ind. Suppl.* 496 (*Kurz in Journ. As. Soc. Bengal*, xxxix. p. 64).

EASTERN BENGAL from Silhet to Tenasserim, Penang, and Malacca.—**DISTRIB.** Malay Archipelago.

A small tree; trunk erect, branches horizontal and pendulous. *Leaves* 4–6 by 2–3 in., leathery, shining, often acuminate; veins stout, prominent, $\frac{1}{2}$ – $\frac{3}{4}$ in. apart, straight or forked, inarching with an intramarginal one. **MALE** fl. inodorous, in 3–9-flowered terminal fascicles, pedicels 1– $1\frac{1}{2}$ in. *Sepals* orbicular, coriaceous. *Petals* ovate, concave, twice as long as the sepals and thinner. *Staminal masses* united at their base only. **HERMAPH.** fl. usually solitary, like the males; pedicel short, stout, terminal. *Stigma* large, 4–6-lobed, glutinous. *Berry* subspherical, the size of a small orange, bright-red; pericarp spongy. *Seeds* enclosed in a white juicy very acid aril.—All Cumming's specimens marked 2296 are from Malacca; his 1124 are from the Philippines and referable to *Blancos Cambogia venulosa* (*Garcinia*, *Choisy*), differing in the large flowers, thick woody pedicels and many-lobed stigma. Wallich's specimen *G. affinis*, 4854) is the only Silhet one I have seen; other of his specimens ticketed (*G. affinis* belong to *G. anomala*. [*M. Lanessan, Mem. Garc.* 21, refers this to *G. celebica*, Linn. There are two or more species or forms comprised under this description of *G. cornea*, one with narrow leaves and very oblique veins, the other with broad leaves and much closer-set veins more spreading from the midrib. This last resembles in foliage the *G. malaccense*, and is apparently common in the Eastern Peninsula.—*J. D. H.*]

3. ***G. speciosa*, Wall. Pl. As. Rar.** iii. t. 258; *Cat.* 4852 E; leaves oblong or elliptic-oblong narrowed at both ends, petiole $\frac{3}{4}$ in. thick angled, male fl. $1\frac{1}{2}$ in. diam. bright yellow. *Chois. Guttif. Ind.* 33; *Planch. & Trian. Mem. Guttif.* 171.

TENASSERIM, near Amherst; **MOULMEIN**; **MARTABAN**; **ANDAMAN Island**, *Kurz*.

A tree about 50 ft., trunk straight, erect, 2 ft. diam.; bark thin, greyish-black. *Leaves* 5–12 by $1\frac{1}{2}$ –3 in., leathery. **MALE** fl. as in *G. cornea* but larger, and very fragrant. **FEMALE** fl. unknown.—Closely allied to *G. cornea*. [*M. Lanessan, Mem. Garcin.* 15, refers this species as a synonym to *G. Mangostana*.]

****** Stamens of male flower in a central shortly-stalked 4-angled or columnar mass; anthers quadrate, dehiscing vertically; rudimentary ovary usually 0.

† *Male flower in 3-∞-fld. terminal and axillary fascicles; fruit subglobose or ovoid, tip mamillar (unknown in G. bancana).*

4. **G. indica**, Choisy. in DC. Prodr. i. 561 (according to Lanessan Mem. Garcin. 45); leaves obovate- or oblong-lanceolate acute or acuminate, male pedicels 1-1½ in., fruit globose as large as an orange purple not furrowed. Planch. & Trian. Mem. Guttif. 183; Lanessan Mem. Garcin. 45. *G. purpurea*, Roxb. Fl. Ind. ii. 624; Graham Cat. Bomb. Pl. 25; Wight Ill. i. 125; Dalz. & Gibs. Bomb. Fl. 31; Beddome Flor. Sylvat. Gen. xxi.; Planch. & Trian. Mem. Guttif. 191. *G. celebica*, Desrouss. in Lamk. Encycl. iii. 700; and Choisy. Guttif. Ind. 33 (not of Rumph.). Brindonia indica, Dupetit-Th. in Dict. Sc. Nat. v. 340.

WESTERN PENINSULA; Ghats of Concan and Canara.—DISTRIB. Cultivated in Bombay, Mauritius, &c. (*I have seen no specimen.*)

A slender tree, with drooping branches. Leaves 2½-3½ in., dark-green, young red, membranous, mucronate rarely obtuse. MALE fl. 4-8 in axillary and terminal fascicles; buds as large as a pea. Sepals orbicular, outer smaller. Petals rather larger. Stamens numerous (12-20 Beddome), forming a short capitate column; anthers oblong, 2-celled, opening longitudinally. FEM. fl. solitary, terminal, shortly and strictly peduncled. *Staminodes* in 4 masses. Ovary 4-8-celled; stigma of as many lobes. Fruit spherical, as large as a small orange, purple throughout, not grooved. Seeds 5-8, compressed, enclosed in an acid pulp. (*Characters from Roxburgh, &c.*)

I have followed Planchon and Triana and Lanessan in referring the *G. purpurea* of Roxburgh (not of Herb. Wallich) to *G. indica* of Choisy, a plant known from early times as the Brindon of the Portuguese, and cultivated as such in Goa and the Mauritius. It was described by Garcias in 1574, by J. Bauhin in 1623, and by Ray in 1688. Roxburgh states of his *G. purpurea* that it was sent to him by Dr. Berry from a garden, and was supposed to come from the Eastern Archipelago. Graham (Cat. Pl. Bombay) says that *G. purpurea*, Roxb., is the Brindall of the Portuguese, is cultivated in the gardens of Bombay, and found wild in the ravines of Kandalla, &c. The juice of the fruit is used as a mordant, and the expressed oil of the seed is the Kokum oil of the natives, extensively used to adulterate Ghee.

There are in the Hookerian Herbarium specimens from Lambert's Herbarium labelled *purpurea*, Roxburgh, but they are imperfect; their leaves are rather small, elliptic, with very oblique somewhat distant nerves, and resemble those of *G. Cambogia* and *G. Morella*, and are perhaps referable to *G. lanceæfolia*.—J. D. H.

5. **G. malaccense**, Hook. f.; leaves very coriaceous elliptic acuminate, nerves very fine spreading close-set connected beneath by oblique nervules, male fl. 1 in. diam. stoutly pedicelled fascicled, female 1½-2 in. diam., stamens in a dense stipitate conical column.

EASTERN PENINSULA; Malacca, Maingay. (*G. cornea*, Roxb., Kew distrib. 149.)

Branches stout, 4-angled. Leaves 5-7 by 2-2½ in., abruptly acuminate, hardly shining above, brown when dry; petiole ½ in. MALE fl. on stout pedicels ½-¾ in., in terminal fascicles of 4-6. Sepals orbicular, concave. Petals twice as long, dull-red, broadly ovate, shortly-clawed. Stamens very numerous, densely imbricated in a narrow conical or pyramidal mass, filaments very short; anthers adnate, ovoid, 2-celled, some oblong, others broader than long. Rudimentary ovary 0. FEMALE fl. solitary, terminal, rose-coloured. *Staminodes* few. Ovary globose, 8-celled; stigma sessile, very large, convex, enveloping half the ovary, 8-cleft almost to the concave centre. Fruit unknown.—So like *G. spectabilis* that but for the structure of the andræcium (which is confirmed by Maingay's careful analysis), I should have hesitated in separating it from that plant, which again differs from *G. cornea* chiefly in the much larger flower. Cumming's 2296 from the same locality (referred by Choisy to *G. venulosa* of the Philippines, and by T. Anderson to *G. cornea*) may be this same plant.—J. D. H.

6. **G. Cambogia**, Desrouss. in Lamk. Encycl. iii. 701; leaves oblong elliptic or lanceolate dark green beneath, nerves very oblique, male pedicels

$\frac{1}{4}$ – $\frac{3}{4}$ in., rudimentary stigma 3–4-lobed or 0, fruit not grooved to the tip. *Roxb. Corom. Pl.* iii. t. 298, *Fl. Ind.* ii. 621; *DC. Prodr.* i. 561; *Wall. Cat.* 4865, 4866, 4861 C, 4863 B; *W. & A. Prodr.* i. 561; *Chois. Guttif. Ind.* 35; *Planch. & Trian. Mem. Guttif.* 177; *Thwaites Enum.* 48; [*Lanessan Mem. Garcin.* 362; *Beddome Flor. Sylvat.* t. 85]. *G. zeylanica*, *Roxb. Fl. Ind.* ii. 621; *Wall. Cat.* 4867; [*Lanessan Mem. Garcin.* 408]. *G. affinis*, *W. & A. Prodr.* 101 (not of *Wall. Cat.* 4854). *G. elliptica*, *Wall. Cat.* 4869.

Mountains of the WESTERN PENINSULA, from Concan to Travancor; CEYLON.

A small erect tree; branches drooping. *Leaves* 2–5 by $\frac{1}{4}$ – $1\frac{1}{2}$ in., dark green, shining, hardly coriaceous, shortly acuminate, base acute rarely obtuse; midrib prominent to the middle; veins thick, usually very oblique, $\frac{1}{4}$ in. apart, reticulate; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Male fl.* in short axillary fascicles; pedicels thickened towards the tip, often reflexed. *Sepals* with narrow membranous margins, outer $\frac{1}{2}$ – $\frac{3}{4}$ in. long, inner larger. *Petals* twice as long as the sepals, thinner, oblong, concave. *Stamens* 12–20 or more, adnate to the receptacle into a mass with a prominent centre; free part of filaments $\frac{1}{8}$ in. long. *Rudimentary stigmas* 3–4, very short or 0. *HERMAPH.* fl. 1–3, terminal and axillary, rather larger than the male; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. *Stamens* 10–20, filaments unequal, all connate at the base or in unequal bundles. *Stigmatic rays* 8–10-tubercled, free nearly to the base, spreading. *Fruit* the size of a small apple, yellow or red, grooves 6–8, ending about the middle; top flat, depressed, mamilla thick. *Seeds* 6–8; aril succulent.—Roxburgh's unpublished drawing (*Herb. Calcutta* and *Kew*) differs from that in the Coromandel plants in the usually axillary female flowers, with few terminal ones, and in the papillose scarcely divided stigma; differences of no specific value. Thwaites (*Enum.*) states that this yields a yellow insoluble gum, hence valueless as a pigment, but that the acid juice of the ripe fruit is used as a condiment.—[*G. indica*, *Chois. (DC. Prodr.* i. 561), founded on Thomas's *Brindonia indica* (*Dict. Sc. Nat.* v. 340), is probably this species, but having seen no specimens I do not quote it. See No. 4.]

[The following varieties or species are referred to *G. Cambogia* by *Beddome (Fl. Sylv. Gen.* xxi.).

VAR. 1. conicarpa, *Wight Ic.* 121 (excl. δ), *Ill.* i. 126 (sp.); *Planch. & Trian. Mem. Guttif.* 192; *Lanessan Mem. Garcin.* 53; leaves broader beyond the middle or linear-oblong, fruit ovoid-conical 4-grooved to the top, furrows angular.—Shevagerry hills, *Wight*.

VAR. 2. papilla, *Wight Ic.* t. 960, 961 (sp.); *Planch. & Trian. Guttif. Ind.* 191; *Lanessan Mem. Garcin.* 50; leaves large elliptic, fruit ovoid 4–8-grooved to the top with a terminal mamilla—Conoor and Sisparah jungles, *Wight*.]

7. *G. Cowa*, *Roxb. Fl. Ind.* ii. 622; leaves broad-lanceolate acute at both ends dark green beneath, male pedicels $\frac{1}{2}$ – $\frac{1}{3}$ in., rudimentary stigma 0, fruit grooved to the tip. *DC. Prodr.* i. 561; *W. & A. Prodr.* i. 101; *Chois. Guttif. Ind.* 34; *Planch. & Trian. Mem. Guttif.* 186; *Wall. Cat.* 4863; [*Lanessan Mem. Garcin.* 54.] *G. Kydia*, *Roxb. l.c.* 623; *Wight. Ic.* t. 113; [*G. Kydiana*, *Lanessan Mem. Garcin.* 59.] *G. Roxburghii*, *Wight Ill.* 125 (excl. *syn. Cambogia Zeylanica affinis*), *Ic.* t. 104. *G. umbellifera*, *Roxb., Wall. Cat.* 4864. *G. Wallichii*, *Chois. l.c.* 37. *G. lobulosa*, *Wall. Cat.* 4868 A; *Chois l.c.* 36. *Oxycarpus gangetica*, *Ham. in Mem. Wern. Soc.* v. 344.

EASTERN BENGAL; hills near Monghir; ASSAM; EASTERN PENINSULA; ANDAMAN Islands, *Kurz*.

An erect tree, 60 ft.; trunk straight, simple; branches many, slender, lower reaching the ground; bark dark-grey. *Leaves* 3–5 by 1–2 in.; veins $\frac{1}{10}$ – $\frac{1}{8}$ in. apart, slender, regular, inarching with an intra-marginal one. *Male fl.* in 3–8-flowered, rarely axillary umbels; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. *Sepals* $\frac{1}{2}$ in. long, broad-ovate, thick, fleshy, yellow, with pink on both surfaces. *Petals* twice as long, oblong. *Stamens* many; anthers subsessile, 4-celled. *HERMAPH.* fl. solitary, rarely 2–3, axillary, sessile. *Ovary* subglobose; stigmatic rays spreading, papillose. *Stamens* (sterile) in 4 clusters of 3–8 unequal filaments. *Fruit* the size of a small orange, dark-yellow, 4–8-grooved and celled, depressed above, tip mamillary.—Wallich's Singapore specimens 4868 B are very im-

perfect. The specimens under this number in Herb. Linn. Soc. consist of two branches with leaves and solitary terminal female flowers: the five leaves marked B are detached and can hardly be referred to *G. Cova*, whilst the flowers certainly can.—[Lanessan retains *G. Kydiana* as a distinct species with *G. Wallichiana*, Choisy, and *umbellifera*, Wall., as synonym.]

8. ***G. nigro-lineata***, *Planch. mss.*; leaves lanceolate or ovate-lanceolate, acuminate acute at the base ferruginous beneath, male pedicels $\frac{1}{8}$ – $\frac{1}{3}$ in., rudimentary stigma 0.

EASTERN PENINSULA; Malacca, *Griffith* (Kew distrib. 854), and *Maingay* (Kew distrib. 152 and 162).

A tree; branches often knotted; bark dusky. *Leaves* 5–8 by $1\frac{1}{4}$ –3 in., subcoriaceous, tapering to the base; veins many, delicate, $\frac{1}{10}$ – $\frac{1}{8}$ in. apart, inarching with an intra-marginal one. MALE fl. 3–9, fascicled on short axillary woody nodes; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., slender, thickened above. *Sepals* $\frac{1}{2}$ in., fleshy, orbicular. *Petals* a little longer and thinner, concave, reflexed above the middle. *Stamens* in a shortly pedicelled 4-cornered compressed mass; anthers 4-gonal, 4-celled. FEMALE fl. solitary, axillary. *Ovary* ovoid (5–7-celled, *Maingay*); stigma 5–7-lobed, lobes lobulate, papillose. ["Fruit subglobose, with a thick fleshy stipitate discoid apiculus, as large as a walnut, bright orange-yellow."—*Maingay*.]

9. ***G. bancana***, *Miquel Flor. Ned. Ind. Suppl.* 494; branchlets very stout, leaves broadly ovate or oblong tip rounded very coriaceous, veins numerous slender, petiole 1 in., male fl. small shortly pedicelled in dense fascicles from axillary cushions that are clothed with lanceolate bracts.

EASTERN PENINSULA; Malacca, *Maingay* (Kew distrib. 158).—DISTRIB. Island of Banca.

Branchlets as thick as the little finger, 4-angled, black when dry, nodes very close set. *Leaves* 5–7 by 3–4 in., not shining, narrowed into the petiole, brown when dry, nerves uniform very slender, with oblique sinuous connecting nerves beneath; petiole not very stout. MALE fl. $\frac{1}{4}$ in. diam., crowded on every node for a considerable length; pedicels $\frac{1}{4}$ in. long; bracts crowded, $\frac{1}{2}$ – $\frac{1}{3}$ in. long, membranous, erect, red-brown. *Sepals* orbicular, outer smaller. *Petals* rather larger than the inner sepals, orbicular, concave, not very coriaceous. *Stamens* forming a quadrate mass, without a rudimentary ovary; anthers small, subsessile, 2-celled, peltate.—I find no difference between this plant and the Banca one except that the leaves are larger and the pedicels rather shorter. A very similar or identical plant is found in Borneo; its remarkable inflorescence and bracts at once distinguish it.—*J. D. H.*

†† *Male flower terminal, solitary or geminate, rarely 3, fruit obovoid, unknown in G. loniceroides.*—*Leaves* 2–4 in.

10. ***G. lanceifolia***, *Roxb. Fl. Ind. ii.* 623; leaves narrow-lanceolate acuminate subcoriaceous dark green, flowers $\frac{1}{2}$ in. diam. *Wight Ic. t.* 163; *Wall. Cat.* 4861 A, B; *Chois. Guttif. Ind.* 36; *Planch. & Trian. Mem. Guttif.* 186 [*Lanessan Mem. Garcin.* 48]. *G. purpurea*, *Wall. Cat.* 4862, and *Chois. l.c.* 36 (not of Roxburgh).

EASTERN BENGAL; in forests of Assam and Silhet.

A small tree; bark dark, rough. *Leaves* 2–4 by $\frac{3}{4}$ –1 in., rather thick, tapering at the base; veins few, indistinct; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in. MALE fl. 1–2, terminal, dark-yellow. *Sepals* $\frac{1}{2}$ in. long, thick, oblong, fleshy. *Petals* smaller, slightly oblique, dark red. *Stamens* about 40, in a globose mass; anthers 4-celled. FEMALE fl. terminal or axillary, rather larger than the male. *Stamens* in 4 bundles of 4–5 each. *Ovary* ovoid; stigmatic rays 6–8, glandularly tubercled. *Fruit* the size of a small plum, obovoid, not grooved, orange-yellow, 6–8-seeded.—[*Lanessan* refers *G. oxyphylla*, Pl. & Trian., to this species.]

11. **G. loniceroides**, *T. Anders.*; leaves oblong-lanceolate or oblanceolate membranous glaucous beneath, flowers very small $\frac{1}{8}$ in. diam.

BIRMA, *Griffith* (Kew distrib. n. 870); PEGU, at Tonkye ghat, *Kurz*.

A shrub or small tree; branches slender, decussate, horizontal, old bark dark grey; young shoots reddish purple. *Leaves* 2-4 by $\frac{1}{2}$ - $\frac{3}{4}$ in., confined to the young shoots; veins slender, indistinct, irregularly branched and forked; petiole $\frac{1}{4}$ in. MALE fl. rarely axillary, usually 3 or more; pedicels slender, $\frac{1}{8}$ in. *Sepals* and *petals* $\frac{1}{4}$ - $\frac{1}{2}$ in., thinly fleshy, broad-ovate, concave. *Stamens* many in a central sessile sub-4-gonal mass; anthers subsessile, 2-celled. Rudimentary ovary 0.

+++ Male flower in a terminal 3-chotomous panicle; fruit smooth.

12. **G. pedunculata**, *Roxb. Fl. Ind. ii.* 625; leaves obovate obtuse long-petioled. *Wall. Cat.* 4860; *Wight Ill.* 125, *lc.* t. 114, 115; *Chois. Mem. Guttif.* 35; *Planch. & Trian. Mem. Guttif.* 192; [*Lalessan Mem. Garcin.* 42].

Forests of N.E. BENGAL, near Rungpore and Goalpara, and in Silhet, where it is cultivated for its pleasant acid fruit.

A tree about 60 ft.; bark spongy. *Leaves* 6-12 by 3-5 $\frac{1}{2}$ in., subcoriaceous; base acute or acuminate; midrib stout; veins $\frac{1}{2}$ in. apart, regular, parallel, tips inarched and anastomosing; petiole 1-1 $\frac{1}{2}$ in. MALE fl. large, pale green, in 8-12-flowered panicles; pedicels 2-3 in., stout, erect. *Sepals* $\frac{1}{2}$ in., orbicular, fleshy, inner pair narrower. *Petals* narrower, but scarcely longer, oblong. *Stamens* in a 4-angled truncate shortly stipitate mass; anthers 4-gonal, 2-celled. FEMALE fl. solitary, larger than the male, terminal on a thick 4-angled peduncle $\frac{1}{2}$ in. long. *Stamens* 20-30, filaments in 4 bundles, connate below. *Ovary* globose; stigmatic rays 8-10, spreading. *Fruit* large, yellow, the size of a small melon. *Seeds* 8-10, large, reniform; aril succulent.

++++ Male flowers several, in sessile terminal heads; fruit echinate.

13. **G. echinocarpa**, *Thwaites in Hook. Journ. Bot.* vi. (1854) 71; *Enum.* 49; leaves lanceolate oblong or obovate acute or retuse base narrowed. *Planch. & Trian. Mem. Guttif.* 193; [*Beddome Flor. Sylvat. Gen.* xxi. *Lalessan Mem. Garcin.* 33].

Central and Southern provinces of CEYLON.

A tree, 40-50 ft. *Leaves* 3-6 by 1-2 $\frac{1}{2}$ in., thickly coriaceous; veins close, regular; petiole stout, $\frac{1}{2}$ -1 in. MALE fl. small, sessile, pale yellow. *Sepals* thick, orbicular, subcordate. *Petals* twice as long, thinner, oblong, suboblique. *Stamens* 12 or more, on a short sub-4-gonous stalk; anthers subsessile, 4-angled. FEMALE fl. solitary, terminal, sessile. *Stamens* connate in a ring. *Ovary* covered with imbricate fleshy scales; stigma peltate, irregularly lobed. *Fruit* 1 $\frac{1}{2}$ in. long, subglobose, dark-red, covered with broad sharp tubercles (like the Litchi fruit), 1-3-seeded.—The thick oil of the seed is used for lamps, but is not good.

VAR. 1. Leaves lanceolate-oblong acute, flowers small.—Forests, below 4000 ft.

VAR. 2. Leaves thickly coriaceous obovate or oblong retuse or obtuse, flowers large.—A mountain state, alt. 4-6000 ft.

*** Stamens of the male flowers in a subglobose mass; anthers adnate, orbicular, dehiscence circumsciss, rudimentary ovary 0. (Male fl. axillary.)

14. **G. Morella**, *Desrouss. in Lamk. Encycl.* iii. 701, t. 405, f. 2; leaves thickly coriaceous elliptic-obovate to ovate-lanceolate obtuse, veins very oblique, petals longer than the inner sepals. *DC. Prodr.* i. 561; *Planch. & Trian. Mem. Guttif.* 195; *Hanbury in Trans. Linn. Soc.* xxiv. 489, t. 50 [*Beddome Flor. Sylvat.* t. 86; *Lalessan Mem. Garcin.* 62]. *G. lobulosa*, *Wall. Cat.* 4868. *G. pictoria*, *Roxb. Fl. Ind.* ii. 627; *Wight Ic.* t. 102 [*Beddome Flor. Sylvat.* t. 87]. *G. elliptica*, *Wall. Cat.* 4869; *Wight Ic.* t. 120. *G. acuminata*, *Planch. & Trian. lc.* 200. *G. gutta*, *Wight Ill.* 125, t. 144

(*excl. syn. Linn.*). *G. cambogioides*, *Royle Mat. Med. Ed. iii.* 339. *Hebradendron cambogioides*, *Graham in Hook. Comp. Bot. Mag. ii.* 199, t. 27.]

Forests of EASTERN BENGAL; the KHASIA Mts.; the WESTERN PENINSULA, in Malabar and Canara, and the EASTERN PENINSULA at Malacca and Singapore; CEYLON.—DISTRIB. Eastwards to Siam.

A small tree, 30–50 ft. *Leaves* 4–6 by $1\frac{1}{2}$ –3 in., base acute, veins indistinct, $\frac{1}{8}$ – $\frac{1}{4}$ in. apart; petiole about $\frac{1}{2}$ in., short, stout. MALE fl. about 3, subsessile in the axils of fallen leaves, or on pedicels $\frac{1}{8}$ – $\frac{1}{4}$ in. long. *Sepals* $\frac{1}{10}$ in., orbicular, concave. *Petals* similar, but rather larger. *Stamens* many, in an obscurely 4-angled subglobose mass; free portion of filament very short; anthers orbicular, flattened. FEMALE fl. larger than the male, solitary, axillary, sessile or shortly pedicelled. *Staminodes* about 12, bases connate or in a ring. *Ovary* subglobose; stigma large, sessile, 4-lobed, tubercled, lobes toothed. *Fruit* the size of a cherry, subglobose, slightly 4-lobed, 4-celled, 4-seeded.—For an excellent memoir and accurate figure see Hanbury's paper cited above. "The only Ceylon Gamboe-yielding species." *Thwaites*. Much confusion has arisen from Planchon and Triana having examined only imperfect specimens of Wallich's n. 4868. The specimens in the Linnean Society consist of 2 branches, with many attached leaves, a young leaf and a fruit, all certainly belonging to the true *G. Morella*.—[Lanessan adds, as other synonyms, *G. lateriflora*?, and *Gaudichaudi*, Pl. & Trian. Beddome keeps *G. pictoria*, Roxb., distinct from *G. Morella*, Desrouss., on account of difference in the female flower, which he represents as having the staminodes in bundles and the stigma very small, 4-lobed in the centre. He states that the Gamboe has been analyzed by Mr. Broughton, and that it proves equal to that of *G. Morella*.—*J. D. H.*]

15. *G. Choisyana*, *Wall. Cat.* 4870; leaves membranous ovate acuminate, petals twice as long as the sepals. *Planch. & Trian. Mem. Guttif.* 203. *Hebradendron Choisanum*, *Chois. Guttif. Ind.* 39.

EASTERN PENINSULA, *Wallich*.

Leaves 4–5 by 2–2½ in.; veins few, $\frac{1}{2}$ –¾ in. apart, alternatè, reticulate, anastomosing at the tips; petiole $\frac{1}{2}$ in., slender. MALE fl. solitary?, axillary, sessile. *Sepals* $\frac{1}{2}$ in., broad ovate, scarious. *Petals* obovate, slightly concave. *Stamens* many, in a short mass, free portion of filament short; anthers irregular, more or less orbicular. FEMALE fl. unknown.

16. *G. heterandra*, *Wall. Cat.* 4856; leaves thickly coriaceous ovate obtuse or obtusely acuminate, petals twice as long as the sepals. *Planch. & Trian. Mem. Guttif.* 204. *Hebradendron Wallichii*, *Chois. Guttif. Ind.* 39.

Forests of PEGU and TENASSERIM, ascending to 4000 ft., *Griffith* (Kew Distrib. n. 874).

Young branches stout, with large axillary flowering nodes. *Leaves* 6–8 by 3–4 in., base tapering; veins $\frac{1}{2}$ –1 in. apart, faint, curved; petiole $\frac{3}{4}$ –1 in., stout. MALE fl. $\frac{1}{2}$ in. diam., axillary, subsessile. *Sepals* thin, coriaceous, orbicular. *Petals* thick, fleshy. *Stamens* in a globose central mass, free portions of filaments very short; anthers peltate. FEMALE fl. axillary, solitary, sessile. *Immature fruit* subglobose, 4-celled, 4-seeded; stigmatic rays 4, sessile, tubercled.—*Choisy* describes the male flowers as solitary, but I think the large scarred axillary nodes indicate their being fascicled.

17. *G. Wightii*, *T. Anders.*; leaves coriaceous linear-lanceolate acuminate, petals equalling the sepals.

Forests of SOUTHERN INDIA, *Wight*. (Distrib. Kew, Pl. Wight, 145.)

Leaves 3–5 by $\frac{1}{2}$ –1 in.; veins very slender oblique; petioles $\frac{1}{4}$ – $\frac{1}{2}$ in. MALE fl. small, sessile, axillary. *Sepals* equal, thinly coriaceous, orbicular, concave. *Petals* obovate, very concave. *Stamens* about 20, in a 4-gonal column enclosing a rudimentary 4-gonal style, filaments free above; anthers peltate, dehiscence oblique. FEMALE fl. solitary, sessile. *Fruit* the size of a small cherry; stigma 4-lobed.—The Gamboe of this species is very soluble, and yields a good pigment.

Series B. Stigma entire.

* Stamens of the male flowers in a globose central mass; anthers 2-4-celled, dehiscing vertically (unknown in 19. *atro-viridis*). Stigma convex.

18. **G. paniculata**, *Roxb. Fl. Ind.* ii. 626; leaves thin oblong-lanceolate or obovate, male fl. in twice or thrice branched panicles, female in short terminal spikes. *Wight Ill.* 125, *Ic. t.* 112; *Wall. Cat.* 4857; *Chois. Guttif. Ind.* 35; *Planch. & Trian. Mem. Guttif.* 194 [*Lanessan Mem. Garcin.* 60]. *G. Bhumicowa*, *Roxb.*; *Wall. Cat.* 4858.

EASTERN BENGAL; Khasia Mts., ascending to 3000 ft.; EASTERN HIMALAYA, Bhotan, *Booth*.

A tree, about 40 feet; branches many, ascending. *Leaves* 6-9 by 2-4 in., shining, acuminate, rarely obtuse, base tapering; veins $\frac{3}{4}$ in. apart, curved; petiole $\frac{3}{4}$ in. MALE fl. many, pure white. *Outer sepals* small, thick, inner $\frac{1}{10}$ in. *Petals* 3 times longer, ovate, very concave. *Stamens* many, subsessile, imbricate in a large subglobose mass; anthers obovate, 2-4-celled. FEMALE fl. few, like the males. *Staminodes* 0, or 1-2 filaments. *Ovary* subglobose; stigma convex, entire, tubercled. *Fruit* the size of a large cherry, yellow, succulent. *Seeds* 4, reniform, aril pulpy.

19. **G. atro-viridis**, *Griff. mss.*; leaves coriaceous oblong-lanceolate, female fl. solitary terminal.

UPPER ASSAM, at Tabong, *Griffith*. (*Herb. Kew Distrib.* 862). MALACCA, *Maingay*. Young branches stout, terete; bark black when dry. *Leaves* 6-9 by 2-2½ in., thickly coriaceous, dark green, shining, abruptly acuminate, base contracted; veins $\frac{1}{2}$ in. apart, prominent on both surfaces, anastomosing along the margin; petiole 1 in. FEMALE fl. large, 1½ in. diam.; pedicel 1 in. *Sepals* spreading, large, orbicular, concave, blood-red within. *Petals* obovate, fleshy, coloured like the sepals, tip recurved. *Stamens* united below into a ring. *Ovary* subangled, 10-celled; stigma sessile sub-4-gonal, minutely tubercled, broader than the ovary.—“*Ovary* 9-celled; stigma closely adherent to the ovary, large, orbicular, convex, blood-red, fleshy, margin obscurely lobed. Ripe fruit 3 in. long, subglobose, base slightly 9-lobed, dull yellow, crowned by the at length concave stigma.”—*Maingay mss.*

20. **G. Griffithii**, *T. Anders.*; leaves very large ovate or ovate-cordate, obtuse, nerves distant.

EASTERN PENINSULA, Mt. Ophir near Malacca, *Griffith* (*Kew Distrib.* 361); *Maingay* (*Kew Distrib.* 153).

A tall tree; young branches 4-gonous, pale green. *Leaves* 12-18 by 4-6½ in., coriaceous; midrib stout, rigid, angled; veins very prominent, $\frac{3}{4}$ in. apart, tips free. MALE fl. numerous, small, bright yellow, in very short axillary woody branches, pedicels 2 in. *Sepals* $\frac{1}{6}$ in. long, concave, fleshy. *Petals* a little larger, oblong, “dull-red,” *Maingay*. *Stamens* many, in a sub-4-gonal sessile flattened mass; anthers subsessile, 2-celled. *Rudimentary ovary* 0. FEMALE fl.: “*Ovary* 12-celled; style very short, stigma peltate slightly convex obscurely lobed at the margin, rough with elevated papillæ, persistent. *Fruit* pomiform faintly ribbed, 2 in. in longest diam. *Seed* two-thirds pendulous.”—*Maingay*.

[There is in *Maingay*'s Herbarium a plant very like this in habit, but described by him as having a circumsciss anther, which is cultivated at Singapore as the true *Gamboge* of Siam.]

** Stamens of the male flower in an annular mass round the rudimentary ovary; anthers 2-celled, dehiscence vertical. Stigma broad, discoid, centre depressed

21. **G. anomala**, *Planch. & Trian. Mem. Guttif.* 174; leaves coriaceous elliptic or oblong-lanceolate shortly acuminate, male and female fl. in bracteate 3-flowered cymes. [*Lanessan Mem. Garcin.* 30.] *G. affinis*, *Wall. Cat.* 4854 in part, not of *W. & A.*—*Guttifera*, *Griff. It. Notes*, 40, No. 654.

EASTERN BENGAL; Jynte Hills and Khasia Mts., Wallich, &c., in beds of torrents, 3000–5000 ft. elevation. (Kew Distrib. Herb., Griffith, 848); (Herb. Ind. Or., H. f. & T. Garcinia, 14).

A small erect tree, branches subverticillate. *Leaves* 4–8 by 2–3½ in., dark green; veins close-set, anastomosing within the margin; petiole ½–¾ in. *Cymes* in the axils of the upper leaves, rather exceeding the petioles; pedicels short, stout; bracts under each flower 2, leafy, ¼ in. long. *MALE fl.*: *Sepals* orbicular, concave. *Petals* ½ in. long, obliquely oblong, suberect, slightly concave. *Stamens* very numerous, mass subglobose concealing the rudimentary ovary; anthers large, horse-shoe shaped. *FEMALE fl.* like the male, but ½ smaller. *Staminodes* many, united into a lobed ring or into bundles. *Ovary* oblong; stigma broad, discoid, edge revolute, slightly lobed. *Fruit* the size of a plum, subglobose, smooth, dark olive-green, crowned by the short-thick style, 1–2-seeded.

22. **G. Maingayi**, *Hook. f.*; leaves 4–6 in., elliptic obtusely apiculate petioled, nerves distant spreading arched distinct, interspaces covered with minute wavy irregular raised points and lines, flowers about ¾ in diam.

EASTERN PENINSULA, Malacca, *Maingay*, (Kew Distrib. No. 161 ♂ and 160 ♀).

A small tree; branches obtusely angled. *Leaves* coriaceous, very pale-brown when dry, not shining, narrowed into the petiole, which is ½ in. long; nerves ½–¾ in. apart. *MALE fl.* in terminal fascicles, shortly pedicelled. *Sepals* broader than long, outer smaller than the inner. *Petals* larger than the sepals, shortly clawed. *Stamens* very numerous, filaments connate into a short column; anthers in very many series surrounding a columnar rudimentary ovary with a discoid top, linear, recurved, 2-celled. *FEMALE fl.* solitary, terminal, subsessile. *Perianth* of the male. *Staminodes* few, slender, inserted on a hypogynous ring. *Ovary* globose, half-concealed by the large convex entire stigma, 4–6-celled.—*Maingay* describes the stigma as marginally 3–4-lobed, but it appears to be quite entire in the dried specimens.—*J. D. H.*

23. **G. stipulata**, *T. Anders.*; leaves thickly coriaceous elliptic-oblong stipulate, male flowers in 4–6-flowered cymes, female solitary or geminate. *Guttifera*, *Griff. It. Notes*, 117 n. 261.

EASTERN HIMALAYA, in moist subtropical forests, Bhotan, *Griffith* (Kew. Distrib. 860) Sikkim, ascending to 4000 ft., *J. D. H.* (Herb. H. f. & T. Garcinia, 17.)

A tree, about 60 ft.; bark smooth, branches slender. *Leaves* 6–12 by 1½–3½ in., dark green, thickly coriaceous, yellow-green; midrib and nerves prominent, the latter alternate, distant, incurved, reticulate; petiole ¾ in.; stipules small, triangular. *MALE fl.* 4–6 in each cyme; pedicels ½ in., stout; bracts scale-like. *Sepals* orbicular, concave, outer ½ in., inner ¼ in. broad. *Petals* twice as long, obliquely ovate, acute. *Stamens* many, in an annular mass; free portion of filaments very short. *FEMALE fl.* like the male, axillary, solitary, shortly pedicelled. *Fruit* ½ in. long, oblong, smooth, shortly pointed, 2-celled and 2-seeded; stigma orbicular, tubercled, margin revolute. *Seeds* flattened, oblong, testa strongly nerved.—*Planchon* and *Triana* refer the flowers of the Herb. Ind. Or. H. f. & T. specimens of this to *G. speciosa* (l.c. 172 in note), and state that they cannot reconcile the venation and stipulation of the leaves distributed with them with any *Guttiferae* but the tribe *Quinææ*, and therefore refer these to a plant of that said tribe. I have however examined the living plant in Sikkim, and it is certain that there was no error in the distribution of the Indian specimens.

*** Stamens of the male flowers in 4 bundles; anther-cells dehiscent by terminal pores, or by 2 erect valves; stigma peltate smooth.

24. **G. merguensis**, *Wight Ill.* 122, *Ic. t.* 116; leaves lanceolate elliptic or ovate with a long obtuse or notched tip, flowers axillary, male cymose, female solitary or in pairs. *Wall. Cat.* 1948. [*Lanessan Mem. Garcin.* 57, excl. *syn.*] *Discostigma merguense*, *Planch. & Triana. Mem. Guttif.* 208.

EASTERN PENINSULA; in dense woods from Mergui to Malacca.

A small tree or shrub, young branches sub-4-gonal. *Leaves* 2-4 by 1-1½ in., thinly coriaceous; veins below very close set, delicate, ending in a stout intramarginal one; petiole ½-¾ in. MALE fl. numerous; cymes ¼-½ in. long; pedicels ¼ in., 4-gonal. *Outer sepals* small, bract-like; inner ⅙ in., thin, membranous, concave. *Petals* like the inner sepals, concave. *Stamens* many, in 4 distinct bundles, each bearing a head of anthers on short filaments; anthers small, 2-celled. *Rudimentary stigma* large fungoid; style equalling the staminal bundles. FEMALE fl. on pedicels ½-1 in. *Fruit* ½-¾ in. long, oblong, fleshy. *Seed* solitary, subreniform.

25. **G. travancorica**, *Beddome Flor. Sylvat.* t. 173; leaves 2½-3½ in. linear-oblong, tip rounded, base acute, nerves very slender horizontal, surface finely reticulated beneath between them, petiole slender, flowers ½ in. diam. *Garcinia*, sp. 2, *Beddome Flor. Sylvat. Gen.* xxi.

WESTERN PENINSULA, in forests of Travancor and Tinnivelly, *Beddome*.

A large tree, abounding in a yellow pigment; branches obtusely 4-angled, shining. *Leaves* coriaceous, sometimes broader upwards, dark green above, not shining, pale beneath, with a stout reddish (when dry) midrib, and beautifully reticulated surface; margins recurved; petiole ¼-¾ in. MALE fl. in 3-clotomous, short, few flowered terminal and subterminal cymes. *Sepals* orbicular, concave. *Petals* about twice as large, shortly clawed. *Stamens* in 4 large masses; anthers very numerous, versatile, 2-celled, cells longitudinally 2-valved. *Rudimentary ovary* columnar, with a circular peltate stigma. FEMALE fl. terminal, subsolitary. *Perianth* of the male. *Staminodes* few, slender, inserted in a hypogynous ring. *Ovary* globose, half concealed by the large convex obscurely lobed stigma. *Fruit* as large as a walnut, subglobose, contracted into a short thick style with a broad imbricate stigma ½ in. diam. *Seeds* few, large, shining.—*J. D. H.*

26. **G. terpnophylla**, *Thwaites Enum.* 406; leaves lanceolate acute or acuminate with an obtuse tip, flowers axillary, male in short subumbellate fascicles, females solitary or in pairs. *Beddome Flor. Sylvat. Gen.* xxi. *Terpnophyllum zeylanicum*, *Thwaites in Hook. Lond. Journ. Bot.* vi. 70, t. 2, f. 1, *Enum.* 49. *Discostigma zeylanicum*, *Planch. & Trian. Mem. Guttif.* 209.

Central province of CEYLON, ascending to 4000 ft., *Thwaites*.

A middle-sized tree, young foliage red-purple. *Leaves* 3-5 by 1-1½ in., coriaceous; midrib prominent, veins ½ in. apart, inarching at the tips with an intramarginal one. MALE fl. ½ in. diam.; pedicels ½ in. *Stamens* many, in 4 [2-4 *Beddome*] very short spreading bundles, adnate to the basal keel of the petals; anthers sessile. *Rudimentary ovary* a small papilla. FEMALE fl.: *Staminodes* scale-like. *Ovary* 2-celled; stigma peltate, partially lobed. *Fruit* ¾ in. long, obliquely ovoid, 1-celled, 1-seeded.—In the flower I have examined the stamens are in 4 equal bundles, as in its allies of this section, and not on a lobed disk as represented in *Journ. Bot.* l.c.

VAR. *acuminatum*; leaves with a long tapering obtuse point. *Discostigma acuminatum*, *Planch. & Trian. Mem. Guttif.* 209.

27. **G. eugeniæfolia**, *Wall. Cat.* 4873; leaves broadly lanceolate acute or acuminate, male flowers in short dense axillary cymes, females subumbelled.

EASTERN PENINSULA; Singapore, *Wallich* (7491); Malacca, *Griffith*, *Maingay*.

A small tree very like *G. merguense*, but with large broader leaves, finely and closely veined beneath like a *Calophyllum*. MALE fl. as in *merguense* but smaller, in short dense cymes. *Staminal* bundles distinct, suberect, free part of filaments very short; anthers very small. *Style* slender, as long as the stamens. FEMALE fl. in 4-10 flowered short subumbelled cymes. *Sepals* minute, scale-like. *Petals* smaller, margins ciliate. *Staminodes* 0? *Ovary* short, terete; stigma broad, peltate with revolute entire margins.—I cannot agree with Triana and Planchon in referring *Discostigma rostratum*,

Haask. to this. Helfer states that the stem exudes a green varnish, and Griffith describes the juice of the fruit as milky.

SUBGENUS II. **Xanthochymus**, Roxb. (Gen.). *Sepals* and *Petals* 5, very rarely 4. *Filaments* connate in 5, rarely 4 erect distant pedicelled spathulate bodies, antheriferous at the top, free portions very short, incurved; anthers small didymous.

28. **G. Xanthochymus**, Hook. f.; leaves large linear-oblong or oblong-lanceolate acute or acuminate, male fl. fascicled $\frac{1}{2}$ in. diam. shortly pedicelled. *Xanthochymus pictorius*, Roxb. *Corom. Pl.* ii. 51, t. 196, *Fl. Ind.* ii. 633. *X. tinctorius*, DC. *Prodr.* i. 562; *Chois. Guttif. Ind.* 32; *Planch. & Trian. Mem. Guttif.* 149; *W. & A. Prodr.* 102; *Wall. Cat.* 4837.

EASTERN BENGAL and the EASTERN HIMALAYA, from Sikkim to the Khasia Mts. and to Birma; EASTERN PENINSULA, Penang and the Andaman Islds.; WESTERN PENINSULA, the Circars, *Roxburgh*, and from the Bombay Ghats southward.

A middling sized tree; trunk straight; branches drooping, angular. *Leaves* 9–18 by 2–4 in., coriaceous, shining, veins $\frac{1}{4}$ – $\frac{1}{2}$ in. apart, reticulated; petiole 1 in., rugose. MALE fls. $\frac{3}{4}$ in. diam., in 4–8-flowered fascicles, from the axils of fallen leaves, white; pedicels thickened, 1–1½ in. *Sepals* $\frac{1}{2}$ in., orbicular, concave, fleshy, unequal. *Petals* $\frac{1}{2}$ in., orbicular, spreading, thin. *Stamens* in 5 broad bundles of 3–5, alternating with 5 fleshy glands, anthers 2-celled. HERMAPH. fl. like the male. *Ovary* ovoid, pointed, usually 5-celled; stigmatic lobes 5, oblong, spreading, entire. *Fruit* the size of an apple, subglobose, pointed, dark yellow. *Seeds* 1–4, oblong.—Yields a large quantity of indifferent gamboge (*Roxburgh*). The closely allied *X. dulcis*, Roxb., of the Indian Archipelago has a round-tipped fruit. There are in Helfer's Tenasserim Herbarium imperfect specimens of a plant much resembling this, but with pubescent branchlets. "A very variable species in the shape of the leaves, and length of the peduncles and pedicels; it yields a tenacious gum of no value."—*Thwaites*.

29. **G. ovalifolius**, Hook. f.; leaves ovate elliptic-oblong or lanceolate or suborbicular retuse obtuse or acute, male fl. spiked or fascicled, sepals ciliolate. *Xanthochymus ovalifolius*, Roxb. *Fl. Ind.* ii. 632; *W. & A. Prodr.* 102; *Wall. Cat.* 4838; *Chois. Guttif. Ind.* 32; *Planch. & Trian. Mem. Guttif.* 149; *Thwaites Enum.* 49. *Stalagmites ovalifolius*, G. Don.

WESTERN PENINSULA; in forests of the Circars, *Roxburgh*; CEYLON, ascending to 3000 ft.—DISTRIB. Java?

A middling-sized tree. *Leaves* 3¼–8½ by 1¾–3½ in., shining; nerves numerous, slender, arched with many oblique transverse nervules; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ – $\frac{1}{3}$ in. diam., ♂ and ♀ often mixed in one fascicle, but usually the females are fascicled and the males often spiked, the spikes sometimes running out to 4 inches long, with fascicles of flowers throughout their length. MALE fl.: *Sepals* 4, coriaceous, orbicular, half as large as the membranous orbicular concave petals. *Stamens* in 5 long-clawed spathulate fascicles; anthers few (6–10) didymous. FEMALE fl. usually on much longer pedicels than the male. *Staminodes* 5, small, with effete anthers. *Ovary* globose, 3–4-celled; style very short; stigma 5-lobed to the middle. *Fruit* broadly oblong; size of a walnut, smooth, deep green, 1–3-seeded.—A very similar species inhabits Java, but has always acute leaves.

VAR. 1. *ovalifolia proper*; leaves obtuse, ♂ flowers fascicled $\frac{1}{4}$ – $\frac{1}{3}$ in. diam.—Ceylon and Western Peninsula.

VAR. 2. *spicata*; leaves obtuse, ♂ in long or short spikes, flowers as in var. 1. *Xanthochymus spicatus*, W. & A. *Prod.* 102; *Wall. Cat.* 346 A.—Western Peninsula.

VAR. 3. *macrantha*; leaves obtuse, ♂ flowers large $\frac{2}{3}$ –1 in. diam. fascicled, anthers 8–12 in each bundle.—*Xanthochymus ovalifolius*? *Beddome Flor. Sylvat. Gen.* xxi.—Western Ghats.

VAR. 4. *acutifolia*; leaves acute, flowers as in var. 1.

I can detect no further differences than the above between vars. 2, 3, and 4 *G. ovalifolia*. *Beddome* states that var. 3 has a different habit.—*J. D. H.*

30. **G. Andersoni**, *Hook. f.*; leaves very large 1-2 ft. oblong thickly coriaceous subacute rounded or cordate at the base, nerves numerous strong, flowers large, fascicled, pedicels very stout long, sepals pubescent.

EASTERN PENINSULA; Malacca, *Griffith*, littoral ("Koonoon Belookar"), *Maingay* (Kew distrib. 157, *G. macrophylla*, *T. And. ms.*)

Branchlets as thick as the middle finger, acutely 4-angled, almost winged when dry green. *Leaves* by far the largest of the genus, often 2 ft. by 9 in., very variable in breadth, nerves very numerous and prominent, meeting in a strong intramarginal one, interspaces reticulate; petiole 1-2 in., very stout. MALE fl. unknown. FEM. fl. $\frac{3}{4}$ in. diam., in axillary many-flowered fascicles; pedicels very stout, 2 in., seated on a subglobose axillary cushion. *Sepals* 5, intricate, leathery, orbicular, concave, two outer smaller, all minutely pubescent at the back. *Petals* three times as large as the sepals, orbicular, concave, contorted in bud. *Disk* very large, of 5 thick fleshy pitted ciliate glands, between each of which is a minute staminode with about 5 imperfect anthers. *Ovary* globose, narrowed into a distinct style, 4-5-celled; stigma cleft to the base into 4-5 linear-oblong obtuse rays. "*Fruit* very large, pomiform, crowned by the stigma, normally 5-celled," *Maingay*.—This species was incompletely characterized by Dr. Anderson from Griffith's specimens under the mss. name of *Garcinia? macrophylla*; I have now redescribed it from Maingay's more complete specimens, and in so doing given the name of my late friend the monographer of the Indian Guttiferæ to what is certainly by far the noblest species of the genus. Griffith in his notes attached to the specimen, describes the perianth as 4-merous, but I find it is always 5-merous.—*J. D. H.*

DOUBTFUL SPECIES.

G. SUCCIFOLIA, *Kurz in Journ. Beng. As. Soc.* xli. pt. 2, of which the female flower and fruit are not known. It is a native of Martaban.

2. **OCHROCARPUS**, Thouars.

(*Calsaccion*, Wight.)

Trees with coriaceous leaves and axillary polygamous flowers. *Calyx* closed before flowering, at length opening into 2, rarely 3, valves or sepals. *Petals* 4-7 or more. *Stamens* indefinite, filaments filiform, free or shortly connate below; anthers erect, oblong or linear, dehiscence vertical. *Ovary* 2-celled; style short, stout, stigma 3-lobed; ovules 2 in each cell. *Berry* 1-4-seeded. *Seeds* large; embryo of a large fleshy tigellus with the cotyledons reduced to a small mamilla or 9.—DISTRIB. A small genus of W. Africa, Madagascar, and India.

1. **O. longifolius**, *Benth. & Hook. f. Gen. Pl.* i. 980; leaves linear-oblong or oblong-lanceolate obtuse, pedicels fascicled, petals acute. *Beddome Flor. Sylvat.* t. 89. *Calsaccion longifolium*, *Wight Ill.* i. 130, *Ic. t.* 1999. *Mammea longifolia*, *Planch. & Trian. Mem. Guttif.* 216. *Calophyllum longifolium*, *Wall. Cat.* 4851. *C. chinense Walp. ? ex Seemann in Bonplandia*.

Forests of the WESTERN PENINSULA from Canara to the Concan.

A middling-sized tree; young branches terete, youngest 4-gonous. *Leaves* 6-8 by 2-2½ in., thickly coriaceous, dark green, base rounded, midrib stout prominent, veins few, indistinct, very slender, united by innumerable venules which give the dried leaf a very beautifully lacunose appearance; petiole short, stout, $\frac{1}{2}$ in. *Flowers* $\frac{3}{4}$ in. diam., on nodes clothed with subulate bracteoles in the axils of fallen leaves; buds globose; pedicels 1 in., slender. *Calyx* bursting into 2 valves, reflexed during flowering. *Petals* 4, thin, deciduous, white. *Stamens* many. *Style* subulate; stigma broad, discoid. *Fruit* 1 in. long, obliquely ovoid, tipped by the hard pointed style, stipitate, 1-seeded. [Flowers often hermaphrodite in cultivation, and used for dyeing silk.—*Beddome*.]

2. **O. siamensis**, *T. Anders.*; leaves linear-oblong or oblong-lanceolate or oblanceolate obtuse, pedicels 1-2 rarely fascicled, petals rounded at the tip.

Mammea siamensis, *T. Anders. in Journ. Linn. Soc.* ix. 261. Calysaccion siamense, *Miquel in Ann. Mus. Bot. Lugd. Bat.* i. 209.

Dry hills in PEGU and ARRACAN, *M'Clelland, Kurz.*—DISTRIB. Siam.

Very similar indeed to *O. longifolius*, but the flowers are fewer in a fascicle, the petals obtuse, and the fruit narrower and more pointed.—*Flowers* sweet. *Fruit* $1\frac{1}{4}$ in. long, ovoid, mucronate, glabrous.

3. *CALOPHYLLUM*, Linn.

Trees. *Leaves* opposite, shining, coriaceous, with innumerable parallel slender veins at right angles to the midrib. *Flowers* polygamous, in numerous axillary or terminal panicles. *Sepals* and *petals* 4–12, imbricate in 2–3 series. *Stamens* very many, filaments filiform often flexuous, free or connate below; anthers erect, 2-celled, dehiscence vertical. *Ovary* 1-celled; style slender, stigma peltate; ovule solitary, erect. *Drupe* with a crustaceous putamen. *Seed* erect, ovoid or globose, testa thin, or thick and spongy.—DISTRIB. About 25 species, chiefly tropical Asiatic with a few American.

A. *Sepals* 4, *Petals* 0 (or *Sepals* 2, *Petals* 2). See also *C. Wightianum*.—APOTERIUM, *Blume Bijdr.* 218.

* *Flowers* in short racemes, racemes sometimes paniced and terminal, usually axillary.

1. *C. spectabile*, *Willd.; DC. Prodr.* i. 562; leaves large (6–14 in.) oblong or ovate-oblong acuminate, margins usually undulate, racemes sub-umbellate few-flowered glabrous axillary or in subterminal leafy panicles. *Chois. Guttif. Ind.* 43, in part; *Planch. & Trian. Mem. Guttif.* 238; *Wight Ill.* i. 128. *C. tetrapetalum*, *Roxb. Fl. Ind.* ii. 608. *C. Moonii*, *Wight Ill.* i. 129, *Ic. t. iii.*; *Wall. Cat.* 4841 D, 4842, 4843, 4849 C; *Thw. Enum.* 52; *Beddome Flor. Sylvat. Gen.* xxii. *C. cymosum*, *Miquel Fl. Ind. Bat. Suppl.* i. 497.

Forests of the EASTERN PENINSULA, PENANG, and CEYLON.—DISTRIB. Java, Fiji, and Society Islands.

A tall tree: young shoots 4-gonal, often clothed with rusty tomentum. *Leaves* 6–14 by 2–5 in., base acute; veins many, close-set, equally prominent on both surfaces; petiole $\frac{1}{2}$ –1 in., stout. *Flowers* few, $\frac{1}{2}$ in. diam., in short racemes. *Sepals* 4, orbicular, *Petals* 0. *Fruits* spherical or ovoid; pedicel 1 in., stout, glabrous.—*Roxburgh* describes the leaves of *C. tetrapetalum* as being finely serrulate.

2. *C. canum*, *Hook. f.*; leaves (6–7 in.) linear-oblong or oblong-lanceolate shining, racemes in very stout terminal many-flowered hoary-pubescent panicles, pedicels short stout.

EASTERN PENINSULA; Malacca, *Maingay*.

Branches robust, woody, subcylindric. *Leaves* coriaceous, rigid, obtusely acuminate, red-brown when dry, shining on both surfaces, especially above, base acute, margin not thickened, a little waved; nerves extremely close, uniform on both surfaces; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Panicles* terminal, of many short opposite stout racemes 1–2 in. long, rachis and branches stout. *Flowers* rather crowded, $\frac{3}{4}$ in. diam. *Sepals* 4, outer coriaceous broadly ovate obtuse concave, hoary-pubescent externally, inner twice as large orbicular concave, almost membranous. *Petals* 0. *Stamens* excessively numerous, and style equalling the inner sepals; anthers linear.—Very like *C. Wallichii*, but the leaves are apparently never tomentose beneath, and there are no petals.—*J. D. H.*

3. *C. pulcherrimum*, *Wall. Cat.* 4848; leaves 1–2 in. ovate-lanceolate, petiole $\frac{1}{4}$ in., racemes axillary few-flowered glabrous, pedicels very slender. *Chois. Guttif. Ind.* 41; *Planch. & Trian. Mem. Guttif.* 246. *C. gracile* and

C. bancanum, *Miquel Fl. Ned. Ind. Suppl.* i. 498 and 499, and *C. plicipes*, *ib.* (according to *Kurz in Journ. As. Soc. Bengal*, xxxix. pt. 2, 64). *C. mesuæfolium*, *Wall. Cat.* 4850.

EASTERN PENINSULA, Singapore and Malacca.—DISTRIB. Sumatra, Banca.

Branches slender, terete, shoots 4 gonial. *Leaves* 1–2½ by ¾–1¼ in., rigid, thin, obtusely acuminate, base tapering acute; veins slender on both surfaces; petiole ¼–½ in., slender. Racemes from the axils of the oldest leaves, slender, glabrous, few-flowered; pedicels ½ in., very slender. *Sepals* all equal, broadly ovate. *Petals* 0.—Of Wallich's *C. mesuæfolium* only a branch with a few leaves are known.

VAR. *oblongifolium*; leaves 1½–2½ in. oblong, tip rounded. Malacca, Maingay (Kew distrib. 173.)

4. **C. Burmanni**, *Wight Ill.* i. 129, *Ic. t.* 107, 188; leaves small (1–2 in.) elliptic-ovate; tip rounded, racemes small axillary few-flowered glabrous. *Planch. & Trian. Mem. Guttif.* 233 (not of *Seemann Fl. Viti.*); *Thwaites Enum.* 52; *Beddome Flor. Sylvat. Gen.* xxii.

Hotter parts of CEYLON, at no great elevation.

Young shoots 4-gonal, clothed with ferruginous tomentum. *Leaves* 1½–2½ by 1–1½ in., thinly coriaceous, tip scarcely emarginate, finely and equally veined on both surfaces; petiole ½–¾ in. *Racemes* slender. *Flowers* scarcely ¼ in. diam., pedicels long slender. *Sepals* 4, orbicular-ovate. *Petals* 0. *Fruit* nearly ¾ in. diam., sub-globose [reddish-brown, *Beddome*].—Wight's var. *β parvifolium* passes so gradually into the typical form as hardly to deserve recognition as a distinct form.

5. **C. floribundum**, *Hook. f.*; leaves 1–2 in. elliptic-lanceolate obtusely acuminate margin thickened, petiole ⅙–¼ in., racemes glabrous in most of the axils, pedicels ⅙–¼ in.

EASTERN PENINSULA; Malacca, Maingay. (Kew distrib. 170, 172, & ? 171.)

Much-branched, everywhere glabrous; branchlets 4-angled, strict. *Leaves* coriaceous, pale when dry, hardly shining, nerves close-set uniform on both surfaces. *Racemes* erecto-patent, about half as long as the leaves, 6–8-flowered, pedicels spreading. *Flowers* ½ in. diam., opposite. *Sepals* 4, outer broadly ovate, subacute, inner broadly obovate, tips rounded, membranous, veined. *Petals* 0. *Stamens* very numerous and style hardly exceeding the sepals. *Fruit* unknown.—*J. D. H.*

6. **C. retusum**, *Wall. Cat.* 4846; leaves 1–2 in. ovate or ovate-oblong, tip rounded, petiole short downy, racemes axillary slender pubescent towards the base. *Chois. Guttif. Ind.* 41 (*excl. synonym*); *Planch. & Trian. Mem. Guttif.* 237. *C. amœnum*, *Wall. Cat.* 4849. *C. Burmanni* var. *bracteatum*, *Wight Ill.* i. 129. *C. pisiferum*, *Planch. & Trian. l.c.* 266.

EASTERN PENINSULA, from Maitaban to Singapore, *Griffith*, (Kew distrib. 876, 881.)

An erect much-branched, densely-leafy shrub; shoots clothed with ferruginous down. *Leaves* 1–2 by ¾–1 in., coriaceous; veins most prominent on the upper surface; petiole ⅙–¼ in., downy. *Racemes* in the axils of the lower and fallen leaves, few-flowered, slender, erect; peduncle ferruginous towards the base. *Flowers* small, glabrous. *Sepals* 4, ½ in. long, ovate-oblong. *Petals* 0. *Anthers* minute, ovoid. *Fruit* pisiform, deep yellow, pericarp thin.

** *Flowers solitary or in pairs.*

7. **C. microphyllum**, *T. Anders.*; leaves obovate or cuneate-obovate obtuse or retuse, flowers few glabrous.

EASTERN PENINSULA, near the top of Mt. Ophir, *Griffith, Lobb, Maingay* (Kew distrib. n. 165).

A glabrous shrub; branches many, short, slender, leafy; shoots 4-gonal. *Leaves* ¾–1½ by ¼–¾ in., tapering to the truncate base; veins prominent on both surfaces; petiole ⅙–¼ in. *Flowers* in the upper axils, minute; pedicels ⅙–¼ in., slender,

recurved, 2 bracteolate at the base. *Sepals* 4, suborbicular, all nearly equal. *Petals* 0. *Fruit* (immature) pisiform, tipped by the persistent style.

B. *Sepals* 4. *Petals* 4 (rarely 3, or 0 in *C. Wightianum*, or 8 in *C. cordato-oblongum*, *cuneifolium* and *Walkeri*).

* *Racemes shorter than the leaves, except C. polyanthum.*

8. **C. inophyllum**, Linn.; *DC. Prod.* i. 562; quite glabrous, leaves oblong or obovate-oblong obtuse or emarginate shining, inner sepals petaloid. *Chois. Guttif. Ind.* 42; *Planch. & Trian. Mem. Guttif.* 254; *Roxb. Fl. Ind.* ii. 606; *W. & A. Prod.* 103; *Wight Ill.* i. 128, *lc.* t. 77; *Wall. Cat.* 4841 B, C, D, E, F; *Beddome Flor. Sylvat. Gen.* xxii. *C. Bintagor*, *Roxb. lc.* 607.

WESTERN PENINSULA; from Concan and Orissa southwards; CEYLON; EASTERN PENINSULA, from Pegu southwards; ANDAMAN ISLANDS.—DISTRIB. E. African Islands, Malay Archipelago, Australia, Polynesia.—Cultivated throughout India.

A middling-sized tree; bark grey, smooth. *Leaves* 4-8 by 3-4 in., coriaceous, shining on both surfaces; veins many, fine; petiole $\frac{1}{2}$ -1 $\frac{1}{4}$ in. *Racemes* in the upper axils, loose, 4-6 in. long, shorter than the leaves, lax, few-flowered. *Flowers* $\frac{3}{4}$ in. diam., pure white, fragrant; pedicels slender, 1-2 in. *Sepals* 4. *Petals* 4, like the inner sepals. *Stamens* numerous, filaments in 4 bundles. *Ovary* globose, stipitate; style much exceeding the stamens, stigma peltate lobed. *Fruit* 1 in. diam., globose, smooth, yellow, pulpy.—Rumph and Blume say that the petals are sometimes 6-8. Wood coarse-grained but valuable. Seeds afford lamp oil..

9. **C. Wallichianum**, *Planch. & Trian. Mem. Guttif.* 249; young parts tomentose, leaves long-petioled narrow-oblong acute or obtuse, racemes pubescent on the rachis or throughout, sepals subequal. *C. tetrapetalum*, *Wall. Cat.* 4843, not of Roxburgh.

EASTERN PENINSULA; from Penang to Singapore, *Wallich*, &c.

Young branches sub-4-gonal, or cylindric, and buds rusty tomentose. *Leaves* 6 by 1-1 $\frac{1}{4}$ in., acute or subacute at the base, margins flat or waved; midrib puberulous; veins close-set, somewhat prominent on both surfaces; petiole 1-1 $\frac{1}{2}$ in. *Racemes* axillary or terminating short branches, few-flowered, half the length of the leaves, rusty pubescent; p-duncle and pedicels glabrous. *Flower* $\frac{3}{4}$ in. diam. *Sepals* ovate-oblong, glabrous or pubescent. *Petals* 4, oblong. *Filaments* slender. *Ovary* ovoid, glabrous. *Fruit* globose, size of a cherry.—Griffith's Malacca, 880, may be this, but consists of a young flowerless branch only, the leaves are rusty-pubescent beneath, as are Maingay's

10. **C. Griffithii**, *T. Anders.*; quite glabrous, leaves oblong or elliptic oblong acute or obtuse, veins stout with a strong intramarginal one, raceme glabrous, sepals subequal.

EASTERN PENINSULA; Malacca, *Griffith*.

A glabrous tree; young shoots 4-gonal, older cylindric. *Leaves* 4-6 by 1 $\frac{1}{2}$ -2 in., tip often rounded, base acute, coarsely veined on both surfaces; petiole $\frac{1}{2}$ in. *Racemes* axillary, few-flowered, glabrous, much shorter than the leaves. *Flowers* $\frac{1}{2}$ in. diam., glabrous. *Petals* 4.

11. **C. macrocarpum**, *Hook. f.*; quite glabrous, leaves linear-oblong or elliptic-lanceolate obtusely acuminate narrowed into a slender petiole, racemes not half the length of the leaves, pedicels 1-1 $\frac{1}{4}$ in., flowers 1 in. diam., petals narrow much longer than the sepals.

EASTERN PENINSULA; Malacca, *Maingay* (*C. Griffithii*, Kew distrib. 174).

Branches robust; branchlets sharply 4-angled. *Leaves* 3-5 by 1 $\frac{1}{2}$ -2 in., very coriaceous, shining above, hardly so beneath; nerves very strong; petiole 1-1 $\frac{1}{4}$ in. *Racemes* axillary, 2-4 in. long, 6-10-flowered; rather minutely puberulous. *Sepals* 4, 2 outer broadly oblong, obtuse, very concave; 2 inner twice as long, petaloid, oblong, obtuse.

Petals 4, much longer than the inner sepals, linear-spathulate. *Stamens* very short, *Fruit* (according to Maingay's drawing) 5 in. long, ellipsoid, narrowed at both ends, smooth.—*J. D. H.*

12. ***C. polyanthum***, *Wall. Cat.* 4844; quite glabrous, leaves lanceolate acuminate, margins waved, racemes terminal glabrous, outer sepals very small. *Chois. Guttif. Ind.* 43; *Planch. & Trian. Mem. Guttif.* 250.

EASTERN BENGAL; Khasia Mts. ascending to 3000 ft.; Pegu, *Kurz.*

A glabrous tree, 60 ft., twigs 4-gonal, compressed. *Leaves* 4-6 by $1\frac{1}{2}$ - $1\frac{1}{2}$ in., coriaceous; veins equally distinct on both surfaces; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Racemes* many-flowered, equalling the leaves; the upper together forming a terminal panicle. *Flowers* $\frac{1}{2}$ in. diam. *Outer sepals* suborbicular, inner twice as long, petaloid. *Petals* rather longer than the inner sepals, obovate, concave, reflexed. *Fruit* the size of a small plum, subglobose, not pointed.

13. ***C. tomentosum***, *Wight Ill.* i. 128, *Ic. t.* 110; young parts tomentose, leaves elliptic or linear-lanceolate acuminate, margin waved, racemes pubescent, outer sepals smaller than the inner. *Planch. & Trian. Mem. Guttif.* 241; *Beddome Fl. Sylvat. Gen.* xxii. *C. elatum*, *Beddome l.c.* xxii. and t. 2.

Moist forests in the WESTERN PENINSULA from the Concan southwards; and in CEYLON, ascending to 5000 ft.

A tall straight tree; branches 4-angled; buds, shoots, panicles and outer sepals clothed with rusty tomentum. *Leaves* 3-5 by $1\frac{1}{2}$ -2 in., coriaceous, shining; veins many, close-set, slender, equally prominent on both surfaces; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., often downy. *Racemes* from the axils of the upper leaves, sometimes collected into a terminal panicle, lax, many-flowered. *Flowers* upwards of $\frac{1}{2}$ in. diam.; pedicels long, slender. *Sepals* orbicular. *Petals* 4, ovate-oblong, larger than the sepals. *Fruit* $\frac{3}{4}$ in. long, obliquely ovoid, pointed.—Yields the Poon-spars of Western India, and the seeds an abundant oil in Ceylon.

14. ***C. bracteatum***, *Thwaites Enum.* 51; young parts tomentose, leaves elliptic- or obovate-lanceolate acuminate, racemes glabrous few-flowered bracteate, sepals obovate, petals oblong-lanceolate. *Planch. & Trian. Mem. Guttif.* 252; *Beddome Fl. Sylvat. Gen.* xxii.

Near streams in the Saffragam district of CEYLON, *Thwaites.*

A large tree, closely resembling *C. Tomentosum*. *Leaves* dimorphic, the fully developed 3-8 in. long, tapering to the obtuse base, highly polished, golden brown when dry; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; abnormal or undeveloped leaves 1-2 by $\frac{1}{8}$ - $\frac{1}{4}$ in., subsessile, linear-lanceolate or linear, pubescent, resembling bracts. *Racemes* in the axils of and shorter than the normal leaves, few-flowered. *Flowers* $\frac{1}{2}$ in. diam.; pedicels with an oblong bract $\frac{1}{2}$ in. long at the base. *Sepals* 4. *Petals* 4. *Fruit* $\frac{3}{4}$ in. long, oblong.—Flowers not in a good state for examination.

15. ***C. Wightianum***, *Wall. Cat.* 4847; young shoots often pruinose, leaves obovate or oblong-cuneate, racemes axillary glabrous, sepals subequal, petals usually 0. *Planch. & Trian. Mem. Guttif.* 228; *Beddome Flor. Sylvat.* t. 90. *C. spurium*, *Chois. in DC. Prod.* i. 563; *W. & A. Prod.* i. 103. *C. decipiens*, *Wight Ill.* i. 128, *Ic. t.* 106, not of *Thwaites*; *Wall. Cat.* 4841 A, G.

Mountains of the Western Coast of the WESTERN PENINSULA from the Concan to Travancor.

Young shoots 4-gonal. *Leaves* 2-4 by $1\frac{1}{2}$ -2 in., rigidly coriaceous, rounded and usually retuse at the tip; veins most prominent on the under surface; petiole $\frac{1}{2}$ in. *Racemes* from the axils of all the leaves and scars of a few fallen ones, several-flowered, shorter than the leaves; peduncles and pedicels slender. *Flowers* $\frac{1}{2}$ in. diam. *Sepals* 4, very thin, strongly veined. *Petals* 0 (or 4 small ones visible in the bud, *Wight*).

Fruit $\frac{3}{4}$ in. long, ellipsoid.—I have never found petals in any of the buds I have opened.

** *Racemes longer than the leaves, or equalling them.* (See also *C. polyanthum.*)

16. ***C. trapezifolium***, *Thwaites Enum.* 51; glabrous, leaves small ovate or rhomboid, racemes few-flowered glabrous 2–3 times longer than the leaves. *Planch. & Trien. Mem. Guttif.* 254; *Beddome Flor. Sylvat. Gen.* xxii.

Central province of CEYLON, from 4–5000 ft., *Thwaites*.

A tall tree. *Leaves* $1\frac{1}{2}$ –2 by 1 in., coriaceous, tip rounded retuse or shortly acuminate; veins fine, equally prominent on both surfaces; petiole $\frac{1}{4}$ in. *Racemes* in the upper axils; pedicels $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in. diam. *Outer sepals* smaller than the inner. *Petals* 4, 2 outer larger than the inner. *Fruit* $\frac{3}{4}$ in. diam., subspherical.

17. ***C. Thwaitesii***, *Planch. & Trien. Mem. Guttif.* 232; glabrous, leaves obovate or orbicular base rounded or cordate, racemes axillary glabrous several times longer than the leaves. *Thwaites Enum.* 407; *Beddome Flor. Sylvat. Gen.* xxii. *C. decipiens*, *Thwaites Enum.* 51, not of *Wight*.

Mountains of CEYLON, ascending to 3000 ft., *Thwaites*.

Twigs stout, 4-angled. *Leaves* 2–3 by 1–2 in., very thick and leathery; veins coarse, very prominent above, less so beneath; petiole $\frac{1}{2}$ in. *Racemes* rather slender, few-flowered. *Sepals* 4, obovate. *Petals* 3–4, oblong, longer than the sepals. *Anthers* half the size of those of *C. Wightianum*. *Fruit* subspherical.

18. ***C. cordato-oblongum***, *Thwaites Enum.* 407; young parts pilose, leaves oblong-cordate obtuse, panicles terminal as long as the leaves pubescent, outer sepals twice as long as the inner. *Beddome Flor. Sylvat. Gen.* xxii.

At Hinidoon Pattoo in CEYLON, *Thwaites*.

A lofty tree; twigs stout, 4-angled; young shoots petiole and pedicels covered with deciduous rusty hairs. *Leaves* 4–6 by 2–3 in., very thickly coriaceous, obtuse, equally veined on both surfaces; petiole $\frac{3}{4}$ –1 in. *Peduncles* and pedicels pubescent. *Flowers* 1 in. diam. *Sepals* rounded, outer $\frac{1}{4}$ in. long, inner petaloid, twice as long. *Petals* 4–8, $\frac{1}{2}$ in., orbicular.

19. ***C. cuneifolium***, *Thwaites Enum.* 51; glabrous except the buds, leaves small obovate or cuneate-spathulate obtuse or retuse, racemes axillary equalling or exceeding the leaves glabrous, outer sepals smaller than the inner. *Planch. & Trien. Mem. Guttif.* 261; *Beddome Flor. Sylvat. Gen.* xxii.

At Madamabanewera in CEYLON, alt. 3–4000 ft., *Thwaites*.

A large tree; leaf-buds and rachis of racemes covered with short brown down. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ –1 in., thick and leathery; veins stout and prominent on both surfaces; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Racemes* 10 or more-flowered. *Flowers* about $\frac{1}{4}$ in. diam., *Sepals* 4. *Petals* 4–8, inner the smallest. *Fruit* spherical, $\frac{3}{4}$ in. diam.

20. ***C. Walkeri***, *Wight Ill.* i. 128, t. 45; quite glabrous, leaves obovate tip rounded or retuse, racemes in the axils of the upper leaves often collected into a terminal panicle glabrous, outer sepals shorter than the inner. *Planch. & Trien. Mem. Guttif.* 263; *Beddome Flor. Sylvat. Gen.* xxii. *C. decipiens*, *Wight Ill.* i. 128.

A large tree; twigs stout, terete, erect. *Leaves* 1–1 $\frac{1}{4}$ in long, almost as broad, rigidly coriaceous, crowded, veins strong; petiole $\frac{1}{2}$ in., very stout. *Flowers* large, pale rose-coloured or white; pedicels 1 in., very stout; buds globose. *Outer sepals* very small. *Petals* usually 8, larger than the sepals; inner smaller. *Style* equalling

the stamens, stigma fleshy peltate. *Fruit* size of a cherry, globose.—This tree is said to flower once in 3–4 years; its seeds yield an oil used for burning.

DOUBTFUL SPECIES.

C. ? MARGINATUM, Wall. *Cat.* 4845.—Does not exist in any herbarium accessible to me.

C. SURIGA, Buch. *Ham*; *ex. Roxb. Fl. Ind.* ii. 608. *Calophyllum* Soulattri, *Burm. Fl. Ind.* 121, with linear-oblong polished leaves and flowers whorled below them, is quite unknown to me.

C. ANGUSTIFOLIUM, *Roxb. Fl. Ind.* ii. 608; "twigs cylindric, leaves short-petioled lanceolate with lengthened subotuse points lucid finely veined, flowers in axillary fascicles, pedicels with a cyathiform tip."—Prince of Wales Island, where called Peon, and yields spars, *Roxb.*

4. **KAYEA**, Wall.

Trees. *Leaves* opposite; veins rather distant, arched. *Flowers* hermaphrodite, either large and solitary, or small and collected in terminal panicles. *Sepals* and *Petals* 4 each, imbricate. *Stamens* numerous, filaments slender, free or connate at the base; anthers small, subglobose, 2-celled, dehiscence vertical. *Ovary* 1-celled; style slender, stigma acutely 4-fid; ovules 4, erect. *Fruit* subdrupaceous, fleshy, indehiscent, 1–4-seeded. *Seeds* thick, testa thin and crustaceous.—DISTRIB. Tropical Asia, 4 species.

1. **K. floribunda**, Wall. *Pl. As. Rar.* iii. 5, t. 210; *Cat.* 4840; leaves oblong or linear-oblong acuminate cuspidate, panicle lax many-flowered, pedicels 2-bracteolate.

Dense tropical forests of the EASTERN HIMALAYA, in Sikkim, and the KHASIA Mts., ascending to 3000 ft.

A tall straight glabrous tree; branches cylindric. *Leaves* 5–8 by 1–1½ in., thickly coriaceous, base acute; veins ½–1 in. apart, slender, arched, prominent on the under surface, faint on the upper; petiole 1 in., slender, cylindric. Panicle 6 in. long, terminal; branches and pedicels with 2 opposite bracts or bracteoles at their bases. *Flowers* 1 in. diam. *Outer sepals* ½ in. long, suborbicular, truncate. *Petals* a little longer than the sepals, thin but fleshy, white, edges rosy. *Stamens* many, filaments capillary, exceeding the sepals. *Fruit* the size of a chestnut, covered by the thick accrescent yellow rugose calyx, tipped by the slender style, 1-seeded.

2. **K. racemosa**, Planch. & Triana. *Mem. Guttif.* 269; leaves oblong-lanceolate acuminate cuspidate, racemes short few-flowered, pedicels ebracteolate. *Mesua singaporiana*, Wall. *Cat.* 4836.

EASTERN PENINSULA; at Singapore, Wallich; Malacca, Maingay (Kew distrib. 177).

A glabrous tree; branches cylindric; bark ashy. *Leaves* 4–5 by 1½ in., thin, rigid; petiole ½ in., terete. *Racemes* short, axillary and terminal; pedicels stout. *Outer sepals* thick, rugose. *Immature fruit* as large as a filbert, tipped with the short subulate style.—Only one specimen seen, in the Linnæan Society's Herbarium, and assumed to be the plant published by Planchon and Triana from a specimen without habitat in De Candolle's Herbarium.—[Maingay's specimens have slender whorled branchlets, each with leaves at the end. *Leaves* 6–9 by 1½–2½ in., elliptic-oblong, coriaceous, not polished, nerves beneath many, strong, arched, about ½ in. apart; petioles ¼–¾ in. *Racemes* few, short (1 in.), crowded on the tips of the branchlets between the two leaves; peduncles and pedicels very short, bracts small ovate deciduous. *Flowers* ½ in. diam. *Sepals* very thickly coriaceous. *Petals* about twice as long. *Stamens* in 1 series, very numerous, monadelphous at the base.—J. D. H.]

3. **K. stylosa**, Thwaites *Enum.* 50; leaves ovate-lanceolate acuminate cuspidate, racemes erect few flowered equalling the leaves, pedicels minutely

bracteolate. *Beddome Flor. Sylvat.* t. 102. *K. cuspidata*, *Planch. & Trian. Mem. Guttif.* 268.

Southern districts of CEYLON, *Thwaites*.

A large glabrous tree; bark dark-grey; branchlets terete, reddish. *Leaves* 2-3 by $\frac{1}{2}$ -1 in., rigid; veins arched, very faint on both surfaces; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., slender. *Racemes* from the upper axils, bracteoles subulate. *Flowers* small. *Stamens* many, filaments capillary, persistent, exceeding the sepals. *Fruit* the size of a small chestnut, covered by the coriaceous accrescent calyx, tipped by the thickened short style.

4. **K. nervosa**, *T. Anders.*; leaves elliptic-oblong or oblong-lanceolate acuminate cuspidate, flowers solitary or 1-3 axillary or terminal. *Mesua nervosa*, *Planch. & Trian. Mem. Guttif.* 279.

TENASSERIM PROVINCES, at Mergui and Martaban, *Griffith, Parish*. Malacca, *Maingay*.

Young branches minutely tubercled, sub-4-angular? *Leaves* 4-5 by $1\frac{1}{2}$ -2 in., thin, membranous, base rounded, shining above, coppery beneath; veins distinct, $\frac{1}{4}$ in. apart, arched, depressed on the upper surface; petiole $\frac{1}{2}$ in. *Flowers* $1\frac{3}{4}$ in. diam., pedicels 1-2 $\frac{1}{2}$ in., tubercled. *Outer sepals* $\frac{1}{2}$ in., thick and coriaceous, suborbicular, inner nearly twice as large. *Petals* cuneate-obovate. *Filaments* capillary, nearly equalling the pistil. *Style* slender, thickened after flowering, stigma deeply 4-cleft.

5. **MESUA**, Linn.

Trees. *Leaves* opposite, rigidly coriaceous, often pellucid-dotted; veins innumerable, very slender, at right angles to the midrib. *Flowers* polygamous or hermaphrodite, large, axillary, solitary. *Sepals* and *Petals* 4 each, imbricate. *Stamens* very numerous, filaments filiform free or connate at the base; anthers erect, oblong, 2-celled, dehiscence vertical. *Ovary* 2-celled; style long, stigma peltate; ovules 2 in each cell, erect. *Fruit* between fleshy and woody, 1-celled by the absorption of the septum, at length 4-valved, 1-4-seeded. *Seeds* without an aril, testa fragile.—**DISTRIB.** Tropical Asia; 3 species.

1. **M. ferrea**, Linn.; *DC. Prodr.* i. 562; leaves drooping linear-lanceolate acute or acuminate, peduncles short stout. *Chois. Guttif. Ind.* 40; *Planch. & Trian. Mem. Guttif.* 271; *Roxb. Fl. Ind.* ii. 605; *W. & A. Prodr.* 102; *Wall. Cat.* 4834; *Wight Ill.* 127, *Ic. t.* 118; *Beddome Flor. Sylvat. Gen.* xxiii. *M. speciosa*, *Chois. in DC. l.c.*; *Guttif. Ind.* 40; *Wight Ic. t.* 961; *Wall. Cat.* 4835; *Beddome l.c.* xxiii. *M. pedunculata* *Wight Ill.* 127, *Ic. t.* 119. *M. coromandeliana*, *Wight Ill.* 129, *Ic. t.* 117; *Beddome Flor. Sylvat. t.* 64. *M. Roxburghii*, *Wight Ill.* 127; *Beddome l.c.* xxiii. *M. salicina*, *M. Walkeriana* and *M. pulchella*, *Planch. & Trian. l.c.* 373, 374, and 379. *M. sclerophylla*, *Thwaites Enum.* 407; *Beddome l.c.* xxiii. *M. Nagana*, *Gard. in Calc. Journ. Nat. Hist.* viii. 4.

Mountains of EASTERN BENGAL, the EASTERN HIMALAYA, and the EASTERN and WESTERN PENINSULAS, and ANDAMAN ISLANDS; cultivated elsewhere in India.

A middling-sized glabrous tree; trunk erect, straight; twigs slender, sub-4-angled. *Leaves* 3-6 by $1\frac{1}{2}$ to $1\frac{3}{4}$ in., base acute or rounded, dark-green and shining above, covered more or less with fine waxy meal beneath; veins very fine, close-set, and equally inconspicuous on both surfaces; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* $\frac{3}{4}$ -3 in. diam., usually terminal and solitary or in pairs. *Sepals* orbicular, thick, with membranous margins, inner pair largest. *Petals* 4, spreading, cuneate-obovate, pure white. *Anthers* large, oblong, golden-yellow. *Fruit* ovoid, conical-pointed, size variable, often of a large chestnut; base surrounded by the persistent sepals, 1-4-seeded. *Seeds* dark-brown, testa smooth.—A very variable plant, the absence of the pruinose under-surface of the leaves is by

no means confined to the small-flowered states from S. India, to which the name of *coro-mandeliana* has been applied; the latter is a small and distinct-looking form.

2. **M. Thwaitesii**, *Planch. & Trian. Mem. Guttif.* 277; leaves linear-oblong acute or acuminate, flowers subsessile. *M. speciosa* var. *a*, *Thwaites Enum.* 50, not of *Choisy*.

Banks of streams in the Ratnapoora district, CEYLON, *Thwaites*.

A tree resembling *M. ferrea*, but distinguished by the form of the leaves and large sessile or subsessile flowers. *Leaves* 8-12 by $1\frac{3}{4}$ -2 in., base acute, glaucous and faintly nerved beneath. *Flowers* nearly 4 in. diam., axillary, solitary or in pairs.

3. **M. ? lepidota**, *T. Anders.*; leaves elliptic- or oblong-lanceolate acuminate, racemes terminal.

EASTERN PENINSULA; Malacca, *Griffith* (distrib. *Kew*, No. 845, named *M. speciosa* by error).

Branches short, rather slender, terete. *Leaves* coriaceous, $2\frac{1}{4}$ - $3\frac{1}{2}$ by $\frac{3}{4}$ - $1\frac{1}{4}$ in., shortly cuspidate, tapering to the obtuse base; veins very numerous, close set, fine, equally faint on both surfaces. *Flowers* unknown. *Fruit* size of a chestnut, subglobose, pointed, subtended by the thickened obtuse sepals, valves thick, surface rugulose as if scurfy. *Seed* with a brown brittle testa.—Probably a new genus between *Kayea* and *Mesua*, on account of the small woody non-acrescent sepals.

6. **PÆCILONEURON**, *Beddome*.

(W. T. Thiselton Dyer.)

Trees. *Leaves* opposite, smooth, coriaceous, with close-set spreading lateral veins, minutely reticulated. *Flowers* yellowish-white, in a terminal panicle, or solitary at each node. *Sepals* 4-5, small, imbricate. *Petals* 5-6, contorted. *Stamens* numerous, free or slightly connate at the base, filaments short or 0; anthers basifixed, narrow-linear, erect. *Ovary* 2-celled; styles 2, subulate, stigmas punctiform; ovules 2 in each cell, ascending from the base. *Capsule* ovoid, 1-celled, septicidal?, with a single erect seed, albumen 0; cotyledons fleshy; radicle minute, inferior.—DISTRIB. S. India; species 2.

1. **P. indicum**, *Bedd. in Journ. Linn. Soc.* viii. 267, t. 17; *Flor. Sylvat.* t. 3; flowers in a pyramidally spreading terminal panicle 4 in. long, sepals and petals each 5, anthers lobulated.

WESTERN PENINSULA; on the west slopes of the Ghats, from South Canara to Malabar, alt. 3-4000 feet., *Beddome*.

A large tree. *Leaves* 4-10 by $1\frac{1}{4}$ - $2\frac{1}{4}$ in., elliptic, with a long acumination, petioled. *Peduncles*, *pedicels*, and *sepals* slightly puberulous. *Flowers* $\frac{3}{4}$ in. diam., yellowish white. *Fruit* ellipsoid.

2. **P. pauciflorum**, *Bedd. Flor. Sylvat.* t. 93; flowers about 4 together and terminal or solitary at each node, sepals 4 the 2 innermost larger, petals 6, anthers simple.

WESTERN PENINSULA; Travancor, alt. 4-5000 ft., *Beddome*.

A tree with red wood. *Leaves* about 5 by $1\frac{1}{4}$ in., narrowly elliptic. *Petals* oblong, obtuse. *Fruit* 1 in. long, $\frac{1}{2}$ in. diam., at first obpyriform, finally ovoid and rather smaller than in *P. indicum*.

ORDER XXIV. **TERNSTRÆMIACEÆ.**

(By W. T. Thiselton Dyer, F.L.S.)

Shrubs rarely climbing, or trees. *Leaves* alternate, simple (in Indian species) entire or often serrate, usually coriaceous, exstipulate. *Flowers* handsome, seldom small, usually subtended by 2 sepal-like bracts, rarely declinous, axillary, 1 or more together, rarely in lateral or terminal racemes or panicles. *Sepals* 5, rarely 4-7, free or slightly connate, the innermost often larger. *Petals* 5, rarely 4-9, free or connate below, imbricate or contorted. *Stamens* numerous (definite in *Sladenia* and *Stachyurus*) free or connate, usually adnate to the base of the deciduous corolla; anthers basifixed or versatile, dehiscing by slits or rarely by terminal pores. *Ovary* free ($\frac{1}{3}$ -inferior in *Anneslea*), sessile, 3-5-celled, (many-celled in *Actinidia*); styles as many, free or connate, stigmas usually small; ovules 2- ∞ in each cell, rarely solitary, never orthotropous. *Fruit* baccate or capsular. *Seeds* few or numerous, placentas axile, albumen scanty or 0, rarely copious; embryo straight or hippocrepiform, cotyledons various.—**DISTRIB.** Rare in temperate, abundant in tropical Asia and America, almost wanting in Africa and entirely in Australasia; species about 260.

TRIBE I. Ternstroemiæ. *Peduncles* 1-flowered (many-flowered in *Sladenia*). *Petals* imbricate. *Stamens* adherent to the base of the corolla; anthers basifixed. *Fruit* (in Indian Genera) indehiscent. *Seeds* usually few, albumen fleshy usually scanty. *Embryo* curved; cotyledons shorter than the radicle and about as broad.

* *Fruit inferior.*1. *ANNESLEA.*** *Fruit superior.*Flowers hermaphrodite (except *Ternstroemia penduligiana*).

Anthers glabrous

2. *TERNSTRÆMIA.*

Anthers usually pilose.

Stamens about 12, ovary 3-celled

3. *SLADENIA.*

Stamens many, seeds numerous, ovary 3-5-celled

4. *ADINANDRA.*

Stamens many, seeds moderate, ovary 2-3 celled

5. *CLEYERA.*

Flowers diœcious

6. *EURYA.*

TRIBE II. Sauraujæ. *Peduncles* many-flowered. *Petals* imbricate. *Anthers* versatile. *Fruit* usually pulpy, rarely sub-dehiscnt. *Seeds* numerous minute, albumen abundant. *Radicle* straight or slightly curved and longer than the cotyledons.

* *Flowers 5-merous, stamens many.*

Styles many

7. *ACTINIDIA.*

Styles 3-5.

8. *SAURAUJA.*** *Flowers 4-merous, stamens few.*9. *STACHYURUS.*

TRIBE III. Gordoniæ. *Peduncles* 1-flowered, often very short. *Petals* imbricate. *Anthers* versatile. *Fruit* indehiscent or loculicidal. *Albumen* scanty or 0. *Cotyledons* various; radicle short, straight or curved.

* *Fruit indehiscent.*11. *PYRENARIA.*** *Fruit dehiscent.*

Seeds winged, radicle inferior

10. *SCHIMA.*

Seeds winged, radicle superior

12. *GORDONIA.*

Seeds wingless

13. *CAMELLIA.*

TRIBE IV. **Bonnetiæ.** *Flowers* in terminal panicles, rarely lateral and solitary or racemose. *Petals* contorted. *Anthers* versatile or basifixed. *Fruit* indehiscent or septicidal; albumen scanty or 0. *Embryo* straight, cotyledons flat; radicle short.

Ovary 5-celled 14. ARCHYTÆA.

Pœciloneuron is referred to *Guttifera*. (p. 278.)

1. **ANNESLEA**, Wall.

Evergreen trees with the habit of *Ternstroemia*. *Flowers* axillary and forming sub-terminal umbellate corymbs, rather large, white. *Sepals* 5, connate into a tube which is finally fleshy and adherent to the ovary. *Petals* 5, connate. *Stamens* many, scarcely adherent to the corolla; anthers with a long apiculus. *Ovary* $\frac{1}{2}$ -immersed in the torus, 3-celled; style 3-fid; ovules many, pendulous from the top of the cells. *Fruit* baccate, leathery, inferior, crowned by the sepals. *Seeds* oblong with a horse-shoe-shaped cavity, testa osseous, albumen fleshy.—DISTRIB. Malay Peninsula; species 2.

1. **A. fragrans**, Wall. *Cat.* 598; *Plant. As. Rar.* i. 5, t. 5; peduncles about twelve in each corymb $2\frac{1}{2}$ -3 in. slender with 2 ovate obtuse bracts. *Griff. Notul.* iv. 567, t. 585 A, f. 17.

EASTERN PENINSULA; Moulmein and Martaban, Wallich, &c.

A tree 30 ft. *Leaves* $3\frac{1}{2}$ -5 by $1\frac{1}{4}$ - $2\frac{1}{2}$ in., elliptic-oblong, acute or obtuse; petioles $\frac{3}{4}$ -1 in. *Sepals* $\frac{1}{2}$ in, cordiform, acute. *Fruit* 1 in. diam. *Seeds* with a thin scarlet fleshy envelope.

2. **A. crassipes**, Hook. ex. Choix. *Mem. Ternstr.* 41; peduncles 3-6 in each corymb about 1 in. rather thick with 2 small ovate acute fleshy bracts.

EASTERN PENINSULA; Mt. Ophir, Malacca, Griffith, &c.—DISTRIB. Philippine Islds.

A tree. *Leaves* 2- $4\frac{1}{2}$ by $1\frac{1}{4}$ -2 in., lanceolate elliptic or oblanceolate, crenulate, acute or obtuse; petioles $\frac{1}{2}$ -1 in. *Flowers* as in *A. fragrans* but drooping. *Sepals* $\frac{1}{2}$ in, orbicular, acute. *Fruit* $\frac{3}{4}$ in. diam.

2. **TERNSTRÆMIA**, Linn.

Glabrous evergreen trees or shrubs. *Leaves* leathery, entire or crenate-serrate. *Peduncles* lateral, recurved, 2-bracteate below the flower. *Sepals* 5. *Petals* 5, connate at the base. *Stamens* many; anthers glabrous. *Ovary* 2-3-celled; style simple, often 0, stigma broadly 2-3-lobed or subentire; ovules 2 in each cell, rarely 1 or 3-6, pendulous from the apex. *Seeds* as in *Anneslea* but the albumen sometimes evanescent.—DISTRIB. Trop. Asia and America; species 25.

* *Anthers* apiculate.

1. **T. japonica**, Thunb. in *Trans. Linn. Soc.* ii. 335; a tree about 20 ft., leaves oblong-obovate petioled, style subentire, stigma 2-lobed, fruit globose. *Cleyera japonica*, Thunb. *Fl. Jap.* 224 (not of Sieb. & Zucc.).

EASTERN BENGAL AND PENINSULA, from the Khasia Mts., alt. 4-5000 ft. to Moulmein. WESTERN PENINSULA; Nilghiri Mts.; CEYLON.—DISTRIB. Sumatra, China, Japan, Loochoo Islds.

Branchlets with rather soft bark, whorled or repeatedly forked. *Leaves* 2-3 by $2\frac{1}{2}$ - $1\frac{3}{4}$ in., rather crowded at the ends of the branches; petioles $\frac{1}{4}$ - $\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ - $\frac{3}{4}$ in., 2-edged. *Flowers* $\frac{3}{4}$ in. diam., in the axils of the fallen leaves; corolla spreading, pale yellow. *Ovary-cells* 2-ovuled. *Fruit* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., baccate, almost

juiceless, usually more than 2-seeded.—Griffith's *Ternstræmiacea* from Khasia (*Itin.* 42, *Notul.* iv. 568; *Ic.* t. 604, f. 1), probably belongs to this, although described with unisexual flowers.

VAR. 1. *Wightii*, Choisy Mem. Ternst. 19 (sp.), leaves acute.—*T. aneura*, *Miq. Fl. Ned. Ind. Suppl.* i. 477. *Cleyera gymnanthera*, *W. & A. Prodr.* 87; *Wight. Ic.* t. 47; *Thw. Enum.* 41; *Bedd. Flor. Sylvat.* t. 91. *C. grandiflora*, *Wall. Cat.* 1461 (*in Herb. Linn. Soc. only*).

VAR. 2. *parvifolia*, *Mf. Ann. Mus. Bot.* iii. 14; leaves $1\frac{1}{2}$ –2 in.

2. ***T. emarginata***, *Choisy Mem. Ternstr.* 14; a shrub 10–16 ft., leaves sessile spatulate crenulate-serrate emarginate, style deeply 2-fid, stigmas flatly capitate, fruit conical. *Cleyera emarginata*, *Gardn. in Calc. Journ. Nat. Hist.* vii. 447; *Thw. Enum.* 40.

CEYLON; higher parts of the Island, *Gardner*.

Leaves 1–2 in. *Peduncles* $\frac{3}{4}$ in., 2-edged, minutely bracteate. *Flowers* $\frac{1}{2}$ in. diam., white, then yellowish-purple. *Petals* twice the length of the sepals. (*Ovary-cells* 1-ovuled, *Thw.*) *Fruit* oblong-ovoid, baccate, 2-seeded.—As Choisy points out, this so closely resembles the Brazilian *T. cuneifolia* as to be barely distinguishable.

* Dioecious, *anthers* not apiculate. *Erythrochiton*, *Griff.*

3. ***T. penangiana***, *Choisy Mem. Ternstr.* 20; stigmas 2 reniform foliaceous, fruit ovoid baccate with a coriaceous epicarp. *T. macrocarpa*, *Scheff. obs. phyt.* 15, *fide Kurz, in As. Soc. Journ. Beng.* 1870, ii. 64. *Erythrochiton Wallichianum*, *Griff. Notul.* iv. 565, t. 585 A, f. 7. *Fagræa?* *dubia*, *Wall. Cat.* 4456.

EASTERN PENINSULA; from Moulmein and the Andaman Islands to Penang and Malacca.—DISTRIB. Java.

A small tree with a thick trunk. *Leaves* 4–8 by $1\frac{1}{2}$ – $3\frac{1}{2}$ in., oblanceolate to obovate, acute, coriaceous; petioles about 1 in. *Flowers* nearly 1 in. diam., solitary axillary or subfasciculate. *Petals* fleshy, twice the length of the sepals. *Stamens* many in the male flowers, crowded in many rows, reduced to filaments in the female flowers. *Ovary-cells* 2-ovuled; style very short. *Berry* $1\frac{1}{2}$ in. diam. *Seeds* 4, bony, imbedded in a reddish or pinkish pulp.

VAR. *monosperma*; berry 1 in. diam., 1-seeded.

T. ? KHASIANA, *Choisy Mem. Ternstr.* 20, *Griff. n.* 422 in *Herb. Boissier* from the Khasia Mts., proves from the examination of the type specimen to be identical with *Illicium Griffithii*, *H. f. & T.*, p. 40. (See *Journ. Linn. Soc.* xiii. 331.)

3. **SLADENIA**, Kurz, MS.

A shrub? *Leaves* crenately serrate, glabrous, feather-veined. *Flowers* in dichotomous cymes shorter than the leaves. *Sepals* 5. *Petals* 5, free. *Stamens* about 12, slightly adnate to the base of the petals, filaments dilated at the base; anthers basifixed, the lobes slightly divergent below, hispid. *Ovary* 3-celled, tapering into the very short 3-denticulate style; ovules 2 in each cell, pendulous. *Fruit* unknown.

1. ***S. celastrifolia***, *Kurz, ms.*

YUNAN, Mynesa, *J. Anderson*.

Leaves 4–5 by $1\frac{1}{2}$ –2 in., oblong-obovate, acuminate, acute at the base; petioles $\frac{1}{2}$ in. *Pedicels* $\frac{1}{4}$ in. *Sepals* $\frac{1}{2}$ in., lanceolate, obtuse or hooded at the apex, papery. *Petals* oblanceolate, obtuse, rather longer than the sepals. *Anthers* lanceolate with a minutely bifid connective.

4. **ADINANDRA**, Jack.

Small evergreen trees with the habit of *Ternstræmia* or *Gordonia*. *Peduncles* axillary, solitary, recurved, 2-bracteate at the apex. *Flowers* often

silky outside. *Sepals* 5. *Petals* 5, connate at the base. *Stamens* many, often 1-4adelphous, usually hairy. *Ovary* 3-5-celled; style ultimately elongate, entire or shortly 3-5-fid; ovules many in each cell. *Fruit* globose. *Seeds* many, small, albumen fleshy.—**DISTRIB.** Confined (except the W. African *A. Mannii*) to the Malay Peninsula and Indian Archipelago; species 10.

1. ***A. dumosa***, *Jack in Malay Misc.* ii. no. 7, 50; leaves elliptic-oblong serrulate above the middle glabrous ferruginous beneath, petioles $\frac{1}{2}$ in., peduncles about 1 in., sepals orbicular-ovate glabrous; *Wall. Cat.* 3664 *bis* (*ex Choisy. Mem. Ternstr.* 90) & 7071 (*in Herb. Kew.*). *A. Jackiana* and *trichocoryna*, *Korth. Verh. Nat. Gesch. Bot.* 106, 107. *A. cyrtopoda*, *stylosa*, and *glabra*, *Miq. Flor. Ned. Ind. Suppl.* i. 478, 479. *Ternstroemia? dumosa*, *Wall. Cat.* 2245 (*ex Choisy. l.c.*). *Camellia? Scottiana*, *Choisy. l.c.* (*not of Wall. Herb.*)

EASTERN PENINSULA; Siucapore and Malacca, *Jack. &c.*—**DISTRIB.** Sumatra, Java, Borneo, China.

A small tree. *Leaves* $2\frac{1}{2}$ - $4\frac{1}{2}$ by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., acute at both ends, coriaceous; petioles $\frac{1}{2}$ in. *Peduncles* solitary or in pairs, extra-axillary. *Bracts* $\frac{1}{2}$ the length of the sepals. *Petals* twice the length of the sepals, ovate-oblong, acute, white. *Stamens* silkily-hairy. *Ovary* glabrous; style subulate, persistent, $\frac{1}{2}$ in. in fruit. *Berry* $\frac{1}{2}$ in. diam., glabrous.

2. ***A. acuminata***, *Korth. Verh. Nat. Gesch. Bot.* 109; leaves oblong-lanceolate more or less acuminate glabrous, petioles $\frac{1}{4}$ in., peduncles $\frac{1}{2}$ in., sepals oblong-ovate glabrous. *Gordonia acuminata*, *Wall. Cat.* 3664 *in Herb. Linn. Soc.* *Ternstroemia? coriacea*, *Wall. Cat.* 1453. *Camellia axillaris*, *Wall. Cat. p.* 158 (*not of Roxb. ex Bot. Reg.* 349, see *Journ. Linn. Soc.* xiii. 330). *Polyspora axillaris*, *Choisy. Mem. Ternstr.* 91 (*not of Don*).

EASTERN PENINSULA; Penang and Singapore, *Wallich, &c.*—**DISTRIB.** Sumatra.

A small tree. *Buds* silky. *Leaves* 3-6 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in. *Peduncles* thickened and warted after flowering. *Bracts* minute, deltoid, acute. *Sepals* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Stamens* hairy. *Style* pilose, filiform, thickened below; stigma very minutely 2-lobed, subcapitate. *Berry* $\frac{3}{4}$ in. diam., glabrous. *Seeds* about 6 in each cell, discoid, rather large.

3. ***A. Griffithii***, *Dyer*; leaves oblong-elliptic to oblong-lanceolate acuminate glabrous, petioles $\frac{1}{2}$ in., peduncles 1 in., sepals rotund-elliptical glabrous, styles deeply 5-fid. *Kew Distrib.* 755, *Cleyera grandiflora*.

EASTERN BENGAL; Khasia Mts., *Griffith*.

A tree? *Buds* glabrous. *Leaves* 3-5 by $1\frac{1}{2}$ -2 in., paler beneath. *Bracts* almost obsolete. *Sepals* $\frac{1}{2}$ in. *Petals* about equalling the sepals. *Stamens* sparingly setose, 1-seriate, adnate to the petals. *Ovary* glabrous; divisions of the style cylindric, hardly exceeding the sepals.

4. ***A. integerrima***, *T. Anders. ms.*; leaves ovate or oblong-ovate glandular-serrulate paler beneath with black glands and a few hairs, petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. pubescent, peduncles $\frac{1}{2}$ in. strigose, sepals ovate silky outside. *A. dasyantha*, *Choisy Mem. Ternstr.* 90 (*not of Korth.*). *Ternstroemia? integerrima*, *Wall. Cat.* 1452 *in Herb. Linn. Soc. T.* ? *reticulata*, *Wall. Cat.* 2246 (*ex Choisy l.c.* 90). *Gordonia reticulata* *Wall. Cat.* 3663 *bis in Herb. Kew & 7070 (ex Choisy l.c.)*. *Camellia japonica*, *Wall. Cat.* 3667 *in Herb. Kew.*

EASTERN PENINSULA; Penang, *Wallich*.

Branches with pubescent extremities and silky buds. *Leaves* 3-5 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., acute at both ends or obtusely acuminate. *Bracts* small, ovate, acute. *Sepals* $\frac{1}{2}$ in., exceeding the silky petals. *Stamens* adnate to the base of the petals; anthers silky. *Ovary* densely silky. *Berry* $\frac{3}{4}$ in. diam., with appressed pubescence. *Seeds* small, shining.

5. ***A. maculosa***, *T. Anders. ms.*; leaves finely mottled beneath with reddish-brown remotely denticulate glabrous, petioles $\frac{1}{2}$ in., peduncles $\frac{1}{2}$ in.

puberulous, sepals strigosely pubescent outside. *Ternstrœmia?* *integerrima*, Wall. Cat. 1452 in *Herb. Kew.*, not in *Herb. Linn. Soc.*

EASTERN PENINSULA; Penang, Wallich.

Branches glabrous; buds yellow, silky. *Leaves* 4–6 by 2–2½ in., elliptic or elliptic-oblong, shortly acuminate, acute at the base. *Bracts* ½ the length of the sepals, orbicular. *Berry* ½ in. diam., hoary with thin appressed pubescence. *Seeds* minute.

6. ***A. villosa***, Choisy Mem. *Ternstr.* 24; leaves pubescent beneath, petioles ¼ in., peduncles 1 in. pilose, sepals silky near the middle externally. *Ternstrœmia?* *sericea*, Wall. Cat. 1454. *Schima Wallichii*, Choisy Mem. *Ternstr.* 91 (not of Choisy in Zoll. Cat.).

EASTERN PENINSULA; Tavoy, Wallich.

A small pubescent tree; young shoots silky. *Leaves* 3½–5 by 1½–2 in., oblong ovate-oblong or elliptic, acute or acuminate, base obtuse, glabrous above, yellowish below, subcoriaceous. *Peduncles* nodding. *Bracts* obsolete. *Flowers* ¾ in. diam. *Sepals* ovate. *Petals* densely silky at the apex. *Style* elongate, subulate, strigose but glabrous at the apex. *Berry* ½ in. diam., covered with white appressed silky hairs.—Habit of *A. integerrima*.

7. ***A. crenulata***, T. Anders. ms.; leaves narrow elliptic-oblong crenulate-serrate glabrous, petioles ½ in., peduncles 1–1½ in. thinly strigose. *Ternstrœmia crenulata*, Wall. Cat. 3723.

EASTERN PENINSULA? *Herb. Madr.* (Wallich.)

Glabrous except the flowers and buds. *Leaves* 3–5 by 1½–1½ in., acute at both ends, prominently reticulated above. *Peduncles* thickened at the apex, slightly recurved. *Bracts* nearly obsolete. *Sepals* and *petals* as in *A. villosa*, but less silky. *Stamens* adnate to the petals, filaments short, glabrous; anthers silky, with an acuminate connective.—The plant described under the name of *Ternstrœmia crenulata* by Wight, (Ill. i. 99) is a species of *A. porosa*.

8. ***A. lasiopetala***, Choisy Mem. *Ternstr.* 24; leaves narrow oblanceolate glabrous above minutely strigillose beneath, margins revolute denticulate, flowers silky-strigose externally. *Sarosanthra lasiopetala*, Thw. Enum. 41. *Cleyera lasiopetala*, Wight Ill. i. 99. *Eurya lasiopetala*, Gardn. in Calc. Journ. Nat. Hist. vii. 466.

CEYLON; at 6000 ft. and upwards.

A small tree; branches terete, minutely strigose. *Leaves* 2½–4 by ¾–1 in., obtuse or subacuminate, retuse. *Peduncles* ¾ in., nodding, thickened towards the apex. *Bracts* ½ the length of the sepals, deltoid. *Flowers* ½–¾ in. diam. *Petals* 3 times the length of the sepals, white. *Stamens* thinly hairy, unequal, filaments slender. *Ovary* 3-celled; style filiform, stigmas 3 cylindric obtuse. *Berry* ½ in. diam.

5. **CLEYERA**, DC.

Trees or shrubs with the habit of *Ternstrœmia*. *Peduncles* shorter, often fascicled, flowers smaller; bracts minute or 0. *Sepals* 5. *Petals* 5, more or less connate at the base. *Stamens* many; anthers pilose. *Ovary* 2–3-celled; style often elongate with a shortly 2–3-fid apex, or shorter and more deeply divided, stigmas slender; ovules many. *Seeds* usually few, albumen fleshy.—**DISTRIB.** Tropical Asia; Japan, Mexico and the Antilles. Species about 6.

1. ***C. ochracea***, DC. Mém. *Ternstr.* 21; leaves oblong-obovate or oblong-oblanceolate acuminate, base acute, flowers usually in small fascicles rarely solitary, apex of peduncles with 2 almost obsolete bracts. *C.*

Wallichiana, *Sieb. & Zucc. Fl. Jap.* i. 154. *C. ochneoides*, *G. Don Gen. Syst.* i. 566.

CENTRAL HIMALAYA; Nipal, *Wallich. KHASIA Mts.*, alt. 2000 ft.

Leaves 3–4½ in. by 1½–2 in.; petioles ½ in. *Peduncles* ⅝ in., usually nodding, thickened towards the apex. *Petals* ⅓–½ in., 3 times the length of the sepals, yellow. *Style* subulate, persistent. *Fruit* baccate.—Probably *C. japonica*, *Sieb. and Zucc.*, which has the pedicels and flowers only ½ as large is not distinct.

VAR. 1. *Lushia*, *G. Don Gen. Syst.* i. 566 (sp.); fascicles about 5-flowered, peduncles erect. *Ternstrœmia Lushia*, *Ham. in Don Prodr.* 225.

VAR. 2. *grandiflora*, *Chois.* *Mem. Ternstr.* 21 (sp.); fascicles 2–4-flowered, flowers larger, leaves narrower more acuminate. *C. grandiflora*, *Wall. Cat.* 1461 in *Herb. Kew.*, not in *Herb. Linn. Soc.*

2. ***C. grandiflora***, *H. f. & T. ms.* (not of *Wall. or Choisy*); leaves oblong obtusely acuminate base obtuse, flowers usually solitary, peduncles with 2 minute alternating bracts.

EASTERN BENGAL; Khasia Mts., alt. 4000 ft., *J. D. H. & T. T.*

Leaves 4–5½ by 1½–2 in.; petioles ¾ in. *Peduncles* about ¾ in., usually erect. *Flowers* ¾ in. diam. *Petals* ½ in., about four times the length of the sepals.—Closely allied to *C. ochneacea*, but larger in all its parts.

6. **EURYA**, Thunb.

Shrubs. *Leaves* glabrous, usually crenate-serrate. *Flowers* small, diceious, sessile or shortly pedicelled in axillary fascicles, or rarely solitary, with persistent bracteoles. *Sepals* 5. *Petals* 5, united at the base. *Stamens* 15 or less, rarely 5; anthers glabrous. *Ovary* 3 (rarely 2–5-) celled; styles 3 (rarely 2–5) free or united; ovules many in the inner angle of each cell. *Fruit* baccate. *Albumen* fleshy.—DISTRIB. S. E. Asia, Indian Arch. and Pacific Is.; reputed species more than 30, reducible at most to 10. Thwaites indeed, after careful study, unites 1, 3, 4, 5 into one variable species.

1. ***E. japonica***, *Thunb. Fl. Jap.* 191, t. 25; glabrous, branches striate, flowers about 2 together 2-bracteolate, sepals glabrous.

EASTERN HIMALAYA; Sikkim, alt. 5–10,000 ft.; Khasia Mts., alt. 3–6000 ft.; Mountains of the EASTERN and WESTERN PENINSULAS, and CEYLON ascending to 7000 ft.—DISTRIB. Eastwards to Japan and the Fiji Islands.

VAR. 1. *Thunbergii*, *Thw. Enum.* 41; leaves 3–5 by 1–1½ in. elliptic or oblanceolate more or less serrate acuminate, petioles ¼ in., styles free. *E. tristyla*, *W. & A. Prodr.* 86. *E. Wightiana*, *Wight Ill.* i. t. 38 (not *Wall.*). *E. coneocarpa*, *Korth. Verh. Nat. Gesch. Bot.* 114. *E. elliptica*, *Gard. in Calc. Journ. Nat. Hist.* vii. 443. *E. japonica*, *Beddome Flor. Sylvat.* t. 92.—Sikkim, 5–10,000 ft. *J. D. H.*; Concan, *Stocks*; Ceylon, *Gardn.*, Nilghiris, *Gardn.*—DISTRIB. S. China, Loochool, Japan, Fiji I.—*E. vitiensis*, *A. Gray.*

VAR. 2. *nitida*, *Korths. l.c.* 115, t. 7 (sp.); stems 8 ft., leaves 1½–2½ by ½–1 in. narrow elliptic or oblanceolate serrate above acute or shortly acuminate, petioles ½ in., styles united beyond the middle. *E. Roxburghii*, *Wall. Cat.* 1465, in part. *E. systyla*, *Miq. in Herb. Honenacker.* *E. Wightiana*, *Wall. Cat.* 3662. *E. fasciculata*, *Wall. Cat.* 4399.—Habit resembling that of the Tea shrub.—Khasia, 3–6000 ft. *Griffith*; Moulmein, 5000 ft.; Penang, *Lobb.*—Nilghiris, *Gardn.* DISTRIB. Borneo, Sumatra, Java.

VAR. 3. *phyllanthoides*, *Blume Mus. Bot.* ii. 110 (sp.); tips of branches silky-pubescent, leaves 4–5 by 1 in. usually narrow elliptic serrulate with a long acuminate apex, petioles ¼ in., styles united.—Khasia Mts., Moulmein.—DISTRIB. Java.

2. ***E. symplocina***, *Blume Mus. Bot.* ii. 114; branches striate silky at the apex, flowers in rather crowded fascicles, peduncles 3-bracteolate silky

sepals silky outside, styles united. *E. acuminata*, *Wall. Cat.* 1464 *in part*, *not of DC.* *E. Wallichiana*, *Planch. ms.*, *not of Steud.* *Diospyros cerasifolia*, *Don Prodr.* 144.

CENTRAL AND EASTERN HIMALAYA, alt. 5-7000 ft.; from Nipal, *Wallich*, to Mishmi, *Griffith*.—DISTRIB. JAVA.

A slender shrub. *Leaves* 3-5 by 1-1½ in., oblong-elliptic, entire or serrulate above, obtusely acuminate, papery, midrib with appressed pubescence; petioles ¼ in.

3. *E. chinensis*, *R. Br. in Abel's Voy.* 379, *cum ic.*; branches subflexuose 2-edged pilose, leaves small, flowers 2-3 together subsessile 2-bracteolate, sepals glabrous, styles united. *E. parvifolia*, *Gardn. in Calc. Journ. Nat. Hist.* vii. 445. *E. japonica* δ *parvifolia*, *Thw. Enum.* 41.

CEYLON; ascending to 8000 ft.—DISTRIB. China, Japan.

A shrub 3-12 ft. *Leaves* ¾-1½ by ½-¾ in., obovate, margins revolute, mucronate serrate, obtusely acuminate, midrib hairy, petioles ⅙ in. *Pedicels* and *bracteoles* glabrous.

4. *E. ceylanica*, *Wight Ill.* i. 98; branches cylindric pilose, leaves with depressed veins, flowers 2-4 together 2-bracteolate shortly peduncled, sepals glabrous, stigmas 3 subsessile reflexed. *E. japonica* γ *chinensis*, *Thw. Enum.* 41.

CEYLON, alt. 3-7000 ft.

A shrub, 12-16 ft. *Leaves* 1½-4 by ¾-1½ in., broadly, elliptic, shortly acuminate, margins recurved, mucronate-serrate, tip retuse, midrib hairy; petioles ⅙ in. *Pedicels* and *bracteoles* hairy. *Fruits* with a few scattered hairs.

5. *E. acuminata*, *DC. Mém. Ternstr.* 29; branches cylindric pubescent-hairy, flowers about 5 together shortly peduncled 2-bracteolate, styles 3-5 distinct or united below. *Diospyros serrata*, *Ham. in Don Prodr. Nep.* 143.

TEMPERATE AND SUBTROPICAL HIMALAYA, alt. 3-7000 ft., from Kumaon to Bhotan; Mountains of EASTERN BENGAL, ASSAM, and the EASTERN PENINSULA to Penang; CEYLON.—DISTRIB. Sumatra, Java, Fiji Islands.

A shrub 8-10 ft. *Leaves* 2-5 by ½-1 in., narrow oblong-elliptic, serrulate, attenuate-acuminate, midrib softly hairy.

VAR. 1. *euprista*, *Korths. Verh. Nat. Gesch. Bot.* 113 (sp.); styles distinct. *Griff. Ic.* 604, f. 3. *E. multiflora*, *DC. l.c.* 25. *E. serrata*, *Blume Fl. Jav. præf.* vii. *E. angustifolia*, *Wall. Cat.* 1465 *in Herb. Linn. Soc.* *E. acuminata*, *Royle Ill.* 127, t. 25. *E. salicifolia*, *Blume Mus. Bot.* ii. 118. ? *E. chinensis*, *Hook. f. & Thoms. Herb. Ind. Or.* (not of Brown).

VAR. 2. *Wallichiana*, *Steud. in Blume Mus. Bot.* ii. 118 (sp.); styles united. *E. lucida*, *Wall. Cat.* 1462. *E. fasciculata*, *Ham. in Wall. Herb.* 1463. *E. acuminata*, *Wall. Cat.* 1464. *E. bifaria*, *Wall. Cat.* 3721 ? *E. membranacea*, *Gardn. in Calc. Journ. Nat. Hist.* vii. 444. *E. japonica* β *acuminata*, *Thw. Enum.* 41.

6. *E. trichocarpa*, *Korth. Verh. Nat. Gesch. Bot.* 114; branches cylindric pubescent at the apex, flowers few together, peduncles 2-bracteolate, ovary densely silky, styles 3-5 united ⅔ of their length. *E. trichogyna*, *Blume Mus. Bot.* ii. 114.

EASTERN HIMALAYA, Bhotan, *Griffith*; KHASIA MTS., *Griffith*.—DISTRIB. Amboyna.

Buds silky. *Leaves* 3-4½ by ¾-1 in. narrowly elliptic, acuminate, serrulate, pubescent especially on the midrib below; petioles ½ in. *Sepals* pubescent externally.

7. ACTINIDIA, Lindl.

Glabrous, strigose or tomentose shrubs, usually climbers. *Leaves* entire or serrate, usually membranous, feather-veined. *Flowers* polygamous or

dioecious, in axillary cymes, rarely solitary. *Sepals* 5, slightly imbricate, subconnate at the base. *Petals* 5, somewhat contorted-imbricate. *Stamens* many; anthers dehiscing by slits. *Ovary* many-celled; styles as numerous, divergent and elongated after flowering. *Fruit* baccate, containing raphides.—**DISTRIB.** Himalaya, China and Japan; species about 8.

1. ***A. callosa***, Lindl. *Nat. Syst. ed.* 2, 439; glabrous, leaves broadly elliptic setosely serrulate, sepals tomentose, fruit sparsely warted. *A. Kolo-mitka*, Rupr. in *Maxim. Amur.* 63. Dillen. ord. *callosa*, Wall. *Cat.* 6634.

TEMPERATE HIMALAYA, from Garwhal to Bhotan, alt. 4–8000 ft.; KHASIA Mts., alt. 4–5000 ft.—**DISTRIB.** Manchuria, Japan, Loochoo Islands.

A shrubby climber; stems brown with white verruculæ. *Leaves* 4–6 by 2–3½ in., membranous, acuminate; petioles 1–1½ in. *Flowers* ½ in. diam. in small lax umbellate cymes, white. *Pedicels* with an obsolete bract below the calyx. *Sepals* oblong, obtuse. *Styles* clavate. *Fruit* ¾ in., ovoid.

2. ***A. strigosa***, Hook. f. & Thoms. in *Journ. Linn. Soc.* v. 55; strigose-hispid, leaves ovate or oblong callously ciliate or denticulate, sepals nearly smooth.

SIKKIM HIMALAYA, alt. 6–8000 ft., *J. D. H.*

A shrubby climber with the habit of *A. callosa*. *Leaves* 4–5 by 2–3 in., acuminate; petioles about 1 in. *Peduncles* short, 2–4-flowered. *Flowers* ¾ in. diam., shortly pedicelled, white. *Sepals* elliptic, obtuse. *Styles* scarcely dilated at the apex. *Fruit* 1½ in., ovoid, mucilaginous, edible.

8. SAURAUJA, Willd.

Trees or shrubs. *Branches* usually brown with whitish tubercular dots, at first as well as the leaves more or less strigose-pilose or scaly. *Leaves* approximate at the ends of the branches, usually serrate, with parallel veins diverging from the midrib. *Inflorescence* lateral, often from the axils of fallen leaves, cymose, subpaniculate, rarely few-flowered. *Bracts* usually small, remote from the calyx. *Flowers* usually hermaphrodite. *Sepals* 5, strongly imbricate. *Petals* 5, usually connate at the base. *Stamens* many; anthers dehiscing by pores. *Ovary* 3–5-celled; styles as many, distinct or connate; ovules many. *Fruit* baccate, rarely dry and subdehiscent.—**DISTRIB.** Tropical and subtropical Asia and America. Species about 60.

* *Flowers* in axillary peduncled panicles. *Styles* 5.

1. ***S. napaulensis***, DC. *Mém. Ternstr.* 29; panicles 2–4 in. alternately branched with a peduncle about 5 in., bracteoles deciduous elliptic acute, sepals orbicular glabrous. Wall. *Pl. Asiat. Rar.* ii. 40, 77, t. 178; *Cat.* 1469. *S. paniculata*, Wall. in *G. Don Gen. Syst.* i. 567. *Ternstroemia racemosa*, Don *Prodr.* 225. *Zanthoxylum Serra*, Turcz. in *Bull. Mosc.* 1858, 440.

TEMPERATE HIMALAYA, from Bhotan and Sikkim, alt. 5–7000 ft., to Garwhal, alt. 2400–5000 ft.; KHASIA Mts., alt. 5000 ft.; MISHMI HILLS, Griffith.

A moderate sized tree; youngest branches, petioles, midribs and peduncles covered with scurfy tomentum, mixed with brown, deciduous, acuminate scales. *Leaves* 10–15 by 3–4 in., narrow oblong-elliptic, rounded at the base, shortly acuminate, strongly serrate, nearly glabrous above, thinly ferruginous-tomentose beneath; petioles 1–1½ in. *Flowers* ½ in. diam., pink. *Sepals* ½ in. *Petals* at length recurved at the apex. *Fruit* green, mealy inside, edible, sweet. *Seeds* red-brown.—Varies with elliptic obtuse leaves.

2. ***S. Griffithii***, Dyer; panicle 4–6 in. alternately branched with a peduncle 6–8 in., bracteoles small oblong, sepals elliptic obtuse densely tomentose externally.

Assam, Griffith.

Covered except on the smooth upper surface of the leaves and old wood with dense brown flocculent tomentum without scales. *Leaves* 8-10 by 4-5 in., broadly elliptic, oblong, rounded at both ends, abruptly and very shortly acuminate, margin with remote spinulose serratures; petioles about 2 in. *Sepals* $\frac{1}{2}$ in.

** *Flowers* in fascicles (the peduncle evanescent) of about 4 trichotomous cymes from the axils of fallen leaves. *Styles* 5.

3. ***S. fasciculata***, Wall. *Pl. As. Rar.* ii. 40, t. 148, *Cat.* 1468; cymes 1-3-flowered glabrous, bracteoles minute linear-deltoid.

EASTERN SUBTROPICAL HIMALAYA; Nipal, Wallich; Sikkim, alt. 2-4000 ft., Griffith, &c.

A bush or small tree 20 ft. high, tomentose as in *S. napaulensis*, but the scales truncate and torn. *Leaves* 7-10 by 2-3 in., narrow elliptic-oblong, acute or rounded at the base, attenuate-acuminate, obtusely serrate, glabrous above, ferruginous-tomentose beneath; petioles 1-2 in. *Cymes* 2-3 in., branches red; bracteoles $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in. diam., pedicelled, subcampanulate, white then pink. *Sepals* $\frac{1}{2}$ in., ovate, obtuse.

4. ***S. punduana***, Wall. *Pl. As. Rar.* ii. 40, *Cat.* 1470; cymes many-flowered scaly, bracteoles broadly ovate, flowers $\frac{3}{4}$ in. diam. *S. fasciculata* var. abbreviata, Choisy *Mem. Ternstr.* 27.

SIKKIM HIMALAYA; alt. 3-5000 ft.; KHASIA Mts., alt. 2-4000 ft.; MISHMI HILLS and BIRMA, Griffith.

Habit of *S. fasciculata*, but the scales mostly acute. *Leaves* 8-11 by 3-4 in., acuminate; petioles 1-2 in. *Cymes* 3 in., rarely solitary; bracteoles $\frac{1}{2}$ - $\frac{1}{4}$ in. *Flowers* $\frac{3}{4}$ in. diam., pink. *Sepals* $\frac{1}{4}$ - $\frac{1}{2}$ in., broadly ovate, rounded.—Varies with elliptic obtuse leaves.

5. ***S. Roxburghii***, Wall. *Pl. As. Rar.* ii. 40, *Cat.* 1467; cymes many-flowered thinly tomentose, bracteoles deltoid acute, flowers $\frac{1}{4}$ in. diam. *Ternstroemia serrata*, Roxb. *Hort. Beng.* 40, not of Jack.

SILHET and KHASIA Mts., ascending to 4000 ft.; CHITTAGONG, J. D. H. & T. T.; PEGU, Kurz.

A shrub or small tree, tomentose as in *S. napaulensis*, the scales minute acute. *Leaves* 6-14 by 2-5 in., elliptic or elliptic-oblong, acute at both ends or shortly acuminate, obtusely serrate, smooth above, ferruginous-tomentose below; petioles 1-2 in. *Cymes* 1-3 in.; bracteoles $\frac{1}{2}$ in. *Flowers* subcampanulate. *Petals* white, then pink. *Stamens* about 50. *Styles* 5. *Berries* the size of a small pea.

*** *Flowers* (except on the old wood) in fascicles of many simple or very shortly peduncled pedicels. *Styles* 3 or 5.

6. ***S. tristyla***, DC. *Mém. Ternstr.* 31, t. 7; leaves obovate or broadly oblong. Wall. *Cat.* 1466. *S. leucophloia* and *S. media*, Korth. *Verh. Nat. Gesch. Bot.* 125. *Scapha Candollii* and *S. pinangiana*, Choisy *Mem. Ternstr.* 31. *Ternstroemia pentapetala*, Jack in *Malay Misc.* i. no. 5, 40. *T. trilocularis*, Roxb. ex Wall. *Pl. As. Rar.* ii. 40. *T. bilocularis*, Roxb. *Fl. Ind.* ii. 522. *Cleyera pentapetala*, Spreng. *Syst. Veg.* ii. 596.

EASTERN PENINSULA; from Tenasserim, Helfer, to Penang, Singapore, and Malacca, Wallich, Maingay.—DISTRIB. Moluccas, S. China.

A shrub or small tree; branches with grey unspotted bark. *Leaves* 7-10 by 2 $\frac{1}{2}$ -4 $\frac{1}{2}$ in. acuminate, spinulose-serrate, glabrous on both sides except the scale-like hairs on the nerves and the midrib beneath; petioles $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Flowers* on old wood in fascicles of about twice 3-chotomous cymes. *Pedicels* $\frac{1}{2}$ in., scaly and hairy. *Flowers* $\frac{1}{2}$ in. diam. *Sepals* obovate, obtuse. *Petals* white. *Stamens* about 20. *Styles* 3, rarely 5, distinct. *Berries* usually 3-lobed.

7. ***S. macrotricha***, Kurz, ms.; leaves very narrowly lanceolate.

BIRMA at Durunja, alt. 1000 ft., *Griffith*; YUNAN at Ponsee, *J. Anderson*.

A small tree, clothed except on the old wood with stiff setose hairs. *Leaves* 9-11 by 1-2½ in., attenuate above and below, setosely serrate, more sparingly hairy on both surfaces; petioles ¾ in. *Pedicels* 1 in. or less, unequal. *Flowers* red. *Sepals* ½ in., elliptic, obtuse. *Styles* 5, connate below.

**** *Flowers* from the axils of fallen leaves, sessile solitary or aggregate, *Styles* 4.

8. *S. cerea*, *Griff. ms.*; ovary densely hairy. *Griff. Itin. Notes*, 200.

BHOTAN HIMALAYA, at Murichom, alt. 3500 ft., *Griffith*.

A small tree. *Leaves* 7-10 by 4-5 in., cuneate-obovate, acute, setosely serrate, glabrous on both sides, veins below with distant setose scales; petioles ½ in., scaly. *Flowers* 1 in. diam. *Sepals* orbicular, densely scaly externally. *Petals* orbicular-obovate, white with the base blood-red, waxy.

DOUBTFUL SPECIES.

S. STERFULIFOLIA, *Griff. Itin. notes*, 193, Bhotan.—Probably *S. napaulensis*.

S. FERRUGINEA, *Griff. Itin. notes*, 120, Bhotan.

S. MICRANTHA, *Griff. Itin. notes*, 71, Khasia.—Probably *S. Roxburghii*.

9. *STACHYURUS*, Sieb. & Zucc.

Glabrous shrubs or small trees. *Leaves* serrate, membranous. *Flowers* small, in short lateral spikes or racemes. *Bracts* 2, connate at the base. *Sepals* 4, strongly imbricate. *Petals* 4, free. *Stamens* 8; anthers dehiscing by slits. *Ovary* 4-celled; style simple, stigma capitate-peltate; ovules many. *Berry* 4-celled. *Cotyledons* elliptic, radicle short.—DISTRIB. 2 known species, a Japanese and a Himalayan.

1. *S. himalaicus*, *Hook. f. & Thoms; Benth. in Journ. Linn. Soc. v. 55*; leaves shortly petioled attenuate-acuminate, berries sessile subglobose. *Inderm. Wall. Cat.* 7417.

EASTERN TEMPERATE HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 5-8000 ft., *J. D. H.*; Bhotan, *Griffith*.

A small-tree with straggling branches. *Leaves* 4-6 by 1½-2 in., ovate, with a rounded base, finely serrate, the veins strongly reticulated beneath; petioles ¼-¾ in. *Spikes* 2-3 in., erect. *Berries* the size of a small pea.

10. *SCHIMA*, Reinw.

Trees with papery evergreen leaves. *Peduncles* usually erect, axillary or solitary, or the uppermost shortly racemed. *Flowers* handsome, 2-bracteolate. *Sepals* 5, subequal. *Petals* 5, much larger, connate at the base, the outermost concave and sub-cucullate. *Stamens* many, adnate to the base of the petals. *Ovary* 5- (rarely 4-6-) celled; styles simple or slightly lobed at the apex with broad spreading stigmas; ovules 2-6 in each cell, attached laterally, sub-pendulous. *Capsule* woody, depressed-globose, loculicidal, with a persistent axis. *Seeds* flat, kidney-shaped, dorsally winged, hilum central, albumen scanty; cotyledons foliaceous, flat or crumpled, accumbent; radicle inferior, curved upwards.—DISTRIB. Tropical Asia. Species about 7.

1. *S. mollis*, *Dyer*; leaves quite entire with nearly simple lateral veins, peduncles 1 in. with minute white warts, fruit pubescent when young. *Gordonia mollis*, *Wall. Cat.* 1458.

TAVOY, *Wallich*.

Branches brown with minute scattered white warts. *Leaves* 5-7 by 1-2 in., elliptic, tapering and acute at both ends, smooth on both surfaces with red veins; petiole $\frac{3}{4}$ in., pubescent. *Peduncles* thickened upwards. *Sepals* $\frac{1}{2}$ in. long, with pubescent-ciliate margins, glabrous externally.

2. **S. Wallichii**, *Choisy in Zoll. Cat.* 144; leaves entire or obscurely crenate-serrate with forked lateral veins, flowers in a short terminal raceme, peduncles $\frac{3}{4}$ -2 in. with minute white warts, fruit $\frac{3}{4}$ in. diam. pubescent when young, afterwards minutely warted. *S. hypoglaucæ*, *Miq. Fl. Ned. Ind. Suppl.* i. 484. *Gordonia Wallichii*, *DC. Prodr.* i. 528; *Wall. Cat.* 1455. *G. integrifolia*, *Roxb. Hort. Beng.* 52. *G. Chilaunia*, *Ham. in Don Prodr.* 225. *G. sp. Griff. Notul.* iv. 562, t. 600.

EASTERN HIMALAYA, from Nipal, *Wallich*, and Sikkim, alt. 2-5000 ft., *J. D. H.*, to Bhotan, *Griffith*. ASSAM, CHITTAGONG, and the KHASIA Mts., alt. 2-4000 ft., *Wallich*, &c. BIRMA, *Griffith*.—DISTRIB. Sumatra.

A tree 80-100 ft., with rough or smooth, pale or brown bark. *Leaves* 6-7 by 2-3 in., elliptic-oblong, tapering or rounded below, acute or slightly acuminate, glabrous and reddish-veined above, reticulate and more or less pubescent beneath; petiole $\frac{1}{2}$ in., pubescent. *Peduncles* rather slender; bracts $\frac{1}{4}$ in., alternate, narrow oblong, retuse. *Flowers* $1\frac{1}{2}$ -2 in. diam., white, fragrant. *Sepals* $\frac{1}{2}$ in. long, with pubescent-ciliate margins, glabrous, or slightly pubescent outside. *Petals* pubescent outside at the base.

3. **S. crenata**, *Korth. Verh. Nat. Gesch. Bot.* 143, t. 29; leaves faintly crenate-serrate, flowers in a loose terminal corymb, peduncles $1\frac{1}{2}$ -2 in. smooth slender, fruit $\frac{1}{2}$ in. diam. pubescent. *Gordonia floribunda*, *Wall. Cat.* 1456; *Griff. Notul.* iv. 563. *G. oblata*, *Roxb. Fl. Ind.* ii. 572. *G. sp. Griff. l.c.* 562.

EASTERN PENINSULA, from Tenasserim to Penang. BIRMA, *Griffith*.—DISTRIB. Borneo, Sumatra.

A tree 30-60 ft. *Branchlets* compressed, pubescent. *Leaves* about 6 by 2 in., elliptic, acute at the base, acuminate, glabrous on both surfaces, rather leaden-coloured above; petiole $\frac{1}{2}$ in., glabrous. *Flowers* $1\frac{1}{2}$ in. diam., white, fragrant. *Sepals* hardly $\frac{1}{2}$ in., long, margins scarcely ciliate, glabrous externally. *Petals* pubescent externally at the base. *Stigma* 4-5-lobed, peltate.—The Borneo and Sumatra specimens have ciliate sepals, pubescent externally. I agree, however, with Kurz (*Journ. As. Soc. Beng.* 1870, ii. 64), that they must be united with the Indian forms. *S. Noronhæ* has fewer and larger flowers and stouter peduncles.

4. **S. khasiana**, *Dyer*; leaves strongly serrate with nearly simple lateral veins, flowers from the axils of fallen leaves, peduncles $\frac{3}{4}$ in. stout with minute white warts, fruit $\frac{3}{4}$ in. diam. rough. *Gordonia superba*, *Hook. f. & Thoms. ms. (not of Gard. & Champ.)*

KHASIA Mts., alt. 4-6000 ft., *Griffith*, &c.

A tree with white bark. *Leaves* 5-6 by 2-2 $\frac{1}{2}$ in., ovate, acute, glabrous on both surfaces, reticulate beneath; petiole $\frac{1}{2}$ in., glabrous. *Flowers* 2 $\frac{1}{2}$ in. diam. *Sepals* $\frac{1}{2}$ in. long, with pubescent-ciliate margins, pubescent externally. *Petals* silky-pubescent externally on the lower half.

11. PYRENARIA, Blume.

Shrubs or trees. *Leaves* serrate, large and submembranous. *Flowers* subsessile, axillary, erect or nodding. *Sepals* usually 5, unequal, graduating from the bracts to the petals. *Petals* connate at the base. *Stamens* very numerous, mostly connate, adnate to the base of the petals. *Ovary* 5-celled; styles 5, free, or partially united; ovules 2 in each cell, attached laterally. *Fruit* drupaceous, indehiscent. *Seeds* oblong, stout, wingless with a thick

woody testa; albumen 0; cotyledons large, crumpled or conduplicate; radicle inferior, inflexed.—DISTRIB. Malay Penins. & Ind. Arch. Species about 7.

* Leaves pubescent beneath.

1. **P. acuminata**, *Planch. ex Choisy Mém. Ternstr.* 84; bracts and sepals ovate acute. *Ternstroemia?* *macrophylla*, *Wall. Cat.* 3663 in *Herb. Linn. Soc.* *Gordonia* (*Camellia?*) *acuminata*, *Wall. Cat.* 3664 in *Herb. Kew.*

EASTERN PENINSULA, Malacca and Sincapore, *Wallich*, &c.

Branches densely hairy. *Leaves* 8–12 by $2\frac{1}{2}$ –4 in., oblanceolate, obscurely serrulate, shortly acuminate, glabrous above; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in., pubescent. *Flowers* $1\frac{1}{4}$ in. diam., shortly stalked. *Bracts* and *sepals* velvety externally. *Petals* round, silky externally, purplish-brown within. *Ovary* silky. *Fruit* $1\frac{1}{2}$ by 1 in. when dry, pomaceous, wrinkled, finally nearly glabrous.

** Leaves glabrous beneath.

2. **P. camelliæflora**, *Kurz in Journ. As. Soc. Beng.* 1871, ii. 46; leaves oblong or elliptic-oblong subacuminate crenato-serrulate.

PEGU, *Kurz*; MARTABAN, *Brandis*.

A small tree, 25–30 ft. high. *Leaves* 5–7 by $1\frac{1}{2}$ –2 in., yellowish-green even when dried; petiole $\frac{1}{2}$ in. *Flowers* $\frac{3}{4}$ in. diam., white; bracteoles small and as well as the sepals and petals silky externally. *Ovary* silky. *Drupe* about 1 in. long, obovoid, succulent, at first slightly pubescent, then pruinose. *Seeds* 2.

3. **P. attenuata**, *Seem. in Linn. Trans.* xxii. 340; leaves obovate serrulate, flowers $\frac{3}{4}$ in. diam. *Freziera?* *attenuata*, *Wall. Cat.* 1451. *Thea viridis* var. *assamica*, *Choisy Mém. Ternstr.* 91. *Thea assamica*, aff. sp., *Choisy l.c.* 68.

TAVOY, *Gomez*.

Branches glabrous; buds silky. *Leaves* 6–7 by $2\frac{1}{2}$ –3 in., obtuse or very shortly acuminate; petiole $\frac{1}{2}$ in. *Flowers* very shortly peduncled. *Bracts*, *sepals*, and *petals* orbicular, pubescent externally. *Ovary* pubescent; styles united below, glabrous above.

4. **P. barringtoniæfolia**, *Seem. in Bonpl. vii.* 49; leaves spatulate strongly serrate, flowers $1\frac{1}{2}$ in. diam. *Eusynaxis barringtoniæfolia*, *Grieff. Notul.* iv. 560, t. 603, f. 1, 2, 3.

ASSAM, *Grieffith*; Garrow hills in EASTERN BENGAL, *Lobb*.

A shrub 6 ft., with glabrous branches and pubescent buds. *Leaves* 8–10 by $2\frac{1}{2}$ – $3\frac{1}{4}$ in., tip rounded or truncate, cuspidate-acuminate; petiole $\frac{1}{2}$ in. *Flowers* yellowish-white, very shortly peduncled. *Bracts*, *sepals*, and *petals* orbicular, erose-crenate, pubescent externally. *Ovary* silky, grooved; styles distinct. *Fruit* ovoid, $1\frac{1}{4}$ in. long when dry, longitudinally wrinkled, glabrous.

12. GORDONIA, Ellis.

Trees with evergreen entire or crenate leaves. *Flowers* usually handsome, often subsessile, solitary in the axils of the leaves or collected at the ends of the branches, 2–4 bracteolate. *Sepals* usually 5, unequal, graduating from the bracts to the petals. *Petals* free or often slightly connate at the base, the innermost larger. *Stamens* 5-adelphous or all connate, adnate to the petals. *Ovary* 3–5- (rarely 6-) celled; style single with a stout spreading stigma; ovules 4–8 in each cell. *Capsule* oblong, woody, loculicidal with a persistent axis. *Seeds* flat or compressed, prolonged upwards into an oblong wing (rarely obsolete) albumen 0; embryo mostly straight, oblique, with ovate flat or slightly crumpled cotyledons; radicle superior.—DISTRIB. N. America, Tropical Asia, Malay Archipelago. Species about 10.

1. *G. excelsa*, Blume, *Bijd.* iii. 130; leaves very shortly petioled narrowly elliptic or oblanceolate more or less acuminate obscurely serrulate usually coriaceous. *G. singaporiana*, Wall. *Cat.* 1457 (in part). *Antheischima excelsa*, Korth. *Verh. Nat. Gesch. Bot.* 138, t. 27. *Dipterosperma* sp. *Griff. Notul.* iv. 564.

BHUTAN HIMALAYA, (var. 1), *Griffith*; EASTERN PENINSULA, Sincapore, *G. Thomson*; Malacca, *Maingay*.—DISTRIB. Java, Amboyna.

Bark of young branches cracking transversely and scaling off. *Leaves* 4–10 by $1\frac{1}{2}$ –3 in., tapering at both ends; midrib strong; veins faint; petiole $\frac{1}{2}$ in. *Peduncles* $\frac{1}{4}$ – $\frac{1}{2}$ in., short, pubescent. *Flowers* $1\frac{1}{2}$ –2 in. diam., pinkish, fragrant. *Sepals* and *petals* rather fleshy, orbicular, silky-pubescent externally with membranous edges. *Capsule* 1 in. long. *Valves* flat on the back, more or less tapering upwards.

VAR. 1. *pubescens*; buds and young shoots pubescent.

VAR. 2. *sincapuriانا*; buds and young shoots glabrous.

2. *G. obtusa*, Wall. *Cat.* 1459; leaves shortly petioled narrowly elliptic tapering at both ends, obtuse or obtusely acuminate crenate papery. *G. obtusifolia* and *G. parvifolia*, *Wight Ill.* i. 99. *Saurauja crenulata*, *Wight in Wall. Cat.* 1459 (not of DC.).

MOUNTAINS of the WESTERN PENINSULA, from the Concan to the Pulney hills. CEYLON? A tall tree; young branches with grey striate persistent bark, at first compressed; buds silky. *Leaves* 2–4 by $1\frac{1}{2}$ in.; midrib strong; petioles $\frac{1}{2}$ in. *Peduncles* short, pubescent. *Flowers* $1\frac{1}{2}$ in. diam., white. *Sepals* orbicular, silky-pubescent externally; the membranous *petals* faintly so. *Capsule* 1 in. long, 5-angled, the valves deeply sulcate above.

3. *G. Maingayi*, *Dyer*; leaves petioled oblanceolate tapering below obtusely acuminate with obscurely serrulate and slightly revolute edges subcoriaceous, margins of petals and sepals glabrous.

MALACCA, *Maingay*.

Branchlets numerous, slender, with grey and persistent bark; buds silky. *Leaves* 3 by $1\frac{1}{2}$ in.; petioles $\frac{1}{2}$ in. *Flowers* 1 in. diam., subsessile. *Sepals* and *petals* orbicular, retuse, silky-pubescent externally, with membranous edges. *Capsule* 1 in. long, stained inside with purple; valves nearly flat on the back.—Closely allied to *G. obtusa*, but the subsessile flower-buds and flowers are smaller and the leaves stouter.

4. *G. zeylanica*, *Wight Ill.* i. 99; leaves shortly petioled elliptic-oblanceolate tapering at both ends with a minute retuse glandular point entire rather coriaceous.

CEYLON; forests of the Central Province, alt. 4–7000 ft., *Walker*, &c.

Bark of young branches persistent, smooth. *Leaves* 3–4 by 1–2 in.; midrib strong; veins obsolete; petiole $\frac{1}{2}$ in. *Peduncles* short, glabrous. *Flowers* $1\frac{1}{2}$ in. diam., white. *Sepals* orbicular, smooth, retuse; margins ciliate. *Petals* slightly pubescent externally towards the base.

VAR. 1. *lanceolata*, *Thwaites Enum.* 40; young branches pilose, leaves narrow.

VAR. 2. *elliptica*, *Thw. l.c.* (excl. syn. *Gardner*); young branches smooth, leaves broader.

5. *G. elliptica*, *Gard. in Calc. Journ. Nat. Hist.* vii. 448; leaves sessile broadly elliptic rounded at both ends retuse at the apex entire slightly coriaceous.

CEYLON; *Gardner*, Newera Ellia, *G. Thomson*.

A large tree. *Branchlets* with the leaves crowded at their extremities; bark cracking across and lengthwise. *Leaves* about 3 by $1\frac{1}{2}$ in., upper surface reticulate-veined; midrib strongly marked below, channelled above. *Flowers* 2–3 in. diam., sessile, white. *Sepals* orbicular, emarginate, puberulous externally. *Petals* obcordiform, puberulous

Capsule 1-1½ in.; back of valves sulcate.—Thwaites does not appear to have seen specimens of this plant, which differs from *G. zeylanica* in its sessile, more coriaceous leaves with slightly revolute margins when dry, and its larger flowers.

6. ***G. speciosa***, *Thwaites Enum.* 40; leaves sessile broadly elliptic rounded and retuse at the apex entire coriaceous. *Carria speciosa*, *Gard. in Calc. Journ. Nat. Hist.* vii. 7.

CEYLON; damp forests of the Central Province, rather uncommon, alt. 5000 ft. and upwards, *Gardner*, &c.

A tree 40-50 ft. *Branchlets* with the leaves crowded at their extremities; bark grey, cracking longitudinally. *Buds* glabrous. *Leaves* 3-5 by 1½-3 in., slightly revolute when dried; midrib strong, channelled above; veins obsolete. *Flowers* 2-4 in. diam., subsessile, reddish-purple. *Sepals* and *petals* orbicular-oblong, obcordate; sepals smooth, margins ciliate; petals faintly silky externally towards the base. *Capsule* 1½ in. long; back of valves sulcate above.

GORDONIA ANOMALA, *Spreng. Syst.* iii. 126, is figured in *Bot. Reg.* 349, under the name of *Camellia axillaris*, *Roxb. ms.*, and is stated to have been introduced by Dr. Roxburgh into the Calcutta Botanic Garden from Pulo-Penang. I have seen, however, no specimens except from S. China, whence it is probably not indigenous in Penang.

13. **CAMELLIA**, Linn.

Trees or shrubs. *Leaves* evergreen, serrate, coriaceous or membranous. *Flowers* axillary, solitary, or aggregated, sessile or shortly stalked, often handsome. *Sepals* 5-6, unequal, graduating from the bracts towards the petals. *Petals* slightly coherent at the base. *Stamens* numerous, the outermost in many rows, slightly or almost wholly monadelphous, adherent to the base of the petals; the innermost, 5-12, free. *Ovary* 3-5-celled; styles free to the base, or more or less united; ovules 4-5 in each cell, pendulous. *Capsule* woody, usually short, loculicidal. *Seeds* mostly solitary in each cell, wingless, albumen 0; embryo straight, cotyledons thick, radicle short, superior.—**DISTRIB.** Trop. and East. Asia and Malay Archipelago. Species about 14.

SECT. I. *Thea*, Linn. *Flowers* nodding, *sepals* persistent.

1. ***C. theifera***, *Griff. Notul.* iv. 558, t. 601, f. i. & iii.; *Trans. Agric. Soc. Calc.* v. (1878), t. C; leaves elliptic-oblong acute or cuspidate-acuminate puberulous on the nerves beneath, peduncles 2-3-bracteate short, styles and stamens glabrous. *Thea chinensis*, Linn.; *Seem. in Trans. Linn. Soc.* xxii. t. 61. *T. assamica*, *Masters in Journ. Agric. & Hort. Soc. Ind.* iii. (1844), 63. *Assam Tea*, *Wall. Journ. Asiat. Soc. Beng.* iv. 48, t. 2. *Camellia*? *Scottiana*, *Wall. Cat.* 3668, (see *Journ. Linn. Soc.* xiii. 328). *Camelliæ* sp., *Griff. Trans. Agric. & Hort. Soc. Ind.* v. (1838), t. B. *Eurya angustifolia*, *Miquel in Herb. Hohenack.* 483 (a cultivated form).

UPPER ASSAM, *Wallich*; **CACHAR** (*vide T. Anderson*).—**DISTRIB.** China.

A shrub, 3-6 ft. high. *Branchlets* glabrous; buds silky. *Leaves* 4-8 by 1½-2½ in. tapering at either end, more or less serrate, membranous; petiole ½ in. *Flowers* 1½ in. diam., white. *Sepals* orbicular, glabrous, with membranous ciliate edges. *Petals* broadly obovate. *Styles* united for ¾ their length. *Capsule* leathery, trigonous; cells 1- rarely 2-seeded. *Seeds* ¾ in. diam., nearly globose or obtusely angled, smooth, pale brown.—Possibly the wild stock of the tea plant. The cultivated forms vary with more contracted habit, smaller, more obtuse and coriaceous leaves, and a pubescent calyx. In *J. W. Bennett's Ceylon*, 277, the Tea plant is alluded to and figured as having been found in that island by the Dutch. This, however, was not confirmed by the writer or by any subsequent observer.

2. **C. caudata**, Wall. *Pl. As. Rar.* iii. 36; leaves elliptic-oblong caudate-acuminate sparsely puberulous beneath, peduncles imbricate-bracteate short, stamens and styles hairy. Wall. *Cat.* 978; *Griff. Notul.* iv. 559, t. 601, f. ii.; *Trans. Agric. & Hort. Soc. Ind.* v. (1838), t. A.

KHASIA MTS. and SILHET, Wallich, &c.; BHOTAN HIMALAYA, Booth; MISHMI HILLS, Griffith.

Branchlets slender; buds silky. *Leaves* 3-4 by $\frac{3}{4}$ -1 in., serrate, membranous with a strong midrib pubescent beneath; petiole $\frac{1}{2}$ in., pubescent. *Flowers* about 1 in. diam., white. *Sepals* ovate, silky externally. *Petals* obovate, puberulous externally. *Capsule* $\frac{3}{4}$ in. diam., trigonously-spherical, 1-celled, 1-seeded.

SECT. II. **Camellia** proper. *Flowers* erect, *sepals* deciduous.

3. **C. drupifera**, Lour. *Fl. Cochîn.* 411, ex Seem. in *Trans. Linn. Soc.* xxii. 344; leaves elliptic or elliptic-oblong tapering below with a long acuminate apex coriaceous, stamens glabrous, styles nearly free woolly at the base. C. Kissi, Wall. in *As. Res.* xiii. 429; *Journ. As. Soc. Beng.* iv. 48, t. 2; *Pl. As. Rar.* iii. 36, t. 256. C. keina, Don *Prodr.* 224. C. mastersia, *Griff. Notul.* iv. 539. C. simplicifolia, *Griff. Notul.* iv. 560, t. 604, f. ii. C. symploccifolia, *Griff. Itin.* 40. C. caudata, *Griff. Itin.* 40 (not of Wall.). C. oleifolia, Wall. *Cat.* 976.

EASTERN HIMALAYA; alt. 3-7000 ft.; from Nipal, Wallich, to Bhotan, Griffith; ASSAM and KHASIA MTS., alt. 5-8000 ft.; TENASSERIM and ANDAMAN ISLANDS, Helfer.

A shrub or small tree, with much divided slender branches. *Branchlets* slightly puberulent; buds with loose scales, sparingly pubescent. *Leaves* 3-4 by 1-1 $\frac{1}{4}$ in., serrulate especially towards the apex, often slightly revolute; veins faint; petiole $\frac{1}{2}$ in. *Flowers* 1 $\frac{1}{2}$ in. diam., white, with the odour of cherry-laurel. *Sepals* orbicular, silky externally. *Petals* obovate, emarginate, scarcely hairy externally. *Ovary* woolly. *Capsule* nearly 1 in. diam., at first pyriform and pubescent, ultimately depressed-globose and smooth. *Seeds* 1-3.—*C. Sasanqua*, of China and Japan, has less acuminate leaves, obcordate or 2-lobed petals and connate styles.

4. **C. lutescens**, Dyer; leaves elliptic-oblong tapering or rounded below caudate-acuminate membranous, styles short, stigmas recurved, capsule drupaceous (when young only?).

MISHMI HILLS, high up on Laim-planj-thaya, *Griff. Journ.* p. 38, *Kew Distrib.* 777 and 779.

A shrub with much divided pale grey branches and buds silky within, *Leaves* 2-3 $\frac{1}{2}$ by 1-1 $\frac{1}{4}$ in., closely serrate; midrib prominent below and pale; petiole $\frac{1}{2}$ in. puberulous. *Flowers* 1 in. diam., crowded towards the ends of the branches, sessile, white, then yellowish, fragrant. *Sepals* orbicular, membranous, thinly pubescent internally. *Petals* obovate, smooth. *Ovary* with long silky hairs.

5. **C. ? sp. n.**; a shrub 10 ft. with puberulous shoots and pubescent buds and petioles. *Leaves* 4-7 by 1 $\frac{1}{2}$ -2 in., oblong, tapering at both ends, crenate serrate, obtuse acuminate, papery, glabrous on both surfaces; petiole $\frac{1}{2}$ in. *Flowers* 1 in. diam. erect; the orbicular, minutely mucronate sepals and obovate petals both pubescent externally; styles 5, distinct, very short; ovary silky.

MOULMEIN, Lobb, alt. 3000 ft.; a single specimen.

I have no means of identifying the plant found by Griffith on the Mishmi mountains (*Journ.* 38 and 45), and called by him *Camellia axillaris*.

14. **ARCHYTÆA**, Martius.

Leaves evergreen, semiamplexicaul, smooth. *Flowers* on a lateral compressed peduncle, 3 or more together, rarely solitary *Bracts* subfoliaceous.

Sepals and *petals* each 5. *Stamens* numerous, 5-adelphous; anthers versatile. *Ovary* 5-celled; styles distinct or wholly united; ovules numerous in many imbricating rows. *Capsule* acuminate, septicidal from below, with a persistent central axis. *Seeds* linear-subcylindric, albumen scanty.—DISTRIB. Trop. Amer. and Indian Archipelago. Species 3.

1. **A. Vahl**, *Choisy Mém. Ternstr.* 73. *Hypericum alternifolium*, *Vahl Symb.* ii. t. 42; *DC. Prodr.* i. 545; *Wall. Cat.* 4806. *Ploiarium elegans*, *Korth. Verh. Nat. Gesch. Bot.* 135, t. 25.

EASTERN PENINSULA; Malacca, *Griffith*; Singapore, *Wallich*; Penang, *Jack*.—DISTRIB. BORNEO.

A shrub or small tree. *Leaves* crowded at the ends of the branches, narrow oblanceolate, acute; margins and midrib red. *Flowers* 1 in. long, pink. *Styles* $\frac{1}{2}$ in. long, distinct.

A plant of which I have seen only specimens in fruit, collected by Maingay at Penang, and described below, is probably the type of a new Ternstræmiaceous genus.—*Leaves* alternate, 2-3 by 1-1 $\frac{1}{2}$ in., elliptic, acute, coriaceous, with close patent lateral veins; petiole 1 in. *Flowers* from the axils of fallen leaves, forming a terminal panicle; peduncle $\frac{3}{4}$ in. long, thickened upwards. *Sepals* 5, imbricate. Immature fruit ovoid, apiculate, drupaceous, containing 2 1-seeded cells.

ORDER XXV. DIPTEROCARPEÆ. (By W. T. Thiselton Dyer.)

Resinous trees, rarely climbing shrubs. *Leaves* alternate, simple, quite entire, rarely sinuate-crenate, with parallel lateral nerves; stipules usually small and deciduous, or inconspicuous, sometimes larger and persistent, or fugitive, leaving an annular scar. *Flowers* usually sweet-scented in few- or many-flowered axillary and terminal racemes or panicles. *Bracts* usually minute or 0, rarely larger and persistent. *Calyx-tube* free and campanulate, or very short and adnate to the base of the ovary. *Petals* contorted, connate at the base or free. *Stamens* ∞ , 15, 10 or 5, hypogynous or subperigynous, free, connate, or adnate to the petals, filaments short, often dilated at the base; anthers 2-celled, the outer valves sometimes larger, connective often aristate or with an obtuse appendage. *Ovary* slightly immersed in the torus, usually 3- rarely 2- or 1-celled; style subulate or fleshy, entire or with 3 minute stigmatic lobes; ovules anatropous, 2 in each cell, pendulous or laterally affixed (solitary and erect in *Ancistrocladus*). *Fruit* usually nut-like, sometimes capsular and 3-valved, 1- rarely 2-seeded, accompanied by the variously accrescent calyx of which two or more lobes are usually developed into linear wings. *Seed* exalbumous (albumen fleshy and ruminated in *Ancistrocladus*); cotyledons fleshy, equal or unequal, straight or more or less plaited and crumpled; radicle directed towards the hilum, usually included between the cotyledons.—DISTRIB. Confined (except 3 Tropical African species) to Tropical Eastern Asia; genera about 13, species about 170.

* Calyx much enlarged in fruit, segments erect.

Calyx in fruit with a distinct tube.

Fruit free 1. DIPTEROCARPUS.

Fruit adnate to the calyx.

All the calyx-lobes enlarged. Stamens 5-10, ovary 1-celled 2. ANCISTROCLADUS.

Two calyx-lobes enlarged. Stamens ∞ , ovary 3-celled 3. ANISOPTERA.

Calyx in fruit with an obscure tube.

Æstivation of the calyx subvalvate; stamens 15 4. VATICA.

Æstivation of the calyx imbricate.

Three or all the calyx-segments enlarged; stamens 15-∞, subulate-cuspidate 5. SHOREA.

Two calyx-segments enlarged; stamens 10-15, subulate-cuspidate 6. HOPEA.

Two calyx-segments enlarged; stamens 15, with an obtuse appendage 7. DOONA.

** Calyx scarcely enlarged in fruit, segments reflexed.

Stamens 15-∞ 8. VATERIA.

Stamens 5 9. MONOPORANDRA.

1. **DIPTEROCARPUS**, Gært. f.

Lofty trees, stellately pubescent or more or less clothed with fascicled hairs. *Leaves* coriaceous, entire or sinuate-crenate, lateral nerves not quite opposite, connected by marginal loops and transverse reticulations; petiole usually more or less tumid at the apex; stipules large, valvate, enclosing the terminal bud, finally caducous leaving an annular scar. *Flowers* large, racemed, white or reddish. *Calyx-tube* free. *Petals* usually pubescent externally especially on the outer margin. *Stamens* ∞; anthers linear, equivalved, acuminate. *Ovary* 3-celled; style filiform; ovules 2 in each cell. *Fruit* nut-like, 1- rarely 2-seeded, inclosed in the accrescent calyx-tube, free; wings 2, erect. *Seed* adnate to the base of the pericarp; cotyledons large, thick, unequal; radicle inconspicuous.—**DISTRIB.** Tropical E. Asia; species about 50.

* *Calyx-tube* in fruit without ribs or wings.

† *Young branches glabrous or canescent.*

1. **D. turbinatus**, Gært. f. *Fruct.* iii. 51, t. 188; leaves ovate or broadly lanceolate entire or sinuate-crenate acute base rounded, fruit-wings 5 by 1 in. linear-oblancheolate obtuse 3-nerved. *Ham. in Mem. Wern. Soc.* vi. 300; *Roxb. Fl. Ind.* ii. 612; *Corom. Pl.* iii. 10, t. 213; *Wall. Cat.* 952; *A. DC. Prodr.* xvi. 2, 607. *D. lævis*, *Ham. l.c.* 299; *A. DC. l.c.* *D. indicus*, *Bedd. Forest Rep.* 1864-5, 17 with tab.

EASTERN BENGAL and EASTERN PENINSULA, from Chittagong and Pegu to Singapore. (Concan and Ceylon cult.?)

Young branches compressed. *Leaves* 5-12 by 2½-7 in.; glabrous on both surfaces or slightly pubescent, especially on the nerves and margins, lateral nerves 14-18 pairs; petiole 1½-3 in.; stipules with dense stellate canescence, pubescent towards the apex. *Racemes* 3-5-flowered. *Flowers* 3 in. diam. *Calyx-tube* obconic, hoary-puberulous; in fruit 1 in. diam., sub-spheroidal, mouth contracted, unenlarged lobes deltoid-ovate. *Petals* pinkish-white. *Nut* pubescent.—The Gurjun oil tree.—Kanyin.

2. **D. vestitus**, *Wall. Cat.* 954; leaves elliptic obtuse at both ends, margins sinuate-crenate and ciliate.

TAVOY, Gomez.

Young branches compressed, clothed in every part except the glabrescent upper surfaces of the leaves with stellate canescence. *Leaves* 7 by 5 in., margins undulate, lateral nerves 15 pairs; petiole 1½ in. *Racemes* about 6-flowered. *Calyx-tube* obtusely obconic; lobes short, broadly deltoid, obtuse.—I have seen no fruit.

†† *Young branches more or less hairy.*

3. **D. obtusifolius**, *Teysm. in Miq. Ann. Mus.* i. 214; leaves broadly

ovate obtuse sinuate-crenate, base rounded, fruit-wings 5 by 1 in. linear-oblongate 1- or sub-3-nerved. *A. DC. Prodr.* xvi. 2, 608.

MOULMEIN and RANGOON, *Griffith*, &c.; ascending 3000 ft., *Brandis*.—DISTRIB. Siam.

The compressed young branches, stipules and petioles densely hairy. *Leaves* 8-9½ by 4-5½ in., glabrous above, softly pubescent beneath, margins undulate sometimes ciliate, lateral nerves 12-14 pairs; petioles 1-1½ in. *Calyx-tube in fruit* 1½ in. diam., depressed spheroidal, mouth contracted, sparsely hispid, at length glabrous, unenlarged lobes cordiform. *Nut* silkily pubescent.—Engnu. Kan.—In Indian specimens the margins of the leaves are smooth, in those from Siam, their upper surface is glabrescent. A plant collected in Pegu by Kurz differs in the stiffly-tomentose young parts, subobtusate leaves, and acute fruit-wings.

4. **D. hispidus**, *Thwaites Enum.* 33; leaves broadly elliptic-oblong shortly acuminate base slightly cordate sinuate-crenate, fruit-wings 6 by 1½ in. linear-obovate obtuse, principal nerve with 3-4 strong ascending branches. *A. DC. Prodr.* xvi. 2, 608.

CEYLON; Saffragam District and Ratnapoora.

Young branches, stipules, petioles and the prominent reticulations on the under surface of the leaves clothed with spreading rufous fascicled hairs. *Leaves* 5-12 by 3½-7 in. (25 by 11 on young trees), lateral nerves 15-24 pairs; petiole 1-2½ in. *Calyx-tube* obconic, densely pubescent, in fruit ovoid, obscurely 5-angled, glabrescent. *Nut* striate, glabrescent.—*D. oblongifolius*, *Thw. Enum.* 33 (not of Blume). *D. oblongus*, *A. DC. Prodr.* xvi. 2, 608, is said by Thwaites to have smaller leaves, but appears to me in other respects indistinguishable.

5. **D. pilosus**, *Roxb. Hort. Beng.* 93; *Fl. Ind.* ii. 615; leaves elliptic-oblong very shortly acuminate base acute or rounded margins with fascicled cilia, fruit-wings 6-8½ by 1¼-1¾ in. linear-oblong retuse usually strongly 3-nerved glabrous. *A. DC. Prodr.* xvi. 2, 614. *D. Baudii*, *Korth. Verh. Nat. Gesch. Bot.* 59, t. 5; *Kurz in Journ. As. Soc. Beng.* 1870, ii. 65; *A. DC. Prodr.* l.c. 609.

ASSAM, *Griffith*; PEGU and CHITTAGONG, *Roxburgh*, &c.; ANDAMAN ISL., *Kurz*.—DISTRIB. Sumatra.

Compressed young branches, stipules and petioles densely hairy. *Leaves* 6-18 by 3-12 in., glabrous above, sparingly hairy on the reticulations beneath, lateral nerves 24 pairs; petiole 1½-3 in. *Calyx-tube in fruit* 2 in. long, ovoid or obovoid, glabrous, mouth not contracted, unenlarged lobes orbicular. *Nut* densely pubescent.—An Assam plant collected by G. Mann has identical fruits but leaves 7 by 4 in., elliptic, acute, base rounded, minutely tawny-pubescent beneath.

6. **D. crinitus**, *Dyer*; leaves obovate acute margins entire slightly incurved when dried fringed with short fascicled hairs, fruit-wings (immature) 3½ in. linear deltoid obtuse or acute 3-nerved.

MALACCA, *Maingay*.—DISTRIB. Borneo.

Young branches, petioles, prominent nerves on the under surface of the leaves and pedicels clothed with long fascicled hairs. *Leaves* 4-6 by 2-3½ in., coriaceous, thinly hairy above especially on the midrib, lateral nerves 15-18 pairs; stipules glabrous except a few fascicled hairs on the dorsal nerve; petiole 1¼-1½ in. *Racemes* about 6-flowered. *Calyx-tube* obconic, glaucous, obovoid in immature fruit, contracted below the mouth, glabrous, unenlarged lobes broadly elliptic.

** *Calyx-tube in fruit* 5-angled or winged.

† *Angles confined to the upper portion of the calyx-tube.*

7. **D. cornutus**, *Dyer*; leaves oblong rounded at both ends or tip apiculate sinuate-crenate, calyx-tube in fruit tubercular-pentagonal above, mouth contracted.

MALACCA, Moingay.

Young branches compressed, canescent. *Leaves* 10-13 by 4-8 in., glabrous above, canescent beneath, lateral nerves 19 pairs with a persistent intermediate plication; petiole 2 in.; stipules 4-6 in., canescent with scattered fascicled hairs. *Racemes* 4-6 in., simple, about 8-flowered. *Calyx-tube* in fruit $\frac{3}{4}$ in. long, glabrous, wings linear-spathulate.

8. **D. tuberculatus**, *Roxb. Fl. Ind.* ii. 614; leaves cordiform acute base cordate or truncate margins sinuate-crenate undulate, calyx-tube in fruit pentangular-costate in its upper part, mouth contracted. *A. DC. Prodr.* xvi. 2, 614. *D. cordatus*, *Wall. Cat.* 956; *A. DC. l.c.* 612. *D. grandifolius*, *Teysm. in Miq. Ann. Mus.* i. 214.

CHITTAGONG, Roxburgh; RANGOON, McClelland; Birmah, Wallich.—DISTRIB. Siam.

Young branches compressed, glabrous or canescent. *Leaves* 10-18 by 5-14 in., lateral nerves 15 pairs; petiole 4-5 in.; stipules 3-5 in. *Racemes* 5-6 in., simple or 2-fid, 4-7-flowered. *Flowers* large, rose-coloured. *Calyx-tube* in fruit $1\frac{1}{4}$ by 1 in., wings $4\frac{1}{2}$ -5 by $1\frac{1}{4}$ -1 $\frac{1}{2}$ in., linear-elliptic, obtuse, 3-nerved.—Enben.

VAR. grandiflora, *Wall. Cat.* 957 (sp.), every part canescent, racemes 8 in. 9-flowered. —Attran.

1 could not agree with Kurz (*Journ. As. Soc. Beng.* 1870, ii. 64, but corrected in *Regensb. Flora*, 1872, 189), that the foliage of *D. cordatus*, *Wall.* (not *cordifolius*, as cited) is identical with that of *D. obtusifolius*. Miquel describes the calyx-tube in fruit as "exalatus;" it does not appear however that he ever saw it mature.

†† *Angles or wings prolonged to the base of the calyx-tube or nearly so.*

a. *Angles costate.*

9. **D. zeylanicus**, *Thwaites Enum.* 33; leaves elliptic or ovate-oblong slightly apiculate base rounded margins faintly crenate, calyx-tube in fruit urceolate. *A. DC. Prodr.* xvi. 2, 610.

CEYLON, ascending to 3000 feet.

Young branches, compressed, glabrous. *Leaves* 8 by 4 in., lateral nerves 17-22 pairs; petiole $1\frac{1}{2}$ -2 in. [*Racemes* 2-fid near the base, 6-12-flowered. *Thw.*] *Petals* blood-red with pale yellowish margins. *Calyx-tube* in fruit 1 in. long; wings 5-7 $\frac{1}{2}$ in., linear-oblong, obtuse, sub-3 nerved, unenlarged lobes $\frac{3}{4}$ -1 in., ovate-oblong, obtuse. *Nut* densely canescent.

b. *Angles winged.*

10. **D. scaber**, *Ham. in Mem. Wern. Soc.* vi. 300; leaves oblong-ovate acute base slightly cordate, racemes 4-9-flowered, calyx-tube in fruit obovoid pilose angles with narrow membranous wings. *D. alatus*, *A. DC. Prodr.* xvi. 2, 611 *in part*, not of *Roxb.*

EASTERN BENGAL; Mountains in Southern Tippera, *Hamilton.*

Clothed with brown fascicled hairs; young branches subcompressed. *Leaves* about 4 by 2 in., pilose on both surfaces, lateral nerves 12 pairs; petiole $\frac{3}{4}$ in. *Calyx-tube* in fruit $\frac{3}{4}$ in., pilose, mouth contracted, fruit-wings 3 in., linear oblong obtuse.

11. **D. glandulosus**, *Thwaites Enum.* 34; leaves oblong-lanceolate acuminate base acute margins slightly ciliate, racemes 2-3-flowered, flowers shortly pedicelled (calyx-tube in fruit subglobose the angles with wings broadest in the middle but not reaching to the pedicel. *Thw.*). *A. DC. Prodr.* xvi. 2, 612.

CEYLON; Saffragam and Ambagamowa districts, *Thwaites.*

The subcompressed young branches, petioles and stipules stellately puberulent and thinly hairy. *Leaves* 4-6 by 2-2 $\frac{1}{2}$ in., glabrous above, glandular-puberulous beneath, lateral nerves 11 pairs; petiole $\frac{3}{4}$ -1 in. [*Fruit-wings* (calyx-lobes) 3-4 by $\frac{3}{4}$ in. *Thw.*] *Petals* about $1\frac{1}{4}$ in. long, yellow.

12. **D. scabridus**, *Thwaites Enum.* 34; leaves elliptic-oblong acuminate base rounded margins ciliate, calyx-tube in fruit subglobose with distant stellate hairs angles with undulate wings $\frac{1}{2}$ in. wide reaching to the pedicel. *A. DC. Prodr.* xvi. 2, 612.

CEYLON; near Ratnapoora, *Thwaites*.

Young branches, petioles, and the under surface of the midrib with appressed hairs. *Leaves* about 7 by $2\frac{3}{4}$ –3 in., glabrous above, glabrescent beneath except on the midrib and nerves, lateral nerves 12–15 pairs; petiole $\frac{3}{4}$ in. *Fruit-wings* (calyx-lobes) 4 by 1 in. linear-lanceolate, obtuse.

13. **D. alatus**, *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 614; leaves ovate or elliptic acute, calyx-tube in fruit globose angles with wings $\frac{1}{2}$ in. broad. *Wall. Cat.* 953; *A. DC. Prodr.* xvi. 2, 611 in part. *D. costatus*, *Gærtn. f. Fruct.* iii. 50, t. 187 (bad). *D. gonopterus*, *Turcz. in Mosc. Bull.* 1863, 576; *A. DC. Prodr.* xvi. 2, 612. *Oleoxydon balsamiferum*, *Wall. Cat.* p. 157.

CHITTAGONG, BIRMA, TENASSERIM, ANDAMAN ISLANDS.—DISTRIB. Siam.

Young branches compressed, pubescent. *Leaves* $5\frac{1}{2}$ by 3 in., shining above, more or less pubescent beneath, margins ciliate, lateral nerves 15 pairs; petiole $1\frac{1}{2}$ in., softly pubescent-hairy; stipules pilose. *Racemes* about 7-flowered. *Calyx-tube* in fruit 1 in. diam., smooth, fruit-wings (calyx-lobes) 4–5 by 1 in., linear-ovate or spatulate, obtuse, 3 nerved, unenlarged lobes orbicular.—Kanyin.—Gærtner's figure is bad as is shown by Hamilton's specimens in the Banksian Herbarium, from which it appears to have been drawn; his specific name suits the drawing, but is inapplicable to the species. I have therefore adopted Roxburgh's.

14. **D. incanus**, *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 614; leaves ovate obtuse. *W. & A. Prodr.* 84; *A. DC. Prodr.* xvi. 2, 611.

CHITTAGONG, *Roxburgh*; PEGU, *Kurz*.

Young parts and compressed branches softly hairy-pubescent. *Leaves* 6 by $4\frac{1}{2}$ in., thinly pubescent on both surfaces, margins ciliate, lateral nerves 12 pairs, pubescent beneath; petiole 2 in., softly pubescent. *Calyx-tube* (in flower) softly pubescent, strongly winged.

15. **D. insignis**, *Thwaites Enum.* 34; leaves ovate apiculate base obtuse, flowers subsessile, calyx-tube in fruit narrowly ovoid, angles with wings $\frac{1}{4}$ in. wide mouth scarcely contracted, fruit-wings (calyx-lobes) with one principal nerve. *A. DC. Prodr.* xvi. 2, 612.

CEYLON; Saffragam district, *Thwaites*.

Young branches densely pubescent ultimately glabrescent. *Leaves* 4–6 by $2\frac{1}{2}$ –3 in., glabrous above, pubescent or glabrous on the nerves beneath, margins sinuate-crenate, lateral nerves 11 pairs; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., silky-pubescent, finally transversely rugose. *Racemes* 3–5 flowered. *Flowers* large. *Petals* $2\frac{1}{2}$ in. long, yellow on the inner, reddish on the outer margin. *Calyx-tube* in fruit about 1 in. long; immature fruit-wings (calyx-lobes) $2\frac{3}{4}$ – $\frac{3}{2}$ in., linear-oblong, obtuse.

16. **D. pterygocalyx**, *Scheff. Obs. Phyt.* ii. 35; leaves elliptic ovate or oblong-ovate shortly and abruptly acuminate base truncate, calyx-tube in fruit ovoid angles with wings nearly $\frac{1}{2}$ in. wide mouth slightly contracted, fruit wings (calyx-lobes) sub-3-nerved central nerve prominent.

MALACCA, *Maingay*.—DISTRIB. Banca.

Young branches subcompressed with deciduous canescence. *Leaves* 4–10 by 3–5 in., glabrous on both surfaces, margins sinuate-crenate and undulate, lateral nerves about 18 pairs, rather remote; petiole 2–3 in.; stipules pale, glabrous. *Racemes* about 5-flowered. *Calyx-tube* in fruit 2 in. long, glabrous; fruit-wings 7 by $1\frac{1}{2}$ –2 in., linear-oblong, obtuse, unenlarged lobes broadly ovate or orbicular.

17. **D. Griffithii**, *Miq. Ann. Mus. Bot.* i. 213; leaves ovate acute base rounded, calyx-tube in fruit oblong ovoid angles with wings fully $\frac{1}{2}$ in. wide mouth uncontracted, fruit-wings with 3 parallel approximate nerves. *A. DC. Prodr.* xvi. 2, 612. *D. grandiflorus*, *Griff. Notul.* iv. 515, *not of Wall.*

MERGUL, *Griffith*; SOUTH ANDAMÁN ISLAND, *Kurz.*

Young branches subcompressed, canescent. *Leaves* 6 by 4 in., glabrous on both surfaces, lateral nerves about 13 pairs; petiole 2-2½ in.; stipules canescent. *Racemes* 3-4-flowered. *Calyx-tube* in fruit 2-3 in. long; fruit-wings (calyx-lobes) 5½-6 by 1-1½ in., linear-spathulate, obtuse, sparingly reticulate, unenlarged lobes broadly deltoid.—Distinguished from *D. pterygocalyx* by the distinctly 3-nerved calyx-wings, and the unenlarged calyx-lobes not being contracted at the base. *D. Motleyanus*, *Hook. f.*, from Borneo, is closely allied.

DOUBTFUL SPECIES.

D. ANGUSTIFOLIUS, *W. & A. Prodr.* 84; *D. costatus*, *Roxb. Fl. Ind.* ii. 613 (*not of Gaertn.*).—Chittagong.

2. **ANCISTROCLADUS**, Wall.

Smooth climbing shrubs with short supra-axillary often arrested and circinate hooked branches. *Leaves* usually in terminal tufts, coriaceous, entire, reticulately feather-veined; stipules small, caducous or inconspicuous. *Flowers* usually small, very caducous, in terminal or lateral panicles. *Calyx-tube* at first very short, adnate to the base of the ovary with imbricate lobes, finally turbinate and adnate to the fruit with the lobes unequally enlarged, spreading and membranous. *Stamens* 5 or 10, subperigynous. *Ovary* 1-celled, inferior; styles 3, articulated to a rounded or shortly cylindrical epigynous disk; ovule solitary, erect or laterally affixed. *Seed* subglobose, testa prolonged into the ruminations of the copious fleshy albumen; embryo short, straight; cotyledons short, divergent.—DISTRIB. Except *A. guineensis* in W. Tropical Africa confined to Tropical Asia and the Indian Archipelago. Species about 10.

* *Leaves* less than 4 times as long as wide.

† *Stamens* 5.

1. **A. VahlII**, *Arn. in Nov. Act. Nat. Cur.* xviii. pt. i. 325. *Thw. in Trans. Linn. Soc.* xxi. 233, t. 24. *Wormia hamata*, *Vahl in Schrift. Nat. Selsk. Kjobenk.* 6, 105.

CEYLON; Central and Southern part, ascending to 2000 ft.

Leaves 4 by 1-1½ in., sessile, cuneate-oblongate, obtuse. *Panicle* about twice 2-chotomous; divisions slender. *Calyx-tube* finally $\frac{1}{2}$ in. long, exceeding the fruit, obconic, pentangular; enlarged lobes 1 in. long, oblong obtuse, obscurely parallel-nerved.

†† *Stamens* 10.

2. **A. extensus**, *Wall. Cat.* 1052 (1); panicle repeatedly 2-chotomous, divisions divaricate recurved, calyx-tube equalling the flat-topped fruit not furrowed, lobes slightly decurrent. *Planch. in Ann. Sc. Nat.* 3rd ser. xiii. 318. *Ancistrolobus* sp., *Griff. Notul.* iv. 568; *l.c.* t. 605, fig. ii.

PEGU and TENASSERIM, *Wallich, Helfer, &c.*

Leaves 5-12 by 2-3½ in., sessile, obovate-oblong, subobtusate or acute, narrowed below. *Bracts* ovate, acute. *Calyx-lobes* 1½ in. long, cuneate-obovate with about 3 subparallel nervules.

3. **A. Heyneanus**, *Wall. Cat.* 7262; panicle about twice 2-chotomous, calyx-tube furrowed exceeded by the conical apex of the fruit, lobes not decurrent. *Wight Ic.* 1987-88; *A. DC. Prodr.* xvi. 2, 602.

WESTERN PENINSULA; from the Concan to Travancor.

Leaves 6-11 by 2-3 in., sessile, elliptic-oblong, subacute, rather abruptly narrowed below, lateral veins remote and inconspicuous with loose reticulations between. *Enlarged calyx-lobes* in fruit $1\frac{1}{2}$ in., spatulate, with numerous subparallel nervules.

4. **A. pinangianus**, *Wall. Cat.* 1054; panicle repeatedly 2-chotomous, divisions slender, calyx-tube furrowed exceeded by the conical apex of the fruit lobes decurrent. *Planch. in Ann. Sc. Nat. ser.* 3, xiii. 318; *A. DC. Prodr.* xvi. 2, 603.

PENANG, *Porter*; MALACCA, *Maingay*.—DISTRIB. Banca.

Leaves 5-11 by 2-3 $\frac{1}{2}$ in., sessile, obovate-oblong, subobtuse, rather abruptly narrowed below, upper surface faintly reticulate. *Bracts* lanceolate. *Calyx-lobes* oblong-cuneate, obtuse, sparingly nerved.

** *Leaves* more than 4 times as long as wide.

5. **A. Wallichii**, *Planch. in Ann. Sc. Nat. ser.* 3, xiii. 319; panicle terminal or on short slender lateral branchlets 2-3-times 2-chotomous, bracts solitary ovate acute denticulate. *A. DC. Prodr.* xvi. 2, 602. *A. extensus?* in part *Wall. Cat.* 1052 (2). *A. stelligerus*, *Wall. Cat.* 1053; *A. DC. l.c.* 603.

PEGU and TENASSERIM, *Wallich, &c.* SILHET, *Da Silva*. CHITTAGONG, *H. f. & T.*

Branches tortuous. *Leaves* 9-12 by $1\frac{1}{2}$ -1 $\frac{1}{2}$ and 10-13 by 2-3 in., sessile, linear or linear-elliptic, obtusely acuminate or acute, gradually narrowed to the subauricled base, lateral veins remote, midrib prominent beneath. *Panicle* about 3 in. long. *Enlarged calyx-lobes* in fruit subequal, about $\frac{1}{2}$ in. long, oblong-ovate, obtuse, spreading.—Planchon mistook the lateral branchlets in imperfect specimens for peduncles. To this species I refer foliage specimens collected by Drs. Hooker and Thomson in Chittagong.

6. **A. Griffithii**, *Planch. in Ann. Sc. Nat. ser.* 3, xiii. 318; panicle terminal repeatedly 2-chotomous divisions ascending slender flexuous, bracts in pairs linear acute.

TENASSERIM, *Griffith, Helfer*.

Branches tortuous. *Leaves* 7-9 by 1-1 $\frac{1}{2}$ in., linear-obovate, obtusely acuminate, tapering below into a flat petiole about $\frac{3}{4}$ in. long. *Panicle* about 7 in. long.

7. **A. attenuatus**, *Dyer*; panicle terminal repeatedly 2-chotomous with stout divaricate divisions the ultimate ones recurved, bracts solitary, deltoid acute.

TENASSERIM and ANDAMAN ISLANDS, *Helfer (Kew Distrib.* 724).

Leaves 12-15 by $1\frac{1}{2}$ -1 $\frac{3}{4}$ in., cuneate-linear, sessile, gradually acuminate, midrib prominent, lateral nerves remote and inconspicuous. *Calyx-tube* in fruit furrowed, 2 lobes enlarged, $\frac{3}{8}$ in. long, narrowly elliptic, obtuse, the rest half as long.

A. sagittatus, *Wall. Cat.* 1055, *A. DC. Prodr.* xvi. 2, 603, is a *Tetramerista*.

3. ANISOPTERA, Korth.

Resinous trees. *Leaves* coriaceous, entire, feather-veined and finely reticulate; stipules small, fugacious or inconspicuous. *Flowers* in lax terminal panicles. *Calyx-tube* very short, adnate to the base of the ovary, segments imbricate, then subvalvate. *Stamens* ∞ ; anthers ovoid with a long subulate connective, outer valves larger. *Ovary* 3- (rarely 4-5-) celled; style fleshy, ovoid or oblong, with an attenuate 3-5-fid apex; ovules 2 in each cell. *Capsule* adnate to the calyx-tube, indehiscent, 1-seeded, crowned by the accrescent calyx-segments, of which 2 form linear wings. *Cotyledons* fleshy,

unequal; radicle superior.—DISTRIB. Malay Peninsula, and Archipelago to New Guinea. Species about 5.

1. **A. oblonga**, Dyer.

MERGUI, Griffith.

Twigs with smooth pale bark, young parts sparingly furfuraceous with fascicled hairs. *Leaves* $3\frac{1}{2}$ –5 by $1\frac{3}{4}$ –2 in., oblong, or oblong-ovate, shortly acuminate, base rounded, shining above, minutely impress-punctate beneath; lateral nerves 18 pairs; petiole 1 in.; stipules pubescent. *Panicle* about 5 in. long. *Calyx-tube* in fruit $\frac{1}{4}$ in. long; wings 4 in., linear-oblongate, obtuse, with 3 oblique, parallel, unequally prominent nerves.

A. GLABRA, Kurz ms. (a native of Birma) is only known to me from the fruit. The wings are 6 by $\frac{3}{4}$ in., and the triple nerves are not oblique and are equally prominent.

4. **VATICA**, Linn.

Small or moderate-sized resinous trees. *Leaves* coriaceous, entire, feather-veined and finely reticulate; stipules small, fugacious or inconspicuous. *Flowers* in axillary and terminal panicles, usually tomentose before expansion. *Calyx-tube* very short, adnate to the base of the ovary; segments somewhat acute, imbricate then subvalvate. *Stamens* 15; anthers oblong, external valves larger, connective apiculate. *Ovary* 3-celled; style short, subulate or apex clavate or capitate, stigma entire or 3-toothed; ovules 2 in each cell. *Capsule* leathery, 3-valved (or indehiscent?), 1–2-seeded, supported by the spreading accrescent calyx, two segments of which often expand into linear wings. *Cotyledons* fleshy.—DISTRIB. Tropical Asia and Indian Archipelago. Species about 25.

SECT. I. **Euvatica**. Benth. & Hook. *Fruiting-calyx* with 2 wing-like segments.

1. **V. grandiflora**, Dyer; leaves 5–8 in. long oblong or oblong-lanceolate shortly acuminate base rounded lateral nerves 12–15 pairs, petiole $\frac{3}{4}$ in. *Hopea grandiflora*, Wall. Cat. 958; A. DC. Prodr. xvi 2, 634. *Synaptea odorata*, Griff. Notul. iv. 516, t. 585 A. f. 5, fide Kurz in Journ. As. Soc. Beng. 1870, ii. 65. *S. grandiflora*, Kurz, l.c. *Anisoptera odorata*, Kurz in Regensb. Flora, 1872, 190.

MARTABAN, TENASSERIM, and SINGAPORE, Wallich, &c.

Young parts densely furfuraceous with tawny fascicled hairs. *Leaves* 2–2½ in. broad. *Panicles* $\frac{1}{3}$ – $\frac{1}{2}$ the length of the leaves. *Calyx-segments* oblong, acute. *Petals* with pale brown tomentum externally in bud, pink. *Ovary* tomentose; stigma capitate, 3-lobed. *Fruit-wings* $2\frac{1}{4}$ by $\frac{1}{2}$ in., linear-oblongate, abruptly contracted below, 5-nerved.

2. **V. faginea**, Dyer; leaves about $4\frac{1}{2}$ in. long elliptic-oblong subobtusate base tapering or rounded lateral nerves about 10 pairs, petiole $\frac{1}{2}$ in. *Hopea faginea*, Wall. Cat. 963.

TENASSERIM; at Mergui, Griffith, Helfer.

A bush or small tree; the young parts with pale tomentum. *Leaves* $1\frac{1}{2}$ –2 in. broad. *Panicles* lax, $\frac{1}{3}$ – $\frac{2}{3}$ the length of the leaves, occasionally contracted. *Calyx-segments* oblong-lanceolate, obtuse. *Petals* tomentose externally in bud, blood-red. *Fruit-wings* $1\frac{1}{2}$ – $2\frac{1}{4}$ by $\frac{5}{8}$ in., linear-elliptic or lanceolate, base more or less contracted, 3-nerved.—Not sharply distinguished from *V. grandiflora* except by the difference in *facies* and the smaller foliage.

3. **V. scaphula**, Dyer; leaves 4–6½ in. long elliptic-oblong apex shortly acuminate or obtuse base rounded lateral nerves about 16, petiole $\frac{3}{4}$ –1¼ in. *Hopea scaphula*, Roxb. Hort. Beng. 93; Flor. Ind. ii. 611.

CHITTAGONG coast at Mascal Island, *Roxb.*

A tree; twigs pale brown, glabrous, young parts with pale grey tomentum. *Leaves* 1½–2½ in. broad, glabrous on both surfaces, paler beneath, midrib prominent. *Panicle* 5 in.; pedicels ½ in. *Flowers* ¾ in. diam. *Calyx-segments* with dense hairy tomentum. *Petals* glabrescent externally, white.

4. **V. Maingayi**, *Dyer*; leaves about 3½–5 in. long oblong or oblong-obovate abruptly acuminate base rounded, lateral nerves 12 pairs, petiole ¾–1½ in.

MALACCA, *Maingay*.

Young parts with rusty furfuraceous tomentum. *Leaves* 1½–2 in. broad. *Panicles* rather dense, fully ½ shorter than the leaves. *Calyx-segments* oblong-lanceolate. *Fruit-wings* 2 by ½ in., linear-oblong, obtuse or subacute, scarcely contracted at the base.

5. **V. Helferi**, *Dyer*; leaves 4½–5½ in. long oblong obtuse base cordate under surface clothed with minute tomentose canescence lateral nerves 12 pairs, petiole ½ in.

TENASSERIM; at Mergui, *Helfer*.

Young parts of inflorescence and pedicels with pale-brown soft puberulence. *Leaves* 2½–3 in. broad, midrib and veins rather prominent beneath. *Panicles* about 6 in., terminal, narrow. *Calyx* and *petals* in bud clothed with silky pubescence. *Fruit* unknown.

SECT II. **Isauxis**, *Arn.* *Fruiting-calyx* with equal segments.

6. **V. lanceæfolia**, *Blume Mus. Bot.* ii. 31; young parts pulverulent but soon glabrous, leaves elliptic-lanceolate acuminate base tapering paler beneath lateral nerves 15 pairs, ascending. *A. DC. Prodr.* xvi. 2, 618. *V. canaca*, *Ham. in Wall. Cat.* 4405 B. *Vateria lanceolaria*, *Roxb. Hort. Beng.* 42? *V. lanceæfolia*, *Roxb. Fl. Ind.* ii. 601; *Wight Ill.* i. 88. *V. lanceolata*, *Roxb. (by error), W. & A. Prodr.* 84; *Wall. Cat.* 4405. *Retinodendron lanceæfolium*, *Korth. Verh. Nat. Gesch. Bot.* 56. *Seidlia lanceæfolia*, *Kostel, allg. med. pharm. Flora* 1945 (*ex DC. Prodr.*).

EASTERN HIMALAYA and EASTERN BENGAL and SILHET, *Wallich*; Khasia Mts. Assam and Bhotan, *Griffith*, &c.

A middle-sized tree. *Leaves* 7–11 by 2–2½ in.; petiole ½ in. *Panicles* ¾ the length of the leaves. *Flowers* fragrant. *Calyx-segments* ovate, acute. *Petals* ¾ in., cuneate white. *Ovary* pubescent; stigma clavate, 3-toothed. *Capsule* ovoid.

7. **V. Roxburghiana**, *Blume Mus. Bot.* ii. 31, t. 7; young parts with lepidote canescence, leaves lanceolate acute base rounded or retuse, lateral nerves 10 pairs. *Miq. Ann. Mus. Bot.* i. 214; *Thwaites Enum.* 404; *A. DC. Prodr.* xvi. 2, 618. *V. chinensis*, *Linn.*; *Smith Ic. ined.* t. 36; *DC. Prodr.* i. 517. *Vateria Roxburghiana*, *Wight Ill.* i. 88; *Ic.* t. 26.

WESTERN PENINSULA; from Canara southwards. CEYLON, *Thwaites*.

Leaves 4½–8½ by 1½–3 in.; petiole 1½–2 in. *Panicles* axillary, ½–¾ the length of the leaves. *Calyx-segments* ovate-deltoid, acute, in fruit nearly ¾ in long, lanceolate (*Stigma* 6-dentate, *Blume*.) *Capsule* ovoid, ultimately globose, 3-sulcate.—A fragmentary specimen collected by Griffith at Mogoung, Birma, appears to belong to this species.

8. **V. pallida**, *Dyer*; young parts hoary, leaves narrowly elliptic or linear-elliptic or oblanceolate cordate-acuminate base acute or obtuse lateral nerves about 9 ascending curved midrib prominent above.

PENANG, *Maingay*.

A small tree, twigs slender, slightly flexuose, pale-barked. *Leaves* 5–7 by 1–2 in.

olive-coloured, shining above, pale and opaque beneath; petiole $\frac{1}{2}$ in., thickened. *Panicles* 1–1½ in., mostly axillary. *Calyx-segments* narrowly-deltoid, acute, at length deflexed, pubescent. *Petals* pubescent externally. *Anthers* apiculate. *Ovary* pubescent; style $\frac{3}{4}$ in., stigma capitate, lobulate. *Fruit* unknown.—Notwithstanding the deflexed calyx this species appears to find its most natural position here.

9. **V. affinis**, *Thwaites Enum.* 404; young parts nigrescent nearly glabrous, leaves lanceolate or oblong-lanceolate acuminate base rounded lateral nerves about 6 pairs ascending curved, midrib prominent above. *A. DC. Prodr.* xvi. 2, 619. *Isauxis Roxburghiana*, *Thwaites Enum.* 37, not of *Wight*.

CEYLON; at Hinidoon Pattoo and Pasdoon Corle, *Thwaites*.

A large tree. *Leaves* 4½–5½ by 2–3 in., both surfaces glabrous, shining above, paler beneath; petiole 1 in. *Panicles* axillary and terminal, $\frac{1}{2}$ – $\frac{1}{3}$ the length of the leaves; pedicels and buds pubescent. *Calyx-segments* lanceolate, acute, in fruit ovate 3-nerved.

10. **V. scabriuscula**, *A. DC. Prodr.* xvi. 2, 620; young parts with tawny stellate pubescence, leaves oblong-lanceolate obtusely acuminate base obtuse lateral nerves about 25 pairs spreading the alternate ones fainter. *Vateria* (*Stemonoporus*) *scabriuscula*, *Thwaites Enum.* 404.

CEYLON; at Hinidoon Pattoo and Pasdoon Corle, *Thwaites*.

A large tree. *Leaves* 4½–5½ by 1½–2 in., on young shoots 11 by 2½ in., glabrous above, scabrid beneath, midrib channelled above, very prominent beneath; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Inflorescence* axillary and terminal, racemose; bracts caducous, ovate, acute, palely tomentose. *Anthers* with a few scattered hairs. *Style* cylindric, slender, truncate.—I have only seen immature flowers of this, but the anthers perfectly agree with *Vatica* and are unlike those of *Vateria*.

11. **V. ? disticha**, *A. DC. Prodr.* xvi. 2, 620; young twigs with minute tawny appressed pubescence, leaves oblong strongly acuminate base rounded, lateral nerves about 10 faint ascending. *Vateria* (*Stemonoporus*) *disticha*, *Thwaites Enum.* 404.

CEYLON; at Hinidoon Pattoo and Pasdoon Corle, *Thwaites*.

A large tree. *Leaves* 5 by 1½–2 in., glabrous above, glabrescent beneath, coriaceous, lateral nerves slightly prominent, midrib channelled above; petiole $\frac{1}{2}$ in. *Panicles* axillary and terminal, imbricate-bracteate when young; bracts $\frac{1}{2}$ in., distichous, ovate, acute, ciliate, the lowest with appressed fulvous pubescence, the uppermost glabrous.—The stamens appear to agree with *Vatica*, and according to De Candolle are apiculate.

DOUBTFUL SPECIES.

V. ? (*ISAUXIS*) *CORDIFOLIA*, *Thw. Enum.* 404 and 39 (*Monoporandra*). Foliage only known. *Leaves* 5–7½ by 2–4 in., oblong or ovate-lanceolate, acute, base obliquely cordate, lateral nerves about 7 pairs; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.—Ceylon; Atakalan Corle, *Thwaites*.

5. **SHOREA**, Roxb.

Glabrous, mealy, or pubescent resinous trees. *Leaves* entire or subrepand, feather-veined, with the intermediate reticulations often inconspicuous; stipules large coriaceous and persistent, or minute and fugacious. *Flowers* in axillary or terminal lax cymose panicles; bracts persistent, caducous or 0. *Calyx-tube* very short, adnate to the receptacle; segments ovate or lanceolate, imbricate. *Stamens* 15 or 20–100; anthers ovate or oblong, rarely linear; connective subulate-cuspidate, rarely inappendiculate; valves obtuse, rarely cuspidate, equal or the outer slightly larger. *Ovary* 3-celled, cells 2-ovuled; style subulate, stigma entire or 3-toothed. *Capsule* leathery, indehiscent (or 2-valved?), usually 1-seeded, closely surrounded

by the bases of the accrescent calyx-segments 3 or more rarely all of which are developed into 10-veined linear wings. *Cotyledons* fleshy, unequal, usually inclosing the superior radicle. **DISTRIB.**—Tropical Asia and Indian Archipelago; species about 40.

SECT. I. Pentacme, A. DC. *Anthers* linear, valves cuspidate.

1. **S. siamensis**, *Miq. Ann. Mus. Bot.* i. 214; *A. DC. Prodr.* xvi. 2, 631. *Pentacme suavis*, *A. DC. l.c.* 626. *S. siamensis*, *Kurz in Journ. Asiat. Soc. Beng.* 1870; 2, 66. *Hopea* (*Shorea?*) *suava*, *Wall. Cat.* 959.

MARTABAN, *Wallich*; **TENASSERIM**, at Moulmein, *Lobb*; **PEGU**, *Kurz*.—**DISTRIB.** Siam.

A shrub 10 ft., leafless during inflorescence; branchlets with smooth greyish bark. *Leaves* 5–6 by 3–4 in., oblong or ovate-oblong, obtuse or subacute, base truncate or cordate, glabrous above and beneath, lateral nerves 15 pairs, scarcely prominent; petiole 1–1½ in. *Panicles* 6–9 in., axillary and terminal, lax, branches divaricate; pedicels ½ in. *Flowers* sweet-scented. *Calyx-segments* ½ in., ovate, acute, glabrous, margins ciliolate. *Petals* ⅞ in., pale citron-colour. *Stamens* 15, filaments very short; anthers ½ in. long, lobes slightly unequal, connective with a subulate prolongation, ultimately bent outwards. *Style* ⅞ in., filiform. *Capsule* indehiscent, ovoid; pedicel dilated; bases of fruiting calyx-segments ovate, thickened, glabrous; wings 3 in., linear-oblancoolate, obtuse, 7-nerved.—Of *Hopea suavis*, *Kurz*, Andamans Report, I have only seen leaves. They do not belong to this species.

SECT. II. Anthers oblong, valves obtuse.

* *Stamens* 12–15.

2. **S. stellata**, *Dyer*; calyx-segments equally developed into wings or 2 slightly shorter. *Parashorea stellata*, *Kurz in Journ. Asiat. Soc. Beng.* 1870, 2, 66.

MARTABAN, *Brandis*; **Birma**, *Kurz*.

A large glabrous tree. *Leaves* 4½ by 1½ in., ovate or lanceolate, acute or apiculate. *Flowers* in panicles of cymose racemes, white. *Capsule* ¾ in. long, obovoid, tawny-tomentose; wings 4½ by ¾ in., linear-oblancoolate, obtuse, tapering to a very obscurely dilated base ½ in. long, strongly 7-nerved, puberulous.—The subequal accrescence of the sepals occurs also in *S. robusta*, and appears to me of no value as a generic distinction.

** *Stamens* 15.

† *Flowers* pedicelled.

3. **S. floribunda**, *Kurz, ms*; leaves rather narrowly-oblong shortly acuminate, panicles terminal or lateral from the axils of fallen leaves, flowers rather crowded, calyx-segments narrowly deltoid-ovate glabrous dark-coloured. *S. robusta*, *A. DC. Prodr.* xvi. 2, 628 (*not of Gærtn.*). *Hopea floribunda*, *Wall. Cat.* 964.

TENASSERIM, at Tavoy, *Gomez*.

Glabrous; branchlets with pale brown bark. *Leaves* about 3½ by 1–1½ in., hardly mature at the time of flowering, base rounded; lateral nerves about 15–20 pairs; petiole ½–¾ in. *Pedicels* ½ in. *Flowers* rather larger than in *S. Talura*. *Calyx-segments* glabrous, ciliolate. *Anthers* with a very long seta.—Fruit unknown, but this and the next species are evidently closely allied. It has nothing to do with *S. robusta*, to which *A. De Candolle* can have referred it only through some confusion of specimens.

4. **S. Talura**, *Roxb. Hort. Beng.* 93; *Fl. Ind.* ii. 618; leaves elliptic or oblong to ovate-elliptic, panicles terminal or lateral from the axils of fallen

leaves lax, calyx segments deltoid linear glabrous not dark coloured. *S. laccifera*, Heyne ex Wall. Cat. 967; *A. DC. Prodr.* xvi. 2, 630. *S. Roxburghii*, Don Gen. Syst. i. 813. *S. robusta*, Roth. nov. sp. 221 (not of Gærtn.). *Vatica laccifera*, W. & A. Prodr. 84; *Wight. Ic.* 164.

WESTERN PENINSULA; forests of Mysore and Malabar.

Glabrous, except the pubescent buds; branchlets with smooth pale brown bark. *Leaves* $3\frac{1}{2}$ – $4\frac{1}{2}$ by 2 – $2\frac{1}{2}$ in., acute or retuse and mucronulate, base rounded or emarginate, margins undulate, lateral nerves about 12–15 pairs; petiole $\frac{1}{2}$ –1 in. *Pedicels* $\frac{1}{2}$ in. *Flowers* 1 in. diam., pinkish white. *Calyx-segments* glabrous, margins ciliate. *Anthers* with a long seta. *Bases of fruiting calyx-segments* $\frac{3}{4}$ in. long, obovate; wings 3 by $\frac{5}{8}$ in., elliptic-linear, obtuse, with about 10 slender parallel nerves.—Yields a kind of lac.

†† Flowers sessile or nearly so.

5. *S. leprosula*, Miq. *Fl. Ned. Ind. Suppl.* i. 487; leaves oblong very shortly acuminate, panicles terminal or axillary, branches small unilateral racemose, calyx-segments ovate pubescent. *A. DC. Prodr.* xvi. 2, 631.

MALACCA, Maingay.—DISTRIB. Sumatra.

Young parts and under surface of the leaves densely tawny-puberulous. *Leaves* about 4–5 by $1\frac{3}{4}$ – $2\frac{1}{4}$ in., shining above, lateral nerves about 14 pairs, prominent beneath; petiole $\frac{1}{2}$ in. *Panicle* about 4 in. *Flowers* sessile. *Anthers* cuspidate. (*Ovary* glabrous; style filiform, stigma urceolate. *Maingay*.) (*Fruit-wings* spatulate obtuse. *Miq.*)

6. *S. parvifolia*, Dyer; leaves oblong-elliptic to ovate-acuminate, panicles terminal lax, flowers with deciduous bracts, calyx-segments ovate pubescent.

MALACCA, Maingay.

Young parts hoary, puberulous. *Leaves* 2 – $2\frac{1}{2}$ by 1 – $1\frac{1}{2}$ in., base rounded, glabrescent beneath, lateral nerves about 15 pairs; petiole $\frac{1}{2}$ in. *Panicles* about 5 in. *Flowers* sessile, 4 or 5 together; bracts fully $\frac{1}{2}$ in. long, broadly elliptic, obtuse. (*Petals* $\frac{1}{4}$ in. long. *Anthers* apiculate. *Ovary* pilose; style slender, shorter than the ovary, stigma scarcely lobed. *Maingay*.) *Fruit* unknown.

7. *S. acuminata*, Dyer; leaves ovate to lanceolate strongly acuminate, panicles terminal lax, branches unilateral, bracts very fugacious, calyx-segments ovate pubescent.

MALACCA, Maingay.

Young parts tawny-puberulous. *Leaves* 4–5 by 2 – $2\frac{1}{2}$ in., base rounded or emarginate, coriaceous, glabrous on both surfaces, lateral nerves about 8 pairs, scarcely prominent; petiole $\frac{1}{2}$ in. *Panicles* about 6 in. long, with tufts of enlarged bracts occasionally terminating the branches. *Flowers* sessile. (*Petals* $\frac{3}{10}$ in. long. *Anthers* shortly appendiculate. *Ovary* minutely pilose, tapering into the short filiform style, stigma minutely lobed. *Maingay*.) *Fruit* unknown.

8. *S. bracteolata*, Dyer; leaves more or less narrowly oblong-elliptic shortly acuminate, panicles terminal lax, branches flexuose, flowers each with a pair of bracts, calyx-segments narrowly deltoid puberulous.

MALACCA, Maingay.

Young parts glabrescent. *Leaves* $3\frac{1}{2}$ – $5\frac{1}{4}$ by $1\frac{1}{2}$ – $2\frac{1}{4}$ in., base rounded, glabrous on both surfaces, lateral nerves 12–15 pairs, scarcely prominent; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Panicles* 5–9 in. long. *Flowers* subsessile; bracts $\frac{1}{2}$ in. long, elliptic-lanceolate. *Calyx segments* $\frac{1}{2}$ in. long. *Stamens* cuspidate. *Stigma* simple. *Bases of fruiting calyx segments* $\frac{1}{2}$ in. long, ovate with 3 gibbosities at the bottom; wings $3\frac{1}{2}$ by $\frac{1}{2}$ in., linear subacute, with 9 parallel nerves.

* *Stamens* 20-∞.

9. **S. robusta**, *Gærtn. f. Fruct.* iii. 48, t. 186; leaves ovate-oblong acuminate base cordate glabrous lateral nerves about 12 pairs, panicles terminal or axillary lax, stamens 50. *Roxb. Fl. Ind.* ii. 615; *Cor. Pl.* iii. 312; *Wall. Cat.* 965; *A. DC. Prodr.* xvi. 2, 628; *Beddome Fl. Sylvat.* t. 4. *Vatica robusta*, *Steud. Nom. Ed.* 2.

TROPICAL HIMALAYA, and along its base from Assam to the Sutlej. Eastern districts of CENTRAL INDIA, WESTERN BENGAL HILLS.

A very large tree, but often occurring in a stunted form. *Leaves* 6-10 by 4-6 in.; petiole $\frac{3}{4}$ -1 in.; stipules $\frac{1}{2}$ in., falcate, pubescent. *Panicles* 5-9 in. long, clothed as well as the flowers with pale velvety pubescence, branches unilateral, racemose. *Flowers* subsessile. *Petals* about $\frac{1}{2}$ in. long, pale yellow, tapering upwards, 12-13-nerved. *Anthers* with a bearded appendage. *Ovary* pubescent; stigma 3-denticulate. *Fruiting-calyx* with the segments sometimes subequal, bases $\frac{1}{2}$ in., ovate, pubescent; wings $2\frac{1}{2}$ in., linear, obtuse, 10-nerved.—The Sal tree; the wood is very generally used in Bengal and it ranks next to teak; the resin-dammer is extensively used as a substitute for pitch.

10. **S. obtusa**, *Wall. Cat.* 966; leaves elliptic or obovate-oblong obtuse base obtuse or emarginate pubescent on the nerves and in their axils beneath lateral nerves about 15 pairs, panicles terminal, stamens 20-25. *Blume Mus. Bot.* ii. 32, t. 8; *A. DC. Prodr.* xvi. 2, 629. *S. leucobotrya*, *Miq. Ann. Mus. Bot.* i. 215. *Vatica obtusa*, *Steud. Nom. Ed.* 2.

MARTABAN, *Wallich*; PEGU, *M'Clelland*, &c.; TENASSERIM, at Moulmein, *Helper*.—DISTRIB. SIAM.

Leaves 4-6 by $1\frac{1}{2}$ -3 in., often unsymmetrical, glabrescent above, subrepand; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Panicles* 2-4 in. long, clothed as well as the flowers with hoary pubescence, racemose. *Flowers* subsessile. *Petals* $\frac{1}{2}$ - $\frac{3}{4}$ in. long. *Anthers* with a bearded appendage. *Ovary* pubescent. *Bases of the segments of the fruiting-calyx* $\frac{1}{2}$ in. long, rather shorter than the pubescent capsule, ovate-oblong, pubescent; wings $2\frac{1}{2}$ by $\frac{1}{2}$ in. linear-ob lanceolate, glabrescent, 9-nerved.

11. **S. sericea**, *Dyer*; leaves elliptic-oblong shortly acuminate scabrous beneath lateral nerves about 20 pairs, panicles terminal, stamens 50, anthers inappendiculate.

MALACCA, *Maingay*.

A very large dammer-producing tree (*Maingay*); young parts, nerves of the leaves beneath and inflorescence covered with rusty meal intermixed with fascicles of short hairs. *Leaves* $4\frac{1}{2}$ -7 by $1\frac{3}{4}$ -2 $\frac{1}{2}$ in., polished above, lateral nerves very prominent beneath; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Panicles* about 6 in. long, ultimate branches racemose, unilateral. *Flowers* sessile; buds clothed with tawny silky hairs. *Anthers* with the lobes subequal. *Stigma* 3-lobed. *Fruiting-calyx* with immature accrescent segments, clothed on both surfaces with soft yellow down.

12. **S. Tumbuggaia**, *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 617; leaves ovate or oblong-cordiform acuminate base truncate or emarginate glabrous on both surfaces lateral nerves about 8 pairs, panicles terminal, stamens about 30. *A. DC. Prodr.* xvi. 2, 630; *Beddome Flor. Sylvat. Gen.* 26. *S. penicillata*, *A. DC. l.c.* 630. *Vatica Tumbuggaia*, *W. & A. Prodr.* 84; *Wight Ic.* t. 27.

WESTERN PENINSULA; forests of Cudapah and Palghat in Mysore, *Wight*, &c.

A gigantic dammer-producing tree. *Leaves* $2\frac{1}{2}$ -8 by $1\frac{1}{2}$ -4 $\frac{1}{2}$ in. (*Beddome*); petiole 1-2 in. *Panicles* 8 in. long, hoary or nearly glabrous. *Flowers* shortly pedicelled; buds densely hoary. *Anthers* with a hairy appendage. *Stigma* 3-lobulate. *Capsule* $\frac{3}{4}$ in. long, ovoid, acuminate, pubescent above; bases of fruiting calyx-segments $\frac{1}{2}$ in. long, ovate, hoary; wings $1\frac{1}{2}$ -1 $\frac{3}{4}$ by $\frac{1}{2}$ in., spatulate, obtuse, 8-10-nerved.—There can be no

doubt as to the identity of this species. Roxburgh states the number of stamens to be 100, but this is clearly an error.

13. *S. oblongifolia*, *Thwaites Enum.* 36; leaves oblong shortly acuminate base truncate or emarginate both surfaces glabrous lateral nerves about 15 pairs, panicles terminal or axillary, stamens 80-100. *A. DC. Prodr.* xvi. 2, 629.

CEYLON; Southern districts of the Island, *Thwaites*.

A large tree. *Leaves* 4-6 by $1\frac{3}{4}$ - $2\frac{1}{4}$ in.; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Panicles* 6 in. long, racemose, hoary. *Flowers* yellow, odorous, shortly pedicelled; buds densely hoary. *Anthers* with a terminal bristle about their own length and two minute lateral ones. *Capsule* $\frac{3}{4}$ in. long, ovoid, silky-pubescent; bases of the fruiting calyx-segments $\frac{1}{2}$ as long as the capsule, oblong, gibbous, puberulent; wings 2 by $\frac{3}{4}$ in., spatulate, obtuse.

14. *S. lissophylla*, *Thwaites Enum.* 402; leaves oblong-cordiform slightly acuminate base emarginate both surfaces glabrous lateral nerves about 7 pairs prominent beneath, panicles small terminal or axillary, stamens about 35. *A. DC. Prodr.* xvi. 2, 630.

CEYLON; Hinidoon Pattoo and Singhe-rajah Forest, *Thwaites*.

A large tree, twigs black when dry. *Leaves* 3-5 by $1\frac{1}{4}$ -3 in.; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in., rugose. *Panicles* about 3 in. long, racemose, glabrous. *Flowers* shortly pedicelled; buds hoary. *Anthers* bearded. *Fruit* unknown.

15. *S. stipularis*, *Thwaites Enum.* 36; leaves oblong shortly acuminate or subobtuse base rounded coriaceous both surfaces glabrous midrib channelled above very prominent beneath lateral nerves about 15 pairs. *A. DC. Prodr.* xvi. 2, 631.

CEYLON; between Ratnapoora and Galle, *Thwaites*.

A large tree. *Leaves* 4-6 by 2-4 in.; stipules $\frac{1}{2}$ -1 by $\frac{1}{4}$ - $\frac{3}{8}$ in., ovate, suboblique, with numerous slender nerves, very persistent; petiole $1\frac{1}{4}$ - $1\frac{1}{2}$ in. *Flowers* unknown. *Capsule* subconic, smooth; (winged calyx-segments 5-5 $\frac{1}{2}$ by $1\frac{1}{4}$ in., 11-14-nerved, *Thwaites*).

16. *S. assamica*, *Dyer*; leaves broadly elliptic or elliptic-oblong very shortly acuminate base rounded both surfaces glabrous midrib channelled above lateral nerves about 17 pairs hispid beneath rather prominent above.

UPPER ASSAM; banks of the Dihing river, *G. Mann*.

Young twigs thinly pendulous. *Leaves* about $3\frac{1}{2}$ by $1\frac{1}{2}$ in., shining above. *Flowers* unknown. *Capsule* $\frac{3}{4}$ in., ovoid, acuminate, glabrous; bases of the fruiting calyx-segments about $\frac{1}{2}$ as long as the capsule, broadly ovate, gibbous; wings 4 by $\frac{3}{4}$ in., linear, subacute, about 12-nerved.

17. *S. gratissima*, *Dyer*; leaves elliptic acuminate base acute both surfaces glabrous margins undulate lateral nerves about 14 pairs inconspicuous, panicles terminal and axillary, stamens 20-25. *Hopea gratissima*, *Wall. Cat.* 960.

SINGAPORE, *Wallich*.

Branchlets slender. *Leaves* $2\frac{1}{2}$ -4 by $1\frac{1}{2}$ - $1\frac{1}{2}$ in.; petiole $\frac{3}{4}$ -1 in. *Panicles* 3-6 in., glabrous, black when dry. *Flower-buds* hoary; pedicels about $\frac{1}{12}$ in. *Anthers* with a terminal seta.

18. *S. reticulata*, *Thwaites ms.*; leaves lanceolate with a long acuminate point base acute shining above glabrous beneath margins undulate lateral nerves about 10 pairs hardly prominent beneath.

CEYLON.

Twigs slender, pale. *Leaves* 3-4 by $1\frac{1}{2}$ in.; petiole $\frac{1}{2}$ in., decurved. *Flowers* un-

known. *Bases of the fruiting calyx-segments* lanceolate, gibbous, puberulous; wings $1\frac{1}{2}$ by $\frac{1}{4}$ in., linear, obtuse, glabrous, 8-nerved.

19. **S. macroptera**, Dyer; leaves narrowly oblong acuminate base obtuse somewhat coriaceous shining above glabrous beneath lateral nerves about 10 pairs rather prominent beneath, panicles terminal.

MALACCA, Maingay.—DISTRIB. Borneo.

Twigs puberulous, dark-brown. *Leaves* 4–5 by $1\frac{3}{4}$ in., chocolate-coloured when dry; petiole $\frac{1}{2}$ in., rugose. *Flowers* sessile. *Capsule* (immature) $\frac{1}{2}$ in. long; bases of the fruiting calyx-segments equalling the capsule, ovate, bordered by the decurrent margins of the wing; wings 5–6 by $\frac{3}{4}$ –1 in., linear, obtuse, 10-nerved, glabrescent.

DOUBTFUL SPECIES.

SHOREA LONGISPERMA, Roxb. *Hort. Beng.* 93; *Fl. Ind.* ii. 618. Parashorea longisperma, Kurz in *Journ. As. Soc. Beng.* 1870, ii. 66. Prince of Wales' Island. Without description.

6. HOPEA, Roxb.

Glabrous or hoary-tomentose resinous trees. *Leaves* quite entire, firm, inconspicuously feather-veined; stipules small, deciduous or inconspicuous. *Flowers* sessile or shortly pedicelled, ebracteate, in lax panicles of unilateral racemes. *Calyx-tube* very short, adnate to the receptacle, segments obtuse, imbricate. *Stamens* 15, or rarely 10, slightly connate; anthers ovate, connective subulate-cuspidate, valves obtuse equal. *Ovary* 3-celled, the cells 2-ovuled; style shortly cylindric or subulate. *Nut* 1-seeded, closely surrounded by the bases of the accrescent calyx-segments, 2 of which are developed into linear wings. *Embryo* as in *Shorea*.—DISTRIB. of *Shorea*; species about 35.—The separation of this genus from *Shorea* is somewhat artificial.

* Panicles palely tomentose.

1. **H. odorata**, Roxb. *Hort. Beng.* 42; *Fl. Ind.* ii. 609; leaves ovate- or lanceolate-oblong acute or obtusely acuminate lateral nerves about 12 pairs rather weak their axils often glandular, anthers oblong appendage about the same length. A. DC. *Prodr.* xvi. 2, 632. H. faginea, *Hort. Calc. ex Herb. Lemann.* (not of Wall.). H. eglandulosa, Roxb. *Hort. Beng.* 42; *Fl. Ind.* ii. 611; A. DC. *Prodr.* xvi. 2, 634. H. decandra, Buch. ex Wight *Ill.* 88. H. Wightiana, Miquel in *Herb. Hohenack.* 320, (not of Wall.).

RANGOON, PEGU, MARTABAN and TENASSERIM.

A large tree; branchlets dark brown, glabrous. *Leaves* 4–6 by $1\frac{1}{2}$ –2 in., base rounded often suboblique, margins undulate, firm, glabrous on both surfaces; petiole $\frac{3}{4}$ in. *Flowers* sweet-scented, buds about $\frac{1}{8}$ in., very shortly pedicelled. *Calyx-segments* ovate, obtuse. *Petals* yellow. *Nut* $\frac{1}{4}$ in., ovoid, apiculate, glabrous; wings of fruiting calyx-segments linear, obtuse, tapering to an oblong base $\frac{1}{2}$ in.

VAR. 1. *odorata proper*, Wall. Cat. 961 (sp.); panicle $\frac{1}{2}$ as long as the leaves rather dense, wings of fruiting calyx-segments $1\frac{1}{2}$ by $\frac{3}{8}$ – $\frac{5}{8}$ in., 7–9-nerved. Roxb. *Cor. Pl.* iii. t. 210; Korth. *Verh. Nat. Gesch. Bot.* 75, t. 7, f. 15–21.—Mergui, Griffith.

VAR. 2. *vasta*, Wall. Cat. 926 (sp.); leaves gradually tapering opaque above, panicles equalling the leaves rather lax, wings of fruiting calyx-segments $1\frac{1}{2}$ by $\frac{5}{8}$ – $1\frac{1}{2}$ in., 9–13-nerved.—Rangoon to Mergui.

2. **H. parviflora**, Beddome *Flor. Sylvat.* t. 7 (by error t. 6); *Gen.* xxvii. in part; *Ind. For. Rep.* 1863–4, with plate; leaves ovate or oblong acute lateral nerves about 10 pairs often forked their axils often glandular, tips of

petals dilated and crisped, anthers suborbicular, appendage about half as long again.

MALABAR and S. CANARA; ascending to 3500 ft., *Beddome*.

A large tree; branchlets reddish-brown, slightly glaucescent. *Leaves* about $3\frac{1}{2}$ by $1\frac{1}{2}$ in., firm, base acute or rounded, margins slightly undulate, glabrous on both surfaces, nerves pale beneath; petiole $\frac{1}{2}$ in. *Flower-buds* about $\frac{1}{2}$ in., tomentose, very shortly pedicelled, calyx-segments lanceolate, obtuse. *Fruit* unknown.

3. *H. longifolia*, *Dyer*; leaves linear-lanceolate obtuse lateral nerves about 10 pairs very oblique their axils often glandular, tips of petals crisped, anthers suborbicular appendage about half as long again. *H. parviflora*, *Beddome Flor. Sylvat. Gen. xxvii., in part.*

SOUTH CARNATIC, near Tinnivelly, *Beddome*.

A large tree; branchlets brown. *Leaves* 5-7 by $1-1\frac{1}{2}$ in., firm, base acute, margins slightly undulate, glabrous on both surfaces; petiole $\frac{1}{2}$ in. *Flower-buds* $\frac{1}{2}$ in., tomentose, shortly pedicelled. *Calyx-segments* ovate, acute. *Fruit* unknown.

** Panicles glabrous (except sometimes in *H. micrantha*).

4. *H. Wightiana*, *Wall. Cat.* 6295; branchlets pale softly pubescent at length glabrous, leaves oblong-lanceolate obtuse or acute lateral nerves about 10 pairs, panicles racemose axillary 1-6 together shorter than the leaves, calyx-segments glabrous. *W. & A. Prodr.* 85; *Wight Ill. t.* 37; *A. DC. Prodr. xvi.* 2, 633.

WESTERN PENINSULA, *Wight*; Concan, *Stocks*.

Leaves 5-8 by $1\frac{1}{2}$ -3 in., firm, base acute rounded or emarginate, glabrous on both surfaces, opaque above, nerves oblique, curved, rather prominent above; petiole $\frac{1}{2}$ in., stout, pubescent. *Bracts* $\frac{1}{2}$ in., lanceolate, acute. *Buds* about $\frac{1}{2}$ in., very shortly pedicelled. *Calyx-segments* lanceolate, obtuse. *Petals* pubescent externally. *Anthers* with an appendage 4 times their length. *Nut* $\frac{1}{2}$ in., ovoid, apiculate, glabrous; bases of fruiting calyx-segments scarcely distinct, gibbous, wings $1\frac{1}{2}$ -2 $\frac{1}{2}$ by $\frac{1}{2}$ - $\frac{3}{4}$ in., linear or elliptic-linear obtuse, about 9-nerved, usually tinged with red. -The inflorescence is often diseased and condensed into a globular mass; this is *Artocarpus lanceæfolia*, *Roxb. Fl. Ind. iii.* 527, ex *Miquel*, in *Herb. Hohenack.* 796 a.

5. *H. glabra*, *W. & A. Prodr.* 85; branchlets dark-coloured glabrous, leaves lanceolate obtuse or shortly acuminate lateral nerves about 8 pairs, panicles 1-3 together, racemes axillary about equalling the leaves, calyx-segments glabrous.

WESTERN PENINSULA, *Wight*; Southern Carnatic, at Tinnivelly, *Beddome*.

Leaves about 4 by $1\frac{1}{2}$ in., base acute or obtuse, glabrous and rather shining on both surfaces, nerves oblique curved and prolonged parallel to the margins slightly prominent above; petiole $\frac{1}{2}$ in., rugose. *Bracts* nearly $\frac{1}{2}$ in., lanceolate, obtuse. *Flower-buds* very shortly pedicelled. *Calyx-segments* ovate, obtuse. *Petals* pubescent. *Anthers* orbicular, appendage about 3 times as long. *Fruit* unknown.

6. *H. oblongifolia*, *Dyer*; branchlets pale compressed, leaves oblong shortly acuminate lateral nerves about 10 pairs, panicles racemose axillary (rarely two together) about half as long as the leaves, calyx-segments glabrescent.

TENASSERIM; at Mergui, *Griffith*.

Leaves about 7 by $2\frac{1}{2}$ in., firm, base obtuse, glabrous and rather opaque on both surfaces; nerves oblique, scarcely curved, inconspicuous above; petiole $\frac{1}{2}$ in., glabrous. *Bracts* minute, about equalling the very short pedicels. *Calyx-segments* ovate, acute. *Petals* pubescent. *Anthers* orbicular with an appendage 4 times their length. *Fruit* unknown.

7. **H. Griffithii**, *Kurz ms.*; branchlets slightly lepidote at length glabrous, leaves lanceolate caudate-acuminate obtuse lateral nerves about 10 pairs evanescent, panicles axillary less than half the length of the leaves, calyx-segments glabrous.

TENASSERIM; Mergui, *Griffith*.

Branches dark-barked, with pale striæ. *Leaves* 3-4 by 1-1½ in., firm, base acute, glabrous on both surfaces, midrib prominent below; petiole ½ in., slender. *Bracts* minute, shorter than the pedicels, lanceolate, acute. *Flower-buds* ⅓ in., shortly pedicelled. *Petals* palely pubescent. *Anthers* suborbicular, appendage about twice as long. *Fruit* unknown.

8. **H. micrantha**, *Hook. f. in Trans. Linn. Soc.* xxiii. 160; branchlets dark-coloured minutely lepidote, leaves elliptic-ovate or lanceolate caudate-acuminate obtuse lateral nerves very numerous evanescent, panicles terminal or axillary less than ½ the length of the leaves hoary-pubescent, calyx-segments varnished. *A. DC. Prodr.* xvi. 2, 634.

MALACCA, *Maingay*.—DISTRIB. Borneo.

A very lofty tree. *Leaves* 2-2½ by ¾-1½ in., coriaceous, glabrous on both surfaces, midrib prominent above and beneath; petiole ½ in., puberulent. *Flowers* ⅓ in., pedicels fully ⅓ in. *Petals* palely pubescent. *Anthers* suborbicular, appendage about as long. *Nut* conical; bases of fruiting calyx-segments ½ in. long with two gibbosities at the bottom, wings 1½ in. oblanceolate, obtuse, 9-nerved.

9. **H. discolor**, *Thwaites Enum.* 36; branchlets dark-coloured slightly pruinose, leaves lanceolate caudate-acuminate obtuse reddish-brown beneath lateral nerves about 5 pairs depressed above, panicles axillary sometimes 2-3 together about ⅓ the length of the leaves, calyx-segments glabrous. *A. DC. Prodr.* xvi. 2, 633.

CEYLON; Saffragam and Ambagamowa districts, at no great elevation, *Thwaites*.

A large tree. *Leaves* 2-3 by ¾-1 in.; petiole ½ in. *Panicle* bright red; pedicels ¼ in. *Petals* yellow, palely puberulous. *Anthers* suborbicular, appendages three times their length. *Nut* ½ in., conical, acute, glabrous; bases of fruiting calyx-segments ½ in. lanceolate; wings 1½-3 by ¾-¾ in.; oblanceolate, obtuse, 7-nerved.

10. **H. racophloea**, *Dyer*; branchlets brown, leaves ovate shortly caudate-acuminate base acute lateral nerves about 4 pairs oblique curved about equally prominent on both surfaces with large axillary glands, panicles terminal or axillary exceeding the leaves.

MALABAR; Wynaad forests, alt. 2-3000 ft., *Beddome*.

A large tree, the bark peeling off in adherent scales (*Beddome*). *Leaves* 4-4½ by 2-2½ in., firm, glabrous on both surfaces; petiole ¾ in. slender. *Bases of fruiting calyx-segments* minute, scarcely distinct, thickened, gibbous; wings 3 by 1 in., oblong, tip truncate or rounded inconspicuously 10-nerved, reddish.—Nearly allied to the Ceylon *H. jucunda*.

11. **H. jucunda**, *Thwaites Enum.* 403; branchlets dark purplish-brown, leaves ovate or orbicular abruptly acuminate obtuse base rounded or obtuse lateral nerves about 4 pairs oblique curved slightly depressed above with large axillary glands, panicles terminal or axillary. *A. DC. Prodr.* xvi. 2, 633.

CEYLON; Hinidoon Pattoo, Pasdoon Corle, and Saffragam district, *Thwaites*.

A large tree. *Leaves* 1½-5 by 1-2½ in., firm, glabrous on both surfaces; petiole ½ in. transversely rugose. *Flower-buds* ½ in.; pedicels ⅓ in. *Calyx-segments* ovate, varnished. *Petals* palely-pubescent externally. *Anthers* with an appendage four times their length. *Fruit* unknown.

VAR. *modesta*, *DC. Prodr.* xvi. 2, 633; leaves 1-2 in., branches of the panicle filiform.

7. **DOONA**, Thwaites.

Lofty glabrous and often glaucescent resinous trees, with the habit of (except in *H. nervosa*) some species of *Hopea*. Leaves entire, firm, inconspicuously veined; stipules small, deciduous or inconspicuous. Flowers rather small, usually in lax panicles rarely exceeding the leaves. Calyx as in *Hopea*. Stamens 15; anthers oblong, connective prolonged into a usually clavate appendage, valves equal. Ovary as in *Hopea*. Nut 1-seeded. Seed ovoid with the thin testa interposed between the folds of the cotyledons; radicle superior.—DISTRIB. Endemic in Ceylon. Species 10.

1. **D. zeylanica**, Thwaites in Hook. Journ. iii. (1851) t. 12 and iv. 7; Enum. 34; leaves lanceolate caudate-acuminate base deltoid lateral nerves numerous ascending inconspicuous, pedicels exceeding the calyx. Beddome Flor. Sylvat. t. 97; A. DC. Prodr. xvi. 2, 626.

CEYLON; Central province, ascending to 4000 ft.

A tree of 60 ft. or more; branchlets much divided, somewhat flexuose, with smooth purple-brown bark. Leaves 2-3 by $\frac{3}{4}$ -1 in., midrib prominent beneath, channelled above; petiole $\frac{1}{2}$ in. Panicles 2 in., erect, many-flowered; bracts small, brown, deciduous. Flowers $\frac{2}{3}$ in. diam., pink; pedicels $\frac{1}{2}$ in., erect. Outermost calyx-segments deltoid-ovate, obtuse. Anthers with an appendage about $\frac{1}{2}$ as long, glabrous, varnished. Nut (immature) $\frac{1}{2}$ in. long, ovoid; winged fruiting calyx-segments about 1 in. oblanceolate with an ovate base, at first bright red.—Yields a gum resin manufactured into a varnish.

2. **D. nervosa**, Thwaites Enum. 35; leaves oblong elliptic or ovate caudate-acuminate base rounded lateral nerves prominent beneath ascending, pedicels about equalling the calyx. A. DC. Prodr. xvi. 2, 627.

CEYLON; Ekualagodde near Ratnapoora, Thwaites.

A large tree; branchlets dichotomously divided with rather pale brown bark transversely rugose on the ultimate twigs when dry. Leaves $3\frac{1}{2}$ -4 $\frac{1}{2}$ by 1 $\frac{1}{2}$ -2 in., lateral nerves about 9 pairs; petiole $\frac{1}{2}$ in. Panicle 2 in., racemose, 3-6-flowered. Flowers $\frac{3}{4}$ in. diam.; pedicels $\frac{1}{4}$ in. decurved, then erect. Outermost calyx-segments oblong, obtuse, glabrous, scarcely varnished. Winged fruiting calyx-segments 1-1 $\frac{1}{2}$ in., oblong or oblanceolate, tip rounded, base narrow, gibbous.

3. **D. affinis**, Thwaites Enum. 35; leaves oblong caudate-acuminate base rounded lateral nerves inconspicuous ascending, pedicels about equalling the calyx. A. DC. Prodr. xvi. 2, 627.

CEYLON; between Ratnapoora and Galle, at no great elevation, Thwaites.

Branchlets dichotomously divided, brown barked. Leaves 2-3 by 1-1 $\frac{1}{2}$ in., lateral nerves about 6 pairs, midrib channelled above; petiole $\frac{1}{2}$ in. Panicle 1 $\frac{1}{2}$ -2 in., peduncled, subcorymbose, 6-9-flowered; pedicels $\frac{1}{2}$ in., at first decurved. Outermost calyx-segments oblong, obtuse, glabrous, scarcely varnished. Fruit unknown.—This description does not completely agree with that of Thwaites; it is drawn up from specimens distributed as *D. nervosa* β C.P. 3712 and referred subsequently (Enum. 402) to this species.

4. **D. trapezifolia**, Thwaites Enum. 35; leaves rhomboid-lanceolate gradually caudate-acuminate base obtuse lateral nerves inconspicuous spreading, pedicels exceeding the calyx. A. DC. Prodr. xvi. 2, 627.

CEYLON; Central and Southern provinces; common, ascending to 1500 ft., Thwaites, &c.

A large tree; branchlets much divided; bark brown with minute pale warts. Leaves 2 $\frac{1}{2}$ -3 $\frac{1}{2}$ by 1-1 $\frac{1}{2}$ in., opaque, midrib slightly channelled above, lateral nerves about 12; petiole $\frac{1}{2}$ in. Panicle about 1 $\frac{1}{2}$ in., racemose, about 6-flowered. Flowers $\frac{1}{2}$ in. diam.; pedicels $\frac{1}{2}$ in. erect. Outermost calyx-segments oblong-lanceolate, obtuse. Nut $\frac{3}{4}$ in.

long; winged fruiting calyx-segments 2 in., linear-lanceolate, obtuse, glaucous, base shorter than the nut, ovate.

5. **D. congestiflora**, *Thwaites Enum.* 35; leaves ovate-lanceolate gradually acuminate base rounded, flowers very shortly pedicelled in dense peduncled panicles. *A. DC. Prodr.* xvi. 2, 627.

CEYLON; Hinidoon and Pasdoon Corles, *Thwaites*.

A large tree; branchlets with pale minutely warted bark. *Leaves* 3-4½ by 1½-2 in., firm, midrib slightly channelled above, prominent beneath, lateral nerves about 9 pairs, scarcely conspicuous, ascending, curved. *Peduncle* 1 in. *Flowers* ½ in. diam., pink; pedicels ⅓ in. or less. *Outermost calyx-segments* oblong, obtuse, opaque. *Petals* scarcely puberulous, margins ciliolate. *Nut* ¾ in.; winged fruiting calyx-segments 2 in., linear-oblancoate, obtuse.

6. **D. Gardneri**, *Thwaites Enum.* 35; leaves long-petioled ovate acuminate base rounded, pedicels shorter than the calyx deflexed. *Beddome Flor. Sylvat.* t. 98; *A. DC. Prodr.* xvi. 2, 628.

CEYLON; Central province between 3-5000 ft., *Walker, &c.*

A large tree; branchlets much divided, slightly flexuose, with smooth purplish brown bark. *Leaves* 2-3¼ by 1½-1¾ in., lateral nerves about 10 pairs, ascending, inconspicuous, midrib channelled above, prominent beneath; petiole ¾-1 in. *Panicle* 2½-4 in. racemose. *Flowers* ¾ in. diam., pinkish; pedicels ½ in. *Outermost calyx-segments* deltoid-oblong, obtuse, shining. *Winged fruiting calyx-segments* 1½ in., linear-oblancoate obtuse; base dilated gibbous, equalling the immature nut.

7. **D. cordifolia**, *Thwaites Enum.* 35; leaves ovate-lanceolate or oblong shortly caudate-acuminate rounded or cordate at the base, midrib elevated above, lateral nerves prominent beneath. *A. DC. Prodr.* xvi. 2, 628.

CEYLON; Pasdoon Corle and Ambagamowa, at no great elevation, *Thwaites*.

A large tree; branchlets much divided, flexuose, with dark-coloured bark. *Leaves* 4-6 by 1½-2½ in., lateral nerves about 10 pairs, ascending, curved; petiole ½ in., transversely rugose. *Flowers* unknown.—The terminal buds appear to be frequently converted into a curious strobiliform gall resulting from the production of a multitude of small imperfectly developed leaves.

8. **D. macrophylla**, *Thwaites Enum.* 402; leaves large oblong obtusely acuminate base rounded, pedicels about equalling the calyx. *A. DC. Prodr.* xvi. 2, 627.

CEYLON; Hinidoon Pattou, *Thwaites*.

A large tree; branchlets with pale brown striately rugose bark. *Leaves* 6½-8 by 2½-3 in., pale beneath; midrib channelled above, prominent beneath, lateral nerves about 15 pairs, parallel. *Panicle* 4-7 in., racemose. *Pedicels* ½ in., deflexed. *Calyx-segments* elliptic, glabrous. *Petals* ½ in., elliptic, canescent externally. *Anthers* ½ in. long, appendage about ⅓ in. *Fruit* unknown.

9. **D. ovalifolia**, *Thwaites Enum.* 402; leaves ovate obtusely caudate-acuminate base rounded lateral nerves inconspicuous above prominent beneath ascending, pedicels equalling the calyx. *A. DC. Prodr.* xvi. 2, 628.

CEYLON; Saffragam district, *Thwaites*.

A large tree; branchlets dichotomously divided, somewhat flexuose, with dark brown bark. *Leaves* 1½-2½ by ¾-1½ in.; lateral nerves about 8 pairs; petiole ½ in. *Panicles* racemose, axillary or terminal, few-flowered, shorter than or equal to the leaves. *Pedicels* deflexed.

10. **D. venulosa**, *Thwaites Enum.* 402; leaves oblong or ovate-oblong obtusely abruptly acuminate with close and prominent venation above. *A. DC. Prodr.* xvi. 2, 628.

CEYLON; south of the Island, *Thwaites*.

A large tree; branchlets turning black when dry. *Leaves* 2-3 by 1-1½ in.; *lateral nerves* about 7 pairs; *petiole* ¼-¾ in.—I have taken these particulars from *Thwaites* as I have seen no specimens.

8. **VATERIA**, Linn.

Glabrous tomentose or furfuraceous resinous trees. *Leaves* entire, firm or leathery, feather-veined; stipules deciduous or inconspicuous, rarely large and persistent. *Flowers* in terminal lax corymbose or lateral racemose panicles, or 1-3 on axillary peduncles. *Calyx* as in *Shorea*. *Stamens* 15, rarely about 50; anthers linear or oblong, connective rarely prolonged or minutely apiculate, external valves equal, or longer, or longer and broader and rolled inwards at the apex. *Ovary* as in *Shorea*. *Capsule* ovoid or globose, leathery or fleshy, 1-seeded, indehiscent, or 3-valved, supported by the reflexed scarcely accrescent calyx. *Cotyledons* large, fleshy, unequal, usually lobed, inclosing the superior radicle.—*DISTRIB.* of *Shorea*; species about 17.—*A. De Candolle* transfers the section *Stemonoporus*, which is endemic in Ceylon, to *Vatica*. The species, however, have an imbricate calyx which in fruit completely agrees with that of *Vateria*.

SECT. I. **Pœnoe**. *A. DC.* *Stamens* about 50; anther-cells adnate to the apex of the acuminate connective, external valves much the longer.

1. **V. indica**, *L.*; *Roxb. Fl. Ind.* ii. 602; *Cor. Pl.* iii. t. 288; *W. & A. Prodr.* 84; *Wight Ill.* i. 88, t. 36; *Wall. Cat.* 3670; *Gœrtn. f. Fruct.* iii. 29, t. 4. *V. malabarica*, *Blume Mus. Bot.* ii. 29; *A. DC. Prodr.* xvi. 2, 624; *Beddome Fl. Sylvat.* t. 84.—*Rheede Hort. Mal.* iv. t. 15.

WESTERN PENINSULA; from Canara to Travancor, *Wight*, &c.

A large tree; young branchlets and inflorescence stellately canescent. *Leaves* 5-8 by 2½-3½ in., oblong or elliptic-oblong, obtuse or minutely acuminate, base rounded or emarginate, lateral nerves 14 pairs, slender; *petiole* 1½ in.; stipules ½ in., obliquely lanceolate, acute. *Panicle* 6-8 in., terminal, loosely corymbose, branches spreading. *Flowers* ¾ in. diam., 1-ranked, erect; *pedicels* ½ in. *Calyx-segments* lanceolate, obtuse, canescent on both surfaces. *Petals* elliptic-oblong, obtuse, white. *Anthers* glabrous. (*Capsule* 2½ by 1½ in., oblong, obtuse, coriaceous, fleshy, 3-valved. *Roxb.*)—*Linnaeus* clearly intended his name *Vateria indica* to apply to *Rheede's* plant. He identified with this an imperfect specimen in the 4th volume of *Hermann's Herbarium* now in the British Museum. What appears to be this specimen is perhaps indeterminable, but certainly does not belong to *Dipterocarpeæ*. The evidence appears to show that *V. acuminata*, *Hayne*, was unknown to *Linnaeus*, and has therefore no claims to be identified with *V. indica*.

SECT. II. **Hemiphractum**. *Turcz.* *Stamens* about 50; anther-cells distinct at the apex, acuminate, valves equal, connective not prolonged.

2. **V. acuminata**, *Hayne Arn.* xi. 5; *A. DC. Prodr.* xvi. 2 (not of *Thw.*). *V. indica*, *Thwaites Enum.* 37; *Beddome Flor. Sylvat.* t. 84; *Blume Mus. Bot.* ii. 29, t. 4 (not of *L.*). *Elæocarpus copalliferus*, *Retz. Obs.* iv. 27. *Hemiphractum oxyandrum*, *Turcz. in Bull. Soc. Mosc.* 1859, i. 262.

CEYLON; common in the hotter parts of the Island, ascending to 2000 ft., *Thwaites*.

A large handsome tree; young branches and inflorescence densely covered with

short caducous ferruginous hairs. *Leaves* 6-8 by 3 in., elliptic or oblong-lanceolate, shortly acuminate, base rounded, lateral nerves about 20 pairs, stout; petiole $1\frac{1}{2}$ in.; stipules $\frac{3}{4}$ -1 in., linear-deltoid, attenuate. *Panicle* terminal, 8 in., loosely corymbose; bracteoles $\frac{1}{2}$ in., ovate, obtuse. *Flowers* 1 in. diam., 1-ranked, erect; pedicels $\frac{1}{2}$ in. *Calyx* ferruginous without, canescent within. *Petals* orbicular, acute, white. *Anthers* puberulous. (*Fruit* 4 in. long by $2\frac{1}{2}$ -3 in. broad.—Yields a green resin, used in Cingalese superstitious ceremonies. *Thwaites*.)

SECT. III. **Stemonoporus**, *Thwaites*. *Stamens* 15; anthers with the external valves longer, broader and rolled inwards at the apex.

* *Inflorescence paniced.*

3. **V. ceylanica**, *Wight Ill.* i. 88; leaves elliptic or oblong apiculate or retuse base rounded or slightly acute. *V. Wightii*, *Thwaites Enum.* 403. *Vatica Wightii*, *A. DC. Prodr.* xvi. 2, 620. *Stemonoporus Wightii*, *Thwaites Enum.* 37.

CEYLON; forests between Galle and Ratnapoora, and near Palmadoolla, *Thwaites*.

A large tree; young branches glabrous. *Leaves* 5-11 by 3-5 $\frac{1}{2}$ in., both surfaces pale, glabrous; lateral nerves 21 pairs, spreading; petiole $2\frac{1}{2}$ in. *Panicles* 3 in. long, lateral. *Flowers* fully 1 in. diam. *Calyx* glabrescent. *Petals* elliptic, obtuse, sulphur-yellow. *Stamens* with dilated slightly connate filaments; anthers puberulous, connective with a short acute apex. *Style* subulate, acute.—I believe this to be the plant intended by Wight. The only sheet in his herbarium with this name has clearly been ticketed in error; it bears the inflorescence of *V. acuminata* and the foliage of some indeterminate plant.

4. **V. Gardneri**, *Thwaites Enum.* 403; leaves ovate or ovate-oblong, acuminate base rounded or cordate. *Vatica Gardneri*, *A. DC. Prodr.* xvi. 2, 622. *Stemonoporus Gardneri*, *Thwaites in Hook. Journ. of Bot.* 1854, 68, t. 2 A.

CEYLON; Rambodde, *Gardner*; Adams Peak, *Thwaites*.

A large tree; young parts faintly puberulous. *Leaves* 3-5 by 2-2 $\frac{1}{2}$ in., lateral nerves about 10 pairs, ascending; petiole about $\frac{3}{4}$ in. *Panicles* about 2 in. long, numerous, collected towards the ends of the branches, 5-7-flowered. *Flowers* $\frac{3}{4}$ in. diam.; pedicels $\frac{1}{2}$ in., decurved. *Calyx-segments* glabrous, ovate, acute. *Petals* broadly ovate, white. *Stamens* connate at the base; external valves of the anthers rolled inwards at the apex, connective not prolonged. *Style* acute. *Fruit* globose, 1 in. diam.

5. **V. jucunda**, *Thwaites ms.*; leaves lanceolate or linear-lanceolate gradually acuminate base rounded. *V. acuminata*, *Thwaites Enum.* 403. (*not of Hayne*). *Vatica acuminata*, *A. DC. Prodr.* xvi. 2, 622.

CEYLON; Madamahanevewa, Ambagamowa, and Badalla districts, *Thwaites*.

A large tree; young branches reddish-brown, glabrous. *Leaves* 4-7 by $\frac{3}{4}$ -2 in., midrib very stout, lateral nerves about 12 pairs, ascending. *Panicles* 2 $\frac{1}{2}$ in. long, lateral, racemose, puberulous. *Flowers* $\frac{3}{4}$ in. diam. *Calyx-segments* lanceolate, acute. *Petals* lanceolate, acute, pale yellow. *Stamens* and style as in *V. Gardneri*.—Mature fruit unknown.

** *Peduncles few-flowered.*

6. **V. affinis**, *Thwaites Enum.* 403; leaves ovate-oblong caudate-acuminate base rounded lateral nerves depressed when dry. *Stemonoporus affinis*, *Thwaites in Hook. Journ. Bot.* 1854, 68; *Enum.* 38. *Vatica Thwaitesii*, *A. DC. Prodr.* xvi. 2, C.

CEYLON; Hunasgiria district, alt. 4000 ft., *Thwaites*.

A large tree. *Leaves* 3-4 $\frac{1}{2}$ by $1\frac{1}{2}$ -2 in., glabrous, opaque, glaucescent above, scabrid beneath; lateral nerves about 10 pairs, intervening spaces irregularly bullate

when dry; petiole $\frac{3}{4}$ in., slender. *Peduncles* $\frac{1}{2}$ in., axillary, usually 1-flowered. *Calyx-segments* subacute, hoary externally.

7. **V. lanceolata**, *Thwaites Enum.* 403; leaves elliptic-oblong shortly caudate-acuminate base acute midrib slightly prominent above lateral and transverse nerves depressed when dry. *Stemonoporus lanceolatus*, *Thwaites Enum.* 38. *Vatica lanceolata*, *A. DC. Prodr.* xvi. 2, 621.

CEYLON; near Ratnapoora, *Thwaites*.

A small tree; young parts glabrescent. *Leaves* $5\frac{1}{2}$ – $7\frac{1}{2}$ by 2–3 in., glabrous above, glabrescent beneath, lateral nerves about 8 pairs, prominent beneath; petiole $\frac{3}{4}$ –1 in., stout, channelled. *Peduncles* $\frac{1}{2}$ in., slightly supra-axillary, 1-flowered. *Petals* $\frac{1}{2}$ in. long, elliptic, obtuse, pale yellow. *Calyx-segments* in fruit linear, acute.

8. **V. canaliculata**, *Thwaites Enum.* 403; leaves elliptic-oblong obtusely acuminate base obtuse or acute midrib channelled above lateral nerves in shallow depressions when dry with intramarginal connecting loops. *Stemonoporus canaliculatus*, *Thwaites Enum.* 38. *Vatica canaliculata*, *A. DC. Prodr.* xvi. 2, 621.

CEYLON; Hinidoon and Reigam Corles, *Thwaites*.

A moderate-sized tree; young parts and petioles striate, scabrous. *Leaves* $2\frac{1}{2}$ – $4\frac{1}{2}$ by $1\frac{1}{4}$ – $1\frac{3}{4}$ in., glabrous and opaque above, scabrous beneath, lateral nerves about 10 pairs, prominent beneath; petiole $1\frac{1}{4}$ in., thickened at the apex. *Peduncles* $\frac{1}{2}$ in., axillary, about 3-flowered. *Calyx-segments* oblong, obtuse, densely pubescent externally, buff-coloured. *Anthers* linear-lanceolate, minutely apiculate, puberulous. *Fruit* $1\frac{1}{4}$ in. diam., $\frac{1}{2}$ in. deep, flattened-spheroidal, pale chocolate-coloured, mottled.

9. **V. petiolaris**, *Thwaites Enum.* 403; leaves oblong or elliptic-oblong shortly acuminate base rounded or subacute midrib elevated above, lateral nerves weak, petiole $1\frac{1}{2}$ –3 in. *Stemonoporus petiolaris*, *Thwaites Enum.* 38. *Vatica petiolaris*, *A. DC. Prodr.* xvi. 2, 621.

CEYLON; at Kittool Galle, *Thwaites*.

A moderate-sized tree; young parts and petioles scarcely scabrous. *Leaves* 6–10 by 2– $2\frac{3}{4}$ in., glabrous above, scabrous beneath, lateral nerves about 12 pairs. *Peduncles* $\frac{1}{2}$ in., axillary, 1–3-flowered. *Calyx-segments* ovate-oblong, obtuse. *Anthers* lanceolate, minutely apiculate, puberulous.

10. **V. rigida**, *Thwaites Enum.* 403; leaves obovate emarginate base acute or narrowly elliptic obtuse base rounded midrib slightly elevated above very stout beneath lateral nerves depressed when dry. *Stemonoporus rigidus*, *Thwaites Enum.* 38. *Vatica rigida*, *A. DC. Prodr.* xvi. 2, 621.

CEYLON; Ambagamowa district, alt. about 3000 ft., *Thwaites*.

A large tree; young parts petioles and under-surface of the leaves minutely scabrous. *Leaves* $3\frac{1}{2}$ – $5\frac{1}{2}$ by $1\frac{3}{4}$ in., glabrescent and opaque above; lateral nerves about 10; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Peduncles* very short, axillary, about 3-flowered. *Flowers* $\frac{3}{4}$ in. diam. *Calyx-segments* oblong, obtuse. *Petals* elliptic, subacute. *Anthers* linear-lanceolate, with a broad retuse apex, minutely hairy puberulous.

11. **V. oblongifolia**, *Thwaites Enum.* 403; leaves elliptic-oblong sub-acuminate base rounded midrib and lateral nerves slightly elevated above. *Stemonoporus oblongifolius*, *Thwaites Enum.* 38. *Vatica oblonga*, *A. DC. Prodr.* xvi. 2, 621.

CEYLON; Ambagamowa district, alt. about 4000 ft., *Thwaites*.

A large tree; young parts tawny pulverulent-scabrous. *Leaves* 3–5 by $1\frac{3}{4}$ – $2\frac{1}{2}$ in., glabrous on both surfaces, midrib stout and prominent beneath; petiole $\frac{3}{4}$ in. *Peduncles*

about $\frac{1}{2}$ in., 1-4-flowered, crowded at the ends of the lateral shoots. *Calyx-segments* elliptic, subacute. *Petals* obovate, obtuse. *Anthers* linear-oblong, obtusely apiculate, puberulous. *Fruit* $\frac{1}{2}$ in. diam., globose, 3-sulcate, pale brown, minutely wrinkled.

12. **V. reticulata**, *Thwaites Enum.* 403; leaves ovate or ovate-oblong leathery acuminate base rounded shining above lateral nerves inconspicuous. *Stemonoporus reticulatus*, *Thwaites Enum.* 38. *Vatica reticulata*, *A. DC. Prodr.* xvi. 2, 620.

CEYLON; Hinidoon Corle, alt. about 1000 ft., *Thwaites*.

A moderate-sized tree; young parts pulverulent. *Leaves* $2\frac{1}{2}$ - $3\frac{1}{2}$ by $1\frac{1}{4}$ - $2\frac{1}{4}$ in., opaque, midrib prominent and minutely reticulate beneath, lateral nerves 9 pairs; petiole $1\frac{1}{4}$ in. *Peduncles* axillary, 1-2-flowered. *Flowers* $\frac{3}{4}$ in. diam. *Calyx-segments* lanceolate, glabrous, acute. *Petals* broadly elliptic, acute. *Anthers* linear, minutely apiculate, hairy-pubescent. *Fruit* $1\frac{1}{2}$ in. long, ovoid, acute, 3-sulcate, brown, minutely verrucose.

13. **V. nitida**, *Thwaites Enum.* 403; leaves lanceolate or ovate caudate-acuminate base rounded shining above opaque beneath midrib and lateral nerves inconspicuously prominent above. *Stemonoporus nitidus*, *Thwaites Enum.* 39. *Vatica nitida*, *A. DC. Prodr.* xvi. 2, 622.

CEYLON; Pasdoon Corle, *Thwaites*.

A moderate-sized tree; twigs white-barked, with black verruculae, young parts dark brown, glabrescent. *Leaves* 3-4 by $1\frac{1}{4}$ - $1\frac{1}{2}$ in., midrib prominent beneath, lateral nerves 6 pairs, slender; petiole $\frac{1}{2}$ in. *Peduncles* few-flowered. *Calyx-segments* lanceolate, acute. *Petals* elliptic, acute, yellowish. *Anthers* linear, minutely apiculate, puberulous.—The number of stamens proves this not to belong to *Monoporandra*, as A. De Candolle appears to think probable; no doubt from its resemblance to *M. lancifolia*, which appears to be nothing more than a variety.

VAR. *lancifolia*, *Thwaites Enum.* 404 (sp.); leaves $2\frac{1}{2}$ - $3\frac{1}{4}$ by $\frac{3}{4}$ -1 in., tapering-acuminate, fruit about 1 by $\frac{3}{4}$ in. ovoid pale brown minutely mottled. *Monoporandra lancifolia*, *Thwaites Enum.* 39; *A. DC. Prodr.* xvi. 2, 637.—Hellessee and Pasdoon Corle, *Thwaites*.—The 15 stamens prove this to belong to *Vateria*.

14. **V. Moonii**, *Thwaites Enum.* 403; leaves linear-lanceolate base tapering nerves hairy on both surfaces when young ultimately glabrous. *Stemonoporus*? *Moonii*, *Thwaites Enum.* 39. *Vatica Moonii*, *A. DC. Prodr.* xvi. 2, 622.

CEYLON; Maturatte? *Moon*.

Young parts and petioles densely fulvous-tomentose, ultimately glabrescent or pulverulous. *Leaves* 6-10 by 1-2 in., papery, midrib prominent beneath, lateral nerves about 20 pairs, curved upwards, rather slender, with weaker ones intervening; petiole 1 in. *Stipules* $\frac{3}{4}$ -1 in. distinct, linear-lanceolate, rigid, persistent. *Peduncles* 1-flowered, in the axils of fallen leaves.—Somewhat resembling *Vatica scabriuscula* in habit, but differing from other species of *Vateria*. *Thwaites*, however, by an analysis of the flower, has determined it to belong to *Stemonoporus*.

9. MONOPORANDRA, *Thwaites*.

Glabrescent or puberulous, much branched, moderate-sized trees. *Leaves* entire, firm, feather-veined; stipules small, deciduous or inconspicuous. *Flowers* moderate-sized on small, few or many flowered axillary peduncles. *Calyx* as in *Vateria*. *Stamens* 5; anthers as in *Vateria* & *Stemonoporus*, minutely apiculate. *Ovary* 2-celled, cells 2-ovuled. *Fruit* globose, leathery, indehiscent, 1-seeded, supported by the reflexed scarcely accrescent calyx. *Cotyledons* fleshy, unequal, radicle superior.—DISTRIB. Endemic in Ceylon; species 2. According to Bentham and Hooker, and also Baillon, *Monopo-*

randra does not differ from the *Stemonoporus* section of *Vateria* (with which genus Thwaites now unites it) except in the number of stamens. Thwaites however figured and described the ovary as 2-celled, and from the examination of *M. cordifolia* I find this to be correct.

1. **M. cordifolia**, *Thwaites in Hook. Journ. Bot.* vi. (1854) 70; *Enum.* 39; leaves ovate shortly caudate-acuminate base cordate or rounded midrib and lateral nerves depressed above, panicles about 1 in. many-flowered. *A. DC. Prodr.* xvi. 2, 237. *Vateria cordifolia*, *Thwaites Enum.* 404.

CEYLON; Ambagamowa and Saffragam districts, elevation about 3000 ft., *Thwaites*.

A moderate-sized much branched tree; young parts puberulous or glabrescent. *Leaves* 2-4½ by 1-2¼ in., glabrous on both surfaces, opaque above, lateral nerves about 7 pairs; petiole ½-1 in., tumid at the apex. *Flowers* drooping, yellow. *Calyx-segments* lanceolate, acute. *Fruit* the size of a pea, brown, mottled.

2. **M. elegans**, *Thwaites in Hook. Journ. Bot.* vi. (1854) 69, t. 2 B; *Enum.* 39; leaves elliptic abruptly and slenderly caudate-acuminate midrib depressed lateral nerves prominent above, peduncles 1-4-flowered about ¾ in. *A. DC. Prodr.* xvi. 2, 636. *Vateria elegans*. *Thwaites Enum.* 404.

CEYLON; Saffragam district, alt. about 2000 ft., *Thwaites*.

A moderate-sized tree; young parts glabrescent. *Leaves* 2½-3 by ¾-1 in., base obtuse or rounded, lateral nerves about 10 pairs; petiole ½ in. *Calyx-segments* linear-lanceolate. *Petals* oblong, obtuse, pale-yellow. *Anthers* lanceolate, pulverulent. *Fruit* globose, ⅕ in. diam., with a drooping peduncle.

An imperfect fruiting specimen of a large tree collected by Major Beddome in South Tinnivelly and there called Karanyongoo, appears to belong to a new genus intermediate between *Pachynocarpus* and *Vatica*.—Twigs brown barked, with minute white spots. *Leaves* 3½-4½ by 1¼-1½ in., lanceolate, obtuse, entire, lateral nerves 10 pairs, scarcely prominent; petiole about ½ in. *Flowers* in short terminal or axillary puberulous panicles; pedicels ½ in. *Calyx-tube* very short, segments ½ in., ovate, minutely acuminate, thickened, with numerous minute pale warts externally. *Capsule* ¾ in. diam., nearly globose, apiculate, glabrous, striate. *Seed* solitary; cotyledons fleshy, deeply 2-fid, enclosing the superior radicle.

ORDER XXVI. MALVACEÆ. (By Maxwell T. Masters, F.R.S.)

Herbs, shrubs or rarely soft-wooded trees, with mucilaginous rarely acid juice, and tenacious inner bark; herbaceous portions generally more or less densely covered with stellate hairs. *Leaves* alternate, palminnerved, simple lobed or rarely compound. *Stipules* free, sometimes caducous. *Bracteoles* 3 or more, scattered or approximate, free or combined, often forming an epicalyx. *Flowers* axillary or terminal, solitary fascicled or cymoso-paniculate, regular, hermaphrodite or 1-sexual. *Sepals* 5, valvate, free or connate. *Petals* 5, twisted-imbricate. *Stamens* ∞, rarely definite, adnate to the base of the petals; filaments monadelphous, forming a tube, rarely a column; anthers oblong or reniform, cells sinuous or twisted, linear or annular, ultimately 1-celled, bursting longitudinally; pollen globose, granular, muriculate. *Ovary* 2- many-celled, entire, or lobed, of 2-5 or usually more carpels whorled round a central axis; styles connate below or throughout their length; stigmas linear peltate spathulate or capitate; ovules 1 or more, curved, attached to the inner angle of each carpel. *Fruit* of dry indehiscent or dehiscent cocci, or capsular and loculicidal, sometimes large and woody. *Seeds* reniform or obovid, glabrous hairy silky or woolly;

albumen scanty often mucilaginous or 0; embryo curved; cotyledons leafy, usually folded or crumpled.—DISTRIB. Abundant in warm regions, common in temperate, absent from arctic. Genera 57, known species about 700, largely represented in India. A few genera are peculiar to India or the Archipelago, and some of the species are also endemic.

A. Andræcium tubular; tube entire, or but slightly divided at the apex.

TRIBE I. **Malvææ**. Herbs or shrubs. *Ripe carpels* separating from the axis. *Styles* as many as the carpels.

Ovules solitary, ascending.

Stigmas linear.

Bracteoles 6-9 1. ALTHÆA.

Bracteoles 3, connate 2. LAVATERA.

Bracteoles 3, free 3. MALVA.

Stigmas capitate 3.* MALVASTRUM.

Ovules solitary, pendulous.

Carpels spreading, beakless 3.** ANODA.

Carpels convergent at the points or beaked 4. SIDA.

Ovules 2 or more.

Carpels with a transverse false partition 4.* WISSADULA.

Carpels with no false partition 5. ABUTILON.

TRIBE II. **Urenææ**. *Styles or stigmatic branches* twice as many as the carpels.

Carpels opposite the petals.

Carpels unarmed 5.* MALACHRA.

Carpels beset with spines 6. URENA.

Carpels opposite the sepals. 7. PAVONIA.

TRIBE III. **Hibiscææ**. Herbs or shrubs. *Fruit* capsular. *Sepals* leafy. *Staminal-tube* truncate or 5-toothed at the apex.

Stigmas spreading. Seeds reniform.

Ovary 10-celled 8. DECASCHISTIA.

Ovary 2-5-celled.

Stamens 10 9. JULOSTYLES.

Stamens numerous.

Bracteoles 4, lanceolate combined at the base . . . 10. DICELLOSTYLES.

Bracteoles 3, cordate 11. SENRA.

Bracteoles 5 or more 12. HIBISCUS.

Stigmas coherent in a club-shaped mass.

Bracteoles 3-5, small 13. THESPESIA.

Bracteoles 3, large, cordate 14. GOSSYPIUM.

B. Andræcium either tubular at the base only, and divided above into pentadelphous filaments (rarely tubular higher up); or divided throughout into filaments.

TRIBE IV. **Bombacææ**. Trees. *Sepals* leathery. *Styles* connate or free. *Fruit* capsular or indehiscent.

Leaves simple or lobed. Bracteoles 4-5 15. KYDIA.

Leaves digitate. Bracteoles 0.

Calyx 5-cleft 15.* ADANSONIA.

Calyx truncate or irregularly 3-5-lobed.

Ultimate filament with a single anther 16. BOMBAX.

Filaments with 2-3 anthers 17. ERIODENDRON.

Leaves simple 1-costate, scaly.

Bracteoles united into a tube.

Petals 0 18. CULLENIA.

Petals 5.

Calyx tubular or bell-shaped.

Anthers linear, cells sinuous 19. *DURIO*.Anthers globose, opening by a pore 20. *BOSCHIA*.
Calyx dilated at the base.Calyx cushion-shaped or orbicular. 21. *NEESIA*.Calyx 5-pouched at the base 22. *CÆLOBSTEGIA*.1. *ALTHÆA*, Linn.

Herbs pubescent or villous, erect or decumbent. *Leaves* more or less deeply divided, rarely entire. *Flowers* peduncled, axillary, solitary or fascicled, often in long terminal racemes. *Bracteoles* 6-9, connate at the base. *Anther-valves* subglobose or linear. *Ovary* many-celled; styles filiform, inner surface stigmatose; ovules 1 in each cell. *Carpels* numerous, ultimately separating from a short torus. *Seed* solitary in each carpel, ascending.—*DISTRIB.* Temperate regions, rare in the tropics; known species about 12.

Althæa rosea, L., the common Holly-hock, is often cultivated in Indian Gardens: it is *A. coromandelina*, Cav., and *A. chinensis*, Wall. Cat. 2689.

1. *A. Ludwigii*, L.; *DC. Prodr.* i. 437; annual, hispid, prostrate or ascending, leaves deeply lobed lobes 3-fid, flowers shortly peduncled few or tufted, anther-valves subglobose, carpels glabrous. *Cav. Ic.* 423; *Boiss. Flor. Orient.* i. 824. *Malva malwensis*, *Edgew. in Hook. Journ. Bot.* ii. 284.

NORTH WESTERN INDIA, the PANJAB, and SINDH.—*DISTRIB.* Western Asia and the Mediterranean region; S. Africa.

Stem 6-12 in high, slender, branching. *Leaves* long-petioled, orbicular, 5-7-lobed, lobes wedge-shaped. *Bracteoles* 7-9, as long as the calyx. *Flowers* whitish, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. *Petals* exceeding the lanceolate sepals. *Carpels* wrinkled at the sides.

2. *A. officinalis*, L.; *DC. Prodr.* i. 436; perennial, uniformly downy, leaves ovate simple or slightly lobed, flowers peduncled in axillary clusters, bracteoles linear-lanceolate, anther-valves subglobose. *Boiss. Flor. Orient.* i. 825.

KASHMIR, *Jacquemont*, &c.—*DISTRIB.* Westward to England.

Stem erect, 2-3 ft. *Leaves* ovoid, annular, base scarcely cordate, unequally toothed; stipules linear-subulate. *Flowers* 1-2 in. diam., rosy. *Bracteoles* half the length of the sepals.—The Marsh Mallow, which yields Guimaive.

VAR. taurinensis; not so densely downy as the type, flowers comparatively few. *A. taurinensis*, *DC. Prodr.* i. 436.

2. *LAVATERA*, Linn.

Herbs with branching downy stems. *Leaves* lobed. *Flowers* peduncled, axillary. *Bracteoles* 3, connate at the base. *Ovary* many-celled; styles filiform, inner surface stigmatose; ovules 1 in each cell. *Ripe carpels* numerous, surrounding a prominent conical torus, from which they ultimately separate. *Seed* solitary, ascending.—*DISTRIB.* Chiefly Mediterranean; one is Australian, two are Canarian.

1. *L. Kashmiriana*, *Camb. in Jacq. Voy. Bot.* 29, t. 32.

KASHMIR, *Jacquemont*, &c.

A branching downy herb. *Lower leaves* with petioles as long as the blade, orbicular, cordate, 5-lobed, lobes crenate nearly glabrous above, downy beneath, upper with petiole shorter than the blade, 3-5-lobed, lobes acute, central longest; stipules linear-lanceo-

late. *Peduncles* about equalling the leaves. *Bracteoles* 3, broadly ovate, acute, combined at the base. *Sepals* lanceolate, longer than the bracteoles. *Corolla* 3 in. diam., pink; petals cuneate, deeply 2-fid. *Staminal column* villous. *Carpels* reniform, smooth, shorter than the projecting torus.

3. *MALVA*, Linn.

Downy herbs. Leaves lobed. *Flowers* in axillary tufts. *Bracteoles* 3, distinct. *Sepals* 5, connate at the base. *Petals* emarginate, connate at the extreme base. *Staminal-tube* antheriferous to the top, without sterile teeth. *Ovary* many-celled; styles as many as the carpels, stigmas linear; ovules 1 in each cell. *Ripe carpels* 1-seeded, indehiscent, separating from a short conical torus. Seed ascending.—DISTRIB. Temperate regions of the Old World. Species about 16; many are widely diffused by cultivation, &c. None of the Indian species are endemic.

1. *M. verticillata*, L.; *DC. Prodr.* i. 433; an erect annual or perennial, pubescent, flowers nearly sessile in dense axillary clusters. *Wall. Cat.* 1879, 1884, 3, 4. *M. neilgherrensis*, *Wight Ic.* t. 950. *M. alchemillæfolia*, *Wall. Cat.* 1884, d.

TEMPERATE HIMALAYA, ascending to 6–12,000 ft., from Assam and Sikkim to Kumaon and Lahul; NĠGHIRIS MTS., in corn fields, *Wight*.—DISTRIB. Europe, Abyssinia, Egypt, Amoor land, China.

Stem branched, 2–4 ft. high. *Leaves* cordate, suborbicular, 5–6-lobed, downy; petiole 6–7 in. *Flowers* small, nearly sessile, densely crowded. *Bracteoles* linear. *Sepals* deltoid-lanceolate. *Petals* notched, slightly longer than the sepals. *Carpels* 10–12, enclosed within the accrescent calyx, netted on the sides, prominently ribbed at the back.

2. *M. silvestris*, L.; *DC. Prodr.* i. 432; an erect nearly glabrous herb, peduncles as long or longer than the flowers erect or ascending. *Boiss. Flor. Orient.* i. 819.

WESTERN TEMPERATE HIMALAYA, from Kumaon, alt. 2500 ft., to KASHMIR and the PANJAB.—DISTRIB. Europe, N. Africa, Siberia.

Annual, 1–3 ft. high. *Leaves* cordate, rounded, lobed; petiole 4–5 in. *Peduncles* about 1 in. *Bracteoles* ovate, entire, shorter than the bell-shaped calyx. *Corolla* 1½ in. diam. *Petals* notched, claw-bearded. *Carpels* reticulated, downy or glabrous.

VAR. 1. *mauritanica*; carpels reticulated, glabrous. *M. mauritanica*, *DC. Prodr.* i. 432, *Cav. Diss.* ii. 25, f. 2; *Roxb. Fl. Ind.* iii. 181; *W. & A. Prodr.* i. 45; *Wall. Cat.* 1877; *Boiss. Fl. Orient.* i. 819.—Bengal, Western Peninsula. *M. ciliata*, *Wall. Cat.* 1878.

VAR. 2. *eriocarpa*; *Boissier Fl. Orient.* i. 819; carpels reticulated downy.—Himalaya.

3. *M. rotundifolia*, L.; *DC. Prodr.* i. 433; a spreading herb, slightly downy, peduncles deflexed after flowering, claw of petal bearded. *Wall. Cat.* 1885; *Boiss. Flor. Orient.* i. 820. *M. vulgaris*, *Fries. Novrit.* 219.

NORTH-WEST PROVINCES; KUMAON and SINDH.—DISTRIB. Europe, W. Asia.

A much-branched herb, sparingly villous. *Leaves* suborbicular, lobed, crenate; petiole 6–7 in. *Peduncles* 1½ in. *Bracteoles* lanceolate half the length of the broadly lance-shaped sepals. *Corolla* 1 in. diam. *Petals* wedge-shaped, notched, twice the length of the sepals. *Ripe carpels* downy, flat or wrinkled.

VAR. 1. *borealis*; petals scarcely exceeding the sepals, carpels prominently wrinkled and netted. *M. rotundifolia*, *Roxb. Fl. Ind.* iii. 181; *M. borealis*, *Wallm. ex Boiss. Flor. Orient.* i. 820; *M. rotundifolia* var. β , *W. & A. Prodr.* i. 45; *Wall. Cat.* 1884, e, f; *M. parviflora*, *Huds. not of Linn.*—Bengal, Mysore.

VAR. 2. *reticulata*; petals exceeding the calyx; carpels glabrous, wrinkled, *M. rotundifolia* var. α , *W. & A. Prodr.* i. 45; *Wall. Cat.* 1884, e.—Bengal, North-West Himalaya, alt. 1–2000 ft.

4. **M. parviflora**, L.; *DC. Prodr.* i. 433; a spreading herb, slightly downy, peduncles spreading after flowering, claw of petal glabrous. *Boiss. Flor. Orient.* i. 820.

NORTH-WEST HIMALAYA, alt. 1-2000 ft., UPPER BENGAL, SINDH and the PANJAB.—DISTRIB. Europe, the Levant, Arabia, Nubia.

A comparatively small spreading herb. *Leaves* roundish, obsolete lobed; peduncles short. *Bracteoles* linear. *Sepals* broad, acute. *Petals* notched, scarcely exceeding the sepals. *Carpels* wrinkled.

3.* **MALVASTRUM**, A. Gray.

Herbs or undershrubs. *Leaves* entire or divided. *Inflorescence* axillary or terminal. *Bracteoles* 3, narrow. *Calyx* cup-shaped, 5-parted. *Petals* longer than the sepals. *Staminal-tube* antheriferous to the summit, with no sterile teeth. *Ovary* 5- or more-celled; styles as many as the carpels, stigmas capitate. *Ripe carpels* separating from a short torus, indehiscent, 1-seeded, beaked or not. *Seed* ascending.—DISTRIB. About 60 species, all American and S. African except 2, which are widely distributed throughout the tropics of both hemispheres.

M. TRICUSPIDATUM, A. Gray *Pl. Wright*, 16; hairs simple, carpels with three small projecting points. *Malva tricuspidata*, Ait.; *DC. Prodr.* i. 430.

Various parts of BENGAL and MADRAS, introduced.—DISTRIB. Tropics of both hemispheres and Australia.

An erect branching herb, 2-3 ft. high. *Leaves* ovate-lanceolate, irregularly toothed, feather-veined. *Petiole* $1\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ – $\frac{3}{4}$ in. *Bracteoles* narrow. *Calyx* campanulate, 5-fid, lobes triangular acute. *Petals* yellow. *Carpels* 8-12, reniform.

M. SPICATUM, A. Gray *Pl. Fendler*, 22; hairs stellate, carpels rounded or angular not beaked. *Malva spicata*, L.; *DC. Prodr.* i. 430.

Various parts of India, introduced; MERGUL, Griffith.—DISTRIB. Tropics of both hemispheres.

An erect herb, 1-2 ft. high. *Leaves* ovate, acute, crenate-serrate, sometimes lobed. *Flowers* in a dense terminal leafy spike. *Bracteoles* narrow. *Sepals* acuminate. *Petals* yellow. *Carpels* 8-12, pubescent.

3.** **ANODA**, Cav.

Hispid herbs. *Leaves* hastate-lobed. *Flowers* on long axillary peduncles. *Bracteoles* 0. *Calyx* 5-parted, segments spreading. *Petals* 5. *Staminal-tube* dividing into numerous filaments at the top. *Ovary* many-celled; styles as many as the cells of the ovary; ovules 1 in each cell. *Ripe carpels* separating from the axis, bursting irregularly, 1-seeded.—DISTRIB. An American genus of 8 species, not indigenous in India.

A. HASTATA, L.; *DC. Prodr.* i. 458; thinly clothed with appressed hairs, leaves ovate-cordate hastate 5-lobed, lobes deltoid central one longest.

Various places in NORTH-WESTERN INDIA and the WESTERN PENINSULA, but not indigenous.—DISTRIB. W. Indies, &c.

A herb 2-3 ft. high, thinly beset with appressed hairs. *Leaves* 2-3 in.; petioles $1\frac{1}{2}$ in. *Stipules* linear, $\frac{1}{2}$ in. long. *Peduncles* 4 in., 1-flowered. *Flowers* $1\frac{1}{2}$ in. diam. *Sepals* 5, broadly ovate, acute, spreading, connate at the base into a shallow tube. *Petals* purple, longer than the sepals.

4. **SIDA**, Linn.

Herbs or undershrubs. *Leaves* simple or lobed. *Bracteoles* 0. *Calyx* of 5 valvate sepals, tubular below. *Corolla* of 5 petals, free above, connate below and adnate to the tube of the stamens. *Staminal-tube* dividing at the summit into numerous anther-bearing filaments. *Carpels* 5 or more, whorled; styles as many as the carpels, stigmas terminal. *Ripe carpels* separating from the axis, generally 2-awned at the summit, and dehiscing irregularly or by a small chink. *Seed* solitary, pendulous or horizontal; radicle superior.—**DISTRIB.** A genus of about 80 species, most of them being tropical weeds.

* *Herbaceous, often trailing.*

1. **S. humilis**, Willd.; DC. *Prodr.* i. 463; a trailing herb, leaves suborbicular-cordate acute serrate slightly hairy, carpels 5 sometimes awned. *Cav. Diss.* v. t. 134, f. 2; *Roxb. Fl. Ind.* iii. 171; *Thwaites Enum.* 28; *Dalz. & Gibs. Bomb. Fl.* 17; *Wall. Cat.* 1854, 1, 2, 3, D; *W. & A. Prodr.* i. 59; *Miq. Fl. Ind. Bat.* i. pt. 2, 140. *S. unilocularis*, L'Her. *Stirp.* t. 56. *S. pilosa*, Retz, not of *Cav. ex W. & A. l.c.*; *Wall. Cat.* 1854, E. *S. radicans*, *Wall. Cat.* 1854 G. *S. multicaulis*, *Cav. Diss.* i. 10, t. 1, f. 6; *DC. l.c.* *S. nervosa*, *Wall. Cat.* 1853, not of DC.

Generally distributed throughout the hotter parts of India. **DISTRIB.** Tropical Africa and America.

Very variable. *Stem* usually procumbent, branching, covered, like the leaves, with a few scattered radiating hairs; petiole rather shorter than the blade. *Peduncles* jointed in the middle, distant or arranged in a loose raceme. *Flowers* axillary, solitary or twin. *Calyx-segments* triangular, very acute. *Corolla* straw-coloured, scarcely exceeding the calyx. *Carpels* 5, mucous or shortly bicuspidate.—The specimens vary so much in quality of pubescence, length of carpellary awns, &c., that I find it difficult to determine the following varieties with accuracy.

VAR. 1. *morifolia*, *Cav. Diss.* i. 9, t. 1, f. 1 (sp.); carpels slightly mucronate.—*Wall. Cat.* 1853 B, E.

VAR. 2. *veronicaefolia*, *Lam. Dict.* n. 11 (sp.); carpels with two longish awns.—*Cav. Diss.* i. 7, t. 1, f. 3 and 5; *Wall. Cat.* 1853 D.

2. **S. mysorensis**, *W. & A. Prodr.* i. 59; herbaceous, covered with glutinous hairs, leaves cordate-ovate acuminate, peduncles shorter than the petioles, carpels 5 awned keeled. *Thwaites Enum.* 28. *S. hirta*, *Wall. Cat.* 1853, not of *Lam.* *S. urticæfolia*, *W. & A. l.c.* *S. nervosa*, *Wall. Cat.* 1853 E. *S. olens*, *Ham. in Wall. Cat.* 1874. *S. glutinosa*, *Roxb. Hort. Beng.* 97; *Fl. Ind.* iii. 172; *Wall. Cat.* 1855, not of *Cav.* *S. tenax*, *Ham. in W. & A. Prodr.* i. l.c.; *Wall. Cat.* 1855, E, F. ? *S. radicans*, *Cav. Diss.* i. p. 8; *W. & A. Prodr.* i. 59.—*Rheede Hort. Mal.* x. 69.

BHUTAN, TENASSERIM, COROMANDEL, MYSORE, CONCAN, CEYLON.

A herb or undershrub 1–2 ft. high. *Leaves* 2½ by 2 in., coarsely toothed, downy beneath; petiole 1½ in. *Peduncle* jointed in the middle. *Flowers* scarcely ½ in. diam.—Perhaps not specifically distinct from *S. humilis*.

** *Suffrutescent (except S. corylifolia) erect or rarely procumbent.*

3. **S. Schimperiana**, *Hochst. in Rich. Fl. Abyss.* i. 66; perennial, shrubby, branches repeatedly forked, leaves oblong retuse base cuneate, carpels 5 subglobose beaks short connivent. *Mast. in Oliv. Fl. Trop. Afr.* i. 180. *Sida cuneifolia*, *Roxb. Fl. Ind.* iii. 170. *Dictyocarpus truncatus*, *Wight in Ann. Sc. Nat. ser. 2, xi.* 169; *Madras Journ. Lit. & Sc.* v. t. 19. *Melochia truncata* and *Hermannia aluifolia*, *Wall. Cat.* 1196 K.

WESTERN PENINSULA; Carnatic and the Dekkan, Wight, &c.—DISTRIB. Abyssinia, S. Africa.

A woody undershrub, with a thick rootstock. *Branches* intricate, decumbent or erect. *Leaves* $\frac{1}{2}$ in., sparingly covered with stellate hairs, petiole very short. *Flowers* solitary, axillary, shortly petioled. *Sepals* 5, connate below the middle in a cup-shaped tube. *Petals* pink. *Carpels* ultimately dehiscing along the inner edge.

4. **S. spinosa**, L.; DC. Prodr. i. 460; shrubby, erect, branches often with spiny tubercles below the variable leaves, which are hoary beneath, carpels 5, beaks erect. *S. alba*, L.; W. & A. Prodr. i. 58; DC. Prodr. l.c.; Roxb. Fl. Ind. iii. 174; Thwaites Enum. 28; Dalz. & Gibs. Bomb. Fl. 17. *S. retusa*, Wight Cat. 195, not of Linn. *S. alnifolia*, L.; DC. Prodr. i. 461; Roxb. Fl. Ind. iii. 174; W. & A. Prodr. i. 58; Wall. Cat. 1873. *S. glandulosa*, Roxb. mss. ex W. & A. Prodr. i. l.c. *S. Boriara*, Wall. Cat. 1872.

Hotter parts of India, from the NORTH-WEST PROVINCES to CEYLON.—DISTRIB. Tropics generally.

Leaves about $\frac{3}{4}$ in., ovate obovate or linear-lanceolate, obtusely serrate, base cordate, sometimes cuneate; petiole $\frac{1}{2}$ in. *Peduncles* solitary or clustered, jointed near the flower, equalling or exceeding the petiole. *Sepals* deltoid, connate below into a cup-shaped tube. *Carpels* membranous, scarcely longer than the calyx.

5. **S. grewioides**, Guill. & Perr. Fl. Seneg. i. 71; a cano-tomentose undershrub, leaves oblong-ovate obtuse, calyx-tube angular, carpels 7-8 wrinkled awned, beaks connivent. Boiss. Fl. Orient. i. 835; Mast. in Oliv. Fl. Trop. Afr. i. 182.

NORTH-WEST PROVINCES and SINDH.—DISTRIB. Arabia, Tropical Africa.

Leaves about $\frac{1}{2}$ in., crenate, downy on both surfaces; petiole shorter than the blade. *Stipules* linear-subulate, scarcely so long as the petiole. *Peduncles* solitary or twin, shorter than the petioles. *Flowers* yellow, small. *Carpels* indehiscent, or nearly so.

6. **S. carpinifolia**, L.; DC. Prodr. i. 460; an undershrub, leaves nearly glabrous narrow acuminate serrate, stipules linear-subulate longer than the petiole, peduncle jointed in the middle as long as the petiole, sepals triangular acute, calyx-tube subglobose, carpels 5-9 rugose awned. Wall. Cat. 1871. *S. acuta*, Burm.; Cav. Diss. i. t. 2, f. 3; DC. Prodr. i. 461; Wall. Cat. 1868, 1, 2, 3, 4, 5; Roxb. Fl. Ind. iii. 171; W. & A. Prodr. i. 57; Dalz. & Gibs. Bomb. Fl. 17; Thwaites Enum. 27; Wight Ic. t. 95; Wall. Cat. 1868 G. *S. lanceolata*, Roxb. l.c. 175; Wall. Cat. 1868 F. *S. stipulata*, Cav. Diss. i. t. 3, f. 10; DC. Prodr. i. 460; W. & A. Prodr. l.c. *S. Stauntoniana*, DC. l.c.; *S. scoparia*, Lour. ex W. & A. l.c.—Rheede, Hort. Mal. x. t. 53.

Generally distributed throughout the hotter parts of India.—DISTRIB. Tropics generally.

Perennial. *Leaves* about 2-3 in., linear-lanceolate; petiole $\frac{1}{10}$ - $\frac{1}{12}$ in.; stipules many-nerved, two or three times longer than the petiole. *Petals* yellow, twice the length of the calyx.—De Candolle's *S. compressa*, from Nipal, which I have not seen, is described as having the leaves hoary beneath, and the peduncles three times as long as the petiole.

7. **S. rhombifolia**, Linn.; shrubby, erect, leaves polymorphous tapering at the base, peduncle longer than the petiole, carpels 10 awned or not, as long as the calyx. DC. Prodr. i. 462; Roxb. Fl. Ind. iii. 176; Wall. Cat. 1862, 2; Thwaites Enum. 28. *S. canariensis*, Willd.; DC. Prodr. i. 462. *Sida compressa*, Wall. Cat. 1866; DC. Prodr. i. 462.

Widely distributed throughout India.—DISTRIB. Tropics of both hemispheres.

Very variable, perennial, glabrous or with scattered stellate hairs. *Leaves* generally more or less rhomboid, under side hoary, rarely green; stipules linear-setaceous, longer than the petiole. *Peduncle* rarely less than twice as long as the petiole, axillary or clustered at the ends of the branches. *Flowers* yellow, rarely white. *Sepals* deltoid

acuminate. *Carpels* smooth or reticulate.—Very variable in form of leaf, relative length of peduncle, position of joint, and size of the carpellary awns.—This species and its allies yield good fibre.

The following forms may be more or less readily distinguished, and many more might be added, but their characters merge so much one into the other, that discrimination becomes difficult.

VAR. 1. *scabrida*, W. & A. Prodr. i. 57 (sp.); sprinkled with rigid hairs, leaves concorous, peduncles jointed at the base, carpels awned.

VAR. 2. *retusa*, Linn. (sp.); leaves obovate retuse hoary underneath, peduncles equalling the leaves jointed above the middle, carpellary awns short.—*Cav. Diss.* i. t. 3, f. 4, and *Diss.* v. t. 131, f. 2; *W. & A. Prodr.* i. 58; *Wall. Cat.* 1870; *DC. Prodr.* i. 462; *Roxb. Fl. Ind.* iii. 175; *Dalz. & Gibs. Bomb. Fl.* 17. *S. chinensis*, *Retz ex Roxb. Hort. Beng.* 97; *Fl. Ind.* iii. 174. *S. philippica*, *DC. Prodr.* i. 462; *W. & A. Prodr. loc.*; *Wall. Cat.* 1869; *Rheede Hort. Mal.* x. 18; *Rumph. Amb.* v. t. 19.—The *S. corynocarpa*, *Wall. Cat.* 1870, seems to be a form of this variety, with densely intricate woody branches, and long carpellary awns.

VAR. 3. *rhomboidea*, *Roxb. Hort. Beng.* 50, *Fl. Ind.* iii. 176 (sp.); leaves rhomboid hoary beneath, peduncles jointed at the base, carpellary awns very short inflected. *DC. Prodr.* i. 462; *W. & A. Prodr.* i. 57; *Wall. Cat.* 1862 E, 1865; *Thwaites Enum.* 28. *S. rhombifolia*, *Wall. Cat.* 1862 F. ? *S. orientalis*, *Cav. Diss.* i. t. 12.—The flowers expand at noon (*Roxb.*).

VAR. 4. *obovata*, *Wall. Cat.* 1864 (sp.); leaves $1\frac{1}{2}$ by 2 in. broadly obovate hoary beneath, apex coarsely toothed, base cuneate, petiole $\frac{1}{4}$ in., peduncle longer than the petiole shorter than the blade.

VAR. 5. *microphylla*, *Cav. Diss.* i. t. 12, f. 2 (sp.); leaves small elliptic dentate hoary beneath, peduncle slightly exceeding the petiole, carpels 5–7 awned.—*Roxb. Fl. Ind.* iii. 170; *DC. Prodr.* i. 461.

8. ***S. corylifolia***, *Wall. Cat.* 1865; leaves oblong glabrous on both surfaces crenate-serrate base rounded, peduncle longer than the petiole jointed above the middle, carpels smooth, awns long erect covered with reflexed bristles.

BIRMA, *Wallich.*

Herbaceous. *Leaves* 4 by 2 in., concolorous; petiole $1\frac{1}{4}$ in.; stipules deciduous. *Peduncle* $1\frac{1}{2}$ in. *Calyx* broad, cup-shaped, $\frac{1}{2}$ in. diam., glabrous; sepals deltoid, acute, shorter than the carpellary awns.—Resembles *S. cordifolia* in the long awns.

9. ***S. cordifolia***, *L.*; *DC. Prodr.* i. 464; downy, erect, leaves cordate-oblong obtuse crenate, carpels 10 awned awns longer than the calyx covered with stiff reflexed hairs. *Roxb. Fl. Ind.* iii. 177; *Wall. Cat.* 1849; *W. & A. Prodr.* i. 58; *Thwaites Enum.* 28; *Dalz. & Gibs. Bomb. Fl.* 17; *Mast. in Oliv. Fl. Trop. Afr.* i. 181; *Miq. Fl. Ind. Bat.* i. pt. 2, 140. *S. herbacea*, *Cav. Diss.* i. 19, t. 13, f. 1; *DC. Prodr.* i. 463. *S. micans*, *Cav. Diss.* i. 19, t. 3, f. 1. *S. rotundifolia*, *Cav. Diss.* i. 20, t. 3, f. 6, and *Diss.* vi. t. 194, f. 2; *Wall. Cat.* 1849, D; *DC. Prodr.* i. 464. *S. althæifolia*, *Swartz*; *Guill. & Per. Fl. Seneg.* i. 73.—*Rheede Hort. Mal.* x. t. 54.

Generally distributed throughout tropical and subtropical India.—DISTRIB. A tropical weed.

Annual or perennial. *Leaves* $1\frac{1}{2}$ –2 by 1 – $1\frac{1}{4}$ in., very downy on both surfaces; petiole as long as the leaf; stipules linear, half the length of the petiole. *Peduncles* jointed near the flower, lower distant longer than the petioles, upper crowded very short. *Flowers* yellow. *Carpels* furrowed at the back, sides reticulated.—Flowers with the other species in the rainy and cool seasons.

DOUBTFUL SPECIES.

S. PENTACARPUS, *Roxb. ex Horn. Supp.* 78; *DC. Prodr.* i. 473, an annual plant having cordate sub-tricuspidate leaves, peduncles as long as the petioles, and mucous very hispid carpels.—*Kosteletzkya pentacarpus* is not a native of India.

4.* **WISSADULA**, Medik.

Undershrubs, more or less beset with soft hairs. *Leaves* palmately lobed. *Inflorescence* lax, paniced. *Bracteoles* 0. *Calyx* of 5 sepals which are free above tubular below. *Petals* 5, connate below and adherent to the tube of the stamens. *Staminal-tube* divided at the apex into numerous filaments. *Styles* as many as the cells of the ovary. *Ripe carpels* 5, many-seeded, beaked, dehiscent, often with a transverse false partition. *Seeds* 1-3 in each cell, lower descending, upper ascending.—**DISTRIB.** Species 5 or 6 tropical American, and one common in all the hotter parts of the globe. In habit they differ from the species of *Sida* and *Abutilon*.

W. ROSTRATA, *Planch. in Hook. Niger Flora*, 229; peduncle longer than the petiole, carpels with a false partition. *Mast. in Oliv. Fl. Trop. Afr.* i. 182. *W. periplocifolia*, *Thwaites Enum.* 27. *W. zeylanica*, *Medik.; Miq. Fl. Ind. Bat.* i. pt. 2, 147. *Abutilon periplocifolium*, *G. Don Gen. Syst.* i. 500; *W. & A. Prodr.* i. 55. *Sida periplocifolia*, *L.; DC. Prodr.* i. 467; *Roxb. Fl. Ind.* iii. 172; *Wall. Cat.* 1861, B, C, D.

Cultivated in India, naturalized in Ceylon, and very common in the south of the island.—**DISTRIB.** Java, Tropical Africa and America.

Suffrutescent, more or less densely clothed with stellate tomentum. *Leaves* 3-4 by 1½-2 in. and upwards, glabrous above, pubescent beneath, cordate-oblong, entire, tapering into a long point; petiole 1 in. *Flowers* yellow, in lax panicles. *Peduncles* 3 in., jointed near the top. *Calyx* campanulate, 5-cleft. *Petals* exceeding the calyx. *Ripe carpels* awned, much longer than the calyx.—Roxburgh says this is a native of the Malay islands, and yields a beautiful hemp.

VAR. 1. zeylanica, *DC. Prodr.* i. 467; leaves narrow, slightly scabrid above.—*Pluk. t.* 74, f. 7; *Dill. Hort. Elth.* i. t. 3, f. 2.

W. LESCHENAULTIANA, peduncles not exceeding the petiole, carpels without false partitions. *Sida Leschenaultiana*, *DC. Prodr.* i. 468. *Abutilon Leschenaultianum*, *Don Gen. Syst.* i. 500.

Cultivated in India and in Ceylon; its native country not known.

Suffrutescent, softly downy. *Leaves* 2-3 by 2½-3½ in., glabrescent above, softly tomentose beneath, cordate-ovate, acuminate, quite entire; petiole 3-4 in. *Inflorescence* terminal, paniced, many-flowered. *Peduncles* 1-2 in. *Petals* obcordate. *Ripe carpels* ovoid.—In habit this plant agrees with *Wissadula*, but it is destitute of the false partitions in the carpel.

5. **ABUTILON**, Gærtn.

Herbs or undershrubs more or less covered with down. *Leaves* angled or palmately-lobed. *Inflorescence* axillary or terminal. *Bracteoles* 0. *Calyx* of 5 valvate sepals, tubular below. *Corolla* of 5 petals, free above, connate below and adnate to the tube of the stamens. *Staminal-tube* divided at the apex into numerous filaments. *Carpels* 5-∞. *Styles* as many as the carpels. *Ripe carpels* separating from the axis, awned or not, 1- or more-seeded. *Seeds* reniform, upper ascending, lower descending.—**DISTRIB.** About 70 species, all tropical or subtropical. As a genus hardly separable from *Sida*, except in habit and in the larger flowers, which latter (in the Indian species) usually open in the evening, while in the *Sidas* they expand about noon.

* *Carpels* more than 10 (except in *A. polyandrum*).

1. **A. polyandrum**, *Schlecht. in Link Enum Hort. Berol.* ii. 264; leaves roundish-cordate with a long acumens, filaments free nearly to the base, staminal-tube with a ring of hairs at the top, carpels 5 awned. *Don*

Gen. Syst. i. 500; *W. & A. Prodr.* i. 55; *Thwaites Enum.* 27; *Dalz. & Gibs. Bomb. Fl.* 17; *Miq. Fl. Ind. Bat.* i. pt. 2, 144. *Sida oxyphylla*, *Wall. Cat.* 1850. *S. polyandra*, *Roxb. Hort. Beng.* 50, *Fl. Ind.* iii. 173; *Wall. Cat.* 1851, D, E, F. *S. persica*, *Burm. Fl. Ind.* t. 47, f. 1; *Cav. Diss.* i. t. 4, f. 1; *DC. Prodr.* i. 473. *S. macrophylla*, *Wall. Cat.* 1851, D.

NORTH-WEST PROVINCES, TROPICAL HIMALAYA, WESTERN PENINSULA, BURMA, CEYLON.—DISTRIB. Java, South Trop. Africa, Persia?

Annual or perennial. *Leaves* 4-5 in., downy, especially beneath; petiole 4 in. *Peduncles* clustered in small terminal racemes, jointed near the top. *Sepals* lanceolate, forming a bell-shaped tube below. *Corolla* 1½ in. diam. *Carpels* hispid exceeding the calyx, awns erect.

2. ***A. asiaticum***, *G. Don Gen. Syst.* i. 503; leaves rugose above velvety beneath acute or acuminate, toothed, cordate at the base, sepals ovate acute or acuminate, petals overlapping, ripe carpels about 20 hispid scarcely longer than the calyx, awns erect. *Thwaites Enum.* 27; *W. & A. Prodr.* i. 56; *Mast. in Oliv. Fl. Trop. Afr.* i. 184. *Sida asiatica*, *Linn. Sp.* 964; *Cav. Diss.* i. t. 7, f. 2, and v. t. 128, f. 1; *Miq. Fl. Ind. Bat.* i. pt. 2, 145; *L'Her. Stirp.* 130.

WESTERN PENINSULA; CEYLON.—DISTRIB. Tropics of both hemispheres.

Herbaceous or suffrutescent. *Leaves* 3-4 in. and more, subscabrid above, velvety beneath; stipules linear, deflexed. *Peduncles* stout, jointed near the flower, longer than the petiole. *Flowers* yellow, 2 in. diam. *Calyx* campanulate. *Carpels* rarely muticous.

The synonymy of this and the two following species is much confused. The *A. asiaticum* of Wight's herbarium is indistinguishable from *A. indicum* of Don. The rugose upper surface of the leaf mentioned by L'Heritier is one of the best marks of this species, the shape of the calyx-lobes, and the relative size and amount of pubescence of the carpels is more variable.

3. ***A. indicum***, *G. Don Gen. Syst.* i. 504; leaves cordate nearly entire or irregularly toothed covered on both surfaces with closely-felted white down with few or no hairs intermingled, sepals ovate acute, ripe carpels 15-20 longer than the calyx glabrescent truncate or shortly awned, awns spreading. *A. asiaticum*, *W. & A. Prodr.* i. 56, not *Sida asiatica*, *Linn.*; *W. & A. Prodr.* i. 56; *Wight. Ic.* t. 12; *Dalz. & Gibs. Bomb. Fl.* 18; *Thwaites Enum.* 27; *Mast. in Oliv. Fl. Trop. Afr.* i. 186; *Miq. Fl. Ind. Bat.* i. pt. 2, 146. *Sida indica*, *L.*; *DC. Prodr.* i. 471; *Cav. Diss.* i. p. 33, t. 7, f. 10; *Roxb. Fl. Ind.* iii. 179; *Wall. Cat.* 1859, 1, 2, D, F.

Generally distributed throughout tropical India (wanting in Malacca). CEYLON, *Thwaites*.—DISTRIB. Tropics.

Annual or perennial. *Stipules* deflexed. *Peduncles* longer than the petioles, jointed near the top. *Flowers* yellow, 1 in. diam., opening in the evening.

VAR. 1. *populifolium*, *W. & A. Prodr.* i. 56, var. β ; leaves more or less acuminate. *Abutilon populifolium*, *G. Don Gen. Syst.* i. 503; *Sida populifolia*, *Lam.*; *Cav. Diss.* i. t. 7, f. 9; *DC. Prodr.* i. 470; *Roxb. Fl. Ind.* iii. 179; *Wall. Cat.* 1858; *Sida Beloere*, *L'Her. Stirp.* i. 130. *S. Eteromischos*, *Cav. Diss.* ii. 55, and v. p. 275, t. 128. —*Rumph. Amb.* iv. t. xi.; *Rheede Hort. Mal.* vi. t. 65.

Lamarck's plant is open to doubt, as the stem is described as purplish, and the stipules as spirally twisted.

4. ***A. bidentatum***, *Hochst. in A. Rich. Fl. Abyss.* i. 68; leaves cordate-ovate acuminate crenate-toothed, stipules short subulate, panicles axillary, peduncles shorter than the leaves, ripe carpels 20 smooth exceeding the calyx, awns spreading. *Mast. in Oliv. Fl. Trop. Afr.* i. 186.

NORTH-WEST PROVINCES, *Edgeworth*; SINDH, *Stocks*; PANJAB, *T. Thomson*; CAN. —DISTRIB. Tropical Africa and Arabia.

Erect, perennial. *Leaves* 2½–3 by 2 in., downy on both surfaces, lower petioles 4–5 in. *Peduncles* 1½–2 in. *Sepals* ovate, acute. *Calyx-tube* cup-shaped. *Ripe fruit* ¼ in. diam. *Carpels* oblong, glabrescent, twice the length of the calyx.

5. **A. graveolens**, *W. & A. Prodr.* i. 56; branches covered with clammy pubescence mixed with spreading hairs, leaves orbicular-cordate abruptly acuminate velvety on both sides, stipules falcate, peduncles as long as the petioles, sepals ovate acuminate, carpels 20 or more rounded hairy. *Mast. in Oliv. Fl. Trop. Afr.* i. 184; *Thwaites Enum.* 27. *Sida graveolens*, *Roxb. Hort. Beng.* 50, *Fl.*; *Ind.* iii. 179; *DC. Prodr.* i. 473; *Wall. Cat.* 1856, D, E, F, G. *S. hirta*, *Wall. Cat.* 1852, B partly.

NORTH-WEST PROVINCES, SINDH, NILGHIRRHIS MTS., and CEYLON.—DISTRIB. Beluchistan, Java, Tropical Africa and Australia.

Leaves sometimes lobed; petiole almost as long as the blade; stipules linear, reflexed. *Flowers* large, orange coloured, with a darker centre, ultimately reflexed. *Petals* obcordate. *Carpels* truncate, rather longer than the calyx, not awned.—The fresh plant, according to Roxburgh, has a strong unpleasant smell. There is no constant difference between this and the following form, but the var. *hirtum* is usually more densely hispid, and its carpels are more awned and scarcely exceed the calyx.

VAR. 1. *hirtum*, *G. Don Gen. Syst.* i. 503 (sp.); stem copiously hispid, pubescence brownish, leaves subscribrate above, stipules linear-subulate, carpels about 20, acute, hairy, about the length of the calyx.—*Abutilon hirtum*, *W. & A. Prodr.* i. 56; *Wall. Cat.* 1856; *Miq. Fl. Ind. Bat.* i. pt. 2, 145. *Sida hirta*, *Lam. Dict.* i. 7; *DC. Prodr.* i. 470; *Wall. Cat.* 1858 G; *Cav. Diss.* t. 129. *S. pilosa*, *L'Her. Stirp.* 130.

6. **A. muticum**, *G. Don Gen. Syst.* i. 502; pubescent and hairy, leaves roundish-cordate, sepals broad cuspidate, carpels about 20 reniform awnless downy shorter than the calyx. *Boiss. Fl. Orient.* i. 836. *A. tomentosum*, *W. & A. Prodr.* i. 56; *Thwaites Enum.* 27; *Dalz. & Gibs. Bomb. Fl.* 18. *A. glaucum*, *Don Gen. Syst.* i. 504; *Mast. in Oliv. Fl. Trop. Afr.* i. 185. *Sida glauca*, *Cav. Ic.* 1, 8, t. 11. *S. hirta*, *Wall. Cat.* 1852 B partly. *S. villosa*, *Wall. Cat.* 1856 C. *S. asiatica*, *Wall. Cat.* 1852 D. *S. mutica*, *Delile Flor. Egypt.* 60, n. 45. *S. tomentosa*, *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 178; *Wall. Cat.* 1852 A, C, D, E.

NORTH-WEST PROVINCES, and WESTERN PENINSULA, *Stocks, Edgeworth, &c.* CEYLON, Tangalle, *Thwaites*.—DISTRIB. Afghanistan, Trop. Africa, Egypt.

Annual or suffrutescent. *Leaves* tomentose on both surfaces, toothed; petioles 2 in.; stipules lanceolate, reflexed. *Peduncles* as long as the petiole, stout, jointed near the flower, usually arranged in axillary nearly leafless clusters. *Flowers* large, orange. *Calyx* very tomentose, divided halfway down. *Petals* obliquely triangular, often lobed. *Fruit* globose, depressed at the summit. *Seeds* 3, scabrous.

7. **A. Avicennæ**, *Gærtn. Carp.* ii. 251; leaves orbicular-cordate with a long point, peduncle shorter than the petiole, sepals free nearly to the base, carpellary awns ultimately widely spreading. *Boiss. Fl. Orient.* i. 836. *Sida Abutilon*, *L.*; *DC. Prodr.* i. 470; *Roxb. Fl. Ind.* iii. 178.

NORTH-WEST INDIA, SINDH, KASHMIR, and BENGAL.—DISTRIB. N. Asia and westward to S. Europe, and also in N. America.

Annual, herbaceous, softly tomentose. *Leaves* 3–4 in.; petiole 3 in. *Peduncles* 1 in., solitary, axillary. *Sepals* ovate, acute. *Petals* yellow, hardly exceeding the sepals. *Staminal-tube* very short. *Carpels* 15–20, much exceeding the sepals, oblong, truncate, hispidulous or pubescent, with 2 long horizontal spreading ciliolate awns. *Seeds* pilose.

8. **A. crispum**, *G. Don Syst.* i. 502; pubescent and hairy, leaves cordate roundish acuminate-crenate upper petioled or nearly sessile, fruit

globose bent downwards when ripe, carpels 12 or more wrinkled membranous awnless. *Wight Ic.* t. 68; *W. & A. Prodr.* i. 56; *Thwaites Enum.* 401. *Sida crispa* L.; *DC. Prodr.* i. 469; *Roxb. Fl. Ind.* iii. 177; *Wall. Cat.* 1857 C, D, E, F. *S. indica*, *Cav. Diss.* 33, tab. 7, f. 10? and *of Herb. Heyne*. *S. montana*, *Roxb. Ic. ined.*

WESTERN PENINSULA; Nilgiri Mts., the Dekkan, and Coromandel.—DISTRIB. Tropical and subtropical America.

A weak diffuse annual. *Leaves* 2–3 by $1\frac{1}{2}$ in.; stipules filiform. *Peduncles* as long as the petiole, geniculate above the middle. *Flowers* small, yellow. *Calyx* tubular below, divided beyond the middle into lanceolate sepals. *Carpels* obtuse, nearly glabrous, 2–3-seeded. *Seeds* pilose.

** *Carpels not exceeding 10.*

9. **A. ramosum**, *Guill. & Perr. Fl. Seneg.* i. 68; leaves ovate-cordate acuminate, peduncles shorter than the petioles, sepals free for half their length, ripe carpels about 10 much exceeding the sepals, hispid, awns spreading. *Mast. in Oliv. Fl. Trop. Afr.* i. 186. *A. sidoides*, *Dalz. & Gibs. Bomb. Fl.* 18. *Sida ramosa*, *Cav. Diss.* i. 28, t. 6, f. 1.

NORTH-WEST PROVINCES; CONCAN, *Dalzell*.—DISTRIB. Tropical Africa.

Suffrutescent. *Branches* downy and with thin spreading hairs. *Leaves* long-petioled, sometimes 3-cuspidate, crenate-serrate. *Peduncles* axillary and terminal, trichotomous. *Calyx-tube* broadly cup-shaped. *Sepals* ovate, acute. *Petals* twice as long as the sepals.

10. **A. fruticosum**, *Guill. & Perr. Fl. Seneg.* i. 73; leaves ovate-cordate acute, stipules linear, carpels 10 truncate awnless pointed but little longer than the calyx. *Boiss. Fl. Orient.* i. 836; *Mast. in Oliv. Fl. Trop. Afr.* i. 187. *A. microphyllum*, *A. Rich. Fl. Abyss.* i. 70, t. 15. *A. albidum*, *Webb. & Berth. Phyt. Canar.* iii. 39, t. 2. ? *Sida amœna*, *Wall. Cat.* 1848.

SINDH, *Stocks, Aitcheson*; IRRRAWADDI? *Wallich*.—DISTRIB. Tropical Africa, Arabia, Java.

Suffrutescent, covered with white down. *Leaves* small, denticulate or nearly entire; petiole short. *Peduncles* solitary, axillary, shorter than the petiole, 1–3-flowered, pedicels jointed above the middle. *Sepals* ovate, acute, scarcely cuspidate, combined below into a shallow cup. *Fruit* cylindric, truncate, scarcely exceeding the calyx. *Seeds* sparingly pilose.—*Dalzell* says the flowers of this species expand at midday like the *Sidas*.

11. **A. neilgherrense**, *Munro in Wight. Ill.* t. 66; suffruticose, subglabrous, leaves whitish beneath roundish deeply peltate-cordate acuminate crenate; peduncles about the length of the petiole, corolla spreading, carpels truncate, twice the length of the sepals.

WESTERN PENINSULA, Nilgiri Mts., *Munro*.

Leaves sometimes $7\frac{1}{2}$ in. *Peduncles* 2–10-flowered. *Sepals* lanceolate, acuminate, villous. *Petals* obovate, united below into a short tube, hairy at the orifice. *Tube* of the stamens glabrous. *Carpels* about 9.—I only know this species from *Munro's* description above cited.

In addition to the foregoing species, *A. auritum* (*Sida aurita*, *Wall. Cat.* 1860), a Javanese plant, is cultivated in India, and is sometimes met with as an escape from gardens.

5.* **MALACHRA**, Linn.

Herbs. *Leaves* angled. *Flowers* in dense heads, usually intermixed with bracteoles. *Sepals* 5, forming below the middle a cup-like tube. *Petals* 5, coherent below, and connate at the base with the tube of the stamens. *Staminal-tube* truncate or 5-toothed, filaments numerous. *Carpels* 5, 1-ovuled; styles 10. *Ripe carpels* 1-seeded, indehiscent, separating from the axis, smooth. *Seeds* reniform, ascending.—**DISTRIB.** Species 5 or 6, all American but the following, which is widely distributed throughout the tropics.

M. CAPITATA, L.; *DC. Prodr.* i. 440; leaves roundish-angled cordate toothed, bracteoles with a white spot at the base. *Mast. in Oliv. Fl. Trop. Afr.* i. 188.

Throughout the hotter parts of India from the North West provinces to the Carnatic, probably introduced.—**DISTRIB.** W. tropical Africa, tropical America.

Annual or perennial, coarsely hairy. *Leaves* 5-6 in. wide or less; petiole 4 in.; stipules linear. *Flowers* in axillary or terminal heads. *Petals* yellow or white, longer than the subulate sepals. *Fruit* subglobose, depressed.—It is singular that this plant is not mentioned either by Wight or Roxburgh, and that it is not included in Wall. Cat. In Wallich's herbarium, however, there are some specimens without numbers, and with no localities assigned, while others are from the Calcutta garden.

6. **URENA**, Linn.

Herbs or undershrubs, more or less covered with rigid stellate hairs. *Leaves* angled or lobed. *Flowers* clustered. *Bracteoles* 5, adnate to the 5-cleft calyx, sometimes coherent at the base into a cup. *Petals* 5, often tomentose at the back, free above, connate below and united to the base of the tube of the stamens. *Staminal-tube* truncate or minutely toothed. *Anthers* nearly sessile. *Ovary* 5-celled, cells 1-ovuled, opposite the petals; stigmatic branches 10; stigmas capitate. *Ripe carpels* covered with hooked bristles or smooth, indehiscent, separating from the axis when ripe. *Seed* ascending; cotyledons bent and folded; radicle inferior.—**DISTRIB.** Species 4-5, natives of tropical and subtropical countries; 2 only are confined to Asia.

* *Carpels armed with hooked bristles.*

1. *U. lobata*, Linn.; leaves rounded angled not divided beyond the middle. *DC. Prodr.* i. 441; *Roxb. Fl. Ind.* iii. 182; *W. & A. Prodr.* i. 46; *Wall. Cat.* 1928; *Dalz. & Gibs. Bomb. Fl.* 18; *Thwaites En.* 25; *Miq. Fl. Ind. Bat.* i. pt. 2, 148. *U. cana*, Wall. Cat. 1930 B. *U. palmata*, *Roxb. Fl. Ind.* iii. 182.

Generally distributed over the hotter parts of India.—**DISTRIB.** Tropics of both hemispheres.

Very variable, herbaceous, more or less hairy. *Leaves* about 1-2 by 2-3 in., cordate, 5-7-lobed, lobes acute or obtuse; nerves 5-7, prominent on the under surface, the three central, or the midrib only provided with a gland on the under surface; petiole usually shorter than the blade. *Bracteoles* oblong-lanceolate, equalling the calyx. *Flowers* pink. *Carpels* densely pubescent, echinate.

VAR 1. *scabriuscula*, DC. *Prod.* i. 441 (sp.); herbaceous, leaves roundish scarcely lobed with 1-3 glands beneath, bracteoles linear longer than the sepals.—*U. scabriuscula*, Wall. Cat. 1928 F; *W. & A. Prodr.* i. 46; *Dalz. & Gibs. Bomb. Fl.* 18.—Wight and Arnott doubt this being a distinct species, but Dalzell considers it very distinct.

2. *U. sinuata*, Linn.; *DC. Prodr.* i. 441; leaves divided below the middle into 5 oblong lobes narrowed at the base and often pinnatifid. *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 182; *Wall. Cat.* 1933 E; *W. & A. Prodr.* i. 46;

Thuaites Enum. 25; *Dalz. & Gibs. Bomb. Fl.* 18. *U. muricata*, *DC. Prodr.* i. 442. *U. Lappago*, *DC. Prodr.* i. 441. *U. morifolia*, *DC. Prodr.* i. 442? *U. heterophylla*, *Smith in Rees. Cycl.* 37; *Wall. Cat.* 1933 E, F, G, H, K. *U. tomentosa*, *Wall. Cat.* 1933 H;—*Burm. Zeyl.* t. 69, f. 2. *Rheede Hort. Mal.* t. x. f. 2; *Rumph. Amb.* vi. t. 25; f. 2.

Generally distributed over the hotter parts of India.—**DISTRIB.** Tropics of both hemispheres.

Very variable in amount of pubescence, and in the form of the foliage, herbaceous, perennial. *Leaves* downy, lobes serrated. *Glands* on under surface of nerves 1-3. *Bracteoles* linear-oblong, as long as the calyx. *Flowers* 1 in. diam. *Carpels* densely pubescent.

** *Carpels* smooth, unarmed.

3. ***U. repanda***, *Roxb. Fl. Ind.* iii. 182; stellate-hairy, leaves roundish or somewhat lobed, flowers racemose, bracteoles 5 subulate connate below into a cup, sepals united for half their length. *W. & A. Prodr.* i. 46; *Wight Ill.* i. 65. *U. rigida*, *Wall. Cat.* 1929 (partly). *U. Hamiltoniana*, *Wall. Cat.* 2700. *Pavonia repanda*, *Spreng. Syst.* iii. 98. *Urena speciosa*, *Wall. Pl. As. Rar.* t. 26, *Cat.* 1931.

NORTH-WEST INDIA, UPPER GANGETIC PLAIN, the WESTERN PENINSULA and AWA. Shrubby. *Leaves* shortly petioled, rough above, midrib glandular at the base beneath, lower 2-2½ in. long, roundish, rarely lobed, cordate at the base, repand-serrate, upper lanceolate. *Flowers* in ultimately leafless clusters. *Bracteoles* ¼-½ in.; subcoriaceous, exceeding the membranous calyx. *Corolla* pink, twice the length of the bracteoles. *Seed* ascending, smooth.

4. ***U. rigida***, *Wall. Cat.* 1929 (partly); stellate-hairy, leaves cordate roundish, flowers in heads at the ends of the branches, bracteoles 5, lanceolate combined for half their length into a bell-shaped tube, sepals free nearly to the base.

BIRMA, *Wallich, McClelland*; MALACCA, *Griffith*.—**DISTRIB.** Borneo.

Perennial. *Stem* purplish, thinly stellate-hairy. *Leaves* petioled, about 2 by 2¼ in., base cordate, roundish serrulate, midrib glandular beneath; stipules setaceous. *Flowers* mixed with floral leaves, in terminal subsessile heads. *Sepals* ¼ in., nearly as long as the bracteoles, membranous, villous at the back. *Corolla* white, tubular at the base, above 5-petalous, twice the length of the bracteoles. *Stamen-tube* with 5 minute teeth at the upper edge. *Ripe carpels* hispid, reticulate. *Seed* pilose.—This species has the habit of a *Malachra*. The nearly free sepals are noteworthy.

7. **PAVONIA**, Cav.

Herbs or undershrubs. *Leaves* entire, angular or lobed, more or less downy. *Flowers* axillary or clustered at the ends of the branches. *Bracteoles* 5-∞, free or forming a tube at the base. *Calyx* 5-parted. *Corolla* 5-petalous, united at the base to the staminal-tube. *Staminal-tube* truncate or 5-toothed at the apex. *Ovary* 5-celled, cells usually opposite the sepals, rarely opposite the petals; styles 10, stigmas capitate, ovules 1 in each cell. *Ripe carpels* separating from the axis, entirely indehiscent, or more or less 2-valved, smooth, netted or winged, never glochidiate. *Seeds* ascending.—**DISTRIB.** Species about 60, chiefly tropical America.

SECT. 1. **Lebretonia**. *Bracteoles* 5-6. *Carpels* indehiscent.

1. ***P. glechomifolia***, *A. Rich. Fl. Abyss.* i. 54; *Mast. in. Oliv. Fl. Trop. Afr.* i. 190. *P. procumbens*, *Boiss. Fl. Orient.* i. 837. *Urena cordata*,

Herb. Heyne. Lebretonia procumbens, *Wall. Cat.* 2688; *Wight Ic.* t. 4; *W. & A. Prodr.* i. 47. *L. flava*, *Wall. Cat.* 1883.—*Pluk.* t. 352, f. 5.

NORTH-WEST PROVINCES, SINDH, the WESTERN PENINSULA, BIRMA, and CEYLON.—*DISTRIB.* Trop. Africa, Arabia.

Rigid, procumbent, more or less pubescent. *Leaves* 2½ by 2 in., hirsute or glabrous, roundish-cordate, crenate-serrate, somewhat 3-lobed, midlobe longest; petiole 2 in. *Peduncle* slender, axillary, 1-flowered, about the length of the petiole. *Bracteoles* 5-6, ovate-lanceolate, exceeding the sepals. *Petals* yellow, longer than the bracteoles. *Ripe carpels* 5, muciculate, sometimes with a serrulate crest.—Variable in pubescence, size of bracteoles and armature of carpels.

SECT. 2. **Eupavonia.** *Bracteoles* 10 or more. *Carpels* dehiscent.

2. **P. arabica**, *Hochst. in Schimp. Pl. Exsicc. Abyss.*; leaves nearly entire, carpels unarmed wingless. *Mast. in Oliv. Fl. Trop. Afr.* i. 193; *Boiss. Fl. Orient.* i. 837.

SINDH, *Stocks*.—*DISTRIB.* Abyssinia.

Perennial, more or less densely clothed with down. *Stems* erect. *Leaves* 1½ by ½ in., subcordate, oblong, entire or slightly dentate; petiole as long as the leaf. *Peduncle* axillary, as long as the petiole. *Bracteoles* 10-12, linear, villous, exceeding the calyx and corolla. *Sepals* lanceolate. *Corolla* pink. *Carpels* 5, oblong, 3-sided.

3. **P. zeylanica**, *Cav.*; *DC. Prodr.* i. 444; glandular-pubescent, leaves hispid deeply 3-5-lobed, carpels unarmed slightly winged. *Roxb. Fl. Ind.* iii. 214; *Wall. Cat.* 1885 A to D; *W. & A. Prodr.* i. 47; *Dalz. & Gibs. Bomb. Fl.* 21; *Thwaites Enum.* 401. *Hibiscus zeylanicus*, *Linn.*; *Roxb. Hort. Beng.* 50.—*Pluk.* t. 125, f. 3; *Burm. Fl. Ind.* t. 48, f. 3.

NORTH-WEST PROVINCES, SINDH, the WESTERN PENINSULA and CEYLON.—*DISTRIB.* Trop. Africa, Mauritius.

Perennial, much branched, hispid. *Leaves* 1 by ¾ in. and upwards, cordate, roundish, deeply 3-5-lobed, lobes wedge-shaped, dentate, midlobe longest; petiole equalling or exceeding the blade. *Peduncles* about the length of the petiole, solitary, axillary. *Bracteoles* 8-12, linear, ciliolate. *Sepals* lanceolate. *Carpels* oblong, 3-sided.—Variable in the form and lobing of the leaf.

4. **P. odorata**, *Willd.*; *DC. Prodr.* i. 144; glandular-pubescent, leaves slightly 3-5-lobed, carpels unarmed wingless. *Roxb. Fl. Ind.* iii. 214; *Wall. Cat.* 1886, 1, 2, D, E; *W. & A. Prodr.* i. 47; *Thwaites Enum.* 26; *Mast. in Oliv. Fl. Trop. Afr.* i. 193. *Hibiscus odoratus*, *Roxb. Hort. Beng.* 50. *P. sidoides*, *Horn. in DC. Prodr.* i. 444; *Wall. Cat.* 1886 F, G. *P. rosea*, *Wall. Cat.* 1887; *P. Romborua*, *Wall. Cat.* 2690.

NORTH-WEST PROVINCES, SINDH and BANDA, *Edgeworth*; WESTERN PENINSULA, BIRMA and CEYLON.—*DISTRIB.* East Trop. Africa.

Erect, herbaceous, covered with sticky hairs. *Leaves* 2½ by 3 in., cordate-ovate, with 3-5 shallow pointed lobes; lower petioles longer than the blades. *Peduncles* as long as the leaves, 1-flowered, clustered at the ends of the branches. *Bracteoles* 10-12, linear. *Sepals* lanceolate. *Corolla* pink, twice the length of the calyx. *Carpels* obovoid.

5. **P. ceratocarpa**, *Dalzell in herb.*; stellate-hairy, leaves oblong irregularly toothed, carpels each with 3 terminal horns and 4 linear basal appendages.

SINDH, *Stocks*.

An undershrub. *Leaves* 1½-2 by 1 in., oblong, rounded at the base, obtuse, irregularly coarsely toothed; petiole ¾ in. *Peduncles* axillary and crowded at the end of the branches, jointed near the top. *Flowers* 1 in. diam. *Bracteoles* 10, linear, connate at

the base. *Calyx* broadly campanulate, lobes deltoid. *Corolla* yellow, 2-3 times longer than the calyx. *Ovary* depressed. *Carpels* 5, woody, pyriform, splitting through the back, 3-horned at the apex, and with 4 linear obtuse wing-like appendages at the base. —Leaves gratefully acid, as in *Oxalis*, Dalzell.

6. **P. propinqua**, Garcke in Schweinf. *Fl. Æthiop.* i. 55; suffrutescent, stellate-hairy, leaves oblong crenate, bracteoles 10 linear-lanceolate, carpels with 2 short prickles. *Must. in Oliv. Fl. Trop. Afr.* i. 191. *P. grewioides*, Hochst. *Pl. Schimp. Exsicc. Abyss.*; Boiss. *Fl. Orient.* i. 837.

SINDH, *Stocks*.—DISTRIB. Beluchistan, Abyssinia.

Leaves 1-4 in., subcordate; petioles shorter than the leaves; stipules linear-subulate. *Peduncles* solitary, axillary or clustered at the ends of the branches. *Bracteoles* nearly free, one-half longer than the ovate lanceolate *sepals*. *Corolla* yellow, 1 in. diam., exceeding the bracteoles. *Fruit* subglobose, depressed; carpels woody.

Under the name *Diplopenta*, Alefeld (in *Æstr. Bot. Zeit.* 1863, p. 11) describes a genus of *Malvaceæ*, which he says differs from *Pavonia* in the presence of 5 stigmatic branches instead of 10. To this genus he refers *Pavonia odorata*, Willd., and a new species, which he calls *D. pedunculosa*, and which, he says, has been confused with *P. zeylanica*. I have seen no specimen of this genus, and suspect some error or accidental cohesion of styles.

8. DECASCHISTIA, W. & A.

Shrubs. *Leaves* entire or lobed. *Flowers* shortly peduncled, axillary or clustered and terminal. *Bracteoles* 10. *Sepals* 5, connate below. *Petals* 5, connate below and adnate to the tube of the stamens. *Staminal-tube* giving off many filaments below the apex. *Ovary* 10-celled, cells 1-ovuled; styles 10, connate below, stigmas capitate. *Capsule* loculicidally 10-valved. *Seeds* reniform, ascending.—DISTRIB. The following are the only species.

1. **D. trilobata**, Wight *Ic. t.* 88; lower leaves deeply 3-lobed, bracteoles considerably shorter than the calyx. *Dalz. & Gibs. Bomb. Fl.* 21.

WESTERN PENINSULA; Mysore, the Concan, and Dekkan.

A shrub, *branches* more or less hispid or tomentose. *Upper leaves* sometimes entire, lanceolate, lower more or less 3-lobed, lobes lanceolate or oblong-lanceolate, finely serrate; petiole $\frac{1}{2}$ in., downy; stipules linear or 3-lobed, equal to the petioles. *Peduncle* solitary, axillary, as long or longer than the petiole. *Flowers* 2 in. diam. *Bracteoles* linear. *Sepals* deltoid, connate below, twice the length of the bracteoles. *Capsule* hispid.

2. **D. crotonifolia**, W. & A. *Prodr.* i. 52; leaves simple rarely lobed coarsely toothed, bracteoles nearly as long as the calyx. *Wight Ic. t.* 42. *Hibiscus crotonifolius*, Wall. *Cat.* 1900 and 1901. *H. pterospermoides*, Wight mss.; Wall. *Cat.* 1901 B. *H. coriaceus*, Heyne mss.; W. & A. *l.c.*

WESTERN PENINSULA; Mysore and Madura. UPPER GANGETIC PLAIN, *Royle*.

A shrub. *Leaves* 4 by 2 in., leathery, simple or slightly lobed, coarsely toothed, velvety on both surfaces with a short dense tomentum, whitish beneath, midrib with a glandular pore at the base; petiole $1\frac{1}{2}$ in.; stipules linear-subulate. *Peduncle* longer than the petiole. *Bracteoles* nearly as long as the calyx. *Capsule* slightly hispid.

Among Maingay's specimens from Rangoon, is one (n. 213?) of which the flowers are too imperfect to allow of examination, but which is probably referable to this genus. *Leaves* 5 by 2 in., oblong-lanceolate, subcordate, sometimes 3-lobed at the apex, hoary-tomentose beneath; petiole $\frac{1}{2}$ in. *Peduncle* solitary, axillary, 1-flowered, as long as the petiole. *Bracteoles* 10, subulate-lanceolate, half the length of the calyx; *sepals* lanceolate. *Corolla* pink, 4 in. diam.

9. JULOSTYLES, Thwaites.

A tree. *Leaves* shortly petioled, lanceolate, entire, puberulous. *Panicle* terminal, pendulous. *Bracteoles* 5, forming below a bell-shaped tube. *Sepals* 5, smaller than the bracteoles, connate below. *Petals* 5, connate below, exceeding the sepals. *Staminal-tube* antheriferous below the middle, 5-toothed above. *Ovary* 2-celled; styles 2, connate below and densely hairy, free at the apex, stigmas large, globose, woolly; ovules 2, collateral in each cell ascending. *Fruit* not seen.

1. *J. angustifolia*, *Thwaites Enum.* 30; *Beddome Fl. Sylvat. Anal. Gen.* t. iii. *Kydia angustifolia*, *Arn. Pug. Pl. Ind. Or.* 4 (322).

CEYLON; south of the island, not uncommon, *Thwaites*.

A low tree. *Leaves* 5-8 by $1\frac{1}{2}$ -3 in., paler beneath; petiole $\frac{1}{4}$ - $\frac{3}{8}$ in. *Flowers* $\frac{1}{2}$ in. diam. *Corolla* pale yellow with a reddish centre. *Pollen-grains* globose, muricate.

10. DICELLOSTYLES, Benth.

Trees, more or less covered with stellate down. *Leaves* simple or slightly lobed. *Inflorescence* paniced; bracteoles 4-6, lanceolate, connate at the base, longer than the calyx. *Sepals* 5, ovate, connate below the middle, internally provided at the base with a ring of fleshy tubercles. *Petals* oblong, unsymmetrical, connate at the base. *Filaments* many, connate at the very base. *Ovary* 2-4-celled; styles 2, connate below the middle, stigmas large globose; ovules 2 in each cell, collateral, ascending. *Capsule* globose, hispid, 8-lobed, splitting into 2 (or more) indehiscent cocci. *Seeds* solitary, reniform, albumen fleshy; cotyledons folded.—*DISTRIB.* So far as known, exclusively Indian.

1. *D. jujubifolia*, *Benth. in Gen. Pl.* i. 207; flowers paniced, bracteoles oblong-lanceolate. *Kydia jujubifolia*, *Griff. Notul.* iv. 534, *Ic. Pl. Asiat.* t. 595.

EASTERN TROPICAL HIMALAYA; Sikkim and Bhotan Mts., *Griffith, &c.*

A tree. *Leaves* 3 by 2 in., ovate-acute, or ovate-lanceolate, entire or obscurely lobed, rounded at the base, glabrous above, closely felted beneath, 5-nerved, nerves convergent; petiole $\frac{1}{2}$ in., stellate-tomentose. *Inflorescence* paniced. *Mature flower* $1\frac{1}{2}$ in. diam. *Bracteoles* oblong, many-ribbed. *Sepals* oblong, half the length of the bracteoles. *Petals* oblong, obtuse, oblique, nearly as long as the bracteoles. *Filaments* 25-30, free nearly to the base; anthers reniform. *Ovary* globose; style cylindric below, branched above.

2. *D. axillaris*, *Benth. l.c.*; flowers solitary axillary, bracteoles linear-oblong. *Beddome Flor. Sylvat. Anal. Gen.* t. 3; *Thwaites Enum.* 401. *Kydia axillaris*, *Thwaites Enum.* 30.

CEYLON; near Badulla, alt. 2000 ft., *Thwaites*.

A tree. *Leaves* $2\frac{1}{2}$ -4 $\frac{1}{2}$ by $1\frac{1}{2}$ -2 in., ovate-lanceolate, rounded at the base, paler beneath, feather-veined; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules linear-lanceolate. 1-nerved, equalling the petiole. *Peduncle* about the length of the petiole. *Bracteoles* 1 by $\frac{1}{4}$ - $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in., cup-shaped, 5-toothed. *Stamens* connate at the base into a short tube, adherent to the petals. *Ovary* 2-celled; styles twice the length of the stamens, connate below the middle. *Fruit* hispid.

11. SENRA, Cav.

(By error *Serræa*, *Serra*, and *Senræa*.)

A downy undershrub. *Leaves* orbicular, 3-lobed. *Inflorescence* axillary. *Bracteoles* 3, large, membranous, free. *Sepals* 5, lanceolate, connate below.

Petals 5, combined below. *Staminal-tube* slightly 5-toothed, antheriferous below the summit. *Filaments* numerous. *Ovary* 5-celled, cells 2-ovuled; styles 5, stigma capitate. *Capsule* loculicidally 5-valved, valves opposite the sepals. *Seeds* reniform, ascending, 1 in each cell.

1. **S. incana**, Cav. Diss. ii. 83, t. 35, f. 3; Boiss. *Fl. Orient.* i. 838; Mast. in *Oliv. Fl. Trop. Afr.* i. 194. *Serræa incana*, Decaisne in *Ann. Sc. Nat. ser.* 2. iv. 70, t. 4; Wight *Ic.* t. 1592. *S. rupestris*, Edgew. *Cat. Band. Pl.* 447; Dumreichera, Hochst. in *Schimp. Pl. Abyss. exsicc.*

SINDH, on rocks, *Stocks*, Vicary; ? BANDA, Edgeworth.—DISTRIB. Arabia, Abyssinia, Nubia.

Leaves long-petioled, denticulate; stipules fugitive. *Peduncles* shorter than the petiole, ultimately deflexed. *Bracteoles* oval, cordate, membranous. *Calyx* bell-shaped. *Petals* obovate, yellow or violet, exceeding the calyx, shorter than the bracteoles. *Seeds* pilose and with black dots.—Varies in size of calyx and bracteoles.

12. HIBISCUS, Medik.

Herbs shrubs or trees. *Leaves* stipulate, usually more or less palmately-lobed. *Inflorescence* axillary. *Bracteoles* 5 or more, rarely fewer or 0, free, or connate at the base. *Calyx* 5-toothed or 5-fid, valvate, sometimes spathaceous and circumsciss. *Petals* 5, connate at the base with the staminal-tube. *Staminal-tube* truncate or 5-toothed at the summit; filaments many; anthers reniform, 1-celled. *Ovary* 5-celled, cells opposite the sepals, each with 3 or more ovules; styles 5, connate below, stigma capitate or subspatulate. *Capsule* loculicidally 5-valved, sometimes with a separate endocarp, or with false dissepiments forming a spuriously 10-celled fruit. *Seeds* glabrous, hairy or woolly.—DISTRIB. A genus of about 150 species, most abundant in the tropical regions of both hemispheres.

SECT. 1. **Trionum**, Medik. *Calyx* membranous, 5-cleft, ventricose.

1. **H. Trionum**, L.; DC. *Prodr.* i. 453; Boiss. *Fl. Orient.* i. 840. *H. vesicarius*, Cav. Diss. iii. 171, t. 64, f. 2; W. & A. *Prodr.* i. 48; Dalz. & Gibs. *Bomb. Fl.* 19. *H. dissectus*, Wall. *Cat.* 2696.

WESTERN HIMALAYA; Kashmir, Simla; BENGAL, CONCAN, SINDH.—DISTRIB. S. Europe and hotter parts of the Old World.

Annual, more or less pubescent. *Lower leaves* orbicular, undivided, upper 3-5-parted, lobes obovate-oblong, obtuse, toothed. *Bracteoles* numerous, linear. *Flowers* 1½ in. diam., yellow with a purple spot. *Calyx* with hispid green nerves. *Capsule* oblong, obtuse. *Seeds* glabrous.—Variable in pubescence, lobing of leaf, size of flower, &c.

SECT. 2. **Furcaria**, DC. *Calyx* persistent, 5-cleft. *Bracteoles* distinct, forked at the apex, or provided with a leafy appendage.

2. **H. surattensis**, Linn.; DC. *Prodr.* i. 449; stem with recurved prickles, stipules leafy broad ear-shaped. W. & A. *Prodr.* i. 48; Roxb. *Fl. Ind.* iii. 205; Wight *Ic.* t. 197; Cav. Diss. iii. t. 53, f. 1; Thwaites *Enum.* 26; Wall. *Cat.* 1893, 1, 2; 3, D, E, F, G; Dalz. & Gibs. *Bomb. Fl.* 20; Mast. in *Oliv. Fl. Trop. Afr.* i. 201; Mig. *Fl. Ind. Bat.* i. pt. 2, 161. *H. furcatus*, Wall. *Cat.* 1896 C, not of Roxb.—Rheede *Hort. Mal.* vi. t. 44.

HOTTER PARTS OF INDIA, from Bengal to Penang, and CEYLON.—DISTRIB. Tropical Asia, Africa, and Australia.

A weak-stemmed trailing plant, covered with soft hairs and scattered prickles. *Leaves* long-petioled, roundish, deeply and palmately 3-5-fid, lobes serrate. *Peduncle* equalling

the petiole. *Bracteoles* linear, with a spatulate appendage. *Flowers* yellow, with a dark centre. *Capsule* hairy, ovoid. *Seeds* downy.

3. **H. furcatus**, *Roxb. Hort. Beng.* 51; *Flor. Ind.* iii. 204; shrubby, perennial or annual, prickly, leaves 3-5-lobed, stipules lanceolate, peduncles scattered. *DC. Prodr.* i. 449; *Wall. Cat.* 1896, 1, 2, A, B, D; *W. & A. Prodr.* i. 48; *Thwaites Enum.* 26; *Dalz. & Gibs. Bomb. Fl.* 19; *Mast. in Oliv. Fl. Trop. Afr.* i. 201; *Miq. Fl. Ind. Bat.* i. pt. 2, 161. ? *H. hispidissimus*, *Griff. Notul.* iv. 52. *H. aculeatus*, *Roxb. Fl. Ind.* iii. 206. *H. bifurcatus*, *Roxb. ic. ined.*, not of *Willd.* or of *Hort. Beng.*

HOTTER PARTS OF INDIA, from BENGAL to CEYLON.—DISTRIB. Trop. and S. Africa, Asia, &c.

Stem erect, covered with soft down and with scattered slender recurved prickles, rising from a thickened coloured base. *Leaves* entire or 3-lobed, serrate, pubescent beneath, prickly along the nerves; stipules oblong-lanceolate. *Peduncles* short. *Bracteoles* 10-12, linear, forked. *Sepals* bristle-pointed. *Corolla* yellow with a crimson centre, 4 in. diam. *Capsule* ovoid, pointed, as long as the calyx.

4. **H. radiatus**, *Willd.*; *Roxb. Fl. Ind.* iii. 209; perennial, prickly, leaves deeply palmately divided, stipules linear, bracteoles 8-10 linear forked with or without an appendage. *Cav. Diss.* iii. 150, t. 54, f. 2; *DC. Prodr.* i. 449; *W. & A. Prodr.* i. 48; *Wall. Cat.* 1894 A, B; *Dalz. & Gibs. Bomb. Fl.* 20; *Miq. Fl. Ind. Bat.* i. pt. 2, 161. *H. Lindlei*, *Wall. Pl. As. Rar.* t. 4; *Wall. Cat.* 1895, 1, 2, C; *Bot. Reg.* 1395. *H. heptaphyllus*, *Dalz. & Gibs. Bomb. Fl.* 20.

KHASIA MTS., *Hk. f. & T.*; SIKKIM, *H. f.*; AVA and MARTABAN, *Wallich*.—DISTRIB. Java.

Suffrutescent. *Leaves* 4-5 by 1 in., 3-5-lobed, lobes broadly lanceolate, serrate; petiole armed, nearly as long as the blade. *Flowers* axillary, solitary, shortly peduncled. *Bracteoles* not glandular. *Sepals* 5, not glandular. *Corolla* yellow with a crimson centre, or all purple. *Fruit* not seen.—The leaves are said to have an acid taste.

SECT. 3. **Bombicella**. *Bracteoles* distinct, entire, without appendages. *Calyx* not distended. *Seeds* cottony or villous.

5. **H. hirtus**, *L.*; *W. & A. Prodr.* i. 51; shrubby, leaves ovate entire or slightly 3-lobed glandular beneath, peduncles as long as the leaves, corolla spreading. *Wight Ic.* t. 41; *Dalz. & Gibs. Bomb. Fl.* 20. *H. phoeniceus*, *Willd. (excl. syn. Linn.)*; *DC. Prodr.* i. 452, partly; *Roxb. Fl. Ind.* iii. 194; *Cav. Diss.* iii. t. 67, f. 2 (*excl. f.*); *Wall. Cat.* 1904, B, C, D, E, F. *H. rosamalabarica*, *Ker, Bot. Reg.* t. 337.—*Rheede Hort. Mal.* x. t. 1; *Pluk.* t. 254, f. 3.

NORTH-WEST PROVINCES, Peshawur, *Jacquemont*, *Stewart*; CONCAN, *Stocks*; WESTERN PENINSULA, often cultivated.—DISTRIB. Java, *Miq.*

Leaves 3 by 2 in., ovate, acuminate, lower often cordate and 3-lobed, serrate hairy, with a large gland on the under side of the midrib, serratures in the young leaves bristle-pointed; petiole 2 in., hairy; stipules linear, $\frac{1}{2}$ in. *Peduncle* axillary, jointed below the flower. *Bracteoles* 5-7, subulate, shorter than the linear-lanceolate *sepals*. *Corolla* $\frac{1}{2}$ in. diam., pink or white, spreading. *Anthers* whorled. *Capsule* globose, shorter than the calyx. *Seeds* cottony.

6. **H. micranthus**, *Linn.*; *Cav. Diss.* iii. t. 66, f. 1; scabrid, leaves ovate glandless, peduncles as long as or longer than the leaves, corolla reflexed. *DC. Prodr.* i. 453; *W. & A. Prodr.* i. 51, *Thwaites Enum.* 26; *Dalz. & Gibs. Bomb. Fl.* 20; *Mast. in Oliv. Fl. Trop. Afr.* i. 205. *H. rigidus*, *L. fil. Suppl.* 310; *Roxb. Fl. Ind.* iii. 195; *Wall. Cat.* 1905 B, C, D, E. *H. clan-*

destinus, Cav. *Ic. i. t. 2. H. suborbiculatus*, Wall. *Cat. 1906. H. ovalifolius*, Vahl *Symb. i. 50; Boiss. Fl. Orient. i. 839*:

HOTTER PARTS OF INDIA, from the North West provinces eastward and southward to CEYLON.—DISTRIB. Tropical Africa, Arabia, &c.

Shrubby, with slender rod-like spreading branches, thinly covered with stellate bristles. *Leaves* $\frac{3}{4}$ –1 in., ovate or oblong, quite entire or serrate, rough with bristly hairs; petiole very short. *Peduncles* axillary, as long or longer than the leaves. *Bracteoles* linear, shorter than the calyx. *Flowers* white or pink, $\frac{1}{2}$ in. diam. *Sepals* lanceolate. *Corolla* reflexed. *Anthers* whorled. *Capsule* globose. *Seeds* cottony.—Variable; Roxburgh suspects that it may be specifically identical with *H. hirtus*. The green capsules of both are eaten by children. The form called *suborbiculatus* has roundish serrated leaves, but is otherwise not different.

7. **H. scindicus**, *Stocks in Hook. Ic. Plant. t. 802*; a hoary undershrub, leaves glandular, cuneate at the base, petals convolute. *Boiss. Flor. Orient. i. 839*.

SINDH, *Stocks*.—DISTRIB. Beluchistan.

A much branched tortuous and subspinous undershrub. *Leaves* subsessile, thinly bestrewn with stellate hairs, retuse, toothed; stipules subulate. *Peduncles* axillary, solitary, shorter than the leaves. *Bracteoles* 6–8, linear-subulate. *Sepals* linear-lanceolate, connate at the base, longer than the bracteoles. *Petals* longer than the calyx, twisted below into a tube. *Anthers* in a globose head. *Ovary cells* 2-ovuled. *Capsule* globose. *Seeds* with long wool.

8. **H. intermedius**, *A. Rich. Fl. Abyss. i. 50*; annual, with reflexed prickly hairs, leaves polymorphous glandless, peduncle shorter than the leaf. *Mast. in Oliv. Fl. Trop. Afr. i. 198. H. scandens*, Dalz. & Gibs. *Bomb. Fl. 20*.

SINDH, *Stocks*; coast of KATTYWAR, *Dalzell*.—DISTRIB. Arabia, East tropical Africa.

A weak-stemmed annual, with a line of hairs along one side of the branches shifting in position at each joint. *Leaves* entire or irregularly toothed, usually deeply 5–7-parted; lobes oblong, wedge-shaped at the base. *Peduncle* axillary, shorter than the petiole. *Bracteoles* strap-shaped, shorter than the calyx. *Flowers* 1 in. diam., yellow with a purple centre. *Sepals* lanceolate, 3-nerved, connate at the base. *Petals* twice the length of the calyx. *Capsule* beaked, hispid, valves slightly winged at the edges. *Seeds* black, covered with appressed shining hairs.

SECT. 4. **Lagunea**, Cav. (*gen.*) *Bracteoles* small or 0. *Seeds* pilose or smooth, not cottony.

9. **H. Solandra**, *L'Her. Stirp. i. 103, t. 49*; annual, herbaceous, leaves palmately lobed or entire, peduncles as long as the petioles, seeds tubercled. *Roxb. Fl. Ind. iii. 197. Mast. in Oliv. Fl. Trop. Afr. i. 206. H. pumilus*, *Roxb. Fl. Ind. iii. 203. H. albus*, Wall. *Cat. 1876 E. Lagunea lobata*, Willd.; Cav. *Diss. v. t. 136; DC. Prodr. i. 474; Wall. Cat. 1876, A to D; W. & A. Prodr. i. 55; Thwaites Enum. 27; Dalz. & Gibs. Bomb. Fl. 21. Sida heterophylla and S. diversifolia*, Spreng. *ex W. & A. Prodr. i. 56, and in Herb. Heyne. Solandra lobata*, Murr. *Comm. Goett. vi. t. 11; Cav. Diss. i. Mantissa, i. 55; Lam. Ill. t. 580. Triguera acerifolia*, Cav. *Diss. i. t. 11. Lagunea sileniflora*, Wall. *Cat. 1882*.

HOTTER PARTS OF INDIA, from the N. W. provinces to Sikkim and from Kumaon and Birma to Ceylon.—DISTRIB. East tropical Africa.

Erect, slightly villous. Lower leaves on long petioles, upper palmately lobed, uppermost 3-fid. *Peduncles* $1\frac{1}{2}$ in., 1-flowered, jointed near the top, arranged in a terminal loose leafless raceme. *Bracteoles* linear, usually 0. *Flower* yellow, $\frac{3}{4}$ in. diam. *Sepals* lanceolate, 3-nerved, connate at the base, as long as the ovoid beaked capsule. *Seeds* blackish.

SECT. 5. **Ketmia**, DC. *Bracteoles* entire, free or connate at the base, sometimes adnate to the calyx-tube. *Calyx* 5-cleft, not ventricose. *Seeds* hairy, not cottony.

* *Bracteoles* 5, free or connate at the base, not adnate to the calyx.

10. **H. fragrans**, Roxb. *Fl. Ind.* iii. 195; arborescent, glabrescent, leaves cordate-ovate acuminate, flowers axillary and terminal, peduncle shorter than the leaf, bracteoles ovate connate below. *Wall. Cat.* 1911 A.

SILHET, Roxburgh; CACHAR, Hk. f. & T.; ASSAM;

A small tree. *Young leaves* 3-4 by 3 in., pubescent, serrate; petiole $2\frac{1}{2}$ in. *Peduncles* axillary, paniced, 2-3 in., jointed near the top. *Sepals* 5, ovate-lanceolate, connate below, longer than the bracteoles. *Corolla* $2\frac{1}{2}$ in. diam., white, fragrant. *Capsule* 1 in., cylindric, downy, longer than the persistent calyx. *Seeds* covered with long white hairs.

11. **H. canescens**, Heyne in *Wall. Cat.* 2698; shrubby, leaves acutely lobed, upper simple tomentose beneath, peduncles axillary shorter than the petiole, bracteoles linear-subulate longer than the calyx. *W. & A. Prodr.* i. 49; *H. septemnervosus*, Wight in *Wall. Cat.* 2693. *H. borbonicus*, Wight in *Wall. Cat.* 2694, not of Link.

WESTERN PENINSULA; Mysore, and the Carnatic.

Stem not prickly. *Leaves* $3\frac{1}{2}$ by 3 in., roundish, cordate, minutely toothed, 7-nerved; petiole 3 in. *Stipule* 1 in., setaceous. *Peduncle* $\frac{3}{4}$ in., angular. *Bracteoles* 1 in., striated. *Sepals* ovate, acute, 3-nerved. *Corolla* yellow with a pink centre. *Capsule* $1\frac{1}{2}$ in., twice the length of the calyx, oblong, pointed, villous. *Seeds* downy.

12. **H. scandens**, Roxb. *Hort. Beng.* 51; *Flor. Ind.* iii. 200; (not of Wall.); scandent, pubescent, leaves cordate-ovate sometimes lobed, flowers numerous in terminal panicles, bracteoles ovate acute connate below the middle. *Wall. Cat.* 1910, 1910 B.

TROPICAL EASTERN HIMALAYA and EASTERN BENGAL, from Sikkim to Chittagong.

A shrub climbing over lofty trees. *Young shoots* thinly stellate-tomentose. *Leaves* 3-8 by 2-5 in., ovate-acuminate, dentate, sometimes 3-angled or 3-lobed, lobes deltoid-lanceolate; petiole 1 in. pilose. *Stipules* linear-lanceolate, deciduous. *Peduncles* 1 in.; flower-buds globose. *Flowers* $1\frac{1}{2}$ in. diam. *Sepals* oblong-lanceolate, slightly exceeding the bracteoles. *Corolla* twice the size of the calyx, white or yellow with a crimson centre. *Fruit* not seen.

** *Bracteoles* more than 5, free or connate at the base, not adnate to the calyx.

13. **H. macrophyllus**, Roxb. *Hort. Beng.* 51; arborescent or shrubby, villous, leaves entire orbicular cordate rarely lobed hispid, bracteoles large spathaceous deciduous, flowers in terminal cymes. *Wall. Pl. As. Rar.* i. 44, t. 51, *Wall. Cat.* 1903. *H. setosus*, Roxb. *Fl. Ind.* iii. 194. *H. vestitus*, Griff. *Notul.* iv. 519.

EASTERN BENGAL and the EASTERN PENINSULA, from Silhet and Chittagong to Mergui and Penang.

A tree or shrub more or less covered with brown, villous, often tufted hairs. *Leaves* large, 7-9-nerved, very hairy on the lower surface; petiole 7-8 in., longer than the blade. *Stipules* large, oblong, foliaceous, deciduous. *Inflorescence* terminal, many-flowered, cymose; pedicels $1\frac{1}{2}$ -2 in., shaggy like the petioles with brown hairs, articulated at the top and provided at the joint with two large spathaceous caducous bracts connate below. *Bracteoles* 10-12, linear, 1 in., connate at the very base, equalling the calyx. *Sepals* 5, lanceolate, connate below the middle into a bell-shaped 10-ribbed tube. *Corolla* 4 in. diam., purple. *Capsule* oblong, pointed, hispid, as long as the persistent calyx. *Seeds* densely bearded with long silky fulvous hairs.

14. **H. collinus**, *Roxb. Hort. Beng.* 51; *Flor. Ind.* iii. 198; arborescent, leaves lobed, peduncles axillary shorter than the leaves, bracteoles 8-10 oblong wavy free. *Wall. Cat.* 1908 E. *H. æstuanus*, *Wall. Cat.* 1908 B. *H. asperatus*, *Wall. Cat.* 1908 C. *H. acerifolius*, *DC. Prodr.* i. 448. *H. eriocarpus*, *DC. Prodr.* i. 452; *W. & A. Prodr.* i. 51; *Thwaites Enum.* 26. *Hibiscus simplex*, *Roxb. Hort. Beng.* 51; *G. Don, Gen. Syst.* i. 480; *W. & A. Prodr.* i. 51. *Pavonia acerifolia*, *Lk. & Otto. Ic. Pl. Select.* x. t. 1.

WESTERN PENINSULA; in the Concan, Circars, and Coromandel; CEYLON.

Stem without prickles. *Leaves* 4 in., glabrous or thinly hairy, cordate, 3-lobed; lobes oblong, narrowed at the base, acuminate, margin wavy; petiole 2 in. *Stipules* setaceous. *Peduncle* 2 in. *Bracteole* $\frac{3}{4}$ in., nearly equal to the calyx. *Sepals* oblong, lanceolate, 1 nerved. *Corolla* 2-3 in. diam., pink with a dark centre; claw of petal hairy. *Staminal-tube* antheriferous all the way down; anthers whorled. *Capsule* $\frac{1}{2}$ in., orbicular, depressed, densely hispid. *Seeds* spherical, glabrescent.

15. **H. lunariifolius**, *Willd.*; *DC. Prodr.* i. 451; herbaceous, perennial, clothed with appressed hairs, leaves angled or lobed, peduncles very short forming a terminal leafless raceme, bracteoles 5-10 lanceolate connate at the base. *W. & A. Prodr.* i. 49; *Wight Ic.* t. 6; *Thwaites Enum.* 401; *Mast. in Oliv. Fl. Trop. Afr.* i. 202; *Miq. Fl. Ind. Bat.* i. pt. 2, 159. *H. pruriens*, *Roxb. Hort. Beng.* 51; *Fl. Ind.* iii. 196; *Wall. Cat.* 1892; *DC. Prodr.* i. 448. *H. racemosus*, *Lincl. Bot. Reg.* t. 917. *H. sidoides*, *W. & A. Prodr.* i. 494.

WESTERN PENINSULA, in the Carnatic and Mysore; BIRMA, *Wallich*; CEYLON.—
DISTRIB. Tropical Africa.

Stem covered with rigid pungent hairs. *Leaves* about 3 in. diam., roundish-cordate, slightly and acutely 3-5-lobed, serrate, hairy beneath; petiole as long or longer than the blade. *Stipules* subulate. *Peduncles* thickened below the flower, very hairy. *Flowers* 4 in. diam., yellow, with a dark centre. *Bracteoles* longer than the calyx. *Sepals* linear. *Corolla* convolute. *Staminal-tube* antheriferous all the way down. *Capsule* ovoid, beaked, clothed with pungent hairs. *Seeds* kidney-shaped.

16. **H. panduræformis**, *Burm. Fl. Ind.* 151, t. 47, f. 2; annual or perennial, without prickles, densely clothed with sticky hairs, leaves cordate angular tomentose, peduncles very short, bracteoles 7-10 linear-spathulate, free. *W. & A. Prodr.* i. 50; *Thwaites Enum.* 26; *Dalz. & Gibs. Bomb. Fl.* 20. *H. tubulosus*, *Cav. Diss.* iii. 161, t. 68, f. 2; *Roxb. Hort. Beng.* 51; *Fl. Ind.* iii. 196; *DC. Prodr.* i. 447; *Wall. Cat.* 1902 E, G; *Miq. Fl. Ind. Bat.* i. pt. 2, 157. *H. setosus*, *Wall. Cat.* 1902 (not of *Roxb.*). *H. velutinus*, *DC. Prodr.* i. 452.

Hotter parts of India, from the NORTH-WEST PROVINCES to BIRMA and CEYLON.—
DISTRIB. Tropical Africa and Australia.

Leaves tomentose, hispid, whitish beneath, slightly 5-lobed, upper narrow; petiole about 2 in., shorter than the blade. *Stipules* linear, divided, deciduous. *Peduncles* $\frac{3}{4}$ in., axillary or clustered at the ends of the branches. *Bracteoles* shorter than the calyx. *Sepals* lanceolate, connate below into a cup-shaped tube. *Petals* yellow with a purple centre or all purple. *Filaments* few. *Capsule* ovoid, very hairy. *Seeds* pubescent or glabrous.

17. **H. vitifolius**, *L.*; *DC. Prodr.* i. 450; annual or biennial, villous, leaves 3-5-lobed, bracteoles 8-12 free, capsule 5-winged. *Roxb. Fl. Ind.* iii. 200; *Wall. Cat.* 1899, 1, 2, 3, and E, F, G; *Cav. Diss.* iii. 145, t. 58, f. 2; *W. & A. Prodr.* i. 50; *Thwaites Enum.* 26; *Dalz. & Gibs. Bomb. Fl.* 20; *Miq. Fl. Ind. Bat.* i. pt. 2, 160. *H. obtusifolius*, *Willd.*; *DC. Prodr. l.c.*; *Wall. Cat.* 1899 D. *H. truncatus*, *Roxb. Hort. Beng.* 51; *Flor. Ind.* iii. 200. *H. serratus*, *Wall. Cat.* 1900, 1, 2. *H. cuspidatus*, *Edgew. Cat. Banda Pl.* 44.—*Rheede Hort. Mal.* vi. t. 46.

Hotter parts of India, from the NORTH-WEST PROVINCES to CEYLON.—DISTRIB. Tropical Africa and Australia.

Herbaceous. *Leaves* tomentose on both sides, cordate, roundish or angled, 3-5 lobed, lobes oblong lanceolate, coarsely serrate, lower 4 in.; petiole 2½ in. *Peduncles* solitary, axillary, 1-flowered, shorter than the petiole, jointed in the middle, often aggregated at the ends of the branches. *Bracteoles* linear, shorter than the bell-shaped 5-cleft calyx. *Sepals* lanceolate, 3-5-nerved, connate below the middle. *Petals* yellow with a purple spot, twice or thrice longer than the sepals. *Anthers* regularly arranged along the whole length of the staminal tube. *Capsule* beaked, hairy, shorter than the calyx, valves winged at the edge. *Seeds* tubercled.—*H. truncatus*, Roxb., is a variety with much smaller parts.

18. *H. procerus*, Wall. Cat. 2692; perennial, prickly, leaves glabrous deeply 5-7-parted, bracteoles 8-10 free linear covered with tawny tomentum, sepals lanceolate bristly, corolla large.

BIRMA, Wallich.

Prickles of stem conical, with a whitish base. *Leaves* 8 by 5 in., roundish, deeply 3-7-9-parted, lobes lanceolate, serrate, glabrous, midrib prickly, upper leaves 3-parted, uppermost lanceolate; petiole 1-2 in., lower 4 in. *Stipules* ½ in., linear, pilose. *Peduncles* ½ in., aggregated at the ends of the branches and with the bracteoles and calyx clothed with tawny tomentum. *Sepals* ½ in. *Corolla* 6 in. diam., pink with a dark centre. *Capsule* ovoid, pointed, shorter than the sepals. *Seeds* black, tubercled.

19. *H. cannabinus*, L.; DC. Prodr. i. 450; annual or perennial, prickly, stem glabrous, lower leaves entire upper lobed, mid-nerve glandular beneath, peduncle very short, bracteoles 7-10 linear, shorter than the calyx, sepals glandular. Cav. Diss. iii. 148, t. 52. f. 1; Roxb. Fl. Ind. iii. 208; Cor. Pl. i. t. 190; Wall. Cat. 1898?; W. & A. Prodr. i. 50; Thwaites Enum. 26; Dalz. & Gibs. Bomb. Fl. 20. *H. Wightianus*, Wall. Cat. 2695 and 1898.

Generally cultivated; apparently wild East of the Northern Ghauts.—DISTRIB. Cultivated in most tropical countries.

Stem glabrous, prickly. *Lower leaves* cordate, upper deeply palmately lobed, lobes narrow, serrate; petiole prickly, lower much longer than the blade. *Stipules* linear, pointed. *Peduncles* axillary, very short. *Sepals* bristly, lanceolate, connate below the middle, with a gland at the back of each. *Corolla* large, spreading, yellow with a crimson centre. *Capsule* globose, pointed, bristly. *Seeds* nearly glabrous.—All parts agreeably acid. The stems furnish fibre.—The specimen of *H. Wightianus* in Wallich's herbarium is imperfect, but it is doubtless referable to this species; its leaves are simple.

20. *H. diversifolius*, Jacq. Ic. Pl. Rar. t. 551; perennial, stem pubescent covered with short stout conical prickles, leaves long-petioled scabrous roundish or angular 3-5-lobed, bracteoles 10 linear very bristly half the length of the calyx. Roxb. Fl. Ind. iii. 208; DC. Prodr. i. 449?; Bot. Reg. t. 381; Mast. in Oliv. Fl. Trop. Afr. i. 198. *H. scaber*, Wall. Cat. 1894 C, and 1897, 18982.

BIRMA, Wallich.—DISTRIB. Tropical Africa and Australia.

A tall herb or undershrub, with the branches, petioles and nerves of leaves armed with hard conical prickles. *Leaves* variable, usually cordate, roundish, slightly lobed, lobes acute, upper nearly entire, lanceolate. *Peduncles* very short bristly, axillary, racemose. *Sepals* linear-lanceolate, bristly not glandular. *Corolla* 3 or 4 times the size of the calyx. *Capsule* ovoid, pointed, hispid, ultimately glabrescent. *Seeds* smooth.—The specimens from Birma do not materially differ from those grown in the Calcutta garden. I refer to De Candolle's plant with doubt, as he gives as a synonym *H. ficulneus* of Cav., quite a different plant.

21. *H. Gibsoni*, Stocks mss.; an undershrub, branches bristly or with minute prickles, leaves deeply palmately divided, peduncle longer than the

leaves, bracteoles free linear prickly curving over the calyx. *H. pentaphyllus*, *F. Muell. Fragm. Phyt. Aust.* ix. 13; *Mast. in Oliv. Flor. Trop. Afr.* i. 198 (not of *Roxb.*).

The PANJAB, DECCAN, CONCAN, and SINDH, *Stocks*, &c.—DISTRIB. Afghanistan, South tropical Africa, North Australia.

Leaves 1–3 in., oblong-lanceolate, serrate, glabrous or with numerous forked hairs; petiole as long as the blade. *Peduncles* solitary, axillary. *Bracteoles* longer than the calyx. *Sepals* lanceolate, 5-nerved, connate below into a bell-shaped tube. *Corolla* twice the length of the bracts, yellow with a purple centre, or all purple. *Staminal-tube* half covered with anthers. *Capsule* ovoid, pointed; valves setose. *Seeds* pilose.

22. **H. punctatus**, *Dalzell in Dalz. & Gibs. Bomb. Fl.* 20 (1861); annual, stellately pubescent and glutinous, leaves ovate more or less 3-lobed, peduncle as long as the petiole, bracteoles 8–10 linear, shorter than the calyx connate at the base, petals scarcely exceeding the sepals. *H. laguneoides*, *Edgew. in Journ. Linn. Soc.* vi. 199 (1862).

SINDH, *Stocks*; MOOLTAN, *Edgeworth*.

A lax branching annual. *Leaves* distant, rounded ovate, acute, entire or 3-lobed, lobes oblong, sinuate-dentate; petiole $1\frac{3}{4}$ in., shorter than the blades. *Stipules* minute, subulate. *Peduncles* 1–2 in., sub-panicked, jointed at the top. *Calyx* bell-shaped; sepals deltoid, lanceolate, connate below the middle. *Petals* rose-coloured. *Capsule* beaked, pilose, as long as the calyx. *Seeds* tubercled, black.—Yields good hemp (*Dalzell*).

*** *Bracteoles adnate to the base of the calyx.*

23. **H. Sabdariffa**, *L.*; *DC. Prodr.* i. 453; annual, glabrous, unarmed, stem purplish, leaves entire or lobed glandular beneath, peduncles very short thickened at the summit, bracteoles 8–12 linear adnate to the base of the calyx, sepals bristly. *W. & A. Prodr.* i. 52; *Miq. Fl. Ind. Bat.* i. pt. 2, 158; *Wall. Cat.* 1909; *Cav. Diss.* iii. p. 170; vi. 351, t. 198, f. 1. ?*H. sanguineus*, *Griff. Not.* iv. 520.

Generally cultivated in the hotter parts of India, and in CEYLON.—DISTRIB. Cultivated in the Tropics.

Erect. *Leaves* polymorphous, midrib glandular beneath; petiole 2 in. *Peduncle* solitary, axillary, shorter than the petiole. *Bracteoles* and *calyx* accrescent. *Sepals* deltoid, acuminate, connate below the middle into a purplish fleshy cup. *Corolla* $2\frac{1}{2}$ in. diam., yellow. *Capsule* ovoid, pointed, villous, shorter than the calyx. *Seeds* reniform, sub-glabrous.—The Rozelle of India, and Red Sorrell of the W. Indies.

SECT. 6. **Abelmoschus**. *Calyx* elongate, spathaceous, circumsciss.

* *Bracteoles* 4–6, broad, leafy.

24. **H. ficulneus**, *L.*; *DC. Prodr.* i. 448; annual, prickly, leaves palmately 3–5-lobed lobes glabrous narrowed at the base, bracteoles 5–6 lanceolate villous fugacious, capsule ovoid. *Wall. Cat.* 2697 B. *H. prostratus*, *Roxb. Fl. Ind.* iii. 208. *H. strictus*, *Roxb. Hort. Beng.* 52; *Flor. Ind.* iii. 206. *H. sinuatus*, *Cav. Diss.* iii. t. 52, f. 2. *Abelmoschus ficulneus*, *W. & A. Prodr.* i. 53; *Wight Ic.* t. 154; *Thwaites Enum.* 27; *Miq. Fl. Ind. Bat.* i. pt. 2, 152. *Lagunea aculeata*, *Cav. Diss.* iii. t. 71, f. 1; *DC. Prodr.* i. 474.

Hotter parts of India, from the NORTH-WEST PROVINCES and PANJAB to BENGAL, the CIRCARS, and CONCAN ("Native of the southern provinces of the Peninsula, naturalized elsewhere, *W. & A. l.c.*").

Branches shining, covered with small sharp tubercles. *Young leaves* rounded-cordate, adult hispid, palmately lobed with wide sinuses, lobes unequally toothed; petiole $2\frac{1}{2}$ –4 in., as long as the leaves. *Stipules* subulate, lanceolate, caducous. *Peduncles* half the length of the petioles, the upper in a leafless raceme. *Sepals* 5, hispid,

connate for almost their whole length. *Corolla* 1 in. diam., white with a rosy centre. *Anthers* equally distributed. *Capsule* tomentose, covered with viscid points when green. *Seeds* globose, sulcate, slightly pilose.—Roxburgh calls special attention to the excellence of the fibre of this plant. His *H. prostratus* is a form with procumbent branches.

25. *H. pungens*, Roxb. Hort. Beng. 50; Fl. Ind. iii. 213; annual or perennial, bristly, petiole longer than the deeply-lobed leaves, lobes oblong acuminate toothed, bracteoles 4-5 persistent oblong-lanceolate acuminate, as long as the cuspidate hispid capsule. *H. vestitus*, Wall. Cat. 1924 partly. *Bamia pungens*, Wall. Cat. 1924.

TROPICAL HIMALAYA, from Kumaon to Sikkim, alt. 2-5000 ft.; KHASIA Mts.

Stem erect, branches ascending, bristly and with scattered black dots. *Leaves* 5-8 in., cordate roundish, deeply palmately 7-lobed, lobes oblong acuminate, toothed, upper ones 3-lobed; petiole 8-10 in. *Stipules* broad lanceolate, upper linear-setaceous. *Peduncles* 1-2 in., racemose. *Bracteoles* 1 in., accrescent. *Calyx* 5-toothed. *Corolla* yellow with a purple centre, 5 in. diam. *Column* antheriferous throughout. *Capsule* $\frac{3}{4}$ in.

H. MANIHOT L.; DC. Prodr. i. 448; annual, subglabrous, leaves deeply palmately-lobed, lobes linear-oblong coarsely toothed or lobulate, peduncles deflexed, bracteoles 4-6 persistent ovate-lanceolate. Wall. Cat. 1926; Cav. Diss. iii. 172, t. 63, f. 2. *H. pentaphyllus*, Roxb. Hort. Beng. 52; Flor. Ind. iii. 212 (not of F. Muell).

Naturalized in Bengal; introduced from China.

A tall almost glabrous herb. *Leaves* 5-6 by 6-7 in.; petiole nearly as long as the blade. *Stipules* lanceolate. *Peduncles* $1\frac{1}{2}$ in., ultimately drooping. *Flowers* 5 in. diam., yellow with a purple centre. *Staminal-tube* antheriferous all the way down. *Capsule* oblong, pointed, hispid (5-seeded, Roxb.).

26. *H. tetraphyllus*, Roxb. Hort. Beng. 52; Fl. Ind. iii. 211; annual hispid and slightly prickly, leaves cordate very deeply 5-7-lobed lobes lanceolate crenate-toothed, bracteoles persistent broadly ovate lanceolate equalling the cuspidate capsule. *H. canaranus*, Miq. Pl. Hohenack exsicc. *Bamia tetraphylla*, Wall. Cat. 1925. *Abelmoschus tetraphyllus*, Grah. Cat. Bomb. 14. *A. Warreensis*, Dalz. in Hook. Kew Journ. Bot. iii. 123; Dalz. & Gibs. Bomb. Fl. 19. *Erebennus canaranus*, Alefeld in Est. Bot. Zeit. 1863, 14.

BENGAL, near Calcutta, Roxburgh; CONCAN, and CANARA, Gibson, &c.

Stem 4-6 ft. *Leaves* scabrous; petiole $2\frac{1}{2}$ in. *Stipules* ovate-lanceolate. *Peduncles* 1 in., axillary, and clustered at the ends of the branches. *Bracteoles* $\frac{1}{2}$ - $\frac{3}{4}$ in., shorter than the calyx. *Flowers* 2 in. diam., yellow. *Capsule* ovate, 5-angled, hispid, $1\frac{1}{2}$ in. *Seeds* smooth.—Dalzell, l.c., says his *A. Warreensis* differs from *A. tetraphyllus* in the persistent not deciduous bracteoles, but in most of the specimens the bracteoles are persistent. There is great variation in foliage and pubescence.

27. *H. angulosus*, Mast.; herbaceous, not prickly, leaf-lobes ovate acuminate, bracteoles fugacious, capsule ovoid pointed hispid as long as the calyx. *Abelmoschus angulosus*, W. & A. Prodr. i. 53; Wight. Ic. t. 951; Ill. i. 65; Thwaites Enum. 26. *Bamia angulosa*, Wall. Cat. 1927; *Hymenocalyx variabilis*, Zenker ex Wight, Ill. p. 65.

WESTERN PENINSULA; Concan, Malabar, and Nilghirris Mts.; CEYLON.

Leaves about 4 in.; pubescent above, tomentose below, cordate, palmately 5-lobed; petiole 5-6 in. *Peduncles* not exceeding the petiole, densely hispid, hairs spreading. *Bracteoles* ovate. *Calyx* $1\frac{1}{2}$ in., ovate-lanceolate, hispid; sepals slightly cohering. *Corolla* 5 in. diam.

VAR. 1. *grandiflorus*, Thwaites Enum. 26; petioles scabrous not hispid, corolla yellow, seeds subpyriform.

VAR. 2. *purpureus*, Thwaites, l.c.; petiole covered with rigid spreading hairs, corolla purple, seeds globose.

28. **H. hostilis**, Wall. ms.; annual, bristly, leaves large cordate angular palmately 5-lobed lobes dentate, bracteoles 5-6 ovate-lanceolate, capsule oblong-lanceolate setose. *Bamia magnifica*, Wall. Cat. 1919.

BIRMA, Wallich.

Erect, stem glabrescent. Leaves 10 by 8 in., lobes acute; petioles of lower leaves 10 in. *Stipules* ovate-lanceolate. *Peduncle* 2 in., dilated at apex. *Bracteoles* $\frac{1}{2}$ as long as the capsule, shorter than the calyx. *Flowers* 6-8 in. diam. *Capsule* 2 in. long, cuspidate.

** *Bracteoles generally more than 5, linear.*

29. **H. Abemoschus**, L.; DC. Prodr. i. 452; annual, hispid, leaves polymorphous base cordate hastate or sagittate with acute lobes, peduncles as long as the petioles, bracteoles 6-12 linear much shorter than the oblong-lanceolate setose glabrescent capsule. *Roxb. Fl. Ind.* iii. 202; *Griff. Not.* iv. 521. *Abemoschus moschatus*, Moench; W. & A. Prod. i. 53; *Wight. Ic.* t. 399; Wall. Cat. 1915, F, G, H, I, K, L; *Thwaites Enum.* 27; *Miq. Fl. Ind. Bat.* i. pt. 2, 151. *H. flavescens*, Cav. Diss. iii. t. 70, f. 2; DC. l.c. 454. *H. spathaceus*, Wall. Cat. 1913, 1913 A, 1915. *H. ricinifolius*, Wall. Cat. 1915. *H. chinensis*, Wall. Cat. 1616? *H. sagittifolius*, Kurz. in Journ. As. Soc. Beng. 1871, ii. p. 46—*Rheede Hort. Mal.* ii. t. 38.

Through the hotter parts of India.—DISTRIB. Cultivated in most tropical countries.

Herbaceous, 2-3 ft. high. Leaves usually palmately 5-7-lobed, lobes spreading, oblong-lanceolate, acuminate, coarsely toothed. *Stipules* linear. *Peduncles* 2 in., equalling the petiole. *Bracteoles* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Calyx* $1\frac{1}{2}$ in., oblong, 15-toothed. *Corolla* 4 in. diam., yellow with a crimson centre. *Capsule* 1-3 in. *Seeds* reniform, striate, musky.—Very variable. The following forms may be distinguished:—

VAR. 1. *multiformis*, *Bamia* Sp. Wall. Cat. 1917; lower leaves roundish-cordate, upper oblong-sagittate, uppermost linear-lanceolate. Birma.

VAR. 2. *betulifolius*, *Bamia* Sp. Wall. Cat. 1918; leaves orbicular-cordate, bracteoles longer than in the type.

30. **H. rugosus**, Mast.; annual, hispid, bristly, leaves cordate or hastate 5-lobed lobes lanceolate serrate, peduncles racemose, bracteoles 10 setaceous, capsule ovoid hairy. *H. hirtus*, Buch. ex Roxb. *Fl. Ind.* iii. 203, not of others. *Bamia rugosa*, Wall. Cat. 1923. *Abemoschus rugosus*, W. & A. Prodr. i. 53.

MYSORE, Hamilton; Madura hills, Wight.

Stem erect, hispid not aculeate. Leaves polymorphous, lower lobed, upper lanceolate, nearly entire; petiole nearly as long as the leaves. *Stipules* subulate. *Bracteoles* half the length of the capsule. *Flowers* yellow with a red centre. *Capsule* 1 in., ovoid, 5-angled, hairy. *Seeds* numerous.—Perhaps not distinct from *H. Abemoschus*.

31. **H. cancellatus**, Roxb. Hort. Beng. 51; *Fl. Ind.* iii. 201; annual, erect, very bristly, leaves cordate angled crenate, bracteoles 10-15 long filiform incurved hispid. *Abemoschus* (*Bamia*) *crinitus*, Wall. Pl. As. Rar. i. 39, t. 44. *A. racemosus*, Wall. Cat. 1929 (not *H. racemosus* of Lindley). *Bamia cancellata* and *B. fusiformis*, Wall. Cat. 1920, 1921.

NORTH-WEST PROVINCES, Falconer; KUMAON, ascending to 4000 ft.; NEPAL, Hamilton; PEGU.

Root fusiform. Stem herbaceous, 2-3 ft. Leaves 4-6 by 3-5 in., cordate, roundish, obtusely 5-angled, crenate-toothed, sometimes lobed, upper sagittate; petiole 4 in. *Stipules* linear. *Peduncles* much shorter than the petiole, racemose at the ends of the branches, each with 2 bracts at the base. *Bracteoles* linear-setaceous, $1\frac{1}{2}$ in. *Flowers*

4-5 in. diam., yellow with a purple centre. *Anthers* scattered. *Capsule* $1\frac{1}{2}$ in., ovoid, furrowed. *Seeds* numerous, reniform.—The form called *fusiformis* has more deeply divided leaves than the type.

H. ESCULENTUS, *L.*; *DC. Prodr.* i. 450; annual, hairy, not prickly, leaves cordate 3-5-lobed lobes oblong toothed scabrous, peduncle shorter than the petiole, bracteoles 8-10 deciduous equalling the calyx, capsule pyramidal. *Cav. Diss.* iii., t. 61, f. 2. *H. longifolius*, *Roxb. Fl. Ind.* iii. 210; *Wall. Cat.* 2699; *DC. Prodr.* i. 450. *Abelmoschus esculentus*, *W. & A. Prodr.* i. 53; *Miq. Fl. Ind. Bat.* i. pt. 2, 152.

Cultivated throughout India, probably originally native.—*DISTRIB.* Naturalized or cultivated in all tropical countries.

A tall herb covered with rough hairs. *Leaves* coarsely toothed; petiole 6 in., more or less bristly. *Stipules* subulate. *Peduncles* about 1 in. *Bracteoles* 1 in., linear-subulate. *Flowers* yellow with a crimson centre. *Staminal-tube* antheriferous throughout. *Fruit* 6-10 by 1 in., pyramidal-oblong, glabrescent, cells 5-8-seeded. *Seeds* striate, hairy.—Variable. Roxburgh distinguishes the West Indian "Ochro," *H. esculentus*, from his *H. longifolius*, but does not specify in what the difference consists, and the plants are so variable that it is difficult to suppose the difference to be specific. The pods are used as pot herbs and for their demulcent properties.

SECT. 7. Paritium. Trees. *Bracteoles* connate at the base. *Capsule* with false dissepiments.

32. *H. tiliaceus*, *L.*; *DC. Prodr.* i. 454; arboreous, leaves cordate roundish acute rarely lobed glabrous above hoary beneath. *Roxb. Fl. Ind.* iii. 192; *Miq. Fl. Ind. Bat.* i. pt. 2, 153; *Beddome Fl. Sylvat. Anal. Gen.* t. 4. *Paritium tiliaceum*, *W. & A. Prodr.* i. 52; *Wight Ic.* t. 7; *Wall. Cat.* 1912; *Thwaites Enum.* 26; *Dalz. & Gibs. Bomb. Fl.* 17; *Griff. Notul.* iv. 523.

Coasts of both PENINSULAS, BENGAL, and CEYLON.—*DISTRIB.* Tropics of both hemispheres, usually near the coast.

A much-branched tree. *Leaves* 4-5 in. diam., leathery, roundish, crenulate, abruptly acuminate, 7-nerved, sometimes glandular beneath; petiole 1-3 in. *Stipules* subulate, 1 in. *Peduncles* terminal with stipule-like deciduous bracts at the base. *Bracteoles* 7-10, linear-lanceolate, connate above the middle. *Calyx* 1 in., about the length of the bracteoles or longer. *Sepals* lanceolate, downy outside. *Corolla* 4 in. diam., campanulate with a crimson centre. *Staminal-tube* $1\frac{1}{2}$ in., antheriferous all the way down. *Capsule* shorter than the calyx, ovoid, pointed, spuriously 10-celled, 5-valved; valves pilose. *Seeds* reniform, thinly pilose.

VAR. 1. tortuosus, stem crooked, branches twisted, capsule as long as the calyx. *Hibiscus tortuosus*, *Roxb. Fl. Ind.* iii. 192; *Wall. Cat.* 1912 G, 1913 B;—*Rheede, Hort. Mal.* i. t. 30.—In herbarium specimens I can find nothing to warrant the separation of this as a distinct species, the form of leaf and relative length of the bracteoles and capsule being subject to variation; but in a native state and under cultivation they look very different.

33. *H. floccosus*, *Mast.*, arboreous, leaves cordate angled thinly stellate-pilose on both surfaces, bracteoles connate into a bell-shaped 5-toothed tube less than half the length of the calyx.

Mount Ophir, MALACCA, Maingay.

A tree. *Young branches* and outer surface of the calyx covered with rusty floccose, tomentum. *Leaves* 4-5 in. diam., obscurely 5-angled; petiole shorter than the blade. *Peduncles* racemose, terminal; pedicels stout, $1\frac{1}{2}$ in. long, jointed near the base; bracteoles deltoid at the apex and somewhat recurved. *Sepals* oblong-lanceolate, united for half their length. *Corolla* 3 in. diam., pink, twice the length of the calyx. *Petals* oblong-spathulate, venoso-striate, stellate-pilose on the outside. *Staminal-tube* pilose. *Capsule* oblong, truncate, shorter than the calyx, downy on the outside. *Seeds* cottony.—Allied to *H. ferrugineus*, *DC.*, of Madagascar.

H. TRICUSPIS, *Banks in Cav. Diss.* iii. t. 55, f. 2; arboreous, leaves 3-lobed glandular beneath. *DC. Prodr.* i. 453; *Roxb. Fl. Ind.* iii. 202; *Wall. Cat.* 1914 B. *Paritium tricuspe*, *G. Don, Gen. Syst.* i. 485; *W. & A. Prodr.* i. 52.

Cultivated in NORTH-WEST INDIA and BENGAL (introduced from the Society isles, *Roxburgh*).

Tree, herbaceous portions covered with stellate white down. *Leaves* 4-5 by 3 in., glabrescent above, hoary-pubescent beneath, base cuneate or cordate, lobes lanceolate, slightly lobed; petiole $2\frac{1}{2}$ -3 in. *Stipules* ovate. *Peduncles* terminal, racemose. *Bracteoles* deciduous, ovate, leafy, half the length of the linear-lanceolate sepals. *Corolla* yellow with a purple base. *Capsule* spuriously 10-celled.—*Roxburgh* describes calyx and epicalyx as ten-parted, but this is probably an error.

H. ROSA SINENSIS, *L.*; *DC. Prodr.* i. 448; shrubby, leaves ovate acuminate nearly glabrous, peduncles axillary, as long or longer than the adjoining leaf, staminal tube exceeding the corolla. *Cav. Diss.* iii. t. 69, f. 2; *Roxb. Fl. Ind.* iii. 194; *Wall. Cat.* 1890 B to F.; *W. & A. Prodr.* i. 49; *Miq. Fl. Ind. Bat.* i. pt. 2, 156.—*Rheede, Hort. Mal.* ii. t. 17, and vi. t. 43.

Cultivated in gardens throughout India.

Stem woody, branched, not prickly. *Leaves* entire at the base, coarsely toothed at the apex. *Stipules* ensiform. *Bracteoles* 6, 7, linear, half the length of the bell-shaped calyx. *Sepals* $\frac{3}{4}$ in., lanceolate, connate below the middle. *Corolla* 3 in. diam., red. *Capsule* roundish, many-seeded (*Loureiro*).—There are numerous varieties differing in colour, duplication, &c. The flowers are used to black shoes. *Roxburgh* says it is wild in Hindostan, but I have seen no wild specimens. *Wight and Arnott* suggest that the plant should be placed in section *Bombicella*, but the seeds are not known, and the habit is more that of the section *Ketmia*.

There is a plant in herbaria from Griffith and others, to which the manuscript names of *H. liliiflorus* (not of *DC.*), and of *H. Arnotti* (not of *Gray*), are attached. It appears identical with *Wallich's* 1890 D, described in *Wall. Cat.* l.c. as a hybrid plant introduced to the Calcutta garden from Mauritius and said to be a form of *H. rosa sinensis*.

H. MUTABILIS, *L.*; *DC. Prodr.* i. 452; arborescent, leaves downy 5-angled, peduncles axillary nearly as long as the leaf, bracteoles 10 linear nearly distinct. *Cav. Diss.* iii. t. 62, f. 1; *Roxb. Fl. Ind.* iii. 201; *W. & A. Prodr.* i. 51; *Wall. Cat.* 1907, 1, 2, 3, D to G; *Miq. Fl. Ind. Bat.* i. pt. 2, 158. *H. æstuanus*, *Rottler in Herb.*—*Rheede Hort. Mal.* vi. 38-42.

Cultivated in gardens, native of China (*Roxburgh*).

A small tree without prickles. *Leaves* 4 in. diam., cordate, toothed; petiole 3 in. *Peduncle* 4-5 in., jointed near the top. *Bracts* shorter than the calyx. *Flowers* 3-4 in. diam. *Sepals* ovate-lanceolate, connate below the middle. *Corolla* white or pink on first opening in the morning, deep red by night. *Capsule* globose, flattened, hairy. *Seeds* reniform, hispid.—In *Dr. Brandis' herbarium* there is a specimen from Martaban, labelled *H. venustus*, *Blume (Bijdr.* 71), which differs from the Indian specimens of *H. mutabilis* in its more tomentose pubescence and hirsute seeds; *Blume's* plant, moreover, is said to have 5 bracteoles, but there are more than 5 in the Martaban plants.

H. SYRIACUS, *L.*; *DC. Prodr.* i. 448; shrubby, leaves cuneiform ovate 3-lobed dentate, peduncle axillary as long as the petiole, bracteoles linear half the length of the calyx. *Cav. Diss.* iii. t. 69, f. 1; *Roxb. Fl. Ind.* iii. 195; *Wall. Cat.* 1891; *Miq. Fl. Ind. Bat.* i. pt. 2, 157. *H. rhombifolius*, *Cav. Diss.* t. 69, ex *Roxb.*

Cultivated throughout India and in China.

Branches destitute of prickles. *Leaves* 2 in., nearly or quite glabrous; petiole short. *Peduncle* shorter than the petiole. *Bracteoles* 6-7, linear. *Sepals* ovate-lanceolate, longer than the bracteoles. *Petals* obovate, longer than the calyx. *Anthers* in whorls all the way up the column. *Capsule* oblong, obtuse, slightly hispid. *Seeds* pilose.

13. THESPEsia, Corr.

Tall trees or shrubs. *Leaves* entire or lobed. *Inflorescence* axillary. *Bracteoles* 5-8, arising from the thickened end of the peduncle, deciduous. *Calyx* truncate, minutely 5-toothed or 5-parted. *Corolla* convolute. *Staminal-tube* 5-toothed at the apex. *Ovary* 4-5-celled; style club-shaped, 5-furrowed, entire or 5-toothed; ovules few in each cell. *Capsule* loculicidal or scarcely dehiscent. *Seeds* glabrous or tomentose; cotyledons conduplicate, black-dotted.—A genus of few species, natives of tropical Asia, Madagascar, and the islands of the Pacific.

1. **T. Lampas**, *Dalz. & Gibs. Bomb. Fl.* 19; subarboreous, herbaceous portions downy, leaves palmately lobed. *Hibiscus Lampas*, *Cav. Diss.* iii. 154, t. 56, f. 2; *DC. Prodr.* i. 447; *Roxb. Fl. Ind.* iii. 197; *Wight Ic.* t. 5; *W. & A. Prodr.* i. 48; *Wall. Cat.* 1889, 1 to 4 & E to I. *Thwaites Enum.* 26; *Miq. Fl. Ind. Bat.* i. pt. 2, 153. *H. tetralocularis*, *Roxb. Fl. Ind.* iii. 198. *Azanza Lampas*, *Alefeld in Bot. Zeit.* 1861, 297. *H. gangeticus*, *Roxb. Ic. ined. and Heyne in Herb. Paritium gangeticum*, *Don, Gen. Syst.* i. 485.

TROPICAL HIMALAYA, alt. 1-4000 ft., from Kumaon eastwards; BENGAL, the WESTERN PENINSULA, BIRMA, and CEYLON.—DISTRIB. Java, East Tropical Africa.

Arborescent, not prickly. *Leaves* 5 in. diam., cordate, 3-lobed, lobes spreading, acuminate, sparingly stellate, pilose above, tomentose beneath, midrib with a glandular pore at the base beneath; petioles $2\frac{1}{2}$ in. downy. *Stipules* subulate. *Peduncles* axillary or terminal, paniced, 3-flowered. *Bracteoles* 4-8, subulate, deciduous. *Calyx* of 5 subulate sepals connate below the middle. *Corolla* campanulate, yellow with a crimson centre. *Capsule* ovoid, pointed, villous, 5- rarely 4-valved; valves hispid glabrescent. *Seeds* glabrescent.

2. **T. populnea**, *Corr. in Ann. Mus.* ix. p. 290; arboreous, herbaceous portions covered with peltate scales, leaves entire ovate acute or acuminate. *Cav. Diss.* iii. 152, t. 56, f. 1; *DC. Prodr.* i. 456; *W. & A. Prodr.* i. 54; *Wight Ic.* t. 8; *Thwaites Enum.* 27; *Beddome Fl. Sylvat.* t. 63; *Dalz. & Gibs. Bomb. Fl.* 18; *Wall. Cat.* 1888, 1, 2, & C to H. *Miq. Fl. Ind. Bat.* i. pt. 2, 150. *Hibiscus populneus*, *L.*; *Roxb. Hort. Beng.* 51; *Flor. Ind.* iii. 190. *H. populneoides*, *Roxb. l.c.* *Malvaviscus populneus*, *Gærtn. Fruct.* ii. 253, t. 135. *Azanza acuminata*, *Alefeld Bot. Zeit.* 1861, 299.—*Rheede Hort. Mal.* i. 29.

Tropical shores of BENGAL, CEYLON, and both PENINSULAS.—DISTRIB. Tropical Asia, the Pacific islands, and Africa.

A small tree. *Leaves* 3 in. diam., cordate, roundish, acuminate, quite entire, 5-7-nerved, with a glandular pore beneath between the nerves; petiole $2\frac{1}{2}$ in. *Peduncle* axillary, shorter than the petiole. *Bracteoles* obsolete or 5, oblong-lanceolate, deciduous, as long as the cup-shaped 5-toothed calyx. *Corolla* 2-3 in. diam. *Staminal-tube* toothed at the top; filaments ascending. *Capsule* $1\frac{1}{2}$ in., oblong, depressed, scaly, ultimately glabrescent. *Seeds* pilose or powdery on the surface.—The characters assigned by Roxburgh to *Hiliscus populneoides* are not sufficient, as on the same specimen acute and acuminate, glandular and glandless leaves may be seen, and the characters of the capsule appear equally invalid. Roxburgh describes the integument of the capsule in *H. populneoides* as double, "the exterior one, which is fragile and composed of five valves, opens from the apex spontaneously when ripe, exposing the inner lamina, which is remarkably strong, tough, reticulated with fibres and not opening without considerable force;" whereas in *H. populneus* the integument "is single, and can be easily broken by the pressure of the thumb and finger."

14. **GOSSYPIMUM**, Linn.

Herbs shrubs or low trees. *Leaves* palmately lobed. *Peduncles* axillary, 1-flowered, jointed. *Flowers* large, yellow with, or rarely without, a crimson centre, or all purplish. *Bracteoles* 3, large, leafy, cordate, sprinkled like the calyx with black glandular dots. *Calyx* cup-shaped, truncate or slightly 5-toothed. *Petals* convolute or spreading. *Staminal-tube* as in *Hibiscus*. *Ovary* 5-celled; style clavate, 5-grooved at the apex with five stigmas; ovules many in each cell. *Capsule* loculicidally 3-5-valved. *Seeds* densely clothed with woolly hairs; cotyledons leafy, plicate, sprinkled with black dots.—**DISTRIB.** Tropics of the Old and New World.

The very numerous forms of this genus are distributed by cultivation throughout the hotter regions of the globe. Their synonymy is extremely complicated, and has baffled the attempts of many authors. Wight and Arnott greatly added to the confusion by their attempts to reduce all the varieties to two species, *G. album* and *G. nigrum*. Speaking broadly, it is not difficult to recognise the following forms. *G. Stocksii* is wild in Sindh, and may be the primitive form of the cultivated states of *G. herbaceum*.

1. ***G. Stocksii*, Mast.**; shrubby, branching, leaves palmately 3-5-lobed lobes glabrous oblong obtuse, bracteoles deeply laciniate, segments linear lanceolate, cotton yellow adherent to the seeds and with no felted down beneath.

Limestone rocks on the coasts of SINDH, truly wild, *Stocks*; *Dalzell*.

Branches straggling, diffuse. *Leaves* small, rounded with five roundish or obtuse lobes. *Flowers* small, yellow. *Capsule* ovoid. *Cotton* not separable from the seed.—It seems probable that this may be the wild form of the plant cultivated as *G. herbaceum*, and therefore the parent type of all the forms of Indian cotton. Dalzell and Gibson (Bomb. Fl. 21) apparently confound Roxburgh's *G. obtusifolium* with this plant, which they say is found all over limestone rocks of the Sindh coast, though the description they give does not apply to this, but to the cultivated form of *G. herbaceum* just alluded to. Stocks, indeed, remarks, that in cultivation the leaves of this plant assume the appearance of those of *G. herbaceum*. Roxburgh's *G. obtusifolium*, which he says is a native of Ceylon, appears, moreover, from his drawing to be a form of *G. herbaceum*. Thwaites does not mention any species as native of Ceylon.

G. HERBACEUM, L.; *DC. Prodr.* i. 456; annual or perennial, hairy or subglabrous, leaf-lobes broadly ovate acuminate, flowers yellow with a purple centre rarely wholly yellow or white or purple, petals spreading, bracteoles not divided below the middle, sometimes entire or nearly so, cotton white or brownish, adherent to the seeds, overlying a grey or greenish down. *Roxb. Cor. Pl.* iii. 269; *Fl. Ind.* iii. 184; *Wight Ic.* t. 9, 11; *Royle Ill.* t. 23, f. 1; *Wall. Cat.* 1880; *Can. Diss.* vi. 310, t. 164, f. 2; *Parlatore Sp. di Cotonì*, p. 31, t. 2; *Mast. in Oliv. Fl. Trop. Afr.* i. 212. *G. indicum*, *Lam. Encycl.* ii. 134; *DC. Prodr.* i. 456. *G. album*, *W. & A. Prodr.* i. 54. *G. micranthum*, *DC. Prodr. l.c. (in part)*; *Royle Ill.* i. 49.—*Rheede Hort. Mal.* i. t. 31.

Cultivated; furnishing the varieties of Indian cotton, such as Dacca and Berar.

Erect, shrubby, or herbaceous, nearly glabrous or more or less hairy, and with a few scattered glandular points. *Leaves* cordate, 3-5- rarely 7-lobed, usually with a gland on the under surface of the midrib. *Stipules* ovate-lanceolate, entire or slightly toothed. *Peduncles* shorter than the petiole. *Bracteoles* equalling the capsule. *Calyx* truncate, or obsoletely crenulate, much shorter than the bracteoles. *Petals* obovate or cuneate. *Capsule* ovate, globose, mucronate, 3-5-valved. *Seeds* 5-7 in each cell, ovoid; cotton white, rarely yellowish, overlying a greenish or greyish down.

VAR. 1. *obtusifolium*, Roxb. Fl. Ind. iii. 183 (sp.); shrubby, much branched, leaves 3-5-lobed, lobes ovate entire, stipules falcate, bracteoles nearly entire, Wall. Cat. 1880, in part. China cotton, Roxb. Ic. 185?—This is the form found in Ava by Griffith, Journals, p. 147.

VAR. 2. *hirsutum*, L. (sp.); hairy or hispid, foliage of *G. herbaceum*, but leaf-lobes usually less rounded and more elongate, bracteoles deeply gashed as in *G. barbadense*, petals yellow without a crimson spot, cotton white with underlying greenish or grey down. *G. hirsutum*, L.; Roxb. Fl. Ind. iii. 187; DC. Prodr. i. 456; Wall. Cat. 1880, in part; Royle Ill. 1, p. 100; Parlatore Sp. Cot. 42, tab. 5.—Yields Upland Georgian Cotton.

VAR. 3. *religiosum*, Roxb. Fl. Ind. iii. 185 (sp.); leaves hairy or subglabrous, with five triangular acute lobes, stipules cordate acuminate, bracteoles deeply lacinate, petals entirely yellow, seeds covered with firmly adherent short tawny down and long wool of the same colour. *G. religiosum*, Roxb. Fl. Ind. iii. 185; Cav. Diss. t. 164, f. 1; Wall. Cat. 1885, M; ? of Linnæus and others.—Yields Nankeen Cotton.

VAR. *vitifolium*, Roxb. Fl. Ind. iii. 186 (sp.), not of others; sub-arboreous, dark purple and hairy, leaves 3-5-lobed, lobes triangular acuminate, capsules oblong, seeds clothed with firmly adhering short greenish-grey down under the long fine white wool.—I have not been able to identify this variety, but it is evidently a form of *G. herbaceum*. The *G. vitifolium* of Roxburgh's drawings is a different plant.

G. BARBADENSE, Linn.; DC. Prodr. i. 456; herbaceous or shrubby, leaves nearly glabrous cordate 3-5-lobed lobes oblong acuminate, bracteoles very large deeply gashed, petals convolute, yellow with a crimson spot, capsule oval acuminate, seeds black, free or coherent, covered with readily separable white or brownish cotton. Roxb. Fl. Ind. iii. 187; Wight Ill. t. 28 A and B. *G. nigrum* (in part), W. & A. Prodr. i. 54; Wall. Cat. 1875, F E, G, H; Royle Ill. p. 100, Cult. of Cotton, t. 3; Parlatore Sp. Cot. 49, t. iil.; Mast. in Oliv. Fl. Trop. Afr. i. 210.

Cultivated; yields the American varieties known as Barbadoes, Bourbon, Sea-island, New Orleans, &c., Cottons.

A shrub or tall herb, herbaceous portions glabrescent, sprinkled with black dots, branches purplish. Leaves 1-glandular, deeply 3-5-lobed, lobes tapering, acuminate. Stipules linear-lanceolate. Peduncle thick, often glandular at the apex. Ovary ovoid, pitted, 3-5-celled.

VAR. *acuminatum*, Roxb. Hort. Beng. 51; Fl. Ind. iii. 186 (sp.); sub-arboreous, leaves 3-5-lobed, lobes oblong-lanceolate acuminate, flowers yellow with a crimson spot, petals spreading, seeds black covered with easily separable white wool and adhering firmly to each other. Wight Ill. t. 27; Royle Ill. i. p. 98; Cult. Cott. t. 3, f. 5. *G. peruvianum*, Cav.; DC. Prodr. i. 456. *G. vitifolium*, Lam. Encyl. ii. 135; Roxb. Ic. ined. not of Fl. Ind.; Cav. Diss. t. 166; Wall. Cat. 1875, F. *G. religiosum*, Parlatore Sp. di Cott. 55, t. 4 (not of authors).—Yields the varieties known as Peruvian, Brazilian, Kidney Cotton, &c. The plant is usually larger in foliage, flower, and capsule than the other varieties.

G. ARBOREUM, L.; DC. Prodr. i. 456; arborescent or shrubby, leaves nearly glabrous, deeply palmately 5-7-lobed lobes linear-oblong, flowers purple rarely white, bracteoles nearly entire, cotton not readily separable from the seed. Roxb. Fl. Ind. iii. 183; Wight Ic. t. 10; Royle Ill. 23, f. 2; Wall. Cat. 1875 J., 1881; Parlatore Sp. Cot. 24, t. 1; Mast. in Oliv. Fl. Trop. Afr. i. 211. *G. nigrum*, Ham. in W. & A. Prodr. i. 54, in part (excl. syn.). *G. rubicundum*, Roxb. Ic. ined. and in herb.—Rheede Hort. Mal. t. 31? Burm. Fl. Ind. 150.

Plains of INDIA, in gardens, but not generally cultivated; KASHMIR, Falconer.

A shrub or low tree, rarely a herb; branches purple, pilose. Leaves 1-glandular, lobes mucronate, contracted at the base, often with a supplementary lobe in the sinus. Stipules ensiform. Bracteoles cordate, ovate, acute. Petals spreading. Staminal-tube antheriferous for its whole length. Capsule about 1 in., oblong-pointed. Seeds tree, covered with white wool overlying a dense green down.

15. **KYDIA**, *Roxb.*

Trees with stellate pubescence. *Leaves* palminerved, usually lobed. *Flowers* paniced, polygamous. *Bracteoles* 4-6, leafy, connate at the base, accrescent and spreading in fruit. *Sepals* 5, connate below the middle. *Petals* 5, obcordate, oblique, longer than the calyx, adnate to the staminal tube. *Staminal-tube* divided about the middle into 5 divisions each bearing 3 reniform anthers which are imperfect in the female flower. *Ovary* 2-3-celled; style 3-cleft, stigmas 3 peltate, imperfect in the male flower; ovules 2 in each cell, ascending. *Capsule* subglobose, mucous, loculicidally 3-valved. *Seeds* reniform, furrowed.—**DISTRIB.** Exclusively Indian.

1. **K. calycina**, *Roxb. Hort. Beng.* 50; *Cor. Pl.* iii. 11, t. 215; *Fl. Ind.* iii. 188; leaves downy beneath, bracteoles oblong downy. *Wight Ic.* t. 879-80; *W. & A. Prodr.* i. 70; *Dalz. & Gibs. Bomb. Fl.* 24; *Beddome Fl. Sylvat.* t. 3; *Wall. Cat.* 1176. *K. Roxburghiana*, *Wight Ic.* iii. t. 881; *Wall. Cat.* 1177. *K. fraterna*, *Roxb. Cor. Pl.* t. 216; *Fl. Ind.* iii. 189; *W. & A. l.c.* *K. pulverulenta*, *Ham. in Wall. Cat.* 1176.

Tropical regions of the HIMALAYA, from Kumaon eastward, and throughout the WESTERN GHATS. **BIIRMA**, *Wallich.*

A tree. *Leaves* 4-5 by 3 in., rounded, cordate, palmately 7-nerved, more or less lobed, midlobe longest, glabrous above or with thinly scattered hairs, closely felted beneath; petiole 1-2 in. *Inflorescence* much branched, many-flowered. *Bracteoles* 4-6, oblong-spathulate, nearly as long as the calyx, ultimately spreading. *Flowers* white or pink, *Sepals* ovate, acute. *Petals* exceeding the sepals, obcordate. *Staminal-tube* shorter than the petals, branches opposite to the sepals.—The size and proportion of the parts vary according to the sex of the flower.

2. **K. glabrescens**, *Mast.*; leaves suborbicular slightly angled, bracteoles oblanceolate glabrous.

BHOTAN, **ASSAM**, and **MALACCA**, *Griffith* (all the localities).

A tree, herbaceous portions sparingly hairy. *Leaves* 4 by 3½ in., palminerved, obscurely lobed, base wedge-shaped; petiole 2½ in. *Panicle* terminal; bracteoles 4-5, spreading, accrescent, ultimately 1 in. *Sepals* lanceolate. *Capsule* the size of a small pea, shorter than the incurved sepals, globose, pubescent.—I have only seen fruiting specimens.

15.* **ADANSONIA**, *Linn.*

Tree with a short thick trunk and very widely spreading branches forming a mushroom-shaped head. *Leaves* pubescent beneath when young, glabrous digitate, deciduous. *Flowers* solitary, axillary, pendulous, long-peduncled. *Calyx* leathery, cup-shaped, 5-cleft, bibracteolate. *Petals* 5, exceeding the sepals, adnate below to the stamens. *Staminal-tube* cylindrical, dividing above into numerous filaments; anthers reniform, 1-celled. *Ovary* 5-10-celled; style long, exserted, divided into as many stigmatic branches as there are cells to the ovary, stigmas radiating; ovules many in each cell. *Fruit* oblong, woody, indehiscent; with mealy pulp in the inside. *Seeds* reniform, testa thick, albumen thin, embryo curved, cotyledons contortuplicate.—Two species are known, one the Baobab, a native of Africa, not truly wild in India, and the other Australian.

A. DIGITATA, *L.*; *DC. Prodr.* i. 478; *Cav. Diss.* v. 298, t. 15; *W. & A. Prodr.* i. 61; *Roxb. Fl. Ind.* iii. 164; *Thwaites Enum.* 28; *Wall. Cat.* 1836; *Mast. in Oliv. Fl. Trop. Afr.* i. 212.

Cultivated in various parts of India and Ceylon.—**DISTRIB.** Tropical Africa.

16. **BOMBAX**, Linn.

Trees. *Leaves* digitate, deciduous. *Peduncles* axillary or subterminal, solitary or clustered, 1-flowered. *Flowers* appearing before the leaves. *Bracteoles* 0. *Calyx* leathery, cup-shaped, truncate or 5-7-lobed. *Petals* obovate. *Stamens* pentadelphous, bundles opposite the petals, and divided above into numerous filaments; anthers reniform, 1-celled. *Ovary* 5-celled; style clavate, stigmas 5; ovules many in each cell. *Capsule* loculicidally 5-valved, valves leathery, woolly within. *Seeds* woolly, testa thin, albumen scanty; cotyledons contortuplicate.—**DISTRIB.** A genus of about 10 species, mostly tropical American, one is tropical African.

1. **B. malabaricum**, DC. *Prodr.* i. 479; trunk and branches prickly, leaflets 5-7 quite entire cuspidate, base tapering, filaments ligulate half the length of the petals, capsule oblong obtuse. *Wight Ill.* t. 29; *W. & A. Prodr.* i. 61; *Wall. Cat.* 1840; *Beddome Fl. Sylvat.* t. 82. *Salmalia malabarica*. *Schott. Meletem.* 35; *Thwaites Enum.* 28; *Dalz. & Gibs. Bomb. Fl.* 22; *Miq. Fl. Ind. Bat.* i. pt. 2, 166. *Bombax heptaphylla*, *Cav. Diss.* v. p. 296; *Roxb. Hort. Beng.* 50; *Cor. Pl.* iii. t. 247; *Fl. Ind.* iii. 167. *B. Ceiba*, *Burm. Fl. Ind.* 145 excl. syn. *Gossampinus rubra*, *Ham. in Trans. Linn. Soc.* xv. 128.—*Rheede Hort. Mal.* iii. t. 52.

Tropical EASTERN HIMALAYA, and throughout the hotter forest regions of India, to BIRMA and CEYLON.—**DISTRIB.** Java, Sumatra.

A large tree, covered with stout hard conical prickles; branches spreading. *Leaflets* 6-12 in., glabrous; petiole longer than the leaflets, secondary petioles 1 in. *Stipules* small, caducous. *Flowers* numerous, fasciated at or near the ends of the branches. *Calyx* 1 in., cup-shaped, smooth externally, silky within, margin slightly lobed, ultimately irregularly cleft, deciduous with the corolla and stamens. *Corolla* 6-7 in., red or white. *Petals* 5, oblong, recurved, fleshy, twice the length of the stamens. *Staminal-tube* short, filaments numerous, pluriseriate, 5 innermost forked at the top, each with an anther, 10 intermediate shorter, outer very numerous. *Style* longer than the stamens. *Capsule* 6-7 in., ovoid, downy, 5-valved, valves silky within. *Seeds* numerous, obovate, smooth.—Cotton tree.

2. **B. insigne**, *Wall. Pl. Asiat. Rar.* i. 71, t. 79, 80; *Cat.* 1841; *Kurz. in Journ. As. Soc. Beng.* 1873, ii. 61; trunk without prickles, leaflets 7-9 obovate cuspidate acuminate glaucous beneath, filaments slender two-thirds the length of the petals.

BIRMA, PEGU, and the Andaman islands.

A tree, 20-30 ft.; trunk marked with large leaf-scars. *Leaflets* 5 in. *Flowers* solitary, large, scattered on leafless branches. *Peduncles* $\frac{1}{2}$ in., thick, club-shaped, jointed at the top. *Flowers* 10 in. diam.; buds globose. *Calyx* $1\frac{1}{2}$ in., urceolate-globose, truncate or slightly two-lobed. *Petals* 5-6 in., linear-oblong, recurved, downy, scarlet within. *Stamens* many. *Ovary* ovoid. *Stigma* 5-lobed. *Capsule* 10 by 1 in., elongated, curved at the apex, glabrous.

17. **ERIODENDRON**, DC.

Trees. *Leaves* digitate, deciduous. *Flowers* appearing before the leaves, tufted at the ends of the branches, or axillary, large white or rose coloured. *Bracteoles* 0. *Calyx* cup-shaped, truncate, or 3-5-fid. *Petals* oblong. *Staminal* bundles 5, opposite the petals connate at the base each bearing 2-3 sinuous or linear anthers. *Ovary* ovoid, 5-celled; style cylindrical, dilated, stigma obscurely 5-lobed. *Capsule* oblong, coriaceous or woody, 5-celled, 5-valved, valves densely silky within. *Seeds* globose or obovoid, testa crustaceous, smooth with silky hairs, albumen scanty; cotyledons contortuplicate.—

DISTRIB. A genus of about 3 species, most of them American, one occurs in tropical Africa.

1. ***E. anfractuosum***, DC. *Prodr.* i. 479; leaflets lanceolate cuspidate entire or serrulate towards the point glaucous beneath. *Wall. Cat.* 1839; *W. & A. Prodr.* i. 61; *Wight Ic.* t. 400; *Griff. Not.* iv. 533; *Dalz. & Gibs. Bomb. Fl.* 22; *Miq. Fl. Ind. Bat.* i. pt. 2. 166; *Beddome Fl. Sylvat. Anal. Gen.* t. 4. *Bombax pentandrum*, Linn. *Sp. Pl.* 989; *Cav. Diss.* v. 293, t. 151; *Roxb. Fl. Ind.* iii. 165. B. orientale, *Spreng. Syst.* iii. 124. *Ceiba pentandra*, *Gærtn. Fruct.* ii. 244, t. 133; *Ham. in Trans. Linn. Soc.* xv. 126. *Eriodendron orientale*, *Steud. Nomencl.* 587; *Thwaites Enum.* 28.—*Rheede Hort. Mal.* iii. t. 49, 50; *Rumph. Amb.* i. t. 80.

Forests throughout the hotter parts of INDIA and CEYLON.—DISTRIB. S. America, W. Indies, Trop. Africa?

A tall tree, trunk straight, tapering, prickly when young; branches horizontal, verticillate. *Leaflets* 5-8, 3-4 by 1 in.; petioles at least as long as or longer than the leaflets. *Stipules* small, caducous. *Peduncles* about 2 in., club-shaped, tufted, 1-flowered. *Calyx* $\frac{3}{4}$ in., cup-shaped, 5-cleft, lobes roundish, glabrous on the outside, slightly downy within. *Petals* 5, oblong, connate at the base, downy externally, yellowish within, twice the length of the calyx. *Filaments* shorter than the petals. *Ovary* conical; style as long as the stamens, declinate, dilated above the contracted base, stigma obscurely 5-lobed. *Capsule* oblong like a cucumber; septa membranous, tardily dehiscent. *Seeds* numerous, subpyriform, black, glabrous.—Roxburgh doubts whether the Indian species be the same as the West Indian, which latter is described with an irregular trunk, often ventricose or thicker above; the shape of the fruit is also different. DC. l.c. makes 3 varieties—1. *Indicum*, above described, with flowers yellowish within; 2. *Caribæum*, with rose coloured flowers; 3. *Africanum*, to which no differential characters are assigned. In herbaria the specimens from the East and from the West do not appear to differ. Planchon, however (in herb.), has suggested that the name *E. Rheedii* be given to the Indian form.

18. **CULLENIA**, Wight.

A tall tree. *Leaves* simple, scaly. *Flowers* fascicled in the axils of the leaves. *Bracteoles* 3-5, connate for nearly their whole length into a deciduous cylindric tube, clothed, like the calyx, with peltate scales. *Sepals* 5, connate for nearly their whole length into a deciduous cylindric tube. *Petals* 0. *Staminal-tube* 5-cleft, divisions linear, exserted, declinate; anthers small, subglobose, 1-celled, clustered at intervals on the branches of the staminal-tube. *Ovary* 5-celled, style elongate, very hairy, stigma capitate; ovules 2 in each cell, superposed. *Fruit* globose, densely clothed with spines, ultimately 5-valved. *Seeds* with a fleshy aril, albumen 0, cotyledons fleshy unequal.

1. ***C. excelsa***, *Wight Ic.* 1761, 2; *Beddome Flor. Sylvat., Anal. Gen.* t. 4; *Thwaites Enum.* 28. *Durio zeylanicus*, *Gardn. in Calc. Journ. Nat. Hist.* viii.

Low hills, MALABAR, *Wight*; CEYLON; common in the central provinces, alt. 2500 ft., *Thwaites*.

Leaves elliptic, acuminate, bright shining green above, silvery and densely scaly beneath. *Flowers* densely packed on contracted branches, short peduncled, pointed at the base. *Fruit* the size of a large orange. *Seeds* like a chestnut.

19. **DURIO**, Linn.

Trees. *Leaves* entire, leathery, closely penninerved, scaly, rarely hairy beneath. *Flowers* in lateral cymes; peduncles angular. *Bracteoles* 3, connate

below into a cup, tips free, deciduous. *Calyx* bell-shaped, leathery, like the bracteoles densely scaly, 5-fid, lobes valvate oblong or rounded. *Petals* 5, contorted-imbricate, spathulate, longer than the sepals. *Staminal-tube* divided into 4-5 phalanges opposite the petals; filaments many, bearing a globose head of sinuous 1-celled anthers, or a single annular 1-celled anther. *Ovary* scaly externally, 4-5-celled; styles connate, stigmas capitate; ovules many and 2-seriate in each cell. *Fruit* very large, subglobose or oblong, spiny, indehiscent or loculicidally 5-valved. *Seeds* arillate; cotyledons fleshy, often connate.—**DISTRIB.** Malay Peninsula and islands; species 3.

1. **D. Zibethinus**, *DC. Prodr.* i. 480; leaves scaly beneath, flowers about 3 in. diam., staminal column tubular at the base only, anthers sinuous in globose heads. *Koen. in Trans. Linn. Soc.* vii. 266, t. 14-16; *Roxb. Fl. Ind.* iii. 399. *Miq. Fl. Ind. Bat.* i. pt. 2, 167. *Griff. Not.* iv. 528; *Ic.* t. 596. —*Rumph. Amb.* i. 99, t. 29.

MALACCA, cultivated only?—**DISTRIB.** Malay islands.

A tree. *Leaves* 6-7 by 2-2½ in., base rounded, obovate oblong, entire, feather-veined, leathery, shining above, scaly beneath, not hairy; petiole about 1 in., thickened at the apex. *Flowers* in lateral trichotomous cymes; peduncles angular, subulate. *Bracteoles* deciduous, half the length of the calyx. *Calyx* bell-shaped, leathery, densely clothed with large peltate scales, 5-lobed, lobes obtuse. *Petals* oblong, tapering at the base, longer than the calyx. *Stamens* longer than the petals. *Ovary* oblong, scaly. *Fruit* subglobose, very large, somewhat woody, densely muricate, indehiscent or tardily 5-valved, pulpy within. *Seeds* arillate.—The *Durian* is probably not indigenous in the Malay Peninsula. Wallace (*Kew. Gard. Mis.* viii. 228) states that two varieties, both small fruited, are indigenous in Borneo.

2. **D. malaccensis**, *Planch. mss.*; leaves scaly beneath, flowers large (about 5 in. diam.), staminal column tubular for half its length, anthers sinuous in globose heads.

MALACCA, *Griffith, Maingay*; BIRMA, *Brandis*.

A tree, with the habit and foliage of *D. Zibethinus*, but with the flowers nearly twice the size. *Petals* twice the length of the sepals. *Staminal-tube* divided, about the middle only, into 5 phalanges. *Ovary* and fruit as in the preceding.—Perhaps the wild form of the *Durian*.

3. **D. Oxleyanus**, *Griff. Notul.* iv. 531; leaves glabrous above pubescent or hairy on the under surface, scaly on midrib only, flowers about 1 in. diam., stamens 4-5-adelphous, anthers annular solitary on the end of each filament.

MALACCA, *Griffith, Maingay*.

A tree, with the habit and foliage of *D. Zibethinus*. *Calyx* ventricose. *Petals* oblong-spathulate, longer than the sepals. *Staminal-phalanges* 4 or 5, dividing about the middle into numerous filaments each bearing a solitary anther with a thickened black connective bordered by an annular cell. *Ovary* and fruit of *D. Zibethinus*, but smaller.—Referred by Planchon, in *Herb. Kew*, to *Neesia*, but erroneously.

20. BOSCHIA, Korth.

Trees. *Leaves* simple entire, scaly beneath. *Flowers* small, axillary. *Bracteoles* 2-3, connate at the base, deciduous. *Calyx* deeply 4-5-parted. *Petals* linear-ligulate, entire or laciniate. *Stamens* many, some free, others irregularly coherent, outermost without anthers; anthers oblong, 1-celled, opening by a terminal pore, solitary, or in groups of 2-6. *Pollen* globose 3-valved. *Ovary* 3-5-celled, style elongate; ovules one or

more in each cell, ascending. *Fruit* oblong, 3-5-celled, 3-5-valved, valves muricate, bright red. *Seeds* few, oblong black, with a fleshy orange-coloured, cup-shaped arillus extending over half their surface; cotyledons amygdaloid; radicle next the hilum.—**DISTRIB.** Malay Peninsula and archipelago. Species 2.

1. **B. Griffithii**, *Mast.*; leaves ovate oblong cuspidate penniveined scaly beneath, flowers solitary or 2-3 in short axillary cymes. *Heteropxyxis*, *Griff. Notul.* iv. 524; *Ic. Pl. As.* t. 594.

MALACCA, *Griffith, Maingay*.

A small tree, *bark* grey, *wood* reddish. *Leaves* 3-4 by $1\frac{1}{2}$ -2 in., glabrous above, white and sparingly lepidote beneath; petiole short. *Stipules* linear, caducous. *Peduncle* very short. *Bracteoles* 2-3, deciduous. *Flowers* $\frac{1}{2}$ in. diam. *Calyx* 4-parted, segments ultimately reflexed. *Petals* linear-spathulate, variable in number, longer than the calyx. *Anthers* minute. *Ovary* covered with spines, each tipped by a peltate stelliform scale. *Fruit* about 2 in. *Seed* $\frac{3}{4}$ in., solitary in each cell.

21. **NEESIA**, Blume.

Trees. *Branches* marked with large leaf-scars. *Leaves* entire, feather-veined. *Stipules* leafy. *Inflorescence* of cymes produced from the stem in the axils of the fallen leaves. *Bracteoles* 3, connate into a campanulate tube, circumsciss and deciduous, covered, like the sepals, with peltate scales. *Calyx* closed, ultimately dilated and cushion-shaped at the base, tubular, conical above, opening by a circular irregularly crenulate orifice at the top. *Petals* 5, free, imbricate. *Stamens* in 5 bundles, alternate with the petals, each dividing midway into numerous filaments, the terminal or central one of which bears a 2-lobed and the lateral filaments a 1-lobed extrorse anther opening lengthwise, connective thick; staminodes 0. *Ovary* very shortly stalked, oblong, 5-celled; style short; stigma conic; ovules numerous 2-seriate, horizontal, anatropous. *Fruit* ovoid, woody, muricate, loculicidally 5-valved. *Seeds* albuminous; aril 0; cotyledons flat, leafy. (Fruit and seed after Blume.)—**DISTRIB.** Two species, a Javanese and Malaccan.

1. **N. synandra**, *Mast.*

PENANG, *Maingay*.

A lofty tree, trunk stout. *Leaves* 9-12 by 4-5 in., cordate-oblong, obtuse, coriaceous, minutely puberulous; petiole 2 in. *Stipules* oblong, 1-nerved, $1\frac{1}{2}$ in. *Peduncle* stout, angular. *Fruit* of *Durian*, (*Maingay*).—This differs from Blume's *N. altissima* in the form of the leaf and particularly in the stamens, which are described and figured by Blume as joined at the base only. *Neesia Griffithii* of herbaria, and upon which Bentham (*Gen. Pl.* i. 213) partly constructed, as it would seem, the generic character, is a true *Durio* (*D. Oxleyanus*, *Griff.*).

22. **CÆLOSTEGIA**, Benth.

A tall tree. *Leaves* simple, quite entire, scaly beneath. *Flowers* axillary, fascicled, subsessile. *Bracteoles* 3-4, scaly, combined below into a cup-shaped tube. *Sepals* 5, lanceolate, much longer than the bracteoles, connate below the middle into a 5-lobed 5-pouched cup. *Petals* 5, free, attached to the base of the calyx and much smaller than it. *Stamens* in 5 bundles opposite to the sepals and adherent to their bases, included; anthers small, subglobose. *Ovary* partly immersed in the calyx-tube, 5-celled; cells few-ovuled; style filiform, stigma large capitate peltate 5-lobed. *Fruit* unknown.—The following is the only known species.

1. **C. Griffithii**, *Benth. in Benth. & Hook. Gen. Pl. i. 213.*

MALACCA, *Griffith.*

Leaves 2½–3 in., glabrous, acuminate, base rounded; *petiole* ½ in. *Flowers* ¼ in. diam., produced from the old wood, covered with scales.

ORDER XXVII. **STERCULIACEÆ.** (By Maxwell T. Masters, F.R.S.)

Herbs, shrubs (rarely climbing), or trees, herbaceous portions usually more or less pubescent. *Bark* usually abounding in mucilage, inner fibrous. *Leaves* alternate, simple, lobed or digitate, stipulate. *Inflorescence* axillary or terminal, usually cymose. *Flowers* regular, uni- or bisexual. *Sepals* 5, more or less connate, rarely completely so. *Petals* 5 or 0. *Andræcium* columnar or tubular, of many stamens, or rarely stamens few, free; anthers in heads, or in a single ring at the apex of the column, or dispersed on the outside of the tube, or arranged along the edge of a cup or tube, with intervening staminodes or sterile stamens; anther-cells always 2, parallel or divergent. *Ovary* free, 2–5-celled, rarely of 1 carpel, sessile or stalked; styles consolidated, or as many as the cells of the ovary. *Ovules* many or few, attached to the inner angle of the carpels, anatropous, ascending or horizontal, raphe ventral or lateral. *Fruit* dry or fleshy, dehiscent or indehiscent. *Seeds* sometimes arillate, albuminous or exalbuminous; cotyledons leafy, flat, folded or convolute, radicle pointing in various directions in different species.—**DISTRIB.** Abundant in the tropics of either hemisphere and in subtropical Africa and Australia. Genera 40–45; species between 500 and 600, largely represented in India and its islands, to which 2 or 3 genera and numerous species are peculiar.

TRIBE I. Sterculiæ. *Flowers* unisexual or polygamous. *Petals* 0. *Andræcium* columnar or sessile; anthers clustered or disposed in a ring.

* *Anthers* numerous.

Ovary with 2 or more ovules in each cell; fruit dehiscent . . . 1. STERCULIA.

Ovarian cells 1-ovuled; fruit indehiscent . . . 2. TARIETIA.

** *Anthers* 5, whorled; fruit indehiscent.

3. HERITIERA.

TRIBE II. Helicteræ. *Flowers* hermaphrodite. *Petals* deciduous. *Andræcium* columnar below, dilated above into a cup, on the margin of which are placed the anthers usually alternating with staminodes.

Anthers sessile . . . 4. REEVESIA.

Anthers stipitate.

Capsule membranous, inflated . . . 5. KLEINHOVIA.

Capsule more or less woody, not inflated.

Anther-cells divaricate; seeds not winged . . . 6. HELICTERES.

Anther-cells parallel; seeds winged . . . 7. PTEROSPERMUM.

TRIBE III. Eriolanæ. *Flowers* hermaphrodite. *Petals* deciduous. *Andræcium* tubular, conical, antheriferous for nearly its whole length; staminodes 0.

8. ERIOLENA.

TRIBE IV. Dombeyæ. *Flowers* hermaphrodite. *Petals* flat, persistent. *Andræcium* tubular, antheriferous at the margin; anthers solitary or in groups, alternating with staminodes.

Bracteoles caducous; anthers 15 9. *PENTAPETES*.
 Bracteoles persistent; anthers 5 10. *MELHANIA*.

TRIBE V. **Hermannieæ**. *Flowers* hermaphrodite. *Petals* marcescent, flat. *Andrœcium* tubular at the base only; stamens 5, staminodes 0.

Ovary 5-celled 11. *MELOCHIA*.
 Ovary of 1 carpel 12. *WALTHERIA*.

TRIBE VI. **Buettnerieæ**. *Petals* concave at the base. *Andrœcium* tubular; anthers marginal, solitary or in groups between the staminodes.

* *Stamens* 1-seriate, anthers 2-4 between each staminode.

Petals with a stipitate ovate blade 13. *ABROMA*.
 Petals with a linear 2-fid blade 14. *GUAZUMA*.

** *Stamens* 1-seriate, anthers solitary between each staminode.

Petals with an entire or 3-fid blade; staminodes short-obtuse . 15. *BUETTNERIA*.
 Petals with a linear blade; staminodes linear-lanceolate . . . 16. *COMMERSONIA*.

*** *Stamens* pluriseriate, petals orbicular without appendage.

17. *LEPTONYCHIA*.

1. **STERCULIA**, Linn.

Trees or shrubs. *Leaves* simple, palmately lobed or digitate. *Inflorescence* panicked, axillary or terminal. *Flowers* polygamous. *Calyx* tubular, 4-5-parted, often coloured. *Petals* 0. *Staminal column* bearing a head or ring of sessile, 2-celled anthers. *Pistil* sessile or stipitate, of 4-5 carpels opposite the sepals, each 2-many-ovuled; styles connate at the base, stigmas as many as the carpels, free, radiating. *Ripe carpels* distinct, follicular, sessile or stipitate, woody or membranous. *Seeds* 1 or many, naked, sometimes arillate, sometimes winged; albumen bipartite, flat or folded; cotyledons flat, thin, adhering to the albumen, or thick and fleshy; radicle near to or remote from the hilum.—*DISTRIB.* A genus of about 60 species, natives of the tropics of both hemispheres, but specially abundant in tropical Asia.

SECT. I. **Eusterculia**, Endl. *Follicle* coriaceous or woody. *Radicle* remote from the hilum.

* *Leaves* digitate.

1. **S. foetida**, L.; DC. *Prodr.* i. 483; leaflets 7-9 elliptic-lanceolate adult glabrous beneath, calyx deeply 5-parted. *Br.* in Benn. *Pl. Jav. Rar.* 227; Cav. *Diss.* v. t. 141; Roxb. *Hort. Beng.* 50; *Fl. Ind.* iii. 155; W. & A. *Prodr.* i. 63; Wall. *Cat.* 1137; Wight *Ic.* t. 181, 364; Thwaites *Enum.* 29; Miquel *Flor. Ind. Bat.* i. pt. ii. p. 172.—Rumph. *Herb. Amb.* iii. t. 107.

WESTERN PENINSULA, in the Concan, Malabar; BIRMA, CEYLON.—*DISTRIB.* East tropical Africa, Moluccas, North Australia.

A tall tree. *Branches* whorled, horizontal. *Leaves* crowded at the ends of the branches; leaflets about 6 by 2 in., pubescent when young; petiole 8 in.; stipules ensiform, caducous. *Panicles* erect, ∞ -flowered, spreading (formed immediately under the young leaves of the present year, Roxb.), branches glabrous, ultimate pedicels shorter than the flower, jointed in the middle. *Bracteoles* minute. *Calyx* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., dull orange coloured, campanulate, deeply 5-parted; lobes oblong-lanceolate, spreading, villous within, much longer than the tube. *Anthers* 12-15. *Carpels* 5, downy; style curved. *Follicles* as large as the fist, woody, oblong, boat-shaped, shortly beaked,

nearly glabrous. *Seeds* 10–15, the size of filberts, black, smooth; albumen 0; cotyledons thick, fleshy, 5-nerved, plumule developed.—The seeds are roasted and eaten as chestnuts.

2. ***S. versicolor***, *Wall. Pl. As. Rar.* i. 48, t. 59; leaves peltate digitate, leaflets 5–7 oblong acuminate pubescent beneath, calyx-lobes inflexed connivent at the tips. *Wall. Cat.* 1129. *Br. in Benn. Pl. Jav. Rar.* 227.

BIRMA, on limestone rocks, by the banks of the Irrawaddy, near Segaeen, *Wallich*.

A tree 16 ft. *Trunk* thick, bark grey. *Branches* spreading. *Leaflets* 5–7 by 2–2½ in., glabrous above, whitish pubescent beneath; petiole 6–8 in., dilated at the apex. *Panicles* at the ends of the branches, erect, shorter than the petioles. *Flowers* ∞, small, fragrant, orange-yellow, pedicelled. *Calyx* ¼ in., campanulate, segments oblong. *Staminal column* curved. ♀ fl.: ovary pedicelled, 5-furrowed, villous; style short, villous, stigma subpeltate, 5-lobed, lobes obtuse.

** Leaves palmately lobed.

3. ***S. urens***, *Roxb. Hort. Beng.* 50; *Cor. Pl.* i. 25, t. 24; *Fl. Ind.* iii. 145; leaves 5-lobed velvety beneath, panicles erect, follicles armed with sharp bristles. *W. & A. Prodr.* i. 63; *Wall. Cat.* 1120 in part; *Dalz. & Gibs. Bomb. Fl.* 23; *Thwaites Enum.* 29; *Br. in Benn. Pl. Jav. Rar.* 227. *Miq. Fl. Ind. Bat.* i. pt. 2, 172. *Cavallium urens*, *Schott & Endl. Melet.* 33.

NORTH-WEST INDIA, ASSAM, BEHAR, EASTERN AND WESTERN PENINSULAS, CEYLON.

A soft-wooded tree, with white papyry outer bark, inner fibrous. *Trunk* erect. *Branches* spreading, marked with large scars. *Leaves* about the ends of the branches, 9–12 in. long and broad, rounded, base cordate, lobes entire acuminate; petiole 6–9 in. *Panicle* dense, terminal, ∞-flowered, glandular-pubescent. *Flowers* small, yellow, ♀ mixed with many ♂. *Calyx* ¼ in. diam., campanulate, 5-parted, lobes acute, spreading. *Filaments* 10. *Follicles* 5, oblong, radiating, yellow pubescent, with stinging hairs intermixed. *Seeds* 3–6, oblong, black. Yields a colloid gum, and the seeds are roasted and eaten.—In *Wallich's* herbarium, under number 1120 D, E, F (*S. urens*), are fragments of two or three species intermixed, with no indication of the proper letters pertaining to each, the leaves are digitate, glabrous above, pubescent beneath, there are flowers of two species, and fruits which may be those of *S. villosa*. The name *S. urens* cannot be properly applied to any of these fragments.

4. ***S. villosa***, *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 153; leaves 5–7-lobed velvety beneath and with spreading villi, panicles pendulous, follicles downy. *Wall. Cat.* 1136, 2, 3, D.; *W. & A. Prodr.* i. 63; *Dalz. & Gibs. Bomb. Fl.* 22; *Br. in Benn. Pl. Jav. Rar.* 227.

NORTH-WESTERN INDIA, BENGAL AND MALABAR, and the tropical Himalaya from Kumaon eastwards.

A tree with white bark. *Branches* few, spreading, with large scars. *Leaves* 12–18 in. each way, glabrescent or thinly stellate-pilose above, base cordate, deeply palmately 5–7-lobed, lobes acuminate, sometimes 3-fid; petiole as long as the leaf, expanded and very downy at the top; stipules lanceolate, acuminate. *Panicle* 12–14 in., deflexed, much branched, rusty pubescent. *Bracts* filiform, caducous. *Flower-buds* globose. *Flowers* ∞, ♂ and ♀ mixed, the former most numerous. *Calyx* ¼ in. diam., broadly campanulate, downy outside, pinkish within, 5-lobed, lobes spreading. *Anthers* 10. *Ovary* globose, style recurved. *Follicles* 1½–2 in., oblong, spreading, rusty-villous. *Seeds* oblong, black; albumen bipartite; cotyledons thin.

*** Leaves simple, not lobed, 1-nerved.

† *Calyx-lobes* broad, spreading.

5. ***S. guttata***, *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 148; leaves glabrous above pubescent beneath oblong-ovate acute or acuminate base rounded or subcordate, panicles sparingly branched. *Wall. Cat.* 1127, in part;

W. & A. Prodr. i. 62; *Wight, Ic.* t. 487; *Thwaites Enum.* 29; *Dalz. & Gibs. Bomb. Fl.* 23; *Beddome Fl. Sylvat.* t. 105; *Br. in Benn. Pl. Jav. Rar.* 229. *S. cuneata*, *Heyne ms. in Walk. Cat.* 1127³. *S. alata*, *Wall. Cat.* 1127 D, not of others.—*Rheede Hort. Mal.* iv. t. 61.

WESTERN PENINSULA, Concan, Nilghiri Mts.; Malabar; EASTERN PENINSULA, at Malacca and the ANDAMAN ISLES; CEYLON, Ambagamowa district.

A tree. *Trunk* straight. *Bark* cracked, ash-coloured, inner fibrous. *Young shoots* pubescent. *Leaves* 7-8 by 4 in., scabrid above, nerves stellate-pilose beneath; petiole 2 in., thinly stellate pilose; stipules ensiform, caducous. *Panicle* equalling the leaves, branches horizontal, rusty-tomentose; ultimate pedicels shorter than the flowers. *Bracts* lanceolate. *Flower-buds* globose. *Flowers* chiefly ♂. *Calyx* $\frac{1}{2}$ in., densely rusty-downy outside, glandular within, campanulate, 5-fid; segments broadly ovate-acute, ultimately reflexed, covered with long hairs. *Anthers* 12. *Ovary* stalked, globose, 3-5-lobed. *Style* curved, stigma 3-5-lobed. *Follicles* 1-5, size of a small apple, each about 3 in., obovoid, covered with reddish down, smooth, pink within. *Placentas* villous. *Seeds* oblong; testa black, brittle; between it and the second coat, which is brown and tough, is a soft white sebaceous substance, innermost coat thin, membranous; albumen amygdaloid; cotyledons elliptic.

Brown, l.c., makes two vars., α with oblong ovate acute leaves; and β with obovate acuminate leaves and racemes much shorter than the leaves.—Cloth is made from the bark in Malabar.

6. *S. Roxburghii*, *Wall. Cat.* 1124; leaves glabrous oval or oblong-lanceolate suddenly acuminate base rounded, racemes erect shorter than the leaves. *Wall. Pl. As. Rar.* 262; *Br. in Benn. Pl. Jav. Rar.* 229. *S. lanceæfolia*, *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 150, not of Cav. *S. ovalifolia*, *Wall. Cat.* 1132. *S. alata*, *Wall. Cat.* 1125. in part.

TEMPERATE HIMALAYA, ascending in Sikkim 6000 ft., *J. D. H.*; SILHET and ASSAM.

A tree. *Bark* ashy. *Leaves* 4-8 by 1-3 in., lanceolate; petiole $\frac{1}{2}$ -1 in., thickened at both ends; stipules subulate. *Racemes* 2 in., axillary, few-flowered, pedicels erecto-patent sparingly stellate-pilose. ♂ fl. most numerous. *Calyx* $\frac{1}{2}$ in. diam., scarlet, campanulate, 5-parted, segments oblong-lanceolate, spreading, longer than the tube. *Follicles* 1-5, 3 in., lanceolate, beaked, downy-scaberulous, pink. *Seeds* 4-8, black, ovoid, coats as in *S. guttata* (Roxb.), albumen scanty; cotyledons thick.—Wallich's *S. ovalifolia* only differs in its oval leaves.

7. *S. parvifolia*, *Wall. Cat.* 1123; leaves glabrous lanceolate base tapering, racemes simple shorter than the leaves. *Br. in Benn. Pl. Jav. Rar.* 229.

MALACCA and PENANG, *Porter, &c.*

A small tree. *Branches* glabrous, purplish, bark cracking, leaving whitish striæ. *Leaves* 4-6 by $1\frac{1}{2}$ in.; petiole 2 in., thickened at the apex. *Racemes* axillary, shorter than the leaf. *Flowers* red. *Follicles* 2 in., downy, oblong. *Seeds* black.—Specimens imperfect.

8. *S. striatiflora*, *Mash.*; leaves glabrous oblong-acute base tapering, panicle branched shorter than the leaves, calyx funnel-shaped striated.

BIEMA, *Griffith.*

A shrub. *Leaves* 8-18 by 4-6 in., leathery, arch-veined, midrib prominent; petiole 1 in.; stipules subulate. *Branches of panicles* erecto-patent, ultimate pedicels shorter than the flowers. *Bracteoles* minute. *Calyx* $\frac{1}{2}$ in., glabrous, pink externally, longitudinally striated; lobes linear, erecto-patent.—Imperfect specimens only seen.

9. *S. macrophylla*, *Vent. Hort. Malm.* ii. n. 91, in note; leaves glabrous above tomentose beneath suborbicular quite entire base deeply cordate, calyx-lobes triangular. *Br. in Benn. Pl. Jav. Rar.* 230.

MALACCA, Maingay.—DISTRIB. Java.

A large tree. *Leaves* 12–16 by 10–12 in., venation arched, secondary veins proceeding nearly to the margin before arching; petiole downy, 6 in. *Panicles* deflexed, much branched, nearly equalling the leaves, ultimate pedicels capillary, shorter than the flowers, pubescent and hispid. *Flower-buds* minute, subglobose. *Calyx* $\frac{1}{2}$ in., cup-shaped, stellate-hairy, 5 fid; lobes triangular, erect, shorter than the tube. *Follicle* 2 in., downy, smooth within.

10. ***S. linguifolia*, Mast.**; leaves glabrous oblong-obtuse base rounded 1-nerved, racemes slender pendulous shorter than the leaves, calyx-lobes linear subulate 3–4 times longer than the tube.

TAVOY, Parish.

A shrub, 6 ft. *Leaves* 7–8 by 2 in., coriaceous; petiole $1\frac{1}{2}$ in. *Flower-buds* lanceolate. *Calyx* $\frac{3}{4}$ in., salmon-coloured; lobes slightly ciliated externally, free at the tips, much longer than the tube.—Imperfect specimens only seen.

11. ***S. pubescens*, Mast.**; leaves glabrous above pubescent beneath oblong obtuse or abruptly acuminate base cordate, panicle erect, calyx campanulate lobes triangular acute.

MALACCA, Maingay.

A tree, younger portions rusty-pubescent. *Leaves* 4–6 by 2–2 $\frac{1}{2}$ in., nerves stellate-hairy beneath; petiole $1\frac{1}{2}$ in., sulcate striated; stipules $\frac{1}{2}$ in., subulate. *Panicle* much branched, as long or longer than the leaves; ultimate pedicels jointed, pubescent, spreading. *Calyx* $\frac{1}{2}$ in., segments hairy within, equalling the tube. *Ovary* globose, downy, style deciduous.

12. ***S. armata*, Mast.**; leaves glabrous above downy beneath oblong acute base rounded nerves hispidulous, panicle erect, calyx broadly campanulate lobes ovate-lanceolate.

BHOTAN, Griffith.

A tree. *Bark* grey, marked with very large cordiform scars. *Leaves* crowded at the ends of the branches, 5–6 by 2 in.; petiole $\frac{3}{4}$ in., rusty-hispid; stipules $\frac{1}{4}$ – $\frac{1}{2}$ in., deltoid-lanceolate, striate. *Panicle* as long as or longer than the leaves, erect or ascending, many-flowered; pedicels subpilose, as long as the flowers. *Flower-buds* oblong. *Calyx* $\frac{3}{4}$ in. diam., pink, 5-fid; lobes spreading, longer than the bell-shaped tube. *Fruit* not seen.

†† *Calyx-lobes narrow incurved, frequently cohering at the tips, gaping at the sides.*

13. ***S. lævis*, Wall. Cat.** 1138; leaves lanceolate acuminate glabrous base tapering, panicles erect, nearly the length of the leaves, calyx subglobose, segments broadly lanceolate. *Br. in Benn. Pl. Jav. Rar.* 230; *Miq. Fl. Ind. Bat.* i. pt. 2, 174. *S. coccinea*, *Jack Mal. Misc.* i. 286, not of *Roxb.*

PENANG, Wallich; MALACCA, Maingay; PEGU, Kurz.—DISTRIB. Java.

A small tree. *Leaves* 6–7 by $1\frac{1}{2}$ –2 $\frac{1}{2}$ in.; petiole $1\frac{1}{2}$ –2 in., thickened at the apex. *Peduncles* very slender, ultimate pedicels spreading, as long as the flower. *Bracteoles* very minute, subulate. *Flower-buds* oblong. *Flowers* $\frac{1}{2}$ – $\frac{3}{4}$ in.; calyx-lobes linear from a broad base, much longer than the tube, glabrous without, bearded within. *Follicles* $1\frac{1}{2}$ in., woody, downy externally, smooth and crimson within, tip beaked. *Seeds* small, oblong, black, shining.

14. ***S. coccinea*, Roxb. Hort. Beng.** 50; *Fl. Ind.* iii. 151; leaves glabrous lanceolate abruptly acuminate base tapering, panicles lax drooping, calyx-segments deltoid below linear-lanceolate above 4–5 times longer than the tube.—*Wall. Cat.* 1122, C; *Br. in Benn. Pl. Jav. Rar.* 230. *S. lanceolata*, *Ham. in Wall. Cat.* 1122.

TROPICAL EASTERN HIMALAYA; Sikkim, 3-6000 ft., *J. D. H.*; BHOTAN, *Griffith*; ASSAM, and the KHASIA MTS.

A small tree. *Leaves* 4-8 by 1-3 in., quite entire, sometimes with scanty stellate hairs beneath; petiole 1 in., hairy, apex thickened; stipules subulate. *Panicles* equalling the leaves, ultimate pedicels capillary, as long as the flowers. *Bracteoles* subulate. *Flower-buds* lanceolate from a broad base; ♂ flowers $1\frac{1}{2}$ in. diam., green externally, pink within. *Sepals* incurved, woolly tips coherent or free, sometimes spreading. *Follicles* 4-5 in., lanceolate, beaked, downy externally, crimson on both surfaces. *Seeds* 4-8, ovoid, smooth, albumen scanty, bipartite.—On some specimens dimorphic male fl. may be seen, the majority similar to those above described, others in which the sepals are united for the greater part of their length, forming a distended, somewhat fleshy, pink, accrescent bell-shaped calyx, ultimately attaining a length of 2 in. This hypertrophy may be the result of insect or fungus growth.

15. **S. nobilis**, *R. Br. in Benn. Pl. Jav. Rar.* 231; leaves glabrous oblong acuminate, panicles pendulous, calyx-segments as long as the bell-shaped tube linear incurved. *Miq. Fl. Ind. Bat.* i. part 2, 175. *S. Balanghas*, *Roxb. Fl. Ind.* iii. 144, *not of Willd.*; *Wall. Cat.* 1118, B, C, E. *Southwellia nobilis*, *Salisb. Par. Lond.* t. 69.

MALABAR, at Quilon, *Wight*; doubtful if wild.—DISTRIB. China and Sumatra.

A tree; bark brown. *Leaves* 2-12 by 2-6 in.; petiole 1 in. *Panicles* lax, axillary, many-flowered; ultimate pedicels filiform, glabrous, spreading horizontally. *Flower-buds* fusiform. ♂ flowers $\frac{1}{2}$ in. diam., fragrant, campanulate, hoary-tomentose outside, red within. *Staminal column* slender, curved. ♀ flowers few. *Ovary* very hairy, stipitate, 5-lobed, style curved. *Follicles* woody, ovoid, beaked. *Seeds* few, testa dark chestnut, clammy, inner coat coriaceous, dull black; albumen 0; cotyledons thick.—*Seeds* eaten as chestnuts.

16. **S. Balanghas**, *L.*; *Br. in Benn. Pl. Jav. Rar.* 231, *not of Roxb.*; leaves pubescent beneath oblong-ovate obtuse acuminate or lanceolate base rounded not cordate, panicle erect or nodding as long as the leaves, flowers globular, sepals as long as the hispid bell-shaped tube, stigmas long. *Wall. Cat.* 1118, D; *Wight, Ill.* t. 30; *W. & A. Prodr.* i. 62; *Thwaites Enum.* 29.—*Rheede Hort. Mal.* i. t. 49.

Throughout the HOTTER PARTS OF INDIA and in CEYLON.

A tree; herbaceous portions rusty-tomentose. *Leaves* 5-6 by 3 in.; petiole $1\frac{1}{2}$ -2 in.; stipules subulate. *Panicle* stellate-hairy; pedicels longer than the flowers. *Flower-buds* ovate, obtuse. *Calyx* globose $\frac{1}{4}$ in. diam., downy outside, hispid within, 5-cleft to the middle, segments connivent. *Stigmas* recurved, as long as the style. *Follicles* 3 in., woody, oblong acuminate, covered with rusty down. *Seeds* oblong, black.

VAR. 1. *mollis*; leaves elliptic-oblong, panicles nodding, pedicels capillary pilose, spreading. *S. mollis*, *Wall. Cat.* 1131, 1426, 1427; *Br. in Benn. Pl. Jav. Rar.* 231.—Bhotan and the Eastern Peninsula. More densely pubescent than the type, but otherwise hardly distinguishable.

VAR. 2. *angustifolia*; leaves narrow lanceolate, panicle spreading or ascending, pilose. *S. angustifolia*, *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 148; *Wall. Cat.* 1133; *Br. in Benn. Pl. Jav. Rar.* 231.—North-Western provinces, Nipal and Mergui. *Roxburgh* describes the panicle as pendulous: I always find it ascending in herbarium specimens.

VAR. 3. *glabrescens*; leaves glabrescent beneath. Mergui, *Griffith*.

17. **S. rubiginosa**, *Vent. Hort. Malm.* ii. 91, *in note*; leaves oblong acute or abruptly acuminate glabrous above downy beneath base rounded stipules very long, panicle erect, calyx-lobes as long as the tube, stigmas short. *Br. in Benn. Pl. Jav. Rar.* 232; *Miq. Fl. Ind. Bat.* i. pt. 2, 175. *S. angustifolia*, *Jack Mal. Misc.* i.; *Hook. Bot. Misc.* i. 287. *S. Jackiana*, *Wall. Cat.* 1134.

BIKMA and the EASTERN PENINSULA.—DISTRIB. Java.

A tree; herbaceous portions rusty-villous. *Leaves* 8–10 by $2\frac{1}{2}$ in., nerves rusty-hispid beneath; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., hispid; stipules 1 in., subulate-lanceolate. *Panicle* scarcely equalling the leaves, laxly hispid, many-flowered; ultimate pedicels spreading, scarcely exceeding the flowers. *Flower-buds* short, broadly ovate, acute. *Calyx* $\frac{1}{4}$ in. long, subglobose, lobes linear-subulate, incurved or spreading, hispid. *Follicles* 2 in., lanceolate, beaked, downy externally, crimson inside. *Seeds* $\frac{1}{2}$ in. long, black.

18. **S. ensifolia**, *Mast.*; leaves lanceolate acute at both ends apex gradually acuminate stipules half the length of the petiole, panicles erect half the length of the leaves, calyx-lobes much exceeding the tube, stigmas short.

PENANG, *Philips*; MERGUI, *Griffith*.

A tree. *Leaves* 8–10 by $2\frac{1}{2}$ in., glabrous above, pubescent beneath, nerves rusty-hispid beneath; petiole $\frac{3}{4}$ –1 in., densely rusty-tomentose; stipules filiform, half the length of the petioles. *Panicle* few-flowered; ultimate pedicels shorter than the flower, rusty-tomentose. *Flower-buds* ovate-lanceolate. *Calyx* nearly $\frac{1}{2}$ in.; lobes linear-lanceolate, sparingly hispid at the edges. *Ovary* 5-lobed, hispid; style curved, stigma-lobes rounded, short, radiating. *Follicles* downy, curved, lanceolate, beaked.

19. **S. parviflora**, *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 147; leaves oblong-ovate acuminate glabrescent above slightly pubescent beneath base subcordate, panicles spreading as long as the leaves, calyx minute, tube urceolate 5-toothed teeth inflexed. *Wall. Cat.* 1121; *Br. in Benn. Pl. Jav. Rar.* 232.

SILHET, *Wallich*; MALACCA and PENANG, *Maingay*, &c.

A large tree. *Leaves* 4–6 by $2\frac{1}{2}$ –4 in.; petiole $1\frac{1}{2}$ in., apex thickened. *Panicle* stellate hairy; ultimate pedicels as long as the calyx, capillary, pilose. *Calyx* $\frac{1}{4}$ in., yellowish; tube longer than the 5, appressed, connivent lobes. *Ovary* globose, 5-lobed; style short. *Follicles* 2 in., downy, oblong, beaked. *Seeds* oblong, black, albumen bipartite.

20. **S. bicolor**, *Mast.*; leaves oblong-acute glabrescent above hoary tomentose beneath base rounded or subcordate midrib rusty subpilose beneath, calyx-lobes linear incurved as long as the campanulate tube.

MALACCA, *Maingay*.

A tree 40–50 ft. *Leaves* 3–4 by $1\frac{1}{2}$ in., coriaceous, 1-nerved, entire; petiole $1\frac{1}{2}$ in., striate. *Panicle* many-flowered, shorter than the leaves; branches spreading or deflexed, rusty-tomentose; ultimate pedicels longer than the flowers. *Calyx* $\frac{1}{4}$ in., 5-fid to the middle.

21. **S. Maingayi**, *Mast.*; leaves obovate oblong abruptly acuminate glabrous base cordate, panicle erect or spreading equalling the leaves, calyx-lobes linear as long as the campanulate downy tube.

MALACCA, *Maingay*.

A lofty tree. *Leaves* 8–9 by 3–4 in.; petiole 3 in. *Panicle* erect, many-flowered; pedicels spreading, pubescent, longer than the flowers. *Flowers* $\frac{1}{4}$ in. long, urceolate-campanulate. *Follicles* 3–4 in., oblong, acuminate, downy externally. *Seeds* $\frac{3}{4}$ in. oblong, black; albumen and cotyledons fleshy.

SECT. II. **Firmiana**, *Marsili*; *Br. in Benn. Pl. Jav. Rar.* 235 (gen.). *Follicles* membranous, opening long before maturity. *Seeds* two or more; embryo transverse, radicle inferior.

22. **S. colorata**, *Roxb. Hort. Beng.* 50; *Cor. Pl.* i. 26, t. 25; *Fl. Ind.* iii. 146; leaves glabrescent roundish palmately lobed lobes acuminate, calyx tubular club-shaped covered with orange coloured down. *Wall. Cat.*

1119, F.; *Hook. Ic. Pl.* 143; *Dalz. & Gibs. Bomb. Fl.* 23; *W. & A. Prodr.* i. 63. *S. rubicunda*, *Wall. Cat.* 1119, D, F, G. *Firmiana colorata*, *Br. in Benn. Pl. Jav. Rar.* 235; *Thwaites Enum.* 29. *Erythropsis Roxburghiana*, *Schott & Endl. Melet. Bot.* 33.

EASTERN BENGAL; PEGU, the WESTERN PENINSULA, and CEYLON.

A large tree; trunk erect, bark ashy, branches spreading. *Leaves* 6-9 by 5-12 in., about the ends of the branches, base cordate, 3-lobed, lobes triangular acuminate; petiole 4-9 in.; stipules erect, lanceolate. *Panicle* terminal, coral-like, many-flowered; pedicels covered with orange-red tomentum. *Calyx* $\frac{3}{4}$ in., tube 4 times longer than the rounded rather obtuse lobes, orange-downy outside, pilose within; anthers 30, reniform. *Styles* recurved. *Follicles* 2-3 in., stipitate, glabrous, membranous. *Seeds* ovoid, smooth or wrinkled, of the size of a field bean.—Brown, l.c., admits 3 varieties: Var. 1, with furfuraceous calyx, tube nearly 4 times longer than the lobes. Var. 2 is *S. fulgens*, *Wall.* Var. 3 has calyx-lobes covered with loose spreading stellate hairs, tube scarcely three times longer than the lobes.

23. *S. fulgens*, *Wall. Cat.* 1135; leaves cordate angular obscurely lobed scabrid above pubescent beneath, calyx downy cylindric tubular curved. *Wall. Cat.* 11192. *Firmiana colorata* var. β , *Br. in Benn. Pl. Jav. Rar.* 235; *Miq. Fl. Ind. Bat.*, i. pt. 2, 178.

TROPICAL WESTERN HIMALAYA; Kumaon, alt. 2500 ft., *Strach. & Wint.*; Garwhal, *Falconer*; BURMA and the EASTERN PENINSULA.—DISTRIB. JAVA.

A small tree. *Leaves* ample, 10 by 6 in., coriaceous; petiole pubescent, 12-18 in. *Panicle* erect, branches covered with rusty-stellate down, many-flowered. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in., produced before the leaves, covered with yellowish down. *Calyx-lobes* ovate, acute, 3-4 times shorter than the tube. *Follicles* stipitate.

24. *S. linearicarpa*, *Mast.*; leaves glabrescent cordate suborbicular, panicle erect, peduncles thick compressed pilose, flowers dense, calyx tubular-campanulate pilose lobes ovate acute, follicles linear-lanceolate yellow downy.

MALACCA, *Maingay*.

A tree. *Leaves* 6-12 in. each way, ample, coriaceous, entire, 7-nerved, nerves prominent beneath; petiole 3-8 in., apex thickened. *Panicle* terminal, erect, many-flowered, rusty-pubescent, as long as the leaves; pedicels spreading, jointed. *Flower-buds* globose. *Calyx* $\frac{1}{4}$ - $\frac{1}{2}$ in., tube cylindric, limb rotate-campanulate; lobes as long as the tube. *Staminal column* slender. *Follicles* 3-4 in.

SECT. III. *Pterygota*. *Endl.* (gen.). *Follicles* woody. *Seeds* many, winged at the apex, albuminous, radicle next the hilum.

25. *S. alata*, *Roxb. Hort. Beng.* 50; *Pl. Cor.* iii. 84, t. 287; *Fl. Ind.* iii. 152; leaves cordate ovate acute glabrous, flowers nearly 1 in. floccose tomentose, wing of seed large spongy. *Wall. Cat.* 1125. *Pterygota Roxburghii*, *Schott & Endl. Melet.* *P. alata*, *Br. in Benn. Pl. Jav. Rar.* 234. *S. coccinea*, *Wall. Cat.* 1122 partly. *S. Heynii*, *Beddome Flor. Sylvat.* t. 230.

SILHET and CHITTAGONG, *Roxburgh*; WESTERN PENINSULA; TINNEVELLY, *Heyne*.

A large tree; herbaceous portions covered with dense golden pubescence. *Bark* ash-coloured. *Leaves* 4-10 by 3-7 in., clustered about the ends of the branches, submembranous, 7-nerved; petiole 1-4 in.; stipules subulate. *Panicles* from the leafless axils, few-flowered, shorter than the leaves. *Bracteoles* caducons. *Calyx* campanulate, densely tomentose, deeply 5-parted, segments linear-lanceolate. *Staminal column* $\frac{3}{4}$ the length of the calyx. \varnothing flowers: *ovaries* 5, sessile; style recurved; *ovules* numerous. *Follicles* 5, 5 in. diam, globose, depressed, woody, clothed with mealy pubescence outside, corky within. *Seeds* many, oblong, compressed, wing 2 in. and upwards by $1\frac{1}{2}$ in.; cotyledons not separable from the mealy albumen, radicle next the hilum.—

Col. Beddome, who gives a good description and figure of this plant, suggests, with reason, that this is the true *S. alata* of Roxburgh. The latter author says there is no albumen, but this is an oversight.

26. **S. Thwaitesii**, *Mast.*; leaves glabrous oblong acute base rounded, ♂ fl. $\frac{1}{2}$ – $\frac{3}{4}$ in., ♀ nearly $\frac{1}{2}$ in., wing of seed membranous scarcely spongy. *Pterygota alata*, *Thwaites Enum.* 29.

CEYLON; Banks of the Mahawelliganga, at Haragam, *Thwaites*.

A tree. *Leaves* 4–5 by 2 in., glabrescent, coriaceous; petiole 1–4 in. *Panicles* axillary, as long as the petiole. *Flowers* pubescent. *Calyx* divided half-way down; lobes ovate, acute, as long as the bell-shaped tube. *Staminal-column* slender, $\frac{1}{2}$ shorter than the calyx. ♀ fl.: *ovaries* 3, with staminodes at the base; styles 3; ovules ∞. *Follicles* 3 by 2 in., woody, oblong, obtuse. *Seed* obovate, wing terminal, oblong, truncate, twice the length of the seed.

SECT. IV. **Hildegardia**, *Endl.* *Follicles* membranous, winged at the top, ultimately dehiscent. *Seeds* albuminous, radicle next the hilum.

27. **S. populifolia**, *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 148; leaves glabrous rounded cordate acuminate, carpels ovate ventricose terminated by a membranous oblique obtuse cultriform wing. *Wall. Pl. As. Rar.* i. 3, t. 3, *Cat.* 1128. *S. populifolia*, *W. & A. Prodr.* i. 62. *Hildegardia populifolia*, *Br. in. Benn. Pl. Jav. Rar.* 235.

WESTERN PENINSULA; Coromandel, *Roxburgh*.

A tree. *Bark* smooth; young branches like those of a poplar, angular. *Leaves* 3–4 by 4 in., 7-nerved; petiole 2–6 in. *Panicles* axillary and terminal, shorter than the leaves; branches angular, glabrous, spreading; ultimate pedicels shorter than the flowers. *Flower-buds* oblong. *Calyx-segments* $\frac{1}{2}$ in., free nearly to the base, linear-spathulate, downy externally. *Ovary* hispid, ovoid, tapering into a short style, stigma 5-lobed. *Follicle* solitary. *Seeds* oblong, $\frac{3}{4}$ in. long.—De Candolle's var. *acutiuscula* (*Prodr.* i. 483) differs in its more acutely pointed leaves, but is scarcely separable even as a variety.

SECT. V. **Scaphium**, *Endl.* *Anthems* 10–15. *Stigmas* lobed, subcapitate. *Follicles* large, leafy, boat-shaped, dilated at the base, opening long before maturity. *Seed* solitary, albuminous, radicle next the hilum.

28. **S. scaphigera**, *Wall. Cat.* 1130; leaves glabrous, oblong-lanceolate 1-nerved, calyx campanulate 5-parted lobes reflexed. *Scaphium Wallichii*, *Br. in. Benn. Pl. Jav. Rar.* 236.

MARTABAN, *Wallich*; MALACCA, *Maingay*.

A lofty tree. *Leaves* 12–14 by 6 in., coriaceous, base rounded; petiole 4–5 in., thickened at the top. *Flowers* paniced. *Calyx* $\frac{1}{2}$ in., pilose. ♂ fl.: *stamens* 10–14; anthers pilose. ♀ fl.: *ovary* villous, on a long slender stalk, 2-celled, with a ring of sessile anthers at the base; style filiform, stigmas 2. *Follicles* at first pilose, ultimately 6–8 by 3–4 in., venoso-reticulate, 1–2-seeded. *Seeds* globose; cotyledons pale green.

29. **S. affinis**, *Mast.*; leaves glabrous oblong base truncate 5-nerved, branches of panicle downy flattened or angular, flowers very small.

MALACCA, *Maingay*.

A tree. *Leaves* 6–8 by 4–5 in., coriaceous, midrib striated beneath; petiole 3–4 in., apex thickened, striated. *Panicle* erect, as long as the leaves; *peduncles* thickly striated, angular, subpilose, spreading; ultimate pedicels downy, densely crowded. *Flower-buds* ovoid. *Flowers* $\frac{1}{2}$ in. *Calyx-lobes* ovate, longer than the funnel-shaped tube. *Follicle* a span long, falcate, leafy, glabrescent, shining within. *Seed* $\frac{3}{4}$ in., solitary, oblong, black.

SECT. VI. **Pterocymbium**, Br. in Benn. Pl. Jav. Rar. 219 (gen). *Flowers* sub-hermaphrodite. *Anthers* 10. *Styles* coherent, stigmas recurved. *Follicles* 4-6, membranous, opening long before maturity. *Seed* solitary, albuminous; radicle next the hilum. (Too nearly allied to *Scaphium*.)

30. **S. campanulata**, Wall. mss.; leaves cordate ovate entire glabrous above pubescent beneath 5-nerved, panicles terminal, calyx turbinate-campanulate, seed glabrous.—*Pterocymbium javanicum*, Br. in Benn. Pl. Jav. Rar. 219, t. 45; *Miq. Fl. Ind. Bat.* i. pt. 2, 179.

PEGU, Kurz.—DISTRIB. Java.

A tree 50-60 ft.; bark brownish. *Leaves* 4 by 3½ in.; petiole equalling or shorter than the leaves; stipules ½ in., subulate, caducous. *Panicles* terminal, ascending, shorter than the leaf; pedicels jointed. *Bracteoles* caducous. *Calyx* smooth, coriaceous, divided half-way down; lobes lanceolate. *Staminal column* pubescent below. *Ovaries* 5, sessile, gibbous at the apex; styles short, cohering; stigmas filiform, recurved; ovules 2, collateral, erect, anatropal. *Follicles* 5-6, or fewer by abortion, stipitate, glabrous. *Seeds* spherical, testa crustaceous, wrinkled, innermost coat membranous, between the two a woolly substance is interposed (*Brown*).

31. **S. tubulata**, Mast.; leaves glabrous entire oblong abruptly acuminate, cymes terminal, calyx tubular-turbinate, follicles pilose 2 in., seeds pilose.

MALACCA, Maingay.

A tree. *Leaves* 6 by 2 in., coriaceous, 1-nerved, base rounded; petiole 1 in. *Cymes* paniced, as long as the leaves, flowers numerous. *Calyx* glabrous; lobes spreading, ovate-lanceolate, shorter than the tube. *Staminal column* slender, pilose; anthers in a ring, lobes parallel. *Ovaries* 5; styles inflexed, tips cohering. *Follicles* 5, 2-3 by 1 in., stipitate, oblong, acute, dilated at the base. *Seed* ovoid.

2. **TARRIETIA**, Blume.

Tall trees. *Leaves* digitate or simple, glabrous or scaly. *Flowers* unisexual, paniced. *Calyx* tubular, small, 5-toothed. *Petals* 0. *Staminal-column* short, bearing a ring of 10-15 very densely clustered anthers, cells parallel. *Ovary* of 3-5 nearly free carpels opposite the sepals; styles as many, short filiform, stigmatose within; ovules 1 in each cell. *Ripe carpels* of stellately spreading samaras with long falcate wings. *Seeds* oblong; albumen bipartible; cotyledons flat; radicle next the hilum.—DISTRIB. Known species 3 or 4, natives of Australia, Java, and the Malay Peninsula.

1. **T. simplicifolia**, Mast.; leaves simple oblong quite entire apex retuse slightly 2-lobed with an intervening mucro, cymes paniced as long as the leaves.

MALACCA, Maingay.

A tree. *Leaves* 6-7 by 3 in., coriaceous, glabrous, 1-nerved, feather-veined, nerves approximate; petiole 2 in., striate, apex thickened. *Cymes* many flowered. *Flower-buds* globose. *Calyx* clavate-campanulate, 5-toothed, downy externally. ♂ fl.: *staminal column* short; anthers annular, lobes parallel, globose. ♀ fl.: *ovary* 5-lobed, sessile; stigmas spreading. *Fruit* samaroid, 3 in., oblong, obliquely spatulate, glabrous.

3. **HERITIERA**, Aiton.

Trees. *Leaves* coriaceous, simple, scaly beneath. *Flowers* small, unisexual, in axillary panicles. *Calyx* 5-, rarely 4-6-toothed or cleft. *Petals* 0.

Anthers in a ring at the top of the column, cells 2, parallel. *Ovaries* 5-6, almost free; style short, stigmas 5 thick; ovules solitary in each cell. *Ripe carpels* woody, indehiscent, keeled or winged. *Albumen* 0; cotyledons thick; radicle next the hilum.—A genus of 4-5 species, natives of Tropical Asia, Africa and Australia.

1. **H. littoralis**, *Dryand. in DC. Prodr.* i. 484; leaves oblong base rounded or subcordate, ripe carpels smooth outer margin winged inner keeled. *W. & A. Prodr.* i. 63; *Roxb. Fl. Ind.* iii. 142; *Thwaites Enum.* 28; *Br. in Benn. Pl. Jav. Rar.* 237; *Miq. Fl. Ind. Bat.* i. pt. 2, p. 179; *Dalz. & Gibs. Bomb. Fl.* 22. *H. Fomes*, *Wall. Cat.* 1139, partly; *H. macrophylla*, hort. *Balanopteris Tothila*, *Gærtn. Fruct.* ii. 94, t. 99.—*Rheede Hort. Mal.* vi. t. 21.

Coasts of BENGAL and of the EASTERN and WESTERN PENINSULAS and CEYLON, extending inland as far as the Khasia hills and Cachar.—DISTRIB. Tropical coasts of the Old World.

A tree. *Leaves* 5-8 by 2-4 in., coriaceous, white beneath, with flat scales; petiole $1\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules lanceolate, caducous. δ flowers small, in axillary much branched clusters, which are shorter than the leaves. *Calyx* nearly $\frac{1}{4}$ in., urceolate, 6-toothed, downy. *Column* short. *Anthers* 5. φ flowers larger than the δ . *Calyx* bell-shaped. *Fruits* 1-4 in., oblong, woody, smooth or tubercled.

2. **H. Fomes**, *Buch. in Symes Ava Emb.* t. 28, (1800); leaves broadly lanceolate acuminate tapering at the base 1-nerved, ripe carpels obovate flattened furrowed on the inner edge winged on the outer. *Balanopteris minor*, *Gærtn. Fruct.* ii. t. 98, f. 2. *Heritiera minor*, *Roxb. Hort. Beng.* 50, *Fl. Ind.* iii. 142.

Abundant in the GANGETIC DELTA, extending inland to SILHET, and along the shores of the EASTERN PENINSULA.—DISTRIB. Borneo.

A tree. *Trunk* straight, often deeply grooved. *Leaves* 4-6 by 2 in., ashy beneath and scaly; petiole 1 in.; panicles axillary, half the length of the leaves, crowded, much branched, rusty-pubescent. *Flowers* small, $\frac{1}{8}$ in., orange-coloured, bell-shaped.—Much used for firewood in Calcutta.

3. **H. Papilio**, *Beddome Flor. Sylvat.* t. 218; leaves lanceolate 3-nerved silvery and scaly beneath, flowers monœcious, ripe carpels winged. *Wall. Cat.* 7836.

TRAVANCORE and SOUTHERN CARNATIC, at Caurtallum and Tinnevely, *Beddome*.

A lofty evergreen tree, all the young parts panicles and inflorescence clothed with a golden, soft, stellate tomentum. *Leaves* 3-5 by $1\frac{1}{2}$ –2 in., young downy on the upper surface, ultimately coriaceous, glabrous and shining beneath, permanently silvery and with close-set scales; petiole $\frac{3}{4}$ – $\frac{1}{2}$ in.; stipules entire. *Panicles* axillary, much shorter than the leaves. δ fl.: *calyx* campanulate, 4-5-cleft. *Staminal column* slender, glabrous; anthers 4-5. φ fl.: *calyx* $\frac{1}{4}$ in., 5-6-cleft. *Carpels* 5-6, ultimately quite glabrous, with a pair of staminodes between each. *Stigmas* recurved. *Ripe carpel* samaroid, wing large, subdeltoid, membranous, like that of some butterflies (*Beddome*).

H. ATTENUATA, *Wall. Cat.* 1140; *Br. in Benn. Pl. Jav. Rar.* 237, is a species of *Niota*. (See *Rutaceæ*.)

4. **REEVESIA**, Lindl.

Shrubs or trees. *Leaves* simple. *Flowers* numerous, white, in terminal much branched cymes. *Calyx* campanulate or funnel-shaped, 5-fid. *Petals* clawed. *Staminal-column* adnate to the gynophore, bearing a globose head of 2-celled anthers, cells diverging, ultimately confluent. *Ovary* 5-lobed,

5-celled; stigma sessile, 5-lobed; ovules 2 in each cell, pendulous, anatropous; raphe turned away from the placenta. *Capsule* woody septicidally 5-valved. *Seeds* 1-2 superposed, ascending oblong, compressed, winged downwards, hilum lateral near the top; albumen fleshy; cotyledons flat, foliaceous, radicle inferior.—DISTRIB. 1 or 2 species, natives of Eastern Asia.

1. **R. Wallichii**, *Br. in Benn. Pl. Jav. Rar.* 231 *ad not.*; leaves thinly stellate hairy beneath oblong acuminate base rounded, calyx campanulate. *Sterculia punduana*, *Wall. Cat.* 2701; *Griff. Itin. Notes*, 73.

EASTERN TROPICAL HIMALAYA; KHASIA MTS., alt. 3000-4000 ft.; Bhotan, *Griffith*; Sikkim, *J. D. H.*

A tree 50 ft. *Leaves* 3 by $1\frac{1}{4}$ in., quite entire, 1-nerved, thinly stellate-hairy; petiole thickened at both ends; stipules deciduous. *Cymes* paniced, dense, from the axils of the fallen leaves, ultimate pedicels as long as the flowers, jointed, 2-bracteolate. *Flower-buds* pyriform. *Calyx* $\frac{1}{2}$ in., at first closed, afterwards 5-fid. *Petals* white, spatulate, clawed, exceeding the calyx. *Staminal column* slender, longer than the flower, with 5 very short terminal divisions, each bearing 3 extrorse anthers; connective thick. *Carpels* pubescent; style very short. *Capsule* $1\frac{1}{2}$ -2 in., pendulous, woody, oblong, obtuse, 5-lobed, lobes keeled, septicidally dehiscent, ultimately separating through the dorsal suture also. *Seeds* pendulous.

2. **R. pubescens**, *Mast.*; leaves pubescent beneath oblong acuminate base cordate, flowers paniced, calyx funnel-shaped.

EASTERN TROPICAL HIMALAYA; Sikkim, *T. Anderson*; Bhotan, *Griffith*.

A tree; branches thinly sprinkled with stellate hairs. *Leaves* 4-5 by 2-2 $\frac{1}{2}$ in., subcoriaceous, glabrescent above, pubescent beneath, nerves stellate hairy beneath; petiole 1 in. *Panicle* terminal, many-flowered, peduncles, pedicels, and calyx pubescent, ultimate pedicels shorter than the flower. *Calyx* $\frac{1}{2}$ in., infundibuliform, 5-lobed, lobes broadly ovate acute. *Petals* pink, linear-spatulate, twice the length of the calyx. *Staminal column* stout, 4 times longer than the calyx. *Fruit* not seen.—Differs from *R. Wallichii* in its pubescent, cordate leaves, and larger flowers.

5. **KLEINHOVIA**, Linn.

A tree. *Leaves* palminerved, ovate, acuminate, quite entire. *Inflorescence* terminal, lax, cymose. *Bracteoles* small, ensiform. *Sepals* deciduous. *Petals* 5, unequal, upper with longer claws, margins involute. *Staminal column* dilated above into a bell-shaped, 5-fid cup, divisions each with 3 extrorse 2-celled anthers, cells divergent. *Ovary* inserted in the staminal cup, 5-lobed, 5-celled; style slender, stigma 5-fid. *Capsule* membranous, inflated, pyriform, loculicidally 5-valved. *Seeds* 1 or 2 in each cell, tubercled; albumen scanty or 0; cotyledons convolute; radicle next the hilum.—DISTRIB. One species only.

1. **K. Hospita**, *L.*; *DC. Prodr.* i. 488; *Wall. Cat.* 1152; *W. & A. Prodr.* i. 64; *Roxb. Fl. Ind.* iii. 141; *Dalz. & Gibs. Bomb. Fl.* 23; *Beddome Flor. Sylvat. Anal. Gen.* t. 4; *Miq. Fl. Ind. Bat.* i. pt. 2, 186; *Mast. in Oliv. Fl. Trop. Afr.* i. 226.

EASTERN and WESTERN PENINSULAS; Southern Concan, *Nimmo*; (a doubtful native, *Gibs. and Dalz.*); CARNATIC, MALACCA and SINGAPORE, *Wallich*, &c. CEYLON.—DISTRIB. Java, Philippines, East tropical Africa.

Trunk straight; bark smooth; branches spreading. *Leaves* 6-12 by 2-3 in., 5-nerved, smooth on both surfaces; petiole nearly as long as the blade; stipules ensiform. *Flowers* rose-coloured. *Petals* 5, shorter than the lanceolate sepals. *Seeds* tubercled.

6. **HELICTERES**, Linn.

Trees or shrubs, more or less stellate-pubescent. *Leaves* simple. *Flowers* axillary, solitary or fascicled. *Calyx* tubular, 5-fid, often irregular. *Petals* 5, clawed, equal or unequal, the claws often with ear-shaped appendages. *Staminal column* adnate to the gynophore, 5-toothed or lobed at the apex; anthers in groups at the top of the column between its teeth, 2-celled, cells divergent, sometimes confluent. *Ovary* at the top of the column, 5-lobed, 5-celled; styles awl-shaped, more or less united, slightly thickened and stigmatose at the tips; ovules many in each cell. *Follicles* spirally twisted or straight. *Seeds* tubercled; albumen scanty; cotyledons leafy, folded round the radicle which is next the hilum.—**DISTRIB.** About 30 species, natives of the tropics of both hemispheres, most abundant in America.

SECT. I. Spirocarpæa. *Ripe carpels* spirally twisted.

1. **H. Isora**, L.; *DC. Prodr.* i. 475; *Roxb. Fl. Ind.* iii. 143; *W. & A. Prodr.* i. 60; *Wall. Cat.* 1179; *Dalz. & Gibs. Bomb. Fl.* 22; *Thwaites Enum.* 28; *Beddome Flor. Sylvat. Anal. Gen.* t. 5; *Wight Ic.* t. 180; *Miq. Fl. Ind. Bat.* i. pt. 2, 169. *H. chrysocalyx*, *Miq. in Pl. Hohen.* *H. Roxburghii*, *G. Don Gen. Syst.* i. 507.—*Rheede Hort. Mal.* vi. t. 30.

Dry forests throughout CENTRAL and WESTERN INDIA, from Behar, as far West as JAMU, the WESTERN PENINSULA, and CEYLON.—**DISTRIB.** Java, North Australia.

Arborescent or shrubby. *Leaves* 3 by $2\frac{1}{2}$ in., bifarious, obliquely cordate, roundish obovate, often lobed, shortly acuminate, serrate, scabrous above, pubescent beneath; petiole $\frac{1}{4}$ in., as long as the linear subulate stipules. *Peduncles* 2–3 together, in a short axillary cyme. *Bracteoles* small, subulate. *Flowers* $1\frac{1}{2}$ in. *Calyx* gibbous, laterally compressed, somewhat 2-lipped. *Petals* reflexed, red at first, fading to lead colour, very unequal in size, 2 lower much the largest, claw winged. *Staminodes* 5 emarginate scales. *Stamens* 10; anthers ovate. *Fruit* cylindric, beaked, pubescent.

VAR. 1. tomentosa; under side of leaves tomentose, *W. & A. l.c.*; *Wall. Cat.* 1179 F.—The Western and Central forms are mostly of this variety.

VAR. 2. glabrescens; under side of leaves nearly glabrous, *W. & A. l.c.*; *Wall. Cat.* 1179 C partly, E partly.—*Miquel's H. chrysocalyx* is a large-flowered form of this variety, to which most of the Southern forms belong.

SECT. II. Orthocarpæa. *Ripe carpels* straight, not spirally twisted.

2. **H. angustifolia**, L.; *DC. Prodr.* i. 476; leaves glabrous above cano-tomentose beneath, ripe carpels stellate-pilose sometimes mossy. *Wall. Cat.* 1180. *H. lanceolata*, *DC. Prodr.* i. 476. *H. virgata*, *Wall. Cat.* 1181. *Oudemansia integerrima*, *Miq. Pl. Jungh.* i. 296; *Fl. Ind. Bat.* i. pt. 2, 170. *O. integerrima* var. β *angustifolia*, *Hassk. Hort. Bog.* i. 98; *Miq. l.c.*

MERGUI, *Griffith*; MALACCA.—**DISTRIB.** Java, Siam, China.

Shrubby. *Leaves* 3 by $\frac{1}{2}$ in.; base tapering, 3-nerved, entire or minutely serrulate; petiole $\frac{1}{4}$ in. *Cymes* racemose-fasciculate; peduncles 1 in. *Calyx* $\frac{1}{4}$ in. *Petals* linear, longer than the stamens, with two teeth at the base of the limb. *Carpels* $\frac{1}{2}$ to $\frac{3}{4}$ in., oblong, obtuse, apiculate.—Varies in breadth of leaf and amount of pubescence.

3. **H. elongata**, *Wall. Cat.* 1845; leaves obliquely oblong-lanceolate serrate thinly stellate hairy above pubescent and stellate-hairy beneath, ripe carpels stellate-hairy or mossy.

AVA, at Taong Dong; **BIRMA**, *Griffith*, *Wallich*; **EASTERN BENGAL**, Sikkim, alt. 1000 ft., *J. D. H.*—**DISTRIB.** Yunnan.

A diffuse, straggling shrub; branches very slender, stellate hairy. *Leaves* 3 by $1\frac{1}{2}$ in.; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Cymes* elongate, terminal, nearly as long as the leaves, many-flowered.

Bracteoles setaceous. *Calyx* bell-shaped, 5-fid; lobes deltoid-lanceolate, pubescent. *Carpels* 5, 1-1½ in., oblong, beaked.—Varies in amount of pubescence, and in shagginess of capsule. The Himalayan forms have subglabrous leaves and very shaggy carpels.

4. **H. obtusa**, Wall. Cat. 1184; leaves thickly stellate hairy above pubescent beneath oblong obtuse entire base rounded, cymes spicate, ripe carpels shaggy oblong obtuse. *Kurz in Journ. As. Soc. Beng.* 1873, ii. 62.

TAVOY, Gomez; MERGUI, Griffith; MOULMEIN, Lobb; PEGU, M'Lelland; ANDAMAN ISLANDS, Kurz.—DISTRIB. China.

Shrubby, herbaceous portions ferruginous. *Leaves* 2½-4 by 1 in., quite entire 3-nerved, petiole ½ in. *Cymes* not much exceeding the petiole; pedicels with 3 minute setaceous bracteoles beneath the flower. *Flower-buds* ovoid. *Flowers* small, ¼ in. *Calyx* cylindric campanulate. *Ripe carpels* scarcely 1 inch.

5. **H. glabriuscula**, Wall. Cat. 1185; leaves obliquely lanceolate base cordate thinly stellate-hairy serrulate, ripe carpels short stellate-hairy. ? *H. spinulosa*, Wall. Cat. 1847.

AVA, at Prome, Wallich; BIRMA, Griffith.

Shrubby, diffuse; branches very slender, virgate, purple, glabrescent. *Leaves* 4½-4 by ½-1½ in.; petiole ¼ in.; stipules subulate, deciduous, as long as the petiole. *Flowers* spicate; peduncles half the length of the leaf. *Ripe carpels* ½-¾ in., oblong, beaked, stellate-hairy.—Flowers not examined.

6. **H. spicata**, Colebr. in Wall. Cat. 1845, B. 1182; leaves stellate-hairy above downy beneath oblong lanceolate acuminate, base obliquely subcordate, cymes elongated spike-like, ripe carpels long shaggy. *H. vestita*, Wall. Cat. 1844. *H. oblonga*, Wall. Cat. 1183 partly. *H. grewiaefolia*, Wall. Cat. 1443. *H. hirsuta*?, Herb. Ham. in Wall. Cat. 2686.

From SIKKIM, ASSAM, and AVA, to PENANG.—DISTRIB. Malayan Archipelago to China (cult.?).

Shrubby. *Leaves* 2-6 by 1-2 in., varying in breadth from ovate-oblong to lanceolate, unequally serrate; petiole ¼-¾ in.; stipules setaceous, as long as the petiole. *Peduncles* shorter than the leaves, 3-flowered; pedicels shorter than the flower. *Calyx* nearly ½ in., bell-shaped, curved, distended at the base, downy. *Ripe carpels* 1½-1¾ in.; stalks exerted from the persistent calyx, oblong-lanceolate, beaked, very shaggy.—Variable. The following form is sufficiently distinct to be made a separate variety.

VAR. *lanigera*, pubescent, leaves thinly hairy with simple hairs above pubescent and stellate hairy beneath coarsely and irregularly toothed, ripe carpels oblong very densely shaggy. *H. lanigera*, Wall. Cat. 1846.

The plant labelled in Wall. Cat. 2687 as *H. longifolia* and also as *H. carthagenensis* is apparently a form of this species with narrow leaves; but it is too imperfect to be accurately determined.

7. **H. plebeja**, Kurz in Journ. Asiat. Soc. Beng. 1870, ii. 67; shrubby, scabrous, leaves ovate-lanceolate or ovate-oblong dentate, ripe carpels stellate-tomentose and muricate.

ARRACAN, Kurz.

Leaves 3-5 in., mostly petioled, base rounded, slightly hispidulous or subglabrous above, stellate-hispid and scabrous beneath, densely cano-tomentose when young. *Cymes* few-flowered. *Flowers* small, yellowish. *Calyx* ⅝-¾ in., stellate-hairy. *Petals* longer than the calyx (Kurz l.c.)

7. PTEROSPERMUM, Schreb.

Trees or shrubs, scaly or stellate-tomentose. *Leaves* usually bifarious, leathery, oblique, simple or lobed, penninerved. *Peduncles* 1-3 axillary

and terminal. *Bracteoles* entire, laciniate, persistent or caducous. *Calyx* of 5 more or less connate sepals. *Petals* 5, deciduous with the calyx. *Staminal column* short, bearing, opposite to the sepals, 3 linear 2-celled anthers between each pair of five antipetalous ligulate staminodes; cells parallel; connective apiculate. *Ovary* inserted within the top of the staminal column, 3-5-celled; style entire, stigma 5-furrowed; ovules many in each cell. *Capsule* woody or coriaceous, terete or angled, loculicidally 5-valved. *Seeds* winged above, attached in two rows to the inner angle of the cells of the capsule; albumen thin or 0; cotyledons plaited or corrugated, radicle inferior.—DISTRIB. A genus of about 15 species, confined to tropical Asia.

* *Bracteoles* linear, entire, very caducous.

1. **P. Jackianum**, *Wall. Cat.* 1164; leaves rusty-pubescent beneath oblong abruptly acuminate undulate entire base 1-nerved, flowers subsessile, capsule ovoid acute.—*P. oblongum*, *Wall. Cat.* 1165.

PENANG, *Jack, Wallich, &c.*

A tree. *Leaves* 3-4 by $1\frac{1}{2}$ -2 in., oblique, nerves stellate-hairy beneath; petiole $\frac{1}{4}$ in.; stipules caducous. *Flowers* solitary, axillary, $1\frac{1}{2}$ in. diam. *Bracteoles* minute, linear-subulate. *Flower-buds* lanceolate, 5-ribbed. *Sepals* 2 in., linear-lanceolate, rusty-tomentose externally, villous within. *Petals* half the length of the sepals. *Capsule* $1\frac{1}{2}$ by 1 in., terete, shortly stalked, covered with flat scaly hairs, 5-celled.

2. **P. suberifolium**, *Lam. Ill. t.* 576, f. ii. *not of Roxb.*; leaves creamy-pubescent beneath oblong abruptly acuminate coarsely toothed or somewhat lobed towards the apex base cuneate rounded or subcordate 4-nerved, capsule ovoid or obovoid-terete, seeds 4 in each cell. *W. & A. Prodr.* i. 68; *Thwaites Enum.* 30; *Dalz. & Gibs. Bomb. Fl.* 24; *Wight in Hook. Bot. Misc.* iii. t. 26; *Wall. Cat.* 1166; 1172 *in part.* *P. canescens*, *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 1162. *P. oblongum*, *Wall. Cat.* 1165? *Pentapetes suberifolia*, *L.*; *Cav. Diss.* iii. t. 43, f. 2.

WESTERN PENINSULA; Madras, Pondicherry, &c.; AVA, at Amherst, *Wallich*; CEYLON, *Thwaites*.

A small tree. *Leaves* 2-6 by 1-2 in., coriaceous, glabrous above, nerves stellate-hairy not prominent; petiole $\frac{1}{2}$ in., rusty pilose. *Peduncles* axillary, twice as long as the petiole. *Bracteoles* very caducous. *Flower-buds* oblong. *Flowers* $1\frac{1}{4}$ in. diam., white, fragrant. *Sepals* oblong, revolute. *Petals* linear-oblong, obtuse, equalling the calyx. *Cells of ovary* 4-ovuled. *Capsule* 1-2 in., subangular, tapering to both ends, 4-5-valved, valves covered with dense fluffy pubescence. *Seeds* 2-4 in each cell.—The Amherst specimen (*P. oblongum*, *Wall.*) is imperfect, and may belong to another species, probably to *P. Jackianum*, according to a fruit preserved in the Kew Museum.

3. **P. diversifolium**, *Blume Bijdr.* 88; leaves hoary beneath obovate-oblong acuminate sinuate rarely peltate 3-5-lobed base cordate 1-nerved, capsule large subclavate-oblong 5-angled. *P. acerifolium*, *Zoll. & Morr. Syst. Verz.* 27, *excl. syn. Willd.*

MALACCA, *Maingay*; SOUTHERN CARNATIC, at Tinnevely, *Beddome*.—DISTRIB. Java, Philippines.

A tree. *Leaves* 6-8 by $2\frac{1}{2}$ in., coriaceous, veins arched, rusty-pilose; petiole 1 in.; stipules entire. *Peduncles* shorter than the petioles. *Flower-buds* linear-oblong. *Bracteoles* entire, strap-shaped. *Sepals* 5-6 in., linear, rusty-tomentose outside, silky within. *Ovary* downy, shorter than the style. *Capsule* 8-10 in.; woody, sulcate, tapering to the stalk.

** *Bracteoles* laciniate or palmately divided.

4. ***P. rubiginosum***, Heyne in Wall. Cat. 1168, 1168 B; leaves rusty-pubescent beneath obliquely ovate-lanceolate entire base 4-nerved, capsule oblong beaked 5-angled 5-furrowed. W. & A. Prodr. i. 68; *Beddome Flor. Sylvat.* t. 106.

WESTERN PENINSULA; Canara at Tellicherry, Rottler; Travancor at Quilon, Wight.

A shrub; branches slender, rod-like. *Leaves* 2 by $\frac{3}{4}$ in., upper smaller, coriaceous, obliquely cordate, midrib with 2 nerves on one side and one on the other, basal lobe rounded, often overlapping the corresponding lobe of the adjoining leaf; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; stipules oblique, laciniate. *Peduncles* $\frac{1}{2}$ – $\frac{3}{4}$ in. *Bracteoles* caducous. *Flower-buds* oblong, downy. *Flowers* $1\frac{3}{4}$ in. diam. *Sepals* 1 in., linear, rusty-tomentose. *Capsule* 2 in., ultimately glabrous.

5. ***P. acerifolium***, Willd.; DC. Prodr. i. 500; leaves roundish or oblong simple or lobed entire or coarsely toothed palmately nerved base cordate often peltate, peduncles shorter than the petioles, capsule stipitate oblong angled sulcate glabrescent. Roxb. Hort. Beng. 50; *Fl. Ind.* iii. 158; W. & A. Prodr. i. 69; Wight Ic. t. 63; Wall. Cat. 1170. *P. aceroides*, Wall. Cat. 1171; Kurz in Journ. As. Soc. Beng. 1873, ii. 62. *Pentapetes acerifolia*, Cav. Diss. iii. t. 44.

From the N. WEST HIMALAYA, in Kumaon, alt. 4000 ft., to Chittagong, Tenasserim and the Concan. Both Roxburgh and Wight question it being a native either of Bengal or the Western Peninsula.—DISTRIB. Java (native?).

A large tree; bark smooth, herbaceous portions floccose-pubescent. *Leaves* 10–14 by 6–12 in., polymorphous, palmately 7–12-nerved, adult glabrescent above, cano-pubescent beneath, nerves prominent beneath and stellate-hairy; petioles like the midrib, striated, lower as long or longer than the blade; stipules multifid, caducous. *Flower-buds* oblong, obtuse, 5-angled, rusty-tomentose outside. *Bracteoles* caducous. *Flowers* 5–6 in. diam., pure white, fragrant. *Sepals* linear-oblong, internally villous. *Petals* linear-oblong, somewhat cuneate, but little shorter than the calyx. *Staminodes* club-shaped. *Ovary* oblong, 5-angled, 5-celled, cells many-ovuled. *Capsule* 4–6 in. long, at first covered with a reddish fluffy crust, 5-celled, 5-valved. *Seeds* numerous in each cell, obliquely ovoid, compressed; wing large, thin; testa brown, smooth; albumen scanty, mucilaginous; cotyledons thin, folded (Roxb.).—The flowers render water gelatinous.

6. ***P. semisagittatum***, Ham. in Roxb. Fl. Ind. iii. 160; leaves oblong-lanceolate entire base very obliquely cordate or sagittate auricled on one side, bracteoles deeply laciniate, capsule elliptic-oblong terete. Wall. Cat. 1167.

CHITTAGONG, H. f. & T.; BIRMA, Wallich, Griffith; TENASSERIM, at Martaban, Wallich. (Carnatic, probably cultivated.)

A large tree. *Bark* ash-coloured, herbaceous portions very downy. *Leaves* 5–6 by $1\frac{1}{2}$ in., glabrescent above, hoary beneath, 5–7-nerved, auricle often as long as the petiole which is 1 in.; stipules pinnatifid. *Flowers* terminal and axillary, generally solitary on short, rusty-tomentose, drooping peduncles, 5–6 in. diam., pure white. *Bracteoles* conspicuous. *Flower-buds* lanceolate. *Sepals* linear, tomentose outside, pubescent within. *Petals* obliquely obovate-cuneate, stellate-hairy externally. *Staminodes* as long as the style. *Capsule* woody, 2–3 by $1\frac{1}{2}$ in., covered with dense yellow fluffy down. *Seeds* about 10 in each cell, winged much as in *P. acerifolium*.—Dr. Brandis informs me that the geographical distribution of this species needs further enquiry.

7. ***P. lanceæfolium***, Roxb. Hort. Beng. 50; *Fl. Ind.* iii. 163; leaves lanceolate and 1-nerved acuminate base rounded, capsule ovoid acute, obscurely 5-angled. Wall. Cat. 1172.

NORTH-WEST HIMALAYA, Kumaon, Madden; SILHET, Roxburgh; the KHASIA Mts. ascending to 4000 ft.; TENASSERIM at Tavoy, Wallich.

A tree. *Shoots* slender, virgate, hoary. *Leaves* 3-6 by 1½ in., glabrescent above, covered with whitish or cream-coloured tomentum beneath, nerves stellate-hairy; petiole very short. *Stipules* 2-3-fid, subulate-lanceolate, as long as the petiole. *Peduncles* axillary, half the length of the leaves, dilated at the top. *Flower-buds* oblong, striated. *Flowers* 2-3 in. diam., sweet-scented, white. *Sepals* linear, rusty-pubescent, villous within. *Petals* obliquely cuneate, longer than the sepals. *Capsule* 3 by 1½-2 in., elliptic, covered with light grey down. *Seeds* 2-4 in each cell.

8. **P. reticulatum**, *W. & A. Prodr.* i. 69; leaves pubescent beneath oblong entire or coarsely toothed towards the apex acuminate 3-nerved base cuneate, peduncles longer than the petioles, capsule oblong acute slightly angular furrowed, seeds 4 in each cell.

MALABAR; on the Naggar hills, *Wight*.

A tree. *Leaves* 4 by 1½ in., coriaceous, whitish beneath, nerves prominent, rusty stellate-hairy; petiole very short. *Peduncles* 3-flowered. *Bracteoles* 3-sect, segments linear. *Flowers* 1½ in. diam. *Sepals* linear-lanceolate. *Petals* obovate-oblong. *Staminodes* filiform. *Ovary* with about 6 ovules in each cell. *Capsule* 3 in., furfuraceous.

9. **P. Heyneanum**, *Wall. Cat.* 1169; leaves oblong acuminate coarsely toothed or lobed near the apex 4-5-nerved base cuneate subcordate rarely peltate, peduncles as long as the petiole, capsule oblong acute obscurely 5-angled scarcely furrowed, seeds 8-10 in each cell. *W. & A. Prodr.* i. 69; *Wight Ic.* t. 489. *P. suberifolium*, *Willd. Sp.* iii. 728; *Bot. Mag.* 1526; *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 160. *P. Lawianum*, *Nimmo in Gralh. Cat. Bomb. Pl.* 246; *Dalz. & Gibs. Bomb. Fl.* 24. *Pentaglottis suberifolia*, *Wall. Cat.* 1169, partly. *Velaga xylocarpa*, *Gærtn. Fruct.* ii. 245, t. 133.

Mountainous tracts throughout the WESTERN PENINSULA.

A middle-sized tree, herbaceous, portions rusty-tomentose. *Leaves* 4-6 by 2-3½ in., variable in form and size, coriaceous, rarely lobed or peltate, whitish beneath, nerves prominent rusty-pilose; petiole pubescent, ½ in. *Stipules* deciduous, ensiform. *Bracteoles* persistent, imbricate, deeply gashed. *Flowers* large, pure white, fragrant. *Sepals* 2 in., oblong, revolute, hairy outside. *Petals* obovate, spreading. *Capsule* 2 in., pointed at both ends, more or less deeply furrowed at the sides, at first densely furfuraceous, afterwards glabrescent.—The nervation of the leaves varies in different specimens, or even on the same; when the leaves are entire the secondary nerves are arched, when coarsely toothed or lobed they are strictly feather-nerved the secondary nerves running out directly into the lobes.

10. **P. glabrescens**, *W. & A. Prodr.* i. 69; leaves obovate shortly and suddenly acuminate base cuneate cordate or subpeltate 5-nerved, stipules entire, peduncles as long as the petioles, capsule large oblong 5-angled beaked cells 10-12-seeded. *Wall. Cat.* 1169, partly.—*Rheede Hort. Mal.* vi. t. 58.

Hills of the WESTERN PENINSULA; the CONCAN, MALABAR, and COROMANDEL.

A tree. *Leaves* 6 by 3½ in., coriaceous, glabrescent above, ashy pubescent beneath, nerves conspicuous, rusty-pilose; petiole ¼-½ in. *Stipules* ligulate, entire, half the length of the petiole. *Bracteoles* deciduous. *Flower-buds* ovoid, acute. *Flowers* 4 in. diam. *Sepals* linear-oblong, villous within. *Petals* oblong, nearly as long as the sepals. *Capsule* 5-6 in., stipitate, at first covered with floccose rusty tomentum, afterwards glabrous.—It is not quite certain that the flowers above described belong really to this species. *Wight* describes the stipules as palmate, but in his specimens they are entire. Probably it is not distinct from *P. diversifolium*, Bl.

11. **P. obtusifolium**, *Wight ms.*; leaves glabrescent above ashy tomentose beneath obovate oblong 1-nerved apex 2-lobed base cuneate, capsule oblong obtuse tubercled downy.

MALABAR, and the CARNATIC; Courtallum, *Wight*.

A tree. *Leaves* 3-4 by 2½-3 in., coriaceous, slightly oblique, obscurely, and remotely

toothed near the apex, feather-nerved; petiole $\frac{1}{4}$ in., downy. *Peduncle* longer than the petiole, jointed in the middle. *Bracteoles* and *flowers* not seen. *Capsule* 2 by 1 in., covered with squarish truncated tubercles.—Very distinct in its curiously tubercled fruit.

8. **ERIOLENA**, DC.

Trees. *Leaves* simple or lobed, downy or stellate-tomentose beneath. *Peduncles* axillary, 1-many-flowered. *Bracteoles* 3-5, lacinate, or small and caducous. *Calyx*, at first spathaceous, ultimately 5-parted. *Petals* flat, with dilated tomentose claws. *Staminal* column short, bearing externally numerous linear-oblong 2-celled anthers, in many series, cells parallel. *Staminodes* 0. *Ovary* sessile, 5-10-celled; style erect, stigmas 5-10 spreading; ovules many in each cell. *Capsule* woody, loculicidal. *Seeds* winged above; albumen thin, cotyledons plaited or contortuplicate, radicle next the hilum.—A genus of 7 or 8 exclusively Asiatic species.

* *Bracteoles* deeply cut.

1. **E. Wallichii**, DC. *Mem. Mus.* x. t. 5; leaves ovate or roundish acuminate 7-nerved base cordate, peduncles 1-flowered, bracteoles pinnatisect, sepals lanceolate, style pilose. *Wall. Cat.* 1174, C. *Gumsia hirta*, *Hann. in Wall. Cat.* p. 157, 1174, B.

NIPAL, *Wallich*.

A shrub, herbaceous portions shaggy-tomentose. *Leaves* 4-8 by 6 in., crenate-serrate, pilose above, stellate-tomentose beneath; petiole 1-2 in. *Stipules* nearly 1 in., leafy, lanceolate, with acute lobes. *Peduncles* villous, shorter than the leaf. *Flowers* 2 $\frac{1}{2}$ in. diam. *Sepals* lanceolate, floccose-tomentose outside, villous within. *Petals* orbicular, with a narrow hairy claw. *Column* glabrous. *Fruit* not seen.

2. **E. Stocksii**, *Hook. fil. et Thoms. ms.*; leaves roundish subacuminate 5-7-nerved base cordate, peduncles 3-flowered longer than the leaves, bracteoles bipinnatisect mossy, sepals cuspidate, style pilose.

WESTERN PENINSULA; CONCAN, *Stocks*.

A shrub, bark purplish, herbaceous portions stellate-hairy. *Leaves* 4-5 by 3 in., crenate, stellate-hairy above, pubescent beneath; petiole 2 in. *Stipules* subulate. *Flower* 1 $\frac{1}{2}$ in. diam. *Sepals* cuspidate, glandular at the base within. *Petals* spatulate. *Ovary* 10-lobed. *Fruit* not seen.

3. **E. Hookeriana**, *W. & A. Prodr.* i. 70; leaves roundish acuminate serrate base cordate, peduncles many-flowered, bracteoles shorter than the calyx much cut pubescent, styles pubescent.—*Beddome Flor. Sylvat. Anal. Gen.* t. 5.

WESTERN PENINSULA; the Concan, Nilghiri, and Pulney Mts., *Wight*; BEHAR, alt. 1-4000 ft., *J. D. H.*

A tree, herbaceous portions stellate-downy. *Leaves* 4 in. each way, thinly stellate-hairy or glabrescent above, rusty-tomentose beneath, nerves prominent beneath; petiole 2 in. *Peduncle* longer than the petiole, stellate-hairy, at length glabrous. *Flowers* 2 in. diam. *Sepals* narrow-lanceolate. *Capsule* 1 in., ovoid, pointed, 10-valved; valves downy, tubercled or pitted, villous at the inner angle.

4. **E. Candollei**, *Wall. Pl. As. Rar.* i. 51, t. 64; *Cat.* 1175; leaves ovate acuminate base cordate lobes rounded, peduncles many-flowered, bracteoles pinnatifid pubescent, style glabrous. *Dalz. & Gibs. Bomb. Fl.* 24.

BERMA; Mountains of Prome, *Wallich*; WESTERN PENINSULA; Ram Ghat in the Concan, *Dalzell*. BHOTAN? *Herb. Griffith*.

A tree, bark grey, herbaceous portions stellate-hairy. *Leaves* 5 by 4 in., upper smaller, palmately 5-7-nerved, stellate-hairy above, grey-pubescent beneath, crenate-

dentate; petiole $1\frac{1}{2}$ –3 in. *Flowers* crowded, yellow, $1\frac{1}{2}$ in. *Peduncles* shorter than the leaves. *Sepals* lanceolate, glandular within at the base, slightly exceeding the bracteoles. *Petals* oblong, apex notched, claw thick, villous. *Ovary* ovoid; style glabrous, stigmas 8–10, revolute. *Capsule* 2 by 1 in., woody, ovoid, acute, beaked, 10-lobed, 10-valved; valves oblong, acute, keeled or rounded at the back, villous or rarely glabrous at the inner margin. *Seeds* ∞ imbricate; embryo erect, cotyledons flat.—The Bhotan plant may, when fuller material is accessible, prove to be distinct.

** *Bracteoles* entire, or nearly so (Jackia, Spreng.; Schillera, Reich.).

5. ***E. spectabilis***, Planch. in *Herb. Hook.*; leaves ovate acuminate base cordate, cymes many-flowered paniced, bracteoles a little below the flower linear entire rarely lobed, style pilose at the base. *Wallichia spectabilis*, DC. *Mem. Mus.* x. 104, t. 6: *Microlæna spectabilis*, Wall. *Cat.* 1173. *Gumsia tiliacea*, Wall. *Cat.* 1173 D. *G. chloroxylon*, Ham. in Wall. *Cat.* p. 157, 1173, E.

CENTRAL HIMALAYA; Nipal, Wallich; Simla, Webb.

A shrub or small tree, young shoots stellate-hairy. *Leaves* 3–4 by $1\frac{1}{2}$ in., unequally serrate, 7–9-nerved, scabrid above, ashy-pubescent beneath; petiole 2 in. *Stipules* capillary. *Peduncles* longer than the leaves; ultimate pedicels stellate-hairy, nearly as long as the flower. *Flowers* 2 in. diam., sulphur-coloured. *Buds* oblong. *Calyx* at first spathaceous, ultimately 5-parted; sepals linear-lanceolate. *Petals* obovate-spathulate, claw thick, villous. *Ovary* ovoid, villous, ∞ -celled; stigmas ∞ . *Capsule* $1\frac{1}{2}$ in., woody, oblong; valves obtuse, tubercled, villous at the inner angle.—Yields a fibre fit for rope-making.

6. ***E. quinquelocularis***, Wight under *Ic.* t. 882; *Ic. Index* 36; leaves roundish toothed apex acute shortly acuminate base cordate, bracteoles a little distance from the flower minute caducous entire or lobed, style hairy stigma 5–10-lobed, Bedd. *Fl. Sylvat. Anal. Gen.* t. 5. *Microchlæna quinquelocularis*, W. & A. *Prodr.* i. 71. *M. flavescens*, Garcke in *Pl. Hohenack.* No. 1533.

BEHAR, alt. 1–4000 ft., J. D. H.; WESTERN PENINSULA, Nilgiri mts., Gardner; Coimbatore, Wight; Concan, Dalzell; Belgaum Ghats, Ritchie.

A tree, herbaceous portions stellate-hairy. *Leaves* $2\frac{1}{2}$ –3 in. each way, palmately 7-nerved, thinly stellate-hairy or glabrescent above, whitish and softly pubescent beneath; petioles 2 in. *Cymes* at the end of the branches; peduncles longer than the leaves, stellate-hairy; pedicels shorter than the flower, jointed above the middle. *Flower-buds* ovate-oblong. *Sepals* $\frac{3}{4}$ in., lanceolate, stellate-hairy, glandular at the base within. *Petals* equalling the sepals; claw broad, pubescent. *Column* as long as the petals. *Stigmas* revolute. *Capsule* $1\frac{1}{2}$ in., oblong, pointed, 5–10-valved; valves not tubercled, usually villous at the inner angle. *Seeds* numerous.

9. PENTAPETES, Linn.

Herbs. *Leaves* hastate-lanceolate. *Flowers* axillary. *Bracteoles* 3, caducous, subulate. *Sepals* 5, lanceolate, connate at the base. *Petals* 5. *Stamens* 20, connate at the base, 15 fertile in 5 groups (of 3 each) alternating with 5 staminodes, which are nearly as long as the petals; anthers 2-celled, extrorse. *Ovary* sessile, 5-celled, cells many ovuled; style entire, twisted and thickened upwards, stigmas 5 minute. *Capsule* loculicidally 5-valved. *Seeds* 8–12, 2-seriate in each cell, not winged; cotyledons plaited, 2 partite, radicle inferior.—A single species, widely distributed in tropical Asia.

1. ***P. phœnicea***, Linn.; Rowb. *Fl. Ind.* iii. 157; W. & A. *Prodr.* i. 67; Wall. *Cat.* 1157, 2, 3, 4; Miq. *Fl. Ind. Bat.* i. pt. 2, 190. *Dombeya phœnicea*, Cav. *Diss.* iii. t. 43, f. 1.—Rheede, *Hort. Mal.* x. t. 56.

Throughout the hotter parts of India, from the PANJAB to BIEMA and the WESTERN PENINSULA.

A branched annual, 2-5 ft., glabrous or with a few scattered stellate hairs. *Leaves* 3-5 in., 1-nerved, crenate-serrate; petiole 1 in. *Stipules* subulate. *Peduncle* simple, axillary, as long as or longer than the petiole, 1-2-flowered, jointed near the flower. *Bracteoles* half the length of the calyx. *Flowers* red, opening at noon and closing at the following dawn. *Sepals* stellate-hairy, with a few simple bristles. *Petals* obovate. *Style* short. *Capsule* subglobose, bristly, half the length of the persistent calyx.

10. **MELHANIA**, Forsk.

Undershrubs. *Leaves* simple, downy. *Peduncles* axillary, 1-flowered. *Bracteoles* 3-5, cordate, often longer than the sepals. *Flowers* yellow. *Sepals* 5, connate below. *Petals* 5 marcescent. *Stamens* 10, connate below into a very short tube, fertile filaments 5, alternating with as many ligulate staminodes; anther-cells parallel. *Ovary* sessile, 5-celled, cells 1-many-ovuled; styles 5, subulate, connate below, stigmatiferous on the inner face. *Capsule* loculicidally 5-valved. *Seeds* albuminous; cotyledons plicate, biparted, radicle inferior.—**DISTRIB.** Species 16 distributed over the hotter parts of Africa, Asia, and Australia.

* *Bracteoles* linear.

1. **M. incana**, Heyne in Wall. *Cat.* 1200; leaves narrow elliptic-oblong serrulate, bracteoles linear-oblong shorter than the calyx, capsule subglobose shorter than the calyx. *W. & A. Prodr.* i. 68; *Mig. Fl. Ind. Bat.* i. pt. 2, 191.

WESTERN PENINSULA; dry hills in the Carnatic and Mysore, Heyne, &c.

Suffrutescent, branches spreading. *Leaves* 1-2 by $\frac{3}{4}$ - $\frac{1}{2}$ in., linear-oblong, obtuse, base subcordate, tomentose beneath; peduncle 1-2-flowered, as long as the petiole, jointed in the middle. *Flowers* small. *Sepals* $\frac{1}{4}$ in., lanceolate, acuminate. *Petals* obovate, longer than the sepals. *Capsule* hairy, shorter than the sepals. *Seeds* 2-4 in each cell, tubercled.

2. **M. abyssinica**, A. Rich. *Fl. Abyss.* i. 76, t. 18; leaves elliptic obtuse crenate-dentate pubescent above paler and tomentose beneath, bracteoles linear shorter than the calyx, capsule longer than the calyx. *Mast. in Oliv. Fl. Trop. Afr.* i. 231. *Brotera ovata*, Cav. *Ic.* v. 20, 433. *Melhania ovata*, Boiss. *Fl. Orient.* i. 841, excl. syn.

SINDH, Stocks.—**DISTRIB.** Cape de Verde islands, Abyssinia.

Suffrutescent, cano-tomentose, branches prostrate intricate spreading. *Leaves* 1 by $\frac{3}{4}$ in., doubly-serrate; petiole $\frac{1}{4}$ in. *Stipules* $\frac{1}{4}$ in., capillary. *Peduncles* axillary, as long as or longer than the petiole, 2-4-flowered. *Flowers* $\frac{3}{4}$ in. diam. *Bracteoles* nearly as long as the lanceolate sepals. *Petals* obovate, shorter than the sepals. *Style* very short. *Capsule* slightly exceeding the persistent calyx.

** *Bracteoles* broad, at least at the base.

3. **M. cannabina**, Wight in Herb. Kew.; leaves oblong obtuse crenulate base subcordate, bracteoles lanceolate equalling the lanceolate cuspidate sepals, capsule subgibbous shorter than the calyx.

WESTERN PENINSULA; in the Carnatic and Mysore, Wight, &c.

A shrub, herbaceous portions cano-pubescent. *Leaves* $2\frac{1}{4}$ - $1\frac{1}{2}$ in., sub-3-nerved, paler beneath; petioles $1\frac{1}{4}$ in. *Stipules* fugacious. *Cymes* peduncled; peduncles equalling the petioles; ultimate pedicels shorter than the flowers. *Flowers* $\frac{1}{2}$ in. diam. *Bracteoles* striated. *Capsule* villous, the size of a large pea. *Seeds* numerous, angled, rugose.

4. **M. Hamiltoniana**, Wall. *Pl. Asiat. Rar.* i. t. 77; leaves roundish-ovate subcordate obtuse unequally toothed, peduncles axillary twice the length of the petiole, bracteoles cordate-ovate longer than the calyx.

WESTERN PENINSULA AND BIRMA.

A shrub, cano-tomentose, branches spreading. *Leaves* 2-3 in., pubescent on both surfaces, white beneath, 5-nerved; petiole 1 in. *Stipules* setaceous, scarcely shorter than the petiole. *Peduncles* axillary and terminal, 3-flowered. *Bracteoles* recurved at the edges. *Sepals* lanceolate, cuspidate, villous. *Petals* yellow, obovate, oblique, longer than the sepals. *Staminodes* ligulate. *Capsule* ovoid, obscurely truncated at the top, villous, shorter than the calyx, 5-celled, cells many-seeded. *Seeds* oblong, somewhat 4-sided, truncated, tubercled.

VAR. 1. *tomentosa*; leaves rounded or subcordate at the base densely tomentose obtuse, petals hardly exceeding the sepals. *Pentapetes tomentosa*, Wall. Cat. 1156.—Dry places on the banks of the Irawaddi, Wall.

VAR. 2. *abutiloides*, Arn. (sp.); leaves deeply cordate cano-tomentose more membranous acute or acuminate, petals much exceeding the sepals. *Wight. Ic. t. 23.*—Western Peninsula.

5. **M. futteyporensis**, Munro in *Herb. Hook.*; leaves oblong acuminate serrate base cordate, bracteoles equalling the calyx cordate-oblong acute margins recurved, sepals lanceolate cuspidate. *M. Hamiltoniana*, Munro, *Hort. Agrens.* 9 (not of Wall).

NORTH WESTERN INDIA, from the Indus Valley, alt. 2500 ft., Stewart, to Delhi, Falconer, and Bundelkhand, Edgeworth; SINDH, Stocks.

A cano-pubescent shrub. *Leaves* 3 by 2 in., petiole 1 in. *Stipules* setaceous. *Peduncles* axillary and terminal, 2-4-flowered, twice the length of the petiole. *Flowers* 1 in. diam. *Capsule* $\frac{1}{2}$ in., oblong, villous, scarcely so long as the sepals.

6. **M. tomentosa**, Stocks in *Herb. Hook.*; leaves oblong-lanceolate crenate-serrate, base rounded, peduncles terminal cymose, bracteoles oblong-lanceolate cuspidate shorter than the sepals. *M. abutiloides*, Aitch. Cat. *Punj. Pl.* 23 partly, not of Arn.

The PANJAB, Aitchison; SINDH, Stocks.

A cano-tomentose shrub. *Leaves* 2 by $1\frac{1}{2}$ in.; thinly stellate-hairy above, paler and softly pubescent beneath; petiole $\frac{3}{4}$ in. *Peduncles* about the length of the leaves, 2-3-flowered. *Bracteoles* $\frac{1}{2}$ in., margins not recurved. *Sepals* $\frac{3}{4}$ in., oblong-cuspidate, tomentose. *Capsule* oblong, villous, shorter than the calyx. *Seeds* muricate, angled.—Nearly allied to *M. futteyporensis*, but with flowers about half the size.

7. **M. Denhami**, Br. in *Denh. & Clapp. Voy. App.* 233; leaves ovate-oblong crenate-serrate 5-nerved at the base, bracteoles cordate-reniform accrescent membranous. *Mast. in Oliv. Trop. Afr.* i. 230. *M. bracteosa*, Boiss. *Fl. Orient.* i. 841. *Brotera bracteosa*, Guill. et Perr. *Fl. Seneg.* i. 80, t. 17. *Cardiostegia Kotschyi*, Presl. *Epimel. Bot.* 249.

Hills of SINDH, Stocks.—DISTRIB. Beloochistan, Tropical Africa and Arabia.

Suffrutescent, cano-tomentose. *Branches* spreading. *Leaves* $1\frac{1}{2}$ in., elliptic, stellate-hairy above, hoary-pubescent beneath; petiole $\frac{1}{2}$ -1 in. *Stipules* setaceous. *Peduncles* as long as the petiole, 3-flowered. *Sepals* ovate-lanceolate. *Petals* yellow. *Capsule* spheroid, downy, hardly as long as the calyx. *Seeds* 1 or 2 in each cell.—The flowers open in the evening.

11. **MELOCHIA**. Linn.

Herbs or undershrubs, more or less downy. *Leaves* simple. *Flowers* small, clustered or loosely paniced. *Sepals* 5, connate below. *Petals* 5, spatulate, marcescent. *Stamens* 5, opposite to the petals, connate below into a tube; anthers extrorse, 2-lobed, lobes parallel. *Ovary* sessile, 5-celled; cells opposite the petals, 2-ovuled; styles 5, free or connate at the base. *Capsule* loculicidally 5-valved. *Seeds* ascending, albuminous; embryo straight, cotyledons flat, radicle next the hilum.—DISTRIB. Species about 50, natives of the warmer regions of both hemispheres.

1. **M. corchorifolia**, Linn. ; Willd. *Sp. Pl.* iii. 604 ; leaves oblong-ovate serrate plaited base rounded or cordate, flowers in terminal or axillary heads, with bracteoles intermixed, capsule globose. *Roxb. Fl. Ind.* iii. 139 ; *Thwaites Enum.* 30 ; *Wall. Cat.* 1196 in part. *M. truncata*, Willd. *Sp. Pl.* iii. 601. *M. supina*, L. *Sp. Pl.* 944. *M. affinis*, Wall. *Cat.* 1198. *M. pauciflora*, Wall. *Cat.* 1199. *Riedleia corchorifolia*, DC. *Prodr.* i. 491 ; *W. & A. Prodr.* i. 66 ; *Miq. Fl. Ind. Bat.* i. pt. 2, 188 ; *Dalz. & Gibs. Bomb. Fl.* 24. *R. truncata* W. & A. *l.c.* 66. *R. supina*, DC. *Prodr.* i. 491. *R. concatenata*, DC. *Prodr.* i. 492. *Visenia corchorifolia*, Spreng. *Syst.* iii. 30. *V. concatenata*, Spreng. *Syst.* iii. 30. *V. supina*, Spreng. *Syst.* iii. 31. *Melochia concatenata*, Wall. *Cat.* 1197. *Sida cuneifolia*, Roxb. *Hort. Beng.* 50.—*Rheede Hort. Mal.* ix. t. 73.

Generally distributed in the hotter parts of India from KUMAON alt. 4000 ft. to Sikkim, MALACCA and CEYLON.—DISTRIB. A widely diffused tropical weed.

An erect branching herb or undershrub, thinly stellate-hairy. *Leaves* 1-3 in., variable in form, rarely obscurely lobed, subglabrous above, thinly stellate-hairy beneath, base 5-nerved ; petiole 1 in. *Stipules* subulate-lanceolate, shorter than the petiole. *Sepals* $\frac{1}{2}$ in., lanceolate, acuminate. *Petals* obovate, white or pink, longer than the sepals. *Capsule* the size of a small pea, globose, exceeding the persistent calyx.—Variable. Wallich's *M. affinis* has the branches of the cynne lengthened and spike-like with flowers on one side only as in the form called *concatenata*.

2. **M. velutina**, Beddome *Fl. Sylvat.* t. 5 ; leaves cordate suborbicular acuminate serrate, flowers in umbellate corymbs, capsule oblong 5-lobed, seeds winged. *Visenia umbellata*, Wight *Ic.* 509. *V. tomentosa*, Miq. *Pl. Hohen. Exsicc.* *Riedleia tiliaefolia*, DC. *Prodr.* i. 491 ; *Dalz. & Gibs. Bomb. Fl.* 24 ; *Miq. Fl. Ind. Bat.* i. pt. 2, 188. *Glossospermum velutinum*, Wall. *Cat.* 1153. *G. cordatum*, Wall. *Cat.* 1155.

Widely distributed through the hotter parts of India, from the N.W. PROVINCES to the CONCAN and AVA, but often cultivated only.—DISTRIB. Wild or cultivated in the Mauritius and Malay islands.

A shrub or tree, herbaceous portions stellate-hairy. *Leaves* 4 by 3 in., thinly stellate-hairy or glabrescent above, downy beneath, base 5-7-nerved ; petiole 3 in. *Stipules* $\frac{1}{4}$ in., leafy, roundish. *Panicles* many-flowered, lax, terminal and axillary. *Flowers* $\frac{1}{4}$ in. diam., pink. *Calyx* campanulate, lobes 5, deltoid-ovate, connate to about the middle. *Petals* oblong, twice the length of the sepals. *Stamens* inserted with the petals on a lobed hypogynous disk, filaments flat. *Ovary* 5-celled ; styles 5, opposite the petals. *Capsule* $\frac{1}{2}$ in., 5-lobed, bristly. *Seed* solitary in each cell, wing ascending.

M. PYRAMIDATA, Linn. occurs as an introduced weed in India.

12. WALTHERIA, Linn.

Herbs or undershrubs. *Leaves* simple. *Stipules* narrow. *Flowers* small, in dense axillary or terminal clusters. *Sepals* 5, connate below into a bell-shaped tube. *Petals* 5, oblong-spathulate. *Stamens* 5, tubular below ; anthers 2-lobed, lobes parallel. *Staminodes* 0. *Ovary* sessile, 1-celled ; ovules 2, ascending ; style excentric, stigma club-shaped. *Capsule* 2-valved, 1-seeded. *Seed* ascending, albuminous ; embryo straight, cotyledons flat, radicle next the hilum.—DISTRIB. About 15 species, one or two of which are tropical weeds, the remainder are natives of tropical America.

1. **W. indica**, L. ; DC. *Prodr.* i. 493. *W. & A. Prodr.* i. 67 ; *Thwaites Enum.* 30 ; *Miq. Fl. Ind. Bat.* i. pt. 2, 187 ; *Dalz. & Gibs. Bomb. Fl.* 23 ; *Wall. Cat.* 1194. *W. americana*, L. ; DC. *Prodr.* i. 492 ; *W. elliptica*, Cav. *Diss.* vi. 171 ; *Wall. Cat.* 1195. *Melochia corchorifolia*, Wall. *Cat.* 1196, H, not of others.

Common in all the hotter parts of INDIA, from KUMAON alt. 4000 ft. to MALACCA and CEYLON.—DISTRIB. A widely diffused Tropical weed.

Perennial, villous. *Leaves* 1-3 in., shortly petioled, cordate-ovate, oblong, obtuse, toothed, plaited. *Flowers* yellow, $\frac{1}{4}$ in. *Bracts* narrow, villous. *Sepals* lanceolate, acuminate. *Petals* longer than the sepals, stalked.

13. **ABROMA**, Jacq.

Trees or shrubs. *Leaves* cordate, ovate-oblong, serrulate, sometimes angled. *Peduncles* opposite the leaves, few-flowered. *Sepals* 5, connate near the base. *Petals* 5, purplish, concave below, prolonged above into a large spoon-shaped lamina. *Staminal-cup* of 5 fertile and as many sterile divisions, fertile filaments opposite the petals, 3-antheriferous; anthers 2-lobed, lobes divergent. *Staminodes* longer than the fertile filaments, obtuse. *Ovary* sessile, pyramidal, 5-lobed; cells many-ovuled; styles 5. *Capsule* membranous, 5-angled, 5-winged, truncate at the apex, septically 5-valved, valves villous at the edges. *Seeds* numerous, albuminous; embryo straight, cotyledons flat, cordate, radicle next the hilum.—DISTRIB. 2 or 3 species, natives of Tropical Asia.

1. **A. augusta**, Linn.; DC. Prodr. i. 485; Roxb. Hort. Beng. 50; Fl. Ind. iii. 156; Miq. Fl. Ind. Bat. i. pt. 2, 183; Beddome Flor. Sylvat. Anal. Gen. t. 5; W. & A. Prodr. i. 35; Wall. Cat. 1142. *A. angulata*, Lam. Ill. 636. *A. Wheeleri*, Retz. Obs. v. 27; Willd. Sp. Pl. iii. 1425. *A. fastuosum* Gaertn. Fruct. i. 307, t. 64.

Widely spread, native or cultivated, throughout the hotter parts of India from the NORTH WEST PROVINCES to SIKKIM, alt. 3000 ft.; KHASIA MTS. alt. 4000 ft., and Assam.—DISTRIB. Java, Philippines, China.

A shrub, branches downy. *Leaves* 4-6 by 4-5 in. repand-denticulate, base 3-7-nerved, upper smaller, narrower, entire, glabrescent above, tomentose below; petiole $\frac{1}{2}$ -1 in. *Stipules* linear, deciduous as long as the petiole. *Peduncle* $1\frac{1}{2}$ in., axillary. *Flowers* 2 in. diam. *Sepals* 1 in., lanceolate, free nearly to the base. *Petals* scarcely exceeding the sepals, imbricate in the bud, deciduous. *Capsule* $1\frac{1}{2}$ in., obpyramidal ultimately glabrous, thrice as long as the persistent calyx.—The bark yields good fibre.

14. **GUAZUMA**, Plum.

A tree. *Leaves* simple, tomentose. *Flowers* in axillary cymes. *Sepals* 5, connate below the middle, at first spathaceous. *Petals* 5, concave at the base, prolonged at the apex into 2 narrow strap-shaped processes. *Stamens* 10, connate into a column which is tubular below, and consists above of 5 fertile, 3-antheriferous filaments opposite the petals, and 5 lanceolate staminodes opposite the sepals; anthers 2-lobed, lobes divergent. *Ovary* sessile, 5-lobed, 5-celled; styles more or less connate; ovules numerous in each cell. *Capsule* oblong, woody, tubercled, resembling a mulberry. *Seed* albuminous; embryo curved, cotyledons leafy folded, radicle next the hilum.—DISTRIB. A genus of 5 species, chiefly natives of Tropical America.

1. **G. tomentosa**, Kunth; DC. Prodr. i. 485; Wight Ill. t. 31; W. & A. Prodr. i. 64; Thwaites Enum. 29; Beddome Fl. Sylvat. t. 107. *Buboma tomentosa*, Spreng. Syst. iii. 385. *G. ulmifolia*, Wall. Cat. 1141. *Diuroglossum rufescens*, Turcz. in Flora 1853, 735.

Generally distributed and frequently cultivated in the warmer parts of India and CEYLON, but perhaps only introduced.—DISTRIB. Java, Tropical America.

A tree, herbaceous portions stellate-tomentose. *Leaves* 3-4 $\frac{1}{2}$ by 2 in., oblong-lanceolate, obliquely cordate, acuminate, serrate, scabrid, or glabrescent above, pubescent

beneath, base 5-7-nerved; petiole short. *Flowers* numerous, yellow, in terminal and axillary panicles, which are twice the length of the leaves. *Flower-buds* globose. *Calyx* $1\frac{1}{2}$ in., bell-shaped, stellate-hairy. *Sepals* ultimately reflexed. *Petals* exceeding the calyx. *Anthers* concealed in the hood of the petals. *Capsule* 1 in., oblong, obtuse, covered with obtuse black tubercles.

15. **BUETTNERIA**, Linn.

Herbs, trees or shrubs, often climbers, frequently prickly. *Foliage* various. *Flowers* minute, in repeatedly branched axillary or terminal umbellate cymes. *Sepals* 5, connate at the base. *Petals* 5, claw concave, limb with a long strap-shaped 2-fid appendage. *Stamens* 10, connate below into a membranous tube, bearing above 5 fertile stamens opposite the petals, and 5 staminodes opposite the sepals; anthers 2-lobed, extrorse. *Ovary* sessile, 5-celled; cells opposite the petals, 2-ovuled; style entire or 5-fid. *Capsule* globose, spiny, septically 5-valved, valves breaking away from a central column, cells 1-seeded. *Seed* ascending, exalbuminous; cotyledons folded around the superior radicle, plumule lobed.—**DISTRIB.** About 45 species, mostly natives of tropical America, a few are Asiatic, and one African.

* *Leaves* usually longer than broad, generally simple.

1. **B. herbacea**, Roxb. *Cor. Pl.* i. t. 29; *Fl. Ind.* i. 619; herbaceous, unarmed, leaves glabrous ovate acuminate toothed paler beneath, capsule covered with small subulate prickles. *Wall. Cat.* 1146; *W. & A. Prodr.* i. 65; *Wight Ic.* t. 488; *Dalz. & Gibs. Fl. Bomb.* 23. *Commersonia herbacea*, *G. Don. Gen. Syst.* i. 523.

WESTERN PENINSULA; not uncommon in the Carnatic, Orissa, and Concan.

Stem herbaceous, unarmed. *Leaves* $1\frac{1}{4}$ – $2\frac{1}{2}$ by $\frac{3}{4}$ in., base cordate or rounded, 3–5-nerved, nerves not glandular; petiole $\frac{1}{2}$ in. *Stipules* linear, equalling the petiole. *Inflorescence* longer than the adjoining leaf. *Sepals* linear-lanceolate, reflexed. *Limb of petals* subulate, as long as the sepals, puberulous. *Fertile filaments* very short; staminodes ovate. *Fruit* the size of a pea, 5-lobed.

2. **B. crenulata**, Wall. *Cat.* 1150; a tree, branches unarmed, leaves glabrous elliptic acuminate, capsule globose glabrous covered with long linear-lanceolate spines. *B. polyacantha*, Wall. *Cat.* 1151 ? *B. catalpifolia*, Wall. *Cat.* 1152 ? *B. echinata*, Wall. *Cat.* 1149 ?

NIPAL, Wallich; BIRMA, at Attran and Saluen, Wallich; PEGU, McClelland.

Leaves 4–5 by 2–3 in., coriaceous, leaves 5–7-nerved, rounded; petiole 2 in., thickened at both ends. *Peduncles* short, thinly stellate-hairy, pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., jointed in the middle. *Bracteoles* equalling the pedicels, persistent, lanceolate. *Flower-buds* deltoid, 5-angular, pilose. *Flowers* $\frac{1}{4}$ in. diam. *Petals* stalked, limb cordate with two rounded lobes, apex linear. *Ovary* ovoid, style short. *Capsule* $\frac{1}{2}$ in. diam.—The above synonyms must be received with hesitation, the materials being too imperfect to allow of satisfactory determination.

3. **B. Jackiana**, Wall. in Roxb. *Fl. Ind. (ed. Carey)* ii. 386; shrubby, unarmed, leaves elliptic acuminate scabrid above, stellate hairy beneath, nerves pilose, capsule globose covered with straight-subulate spines. Wall. *Cat.* 1147.

PENANG, Jack, &c.

A climbing shrub; herbaceous portions pilose and downy. *Leaves* 3–5 by $1\frac{1}{4}$ – $2\frac{1}{2}$ in., entire or minutely serrated, base rounded; petiole $\frac{3}{4}$ in. pilose. *Panicles* axillary, much shorter than the leaves, many-flowered; pedicels capillary, stellate-hairy. *Sepals* $\frac{1}{2}$ in., deltoid acuminate, spreading. *Petals* shorter than the sepals. *Capsule* 1 in. diam., glabrous, 5-lobed. *Seeds* black.

4. **B. elliptica**, *Mast.*; shrubby, unarmed, leaves pilose on both surfaces especially along the nerves elliptic-oblong shortly acuminate.

MALACCA, *Maingay*.

A climbing shrub. *Stem* terete, downy. *Leaves* 5-6 by 3 in., base 5-nerved, rounded; petiole 3 in., pilose. *Peduncles* axillary, shorter than the petiole; pedicels $\frac{1}{2}$ - $\frac{1}{3}$ in., umbellate, thinly stellate-hairy. *Flowers* $\frac{1}{2}$ in. diam. *Petals* shorter than the lanceolate sepals. *Fruit* not seen.

5. **B. uncinata**, *Mast.*; shrubby, unarmed, leaves glabrescent elliptic-lanceolate acuminate, capsule covered with hooked gland-tipped barbed spines.

MALACCA, *Maingay*.

Stem glabrous, scarred. *Leaves* 8-10 by 3 in., coriaceous, glabrous or with a few thin hairs along the midrib on the under surface, base rounded, 3-nerved; petioles $2\frac{1}{2}$ -3 in., thickened at both ends. *Fruiting-peduncles* half the length of the leaves. *Capsule* depressed, 3-celled, spheroidal, the size of a hazel nut.

6. **B. Maingayi**, *Mast.*; shrubby, unarmed, leaves glabrous on both surfaces lanceolate acuminate, capsule globose obscurely 5-lobed studded with short subulate prickles.

MALACCA, *Griffith, Maingay*.

A climbing shrub. *Leaves* 10 by 3 in., coriaceous, base rounded, 5-nerved; petiole 2 in., thickened at both ends. *Peduncles* barely 1 in., spreading at right angles, and bearing an umbel of flowers; pedicels $\frac{1}{2}$ in. *Sepals* $\frac{1}{2}$ in., ovate-lanceolate. *Petals* shorter than the sepals, with a long linear appendage. *Staminodes* erect, oblong, obtuse, 2-fid. *Style* as long as the ovary. *Fruiting peduncle* as long as the petiole. *Capsule* $1\frac{1}{4}$ in. diam.

** *Leaves* more or less orbicular, or not much longer than broad, usually lobed.

7. **B. aspera**, *Colebrooke in Roxb. Fl. Ind. (ed. Carey) ii. 383 and in Wall. Cat. 1144*; a tree, unarmed, leaves glabrescent suborbicular or oblong shortly acuminate base cordate, capsule glabrous globose covered with stout curved prickles. *B. grandifolia*, *DC. Prodr. i. 486*. *B. nepalensis*, *Turcz. in Bull. Mosc. 1858, 207*.

NIPAL, *Wallich*; SILET, *Da Silva*, SIKKIM and the KHASIA Mts., ascending to 4000 ft., *J. D. H. & T. T.*—DISTRIB. China.

Tree. *Leaves* 4 by $2\frac{1}{2}$ in. and upwards, base 7-nerved; petiole 2 in. and upwards. *Peduncle* pubescent, as long as the petioles; pedicels umbellate, ultimate pedicels $\frac{1}{2}$ in., jointed in the middle. *Flower-buds* ovoid. *Flowers* minute, downy, campanulate. *Sepals* deltoid. *Capsule* $1\frac{1}{2}$ in.

8. **B. andamanensis**, *Kurz in Journ. As. Soc. 1871, ii. 47*; *Flora*, 1871, 277; shrubby, unarmed, leaves glabrescent palmately lobed, capsule globose glabrous covered with short subulate spines.

ANDAMAN ISLDS., *Kurz*; TENASSERIM, at Martaban, *Brandis*; and Moulmein, *Lobb*.

A climbing shrub. *Stem* terete. *Leaves* 4-5 by 4 in., thinly stellate-hairy, glabrescent, ovate, shortly 3-5-lobed, lobes acute or acuminate, irregularly and coarsely toothed, base 5-7-nerved, deeply cordate, lobes rounded; petiole 2-4 in. *Stipules* $\frac{1}{2}$ in., subulate, deciduous. *Cymes* 2-3-chotomous. *Peduncles* slender. *Capsule* the size of a cherry.

9. **B. pilosa**, *Roxb. Fl. Ind. i. 618*; shrubby, unarmed, leaves pilose on both surfaces suborbicular palmately lobed, capsule globose downy, studded with subulate barbed prickles. *Wall. Cat. 1145*. *B. velutina*, *Wall. Cat. 1148, 1925*.

EASTERN BENGAL; SILHET, *Da Silva*; Assam and Khasia Mts., *Griffith*; BIRMA, *Wallich*, &c.; CHITTAGONG, *H. f. & T.*

A climbing shrub. *Branches* hispid with spreading hairs, or thinly stellate-hairy. *Leaves* 4 in., shortly 3-lobed, lobes deltoid, entire or serrulate, 7-9-nerved, midrib glandular, base deeply cordate, lobes rounded, upper ovate-lanceolate; petiole 1½-4 in., densely rusty-tomentose. *Stipules* subulate. *Inflorescence* lax, much branched; peduncles longer than the petioles. *Flowers* minute, campanulate. *Sepals* lanceolate. *Petals* yellow, incurved, appendage orange. *Capsule* the size of a large cherry, globose. *Seed* ovate-oblong.

16. **COMMERSONIA**, Forsk.

Trees or shrubs. *Leaves* simple, oblique. *Inflorescence* cymose, terminal or axillary or leaf opposed. *Calyx* 5-cleft. *Petals* 5, concave at the base, prolonged into a long strap-shaped appendage at the apex. *Fertile stamens* 5, opposite the petals; anthers subglobose, 2-celled, cells diverging; staminodes 5, opposite to the sepals, lanceolate. *Carpels* 5, opposite to the sepals, connate; *styles* connate; ovules 2-6. *Capsule* loculicidally 5-valved, covered with bristly hairs. *Seeds* ascending, albuminous, strophiolate; cotyledons flat, radicle next the hilum.—DISTRIB. A genus of about 8 species, some of which are natives of the Malay peninsula and archipelago, others of Australia.

1. **C. platyphylla**, *Andr. Bot. Rep.* t. 603, *adnot*; leaves broadly ovate-lanceolate oblique stellate-hairy above hoary tomentose beneath. *C. javensis*, *G. Don Gen. Syst.* i. 523. *C. echinata*, *Blume Bijdr.* 86; *Wall. Cat.* 1143; *Andr. Bot. Rep.* t. 519, *not of Forst.* *C. echinata*, *var. β. Miq. Fl. Ind. Bat.* i. pt. 2, 182. *Buettneria hypoleuca*, *Turcz. in Mosc. Bull.* 1858, 207.

MALACCA, PENANG, and SINGAPORE.—DISTRIB. Malay isles.

A shrub or low tree. Younger *branches* softly downy. *Leaves* 6 by 4 in., obliquely subcordate, subacuminate, irregularly serrulate, nerves with reddish down beneath; petioles ½-¾ in., downy. *Stipules* deciduous, herbaceous, palmately cut. *Flowers* numerous, rotate, ½ in. diam., in much branched terminal cymose corymbs; ultimate pedicels divaricate, hispid, as long as the flowers. *Calyx-lobes* ovate, as long as the tube. *Petals* 5, base concave, appendage linear. *Stamens* 5, opposite the petals, and concealed within their concavity; staminodes 5, lanceolate, opposite the sepals, as long as the petals. *Ovary* 5-celled, cells opposite the petals. *Capsule* globose, the size of a marble, covered with long filiform intricate ciliolated processes.

Var. Leschenaultii; leaves glabrescent equally serrate, peduncles opposite the leaves.

The true *C. echinata* of Forst. has not yet been met with within the limits of this Flora, though it probably will be discovered in Malacca. It is distinguished from the preceding by its narrower lance-shaped leaves, glabrous on the upper surface.

17. **LEPTONYCHIA**, Turcz.

Shrubs or trees. *Leaves* simple, entire. *Flowers* cymose axillary. *Sepals* 5, valvate, distinct nearly to the base. *Petals* 5, valvate, short, orbicular, concave. *Andræcium* tubular below, filamentous above, filaments 3-seriate, outer series of 10-15 ligulate staminodes opposite the petals, middle of 10 fertile stamens also opposite the petals, innermost of 5 very short fleshy subulate staminodes opposite the sepals; anthers linear-oblong, introrse, dehiscent at the sides longitudinally. *Ovary* sessile, 3-4-celled; placentas axile; styles connate, stigmas capitellate; ovules many in each cell, anatropous. *Capsule* 2-3-celled, or by abortion 1-celled, dehiscent septicidally or loculicidally, or both, simultaneously or irregularly. *Seeds* black,

aril fleshy orange-coloured, albumen fleshy; cotyledons flat leafy, radicle superior.—DISTRIB. A genus of 3 or 4 species, natives of both Peninsulas, the Archipelago, and also of west tropical Africa.

1. ***L. acuminata*, Mast.**; leaves oblong abruptly acuminate base tapering, outer staminodes 10, inner subulate not ciliate, capsule 2-valved valves ultimately dimidiate.

MALACCA, *Maingay*.

A tree. *Leaves* 8 by 2½ in., glabrous on both surfaces; petiole ¼–2 in. *Flower-buds* oblong, pointed, 5-sided. *Flowers* ½–¾ in. diam. *Sepals* spreading, coriaceous, lanceolate, downy on both sides. *Petals* less than half the length of the sepals, erect, subcoriaceous, orbicular, concave, villous. *Andræcium* tubular at the base, outer staminodes linear-ligulate, nearly as long as the sepals, fertile stamens intermediate, as long as the outer staminodes, and placed with them in pairs opposite the petals; anthers adnate; inner staminodes 5, very short, subulate fleshy, opposite the sepals. *Ovary* oblong, villous, 3-celled; style terete, as long as the fertile filaments, stigma capitate obscurely lobed. *Seed* oblong, testa black shining smooth, aril fleshy orange-yellow tubular covering half the seed from the hilum upwards, albumen fleshy, embryo straight, cotyledons flat leafy base cordate, radicle superior away from the hilum.

2. ***L. glabra*, Turcz. in Bull. Mosc. 1858, 222**; leaves oblong-lanceolate abruptly acuminate base tapering subcordate, outer staminodes 15, inner staminodes ciliated, capsule 1-celled. *Oudem. in Compt. Rend. Ac. Roy. Sc. Amsterd.* 2 ser. ii. 8, *cum. ic. and Walp. Ann.* vii. 449. *Grewia?* caudata, *Wall. Cat.* 1099. *G. heteroclita*, *Roxb. Fl. Ind.* ii. 590. *Binnendykia trichostylis*, *Kurz in Nat. Tijdschrift Ned. Ind.* ser. 3, iii. 164. *Turraea trichostylis*, *Miq. Fl. Ind. Bat. Supp.* i. 502.

MALACCA, *Maingay*; PENANG, *Wallich*; MOULMEIN, *Lobb*; TENASSERIM, *Helfer*.—DISTRIB. Moluccas, Borneo, Java, Sumatra.

A tree. *Leaves* 4–6 by 2 in., glabrous or thinly stellate-hairy, base 3–5-nerved, somewhat oblique; petiole ½ in. *Peduncles* axillary, solitary, or in short few-flowering cymes. *Buds* oblong, club-shaped. *Ovary* oblong, obscurely 4-lobed. *Capsule* ½ in. depressed pyriform, coriaceous, rugose, shining and wrinkled within. *Seed* ½ in.—In the absence of perfect flowers on the Indian specimens it is not absolutely certain that they are specifically identical with those from Sumatra.

3. ***L. moacurroides*, Beddome Fl. Sylvat. t. 114**; leaves elliptic acuminate base rounded, outer staminodes 10, capsule tubercled.

CARNATIC and MYSOKE, *Beddome*; Courtallum, *Wight*.

A small Grewioid tree. *Branches* virgate. *Leaves* 3–4 by 1¾ in., glabrous on both surfaces, base 3-nerved; petiole ¼–½ in. *Stipules* lanceolate, caducous. *Flowers* in axillary cymes, half the length of the petioles. *Sepals* ½ in., linear-lanceolate, pubescent. *Petals* orbicular, half the length of the sepals, densely villous. *Ovary* 4-lobed; style pubescent. *Capsule* ½–¾ in., obovoid, verrucose, irregularly 2-valved.—The leaves and flowers of this species are smaller than those of the preceding.

ORDER XXVIII. TILIACEÆ. (By Maxwell T. Masters, F.R.S.)

Trees, shrubs or herbs. *Leaves* alternate, rarely opposite, simple or lobed. *Stipules* free, often caducous. *Flowers* usually cymose, cymes few-flowered, or large and many-flowered. *Flowers* regular, hermaphrodite or unisexual. *Sepals* 3–5, free or connate, valvate. *Petals* as many as the sepals, rarely absent, imbricate or valvate. *Stamens* numerous, rarely definite, usually springing from a prolonged or dilated torus, free or some-

times 5-adelphous, filaments filiform; anthers 2-celled. *Ovary* free, 2-10-celled; styles columnar, or divided into as many divisions as there are cells to the ovary, stigmas usually distinct rarely confluent or sessile. *Ovules* attached to the inner angle of the cells of the ovary, if few in number often pendulous from the apex or ascending from the base, if more numerous disposed in 2 or more ranks, anatropous; raphe ventral or lateral. *Fruit* fleshy or dry, dehiscent or indehiscent, 2-10 or by abortion 1-celled (cells sometimes divided by false partitions), carpels separable or always united. *Seeds* 1 or many, ascending, pendulous or transverse, with no arillus, testa leathery or crustaceous or pilose, albumen fleshy abundant or scanty rarely wanting; embryo straight or slightly curved, cotyledons leafy rarely fleshy, radicle next the hilum.—**DISTRIB.** About 350 species some of which occur in all the great divisions of the world except the arctic and antarctic, but most abundantly in the tropics of either hemisphere. Some of the genera and many of the species are strictly Indian.

SERIES A. Holopetalæ. *Petals* glabrous or rarely downy, coloured, thin, unguiculate, entire or nearly so, imbricate or twisted in the bud. *Anthers* globose or oblong, opening by slits.

TRIBE I. Brownlowiæ. *Sepals* combined below into a cup. *Anthers* globose, cells ultimately confluent at the top.

* *Staminodes* 5.

Carpels distinct, 2-valved	1. BROWNLOWIA.
Carpels combined, indehiscent, winged	2. PENTACE.
Capsule 5-valved	3. PITYRANTHE.

** *Staminodes* 0.

Stamens on a raised torus	4. CHARTACALYX.
Stamens on a contracted torus	5. BERRYA.

TRIBE II. Grewiæ. *Sepals* distinct. *Petals* glandular at the base. *Stamens* springing from the apex of a raised torus.

* *Fruit* destitute of prickles.

Fruit drupaceous	6. GREWIA.
Fruit of 3-5 winged cocci	7. COLUMBIA.

** *Fruit* prickly.

Fruit large, 3-angular, indehiscent	8. ERINOCARPUS.
Fruit small, globose, indehiscent, or 3-5-coccous	9. TRIUMFETTA.

TRIBE III. Tiliæ. *Sepals* distinct. *Petals* not glandular. *Stamens* springing from a contracted torus.

Leaves alternate	10. CORCHORUS.
Leaves opposite	11. PLAGIOPTERON.

SERIES B. Heteropetalæ. *Petals* sepaloid, incised or 0, induplicate or imbricate, not twisted. *Anthers* linear, opening by a terminal pore.

Stamens on a depressed torus. Fruit capsular	12. ECHINOCARPUS.
Stamens on a raised torus. Fruit drupaceous	13. ELÆOCARPUS.

1. **BROWNLOWIA**, Roxb.

Trees. *Pubescence* stellate or scaly. *Leaves* entire, 3-5-nerved, feather-veined. *Flowers* numerous, small, in large terminal or axillary panicles. *Calyx* bell-shaped, irregularly 3-5-fid. *Petals* 5, without glands. *Stamens* many free, springing from a raised torus. *Staminodes* 5, within the stamens, opposite the petals and petaloid. *Anthers* subglobose. *Ovary* 5-celled, each cell 2-ovulate; styles awl-shaped, slightly coherent; ovules ascending. *Carpels* ultimately nearly free, 2-valved, 1-seeded. *Albumen* 0; cotyledons thick, fleshy.—DISTRIB. Three species confined to Tropical Asia.

1. **B. elata**, Roxb. *Cor. Pl.* iii. 61, t. 265; leaves ovate acute base cordate 5-7-nerved undulate downy beneath, petiole long. *Bot. Reg.* t. 1472; *Wall. Cat.* 1178. *Humea elata*, Roxb. *Fl. Ind.* ii. 640.

CHITTAGONG to TENASSERIM, Roxburgh, Griffith &c.—DISTRIB. Borneo.

A lofty tree. *Branches* spreading. *Leaves* 4-12 by 3-8 in., glabrous, white beneath, sometimes peltate; petiole 3-4 in. or longer, thickened at the apex. *Panicles* terminal, as large as the adjacent leaf, branches pubescent, ultimate pedicels longer than the flower. *Flower-buds* clavate-oblong. *Flower* $\frac{1}{2}$ in., yellow. *Calyx* funnel-shaped, lobes ovate shorter than the tube. *Petals* oblong, spreading, tapering at the base, longer than the sepals. *Filaments* slender; anther-lobes divergent at the base, confluent at the apex; staminodes linear-lanceolate. *Style* as long as the petals. *Follicle* $1\frac{1}{2}$ in., by abortion solitary, obliquely ovate, woody, covered with fine ash-coloured pubescence. *Seed* solitary, rarely 2, albumen 0; embryo erect, cotyledons 2 nearly equal amygdaloid.

2. **B. lanceolata**, Benth. in *Journ. Linn. Soc. v. Suppl.* ii. 57; leaves lanceolate-acuminate white and scaly beneath, petiole short, panicle much shorter than the leaves.

SUNDERRUNDS, Griffith; TENASSERIM, at Moulmein, Parish.

A tree. *Leaves* 4-6 by 1-2 in., glabrous; petiole $\frac{1}{2}$ in., thickened at the apex. *Panicles* terminal and axillary, shorter than the leaves, peduncles longer than the petioles. *Flower-buds* ovoid. *Calyx* $\frac{1}{2}$ in. diam., campanulate, lobes lanceolate equalling the tube. *Petals* $\frac{1}{2}$ in., oblong base broad. *Anthers* small, didymous, lobes not widely divergent, connective thick; staminodes petaloid. *Ovary* 4-lobed, cells 2-ovuled, style simple, stigma 4-lobed. *Young fruit* pyriform, truncate.

2. **PENTACE**, Hassk.

Trees. Herbaceous portions pubescent or scaly, ultimately glabrous. *Leaves* entire, leathery, 3-5-nerved. *Flowers* numerous, small, in terminal panicles. *Calyx* bell-shaped, irregularly 3-5-fid. *Petals* 5, glandless. *Stamens* numerous, on a slightly raised torus, sometimes pentadelphous. *Staminodes* 5, opposite the sepals. *Anthers* subglobose, pollen globose 3-pored. *Ovary* 5-celled, cells 2-ovuled; ovule pendulous, raphe next the placenta. *Fruit* dry indehiscent 3-5-winged, by abortion 1-celled, 1-seeded. *Seed* solitary, albuminous.—DISTRIB. Three species, all Malayan.

1. **P. burmannica**, Kurz in *Flora*, 1871, 278; leaves elliptic ovate acute 3-5-nerved pubescent beneath, pedicels long, ovary globose 5-lobed, fruit oblong truncate 5-winged wings longer than broad.

MARTABAN, Brandis; PEGU, Kurz.

A tree. *Shoots* pubescent. *Leaves* 4 by $2\frac{1}{2}$ in., oblong, rounded at the base, acuminate, glabrous, whitish beneath; petiole $\frac{1}{2}$ in. *Pedicels* long, covered with tawny down.

Calyx $\frac{1}{2}$ in., pubescent, sepals lanceolate. *Petals* obovate-oblong, tapering at the base, slightly exceeding the sepals. *Capsule* $1\frac{3}{4}$ by $1\frac{1}{4}$ in., oblong-truncate, wings stellate-hairy.

2. **P. triptera**, *Mast.*; leaves 1-nerved, ovary 3-celled, fruit 3-winged wings obtuse rounded as broad as long.

MALACCA, *Griffith, Maingay*.

A tree. *Leaves* 6 by 3 in., glabrous, white beneath, oblong-acute, rounded at the base, 1-nerved, feather-veined; petiole 1 in. *Panicle* terminal. *Sepals* $\frac{3}{4}$ – $1\frac{1}{4}$ in., oval-lanceolate, downy. *Petals* twice the length of the sepals, oblong-spathulate. *Stamens* in 5 parcels, one opposite each petal. *Staminodes* 5, linear-subulate, much shorter than the stamens, opposite the sepals. *Ovary* pubescent, globose. *Styles* shorter than the stamens. *Capsule* $\frac{3}{4}$ by 1 in.

3. **PITYRANTHE**, Thwaites.

A tree. *Leaves* obovate. *Panicles* terminal. *Flowers* small, numerous. *Calyx* urceolate-campanulate, 3–4-lobed. *Petals* obovate, tapering at the base, glandless. *Fertile stamens* 15 in groups of 3 before the petals, filaments dilated. *Staminodes* 5, opposite the sepals. *Anther-lobes* divergent at the base. *Ovary* sessile, 5-celled, cells opposite the sepals, 1–2-ovuled, ovules pendulous; styles conjoined, stigma minute 5-lobed. *Fruit* pyriform, loculicidally 5-valved, 1-seeded by abortion. *Seeds* oblong, netted, pubescent.—**DISTRIB.** A single species, native of Ceylon.

1. **P. verrucosa**, *Thwaites Enum.* 29; *Beddome Flor. Sylvat.* t. 109.

CEYLON; Baticaloa, Jaffna, Trincomalee, *Thwaites*.

Leaves 2–6 by 1–3 in., shining on the upper surface, paler beneath, with stellate pubescence, crenate, base rounded 3-nerved; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Flowers* $\frac{1}{2}$ in. *Flower-buds* ovoid, acute. *Calyx* $\frac{1}{2}$ in., lobes ovate acute as long as the tube. *Petals* and stamens twice the length of the sepals. *Capsule* $\frac{3}{4}$ –1 in.

4. **CHARTACALYX**, Maingay herb.

A tree. *Leaves* alternate, simple, 1-nerved. *Panicle* terminal, few-flowered. *Calyx* campanulate, 5-lobed, lobes valvate accrescent coloured. *Petals* 0. *Stamens* numerous, free, springing from the top of a short gynophore; anthers oblong, 2-celled, cells parallel dehiscing at the sides longitudinally. *Staminodes* 0. *Ovary* stalked, 5-celled; placentas axile; styles consolidated stigmas 5 linear recurved; ovules 2 in each cell, collateral, pendulous from near the apex of the placenta. *Fruit* not seen.—The following is the only known species.

1. **C. accrescens**, *Mast.*; leaves oblong acuminate entire base oblique.

MALACCA, *Maingay*.—**DISTRIB.** Borneo.

Branches rigid, obliquely ascending. *Leaves* 2–4 by $\frac{3}{4}$ – $1\frac{1}{2}$ in., coriaceous, glabrous above, rusty tomentose beneath, base rounded or tapering, 1-nerved, venation arched; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in. *Panicle* stellate-hairy, pedicel 1 in., jointed near the base. *Calyx* $\frac{3}{4}$ in., ultimately 2 in. diam., papery, pink, veins prominent. *Filaments* slender, stellate-hairy, half the length of the calyx. *Ovary* pilose, ovoid, obscurely 5-lobed. *Styles* cylindric, stellate-pilose, longer than the filaments, dividing at irregular heights into 2–5 stigmatic branches.—The cohesion between the styles is apparently but slight, hence they separate one from another at varying heights.

5. **BERRYA**, Roxb.

A tree. *Leaves* alternate, ovate, acuminate, glabrous, base cordate, 5-7-nerved. *Panicles* large, many-flowered, terminal and axillary. *Calyx* campanulate, irregularly 3-5-lobed. *Petals* 5, spatulate. *Stamens* many, inserted on a short torus; anthers didymous, lobes divergent opening lengthwise. *Staminodes* 0. *Ovary* 3-4-lobed, cells, 4-ovuled; style consolidated, stigma lobed; ovules horizontal. *Fruit* loculicidally 3-4-valved, each valve 2-winged. *Seeds* pilose albumen fleshy; cotyledons flat leafy, radicle superior next the hilum.—**DISTRIB.** The following is the only species.

1. **B. Ammonilla**, Roxb. *Hort. Beng.* 42; *Fl. Ind.* ii. 639; *Cor. Pl.* iii. 264; leaves ovate base cordate palmately 5-7-nerved. *Wall. Cat.* 1068; *W. & A. Prodr.* i. 81; *Wight Ill.* t. 34; *Thwaites Enum.* 32; *Beddome Flor. Sylvat.* t. 58.

MALABAR, TRAVANCORE, PEGU, MARTABAN, Wallich &c.; CEYLON.

A large tree. *Leaves* 4-8 by 2½-3 in.; petiole 1½ in. and upwards. *Stipules* ensiform. *Pedicels* 1 in., pubescent. *Calyx* ½ in., downy. *Petals* linear-oblong, twice the length of the calyx. *Filaments* half the length of the petals. *Ovary* ovate; style short, stigma 3-cleft. *Capsule* 6-winged, rounded, wings netted, villose. *Seeds* 1-4 in each cell.

VAR. *mollis*; petiole and under surface of leaves pubescent. *Berrya mollis*, Wall. *Cat.* 1186; *Kurz in Journ. As. Soc. Beng.* 1873, ii. 62.—**ATTRAN.**—The wood is used for building, and is sometimes called Trincomalee wood.

6. **GREWIA**, Linn.

Trees or shrubs more or less stellate-pubescent. *Leaves* entire, 1-9-nerved. *Flowers* axillary, few or more numerous and paniced. *Sepals* distinct. *Petals* 5, glandular at the base, sometimes 0. *Stamens* many on a raised torus. *Staminodes* 0. *Ovary* 2-4-celled, cells opposite the petals, 2-many-ovuled; style subulate, stigma shortly lobed. *Drupe* fleshy or fibrous, entire, or 2-4-lobed; stones 1-4, 1-2-seeded, with false partitions between the seeds. *Seeds* ascending, albumen fleshy or rarely 0; cotyledons flat.—**DISTRIB.** A genus of about 60 species, for the most part confined to the hotter regions of the old world. Some of the Indian species are endemic, others common to tropical Africa, &c. The synonymy of some of the species is extremely involved, and the genus requires a complete re-examination. The structure of the drupes and seeds in particular requires fuller investigation than is possible in herbarium specimens which are often incomplete.

SECT. I. Grewia proper. *Flowers* axillary or terminal. *Fruit* fleshy or crustaceous usually lobed.

* *Inflorescence usually terminal or extra-axillary.*

1. **G. columnaris**, Sm.; *DC. Prodr.* i. 510; shrubby, leaves scabrous oblong shortly acuminate glandular-serrate, cymes extra-axillary and terminal, flower-buds conical sulcate, drupes turbinate 4-lobed bristly. *Wight Ic.* t. 44; *W. & A. Prodr.* i. 76; *Thwaites Enum.* 31; *Dalz. & Gibs. Bomb. Fl.* 26. *G. orientalis*, Vahl *Symb.* i. 34, ex *W. & A. l.c.* *G. pilosa*, Wall. *Cat.* 1112 C, D, E, F, not of Lam. *G. bracteata*, Miq. *Pl. Hohen.* *G. obtusa*, Wall. *Cat.* 1103, partly. *G. carpinifolia*, Wall. *Cat.* 1093.

WESTERN PENINSULA, BENGAL AND CEYLON.—**DISTRIB.** Java, East tropical Africa.

A shrub. *Branches* virgate, stellate-hairy. *Leaves* 2-3 by 1-1½ in., coriaceous, glabrescent, base rounded, 3-nerved, secondary nerves arched; petiole ½-¾ in. *Flowers* white, in terminal corymbose cymes. *Peduncles* twice the length of the petiole, 3-5-flowered, pedicels supported by small subulate deciduous bracts. *Sepals* ½ in., linear, yellow, 3-nerved. *Petals* half the length of the calyx, ovate-lanceolate, entire. *Torus* short, villous. *Ovary* villous. *Drupe* ½ in. diam., purplish; stones 4, 2-celled.

2. ***G. emarginata***, *W. & A. Prodr.* i. 79; shrubby, leaves stellate-hairy above pubescent beneath roundish-obovate cordate gland-toothed, peduncles mostly terminal much longer than the petiole, flower-buds ovate-oblong not striated, drupes glabrescent, stones 4 1-2-seeded. *G. carpinifolia*, *Roth Nov. Sp.* 245, partly; *Wall. Cat.* 1093 B, partly. *G. orientalis*, *Wall. Cat.* 1093 B, *G. involucrata*, *Wall. Cat.* 1093, C.

WESTERN PENINSULA; Mysore, Courtallum, Pulney and Nilghiri Mts., *Wight, &c.* *Leaves* 2-2½ by 1½-2 in., base 3-nerved, secondary nerves not arched, petioles ½ in. *Stipules* subulate. *Peduncle* 1½ in., 3-6-branched, pedicel ¼-½ in. *Bracts* linear-subulate. *Flowers* 1 in. diam. *Sepals* linear-lanceolate. *Petals* linear-oblong, emarginate, shorter than the sepals. *Torus* elongate. *Style* clavate, stigma 4-lobed. *Drupe* the size of a large pea, yellowish, subglobose, turbinate, 4-lobed.

3. ***G. oppositifolia***, *Roxb. Fl. Ind.* ii. 583; a tree, leaves scabrous above pubescent beneath broadly ovate-lanceolate acuminate, cymes umbellate opposite the leaves, drupes 1-4-lobed, stone 1-celled 1-seeded. *Wight Ic. t.* 82; *Wall. Cat.* 1101; *Miq. Fl. Ind. Bat.* i. pt. 2, 204.

Common and indigenous, wild in the N.W. Himalaya, from Jamu to Nipal, ascending to 7000 ft.; also frequently cultivated.

Bark ash-coloured. Herbaceous portions rough with stellate hairs. *Leaves* 3 by 1½ in., distichous, crenate-serrate, lower serratures glandular, base rounded, 3-nerved, secondary nerves scarcely arched, tertiary veins parallel conspicuous; petiole ½ in., pilose. *Stipules* caducous, linear-lanceolate, longer than the petioles. *Peduncles* opposite the leaf, sometimes terminal, rarely axillary, much longer than the petioles; pedicels shorter than the peduncle, clavate, with small bracteoles at the base. *Flower-buds* cylindric, obovate-oblong, pilose sulcate-striate. *Flowers* yellowish. *Sepals* ¾ in., linear, 3-nerved. *Petals* oblong, entire, half the length of the sepals. *Torus* hairy, scarcely longer than the glands. *Ovary* 2-celled, cells 2-ovuled, stigma 2-lobed. *Drupe* glabrescent, blackish, lobes the size of a small pea.—The leaves are used as fodder, the bark for cordage, and the wood for various purposes.

4. ***G. orientalis***, *Linn.; DC. Prodr.* i. 510; shrubby, often scandent, leaves glabrescent elliptic-lanceolate acuminate, peduncles axillary and terminal twice the length of the petiole, petals lanceolate entire, drupe globose scarcely lobed. *Roxb. Fl. Ind.* ii. 586; *Roth Nov. Sp.* 242; *W. & A. Prodr.* i. 76; *Wall. Cat.* 1100 A, B, D, E; *Thwaites Enum.* 31; *Dalz. & Gibs. Bomb. Fl.* 26. *G. obtusa*, *Wall. Cat.* 1103, partly. *G. rhamnifolia*, *Roth Nov. Sp.* 244; *Wall. Cat.* 1100 C. *G. ovalifolia*, *Wight in Wall. Cat.* 1103 B, C. *G. pilosa*, *Wall. Cat.* 1112, partly.

SOUTHERN PROVINCES of the WESTERN PENINSULA, *Wight*; CEYLON.

Branches virgate, thinly stellate-hairy. *Leaves* 3-4 by 1-1½ in., base tapering or slightly cordate, 3-nerved, arch-veined, veins with appressed simple hairs, margins serrulate; petiole ½ in. *Cymes* umbellate; pedicels shorter than the flowers, each with a small subulate bracteole at the base. *Flower-buds* ovoid, pilose, ribbed. *Sepals* nearly 1 in., linear, yellow, pubescent outside. *Petals* half as long as the sepals, lanceolate, entire. *Torus* hispid, short. *Drupe* yellow, wrinkled, the size of a small cherry, pilose; stones 4, 2-3-celled.—The Ceylon specimens are referred with doubt to this species, as I have not seen the fruit.

5. **G. umbellata**, *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 591; shrubby, scandent, leaves glabrescent above thinly stellate-hairy beneath elliptic acuminate, cymes umbellate terminal and axillary, drupe 1-celled 1-seeded. *Wight Ic.* t. 83; *Wall. Cat.* 1084. *G. pedicellata*, *Roxb. Fl. Ind.* ii. 585; *Wall. Cat.* 1084 B.

WESTERN PENINSULA, Concan and Coromandel; EASTERN PENINSULA, Malacca, Penang, and Sincapur, *Maingay, Griffith, &c.*—DISTRIB. Philippines, Sumatra.

Branches virgate, thinly stellate-hairy. *Leaves* 5 by 2 in., base rounded, 3-nerved, veins not prominent, not arched; petiole $\frac{3}{4}$ in. *Peduncle* longer than the petiole, pedicels divergent. *Flower-buds* narrow, oblong, pilose, striated. *Sepals* $\frac{1}{2}$ in. *Petals* narrow, entire, shorter than the sepals, springing from the back of a thickened claw. *Torus* prolonged, terete, pilose. *Drupe* the size of a cherry, stellate-hairy, obscurely lobed, purplish.

6. **G. heterotricha**, *Mast.*; arborescent, leaves scabrous elliptic acuminate crenate-serrate, peduncles opposite the leaves and terminal twice the length of the petiole, buds obovoid, torus elongate sulcate.

WESTERN PENINSULA, in Kurg, *G. Thomson.*

A shrub or small tree? Young shoots stellate-hairy, ferruginous. *Leaves* 4 by 2 in., stellate-hairy; petiole $\frac{1}{2}$ in., densely pilose, hairs simple. *Stipules* subulate, equal to the petiole, with simple hairs. *Peduncles* 3-flowered, stellate-hairy, pedicels shorter than the flower. *Bracts* subulate. *Flowers* 1 in. diam. *Sepals* linear-oblong, 3-nerved. *Petals* lanceolate, half the length of the sepals. *Torus* and ovary clothed with simple hairs. *Anthers* glabrous. *Stigma* clavate, 5-lobed.—The only specimens known to me were gathered by collectors employed by G. Thomson, Esq., of Madras, about the year 1845.

7. **G. populifolia**, *Vahl*; *DC. Prodr.* i. 511; shrubby, leaves glabrous unequally crenate-serrate, base roundish or cuneate, peduncle solitary or twin opposite the leaves, drupe 1-4-lobed, stones 1-4 1-2-celled; *W. & A. Prodr.* i. 80; *Boiss. Fl. Orient.* i. 843; *Wall. Cat.* 1088 B? C? *G. betulæfolia*, *Juss. in Ann. Mus.* iv. 92, t. 2, f. 1; *Roth Nov. Sp.* 249. *G. rigida*, *Ham. in Wall. Cat.* 1088 D.

SINDH, *Stocks, Dalzell, &c.*; PANJAB, *Aitcheson, &c.*; WESTERN PENINSULA, Concan, Nilghiris, &c.—DISTRIB. Afghanistan, Arabia, Tropical Africa, Mauritius.

A much and intricately branched shrub; herbaceous portions more or less stellate-hairy, ultimately glabrescent. *Leaves* $\frac{1}{2}$ –1 $\frac{1}{2}$ by $\frac{1}{4}$ in., coriaceous, multifid, often cuneate-obovate, base 3–5-nerved; secondary nerves obscure, not arched; petiole $\frac{1}{2}$ in. *Peduncles* longer than the petiole. *Sepals* $\frac{1}{2}$ – $\frac{3}{4}$ in., linear-oblong. *Petals* white, notched, shorter than the sepals. *Torus* short. *Ovary* hoary, ultimately glabrescent. *Drupe* yellowish, generally 2-lobed, lobes the size of a small pea, orange-red.—The acid fruit is eaten under the name of "Gingo."

** *Inflorescence axillary very rarely extra-axillary.*

† *Leaves hoary, at least beneath.*

8. **G. excelsa**, *Vahl*; *DC. Prodr.* i. 509; shrubby, leaves glabrous above hoary beneath ovate-oblong or lanceolate acuminate serrulate, peduncles 2–3 axillary much longer than the petiole, petals entire, drupe globose pubescent. *Wall. Cat.* 6307 A; *Roxb. Fl. Ind.* ii. 586. *G. Rothii*, *DC. Prodr.* i. 509; *W. & A. Prodr.* i. 78. *G. bicolor*, *Roth Nov. Sp.* 240, *not of Juss.* *G. salvifolia*, *Roxb. Fl. Ind.* ii. 587; *Wall. Cat.* 1091.

EASTERN BENGAL, ASSAM, SIKKIM, and CHITTAGONG; BUNDELKUND, *Edgeworth*; COROMANDEL, *Roxburgh.*—DISTRIB. Tropical Africa.

Leaves 4–5 by $\frac{1}{2}$ in., finely serrulate, base rounded, 5-nerved, nerves arched transverse ones prominent, tip obtuse or acute; petiole $\frac{3}{4}$ in. *Stipules* linear-ligulate,

longer than the petiole. *Flowers* $\frac{1}{4}$ – $\frac{1}{3}$ in. diam. *Sepals* linear. *Petals* oblong, half the length of the sepals. *Drupe* the size of a pea; nuts 2-celled.—Possibly not specifically distinct from *G. salvifolia*, Heyne. The fruit is agreeable.

9. *G. salvifolia*, Heyne in *Roth Nov. Sp.* 239; leaves glabrescent hoary beneath entire or minutely serrate, peduncles 1–3 axillary clustered longer than the petiole, petals 2-fid, drupe 1–4-lobed. *W. & A. Prodr.* i. 77. *G. bicolor*, Juss. in *Ann. Mus.* iv. 90, t. 50, f. 2; *Boiss. Fl. Orient.* i. 844. *G. araria*, Wall. *Cat.* 6308?

North West provinces from the JHELMUM to NIPAL, Hamilton, &c.; WESTERN PENINSULA, Heyne, &c.—DISTRIB. Tropical Africa.

A shrub or small tree; bark grey, herbaceous portions covered with soft hoary pubescence. *Leaves* $2\frac{1}{2}$ by $1\frac{1}{2}$ in., base 3-nerved, transverse nerves indistinct; petiole $\frac{1}{4}$ in. *Stipules* $\frac{3}{4}$ in., subulate. *Peduncles* 2 in., pedicels $\frac{1}{4}$ in. *Buds* ovate-oblong, striated. *Sepals* $\frac{1}{4}$ in., linear, 3-nerved. *Petals* $\frac{1}{2}$ in., obovate, 2-fid, limb yellow from the back of the thickened claw. *Ovary* pubescent; style as long as the stamens.—Wight and Arnott describe the petals as entire, probably from confounding the present species with *G. Rothii*.

10. *G. orbiculata*, Rottl. in *Nov. Act. Nat. Cur. Berol.* 1803, 205; shrubby, leaves cordate roundish elliptic or oblong pubescent on both surfaces hoary beneath minutely toothed, peduncles tufted longer than the petiole, flower-buds subglobose or oblong, drupes slightly 2-lobed, stones 1–2 2-celled. *Roth Nov. Sp.* 246; *Wall. Cat.* 1085 and p. 237, 1085 C. *G. rotundifolia*, Juss. in *Ann. Mus.* iv. 92, t. 50, f. 3; *Wight Ic.* t. 45; *W. & A. Prodr.* i. 80; *Wall. Cat.* 1085. *G. orbicularis*, *G. Don Gen. Syst.* i. 550. *G. variabilis*, *Wall. Cat.* 1087.

WESTERN PENINSULA; Concan, Malabar, &c.

A shrub; branches virgate. *Leaves* $1-2\frac{1}{2}$ by $\frac{1}{2}-1\frac{1}{2}$ in., subsessile, base often oblique, 5-nerved, nerves arched. *Cymes* umbellate; peduncles pilose, 3-flowered; pedicels shorter than the peduncles, divaricate. *Bracteoles* minute, pinnatifid. *Buds* ovoid oblong striated. *Flowers* yellow, $\frac{1}{2}$ in. diam. *Sepals* linear. *Petals* notched, half the length of the sepals. *Torus* glabrescent, very short. *Ovary* villous. *Drupe* greyish, pilose.—The *G. orbiculata*, of *Wall. Cat.* 1085 D, may prove a distinct species. It has smaller flowers and very small glands to the petals.

11. *G. tillæfolia*, Vahl *Symb.* i. 35; a tree, leaves hoary beneath oblique cordate, stipules leafy falcate acuminate, auricled, flower-buds oval-oblong, drupe 1–4-lobed small subglobose, stones 3–6-celled. *W. & A. Prodr.* i. 80; *Roxb. Fl. Ind.* ii. 587; *Wall. Cat.* 1094; *Dalz. & Gibs. Bomb. Fl.* 26; *Beddome Fl. Sylvat.* t. 108; *Thwaites Enum.* 32. *G. arborea*, *Roth Sp. Nov.* 247. *G. variabilis*, *Wall. Cat.* 1087, partly. *G. subinæqualis*, *Wall. Cat.* 1087 E.

Hot dry forests throughout WESTERN INDIA, ascending to 4000 ft. in the Himalaya. WESTERN PENINSULA; BIRMA, CEYLON.—DISTRIB. East Tropical Africa.

A moderate tree, branches purplish. *Leaves* 4 by 2 in., dentate, base 3–5-nerved, feather veined; petiole $\frac{1}{2}$ –1 in., pubescent, thickened at the top. *Peduncles* 3–10, axillary, tufted, as long as, or longer than, the petiole. *Pedicels* 3, divergent, shorter than the peduncle. *Sepals* $\frac{1}{2}$ – $\frac{1}{3}$ in., oblong. *Petals* oblong, emarginate, half the length of the sepals. *Torus* slender, glabrous. *Drupe* blackish, the size of a small pea.—Fruit eaten by the natives. The stipules form the best distinguishing mark of this species.

12. *G. asiatica*, L.; *W. & A. Prodr.* i. 79; arborescent, leaves roundish coarsely and irregularly toothed subacuminate oblique, stipules subulate ensiform, buds club-shaped, drupes subturbinate with 1 or 2 1-celled nuts. *Roxb. Fl. Ind.* ii. 586; *Wall. Cat.* 1089; *Boiss. Fl. Orient.* i. 844; *Dalz. & Gibs. Bomb. Fl.* 26. *G. subinæqualis*, *DC. Prodr.* i. 511; *Wall. Cat.* 1087 C.

Generally cultivated in India, except in the Gangetic plains and E. Bengal; said to be indigenous in the Salt Range, Poonah, and Oudh. CEYLON.

A small tree, herbaceous portions covered with soft yellowish pubescence. *Leaves* 2-7 in., obliquely cordate, base 5-nerved, smaller nerves not arched, prominent beneath, transverse ones parallel; petiole $\frac{1}{2}$ in., thickened at the top. *Stipules* nearly as long as the petiole. *Peduncles* 2 or more, usually shorter, sometimes longer, than the petioles, dividing into 2 or more divergent pedicels. *Bracts* linear. *Flowers* $\frac{3}{4}$ in. diam. *Sepals* oblong-lanceolate. *Petals* yellow, linear-oblong, half the length of the sepals. *Drupe* globose, 1-2-lobed, pilose, about the size of a pea.—A very variable plant, the following form is usually held to be distinct:—

VAR. *vestita*, Wall. Cat. 1105 (sp.); leaves obovate acuminate obscurely 3-lobed minutely serrate, cymes densely crowded, buds ovoid not striated. *G. asiatica*, Wall. Cat. 1089, partly. *G. elastica*, Royle Ill. t. 22. *G. obtecta*, Wall. Cat. 1114.—Tropical Himalaya, from Garwhal to Sikkim, Pegu.

13. *G. sapida*, Roxb. *Fl. Ind.* ii. 590; shrubby, leaves subsessile ovate or orbicular doubly-serrate pilose above pubescent beneath, stipules linear, peduncles 2-5-flowered, drupes subglobose slightly 4-lobed, stone 2-seeded. Wall. Cat. 1115. *G. nana*, Wall. Cat. 1102. *G. suffruticosa*, Ham. in Wall. Cat. 1102 B, *G. pumila*, Ham. in Don Prodr. 227.

TROPICAL HIMALAYA, from Garwhal to Bhotan, and ASSAM.

A decumbent shrub; stock woody, subterranean, sending up annually a number of herbaceous pubescent shoots, 12-14 in. *Leaves* $1\frac{3}{4}$ in. by 3 in., base 5-nerved, secondary nerves not arched; petiole $\frac{1}{4}$ in. *Stipules* linear-subulate, as long as the petiole. *Peduncles* 2-3, 1 in.; pedicels divaricate, shorter than the petiole. *Flower-buds* oblong. *Flowers* yellow, $\frac{1}{2}$ in. diam. *Sepals* oblong. *Petals* yellow, entire, half the length of the sepals. *Torus* glabrescent. *Drupe* the size of a pea, obscurely lobed.—The shoots are usually burnt by the jungle fires after flowering. Roxburgh describes the petals as 2-toothed, the stone as 1-3-seeded, and the leaves as scabrid.

†† Leaves not hoary beneath.

0 *Drupe* globose, rind crustaceous.

14. *G. scabrophylla*, Roxb. *Fl. Ind.* ii. 584; shrubby, leaves scabrous above pubescent beneath roundish ovate irregularly serrate, peduncles 1-4 axillary equalling the petiole 2-3-flowered, drupe globose tomentose with a crustaceous rind. *G. sclerophylla*, Wall. Cat. 1095; *Wight Ic.* t. 89. *G. Carrea*, Ham. in Wall. Cat. 1095 B. *G. sulcata*, Wall. Cat. 1096. *G. pilosa*, Wall. Cat. 1112, partly. *G. obliqua*, Roxb. *Fl. Ind.* ii. 590? not of Juss.

TROPICAL HIMALAYA; GARWHAL, Falconer; SIKKIM, alt. 2-300 ft., *Hk. f.*; ASSAM, CHITTAGONG, and AVA, Wallich, &c.

A small shrub, herbaceous portions pubescent. *Leaves* 3-6 by 4 in., often slightly lobed, base 3-5-nerved, secondary nerves not arched, prominent beneath; petiole $\frac{1}{2}$ in. *Stipules* subulate. *Cymes* umbellate, pedicels diverging, longer than the peduncles. *Bracteoles* linear-subulate, deciduous. *Flower buds* ovate-oblong, ribbed. *Flowers* $\frac{3}{4}$ in. *Sepals* linear-lanceolate pubescent. *Petals* obovate, white, notched, half the length of the sepals or less. *Torus* short, hispid. *Ovary* hairy, 2-celled, cells 4-6-ovuled. *Drupe* the size of a large cherry, stellate-hairy; stones 4, 1-celled, 1-seeded.

15. *G. carpinifolia*, Juss. in *Ann. Mus.* iv. 91, t. 51, f. 1; arborescent, leaves 3-nerved oval acute thinly stellate-hairy crenate-serrate, peduncles exceeding the short petiole, flower-buds elliptic dilated at the base, anthers smooth, drupe globose glabrescent. *G. pilosa*, Wall. Cat. 1112, partly.

WESTERN PENINSULA, Pondicherry.—DISTRIB. Tropical Africa.

A small tree. *Leaves* 3 by $1\frac{1}{2}$ in., glabrescent above, thinly stellate-hairy along the nerves beneath; petiole $\frac{1}{4}$ in. *Peduncles* 3-flowered, pedicels short. *Flower-buds* pilose. *Sepals* oblong-lanceolate. *Petals* oblong, half the length of the sepals.

16. ***G. pilosa***, Lam. Dict. iii. 43, excl. syn.; shrubby, leaves subsessile scabrous cuneate-obovate or lanceolate, peduncles 1-3 as long as the petiole, drupe hairy 1-4-lobed. *W. & A. Prodr.* i. 78; *Dalz. & Gibs. Bomb. Fl.* 26. *G. carpinifolia*, Roxb. *Fl. Ind.* ii. 587; *Wall. Cat.* p. 237, 1113 C, partly, not of Juss.; *Roth Nov. Sp.* 245, partly. *G. involu-rata*, Wight in *Wall. Cat.* 1093 C. *G. commutata*, DC. *Prodr.* i. 511. *G. flavescens*, Juss. in *Ann. Mus.* iv. 91; *Wall. Cat.* p. 237, 1113 D. *G. bipartita*, *Wall. Cat.* p. 237, 1113 B. *G. scabrida*, *Wall. Cat.* 1113. *G. orientalis*, *Gærtn. Fruct.* ii. t. 106?

CENTRAL AND SOUTHERN INDIA; from GUZERAT to BEHAR, and southwards to MAISOR.—DISTRIB. Tropical Africa.

A small tree or shrub, herbaceous portions rough with stellate hairs. *Leaves* 2-4 by $1-1\frac{1}{2}$ in., scarcely acuminate, unequally serrate, softer beneath, base rounded or subcordate, 3-nerved, secondaries arched; petiole very short, pilose. *Stipules* subulate, acuminate. *Peduncles* axillary, $\frac{1}{4}$ in.; pedicels as long as the peduncle. *Flower-buds* oblong, dilated at the base, constricted in the middle. *Sepals* linear. *Petals* linear, 2-fid, one-third shorter than the sepals. *Torus* glabrous, scarcely exceeding the glands. *Anthers* and style stellate-hairy. *Stigma* 4-parted. *Ovules* numerous. *Drupe* reddish-brown, the size of a large pea, mesocarp fibrous; stones 1-4, 1-3-celled, pitted.—Very great confusion exists in books and herbaria as to the synonymy of this and some nearly allied species.

Several distinct species are called *G. pilosa* in Wallich's herbarium, and the labels have in all probability been shifted; moreover, it sometimes happens that two or three different plants are included under the same letter.

17. ***G. villosa***, Willd. in *Nov. Act. Nat. Cur. Berol.* 1803, 205; shrubby, leaves rugose above villous beneath suborbicular obliquely cordate serrate, serratures ciliate, peduncles very short, drupe 4-stoned rind crustaceous. *DC. Prodr.* i. 512; *W. & A. Prodr.* i. 79; *Wall. Cat.* 6:06; *Dalz. & Gibs. Fl. Bomb.* 25. *G. corylifolia*, *Guill. & Perr. Fl. Seneg.* i. 95, t. 20. *G. orbiculata*, *G. Don Gen. Syst.* i. 551, not of Rottler.

WESTERN AND SOUTHERN INDIA, from SINDH and the PANJAB to TRAYANCOR.—DISTRIB. Cape de Verde Islands, Tropical Africa.

Herbaceous portions covered with long soft hairs. *Leaves* 1-3 in., apex acuminate or rounded, base 5-nerved, nerves prominent villous, secondary nerves not arched; petiole $\frac{1}{2}$ -1 in. *Stipules* broad, leafy. *Flowers* nearly sessile, in close tufts, sometimes opposite the leaves. *Bracts* oblong. *Sepals* oblong, acute, villous. *Petals* dull yellow, oblong, notched, much shorter than the sepals. *Drupe* globose, coppery, pilose, the size of a cherry; stones 4, 1-2-seeded.

00 *Drupe fleshy didymous.*

18. ***G. multiflora***, Juss. in *Ann. Mus.* iv. 89, t. 47, f. 1; shrub or tree, leaves shortly petioled lanceolate glandular-serrate peduncles much exceeding the petiole 3-flowered, flower-buds oblong-clavate, petals entire, drupes 2-lobed. *Miq. Fl. Ind. Bat.* i. pt. 2, 200. *G. sepiaria*, Roxb. *Hort. Beng.* 42; *Fl. Ind.* ii. 589; *Wall. Cat.* 1104, partly. *G. serrulata*, DC. *Prodr.* i. 510. *G. coriacea*, *Garcke in Pl. Hohenack. exsicc.* 1132.

EASTERN BENGAL, ASSAM, the SIKKIM HIMALAYA, and KHASIA Mts., ascending to 4000 ft.; WESTERN PENINSULA, NILGHERI Mts.; SINGAPORE.—DISTRIB. Malay Archipelago, East Tropical Africa.

Branches slender, sparingly hairy. *Leaves* distichous, variable in shape and size, glabrescent, apex sometimes acuminate, base 3-nerved; petiole very short, pilose. *Stipules* linear-subulate, as long as the petiole. *Peduncles* half the length of the

leaves, pilose; pedicels dilated upwards. *Sepals* $\frac{1}{2}$ in., linear-oblong. *Petals* half the length of the sepals, entire. *Drupe* the size of a small pea, purplish, glabrescent; stones 1-seeded.—Doubtful if distinct from *G. lævigata*; used as a hedge plant.

19. *G. lævigata*, Vahl *Symb.* i. 34; arborescent, leaves shortly petioled glabrescent tapering to both ends acuminate serrate, peduncles much exceeding the petiole, flower-buds oblong obtuse, drupe 2-lobed. *W. & A. Prodr.* i. 77; *Wall. Cat.* 1086 H; *Miq. Fl. Ind. Bat.* i. pt. 2, 199. *G. ovalifolia*, Juss. in *Ann. Mus.* iv. 90. *G. didyma*, Roxb. *Fl. Ind.* ii. 591; *Wall. Cat.* 1086, partly. *G. disperma*, Rottl. in *Spreng. Syst.* ii. 579. *G. mollococca*, Ham. in *Wall. Cat.* p. 237, 1086 F. *G. Lalpeta*, Ham. in *Wall. Cat.* p. 237, 1086 G.

EASTERN and SOUTHERN INDIA, from NIPAL, SIKKIM, and the KHASIA Mts., through both PENINSULAS, AYA, and MARTABAN.—DISTRIB. Tropical Africa, Malay Islands, Australia.

Herbaceous portions thinly stellate-hairy. *Leaves* $3\frac{1}{2}$ – $4\frac{1}{2}$ by $1\frac{1}{4}$ – $1\frac{3}{4}$ in., 3-nerved, nerves pilose beneath, secondaries arched; petiole $\frac{1}{2}$ in. *Stipules* linear-subulate. *Buds* ovoid-oblong, striated, as long as the petiole. *Peduncles* 2 or 3 together, 2–3-flowered. *Bracts* linear-subulate. *Sepals* $\frac{1}{2}$ – $\frac{3}{4}$ in., 3-nerved. *Petals* oblong-lanceolate, entire, yellow, half the length of the sepals. *Torus* glabrous, short. *Style* longer than the stamens. *Drupe* smooth, 1–4-lobed, the size of a small pea, black when ripe; stones 1-celled.—Closely allied to *G. multiflora*, but has larger flowers.

000 *Drupes* fleshy 1–4-lobed.

20. *G. Ritchiei*, Mast.; arboreous, leaves glabrescent ovate-lanceolate glandular-serrate 3-nerved, peduncles cymose axillary and terminal, buds oblong subclavate, torus as long as the entire petals sulcate, drupe deeply 4-lobed.

CONCAN, *Stocks*; WESTERN GHATS, *Ritchie*.

Young branches stellate-hairy. *Leaves* 3 by $1\frac{1}{2}$ in., coriaceous, glabrous above, thinly stellate-hairy beneath, base rounded, smaller nerves arching, petiole pilose, $\frac{1}{2}$ – $\frac{1}{3}$ in. *Peduncles* half as long as the leaves, pedicels pilose. *Sepals* linear-oblong. *Petals* white, narrow-pointed, shorter than the sepals. *Style* exceeding the stamens. *Drupe* purplish, $\frac{1}{2}$ in. diam.; stones 1-seeded.—Allied to *G. columnaris*, but differs in the oblong buds, very long torus, and deeply lobed fruit.

21. *G. bracteata*, Roth *Nov. Sp.* 243; shrubby, leaves glabrescent scabrous beneath oval-lanceolate, peduncles equalling the short petioles, drupe 4-lobed, stones 2–3-celled. *W. & A. Prodr.* i. 76. *G. obtusa*, Wall. *Cat.* 1103, partly.

WESTERN PENINSULA, in the Carnatic, *Heyne*; CEYLON.

Leaves 3–4 by $1\frac{1}{2}$ – $1\frac{3}{4}$ in., somewhat oblique, serrate, base rounded, 3-nerved, secondaries arched, with straight hairs along the nerves beneath; petiole $\frac{1}{2}$ in. *Peduncles* solitary or twin, axillary, 3-flowered. *Bracts* broad, pilose, as long as the peduncle. *Buds* conical or ovoid, pilose, sulcate. *Sepals* linear, covered with golden down. *Petals* much shorter than the sepals, oblong, entire, recurved. *Torus* prolonged beyond the glands. *Drupe* shrivelled when dry, the size of a cherry, covered with yellow hairs.—Some specimens, labelled as from Assam, but probably from the Calcutta Bot. Gardens, are slightly more scabrous.

22. *G. scabrida*, Wall. *Cat.* 1113, partly; shrubby, leaves pilose or glabrescent elliptic acute dentate, peduncles axillary cymose, much longer than the petiole, flower-buds cylindric-oblong ribbed, torus longer than the glands, drupe 4-lobed. *Kurz in Journ. As. Soc. Beng.* 1873, ii. 63. *G. pilosa*, Wall. *Cat.* 1112, partly. *G. ferruginea*, Hochst. in *A. Rich. Fl. Abyss.* i. 87? *G. odorata*, Blume ex Walp. *Rep.* i. 361. *G. acuminata*, Juss. in *Ann. Mus.* iv. 91, t. 48.

EASTERN PENINSULA, from Tenasserim, *Helper*, to Malacca.—DISTRIB. Malay Archipelago, West Tropical Africa, Abyssinia.

A climbing shrub? *Branches* rusty stellate-hairy. *Leaves* 4-6 by 2-2½ in., base rounded, 3-nerved, transverse nerves prominent; petiole ½ in., rusty tomentose. *Stipules* subulate-lanceolate. *Peduncle* 3-4 times longer than the petiole, floccose-tomentose. *Sepals* ¾ in. and upwards, pilose. *Petals* oblong, entire or erose, less than half the length of the sepals, blade from the back of a thick glandular claw. *Torus* villous, angular, sulcate. *Drupe* glabrescent, the size of a cherry, purplish, mesocarp fibrous; stones 1-seeded.—Variable in size of parts, and in quality of pubescence.

23. **G. abutilifolia**, *Juss. in Ann. Mus.* iv. 92; arboreous, leaves scabrous roundish base cordate or rounded irregularly toothed or lobed, peduncles clustered axillary half the length of the petiole, petals entire, drupe 1-4-lobed pubescent. *W. & A. Prodr.* i. 79; *Wall. Cat.* 1092; *Dalz. & Gibs. Bomb. Fl.* 26. *G. aspera*, *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 591; *Wall. Cat.* 1092 B, C, D, E. *G. macrophylla*, *G. Don Gen. Syst.* i. 549. *G. asiatica*, *Wall. Cat.* 1089, partly, not of others.

WESTERN PENINSULA, from the Circars and Kurg to Malabar.—DISTRIB. Java.

A small tree, herbaceous portions scabrid, stellate-hairy. *Leaves* 3-4 by 2½-3 in., thinly stellate-hairy on both surfaces, base 3-nerved, smaller nerves parallel, straight; petiole ½ in. *Cymes* contracted, peduncles 3-4-flowered. *Buds* oblong, pilose. *Flower* ¾ in. diam. *Sepals* ½ in., oblong. *Petals* much shorter than the sepals, oblong, entire. *Ovary* hispid; style as long as the stamens. *Drupe* yellow, subglobose or turbinate, obscurely 4-lobed, the size of a large pea; stones 4 or fewer, 1-2-celled.

24. **G. diplocarpa**, *Thwaites Enum.* 31; shrubby, leaves oblong-lanceolate acuminate crenate-serrate, peduncles 3-flowered as long as the petiole, drupe 4-lobed pilose.

CEYLON; Matturatte and Oova, alt. 3000 ft., *Thwaites*.

Herbaceous portions clothed with simple appressed rigid hairs. *Branches* purplish. *Leaves* 3-4 by 1½-1¾ in., tapering at the base, glabrescent or sparingly pilose along the nerves, secondary nerves not arched; petiole ¼-½ in., hairy. *Stipules* subulate, lanceolate. *Peduncles* axillary, pedicels shorter than the peduncle. *Bracts* subulate, as long as the pedicels. *Buds* cylindric-oblong. *Sepals* linear. *Petals* lanceolate, acute, half the length of the sepals, limb scarcely longer than the claw. *Stigma* 4-lobed.

25. **G. microstemma**, *Wall. Cat.* 1109; shrubby, leaves scabrous broadly lanceolate acuminate coarsely and unequally serrate, cymes tufted, buds oblong striated, drupe subglobose 1-4-lobed. *Kurz in Journ. As. Soc. Beng.* 1873, ii. 63.

PEGU and BIRMA on the Irrawaddy, and at Prome, *Wallich, Griffith, &c.*

Young shoots scabrous; branches terete, stellate-hairy. *Leaves* 5-7 by 2½ in., base rounded, 3-nerved, secondary nerves not arched; petiole ½ in., hairy. *Stipules* subulate-acuminate, as long as the petiole. *Cymes* axillary, many-flowered; peduncles very short. *Buds* oblong, striated. *Sepals* ½ inch, linear, 1-nerved. *Petals* linear, subentire, shorter than the sepals. *Torus* glabrous, scarcely exceeding the claw of the petals. *Drupe* the size of a large pea, purplish, glabrescent.

26. **G. humilis**, *Wall. Cat.* 1110; shrubby, leaves downy ovate or roundish acute, petiole and peduncle very short, drupe turbinate obscurely lobed. *G. pilosa*, *Wall. Cat.* p. 237, 1112 *G. G. retusifolia*, *Kurz in Journ. As. Soc. Beng.* 1872, ii. 294.

AVA, on the Irrawaddy, *Wallich*; BIRMA, *Kurz*.

Branches downy. *Leaves* 1½-2 by 1-2 in., 3-5-nerved, feather-veined, secondary nerves transverse parallel; petiole very short. *Stipules* linear. *Peduncle* axillary, hairy, slightly longer than the petiole, dividing above into 2 or 3 short diverging pedi-

cells. *Ripe fruit* wrinkled, glabrescent, on a very short hispid torus.—Near *G. hirsuta*, but differing in the broader leaves and smaller fruit.

27. *G. hirsuta*, *Vahl Symb.* i. 34; shrubby, leaves glabrescent or pilose above densely tomentose beneath lanceolate acuminate, peduncles 1-3, drupe subglobose 4-lobed. *W. & A. Prodr.* i. 78; *Roxb. Fl. Ind.* ii. 587; *Wight Ic.* t. 76; *Thwaites Enum.* 31; *Wall. Cat.* p. 237, 1091 B. *G. pilosa*, *Roxb. Fl. Ind.* ii. 588, not *Lam.* *G. salvifolia*, *Wall. Cat.* 1091, not of *Roth.* *G. helicterifolia*, *Wall. Cat.* 1090 C; *Thwaites Enum.* 31. *G. Roxburghii*, *G. Don Gen. Syst.* i. 548, excl. syn. *G. saxatilis*, *Ham. in Wall. Cat.* 1091 E. *G. Sulcoria*, *Ham. in Wall. Cat.* 1090 D. *G. longifolia*, *Ham. in Wall. Cat.* 1090 E.

Southern provinces of the WESTERN PENINSULA; CEYLON.

Branches stellate-hairy. *Leaves* distichous, $2\frac{1}{2}$ -3 by $1\frac{1}{4}$ -1 $\frac{1}{2}$ in., base 3-nerved, oblique, rounded, irregularly serrate, wrinkled; petiole $\frac{1}{2}$ in., hairy, thickened at the top. *Stipules* linear, as long as the petiole. *Peduncles* 1-3, axillary, 2-4-flowered, pedicels very short. *Flower-buds* oblong, obtuse, pilose. *Flower* $\frac{1}{2}$ in. diam., white, subsequently yellow. *Sepals* lanceolate. *Petals* oblong, entire, half as long as the sepals. *Drupe* glabrescent, the size of a small cherry; stones 4, 2-celled.—Roxburgh's description of the stones of this plant being 1-celled is probably erroneous, as shown by Wight and Arnott.

28. *G. polygama*, *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 588; shrubby, leaves almost sessile narrow velvety beneath, flowers polygamous, drupe 4-lobed. *W. & A. Prodr.* i. 78 under *G. hirsuta*; *Wall. Cat.* p. 237, 1090 B. *Dalz. & Gibs. Bomb. Fl.* 26. *G. helicterifolia*, *Wall. Cat.* 1090, partly *Thwaites Enum.* 31. *G. viminea*, *Wall. Cat.* 1111?. *G. lanceolata*, *Herl Heyne*. *G. lancifolia*, *Grah. Cat. Bomb. Pl.* 21. *G. hirsuta*, *Wall. Cat.* p. 237, 1090 C. *G. angustifolia*, *Wall. Cat.* 1106?. *G. biloba*, *Wall. Cat.* 1107?. ?*G. lanceæfolia*, *Roxb. Fl. Ind.* ii. 586.

North Western India and along the Himalāya, from the SALT RANGE to NIPAL ascending to 4000 ft.; CONCAN, PEGU, CEYLON.—DISTRIB. North Australia.

Herbaceous portions pubescent or thinly pilose; branches spreading. *Leaves* distichous, 3-4 by $\frac{1}{2}$ - $\frac{3}{4}$ in., lanceolate, very acute, serrate, base 3-nerved, nerves not arched, secondary nerves transverse, parallel. *Stipules* subulate. *Peduncles* 1-5, axillary, about half the length of the leaf; pedicels 2-3, divergent, shorter than the peduncle. MALE fl. *Sepals* $\frac{1}{2}$ - $\frac{1}{4}$ in. diam., linear, longer than the oblong entire petals. *Stamens* numerous. HERMAPHRODITE fl. *Ovary* very hairy, shortly stipitate. *Drupe* $\frac{1}{2}$ in. diam., hairy, brownish; stones 4, 1-seeded.

SECT. II. *Omphacarpus*. *Inflorescence* terminal, or terminal and axillary. *Flowers* involucrate. *Drupe* with a corky or fibrous rind.

29. *G. fibrocarpa*, *Mast.*; arborescent, young shoots densely covered with brown hairs, leaves scabrous above pilose beneath, stipules laciniate, inflorescence terminal, drupe 1-celled globose tomentose outside fibrous within.

MALACCA, Maingay, Griffith.

A tree; herbaceous portions tomentose. *Leaves* 5-7 by $1\frac{3}{4}$ -2 $\frac{1}{2}$ in., somewhat oblique, minutely serrulate, base 3-5-nerved, nerves prominent, secondary distant; petiole $\frac{1}{2}$ in., densely hairy. *Stipules* nearly as long as the petiole, ovate, laciniate, concave. *Flowers* numerous, in terminal cymes; peduncles longer than the petiole; pedicels divergent. *Bracts* oblong, entire, $\frac{1}{2}$ - $\frac{1}{4}$ in. *Sepals* linear-oblong, very pilose, $\frac{1}{4}$ in. *Petals* linear-oblong, half the length of the sepals. *Torus* as long as the glands of the petals. *Drupe* 1 by $\frac{3}{4}$ in., stone 1-seeded.

30. *G. globulifera*, *Mast.*; shrubby, herbaceous portions floccose tomentose, leaves glabrescent oblong acuminate entire, base rounded 3-nerved, flower-heads globose, drupe 1-celled, stone cartilaginous.

MALACCA, Griffith, Maingay.

Leaves 8 by 3 in., glabrescent or thinly stellate-hairy, nerves prominent beneath, secondary nerves distant; petiole 1 in., thickened at the end, tomentose. *Stipules* caducous. *Inflorescence* terminal, floccose-tomentose; cymes half the length of the leaves, ultimate pedicels with 3 ovate entire bracts supporting as many flowers. *Buds* oblong. *Sepals* linear-oblong, $\frac{1}{2}$ in., tomentose. *Petals* notched, dilated at the base, shorter than the sepals. *Torus* not much longer than the petaline glands. *Drupe* 1 in., furfuraceous-tomentose, crustaceous, fibrous in the middle; stone 1-celled, 1-seeded.

31. **G. calophylla**, Kurz in *Andaman Report*, App. B, iii.; shrubby, leaves glabrous ovate-lanceolate acuminate, base rounded, drupe 2-celled.

ANDAMAN ISLES, Kurz; MALACCA? Maingay.

Leaves 6-7 by 3 in., coriaceous, entire, 3-nerved, secondary nerves distant; petiole $\frac{1}{2}$ - $\frac{1}{4}$ in. *Inflorescence* terminal, pedicels articulate. *Flower-buds* cylindric, hoary, striated. *Sepals* linear-oblong. *Petals* shorter than the sepals. *Drupe* $\frac{3}{4}$ by $\frac{1}{2}$ in., obovate, tapering at the base into a stalk, coriaceous and glabrous externally, fibrous within; stones 2, 1-celled.—Kurz suggests (*Flora* 1872, 397) that *Inodaphnis lanceolata*, Miq. *Flor. Ind. Bat. Supp.* i. 357, from Sumatra is this plant.

32. **G. latifolia**, Mast.; a tree, leaves glabrescent above stellate-hairy beneath oblong acuminate inequilateral entire tapering at the base sub-3-nerved, inflorescence terminal fulvo-tomentose, drupe 1-celled.

MALACCA, Maingay.

Leaves 7-8 by $3\frac{1}{2}$ in.; petiole $\frac{1}{2}$ in., pilose. *Inflorescence* cymose, peduncles half the length of the leaves, pedicels divaricate. *Drupe* ovoid, 1 by $\frac{3}{4}$ in., glabrous, rind yellow, crustaceous, middle coat fibrous; stone 1-celled, 1- or more-seeded.—I have not seen flowers of this species, which, however, appears quite distinct.

33. **G. laurifolia**, Hook. ms.; shrubby, leaves glabrous oblong sub-acuminate mucronate entire, inflorescence pubescent terminal and axillary.

MALACCA and PENANG, Maingay, Griffith, &c.—DISTRIB. Borneo.

A shrub or tree? *Branches* terete, glabrous. *Leaves* 4-6 by $1\frac{3}{4}$ in., shining, base 3-nerved, secondary nerves very distant; petiole 1 in. *Cyme* shorter than the leaves. *Involucre* of 3 ovate dentate bracts. *Sepals* 5, pubescent. *Petals* 5, or fewer by abortion, sometimes absent. *Drupe* $\frac{1}{2}$ in., globose, yellow, 1-lobed by abortion, tapering below into a stalk of nearly equal length to itself, fibrous within; stone 3-celled. *Seed* 1 by abortion.—Fruit agreeable subacid (Maingay).

SECT. III. **Microcos**. *Inflorescence* terminal, in panicked cymes. *Flowers* involucrate. *Drupe* entire, fleshy (unknown in *G. sinuata*).

34. **G. sinuata**, Wall. *Cat.* 1108; shrubby, branches spreading glabrescent, leaves ovate obtuse sinuate, stipules entire as long as the very short petiole.

MARTABAN and TENASSERIM, Wallich, Griffith, &c.

Branches slender, rigid, widely spreading, thinly stellate-hairy when young. *Leaves* 2 by 1 in., glabrous, coriaceous, base rounded, scarcely 3-nerved, secondary nerves straight, apex obtusely acuminate; petiole $\frac{1}{2}$ - $\frac{1}{4}$ in. *Stipules* subulate, as long as the petiole. *Cymes* at the ends of the branches. *Buds* obovoid, longer than the pedicels, hoary. *Sepals* oblong. *Petals* oblong, entire, half the length of the sepals. *Torus* as long as the glands. *Fruit* not seen.

35. **G. Microcos**, L.; DC. *Prodr.* i. 510; shrubby, leaves glabrescent ovate or obovate-lanceolate serrulate acuminate, stipules subulate-lanceolate. W. & A. *Prodr.* i. 81; Wall. *Cat.* 1098; Wight *Ill.* t. 33; *Thuwaites Enum.* 32; Miq. *Fl. Ind. Bat.* i. pt. 2, 202; Dalz. & Gibs. *Bomb. Fl.* 26. *G. ulmifolia*, Roxb. *Hort. Beng.* 42; *Fl. Ind.* ii. 591; Wall. *Cat.* 1098, 1, 2, 3, and

p. 237, 1098 H; *Wight Ic.* t. 84. *G. affinis*, *Lindl. in Trans. Hort. Soc.* vi. 265. *G. begonifolia*, *Wall. Cat.* 237, 1098 D. *G. glabra*, *Jack. Mal. Misc.* i. p. 14, *ex Hook. Bot. Misc.* i. 282. *Microcos paniculata*, *L. ex W. & A. Prodr.* i. 81; *Wall. Cat.* p. 237, 1098 E, F. *M. mala*, *Ham. in Trans. Linn. Soc.* xiii. 549. *M. Stauntoniana*, *G. Don Gen. Syst.* i. 551.—*Rheede Hort. Mal.* i. t. 56.

EASTERN BENGAL; Khasia Mts., ascending to 4000 ft.; CHITTAGONG, BIRMA, and MARTABAN; WESTERN PENINSULA, Mysore, &c.; CEYLON.—DISTRIB. Java, China.

Leaves distichous, 5–6 by $1\frac{1}{2}$ in., subcoriaceous, glabrous, or more or less stellate-hairy beneath, base 3-nerved; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Stipules* entire, half the length of the leaves. *Cymes* terminal, peduncles pubescent, pedicels hispid divergent. *Bracts* subulate. *Flowers* 2 or 3 together within the bracts. *Sepals* oblong, pubescent. *Petals* oblong, entire or slightly emarginate, thrice shorter than the sepals. *Drupe* the size of a pea, purplish, glabrous; stone hairy, 3-celled.

VAR. rugosa; leaves bullate. *G. rugosa*, *Wall. Cat.* 1098 β . *Ardis rugosa*, *Lour. Fl. Coch.* 409.—Pegu.

36. *G. paniculata*, *Roxb. Fl. Ind.* ii. 591; shrubby, leaves pubescent beneath oblong acuminate serrulate base cuneate, petiole short, stipules 2-partite, drupes 1–4-lobed obovoid. *Wall. Cat.* 1097, partly; *Miq. Fl. Ind. Bat.* i. pt. 2, 203. *G. Blumei*, *Hassk. Tijdschr. Nat. Gesch.* xii. 130; *Miq. Fl. Ind. Bat.* i. pt. 2, 203. *Microcos tomentosa*, *Smith in Rees Cycl.* *G. affinis*, *Hassk. Cat. Hort. Bog.* 207, not of *Lindl.*

MALACCA and PENANG, *Hunter, Wallich, Maingay*.—DISTRIB. Java, Philippines, Siam.

A tree? or shrub. *Leaves* 6 by $2\frac{1}{2}$ in., base 5-nerved; petiole $\frac{1}{2}$ in., pilose. *Stipules* nearly equalling the petiole. *Cymes* terminal, half the length of the leaves, pedicels rusty-floccose. *Bracts* divided. *Buds* subglobose or turbinate. *Sepals* oblong. *Petals* entire, much shorter than the sepals. *Fruiting-pedicels* recurved. *Drupe* the size of a large pea, pilose; stones 1-celled.

In addition to the above species, *Beddome* mentions a *G. umbellifera*, *Bedd.*, from South Canara, with the following imperfect description: "Leaves oblong-ovate, very suddenly pointed asperous, heads of flowers on long stalks axillary or supra-axillary." The same author describes in *Linn. Trans.* xxv. 210, a species which he calls *G. acuminata* (not of *Juss.*), but of which I have seen no specimen. It is described as a "small tree with glabrous shoots; leaves 4–6 by 2 in. oblong acuminate entire, petiole $\frac{1}{4}$ in., stipules small subulate; peduncles very short lateral or axillary 2–5-flowered bracteolate; sepals covered with ash-coloured pubescence."

7. COLUMBIA, Pers.

Trees or shrubs. *Leaves* simple, usually oblique. *Flowers* clustered, clusters in terminal panicles. *Sepals* 5, distinct. *Petals* 5, glandular at the base. *Stamens* indefinite, free, springing from a raised torus. *Ovary* 3–5-celled, cells 2–4-ovuled; style subulate, entire. *Capsule* roundish 3–5-winged, 3–5-coccous, cocci indehiscent 1-seeded. *Seed* albuminous; cotyledons flat.—DISTRIB. A genus of about 5 species, natives of Tropical Asia.

1. *C. floribunda*, *Wall. in Voight Cat. Hort. Calc.* 128; leaves scabrous above puberulous beneath oblong acute spinuloso-denticulate base cordate. *Kurz in Journ. As. Soc. Beng.* 1873, ii. 63. *Glossospermum*? *quinque-alatum*, *Wall. Cat.* 1154 and 7841.

BIRMA, at Taong Dong, *Wallich*; Ava, Martaban, *Kurz*.

A shrub; younger portions scabrid, stellate-hairy. *Leaves* 5 by 3 in., 3–7-nerved, petiole 1 in., floccose-tomentose. *Flowers* small. *Sepals* $\frac{1}{10}$ in., oblong, hoary externally. *Petals* oblong-spathulate, as long as or longer than the sepals. *Style* stellate-hairy. *Fruit* $\frac{3}{4}$ –1 in. diam., 3-winged, stellate-hairy, separating when ripe into 3–5 indehiscent 1-seeded cocci.

2. **C. merguensis**, *Planch. ms.*; leaves lanceolate acuminate serrate 1-3-nerved scabrous above puberulous beneath.

TENASSERIM; at Mergui, *Griffith*.

Leaves 6-8 by 2 in.; petiole $\frac{1}{2}$ in. Fruit $1\frac{1}{2}$ in. diam., downy, 3-winged.—Imperfect specimens only seen.

8. **ERINOCARPUS**, Nimmo.

A tree. Leaves long-petioled, roundish-cordate, toothed, 5-7-nerved, sometimes 3-lobed. Flowers large, yellow, in large terminal panicles. Sepals 5, distinct. Petals 5, clawed. Stamens numerous, springing from a raised torus, free, or slightly united at the base. Ovary 3-celled, cells 2-ovuled; style filiform, stigma minute. Fruit indehiscent, woody, triangular, 3-winged, spiny, 1-celled by abortion. Seed solitary, pendulous, albumen fleshy; cotyledons ovate, flat.—The only species

1. **E. Nimmoanus**, *Grah. Cat. Bomb. Pl.* 21; *Beddome Flor. Sylvat.* t. 110; *Dalz. & Gibs. Bomb. Fl.* 27.

WESTERN PENINSULA; the Concan and Dekkan, *Stocks, &c.*

Leaves 4 by $4\frac{1}{2}$ in., glabrous; petiole 1-4 in. Stipules caducous. Bracts 6-8 in., tomentose, ovate-oblong. Flower-buds oblong. Flower $\frac{3}{4}$ in. diam. Fruit 2 by $1\frac{1}{2}$ in.

9. **TRIUMFETTA**, Linn.

Herbs or undershrubs, generally more or less covered with stellate hairs. Leaves serrate, simple or lobed. Flowers yellowish, in dense cymes. Sepals 5, oblong, concave. Petals 5. Stamens 5-35, springing from a fleshy, lobed, glandular torus. Ovary 2-5-celled, cells 2-ovuled; style filiform, stigma 5-toothed. Capsule globose or oblong, spiny or bristly, indehiscent or 3-6-valved. Seeds 1-2 in each cell, pendulous, albuminous; embryo straight, cotyledons flat.—DISTRIB. A genus of about 40 very variable species, mostly tropical weeds.

* Fruit globose rarely ovoid.

1. **T. tomentosa**, *Bojer in Ann. Sc. Nat. ser. 11* xx. 103; herbaceous or suffruticose more or less downy, leaves variable. fruit globose covered with straight spines. *Mast. in Oliv. Flor. Trop. Afr.* i. 258. *T. ovata*, *DC. Prodr.* i. 507. *T. pilosa*, *Wall. Cat.* 1080. *T. pilosa*, var. α , *Thwaites Enum.* 31. *T. vestita*, *Wall. Cat.* 1078, 1, 2. *T. indica*, *Ham. in Wall. Cat.* 237, 1078 D; *W. & A. Prodr.* i. 74. *T. oblonga*, *Wall. in Don Prodr.* 227.

EASTERN BENGAL; Silhet, *Wallich*; SIMLA, *Govan*; ASSAM, *Griffith*; CEYLON.—DISTRIB. Mauritius, Madagascar, East Tropical Africa, West Indies?

Stem hispid. Leaves 4 by 3 in., thinly stellate-hairy above, pubescent beneath, ovate, acuminate, sometimes lobed, crenulate, base rounded, 5-7-nerved, upper obliquely lanceolate, serrate, 3-nerved; petiole about 2 in. Stipules lanceolate. Flowers yellow, in interrupted spikes. Sepals apiculate, densely stellate-hairy. Stamens 5-7. Fruit the size of a large pea, hispid, spines ciliate along the lower edge, glabrous along the upper, with a straight transparent bristle-point.—It is not quite certain that the African and Indian plants are specifically identical. Perhaps only a woolly state of *T. pilosa*.

2. **T. pilosa**, *Roth Nov. Sp.* 223; herbaceous, bristly, bristles bulbous at the base, lower leaves lobed upper ovate or ovate-lanceolate unequally toothed, fruit globose tomentose covered with long hooked spines which are glabrous along the upper hispid along the lower edge. *W. & A. Prodr.* i. 74. *T. pilosa*, var. β , *Thwaites Enum.* 31; *Dalz. & Gibs. Bomb. Fl.* 25.

T. tomentosa, Wall. Cat. 1078 C. *T. glandulosa*, Heyne herb.; Wall. Cat. 1077, 5. *T. polycarpa*, Wall. Cat. 1079. *T. oblongata*, Link. Enum. Pl. Hort. Ber. ii. 5; Wall. Cat. 1077, 1, 2, 3.

Throughout Tropical India, from NIPAL and KUMAON to AYA and MALACCA, TRAVANCOR, and CEYLON.—DISTRIB. Abyssinia, West Tropical Africa.

Upper leaves $3\frac{1}{2}$ –4 by $2\frac{1}{4}$ in., lower 3-lobed, stellate-hairy on both sides; petiole $\frac{3}{4}$ in., villous. *Stipules* subulate-aristate, shorter than the petiole. *Peduncles* shorter than the petiole. *Flowers* $\frac{3}{4}$ in., yellow. *Sepals* linear, apiculate. *Petals* oblong-spathulate, scarcely shorter than the sepals, ciliate at the base. *Stamens* about 10. *Fruit* (including the spines) about the size of a cherry, 4-celled, 8-seeded.

3. ***T. glabra***, Herb. Miss.; W. & A. Prodr. i. 75; suffruticose stem pubescent, leaves subcordate 3-lobed 7-nerved, fruit globose covered with hooked spines ciliated for nearly their whole length.

WESTERN PENINSULA; Canara, at Balticalo, Rottler.

Leaves $2\frac{1}{2}$ by 2 in., glabrous, lobes coarsely and irregularly toothed, slightly cuspidate. *Flowers* in terminal leafless clusters. *Sepals* apiculate. *Petals* oblong, glabrous at the base. *Stamens* 30–35 (W. & A.), filaments glabrous. *Fruit* slightly hairy.—Differs from *T. semitriloba* in the number of stamens and in the larger fruit.

4. ***T. rhomboidea***, Jacq.; DC. Prodr. i. 507; glabrous or pubescent, leaves polymorphous, fruit small globose or ovoid pubescent and with hooked spines. *T. angulata*, Lam. Dict. iii. 41; Wight Ic. t. 320; W. & A. Prodr. i. 74; Thwaites Enum. 31; Dalz. & Gibs. Bomb. Fl. 25; Wall. Cat. 1075, 2, C; Miq. Fl. Ind. Bat. pt. i. 197. *T. angulata*, β . *acuminata*, Wall. Cat. 1075 β . *T. Bartramia*, Roxb. Fl. Ind. ii. 463; Wall. Cat. 1075, D, E. *T. trilocularis*, Roxb. Fl. Ind. ii. 462; Wall. Cat. 1083. *T. vestita*, Wall. Cat. 1078, in part.

Throughout tropical and subtropical INDIA and CEYLON, ascending to 4000 ft. in the Himalaya.—DISTRIB. Malay Islands, China, Tropical Africa.

Herbaceous or suffruticose. *Leaves* ovate rhomboid or cordate, 3–7-nerved, apex acute or somewhat 3-lobed, serrate, variable in amount and quality of pubescence. *Flowers* $\frac{1}{4}$ in., yellow, in dense cymes. *Pedicels* short. *Flower-buds* oblong, club-shaped, apiculate. *Sepals* oblong, apiculate. *Petals* oblong, ciliate at the base. *Stamens* 8–15. *Capsule* the size of a small pea, albido-tomentose between the spines, spines hooked, glabrous or ciliated.—Some of the forms of this protean species are superficially so different that they may be mistaken for distinct species. On examination, however, of large suites of specimens from various localities, it will be found that the forms merge one into the other. The same variability occurs in Tropical Africa and elsewhere—see Flora of Trop. Afr. i. 257.

5. ***T. rotundifolia***, Lam. Dict. iii. 421; leaves suborbiculate glabrescent above tomentose beneath, flowers in interrupted racemes, fruit globose pubescent, spines conical subulate hooked pubescent. W. & A. Prodr. i. 75; Roth Nov. Sp. 222; Wall. Cat. p. 237, 1076 B, C, D, E; Miq. Fl. Ind. Bat. i. pt. 2, 196; Dalz. & Gibs. Bomb. Fl. 25. *T. suborbiculata*, DC. Prodr. i. 506. *T. orbiculata*, Koenig in Roxb. Hort. Beng. 36. *T. bilocularis*, Wall. Cat. 1081.

WESTERN PENINSULA and CENTRAL INDIA, from Bandelkhand, Edgeworth, to Maisor, PEGU, Wallich.

Suffruticose, roughish. *Leaves* $1\frac{1}{2}$ in., coriaceous, unequally serrate, lower serratures thickened, rugose and glabrescent above, cream-coloured and pubescent beneath; petiole $\frac{1}{2}$ in. *Sepals* apiculate, albido-tomentose. *Petals* oblong, ciliate at the base. *Stamens* 15–25. *Fruit* globose, the size of a pea, pubescent, spines dilated at the base.—Possibly only a form of *T. rhomboidea*, but having larger fruits and the spines wider at the base.

6. **T. semitriloba**, Linn.; DC. *Prodr.* i. 507; herbaceous or suffrutescent, pubescent villous or glabrescent, leaves variable, fruit globose prickly, prickles hooked shaggy or ciliated scarcely dilated at the base. Wall. *Cat.* 1075, partly.

TENASSERIM; at Tavoy, Gomez.—DISTRIB. A tropical weed.

Stem hispidulous. Leaves cordate-ovate, sub-3-lobed, coarsely and irregularly toothed, 5-7-nerved, downy, upper leaves smaller ovate-lanceolate; petioles 2-4 in. Flowers in clusters along the sides of the branches. Buds oblong. Sepals apiculate. Petals ciliate at the base. Stamens 10-15. Fruit the size of a large pea, 4-6-valved, barbed.—A variable plant as to pubescence and form of leaf, and closely allied to *T. rhomboidea*, but differs in its larger fruit with bristly or shaggy spines.

7. **T. annua**, Linn.; DC. *Prodr.* i. 507; annual, nearly glabrous, leaves ovate acuminate toothed, fruit glabrous globose covered with long hooked spines. Mig. *Fl. Ind. Bat.* i. pt. 2, 196. *T. polycarpa*, Wall. *Cat.* 1079, partly. *T. trichoclada*, Link. ex DC. *Prodr.* i. 507; Wall. *Cat.* 1082. *T. indica*, Lam. *Dict.* iii. 420?

TROPICAL HIMALAYA, from Simla to Sikkim; the KHASIA Mts., ASSAM, CONCAN, AWA, and ANDAMAN ISLANDS.—DISTRIB. Malay Archipelago, Tropical Africa.

Stem 1-2 ft., with a line of hairs along one side, shifting at each joint. Leaves 4-5 by 2-4 in.; petiole long. Stipules subulate. Peduncles $\frac{1}{2}$ in., extra-axillary, 3-flowered. Flowers about $\frac{1}{4}$ in. Petals orange, nearly as long as the apiculate sepals. Stamens 10. Fruit the size of a large pea, glaucous, 4-celled; spines glabrous.

8. **T. cana**, Blume *Bijdr.* i. 116; leaves ovate-oblong or lanceolate acuminate slightly cordate unequally toothed thinly stellate-hairy above densely beneath, peduncles extra-axillary, sepals tomentose, fruit globose, spines straight ciliated.

The KHASIA Mts. and Chittagong, Hook. & Thoms.; Assam, Sincapore, G. Thomson.—DISTRIB. Java, Hongkong.

Stem hispid. Leaves 2 by $\frac{3}{4}$ in.; petiole 1 in. Flowers scarcely $\frac{1}{8}$ in. Stamens 10-12. Fruit the size of a small pea; prickles hispid, with a slender transparent straight point.

** Fruit oblong.

9. **T. neglecta**, W. & A. *Prodr.* i. 75; annual, leaves roundish, stamens 5-10, fruit oblong indehiscent covered with hooked spines ciliated on the upper edge. Mast. in Oliv. *Flor. Trop. Afr.* i. 255. *T. pentandra*. Guill. & Perr. *Fl. Seneg.* i. 93, t. 19; Ham. in Wall. *Cat.* p. 237, 1075 F. *T. pilosul*, Thwaites *Enum.* 401.

NORTH WESTERN INDIA, Royle; WESTERN PENINSULA; CEYLON, at Trincomalee.—DISTRIB. Abyssinia, Senegal.

Slightly hairy, branched. Leaves subcordate, acuminate or slightly 3-lobed, serrate, hairy on both surfaces, especially beneath, upper lanceolate. Flowers small, $\frac{1}{8}$ in., in lateral extra-axillary clusters. Sepals linear. Petals oblong, obtuse, glabrous below.

Wight and Arnott, in *Prodr.* i. 75, describe as *T. ? microphylla*, a Peninsular plant known only in a malformed condition. Stems herbaceous, erect, branched, glabrous; leaves oblong-lanceolate, not lobed, sharply serrate, glabrous; peduncles bearing 1-3 flowers, opposite? to the leaves; stamens 5-8.—It is perhaps a state of *T. pilosa* eaten down by the cattle or goats.

10. **CORCHORUS**, Linn.

Herbs or undershrubs, more or less covered with stellate pubescence. Leaves simple. Peduncles axillary or opposite to the leaves, 1-2-flowered.

Flowers small, yellow. *Sepals* 4-5. *Petals* 4-5, glandless. *Stamens* free, indefinite or rarely twice the number of the petals, springing from a short torus. *Ovary* 2-6-celled, style short, stigma cup-shaped. *Capsule* elongated, slender or subglobose, smooth or prickly, loculicidally 2-5-valved, sometimes with transverse partitions. *Seeds* numerous, albuminous, pendulous or horizontal; embryo curved.—**DISTRIB.** A genus of about 35 species, for the most part widely dispersed throughout the tropics.

* *Capsule* globose, not beaked.

1. ***C. capsularis*, L.**; *DC. Prodr.* i. 505; annual, capsules oblate subglobose 5-celled. *Roxb. Fl. Ind.* ii. 581; *W. & A. Prodr.* i. 73; *Wall. Cat.* 1071; 1071, B, C; *Wight Ic.* t. 311; *Thwaites Enum.* 31; *Dalz. & Gibs. Bomb. Fl.* 25; *Miq. Fl. Ind. Bat.* i. pt. 2, 194. *C. Marua*, *Ham. in Wall. Cat.* 6311.—*Rumph. Amb.* v. t. 78, f. 1.

Throughout the hotter parts of India; cultivated in most tropical countries.

Leaves 2-4 by $\frac{3}{4}$ -1 in., glabrescent, oblong, acuminate, coarsely toothed, base generally prolonged into tail-like appendages; petiole $1\frac{1}{2}$ in. *Stipules* $\frac{1}{4}$ - $\frac{1}{2}$ in. *Capsule* wrinkled, muricate, 5-valved, valves without transverse septa. *Seeds* few in each cell.—Yields the fibre known as Jute.

** *Capsule* elongated, beak entire.

2. ***C. olitorius*, L.**; *DC. Prodr.* i. 504; annual, capsule elongate glabrous 3-6-valved, valves with transverse partitions between the seeds, beak long erect. *Roxb. Fl. Ind.* ii. 581; *W. & A. Prodr.* i. 73; *Wall. Cat.* 1072; 1, 2, 3, 4, D, E, F; *Boiss. Fl. Orient.* i. 845; *Dalz. & Gibs. Bomb. Fl.* 25; *Miq. Fl. Ind. Bat.* i. pt. 2, 195; *Thwaites Enum.* 31. *C. decemangularis*, *Roxb. Fl. Ind.* ii. 582; *Wall. Cat.* p. 237, 1072 G.

Indigenous in many parts of India.—Generally distributed by cultivation in all tropical countries.

Leaves 2-4 by 1-2 in., nearly glabrous, ovate-lanceolate, 3-5-nerved, serrate, the two lower serratures prolonged into long sharp points; petiole 1-2 in., pilose. *Stipules* shorter than the petiole. *Peduncles* 1-3-flowered; shorter than the petiole. *Sepals* shortly pointed. *Petals* yellow, spatulate, longer than the sepals. *Capsule* 2 in., cylindric, 10-ribbed.—Cultivated as a potherb, or for its fibre (Jute). The plant varies in stature, hairiness, &c. Arnott (in herb.) corrects an error into which he had fallen in the measurement of the pod, in the *Prodromus*, and which, as corrected, should read—"pods 10-12 times longer than broad."

3. ***C. trilocularis*, L.**; *DC. Prodr.* i. 504; annual, capsule elongate 3-angled scabrous or aculeate, beak short erect, valves with transverse partitions. *W. & A. Prodr.* i. 72; *Roxb. Fl. Ind.* ii. 582; *Wall. Cat.* 1070 B; *Wight in Wall. Cat.* 1070 C; *Dalz. & Gibs. Bomb. Fl.* 25.

SINDH, *Stocks*; **NORTH-WEST PROVINCES**, from Amballa to the Panjab; Nilghirris Mts.—**DISTRIB.** Afghanistan, Tropical Africa.

Leaves 1-4 by 1 in. elliptic-oblong or oblong-lanceolate, crenate-serrate with or without basal lobes; petiole very short, pilose. *Peduncles* 1-3-flowered, very short, opposite the leaves. *Capsule* 2-3 in., straight or curved, 3-4 angled, 3-4-valved, valves scabrous.—Of this species Wight and Arnott, l.c., make three varieties: α , leaves ovate oblong, capsules in pairs, 3-angled; β , leaves ovate-oblong, capsules solitary 4-angled; γ , leaves oblong-lanceolate capsules in pairs 3-angled. To the latter belongs Wallich's 1070 B. It would appear, however, that these are mere individual variations.

4. ***C. urticæfolius*, W. & A. Prodr.** i. 73; annual, capsules terete or slightly 3-angled not exceeding one inch pilose beaked, beak erect entire, valves with transverse internal partitions. *Thwaites Enum.* 31. *C. olitorius*,

Wall. Cat. 1072 F, partly. *C. subscandens*, *Wall. Cat.* 1074. *C. æstuanus*, *Hb. Madr.*; *Wall. Cat.* p. 237, 1074.

Southern provinces of the WESTERN PENINSULA, *Wight*; *Ava*, *Wallich*; CEYLON, Trincomalee, *Thwaites*.—DISTRIB. Abyssinia.

Leaves 2-3 by 1-1½ in., thinly pilose, cordate, sometimes oblique, ovate acuminate, dentate (almost precisely as in *Urtica dioica*). *Peduncles* extra-axillary, 2-3-flowered. *Capsule* 1 in., bent downwards, hairy.—Closely allied to *C. trilocularis* but with a much shorter pod.

5. ***C. fascicularis***, *Lam.*; *DC. Prodr.* i. 505; annual, capsule short sub-cylindric puberulous shortly beaked, valves nearly destitute of internal partitions. *Roxb. Fl. Ind.* ii. 582; *Thwaites Enum.* 401; *Dalz. & Gibs. Bomb. Fl.* 24; *Wall. Cat.* 6312. *C. linearis*, *Wall. Cat.* 1070, partly.

Throughout the hotter parts of India from BANDA, *Edgeworth*, to BENGAL, the WESTERN PENINSULA and CEYLON.—DISTRIB. Tropical Australia and Africa.

Leaves 1-2 by ¼-½ in., oblong lanceolate, serrated; petioles very short pilose. *Peduncles* opposite the leaves, 2-5-flowered. *Sepals* ½ in. *Stamens* 5-10. *Capsule* ½-¾ in., 3 or 4 together, each 3-4-valved, valves downy.

6. ***C. Antichorus***, *Ræusch. Nomencl. Bot. ed.* iii. 158; woody, perennial, much branched, branches prostrate, capsule cylindric elongate beaked. *Boiss. Fl. Orient.* i. 846; *Mast. in Oliv. Fl. Trop. Afr.* i. 263. *Antichorus depressus*, *Linn.*; *DC. Prodr.* i. 504. *Corchorus humilis*, *Munro Hort. Agrens. Appendix* 35; *Wight Ic.* 1073; *Dalz. & Gibs. Bomb. Fl.* 25.

North Western India from SINDH, *Stocks*, and the PUNJAB, *Vicary*, to AGRA, *Munro*. WESTERN PENINSULA, in Kattywar, Guzerat and the Deccan.—DISTRIB. Afghanistan, Aden, Tropical Africa, Cape de Verde Isles.

Branches tortuous, imbricate, 6-7 in. *Leaves* ½-¾ by ½ in., shortly petioled, roundish, plicate, crenate-serrate, base 3-nerved. *Peduncles* short, stout, opposite the leaves. *Capsules* ½-1½ in., straight or curved, 4-valved.

*** *Capsule* elongated, beak 3-fid spreading.

7. ***C. tridens***, *L.*; *DC. Prodr.* i. 505; annual, capsule elongate cylindric terminated by 3 spreading points, valves without partitions. *W. & A. Prodr.* i. 73; *Thwaites Enum.* 401; *Wall. Cat.* 1073; *Boiss. Fl. Orient.* i. 845. *C. Burmannii*, *DC. Prodr.* i. 505. *C. linearis*, *Wall. Cat.* 1070. *C. trilocularis*, *Burm. Fl. Ind.* t. 37, f. 2.

Generally distributed.—DISTRIB. Australia and Africa.

Variable as to habit, pubescence and form of leaf. *Leaves* 1-3 by ½-1 in., linear-oblong or lanceolate; petiole ½-¾ in. *Peduncles* 1-4-flowered. *Capsule* 1-2 in.—Of this species *Wight* and *Arnott* recognise three forms, viz.:—*a*, leaves lanceolate acuminate, *Wall. Cat.* 1073. *β*, leaves linear oblong or linear-lanceolate, *C. Burmannii* *DC.* *C. linearis*, *Wall. Cat.* 1070. *γ*, leaves oblong or obovate cuneate at the base.—The three forms merge one into the other.

8. ***C. acutangulus***, *Lam.*; *DC. Prodr.* i. 505; annual, capsules elongate 6-angled 3 of the angles winged, beak 3-fid divisions spreading horizontally, valves with or without partitions. *W. & A. Prodr.* i. 73; *Wall. Cat.* 1069, 1074 D, E; *Wight Ic.* t. 739; *Thwaites Enum.* 31; *Dalz. & Gibs. Bomb. Fl.* 25; *Miq. Fl. Ind. Bat.* i. pt. 2, 194. *C. æstuanus?* *Ham.* in *Wall. Cat.* p. 237, 1074 C. *C. fuscus*, *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 582; *Ham. in Wall. Cat.* 1069.

Throughout the hotter parts of INDIA and CEYLON.—DISTRIB. Australia, Tropical Africa, West Indies.

Leaves 1-3 by ¾-1 in., more or less hairy, ovate and acute, or oblong and acuminate, serrate, with or without basal lobes; petiole ¼ in., hairy. *Stipules* linear-subulate,

much shorter than the petiole. *Peduncles* opposite the leaves, 2-3-flowered. *Capsule* 1-1½ in.—Wight and Arnott describe the septa between the seeds as nearly obsolete, but they are frequently well marked.

DOUBTFUL SPECIES.

C. PUMILUS, *Ham. in Wall. Cat.* 6310 (a plant cultivated in the Calcutta Garden), is too imperfect to be determined. It is probably a depauperated form of some common species.

11. **PLAGIOPTERON**, Griff.

A climbing shrub. *Leaves* opposite and alternate, pubescent, entire. *Flowers* numerous, in peduncled panicles. *Sepals* 5. *Petals* 5, reflexed. *Stamens* numerous; filaments clavate; anthers 2-celled, cells divergent at the base. *Ovary* 3-celled; styles consolidated, subulate; ovules 2 in each cell, collateral. *Fruit* subturbinate, woody, 3-celled, 3-winged at the summit.—**DISTRIB.** A solitary species.

1. *P. fragrans*, *Griff. in Calc. Journ. Nat. Hist.* iv. 244, t. 13.

TENASSERIM, at MERGUI, *Griffith*.

Stellate-pubescent. *Leaves* 4 by 2 in., ovate-oblong, cuspidate; petiole ¼ in. *Flowers* small, fragrant. *Petals* 3-4 times longer than the sepals. *Stamens* longer than the petals, filaments capillary. *Ovary* pilose. *Fruit* 1½ in. diam.—Griffith, who describes this plant from specimens growing in the Calcutta Garden, says that it is supposed to come from Silhet; but I find specimens in his own Herbarium gathered by himself in Mergui, probably at a subsequent date.

12. **ECHINOCARPUS**, Blume.

Trees. *Leaves* simple, arch-veined. *Peduncles* axillary, 1-flowered, solitary or tufted. *Sepals* 4, imbricate. *Petals* 4, gashed. *Stamens* numerous, free, springing from a thick disk; anthers linear, opening by a terminal pore. *Ovary* 3-4-celled; cells many-ovuled; style subulate. *Capsule* coriaceous or woody, prickly or setose, 3-4- or by abortion, 1-celled. *Seeds* solitary few or many, pendulous, ovoid, testa bony shining, albumen fleshy; cotyledons broad, flat.—**DISTRIB.** One species is Australian, another Javan, the remainder are Indian.

1. *E. Murex*, *Benth. in Proc. Linn. Soc. v. Suppl.* ii. p. 71; leaves oblong or subanceolate acuminate glabrous on both surfaces, spines of the fruit dilated at the base.

KHASIA MTS.; alt. 3-5000 ft., *Hk. f. & T.*

Glabrous except the peduncles. *Leaves* 3-4 by 1½ in.; petiole 1 in. *Peduncle* 1 in. *Flowers* not seen. *Capsule* 1-1½ in., ovoid, woody, 4-5-valved, valves downy, covered with long straight subulate spines.—Kurz (*Journ. As. Soc. Beng.* 1870, ii. 67), identifies *E. Murex* with Blume's *E. Sigun*, but in the absence of authentic specimens of the latter I hesitate to adopt his view seeing how far apart the Khasia Mountains and Java are, and that the species has been found in no intermediate station. Clos, moreover, describes *E. Sigun* as differing both in the foliage and spines of the capsules.

2. *E. assamicus*, *Benth. l.c.* 72; leaves elliptic-oblong abruptly acuminate, glabrous above thinly pubescent beneath, spines of the fruit subulate.

UPPER ASSAM, *Griffith*.

A medium-sized tree. *Leaves* 9 by 4 in.; petiole 2-3 in. *Peduncles* puberulous. *Ovary* ovoid, bristly; style subulate. *Fruit* pendulous, 2 in. diam., globose, studded with long slender spines.

3. ***E. sterculiaceus***, *Benth. loc. cit.* 72; leaves ovate or obovate cuspidate downy beneath, spines of the fruit subulate.

EASTERN HIMALAYA; Bhotan, *Griffith*; Sikkim, at 2000 ft., *Hk. f.*

A tree. *Bark* smooth. *Leaves* 8-10 by 4 in., base rounded or subcordate, minutely serrulate; petiole 2 in. *Peduncles* tomentose, 1-1½ in. *Fruit* globose, densely covered with very long subulate spines.

4. ***E. tomentosus***, *Benth. loc. cit.* 72; leaves elliptic tomentose beneath, capsule covered with short bristles.

EASTERN HIMALAYA; Bhotan, *Griffith*; Sikkim, alt. 2-4000 ft., *Hk. f.*

A lofty tree, younger portions tomentose. *Leaves* 6-8 by 3-4 in., coriaceous, acuminate, serrated, base rounded; petiole 1½ in., downy, thickened at the apex. *Peduncles* 1½-2 in., tomentose, thickened at the apex. *Flowers* ½ in. diam. *Sepals* 5, ovate, pointed. *Petals* oblong, concave, 4-5-toothed at the apex. *Anthers* linear, apiculate, filaments pilose. *Capsule* 1½ in., ovoid, woody, 4-5-valved, valves densely covered with short fine bristles.

5. ***E. dasycarpus***, *Benth. loc. cit.* 72; leaves oblong or oblanceolate entire or serrulate glabrous on both surfaces, petals longer than the calyx, fruit covered with short dense ultimately deciduous spines.

EASTERN HIMALAYA; Bhotan, *Griffith*; Sikkim, alt. 4-6000 ft., *Hk. f.*

A tree. *Leaves* 4-5 by 3 in., coriaceous, shortly acuminate, base tapering; petiole 1 in., thickened at the apex. *Peduncles* 1½-2 in., axillary or aggregated at the end of the branches. *Flowers* nearly 1 in. diam. *Receptacle* cushion-shaped, pitted. *Sepals* oval or orbicular. *Petals* broad, lobed. *Anthers* oblong, apiculate. *Ovary* 4-celled, style longer than the ovary. *Capsule* 1 in., subglobose, 4-5-valved, valves woody. *Seeds* ½ by ¾ in., oval, black, smooth.—Variable in foliage and size of flower.

13. **ELÆOCARPUS**, Linn.

Trees. *Leaves* simple. *Flowers* usually hermaphrodite, rarely polygamous, in axillary racemes. *Sepals* 5, distinct. *Petals* 5, usually laciniate at the apex, rarely entire, springing from the outside of a cushion-shaped, often 5-lobed torus. *Stamens* usually indefinite, never less than 10, arising from the inside of the torus, and more or less aggregated into groups opposite the petals and alternating with the glands of the torus; anthers innate, linear, opening by a terminal pore. *Ovary* sessile, 2-5-celled, cells 2-many-ovuled; style columnar. *Drupe* with a single bony stone which is 3-5 or by abortion 1-celled. *Seeds* pendulous, 1 in each cell, albumen fleshy; cotyledons flat.—**DISTRIB.** About 50 species, most abundant in the hotter parts of India and the Indian archipelago. A few species are found in some of the South Sea islands, New Zealand, and Australia.

SECT. I. Ganitrus. *Ovary* and *drupe* 5-celled.

1. ***E. Ganitrus***, *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 592; leaves glabrescent elliptic acute, stamens many anthers bearded, drupe globose. *Wall. Cat.* 2660 A to D; *Dalz. & Gibs. Bomb. Fl.* 27. *Ganitrus sphaerica*, *Gærtn. Fruct.* ii. 271, t. 139; *Wight Ic.* i. 66.—*Rumph. Amb.* iii. t. 101.

Native of various parts of India, *Roxburgh*; NIPAL, and CHITTAGONG, *Wallich*; MALACCA, CONCAN, on the higher Ghats, *Dalz. & Gibs.*—**DISTRIB.** Malay Archipelago, *Roxburgh*.

A tree. *Leaves* 5-6 by 2 in., serrulate; petiole ½-¾ in. *Stipules* minute, subulate, caducous. *Racemes* from the old wood, drooping, shorter than the leaves. *Flower-buds* ovoid-conical, elongate. *Flowers* ½ in. diam., white. *Sepals* lanceolate, acuminate, glabrescent, internally 1-ribbed. *Petals* glabrescent, oblong, laciniate halfway

down. *Stamens* 35–40. *Ovary* spherical, albido-pilose; style longer than the stamens. *Drupe* the size of a cherry, globose, purple; stone tubercled, grooved, 5-celled, 5-seeded.

2. ***E. parvifolius***, *Wall. Cat.* 684 and 2662 A, B; leaves glabrous elliptic acute at both ends minutely serrulate, stamens 15–20, anthers beardless, drupe oblong. *C. Mull. Anot. de fam. Elæocarp.* 24.

MALACCA, Mt. Ophir, *Griffith*, &c.; PENANG, *Jack*; SINGAPORE.—DISTRIB. BORNEO.

A small tree. *Young shoots* silky. *Leaves* 3–3½ by 1 in.; petiole ½–¾ in. *Pedicels* and calyx villosulous. *Flowers* about ½ in. diam. *Glands* large, 2-lobed, opposite the sepals. *Stamens* in pairs between each gland, opposite the petals, and singly opposite the glands and sepals. *Ovary* 5-celled, cells opposite the petals. *Drupe* ¾ in. and upwards, olive-shaped; stone 5-celled.—In one of Wallich's specimens the drupe is globose.

3. ***E. nitidus***, *Jack Mal. Misc.; ex Hook. Bot. Misc.* ii. 84; leaves ovate-lanceolate serrate, stamens 15, anthers beardless, drupe globose. *Miq. Fl. Ind. Bat.* i. pt. 2, 208; *Wall. Cat.* 2670.

MALACCA and PENANG, *Jack*, &c.—DISTRIB. JAVA.

A tree. *Leaves* 4–6 by 2–2½ in., base tapering; glabrous, petiole 1–¾ in. *Flowers* ½ in. diam. *Sepals* linear, acute, thinly pilose. *Stamens* 15, 10 in pairs between the glands. *Drupe* globose; stone rugose, 5-celled, one cell only usually fertile.—Like *E. robustus*, but differing in the anthers and fruit.

SECT. II. **Dicera**. *Flowers* bisexual. *Anthers* not, or scarcely prolonged at the apex (see also *E. prunifolius* and *E. pedunculatus*). *Drupe* 1–3-celled.

* *Anthers usually bearded, sometimes not* (see *E. robustus* and *E. lanceæfolius*).

4. ***E. serratus***, *L.; W. & A. Prodr.* i. 82, not of *Roxb.*; leaves elliptic obtuse or acuminate crenate-serrate, stamens 20–35, anther-valves sparingly bearded, drupe oblong, stone tubercled 1-celled 1-seeded. *Wall. Cat.* 2666 B, F, K, L; *Thwaites Enum.* 32; *Miq. Fl. Ind. Bat.* i. pt. 2, 208. *E. Pirincara*, *Wall. Cat.* 2664 partly, not of *DC.* *E. integrifolius*, *Lam. Ill.* t. 459; *DC. Prodr.* i. 519. ? *E. lacunosus*, *Wall. Cat.* 6858, 9026.

TROPICAL HIMALAYA; Sikkim, 2–3000 ft., *Hk. f.*, Nipal, Wallich; EASTERN BENGAL, and the EASTERN and WESTERN PENINSULAS.—DISTRIB. JAVA.

A tree. *Leaves* 4–5 by 2½ in., glabrous, base tapering; petiole 1½ in. *Racemes* scarcely so long as the leaves, ascending. *Flower-buds* ovoid-conical. *Flowers* ½ in. diam. *Sepals* ovate, speckled, glabrous. *Petals* lacinate halfway down, ciliate at the edges. *Ovary* villous, 3-celled. *Drupe* the size and form of a small olive, edible; stone oblong, pointed, tubercled, pitted, 1-celled.—In Lamarck's *integrifolius* the leaves are nearly entire. The plant called *E. serratus* in Roxburgh's unpublished drawings apparently belongs to this species, having a 1-celled stone, while the species so called in Roxburgh's *Fl. Ind.* ii. 596, is described as 3-celled. I have referred *E. lacunosus*, Wall., both to this species and to *E. cuneatus* with doubt. The specimens have leaves and fruit only, and are insufficient to determine to which species (if either) they really belong.

5. ***E. floribundus***, *Blume Bijdr.* 120; leaves elliptic-oblong acuminate crenate-serrate base acute, peduncles spreading, stamens about 20, anthers bearded, drupe ovoid 1-celled 1-seeded. *Miq. Fl. Ind. Bat.* i. pt. 2, 210. *E. grossa*, *Wall. Cat.* 2661. *E. serratus*, *Roxb. ex Wall. Cat.* 2666 A, B, partly. *E. oblongus*, *Wall. Cat.* 2677; *C. Müll. Anot. de fam. Elæocarp.* 19, f. 30. *E. Lobbianus*, *Turcz. in Mosc. Bull.* 1858, 235.

EASTERN BENGAL; Khasia Mts., alt. 3–4000 ft., and Chittagong; ASSAM, *Griffith*; TENASSERIM, *Helper*; SINGAPORE; BURMA, *Kurz*.—DISTRIB. JAVA.

A tree. *Leaves* 4 by 2½ in. and upwards, coriaceous, glabrous, acute at both ends,

venation obscure; petiole $1\frac{1}{2}$ in., thickened at the top. *Flower* $\frac{1}{2}$ in. diam. *Pedicels* pilose. *Sepals* deltoid-lanceolate. *Petals* cuneate, cut halfway down, lobes fringed. *Ovary* 3-celled. *Stone* pitted.

6. ***E. robustus***, *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 597; leaves ovate-oblong acuminate serrate, flower-buds oblong-ovoid, stamens 50, anthers bearded rarely beardless, drupe ovoid 3-celled 1-seeded. *Wight Ic.* t. 64; ?*Wall. Cat.* 2664 A. *E. ovalifolius*, *Wall. Cat.* 2665; *C. Müll. Anot. de jam. Elæocarp.* 21 *E. amygdalinus*, *Wall. Cat.* 6857. *E. serratus*, *Wall. Cat.* 2666 C. *E. oblonga*, *Wall. Cat.* 2677 ? (specimen imperfect). *E. aristatus*, *Wall. Cat.* 2665 B. ? *Wall. Cat.* 9027 (a monstrous form, not in flower).

From the EASTERN HIMALAYA, Sikkim, alt. 2000 ft., and the KHASIA MTS. to CHITTAGONG, TENASSERIM, MALACCA and PENANG; also in CANARA and CEYLON.

A tree or shrub? Young shoots pubescent. *Leaves* 6-8 by $2\frac{1}{2}$ -3 in. and upwards, glabrous; petiole 1-2 in. *Racemes* shorter than the leaves. *Flower-buds* acute. *Flowers* $\frac{1}{2}$ in. diam. *Anthers* puberulous. *Ovary* downy. *Drupe* 1-1 $\frac{1}{2}$ in., rind hard crustaceous, yellow; stone furrowed deeply pitted.

7. ***E. cuneatus***, *Wight Ill.* i. p. 83; leaves cuneate-obovate acuminate, stamens 30-40, anthers bearded, ovary 3-celled, drupe olive-shaped, stone 3-celled. ? *E. serratus*, *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 296; *Miq. in Herb. Hohenack.*; *Thwaites Enum.* 32. ? *E. lacunosus*, *Wall. Cat.* 6858, 9026.

EASTERN HIMALAYA; SIKKIM; CHITTAGONG; SILHET; BIRMA and TENASSERIM; WESTERN PENINSULA, the Southern Provinces, *Wight, Beddome*; CEYLON, *Thwaites*.

A small tree. *Leaves* 3 by $1\frac{1}{2}$ in., glabrous, serrulate, petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Racemes* shorter than the leaves. *Buds* conical. *Petals* speckled (in dried specimens), glabrous, ciliolate. *Anthers* usually bearded or not, on the same specimen. *Drupe* the size and form of an olive; stone rugose, pitted, 3-celled.—The synonymy of this species is open to doubt.

8. ***E. lanceæfolius***, *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 598; leaves broad lanceolate serrulate, flower-buds ovate-lanceolate, stamens 15, drupe oblong-ovoid 1-celled. *Wight Ic.* i. 65. *E. lanceolata*, *Wall. Cat.* 2667, partly.

EASTERN HIMALAYA, Sikkim, alt. 5-6000 ft.; Bhotan, *Griffith*; KHASIA MTS., alt. 4-5000 ft., SILHET and TENASSERIM, *Wallich, Griffith*, &c.; CANARA, *Law*.—DISTRIB. JAVA.

A tree. *Leaves* 4-6 by $1\frac{3}{4}$ -2 in., glabrous, base tapering; petiole $\frac{1}{2}$ -1 in. *Racemes* nearly as long as the leaves; pedicels slender. *Flowers* about $\frac{1}{2}$ in. diam. *Sepals* glabrous, lanceolate. *Petals* ciliate at the edges, shorter than the sepals. *Anthers* sparingly or not at all bearded. *Ovary* 3-celled, downy. *Drupe* the size of a pigeon's egg.

9. ***E. Helferi***, *Kurz ms.*; leaves oblong-lanceolate crenate-serrate, flower-buds ovoid obtuse, anthers bearded.

TENASSERIM, *Helfer*; ANDAMANS, *Kurz*.

A tree. *Leaves* 8-10 by 3 in., glabrous, base rounded; petiole 1-1 $\frac{1}{2}$ in. *Raceme* half the length of the leaves. *Flowers* $\frac{1}{2}$ in. diam. *Sepals* ovate-lanceolate, downy. *Petals* wedge-shaped, lacinate halfway down, ciliate at the edges. *Ovary* globose, downy, 3-celled.—Apparently very nearly allied to *E. robustus* from which it differs in the shorter petioles, smaller flowers and more broadly ovoid buds.

10. ***E. sikkimensis***, *Mast.*; leaves elliptic acuminate crenate-serrate, serratures mucronulate, flower-buds ovate-lanceolate, anthers bearded, drupe ellipsoid.

EASTERN HIMALAYA; Sikkim, alt. 5000 ft., *Ilk. f.*; ASSAM, *Griffith*.

A tree. *Leaves* 8 by 3 in., glabrous; petiole 2 in. thickened at the apex. *Racemes* erect, half the length of the leaves; pedicels thinly pilose. *Flowers* about $\frac{1}{2}$ in. diam. *Sepals* lanceolate, pilose. *Petals* cuneate, slightly silky at the back. *Disk* villous.

Ovary 3-celled. *Drupe* 2 by 1 in., tubercled.—Differs from *E. robustus* in the narrow pointed flower-buds. It is open to doubt whether the fruit placed with it in the Kew Herb. belongs to this species.

**** *Anthers usually beardless.***

11. ***E. leptostachya*, Wall. Cat. 2672**; leaves glabrous lanceolate serrulate, peduncles erect, pedicels pilose, flower-buds rounded, anthers beardless. *C. Müll. Anot. de fam. Elæocarp. 23.*

TENASSERIM, *Helfer*; PENANG, *Wallich*.

A tree. *Leaves* 6–8 by 2–3 in., serrulate, base rounded; petiole 2–2½ in., thickened at the apex. *Peduncles* half the length of the leaves. *Flowers* ½ in. diam. *Sepals* pubescent. *Petals* cuneate, ciliate, tip laciniate. *Ovary* villous, 3-celled.—Very like *E. robustus*, but the anthers are not bearded.

12. ***E. lucidus*, Roxb. Hort. Beng. 42**; *Fl. Ind. ii. 600*; leaves glabrous lanceolate serrate, racemes as long as the leaves, flower-buds ovoid-conical, anthers beardless.

CHITTAGONG; *Roxburgh, Griffith*.

A tree. *Leaves* 5 by 2 in., acute, serratures spiny, base rounded; petiole 1 in. *Raceme* erect, many-flowered, scarcely so long as the leaves. *Flowers* ¾ in. diam. *Sepals* lanceolate. *Petals* laciniate halfway down. *Anthers* puberulous. *Disk* villous. *Fruit* not seen.—Differs from *E. robustus* in the beardless anthers as well as in the pointed buds and smaller flowers.

13. ***E. oblongus*, Gærtn.; W. & A. Prodr. 82**; leaves glabrous elliptic acute or acuminate serrate, stamens 30–40, anther-valves beardless or bearded, drupe oblong, stone 1-celled 1-seeded. *Smith in Rees Cycl.; DC. Prodr. i. 519*; *Wight Ic. t. 46*; *Dalz. & Gibs. Bomb. Fl. 27*; *Miq. Fl. Ind. Bat. i. pt. 2, 208*. *E. glandulosus*, *Wall. Cat. 6859*; *E. adenophyllus*, *Wall. Cat. 6860*. *E. Perim-nara*, *DC. Prodr. i. 509*; *Wall. Cat. 2664 B, in part*. *E. serratus*, *Heyne in Wall. Cat. 2666*. ? *E. angustifolius*, *Wight Ill. p. 84*.

TENASSERIM, at Moulmein, *Lobb*; WESTERN PENINSULA, from the Concan to Travancor.—DISTRIB. Moluccas, Borneo.

A tree. *Leaves* 3–4 by 1½–2 in., base wedge-shaped; petiole ¾–1 in., glandular at the apex. *Racemes* from the axils of the fallen leaves. *Flower-buds* ovoid-conical. *Petals* ciliate. *Drupe* 1 in.—Wight and Arnott make two vars. of this species—one var., α , with acute leaves and stout pedicels, the other var. β , with marked acuminate leaves and slender pedicels; the former has also larger flowers and more lanceolate sepals, the latter has smaller flowers and ovate acute sepals; but the two forms seem to merge one into the other. The saccate glands seen on the under surface of the leaves in this and other species are possibly the result of insect agency.

14. ***E. polystachyus*, Wall. Cat. 2671**; leaves elliptic-oblong serrulate pubescent beneath, flower-buds subglobose, petals almost entire at the apex, stamens 40–50, anthers beardless, drupe 1-celled.—*C. Müll. Anot. de fam. Elæocarp. 20, f. 13.*

SINGAPORE, *Wallich*; MALACCA, *Maingay*.

A tree; shoots, petioles, peduncles, pedicels and sepals pubescent. *Leaves* 4–8 by 3–4 in., base rounded; petiole 2½ in., thickened at the apex. *Peduncles* scarcely exceeding the petioles, pedicels resupinate. *Flowers* ½ in. diam. *Petals* oblong. *Stamens* numerous. *Glands of disk* obsolete. *Ovary* 2-celled. *Drupe* ¾ in., glabrous, crustaceous.

15. ***E. glabrescens*, Mast.**; leaves at first covered with ferruginous down afterwards glabrescent lanceolate-acuminate, stamens 15–20, anthers beardless, drupe globose 1-celled.

MALACCA, *Maingay*.

A tree; herbaceous portions downy. *Leaves* 3 by $1\frac{1}{2}$ in., acute at both ends, glabrescent, or with a few hairs beneath; petiole $1\frac{1}{2}$ in., with two glands at the apex. *Peduncle* as long or longer than the petiole, pedicels $\frac{1}{2}$ in., hairy. *Flowers* $\frac{1}{2}$ in. diam. *Sepals* ovate-lanceolate. *Petals* oblong. *Anthers* puberulous. *Ovary* 3-celled. *Drupe* the size of a cherry; stone 1-celled, 1-seeded.

16. **E. stipularis**, *Blume Bijdr.* 121; leaves elliptic-oblong acuminate serrulate pubescent beneath, stipules ovate incised, drupe globose 1-celled.

From BIRMA, *Wallich*, to MALACCA, *Maingay*.—DISTRIB. JAVA, BORNEO.

A tree, herbaceous portions pubescent. *Leaves* 6 by 2 in.; petiole 1 in. *Racemes* nearly as long as the leaves, pubescent. *Flowers* $\frac{1}{2}$ in. diam. *Buds* ovoid. *Sepals* lanceolate, silky-pubescent. *Disk* 5-lobed. *Anthers* bearded or beardless, 15–20. *Ovary* downy, 5 celled.

17. **E. amœnus**, *Thwaites Enum.* 32; leaves glabrous lanceolate acuminate serrate, serratures aristulate, anthers beardless, drupe globose 1-celled. *Beddome Flor. Sylvat.* t. 111.

Southern provinces of the WESTERN PENINSULA, *Beddome*; CEYLON, Central province, alt. 4000 ft., *Thwaites*

A tree. *Leaves* 2–4 by $\frac{3}{4}$ –2 in., glandular beneath; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Leaf-buds* pilose. *Racemes* from the axils of the fallen leaves. *Flower-buds* ovate-lanceolate. *Sepals* lanceolate. *Ovary* 5-celled. *Drupe* the size of a large cherry; stone 1-celled.

18. **E. obovatus**, *Arn. in Act. Acad. Nat. Cur.* xviii. 323 (1836); leaves glabrous obovate, racemes longer than the leaves, anthers beardless, drupe globose 1-celled. *Thwaites Enum.* 32. **E. coriaceus**, *Hook. Ic. Pl.* t. 154; *Wight Ill.* i. 83 (1840).

CEYLON, Newera Ellia, alt. 6–8000 ft.

A shrub. *Leaves* $2\frac{1}{2}$ –3 by $1\frac{1}{2}$ –2 in., coriaceous, obtuse, serrulate, sometimes glandular, base cuneate; petiole $\frac{1}{2}$ in. *Flowers* $\frac{3}{4}$ in. diam., drooping. *Sepals* lanceolate, tomentose. *Stamens* 15–25. *Ovary* minutely villous, 3-celled. *Drupe* spherical; stone rugulose, tubercled.

19. **E. montanus**, *Thwaites Enum.* 32; leaves ovate-oblong or orbicular obtuse denticulate glandular beneath, anthers beardless, drupes spherical.

CEYLON; loftier parts of the island, alt. 6–8000 ft., *Thwaites*.

A middle-sized tree. *Leaves* $2\frac{3}{4}$ –3 by $1\frac{3}{4}$ –2 in., coriaceous, younger ones pubescent beneath; petiole $\frac{1}{2}$ –1 in. *Racemes* nearly as long as the leaves, pubescent. *Flowers* $\frac{1}{2}$ in. diam. *Sepals* oblong. *Petals* silky, longer than the sepals.

20. **E. subvillosus**, *Arn. in Act. Acad. Nat. Cur.* xviii. 323 (1836); leaves oval obtuse abruptly and shortly acuminate crenate-serrate glabrescent, bracts pectinate, anthers pubescent. drupe oblong 1-celled.—*Thwaites Enum.* 33. **E. pubescens**, *Hook. Ic. Pl.* 155, (1837).

CEYLON; Saffragam district, *Thwaites*; MALACCA, *Maingay*—DISTRIB. BORNEO.

Arborescent; herbaceous portions densely pubescent, at length glabrescent. *Leaves* 4 by $2\frac{1}{2}$ in.; petiole $1\frac{1}{2}$ in. *Stipules* subulate. *Racemes* downy, from the axils of the fallen leaves. *Flower-buds* ovate, acute. *Petals* oblong, clawed, fimbriate at the apex. *Stamens* 15–25. *Anthers* densely pubescent. *Ovary* villous. *Drupe* olive-shaped; stone tubercled, sharply pointed.

SECT. III. **Monocera**, *Jack (Gen.)*. *Flowers* bisexual. *Anthers* terminated by a long awn. *Ovary* 2–3 rarely 5-celled. *Drupe* 1-celled, 1–2-seeded.

* *Petals* narrowed toward the base, dilated toward the apex.

† Anther-tails erect.

21. **E. tuberculatus**, *Roxb. Fl. Ind.* ii. 594; leaves glabrous above hairy along the nerves beneath obovate minutely serrate base cuneate,

stamens 70-80, anther-tails erect. *Wall. Cat.* 2658 B, C; *Beddome Fl. Sylvat.* t. 113. *E. serrulatus*, *Roxb. Hort. Beng.* 42. *E. rugosus*, *Wall. Cat.* 2658, A, B, not of *Roxb.* *Monocera tuberculata*, *W. & A. Prodr.* i. 83; *Wight Ic.* 62; *Wight. Ill.* t. 35; *Dalz. & Gibs. Bomb. Fl.* 27. *M. subintegerrima*, *MIq. in Herb. Hohenack.*

PEGU and MARTABAN, *Wallich*; Southern provinces of the WESTERN PENINSULA, *Wight, &c.*—DISTRIB. Java.

A tree. *Leaves* 6-12 by 3-4 in., glabrous or more or less downy beneath; petiole $1\frac{1}{2}$ -2 in., pilose or glabrescent, thickened at the apex. *Racemes* erect, more than twice the length of the petiole. *Pedicels* recurved, ultimately erect. *Flower-buds* lanceolate. *Flower* 1 in. diam. *Sepals* lanceolate, rusty-pubescent. *Petals* oblong-cuneate, deeply lacinate, sometimes bifid, silky on the outside. *Stamens* very numerous (70), filaments hairy or glabrous. *Ovary* 2-celled, cells 8-ovuled. *Drupe* $1\frac{1}{2}$ -2 in., oval, smooth; stone 1-2-celled, coarsely tubercled furrowed.—To this species may possibly be referred *E. grandifolius*, *Kurz, Journ. As. Soc. Beng.* 1872, pt. ii. p. 294, of which leaves only exist in the Kew Herbarium. The leaves are larger than ordinary. The nuts of *E. tuberculatus* are worn by the Hindoos as a religious ornament.

22. ***E. aristatus***, *Roxb. Hort. Beng.* 52; *Fl. Ind.* ii. 599; leaves glabrous cuneate-obovate, stamens 40-50, anther-tails erect. *Monocera Roxburghii*, *Wight Ic.* i. 63. *Elæocarpus rugosus*, *Wall. Cat.* 2659 A, partly, not of *Roxb.*

BHOTAN, *Booth*; SILHET, *Wallich*; ASSAM, *Jenkins*; CONCAN, *Stocks*.

A tree. *Leaves* 6-10 by 3 in., serrate, base tapering; petiole 1 in. *Racemes* nearly as long as the leaves. *Flower-buds* lanceolate, ribbed. *Sepals* lanceolate, pubescent. *Petals* wedge-shaped, deeply fringed. *Filaments* glabrous. *Ovary* villous, 2-celled, cells 10-12-ovuled. "*Drupe* the size shape and colour of a large olive; stone oblong, pointed at both ends, rugose."—*Roxb.*

23. ***E. rugosus***, *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 596; leaves glabrescent shortly petioled or subsessile obovate-oblong serrate, peduncles downy, stamens 30, anther-tails erect, drupe yellow obovoid 1-2-celled, stone 2-edged tubercled. *Wight Ic.* t. 61.

CHITTAGONG, *Roxburgh*; WESTERN PENINSULA, Coorg, Nilghiri Mts., *Wight, Gardn.*

A tree. *Leaves* 6-12 by 4 in. *Racemes* shorter than the leaves, spreading. *Flowers* 1 in. diam. *Flower-buds* elongate, conical. *Sepals* linear-lanceolate. *Petals* cuneate, silky, deeply lacinate. *Ovary* villous 2-celled, cells 8-ovuled. *Stone* oblong, pointed at both ends.—The flowers are generally smaller than those of *E. aristatus*.

24. ***E. Monocera***, *Cav. Ic.* t. 501; leaves glabrous cuneate-obovate serrulate serratures apiculate, stamens 40-50, anther-tails erect very long. *E. obtusus*, *Blume Bijdr.* 123. ? *E. venustus*, *Beddome Fl. Sylvat.* t. 174. *Monocera macrocera*, *Zoll. ex Walp. Ann.* i. 112.

ASSAM, *Griffith*; ? BIRMA, *Kurz*; MALACCA, *Griffith*; ? Southern provinces of the WESTERN PENINSULA, *Beddome*.—DISTRIB. Borneo, Sumatra, Philippines.

A tree. *Leaves* 3-5 by $1\frac{1}{2}$ -2 in., obtuse, acute or acuminate, often glandular beneath; petiole 1- $1\frac{1}{2}$ in. *Racemes* shorter than the leaves, 3-7-flowered. *Flower-buds* ovoid, acute. *Sepals* lanceolate. *Petals* cuneate, lobed, pilose. *Disk* 10-lobed. *Quary* pubescent, 2-celled. *Drupe* $1\frac{1}{2}$ in., ovoid; stone tubercled, 1-celled.—*Beddome's E. venustus*, *Fl. Sylvat.* t. 174, so closely resembles *E. Monocera*, that it may perhaps be considered as a variety of that species. It differs, however, especially in the ovate leaves having shorter petioles, glabrous sepals, and very short anther-tails.

25. ***E. punctatus***, *Wall. Cat.* 2676; leaves small glabrous above densely felted beneath oval acute entire, anther-tails long erect, drupe ovoid.

SINGAPORE, *Wallich*.

A tree. *Leaves* 2 by 1 in., with brownish pubescence beneath; petiole $\frac{1}{2}$ in. *Flower* $\frac{1}{4}$ in. diam. *Sepals* lanceolate. *Petals* oblong, silky. *Drupe* $1\frac{1}{2}$ in., scaly.

I have seen only imperfect specimens of this, and have some doubt whether the foliage in Herb. Wallich. does not belong to some other genus (? *Pterospermum*).

26. **E. acuminatus**, *Wall. Cat.* 2675; leaves glabrous lanceolate acuminate serrulate, racemes erect half the length of the leaves, flower buds fusiform lanceolate, stamens numerous, anther-tails short.

EASTERN BENGAL; ASSAM, SILHET, and the KHASIA, *Wallich*, &c.

A tree. *Leaves* 6 by $1\frac{3}{4}$ in.; petiole $\frac{3}{4}$ –1 in., lower ones much longer, thickened at the apex. *Flowers* $\frac{1}{2}$ in. diam. *Sepals* oblong-lanceolate, slightly villous. *Petals* silky outside, laciniate at the apex. *Disk* broad, lobed. *Ovary* subglabrous, 2–3-celled; ovules numerous.

27. **E. ferrugineus**, *Wight Ic.* 205 (Monocera), not of *Jack*; leaves oblong-oval entire downy beneath, stamens 20, anthers shortly awned, ovary 3-celled.—*Beddome Flor. Sylv.* t. 112.

WESTERN PENINSULA, Nilghiri, Pulney, &c. Mts., *Munro*, &c.

A tree. Young branches stout, covered with rusty down. *Leaves* 3–6 by $1\frac{3}{4}$ –2 in., coriaceous, convex above; petiole 1–2 in., villous, thickened at the apex. *Racemes* downy, shorter than the leaves, crowded at the ends of the branches. *Flowers* $\frac{3}{4}$ in. diam. *Sepals* lanceolate, downy. *Petals* silky, oblong, laciniate at the apex. *Drupe* $\frac{3}{4}$ in., ovoid; stone 1 celled, 1-seeded.—The leaves are remarkably convex in all the specimens. This differs from *Jack's Monocera ferruginea* (Hook. Bot. Misc. ii. 86), in the short petiole, and other characters.

28. **E. cyanocarpa**, *Maingay mss.*; leaves glabrous lanceolate serrulate shortly petioled, racemes nearly as long as the leaves, buds elliptic-lanceolate, ovary 5-celled, drupe 3-celled.

MALACCA, *Maingay*.

A tree. *Leaves* 5–6 by $1\frac{3}{4}$ in.; petiole $\frac{1}{2}$ in. *Flowers* nearly $\frac{1}{2}$ in. diam. *Sepals* lanceolate. *Petals* obovate, longer than the sepals, divided halfway down into linear-lanceolate very acute straight segments. *Anthers* puberulous. *Ovary* villous; style much exceeding the stamens. *Drupe* the size of a large cherry, bright blue; stone rugose, woody, 3-celled.

29. **E. bracteatus**, *Kurz in Flora* 1871, p. 278; glabrous, leaves obovate-oblong, bracts leafy dentate, stamens numerous, ovary villous, stone rugose.

MARTABAN, *Kurz*.

A large tree. *Leaves* 5–6 in., pointed at both ends, repando-dentate; petiole $\frac{1}{2}$ –1 in. *Racemes* axillary. *Pedicels* 1 in., glabrous; bracts $\frac{1}{2}$ –1 in., obovate, apparently persistent. *Sepals* $\frac{1}{2}$ in., linear-lanceolate, silky outside, ciliate. *Petals* cuneate-oblong, bifid, lobes laciniate. *Drupe* the size of a plum.

30. **E. ceylanicus**, *Arn. in Act. Acad. Nat. Cur.* xviii. 323; leaves glabrous long petioled broadly ovate acuminate, stamens numerous, anther-tails erect. *Monocera Walkerii*, *Wight Ill.* i. 84; *Thwaites Enum.* 33.

CEYLON; Saffragam District, alt. 5000 ft., *Walker*, &c.

A tree. *Leaves* 4–6 by 2 in., crenulate; petiole $1\frac{1}{2}$ in. *Racemes* as long as the leaves; pedicels slender, $1\frac{1}{2}$ in. *Flower-buds* lanceolate. *Flowers* secund, drooping. *Sepals* lanceolate. *Petals* densely hairy, sparingly fimbriate. *Filaments* pubescent. *Ovary* 2-celled; stone tubercled, subcylindric.

31. **E. glandulifer**, *Mast.*; leaves glabrous long-petioled ovate-lanceolate undulate crenate, stamens numerous, anthers hairy, ovary

3-celled. *Monocera glandulifera*, *Hook. ex Wight Ill. i. p. 84. Thwaites Enum. 33.*

CEYLON; Central Provinces, 4-6000 ft., *Gardner, &c.*

A tree. *Leaves* 4-5 by 2 in., glandular beneath; petiole $1\frac{1}{2}$ in. *Racemes* shorter than the leaves, many-flowered. *Flower-buds* ovoid. *Flowers* $\frac{3}{8}$ in. diam., drooping. *Petals* oblong, pubescent. *Ovary* silky, 3-celled. *Drupe* olive-shaped; stone 2-celled. —Nearly allied to *E. prunifolius* and *E. Munroii*. The so-called saccate glands on the under surface of the leaf are possibly the result of insect agency.

†† Anther-tails at length reflexed.

32. ***E. Munroii*, Mast.**; leaves glabrous long-petioled ovate-lanceolate acuminate, stamens 20, anther-tails at length reflexed, drupe olive-like. *Monocera Munroii*, *Wight Ill. p. 84; Ic. t. 952.*

WESTERN PENINSULA; Nilghiri Mts., *Wight*; Concan, *Stocks*.

A tree. *Branches* with prominent scars. *Leaves* 3 by 2 in., crenulate; petiole 2 in. *Racemes* many-flowered, scarcely as long as the leaves. *Flower-buds* ovoid. *Flowers* $\frac{1}{2}$ in. and upwards diam., drooping. *Sepals* lanceolate, acute. *Anthers* glabrous. *Ovary* 2-celled, on a raised torus. *Drupe* yellowish, shining, edible; stone 1-celled.

33. ***E. apiculatus*, Mast.**; leaves glabrous obovate acuminate minutely serrulate base cuneate, racemes half the length of the leaves, anther-tails reflexed, disk very small glabrescent, drupe oblong apiculate 2-celled.

MALACCA, *Maingay*.

A tree, 50-60 ft. *Stem* very thick. *Leaves* 6 by $2\frac{1}{2}$ in. and upwards; petiole $\frac{1}{2}$ in., thickened at both ends. *Peduncles* puberulous, many-flowered; pedicels about $\frac{1}{4}$ in., articulate at the base, dilated at the apex. *Flower* $\frac{3}{8}$ in. diam. *Buds* oblong, obtuse. *Sepals* linear-oblong, puberulous. *Petals* white, cuneate, 2-lobed, lobes fringed silky. *Stamens* numerous. *Drupe* 1 in., resembling the fruit of a *Diospyros*.

** *Petals wide at the base, narrowed towards the apex.*

34. ***E. prunifolius*, Wall. Cat. 2669**; leaves glabrous lanceolate long-petioled, petals nearly entire, stamens 20, anther-tails obsolete or short. *C. Müll. Anot. de fam. Elæocarp. 15.*

SILHET, *Wallich*; KHASIA MTS., alt. 1-3000 ft., *Griffith, &c.*

A tree. *Leaves* 3-5 by $1-1\frac{1}{2}$ in., often recurved; petiole 2 in. *Racemes* nearly as long as the leaves, loose; pedicels glabrous. *Flower-buds* ovoid. *Sepals* lanceolate. *Petals* deltoid, nearly entire, silky on both sides. *Anthers* glabrous. *Ovary* villous, 2-3-celled, cells 6-ovuled. *Drupe* $\frac{3}{4}-\frac{1}{2}$ in., ovoid, 1-celled, 1-seeded.

35. ***E. paniculatus*, Wall. Cat. 2663**; leaves glabrous elliptic acuminate entire, petals nearly entire silky, stamens 50, anthers and ovary villous. *C. Müll. Anot. de fam. Elæocarp. 12.* *Monoceras leucobotryum*, *Miq. Fl. Ind. Bat. Suppl. i. 409*; *Monocera Griffithii, C. Müll. l.c.*

MALACCA, *Maingay*; SINGAPORE, *Wallich*.—DISTRIB. Banka.

A tree. *Leaves* 6 by 2 in. and upwards, coriaceous, base rounded; petiole 2-3 in., thickened at the apex. *Racemes* subterminal, erect, nearly as long as the leaves. *Flower-buds* ovoid, acuminate. *Flowers* $\frac{1}{2}$ in. diam. *Sepals* lanceolate, hoary, silky outside. *Anther-tails* reflexed. *Drupe* $\frac{1}{2}$ in., ovoid; stone tubercled.

36. ***E. Varunua*, Ham. in Wall. Cat. 2666 G, H**; leaves glabrous elliptic acuminate serrulate, flower-buds ovate-lanceolate, anthers puberulous, ovary villous. ? *E. Finlaysonianus*, *Wall. Cat. 6851.*

TROPICAL HIMALAYA, from Kumaon to Sikkim, alt. 1-2000 ft. ASSAM; SILHET, CHITTAGONG, and MALACCA.

A tree. *Leaves* 3-7 by $1\frac{1}{2}-3$ in., base rounded; petiole $1\frac{1}{2}-3$ in. *Racemes* axillary, half the length of the leaves and upwards. *Flower* $\frac{1}{2}$ in. diam. *Sepals* ovate-lanceolate,

white, silky. *Petals* oblong fimbriate, downy outside.—The *E. Finlaysonianus* doubtfully referred to here is a native of Siam.

37. ***E. pedunculatus***, *Wall. Cat.* 2678; glabrous, leaves long-petioled oblong obtuse serrulate with apiculate serratures, racemes much shorter than the leaves, buds ovate-lanceolate, stamens few, anthers glabrous tails very short, ovary 2-celled glabrous.

MALACCA, *Maingay*; SINGAPORE, *Wallich*.

A tree. *Leaves* 3–4 by $1\frac{1}{2}$ – $1\frac{1}{4}$ in., tapering at the base; petiole $\frac{3}{4}$ –1 in. thickened at the apex. *Racemes*, 2–3 in. long, many-flowered, from the axils of the fallen leaves. *Pedicels* downy. *Flower-buds* ovate-lanceolate. *Flowers* nodding. *Sepals* ovate-lanceolate, covered with white down. *Petals* oblong-lanceolate, silky on both sides, fringed at the apex. *Anthers* glabrous. *Glands* 10. *Drupe* $\frac{3}{4}$ in., linear-oblong, glabrous, 1-celled.

38. ***E. Griffithii***, *Mast.*; leaves ovate-lanceolate acuminate glabrous, pedicels as long as the petioles, anthers hairy, ovary subglabrous. *Monocera Griffithii*, *Wight Ill.* i. p. 84, *not of Müll.* *M. holopetala*, *Zoll. ex Walp. Ann.* i. 113. *M. trichanthera*, *Griff. Not.* 518, t. 616, f. 3.

TENASSERIM, *Helper, Griffith*; MALACCA, *Griffith, &c.*; SINGAPORE, *Maingay*.—DISTRIB. JAVA.

A small tree. *Leaves* 6 by $2\frac{1}{2}$ in., minutely serrulate, paler beneath; petiole $2\frac{1}{2}$ in., thickened at the apex. *Racemes* longer than the leaves, erect. *Flower-buds* ovate-lanceolate. *Flower* $\frac{1}{2}$ in. diam. *Sepals* silky. *Petals* lanceolate, entire or slightly laciniate. *Anther-tails* reflexed. *Drupe* olive-shaped, purple, 1-celled; stone tubercled.

39. ***E. integra***, *Wall. Cat.* 2668, and 2673; leaves long-petioled glabrous ovate-lanceolate, racemes shorter than the leaves, anthers glabrescent tails reflexed, ovary 2-celled. *C. Müll. Anot. de fam. Elæocarp.* 14. *Monocera petiolata*, *Jack Mal. Misc. ex Hook. Bot. Misc.* ii. 86. *Monoceras petiolatum*, *Miq. Fl. Ind. Bat.* i. pt. 2, 212. ?*Elæocarpus robustus*, *Wall. Cat.* 2664 A.

MALACCA, *Griffith, Maingay*; PENANG, *Wallich*; TENASSERIM, *Helper*; SILHET, *Wallich*.—DISTRIB. Sumatra, Borneo.

A tree. *Leaves* 5–9 by 2–3 in., entire or minutely serrulate; petiole 2–4 in. *Racemes* erect, many-flowered, shorter than the leaves. *Flower-buds* glabrous externally, ovoid, abruptly acuminate. *Flowers* $\frac{1}{2}$ in. diam. *Sepals* glabrous, lanceolate. *Petals* oblong-lanceolate, silky on both sides. *Stamens* 20–30. *Drupe* $\frac{3}{4}$ in., smooth, olive-coloured; stone tubercled, 1-celled, 1–2-seeded.—Varies in the proportion of leaf and petiole.

SECT. IV. *Acronodia*. *Flowers* polygamous.

40. ***E. Acronodia***, *Mast.*; leaves glabrous lanceolate, anthers beardless, ovary 2-celled. *Acronodia punctata*, *Blume Bijdr.* 123; *Miq. Fl. Ind. Bat.* i. pt. 2, 213.

MALACCA, *Griffith, Maingay*.—DISTRIB. JAVA, Borneo.

A tree. *Leaves* $2\frac{1}{2}$ –3 by $\frac{3}{4}$ in., acute at both ends, apiculate; petiole $\frac{1}{2}$ in. *Racemes* shorter than the leaves. *Flowers* $\frac{1}{2}$ in. diam. *Sepals* 4–5, oblong, pointed, minutely villous. *Petals* 4–5, spatulate, laciniate at the apex. ♂ *Stamens* 15; anthers beardless, mucous. *Pistil* 0. ♀ *Stamens* as in the male, but smaller. *Ovary* ellipsoid, tubercled; ovules 2 in each cell, pendulous, anatropal, raphe next the placenta. *Drupe* $\frac{1}{2}$ in., oblong, obtuse, olive-coloured, smooth, by abortion 1-celled.

DOUBTFUL SPECIES.

E. CHACKROULA, *Ham. in Wall. Cat.* 2674. Gualpara. Of this there is no specimen in Wallich's Herbarium.

E. JACKIANUS, *Wall. Cat.* 2679, not found in Wallich's Herbarium. It is said to be a native of Singapore, *Jack*.

E. LONGIFOLIUS, *Wall. Cat.* 6682, from Ava, is indeterminate. It has very long, strap-shaped leaves, pilose along the nerves.

E. MONOCEROIDES, *Wight. Ill. i.* p. 84. "Leaves glabrous elliptic. Racemes lax, few-flowered. Stamens indefinite, glabrous. Anthers pointed, beardless, shorter than the style."

MONOCERA FERRUGINEA, *Jack Mal. Misc. ex Hook. Bot. Misc. ii.* 86. "Leaves oblong-ovate, acuminate, entire, under surface as also the peduncles and branchlets ferruginous villous, racemes axillary shorter than the leaves.—Leaves 6-7 in., entire, with revolute margins; petiole 2-2½ in., downy. Drupe olive-shaped; nut rather smooth, 1-seeded by abortion. Seed oblong, pointed, albumen conform, embryo inverse, cotyledons flat, radicle superior and much shorter than the cotyledons."—*Jack* states that he did not see the flowers.

NOTE ON ROYDSIA.

At p. 180, it is stated that *Roydsia parviflora*, *Griff.*, is a Tiliaceous plant; this is an error. *R. parviflora* forms with *R. floribunda*, *Planch. Mss.* (Cuming, Philippine Island collection, n. 541), a subgenus of *Roydsia*, or a new genus closely allied to it, of which the fruit is unknown. These plants differ from *Roydsia suaveolens* and *R. obtusifolia* in the linear-oblong buds, strap-shaped perianth-segments, which are imbricate in two series, in the anthers being entire at the base, in the long stipes of the ovary, subulate style with 3 minute terminal stigmas, and in the few ovules in each cell. I would suggest the name of *Alytostylis* for this genus or subgenus, in allusion to the undivided style. The Philippine Island *R. floribunda*, *Planch. Mss.*, has flowers nearly an inch in diameter, very many stamens, a very slender gynophore, which elongates after flowering, and oblong leaves, 7-9 inches long.

There can be no doubt but that *Roydsia* should, as *Griffith* observes, form the type of a Natural Order intermediate between *Bixineæ* and *Capparideæ*. Both *Roydsia* and *Alytostylis* differ remarkably in habit from *Tiliaceæ*.

3. ***Roydsia (Alytostylis) parviflora*, *Griff. Notul. iv.* 578; *Ic. Plant. Asiat. t.* 607, f. 1; leaves elliptic or elliptic-lanceolate acuminate, perianth-segments ligulate obtuse.**

BIRMA, in woods near the Serpentine Mines at Hookum, *Griffith*.

A climbing shrub. Leaves 4-7 by 1½-2 in., glabrous, rather membranous, pale yellow-green, nerves almost horizontal; petiole ½-¾ in., slender. Racemes short, very pubescent, axillary, and forming small terminal panicles, rachis slender; pedicels shorter than the buds; bracts subulate, caducous. Flowers ½ in. diam., inodorous, densely tomentose; buds oblong. Perianth divided nearly to the base into 6, biseriate, imbricate, obtuse, strap-shaped, densely pubescent segments, that are finally recurved, not much shorter than the stamens. Gynophore short in flower, slender. Stamens about 20, not much exceeding the perianth-segments; anthers not 2-fid at the base. Ovary ovoid, densely pubescent, contracted into a stipes as long as itself, 3-celled; style subulate, stigmas 3, minute; ovules about 4 in each cell.

Flowering specimens of *R. obtusifolia*, *H. f. & T.* (see p. 180), have been recently received from *Kurz*, collected in Pegu. The flower-buds are very small, globose, tomentose. Sepals 6, short, obtuse, apparently valvate, pubescent. Stamens about 18, exceeding the perianth. Ovary glabrous, on a tomentose gynophore; styles 3, subulate, united at the base.—*J. D. Hooker*.

ORDER XXIX. LINEÆ. (By J. D. Hooker.)

Herbs or shrubs. Leaves usually alternate, simple, entire, rarely crenate-serrate; stipules lateral or intrapetiolar or 0. Inflorescence various. Flowers regular, bisexual. Sepals 5, rarely 4, free or connate below, imbricate.

Petals as many, hypogynous or slightly perigynous, usually fugacious, often contorted. *Stamens* 4-5 with as many interposed staminodes, or 8-10, rarely more, filaments united at the base into a hypogynous or slightly perigynous ring, filiform; anthers versatile, 2-celled. *Glands* 5, entire or 2-lobed, usually adnate to the staminal ring, or obsolete. *Ovary* entire, 3-5-celled; styles 3-5, free or more or less connate, stigmas terminal; ovules 1 or 2, inserted in the inner angle of the cells, anatropous, pendulous. *Fruit* usually splitting into 3-5 cocci, rarely a drupe. *Seeds* 1-2 in each cell, testa sometimes winged, albumen fleshy or 0; embryo nearly as long as the seed, straight, rarely incurved, cotyledons broad, radicle superior.—**DISTRIB.** All regions; genera 14, species about 135.

TRIBE I. Eulineæ. *Petals* contorted, fugacious. *Perfect stamens* as many as the petals. *Capsule* septicidal.—Herbs rarely shrubs.

Calyx glabrous or pubescent. Styles 5. Capsule 5-celled . . . 1. LINUM.

Calyx glabrous. Styles 3-4. Capsule 3-4-celled . . . 2. REINWARDTIA.

Calyx setose. Styles 3. Capsule 1-celled, 1-seeded . . . 3. ANISADENIA.

TRIBE II. Hugoniæ. *Petals* contorted, fugacious. *Perfect stamens* 2-3 times as many as the petals. *Fruit* a drupe.—Usually scandent shrubs, with hooked woody tendrils formed of arrested branchlets.

Sepals subacute, tomentose, ebracteolate . . . 4. HUGONIA.

Sepals obtuse, bracteolate . . . 5. ROUCHERIA.

TRIBE III. Erythroxyloæ. *Petals* imbricate, rarely contorted, with a scale on the inner face, at length deciduous. *Perfect stamens* twice as many as the petals. *Fruit* a drupe.—Shrubs or trees.

Pedicels axillary. Petals with a double scale . . . 6. ERYTHROXYLON.

TRIBE IV. Ixonanthæ. *Petals* contorted, persistent. *Stamens* 2-3-4 times as many as the petals. *Capsule* septicidal.

Stamens perigynous . . . 7. IXONANTHES.

1. LINUM, Linn.

Herbs, rarely shrubby below. *Leaves* narrow, quite entire; stipules 0, or replaced by glands. *Sepals* 5, quite entire. *Petals* 5, contorted, fugacious. *Stamens* 5, often alternating with minute staminodes. *Glands* opposite the petals, adnate to the staminal ring. *Ovary* 5-celled, cells 2-locellate, 2-ovuled; styles usually free, stigmas various; ovules 10, 1 in each locellus. *Capsule* 5-celled, septicidally splitting into 5 simple 2-seeded or 10 1-seeded cocci. *Seeds* compressed, albumen sparing; embryo straight.—Species about 80, most of them Mediterranean.

1. **L. usitatissimum**, Linn.; annual, stem cylindric erect simple below, leaves narrow sub-3-nerved, petals blue, styles quite free, stigmas linear-clavate, capsule scarcely exceeding the narrowly white-margined, acuminate sepals. *Wall. Cat.* 1504; *Don Prodr.* 217; *Roxb. Fl. Ind.* ii. 110; *Gibbs. & Dalz. Bomb. Fl. Suppl.* 16; *DC. Prodr.* 217; *W. & A. Prodr.* 134. *L. trinervium*, *Roth Nov. Sp.* 187.

Cultivated chiefly for oil throughout INDIA, up to 6000 ft., in the Himalaya.—**DISTRIB.** Westwards to the Atlantic.

Stems 2-4 ft., often solitary, corymbosely branched above. *Leaves* linear or lanceolate, without stipular glands. *Flowers* 1 in. diam., in broad cymes. *Sepals* ovate, acuminate, 3-nerved, eglandular, margins ciliate or not.—The Indian plant has the

ciliated axile margins of the carpels of *L. humile*, Mill., and the crenate petals (Roxb.) and smooth leaf-margins of *L. usitatissimum*, and is thus intermediate between these supposed species. Roth's specimens of *trinervium* (from Herb. Rottler) are from a garden; they are very imperfect, but clearly *L. usitatissimum*.

2. ***L. perenne***, Linn.; perennial, stems many from the roots, leaves all lanceolate or lower oblong obtuse and upper linear acute, petals blue entire, styles quite free, stigmas subcapitate, capsule much longer than the white-margined sepals.

WESTERN TIBET, alt. 9-13,000 ft., *Hb. Royle, Munro, &c.*; LAHUL, *Jaeschke*.—DISTRIB. Westwards to the Canaries.

Stem 1-3 ft. high. Leaves $\frac{1}{2}$ - $\frac{3}{4}$ in., without stipular glands. Cymes few-flowered, racemose. Flowers 1 in. broad. Sepals ovate or obovate, 3-5-nerved. Capsule as large as a pea, on a slender pedicel. Sepals with glandular margins.

VAR. *Stockianum*, Boiss. *Fl. Orient.* i. 865; more glaucous, cymes very few-flowered. *L. Stockianum*, Boiss. *Diagn. Ser.* 2, i. 98.—Scarcely different from the type.

3. ***L. strictum***, Linn.; annual, leaves linear linear-oblong or lanceolate 1-nerved margins and keel scabrid, petals yellow, styles quite free stigmas capitate, capsule globose shorter than the long acuminate sepals. Boiss. *Fl. Orient.* i. 852.

VAR. *corymbulosum*, Planch. in Hook. Lond. Journ. Bot., vii. 476; corymbs lax-flowered, pedicels longer than the calyx. *L. corymbulosum*, Reichb.; Boiss. *Fl. Orient.* i. 852.

THE PUNJAB HILLS, &c., extending to Peshawur and Marri, *Jacquemont, &c.* WESTERN TIBET, alt. 10,000 ft., *Falconer, &c.*—DISTRIB. From Soongaria to N. Africa and Italy.

A slender annual, perhaps at times biennial, usually corymbosely branched above, glabrous or sparingly pubescent. Leaves $\frac{1}{4}$ - $\frac{1}{2}$ in., acuminate, without stipular glands. Flowers $\frac{1}{4}$ - $\frac{3}{4}$ in. diam., shortly pedicelled, in corymbose cymes. Sepals with very long rigid green points, about equalling the pedicels, margins glandular. Capsule $\frac{1}{4}$ in. diam., globose.—Cultivated in Afghanistan for oil and fodder, and not for flax (*Griffith, It. Notes*, 313).

4. ***L. mysoreense***, Heyne in Wall. *Cat.* 1507; annual, stem corymbosely branched above, leaves oblong or elliptic-oblong narrowed at the base obtuse or acute 3-nerved, petals yellow small but exceeding the calyx, styles connate below stigma capitate, capsule about equalling the ovate acute sepals. W. & A. *Prodr.* i. 134; *Thwaites Enum.* 25; *Benth. in Bot. Reg. under tab.* 1326; *Dalz. & Gibs. Bomb. Flor.* 16. *L. humile*, Heyne mss. *L. trinervium*, Herb. *Hohenbach, not of Roth*.

Exposed hills of the WESTERN PENINSULA, from the Concan, Kandalla and the Deccan to the Nilghiris. WESTERN HIMALAYA, Garwhal, alt., 3-5000 ft., *Jacquemont, Royle, &c.* CEYLON, alt. 4-6000 ft., *Thwaites*.

A small slender glabrous herb, usually much corymbosely branched above. Leaves $\frac{1}{3}$ - $\frac{2}{3}$ in., variable in breadth and somewhat in form, without stipular glands. Flowers $\frac{1}{4}$ in. diam., in panicked corymbs, the branches of which elongate as unilateral cymes in fruit. Sepals with white eglandular margins and short points. Filaments connate below, dilated above. Capsule $\frac{1}{2}$ in. diam., globose.

2. **REINWARDTIA**, Dumort.

Undershubs. Leaves alternate, quite entire or crenate-serrate; stipules minute, subulate, caducous. Flowers yellow, in axillary and terminal cymose fascicles, rarely solitary. Sepals 5, quite entire, lanceolate, acuminate. Petals 5, contorted, fugacious, much longer than the sepals. Stamens 5, hy-

pogynous, connate below, alternating with as many interposed subulate staminodes. *Glands* 2-3, adnate to the staminal ring. *Ovary* 3-5-celled, cells 2-locellate; styles 3-4, filiform, free or connate below, stigmas subcapitate; ovules 1 in each locellus. *Capsule* globose, splitting into 6-8 cocci. *Seeds* reniform.—**DISTRIB.** The following are the only species.

1. ***R. trigyna***, *Planch. in Hook. Lond. Journ. Bot.* vii. 522; leaves elliptic-obovate with the tip rounded or elliptic and subacute quite entire or minutely crenate-serrate, styles 3 free or connate at the base. *R. indica*, *Dumort. Comm. Bot.* 19. *R. repens*, *Planch. l.c.* 523. *Linum trigynum*, *Roxb. Fl. Ind.* ii. 110; *Smith Exot. Bot.* 31. t. 17; *Bot. Mag.* t. 1100; *Wall. Cat.* 1505; *W. & A. Prodr.* 134. *L. repens*, *Don Prodr.* 217. *Macrolinum trigynum*, *Reichb. Ic. Fl. Germ.* iii. 68. *Kittelocharis trigyna*, *Alef. in Bot. Zeit.* 1863, 282.

Hilly parts of India, from the PUNJAB eastwards to SIKKIM, ascending to 6000 ft. BEHAR, ASSAM, and CHITTAGONG, and southwards from the BOMBAY GHATS to the NILGHIRI HILLS.

A tufted glabrous undershrub, 2-3 ft. high, with erect and prostrate rooting terete rather stout soft branches. *Leaves* 1-3 in., narrowed into slender petioles, usually rounded and mucronate at the tip, and then quite entire, but sometimes acute or even suddenly acuminate, and then minutely crenate-serrate. *Flowers* often 1 in. diam., but variable in number, size, length of pedicel, and of sepals, which are sometimes $\frac{3}{4}$ in. long. *Capsule* shorter than the sepals, the size of a small pea.—If, as is probable, this and the following species are varieties of one, *Dumortier's* name of *R. indica* should be retained for both.

2. ***R. tetragyna***, *Planch. in Hook. Lond. Journ. Bot.* vii. 523; leaves elliptic-lanceolate acuminate crenate-serrate, styles 3-4 united below. *R. trigyna*, *Dalz. & Gibs. Bomb. Flor.* 16. *Linum tetragynum*, *Coleb. in Wall. Cat.* 1506; *Benth. in Bot. Reg. under tab.* 1326. *L. Cicanobum*, *Don Prodr.* 217.

In the same regions as *R. trigyna*, but usually in damper localities.

Easily distinguished from the common type of *R. trigyna* by the much larger lanceolate leaves, and more numerous styles, but variable in the former respect, and I suspect that the two are varieties of one.—I have a note to the effect that 5 styles occur.

3. **ANISADENIA**, Wall.

Perennial herbs. *Leaves* alternate or somewhat whorled at the top of the stem, coriaceous, serrate; stipules intrapetiolar, striate. *Flowers* in terminal spike-like racemes, white or pink; bracts minute, coriaceous, concave, grooved, caducous, pedicels at length reflexed. *Sepals* 5, lanceolate, coriaceous, strongly nerved, 3 outer with spreading gland-tipped bristles, 2 inner glandular. *Petals* 5, contorted, fugacious. *Stamens* 5, hypogynous, filaments connate below, alternating with interposed staminodes. *Glands* usually 3, adnate to the staminal tube, one very large. *Ovary* 3-celled; styles 3, stigmas terminal; ovules 2, collateral in each cell. *Capsule* oblong, membranous, indehiscent? 1-seeded. *Seed* oblong, testa adherent to the thin albumen; embryo straight, green, cotyledons plano-convex.—**DISTRIB.** The following are the only species.

1. ***A. saxatilis***, *Wall. Cat.* 1510; stem glabrous leafy at the summit, leaves 2-5-in. glabrous above sparingly pubescent or glabrous beneath. *A. Khasyana*, *Griff. Notul.* iv. 534; *Ic. Pl. Asiat.* t. 593 (middle figure).

CENTRAL and EASTERN TEMPERATE HIMALAYA; Nipal, Sikkim, alt. 6-8000 ft., and the KHASIA Mts., alt. 5-6000 ft.

Stem curved at the base, ascending, rather stout, often 1 ft. long below the foliage,

always simple, lower part often creeping. *Leaves* approximate, spreading, elliptic-lanceolate, acuminate, glaucous beneath, margin quite entire or obscurely waved or crisped. *Raceme* 2-5 in. long, quite simple. *Flowers* $\frac{1}{4}$ - $\frac{1}{3}$ diam., pink; pedicel very short. *Calyx* $\frac{1}{8}$ in. long.

2. **A. pubescens**, Griff. *Notul.* iv. 535; *Ic. Pl. Asiat.* t. 593 (*right hand figure*); stem pubescent leafy all the way up, leaves 1-1 $\frac{1}{2}$ in. with appressed hairs above silkily villous beneath.

KHASIA Mts., alt. 5-6000 ft., Griffith, &c.

More slender than *A. saxatilis*, stem elongate, prostrate, often much-branched; branches including the racemes 6-15 in. *Leaves* alternate, whitish beneath, elliptic, acute at both ends, margin quite entire, sometimes undulate, nerves very oblique; petiole $\frac{1}{8}$ - $\frac{1}{2}$ in. *Raceme* very slender, simple above, the lower peduncles 2-3-flowered, short, erect, and as well as the rachis tomentose. *Calyx* $\frac{1}{4}$ in. long, gland-tipped hairs more robust than in *A. saxatilis*. *Flowers* $\frac{1}{4}$ in. diam., white, much larger than in *A. saxatilis*.

4. HUGONIA, Linn.

Climbing, often tomentose shrubs. *Leaves* alternate, serrate, stipulate. *Inflorescence* various; flowers yellow, lower peduncles converted into spiral hooks. *Sepals* 5. *Petals* 5, contorted, fugacious. *Stamens* 10, hypogynous, with glandular swellings on the basal ring between the filaments, which are connate below. *Ovary* 5-celled; styles 5, filiform, stigmas capitate; ovules 2, collateral in each cell. *Drupe* globose. *Seeds* compressed, albuminous; embryo straight or slightly curved, cotyledons flat.—**DISTRIB.** Tropical Asia and Africa; species about 6.

1. **H. Mystax**, Linn.; leaves elliptic-obovate or obovate-oblong obtuse or subacute quite entire reticulate on both surfaces. *Wall. Cat.* 1201; *W. & A. Prodr.* 72; *Wight Ill.* 79, t. 32; *Planch. in Hook. Lond. Journ. Bot.* vii. 524; *Dalz. & Gibs. Bomb. Flor.* 17. *H.*: obovata, *Ham. in Trans. Linn. Soc.* xiv. 205.—*Rheede Hort. Mal.* ii. t. 19.

WESTERN PENINSULA, from the Concan to Travancor. CEYLON.

A rambling leafy shrub; branches, tendrils, and sepals densely clothed with brown tomentum. *Leaves* crowded, 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in., rather thin, nerves spreading; stipules subulate, undivided. *Flowers* 1-1 $\frac{1}{2}$ in. diam., terminal and in the upper axils, shortly pedicelled, yellow. *Stamens* alternately long and short. *Fruit* globose, shorter than the sepals.

2. **H. ferruginea**, W. & A. *Prodr.* 72; leaves elliptic long acuminate quite entire densely silkily villous beneath, veins arched not reticulate.

CEYLON, hotter and drier parts of the island.

A rambling or climbing shrub; branches, tendrils, and sepals densely velvety. *Leaves* 2-5 by 1 $\frac{1}{2}$ -2 in., rather coriaceous, finely silky above when young, glabrous when old, midrib and arched nerves strong; stipules subulate. *Flowers* about half the size of those of *H. Mystax*.

5. ROUCHERIA, Planch.

Erect or climbing trees or shrubs with revolute woody tendrils. *Leaves* quite entire or glandular-serrate, coriaceous, penninerved; stipules minute, caducous. *Flowers* axillary, yellow, subsessile, or in excessively short fascicled spikes; pedicels bracteolate. *Sepals* 5. *Petals* 5, hypogynous, contorted, fugacious. *Stamens* 10, all fertile, filaments connate into a short tube below. *Glands* obsolete. *Ovary* 3-5-celled; styles 3-5, filiform, stigmas cuneate, 2-lobed; ovules 2, collateral. *Drupe* scarcely fleshy, subglobose; stone 3-6-angled, bony, cells 1-2-seeded. *Seeds* compressed, pendulous; albumen rather fleshy, embryo with foliaceous cotyledons and an elongate radicle.—**DISTRIB.** 3 or 4 species, one or more Malayan and Bornean, and 2 from Guiana.

1. **R. Griffithiana**, *Planch. in Hook. Lond. Jour. Bot.* vi. 143, vii. 527; leaves lanceolate or elliptic- or obovate-lanceolate obtusely caudate-acuminate crenate-serrate, drupe 1-celled 1-seeded.

MALACCA, *Griffith, Maingay*.—DISTRIB. Sumatra, Borneo.

A climbing shrub, perfectly glabrous. *Leaves* 3-5 in., alternate, coriaceous, complicate, shining above, nerves few, arched; petiole $\frac{1}{2}$ in., slender. *Flowers* $\frac{1}{2}$ in. diam., 7-8 in a cluster; pedicels very short, densely bracteate. *Petals* narrow, very fugacious. *Drupe* the size of a small pea.—There cannot be much doubt of this constituting the genus *Sarcotheca*, Blume, though he describes the calyx as ebracteate, the ovules as superposed, and the fruit as a bacciform capsule, dehiscing by 5 apical fissures.

6. **ERYTHROXYLON**, Linn.

Shrubs or small trees, usually quite glabrous. *Leaves* alternate, quite entire, often subdistichous; stipules intrapetioar, often imbricating on short arrested leafless branches. *Flowers* axillary, small, white or pink, solitary or fascicled; peduncles bracteolate, *Sepals* 5, rarely 6, free or connate. *Petals* 5, hypogynous, deciduous, with an erect double ligula on the inner face, imbricate. *Stamens* 10, rarely 12, filaments united into a glandular or eglandular tube. *Ovary* 3- rarely 4-celled; styles 3, rarely 4, free or connate (connate in all Indian species), stigmas capitate; ovules 1, rarely 2 in each cell. *Drupe* 1-celled, 1-seeded. *Seed* with a thin testa, albumen variable in quantity or 0; embryo straight, cotyledons plano-convex, radicle short.—DISTRIB. Species about 50, four-fifths of them American, and almost all tropical. The Indian species are not easy of discrimination.

* *Leaves* glaucous brown beneath when dry.

1. **E. monogynum**, *Roxb. Cor. Pl.* i. t. 88; *Flor. Ind.* ii. 449; leaves 1-2 by $\frac{3}{4}$ -1 in. obovate or elliptic- or cuneate-obovate tip rounded hardly shining above pale glaucous brown beneath when dry, nerves oblique much reticulated, peduncles $\frac{1}{4}$ - $\frac{1}{3}$ in. *E. indicum*, *Beddome Flor. Sylvat.* t. 81. *Sethia indica*, *DC. Prodr.* i. 576; *Wall. Cat.* 6848; *W. & A. Prodr.* 106; *Wight Ill.* t. 48.

Hilly parts of the WESTERN PENINSULA, *Rottler, &c.*; CEYLON, in hot dry parts of the Island.

A shrub with pale bark. *Leaves* the smallest of the Indian species, always more or less cuneate-obovate, the primary nerves hardly distinguishable from the secondary, and these last not connected with an evident intramarginal one; petiole sometimes $\frac{1}{2}$ in. —The Ceylon specimens have larger leaves and longer pedicels. This is very closely allied to, if not identical with, an Eastern African species.

2. **E. Kunthianum**, *Wall. Cat.* 6849 (*Sethia* ?); leaves $2\frac{1}{2}$ - $3\frac{1}{2}$ by $\frac{3}{4}$ - $1\frac{1}{4}$ in. elliptic-lanceolate rarely elliptic-obovate acute or acuminate rarely obtuse or rounded at the tip opaque above pale glaucous-brown beneath when dry with a reddish midrib, nerves sub-horizontal very faint. ? *E. Kunthianum*, *Kurz in Journ. Beng. Asiat. Soc.* xli. pt. ii. 294.

EASTERN BENGAL, and Khasia hills, alt. 3-5000 ft.; ? Martaban, *Kurz*.

A shrub, 3-6 ft. *Leaves* very faintly reticulate on both surfaces, the secondary nerves not collected into an obvious intramarginal nerve; petiole very short. *Drupe* $\frac{1}{2}$ in. long, slender, equalling the pedicel.—I have not seen *Kurz's* specimens.

VAR. ? *Parishii*; leaves smaller $1\frac{1}{2}$ in. acute pale with more prominent nerves.—Top of Thounnggyun in Moulmein, *Parish*.

3. **E. burmanicum**, *Griff. Notul.* iv. 468; *Ic. Plant. Asiat.* t. 581, f. 3 (*flower*); a tree, leaves 1- $2\frac{1}{2}$ by $\frac{3}{4}$ - $1\frac{1}{4}$ in. obovate-oblong or obovate very

obtuse or emarginate glaucous beneath nerves horizontal faint not forming an intramarginal nerve, pedicels $\frac{1}{4}$ – $\frac{1}{3}$ in. solitary or geminate. *E. sumatranum*, *Miq. Flor. Ind. Bat. Suppl.* i. 572. *E. retusum*, *Bauer ex Teysm. & Binnend. in Tydschr. v. Naturch. Ver. Ned. Ind.* xxviii. 71 (according to Kurz).

EASTERN PENINSULA, TENASSERIM, and ANDAMAN ISLDS., *Helper*; MERGUI, *Griffith*; MALACCA, *Griffith*, *Maingay*; PENANG, *Phillips*.—DISTRIB. Sumatra.

Very near to *E. Kunthianum*, but with more obovate and more obtuse leaves; it is further described as a tall tree, whilst the Khasia plant is a mere bush. The Penang and some Malaccan specimens have much smaller leaves than the Mergui ones.—I have seen no Sumatran specimens.

** *Leaves* not glaucous beneath, but more or less shining on both surfaces.

4. ***E. lanceolatum***, *Wight Ill.* i. 136 (*Sethia*); leaves 2–4 by $\frac{3}{4}$ in. elliptic-lanceolate obtuse shining on both surfaces nerves oblique, peduncles $\frac{1}{4}$ – $\frac{3}{4}$ in. very slender. *Sethia lanceolata*, *Thwaites Enum.* 54. *S. erythroxylodes*, *Wight, l.c.*

WESTERN PENINSULA; Courtallum, *Wight*; CEYLON, banks of streams, Galagama district, alt. 2–3000 ft., *Thwaites*, &c.

An erect branching shrub. *Leaves* sometimes slightly contracted towards the base, nerves not connate into a distinct intramarginal one; petiole $\frac{1}{10}$ – $\frac{1}{8}$ in.—Wight's var. *obtusifolium* and his *S. erythroxylodes* are hardly distinguishable; the latter is a short-styled form, with alternately longer stamens; another form with longer styles and shorter stamens occurs; as is the case with the two following species;—all are no doubt dimorphous.

5. ***E. lucidum***, *Moon Cat. Ceyl. Pl.* 36; leaves 2–3 by $\frac{3}{4}$ –1 in. elliptic-lanceolate obtusely caudate-acuminate opaque or shining above shining beneath nerves nearly horizontal, pedicels $\frac{1}{10}$ – $\frac{1}{4}$ in. *Sethia acuminata*, *Arn. in Act. Acad. Nat. Cur.* xviii. 324; *Wight Ill.* i. 135; *Thwaites Enum.* 54.

CEYLON; Ambagamowa and Saffragam districts, alt. 1000 ft., *Walker*.

This differs from *E. lanceolatum* in the long points to the comparatively broader leaves, which have furthermore horizontal nerves; and in the short stout peduncles. Thwaites notices two forms of flower, one (*stylosa*) with the alternate stamens longer, and a shorter style; the other (*staminea*) with equal stamens and a longer style.—The expressed juice of the fresh leaves is given by the Cinghalese as an anthelmintic to children. There is a very similar species to this, a variety of it, in Borneo.

6. ***E. obtusifolium***, *Thwaites Enum.* 54; leaves 2–3 $\frac{1}{2}$ by 1 $\frac{1}{4}$ –1 $\frac{3}{4}$ in. obovate-obtuse or broadly oblong tip rounded or obtusely pointed rather shining on both surfaces nerves rather oblique elevated, pedicels short stout.

CEYLON; Central Provinces, alt. 2–4000 ft., *Thwaites*.

I follow Thwaites in retaining this as a distinct species, though I can scarcely doubt its being a broad-leaved state of *E. lanceolatum*, its nerves are less oblique however. It occurs under the two forms of long stamens and short style and vice versa. *Fruit* in Thwaites's drawing $\frac{1}{2}$ in. long, linear-oblong, straight, red. Thwaites refers to this the *S. lanceolata*, var. *obtusifolia* of Wight, which is, however, clearly a very trifling variety of *S. lanceolatum*.

DOUBTFUL SPECIES.

E. SIDEROXILOIDES, *Lamk.* This is a Mauritian species, mentioned by Roxburgh (ii. 449) as having been sent from Ceylon to the Botanic Garden of Calcutta by General Macdowall, and as being also a native of Coromandel. As no description is given I cannot say to which of the above Roxburgh's Coromandel species it should be referred.

7. **IXONANTHES**, Jack. (*Ixonanthes*, Auct.)

Glabrous trees, turning black in drying. *Leaves* alternate, entire or crenate-serrate, nerves reticulate; stipules minute or 0. *Flowers* small, in axillary cymose dichotomous peduncled panicles. *Sepals* 5-6, shortly connate at the base. *Petals* 5-6, perigynous, contorted, persistent, hardened round the fruit. *Stamens* 10-20, inserted on the outside of a perigynous annular or cupular eglandular disk. *Ovary* free, 5-6-celled, cells sometimes 2-locellate; style simple, stigma capitate lobed; ovules two in each cell. *Capsule* coriaceous or woody, oblong or conic, septicidal, carpels opening inward. *Seeds* (according to Griffith) winged or crowned with a mitri-form aril, albumen fleshy; embryo lateral, cotyledons foliaceous, radicle superior.—**DISTRIB.** Species 6-8, all tropical Asiatic, and chiefly Malayan.

1. ***I. icosandra***, Jack *Mal. Misc. ex Hook. Comp. Bot. Mag.* i. 154; leaves obovate or obovate-oblong obtuse quite entire or crenate narrowed into a very short petiole, stamens 10-20, capsule $\frac{3}{4}$ by $\frac{1}{4}$ in. very narrow ovoid. *Miq. Fl. Ind. Bat.* i. pt. 2, 494. *I. dodecandra*, Griff. *Plant. Cantor.* 12. *Gordonia*? peduncularis, Wall. *Cat.* 4409. *Hypericinea dentata*, Wall. *Cat.* 4832. *Pierotia lucida*, Blume *Mus. Bot.* i. 180. *Brewstera crenata*, Roem. *Synops.* i. 141. *Macharisia icosandra*, Planch. *ms.*—Griff. *Notul.* iv. 498; *Ic. Pl. Asiat.* t. 589, f. 2.

PENANG, Wallich; MALACCA, Griffith, Maingay; SINGAPORE, Lobb.—**DISTRIB.** Sumatra.

A small tree. *Leaves* 3-7 by $1\frac{1}{2}$ -2 in., very variable, always narrowed into the petiole, which varies from $\frac{1}{10}$ - $\frac{1}{4}$ in., brown when dry, shining on both surfaces, margins thickened, nerves very slender almost horizontal, tip obtuse rounded or emarginate. *Peduncles* slender, straight, often exceeding the leaves. *Flowers* about $\frac{1}{4}$ in. long.—Without authentic specimens the identity of this with Jack's plant cannot be verified. Though it differs from his description in the usually small leaves, and in the often fewer stamens, I have followed my predecessors in referring it to his *I. icosandra*. Jack describes the flowers as 5-6-merous. The pedicels appear to elongate very much as the bud advances, and up to the ripening of the fruit. There are perhaps two varieties, one with peduncles shorter than the leaves, and longer pedicels.

2. ***I. cuneata***, Miq. *Fl. Ind. Bat. Suppl.* i. 484; leaves oblong-spathulate or obovate-oblong obtuse quite entire or crenate narrowed into a very short petiole, cymes peduncled, stamens about 10, capsule turgid $\frac{1}{2}$ - $\frac{2}{3}$ by $\frac{1}{2}$ in. broadly ovoid.

MALACCA, Maingay.—**DISTRIB.** Sumatra.

I retain this species with great doubt, the foliage and flowers appear to be identical with those of *I. icosandra*, but the capsule is very much broader for its length. I have seen two Sumatran specimens thus named by Miquel himself, of which one alone has these broad capsules; the other appears to be in this as in every other respect, identical with *I. icosandra*. Miquel does not describe the capsule, and I hence do not know which he meant to be *I. cuneata*.

3. ***I. khasiana***, Hook. f.; leaves elliptic-lanceolate obtusely acuminate quite entire narrowed into a slender petiole, nerves very oblique, peduncles slender shorter than the leaves, cymes dense-flowered. *Hypericinea pedunculosa*, Wall. *Cat.* 4826.

KHASIA MTS., F. de Silva.

Similar in habit to *I. icosandra*, but the leaves are of a totally different shape, much more membranous, and the flowers are twice as large. *Leaves* 3-4 $\frac{1}{2}$ in., membranous;

nerves numerous, oblique; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Peduncles* shorter than the leaves. *Flowers* $\frac{1}{2}$ in. diam. *Stamens* 10.

4. *I. obovata*, *Hook. f.*; leaves broadly obovate rounded at the apex sinuate-crenate narrowed into a slender petiole nerves nearly horizontal, stamens 12 or more, capsule (unripe) $\frac{1}{2}$ by $\frac{1}{6}$ in. narrow ovoid.

EASTERN PENINSULA; SINGAPORE, *Lobb.*

A very distinct species, easily recognised by the broad flat obovate leaves, 2–4 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., with nearly horizontal nerves, the tip is rounded and often emarginate, and the margins have long very shallow crenatures. *Peduncles* very slender, equalling or exceeding the leaves; cymes rather crowded. *Flowers* about the size of those of *I. icosandra*.

5. *I. reticulata*, *Jack in Mal. Misc. ii. No. 7, 51*; leaves elliptic-oblong obtuse quite entire scarcely narrowed into the slender petiole nerves arching much reticulated on both surfaces, peduncles very stout, stamens 10, capsule $1-1\frac{1}{2}$ by $\frac{2}{3}$ in. ovoid, valves grooved at the back. *Griffith Plant. Cantor 11. Hypericinea macrocarpa, Wall. Cat. 4833. Gordonia decandra, Roxb. Fl. Ind. ii. 573; Wall. Cat. 4408.*

EASTERN PENINSULA; MALACCA, *Maingay*; SINGAPORE, *Wallich*.—DISTRIB. Sumatra.

Leaves 3–5 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in.; petiole 1 in., very slender. *Peduncles* shorter than or equalling the leaves. *Sepals* in fruit $\frac{1}{2}$ in. long, very thick.—*Wallich's* specimens have a shorter, more turgid capsule than *Maingay's*, and more shining leaves, with a decidedly recurved margin. This accords best with *Jack's* description of *I. reticulata*, though, as with *I. icosandra*, its identity cannot be satisfactorily ascertained. It differs in the leaves not having very thickened margins, and not being glaucous beneath. It approaches the *I. chinensis*, but the fruit is very much larger, and may be identified with a Bornean species, of which, however, I have seen no fruit.

ORDER XXX. MALPIGHIACEÆ. (By J. D. Hooker.)

Trees or shrubs, often climbing. *Leaves* (in the Indian genera) opposite, quite entire; stipules small or 0. *Inflorescence* axillary or terminal; pedicels articulate, usually 2-bracteolate. *Flowers* middling sized or small, white or yellow, more rarely red yellow or blue, hermaphrodite, regular or irregular. *Calyx* usually 5-partite; segments imbricate or valvate, 1 or more (never all) furnished with a large gland, rarely eglandular (*Aspidopterys*). *Petals* 5, clawed or not, often fimbriate, imbricate. *Disk* obscure. *Stamens* 10, hypogynous or subperigynous, equal or 1 or more much larger than the others, filaments free or connate below, anthers 2-lobed. *Ovary* 3-celled; styles 1–3, straight or cinate, stigmas capitate or punctiform or lateral; ovules solitary in each cell, micropyle superior, raphe ventral. *Fruit* (in the Asiatic genera) of one or more winged samaras. *Seed* exalbuminous; embryo straight or curved, radicle superior.—DISTRIB. A very large American Order, scantily represented in Africa and still more so in Asia; genera about 50, species about 600.

Styles 1 rarely 2.

Calycine glands minute or 0	1. TRISTELLATEIA.
Calycine gland 1, large, adnate to the pedicel	2. HIPTAGE.

Styles 3.

Calycine glands 0	3. ASPIDOPTERYS.
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1. **TRISTELLATEIA**, Thouars.

Woody-climbers. *Leaves* opposite or whorled; petiole 1-2-glandular at the top; stipules minute. *Flowers* yellow, in terminal or lateral racemes. *Calyx* 5-partite, eglandular, or with minute glands. *Petals* 5-clawed. *Stamens* 10, all perfect; filaments rigid, truncate and articulate at the top; anthers acute. *Ovary* 3-lobed; styles 1-3, slender, one or more reduced to small papillæ. *Ripe carpels* 3, each with about 3 or more wings, the whole forming a stellate fruit. *Seed* obovoid, testa membranous; cotyledons fleshy, hooked.—**DISTRIB.** About 8 species, natives of tropical Africa, Asia, and Australasia.

1. **T. australasica**, A. Rich. *Sert. Astrol.* 38, t. 15; *Benth. Flor. Austral.* i. 286. *Platynema laurifolium*, W. & A. in *Edin. New Phil. Journ.* 1833, 179; *Prodr.* 107.

EASTERN ARCHIPELAGO; Singapore, *Herb. Wight, &c.*—**DISTRIB.** Eastwards to New Ireland.

Glabrous. *Leaves* 2-4 in., ovate or elliptic, acute, membranous, quite entire; petiole 1- or eglandular. *Racemes* terminal, 4-6 in. *Flowers* 1 in. diam.; pedicels opposite, minutely 2-bracteolate below the middle. *Petals* ovate-cordate, claw slender. *Fruit* $\frac{1}{2}$ in. diam.; carpel-wings coriaceous, spreading and recurved, linear-oblong, vertically compressed.—Wight's specimens, stated in the Prodrömus to be from Ceylon, were from Singapore.

2. **HIPTAGE**, Gärtner.

Climbing or suberect shrubs. *Leaves* opposite, quite entire, coriaceous, eglandular, or with a row of remote intramarginal glands beneath; stipules 0. *Racemes* terminal or axillary, simple or compound; peduncles erect, bracteate, articulate with the 2-bracteolate pedicels. *Flowers* white, fragrant, the 5th petal discoloured. *Calyx* 5-partite; glands large, adnate to the pedicel. *Petals* 5, clawed, unequal, silky. *Stamens* 10, declinate, all fertile, one much the largest, filaments connate at the base. *Ovary* 3-lobed, lobes appendiculate; styles 1-2 circinate, the others rudimentary, stigmas 1 or 2. *Fruit* of 1-3, 2-3-winged samaras. *Seed* subglobose; cotyledons thick, unequal.—**DISTRIB.** Four species, all tropical Asiatic.

1. **H. Madablota**, Gärtn. *Fruct.* ii. 169, t. 116; branches stout, leaves 4-6 in. oblong or ovate-lanceolate acuminate or cordate-acuminate, racemes with densely appressed pubescence, flowers $\frac{3}{4}$ -1 in. diam., carpels, with a central wing between the 2 lateral. *DC. Prodr.* i. 583; *W. & A. Prodr.* 107; *Wall. Cat.* 1063; *Wight Ill.* t. 50. *Molina racemosa*, *Lamk. Dict.* iv. 227; *Cav. Diss.* ix. t. 263. *Gärtnera racemosa*, *Roxb. Cor. Pl.* i. t. 18; *Fl. Ind.* ii. 368. *Banisteria bengalensis*, *Linn.* *B. unicapsularis*, *Lamk.* *B. tetraptera*, *Sonnerat Voy.* ii. t. 135.—*Rheede Hort. Mal.* vi. t. 59.

Throughout the hotter parts of India, from JAMU and SINDH to BIRMA, MALACCA, and CEYLON.—**DISTRIB.** China, Java.

A tall climber, glabrous except the young parts and inflorescence, which are hoary or appressed-tomentose. *Leaves* 3-3 in., coriaceous, petioled, shining above. *Racemes* 1-6 in., axillary, usually forming a leafy panicle. *Flower* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., fragrant, white. *Sepals* obtuse. *Petals* twice as long, fimbriate, 5th petal yellow at the base. *Wings of carpels* oblong, coriaceous, inner 1-2 in. linear-oblong, outer narrower shorter spreading.—*G. obtusifolia*, DC., a native of China and Birma, differs chiefly in its smaller size.

2. **H. parvifolia**, *W. & A. Prodr.* 107, *excl. syn.*; branches and shoots elongate twiggy, leaves about 3 in. elliptic acute or acuminate glabrous, racemes with appressed pubescence, flowers $\frac{1}{2}$ in. diam., carpels usually without the additional wing. *Gærtnera laurifolia*, *Herb. Madr. ex Wall. Cat.* 7265.

WESTERN PENINSULA; Mysore, *Rottler*; Courtallum, *Wight*; CEYLON, hot and dry parts of the Island, *Gardner*, &c.

Smaller in all its parts than *H. Madablota*, and with usually two styles; the pubescence of the inflorescence is appressed, in which respects it differs from *H. sericea*.

3. **H. sericea**, *Hook. f.*; branchlets short slender, leaves about 2-3 in. elliptic or ovate acuminate glabrous, racemes short laxly soft tomentose or villous, flowers $\frac{1}{3}$ - $\frac{1}{2}$ in. diam., carpels with an intermediate ridge. *H. parviflora*, *Wight. Cat.* 358. *Clerodendron sericeum*, *Wall. Cat.* 1824.

EASTERN PENINSULA; PENANG, *Wallich*; MALACCA, *Griffith*, *Maingay*.

Branches and inflorescence clothed with soft brown villous pubescence. *Leaves* always small. *Racemes* axillary and terminal, short, dense-flowered; pedicel much thickened from beneath the flower downwards.—The habitat of Ceylon given by *Wight* and *Arnot* is, no doubt, an error, originating with that respecting *Tristellateia australasica*.

4. **H. acuminata**, *Wall. Cat.* 1065; branches stout woody scabrid, leaves 3-4 in. lanceolate acuminate glabrous, racemes short dense clothed with thick brown tomentum, flowers $\frac{2}{3}$ in. diam., fruit unknown.

KHASIA Mts., at Churra, alt. 4000 ft., *Gomez*, &c.

A bushy dense shrub. *Leaves* coriaceous, usually caudate-acuminate; nerves very oblique, few, arched, reticulate on both surfaces; petiole short, stout. *Racemes* much shorter than the leaves, sometimes corymbose.—A chain of very fine reticulate nerves borders the leaf beneath, in which are often (not always) remote deeply impressed points or glands.

5. **H. candicans**, *Hook. f.*; branchlets slender and with the leaves beneath clothed with soft fine white cottony pubescence, leaves on young shoots 1-2 in. oblong or orbicular on old 4-5 in. elliptic-oblong, carpels with no intermediate ridge or wing. *Flacourtiaceae*, *Wall. Cat.* 9020.

BERMA; banks below Yenangheum, *Wallich*; sandy woods in the Kivakdwong, above Bamo, *Griffith*.

A very distinct species, apparently scandent or sarmentose; the shoots with small rounded leaves resemble the pinnate leaves of a Leguminous climber. The leaves are of a very pale colour, rather shining on the upper surface, and all obtuse or apiculate; the nerves are indistinct. There are no flowers, and only imperfect fruits, which are pubescent.

EXCLUDED SPECIES.

HIPTAGE, *Wall. Cat.* 9029, from *Herb. Heyne*, is *Terminalia paniculata*.

3. ASPIDOPTERYS, A. Juss.

Shrubs, usually climbing. *Leaves* opposite, eglandular, quite entire; stipules 0. *Flowers* in simple or compound axillary and terminal panicles; peduncles bracteate, jointed at the top, pedicels often minutely 2-bracteolate. *Flowers* small, yellow or white. *Calyx* short, 5-partite, eglandular. *Petals* 5, not clawed, spreading or reflexed, quite entire. *Stamens* 10, all perfect, filaments connate or distinct at the base. *Ovary* 3-lobed, lobes flattened at the back, sides winged; styles 3, glabrous, stigmas capitate. *Fruit* of 1-3 samaras; nucleus sometimes crested or winged at the back, and

surrounded with a broad oblong or orbicular wing. *Seeds* oblong, subterete; embryo straight, cotyledons equal, radicle short.—**DISTRIB.** Species about 15; all tropical Asiatic.

* *Leaves glabrous beneath, or nearly so.*

1. **A. Roxburghiana**, *A. Juss. in Archiv. Mus. Hist. Nat.* iii. 511; shoots usually glabrous, inflorescence rusty-tomentose, leaves ovate or elliptic-ovate acuminate, midrib beneath glabrous or pubescent, ovary hairy, samara linear-oblong, nucleus not dorsally winged or keeled. *Hiræa indica*, *Roxb. Hort. Beng.* 90; *Fl. Ind.* ii. 448; *Cor. Pl.* ii. 160; *Wall. Pl. As. Rar.* i. 13. *Aspidopterys oxyphylla*, *A. Juss. Lc.* 510. *Hiræa oxyphylla*, *Wall. Cat.* 7264 (a more slender form).

SIKKIM HIMALAYA, MISEMI and KHASIA Mts., alt. 1-5000 ft., BIRMA, Saluen river, *Wallich*; WESTERN PENINSULA, CARNATIC, ORISSA, and CONCAN.

A slender climber. *Leaves* 3-4 in., variable in breadth, acute or rounded at the base, undersurface when very young slightly pubescent, when old quite glabrous or the centre only; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., glabrous or pubescent. *Panicles* effuse, rusty-tomentose. *Flowers* $\frac{1}{2}$ in. diam. *Fruit* variable, much narrower in the Peninsular than in the Bengal specimens.—I have given the Bombay habitat on the authority of the Bombay Flora.

VAR. 1. Samara 2 by $\frac{1}{2}$ in. sides nearly parallel.—Western Peninsula.

VAR. 2. Samara $1\frac{1}{2}$ -2 by $\frac{3}{4}$ -1 in. more elliptic-oblong often narrowed either above or below. *A. glabriuscula*, *A. Juss. Lc.* 511; *Hiræa glabriuscula*, *Wall. Cat.* p. 260, 6626—Khasia Mts., Sikkim.

VAR. 3. Leaves more rounded, samara $1\frac{1}{2}$ by $\frac{1}{2}$ - $\frac{3}{4}$ in.—Assam.

Jussieu describes the ovary of Var. 2 as glabrous, but it is clothed with deciduous hairs, as in all the vars. *Wallich's* Assam specimen under this name is referable to *A. nutans*.

2. **A. concava**, *A. Juss. in Archiv. Mus. Hist. Nat.* iii. 509; shoots glabrous, leaves ovate obtuse or obtusely-acuminate quite glabrous, buds rusty-tomentose, samaras orbicular very membranous transparent very concave, nucleus winged in the concavity. *Hiræa concava*, *Wall. Pl. As. Rar.* i. 13; *Cat.* 1061. *H. Merguensis*, *Wight Ill.* i. 139.

BIRMA, at Martaban, *Wallich*; TENASSERIM, at Mergui, *Griffith*.

I have seen only imperfect specimens, *Wallich's* are in young bud only; *Griffith's* in old fruit. *Leaves* 3-4 in.; petiole quite glabrous. *Fruit* on very long capillary pedicels, 1-1 $\frac{1}{2}$ in. diam., beautifully hyaline with radiating veins.—I do not observe the plication of the leaves described by Jussieu, who suspected that this was *Blume's elliptica*; but that is described as having much larger samaras, with a dorsal crest 6-7 lines long.

3. **A. canarensis**, *Dalz. in Hook. Kew Journ. Bot.* iii. 37; glabrous almost throughout, shoots stout woody, leaves ovate or elliptic-lanceolate obtusely acuminate, inflorescence reduced to axillary fascicles, ovary glabrate, samara suborbicular very membranous, nucleus with a dorsal wing. *A. glomerata*, *Wight Lc. t.* 1986.

Western Peninsula; CANARA, *Dalzell*; MALABAR and MYSORE, *Wight*.

Branchlets flexuous, hard, with furrowed bark. *Leaves* 3-4 in., sometimes elliptic-obovate, base acute or rounded, rather coriaceous, pale; petiole $\frac{1}{2}$ in. *Pedicels* slender, $\frac{1}{2}$ in., glabrous, bracteolate towards the base, crowded on very short, simple or divided, pubescent axillary peduncles that are clothed with minute bracts. *Flowers* $\frac{1}{2}$ in. diam. *Samaras* $1\frac{1}{2}$ -1 $\frac{3}{4}$ in. diam., margin even or lobed towards the apex.—A very remarkable and distinct species.

**** Leaves hairy tomentose or pubescent beneath.**

4. **A. hirsuta**, *A. Juss. in Archiv. Mus. Nat. Hist.* iii. 512, t. 17; clothed with long spreading flaccid hairs, leaves broadly obovate or oblong or orbicular-obovate abruptly acuminate cordate at the very base, ovary glabrous, samaras linear-oblong, nucleus without dorsal crest or wing. *Hiræa hirsuta*, *Wall. Pl. As. Rar.* i. 13, t. 13; *Cat.* 1059.

BIRMA, on the Taong dong and the Prome Mts., *Wallich*.

Shoots very slender. *Leaves* 4–7 in., clothed on both surfaces with long soft hairs, membranous; petiole $\frac{1}{4}$ in. *Inflorescence* an open lax panicle, with regular opposite spreading branches; bracts at the base of the branches $\frac{1}{2}$ – $\frac{3}{4}$ in., lanceolate; branches with many opposite bracteoles above the middle. *Flowers* $\frac{1}{2}$ in. diam., subumbellate, glabrous, white. *Samaras* $1\frac{1}{2}$ –2 by $\frac{1}{2}$ – $\frac{3}{4}$ in., sides almost parallel.

5. **A. cordata**, *A. Juss. in Archiv. Mus. Nat. Hist.* iii. 513; shoots inflorescence and leaves beneath clothed with white appressed tomentum, leaves orbicular-cordate with a broad acumen, panicle effuse, ovary villous, samaras orbicular or nearly so, nucleus not winged or keeled. *Hiræa cordata*, *Heyne in Wall. Cat.* 1060; *Wall. Pl. As. Rar.* i. 13. *H. nutans*, *Wall. Cat.* 1058, 2.

WESTERN PENINSULA; Concan, Canara, and Mysore.

A slender climber. *Leaves* 5–8 in. diam., the younger ovate-cordate, all rather abruptly terminated by a broad acuminate tip, opaque, and sometimes pubescent above; petiole $1\frac{1}{4}$ in. *Inflorescence* a lax pendulous panicle, sometimes rusty; bracts at the branches filiform or 0, pedicels very variable. *Flowers* $\frac{1}{2}$ in. diam. *Samaras* pale, $1\frac{1}{4}$ in. diam., sometimes slightly oblong.

6. **A. nutans**, *Hook. f. (not of A. Juss.)*; young shoots and inflorescence tomentose, leaves ovate elliptic or orbicular with a broad based acumen base not cordate silkily pubescent beneath, panicle effuse, ovary villous, samaras oblong or suborbicular, nucleus not or rarely ridged or with a small wing at the base. *A. Roxburghiana*, *A. Juss. in part.* *A. lanuginosa*, *A. Juss. l.c.* 512. *Hiræa nutans*, *Roxb. Fl. Ind.* ii. 447 (*not of Wallich*). *H. indica*, *Wall. Cat.* 1057 *in part.* *H. lanuginosa*, *Wall. Cat.* 1058. *in part* (a very villous-leaved form, from Nepal).

NIPAL, *Wallich*; SIKKIM HIMALAYA, alt. 2000 ft., *J. D. H.*; EASTERN BENGAL, ASSAM, and CHITTAGONG, *Roxburgh, &c.*; BIRMA, at Bhamo, *T. Anderson*.

Very similar to *A. cordata*, but usually less tomentose, leaves even larger, attaining 10 in. diam., with often rusty tomentum on the nerves and rather thin long hairs between them; upper surface reticulate and rather shining; petiole of the larger leaves 2 in. *Samaras* $1\frac{1}{2}$ by 1 in., usually oblong, sometimes almost orbicular.—*Wallich* says, under his *H. indica* (*Cat.* 1057), “An plus una species sub hac confusa;” and so it is, from wanting fruit of any of his specimens; five sheets thus named appertain to this species.

VAR. rotundifolia; leaves more villous beneath, samara with a small dorsal wing or crest. *A. rotundifolia*, *A. Juss. l.c.* 514; *Roxb. Fl. Ind.* ii. 448. *Hiræa orbiculata*, *Roxb. Hort. Beng.* 90; *Wall. Pl. As. Rar.* ii. 13.—Chittagong, *Roxburgh*.

7. **A. Wallichii**, *Hook. f.*; shoots slender, inflorescence and leaves beneath densely clothed with appressed more or less silky white tomentum, leaves ovate acute or acuminate base subcordate, panicle graceful effuse pendulous, ovary densely hispid with long white deciduous hairs, samaras orbicular-oblong, nucleus without crest or wing. *A. nutans*, *A. Juss. l.c.* 513. *Hiræa nutans*, *Wall. Pl. As. Rar.* i. 13; *Cat.* 1056, 1, *not of Roxburgh*. *H. lanuginosa*, *Wall. l.c.*; *Cat.* 1058 *in part*.

Western Tropical Himalaya; GARWHAL and KUMAON, ascending to 4500 ft., Govan, &c.

A tall climber; branches white. *Leaves* 4-7 in., base rounded, undersurface usually snow-white and silky, upper glabrous; petiole rarely $\frac{1}{2}$ in. *Panicle* sometimes a foot long, white, lax, very graceful. *Flowers* $\frac{1}{2}$ in. diam.; pedicels rather stout, bracteoles most minute. *Samaras* $1\frac{1}{2}$ - $1\frac{3}{4}$ by 1 - $1\frac{1}{2}$ in., variable in shape, sometimes narrowed at one end or emarginate.—It is not clear to what plant Wallich meant the name *lanuginosa* to apply; he has in his Herbarium two under that name, and both numbered 1058; of these, one from Govan, gathered, no doubt, in Kumaon, is identical with his own (not Roxburgh's) *Hiraea nutans*; the other, from Nipal, has a rusty tomentose panicle, and is probably the true *nutans* of Roxburgh; indeed he tickets it in mss. "prox nutanti, Roeb." As Wallich's and Jussieu's *lanuginosa* is certainly not the very local and beautiful species here described, I have dedicated the latter to Dr. Wallich.

DOUBTFUL AND EXCLUDED SPECIES.

Imperfect specimen in young fruit of a plant from Poneshee in Birma, collected by Dr. J. P. Anderson. *Leaves* orbicular, coriaceous, densely rusty tomentose beneath. *Unripe samaras* oblong, with a dorsally winged nucleus.—Perhaps *A. tomentosa*, Juss., Java.

A Tenasserim or Andaman Island plant of Helfer, with orbicular leaves slightly cordate at the base, glabrous on both surfaces, except the costa beneath, which with the short petioles shoots and inflorescence are clothed with dense rusty tomentum. *Samaras* membranous, orbicular, not concave, retuse at the top, nucleus with a prominent dorsal wing.—Perhaps a form of *A. concava*, Juss.

HIRÆA FINLAYSONIANA, Wall. Cat. 7263, is a species of *Nelitris*.

ORDER XXXI. ZYGOPHYLLÆ. (By M. P. Edgeworth, F.L.S., and J. D. Hooker.)

Herbs or shrubs, rarely trees, branches usually articulate. *Leaves* opposite or alternate by suppression, stipulate, 2-3-foliolate or pinnate; leaflets entire, not punctate; stipules twin, persistent, sometimes spiny. *Peduncles* usually 1-2 in the axils of the stipules, ebracteate rarely 2-bracteate. *Flowers* hermaphrodite, regular or irregular, white, red or yellow, very rarely blue. *Sepals* 5, rarely 4, free or rarely connate at the base, imbricate, rarely valvate. *Petals* 5-4, very rarely 0, hypogynous, free, imbricate or contorted, rarely valvate. *Disk* convex or depressed, rarely annular or 0, without glands. *Stamens* equal to or double or rarely three times as many as the petals, inserted at the base of the disk, often alternately longer, those opposite to the petals often connate at the base to the petals, filaments usually with a scale at the base or middle; anthers versatile, opening longitudinally. *Ovary* sessile or rarely stipitate on a short gynophore, furrowed angled or winged, 4-5- (rarely 2-12-) celled, cells very rarely with partial transverse septa, narrowing into a terminal angled or furrowed style; stigma simple, rarely discoid or stigmas 5; ovules 2 or more, rarely 1, usually filiform, pendulous or ascending, raphe ventral with a superior micropyle. *Fruit* never berried, coriaceous or crustaceous, either of 2-10 free or united often spiny cocci, or capsular and septicidally dehiscent. *Seeds* usually pendulous, solitary, rarely twin or more, oblong or linear, the raphe adnate or free; testa membranous crustaceous or thick and mucous; albumen scanty rarely 0; embryo the length of the seed, green, straight or rarely curved, cotyledons oblong or linear thick or foliaceous, radicle very short, straight, superior.—

DISTRIB. Genera, about 17, with 100 species, chiefly tropical and sub-tropical

* *Seeds* exalbuminous.

Petals entire. Stamens 10. Fruit of usually spiny cocci. Leaves abruptly pinnate 1. **TRIBULUS**.

** *Seeds* albuminous.

Petals 0. Stamens 5. Leaves 3-foliolate 2. **SEETZENIA**.

Petals 4-5. Stamens 8-10. Ovules axile, superposed. Leaves 1-2-foliolate 3. **ZYGOPHYLLUM**.

Petals 5. Stamens 10. Ovules basal, collateral. Leaves 1-3-foliolate 4. **FAGONIA**.

(See **PEGANUM** in *Rutaceæ*.)

1. **TRIBULUS**, Linn.

Branching prostrate herbs, usually silky. *Leaves* stipulate, opposite, usually unequal, abruptly pinnate. *Flowers* solitary, on pseudo-axillary peduncles, white or yellow. *Sepals* 5, deciduous (or persistent) imbricate. *Petals* 5, fugacious, patent, imbricate. *Disk* annular, 10-lobed; stamens 10, inserted on the base of the disk, 5 longer opposite to the petals, 5 shorter with a little gland outside; filaments filiform, naked. *Ovary* sessile, hirsute, 5-12-lobed, 5-12-celled, cells opposite the petals; style short, pyramidal or filiform, stigmas 5-12; ovules superposed. *Fruit* 5-angled, of 5-12 winged or spinous or tuberculate indehiscent cocci. *Seeds* obliquely pendulous, testa membranous; embryo without albumen, cotyledons ovate, radicle short.—**DISTRIB.** A cosmopolitan genus of about 15 species.

1. **T. cistoides**, Linn.; *DC. Prodr.* i. 703; perennial, flowers 1-2 in. diam., peduncles equalling or exceeding the leaves, cocci 2-4-horned.

BENGAL, near Calcutta, *Edgeworth*; WESTERN PENINSULA, Madras, *Shuter, &c.*; Nilghiri Mts., *Foulkes*; Tenasserim at Mergui, *Wallich*.—**DISTRIB.** Throughout the Tropics.

Rootstock stout; branches 1-2 ft., procumbent or ascending, and leaves usually more silky than in the following. *Leaflets* often 7-8 pairs, subequal; stipules falcate, acuminate. *Sepals* $\frac{1}{4}$ - $\frac{1}{3}$ in., acuminate, silky. *Petals* obovate. *Stigmatic lobes* shorter than the diameter of the style. *Cocci* tubercled and hairy, with usually 2 spines. *Seeds* separated by transverse septa.—Regarded as a large flowered form of *T. terrestris* by Oliver (*Fl. Trop. Afr.* i. 284).

2. **T. terrestris**, Linn.; *DC. Prodr.* i. 703; annual or biennial, flowers $\frac{1}{3}$ - $\frac{3}{4}$ in. diam., peduncles shorter than the leaves, cocci with 2 long and 2 short spines. *Dalz. & Gibs. Fl. Bomb.* 45. *T. lanuginosus*, Linn.; *DC. l.c.*; *W. & A. Prodr.* 145; *Wall. Cat.* 6854; *Wight Ic.* t. 98; *Ill.* i. 164; *Boiss. Fl. Orient.* i. 902.—*Burm. Fl. Zeyl.* 265, t. 106, f. 1.

Throughout INDIA, ascending to 11,000 ft. in WESTERN TIBET; northern part of CEYLON.—**DISTRIB.** Throughout the warm regions of the globe.

Prostrate, hirsute or silky hairy; branches 1-2 ft. *Leaflets* 5-7 pairs, subequal, mucronate. *Petals* often not exceeding the calyx. *Cocci* very variable, glabrous or hairy, mucronate, much as in *T. cistoides*. *Stigmatic lobes* longer than the diameter of the style.

3. **T. alatus**, *Delile*; *DC. Prodr.* i. 703; annual, flowers $\frac{1}{3}$ - $\frac{1}{2}$ in. diam., peduncles shorter than the leaves, cocci broadly winged.—*Boiss. Fl. Orient.* i. 902.

SINDH, *Stocks, Vicary*; PANJAB, at Multan, *Edgeworth*.—DISTRIB. Egypt, Arabia, Nubia.

Hispid and villous; branches procumbent or ascending. *Leaflets* 5 pairs, subacute; stipules ovate, acute. *Petals* about equalling the sepals. *Stamens* 5 or 10. *Fruit* broadly pyramidal, somewhat pointed; cocci hirsute, 2-seeded, the spines confluent into toothed wings.—Fruit slightly bitter, eaten by the desert nomads in Multan.

2. SEETZENIA, Br.

A small prostrate glaucous herb, woody at the base, glabrous or woolly. *Leaves* opposite, 3-foliolate; leaflets obovate, apiculate. *Peduncles* axillary, 1-flowered. *Flowers* small. *Sepals* 5, linear-oblong, valvate, incurved at the top. *Petals* 0. *Disk* small, 5-lobed. *Stamens* 5, inserted on the disk, filaments filiform glabrous naked at the base; anthers nearly globose. *Ovary* oblong-clavate, sessile, pentagonal, truncate, fleshy, 5-celled; styles 5, short, spreading, stigmas small capitate; ovules solitary in each cell, pendulous. *Fruit* ovoid, of 5 1-seeded cocci, separating from the persistent axis, with a narrow succulent exocarp on the back only, endocarp crustaceous. *Seeds* oval, compressed, testa thick with three skins, the outer membranous, the middle one cellular and mucous, the inner coriaceous, albumen thin; cotyledons thickish.

1. *S. orientalis*, *De ne. in Ann. Sc. Nat. ser. 2, iii. 280, t. 7; Boiss. Fl. Orient. i. 916.*

SINDH, *Stocks, Vicary*.—DISTRIB. Arabia, N. and S. Africa.

Branches long and slender, smooth or papillose. *Leaflets* fleshy, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, middle one obovate-cuneate, lateral oblique; stipules triangular. *Peduncle* $\frac{1}{2}$ in., more or less recurved at the tip, longer than the petiole. *Fruit* ellipsoid, ovoid or subglobose, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, pendulous. *Seeds* fusiform, smooth.

3. ZYGOPHYLLUM, Linn.

Small shrubs or prostrate herbs. *Leaves* opposite, 1- or 2-foliolate, fleshy; stipules 2, often spiny. *Peduncles* 1- or 2-flowered, among the stipules. *Flower* white, or yellow with red or purple spots at the base. *Calyx* 4-5-partite, persistent or deciduous, imbricate. *Petals* 4-5, clawed, imbricate and contorted. *Disk* fleshy, angled, cup-shaped or concave. *Stamens* 8-10, inserted on the disk, longer than the petals, filaments filiform with a scale at the base; anthers oblong. *Ovary* sessile upon the disk, 4-5-cornered, 4-5- (rarely 2-3-) celled, tapering into an angled style, stigma small; ovules 2- ∞ , superposed, raphe free or adnate. *Fruit* capsular, 4-5-cornered or winged, indehiscent or septicidally dehiscent into 5 cocci, or loculicidally 5-valved, the endocarp sometimes separating. *Seeds* 1 or many in each cell, pendulous, testa crustaceous, albumen scanty; cotyledons oblong.—DISTRIB. Upwards of 50 species, natives of the Old World, and chiefly Cape and Australian.

1. *Z. simplex*, *Linn.; DC. Prodr. i. 705; annual, leaves simple cylindric.—Boiss. Fl. Orient. i. 912.*

Sandy deserts; SINDH, *Stocks, vicary*; PANJAB, at Multan, *Edgeworth*.—DISTRIB. Arabia, tropical Africa.

A prostrate glabrous slender much branched herb. *Leaves* small, sessile, fleshy, obtuse; stipules lanceolate, acute. *Peduncle* as long as the obovate cucullate sepals. *Petals* spatulate. *Scales* 2-partite. *Capsule* deflexed, turbinate, rough, of 5 com-

pressed 2-3-seeded cocci. *Seeds* fusiform. smooth.—The seeds are swept up by the nomad tribes of the Multan desert, and eaten under the name of Alathi.

2. **Z. coccineum**, Linn.; *DC. Prodr.* i. 706; perennial, leaves 2-foliolate. *Boiss. Fl. Orient.* i. 915.

Rocky ground in SINDH, *Stocks, Vicary*.—DISTRIB. Syria, Arabia, Egypt. *Stem* shrubby below, with erect or ascending hoary at length glabrous branches. *Leaves* petioled; leaflets terete, grooved or semiterete, minutely powdery; stipules triangular, scarious. *Peduncle* equalling the petiole. *Sepals* ovate, cucullate, fleshy, shorter than the spatulate white undulate petals. *Scales* lanceolate, entire or torn. *Capsule* erect, grooved, cylindric-ovoid, truncate. *Seeds* small, ovoid, tubercled, acute, compressed.—The flowers open in the middle of the day.

4. **FAGONIA**, Linn.

Branching woody herbs. *Leaves* opposite, 1-3-foliolate, entire, mucronate; stipules usually spiny. *Peduncle* solitary from between the stipules. *Sepals* 5, deciduous, imbricate. *Petals* 5, closed, caducous, imbricate. *Disk* short, inconspicuous. *Stamens* 10, inserted on the disk, filaments filiform, naked; anthers oblong. *Ovary* sessile, 5-cornered, 5-celled, tapering into a subulate style, stigma simple; ovules 2, collateral at the base of each cell, pendulous from ascending funicles. *Fruit* 5-cornered, of 5 1-seeded cocci which dehisce along the ventral suture and separate from a horny endocarp. *Seeds* erect, compressed, broadly oblong, testa mucilaginous, albumen horny; cotyledons broad, flat, ovate.—DISTRIB. Species variously estimated from 2 or 3 to 30, being very variable and difficult to define.

1. **F. arabica**, Linn.; *DC. Prodr.* i. 704; glandular, young branches terete striate, spines exceeding the linear leaflets. *Boiss. Fl. Orient.* i. 907. *F. mysorensis*, Roth.; *DC. l.c.*; *Wall. Cat.* 6853; *W. & A. Prodr.* 145; *Dalz. & Gibs. Bomb. Flor.* 45; *Wight Ill.* i. t. 64. *F. cretica* var. *arabica*, *T. Anders. in Journ. Linn. Soc. v. Suppl.* i. 12; *Oliver Fl. Trop. Afric.* i. 287.

Throughout NORTH WESTERN INDIA, SINDH, the PANJAB, and the southern provinces of the WESTERN PENINSULA.—DISTRIB. Westward to Egypt.

A small green spiny undershrub, with erect branches, more or less glandular. *Leaves* 1-3-foliolate; leaflets elliptic or linear, acute; petiole often foliaceous. *Flowers* small, pale rose-coloured. *Sepals* oblong lanceolate, half as long as the petals. *Capsule* pubescent, about as long as the recurved peduncle. *Seeds* punctulate.

2. **F. Bruguieri**, *DC. Prodr.* i. 704; glandular, young branches subtrigonous sides grooved, spines exceeding the ovate rather fleshy leaflets. *Boiss. Fl. Orient.* i. 905. *F. Echinella*, *Boiss. Diagn. ser. 1.* viii. 123. *F. cretica* var. *T. Anders. in Journ. Linn. Soc. v. Suppl.* i. 12.

NORTH-WEST INDIA; Peshawur, *Herb. Falconer, Stewart*; Chandnist, *Edgeworth*.—DISTRIB. Westward to Algeria.

Similar to *F. arabica*, and like it referable by many authors to a variety of *F. cretica*. *Internodes* short; branches procumbent. *Lower leaves* 3-foliolate, the rest 1-foliolate; leaflets minute.—The form distinguished as *Echinella* by Boissier, has crowded decussate branches, and very short leaves.

EXCLUDED SPECIES.

FAGONIA MONTANA, Miq.; see *Fl. Ind. Bat.* i. pt. 2, 596, is *Monetia tetracantha*.

ORDER XXXII. **GERANIACEÆ.** (By M. P. Edgeworth, F.L.S.,
and J. D. Hooker.)

Herbs, undershrubs, or rarely trees; glabrous or more usually pubescent and glandular. *Leaves* opposite or alternate, usually 2-stipulate. *Peduncles* usually solitary and axillary, 1- or more-flowered. *Flowers* umbelled cymose or racemose, usually showy, hermaphrodite, regular or irregular. *Sepals* 5, rarely 4 or 2, free or united to the middle, imbricate or rarely valvate, the posticous sometimes spurred. *Petals* as many as the sepals or fewer by suppression, or 0, hypogynous or superigynous, variously imbricated, rarely contorted. *Torus* scarcely expanded into a disk with 5 glands alternating with the petals, or without glands, raised in the centre into a beak, rarely flat. *Stamens* as many as or double or treble the sepals, or fewer by suppression; filaments filiform or dilated, or connate into a ring; anthers 2-celled, cells parallel, opening lengthwise. *Ovary* 3-5-lobed, 3-5-celled, rarely 2-lobed, of 3-5 carpels united with the axis as far as the insertion of the ovules, sometimes lengthened into a beak-bearing style, or styles which are free or more or less united, stigmas capitate linear or ligulate; ovules 1 or 2 or rarely more, horizontal or pendulous or ascending. *Fruit* capsular, 3-5-lobed, lobes 1-seeded often separating from the axis septicidal or loculicidal rarely berried. *Seeds* pendulous or horizontal, albumen 0 or scanty or fleshy; embryo straight or curved, cotyledons flat convex or variously folded foliaceous or thick or fleshy, radicle either short and near the hilum or longer and inflected or incumbent on the cotyledons.—**DISTRIB.** Genera 20, with about 800 species, chiefly found in temperate climates.

Besides the genera described below, *Pelargonium* (the garden so called *Geranium*) is cultivated throughout India, and one species of Natal (*P. grossularioides*, DC.; *Erodium nilagiricum*, Schlecht. *Pl. Ind. Or. exsicc.* 1560), is naturalized in the Nilghiris. The genus is distinguished by the posticous sepal being produced into a spur which is adnate to the pedicel and by some of the filaments being antherless.

TRIBE 1. Geraniæ. *Leaves* simple or compound. *Flowers* regular or nearly so. *Sepals* imbricate. *Glands* alternate with the petals. *Antheriferous stamens* as many or double or treble the number of petals.

Carpels indelhiscent; not beaked. Ovules solitary.

Stamens 10, all perfect	1. BIEBERSTEINIA.
Carpels beaked, dehiscent. Ovules geminate.	
Perfect stamens 15, pentadelphous	2. MONSONIA.
Perfect stamens 10, rarely fewer	3. GERANIUM.
Perfect stamens 5, staminodes 5	4. ERODIUM.

TRIBE 2. Oxalidæ. *Leaves* compound. *Flowers* regular. *Sepals* imbricate. *Glands* 0. *Stigmas* capitate. *Ovules* 2 or more.

* *Herbs. Fruit capsular.*

Stamens 10. Capsule loculicidal, valves cohering with the axis.

Leaves 3-∞-foliate 5. OXALIS.

Stamens 10. Capsule loculicidal, valves usually separating from the axis to the base. Leaves pinnate

6. BIOPHYTUM.

** *Trees or shrubs. Fruit berried.*

Stamens 10, or 5 and 5 staminodes. Ovules many. Leaves

pinnate 6.* AVERRHOA.

Stamens 10. Ovules in pairs. Leaves 1-3-foliate 7. CONNAROPSIS.

TRIBE 3. **Balsamineæ**. *Leaves* simple. *Flowers* irregular. *Sepals* usually coloured, the posticous spurred. *Stamens* 5, very short. *Anthers* subconnate.

Lateral petals connate in pairs. Fruit capsular 8. IMPATIENS.
Lateral petals free. Drupe fleshy 9. HYDROCERA.

1. **BIEBERSTEINIA**, Stephan.

Perennial glandular herbs. *Leaves* stipulate, pinnatisect. *Flowers* regular, racemose or paniced. *Sepals* 5, imbricate. *Petals* 5, hypogynous, imbricate, alternating with 5 glands. *Stamens* 10, all bearing anthers, filaments united into a ring at the base. *Ovary* deeply 5-lobed, 5-celled; styles distinct, arising from the bases of the lobes, connate into a capitate stigma; ovules solitary in the cells, pendulous from below the top of the cell. *Ripe carpels* separating from a persistent 5-lobed axis, indehiscent, crustaceous, wrinkled. *Seeds* incurved on one side of the fleshy albumen; embryo arched, cotyledons thick.—DISTRIB. Several species, natives of Asia, Siberia, Greece, the Altai Mountains, and Tibet.

1. **B. emodi**, *Jauh. & Spach. Ill. Pl. Or.* ii. 109; leaves pinnatisect lobes pinnatifid, stipules adnate laciniate, bracts oblong or obovate lobed, petals entire. *B. odora*, *Royle Ill.* 153, t. 30, not of *Stephan*.

ALPINE WESTERN TIBET and KUNAWAR alt. 14–17,000 ft., *Jacquemont*, &c.

Glandular-pubescent. *Rootstocks* densely tufted, branched, tuberous, giving off crowns of leaves and short simple flowering stems a few inches high. *Leaves* linear, with many pairs of small broad irregularly lobed leaflets; stem leaves small. *Flowers* racemose, $\frac{1}{2}$ in. diam., yellow; pedicels equalling the calyx, 2-bracteolate. *Sepals* elliptic-oblong, pubescent. *Petals* nearly orbicular. *Filaments* hairy. *Styles* slender.—The aspect, and in many respects the structure, of this plant is singularly Rosaceous, and like a *Potentilla*.

2. **MONSONIA**, Linn.

Herbs or undershrubs. *Leaves* opposite or alternate, stipulate. *Peduncles* axillary, bracteate. *Flowers* solitary or umbelled. *Sepals* 5, imbricate. *Petals* 5, hypogynous, imbricate, alternate with 5 small glands. *Stamens* 15, all bearing anthers, shortly monadelphous, 5 of them opposite the petals. *Ovary* 5-lobed, 5-celled, beaked; beak ending in the style, bearing 5 linear branches inwardly stigmatose; ovules 2, superposed in each cell. *Capsule* with a very long beak of 5 1-seeded carpels; carpels with 5 elastic tails which are bearded on the inner side, and separate from the beak. *Seeds* exalbuminous; embryo incumbent on the convolutely folded cotyledons.—DISTRIB. South Africa; genera of about a dozen species, besides 4 or 5 North African species and the present.

1. **M. senegalensis**, *Guill. & Perr. Fl. Senegamb.* i. 131; viscid, leaves ovate or cordate, peduncles rarely 2-flowered, beak of carpels very long setose on the inner face. *Boiss. Fl. Orient.* i. 898. *M. Lawiana*, *Stocks in Calcutta Journ. Nat. Hist.* vii. 19. *M. Chumbalensis*, *Wight Ic. in text* t. 1074. *Erodium Chumbalense*, *Munro in text Wight Ic.* t. 1074. ? *Geranium Lawianum*, *Graham Cat. Bomb. Pl. Supplemental page*.

SINDH, *Stocks*; UPPER GANGETIC PLAIN near AGRA, *Munro*; the DEKKAN, common in dry pastures, *Gibson*, &c.—DISTRIB. Beluchistan, Arabia, and westwards to Senegambia and Namaqualand.

A diffuse annual herb or undershrub; branches pubescent and glandular. *Leaves* $\frac{3}{4}$ –1½ in., long-petioled, obtuse or mucronate, repand-toothed, glabrate above, pilose and pubescent beneath; stipules subulate. *Peduncles* long, sharply deflexed at the bracteoles. *Sepals* obovate, awned, densely pubescent with long hairs. *Petals* violet or pink, 3-veined, crumpled, scarcely exceeding the sepals. *Filaments* ciliate. *Carpels* acute, stipitate, obliquely truncate with 2–3 wrinkles at the top, roughly hairy; beak 3 in.

2. ***M. heliotropioides*, Cav.; Boiss. Fl. Orient. i. 897**; annual or perennial, leaves petioled ovate ovate-cordate or rhomboid minutely toothed, sometimes obscurely lobed hoary above villous beneath, petiole and scape clothed with very long white deciduous hairs, sepals silky or hoary mucronate. *M. mallica*, Edgw. in Jour. Linn. Soc. vi. 200.

PANJAB; Moulton, Edgeworth; beyond the Indus in Waziristan, Stewart; SINDH, in the Hill range, Vicary.—DISTRIB. Westwards to Egypt.

A small white annual herb, or with a well-developed woody rootstock. *Leaves* $\frac{1}{2}$ –1 in. long, chiefly radical, very variable in shape, coriaceous, densely-silky and villous beneath; petiole longer than the blade. *Scapes* 2–8 in., erect, slender. *Flowers* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., umbelled. *Sepals* oblong, at length obovate and enlarged in fruit. *Petals* obovate-spathulate, not exceeding the sepals. *Stamens* 15, slightly 5-adelphous at the base. *Fruit* 3 in.; carpels narrow, stipitate, hairy, keeled, with two transverse wrinkles at the top.—The Indian specimens are usually but not always annual, and never so large as the Persian and Arabian specimens. The structure of the fruit is identical with that of *Erodium stipaceum*, but the stamens are very different.

3. GERANIUM, Linn.

Herbs or undershrubs. *Leaves* opposite or alternate, stipulate. *Peduncles* axillary, bracteate, 1–2-flowered, or pedicels umbelled. *Flowers* regular. *Sepals* 5, imbricate. *Petals* 5, hypogynous, imbricate, alternating with 5 glands. *Stamens* 10, usually all anther-bearing, rarely 5 without anthers, free or shortly monodelphous. *Ovary* 5-lobed, 5-celled, beaked; styles 5, stigmatose longitudinally, ovules superposed. *Capsule* 5-lobed, 5-celled, cells 1-seeded, carpels usually dehiscent ventrally, often separating septifragally from the axis, their beaks elastically coiling upwards from the base to the apex of the axis. *Seeds* with scanty albumen or 0; embryo with the cotyledons induplicate or convolute incumbent.—DISTRIB. Species about 100, natives chiefly of cold temperate regions in the Northern Hemisphere; they are very difficult of discrimination.

SECT. 1.—*Peduncles* axillary and terminal, solitary, 2-flowered. *Flower-buds* oblong or ovoid, not pyramidal. *Sepals* not dilated or subcordate at the base. *Carpels*, with their beaks separating elastically from the axis, not wrinkled.—Rootstock stout, perennial.

* Flowers large, an inch or upwards in diameter.

† *Petals reflexed*.

1. ***G. refractum*, Edgew. & Hook. f.**; tall, stout, branched, glandular-hairy, leaves 5–7 partite segments obtuse deeply lobed and cut, stipules large, bracts linear very slender, sepals shortly awned, petals reflected, filaments nearly glabrous.

SIKKIM HIMALAYA; Tungu, alt. 12–13,000 ft., J. D. H.

Stems 2–4 feet, erect. *Leaves* 3 in. diam., shortly pubescent on both surfaces; lower petioles long; stipules $\frac{1}{2}$ in., broadly oblong, ovate or obtuse. *Peduncle* and refracted *pedicels* long, clothed with spreading hairs. *Sepals* $\frac{1}{2}$ in., membranous, glan-

dular-hairy, margins broad, awn stout. *Petals* twice as long as the sepals, linear-oblong, obtuse, white, 5-nerved, villous on each side at the base. *Filaments* gradually narrowed upwards. *Ovary* tomentose. *Fruit* not seen.—A very curious species, allied to the N. American *G. Richardsoni*.

†† *Petals spreading.*

2. *G. pratense*, Linn.; DC. Prodr. i. 641; stout, erect, branched, hairs spreading, leaves orbicular 7-9-partite segments acute incised, stipules subulate-lanceolate, pedicels glandular-hairy, sepals long-awned, bracts subulate, filaments ciliate. Boiss. Fl. Orient. i. 877. *G. himalayense*, Klotzsch in Reise Prinz. Waldem. 116, t. 122; Walp. Ann. vii. 485.

WESTERN TEMPERATE HIMALAYA; Kashmir, Falconer; Kulhara in GARHWAL, alt. 10,500 ft., Strach. & Winter.; PITH, alt. 7-8000 ft., T. Thomson; WESTERN TIBET; Sakh river, alt. 14,000 ft., Strach. & Winter.—DISTRIB. N. Asia, and westwards to Europe.

Stem 2-4 ft. high, usually stout, hairs on branches and petioles often reflexed. *Leaves* 2-3 in. diam., variously cut; stipules usually small. *Peduncles* and refracted *pedicels* densely hairy and glandular; bracts small and slender. *Flowers* 1½-2 in. diam., blue-purple. *Petals* entire or notched, ciliate at the base. *Filaments* gradually narrowed upwards. *Carpels* glandular-hairy. *Seeds* reticulate.

3. *G. rectum*, Trautv.; Walp. Ann. vii. 485; very slender, tall, subsimple, sparingly leafy and hairy, leaves opposite 5-angled 7-lobed to below the middle membranous segments rhomboid acute and acutely incised, stipules subulate-lanceolate, peduncles, very long and slenderly appressed-pubescent, bracts subulate, sepals long awned, filaments ciliate.

KASHMIR, Falconer; in Baltal, T. Thomson.—DISTRIB. Soongaria.

Stem 2 feet, very slender, apparently ribbed, almost glabrous. *Leaves* 3-4 in. diam., membranous, sparingly pilose on both surfaces, radical petioles very long and slender. *Peduncles* sometimes 8 in.; *pedicels* very variable; bracts subulate. *Flower* 1½ in. diam. *Sepals* membranous, glabrate, narrow-oblong with a stout awn. *Petals* obovate, retuse, ciliate at the very base. *Filaments* gradually narrowed upwards. *Carpels* (not seen in Indian specimens) smooth, appressed-pubescent. *Seeds* smooth.—Siberian (Alatau Mts.) specimens are described as having erect fruiting peduncles and presenting two varieties, one glabrous, the other villous with white hairs. It differs from *G. nodosum* in the stems not being swollen at the nodes and in the entire petals. Falconer's is a single rather doubtful specimen, mixed with *G. Wallichianum*.

4. *G. aconitifolium*, L'Herit.; DC. Prodr. i. 642; very slender, sparingly pubescent, much branched, leaves deeply 3-9-partite segments acute deeply lacinate or pinnatifid upper sessile, stipules small subulate, pedicels and long-awned sepals usually glandular hairy, filaments ciliate.

WESTERN TIBET, Falconer (Kew Distrib. 328).—DISTRIB. Alps of Switzerland and N. Italy.

Stems slender, 1-2 ft., very sparingly hairy. *Leaves* 2-2½ in. diam.; segments narrow, acute or obtuse; upper leaves sessile with the radiating lobes giving a peculiar appearance to the plant. *Peduncles* variable in length, pedicels usually clothed with spreading glandular hairs, but sometimes merely pubescent; bracts subulate, very slender. *Flowers* smaller than in the other species of this group, 1-1½ in. diam. *Sepals* rather broad. *Petals* obovate, rounded at the tip, glabrous. *Filaments* suddenly dilated at the base. *Fruit* 1 in., nearly glabrous. *Seeds* smooth, opaque.—Apparently the same as the European species, in which the peduncles and pedicel and calyx are eglandular, which is rarely the case in the Tibetan specimens.

5. *G. collinum*, M. Bieb.; DC. Prodr. i. 642; stem usually short hoary or glandular pubescent, leaves orbicular 5-7-lobed to below the middle

segments cuneate obtusely 3-5-lobed, stipules small ovate acute, pedicels appressed-pubescent or glandular-hairy, sepals shortly awned, filaments ciliate at the base. *Boiss. Fl. Orient.* i. 874. *G. multifidum*, *Don Prodr.* 207. *G. Donianum*, *Wall. Cat.* 8565; *Sweet Geran. sub tab.* 338.

WESTERN TIBET, ZASKAR, PITI, and KUNAWER, alt. 12-14,000 ft., *Jacquemont*, &c.; KASHMIR, *Falconer*; NIPAL, *Wallich*; GARHWAL, 9-11,000 ft., *Edgeworth*; inner valleys of SIKKIM HIMALAYA, *J. D. H.*—DISTRIB. Afghanistan, Siberia, S. Russia.

In its common Tibetan form this is a short hoary-pubescent or glandular species, with many subsimple flowering stems, 6-10 in. high, orbicular (not angled) leaves, with obtusely cut often slender lobes, slender peduncles and pedicels, and large flowers. —Afghanistan specimens are taller, more slender, and branched.

6 *G. ?palustre*, *Linn.*; *DC. Prodr.* i. 642; rather tall, pubescent or hairy, leaves pentagonal palmately 5-lobed lobes rhomboid acute pennatifidly incised, stipules subulate-lanceolate, peduncles long glandular-hairy, sepals awned, petals obovate rounded at the tip. *Boiss. Fl. Orient.* i. 874. *G. grandiflorum*, *Edgew. in Trans. Linn. Soc.* xx. 42.

KASHMIR, *Falconer*; KUMAON, at Mana, alt. 9-11,000 ft., *Edgeworth*.—DISTRIB. Siberia, Caucasus, Mid. and N. Europe.

Very similar to large states of *G. collinum*, but the flowers are larger, nearly 2 in. diam., and leaves pentagonal in outline from their segments being more produced. The identification with *G. palustre* is doubtful.

7. *G. Wallichianum*, *Sweet Geran.* t. 90; *DC. Prodr.* i. 641; tall, robust, much branched, leaves 5-gonal deeply 3-5-lobed segments rhomboid acuminate incised, stipules very large broadly oblong or almost rounded obtuse, bracts large, pedicels long, sepals long-awned, filaments ciliate at the base. *Wight Ic.* t. 324; *Wall. Cat.* 8558; *Don Prodr.* 208.

TEMPERATE HIMALAYA, alt. 7-11,000 ft., from Nipal, *Wallich*, to Marri, *Fleming*.

More or less pilose or villous with spreading or reflexed hairs, which are rarely glandular. Leaves 3-4 in. broad, segments acutely cut; stipules $\frac{1}{2}$ -1 in. long, very broad. Bracts usually 4, linear-oblong, $\frac{1}{2}$ in. long, obtuse, acute or acuminate. Flowers $1\frac{1}{2}$ -2 in. diam. Petals obovate, retuse. Filaments suddenly dilated at the base. Carpels pilose. Seeds smooth.—The very large solitary stipules best distinguish this species.

8. *G. Grevilleanum*, *Wall. Cat.* 8559; *Pl. As. Rar.* iii. t. 209; robust or slender, hairy and glandular, branched, leaves 5-gonal 5-7-lobed below the middle segments rhomboid acute or acuminate incised, stipules 2-fid or in pairs ovate acuminate, pedicels long slender, sepals long-awned, filaments villous with long hairs. *G. eriostemon*, *Don Prodr.* 208, not of *Fischer*. ? *G. Lambertii*, *Sweet Geran.* t. 338 *G. Backhousianum*, *Regel. Descript. Plant. Nov.* 1873, 32.

TEMPERATE HIMALAYA, alt. 8-11,000 ft., from KUMAON to SIKKIM.

A tall branched species, resembling *G. Wallichianum*, but distinguished by the bifid or bipartite stipules and very villous filaments; it varies much in pubescence and glandular often reflexed hairs, being sometimes almost villous or velvety. Peduncles and pedicels slender, clothed with spreading glandular hairs; bracts linear, slender. Flowers 1-1 $\frac{1}{2}$ in. diam. Petals obovate, tip rounded or retuse, hairy at the base, rose-coloured, or very pale with a purplish eye (in Sikkim specimens). Filaments gradually narrowed upwards. Carpels pilose. Seeds smooth.

** Flowers less than an inch in diameter (see also 14, *G. rotundifolium*).

9. *G. nepalense*, *Sweet Geran.* t. 12; slender, diffuse, much branched, hairy or villous, eglandular, leaves 5-gonal deeply 3-5-lobed or -partite upper sessile segments rhomboid incised, stipules subulate-lanceolate, peduncles slender 1-2-fid, sepals shortly awned almost equalling the entire

petals. *Don Prodr.* 208. *G. radicans*, *DC. Prodr.* i. 639. *G. pallidum* and *G. patens*, *Royle Herb.*; *Wall. Cat.* 8560, 8561. *G. affine*, *W. & A. Prodr.* 133 (not of *Ledebour*) *Wight Ill.* i. 153, t. 59 (colour of flower wrong ?). *G. Arnotianum*, *Steud. Nomen.* 677.

Throughout the TEMPERATE HIMALAYAS, alt. 5–9000 ft.; the KHASIA, NILGHIRI and PULNEY MTS., and in the higher parts of CEYLON.—DISTRIB. Yunnan.

Branches sometimes rooting (*G. radicans*, *DC.*), more or less clothed with spreading or reflexed hairs. *Leaves* $1\frac{1}{2}$ – $2\frac{1}{2}$ in. diam., opposite, spreading. *Peduncles* usually slender, sometimes 1-flowered, very variable in length, spreading, reflexed after flowering. *Flowers* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., pink or purple. *Sepals* usually silky. *Carpels* hairy. *Seeds* shining, smooth.—We find no difference between the Himalayan and Peninsular specimens. The Javanese *G. ardjunense*, *Zoll.*, may, from the description, prove to be this.

10. ***G. sibiricum***, *Linn.*; *DC. Prodr.* i. 639; prostrate, slender, excessively branched, hoary, leaves 5-gonal 5-partite segments rhomboid acute acutely incised, stipules subulate, peduncles slender 1–2-flowered, sepals long-awned, equalling or exceeding the notched petals. *Boiss. Fl. Orient.* i. 879.

WESTERN TIBET, Nubra and Ladak, alt. 10–12,000 ft. *Thomson.*—DISTRIB. Siberia, Dahuria, Caucasus, Germany.

Very similar at first sight to *G. nepalense*, but more flaccid and branched, with the upper leaves all petioled, and shorter notched petals.—*Thomson's* specimens are the only Indian ones we have seen.

SECT. 2. *Pedicels* crowded amongst the uppermost leaves, subumbellate. *Flower-buds* ovoid or oblong, not pyramidal. *Carpels* wrinkled, becoming detached from their beaks which coil upwards elastically.—Rootstock stout, perennial.

11. ***G. polyanthes***, *Edgew. & Hook. f.*; sparingly hairy, slender, flowering-stems naked below, leaves orbicular-reniform 7–9-partite or lobed segments cuneate obtuse 3–7-fid, pedicels short, sepals shortly awned, filaments ciliate. *Wall. Cat.* 8564. *G. Donianum*, *Herb. Ind. Or. H. f. & T. not of Sweet.*

TEMPERATE HIMALAYA, KUMAON, *Blinkworth*; Inner valleys of SIKKIM, alt. 9–12,000 ft., in grassy places, *J. D. Hooker.*

A very singular species, with subsimple stems 6–10 in. high, bearing clusters of flowers amongst the uppermost involucre-like leaves. *Flowering-stems* simple or umbellately branched about the middle. *Leaves* $1\frac{1}{2}$ –2 in. diam., more or less pilose; petiole of radical very long, upper sessile and crowded under the pedicels; stipules variable, ovate acuminate or subulate-lanceolate. *Umbels* 3–10-flowered; pedicels $\frac{1}{4}$ –1 in., glandular-hairy, as are the sepals. *Flowers* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., dark-purple. *Fruit* erect, 1 in. long. *Carpels* laterally compressed, keeled, strongly reticulate, glabrous; beaks slender; styles very short. *Seeds* smooth.

SECT. 3. *Peduncles* 2- or more-flowered, crowded. *Flower-buds* ovoid or oblong, not pyramidal. *Carpels* smooth, their beaks remaining attached to the axis (not always in *G. rotundifolium*).

* Rootstock perennial, flowers large.

12. ***G. Tuberaria***, *Camb. in Jacq. Voy. Bot.* 33, t. 37; slender, erect, hairy and glandular, leaves orbicular-reniform 5–7-partite, segments pinnatifid, petiole very slender, peduncles 2-flowered terminal umbelled or fasciated very hairy and glandular, sepals obtuse awned or apiculate very hairy, petals retuse, filaments ciliate with very long hairs. *Walp. Rep.* 449.

Temperate Western Himalayas, KASHMIR, *Jacquemont*; KISHTWAR, alt. 8000 ft., *T. Thomson*.

Rootstock tuberous. *Flowering stems* 12–18 in. high, slender, simple or subumbellately branched. *Leaves* $1\frac{1}{2}$ –3 in. diam., segments very spreading, radical on very long slender petioles; stipules variable. *Inflorescence* subumbelled, with an involucre of shortly petioled leaves: peduncles and pedicels erect, clothed with long spreading glandular hairs; bracts leafy, pinnatifid. *Flowers* 1 in. diam. *Sepals* elliptic, small, obtuse, apiculate, narrowly margined. *Petals* large, obcordate, ciliate at the very base. *Filaments* very slender throughout their length. *Fruit* $1\frac{1}{4}$ – $1\frac{1}{2}$ in., erect, hairy; carpels not wrinkled; styles very short. *Seeds* smooth.—There is no trace of the beaks being separable from the axis, though the valves are removable.—A very curious species.

**** Annual, flowers small, in axillary peduncles, fruiting pedicels deflexed.**

13. ***G. pusillum*, Linn.; DC. Prodr. i. 642**; prostrate, very slender, much branched, pubescent, leaves reniform-orbicular deeply 5–9-lobed or partite segments cuneate 3-lobed, petals obcordate scarcely exceeding the mucronate sepals, carpels smooth, seeds smooth. *Boiss. Fl. Orient. i. 881*.

Western Temperate Himalaya; KASHMIR, *Falconer*; KISHTWAR, alt. 8000 ft., *J. Thomson*.—DISTRIB. Syria and throughout Europe.

Very slender and much branched, leafy, slightly glandular above. *Leaves* $\frac{1}{2}$ –1 in. diam; stipules short. *Flowers* $\frac{1}{4}$ in. diam., blue-purple, very small. *Petals* and *Filaments* ciliate at the base. *Fruit* $\frac{1}{2}$ in. long. *Carpels* smooth, hairy. *Seeds* very minutely granulate.

14. ***G. rotundifolium*, Linn.; DC. Prodr. i. 643**; suberect with very slender spreading branches, glandular-hairy, leaves reniform 7-fid segments broad obtusely lobulate, petals cuneate entire exceeding the calyx, carpels smooth, seeds deeply pitted. *Boiss. Fl. Orient. i. 880*. *G. potentilloides*, *Klotzsch in Reise Pr. Waldem. 123, t. 17*.

PANJAB at Peshawar, *Vicary*; and Hooshiarpore, *Aitcheson*; WESTERN TEMPERATE HIMALAYA, alt. 6–9000 ft.; Kashmir, *Falconer*; Jamu, *Thomson*; Garwhal, alt. 2000 ft., *Strach. & Winter*.—DISTRIB. Siberia and Eastward to Europe and N. Africa.

Very slender. *Leaves* $\frac{1}{2}$ – $1\frac{1}{2}$ in. diam.; petioles very slender. *Flowers* $\frac{1}{2}$ in. diam. *Petals* red, glabrous. *Fruit* $\frac{3}{8}$ in. long.

15. ***G. molle*, Linn.; DC. Prodr. i. 643**; stems rather stout diffuse or ascending softly villous and glandular, leaves orbicular palmately 7–9-fid, lobes cuneate obtusely lobulated, petals obcordate exceeding the sepals, carpels obliquely wrinkled, seeds smooth. *Boiss. Fl. Orient. i. 882*.

Temperate Western Himalaya; KISHTWAR, 6–9000 ft., *Thomson*; KUMAON, alt. 1500 ft., *Madden*.—DISTRIB. Westward to Europe and N. Africa.

A common European weed, possibly introduced into India, but also found in Afghanistan and Persia; more robust than the two preceding species, readily distinguished by the wrinkled carpels, smooth seeds, purple petals ciliate at the base, and glabrous filaments.

SECT. 4. *Peduncles* 2-flowered. *Flower-buds* pyramidal. *Sepals* broad or cordate at the base, acuminate, not abruptly awned.—Annual or biennial.

16. ***G. Robertianum*, Linn.; DC. Prodr. i. 644**; erect, much branched, pubescent or hairy, leaves triangular-oblong 5-foliolate or ternatisect segments incised or pinnatifid, peduncles slender, pedicels spreading, petals twice as long as the sepals clawed, carpels wrinkled

keeled, seeds punctulate. *Boiss. Fl. Orient.* i. 883. *G. Lindleyanum*, *Royle Ill.* 151, t. 27.

Western Temperate Himalaya, alt. 6-8000 ft., from KASHMIR, *Falconer*, to GARHWAL, *Strach. & Winter*.—DISTRIB. Siberia, Asia Minor, the Caucasus, Europe.

A reddish fetid rather succulent annual or biennial. *Branches* 6-18 in., brittle, leafy. *Leaves* 1-3 in. broad; petiole long; stipules ovate. *Flowers* $\frac{1}{2}$ in. diam., streaked with dark and light red. *Petals* narrow, claw glabrous. *Fruit* $\frac{3}{4}$ -1 in.; beak of carpels separating upwards from the axis and attached to its apex by silky hairs.—“*Herb. Robert.*”

17. *G. lucidum*, *Linn.*; *DC. Prodr.* i. 644; annual, glabrous, shining, leaves orbicular 5-7-lobed lobes 5-fid cuneate, pedicels with a series of hairs, sepals long-awned shorter than the spatulate petals, carpels reticulate keeled nearly glabrous, seeds smooth. *Boiss. Fl. Orient.* i. 884. *G. lævigatum*, *Royle Ill.* 150.

Temperate Western Himalaya; from KISHTWAR to KUMAON, alt. 6-9000 ft.—DISTRIB. Siberia, Syria, the Caucasus, Europe, N. Africa.

A suberect, much-branched, brittle herb, with usually bright red branches. *Leaves* $\frac{3}{4}$ -1 $\frac{1}{2}$ in. diam., lobes short broad; stipules acute. *Peduncles* longer than the petioles. *Flowers* $\frac{3}{4}$ -1 in. diam. *Sepals* wrinkled. *Petals* rose-red, claw glabrous. *Fruit* $\frac{1}{2}$ in., glabrous, beak very slender; carpels small, separating both from their beak and the axis.

18. *G. ocellatum*, *Camb. in Jacq. Voy. Bot.* 33, t. 38; annual, hoary-pubescent or hairy and glandular, excessively branched, prostrate, slender, leaves orbicular 5-7-lobed lobes cuneate 3-5-fid, petals large broadly obcordate much larger than the acuminate sepals, carpels corrugated, seeds smooth. *Walp. Ann.* i. 449. *G. bicolor*, and *G. choorensis*, *Royle Ill.* 149, 150; *Wall. Cat.* 8562.

Hills of the PANJAB; temperate and subtropical Himalaya, alt. 1-6000 ft., from KASHMIR and the SALT RANGE to E. NIPAL; BEHAR, on the top of Parusnath, *Anderson*.

A small straggling species. *Leaves* $\frac{1}{2}$ -2 in. diam. *Peduncles* sometimes clustered, and subumbelled as in *G. Tuberaria*, at others axillary solitary and 1-flowered. *Flowers* $\frac{3}{4}$ in. diam., rose-coloured with a dark purple eye. *Sepals* rigid after flowering, wrinkled from pressure against the carpels. *Fruit* erect, $\frac{3}{4}$ in. long; carpels small, separating from the axis and beak, which latter eventually coils up elastically. *Seeds* shining, pale.—Found in E. Nipal (Tambur river), but not hitherto in Sikkim.

DOUBTFUL AND UNKNOWN SPECIES.

G. HETEROTRICHON, *Sm.*; *Royle Ill.* 150.

G. PEDUNCULATUM, *Royle, l.c.*—Of this and the preceding species no information is given by *Royle*; *Smith* has nowhere described a *G. heterotrichon*.

4. *ERODIUM*, L'Herit.

Herbs, rarely undershrubs, with the branches swollen or jointed at the nodes. *Leaves* opposite, often alternately smaller, stipulate. *Flowers* usually regular, in axillary 1-flowered or umbelliferous peduncles. *Sepals* 5, imbricate. *Petals* 5, hypogynous, with alternating glands. *Stamens* 5, alternating with 5 staminodes. *Ovary* 5-lobed, 5-celled, long-beaked; styles 5, stigmatose longitudinally; ovules 2, superposed in each cell. *Capsule* 5-lobed 5-celled, cells 1-seeded; carpels indehiscent, separating septifragally from the axis, their beaks elastically coiling upwards from the base to the apex of the axis, hairy on the inner surface; each with usually

2 pits at the top below the beak. *Seeds* exalbuminous; embryo incumbent on the induplicate or flexuous radicle.—**DISTRIB.** About 50 species, natives of temperate regions in the Old World, whence a few have escaped to the New, and to the Southern Hemisphere.

* *Beak of carpels* ventrally clothed with rigid setæ that disappear towards the tip.

† *Leaves* 1–2–3-pinnatisect.

1. ***E. cicutarium***, *Leman*; *DC. Prodr.* i. 646; annual, leaves pinnatisect pinnules pinnatifid, not decurrent, sepals mucronate, filaments glabrous not toothed. *Boiss. Fl. Orient.* i. 890. ? *E. himalayanum*, *Royle Ill.* 150.

Western India, from SINDH and the PANJAB to SIMLA, ascending to 8000 ft. in LITTLE TIBET, near Iskardo.—**DISTRIB.** Westward to Algeria and throughout Europe and temperate N. Asia; introduced elsewhere.

Pubescent and glandular. *Branches* short or long, sometimes 2–3 ft. *Leaves* oblong, pinnules 7–11 pairs sessile; stipules ovate-lanceolate, acuminate, scarious. *Peduncles* many-flowered; pedicels hoary; bracts small, connate, ovate, hyaline. *Sepals* 5-nerved, margined. *Petals* obovate, unequal, bearded at the base, purple, often spotted. *Beak of carpels* 5 times as long as the cell, scabrous outside, almost glabrous above, pits with a concentric fold. *Seeds* very smooth; cotyledons 3-lobed.

2. ***E. ciconium***, *Willd.*; *DC. Prodr.* i. 646; annual, leaves pinnatisect pinnules pinnatifid decurrent, sepals awned, filaments ciliate not toothed. *Boiss. Fl. Orient.* i. 891.

PANJAB, near Kohat in the Salt Range, *Stewart*.—**DISTRIB.** Westward to Syria, the Caucasus, and S. Europe.

Pubescent and viscid. *Branches* stout, ascending. *Leaves* ovate, pinnules toothed; stipules ovate-lanceolate, long-acuminate, scarious. *Peduncles* longer than the leaves, 2–∞-flowered; bracts scarious, mucronate, ciliate. *Sepals* ovate, membranous, with 3 glandular hairy nerves with long ciliae and a long rough awn. *Petals* purple, obovate. *Carpels* subulate at the base, glabrous, with white hairs and a glabrous scar at the tip, pits without a fold; beak very long, scabrous outside, with brown hairs at the top and longer setæ below.

3. ***E. Stephanianum***, *Willd.*; *DC. Prodr.* i. 645; annual, leaves 2-pinnatisect segments decurrent acutely toothed, sepals awned, filaments ciliate toothed on one side. *Ledeb. Fl. Ross.* i. 475 in part.

WESTERN TIBET, Ladak and Nubra, alt. 11–12,000 ft., *Thomson*.—**DISTRIB.** Siberia, China.

Pubescent and pilose. *Branches* diffuse. *Stipules* cuneate, acute, ciliate. *Peduncles* 2–5-flowered; bracts linear, reflexed, ciliate. *Sepals* ovate, 5-nerved, ciliate, awn long. *Petals* as long as the sepals, broadly ovate, nerved, ciliate at the base. *Carpels* hispid. *Seeds* glabrous, minutely aciculate.—The Siberian specimen in Herb. Kew. resembles the Tibetan, and does not accord with Ledebour's description as to the stamens, which, however, Chinese specimens do.

†† *Leaves* not pinnatisect.

4. ***E. tibetanum***, *Edgew.*; annual?, leaves 3-fid velvety beneath, sepals obovate obtuse not awned, carpels not pitted below the beak.

WESTERN TIBET, *Falconer*; Ladak Valley below Hanle, alt. 12–15,000 ft., *Thomson, Hay*.

Hoary, almost stemless. *Leaves* oblong-ovate, more or less inciso-crenate; stipules cuneate, scarious, ciliate. *Peduncles* shorter than the leaves, 2- or more-flowered, bracts ciliate. *Sepals* pubescent, with a small knob in place of a mucro. *Petals* elliptic,

exceeding the sepals. *Ovary* silky. *Carpels* brown, stipitate, with stiff white hairs, split on the back; beak $\frac{3}{4}$ –1 in. long, 3–4 times the length of the cell, rough on the outer side, in the inner side with long brown hairs and a few setæ, hairy to the tip.—This resembles *E. chium* and *ægyptiacum*, which differ in their mucronate sepals.

5. ***E. malacoides***, Willd.; DC. *Prodr.* i. 648; annual, leaves 3-fid or lacerate shortly pubescent, sepals awned, carpels pitted below the beak. Boiss. *Fl. Orient.* i. 893.

PANJAB, *Falconer*; Indus Valley at Attok, Peshawur, and Hazara, *Stewart*.—DISTRIB. Westward to S. Europe and N. Africa.

Softly hairy, hairs on the stem deflexed. *Stems* erect or diffuse, elongate, branched. *Leaves* ovate-oblong, acute or obtuse, shortly appressed-pubescent, lower cordate; stipules large, scarious, acute or obtuse. *Inflorescence* glandular; peduncles 3-many-flowered; bracts ovate, scarious, ciliate. *Sepals* membranous, two outer 5- and three inner 3-nerved, awn hairy. *Petals* ciliate at the base, obovate, lilac, 9-nerved. *Filaments* glabrous, lanceolate. *Staminodes* linear. *Ovary* hairy. *Carpels* stipitate, 3-gonous, setose; beak 4–5 times as long as the cell, with stiff brown hairs for $\frac{1}{4}$ of its length; pits with a deep fold.

** *Beak of carpels* plumose on the ventral face, with long soft cilia.

6. ***E. stipaceum***, Edgew.; hoary, annual, leaves oblong crenate-toothed lobed or unequally pinnatifid, sepals silkily hoary apiculate, filaments ciliate 5 inner the broadest, carpels slender hispid with transverse wrinkles at the tip of the valves, beak very long.

WESTERN TIBET? *Vigne* (*Herb. Falconer*); PANJAB beyond the Indus in Bannu *Stewart*.

Root woody, but apparently annual; branches straggling. *Leaves* $\frac{1}{4}$ –1 in., variable in shape, oblong or linear-oblong; petiole slender. *Peduncles* several-flowered; pedicels short. *Flowers* $\frac{1}{2}$ in. diam. *Sepals* concave, strongly 3-nerved. *Petals* narrow-cuneate, equalling the sepals. *Filaments* subulate, ciliate, the inner series much the largest and broadest. *Fruit* 3–4 in., slender, erect; carpels slender, narrowed into a stipes, terete, transversely grooved at the base of the beak, covered with stiff hairs with swollen bases, beaks membranous, silky, hairs fulvous.—A very close ally of *Monsonia heterotricha*, notwithstanding the different stamens.

DOUBTFUL AND EXCLUDED SPECIES.

E. VIOLEFOLIUM, Turz. *Mosc. Bull.* xxxvi. i. 592. "Cæspitosa, diffuse, pilose, leaves petiolate cordate obtuse sinuate-lobate crenate, with scattered adpressed hairs, peduncles 3–5-flowered, calyx aristate, fruit densely hairy."—Western Peninsula, *Perrotet*. "Root fibrous, stalk 4–5 in. long; arista not plumose when young."—Specimens not seen, only known from the above (? *Monsonia senegalensis*).

E. NILAGIRICUM, Schlecht. *Herb. Ind. Or.* 1560, is an introduced Cape *Pelargonium* (*P. grossularioides*).

5. **OXALIS**, Linn.

Acid herbs, rarely shrubby. *Leaves* radical or alternate, stipulate or exstipulate, compound, usually 3-foliolate. *Flowers* on axillary 1- or more-flowered peduncles, regular. *Sepals* 5, imbricate. *Petals* 5, hypogynous, contorted. *Glands* of the disk 0. *Stamens* 10, free or united at the base, all anther-bearing. *Ovary* 5-lobed, 5-celled; styles 5, distinct, stigma terminal capitate 2-fid or lacinate; ovules 1 or more in each cell. *Capsule* with loculicidal dehiscence, valves persistent to the axis. *Seeds* with an outer fleshy coat which bursts elastically, testa crustaceous, albumen fleshy; embryo straight.—DISTRIB. Species about 200, chiefly tropical and temperate S. American and S. African.

1. ***O. corniculata***, Linn.; DC. *Prodr.* i. 692; appressed-pubescent, diffuse, creeping, leaves 3-foliolate, stipules adnate to the petiole, peduncles 2- ∞ -fid. petals yellow notched. Boiss. *Fl. Orient.* i. 866; Wall. *Cat.* 4347; Roxb. *Fl. Ind.* ii. 457; W. & A. *Prodr.* 142. *O. repens*, Thunb.; Wight *Ic.* t. 18. *O. pusilla*, Salisb.; Roxb. *l.c.*

Throughout the warmer parts of INDIA and CEYLON, ascending the Himalaya to 7000 ft.—DISTRIB. Cosmopolitan.

A very variable weed, abundant in cultivated places. *Leaves* long-petioled; leaflets obcordate. *Flowers* subumbellate. *Sepals* obtuse, bracts setaceous. *Petals* yellow, obcordate. *Fruiting-pedicels* depressed. *Capsule* tomentose, subcylindric, cells many-seeded. *Seeds* transversely ribbed.

2. ***O. Acetosella***, Linn.; DC. *Prod.* i. 700; pilose, stemless, rootstock creeping scaly, leaves all radical 3-foliolate leaflets broadly obcordate, stipules large broad membranous, peduncles 1-flowered, petals white. Boiss. *Fl. Orient.* i. 806.

Temperate Himalaya, from KASHMIR, alt. 8000 ft., to SIKKIM, alt. 8-12,000 ft.—DISTRIB. N. Asia, Europe, N. Africa, N. America.

Petioles 3-6 in.; leaflets $\frac{1}{2}$ - $\frac{3}{4}$ in., obcordate, often purple beneath. *Peduncle* axillary, slender, 2-bracteolate about the middle. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. *Sepals* oblong. *Petals* obovate; white or pale-rose, veined with purple, erose, cohering above the claw. *Capsule* erect, cells 2-3-seeded. *Seeds* longitudinally ribbed.

3. ***O. Griffithii***, Edgew. & Hook. f.; pilose or villous, rootstock creeping, leaves all radical 3-foliolate leaflets triangular retuse, stipules small ovate-lanceolate, peduncles 1-flowered, petals white.

Temperate Eastern Himalaya; BHOTAN, Griffith; SIKKIM, in woods, alt. 8-10,000 ft. J. D. H.; KHASIA MTS., alt. 5-7000 ft., H. f. & T.

Very similar to *O. Acetosella*, but the whole plant more hairy, leaflets triangular, and stipules small.

6. **BIOPHYTUM**, De Cand.

Annual rarely perennial herbs, with simple or branched stems. *Leaves* abruptly pinnate, fascicled or almost whorled at the top of the stem; leaflets opposite, oblique; petiole swollen at the base. *Peduncles* terminal; pedicels umbelled. *Flowers* small, yellow, rarely purple. *Sepals* 5, lanceolate, acuminate. *Petals* 5. *Stamens* 10, filaments free, 5 outer smaller. *Styles* 5, stigmas notched at the apex or 2-fid. *Capsule* ovoid or oblong or subglobose, splitting loculicidally sometimes to the base into 5 spreading valves. *Seeds* as in *Oxalis*.—DISTRIB. Tropical Asia, Africa, and America. Species about 20; various species have sensitive leaves which, and the leaflets, close downwards. The flowers are dimorphous as regards the relative length of the styles and stamens.

* *Stem* simple. *Leaflets* rounded or merely apiculate at the tip, the terminal pair usually the largest.

1. ***B. sensitivum***, DC. *Prodr.* i. 690; leaflets 6-15 pairs oblong nearly straight except the terminal tip apiculate or not, peduncles long or short not clubbed at the top, flowers shortly pedicelled, sepals usually much exceeding the capsule, seeds with obliquely transverse tubercled ridges. Roxb. *Fl. Ind.* ii. 457; W. & A. *Prodr.* 162; Bot. Reg. xxxi. t. 68; Wall. *Cat.* 4343 C, E.

Throughout the hotter parts of INDIA, ascending to 6000 ft. in the Himalaya, and CEYLON.—DISTRIB. Tropical Asia, Africa, and America.

Stems long or short, slender or robust, hispidly pubescent. *Leaves* $1\frac{1}{2}$ –5 in.; petiole hispidulous or merely ciliate; leaflets very variable in size, $\frac{1}{4}$ – $\frac{1}{2}$ in., sometimes arched a little upwards, nearly equal at the base except the terminal one, which is obovate and oblique at the contracted base, nerves few or many rather oblique often waved. *Peduncles* very variable, $\frac{1}{4}$ –5 in., hispid, sometimes swollen at the tip; bracts rigid, setaceous; pedicels usually shorter than the sepals, sometimes equalling them or a little longer. *Sepals* rigid, subulate-lanceolate, grooved, glandular and hispid. *Petals* usually twice as long as the sepals, yellow (sometimes purple?). *Capsule* elliptic, shining; cells few-seeded. *Seeds* very variable, minute, with transverse oblique acute or obtuse ridges that are more or less broken up into tubercles.

VAR. 1. *Candolleana*; leaflets 10–15 pairs, more or less strigose or appressed pilose on the upper surface, seeds both tubercled and grooved. B. *Candolleanum*, *Wight Ill. i.* 161, t. 62; *Wall. Cat.* 4343 D.—Western Peninsula, and Ceylon.

VAR. 2. *assamica*; leaves 3–7 in., leaflets 7–15 pairs glabrous, petiole and rachis nearly glabrous, seeds turbinate smooth acutely furrowed; flowers yellow. *Wall. Cat.* 4343 G.—Assam.

VAR. 3. *nervifolia*; leaflets about 12 pairs glabrous, nerves few strong and waved beneath as in *B. Apodiscias*. B. *nervifolium*, *Thwaites Enum.* 64.—Bengal, Ceylon. Mr. Edgeworth, who has laboriously studied the Indian forms of this genus, distinguishes as species—1, *B. Candolleanum*, described above; 2, *B. sesbanioides*, Edgew. mss. (*Wall. Cat.* 4343 A), with ciliate downy nerved leaflets, and (judging from dried specimens) purple flowers; 3, *B. Cummingianum*, Turcz. in *Bull. Mosc.*, with 6–15 pairs of glabrous leaflets, and 4, *B. poterioides*, Edgew. mss. (*Wall. Cat.* 4343 B) which is stemless with 6–12 pairs of glabrous leaflets, strongly nerved beneath, purple petals and shining not tubercled seeds with forked furrows.

2. **B. Apodiscias**, *Turcz. in Bull. Mosc.* xxxvi. i. 599 (*Aposcias* by error); leaflets 5–7 pairs small shortly and reniformly obovoid widening towards the rounded tip, nerves beneath few strong horizontal waved, pedicels sessile, seeds with scattered tubercles. *Oxalis sessilis*, *Hamilton in Wall. Cat.* 4344. O. *Petersii*, *Klotzsch in Peters Mossamb. Reis. Bot.* t. 5.

BENGAL, at Monghir, *Hamilton*; ASSAM, *Griffith*; KHASIA Mts., alt. 3–5000 ft., *J. D. H. & T. T.*; MYSORE and CARNATIC, *G. Thoms. Herb.*

Annual. *Stem* 1–2 in., slender. *Leaves* 1– $1\frac{1}{4}$ in., crowded; leaflets rather coriaceous, pale, the lowest smallest orbicular-ovate, the middle ones truncate at the base, the terminal with a contracted oblique base and much arched midrib; petiole puberulous. *Flowers* $\frac{1}{2}$ in. long. *Sepals* exceeding the pedicels.—Probably only a state of *B. sensitivum*, approaching var. *nervifolium*, but distinguished by the small size, arched midrib of the leaflets, absence of peduncle, and simply tubercled seeds.

3. **B. adiantoides**, *Wight mss.*; leaflets 12–25 pairs linear-oblong tip rounded very unequal at the base, midrib straight, peduncles slender, pedicels equalling the sepals.

TENASSERIM, at Mergui, *Griffith*.

A very distinct and large species; stem, petiole, rachis and peduncles tomentose and pilose. *Leaflets* $\frac{3}{4}$ in. long, sides nearly straight, base obliquely truncate, lower edge short, upper long, sometimes produced into an obscure lobe at the anterior margin. *Peduncles* slender, with a clubbed mass of bracts at the apex. *Flowers* imperfect.

4. **B. Reinwardtii**, *Walp. Rep.* i. 476; leaflets 10–20 pairs oblong tip rounded equal at the base glabrous, midrib straight, nerves slender oblique, peduncles slender, pedicels equalling or exceeding the small flowers, capsule almost equalling the small sepals. O. *sensitiva*, *Zucc. in Munch. Denks.* ix. 183, t. v. B. O. *Reinwardtii*, *Zucc. in Munch. Abhand.* i. 274.

O. Metziana, Miq. in *Herb. Hohenack*. 144. *O. gracilentia*, Kurz in *Journ. As. Soc. Beng.* 1870, ii. 68. *O. sensitiva*, Wall. *Cat.* 4343 F, H.—*Rheede Hort. Mal.* ix. 33, t. 19.

Throughout the hotter parts of India, as far to the N.W. as GARHWAL; and in CEYLON.—DISTRIB. China, Java.

But distinguished from *B. sensitivum* by the graceful habit, slender peduncles, and small flowers with the capsule not much overtopped by the sepals. The seeds vary in amount of furrowing and tubercles exactly as in *B. sensitivum*. The following three varieties are regarded as species by Mr. Edgeworth:—

VAR. 1. *Reinwardtii proper*; seeds spirally furrowed. *O. Reinwardtii*, Zucc. in part. *O. sensitiva*, Linn. *Herb. in part*; Wall. *Cat.* 4343 B 2.

VAR. 2. *nervoides*; seeds deeply furrowed and tubercled.

VAR. 3. *Metziana*; seeds turbinate 5-7 furrowed tuberculate.—To which should be added—

VAR. 4. *gracilentia*; seeds tubercled not furrowed.

** *Stem usually branched in a proliferous manner. Leaflets usually cuspidate or acuminate; the terminal pair generally shorter than the rest.*

5. ***B. nudum***, Arn. in *Nov. Act. Acad. Cæs.* xviii. 326; stem tall simple or branched, leaflets 15-30 pairs linear-oblong obliquely abruptly cuspidate equal at the base, midrib straight, nerves close-set, pedicels equalling or exceeding the sepals, seeds tubercled not furrowed. *Wight Ill.* i. 161.

CEYLON, Central Province, alt. 4-6000 ft.

Apparently annual. *Stem* 6-18 in., sometimes as stout as a goose-quill, often umbellately branched. *Leaves* 2-3 in., rachis tomentose; leaflets $\frac{3}{4}$ in., glabrous, margins thickened, base truncate. *Peduncles* slender, pubescent; pedicels pilose. *Sepals* $\frac{1}{2}$ in., scarcely exceeding the globose capsule.

6. ***B. proliferum***, Arn. in *Nov. Act. Acad. Cæs.* xviii. 327; stem slender prostrate copiously dichotomously branched from a woody stock, leaves short, leaflets very small 5-10-pairs oblong obliquely cuspidate, midrib nearly straight, base equal, peduncles very short usually 1-flowered, seeds tubercled not furrowed. *Wight Ill.* i. 162.

CEYLON, alt. 6000 ft., Walker, Gardner, &c.

A remarkable species, easily recognised by its excessively branched prostrate habit, slender branches, minute leaflets, and solitary, rarely geminate flowers. *Branches* and *peduncles* pubescent. *Leaves* rarely 1 in., in whorls; leaflets $\frac{1}{2}$ in. long, usually glabrous above; nerves oblique, slender. *Peduncles* much shorter than the leaves and than the very slender pedicels. *Sepals* hairy, about as long as the leaflets.—I identify this with Arnott's plant on the faith of two specimens thus ticketed by himself in Wight's Herbarium, though Arnott describes the umbel as 2-5-flowered, and the leaflets as pilose above, and does not allude to the remarkable smallness of the foliage; whence I suspect that he had both this and the following under his eye.

7. ***B. intermedium***, *Wight Ill.* i. 162; branches very numerous from a stout woody rootstock slender dichotomously branched, leaflets 15-20 pairs linear-oblong abruptly cuspidate, midrib somewhat arched, base equal, peduncles usually exceeding the leaves several-flowered.

CEYLON, Walker.

A much larger plant than *B. proliferum*, of a very different habit, having long arching branches arising from a woody stock as thick as the finger. *Leaves* 2 in. long; leaflets $\frac{1}{2}$ - $\frac{3}{4}$ in., glabrous or pilose above, margins sometimes ciliate, nerves close-set, oblique; petiole ciliate with long hairs. *Flowers* three times as large as in *B. proliferum*.—I have identified this by specimens in Wight's Herbarium; which contains a

somewhat similar plant (described below as a variety) from the Pulney Mountains that differs in being apparently annual, and having more pilose foliage.

? Var. 1. *pulneyense*; annual, stem simple below subumbellately branched above, leaflets slightly hairy above. *O. sensitivum*, *Herb. Wight Kew Distrib.* 302.—Pulney Mts.

Var. 2. *verticillatum*; annual?, stem dichotomously branched, leaves and leaflets smaller often much ciliated on one or both surfaces. *B. verticillatum*, *Wight Ill.* i. 162.—*B. sensitivum* var. *Heyneana*, *Wall. Cat.* 4343 I.

8. **B. polyphyllum**, *Munro in Wight Ill.* i. 162; silky and villous, stem stout umbellately branched, leaves long very narrow flexuous, leaflets minute 30–50 pairs shortly falcate-oblong gradually and obliquely acuminate terminal pair much the smallest.

NILGIRI MTS., at Kundalis, *Munro*.

An exceedingly curious and distinct species, remarkable for the slender, flexuous leaves, 2–3 in. long, and very minute crowded leaflets, $\frac{1}{8}$ in. long, which are not abruptly cuspidate as in the preceding species; rachis villous with long hairs.

6.* **AVERRHOA**, Linn.

Trees. *Leaves* alternate, exstipulate, pinnate with a terminal leaflet; leaflets subopposite. *Flowers* small, regular, in paniced axillary or ramal cymes. *Sepals* 5, imbricate. *Petals* 5, contorted. *Glands* 0. *Stamens* 10, united at the base, all perfect or 5 without anthers. *Ovary* 5-lobed, 5-celled, without a beak; styles 5, distinct, stigmas capitate; ovules numerous in the cells. *Berry* oblong, 5-lobed. *Seeds* naked or arilled, albumen scanty, fleshy; embryo straight.—*DISTRIB.* Three or four species, of which two are copiously cultivated in many hot countries, probably both natives of the New World, in which alone is a native species found. Very likely both were introduced by the Portuguese into India.

A. *CARAMBOLA*, *Linn.*; *DC. Prodr.* i. 689; leaflets 2–5 pairs ovate or ovate-lanceolate acute glabrous and glaucous beneath, fruit with acutely angled lobes, seeds arillate. *Roxb. Fl. Ind.* ii. 450; *W. & A. Prodr.* 141; *Brandis For. Flor.* 45; *Beddome Fl. Sylvat.* 39.—*Rheede Hort. Mal.* iii. t. 43, 44.

In gardens throughout the hotter parts of INDIA as far north as Lahore.—Native country unknown.

A small tree, densely branched. *Leaflets* $1\frac{1}{2}$ –3 in.; petiole stout, pubescent. *Flowers* chiefly axillary, variegated white and purple. *Calyx* glabrous, half as long as the petals. *Stamens* 10, 5 shorter without anthers, or sometimes 1 or 2 of these longer and antheriferous. *Ovary* pubescent. *Fruit* 3 in. long, yellow; aril 2-lobed, lacerate.—Two varieties are known, sweet and sour. The former is eaten raw and cooked. Leaflets irritable to the touch.

A. *BILIMBI*, *Linn.*; *DC. Prodr.* i. 689; leaflets 5–17 pairs oblong or linear-lanceolate acuminate pubescent beneath, fruit with 5 rounded lobes, seeds not arillate. *Roxb. Fl. Ind.* ii. 451; *W. & A. Prodr.* 142; *Brandis For. Fl.* 46; *Beddome Fl. Sylv.* t. 117.—*Rheede Hort. Mal.* 3, t. 45.

In gardens throughout the hotter parts of INDIA, also naturalized as an escape.—Native country unknown.

7. **CONNAROPSIS**, Planch.

Trees or shrubs. *Leaves* pinnately 1–3-foliolate; leaflets coriaceous, quite entire strongly nerved, triple-nerved at the base, margined. *Flowers* minute.

regular, in terminal and axillary paniced cymes. *Sepals* 5, imbricate, connate at the base. *Petals* 5, imbricate. *Glands* 0. *Stamens* 10, filaments united at the base, the alternate shorter. *Ovary* 5-angled, 5-celled; styles 5, subulate, stigmas apiculate; ovules 2 in each cell. *Fruit* fleshy, 5-lobed.—**DISTRIB.** Three species, all from the Malayan archipelago.

1. ***C. monophylla***, *Planch. in Herb. Hook.*; leaves 1-foliolate, leaflets ovate obtusely acuminate shining above glaucous beneath, panicles puberulous of slender spiciform erect branches.

MALACCA, *Griffith, Cuming, Maingay*.

A small round-headed tree. *Leaflets* 2-3 in., quite entire; petiole $\frac{1}{2}$ in., slender. *Panicles* 3-5 in. long. *Sepals* pubescent. *Corolla* suburceolate; petals oblong, blood-red, tips subrecurved. *Fruit* pilose. *Ovary* pilose. *Fruit* obtusely angled, 5-furrowed; endocarp fibrous, sending outwards fibres which reticulately divide the sarcocarp. *Albumen* copious; embryo green, radicle terete. (*Descr.* chiefly from Griffith's notes.)

2. ***C. Griffithii***, *Planch. in Herb. Hook.*; leaves 3-foliolate ovate or elliptic-lanceolate long-acuminate opaque above, panicles short broad tomentose. *Hook. f. in Trans. Linn. Soc.* xxiii. 166 (name only).

MALACCA, *Griffith, Maingay*.

A small tree. *Branches* woody, bark black. *Leaflets* $2\frac{1}{2}$ - $3\frac{1}{2}$ in., pale, pubescent, as are their short petioles; nerves remote; petiole $\frac{3}{4}$ in., that of the leaflets $\frac{1}{4}$ in. *Inflorescence* ferruginous. *Flowers* usually all antheriferous. *Stamens* usually on the old wood, $\frac{1}{2}$ in. long, brown purple. *Fruit* 2 in., yellow.—Kurz (*Journ. As. Soc. Bengal*, 1870, ii. 69), considers that this should bear the name of *C. diversifolia*, because it was first described as *Bourea diversifolia* by Miquel (*Fl. Ind. Bat. Suppl.* 528), a view I cannot adopt, seeing that Miquel put it not only in a wrong genus, but in a wrong Natural Order, and that the trivial name *diversifolia* is not applicable. Moreover, I doubt *C. Griffithii* being the same with Miquel's plant, which latter has lucid leaves, whereas those of *C. Griffithii* are singularly opaque.—*Fruit* acid, eaten cooked, pickled or preserved with sugar. Leaves irritable to the touch.

8. **IMPATIENS**, *Linn.* (By J. D. Hooker.)

Herbs, rarely shrubby at the base. *Leaves* opposite or alternate, in some whorled, in others all radical, simple, exstipulate, or with stipular glands at the base of the petiole. *Flowers* in scapes, or in axillary or terminal 1-2-many-flowered peduncles, irregular, resupinate. *Sepals* 3 rarely 5, imbricate; 2 anterior when present minute; 2 lateral small, flat, usually green; posterior (anterior in flower) large, petaloid, produced into a hollow spur or sac. *Petals* 3 (or 5); anterior (outer in bud) large; lateral 2-lobed (or 2 connate). *Stamens* 5, filaments short, broad; anthers cohering. *Disk* 0. *Ovary* oblong, 5-celled; stigma sessile, 5-toothed; ovules many, 1-seriate in each cell. *Capsule* loculicidal; valves 5, elastically springing away from a placentiferous axis. *Seeds* smooth or tubercled, glabrous or hairy, albumen 0; embryo straight.—**DISTRIB.** Mountains of trop. Asia and Africa, rare in temp. Europe, N. America, N. Asia, and S. Africa; species about 150.

The species of *Impatiens* are difficult of determination, in a dried state especially; and for Beddome's I am chiefly dependent on his published plates. Minute flowers fertilized in the bud occur in some species apart from the others. The following arrangement is that suggested by myself in the Journal of the Linnean Society, vol. iv. p. 106 (Dec. 1859), with the addition of the Peninsula species subsequently described by Beddome, and with the important change consequent on dividing the genus into two principal groups, a Himalayan, with slender terete or obovate capsules, and a chiefly Peninsular group, with the capsule short and swollen in the middle. To avoid verbiage I shall employ the same terms used in that arrangement, of *Sepals* for the 2

lateral sepals (or 4 when present); *Lip* for the spurred sepal; *Standard* for the petal next the axis; and *Wings* for the combined pairs of lateral petals.

CONSPECTUS OF SECTIONS.

Series A. *Capsule* ellipsoid or oblong, short, (rarely $\frac{1}{2}$ in.), turgid in the middle. *Seeds* rounded, often with a shining brittle or hairy testa.—Chiefly Peninsular, Ceylon and Khasian species.—*Capsule* slender in *I. Kleinii*, *trilobata*, and perhaps in a few other species of group III.

A I.—SCAPIGERÆ. *Root-stock* tuberous, perennial. *Leaves* all radical. *Scape* slender; flowers racemed.—All *Western Peninsula* and *Ceylon*. (Sp. 1-9.)

A II.—OPPOSITIFOLIÆ. Annual. *Leaves* all opposite, or the upper rarely all whorled in threes (never alternate), usually acutely serrate. *Pedicels* solitary or fascicled. *Seeds* few, large, testa black glabrous.—The pedicels of *I. Lawii*, *salicifolia*, and others are sometimes arranged on a short peduncle. (Sp. 10-25.)

A III.—SUBVERTICILLATÆ. Annual. *Leaves* all opposite or subopposite, or the lower alternate and upper opposite or whorled, rarely all alternate. *Peduncles* 1- or more-flowered. *Seeds* often villous or hairy. (Sp. 26-36.)

A IV.—UNIFLORÆ. Mostly annual. *Leaves* all alternate, usually rather distant. *Flowers* solitary or fascicled; pedicels not crowded on a common peduncle. (Sp. 37-53.)

A V.—LATERIFLORÆ. *Leaves*, all alternate, rather distant, not all approximate or whorled. *Peduncles* axillary, 1-3 rarely 4-5-flowered; flowers racemose (not umbelled). (Sp. 54-57.)

A VI.—EPIPHYTICÆ. Succulent short stemmed epiphytes. *Peduncles* 1-2-flowered. *Standard* and wings very small; lip very large, laterally compressed and saccate.—*Western Peninsula*. (Sp. 58-60.)

A VII.—UMBELLATÆ AND SUBCAPITATÆ. *Leaves* all alternate, rarely opposite, often crowded at the end of the stem or branches and almost whorled.—*Flowers* in peduncled dense racemes or subumbelled corymbs; bracts often conspicuous.—Chiefly *Western Peninsula* and *Khasia Mts.* (Sp. 61-76.)

A VIII.—RACEMOSÆ. *Leaves* usually crowded upwards, all alternate. *Peduncles* many, subterminal, elongate, at length exceeding the leaves, many-flowered. *Flowers* racemose, rarely whorled or fascicled. (Sp. 77-87.)

Series B. *Capsule* elongate, linear or clavate, rarely shortly clavate. *Seeds* oblong or obovoid, compressed; testa usually rugulose, opaque, coriaceous, quite glabrous.—Chiefly Himalayan and Khasia Mts. species. (*Capsule* doubtful in *I. tropæolifolia*, Griff.)

B I.—OPPOSITIFOLIÆ AND VERTICILLATÆ. *Leaves* all opposite or whorled or a few alternate.—Stout, tall, succulent, annual species, with subumbelled, often purplish flowers on long peduncles. (Sp. 88-91.)

B II.—UNIFLORÆ. *Leaves* all alternate. *Flowers* solitary or rarely 2 together, on slender axillary pedicels. (Sp. 92-94.)

B III.—AXILLIFLORÆ. *Leaves* all alternate. *Flowers* in axillary 2-4-flowered peduncles, not umbelled or racemed. (Sp. 95-106.)

B IV.—SUBUMBELLATÆ. *Leaves* all alternate, very rarely opposite. *Peduncles* usually fascicled towards the top of the stem or branches, many-flowered. *Flowers* in interrupted racemes, subumbelled or whorled, often large purplish, small and yellow in *I. radiata*. (Sp. 107-111.)

B V.—RACEMOSÆ. *Leaves* alternate, very rarely opposite. *Peduncles* usually fascicled towards the top of the stem or branches. *Flowers* often small, in uninterrupted racemes, usually yellow. (Sp. 112-122.)

A. Capsule short, trapezoid or ellipsoid.

A 1.—SCAPIGERÆ.

* *Spur* shorter than the flower or 0. *Wings* 3-lobed, except in *I. orchioides*.

1. ***I. Beddomei***, Hook. f.; quite glabrous, leaves orbicular or reniform-cordate, bracts obtuse or subacute, standard short broader than long, wing-lobes 3 subequal retuse, spur incurved clavate obtuse. *I. scapiflora*, W. & A. *Prodr.* 137 in part; *Wight Ill.* t. 967; *H. f. & T. in Journ. Linn. Soc.* iv. 118; *Dalz. & Gibs. Bomb. Flor.* 43, not of Heyne.

Mountains of MALABAR; near Dodabet, Coonnoor, and elsewhere in the Nilghiris, *Wight*.

A foot high or less. *Leaves* 1-4 in. diam., fleshy, quite entire or obscurely crenate-serrate; nerves flabellate. *Racemes* 1-4 in.; bracts broadly ovate; pedicels slender. *Flowers* $\frac{1}{2}$ in. diam.; sepals broadly and obliquely ovate; wings with three subequal short truncate retuse lobes; spur rather shorter than the flower. *Capsule* $\frac{1}{2}$ in., elliptic. *Seeds* minute, granulate.—Being obliged to find a new name for this beautiful plant, I have selected that of Col. Beddome, who has made the Peninsular species his special study.

2. ***I. modesta***, *Wight in Madr. Journ.* v. 13; *l.c.* t. 968; leaves ovate-cordate acute crenate-serrate sparsely hairy above, bracts with thickened tips, standard short broader than long, wings with 3 subequal obtuse lobes, spur recurved short obtuse. *I. tenuis*, *Bedd. in Madr. Journ.* ser. 2, iv. 69, t. 7, f. 12; *l.c. Pl. Ind. Or.* p. 31.

Mountains of MALABAR; Nilghiri, and Sivagherri hills, *Wight*. Anamallay hills, alt. 5-7000 ft., *Beddome*.

A foot high or less. *Leaves* 1-5 in.; basal lobes rounded, with a rounded sinus on each side of the petiole. *Scape* very slender; raceme 1-2 in.; pedicels capillary; bracts much smaller and narrower than in *Beddomei*. *Flowers* $\frac{1}{2}$ in. diam., pink; sepals small. *Capsule* $\frac{1}{2}$ - $\frac{1}{4}$ in., elliptic, acute at both ends. *Seeds* minute. (*Wings* pubescent on the surface, *Beddome*.)

3. ***I. Stocksii***, *H. f. & T. in Journ. Linn. Soc.* iv. 119; very small, quite glabrous, leaves orbicular oblong or broad-ovate obtuse crenate base acute or rounded, bracts acute, standard orbicular, lip boat-shaped spur less. *Dalz. & Gibs. Bomb. Flor.* 42.

Mountains of the CONCAN, *Law*, *Stocks*.

Much the smallest of the Scapigerous section, 1-4 in. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., tip obtuse or rounded, nerves flabellate; petiole as long or shorter than the blade; pedicels thick for the size of the plant; bracts small, ovate. *Flowers* few, 3-6. *Sepals* broadly ovate, obtuse; standard as broad as long, not very concave, obtuse, rather rhomboid; wings with three obtuse lobes, the lower rather the longest. *Capsule* $\frac{1}{2}$ in., elliptic, turgid, acute. *Seeds* minute, linear-oblong.

4. ***I. crenata***, *Bedd. in Madr. Journ.* ser. 2, iv. 69, t. 7, f. 10; *l.c. Pl. Ind. Or.* p. 31; leaves orbicular-reniform or cordate crenate, scape very

slender few-flowered, standard broader than long very concave, spur short obtuse. *I. Akka*, *Beddome*, *l.c.* 69, f. 11.

MALABAR, in the Anamallay and Akka Mts, alt. 5-8000 ft., *Beddome*.

I have not seen this species, which *Beddome* describes as perhaps not distinct from *I. Stocksii*; from which, however, it seems to differ in the large flowers, long scapes, short pedicels, shape of the standard, and presence of a distinct spur, as well as in the habitat. Though originally described as different plants, *Beddome* subsequently united his *I. crenata* and *Akka*, which according to his descriptions differ in the first having hairy nerves on the leaves above, short petioles, and a crenate standard; both have hairy upper surfaces of the wings and large flowers (how large is not stated), pure white with a blue tuft of hairs in *I. crenata*.

5. ***I. orchioides***, *Bedd. Ic. Pl. Ind. Or.* p. 31, t. 151; leaves ovate-cordate obtuse acuminate very hairy above, bracts ovate, standard ovate, wings with two subulate tails, lip saccate spurless.

Koondah Mts. in MALABAR, near Avalanche Ghat, *Beddome*.

Leaves 1½-2 in., glabrous beneath, crenatures bristle-pointed; petiole very long. *Scape* 6-7-flowered; pedicels very slender. *Flowers* ½ in. diam., like those of a *Liparis*, reddish-brown; sepals ovate; standard obtuse, not vaulted; wings with a dimidiate oblong blade produced into two pendulous tails longer than itself; lip acute. *Capsule* contracted at both ends. *Seeds* minute scrobiculate.—Description from *Beddome*, who describes the sepals as small, but figures them, as remarkably large for the size of the plant.

**** Spur longer than the flower. Wings 3-lobed (except in *I. acaulis*).**

6. ***I. acaulis***, *Arn. in Hook. Comp. Bot. Mag.* i. 325; glabrous, leaves orbicular ovate-cordate or oblong, base acute rounded or cordate (not deeply 2-lobed), standard obovate very concave, wings 2-partite terminal lobe largest, spur very slender. *Thwaites Enum.* 68; *Dalz. & Gibs. Bomb. Flor.* 42; *H. f. & T. in Journ. Linn. Soc.* iv. 118; *Bedd. Ic. Pl. Ind. Or.* p. 31. *I. scapiflora*, *Hook. Bot. Mag.* t. 3587; *W. & A. Prodr.* 137, in part. *I. bulbosa*, *Moon Cat.* 18. *I. gracilis*, *Bedd. in Madr. Journ.* ser. 2, iv. 69, t. 7, f. 13.

Mountains of the central province of CEYLON; alt. 3-5000 ft., and of MALABAR and the CONCAN?

Very variable in size and robustness, 2-12 in. high. *Leaves* 1-6 in.; usually on slender petioles, more or less crenate. *Scape* stout. *Racemes* 1-4 in.; bracts broad; pedicels stout, 1 in. *Flowers* ½-1½ in. broad; sepals broadly ovate; standard short, broader upwards; wings variable in the length and breadth of the segments, which are falcate and truncate; spur very slender, variable in length. *Capsule* ¼-½ in., ellipsoid, acute at both ends.—*Thwaites* suspects that the Ceylon plant cannot be *scapiflora*, because *Wallich* describes the spur as several inches long, but in some of our specimens it attains 3 inches. *Wight and Arnott*, in the *Prodromus*, apparently confound *acaulis* with the true *I. scapiflora*. There is so much diversity in the foliage of specimens which the 2-partite wing obliges me to refer to this species, that I cannot but repeat that this and the three following may prove to be forms of one. Some have the orbicular reniform leaves of *I. scapiflora*, others the ovate-cordate and pilose leaves of *I. rivalis* (notably *Thwaites*, No. 2595), others the elliptic leaves of *I. rivalis*, var. 2, and still others the oblong leaves with rounded sinus of *I. Denisonii*. The species of this group cannot be determined from dried specimens: *Beddome* (*Ic. Pl. Ind. Or.* p. 31) states that *I. acaulis* and *rivalis* "could never be confounded except in dried specimens."

7. ***I. scapiflora***, *Heyne in Roxb. Fl. Ind. ed. Carey*, ii. 464; leaves orbicular cordate or reniform sinus usually deep and broad above tip rounded obscurely crenate serrate, standard large orbicular rhomboid, wings with 3 broad segments, spur very slender.

Mountains of MALABAR, *Heyne*; Bababud, *Herb. Rottler*.

A specimen of this plant in Rottler's Herbarium, labelled by himself "*I. scapiflora*, Heyne," may, I assume, be regarded as authentic for the plant discovered by the author of the species. It is certainly not the plant which bears this name in the Linnean Journal (see *I. Beddomei*), which has a short spur and 2-partite wings; it entirely resembles round-leaved forms of *I. acaulis*, except in the 2-partite wings. The leaves are evidently fleshy, obscurely crenate, with radiating nerves; the bracts thick, and scape and pedicels stout. Flowers 1 in. diam.; segments of wings recurved-falcate linear, rather broad, tips rounded.

8. ***I. rivalis***, *Wight in Madr. Journ.* v. 13, t. 8; *Id.* t. 751; leaves ovate-cordate with an acute sinus or a rounded base or elliptic and acute at both ends crenate-serrate usually hairy above, standard broader than long vaulted, wings 3-partite, spur very long. *H. f. & T. in Journ. Linn. Soc.* iv. 119.

Mountains of the CONCAN, CANARA, MALABAR, and TRÁVANCOR, alt. 5-8000 ft.

Very variable in stature, 6-18 in. high. Leaves extremely variable in form and pubescence, feather-nerved, never orbicular-reniform with a broad sinus as in *I. scapiflora* and *Denisonii*.—Except by the wings I do not see how some specimens are to be distinguished from *I. acaulis*, but Beddome says they "never could be confounded except in dried examples;" he reduces his *verrucosa* to this species (*Id.* Pl. Ind. Or. p. 31).

VAR. 1. leaves 2-5 in. ovate-oblong hairy acute, base rounded or cordate. *Wight Id.* t. 757.

VAR. 2. leaves 4-8 in. elliptic acute at both ends, petiole as long very stout.—Concan, *Stocks*.

VAR. 3. leaves 3-4 in. ovate-cordate, wings with a batch of warts on the upper surface. *I. verrucosa*, *Bedd. in Madr. Journ.* iv. 69, t. 7, f. 9.

9. ***I. Denisonii***, *Bedd. Id. Pl. Ind. Or.* p. 30, t. 151; leaves ovate-cordate obtuse or acute crenate pilose above base deeply 2-lobed sinus broad, scape and pedicels very long and slender, standard broadly ovate vaulted, wings 3-partite bearded on the inner face, lateral segment with a filiform appendage enclosed in the long recurved spur.

NILGHIRI MTS.; abundant in the Sisparah ghat, alt. 4-5000 ft., *Beddome*.

Apparently very near to *I. rivalis*, differing in the deeply 2-lobed base of the leaf, smaller flowers, ($\frac{3}{4}$ in. diam.) with much narrower and longer segments to the wings, and in the curious filiform appendages of the latter that descend into the spur as in *I. racemosa*, and which are no doubt concerned in the process of fertilization. I suspect that *Herb. Wight. Kew Distrib.* 310 is referable to this, not to *I. acaulis*.

A II.—OPPOSITIFOLIÆ.

* *Spur as long as the flower or longer.*

10. ***I. chinensis***, *Linn.*; glabrous, stem angled, leaves all opposite subsessile linear-oblong or obovate, stipules setaceous, sepals linear, standard orbicular, wings semi-obovate entire base auricled, spur very slender incurved. *Dalz. & Gibs. Bomb. Fl.* 42; *H. f. & T. in Journ. Linn. Soc.* iv. 119. *I. fasciculata*, *Lamk. Dict.* i. 359; *Wight Id.* t. 748; *W. & A. Prodr.* 138; *Hook. Bot. Mag.* t. 4631. *I. heterophylla*, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 458; *Cat.* 4748. *I. setacea*, *Coleb. in Hook. Exot. Flor.* t. 137. *Balsamia fasciculata* and *B. chinensis*, *DC. Prodr.* i. 686.—*Rheede Hort. Mal.* ix. t. 47.

BHOTAN, *Griffith*; mountains of the WESTERN PENINSULA, from the Concan to Trávancor, alt. 5-8000 ft.; KHASIA MTS., alt. 3-5000 ft.; BIRMA, *Wallich*; TENASSERIM, *Helfer*; MALACCA, *Griffith*.—DISTRIB. China.

A very variable and beautiful plant. Stem 4-16 in., erect from a rooting prostrate

base. *Leaves* $\frac{1}{2}$ to nearly 4 in., serrate, linear-oblong obovate or almost rounded, sharply serrate, acute or obtuse, base acute rounded or subcordate, glabrous or sparsely hairy, rather thick, glaucous beneath, basal serratures often setaceous; stipules subulate, gland-tipped, recurved. *Pedicels* shorter or longer than the leaves, solitary or fascicled, fruiting deflexed. *Flowers* $\frac{1}{2}$ –1 in. diam., rose-purple or white; perianth flat; lip boat-shaped. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in., elliptic, turgid in the middle. *Seeds* many, shortly oblong, smooth, nearly black, shining.—The Linnean type is a straight broad-leaved form, but the narrow-leaved occurs in China.

11. **I. Griffithii**, *H. f. & T. in Journ. Linn. Soc.* iv. 120; lower leaves opposite petioled uppermost sessile whorled in threes, all narrow linear-lanceolate, sepals ovate-oblong acuminate, standard broad obcordate spurred behind, wings broadly 2-lobed, spur long filiform.

EASTERN PENINSULA; Mounts Ophir and Gerai, &c., alt. 3000 ft., near Malacca, *Griffith, &c.*

A beautiful species, closely allied to *I. chinensis*, but very distinct in the foliage, all the leaves being narrowed at the base, and the upper in threes; they are $1\frac{1}{2}$ –4 in. long, rather thick, whitish beneath, glabrous and somewhat hairy on the upper surface, as is the stem sometimes, teeth remote, lower setaceous. *Pedicels* solitary, very rarely in pairs. *Flowers* 1 in. diam., perianth flat, rose-lilac. *Capsule* unripe, like that of *I. chinensis*.

12. **I. Gardneriana**, *Wight Ic. t.* 1050; nearly glabrous, stem creeping at the base, leaves whorled in threes sessile or shortly petioled ovate-oblong acute sharply serrate, sepals short, standard obovate apiculate dorsally winged, wings 2-lobed, lobes similar obovate retuse, lip boat-shaped with a long slender spur. *H. f. & T. in Journ. Linn. Soc.* iv. 121.

Pastures below Sisparah in the western slopes of the NILGHIRI Mts., *Wight & Gardner*.

Stem procumbent at the base and rooting; simple, ascending. *Leaves* $1\frac{1}{2}$ –2 in., distinctly petioled, very sharply serrate, ciliate towards the base. *Peduncles* longer than the leaves, filiform. *Sepals* ovate, acuminate; wings very short and subequally 2-lobed, neither of the lobes clawed, the terminal rather the larger. *Capsule* oblong, small, pointed, glabrous.—I have seen no specimens of this plant; that so named in Wight's Herbarium and distributed from it (No. 312) is an opposite-leaved species, with a very short spur, and wholly differently shaped wings.

13. **I. setosa**, *H. f. & T. in Journ. Linn. Soc.* iv. 123; stem branched, leaves all opposite or uppermost whorled most of them long petioled elliptic-lanceolate acuminate distinctly serrulate, upper sessile with long cilia at the base, stipules of many setæ, standard suborbicular with a dorsal wing; wings broad, spur very slender.

Mountains of MALABAR; Agamalay, near Palaghautcherry, *Wight*; Sisparah Ghat, alt. 3–4000 ft., *Beddome*.

A tall erect branched annual, 1–2 ft. high; stems below as stout as a goose-quill, quite glabrous, minutely dotted with black; branches opposite. *Leaves* 2–4 in., the lower on petioles $\frac{1}{2}$ –1 in.; petiole and both surfaces sparsely pubescent, margins at the base and stem at the upper nodes with long cilia. *Pedicels* quite glabrous, solitary or twin, slender, equalling the leaves. *Flowers* 1 in. diam.; perianth rotate, violet-purple; sepals rather large, ciliate, apiculate; standard suborbicular, with a broad dorsal wing; wings broad, 3-lobed?; spur curved upwards. *Capsule* (diseased) 1 in. long, terete, very slender.

14. **I. Kleinii**, *W. & A. Prodr.* 140; slender, branched, nearly glabrous, leaves all opposite usually petioled elliptic-lanceolate or oblong or obovate acute or acuminate distantly serrulate, pedicels glabrous, stipules of 2 glands or obsolete, flower small, sepals linear-subulate, standard small

orbicular, wings with long claws broadly obovate almost entire, spur slender, capsule narrow. *Wight Ic.* t. 884; *H. f. & T. in Journ. Linn. Soc.* iv. 122; *Dalz. & Gibs. Bomb. Flor.* 43. *I. tenella*, *Wall. Cat.* 4746 B. *Balsamina minor*, *DC. Prodr.* i. 686.—*Rheede Hort. Mal.* ix. t. 50, 51.

Mountains of the WESTERN PENINSULA, from the Concan southwards, common in the rains.

A slender herb, rarely 1 ft. high; branches opposite, spreading. *Leaves* 1–2½ in., very variable, glabrous or pilose above, glaucous beneath, rarely sessile, usually narrowed into a slender petiole. *Pedicels* slender, solitary or twin, reflexed in fruit. *Flowers* ½ in. diam., violet-purple; spur hardly exceeding the flower or longer, more or less ascending. *Capsule* ½ in., ellipsoid-lanceolate. *Seeds* few, subglobose, black, shining.—The small flower, long spur, entire clawed wings, and small capsule with few globose seeds together best distinguish this variable plant. I never find the pedicel to have a line of pubescence as in *I. tenella* and *inconspicua*.

15. ***I. diversifolia***, *Wall. Cat.* 4749; diffuse with ascending branches, quite glabrous, leaves all opposite faintly serrate lower shortly petioled elliptic or oblong obtuse, upper sessile linear-oblong or ligulate base cordate, sepals linear acuminate, standard small, wings broadly semi-obovate, spur long filiform. *W. & A. Prodr.* 139; *H. f. & T. in Journ. Linn. Soc.* iv. 121. *I. heterophylla*, *Wall. Cat.* 4748 B. *I. Arnottiana*, *Miq. in Herb. Hohenack.* 275.

WESTERN PENINSULA, from CANARA to MALABAR, *Heyne, &c.*; Quilon, *Wight*; Bababoodan hills, *Law*.

Stems very succulent, a foot or more long, rooting at the nodes. *Leaves* ½–3 in., the lower smallest and usually petioled, upper often dilated at the base, serratures rarely well defined, all very flaccid when dry; stipules obscure, glandular. *Pedicels* solitary or twin, with a faint line of pubescence, usually longer than the leaf, deflexed in fruit. *Flowers* ¾ in. diam.; perianth rosy, rotate; spur ascending, sometimes thick, inflated, equalling or exceeding the flower. *Capsule* ½ in., ellipsoid, turgid. *Seeds* globose, dark brown, smooth, shining.—Copious specimens in *Wight's Herbarium* prove this to be a very variable plant, sometimes of considerable size, and not the small species it was assumed to be in the Linnean Journal. Some specimens, probably gathered in marshy places, have very thick succulent stems and large leaves, flaccid when dry, and others are very slender with leaves not ½ in. in breadth.

16. ***I. ligulata***, *Bedd. in Madr. Journ.* ser. 2, iv. 67, t. 7, f. 6; *Ic. Pl. Ind. Or.* p. 30, t. 149; branched, erect, glabrous, leaves uniform subsessile linear-ligulate mucronate base cordate remotely serrate hispid above, stipules setaceous or 0, pedicels with a pubescent line, sepals linear-lanceolate, standard small, lateral wing-lobes broad almost hatchet-shaped, terminal very slender descending into the spur, spur as long as the flower stout incurved.

Mountains of TRAVANCOR and MALABAR, alt. 1–2500 ft, *Beddome*.

Stem 1–2 ft.; branches slender, spreading. *Leaves* 3–4 in., horizontal, very uniform in all the specimens, though probably the species occurs with broad and petioled lower leaves. *Pedicels* 1 or more, very slender, about half the length of the leaves. *Flowers* about 1 in., pink or white; standard with a dorsal pubescent line; spur undulate. *Capsule* ellipsoid, swollen in the centre. *Seeds* about 12, glabrous, shining.—When dry it is difficult, except by the spur, to distinguish this from narrow-leaved states of *I. inconspicua*, *tenella*, and *oppositifolia*; and, except from the breadth of the spur, from *I. diversifolia*, it being difficult to make out the curious structure of the 2 wing-lobes (that descend into the spur), except on fresh specimens. According to *Beddome's* figure it is the terminal lobes that are reduced to narrow ligulæ and descend into the spur; but as far as I can make out from dried specimens, it is the lateral lobes; they are filiform, much longer and more slender than *Beddome* represents, and dilated at the apex.

** *Spur shorter than the flower or 0.*

17. **I. tenella**, Heyne in Wall. Cat. 4746 A; small, slender, erect, glabrous, leaves all opposite sessile or shortly petioled ligulate oblong or lanceolate remotely serrate, stipules obscure or 0, pedicels with a line of pubescence, sepals linear acuminate, standard short, terminal lobe of wing clawed elongate lateral small, spur shorter than the flower, capsule clavate pointed few-seeded. *W. & A. Prodr.* 140; *H. f. & T. in Journ. Linn. Soc.* iv. 123. ? *I. rosmarinifolia*, Retz; *Wight Ic.* t. 750. *I. tenuicula*, Steud. *Nom. ed.* 2, i. 804.

Mountains of MALABAR, Heyne; and the CONCAN, Jacquemont.

Stem 4–10 in., simple or sparingly branched. *Leaves* 1–4 in., the upper or all narrow, sessile with a subcordate base, the lower (rarely all) usually narrow lanceolate and petioled. *Pedicels* 1–3, solitary or fascicled, capillary, erect horizontal or deflexed in fruit. *Flowers* about $\frac{1}{2}$ in., pink? *Capsule* glabrous, $\frac{1}{2}$ in., straight, long-beaked. *Seeds* few, orbicular, compressed, shining, black.—A very obscure plant, probably a variety of *I. Kleinii*, intermediate between it and *I. inconspicua*. There is a specimen in Rottler's Herbarium, marked *I. longiflora*, Heyne, from Bababud. Wight's *I. rosmarinifolia*? has a very short spur.

VAR. brachycarpa; spur very slender as long as the flower, capsule shorter $\frac{1}{2}$ in. ellipsoid acute at both ends. *Herb. Wight*.—Cochin, Johnstone, Mysore, Lobb. *Leaves* 4 in. long, ligulate from a cordate sessile base in Cochin specimens.

18. **I. inconspicua**, Benth. in Wall. Cat. 4741; flaccid, glabrous, much branched from the base, leaves serrate lower ovate or oblong and petioled upper linear sessile or all ovate or all linear, stipules setaceous or 0, pedicels very slender shorter than the leaves with a line of pubescence, sepals linear-subulate, wings with a broadly rhomboid obovate clawed terminal lobe and small lateral lobe, lip saccate acuminate not spurred. *W. & A. Prodr.* 139; *Wight Ic.* t. 970; *Dalz. & Gibs. Bomb. Fl.* 43. *I. pusilla*, Heyne in Wall. Cat. 4745; *H. f. & T. in Journ. Linn. Soc.* iv. 122. *I. filiformis*, *W. & A. Prodr.* 140. *I. mysorensis*, Roth in Wall. Cat. 4743 in part. *I. Perrottetii*, Turcz in Bull. Soc. Nat. Mosc. 1863, i. 594.

Mountains of the Western Peninsula, from the CONCAN to MALABAR; common at 3–8000 ft.

Stems 4–12 in., robust or slender, erect. *Leaves* $\frac{1}{2}$ –4 in., upper always narrowed and most remotely serrate, often very slender, glabrous or pubescent above, pale or glaucous beneath. *Pedicels* always with one line of pubescence, solitary or geminate, shorter than the leaf, deflexed in fruit. *Sepals* very long and narrow; wings with a large rounded almost obovate clawed terminal lobe, and small linear lateral one. *Capsule* $\frac{1}{2}$ in., turgid in the middle, acute at both ends. *Seeds* few, almost globose, but a little compressed, black shining.—Of this very variable plant there appear to be two extreme and totally distinct forms, but the Wallichian specimens, which are all under-sized, are so bad, that I cannot satisfactorily determine to which of them any of the synonyms quoted above should apply. One of these two forms is usually shorter, and has all the leaves $\frac{1}{2}$ – $\frac{3}{4}$ in., petioled, ovate or ovate-lanceolate, and sharply serrate; it is the *I. inconspicua* of Wight's *Icones*, t. 970, *I. tenella* of Heyne, according to a specimen so named in Rottler's Herbarium, but certainly not Rottler's *tenella*. The other extreme form is much larger, with leaves $1\frac{1}{2}$ –2 in., narrow-ligulate, remotely serrate, often rounded or subcordate at the base; this is the *I. filiformis* of Wight's Herbarium, but differs from the description in Wight and Arnott in the pedicels not being confined to the uppermost leaves. *I. mysorensis*, Wall. Cat. 4743 B, is a very small state of *inconspicua* and not the true plant. *I. ramosissima*, Dalz., referred in the *Journ. Linn. Soc.* to *I. tomentosa*, Dalz., is another form, with a minute rudimentary spur. Between the extreme forms there are innumerable connecting links; and I retain the name *inconspicua*, as the most applicable, the flowers being amongst the smallest of the genus. Beddome adopts the synonymy of the *Prodromus* for *I. inconspicua*, and says that he does not

know *I. tenella* (Lc. Pl. Ind. Or. p. 32). Upon the whole, I am disposed to separate the varieties as follows:—

VAR. 1. *inconspicua proper*; stem 4–8 in. usually more robust, leaves ovate or ovate-lanceolate petiolate strongly serrate, peduncles usually short. *I. inconspicua*, *Wight Ic.* t. 970.

VAR. 2. *pusilla*; smaller, lower leaves more or less petioled lanceolate and serrate, upper longer narrow subsessile remotely serrate. *I. pusilla*, *Heyne in Wall. Cat.* 4745.

VAR. 3. *filiformis*; slender and much branched, leaves subsessile very long slender remotely serrate the lower sometimes petioled and lanceolate. *I. filiformis*, *W. & A. Prodr.* 140 (a small few-flowered form).

VAR. 4. *ramosissima*; robust, much branched, leaves uniform short sessile oblong obtuse at both ends, lip with a very minute spur. *I. ramosissima*, *Dalz. in Hook. Kew Journ. Bot.* iii. 230.

19. ***I. oppositifolia*, Linn.**; erect, leaves subsessile narrow-linear elongate remotely serrate, or the lower oblong or linear-oblong and petioled, stipules subulate, pedicels quite glabrous, sepals linear acuminate, wings with a broadly-obovate clawed terminal lobe and a small lateral one, lip conical ending in a short stout incurved spur. *Wight Ic.* t. 883; *W. & A. Prodr.* 139; *Dalz. & Gibs. Bomb. Fl.* 43; *H. f. & T. in Journ. Linn. Soc.* iv. 121. *I. rosmarinifolia*. *Retz. Obs.* v. 29; *Arn. in Hook. Comp. Bot. Mag.* i. 325. *Balsamina rosmarinifolia and oppositifolia*, *DC. Prodr.* i. 686.

Mountains of MALABAR, CANARA, and the CONCAN, alt. 3–5000. CEYLON, abundant from the sea-level to 7000 ft., *Thwaites*.

This is another plant so closely allied to *I. tenella* and *inconspicua*, that I do not see how they are always distinguishable, in a dried state at any rate, except by the spur and glabrous pedicels. Ceylon specimens are remarkably uniform, 12–18 in., erect, simple or sparingly branched, stipulate with very narrow leaves $1\frac{1}{2}$ –3 in., flowers $\frac{1}{4}$ – $\frac{3}{4}$ in. long (from standard to tip of wings), and a short stout incurved spur; but Peninsular specimens have more often broadly oblong shortly-petioled leaves, sometimes rounded at the tip. Rottler's specimens are excessively slender and flaccid. The spur is tolerably uniform in all, being horned, and the peduncles invariably glabrous; the capsule and seed are quite like those of *I. inconspicua*. I had (in *Linn. Journ.*) referred to this *Wight's* figure of *I. rosmarinifolia*, t. 750, which I am now disposed to refer to *I. tenella* or *inconspicua*.

20. ***I. reticulata*, Wall. Pl. As. Rar.** 19, t. 19; *Cat.* 4750; glabrous, stem erect from a creeping base fleshy simple or branched, leaves all opposite upper subsessile linear-oblong acute cuspidate-serrate base retuse, lower often shortly petioled, sepals narrow linear, standard ovate acute, wings clawed, claw with a hooked process (lateral lobe) on each margin, terminal lobe orbicular clawed, lip funnel-shaped narrowed into a short incurved spur.

PEGU near Rangoon, *Wallich*; MOULMEIN, *Lobb*.

Stem 6–12 in.; branches opposite or alternate, obscurely 4-angular. Leaves 1–1 $\frac{1}{2}$ in.; lower often narrow-obovate acute. Flowers $\frac{1}{4}$ in. diam., rosy, nodding; fruiting peduncles deflexed. Capsule $\frac{1}{4}$ in., ellipsoid, turgid in the middle, narrowed at both ends and beaked at the apex, glabrous. Seeds few, subglobose, testa black shining.—Very nearly allied to *I. oppositifolia*, with which I have confounded it in *Journ. Linn. Soc.*; but the character of the 2 small lateral recurved lateral lobes on each wing, is very remarkable. I describe them from *Wallich's* figure, and assume *Lobb's* plant to be the same, a point which can only be determined from living specimens.

21. ***I. Lawii*, H. f. & T. in Journ. Linn. Soc.** iv. 122; erect, much branched, leaves short sessile or subsessile ovate or oblong subserrate sparsely scabrid above, stipules 0, pedicels with a line of hairs, sepals

linear-lanceolate, standard orbicular cuspidate, wings with very broadly obovate subsessile terminal and small lateral lobes, lip boat-shaped spurless. *Dalz. & Gibs. Bomb. Flor.* 43.

Bababoodan hills in MALABAR, *Lavo.*

Annual, 8-10 in. *Stem* rather stout, glabrous. *Leaves* $\frac{3}{4}$ -1 in., smaller upwards, acute, glabrous and pale beneath, the upper often cordate at the base. *Pedicels* about equalling the leaves, sharply deflexed in fruit. *Flowers* $\frac{3}{4}$ in. diam. across the wings. *Capsule* $\frac{1}{2}$ in., ellipsoid, acute at both ends. *Seeds* few, unripe, apparently as in *I. Kleinii*.—Very distinct from any of the preceding specimens of this section in the form of the wings.

22. ***I. Dalzellii***, *H. f. & T. in Journ. Linn. Soc.* iv. 123; erect, sparingly branched, quite glabrous, robust, leaves subsessile lower elliptic-lanceolate, upper ovate or oblong-lanceolate from a broad or cordate base spinulose-serrulate, stipules 0, sepals linear-lanceolate, standard sub-orbicular hooded winged at the back, terminal wing-lobe clawed, lip boat-shaped with a very short spur. *Dalz. & Gibs. Bomb. Fl.* 43.

Mountains of the CONCAN, *Dalzell.*

Stem stout, 10-18 in. high. *Leaves* 3-5 in., sometimes $1\frac{1}{2}$ in. broad, acuminate, basal serratures often with long cilia. *Pedicels* solitary or fascicled on a very short common peduncle, quite glabrous, shorter than the leaves, apparently not deflexed in fruit. *Flowers* about $\frac{1}{2}$ in. across, yellow (structure not well made out). *Capsules* nearly $\frac{1}{2}$ in., ellipsoid. *Seeds* few, very large, broadly oblong, black, shining.—A very distinct species, which differs from all of this section in the often fascicled peduncles and very large seeds.

23. ***I. tomentosa***, *Heyne in Wall. Cat.* 4751; more or less tomentose, leaves nearly uniform very shortly petioled elliptic- or oblong-ovate acute or obtuse serrulate hispid above glabrous or tomentose on the nerves beneath, sepals linear-lanceolate, standard oblong, wings with a broad sessile terminal and small lateral lobe, lip saccate. *Dalz. & Gibs. Bomb. Flor.* 43; *Wight Ic. t.* 749; *H. f. & T. in Journ. Linn. Soc.* iv. 121 (*excl. syn. of ramosissima*); *W. & A. Prodr.* 139. *I. rufescens*, *Benth. in Wall. Cat.* 4747; *W. & A. Prodr.* 138; *Wight Ic. t.* 969.

Mountains of MALABAR and TRAVANCOR, alt. 3-7000 ft., common in swamps.

Stem 4-8 in., usually simple, erect, more or less clothed with crisped rufescent hairs above, which also appear on the pedicels and often on the nerves of the leaf beneath. *Leaves* $\frac{1}{2}$ -1 in., short, uniform, obtuse or acute, more or less scabrid or tomentose above; nerves beneath few. *Pedicels* always solitary, longer or shorter than the leaf, deflexed in fruit. *Flowers* very variable in size, longest diameter ($\frac{1}{2}$ - $\frac{3}{4}$ in.) through the lip because of its being so saccate, more or less pubescent; wings short, terminal lobe rounded; lip obtusely conical. *Capsule* and *seeds* as in *I. oppositifolia*, &c.—Wight figures a short apical spur in *I. rufescens*, but I do not find it in any of the specimens, and I do not think that *tomentosa* and it are separable as permanent varieties. On the other hand, Wight's figure of *I. rufescens* differs so much from that of his *I. tomentosa*, that it seems best to rank these provisionally as varieties.

VAR. 1. *tomentosa*; flower $\frac{1}{2}$ in. long from tip of lip to that of standard, wings with an oblong lateral lobe incumbent on a large terminal one, lip saccate with a short hooked spur. *Wight l.c.*

VAR. 2. *rufescens*; flowers twice as long as in var. 1, lip shortly saccate spurless. *Wight l.c.*

24. ***I. concinna***, *H. f.*; small, glabrous, branches opposite, leaves uniform opposite subsessile ovate or ovate-cordate acute sharply serrate, nerves strong beneath, sepals dimidiate-lanceolate as long as the lip, standard orbicular spurred, wings 2-lobed, the terminal clawed dimidiate-

ovate, lip boat-shaped with a very short curved spur. *I. Gardneriana*, *Wight Herb. not of the Icones*.

Mountains of MALABAR, *Wight*.

Annual, erect, 6–10 in., rather stout; branches opposite, ascending. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., lower serratures almost setaceous; stipules setaceous or obsolete. *Pedicels* rather shorter than the leaves. *Flowers* $\frac{1}{2}$ in. diam., remarkable for the length of the sepals, apparently purple. *Capsule* erect, $\frac{1}{2}$ in., acute at both ends, very turgid in the middle. *Seeds* very few and large, subcompressed, rather broader than long, testa black shining. —This has much the habit of *I. tomentosa*, but it is glabrous with ovate very acutely serrate leaves, and different flowers. The pedicels show no disposition to be deflexed.

25. *I. salicifolia*, *H. f. & T. in Journ. Linn. Soc.* iv. 124; erect, stout, tomentose, leaves shortly petioled lanceolate serrate all opposite or lower opposite upper whorled, peduncles solitary or fascicled on a common peduncle sometimes 2-flowered, stipules subulate or 0, flowers large, sepals subulate-lanceolate, standard obovate keeled, lip deeply saccate with a short stout hooked spur.

KHASIA MTS., alt. 3–4000 ft., *Griffith, &c.*

—*Stem* stout, 1–2 ft., with spreading opposite branches. *Leaves* 2–5 in., acuminate at both ends, membranous, tomentose or glabrate on both surfaces, serratures small, the basal long-ciliate. *Inflorescence* very variable, of slender 1-flowered pedicels that are solitary or fascicled or collected into a many-flowered axillary cyme, with subulate bracteoles. *Flowers* dark purple, nearly triangular in profile, and $\frac{3}{4}$ in. from the tip of the spur to that of the standard. *Capsule* $\frac{3}{4}$ in., elliptic-lanceolate. *Seeds* immature. —*I. salicifolia*, Turcz., published in the Moscow Bulletin in the year previous to this (in the Linnean Journal, 1860) is, I suspect, *I. Balsamina*.

A III.—SUBVERTICILLATÆ.

* *Peduncles 1-flowered. See I. parvifolia in **.*

26. *I. latifolia*, *Linn.*; tall, stout, erect, branched, quite glabrous, leaves subopposite and whorled petioled ovate-lanceolate crenate, sepals ovate cuspidate, standard broad 2-lobed spurred behind, wings broad 2-lobed, lip boat-shaped, spur long slender straight or incurved. *Wall. Cat.* 4737; *W. & A. Prodr.* 138 in part; *Dulz. & Gibs. Bomb. Fl.* 44; *H. f. & T. in Journ. Linn. Soc.* iv. 124 (excl. some syn.); *Miq. Ill. Flor. Arch. Ind.* 93. *I. cuspidata*, *W. & A. in Hook. Comp. Bot. Mag.* i. 321; *Wight Ic.* t. 741; *Thwaites Enum.* 65. *Balsamina latifolia*, *DC. Prodr.* i. 686.—*Rheede Hort. Mal.* ix. t. 48.

Mountains of the WESTERN PENINSULA, from CONCAN to TRAVANCOR, alt. 3–7000 ft.; CEYLON, alt. 4–7000 ft.—*DISTRIB.* Java, fid. *Miquel*.

A robust plant, annual? 2–3 ft. high; stem as thick as the finger below, branches alternate. *Leaves* membranous, 2–5 in., acuminate, base always acute, crenatures often setose. *Flowers* 1–1 $\frac{1}{2}$ in. diam., pale purple, perianth rotate. *Standard* larger than the wings, which have a large retuse basal and narrower terminal lobe; lip green, as is the spur. *Capsule* 1 in., elliptic, turgid, quite glabrous. *Seeds* few, large, oblong, compressed; testa thick, opaque, reticulate. —A Nilghiri specimen of Gardner's has long cilia on the petiole and alternate leaves. Thwaites remarks the variability of the large lobes of the wings. I have not cited under this the *I. latifolia* of *Bot. Mag.* t. 5625, which has very alternate leaves, and must hence be referred to *I. flaccida*. These species are undistinguishable in herbarium specimens, though so different in the seeds.

27. *I. Leschenaultii*, *Wall. Cat.* 4739; almost shrubby, leafy, glabrous, leaves opposite and alternate spreading and recurved petioled ovate-lanceolate acuminate base acute crenate, sepals ovate acuminate,

standard 2-lobed spurred at the back, wings 2-lobed, lip boat-shaped, spur slender incurved. *W. & A. Prodr.* 136; *Wight Ic.* t. 970, *bis*; *H. f. & T. in Journ. Linn. Soc.* iv. 125. *Balsamina Leschenaultii*, *DC. Prodr.* i. 686.

Mountains of MALABAR and TRAVANCOR, alt. 3-7000 ft.

A very near ally of *I. latifolia*, but I think distinct, especially in the excessively branched and leafy habit, much smaller, crowded, usually recurved leaves, and smaller flowers and capsules. De Candolle is, no doubt, wrong in assigning Ceylon as a habitat, except, indeed, he took *I. latifolia* for this. Leschenault, its discoverer, collected in the Peninsula.

28. ***I. lucida***, *Heyne in Wall. Cat.* 4738; nearly glabrous, flaccid, stem very slender, leaves chiefly opposite and whorled petioled ovate or ovate lanceolate acuminate crenate, peduncles very slender, flowers small, sepals ovate acuminate, standard suborbicular beaked entire, wings 2-lobed, lip boat-shaped with a long incurved slender spur. *I. latifolia*, *W. & A. Prodr.* 138.

Mountains of the WESTERN PENINSULA, from the CONCAN to MALABAR.

Numerous specimens of this from Law, Stocks, Wight and others, show it to be a very different species from *I. latifolia*, being much smaller in all its parts, 4-8 in. high, sparingly branched, very slender and flaccid; with a small flower $\frac{1}{4}$ in. diam., and a small entire orbicular standard. The crenatures of the leaf, which is sparsely hairy above, are rarely setigerous. A specimen in Rottler's Herbarium bears the name *lucida*, Heyne, and station Courtallum, spelled Kuttalam. This may be a form of *I. flaccida*, with the leaves sometimes opposite.

** *Peduncles* 2- ∞ rarely 1-flowered. See *I. fimbriata* and *janthina* in A vii.

29. ***I. radicans***, *Benth. in Wall. Cat.* 4763; pubescent, stem simple erect leafy, leaves opposite subsessile stipulate lanceolate acuminate serrate, peduncles horizontal, flowers 1-4 large, standard galeate, wings small, lip saccate obtuse, spur short hooked. *H. f. & T. in Journ. Linn. Soc.* iv. 126.

KHASIA MTS., in marshes, alt. 4-6000 ft., *Wallich, Griffith, &c.*

A beautiful species, 10-18 in., more or less crisply hairy on the stem and leaves above, rarely glabrate. *Stem* square. *Leaves* 1-3 in., sometimes ovate- or oblong-lanceolate, the serratures often ciliate, pale beneath; stipules of 2 fascicles of soft gland-tipped setæ. *Peduncles* slender, shorter than the leaves, with as many lanceolate bracteoles as there are pedicels. *Flowers* nearly 1 in. across and as deep, purple; sepals very variable, dimidiate-ovate or lanceolate, straight or falcate; standard with a dorsal conical obtuse horn or gibbosity; wings 2-lobed; lip very obtuse, longer than broad; spur incurved. *Capsule* $\frac{3}{4}$ in., glabrous, ellipsoid, turgid in the middle. *Seeds* oblong, compressed; testa pale, membranous.

30. ***I. trilobata***, *Coleb. in Hook. Exot. Flor.* ii. t. 141; tall, alternately branched, almost glabrous, leaves opposite and alternate all or the lower only long-petioled lanceolate or ovate-lanceolate crenate-serrate stipulate, peduncles horizontal, flowers 2-5 large, sepals minute subetaceous, standard obcordate, lip saccate obtuse or conical, spur long or short. *Wall. Cat.* 4762 A, and 4763 (Pundua); *H. f. & T. in Journ. Linn. Soc.* iv. 126.

Tropical SIKKIM HIMALAYA, alt. 2-4000 ft., and KHASIA MTS., alt. 3-5000 ft.

A very variable and beautiful species, 1-2 ft. *Leaves* membranous, sparsely hairy above, lower 2-5 in. usually long-petioled elliptic-lanceolate long-acuminate crenate, the upper more often sessile lanceolate or oblong-lanceolate, all often ciliate towards the base; stipules usually of large tufts of soft cilia. *Peduncles* very slender, shorter than the leaves; bracts minute or 0. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. from base of lip to tip of standard, which is horned at the back, bright violet-purple; wings 2-lobed, but not deeply, notched

on the inner margin, lobes rounded-oblong, sometimes elongate; lip very variable, sometimes conoid and produced into a slender curved spur, at others obtuse, abruptly spurred, or gibbous above the spur. *Capsule* and seeds as in (92) *I. tripetala*.—The figures in the Exotic Flora represent etiolated flowers.

31. **I. *havida***, *H. f. & T. in Journ. Linn. Soc.* iv. 127; erect, quite glabrous, leaves opposite and 3-nately whorled all long-petioled ovate-lanceolate minutely serrulate, stipules obsolete, flowers 2-4-subumbelled yellow, bracts recurved, standard obovate, wings small, lip saccate obtuse, spur stout incurved. *Wall. Cat.* 4763 (*with I. trilobata*).

EASTERN BENGAL; SILHET and CACHAR, in woods, *Wallich*, &c.; MISHMI Mts. and UPPER ASSAM, *Griifith*.

A branched annual, not easily distinguished in a dried state from states of *I. trilobata*, except by the leaves being more constantly quite glabrous above, the stipules being obsolete, and the leaves not ciliate towards the base. *Peduncles* often opposite and usually erect; bracts apparently always recurved. *Flowers* $\frac{3}{4}$ in. from the base of the lip to the tip of the standard, dirty gamboge-yellow; spur thick, hooked; wings with 2 rounded lobes, the terminal purplish.

32. **I. *verticillata***, *Wight in Madr. Jour.* v. 15; glabrous, erect, leaves opposite and in whorls of 3 and 6 short-petioled narrow-lanceolate, stipules subulate, flowers umbelled, wings broad 2-lobed, terminal lobe elongate, lip boat-shaped with a long very slender spur. *H. f. & T. in Journ. Linn. Soc.* iv. 129.

Mountains of MALABAR; in gravelly beds of streams, at Sivagherry, *Wight*; COCHIN, *Johnstone*.

Herbaceous, diffuse; stem 6-18 in., subsimple, naked below, swollen at the joints, terete. *Leaves* 4-6 in., usually 4-6 in a whorl, much narrowed at both ends, ciliate-serrate. *Peduncles* shorter than the leaves, 2- ∞ -flowered, bracts subulate. *Flowers* $\frac{3}{4}$ in. diam., crimson, perianth subrotate; standard suborbicular-oblong; wings deeply 2-lobed, terminal lobe elongate, dimidiate-oblong; lip boat-shaped; spur $\frac{3}{4}$ -1 in., nearly straight or with an incurved tip, very slender indeed. *Capsule* erect or inclined (oblong obtusely 5-angled, *Wight*).

33. **I. *Goughii***, *Wight Ill.* i. 160; *Ic. t.* 1603; small, slender, quite glabrous, leaves mostly opposite petioled ovate crenate-serrate, peduncles capillary viscid exceeding the leaves 4-6-flowered, flowers minute, standard obovate retuse, wings 2-lobed, lobes short truncate and retuse, lip boat-shaped with a straight spur shorter than the flower. *H. f. & T. in Journ. Linn. Soc.* iv. 130. *I. pulniensis*, *Bedd. in Madr. Journ.* iii. 176. *I. anamallayensis*, *Bedd. in Madr. Journ.* N.S. iv. 68, t. 7, f. 8; *Ic. Pl. Ind. Or.* 30, t. 150. *I. circæoides*, *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1863, i. 594.

Mountains of MALABAR and TRAVANCOR; Nilgiri Mts. at Pycarrah, *Gough*; Anamallay and Pulney Mts. by streams, alt. 7-8000 ft., *Beddome*.

A very slender glabrous simple or branched annual, 4-8 in. high, supporting itself amongst herbage (*Wight*). *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., petiole half as long or longer, subacute, base rounded, nerves few, serratures not ciliate; stipules obsolete. *Peduncles* terminal, often numerous. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., 4-8, umbelled, pink; bracts minute, setaceous; sepals minute, falcate; standard mucronate in the retuse apex; wings with very variable lobes, the lower 2-lobed according to *Beddome*; spur shorter than the flower. *Capsule* $\frac{1}{10}$ in., erect, ellipsoid, acute at both ends. *Seeds* few, clothed with hairs.—*Beddome* (*Ic. Pl. Ind. Or.* p. 32) identifies his *I. viscosa* with *Goughii*; but his specimens of *I. anamallayensis* are certainly identical with *Goughii*, and *viscosa* appears to me to be a different plant, with a long spur; his figure of *anamallayensis* represents a coarser plant than his specimen, with very hairy upper surface of the leaves, which, however, he describes as having but few distant hairs: he further describes it in his *Icones* (not in the *Madr. Jour.*) as having a ligulate appendage to the wings, which is

hidden in the spur. The wings are probably very variable; the drawing in Beddome's *Icones* does not resemble that in the *Madr. Journal* (and neither are like Wight's figure); there is a short subulate process on their inner margin, close above the spur, which may descend into it.

34. ***I. viscosa***, *Bedd. in Madr. Journ.* N.S. iv. 68, t. 7, f. 7; stem petioles and peduncles viscidly pubescent, leaves opposite long-petioled elliptic or ovate obtuse or acute subcrenate, peduncles exceeding the leaves 6-12-flowered, flowers minute umbelled, standard suborbicular, wings 2-lobed terminal lobe the largest clawed, lip conical, spur curved gibbous longer than the flower, seeds echinate.

Anamallay hills in MALABAR, alt. 3500 ft., *Beddome*.

Probably a variety of *I. Goughii*, from which it differs in the stem and branches and sometimes the leaves being viscid, the usually larger size, faint crenatures of the leaves, longer spur, and (according to Beddome) the echinate ripe seeds which are matted with hair when young. The wings are, as usual, very variable, sometimes exactly as in Wight's figure of *Goughii*, and there is, as in that plant, a subulate process on their inner margin close to the base, which is hidden in the lip.

35. ***I. parvifolia***, *Bedd. in Madr. Journ.* N.S. iv. 66, t. 7, f. 1; *Ic. Pl. Ind. Or.* 29, t. 142; glabrous, small, stem very slender branched, leaves alternate and opposite very small ovate coarsely crenate-serrate, peduncles axillary much longer than the leaves, flowers 3-5 very small racemose, standard suborbicular, wings with a large triangular terminal lobe, lip boat-shaped, spur short blunt, seeds villous.

MALABAR; on rocks at the top of the Akka Mts., alt. 8-8600 ft., *Beddome*.

Much the smallest known species. *Stem* 3-6 in., apparently prostrate. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., opposite and alternate, sessile or petioled, the lower usually opposite and upper alternate. *Peduncles* very stout and long for the size of the plant, often 1-1 $\frac{1}{2}$ in., spreading, axillary, solitary; bracts minute. *Flowers* $\frac{1}{2}$ in. diam., pale pink with a crimson blotch on the wing; sepals falcate; standard small, vaulted; wings with a small upper and large terminal lobe; lip greenish. *Capsule* apparently as in *I. Goughii*.—Description taken chiefly from Beddome. In the Kew specimens the peduncles are almost always single-flowered.

36. ***I. circæoides***, *Wall. Cat.* 4772; small, glabrous, stem simple, leaves few opposite long-petioled broadly ovate subserrate, peduncle solitary filiform, flower subracemose, sepals orbicular acuminate, standard small, wings large, lip concave, spur very short. *H. f. & T. in Journ. Linn. Soc.* iv. 130.

TENASSERIM, at Tavoy, *Wallich*; PEGU, *M'Clelland*.

Stem very slender and quite simple, 4-6 in. *Leaves* 2-4 pairs, 2 by 1 $\frac{1}{2}$ -1 $\frac{1}{4}$ in., glabrous, with a few scattered hairs on both surfaces, glaucous beneath, acute, serratures subsiculate, nerves many slender; petiole very slender; stipules obscure, glandular. *Peduncle* shorter than the leaf; bracts small, ovate; pedicels short. *Flowers* about $\frac{1}{2}$ in. diam., white?; sepals green; terminal lobe of wing long-clawed, pendulous. *Capsule* short.—The above is an imperfect description, the specimens being very indifferent.

A IV.—UNIFLOREÆ.

* Spur much shorter than the flower or 0, sometimes longer in *I. Balsamina*, and *I. leptopoda*.

37. ***I. Balsamina***, *Linn.*; pubescent or glabrate, leaves petioled narrow-lanceolate acuminate deeply serrate, petiole glandular, flowers rose-coloured, sepals broad-ovate minute, standard orbicular retuse, wings very broad lateral lobe much rounded, terminal sessile very large, lip small conoid, spur short or long and slender incurved, capsule tomentose. *W. &*

A. Prodr. 135; *H. f. & T. in Journ. Linn. Soc.* iv. 130; ?*I. Lobbiana and salicifolia, Turcz. in Bull. Mosc.* 1859, i. 270, 271.

Throughout tropical and subtropical INDIA and CEYLON.—DISTRIB. Malay Islands and China.

The common garden Balsam is a very variable plant in habit, pubescence, size and colour of flower, breadth of leaf, shape of lip, and length of spur. *Capsule* $\frac{1}{2}$ – $\frac{1}{4}$ in., ellipsoid, narrowed at both ends, densely tomentose or woolly. *Seeds* globose; testa black, opaque, tubercled.

VAR. 1. *vulgaris*; tall, leaves broadly lanceolate, flowers large, spur short. *I. Balsamina, Linn.; Roxb. Fl. Ind.* i. 651; *Wall. Cat.* 4731. *Balsamina hortensis, DC. Prodr.* i. 685.—*Rheede Hort. Mal.* ix. t. 52.

VAR. 2. *coccinea*; leaves narrow-lanceolate, flowers medium-sized, spur long and slender. *I. Balsamina, Dulz. & Gih. Bomb. Fl.* 44. *I. coccinea, Wall. Cat.* 4732; *Bot. Mag.* 1256. *I. cornuta, Linn.; Wall. Cat.* 4733. *I. longifolia, Wight in Wall. Cat.* 4734. *Balsamina coccinea and cornuta, DC. Prodr.* i. 685-6.

VAR. 3. *arcuata*; diffusely branched, leaves small narrow-lanceolate, flowers small, spur long slender arcuate. *I. arcuata, Wall. Cat.* 4785; *W. & A. Prodr.* 136.—Western Peninsula.

VAR. 4. *macrantha*; small, 4 in., leaves ovate-lanceolate, flower large, spur short.—Western Peninsula.

VAR. 5. *micrantha*; small, stem simple, leaves small ovate-lanceolate, flowers small, spur long slender.—Western Peninsula.

VAR. 6. *rosea*; tall, leaves linear-lanceolate, flowers rather small, lip saccate, spur short incurved. *I. rosea, Indl. Bot. Reg.* 1841, t. 27.—Western Himalaya.

38. ***I. scabriuscula***, *Heyne in Roxb. Fl. Ind. ed. Carey*, ii. 464; short, erect, branched, tomentose, leaves petioled lanceolate or obovate serrate, peduncles short, sepals minute, standard orbicular winged, wings 2-lobed, lip boat-shaped tomentose, spur 0. *Wall. Cat.* 4729, 4736, *in part*; *Arn. in Hook. Comp. Bot. Mag.* i. 322; *Bedd. Ic. Pl. Ind. Or.* 29, t. 144; *H. f. & T. in Journ. Linn. Soc.* iv. 131.

Mountains of MALABAR, from the Southern Concan to Wynaad and Kurg, alt. 2–4000 ft.

Usually much branched from the base, 4–10 in. high. *Leaves* uniform, 1–2 in.; petiole hardly glandular, variable in length. *Peduncles* short, scabrid. *Flowers* $\frac{1}{2}$ in. diam., pink; sepals, lip, and standard usually very hairy. *Capsule* $\frac{1}{2}$ in. long, ellipsoid, mucronate, villous. *Seeds* few, globose; testa opaque, dark brown, tubercled.

39. ***I. glandulifera***, *Arn. in Hook. Comp. Bot. Mag.* ii. 322; almost shrubby, leaves subterminal 4–8 in. glabrous ovate or elliptic-lanceolate acuminate serrulate, petiole very long glandular, flowers fascicled axillary and shortly pedicelled, sepals subulate, standard orbicular 2-lobed spurred behind, wings 2-lobed lateral lobe small rounded, terminal broad half-obovate pendulous, lip saccate hairy, spur short minute. *Thwaites Enum.* 66; *H. f. & T. in Journ. Linn. Soc.* iv. 131. *I. cornigera, Hook. Bot. Mag.* t. 4623, *not of Arnott*.

Central province of CEYLON, alt. 4–6000 ft.

Stem 2–3 ft., very robust. *Leaves* glabrous on both surfaces, serratures very small ciliolate and setigerous; petiole 1–3 in., usually with pedicelled glands. *Flowers* rose-coloured, $1\frac{1}{2}$ in. long; pedicels pubescent, short; standard with a large green spur behind; lip sometimes conoid and almost glabrous; spur involute. *Capsule* unknown.

40. ***I. macrophylla***, *Gardner in Bot. Mag.* t. 4662; almost shrubby, stem very thick, leaves subterminal 6–16 in. usually pubescent beneath ovate or lanceolate acuminate serrate, petiole very long glandular, flowers mostly fascicled on the stem below the leaves shortly pedicelled, sepals

minute, standard small elliptic acuminate with a long beak, wings very small 2-lobed included in the lip, lip saccate, spur short involute. *H. f. & T. in Journ. Linn. Soc.* iv. 132. *I. glandulifera* var. ? *Arn. in Hook. Comp. Bot. Mag.* i. 322.

Mountains of CEYLON, alt. 5-7000 ft.

Stem as thick as the thumb, 10-12 ft. high, naked below. *Leaves* very like those of *I. glandulifera*, but even larger, and petioles as in it, with pedicelled glands. *Flowers* $\frac{3}{4}$ in. long, orange-red, quite glabrous, with a remarkably small beaked standard and wings. *Capsule* $\frac{1}{2}$ in., very turgid, straight, beaked, quite glabrous. *Seeds* not ripe.—A noble species in habit and foliage.

41. ***I. repens***, *Moon Cat.* 18; glabrous, creeping, diffusely branched, leaves long-petioled ovate cordate or reniform, pedicels very long, standard orbicular spurred behind, wing-lobes short broad, lip subconoid, spur short incurved. *Wight Ill.* i. 160, t. 61; *Hook. Bot. Mag.* t. 4404; *H. f. & T. in Journ. Linn. Soc.* iv. 132.

Southern and Central parts of CEYLON, at no great elevation.

A slender creeping much branched and perfectly glabrous plant. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., acute; petiole 1 in. *Flowers* yellow, $\frac{3}{4}$ in. diam. *Capsule* and seeds unknown.

42. ***I. leptopoda***, *Arn. in Hook. Comp. Bot. Mag.* i. 321; erect, branched, quite glabrous, slender, leaves long-petioled ovate or lanceolate acuminate crenate-serrate, pedicels long axillary subsolitary, flowers small, standard obcordate spurred at the back, wings 2-lobed broad horizontal, lip boat-shaped, spur long or short. *Thwaites Enum.* 65; *H. f. & T. in Journ. Linn. Soc.* i. 132. *I. brevicornu* and *I. gibbosa*, *Arn. l.c.*

Mountain woods of CEYLON, alt. 5-8000 ft.

A flaccid variable herb, 1-3 ft. high; stem often prostrate and rooting at the base, sometimes almost woody below. *Leaves* 1-3 in., membranous, sometimes ciliate towards the base, young usually puberulous, nerves many; petiole very variable in length, sometimes with stipitate glands. *Flowers* about $\frac{1}{2}$ in. diam.; pedicels very slender; perianth rotate, rosy; sepals small, oblong-lanceolate; lobes of wings subequal, flat; spur sometimes $\frac{3}{4}$ in., and very slender, at others reduced to a mere tubercle. *Capsules* $\frac{1}{2}$ - $\frac{3}{4}$ in., erect, ellipsoid, beaked. *Seeds* immature.

43. ***I. truncata***, *Thwaites Enum.* 66; weak, slender, diffusely branched, leaves 1-1 $\frac{1}{2}$ in. petioled ovate or ovate-lanceolate acuminate serrate sparsely pubescent above, pedicels 1-3 slender bracteate and small, flowers pubescent, standard orbicular cuspidate, wings unequally 2-lobed spreading, lip conoid, spur short curved. *H. f. & T. in Journ. Linn. Soc.* iv. 133.

Mountain woods of CEYLON, alt. 4-6000 ft.

Closely allied to *I. leptopoda*, and probably a variety of that plant, with diffuse stems and hairy leaves peduncle and flowers, but of which Thwaites enumerates a variety, *subglabra*, which is almost glabrous. *Young capsules* pilose, *Thw.*

44. ***I. pendula***, *Heyne in Wall. Cat.* 4744; very small, erect, slender, branched, almost glabrous, leaves $\frac{1}{4}$ - $\frac{1}{2}$ in. petioled elliptic-ovate or subcordate acute remotely serrate, pedicels solitary fruiting deflexed, flowers minute glabrous, standard spurred at the back, lip concave not spurred. *W. & A. Prodr.* 137; *H. f. & T. in Journ. Linn. Soc.* iv. 133.

Mountains of MALABAR, at Bababood, *Heyne*.

The specimens of this do not suffice for a good description; it is evidently closely allied to *I. inconspicua*, *tenella*, and other species with minute flowers, opposite leaves and deflexed fruiting peduncles. *Stem* 4-6 in.; branches with a faint line of pubescence

on one side. *Leaves* with few nerves. *Pedicels* shorter than the leaves, minutely pubescent. *Flowers* $\frac{1}{2}$ in. diam. *Capsule* $\frac{1}{2}$ in., ellipsoid, beaked, glabrous.

45. **I. mysorensis**, Roth Nov. Plant. Sp. 164; stem very slender glabrous, leaves alterhate petioled lanceolate acuminate remotely serrulate, pedicels 1-2 axillary, flowers very small, sepals minute, standard suborbicular gibbous at the back, terminal lobe of wing largest, lip boat-shaped, spur short straight, capsule tomentose. Wall. Cat. 4743 C; W. & A. Prodr. 137; H. f. & T. in Journ. Linn. Soc. iv. 133. *Balsamina mysorensis*, DC. Prodr. i. 686.

MYSORE, Heyne.

Stem 6-10 in. *Leaves* $1\frac{1}{2}$ in., quite glabrous. *Pedicels* half the length of the leaves or less. *Flowers* red, about $\frac{1}{2}$ in. diam.; spur about half the length of the lip, which is acuminate. *Capsule* unripe, $\frac{1}{2}$ in. ellipsoid—A very obscure plant, belonging apparently to the section with (18) *I. inconspicua*, but with leaves all alternate and a very tomentose capsule. Wight & Arnott, in the Prodr. quote Wight Cat. n. 979, under this species, but give no particulars, taking the description almost entirely from Roth. I find a good authentically named specimen in Rottler's Herbarium, communicated by Heyne himself in 1801, and marked *mysorensis*, nobis, in Rottler's handwriting.

46. **I. Parishii**, H. f.; glabrous, stem very thick and fleshy, leaves large long-petioled elliptic or ovate serrulate, pedicels solitary in the upper axils capillary, sepals very large orbicular-ovate, standard broadly orbicular, wings not lobed very obliquely trapezoid acute projecting forwards, lip small oblong concave with a basal gibbosity or very short spur.

TENASSERIM; on limestone rocks, near Moulmein, Parish.

The Rev. Mr. Parish describes this very curious species as a "biennial or perennial fleshy short-stemmed plant, 10-24 in. high, slightly branched, with large handsome flowers, which are single in the axils of the upper leaves;" and suggests the names for it of *levis* or *levicaulis*, which, not being significant in so glabrous a genus, I have ventured to replace by that of its excellent discoverer. It is described above partly from imperfect specimens communicated by himself and partly from his drawing. *Stem* as thick as the finger, short, smooth. *Leaves* 5-7 in., membranous, straight or oblique, base sometimes slightly cordate; nerves many, arched; petiole 2-3 in., slender, sometimes 2-glandular at the top. *Flowers* 2 in. long from tip of wing to that of standard, white with red streaks on the wings and lip; sepals $\frac{1}{2}$ - $\frac{3}{4}$ in., concave, acute; wings projecting forward, the lateral lobes not distinct from the terminal, turned upward and falcate, the rest of the lobe triangular with straight inner edges and acute apex; lip very small, horizontal, the spur a gibbosity, green. *Capsule* unknown.

47. **I. capillipes**, H. f. & T. in Journ. Linn. Soc. iv. 135; very slender, glabrous, diffusely branched, leaves long-petioled lanceolate caudate-acuminate, crenate, pedicels 1-2 axillary capillary, flowers very small, sepals falcate, standard very long erect linear-oblong, wings short lobes rounded acuminate, lip saccate, base rounded with a short slender spur.

TENASSERIM; Moulmein, on limestone rocks, Lobb, Parish.

Stem 6-10 in., branches long. *Leaves* 2-5 in., very narrow, flaccid, many-nerved, narrowed into the slender naked petiole. *Pedicels* $\frac{1}{4}$ - $\frac{1}{2}$ in., extraordinarily slender. *Flowers* white? $\frac{1}{4}$ in. from the top of the standard to the base of the spur; sepals linear, obtuse; standard remarkably long, obtuse, concave; wings lobed to the middle, lateral lobe much the largest, sides rounded, acute, tips of both lobes pointed downwards. *Capsule* $\frac{1}{2}$ in., trapezoid, acuminate, contracted at the base, like that of (87) *I. racemulosa*. *Seeds* unripe.

** *Spur longer than the flower.* (See *I. Balsamina* and *leptopoda* in *.)

48. **I. Munronii**, Wight Ill. i. 160; Ic. t. 1049; softly hairy, stem hard

flexuous branched, leaves towards the ends of the branches petioled elliptic acuminate serrulate, pedicels slender, sepals large as long as the wings, standard orbicular winged at the back, wings short 2-lobed to the middle, spur trumpet-shaped villous ending in a long stout incurved spur. *H. f. & T. in Journ. Linn. Soc.* iv. 133. *I. eriantha*, Turcz. in *Bull. Soc. Imp. Nat. Mosc.* 1859, i. 270.

Western NILGHIRIS, at Sisparah, alt. 5-7000 ft., in shady places.

Suffrutescent, 1-2 ft., stem terete, somewhat woody; branches spreading, nodose. *Leaves* $1\frac{1}{2}$ -3 in., membranous, covered with soft scattered hairs on both surfaces, teeth small glandular, nerves faint; petiole $\frac{1}{2}$ -2 in., hairy. *Pedicels* $\frac{3}{4}$ -1 $\frac{1}{4}$ in., hairy. *Flowers* (white and red, *Beddome*) about $\frac{3}{4}$ in. long; sepals very large, acuminate; wings and standard very small; spur hirsute. *Ovary* hairy. *Capsule* hairy. *Seeds* glabrous, (Wight.)

49. ***I. dasysperma***, Wight in *Madr. Journ.* v. 7. t. 2; *Ic.* t. 742; herbaceous, flaccid, erect, branched, leaves petioled elliptic or ovate acuminate crenate, petiole often glandular, pedicel usually solitary slender, flowers rather small, sepals minute, standard obcordate, wings spreading deeply 2-lobed, lip boat-shaped, spur very long and slender. *H. f. & T. in Journ. Linn. Soc.* iv. 134.

MALABAR, in woods and plains, ascending to 3000 ft.

Stem 1-2 ft., branches sometimes opposite. *Leaves* always alternate, 2-3 in., slightly hairy on the upper surface, glabrous beneath; crenatures large, not setigerous; petiole $\frac{1}{2}$ -2 in., sometimes with stipitate glands. *Pedicels* equalling or exceeding the petioles, very slender. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; standard cuspidate; wings very divergent; lobes subequal, obovate, retuse; spur incurved, exceeding the flower, very hairy. *Capsule* $\frac{1}{2}$ in., very obliquely ovoid, turgid, glabrous, pointed at both ends. *Seeds* subglobose, hairy, numerous.

50. ***I. flaccida***, Arn. in *Hook. Comp. Bot. Mag.* i. 322; slender, erect sparingly branched, glabrous, leaves petioled ovate or lanceolate crenate, sepals ovate, standard broad 2-lobed, spurred behind, wings broad 2-lobed, lip boat-shaped, spur long slender, capsule glabrous, seeds globose tubercled. *Thwaites Enum.* 65; *Hook. Bot. Mag.* t. 5276, and *I. latifolia*, t. 5625. *I. bipartita*, Arn. in *Hook. Comp. Bot. Mag.* i. 322? *I. floribunda*, Wight in *Madr. Journ.* v. 7. *I. bifida*, Thunb. *Prodr. Pl. Cap.* 41. *I. latifolia*, *Moon Cat.* 18.

Mountains of MALABAR; forests of the Sivagherri hills, alt. 4000 ft., Wight; CEYLON, abundant to 3000 ft., Thwaites, &c.

Stem 6-18 in., branched above. *Leaves* 2-5 in., membranous; petiole with stalked glands or naked. *Pedicels* solitary or several. *Flowers* rose-purple, $\frac{3}{4}$ -1 $\frac{1}{4}$ in. diam.; wings very variable; spur 1 $\frac{1}{2}$ in., very slender, sometimes 2-fid to the middle. *Capsule* $\frac{1}{2}$ in., ellipsoid, acuminate, quite glabrous. *Seeds* numerous, opaque, tuberculate with pale papillæ.—So similar in most characters to *I. latifolia*, that it is difficult to separate these species in the Herbaria. *I. flaccida* is, however, a smaller plant, more slender, with never opposite leaves, and has globose pubescent seeds, very different from those of *I. latifolia*. I have brought the alternate-leaved plants (*I. latifolia*, Bot. Mag. t. 5625, *I. bipartita*, Arn., *I. floribunda*, Wight, and *I. bifida*, Thunb.) to this, from *I. latifolia*, under which I had placed them before, because of their alternate leaves, though some or all may be alternate-leaved specimens of *I. latifolia*. The specimen of what I suppose to be this plant in the Linnean Herbarium has no name or habitat, and Thunberg has founded his *I. bifida* on it, because of its abnormally bifid spur, supposing it to have been a native of the Cape, where there is nothing at all like it.

51. ***I. violæiflora***, *H. f.*; very slender, erect, glabrous, simple or sparingly branched, leaves petioled very membranous elliptic-lanceolate

acuminate crenate-serrulate, pedicels axillary solitary or few slender, sepals minute, standard broadly obcordate, wings 2-lobed spreading, lobes obovate lateral rounded terminal retuse or 2-lobed, lip boat-shaped, spur very long straight and slender, capsule puberulous. *I. flaccida*, var. β , *H. f. & T. in Journ. Linn. Soc.* iv. 134.

TENASSERIM, at Moulmein, *Lobb.*

Very similar to *I. flaccida*, but the lobes of the wings are longer and narrower, the standard is obcordate and not spurred behind, and the capsule is smaller and puberulous.

52. ***I. pulcherrima***, *Dalz. in Hook. Lond. Journ. Bot.* ii. 37; stout, succulent, erect, glabrous, leaves petioled ovate-lanceolate acuminate, pedicels 2-3 erect, sepals 2-fid minute, standard orbicular notched or spurred at the back, wings very broad 2-fid, lip boat-shaped or conoid, spur long stout curved, capsule glabrous, seeds large obovate rugose. *Hook. Bot. Mag.* t. 4615; *H. f. & T. in Journ. Linn. Soc.* iv. 134; *Dalz. & Gibs. Bomb. Flor.* 44.

Warree jungle in the SOUTHERN CONCAN, *Dalzell.*

Stem 1½-2 ft., simple or branched. *Leaves* 3-5 in., flaccid, ciliate towards the base, glabrous or with a few scattered hairs above; petiole 1-3 in., naked or with stipitate glands. *Pedicels* 2-3 in., slender, spreading. *Flowers* 1½-2 in. diam., rose- or violet-purple; wings spreading, flat, variable in shape; lip small; spur 2 in., rather stout, incurved. *Capsule* ½ in., very turgid. *Seeds* 2-8, subcompressed, testa very thick. — A very fine species, allied to *I. flaccida* in the flowers, but the seeds are wholly different.

53. ***I. Henslowiana***, *Arn. in Hook. Comp. Bot. Mag.* i. 322; perennial ½, stem very stout almost shrubby nodose scarred, leaves petioled ovate or lanceolate serrate acuminate hirsute, pedicels subsolitary erect, sepals large broad, standard orbicular or obovate, wings broad flat 2-partite, segments 2-lobed, lip small, spur very long incurved slender, capsule glabrous or pilose. *Thwaites Enum.* 65; *H. f. & T. in Journ. Linn. Soc.* iv. 135. *I. albida*, *Wight in Madr. Journ.* v. 7, t. 1; *Id.* t. 743.

Mountains of MALABAR, clefts of rocks near Courtallum, alt. 2-7000 ft., *Wight, &c.* CEYLON, in the Central Province, alt. 4-6000 ft., on rocks.

Stem 8-16 in., as thick as the thumb, woody, sometimes so closely covered with scars as to be nodose, simple or branched. *Leaves* 3-5 in., crowded at the ends of the thick branches, serratures fine or coarse, both surfaces usually hirsute, sometimes glabrate; petiole ½-3 in., naked or glandular. *Pedicels* 2-5 in., stout, glabrous or pubescent. *Flowers* 1-2 in. diam., white or pale pink; sepals remarkably large, broadly ovate, acuminate; standard winged at the back (in *Wight's* figure); wings with very broad, flat, semi-obovate lobes; spur stout or slender, 1-1½ in. *Capsule* ¾-1 in., rather slender. *Seeds* not ripe. — The habit and large sepals and capsule are excellent characters of this plant.

A v. — LATERIFLORÆ.

54. ***I. bella***, *H. f. & T. in Journ. Linn. Soc.* iv. 138; diffuse, stem short densely pubescent creeping below, leaves broadly ovate or orbicular crenate, petiole slender, peduncle pubescent 1-2-flowered bracteate in the middle, flowers large yellow, sepals large ovate, standard orbicular-obovate gibbous or bluntly spurred at the back, terminal lobe of wing elongate obovate, lip conical saccate narrowed into a long incurved spur.

KHASIA Mts., in marshes at the Kala Pane, alt. 5000 ft., *Griffith, &c.*

A small species, 6-10 in., growing in loose tufts; stem rather stout, rooting much at the base, glandular and almost tomentose with crisped hairs. *Leaves* 1-3 in., some-

times lanceolate, obtuse acute or acuminate, many-nerved, often pubescent above; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in., pubescent, rarely glandular. *Peduncle* stout, usually from a subterminal axil, curved, pubescent, most often 1-flowered, with bracts in the middle; pedicel short. *Flower* 1 in. long without the spur, orange- or golden-yellow, beautifully streaked with purple. *Capsule* $\frac{1}{2}$ in., ellipsoid, acute at both ends, turgid, pubescent. *Seeds* subglobose, papulose, puberulous, testa thick opaque.—A very distinct and beautiful little species.

VAR. major; more robust, leaves 3–4 in., flowers $1\frac{1}{2}$ in. red quite glabrous.—Khasia, alt. 5–6000 ft.

55. ***I. latiflora***, *Hook. f. & Thoms. in Journ. Linn. Soc.* iv. 139; short, herbaceous, pubescent, leaves petioled elliptic-lanceolate caudate-acuminate crenate, peduncle erect stout 2–3-flowered, bracts ovate acuminate, flowers large, sepals broad, standard orbicular winged at the back, terminal lobe of wings large semi-ovate acute, lip boat-shaped, spur very long slender incurved.

Subtropical forests of the KHASIA Mts., alt. 3–4000 ft.; ? SIKKIM HIMALAYA, alt. 2–4000 ft. (specimens imperfect); BHOTAN, at Daphla, *Booth*.

Stem a foot high, branched or not, sometimes as thick as the little finger, remotely scarred. *Leaves* 3–7 in., sometimes narrowly lanceolate, glabrous except the nerves beneath, often ciliate towards the base, as is the puberulous petiole. *Peduncle* solitary, stout, erect, $\frac{3}{4}$ –1 in.; bracts variable in position; pedicels stout. *Flowers* 1–2 in. diam., pale rose or violet; sepals acute; lateral lobe of wings obovate, retuse, smaller than the usually acute terminal one, which is sometimes 1 in. long; standard retuse; spur 1–2 $\frac{1}{2}$ in., acute. *Capsule* immature, probably like that of *I. pulchra*.

56. ***I. pulchra***, *H. f. & T. in Journ. Linn. Soc.* iv. 139; glabrous, stem short stout simple, leaves petioled elliptic-lanceolate acuminate serrate, peduncles stout erect 1–2-flowered, bracts lanceolate, flowers large, sepals broad, standard winged at the back, wings broad, lip funnel-shaped narrowed into the stout hooked spur.

Shaded woods in the subtropical and temperate regions of EASTERN NIPAL and the KHASIA Mts., alt. 4–5000 ft.

Stem 4–10 in., erect, nodose at the scars, rarely divided. *Leaves* 2–4 in., glabrous on both surfaces, rather coriaceous, not or rarely ciliate; petiole stout, naked. *Peduncles* 1–2 in., few, stout, erect; pedicels often as stout and as long. *Flowers* 2 in. long from the tip of the spur to that of the standard, pale rose-coloured or straw-coloured, streaked with red; sepals $\frac{1}{2}$ in., green, acute; terminal lobe of wing semi-ovate obtuse; lip very large; spur sometimes spiral. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in., erect, narrowly ellipsoid-oblong glabrous, subacute. *Seeds* many, immature, pubescent?

57. ***I. fruticosa***, *DC. Prodr.* i. 687; shrubby, perennial, leaves elliptic acuminate many-nerved pubescent on both surfaces, petiole stout long, peduncles numerous 3–5-flowered, bracts linear, pedicels very long slender, flowers large, sepals broad, standard orbicular 2-lobed, wings lobed spreading, lip trumpet-shaped, spur very stout long curved. *W. & A. Prodr.* 137; *Wight Ic.* t. 966; *Wall. Cat.* 4762; *H. f. & T. in Journ. Linn. Soc.* iv. 140.

Mountains of MALABAR and TRAVANCOR, common at 4–6000 ft.

An erect much branched shrub, 8 ft. high; branches glabrous, nodose at the scars. *Leaves* 3–5 in., sometimes almost silky beneath, ciliate and glandular towards the base, nerves stout; petiole 2–3 in., often villous, naked or glandular. *Peduncles* 1–2 in.; pedicels often much longer and exceeding the leaves. *Flowers* $1\frac{1}{2}$ in. broad; sepals acuminate; standard neither winged nor spurred; wing-lobes flat, subequal, divaricating, oblong; spur 1–1 $\frac{1}{2}$ in. *Capsule* erect, 1 in., ellipsoid, narrowed at both ends, beaked. *Seeds* many, unripe, large, opaque, obovoid; testa thick, pitted.

A VI.—EPIPHYTICÆ.

58. **I. Jerdoniæ**, *Wight Ic.* t. 1602; epiphytic, glabrous, stem tumid short stout prostrate, leaves few petioled elliptic acute serrate, peduncles short, pedicels 1-3 very long, bracts setaceous, sepals long lanceolate, standard small hooded, wings small 2-lobed, spur very large saccate ventricose wrinkled, spur short horn-like or 0. *Hook. Bot. Mag.* t. 4739; *H. f. & T. in Journ. Linn. Soc.* iv. 141.

Mountains of MALABAR, on trees at Sisparah, the Brahmagherrie and Palghat hills, alt 3-5000 ft., *Wight, &c.*

Stem 3-6 in., green or purple-brown, often as thick as the finger, rooting. *Leaves* 2-3 in., deep green, with glandular cilia at the base and on the top of the stout petiole, nerves few. *Peduncles* 1-3 in., green, stout; *pedicels* sometimes 4 in., red. *Flowers* 1½-2 in. measured along the lip; sepals acuminate, green; standard yellow, orbicular, apiculate, narrowly winged at the back; wings yellow, almost included in the lip, lobes rounded overlapping; lip bright red, laterally compressed.—In flower closely allied to *I. Walkeri*. I have seen no specimen of Beddome's *I. parasitica*; his character of it accords with that of *I. Jerdoniæ* in all but the green colour of the standard and sepals, and the moniliform stem. I shall therefore provisionally add it to this as a variety.

VAR.; stem moniliform, standard with a foliaceous crest and wings green.—*I. parasitica*, *Bedd. in Madr. Jour.* iv. t. 7, f. 2; *Ic. Pl. Ind. Or.* 28, t. 140.—Anamallay hills, alt. 6-7000 ft., *Beddome*.

59. **I. auriculata**, *Wight in Madr. Journ.* v. 8, t. 3; epiphytic, glabrous, stem short prostrate internodes very tumid, leaves petioled elliptic acute, peduncle short, pedicels 1-3 erect very long, bracts ovate, sepals very large obliquely oblong pendulous red, standard small hooded, wings very small 2-lobed, lip very large saccate wrinkled, spur short thick.

Mountains of MALABAR and TRAVANCOR, alt. 5000 ft., on branches of trees, *Wight, &c.*

A smaller plant than *I. Jerdoniæ*, with the internodes much swollen, sometimes as large as nuts, the stem appearing annulate in dried specimens. *Leaves* 1-2 in., obscurely crenulate, with but few glandular setæ at the base. *Pedicels* 1-1½ in. *Flowers* 1 in. measured along the lip; sepals very remarkable, pendulous, acute, much exceeding the wings, and sometimes as long as the lip, scarlet; standard dark green; wings dark purple, the segments cochleate and overlapping; lip scarlet, laterally compressed; spur very variable. *Capsule* unknown.—The sepals of this species are wholly different from any other in the genus, and hang down like a spaniel's ears.

60. **I. viridiflora**, *Wight in Madr. Journ.* v. 9; erect, glabrous, epiphytic, stem short extremely thick, branches few short nodose, leaves petioled elliptic acute crenate-serrate, peduncles short, pedicels 1-2 slender, sepals linear, standard orbicular 2-lobed back strongly keeled, lip saccate narrowed into a stout involute spur. *Bedd. Ic. Pl. Ind. Or.* 29, t. 141.

Mountains of MALABAR; forming masses on the trunks of trees at the Sivagherry ghāt, alt. 5000 ft., *Wight*.

Stem often 1 in. diam., fleshy. *Leaves* 1½-2 in., sometimes obovate or lanceolate; with very few glandular cilia at the base, rather fleshy, crenatures large; petiole stout. *Peduncle* ½-¾ in., usually 2-flowered; bracts subulate. *Flowers* 1 in. measured along the lip, wholly green; sepals reflexed or deflexed, acuminate; standard small, deeply hooded; wings fleshy, 2-lobed, lateral lobes hid under the standard, terminal oblong rounded; lip wrinkled, laterally compressed. *Capsule* glabrous.

A VII.—UMBELLATÆ AND SUBCAPITATÆ. (See *I. Goughii*, *trilobata*, and others in A III., *I. Tangachæ* and others in A VIII.)

* *Spur very slender, as long as or exceeding the flower.*

61. ***I. fimbriata***, Hook. *Exot. Flor.* ii. t. 146; glabrous, stem erect subsimple, leaves opposite and alternate long-petioled ovate-lanceolate acuminate subserrulate, peduncle terminal long erect bearing at the top a subcapitate crowded raceme clothed with recurved ciliate bracts. *I. bracteata*, Coleb. in Roxb. *Fl. Ind. ed. Carey*, ii. 459; Wall. *Cat.* 4760; H. f. & T. in *Journ. Linn. Soc.* iv. 142.

Marshes in the KHASIA Mts., alt. 4–6000 ft., abundant.

Stem 1–2 ft., simple or branched, succulent. *Leaves* 2–5 in., opposite alternate and whorled sometimes on the same specimen, flaccid, ciliate or not at the base; petiole $\frac{1}{2}$ –2 in.; stipules 0. *Peduncle* 2–6 in., strict, absolutely terminal in all the specimens, with sometimes an axillary one, naked; raceme $\frac{1}{2}$ –2 in., oblong or globose, very dense and covered with crinite-green slender recurved bracts, which are $\frac{1}{2}$ – $\frac{3}{4}$ in. long, clothed with long pink hairs and conceal the bases of the capillary pedicels. *Flowers* rose-purple, $\frac{3}{4}$ in. diam.; sepals small, lanceolate; standard small, ovate, with a recurved point; lateral wing-lobes small, rounded, terminal semi-ovate large broad clawed; lip boat-shaped; spur $\frac{3}{4}$ in., very long, slender, incurved. *Capsule* $\frac{1}{2}$ in., ellipsoid, acute at both ends, turgid, glabrous. *Seeds* few, obovate, compressed, very hairy.—The *Flora Exotica* name having a year's priority over Colebrooke's, I am compelled to adopt it.

62. ***I. janthina***, Thwaites *Enum.* 68; small, glabrous, stem simple 1–4-leaved, leaves opposite broad-elliptic or orbicular acuminate subserrate, peduncle terminal erect, flowers umbelled, bracts oblong, sepals broadly cordate, standard hooded, wings 2-lobed, lip saccate narrowed into the involute spur. H. f. & T. in *Journ. Linn. Soc.* iv. 142.

CEYLON; Hinidoon and Pasdoon Corles, at no great elevation, Thwaites.

Whole plant, 4–10 in.; stem sometimes very thick and succulent. *Leaves* 2–5 in., base rounded or subacute, not ciliate, sometimes oblique, very membranous; petiole $\frac{1}{2}$ –2 in.; stipules 0. *Peduncle* erect, 3–5 in., very slender; umbel terminal, 3–5-flowered, with sometimes a small lateral one; pedicels $\frac{1}{2}$ –1 in.; bracts broad, green, obtuse. *Flowers* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., violet; standard not winged, very concave; lateral lobe of wings rounded, obtuse, terminal acute. *Capsule* $\frac{1}{2}$ in., ellipsoid, subacute, glabrous, many-seeded.—A very curious species, quite unlike any other, but allied to the preceding and following.

63. ***I. umbellata***, Heyne in Roxb. *Fl. Ind. ed. Carey*, ii. 464; small, glabrous, stem simple stout leafy at the top, leaves crowded petioled broad-ovate or elliptic obtuse or acute crenate, peduncles subterminal erect 1– ∞ -flowered, sepals broad-ovate, standard orbicular, wings spreading lobes obtuse, lip small boat-shaped, spur long slender incurved. Wall. *Cat.* 4759; W. & A. *Prodr.* 137; Wight in *Madr. Journ.* v. 9, t. 4; Ic. t. 745; H. f. & T. in *Journ. Linn. Soc.* iv. 143.

Mountains of MALABAR, in Tinnevely near Courtallum only, Wight.

Stem 4–8 in., very rarely branched, naked below. *Leaves* 1–2 in., sometimes orbicular, membranous, crenatures ciliate, base ciliate or not; petiole very variable, $\frac{1}{4}$ –1 $\frac{1}{2}$ in. *Peduncle* and *pedicels* stout; bracts small, green. *Flowers* $\frac{3}{4}$ in. diam.; standard not spurred; wings with subequal lobes; spur 1 in., graceful. *Capsule* $\frac{1}{2}$ in., ellipsoid, turgid, glabrous. *Seeds* echinate (Wight).—Wight describes the root as tuberous, which is I think an error; it is fibrous and annual in his specimens.

64. ***I. subcordata***, Arn. in Hook. *Comp. Bot. Mag.* i. 323; glabrous, stem prostrate and rooting at the base stout, leaves long-petioled ovate or

lanceolate acute or acuminate crenate base rounded or cordate, peduncles short 4-8-flowered, flowers umbelled or shortly racemed, sepals large ovate, standard orbicular not spurred behind, terminal lobe of wings very large and broad, lip small, spur long slender incurved. *Thwaites Enum.* 67; *H. f. & T. in Journ. Linn. Soc.* iv. 144.

Central province of CEYLON; alt. 3-6000 ft., *Walker, &c.*

Stem 1-2 ft., stout, sometimes much diffusely branched, smooth or scarred. *Leaves* very variable, 1-3 in.; crenatures large, ciliate or not; petioles $\frac{1}{2}$ -2 in., eglandular. *Peduncles* 2-4 in., axillary and subterminal; bracts $\frac{1}{2}$ in., ovate-lanceolate, acute. *Flowers* $\frac{3}{4}$ -1 in. diam., white with red sepals and standard; spur $\frac{1}{2}$ -1 in., slender, incurved. *Capsule* $\frac{1}{2}$ in., ellipsoid, beaked, glabrous. *Seeds* subglobose, hairy.

65. ***I. viscidula***, *Wight in Madr. Journ.* v. 12; *Ic. t.* 746; tall, slender, stem rigid angled rooting below hairy above, leaves petioled elliptic-lanceolate serrate firm, peduncles axillary very long viscid 3- ∞ -flowered, flowers umbelled or in short racemes, pedicels viscid, sepals suborbicular equalling the small standard, terminal lobe of wings large suborbicular, lip small boat-shaped, spur long strong incurved. *H. f. & T. in Journ. Linn. Soc.* iv. 144.

Pulney Mts. in the SOUTHERN CARNATIC, alt. 5500 ft., in beds of rivers, *Wight*.

Stem 2-3 ft., simple or sparingly branched, leafy all the way up, very rigid for the genus. *Leaves* 2-3 in., pubescent beneath on the midrib and numerous strong nerves, not ciliate, teeth glandular; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Peduncles* 2-4 in., rigid, erect, terete; bracts ovate-lanceolate; pedicels short, often hairy. *Flowers* $\frac{3}{4}$ in. diam., pink; sepals acuminate, almost as large as the orbicular acuminate standard; wings with spreading lobes, lateral short falcate, terminal twice as large hatchet-shaped, tip rounded; spur stout towards the base, slender on to the tip. *Capsule* $\frac{1}{2}$ in., ellipsoid, beaked, ventricose, glabrous. *Seeds* numerous, globose, hairy.—Pedicels more or less hairy and viscid.

66. ***I. cordata***, *Wight in Madr. Journ.* v. 10; glabrous, flaccid, stem prostrate and rooting below, leaves long-petioled ovate-cordate acuminate obscurely crenate, peduncle subterminal and axillary 3-4-flowered, flowers umbelled, pedicels glabrous, sepals large ovate acuminate, standard cuneate emarginate, lateral lobes of wings small incurved, terminal large broad spreading, lip boat-shaped, spur long slender incurved.

Sivaggherry Ghats, on the MALABAR MOUNTAINS, *Wight*; Anamallay Mts., alt. 3-5000 ft.; TRAVANCOR, *Beddome*.

Stem 6-12 in., apparently succulent. *Leaves* 2-3 in., very membranous, crenatures with minute cilia, base ciliate or not, nerves slender, with scattered hairs on both surfaces; petiole 1-3 in. *Peduncles* 2-4 in.; bracts broadly ovate, $\frac{1}{2}$ in., green; pedicels short. *Flowers* 1 in. diam., lilac with a purple centre; sepals almost equalling the standard; lateral lobes of wings fleshy, forming a vault over the stamens; terminal almost orbicular; spur $\frac{3}{4}$ in. *Capsule* $\frac{1}{2}$ in., ellipsoid, beaked, glabrous. *Seeds* unripe.

67. ***I. acuminata***, *Benth. in Wall. Cat.* 4754; shrubby, glabrous, stem simple stout, leaves crowded upwards petioled lanceolate acuminate crenate, peduncles axillary stout, flowers umbelled or racemed, bracts broad, sepals large ovate-cordate, standard orbicular, wings 2-partite, lip boat-shaped narrowed into the slender incurved spur. *H. f. & T. in Journ. Linn. Soc.* iv. 145.

Wet rocks in the KHASIA Mts., alt. 4-5000 ft.

Root perennial? *Stem* 6-14 in., naked below, almost invariably simple. *Leaves* 3-5 in., often caudate-acuminate, rather thick, crenatures minutely setigerous, not ciliate at the base; petiole $\frac{1}{2}$ -1 in., naked. *Peduncles* 1-1 $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ - $\frac{1}{4}$ in., obtuse or acute, concave, green; pedicels $\frac{1}{2}$ -1 in., erect. *Flowers* about 1 in. diam., pale red;

sepals broad, very oblique, acuminate; standard not winged or spurred; lateral wing-lobes reniform, incumbent on the much larger triangular terminal one, lower margin of wing with an inflexed auricle; lip almost conical. *Capsule* $\frac{1}{2}$ in., short, erect, ellipsoid, subacute. *Seeds* many, minute, woolly.

68. **I. Hookeriana**, Arn. in *Hook. Comp. Bot. Mag.* i. 324; shrubby, glabrous, stem and branches robust, leaves elliptic acute or acuminate crenate-serrate thick, petiole long with 2 large glands, flowers 4-6 subumbelled long pedicelled, sepals small lanceolate, standard transversely oblong spurred at the back, wing-lobes large broad rounded, lip small continuous with the long curved stout spur. *Hook. Bot. Mag.* t. 4704; *Thwaites Enum.* 66; *H. f. & T. in Journ. Linn. Soc.* iv. 145. *I. biglandulosa*, *Moon Cat.* 18.

Central Province of CEYLON, alt. 3-5000 ft.

A shrub, 4-5 ft., with very stout stem and often scarred branches as thick as the finger. *Leaves* 4-8 in., crenatures with a bristle; petiole 1-4 in., stout, with 2 large opposite glands above the middle (usually at the top). *Peduncle* 3-4 in., erect, very robust; bracts small, caducous; pedicels very slender. *Flowers* 2 in. diam., white or with the wings streaked with blood-red; standard very large; wings spreading, lateral lobes oblong, terminal much larger, notched towards the tip; spur and lip $1\frac{1}{2}$ -2 $\frac{1}{2}$ in. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in., ellipsoid, beaked, glabrous, obtuse. *Seeds* many, young pubescent.—This, though closely allied to *I. grandis*, seems to differ in the much smaller sepals, as well as in the shape of the wings, lip, and spur.

69. **I. grandis**, Heyne in *Roxb. Fl. Ind. ed. Carey*, ii. 464; shrubby, glabrous, stem and branches robust, leaves elliptic acute or acuminate crenate-serrate thick, flowers 4-6 subumbelled long-pedicelled, sepals large broad-ovate, standard orbicular, lateral wing-lobes obovate terminal cuneate notched, lip saccate obtuse or prolonged into a very stout conoidal straight spur. *Wight in Madr. Jour.* v. 10, t. 5; *W. & A. Prodr.* 137; *Arn. in Hook. Comp. Bot. Mag.* i. 324; *Bedd. Ic. Pl. Ind. Or.* 31, t. 153; *H. f. & T. in Journ. Linn. Soc.* iv. 145.

Mountains of MALABAR and TINNEVELLY, alt. 1-4000 ft., *Wight, &c.*

Shrubby, 8 ft. high, habit, foliage, and inflorescence of *I. biglandulosa*, and with the same coloured flower, but the sepals are three times as large, the standard more orbicular, the wing-lobes much narrower, and the lip ends in a sac or very stout conoidal straight spur.

** *Spur shorter than the flower or 0.* (See *I. grandis* and *biglandulosa* in *).

70. **I. campanulata**, *Wight in Madr. Jour.* v. 11, t. 7; *Ic.* t. 744; herbaceous, robust, glabrous, sparingly branched, leaves long-petioled elliptic- or ovate-lanceolate crenate glaucous beneath, peduncle stout, flowers 3 umbelled, bracts very large deciduous, sepals very large and broad ovate, standard orbicular keeled at the back, wing-lobes small incurved, lip smooth boat-shaped, spur very short. *H. f. & T. in Journ. Linn. Soc.* iv. 145.

Mountains of the SOUTHERN CARNATIC, alt. 5-7000 ft., in moist woods, *Wight*.

Stem 4-5 ft., as thick as the finger. *Leaves* 3-6 in., membranous, crenatures ciliate, base usually 2-glandular; petiole 1-2 in., eglandular. *Peduncle* 2-3 in., very stout, erect; bracts $\frac{1}{2}$ in., ovate-lanceolate, subfoliaceous; pedicels short. *Flowers* campanulate, white and yellow speckled with purple; sepals perhaps the largest of the genus, acuminate; standard apiculate; wings concave and pointing forwards, lateral lobe small, obovate, overlapping the larger hatchet-shaped protruded terminal one. *Capsule* $\frac{3}{4}$ in., ellipsoid, pointed at both ends, glabrous. *Seeds* globose, echinulate.

71. **I. leucantha**, *Thwaites Enum.* 67; glabrous, stem erect simple rarely forked, leaves in 1 whorl or fascicled rarely opposite shortly petioled lanceolate acuminate serrulate, peduncles several long erect, flowers in a short terminal raceme, bracts ovate-lanceolate, sepals ovate-oblong acute, standard hooded, lateral lobe of wings small lanceolate, terminal large 3-lobed, lip boat-shaped, spur short straight.

CEYLON; at Hinidoon and Kittool Galle, *Thwaites*.

Stem 5-10 in., naked below, succulent. Leaves 6-10 in the fascicle, of unequal sizes, 3-6 in., serratures acute, base often ciliate; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. Peduncles many, longer or shorter than the leaves, many-flowered; pedicels capillary, spreading, $\frac{1}{4}$ -1 in.; bracts green, concave. Flowers white, $\frac{1}{2}$ in. diam.; standard not winged; wings with the lobes rounded; spur $\frac{1}{2}$ in. Capsules $\frac{1}{2}$ in., unripe, erect, ellipsoid, glabrous, beaked.

72. **I. linearis**, *Arn. in Hook. Comp. Bot. Mag.* i. 323; stem short stout simple, leaves crowded upwards subsessile linear-lanceolate acute subserrate, peduncles solitary or 2 stout erect, flowers very shortly umbelled, bracts ovate, sepals short ovate, standard short spurred at the back, terminal lobe of wings large obovate clawed, lip concave, spur very short. *H. f. & T. in Journ. Linn. Soc.* iv. 143.

Adam's Peak, CEYLON, alt. 4-6000 ft., *Walker, &c.*

Erect, glabrous, stem stout, scarred. Leaves many, 1-3 in., all crowded at the top of the stem, rather thick, base not ciliate. Peduncle 1-2 in., very stout; bracts $\frac{1}{2}$ in., green, spreading, acuminate, concave; pedicels slender, spreading. Flowers $\frac{1}{2}$ in. diam.; wings large; spur a mere point. Capsule $\frac{1}{4}$ in., ellipsoid, very turgid, acuminate, glabrous. Seeds many, very small, pubescent.

VAR. petiolata; leaves rather broadly petioled with scattered short hairs on the upper surface.

73. **I. appendiculata**, *Arn. in Hook. Comp. Bot. Mag.* i. 323; small, glabrous or pubescent, stem slender, leaves solitary few or many petioled ovate elliptic or lanceolate acute serrulate, peduncles long solitary or few, flowers umbelled or very shortly racemed, bracts broad-ovate or lanceolate, sepals ovate or oblong, standard hooded, lateral lobe of wings lanceolate caudate, terminal large clawed $\frac{1}{2}$ -cordate, lip boat-shaped, spur very short. *Thwaites Enum.* 67.

Southern and Central parts of CEYLON, alt. 2-5000 ft.

Very variable, both in habit and foliage. Stem simple, rarely branched, naked below, usually leafy above, with the leaves 1-1 $\frac{1}{2}$ in. broad, long-petioled and almost glabrous above; other specimens have 4 similar but pubescent leaves in a whorl, others 1, 2, 3, or a few lanceolate acuminate leaves, 4 in. long. Leaves membranous, usually ciliate towards the base. Peduncle often solitary, subterminal and longer than the leaves, with an umbel or very short raceme of 4-8 flowers; bracts $\frac{1}{2}$ in., concave, acuminate, green; pedicels slender, spreading. Flowers about $\frac{3}{4}$ in. long, white or pale rose-colour; standard streaked transversely with red.—*Thwaites* describes the lateral lobes of wings as small lanceolate long-caudate, the terminal as larger $\frac{1}{2}$ -cordate and acuminate; the spur is sometimes reduced to a mere point. Capsule $\frac{1}{2}$ in., ellipsoid, turgid, beaked, many-seeded. Seeds immature, oblong, hairy?

74. **I. travancorica**, *Bedd. Ic. Pl. Ind. Or.* p. 29, t. 142; small, stem short stout leafy at the top, leaves crowded small petioled elliptic subacute crenate, peduncles 1-3 subterminal erect 2-4-flowered, bracts lanceolate, flowers umbelled small, sepals obliquely ovate, standard small concave, terminal lobe of wings large sessile, lip boat-shaped, spur short obtuse or 0.

Mountains of TRAVANCOR; Myhendra and Aghasteer, alt. 4-5000 ft., *Beddome*.

Stem strict, 6-8 in., naked below. *Leaves* $\frac{1}{2}$ in., rather thick, ciliated in the crenatures; petiole slender, often as long as the blade. *Peduncles* 1-2 in.; bracts green, subulate-lanceolate, spreading. *Flowers* $\frac{1}{2}$ in. diam., white streaked with red, very membranous; sepals oblique, acuminate; lateral lobe of wings small. *Capsule* unknown.

75. ***I. uncinata***, *Wight in Madr. Journ.* v. 11, t. 6; *Ic. t. 747*; slender, erect, glabrous, leaves long-petioled ovate or ovate-cordate crenate, peduncles slender 4-8-fld., flowers small subumbelled or shortly racemed, sepals very large obliquely ovate, standard small elliptic, wings divaricating, terminal lobe obovate falcate, lip subcampanulate, spur short, inflated hooked. *H. f. & T. in Journ. Linn. Soc.* iv. 144.

Mountains of the SOUTHERN CARNATIC, in dense shaded jungles near Courtallum, alt. 2-3000 ft., *Wight*.

Stem 6-10 in., sparingly branched, leafy. *Leaves* 2-4 in., very membranous, ciliate often at the base, crenatures large, minutely ciliate; petiole 1-3 in., rather slender. *Peduncle* shorter than the leaves; bracts small, rather persistent; pedicels $\frac{1}{2}$ -1 in. *Flowers* $\frac{3}{4}$ in. diam.; sepals very large for the size of the plant; standard pointed; lateral wing-lobes oblong, pointed forward, terminal protruded, rather hatchet-shaped; lip shortly campanulate; spur constricted at the insertion, inflated below it, with a more slender upcurved tip. *Capsule* $\frac{1}{2}$ in., ellipsoid, beaked, turgid, glabrous. *Seeds* few, unripe, apparently orbicular and glabrous.

76. ***I. elegans***, *Bedd. Ic. Pl. Ind. Or.* p. 29, t. 145; stout, glabrous, stem erect stout simple or branched, leaves long-petioled ovate or ovate-cordate acuminate crenate, peduncles slender axillary and terminal erect, flowers 3-5 unbelled or shortly racemed, bracts large ovate-lanceolate, sepals ovate, standard small orbicular-ovate, lateral wing-lobes small rounded arched over the stamens, terminal very large obliquely ovate acute, lip very small boat-shaped, spur 0.

Anamallay hills, in TRAVANCOR, alt. 2500-5000 ft., common, *Beddome*.

Stem 6-12 in., simple or branched, often rooting at the joints. *Leaves* 2-4 in., very membranous, crenatures minutely ciliate; petiole 1-3 in. *Peduncles* 1-3 in.; bracts $\frac{1}{2}$ in., usually recurved, whorled; pedicels capillary, spreading. *Flowers* 1 in. across the wings, pale rose colour with a purple eye, those from the highest localities the largest; standard apiculate flat with a green dorsal ridge; terminal wing-lobe sessile, tip obtuse entire, inner margin obscurely retuse towards the tip. *Capsule* $\frac{1}{2}$ in., ellipsoid, beaked, turgid in the middle, glabrous. *Seeds* hairy, subglobose.—In many respects near *I. cordata*, in which the side lobes of the wings are also incurved.

A VIII.—RACEMOSÆ.

* *Spur long and slender.*

77. ***I. maculata***, *Wight in Madr. Journ.* v. 12; tall, slender, branched, leaves long-petioled elliptic-lanceolate acuminate serrate hairy above and beneath, peduncles and very long lax racemes much exceeding the leaves, pedicels horizontal, sepals large broad, standard small, lateral lobes of wings minute terminal very large, lip conoid, spur very long slender. *H. f. & T. in Journ. Linn. Soc.* iv. 149.

Mountain streams in MALABAR; Sivagherey hills, alt. 4-7000 ft., *Wight*.

Stem 5-6 ft.; branches and petioles laxly hairy, or glabrate. *Leaves* 3-5 in., membranous, often 2-glandular at the base, serratures not tipped with a bristle; petiole 1-2 in., sometimes with 2 or more long stipitate glands. *Raceme* and stiff peduncle together 6-12 in., quite erect; bracts ovate, persistent; pedicels 1 in. *Flower* nearly 1 in. long; sepals and orbicular standard acuminate; terminal wing-lobe suborbicular, lateral hid under the standard; spur twice as long as the flower, curved up. *Capsule*

$\frac{1}{2}$ in., ellipsoid, beaked, glabrous. *Seeds* suborbicular, pustular, and shortly hairy.—The glands of the leaf-base and petiole are sometimes spirally involute.

78. **I. elongata**, Arn. in *Hook. Comp. Bot. Mag.* i. 324; tall, stout, glabrous, simple or branched, leaves stout-petioled elliptic acuminate serrate thick, peduncles far exceeding the leaves very stout, racemes lax, pedicels horizontal, sepals rather large ovate, standard small, lateral lobes of wings small, terminal large, lip small, spur long very slender. *Thwaites Enum.* 67; *H. f. & T. in Journ. Linn. Soc.* iv. 150.

Adam's Peak in CEYLON, alt. 3–4000 ft.

Apparently about 3 ft. high; stem woody below, straight or flexuous and scarred above. *Leaves* 2–3 in.; serratures gland-tipped. *Peduncle* very lax; raceme 4–10 in., stout; bracts ovate, acuminate, persistent; pedicels 1– $1\frac{1}{2}$ in., horizontal, thickened upwards. *Flower* 1 in. long, red; sepals acuminate, the small dorsally spurred standard about equalling the lateral lobes of the wings; terminal lobe oblique; spur $1\frac{1}{2}$ in., tip thickened. *Capsule* $\frac{1}{2}$ in., ellipsoid, beaked, glabrous.

79. **I. cornigera**, Arn. in *Comp. Bot. Mag.* i. 323; quite glabrous, stem simple rather stout, leaves (rarely opposite) petioled elliptic-lanceolate acute or acuminate crenate, peduncles subterminal slender erect, racemes short lax, pedicels capillary, sepals small ovate, standard oblong acuminate, lateral wing-lobes minute, terminal subquadrate with a broad claw, spur long or short rather stout ciliate at the tip. *Thwaites Enum.* 67; *H. f. & T. in Journ. Linn. Soc.* iv. 150.

Warmer parts of CEYLON, in damp woods.

Stem 6–24 in., stout or slender, usually the former, often naked below and very leafy above. *Leaves* very variable, 3–6 in., sometimes variegated with white along the midrib, rarely serrate, crenatures ciliate; petiole $\frac{1}{2}$ –1 in. *Peduncles* erect, longer or shorter than the leaves; raceme 1–2 in.; bracts small, ovate, acute; pedicels 1 in., horizontal. *Flowers* 1 in. long, yellow, variegated, with green or pale rose; standard concave, orbicular when spread out; terminal lobe of wings with concave sides and broad oblique notched apex; spur very variable, sometimes inflated below. *Capsule* $\frac{1}{2}$ in., ellipsoid, turgid, beaked, glabrous. *Seeds* few, orbicular, compressed, shining.—The shining smooth compressed seeds ally this to *I. Kleinii*, &c.

80. **I. Arnottii**, *Thwaites Enum.* 67; quite glabrous, stem simple rather slender, leaves petioled elliptic-lanceolate acuminate crenulate sparsely hairy above, peduncles strict subterminal, flowers few and shortly racemed or subumbelled, sepals small cordate, standard small, lateral wing-lobes small, terminal large clawed semicircular, lip small, spur slender incurved.

Central Province of CEYLON, alt. 1–3000 ft., rare, *Thwaites*.

Very similar to *I. cornigera*, but more slender, racemes shorter or flowers sometimes umbelled, red-purple, tinged yellow in the centre, and with very differently shaped terminal wing lobes which are notched at the apex on one side.—The base of the stem in this and its allies seems to form a perennial tuber.

81. **I. phœnicea**, *Bedd. in Madr. Journ.* iii. 175; *Ic. Pl. Ind. Or.* p. 30, t. 148; suffruticose, erect, glabrous, leaves petioled lanceolate, narrowed at both ends serrate, peduncles axillary as long as the leaves racemose, bracts cordate, raceme few-flowered, sepals ovate, standard broad ovate, wings small, lateral lobe cordate overlapping the much larger oblong terminal one, lip with spur trumpet-shaped incurved.

Pulney hills in the SOUTHERN CARNATIC, alt. 6–7000 ft., *Beddome*.

Apparently a slender sparingly branched herb, quite glabrous. *Leaves* 3–4 in., membranous, serratures with rather long cilia; petiole $\frac{1}{2}$ –1 in., naked. *Peduncles* axillary,

slender, erect; bracts $\frac{1}{2}$ in., persistent; pedicels $\frac{1}{2}$ –1 in., slender. *Flowers* 4–14, 1 in. long, campanulate, brilliant scarlet, yellow in the centre; standard vaulted, dorsally winged; tip of spur swollen.—Major Beddome regards this as allied to *I. Walkeri*, of Ceylon.

82. ***I. Tangachee***, *Bedd. Ic. Pl. Ind. Or.* p. 30, t. 147; glabrous, stem stout short subprocumbent, leaves obscurely whorled subsessile narrowly elliptic-lanceolate acuminate serrate, peduncles exceeding the leaves very stout erect, flowers subumbelled or racemed, pedicels erect, sepals oblong, standard short broad, lateral wing-lobes truncate terminal broadly cuneate, lip small boat-shaped, spur slender incurved.

Anamallay hills in TRAVANCOR, alt. 4000 ft. and upwards, in river-beds, *Beddome*; Bolempetty, *Wight*.

A short simple or forked herb, 6–10 in. *Stem* naked and rooting below. *Leaves* 2–3 in.; glabrous on both surfaces, thick, nerves few slender. *Peduncles* very stout, $1\frac{1}{2}$ –2½ in.; bracts $\frac{1}{5}$ in., coriaceous; pedicels $\frac{1}{2}$ –1½ in., stout, thickened upwards. *Flowers* 4–8, 1–1½ in., bright rose; spur stout, straight or hooked, terminal wing-lobe with a broadly truncate and erose apex; spur 1 in., straight or incurved. *Capsule* $\frac{1}{2}$ in., gibbous, glabrous. *Seeds* many, very small.

83. ***I. leptura***, *Hook. f.*; quite glabrous, branches slender, leaves long-petioled elliptic acuminate crenate membranous, peduncles axillary slender 2–3-fld, bracts deciduous, sepals broad ovate very oblique, standard small vaulted, lateral wing-lobes small rounded, terminal very large suborbicular, lip small saccate, spur long very slender incurved.

Anamallay hills, in MALABAR, alt. 4500–5500 ft., *Beddome*.

Leaves 4–6 in., very membranous, with or without gland-tipped bristles at the base, crenatures ciliate; petiole 1–3 in., slender. *Peduncles* shorter than the leaves; bracts ovate, small; pedicels $\frac{1}{2}$ –1 in. *Flowers* 1 in. across the broad flat wings; standard quite small, not winged or spurred dorsally; lateral wing-lobes very small, concave, overlapping the very large terminal ones which are quite entire; spur 1–1½ in., flexuous, turned to one side. *Capsule* $\frac{1}{2}$ in., ellipsoid, beaked, turgid in the middle, glabrous. *Seeds* many, orbicular, young pilose, probably large.—I have only fragments of this very distinct species, which is labelled *I. cordata*? by Major Beddome.

** *Spur short, or 0.* (See also *I. cornigera*).

84. ***I. Wightiana***, *Bedd. Ic. Pl. Ind. Or.* p. 30, t. 146; suffruticose, erect, glabrous, leaves long-petioled elliptic-lanceolate acuminate serrate, petiole with many stipitate glands, peduncles slender shorter than the leaves, bracts ovate, racemes lax, pedicels capillary, sepals small, standard small orbicular ovate apiculate, lateral wing-lobes small spreading, terminal very large long oblong obtuse, lip funnel-shaped, spur short incurved.

Moist forests in the Anamallay hills, TRAVANCOR, alt. 3–4500 ft., *Beddome*.

Leaves 5–6 in., with a few scattered hairs above on the nerves, membranous, lineolate between the nerves; petiole $1\frac{1}{2}$ –2½ in., slender. *Peduncles* flowering almost throughout their length; bracts very small; pedicels spreading in fruit. *Flowers* 1–1½ in. long, white mottled with pink; standard with a green dorsal ridge; upper wing-lobe oblong, pointing forwards, terminal narrow, obtuse; spur very short, hooked. *Capsule* $\frac{1}{4}$ in., trapezoid, glabrous. *Seeds* about 5, globose, hairy.

85. ***I. Walkeri***, *Hook. Comp. Bot. Mag.* i. 324, t. 18; tall, erect, quite glabrous, leaves very long-petioled elliptic-lanceolate acuminate serrulate, peduncles stout erect, flowers 6–8, bracts broadly ovate, pedicels slender erect, sepals small ovate-cordate, wings small 2-partite, lip elongate serrate ventricose incurved laterally compressed, spur very short incurved. *Bot. Mag.* t. 5237.

Central Provinces of CEYLON, alt. 4–6000 ft.

Root tuberous, perennial. *Stem* 1–2 ft., stout, simple or branched. *Leaves* $1\frac{1}{2}$ –4 in., thick, serratures ciliate, petiole $\frac{1}{2}$ –1 in. *Peduncles* stout, erect; racemes 4–8-flowered; bracts small, persistent; pedicels slender, erect, spreading in fruit. *Flowers* $\frac{3}{4}$ –1 in., scarlet, rarely yellow; sepals small, ovate; standard very small, hooded; wings very small, lateral lobes rounded, almost hidden under the standard; terminal lobes orbicular protruded, notched on the inner margin towards the rounded end; lip very large, walls undulate; spur slender, hooked, swollen at the tip. *Capsule* $\frac{1}{2}$ in., ellipsoid, gibbous, glabrous. *Seeds* unknown.

86. **I. tavoyana**, *Benth. in Wall. Cat.* 4773; short, quite glabrous, stem stout succulent, leaves petioled ovate acuminate subserrate base with long cilia, peduncles subterminal erect slender, flowers small in short racemes, bracts minute, pedicels spreading capillary, sepals narrow, standard small oblong concave spurred at the tip, terminal wing-lobes very long-clawed pendulous oblong?, lip boat-shaped with a gibbosity or short slender spur. *H. f. & T. in Journ. Linn. Soc.* iv. 146. *I. lineata*, *Turcz. in Bull. Soc. Nat. Mosc.* 1859, i. 271.

TENASSERIM at Moulemein, *Lobb.*

Annual. Stem 4–10 in., simple or branched. *Leaves* 2–3 in., very membranous, serratures ciliate, hairs at the base not glandular; petiole $\frac{1}{2}$ –1 in. *Peduncles* 1–3 in., erect or spreading; raceme terminal, 8–14-flowered; bracts setaceous, persistent, pedicels $\frac{1}{2}$ –1 in. *Flowers* $\frac{1}{2}$ in. long, white? with purple streaks on the lip, sepals variable in shape, usually linear; standard with a green spur at the tip; claw of wings $\frac{1}{2}$ in. long, very narrow, strap-shaped, blade shorter than the claw, obovate-cuneate, with a callous auricle at the base; lip large for the plant, very concave, acuminate; spur sometimes as long as the lip, and turned up along its base. *Capsule* $\frac{1}{2}$ in.; trapezoid, acutely beaked, glabrous. *Seeds* 2–3, oblong, compressed, opaque, glabrous.—An exceedingly curious species, the long slender claws of the wings are unique in the genus. The form of the wing itself, as described, I have not ascertained with sufficient confidence.

87. **I. racemulosa**, *Wall. Cat.* 7274; stem simple erect leafy, leaves long-petioled elliptic-ovate acute crenate-serrate, petiole eglandular, racemes flexuous axillary 6–8-flowered, bracts ovate, pedicels capillary, flowers $\frac{3}{4}$ in., sepals obliquely ovate, standard small orbicular, terminal lobe of wings very large $\frac{1}{2}$ -orbicular violet, lip boat-shaped, spur incurved slender. *H. f. & T. in Journ. Linn. Soc.* iv. 138.

KHASIA MTS., in marshes, alt. 4–5000 ft., *Gomez, &c.*; BHOTAN, *Herb. Griffith.*

Stem 6–8 in., succulent, sometimes thick. *Leaves* $1\frac{1}{2}$ –2 $\frac{1}{2}$ in., membranous, exstipulate. *Racemes* 1–2 in., horizontal; pedicels scattered, spreading, $\frac{1}{2}$ in.; bracts $\frac{1}{4}$ in., coriaceous, persistent, glandular at the tip. *Flowers* $\frac{3}{4}$ in. across the wings, of a deep fine violet colour; standard not spurred at the back; lateral lobes of wings small; spur $\frac{1}{2}$ – $\frac{3}{4}$ in., obtuse, curved into a semicircle. *Capsule* short, $\frac{1}{2}$ in., clavate, acute, glabrous. *Seeds* few, small.—A very beautiful plant, allied to none.

B. Capsule linear.

B I.—OPPOSITIFOLIA and VERTICILLATA. (See *I. tripetala* in B II.)

88. **I. Roylei**, *Walp. Rep.* i. 475; tall, robust, branches quite glabrous, leaves usually opposite and whorled lanceolate or ovate-lanceolate, sharply serrate, stipules of seta, peduncles subterminal, flowers many umbelled or racemed, standard 2 lobed, wings broad, lip saccate very obtuse, spur short, capsule clavate beaked cernuous. *H. f. & T. in Journ. Linn. Soc.* iv. 127. *I. glandulifera*, *Royle Ill.* 151, t. 28, f. 2; *Lindl. Bot. Reg.* 1840, t. 22; *Hook. Bot. Mag.* t. 4020.

Temperate Western Himalaya; common from NIPAL to MARRI, alt. 6-8000 ft.

A handsome often gigantic species, 4-10 ft., with the stem as thick as the thumb, fleshy. *Leaves* very variable as to disposition, size, breadth, petiole, and cutting of the margin, base rounded or acute; stipules of stout gland-tipped setæ. *Peduncles* 2-5 in., stout, straight, erect; bracts ovate lanceolate, acuminate. *Flowers* usually pale red-purple, sometimes white; sepals $\frac{2}{3}$ - $\frac{1}{2}$ in., green. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in., clavate, or much narrowed towards the base, top abruptly beaked, glabrous, usually drooping, very turgid in the middle. *Seeds* large, broadly obovoid; testa opaque, spongy.—Very closely allied to *I. longicornu*, *sulcata*, and *Thomsoni*. Edgeworth considers that *I. moschata* differs specifically in its musky odour, habit, and more deeply serrated leaves.—Seeds eatable raw, tasting like nuts.

VAR. 1; leaves crenate-serrate, serratures glandular.

VAR. 2. *moschatu*; leaves alternate and whorled, coarsely serrate, less glandular. *I. moschata*, Edgew. in *Trans. Linn. Soc.* xx. 38.

VAR. 3. *candida*; uppermost leaves opposite or whorled, flowers white spotted with crimson. *I. candida*, Lindl. in *Bot. Reg.* 1840, *Misc.* 85; 1841, t. 20.

VAR. 4. *macrochila*; upper leaves alternate, terminal lobes of the wings longer dimidiate-ovate falcate. *I. macrochila*, Lindl. *Bot. Reg.* 1840, t. 8.

89. ***I. Thomsoni***, Hook. f. in *Journ. Linn. Soc.* iv. 128; tall, robust, branched, quite glabrous, leaves opposite below whorled or alternate above, petioled ovate acuminate coarsely serrate, stipules pulvinate, peduncles erect, flowers umbelled, sepals ovate-lanceolate, standard entire, wings 2-lobed, lip conical narrowed into the rather long spur, capsule narrowly clavate.

Inner ranges of the Temperate Himalaya, PITI and KUNAWUR, alt. 9-10,000 ft., *T. Thomson*; KUMAON and GARHWAL, alt. 12,000 ft., *Strach. & Wint.*; SIKKIM, alt. 12,000 ft., *J. D. H.*

Probably a small state of *I. Roylei* or *sulcata*, 2-12 in. high, with flowers only half the size, a conical or trumpet-shaped lip narrowed into the spur, and a narrower capsule $\frac{1}{2}$ -1 in. long. It is only found in the interior and drier Himalayan ranges, and varies exceedingly in the size of all its parts. The flowers are pale and spotted. The stipules usually form a large glandular tubercle.

90. ***I. sulcata***, Wall. *Cat.* 4764 in part; stem stout erect grooved quite glabrous, leaves usually opposite and whorled elliptic-ovate or lanceolate coarsely crenate-serrate, stipules pulvinate, flowers many umbelled or racemed, standard 2-lobed, wings broad, lip saccate obtuse, spur short inflexed, capsule elongate horizontal. *H. f. & T.* in *Journ. Linn. Soc.* iv. 129. *I. gigantea*, Edgew. in *Trans. Linn. Soc.* xx. 38.

Temperate Himalaya, alt. 7-12,000 ft., from MARRI to SIKKIM.

A gigantic annual herb, said to attain 15 ft. in height, but I never saw it more than 8 in Sikkim, with furrowed fistular stems, so like *I. Roylei* that I suspect it may prove to be a variety of that plant, differing in the more crenate leaves, stipules (a very variable character), and the longer narrow inclined capsules 1 in. long, which are but slightly clavate, and have similar large eatable seeds. It should also be compared with states of *I. longicornu*. The 4 lateral sepals are sometimes developed in Sikkim.

Var. *minor*; smaller, lip conical.—Kunawur, alt. 8000 ft., *T. Thomson*.

91. ***I. amplexicaulis***, Edgew. in *Trans. Linn. Soc.* xx. 37; tall, branched, quite glabrous, leaves sessile lower opposite oblong-lanceolate upper alternate ovate-lanceolate amplexicaul, all crenate-serrate, stipules pulvinate or obsolete, flowers umbelled or racemed, standard orbicular 2-lobed, wings 2-lobed, lip saccate acute or obtuse, spur short inflexed, capsule slender horizontal. *H. f. & T.* in *Journ. Linn. Soc.* iv. 129.

Western Temperate Himalaya, alt. 6-12,000 ft.; KULU, Edgeworth; SIMLA, *Lady Dalkousie*; KUMAON, *Strach. & Wint.*

A very distinct species in foliage, and at once recognised by the alternate amplexicaul upper leaves, but the lower leaves, habit, flowers and fruit differ little from *I. sulcata* and *Thomsoni*. The stem is 4-angled, peduncles short, flowers fewer and smaller, and the capsule is hardly clavate, 1-1½ in.

B II.—UNIFLOREÆ. (See also *I. discolor*, *spirifer* and *serrata* under B III., which are sometimes 1-flowered).

92. ***I. tripetala***, Roxb. *Fl. Ind. Ed. Carey*, ii. 453; tall, glabrous, rarely pubescent, branched, stout, leaves large membranous long petioled opposite alternate or whorled ovate- or elliptic-lanceolate acuminate crenulate, pedicels slender solitary or fascicled, flowers large, sepals subulate falcate, standard obovate spurred at the back, wings small, lip deeply saccate, spur short abrupt incurved. *I. multiflora*, Wall. *Cat.* 4742; *H. f. & T. in Journ. Linn. Soc.* iv. 126.

Tropical Himalaya, SIKKIM, alt. 2-5000 ft., *J. D. H.*; BHOTAN, Dupbla Hills, Booth; ASSAM, SILHET, and KHASIA Mts., alt. 0-3000 ft.

Annual. *Stem* stout, succulent, 1½-2 ft., swollen at the nodes, simple or with opposite branches. *Leaves* 2-8 in., exclusive of the petiole, which is often 5 in., membranous, acuminate, glabrous or sparsely pubescent above, nerves very numerous, lower crenatures often with bristles. *Pedicels* ½-1 in., glabrous, bracteate at the base when fascicled on a short peduncle. *Flowers* red or purple, 1½ in. from the base of the lip to the tip of the standard, glabrous or pubescent; sepals very small for the size of the flower; standard galeate; wings with two suborbicular lobes; lip rounded at the base, suddenly narrowed into a spur. *Capsule* ½-¾ in., ellipsoid, quite glabrous. *Seeds* many; pyriform, testa rough opaque.—Specimens of this might be referred to sections B. i. and B. iii., according as the leaves are opposite or alternate, and the pedicels solitary or collected on a peduncle.

93. ***I. puberula***, DC. *Prodr.* i. 684; slender, erect, leafy, pubescent, leaves petioled elliptic-lanceolate crenate acuminate eglandular, pedicels subterminal bracteate slender 1-flowered, flowers pubescent violet, sepals broad, standard orbicular notched dorsally winged, terminal lobe of wings broadly semi-obovate, lip conoidal, spur long slender incurved, capsule slender. *Wall. Pl. As. Rar.* ii. 83, t. 193; *Cat.* 4767 A; *H. f. & T. in Journ. Linn. Soc.* iv. 141. *I. mollis*, Wall. in Roxb. *Fl. Ind. Ed. Carey*, ii. 461. *I. hispidula*, Benth. in Wall. *Cat.* 4740.

Temperate regions of the SIKKIM and NIPAL HIMALAYA, alt. 5-6000 ft.

Stem 2-3 ft., sparingly branched, pubescent above. *Leaves* 1-3 in., membranous, usually pubescent on both surfaces; petiole rather short; stipules 0. *Pedicels* 1-1½ in., pubescent, usually confined to the uppermost axils; bracts subulate, basal, or 0. *Flower* flat, 1¼-1½ in. from the standard to the wings; sepals broad ovate acuminate; standard almost as large as the two wings, and, like them, of a deep violet colour; wings of 2 sessile lobes, lateral smaller rounded; lip rather small; spur ½ in. *Capsule* 1 in., glabrous. *Seeds* immature.—In the Linnean Journal I confounded with this under variety β, a Khasia plant which I now find should be referred to *I. bella*, leaving this a single-flowered species. The Sikkim specimens are larger leaved and more glabrous than the Nipalese.

94. ***I. arguta***, *H. f. & T. in Journ. Linn. Soc.* iv. 137; slender, erect, glabrous or sparsely pubescent, leaves ovate or lanceolate sharply serrate, petiole usually glandular, peduncle very short 1-2-flowered, bracts setaceous twisted or 0, flower large, sepals ovate-cordate, standard orbicular spurred behind, terminal lobe of wings very long pendulous, lip elongate saccate, spur short stout incurved.

Shaded woods of the SIKKIM HIMALAYA, alt. 5-7000 ft., and KHASIA Mts., alt. 3-6000 ft.; BHOTAN, at Dupleh, *Booth*; BURMA, at Momyen, *J. Anderson*.

Perhaps only a variety of *I. spirifer*, but a stronger growing plant, often much branched, leaves more strongly toothed, often ciliate at the base, petiole usually glandular, bracts, when present, very curiously twisted, lip deeper, and spur not spiral. *Capsule* 1 in., stout. *Seeds* orbicular, small, opaque, granulate.—I have found 4 lateral sepals on this species; it was the commonest Darjeeling one in 1848.

B III.—AXILLIFLORÆ.

* *Standard usually spurred at the back.*

95. ***I. Jurpia***, *Ham. in Wall. Cat.* 4761; tall, shrubby, branched, glabrous or pubescent, leaves long-petioled elliptic-lanceolate caudate-acuminate often oblique crenate, peduncles very long 1-3-flowered, flowers large, bracteoles and sepals minute, standard obovate usually with a long dorsal spur, terminal lobe of wings obovate or oblong, lip very large saccate, spur short stout incurved. *H. f. & T. in Journ. Linn. Soc.* iv. 140.

Shaded woods of the temperate and subtropical Himalaya from NIPAL to BHOTAN; KHASIA Mts., alt. 3-5000 ft.

Stem 5-8 ft., stout and woody below; branches glabrous or pubescent. *Leaves* 3-10 in., very membranous, many-nerved, with scattered hairs above, often red beneath, often ciliate towards the base; nerves numerous, slender; petiole usually long and slender, often glandular. *Peduncles* 2-4 in., slender; bracts subulate; pedicels $\frac{1}{2}$ -1 in. *Flowers* nearly 2 in. from the spur to the tip of the standard, white or pale straw-coloured or orange-red; standard with a spur sometimes $\frac{1}{2}$ in. long, at others obsolete; wings small, lateral lobes rounded, included, terminal exserted, twice as large, notched at the tip or not, with an inflexed auricle on the inner margin; lip very large and broad, usually rounded at the base; spur stout, obtuse. *Capsule* 1-1 $\frac{1}{2}$ in., narrow-linear, clavate, acute, glabrous. *Seeds* many, small, opaque, suborbicular, tubercled.—A splendid species, closely allied in flower to *I. spirifer*, *arguta*, and *discolor*. The peduncles are sometimes 9 in. long, and bear many alternate broad ovate small persistent thick bracts and no flowers. Amongst Cathcart's drawings of Darjeeling plants is a white-flowered species, probably a variety of this, with large bracts and a very short spur on the standard.

96. ***I. discolor***, *Wall. Cat.* 4767; ? *DC. Prodr.* i. 687; slender, erect, branched, leaves petioled ovate or lanceolate acuminate crenate, peduncles short axillary 1-3-flowered, bracts broad ovate gland-tipped, flowers large, sepals rather large broadly ovate, standard orbicular spurred at the back, terminal lobe of wing large pendulous, lip very large deep conoidal narrowed into a short stout involute obtuse spur. *H. f. & T. in Journ. Linn. Soc.* iv. 137. *I. Hoffmeisteri*, *Klotzsch in Reise Pr. Waldem. Bot.* 121, t. 15 A.

Temperate NIPAL and SIKKIM HIMALAYA, alt. 6-8000 ft.

Glabrous, or pubescent on the leaves above. *Stem* 3-5 ft., decumbent and rooting at the base. *Leaves* membranous, crenatures coarse, with a bristle in the sinus; nerves many; petiole variable, naked. *Peduncle* and *pedicels* together 1-2 in., very slender, bracts $\frac{1}{2}$ -1 in., scattered. *Flowers* 1 $\frac{1}{2}$ -2 in., violet-blue with a pink-purple veined very large lip; standard small; wings as in *I. arguta* and *spirifer*, which this much resembles in foliage and flowers, but differs wholly in the fruit. *Capsule* $\frac{3}{4}$ in., slender, clavate and acuminate beyond the middle, the lower portion being seedless. *Seeds* unripe.—A very common Darjeeling species. De Candolle describes the flower as yellow, so I suspect that he has had *I. urticifolia* (or perhaps *I. flavida*) in his eye, with which species this has much in common; in this the leaves are more uniform, less crowded upwards and less drawn out at the apex; and the flowers are more uniformly lateral.

97. ***I. spirifer***, *H. f. & T. in Journ. Linn. Soc.* iv. 135; erect, glabrous, or sparsely pubescent, leaves long-petioled ovate-lanceolate caudate-acu-

minate coarsely crenate upper sessile, stipules setose, peduncles 1-2, sepals large ovate-cordate, standard orbicular spurred behind, terminal lobe of wings very long pendulous, lip subcampanulate, spur short spiral, capsule long slender.

Temperate and subtropical woods of the SIKKIM HIMALAYA, alt. 4-7000 ft.

Stem 8-10 in., slender, sparingly branched. *Leaves* membranous, 1-3 in., narrowed into the slender cylindrical petiole, apiculate in the crenatures. *Peduncles* sometimes 2 and connate at the base, ebracteate, very slender, shorter or longer than the leaves. *Flowers* 1½ in. from the spur to the tip of the apiculate standard; wings violet-purple, the terminal lobe sometimes 1½ in. long, elliptic-oblong; lip deeply conoidal, inflated, narrowed into the spiral spur, pale rose-coloured streaked with purple. *Capsule* ½ in., very slender. *Seeds* small, globose, puberulous.—A lovely plant, closely allied to *I. arguta*, but the flowers are almost invariably solitary, and it wants the curious united bracts.

98. ***I. porrecta***, Wall. Cat. 7275; slender, quite glabrous, stem simple creeping below, leaves petioled ovate or lanceolate acuminate serrulate 2-glandular near the base, peduncles 2-3-flowered, bracts setaceous gland-tipped, sepals ovate-lanceolate, standard orbicular spurred at the back, terminal lobe of wings elongate pendulous, lip large conoid deep narrowed into a rather long abruptly hooked spur. *H. f. & T. in Journ. Linn. Soc. iv. 138.*

KHASIA MTS., Wallich; in marshes at Kala Panee, alt. 5-6000 ft., *J. D. H. & T. T.*

Stem simple, 12-18 in., succulent. *Leaves* 1½-2½ in., membranous, many-nerved; petiole 1-1½ in. *Peduncle* with the pedicels shorter than the leaves. *Flowers* large, 1½ in. long, pale yellow or straw-coloured, beautifully striated with red; standard and wings as in *I. discolor*, but the lip is very different, being almost triangular in profile, narrowed into a spur as long as itself. *Capsule* very immature, apparently not more than ½ in., acuminate.

99. ***I. scabrída***, DC. Prodr. i. 687; glabrous or pubescent, leaves ovate or lanceolate acuminate serrate, stipules of two large glands, peduncles short 2-6-flowered, bracts setaceous, sepals broad ovate-cordate, standard very large orbicular spurred behind, wings smaller, lip conoidal as long as the incurved spur. Wall. Cat. 4769; Wight Ic. t. 323; *H. f. & T. in Journ. Linn. Soc. iv. 136.* *I. tricornis*, Lindl. Bot. Reg. 1840, t. 9; Hook. Bot. Mag. t. 4051. *I. cristata* and *I. calycina*, Wall. in Roxb. Fl. Ind. Ed. Carey, ii. 456 and 463. *I. Hamiltoniana*, Don Prodr. 204.

Shady woods of the temperate Himalaya, from KUNAWAR to BHOTAN, alt. 6-10,000 ft.

Robust, often much branched, 3-5 ft., rarely quite glabrous. *Leaves* 2-6 in., sessile or narrowed into the naked petiole. *Flowers* 1 in., golden-yellow, spotted with red, sometimes paniced, generally in several axils; peduncle 1-2 in., pedicels as long; standard cordate at the base, lateral lobe of wings short rounded, terminal much smaller, oblong. *Capsule* 1-2 in., slender, straight, ribbed, glabrous or puberulous. *Seeds* 1-seriate, oblong, scarcely tubercled.—De Candolle describes the spur as very long (longissimus), which is certainly not the case. I have no Sikkim specimen, but have a figure of the plant amongst Cathcart's drawings, which has 4 lateral sepals.

100. ***I. tropæolifolia***, Griff. mss.; nearly glabrous, stem stout succulent branched, leaves petioled elliptic-obovate acuminate crenate-serrulate, peduncles succulent 2-3-flowered, flowers large yellow, sepals broad orbicular-ovate, standard orbicular thick green with a dorsal spur, wings very large clawed 2-lobed with an inflexed thickened auricle on the inner margin, lip funnel-shaped narrowed into a stout incurved spur.

MISHMI HILLS, Griffith.

Annual, a foot high; stem diaphanous, flexuous. *Leaves* 2-3½ in., rather thick,

glabrous or sparsely puberulous above, white beneath, teeth with subspiral bristles, nerves slender; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in.; stipular glands obsolete or 0. *Peduncles* $1\frac{1}{2}$ in., apparently not stiff; bracts small, caducous; pedicels slender. *Flower* about 1 in. diam.; sepals acuminate, green; standard very coriaceous or fleshy; wings 1 in. long, claw broad, dilating first into a rounded lateral lobe, which is followed by twice as large a rounded terminal lobe; a curious incurved and thickened semilunar fold of the inner margin occurs opposite the union of the lobes; lip large; spur 1 in. long. *Fruit* unknown.—This fine species may belong to A v. in the short-fruited section.

**** Standard not spurred, but sometimes gibbous at the back.** (See also 100. *tropæolifolia*.)

101. ***I. lævigata*, Wall. Cat. 4753**; shrubby, erect, glabrous, leaves petioled elliptic or obovate-lanceolate caudate-acuminate serrate, peduncles axillary very short stout, bracts large, flowers racemed and crowded or solitary yellow, sepals very large green orbicular, standard transversely oblong not spurred behind, wings short 2-lobed, lip funnel-shaped narrowed into a hooked spur of its own length or shorter. *H. f. & T. in Journ. Linn. Soc. iv.* 146.

Shaded woods in the KHASIA Mts., alt. 3–5000 ft.

Stem 4–6 ft., woody below, branched; branches nodose, sometimes puberulous. *Leaves* 4–6 in., membranous, often oblique at the base, serratures with a bristle; petiole $\frac{1}{2}$ –1 in., sometimes glandular. *Peduncles* $\frac{1}{2}$ –1 in., usually crowded in the upper axils, stout, 1–4-flowered; bracts broadly ovate-cordate, obtuse, sometimes $\frac{1}{2}$ in.; pedicels short, stout. *Flowers* 1– $1\frac{1}{2}$ in. long, pale yellow streaked with pink on the wings and lip; sepals very large indeed, sometimes $\frac{1}{2}$ in. long, acute, very oblique; upper wing-lobes short, oblong, obtuse, lower almost twice as large, oblong, unequally 2-lobed, notched; lip and spur $\frac{3}{4}$ –1 in.

102. ***I. Cathcartii*, Hook. f.**; erect, shrubby, branched, glabrous, leaves petioled elliptic or elliptic-lanceolate acuminate crenate, peduncles axillary long stout, bracts small, flowers laxly racemed large, sepals very large coloured orbicular, standard orbicular gibbous or spurred behind, wings short 2-lobed, lip saccate with a short stout incurved spur.

Shaded forests in the SIKKIM HIMALAYA, alt. 3–5000 ft., *J. D. H.*

A large ramous species, nearest allied to *I. lævigata* in foliage and habit, but differing in the long very stout peduncled racemes, 3–7 in. long, smaller bracts, larger pink flowers 2– $2\frac{1}{2}$ in. long, with bright rose-coloured spur and standard; in the red (not green) sepals and more saccate lip.—As in *I. Jurpia* and other species the standard varies in being spurred or only gibbous at the back.

103. ***I. serrata*, Benth. in Wall. Cat. 4771**; glabrous, erect, simple or sparingly branched, leaves sessile or shortly petioled ovate-lanceolate acuminate sharply serrate glandular, stipules glandular or 0, pedicel very slender forked in the middle 2-flowered, bracts setaceous scattered, sepals large broad, standard oblong clawed, wings clawed narrow, lip oblique conoid, spur about equalling the flower. *H. f. & T. in Journ. Linn. Soc. iv.* 136.

Shaded woods in the temperate regions of NIPAL, Wallich; SIKKIM, alt. 8–10,000 ft., and BHOTAN, Griffith.

Stem slender, 1–3 ft. *Leaves* membranous, narrowed gradually into the petiole. *Flowers* $\frac{3}{4}$ – $1\frac{1}{2}$ in. long, yellow or white spotted with red; sepals very variable, sometimes very large, and almost orbicular; standard and wings apparently remote from the length of their claws; spur abrupt, recurved. *Capsule* 1– $1\frac{1}{2}$ in., very slender. *Seeds* numerous, narrow obovoid, strongly tubercled.—Allied to *I. scabrida*, but smaller, more delicate, with differently shaped lip, spur, and sepals.

104. ***I. longipes*, H. f. & T. in Journ. Linn. Soc. iv.** 150; quite glabrous, tall, branched, leaves distant shortly petioled elliptic-lanceolate caudate-

acuminate crenate, peduncles solitary axillary very long slender arcuate, raceme terminal 3-5-flowered, bracts subulate caducous, flowers 1 in. yellow, sepals 2-4 small, standard orbicular apiculate, wings with a long narrow twisted terminal lobe, lip trumpet-shaped, spur slender hooked.

Temperate SIKKIM HIMALAYA, alt. 8-10,000 ft., *J. D. H.*

A very distinct plant, 3-4 ft., with scattered uniform leaves and long axillary sub-horizontal peduncles, 2-5 in. long. Stipules 0. Stem subtetragonous. Leaves 3-5 in., membranous, rather falcate; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. Flowers loosely racemed, pale yellow, unspotted; buds rounded at the apex. Sepals sometimes 4, ovate-lanceolate; lateral wing-lobe rounded, terminal 1 in., broadly subulate. Capsule not seen.—I have not cited any other habitat for this species but Sikkim; the Kumaon plants cited in Journ. Linn. Soc. being imperfect. In the form of the flower it is most allied to *I. laxiflora* and its allies.

105. ***I. urticifolia***, Wall. in Roxb. *Fl. Ind. Ed. Carey*, ii. 457; *Cat.* 4768; simple or sparingly branched, quite glabrous, leaves large lower long-petioled elliptic-ovate caudate-acuminate coarsely crenate, peduncles axillary and subterminal very slender arched 3-5-flowered, bracts persistent slender, flowers large purple or yellow, sepals obliquely ovate, standard orbicular, wings 2-lobed, lip shortly saccate, spur short incurved or hooked. *I. urticifolia*, vars. *a* and *γ*, *H. f. & T. in Journ. Linn. Soc.* iv. 152.

Temperate Himalaya, NIPAL, Wallich; SIKKIM, alt. 10-12,000 ft., *J. D. H.*

Stem 2-3 ft., usually slender, and hardly branched. Leaves 4-6 in., upper sessile, membranous, tips long and quite entire; nerves many spreading, very slender; crenatures with subbasal bristles; petiole 1-3 in.; stipular glands sessile or pedicelled or 0. Peduncles 2-5 in., usually axillary, sometimes subterminal and clustered, always very slender, horizontal, and more or less arched; divided, as it were, at the top into 3-5-filiform pedicels, which, as well as the bracts (nearly $\frac{1}{4}$ in.), are very slender, and do not spread. Flowers yellow according to Wallich, white or pale purple with red streaks, in the Sikkim specimen, $\frac{3}{4}$ in. diam.; sepals oblique, long-pointed; standard obscurely keeled; wings with broad lateral lobes and elongate oblong terminal ones; spur almost as broad as deep, apiculate, base contracted but rounded, spur stout, obtuse. Capsule 1 in., inclined, linear, acuminate, glabrous. Seeds unripe.—This resembles a good deal *I. amphorata*, but is distinguished by its long, arched, filiform, usually horizontal, peduncles, which do not bear a raceme, but as it were divide into pedicels, and by its long slender bracts. It is most nearly allied to *I. longipes* and *I. cymbifera*. Wallich's description of the flower is imperfect, and I am unable to examine the wings of the dried specimens.

106. ***I. cymbifera***, Hook. f.; slender, branched, quite glabrous, leaves petioled elliptic-ovate or lanceolate caudate-acuminate sharply crenate-serrate, peduncles axillary and subterminal much shorter than the leaves filiform 1-4-flowered, bracts large caducous, flowers large lilac, sepals large orbicular-ovate, standard orbicular gibbous behind, lateral wing-lobes rounded, terminal elongate-oblong conniving, lip broadly and deeply boat-shaped rounded below, spur 0. *I. urticifolia* β , *H. f. & T. in Journ. Linn. Soc.* iv. 152.

Inner valleys of the SIKKIM HIMALAYA; Lachoong river, alt. 8-10,000 ft., *J. D. H.*

Stem 2-3 ft., green with pale red-purple blotches; branches slender. Leaves 4-8 in., membranous, tip quite entire, crenatures or serratures very shallow, with a terminal or subterminal bristle; nerves many, arched, slender; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in., winged; stipular glands sessile. Peduncles $1\frac{1}{2}$ -3 in., spreading, capillary; bracts $\frac{1}{4}$ in., boat-shaped with long points; pedicels divaricating. Flowers 1-1 $\frac{1}{4}$ in. long, pale lilac spotted with red; sepals nearly as long as the standard, acuminate, green on one (the upper) side of the midrib, lilac on the other; standard much vaulted, hardly, keeled; terminal wing-lobes horizontal, obtuse, conniving and parallel; lip $\frac{3}{8}$ in. long, ovoid in outline, apiculate,

almost hemispherical below. *Capsule* $\frac{3}{4}$ –1 in., linear, cuspidate, torulose, glabrous. *Seeds* few, young obovoid acute at the hilum, opaque.—Most nearly allied to *I. urticifolia*, Wall., differing in the acute small serratures of the leaves, short peduncles, caducous broad bracts, and the curious concave boat-like spurless lip.

B IV.—SUBUMBELLATÆ.

107. ***I. bicornuta***, Wall. in Roxb. *Fl. Ind. Ed. Carey*, ii. 460; *Cat.* 4765; tall, stout, quite glabrous, leaves petioled elliptic or elliptic-lanceolate crenate caudate-acuminate, racemes subterminal interrupted, pedicels whorled, bracts narrow persistent, flowers rather large, sepals small, standard orbicular, wings caudate, lip horned at the tip produced downwards into a broad conoid or oblong incurved sac, spur short hooked or incurved. *I. longicornu*, Wall. *Cat.* 4729 in part, not of *Flor. Ind.* *I. longicornu*, Wall. var. *a*; *H. f. & T. Journ. Linn. Soc.* v. 148.

Central and Western Temperate Himalaya; NIPAL, Wallich; GARHWAL, Strach. & Wint.

A tall, leafy, much-branched annual; stem stout, succulent. *Leaves* 3–6 in., membranous, with sometimes a few scattered hairs on the upper surface, crenate, bristles 0 or basal; petiole 1–3 in., often with prominent basal stipular glands. *Peduncles* 2–4 in., rather stout, erect; racemes many-flowered; bracts whorled, ovate, with long prominent glandular tips; pedicels $\frac{3}{4}$ –1 in., slender. *Flowers* $\frac{3}{4}$ –1 in. long from tip of lip to that of standard; buds 2-horned by the spur and projecting glandular herbaceous end of the lip, which is large, broad, and remarkably incurved; wings with small lateral lobes and narrow terminal ones. *Capsule* (according to Wallich) $1\frac{1}{2}$ in., cylindric, smooth, shining. *Seeds* 8–10, subcylindric.—Under Wallich's 4729 (*I. longicornu*) there is a fine specimen of this, together with one of *I. sulcata*, and another of *I. amphorata*? to neither of which does his character of the double-horned bud apply; and as the said fine specimen accords with another called *I. bicornuta*, but without a Catalogue number, in Wallich's Herbarium, collected in Nipal in 1821, and with his description of that plant in Roxburgh's *Flora Indica*, I retain the name here. The specimen in his Herbarium bearing the Catalogue name of *I. bicornuta*, has the spur rather more like that of *I. amphorata*, but it has not the broad sepals. The name *longicornu* in his Herbarium is inapplicable to any of the 3 plants in the sheet to which it is attached, and had best be suppressed; and all the more because it is not his own *I. longicornu* published in Roxburgh (which is De Candolle's, and his own *leptoceras*)

108. ***I. amphorata***, Edgew. in *Trans. Linn. Soc.* xx. 39; erect, branched, slender or robust, glabrous, leaves petioled elliptic acuminate-crenate with glandular stipules, racemes subterminal subumbellately interrupted, bracts broad persistent, flowers large, sepals small broadly cordate, standard orbicular dorsally keeled or crested, wings with short lobes, lip a large deep broad rarely conical obtuse sac with a short abrupt incurved spur, capsule linear.

Western Temperate Himalaya, from KASHMIR to KUMAON, alt. 5–8000 ft.

The habit and foliage of this are quite those of *I. bicornuta*, but the petioles are more constantly 2-glandular at the base, with the glands either sessile or stipitate, the apex of the leaf is not so produced into an entire linear tail, the raceme is often hardly whorled or interrupted, the sepals are constantly cordate, and the lip is usually of a very different shape, being very large, subcylindric and saccate, rarely conoidal, and though at times apiculate, never having the strong callous green points which suggest the name of *bicornuta* for that plant. The flowers are, I believe, rose-coloured and yellow, with red veins; the lip, often $\frac{3}{4}$ in., is in one specimen from Simla, drawn out into a spur circinnate at the tip, and with the spur considerably over an inch long. The capsule is erect, $\frac{3}{4}$ –1 $\frac{1}{2}$ in., linear, acuminate, not at all clavate. *Seeds* few, large,

oblong, compressed; testa rugose.—The following varieties are distinguished as species by Mr. Edgeworth:—

VAR. 1. *amphorata proper*; stipular glands pedicelled, standard crested, wings unequally hatchet-shaped, lip very obtuse, spur incurved, capsule subterete. *I. amphorata*, Edgeworth, l.c. *I. longicornu*, Wall. Cat. 4729, in part. *I. umbrosa*, Nob. in Linn. Soc. Journ. *I. picta*, Knowles & Wescott Floral Cabinet, t. 128 (according to a specimen in Herb. Lindley).

VAR. 2. *umbrosa*; stipular glands sessile obtuse, pedicels glandular, lip gradually narrowed into the incurved spur, capsule subtorulose. *I. umbrosa*, Edgew. in Trans. Linn. Soc. xx. 39. *I. longicornu*, var. *a* and *δ*, nob. l.c. *I. bicolor*, Royle Ill. 151, t. 28. *I. Roylei*, Klötzsch in Reise Pr. Wald. 121, t. 15 B.

VAR. 3. *pallens*; stipular glands unequal ear-shaped, pedicels thickened eglandular, flowers smaller paler, lip gradually narrowed into a revolute spur. *I. pallens*, Edgew. l.c. 39. *I. longicornu*, var. *pallens*. Nob. l.c.

109. ***I. Edgeworthii***, Hook. f.; tall, robust, branched, glabrous, leaves large petioled elliptic acuminate acutely serrate, peduncles subterminal fascicled, raceme short, interrupted, bracts large keeled persistent often whorled, flowers large yellow and red, sepals very large orbicular midrib crested, standard orbicular crested, lateral wing-lobes obliquely oblong, terminal oblong, lip funnel-shaped narrowed into an incurved spur. *I. longicornu*, var. *γ cristata*, Nob. in Journ. Linn. Soc. iv. 148.

Western Temperate Himalaya at Kundau and the Beas Valley in KULU, Edgeworth.

This resembles very closely *I. bicornuta* in habit, stature, and foliage, but the leaves are sharply serrate, the serratures tipped with glandular bristles, the sepals are very large, nearly $\frac{1}{2}$ in. long, crested on the midrib, and the lip is broadly funnel-shaped, without the callous green points of that species. From *I. umbrosa* it differs in the same points (except the last). The stipular glands are tumid; the bracts boat-shaped, with long stiff glandular points; the flower 1 in. long from the tip of the standard to the spur; the sepals green, rest of the flower yellow streaked with red, except the broad crested midrib of the standard, which is green. Capsule and seeds as in *I. amphorata*.

110. ***I. mishmimensis***, Hook. f.; quite glabrous, stem stout branched, leaves petioled elliptic-oblancoolate acuminate serrate, peduncles stout axillary, flowers large white in broken whorls, bracts large whorled persistent, sepals large broad ovate, standard orbicular obtusely spurred at the back, terminal wing-lobes elongate, lip funnel-shaped narrowed into a short incurved spur.

MISHMI Mts., Griffith.

A stout apparently succulent plant, 4 ft. high. Leaves 6 in., crowded towards the ends of the branches, membranous, sometimes gland-tipped, nerves very slender; petiole $1\frac{1}{2}$ –2 in.; stipular glands 0 or obsolete. Peduncles stout, shorter than the leaves; bracts $\frac{1}{2}$ in., spreading, acuminate, concave, green; pedicels $\frac{3}{4}$ –1 in. Flowers few, more or less umbelled, about $1\frac{1}{2}$ in. diam.; sepals and standard flesh-coloured; wings apparently clawed and 2-lobed, both lobes being narrow, the terminal larger, tinged with yellow, and with 2 yellow spots; lip large; spur about 1 in. Capsule unripe, $1\frac{1}{2}$ in., linear.

111. ***I. radiata***, Hook. f.; tall, quite glabrous, much branched, leaves long-petioled elliptic-ovate or lanceolate acuminate crenate, peduncles fascicled towards the ends of the branches erect, pedicels very numerous more or less whorled, bracts persistent, flowers small yellow or purplish, sepals small, standard orbicular, terminal wing-lobe elongate, lip conical ending in a short straight spur. *I. racemos* H. f. & T. in Linn. Soc. Journ. iv. 147, not of De Candolle and Wallich.

SIKKIM HIMALAYA, alt. 6-12,000 ft.; KHASIA Mts., alt. 5-7000 ft.

A large leafy species, 3-5 ft., with copious inflorescence. *Leaves* 3-5 in., often fascicled towards the top of the stem, crenatures large, bristles basal; petiole $\frac{1}{2}$ -3 in., with two large stipuliform glands at the base. *Peduncles* 3-8 in., corymbosely crowded, strict, stiff, with 2-5 whorls of stiff spreading pedicels $\frac{1}{2}$ -2 in. long; bracts whorled, $\frac{1}{2}$ - $\frac{3}{4}$ in., ovate, with long stout glandular points. *Flowers* $\frac{1}{2}$ in. including the spur, yellow or purplish, bud rounded at the top; sepals lanceolate, with long points like the bracts; standard neither winged, keeled nor spurred; spur straight with a swollen tip, much shorter than the pedicel. *Capsule* $\frac{3}{4}$ -1 in., strict, rarely inclined, usually in a line with the pedicel, linear, hardly at all clavate, glabrous. *Seeds* between obovoid and oblong, small and smooth or nearly so, apiculate at the hilum.—A very distinct plant, though in a dry state small specimens are indistinguishable from several of its allies in B. v. The Sikkim specimens have larger seeds than the Khasian.

B v.—RACEMOSÆ.

* *Bracts deciduous; spur long, slender.*

112. **I. insignis**, DC. *Prodr.* i. 688; glabrous, stem simple robust, leaves sessile elliptic-lanceolate acuminate serrate thick, nerves many strong, peduncles subterminal usually numerous stout long erect, raceme terminal, bracts large caducous, flowers crowded red, sepals large, standard broadly oblong recurved, wings small 2-lobed, lobes short, lip conoidal tapering into a long curved spur. *Wall. Plant. As. Rar.* ii. 83, t. 194; *Cat.* 4766; *H. f. & T. in Journ. Linn. Soc.* iv. 150.

NIPAL, Wallich.

Stem 1-2 ft., quite simple, very stout, hard, angled, swollen at the nodes, leafy. *Leaves* 2-5 in., almost coriaceous, serratures close-set, tipped with a stout bristle, midrib and nerves prominent, transverse nerves very distinct; stipules of 2 glands. *Peduncles* often crowded at the top of the stem, 4-8 in., rigid; bracts $\frac{1}{2}$ in., boat-shaped, acute; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in., erect in flower spreading in fruit. *Flowers* $\frac{1}{2}$ in., dark rose; sepals broad, acuminate; standard neither keeled nor spurred; lateral wing-lobes ovate, obtuse, terminal longer, oblong; lip with a stout point or horn, gradually contracting below into the flexuous spur, together 1 in. long. *Capsule* 1 in., narrow clavate, apiculate, glabrous, cernuous.—Specimens in the Wallichian Herbarium are labelled as from Silhet, but I suspect through some error.

113. **I. leptoceras**, DC. *Prodr.* i. 688; very robust, much branched, nodes close swollen, leaves sessile or petioled narrow lanceolate acuminate crenate-serrate, peduncles fascicled subterminal erect shorter than the leaves, flowers small (except the spur) crowded, bracts large boat-shaped with long points deciduous, buds rounded, sepals large obliquely ovate-cordate, wings 2-lobed with a short narrow claw, lip boat-shaped, spur very long slender. *Wall. Cat.* 4770. *I. longicornu*, *Wall. in Roxb. Fl. Ind. Ed. Carey*, ii. 462? *Miquel III. Flor. Archip. Ind.* 103. *I. leptoceras* var. *a*, *H. f. & T. in Journ. Linn. Soc.* iv. 153. *I. odorata*, *Don Prodr.* 213.

NIPAL, or Sheepore, Wallich.—DISTRIB.? Java (*Miquel*).

Stem 2-4 ft.? smooth, fleshy, as thick as the thumb below; branches with decurrent lines from the petioles. *Leaves* 5-6 in., very long-acuminate, serratures incumbent, with basal bristles; nerves not stout, and without transverse nervules; petiole $\frac{1}{2}$ -1 in., with purplish stipular glands. *Peduncles* shorter than the leaves, stout, erect. *Flowers* yellow, fragrant, $\frac{1}{2}$ in. diam.; bracts large, $\frac{1}{2}$ - $\frac{3}{4}$ in., 3-nerved; pedicels 1 in. *Standard* broader than long; wings (I have given Wallich's description in the specific character); lip pointed, but not horned at the point; spur ascending or straight. *Capsule* detached, those in the Wallichian Herbarium, and consequently possibly not of this species, are 1- $\frac{1}{2}$ in., very narrow, acuminate, glabrous. *Seeds* unripe, oblong.—I find nothing resembling Wallich's original specimens in any other collection, in point of robustness,

short internodes (1 in.), swollen nodes, leafiness, very long narrow leaves, few flowers terminating the short peduncles, and great length of spur. Amongst his distributed specimens under this name, however, are *I. racemosa*, *laxiflora*? and others. He has attached a mss. ticket of "*I. longicornu*, Wall." (along with the lithographed Catalogue ticket) to the original specimen, thus identifying this plant with that he described in the Carey Edition of Roxburgh's *Flora Indica*. In that work Wallich says he has received the same plant from Western Nipal, gathered by Dr. Govan; but there are no specimens of Govan's in his Herbarium, and I suspect that *laxiflora* or *racemosa* is here alluded to, which he has distributed under the same number, and which De Candolle probably describes as var. α . *I. leptoceras* resembles *I. insignis*, but the leaves are longer, less coriaceous, and want the strong transverse nervules so well marked in that plant; the peduncles are moreover much shorter, the flowers and sepals much smaller, the tip is not horned at the points, and the spur is far longer. De Candolle describes two varieties, α and β , with peduncles respectively longer and shorter than the leaves. The present plant is his β I suppose; his α being probably *I. laxiflora*. I have, however, retained his name, as being in accordance with Wallich's determination.

114. ***I. tuberculata*, H. f. & T. in Journ. Linn. Soc. iv. 155**; erect, branched, quite glabrous, leaves shortly petioled elliptic acuminate crenate, peduncles erect and pedicels short, bracts minute caducous, flowers small purplish, sepals falcate, standard orbicular, wings exserted broad obtuse, lip boat-shaped with a very short spur, capsule short clavate tubercled.

Temperate and Subalpine SIKKIM HIMALAYA, alt. 10–13,000 ft., *J. D. H.*

Stem 2–3 ft., succulent. *Leaves* 2–4 in., more or less fascicled as if whorled at the ends of the branches, rather thick, bristles of the serratures basal, nerves many, diverging; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipular glands obscure or 0. *Peduncles* 1–1 $\frac{1}{2}$ in.; racemes not interrupted, 4–8 flowered; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in. diam.; sepals much curved, very small; standard orbicular, very concave, keeled at the back; lateral wing-lobes orbicular, terminal produced (I think); lip apiculate; stem broad short. *Capsule* $\frac{3}{4}$ in., erect or horizontal, 5-angled, valves with 2 series of pustules or tubercles; tip obtuse, with a curved spur or beak. *Seeds* $\frac{1}{4}$ in., oblong, narrow, compressed; testa spongy, wrinkled, brown.—A very well marked species, by the shortly petioled leaves with basal bristles in the crenatures, short peduncles and pedicels, peculiar capsules and large seeds.

115. ***I. stenantha*, Hook. f.**; tall, much branched, quite glabrous, leaves petioled elliptic-ovate or lanceolate acute or caudate-acuminate crenate, peduncles axillary and terminal, bracts caducous, flowers yellow, buds beaked at the rounded or subacute tip, sepals small narrow, standard recurved, lateral wing-lobes oblong, terminal narrow elongate acute or obtuse, lip trumpet-shaped horned at the very oblique mouth, narrowed into a long slender spur.

SIKKIM HIMALAYA and E. NIPAL, common, alt. 6–8000 ft.; KHASIA Mts., alt. 5–6000 ft., *Griffith, &c.*

Usually tall, erect, much branched. *Leaves* 2–6 in., crenatures with basal or sub-basal bristles; petiole $\frac{1}{2}$ –3 in.; stipular glands sessile or stipitate on the stem or petiole. *Peduncles* slender, shorter or longer than the leaf; racemes short; bracts setaceous, caducous long before the expansion of the flower. *Flowers* yellow, often speckled with red; bud 1 in. long, with a long terminal green beak; sepals sometimes 4; standard orbicular or oblong; wings with sometimes a twisted acute terminal lobe nearly as long as the spur, which is sometimes clubbed at the tip. *Capsule* $\frac{1}{2}$ in., narrow clavate, acuminate, glabrous. *Seeds* small, obovoid, compressed, opaque.—I long hesitated before separating this from *I. angustiflora*, but the constantly caducous bracts both in Sikkim and the Khasia Mountains seem to indicate an important difference, which will no doubt be confirmed when the structure of the flower is better known.

VAR. 1; leaves large elliptic caudate-acuminate, terminal wing-lobes acute flat recurved or twisted.—Sikkim.

? VAR. 2; leaves small obtuse or subacute, peduncles few longer than the leaves, terminal wing-lobe strap-shaped obtuse, flowers orange-yellow speckled with red, mouth of lip hardly horned.—*I. leptoceras*, var. β , *H. f. & T. in Journ. Linn. Soc.* iv. 153, Khasia Mts., at Myrung and Nonkrim—perhaps a different species.

** *Bracts persistent; spur long, slender.*

116. ***I. racemosa***, DC. *Prodr.* i. 688; erect, quite glabrous, slender, branched, leaves petioled elliptic-ovate or lanceolate acuminate crenate, peduncles lateral and subterminal slender erect, bracts persistent, flowers $\frac{1}{3}$ – $\frac{1}{2}$ in., sepals ovate, standard orbicular, wings with a filiform process descending into the spur, lip boat-shaped with a curved spur equalling the pedicel. *I. racemosa*, Wall. *Cat.* 4730 *in part*; *I. tingens*, Edgew. in *Trans. Linn. Soc.* xx. 41; *H. f. & T. in Journ. Linn. Soc.* iv. 151. *I. micrantha*, Don *Prodr.* 203.

Temperate Himalaya; from SIMLA, alt. 5–7000 ft., to SIKKIM, alt. 6–12,000 ft.

Stem 2–3 ft. high, sometimes glandular above. *Leaves* 3–9 in., membranous, crenatures with a bristle in the sinus or near it; petiole $\frac{1}{2}$ –2 in., slender, naked or with 2 sessile or pedicelled stipular glands at the base. *Racemes* usually exceeding the leaves, not interrupted, lax, 6–10-flowered; bracts ovate, with stout glandular points; pedicels slender. *Flowers* small ($\frac{1}{4}$ in.), yellow; sepals very variable, ovate or oblong, with points like the bracts; standard not spurred or winged; wings narrow, pendulous, lateral lobes orbicular, terminal broadly strap-shaped, obtuse, with a basal rounded auricle externally, a slender almost filiform process, with a glandular tip, descends from the inner margin of each wing into the spur. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in., linear-clavate, acuminate, glabrous. *Seeds* large, oblong, compressed, rugose.—A careful examination of those specimens of Wallich's *I. racemosa* that agree with De Candolle's description, prove its identity with Edgeworth's *I. tingens*, both having the curious filiform process of the wings concealed in the spur; and this obliges me to alter the nomenclature adopted in the Linnean Journal, together with the description, as far as the Khasian specimens (which must be excluded) are concerned. I have failed to prove the existence of the said processes in the dried Sikkim specimens, which are in a very unsatisfactory state for an analysis of such delicacy as that of the spur; but I think I detect their presence. The plant varies extremely in size of all its parts, but is always small-flowered. Some of Wallich's specimens have linear-lanceolate bracts. There are two sheets marked *I. racemosa* in Wall. Herb., and on both are specimens of this, and of what is either *I. radiata* or a small state of *I. bicornuta*. The plant distributed by Wallich to the Hookerian and Benthalian Herb., is that here described. Edgeworth (*Trans. Linn. Soc.*) describes the standard as keeled and crested, which I do not find to be the case in his specimen, which precisely accords with Wallich's.

117. ***I. laxiflora***, Edgew. in *Trans. Linn. Soc.* xx. 40; tall, branched, quite glabrous, leaves petioled elliptic-lanceolate acuminate crenate, peduncles subterminal slender fascicled, bracts persistent lanceolate, pedicels slender, flower $\frac{1}{2}$ in. yellowish, buds rounded at the end, sepals small, standard orbicular, lateral wing-lobes rounded or oblong terminal rounded or elongate, lip conical apiculate narrowed into a long usually curved spur.

Temperate Himalaya, alt. 5–10,000 ft. from SIMLA to SIKKIM; KHASIA Mts., alt. 5–6000 ft.

Stem 2–4 ft., slender. *Leaves* 3–5 in., membranous, crenatures rounded with basal or subbasal bristles, nerves slender; petiole 1–3 in.; stipular glands various. *Peduncles* usually exceeding the leaves, slender; bracts small, narrow; pedicels not whorled or fascicled, spreading. *Flowers* together with the spur, about 1 in.; sepals usually small and narrowly ovate; standard not crested nor spurred at the back; wings very variable (if the following varieties all belong to one species); lip without a stout callous tip; spur straight or conical, tip often clubbed. *Capsule* $\frac{3}{4}$ –1 in., narrowly clavate, mucro-

nate, glabrous. *Seeds* oblong, rugose, compressed, brown.—I have made this to include the common Himalayan *Impatiens* of the group with much larger flowers than *racemosa*, crenate leaves, rounded tips to the buds, a long slender spur, and persistent narrow bracts; whether all the following varieties are referable to it cannot be determined from dried specimens. Edgeworth's specimens in Herb. Bentham are not in an examinable state. It differs from *I. leptoceras* (to which I had referred various of the forms) in the broader shorter leaves, persistent bracts, and habit of growth; from *I. angustiflora*, in the rounded buds and lip not ending in a beak; and from *I. stenantha* by the same characters and persistent bracts.

VAR. 1. *Edgeworthii*; stipular glands 3-4 on each side of the petiole sessile, standard mucronate at the back, lateral wing-lobes obovate erect spotted yellow, terminal flat lanceolate rosy or purple?, spur straight white spotted yellow and purple.—*I. laxiflora*, Edgew. l.c. Banks of streams at Sevaria, alt. 7-9000 ft. Kumaon, *Strach. & Wint.* (Imp. 19).

VAR. 2. *Stracheyi*; stipular glands various, flowers yellow, lateral wing-lobes large rounded spreading, terminal short, narrower obtuse.—Simla, *T. T.*; Birma, 7300 ft., *Madden*; Jagesur and Naintal, in Kumaon, *Str. & Wint.* (Imp. 3); Sikkim, at Choongtam, *J. D. H.*

VAR. 3. *sikkimensis*; stipular glands several small or 0, standard green with purple spots, wings lilac spotted with purple, lip yellow-green.—Sikkim at Lachooing, alt. 9000 ft.

VAR. 4. *hasiana*; stipular glands 0 or sessile or pedicelled, flowers pale-yellow, lateral wing-lobes small spreading rounded, terminal with a very broad rounded basal-lobe on the outer margin and tongue-like obtuse apex.—Khasia, not common at Pomrang, Nunklow, Surureem and Molim. *I. leptoceras* var. *a* in part. *H. f. & T. in Journ. Linn. Soc.* iv. 153.

118. ***I. paludosa***, *Hook. f.*; small, sparingly leafy, quite glabrous, leaves shortly petioled elliptic-ovate or lanceolate acute or obtuse crenate-serrate, peduncles 1-2 much longer than the leaves 2-4 flowered, bracts broad boat-shaped, flowers yellow, buds rounded, sepals orbicular-ovate, standard orbicular, lateral wing-lobes small spreading rounded, terminal very large spreading lobed at the side obtuse, lip boat-shaped apiculate narrowed into a long slender incurved spur. *I. leptoceras*, var. ζ *H. f. & T. in Journ. Linn. Soc.* iv. 153.

KHASIA Mts.; marshes near Nonkrim and Pomrang, alt. 5-6000 ft., *J. D. H. & T. T.*

Stem 4-10 in., rather rigid. *Leaves* 1-2 in., rather distant, thickish, crenatures with basal bristles; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Peduncles* 1-3 in., terminal and lateral; bracts $\frac{1}{2}$ in., spreading or reflexed. *Flowers* with the spur 1-1 $\frac{1}{4}$ in.; sepals more than half as long as the keeled standard; terminal wing-lobes about $\frac{1}{2}$ in. broad; spur clubbed at the tip. *Capsule* $\frac{3}{4}$ in., cylindric, apiculate, glabrous. *Seeds* minute, subovate, pointed at the hilum, rough, opaque.—I was long disposed to rank this merely as a form of *I. laxiflora*, but besides that the habit is very different, the leaves are small, rather coriaceous, not long-acuminate, the peduncles are few and few-flowered, the bracts very broad and boat-shaped, with short stiff glandular points, the sepals are much longer and broader, and the capsule shorter.

119. ***I. angustiflora***, *Hook. f.*; simple or branched, quite glabrous, leaves petioled elliptic-ovate or lanceolate caudate-acuminate crenate, peduncles subterminal clustered slender erect, bracts small lanceolate persistent, flowers yellow narrow, buds acuminate, sepals small, standard orbicular or oblong, lateral wing-lobes small, terminal elongate, lip trumpet-shaped horned at the very oblique tip narrowed into a long slender curved spur. *I. leptoceras* η , θ , *H. f. & T. in Journ. Linn. Soc.* iv. 153.

KHASIA Mts., alt. 5-7000 ft., *Lobb, &c.*; BHOTAN, *Griffith*.

Very similar to *I. laxiflora*, but at once distinguished by the narrow acute buds, due to the very oblique mouth of the lip, which ends in a green strong subulate process,

whence the unexpanded flower has a remarkably narrow form with a beaked tip; in this respect it agrees with *I. stenantha*, which differs in the deciduous bracts. The wing-lobes vary much in breadth, and in var. 2 the terminal-lobes are inflexed, crossing one another; in var. 1 the form of the wing-lobes cannot be determined; stipular glands sessile or pedicelled or 0.

VAR. 1; stem slender, branched, leaves elliptic-ovate.—Surureem in woods. ? Bhotan.

VAR. 2; stem very robust shorter sometimes narrowly-winged above, leaves longer narrow-lanceolate.—Moflong.

120. ***I. micranthemum***, *Edgew. in Trans. Linn. Soc.* xx. 40; quite glabrous, stem slender branched with scattered glands, somewhat winged by the decurrent petioles, leaves petioled elliptic-ovate acuminate crenate, peduncles subterminal fascicled and axillary very slender, bracts lanceolate persistent, flowers $\frac{1}{2}$ in. white, sepals small narrow, standard orbicular, wings conniving, lateral lobes elliptic, terminal rounded, lip tubular narrowed into a slender straight spur. *H. f. & T. in Journ. Linn. Soc.* iv. 154, under *I. laxiflora*.

Temperate Western Himalaya; SIMLA, alt. 6–10,000 ft., *Edgeworth, Thomson*.

A tall slender pale succulent plant, with difficulty distinguished in a dry state from *I. laxiflora*, except by the smaller flowers and straighter spur. Leaves 3–4 in., very rarely opposite, flaccid, with often 2 glands at the base of the blade, crenatures with basal bristles, upper subsessile; stipular gland stipitate. Peduncles longer or shorter than the leaves; racemes many-flowered; pedicels $\frac{1}{2}$ –1 in., capillary. Flowers white; standard with yellow and red spots. Capsule horizontal, $\frac{1}{2}$ – $\frac{3}{8}$ in., linear, apiculate, glabrous. Seeds oblong, rugulose.—I can find no valid characters in the description given whereby to separate *I. elata*; both are probably forms of *I. brachycentra*, to which *Edgeworth's* var. β of *I. micranthemum* may be referable.

VAR. 1; bristles of crenatures basal, pedicels glandular. *I. micranthemum*, *Edgew. l.c.*

VAR. 2; bristles of crenatures subapical, pedicels glandular. *I. elata*, *Edgew. l.c.* 41.

* Bracts persistent, spur short or 0.

121. ***I. brachycentra***, *Kar. & Kir. in Bull. Soc. Nat. Mosc.* 1842, i. 179; erect, slender, branched, quite glabrous, leaves long-petioled elliptic acuminate crenate-serrate, peduncles fascicled at the top of the stem stout erect, racemes many-flowered, bracts minute persistent, flowers minute, pale, sepals ovate obtuse concave, standard broadly obovate, wings rather long, lateral lobes rounded, terminal produced 2-lobed, lip boat-shaped with a very short straight conical spur.

Western temperate Himalaya, alt. 7–10,000 ft., from KUNAWUR, *Jacquemont*, to MARRI, *Fleming*.—DISTRIB. Soongaria.

Annual, 1–2 ft. Stem usually naked below, not winged. Leaves 2–5 in., very membranous, teeth tipped with a bristle, nerves many, very slender; petiole $\frac{1}{2}$ –1 in., slender, often with 2 sessile or stipitate stipular glands. Peduncles usually very numerous, 1–3 in., very slender, mostly subterminal, with a few reduced lateral ones in the lower axils; bracts setaceous; pedicels capillary. Flowers $\frac{1}{4}$ in., whitish; sepals large for the size of the flower; standard not keeled or spurred. Capsule $\frac{1}{2}$ – $\frac{3}{8}$ in., narrow clavate, acute, membranous, glabrous. Seeds few, oblong, pyriform, compressed, rugulose. The bristles of the teeth of this species are distinctly apical.—*I. elata*, *Edgew. (Trans. Linn. Soc.* xx. 41) differs according to the description in the distinct spur, in being dotted with black glands, and having glandular tips to the pedicels. (See under *I. micranthemum*.)

122. ***I. depauperata***, *Hook. f.*; low, slender, very much branched, quite glabrous, leaves small shortly petioled elliptic-ovate or lanceolate acuminate-crenate, racemes axillary few-flowered, bracts persistent, flowers

minute yellow, sepals ovate, standard orbicular, wings short, lip boat-shaped with a gibbosity or boss in place of a spur.

KHASLA Mts., alt. 5-6000 ft., at Surureem on walls, *Griffith*; at Molim, *J. D. H. & T. T.*

Like a very small form of *I. racemosa*, but the flowers are not $\frac{1}{2}$ in. diameter and are not spurred. I should have referred it to a reduced form of this plant with minute flowers arrested in development, had it occurred in the Himalaya, but the widely-sundered habitat obliges me to regard it as distinct.—*Capsule* $\frac{1}{2}$ in., narrow-clavate, glabrous. *Seeds* small, obovate, compressed, pointed at the hilum.

OF DOUBTFUL AFFINITY.

123. ***I. glauca*, H. f. & T. in Journ. Linn. Soc. iv. 155**; tall, stout, erect, quite glabrous, very glaucous throughout, leaves long-petioled ovate-oblong or cordate coarsely crenate white beneath, peduncles axillary and terminal very long and stout, raceme not interrupted.

Western temperate Himalaya, at Dwali in KUMAON, alt. 9500 ft., *Strach. & Wint.*

Stem very stout, the base of the branch in the Herbarium, which is almost 2 feet long, being as thick as a swan's quill and much contracted, as if succulent when fresh. *Leaves* 2 in., very obtuse, quite white beneath, membranous, nerves few arched, crenatures with subterminal cilia or none; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., with a large scutellate gland at the outer base, which is also present at an analogous position on the peduncle. *Peduncles* many, 5 in., erect or ascending, the upper fascicled (as if branched); raceme terminal, 6-8-flowered; bracts caducous; pedicels stout, $\frac{3}{8}$ in., fruiting ones spreading, much thickened at the tip. *Capsule* $1\frac{1}{2}$ in., inclined, linear-clavate, glabrous. *Seeds* several, large, oblong, rugulose.—Of this very singular species I have seen but one mutilated flowerless specimen; it is wholly covered with a glaucous secretion of the epidermis, very much as in *Rubus biflorus*; the long-petioled leaves not narrowed into the petiole, with coarse crenatures, resemble those of *I. Noli-me-tangere*; it is evidently a tall much-branched plant.

[The following species has been published by Major Beddome in a number of the *Icones*, which did not reach England until after Part II. had appeared.]

33 bis. ***I. Ballardii*, Bedd. Ic. Pl. Ind. Or. 44, t. 192**; slender, rooting below, nearly glabrous, leaves alternate and opposite petioled ovate serrate, base with glandular cilia, peduncles slender axillary and terminal much exceeding the leaves, flowers subumbellate, sepals ovate-subulate, standard orbicular concave, wings dimidiate-lanceolate acute spreading, the lobes separated by a notch only, lip boat-shaped with a very short straight spur which is inflated in the middle and subulate at the tip.

Mountains of TRAVANCOR, near Permeede, at 2-3500 ft., *Beddome*.

A slender herb, 1-1 $\frac{1}{2}$ ft. *Stem* glabrous. *Leaves* 1-2 in, nerves 3 or 4 on each side, slightly hairy above, glabrous beneath; petiole $\frac{1}{4}$ – $\frac{3}{8}$ in. *Peduncles* 2-3 $\frac{1}{2}$ in., subglabrous, 5-8-flowered; pedicels slender, bracts minute. *Flower* $\frac{3}{8}$ in. long; standard obscurely keeled, spur as long as the wings. *Capsule* ovoid, swollen, subglabrous, 7-10-seeded. *Seeds* with weak hairs.—Description taken from Beddome's characters and plate quoted above, where it is stated that it is allied to *I. Goughii*, but has much larger flowers and differently shaped petals.

DOUBTFUL SPECIES.

***I. SEMIVERTICILLATA*, Turcz. in Bull. Soc. Nat. Mosc. 1863, i. 594.** Annual, erect, glabrous, branched; leaves opposite and often 3-nately whorled, lower long-petioled, upper sessile, attenuate at both ends, repand crenate, with a bristle between the crenatures; peduncles axillary, 1-flowered, as long as the leaf, lower solitary, upper fascicled;

spur exceeding the flower; capsule cylindric, often incurved.—Nilgiri Mts., *Perrotet*, n. 187.

I. CLAVICORNU, *Turcz. l.c.* 1859, i. 271. The description will apply to any of the long-spurred species of group A 1.

I. DEBILIS, *Turcz. l.c.* 1859, i. 271, may be *I. tenella* or any of its allies.

I. ASSAMENSIS, *Griff. Not. Pl. Asiat.* iv. 459, t. 576, f. 1. It is impossible to say what plant is meant here. The description answers best to *I. stenantha* in its habit, very long peduncles, small flowers, and glabrous foliage, &c.; but the figure cited is that of a very robust and very pubescent plant (like *I. scabrida*), with an immense flower, totally differing from the description in every respect.—Banks of the Burrampoota in sandy places near Dibong Mookh, *Griffith*.

I. MALAYENSIS, *Griff. l.c.* 457, t. 576, f. 2. From the imperfect description this is probably one of the forms of *I. Balsamina*.—Mergui, *Griffith*.

I. ? From Ramgunga in Kumaon, alt. 7200 ft., *Strach. & Wint.*—Resembles *I. laxiflora*, *Edgew.*, but has very broad green sepals.

I. ? Baltal in Kashmir, *T. Thomson*; and Marri, *Fleming*.—Probably a form of *I. amphorata* or *I. bicornuta*.

I. ? Marri, *Fleming*.—Probably a form of *I. laxiflora*, but the leaves are sharply serrate and buds larger.

I. ? Khagump, *Griffith* (? Khagumpa in Bhotan).—A suffruticose species with the habit of *I. levigata*, but flowers twice as large, and the very large standard herbaceous and crested; wings apparently rounded; lip large, deeply boat-shaped; spur stout, clubbed at the tip.

9. **HYDROCERA**, Blume.

A glabrous erect marsh herb. *Leaves* narrow, alternate. *Flowers* in short axillary 1-2-flowered peduncles, irregular. *Sepals* 5, coloured, imbricate; 2 outer lateral, flat; posticous one produced into a short hollow spur. *Petals* 5, the anticous outer, very large, concave. *Disk-glands* 0. *Stamens* 5, filaments short flat; anthers slightly cohering around the pistil. *Ovary* 5-celled; stigmas 5 sessile; ovules 2-3 in each cell. *Drupe* baccate, stone bony truncate 5-celled, cells 1-seeded. *Seeds* curved, corrugated, albumen 0; cotyledons plano-convex, thickish, radicle short superior.—**DISTRIB.** One tropical Asiatic species.

1. ***H. triflora***, *W. & A. Prodr.* i. 140; *H. f. & T. in Journ. Linn. Soc.* iv. 156. *H. angustifolia*, *Blume Bijdr.* 241. *Impatiens triflora*, *Linn. DC. Prodr.* i. 687; *Wall. Cat.* 4756. *I. ? natans*, *Willd.*; *DC. Prodr.* i. 687; *Roxb. Fl. Ind.* i. 652; *Wall. Cat.* 4755. *Tytonia natans*, *G. Don, Gen. Syst.* i. 749; *Burm. Fl. Zeyl.* t. 16 (*inaccurate*).

Throughout BENGAL, the EASTERN and WESTERN PENINSULA, CEYLON and BURMA, in marshes.—**DISTRIB.** JAVA.

Annual. *Stem* floating, fistular, flexuous, rooting at the nodes, often many yards long; branches 1-2 ft., erect, 5-angled, as thick as the finger. *Leaves* 1-5 in., linear-lanceolate, serrate, sessile; stipular glands 2. *Peduncles* short, usually 3-flowered; bracts oblong. *Flowers* 1 in. diam., variegated red, white, and yellow. *Drupe* subglobose, as large as a cherry, smooth, red, succulent.

ORDER XXXIII. **RUTACEÆ.** (By J. D. Hooker.)

Trees or shrubs, rarely herbs, abounding in pellucid glands filled with essential oil (except *Peganum*). *Leaves* opposite or alternate, simple or compound, exstipulate. *Flowers* in axillary or terminal cymes or panicles, (racemed in *Dictamnus*), never spiked, usually bisexual and regular in the Indian species (except *Dictamnus*). *Calyx* of 4-5 small lobes or sepals. *Petals* 4-5, hypogynous (in the Indian genera), valvate or imbricate. *Stamens* 4-5 or 8 or 10, rarely more (*Citrus*, *Egle*), or 6 (*Bœninghausenia*), filaments usually free, hypogynous; anthers 2-celled, opening inwards. *Disk* within the stamens, crenate or lobed, sometimes large or long. *Ovary* of 4-5 free or connate carpels; styles as many, free or variously united, stigmas terminal, entire or lobed; ovules usually 2 in each cell. *Fruit* a capsule, berry or drupe, or of 1-4 capsular cocci. *Seeds* usually solitary in the cells, testa various, albumen fleshy or 0; embryo straight or curved, radicle superior.—**DISTRIB.** Tropical and extratropical plants; many are S. African and Australian. Genera 63, and about 650 species.

TRIBE I. Ruteæ. Herbs, rarely shrubby. *Flowers* hermaphrodite. *Disk* thick. *Ovary* deeply 3-5-lobed; styles basilar or ventral, free or united; cells 3 or more ovuled. *Fruit* capsular. *Albumen* fleshy; embryo usually curved.

* *Flowers regular.*

Petals 4-5. Stamens 8-10. Ovary sessile	1. RUTA.
Petals 4. Stamens 6-8. Ovary pedicelled	2. BœNINGHAUSENIA.
Petals 4-5. Stamens 12-15	3. PEGANUM.

** *Flowers irregular.*

4. DICTAMNUS.

TRIBE II. Zanthoxyleæ. Shrubs or trees. *Flowers* usually polygamous. *Disk* free, rarely 0. *Ovary* deeply 2-5-lobed; styles basilar or ventral, more or less free; cells 2-ovuled. *Fruit-carpels* capsular.

Leaves opposite. Stamens 4-5	5. EVODIA.
Leaves opposite. Stamens 4, with 4 staminodes opposite the petals	6. TETRACOMIA.
Leaves opposite. Stamens 8	7. MELICOPÉ.
Leaves alternate. Stamens 3-5	8. ZANTHOXYLUM.

TRIBE III. Toddalieæ. Shrubs or trees. *Flowers* usually polygamous. *Disk* free. *Ovary* entire; style single; cells 1-2-ovuled. *Fruit* syncarpous. *Seed* albuminous; cotyledons usually flat.

Stem usually prickly. Leaves compound. Petals and stamens 2-5 each	9. TODDALIA.
Stem unarmed. Leaves 1-3-foliate. Petals 4. Stamens 8	10. ACRONYCHIA.
Stem unarmed. Leaves simple. Petals and stamens 4-5 each	11. SKIMMIA.

TRIBE IV. Aurantieæ. Shrubs or trees. *Flowers* hermaphrodite. *Petals* and *stamens* free or connate. *Ovary* entire; style simple; cells 1-∞-ovuled. *Berry* usually pulpy. *Seed* exalbuminous.

* *Ovules solitary or twin in each cell.*

Style very short, persistent	12. GLYCOSMIS.
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- Unarmed. Leaves pinnate. Style jointed on the top of the ovary, deciduous.
- Petals valvate. Filaments linear-subulate. Cotyledons leafy, crumpled 13. MICROMELUM.
- Petals imbricate. Filaments linear-subulate. Cotyledons fleshy, plano-convex 14. MURRAYA.
- Petals imbricate. Filaments dilated below. Cotyledons fleshy, plano-convex 15. CLAUSENA.
- Armed (except some species of *Limonia*). Leaves 3-8-foliolate.
- Calyx 3-lobed. Stamens 6 16. TRIPHASIA.
- Calyx 4-5-lobed. Stamens 8 or 10 17. LIMONIA.
- Calyx cupular. Stamens 8 or 10 18. LUVUNGA.
- Unarmed or armed. Leaves 1-foliolate.
- Anthers linear-oblong. Disk elongate 19. PARAMIGNYA.
- Anthers ovate or cordate. Disk cupular 20. ATALANTIA.
- ** Ovules many in each cell.**
- Stamens 20-60. Ovary ∞ -celled. Leaves 1-foliolate 21. CITRUS.
- Stamens 10-12. Ovary incompletely 5-6-celled. Leaves pinnate 22. FERONIA.
- Stamens 30-60. Ovary 8- ∞ -celled. Leaves 3-foliolate 23. ÆGLE.

1. **RUTA**, Linn.

Strong-smelling herbs, sometimes shrubby below. *Leaves* alternate, simple or compound. *Flowers* in terminal corymbs, cymes, or panicles, greenish or yellow. *Calyx* short, 4-5-partite or -lobed, persistent. *Petals* 4-5, concave, often toothed or ciliate, imbricate. *Stamens* 8-10, inserted round the base of a thick 8-10-glandular or pitted disk, the alternate shorter. *Ovary* 3-5-lobed and -celled; style central, basilar; ovules pendulous from the axis of the cells. *Capsule* 4-5-lobed, lobes indehiscent, or dehiscing at the apex. *Seeds* angled, testa pitted, albumen fleshy; embryo slightly curved, cotyledons sometimes 2-partite.—**DISTRIB.** About 40 species, chiefly Mediterranean and W. Asiatic.

SUBGEN. 1. *Ruta* proper. *Flowers* 4-merous. *Petals* usually toothed or lacinate. *Filaments* glabrous. *Ovules* many. *Leaves* pinnate or decompound.

R. GRAVEOLENS, Linn.; var. *angustifolia*; leaves petioled triangular-ovate decompound, segments various, corymbs spreading, bracts lanceolate, sepals triangular acute, petals ciliate, capsule obtuse shortly pedicelled. *R. angustifolia*, Pers.; *W. & A. Prodr.* 146. *R. chalepensis*, Wull. Cat. 7113.

Cultivated in INDIA.—**DISTRIB.** Westward to the Canaries.

One or more forms of the common Rue are cultivated in India, and hence introduced into Botanical works. Wallich says of the plant described as *R. angustifolia*, Pers., by W. & A., that it is from a Mr. Stevenson's garden at Tranquebar.

SUBGEN. 2. *Haplophyllum*. *Flowers* 5-merous. *Petals* quite entire. *Filaments* pilose. *Ovules* few or many. *Leaves* simple or 3-sect.

1. *R. tuberculata*, Forsk.; stem erect or ascending glabrous, branchlets and inflorescence puberulous and glandular, leaves oblong linear-oblong or somewhat spatulate pubescent. *Boiss. Flor. Orient.* i. 939.

Boogta hills in SINDH, Vicary.—**DISTRIB.** Westward to Egypt and Algeria.

Stem terete, woody, branched, minutely glandular. *Leaves* scattered, $\frac{1}{4}$ -1 in.,

coriaceous, pustular and pubescent, nerveless. *Cymes* dichotomously branched, divisions pubescent and glandular. *Flowers* $\frac{1}{4}$ in. diam., the centre one of each cymule sessile, the others shortly pedicelled. *Sepals* very short broad, obtuse. *Petals* fimbriate.—The specimens are not in a good state, but I believe them to be referable to this species.

DOUBTFUL SPECIES.

RUTA (HAPLOPHYLLUM), sp., *Aitchison (Cat. Punjab and Sindh Pl. 30)* from Peshawur (*Stewart*) is undeterminable.

2. **BENNINGHAUSENIA**, Reichb.

A perennial-rooted herb. *Leaves* alternate, 2-pinnate, leaflets quite entire. *Flowers* in compound terminal leafy paniced cymes, white, pedicels slender. *Calyx* 4-5-lobed, persistent. *Petals* 4-5, obovate-oblong, imbricate. *Stamens* 6-8, inserted at the base of an urceolate disk, filaments filiform, the alternate shorter; anthers oblong. *Ovary* long-stipitate, 3-5-lobed, narrowed below, lobes 1-celled distant; styles 3-5, ventral, connate, stigma simple; ovules 6-8 in each cell, pendulous from the middle of the axis. *Fruit* of 6-8 free membranous ventrally dehiscent few-seeded carpels. *Seeds* reniform, testa black granulate, albumen fleshy; embryo arcuate.

1. **B. albiflora**, *Reich. Conspect.* 197. *Ruta albiflora*, *Hook. Exot. Flor.* t. 79; *Wall. Cat.* 1203. *R. japonica*, *Sieb.*

TEMPERATE HIMALAYA, from Marri to Sikkim, alt. 4-8000 ft.; KHASIA Mts., alt. 4-6000 ft.—DISTRIB. Japan.

A slender erect branching perennial-rooted herb, 1-2 ft., glabrous or somewhat pubescent. *Leaves* 2-3-pinnate; petiole slender; leaflets $\frac{1}{4}$ - $\frac{3}{4}$ in., obovate or obcordate, glaucous beneath, membranous, the terminal largest, petioled. *Cymes* leafy, many-flowered. *Flowers* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., inclined or nodding, pure white. *Calyx* very small. *Petals* oblong, obtuse. *Pedicel* of ovary variable in length. *Fruit* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.

3. **PEGANUM**, Linn.

Branching glabrous or pubescent perennial-rooted herbs. *Leaves* alternate, entire or multifid, not glandular; stipules setaceous. *Flowers* solitary, in subterminal leaf-opposed peduncles, white. *Sepals* 4-5, often foliaceous and pinnatifid, persistent. *Petals* 4-5, subequal, imbricate. *Stamens* 12-15, inserted at the base of the disk, some antherless; filaments dilated below; anthers linear. *Ovary* globose, deeply 2-3-lobed; styles basal, twisted, 2-3-keeled above, the keels stigmatose; ovules many in each cell, inserted in the inner angle. *Fruit* globose, 3-4-celled, dry and 3-valved or fleshy and indehiscent, cells many-seeded. *Seeds* angled, testa spongy, rough, albumen fleshy; embryo curved.—DISTRIB. Species 4, natives of the Mediterranean, W. Asia, and Mexico.

This genus is perhaps better placed in *Zygophylleæ*.

1. **P. Harmala**, *Linn.*; glabrous, stem dichotomously and corymbosely branched, leaves multifid, segments linear acute, petals elliptic-oblong, fruit capsular. *Wall. Cat.* 1204; *Boiss. Fl. Orient.* i. 917; *W. & A. Prodr.* 146; *Dalz. & Gibs. Bomb. Fl.* 45.

North-West India, from SINDH, the PANJAB, and the KASHMIR plain to DELHI and AGRA; the WESTERN DECCAN.—DISTRIB. Soongaria, Arabia, N. Africa, and westward to Hungary and Spain.

A bush, 1-3 ft. high, much branched and densely foliaged. *Stem* stout, flexuous.

Leaves 2-3 in., green, pinnatifidly cut into linear very narrow acute spreading lobes. *Flowers* $\frac{2}{3}$ - $\frac{3}{4}$ in. diam., solitary in the axils of the branches, sessile or pedicelled. *Calyx-lobes* very narrow, much exceeding the corolla, persistent. *Capsule* globose, $\frac{1}{3}$ in. diam., and less.

4. **DICTAMNUS**, Linn.

A strong-smelling herb, shrubby below, clothed with pustular glands. *Leaves* alternate, unequally pinnate; leaflets opposite, ovate or ovate-lanceolate, serrulate. *Flowers* large, white or rose-coloured, in terminal racemes, pedicels bracteate. *Calyx* 5-partite, deciduous. *Petals* 5, 4 upper in pairs ascending, lower declinate. *Stamens* 10, inserted at the base of a thick annular disk, filaments long slender somewhat thickened and very glandular below the slender tip; anthers subglobose. *Ovary* shortly stipitate, deeply 5-lobed, 5-celled, hispid; style filiform, declinate, stigma terminal; ovules 3-4 in each cell, inserted on the ventral suture. *Fruit* of 5 compressed broad truncate long-beaked elastically 2-valved 2-3-seeded hispid carpels; endocarp horny, separable. *Seeds* subglobose, testa thin black shining, albumen fleshy; cotyledons thick, radicle short.

1. **D. albus**, Linn. *D. Fraxinella*, Pers.; *DC. Prodr.* i. 712; *Boiss. Fl. Orient.* i. 920. *D. himalayanus*, Royle *Ill.* 156, t. 29.

TEMPERATE WESTERN HIMALAYA, from Kashmir to Kunawur (and according to Royle, Junnotie in Garwhal), alt. 6-8000 ft.—*DISTRIB.* Japan, Siberia, Dahuria, and westward to France and Spain.

Stem stout but not woody, branched. *Leaves* 1 ft. and upwards; petiole very stout, angular, margined; leaflets 2-3 $\frac{1}{2}$ in., sessile, dark green, base wedge-shaped, nerves slender. *Racemes* 1 ft. and upwards, stout, strict, erect. *Flowers* 1 $\frac{1}{2}$ in. long, erect; pedicels 1-3 in., glandular, bracteate at the base and bracteolate usually above the middle. *Sepals* small, lanceolate. *Petals* elliptic-lanceolate, glandular on the back. *Stamens* equalling the petals. *Capsule* 1 in. diam.

5. **EVODIA**, Forst.

Trees or shrubs, unarmed. *Leaves* opposite, simple or 1-3-foliolate or imparipinnate, quite entire. *Flowers* small, in paniced axillary cymes, unisexual. *Sepals* 4-5, imbricate. *Petals* 4-5, sessile, valvate or slightly imbricate. *Stamens* 4-5, inserted at the base of the disk, filaments subulate; anthers oblong. *Ovary* deeply 4-lobed, 4-celled; style basilar, stigma 4-lobed, ovules 2 in each cell, collateral or superposed. *Fruit* of 4 coriaceous 3-valved 1-seeded cocci, endocarp horny elastically separable 2-lobed. *Seeds* oblong, testa bony or crustaceous shining, hilum linear, albumen fleshy; embryo straight, cotyledons ovate.—*DISTRIB.* About 22 species, natives of tropical Asia, the Pacific, the E. African Islands, and Australia.

* *Leaves* 3-foliolate.

1. **E. Roxburghiana**, Benth. *Fl. Hongk.* 59; leaves quite glabrous throughout, cymes very broad bracteate finely pubescent, flowers densely crowded, filaments glabrous, ovary densely pubescent. *E. triphylla*, Bedd. *Flor. Sylvat*; *Anal. Gen.* xli. t. vi. f. 2. *E. Marambong*, Miquel *Ann. Mus. Bot.* iii. 244. *Fagara triphylla*, Roxb. *Fl. Ind.* i. 416 (? of Linn.). *F. Lunur-ankenda*, Gertn. *Carp.* i. 334, t. 68, f. 9. *Xanthoxylon triphyllum*, Wight *Ic.* t. 204; *Ill.* i. 169; *Grah. Cat. Bomb. Pl.* 36; *Dalz. & Gibs. Bomb. Flor.* 45. *X. Roxburghianum*, Cham. in *Linnæa* v. 58. *X. zeylanicum*, *DC. Prodr.* i. 728. *X. nilagiricum*, Miquel *Herb. Hohenack.*

X. Marambong, *Miq. Fl. Ind. Bat. Suppl.* 533. *Schmidelia integerrima*, *Wall. Cat.* 8065.

· KHASIA Mts., alt. 4000 ft., *H. f. & T.* Throughout the Mountains of the WESTERN PENINSULA; in the EASTERN PENINSULA, from Tenasserim to Malaya and Penang, &c., CEYLON.—DISTRIB. Sumatra, Java.

A small tree with soft wood; branches opposite. *Leaves* usually large, spreading; petiole 2-5 in. terete; leaflets 2-5 in., very shortly petioled, obovate, oblong or oblanceolate, tip rounded or acuminate or apiculate, nerves almost horizontal very slender not at all prominent, costa perfectly glabrous on both surfaces. *Cymes* very variable, length and breadth of peduncle, more or less finely pubescent; branches opposite and alternate, bracts minute. *Flowers* usually densely crowded, $\frac{1}{10}$ - $\frac{1}{8}$ in. diam., yellow-green, very shortly pedicelled. *Calyx* minute. *Petals* slightly imbricate. *Capsules* usually 2, about the size of a pepper-corn, coriaceous, rugose. *Seed* splendid, blue-black.

There is some doubt as to the name which this species should bear, consequent upon the obscurity of *Evodia triphylla*, DC., founded on the Philippine Islands *Fagara triphylla* of Lamk. (*Evodia Lamarckiana*, Benth. *Flor. Hongk.* 59). Lamarck (*Dict.* ii. 447) identifies his Philippine Isld. plant with Rumph's *Ampacus angustifolius* (Herb. Amb. ii. 88, t. 62), with which also Bentham's Hongkong specimens agree. Roxburgh, on the other hand, identifies a Penang plant, cultivated in the Calcutta Gardens, with Rumph's *Ampacus angustifolius*, and describes its capsules as the size of a field-bean. This character of capsule does not agree with any Indian species known to me. Roxburgh's characters agree in all but this, with a common Malay plant. As Wight refers an identical Nilghiri plant to Roxburgh's, I have preferred to retain for it the name *Roxburghiana*, given to it by Chamisso, to distinguish it from the true *triphylla* of Lamarck, which has very small few-flowered cymes and smaller capsules. Bentham (l.c.) observes that Lamarck's plant is a native of India, and quotes Wight's *Icones*; but this is a mistake, for Wight's figure represents a poor specimen of this, which is a common Nilghiri plant. Wight gives Jussieu as the authority for *X. triphyllum*, both in his "Icones" and "Illustrations," but this is an error. Wallich's *Schmidelia integerrima* is clearly a very large-leaved form from Penang; it has neither flower nor fruit; the terminal leaflet is 12 by 5 in.

2. ***E. triphylla***, DC. *Prodr.* i. 724; leaves quite glabrous, nerves slender, cymes small hardly bracteate, branches and pedicels very slender finely pubescent, filaments glabrous, ovary hairy. *E. Lamarckiana*, Benth. *Fl. Hongk.* 59. *E. gracilis*, Kurz in *Journ. As. Soc. Beng.* 1871, ii. 48. *Fagara triphylla* Lamk. *Dict.* ii. 447. *Xanthoxylum Lamarckianum*, Cham. in *Linnaea* v. 58. *X. pteleæfolium*, Champ. in *Kew Journ. Bot.* iii. 330. *Lepta triphylla*, Lour. *Fl. Coch.* 82.

TENASSERIM, at Moolmein, alt. 6000 ft., *Parish*; north of Moulmein, *Helper*; BURMA, *Brandis*.—DISTRIB. Philippine Islds., Japan, China, Borneo.

This, though a very distinct-looking plant from *E. Roxburghiana*, is not easily characterized, except by comparison. It is smaller, more slender, with shortly-peduncled cymes, 1-3 in. long, hairy, more slender branches and pedicels, the flowers are smaller and paler, and the capsules much smaller, about $\frac{1}{2}$ in. diam. The Tenasserim specimens have elliptic-lanceolate leaves, but in other countries they vary from obovate to elliptic-lanceolate. As in *E. Roxburghiana* the costa above is perfectly glabrous.

3. ***E. robusta***, Hook. f.; leaflets elliptic obtuse or obtusely-acuminate shining, nerves very prominent beneath, costa glabrous above puberulous beneath, cymes broad brachiate their branches very robust.

PENANG, *Phillips*; SINGAPORE, *Maingay* (278 *Kew Distrib.*).

A much more robust plant than *E. triphylla*. *Branchlets* compressed, as thick as a swan's quill, hoary. *Petiole* 4 in., terete, as thick as a crow-quill; leaflets 6-8 in., terminal subobovate, lateral elliptic, coriaceous, midrib and arching nerves very strong indeed. *Cymes* 5 in. diam. and upwards. *Flowers* and fruit as in *Roxburghiana*, of which this may be a variety; but it differs remarkably from the Singapore and Malacca

specimens of that plant, and is the only trifoliolate species known to me with shining upper surfaces to the leaves.—This differs from Miquel's description of the Sumatran *Zanthoxylon Euneuron* (Fl. Ind. Bat. Suppl. 532) in its glabrous capsules, in the leaves not pale and silvery beneath, and in the fruiting cyme not being pyramidal.

4. ***E. latifolia*, DC. Prodr. i. 724**; branchlets petioles leaves beneath and midrib above tomentose, leaflets large, nerves strong, cymes pubescent and brachiate or pyramidal, capsules glabrous. *Miq. Fl. Ind. Bat. i. pt. 2, 672*; *Ann. Mus. Bot. iii. 244*. *Zanthoxylum Rumphianum*, *Cham. in Linnæa v. 58*.

MALACCA, *Griffith*; (*Kew Distrib. 1176*); *Maingay* (*Kew Distrib. 277*).—DISTRIB. Malayan Archipelago.

Branchlets as thick as the little finger, obtusely 4-angled. *Petiole* 4-6 in., as thick as a goosequill or less; leaflets 6-10 in. broad, elliptic or elliptic-lanceolate, glabrous above except the costa, finely pubescent beneath. *Cymes* more pyramidal than in *I. Roxburghiana*; flowers and capsules quite the same.

VAR. ? branches more slender, leaves more membranous puberulous on the costa above and nerves beneath only not on either surface.—Malacca, *Griffith*, *Maingay*. This resembles Miquel's description and plate of *E. accedens* (*Ann. Mus. Bot. iii. 242, t. 6*), except in the much smaller flowers, which wholly resemble those of *E. latifolia*.

5. ***E. glabra*, Blume Bijl. 245**; glabrous, leaflets large 5-7 in. dark green above paler beneath with very strong nerves, cymes large brachiate glabrous. *Miq. Flor. Ind. Bat. i. pt. 2, 672*; *Ann. Mus. Bot. iii. 243*.

PENANG, *Phillips*.—DISTRIB. Java.

This closely resembles *E. robusta*, but the leaflets are not shining above, are of a dark green colour when dry, and are sometimes suddenly acuminate. My specimens, which are in ♂ flower only, have branchlets as thick as the little finger and pyramidal bracteate densely-flowered cymes; they precisely resemble a flowerless specimen of *E. glabra* from the Leyden Herbarium, which is, I presume, authentic, though the leaflets are abruptly acuminate, which is contrary to Miquel's description.

** *Leaves 1- rarely 3-foliolate.*

6. ***E. viticina*, Wall. Cat. 1219**; quite glabrous, leaves 1-3-foliolate, petiole acutely margined, leaflets lanceolate acuminate, cymes small usually shorter than the petiole few-flowered. *Kurz in Journ. As. Soc. Beng. 1873, ii. 64*.

TENASSERIM; at Tavoy, *Gomez, Helfer*.

Branches slender, alternate, 2-edged, and whole plant dull green when dried. *Petiole* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., with 2 acute edges bounding a median groove in front; leaflets 1 $\frac{1}{2}$ -4 $\frac{1}{2}$ in., pale beneath; nerves very slender, horizontal. *Cymes* 6-10-flowered, erect, almost glabrous; peduncle glabrous, angled. *Flowers* minute, fascicled, 4-merous; pedicel very short, slender. *Fruit* $\frac{1}{2}$ in. diam., of 4 nearly smooth rather compressed carpels.

7. ***E. pedunculosa*, Hook. f.**; leaves 1-foliolate, petiole $\frac{1}{2}$ -cylindric, leaflet obovate abruptly narrowed at the obtuse point quite glabrous, cymes trichotomous pubescent terminating long slender peduncles.

SINGAPORE, *Lobb*.

I have seen but one specimen of this very distinct plant. *Branches* smooth, cylindric, glabrous. *Leaves* 4-5 in.; petiole rather stout, $\frac{1}{2}$ -1 in., edges acute, not thickened at the top; leaflet coriaceous, quite entire, cuneate at the base, copiously minutely punctate, costa stout, nerves many slender spreading. *Peduncles* in opposite axils, stout, 1-4 in., pubescent towards the top where they branch into small trichotomous pubescent cymes. *Flowers* (♂ buds only) shortly pedicelled, bracts minute, buds $\frac{1}{2}$ in. diam. *Sepals* rounded, acute. *Petals* broad-ovate, acute, valvate, glabrous. *Stamens* 4, filaments short; anthers broad, acute. *Disk* tumid. *Ovaries* 4, imperfect, immersed in the disk.

*** *Leaves pinnate*.

8. ***E. fraxinifolia***, *Hook. f.*; leaves quite glabrous throughout, leaflets 3-5-pairs, cymes broad brachiate pubescent, branches stout, flowers 4-5-merous, fruit glabrous. *Tetradium trichotomum*, *Lour. Fl. Coch.* 91; *DC. Prodr.* ii. 88. *Rhus fraxinifolium*; *Don Prodr.* 248. *Philagonia fraxinifolia*, *Hook. Ic. Pl.* t. 710; *Wall. Cat.* 8521? *P. sambucina*, *Blume Bijl.* 250. *P. procera*, *DC. Prodr.* ii. 90.

SUBTROPICAL HIMALAYA from Nipal to Sikkim, alt. 4-7000 ft.; KHASIA Mts., alt. 3-5000 ft.—DISTRIB. Java? Cochinchina.

A small much branched densely leafy tree, smelling strongly of Caraway when bruised. *Branchlets* thick, terete. *Leaves* 8-12 in., spreading, bright green; petiole cylindric; leaflets 4-9 in., shortly petioled, oblong or oblong-lanceolate, acuminate, straight or falcate, quite entire or crenulate, base rounded often oblique, nerves spreading, slender, terminal leaflet often long-petioled. *Cymes* on short stout compressed peduncles, axillary and terminal, clothed with fine close-set pubescence; bracts minute. *Flowers* shortly pedicelled, white, ♂ nearly $\frac{1}{2}$ in. diam. *Sepals* small, obtuse. *Petals* imbricate, pubescent within. *Stamens* exceeding the petals, filaments somewhat hairy; anthers broad. *Ovary* glabrous; style short, stigma capitate. *Fruit* $\frac{1}{2}$ in. diam., red; carpels not separating to the base, very coriaceous. *Seed* broadly elliptic, slightly compressed; testa dark brown, shining.—I can hardly doubt this being the *Philagonia sambucina* of Blume (*P. procera*, DC., published in the same year); but having seen no Java specimen I retain the name of *fraxinifolia*. It is the plant alluded to under *Evodia* in the "Genera Plantarum" as *E. Roxburghiana*.

9. ***E. meliæfolia***, *Benth. Fl. Hongk.* 58; petioles pilose, leaflets 3-5 pairs glabrous, cymes broad brachiate pilose-pubescent, branches very slender, flowers 4-5-merous. *E. glauca*, *Miq. Ann. Mus. Bot.* iii. 23. *Boymia glabrifolia*, *Champ. in Hook. Kew Journ. Bot.* iii. 330. *Megabotrya meliæfolia*, *Hance in Walp. Ann.* ii. 259.

ASSAM, *Masters (in Herb. Griffith)*.

A much more slender plant than *E. fraxinifolia*, with spreading soft hairs on the rachis of the leaf and on the more slender partial petioles, very slender spreading branches of the cyme, which is 8 inches broad, fewer sparser flowers, the ♂ $\frac{1}{4}$ in. diam., shorter more slender filaments, and more oblong anthers. The leaflets are 3-4 in., more oblique at the base, and usually more acuminate.

10. ***E. rutæcarpa***, *Hook. f. & Thoms. Herb. Ind. Or.*; clothed throughout with soft velvety pubescence, cymes brachiate, branches very stout, fruit pustular. *Boymia rutæcarpa*, *Juss. according to Sieb. & Zucc. Fl. Japon.* i. 50, t. 21.

Inner valleys of the Temperate region of the SIKKIM HIMALAYA, alt. 7-10,000 ft., *J. D. H.*—DISTRIB. Japan.

A small densely-foliaged green tree, inodorous. *Leaves* 1-1 $\frac{1}{2}$ ft.; petiole terete, stout; leaflets about 5 pair, subsessile, oblong-acute, usually rounded and oblique at the base, margin quite entire, under surface woolly, nerves faint. *Cymes* 3-4 in. diam., terminal; peduncles very short stout and as well as the pedicels and calyx tomentose. *Flower* about $\frac{1}{2}$ in. diam. *Petals* nearly glabrous externally, pubescent within. *Stamens* not much exceeding the petals, filaments hairy; anthers very large, ovate, 2-lobed at the base. *Fruit* $\frac{1}{2}$ in. diam.; carpels 4, opening at the apex.

6. **TETRACTOMIA**, *Hook. f.*

Trees or shrubs. *Leaves* opposite, petioled, 1-foliolate, coriaceous, quite entire, punctate. *Flowers* small, in axillary branched cymes. *Calyx* small, 4-partite. *Petals* 4, triangular-ovate, acute, persistent, valvate.

Disk broad, glandular, flattish or pulvinate, obtusely 4-angled. *Stamens* 8, 4 perfect alternate with the petals, 4 smaller with imperfect anthers (or 0) opposite the petals and partially adnate to them at the base; filaments subulate, flattened at the base; anthers 2-lobed, dorsifixed. *Ovary* immersed in the centre of the disk, 4-celled, with 4 free projecting lobes; styles 4, free at the base, connate above, stigma capitate obscurely 4-lobed; ovules 2, collateral in each cell. *Fruit* of 4 coriaceous laterally compressed oblong 2-seeded carpels, splitting ventrally, the horny endocarp partially separating. *Seeds* inserted towards the base of the carpels (nucleus small with a large oblong obtuse membranous wing, embryo unknown).—DISTRIB. Three species, natives of the Malayan Peninsula and Borneo.

A very singular genus, which I find in no Indian Herbarium but Maingay's, who gathered both species in 1867-8, and describes *H. majus* in his Mss. as a *Diosmea*, no doubt because of the staminodes, and the leaves as alternate, in which he is certainly mistaken. One of these two is, however, the *Melicope tetrandra* of Roxburgh, from Penang. It is nearly allied to *Evodia*, differing in the staminodes, valvate petals and seeds. A third species (*H. Beccarii*, Hook. f.) from Borneo was discovered by Dr. Beccari at Sarawak (No. 1880), it has obovate leaves and small trichotomous glabrous cymes. I have described the seeds as I found them in *H. majus* (which are imperfect), but Roxburgh describes them in his *Melicope tetrandra* as oblong and immersed in a yellow fleshy aril. I have no seeds of this species, but the structure of the capsule is precisely as in *H. majus*.

1. **T. majus**, Hook. f.; leaflets 8 in. obovate rounded at the tip, cymes glabrous or nearly so.

MALACCA, Maingay (*Kew distrib.* 290).

A tree; branchlets stout, woody, as thick as the finger, covered with rough brown bark. *Leaves* apparently crowded on the branchlets; petiole 2-2½ in., stout, terete, slightly swollen at the base and apex; leaflets very coriaceous, quite entire, narrowed at the base, pale when dry with obscure darker spots, nerves numerous slender spreading, smooth above, beneath with minute prominent gland-dots crowned with microscopic hairs; nervules reticulate, obscure, most visible on the upper surface (Maingay). *Cymes* 4-6 in. diam., opposite, glabrous or minutely pubescent, branches stout spreading alternate, branchlets opposite; bracts minute, persistent. *Flowers* ¼ in. diam., pedicelled, ebracteolate, glabrous. *Filaments* exceeding the petals and style. *Ripe carpels* unequally ½ in. long, obtusely keeled at the back. *Seeds* nearly as long as the carpel; nucleus basal, oblique, very much smaller than the oblong wing.

2. **T. Roxburghii**, Hook. f.; leaflets 3-5 in. elliptic or cuneate-obovate obtusely acuminate, cymes pubescent. *Melicope tetrandra*, Roxb. *Fl. Ind.* ii. 257.

PENANG, Roxb.; SINGAPORE, Maingay (*Kew distrib.* 278, 2).

Differs from *H. majus* conspicuously in size, the branchlets not being thicker than a goose-quill, and the flowers ¼ in. diam., and ripe carpels ¼ in. long. In texture and nervation the leaflets are identical; the cymes of this are laxly clothed with a furfureous pubescence.

7. MELICOPE, Forst.

Shrubs. *Leaves* opposite (in the Indian species) 1-3-foliolate, pellucid-punctate. *Flowers* small, in axillary cymes or panicles. *Calyx* 4-lobed or 4-partite. *Petals* 4, sessile, spreading, valvate or imbricate. *Disk* large, entire or 8-lobed or obsolete. *Stamens* 8, inserted at the base of the disk, those opposite the petals shorter, filaments subulate or flattened; anthers oblong or cordate. *Ovary* 4-celled, deeply 4-lobed; style basilar or styles 4, subterminal, more or less combined, stigma capitate 4-lobed; ovules 2 in each

cell, collateral or superposed. *Fruit* of 4 free spreading coriaceous carpels dehiscent on the inner face; endocarp more or less separating. *Seeds* oblong, funicle sometimes elongate, testa black brittle shining, albumen fleshy and oily; embryo with large oblong cotyledons and a short superior radicle.—**DISTRIB.** Chiefly Polynesian; species about 15.

1. **M. indica**, *Wight Ic.* t. 1051; glabrous, leaves 1-foliolate, leaflets elliptic or obovate acute, flowers 3-5 terminating long slender decurved peduncles. *Bedd. Flor. Sylvat. Anal. Gen.* xl. t. vi. f. 1.

NILGHIRI Mts., in woods near the Avalanches, *Wight, Gardner*.

A shrub or small tree; branches slender. *Leaves* glabrous; petiole $\frac{1}{2}$ – $1\frac{1}{2}$ in., terete; leaflet 3-4 in., glabrous, shining, narrowed towards the base, nerves very slender. *Peduncles* 2-4 in., slender, often 3-flowered. *Flowers* $\frac{1}{2}$ in. diam., on short stout pubescent pedicels. *Calyx* divided nearly to the base into 4 orbicular coriaceous obtuse lobes. *Petals* valvate, ovate, acute, glabrous, thick, longer than the stamens. *Disk* obsolete. *Ovary-lobes* villous, free at the apex; styles free below; ovules subcollateral. *Ripe carpels* 4, $\frac{1}{2}$ in. long, turgid, apiculate, 1-seeded, veined. *Seed* oblong.

2. **M. ? Helferi**, *Hook. f.*; quite glabrous, leaves 1-foliolate, petiole short stout, leaflet obovate-lanceolate obtuse, panicle rather longer than the petiole few-flowered, petals valvate.

TENASSERIM or ANDAMAN ISLANDS, *Helfer*.

Dioecious? *Branches* rather stout, bark wrinkled; whole plant yellowish when dried. *Petiole* $\frac{1}{2}$ –1 in., not acutely margined; leaflet 4-8 in., membranous, nerves horizontal, very slender. *Cymes* 1-3 in., paniced, suberect; peduncle rather stout, quite glabrous; branches $\frac{1}{2}$ – $\frac{1}{2}$ in., few. *Flowers* (σ) small, fascicled; pedicels short, stout. *Petals* valvate, longer than the stamens. *Disk* 8-lobed. *Fruit* not seen.

8. **ZANTHOXYLUM**, Linn.

Shrubs or trees, often armed with stout prickles. *Leaves* alternate, 3-foliolate or unequally pinnate; leaflets opposite or alternate, entire or crenate, often oblique, punctate. *Flowers* small, in axillary or terminal peduncled broad or narrow cymes, white, pink, or greenish, often unisexual. *Calyx* 3-8-fid, rarely 0. *Petals* 3-5, rarely 0, imbricate or induplicate-valvate. *Disk* small or obscure. *Stamens* 3-5, hypogynous or reduced to scales in the ♀. *Ovary* rudimentary in the ♂, in the ♀ of 1-5 oblique 1-celled carpels; styles sublateral, free or connate above, stigma capitate; ovules 2 in each cell, usually collateral. *Fruit* of 1-5 globose coriaceous or fleshy 1-seeded carpels, dehiscent ventrally, endocarp horny, separating or not. *Seed* oblong and compressed or globose, often hanging out of the carpel, hilum broad, testa bony or crustaceous blue or black shining, albumen fleshy; embryo axile, straight or curved, cotyledons flat, radicle very short.—**DISTRIB.** About 80 species, all tropical and subtropical.

SECT. 1. *Cymes* axillary, or axillary and terminal; branches alternate.

* *Leaves* 3-foliolate, petiole not winged, flowers polypetalous.

1. **Z. ovalifolium**, *Wt. Ill.* i. 169; quite glabrous, unarmed or with short straight prickles, leaflets elliptic-oblong or obovate crenulate tip obtuse emarginate. *Bedd. Flor. Sylvat. Anal. Gen.* xlii. t. vi. f. 3; *Wall. Cat.* 7469. *Z. lucidum*, *Wall. Cat.* 1212. *Toddalia mitis*, *Miq. in Herb. Hohenack.* 466. *Limonia leptostachya*, *Jack according to Herb. Griffith.*

WESTERN PENINSULA, in Canara, Kurg and the Nilghiri Mts., and near Madras; KHASIA Mts.; ASSAM and MISHMI Mts.; SINGAPORE, *Wallich*.

A shrub? *Leaflets* 3-4 in., coriaceous, subsessile, petioles not armed. *Cymes* in slender panicles, quite glabrous. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., 4-5-merous. *Petals* valvate. *Ripe carpels* solitary, the size of a pea, smooth.—Wight makes 2 species of this, which I cannot distinguish except as varieties. The Khasian and Assam specimens have rather longer leaves than the Madras ones.

VAR. 1. *ovalifolium*; unarmed. *Z. ovalifolium*, Wight, l.c.

VAR. 2. *sepiarium*; armed with short straight prickles. *Z. sepiarium*, Wt. Ill. i. 169.

** *Leaves* 5- ∞ -foliolate, petiole winged, flowers apetalous, wood with a broad septeate pith.

2. ***Z. alatum***, Roxb. *Fl. Ind.* iii. 768; leaflets 2-6 pairs lanceolate glabrous beneath, petiole and rachis usually broadly winged, nerves very indistinct, flowers in sparse panicles 2-6 inches long glabrous or pubescent. *Wall. Cat.* 1209 in part; *Brandis For. Flor.* 47; *Bedd. Flor. Sylvat. Anal. Gen.* xlii. *Z. hostile*, *Wall. Cat.* 1210, in part.

Hot valleys of the SUBTROPICAL HIMALAYA, ascending to 6000 ft. from Jamu to Bhotan; KHASIA Mts., alt. 2-3000 ft.

A shrub or small tree, with dense foliage and pungent aromatic taste and smell; prickles often vertically flattened on the trunk and branches, the older with a corky base. *Leaves* $1\frac{1}{2}$ -9 in. (in Khasia specimen); petiole glabrous, narrowly winged, with 2 stipular prickles at the base; leaflets $\frac{3}{4}$ -4 in., narrow, usually elliptic-lanceolate, rarely ovate, obtusely acuminate. *Panicles* loose, sparingly branched. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. *Calyx* 6-8-lobed, lobes subacute. *Stamens* 6-8. *Ripe carpels* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., usually solitary, laxly paniced, broadly ovoid, pale red, tubercled.—Young leaflets have often the costa prickly beneath, and usually few large scattered glands. The wood is hard and used for tooth cleaning, and the carpels as a condiment.

3. ***Z. acanthopodium***, DC. *Prodr.* ii. 727; branchlets glabrous or tomentose, leaflets 2-6-pairs lanceolate, nerves distinct glabrous or more or less pubescent beneath, petiole and rachis narrowly winged, cymes very short dense $\frac{1}{2}$ -1 in. long pubescent. *Z. hostile*, *Wall. Cat.* 1210, and *Z. alatum*, *Wall. Cat.* 1209, in part.

Hot valleys of the SUBTROPICAL HIMALAYA, from Kumaon to Sikkim, ascending to 7000 ft.; KHASIA Mts., alt. 4-6000 ft.

Very similar indeed to *Z. alatum*, and possibly a variety of that plant, but the leaflets have never the large scattered glands, and are often very pubescent beneath, the nerves are much stronger, and the inflorescence is remarkably different, the ripe carpels ($\frac{1}{2}$ in. diam.) forming dense sessile and almost globose clusters on the branches below the leaves.—The *Z. planispinum*, Sieb. and Zucc., of Japan, is probably another variety, with fewer glabrous leaflets, faint nerves, and glabrous inflorescence; it is intermediate between this and *Z. alatum*, to which it is most nearly allied, but wants the large glands. Wallich in his catalogue quotes *Z. acanthopodium*, DC., as a synonym of *Z. alatum*, Roxb., and the ticket is attached to a specimen with very short cymes and crowded points, and with leaves pubescent beneath. I therefore retain De Candolle's name for this plant, which is quite distinct from Roxburgh's *Z. alatum*.

VAR. *Timbor*; branches clothed with dense rusty (when dry) tomentum. *Z. ? Timbor*, *Wall. Cat.* 7116.—Chainpur hills, *Hamilton* (? Chayanpoor. hills in Behar, 40 miles S.E. of Benares).

*** *Leaves* 5- ∞ -foliolate, petiole not winged, flowers polypetalous.

4. ***Z. tomentellum***, Hook. f.; sparingly prickly, branches petioles and cymes velvety, leaflets alternate 6-8 pairs quite entire velvety beneath, cymes axillary.

EASTERN SUBTROPICAL HIMALAYA; Bhotan, *Griffith*; Sikkim, at Choongtam, alt. 5000 ft., *J. D. H.*

A small erect tree, 30 ft., with horizontal branches; branchlets terete, stout, woody; prickles scattered, short, recurved. *Leaves* 8-12 in.; petiole terete, with scattered hooked prickles on the under-side; leaflets 2-3 in., shortly petioled, oblong or elliptic, subacute or obtusely acuminate, coriaceous, glossy above, base subequal, nerves distinct. *Cymes* 2-4 in., sparingly branched, densely velvety, branches few short and rachis stout; bracts and bracteoles caducous. *Flowers* (♀ only seen) small, clustered; about $\frac{1}{8}$ in. diam. *Sepals* 4, pubescent. *Petals* glabrous. *Carpels* 4, glabrous. *Carpels* (hardly ripe) $\frac{1}{2}$ in. long, 4, compressed, beaked.

5. **Z. oxyphyllum**, *Edgew. in Trans. Linn. Soc.* xx. 42; glabrous, prickles hooked, leaflets alternate and opposite 3-10 pairs, young crenate, cymes terminal and axillary quite glabrous or slightly pubescent, flowers large. —*Zanthoxylon violaceum*, *Wall. Cat.* 1213.

TEMPERATE and SUBTROPICAL HIMALAYA, from Garwhal, alt. 4-8000 ft., to Sikkim, alt. 6-9000 ft., and BHOTAN; KHASIA MTS., alt. 4-6000 ft.

A shrub, clothed with hooked prickles. *Leaves* very variable in size, 4-12 in.; petiole arched, usually very prickly along the back; leaflets in young specimens ovate-lanceolate, very long-acuminate, crenate-serrate, pale, nerves very distinct beneath, in older ones more elliptic or oblong, 2-2 $\frac{1}{2}$ in. long in Kumaon specimens, upwards of 4 in. in some Sikkim ones, coriaceous, shining above. *Cymes* much branched many-flowered. *Flowers* the largest of the Indian species, $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., umbellate, on the branches of the cyme; pedicels slender, longer than the petals. *Sepals* 4, small, obtuse. *Petals* 4, obtuse, imbricate. *Ripe carpels* 2-4, the size of a pea, tubercled, hardly beaked. *Seed* black.

6. **Z. khasianum**, *Hook. f.*; branches petioles and inflorescence pubescent, leaflets 8-10 pairs alternate rarely opposite small ovate with an obliquely curved narrowed obtuse apex quite glabrous, cymes axillary and terminal.

KHASIA MTS.; at Myrung, alt. 4-6000 ft., *J. D. H. & T. T.*

A small very fragrant climbing straggling bush. *Branches* very slender, sparingly prickly. *Leaves* 1 ft. long, arched; petiole more or less pubescent, usually copiously prickly underneath; leaflets 1-1 $\frac{3}{4}$ in., straight or oblique, coriaceous, shining above, fully $\frac{1}{2}$ of the blade usually occupied by the contracted apex; partial petioles $\frac{1}{10}$ - $\frac{1}{4}$ in. *Cymes* (♀ only seen) 2 in., paniced, spreading, very pubescent. *Ripe carpels* 1-3, about $\frac{1}{2}$ in. diam., globose, not beaked. *Seeds* globose, black.—I have not ventured to unite this with the very similar Chinese *Z. cuspidatum*, *Champ. (in Kew Journ. Bot.* iii. 329), though this agrees entirely in habit, the curious form of the alternate petioled small leaflets, and in the paniculate cyme and fruit; it differs in being very pubescent on the branches petiole and rachis of the leaf and cyme, and in the small less coriaceous and less shining leaves, that do not blacken in drying.

7. **Z. Hamiltonianum**, *Wall. Cat.* 7117; prickles few short, branches and petioles glabrous or more or less pubescent or velvety, leaflets 4-7 in., 2-3 pairs, opposite glossy oblong not sinuate, cymes axillary tomentose or glabrous.

ASSAM, *Jenkins*; SUDYAH and BIRMA, *Griffith*; Borylari, *Hamilton* (Feb. 1809).

Probably a large scandent shrub; branches stout, woody, prickles crooked. *Leaves* 6-8 in.; petiole terete, stout, very prickly; leaflets sessile, suddenly narrowed into a broad notched apex, base rounded, glossy on both surfaces, glabrous or pubescent beneath, with many subparallel prominent arching nerves. *Cymes* 3-4 in., paniced, very slender. *Flowers* $\frac{1}{10}$ in. diam., shortly pedicelled. *Petals* 4-5, valvate or slightly imbricate.—Perhaps a form of *Z. tetraspermum*.

VAR. *tomentosum*; branches, petioles, and inflorescence very tomentose.—Assam, *Jenkins*.

8. **Z. tetraspermum**, *W. & A. Prodr.* 148; very prickly, glabrous except the velvety cymes, leaflets 3-5 in. opposite 2-3 pairs large elliptic or

oblong very glossy coriaceous many-nerved margin waved and sinuate-toothed, cymes axillary and terminal. *Thwaites Enum.* 69; *Beddome Flor. Sylvat. Anal. Gen.* xlii.

WESTERN PENINSULA; Kurg and the Nilghiri Mts., CEYLON, alt. 3-5000 ft., *Walker*.

A stout climbing shrub; prickles short, hooked. *Leaves* 4-7 in., glabrous; petiole stout, straight, very prickly; leaflets subsessile, suddenly contracted to a rather long obtuse notched tip, shining above and sinuate-toothed, especially in the Ceylon specimens, coriaceous, nerves numerous spreading. *Panicles* 2-3 in., axillary and terminal, short, or rather large and spreading, when terminal densely tomentose, branches alternate. *Flowers* small, $\frac{1}{2}$ - $\frac{1}{3}$ in. diam. *Petals* 4, acute, valvate. *Ripe carpels* 2-4, $\frac{1}{2}$ in. diam., globose.—Ceylon specimens have the brilliantly glossy leaves almost black when dry and far more sinuate-toothed than the Kurg ones, which show a passage to *Z. Hamiltonianum*, which has a very similar tip to the leaf.

SECT. 2. *Cymes* terminal; branches opposite. *Flowers* polypetalous. *Leaves* 5-∞-foliolate; petiole not winged. *Wood* with a broad septate pith.

9. **Z. Rhetsa**, DC. *Prodr.* i. 728; armed except the petioles and rarely the cymes with short prickles, leaflets 8-20 pairs very oblique quite entire glabrous, cymes terminal very large glabrous. *W. & A. Prodr.* 148; *Grah. Cat. Bomb. Pl.* 36; *Dalz. & Gibs. Bomb. Fl.* 45; *Thwaites Enum.* 69; *Bedd. Flor. Sylvat. Anal. Gen.* xli. *Z. oblongum*, *Wall Cat.* 1218. *Fagara Rhetsa*, *Roxb. Fl. Ind.* i. 417. ? *F. Budrunga*, *Roxb. Fl. Ind.* i. 417, not of *Wallich*.—*Rheede Hort. Mal.* v. t. 34.

WESTERN PENINSULA, from Coromandel and the Concan southward; TAVOY, *Gomez*.

A tree with corky bark and spreading leafy branches, prickles straight or incurved, the old ones with a solid conic base. *Leaves* 1-1½ ft., clustered at the ends of the branches, equally or unequally pinnate; petiole unarmed; leaflets opposite, 3-5 in., with short partial petioles, recurved, ovate-oblong or lanceolate, caudate-acuminate, upper base rounded, lower very narrow and ending in the costa, nerves 10-12 on the upper half, 2 fewer on the lower. *Cymes* sometimes 1½ ft. broad; branches opposite, angled; bracts minute, caducous. *Flowers* $\frac{1}{2}$ in. diam., yellow, 4-merous. *Petals* valvate. *Ovary* glabrous. *Ripe carpels* solitary, the size of a pea, tubercled. *Seed* subglobose, blue-black.—The unripe carpels taste of orange-peel, the seeds like black pepper.—*Thwaites* introduces this into his *Enumeratio*, but says, in *Herb.* that he knows of but one tree, and that is in a garden.

10. **Z. Budrunga**, *Wall. Cat.* 1211; ? of DC. *Prodr.* i. 728; armed with short incurved prickles, leaflets 5-10 pairs glabrous broadly crenate with large glands in the sinus, base very oblique, cymes terminal very large glabrous. *Z. crenatum*, *Wall. Cat.* 1216. ? *Fagara Budrunga*, *Roxb. Fl. Ind.* i. 417.

TROPICAL HIMALAYA, KUMAON, *Blinkworth* (in *Herb. Wallich*); Forests of SILHET, the KHASIA Mts., CHITTAGONG, and MARTABAN.

Apparently a tree, easily recognised by the large glands at the crenatures of the leaflets.—I am not satisfied as to the name this plant should bear; the description is founded on *Wallich's* specimens from the Calcutta Garden, named *Z. Budrunga*, *Roxb.*, and which should therefore be authentic, and which perfectly agree with those from Silhet, &c.; but *Roxburgh* describes in his "*Flora Indica*" (and figures in his drawings) the leaflets as few, narrow, and quite entire; and neither he nor *Wallich* (in *Carey's* edition of the "*Flora Indica*") makes allusion to the crenatures and glands. I find no plant corresponding to either *Roxburgh's Fagara Rhetsa* or *F. Budrunga* in any Silhet, Assam, or Bengal collection, and except in the fewer leaflets there is no differential character given by *Roxburgh* between these two supposed species, though in his drawings he figures the flowers of *Budrunga* as small, white, with stamens larger than the petals (probably a sexual character); and those of *Rhetsa* as larger, yellowish, with stamens shorter than the petals. On the other hand, there are plenty of Western Peninsula

and Ceylon specimens of *Z. Rhetsa*, with a few leaves, as Roxburgh describes in *Z. Budrunga*, which leads me to suspect that Roxburgh may, by some mistake, have described a specimen of *Z. Rhetsa* with few leaflets for one of the Silhet *Z. Budrunga*. Should this not be so, and should his *Budrunga* prove really different from *Rhetsa*, Wallich's name of *Z. crenatum* must be given to the plant here described.

11. ***Z. myriacanthum***, Wall. Cat. 1214; copiously armed except the petioles with short straight prickles, leaflets 4-8 pairs coriaceous not very oblique glabrous crenulate, cymes large terminal pubescent, carpels very small. *Z. longifolium*, Wall. Cat. 7115.

PENANG, Porter; MALACCA, Maingay.

A large tall tree (Porter). Branches stout, densely armed. Leaves 1-1½ ft.; petiole unarmed; leaflets 3-4 in., opposite, oblong or oblong-lanceolate, acute or subacuminate, crenatures minute and shallow, nerves spreading distinct beneath; partial petioles very short. Cymes long and broad, with much longer primary branches than *Z. Rhetsa*, which are terete and alternate, very pubescent, and bear a few scattered prickles. Flowers ½ in. diam., subsessile, 5-merous. Calyx 3- or more-, bracteate at the base. Petals 5, imbricate. Ovaries 3. Ripe carpels ½ in. diam., compressed, apiculate. Seed compressed, ⅓ in. diam., not quite ripe.

DOUBTFUL, REJECTED, AND UNKNOWN SPECIES.

Z. ARMATUM, Roxb. Cat. Hort. Beng. 727; DC. Prodr. i. 727, is probably *Z. Rhetsa* or *Z. Budrunga*.

Z. ? BAJARNANDIA, Wall. Cat. 7118; a very imperfect specimen, consisting of a broken unarmed petiole, 10 detached leaflets like those of *Z. oblongum*, but narrower, more finely acuminate, and with more numerous nerves and an even more oblique base, ripe carpels larger.—Assam, at Guralpara, Hamilton. Probably *Z. Rhetsa*, DC., but too imperfect for determination.

Z. ? CONNAROIDES, W. & A. Prodr. 148, is a species of *Heynea*.

Z. ? FINLAYSONIANUM, Wall. Cat. 7114; glabrous, branches as in *Z. spondiæfolium*, but the more numerous prickles are seated on a compressed woody conical base much broader than themselves, leaves 3 in., petiole very slender obscurely winged minutely armed, leaflets 8-10 alternate ½-¾ in. rhomboid-ovate obtuse crenate, panicles axillary and terminal peduncled quite glabrous, flowers small subumbelled, petals 5.—Siam? Herb. Finlayson.

Z. OBTUSIFOLIUM, Poir. Suppl. ii. 293; DC. Prodr. i. 727, is a doubtful native of India and probably not a *Zanthoxylum*.

Z. RHOIFOLIUM, Lamk.; DC. l.c. is not Indian, but the *Z. sorbifolium*, A. St. Hil., of America.

Z. SAPINDIFOLIUM, Wall. Cat. 1215, from Amherst. Of this there is no specimen in Wallich's Herbarium, but only a blank sheet with the ticket attached.

Z. SERRA, Turcz. in Bull. Soc. Nat. Mosc. 1858, i. 440, is *Saurauja nepalensis*.

Z. SPONDILIFOLIUM, Wall. Cat. 1217; branches as thick as a goose-quill, bark rough, with very small conical prickles, leaves crowded at the end of the branch 4-5 in. glabrous, petiole slender unarmed, leaflets 5-8 subopposite 2-2½ in. elliptic-ovate acuminate quite entire, partial petiole ⅓ in., flower-buds minute in short axillary clusters, petals 4, glabrous.—Amherst, Wallich.

Z. TRIFLORUM, Turcz. l.c. 1863, i. 597, described as having opposite leaves not pellucid dotted and 3-flowered peduncles in the upper axils, and which is a Nilghiri plant (Perottet, No. 154) is clearly not of this genus. It may be *Melicope indica*, W.

9. **TODDALIA**, Juss.

Usually subscandent or sarmentose prickly shrubs. *Leaves* alternate, 1-3-foliolate; leaflets sessile. *Flowers* small, in axillary or terminal cymes or panicles, unisexual. *Calyx* short, 2-5-lobed or -parted. *Petals* 2-5, imbricate or valvate. *Stamens* 2, 4, 5 (or 8 with the alternate imperfect), imperfect or 0 in the ♀ flower, inserted at the base of a short or long or inconspicuous disk. *Ovary* ovoid oblong or globose, rudimentary or 4-lobed in the ♂ flower, 2-7-(rarely 1-) celled; style short or 0, stigma capitate; ovules 2, superposed or collateral in each cell. *Fruit* subglobose, or lobed, coriaceous or fleshy, 2-7-celled; cells 1-rarely 2-seeded. *Seeds* angled, reniform, testa coriaceous, albumen fleshy; embryo curved, terete, cotyledons linear or oblong.—**DISTRIB.** About 8 species, natives of tropical and subtropical Asia, Africa and Australia.

1. **T. aculeata**, Pers.; DC. *Prodr.* ii. 83; prickly, leaflets sessile elliptic obovate oblong or lanceolate crenulate, fruit 3-7-celled. *W. & A. Prodr.* 149; *Thwaites Enum.* 69; *Grah. Cat. Bomb. Pl.* 37; *Dalz. & Gibs. Bomb. Flor.* 46; *Wight Ill.* t. 66; *Wall. Cat.* 9042; *Bedd. Flor. Sylvat. Anal. Gen.* xlii. t. vi. f. 4. *T. asiatica*, Lamk. *Dict.* vii. 693; *Ill.* ii. 116. *T. nitida*, Lamk. *Ill.* t. 139, f. 1. ? *T. angustifolia*, Lamk. *Dict. l.c.* 694. *T. angustifolia*, Miq. in *Plant. Hohen.* 470. *T. rubricaulis*, Willd. *T. floribunda*, Wall. *Pl. As. Rar.* iii. p. 37. *Zanthoxylon nitidum*, Wall. *Cat.* 1207, from Chinā (not of DC.). *Z. floribundum*, Wall. *Cat.* 1206; *Pl. As. Rar.* iii. t. 232. *Scopolia aculeata*, Sm. *Ic. ined. sub t.* 34; *Roxb. Fl. Ind.* i. 616. *Limonia oligandra*, Dalz. in *Kew Journ. Bot.* ii. 258. *Paullinia asiatica*, Linn. *Sp. Pl.* 524.—*Burm. Flor. Zeyl.* 58, t. 24; *Rheede Hort. Mal.* v. 81, t. 41.

SUBTROPICAL HIMALAYA, from Kumaon eastwards to Bhotan, ascending to 5000 ft.; KHASIA Mts., ascending to 6000 ft., and throughout the WESTERN PENINSULA and CEYLON.—**DISTRIB.** Sumatra, Java, China, the Philippine Islands.

A rambling sarmentose shrub, prickly or not. *Leaflets* sessile, 1-3 by $\frac{1}{2}$ -1 in., glabrous, rounded, narrowed or subacute at the tip, which is acute obtuse or notched, many-nerved, green on both surfaces, coriaceous. *Cymes* axillary, compressed, longer or shorter than the leaves. *Flowers* $\frac{1}{2}$ in. diam., white. *Calyx* glandular. *Petals* 5, imbricate. *Stamens* not exceeding the petals. *Ovary* usually 5-celled; style short, stigma 5-lobed; ovules 2, superposed in each cell. *Fruit* globose, size of a large pea, 3-5-grooved, orange-coloured, 3-5-celled. *Seeds* solitary in each cell.—Whole plant hot and pungent.

2. **T. bilocularis**, W. & A. *Prodr.* 149; unarmed, leaflets elliptic-lanceolate acuminate quite entire, tip notched, flowers 2-3-nerous, fruit 2-celled. *Bedd. Flor. Sylvat.* xliii.; *Icones*, t. 167. *Dipetalum biloculare*, Dalz. in *Kew Journ. Bot.* ii. 38.

WESTERN PENINSULA; Courtallum, Wight; Anamallay forests, alt. 2500-3000 ft., Beddome; Concan and Canara, Dalzell.

A tree (Beddome), trunk often 3 ft. in girth, foliage dense, always unarmed. *Leaflets* 6-10, sessile or petioled, nerved as in the other species, apparently quite entire. *Petals* 2-3, slightly imbricate. *Stigma* large, peltate. *Fruit* as large as a cherry.—I have seen but two specimens, both Wight's, and in fruit only. I follow Dalzell in considering his *Dipetalum* to be the same; he seems to have found it in a very early state, and says the stamens were 6, and inflorescence terminal, which latter is not the case in Wight's specimens; Beddome, however, describes the inflorescence as terminal or from the upper axils, and much shorter than the petiole. Beddome further describes it as a beautiful tree of considerable size, with dense dark-green foliage; he found the females in March, but not the males; 3-petaled flowers were much more common than 2-petaled.

10. **ACRONYCHIA**, Forst.

Trees. *Leaves* opposite or alternate, 1- rarely 3-foliate, leaflets quite entire. *Flowers* small or rather large, yellow, in peduncled axillary and terminal corymbs, polygamous. *Calyx* 4-lobed, sometimes enlarged after flowering, imbricate. *Petals* 4, spreading, revolute, valvate. *Stamens* 8, inserted under a thick 8-angled tomentose disk, filaments subulate, the alternate longer. *Ovary* inserted in the hollowed tip of the disk, tomentose, 4 celled; style terminal, stigma 4-grooved; ovules 2, superposed in each cell. *Fruit* a 4-celled drupe, or 4-valved loculicidal capsule. *Seeds* often exserted and pendulous from a slender funicle, testa black, albumen copious; embryo straight, cotyledons oblong flat.—**DISTRIB.** About 15 species, natives of tropical Asia, Australia and the Pacific Islands.

1. **A. laurifolia**, *Blume Bijl.* 245; glabrous, leaves subopposite 1-foliate, leaflet elliptic subobovate or oblong, cymes long-peduncled very broad corymbose, buds linear, petals linear villous within. *A. pedunculata*, *Miq. Fl. Ind. Bat. Suppl.* 532; *Thwaites Enum.* 409 and 69 (*Cyminosma*); *Bedd. Flor. Sylv. Anal. Gen.* xlii, t. 6, f. 4. *Cyminosma pedunculata*, *DC. Prodr.* i. 722; *Wall. Cat.* 1205; *W. & A. Prodr.* i. 147; *Wight Ill.* i. 165, t. 65; *Dalz. & Gibs. Bomb. Flor. Suppl.* 17. *C. Ankenda*, *Gartn. Fruct.* i. 280, t. 58, f. 6 (bad); *DC. Ic.* *Clausena simplicifolia*, *Dalz. in Kew Journ. Bot.* iii. 180. *Jambolifera pedunculata*, *Vahl Symb.* iii. 52, t. 61. *Gela lanceolata*, *Lour. Fl. Coch.* i. 232. *Selas lanceolatum*, *Spreng. Syst.* ii. 216. *Ximenia*? *lan- ceolata*, *DC. Prodr.* i. 533. *Indeterm.* *Wall. Cat.* 9028—*Rheede Hort. Mal.* v. p. 29, t. 15.

SIKKIM HIMALAYA, in hot valleys, alt. 3-4000 ft.; KHASIA Mts., alt. 0-4000 ft.; ASSAM; CHITTAGONG; EASTERN PENINSULA, from Rangoon to Penang and Malacca; WESTERN PENINSULA, on the Ghats from Concan to Travancor, ascending to 5000 ft.; CEYLON.—**DISTRIB.** Sumatra, Java, Cochin China.

A small glabrous tree or shrub, with somewhat silky or puberulous young shoots and inflorescence. *Leaves* very variable; leaflets 2-6 in., obtuse or obtusely acuminate, membranous, quite entire, much veined and reticulate on both surfaces. *Cymes* axillary, slender, oppositely branched, spreading, long-peduncled, corymbose; bracts and bracteoles small. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., fragrant, yellowish-white; buds linear-oblong, obtuse; pedicels slender. *Sepals* very small, rounded. *Petals* linear-oblong from a broad base, obtuse, revolute, more or less villous on the inner surface. *Filaments* equalling the petals, slender, bearded below. *Ovary* villous; style short, stigma capitate. *Drupe* very variable in size, from a pea to a small cherry, 3-5-celled, glabrate, usually with a narrowed angular or grooved tip, sometimes narrowed at the base, sometimes deeply lobed from the tip downwards.

VAR. 1; leaflets oblong, flowers about $\frac{1}{2}$ in. diam.

VAR. 2; leaflets 5-7 in. oblong-lanceolate, petals very sparingly villous within, drupe globose $\frac{1}{10}$ in. diam. glabrous.—Sikkim, *J. D. H.*

VAR. 3; leaflets 4-5 in. cymes very slender, flowers smaller ($1\frac{1}{2}$ in.), fruit small contracted at the base.—Western Peninsula.

VAR. 4; leaflets very small $1\frac{1}{2}$ -2 by $\frac{1}{4}$ - $\frac{1}{2}$ in. very membranous narrowly elliptic-lanceolate, cymes few-flowered.—Pulney Mts., *Wight*.

VAR. 5; cymes few-flowered, fruit small turbinate lobed at the top.—Mergui, *Griffith*.

VAR. 6; peduncles stout thick, branches 3-flowered, flowers large almost 1 in. diam., petals much bearded within, fruit nearly $\frac{3}{8}$ in. diam. subglobose puberulous.—Malacca? *Maingay*.

2. **A. Porteri**, *Hook. f.*; leaves opposite 1-foliate, cymes panicle narrow, buds globose, petals ovate minutely pilose within.—*Wall. Cat.* 7756.

PENANG, *Porter, Maingay* (*Kew distrib.* 280); MALACCA, *Griffith*.

A lofty tree. *Petiole* $\frac{1}{2}$ in.; leaflets 3-6 in., usually shortly acuminate, quite glabrous and entire, nerves beneath slender, spreading. *Cymes* 3-4 in.; peduncle and short branches stout, more or less hoary; bracts and bracteoles small, persistent, obtuse. *Flowers* $\frac{1}{2}$ in. diam; buds $\frac{1}{12}$ in., puberulous. *Sepals* 4, fleshy, obtuse. *Petals* broad, short. *Disk* pulvinate, bright yellow, glabrous. *Filaments* with dilated bases. *Ovary* imperfect; styles minute, rudimentary, connate. *Drupe* $\frac{1}{4}$ in. diam., nearly globose, obtusely 4-angled, minutely pitted, 4-celled, cells 2-seeded. *Seeds* subcollateral, oblong-reniform, plano-convex; testa black, brittle.—The above description of the flowers is taken very much from Maingay's ms. which was drawn up from fresh specimens.

11. SKIMMIA, Thunb.

Small glabrous strong scented shrubs. *Leaves* alternate, petioled, simple, quite entire. *Flowers* crowded, in terminal panicles, white, polygamous. *Calyx* 4-5-lobed, imbricate. *Petals* 4-5, oblong, valvate or slightly imbricate. *Disk* obsolete. *Stamens* 4-5, hypogynous, imperfect in the ♀ flower. *Ovary* obovoid, (of 1-5 rudimentary carpels in the ♂ flower) 2-5-celled; style stout, terminal, or 0, stigma capitate 2-5-lobed; ovules solitary, pendulous from the top of each cell. *Drupe* ovoid, fleshy, with 2-5 cartilaginous 1-seeded stones. *Seed* pendulous, testa coriaceous, albumen fleshy; embryo straight, cotyledons oblong flat, radicle short.—DISTRIB. Species 4, Himalayan and Japanese.

1. **S. Laureola**, *Hook. f.*; leaves oblong linear-oblong elliptic-lanceolate or obovate obtuse acute or caudate-acuminate, flowers 5-merous. *Limonia?* *Laureola*, *DC. Prodr.* i. 536. *L. Laureola*, *Wall. Pl. As. Rar.* iii. 23, t. 245; *Cat.* 6357. *Anquetilia Laureola*, *Dcne. in Jacq. Voy. Bot.* 161, t. 161. *Laureola fragrans*, *Roem. Synops. fasc.* i. 74.

Throughout the TEMPERATE HIMALAYA, from Marri to Mishmi, alt. 6-10,000 ft.; KHASIA Mts., alt. 5-6000 ft.—DISTRIB. Afghanistan.

A glabrous shrub branched from the base, 3-5 ft. high, evergreen, strongly aromatic; branches and foliage very bright green. *Leaves* exceedingly variable in size and shape, 3-7 in., softly coriaceous, quite entire, nerves indistinct; petiole short, stout. *Panicles* terminal, short, dense-flowered, branched; females smaller; bracts and 2 bracteoles deciduous. *Flowers* about $\frac{1}{2}$ in. diam., yellowish-white, inodorous, shortly pedicelled. *Sepals* small. *Petals* oblong, obtuse. *Filaments* stout, subulate. *Ovary* ovoid, minute, conic and 4-cleft in the ♂ flowers. *Fruit* $\frac{1}{2}$ - $\frac{3}{4}$ in. long; ellipsoid, red, fleshy. *Seeds* 1-3; embryo green.—Very similar to the Japanese *S. japonica*, Thunb., but the flowers are 4-merous in that species.

12. GLYCOSMIS, Correa.

Unarmed shrubs or trees. *Leaves* 1-foliolate or imparipinnate; leaflets alternate. *Flowers* small, in axillary rarely terminal panicles. *Calyx* 4-5-partite, segments broad imbricate. *Petals* 4-5, imbricate. *Stamens* 8-10, free, inserted round a disk, filaments subulate dilated below; anthers small, with often a dorsal or apical gland. *Ovary* 2-5-celled; style very short, persistent, stigma simple; ovules solitary and pendulous in each cell. *Berry* small, dry or fleshy, 1-3-seeded. *Seeds* oblong, testa membranous; cotyledons equal, radicle very short.—DISTRIB. Species 5, Asiatic and Australian.

I have followed Professor Oliver in the limitation of the forms of this troublesome Genus, which might very well be included in one species.

1. **G. pentaphylla**, *Correa in Ann. Mus.* vi. 384; leaves 3-5 rarely 1-foliolate, leaflets polymorphous usually elliptic-lanceolate, ovary 5- rarely

3-4-celled glabrous, style very short stout. *DC. Prodr.* i. 538; *W. & A. Prodr.* 93; *Oliv. in Journ. Linn. Soc. v. Suppl.* ii. 37; *Wall. Cat.* 6374; *Thwaites Enum.* 45 and 406; *Dalz. & Gibs. Bomb. Fl.* 29; *Bedd. in Trans. Linn. Soc.* xxv. 211; *Flor. Sylv. Anal. Gen.* xliii. t. 6, f. 6. *G. chylocarpa*, *W. & A. Prodr.* 93. *G. arborea*, *DC. l.c.*; *Wall. Cat.* 6373; *Thwaites Enum.* 45. *G. Retzii*, *Roem. Synops.* fasc. i. 41. *Limonia pentaphylla*, *Retz Obs.* v. 24; *Roxb. Cor. Pl.* t. 84; *Flor. Ind.* ii. 381. *L. arborea*, *Roxb. Cor. Pl.* t. 85; *Fl. Ind. l.c.*; *Bot. Mag.* t. 2074. *Myxospermum chylocarpum*, *Roem. Synops.* fasc. i. 40.

Throughout TROPICAL and SUBTROPICAL HIMALAYA, ascending to 7000 ft. in Sikkim from the Sutelj river in the N.W., southwards to UPPER ASSAM, TRAVANCOR, MALACCA, and CEYLON. — *DISTRIB.* Malay Archipelago, China, Philippine Islands, Borneo, Australia.

One of the commonest plants in India, if, as most suppose, the shrubby *G. pentaphylla* and arboreal *G. arborea* are the same species. This is a point to which observers in India should pay attention. Thwaites, who distinguished *arborea* at one time by the short glandular ovary narrower than the spheroid disk, short depressed style as broad as the distinct discoid stigma, and the smaller panicles, finds these characters not to hold as he expected. The leaves, which are evergreen, vary from 1-5-foliolate, and the leaflets from 1-9 inches long, and are broad or narrow, obtuse acute or acuminate, oblong elliptic or obovate or lanceolate, quite entire or crenulate, rather membranous, pale and reticulately veined. Flowers small, white, in pubescent panicles that are very variable in size and composition. Berry white, globose, usually the size of a large pea, in var. 3, as large as a cherry. — I follow Prof. Oliver's classification of the first two varieties, to which he gave many weeks of study with copious materials at his command. The 3rd is added from Wight's Illustrations and Herbarium. Upwards of 200 specimens are preserved in the Herbarium at Kew from different collectors and habitats.

VAR. 1; leaves usually 3- rarely 1- or 5-foliolate, leaflets 4-9 in. lanceolate or oblong or obovate-lanceolate quite entire or obscurely crenulate, panicles towards the tips of the branches usually elongate many-flowered, ovary usually covered with mamillary glands 5-celled connate at the base with the disk. — Throughout India.

Subvar.; leaves narrower. — Canara and Mysore.

VAR. 2; leaves usually 3-5-foliolate (except subvar. 1), leaflets elliptic or elliptic-lanceolate, panicles small few- or many-flowered, flowers smaller, ovary 4-5 celled scarcely mamillate constricted at the base and thus free from the disk. — *G. triphylla*, *Wight in Hook. Bot. Misc.* iii. 298; *Suppl.* t. 39; *l.c.* t. 167; *W. & A. Prodr.* 93. *G. nitida*, *W. & A. Prodr. l.c.* — Western Peninsula, Ceylon, Tenasserim.

Subvar. 1. longifolia; leaves usually 1-foliolate, leaflets 3-10 in. oblong or obovate-lanceolate often acuminate or even caudate, panicles short 1-2 in., or if terminal 3-4 in. — Assam, the Khasia Mts., Rangoon, and Malacca.

Subvar. 2. macrophylla; leaves 3-5-foliolate with the leaflets 3½-6 in., or 1-foliolate with the leaflets 8-12 by 2½-6 in., disk thicker broader than the ovary. *G. macrophylla*, *Lindl. in Wall. Cat.* 6377. — Assam, Penang, and Tavoy. ? *Chionotria rigida*, *Jack in Mal. Misc. ex Hook. Comp. Bot. Mag.* i. 155. *Ch. monogyna*, *Walp. Rep.* i. 382; *Roem. Synops.* fasc. i. 73.

Subvar. 3. angustifolia; leaflets narrower lanceolate 1½-3 by ½-¾ in. *G. angustifolia*, *Lindl. in Wall. Cat.* 6378; *W. & A. Prodr.* 93. *Limonia? angustifolia*, *Wall. Cat.* 6360. — Tanjore, Mysore and Tavoy.

Subvar. 4; panicles axillary very short, ovary scarcely constricted at the base, style equalling the ovary. — Sikkim, Silhet, the Khasia Mts., Cachar, and Chittagong.

VAR. 3. macrocarpa; fruit ¾-1 in. diam. constricted at the base. *G. macrocarpa*, *Wight Ill.* i. 109. — Courtallum, *Wight*.

2. *G. bilocularis*, *Thwaites Enum.* 45; leaves 3-5-foliolate, ovary 2-celled glabrous seated on the thickened disk. *Oliv. in Journ. Linn. Soc. v. Suppl.* ii. 38.

CEYLON, in the Maturatte district, *Thwaites*.

A shrub. Leaflets 1½-2½ by ½-¾ in., lanceolate or trapezoid-lanceolate, subacuminate,

obtuse at the base, pale beneath. *Panicles* axillary, very short, few-flowered. *Sepals* broad-ovate or triangular-ovate. *Petals* oblong or elliptic-oblong. *Stamens* alternately shorter (much and irregularly dilated, concave within, *Thw.*); anthers small, cordate. *Disk* short, thick, rather broader than the ovary.—I have seen only scraps of this. I take the characters from Oliver and Thwaites.

3. **G. sapindoides**, *Lindl. in Wall. Cat.* 6376; leaves 5-7-foliolate, panicles branched from the base stout many-flowered, ovary 2-3-celled, hairy about as long as the thick style.

PENANG, *Wallich, Maingay*.—DISTRIB. Java.

A tree 3 (? 30) feet high, with the trunk as thick as a man's thumb (*Maingay*). *Branches* terete, glabrous. *Leaflets* 4-9 in., oblong or lanceolate, subacuminate. *Panicles* 1-3 in., subpyramidal, branches short stout. *Flowers* shortly and stoutly pedicelled. *Sepals* orbicular-ovate. *Petals* oblong or narrow oblong. *Disk* small or obsolete. *Ovary* shortly stipitate.—Kurz (*Journ. Beng. As. Soc.* 1871, pt. ii. 49) suggests that this will prove a form of *G. chlorosperma*, Sprengel (*Chr. Post.* 162), but I do not see how this can be, Sprengel's plant being described as having terminal inflorescence.

4. **G. puberula**, *Lindl. in Wall. Cat.* 6375; leaves usually 3-foliolate, ovary 4-5-celled shortly stipitate oblong pilose. *Oliv. in Journ. Linn. Soc. v. Suppl. ii.* 39.

PENANG and SINGAPORE, *Wallich*.

Leaflets 2-4 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., caudate-acuminate. *Pedicels* $\frac{1}{2}$ - $\frac{1}{3}$ in. *Disk* small, adnate to the ovary. *Style* very short.—Perhaps a var. of *G. pentaphylla*, from which it differs chiefly in the pilose ovary (*Oliver*).

EXCLUDED SPECIES.

G. CRENULATA, *Turcz. in Mosc. Bull. Soc. Nat.* 1858, pt. ii. 250, is *Murraya crenulata*, *Oliv.* (in *Journ. Linn. Soc. v. Suppl. ii.* 29), a native of Luzon and not of Singapore as Turczaninow states.

13. MICROMELUM, Blume.

Unarmed trees. *Leaves* imparipinnate; leaflets alternate, oblique. *Flowers* in large terminal corymbose panicles. *Calyx* cupular, 3-5-toothed or lobed. *Petals* 5, free, thick, valvate or subimbricate. *Stamens* 10, free, inserted round a short or long disk, filaments linear-subulate, alternate shorter. *Ovary* 5- rarely 2-6-celled; style constricted at the base, deciduous, stigma obtuse or capitate; ovules 2, superposed in each cell. *Berry* small, dry, usually 1-2-seeded, septa spirally twisted. *Seeds* oblong, testa membranous; cotyledons leafy, crumpled, radicle long.—DISTRIB. Species 3 or 4, tropical Asiatic and Oceanic.

1. **M. pubescens**, *Blume Bijl. i.* 137; pubescent, leaflets 9-15 ovate to broad lanceolate, corymbs subsessile or peduncled finely pubescent, calyx cupular entire or 5-lobulate, ovary 5- rarely 2-4-celled more or less hairy, stigma capitate slightly broader than the style, berry glabrous. *Oliv. in Journ. Linn. Soc. v. Suppl. ii.* 40; *Bedd. Flor. Sylv. Anal. Gen.* xliii. t. 7, f. 1; *Thwaites Enum.* 46. *Bergera integerrima*, *Roxb. Fl. Ind.* ii. 376; *Wall. Cat.* 6371. *Aurantiacea*, *Wall. Cat.* 8517, 8518.

Central and Eastern TROPICAL HIMALAYA; Nipal, *Wallich*; Sikkim, *J. D. H.*; ASSAM; KHASIA Mts.; CHITTAGONG and from BURMA southward to MALACCA; CEYLON.—DISTRIB. Java, China and Eastward to the Pacific Islands.

A small umbrageous tree. *Leaves* 6-18 in.; leaflets subopposite and alternate, short-petioled, waved, often caudate-acuminate, base often cordate, pubescent beneath, rarely above. *Cymes* terminal, decomposed, tomentose; peduncle long or short; pedicels

$\frac{1}{2}$ – $\frac{1}{2}$ in.; bracts minute. *Flowers* variable in size, $\frac{1}{2}$ – $\frac{1}{2}$ in. diam., heavy-scented; buds oblong. *Petals* narrow-oblong, subacute, finely pubescent. *Stamens* alternately longer; anthers didymous. *Ovary* usually hairy; 2–7- but usually 5-celled. *Berry* ovoid or oblong, as large as a large pea, yellow. *Seed* nearly as long.—There is a specimen from N. W. India in Royle's Herbarium, but probably from a garden, as he makes no mention of it in his Illustrations of Himalayan Plants. The following varieties are established by Prof. Oliver:—

VAR. 1; leaflets $2\frac{1}{2}$ – $3\frac{1}{2}$ by $1-1\frac{1}{2}$ in., calyx subentire, style equalling or exceeding the ovary. *Bergera villosa*, Wall. Cat. 6372. *Cookia punctata*, Hassk.; *Miq. Fl. Ind. Bat.* i. pl. 2, 524.—Penang (Java, Philippines).

VAR. 2; leaflets $3\frac{1}{2}$ –6 by $1-1\frac{1}{2}$ –2 in., cymes broader, flowers larger, calyx with triangular lobes.—*B. integerima*, Roxb. l.c.; *DC. Prodr.* i. 537. *B. villosa*, Wall. Cat. 6372.—Sikkim, ascending to 4000 ft.; Nipal, Assam, Birma.

VAR. 3; leaflets narrower $1\frac{1}{2}$ – $3\frac{1}{2}$ by $\frac{1}{2}$ – $1\frac{1}{2}$ in., calyx lobulate, style often exceeding the ovary.—Ceylon.

2. **M. hirsutum**, Oliv. in *Journ. Linn. Soc. v. Suppl.* ii. 40; tomentose, leaflets 10–25 obscurely toothed, cymes densely tomentose almost hirsute, ovary 5-celled, stigma about as broad as the style, berry very hairy.—*Aurantiacea*, Wall. Cat. 8516.

PENANG, Jack, Porter, &c.; SINGAPORE, Wallich; PEGU, McLelland; TENASSERIM, Griffith, Helfer.—DISTRIB. Philippine Islds.

Very like *M. pubescens*, and probably only a variety of that plant, but more tomentose, especially the inflorescence, which is almost hirsute, as is the berry. The flowers are as small as the smallest var. of *M. pubescens*.

14. **MURRAYA**, Linn.

Unarmed shrubs or small trees. *Leaves* pinnate; leaflets alternate, petioled, base oblique or cuneate. *Flowers* solitary and axillary, or in terminal corymbs or axillary cymes. *Calyx* 5-fid or -partite. *Petals* 5, free, imbricate. *Stamens* 10, inserted round an elongate disk, filaments linear-subulate, the alternate shorter; anthers short, small. *Ovary* 2–5-celled, narrowed into a long deciduous style, stigma capitate; ovules solitary or 2 superimposed or collateral in each cell. *Berry* 1–2-celled, oblong or ovoid, 1–2-seeded. *Seed* with a woolly or glabrous testa; cotyledons equal.—DISTRIB. Species 4, tropical Asiatic.

1. **M. exotica**, Linn.; leaves glabrous 3–8-foliate, leaflets oblique, cymes terminal corymbose. Oliv. in *Journ. Linn. Soc. v. Suppl.* ii. 28; *Roxb. Fl. Ind.* ii. 374; *Wall. Cat.* 6368; *Thwaites Enum.* 45; *Wight Ic.* t. 96; *Bedd. Flor. Sylvat. Anal. Gen.* xlv. t. 7, f. 2; *Brandis Flor. Flor.* 48. *Chalcas intermedia* and *C. paniculata*, *Roem. Synops.* fasc. i. 48 and 49.

Throughout the hotter parts of INDIA, from GARHWAL to ASSAM and BIRMA, and southward to CHITTAGONG, TRAVANCOR, and CEYLON.—DISTRIB. Eastward to China, Australia, and the Pacific Islands.

A very variable evergreen plant, of which two forms occur—a bushy and a sub-arboreous. *Branches* slender, young parts pubescent. *Leaves* 4–5 in.; leaflets shortly petioled, 1–3 in., ovate or obovate, or rhomboid, obtuse or obtusely acuminate and often notched at the tip, usually very oblique at the base, shining above, quite entire, newer slender. *Corymbs* terminal and axillary, few- or many-flowered. *Flowers* campanulate, $\frac{1}{2}$ in. diam., pure white, very fragrant. *Sepals* glandular, acute. *Petals* oblong-lanceolate, spreading above. *Stamens* alternately longer. *Ovary* 2-celled; style slender, stigma capitate; ovules solitary in each cell or 2 superposed. *Berry* $\frac{1}{2}$ in., apiculate, globose or ovoid, 1–2-seeded.

VAR. 1; shrubby, corymbs many-flowered, ovary 2-celled.—*M. exotica*, *Auct. M.*

exotica and brevifolia, *Thwaites Enum.* 45.—Common in Northern India; Ceylon in Gardens only.

VAR. 2; arboreous, corymbs few-flowered or flowers subsolitary, ovary 2-celled.—*M. paniculata*, *Jack in Mal. Misc.* i. 31 ex *Hook. Bot. Misc.* ii. 79; *DC. Prodr.* i. 537; *W. & A. Prodr.* 94; *Dalz. & Gibs. Bomb. Flor.* 29. *M. sumatrana*, *Roxb. Fl. Ind.* ii. 375; *Wall. Cat.* 6369. *Chalcas paniculata*, *Linn. Ch. sumatrana*, *Roem. Synops. fasc.* i. 49.—Chiefly in the Western Peninsula. Ceylon, ascending to 3000 ft.

VAR. 3; ovary 4-5-celled.—*M. Glenieii*, *Thwaites Enum.* 406; *Oliv. in Journ. Linn. Soc. v. Suppl.* ii. 29.—Trincomalee in Ceylon.—*Thwaites*, l.c., gives *Oliver* as the author of this species, but the latter quotes *Thwaites mss.* as his authority.

2. **M. Koenigii**, *Spreng. Syst. Veg.* ii. 315; leaves pubescent or glabrous 10-20-foliolate, leaflets small oblique, cymes terminal, ovary 2-celled. *Oliv. in Journ. Linn. Soc. v. Suppl.* ii. 29; *Bedd. Flor. Sylv. Anal. Gen.* xlv.; *Brandis For. Flor.* 48. *Bergera Koenigii*, *Linn.*; *W. & A. Prodr.* 94; *Wight Ic.* t. 13; *Wall. Cat.* 6370; *Roxb. Cor. Pl.* ii. t. 112; *Fl. Ind.* ii. 375; *Dalz. & Gibs. Bomb. Flor.* 29.

Along the foot of the Himalayas, from GARHWAL to SIKKIM, ascending to 5000 ft.; BENGAL, PEGU, and southward to TRAVANCOR and CEYLON; often cultivated.

A small strong-smelling umbrageous tree, pubescent or tomentose, rarely glabrous, deciduous. *Leaves* often 1 foot long, narrow; petiole slender, terete; leaflets petioled, 1-1½ in., variable, usually obliquely ovate, obtusely acuminate, tip notched, crenulate, sometimes suborbicular or lanceolate. *Corymbs* peduncled, many-flowered. *Flowers* white, ½ in. long, subcampanulate, ebracteate. *Sepals* acute. *Petals* linear-oblong, obtuse, dotted. *Stamens* alternately longer, filaments dilated below. *Ovary* 2-celled; style cylindric, stigma capitate grooved; ovules solitary in each cell, or 2-superposed. *Fruit* ovoid or subglobose, ½ in. diam., black, rugose. *Seeds* imbedded in mucilage.—*Leaves* much eaten in curries.

3. **M. elongata**, *Alph. DC. mss. in Wall. Herb.*; leaves glabrous 4-6-foliolate, leaflets 4-5 in. ovate- or elliptic-lanceolate obtusely caudate-acuminate tip notched coriaceous.

BIRMA, at Taong-dong, *Wallich*.

A very different looking plant from any of the forms of *M. exotica*.—Bark on the slender branches pale yellow. *Petiole* with rachis 3 in., angular; leaflets pale bright-brown when dry, much longer and more lanceolate than in any form of *M. exotica*. *Fruit* ¾ in. long, narrowly ellipsoid, as in the last-named species, of which it may be a form.

15. CLAUSENA, Burm.

Unarmed shrubs or trees. *Leaves* imparipinnate, usually deciduous, leaflets membranous. *Flowers* small, in terminal or axillary cymes panicles or lax racemes. *Calyx* 4-5-lobed or partite. *Petals* 4-5, free, membranous, margins imbricate. *Stamens* 8-10, inserted round an elongated disk, the alternate shorter, filaments usually dilated or arched and concave below the subulate tip; anthers short. *Ovary* stipitate, 4-5 (rarely 2-3-) celled; style usually distinct, deciduous, stigma obtuse entire or 2-5-lobed; ovules 2, collateral or superposed in each cell. *Berry* small, ovoid, oblong or globose, 2-5-celled. *Seeds* oblong, testa membranous; cotyledons equal, plano-convex.—DISTRIB. Species about 14, chiefly tropical Asiatic, with a few African and Australian.

* *Inflorescence terminal, panicked.*

1. **C. pentaphylla**, *DC. Prodr.* i. 538; tomentose above, leaves 3-7-foliolate, leaflets 5-9 in. ovate acuminate tomentose or glabrate beneath, flowers 4-merous, ovary hairy, style very short glabrous. *Don Gen. Syst.* i.

586; *Oliv. in Journ. Linn. Soc. v. Suppl. ii. 30*; *Brandis For. Flor. 49*. *Amyris pentaphylla*, *Roxb. Fl. Ind. ii. 247* (error in descript. of ovules); *Wall. Cat. 8519*. *Limonia mollis*, *Wall. Cat. 6362*. *Gallesioa pentaphylla*, *Roem. Synops. fasc. i. 45*.

TROPICAL WESTERN HIMALAYA, from Kumaon to Nipal, and in the Doom and Sal forests of Oudh; Cawnpore, *Hardwick*.

Branchlets terete, softly tomentose, as thick as a goose-quill. *Leaves* large; petiole often shorter than the leaflet, terete; leaflets membranous, narrow and more or less oblique at the cuneate base, quite entire or obscurely crenate, very shortly petioled, usually softly tomentose beneath; nerves spreading. *Panicle* erect, 4–10 in. long, branches long stout much divided, all very softly downy. *Flowers* $\frac{1}{4}$ in. diam.; buds globose. *Sepals* triangular, acute. *Petals* oblong, concave, obtuse, glabrous or hairy outside. *Filaments* short, broad. *Fruit* $\frac{1}{4}$ in. diam., broadly oblong, glabrous, pale orange, papillose.—*Wallich's 8519*, from the Calcutta Gardens, have very large (10 by $4\frac{1}{2}$ in.) membranous sometimes 1-foliate leaves, almost glabrous beneath and glabrous petals.

2. **C. heptaphylla**, *W. & A. Prodr. 95*, in note; glabrous, leaves 5–9-foliate, leaflets 2–5 in. equal or slightly oblique at the base, flowers 4–5-merous, ovary obovoid 4-grooved glabrous, style as long as the ovary and as broad as the stigma. *Oliv. in Journ. Linn. Soc. v. Suppl. ii. 30*. *Amyris heptaphylla*, *Roxb. Fl. Ind. ii. 248*; *Wall. Cat. 8508*.

EASTERN BENGAL, near Calcutta, *Roxburgh*; SILHET, *Wallich*; KHASIA MTS., ascending to 4000 ft., and CHITTAGONG, *H. f. & T.*; TENASSERIM, *Griffith*.

A branching bush, smelling strongly of aniseed; branchlets glabrous, as thick as a crow-quill. *Leaves* 6–16 in.; petiole cylindric, slender; leaflets sometimes 8 in., shortly petioled, membranous, ovate or lanceolate, acuminate, very obscurely crenulate, pale beneath; nerves and costa slender. *Panicle* with slender spreading branches, on which the flowers are racemed. *Flowers* $\frac{1}{4}$ in. diam., pedicels slender, buds globose, yellow-white. *Petals* oblong, glabrous. *Berry* $\frac{1}{2}$ in. long, oblong, white reddish on pale yellow, glandular.

3. **C. macrophylla**, *Hook. f.*; softly villous, leaves 5-foliate, leaflets 5–7 in. equal or suboblique obscurely toothed tomentose beneath, flowers glabrous, stamens equal, filaments very short, ovary stipitate glabrous 4-lobed tubercled, style as long as the ovary and as broad as the stigma. *C. heptaphylla* var. ? pubescens; *Oliv. in Journ. Linn. Soc. v. Suppl. ii. 30*. *Cookia* ? *macrophylla*, *Lindl. in Wall. Cat. 6367*.

BIRMA, on the banks of the Saluen at Trogla, *Wallich*.

I have seen but one specimen. *Branchlets* as thick as a goose-quill, and as well as the petiole and panicle clothed with a soft spreading close-set velvety tomentum. *Leaves* 1 ft.; leaflets very shortly petioled, acuminate, pale on both surfaces, nerves strong arched, margin with shallow small rather distant teeth, midrib stout; common petiole stout, terete. *Panicle* stout, erect, with the peduncle 1 ft. long; branches strict, erect-patent, secondary branchlets short. *Flowers* crowded, $\frac{1}{16}$ in. diam., shortly pedicelled, buds globose. *Calyx-lobes* 4, minute, rounded, acute. *Petals* broadly oblong, concave, membranous, covered with large glands. *Filaments* much dilated below; anthers large, oblong. *Ovary* stipitate, tubercled with very large glands; ovules 2, collateral in each cell. *Fruit* immature, oblong, tip obscurely 4-angled and truncate.

4. **C. excavata**, *Burm. Fl. Ind. 87*; pubescent or tomentose, leaves 15–30-foliate, leaflets 2–3 $\frac{1}{2}$ in. oblique at the base, flowers 4-merous, ovary ovoid or elliptic sub-4-gonal stipitate hairy or hirsute, style stout about equalling the ovary. *DC. Prodr. i. 538*; *Oliv. in Journ. Linn. Soc. v. Suppl. ii. 31*. *Murraya Burmanni*, *Spreng. Syst. Veg. ii. 315*. *Amyris sumat-*

trana and punctata, *Roxb. Fl. Ind.* ii. 250, 251; *Wall. Cat.* 8512. *Cookia graveolens*, *W. & A. Prodr.* 95; *Wall. Cat.* 8515. *Galliesia graveolens*, *Roem. Synops. fasc.* i. 45.

TROPICAL HIMALAYA, alt. 2000 ft., from Nipal, *Wallich*, to Bhotan, *Griffith*; SILHET PEGU, and CHITTAGONG, *Wallich*, &c. EASTERN PENINSULA; MALACCA, *Griffith*; PENANG, *Porter*, &c.—DISTRIB. Sumatra, Java, Borneo.

A tree, fetid when bruised, smelling of Sassafras (*Roxburgh*); branchlets as thick as a crow-quill and as well as the inflorescence petioles and leaflets more or less softly tomentose. *Leaves* 6–12 in.; petiole slender, cylindric, more tomentose than the leaflets which are very oblique at the base, petioled, ovate or lanceolate, acuminate, membranous, obscurely crenate, upper often falcate. *Panicle* 4–12 in. high, pyramidal; branches spreading, alternate. *Flowers* shortly pedicelled, $\frac{1}{2}$ in. diam., white; buds globose. *Petals* oblong, glabrous. *Fruit* $\frac{3}{4}$ in., broadly oblong.

VAR. *villosa*; clothed with soft spreading hairs, petals hirsute.—Rangoon.

5. **C. Wampi**, *Blanco Flor. Filip.* 358; branches petioles and inflorescence pustular, leaves 5–9-foliolate, leaflets 2–4 in. broad ovate elliptic or lanceolate, waved or crenulate, flowers 4–5-merous, ovary pilose usually 5-celled, style very short glabrous above, stigma 5-lobed, ovules 2 in each cell superposed. *Oliv. in Journ. Linn. Soc. v. Suppl.* ii. 34. *Cookia punctata*, *Sonnerat Voy.* iii. 258, t. 130; *DC. Prodr.* i. 537; *Roxb. Fl. Ind.* ii. 382; *Wall. Cat.* 6366.

Cultivated in INDIA and the Eastern Islands; native probably of China.

A small glabrous tree, with a sweet terebinthine odour. *Leaves* 4–10 in.; petiole cylindric, glabrous or hairy; leaflets petioled, oblique, shining above, tip obtuse notched. *Panicle* large, erect, compound, branched from the base, branches stout. *Flowers* $\frac{1}{2}$ in. diam., white; pedicels very short, stout; buds globose. *Petals* broad, concave. *Fruit* nearly globose; rind tough, covered with glands full of green balsamic oil. *Seed* solitary.

6. **C. Wallichii**, *Oliv. in Journ. Linn. Soc. v. Suppl.* ii. 35; leaves 13–17-foliolate, leaflets rhomboid or oblong-lanceolate crenulate glabrous, petiole and rachis obscurely winged, flowers 5-merous, ovary glabrous 4–5-celled, style distinct, ovules 2 superposed in each cell.

BIRMA, Chappedong hill, *Wallich*.

Branchlets terete, black when dry, smooth. *Leaves* 8–12 in.; leaflets 2–3 in., alternate, oblique, caudate-acuminate with an obtuse notched tip, narrowed into a cuneate base; petiole very slender, margined rather than winged. *Panicle* 3–5 in. long and broad, much branched; branches erecto-patent, glabrous, strict. *Flowers* subsessile, $\frac{1}{2}$ in. diam., glabrous. *Calyx* 5-partite. *Petals* imbricate. *Stamens* 10, free, filaments thickened in the middle. *Ovary* on a short narrow stalk, usually 5-celled; style very short, grooved, as broad as the stigma; ovules obliquely superposed.—*Oliver* remarks that when the ovary is 4-celled, the ovules in at least one cell are collateral, as also that this species weakens the distinction between *Clausena* and *Murraia*.

7. **C. indica**, *Oliv. in Journ. Linn. Soc. v. Suppl.* ii. 36; glabrous, leaves 7–11-foliolate, leaflets oblique polymorphous crenulate, flowers 5-merous, ovary 2–5-celled glabrous papillose, ovules 2 collateral in each cell. *Bedd. Flor. Silv. Anal. Gen.* xlv. *Piptostylis indica*, *Dalz. in Kew Journ. Bot.* iii. 33, t. 2; *Dalz. & Gibs. Bomb. Flor.* 29. *Bergera nitida*, *Thwaites Enum.* 46.

WESTERN PENINSULA; from the Bombay Ghats, *Dalzell*, to the Anamallay hills, *Beddome*. CEYLON, *Thwaites*,

A shrub or small tree; branchlets slender, pubescent. *Leaves* 4–10 in.; petioles slender, arched, terete, glabrous or puberulous; leaflets 2–4 in., petioled, very oblique, oblong-ovate, elliptic or lanceolate, rarely almost rounded, tip rounded obtuse and notched or acute or acuminate, crenulate, very dark with raised glands on both surfaces when dry.

Panicle peduncled; peduncle hoary, corymbosely branched above. *Flowers* $\frac{1}{2}$ in. diam., very shortly pedicelled, pale, glabrous, globose. *Petals* broadly ovate. *Fruit* $\frac{1}{2}$ in. diam., globose, yellow.—Beddome considers this to be probably a variety of *C. Willdenovii*, but the inflorescence is totally different.

**** Inflorescence axillary, paniced or racemose.**

8. **C. Willdenovii**, *W. & A. Prodr.* 96; glabrous or pubescent or tomentose, leaves 5-13-foliolate, leaflets 1-2 in. obliquely ovate or ovate-lanceolate crenulate, flowers in compound slender racemes usually 4-merous, ovary stipitate 4-angled or grooved glabrous, style short thick, ovules 2 superposed in each cell. *Oliv. in Journ. Linn. Soc. v. Suppl.* ii. 32; *Bedd. For. Sylvat. Anal. Gen.* xlv. t. 7, f. 3; *Dalz. & Gibs. Bomb. Flor.* 30; *Wight Ic.* t. 14; *Thwaites Enum.* 47; *Wall. Cat.* 8509. *Cookia dulcis*, *Bedd. in Madr. Journ.* 1861; *Trans. Linn. Soc.* xxv. 211. *Icica dentata* *DC. Prodr.* ii. 78. *Amyris dentata*, *Willd. Sp. Pl.* ii. 337.

SIKKIM HIMALAYA, alt. 1-2000 ft. WESTERN PENINSULA, common, ascending to 3000 ft. in Wynad. CEYLON, in the hot drier parts.—DISTRIB. Moluccas.

A large shrub (*Roxburgh*), glabrous or with the young parts and sometimes the petioles and inflorescence pubescent; branchlets slender. *Leaves* 6-16 in.; petiole slender, terete; leaflets petioled, oblique, oblong-ovate or ovate-lanceolate, obtuse, acute or obtusely caudate acuminate, crenulate, membranous. *Racemes* slender, axillary, 3-10 in. long, branches or pedicels divaricating. *Flowers* fragrant, rather remote, $\frac{1}{2}$ in. diam., whitish; buds globose. *Petals* oblong, concave, glandular. *Fruit* globose, from the size of a pea to a cherry, whitish-green, pellucid.

VAR. 1. pubescens; more or less pubescent or tomentose or woolly on the young bracts petioles and inflorescence or throughout. *C. pubescens*, *W. & A. Prodr.* 96; *Wall. Cat.* 8510.—Pegu, Madras, Ceylon.

VAR. 2. nana; branches petioles and racemes quite glabrous with scattered pustular glands, leaflets smaller membranous reticulate. *C. nana*, *W. & A. l.c.*; *Wall. Cat.* 8507. *Amyris nana*, *Roxb. Fl. Ind.* ii. 249. Madras (Moluccas, *Roxburgh*).

9. **C. suffruticosa**, *W. & A. Prodr.* 96; softly tomentose, leaves 11-17-foliolate, leaflets 3-5 in. obliquely oblong or ovate-oblong, flowers in compound slender racemes 4-merous, ovary stipitate ovoid or subspherical or grooved, style slender, ovules superposed in each cell. *Oliv. in Journ. Linn. Soc. v. Suppl.* ii. 33; *Wall. Cat.* 8513, 8514. *Amyris suffruticosa*, *Roxb. Fl. Ind.* ii. 250.

CHITTAGONG, *Roxburgh*; KHASIA MTS., *De Silva*.

Shrubby, wholly clothed with soft spreading tomentum; stem simple; branchlets about as thick as a goose-quill. *Leaves* 1 ft.; petiole straight, slender, terete, glandular towards the base; leaflets shortly petioled, obtuse acute or acuminate, often equally tomentose on both surfaces, quite entire. *Racemes* 2-5 in., compound, slender, glandular. *Flowers* $\frac{1}{2}$ in. diam., greenish-white, pedicels slender; buds globose. *Petals* glabrous, concave. *Fruit* (according to *Roxburgh*) 1 in. long, fusiform or ovoid, drooping, orange-yellow, glandular. *Seed* solitary, green.—Distinguished from var. *pubescens* of Willdenow by the much larger size of leaves leaflets and fruit.

16. **TRIPHASIA**, Lour.

A spiny shrub. *Leaves* alternate, sessile, 3-foliolate, leaflets obtuse, crenate, lateral smaller. *Flowers* solitary, or in 3-flowered cymes, axillary, sweet-scented. *Calyx* 3-lobed. *Petals* 3, free, imbricate. *Stamens* 6, inserted round a fleshy disk, filaments free subequal dilated at the base; anther linear. *Ovary* ovoid, 3-celled, narrowed into a slender deciduous style, stigma obtuse or capitate and 3-lobed; ovules solitary in each cell. *Berry* small, ovoid, 1-3-celled, 1-3-seeded. *Seeds* oblong, immersed in

mucilage, testa coriaceous; cotyledons plano-convex, often unequal or lobed.

1. **T. trifoliata**, DC. *Prodr.* i. 536; *Oliv. Journ. Linn. Soc.* v. *Suppl.* ii. 26; *W. & A. Prodr.* 91; *Dalz. & Gibs. Bomb. Fl. Suppl.* 12. *T. auranticola*, Lour.; *Wall. Cat.* 6381. *Limonia trifoliata*, Linn.; *Burm. Fl. Ind.* t. 35, f. 1. *L. diacantha*, DC. *Prodr.* i. 536.

WESTERN PENINSULA, apparently common, but said to be an escape; common in gardens throughout INDIA and in various tropical countries.

A glabrous spinous shrub, with straggling evergreen branches and leaves; spines slender, straight. *Leaflets* thick and soft, crenulate, coriaceous, almost nerveless, the terminal shortly petioled, $\frac{3}{4}$ –1½ in., ovate with a cuneate base and rounded notched tip; lateral smaller, more rounded, oblique. *Flowers* very shortly peduncled, nearly ½ in. long, white, fragrant. *Petals* linear-oblong. *Fruit* ½ in. long, fleshy, apiculate, gland-dotted.—Graham (*Cat. Bomb. Pl.* 23) is probably mistaken in supposing that this, which is considered by many to be a Chinese plant, is a native of the Southern Concan. I am not aware, however, that it has anywhere been found in an indigenous state.

17. LIMONIA, Linn.

Shrubs or small trees, often spiny. *Leaves* alternate, 3-foliolate or imparipinnate; leaflets opposite or alternate; petiole winged. *Flowers* paniced, racemed or fascicled. *Calyx* equally 4-5-lobed or -partite. *Petals* 4-5, imbricate. *Stamens* 8-10, inserted around an annular or elevated disk, filaments subulate; anthers cordate or linear-oblong. *Ovary* oblong, 4-5-celled; style short, stout, deciduous, stigma obtuse or capitate; ovules 1-2 in each cell. *Berry* globose, 1-4-celled, 1-4-seeded. *Seeds* imbedded in mucilage; cotyledons fleshy.—DISTRIB. Species 2-3, natives of Tropical Asia.

* *Cells of the ovary* 1-ovuled.

1. **L. acidissima**, Linn.; DC. *Prodr.* i. 536; spinous, glabrous, leaves pinnate, leaflets 2-4 pair sessile opposite obtuse crenulate, rachis broadly winged, racemes subumbellate, flowers 4-merous. *W. & A. Prodr.* 92; *Grah. Cat. Bomb. Pl.* 23; *Dalz. & Gibs. Bomb. Fl.* 29; *Bedd. For. Flor. Anal. Gen.* xlv. *L. crenulata*, Roeb. *Cor. Pl.* t. 86; *Fl. Ind.* ii. 381; *DC. l.c.*; *Wall. Cat.* 6364. *Hesperethusa acidissima*, *crenulata* and *ambigua*, Roem. *Synops. fasc.* i. 38.—*Rheede Hort. Mal.* iv. t. 14.

Dry hills in various parts of India, N.W. HIMALAYA in Simla and Kumaon, ascending to 4000 ft.; Monghyr hills in BEHAR; ASSAM; WESTERN PENINSULA, from the Bombay Ghats and Coromandel southwards. YUNAN, J. Anderson.

A spinous glabrous shrub or small tree, with rigid flexuous woody branches; spines ½–1 in. *Leaves* 1-4 in. long; petiole and rachis jointed, the former narrowly the latter very broadly winged; leaflets 1-2 in., trapezoid-ovate, obtuse and notched at the tip, base cuneate, margins crenulate, nerves slender reticulate; joints of rachis obovate-oblong, crenulate. *Racemes* 1 in. long, pubescent, often leafy; pedicels slender. *Flowers* ½ in. diam., tetramerous, white, fragrant. *Sepals* small. *Petals* elliptic or oblong. *Disk* annular or columnar. *Ovary* 4-celled, style short thick; ovule 1 pendulous in each cell. *Berry* globose, ½ in. diam., 1-4-seeded, very acid.

2. **L. pubescens**, Wall. *Cat.* 6365 (*Limonia* ?); spinous, leaflets 3-5-pair opposite broadly rhomboid or ovate obtuse quite entire or sinuate-crenate midrib beneath and winged costa pubescent.

BIRMA; at Taong-dong, Wallich.

The specimen in Wallich's Herbarium is very incomplete, and the detached fruit which accompanies it is probably that of another plant. *Branches* woody, with short strong scattered thorns, branchlets unarmed. *Leaves* 3-5 in., leaflets $1\frac{1}{2}$ -2 in., sessile, base cuneate; rachis between the leaflets $\frac{1}{16}$ in. broad.—? *Fruit* a depressed sphere $\frac{1}{2}$ in. diam., 5-lobed, smooth.

3. **L. alternans**, Wall. in Voigt. Hort. Cat. 139; unarmed, leaves pinnate, leaflets 5-7 pairs alternate acuminate crenulate, rachis narrowly winged, cymes subsessile, flowers 5-merous. Kurz in Journ. As. Soc. Beng. 1873, ii. 64 (*L. alternifolia*).

PEGU, Wallich, Kurz; TENASSERIM, at Mergui, Griffith.

A slender shrub, with a simple or sparingly branched stem, quite glabrous. *Leaves* 4-9 in.; petiole hardly winged; rachis narrowly winged; leaflets $1\frac{1}{2}$ -2 in., ovate, sessile, terminal much larger, nerves obscure. *Cymes* short and shortly peduncled, axillary, glabrous. *Flowers* small, white. *Sepals* minute, acute. *Petals* $\frac{1}{4}$ in. long, subacute. *Stamens* 10, the alternate longer, filaments sparsely pubescent within. *Disk* thick, elongate after flowering. *Ovary* obovoid, compressed, smooth, 2-celled; ovules solitary, pendulous; style curved, stigma thickened.—The description of the flower is from Kurz, who retains it in this genus.

** *Cells of ovary* 2-ovuled.

4. **L. alata**, W. & A. Prodr. 92; usually spinous, leaves 3-foliolate, leaflets obovate quite entire, the lateral small, flowers 4-5-merous. Wight Ill. i. t. 41; Oliv. in Journ. Linn. Soc. v. Suppl. ii. 27; Wall. Cat. 6363; Thwaites Enum. 45; Bedd. Flor. Sylv. Anal. Gen. xlv. t. 7, f. 4.

WESTERN PENINSULA; foot of the Nilghiri and Anamallay Mts. and elsewhere in the Madras Presidency, Wight, Maingay; CEYLON, common in hot dry parts of the Island.

A small glabrous tree; spines 1 in., nearly straight. *Leaves* 2-4 in.; leaflets 1-2 $\frac{1}{2}$ in., subsessile, base cuneate; petiole 1-1 $\frac{1}{2}$ in., winged. *Panicles* 2-3 in., terminal and axillary, few- or many-flowered, hoary, branches rather stout. *Flowers* $\frac{1}{2}$ in. diam., shortly pedicelled, ebracteolate. *Sepals* triangular. *Petals* oblong. *Stamens* subequal. *Disk* small, annular. *Ovary* 4-5-celled; style rather slender, stigma capitate; ovules collateral or obliquely superposed. *Berry* 1 in. diam., globose, many-seeded.

DOUBTFUL AND EXCLUDED SPECIES.

LIMONIA BILOCULARIS, Roxb. Fl. Ind. ii. 377. *Atalantia?* bilocularis, Wall. Cat. 6356. *Sclerostylis atalantioides*, W. & A. Prodr. 93, not of Wight Ic. 71; *Helie atalantioides*, Roem. Synops. fasc. 42. *A. buxifolia*, Oliv. in Journ. Linn. Soc. v. Suppl. ii. 26.—A Chinese plant, erroneously supposed to have been introduced into the Calcutta Botanic Garden from Coromandel by Dr. Berry.

L. ? *FLAVICANS*, Wall. Herb., from Taong-dong in Ava, a plant without flower or fruit, is not Aurantiaceous, but I cannot tell what it is.

L. *OBLONGA*, Wall. Cat. 6359; an imperfect specimen without flower or fruit, may be *Paramignya Griffithii*. The leaves are 3-5 in., oblong-lanceolate, obtusely acuminate, and as well as the slender branchlets finely pubescent beneath; spines short.

L. *PENTAGYNA*, Roxb., is *Bursera serrata*, Wall., according to Kurz in Journ. As. Soc. Bengal, 1870, pt. 2, 70.

L. *RETUSA*, Don Prodr. 224, is probably *Triphasia trifoliata*.

18. **LUVUNGA**, Hamilt.

Glabrous, climbing shrubs, usually armed with axillary spines. *Leaves* 3-foliolate; leaflets coriaceous quite entire. *Flowers* in axillary fascicled or paniced racemes. *Calyx* cupular, entire or obscurely 4-6-lobed. *Petals* 4-5,

free, linear-oblong, thick, imbricate. *Stamens* 8 or 10, inserted around a cupular annular or elevated disk; filaments equal or not, linear-subulate, free or cuneate; anther linear or linear-oblong. *Ovary* 2-4-celled; style stout, deciduous, stigma capitate; ovules 2 superposed in each cell. *Berry* large, ellipsoid, with a thick rind, 2-3-seeded. *Seeds* large, ovoid, testa membranous, nerved; cotyledons equal, oblong, fleshy.—**DISTRIB.** About 4 species tropical Asiatic.

1. ***L. scandens***, *Ham. in Wall. Cat.* 6382; leaflets 5-12 in. oblong elliptic-oblong or lanceolate or oblanceolate tip rounded acute or acuminate, filaments more or less cuneate. *Wight Ill.* i. 108; *Oliv. in Journ. Linn. Soc. v. Suppl.* ii. 43; *Bot. Mar.* t. 4522. *Limonia scandens*, *Roxb. Fl. Ind.* ii. 380.

EASTERN BENGAL, ASSAM, the KHASIA MTS., BIRMA, and MALACCA.

A strong scandent annual glabrous shrub, with woody flexuous branches, and recurved spines. *Leaves* very variable, thickly coriaceous; petiole 2-5 in., stout, cylindrical; leaflets smooth, shortly petioled, nerves very faint, spreading. *Cymes* panicked or subracemose, short, shortly peduncled, few-flowered. *Flowers* about $\frac{3}{4}$ in. diam., very fragrant, white. *Calyx* with the margin truncate and lobed more or less. *Petals* 4, fleshy, recurved. *Stamens* with the filaments sometimes united almost to the top. *Ovary* 3-4-celled. *Berry* oblong, size of a pigeon's egg, yellowish, obscurely 3-lobed, rind smooth, pulp resinous-odoriferous. *Seeds* 1-3, ovoid, pointed.—The description of the fruit is from Roxburgh. Malacca specimens have much broader and more obtuse leaves than the Silhet and Assam ones. Beddome (*Flor. Sylv. Anal. Gen.* xlvii. in note) says that this, as well as the following, is abundant in the Western side of the Madras Presidency, but I have seen no specimens from thence.

2. ***L. eleutherandra***, *Dalz. in Hook. Kew Journ. Bot.* ii. 258; leaflets 3-5 in. elliptic or obovate abruptly obtusely acuminate, filaments free. *Oliv. in Journ. Linn. Soc. v. Suppl.* ii. 44; *Dalz. & Gibs. Bomb. Flor.* 30. *L. Tavoyana*, *Lindl. in Wall. Cat.* 6383. *L. scandens* and *eleutherandra*, *Thwaites Enum.* 47, 48, 406. ? *Triphasia sarmentosa*, *Blume Bijdr.* i. 132.

WESTERN PENINSULA, in forests from the Concan southwards; CEYLON, alt. 3-5000 ft., *Thwaites*, &c.; ? TAVOY, *Gomez*.—**DISTRIB.** Java.

Perhaps only a variety of *L. scandens*, with smaller leaves and fruit and free stamens.—Kurz (*Journ. As. Soc. Beng.* 1870, ii. 69) doubts Blume's *T. sarmentosa* being this; but there is a Javan specimen so marked in the Herb. that altogether resembles the Indian. Wallich's specimens of *L. Tavoyana* have the leaves even larger than those of *L. scandens*.

19. **PARAMIGNYA**, Wight.

Erect or climbing shrubs, unarmed or with axillary spines. *Leaves* 1-foliolate, the joint often obscure, quite entire, subcoriaceous, persistent. *Flowers* rather large, axillary, solitary or fascicled. *Calyx* cupular or small and 4-5-lobed. *Petals* 4-5, free, imbricate or rarely induplicate-valvate. *Stamens* 8-10, inserted round a columnar disk, filaments free linear equal or subequal; anther linear-oblong. *Ovary* 3-5-celled; style elongate, deciduous; ovules in each cell solitary or 2 obliquely superposed. *Berry* ovoid or subglobose, often contracted at the base, 1-5-seeded, rind thick. *Seeds* large, oblong, much compressed, testa membranous; cotyledons fleshy, equal.—**DISTRIB.** Species 4, tropical Indian.

Kurz proposes to join this genus with *Atalantia* (*Journ. As. Soc. Beng.* 1870, ii. 69), observing that the shape of the anthers cannot be important, that *A. missionia* has a columnar disk, and that the habit is the same in both genera. All the species of both genera want a careful study and revision with better materials than I have.

* *Flowers nearly 1 in. long. Calyx cupular with broad lobes.*

1. **P. monophylla**, *Wight Ill. i. 109, t. 42* (Micromelum ?); spines recurved, leaflet oblong or elliptic with an abruptly acute tip, flowers 1-4 equalling or exceeding the pedicels, calyx cupular broadly 4-5-lobed, stamens 10-12, ovary-cells 3-5 2-ovuled. *Oliv. in Journ. Linn. Soc. v. Suppl. ii. 41.*

SIKKIM HIMALAYA, alt. 2-5000 ft., *J. D. H.*; BHOTAN, *Booth*; KHASIA Mts., alt. 2-4000 ft.; TENASSERIM, *Lobb*; WESTERN PENINSULA, common; the Western Forests, from the CONCAN southward; CEYLON.

A stout climbing evergreen shrub, with strong green flexuous woody branches and hooked axillary spines sometimes nearly an inch long; tips of young shoots and petioles often pubescent. *Leaflets* 2½-5 in., usually elliptic and rounded at both ends, rarely somewhat obovate, sometimes elliptic-lanceolate and acute or caudate-acuminate, coriaceous, bright green; nerves numerous, spreading; petiole ½-¾ in. *Flowers* 1 in. diam., white, fragrant. *Petals* linear-oblong, very imbricate. *Filaments* linear, flattened, glabrous and hairy. *Ovary* hairy or glabrous; style glabrous above; ovules rarely solitary. *Berry* ovoid or obovoid, size of a nut or larger, yellow, odour heavy. *Seeds* compressed.

2. **P. grandiflora**, *Oliv. in Journ. Linn. Soc. v. Suppl. ii. 42*; spines short recurved or 0, branches and leaves beneath pubescent, leaflet elliptic or ovate-oblong abruptly obtusely acuminate, flowers usually solitary shorter than or equalling the slender pubescent or glabrate pedicel, calyx cupular, filaments villous, ovary-cells 5 usually 2-ovuled. *Limonia grandiflora*, *Wall. Cat. 6361.*

TENASSERIM, at TAVOY, *Wallich, Helfer*; SINGAPORE, *Lobb*.

A small tree (*Wallich*). *Branches* slender, terete, sometimes glabrate. *Leaflets* 2½-4 in., thinly coriaceous, base rounded. *Flowers* 1 in. long, as large as those of *P. monophylla*; pedicel sometimes longer, with a pair of basal bracteoles. *Calyx-lobes* rounded, ciliate. *Petals* linear-oblong.

* *Flowers about ½ in. long. Calyx small, with acute teeth.*

3. **P. Griffithii**, *Hook. f.*; spines short, branches and leaves glabrous or pubescent, leaflet elliptic or oblong abruptly obtusely acuminate, flowers 1-3, pedicels very short, calyx acutely 5-lobed, filaments longer than the linear-oblong anthers, ovary-cells 5 2-ovuled. *P. citrifolia*, *Oliv. in Journ. Linn. Soc. v. Suppl. ii. 42* (not *Limonia citrifolia*, *Roxb.*). *Citrus scandens*, *Griff. Notul. iv. 495*; *Ic. Pl. Ind. Or. t. 587, f. 1.* ? *Limonia oblonga*, *Wall. Cat. 6359*; and *L. missionis*, *Wall. Cat. 6358 D. & F*

BIRMA, at the Serpentine Mines and Malacca, *Griffith*; Mukee hills in ASSAM, *Masters*; PEGU, *M. Lelland.* ? PENANG and SILHET, *Wallich*.

Branches and foliage like that of *P. monophylla*, but the flowers are very different, ½-¾ in. long, with a small acutely-lobed calyx. *Fruit* unknown.—*Griffith's* figure is a great exaggeration, as his specimens prove. *Wallich's* 6358 D and F are referable to this or the following.

4. **P. citrifolia**, *Hook. f. (not of Oliver)*; glabrous, spines short, leaflet elliptic ovate acute, flowers 1-3, pedicels very short, calyx acutely 5-lobed, filaments much shorter than the linear elongate anther, ovary-cells 5 2-ovuled. *Limonia citrifolia*, *Roxb. Fl. Ind. ii. 379.*

CHITTAGONG, *Roxburgh*.

Young shoots polished. *Leaflet* 4-5 by 2-3 in., quite entire. *Flowers* white, about ½ in. diam. *Petals* oblong. *Filaments* quite free. *Ovary* ovoid-oblong, 5-grooved; style short, thick; stigma subpelate. *Berry* ovoid, pointed, of the colour and appearance of a Lime, even to the little green cells in the cortex. *Seeds* 1-4, separated by a

few small dry fibres only which are scarcely to be traced when dry, oblong; testa membranous.—This plant is unknown to me; the description is taken from Roxburgh's *Flora Indica* and drawings. Prof. Oliver referred to it the preceding species, which differs in the form of the stamens, and (if Roxburgh's figure of the ovary is correct) in wanting a style, but the said figures resemble what an ovary would be were the style fallen away. I refer it to *Paramignya* from the long anther and pointed fruit. Kurz has pointed out that Oliver's *P. citrifolia* and Griffith's *Citrus scandens* cannot both be the same as Roxburgh's *Limonia citrifolia* (Journ. As. Soc. Beng. 1870, Pt. 2, 69).

5. **P. longispina**, Hook. f.; glabrous, spines long straight, leaflet oblong subacute, flowers solitary small, pedicel very short, calyx 5-toothed, filaments short equalling the linear anthers, ovary-cells 3-4 4-ovuled, fruit 3-4-angled.

MALACCA, Maingay.

Branches stout; spines opposite and alternate, straight, sometimes 2 in. long. *Leaflet* 3-4 in., base cordate; petiole very short. *Flowers* $\frac{1}{2}$ in. long; pedicel very short. *Calyx-lobes* obtuse. *Petals* oblong, obtuse. *Stamens* 10, equal, glabrous; anthers as long as the filaments, narrow, with a long apiculus. *Ovary* glabrous, stipitate; style stout, cylindric; ovules superposed in pairs. *Fruit* 1-1 $\frac{1}{4}$ in. long, between globose and ovoid, pointed, 3-4-celled; rind thick, coriaceous, glandular, pulp 0. *Seeds* 2-4 in each cell, oblong, compressed, narrowed at the base into a short beak.—This description is mainly taken from Maingay's notes.

6. **P. armata**, Oliv. in Journ. Linn. Soc. v. Suppl. ii. 43; glabrous, spines straight or recurved, leaflet elliptic or elliptic-lanceolate obtusely caudate-acuminate, flowers small solitary or fascicled, pedicel very slender, calyx obtusely 4-5-lobed, ovary-cells 3-4 usually 1-ovuled. *Arthromischus armatus*, Thwaites. Enum. 47.

CEYLON; in the hotter parts of the Island, common.

A scandent shrub; branches stout or slender, straight or flexuous. *Leaflet* 2-3 in., base rounded, nerves indistinct; petiole exceedingly short. *Flowers* $\frac{1}{2}$ in. long, 4-5-merous; pedicels $\frac{1}{2}$ in.; buds obovoid. *Calyx* minute. *Petals* oblong, very much imbricated. *Filaments* linear-subulate, pilose; anthers linear-oblong. *Ovary* hairy; style long, cylindric, stigma dilated. *Fruit* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., subglobose, pulpy, yellow, 1-4-seeded.

20. ATALANTIA, Correa.

Unarmed or spinous shrubs or trees. *Leaves* alternate, 1-foliolate, coriaceous, persistent, quite entire or crenulate; stipule-like scales are often present at the base of the petioles and spines, which belong to undeveloped leaf-buds. *Flowers* axillary rarely terminal, fascicled or in short racemised corymbs or panicles, rarely solitary. *Calyx* 3-5-lobed or -partite, rarely irregularly split. *Petals* 3-5, free or adnate to the stamens and united with them into a tube, imbricate. *Stamens* 6-8, rarely 15-20, inserted round an annular or cupular disk, filaments free or irregularly connate subequal or the alternate shorter; anthers short, ovate-oblong or base cordate (linear-oblong in *A. missionis*). *Ovary* 2- or 4- rarely 3- or 5-celled; style deciduous, stigma capitate; ovules solitary or 2 collateral in each cell. *Berry* large, subglobose, 1-5-celled, 1-5-seeded, rind thick. *Seeds* oblong; cotyledons fleshy, plano-convex.—DISTRIB. Species about 10, tropical Asiatic and 1 Australian.

* *Anthers* broadly ovoid. *Ovary* sessile on a short disk; stigma clavate.

† *Calyx* irregularly lobed, split to the base on one side.

1. **A. monophylla**, Correa; DC. Prodr. i. 535; leaflet elliptic or ovate-oblong, tip obtuse or 2-lobed, flowers fascicled or shortly racemised,

calyx in flower or after it irregularly split to the base, margin erose scarious, filaments monadelphous, ovary usually 4-celled, ovules 1 or 2. *W. & A. Prodr.* 91; *Wight Ill.* i. 108; *Wall. Cat.* 6353; *Oliv. in Journ. Linn. Soc. v. Suppl.* ii. 24; *Dalz. & Gibs. Bomb. Flor.* 28; *Bedd. Flor. Sylv. Anal. Gen.* xlv. t. 7, f. 5. *A. floribunda*, *Wight. Ic.* t. 1611. *A. platystigma*, *Wight Ill.* i. 108. *Limonia monophylla*, *Linn.*; *Roxb. Cor. Pl.* i. t. 82; *Fl. Ind.* ii. 378. *Turraea virens*, *Hellen. in Act. Holm.* 1788, t. 10, f. i. (not of *Linn.*). *Trichilia spinosa*, *Willd.*; *DC. Prodr.* i. 623.—*Rheede Hort. Mal.* iv. t. 12; *Burm. Fl. Zeyl.* t. 65, f. 1.

SILHET, at the foot of the Khasia Mts., *H. f. & T.*; throughout the WESTERN PENINSULA, from the Concan and Coromandel southwards; CEYLON, not uncommon towards the N. of the Island.

A large glabrous shrub or small tree, with rigid flexuous woody branches (the tips often pubescent), and usually strong axillary single spines. *Leaflet* 1-3 in., ovate-oblong or elliptic, obtuse, notched or 2-lobed at the tip, coriaceous, bright green, quite entire; petiole very short, often pubescent, stipular scales subulate. *Flowers* $\frac{1}{2}$ - $\frac{1}{3}$ in. diam., always fascicled in the leaf-axils, pubescent; pedicels $\frac{1}{2}$ - $\frac{1}{3}$ in., minutely bracteolate; buds subglobose or pyriform. *Calyx* rupturing irregularly. *Petals* obovate-oblong, obtuse. *Filaments* 8, rarely 5-7, connate into an irregularly cleft tube, which is antheriferous at the top; anthers broadly cvoid. *Ovary* sessile on a small disk, 3-5-celled. *Berry* as large as a nutmeg, globose, like a lime, usually 4-celled; cells 1-seeded.—*Roxburgh* describes the flowers, as shortly racemose, and calyx as 4-5-parted, which does not agree with our specimens from the Peninsula.

VAR. macrophylla, *Oliv. l.c.*; leaves larger and broader, flowers racemose, pedicels stout compressed (flowers not seen).—Tenasserim, *Helfer*.

VAR. carissoides, *Oliv. l.c.*; leaves ovate or ovate-lanceolate, pedicels longer hairy. *A. carissoides*, *Wall. Cat.* 6354.—Segaen on the Irrawaddy, *Wallich*.

†† *Calyx* regularly or subregularly 4-5-lobed.

2. *A. racemosa*, *W. & A. Prodr.* 91; leaflet oblong elliptic or ovate oblong, lip obtuse or 2-lobed, flowers racemed rarely fascicled, racemes pubescent or glabrous, calyx 4-lobed, lobes acute or obtuse, filaments more or less connate, ovary 2-3-celled, ovules 2 collateral. *Oliv. in Journ. Linn. Soc. v. Suppl.* ii. 24; *Bedd. Flor. Sylv. Anal. Gen.* xlv. *A. capitellata*, *Lindl. in Wall. Cat.* 6355. *Sclerostylis racemosa*, *parvifolia* and *ovalifolia*, *Wight Ill.* i. 109. *S. atalantioides*, *Wight Ic.* 71. *Lampetia* (not of *W. & A. Prodr.*) *racemosa*, *Roem. Synops. fasc. i.* 42? *Limonia* ? *missionis*. *Wall. Cat.* 6358 E.

WESTERN PENINSULA; from the Concan to Travancor; CEYLON, at Galagame, *Gardner*.

A small tree, armed or unarmed, very similar to *A. monophylla*, but the flowers, instead of being long pedicelled in short racemes or fascicles, are shortly pedicelled on racemes sometimes 3 in. long, but at others almost reduced to corymbs; the leaves are usually larger, and often broader, though quite small in *Wight's* figure; the flowers are of the same size, but often very crowded and the buds very globose, they are usually 4- but sometimes 3-5-merous, and the filaments are free or variously united; the ovary is sessile on a small disk.—The great distinction between these species is in the more or less regularly 4- (3-5-) lobed calyx of this, the lobes of which are acute or obtuse. *Fruit* globose, $\frac{3}{4}$ in. diam. One of *Wight's* specimens has ovate leaves, cordate at the base. *Wallich's* 6358 E, from Penang (*G. Porter*), in fruit only, with leaves cordate at the base, may be this or the following, or something different from both.

3. *A. ceylanica*, *Oliv. in Journ. Linn. Soc. v. Suppl.* ii. 25; leaflet obtuse notched or 2-lobed rarely obtusely acuminate, flowers very shortly racemed, calyx 4-lobed, filaments free or 2 or 3 of them more or less combined, ovary 2-celled, ovules 2 collateral. *Thwaites Enum.* 405; *Bedd. Flor. Sylvat. Anal. Gen.* xlv. *Rissoa zeylanica*, *Arn. in Act. Acad. Nat.*

Cur. xviii. 324. *Sclerostylis zeylanica*, *Wight Ill.* i. 109; *Thwaites Enum.* 46. *S. Arnottiana*, *Wight Ill.* l.c.

WESTERN PENINSULA; Phoondah Ghat, in the Concan, *Ritchie*; Nilghiris, *Beddome*; CEYLON, common in the warmer parts of the island; ? MALACCA, *Griffith*.

A bush or small tree, unarmed or armed with very straight spines, $\frac{1}{4}$ –1 in. long. *Leaflet* extremely variable, 1–7 in., elliptic-oblong ovate-oblong obovate or almost lanceolate, simply obtuse or with an emarginate or 2-lobed tip. *Racemes* rarely exceeding $\frac{3}{4}$ in. *Flowers* quite similar to those of *A. racemosa*, and on equally short pedicels; buds globose. *Ovary* sunk in the annular disk.—The Malacca specimens have no flowers, the leaf is 5–6 in., elliptic-lanceolate, more attenuate at the obtuse entire tip, and the globose fruit $\frac{3}{8}$ in. diam. when dry.

VAR. rotundifolia, Oliv. l.c.; Thwaites, *Enum.* 405; leaves rounded or obovate or even obo cordate. *Sclerostylis rotundifolia*, *Thwaites*, l.c. 46.—Ceylon, at Maturatte; alt. 4000 ft. and upwards, *Thwaites*.

4. **A. caudata**, *Hook. f.*; leaflet elliptic-lanceolate caudate-acuminate with a broad 2-lobed tip, flowers small in very short glabrous racemes, calyx very small 4–5-lobed, ovary 2-celled, ovules 2 collateral. *A. Roxburghiana*, Oliv. in *Journ. Linn. Soc. v. Suppl.* ii. 25. *Limonia? caudata*, *Wall. mss. in Herb. Hook.*

KHASIA MTS., at Churra, alt. 4000 ft., *H. f. & T.* (*Hort. Bot. Calc. Wallich*).

A glabrous unarmed shrub, with slender branches. *Leaflet* 3–4 in., much narrower and more narrowed at each end than in any congener, margin quite entire, tip sometimes dilated. *Racemes* $\frac{1}{2}$ in., peduncles and pedicels much more slender than in its congeners. *Flowers* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., white, fragrant, usually 4-merous, buds rather longer than broad. *Calyx* very small. *Petals* obovate-oblong. *Stamens* quite free; anthers ovoid. *Ovary* sessile on a disk narrower than itself; stigma subcapitate.—A very distinct species, distributed as *S. Roxburghiana?* by T. Thomson and myself.

5. **A. Roxburghiana**, *Hook. f.* (not of *Oliver*); leaflet elliptic-lanceolate acute, racemes axillary short few-flowered, calyx 4-lobed, filaments free, ovary 2-celled. *Amyris simplicifolia*, *Roxb. Fl. Ind.* ii. 244. *Sclerostylis Roxburghii* *Wight Ic.* t. 72.

PENANG, *Roxburgh*; ? MALACCA, *Griffith*.

Branches slender, apparently without spines. *Leaflet* 4–5 in., narrowed at both ends, subacute, nerved exactly as in all its congeners (except *L. missionis*); petiole $\frac{1}{4}$ in. *Racemes* 1 in., 5–6-flowered. *Flowers* nearly $\frac{1}{2}$ in. diam., buds globose. *Calyx* obtusely 4-lobed. *Petals* obovate. *Filaments* free short subulate; anthers ovoid-oblong. *Ovary* ovoid, apparently sessile; the disk not being represented in *Roxburgh's* drawing tapering into a toothed stigma (probably incorrectly figured); cells with 2 collateral, ovules in each. *Berry* (in *Griffith's* specimen) globose, $\frac{3}{8}$ in. diam. when dry.—A very little known plant, of which there is a figure amongst *Roxburgh's* drawings (copied by *Wight* in his *Joones*), and with which I provisionally identify a fruiting specimen of a Malacca plant collected by *Griffith*.

** *Anthers* linear-oblong. *Ovary* stipitate.

6. **A. missionis**, Oliv. in *Journ. Linn. Soc. v. Suppl.* 25; leaflet oblong-obovate or elliptic opaque margin undulate when dry articulation obsolete nerves very obscure, racemes very short, calyx 4–5-lobed, ovary usually 4-celled, stigma capitate, ovules 2 collateral. *Bedd. Flor. Sylvat. Anal. Gen.* xlv. *Limonia missionis*, *Wight in Hook. Bot. Misc.* iii. 291; *Suppl.* t. xxxiii; *Ic.* t. 175; *W. & A. Prodr.* 92. *L. ? missionis*, *Wall. Cat.* 6358, *A. B. C.* Chilocalyx ellipticus, *Turcz. in Bull. Soc. Nat. Mosc.* 1863, 588.

WESTERN PENINSULA; Redhills, Madras, and other places on both sides of the Presidency. CEYLON, in the hotter parts,

A small tree, head bushy; branches green, terete, the old with long sharp thorns, the young with two axillary ones. *Leaflet* 2-4 in., very thick and coriaceous, tip rounded, margin sometimes crenulate, both surfaces alike and of a very opaque and ashy green when dry, with a few very obscure horizontal nerves not reticulated like the other species, green mottled with white when fresh; *petiole* $\frac{1}{4}$ - $\frac{1}{2}$ in., with no trace of articulation. *Racemes* $\frac{3}{4}$ -1 $\frac{1}{2}$ in., glabrous, 6-8-flowered. *Flowers* pure white, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., buds globose. *Calyx* very small, lobes acute. *Petals* obovate. *Filaments* slender, quite free; anthers obtuse. *Ovary* 4-5-celled, narrowed at the base, crowning the disk; style cylindric. *Berry* globose, upwards of 1 in. diam., 4-5-celled; cells 1-seeded, full of glutinous fluid. *Seeds* oblong.—A very distinct and curious species, the texture and nervation of the leaf differ wholly from its congeners, and resemble those of *Triphasia*. Wight (from whom most of the above description is taken) states that the ovarian cells have several ovules, but this is certainly an error.

EXCLUDED SPECIES.

A. ? BILOCULARIS, Wall. Cat. 6356 (see after *Limonia*).

21. CITRUS, Linn.

Shrubs or trees, usually spinous. *Leaves* alternate, 1-foliate, coriaceous, persistent; *petiole* often winged. *Flowers* axillary, solitary fascicled or in small cymes, white or pinkish, sweet-scented. *Calyx* cupular or urceolate, 3-5-fid. *Petals* 4-8, linear-oblong, thick, imbricate. *Stamens* 20-60, inserted round a large cupular or annular disk; filaments variously connate, compressed at the base; anthers oblong. *Ovary* ∞ -celled; style stout deciduous, stigma capitate; ovules 4-8, 2-seriate in each cell. *Berry* large, oblong or globose, fleshy, many-celled, septa membranous, cells few-seeded and filled with horizontal fusiform cells distended with juice. *Seeds* horizontal or pendulous, testa coriaceous or membranous; embryo sometimes 2 or more in one seed, cotyledons plano-convex, often unequal, radicle small, superior.—DISTRIB. About 5 tropical Asiatic species, and 2 Australian.

C. japonica, Thunb. (*C. inermis*, Roxb. *Fl. Ind.* iii. 393), the Kumquat, is not cultivated in India. I have followed Dr. Brandis's excellent work closely in regard to the forms of this difficult genus.

1. **C. medica**, Linn.; young shoots glabrous purple, leaflet glabrous, flowers often unisexual, petals generally more or less pink, fruit globose ovoid or oblong often mamillate at the apex,

Valleys along the foot of the HIMALAYA from GARHWAL to SIKKIM, ascending to 4000 ft.; the KHASIA Mts.; GARROW Mts., Roxburgh; CHITTAGONG, H. f. & T.; and the WESTERN GHATS and Satpura range in CENTRAL INDIA.

A shrub or small tree, flowering and fruiting at most seasons, growing where I found it on steep hill sides (in Sikkim). *Leaflet* 3-6 in., elliptic-ovate or ovate-lanceolate; *petiole* naked or winged. *Flowers* 5-10 in a raceme, small or middle-sized. *Stamens* 20-40.—The following are the principal varieties, of which I have found one truly long in Sikkim, with an oblong leaflet 4 in. long, margined *petiole*, pink flowers 1 in. long, narrowly ellipsoid, rough fruit 7 in. long, of which the upper 2 in. are contracted into a long conical mamilla, the rind is very thick, and pulp pale yellow. The petals pass into stamens, which would suggest its not being indigenous, but I did not doubt its being so when I gathered it, mainly on dry sunny slopes totally unsuited for any kind of cultivation, where it formed large bushes.

VAR. 1. *medica proper*; leaflet oblong, *petiole* short margined or not, flowers usually numerous, fruit large oblong or obovoid, mamilla obtuse, rind usually warted thick tender aromatic, pulp scanty subacid. Brandis *For. Flor.* 52. *C. Aurantium var. medica*, W. & A. *Prodr.* 98. *C. medica*, Linn.; Wall. Cat. 6387; Dalz. & Gibs. *Bomb. Fl. Suppl.* 13.—The Citron.

VAR. 2. *Limonum*; leaflet ovate, petiole margined or winged, fruit middle-sized ovoid yellow mamillate, rind thin, pulp abundant acid. *Brandis, l.c.* 52. *C. Aurantium* var. *Limonum*, *W. & A. Prodr.* 98. *C. Limonum*, *Wall. Cat.* 6389; *Dalz. & Gibs. Bomb. Fl. Suppl.* 13. *C. medica*, *Willd. according to Roxburgh Fl. Ind.* iii. 392.—The Lemon.

VAR. 3. *acida*; leaflet elliptic-oblong, petiole many-times shorter than the leaflet linear or obovate, racemes short, flowers small, petals usually 4, fruit usually small globose or ovoid, with a thick or thin rind, pulp pale sharply acid. *Brandis, l.c.* 52. *C. acida*, *Roxb. Fl. Ind.* iii. 390 (who includes under this the varieties, if not species, of Sour Limes and Lemons found in India). The large fruited states of this appear to assume the form of the Citron, and the small to approach the W. Indian Lime, which is, however, described as a bush with white flowers.—The Sour Lime of India.

VAR. 4. *Limetta*; leaves and flowers as in var. *acida*, fruit globose 3–5 in. diam., rind thin smooth, juice abundant sweet not aromatic, *Brandis, l.c.* 52. *C. Aurantium* vars. *Limetta* and *Lumia*, *W. & A. Prodr.* 98. *C. Limetta*, *Risso*; *Dalz. & Gibs. Bomb. Fl. Suppl.* 13; *Wight Ic. t.* 958; *Wall. Cat.* 6385.—This includes 2 of Wight & Arnott's varieties, viz., (1) *C. Limetta*, *Risso* (Sweet Lime), with winged or margined petioles, small white flowers, globose or ovoid mamillate fruit, and a rind with concave vesicles. *C. Limetta*, *DC.*; *Wall. Cat.* 6385. *C. Limonellus*, *Wall. Cat.* 6386? (2) *C. Lumia*, *Risso* (Sweet Lemon), with a simply margined petiole, flowers tinged with red, ovoid-oblong fruit with a long mamilla, and rind with convex vesicles.—Wight says that his *C. Limetta* is certainly indigenous at Kolagbery in the Nilghiris.—The Sweet Lime of India.

2. *C. Aurantium*, Linn.; arboreous rarely shrubby, young shoots glabrous greenish white, leaflet elliptic or ovate acute obtuse or acuminate, petiole often broadly winged, flowers pure white bisexual, fruit globose generally oblate not mamillate.

Hot valleys along the foot of the HIMALAYA, from Garwhal eastwards to Sikkim, and in the KHASIA Mts.

A small slender tree, flowering in the rains, and fruiting after them, growing where I have found it in the very bottoms of valleys, and where it did not occur to me to doubt its being indigenous. The fruit was somewhat flattened or nearly globose, about 2 in. diam., high coloured, and uneatable, being (if I remember aright) mawkish and bitter. The following are the principal cultivated varieties:—

VAR. 1. *Aurantium proper*; petiole naked or winged, pulp sweet yellow rarely red. *Brandis, For. Fl.* 53. *C. Aurantium*, *L.*; *Roxb. Fl. Ind.* iii. 392; *W. & A. Prodr.*, 97; *Wall. Cat.* 6390; *Dalz. & Gibs. Bomb. Fl. Suppl.* 12.—The Sweet Orange.

VAR. 2. *Bigaradia*; petiole usually winged, flowers larger and more strongly scented, rind very aromatic, pulp bitter. *Brandis, l.c.* 53. *C. vulgaris*, *Risso*; *W. & A. Prodr.* 97; *Wall. Cat.* 6384; *Wt. Ic. t.* 957. *C. buxifolia*, *Poir.*—Wight & Arnott describe its oil vesicles as concave, in contradistinction to *C. Aurantium*, in which they are convex. This variety does not seem to be cultivated in India, except in gardens.—The Bitter or Seville Orange.

VAR. 3. *Bergamia*; flowers small very sweet-scented, fruit globose or pyriform, rind smooth pale-yellow, pulp acidulous with pleasant aroma. *Brandis, l.c.* 54. *C. Aurantium*, var. *Bergamia*, *W. & A. Prodr.* 98. *C. Limetta* var., *DC. Prodr.* i. 539. Rarely cultivated in India.—The Bergamotte Orange.

3. *C. Hystrix*, DC. Prodr. i. 539; young shoots glabrous, leaflet ovate elliptic or lanceolate equalling or smaller than the very broad petiole, flowers small white, fruit globose or obovoid. *Kurz in Journ. As. Soc. Beng.* xxxix. pt. 2, p. 70. *Citrus Papeda*, *Miq. Fl. Ind. Bat.* i. pt. 2, 530. *C. latipes*, *Hook. f. & Thoms. Herb. Ind. Or.* *Papeda Rumphii*, *Cat. Hort. Bog.* 216.—*Rumph. Herb. Amboin.* ii. t. 26, f. 1 & 3, 27, 28.

KHASIA Mts.; in woods at the Living bridge, Moflong and Myrüng, alt. 2–5000 ft.—**DISTRIB.** Sumatra.

A very little-known plant described by Decandolle from a plant in the Montpellier

Botanic Gardens, without flower or fruit, and of which I have seen dried specimens; as I have also flowering ones from the Mauritius Gardens, all named *C. Hystrix*. Kurz has, no doubt rightly, identified Rumph's figures quoted above with this plant. Distinguished from *C. Aurantium* by the spinous branchlets, large petioles, and small flowers which are 4-petalous. The fruit varies from the size of a walnut to that of a small apple, it has a very thick more or less tubercled rind and insipid or acid pulp. Kurz, probably by a misprint, describes the flowers as 4-5-androus, Miquel says 24-androus; I find in Mauritius specimens about 15 stamens.

4. **C. decumana**, Linn.; young shoots pubescent, leaflet large ovate-oblong frequently emarginate pubescent beneath, petiole broadly winged, flowers large white, stamens 16-24, fruit large pale globose or pyriform, rind thick, pulp pale sweet or acrid. *Roxb. Fl. Ind.* iii. 393; *Dalz. & Gibs. Bomb. Fl. Suppl.* 12; *Wall. Cat.* 6388.

Commonly cultivated in INDIA. A native of the Malayan and Polynesian Islands.

A tree, 30-40 ft. *Leaflets* 6-9 in. *Fruit* often very large, pulp yellow pink or crimson, sweet or acrid, vesicles distinct.—Shaddock, Pumelo, Pompelmoes.

22. FERONIA, Gærtn.

A spinous tree. *Leaves* alternate, imparipinnate; leaflets opposite, sessile, quite entire; petiole winged or not. *Flowers* in terminal or lateral loose panicles or racemes, polygamous. *Calyx* small, flat, 5-toothed, deciduous. *Petals* 5, rarely 4-6, spreading, imbricate. *Stamens* 10-12, a few sometimes imperfect, inserted around a short disk, filaments dilated, sides and front villous, tip subulate; anthers linear-oblong. *Ovary* oblong, 5-6-celled, at length 1-celled; style 0, stigma oblong fusiform deciduous; ovules ∞ , crowded in many series upon 5-6 at length parietal placentas. *Fruit* large, globose, 1-celled, ∞ -seeded, bark woody rough. *Seeds* buried in pulp, oblong, compressed; cotyledons thick, fleshy, radicle pointing away from the hilum.

1. **F. Elephantum**, Correa; *Roxb. Cor. Pl.* t. 141; *Flor. Ind.* ii. 411; *W. & A. Prodr.* 96; *Wt. Ic.* t. 15; *Dalz. & Gibs. Bomb. Fl.* 30; *Wall. Cat.* 6380; *Brandis For. Flor.* 56. *Cratæva* Vallanga, Kœnig mss.

Throughout India, in dry situations, from the PANJAB eastward and southward to CEYLON; wild or cultivated, ascending to 1500 ft. in the W. Himalayas.

A small deciduous glabrous tree, head ovoid. *Leaves* smelling of aniseed; spines strong straight axillary. *Leaflets* 5-7, cuneate or obovate, tip crenate. *Flowers* $\frac{1}{2}$ in. diam., dull-red, σ and φ often in the same panicle; peduncle and pedicels pubescent. *Fruit* $2\frac{1}{2}$ in. diam., pulp edible.—The Elephant or Wood-apple.

23. ÆGLE, Correa.

Spinous trees. *Leaves* alternate, 3-foliolate; leaflets membranous, subcrenulate. *Flowers* large, white, in axillary panicles. *Calyx* small, 4-5-toothed, deciduous. *Petals* 4-5, spreading, imbricate. *Stamens* numerous, inserted round an inconspicuous disk, filaments short subulate; anthers elongate, erect. *Ovary* ovoid, axis broad, cells 8-20, peripheral; style short, stigma capitate oblong or fusiform deciduous, ovules numerous 2-seriate. *Fruit* large, globose, ovoid or reniform, 8-15-celled; cells many-seeded, rind woody. *Seeds* numerous, in aromatic pulp, oblong, compressed, testa woolly and mucous.—DISTRIB. Species 2-3, tropical Asiatic and African.

1. **A. Marmelos**, Correa; *Roxb. Cor. Pl.* t. 143; *Fl. Ind.* ii. 579; *W. & A. Prodr.* 96; *Wight Ic.* t. 16; *Beddome Fl. Sylv.* t. 161; *Wall. Cat.*

6379; *Dalz. & Gibs. Bomb. Flor.* 31; *Brandis For. Flor.* 57. *Feronia pellucida*, *Roth. Nov. Sp.* 384. *Cratæva Marmelos*, *Linn. C. religiosa*, *Ainslie Mat. Med. Ind. (fid. Wight) not of Vahl.*—*Rheede Hort. Mal.* iii. t. 35.

Throughout INDIA, in dry hilly places, from the Jhelum to Assam and southwards to Travancor; wild or cultivated, ascending to 4000 ft. in the W. Himalaya.

A small deciduous glabrous tree; spines 1 in., straight, strong, axillary. *Leaflets* 3-5, ovate-lanceolate, lateral sessile, terminal long-petioled. *Flowers* 1½ in. diam., greenish-white, sweet-scented; pedicels and calyx pubescent. *Filaments* sometimes fascicled. *Fruit* 2-5 in. diam., globose oblong or pyriform, rind grey or yellow; pulp sweet, thick, orange-coloured.—A species or variety with oblong fruit is grown in Birma, of which I have seen the fruit only.—The Bael tree.

At p. 363 Dr. Masters has referred *Heritiera attenuata*, Wall. Cat. 1140, to *Rutaceæ* as a species of *Niota*. That genus is however now merged in *Samadera* in *Simarubeæ*. Wallich's plant, of which the specimens are imperfect, may be certainly identified with *Brownlowia lanceolata*, Benth. Steudel, quoting from Wall. Cat. p. 157, the ms. name *Niota? polyandra*, has misread the authority H. Ham. (Herb. Ham.) as W. & A., and has further referred the plant to *Vitmannia*.

ORDER XXXIV. SIMARUBEÆ. (By Alfred W. Bennett, F.L.S.)

Trees or shrubs, almost always with bitter bark. *Leaves* alternate, often very large, pinnate or rarely simple; stipules 0 or deciduous. *Inflorescence* axillary, racemose paniculate or cymose, rarely spicate. *Flowers* usually declinous, regular, and generally small. *Calyx* 3-5-lobed, valvate or imbricate. *Petals* 3-5, very rarely 0, hypogynous, valvate or imbricate. *Disk* annular or elongate, simple or lobed, rarely 0. *Stamens* as many or twice as many as the petals, rarely indefinite, inserted at the base of the disk; filaments free, often with a scale at the base; anthers oblong, usually introrse, 2-celled, dehiscent longitudinally. *Ovary* free, 1-6-celled, usually deeply lobed, less often entire; styles 2-5, free or more or less united, stigmas capitate; ovules usually solitary in each cell, rarely more numerous, raphe ventral, micropyle superior. *Fruit* drupaceous, capsular, or occasionally samaroid, usually of 2-6 distinct carpels. *Seeds* usually solitary, erect or pendulous, albuminous; embryo straight or curved, radicle superior.—**DISTRIB.** Tropical and subtropical regions of both hemispheres; genera 30; species about 120.

TRIBE I. *Eusimarubeæ*. *Ovary* deeply divided.

Ovules solitary in each cell.

Stamens twice as many as petals.

- | | |
|---|----------------|
| Leaves pinnate; fruit samaroid | 1. AILANTUS. |
| Leaves simple; fruit drupaceous, variously winged | 2. SAMADERA. |
| Stem spiny; filaments with a scale; fruit baccate | 3. HARRISONIA. |

Stamens as many as petals.

- | | |
|---|--------------|
| Disk thick, entire; flowers paniced; styles connate | 4. PICRAMMA. |
| Disk 4-lobed; flowers compoundly cymose; styles nearly free | 5. BRUCEA. |
| Disk 0; flowers paniced; styles connate | 6. EURYCOMA. |

- | | |
|--|-------------|
| Ovules 2 in each cell; leaves simple | 7. SURIANA. |
|--|-------------|

TRIBE II. *Picramnieæ*. *Ovary* entire; 2-5-celled.

- | | |
|--|---------------|
| Ovary 2-celled; leaves simple | 8. IRVINGIA. |
| Ovary 5-celled; stem spiny; leaves 2-foliate | 9. BALANITES. |

1. **AILANTUS**, Desf.

Lofty trees. *Leaves* very large, alternate, unequally pinnate. *Flowers* small, polygamous, bracteolate, in terminal or axillary panicles. *Calyx* 5-fid; lobes equal, imbricate. *Petals* 5, valvate. *Disk* 10-lobed. *Stamens* 10 (in the hermaphrodite flowers 2-3); filaments short or filiform, without scales. *Ovary* 2-5-partite; styles connate; ovules 1 in each cell, semi-anatropous. *Fruit* of 1-5 1-seeded samaras; wing very large, membranous. *Seed* pendulous, sparingly albuminous.—**DISTRIB.** India, China, Australia; species 3-4.

A. GLANDULOSA, Desf.; *DC. Prodr.* ii. 89; leaves pubescent or subglabrous, leaflets very coarsely toothed at the base, filaments elongate. *Brandis For. Flor.* 58.

Northern India, probably introduced.—**DISTRIB.** China.

A lofty tree. *Leaves* often exceeding 1 ft.; leaflets very numerous, divided very unequally by the midrib, paler beneath. *Flowers* small, in much-branched panicles. *Filaments* filiform, exserted, several times exceeding the anther. *Fruit* of about 3 membranous linear oblong samaras, about $1\frac{1}{4}$ by $\frac{1}{2}$ in. *Seed* near the centre of the samara, about $\frac{1}{4}$ by $\frac{1}{10}$ in.

1. *A. excelsa*, *Roxb. Cor. Pl.* i. t. 23; *Fl. Ind.* ii. p. 450; leaves glandular-hairy, leaflets very coarsely toothed, filaments short, samara large red twisted. *DC. Prodr.* ii. 89; *W. & A. Prodr.* 150; *Wight Ill.* i. t. 67; *Grah. Cat. Bomb. Pl.* 37; *Dalz. & Gibs. Bomb. Fl.* 46; *Wall. Cat.* 8481; *Brandis For. Flor.* 58.

N. W. INDIA (probably introduced); BEHAR, and WESTERN PENINSULA.—**DISTRIB.** Queensland (var. *imberbiflora*).

A tree 60-80 ft. *Leaves* 1 ft. or more; leaflets very numerous, on long petioles, very unequal at the base. *Flowers* larger than in *A. glandulosa*, on longish pedicels, in large lax often very much-branched panicles. *Petals* ovate-lanceolate, commonly reflexed. *Filaments* half the length of the anther. *Samara* larger than in *A. glandulosa*, 2 in. by $\frac{1}{4}$ in., strongly veined, blunt or pointed at both ends, copper-red, always once or twice twisted at the base.

2. *A. malabarica*, *DC. Prodr.* ii. 89; leaflets almost entire nearly glabrous on long petioles very unequal at the base, filaments filiform, samara large rounded. *W. & A. Prodr.* 150; *Wight Ic.* t. 1604; *Thwaites Enum.* 69; *Grah. Cat. Bomb. Pl.* 37; *Dalz. & Gibs. Bomb. Fl.* 46; *Bedd. Fl. Sylv.* t. 122; *Brandis For. Flor.* 58.—*Rheede Hort. Mal.* vi. t. 15.

WESTERN PENINSULA, in Canara, &c.; CEYLON, near Colombo, and district of the Seven Corles.—**DISTRIB.** Cochín China.

A lofty tree. *Leaves* very large; leaflets distant, coriaceous, much lighter beneath, the two sides very unequal, margin often thickened and wavy. *Flowers* as in *A. excelsa*, but rather larger, and *filaments* very slender, exserted, many times longer than the anther. *Samara* broadly linear, $2\frac{1}{2}$ by $\frac{3}{4}$ in., reddish, not twisted, rounded at both ends.

2. **SAMADERA**, Gærtn.

Larger or smaller glabrous trees. *Leaves* simple. *Flowers* hermaphrodite, in peduncled axillary or terminal umbels. *Calyx* small, 3-5-partite, imbricate. *Petals* 3-5, much longer than calyx, coriaceous, imbricate. *Disk* large, conical. *Stamens* 8-10, included in the corolla, with a small scale at the base. *Carpels* 4-5, distinct, free; styles free at the base, more or less united above, stigmas acute; ovules solitary, pendulous. *Fruit* of 1-5 large dry compressed 1-seeded drupes, each with a narrow unilateral wing.—**DISTRIB.** Tropical Asia and Madagascar. Species 3.

1. **S. indica**, *Gærtn. Frut.* ii. t. 156; leaves elliptic-lanceolate fleshy, umbels many-flowered on very long peduncles equalling the leaves, fruit coriaceous glabrous smooth or slightly reticulated. *Wight Ill.* t. 68; *W. & A. Prodr.* 151; *Grah. Cat. Bomb. Pl.* 37; *Hook. Ic. Plant.* t. 7; *Planch. in Hook. Lond. Journ. Bot.* v. 562; *Thwaites Enum.* 70. Niota pentapetala, *Poir. in Lamk. Dict.* iv. 490; *DC. Prodr.* i. 592. N. tetrapetala, *Lamk. Ill.* t. 299, p. 436; *Poir. in Lamk. Dict.* iv. 490; *Blanc. Flor. Filip.* ed. 2, p. 213; *Wall. Cat.* 6349. N. Lamarckiana, *Blume Bijl.* 251, 260. Vittmannia elliptica, *Vahl Symb.* iii. t. 62. Manungala pendula, *Blanc. Flor. Filip.* p. 306.—*Rheede Hort. Mal.* vi. t. 18.

WESTERN PENINSULA; throughout the S. Concan, and Malabar. CEYLON, not uncommon in the South of the Island.

A small tree, 30–35 ft., with stout branches. *Leaves* 8 by 3 in. or larger, blunt, with short thick petioles. *Flowers* numerous, shortly stalked, in dense umbels. *Calyx* small, thick, ciliated, persistent in fruit. *Petals* narrowly oblong, often apiculate. *Stamens* twice as many as petals; filaments very long; with a scale at the base. *Ovary* usually 4-celled. *Fruit* oval, $1\frac{1}{2}$ by 1 in.—There appears to be no reason for identifying, with Lamk. and DC., this with the Madagascar species.

2. **S. lucida**, *Wall. Cat.* 1062; and *Plant. As. Rar.* ii. t. 168; peduncle of umbel shorter than the leaves, fruit strongly reticulated. *Planch. in Hook. Lond. Journ. Bot.* v. 562. Niota lucida, *Wall. Pl. As. Rar.* ii. t. 168. Vittmannia lucida, *Steud. Nom.*

TENASSERIM, *Wallich*; ANDAMAN ISLDS., *Helfer*.

Very nearly allied to *S. indica*, and perhaps only a variety. *Leaves* a paler green, sometimes larger and with longer petioles. *Umbels* sometimes almost sessile. *Fruit* smaller, pear-shaped, dark-brown, glabrous, with a very narrow wing.

3. HARRISONIA, Brown.

Glabrous spiny shrubs. *Leaves* unequally pinnate or 1-foliolate. *Flowers* hermaphrodite, in bracteate cymes. *Calyx* small, 4–5-fid. *Petals* 4–5, longer than calyx. *Disk* hemispherical. *Stamens* 8–10, with small scales at the base. *Ovary* globose or 4–5-lobed, 4–5-celled; styles connate or distinct at the base; ovules solitary, pendulous. *Fruit* a small globose berry. *Seed* solitary, sparingly albuminous.—DISTRIB. Tropical Asia, Australia, and Africa. Species 3–4.

Oliver (*Flor. Trop. Afr.* i. 311) has shown that the affinities of this genus are rather with this tribe of the Order than with *Pieramnieæ*, in which it is usually placed.

1. **H. Bennetti**, *Hook. f. in Gen. Plant.* i. 314; leaflets 5–9 entire or crenate, calyx persistent, filaments glabrous with a hairy scale at the base, styles completely united hairy. *Lasiolapis paucijuga* and *multijuga*, *Benn. Pl. Jav. Rar.* 202, t. 42. *L. Bennetii*, *Planch. in Hook. Lond. Journ. Bot.* v. 570.

BIRMA and PEGU, *Griffith*, &c.—DISTRIB. Java, Philippines, Siam, S. China, Africa (?)

A woody shrub, with sharp short recurved spines (stipules?), especially on the lower part of the branches. *Leaflets* ovate, glabrous; rachis broadened and even winged and articulated between the leaflets. *Cymes* terminal, 8–20-flowered. *Calyx*-segments very small. *Petals* lanceolate, glabrous. *Filaments* longer than petals, 5 rather shorter than the other 5. *Berry* formed of 2–5 carpels, surrounded by the persistent calyx.—A specimen in the Hookerian Herbarium from Madura, “*Herb. Hort. Bot. Calc. No. 1794*,” with the leaves 3-foliolate, appears distinct.

Kurz (*Andam. Rep. App.* iv.) reports *H. Brownii* (?) a Philippine species, from “Bird-Nest Cape, observed nowhere else, specimens lost.”

4. **PICRASMA**, Blume.

Trees or shrubs with very bitter properties. *Leaves* very large, unequally pinnate. *Flowers* small, declinous or polygamous, in axillary panicles. *Calyx* very small, 4-5-toothed. *Petals* 4-5, valvate, very often increasing after flowering. *Disk* thick, entire. *Stamens* 4-5, not scaly, hairy. *Ovary* 3-5-partite, free; styles distinct at the base and apex, but united in the middle, stigmas simple; ovules erect, solitary. *Fruit* of 1-3 fleshy or coriaceous drupes. *Seed* erect, albuminous.—**DISTRIB.** India, Archipelago, China, Japan, West Indies, Brazil. Species about 6.

1. **P. quassioides**, *Benn. Pl. Jav. Rar.* 198; leaflets numerous obovate acuminate serrate, flowers polygamous in pubescent panicles, calyx-segments petals and stamens 5, petals persistent in female and hermaphrodite flowers, filaments strap-shaped equalling the petals villous. *Planch. in Hook. Lond. Journ. Bot.* v. 573; *Wall. Cat.* 8506. *Simaba quassioides*, *Ham. in Don Prodr.* 248. *Nima quassioides*, *Ham. mss.*

Subtropical Himalaya; from JAMU to NIPAL, ascending to 8000 ft. in GARHWAL; BHOTAN, *Griffith*.—**DISTRIB.** S. China.

A large scrambling shrub, with stout often spotted branches and very bitter bark. *Leaves* a foot or more long, of 9-15 leaflets, the lowest pair much smaller and stipuliform. *Flowers* green. *Calyx*-segments small, imbricate. *Petals* ovate or obovate, much enlarged and coriaceous in fruit. *Fruit* of 3-5 rather membranous drupes, about the size of a pea, each containing 1 erect seed.

2. **P. javanica**, *Blume Bijl.* p. 248; leaflets 3-7 elliptic-oblong abruptly obtusely acuminate quite glabrous, margins flat quite entire, tips not above $\frac{1}{6}$ - $\frac{1}{4}$ the length of the blade, flowers 4-merous. *Benn. Flor. Jav.* 197, t. 41; *Planch. in Hook. Lond. Journ. Bot.* v. 573.

MALACCA, *Maingay*.—**DISTRIB.** Java.

A moderate-sized tree, of which there are two forms (or species) in Java—one with elliptic oblong leaflets and a slightly pubescent panicle, and with which the Malacca specimens agree; the other with more obovate leaflets and a glabrous panicle.

VAR.? *mishmiensis*; leaflets 5-9, elliptic oblong more coriaceous, drupes larger, $\frac{1}{2}$ in. diam.—Mishmi hills near Jingsha, *Griffith*.

3. **P. nepalensis**, *Benn. Flor. Jav.* 201; leaflets 5-7 elliptic-lanceolate caudate-acuminate quite glabrous, margins waved or wrinkled quite entire, tips $\frac{1}{4}$ - $\frac{1}{3}$ the length of the blade, flowers 4-merous. *Planch. in Hook. Lond. Journ. Bot.* v. 573. *Brucea?* *Wall. Cat.* 7499. *B. dubia*, *Steud. Nom.*—*Indeterminata*, *Wall. Cat.* 9037 (see under 8506).

NIPAL, *Wallich*; Khasia Mts., *De Silva, Griffith*.

A smaller and narrower leafleted plant than *P. javanica*, with longer points to the leaves which have wrinkled white edges when dry; the branches of the panicle are more slender and the anthers larger.

4. **P. andamanica**, *Kurz Andam. Rep. App.* iv.; leaflets elliptic-oblong rounded at the base, abruptly obtusely acuminate quite entire, flowers 4-merous, petals glandular.

SOUTH ANDAMAN ISLANDS, *Kurz*.

A tree with very smooth branches, closely resembling *P. javanica*. *Leaflets* variable in number, 5 by 2½ in., thinner, and scarcely thickened at the margin, much more rounded at the base and often unequalateral. *Panicle* rather lax, perfectly glabrous. One or more of the *petals* of the male flowers with two large glandular dots. *Fruit* unknown.

5. **BRUCEA**, Mill.

Bitter trees or shrubs. *Leaves* very large, unequally pinnate. *Flowers* very small, in very numerous very small cymes collected into axillary

panicles. *Calyx* minute, 4-partite, imbricate. *Petals* 4, minute, linear, imbricate. *Disk* 4-lobed. *Stamens* 4, inserted beneath the disk; filaments naked. *Ovary* deeply 4-lobed, or consisting of 4 entirely free carpels. *Drupe*s. 4, entirely free, ovoid, somewhat fleshy. *Seed* solitary, exalbuminous.—DISTRIB. Africa, Tropical Asia, Australia; species 6.

1. **B. sumatrana**, *Roxb. Fl. Ind.* i. 449; leaves very large, leaflets numerous very coarsely toothed villous beneath, panicles very long compound, flowers usually hermaphrodite, filaments short. *DC. Prodr.* ii. 88; *Wall. Cat.* 8482; *Blume Bijl.* 1167.

ASSAM; EASTERN PENINSULA; in Tenasserim and the Andaman Islds., *Helper*; Singapore, *Wallich*.—DISTRIB. Borneo, Sumatra, Java, Philippines, South China, Australia.

A shrub with bitter and somewhat fetid properties. *Leaves* often more than a foot long, covered with a dense yellow pubescence, especially on the veins, &c. beneath, the lowest leaflets sometimes compound. *Panicles* axillary; rachis greatly elongated, yellow-pubescent; the minute *flowers* collected into small rather distant stalked cymes. *Calyx* very minute. *Petals* larger than the calyx-segments, linear-spathulate. *Stamens* not exceeding petals in length. *Drupe*s $\frac{1}{2}$ – $\frac{3}{4}$ in., black, glabrous, reticulated.

2. **B. mollis**, *Wall. Cat.* 8483; leaflets numerous lanceolate-acute entire usually pubescent, racemes compound, drupes ovoid. *Kurz in Journ. As. Soc. Beng.* xlii. pt. ii. p. 64.

Subtropical EASTERN HIMALAYA; Sikkim and Bhotan, alt. 3–6000 ft., *Griffith*, and SILHET, *Wallich*.

A bitter shrub. *Leaflets* larger than in *B. sumatrana*, 3 by 2 in., from pubescent to nearly glabrous. *Panicles* axillary; rachis pubescent or nearly glabrous; secondary cymes often many-flowered. *Petals* linear, longer than the stamens. *Drupe*s much larger than in *B. sumatrana*, $\frac{1}{3}$ – $\frac{1}{4}$ in., brown, glabrous, scarcely reticulated.

6. EURYCOMA, Jack.

Small trees, with bitter bark. *Leaves* very large, unequally pinnate, with entire leaflets. *Flowers* polygamous, in much-branched subterminal hairy panicles. *Calyx* minute, 5-toothed, valvate. *Petals* 5, induplicate-valvate. *Disk* 0. *Stamens* in male and hermaphrodite flowers 5, smaller in the latter; filaments attached to the base of the petals. *Ovary* 5-partite, free; styles 5, connate, stigmas distinct. *Drupe*s 3–5, stipitate. *Seed* solitary, pendulous, exalbuminous.—DISTRIB. Malacca, Archipelago, Philippines. Species 2.

1. **E. longifolia**, *Jack, Roxb. Fl. Ind. ed. Carey*, ii. 307; leaflets elliptic acute, panicles glandular-hairy, calyx-segments glandular, petals ovate-lanceolate, filaments appendiculate. *DC. Prodr.* ii. 86; *Wall. Cat.* 8522; *Planch. in Hook. Lond. Journ. Bot.* v. 584. *E. merguensis*, *Planch. l.c.* *E. tavoyana*, *Wall. Cat.* 8523.

TENASSERIM, *Parish*, and the ANDAMAN ISLANDS., *Helper*, to MALACCA, PENANG, and SINGAPORE.—DISTRIB. Sumatra, Borneo, Philippines.

A tree with bitter properties. *Leaves* a foot or more long, with a large number of coriaceous (often not opposite) leaflets, much paler beneath. *Panicles* large, spreading, and much-branched; rachis and pedicels covered with a rufous glandular pubescence. *Petals* 4 times as long as calyx-segments, $\frac{1}{2}$ by $\frac{1}{10}$ in. broad, very finely pubescent within and without. *Filaments* broad, half as long as the petals, glabrous, with a ligulate ciliated appendage at the base. *Drupe*s hard, ovoid, $\frac{1}{2}$ in. long, $\frac{1}{3}$ in. broad.—I am unable to distinguish the specimen of Planchon's *E. merguensis* in the Hookerian Herbarium by the alleged character of the filaments; otherwise it precisely resembles the type.

2. **E. apiculata**, A. W. Bennett; leaflets elliptic apiculate, panicles slightly hairy, calyx hairy without, petals ligulate, filaments not appendiculate.

PENANG, Maingay.

Leaves very long; leaflets ending in an abrupt point, dotted on the lateral veins beneath. Panicles denser than in *E. longifolia*; the rachis and pedicels slightly hairy. Calyx-segments not ciliate. Petals very narrow, 1 lin. long, $\frac{1}{2}$ lin. broad, glabrous. Filaments very short, $\frac{1}{4}$ – $\frac{1}{3}$ as long as the petals, glabrous. Fruit unknown.

7. **SURIANA**, Linn.

An insipid littoral shrub. Leaves simple, entire. Flowers hermaphrodite, conspicuous. Calyx 5-partite, imbricate, persistent. Petals 5, imbricate. Disk inconspicuous. Stamens 10, unequal in length, 5 sometimes barren. Ovary of 5 free carpels; styles basilar, filiform; ovules 2 in each carpel, lateral. Fruit consisting of 5 or fewer carpels covered by the persistent calyx, each 1-seeded, indehiscent. Seed ascending, exalbuminous.

1. **S. maritima**, Linn. Gen. No. 581; DC. Prodr. ii. 91; W. & A. Prodr. 361.

Throughout the tropical shores of India.—DISTRIB. Cosmopolitan.

Branches thick, covered with a velvety pubescence. Leaves about 1 in. long, linear-spathulate, obtuse, velvety. Flowers $\frac{3}{4}$ – $\frac{1}{2}$ in. across, terminal, hidden by the leaves. Petals $\frac{1}{4}$ by $\frac{1}{2}$ in. long, equalling the calyx, ovate-acute, yellow.

8. **IRVINGIA**, Hook. f.

Glabrous insipid trees. Leaves simple, coriaceous, entire, with deciduous stipules. Flowers hermaphrodite, in axillary panicles, ebracteate. Calyx small, 4–5-partite, imbricate. Petals 4–5, imbricate. Disk very large, cushion-shaped and folded. Stamens 10, inserted beneath the disk, filaments long, slender. Ovary conical, compressed, 2-celled, entire; style simple, terminal; ovules solitary. Fruit large, drupaceous, 1-seeded. Seed pendulous, exalbuminous.—DISTRIB. Species 3–4; all but the following Tropical African.

1. **I. malayana**, Oliver, ms.

MALACCA, Maingay.

Branches striated, glabrous, annulated at or near the nodes. Leaves large and thick, 4 by 2 in., elliptic, acute, quite entire, petiolate, base rounded and somewhat unequal. Flowers small, hermaphrodite, in axillary racemes or panicles. Calyx persistent; lobes ovate, obtuse. Petals twice as long as the calyx-lobes, reflexed after flowering. Filaments as long as the petals. Ovary conical, rising from the centre of a very large disk and narrowing into a terminal style.

9. **BALANITES**, Delile.

Spiny shrubs or trees. Leaves coriaceous, 2-foliolate, entire. Flowers green, in small axillary cymes. Calyx-segments 5, imbricate, deciduous. Petals 5, imbricate. Disk thick, conical, entire. Ovary entire, globose, 1-celled; ovules solitary, pendulous. Fruit a large fleshy oily 1-seeded drupe. Seed pendulous, exalbuminous.—DISTRIB. Tropical and Northern Africa, Syria, and W. Asia; species 2 (?).

1. **B. Roxburghii**, Planch. in Ann. Sc. Nat. ser. 4, ii. 258; petals velvety. Brandis. For. Flor. 59. B. ægyptiaca, Wall. Cat. 6855; Griseb. Cat. Bomb. Pl. 23; Wight Ic. t. 274. Ximenia ægyptiaca, Roxb. Fl. Ind. ii. 253.

Drier parts of India from CAWNPORE to SIKKIM, BEHAR, GOOZERAT, KANDEISH, and the DECCAN; BIRMA, Griffith.

A small tree, 20 ft. high, with glabrous or puberulous *branches* ending in very strong sharp ascending spines. *Leaves* of two elliptical or obovate puberulous entire coriaceous leaflets. *Cymes* 4-10-flowered. *Sepals* and *petals* ovate, velvety-pubescent. *Filaments* filiform-subulate. *Fruit* large, woody, angular, more than an inch long.—Very nearly allied to, and perhaps only a variety of, the *B. ægyptiaca* of northern and tropical Africa.

ORDER XXXV. **OCHNACEÆ.** (By Alfred W. Bennett, F.L.S.)

Glabrous trees or shrubs, with watery juice. *Leaves* alternate, simple, (very rarely pinnate) coriaceous; stipules 2. *Inflorescence* paniced or occasionally umbellate (rarely flowers solitary), bracteate. *Flowers* hermaphrodite, conspicuous. *Sepals* 4-5, free, imbricate, persistent. *Petals* 5, rarely 4 or 10, free, hypogynous, imbricate, longer than the sepals, deciduous. *Disk* enlarged after flowering, occasionally 0. *Stamens* 4, 5, 8, 10, or indefinite, inserted on the disk; filaments persistent; anthers basifixed, sometimes deciduous, dehiscent longitudinally, or often opening by terminal pores. *Ovary* short, 2-celled or elongate and 1-10-celled; placenta axile or parietal; style simple, subulate, acute, rarely divided at the extremity, stigmas simple, terminal; ovules 1-2 in each cell or indefinite, ascending or rarely pendulous, raphe ventral, micropyle superior. *Fruit* indehiscent, drupaceous or baccate, compound, each drupe or pyrene 1-4-seeded; or capsular and 1-5-celled with septicidal dehiscence. *Seeds* solitary, few, or numerous; albumen fleshy or 0; embryo straight or rarely curved, radicle superior or inferior.—**DISTRIB.** Tropical regions of both hemispheres, chiefly American; species about 150.

TRIBE I. **Ochneæ.** *Ovary* 2-10-celled; ovules solitary in each cell. *Seeds* exalbuminous.

Stamens ∞ ; flowers paniculate	1. OCHNA.
Stamens 10; flowers paniculate or umbellate	2. GOMPHIA.
Sepals, petals, and stamens 4	3. TETRAMERISTA.

TRIBE II. **Euthemideæ.** *Ovary* semi-5-celled; ovules 2 in each cell. *Seeds* albuminous.

Stamens 5, with alternate staminodes	4. EUTHEMIS.
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1. **OCHNA**, Linn.

Glabrous trees or shrubs. *Leaves* alternate, simple, serrate, rarely entire, 2-stipulate. *Flowers* large, yellow, in bracteate panicles or umbels. *Sepals* 5, coloured, persistent. *Petals* 5-10, deciduous. *Disk* thick, lobed. *Stamens* ∞ , shorter than the petals, filaments short or elongated; anthers opening longitudinally, deciduous. *Ovary* deeply 3-10-lobed, lobes 1-celled; styles entirely connate or distinct at the apex; ovules solitary in each cell, axile. *Fruit* of 3-10 drupes seated on the broad disk. *Seed* erect, albuminous.—**DISTRIB.** Tropical Asia and Africa; species about 25.

1. **O. squarrosa**, Linn.; DC. *Prodr.* i. 735; leaves from narrowly oblong to oblong-ovate or obovate, acute obtuse or mucronate, finely serrate, flowers fragrant, petals 7-12 (rarely 5), anthers very long deciduous, with very short persistent filaments, styles united to the apex. *Roxb. Fl. Ind.* ii. 643; *Cor. Pl.* i. t. 89; *Wight Ill.* i. t. 69; *Grah. Cat. Bomb. Pl.* 37; *Dalz. & Gibs. Bomb. Fl. Suppl.* 17. *O. lucida*, Lamk. *Ill.* t. 472, f. i.; DC. *l.c.*; *Planch. in Hook. Journ. Bot.* v. 649; *Griff. Not.* iv. 464, t. 605, f. vi. *O. nitida*, Thunb.; DC. *l.c.*; *Planch. l.c.* 650 (not of Wall.). *O. rufescens* (?) Thunb. *l.c.*; *Thw. Enum.* 70. *O. obtusata*, DC. *l.c.* 735; *Wall. Cat.* 2805.

SILHET; BIRMA; PEGU; EASTERN and WESTERN PENINSULAS, and CEYLON.

Leaves very various in size and shape; stipules $\frac{1}{2}$ – $\frac{1}{4}$ in. *Flowers* $\frac{1}{4}$ – $\frac{3}{4}$ in. across, in loose axillary panicles. *Petals* not much longer than the sepals, clawed. *Anthers* many times longer than the very short filaments. *Style* greatly exceeding the stamens. *Drupe*s $\frac{1}{4}$ in. long, seated on the greatly enlarged disk, and surrounded by the persistent coriaceous calyx.—Griffith's *O. lucida* is described as having 5 petals, but is apparently the same plant.

VAR. cordata; leaves much smaller cordate at the base and rounded at the apex more sharply serrate. *O. cordata*, *Thw. Enum.* 70.—Ceylon.

2. *O. Wallichii*, *Planch. in Hook. Lond. Journ. Bot.* v. 650; leaves oblong-elliptic very finely serrate, petals 5, anthers not longer than the filaments, styles united nearly to apex. *O. nitida*, *Wall. Cat.* 2804 (not of *Thunb.*). *O. stipulacea* (?), *Colebr. ms.*; *Wall. Cat.* 2806; *Planch. in Hook. Lond. Journ. Bot.* v. 653. *O. squarrosa*, *Kurz Andam. Rep. App.* iv. (not of *Linn.*). *O. andamanica*, *Kurz Rep. And. ed.* ii. 33, and in *Journ. As. Soc. Beng.* xli. pt. 2, 295.

TENASSERIM, TAVOY, the ANDAMAN ISLANDS, and PEGU.

Leaves 4 by $1\frac{1}{2}$ in. or larger, acute, very shortly petioled; stipules very minute. *Flowers* on very long pedicels, in loose axillary panicles. *Sepals* ovate or lanceolate, generally reflexed after flowering. *Petals* somewhat longer than the sepals. *Anthers* elongated, but rather shorter than the very slender persistent filaments. *Styles* greatly exceeding the stamens.

VAR. parviflora; flowers much smaller. *O. parviflora*, *Griff. Not.* iv. 464.—Moulmein, *Griffith*.

3. *O. Wightiana*, *Wall. Cat.* 2808; leaves elliptical to ovate base rounded subcordate subobtusely coriaceous serrulate, flowers solitary or in pairs or rarely 3, petals 5, anthers about as long as the filaments, style 5-cleft at the apex. *W. & A. Prodr.* 152; *Thwaites Enum.* 70; *Wight Ic.* t. 223 (?); *Planch. in Hook. Lond. Journ. Bot.* v. 653. *O. Heyneana*, *W. & A. l.c.*; *Planch. l.c.* 653. *O. Walkerii*, *Planch. l.c.* *O. parvifolia*, *Vahl*?, *Wall. Cat.* 2807. *O. Moonii*, *Thwaites Enum.* 70.

TRAVANCOR, *Wight*; warmer parts of CEYLON.

Leaves much smaller than in *O. squarrosa* and *Wallichii*, $1-1\frac{1}{2}$ by $\frac{1}{2}-\frac{3}{4}$ in., but often narrower, very shortly stalked; stipules very slender, $\frac{1}{2}-\frac{1}{4}$ in. *Flowers* axillary, usually solitary, smaller than in the two species named. *Sepals* usually reflexed after flowering.—In *O. Moonii*, *Thw.*, the number of flowers in a cluster is larger.—*Ochna parvifolia*, *Vahl Symb.* i. 33; *DC. Mon. Och.* 17, t. xix. f. 2; *Prodr.* i. 736, from Arabia Felix, much resembles and may even be identical with a small-leaved form of this species.

VAR. angustifolia; leaves narrowly elliptical tapering to either end.

4. *O. pumila*, *Ham. in Don Prodr.* 224; leaves very large more or less broadly oblanceolate serrulate, flowers very large and handsome, anthers longer than filaments, style undivided. *DC. Prodr.* i. 736; *Planch. in Hook. Lond. Journ. Bot.* v. 652. *O. nana*, *Ham. in Wall. Cat.* 3761; *Dalz. & Gibs. Bomb. Fl.* 46. *O. humilis*, *Wall. Cat.* 3762. *O. collina*, *Edgew. in Trans. Linn. Soc.* xx. p. 43. ? *O. fruticulosa*, *Kurz in Journ. As. Soc. Beng.* xli. pt. 2, 295.

Foot of the HIMALAYA, from Kumaon, *Edgeworth*, to SIKKIM, *J. D. H.*; PEGU, *Kurz*; SOUTH CONCAN, *Dalz. & Gibs.*

A small shrub, 1–3 ft. (?). *Leaves* often as much as 6 in. by 2 in., narrowed below and very shortly petioled, acute or obtuse, very sharply serrulate; stipules $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* umbellate, 3–6 at the end of a common peduncle, as much as $1\frac{1}{2}$ in. across; pedicels $\frac{1}{2}$ –1 in.; common peduncle 3 in. long, bracteate at the base. *Sepals* ovate, 2–3 times shorter than the petals. *Filaments* short, surmounted by the elongated anthers. *Styles* elongate, connate or very slightly divided at the apex. *Drupe*s finely reticulated.—I am unable to distinguish *Kurz's O. fruticulosa* from Pegu by the description. The Concan habitat is taken from the Bombay Flora.

5. (?) **O. brevipes**, *Planch. in Hook. Lond. Jour. Bot.* v. 652; flowers nearly sessile in compound fascicles, anthers somewhat longer than the filaments, styles undivided.

PEGU.

Leaves unknown, deciduous. *Flowers* $\frac{1}{2}$ – $\frac{3}{4}$ in. across. *Sepals* elliptical. *Petals* 5, obovate, suddenly narrowed into a claw. *Styles* about as long as stamens.

2. **GOMPHIA**, Schreb.

Glabrous trees or shrubs. *Leaves* alternate shining, 2-stipulate. *Flowers* yellow, in axillary or terminal racemes or umbels. *Sepals* 5, coloured, persistent. *Petals* 5, imbricate. *Disk* thick, lobed. *Stamens* 10, inserted at the base of the disk, filaments very short; anthers opening by terminal pores. *Ovary* deeply 5–6-lobed, lobes 1-celled; styles connate, stigma simple; ovules solitary in each cell, erect. *Drupe* 5 or fewer, seated on a broad disk, 1-seeded. *Seed* erect, exalbuminous.—**DISTRIB.** Chiefly tropical South American; a few are Asiatic and African; species about 80.

1. **G. angustifolia**, *Vahl Symb.* ii. 49; leaves coriaceous narrowly ovate acute serrulate sessile, flowers in compound rather dense terminal racemes, drupes ovoid. *DC. Prodr.* i. 736; *W. & A. Prodr.* 152; *Grah. Cat. Bomb. Pl.* 38; *Thwaites Enum.* 71; *Planch. in Hook. Lond. Journ. Bot.* vi. 3. *G. zeylanica*, *DC. l.c.*; *Wall. Cat.* 2802. *G. malabarica*, *DC. l.c.* *Ochna zeylanica*, *Lam. Walkera serrata*, *Willd., DC. Prodr.* i. 737. *Meesia serrata*, *Gaertn. Fruct.* i. t. 70.—*Burm. Fl. Zeyl.* t. 56; *Rheede Hort. Mal.* v. t. 48 and 52 (monstrous):

Southern provinces of the WESTERN PENINSULA, from the South Concan to Travancor; SINGAPORE, *Walker*; common in CEYLON.—**DISTRIB.** Philippines.

A small tree, 30 ft. high. *Leaves* about 5 in. by 1 in., very shining; stipules linear, deciduous. *Flowers* about $\frac{1}{2}$ in. across, very numerous, on slender pedicels. *Sepals* oval, coriaceous. *Petals* longer than sepals, deciduous. *Anthers* elongated, about as long as petals, nearly sessile. *Carpels* obovate or reniform; styles 10, larger than stamens, persistent in fruit, stigma quite entire. *Drupe* about the size of peas, smooth, shining, reticulated.

2. **G. sumatrana**, *Jack in Mal. Misc.* No. v. p. 29, and in *Hook. Bot. Misc.* ii. 77; leaves narrowly ovate serrulate, panicle very diffuse. *Wall. Cat.* 2803. *G. sumatrensis*, *Planch. in Hook. Ic. Pl.* t. 712, and *Hook. Lond. Journ. Bot.* vi. 2. *Ochna crocea*, *Griff. Not.* iv. 463. *Euthemis elegantissima* (?), *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 305. *E. pulcherrima*, *Wall. Cat.* 2518.

SINGAPORE, *Wallich*; MALACCA, *Maingay*.—**DISTRIB.** Sumatra, Borneo.

Very closely allied to *G. angustifolia*, there being scarcely any characters by which it can be distinguished, except the much more diffuse character of the panicle.

3. **G. Hookeri**, *Planch. in Hook. Lond. Journ. Bot.* vi. 3; leaves coriaceous narrowly ovate entire shortly petioled, flowers in terminal umbels, drupes ovoid.

PENANG, *Phillips*; MALACCA, *Maingay*.

Leaves about 4 in. by $1\frac{1}{2}$ in., narrowed into the short petiole; stipules deciduous. *Flowers* rather smaller than in *G. angustifolia*, on long slender pedicels, 10–20 in an umbel. *Sepals* ovate, coriaceous. *Styles* quite connate; stigma entire. *Drupe* smooth, not reticulated.—This species is rather a *Brackenridgia* (*A. Gray, Bot. U. S. Expl. Exped.* 361) than a *Gomphia*, if the two genera are to be kept distinct, and *Brackenridgia* not rather to be considered as a section of *Gomphia*, as suggested by Oliver (in *Hook. Ic. Plant.* xi. t. 1096). *Brackenridgia* is not otherwise a Malayan genus.

DOUBTFUL SPECIES.

"*G. UMBELLATA*," *Hook. f. ms.*, from Penang, appears distinct; but the specimens are not sufficiently perfect for determination.

3. **TETRAMERISTA**, Miq.

Shrubs or trees. *Leaves* very large, coriaceous, entire. *Flowers* in axillary racemes, with large foliaceous bracts. *Sepals* 4, imbricate, persistent; 2 outer ones larger. *Petals* 4, persistent. *Stamens* 4; filaments dilated at the base; anthers dehiscing longitudinally. *Ovary* 4-angled, 4-celled; style entire. *Fruit* a globose 4-seeded coriaceous berry.—**DISTRIB.** Malayan Peninsula and Islands. Species 1-2.

1. **T. glabra**, *Miq. Fl. Ind. Bat. Suppl.* 534; var. *sagittata*; leaves sagittate at the base. *Ancistrocladus*? *sagittatus*, *Wall. Cat.* 1055.

SINGAPORE, *Wallich*; TENASSERIM (or the Andaman Islands), *Helfer*; Kedah Peak, *MALACCA, Low*.

Leaves obovate, rounded at the apex. *Sepals* in two series, lanceolate. *Petals* resembling the sepals, but rather smaller. *Filaments* filiform above. *Style* single, central. —*T. glabra* is a Sumatran plant, entered as Indian on account of some specimens in *Herb. Kew.*, collected by *Helfer*, either in "Tenasserim or the Andaman Islands," and by *Wallich* at Singapore, without flowers, but apparently belonging either to this species or to an allied one, differing in the sagittate base of the leaves.

4. **EUTHEMIS**, Jack.

Glabrous shrubs. *Leaves* alternate, simple, shining, coriaceous, serrulate, with ciliate deciduous stipules. *Flowers* rose or white, in terminal or leaf-opposed racemes, bracteate. *Sepals* 5, imbricate, persistent or deciduous. *Petals* 5, longer than sepals, imbricate. *Disk* small, conical. *Stamens* 5, inserted at the base of the disk, with alternate staminodes; anthers opening by terminal pores. *Ovary* semi-5-celled, elongate, viscid; style 1, stigma entire; ovules 1-2 in each cell, pendulous. *Fruit* a berry of 5 pyrenes, each 1-2-seeded. *Seeds* pendulous with a fleshy albumen.—**DISTRIB.** Species 4, natives of the Malayan Archipelago.

1. **E. leucocarpa**, *Jack in Mal. Misc.* No. v. p. 16; leaves large acute very gradually narrowed into the petiole very beautifully serrulate on the thickened margin, flowers in rather small terminal branched racemes, berry snow-white. *Roxb. Fl. Ind. ed. Carey*, ii. 303; *Planch. in Hook. Ic. Pl.* viii. t. 711.

Mounts Gerai and Ophir, alt. 3000 ft., in MALACCA, *Lobb*.—**DISTRIB.** Malayan Archipelago.

An erect shrub, 4-5 ft. *Leaves* narrowly elliptic, 4 in. by 1½ in., with fine curved nearly parallel veins running from the midrib to the thickened margin; stipules acuminate, ciliate, deciduous. *Sepals* ovate, thick, ciliate-serrate. *Petals* twice as long as the sepals, reflexed. *Filaments* very short. *Ovary* elongate, acute; style, tapering. *Berry* crowned by the persistent style, 5-seeded.

2. **E. minor**, *Jack in Mal. Misc.* No. v. p. 18; leaves narrowly lanceolate, obtuse, mucronate obscurely serrulate, racemes simple, berry red. *Roxb. Fl. Ind. ed. Carey*, ii. 304.

SINGAPORE and PENANG.—**DISTRIB.** Malayan Archipelago.

A small shrub. *Leaves* much smaller than in *E. leucocarpa*, coriaceous, narrowed, into the petiole, obscurely veined; stipules linear, ciliate, deciduous. *Sepals* ovate-ciliate. *Filaments* short. *Ovary* ovate, acute. *Berry* 5-seeded.

DOUBTFUL SPECIES.

E.? **ELEGANTISSIMA**, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 305, is probably a distinct

plant, but is only imperfectly known. Planchon (Hook. Lond. Journ. Bot. v. 64) suggests that it may be *Gomphia sumatrana*, with which, however, the description of the leaves does not appear to agree. Wallich describes it as having elliptic-lanceolate leaves tapering at both ends, finely acuminate, sharply and minutely serrulate, the nerves reticulating and uniting in two or more submarginal arches.—Native of Singapore and the contiguous islands.

ORDER XXXVI. **BURSERACEÆ.** (By Alfred W. Bennett, F.L.S.)

Balsamiferous trees or shrubs. *Leaves* alternate (very rarely opposite), imparipinnate or trifoliolate (very rarely unifoliolate), stipulate or exstipulate. *Inflorescence* racemose or paniculate. *Flowers* regular, small, hermaphrodite or often polygamous. *Calyx* free, 3-6-lobed, imbricate or valvate, often minute. *Petals* 3-6, distinct, rarely connate, imbricate or valvate. *Disk* annular or cupular, usually conspicuous, free or adnate to the base of the calyx. *Stamens* as many or twice as many as petals, inserted at the base or margin of the disk, equal or unequal; filaments free, rarely connate at the base, smooth; anthers dorsifixed rarely adnate, 2-locular, dehiscing longitudinally. *Ovary* free, rarely 1- more often 2-5-celled; style simple, stigma undivided or 2-5-lobed; ovules 2 or rarely 1 in each cell, anatropous, axile, usually pendulous rarely ascending, micropyle superior, raphe ventral. *Fruit* drupaceous, indehiscent, containing 2-5 pyrenes, rarely pseudo-capsular and dehiscent. *Seeds* solitary, pendulous, testa membranous, albumen 0; cotyledons usually membranous, contortuplicate, rarely fleshy and planoconvex, radicle superior.—**DISTRIB.** Tropical regions of both hemispheres; genera 16-18; species about 160.

Drupe valvately dehiscent, pyrenes separating.

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|----------------------------------|---------------|
| Drupe trigonous | 1. BOSWELLIA. |
| Drupe broadly 3-winged | 2. TRIOMMA. |

Drupe indehiscent, pyrenes not separating.

Stamens 6-10.

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| Calyx 5-fid, urceolate. Disk clothing tube of calyx . . . | 3. GARUGA. |
| Calyx 4-toothed, urceolate. Disk cupular. Flowers few, fasciculate | 4. BALSAMODENDRON. |

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| Calyx 4-6-toothed, small. Disk clothing base of calyx. Stamens 8-10. Inflorescence paniculate | 5. PROTIUM. |
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| Calyx 4-6-lobed, imbricate. Disk annular. Stamens 8-10 | 6. BURSERA. |
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| Calyx usually 3-fid, valvate. Drupe ellipsoid, usually trigonous; style terminal | 7. CANARIUM. |
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| Calyx 3-fid, valvate. Drupe usually gibbous; style lateral | 8. SANTIRIA. |
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| Calyx 3-partite, large, valvate. Drupe globose | 9. TRIGONOCHEILANTHUS. |
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| Stamens 5 | 10. FILICIMUM. |
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i. **BOSWELLIA**, Roxb.

Balsamiferous trees, bark frequently papyraceous. *Leaves* alternate, exstipulate, imparipinnate, deciduous, with opposite sessile usually serrate leaflets. *Flowers* small, white, hermaphrodite, in axillary racemes or panicles. *Calyx* small, 5-toothed, persistent. *Petals* 5, distinct, narrowed at the base, imbricate. *Disk* annular, crenate. *Stamens* 10, 5 long 5 short, inserted at the base of the disk. *Ovary* sessile, 3-celled; style short, stigma 3-lobed; ovules 2 in each cell, pendulous. *Drupe* trigonous, containing 3 1-seeded pyrenes which finally separate. *Seeds* compressed, pendulous.—**DISTRIB.** India and Tropical Africa; species about 6.

1. **B. serrata**, *Roxb. ex Colebr. in Asiat. Res.* ix. 379, t. 5; leaflets sessile pubescent coarsely crenate-serrate, racemes axillary shorter than the leaves. *Stackhouse, Extracts*, p. xix; *Colebr. in Trans. Linn. Soc.* xv. 363, t. v. fig. 1; *Wall. Cat.* 8486. *B. thurifera*, *Roxb. ex Fleming in Asiat. Res.* xi. 158; *Roxb. Hort. Beng.* 32; *Fl. Ind.* ii. 383; *W. & A. Prodr.* 174; *Grah. Cat. Bomb. Pl.* 42; *Birdwood in Trans. Linn. Soc.* xxvii. 146; *Brandis For. Flor.* 61. *Libanus thurifera*, *Colebr. in Asiat. Res.* ix. 382. *Libanotus asiaticus*, *Stackhouse, De Liban.* 13, t. iii. fig. 6.

Forests of the base of the WESTERN HIMALAYA, as far west as the Sutlej; Central India, from BEHAR to RAJPUTANA, and southward into the DECCAN, and to the Circars and the Concan.

Leaves of a large number of opposite or nearly opposite lanceolate or ovate acute or obtuse inequilateral leaflets, very variable in size, shape, and degree of pubescence. *Calyx-segments* deltoid. *Drupe* $\frac{1}{2}$ in. long, trigonous, splitting into three valves, subtended by the woody disk.

VAR. glabra; leaflets nearly or quite glabrous, often nearly entire. *B. glabra*, *Roxb. Hort. Beng.* 90; *Cor. Pl.* iii. t. 207; *Fl. Ind.* ii. 384; *Grah. Cat. Bomb. Pl.* 42; *DC. Prodr.* ii. 76; *W. & A. Prodr.* 174; *Bedd. Fl. Sylv.* t. 124. *Chloroxylon Dupada*, *Buch. Journ. Mys.* i. 184.—Scarcely a species, running by insensible gradations into the typical form.—N. W. India; Siwalik hills, near Khizeraband, *Edgeworth*; Padshapoor (near Belgaum), *Ritchie*.

2. **TRIOMMA**, Hook. f.

A tree; branchlets robust, pubescent. *Leaves* alternate, exstipulate, imparipinnate, with opposite petiolulate leaflets. *Flowers* very small, in terminal panicles, polygamous (?). *Calyx* 5-fid. *Petals* 5, small, valvate (?). *Stamens* 10 (?) inserted at the base of the 5-lobed disk. *Ovary* trigonous, 3-celled; style short; ovules 2 in each cell. *Fruit* 3-winged, 3-valved, as much as 2-2 $\frac{1}{2}$ inches long, containing 3 hard woody separable pyrenes.—**DISTRIB.** A solitary species.

1. **T. malaccensis**, *Hook. f. in Trans. Linn. Soc.* xxiii. 171; leaflets oblique ovate-lanceolate-acuminate entire, drupe ovate-caudate acutely cuspidate. *Arytera?* *macrocarpa* *Miq. Fl. Ind. Bat. Suppl.* 199 (according to *T. Anderson in Herb. Kew.*).

MALACCA, *Griffith, Maingay*.

3. **GARUGA**, Roxb.

Trees; branchlets pubescent. *Leaves* alternate, exstipulate, imparipinnate, crowded towards the ends of the branches, with opposite subsessile crenate leaflets. *Flowers* polygamous, in much-branched panicles. *Calyx* campanulate, 5-fid, valvate, clothed within by the ample disk. *Petals* 5, inserted on the tube of the calyx, induplicate-valvate. *Stamens* 10, equal, inserted in the tube of the calyx at the margin of the disk, filaments hairy at the base. *Ovary* sessile, 4-5-celled; style erect, stigma capitate 4-5-lobed; ovules 2 in each cell. *Drupe* globose, fleshy, containing 1-5 1-seeded pyrenes.—**DISTRIB.** Tropical Asia, America, and Australia; species 8-10.

1. **G. pinnata**, *Roxb. Cor. Pl.* iii. t. 208; leaflets ovate obtusely acuminate oblique crenate, flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. long pubescent. *Roxb. Fl. Ind.* ii. 400; *Grah. Cat. Bomb. Pl.* 43; *DC. Prodr.* ii. 81; *W. & A. Prodr.* 175; *Bedd. Fl. Sylv.* t. 118; *Brandis For. Flor.* 62; *Wall. Cat.* 8485; ? *G. mada-gascariensis*, *DC. l.c.*—*Rheede Hort. Mal.* iv. t. 33.

Throughout INDIA, and from the Jumna eastwards to BIRMA, and southwards to the NILGHIRS and TENASSERIM; ascending to 3000 ft. in the Himalaya.—**DISTRIB.** Malayan Archipelago, Philippines.

A tree 30–40 ft. *Leaves* 1 ft. or more, pubescent when young, afterwards glabrous. *Panicle* very large, compound, pubescent. *Calyx*-teeth ovate, pubescent. *Petals* linear, inserted between the calyx-teeth. *Disk* completely clothing the tube of calyx. *Stamens* about as long as the petals. *Ovary* ovoid, narrowing into the hairy style; stigma capitate, 5-lobed. *Drupe* black, "size of a gooseberry."

4. **BALSAMODENDRON**, Kunth.

Balsamiferous often spiny trees or shrubs. *Leaves* alternate, 1–5-foliolate or imparipinnate; leaflets sessile, oblique, crenate or serrate. *Flowers* small, polygamous, fasciculate, on short petioles or sessile. *Calyx* tubular, 3–4-toothed, persistent. *Petals* 3–4, valvate. *Disk* erect, cupular. *Stamens* 6–8, usually 4 long and 4 short, inserted on the margin of the disk. *Ovary* sessile, 4-celled, surrounded by the disk; style short, stigma obtuse 4-lobed; ovules 2 in each cell. *Drupe* ovoid, containing a 1–3-celled and -seeded stone or 1–3 stones.—**DISTRIB.** India, Arabia, Tropical and Southern Africa; species 6–10. (See Berg. in *Bot. Zeit.* 1862. 153, 161.)

1. **B. Mukul**, Hook. ex Stocks in Hook. *Kew Journ. Bot.* i. 259, t. 8; branches generally ending in a sharp spine, leaves 1–3-foliolate, leaflets smooth and shining obovate nearly sessile toothed at the end. *Boiss. Fl. Orient.* ii. 3; *Brandis For. Flor.* 64. *B. Roxburghii*, Stocks in *Bomb. Trans.* 1847 (*excl. syn.*); *Dalz. & Gibs. Bomb. Fl. Suppl.* 19 (*not of Arn.*). (?) *B. Wightii*, Arn. in *Ann. Nat. Hist.* iii. 86; *Wight Ill.* i. 185.

SINDH, Stocks; RAJPOOTANA, Bednore, Brandis; KHANDEISH and BERAR, Dalz. & Gibs.; ? MYSORE, Bellary, Wight.—**DISTRIB.** Beluchistan, Arabia?

A small tree 4–6 ft. *Branches* slightly ascending. *Flowers* nearly sessile, a few in each fascicle, unisexual, the male with small abortive ovary, the female with short barren stamens. *Calyx* forming a cylindrical cup, glandular-hairy. *Petals* 4–5, ligulate, brownish red, recurved at the tip, 3 times as long as calyx. *Disk* 8–10-toothed. *Stamens* 8–10. *Stigma* obscurely 2-lobed. *Drupe* red, ovate-acuminate, containing 2 2-celled stones, rarely 4-valved.—I follow the suggestion of Brandis in referring to the Bellary plant (*B. Wightii*) under *B. Mukul*, from which it appears to be indistinguishable, though without flowers. Brandis remarks, "This species will probably be found to be indigenous on arid rocky hills throughout Rajputana and a great part of the Dekkan" (*l.c.* p. 65).—Gugal.

2. **B. Roxburghii**, Arn. in *Ann. Nat. Hist.* iii. 86; branches spiny, leaves 3-foliolate, terminal leaflet very finely serrulate, lateral leaflets very small. *Wight Ill.* i. 185. *Amyris Commiphora*, Roxb. *Fl. Ind.* ii. 244; *Wall. Cat.* 8498. ? *A. Agallocha*, Roxb. *Hort. Beng.* 28.

EASTERN BENGAL; Silhet and Assam, Roxburgh, &c.

Very similar to *B. Mukul*, and possibly identical, but only imperfectly known; the leaves appear to be larger and of a thinner texture. I have only seen specimens of Wallich's and Rottler's from the Mission Garden of Madras, to which Rottler has attached the name *Amyris serratifolia*, nob.

3. **B. pubescens**, Stocks in *Bomb. Trans.* 1847; *Hook. Kew Journ. Bot.*; 264, t. 9; branches not spiny, leaves petioled, 3–5-foliolate, leaflets entire. *Boiss. Fl. Orient.* ii. 2; *Brandis For. Flor.* 64.

Rocky parts of SINDH, Stocks.—**DISTRIB.** Beluchistan.

A small tree with pubescent unarmed branches. *Leaves* on slender petioles longer than the blade, soft and downy when young, lateral leaflets nearly orbicular, terminal obovate-cuneate, petiolulate. *Flowers* sessile. *Stamens* equal. *Drupe* red, with 2 stones.

4. **B. Berryi**, Arn. in *Ann. Nat. Hist.* iii. 86; branches spiny, leaves 3-foliolate petioled glabrous entire, calyx 3–4-cleft, petals 3–4, stamens 6–8,

the alternate ones smaller. *Wight Ill.* i. 185; *Bedd. Fl. Syl.* t. 126; *Brandis For. Flor.* 65. *Protium gileadense*, *W. & A. Prodr.* 177, *exclud. synon.*; *Grah. Cat. Bomb. Pl.* 43, (*not B. gileadense DC.*). *Amyris gileadensis*, *Roxb. Fl. Ind.* ii. 246.

WESTERN PENINSULA; in dry forests East of the Nilghiris and Sivagherri Hills (cultivated for hedging throughout S. India).

Branches patent, the lateral ones ending in very abrupt spines. *Leaves* alternate or fascicled; leaflets obovate, sessile, the terminal one twice as large as the lateral ones. *Flowers* nearly sessile, solitary or fascicled. *Disk* small, 6-8-lobed. *Drupe* oblong, apiculate.

5. **PROTIUM**, *W. & A.*

Small balsamiferous spiny trees. *Leaves* alternate, 3-foliolate or imparipinnate, with entire or toothed leaflets. *Flowers* small, on long pedicels in much branched cymes. *Calyx* small, cupular, 4-6-fid or -toothed. *Petals* 4-6, linear-oblong, valvate. *Disk* clothing the bottom of the calyx-cup, with free margin. *Stamens* 8-12, inserted in the margin of the disk, unequal. *Ovary* 2-4-celled, sessile; style short, stigma 3-6-lobed; ovules 3 in each cell. *Drupe* fleshy, globose, containing 1-4 pyrenes. *Seeds* oblong; radicle superior.—**DISTRIB.** India, Java, subtropical Africa. Species 3-4.

1. **P. caudatum**, *W. & A. Prodr.* 176; leaves 3-7-foliolate, leaflets glabrous more or less abruptly acuminate, cyme branched many times dichotomously greatly exceeding the leaves. *Bedd. Fl. Sylv.* t. 125; *Wall. Cat.* 8494, 8495.

WESTERN PENINSULA; CEYLON, at Jaffoa.

Leaves long-petioled with short lateral leaflets, the terminal one with a long petiolule, ovate, entire. *Cymes* bracteate at the branches, the bracteoles beneath the flowers very minute. *Flowers* polygamous, small. *Calyx*-lobes deltoid, acute, as long as broad. *Petals* about twice as long as calyx-lobes. *Drupe* about the size of a pea, nearly globular, subtended by the persistent calyx.

VAR. *Roxburghiana*, *W. & A. l.c.* (species); leaflets not acuminate, but ending in a short abrupt point. *Amyris acuminata*, *Roxb. Fl. Ind.* ii. 246; *Wall. Cat.* 8496.—*Pulney Mts., Wight.*

2. **P. pubescens**, *W. & A. Prodr.* 176; leaflets pubescent obtusely acuminate, cyme (panicle?) rather dense branched many times but not dichotomously. *Wall. Cat.* 8497.

WESTERN PENINSULA, *Wight.*

Leaflets about 7, ovate or obovate, entire, very shortly petiolulate. *Bracts* in the upper part of the inflorescence exceeding flowers. *Flowers* rather shortly pedicelled. *Calyx-segments* lanceolate, twice as long as broad. *Drupe* rather larger than in *P. caudatum*.

6. **BURSERA**, *Linn.*

Balsamiferous trees. *Leaves* alternate, imparipinnate, or rarely 1-foliolate. *Panicles* short, branched. *Flowers* hermaphrodite or polygamous. *Calyx* small, 4-6-partite or -toothed, imbricate. *Petals* 4-6, short, patent at length reflexed, usually valvate. *Disk* annular, crenate. *Stamens* 8-12, nearly equal, inserted at the base of the disk. *Ovary* free, ovoid or subglobose, 3-5-celled; style very short, stigma 3-5-lobed; ovules 2 in each cell. *Drupe* globose or ovoid, with 3-5 pyrenes.—**DISTRIB.** About 40 species, mostly natives of Tropical America.

1. **B. serrata**, *Colebr. in Trans. Linn. Soc.* xv. 361, t. 4; leaflets narrowed below acuminate, drupe globose 1-3-celled, the pedicel greatly

thickened and elongated. *Brand. For. Flor.* 61. *Icica indica*, *W. & A. Prodr.* 177; *Wall. Cat.* 8492. *Limonia pentagyna*, *Roxb. Fl. Ind.* ii. 382, *ex Kurz in Journ. As. Soc. Beng.* 1870, ii. 70.

EASTERN BENGAL; Garrow hills and Rajmahal hills, ASSAM; and CHITTAGONG. The CIRCARS, *Roxburgh*.

Leaflets about 7 or more, opposite, petiolulate, ovate, pubescent or nearly glabrous, serrulate or quite entire. *Panicles* axillary, lax, much branched, shorter than the leaves, bracteate. *Flowers* very small, hermaphrodite, pubescent externally. *Calyx* obtusely 5-toothed. *Petals* 5, recurved. *Stamens* 10, shorter than the petals.

7. CANARIUM, Linn.

Balsamiferous trees. *Leaves* alternate, imparipinnate, stipulate or exstipulate. *Flowers* bracteate, in terminal or axillary panicles, hermaphrodite or polygamous. *Calyx* cupuliform or campanulate, 3-lobed or -fid (5-lobed in § *Scutinanthe*), valvate. *Petals* 3-5, imbricate below or valvate, usually exceeding calyx. *Stamens* 6 (10 in § *Scutinanthe*), distinct, inserted on margin or outside of disk, or filaments confluent below and distinct from disk. *Ovary* 2-3-celled; ovules 2 in each cell; style various, or stigma subsessile, capitate. *Drupe* usually ellipsoidal, more or less distinctly trigonous, with a 1-3-celled, 1-3-seeded stone; cotyledons often partite, contortuplicate.—DISTRIB. Tropical Asia and Malayan Archipelago. Species probably about 30.

As may be inferred from the sectional characters it is not improbable that two or three generic types are included here under *Canarium*, but the final settlement of these cannot be undertaken without the examination of a full series of Archipelago forms.

SECT. I. *Flowers* 5-merous (*SCUTINANTHE*, *Thw.*).

1. **C. brunneum**, *Bedd. Fl. Sylv.* t. 127; extremities shortly red-tomentose, leaves exstipulate, leaflets 5-11 oblong or ovate-oblong acuminate entire glabrescent or midrib beneath puberulous, panicles axillary branching from base red-tomentose, pedicels not exceeding 5-fid calyx, petals scarcely exceeding calyx, stamens 10 confluent in a disk adnate to calyx-tube (in ♂ fl.), ovary hirsute 2-celled, fruit drupaceous ellipsoidal shortly pointed. *Scutinanthe brunnea*, *Thwaites in Kew Journ. Bot.* viii. 266, t. 8 B; *Enum.* 79.

CEYLON; in the central Province, alt. 2-3000 ft., *Thwaites*.

Tree of 50-60 ft. *Leaves* 10-20 in.; leaflets 4-8 by 2-2½ in.; petiole ½-1 in. *Panicles* much shorter than leaves; bracts ovate-lanceolate. *Flowers* polygamous. *Calyx* cupuliform, lobes 5 ovate-deltoid. *Petals* tomentose outside, subvalvate. *Drupe* 1-1½ in. long, apiculate and thinly red-tomentose when dry, 1-celled (in our specimen), with thin bony stone. (*Cotyledons* entire foliaceous plicate. *Thwaites*.)—Nearly allied to this species, but with drupes 1¾ in. long, are specimens from Malacca (*Main-gay*), without flowers.

SECT. II. *Flowers* normally 3-merous.

* *Stamens* confluent in short disk around ovary or its rudiment. *Buds* sheathed by deciduous bracts. *Stone* thick bony.—*Canarium* proper.

† *Leaflets* entire.

2. **C. commune**, *Linn.*; extremities tawny puberulous or glabrate. stipules elliptic or rotundate auricled often early deciduous, leaflets 7-9 ovate to oblong elliptical acuminate glabrous, lateral nerves about 10-15 pairs often paler and subprominent beneath, panicles terminal puberulous with

spreading successively shorter lateral branches, buds enclosed in ovate or rotundate tomentose bracts, petals 3 imbricate below, stamens (in ♂ fl.) inserted around hairy rudiment of ovary (drupe ellipsoidal subtrigonus with a bony 1-3-celled stone. *Blume*). *Koenig. Ann. Bot.* i. 360, t. 7, f. 2; *Roxb. Fl. Ind.* iii. 137; *Blume Mus. Bot.* i. 214; *Bijdr.* 1161; *DC. Prodr.* ii. 79; *W. & A. Prodr.* 175; *Miq. Fl. Ind. Bot.* vol. i. pt. 2, 643; *Wall. Cat.* 8493. *Sapindus travancorensis*, *Wall. Cat.* 8047.

PENANG, *Phillips, Jack*.

Leaves of flowering branches $\frac{3}{4}$ –1½ ft. more or less; upper leaflets 4–6 by 1½–2½ in.; petiolules $\frac{1}{4}$ –1 in. *Flowers* variable in size, ♀ $\frac{1}{2}$ to over $\frac{1}{2}$ in. in length. *Calyx* campanulate, broadly 3-lobed. *Petals* tomentose above. *Ovary* glabrous, incrassate above. *Cotyledons* tripartite, contorted (*Blume*).—A Malayan and Archipelago plant cultivated in India.

3. *C. zeylanicum*, *Blume Mus. Bot.* i. 218; extremities tawny-puberulous, stipules deciduous, leaflets 5–9 more or less broadly elliptical shortly acuminate entire, when pressed flat the margins (of young leaves) infolded beneath glabrous, panicles terminal, of ♂ fl. lateral branches successively shorter, buds globose or ovoid at first enveloped in rotundate deciduous tawny-tomentose bracts, calyx trifid, petals imbricate, stamens of ♂ fl. inserted in disk around glabrous rudiment of ovary. *Amyris zeylanica*, *Retz Obs.* iv. 25. *Balsamodendrum? zeylanicum*, *Kunth in Ann. Sc. Nat. ser. i.* ii. 349 (adnot.); *DC. Prodr.* ii. 76; *Thwaites Enum.* 79. *C. balsamiferum*, *Moon Cat.* 68.

CEYLON, in warm moist districts, ascending to 1500 ft., *Thwaites, &c.*

Leaves of flowering shoots 1 ft. more or less; stipules moderately large inserted on the rachis at some little distance from the base, obliquely rotundate-sagittate, shortly stipitate, early deciduous (*Thwaites*); leaflets 4–6 by 1½–2½ in., petiolule $\frac{3}{8}$ – $\frac{1}{2}$ in. *Female flower* $\frac{1}{2}$ in. long. *Ovary* glabrous, incrassate above as in *C. commune*. *Drupe* ellipsoidal, smooth, obscurely 3-gonous, with very thick bony stone.—Very nearly allied to *C. commune*, and now that *Thwaites* finds rotundate-sagittate early caducous stipules, there remains little besides the shorter petiolules of the leaflets to separate it from that species.

4. *C. secundum*, *A. W. Benn.*; tawny-pubescent, stipules 0 or early deciduous, leaflets 7–9 oblong shortly acuminate entire or faintly denticulate glabrous above except midrib, shortly pubescent, with lateral nerves in 10–15 pairs prominent with conspicuous transverse venation beneath, panicles terminal rusty-tomentose, buds subsessile in bracteate sessile or pedunculate glomerules, calyx broadly 3-lobed, petals imbricate, stamens confluent with short disk around ovoid-subulate glabrous rudiment of ovary, fruit trigonous ellipsoidal, with thick bony stone.—*Canarium*, *Wall. Cat.* 9046 (as to Singapore specimens).

SINGAPORE, *Wallich*; MALACCA, *Griffith, Maingay*.

Leaves 1 ft. more or less on flowering branches, leaflets varying from ovate- to lanceolate-oblong, upper 3–6 by 1½–2½ in., petiolule $\frac{1}{2}$ to nearly $\frac{1}{2}$ in. *Panicles* shorter than or as long as leaves, with successively shorter branches; bracts ovate-oblong and rotundate enclosing the buds. *Drupe* 1½–2 in., glabrous.—Nearly allied to *C. purpurascens*, but I cannot find stipules in any of the numerous specimens.

5. *C. purpurascens*, *A. W. Benn.*; extremities shortly pubescent-tomentose with rotundate-cordate stipules, leaflets 7–9 ovate-oblong to ovate-elliptical acuminate glabrous except puberulous midrib above purplish-glaucous with minute scattered pubescence and 10–14 pairs of prominent lateral nerves with conspicuous transverse reticulation beneath, panicles terminal and from upper axils, pedicels (of ♂ fl.) very

short or 0 bracteate, calyx broadly 3-lobed, petals imbricate, stamens 6 confluent with short disk around the glabrous ovoid-subulate rudiment of ovary.

MALACCA, Griffith.

Leaves of flowering shoots $\frac{3}{4}$ -1 ft., leaflets 3-5 by $1\frac{1}{2}$ -2 in., petiolules $\frac{1}{4}$ - $\frac{1}{3}$ in.; stipules $\frac{1}{2}$ - $\frac{3}{4}$ in. broad (or larger). Panicles puberulous, as long as leaves; buds and ovate or rotundate bracts tomentose. Fruit not seen.

6. **C. nitidum**, A. W. Benn.; extremities obsolète puberulous glabrate, stipules wanting at flowering, leaflets 5-7 oblong to elliptical acuminate glabrous, midrib prominent beneath but lateral nerves subdis tant faint 7-10 pairs, reticulation obscure beneath, panicles terminal, drupe ellipsoidal with thick bony stone. Wall. Cat. 8546 (excepting specimens intermixed of a Connaracea?).

SINGAPORE, Wallich; MALACCA, Griffith, Maingay.

Leaves of flowering branches 1 ft. more or less; leaflets 4-6 by $1\frac{1}{2}$ -3 in.; petiolule $\frac{1}{2}$ - $\frac{3}{4}$ in. Flowers not seen. Calyx 3-lobed. Drupe $1\frac{1}{2}$ -2 in., glabrous.

†† Leaflets serrulate.

7. **C. rufum**, A. W. Benn.; extremities stout closely rusty-tomentose, leaves 1-2 feet (? exstipulate), rachis tomentose, leaflets 6-11 oblong shortly acuminate base rounded denticulate-serrate coriaceous, glabrous above except shortly tomentose midrib, closely tawny tomentose with 15-20 pairs of prominent lateral nerves and distinct reticulation beneath, flowers congested in sessile or shortly pedunculate bracteate inch-broad fascicles along the branches of panicle, calyx thick trifid, petals coriaceous exceeding calyx narrowly-imbricatè, stamens 6, filaments apparently confluent at base, fruit ellipsoidal trigonous with a thick bony stone.

MALACCA, Maingay, Griffith.

Tree of medium size. Leaflets very coriaceous, upper larger varying to 6-8 by 2-2 $\frac{1}{2}$ in., petiolule $\frac{1}{4}$ - $\frac{1}{2}$ in., reticulation very prominent beneath. Panicles terminal, closely rusty-tomentose; buds enclosed in rotundate concave tomentose bracts. Calyx-lobes broadly ovate, obtuse. Petals tomentose outside except narrow covered margins. Fruit 2 in. long. (Cotyledons 3-partite. Griffith.)

** Stamens monadelphous, distinct from disk. Buds cylindrical or clavate. Leaflets entire or serrulate.—Pimela, Lour.

8. **C. grandiflorum**, A. W. Benn.; extremities tawny-pubescent, stipules subulate from near the base of the glabrous rachis, leaflets 7-9 ovate-lanceolate to elliptic-oblong acuminate glabrous or with few scattered hairs and 8-12 pairs prominent lateral nerves beneath, pedicels shorter than hairy broadly 3-lobed calyx, petals narrowly imbricate, stamens 6, filaments confluent in a tubiform sheath, ovary densely setose, style long, fruit sub-trigonous, stone thick bony.

MALACCA, Maingay.

Leaves $\frac{3}{4}$ -1 ft. or longer; leaflets 3-4 $\frac{1}{2}$ by 1-1 $\frac{3}{4}$ in.; petiolule $\frac{1}{4}$ in. more or less. Flowers hermaphrodite, $\frac{1}{2}$ in. long, in compound tawny tomentose racemes collected in a terminal panicle. Filaments glabrous, confluent below. Fruit 1 $\frac{1}{2}$ in., oblong-ellipsoidal, obtuse.

9. **C. pilosum**, A. W. Benn.; extremities thinly hirsute, stipules subulate hairy, leaflets usually 5 obovate- to oblong-elliptical or broadly elliptical shortly acuminate more or less undulate-dentate above or subentire glabrous and reticulate, thinly hirsute chiefly on the prominent reticulation beneath, lateral nerves 9-13 pairs, pedicels shorter than shallow 3-lobed

calyx, petals narrowly imbricate, stamens 6, filaments confluent $\frac{1}{5}$ - $\frac{1}{6}$ their length.

MALACCA, *Maingay*.

Leaves $\frac{3}{4}$ -1 ft., leaflets 3-6 by $1\frac{1}{4}$ - $2\frac{3}{4}$ in., petiolule $\frac{1}{4}$ in. *Racemes* interrupted, rusty-pubescent or glabrate, from the uppermost axils, overtopped by the leaves; pedicels tomentose, not exceeding the cupuliform obscurely-lobed calyx. *Petals* tomentose. *Filaments* glabrous. *Rudiment of ovary* setose. *Fruit* not seen.—*Wall. Cat.* 8100, from Singapore, leaves only, may belong here.

10. **C. hirtellum**, *A. W. Benn.*; extremities tawny-tomentose, leaves stipulate, leaflets 7-9 oblong-elliptical shortly and rather acutely acuminate denticulate toward apex, reticulate at length glabrous above except pubescent midrib, shortly hirsute-pubescent and strongly reticulate beneath, flowers tomentose fascicled in interrupted racemes from the upper axils, calyx 3-lobed, petals narrowly imbricate, filaments 6 confluent half their length, rudiment of ovary setose, fruit trigonous. *Wall. Cat.* 8102 and 9047.

PENANG, *Wallich*.

Leaves 1 ft. or more in length, rachis pubescent-tomentose, with a pair of linear-subulate $\frac{1}{2}$ -in. stipules near the base; leaflets varying from ovate through oblong to obovate-elliptical, upper $3\frac{1}{2}$ -6 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in.; petiolules $\frac{1}{4}$ in. *Pedicels* scarcely exceeding calyx. *Flowers* $\frac{3}{4}$ - $\frac{1}{2}$ in. long. *Fruit* 1 in., glabrous, oblong-ellipsoidal, trigonous; stone hard, bony.—Nearly allied to *C. pilosum*, differing in indumentum, pubescent midrib above, the more triangular teeth of calyx, &c.

11. **C. strictum**, *Roxb. Hort. Beng.* 49; *Fl. Ind.* iii. 138; extremities at first densely rusty-tomentose, leaflets 7-9 (-15) ovate-oblong or varying from ovate to ovate-lanceolate acuminate denticulate-serrate or subentire glabrescent above more or less closely pubescent-tomentose with 10-15 pairs of prominent lateral nerves beneath, panicles tomentose from the upper axils interruptedly racemose, pedicels of ♂ fl. shorter than 3-lobed calyx, petals twice as long distinctly imbricate, filaments confluent half their length. *W. & A. Prodr.* 175; *Dalz. & Gibs. Bomb. Fl.* 52; *Bedd. Fl. Sylv.* i. 128.

WESTERN PENINSULA, Concan, Bababuden Hills, Anamallays, &c., *Dalzell, Beddome, &c.*

Tall straight tree. *Leaves* 1- $1\frac{1}{2}$ ft. long more or less on flowering branches, varying to 4 ft., stipules obsolete (stipulate, *Roxburgh*, who had seen only barren shoots); leaflets from 3-6 (-12) by $1\frac{1}{2}$ - $2\frac{1}{2}$ (5-) in. broad; petiolule $\frac{1}{10}$ - $\frac{1}{4}$ in. *Panicles* shorter than leaves, upper lateral branches short or flowers (of ♂) in sessile fascicles; ♀ fl. less crowded on stout longer pedicels marked with scar of small caducous bract. *Calyx* tomentose, campanulate, shortly and broadly 3-lobed. *Petals* thinly tomentose above. *Ovary* glabrate, equalling the stout style, rudiment in ♂ fl. setose. *Drupe* $1\frac{1}{2}$ -2 in., ellipsoidal or ovoid, tapering, with a thick bony stone.

12. **C. bengalense**, *Roxb. Hort. Beng.* 49; *Fl. Ind.* iii. 136; extremities rusty-pubescent glabrate with subulate stipules, leaflets 13-21 ovate-oblong or lanceolate acuminate glabrous?, panicles racemiform from upper axils, petals 3 imbricate, filaments confluent half their length, disk hirsute within the stamens, drupe ellipsoidal smooth.

SILHET and adjoining districts, *Roxburgh*.

Leaves 1-2 ft., leaflets subopposite, 3-6 by 1-2 in. *Panicles* shorter than or equalling the leaves (supra-axillary), buds cylindrical. *Calyx* cupuliform, 3-fid. *Petals* obovate-oblong. *Drupe* size of large olive, 1-3-celled, dark-purple pruinose, stone trigonous, thick, bony. *Cotyledons* contortuplicate.—I have seen no specimen. The description is from *Roxburgh, l.c.*, and from his drawing, No. 2311.

13. **C. euphyllum**, *Kurz in Journ. As. Soc. Beng.* 1872, ii. 295; leaves 2-3-ft. glabrous, leaflets 9-10 subopposite ovate- or oblong-elliptical apiculate obtusely glandular-serrulate, base rounded or subcordate, lateral nerves 14-16 pairs rather prominent beneath, peduncle elongate naked below, flowers thinly tomentose, calyx obtusely 3-lobed glabrate, petals narrowly imbricate, filaments 6 confluent half their length enclosing a short fleshy lobed disk surrounding the ovary-rudiment.

South ANDAMAN ISLANDS, *Kurz*.

Upper leaflets 9-10 in.; *petiolule* $\frac{1}{2}$ in.; *stipules* 0? *Panicle* $1\frac{1}{2}$ ft. long; branches glabrous, naked below. *Calyx* campanulate, broadly 3-lobed. *Petals* oblanceolate. *Fruit* unknown.—Description in part from *Kurz*, l.c.

*** *Stamens inserted below margin of fleshy disk. Pedicels slender. Endocarp thin.*

14. **C. laxum**, *A. W. Benn.*; extremities leaf-rachis and inflorescence hirsute more or less with tawny or rust-coloured spreading at length deciduous setæ, leaves 1-2 $\frac{1}{2}$ ft. (exstipulate?), leaflets 7-9 oblong or oblanceolate-oblong shortly and obtusely acuminate glabrous with 11-17 pairs prominent looping lateral nerves beneath, panicles elongate flexuose with alternate lateral branches, pedicels slender articulated equalling or exceeding the flower, calyx trifid, petals very narrowly imbricate glabrous, drupe ellipsoidal with thin bony 1-celled stone.

MALACCA, *Maingay*.

Leaflets $\frac{1}{2}$ - $\frac{3}{4}$ ft. by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., upper usually larger, lower third of rachis terete naked, usually loosely setose-hirsute towards the base. *Panicle* elongate, 1-2 ft., with sparse patent setæ, ultimate divisions often red- or rusty-tomentose. *Calyx* trifid, lobes obtuse triangular. *Petals* ovate, obtuse. (*Stamens* 6, inserted below the margin of thin fleshy disk, *Maingay*.) *Fruit* about $1\frac{1}{2}$ by 1 in., ellipsoidal, 1-celled by abortion (rose-coloured; cotyledons digitate, *Maingay*).

**** *Stamens inserted outside margin of disk. Buds small, globose. Endocarp thin.*

15. **C. rubiginosum**, *A. W. Benn.*; leaves exstipulate?, leaflets 5-7 oblong-elliptical shortly and obtusely acuminate glabrous above thinly pubescent at length glabrate beneath with 10-13 pairs prominent lateral nerves incurved and nearly looping at the margin, ♂ buds globose, calyx entire, stamens 6, fruit ellipsoidal thinly drupaceous, stone crustaceous 1-seeded.

MALACCA, *Maingay*.

Extremities tawny hirsute-tomentose glabrescent. *Leaves* $\frac{1}{2}$ -1 ft.; leaflets 4-6 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in.; *petiolule* $\frac{1}{2}$ - $\frac{1}{2}$ in. *Panicle* terminal; of ♂ fl. pyramidal, with sparse divergent branches simple below; pedicel equalling and dilated into short calyx. *Petals* deltoid, valvate, externally tawny-tomentose. *Fruit* 1 by $\frac{1}{2}$ in. (bright yellow; cotyledons bright green, cleft on either side to the base into 5 linear segments, contortuplicate; radicle long, ascending, *Maingay*).

16. **C. Kadondon**, *A. W. Benn.*; extremities early glabrous (leaves exstipulate?), leaflets 7-9 elliptic-lanceolate obtusely acuminate entire glabrous or nearly so with 6-9 pairs subprominent incurved lateral nerves, petiolules slender, flowers hermaphrodite, calyx broadly 3- (4-) lobed, stamens 6, stigma in bud subsessile.

MALACCA, *Maingay*.

Leaves $\frac{1}{2}$ -1 ft.; rachis terete, nearly glabrous, lower $\frac{1}{2}$ - $\frac{1}{2}$ naked; leaflets 2 $\frac{1}{2}$ -4 by 1-1 $\frac{1}{2}$ in., drying purplish brown; *petiolule* $\frac{1}{2}$ in. *Panicle* corymbose, thinly tomentose,

pedicels not exceeding the flower. *Petals* valvate. *Ovary* glabrous. *Fruit* unknown.

**** *Stamens* inserted around and upon ovary-rudiment. *Buds* ellipsoidal $\frac{1}{4}$ – $\frac{1}{3}$ in.

17. **C. parvifolium**, A. W. Benn.; wholly glabrous or nearly so, leaflets 7 oblong lanceolate or elliptic acuminate, midrib prominent beneath, lateral nerves faint, panicle terminal, buds ellipsoidal subsessile on pedicels not exceeding cupuliform subtire calyx, petals imbricate, stamens inserted around and upon the ovoid-subulate ovary-rudiment.

MALACCA, *Maingay*.

Leaves of flowering branches $\frac{1}{2}$ ft. more or less; leaflets 2–3½ by $\frac{3}{4}$ –1½ in.; petiole $\frac{1}{8}$ – $\frac{1}{6}$ in. *Buds* on expansion $\frac{1}{4}$ – $\frac{1}{3}$ in. long, pubescent or glabrous. *Fruit* unknown.

18. **C. coccineo-bracteatum**, Kurz Journ. As. Soc. Beng. (1872) ii. 296; extremities softly pubescent, leaves glabrous 1–2 ft., stipules deeply divided segments rigid coarsely toothed, leaflets 7–9 shortly petiolulate oblong or ovate-oblong acuminate entire or setose-serrulate glabrous with about 10 pairs of lateral nerves and loose reticulation beneath, panicles puberulous with scarlet oblong acute bracts.

South ANDAMAN ISLANDS, Kurz.

Leaflets 5–7 in. long. Expanded flowers and fruit undescribed.

8. SANTIRIA, Blume.

Balsamiferous trees. *Leaves* alternate, stipulate, 3-foliolate or imparipinnate, firm; leaflets opposite, slightly oblique, entire. *Flowers* in axillary rarely terminal patently branched panicles; bracts usually obsolete; bracteoles minute. *Calyx* cupuliform, 3-lobed or -fid, valvate. *Petals* 3, valvate or subimbricate, much exceeding the calyx. *Disk* annular, fleshy, adnate. *Stamens* 6 (rarely fewer by abortion), distinct, often unequal, inserted on the margin or outside of the disk. *Ovary* 3-celled, with 2 ovules in each cell; style short, stigma capitate. *Drupe* ellipsoidal or subglobose, more or less laterally compressed on the ventral side, 1-celled, 1-seeded, stone crustaceous or woody. *Cotyledons* contortuplicate. — **DISTRIB.** Malayan Archipelago. Species probably 25.

SECT. I. **Icicopsis**. *Anthers* adnate.

1. **S. Planchonii**, A. W. Benn.; leaflets 11 glabrous on both surfaces ovate-oblong elliptic or oblong obtusely acuminate or shortly caudate-acuminate, base obliquely rounded, nervation inconspicuous above, lateral nerves weak often bifurcating before reaching the margin, panicle with numerous canescent lax slender ascending branches, bracts obsolete, pedicels shorter than the flowers, calyx-segments deltoid acute, stamens shorter than the petals.

MALACCA, *Griffith*, *Maingay*.

Tree; branchlets with pale-brown or ashy-grey somewhat striate bark, youngest palely pubescent. *Leaves* of flowering-shoots 8–12 in.; petiole 2–3 in., slightly flattened above, glabrescent; leaflets 3–4½ by 1¼–1½ in., glaucescent beneath, petiole $\frac{1}{4}$ – $\frac{1}{3}$ in. *Panicle* 2–6 in., pedicels less than $\frac{1}{4}$ in. *Flowers* with several minute very caducous bracteoles immediately beneath the glabrescent calyx. *Stamens* with broad striate filaments inserted just beneath the margin of the disk, spatulate above and with the anther-cells attached on their inner face. *Drupe* $\frac{1}{3}$ in. long, ellipsoidal, somewhat late-

rally compressed on the ventral, gibbous on the dorsal side, purple, covered with pale bloom; style very oblique, but not basilar, as stated by Benth. and Hook. f. in Gen. Pl. i. 325.

SECT. II. *Santiria* proper. *Anthers* dorsifixed.

* *Panicle* branched from base, or nearly so.

2. *S. costata*, A. W. Benn.; leaflets 7 glabrous above pubescent beneath elliptic-oblong shortly obtusely caudate-acuminate, base obliquely acute, midrib prominent above pale, lateral nerves about 9 pairs inconspicuous above and very prominent beneath divaricate curving towards the margin, panicle pyramidal ferruginously pubescent, branches divaricating subtended by lanceolate obtuse bracts, pedicels as long as the flowers, calyx ultimately truncate-dentate, stamens about equalling the petals.

MALACCA, *Maingay*.

Tree; branchlets with pale ashy-grey bark; youngest branchlets, petioles and petiolules ochraceously pubescent. *Leaves* of flowering shoots 6-8 in., petiole 1 in. flat above; leaflets $3\frac{1}{2}$ -6 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., petiolule $\frac{1}{2}$ - $\frac{1}{2}$ in., transversely rugose, thickened at both ends. *Panicle* 3 in. long (occasionally with a peduncle $\frac{1}{2}$ - $\frac{1}{2}$ in.). *Flowers* in fascicles of about 4 on lateral branches of panicle, surrounded by several minute bracteoles; pedicels $\frac{1}{2}$ in. *Calyx* glabrescent. *Stamens* with slender filaments inserted beneath the margin of the disk. *Fruit* unknown.

3. *S. apiculata*, A. W. Benn.; leaves trifoliolate glabrous on both sides elliptic or elliptic-oblong shortly obtusely caudate-acuminate, base acute, midrib prominent above, lateral nerves weak bifurcating before reaching the margin, panicle narrowly pyramidal, glabrous branches ascending, bracts obsolete, pedicels twice as long as the flowers, calyx-segments deltoid acute, stamens shorter than petals, style completely basal in fruit.

MALACCA, *Maingay*.

Tree; branchlets with pale ashy-grey bark. *Leaves* of flowering-shoots, 6-8 in., petiole 2 in., striate, flat above; leaflets $2\frac{1}{2}$ -4 by $1\frac{1}{2}$ -2 in. broad, petiolule $\frac{1}{2}$ - $\frac{3}{4}$ in., jointed at the apex. *Panicle* $\frac{1}{2}$ -3 in. long (occasionally with a peduncle $\frac{1}{2}$ in.) pedicels $\frac{1}{2}$ in. *Bracteoles* minute. *Stamens* with slender filaments inserted beneath the margin of the disk, about equalling the capitate stigma. *Drupe* $\frac{1}{2}$ in. long, ovoid, the obtuse protuberance bearing the style completely basal, giving the drupe the appearance of an anatropous ovule; stone thin, fragile; fruit-pedicel $\frac{1}{4}$ in.

4. *S. puberula*, A. W. Benn.; leaflets 7-9 glabrous above minutely pubescent beneath elliptic-oblong shortly acuminate, base obliquely rounded, midrib and lateral nerves inconspicuous above, lateral nerves about 8 pairs prominent below curving towards the margin, panicle pyramidal lax few-flowered canescent, scurfy branches patent dividing only at the apex, bracts obsolete, pedicels as long as the flowers, calyx ultimately truncate-dentate, stamens rather shorter than petals.

MALACCA, *Maingay*.

Tree; branchlets with brown striate bark when young, as well as petioles and petiolules clothed with minute canescence. *Leaves* of flowering-shoots 6-8 in.; petioles $1\frac{1}{2}$ -2 in., flat above; leaflets 3- $4\frac{1}{2}$ by $1\frac{1}{2}$ -2 in., petiolule $\frac{1}{2}$ in., transversely rugose, slightly thickened at the apex. *Panicle* $2\frac{1}{2}$ -4 in. long; pedicels $\frac{1}{2}$ in. long. *Bracteoles* minute. *Calyx* minutely pubescent. *Stamens* with slender filaments inserted beneath the margin of the disk. *Fruit* unknown.

5. *S. conferta*, A. W. Benn.; leaflets 13 firm glabrous and finely reticulate above clothed with minute rusty pubescence beneath more or less broadly lanceolate or oblong-lanceolate taper-pointed, base obliquely

rounded, lateral nerves about 10 pairs curved and weak towards margin, panicle pyramidal rather compact ferruginously-pubescent divaricately branched, bracts obsolete, pedicels shorter than the flowers, calyx ultimately truncate-dentate, stamens shorter than petals.

MALACCA, *Griffith, Maingay*.

Tree; branchlets with pale-brown irregularly striate bark when young, as well as petioles and petiolules clothed with ferruginous pubescence. *Leaves* of flowering-shoots 12-18 in.; petiole 4-5 in., closely striate below, shallowly channelled above, petiolule $\frac{1}{2}$ - $\frac{3}{4}$ in. slightly transversely rugose and thickened at either extremity. *Panicle* 3-4 in., pedicels $\frac{1}{2}$ in. *Bracteoles* minute, obtuse. *Calyx* pubescent. *Stamens* inserted beneath the margin of the disk. *Drupe* as in *S. apiculata*, but a more reddish purple when dry.

** *Panicle pedunculate*.

6. ***S. lævigata***, *Blume Mus. Bot.* i. 211; leaflets 7-15 glabrous on both surfaces elliptic-lanceolate elliptic or oblong-acuminate, base acute or rounded, midrib prominent above, lateral nerves 12-18 pairs more or less divaricating, panicle shorter than leaves pyramidally branched, peduncle and branches minutely puberulous, bracts obsolete, pedicels as long as the flowers, calyx at length truncate-dentate, stamens about equalling petals, style nearly basal in fruit. *Canarium lævigatum*, *Miq. Fl. Ind. Bat.* vol. i. pt. 2, 648.

MALACCA, *Griffith, Maingay*.—DISTRIB. Sumatra.

A large tree; branchlets striate, with decurrent angles from the bases of the leaves and ashy-brown bark with minute white warts. *Leaves* of flowering shoots 10-18 in.; petiole 2-4 in., striate and channelled above; leaflets 4-7 by $1\frac{1}{2}$ -2 in., petiolule $\frac{1}{2}$ - $\frac{1}{3}$ in. *Panicle* 6-9 in., peduncle $2\frac{1}{2}$ -4 in., pedicels about $\frac{1}{2}$ in. *Bracteoles* minute. *Calyx* minutely hispid, ultimately almost transversely truncate. *Stamens* with filaments dilated at the base, inserted just below the outer margin of the disk. *Drupe* subglobose, $\frac{1}{2}$ in. diam.—Blume has figured the stamens incorrectly as inserted at the base of the disk, as is proved by the examination of an authentic specimen.

7. ***S. multiflora***, *A. W. Benn.*; leaflets about 7 glabrous above except the prominent tomentose midrib ferruginously pubescent beneath elliptic-oblong shortly acuminate, base obliquely rounded, lateral nerves about 15-18 pairs, panicle shorter than leaves pyramidally branched, peduncle and branches ochraceously pubescent, bracts caducous, pedicels as long as the flowers, calyx at length truncate-dentate, stamens about equalling the petals, style subterminal in fruit.

MALACCA, *Griffith, Maingay*.

Tree; young branchlets, pedicels and inflorescence ochraceously pubescent. *Leaves* of flowering shoots 6-12 in.; petiole 2-4 in., striate and flat above; leaflets 4-6 by $1\frac{1}{2}$ -2 $\frac{1}{4}$ in., petiolule $\frac{1}{2}$ - $\frac{1}{3}$ in. *Panicle* 4-6 in., peduncle $\frac{3}{4}$ -1 $\frac{1}{2}$ in., pedicels $\frac{1}{2}$ in. *Bracteoles* minute. *Calyx* minutely hispid. *Petals* covered with a glaucous bloom. *Stamens* with filaments slightly dilated at the base, inserted just below the outer margin of the disk. *Drupe* $\frac{1}{2}$ in. long, globosely cylindric, reticulate and pruinose when dry; stone woody; fruit-pedicel $\frac{1}{2}$ in. long, stout.—This agrees in everything except the small number of leaflets with *S. tomentosa*, Bl., which occurs in Sumatra, and with which it may eventually prove identical.

8. ***S. Maingayi***, *A. W. Benn.*; leaflets 7-9 glabrous on both sides oblong-lanceolate shortly acuminate, base acute, lateral nerves about 10 curving towards the margin, panicle shorter than the leaves cymosely dichotomously branched, peduncle and branches minutely puberulous finally glabrescent, bracts obsolete, pedicels rather longer than the flowers, calyx-teeth deltoid obtuse, stamens shorter than the petals.

MALACCA, Maingay.

Tree; branchlets smooth, striate, pale brown. *Leaves* of flowering shoots 10-22 in.; petiole 3-6 in., striate and flat above; leaflets 5-6 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., petiolule $\frac{1}{2}$ - $\frac{3}{4}$ in., thickened at the apex. *Panicle* 10-12 in., peduncle 4 in., pedicels $\frac{1}{2}$ in. *Bracteoles* very minute. *Calyx* and *petals* minutely puberulous and rather fleshy. *Stamens* inserted below the margin of the crenate disk. *Fruit* unknown.

9. ***S. fasciculata*, A. W. Benn.**; leaflets 7 glabrous on both surfaces elliptic or elliptic-oblong shortly obtusely cordate-acuminate, base acute, midrib prominent above, lateral nerves about 8 depressed above prominent below divaricate curving towards the margin, panicle exceeding the leaves with long slender filiform puberulous branches bearing small distant fascicles of minute flowers, bracts obsolete, calyx-lobes ovate acute, stamens shorter than the petals.

MALACCA, Maingay.

Tree; branchlets smooth with ashy-brown bark. *Leaves* of flowering shoots about 1 ft.; petiole 2 in., with 2 lateral edges, scarcely flattened above, leaflets 4-5 in., $1\frac{1}{2}$ - $2\frac{1}{2}$ in. broad, petiolule about 1 in. transversely rugose thickened at either end. *Panicle* rather longer than leaves, peduncle 3-4 in. long, pedicels twice as long or shorter than flowers. *Bracteoles* obsolete. *Flowers* about $\frac{1}{2}$ in. long. *Calyx* minutely hispid. *Stamens* inserted on the outer margin of the disk. *Fruit* unknown.—This appears to agree very closely with the description of *S. virgata*, Bl., except that the leaves have the midrib tomentose beneath.

9. **TRIGONOCHLAMYS**, Hook. f.

A tree with pustulate tomentose-pubescent branches. *Leaves* alternate, imparipinnate with opposite petiolulate leaflets. *Flowers* polygamous. *Calyx* large, 3-partite, valvate, persistent. *Petals* 3, valvate, about equalling calyx. *Disk* annular. *Stamens* 6, inserted in the margin of the disk; filaments very short. *Ovary* 3-celled, nearly globose; style straight, short, stigma 3-lobed; ovules 2 in each cell, axile. *Drupe* obliquely globose, 1-celled. 1-seeded.

1. ***T. Griffithii*, Hook. f. in Trans. Linn. Soc. xxiii. 170, t. xxvii.**; leaflets about 13-15 elliptic-acuminate rather coriaceous with a very prominent midrib, panicle axillary, shorter than the leaves, flowers rufous-tomentose with 2 spatulate bracts at base of the pedicel, drupe glabrous about the size of a cherry.

MALACCA, Griffith.

10. **FILICIUM**, Thwaites.

A lofty tree with angular often scaly branches. *Leaves* imparipinnate, with opposite sessile leaflets and broadly-winged rachis. *Flowers* polygamous. *Calyx* 5-partite, imbricate, deciduous. *Petals* 5, small, imbricate. *Disk* 5-lobed, tomentose. *Stamens* 5, inserted within the disk, equal; filaments subulate, free. *Ovary* globose, 2-celled; style bent, stigma simple or 2-lobed; ovules solitary in each cell, pendulous. *Drupe* fleshy, usually 1-celled, 1-seeded.

1. ***F. decipiens*, Thwaites Enum. 408**; leaflets about 15 narrowly elliptical quite glabrous sometimes glaucous, wing of rachis spatulate between each pair of leaflets, drupe about the size of a large pea nearly globose glabrous. *Bedd. Fl. Sylv. i. t. 129.* Pteridophyllum decipiens,

Thwaites, l. c. 59, and in *Hook. Kew Journ. Bot.* vi. 66, t. i. B. *Rhus decipiens*, *W. & A. Prodr.* 172; *Wight Ill.* i. 184, t. 75.—*Burm. Fl. Zeyl.* t. 45.

WESTERN PENINSULA; throughout the Western Ghats ascending to 4-5000 ft., *Beddome*; CEYLON, in the central province, ascending to 3000 ft., *Thwaites*.

ORDER XXXVII. MELIACEÆ. (By W. P. Hiern, M.A.)

Trees or shrubs. *Leaves* alternate, exstipulate, usually pinnate rarely simple or bipinnate; leaflets opposite or alternate, usually quite entire and more or less oblique at base. *Flowers* hermaphrodite or polygamo-dioecious, regular, usually in axillary panicles. *Calyx* 3-6-lobed rarely entire or with free sepals, usually imbricated in bud. *Petals* 3-6, free or rarely connate at the base, sometimes adhering to the lower half of the staminal tube, valvate imbricated or contorted. *Stamens* 4-12, inserted outside the base of the hypogynous disk, filaments connate in a tube or rarely free; anthers erect, usually sessile on the tube, included or exserted, 2-celled, longitudinally dehiscing. *Hypogynous disk* tubular annular or obsolete, free or connate with the ovary. *Ovary* usually free, 2-5-celled; style single, stigma disciform or capitate; ovules 2, rarely more, collateral or superposed, raphe ventral, micropyle superior. *Fruit* capsular drupaceous or baccate. *Seeds* exalbuminous or sometimes with fleshy albumen, often enclosed in an aril.—DISTRIB. About 300 species, mostly tropical, widely spread over both hemispheres. Miquel enumerates 113 species as occurring in the Indian Archipelago.

Swietenia Mahagoni, *Linn.* (Mahogany) has been successfully cultivated near Calcutta and in Sikkim (*Brandis For. Flor.* 70); it is a native of the West Indies and Central Africa.

In the development of the flower of this Order the staminal-tube and the style are late in completing their growth.

Heynichia malleoides, *Kth. Ind. Sem. Hort. Berol.* 1844 *Coll. adnot.* 8, supposed to have come from East India, is a species of *Moschoxylum*, near *M. elegans*, *A. Juss.*, and probably came from South America.

TRIBE I. **Meliææ**. *Leaflets* often toothed. *Stamens* united into a tube. *Cells of ovary* 1-2-ovuled. *Seeds* not winged, albumen thin fleshy; cotyledons thin, foliaceous.

Leaves simple 1. TURRÆA.

Leaves trifoliolate pinnate or 2-3-pinnate.

Flowers elongated. Style long.

Petioles winged. Ovules collateral 2. NAREGAMIA.

Petioles not winged. Ovules superposed.

Disk tubular. Petals cohering half way. Fruit capsular,
loculicidally 5-valved 3. MUNRONIA.

Disk annular. Petals free. Fruit drupaceous, indehiscent 4. MELIA.

Flowers globose. Style rather short 5. CIPADESSA.

TRIBE II. **Trichillææ**. *Leaflets* entire. *Stamens* united into a tube (free in one species of *Walsura*). *Cells of ovary* 1-2-ovuled (2-5-ovuled in *Carapa*). *Seeds* not winged, albumen 0; cotyledons thick.

Flowers and staminal-tube oblong or linear. Style elongated.

Capsule loculicidal. Leaves pinnate.

Flowers oblong. Anthers short. Ovules 2 together, rarely
solitary 6. DYSOXYLUM.

Flowers linear or oblong. Anthers linear. Ovules solitary 7. CHISOCHETON.

Berry indehiscent. Leaves trifoliolate 8. SANDORICUM.

Flowers and staminal-tube globose or turbinate. Style short or obsolete.

Anthers included in the staminal-tube or nearly so. Ovules 1-2 together. Seeds not angular.

Anthers 5, isomerous 9. *AGLAIA*.

Anthers 6-10; flowers diplostemonous.

Berry indehiscent 10. *LANSIUM*.

Capsule loculicidal 11. *AMOORA*.

Anthers exserted, or filaments free. Ovules 1-2 together. Seeds not angular except *Beddomea*.

Seeds arillate. Calyx 4-5-fid. Flowers small.

Berry indehiscent, shortly tomentose 12. *WALSURA*.

Capsule loculicidal, glabrous 13. *HEYNEA*.

Seeds exarillate. Calyx 4-5-partite. Flowers of moderate size.

Anthers included. Ovules 2-8 together. Seeds angular . . . 14. *BEDDOMEA*.

15. *CARAPA*.

TRIBE III. Swietenieæ. *Stamens* united into a tube. *Cells of ovary* with numerous ovules. *Seeds* not winged.

Petals obovate, spreading. Staminal-tube cup-shaped. Disk wide.

Ovary 5-celled 16. *SOYMIDA*.

Petals oblong, erect-patent. Staminal-tube cylindrical. Disk ob-

solete. Ovary 3-celled 17. *CHICKRASSIA*.

TRIBE IV. Cedreleæ. *Stamens* distinct. *Cells of ovary* 8-12-ovuled.

Petals oblong, erect. Stamens 4-6, sometimes with alternating

staminodes. Ovary 5-celled. Albumen thin fleshy; cotyledons

subfoliaceous 18. *CEDRELA*.

Petals unguiculate, spreading. Stamens 10. Ovary 3-celled.

Albumen wanting; cotyledons plano-convex 19. *CHLOROXYLON*.

1. **TURRÆA**, Linn.

Trees or shrubs. *Leaves* simple, quite entire or obtusely lobed. *Peduncles* axillary, with numerous small bracts at base, bearing elongated white or yellow flowers. *Calyx* campanulate, 5-4-fid. *Petals* 5-4, elongated, spatulate, imbricated in bud, free, diverging in full flower. *Staminal-tube* elongated, toothed at the apex; anthers 10 or 8, short, inserted just within the mouth, alternating with the teeth. *Disk* annular or obsolete. *Ovary* 5- or more-celled; cells opposite the calyx-lobes when equal in number to them, with 2 superposed ovules; style elongated, exserted, stigma capitate. *Capsule* 4- or more-celled, loculicidal; valves woody or coriaceous, separating from the winged axis. *Seeds* with a broad ventral hilum, albumen fleshy; embryo foliaceous.—**DISTRIB.** A genus of 12-16 species, confined to tropical Asia, and tropical and South Africa.

1. **T. virens**, Linn. *Mant. Plant. alt.* 237; glabrate, shining, leaves elliptic-oblong subacuminate emarginate coriaceous, base obtuse, flowers yellow, style just exserted, capsule hairy. *Sm. Pl. Ic.* t. 10; *not of Helenius*; *Grah. Cat. Bomb. Pl.* 31; *Benn. Pl. Jav. Rar.* 181; *Dalz. & Gibs. Bomb. Fl.* 36.

WESTERN PENINSULA; amongst lava heaps, *Kœnig*; common on the Ghats, *Dalz. & Gibs.*

An evergreen shrub, 3-4 ft. high, or a tree. *Leaves* 2½-3½ by 1-1½ in., shortly petioled, margins slightly revolute, paler beneath. *Flowers* 1-1½ in. long, in axillary

or lateral clusters, shortly peduncled. *Calyx* shortly 5-fid, hairy. *Staminal-tube* about 1 in. long, with 10 lanceolate teeth. *Ovary* 5-celled. *Capsule* $\frac{1}{2}$ in. long, hairy. *Seeds* not winged.

2. **T. villosa**, *Benn. Pl. Jav. Rar.* 182; more or less pubescent with short hairs, leaves elliptic or ovate shortly acuminate thin, base obtuse or cuneate, flowers white, style far exserted, capsule glabrate. *Wight Ic. t.* 1593. *Euonymus* (sp.) *Beddome Flor. Sylv. Anal. Gen.* lxiv.

WESTERN PENINSULA; on the Anamallay and Mahabeshwur hills; GUZERAT, at Dolra, *Hove in Hb. Banks.*

A large shrub or small tree. *Leaves* in flower usually about 1½ in., in fruit 2-4 in. and sometimes glabrate, entire, shortly petioled. *Flowers* sweet-scented, 1-1½ in. long, in axillary clusters or short racemes, 3-6 together, about double the length of the peduncles. *Calyx* short, pubescent. *Staminal-tube* $\frac{3}{4}$ -1 in. long, glabrous as well as the petals; teeth very short. *Ovary* 5-celled. *Capsule* subglobose, about $\frac{1}{2}$ in. long. *Seeds* not winged.

2. NAREGAMIA, W. & A.

A small glabrous and shining undershrub. *Leaves* trifoliolate. *Peduncles* axillary, solitary, 1-flowered. *Calyx* small, campanulate, 5-cleft, deciduous. *Petals* 5, free, elongate-spathulate, imbricated in bud, at length spreading above. *Staminal-tube* elongated, inflated above, obsoletely 10-crenate at the mouth; anthers 10, terminal, shortly oblong, inserted at the crenatures of the mouth, exserted, setaceous-apiculate. *Disk* annular. *Ovary* 3-celled, ovules 2 collateral in each cell, pendulous; style filiform, stigma capitate. *Capsule* ovoid-globose, 3-lobed, 3-celled, loculicidally 3-valved; valves separating from the 3-winged axis. *Seeds* 2 in each cell, albumen fleshy; embryo foliaceous.—DISTRIB. One Indian species, represented in Angola, West Tropical Africa by a shortly hairy form scarcely likely to prove specifically distinct.

1. **N. alata**, *W. & A. Prodr.* i. 117; leaflets sessile cuneate-obovate quite entire or obtusely lobed, common petioles winged. *Wall. Cat.* 9038; *Grah. Cat. Bomb.* Pl. 30; *Dalz. & Gibs. Bomb. Fl.* 36; *Drury Ind. Fl.* i. 161; *Wight Ic. t.* 90. *N. dentata*, *Miq. in Pl. Hohenack.* No. 79. *Turraea alata*, *Wight ex W. & A. l.c.*—*Rheede Hort. Mal.* x. t. 22.

WESTERN PENINSULA; or the Western Ghats from the Concan southwards.—DISTRIB. Angola (a pubescent form).

Branches erect or decumbent, from a few inches to 2 ft. long. *Leaves* 1-4 in. long; terminal leaflets rather larger than the lateral ones and about the length of the common petiole. *Flowers* 1-1½ in. long, quite white, longer than the peduncles. *Style* yellow.

3. MUNRONIA, Wight.

Shrubs or undershrubs with trifoliolate or unequally pinnate leaves, entire or coarsely toothed leaflets, elongated flowers, and axillary few-flowered peduncles. *Calyx* 5-partite, short at least in flower, persistent, subfoliaceous. *Petals* 5, elongate-spathulate, cohering half way. *Staminal-tube* adnate below to the corolla, cylindrical, 10-toothed at the apex; anthers 10, terminal, alternating with the teeth, setaceous-apiculate. *Disk* membranous, tubular, sheathing the ovary and base of the style. *Ovary* 5-celled; cells opposite the sepals, 2-ovuled; style elongated, slender, stigma capitate; ovules superposed. *Capsule* depressed-globose, 5-lobed, coriaceous, loculicidally 5-valved; valves separating from the 5-winged axis.

Seeds winged, albumen thin.—**DISTRIB.** Three species confined to India and the Malay Archipelago.

1. **M. pumila**, *Wight Ic.* t. 91; *Ill.* i. 147; leaflets 3 rarely 4-5 elliptic-lanceolate terminal one longer, peduncles axillary few-flowered crowded near the top of the short stem. *Thwaites Enum.* 59. *Melia pumila*, *Moon Cat.* 35.

CEYLON; not uncommon in the warmer parts of the Island.

More or less hirsute, 3-6 in. above the ground; *leaves* about as long; petiole scarcely half as long; lateral leaflets subsessile; terminal one $1\frac{1}{2}$ - $3\frac{1}{2}$ in. long. *Flowers* $1\frac{1}{4}$ - $1\frac{1}{2}$ in. long, white, somewhat hairy outside. *Peduncles* short, bracteate. *Staminal-tube* with subulate teeth. *Fruit* $\frac{3}{8}$ in. diam., hairy.—Much valued in India as a medicinal plant.

2. **M. Wallichii**, *Wight Ill.* i. 147; leaflets 5-9 usually 7 opposite or subopposite lanceolate or ovate lateral ones very shortly petioled, base obliquely rounded or rarely cuneate, peduncles axillary bearing a few fascicled flowers crowded at the top of the stem. *Turræa pinnata*, *Wall. Pl. As. Rar.* ii. 21, t. 119. *M. neilgherica*, *Wight Ill.* i. 147, t. 54.

EASTERN TROPICAL HIMALAYA, in Sikkim. KHASIA Mts. NILGHIRI Mts. at Koondah Ghat.

A shrub. *Leaves* approximated at the ends of the branches, 6-12 in.; leaflets 1-5 in. by $\frac{3}{8}$ - $1\frac{1}{2}$ in.; petiole 2-4 in. *Flowers* $1-1\frac{1}{4}$ in. long, pale rose or white, hairy outside. *Peduncles* 1 in. long, hairy, bent downwards after flowering, bracteate. *Staminal-tube* with short subulate teeth. *Fruit* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., hairy.

4. **MELIA**, Linn.

Trees with pinnate or 2-3-pinnate leaves, toothed or entire leaflets and paniced axillary flowers; pubescence often stellate-mealy. *Calyx* short, 5-6-lobed, imbricated. *Petals* 5-6, free, spathulate-oblong, patent, imbricated in bud. *Staminal-tube* cylindrical, dilated at base and apex, 10- or 12-striate and toothed; anthers 10 or 12, included or partly exserted, short, inserted near apex. *Disk* annular. *Ovary* 3-6-celled; cells alternate to the sepals when equal in number to them; *style* slender, nearly as long as the tube, stigma capitate; ovules 2, superposed. *Fruit* drupaceous. *Seeds* with thin fleshy albumen; cotyledons foliaceous.—**DISTRIB.** A genus containing scarcely more than the following five species.

Melia latifolia, in Griff. *Itin. Notes*, p. 402, is a misprint for *Melica latifolia*, Roxb.

* *Leaves* simply pinnate.

1. **M. tomentosa**, *Roxb. Hort. Beng.* 90; *Fl. Ind.* ii. 394; leaves simply pinnate, leaflets subsessile 20 or more opposite lanceolate acuminate needle-pointed firmly coriaceous, base obtuse, panicles spike-like on long peduncles, flowers 5-merous, teeth of staminal tube linear-oblong notched about equalling the anthers, ovary 5-celled.

PENANG, *Roxburgh.*

A large tree, with the young parts petioles lower surface of leaflets bracts calyx exterior of petals interior of staminal-tube ovary and style downy. *Leaves* 6 ft. or more long continuing to expand leaflets at the apex; leaflets ranging up to 1 ft. *Flowers* pretty large, very numerous, crowded. *Bracts* subulate. *Calyx* cup-shaped, subentire. *Young fruit* 5-celled, with 1 seed in each cell.—There is a coloured drawing of this plant amongst Roxburgh's drawings in the Kew Herbarium, but no specimen.

2. **M. excelsa**, *Jack in Mal. Misc.* i. 12; leaves simply pinnate, leaflets numerous (19) subopposite or alternate ovate-oblong rather obtusely acuminate quite entire glabrous, base very oblique subauriculate, panicle ascending about equalling the leaves, flowers 5-merous, calyx short with rounded sepals, petals puberulent outside, staminal tube 10-furrowed obtusely 10-20-toothed, anthers 10 somewhat exserted, style rather thickly filiform, ovary 3-celled. *Griff. Notul.* iv. 499; *Hook. Bot. Misc.* i. 281; *Wall. Cat.* 1253, b non B.

PENANG, *Jack, Wallich*; MERGUI, *Griffith* (cult.?)

A lofty tree of 50 ft. Leaves crowded at the ends of the branches, 2-2½ ft.; petiole terete, thickened and somewhat scaly at base; leaflets 3-6 by 1½-2 in., petioles ½-¾ in. Pedicels short, bracteolate. Flowers white, ½-¾ in. long. Staminal-tube glabrous outside. Ovary glabrous.

3. **M. Azadirachta**, *Linn. Sp. Pl. ed.* i. 385; leaves simply pinnate, leaflets 9-15 opposite subopposite or alternate lanceolate acuminate oblique or subfalcate serrate glabrous shortly petioluled sometimes sublobed near the obtuse base, flowers 5-merous, calyx 5-fid with obtuse or rounded lobes, petals shortly ciliate, anthers nearly equalling the obtuse teeth of the staminal tube, ovary 3-celled, fruit 1-celled 1-seeded. *Roxb. Hort. Beng.* 33; *Fl. Ind.* ii. 394; *Griff. Notul.* iv. 500; *Wall. Cat.* 1251; *Bedd. Fl. Sylvat.* t. 14; scarcely of *Gærtner*. *M. parviflora*, *Moon Cat.* 35. *M. indica*, *Brandis For. Flor.* 67. *Azadirachta indica*, *Adr. Juss. in Mem. Mus.* xix. 221, t. 13, f. 5; *W. & A. Prodr.* i. 118; *Wight Ic.* t. 17; *Grah. Cat. Bomb.* Pl. 30; *Dalz. & Gibs. Bomb. Fl.* 36.—*Rheede Hort. Mal.* iv. t. 52.

A common tree throughout the greater part of INDIA, often planted, as elsewhere in hot climates.

A large tree of 40-50 ft., with a straight trunk. Leaves 8-15 in., crowded near the ends of the branches; leaflets 1-3 by ½-1½ in. Flowers white, honey-scented, ½-¾ in. long. Drupe oblong, ½-¾ in. long.—The "Neem;" the seeds supply oil: see *Buchanan, Journ. Madr.* i. 9; a gum is also said to exude from the tree, *Buch. l.c.* 188. The wood resembles Mahogany, and the bark is very bitter.

** Leaves twice or three times pinnate.

4. **M. Azedarach**, *Linn. Sp. Pl. ed.* i. 384; leaves bipinnate occasionally tripinnate, ultimate leaflets 3-12 opposite subopposite or alternate ovate or lanceolate serrate or entire acuminate, base more or less oblique, flowers usually 5-merous, calyx deeply lobed lobes lanceolate-oblong, petals puberulent, anthers nearly equalling the linear-lanceolate teeth of the purple quite or nearly glabrous staminal tube, ovary 5-celled, fruit with 5 or fewer cells and seeds. *Roxb. Hort. Beng.* 33; *Fl. Ind.* ii. 395; *Wight Ic.* t. 160; *Wall. Cat.* 1250; *Boiss. Fl. Orient.* i. 954; *W. & A. Prodr.* i. 117; *Adr. Juss. in Mém. Mus.* xix. t. 13, f. 4; *Bot. Mag.* t. 1066; *Bedd. Fl. Sylvat.* t. 13; *Brandis For. Flor.* 68. *M. sempervirens*, *Sw. Prodr.* 67; *Bot. Reg.* t. 643; *Roxb. Hort. Beng.* 33; *Fl. Ind.* ii. 395; *Wall. Cat.* 1252; *Dalz. & Gibs. Bomb. Fl. Suppl.* 15. *M. Bukayun*, *Royle Ill. Bot.* 144; *Griff. Itin. Notes* 355, 403.

Commonly cultivated in India; wild in the sub-Himalayan tract, alt. 2-3000 ft.—DISTRIB. Persia, China, (*Roxb.*)—Cult. elsewhere.

A tree from 40 ft. downwards with a short erect trunk and broad crown. Leaves 9-18 in.; leaflets ½-3 by ½-1½ in. Flowers lilac, ¼-½ in. long, honey-scented. Drupe subglobose, ½-¾ in. diam.—Numerous synonyms not being Indian are omitted. Wood hard finely marked; the seeds are used to make rosaries.

5. **M. dubia**, *Cav. Diss.* (vii.) 364 (1789); leaves bipinnate or occasionally tripinnate, ultimate leaflets 2-11 opposite ovate or oblong-lanceolate entire or crenate-serrate acuminate, base more or less oblique, panicles mealy with stellate hairs rather dense, calyx-lobes ovate, petals mealy, anthers exceeding the numerous short subulate teeth of the hairy mouth of the white staminal tube, ovary 5-celled, fruit with 5 or fewer cells and seeds. *M. composita*, *Willd. Sp. Pl.* ii. 559 (1799), not of *De Candolle*; *W. & A. Prodr.* i. 117; *Dalz. & Gibs. Bomb. Fl.* 36; *Thwaites Enum.* 59; *Bedd. Fl. Sylvat.* t. 12; *Brandis For. Flor.* 69. *M. superba*, *Roxb. Hort. Beng.* 33; *Fl. Ind.* ii. 396; *Wall. Cat.* 1254. *M. robusta*, *Roxb. Hort. Beng.* 33; *Fl. Ind.* ii. 397. *M. australasica*, *Adr. Juss. in Mém. Mus.* xix. 257. *M. æthiopica*, *Welw. Apontam. Phyto-geogr. Prov. Angola*, 584. *M. Bombolo*, *Welw. l.c.* 501. *M. argentea*, *Hb. Ham. ex Wall. Cat.* 1254, C.

The EASTERN and WESTERN PENINSULAS; BURMA and CEYLON; wild and cultivated. —DISTRIB. Tropical Asia, Australia, and Angola.

A large handsome tree. *Leaves* 9-24 in.; leaflets $\frac{3}{4}$ -3 by $\frac{1}{4}$ -1 $\frac{1}{4}$ in. *Flowers* greenish-white, fragrant, $\frac{1}{4}$ - $\frac{1}{2}$ in. long. *Drupe* ellipsoidal, $\frac{1}{2}$ in. or more long.—By the kindness of Dr. Roeper, Professor of Botany at the University of Rostock, I have been enabled to examine the original specimen of *M. dubia*, *Cav.*, and to ascertain its identity with *M. composita*, *Willd.*

5. CIPADESSA, Blume (Mallea, Juss.).

Shrubs or small trees with odd-pinnate leaves, opposite or subopposite coarsely serrate or entire leaflets, axillary peduncled panicles and subglobose flowers. *Calyx* small, cup-shaped, 5-toothed. *Petals* 5, oblong, rather short, spreading, free, valvate in bud. *Staminal tube* deeply 10-lobed, adnate below to the disk, lobes linear, bifid at the apex; anthers short, inserted between the teeth, subapiculate. *Disk* shortly cup-shaped, wholly adnate to the base of the staminal tube. *Ovary* 5-celled; cells alternate with the calyx-lobes; style rather short, stigma clavate-capitate; ovules two, collateral, pendulous. *Drupe* slightly fleshy, 5-ribbed, 5-celled; ribs alternate with the calyx-lobes; cells 1-2-seeded. *Seeds* with fleshy albumen; embryo subfoliaceous.—DISTRIB. A genus of 2 species, limited to India and the Malay Archipelago.

1. **C. fruticosa**, *Blume Bijl.* 162; leaflets 7-11 ovate or elliptic entire or coarsely serrate pubescent on the nerves beneath, ovary glabrous. *C. baccifera*, *Miq. in Ann. Mus. Lugd.-Bat.* iv. 6. *C.?* subscandens, *Miq. l.c.* 7. *Melia baccifera*, *Roth Nov. Sp.* 215. *Ekebergia indica*, *Roxb. Hort. Beng.* 33; *Fl. Ind.* ii. 392; *Wall. Cat.* 1256. *E.?* integerrima, *Wall. Cat.* 1257. *Mallea Rothii*, *Adr. Juss. in Mém. Mus.* xix. 222, t. 13, f. 6; *W. & A. Prodr.* i. 118; *Grah. Cat. Bomb. Pl.* 31; *Thwaites Enum.* 60; *Dalz. & Gibs. Bomb. Fl.* 37; *Bedd. Fl. Sylv. Anal. Gen.* liv. t. 8, f. 5. *M. integerrima*, *Wall. ex Voigt Hort. Sub. Calc.* 134. *M. subscandens*, *Teysm. & Binnend. in Nat. Tijdschr. Ned. Ind.* xxvii. 39. *Melia montana*, *Hb. Madr. ex Wall. Cat.* 1256, D.

WESTERN PENINSULA; from the Concan and Circars southwards to CEYLON.—DISTRIB. Java.

A much branched shrub, erect or in dense moist forests somewhat scandent. *Leaves* 3-10 in.; leaflets 1-3 $\frac{1}{2}$ by $\frac{1}{2}$ -1 $\frac{1}{2}$ in., shortly petiolulate. *Flowers* $\frac{1}{4}$ - $\frac{1}{2}$ in. long; panicles mostly on long peduncles. *Fruit* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.

6. **DYSOXYLUM**, Blume.

Trees, mostly glabrous. *Leaves* pinnate; leaflets quite entire, opposite subopposite or alternate, more or less acuminate at the apex and oblique at the base, coriaceous. *Flowers* paniculate, hermaphrodite. *Calyx* 4-5-fid, dentate or partite or subentire, imbricated, caducous. *Petals* 4-5, oblong, spreading, valvate or slightly imbricated. *Staminal tube* cylindrical, dentate or crenulate at mouth; anthers short, 6, 8 or 10, included or half exserted. *Disk* tubular, equalling or twice the length of the ovary, crenulate or entire at the mouth. *Ovary* usually 3-4-celled; style about equalling the staminal tube; ovules usually 2 in each cell. *Capsule* globose or pear-shaped, coriaceous (often thickly so), 1-4-celled, loculicidal; seeds arillate or exarillate, exalbuminous.—**DISTRIB.** Species about 40, many in the Malay Archipelago, and a few in Australia and New Zealand.

The Indian species appear to be endemic. Many species emit an alliaceous odour.

SECT. I. *Calyx* cup-shaped, subentire, about half the length of the flower.

1. **D. binectariferum**, Hook. f. ex Bedd. in *Trans. Linn. Soc.* xxv. 212; pallid, leaflets 5-9 alternate elliptic acuminate glabrous, panicles nearly glabrous much shorter than the leaves, pedicels shorter than the 4-merous obsolete tomentose flowers, calyx thick urceolate-cup-shaped subentire, petals valvate except the apex, disk glabrous inside scarcely so outside twice as long as the 4-celled shortly hairy ovary, style very shortly hairy, fruit obovoid somewhat pyriform or subglobose nearly glabrate or puberulous. *Guarea binectarifera*, Roxb. *Hort. Beng.* 28; *Fl. Ind.* ii. 240; *Wall. Cat.* 1260; *Grah. Cat. Bomb. Pl.* 31. *D. macrocarpum*, Thwaites *Enum.* 60; *Beddome Fl. Sylv.* t. 150; *Anal. Gen.* liv.; not of Blume. *G. Gotadhora*, Buch. Ham. in *Edinb. Mem. Wern. Soc.* vi. 307; *Wall. Cat.* 4884, excl. lett. B. *Epicharis exarillata*, Arn. ex W. & A. *Prodr.* i. 120, not of Nimmo. ? *G. Amaris*, Hamilt. l.c. 308.

KHASIA MTS. and ASSAM; WESTERN PENINSULA from the Concan southwards; CEYLON (? Sikkim Himalaya and S. Andaman Islds.).

A tree 30 ft. high or more. *Leaves* 9-18 in.; leaflets 2½-7 by 1-3 in.; petiolules ½-¾ in. *Flowers* ¾ in., pale green; calyx nearly half the length of the flower; staminal tube somewhat mealy on both sides. *Fruit* 2½ in. long, reddish, 4-celled, 4-seeded. *Seeds* polished, dark purple.—The form with smaller and narrower leaves is the var. β of Dr. Thwaites. *Amoora ficiformis*, Wight *Illustr. Ind. Bot.* i. 147, closely resembles the Ceylon specimens, and may be synonymous with this species.

SECT. II. *Calyx* 4-5-fid or -partite or -sepalous, mostly short.

* *Flowers* panicled.

† *Ovary* glabrous.

2. **D. brevipes**, Hiern; leaflets 5-11 opposite or alternate elliptic or ovate-oblong acuminate glabrous, ultimate pedicels shorter than the glabrous flowers, calyx small cup-shaped irregularly 4-toothed, petals (3-) 4, disk exceeding the 3-4-celled glabrous ovary, fruit pear-shaped 4-valved.

MALACCA, Maingay.

A tree. *Leaves* 8-24 in.; leaflets 3-9 by 1-2 in., sometimes obscurely pellucid-punctate; lateral veins more or less depressed on the upper surface; petiolules ¼-½ in. *Flowers* ¼-½ in., white, with a strong alliaceous smell; petals distinctly but slightly imbricated at the margin; staminal tube pilose inside; connective obtusely apiculate; ovary glabrous; style glabrous, smooth, stigma discoid flattened at apex, its base surrounded

by a viscid ring. *Ovules* 2 together, superposed. *Fruit* brownish-orange, $1\frac{1}{2}$ –2 in. long; seeds attached by a broad ovoid hile to the axis; testa externally of a chestnut colour.

†† Ovary more or less hairy.

‡ *Disk* densely hairy at the mouth.

3. **D. thyrsiodeum**, *Griff. mss. sub Hartighsea*; leaflets 5–9 more or less alternate elliptic or oblong acuminate glabrous shining, panicles divaricately branched, ultimate pedicels about equalling the glabrous 4–5-merous flowers, calyx small cup-shaped or nearly flat irregularly toothed, disk hairy on both sides especially at the mouth fleshy truncate rather exceeding the 3-celled slightly hairy ovary, fruit obovoid.

MALACCA, *Griffith (Kew distrib. 1053)*.

A tree. *Leaves* 12–16 in.; leaflets 4–10 by $2\frac{1}{4}$ in.; lateral veins obscurely depressed on the upper surface; petiolule $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in., white. *Fruits* fleshy, 2–3-lobed, umbilicate, nearly 1 in. long. *Fruiting peduncles* stout, woody. *Style* robust, stigma discoid sub-3-lobed. *Seeds* exarillate.

4. **D. procerum**, *Hiern*; leaflets 7–10 alternate or opposite elliptic or oblong abruptly acuminate glabrous, branches of elongated panicle spreading, ultimate pedicels very short, bracteate near the apex, calyx shortly cup-shaped 4–5-toothed, corolla appressedly pubescent 4–5-merous, anthers 8 or 10, disk twice the length of the 3–4-celled hairy ovary hairy at the apex and inside, fruit pyriform-globose, pericarp thick, seeds arillate. *Guarea procera*, *Wall. Cat. 1261*. *G. oblonga*, *Wall. Cat. 1262*. *G. Gobara*, *Hamilt. in Mem. Wern. Soc. vi. 306 (1832)*; *Wall. Cat. 4885*. *Hartighsea Gobara*, *W. & A. ex Voigt Hort. Sub. Calc. 136*. *Cfr. Guarea acuminata*, *Wall. Cat. 1263*, *Cfr. G. disyphonia*, *Griff. Notul. iv. 503*.

From ASSAM, the KHASIA Mts., and CACHAR to TENASSERIM.

A large tree. *Leaves* 1–2½ ft.; leaflets 4–14 by 2–6 in.; petiolule $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* $\frac{3}{8}$ – $\frac{1}{2}$ in.; petals valvate or very slightly imbricate; staminal tube glabrous. *Fruit* 2 by $1\frac{1}{2}$ in., 3–4-celled.

‡† *Disk* glabrous at the mouth or nearly so.

5. **D. grande**, *Hiern*; puberulent, leaflets 12 alternate oblong caudate-acuminate base rounded, panicles about equalling leaves, flowers shortly pedicelled clustered 4-merous, calyx short, staminal tube thinly pubescent on both sides 8-toothed teeth bifid, disk shortly tubular glabrous outside rather exceeding the hairy 4-celled ovary. *Guarea grandis*, *Wall. Cat. 4883*.

EASTERN BENGAL; at Silhet (*Wall.*).

Leaves 2 ft.; petiole $5\frac{1}{2}$ in. long; leaflets 5–9 by $2\frac{1}{2}$ –3 in.; petiolules $\frac{1}{4}$ in. *Flowers* $\frac{1}{8}$ in. long.

6. **D. Maingayi**, *Hiern*; leaflets 5–7 opposite or subopposite elliptic obtusely acuminate glabrous base cuneate, panicles short not much branched, flowers about equalling the pedicels 5-merous, calyx short flattish very shortly toothed, staminal tube obtusely crenate, anthers 10, disk just exceeding the hairy 4-celled ovary.

MALACCA, *Maingay*.

Leaves 6–9 in., pale; leaflets $2\frac{1}{2}$ –5 by 1–2 in.; lateral petiolules short, terminal $\frac{1}{4}$ in. *Panicles* $1\frac{1}{2}$ in. long. *Petals* somewhat hairy outside, adnate in bud with the glabrous staminal tube, at length free, $\frac{1}{4}$ in. long. *Disk* glabrous outside, hirsute inside, 5-toothed. *Style* glabrous except the base.—According to Dr. Maingay's mss., the ovary is 5-celled, each cell opposite a calyx-lobe and containing 2 collateral ovules.

7. **D. Hamiltonii**, *Hiern*; shoots tawny velvety, leaflets 9-17 opposite or subopposite oblong acuminate velvety on the midrib beneath, panicles lax axillary shorter than the leaves, pedicels slender about equalling or shorter than the flowers, calyx very small 4-partite with rounded concave imbricated lobes pubescent, petals 4 glabrous, staminal tube pubescent on both sides, anthers 8, disk glabrous on both sides twice the length of the ovary, style slender pubescent below glabrous above, ovary pubescent 3-celled. *Guarea mollis*, *Wall. mss.* *G. paniculata*, *Wall. Cat. n. 4882, not of Roxb.* *Epicharis mollis*, *Wall. ex Voigt Hort. Sub. Calc. 135.* *G. Alliaria*, *Hamilt. in Mem. Wern. Soc. vi. 305 (1832) excl. syn. Rumph.* *Hartighsea Alliaria*, *Arn. ex Voigt Hort. Sub. Calc. 136.*

ASSAM and SILHET.

A large tree. *Leaves* erect, 15-20 in.; leaflets 4 by $1\frac{1}{2}$ in.; petiolules $\frac{1}{2}$ in. *Inflorescence* 6 in. long and wide; flowers $\frac{1}{4}$ in. long, greenish-white.

8. **D. malabaricum**, *Bedd. mss.*; leaflets about 8 subopposite ovate or subelliptic acuminate obsolete puberulent base cuneate shortly petioluled, panicles many-flowered puberulent, pedicels short, flowers 4-merous, calyx cleft halfway short, disk short mouth not very hairy, ovary shortly pubescent 4-celled, ovules 2 together collateral, fruit globose both ends pointed. *Dysoxylum* (sp.), *Bedd. in Trans. Linn. Soc. xxv. 212; Fl. Sylv. Anal. Gen. p. liv.*

WESTERN PENINSULA; Mountains of Kurz and Travancor, alt. 2-3000 ft., *Beddome*.

An immense tree. *Leaves* pallid, $1\frac{1}{2}$ ft.; leaflets 5-8 by $1\frac{3}{8}$ - $2\frac{1}{4}$ in.; petioles angular, $4\frac{1}{2}$ in.; petiolules $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in. *Anthers* short. *Fruit* 2 in. diam., verrucose, longitudinally lined, nearly glabrous, bright yellow when ripe, 3-4-seeded. *Seeds* bluntly 3-sided, attached by their whole inner face to the central placenta; testa reddish-brown; cotyledons green.—Called Porapa by the Kaders on the Anamallays.

** *Flowers* racemose or spicate.

† Leaflets alternate.

9. **D. pallens**, *Hiern*; leaflets 5-10 alternate oblong or elliptic narrowly acuminate glabrous, inflorescence axillary racemose, pedicels not exceeding the closely puberulent 4-merous flowers, calyx shortly cup-shaped 4-fid, anthers 8, disk glabrous on both sides coarsely toothed about equalling the hairy 3-(-2)-celled ovary, style shortly hairy below, fruit pyriform, seeds exarillate?

SIKKIM HIMALAYA (*Herb. Griff.*); MISHMI and KHASIA Mts., *Griffith*.

A small or moderate-sized tree; shoots pale. *Leaves* 9-32 in.; leaflets 3-8 by $1\frac{1}{4}$ -3 in.; petiolule $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in., greenish; calyx $\frac{1}{10}$ - $\frac{1}{2}$ in. long; petals valvate; staminal tube glabrous on both sides, obtusely 6-8-toothed. *Fruit* $1\frac{1}{2}$ by 1 in., slightly pubescent.

10. **D. Beddomei**, *Hiern*; leaflets 7-9 alternate glabrous submembranous ovate- or elliptic-oblong narrowly and obtusely acuminate base oblique obtuse or cuneate, inflorescence axillary spicate somewhat branched near the base, flowers subsessile or very shortly pedicelled 4-merous puberulent, calyx very short, teeth short obtuse, staminal tube puberulent on both sides, disk glabrous exceeding the hirsute ovary.

SOUTH TRAVANCOR, *Beddome*.

A middling-sized tree; young parts puberulent. *Leaves* pale-green, 12-15 in.; leaflets 4-6 by $1\frac{1}{2}$ to 2 in., midrib and lateral veins pale beneath; petiolules $\frac{1}{2}$ - $\frac{1}{4}$ in. *Inflorescence* 3-6 in., 1-2 in. wide. *Flowers* $\frac{1}{2}$ in. long. *Petals* imbricated. *Staminal tube* shortly toothed. *Ovary* 2-celled; ovules collateral.

11. **D. flavescens**, *Hiern*; leaflets 9-13 alternate elliptic acuminate glabrous midrib alone conspicuous, flowers subsessile crowded in elongated axillary spikes 4-5-merous minutely hairy, calyx very short nearly flat toothed, petals very slightly imbricated pale yellow, staminal tube glabrous below slightly pilose above, disk glabrous exceeding the 4-celled shortly hairy ovary.

MALACCA, *Maingay*.

Leaves 1-2 ft.; leaflets 3-5 by $1\frac{1}{4}$ -2 in.; petiolules $\frac{1}{2}$ - $\frac{1}{4}$ in. *Flowers* $\frac{1}{2}$ in.; calyx minutely spongio-pilose (*Maingay* mss.); petals minutely pilose outside, glabrous inside; anthers black; style very minutely and sparingly pilose, stigma discoid, surrounded at the base by a ring. *Disk* dull reddish-orange, entire or undulated at the mouth. *Ovules* 2 together, superposed.

12. **D. Griffithii**, *Hiern*; leaflets alternate about 11 oblong-lanceolate acuminate glabrous shining, racemes from the axils of fallen leaves at the lower parts of the branches short, pedicels shorter than the 4-merous nearly glabrous flowers, calyx very short nearly flat, staminal tube puberulent outside glabrous inside, disk glabrous equalling or rather exceeding the 4 (3-) celled somewhat hairy ovary, style puberulent. *Hartighsea* ramiflora, *Griff. Notul.* iv, 501.

MALACCA, *Griffith*.

Branchlets subsimple, elongated, flowering below, leafy above; youngest parts ferruginous-scaly. *Leaves* 1-1 $\frac{1}{2}$ ft.; leaflets 4 $\frac{1}{2}$ -5 by $1\frac{1}{2}$ in.; petiolules $\frac{1}{2}$ in. *Flowers* pale-yellow, quickly turning brown; petals $\frac{1}{2}$ in. by $\frac{1}{16}$ in. *Racemes* 1 in. long.—In the axils of the lowest leaves a short raceme sometimes occurs.

†† Leaflets opposite or subopposite.

13. **D. cauliflorum**, *Hiern*; pallid, leaflets about 13 opposite or subopposite elliptic or oblong obtusely and shortly acuminate glabrous chartaceous, base cuneate, spikes clustered on the trunk much shorter than the leaves tawny-pubescent, flowers crowded 4-merous, calyx obscure 4-toothed, petals puberulent, staminal tube rather pubescent on both sides 8-lobed, lobes notched at apex, anthers 8 included short, style shaggy below not exerted, disk tubular glabrous much exceeding the ovary much shorter than the hairy style obscurely and obtusely 4-toothed, ovary 4-celled hairy "cells 1-ovuled." (*Maingay*.)

MALACCA, *Maingay*.

A tree. *Leaves* 1-2 ft.; leaflets 4-8 by $1\frac{1}{4}$ -3 $\frac{1}{4}$ in. *Shoots* tawny-velutinous; petiolules $\frac{1}{2}$ - $\frac{1}{2}$ in. or terminal one longer. *Inflorescence* 3-4 in. long; flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. long. *Calyx* $\frac{1}{2}$ - $\frac{1}{10}$ in. long. *Fruit* 1 in. long, nearly glabrous, 1-2-seeded subglobose, 4-valved, deep dull red.

14. **D. cuneatum**, *Hiern*; leaflets 13 opposite or subopposite elliptic obtuse or shortly acuminate glabrous, base cuneate, inflorescence spicate shorter than the leaves, flowers 4-merous subsessile, calyx campanulate obtusely cleft halfway down shortly pubescent, petals nearly glabrous slightly imbricated, staminal tube with 8 hairy lines outside pubescent inside, disk nearly equalling the ovary glabrous outside densely hairy inside, style pilose-pubescent below, ovary densely hairy 4-celled, fruit subglobose.

MALACCA, *Maingay*; (? *Singapore*, *T. Anderson*).

A large tree. *Leaves* 2-2 $\frac{1}{2}$ ft.; leaflets 4-7 by 2-3 in.; petiolules $\frac{1}{4}$ - $\frac{3}{8}$ in., somewhat tumid at base. *Flowers* $\frac{3}{8}$ in. long; calyx nearly half the length of the flower; style robust. *Fruit* 1 in. long, 3-valved.—Local name "Tautoolan." According to Dr. *Maingay's* ms. notes, the staminal tube is campanulate, cleft into 10 narrowly quadrate

divisions slightly crenulate at the margins; stamens 10; ovary 5-celled, each cell containing 1 subhorizontal ovule; seeds with an incomplete orange arillus.

7. **CHISOCHETON**, Blume. (*Schizochiton*.)

Trees or shrubs. *Leaves* pinnate, quite entire, opposite or subopposite; leaflets more or less oblique. *Panicles* supra-axillary divaricately branched many-flowered, rarely axillary or flowers in spicate racemes; flowers polygamo-dioecious. *Calyx* small, cup-shaped, 4-5-toothed. *Petals* 4-5, very rarely 6, usually linear-elongated, long cohering in a tube especially below, at length spreading, somewhat imbricated or valvate. *Staminal tube* elongated, slender, tubular, 4-8-lobed at the apex, lobes entire or toothed; anthers linear, equal in number to and alternate with the lobes, included or somewhat exerted. *Disk* short and fleshy or tubular. *Ovary* short, 2-4-celled; style filiform, usually exceeding the staminal tube, stigma capitate; ovules usually one in each cell. *Capsule* subglobose, thickly coriaceous, 2-4-celled, loculicidally 2-4-valved. *Seeds* usually enclosed in an imperfect aril, hile usually suborbicular or oval; cotyledons usually peltate.—**DISTRIB.** A genus of about 12 species confined to Eastern India and the Indian Archipelago.

SECT. I. *Racemes* spicate.

1. **C. spicatus**, *Hiern*; leaflets 4 or 6 opposite elliptic or oblong acuminate glabrescent, base cuneate shortly petiolulate, racemes spicate axillary, calyx entire, staminal tube obtusely 5-6-toothed, anthers 5-6.

MALACCA, *Maingay*.

A tree about 30 ft. high. *Young parts* and *inflorescence* pale tawny, puberulent. *Leaves* 8-12 in., terminating in a growing point; leaflets 2-6 by $1\frac{1}{2}$ -2 in., but little oblique. *Spikes* 4-6 in., about double the length of the common peduncle; flowers subsessile, $\frac{1}{2}$ - $\frac{3}{4}$ in. long; bracteoles ovate, small. *Petals* 4. *Staminal tube* appressedly pubescent on both sides. *Fruit* (immature) attenuate at both ends, especially towards apex, obsoletely tomentose.

SECT. II. *Flowers* panicked.

* *Anthers* 5 or fewer.

2. **C. erythrocarpus**, *Hiern*; leaflets 10-12 opposite elliptic or oblong obtusely cuspidate above, base obtuse, panicles about half the length of the leaves many-flowered supra-axillary, anthers 5, disk inconspicuous, fruit globose base stipitate.

MALACCA, *Maingay*.

Young parts petioles petiolules and fruit tawny and shortly tomentose. *Leaves* terminating in growing points, about 1 ft. long or more; leaflets 3-6 by $1\frac{1}{2}$ -2 in.; petiolules $\frac{1}{8}$ - $\frac{1}{4}$ in. *Flowers* $\frac{5}{12}$ in. long; pedicels short. *Calyx* 3-5-toothed. *Petals* 5, valvate. *Staminal tube* truncately 5-toothed at apex, pubescent on both sides, teeth centrally emarginate, truncate; anthers 5, included. *Ovary* 2-2-celled; ovules solitary. *Fruit* bright blood-red. *Seeds* exarillate, 1 in. long; testa very thick, coriaceous, bright orange; hile $\frac{3}{8}$ - $\frac{1}{2}$ in. diam.

3. **C. penduliflorus**, *Planch. mss. in Hb. Kew.*; tawny velvety, leaflets 10-11 opposite elliptic or ovate or upper ones obovate cuspidate base rounded or subcordate except of the upper leaflets, panicles elongated supra-axillary very narrow pendulous, flowers 4-5-merous elongated, calyx toothed or entire, staminal tube appressedly pilose outside below its 3-5 lobes, sparingly pilose inside below the middle, lobes deeply emarginate, anthers 3-5 included sessile, style very slender glabrous above pilose below, disk glabrous free short cupular fleshy. *Melia penduliflora*, *Wall. Cat. n. 1255*.

MALACCA, *Maingay*; PENANG, *Porter*.

A small tree or shrub. *Leaves* 1-2 ft.; leaflets 3-9 by $1\frac{1}{2}$ -3 in.; petiolules very short. *Panicles* nearly as long as the leaves. *Flowers* $\frac{3}{4}$ - $\frac{7}{8}$ in. long, clustered, subsessile, dull red. *Young fruit* fusiform-oblong, appressedly silky, 1 in. long.

**Anthers* 6-8.

† *Flowers* subsessile or on very short pedicels.

‡ *Teeth of staminal tube* lanceolate.

4. **C. glomeratus**, *Hiern*; young parts inflorescence lower surface of leaflets and midrib above hispid-pubescent tawny, leaflets 2-5-7 opposite elliptic cuspidate base rounded very shortly petiolulate, panicles supra-axillary equalling the leaves, flowers subsessile clustered, calyx obscurely toothed, petals 4 nearly glabrous, staminal tube 6-toothed teeth lanceolate entire silky inside, anthers 6 somewhat exserted, style very hairy. *Schizochiton*? *Wall. Cat.* 9040.

PENANG hills, *Porter*.

A very lofty tree, and stout in proportion. *Leaves* 1-1½ ft., often terminating in a growing point; leaflets 4-8 by $1\frac{1}{2}$ -2½ in. *Flowers* ½ in. long or more, glabrous, white.—A specimen in fruit from Malacca (Hb. Griffith, Kew distr. n. 1065), with a leaf 2 ft. long and leaflets 6-10 by $2\frac{1}{2}$ -3½ in., and fruit 1½ in. long, seems to belong to this species.

5. **C. fragrans**, *Hiern*; subglabrous, leaflets 16-28 subopposite elliptic-oblong obtusely acuminate nervose shortly petiolulate, base obtuse oblique, male panicles elongated about equalling the leaves, flowers 4-merous, calyx 4-toothed or subentire, teeth of staminal tube 6-5 entire, fruiting racemes elongated pendulous equalling or shorter than the leaves, fruits subglobose somewhat pyriform pedicelled 2-celled, cells 1-2-seeded.

MALACCA, *Griffith, Maingay* 324.

A lofty tree. *Leaves* 1½ ft., dark green; leaflets 1½-4 by $\frac{3}{4}$ -1½ in.; petiolules $\frac{1}{2}$ - $\frac{1}{3}$ in. *Flowering panicles* 1 ft. or more long, pendulous, supra-axillary; flowers ½ in. long, very fragrant, shortly pedicelled. *Petals* slightly imbricated above, glabrous, reflexed to the middle. *Staminal tube* petaloid, glabrous outside, hairy inside; teeth lanceolate, acute, spreading. *Anthers* 6-5, sessile, exserted. *Ovary* 2?-celled; *style* appressedly hairy. *Disk* annular, fleshy. *Fruiting racemes* 1 ft. or more long. *Fruits* obsoletely tomentose, reddish brown, 1¼ in. diam., 2-celled; few, many being abortive, on short pedicels stouter than the peduncle. *Aril* large, fleshy, white, covering half the seed; hile broadly oval. *Cotyledons* greenish, very thick, fleshy, deeply aricled.

6. **C. holocalyx**, *Hiern*; subglabrous, leaflets 17-23 narrowly oblong narrowly acuminate opposite or subopposite petiolulate, base obliquely cuneate, margins narrowly revolute, panicles elongated narrow drooping supra-axillary, flowers 4-merous, calyx truncate entire, staminal tube pubescent especially inside 6-8-toothed teeth lanceolate acute entire or bifid, anthers 6-8 somewhat exserted sessile, style appressedly pubescent, disk annular fleshy about equalling the short ovary.

MALACCA, *Maingay*; SINGAPORE, *T. Anderson*.

Leaves 2-3 ft.; leaflets 3-7 by $1-1\frac{1}{2}$ in.; petiolules $\frac{1}{2}$ -1 in. *Panicles* nearly equalling the leaves with very short divaricate branches; pedicels very short. *Flowers* ½ in. long. *Petals* glabrous except the apex. *Ovary* 2-celled.—“Flowers with a stercoraceous odour like *Pæderia*” (*Maingay*). Closely allied to *C. divergens*, *Blume*.

‡ *Teeth of staminal tube* oblong.

7. **C. dysoxylifolius**, *Kurz in Journ. As. Soc. Beng.* xl. ii. 49 (1871); leaflets alternate oblong or oblong-lanceolate acuminate glabrous subcor-

iaceous shortly and thickly petiolulate, base oblique rather obtuse, panicles supra-axillary pyramidal elongated more or less pubescent, flowers subsessile 4-merous, calyx obsoletely toothed very thinly pubescent, petals pubescent, staminal tube appressedly pubescent 6-lobed at the apex lobes oblong obtuse entire quite glabrous, anthers 6, ovary and style pubescent towards the base.

MARTABAN, at Thoungyeen, *Brandis*.

A tree, glabrous in most parts. *Leaves* large, "very like those of *Dysoxylum acuminatissimum*," *Kurz*; leaflets 6-12 by 3-4 in.; petiolules puberulent, $\frac{1}{4}$ in. *Panicles* $1\frac{1}{2}$ ft. or more; bracteoles small, lanceolate, pubescent; flowers $\frac{1}{2}$ in. long. *Style* equaling the staminal tube.

8. **C. grandiflorus**, *Kurz in Journ. As. Soc. Beng.* xli. ii. 296 (1872); leaflets 8-13 opposite or subopposite oblong or oblong-lanceolate shortly acuminate glabrescent above except the nerves softly pubescent beneath shortly and thickly petiolulate, panicles axillary slender densely tawny-tomentose, flowers subsessile clustered, calyx cup-shaped obsoletely 4-toothed, densely pubescent outside as well as the 4-6 petals, glabrous inside, staminal tube sparingly pubescent outside glabrous inside 6-7-lobed lobes oblong truncate entire, anthers 6-7 included, capsules 3-lobed pyriform 3-valved. *Plagiotaxis grandiflora*, *Wall. Cat.* 1271. *Dysoxylum grandiflorum*, *Roem. Synops.* i. 135; *W. & A. Prodr.* i. 123. *Diploaxis grandiflora*, *Wall. ex Kurz Rep. Veg. Andam. ed.* ii. 33. *Epicharis* sp. *Kurz l.c. ed.* i. p. iv.

TENASSERIM, *Gomez*; S. ANDAMAN, *Kurz*.

A moderately-sized or large tree with young parts tawny velvety-tomentose or pubescent. *Leaflets* 6-10 in. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, silky-tomentose, subtended by a widely oblong densely tawny-pubescent calyx $\frac{1}{4}$ in. long. *Panicles* on long peduncles. *Ovary* and *style* tawny-pubescent. *Disk* cup-shaped, as high as the ovary, glabrous. *Capsule* $1\frac{1}{4}$ in. long; seeds solitary; aril complete, orange.

†† Flowers on slender pedicels.

9. **C. paniculatus**, *Hiern*; young parts and inflorescence hispid-pubescent, leaflets 7-24 opposite or subopposite elliptic ovate-oblong or oblong acuminate glabrescent or hispid-pubescent on the veins beneath papery-coriaceous, base obtuse oblique shortly petiolulate, panicles usually about equalling or exceeding the leaves with elongated lax branches, flowers pubescent or glabrate on slender pedicels, calyx obscurely 4-toothed staminal tube more or less pubescent on both sides obtusely 6-8-lobed lobes deeply bifid, style pubescent below. *Guarea paniculata*, *Roxb. Hort. Beng.* 28; *Fl. Ind.* ii. 242, not of *Wall.* *Dysoxylum multijugum*, *Arn. ex W. & A. Prodr.* i. 121. *D. paniculatum*, *Arn. ex Wight Ic.* n. 146. *Trichilia? longissima*, *Wall. Cat.* n. 8069. *Cupania* (sp.) *Wall. Cat.* 8069.—*Wall. Cat.* p. 250, n. 4884 B not A.

EASTERN BENGAL, ASSAM, CACHAR, the KHASIA Mts., and TAVOY.

Leaves 15-36 in. or more; leaflets 4-10 by $1\frac{1}{2}$ -4 in.; petiolules $\frac{3}{8}$ - $\frac{1}{2}$ in. *Panicles* axillary, 2-3 ft. long, ramifications hairy; pedicels $\frac{1}{10}$ - $\frac{1}{8}$ in. long; flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. long, 4-merous, pale yellow; rachis often angular. *Ovary* 4-celled, cells 1-rarely 2-ovuled. *Capsule* 1-2 $\frac{1}{2}$ in. diam., globose, base pyriform, 2-4-celled, smooth, of a dark orange or red colour when ripe.—The anthers in *Wight's* figure are ovate instead of linear. *Sapindus multijugus*, *Wall. Cat.* 8099, leaves only, from Taong Dong, Burma, may possibly belong to this species.

C. ? costatus, *Hiern*; leaflets about 10 alternate ovate-oblong acutely acuminate pale olive and velvety beneath, base rounded or slightly exca-

vated, panicles short supra-axillary, fruit subglabrous subglobose or ellipsoid 3-2-ribbed.

EASTERN BENGAL; in Cachar, *R. L. Keenan*.

A tree with the shoots softly and shortly velvety. *Leaves* about 18 in.; leaflets 3-8 by $1\frac{1}{2}$ - $2\frac{1}{4}$ in., dark green, subglabrous above, lateral veins 15-24 on each side of midrib; petiolules $\frac{1}{2}$ - $\frac{3}{4}$ in. *Fruiting panicles* 3 in. long; fruit orange-coloured, 1- $1\frac{1}{2}$ in. long, base shortly stipitate. *Seeds* nearly 1 in. long, hile $\frac{1}{2}$ in. diam. near the apex; cotyledons somewhat peltate.

8. **SANDORICUM**, Cav.

Trees. *Leaves* trifoliolate, coriaceous; leaflets quite entire, the lateral ones shortly and the terminal one long-petiolulate. *Flowers* 5-merous, in axillary panicles, yellow or whitish. *Calyx* cup-shaped, with short lobes imbricated in bud; base of the tube adnate to the ovary. *Petals* imbricated, spreading. *Staminal tube* tubular, nearly as long as the petals, toothed at the apex; anthers 10 or 8, included. *Disk* cup-shaped, sheathing the ovary and base of the style, lacinate. *Ovary* 5-celled, adnate to the calyx below, attenuate into the style above, cells opposite the calyx-lobes, each with 2 collateral pendulous ovules; style cylindrical or columnar, nearly the length of the staminal tube, crowned by a slightly elevated glandular ring, stigmas 5 short linear subacute or truncate. *Berry* superior, globose, fleshy, indehiscent, 3-5-celled and -seeded; flesh edible. *Seeds* included in a papery aril, pulpy outside.—**DISTRIB.** A genus of about 4 species limited to India and the Malayan Archipelago, one species being cultivated over an extensive area.

1. **S. indicum**, *Cav. Diss.* (vii.) p. 359, tt. 202, 203; shoots panicles and lower surface of leaves at least on the veins tawny-velvety, leaflets elliptic or ovate-orbicular shortly acuminate or apiculate, base unequally obtuse, flowers clustered subsessile in ample much branched panicles small yellowish sweet-scented, calyx shortly pubescent. *W. & A. Prodr.* i. 120; *Bedd. Anal. Gen.* lv.; *Adr. Juss. in Mém. Mus.* xix. t. 16, f. 15; *Drury Fl. Ind.* i. 165; *Hassk. Retzia*, i. 146; *Roxb. Cor. Pl.* iii. t. 261; *Fl. Ind.* ii. 392; *Wall. Cat.* 1249. *S. nervosum*, *Blume Bijl.* 163. *S. ternatum*, *Blanco Fl. Filip. ed.* i. 346. *S. glaberrimum*, *Hassk. Retzia*, i. 145. *Trichilia nervosa*, *Vahl Symb.* i. 31. *Melia Koetjape*, *Burm. Fl. Ind.* 101. *T. venosa*, *Euphr.* *Syst.* iii. 68.

EASTERN PENINSULA; from Rangoon and Tenasserim (var. *β velutina*) to Penang. Introduced in the Western Peninsula.—**DISTRIB.** Malayan Islands.

A lofty tree. *Leaves* 6-18 in.; leaflets 3-8 by $1\frac{1}{2}$ - $4\frac{3}{4}$ in.; common petiole $1\frac{1}{2}$ -6 in. *Flowers* $\frac{1}{2}$ in. long; calyx about $\frac{1}{2}$ in. *Stigmas* truncate. *Fruit* about 3 in. diam.; pulp fleshy, acid, with a peculiar smell.—The Burmese eat the raw fruit. There are two varieties known at Singapore, according to Captain Blomfield, under the distinctive names of "Santól" and "Kachápee;" they differ in the fruit like the apple and pear in appearance and 'flavour.—*S. serratum*, *G. Don Gen. Syst.* i. 680, differing by its repand-crenate leaflets, may belong to this species.

2. **S. emarginatum**, *Hiern*; glabrous, leaflets obovate or elliptic emarginate usually mucronulate rigid, base obtusely narrowed oblique, lateral veins feeble, panicles short dense, pedicels shorter than the flowers, fruit obovoid very shortly tomentose.

MALACCA, *Maingay*.

Leaves 5-7 in.; leaflets 2- $3\frac{1}{2}$ by $1\frac{1}{4}$ -2 in.; petiolules $\frac{1}{2}$ -to $\frac{3}{4}$ in., the terminal one quasi-articulated near apex, 1- $1\frac{1}{4}$ in. *Calyx* somewhat enlarged and persistent in fruit.

Staminal tube terminating in 8 or 10 subglabrate emarginate lobes. *Flowers* $\frac{1}{8}$ in. long. *Fruit* (immature?) $\frac{3}{8}$ in. long.

3. **S. Maingayi**, *Hiern*; subglabrous, leaves elliptic subacuminate, base obtuse, lateral nerves strong above depressed beneath, panicles shorter than the leaves, pedicels equalling the flowers mostly exceeding the subulate bracteoles, calyx fleshy obscurely toothed very minutely pilose.

MALACCA, *Maingay*.

A tree. *Leaves* about 6-8 in.; leaflets 2-5 by $1\frac{1}{2}$ -3 in.; petiolules $\frac{1}{4}$ in.; terminal one quasi-articulated near apex, $1\frac{1}{2}$ -1 $\frac{3}{4}$ in. *Flowers* $\frac{3}{8}$ - $\frac{1}{2}$ in. long. *Calyx* $\frac{1}{8}$ - $\frac{1}{4}$ in. long. *Petals* white tinged with pink, glabrous, marked outside with pale glandular dots. *Staminal tube* ventricose-cylindrical, contracted at the throat, ribbed externally and 5-lobed near the apex, each lobe obtusely 4-toothed, the 2 central teeth larger. *Anthers* 2-seriate. *Stigma* subacute.—Cfr. *S. borneense*, *Miq. Ann. Mus. Bot. Lugd.-Bat.* iv. 33.

9. **AGLAIA**, *Lour.*

Trees or shrubs, glabrous lepidote or stellately pubescent. *Leaves* pinnate or trifoliolate; leaflets quite entire. *Flowers* polygamo-dicæious, minute or small, numerous, paniculate, subglobose. *Calyx* 5-lobed, imbricated in bud. *Petals* 5, concave, short, imbricated. *Staminal tube* urceolate or subglobose, 5-toothed at the apex or entire; anthers 5, included or half-exserted, erect. *Disk* inconspicuous. *Ovary* ovoid or shortly so, 1-3-celled, with 2-1 ovules in each cell; style very short. *Berry* dry, 1-2-celled and -seeded. *Seeds* with a fleshy integument.—DISTRIB. Species about 50, inhabiting China, the Malay islands and the islands of the Pacific ocean, as well as India.

Milnea? *racemosa*, *Roemer Synops.* i. 98 (*Nyalelia racemosa*, *Dennstedt Schlüss. Hort. Mal.* 23. *Nyalel*, *Reede Hort. Mal.* iv. t. 16), has, according to the figure, the structure of the stamens incompatible with the Order Meliaceæ.

SECT. I. *Shoots leaves and inflorescence* lepidote or glabrous.

* *Leaflets* 3-5, rarely 7.

† *Inflorescence* lax, pedicels slender, about equalling the flowers.

1. **A. odorata**, *Lour. Fl. Cochinch.* 173; glabrous or quickly becoming so, leaflets obovate or oblong obtuse shortly petiolulate terminal one longest, base cuneate, panicles rather lax, flowers on slender pedicels about as long as themselves, ovary hairy. *Wight Ic.* t. 511; *Miq. Ann. Mus. Lugd.-Bat.* iv. 48; *Wall. Cat.* 1275; *Adr. Juss. in Mem. Mus.* xix. t. 14, f. 7. *Camunium sinense*, *Rumph. Amb.* v. 28, t. 18, f. 1. *C. chinense*, *Roxb. Hort. Beng.* 18; *Fl. Ind.* i. 636. *Opilia odorata*, *Spr. Syst. Veg.* i. 766. *Murraya exotica*, *Reinw. ex Miq. l.c.* *A. pentaphylla*, *Kurz ex Miq. l.c.*

EASTERN PENINSULA; Malacca, Penang, and Sincapore; (CEYLON, cultiv.).—DISTRIB. Siam, Java, China.

An elegant shrub or small leafy tree; extremities of young shoots covered with stellate ferruginous scales. *Leaves* 2-6 in.; leaflets 1-3 by $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Flowers* yellow, fragrant, $\frac{1}{12}$ in. diam.—Often cultivated for its sweet-scented flowers.

†† *Inflorescence* dense; pedicels very short.

2. **A. khasiana**, *Hiern*; leaves narrowly elliptical obtusely narrowed towards both ends glabrescent on rather long petiolules, panicles short ferruginous, branches short patent, flowers sessile not minute.

KHASIA Mts.; alt. 4-5000 ft., *J. D. H. & T. T.*; (? Sikkim, Himalaya, *J. D. H.*).

Shoots and inflorescence lepidote. *Leaves* 6–12 in.; leaflets 4–8 by 1–2 in.; petioles $\frac{1}{2}$ –1 in. *Flowers* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. *Fruit*? glabrous, 1 in. diam.

3. **A. ? andamanica**, *Hiern*; leaflets 3–5 alternate or subopposite ovate-elliptic obtusely acuminate rounded or obtuse at the base sparsely lepidote, inflorescence shorter than the leaves, pedicels very short, fruit pale tawny lepidote somewhat pear-shaped. *Milnea* (sp.), *Kurz Andam. Rep.* p. iv.; Ed. 2, 33.

SOUTH ANDAMAN ISLANDS; in the Jungles between Port Mouat and Homfray's Ghât, not rare. Burmese name, Tau-ahnyeen, *Kurz*.

A tree, 30–40 ft. high; indumentum pallid. *Leaves* 10 in.; leaflets $3\frac{1}{2}$ –5 by 2 in.; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Fruit* $\frac{1}{2}$ – $\frac{3}{8}$ in. by $\frac{1}{2}$ – $\frac{3}{8}$ in.

4. **A. apiocarpa**, *Hiern*; leaflets 5–7 rather narrowly and unequally elliptic obtusely acuminate base cuneate, younger ones lepidote below glabrescent, inflorescence shorter than the leaves with short spreading branches and shortly pedicellate small flowers, fruit pyriform reddish-brown lepidote. *Milnea apiocarpa*, *Thw. Enum.* 60.

CEYLON; in the central provinces, alt. 3–6000 ft.

A small tree. *Leaves* 6–16 in.; leaflets 2–8 by $\frac{3}{4}$ –3 in.; petiolules $\frac{1}{2}$ – $\frac{3}{4}$ in.; indumentum reddish-brown. *Flowers* $\frac{1}{10}$ in. diam., about equalling the pedicels. *Fruit* $\frac{3}{4}$ – $\frac{7}{8}$ by $\frac{3}{8}$ – $\frac{1}{2}$ in.

5. **A. Roxburghiana**, *Miq. Ann. Mus. Lugd.-Bat.* iv. 41; leaflets 5 rarely 7 or 3 more or less elliptic obtuse glabrescent sometimes acuminate base usually cuneate shortly petiolulate, panicles rather supra-axillary pyramidal elongate, flowers shortly pedicellate, fruit subglobose ferruginous-lepidote. *Beddome Flor. Sylvat.* t. 130 (excl. synonym. *Thw.*); *Anal. Gen.* lv. *Milnea Roxburghiana*, *W. & A. Prodr.* i. 119; *Drury Ind. Fl.* i. 164; *Wight Ic.* t. 166 (*M. Roxburghii*). *A. lepidota*, *Miq. Fl. Ind.-Bat. Suppl.* 197, 507. *A. Spanoghei*, *Bl. ex Miq. Ann.* l.c. *Aglaia* (spe. Sangian), *Teyssm. et Binnend. Cat. Hort. Bogor.* 211. *Walsura*? lanceolata, *Wall. Cat.* 4886. *A. grata*, *Wall. ex Voigt Hort. Sub. Calc.* 136. *A. midnaporensis*, *Carey ex Voigt.* l.c. *Cfr. Aglaia*? sp., *Wall. Cat.* n. 9039; *Meliacea singapureana*, *Wall. Cat.* 4887. *Dimocarpus*, *Wall. Cat.* 5050.

WESTERN PENINSULA; from the Concan and Midnapore southwards; CEYLON, ascending to 6000 ft.; SINGAPORE, *Wallich*; (? Tenasserim and the Andaman Islds., *Heffer*; Burma, *Wallich*, and Malacca, *Griffith & Maingay*).—DISTRIB. Java, Sumatra, and other Malay Islands.

A large tree; indumentum ferruginous. *Leaves* 3–7 in.; leaflets $1\frac{1}{2}$ – $4\frac{1}{2}$ by $\frac{3}{8}$ –2 in.; petiolules $\frac{1}{10}$ – $\frac{1}{2}$ in. *Flowers* $\frac{1}{12}$ in. diam.; calyx dull yellow, often covered with stellate hairs; petals yellow. *Fruit* $\frac{3}{4}$ in. diam., edible, buff-coloured, very minutely pilose. *Radic*le minutely pilose.

** -Leaflets 7–9.

6. **A. glabriflora**, *Hiern*; shining, leaflets 7–9 subopposite or alternate elliptic acuminate base cuneate shortly petiolulate, panicles ample rather lax shorter than or about equalling the leaves, pedicels about equalling the glabrous flowers, staminal tube turbinate.

MALACCA; on Mt. Ophir, *Griffith, Maingay*.

Whole plant nearly glabrous. *Leaves* 6 in.; leaflets 2 by 1 in.; petiolules $\frac{1}{2}$ –1 in. *Pedicels* slender, $\frac{1}{12}$ – $\frac{1}{8}$ in. *Flowers* $\frac{1}{10}$ in. long or less. *Fruit* size of cherries, white, subglobose.

7. **A. Wallichii**, *Hiern*; young parts sparsely lepidote, leaflets 7–9 opposite or subopposite narrowly elliptic or lanceolate-oblong acuminate

base obtuse margins slightly undulated, petiolules short much branched, panicles rather supra-axillary shorter than or about equalling the leaves, pedicels rather slender about equalling the flowers, calyx lepidote shortly ciliate, corolla glabrous, staminal tube urceolate. *Sapindus lepidotus*, *Wall. Cat.* 8036.

SILHET, *Wallich, Griffith.*

Leaves 5-8 in.; leaflets $1\frac{1}{2}$ -1 by $\frac{1}{2}$ - $1\frac{1}{2}$ in.; petiolules $\frac{3}{8}$ - $\frac{1}{2}$ in. *Inflorescence* 3-5 in. long; flowers $\frac{1}{8}$ in. diam.

*** *Leaflets* 9-13 or more.

8. **A. perviridis**, *Hiern*; leaflets 11-13 opposite oblong acuminate glabrous shining base obtuse shortly petiolulate, panicles pyramidal elongated many-flowered lepidote, flowers very small, staminal tube subglobose.

KHASIA Mts., *Griffith, J. D. H. & T. T.*, alt. 2000 ft. (*Milnea*, No. 8).

A tree of 40 ft.; leaves and buds deep green. *Leaves* about 1 ft.; leaflets 2-5 by $\frac{3}{4}$ - $1\frac{1}{2}$ in.; petiolule $\frac{1}{2}$ - $\frac{3}{4}$ in. *Panicles* nearly as long as the leaves; flower-buds minute, nearly glabrous.—Specimens from Sikkim, collected by Dr. Hooker, probably belong to this species; they have leaves 1- $1\frac{3}{4}$ ft., leaflets 3-8 by 1- $2\frac{1}{4}$ in., fruiting panicles 4-9 in. long, fruits ellipsoidal about 1 in. long, seeds nearly as long.

9. **A. crassinervia**, *Kurz in litt. ad Hook. f.*; leaflets 9 or more, opposite or subopposite oblong obtuse at both ends with minute scales beneath shortly petiolulate, petioles angular, panicles supra-axillary pyramidal elongated many-flowered lepidote-ferruginous, flowers minute.

TENASSERIM, *Helper.*

Leaves 18 in. or more; leaflets 6-10 by 2- $2\frac{3}{4}$ in.; lateral veins about 20 on each side of midrib with which they make a large angle; petiolule $\frac{1}{2}$ in., terminal one $\frac{1}{2}$ - $\frac{3}{4}$ in. *Panicles* 10-15 in. or more long.

SECT. II. *Shoots leaves and inflorescence stellate-pubescent or tomentose.*

* *Flowers shortly pedicelled.*

10. **A. edulis**, *A. Gray in Bot. U. S. Explor. Exped.* i. 237; leaflets 9-13 opposite or subopposite elliptic or oblong obtuse or acuminate shortly petiolulate subglabrescent or scattered beneath as well as the shoots inflorescence and fruit with ferruginous scales mixed sometimes with stellate hairs, panicles pyramidal shorter than the leaves, flowers shortly pedicellate, fruit subglobose edible. *Miq. Ann. Mus. Lugd.-Bat.* iv. 49. *Milnea edulis*, *Roxb. Hort. Beng.* 18; *Fl. Ind.* i. 637; *Drury Ind. Fl.* i. 164; *Wall. Cat.* 1279. *Camunium bengalense*, *Hb. Ham. ex Wall. Lc.* *Cfr.* *Cupania* (sp.) *Wall. Cat.* 8067, letter B not A.

EASTERN BENGAL; Silhet, *Wallich, J. D. H. & T. T.* (*Milnea*, sp. 17); (? Assam *Simon*).—DISTRIB. Borneo, Fiji Islds.

A tree of middling size. *Leaves* $\frac{3}{4}$ -2 ft.; leaflets 2-9 by 1-3 in.; petiolule $\frac{1}{2}$ - $\frac{1}{2}$ in. *Flowers* small. *Fruit* more than 1 in. diam. according to Roxburgh; succulent integument of the seed eaten.—*A. sexipetala*, *Griff. Notul.* iv. 505, sometimes with 6 petals and with rather fleshy leaflets, appears to belong to this species. The authentic specimen in Herb. Kew. has leaves with 8-9 leaflets, not trifoliolate as given in Griffith's description.

11. **A. tenuicaulis**, *Hiern*; indumentum rufous-stellate, leaflets 9 or more alternate shortly acuminate rounded or somewhat cuneate and sometimes minutely peltate at the base shortly petiolulate, flowers small

shortly pedicellate arranged in ample many-flowered pyramidal panicles shorter than the leaves, fruits in short panicles ellipsoidal.

PENANG? top of the hill, *Maingay*. (? Sincapore, *Lobb*.)

A tree of 8 ft. with slender stem. *Leaves* 3 ft. or more; leaflets glaucescent above, 6-11 by 3-4 in.; petiolule $\frac{3}{4}$ -1 in. *Inflorescence* 6-12 in. long. *Fruit* $\frac{1}{2}$ in. long.

Specimens from Sincapore, collected by Lobb, with ovate-oblong leaves and short dense young panicles, probably belongs to this species.—*Maingay*'s specimens are marked as "from top of hill" simply, Penang being probably intended.

12. **A. minutiflora**, *Bedd. Ic. Pl. Ind. Or.* i. 44, t. 193; pubescence ferruginous- or rufous-stellate, leaflets 7-15 opposite or subopposite narrowly elliptic or oblong-lanceolate acuminate, base subcordate rounded or subcuneate, panicles divaricately branched many-flowered, flowers shortly pedicelled, fruit subglobose 1-2-seeded. *A. polyantha*, *Bedd. l.c.* *Euphora exstipulatis*, *Griff. Notul.* iv. 547.

A handsome slender tree of 25 or 40 ft. with hard wood. *Leaves* 6-24 in. or more; leaflets 2-7 by $\frac{3}{4}$ -2 $\frac{1}{4}$ in., stellate-hairy beneath, glabrescent above except midrib. *Panicles* half to all the length of the leaves. *Fruit* $\frac{3}{4}$ -1 by $\frac{1}{2}$ - $\frac{3}{4}$ in.

There are two forms, possibly distinct species.

a. travancorica; leaflets usually subcordate, flowers $\frac{1}{8}$ in. thick, corolla subglabrescent.—*Courtallum, Wight*; Travancor, Western Ghats, alt. 2-3500 ft., *Beddome*.

β. Griffithii; leaflets subcuneate or rounded at the base sometimes with pellucid dots, flowers minute, "cotyledons amygdaloid superposed, radicle imbedded between the cotyledons its apex perpendicular to the ventral face of the seed its opposite pole delicately pilose" (*Maingay mss.*).—Tenasserim and Malacca, *Griffith, Maingay*.

** *Flowers clustered in small spikes.*

13. **A. cordata**, *Hiern*; pubescence rufous-stellate, leaflets subsessile 7 elliptic opposite finely acuminate, base more or less cordate, flowers small sessile in little spike-like clusters arranged on a pyramidal panicle nearly equalling or shorter than the leaves.

MALACCA, *Maingay*.

Leaves 12-18 in.; leaflets 4-8 by 2-3 $\frac{1}{2}$ in. *Panicles* 5-10 in. long or more.

FORM 1. *Calyx* glabrous.

FORM 2. *Calyx* hirsute.

14. **A. palembanica**, *Miq. Fl. Ind. Bat. Suppl.* i. 507; *Ann. Mus. Lugd.-Bat.* iv. 52; pubescence rufous-stellate, leaflets 11-13 opposite or subopposite elliptic acuminate somewhat cuneate at the base shortly petiolulate, flowers small sessile in little spike-like clusters arranged on a pyramidal panicle rather shorter than the leaves, fruit depresso-globose. *A. Sippannas*, *Miq. l.c.* 506. *A. tomentosa*, *Teysm. & Binn. in Nat. Tijdschr. Ned. Ind.* xxvii. 43.

MALACCA, *Griffith, Maingay*.—DISTRIB. Sumatra and S. Borneo.

Leaves 6-12 in.; leaflets 2-4 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., minutely pellucid-punctate (*Maingay*); petiolule $\frac{1}{2}$ - $\frac{3}{4}$ in. *Panicles* 4 $\frac{1}{2}$ -9 in. long.

10. **LANSIUM**, Rumph.

Trees, glabrous or pubescent. *Leaves* odd-pinnate with quite entire alternate or opposite shortly petiolulate leaflets. *Flowers* polygamodicecious, 5-merous, axillary, male usually paniculate, the female spicate-racemose. *Sepals* rounded, imbricated. *Petals* rounded, connivent, imbricated.

cated. *Staminal tube* globose, crenulated; anthers 10, obtuse, usually in two rows, the shorter ones included, the longer partly exerted sometimes apiculate. *Disk* obsolete. *Ovary* globose, 3-5-celled; cells 1-2-ovuled; style very short, thick, stigma truncate 3-5-lobed. *Fruit* baccate, edible, 1-5-celled; cells 1-2-seeded. *Seeds* oblong, with ventral hile, invested in a pulpy aril, exalbuminous.—**DISTRIB.** A genus of scarcely more than the following 4 species, confined to India and the Malay Archipelago.

The juicy envelope of the seeds is the part eaten, and the taste is cooling and pleasant.

* *Leaflets* 3-5.

1. **L. anamalayanum**, *Beddome in Trans. Linn. Soc.* xxv. 212; *l.c. Pl. Ind. Or.* 104; *Fl. Sylvat.* t. 131; leaflets alternate elliptic obtusely acuminate base cuneate glabrous except occasionally hairy glands in axils of veins beneath, sepals shortly ciliate, ovary strigose 3-lobed and -celled, cells 2-ovuled, fruit oblong, radicle pubescent.

WESTERN PENINSULA; common in the moist woods on the Anamallay hills, and in the Wynaad, alt. about 2000 ft., *Beddome*.

A good-sized tree. *Leaves* 6-9 in.; leaflets 3-4½ by 1½-2 in.; petiolule ½-¾ in. *Hermaphrodite flowers* sessile, about ½ in. diam. *Fruit* as big as a large grape.

2. **L. pedicellatum**, *Hiern*; leaflets 3-5 alternate or subopposite elliptic acuminate glabrous base oblique obtuse or cuneate, ♀ racemes short simple or branched at the base, flowers pedicelled, ovary shortly tomentose 4-celled.

MALACCA, Maingay.

Shoots pale brown, obsoletely lepidote. *Leaves* 9-12 in.; leaflets 3-6 by 1½-3 in. petiolule ¾-1 in. long. ♀ *Inflorescence* 1-2 in. long; pedicels ½-¾ in. long. *Young fruit* subglobose, fleshy, shortly tomentose, ½ in. diam.

3. **L. cinereum**, *Hiern*; leaflets 3-5 opposite elliptic obtusely acuminate base cuneate coriaceous glabrous shining except the veins, sepals short, ovary hairy 5-celled, cells 1-ovuled.

MALACCA, Maingay.

Branches cinereous, tawny-pubescent at the extremities. *Leaves* 3-5 in.; leaflets pallid, 2-3½ by ¾-1½ in.; petiolule ½-¾ in. *Hermaphrodite spikes* nearly equalling the leaves. *Longer anthers* apiculate.

** *Leaflets* 6-8.

4. **L. domesticum**, *Jack in Trans. Linn. Soc.* xiv. 115, t. iv. f. 1, *var.*; leaflets alternate elliptic oblong or obovate abruptly shortly and obtusely acuminate more or less narrowed at the base reticulate coriaceous shining nearly or quite glabrous, petiolules tumid at the base, hermaphrodite spikes springing from the trunk and naked branches solitary or fasciculate pubescent shorter than the leaves, ovary tomentose 5-celled, cells 1-2-ovuled. *Correa de Serra in Ann. Mus.* x. 157, t. 7, f. 1.

MALACCA, Griffith (Maingay, cult.).—**DISTRIB.** Widely cultivated in India, and perhaps spontaneous in the Malay Archipelago. Philippine Islands, according to Blanco.

A tree. *Leaves* 9-18 in. long; leaflets 4-8 by 2-4 in.; petiolules ¼-½ in. *Flowers* sessile or subsessile. *Fruit* 1-1½ in. long, yellowish, turbinate-ellipsoidal.—According to Griffith the spikes are proliferous at the apex.

L. javanicum, *Roemer Synops. Monogr.* i. 99; *Aglaia Dookkoo*, *Griff. Notul.* iv. 505; *L. aqueum*, *Miq. in Ann. Mus. Lugd.-Bat.* iv. 34; and *L. humile*, *Hassk. Retz. ed.*

nov. i. 121, are probably also varieties of this cultivated species. *L. silvestre*, Roemer, l.c. according to Miquel, l.c. scarcely belongs to Meliaceæ; the plant intended by this name has been referred by De Candolle to *Cookia punctata*, Retz.

11. AMOORA, Roxb.

Trees. *Leaves* usually unequally-pinnate; leaflets oblique quite entire axillary subdioecious, paniculate; female spicate or racemose. *Calyx* 3-5-partite or -fid. *Petals* 3-5, thick, concave, imbricated, rarely slightly combined at the base. *Staminal tube* subglobose or campanulate, inconspicuously 6-10-crenate; anthers 6-10, included. *Disk* obsolete. *Ovary* sessile, short, 3-5-celled; cells 1-2-ovuled; stigma sessile, or style elongated in *A. Championii*. *Capsule* subglobose, coriaceous, 3-4-celled and -seeded, loculicidally 3-5-valved. *Seeds* in a fleshy aril, with ventral hile.—**DISTRIB.** A genus of about 15 species occurring only in India and the Malay Archipelago, and also 1 endemic species in Australia.

SECT. I. *Style* short; *staminal tube* subglobose or turbinate.

* *Panicles* spicate, male branched, female simple or branched; *flowers* sessile. *Staminal tube* 6-toothed; *anthers* 6.

1. **A. Rohituka**, W. & A. *Prodr.* i. 119; young parts tawny closely pubescent in most cases quickly glabrescent leafy, leaflets 9-15 more or less elliptic or ovate acuminate opposite base usually obtuse shortly petiolulate, flowers white bracteate subsessile, male spikes panicled, female simple, calyx 5-partite, petals 3, anthers 6, ovary 3-celled with 2 superposed ovules in each cell. *Bedd. Fl. Sylvat.* t. 132 (but pedicels $\frac{1}{6}$ - $\frac{1}{4}$ in. long); *Brandis For. Fl.* 69. *Andersonia Rohituka*, Roxb. *Hort. Beng.* 87; *Fl. Ind.* ii. 213; *Roxb. Drawings in Hb. Kew.* tt. 934, 1827. *Sphærosacme polystachya*, Wall. *Cat.* 1277. *Aglaia*? *polystachya*, Wall. in *Roxb. Fl. Ind. ed. Carey*, ii. 429. *S. spicata*, Wall. *Cat.* 4895. *Buchanania spicata* *Hb. Roxb. ex Wall.* l.c. *Meliacea Wightiana*, Wall. *Cat.* 4888. *Amoora macrophylla*, Nimmo in *Grav. Cat. Bomb. Pl.* 31. *Andersonia Rohitoca*, Griff. *Notul.* iv. 507; *l.c. Pl. Asiat.* iv. t. 589, f. 3.

ASSAM, SILHET, CACHAR, OUDH, WESTERN PENINSULA from Concan to Travancore, TENASSERIM and the ANDAMAN ISLANDS, MALACCA, CEYLON.—**DISTRIB.** Malay Archipelago, Philippine Islds.

An evergreen tree with a large crown of branches. *Leaves* 1-3 ft.; leaflets 3-9 by $1\frac{1}{2}$ -4 in. *Male panicles* equalling or shorter than the leaves, female about half the length of the leaves; male flowers $\frac{1}{2}$, female $\frac{1}{4}$ in. long. *Stigma* trigonous, angles opposite the calyx-lobes. *Fruit* smooth, pale yellow or reddish, 1-1 $\frac{1}{2}$ in. diam., scarcely attenuate at the base, rather soft and fleshy, 3-celled, 3-valved.—The seeds supply an economic oil.—Col. Beddome, in his *Flora Sylvatica*, t. 132, figures and describes under this name a form from the Anamallay hills with shortly pedicelled flowers, the pedicels measuring $\frac{1}{2}$ - $\frac{3}{4}$ in. long. A plant gathered by Dr. Hooker in the Sikkim Terai and Kursiong with very large leaves, the leaflets measuring 12-15 by 3-6 in., may belong to this species.

** *Flowers* panicled, not spicate.

† *Petals* 3. *Anthers* 6-10.

‡ *Leaflets* 3-6, alternate or subalternate.

2. **A. chittagonga**, Hiern; young parts calyx and fruit lepidote, leaflets 3-6 alternate and subalternate narrowly elliptic acuminate sub-

glabrescent, base more or less narrowed, panicles racemose rather lax much shorter than the leaves, calyx cup-shaped 3-toothed, petals 3, anthers 6, ovary 2-celled, fruit obovoid. *Aglaia chittagonga*, *Miq. in Ann. Mus. Lugd.-Bat.* iv. 44.—*Meliacea*, *Griff. Itin. Notes* 168.

BHUTAN and UPPER ASSAM, *Griffith*; the KHASIA MTS., CHITTAGONG, *J. D. R. & T. T. (Milnea, No. 13)*; *PEOU*, *Kurz*.

A tree. *Leaves* 6-12 in.; leaflets 3-8 by 1-3 in.; petiolule $\frac{1}{2}$ - $\frac{1}{2}$ in. *Flowers* $\frac{1}{10}$ - $\frac{1}{8}$ in. long, pedicelled. *Fruit* (immature?) $\frac{3}{4}$ in. long, longitudinally ridged, 2-celled.

3. ***A. canarana***, *Benth. & Hook. f. Gen. Pl.* i. 335; young parts inflorescence calyx and fruit lepidote, leaflets 4-6 alternate or subalternate narrowly elliptic acuminate glabrate above usually punctate-lepidote beneath, base more or less narrowed shortly petiolulate, panicles pyramidal much branched shorter than the leaves, flowers shortly pedicelled, calyx 4-5-toothed cup-shaped ebracteate, corolla 3-(-4)-partite, staminal tube truncate, anthers 6 (-7) included or slightly exserted, ovary 3-celled, cells 2-ovuled, fruit obovoid. *Oraoma canarana*, *Turcz. in Bull. Soc. Nat. Mosc.* 1858, i. 411.

WESTERN PENINSULA, from Canara, *Stocks*, to the Anamallay hills, *Beddome*.

Leaves 6-14 in.; leaflets 3-6 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in.; petiolule $\frac{1}{2}$ - $\frac{2}{3}$ in. *Fruit* (immature?) $\frac{2}{3}$ in. long.

†† *Leaflets* 3-13 opposite or subopposite.

4. ***A. cucullata***, *Roxb. Cor. Pl.* iii. 54, t. 258; subglabrous, leaflets 3-13 opposite or subopposite obliquely ovate-oblong obtuse at both ends glabrous shining firm terminal one often hooded at the apex, male panicles drooping about as long as the leaves with numerous diverging branches sparingly lepidote, female racemes few-flowered, calyx 3-lobed, petals 3, anthers 6 (-8), ovary 3-celled, cells 2-ovuled, fruit subglobose 3-lobed 3-celled 3-valved. *Dalz. & Gibs. Bomb. Fl.* 37; *Drury Ind. Fl.* i. 164. *Andersonia cucullata*, *Roxb. Hort. Beng.* 87; *Fl. Ind.* ii. 212. *Sphærosacme Rohituka*, *Wall. Cat.* 1278, excl. syn. *S. ? laxa*, *Wall. Cat.* 4894. *S. paniculata*, *Wall. Herb. ex Miq. Ann. Mus. Lugd.-Bat.* iv. 37. ? *Amoora auri-culata*, *Miq. fide Miq. l.c.*

LOWER BENGAL, in the Sunderbunds, and in NIPAL, *Wallich*; King's Island in the ANDAMANS, *Helfer*.

A tree of considerable size and slow growth with cinereous bark and smooth branches. *Leaves* 6-16 in.; leaflets 3-7 $\frac{1}{2}$ by $1\frac{1}{2}$ - $2\frac{1}{2}$ in.; petiolule $\frac{1}{2}$ - $\frac{3}{4}$ in. or terminal one longer. MALE fl. $\frac{1}{2}$ in. yellow. *Bracts* caducous, 2 at the base of the calyx. *Staminal tube* turbinate or subglobose. *Capsule* $2\frac{1}{2}$ in. diam. *Seeds* three-quarters covered with a fleshy bright orange-coloured aril.

5. ***A. lanceolata***, *Hiern*; subglabrous, leaflets about 17 opposite or subopposite approximated lanceolate obtusely acuminate glabrous shining, base obtuse lateral veins inconspicuous, male panicles nearly equalling the leaves, flowers 3-merous shortly pedicelled, calyx trifid, anthers 6 just included, ovary in the male flowers rudimentary.

MALACCA, *Maingay*.

Shoots angular at the apex, leafy and with numerous axillary panicles. *Leaves* 6-10 in.; leaflets 2-3 by $\frac{1}{2}$ - $\frac{3}{4}$ in.; petiolule $\frac{1}{2}$ - $\frac{1}{2}$ in. *Flowers* very small. *Staminal tube* globosely cup-shaped, 6-lobed; lobes ovate, obtuse, minutely apiculate. *Antheras* minutely and very sparingly pilose. *Stigmas* 3, sessile, linear-trigonous, glabrous.

6. **A. rubiginosa**, *Griff. mss. under Aphanamixis*; ferruginous on young parts calyx lower surface of leaves &c., leaflets numerous approximated subopposite ovate-oblong acuminate very shortly petiolulate somewhat farinaceous base conduplicate deeply cordate, lateral nerves numerous subparallel spreading, panicles pyramidal base bulbous, flowers racemose trimerous, calyx comparulate trifid. anthers 6, ovary 3-celled, cells 2-ovuled.

MALACCA; *Griffith, Maingay*.

A big tree, large in all its parts. *Petioles* thickened at base; *leaflets* 3-9 by 1-2½ in. or larger. *Panicles* 9-18 in. long; flowers ¼ in. long, calyx ½ in. long, petals orange-yellow, aperture of the staminal tube very small. *Ovules* superposed.

†† Petals 3. Anthers 8 or 10.

7. **A. spectabilis**, *Miq. Ann. Mus. Bot. Lugd.-Bat. iv. 37*; leaflets 11-13 opposite or subopposite oblong acutely subacuminate glabrescent shining glaucescent beneath petiolulate base obtuse, male panicles pedunculate with alternate unequal branches, calyx stellate-puberulent obtusely 3-lobed short, petals 3 imbricated substellate-velutinous along the back, staminal tube urceolate glabrous shortly and obtusely 8-dentate, anthers 8 (-9?) sublinear acute subexserted at the apex, fruit obovoid-pyriform. *Aglaia spectabilis*, *Hort. Calcutt. ex Miq. Lc*

RANGOON, *McClelland*.

Indumentum of young parts lepidote and mixed with stellate tawny hairs. *Leaves* 15 in. long; petioles angular; leaflets 4-8 by 1½-2 in.; petiolules ¼-½ in. *Male panicles* nearly 1½ ft. long, female short. *Fruit* 1½-1¾ by 1-1½ in.

The description of the flowers is taken from Miquel, that of the fruit is given from a specimen in Hb. Kew. Mr. Kurz, in *Journ. Asiat. Soc. Beng. xxxix. ii. 72* (1870), declares that the species as described by Miquel is identical with the male plant of *A. cucullata*, *Roxb.* *Sphærosacme spectabilis*, *Wall. ex Voigt Hort. Suburb. Calcutt. 136*, from Nepal, may be a synonym.

8. **A. rubescens**, *Hiern*; leaflets 13-15 opposite oblong subacuminate or obtuse glabrate base obtuse, panicles supra-axillary divaricately branched crowded near the ends of the branches, pedicels short, petals 3, staminal tube subglobose crenulate, anthers 10 linear, stigma conical sulcate.

SINGAPORE, *Maingay*.

Young parts and inflorescence puberulent. *Leaves* 1½-2½ ft. long; leaflets 3-7 by 1½-2½ in., lateral nerves about 10 on each side of midrib, depressed beneath; petiolules ⅔-¾ in. *Panicles* ½-1 ft. long, many-flowered; flowers ⅙ in. diam. *Calyx* short, irregularly toothed. *Petals* and *staminal tube* glabrous. *Disk* annular. *Ovary* hairy, 5?-celled.

††† Petals 4. Anthers 8.

9. **A. Lawii**, *Benth. & Hook. f. Gen. Pl. i. 335*; pallid, young parts panicles calyces and fruit lepidote, leaflets 3-5 alternate or subopposite more or less elliptic obtusely acuminate nearly or quite glabrous base more or less narrowed, panicles pyramidal falling short of the leaves, flowers racemose, calyx short truncate 4-toothed, petals 4, anthers 8 rarely 7, ovary 3-celled cells 1-ovuled, fruit 3-valved pear-shaped. *Bedd. Fl. Sylv. t. 133*. *Epicharis exarillata*, *Nimmo in Grah. Cat. Bomb. Pl. 31*. *Nimmonia Lawii*, *Wight in Calc. Journ. Nat. Hist. vii. 13*. *Nemedra Nimmonii*, *Dalz. in Dalz. & Gibs. Bomb. Fl. 37*.

WESTERN PENINSULA, from the Concan to Malabar.

A middling-sized tree; scales yellowish brown. *Leaves* 6-9 in. long; leaflets 3-5 by $1\frac{1}{2}$ -2 in., axils of lateral veins sometimes with hairy gland-like excrescences (galls?), petiolules $\frac{1}{2}$ - $\frac{1}{4}$ in. *Flowers* $\frac{1}{5}$ - $\frac{1}{4}$ in. long, white, rarely 5-merous. *Fruit* 1 in. long, abounding in white resinous juice.

+++ Petals 5. Anthers 10.

10. **A. Maingayi**, *Hiern*; subglabrous, leaflets 3-4 elliptic obtusely acuminate glabrous shining above alternate or subopposite base more or less narrowed shortly petiolulate, panicles shorter than the leaves, flowers pentamerous, calyx short cleft, anthers 10 included, ovary minutely hirsute 3-celled, stigmas 3 connate sessile.

MALACCA, *Maingay*.

Leaves numerous, 4-6 in. long; leaflets very minutely pellucid-punctate, 3-4 $\frac{1}{2}$ by $1\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in. long; petals slightly adherent at their base to the staminal tube.

11. **A. decandra**, *Hiern*; leaflets 7-13 opposite oblong acuminate base somewhat cuneate or nearly rounded subglabrescent, opposite submembranous, sepals very short, anthers 10, ovary (3-) 5-celled cells 1-ovuled, fruit globose-obovoid 5-furrowed umbilicate 5-celled and-seeded. *Aglaia?* *decandra*, *Wall. in Roxb. Fl. Ind. Ed. Carey*, ii. 427. *Sphærosacme fragrans*, *Wall. l.c.* 429; *Voigt Hort. Suburb. Calcutt.* 135. *Lansium* (sp.) *W. & A. Prodr.* i. 119; *Benth. & Hook. f. Gen. Pl.* i. 334. *S. decandra*, *Wall. Cat.* 1276.

NIPAL, *Wallich*; Sikkim, alt. 2-4000 ft., *Hb. Griffith, J.D.H.*; MALAYAN PENINSULA, *Maingay*.

A large spreading tree with thick trunk. *Leaves* about 1 ft. long; leaflets $1\frac{1}{2}$ -8 by $\frac{1}{2}$ -2 in.; petiolules short. *Male panicles* equalling the leaves; flowers very fragrant, on slender pedicels. *Petals* 5. *Fruit* about $1\frac{1}{2}$ in. diameter, capsular.

SECT. II. *Style* long.

12. **A. ? Championii**, *Benth. & Hook. f. Gen. Pl.* i. 335; leaflets 4-6 abruptly pinnate opposite obovate-cuneate glabrous and shining subcoriaceous without prominent nerves shortly petiolulate apex rounded, panicles supra-axillary slightly puberulent about half the length of the leaves, flowers pedicelled tetramerous oblong, calyx short, petals oblong very slightly or scarcely imbricated in bud at length spreading or reflexed, apex obtusely pointed, staminal tube widely tubular obtusely dentate bearing inside near apex 8 equal short 2-celled anthers in one row, ovary glabrous 4-celled cells 1- (or 2- cf. fig. in *Hb. Kew.*) ovuled, style columnar, nearly as long as the staminal tube, stigma capitate, disk 0, fruit globose-pyriform 1-2-seeded, seeds exalbuminous with aril. *Thwaites Enum.* 409; *Bedd. Anal. Gen.* lv. *Dysoxylon Championii*, *Hook. f. & Thoms. ex Thwaites*, 61.

CEYLON; Central province, up to 4000 ft. alt., *Thwaites*.

A large tree, with leaves 4-7 in. long; leaflets 2-4 by $\frac{1}{2}$ - $1\frac{1}{2}$ in.; petiolules $\frac{1}{2}$ - $\frac{3}{4}$ in. *Flowers* yellowish, $\frac{1}{4}$ in. long. *Fruit* 1 in. long.—Differs from the type of *Amoora* by the elongated style and by abruptly pinnate leaves. Perhaps a new genus. Mr. Kurz (in *Journ. Asiatic Soc. Beng.* xxxix. ii. 72, 1870) declares it to be a species closely allied to *Carapa* (*Xylocarpus*) *carnosula*, *Zoll.*

12. **WALSURA**, Roxb.

Trees. *Leaves* 1-5-foliate; leaflets opposite, quite entire, pale beneath. *Panicles* axillary and terminal; flowers small hermaphrodite. *Calyx* short, 5-fid or -partite, imbricated. *Petals* 5, ovate-oblong, spreading, slightly imbricated or subvalvate. *Filaments* 10 or 8, linear or subulate, free or connate in a tube; anthers terminal or inserted in the notch at the apex of the filament. *Disk* usually annular, fleshy. *Ovary* short, 2-3-celled, imbedded in the disk, style rather short; stigma turbinate-capitate, 2-3-dentate; ovules 2 in each cell. *Fruit* baccate, shortly tomentose, indehiscent, 1- rarely 2-celled and -seeded; seed inclosed in a fleshy aril, exalbuminous.—**DISTRIB.** Genus of about 10 species limited to India and the Indian Archipelago. Occasionally, according to Kurz, the petals are increased to 8 and the stamens to 15.

Imperfect specimens from Silhet (*Wallich*, n. 8113), with short spicate inflorescence and with trifoliate leaflets, the terminal one on a long petiolute, appear to differ from the known species of the genus. *W. trichostemon*, *Miq. in Ann. Mus. Bot. Lugd.-Bat.* iv. 60, from Siam, is said to differ from the undermentioned by its pilose anthers; Mr. Kurz in *Journ. Asiat. Soc. Beng.* xxxix. ii. 72 (1870) unites it with *W. villosa*, *Wall.*

SECT. I. *Euwalsura*. *Filaments* linear.

* *Leaflets* solitary.

1. **W. Gardneri**, *Thwaites Enum.* 61; leaflet solitary elliptic-oblong obtusely acuminate glabrous whitish beneath, base obtusely narrowed, petiolute short articulated to the longer petiole, filaments free hairy apex bifid, anthers between the teeth of the filaments, fruit obovoid ellipsoidal apiculate base narrow. *Bedd. Anal. Gen.* lvi.

CEYLON; in the Central province, alt. 2-4000 ft.

A small tree of 10-12 ft. *Leaflets* 3-6 by $1\frac{1}{2}$ - $2\frac{1}{4}$ in.; petiolute $\frac{1}{2}$ - $\frac{1}{4}$ in. *Petiole* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Petals* somewhat imbricated. *Fruit* 1 in. long, covered with a short tomentum.

** *Leaflets* 3-5.

† *Filaments* connate half way or more.

2. **W. tubulata**, *Hiern*; leaflets 3 ovate- or elliptic-oblong obtusely acuminate shining above glaucous beneath quite glabrous, base somewhat narrowed, panicles scarcely equalling the leaves, calyx partite, staminal tube glabrous outside thinly pubescent inside equally 10-lobed at apex, lobes bifid receiving the apiculate anthers within the notches.

SIKKIM HIMALAYA and KHASIA Mts., *Herb. Griffith.*

Shoots and *petioles* rough with lenticular specks. *Leaves* 8-15 in.; leaflets 3-9 by $1\frac{1}{2}$ -3 in.; petiolules $\frac{1}{4}$ - $\frac{1}{2}$ in., or the terminal ones longer. *Flowers* $\frac{1}{2}$ in. long.

3. **W. ternata**, *Roxb. Hort. Beng.* 90; *Fl. Ind.* ii. 389; leaflets 3 lanceolate-oblong or oblong obtuse glabrous and shining whitish beneath obtuse at base, axillary panicles shorter than the leaves, flowers milk-white, calyx partite, staminal tube thinly pubescent on both sides 10-fid halfway, free portion of filament alternately notched and shorter, anthers apiculate. *Bedd. Anal. Gen.* lvi. Cfr. *Xylocarpus?* *Antila*, *Hb. Ham.*; *Wall. Cat.* 4893.

The PANJAB, at Sheikpura; WESTERN PENINSULA; in the Godavery forests and in the hilly districts of the Northern division of the Madras Presidency, *Beddome*.

A small tree, subglabrous. *Leaves* about 8 in.; leaflets 4-5 by 1 in.; petiolules $\frac{3}{8}$ – $\frac{3}{4}$. *Panicles* puberulent; flowers $\frac{1}{2}$ in. long. "Disk salver-shaped with a large high callous margin. *Berry* narrow oblong." *Beddome*.

†† Filaments connate one third way or less.

‡ *Leaflets usually 3 only*.

4. **W. piscidia**, *Roxb. Hort. Beng.* 32; *Fl. Ind.* ii. 387; leaflets subternate elliptic obtuse often retuse glabrous shining pale beneath, flowers pentamerous, petals imbricated, staminal tube half the length of the petals equally 10-cleft for two thirds of its length divisions all bifid at apex hairy above, ovary 2- rarely 3-celled, fruit covered with a short tomentum. *Wight Ill.* i. t. 55; *Beddome Anal. Gen.* lvi. t. 8, f. 6; *Wall. Cat.* 1265; *Dalz. & Gibs. Bomb. Fl.* 37. *Heynea trifoliata*, *A. Juss. in Mém. Mus.* xix. 235. *Trichilia coriacea*, [*Rottl. l.*]; *Wall. Cat.* 1265. *Trichilia trifoliata*, *Wall. Cat.* 8093.

WESTERN PENINSULA; Malabar and Travancor. CEYLON, *Walker*.

Leaves 2-7 in.; leaflets 1-4 by $\frac{3}{8}$ – $1\frac{3}{8}$ in.; petiolules $\frac{1}{16}$ – $\frac{1}{8}$ in., terminal one longer. *Flowers* $\frac{1}{2}$ in. long, sordid-yellowish; bracts minute, caducous: *Fruit* egg shaped, $\frac{3}{8}$ in. long.—The bark acts as a fish poison.

†† *Leaflets 5*.

5. **W. villosa**, *Wall. Cat.* 1264; young parts tawny-velutinous, leaflets 5 elliptic or ovate obtuse sometimes shortly acuminate glabrescent whitish beneath, at least when young, panicles equalling or shorter than the leaves, calyx partite, filaments equal thinly pubescent narrowing upwards but not subulate connate one third way from base, anthers terminal. *Wight & Arn. Prodr.* i. 120. *Trichilia? villosa*, *Wall. l.c.*

TENASSERIM, at Moulmein, *Wallich, Griffith*.

Leaves 6-10 in.; leaflets 2-4 by $\frac{3}{4}$ –2 in., petiolules $\frac{1}{4}$ –2 in. or the terminal ones longer. *Flowers* velutinous.—*Schmidelia* (sp.), *Wall. Cat.* 8056, also from Moulmein with narrowly ellipsoidal acuminate shortly tomentose fruit scarcely 1 in. long, probably belongs to this species.

6. **W. hypoleuca**, *Kurz Rep. Veg. Andam. ed.* ii. 33; *in Journ. Asiat. Soc. Beng.* xli. ii. 1872, 296; leaflets 5 elliptic to oblong-lanceolate acuminate quite glabrous chartaceous glaucous beneath smooth, panicles puberulent shorter than the leaves, calyx partite, filaments linear densely pubescent on both sides not subulate free except base equal, ovary densely tawny-tomentose, berries (immature) hoary-velutinous oblong acuminate. *W. sp. Kurz Rep. Veg. Andam. ed.* i. p. iv.

SOUTH ANDAMAN ISLAND; in the Jungles especially of the interior, common, *Kurz*.

Leaves 9-16 in.; leaflets 4-6 by $1\frac{1}{2}$ –3 in.; petiolules $\frac{1}{2}$ –1 in., terminal ones longer. *Flowers* $\frac{1}{2}$ in. long, white. *Petals* 5, occasionally 8. *Stamens* 10, sometimes as many as 15. *Fruit* (young) $\frac{1}{2}$ in. long.—I have followed Mr. Kurz; but perhaps the flowering and fruiting specimens belong to different species.

7. **W. neurodes**, *Hiern*; leaflets 5 elliptic shortly acuminate shining above strongly nerved beneath glabrous base obtuse, panicles equalling or exceeding the leaves puberulent, filaments linear equal densely pubescent base connate, anthers subterminal, fruit 1-2-celled, aril-thin.

MALACCA, *Griffith, Maingay*.

Leaves 4-12 in., leaflets 2-6 by 1-2 in., faintly pellucid-punctate; petiolules $\frac{1}{2}$ – $\frac{1}{2}$ in. or terminal one longer. *Flowers* $\frac{1}{2}$ in. long. *Ovary* 2-celled; stigma discoid; ovules 2 in each cell, collateral, horizontal. *Fruit* ellipsoidal, $\frac{1}{2}$ – $\frac{3}{4}$ in. long.

SECT. II. Surwala. *Filaments subulate.*

8. **W. robusta**, Roxb. *Hort. Beng.* 32; *Fl. Ind.* ii. 386; subglabrous, shoots and petioles rough with scabrous specks, leaflets 5 sometimes 3 ovate or elliptic acuminate shining, panicles nearly as long as the leaves dense puberulent, calyx partite, filaments equal free subulate pubescent except apex, anthers terminal, ovary 2-celled, berry egg-shaped or sub-globose. *Wall. Cat.* 1266, 8110, 8111, 8112. *Surwala robusta*, Roem. *Synops.* i. 108. *Monocyclis robusta*, *Wall. ex Voigt Hort. Suburb. Calcutt.* 135. *Scytalia glabra*, *Hb. Ham. ex Wall. Cat.* 8048 E, not other letters.

SILKET, Wallich; ASSAM, Hamilton; KHASIA MTS. and TENASSERIM, Griffith, &c.; ANDAMANS, Kurz under name of *W. villosa* in *Rep. Andam.* ed. 2, 33.

A large timber tree. *Leaves* 6-12 in.; leaflets 2-6 by 1-3 in.; petioles $\frac{1}{4}$ - $\frac{1}{2}$ in. or the terminal one longer. *Flowers* $\frac{1}{2}$ in. long, white. *Staminal tube* white; anthers yellow. *Fruit* $\frac{1}{2}$ - $\frac{3}{4}$ in. long.

13. **HEYNEA**, Roxb.

Trees or rarely shrubs. *Leaves* 5-11-foliolate; leaflets opposite, quite entire. *Panicles* terminal and axillary, corymbose, long-peduncled; flowers rather small, hermaphrodite. *Calyx* short, 4-5-fid, imbricated. *Petals* 4-5, oblong, suberect, somewhat imbricated. *Staminal tube* 8- or 10-fid; lobes linear, bidentate at apex, bearing the anthers between the linear teeth. *Disk* annular, fleshy. *Ovary* immersed in the disk, 2-3-celled, narrowing into the short style; stigma 2-3-dentate, with a thickened ring at the base; ovules 2 in each cell. *Fruit* capsular, 1-celled, 2-valved, 1-seeded, glabrous. *Seed* arillate, exalbuminous; aril thin, white; cotyledons hemispherical.—DISTRIB. A genus of 1-3 species, limited to India and the Indian Archipelago.

1. **H. trijuga**, Roxb. *Hort. Beng.* 33; in *Bot. Mag.* t. 1738; *Cor. Pl.* iii. 56, t. 260; *Fl. Ind.* ii. 390; leaflets 5-11 ovate oblong or lanceolate acuminate glabrous above, paler and glabrate or pubescent beneath usually obtuse-based, panicles nearly equalling the leaves, calyx pubescent or sub-glabrate 5-4-fid, petals 5-4 glabrous or puberulent, staminal tube glabrous or puberulent outside usually pubescent inside, filaments 10 or rarely 8 alternately rather shorter, capsule round. *Grah. Cat. Bomb. Pl.* 31; *Adr. Juss. in Mém. Mus.* xix. t. 18, f. 17; *Dalz. & Gibs. Bomb. Fl.* 38; *Wall. Cat.* 1258; *Brandis Fl. Sylvat.* 70. *Leea lævis*, *Hb. Heyne ex Wall. l.c.* *H. quinquejuga*, Roxb. *Cat.* 90; *Fl. Ind.* ii. 391; *Wall. Cat.* 1259. *H. affinis*, *Adr. Juss. l.c.* 275; *Beddome Fl. Sylvat.* t. 134; *W. & A. Prodr.* i. 121. *Walsura* (Heynea) pubescens, Kurz in *Journ. Asiat. Soc. Beng.* xli. ii. 297. *H. connaroides*, Wight ex Voigt *Hort. Suburb. Calcutt.* 136; *Drury Ind. Fl.* i. 166. *Zanthoxylon?* *connaroides*, *W. & A. Prodr.* i. 148. *Zygophyllum?* *connaroides*, *W. & A. ex Wight Cat.* n. 553.

Forests of OUDH and the HIMALAYA, from Nipal to Bhotan; KHASIA MTS., PEGU, BENGAL, PENANG; WESTERN PENINSULA from the Concan southwards.

A tree sometimes attaining a large size. *Leaves* 4-15 in. long; leaflets 2-6 $\frac{1}{2}$ by $\frac{3}{4}$ -3 in.; petioles $\frac{1}{2}$ - $\frac{5}{8}$ in. long or the terminal ones longer. *Flowers* white. *Capsules* $\frac{1}{4}$ - $\frac{1}{2}$ in. long.—A specimen from Malacca in very young flower, gathered by the late Dr. Maingay (Distrib. n. 346), with the leaflets of nearly the same colour on both surfaces, may belong to this species. Mr. Kurz, in *Journ. Asiat. Beng.* xxxix. ii. 72 (1870), states that *H. sumatrana*, Miq. *Fl. Ind. Bat. Suppl.* i. 505, from W. Sumatra is identical with *H. quinquejuga*, Roxb.

14. **BEDDOMEA**, Hook. fil.

Trees or shrubs. *Leaves* 1-5-foliolate, opposite or subopposite; leaflets quite entire. *Racemes* or *panicles* axillary, few-flowered; flowers of moderate size, subglobose hermaphrodite. *Calyx* 4-6-partite, with broadly ovate imbricated segments. *Petals* 4-6, orbicular, much imbricated. *Staminal tube* short or globose, crenulate; anthers 5-6, sessile, partially or wholly exserted; connective thick; cells narrow, marginal, at length confluent at the apex. *Ovary* short, hairy, more or less immersed in the inconspicuous disk, 3-celled; cells 2-ovuled; style short thick, stigma 3-lobed, pyramidal. *Fruit* coriaceous, ellipsoidal ovoid or subglobose, often acute at the apex, more or less ribbed and densely covered with closely set scurfy and stellate tomentum, tardily dehiscent, 2-3-celled; septa thin and often obsolete. *Seeds* 3-5, large, more or less angular, exarillate (*Beddome*).—DISTRIB. An endemic genus.

1. **B. indica**, Hook. f. in Benth. & Hook. f. *Gen. Pl.* i. 336; young shoots somewhat lepidote, leaflets 3 elliptic obtuse glabrate base somewhat cuneate, panicles lax racemose, pedicels usually long, flowers 5-4-nerous, staminal tube short, anthers 5, fruit ovoid to oblong. *Bedd. in Trans. Linn. Soc.* xxv. 212; *Anal. Gen.* lvi.; *Fl. Sylvat.* t. 135 (smaller figure).

WESTERN PENINSULA, from Kurg to Cape Comorin, ascending to 3-4000 ft. *Anemia* rocks, Sispara, *Hb. Wight*, 417.

A twiggy shrub. *Leaves* 6-12 in., leaflets 3-7 by $1\frac{1}{2}$ -3 in.; petiolules $\frac{1}{2}$ -1 in. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. *Fruit* 1- $1\frac{1}{2}$ in. long, more or less furrowed, rough with close-set rusty scales.

2. **B. simplicifolia**, *Beddome Fl. Sylvat.* t. 135; young parts with scurfy scales, leaflets solitary elliptic or narrowly so subacuminate glabrescent base obtuse or somewhat cuneate, panicles or racemes from much shorter than the leaves to much longer or the flowers occasionally solitary, flowers 5-6-merous, staminal tube large and globose or smaller, fruit as in the genus.

WESTERN PENINSULA; from the S. Concan to the Anamallay hills.

A tree up to 3 ft. in girth and 25 in height. *Leaves* 3-6 by $1\frac{1}{2}$ - $3\frac{1}{2}$ in.; petioles $\frac{1}{2}$ -1 in., much thickened and quasi-articulated near the apex. *Flowers* variable in size, $\frac{1}{2}$ - $\frac{5}{8}$ in. diam; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in. long. *Fruit* oblong, size of pigeon's egg.—*Beddome* gives the following varieties.

VAR. α ; racemes much longer than the leaves, flowers $\frac{1}{2}$ - $\frac{5}{8}$ in. diam. rufous-tomentose.—Wynaad, Tinnevely hills and Travancor, alt. 2-4000 ft.

VAR. β , *parviflora*; panicles very small not much longer than the petioles, flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. rufous-tomentose.—Anamallay and Pulney hills, alt. 3-4000 ft.

VAR. γ , *racemosa*; racemes filiform longer than the leaves, pubescence scurfy.—Wynaad, Coorg, S. Canara.

15. **CARAPA**, Aubl.

Glabrous littoral trees. *Leaves* 2- or 4- or sometimes 6-foliolate; leaflets opposite quite entire feebly nerved. *Panicles* lax, axillary, flowers hermaphrodite. *Calyx* 4-fid, short. *Petals* 4, reflexed, contorted sinistrosely (as seen from within). *Staminal tube* urceolate-globose, 8-dentate at apex, teeth bipartite; anthers 8, 2-celled, just included, sessile at top of tube, alternating with the teeth. *Disk* fleshy, cup-shaped, adherent to the base of the ovary. *Ovary* 4-celled, 4-sulcate; cells 2-8-ovuled; style short, stigma discoid. *Fruit* capsular, irregularly globose, large, 6-12-seeded; pericarp fleshy dehiscent by 4 valves opposite the obliterated

dissepiments. *Seeds* large, thick, angular; testa hard, spongy, aril 0. hilum large, ventral; cotyledons amygdaloid.—**DISTRIB.** A genus of scarcely more than 2 species, one Tropical American; the other from Tropical Asia, both however occurring in Tropical Africa on the west and east coast respectively.

The character of the genus given above is based on the latter species; it constitutes Kœnig's genus *Xylocarpus*.

1. **C. moluccensis**, *Lam. Encyl. Méth.* i. 621; leaflets from ovate to obovate usually obtuse very shortly petiolulate, panicles lax shorter than the leaves sometimes in simple racemes. *Bedd. Flor. Sylv.* t. 136; *Wall. Cat.* 1274. *C. indica*, *Juss. in Dict. Sc. Nat.* vii. 32. *C. obovata*, *Blume Bijdr.* 179. *Xylocarpus Granatum*, *Koen. Naturf.* xx. 2; *Adr. Juss. in Mém. Mus.* xix. t. 20, f. 22. *X. obovatus*, *Adr. Juss. l.c.* 244. *X. moluccensis*, *Roem. Synops.* i. 124. *Granatum littoreum*, *Rumph. Amb.* iii. 92, t. 61. *Monosoma littorata*, *Griff. Notul.* iv. 502. *Cfr. Guarea oblongifolia*, *Griff. l.c.* 503.

Muddy seacoasts throughout India and Ceylon.—**DISTRIB.** Tropical Africa, Malayan Archipelago and N. Australia.

Leaves 4–8 in.; leaflets 2–5 by 1–2½ in. *Panicles* 1–5 in. long; *flowers* ½–¾ in. long, yellowish. *Fruit* 3–4 in. diam.

16. SOYMIDA, Adr. Juss.

A lofty glabrous tree. *Leaves* paripinnate; leaflets opposite, entire, obtuse. *Panicles* axillary and terminal; flowers greenish-white, pentamerous. *Calyx* composed of 5 short imbricated sepals. *Petals* free, imbricated, obovate, unguiculate, spreading. *Staminal tube* short, cup-shaped, 10-cleft, lobes bidentate; anthers 10, sessile between the teeth, short. *Disk* flat. *Ovary* 5-celled; cells alternate with the sepals, each with about 12 biseriate pendulous ovules; style short, stigma broad, fleshy. *Capsule* septifragally 5-valved, woody; valves consisting of two plates, separating from the 5-winged axis. *Seeds* numerous, flattish, winged at both ends, albuminous; cotyledons foliaceous.—**DISTRIB.** One endemic species; two other species from East Tropical Africa have been conjecturally referred to this genus.

1. **S. febrifuga**, *Adr. Juss. in Mém. Mus.* xix. 251, t. 22, f. 26; leaflets 6–12 elliptic or oblong base usually oblique shortly petioluled, panicles often equalling the leaves branches divaricate. *W. & A. Prodr.* i. 122; *Dalz. & Gibs. Bomb. Fl.* 38; *Bedd. Fl. Sylvat.* t. 8; *Forest Reports Madras.* 1866–67, t. 2; *Brandis Fl. Sylvat.* 71. *Swietenia febrifuga*, *Roxb. Monograph.*; *Cor. Pl. i.* t. 17; *Fl. Ind.* ii. 398; *Grah. Cat. Bomb. Pl.* 32; *Wall. Cat.* 1267. *S. Soyimida*, *Duncan Tent. Inaug. de Sw. S.* (1794). *S. rubra*, [*Rottl.*] *Wall. Cat.* 4890.

Hilly districts of NORTH WESTERN CENTRAL and SOUTHERN INDIA extending southward to Travancor; CEYLON.

Yields a very hard dull red-coloured wood, one of the most durable. *Leaves* nearly evergreen, 9–18 in.; leaflets 1½–5 by ¾–2¾ in.; petiolules mostly very short. *Flowers* about ½ in. long; bracts ovate-deltoid, small. *Capsule* smooth, black when ripe, 1–2½ in. long.—*Timber* strong; bark bitter.

17. CHICKRASSIA, Adr. Juss.

A large timber tree with paripinnate leaves, alternate subopposite or opposite acuminate oblique entire leaflets, terminal panicles and 4–5-merous flowers. *Calyx* short, dentate. *Petals* oblong, free, sinistrorsely

contorted (as regarded from inside) erecto-patent. *Staminal tube* cylindric, 10-crenate; anthers 10, erect, inserted within the crenatures, short. *Disk* obsolete. *Ovary* shortly stipitate, 3-celled, cells each with numerous biseriate ovules; style stout, stigma capitate. *Capsule* 3-celled, septically 3-valved, woody; valves consisting of two plates, separating from the 3-winged axis. *Seeds* numerous, flattish, winged below, exalbuminous; cotyledons orbicular.—**DISTRIB.** One endemic species.

1. **C. tabularis**, *Adr. Juss. in Mém. Mus.* xix. 251, t. 22, f. 27; leaflets 10–16 ovate more or less velvety especially beneath or nearly glabrous base obtuse shortly petiolulate, panicles erect scarcely equalling the leaves, flowers yellowish or red, fruit ellipsoidal. *W. & A. Prodr.* i. 123; *Thwaites Enum.* 61; *Wight Ill.* i. t. 56; *Bedd. Fl. Sylvat.* t. 9; *Grah. Cat. Bomb. Pl.* 32. *Swietenia Chickrassia*, *Roxb. Hort. Beng.* 33; *Fl. Ind.* ii. 399. *Plagiotaxis Chickrassia*, *Wall. Cat.* 1269. *S. Sotrophola*, *H. Ham. ex Wall. Cat. l.c.* p. 214. *C. Nimmonii*, *Grah. ex Wight l.c.* 148; *Dalz. & Gibs. Bomb. Fl.* 38. *P. velutina*, *Wall. Cat.* 1270. *C. trilocularis*, *Roemer Synops. Monogr.* i. 135. *S. trilocularis*, *Roxb. ex Buch. Journ.* i. 184; *G. Don Gen. Syst.* i. 688. *C. velutina*, *Roemer l.c.*; *Kurz in Journ. Asiat. Soc. Beng.* xlii. ii. 1873, 65. *S. velutina* and *S. villosa*, *Wall. ex Kurz l.c.* *Cedrelæ spec. De Cand.* ? *Hb. Wight. ex Wall. Cat.* 4892. ? *Cedrela velutina*, *DC. Prodr.* i. 625. ? *Cedrela villosa*, *Roxb. Hort. Beng.* 18. ? *Melia tomentosa*, *Kurz. Rep. Veg. Andam.* ed. i. p. iv., not of *Roxburgh*. ? *Toona velutina*, *Roem. Synops. Monogr.* i. 139. ? *T. villosa*, *Roem. l.c.* 140. ? *Cedrela odorata*, *Hort. Kew. olim ex Roem. l.c.*; not *Linn.*

WESTERN PENINSULA, from the Concan to Coorg; **MALACCA** and **CEYLON**; (? **Tipper** and the Andaman Islands).

Leaves 12–18 in.; leaflets 2–5 by $1\frac{1}{2}$ – $2\frac{3}{4}$ in. *Flowers* about $\frac{1}{2}$ – $\frac{3}{8}$ in. long. *Ovary* hairy. *Stigma* about on the level of the anthers. *Fruit* nearly 2 in. long.—The Chit-gong wood tree.

18. **CEDRELA**, Linn.

Tall trees with coloured wood. *Leaves* pinnate; leaflets numerous, opposite or subopposite, entire or serrate. *Panicles* terminal and subterminal oblong; flowers white pentamerous. *Calyx* short, 5-cleft. *Petals* suberect, oval, imbricated, free. *Stamens* 4–6, free, inserted at the top of the disk, sometimes alternating with staminodes, filaments subulate; anthers widely oblong, versatile. *Disk* thick or raised, 4–6-lobed. *Ovary* sessile on the top of the disk, 5-celled; cells alternate with the calyx-lobes, each with 8–12 biseriate pendulous ovules; style filiform, stigma discoid. *Capsule* coriaceous, 5-celled, septifragally 5-valved; valves consisting of two plates. *Seeds* compressed, winged below or at both ends, with fleshy albumen; cotyledons flat, subfoliaceous.—**DISTRIB.** About 12 species, inhabiting Tropical Asia, Australia, and America.

1. **C. Toona**, *Roxb. ex Rottl. & Willd. in Gesell. Nat. Freunde. N. Schr.* iv. 198 (1803); *Hort. Beng.* 18; *Cor. Pl.* iii. t. 238; *Fl. Ind.* i. 635; leaflets 8–30 obliquely ovate or lanceolate acutely acuminate glabrous shining entire or serrate base obtuse petioluled, panicles drooping about as long as or exceeding the leaves, pedicels short, stamens 5 occasionally 6 or alternating with staminodes equalling the petals, capsule oblong. *W. & A. Prodr.* i. 124; *Wight Ic.* t. 161; *Bedd. Fl. Sylvat.* t. 10; *Dalz. & Gibs. Bomb. Fl.* 38; *Brandis Fl. Sylv.* 72, t. 14; *Wall. Cat.* 1272, 9041. *C. febrifuga*, *Blume Bijdr.* 180. *C. hexandra*, *Wall. in Roxb. Fl. Ind. ed. Carey* ii. 425; *Cat.* 1272. ? *C. longifolia*, *Wall. Cat.* 1273. *C. serrata*, *Royle Ill.* t. 25; *Brandis*

l.c. 73. *C. australis*, *F. Muell. Fragm.* i. 4, *teste Benth. Fl. Austral.* i. 387. ? *C. multijuga*, *Kurz in Journ. Asiat. Soc. Beng.* xli. ii. 297. *Toona ciliata*, *febrifuga*, *hexandra*, *serrata*, and *longifolia*, *Roem. Synops.* i. 139, 140.—*Rumph. Herb. Amboin.* iii. t. 39.

TROPICAL HIMALAYA; from the Indus eastward, ascending to 3000 ft.; and throughout the hilly districts of CENTRAL and SOUTHERN INDIA and BURMA (absent in Ceylon!).—DISTRIB. Java; Australia.

Leaves 1–3 ft., deciduous; leaflets 2–7 by $\frac{3}{4}$ –3 in., sometimes glaucescent beneath. *Flowers* fragrant, $\frac{1}{2}$ – $\frac{1}{4}$ in. long. *Petals* ciliate. *Capsule* about $\frac{3}{4}$ –1 in. long, oblong.—Dr. Brandis distinguishes *C. serrata* from *C. Toona* by several characters; however, I do not find any of them constant, except that in the few examples that show it the seeds of the former have wings at the upper end only, while those of the latter have wings at both ends; it is common throughout the Himalaya, attaining an elevation of 8000 ft.—The flowers are used for dyeing: see *Buchanan, Journey*, i. 215, iii. 288.

19. CHLOROXYLON, DC.

A moderate-sized tree. *Leaves* abruptly pinnate; leaflets obtuse, oblique, entire. *Panicles* terminal and axillary, pubescent; flowers small pentamerous. *Calyx* deeply lobed. *Petals* spreading, unguiculate, imbricated in bud. *Stamens* 10, inserted in the depressions of the disk, free; filaments filiform-subulate, the alternate ones rather longer; anthers small, versatile. *Disk* thick, 10-lobed, pubescent. *Ovary* pubescent, immersed in the disk; 3-lobed, 3-celled; cells about 8-ovuled; style short, slender, glabrous, stigma small, capitate. *Capsule* coriaceous, 3-celled, loculicidally 3-valved. *Seeds* compressed, exalbuminous; margins angular, winged above; cotyledons plano-convex.—DISTRIB. One endemic species.

1. *C. Swietenia*, *DC. Prodr.* i. 625; leaflets 20–40 opposite subopposite or alternate glabrous pale and dotted on lower surface base very unequal shortly petioluled, panicles scarcely as long as the leaves, pedicels longer than the flowers, capsule glabrous oblong dark brown. *W. & A. Prodr.* i. 123; *Wight Ill.* i. t. 56 bis; *Grah. Cat. Bomb. Pl.* 32; *Bedd. Fl. Sylvat.* t. 11; *Brandis Fl. Sylvat.* 74; *Dalz. & Gibs. Bomb. Fl.* 39; *Thwaites Enum.* 61; *Wall. Cat.* 1268. *Swietenia Chloroxylon*, *Roxb. Cor. Pl.* i. t. 64; *Fl. Ind.* ii. 400.

WESTERN PENINSULA, from the Concan to the Nilghiris; CEYLON.

Young parts petioles and inflorescence covered with grey puberulence; heartwood with a beautiful satin lustre and fragrant. *Leaves* 5–9 in.; leaflets $\frac{3}{4}$ –1 $\frac{1}{4}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in. wide when open. *Capsule* 1 in. long by $\frac{1}{2}$ in. thick.—INDIAN SATINWOOD.

MELIACEÆ PENANGIANA, *Wall. Cat.* 4889, from Penang, consists of 3 unnameable and apparently diverse species, one of which is probably a *Canarium*.

MELIACEÆ RUGOSA, *Wall. l.c.* 4891, from Penang is probably not Meliaceous.

ORDER XXXVIII. CHAILLETIACEÆ. (By J. D. Hooker.)

Trees or shrubs. *Leaves* alternate, quite entire; stipules 2, deciduous. *Flowers* small, unisexual or polygamous, in corymbose cymes; peduncles sometimes adnate to the petiole. *Sepals* 5, free or connate, sometimes unequal, imbricate. *Petals* 5, free, subperigynous, equal or unequal, notched or 2-fid, with often an inflexed lamina, which is adnate to the face of the petal, usually open in æstivation. *Stamens* 5, subperigynous, all or some only fertile, free or adnate to the corolla; anthers oblong, connective

often thickened at the back. *Disk* of 5 glands or scales, or a 5-glandular or -lobed cup. *Ovary* free, pubescent or villous, 2-3-celled; styles 1-2-3, free or more or less connate, stigmas simple or capitate; ovules anatropous in pairs from the top of each cell, pendulous. *Drupe* pubescent or hispid, oblong transversely oblong or didymous, compressed; epicarp entire or dehiscent; putamen indehiscent or not, 1-3-celled, cells 1-seeded. *Seed* pendulous, hilum broad, testa membranous, albumen 0; embryo large, cotyledons thick, radicle small superior.—A small chiefly tropical order, of 3 genera and about 40 species.

1. CHAILLETIA, DC.

Flowers polygamo-monœcious. *Sepals* 5, unequal, united at the base or above it, obtuse. *Petals* 5, 2-lobed, narrow, free. *Stamens* 5, sometimes slightly adnate at the base to the petals. *Disk* of 5 quadrate scales placed opposite the petals. *Ovary* 2-3-celled.—DISTRIB. Tropical Asia, Africa, and especially America; species about 30.

1. **C. gelonioides**, Hook. f. in *Gen. Plant.* i. 341; branchlets minutely pubescent, leaves glabrous elliptic or elliptic-lanceolate or -obovate abruptly acuminate or caudate-acuminate narrowed into the very short petiole, flowers in small cymes. *Bedd. Fl. Sylv. Anal. Gen.* 59, t. 9, f. 1. *C. sumatrana*, *Miquel Fl. Ind. Bat. Suppl.* 329. *Moacurra gelonioides*, *Roxb. Fl. Ind.* ii. 70; *Baill. Etud. Gen. Euph.* 587; *Mull. Arg. in DC. Prodr.* xv. pt. 2, 227; *Thwaites Enum.* 79; *Dalz. & Gibs. Bomb. Fl.* 52. *Celastrus acuminatus*, *Wall. Cat.* n. 4342. *Wahlenbergia*, *Br. ex Wall. Cat. Index*, p. 232.

EASTERN BENGAL; at the foot of the Khasia Mts., and in Silhet and Chittagong; WESTERN PENINSULA, on the Ghats from the Concan southwards. CEYLON, ascending to 3000 ft.—DISTRIB. Sumatra.

A small subdioecious tree. *Leaves* 2-4 by $\frac{3}{4}$ -2 in., rather thin, nerves reticulate, pale when dry, the young pilose or silky beneath; stipules pubescent, old quite glabrous beneath. MALE fl. about $\frac{1}{2}$ in. diam. *Sepals* subequal, obtuse, hoary. *Petals* as long, narrow obovate, glabrous, a subquadrate scale is placed in front of each at the base. *Stamens* inserted at the very base of the calyx, or rather shorter than the petals, connective broad. FEMALE fl. as in the male, but the anthers have no pollen. *Ovary* broad, sessile, woolly; styles 2, very short, stigma minute capitate. *Fruit* when perfect $\frac{3}{4}$ -1 in. diam., transversely oblong or obcordate, 2-celled, compressed and didymous, but often only one carpel is perfect, and then it is smaller, oblong and oblique, epicarp thick, rather fleshy, dehiscent along the edges, and becoming partially reflected, exposing the yellow mesocarp which surmounts the rough crustaceous endocarp. *Seeds* oblong, testa thin; embryo the shape of the seed, radicle short.—Roxburgh erroneously describes the split epicarp as a 2-valved capsule, and the coloured fleshy mesocarp as an aril. The descriptions of Baillon and Müller are evidently taken from imperfect specimens, and probably of two different plants; they both retain *Moacurra*, and refer it to *Euphorbiaceæ*. *Beddome* describes the endocarp as divisible into two valves, but I find no trace of this in eastern specimens. *Thwaites* has a var. β , with leaves more or less tomentose beneath.

2. **C. Helferiana**, *Kurz in Beng. As. Soc. Journ.* xli. 1872, pt. 2, 297; branchlets terete, young hoary-pubescent, leaves elliptic-oblong or -obovate acuminate petioled young and old along the nerves silky pubescent beneath, veins very indistinct, flowers in hoary branched racemes, fruit hoary. *Chaillet. (spec.) Brunoniana*, *Wall. Cat.* 4038.

TENASSERIM, at Tavoy, *Gomez, Helfer*.

It is difficult, in the absence of flowers, to distinguish this by characters from *C. gelonioides*; the leaves are larger, 4 inches long, more oblong, more shortly and sharply acuminate, of a brown colour when dry, with very faint slender nerves, and they are less narrowed at the base. The fruit, judging from Wallich's specimen, is smaller, though as densely hoary and of the same shape, and the epicarp dehisces in the same way.

3. *C. longipetala*, Turcz. in Bull. Mosc. 1863, pt. i. 611; branches angular pustular, young densely tomentose leaves elliptic or elliptic-lanceolate acuminate silkily hairy beneath, especially on the nerves and pubescent on the nerves above, old scabrid beneath, cymes densely tomentose, male lax small-flowered, female short with fewer denser flowers that have longer petals.

TENASSERIM; at Mergui, Griffith, Helfer.

Apparently a monœcious climber; bark of branchlets pale and densely pustular, youngest fulvous-pubescent. Leaves 3-4½ in., dark-brown when dry, nerves strong beneath; petiole very short. MALE fl. in effuse cymes, about ½ in. diam. Sepals connate into a turbinate tube, obtuse, hoary, unequal. Petals little longer than the sepals, broad, split to below the middle. Stamens equalling the petals. Disk-scales quadrate, crenate. Rudimentary-ovary minute, woolly. FEMALE fl. twice as large as the male. Calyx the same. Petals twice as long as the sepals, narrow. Stamens with long filaments and no pollen. Ovary globose, clothed with straight white hairs; style long and slender, 3-fid at the apex. Fruit wanting.

4. *C. deflexifolia*, Turcz. in Bull. Mosc. 1863, pt. i. 611, var. TOMENTOSA; branches terete smooth young fulvous-tomentose, leaves petioled elliptic or elliptic-oblong acute coriaceous shining above tomentose beneath, nerves strong minutely pubescent above, cymes peduncled spreading many-flowered hoary.

MALACCA, Griffith, Maingay.

Apparently a climber; branches black, the ultimate clothed with fulvous pubescence. Leaves 4-6 by 2½-3½ in., much broader than in any of the preceding species, very shortly acuminate or very acute, coriaceous and hard, dark-brown when dry; petiole stout. Cymes many, much branched, effuse, 2 in. diam. MALE fl. ⅙ in. diam. Calyx divided nearly to the base; segments unequal, obtuse. Petals rather longer than the sepals. FEMALE fl., calyx as in the males. Petals half as long again as the sepals. Stamens long; anthers empty. Ovary clothed with matted wool; style very slender, 3-fid at the tip. Fruit unripe, hoary with fulvous tomentum.—I unite this with the Javanese *C. deflexifolia* with some doubts, the leaves being so much more tomentose beneath.

VAR. ? *sordida*; leaves 3-4 by 1½-2 in., minutely pilose or pubescent and purplish-brown beneath. Singapore, Wallich (Cat. n. 9016), Maingay.—The specimens are flowerless; Wallich's has unripe fruit quite like that of var. *tomentosa*.

5. *C. Griffithii*, Hook. f.; branchlets clothed with long spreading strigose hairs, leaves oblong or oblong-lanceolate acuminate cordate at the very base, hairy beneath, cymes short few-flowered, fruit oblong densely clothed with fulvous rigid hairs.

MALACCA, Griffith, Maingay.

A very distinct species from any of the above. Branchlets slender, clothed more or less laxly with hairs, ⅙-⅕ in. long. Leaves subsessile, 4-7 by 2-3 in., glabrous above, beneath more or less clothed with long hairs, that are sometimes confined to the nerves, at others scattered over the surface. Flowers, female only seen, larger than its congeners, ½ in. diam., in small few-flowered cymes. Calyx divided nearly to the base, densely tomentose. Petals not exceeding the sepals, pubescent. Stamens equalling the petals. Ovary densely clothed with rigid fulvous bristles; style very slender, 3-fid at the tip. Fruit 1½ in. long, 2-celled.—Griffith describes this as a shrub with the flowers whitish, capitate, and hidden under the leaves, and with 1-ovuled ovarian cell. I find however 2 ovules, as in the other species. Maingay had given this, or a

variety of it, the ms. name of *lanuginosa*, his specimen having softer pubescence on the leaves than Griffith's; but the nature of the clothing of the branchlets, leaves, and fruit is far from being woolly; he further describes the styles as 2, short and distinct, which probably applies to male flowers, as in Griffith's plant it is slender and 3-fid at the apex.

6. **C. Laurocerasus**, *Planch. in Herb. Hook.*; branches terete smooth black and leaves perfectly glabrous, leaves oblong and elliptic-oblong, very shortly petioled obtusely acuminate, nerves very slender, cymes very small few-flowered, fruit large hoary, transversely oblong or globose when one carpel ripens.

PENANG, in every part of the hill, *Maingay*. (Singapore? *Lobb*.)

A scandent shrub; remarkable amongst the India species for being perfectly glabrous, even the young twigs and leaves; branchlets black when dry, not pustular. *Leaves* 3-5 by $1\frac{1}{2}$ -2 in., on short slender petioles, coriaceous, very smooth and bright red-brown when dry. *Cymes*, female only seen, small, few-flowered, shortly peduncled. *Flowers* $\frac{1}{8}$ in. diam. *Calyx* divided nearly to the base, lobes very rounded, nearly equal, hoary externally. *Petals* glabrous, about twice as long as the calyx. *Stamens* equalling the petals; anthers empty. *Ovary* minute, pubescent; style long, slender, 3-fid at the tip. *Fruit* fully formed $1\frac{1}{2}$ in. across, epicarp hard, endocarp thick, bony, tubercled on the surface, white inside.—*Lobb's* specimen is ticketed from Singapore, but is more probably from Penang.

C. sp.? *Wall. Cat.* 7443, from Penang, *Porter*, without flower or fruit, is probably an undescribed species of *Chailletia*. It has terete branches, pubescent branchlets, narrow-oblong glabrous leaves, 5-8 in. long, with obtuse or subacute tips and rounded bases, beautifully reticulated and shining on both surfaces; the cymes are small and fulvous-pubescent.

ORDER XXXIX. OLACINEÆ. (By Maxwell T. Masters, F.R.S.)

Trees or shrubs rarely herbs, sometimes climbing. *Leaves* alternate, rarely opposite, simple or lobed, penni- or palminerved, exstipulate. *Inflorescence* cymose; cymes terminal, axillary, or extra axillary, sessile or more or less peduncled, rarely capitate. *Flowers* regular, hermaphrodite or unisexual, often dioecious. *Calyx* usually small, 4-5-toothed, sometimes accrescent, free, or adherent either to the ovary or to the fruit, lobes valvate or imbricate. *Petals* 3-6, valvate or imbricate, free, or more or less coherent. *Stamens* 3-15, inserted with the petals, free or adnate to them and either opposite to or alternate with them, all fertile, or some (staminodes) anantherous, disunited or more or less monadelphous; anthers erect, 2-celled, splitting longitudinally. *Disk* hypogynous, cup-shaped, perigynous or epigynous. *Ovary* free, or half-inferior, 1-celled, or imperfectly 2-3-5-celled (from the dissepiments not reaching the apex of the cavity); style simple or 0, rarely divided, stigma entire or lobed; ovules 1-5, pendulous from the apex of a central placenta, or from the side or apex of the ovarian cavity, consisting usually of a naked nucleus; funicle (or placenta?) often dilated into a thickened process, "obturator," above the ovule. *Fruit* drupaceous, or dry indehiscent, 1-celled, 1-seeded, free, or more or less adnate to the calyx-tube and disk. *Seed* pendulous, albumen fleshy, entire or lobed rarely 0; radicle superior, cotyledons leafy, flat or folded, rarely fleshy.—*DISTRIB.* Genera about 40, species about 190, widely distributed through the Tropics of both hemispheres.

In the following pages the arrangement of Bentham and Hooker is followed, though in all probability some of the genera, when better known, will have to be transferred

elsewhere. Griffith, Miers, and following them Baillon, Engler, and others, consider the *Icacinææ* to form a separate Order, an arrangement probably more natural than that which is here followed on the ground of expediency, though Oliver's genus *Pteleocarpa* is to some extent intermediate.

TRIBE I. Olacææ. *Stamens* anisomerous, or equal and opposite to the petals. *Ovary* 2-3-5-celled at the base, 1-celled at the apex, or completely 1-celled ; ovules pendulous.

* *Fertile stamens anisomerous or twice or thrice the number of the petals.*

Leaves alternate. Fertile stamens 10	1. XIMENIA.
Leaves alternate. Fertile stamens 3-5	2. OLAX.
Leaves alternate. Fertile stamens 12-15	3. OCHANOSTACHYS.
Leaves opposite. Fertile stamens 10	4. CTENOLOPHON.

** *Fertile stamens isomerous with and opposite to the petals.*

Calyx adherent to the fruit. Staminodes 5. Ovary 1-celled	5. ERYTHROPALUM.
Calyx adherent to the fruit. Staminodes 0. Ovary 3-5-celled	6. STROMBOSIA.
Calyx not adherent to the fruit. Staminodes 5. Ovary 1-celled	7. ANACOLOSA.
Calyx adherent to the fruit. Staminodes 0. Ovary 3-celled	8. SCHOFFIA.

TRIBE II. Opilicææ. *Stamens* isomerous, opposite to the petals or lobes of the perianth. *Ovary* 1-celled, 1-ovuled.

* *Flowers monochlamydeous.*

Bracts small. Staminodes 5. Ovule erect	9. CANSJERA.
Bracts conspicuous, hop-like. Staminodes 0. Ovule pendulous	10. LEPIONURUS.

** *Flowers dichlamydeous.*

Staminodes 5	11. OPILIA.
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TRIBE III. Icacinææ. *Stamens* isomerous, alternate with the petals. *Ovary* 1-2-celled, with 1-2 ovules pendulous from the top of the cell ; rarely perfectly 2-3-celled with 1-2 ovules in each cell.

* *Calyx cup-shaped, denticulate, valvate.*

Petals glabrous within.

Filaments bearded, hairs curving over the anther ; anthers adnate. Style subulate 12. LASIANTHERA.

Filaments glabrous or with short hairs only ; anthers pendulous. Stigma discoid 13. GOMPHANDRA.

Filaments glabrous ; anthers innate, sagittate at the base. Ovary oblique 14. APODYTES.

Petals villous within. Ovary ovoid 15. MAPPIA.

** *Calyx deeply 5-parted, lobes imbricate.*

Flowers unisexual. Ovary 1-celled 16. PHLEBOCALYMNA.

Flowers hermaphrodite. Ovary 2-celled. Fruit dry, winged 17. PTELEOCARPA.

TRIBE IV. Phytocreneæ. *Flowers* (except in *Iodes*) and fruit as in *Icacinææ* . *Embryo* more developed, cotyledons broad fleshy or foliaceous. — Climbers.

Stamens alternate with the petals.

Flowers capitate.

Drupe echinate or bristly. Albumen deeply lobed 18. PHYTOCRENE.

Drupe smooth. Albumen slightly lobed 19. MIQUELLA.

Flowers spicate, racemose or paniced.

Staminodes 0. Stigma sessile. Albumen 0 20. *SARCOSTIGMA*.

Staminodes 5. Styles 2. Albumen fleshy 21. *NATSIATUM*.

Stamens opposite to the petals. Stigma sessile 22. *IDES*.

A milky-juiced climber. Sepals and petals imbricate. Fruit

dry winged 23. *CARDIOPTERIS*.

1. *XIMENIA*, Linn.

A shrub or low tree. *Branches* spiny. *Leaves* shortly petioled, alternate, simple, 1-nerved. *Flowers* racemose, usually hermaphrodite. *Calyx* cupular, 4-5-toothed, persistent, not accrescent. *Petals* 4-5, oblong, revolute, hairy within. *Stamens* twice the number of the petals, hypogynous; anthers innate, linear, 2-celled. *Staminodes* 0. *Ovary* sessile, superior, 4-celled; style columnar, stigma simple; ovules solitary in each cell, pendulous, anatropous. *Drupe* ovoid, 1-celled; stone solitary.—*DISTRIB.* Species, 4-5, 1 Mexican, 1 South African, 1 Bornean, 1 Polynesian, 1 widely dispersed through the Tropics of both hemispheres.

Baillon (*Adansonia*, iii. 128) describes the ovules as erect, but I find them as above described.

1. *X. americana*, Willd. *Sp. Pl.* ii. 230; *Roxb. Fl. Ind.* ii. 252; *W. & A. Prodr.* i. 89; *Miq. Fl. Ind. Bat.* i. pt. i. 787. *X. Russelliana*, Wall. *Cat.* 6784.

EASTERN and WESTERN PENINSULAS, *Circars*, *Wight*; *Belgaum*, *Ritchie*; *ANDAMAN ISLANDS*, *Kurz*; *MALACCA*, *Griffith*; *CEYLON*, *Thwaites*.—*DISTRIB.* *Malayan Archipelago*, *Trop. Africa* and *America*.

Branches spreading glabrous, covered with a red astringent bark, often ending in a spine. Young shoots angular. *Leaves* $1\frac{1}{2}$ by 1 in. and upwards, coriaceous, glabrous, ovate-oblong, or roundish, emarginate, base rounded, vernation conduplicate; petiole $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in., bisexual, sometimes polygamous, white, fragrant, in short racemes, which are axillary, or on the ends of thickened contracted shoots. *Rachis* terete, 4-6-flowered. *Bracts* minute. *Buds* oblong, acute. *Calyx* minute. *Petals* many times longer than the calyx, equal to the stamens in length. *Connective* thick. *Ovary* ovoid-oblong, glabrous, longitudinally sulcate, surrounded at the base by the persistent ultimately reflexed calyx; style as long as the stamens.—The fruit is edible and the wood is used as a substitute for Sandal-wood. This plant is omitted in *Thwaites' Enumeration*.

EXCLUDED SPECIES.

X. ? OLACIOIDES, *W. & A. Prodr.* i. 89, is *Opilia amentacea*, *Roxb.*

X. AEGYPTIACA, *Juss. Gen.* 288; *Roxb. Fl. Ind.* ii. 233, is *Balanites Roxburghii*, *Planch.*

2. *OLAX*, Linn.

Trees or shrubs, often scandent, sometimes prickly. *Leaves* alternate, petioled, simple. *Racemes* axillary, simple, or branched. *Bracts* minute. *Calyx* minute, cup-shaped, truncate or obscurely toothed, accrescent. *Petals* hypogynous, valvate, more or less coherent, sometimes 6 in 3 pairs, or 5, 4 coherent, 1 free, rarely 5 or 3 free. *Fertile stamens* usually 3, rarely 4, 5, generally opposite the edges of the petals and attached to their base, rarely opposite their centre; anthers adnate to the filament, (versatile, *W. & A.*) oblong, 2-celled, dehiscing longitudinally. *Staminodes* 5-6, bifid, usually opposite the petals. *Ovary* free, usually surrounded by a shallow,

cup-shaped, hypogynous disk, more or less 3-celled below, 1-celled above; style simple, terminal, stigma 3-lobed; ovules 3, linear, pendulous from the apex of a central placenta. *Fruit* more or less covered by the accrescent fleshy calyx; stone crustaceous, 1-celled, 1-seeded. *Seed* inverse, albuminous; embryo minute, in the apex of albumen; radicle superior.—DISTRIB. A genus of 25–30 species, natives of the tropics of the Old World.

1. **O. scandens**, *Roxb. Fl. Ind.* i. 163; *Cor. Pl.* iii. t. 102; scandent, prickly, leaves ovate oblong or oblong-lanceolate, racemes many-flowered, peduncles ascending longer than the bracts. *Wall. Cat.* 6774 A to G; *W. & A. Prodr.* i. 89; *Miq. Fl. Ind. Bat.* i. pt. i. 785; *Dalz. & Gibs. Bomb. Fl.* 27; *Thwaites Enum.* 42; *Brandis For. Flor.* 75. *O. Bador*, *Ham. in Wall. Cat.* 6778. *O. psittacorum*, *Vahl Enum.* 34, partly. *Roxburghia baccata*, *Koen. ex W. & A. Prodr.* i. 89.

Tropical WESTERN HIMALAYA, in KUMAON; BEHAR; CENTRAL and SOUTHERN INDIA; ROHILKUND, BIRMA; TENASSERIM; CEYLON, in hot dry parts of the Island.—DISTRIB. Java.

Trunk as thick as a man's thigh. *Branches* terete, more or less puberulous, prickles stout, curved. *Leaves* distichous, 2 by 1 in., yellowish-green, glabrous or sometimes puberulous beneath; petiole $\frac{1}{2}$ – $\frac{1}{3}$ in., puberulous. *Racemes* solitary, axillary, half the length of the leaves; peduncles puberulous, twice the length of the minute bracts. *Flowers* small, white. *Calyx* puberulous or glabrescent. *Petals* 3–5–6, irregularly cleft. *Fertile stamens* 3, anthers oblong. *Staminodes* 2-fid. *Ovary* ovoid-oblong 1-celled, 1–rarely 3-ovuled. *Drupe* ovoid or globose, 3–4ths covered by the accrescent calyx.—Variable in the form and vestiture of the leaves as well as in the degree of cohesion of the petals. From this latter cause the number of petals in different flowers appears to vary and the relative position of the fertile stamens and petals seems to be different. Wallich's *O. Bador* is rather more pubescent than the other specimens.

2. **O. imbricata**, *Roxb. Fl. Ind.* i. 164; scandent, unarmed, leaves ovate-oblong acute, racemes many-flowered, peduncles ascending scarcely longer than the bracts. *Wall. Cat.* 6775 A, B; *Miq. Fl. Ind. Bat.* i. pt. i. 785.

CHITTAGONG and MARTABAN at Amherst, Wallich.—DISTRIB. Java, Philippines.

Branches slender, terete, young shoots puberulous. *Leaves* distichous, 4 by $1\frac{1}{2}$ in. and upwards, coriaceous, glabrous, base rounded; petiole $\frac{1}{4}$ in. *Racemes* axillary, compact, provided, when young with large (for the genus), ovate, concave, imbricate bracts so as to resemble the spikelets of a *Briza* (Roxb.), ultimately about 1 in., dichotomous, many-flowered; peduncles puberulous. *Flowers* nearly $\frac{1}{2}$ in. *Petals* 6, combined in 3 pairs. *Fertile stamens* 3, nearly as long as the 6 bifid staminodes. *Fruit* $\frac{1}{2}$ in., ovoid, glabrous.

3. **O. Wightiana**, *Wall. Cat.* 6779; shrubby or arborescent, leaves ovate-oblong, racemes many-flowered lax, peduncles drooping longer than the bracts. *W. and A. Prodr.* i. 89; *Dalz. and Gibs. Bomb. Fl.* 27; *Thwaites Enum.* 42; *Beddome Fl. Sylv. Anal. Gen.* t. 9, f. 2. *O. lucida*, *Heyne in Wall. Cat.* 6777. *O. psittacorum*, *Vahl Enum.* 233 partly ex *W. & A. Prodr.* i. 89. *O. zeylanica*, *Wall. Cat.* 6777 B!

WESTERN PENINSULA, from the Concan southwards; MALACCA, Griffith; CEYLON, in the warmer parts of the island.

A shrub or small tree (Beddome), a scandent shrub (Dalz. and Gibs.). *Branches* terete, glabrous. *Leaves* 3–4 by $1\frac{1}{2}$ in.; glabrous, shining above, paler beneath; petiole $\frac{1}{4}$ in., glabrous or puberulous. *Raceme* 1 in., axillary, solitary or clustered, simple or branched; peduncles $\frac{1}{2}$ in., distichous. *Flower-buds* cylindric-clavate. *Flower* $\frac{1}{2}$ – $\frac{1}{4}$ in. *Calyx* cupular, puberulous. *Petals* 5. *Fertile stamens* 3, half the length of the

petals. *Staminodes* 5, bifid, nearly as long as the petals. *Ovary* ovoid. *Fruit* oblong, nearly covered by the closely adherent glabrous calyx.

VAR. 1. *bracteata*, racemes elongated half as long as the leaves, bracts 2-3 times longer than the peduncles ovate leafy. — Bombay, *Law*. This may be merely an accidental variation.

4. *O. zeylanica*, *Linn.*; *DC. Prodr.* i. 532; arborescent, leaves ovate acuminate or ovate-lanceolate, racemes many-flowered, peduncles ascending scarcely exceeding the bracts. *Wall. Cat.* 6776 A, 6776 B†; *W. & A. Prodr.* i. 88; *Thwaites Enum.* 42; *Beddome Fl. Sylv.* lx.

CEYLON, southern parts of the island, *Thwaites*.

A small tree. Young branches acutely angled, glabrous, transversely wrinkled, loosely divaricate. *Leaves* 2 by $\frac{3}{4}$ in., glabrous, shining; petiole $\frac{1}{4}$ in. *Racemes* axillary twice the length of the petiole, rachis puberulous, peduncles subtended by a bract of about equal length. *Flower-bud* cylindric-clavate. *Flowers* $\frac{1}{4}$ in. *Calyx*-rim crenulate. *Petals* 5, oblong, many times longer than the calyx. *Fertile stamens* 3, shorter than the 5 bifid *staminodes*. *Ovary* ovoid. *Fruit* ovoid-oblong, obtuse.

5. *O. merguensis*, *Planch. in Herb. Kew*; arborescent, leaves oblong-lanceolate acuminate, base tapering, racemes many-flowered, peduncles ascending scarcely exceeding the bracts.

TENASSERIM; at Mergui, *Griffith*; MALACCA, *Maingay*.

A low tree. Branches purplish, glabrous. *Leaves* 5 by $1\frac{1}{2}$ in., glabrous, coriaceous; petiole $\frac{1}{2}$ in. *Racemes* solitary or many from the same axil, rather longer than the petiole, simple or branched, erect; peduncles puberulous. *Bracts* ovate, acute, concave, overlapping when young. *Flowers* $\frac{1}{2}$ in., whitish, fragrant. *Petals* usually 6, in 3 pairs, or 5, rarely three. *Fertile stamens* 3, opposite the petals, nearly as long as the bifid *staminodes*. *Ovary* ovoid-conic.

6. *O. acuminata*, *Wall. Cat.* 6781; shrubby, branchlets angular, leaves ovate or oblong-lanceolate acuminate, racemes few-flowered, peduncles deflexed. *Benth. in Linn. Trans.* xviii. 678. *O. Heyneana*, *Wall. Cat.* 6780. *O. longifolia*, *Wall. Cat.* 6782.

SILHET, *Wallich*; Khasia Mts., alt. 2000 ft., *H. f. & T.*; BHOTAN, *Griffith*; ASSAM, *Jenkins*.

A scandent? shrub. Branches glabrous, yellow, divaricate, virgate. *Leaves* 2-4 by $\frac{3}{4}$ - $1\frac{1}{2}$ in., glabrous, acute, base tapering; petiole $\frac{1}{2}$ in. *Racemes* very short, peduncles distichous. *Flower-buds* ovoid-conic. *Flowers* minute. *Calyx* pateriform. *Petals* 3, oblong-lanceolate, apex incurved. *Fertile stamens* 3, opposite the petals, shorter than the 6 bifid *staminodes*; anthers apiculate. *Ovary* ovoid. *Fruit* $\frac{3}{4}$ in., ovoid-oblong, obtuse, glabrous, orange-coloured.

7. *O. nana*, *Wall. Cat.* 6783 A, B; suffruticose, leaves oblong-lanceolate, peduncles solitary 1-flowered. *Benth. in Linn. Trans.* xviii. 678:

Hot Valleys of the WESTERN HIMALAYA, ascending to 5000 ft. from Nipal westward and in the PANJAB.

Shoots herbaceous, from a contracted woody stock, virgate. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ in., sessile, glabrous, black in drying; petiole $\frac{1}{2}$ in. *Flower-buds* obovoid. *Flowers* scarcely $\frac{1}{2}$ in. *Petals* 3, oblong-lanceolate, rather obtuse. *Fertile stamens* 3, opposite to the petals. *Staminodes* bifid, longer than the fertile stamens. *Ovary* ovoid-oblong, 1-celled. *Fruit* globular, pea-like, 1-celled, 1-seeded.—This is one of those curious plants, which like *Grewia nana*, appear never to form a trunk, but only a contracted stock from which the shoots originate every year and are destroyed by fire, cattle, &c.

3. OCHANOSTACHYS, Mast.

A tree or shrub. *Leaves* alternate, petiolate, 1-nerved. *Flowers* numerous, on long, slender, branching axillary spikes. *Calyx* cup-shaped, 4-5-toothed,

not accrescent? *Petals* 4-5, free, valvate, hairy within. *Stamens* 12-15, hypogynous, or adherent to the base of the petals, or arranged in groups of 3 before the petals, filaments subulate, glabrous; anthers minute, didymous, opening longitudinally. *Staminodes* 0. *Disk* hypogynous, fleshy, very shallow, annular, or inconspicuous. *Ovary* free, ovoid, incompletely 3-celled beneath, 1-celled above; style cylindric, stigma minute capitate obscurely 3-lobed; ovules 1 in each cell, pendulous from the apex of a central placenta. *Fruit* unknown.—**DISTRIB.** Species 1 or 2 natives of the Malay peninsula and Borneo. In technical characters allied to *Ximenia*, but differing in habit, arrangement of the leaves, inflorescence and number of stamens. The name refers to the thong-like inflorescence.

1. **O. amentacea**, *Mast.*; leaves oblong acuminate, base acute, spikes about as long as the leaves.

MALACCA, *Maingay*, *Griffith*.—**DISTRIB.** Borneo.

Branches terete. *Leaves* 5-6 by $2\frac{1}{2}$ in., coriaceous, glabrous, quite entire, 1-nerved, secondary pairs of nerves about 5, rather distant, arching; petiole $\frac{1}{2}$ in. *Flower-bud* roundish-oblong. *Flowers* $\frac{1}{10}$ in. *Calyx* puberulous. *Stamens* $\frac{1}{3}$ shorter than the petals.

4. **CTENOLOPHON**, *Oliv.*

Trees. *Leaves* opposite, petiolate, simple, 1-nerved. *Inflorescence* panicle-cymose, terminal. *Flowers* regular, hermaphrodite, diblamydeous. *Calyx* 5-parted; lobes imbricate, not accrescent. *Petals* 5, free, imbricate, oblong, reflexed after flowering. *Stamens* 10, free, springing from a short, ring-like hypogynous disk, those opposite the petals longer than the others; anthers roundish, apiculate, 2-celled, dehiscing lengthwise. *Staminodes* 0. *Ovary* free, shortly stalked, imperfectly 2-celled; style cylindric, apex bifid, stigmas capitate; ovules in pairs in each cell, collateral, pendulous. *Fruit* coriaceous or crustaceous, 1-celled, 1-seeded, dehiscing irregularly. *Seed* pendulous from the apex of a free central placenta, and provided with a dorsal, pectinate crest.—**DISTRIB.** 2 known species, both Malayan.

1. **C. parvifolius**, *Oliv. in Trans. Linn. Soc.* xxviii. 516, t. 43; leaves elliptic shortly and obtusely acuminate, ovarian cavity reaching nearly to the base of the style.

MALACCA, *Maingay*.

Branchlets glabrous, purplish. *Leaves* 2-4 $\frac{1}{2}$ by $1\frac{1}{4}$ - $1\frac{3}{4}$ in., coriaceous, glabrous, shining above, reticulate beneath, base rounded; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., channelled. *Inflorescence* about the length of the leaves, cano-tomentose, panicle-cymose; pedicels short, thick. *Bracts* $\frac{1}{2}$ in., caducous, ovate, deltoid. *Flowers* $\frac{1}{2}$ in. *Calyx-lobes* roundish, concave, tomentose outside, subglabrous within. *Petals* 5, erect, four times longer than the calyx-lobes, coriaceous, oblong, recurved, downy outside, except at the overlapped margin. *Anthers* adnate. *Ovary* ovoid-globose, hirsute, surrounded at the base by an annular disk, 2-celled; style elongate, 2-furrowed, glabrous. *Fruit* $\frac{1}{2}$ - $\frac{3}{4}$ in., ellipsoid; pericarp woody, crustaceous, splitting on one side. *Seeds* with an ariloid crest.

2. **C. grandifolius**, *Oliv. l.c.*; leaves oblong shortly and obtusely acuminate, ovarian cavity scarcely exceeding in length the hypogynous disk.

MALACCA, *Maingay*.

Branchlets terete, glabrous. *Leaves* 3 $\frac{1}{2}$ -7 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., coriaceous, glabrous, entire, midrib prominent beneath; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., glabrous or pruinose. *Inflorescence* subpyramidal, peduncles ascending, articulate at the nodes, pedicels exceeding the calyx. *Bracts* scale-like, caducous. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Sepals* equal, roundish, concave, coriaceous, cano-tomentose outside, glabrous within. *Petals* 5-6 times longer than the

sepals, linear-oblong, cano-tomentose. *Pollen-grains* large, 5-6-gonous, compressed. *Ovary* ovoid, densely hirsute, angular, 2-celled, dissepiment perforate; style short, glabrous above. *Fruit* not seen.

5. **ERYTHROPALUM**, Blume.

Climbing cirrhose shrubs. *Leaves* alternate, petiolate, simple, palmi-nerved. *Tendrils* axillary. *Peduncles* axillary, dichotomous, ultimate pedicels umbellate, ebracteate. *Flowers* hermaphrodite (monœcious *Blume*). *Calyx* adherent, limb 4-5-parted. *Corolla* rotate-campanulate, deeply 5-lobed, lobes valvate. *Stamens* 5, opposite the petals, filaments very short; anthers incurved, adnate, introrse, 2-celled, dehiscing lengthwise at the sides; connective thick. *Staminodes* 5, alternate with the lobes of the calyx, and springing with the stamens from the throat of the corolla. *Ovary* semi-adherent, obconic, tapering at the apex into a short style, 1-celled, sometimes (always?) provided with an epigynous disk; stigma minute 3-lobed; ovules 1-3, pendulous from the apex of the ovarian cavity, naked. *Fruit* fleshy, indehiscent, ovoid-oblong or clavate, surmounted by the remains of the calyx, 1-celled; epicarp (calyx?) ultimately separating from the fruit in 3-5 fleshy, reflexed valves. *Seed* 1, pendulous, albumen fleshy; embryo minute.—**DISTRIB.** The following are the only known species:—

1. **E. scandens**, *Blume Bijdr.* 921; leaves glabrous membranous ovate or oblong-lanceolate acuminate, base subpeltate rounded or acute, flowers less than $\frac{1}{2}$ in. *Miq. Fl. Ind. Bat. i. pt. i.* 704; *Wall. Cat.* 9033, without name. *Cocculus calophyllus*, *Wall. Mss. in herb.*

SILHET, *Wallich*; KHASIA MTS., alt. 2-2400 ft., *H. f. & T.*; PEGU, *Kurz*; MALACCA, *Maingay*.—**DISTRIB.** Java.

Branches striated, glabrous. *Leaves* 5 by $2\frac{3}{4}$ in., 3-7-nerved, glaucous beneath. *Tendrils* (abortive peduncles) simple or bifid, thickened towards the apex. *Cymes* axillary, lax, much branched, many-flowered, peduncles 3-4 in.; branches divaricate, ultimate pedicels umbellate, longer than the flower. *Bracteoles* minute. *Calyx* cup-shaped, obscurely 4-5 toothed. *Corolla* deeply 5-parted, lobes ovate. *Ovary* ovoid, style short. *Fruit* $\frac{3}{4}$ -1 in. by $\frac{1}{2}$ in., 1-celled, epicarp, (persistent calyx), yellowish, ultimately separating from above downwards into 3-4 valves.

2. **E. populifolium**, *Mast.*: leaves subcoriaceous ovate or roundish acuminate, base cordate subpeltate, flowers exceeding $\frac{1}{2}$ in. *Mackaya populifolia*, *Arn. in Mag. Zool. Bot.* 1838, ii. 531.

TRAVANCOR, at Courtallum, *Wight*.

Glabrous. *Leaves* 5 by $4\frac{3}{4}$ in., 3-7-nerved, glaucous beneath; petiole $1\frac{1}{2}$ in. *Peduncles* axillary, 1 or more together, or on a short thick spur, slender, dichotomous, few-flowered, pedicels longer than the flowers. *Calyx* cup-shaped, obscurely 5-toothed. *Corolla* rotate, deeply 5-parted, lobes oblong, much longer than the calyx. *Ovary* ovoid, semi-adherent, 1-celled; style short, subulate; ovules 3. *Fruit* $\frac{3}{4}$ in., oblong or ellipsoid.

3. **E. vagum**, *Mast.*; leaves subcoriaceous ovate-oblong obtuse or acute, base subpeltate cordate, ovary with an epigynous disk. *Modecopsis vaga*, *Griff. Notul.* iv. 633; *Ic. Pl. Ind. Or.* 628.

TROPICAL HIMALAYA, from Nipal to Mishmi and Assam; MALACCA, *Griffith*.

Leaves $6\frac{1}{2}$ by $4\frac{1}{2}$ in., 5-7-nerved; petiole 2 in. *Peduncle* 7-8 in. *Calyx-tube* obconic, margin obscurely 5-toothed. *Corolla* deeply 5-lobed; lobes herbaceous, oblong-ovate, reflexed. *Filaments* filiform, anthers minute. *Ovary* ovoid-oblong, 1-celled, epigynous disk large, 5-lobed, lobes opposite the sepals; style short, subulate, stigma minute;

ovules 3, pendulous, anatropal. *Fruit* 1 in., ovoid-oblong, surmounted by the remains of the disk, epicarp fleshy whitish; mesocarp somewhat bony, brownish; endocarp whitish, spongy. *Seed* solitary, large, pendulous, ovoid, acute below, without coat or distinction of parts except a trace of a radicle (Griffith).—The structure of the seed requires further investigation. Materials are wanting for this purpose.

6. STROMBOSIA, Blume.

Trees or shrubs. *Leaves* alternate, petioled, simple, 1-nerved. *Inflorescence* cymose, cymes short. *Flowers* regular, hermaphrodite, dichlamydeous. *Calyx* cup-shaped, more or less 5-lobed, inferior, or partly superior. *Petals* 5, free, hairy within. *Stamens* 5, opposite the petals and adnate to their base; anthers 2-celled, introrse. *Staminodes* 0. *Ovary* wholly superior, or partly inferior, imperfectly 4-5-celled, surrounded by a perigynous 5-lobed disk; style simple; ovules 4-5, pendulous from a central placenta. *Fruit* drupaceous, surmounted by the remains of the calyx-lobes and of the style; stone crustaceous. *Seed* pendulous, embryo minute within fleshy albumen.—DISTRIB. Species 6, natives of the Western peninsula, Ceylon and the Archipelago. In the Indian species I find the flowers cleistogamous.

SECT. 1. *Eustrombosia*. *Ovary* free.

1. *S. javanica*, *Blume Bijdr.* 1154; *Mus. Bot. Lugd. Bat.* i. 251 c. ic.; leaves oblong acuminate entire, base rounded, calyx obscurely 5-lobed. *Miq. Fl. Ind. Bat.* i. 787.

EASTERN PENINSULA; TENASSERIM, *Helper*; Penang, *Wallich*; Malacca, *Maingay*

A lofty tree with hard white wood. *Branches* terete, purplish, glabrous. *Leaves* 6-7 by 3 in., coriaceous, glabrous; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Flower-bud* ellipsoid. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in., greenish, in short axillary cymes, which scarcely exceed the petiole. *Calyx* shallow, free, but accrescent and adherent to the fruit. *Petals* 5, much exceeding the sepals, oblong, coriaceous, slightly hairy within near the revolute tip. *Stamens* 5, $\frac{1}{2}$ shorter than the petals. *Ovary* conical, style short. *Fruit* drupaceous, turbinate, substipitate, by abortion 1-seeded.—Although the ovary of this species is free, the fruit is adherent (Blume confirmed by Baillon).

SECT. 2. *Lavallea* (*Buillon*, genus). *Ovary* more or less adherent to the calyx-tube.

2. *S. ceylanica*, *Gardn. in Calc. Journ. Nat. Hist.* vi. 350; leaves inequilateral oblong-lanceolate acuminate entire, calyx 5-fid. *Miq. Fl. Ind. Bat.* i. pt. i. 787; *Bedd. Fl. Sylv.* t. 137. *Strombosia javanica*, *Thwaites Enum.* 42, not of Blume. *Sphærocarya leprosa*, *Dalz. in Hook. Kew Journ.* iii. 34; *Dalz. & Gibs. Bomb. Fl.* 223. *Lavallea ceylanica*, *Baill. Adansonie*, ii. 361.

WESTERN PENINSULA; in the Concan and Canara. CEYLON, in forests of the Central province, alt. 3000 ft.

A tree or shrub with greyish bark. *Leaves* 6 by 2½ in., glabrous, coriaceous, base rounded or somewhat tapering; petiole $\frac{1}{2}$ in. *Flower-buds* oblong-clavate. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in., subsessile, in axillary glomerules, or on a thick spur. *Calyx-lobes* rounded, ciliate. *Petals* 3 times longer than the calyx-lobes, acute, hairy within, tips ultimately reflexed. *Ovary* 4-5-celled below, ovules 5. *Fruit* 1 in., pyriform, rugose, deep purple, apiculate, scaly, tuberculate when ripe.—The species varies in stature and in the form of the leaf. The Cingalese forms have often more oblique leaves than those from the Peninsula.

7. **ANACOLOSA**, Blume.

Shrubs or trees. *Leaves* alternate, petiolate, simple, 1-nerved. *Inflorescence* cymose, axillary. *Calyx* cup-shaped, 5-7-toothed, not accrescent. *Petals* 5-7, free, valvate, springing with the stamens from an hypogynous or perigynous disk. *Stamens* concealed in the cavity of the petals and slightly adnate to their base, filaments glabrous, or pilose at the apex; anthers basifixed, 2-celled, dehiscing longitudinally. *Ovary* imperfectly 2-3-celled below, 1-celled above; style simple, stigma shortly lobed; ovules 2-3, pendulous from a central placenta. *Fruit* drupaceous, surrounded by the accrescent disk; stone crustaceous, 1-seeded. *Seed* pendulous; embryo minute, at the apex of fleshy albumen, radicle superior thicker than the cotyledons.—**DISTRIB.** Species 5 or 6, natives of Southern India, the Malay peninsula, and archipelago.

1. **A. densiflora**, *Bedd. in Trans. Linn. Soc. xxv.* 211, t. 22; *Fl. Sylv.* t. 138; leaves oblong acuminate, base rounded, cymes many-flowered dense, calyx glabrous.

TRAVANCOR, on the Anamallay hills, *Beddome*.

A lofty tree. *Branches* terete. *Leaves* 4-5 by $1\frac{1}{2}$ -2 in., glabrous, shining, entire; petiole $\frac{1}{4}$ in. *Cyme* 7-20-flowered, pedicels $\frac{1}{4}$ in., as long as the yellow fragrant flowers. *Flower-buds* ovoid, conic. *Calyx* cup-shaped, 4-6-toothed. *Petals* 4-6, ovate-lanceolate, reflexed at the tips, hispid within. *Filaments* glabrous, much shorter than the petals, anthers roundish glabrous. *Ovary* surrounded by a broad disk, 3-celled, cells 1-ovulate; style simple, scarcely so long as the ovary, stigma 3-lobed.

2. **A. illicoides**, *Mast.*; leaves oblong-lanceolate acute at both ends, cymes few-flowered lax, calyx glabrous.

KHASIA MTS., *J. D. H. & T. T.*

A small spreading tree. *Bark* grey. *Leaves* 5-6 by 2 in., glabrous, coriaceous; petiole $\frac{1}{2}$ in. *Peduncle* half the length of the petiole, dividing into 3 pedicels as long as itself, or cymes sessile, umbellate. *Flower-buds* ovoid, subglobose. *Calyx* glabrous, cup-shaped, 5-6-fid, lobes deltoid. *Petals* 5-6, 2 or 3 times longer than the sepals, coriaceous, oblong, inflexed at the points, hairy within just above the anther. *Filaments* broad, glabrous; anthers subglobose. *Ovary* depressed conic, imperfectly 3-celled; ovules 3. *Fruit* unknown.

3. **A. Griffithii**, *Mast.*; leaves lanceolate or ovate-lanceolate, cymes few-flowered, calyx glabrous.

TENASSERIM and ANDAMAN ISLANDS, *Griffith, Kurz.*

Shrub or tree? *Branches* slender, purplish. *Leaves* $2\frac{1}{2}$ by 1 in., coriaceous, glabrous; petiole $\frac{1}{4}$ in. *Cymes* axillary, sessile, or on a short scaly spur; pedicels half the length of the petiole. *Flower-buds* subglobose. *Calyx* cup-shaped, 5-6-toothed. *Petals* 2 or 3 times longer than the sepals. *Filaments* much shorter than the petals. *Ovary* conical, 2-3-celled; style short, stigma obscurely lobed; ovules 2-3.

4. **A. Maingayi**, *Mast.*; leaves suborbicular, base rounded, cymes few-flowered, calyx glabrous.

SINGAPORE, *Maingay*.

A tree or shrub? *Bark* grey, rugose, tubercled. *Leaves* about 2 in. each way, coriaceous, glabrous, venation obscure; petiole $\frac{1}{2}$ in. *Cymes* axillary; pedicels glabrous, shorter than the petiole, each with 2-3 minute, squamiform bracts at the base. *Flower-buds* oblong. *Calyx* cup-shaped, minutely 5-toothed. *Petals* 5, oblong, valvate. *Filaments* glabrous, much shorter than the petals; anthers oblong. *Ovary* surrounded by a 5-lobed disk, imperfectly 3-celled; style as long as the ovary, stigma 3-lobed ovules 3, pendulous. *Fruit* the size of a pea, glaucous, globose.

5. **A. puberula**, *Kurz in Journ. As. Soc. Beng.* 1872, ii. 297; leaves oblong or ovate-oblong acuminate, base acute, calyx puberulous.

ANDAMAN ISLDS., *Kurz*.

A large shrub. *Leaves* 5-6 in., shortly petioled, glabrous, coriaceous. *Peduncles* short, erect, puberulous, springing from a short, thick, axillary spur. *Calyx* covered with yellowish down (*Kurz*).—I have not seen this species.

6. **A. ? heptandra**, *Maingay in herb.*; leaves lanceolate, base acute, calyx puberulous, filaments hairy.

MALACCA, *Maingay*.

A shrub or tree. *Leaves* 6 by 2 in., coriaceous, glabrous; petiole $\frac{1}{4}$ in. *Peduncles* 4-6, axillary, tufted, about the length of the petiole, puberulous. *Flower-buds* oblong-truncate. *Flower* $\frac{1}{2}$ in. *Calyx* cup-shaped, 5-toothed. *Petals* 5 (7, *Maingay*), valvate, coherent, ultimately free, coriaceous, oblong, obtuse, concave, triangular at the apex, hairy on the middle of the inner surface, edges membranous. *Stamens* 5 (7, *Maingay*), hypogynous, opposite the petals, filaments broadly strap-shaped, bilobed at the apex, and provided with a tuft of bristly hairs; anthers minute, didymous, concealed by the hairs of the filament; pollen-grains triangular. *Ovary* depressed-globose, lobed, surrounded by an annular disk, imperfectly 2-3-celled; style conic-fusiform as long as the ovary, stigma minutely 2-3-toothed; ovules 2-3, pendulous.—A remarkable species. The flowers I examined were pentamerous. *Maingay* says in a note that it agrees with *Anacolosa* in all respects but the heptamerous flowers.

8. **SCHÆPFIA**, Schreb.

Trees. *Branches* terete or angular. *Leaves* alternate, simple, petiolate. *Racemes* axillary, many-flowered. *Flowers* fragrant, yellow. *Epicalyx* cup-shaped, deeply 3-lobed. *Calyx* adherent to the ovary, limb obsolete. *Corolla* perigynous, tubular, limb 4-5-parted. *Stamens* 4-5, epipetalous, filaments slender; anthers free, glabrous, 2-celled, attached below the middle to the apex of the filament; pollen triangular. *Ovary* half-superior, surmounted by a fleshy epigynous disk, 3-celled beneath, 1-celled at the top; style cylindric, stigma capitate, 3-lobed; ovules 3, cylindric, pendulous from the apex of a central placenta. *Fruit* drupaceous, surrounded at the base by the persistent epicalyx, marked above by the remains of the calyx and corolla; stone thin, striated, 1-celled, 1-seeded. *Embryo* minute, in the apex of fleshy albumen, radicle superior, cotyledons plano-convex.—**DISTRIB.** Species 3-4, natives of the Himalaya and of tropical South America.

1. **S. fragrans**, *Wall. Tent. Fl. Nep.* 18, t. 9; leaves narrow lanceolate acuminate. *Roxb. Fl. Ind.* ii. 188; *Griff. Ic. Pl. Ind. Or.* 629. *S. odorata*, *Wall. Cat.* 485.

NIPAL, *Wallich*. KHASIA MTS., *Griffith*.

A small tree. *Bark* corky, whitish. *Branches* terete, smooth. *Leaves* scattered, 2-3 by $\frac{1}{2}$ - $\frac{3}{4}$ in., acute at both ends; petiole $\frac{1}{4}$ in., channelled above. *Racemes* half the length of the leaves; rachis slender, pedicels 6-8, each $\frac{1}{2}$ -1 in. *Flowers* $\frac{1}{4}$ in. *Lobes of the epicalyx* imbricate, ciliate. *Corolla* double the length of the calyx-tube, tubular or funnel-shaped, limb 5-lobed; lobes lanceolate, acute, valvate, with a tuft of hairs on the centre of the inner surface. *Filaments* attached to the petals for nearly their whole length; anthers on a level with the hairs on the petals, connective prolonged above. *Ovary* nearly twice the length of the calyx.—The plant varies considerably in the size of the leaves and flowers. I have followed *Wallich*'s description of the epicalyx, the three bracts of which differ from the calyx of *Anacolosa* and *Cathedra* (with which they are compared by *Bentham*) in their unequal size and their imbrication.

2. **S. acuminata**, Wall. Cat. 486; leaves oblong-lanceolate acute, flowers $\frac{1}{2}$ in.

SILHET and the KHASIA Mts., Wallich, &c.; MISHMI HILLS, Griffith.

A tree. Young branches angular. Leaves 6 by $1\frac{3}{4}$ –2 in., glabrous, very acute at the apex, less so at the base; petiole $\frac{1}{4}$ in. Pedicels $\frac{1}{4}$ in. Epicalyx cup-shaped, scarcely lobed. Corolla $\frac{1}{2}$ in., yellow, fragrant, tubular-campanulate, limb 5-lobed; lobes valvate, ovate-acute, hairy within. Stamens and ovary as in *S. fragrans*.—This differs from *S. fragrans* in its broader leaves, shorter pedicels, and much larger flowers.

In the herbarium are specimens from Griffith collected in Bhotan (n. 1819), which are very imperfect, but which apparently belong to a third species of *Schapfia*, characterized by short ovate or oblong-acute leaves, with closer venation than in *S. fragrans* or *S. acuminata*.

9. CANSJERA, JUSS.

Climbing shrubs, sometimes spiny. Leaves alternate, shortly petioled, 1-nerved. Flowers bracteate, in dense axillary spikes, monochlamydeous, hermaphrodite. Perianth regular, 4–5-parted, lobes valvate. Fertile stamens as many as the lobes of the perianth, and opposite to them, filaments glabrous, free, or adnate at the base to a thickened disk; anthers small, oblong, adnate, 2-celled, dehiscing longitudinally. Staminodes (glands of disk) 4–5, hypogynous, alternate with the stamens, ovoid or subtriangular, fleshy. Ovary superior, ovoid-conical, 1-celled; style cylindric, stigma capitate 4-lobed, lobes alternating with the fertile stamens; ovule solitary, pendulous. Fruit drupaceous, surrounded at the base by the marcescent perianth; stone bony. Seed solitary, erect, roundish; embryo in the upper part of the fleshy albumen, radicle superior, cotyledons sometimes 3 very long plano-convex.—DISTRIB. Species 3–4, natives of Tropical Asia and Australia.

In the description of the ovary and seed I have followed Griffith, as my observations coincide with his. Benthams finds a true calyx, which others have not been able to see, nor have I been able to detect one. Miers says the ovary is 4-celled at the base, but I have only seen it 1-celled, as Benthams describes it. Many authors, including Meissner and Miers, place this genus in *Thymelacææ*, an arrangement I myself prefer, but in default of more certainty as to the real structure of the flower, the genus is here retained in *Olacineæ*.

1. **C. Rheedii**, Gmel. Syst. i. 280; leaves glabrous ovate or oblong-lanceolate, spikes axillary solitary or twin. Wall. Cat. 1043, B; Wight Ic. t. 1861; Bedd. Flor. Sylvat. Anal. Gen. t. xxvi.; Thwaites Enum. 251; Brandis. For. Flor. 75. C. scandens, Roxb. Cor. Pl. 103; Fl. Ind. i. 441. C. malabarica, Lamk. Dict. iii. 433. C. zizyphifolia, Griff. Notul. iv. 360, t. 537, f. 1. C. martabanica, Wall. Cat. 7266. Salvadora persica, Wall. Cat. 1042, not of Linn. Olax? sumatrana, Miq. Fl. Ind. Bat. Suppl. i. 342. Opilia amentacea, Wall. Cat. 2331. Struthiola scandens, Wall. Cat. 2331.—Rheede Hort. Mal. vii. t. 2, 4.

UPPER GANGETIC PLAIN, in forests of Oude; WESTERN PENINSULA, from the Concan and Dekkan southwards. EASTERN PENINSULA, in Martaban and Malacca.—DISTRIB. Indian Archipelago, Hong Kong, N. Australia.

A climbing evergreen shrub. Branches divaricate sometimes spiny, younger ones, as well as the inflorescence petioles and tube of flower, pubescent. Leaves $1\frac{1}{2}$ –3 by $\frac{3}{4}$ – $1\frac{1}{4}$ in., coriaceous, yellowish and rugose when dry, base rounded, sometimes oblique; nerves depressed, arching, evanescent towards the apex; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. Spikes about 1 in., dense, many-flowered. Bracts minute. Flowers yellow. Perianth $\frac{1}{2}$ – $\frac{3}{4}$ in., urceolate, limb 4–5-parted. Fruit $\frac{1}{2}$ – $\frac{3}{4}$ in., ellipsoid or ovoid, orange-red, surmounted by the remains of the style.

2. **C. parvifolia**, Kurz in Journ. As. Soc. Beng. 1872, ii. 298; leaves pubescent and pilose rounded or ovate acute.

TENASSERIM, Helfer.

A shrubby climber? Shoots, leaves and inflorescence pubescent and with stiff forked hairs. Leaves $\frac{3}{4}$ by $\frac{2}{3}$ in., coriaceous, base rounded; petiole very short. Bracts ovate, acute. Perianth $\frac{1}{2}$ in., funnel-shaped or urceolate, limb 4-parted; lobes ovate, ultimately spreading. Stamens 4, free, springing from a perigynous disk, opposite the lobes of the perianth; anthers small, introrse. Glands of disk (staminodes) ovoid, acute, fleshy. Ovary oblong.

10. LEPIONURUS, Blume.

Arborescent. Leaves alternate, shortly petioled, simple, 1-nerved. Inflorescence axillary, of numerous densely packed trichotomous umbellate cymes, each subtended by an ovate bract. Flowers monochlamydeous, regular, hermaphrodite. Perianth urceolate, limb 4-parted; lobes valvate, glabrous within. Stamens equal in number to the lobes of the perianth and opposite to them; anthers glabrous. Staminodes 0. Disk fleshy, yellow, lining the base of the perianth-tube. Ovary free, oblong, conical; stigma sessile 4-lobed; ovule solitary. Fruit drupaceous, glabrous, stone crustaceous. Seed pendulous; embryo small, in the axis of fleshy albumen, radicle terete, cotyledons ternate.—DISTRIB. Species 2, natives of Tropical Asia.

1. **L. oblongifolius**, Mast.; leaves oblong or obovate-lanceolate acuminate. Leptonium oblongifolium, Griff. in Calc. Journ. Nat. Hist. iv. 236. Opilia acuminata, Wall. Cat. 7206 F.

EASTERN BENGAL, ASSAM, and the KHÁSIA Mts., ascending to 2000 ft. ABOR HILLS, Griffith; TENASSERIM at Mergui, Griffith. MALACCA, Maingay.—DISTRIB. Java, Sumatra.

Branches greenish, subangular, glabrous. Leaves 5-7 by $1\frac{3}{4}$ - $2\frac{3}{4}$ in., membranous, glabrous, base acute; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. Pedicels twice the length of the petiole. Bracts thin, membranous, roundish, imbricating when young. Flowers minute. Fruit $\frac{1}{2}$ by $\frac{1}{4}$ in.—The flowers are minute and the specimens very imperfect, hence the flowers are differently described by different authors. In the absence of more complete material, it is not possible to decide which view is the more correct. In the generic description I have followed Griffith, as the results of my own examinations, so far as they have gone, are in accordance with his. Wallich's 7464 A may possibly also belong to this genus, but the material is too scanty for accurate determination. Its flowers are in axillary spikes, and have a monochlamydeous, 5-parted, campanulate perianth, isomerous stamens opposite the lobes, 2-celled anthers dehiscing longitudinally and a free roundish ovary.

11. OPILIA, Roxb.

Scandent shrubs or low trees. Leaves alternate, distichous, simple, entire, 1-nerved, shortly petioled. Flowers numerous, in axillary, racemose cymes, each cyme umbellate. Bracts deciduous. Calyx minute, annular; obscurely 5-toothed, not accrescent. Petals 5. Fertile stamens 5, free, opposite the petals; anthers 2-celled, dehiscing longitudinally. Glands of the disk (staminodes) alternating with the petals, thick, fleshy. Ovary free, sessile, 1-celled; style short, stigma minute; ovule solitary, pendulous. Fruit drupaceous. Seed albuminous; radicle superior.—DISTRIB. Species 1 or 2 natives of the tropics of the Old World.

1. **O. amentacea**, Roxb. Cor. Pl. ii. t. 158; Fl. Ind. ii. 87; leaves ovate or ovate-lanceolate. Wight Ill. t. 40; Thwaites Enum. 41; Miq. Fl. Ind.

Bat. i. pt. i. 784; *Bedd. Fl. Sylv. Anal. Gen.* t. ix. f. 3. *O. javanica*, *Miq. Fl. Ind. Bat.* i. pt. i. 174. *Ximenia* ? *olacoides*, *W. & A. Prodr.* i. 89.

WESTERN PENINSULA; Northern Circars, *Roxburgh*; *Pulney Mts.*, *Wight*; *PEGU, Kurz*; *CEYLON*, in hot dry parts of the island, *Thwaites*.—DISTRIB. Islands of the Archipelago, tropical Australia and Africa.

A low scrambling shrub, or small weak tree; herbaceous portions puberulous. *Leaves* 2–4 by $1\frac{1}{2}$ –2 in., coriaceous, glabrous, ovate, or ovate-lanceolate, entire, 1-nerved, arch-nerved, base tapering; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Racemes* 1– $1\frac{1}{2}$ in., erect, before flowering resembling cones. *Flowers* crowded. *Bracts* imbricate, at first concealing the flowers, peltate, roundish, deciduous. *Pedicels* $\frac{1}{2}$ in., puberulous. *Flowers* $\frac{1}{2}$ in. *Calyx* minute. *Petals* 5, deciduous, each $\frac{1}{2}$ in., oblong, obtuse, alternating with the lobes of the calyx. *Glands* (staminodes?) oblong, obtuse, half the length of the stamens. *Drupe* ovoid or globose. *Embryo* linear nearly as long as the albumen.—*Beddome* describes the ovule as erect, but this is probably an oversight.

12. LASIANTHERA, Pal. de Beauv.

Shrubs or trees, sometimes scandent. *Leaves* petioled, alternate, simple, 1-nerved, coriaceous. *Cymes* axillary, stalked. *Flowers* dichlamydeous, hermaphrodite or unisexual. *Calyx* minute, cup-shaped, 4–5-lobed. *Petals* 4–5, free or rarely cohering, without an inflexed point and with no prominent midrib. *Stamens* 5, hypogynous, free, alternate with the petals, filaments flat, dilated above, hairy behind, hairs curving over the anther in the bud; anthers adnate, 2-lobed, debiscing lengthwise. *Hypogynous disk* cup-shaped, more or less lobed. *Ovary* ovoid, 1-celled, tapering into a subulate style, terminated by a minute stigma; ovules 2, pendulous. *Fruit* drupaceous; stone fibrous outside, woody within. *Seed* pendulous; embryo in albumen, cotyledons leafy broad, radicle superior (*Thwaites*).—DISTRIB. Species 4–5, 1 African, the others Malayan.

1. **L. apicalis**, *Thwaites Enum.* 43 and 403; leaves obovate-oblong shortly and abruptly acuminate, petals free or nearly so, fruit ellipsoid. *Bedd. Fl. Sylv.* t. 139. *Urandra apicalis*, *Thwaites in Hook. Kew Journ.* vii. 211. *Stemonurus apicalis*, *Miers in Trans. Linn. Soc.* xxii. 110; *Contrib.* i. 305. ? *S. secundiflorus*, *Blume Bijdr.* 649. *Lasianthera secundiflora*, *Miq. Fl. Ind. Bat. Suppl.* i. t. ii.

CEYLON; in damp forests, alt. 1–3000 ft., *Thwaites*.—DISTRIB. Borneo.

A large tree. *Branches* terete, glabrous. *Leaves* 4–6 by 2–3 in., coriaceous, glabrous, midrib depressed above, prominent beneath, base tapering into a short petiole, $\frac{1}{4}$ – $\frac{1}{2}$ in. *Peduncles* about as long as the petiole, axillary, subsolitary, cymes congested 7–12 fl. *Flowers* greenish-purple. *Calyx* cup-shaped, 5-lobed, lobes roundish. *Petals* 3 or 4 times longer than the calyx, ovate or roundish. *Stamens* as long as or longer than the petals. *Ovary* ovoid, surrounded by an hypogynous cupular lobulate disk, tapering above into a subulate style, stigma minute. *Drupe* $1\frac{1}{4}$ by $\frac{3}{4}$ in., stone woody lacunose, mesocarp fibrous. *Testa* consolidated with the pericarp. *Embryo* half the size of the albumen; cotyledons leafy, cordate-ovate, acute, as long as the superior radicle. (*Thwaites*.)

2. **L. malaccensis**, *Mast.*; leaves oblong-lanceolate abruptly acuminate, calyx puberulous, petals coherent.

MALACCA, *Maingay*.

A scandent shrub (*Maingay*). *Leaves* $4\frac{1}{2}$ – $5\frac{1}{2}$ by 2 in., coriaceous, glabrous, midrib prominent, secondary nerves obscure; petiole scarcely $\frac{1}{2}$ in. *Cymes* axillary, stalked; peduncle compressed, as long as the petiole; pedicels shorter than the flowers, ascending. *Flowers* $\frac{1}{4}$ in. *Calyx* shallow, lobes deltoid acute. *Petals* 4–5 times longer than the calyx, slightly coherent, externally glabrous, linear, spotted within. *Filaments* flat,

dilated above, slightly hairy in front beneath the anther, densely so behind. *Hypogynous disk* cup-shaped, more or less 5-lobed, lobes opposite the petals. *Ovary* half the length of the stamens, ovoid, rugulose; style conic, stigma minute. *Fruit* unknown.

3. **L. Maingayi**, *Mast.*; leaves ovate or ovate-lanceolate acute or sub-acute, base acute, fruit small ovoid obtuse.

MALACCA, *Maingay*.

A shrub about 4 ft. (*Maingay*). *Branches* virgate. *Leaves* 2-3 by $\frac{3}{4}$ -1 in., coriaceous, glabrous; petiole $\frac{1}{4}$ in. *Peduncle* axillary, about the length of the petiole, dichotomous, ultimate pedicels drooping, shorter than the flowers. *Flowers* pendulous, $\frac{1}{2}$ in. MALE fl.: *Calyx* minute, cup-shaped, 4-5 toothed, teeth shallow acute. *Petals* 4-5, much exceeding the calyx, free, coriaceous, oblong-acuminate, (acumen inflexed,) glabrous on both surfaces or slightly pilose within, midrib prominent on the inner surface. *Stamens* 4-5, filaments flat, with a tuft of hairs at the back curving over the anther. *Pistil* rudimentary. FEMALE fl.: *Fruit* $\frac{1}{4}$ - $\frac{1}{2}$ in., 1-celled, 1-seeded.

4. **L. ? lanceolata**, *Mast.*; leaves lanceolate pointed at both ends, cymes terminal, petals free villous internally.

MALACCA, Mt. Ophir, *Griffith*.

Leaves 4-5 by $\frac{3}{4}$ -1 in., glabrous; petiole $\frac{1}{4}$ in. *Cymes* terminal, half the length of the leaf; peduncle trichotomous; pedicels divaricate, densely tomentose, shorter than the flower. *Flower-buds* clavate. *Flowers* hermaphrodite. *Calyx* cup-shaped, 5-toothed. *Petals* 4-5, ultimately free, lanceolate, inflexed at the apex and marked with a prominent nerve. *Stamens* 4-5, filaments flat, shorter than the petals, pilose in front beneath the anther, densely so behind, hairs curling over the anther. *Ovary* ovoid, conical; style short, stigma minute.—This may be a form of some *Gomphandra*.

13. **GOMPHANDRA**, Wall.

Trees. *Leaves* alternate, petioled, simple, 1-nerved. *Cymes* axillary, terminal or opposite the leaves. *Flowers* dichlamydeous, hermaphrodite, or polygamo-dioecious. *Calyx* minute, cup-shaped, 4-5-lobed. *Corolla* campanulate, 4-5-lobed; lobes acuminate, inflexed, rarely entirely free, midrib prominent within. *Stamens* 5, hypogynous, alternate with the petals, filaments thick, dilated above, hairy at the back, hollowed in front to receive the anthers; anthers pendulous from the filiform apex of the filament, 2-lobed, dehiscing lengthwise; pollen-grains triangular. *Hypogynous disk* thick, annular or 0. *Ovary* effete in the male, oblong in the female flower, 1-celled; style conic, stigma minute or style crowned by a stigmatiferous disk; ovules 2, collateral, pendulous, funicle dilated into an "obturator." *Fruit* drupaceous, surmounted by the remains of the disk (stigma?), stone crustaceous. *Seed* pendulous, surrounded by the raphe, albumen fleshy bipartite; embryo minute.—DISTRIB. Species 5-6, natives of tropical Asia.

Owing to the frequently unisexual flowers and the imperfection of the materials, great confusion exists in books as to the characters and limitations of the genera *Gomphandra* and *Stemonurus*. This arises chiefly from the difficulty of determining and correlating the variations in the structure of the ovary. In some cases, in the male flowers, there is a rudimentary pistil with a subulate style; in other cases this is developed into a fertile ovuliferous ovary, the style retaining its conical shape. In a third series (the true female flowers) the ovary is oblong and is apparently surmounted by a fleshy discoid stigma. Miers, however, considers this stigma-like body to be in reality an accrescent epigynous disk concealing the true style and stigma. The exact relation of these forms one to the other, and their true nature cannot be surely determined from dried specimens. From *Lasianthera*, the most striking difference is the form of the hypogynous disk.

1. ***G. axillaris***, Wall. *Cat.* 3718; leaves lanceolate, cymes axillary about the length of the petiole, flowers unisexual or polygamous. *Bedd. Fl. Sylv.* lxi. *Lasianthera* ? tetrandra, Wall. in *Roxb. Fl. Ind. ed. Carey*, ii. 327. *Platea axillaris*, *Thwaites Enum.* 44; *Dalz. & Gibs. Bomb. Fl.* 28. *Stemonurus axillaris*, longifolius, Heyneanus, and ceylanicus, *Miers Contrib.* i. 90-93. *S. polymorphus*, *Miers l.c.* i. 87, partly. *Olex Heyneana*, Wall. *Cat.* 6780. *O. longifolia*, Wall. *Cat.* 6782, A partly, 6782 B. *Gomphandra polymorpha*, *Wight Ic.* 954, ♀ partly.—*Dicæcia pentandra*, Wall. *Cat.* 6780 B.

SILHET, Wallich; WESTERN PENINSULA from the Concan southwards; CEYLON, from the sea level to 4000 ft., *Thwaites*.

A small tree or large shrub, glabrous, or the terete branches slightly puberulous. *Leaves* $2\frac{1}{2}$ – $5\frac{1}{2}$ by 1 – $2\frac{1}{2}$ in., submembranous, conspicuously nerved, base acute; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Cymes* puberulous. *Calyx* minute, 4–5-toothed, slightly ciliated. *Corolla* 4–5 times longer than the calyx, tubular-campanulate, limb 4–5-lobed; lobes ovate, acuminate, point inflexed, ultimately spreading. *Filaments* flat, pilose at the apex. *Ovary* small, oblong, smooth; style conic, stigma minute; disk accrescent. *Fruit* $\frac{1}{2}$ in., oblong, obtuse, smooth, crowned by the remains of the stigma. *Seed* large, integument striated; cotyledons very large, semicylindric, amygdaloid, obtuse, radicle superior (Wallich).—Wallich describes the stigma as fleshy, broadish, subcapitate, but my own examination of Wallich's specimens agrees with that of Miers' description and figure. What Wallich took for the stigma may thus be the epigynous disk of which Miers elsewhere makes mention. The Silhet habitat is derived from Wallich's specimen of his number 6782. There is no other authority for this plant occurring in Eastern India.

2. ***G. polymorpha***, *Wight Ill.* 103; *Ic.* 953 (not 954); leaves coriaceous roundish to lanceolate, base tapering, cymes terminal or opposite the leaves, very rarely axillary, two or three times longer than the petiole, flowers polygamous. Wall. *Cat.* 9024. *G. coriacea*, *Wight Ill.* i. 103; *Bedd. Fl. Sylv. Anal. Gen.* t. ix. *Stemonurus polymorphus*, coriaceus, *Walker and Gardner*, *Miers Contrib.* i. 87. *Platea Wightiana*, *Miers*, l.c. i. 98.

WESTERN PENINSULA, Nilghiri Mts., *Wight*; CEYLON.

A small tree or large shrub, glabrous, or the young parts and leaves slightly puberulous. *Leaves* 2–6 by $\frac{1}{2}$ – $2\frac{1}{2}$ in., more or less coriaceous, opaque, inconspicuously veined; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Cymes* puberulous. *Flower-buds* oblong-clavate. *Flowers* $\frac{1}{2}$ in., 4–5-merous, hermaphrodite or unisexual. *Calyx* minute. *Corolla* campanulate, lobes acuminate, points inflexed. *Stamens* glabrous or slightly puberulous, free, or ultimately agglutinated into a tube, at length exserted. *Ovary* on an hypogynous disk; style short, conic, stigma minute. *Fruit* $\frac{1}{2}$ – $\frac{3}{4}$ in., oblong or obovoid, reddish-brown.—The plant figured by Wight *Icon.* 953, as the male of this species has, as shown, hermaphrodite flowers, and the stamens are destitute of hairs. Miers in consequence, refers it to his *Platea Wightiana*, but it differs from *Platea* in the coherent petals and acute, not discoid, stigma. It is apparently the same form as Wight's *G. coriacea*.—Very variable. *Wight Ill.* p. 103, distinguishes the following varieties:—

VAR. 1. *acuminata*, leaves oval attenuate at both ends terminating in a longish linear acumen.

VAR. 2. *oblongifolia*, leaves linear-oblong obtuse at both ends abruptly acuminate.

VAR. 3. *angustifolia*, leaves 5–7 by 1–2 in. narrow linear-lanceolate acuminate, base acute.

VAR. 4. *longifolia*, leaves 5–7 by 1–2 in. linear acuminate, base rounded.

VAR. 5. *ovalifolia*, leaves 2–3 by $1\frac{1}{2}$ in. oval, obtuse at both ends or shortly acuminate.

3. ***G. affinis***, *Mast.*; leaves glabrous oblong-lanceolate, base acute, cymes axillary 2–3 times longer than the petiole, flowers hermaphrodite.

Stemonurus prasinus, *Blume Mus. Bot.* i. 249. *S. affinis*, *Miers Contrib.* i. 94. *Lasianthera prasina*, *Miq. Fl. Ind. Bat.* i. 791.

MALACCA, *Griffith, Maingay*.—DISTRIB. JAVA.

A tree or shrub. *Branches* angular, tortuous. *Leaves* $3\frac{1}{2}$ – $1\frac{1}{2}$ in., petiole $\frac{1}{2}$ – $\frac{1}{4}$ in. *Pedicels* pubescent. *Calyx* 4–5-toothed. *Corolla* $\frac{1}{2}$ in., tubular-campanulate, 4–5-lobed, lobes ovate acute. *Filaments* hairy at the back near the top. *Ovary* cylindric, stigma large, discoid. *Fruit* oblong-ovate, narrowed at the base, surmounted by the remains of the stigma. *Seed* solitary, integument brown, traversed by the raphe, albumen copious; embryo minute, radicle superior, cotyledons plano-convex (*Griff. Mss.* in herb.)

4. **G. penangiana**, *Wall. Cat.* 7204; leaves oblong-acuminate, cymes extra-axillary erect much branched exceeding the petiole. *Stemonurus penangianus*, *Miers Contrib.* i. 90.

PENANG, *Wallich*; MALACCA, *Griffith, Maingay*. TENASSERIM, at Moulmein, *Lobb*.

A tree. *Shoots* terete, yellowish, glabrous. *Leaves* $5\frac{1}{2}$ by 2 in., coriaceous, glabrous, margins revolute, base tapering; petiole $\frac{1}{2}$ in. *Peduncles* 1 in. and upwards, setulose, 3–6-chotomous, ultimate pedicels shorter than the flower. *Flower* $\frac{1}{2}$ in. *Calyx* pateriform, 4–5-toothed. *Corolla* many times longer than the calyx, funnel-shaped; limb 4–5-fid, lobes acuminate inflexed at the point, midrib prominent on the inner surface. *Stamens* 4–5, free, hypogynous, filaments flat, hairy at the back. *Pistil* rudimentary. FEMALE fl.: *Ovary* very short, 5-angled, depressed at the top; style conical, tubular, 5-toothed at the apex (*Miers*). *Immature fruit* $\frac{1}{2}$ in., ovoid.—*Miers* describes the flowers of *Wallich's* plant as hermaphrodite. In *Griffith's* specimens, which are otherwise indistinguishable, they are unisexual. *Arnett* in *Ann. des Sc. Nat.* (Bot.) 1834, ii. 236, says, this plant does not belong to *Gomphandra*, but he gives no reason for this conclusion.

5. **G. tomentella**, *Mast.*; leaves pubescent beneath oblong-lanceolate acuminate, base acute, cymes axillary equalling the petiole, flowers hermaphrodite. *Stemonurus? tomentellus*, *Kurz in Journ. As. Soc. Beng.* 1872, ii. 298.

BIRMA, *Griffith*.

Arborescent. *Shoots*, petioles, under surface of leaves and inflorescence yellow-tomentose. *Leaves* 6–7 by $1\frac{1}{2}$ in.; petiole $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in. *Calyx* cup-shaped, 4–5-toothed. *Corolla* 4–5-parted, pubescent externally, lobes acute, inflexed. *Stamens* exserted, filaments pilose at the apex behind and slightly so in front beneath the anther. *Ovary* oblong, pilosulous, surmounted by a large discoid stigma.

6. **G.? crassipes**, *Mast.*; leaves lanceolate or oblong-lanceolate acuminate, pedicels pilose. *Stemonurus? crassipes*, *Kurz in Journ. As. Soc. Beng.* 1872, ii. 298.

PEGU, *Kurz*.

A shrub or small tree. *Leaves* 5–7 by 2 in., subcoriaceous, glabrous; petiole $\frac{1}{2}$ – $\frac{1}{4}$ in. *Cymes* axillary, as long as the petiole, pedicels $\frac{1}{2}$ in. *Calyx* coriaceous, cup-shaped, 5-toothed. *Immature fruit* $\frac{1}{2}$ – $\frac{1}{4}$ in., turbinate, glabrescent, purplish, surrounded at the base by the persistent calyx.—Imperfect specimens only known.

14. **APODYTES**, *E. Meyer*.

Trees or shrubs. *Leaves* alternate, petiolate, simple, coriaceous, usually black in drying. *Flowers* small, in terminal or axillary corymbose cymes. *Calyx* minute, cup-shaped, 5-toothed. *Petals* 5, free, valvate. *Stamens* 5, alternate with the petals, filaments dilated; anthers long or short, oblong, basifixed, sagittate, 2-lobed, dehiscing longitudinally; pollen triangular. *Ovary* 1-celled, obliquely gibbous; style excentric, curved, stigma small; ovules 2, pendulous, superposed. *Drupe* obliquely ovoid, compressed, stone

crustaceous. *Seed* pendulous; embryo small, in the apex of fleshy albumen, cotyledons narrow.—**DISTRIB.** Species 9, natives of tropical Asia and Africa.

* *Anthers* elongate, linear-oblong.

1. **A. Benthamiana**, *Wight Ic.* 1153; leaves glabrous oblong obtuse at both ends margins revolute, anthers and ovary puberulous. *Bedd. Fl. Sylv.* 140 var. a.

WESTERN PENINSULA in the NILGHIRI Mts. and Southern provinces, *Wight, Beddome*.

Branches terete, glabrous, shoots puberulous. *Leaves* 3–4 by 1–1½ in., coriaceous, black in drying; petiole ½–1 in. *Panicles* terminal, rigid, shorter than the leaves, pedicels puberulous. *Flowers* ¼ in. *Petals* inflexed at the point. *Ovary* hairy. *Drupe* ¾ by ½ in., ovoid, reniform, crowned with the persistent base of the style, and furnished with a lateral scutelliform appendage, 1-seeded. *Seed* pendulous, obovate-cuneate, compressed.

2. **A. Gardneriana**, *Miers in Ann. & Mag. Nat. Hist. ser. 2, vol. ix.* 389; *Contrib. i.* 58; leaves oblong acute at both ends abruptly acuminate, margins revolute, anthers glabrous, ovary slightly puberulous. *Thwaites Enum.* 42.

CEYLON; Central province, alt. 5–7000 ft., *Gardner, Thwaites*.

Bark wrinkled. *Leaves* 2–4 by ¾ in., black in drying; petiole ½ in. *Cymes* peduncled; terminal, pedicels divaricate or ascending, ultimate pedicels shorter than the flowers. *Buds* elongate, oblong. *Flowers* ½ in.

3. **A. Beddomei**, *Mast.*; leaves membranous broadly ovate acute acuminate, margins flat, anthers and ovary glabrous. *A. Benthamiana*, var. β , *Bedd. Fl. Sylv.* 140.

WESTERN PENINSULA in the Nilghiri Mts., and Travancore, *Wight, &c.*

Quite glabrous. *Leaves* 3–4 by 1½–2 in., black in drying, base rounded or acute; petiole ¼–½ in. *Pedicels* pilosulous, ultimate pedicels shorter than the flowers. *Buds* oblong, obtuse. *Flowers* ½ in. *Fruit* ¾ in., wrinkled.

** *Anthers* short, oblong.

4. **A. andamanica**, *Kurz Andam. Rep.* 5; *Journ. As. Soc. Beng.* 1872, ii. 298; leaves oblong acuminate not black in drying, cymes axillary short.

ANDAMAN ISLANDS, *Kurz*.

A small tree. *Branches* virgate, terete. *Leaf-buds* puberulous. *Leaves* 7–8 by 2½ in., glabrous, base obtuse or acute, midrib depressed above prominent beneath; petiole ½ in. *Cymes* peduncled, peduncles not much exceeding the petiole, strigose. *Flower* ½ in. *Calyx* puberulous, cup-shaped, scarcely lobed. *Petals* externally puberulous, oblong-acute, midrib prominent within. *Filaments* flat, ligulate; anthers short, oblong. *Drupe* 1½ in.; stone fibrous woody.

15. **MAPPIA**, Jacq.

Trees. *Leaves* alternate, petiolate, simple, 1-nerved. *Flowers* small, in terminal corymbose cymes. *Calyx* 5-toothed. *Petals* 5, usually hairy within. *Stamens* 5, hypogynous, alternate with the petals; anthers 2-lobed, dorsifixed, dehiscing longitudinally; pollen grains subquadrate. *Disk* hypogynous, cup-shaped. *Ovary* superior, 1-celled; style short; ovules 2, pendulous. *Fruit* drupaceous. *Seed* pendulous; embryo in fleshy albumen, cotyledons leafy, radicle superior.—**DISTRIB.** Species 8 or 10, natives of the Western Peninsula, Ceylon and tropical South America.

1. **M. tomentosa**, *Miers Contrib.* i. 67; leaves subcoriaceous ovate-oblong acute or acuminate densely pubescent beneath black when dry. *Stemonurus*? *foetidus*, *Wight Ic.* 955.

WESTERN PENINSULA, in the Nilghiri Mts., *Wight, Hohenacker.*

A large tree. *Bark* of branches yellow, wrinkled. Leaves 4-7 by 2-3 in., base obtuse, nerves prominent; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., thinly tomentose. *Cymes* terminal, corymbose, many-flowered; peduncles very thick, half as long as the leaves, ultimate pedicels shorter than the flower. *Flower-buds* oblong, obtuse. *Flowers* $\frac{1}{2}$ in., polygamous, villous externally, yellowish and very fetid. *Petals* oblong. *Stamens* glabrous. *Ovary* ovoid; style cylindric. *Drupe* $\frac{1}{3}$ - $\frac{1}{2}$ in., olive-shaped, purple, stone thin and soft.

2. **M. foetida**, *Miers Contrib.* i. 64 (not *Stemonurus foetidus*, *Wight*); leaves glabrescent ovate acuminate not black in drying, base rounded. *Mappia fetida*, *Bedd. Fl. Sylv.* t. 141 (not the text).

WESTERN PENINSULA; Nilghiri Mts. and Mysore, *Wight, &c.*

A large tree. *Bark* wrinkled. Leaves $2\frac{1}{2}$ -7 by 2-3 $\frac{1}{2}$ in., coriaceous, thinly pubescent, ultimately glabrous; petiole $\frac{3}{4}$ -1 in. *Peduncles* half the length of the leaves, flattened, ultimate pedicels about $\frac{1}{2}$ in., strigose. *Flower-buds* roundish-oblong. *Calyx* minute, lobed, lobes rounded. *Corolla* hairy within. *Anthers* roundish. *Ovary* half the length of the stamens. *Drupe* oblong, obtuse, $\frac{3}{4}$ by $\frac{1}{2}$ in.

3. **M. ovata**, *Miers Contrib.* i. 65; leaves glabrous but with a few tufts of hairs in the axils of the nerves ovate-oblong abruptly and shortly acuminate, base inequilateral acute. *M. foetida* α , *Thwaites Enum.* 43. *M. Gardneriana* and *Wightiana*, *Miers Contrib.* i. 66, 67.

WESTERN PENINSULA; hills of the Southern Carnatic and Travancor, *Wight, &c.* CEYLON, ascending to 7000 ft.

Branchlets angular. Leaves $6\frac{1}{2}$ by $2\frac{1}{4}$ in., shining above, glaucous beneath with resinous spots; petiole 2-2 $\frac{1}{2}$ in. *Panicle* terminal, pedicels strigose. *Flower-buds* clavate. *Flowers* $\frac{1}{2}$ in. *Calyx* cup-shaped, 5-toothed, strigose. *Petals* 5, oblong, acute, connate at the base, hairy on the inner surface. *Filaments* subulate, glabrous, anthers ovoid, acute. *Ovary* ovoid, hairy, tapering into a club-shaped style and surrounded at the base by an hypogynous cup-shaped disk. *Fruit* $\frac{3}{4}$ in. by $\frac{1}{2}$ in., ovoid, acute, stone thin, 1-seeded; cotyledons large, flat, leafy, palminerved; radicle thick, albumen fleshy.—There is a little difference in the shape of the leaves in the Cingalese specimens, the base being more rounded and the petiole not so long.

4. **M. oblonga**, *Miers Contrib.* i. 65; leaves oblong acute at both ends, glabrous except along the nerves or sparingly setose. ? *Dalz. & Gibs. Bomb. Fl.* 28. *M. Championiana*, *Miers l.c.* 66. *M. foetida* β , *Thaites Enum.* 43.

WESTERN PENINSULA; in the Concan, *Dalzell*; Travancor, *Wight*; CEYLON, ascending to 7000 ft., *Champion*.

A tree. Leaves 4-7 by $2\frac{1}{2}$ -3 in.; petiole 1-1 $\frac{1}{4}$ in.; cymes terminal, lax, pubescent; ultimate pedicels as long as the flowers. *Flowers* $\frac{1}{2}$ in., pilose. *Fruit* $\frac{3}{4}$ in., ovoid-oblong, purple.—The plant intended by *Dalzell* and *Gibson* may be *M. tomentosa* of *Miers*.

VAR. *elliptica*, *Miers, l.c.*, branches angular, leaves smaller ovate acute. "*Cordia*," *Wall. Cat.* 9064.—Travancor.

16. PHLEBOCALYMNA, Griff.

Trees. Leaves alternate, petiolate, simple, coriaceous. Flowers polygamous; males in globose heads, borne on short spikes; females shortly pedicelled. Sepals 5, distinct, imbricate. Corolla tubular, limb 5-parted. Stamens 5, alternate with the petals, adherent to the tube of the corolla; anthers ovoid-oblong, dorsifixed, 2-lobed, dehiscing longitudinally. Disk

fleshy, hypogynous, 5-lobed, lobes opposite the petals. *Ovary* conic, 1-celled; style subulate; ovules 2, pendulous. *Fruit* oblong with a crustaceous rind. *Seed* pendulous; albumen coriaceous, lobulate, ruminate; embryo minute.—**DISTRIB.** Species 2 or 3, natives of the Malay peninsula and islands.

1. **P. Griffithiana**, *Mast.*, leaves obovate-oblong shortly and abruptly acuminate, stamens adherent to the base of the corolla. *Platea Griffithiana*, *Miers Contrib.* i. 97.

TENASSERIM: at Mergui, *Griffith*.

A glabrous shrub. *Branches* terete, slender, slightly compressed, rugose, yellowish. *Leaves* 6-8 by 3 in., coriaceous, glabrous, pale, concolorous, midrib prominent beneath, margins revolute; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., sulcate. *Cymes* axillary, erect, spicate, scarcely longer than the petiole, few-flowered; pedicels puberulous. *Calyx*-lobes imbricate, ovate, ciliolate. *Corolla* much longer than the calyx, funnel-shaped, limb 5-lobed, lobes ultimately inflexed at the point. *Filaments* linear, glabrous. *Ovary* very short, surrounded by a pentagonal disk, 1-celled; style conic, pilosulous, stigma obscurely 3 lobed. *Fruit* $1\frac{1}{2}$ by $\frac{3}{4}$ in., oblong, obtuse; stone thick, bony, 1 celled by abortion. *Seed* solitary, pendulous from the apex of the cell, integument densely permeated by spiral vessels, albumen fleshy lobulate.—Kurz refers Miquel's *Gonocaryum*? *gracile* to this species, but Miquel's plant is described as having a longer inflorescence, two styles and a different fruit.

2. **P. Lobbiana**, *Mast.*; leaves oblong acuminate, stamens adherent to the corolla for the greater part of their length. *Platea Lobbiana*, *Miers Contrib.* i. 97; *Wall. Cat.* 9052.

RANGOON, MARTABAN, and TENASSERIM; *Wallich*, &c.

A shrub or tree? *Branches* angular. *Leaves* $4\frac{1}{2}$ - $5\frac{1}{2}$ by $1\frac{3}{4}$ - $2\frac{1}{4}$ in., coriaceous, glabrous, margins revolute, nerves prominent beneath; petiole $\frac{1}{4}$ in., sulcate, rugose. *Cymes* axillary, peduncled; peduncle erect, shorter than the petiole. *Flowers* subfascicled, $\frac{1}{4}$ in. *Calyx* $\frac{1}{2}$ in., cup-shaped, lobes imbricate. *Corolla* $\frac{1}{4}$ in., funnel-shaped, limb 5-lobed; lobes oblong, recurved. *Filaments* glabrous; anthers ovoid, compressed, connective wide at the base. *Disk* hypogynous, 5-lobed. *Ovary* hirsute, ovoid, tapering into a short style. *Fruit* $1\frac{3}{4}$ in., oblong, obtuse, olive-coloured, obscurely 2-celled.

A plant collected by Wallich in Tavoy (Cat. 9051), has the habit, inflorescence, and floral characters (ovary not seen) of *Phlebocalymna*, but the fruit is different, and more like that described by Miquel under his *Gonocaryum*? *gracile* (Fl. Ind. Bat. Suppl. i. 343). Indeed, I should refer both Wallich's 9051, and Helfer's 817, Kew. dist. from Tenasserim? which evidently belong to the same species, to Miquel's genus, but for the different habitat (Miquel's plant is Sumatran), and that I have not seen either the ovaries of Wallich's or Helfer's plant in any specimen of Miquel's. Kurz, in Journ. As. Soc. Beng. xxxix. pt. 2, p. 72, refers *Gonocaryum*? *gracile* to *Phlebocalymna Griffithii*, from which it differs in the longer inflorescence, and especially in the fruit.—The following description applies to Wallich's plant, to which I would give the provisional name *Gonocaryum*? *Wallichii*; A glabrous shrub. *Branches* terete, bark yellow. *Leaves* 6 by 3 in., glabrous, coriaceous, oblong, tapering to both ends, shortly acuminate, entire; nerves depressed on the upper, prominent on the lower surface; petiole scarcely $\frac{1}{2}$ in., rugose, channelled. *Racemes* axillary, solitary or geminate, half the length of the leaves; rachis angular; pedicels $\frac{1}{2}$ in., horizontal, ciliated, 1-2 flowered. *Flowers* unisexual or polygamous? *Calyx* pateriform, deeply divided into 5 imbricate, ovate acute, ciliated lobes. *Corolla* twice the length of the calyx, cylindric, obtuse; petals erect, thick green, oblong with inflexed points, valvate and cohering by the margins but readily separable. *Stamens* 5, alternate with the petals and agglutinated to their edges, but easily separable, filaments glabrous, anthers 2-celled, introrse. *Ovary* abortive; style 1, filiform, covered with short erect white appressed hairs. *Fruit* 2 by 1 in., obliquely oblong, tapering to both ends, 1-celled; rind fibrous, corky. *Seed* not seen.

17. **PTELEOCARPA**, Oliv.

Trees. *Leaves* alternate, simple, 1-nerved, petiolate. *Inflorescence* terminal, paniced, many-flowered. *Flowers* regular, dichlamydeous, hermaphrodite. *Calyx* tubular below, limb deeply 5-parted, lobes imbricate, not accrescent. *Corolla* tubular below, limb deeply 5-parted, lobes imbricate, glabrous. *Stamens* 5, glabrous, springing from the tube of the corolla, alternate with its lobes; anthers linear, innate, debiscing longitudinally. *Staminodes* 0. *Ovary* free, stipitate, 2-celled; styles 2, stigma minute; ovules solitary in each cell, pendulous, anatropal, raphe lateral or subventral. *Fruit* 2-celled, compressed, orbicular, emarginate, deeply winged, wings striate. *Seed* elongate, compressed, albuminous; radicle superior, cylindrical, cotyledons linear-lanceolate longer than the radicle.—**DISTRIB.** Species 2, one Malayan, the other from Borneo.

By reason of the imbricate calyx and stamens alternate with the petals, this genus should be placed in *Icacineæ*, but the structure of the ovary is that of *Olacineæ*. The fruit is quite distinct.

1. **P. malaccensis**, Oliv. in *Trans. Linn. Soc.* xxviii. 515, t. 42.

MALACCA, *Maingay*.—**DISTRIB.** Borneo.

Quite glabrous. *Branchlets* terete. *Leaves* 3–5 by $1\frac{1}{4}$ –2 in., membranous, oblong or oblanceolate, abruptly acuminate, base narrowed, midrib prominent beneath; petiole $\frac{1}{3}$ – $\frac{2}{3}$ in. *Panicles* terminal, scarcely exceeding the leaves. *Bracts* minute, ovate, deltoid. *Pedicels* $\frac{1}{4}$ – $\frac{1}{3}$ in., slender, ascending, sometimes clustered in umbellate cymes. *Flowers* $\frac{1}{2}$ in. diam., yellow or red, glabrous. *Calyx-lobes* ovate, roundish, obtuse. *Corolla* 4 times longer than the calyx, tube short; lobes oblanceolate, oblong, obtuse. *Stamens* as long as the corolla, filaments filiform, glabrous; anthers basifixed. *Ovary* glabrous, oblong, obtuse, compressed, obscurely furrowed, seated on a thick stipes. *Fruit* $1\frac{1}{4}$ – $1\frac{1}{2}$ in. diam. *Seed* $\frac{1}{2}$ in.; embryo half the length of the fleshy albumen.

18. **PHYTOCRENE**, Wall.

Climbing shrubs, usually more or less hairy, often prickly; wood with very large porous vessels and thick medullary rays, but no annual rings. *Leaves* alternate, petiolate, entire or palmately lobed. *Flowers* diœcious; male in small globose clusters borne on long branching spikes; female in large solitary globose pedunculate clusters. **MALE fl.:** *Calyx* of 3–5 free segments, usually anisomerous with the petals. *Corolla* tubular-campanulate, 4- rarely 5-parted, lobes valvate. *Stamens* as many as the lobes of the corolla and alternate with them, filaments hypogynous; anthers 2-lobed, dehiscing longitudinally; pollen-grains globose. *Pistil* rudimentary, hispid. **FEMALE fl.:** *Calyx* and *Corolla* of the male. *Stamens* 0. *Staminodes* minute or 0. *Ovary* sessile, 1-celled; style thick columnar, stigma capitate more or less lobed; ovules 2 descending from the apex of the cavity, raphe dorsal; micropyle superior. *Drupe*s many, in globose heads, bristly or echinate; stone hard, 1-celled, 1-seeded, pitted externally. *Seed* pendulous; embryo as long as the fleshy albumen, radicle superior short, cotyledons large flat appressed.—**DISTRIB.** Species 8, all natives of India and the Archipelago.

1. **P. gigantea**, Wall. *Pl. As. Rar.* iii. 11, t. 215; branches prickly, leaves cordate-ovate acute obscurely lobed pilose along the nerves beneath, bracts 0 or shorter than the pedicel. Wall. in *Phil. Mag.* iii. 223; *Cat.* 4946. *P. callicarpa*, Griff. *Notul.* iv. 327, t. 490. *Gynocephalum giganteum Trécul* in *Ann. Sc. Nat. ser.* 3, viii. 149.

MARTABAN, Wallich.

Branches spirally grooved, studded with conical prickles. *Leaves* 4-10 by 4-7 in., palmately 5-7-nerved, glabrescent above, villous beneath, rusty-pilose along the prominent nerves; petiole 2-3 in., hairy. **MALE** fl. in long (8-10 in.), pendulous, axillary, racemes, or from the old wood; rachis and pedicels hairy; pedicels supporting a globose head of flowers. *Bracts* 0 or shorter than the pedicel. *Flowers* $\frac{1}{10}$ in., setose. *Sepals* oblong obtuse concave at the apex, anisomerous with the corolla. *Corolla* funnel- or bell-shaped, twice the length of the calyx, bristly externally with uncinatè bristles, limb 4-lobed, lobes ovate-lanceolate. *Stamens* 4, alternate with the lobes of the corolla; filaments and anthers glabrous. *Pistil* rudimentary, hairy. **FEMALE** fl. not seen. *Fruit* covered with subulate bristles.

2. **P. bracteata**, Wall. *Pl. As. Rar.* iii. 12; branches prickly, leaves cordate-ovate entire or slightly lobed, bracts (of male spikes) linear longer than the pedicel. Wall. *Cat.* 4947. *P. macrocarpa*, Griff. *Notul.* iv. 322; *Ic. Pl. Ind. Or.* 487. *Gynocephalum bracteatum*, Trécul in *Ann. Sc. Nat. ser.* 3, viii. 149.

PENANG, Porter; MALACCA, Griffith, Maingay.—DISTRIB. Borneo.

Stem tubercled, tubercles ending in a spine. *Branches* covered with minute prickles. *Leaves* 6-7 by $4\frac{1}{2}$ -5 in., coriaceous, asperulous above, pubescent beneath, palmately 5-7-nerved, nerves prominent beneath; petiole $2\frac{1}{2}$ in. **MALE** fl. small, in axillary hoary racemes each about 8 in.; pedicels slender, each supporting 3 small heads of flowers and subtended by a long linear bract adnate to its base and studded with hooked bristles. **MALE** fl.: *Sepals* 3-5, truncate. *Corolla* longer than the calyx-lobes, rounded, inflexed, setose externally. *Stamens* 3-5. *Rudiment of ovary* oblong, setose. **FEMALE** fl. (according to Griffith), in rounded, peduncled capitula; peduncles 3 from the same axil, as long as the petiole, flattened, strigose. *Calyx* of 4 spatulate, concave sepals. *Corolla* 4-parted. *Ovary* strigose; style short or 3-partite, stigmas 3; ovules anatropal, pendulous. *Drupe*s in globose masses the size of a man's head, each $1\frac{1}{2}$ by $\frac{3}{4}$ in., ovoid, acute at both ends, densely covered with slender, appressed, yellow setæ, 1-celled. *Seed* 1, albumen fleshy, papulose on the surface, smelling of linseed oil; radicle broad; cotyledons small, suborbicular.

3. **P. oblonga**, Wall. *Pl. As. Rar.* iii. 12; branches not prickly, leaves oblong-lanceolate entire pubescent beneath, bracts shorter than the pedicels. Wall. *Cat.* 4948. *Gynocephalum oblongum*, Trécul in *Ann. Sc. Nat. ser.* 3, viii. 149.

PENANG, Wallich, &c.; MALACCA, Griffith, Maingay.

Bark striated, brownish. *Leaves* 8 by 3 in., coriaceous, glabrous above, pubescent beneath, shortly acuminate, 1-nerved, base acute; petiole $\frac{1}{2}$ in., rugose. **MALE** fl. in axillary racemes or in tufts from the old wood. *Racemes* slender, densely covered, like the pedicels, bracts and perianth, with brown hairs; pedicels filiform, 3-flowered. *Bracts* linear, half the length of the pedicel and more or less adnate to it. *Sepals* 4, obovate, obtuse, concave. *Corolla* 4-parted, lobes rounded. *Stamens* 3-4. *Pistil* rudimentary. **FEMALE** fl. (according to Maingay): *Sepals* linear-oblong, pale brown, hirsute. *Petals* 4, their length into an infundibuliform corolla; lobes ovate, obtuse, hirsute. *Ovary* 1-celled, with 2 collateral, suspended ovules; style twice the length of the corolla, cylindric, ventricose, hirsute, 2-3-partite, divisions subacute, stigmatic on their inner surface. *Drupe*s in globular masses the size of a man's fist, each 2 by $\frac{3}{4}$ in., oblong-obovoid, obtuse, covered with stout, straight, subulate prickles which, falling off, leave circular pits; epicarp coriaceous, mesocarp pulpy, stone crustaceous. *Cotyledons*, according to Maingay, thin, white, divaricate, tortuous, branched, (?) embedded in a fleshy lobulated albumen.

4. **P. palmata**, Wall. *Pl. As. Rar.* iii. 12; stem prickly, leaves palmately 5-lobed ferruginous-hairy beneath, bracts shorter than the pedicels. Wall. *Cat.* 4949. *P. stylocarpa*, Griff. *Notul.* iv. 320; *Ic. Pl. Ind. Or.* 489. *Gynocephalum palmatum*, Trécul in *Ann. Sc. Nat. ser.* 3, viii. 149.

PENANG, Porter, &c.; MALACCA, Griffith.—DISTRIB. Java.

Branches studded with minute prickles; shoots, petioles, and nerves of leaves ferruginous hispid. *Leaves* very large, orbicular, cordate, palminerved, lobed halfway down; lobes oblong-obovate, acute; petiole 4-6 in. MALE fls. in long, axillary, dense, branched racemes, each pedicel supporting a globose head of flowers. *Flowers* $\frac{1}{2}$ in. *Calyx* of 3-4 obovate, concave, hairy segments. *Corolla* longer than the calyx, deeply 4-parted, lobes lanceolate acute setose. *Stamens* 4, filaments glabrous; anthers apiculate. *Rudiment of ovary* minute, hairy. FEMALE fl. not seen. *Drupe* $1\frac{1}{2}$ by 1 in., oblong-turbinate, surmounted by the thickened base of the style and covered by dense subulate bristles, some of which are barbed and have a transparent point. *Seed* pendulous; radicle superior, very short; cotyledons elongate, linear-oblong, leafy.

19. MIQUELIA, Meissner.

Climbing shrubs. *Wood* with large vessels. *Leaves* alternate, petiolate, simple, membranous, usually palminerved. *Peduncles* supra-axillary, racemose in the male, solitary in the female plant. *Flowers* diœcious, capitate. MALE fl.: *Calyx* minute, 4-5-fid. *Corolla* separated from the calyx by a long pedicel-like stipes (corolla-tube?), limb 4-5-lobed, lobes valvate, apex inflexed. *Stamens* isomerous and alternate with the lobes of the corolla, filaments short; anthers introrse. FEMALE fl.: *Calyx* as in the male. *Corolla* not removed from the calyx, lobes free, or nearly so, ultimately reflexed. *Staminodes* 4-5, very small, alternate with the lobes of the corolla or 0. *Ovary* sessile, 1-celled; style short, stigma dilated cup-like; ovules 2, pendulous from the apex of the cavity, raphe dorsal, micropyle superior. *Drupe* oblong, more or less compressed, surrounded at the base by the persistent calyx, mesocarp thin, endocarp crustaceous externally rugose. *Seed*, solitary, pendulous albumen fleshy rugulose; radicle superior; cotyledons elliptic, thick, leafy flat. — DISTRIB. Species 5, (perhaps all forms of one variable species, *Baillon*), distributed in India and the Archipelago.

The materials in herbaria are not good, and the structure of the male flowers especially requires further examination in a fresh state.

1. **M. Kleinii**, Meissn. *Gen.* 152; leaves obovate-lanceolate shortly and abruptly acuminate subentire or crenulate. *Miquelia assamica*, *Blume Rumphia*, iv. 37. *Jenkinsia assamica*, *Griff. in Calc. Journ. Nat. Hist.* iv. 231, t. 12; *Notul.* 370, t. 537, f. 2. *Araliaceae?* *Kleinii*, *W. & A. Prodr.* i. 375. *Phytocrene* sp. *Wight Ill.* ii. 62.

ASSAM, Griffith; KHASIA MTS., H. f. & T.

Glabrescent. *Branches* strigose when young. *Leaves* 7-8 by 3 in., glabrous, base tapering, rarely subhastate; petiole $1\frac{3}{4}$ -2 in. *Peduncles of male plant* 1-2 in., filiform. *Flowers* capitate, $\frac{1}{2}$ in. *Calyx* minute, 3-5-fid. *Corolla* 4-5-parted, lobes oblong, free, yalvate. *Filaments* very short, anthers elongate. *Rudiment of pistil* depressed. *Peduncles of female plant* short, thick. *Calyx* minute, 4-5-lobed. *Corolla* 4-5-parted, lobes reflexed, greenish. *Staminodes* minute. *Ovary* ovoid, apex truncate; stigma sessile, 4-lobed. *Drupe* $\frac{3}{4}$ by $\frac{1}{2}$ in. subsessile, yellowish, obliquely ovoid.

2. **M. dentata**, *Bedd. in Trans. Linn. Soc.* xxv. 211, t. 23; leaves oblong acuminate remotely and coarsely toothed, base truncate cordate.

WESTERN PENINSULA; Anamallay forests, *Beddome*,

Branches terete, glabrous. *Leaves* 8 by $3\frac{3}{4}$ in., membranous, glabrous; petiole 2 in. MALE fl. capitate on supra-axillary racemose peduncles which are shorter than the petiole. *Flower-buds* club-shaped, truncate. *Calyx* subcampanulate, 4-toothed. *Corolla-lobes* lanceolate. *Stamens* 4, anthers oblong, base sagittate. *Pistil* minute, rudimentary. FEMALE fl. capitate, on a solitary supra-axillary peduncle longer than

the petiole. *Calyx* deeply toothed. *Corolla-lobes* lanceolate. *Ovary* obovoid, base tapering; style very short, dilated into a cup-shaped stigma; ovules 2.

3. **M. ? gibba**, *Baill. Adansonia*, x. 278; *DC. Prodr.* xvii. 15; leaves ovate acuminate entire, base rounded 5-nerved.

WESTERN BENGAL, *Griffith*.

Branches terete, glabrous. *Leaves* 8 by 4 in., membranous, glabrous, nerves prominent beneath. *Drupc* $1\frac{1}{2}$ – $1\frac{1}{4}$ in., ellipsoid, glabrescent, brownish, convex on one side, furrowed on the other, gibbous towards the base; stone hard, granular. *Cotyledons* thin.—An imperfectly known species. I have seen no specimens.

20. **SARCOSTIGMA**, W. & A.

Climbing shrubs. *Wood* without zones. *Leaves* alternate, simple, shortly petioled. *Flowers* dioecious, minute, arranged in tufts along a long pendulous rachis. MALE fl.: *Calyx* minute, 4–5-lobed. *Petals* 5, free, or nearly so, valvate, oblong, ultimately reflexed. *Stamens* 5, alternate with the petals, free, or adnate to the base of the petals, filaments glabrous; anthers erect, 2-celled, dehiscing longitudinally. *Pistil* rudimentary. FEMALE fl.: *Calyx* and *corolla* as in the male. *Staminodes* 4–5, hypogynous, alternate with the petals. *Ovary* superior, sessile, 1-celled; stigma subsessile, globose or umbonate; ovules 2, collateral, pendulous, funicle expanded into an “obturator.” *Drupe* surrounded at the base by the persistent calyx and corolla, epicarp coriaceous, endocarp woody lined with a thin white membrane. *Seed* (according to Baillon) pendulous, exalbuminous; cotyledons fleshy, wrapping round the short superior radicle.—DISTRIB. Species 3 or 4, all tropical Asiatic.

1. **S. Kleinii**, *W. & A. in Edin. New Phil. Journ.* xiv. 299; leaves glabrous oblong or oblong-lanceolate acuminate. *Miers in Ann. Nat. Hist. ser.* 2, 116; *Contrib.* i. 103, t. 18; *Wight Ic.* t. 1854; *Dalz. & Gibs. Bomb. Fl.* 221.

EASTERN AND WESTERN PENINSULAS; Malacca, *Maingay*, Cochin and Travancor, *Wight*; the Concan, *Stocks*.

A climbing, branched shrub. *Branches* terete. *Leaves* 4–10 by 2–4 in., coriaceous, pale on both surfaces, base rounded, nerves prominent beneath; petiole $\frac{3}{4}$ in., transversely wrinkled. *Rachis* extra-axillary, angular, covered with brownish strigose hairs. *Flowers* $\frac{1}{2}$ in. diam. MALE fl.: *Calyx* minute, pilosulous, cup shaped, obscurely 4–5-lobed. *Petals* $\frac{1}{2}$ in., glabrous, oblong, acute. *Stamens* as long as the petals, filaments glabrous, flat, strap-shaped; anthers 2-celled. *Rudiment of pistil* conical. FEMALE fl.: *Calyx* and *corolla* as in the male. *Ovary* obovoid, pilosulous, surrounded by 5 hypogynous, abortive stamens; stigma subsessile, conical; ovules 2, collateral. *Fruit* 1– $1\frac{1}{2}$ in. olive-shaped, somewhat compressed, bright orange-red, rugose and strigose externally, smooth within.

2. **S. Wallichii**, *Baill. in Adansonia*, x. 282; leaves downy beneath along the nerves ovate acute or acuminate, fruiting peduncles densely villous. *Wall. Cat.* 9030 (“indeterm.”)

BIRMA; Phanoe Hill on the Saluen, *Wallich*.

Branches terete, rugose. *Leaves* 6 by 3 in., nerves depressed above, prominent beneath; petiole $\frac{1}{2}$ in., thick. *Fruiting peduncles* from the old wood. *Calyx* minute, villous, 4-fid. *Fruit* $3\frac{1}{4}$ in., ovoid-oblong, compressed, densely hairy.—The specimens are very imperfect.

3. **S. edule**, *Kurz in Journ. As. Soc. Beng.* 1872, ii. 298; glabrous, leaves ovate-oblong apiculate, spikes rusty-tomentose. *Chailletia edulis*, *Kurz in Andam. Rep. App.* B 6.

ANDAMAN ISLES, *Kurz.*

Branches woody. *Leaves* 7 by $3\frac{1}{2}$ in., coriaceous, glabrous, base obtuse; petiole short. *Fruit* 1 in., obliquely oblong, obtuse, densely covered with orange-coloured down, shining white within, pulp sweet, edible (*Kurz*).—Probably only a form of *S. Kleinii*.

21. **NATSIATUM**, Ham.

A climbing shrub. *Wood* porous, with inconspicuous medullary rays. *Leaves* alternate, petiolate, simple, 7-9-nerved. *Flowers* diœcious, in supra-axillary racemes. MALE fl.: *Calyx* deeply 5-parted, persistent, not accrescent. *Petals* 5, free, or united at the base. *Staminodes* 5, opposite the petals, outside the stamens. *Fertile stamens* alternate with the petals; anthers erect, apiculate, bilocular, dehiscing longitudinally. *Pistil* rudimentary. FEMALE fl.: *Sepals* and *petals* as in the male. *Staminodes* 4-6, hypogynous, alternating with an equal number of compressed glands. *Ovary* sessile, villous; style short, apex 2-3-lobed, stigmas capitate; ovules 2, collateral, pendulous, raphe dorsal. *Drupe* obliquely ovoid, compressed; stone crustaceous, 1-celled. *Seed* solitary, albumen fleshy; radicle superior; cotyledons leafy, orbicular, 3-5-nerved.

1. **N. herpeticum**, Ham. in Wall. Cat. 4252; Arn. in Edin. New Phil. Journ. xvi. 314; N. sp. Griff. Notul. iv. 330; Ic. Pl. As. t. 496, f. 1. *Natsiatum herpeticum*, Ham. ex R. Br. in Benn. Pl. Jav. Rar. 245; Miq. Fl. Ind. Bat. i. pt. i. 797. *Sicyos pentandrus*, Wall. Cat. 6682, ♂.

EASTERN BENGAL and the HIMALAYA, from Nipal, Sikkim, Silhet, and the Khaasia Mts., alt. 3000 ft., to CHITTAGONG and PEGU.

Herbaceous portions strigose. *Branches* as thick as a goose-quill. *Leaves* distant, 3-6 in., membranous, roughish, cordate-ovate, acute, repand, 7-9-nerved; petiole longer than the blade. *Racemes* supra-axillary, long, slender, pendulous, many-flowered. *Bracts* small, linear, pedicels about the length of the flower. *Flowers* minute, greenish-yellow. MALE fl.: *Calyx* lobes valvate, lanceolate, scabrid. *Petals* 5, alternate with the calyx-lobes and one-third longer, lanceolate. *Glands* (staminodes?) 5, fleshy, 2-lobed. *Fertile stamens* opposite the sepals, filaments very short; anthers sagittate; connective glandular. FEMALE fl.: *staminodes* subulate. *Drupe* $\frac{1}{4}$ in.

DOUBTFUL SPECIES.

N. GAMOSEPALUM, Griff. Notul. iv. 330. *Menispermea*, Itin. Notes 114, is *Lophophyllum bicristatum*, Griff. (See p. 105.)

22. **IODES**, Blume.

Climbing shrubs, rarely erect. *Leaves* opposite, or subalternate, petiolate, simple, 1-nerved. *Inflorescence* cymose, cymes axillary or extra-axillary; lower peduncles often sterile, cirrose. *Flowers* dichlamydeous, diœcious. MALE fl.: *Calyx* minute, cup-shaped, 5-toothed. *Corolla* 3-5-merous, lobes valvate. *Stamens* hypogynous, equal in number to, and opposite the lobes of the corolla; anthers basifixed, straight, 2-celled, introrse, dehiscing longitudinally. *Pistil* rudimentary. FEMALE fl.: *Calyx* as in the male. *Corolla* 4-5-parted, tubular below and often dilated. *Staminodes* 0. *Ovary* subsessile, 1-celled, with 2 collateral pendulous ovules; funicle dilated into an "obturator;" stigma sessile, discoid, 5-lobed. *Drupe* surrounded at the base by the persistent, but not accrescent calyx, stone 1-seeded. *Seed* pendulous, testa thin, albumen fleshy; cotyledons flat, leafy; radicle superior.—DISTRIB. Species about 6, natives of India, the Archipelago, and of tropical Africa.

SECT. 1. **Eviodes**, Baillon. *Pedicels* slender, not woody.

1. **I. ovalis**, Blume *Bijdr.* i. 30; leaves ovate acute or acuminate, base rounded, male flowers paniced. *Br. in Benn. Pl. Jav. Kar.* 243, t. 48; *Hassk. Cat. Pl. Hort. Bogor.* 172; *Miq. Fl. Ind. Bat.* i. 795. *I. tomentella*, *Miq. l.c.* 796. *Natsiatum oppositifolium*, *Planchon in Hook. Lond. Journ. Bot.* v. 247 (name only).

MALACCA, Griffith, Maingay.—DISTRIB. Java, Philippines.

A climbing shrub, rarely sub-arborescent. *Branches* terete, covered with rufous tomentum. *Tendrils* axillary or opposite the leaves. *Leaves* 5 by 4 in., subcoriaceous, glabrous above, except along the midrib, tomentose beneath, ovate or roundish; petiole $\frac{1}{4}$ in. *Cyme* (of male plant) much branched, peduncles 6-8 in., pedicels spreading. *Flower-buds* subglobose, densely rufous-villous. *Calyx* ciliate. *Corolla* much exceed ing the calyx; lobes lanceolate, inflexed at the points, ciliate, connate at the base. *Stamens* shorter than the lobes of the corolla, filaments short erect; anthers oblong-ovovate, dehiscing longitudinally. *Rudiment of pistil* erect, cylindrical, or subclavate, hispid. FEMALE fl.: *Calyx* tubular, limb as in the male fl. *Corolla* 4-5-parted, sub-rotate, lobes acute reflexed globose beneath. *Ovary* substipitate, ovoid, compressed, densely villous; stigma thick, orbicular, crenate, concave. *Drupe* $\frac{1}{2}$ by $\frac{1}{4}$ in., rather dry, ovoid, compressed, villous, mesocarp thin.—Miquel's *I. tomentella* (*I. ovalis*, var. β *Miquelii*, Baill. in DC. Prodr. xvii. 23), seems to differ only in its more dense covering of rufous tomentum. Maingay's Malacca specimens belong to this form.

SECT. 2. **Lasiodes**, Baillon. *Pedicels* thick, woody.

2. **I. Hookeriana**, Baill. in *Adansonia*, x. 268, and in DC. Prodr. xvii. 24; leaves oblong-ovate or ovate acuminate, base acute or cordate.

ASSAM, Griffith; CHITTAGONG, H. f. & T.

Branches cylindric or subangled, setose, ultimately glabrous. *Leaves* 4-8 by $1\frac{3}{4}$ -4 in., opposite or subalternate; coriaceous, glabrous above, setose beneath along the prominent nerves; petiole $\frac{1}{4}$ in., rugose, articulate at the base, covered with rigid, brownish hairs. *Inflorescence* extra-axillary; peduncle rugose, as long as the petiole, dichotomous; pedicels spreading, thickened at the apex. MALE fl. $\frac{1}{2}$ in. *Calyx* pateriform, limb shortly 5-lobed, lobes deltoid acuminate. *Corolla* twice the length of the calyx, densely hairy at the base externally, deeply 5-parted; lobes thick, oblong, with inflexed points. *Stamens* 5, free, hypogynous, half the length of the petals and concealed within them, filaments glabrous; anthers shorter than the filaments, erect, adnate, base sagittate. *Rudiment of pistil* conical. *Drupe* the size of a pigeon's egg, acute at the apex, yellowish-red, glabrous; stone compressed, woody, somewhat rugose, 1-celled. *Seed* ovate, compressed.—I have not examined the female flowers. In the unopened male bud I found the pollen shed.

3. **I. Thomsoniana**, Baill. in *Adansonia*, x. 270, and in DC. Prodr. xvii. 25; leaves oblong-ovovate acuminate, base narrowed cordate.

CHITTAGONG, H. f. & T.

A climber. *Branches* woody, terete, sulcate, grey, deeply scarred, young shoots and petioles densely rusty setose. *Leaves* 10 by 3 in., at length glabrous, repand, basal lobes rounded, midrib downy beneath; petiole $\frac{1}{4}$ in. *Inflorescence* extra-axillary, cymose; peduncles short, woody, pedicels divaricate. MALE fl. as in *I. Hookeriana*, but petals relatively shorter and broader.—An imperfectly known species, probably as suggested by Baillon himself a mere form of *I. Hookeriana*.

DOUBTFUL SPECIES.

4. **I. ? Brandisii**, Kurz in *Journ. As. Soc. Beng.* ii. 1872, 298; leaves oblong acuminate mucronate, base obtuse, petiole long slender.

TEXASSERIM, Kurz.

A climbing cirrose shrub. *Leaves* 6-8 in., membranous, tomentose along the nerves

above, over the whole surface beneath. *Cymes* opposite the leaves, pedicels short, slender. *Flowers* minute, tomentose.—Only known from Kurz's description.

5. **I. oblonga**, *Planch. in herb. Kew.*; leaves oblanceolate, base tapering subcordate.

PENANG? *Wallich.*

Shrubby, scandent? *Branches* cylindric, grey, setose, ultimately glabrescent, with prominent scars. *Leaves* 5 by $1\frac{1}{2}$ in., membranous, glabrous above, setose along the midrib above, and over the whole lower surface; petiole $\frac{1}{4}$ in. *Inflorescence* inter-axillary, peduncles 1 in., cymose, dichotomously branched. *Flowers* very minute. *Ovary* oblong, 1-celled; stigma sessile, thick, discoid, 5-lobed; ovules 2, pendulous.—I have not seen perfect flowers, but the structure of the ovary is that of *Iodes*.

GENUS OF DOUBTFUL AFFINITY.

23. **CARDIOPTERIS**, Wall.

A climbing herb with milky juice. *Leaves* alternate, long-petioled, simple or lobed, cordate, palminerved. *Flowers* ebracteate, in axillary racemose or paniced cymes, bisexual, dichlamydeous. *Calyx* 4-5-parted; lobes imbricate, persistent, but not, or only slightly accrescent. *Corolla* deciduous, between rotate and funnel-shaped, 4-5-lobed. *Stamens* 4-5, inserted on the base of the tube of the corolla, alternate with its lobes, filaments short glabrous; anthers 2-celled, introrse, dehiscing longitudinally; pollen-grains 4-angular. *Ovary* free, surrounded at the base by a thick fleshy annular disk, oblong, compressed, 1-celled; ovules 1 (rarely 2) pendulous, naked, micropyle ultimately superior; style 2-branched, one branch deciduous, curved, capitate at the apex, the other accrescent, ultimately deciduous, divided at the apex into 2 unequal, ovate, rather obtuse divisions. *Fruit* ovate-orbicular, emarginate or obcordate, compressed, very broadly winged, 1-celled, indehiscent. *Seed* solitary, linear, furrowed; embryo minute, in hard fleshy albumen.—The following is the only species.

1. **C. lobata**, *R. Br. in Wall. Cat.* 8033 A, and in *Benn. Pl. Jav. Rar.* 246, t. 49. *Miq. Fl. Ind. Bat.* i. pt. i. 799. *C. moluccana*, *Blume Rumph.* iv. 207, t. 177, f. 2, partly. *C. javanica* *Blume Rumph.* iii. 206, iv. t. 177. *C. Rumphii*, *Baill. in Adansonia* x. 280, and in *DC. Prodr.* xvii. 26. *Peripterygium quinquelobum*, *Hassk. Cat. Pl. Hort. Bogor.* 351.

WESTERN BENGAL, in Silhet and Cachar. RANGOON, Ava, and TENASSERIM.—DISTRIB. Yunan, Indian Archipelago, Siam, New Guinea.

Stem terete, striate. *Leaves* 3-5 in. by $3-4\frac{1}{2}$ in., glabrous, membranous, polymorphous, usually more or less angular and slightly lobed, base 7-9 nerved, cordate, lobes acute or acuminate, widely divergent; petiole 3-5 in. *Peduncles* $2\frac{1}{2}-4$ in., solitary, axillary, dichotomous; pedicels puberulous, erect, ultimately spreading or recurved. *Flowers* rather crowded, secund, ebracteate. *Calyx* puberulous. *Corolla* slightly exceeding the calyx, whitish, deciduous. *Fruit* $1-1\frac{1}{2}$ in. by $1\frac{1}{4}$ in.—The plant varies much in the consistence and form of the leaves, occasionally even on the same specimen, hence, by some writers, several species have been proposed. Baillon, however, ranks them all as varieties. The following occur within the limits of this Flora.

VAR. 1. *moluccana*, leaves rather thick subcordate or hastato-subcordate not lobed, nerves subpedate more or less conspicuous sometimes reddish, inflorescence cymose-racemose. *C. moluccana*, *Blume Rumph.* iii. 207, t. 177, f. 2; *Royle Ill.* 136; *Miq. Fl. Ind. Bat.* i. pt. i. 799. *C. Rumphii*, var. *a integrifolia*, *Baill. in DC. Prodr.* xvii. 26; *Rumph. Amb.* v. 482, t. 180. *Dioscorea sativa*, *L. Amæn. Acad.* iv. 133.

VAR. 2. *subhamata*, *Baill. in DC. Prodr.* xvii. 26; leaves cordate pedately 7-nerved

sagittate-ovate, 5-7-lobed, terminal lobe largest ovate acuminate, lateral lobes angular acuminate, lowermost unequally cuneate. *C. subhamata*, Wall. mss.

There are differences of opinion as to the structure of the flower. The figure of the ovary in Blume's *Rumphia*, t. 177, f. 8, differs from the description, and is erroneous. The persistent and accrescent style (?) assumes a spongy cellular character, and is traversed by two bundles of spiral vessels and by laticiferous tubes. Octahedral crystals also abound in its tissues. The cells of the epicarp contain in some cases a spiral fibre. The structure of the ovule is very peculiar. According to Dr. Hooker's unpublished drawings made from the fresh specimens, the ovule is pendulous and originally straight, but afterwards curves upward. It is devoid of coats, but is provided with a raphe and the embryo sac (?) is protruded in the shape of a long tubular process.

ORDER XL. ILICINÆ. (By J. D. Hooker.)

Shrubs or trees. *Leaves* alternate, simple, exstipulate, or with 2 minute stipules, usually coriaceous and evergreen. *Flowers* small, in axillary cymes fascicles or umbellules, usually diœcious, ♂ with imperfect ovary, and ♀ with imperfect stamens. *Calyx* 3-6-partite or -lobed; segments or lobes imbricate, persistent. *Petals* 4-5, rarely 6-8, connate at the base, or connate in the ♂ and free in the ♀, deciduous, imbricate. *Stamens* 4-5, adhering to the bases of the petals, sometimes free and hypogynous in the ♀, filaments subulate; anthers shortly oblong, dorsifixed. *Disk* 0. *Ovary* free, 3-16-celled; style 0, or very short, rarely long, stigma capitate or discoid; ovules 1, or 2 collateral, pendulous, raphe dorsal, micropyle superior, funicle often cupular. *Drupe* with 2 or more 1-seeded free rarely connate stones. *Seed* with a membranous testa, fleshy albumen and minute embryo.—**DISTRIB.** Three genera, and about 150 species, chiefly tropical.

An examination of the Indian species has led to very important modifications of the ordinal character as given in the *Genera Plantarum*, and to the suppression of the genus *Byronia*.

1. *ILEX*, Linn.

Calyx 4-5-lobed or -parted. *Corolla* rotate, petals free or connate at the base. *Stamens* 4-5, adhering to the base of the corolla in the ♂, sometimes hypogynous in the ♀. *Ovary* 2-12-celled; styles 0 or very short, stigmas free or confluent on the top of the ovary. *Drupe* globose, very rarely ovoid, with 2-16 stones.—**DISTRIB.** Of the Order; species about 145.

SECT. I. *Flowers* in strict spikes. *Drupe* with 10-16 stones.

1. *I. spicata*, Blume *Bijdr.* 1149; glabrous, leaves elliptic shortly obtusely caudate-acuminate very coriaceous quite entire. *Prinos spicata*, Miq. *Fl. Ind. Bat.* i. pt. 2, 594.

MALACCA, Maingay.—**DISTRIB.** Java, Borneo.

An often epiphytic shrub (*Blume*); branches stout, woody. *Leaves* 4-6 in., base rounded, midrib stout beneath, dark olive-green when dry; nerves very slender, reticulate; petiole very short. *Spikes* 1½ in., solitary or twin, axillary and below the leaves, suberect or spreading; rachis rather stout, flowering from the base; bracts minute, pedicel ⅙ in. *Flowers* minute; ♂ about ⅙ in. diam. *Calyx* flat, of 4-5 rounded lobes. *Corolla* of 4-5 broadly oblong petals, slightly connate at the base, finally reflexed. *Stamens* inserted at the junction of the petals, filaments at length longer than the corolla; anthers small. *Imperfect ovary* globose, grooved. *Fl.* ♀ not seen.

Drupe $\frac{1}{2}$ in. long, broadly ovoid, much compressed, with a sessile transversely elongated stigma on its broad truncate end, and 10–16 minute compressed coriaceous stones.—A very curious plant, which I assume to be Blume's *I. spicata*. Maingay's specimens are in ♂ flowers only, and I have described the drupe from Bornean ones collected by Beccari.

SECT. II. *Flowers* in very dense short axillary branched cymes, pedicels very short, ♂ and ♀ 4-merous. *Drupe*s sessile in the axils, 1–4-celled (pedicelled in *I. odorata*).

2. *I. insignis*, *Hook. f.*; branches very stout, leaves 6–9 in. elliptic-lanceolate obscurely serrate very coriaceous young spinous-toothed, drupe sessile large with a rugose 1–3-seeded stone.

SIKKIM HIMALAYA; at Darjeeling, alt. 7000 ft.

A small evergreen erect tree; branchlets as thick as the little finger, grooved. *Leaves* very thick, acute, narrowed into the stout petiole, which is $\frac{3}{4}$ –1 in.; nerves beneath very stout and much reticulated; young oblong-lanceolate, base rounded, margins spinous, petiole shorter. *Flowers* 4-merous, $\frac{1}{2}$ in. diam., in subglobose clusters $\frac{1}{2}$ in. diam., green; pedicels very short, stout; bracts opposite, small, ovate, acute. *Calyx-lobes* broadly ovate, acute or obtuse. *Petals* orbicular-obovate, connate below in the ♂. *Stamens* equalling the petals, inserted on the corolla in the ♂, filaments very thick. *Rudimentary-ovary* globose, with 4 minute papillæ as stigmas. *Ovary* of ♀ 4-celled; stigma sessile, discoid, 4-lobed. *Drupe* $\frac{3}{8}$ in. diam., globose, with a globose 1–3-celled 1–3-seeded grooved woody stone formed of 4 connate stones.—Closely allied to *I. dipyrrena*, but a very much larger plant in all its parts, with shorter stamens and a very different structure of the drupe. Still more closely allied to the Japanese *I. latifolia*, Thunb., which has 4 separate stones in the drupe.

3. *I. dipyrrena*, *Wall. in Roxb. Fl. Ind. ed. Carey*, i. 473; *Pl. As. Rar.* iii. 68, t. 292; *Cat.* 4327; branches stout, leaves 3–4 in. elliptic-lanceolate spinous-serrate very coriaceous, the old quite entire, drupe sessile with 2 rarely more plano-convex deeply-grooved stones. *Don Prodr.* 188; *DC. Prodr.* ii. 15; *Brandis For. Flor.* 76.

TEMPERATE HIMALAYA; from Simla, alt. 5–8000 ft., to Sikkim, alt. 7–9000 ft., Wallich, &c.

An evergreen tree 30–40 ft.; trunk sometimes 17 feet girth; shoots pilose. *Leaves* shining, the young very spinous, the older with scattered marginal spines, the oldest with a thickened quite entire border; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* 4-merous, $\frac{1}{2}$ in. diam., in axillary subglobose clusters, white; pedicels very short; bracts 2, opposite, ovate, acute. *Calyx-lobes* broadly ovate, acute, ciliate. *Petals* obovate, connate below in the ♂, free in the ♀. *Stamens* of ♂ inserted on the corolla, longer than the petals, of the ♀ hypogynous. *Ovary* of ♀ ovoid, 2–rarely 3–4-celled, stigma quadrate. *Drupe* $\frac{1}{2}$ in. diam., globose, scarlet, stones usually 2, rarely 3–4, deeply grooved longitudinally.

4. *I. odorata*, *Ham. in Don Prodr.* 189; leaves 5–7 in. elliptic-oblong or lanceolate acute minutely serrate-toothed, ♂ fl. in short globose panicle cymes, female cymes shorter, drupe pedicelled with 4 stones. *DC. Prodr.* ii. 15; *Brandis For. Flor.* 77.—*Ilex?* *Wall. Cat.* 9023.

TEMPERATE HIMALAYA; from Simla to Nipal, alt. 3–6000 ft.

A small evergreen tree; branches much less stout than in the preceding two species. *Leaves* sometimes 9 in.; nerves rather slender; petiole $\frac{1}{4}$ – $\frac{3}{8}$ in. *Flowers* 4-merous, about $\frac{1}{2}$ in. diam., white; ♂ in very shortly peduncled spreading globose cymes $\frac{1}{4}$ –1 in. diam.; ♀ in shorter cymes and with shorter pedicels; bracts minute, at the base of the pedicels. *Calyx-lobes* rounded. *Petals* of ♂ connate below; of ♀ free, oblong, obtuse. *Stamens* of ♂ inserted on the corolla, filaments slender, much longer than the petals; of ♀ hypogynous. *Ovary* globose, 4-celled; stigma sessile quadrate. *Drupe* $\frac{1}{4}$ in. diam., pedicelled, globose (ovoid, black, *Brandis*); stones 4, small, trigonous, with

obtuse angles.—Brandis gives Sikkim as a habitat for this, but I doubt the plant he here alludes to being the same species; his plant has very stout branches like those of *I. dipyrena*, and very shortly pedicelled young fruits, has 4 pyrenes, lanceolate minutely serrate leaves, and inhabits elevations of near 10,000 ft.; it may be a new species, but the specimens are too imperfect for determination.

SECT. III. *Flowers* ♂ in panicked cymes; ♀ solitary or fascicled, pedicelled (not cymose nor on peduncled umbellules). *Drupe* 4-6-celled. (See 15. *Gardneriana*, in Sect IV.).

* *Leaves quite entire, or with 2-3 spinulose teeth.* (See 9. *embelioides*.)

5. ***I. malabarica***, *Bedd. Flor. Sylv.* t. 143; leaves 2-4-in. narrowly elliptic-oblong acute or apiculate quite entire, ♂ flowers in shortly panicked umbellules, calyx usually 6-merous, drupe very small puberulous usually 6-celled, style short cylindric stout. *I. Wightiana*, *Dalz. & Gibs. Bomb. Flor.* 143, not of *Wall.*

WESTERN PENINSULA; on the Ghats, from the Concan southwards, ascending to 3000 ft.

A large tree, everywhere quite glabrous. *Leaves* variable in length and breadth, always more or less narrowly elliptic, acute acuminate or apiculate by the produced nerve, shining above, nerves beneath faint, margin with rarely a spinulose tooth towards the tip; petiole $\frac{1}{8}$ - $\frac{1}{2}$ in. *Flowers* $\frac{1}{10}$ in. diam., peduncles and pedicels puberulous; ♀ fl. solitary or fascicled, the fascicles very rarely peduncled, pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in. *Calyx-lobes* usually 6, broad, subacute, ciliate. *Petals* 4-6, orbicular, ciliate, connate at the base in the ♂, less so in the ♀. *Stamens* often only 4, inserted at the base of the corolla, filaments short; anthers broadly oblong. *Ovary* of ♂ imperfect, with 4 minute stigmas. *Drupe* $\frac{1}{2}$ in. diam., depressed-globose, usually 6- or more celled, with an evident stout style.—This has been distributed as *I. Wightiana*, by Perrottet and others.

6. ***I. Walkeri***, *Wight & Gard. mss. ex Thwaites Enum.* 184 (1858); glabrous, leaves $\frac{3}{4}$ -1 in. subsessile orbicular obovate or broadly elliptic very coriaceous obtuse rounded or retuse with a few teeth near the tip, flowers 4-5-merous, ♂ in very shortly peduncled umbellules, ♀ shortly pedicelled. *I. Walkeri*, *Turcz. in Bulb. Soc. Nat. Mosc.* 1863, pt. i. 605. *I. emarginella*, *Turcz. l.c.*

WESTERN PENINSULA; Pulney Mts., *Wight*. CEYLON; in the Central province, alt. 5-8000 ft.

A small densely branched tree. *Leaves* very coriaceous, usually obovate with an emarginate or 2-lobed or 3-4-toothed tip, margins recurved, nerves below few and slender; petiole $\frac{1}{10}$ in. *Flowers* $\frac{1}{10}$ in. diam., white, 4-5-merous. *Calyx-lobes* 4-5, subacute. *Petals* orbicular, spreading, connate in both sexes. *Stamens* 4-5, inserted on the corolla in both sexes. *Drupe* $\frac{1}{2}$ in. diam., globose, with 4-5 triangular hard cohering stones; stigma sessile, 4-5-lobed.—A very variable plant, named *Walkeri* independently by Thwaites and Turczaninoff. Thwaites has a var. *major* with elliptic apiculate leaves. Turczaninoff's *I. emarginella* is the more common form of the plant.

** *Leaves toothed or serrate.* (See also 6. *Walkeri*.)

7. ***I. denticulata***, *Wall. Cat.* 4333; glabrous, leaves 2 $\frac{1}{2}$ -3 in. elliptic or elliptic-oblong acute or obtusely acuminate serrate very coriaceous, flowers 4-merous, ♂ in short subsessile cymes, ♀ fascicled, drupe $\frac{1}{2}$ in. diam. with 4 hard stones. *Wight Ill.* t. 142; *Thwaites Enum.* 183; *Beddome Fl. Sylv.* t. 142. *I. nilagirica*, *Miquel Pl. Hohen.* 1456.

WESTERN PENINSULA; Nilghiri and Anamallay hills, alt. 6-8000 ft., *Wight*, &c. CEYLON, on the Bopatalawa Plains, alt. 6000 ft., *Thwaites*.

A large timber tree (*Beddome*); young parts minutely pubescent. *Leaves* very coriaceous, acutely or obtusely serrate throughout their length, tip variable, very coriaceous; nerves beneath few, very slender; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Flowers* $\frac{1}{2}$ in. diam.; ♂ in branched very short cymes. *Calyc-lobes* broad, subacute. *Petals* connate at the very base in the ♂, free in the ♀, broadly oblong. *Stamens* about equalling the petals, inserted on the corolla in the ♂, hypogynous in the ♀. *Drupe*s rarely solitary, globose, with 4 trigonous grooved rather woody stones; stigma sessile, 4-lobed; pedicels very stout, $\frac{1}{2}$ in. long.—Wight figures the ovarian cells with 2 superposed ovules (copied in *Beddome's Flor. Sylv.*); I find but one with a large thick funicle. I have followed Wight and all subsequent authors in calling this *I. denticulata*, Wall.; but the only representatives of this name in the Wallichian Herbarium are two small obovate leaves, with obscurely serrate margins, probably of *I. Wightiana*.

8. ***I. theæfolia***, Wall. Cat. 6391 (Myrsine); glabrous, branches robust, leaves 2–3½ in. elliptic-oblong or lanceolate subcaudate with an obtuse tip obtusely obscurely serrate very coriaceous reticulate beneath, flowers 5-merous, ♂ in very short subsessile cymes, ♀ fascicled, drupe $\frac{1}{4}$ in. diam. with 4 stones. *I. gaultheriæfolia*, Kurz in *Beng. As. Soc. Jour.* 1872, ii. 259.

KHASIA Mts., alt. 3–4000 ft., Gomez, &c.; TENASSERIM, Kurz; MISHMI HILLS, Griffith.

So near to *I. denticulata*, that I have hesitated before keeping it distinct; it differs in the longer narrower more attenuate tips of the leaves, with more reticulated nerves beneath, and in the smaller drupes. I have adopted Wallich's singularly appropriate specific name.

9. ***I. embelloides***, Hook. f.; glabrous, leaves 1½–2 in. elliptic or elliptic-lanceolate caudate-acuminate with an obtuse apiculate tip entire or with a few acute serratures, flowers 4-merous minute, ♂ in small pedicelled umbellules, ♀ fascicled, drupe $\frac{1}{8}$ in. globose with 4 stones.

KHASIA Mts.; common at Churra, Nunklow, &c., alt. 3–4000 ft.

A small tree; tips of branchlets obscurely puberulous, as is sometimes the midrib of the young leaf above. *Leaves* coriaceous, sometimes quite entire, at others with small scattered spinulose teeth along the margin, very obscurely reticulated beneath; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* about $\frac{1}{12}$ in. diam., white; ♂ panicles $\frac{1}{4}$ –1 in., peduncles slender, pedicels obscurely puberulous. *Calyc-lobes* obtuse. *Petals* oblong-orbicular, connate below in both sexes. *Stamens* equalling the petals, inserted on the corolla in both sexes. *Drupe*s clustered on a very short axillary branchlet, pedicels as long as themselves.—A very distinct species, of which a specimen in Griffith's Herbarium from the Khasia is labelled "*Embeliæ affinis? Mambrea 12-6 35*," apparently in Wallich's handwriting.

10. ***I. Griffithii***, Hook. f.; branches pubescent or glabrescent, leaves 1½–2 in. elliptic acute serrulate coriaceous shining above, flowers 4-merous, ♂ fascicled, ♀ solitary or nearly so, drupe globose with 4 large coriaceous 3-gonous stones and a thin epicarp.

ASSAM, Jenkins, Griffith; SILHET, at Terrya Ghat, H. f. & T. T.; MALACCA, Keddah Peak, Low; Summit of Goonong, &c., Maingay, Griffith.

A small tree, branches very sparingly pubescent in Khasia specimens, much more so in those from Malacca. *Leaves* coriaceous, but soft, serratures obtuse, midrib below often pubescent; nerves numerous very fine; petiole $\frac{1}{4}$ in. *Flowers* ♀ nearly $\frac{1}{4}$ in. diam., larger than in *I. theæfolia*, ♂ nearly $\frac{1}{8}$ in. diam., apparently not panicked; pedicels $\frac{1}{4}$ in. *Calyc* orbicular with 4 broad shallow ciliolate lobes. *Petals* broadly oblong, obtuse, recurved, connate below in both sexes. *Stamens* of ♂ equalling the petals, inserted on the corolla in both sexes. *Ovary* globose; stigma sessile, 4-lobed. *Drupe* quite globose, black or purple? flesh very thin, stones coriaceous with broad flat faces and a convex back; pedicel stout, $\frac{1}{4}$ – $\frac{1}{2}$ in. long.

11. ***I. Thomsoni*, Hook. f.**; a small shrub, branchlets puberulous, leaves $\frac{1}{2}$ –1 in. obovate or oblanceolate subacute or apiculate serrulate coriaceous gland-dotted beneath, flowers 4-merous, ♂ solitary and in 3-5-flowered cymes, ♀ subsolitary, drupe globose $\frac{1}{4}$ in. diam. with 4 large coriaceous 3-gonous stones.

EASTERN HIMALAYA; Bhotan, at Tongse, *Griffith*. KHASIA Mts., alt. 4-5000 ft., at Moflong, *Wallich*; Churra and Surureem, *H. f. & T. P.*

A small bright green shrub, about 6 ft. high. *Leaves* shining, green, retaining their colour when dry, narrowed into the short petiole, serratures obtuse; nerves very obscure beneath. *Flowers* about $\frac{1}{2}$ in. diam., white; cymes of ♂ of usually 3 flowers on a peduncle $\frac{1}{4}$ – $\frac{1}{2}$ in. long; pedicels slender; ♀ pedicels $\frac{1}{2}$ in., lengthening and thickening in fruit. *Calyx* with 4 orbicular lobes. *Petals* broadly oblong, obtuse, connate at the base in both sexes. *Stamens* as long as the petals, inserted on the corolla in both sexes. *Drupe* like that of *I. Griffithii*, but smaller, purple; stigma sessile, 4-lobed.—This was first gathered by Wallich at Moflong in 1835, when on the tea deputation to Assam. Very near, indeed, to *I. Horsfieldii*, Miq., of Java, but the leaves are obovate; both have leaves of similar texture and serrature, and gland-dotted beneath.

12. ***I. intricata*, Hook. f.**; branches straggling with warted ridges, leaves $\frac{1}{3}$ – $\frac{1}{2}$ in. obovate obtuse coarsely serrate very coriaceous, flowers subsolitary 4-merous, ♂ shortly pedicelled, ♀ sessile, drupe $\frac{1}{4}$ in. diam. with 4 large 3-gonous stones.

SIKKIM and EAST NIPAL HIMALAYA, alt. 10-11,000 ft., *J. D. H.*

A low rigid straggling shrub, forming matted masses with interlaced woody branches; branchlets stout, angled and rigid, the ridges warted. *Leaves* spreading, thickly coriaceous, bright green, narrowed into very short petioles; nerves few beneath, raised. *Flowers* $\frac{1}{10}$ in. diam. *Calyx-lobes* orbicular. *Petals* broadly oblong, coriaceous, nearly free below in the ♀, spreading. *Stamens* equalling the petals, shorter in the ♀; and hardly adherent to the petals at the very base. *Drupe* sessile, red, globose, stigma sessile 4-lobed, flesh thin, of the same structure as those of *I. Thomsoni* and *Griffithii*, to which this species is clearly allied,

13. ***I. fragilis*, Hook. f.**; glabrous, leaves 4-5 in. elliptic or ovate subcaudate-acuminate serrulate membranous, flowers 5-merous all fascicled, drupe $\frac{1}{8}$ in. with 5-8 stones.

SIKKIM and BHOTAN HIMALAYA, alt. 7-10,000 ft., *Griffith*. KHASIA Mts. at Surureem, alt. 5000 ft., *H. f. & T. P.*

A small tree, with very brittle branches, quite glabrous. *Leaves* bright deep green, more membranous than in any of the Indian species, very strongly reticulate with many raised nerves beneath; petiole $\frac{1}{2}$ – $\frac{3}{8}$ in. *Flowers* $\frac{1}{2}$ in. diam., both ♂ and ♀ fascicled; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., glabrous. *Calyx-lobes* rounded-oblong. *Petals* spreading, broadly oblong, obtuse, united at the base in both sexes. *Stamens* shorter than the petals, filaments stout, inserted on the corolla in both sexes. *Drupe* $\frac{1}{4}$ in. diam., on short stout pedicels, fleshy, red, globose, stigma rather large and tumid, stones thickly coriaceous.

SECT. IV. *Female flowers* in simple or branched peduncled umbellules. *Leaves* quite entire in all. (See various species in § V.)

14. ***I. venulosa*, Hook. f.**; quite glabrous, leaves 5-8 in. elliptic-oblong with long slender caudate points quite entire much reticulated, umbellules simple and paniced, ♂ flowers 4- ♀ 5-6-merous, drupe very small, stigma tumid subsessile.

KHASIA Mts., in woods, alt. 4-5000 ft., *De Silva*, &c.

A handsome tree. *Leaves* shining above, pale beneath, with many spreading strong branching nerves, suddenly contracted at the apex into a tail sometimes almost 2 inches

long, base rounded; petiole $\frac{1}{2}$ –1 in. MALE fl. in glabrous axillary branched cymose umbellules, $\frac{1}{10}$ in. diam., greenish-white; peduncle compressed, stout, $\frac{1}{4}$ –1 in.; pedicels $\frac{1}{4}$ in., slender. *Calyx-lobes* rounded. *Petals* broadly oblong, connate in both sexes. *Stamens* short, inserted on the corolla in both sexes. FEMALE fl. umbellules in shorter stouter simple or much-branched peduncles. *Drupe*s red, crowded; pedicels of about their own diameter; stones 5–6, trigonous, with convex backs, rather thick.—A very distinct and handsome species.

15. **I. Gardneriana**, *Wight Ic.* t. 1217; glabrous, leaves 2–2½ in. long-petioled ovate-lanceolate caudate-acuminate quite entire, umbellules simple and paniced, flowers 5-merous.

WESTERN PENINSULA; on the Nilghiri hills at Sisparah Ghat, *Wight*.

A small tree or large shrub (*Wight*). *Leaves* rather coriaceous, base rounded; nerves very faint beneath; petiole $\frac{1}{2}$ –¾ in., very slender. *Flowers* $\frac{1}{2}$ in. diam., male only seen, in simple solitary or fascicled peduncled slightly pubescent umbels; peduncles shorter than the petioles; pedicels slender, $\frac{1}{4}$ in. *Calyx-lobes* broad, ciliolate. *Petals* oblong, obtuse, connate below. *Stamens* of ♂ equalling the petals, inserted on the corolla in both sexes.—A very distinct species, of which the fruit is unknown.

16. **I. Wightiana**, *Wall. Cat.* 4332; glabrous, leaves 1½–4½ in. elliptic elliptic-oblong or ovate subacute or acuminate quite entire softly coriaceous, flowers usually 5–6-merous, ♂ and ♀ in peduncled simple paniced puberulous umbellules, drupe with 5–6 stones, stigma subsessile. *Wight Ic.* t. 1216; *Thwaites Enum.* 183; *Bedd. Fl. Sylv.* t. 142.

WESTERN PENINSULA; Nilghiri hills, *Wight*, &c.; CEYLON, in the southern and central parts, ascending to 4000 ft., *Thwaites*.

A large umbrageous tree, trunk 6 ft. in diam. at as high above the ground (*Wight*). *Leaves* coriaceous, much larger in Ceylon than in Peninsular specimens, and more reticulated with rather distant nerves beneath, narrowed into a petiole $\frac{1}{4}$ –½ in. long. *Flowers* minute, $\frac{1}{10}$ in. diam., white, umbellules subsessile in Peninsular specimens, on peduncles $\frac{1}{2}$ –½ in. long in Ceylon specimens. *Calyx-lobes* orbicular. *Petals* oblong, connate below in both sexes. *Stamens* of ♂ shorter than the petals, united to the corolla in both sexes. *Drupe* ½ in. diam., globose, smooth, stones with flat sides and convex backs; style very short indeed.—The differences between the Peninsular and Ceylon specimens are almost specific.

Var. peninsularis; leaves 1–2½ in., nerves very indistinct beneath, umbellules subsessile.

Var. zeylanica; leaves 3–5 in., nerves very distinct beneath, umbellules pedicelled.

17. **I. excelsa**, *Wall. Cat.* 4328 (exsulca); glabrous, leaves 2–4 in. soft elliptic-ovate or lanceolate acuminate quite entire, nerves very oblique, petiole slender, umbellules pubescent very shortly and stoutly peduncled, flowers 4–5-merous, drupe $\frac{1}{6}$ in. diam. with 5 stones. *Brandis For. Flor.* 76 (excl. syn. Ehretia). ? *I. elliptica*, *Don Prodr.* 189. *Cassine excelsa*, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 376.

SUBTROPICAL HIMALAYA; from Kumaon to Nipal and Bhotan (exclusive of Sikkim), alt. 4–6000 ft.; KHASIA Mts., alt. 4000 ft., *Griffith*, &c.

A large shrub (or tall tree, *Wallich*). *Leaves* dark-green, shining above, paler beneath, rather fleshy, base acute; petiole $\frac{1}{2}$ –1 in.; stipules 2, minute. *Flowers* $\frac{1}{2}$ in. diam., about 12 in an umbel; peduncle $\frac{1}{4}$ –½ in., stout, compressed; pedicels stout, very short. *Calyx-lobes* ovate, obtuse, ciliate. *Petals* ovate-rotundate, crenulate, united at the base in both sexes. *Stamens* equalling the petals, inserted on the corolla in both sexes; filaments dilated at the base. *Drupe* globose, with 4–5 trigonous stones; stigma 4–5-lobed.—That the trivial name *exsulca* of *Wall. Cat.* is an oversight for *excelsa* is evident from this being the *Cassine excelsa* of *Wallich* in *Roxburgh's Flora Indica*, where it is admirably described and stated to be a lofty tree; no less than from the fact

that the mss. ticket attached to Blinkworth's specimens in Wallich's handwriting, bears the name *excelsa*. Brandis is certainly mistaken in referring the *Ehretia umbellulata*, together with various Malayan Peninsula specimens, to this species. Wallich describes the flower as inodorous, Brandis as sweet-scented. Very near if not identical with *I. rotunda*, Thunb., of Japan.

18. **I. Godajam**, *Colebr. ms. ex Wall. Cat.* 4329; branchlets pubescent, leaves 3-5 in. soft ovate acute or with a retuse tip quite entire nerves spreading, petiole slender, umbellules pubescent on simple or branched peduncles, ♂ flowers 4-5-merous. *Ehretia umbellulata*, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 344; *Cat.* 4329. *Pseudehretia umbellulata*, *Turcz. in Bull. Soc. Nat. Mosc.* 1863, pt. i. 607.

EASTERN BENGAL, ASSAM, and SILHET; Jilpigoree (*Hamilton in Herb. Wall.*); foot of Sikkim hills, *J. D. H.*

A branching tree; bark pale, ashy. *Leaves* rather membranous, soft, undulate, nerves very slender; petiole slender, $\frac{1}{2}$ -1 in.; stipules 2, minute. *Flowers* (♂ only seen) $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., in simple or paniced peduncled umbellules, which, as well as the peduncles and very short pedicels, are more or less pubescent, fragrant. *Calyx-lobes* orbicular. *Petals* ovate-oblong, shorter than the slender filaments, united below.—It is remarkable that of the five collectors from whom I have specimens of this plant, not one has obtained the female flowers or fruit. One of Wallich's specimens has the flowers almost twice as large as and more pubescent than the others, and may be a different species. I have the same from the Garrow hills, gathered by Simons.—This differs much from *I. excelsa*, in the foliage, longer peduncles, and more numerous flowers, and may prove the same with *I. sulcata*, Wall.

19. **I. sulcata**, *Wall. Cat.* 4330; glabrous, leaves 4-6 in. soft elliptic-lanceolate or -oblong or -ovate obtuse quite entire membranous, petiole slender, umbellules solitary simple long-peduncled puberulous, flowers 4-6-merous, drupe with about 8 trigonous stones.

TENASSERIM, at Moulmein, *Wallich*; Mergui, *Griffith*; Amherst, *Helfer* (Kew distrib. 1998); PEGU, *Kurz*.

Probably a tree; bark of branches grey-brown; shoots apparently soft. *Leaves* thin and soft in texture, pale yellow-brown when dry, with a slender translucent margin; nerves beneath very slender, arching, hardly reticulate; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Umbellules* 12-20-flowered, more or less puberulous, always solitary and simple; peduncle 1 in., often shorter in the ♀, compressed; pedicels $\frac{1}{4}$ in. *Flowers* about $\frac{1}{10}$ in. diam. *Calyx-lobes* orbicular. *Petals* broadly oblong, obtuse, recurved, 4 in the ♂ and connate below, 6 in the ♀ and free, shorter than the slender filaments. *Rudimentary-ovary* conical, subtended by the obtusely 6-lobed calyx. *Drupe* $\frac{1}{2}$ in. diam., globose; stones trigonous, with the back, I think, concave, whence probably Wallich's name of *sulcata*, but I cannot well determine this point; stigma quite sessile, lobed.—Perhaps the same as *I. Godajam*, *Colebr.* Very similar in foliage to *I. cymosa*, Blume, but the umbellules are simple, and bark of a very different colour.

SECT. V. *Female flowers* in branched peduncled cymes, rarely in simple umbellules. *Leaves* quite entire in all. (This differs from Sect. IV. in the umbellules being more broken up into cymules.)

20. **I. macrophylla**, *Wall. Cat.* 4331; quite glabrous, leaves 4-7 in. elliptic-oblong obtuse quite entire rather coriaceous, nerves beneath few strong ascending, flowers in branched peduncled cymes 4-6-merous, drupe small with about 8 stones.

EASTERN PENINSULA, Penang, *Phillips*, *Wallich*; MALACCA, *Griffith*, *Maingay*. ? TENASSERIM, *Helfer*, and Mergui, *Griffith* (Kew distrib. 2012).—DISTRIB. Java, Sumatra.

A tree about 15 ft. high (*Maingay*). Branches stout, bark grey; shoots quite glabrous. Leaves rigid, light brown when dry, shining above, paler beneath, with about 6-8 rather distant prominent ascending nerves, sparingly reticulated; petiole short, stout, $\frac{1}{4}$ - $\frac{1}{2}$ in. Cymes more or less effuse, with short subscorpioid many-flowered branches; peduncles $\frac{1}{4}$ - $\frac{3}{4}$ in., rather slender, glabrous or minutely puberulous; pedicels as short as the flowers, sometimes umbellulate. Calyx-lobes orbicular. Petals broadly oblong, obtuse, rather shorter than the stamens; of the ♂ 4-6, united at the base, of ♀ often 6, unequal and free. Stamens inserted on the corolla in the ♂, hypogynous in the ♀. Drupe of two forms; one perfect, globose, $\frac{1}{4}$ in. diam., with a sessile stigma and 6-8 much compressed acutely 3-gonous stones; the other (imperfect) smaller, with a distinct but very short style and empty cells.—The Tenasserim specimens doubtfully referred to this species have smaller very coriaceous leaves, 2-3 in., with more narrowed bases and tips, and glabrous cymes. A specimen of apparently the same plant is amongst Maingay's Malacca collections, its fruit is unknown.

21. **I. Maingayi**, Hook. f.; quite glabrous, leaves 4-5 in. elliptic or narrowly elliptic-oblong obtusely acuminate very coriaceous rather glaucous beneath, nerves nearly horizontal, flowers subumbellate in stout much branched cymes 4-6-merous, drupe $\frac{1}{2}$ in. diam. with 6 stones, style distinct.

PENANG, *Maingay* (Kew distrib. 1021).

A tree about the size of a Guava (*Maingay*); branches woody, bark dark grey, shoots quite glabrous. Leaves very coriaceous, dark brown opaque and subglaucous beneath when dry, blacker brown and shining above, midrib stout, narrowed into a stout petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. Cymes almost racemose, 1-2 in. long, peduncle and pedicel stout quite glabrous, black when dry. Flowers crowded on very short stout pedicels, $\frac{1}{10}$ in. diam.; ♀ cymes very short judging from the fruit. Calyx-lobes orbicular, not ciliate. Petals rather coriaceous, broadly oblong, in the ♂ 4, rather shorter than the stout filaments; in the ♀ 6, inserted below the ovary free. Stamens inserted on the corolla in the ♂, hypogynous in the ♀. Drupes on stout pedicels shorter than themselves, subtended by the 6-lobed calyx, rather longer than broad; pulp very scanty; stones trigonous, thickly coriaceous; stigma tumid, subsessile.—Near *I. macrophylla*, but the nerves of the leaf are more numerous and almost horizontal.

22. **I. cymosa**, Blume Bijdr. 1149; branches with white bark, leaves 3-5 in. elliptic or elliptic-oblong obtuse or obtusely acuminate rather membranous, nerves beneath very slender, flowers in lax open cymes 4-8-merous, drupe $\frac{1}{2}$ in. diam. with about 8 trigonous stones, style stout distinct. I. singapuriana, Wall. Cat. 6526. Prinos cymosa, Hassk. Tijdschr. Nat. Gesch. x. 140; Miquel Fl. Ind. Bat. i. pt. 2, 595. Leucoderis javanica, Planch. mss.

EASTERN PENINSULA; from Tenasserim to Malacca, common.—DISTRIB. Sumatra, Java, Borneo.

A small tree; quite glabrous; bark of branches snow-white, with the epidermis flaking off. Leaves usually membranous, variable in shape; nerves few or many, spreading, very slender, sometimes quite faint, pale brown when dry, shining above, narrowed into a rather stout petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. long. Flowers $\frac{1}{2}$ in. diam., in small cymes or irregular umbellules which are collected into a spreading cymose long-peduncled panicle; peduncle $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; pedicels slender $\frac{1}{4}$ in.; ♂ 4-5-merous, with equal oblong obtuse spreading petals; ♀ with a 5-merous calyx and 6-8 unequal small erect concave petals. Calyx-lobes orbicular. Drupe $\frac{1}{2}$ in. diam., rather longer than broad, grooved when dry, with very little flesh, and usually 8 trigonous compressed stones; stigma on an evident stout short style.—The white bark is very conspicuous in this plant, which has a more open panicked cyme and longer style than any of its Indian congeners.

23. **I. Wallichii**, Hook. f.; branches with white bark, leaves 4-5 in. elliptic or elliptic-ovate obtuse quite entire thinly coriaceous, drupe $\frac{1}{2}$ in. diam. with about 12 compressed stones, stigma sessile. Illicinea, Wall. Cat. 9012.

TENASSERIM; at Tavoy, *Gomez*.

Branches woody; bark as in *I. cymosa*, but apparently less inclined to flake. *Leaves* brown when dry, pale beneath, with about 10 pair of very faint-spreading nerves, narrowed into a petiole $\frac{1}{2}$ in. long.

24. **I. sclerophylla**, *Hook. f.*; leaves 5-6 in. elliptic-oblong obtuse quite entire glaucous beneath thickly coriaceous, petiole short very thick, cymes ♀ short with a very stout peduncle and pedicels.

MALACCA, on Mt. Ophir, *Griffith*.

A very remarkable species, of which I have seen only two fragments. The leaves are polished above, extraordinarily thick, narrowed into a very thick petiole $\frac{1}{2}$ in. long. *Cyme* 1 in., sparingly branched, branches apparently 3-flowered; pedicels $\frac{1}{2}$ in. *Flowers* ♀ only with the corolla. *Calyx* of 5 short rounded ciliate lobes. *Petals* many, very small, unequal, free. *Ovary* ovoid, truncate; stigma sessile.

UNKNOWN SPECIES.

I. DAPHNEPHYLOIDES, Kurz in Journ. As. Soc. Beng. 1870, ii. 72, from Tonglao in Sik-kim, is described as 10-androus and hence cannot be an *Ilex*.

I. ASIATICA, *Linn. Sp. Pl.* 125. This is undeterminable; no specimen exists in the Linnean Herbarium.

ORDER XLI. CELASTRINÆ. * (By M. A. Lawson, F.L.S.)

Trees or shrubs, erect or climbing. *Branches* sometimes spinescent. *Leaves* opposite or alternate, usually coriaceous, simple, petioled, rarely subsessile; stipules caducous or 0. *Flowers* hermaphrodite or polygamous, usually cymose. *Calyx* small, 4-5-lobed, imbricate, persistent. *Petals* 4-5, rarely 0, inserted below the disk or continuous with its margin, imbricate. *Stamens* 3-5, rarely 2, filaments subulate or flattened; anthers 2-celled. *Disk* usually conspicuous, pulvinate or flattened, lobed or entire, rarely 0. *Ovary* sessile, the disk free at the base or confluent with it, 3-5-celled; style short or 0, stigma triangular rarely 3-partite; ovules 2 in each cell, anatropous, erect, rarely 1 and pendulous, or many ascending attached to the axis; raphe in those ascending ventral, in those which are pendulous dorsal. *Fruit* capsular, baccate, drupaceous or samaroid. *Seed* arillate rarely exarillate, sometimes winged, albumen fleshy or 0; embryo usually large, cotyledons foliaceous flat.—DISTRIB. Species about 400, scattered over the tropical and temperate regions of the whole world.

TRIBE I. **Celastreæ**. *Stamens* 4 or 5, rarely more, inserted on or beneath the margin of the conspicuous disk; filaments subulate, often incurved. *Seed* (*Kokoona* excepted) albuminous.

SUBTRIBE I. EUONYMÆ. *Leaves* opposite (rarely alternate in *Lophopetalum*).

* *Fruit* a capsule, dehiscent.

a. *Ovules* 1-2 in the axis of each cell.

Petals free, efoveolate. Ovules 2 in each 1. EUONYMUS.

Petals free, 2-foveolate. Ovules 1 in each cell, pendulous . . . 2. GLYPTOPETALUM.

Petals connate, efoveolate, rarely 0. Ovules 2 in each cell . . . 3. MICROTROPIS.

b. *Ovules* 4 or more in each cell.

Ovary 3-4-celled. Seeds arillate, rarely winged, albuminous . . . 4. LOPHOPETALUM.

Ovary 3-celled. Seeds exarillate, winged, exalbuminous . . . 5. KOKOONA.

** *Fruit* indehiscent.

Ovules 2 in each cell, erect. Fruit coriaceous, 1-2-celled . . . 6. PLEUROSTYLIA.

SUBTRIBE II. CELASTREÆ. Leaves alternate. Ovules 2 in each cell, erect. Fruit dehiscent.

Ovary free. Seeds arillate. Shrubs, usually scandent; flowers paniculate or racemose . . . 7. CELASTRUS.

Ovary confluent with the disk. Erect shrubs or trees, often spinose; flowers cymose . . . 8. GYMNOSPORIA.

Ovary free, surmounted by a tuft of hairs, styles 2. Flowers in simple or panicled racemes . . . 9. KURRIMIA.

SUBTRIBE III. ELEODENDREÆ. Leaves opposite or subopposite. Fruit a dry or pulpy drupe.

Ovary confluent with the disk, flowers cymose. Seeds exarillate . . . 10. ELEODENDRON.

TRIBE II. **Hippocrateæ**. *Stamens* 3, rarely 2, 4 or 5, inserted on the face of the disk. *Filaments* flattened, sometimes adnate to the ovary, recurved and causing the anthers when dehiscing to become extrorse. *Seed* exalbuminous.—*Leaves* opposite except in *Siphonodon*.

Fruit flattened, dehiscent. Seeds winged. Scandent shrubs; leaves opposite . . . 11. HIPPOCRATEA.

Fruit a berry. Seeds not winged. Erect shrubs; leaves opposite . . . 12. SALACIA.

Fruit indehiscent. Seeds not winged; leaves alternate . . . 13. SIPHONODON.

1. EUONYMUS, Linn.

Trees or shrubs, erect rarely scandent, glabrous. *Leaves* petioled, rarely subsessile; stipules caducous. *Calyx* 4-5-fid, spreading or recurved. *Petals* 4-5. *Stamens* 4-5, inserted on the disk; anthers broad, 2-celled. *Disk* large, fleshy, 4-5-lobed. *Ovary* sunk in the disk, 3-5-celled; style short or 0, stigma 3-5-lobed; ovules 2 in each cell, attached to the inner angle, ascending and suspended. *Capsule* 3-5-celled, 3-5-lobed, angled or winged, coriaceous, rarely echinate; cells 1-2-seeded, loculicidal. *Seeds* covered by the aril, albuminous.—*DISTRIB.* Species about 40; natives of the mountainous regions of Tropical Asia and the Malayan Archipelago, a few also scattered over Europe and North America.

SECT. I. *Peduncles* 1-3-flowered.

* *Flowers* usually 5-merous. *Petals* fimbriate.

1. **E. javanicus**, Blume Bijdr. 1146; peduncles 1-flowered fascicled. Benn. Pl. Jav. Rar. 130, t. 28. E. sumatranus, Miq. Fl. Ind. Bat. Suppl. I. 512. E. sphaerocarpus, Hassk. Cat. Pl. Hort. Bog. 229.

EASTERN PENINSULA; from Tenasserim to Penang and Malacca.—*DISTRIB.* Sumatra, Java.

A tree 30-40 ft. *Leaves* 4-6 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., thick and coriaceous, oblong, elliptic or elliptic-oblong, acute or subacuminate, entire or obscurely crenate-serrate towards the apex. *Peduncles* $\frac{3}{4}$ - $1\frac{3}{4}$ in., terete. *Petals* oblong, about $\frac{1}{4}$ in. *Fruit* $\frac{3}{4}$ in., obovate-clavate.—E. sumatranus, Miq., has fruit 1 in. or more long, but in all other respects it resembles E. javanicus.

2. **E. indicus**, *Heyne in Roxb. Fl. Ind. ed. Carey*, ii. 409; peduncles 1-3-flowered solitary or geminate. *Wall. Cat.* 4290; *W. & A. Prodr.* 160. *E. Goughii*, *Wight Ill.* i. 178; *Ic. t.* 215; *Dalz. & Gills. Bomb. Fl.* 47; *Bedd. Fl. Sylv. Anal. Gen.* lxiii.

WESTERN PENINSULA; on the Ghats from the Concan southward.

A shrub or small tree. *Leaves* 3-4 by $1\frac{1}{4}$ - $2\frac{1}{4}$ in., subcoriaceous, ovate or lanceolate-oblong, entire or obscurely serrate at the apex. *Peduncles* $\frac{1}{4}$ -2 in., cylindric, stoutish. *Petals* nearly orbicular, about $\frac{1}{4}$ in., rust-coloured. *Fruit* $\frac{3}{4}$ in., obovoid-clavate.

** *Flowers usually 5-merous. Petals entire.*

3. **E. revolutus**, *Wight Ill.* i. 178; leaves $1\frac{1}{2}$ -2 by $\frac{3}{4}$ - $1\frac{1}{2}$ in. ovate or roundish to obovate very coriaceous margins revolute, peduncles 1-3-flowered usually geminate, petals $\frac{1}{6}$ in. orbicular flat. *Thwaites Enum.* 73; *Bedd. Fl. Sylv. Anal. Gen.* lxiv.

CEYLON; at Newera Ellia, ascending to 6000 ft.

A small glabrous tree with subquadrangular shoots. *Leaves* rounded at the apex, entire or obscurely serrate at the apex. *Peduncles* $\frac{1}{4}$ -1 in. cylindrical. *Flowers* bright red. *Fruit* $\frac{1}{2}$ in., turbinate.

4. **E. crenulatus**, *Wall. Cat.* 4297; leaves 2-3 by $1-1\frac{1}{2}$ in. elliptic-oblong to subovate coriaceous margins revolute, peduncles 3- or more-flowered, solitary, petals $\frac{1}{4}$ in. orbicular flat. *W. & A. Prodr.* 161; *Wight Ic. t.* 973; *Bedd. Fl. Sylv. t.* cxliv.

WESTERN PENINSULA; Nilghiri hills, *Wight, &c.*

A small glabrous tree; young branches slightly compressed. *Leaves* crenulate-serrate towards the apex. *Peduncles* 1 or more in., compressed, usually 3-flowered, but sometimes twice divided and 7-flowered. *Petals* rust-coloured. *Fruit* $\frac{1}{2}$ in., turbinate.—Very nearly allied to the last species, of which it may prove to be a variety.

5. **E. Thwaitesii**, *Laws.*; leaves $1\frac{1}{2}$ by $\frac{3}{4}$ in. broadly lanceolate subovate acute or blandly subacuminate subcoriaceous margins flat or wrinkled, peduncles 1 in. filiform solitary 3-flowered, petals $\frac{1}{6}$ in. orbicular with undulate margins.

CEYLON; alt. 2000 ft., *Walker, Thwaites*.

A small tree with twiggy branchlets and rough dark bark. *Leaves* entire. *Fruit* $\frac{1}{2}$ in., obovoid, clavate.

6. **E. Walkeri**, *Wight Ill.* i. 178; leaves $1\frac{1}{2}$ -4 by $\frac{3}{4}$ - $1\frac{1}{2}$ in. lanceolate to ovate or acuminate subcoriaceous margins flat, peduncles 1-flowered sessile or in subsessile cymes $\frac{1}{5}$ - $\frac{1}{4}$ in. in the axils of the upper leaves, petals $\frac{1}{12}$ in. orbicular with undulate margins. *Thwaites Enum.* 73; *Bedd. Fl. Sylv. Anal. Gen.* lxiv. *E. zeylanicus*, *Moon Cat.* 17.

CEYLON; ascending to 3000 ft.

A small tree. *Leaves* crenate-serrate towards the apex. *Peduncles* slender. *Flowers* almost sessile, exceedingly small. *Fruit* turbinate.—Small-leaved specimens of this species closely resemble *E. dichotomus*, and it is possible that Wight in describing the inflorescence as dichotomously branched may have confounded the two.

*** *Flowers 4-merous.*

7. **E. grandiflorus**, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 404; *Cat.* 4282; *Tent. Fl. Nep.* 41, t. 30; *Pl. As. Kar.* iii. 35, t. 254; peduncles 2-3 in. slender. *E. lacerus*, *Ham. in Don Prodr.* 191; *DC. Prodr.* ii. 5. *Lophopetalum grandiflorum*, *Arn. in Ann. Nat. Hist.* iii. 151. *L. lucidum*, *Wight mss.*

WESTERN TEMPERATE HIMALAYA; from Kumaon, alt. 3000 ft. to Nepal. KHASIA Mts., alt. 4-6000 ft., *Griffith, &c.*

A small branching tree, 12 ft. *Leaves* 3-4 in., obovate to obovate-oblong, rounded finely and acutely serrate at the apex, shining and dark green above, pale beneath, almost black when dry. *Peduncles* 3 in., slender, 3-flowered. *Flowers* $\frac{1}{2}$ in. across. *Petals* white, nearly orbicular. *Fruit* $\frac{1}{2}$ in., globose with 4 rounded angles yellow. *Seeds* black, shining, with a scarlet aril. — A very elegant plant both in flower and fruit.

VAR. *Leaves* $1\frac{1}{2}$ by $\frac{1}{4}$ in., oblong-lanceolate, flowers smaller—perhaps a distinct species. Bhotan, *Griffith*.

8. **E. calocarpus**, *Kurz in Journ. As. Soc. Beng.* 1872, pt. ii. 299; peduncles 1 in. or less stout.

TENASSERIM, *Helper*.

A shrub? with glabrous terete branches. *Leaves* 4-6 by $2\frac{3}{4}$ -3 in., elliptic or elliptic-oblong, acute or subacuminate, entire, subcoriaceous, green above, pale beneath. *Flowers?* *Capsule* the size of a cherry, globose, obscurely 4-lobed. *Seed* 1 in each cell, aril red.—Closely resembling a *Microtropis* in the texture and colour of its leaves.

SECT. II. *Flowers* in 7- or more-flowered dichotomous cymes. (See 4. *E. crenulatus*.)

* *Flowers* usually 5-merous.

† *Branches* cylindric.

9. **E. dichotomus**, *Heyne in Roxb. Fl. Ind. ed. Carey*, ii. 410; leaves $1\frac{1}{2}$ -2 in. lanceolate margins entire undulate, peduncles very slender, flowers very small. *Wall. Cat.* 4289; *W. & A. Prodr.* 160; *Thwaites Enum.* 73; *Bedd. Fl. Sylv. Anal. Gen.* lxiii.

WESTERN PENINSULA; Courtallam, *Heyne*. CEYLON, banks of streams at Galagama, *Thwaites*.

A small tree with twiggy branchlets. *Cymes* nearly as long as the leaves, exceedingly slender, but firm. *Petals* $\frac{1}{2}$ in., orbicular, entire, flat. *Fruit* obconical.

10. **E. glaber**, *Roxb. Fl. Ind.* i. 628; leaves smooth elliptic-oblong the upper half obtusely serrate, flowers white. *Wall. Cat.* 4281. ? *E. serrulata*, *Wall. Cat.* 4296.

EASTERN BENGAL, *Griffith*; ? *Tavoy*, *Wall*.

A small tree with smooth shining dark-brown bark. *Leaves* $2\frac{1}{2}$ by 1- $2\frac{1}{2}$ in., dark-green above, paler beneath. *Peduncles* stoutish, 1- $2\frac{1}{2}$ in. *Petals* $\frac{1}{2}$ in., orbicular, margins slightly undulate. *Fruit?*

VAR. *Leaves* 3-5 in. oblong-elliptic quite entire.—Bhotan, *Griffith*.

11. **E. serratifolius**, *Bedd. Fl. Sylv. Anal. Gen.* lxiv.; *Ic. Pl. Ind. Or.* 37, t. clxxi.; leaves smooth lanceolate sharply and prominently serrate.

WESTERN PENINSULA; slopes of the Nilghiris, at Carcom Ghat, alt. 3000 ft., *Beddome*.

Leaves $3\frac{1}{2}$ -4 by $\frac{3}{4}$ - $1\frac{1}{2}$ in., narrow to broad lanceolate, tapering at the apex to a short obtuse point. *Petals* $\frac{1}{2}$ in., orbicular, subcordate at the base, crenulate. *Fruit* globose, with 5 rounded lobes.—Apparently closely allied to *E. paniculatus*, from which it differs chiefly in its longer narrowed and more sharply serrate leaves.

12. **E. paniculatus**, *Hb. Wight*; leaves $3\frac{1}{2}$ by $1\frac{1}{2}$ in. smooth elliptic crenate-serrate membranous, flowers purplish. *E. crenulata* *var. laxiflora*, *Wight Ic.* i. 214.

WESTERN PENINSULA; on the Shivagherry hills, *Wight*.

Cymes lax and divaricating, $2\frac{1}{2}$ -4 in. *Petals* orbicular, entire, $\frac{1}{2}$ in. across. *Fruit?*

13. **E. attenuatus**, Wall. Cat.-4298; leaves $3\frac{1}{2}$ -6 by $\frac{3}{4}$ - $1\frac{3}{4}$ in. smooth lanceolate-acuminate quite entire very coriaceous.

KHASIA Mts.; alt. 4-6000 ft., Wallich, &c.

A small tree? *Cymes* much shorter than the leaves, about 7-flowered. *Peduncles* stoutish, flattened, erect. *Petals* $\frac{1}{4}$ in., shortly clawed, nearly orbicular, fimbriate. *Fruit* obovoid, 4-angled.

14. **E. timorensis**, Zipp. ? ex Turcz. in Bull. Mosc. 1858, pt. i. 447; leaves smooth 4-6 by $2-2\frac{1}{2}$ in. elliptic-oblong rounded or subacute at the apex faintly serrate.

TENASSERIM OR ANDAMAN ISLDS., Helfer. PEGU, Kurz.—DISTRIB. Timor and Philippine Islds.

A tree? *Cymes* as long or nearly as long as the leaves; peduncles stouter than in the last species, flattened, erect. *Petals* not clawed, orbicular, fimbriate. *Fruit* ?

15. **E. tingens**, Wall. in Roxb. Fl. Ind. ed. Carey, ii. 406; Cat. 4283; Brand. For. Fl. 79; leaves thick coriaceous rugose above ovate-lanceolate sharply-serrate.

WESTERN TEMPERATE HIMALAYA, alt. 6-10,000 ft., from Nipal, Wallich; to Simla, Griffith.

A tree 16-20 ft. Leaves $1\frac{1}{2}$ -3 in. by $\frac{3}{8}$ -1 in., lucid, dark-green above, very pale beneath. *Peduncles* compressed. *Petals* shortly clawed, nearly orbicular, coarsely crenulate, $\frac{1}{2}$ in., yellowish with purple veins. *Fruit* $\frac{1}{2}$ in., nearly round, 4-5-angled.—The flowers of this species are sometimes tetramerous.

† *Branches acutely quadrangular.*

16. **E. angulatus**, Wight Ic. t. 1053; Bedd. Fl. Sylv. Anal. Gen. lxiv. E. acutangulus, Wight Ill. 178. E. pterocladus, Hohenacker Pl. Ind. Or. E. glaucus, Turcz. in Bull. Soc. Nat. Mosc. 1863, pt. ii. 599.

WESTERN PENINSULA, Nilghiri hills, Wight, &c.

A small tree, young stems acutely 4-angled or -winged. Leaves $2\frac{1}{2}$ - $4\frac{1}{2}$ by $1-1\frac{1}{2}$ in., oblong-lanceolate to ovate-lanceolate, acute, quite entire, with a thickened margin. *Flowers* ? *Fruit* narrowly obtriangular, acutely angled.

** *Flowers usually 4-merous.* (See 15. *tingens*.)

† Style 0.

17. **E. nitidus**, Benth. in Hook. Lond. Journ. Bot. i. 483; leaves $1\frac{1}{2}$ -2 by $\frac{1}{2}$ -1 in. obovate-lanceolate subacuminate, fruit roundly 4-angled. Benth. Fl. Hongk. 62; Seem. Bot. Voy. Her. 371, t. 83. E. punctatus, Wall. Cat. 4286.

BENGAL; Herb. Griffith (probably cult.).—DISTRIB. Hong Kong.

Leaves entire or obscurely serrate at the apex, coriaceous, shining. *Peduncles* filiform, $\frac{1}{2}$ -1 in., usually twice divided. *Petals* orbicular, entire, $\frac{1}{2}$ in. across. *Fruit* $\frac{1}{2}$ in., subglobose.—This is perhaps an introduced plant in Bengal.

18. **E. bullatus**, Wall. Cat. 4299; leaves 4-10 by $2\frac{1}{2}$ -4 in. ovate acute, fruit 4-angled. Lodd. Bot. Cab. t. 1749. *Euonymus* sp., Wall. Cat. 7473.

KHASIA Mts.; alt. 3-4000 ft., Wallich, &c.

A tree? young branches terete or slightly flattened, thick and coarse. Leaves thick, entire, or faintly serrate at the apex, bullate above, nerves very prominent beneath. *Peduncles* many times divided. *Flowers* very numerous. *Petals* $\frac{1}{2}$ in., nearly orbicular, crenulate. *Fruit* 4-lobed, roundish, often only 1-3-seeded.

19. **E. fimbriatus**, Wall. in Roxb. *Fl. Ind. ed. Carey*, ii. 408; *Cat.* 4287; leaves ovate-acuminate biserrate membranous, fruit with 4 tapering wings. ? *E. micranthus*, Don *Prodr.* 191.

TEMPERATE HIMALAYA; from Kumaon, alt. 8–10,000 ft., to Sikkim, alt. 10–12,000 ft., J. D. H.

A tree? Leaves $1\frac{1}{2}$ –3 by $\frac{1}{2}$ – $1\frac{1}{4}$ in., elegantly fringed with sharp deep biserratures, dark-green. Peduncles 2–3 in.; pedicels branching subumbellately. Petals $\frac{1}{2}$ in., white, broadly ovate, entire. Fruit leathery, the size of a cherry.—The woodcut given in Paxton's Flower Garden, ii. 55, t. 316, can hardly belong to this species; the leaves resemble more those of *E. pendulus* or *E. frigidus*.

20. **E. frigidus**, Wall. in Roxb. *Fl. Ind. ed. Carey*, ii. 409; *Cat.* 4288; adult leaves 3–5 by $\frac{3}{4}$ – $1\frac{1}{2}$ in. oblong-lanceolate acuminate somewhat sharply serrate, fruit with 4 long tapering wings.

SIKKIM HIMALAYA, alt. 8–12,000 ft., J. D. H.; BHOTAN, Griffith; KUMAON, Wallich.

A small tree? young shoots succulent. Flowers very small, on weak succulent filiform peduncles and pedicels, the latter $\frac{1}{2}$ in. long. Petals orbicular, entire. Fruit as in the last species.

VAR. Apparently a shrub, leaves 1 ft. by $\frac{1}{2}$ in. faintly and distantly serrate.

†† Style manifest.

a. Fruit armed with spines.

21. **E. cinereus**, Laws.; branches rough with minute tubercles, leaves obovate, fruit $\frac{3}{4}$ in. globose armed with pale-coloured spines.

EAST BENGAL, Griffith.

Scandent? Branches destitute of rootlets. Leaves $2\frac{1}{2}$ by $1\frac{1}{4}$ in., broadly obovate, rounded at the apex, serrate, pale-coloured. Flowers?

22. **E. echinatus**, Wall. in Roxb. *Fl. Ind. ed. Carey*, ii. 410; *Cat.* 4285; branches smooth radicant, leaves ovate-lanceolate, fruit $\frac{1}{2}$ in. globose armed with dark-coloured spines. Royle *Ill.* t. 31; *Bot. Mag.* 2767; Voigt *Hort. Sub. Calc.* 165; Brand. *For. Fl.* 80. *E. scandens*, Graham in Jameson's *Ed. New. Phil. Journ.* 1827, 386. *G. vagans*, Wall. *Cat.* 4284, in part.

TEMPERATE HIMALAYA; from Garwhal to Sikkim, alt. 7–10,000 ft.

Climbing over trees and rocks, to which the stems adhere by means of dense adventitious rootlets. Leaves 1–2 by $\frac{1}{2}$ – $\frac{3}{4}$ in., serrate, dark-green above, pale beneath. Peduncles mostly 3 times divided. Petals $\frac{1}{2}$ in., orbicular, crenulate. Style $\frac{1}{4}$ in.

b. Fruit unarmed.

23. **E. vagans**, Wall. in Roxb. *Fl. Ind. ed. Carey*, ii. 412; *Cat.* 4284, in part; stem climbing, leaves 1–2 by $\frac{1}{2}$ – $\frac{3}{4}$ in. ovate-lanceolate serrate, fruit the size of a pea nearly black minutely tubercled.

TEMPERATE HIMALAYA; Sikkim and Nipal, Wallich, &c.

Branches smooth and never radicant. This and the smooth fruit are the only characters by which to distinguish this species from the last. In *Bot. Mag.* 54, t. 2767, Sir W. Hooker suggested that it might be a variety only, and he founded this opinion on the circumstance that he believed he had seen a tendency in some of the fruits of *E. vagans* to become echinate.

24. **E. Griffithii**, Kurz in *Journ. As. Soc. Beng.* 1872, pt. 2, 73; stem scandent acutely 4-angled or -winged, leaves 3–4 by $1\frac{1}{2}$ in. ovate or oblong-lanceolate. Hippocratea angulata, Griff. *Notul.* iv. 473; *Ic. Pl. As.* iv. t. 581, f. i.

BIRMA; on rocks at Loonkaram and Delvi Nempuan on the north from Assam, Griffith.

Leaves sessile or subsessile, serrate, subbullate. *Peduncles* twice divided. *Petals* $\frac{1}{2}$ in., white, orbicular, entire, shortly clawed. *Style* $\frac{1}{4}$ in. *Fruit*?

25. **E. theaeifolius**, Wall. Cat. 4293; a small erect shrub, branches terete, leaves 2-3 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in. ovate or oblong-lanceolate coriaceous.

CENTRAL and EASTERN HIMALAYA; Nipal, Wallich; Sikkim, alt. 5-8000 ft., J. D. H.; KHASIA Mts., alt. 4-6000 ft., Griffith, &c.

Peduncles about twice divided, short, slender. *Petals* reddish, orbicular, entire, $\frac{1}{2}$ in. *Style* $\frac{1}{2}$ in. *Fruit* the size of a large pea, nearly round, obscurely 4-angled, 1-seeded.

26. **E. pendulus**, Wall. in Roxb. Fl. Ind. ed. Carey, ii. 406; Cat. 4280; a small tree with slender pendulous branchlets, leaves 4-6 in. oblong or oblong-lanceolate sharply serrate coriaceous smooth and shining above, petals fimbriate. Brand. For. Fl. 79. E. lucidus, Don Prodr. 191 ? DC. Prodr. ii. 4. E. japonicus, Wall. in Roxb. Fl. Ind. ed. Carey, ii. 405 (not Thunb.).

TEMPERATE HIMALAYA; from Garwhal, Falconer, to Nipal, Wallich; EAST BENGAL, Griffith.

Branches terete. *Peduncles* much compressed, fascicled. *Petals* 4, $\frac{1}{4}$ in., white, ovate-oblong, fimbriate. *Stamens* and *style* $\frac{1}{2}$ in. *Fruit* $\frac{1}{2}$ in., obtriangular, with 4 tapering wings.—This is quite distinct from *E. japonicus*, Thunb. Fl. Jap. 100, of which there is a good plate in Kämpf. Ic. Select. t. 8.

27. **E. Hamiltonianus**, Wall. in Roxb. Fl. Ind. ed. Carey, ii. 403; Cat. 4279; a shrub with terete branches, leaves 3-6 in. ovate or ovate-lanceolate very finely serrate membranous, petals entire. Brand. For. Fl. 78, t. xvi. E. atropurpureus, Roxb. Fl. Ind. i. 627 (non Jacq.).

TEMPERATE HIMALAYA, alt. 5-6000 ft., from Kashmir, Falconer, to Kumaon, Strach. & Wint.; KHASIA Mts., alt. 5-6000 ft., Griffith, &c.

Peduncles about 7-flowered. *Petals* $\frac{1}{2}$ in., cordate-lanceolate with revolute margins. *Stamens* and *style* $\frac{1}{2}$ in. *Fruit* turbinate, 4-lobed.

2. GLYPTOPETALUM, Thwaites.

Erect shrubs or small trees, glabrous. *Leaves* opposite, petioled, ex-stipulate. *Cymes* 3- or more-flowered. *Calyx* with 4 short spreading lobes. *Petals* 4, with 2 pit-like depressions on the upper surface. *Stamens* 4, inserted above the disk; the connective dilated; anther-cells diverging. *Disk* 4-lobed. *Ovary* immersed in the disk, 4-lobed, 4-celled; style short, stigma capitate; ovules solitary and pendulous from the top of each cell. *Capsule* subglobose, coriaceous, 1-4-celled, 1-4-seeded. *Seeds* as in *Euonymus*.—DISTRIB. Species 3. Ceylon, Southern India, and Malayan peninsula.

1. **G. zeylanicum**, Thwaites in Hook. Kew Journ. viii. 268, t. vii. B; Enum. 73; leaves 4 $\frac{1}{2}$ -6 by 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in., cymes not half as long as the leaves. Bedd. Fl. Sylv. Anal. Gen. lxiv.

WESTERN PENINSULA; Anamallay hills, Beddome; CEYLON, in the Central province, alt. 3000 ft., Thwaites.

A large shrub or tree, 30-40 ft. *Leaves* subcoriaceous or membranous, oblong or oblong-lanceolate or elliptic, serrate or entire. *Cymes* short, robust, 2-3 times divided, supra-axillary. *Petals* $\frac{1}{2}$ in., oblong. *Fruit* the size of a small cherry, greenish, smooth; pedicels $\frac{1}{4}$ in., straight.

2. **G. sclerocarpum**, *Kurz in Journ. As. Soc. Beng.* 1872, pt. ii. 299 leaves 8-12 by 2-3½ in., cymes not half as long as the leaves.

PEGU, *Kurz*.

A tree with thick coarse branches. *Leaves* very coriaceous, finely serrate or entire. *Cymes* stoutish. *Flowers*? *Fruit* globose, the size of a large cherry, rough with minute tubercles; pedicels 1½ in., straight.

3. **G. grandiflorum**, *Bedd. Ic. Pl. Ind. Or.* 21, t. 102; *Fl. Sylv. Anal. Gen.* lxxv.; peduncles longer than the leaves.

WESTERN PENINSULA; damp forests of the Wynaad, alt. 2-2800 ft., *Beddome*.

Leaves subcoriaceous, 3½-5 by 1½-2 in., oblong-elliptic, rounded at the apex, acute or acuminate. *Peduncles* filiform, 3-flowered; pedicels 1 in., arcuate. *Flowers* 1½ in. across. *Petals* obovate. *Fruit*?

3. **MICROTROPIS**, Wall.

Trees or shrubs, glabrous. *Leaves* opposite, petioled, or subsessile exstipulate, entire. *Flowers* in sessile clusters, or in peduncled cymes, axillary or supra-axillary, sometimes unisexual. *Sepals* 5, imbricate. *Petals* 5, rarely 0, connate at the base, erect. *Stamens* 5, inserted on the disk or on the tube of the corolla. *Disk* 0, or annular. *Ovary* free, ovoid, perfectly or imperfectly 2-3-celled; style very short; stigma minutely 2-4-lobed; ovules 2 in each cell, collateral at the inner angle. *Capsule* oblong, coriaceous, 1-celled, 2-valved, 1-seeded, surrounded at the base with the persistent calyx. *Seed* erect, stipitate; aril 0.—**DISTRIB.** Species 9; mountains of India, Ceylon, the Malayan peninsula and Java.

* *Flowers sessile, clustered on the branches.* (See 4, *densiflora*.)

1. **M. Wallichiana**, *Wight mss.*; leaves 2½-4 by 1-2 in. petioled oblong-elliptic acute at both ends, flowers few small, fruit tapering at the base rounded at the apex. *Thwaites Enum.* 71; *Bedd. Fl. Sylv. Anal. Gen.* lxxv.

CEYLON; forests of the Central province and Saffragam, alt. 2-5000 ft.

A middle-sized tree with slender branches. *Petals* 1½ in., ovate-lanceolate, narrowed at the base, rounded at the apex. *Fruit* ¾ in.

2. **M. latifolia**, *Wight mss.*; leaves 4-5 by 2½-3 in. petioled oblong-lanceolate subacuminate, flowers large and more numerous than in the last species, fruit pointed at both ends. ? *M. longifolia*, *Wall. Cat.* 4339 *in part*.

WESTERN PENINSULA; from the Concan to the Nilghiris.

A small tree with almost black branches. *Leaves* pale green, very coriaceous and with a thickened margin, rugulose and opaque above. *Petals* ½ in., subovate. *Fruit* ¾ in.

3. **M. ramiflora**, *Wight Ic.* t. 977; leaves subsessile 1-3½ by ¾-2 in. broadly-elliptic or obovate rounded and slightly emarginate at the apex margins revolute, flowers in dense clusters, fruit acute at the apex. *Thwaites Enum.* 72; *Bedd. Fl. Sylv. Anal. Gen.* lxxv.

WESTERN PENINSULA; Nilghiri Mts., *Wight*. CEYLON; common in the more elevated parts of the Central Province.

A small tree with thick coarse branches. *Leaves* very coriaceous, rounded or subcordate at the base, rugulose and opaque above. *Petals* ½ in., broadly obovate. *Fruit* ¾ in. *Testa* reddish brown.

** *Flowers in axillary or extra-axillary peduncled di- or trichotomous cymes.*

4. **M. densiflora**, *Wight Ic. t.* 1052; leaves 2-2½ by 1¼-2 in. elliptic margins revolute very coriaceous, cymes ½ in. short dense. *Bedd. Fl. Sylv. Anal. Gen.* lxxv.

WESTERN PENINSULA; Nilghiri Mts., *Wight, &c.*

A large straggling shrub or small tree. *Flowers* sometimes almost sessile. *Petals* ½ in., roundish-elliptic. *Fruit* ¾ in., narrowly oblong, acute at both ends.

5. **M. microcarpa**, *Wight Ic. t.* 975; leaves 1-3 by ½-1¼ in. elliptic- or broadly-lanceolate coriaceous margins revolute, cymes 1½-2 in. lax, fruit oblong narrowing to the acute apex, testa light brown.

WESTERN PENINSULA; from the Concan and Maisor southwards; dry jungles at Kotagerry in the Nilghiris, *Wight*.

An erect shrub. *Leaves* smooth above, glaucous beneath. *Cymes* di-trichotomous. *Petals* obovate-cuneate.

6. **M. ovalifolia**, *Wight Ic. t.* 976; leaves 1-3 by ½-1¼ in. ovate or broadly-lanceolate coriaceous margins revolute, fruit ovoid subacute, testa crimson. *Bedd. Fl. Sylv. Anal. Gen.* lxxv. *Elæodendron nilghirense*, *Wall. Cat.* 4409.

WESTERN PENINSULA; Nilghiri hills, Courtallam and Ootacamund, *Wight, &c.*

A somewhat diffuse shrub. *Cymes* trichotomous, 2-3 in. *Petals* orbicular.—Very closely allied to *M. microcarpa*, of which it may prove to be a variety.

7. **M. discolor**, *Wall. Cat.* 4337; leaves 3-5 by 1¼-2½ in. elliptic sub-acuminate membranous flat, cymes ½-1 in. compact. *Arq. in Ann. Nat. Hist.* iii. 152. *Cassine discolor*, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 378. *Celastrinea* ? *Wall Cat.* 9014. *Euonymus garcinifolius*, *Roxb. Fl. Ind.* i. 628.

SUBTROPICAL HIMALAYA; Kumaon, *Wallich*; Sikkim, alt. 4-7000 ft., *J. D. H.*; KHASIA Mts., alt. 1-7000 ft., *J. D. H. & T. T.*; TENASSERIM, *Wallich, &c.*

A small tree. *Petals* ½ in., elliptic, concave. *Fruit* ½ in., ovoid.

8. **M. bivalvis**, *Wall. Cat.* 4340; leaves 4-8 by 1¼-2½ in. ovate to oblong-lanceolate acuminate membranous or subcoriaceous margins flat, cymes 2-4 in. di-trichotomous branches widely divaricating. *Celastrus bivalvis*, *Jack. in Hook. Bot. Misc.* ii. 71; *Roxb. Fl. Ind. ed. Carey*, ii. 399; *DC. Prodr.* ii. 6. *Euonymus* ? *læta*, *Wall. Cat.* 4294. *E. capillareus*, *Wall. Cat.* 7270. *E. filiformis*, *Wall. Cat.* 4295. *Paracelastrus bivalvis*, *Miq. Fl. Ind. Bat.* i. pt. 2, 591.

EASTERN PENINSULA; from Tenasserim to Penang, *Wallich*; Malacca, *Maingay*.—DISTRIB. Sumatra, Java.

Branches slender. *Peduncles* extra-axillary, usually springing from the branches at right angles. *Petals* elliptic, ½ in. *Fruit* ellipsoid.

4. LOPHOPETALUM, Wight.

Trees and shrubs, usually glabrous. *Leaves* opposite or alternate, petioled, exstipulate. *Calyx* 5-lobed, lobes round short. *Petals* 5, continuous with the disk, persistent, the upper surface cristate or lamellate or covered with fleshy villi or naked. *Stamens* 5, inserted on the disk; anthers oblong. *Disk* large, entire or lobed. *Ovary* small, immersed in

the disk and continuous with it, trigonal or pyramidal, 3-4-celled, contracted into a short style, stigma capitate; ovules 4 or more in each cell, in 2 series. *Capsule* coriaceous, 3-4-angled, 3-4-celled, loculicidal. *Seeds* few, rarely winged, arillate, albumen fleshy.—*DISTRIB.* Species 8; Indian Malayan and Javan.

The species without fruit have been referred to this genus by habit alone.

SECT. I. *Petals* crested. *Disk* flat, adhering to the calyx, 5-lobed; lobes continuous with the petals.

1. ***L. Wightianum***, Arn. in *Ann. Nat. Hist.* iii. 151; leaves 5-9 by 2-4 in., flowers $\frac{3}{4}$ in. diam. *Wight Ill.* 178; *Ic.* t. 162; *Walp. Rep.* i. 530; *Dalz. & Gibs. Bomb. Fl.* 48; *Bedd. Fl. Sylv.* t. 145; *Fl. Sylv. Anal. Gen.* lxx.

WESTERN PENINSULA, from the Concan southwards.

A large tree. *Leaves* coriaceous. *Cymes* axillary or terminal, branching paniculately several times. *Petals* with a membranous corrugated crest. *Fruit* 4 in. long, 3-celled, sharply triangular. *Seeds* oblong, compressed.

2. ***L. fimbriatum***, *Wight Ill.* i. 178; leaves 4-7 by 2-3 $\frac{1}{2}$ in. ovate or ovate-oblong shortly acuminate, flowers nearly $\frac{1}{2}$ in. diam. *L. ovatum Presl Botan. Bemerk.* 32. *L. javanum Turcz. in Bull. Soc. Nat. Mosc.* 1863, pt. i. 545. *Euonymus ovata, Wall. Cat.* 4300.

SILHET, Wallich; TENASSERIM, at Mergui, Griffith..

Leaves more thin and membranous than in *L. Wightianum*. *Flowers* in axillary or terminal rigid divaricating paniculate cymes. *Petals* with a fimbriate crest. *Fruit*?

SECT. II. *Petals* corrugated or crisped (except 6. *floribundum*) on the upper surface. *Disk* flat, 10-lobed, lining the calyx.

3. ***L. pallidum***, Laws.; leaves 2 $\frac{1}{2}$ -3 by 1-1 $\frac{1}{4}$ in. elliptic-oblong, cymes 1 $\frac{1}{2}$ in. glabrous, disk faintly lobed with long fleshy hairs surrounding the base of the stamens otherwise naked.

MALACCA, Maingay.

A tree; whole plant quite glabrous. *Leaves* pale ash-coloured, almost shining, petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Cymes* axillary. *Petals* $\frac{1}{2}$ in., broadly ovate, corrugated on the upper surface.—A very distinct species, readily known by the colour of its leaves, and the ring of fleshy hairs surrounding the stamens.

4. ***L. Wallichii***, Kurz in *Journ. As. Soc. Beng.* 1872, pt. ii. 299; leaves 6-8 by 3-3 $\frac{1}{2}$ in. ovate-oblong rounded at the apex, cymes 6 or more in. glabrous, disk faintly 10-lobed covered with fleshy warts.

TENASSERIM, at Tavoy, Parish; BIRMA, Kurz.

A large glabrous tree. *Leaves* glaucescent, green and shining above, opaque beneath, coriaceous; petiole 1-1 $\frac{1}{4}$ in. *Cymes* axillary and terminal, paniculate. *Petals* $\frac{1}{2}$ in., crisped on the upper surface, whitish. *Disk* yellow. *Capsule* 4 or more by 2 in., smooth, 3-lobed, 3-valved. *Seeds* compressed, imbricate; wings 2-2 $\frac{1}{2}$ in., elliptic-oblong, membranous.—The description of the fruit and seed is taken from Kurz. In a letter to Dr. Hooker he would make *Prismatocarpus littoralis*, Wall. Cat. 6520, a synonym of the above, but in this he is in error.

5. ***L. celastroides***, Laws.; leaves 2 $\frac{1}{2}$ -4 by 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in. ovate acute or rounded at the apex, cymes 6 in.-1 ft. glabrous, disk very faintly lobed entirely covered with minute fleshy lobulate warts.

TENASSERIM at MOULMEIN, Griffith; PEGU, M'Clelland.

A tree?; whole plant quite glabrous. *Leaves* coriaceous; petiole 1-1 $\frac{1}{4}$ in. *Flowers* in large axillary and terminal widely-divaricating paniculate cymes. *Petal's* $\frac{1}{2}$ in., ovate from a broad base, slightly corrugated. *Fruit*?—Closely allied to *L. Wallichii*.

6. **L. floribundum**, *Wight Ill.* i. 178; leaves $3\frac{1}{2}$ –6 by 1–2 in. oblong-elliptic, cymes 6–8 in. puberulous, disk naked 5-angled, petals naked.

TENASSERIM, at Mergui, *Griffith*.

A tree; quite glabrous with the exception of the inflorescence. *Leaves* acute, coriaceous; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* in diffuse divaricating cymes. *Petals* $\frac{1}{16}$ in., ovate-orbicular.

SECT. III. *Petals* and disk naked. *Disk* cupular with a free margin.

7. **L. filiforme**, *Laws.*; branches very slender almost filiform, leaves 3 by $1\frac{1}{4}$ in. oblong-lanceolate subacuminate with crisped margins membranous, petals $\frac{1}{8}$ in.

TENASSERIM, at Mergui, *Griffith*.

Whole plant quite glabrous. *Cymes* axillary, very slender, shorter than the leaves, subpaniculate. *Flowers* shortly pedicellate. *Petals* ovate, rounded at the apex. *Fruit*?—A very distinct species readily distinguished from the rest by its very slender branches and crisped leaves.

8. **L. reflexum**, *Laws.*; branches short, leaves $2\frac{1}{2}$ –3 by $\frac{3}{4}$ – $1\frac{1}{4}$ in. ovate-lanceolate acuminate with reflexed tips coriaceous margins flat, flowers very small.

MALACCA, *Maingay*.

Whole plant quite glabrous. *Leaves* minutely pellucidly punctate. *Flowers* in rigid divaricating paniculate cymes longer than the leaves, shortly pedicellate, yellow. *Fruit*?—The description of the flowers is taken from *Maingay's* mss.

9. **L. dubium**, *Laws.*; branches stout coarse, leaves 3 by $1\frac{3}{4}$ in. elliptic acute at both ends with a reflexed tip coriaceous margins flat, petals $\frac{1}{8}$ in.

MALACCA, *Maingay*.

A tree; whole plant quite glabrous. *Flowers* in stoutish erect spicate axillary cymes, shorter than the leaves, almost sessile. *Petals* subtriangular. *Fruit*?

5. **KOKOONA**, Thwaites.

Branching trees with yellow or pale-coloured bark. *Leaves* opposite, petioled, coriaceous. *Calyx* small, 5-lobed. *Petals* 5, coriaceous, with glandular dots. *Stamens* 5, inserted into the margin of the disk; anthers oblong. *Disk* thick, glandular, obscurely angled. *Ovary* immersed in the disk, 3-celled; style short, stigma 3-lobed; ovules 4 in each cell, in 2 series, adnate to the axis, ascending. *Capsule* woody, oblong, 3-gonous, 3-celled, 3-valved; cells 4-seeded. *Seeds* broadly winged above, imbricate, exalbuminous.—DISTRIB. Species 3: Ceylon, Malayan Peninsula, and Borneo.

A genus perhaps too closely allied to *Lophopetalum* to be kept separate when the fruit of more of the species of the latter genus is known.

1. **K. zeylanica**, *Thwaites in Hook. Kew Journ. Bot.* v. 380, t. 6; *Enum.* 52; leaves crenate or serrate, petals naked brown with numerous minute dark red glandular dots, fruit oblong. *Beddome Fl. Sylv.* t. 146; *Fl. Sylv. Anal. Gen.* lxx.

WESTERN PENINSULA; Amamallay hills, *Beddome*; CEYLON; banks of streams in the Ambagamuwa and Suffragam districts, alt. 2–4000 ft.

Leaves on young plants 6–8 in., oblong-lanceolate, subacuminate, serrate; on adult trees $2\frac{1}{2}$ – $3\frac{1}{2}$ in., elliptic or obovate, crenate, rounded at the apex or emarginate, dark-

green above and glabrous, paler beneath and with numerous dark-red glandular dots. *Petals* broadly ovate. *Fruit* 1-4 in., bluntly triangular.—An oil is expressed from the seeds and used for burning in lamps. *Thwaites*.

2. **K. littoralis**, *Laws.*; leaves entire, petals sublamellate dotless, fruit ovate-lanceolate acute. *Trigonocarpus littoralis*, *Wall. Cat.* 6520.

MALACCA, *Maingay*; SINGAPORE, *Lobb*.

A tall tree, always growing in the water. *Leaves* $3\frac{1}{2}$ -4 $\frac{1}{2}$ in., elliptic, dotless. *Petals* ovate. *Fruit* $1\frac{1}{2}$ -2 in.

6. PLEUROSTYLIA, Wight.

A glabrous shrub. *Leaves* opposite, shortly petioled, entire, exstipulate. *Cymes* axillary, very short, few-flowered. *Calyx* small, 4-lobed. *Petals* 5, much larger than the calyx. *Stamens* 5, inserted below the disk; connective dilated at the back. *Disk* thick, crenulate. *Ovary* half immersed in the disk, 2-celled or more commonly by abortion 1-celled; style short, stigma broadly peltate; ovules 2 in each cell, erect. *Fruit* 1-2-celled, coriaceous, indehiscent. *Seed* 1 rarely 2, erect, covered by the arillus-like endocarp, albumen fleshy abundant; cotyledons orbicular.—*DISTRIB.* Species 1 or 2; mountains of India, Ceylon, Mauritius and Madagascar.

1. **P. Wightii**, *W. & A. Prodr.* 157; *Wight Ic.* 155; *Thwaites Enum.* 71; *Dalz. & Gibs. Bomb. Fl.* 47. *P. Heynei*, *W. & A. Prodr.* 157. *Celastrus opposita*, *Wall. in Roxb. Fl. Ind. ed. Carey*; ii. 398; *Cat.* 4314; *C. ?? Wightiana*, *Wall. Cat.* 4322.

WESTERN PENINSULA; Mountains of Malabar, Nilghiris, Quilon, and Courtallam. CEYLON; in the hot dry parts of the island.—*DISTRIB.* Mauritius and Madagascar.

Leaves elliptic-oblong to narrow oblong-lanceolate.

7. CELASTRUS, Linn.

Scandent shrubs. *Leaves* alternate, petioled; stipules minute and deciduous, or 0. *Flowers* polygamous, in terminal or axillary panicles or racemes. *Calyx* 5-cleft. *Petals* 5, spreading. *Disk* broad, concave. *Stamens* 5, inserted on the margin of the disk. *Ovary* not immersed in the disk, 2-4-celled; style short, stigma 3-lobed, rarely 3-fid with the segments recurved; ovules 2 in each cell, erect. *Capsule* globose or obovoid, 1-3-celled, 1-6-seeded. *Seeds* enveloped in a fleshy aril, albumen fleshy; cotyledons foliaceous.—*DISTRIB.* Species scarcely 15, natives of tropical Asia, China, Japan, Australia and North America.

I. *Branches covered with pale lenticular warts.*

1. **C. paniculata**, *Willd. Sp. Pl.* i. 1125; calyx-segments half-orbicular, petals $\frac{1}{2}$ in. obovate-oblong entire, style acute not lobed, fruit 3-celled 3-6-seeded, seed $\frac{1}{8}$ in. ovoid brown. *Wall. Cat.* 4310; *Roxb. Fl. Ind.* i. 621; *DC. Prodr.* ii. 6; *W. & A. Prodr.* 158; *Wight Ill.* 179, t. 72; *Ic.* t. 158; *Brand. For. Fl.* 82; *Dalz. & Gibs. Bomb. Fl.* 47; *Thwaites Enum.* 72; *Voigt Hort. Sub. Calc.* 166. *C. alnifolia*, *Don Prodr.* 190; *DC. Prodr.* ii. 6. *C. dependens*, *Wall. Cat.* 4302; *Voigt Hort. Sub. Calc.* 166. *C. multiflora*, *Roxb. Fl. Ind.* i. 622. *C. nutans*, *Roxb. Fl. Ind.* i. 623; *Wall. Cat.* 4301. *C. Rothiana*, *Rœm. & Schult. Syst.* v. 423; *DC. Prodr.* ii. 8. *C. Metziana*, *Turcz. in Bull. Soc. Nat. Mosc.* 1858, 447. *Ceanothus paniculatus*, *Roth Nov. Sp.* 154. *Scutia paniculata*, *Don Gen. Syst.* ii. 34.

TROPICAL and SUBTROPICAL HIMALAYA, alt. 1-4000 ft.; PANJAB, and throughout the hilly districts of INDIA, ascending to 3000 ft.; CEYLON, ascending to 2000 ft.—*DISTRIB.* Malay Archipelago, and Philippine Islds.

A scandent shrub with terete branches, the young shoots and branches pendulous. *Leaves* $2\frac{1}{2}$ –5 by $1\frac{1}{4}$ – $2\frac{1}{4}$ in., oval oblong or ovate or obovate, acuminate, serrate, membranous. *Flowers* yellowish-green, in terminal pendulous panicles. *Petals* $\frac{1}{2}$ in., oblong.—*Foliage* very variable. An oil for burning in lamps is expressed from the seeds.

2. **C. stylosa**, Wall. in *Roxb. Fl. Ind. ed. Carey*, ii. 401; *Cat.* 4313; calyx-segments ovate rounded, petals $\frac{1}{2}$ in. oblong with wavy margins, style 3-lobed, fruit 3-celled 3–6-seeded, seed $\frac{1}{4}$ by $\frac{1}{5}$ in. curved black. *Voigt Hort. Sub. Calc.* 166.

NIPAL, Wallich; SIKKIM HIMALAYA, alt. 5–6000 ft., *J. D. H.*; KHASIA MTS., alt. 4–5000 ft., Griffith, &c.; ? PEGU, M'Clelland.

A scandent shrub with terete branches. *Leaves* $2\frac{1}{2}$ –4 by $1\frac{1}{4}$ –2 in., elliptic or ovate-oblong, acute or subacuminate, serrate. *Flowers* in short axillary or terminal irregular racemose cymes. *Fruit* yellow, crowned by the persistent style.

II. Branches destitute of lenticels.

3. **C. venulosa**, Wall. *Cat.* 4321; calyx-segments half orbicular, petals $\frac{1}{2}$ in. linear-oblong with wavy margins, style acute not lobed.

SILHET, Wallich.

A scandent shrub, with smooth pale-brown round branches, or dark brown and rather rough. *Leaves* 4–6 by 2 – $2\frac{1}{2}$ in., elliptic-oblong, narrowed at the base, suddenly and shortly acuminate, faintly serrate membranous, venation conspicuous but very delicate, shining. *Flowers* in short axillary or terminal spicate cymes. *Fruit*?—A single specimen from Silhet in the Wallichian Herbarium. Closely allied to *C. paniculata*.

4. **C. monosperma**, Roxb. *Hort. Beng.* 18; *Fl. Ind.* i. 625; calyx-segments broadly and roundly ovate, petals $\frac{1}{2}$ in. suborbicular, style 3-lobed, fruit 1-celled 1-seeded, seed $\frac{1}{3}$ in. elliptical brown. Wall. *Cat.* 4311 and 7009; *Benth. Fl. Hongk.* 63; *Voigt Hort. Sub. Calc.* 166. *C. Hindsii*, Benth. in *Hook. Kew Journ. Bot.* iii. 334. *Catha monosperma*, Benth. in *Hook. Lond. Journ. Bot.* i. 483. *C. Benthamii*, Gardn. & Champ. in *Hook. Kew Journ.* i. 310.

EASTERN BENGAL and ASSAM, Wallich, Griffith, &c.—DISTRIB. China.

A scandent shrub with quadrangular branches. *Leaves* 2–4 by 1 – $1\frac{3}{4}$ in., oblong-elliptic, acuminate, sharply serrulate, coriaceous. *Flowers* white or greenish-yellow, in short pedunculate cymes, frequently disposed in long slender axillary or terminal naked or leafy racemes. *Petals* very finely crenate.—The whole plant drying black.

DOUBTFUL AND EXCLUDED SPECIES.

C. CRENULATA, Wall. *Cat.* 4323, is a Siam plant.

C. FINLAYSONIANA, Wall. *Cat.* 4324, is a native of Siam.

C. LUCIDA, Wall. in *Roxb. Fl. Ind. ed. Carey*, ii. 400; Wall. *Cat.* 4318. *C. Jackianus*, Steud. *Nomenc.* 314 (capsules many-seeded).

C. MICRANTHA, Roxb. *Fl. Ind.* i. 625 (leaves pinnate). A native of the Moluccas.

C. PAUCIFLORA, Wall. in *Roxb. Fl. Ind. ed. Carey*, ii. 400 (ovary 1-celled, placenta parietal).

C. RACEMOSA, Wall. *Cat.* 4320, without flowers or fruit is indeterminable.

C. TRIGYNA, Lam.; *Roxb. Fl. Ind.* i. 624; Wall. *Cat.* 4315. *C. obtusifolia*, Roxb. *Fl. Ind.* i. 625, is a native of the Mauritius, not of the Moluccas as stated by Roxburgh under *trigyna*.

C. VERTICILLATA, Roxb. *Fl. Ind.* i. 624, is *Pittosporum floribundum*, W. & A.

8. GYMNOSPORIA, W. & A.

Shrubs or small trees, branches often spinescent. *Leaves* alternate, exstipulate. *Flowers* in small dichotomous cymes. *Calyx* 4–5-cleft. *Petals* 4–5, spreading. *Stamens* 4–5, inserted underneath the disk. *Disk* broad,

sinuate or lobed. *Ovary* attached by a broad base, or immersed in the disk, 2-3-celled; style short, 2-3-lobed; ovules 2 in each cell. *Capsule* obovoid, or nearly globose. *Seeds* 1-2 in each cell, aril completely or partially covering the seed, or 0, albumen fleshy; cotyledons foliaceous.—**DISTRIB.** Species 60, natives of the hotter parts of the whole world.

* *Branches unarmed.*

1. **G. acuminata**, *Hook. f.*; leaves 5-8 by 2-3 $\frac{1}{2}$ in. ovate-oblong acuminate serrate membranous glabrous. *Celastrus oxyphylla*, *Wall. Cat.* 4312.

SIKKIM HIMALAYA, alt. 2-5000 ft., *J.D.H.*; KHASIA Mts., alt. 4-5000 ft.; EASTERN PENINSULA and BIRMA, *Griffith*.—**DISTRIB.** Yunnan.

A shrub with somewhat slender branches. *Flowers* in very delicate fasciculate dichotomous cymes $\frac{1}{2}$ -1 in. long. *Petals* $\frac{1}{4}$ in., oblong-elliptic, reddish. *Fruit* $\frac{1}{2}$ - $\frac{1}{2}$ in., roundly obcordate, somewhat compressed, 2-celled, 2-seeded, black.

2. **G. neglecta**, *Wall. Cat.* 4341 (under *Celastrus*); leaves 4-6 by 2-2 $\frac{1}{2}$ in. ovate-elliptic acute or subacuminate entire or very faintly serrate towards the apex very coriaceous glabrous. *C. ? attenuata*, *Wall. Cat.* 4319. ? *Bæobotrys acuminata*, *Wall. Cat.* 2321.

NIPAL and SILHET, *Wallich*.

A shrub? with thick stout branches. *Flowers* $\frac{1}{2}$ -1 in. long, in very delicate dichotomous cymes. *Petals* as in *G. acuminata*. *Fruit* nearly globose, about $\frac{1}{4}$ in., light yellow, 3-celled, 1-3-seeded.

3. **G. salicifolia**, *Laws.*; leaves 3-4 by $\frac{1}{3}$ - $\frac{1}{2}$ in. narrowly lanceolate serrate glabrous.

ASSAM, *Simons*.

A shrub? with erect slender dark-coloured branches. *Flowers* in slender dichotomous cymes 1-2 $\frac{1}{2}$ in. long. *Petals* $\frac{1}{10}$ in., suboval, concave, pinkish-white. *Fruit*?

4. **G. oblanceolata**, *Laws.*; leaves 3-4 by $\frac{1}{2}$ - $\frac{3}{4}$ in. oblanceolate tapering into the petiole serrate in the upper half coriaceous glabrous, margins revolute in the lower half.

BIRMA, *Griffith*.

A tortuous shrub with smooth blackish branches. *Flowers* in delicate trichotomous cymes $\frac{1}{2}$ -1 in. long. *Fruit*?

5. **G. puberula**, *Laws.*; leaves 2-2 $\frac{1}{2}$ by 1 $\frac{1}{4}$ -1 $\frac{1}{2}$ in. broadly obovate subacuminate serrate-crenate membranous puberulous on the nerves beneath.

BOMBAY, *Lav.*

A shrub with stout branches, young branches and peduncles puberulous. *Flowers* in slender dichotomous cymes 2-3 in. long, which are axillary or fascicled at the ends of short branches. *Fruit* obovate, $\frac{1}{3}$ in.?

6. **G. fruticosa**, *Thwaites Enum.* 72 (under *Catha*); leaves $\frac{3}{4}$ -1 $\frac{1}{2}$ by $\frac{1}{8}$ - $\frac{1}{2}$ in. oblong-spathulate crenate-serrate glabrous.

CEYLON; Central province, &c., *Thwaites*.

A shrub, 8-10 ft.; young branches angular. *Flowers* in corymbose cymes shorter than the leaves; pedicels $\frac{1}{2}$ in., filiform. *Fruit* $\frac{1}{8}$ - $\frac{1}{6}$ in., turbinate, reddish brown, with faint transverse striæ, 3-celled, cells 1-seeded. *Seeds* red, shining, aril small whitish.—Very like some of the unarmed forms of *G. montana*, but it may be known from them by the slender filiform pedicels and the colour of the capsules.

7. **G. ovata**, *Wall. Cat.* 4308 (under *Celastrus*); leaves 1 $\frac{3}{4}$ -3 by 1 $\frac{1}{4}$ -1 $\frac{1}{2}$ in. roundly ovate or subovate serrate coriaceous glabrous. *W. & A. Prodr.* 159. *Catha ovata*, *Walp. Rep.* i. 532.

WESTERN PENINSULA; Nilghiri Mts., Noton, &c.

A shrub, drying blackish. *Flowers* small, in fasciculate sessile dichotomous cymes $\frac{1}{4}$ – $1\frac{1}{2}$ in. *Fruit* broadly obovate, $\frac{1}{2}$ in., drying black, 3-celled; cells 1–2-seeded.

VAR.; stems more slender and straight, leaves oblong narrowed below rounded at the apex not turning blackish when dried.—Malabar, Wight.

8. **G. Rothiana**, W. & A. *Prodr.* 159 (Celastrus); leaves 3–4 by $1\frac{3}{4}$ –2 in. elliptic or obovate subcuneate at the base coriaceous glabrous. *Dalz. & Gibs. Bomb. Fl.* 47. *C. serrulata*, Roth *Nov. Sp.* 155 in part. *C. Wallichiana*, Wall. *Cat.* 4304, c in part. *Catha Rothiana*, Walp. *Rep.* i. 532.

WESTERN PENINSULA; the Concan and Canara, Heyne, &c.

Branches thick and coarse, sometimes armed. *Leaves* crenulate. *Flowers* in cymes so reduced that they become sessile and clustered. *Fruit* obovate, $\frac{1}{2}$ in., 3-celled; cells 3-seeded.

** *Branches armed; spines naked.* (See 8. *G. Rothiana*.)

9. **G. rugulosa**, Laws.; leaves 6 by $2\frac{1}{2}$ in. oblong subacuminate, fruit $\frac{1}{2}$ in. solitary on pedicels $\frac{3}{4}$ in. obovoid transversely wrinkled.

MISHMI HILLS, Griffith.

A tree? branches with smooth bark, very sparingly armed; spines very short. *Leaves* faintly serrate, coriaceous. *Flowers*? *Fruit* 3-celled; cells 1-seeded.

10. **G. Heyneana**, W. & A. *Prodr.* 159 (Celastrus); leaves 3–4 by $1\frac{3}{4}$ – $2\frac{1}{4}$ in. elliptic crenate-serrate, fruiting cymes 3 in. dichotomous, capsule obovoid $\frac{1}{2}$ in. smooth. *Celastrus Heyneana*, Roth in *Rœm. & Schult. Syst.* v. 421 in part; *DC. Prodr.* ii. 7. *C. serrulata*, Roth *Nov. Sp.* 155 in part. *C. Wallichiana*, Spreng. in Wall. *Cat.* 4304 c in part. *Catha Heyneana*, Walp. *Rep.* i. 532.

WESTERN PENINSULA, Heyne; Pulney Mts., Wight.

A tree? branches with smooth blackish bark, spines straight, $\frac{1}{2}$ in. *Flowers* in axillary dichotomous cymes 2–3 in. *Petals* broadly ovate, $\frac{1}{2}$ in. *Fruit* turbinate, 3-celled, cells 1–2-seeded, drying blackish.

11. **G. Falconeri**, Laws.; leaves $2\frac{1}{2}$ by $1\frac{1}{4}$ in. obovate or subelliptic serrate scabrous above pubescent beneath, fruit $\frac{1}{4}$ in. diam solitary on short peduncles or in small dichotomous cymes $\frac{1}{2}$ in. long globose smooth 3-celled 1–2-seeded.

NORTH-WEST INDIA, Herb. Falconer.

A tree? branches thickish, sparingly armed; spines $\frac{1}{2}$ in. *Flowers*?—Known from all the other *Gymnosporiæ* by its pubescent leaves.

12. **G. rufa**, Wall. in Roxb. *Fl. Ind. ed. Carey*, ii. 397 (Celastrus); leaves 3–5 by 1 – $1\frac{1}{2}$ in. lanceolate acuminate serrate subcoriaceous glabrous, cymes 1–2 in. capillary dichotomous fascicled, fruit $\frac{1}{4}$ – $\frac{1}{2}$ in. obtriangular 3-celled, cells 1-seeded. *Celastrus rufa*, Cat. 4309; Brand. *For. Fl.* 80. *Catha rufa*, Don *Gen. Syst.* ii. 10; Walp. *Rep.* i. 532.

SUBTROPICAL HIMALAYA; from Kumaon, alt. 2–5000 ft., to Sikkim and Bhotan, alt. 3–6000 ft. KILASIA Mts., alt. 2–4800 ft.

A large branching tree, with slender sparingly-armed branches; spines slender, $\frac{1}{2}$ –1 in. *Leaves* green above, pale beneath. *Flowers* small. *Petals* $\frac{1}{8}$ in. *Fruit* pale-yellow inside. *Seeds* black.

13. **G. Royleana**, Wall. *Cat.* 4317 (Celastrus); leaves $\frac{3}{4}$ – $1\frac{3}{4}$ by $\frac{1}{3}$ –1 in. ovate to obovate glabrous, cymes dichotomous shorter than the leaves, fruit turbinate $\frac{1}{4}$ – $\frac{1}{3}$ in. diam. 3-celled, cells 1-seeded. *C. spinosus*, Royle *Ill.* 157; Boiss. *Fl. Orient.* ii. 11; Brand. *For. Fl.* 80.

WESTERN HIMALAYA; in Kumaon and Garwhal, alt. 1-4500 ft. ? CONCAN, *Stocks*.—
DISTRIB. Afghanistan.

A shrub with very thorny straight or slightly zigzag branches; spines slender, $\frac{1}{2}$ -1 in. *Leaves* serrate. *Petals* $\frac{1}{2}$ - $\frac{3}{4}$ in., white, oblong-ovate.

** *Branches armed. Spines bearing leaves and flowers.*

14. **G. Wallichiana**, *Spreng. Syst.* 5, *Index* 150 (under *Celastrus rigida*); leaves 1-1 $\frac{1}{2}$ by $\frac{3}{4}$ -1 in. obovate crenate, fruit turbinate $\frac{1}{2}$ in. *Celastrus Wallichiana*, *W. & A. Prodr.* 159; *Wall. Cat.* 4304. *C. rigida*, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 396. *C. buxifolia*, *Roxb. Hort. Beng.* 18. *Catha Wallichii*, *Don Gen. Syst.* ii. 10; *Walp. Rep.* i. 532.

PANJAB, at Peshawur, *Falconer*; WESTERN PENINSULA; Courtallam, *Wight*; Maisor, *G. Thomson*; EASTERN BENGAL, *Herb. Griffith*.

A shrub with zigzag branches, profusely armed with stout spines 1-3 in. long. *Leaves* coriaceous, glabrous. *Cymes* shorter than the leaves, axillary and on the spines. *Fruit* somewhat inflated, 3-celled; cells 1-seeded.

15. **G. emarginata**, *Roth Nov. Sp.* 155 (*Celastrus*); leaves 1-2 $\frac{1}{2}$ by $\frac{1}{2}$ -1 $\frac{1}{4}$ in. obovate-cuneate entire, flowers fascicled in the axis of the leaves and on the spines, fruit turbinate $\frac{1}{4}$ in. *C. emarginata*, *W. & A. Prodr.* 160; *DC. Prodr.* ii. 8; *Wall. Cat.* 4305; *Roxb. Fl. Ind.* i. 620; *Grah. Cat. Bomb. Pl.* 39; *Voigt Hort. Sub. Calc.* 166. *Catha emarginata*, *Don Gen. Syst.* ii. 9; *Thwaites Enum.* 72; *Walp. Rep.* i. 532.

WESTERN PENINSULA, *Shuter*; Concan, *Graham*; Anamallay hills, *Wight*. CEYLON, in hot dry parts of the Island.

A shrub with stout zigzag branches, profusely armed with spines 1-2 $\frac{1}{2}$ in. long. *Leaves* sometimes broadly ovate, emarginate, very coriaceous. *Flowers* on slender delicate pedicels $\frac{1}{2}$ in. long. *Fruit* 3-celled, 1-seeded.

16. **G. montana**, *Roxb. Fl. Ind.* i. 620 (*Celastrus*); leaves 1-3 by $\frac{1}{4}$ -2 in. linear obovate to orbicular-obovate crenulate, cymes rigid divaricating shorter than the leaves, fruit globose $\frac{1}{6}$ in. black 1-3-celled, cells 1-seeded. *Celastrus montana*, *W. & A. Prodr.* 159; *Grah. Cat. Bomb. Pl.* 381; *Wall. Cat.* 4306; *Wight Ic.* 382; *Voigt Hort. Sub. Calc.* 166; *Roth Nov. Sp.* 154; *DC. Prodr.* ii. 9; *Bedd. Fl. Sylvat. Anal. Gen.* lxxvi.; *Dalz. & Gibs. Bomb. Fl.* 48. *C. pallida*, *Wall. Cat.* 4307; *Voigt Hort. Sub. Calc.* 167. *C. crenatus*, *Roth Nov. Sp.* 156, not of *Forst.* ? *C. senegalensis*, *Lam.*; *DC. Prodr.* ii. 8; *Boiss. Fl. Or.* ii. 11; *Brand. For. Fl.* 81. *Catha montana*, *G. Don Gen. Syst.* ii. 10.

Throughout the drier parts of CENTRAL, SOUTH-WESTERN, and NORTH-WESTERN INDIA.—DISTRIB. Afghanistan; Central Africa; Malay Archipelago; Australia.

Branches straight, or only slightly zigzag, profusely armed, rarely unarmed. *Cymes* axillary or borne on the spines, forking many times. *Capsules* numerous, with the size and look of a pepper corn.—Although the extreme forms of this species are very distinct, it is impossible to find characters to limit them. *Celastrus montana*, *Roxb.*, comprises those forms which have the branches less profusely armed, and the leaves larger and broader; *C. senegalensis*, *Lam.*, those in which the stems are more robust, and profusely armed, and the leaves smaller and narrower. *C. pallida*, *Wall.*, may prove to be a distinct species. De Candolle regards Roxburgh's and Roth's *montana* as different species, but I follow Wight and Arnott in uniting them.

9. KURRIMIA, Wall.

Trees, usually quite glabrous, young branches tipped with the deciduous stipules. *Leaves* opposite, rarely alternate, towards the ends of the branches, coriaceous, entire, shining, penninerved; petiole slender.

Flowers in simple or paniculately disposed racemes. *Calyx* 5-fid or -lobed, recurved. *Petals* 5, inserted under the margin of the disk, spreading or recurved. *Stamens* inserted with the petals. *Disk* fleshy, 5-lobed. *Ovary* free, glabrous or puberulous at the base, crowned at the top with a tuft of hairs; styles 2 filiform, stigmas small capitate; ovules 2 in each cell, erect. *Capsule* entire or 2-lobed, 1-2-celled, dehiscing slowly with 2 valves, 1-2-seeded. *Seeds* erect, completely or partially covered by a fleshy aril, albumen abundant fleshy; cotyledons linear-oblong.—DISTRIB. India, Ceylon, Malayan Peninsula.

* *Flowers in simple spikes.*

1. **K. pulcherrima**, Wall. Cat. 4334; petals elliptic-oblong $\frac{1}{12}$ in., disk slightly puberulous forming a shallow crenate cup round the glabrous base of the ovary. fruit narrowly oblong. *K. calophylla*, Wall. Cat. 4335. *K. robusta*, Kurz mss. Rhessa Moja, Ham. mss. ex Arn. in Ed. Phil. Journ. xvi. 315; Walp. Rep. i. 538. *Celastrus robustus*, Roxb. Fl. Ind. i. 626. *Nothocnestis sumatrana*, Miq. Fl. Ind. Bat. Suppl. i. 531.

The KHASIA MTS., SILHET and CHITTAGONG; ascending to 3000 ft.; BURMA, Griffith; TENASSERIM, Helfer; SINGAPORE, Wallich.—DISTRIB. Sumatra.

A tree. *Leaves* 4-7 by 1-2 in., oblong-lanceolate, acute or acuminate, glossy above. *Spikes* glabrous. *Fruit* $1\frac{1}{2}$ -2 in., the apex often produced into a beak, 1-celled, 1-seeded.

2. **K. Maingayi**, Laws.; petals $\frac{1}{10}$ in. linear-oblong, disk puberulous forming a crenate cup round the puberulous ovary, fruit broadly oblong acute.

SINGAPORE, Maingay.

A tree. *Leaves* 5-9 by $3\frac{1}{4}$ -4 in., elliptic-oblong. *Spikes* glaucous. *Fruit* 1-1 $\frac{1}{2}$ in.—Closely allied to the last species, of which it may prove to be a variety.

** *Flowers in panicked spikes or racemes.*

3. **K. paniculata**, Wall. Cat. 4336; fruit $\frac{3}{4}$ in. unequally 2-lobed, lobes diverging. Rhessa paniculata, Arn. in Ed. Phil. Journ. xvi. 315; Walp. Rep. i. 538. *Trochisandra indica*, Bedd. Fl. Sylv. t. 120; Fl. Sylv. Anal. Gen. lxvii. *Pyrospermum calophyllum*, Miq. Fl. Ind. Bat. Suppl. i. 402.

PENANG, Wallich, &c.; SINGAPORE, Maingay; abundant in Anamallay Hills, Beddome—DISTRIB. Sumatra.

A tree. *Leaves* elliptic-oblong, 6-12 by 2-3 in. *Flowers* shortly pedicellate, in stoutish paniculate racemes. *Petals* obovate-oblong, flat. *Disk* lobed, glabrous. *Ovary* glabrous beneath the tuft of hairs. *Fruit* with the smaller lobe abortive, the larger 1-seeded.—I have seen no specimen of Beddome's *Trochisandra indica*, but from his description and figure I am not able to distinguish it from the above.

4. **K. bipartita**, Laws.; fruit $1\frac{1}{4}$ in. divided nearly to the base into 2 equal nearly parallel lobes.

WESTERN PENINSULA; Shivagherri hills, Wight.

Leaves 3-8 by $1\frac{1}{2}$ -3 in., elliptic-oblong. *Panicles* stoutish. *Flowers*? *Fruit*-lobes narrowly oblong, rounded at the apex, black, 1-seeded. *Seed* not half covered by the aril.

5. **K. ceylanica**, Arn. Pug. in Act. Acad. Nat. Cur. xviii. pt. i. 328; fruit $\frac{3}{4}$ in. elliptic or elliptic-oblong not lobed. Thwaites Enum. 72; Bedd. Fl. Sylv. t. 147.

CEYLON; warm moist parts of the island.

A large tree. *Leaves* 3-6 by $\frac{1}{2}$ -3 in., ovate or ovate-oblong, acute, the apex often reflexed. *Flowers* sessile, in slender paniced spikes. *Petals* elliptic, $\frac{1}{4}$ in. *Fruit* reddish brown, 1-celled, 1-seeded. *Seed* nearly covered by the aril.

VAR. montana, Thwaites, l.c.; panicles smaller and more succulent, flowers larger.—Central province, ascending to 5000 ft.

10. **ELÆODENDRON**, Jacq. f.

Small trees or shrubs. *Leaves* opposite or subopposite, crenate or entire. *Flowers* in axillary dichotomous cymes, often polygamous. *Calyx* 5-cleft. *Petals* 5, spreading. *Disk* thick. *Stamens* 5; anthers nearly globose. *Ovary* continuous with the disk, conical, rarely 2-4- or 5-celled; style very short; ovules 2 in each cell. *Fruit* succulent or dry, 1-2-celled, indehiscent; cells 1- rarely 2-seeded. *Seed* without an aril, albuminous.—*DISTRIB.* About 30 species, natives of South Africa, Tropical Asia, America and Australia.

1. **E. glaucum**, Pers. *Synops.* i. 241; *Roxb. Fl. Ind.* i. 638; *Wall. Cat.* 4325; *DC. Prodr.* ii. 10; *Thwaites Enum.* 73; *Bedd. Fl. Sylv. Anal. Gen.* lxxvii. *E. Roxburghii*, W. & A. *Prodr.* 157; *Grah. Cat. Bomb. Pl.* 38; *Dalz. & Gibs. Bomb. Fl.* 48; *Wight Ill.* 178, t. 71; *Bedd. Fl. Sylv. Anal. Gen.* 67; *Fl. Sylv.* 148; *Brand. For. Fl.* 82. *E. paniculatum*, W. & A. *Prodr.* 157. *E. oxyodon*, Turcz. in *Bull. Soc. Nat. Mosc.* 1863, pt. i. 603. *Celastrus glaucus*, Vahl *Symb.* ii. 42. *Mangifera glauca*, Rothb. in *Nov. Act. Harn.* ii. 534, t. 4, f. i. *Euonymus grossa*, Wall. in *Roxb. Fl. Ind.* ed. Carey, ii. 408; *Cat.* 4291. *E. Tina*, Ham. in *Wall. Cat.* 4292. *Neeriya dichotoma*, Roxb. *Fl. Ind.* i. 646. *Rhamnus Neeriya*, Spreng. *Syst. Veg. Suppl.* 86. *Schrebera albens*, Willd. *Sp. Pl.* i. 1092.

Throughout the hotter parts of INDIA and CEYLON.—*DISTRIB.* Malay Archipelago.

Leaves 2-6 by $\frac{1}{2}$ -2 $\frac{1}{2}$ in., elliptic or ovate, acute or acuminate, crenate or nearly entire, membranous or subcoriaceous. *Flowers* in diffuse dichotomous cymes. *Fruit* woody, obovoid, $\frac{1}{2}$ in., tipped at the apex with the persistent style, 1-celled, 1-seeded.—So far as foliage is concerned this is a most variable species.

VAR. 1. montanum, Thwaites Enum. 73; fruit $\frac{1}{2}$ in. globose very hard and woody 1-celled 1-seeded brown.—CEYLON, in hot drier parts of the Island.

VAR. 2. leaves 2 $\frac{1}{2}$ by 1 in. oblong-elliptic subacuminate, fruit $\frac{1}{3}$ in. round succulent 2-celled black.—Canara, Ritchie.

11. **HIPPOCRATEA**, Linn.

Small trees or scandent shrubs. *Leaves* opposite, petioled; stipules small, caducous. *Flowers* small, white or greenish, disposed in axillary cymes, more rarely in terminal cymose panicles. *Calyx* small, 5-parted. *Petals* 5, spreading, much larger than the calyx, imbricate or valvate. *Stamens* 3; recurved, lying in the grooves of the ovary. *Disk* conical or cupular. *Ovary* surrounded by the disk, 3-celled; style very short or 0, stigmas 1-3; ovules 2-10 in each cell, in 2-series, inserted on the inner angle. *Fruit* of 3-flattened carpels connate at the base, usually dehiscent. *Seeds* compressed, usually winged below, exalbuminous.—*DISTRIB.* Species about 60, natives of the tropics of both hemispheres.

* *Petals* $\frac{1}{6}$ - $\frac{1}{3}$ in.—*Shrubs with climbing branches.*

1. **H. obtusifolia**, Roxb. *Fl. Ind.* i. 166; calyx-lobes triangular, petals $\frac{1}{2}$ in. subulate puberulous. W. & A. *Prodr.* 104; *Wight Ill.* i. 134; *Yc.* t. 936; *DC. Prodr.* i. 569; *Thwaites Enum.* 52. *H. barbata*, F. Muell.

in *Trans. Phil. Inst. Vict.* iii. 23. *H. grandiflora*, Wall. *Cat.* 4213. *H. rigida*, Hamp. *H. tortuosa*, Wall. *Cat.* 4216. *H. volubilis*, Heyne in Wall. *Cat.* 4215 (not of Linnæus). *Salacia lævigata*, Wight in Hook. *Bot. Misc.* iii. 295; *Suppl. t.* xxxvi. (non DC.).

EASTERN and WESTERN PENINSULAS, from Tenasserim and the Concan southwards. SILHET, Wallich.—DISTRIB. Malay Archipelago, China, Australia, tropical Africa.

A climbing shrub; young branches often quadrangular. *Leaves* 2–5 by 1–2½ in., elliptic or oblong, obtuse, acute or shortly acuminate, crenate-serrate or entire, glabrous, coriaceous. *Flowers* in dichotomous cymes shorter than the leaves. *Calyx-lobes* entire. *Disk* puberulous. *Ovules* 6 in each cell. *Carpels* 1½–2 in., obovoid, emarginate, striate, 4–6-seeded.

2. **H. Cumingii**, Laws.; calyx-lobes round, petals ⅓ in. subulate puberulous outside inside covered with rust-coloured hairs for the upper three-fourths glabrous below.

MALACCA, Griffith.—DISTRIB. Philippines.

A climbing shrub. *Leaves* 3–4 by 1½–2 in., elliptic, acute or subacuminate, glabrous, coriaceous, entire. *Flowers* in dichotomous cymes shorter than the leaves. *Calyx-lobes* very short, glabrous, entire. *Disk* with a ring of hairs at the base of the stamens, otherwise glabrous. *Fruit*?

3. **H. Lobbii**, Laws.; calyx-lobes elliptic-oblong, petals elliptic-ovate slightly cohering at the base entirely covered on the inside with dense cinereous hairs.

TENASSERIM; at Moulmein, Lobb.

A climbing shrub? *Leaves* 3–4 by ¾–2 in., broadly elliptic, subacuminate, entirely glabrous. *Cymes* 2–3 times divided, shorter than the leaves. *Calyx-lobes* entire, pubescent. *Petals* ½ in. *Anthers* almost sessile. *Fruit*?

4. **H. Arnottiana**, Wight *Ill.* i. 133, t. 46–47; calyx-lobes orbicular-ovate, petals ¼ in. shortly clawed cordate very concave with involute margins. *Salacia terminalis*, Thwaites *Enum.* 407.

WESTERN PENINSULA; Quilon, Wight; Canara, Plant. Hohenacker. CEYLON, near Galle, Thwaites.

A climbing shrub, glabrous in every part. *Leaves* 3–3 by 1½–2¾ in., elliptic, acute or subacuminate, very coriaceous, entire or faintly crenate, glabrous. *Cymes* axillary or paniced. *Calyx-lobes* entire. *Fruit* 2½ in., oblong, emarginate.

** *Flowers* very numerous. *Petals* ⅙ in. or less.—*Shrubs* with climbing branches.

5. **H. Grahmi**, Wight *Ill.* i. 134; *Ic.* t. 380; cymes diffuse paniced longer than the leaves, calyx-lobes orbicular sharply crenate. *Dalz. & Gibs. Bomb. Fl.* 32. *H. lanceolata*, Wall. *Cat.* 4214. *Salacia paniculata*, Wall. *Cat.* 4214, B in part.

WESTERN PENINSULA; from the Concan southwards, Wight, &c. ? ASSAM and ? SILHET, Wallich.

A climbing shrub. *Leaves* 3–5 by 1¾–2 in., ovate-elliptic, acute or subacuminate, entire, coriaceous, glabrous. *Petals* ⅙ in., very shortly clawed, linear-oblong, glabrous. *Anthers* subsessile. *Disk* glabrous. *Fruit* 3 by ¾ in., linear-oblong, emarginate.

VAR. *Leaves* 4 in. lanceolate-acuminate, flowers in slender divaricating panicles twice the length of the leaves, fruit 2¾ in. narrowly elliptic.—Assam, Griffith.

6. **H. indica**, Willd. *Sp. Pl.* i. 193; leaves 1½–2½ by ¾–1½ in., cymes very slender dichotomous shorter than the leaves, calyx-lobes triangular entire, fruit 1–1½ in. DC. *Prodr.* i. 568; *Roxb. Fl. Ind.* i. 165; *Cor. Pl.* ii. t. 130;

W. & A. Prodr. 104; *Dalz. & Gibs. Bomb. Fl.* 32; *Thwaites Enum.* 52; *Oliv. Fl. Trop. Afr.* i. 368; *Brand. For. Fl.* 83. *H. disperma*, *Vahl Enum.* ii. 28; *Wall. Cat.* 4210 in part. *H. euonymoides*, *Vahl Enum.* ii. 28. *H. obtusifolia*, *Roxb. Wall. Cat.* 4211. *Tonsella disperma*, *Poir.*—*Celastrinea*? *Wall. Cat.* 9013.

In the hotter parts of INDIA from Behar, the Concan, and Tenasserim southwards, and in CEYLON.—DISTRIB. Malay Archipelago and Africa.

A shrub with climbing branches. *Leaves* ovate or elliptic-ovate, acute or subacuminate or lanceolate, finely serrate, membranous, glabrous. *Flowers* glabrous, exceedingly small. *Cymes* many times divided; partial cymes subumbellate. *Petals* $\frac{1}{4}$ in., usually 6, elliptic oval-oblong, concave. *Ovules* 2-4 in each cell. *Fruit* oblong. *Wall. Cat.* 4111 B? is evidently the same plant.

7. *H. arborea*, *Roxb. Hort. Beng.* 5; *Fl. Ind.* i. 167; *Cor. Pl.* t. 205; leaves 4-7 by $2\frac{1}{2}$ - $3\frac{1}{4}$ in., cymes and fruit 3 in. *Wall. Cat.* 4212; *DC. Prodr.* 569; *Brand. For. Fl.* 83. ? *H. disperma*, *Wall. Cat.* 4212 B.

Interior parts of INDIA, *Roxb.*; BHOTAN and the KHASIA Mts., *Griffith*? Morung Mts., *Hamilton*.

Subarborescent, with climbing branches. *Leaves* ovate-elliptic, subacuminate, serrate, membranous, glabrous. *Fruit* of 3 carpels, cuneiform, 3 by $1\frac{1}{2}$ in.—This ought probably to be considered a variety of *H. indica*, from which it differs apparently in nothing but size. In the description given by Roxburgh of *H. obtusifolia* (*Fl. Ind.* i. 166) the flowers are those of *H. indica* proper, while the leaves belong to *H. obtusifolia*, *Wight*.

*** *Erect trees.*

8. *H. Maingayi*, *Laws.*; cymes 3-flowered, racemose.

MALACCA, *Maingay*.—DISTRIB.? Borneo.

Branches terete. *Leaves* 3 by $\frac{3}{4}$ in., lanceolate, glabrous, coriaceous. *Carpels* triquetrous, 4-5 in., woody. *Seeds* $3\frac{1}{2}$ -4 $\frac{1}{2}$ in., oblong.

12. SALACIA, Linn.

Scandent or sarmentose shrubs or small trees. *Leaves* opposite, petiolate, exstipulate. *Flowers* few or many, clustered in the axils of the leaves or extra-axillary, more rarely in cymes. *Calyx* small, 5-parted, *Petals* 5, imbricate. *Stamens* 3, rarely 2 or 4, continuous with the disk, recurved. *Ovary* conical, immersed in the disk, 3-celled; style very short, stigma simple or 3-lobed; ovules 2-8 in each cell, in 1-2 series, inserted on the inner angle. *Fruit* baccate, 1-3-celled, sub-woody or fleshy. *Seeds* large, angular.—DISTRIB. Species about 70, natives of the tropics of both hemispheres.

* Flowers 1-6 from an axillary or extra-axillary tubercle.

a. *Leaves coriaceous mostly 6-12 in.*

1. *S. flavescens*, *Kurz in Journ. As. Soc. Beng.* 1872, pt. ii. 300; leaves 6-12 by 2-3 $\frac{1}{2}$ in. oblong-lanceolate acute or subacuminate margins recurved, flowers about 3 very small. *Drypetalum coriaceum*, *Arn. in Ann. Nat. Hist.* i. 373. *Microtropis coriacea*, *Wall. Cat.* 4338. *M. longifolia*, *Wall. Cat.* 4339, in part.

EASTERN PENINSULA, from Tenasserim, *Gomez, &c.*, to Penang, *Wallich, &c.*

A small tree with black branches. *Leaves* green glabrous and shining above, paler beneath, drying light-yellow. *Flowers* axillary and extra-axillary, sessile or on pedicels under $\frac{1}{2}$ in. *Fruit*? The dark stems and light-coloured leaves, together with a general aspect of a *Microtropis*, serve to distinguish this species from its allies.

2. **S. longifolia**, Hook. f. mss. (not Wall.); leaves 6-14 by 2-4 in. elliptic-lanceolate acute or subacuminate margins recurved, flowers 3-6 large.

MALAY, *Maingay*; Penang, *Phillips*; Prince of Wales Island?

A small tree with rather coarse pale-coloured branches. *Leaves* pale-brown when dry, glabrous, coriaceous, shining beneath and finely reticulated. *Flowers* axillary or extra-axillary, usually sessile but sometimes on pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in. *Petals* obovate, $\frac{1}{2}$ - $\frac{1}{4}$ in.

3. **S. grandiflora**, Kurz in Journ. As. Soc. Beng. 1872, ii. 300; leaves 6-12 by $2\frac{1}{2}$ -4 in. oblong with a short obtusely-cuspidate reflexed apex margins recurved, flowers large.

TENASSERIM, Kurz; MALACCA, Griff. and *Maingay*; PENANG, *Phillips*.

A small tree. *Leaves* very coriaceous, glabrous and shining, finely reticulated. *Flowers* 1-3 axillary and extra-axillary, sessile or very shortly pedicellate, the largest in the genus. *Petals* $\frac{1}{2}$ in., roundly obovate. *Fruit* 1-2 in. diam., black, smooth.—Closely allied to *S. longifolia*, of which it is perhaps only a variety. *Maingay's* specimen, No. 401, from Malacca, has pale-green leaves and a rough light-coloured fruit; it is perhaps a distinct species.

b. *Leaves coriaceous* $1\frac{1}{2}$ -5 in. rarely more.

4. **S. Maingayi**, Laws.; leaves $1\frac{1}{2}$ -2 by $1\frac{1}{4}$ in. ovate subacute entire, flowers 1-3 in each axil thick and fleshy, pedicels stout $\frac{1}{2}$ - $\frac{3}{4}$ in., petals $\frac{1}{2}$ in. roundly-oblong.

PENANG, *Maingay*.

A scandent shrub. *Branches* terete, rough with minute tubercular warts. *Leaves* very coriaceous, drying black. *Fruit*?

5. **S. Lobbii**, Laws.; leaves 3-3 $\frac{1}{2}$ by $1-1\frac{3}{4}$ in. elliptic-oblong with a short obtuse point entire, flowers 1-3 in each axil thick and fleshy, pedicels stout $1-1\frac{1}{2}$ in., petals $\frac{1}{4}$ in. roundly ovate subcordate at the base.

SINGAPORE, *Lobb*.

An erect shrub. *Branches* terete, covered with minute warts. *Leaves* not drying black. *Fruit*?

6. **S. prinoides**, DC. Prodr. i. 571; leaves $1\frac{1}{2}$ -3 by $\frac{3}{4}-1\frac{1}{4}$ in. oblong obtusely acuminate serrate, flowers 3-6 from each tubercle, pedicels under $\frac{1}{2}$ in., petals $\frac{1}{2}$ in. broadly ovate, fruit the size of a small cherry smooth. Wall. Cat. 4219; W. & A. Prodr. 105; Dalz. & Gibs. Bomb. Fl. 33. *S. podopetala*, Turcz. in Bull. Soc. Nat. Mosc. 1863, i. 581. *S. Wightiana*, Wall. Cat. 4221. *Johnia coromandeliana*, Roxb. Fl. Ind. i. 169; DC. Prodr. i. 571. *Tonsella prinoides*, Willd. in Act. Ac. Cur. Ber. iv. 184.

SILHET and the KHASIA Mts., H. f. & T.; EASTERN and WESTERN PENINSULA, and CEYLON.—DISTRIB. Java and the Philippine Islands.

A small straggling tree or large climbing shrub. *Leaves* very coriaceous. *Flowers* mostly axillary. *Sepals* puberulous, ciliate. *Petals* unguiculate, entire. *Fruit* globose, 1-celled, 1-seeded, black.

7. **S. Brunoniana**, W. & A. Prodr. 105; leaves 2-3 by $\frac{3}{4}-1$ in. oblong or elliptic obtuse or with a short obtuse acumination faintly serrate, flowers 1-2 in each axil, pedicels under $\frac{1}{2}$ in. slender, petals $\frac{1}{2}$ in. ovate from a broad base margins incurved when dry. Wall. Cat. 4217 E?; Dalz. & Gibs. Bomb. Fl. 33.

WESTERN PENINSULA, Hb. Wight; Ram Ghaut, Dalzel & Gibson.

A scandent shrub with black rigid divaricating branches, rough with minute reddish

warts. *Leaves* black when dry. *Fruit*?—*S. Finlaysonii*, Wall. Cat. 4220, which appears to be nearly allied to this species, is not Indian.

8. **S. Roxburghii**, Wall. Cat. 4217; leaves 3-6 by $\frac{3}{4}$ -2 in. oblong-lanceolate or elliptic-oblong caudate-acuminate entire or very faintly serrate, flowers 3-6 in each axil, pedicels under $\frac{1}{2}$ in. petals $\frac{1}{17}$ in. roundly obovate, fruit $1\frac{3}{4}$ -2 in. diam. smooth. *W. & A. Prodr.* 105; *Dalz. & Gals. Bomb. Fl.* 33. ? *S. chinensis*; *L.*; *DC. Prodr.* 571. ? *S. cochinchinensis*, *Lour. DC. Prodr.* i. 571. ? Indeterminata, Wall. Cat. 4291. *Johnia salacioides*, *Roxb. Fl. Ind.* i. 168; *DC. Prodr.* i. 571.

A scandent shrub. *Branches* pale-brown with wrinkled bark. *Sepals* glabrous, entire. *Fruit* globose, 2-3-seeded.—This is the true *S. Roxburghii* of Wall. Cat., and seems to be confined to the N.E. of India, so that the specimen in *Hyne's Herbarium* alluded to by *Wight & Arnott* was probably not of his own gathering.

9. **S. ovalis**, *Laws.*; leaves 3-4 by $1\frac{1}{2}$ -2 in. elliptic-obtuse or rounded at both ends entire, flowers 3-6 in each axil, pedicels under $\frac{1}{2}$ in. slender, petals $\frac{1}{2}$ in. ovate.

MALACCA, *Maingay*.

A scandent shrub with smooth black pruinose branches. *Leaves* subcoriaceous, pale-coloured. *Fruit*?

10. **S. rubra**, *Laws.*; leaves 2-3 by $1-1\frac{1}{4}$ in. elliptic-lanceolate pointed at both ends entire, fruit $1\frac{1}{2}$ in. diam. rugose bright red.

MALACCA, *Maingay*.

A scandent? shrub with coarse pale-coloured branches. *Flowers*? *Fruit* 2-seeded.

11. **S. reticulata**, *Wight Ill.* i. 134; leaves $2\frac{1}{2}$ -4 by $1-2\frac{1}{4}$ in. elliptic or subovate rounded at the apex or with a short obtuse point very faintly serrate or entire shining above finely reticulated beneath, flowers 6 in each axil, pedicels under $\frac{1}{2}$ in., petals ovate acute $\frac{1}{8}$ in., fruit 2 in. diam. tuberculate. *Thwaites Enum.* 53.

WESTERN PENINSULA; Quilon, *Wight*; CEYLON, ascending to 3000 ft.

A scandent shrub with blackish branches. *Sepals* glabrous, entire.

VAR. *diandra*, *Thwaites Enum.* 53 (sp.); leaves smaller, less coriaceous; stamens 2.

c. *Leaves membranous.*

12. **S. membranacea**, *Laws.*; leaves 3-6 by 1-2 in. elliptic entire.

Sikkim, *Herb. Griffith*; Khasia, 2-3000 ft., *H. f. & T.*

A scandent shrub with slender stems and branches. *Branches* completely covered with minute pale-coloured warts. *Leaves* flat, shining, and very finely reticulated on both sides. *Flowers*? *Fruit* $1\frac{1}{2}$ in. diam., green. *Seeds* yellow in a subfleshy pulp.—Apparently intermediate between *S. Roxburghii* and *S. viminea*, but approaching the latter most closely.

13. **S. ? viminea**, Wall. Cat. 7267; leaves 3-5 by 1-2 in. elliptic-lanceolate obtusely subacuminate crenate.

MERGUI, *Griffith*; Moulmein, *Griffith*; Tenasserim and Andaman, *Helper*.

A scandent shrub? with exceedingly slender branches. *Leaves* shining above, finely reticulated beneath. *Flowers* 1-3 together, axillary or extra axillary, flat, membranous or submembranous. *Pedicels* $\frac{1}{2}$ - $\frac{3}{4}$ in., very slender. *Fruit*?

** Flowers very numerous from an axillary or extra-axillary tubercle.

14. **S. multiflora**, *Wight Ill.* i. 134; whole plant pale-coloured, pedicels 1 in. very slender.

TENASSERIM, at Mergui, *Griffith*.

A scandent? shrub, with very light-coloured branches and leaves. *Leaves* 6-9 by 2 $\frac{3}{4}$ -4 in., elliptic-oblong, acute, entire, margins slightly recurved, membranous or subcoriaceous. *Petals* $\frac{1}{2}$ in., orbicular. *Ovules* about 8 in each cell. *Fruit*?—Resembling *S. flavesces*, but readily distinguished by its numerous flowers and long slender pedicels.

15. ***S. verrucosa***, *Wight Ill. i.* 134; whole plant drying nearly black, branches covered with minute rough warts, pedicels slender $\frac{1}{2}$ -1 in. *S. memecyloides*, *Wall. Cat.* 4218.

TENASSERIM, at Moulmein and Mergui, *Griffith, &c.*—DISTRIB. Philippine Islands.

A shrub. *Leaves* 3 $\frac{1}{2}$ -5 by 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in., elliptic-oblong or broadly lanceolate, obtuse at the apex or with a short obtuse acumen, entire or faintly serrate, very coriaceous. *Flowers* from chiefly extra-axillary tubercles. *Calyx-lobes* fringed with rust-coloured hairs. *Petals* $\frac{1}{2}$ in., oblong-ovate, obtuse. *Ovules* 2 in each cell. *Fruit* $\frac{3}{4}$ in. diam., subglobose, smooth, black.

16. ***S. macrosperma***, *Wight Ic. t.* 962; whole plant drying nearly black, branches without warts, pedicels stoutish usually under $\frac{1}{2}$ in.

WESTERN PENINSULA, from the Concan southwards.

A diffuse rambling shrub. *Leaves* 3 $\frac{1}{2}$ -5 by 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in., oblong-elliptic, shortly and obtusely acuminate, entire, very coriaceous. *Flowers* chiefly from extra-axillary tubercles. *Calyx-lobes* fringed with rust-coloured hairs. *Petals* rather smaller than in *S. verrucosa*, ovate, obtuse from a broad base. *Ovules* 2 in each cell. *Fruit* 1-1 $\frac{1}{2}$ in. diam., globose, rugulose, black.—Wight says that the calyx-lobes are not fringed in this species, but in some of his own specimens they are distinctly ciliated. Very closely indeed allied to *S. verrucosa*.

*** Peduncles under $\frac{1}{4}$ in. 3-flowered.

17. ***S. oblonga***, *Wall. Cat.* 4226; *W. & A. Prodr.* 106; *Wight Ill. t.* 47 B; *Thwaites Enum.* 53; *Dalz. & Gibs. Bomb. Fl.* 33; *Bedd. Fl. Sylv. Anal. Gen.* lxvii. t. x. iv. *S. oppositifolia*, *Rottl.*; *Wight Ic. t.* 97. *S. pomifera*, *Wall. Cat.* 4227, not *W. & A.*

WESTERN PENINSULA; from the Concan southwards. CEYLON, in the hotter parts of the island.

A small glabrous tree or shrub. *Leaves* 3-6 by 1 $\frac{1}{2}$ -2 in., elliptic-oblong, rounded at the apex or with a very short obtuse acumen, slightly serrate, subcoriaceous, turning yellow when dry. *Flowers* sometimes sessile in the axils of the leaves owing to the extreme shortness of the common peduncle. *Calyx-lobes* rounded, glabrous, entire. *Petals* about $\frac{1}{2}$ in., broadly elliptic, serrate. *Ovules* 4 in each cell. *Fruit* 2-2 $\frac{1}{2}$ in. diam., tuberculate, light-brown. *Seeds* about 8.

**** Flowers in branching cymes.

18. ***S. fruticosa***, *Heyne in Wall. Cat.* 4223 (under Tonsella); flowers in dichotomously branched cymes $\frac{3}{4}$ in.

WESTERN PENINSULA; Canara, *Herb. Hohenacker, Kurz, Rottler*.

A scandent shrub. *Leaves* 3 $\frac{1}{2}$ by 1 $\frac{1}{2}$ in., elliptic-lanceolate, acute, or shortly and obtusely acuminate, serrate, chartaceous. *Petals* $\frac{1}{12}$ in. diam., orbicular, with a white border. *Fruit*?—Closely allied to *S. floribunda*, of which it may be a variety.

19. ***S. Griffithii***, *Laws.*; flowers in divaricating cymes 4 in. long.

Habitat unknown.—*Herb. Griffith*.

Leaves 3-5 by 1 $\frac{1}{2}$ -2 in., oblong-elliptic, shortly acuminate, crenate-serrate, subcoriaceous. *Petals* ovate-oblong, obtuse. *Ovules* 2, superposed. *Fruit*?

20. **S. floribunda**, *Wight Ill.* i. 134; flowers small umbellate in dichotomous cymes. *S. densiflora*, *Wall. Cat.* 4224. *S. longifolia*, *Wall. Cat.* 4225. *S. pomifera*, *W. & A. Prodr.* 105. ? *non Wall.*

SILHET, *De Silva*; ASSAM and the KHASIA Mts., *Griffith, &c.*; TENASSERIM, at Mergui, *Griffith*.

A scandent shrub. *Leaves* 3-6 by $\frac{3}{4}$ -2 $\frac{3}{4}$ in., elliptic-lanceolate, shortly and obtusely acuminate, serrate, subcoriaceous, shining. *Petals* orbicular. *Ovules* 2 in each cell. *Fruit* $\frac{1}{2}$ in. diam., globose, black.

DOUBTFUL SPECIES.

S. latifolia, *Wall. Cat.* 4222; leaves 2 $\frac{1}{2}$ -3 by 1 $\frac{3}{4}$ -2 in., flowers? fruit ripe? the size of a cherry pyriform smooth.

SINGAPORE, *Wallich*.

13. SIPHONODON, Griff.

A small glabrous tree. *Leaves* alternate, shortly petiolate, entire or crenate; stipules minute, deciduous. *Peduncles* axillary, short, 3-4-flowered. *Calyx* 5-cleft. *Petals* 5, spreading. *Disk* not distinct from the base of the calyx. *Stamens* 5, connivent round the pistil, filaments flattened. *Ovary* half immersed in the disk, conical, the summit hollowed out and stigmatose in the cavity round a central column, cells numerous in 2-4 series; ovules solitary in each cell, ascending and pendulous. *Drupe* globose, hard and fleshy, with numerous 1-seeded bony stones superposed in rings round the central axis, testa membranous, albumen sub-horny.—*DISTRIB.* Species 2; Malayan Peninsula, Java, Australia.

Mr. Benthams in his *Flora Australiensis* remarks that the ovary must probably be regarded as being 5-celled, with many ovules in each cell separated by spurious transverse dissepiments.

1. **S. celastrineus**, *Griff. in Calc. Journ. Nat. Hist.* iv. 247, t. 14; *Wall. Cat.* 9019; *Miq. Fl. Ind. Bat.* i. pt. ii. 592; *Hook. f. in Trans. Linn. Soc.* xxii. t. 26. *Astrogynae coriacea*, *Wall. mss.*

PEGU, *Kurz*; PENANG, *Griffith*.—*DISTRIB.* Java.

Leaves 4-8 by 2-2 $\frac{1}{2}$ in., oblong or oblong-elliptic, acute or subacuminate, crenate-serrate, coriaceous. *Peduncles* under 1 in. *Flowers* yellowish. *Fruit* globose, 1-1 $\frac{1}{2}$ in.

ORDER XLII. RHAMNEÆ. (By M. A. Lawson, M.A., F.L.S.)

Shrubs or trees, erect or scandent (cirrhose in *Gouania*). *Branches* unarmed spinous or aculeate. *Leaves* simple, alternate (opposite or subopposite in *Scutia* and *Sageretia*) usually coriaceous, often 3-5-nerved; stipules small, deciduous or changed into prickles. *Flowers* hermaphrodite or polygamous, small, greenish, in lax or dense axillary cymes, which are solitary or disposed in spikes or panicles. *Calyx* 4-5-fid; lobes triangular, erect or recurved, usually carinate within, valvate. *Petals* 4-5, rarely 0, inserted on the throat of the calyx-tube, usually shorter than its lobes, cucullate or involute. *Stamens* 4-5, inserted with the petals and opposite to them, often enclosed within their folds; anthers versatile, 2-celled, dehiscing longitudinally. *Disk* fleshy and filling the calyx-tube, or thin and lining it, entire or lobed, glabrous, rarely tomentose. *Ovary* sessile, free or immersed in the disk, wholly free from the calyx-tube or more or

less adherent to it, 3- rarely 2-4-celled; style short, simple, or 2-4 cleft; ovules 1 in each cell, erect, anatropous, raphe dorsal. *Fruit* free or girt at the base or middle by the adhering calyx-tube, 3- more rarely 1-4-celled, capsular or a dry or fleshy drupe, sometimes winged. *Seed* with fleshy albumen, rarely exalbuminous; embryo large, erect.—**DISTRIB.** Abundant in the tropical and temperate regions of the world; genera 38, species above 400.

VITMANNIA AFRICANA, W. & A. Prodr. 166; W. Ic. 490, is a S. African plant, not Indian.

TRIBE I. Ventilagineæ. Scandent unarmed shrubs. *Leaves* alternate. *Disk* filling the calyx-tube. *Ovary* superior or half superior. *Fruit* dry, 1-celled, 1-seeded, girt at the base or middle by the calyx-tube. *Seed* exalbuminous.

Fruit indehiscent, prolonged above into a linear-oblong wing . . . 1. VENTILAGO.
Fruit a 2-valved broadly oblong capsule . . . 2. SMYTHEA.

TRIBE II. Zizyphææ. Shrubs or trees. *Disk* filling the calyx-tube. *Fruit* a dry or fleshy drupe with a 1-3-celled stone.

Leaves prominently 3-nerved . . . 3. ZIZYPHUS.
Leaves penninerved . . . 4. BERCHEMIA.

TRIBE III. Rhamneæ. Shrubs or trees. *Disk* lining or filling the calyx-tube. *Ovary* superior or half-superior. *Fruit* dry or fleshy, of 3 (rarely 2 or 4) pyrenes or cocci.

* *Disk thin, lining the calyx-tube.*

Trees or shrubs. *Leaves* alternate. *Cymes* axillary. *Fruit* indehiscent . . . 5. RHAMNUS.

** *Disk fleshy, filling the calyx-tube.*

Leaves alternate, unequal. Peduncles swollen, fleshy. An unarmed tree . . . 6. HOVENIA.
Leaves opposite or subopposite. Flowers subumbellate. An unarmed or prickly shrub . . . 7. SCUTIA.
Leaves opposite or subopposite. Flowers sessile in terminal panicles. Unarmed or spinous shrubs . . . 8. SAGERETIA.
Leaves alternate. Peduncles slender, not fleshy. An unarmed shrub . . . 9. COLUBRINA.

TRIBE IV. Gouanieæ. Fruit inferior, crowned with the persistent calyx.

Fruit globose, not winged. Flowers fascicled, forming paniculate racemes . . . 10. APTERON.
Fruit 3-winged. Flowers fascicled, forming paniculate racemes . . . 11. GOUANIA.
Fruit ovate, terete. Flowers subumbellate . . . 12. HELINUS.

1. VENTILAGO, Gærtn.

Scandent shrubs. *Leaves* alternate, subbifarious. *Flowers* small, disposed in axillary and terminal (usually leafless) panicles, rarely in the axils of the leaves. *Calyx* 5-fid, with spreading internally keeled lobes; calyx-tube obconical. *Petals* 5, obtriangular or cucullate. *Stamens* 5, adnate to the base of the petals. *Disk* 5-lobed with a free margin. *Ovary* sunk in the disk, 2-celled; style very short. *Fruit* amaroid, the nut subglobose,

girt at the base or middle by the adhering calyx-tube, prolonged above into a linear or linear-oblong coriaceous wing, 1-celled, 1-seeded. *Seed* subglobose, exalbuminous.—*DISTRIB.* Species about 10, scattered over the tropics of Asia, Africa, America, Australia, and the Pacific Islands.

1. **V. madraspatana**, *Gærtn. Fruct.* i. 223, t. 49, f. 2; flowers in slender simple or paniculate spikes, fruit $1\frac{1}{2}$ –2 by $\frac{2}{3}$ in., nut girt at the base. *W. & A. Prodr.* 164; *Wight Ic.* 163; *Wall. Cat.* 4268; *Dalz. & Gibs. Bomb. Fl.* 48; *Thwaites Enum.* 74; *Brandis For. Fl.* 96. *V. bracteata*, *Wall. Cat.* 4269.

WESTERN PENINSULA, from the Concan southwards; TENASSERIM, at Moulmein and Mergui, *Griffith, &c.*; CEYLON, common in hot dry places.—*DISTRIB.* Java.

Young branches and leaves glabrous or only slightly pubescent. *Leaves* 2–4 by $1\frac{1}{2}$ in., oblong-lanceolate to ovate, acute or subacuminate, crenate or entire; costal nerves 6–8 pair. *Calyx* slightly puberulous outside, glabrous inside. *Ovary* with a few white hairs at the base; styles nearly straight.

2. **V. calyculata**, *Tulasne in Ann. Sc. Nat. Ser.* 4, viii. 124; flowers in densely pubescent paniculate spikes, fruit $1\frac{1}{2}$ –2 by $\frac{2}{3}$ in. pubescent, nut girt round the middle. *Brandis For. Fl.* 96. *V. denticulata*, *Willd. Nov. Act. Ber.* iii. 417; *DC. Prodr.* ii. 38. *V. macrantha*, *Tulasne in Ann. Sc. Nat. Ser.* 4, viii. 123. *V. madraspatana*, *Roxb. Fl. Ind.* i. 629; *Cor. Pl.* i. 55, t. 76; *Wall. Cat.* 4268 b; *W. & A. Prodr.* 164 not of *Gærtn.* *V. silhetiana*, *Smithiana*, and *sulphurea*, *Tulasne in Ann. Sc. Nat. Ser.* iv.–viii. 125.

Throughout the hotter parts of India, from the KUMAON HIMALAYA and NIPAL, to BHOTAN, SILHET, TENASSERIM, and throughout the WESTERN PENINSULA.—*DISTRIB.* Java.

Leaves pubescent, $3\frac{1}{2}$ –6 by $\frac{1}{2}$ – $2\frac{1}{2}$ in., ovate or ovate-elliptic, crenate-serrate, with about 6 pairs of costal nerves. *Calyx* densely pubescent without, hairy within on the disk. *Ovary* densely pubescent; styles longer than in *V. madraspatana* and more diverging. *Fruit* yellow, often densely pubescent, at length nearly glabrous.—A variable plant so far as the size of the leaves and amount of pubescence go.

3. **V. Maingayi**, *Laws.*; flowers in long filiform simple or compound spikes, fruit 3 by $\frac{3}{4}$ in. glabrous girt below the middle. *V. Sp.*; *Griff. Notul.* iv. 492.

TENASSERIM, *Helper*, at Mergui, *Griffith*; MALACCA, *Maingay*.

Leaves 4–7 by 1–2 in., oblong-lanceolate, entire, coriaceous, with about 10 pairs of costal nerves. *Nut* $\frac{1}{2}$ in. diam., blackish, veined.

4. **V. leiocarpa**, *Benth. in Journ. Linn. Soc.* v. 77; flowers in small axillary clusters or cymes, the upper often forming leafless panicles, fruit glabrous $1\frac{1}{2}$ – $2\frac{1}{2}$ in., nut girt round the middle. *V. madraspatana*, *Benth. in Hook. Kew Journ.* iv. 42.

BERMA, *Griffith*; TENASSERIM, *Helper*; MALACCA, *Maingay*.—*DISTRIB.* Hongkong.

Leaves ovate to oblong acuminate, crenate-serrate or entire, coriaceous, shining, with about 6 pairs of costal nerves. *Fruit* $\frac{3}{4}$ – $\frac{1}{2}$ in. diam.

? *VAR.*; leaves larger ovate or elliptical obtuse, costal nerves about 10 pair.—MALACCA, *Maingay*; Trop. Africa.—Without the fruit it is impossible to be certain that this is not a distinct species.

5. **V. bombalensis**, *Dalz. in Hook. Kew Journ. Bot.* iii. 36; young branches and flowers covered with fulvous tomentum, flowers fascicled in the axils of the leaves. *Dalz. & Gibs. Bomb. Fl.* 43; *Bedd. Ic. Pl. Ind. Or.* t. 114.

The CONCAN; at Chorla Ghat, *Dalzel*.

Leaves 3-5 by $\frac{3}{4}$ -1 $\frac{3}{4}$ in., lanceolate, acute or subacuminate, crenate, glabrous, with about 3-4 pairs of costal nerves. *Fruit*?—Mr. Benthham, in Journ. Linn. Soc. v. 77, suggests that this may be only a side shoot of *V. calyculata*, but the shape of the leaves, the number of the costal nerves, and Dalzel's supposition that the fruit is larger than in *V. madraspatana*, point to its being distinct.

2. **SMYTHEA**, Seeman.

Scandent shrubs. *Flowers* fascicled or solitary in the axils of the leaves. *Calyx* 5-fid; lobes spreading; tube obconical. *Petals* 5, cucullate, broadly emarginate, 2-lobed. *Stamens* 5, not included in the folds of the petals, filaments incurved. *Disk* 5-angled, flat. *Ovary* 2-celled; styles 2, recurved. *Fruit* a 1-celled 1-seeded capsule, dehiscing down the middle, compressed, not winged. *Seed* flat, large, exalbuminous.—**DISTRIB.** Sp. 2, one Malayan, the other Fijian.

1. **S. calpicarpa**, Kurz in Journ. As. Soc. Beng. 1872, ii. 301.

TENASSERIM, *Helfer*.

Branches clothed with fulvous hairs. *Leaves* 3-4 by 1-1 $\frac{1}{2}$ in., elliptic-lanceolate, sometimes shortly acuminate, crenate, slightly pilose on the nerves beneath otherwise glabrous. *Flowers* solitary in the axils of the leaves. *Fruit* (immature) 1 $\frac{1}{4}$ by $\frac{3}{4}$ in., oblong, coriaceous, covered with dense silky fulvous hairs.

3. **ZIZYPHUS**, Juss.

Trees or shrubs, often decumbent or sarmentose and frequently armed with sharp, straight or hooked prickles (transformed stipules). *Leaves* sub-bifarious, alternate, usually coriaceous. *Flowers* fascicled, or in sessile or pedunculated cymes. *Calyx* 5-fid, lobes spreading, keeled within; tube broadly obconical. *Petals* 5, rarely 0, cucullate, deflexed. *Disk* 5-10-lobed, flat or pitted, with a free margin. *Stamens* 5. *Ovary* sunk in the disk and confluent with it at the base, 2-4-celled; styles 2-4, free, or more or less united. *Fruit* fleshy or dry, with a woody or bony 1-4-seeded 1-4-celled stone. *Seed* plano-convex, albumen 0, or very scanty.—**DISTRIB.** Species about 50, found in tropical Asia and America, and the temperate regions of both hemispheres.

* *Flowers* in sessile cymes or fascicled in the axils of the leaves.

1. **Z. Jujuba**, Lamk. Dict. iii. 318; usually armed, leaves 1-2 $\frac{1}{2}$ by $\frac{3}{4}$ -2 in. elliptic-ovate ovate or suborbicular dark green and glabrous above, covered beneath with a dense woolly pale-coloured tomentum, fruit $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. *DC. Prodr.* ii. 21; *Roxb. Fl. Ind.* i. 608; *Wall. Cat.* 4244; *W. & A. Prodr.* 162; *Wight Ic.* t. 99; *Hook. Journ. Bot.* i. 320, t. cxl. (1834); *Dalz. & Gibs. Bomb. Fl.* 49; *Thwaites Enum.* 74; *Bedd. Fl. Sylvat.* t. cxlix.; *Boiss. Fl. Orient.* ii. 13; *Brandis For. Flor.* 86, t. 17. *Z. mauritiana*, *Herb. Ham. in Wall. Cat.* 4245; *DC. Prodr.* ii. 21. *Z. Sororia*, *Schult. Syst.* v. 337; *DC. Prodr.* ii. 21. *Z. trinervius*, *Roth Nov. Sp.* 168, excl. var. β . *Rhamnus Jujuba*, *Linn. Fl. Zeyl.* 36; *Rheede Hort. Mal.* iv. t. 40.

Throughout INDIA, from the N.W. frontier, SINDH, and base of the HIMALAYA to CEYLON, and MALACCA; wild and extensively cultivated.—**DISTRIB.** Afghanistan, tropical Africa, the Malay Archipelago, China, Australia.

A small tree 30-50 ft.; young branches and flowers covered with a dense fuscous tomentum. *Prickles* solitary and straight, or geminate and then one shorter and recurved. *Cymes* $\frac{3}{4}$ in. long. *Calyx* glabrous within. *Petals* subspathulate, very concave, reflexed. *Disk* of 10 grooved lobes. *Ovary* 2-celled; styles 2, united to the

middle. *Fruit* globose, 2-celled, fleshy and mealy, glabrous.—There are many cultivated varieties, differing greatly in the shape and size of the leaves, as also in the size and nature of the fruit, of which the most remarkable is Edgeworth's var. *Hysudricus* (Journ. Linn. Soc. vi. 201), with erect or spreading not drooping branches, obtuse ovate oblong or orbicular leaves, glabrous or slightly tomentose beneath, and long petioles. This, according to Aitchison, is always raised by grafts. Two other varieties are described by Edgeworth—viz., *hortensis* and *spontaneus*.

2. **Z. glabrata**, Heyne in *Roth Nov. Sp.* 159; unarmed, leaves 1–3 by $\frac{3}{4}$ – $1\frac{1}{2}$ in. elliptic glabrous on both sides, fruit under $\frac{1}{2}$ in. in diameter. *W. & A. Prodr.* 162; *Wight Ic. t.* 282; *Bedd. Fl. Sylv. Anal. Gen.* lxviii. *Z. trinervius*, var. β , *Roth. Nov. Sp.* 159. *Z. trinervia*, *Roxb. Fl. Ind.* i. 606, not *Poir.*; *Wall. Cat.* 4231.

EASTERN BENGAL and BHOTAN, *Griffith*; WESTERN PENINSULA, Nilghiri Mts., *Wight*, &c.

A tree. *Leaves* obtusely serrate, coriaceous, glossy, dark-green, with 3 unbranched prominent nerves. *Flowers* slightly puberulous, yellowish; cymes $\frac{1}{2}$ in. long. *Petals* obtriangular with convolute margins. *Disk* faintly 10-lobed, not pitted or grooved, glabrous. *Ovary* 2-celled; styles 2, united to the middle. *Fruit* globose, yellow? with a sweet gelatinous pulp, 1–2-celled.—In some few cases the cymes are shortly pedunculate.

3. **Z. nummularia**, *W. & A. Prodr.* 162; profusely armed, leaves $\frac{1}{2}$ –1 in. ovate to orbicular covered with a short velvety tomentum on both sides, fruit $\frac{3}{8}$ in. diam. *Dalz. & Gibs. Bomb. Fl.* 49; *Bedd. Fl. Sylv. Anal. Gen.* lxxix.; *Boiss. Fl. Orient.* ii. 13; *Brandis For. Fl.* 88. *Z. Lotus*, *Lamk.*; *Aitch. Cat.* 33. *Z. microphylla*, *Roxb. Fl. Ind.* i. 613; *Wall. Cat.* 4232. *Z. rotundifolia*, *Lamk. Dict.* iii. 319; *DC. Prodr.* ii. 21. *Rhamnus nummularia*, *Burm. Fl. Ind.* 61.

The PANJAB, ascending to 3000 ft.; GOOZERAT, and the WESTERN PENINSULA, from the Deccan and Concan southwards.—DISTRIB. Persia.

A shrub, with widely-divaricating flexuous branches; young branches puberulous. *Leaves* serrate, dark-green and velvety above, pale and more felted beneath. *Cymes* under $\frac{1}{2}$ in. *Petals* obovate with convolute margins. *Disk* 10-lobed with a pit opposite each lobe. *Ovary* 2-celled; styles 2, united to above the middle. *Fruit* globose, woody, black, 2-celled.—Much used for fencing, and the sweet subacid fruit as food, especially in famine time. I follow Wight and Arnott in adopting Burmann's specific name; though perhaps Lamarck's should be adopted.

4. **Z. wynadensis**, *Bedd. Ic. Pl. Ind. Or.* 23. t. cxiv.; unarmed, leaves $1\frac{1}{2}$ –2 by $\frac{3}{4}$ in. elliptic-lanceolate glabrous and shining above slightly hairy on the nerves beneath.

WESTERN PENINSULA; dense forests of the Wynaad, alt. 3000 ft., *Beddome*.

A lofty tree, the young shoots and flowers covered with a fulvous tomentum. *Leaves* finely reticulated beneath, penninerved, with hairy glands in the axils of the main nerves. *Flowers* fasciated, forming dense axillary clusters. *Petals* 3-lobed with convolute margins. *Disk* hairy, 5-angled, not pitted. *Ovary* 2-celled; styles 2, divided to nearly the base. *Fruit*?

5. **Z. vulgaris**, *Lamk. Dict.* iii. 316; armed, leaves $\frac{3}{4}$ – $2\frac{1}{2}$ in. sub-obliquely ovate obtuse or subacute crenate-serrate glabrous on both sides, fruit $\frac{1}{2}$ in. in diam. *Roxb. Fl. Ind.* i. 609; *Sibth. Fl. Græc.* i. 159, t. 241; *Boiss. Fl. Orient.* ii. 12. *Z. flexuosa*, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 365; *Cat.* 4229. *Z. nitida*, *Roxb. Fl. Ind.* i. 609. *Z. sativa*, *Gærtn. Fruct.* i. 202. ? *Z. sinensis*, *Lamk. Dict.* iii. 317.

PANJAB, extending to the Western frontier; the PANJAB HIMALAYA, *Falconer*, &c.; ascending to 6500 ft.; wild and cultivated, extending to Bengal.—DISTRIB. Beluchistan, W. Asia, China, Japan, S. Europe.

A shrub or small tree, with rigid spreading boughs and stiff branches, which are often unarmed, the whole plant quite glabrous. *Prickles* usually geminate, the straight one often over 1 in. long, stout. *Flowers* few, fascicled in the axils of the leaves. *Petals* cucullate. *Disk* thin, obscurely 5-lobed. *Ovary* 2-celled; styles 2, united to the middle. *Fruit* globose or oblong, succulent, red or black, shining.—*Z. nitida*, Roxb., of China, is said to have a yellow fruit.

6. ***Z. oxyphylla***, Edgew. in *Trans. Linn. Soc.* xx. 43; armed, leaves 1–2 in. obliquely ovate acute or subacuminate glabrous on both sides, fruit elliptic $\frac{3}{8}$ in. long. *Brandis For. Fl.* 85. *Z. acuminata*, Royle *Ill.* i. 168 (name only).

HAZARAH, Falconer; TEMPERATE HIMALAYA, in Sirmor and Garwhal, ascending to 6000 ft., Falconer, Edgeworth, &c.

A shrub or small tree, 25–30 ft., resembling *Z. vulgaris* in habit; whole plant quite glabrous. *Prickles* usually geminate, the straight one $\frac{1}{2}$ in. long, slender. *Leaves* finely crenate-serrate. *Flowers* fascicled in the axils of the leaves. *Petals* and *disk* as in *Z. vulgaris*. *Fruit* 1-celled, 1-seeded, subfleshy, black, very acid; stone thin and crustaceous, flattened.

7. ***Z. Cnoplia***, Mill. *Gard. Dict.* No. 3; armed, leaves 1–2 $\frac{1}{2}$ by $\frac{3}{4}$ –1 in. very obliquely ovate-lanceolate acute with a short soft pubescence above, and long silky appressed fulvous hairs beneath, fruit $\frac{1}{4}$ in. diam. *DC. Prodr.* ii. 21; *Roxb. Fl. Ind.* i. 611; *Wall. Cat.* 4246; *Don Prodr.* 190; *W. & A. Prodr.* 163; *Dalz. & Gibs. Bomb. Fl.* 49; *Thwaites Enum.* 74; *Bedd. Fl. Sylv. Anal. Gen.* lxi.; *Brandis For. Fl.* 86. *Z. albens*, Roxb. *Fl. Ind.* i. 607. *Z. celtidifolia*, *DC. Prodr.* ii. 20. *Z. ferruginea*, Heyne in *Wall. Cat.* 4246 B, in part. *Z. Napoca*, Roxb. *Fl. Ind.* i. 612, not Willd.; *Roth Nov. Sp.* 159. *Z. pallens*, *Wall. Cat.* 4247 ? *Z. pedicellata*, *Wall. Cat.* 4243. *Z. rufula*, *Miq. Fl. Ind. Bat.* i. 643. *Z. scandens*, Roxb. *Hort. Beng.* 17; *Wall. Cat.* 7269. *Rhamnus Cnoplia*, *Linn. Sp. Pl.* 282.

Throughout the hotter parts of India, from the PANJAB and the N.W. HIMALAYA to Assam and southwards to CEYLON and MALACCA.—DISTRIB. Tropical Asia and Australia.

A shrub with straggling often climbing branches, the young ones strigose or oftener covered with a rust-coloured pubescence. *Leaves* crenate-serrate. *Prickles* solitary, very short, recurved. *Cymes* under $\frac{1}{2}$ in. long. *Flowers* glabrous within. *Petals* obtriangular, cucullate. *Ovary* 2-celled; styles 2, united to above the middle. *Fruit* 1–rarely 2-celled, black and shining, globose or obovoid; stone woody or bony.

** *Flowers in pedunculate axillary cymes (see 2. glabrata).*

8. ***Z. xylopyrus***, Willd. *Sp. Pl.* 1104; armed or on the younger branches often unarmed, branches inflorescence and fruit covered with a short greyish tomentum, leaves 1 $\frac{1}{2}$ –3 $\frac{1}{2}$ in. broadly-elliptic orbicular or obovate glabrous and dark above covered with a soft pale pubescence beneath, fruit 1 $\frac{1}{2}$ –1 in. diam. *Roxb. Fl. Ind.* i. 611; *Wall. Cat.* 4239; *DC. Prodr.* ii. 21; *W. & A. Prodr.* 162; *Dalz. & Gibs. Bomb. Fl.* 49; *Thwaites Enum.* 74; *Bedd. Fl. Sylv. Anal. Gen.* lxxiii.; *Brandis For. Fl.* 90. *Z. Caracutta*, Roxb. *Fl. Ind.* i. 612; *Wall. Cat.* 4238. *Z. cuneata*, *Wall. Cat.* 7263. *Z. elliptica*, Roxb. *Fl. Ind.* i. 610. *Z. orbicularis*, *Schult. Syst.* v. 338; *DC. Prodr.* ii. 21. *Z. ruminata*, *Ham. in Wall. Cat.* 4236. *Z. rotundifolia*, *Roth Nov. Sp.* 160. *Rhamnus xylopyrus*, *Retz Obs.* ii. 11.

NORTH-WEST INDIA, Royle, Edgeworth. NIPAL, Wallich; BANDA, RAJFOOTANA, OUDE, ascending to 2000 ft.; BEHAR, WESTERN PENINSULA, from the Concan southwards. CEYLON, in hot dry places.

A large straggling shrub or small tree, often gregarious, deciduous. *Leaves* slightly oblique, rounded or subcordate at the base, serrulate. *Prickles* usually geminate, one

straight the other recurved, glabrous. *Cymes* compact, 1-1½ in. *Flowers* sometimes 4-merous. *Calyx* glabrous within. *Petals* subspathulate, very concave, reflexed. *Disk* thin, 5-angled. *Ovary* 3- rarely 2- or 4-celled; styles usually 3, divided to near the base. *Fruit* globose, 3- rarely 2- or 4-celled, very hard and woody and covered with a dense almost felted grey or whitish tomentum.

VAR.; branches leaves and fruit nearly glabrous, fruit oblong or round.—Perhaps the *Z. Caracutta* of Roxburgh.

9. **Z. Napeca**, Willd. *Sp. Pl.* 1104; profusely armed, branches inflorescence and petioles covered with spreading rusty hispid hairs, leaves 1½-2½ by ¾-1½ in. elliptic obtuse or very shortly cuspidate finely serrulate dark and glabrous on both surfaces, styles 2. *Rhamnus Napeca*, Linn. *Sp.* 194; *Fl. Zeylan.* 87.

CEYLON, *Herb. Linnæus*.

A straggling shrub. *Leaves* slightly oblique, rounded at the base, glabrous or when young slightly hispid on the nerves beneath. *Prickles* solitary or geminate, stout, hairy, dark, both recurved. *Styles* equalling the ovary, arms recurved. *Fruit*?—This, by inspection of the specimens preserved in Hermann's Herbarium, I have determined to be the true *Z. Napeca* of Linnæus. No modern collector has sent it from Ceylon, whence it may be suspected that the habitat is erroneous.

10. **Z. lucida**, Moon *Cat.* 17; armed, leaves 2-2½ by ¾-1½ in. ovate-lanceolate glabrous above hairy on the veins beneath, styles 3-1½ in. divided to the middle, fruit ½ in. diam. *Thwaites Enum.* 74.

CEYLON, *Walker, Thwaites*.

A prickly shrub. *Branches* far climbing, round, glabrous or hairy when young, black. *Leaves* oblique, crenate-serrate with a minute bristle in each crenature, minutely apiculate. *Prickles* solitary, very short, recurved. *Flowers* in pedunculated cymes about 1 in. very hairy. *Petals* 1½ in., deeply cuculate on a slender claw. *Disk* faintly 5-angled, not pitted. *Fruit* globose, black, smooth.—Very closely allied to *Z. Napeca*.

11. **Z. Linnæi**, Laws.; armed, leaves 1½-2 by ¾-1½ in. ovate glabrous and shining, styles 4 exceedingly minute. *Z. Napeca*, Linn. *Herb. not Herb. Hermann*.

CEYLON, *Walker*.

A prickly shrub. *Branches* round, glabrous, pale. *Leaves* nearly symmetrical, crenate without the bristles and not apiculate, pale green. *Prickles* solitary, very short, recurved. *Cymes* shortly-peduncled, about 1 in., nearly glabrous. *Flowers* larger than in *Z. lucida*. *Petals* deeply cuculate, but on rather less slender claws. *Disk* faintly 5-angled, not pitted. *Fruit*?—This is the *Z. Napeca* in the Linn. *Herb.*, but not of Hermann's herbarium.

12. **Z. incurva**, Roxb. *Fl. Ind.* i. 614; armed, leaves 2-3½ by 1-1½ in. ovate or ovate-oblong acute or subacuminate glabrous, petals 5, ovary 2-celled, styles 2, fruit ¾ in. long. *DC. Prodr.* ii. 20; *Don Prodr.* 189; *Wall. Cat.* 4237.

NIPAL, *Wallich*; BHOTAN, *Griffith*; WESTERN PENINSULA, Nilghiri Mts., *Herb. Hohenacker*.

A tree? *Leaves* crenate-serrate, membranous, turning black in drying. *Cymes* ¾ in. *Calyx* hairy outside, glabrous within. *Petals* subcucullate. *Disk* 10-lobed, with a pit opposite each lobe. *Styles* divided to the middle. *Fruit* ellipsoid, woody, 2-celled, 2-seeded.

13. **Z. apetala**, Hook. f.; armed, leaves 2½-4 by 1-1½ in. obliquely-ovate acute or acuminate glabrous, petals 0.

SIKKIM HIMALAYA, *J. D. H.*

A shrub; young branches and flowers covered with ferruginous pubescence. *Leaves* crenate-serrate, membranous. *Prickles* recurved, very short and sharp, base broad.

Cymes 1½ in. *Calyx* hairy inside. *Disk* 5-lobed, corrugated, hairy. *Ovary* 2-celled; styles 2, united to a little above the middle.

14. **Z. horrida**, *Roth Nov. Sp.* 159; profusely armed, leaves $\frac{3}{4}$ –1½ by $\frac{1}{2}$ –1 in. suborbicular glabrous, petals 5, ovary 3-celled, styles 3 minute, fruit $\frac{5}{8}$ in. diam. *DC. Prodr.* ii. 20; *W. & A. Prodr.* 163?

WESTERN PENINSULA, *Wight*; the Concan, *Stocks*.

A shrub with slender divaricating branches. *Leaves* coarsely serrate, especially at the apex. *Prickles* geminate, very short, straight and recurved, the straight one $\frac{1}{4}$ in. long or more. *Flowers* in dense cymes 1 in. long. *Calyx* hairy outside, glabrous inside. *Petals* spatulate, concave. *Disk* 5-angled, not pitted. *Styles* divided to nearly the base. *Fruit* globose, woody, 3-celled, 3-seeded.—Although this description does not entirely agree with that of Roth, I do not know to what other species his description can apply. *Z. Bhunder*, *Royle Ill.* i. 168 (name only), is scarcely determinable, but is apparently closely allied to this species.

*** *Flowers in pedunculated cymes, which are disposed in leafless (rarely leafy) simple or compound spikes.*

15. **Z. calophylla**, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 366; armed, leaves 4–5 by 2–2½ in. elliptic-oblong shortly and obtusely acuminate entire with 3 very prominent unbranched nerves glabrous, petals 5, fruit $\frac{3}{4}$ in. diam. *Wall. Cat.* 4230. *Berchemia calophylla*, *G. Don Gen. Syst.* ii. 28.

PENANG, *Wallich*; MALACCA, *Griffith, Maingay*.—DISTRIB. BORNEO.

A shrub, with climbing branches and black bark; wholly glabrous with the exception of the flowers and fruit. *Leaves* coriaceous. *Prickles* solitary, recurved, short, stout, base broad. *Cymes* usually disposed in terminal thyrsoid panicles. *Calyx* hairy outside, glabrous within. *Petals* ovate, concave. *Disk* 5-angled, not pitted, glabrous. *Ovary* 2-celled, puberulous; styles 2. *Fruit* globose, woody, covered with a light-brown pubescence, at length glabrous.—*Kurz (in Journ. As. Soc. Beng.* 1870, ii. 73) identifies with this species *Z. ornata*, *Miq. Fl. Ind. Bat.* i. 642.

16. **Z. funiculosa**, *Ham. in Wall. Cat.* 4234; armed, leaves 2½–5 by $\frac{3}{4}$ –2 in. ovate or ovate-oblong obtusely acuminate with 3 very prominent unbranched nerves, petals 5, fruit obovoid $\frac{3}{8}$ in. long. ? *Z. venulosa*, *Wall. Cat.* 4235.

EASTERN BENGAL, the KHASIA Mts., and SILHET, *Wallich, &c.* ? BIRMA, *Griffith*; TENASSERIM, *Helper*; MALACCA, *Maingay*.—DISTRIB. ? BORNEO.

A shrub?; young branches and flowers puberulous; branches long slender climbing. *Leaves* crenate. *Prickles* short, stout, recurved, quite glabrous. *Cymes* disposed in leafless rarely leafy panicles. *Petals* cucullate. *Disk* faintly 10-lobed, not pitted, glabrous. *Ovary* 2-celled; styles 2, divided to nearly the base. *Fruit* 1-celled, 1-seeded, fleshy, glabrous.—*Z. venulosa*, *Wall. Cat.* 4235, may be a more slender form of the above.

17. **Z. rugosa**, *Lamk. Dict.* iii. 319; armed, leaves 2½–6 in. elliptic glabrous above young tomentosely pubescent beneath, the older nearly glabrous, petals 0, fruit $\frac{1}{4}$ – $\frac{1}{3}$ in. obovoid or globose. *DC. Prodr.* ii. 20; *W. & A. Prodr.* 162; *Wight Ic.* 339; *Dalz. & Gibs. Bomb. Fl.* 49; *Thwaites Enum.* 73; *Brandis For. Fl.* 89. ? *Z. Burraea*, *Ham. in Wall. Cat.* 4240 g. *Z. glabra*, *Roxb. Fl. Ind.* i. 614; *Wall. Cat.* 4242. *Z. latifolia*, *Roxb. Fl. Ind.* i. 607; *Wall. Cat.* 4240; *DC. Prodr.* ii. 20. *Z. obliqua*, *Heyne in Roth Nov. Sp.* 161; *DC. Prodr.* ii. 20. *Z. paniculata*, *Roth Nov. Sp.* 160; *Wall. Cat.* 4241. *DC. Prodr.* ii. 20. ? *Z. tomentosa*, *Roxb. Fl. Ind.* i. 611. ? *Rhamnus glabratus*, *Herb. Heyne in Wall. Cat.* 7479.

TROPICAL HIMALAYA, in Kumaon and Sikkim. BEHAR, *J. D. H. Assam*, and SILHET, *Wallich, &c.* BIRMA, *Griffith*. WESTERN PENINSULA, from the Concan southwards; CEYLON, common up to 2000 ft.

A straggling evergreen large shrub, or small tree, often climbing. *Prickles* usually

solitary, recurved, short, base broad. *Flowers* densely pubescent, in long pedunculated cymes, forming on the usually leafless branches long terminal panicles. *Calyx* puberulous inside. *Disk* 5-lobed, hairy. *Ovary* 2-celled; styles 2, united below the middle. *Fruit* fleshy, with a 1-celled, 1-seeded, very thin crustaceous stone.—Dalzel and Gibson speak of the fruit as being very palatable, and affording great support to the inhabitants of the Ghauts from March to the middle of May. Brandis calls it mawkish and peculiar. Kurz in *Journ. As. Soc. Beng.* 1870, ii. 73, identifies *Z. Horsfieldii*, Miq. *Fl. Ind. Bat.* i. 643, with *Z. glabra*, Roxb., but that species is closely allied to *Z. Naepa*, L., if not a variety of it.

18. **Z. ? elegans**, Wall. in Roxb. *Fl. Ind. ed. Carey*, ii. 366; *Cat.* 4233; an erect nearly unarmed shrub, branches filiform pubescent, leaves $1\frac{1}{2}$ by $\frac{3}{4}$ in. obliquely-ovate-lanceolate obtusely acuminate finely crenate quite glabrous with 3 prominent unbranched nerves.

SINGAPORE, Wallich.

The flowers and fruit are not known.

UNDETERMINABLE AND EXCLUDED SPECIES.

Z. BAENCHIA, Wall. *Cat.* 4249, from Monghir, and *Z. GLOBULARIS*, 4248, from Birma are undeterminable.

Z. BRUNDER, Royle *Ill.* i. 168, name only is undetermined.

Z. LOTUS, Lamk.; Roxb. *Fl. Ind.* i. 610, is a bush allied to *Z. nummularia*, a native of S. Europe, N. Africa, and Arabia.

Z. NITIDA, Roxb. *Fl. Ind.* i. 609, is a native of China.

Z. SPINA-CHRISTI, L., is a tree cultivated in gardens in N.W. India, allied to *Z. Jujuba*, it is a native of W. Asia and Egypt.

4. **BERCHEMIA**, Neck.

Shrubs with armed often scandent branches. *Leaves* alternate, penninerved; nerves straight, parallel. *Flowers* hermaphrodite or polygamous, fascicled, fascicles disposed in axillary spikes or panicles, or in the axils of the leaves, or clustered at the ends of the branches. *Calyx* 5- rarely 6-fid; tube hemispherical or turbinate. *Petals* 5, rarely 6, obovate or cucullate. *Disk* lining the calyx-tube, margins free. *Ovary* sunk in the disk, but free from it, 2-celled, narrowed into the bifid style. *Fruit* a hard or fleshy drupe, girt at the base with the calyx-tube; stone crustaceous or woody, 2-celled, 2-seeded. *Seed* linear-oblong, albumen fleshy.—DISTRIB. Species about 10, scattered through the tropics of Asia, Africa, and America.

1. **B. floribunda**, Wall. *Cat.* 4256; leaves 2-4 in. ovate acute, petiole $\frac{3}{4}$ -1 in., panicles very large terminal. Brandis *For. Fl.* 91. *B. laxa*, Wall. *Cat.* 4257. *Zizyphus floribunda*, Wall. in Roxb. *Fl. Ind. ed. Carey*, ii. 368.

TROPICAL HIMALAYA, from the Jhelum to Sikkim; EASTERN BENGAL and KHASIA Mts., Griffith, &c.

A large erect or climbing shrub or small tree. *Branches* glabrous, glaucous when young. *Stipules* 2-fid. *Flowers* sessile or very shortly pedicellate, about 6 in a fascicle. *Calyx* 5-fid; calyx-lobes lanceolate, acute. *Petals* 5, spatulate. *Fruit* $\frac{3}{4}$ in. long, purple, cylindric.—Very closely allied to if not identical with *B. racemosa*, Sieb., of China and Japan (Brandis).

2. **B. flavescens**, Wall. *Cat.* 4255; leaves 2-3 in. ovate-oblong acute cuspidate, petiole $\frac{3}{4}$ to 1 in., flowers in short terminal racemes or panicles usually under 3 in. *Zizyphus flavescens*, Wall. in Roxb. *Fl. Ind. ed. Carey*, ii. 367.

TEMPERATE HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 7-10,000 ft., *J. D. H.*

A climbing shrub; young branches with black spreading deciduous hairs. *Pedicels* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, often arcuate. *Calyx* 5-fid; lobes triangular, acute. *Petals* 5, oblong. *Stamens* 5. *Fruit* $\frac{1}{2}$ in. long.

3. **B. polyphylla**, *Wall. Cat.* 4259; leaves 1-1 $\frac{1}{2}$ in. ovate obtuse, petiole $\frac{1}{4}$ in., flowers in axillary racemes.

BIIRMA; at Taong Dong, *Wallich*.

An erect? shrub; young branches, rachis, and petioles puberulous. *Pedicels* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, straight. *Calyx* 5-fid, lobes triangular, acute. *Petals* 5, almost orbicular. *Stamens* 5. *Fruit* $\frac{1}{2}$ in. long.—Closely allied to *B. flavescens*.

4. **B. lineata**, *DC. Prodr.* ii. 23; leaves $\frac{1}{2}$ -1 in. ovate or suborbicular subsessile, stipules very small setaceous, flowers 2-3 together fascicled in the axils of the leaves or clustered at the ends of the branches. *Hook. & Arn. Bot. Beech.* 177, t. xxxvii.; *Brandis For. Flor.* 91. ? *B. Poirietiana*, *DC. Prodr.* ii. 23. *Rhamnus lineatus*, *Linn. Amœn.* iv. 308.

NORTH WEST HIMALAYA, from the Indus eastwards; Khazan Valley, alt. 4-7000 ft., *Stewart*; Sikkim, alt. 10,000 ft., *J. D. H.*—DISTRIB. China.

A diffuse shrub, with subvoluble branches, puberulous when young. *Flowers* on slender pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in. *Calyx* 5-cleft; lobes linear-subulate, many times longer than the tube. *Petals* linear-lanceolate. *Fruit* ovoid, $\frac{1}{2}$ in. long, succulent, blue.

5. **B. Edgeworthii**, *Laws.*; leaves $\frac{3}{4}$ -1 in. subelliptic, petiole $\frac{1}{8}$ - $\frac{1}{4}$ in., stipules $\frac{1}{4}$ in. long ovate-lanceolate scarious, flowers about 2 together in the axils of the leaves.

WESTERN HIMALAYA, alt. 7-8000 ft., *Edgeworth*.

An erect? shrub, with glabrous branches. *Flowers* on short pedicels, the buds almost hidden by the stipules. *Calyx* 6-fid. *Petals* 6, very broadly-ovate. *Stamens* 6. *Fruit* $\frac{3}{4}$ in. long, surrounded at the base by the persistent entire calyx.—Known at once by its conspicuous stipules and 6-merous flowers.

5. RHAMNUS, L.

Shrubs or trees. *Leaves* alternate, penninerved. *Flowers* fascicled in the axils of the leaves or disposed in simple or compound racemes, hermaphrodite or polygamous. *Calyx* 4-5-fid; tube urceolate; lobes keeled within. *Petals* 4-5 or 0, cucullate or flat. *Stamens* 4-5. *Disk* thin, lining the calyx-tube. *Ovary* free, 3-4-celled, narrowed into a 3-4-cleft style. *Fruit* a berry-like drupe, girt at the base by the small calyx-tube, 2-4-celled, 2-4-seeded, obscurely dehiscent or indehiscent. *Seed* obovoid, albumen fleshy.—DISTRIB. Species about 60, scattered over the hotter and temperate regions of both hemispheres.

* *Flowers* 4-merous.

1. **R. Arnottianus**, *Gardn. in Thwaites Enum.* 74; unarmed, petals 0.

CEYLON; in the most elevated parts of the Central province.

A small glabrous tree; young branches puberulous. *Leaves* 1 $\frac{1}{2}$ -3 by $\frac{3}{4}$ -1 $\frac{1}{4}$ in., ovate-lanceolate, acute or subacuminate, closely serrate. *Flowers* 2-4, fascicled in the axils of the leaves. *Fruit* on pedicels $\frac{3}{4}$ -1 in. long, the size of a pea, 3-4-lobed, reddish-black.—The whole plant turns blackish in drying.

2. **R. persicus**, *Boiss. Fl. Orient.* ii. 17; armed, leaves tomentose beneath, petals 4. *Brandis For. Flor.* 93.

SULIMAN and SALT ranges; TEMPERATE HIMALAYA, from the Jhelum eastwards to Garwhal, alt. 2-5000 ft.; WESTERN TIBET, alt. 9-14,000 ft.—DISTRIB. Beluchistan, Persia.

A shrub, 6-8 ft., or small tree, 20 ft., with coarse spinous or unarmed branches. *Leaves* fascicled at the ends of the congested branchlets, $\frac{1}{2}$ -2 in., oblong or elliptic-lanceolate or obovate, acute or rounded at the apex, minutely tomentose beneath, entire or faintly serrate. *Flowers* few, shortly pedicellate, fascicled in the axils of the leaves. *Petals* spathulate. *Ovary* 3-4-celled. *Fruit* $\frac{1}{2}$ in. long, obovoid-globose, 2-4-celled, 1 or 2 of the cells often abortive.—Boissier mentions only the small obovate-leaved plants, but in many specimens the large and small leaves occur together.

3. **R. dahuricus**, *Pall. Fl. Ross.* ii. t. 61; armed, leaves glabrous, petals 4. *DC. Prodr.* ii. 25. *R. globosus*, *Bunge Enum. Chin.* 14. *R. parvifolius*, *Turcz. in Bull. Mosc.* 1857, ii. 150. *R. polymorphus*, *Turcz. Fl. Baik. Dahur.* i. 269. *R. virgatus*, *Roxb. Fl. Ind.* i. 604; *Don Prodr.* 190; *Brand. For. Flor.* 92; *var. sylvestris*, *Maxim. in Mem. Acad. Imp. Sc. Petersb.* x. 11, 13.

THE PANJAB, at Peshawur, *Stewart*; TEMPERATE HIMALAYA, from Jamu and Simla, to Bhotan, alt. 4-9500 ft.; WESTERN PENINSULA, in the Ghats.—*DISTRIB.* China, Japan.

A tree, 15-20 ft., or shrub, usually much branched, very variable in habit and shape of the leaves. *Branches* divaricating, the spines terminating the branches and so often appearing in the forks. *Leaves* fascicled at the ends of the exceedingly congested branchlets, $\frac{3}{4}$ -2 in., obovate, acuminate, to narrow elliptical-lanceolate, slightly pubescent beneath when young. *Flowers* numerous, fascicled in the axils of the leaves. *Petals* spathulate. *Fruit* obovate-obicular, $\frac{1}{2}$ in. long.—Closely allied to the European *R. catharticus*. It seems hardly possible to define even as varieties the numerous forms that have been proposed as species. *R. virgatus*, *var. aprica*, *Max. in Mem. Acad. Sc. Petersb.*, is a dwarf form with scrubby squamose branches and very small leaves.

VAR. hirsutus: a large shrub or small tree, leaves 2 in. *R. hirsutus*, *W. & A. Prodr.* 165; *Bedd. Fl. Sylv. Anal. Gen.* lxx. t. x. f. vi.—Western Peninsula.

**** Unarmed. Flowers 5-merous.**

4. **R. Wightii**, *W. & A. Prodr.* 164; leaves 3-5 by 1-2 in. glabrous, flowers fascicled, petals 5. *Wight Ic.* t. 159; *Bedd. Fl. Sylv. Anal. Gen.* lxx.: *Dalz. & Gibs. Bomb. Fl.* 50. *Ceanothus Wightiana*, *Wall. Cat.* 4264.

WESTERN PENINSULA; from the highest hills of the Concan southwards to the Nilghiris. CEYLON; in the elevated parts of the Central province.

A large glabrous shrub, the younger parts drying black. *Leaves* elliptic or narrowly-elliptic, shortly acuminate, closely serrate, subcoriaceous. *Pedicels* much shorter than the petiole. *Petals* cuneate-obovate, with a short apiculus, flat. *Styles* 3-4, diverging.

5. **R. purpureus**, *Edgew. in Trans. Linn. Soc.* xx. 44; leaves 3-5 by 1-2 in. glabrous, flowers fascicled, petals 0. *Brandis For. Flor.* 91.

WESTERN HIMALAYA; from Marri to Kumaon, alt. 4500-10,000 ft.

A middle-sized unarmed tree. *Branches* purplish, with white spots; the young leaves pubescent beneath, otherwise glabrous. *Leaves* ovate, shortly acuminate, closely and finely serrate, membranous. *Flowers* 2-3; *pedicels* $\frac{1}{2}$ in., nearly as long as the petiole. *Fruit* on *pedicels* $\frac{1}{2}$ in., the size of a pea, subglobose, bitter and purgative.

6. **R. triqueter**, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 376 (under *Ceanothus*); *Cat.* 4265; leaves 3-6 by 1-2 $\frac{1}{2}$ in. pubescent beneath, fascicles of flowers disposed in racemes.—*Brand. For. Fl.* 92.

PANJAB, in the Salt range; WESTERN HIMALAYA, from the Jhelum, alt. 3-4000 ft., *Stewart*; to Kumaon, alt. 6000 ft.

A shrub, the young branches pubescent. *Leaves* elliptic-ovate to oblong-lanceolate, acute or subacuminate, closely serrate, the old leaves pubescent on the nerves only. *Flowers* shortly pedicellate, fascicled on the leafless (very rarely leafy) branches, puberulous. *Petals* broadly obovate, emarginate. *Fruit* $\frac{1}{2}$ in., obovoid, 3-lobed.—Although Wallich says of this species that the fruit is acutely 3-cornered, I do not find it to be the case in any of his specimens.

7. **R. nipalensis**, Wall. in Roxb. *Fl. Ind.*, ed. Carey, ii. 375 (Ceanothus); *Cat.* 4263; leaves 3-6. by $1\frac{1}{2}$ -2 in. glabrous; fascicles of flowers disposed in simple or compound racemes, petals 5.

CENTRAL AND EASTERN HIMALAYA; Nipal, Wallich; Sikkim, alt. 3-6000 ft., J. D. H.; KHASIA Mts., alt. 3-4000 ft., and ASSAM; BURMA? Griffith.

A suberect or rambling shrub, with long slender glabrous branches, or pubescent only on the younger parts. Leaves oblong or elliptic-oblong, shortly acuminate, serrate, membranous or subcoriaceous, dark-green and shining above. Flowers shortly pedicellate, small, green, pubescent. Petals oblong, concave. Fruit $\frac{1}{4}$ in., broadly obovate, blackish-red.

8. **R. procumbens**, Edgew. in *Trans. Linn. Soc.* xx. 43; leaves $\frac{1}{2}$ -1 in., petals 0. *R. rupestris*, Royle *Ill.* 169 (name only).

WESTERN HIMALAYA, from Simla to Kumaon, alt. 7-8000 ft., Edgeworth, &c.

A small shrub with prostrate branches, the younger ones pubescent. Leaves lanceolate, acute or subacuminate, coriaceous, serrulate, very shortly petiolate. Flowers 1-2, in the axils of the leaves, pedicellate. Fruit fleshy.

6. HOVENIA, Thunb.

A small unarmed tree. Leaves alternate, subbifarious. Flowers in pedunculated, dichotomous, many-flowered, axillary and terminal cymes. Calyx 5-fid; tube broadly obconical. Petals 5, inserted below the disk, clawed, cucullate. Stamens 5, a little longer than the petals. Disk lining the calyx-tube, the margin free and hairy. Ovary conical, sunk in disk, 3-celled; style 3-cleft, branches straight, erect. Fruit with arching thickened pedicels, the size of a pea, indehiscent, obscurely 3-lobed, 3-celled, 3-seeded, the outer covering coriaceous and separating from the inner membranous endocarp.

1. **H. dulcis**, Thunb. *Fl. Jap.* 101; Lamk. *Ill.* t. 131; Sieb. *Fl. Jap.* t. 73 & 74; Bot. Mag. t. 2360; Roxb. *Fl. Ind.* i. 630; Wall. *Cat.* 4274; DC. *Prodr.* ii. 40; Brandis *For. Flor.* 94; Don *Prodr.* 189. *H. acerba*, Lindl. in Bot. Reg. t. 501; DC. *Prodr.* ii. 40. *H. inæqualis*, DC. *Prodr.* ii. 40.

SUBTROPICAL HIMALAYA; alt. 3-6500 ft., from Chamba and Hazara to Bhotan, but often cultivated.—DISTRIB. China and Japan.

A tree 30 ft.; trunk straight; head broad, rounded. Leaves 4-6 by 2-3 in., ovate-acuminate, deeply and sharply serrate or nearly entire, membranous, glabrous or more rarely pubescent, 3-nerved at the base, the midrib pinnately branched.—Extensively cultivated in China and Japan for its sweet fleshy peduncles, which taste like a Bergamot pear.

7. SCUTIA, Comm.

Glabrous shrubs. Leaves opposite or subopposite, penninerved, coriaceous. Flowers in axillary fascicles or subumbellate. Calyx 5-fid; tube hemispherical or turbinate. Petals 5, clawed, emarginate, flat or hooded. Disk filling the calyx-tube. Stamens 5, equalling the petals. Ovary sunk in the disk, 2-4-celled, narrowed into a short 2-3-cleft style. Fruit broadly obovoid or subglobose, dry or sub-fleshy, surrounded at the base by the persistent calyx-tube, 2-4-celled, 2-4-seeded.—DISTRIB. Species 8; natives of Asia, Africa, and tropical America.

S. indica, Brongn. in *Ann. Sc. Nat.* x. 363; W. & A. *Prodr.* 165; Wight *Ill.* i. t. 73; Dalz. & Gibs. *Bomb. Fl.* 50; Thwaites *Enum.* 75; Bedd. *Fl. Sylv. Anal. Gen.* lxx. *S. Commersoni*, Brongn. in *Ann. Sc. Nat. Ser.* 1, x. 363. *S. lucida*, G. Don *Gen. Syst.* ii. 33. *S. Rheediana*,

Wight Ic. t. 1071. Catha zeylanica, G. Don Gen. Syst. ii. 10. Ceanothus circumscissa, Gaertn. Fruct. ii. t. 106; Wall. Cat. 4266; DC. Prodr. ii. 30. C. zeylanica, Heyne in Roth Nov. Sp. 153; Wall. Cat. 4267; DC. Prodr. ii. 30. Celastrus zeylanica, Roth in Rœm. & Schult. Syst. v. 427; Nov. Sp. 398; DC. Prodr. ii. 9. Rhamnus circumscissus, Linn. f. Suppl. 152; Roxb. Fl. Ind. i. 603. R. lucidus, Roxb. Fl. Ind. i. 605. R. myrtinus, Burm. Fl. Ind. 60.—Rubiacea, Wall. Cat. 8300. Rhamnea ? lucida, Wall. Cat. 4250.

BIRMA, *Wallich*; WESTERN PENINSULA, from the Concan southwards; CEYLON, in the hot dry parts of the plains.—DISTRIB. Mauritius, *Roxb.*

Branches straggling, armed with subopposite recurved prickles, more rarely unarmed. Leaves $\frac{3}{4}$ –1½ in. long, orbicular or obovate entire, or crenate.

8. SAGERETIA, Brongn.

Unarmed or spinous shrubs, with slender subsacandent or rigid opposite or subopposite branches. *Leaves* subopposite, penninerved, nerves arched. *Flowers* very small, sessile on the terminal leafless paniculate branches. *Calyx* 5-fid, tube hemispherical; lobes acute, keeled within. *Petals* 5, clawed, hooded. *Stamens* 5, equalling the petals. *Disk* cup-shaped, lining the calyx-tube, margin free 5-lobed. *Ovary* sunk in the disk, but free from it, 3-celled; style short, 3-grooved, stigmas 3 capitate. *Fruit* globose, 3-celled, 3-seeded, coriaceous, indehiscent.—DISTRIB. Species about 11; natives of Central and Eastern Asia, Java, and the hotter parts of North America.

1. **S. hamosa**, *Brongn. in Ann. Sc. Nat. ser. 1, x. 360*; leaves 4–5 by 2 in. elliptic-oblong shortly acuminate serrate glabrous on both surfaces. *Berchemia ? hamosa, Wall. Cat. 4253. Zizyphus hamosa, Wall. in Roxb. Fl. Ind. ed. Carey, ii. 369.*

NIPAL, *Wallich*; WESTERN PENINSULA; Pulney Mts., *Wight*.—DISTRIB. Formosa.

A large shrub, with long straggling glabrous branches, unarmed or with very stout short deflexed spines. *Flowers* puberulous, in terminal and axillary panicles not longer than the leaves. *Fruit* ?

2. **S. oppositifolia**, *Brongn. in Ann. Nat. Sc. ser. 1, x. 360*; leaves 2–4 in. ovate-lanceolate acute or subacuminate glabrous and dark green above covered beneath when young with a dense woolly tomentum, *Brand. For. Fl. 95. Sageretia filiformis, G. Don Gen. Syst. ii. 29. Berchemia ? oppositifolia, Wall. Cat. 4254. B. ? parviflora, Wall. Cat. 4258. Rhamnus filiformis, Roth Nov. Sp. 153. R. parviflorus, Klein in Rœm. & Schult. Syst. v. 295; DC. Prodr. ii. 28. R. rigynus, Don Prodr. 190. Zizyphus oppositifolia, Wall. in Roxb. Fl. Ind. ed. Carey, ii. 370.*

N.W. INDIA and SUBTROPICAL HIMALAYA; from Peshawur and Rajaori eastward to Nipal, alt. 2–5000 ft.; WESTERN PENINSULA, from the Concan southwards.—DISTRIB. Java.

A shrub or small tree, with long slender subsarmentose spinous branches, tomentose when young: *Leaves* with 5–8 pairs of nerves; petiole $\frac{1}{4}$ in. *Flowers* in large terminal panicles. *Fruit* turbinate, $\frac{1}{4}$ in. long, black, succulent, sweetish.

3. **S. theezans**, *Brongn. in Ann. Sc. Nat. ser. 1, x. 360*; leaves 1½–2 in. ovate or elliptic minutely serrate dark green and glabrous above pubescent when young beneath, *Brandis For. Flor. 95. Sageretia, Wall. Cat. 9010. Rhamnus theezans, Linn. Mant. 207.*

The SALT and SULIMAN RANGES, alt. 2-8000 ft., *Fleming*; HAZARA, *Stewart*; WESTERN HIMALAYA, alt. 3-8000 ft., from Kashmir to Simla.—DISTRIB. Beluchistan, China.

A sarmentose spinous shrub with long slender branches. *Flowers* in long slender interrupted spikes. *Spines* and *flower branches* squarrose, or at the ends of the pendant branches. *Fruit* the size of a pea, globose, succulent, irregularly rugose, dark brown.—The fruit is sweet to the taste and extensively eaten, the leaves are used as a substitute for tea.

VAR. *diospyrifolia*; a scrubby shrub not sarmentose, leaves shorter and broader, flower-spikes shorter. *S. theezans*, *Brand. For. Fl.* 95. *Rhamnea?* *diospyrifolia*, *Wall. Cat.* 4251.—Ava, *Wallich*.

4. *S. Brandrethiana*, *Aitch. in Journ. Linn. Soc.* viii. 62; leaves $\frac{3}{4}$ -1 in. elliptic crenate or nearly entire glabrous above covered with a dense white woolly tomentum beneath 4-8-nerved very shortly petioled. *Boiss. Fl. Orient.* ii. 22; *Brand. For. Fl.* i. 95.

NORTH WESTERN INDIA; the Salt Range, Jhelum and Peshawur, *Fleming*, &c.—DISTRIB. Westward to Persia and Arabia.

A scrubby shrub, with numerous spinose pubescent branches. *Flowers* in terminal and axillary panicles. *Fruit* the size of a small pea, ovoid, 3-lobed, succulent, black, with raised longitudinal lines.—The fruit is sweet and much eaten by the Affghans. *Brandis*.

S. CORYMBOSA, *G. Don Gen. Syst.* ii. 29, is a West Indian species incorrectly stated by Don to be East Indian.

9. COLUBRINA, Rich.

Erect shrubs. *Leaves* alternate, *Flowers* in very short axillary cymes. *Calyx* 5-fid; tube hemispherical. *Petals* 5, clawed, springing from the margin of the disk, hooded. *Stamens* 5. *Disk* fleshy, filling the calyx-tube. *Ovary* sunk in the disk and confluent with it, 3-celled; style 3-cleft; stigmas reflexed. *Fruit* the size of a pea, subglobose, surrounded below the middle by the remains of the calyx-tube, 3-celled, cells 1-seeded, tardily dehiscent.—DISTRIB. Species 10, chiefly tropical American.

1. *C. asiatica*, *Brongn. in Ann. Sc. Nat. ser.* 1, x. 369; whole plant quite glabrous, leaves $1\frac{1}{2}$ -2 in. by $\frac{3}{4}$ -1 $\frac{1}{4}$ in. acuminate. *W. & A. Prodr.* 166; *Wight Ill.* i. t. 74; *Dalz. & Gibs. Bomb. Fl.* 50; *Thwaites Enum.* 75; *Bedd. Fl. Sylv. Anal. Gen.* lxi. *C. javanica*, *Miq. Fl. Ind. Bat.* pt. 1, 649. *Ceanothus asiaticus*, *Lamk. Ill.* t. 129, f. 2; *DC. Prodr.* ii. 30; *Roxb. Fl. Ind.* i. 615; *Wall. Cat.* 4262. *C. capsularis*, *Forst. Prodr.* 18; *DC. Prodr.* ii. 32. *Pomaderris capsularis*, *G. Don Gen. Syst.* ii. 39; *Burm. Zeylan.* t. 48. *Rhamnus acuminata*, *Colebr. in Roxb. Fl. Ind.* i. 615.

EASTERN and WESTERN PENINSULAS; from the Concan and Tenasserim southwards. CEYLON, north end of the Island.—DISTRIB. Java, Borneo, Australia, S.W. Africa.

Unarmed. *Leaves* 2 by 1 in., ovate, subacuminate, crenate-serrate, glabrous, membranous, 3-nerved at the base, the midrib pinnately branched. *Cymes* $\frac{1}{4}$ - $\frac{1}{2}$ in. long. *Flowers* yellowish-green.

2. *C. pubescens*, *Kurz in Journ. As. Soc. Beng.* 1872, ii. 301; branches and flowers hispidly-pubescent, leaves $1\frac{1}{2}$ -2 $\frac{1}{2}$ by $\frac{3}{4}$ -1 in.

PEGU, *Kurz*.

Leaves ovate-oblong, acute or acuminate, hispidly-pubescent on both sides. *Petals* nearly sessile, broadly oval, emarginate, very concave. *Fruit?*

3. *C. travancorica*, Bedd. Ic. Pl. Ind. Or. t. 188; young branches covered with a dark rust-coloured pubescence, leaves 3-5 by $1\frac{1}{4}$ - $1\frac{3}{4}$ in.

WESTERN PENINSULA; Quilon, *Wight*; S. Travancor, *Beddome*.

Leaves oblong shortly and suddenly acuminate, glabrous above, slightly pubescent on the nerves beneath. *Flowers* $\frac{3}{4}$ in. across. *Pedicels* puberulous. *Calyx-tube* with a few hispid hairs, otherwise glabrous. *Petals* clawed, spatulate, acute.

10. **APTERON**, Kurz

A scandent shrub. *Leaves* penninerved. *Flowers* small, fascicled, disposed in paniced racemes. *Calyx* 5-fid, tube shortly obconic; lobes spreading, acute. *Petals* 5, obovate, minute, inserted between the calyx-lobes. *Stamens* 5, a little longer than the petals, filaments filiform. *Disk* flat, free. *Ovary* subglobose, immersed in the disk, 2-celled; style very short, stigmas 2. *Drupe*? globose, adnate to the calyx-tube as in *Gouania*, and crowned by the calyx-limb, 1-celled by arrest, 1-seeded?

1. *A. lanceolatum*, Kurz in Journ. As. Soc. Beng. 1872, ii. 301.

TENASSERIM, *Kurz*.

A large scandent shortly-tomentose shrub. *Leaves* 4-5 in., lanceolate, with a long somewhat obtuse point, serrate, chartaceous with a fulvous pubescence on the nerves, at length glabrous, lateral nerves numerous (7-9) prominent and reaching to the margin. *Panicles* hoary or yellowish tomentose. *Flowers* small; pedicels $\frac{1}{2}$ in., slender or subfleshy, puberulous, fascicled or sub-solitary. *Calyx* $\frac{3}{8}$ - $\frac{1}{2}$ in. diam., puberulous. *Ovary* pubescent; style shortly bifid. *Fruit*?—*Kurz* speaks of the *immature fruit* as being globose, and the size of a peppercorn. I have seen no specimen.

11. **GOUANIA**, Linn.

Unarmed climbing shrubs. *Leaves* alternate. *Flowers* polygamous, in axillary or terminal spikes; rachis often cirrrose. *Calyx* superior, 5-fid; tube short, obconic. *Petals* 5, inserted below the margin of the disk, hooded. *Stamens* 5, enfolded by the petals. *Disk* filling the calyx-tube, 5-angled or stellate. *Ovary* sunk in the disk, 3-celled; style 3-cleft. *Fruit* inferior, coriaceous, crowned by the persistent limb of the calyx, 3-winged.—**DISTRIB.** Species 30, chiefly American, a few are African and Asiatic, and one belongs to the Pacific Islands.

1. *G. microcarpa*, DC. Prodr. ii. 40; flowers sessile densely pubescent, disk glabrous 5-lobed, style-arms glabrous minute. *W. & A. Prodr.* 167; *Wall. Cat.* 4271; *Thwaites Enum.* 75. *G. integrifolia*, *Kurz in Journ. As. Soc. Beng.* 1871, pt. ii. 49. *G. tiliaefolia*, *Heyne in Wall. Cat.* 4271.

WESTERN PENINSULA; from the Concan southwards. *PEGU, Kurz. MALACCA, Griffith, &c. CEYLON*, ascending to 2000 ft.—**DISTRIB.** *JAVA*.

Young branches and racemes pubescent. *Leaves* 2-3 by $\frac{3}{4}$ - $1\frac{1}{2}$ in., ovate or elliptic, acute or acuminate, orbicular or subcordate at the base, entire or very faintly crenate-serrate, glabrous. *Calyx* densely hairy outside, glabrous within. *Petals* obovate-oblong, very concave, margins involute. *Disk-lobes* faintly emarginate, or truncate. *Fruit* shortly winged, pubescent, at length glabrous.

2. *G. leptostachya*, DC. Prodr. ii. 40; flowers shortly pedicelled glabrous, disk glabrous 5-lobed, lobes oblong faintly emarginate, style-arms elongate. *Roxb. Cor. Pl. i. t. 95 (not Lamk.)*; *Wall. Cat.* 4270; *W. & A. Prodr.* 166; *Dalz. & Gibs. Bomb. Fl.* 50.

TROPICAL HIMALAYA, from Kumaon to Assam and the Khasia Mts., ascending to 4000 ft.; BANDA, BIRMA, TENASSERIM, and the MALAY PENINSULA.—DISTRIB. Java, Philippines.

Branches glabrous. *Leaves* 3-4 by $1\frac{3}{4}$ -2 in., ovate, acuminate, subcordate at the base, serrulate. *Racemes* slightly puberulous; bracteoles conspicuous, subulate. *Calyx* glabrous or with a very few scattered hairs on the outside. *Petals* hooded. *Styles* $\frac{1}{4}$ the length of the calyx-segments. *Fruit* glabrous.

3. **G. napalensis**, Wall. in Roxb. *Fl. Ind. ed. Carey*, ii. 417; *Cat.* 4272; flowers pubescent, disk glabrous the lobes linear acuminate, style-arms much elongated.

NIPAL, Wallich. SIKKIM, Griff.

Leaves longer and the *flowers* a little larger than in the last species, and the styles twice as long.

12. **HELINUS**, E. Meyer.

Unarmed scandent cirrhose shrubs, with slender angular branches. *Leaves* alternate, entire. *Flowers* umbellate, on long slender peduncles. *Calyx* superior, tube broadly obconic. *Petals* 5, inserted upon the margin of the disk, hooded. *Stamens* 5, equalling the petals. *Disk* epigynous, filling the calyx-tube. *Ovary* 3-celled; style short, 3-cleft, stigmas recurved. *Fruit* inferior, obovoid-globose, 3-celled; cells 1-seeded, coriaceous, tardily dehiscent.—DISTRIB. Species 3, two African, and one North Indian.

1. **H. lanceolatus**, Brand. *For. Fl.* 574. *Gouania lanceolata*, Wall. *Cat.* 4273.

The PANJAB, OUDE, and the WESTERN HIMALAYA from Kashmir to Kumaon, alt. 1-4000 ft.

The whole plant quite glabrous, or the youngest parts of the shoots and flowers pubescent. *Leaves* $1-1\frac{1}{4}$ by $\frac{1}{2}-\frac{3}{4}$ in., ovate to ovate-lanceolate.

ORDER XLIII. **AMPELIDEÆ**. (By M. A. Lawson, F.L.S.)

Small trees or shrubs, usually climbing by means of tendrils, more rarely radicant (sometimes herbaceous in *Leea*); juice copious, watery. *Stems* angled compressed or cylindric, with numerous very large proper vessels. *Leaves* alternate, usually petioled, simple or digitately or pedately 3-9-foliate, rarely pinnate or decompound. *Flowers* umbellately-paniculately- or spicately-cymose. *Peduncles* often transformed into simple or compound tendrils or adhering to rocks or trees by viscid pads terminating the ultimate segments, or expanded into a broad floriferous membrane (*Pterisanthes*). *Flowers* regular, hermaphrodite, rarely unisexual. *Calyx* small, entire or 4-5-toothed or lobed. *Petals* 4-5, distinct, or cohering, valvate, caducous. *Stamens* 4-5, opposite the petals, inserted at the base of the disk or between its lobes, filaments short subulate; anthers free or connate, 2-celled, introrse. *Disk* free or connate with the petals stamens or ovary, annular or variously expanded. *Ovary* 2-6-celled; style short, slender conical or 0, stigma minute or large and flat, sublobed; ovules 1-2 in each cell, ascending, anatropal, raphe ventral. *Berry* 1-6-celled; cells 1-2-seeded. *Seed* erect, often rugulose, albumen cartilaginous; embryo short basal, cotyledons ovate.—DISTRIB. Species about 250, inhabiting the tropical and temperate regions of the whole world.

- Scandent shrubs, usually bearing tendrils. Flowers racemose or cymose. Ovary 2-celled, cells 2-ovuled 1. *VITIS*.
 Flowers sessile on the dilated membranous peduncle 2. *PTERISANTHES*.
 Erect shrubs destitute of tendrils. Petals and stamens connate with the disk. Ovary 3-6-celled, cells 1-ovuled 3. *LEEA*.

1. *VITIS*, Linn.

Sarmentose shrubs, climbing, usually by means of leaf-opposed tendrils, rarely rooting. *Leaves* simple or 3-9-foliolate and then digitate or pedate, rarely pinnate or bipinnate. *Flowers* umbellately-paniculately-racemosely- or spicately-cymose, usually ebracteate, sometimes polygamous. *Calyx* short, entire, or 4-5-toothed or -lobed. *Petals* 4-5, free or cohering at the apex. *Stamens* 4-5, inserted below the margins of the disk; anthers free. *Ovary* 2- very rarely 3-4-celled; style 0 or short; ovules 2 in each cell. *Berry* ovoid or globose, 1-2-celled; cells 1-2-seeded.—*DISTRIB.* About 230 species growing mostly in the tropics and subtropics of Asia, Africa and Polynesia, more rarely in America.

SECT. I. *Leaves* simple.

* Petals and Stamens 4.

† *Flowers* umbellately-cymose.

§ *Stems and branches* acutely angled or winged. (See 7, diffusa.)

1. *V. quadrangularis*, Wall. Cat. 5992; stems 4-winged very thick fleshy greatly contracted at the nodes. *W. & A. Prodr.* 125; *Wight Ic.* t. 51; *Brand. For. Fl.* 100. *Cissus edulis*, Dalz. in *Hook. Lond. Journ. Bot.* ix. 248; *Dalz. & Gibs. Bomb. Fl.* 40; *Thwaites Enum.* 62. *C. quadrangularis*, Linn. *Mant.* 39; *Roxb. Fl. Ind.* i. 407; *DC. Prodr.* i. 628; *Grah. Cat. Bomb. Pl.* 33; *Dalz. & Gibs. Bomb. Fl.* 39. *Sælanthus quadrangonous*, *Forsk. Descr.* 33, t. 2.—*Rheede Hort. Mal.* vii. t. 41.

Throughout the hotter parts of India, from the foot of the WESTERN HIMALAYAS in Kumaon to CEYLON and MALACCA.—*DISTRIB.* Java, East Africa.

Stems glabrous, often of a great length, sometimes nearly leafless. *Leaves* 1-1½ in., broadly cordate or reniform or 3-5-lobed, crenate-serrate, glabrous. *Cymes* small, shortly peduncled, glabrous. *Style* conspicuous, slender, stigma small. *Berry* globose, red, succulent, the size of a pea, very acid.—The stems are frequently eaten by the natives of Ceylon in their curry.

2. *V. glyptocarpa*, *Thwaites Enum.* 62 (*Cissus*); branches slender 4-winged, leaves 2-3 by 1-1½ in. truncate-cordate acuminate glabrous above, nerves beneath with a few appressed hairs.

CEYLON; hot drier parts of the Island, *Thwaites*.

Leaves serrate; petiole ¾-1½ in. *Cymes* 3-5-rayed, longer than the petioles, glabrous. *Flowers* small, rufoescent. *Petals* acute, reflexed. *Style* conspicuous. *Fruit* ¼ in., oblong, 1-seeded, blackish-purple.

3. *V. sagittifolia*, *Laws.*; very glaucous, stems 4-angled or -winged flaccid not contracted at the joints, leaves cordate-sagittate peltate. *V. glaberrima*, Wall. Cat. 5991 in part; *W. & A. Prodr.* 125. *Cissus hastata*, *Miq. Fl. Ind. Bat. Suppl.* 517.

EASTERN PENINSULA; Singapore, *Wallich*; Penang, *Porter*; Malacca, *Griffith*.—*DISTRIB.* Java.

A weak trailing plant. *Leaves* 3-5 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., entire or distantly and often bristly-serrate; petiole $1\frac{1}{2}$ -2 in. *Petals* about $\frac{1}{2}$ in. *Style* conspicuous, slender. *Berry* small, obovoid, 2-seeded.

4. **V. lonchiphylla**, *Thwaites Enum.* 62 (Cissus); stems thick weak acutely-angled glabrous, leaves 4-7 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in. oblong-lanceolate acuminate roundly truncate at the base, petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.

CEYLON; Ambagamowa district, at no great elevation, *Thwaites*.

Leaves remotely denticulate, 3-nerved at the base, subpeltate. *Cymes* longer than the short petiole. *Flowers* small. *Fruit* depressed, globose.

5. **V. pentagona**, *Roxb. Fl. Ind.* i. 408 (Cissus); stem 5-angled woody not contracted at the nodes. *DC. Prodr.* i. 628 (Cissus); *Kurz in Journ. As. Soc. Beng.* 1870, ii. 74.

Forests of CHITTAGONG, *Roxburgh*; ARRACAN and SOUTH ANDAMAN ISLDS. *Kurz*.

Stems more robust and wiry than in the last species. *Leaves* 3-4 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., ovate or cordate-ovate, acuminate, serrulate, glabrous. *Cymes* on long peduncles. *Flowers* yellowish. *Petals* about $\frac{1}{2}$ in. *Style* shorter and stouter than in the last species, stigma capitate. *Fruit* ?

§§ *Stems cylindric terete or obscurely angled. (Except 7, diffusa.)*

a. *Plants glabrous.*

6. **V. glaberrima**, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 476; *Cat.* 5991 in part; glabrous, not glaucous, stem fleshy obtusely angled jointed not contracted at the nodes, leaves coriaceous obtuse or subcordate at the base, tendrils 0, flowers $\frac{1}{2}$ in. conical.

EASTERN PENINSULA; Penang and Sincapore, *Wallicé*.

Leaves $2\frac{1}{2}$ -5 by $1-2\frac{1}{2}$ in., oblong, rounded at the apex or very shortly cuspidate, entire or remotely and very faintly bristly-crenate, drying green. *Cymes* about 1 in. long, compact. *Fruit* (unripe) 2-celled.—The absence of tendrils and large flowers serve to distinguish this species from its allies.

7. **V. diffusa**, *Miq. Ann. Mus. Bot. Lugd. Bat.* i. 83; glabrous, stem 4-5-angled or subterete suffrutescent, leaves subfleshy concave-truncate at the base, tendrils simple, flowers $\frac{1}{2}$ in. oblong.

EASTERN PENINSULA; Sincapore, *G. Thomson*; Malacca, *Maingay*.—DISTRIB. Java?

Leaves 3-5 by 2-3 in., ovate, drying an ashy-brown, entire or distantly and faintly serrate. *Tendrils* long, woody, opposite the leaves. *Cymes* less compact than in *V. glaberrima*. *Fruit* fleshy, 1-celled, 1-seeded, black.—The description of the flowers is taken from Miquel's *V. nodosa* var. *subovata*, for any difference between it and this species I am not able to distinguish.

8. **V. furcata**, *Laws.*; glabrous, branches cylindric woody not jointed, leaves 3-4 by $2-2\frac{1}{2}$ in. broadly ovate cuspidate distantly and faintly serrate coriaceous, tendrils forked towards the tips, petals $\frac{1}{2}$ in., fruit nearly $\frac{1}{2}$ in.

EASTERN PENINSULA; Sincapore, *G. Thomson*; Malacca, *Maingay*.

A woody climber. *Tendrils* long, woody. *Flowers* much smaller than in *V. diffusa*. *Style* conspicuous. *Fruit* obovate, black, dry, 1-celled, 1-seeded. *Seed* $\frac{1}{16}$ by $\frac{3}{16}$ in., obovate, angled, brown.

9. **V. repens**, *W. & A. Prodr.* 125; quite glabrous and glaucous, branches cylindric weak fleshy, leaves 3-8 by $1-3\frac{1}{2}$ in. cordate-ovate acute with distant sharp spinous teeth pale green membranous, tendrils forked, petals $\frac{1}{2}$ - $\frac{3}{4}$ in., fruit the size of a pea, pedicels slender. *Dalz. & Gibs. Bomb. Fl.* 39. *V. glauca*, *Wall. Cat.* 5990 except *G. C. cordata*, *Roxb. Fl.*

Ind. l. 407; *Grah. Cat. Bomb. Pl.* 32. *C. repens*, Lamk.; *DC. Prodr.* i. 628.—*Rheede Hort. Mal.* vii. t. 48.

EASTERN TROPICAL HIMALAYA, the KHASIA MTS., ASSAM, and SILHET, ascending to 5000 ft. CHITTAGONG. TENASSERIM. WESTERN PENINSULA.—DISTRIB. Java, Amböyna. (*Roxb.*)

A weak trailing plant, always very glaucous, at least when young. *Tendrils* weak, fleshy. *Umbels* on slender peduncles, 1-4 in., the rays again umbelliferous. *Style* very conspicuous. *Fruit* dry, pedicels $\frac{1}{2}$ -1 in., neither fleshy nor increasing in size. *Seed* $\frac{1}{2}$ in., globosely-pyriform, smooth, pale.

10. **V. discolor**, Dalz. in Hook. *Kew Journ. Bot.* ii. 39; glabrous, not glaucous, stems subangular weak, leaves 3-12 by 1-4 in. narrowly cordate-ovate acute the upper lanceolate subcordate or entire at the base bristly-serrate blotched with white on the upper surface membranous, tendrils forked, flowers and fruit as in *V. repens*. Dalz. & Gibs. *Bomb. Fl.* 40. *V. inæqualis*, Wall. *Cat.* 6010; *W. & A. Prodr.* 125. ? *V. diversifolia*, Wall. *Cat.* 5996. ? *V. costata*, Wall. *Cat.* 6011. *C. discolor*, Blume *Bijd.* 181; *Bot. Mag.* 80, t. 4763.

TROPICAL SIKKIM HIMALAYA, the KHASIA MTS., and SILHET, ascending to 3000 ft.; CHITTAGONG, PEGU, and TENASSERIM. WESTERN PENINSULA, in the Concan, Dalzell.—DISTRIB. Java.

Branches and pedicels bright red. *Leaves* oblique, spotted with transverse blotches of white between the nerves on the upper surface, purple beneath. *Fruit* reddish purple. *Seed* as in *V. repens*.—The presence and position of the blotches seem to be very uncertain. Instead of the discolorations lying between, they sometimes follow the course of the nerves, while sometimes the leaves are entirely destitute of any markings, in which case the plant becomes *Cissus velutinus*, Linden *Cat.* (in *Bot. Mag.* 86, t. 5207). *Vitis inæqualis*, Wall., appears to belong to the uncoloured forms of this species, in which the leaves are narrowly ovate-lanceolate, almost entire and very unequal at the base. To specimens taken from the tops of branches of either this species or *V. repens* must probably be referred *V. costata*, Wall. and *V. diversifolia*, Wall.

11. **V. Heyneana**, Wall. *Cat.* 5988 A; *W. & A. Prodr.* 125, not *DC.*; quite glabrous, branches thick hollow succulent, leaves 3-7 by $1\frac{1}{2}$ -4 in. cordate-ovate or ovate distantly and faintly serrate thick and leathery, tendrils simple, peduncle 1 in. usually 2-rayed, rays bearing numerous umbellate flowers, pedicels thick, petals $\frac{1}{2}$ in., fruit $\frac{1}{3}$ in. *Cissus rotundiatia*, Heyne in Wall. *Cat.* 5988; ? *DC. Prodr.* i. 628.

WESTERN PENINSULA in the Southern provinces, Courtallam and Travancor, Wight. CEYLON, Thwaites.

A coarse plant with thick fleshy leathery stems. *Leaves* pale green. *Tendrils* stout. *Petals* distinct. *Style* conspicuous. *Fruit* pyriform, dry, 1-2-seeded, the pedicels thickened upwards.—*Cissus glauca*, Thwaites (*Enum.* 62), has thick fleshy stems and leaves as in this species, leaves 6-8 by 4 in. ovate obtuse; the fruit resembles that of *V. pallida*, to which perhaps it is most closely allied.

12. **V. pallida**, *W. & A. Prodr.* 125; quite glabrous or young parts slightly puberulous, branches thick fleshy hollow, leaves 4-10 in. broadly cordate dentate-serrate or inciso-serrate often repand, tendrils simple, peduncle 1-2 in. very thick fleshy, cyme compact fleshy subcorymbose, bracts and bracteoles large glabrous and pellucid, petals $\frac{1}{2}$ in., fruit the size of a pea. *Oliv. Fl. Trop. Afr.* i. 393. ? *V. Wallichii*, Kurz in *Journ. As. Soc. Beng.* 1872, ii. 302.

WESTERN HIMALAYA, Garwhal, *Strach. & Wint.* WESTERN PENINSULA, from the Concan southwards. AVA? *Kurz.*—DISTRIB. Abyssinia.

Young branches and leaves often pellucid. *Leaves* pale green; petiole 2-5 in. *Tendrils* short, fleshy, opposite the leaves or 0. *Petals* distinct. *Style* long, slender. *Fruit* subglobose, 1- or according to W. & A. 1-2-seeded; pedicels very thick and fleshy. *Seed* $\frac{1}{4}$ in., pyriform, smooth, pale.—Wight and Arnott refer *Cissus vitiginea*, Roxb. *Fl. Ind.* i. 406, to this species, but Roxburgh's figure is without doubt *V. lanata*.

13. **V. glauca**, W. & A. *Prodr.* 126; whole plant except the younger parts quite glabrous, stems glaucous, leaves 5-10 by 2-4 $\frac{1}{2}$ in. with long petioles roundly cordate rarely obscurely lobed cuspidate bristly-serrate membranous, tendrils forked, peduncles 2-3 in. very slender 3-5-rayed, rays umbellately many-flowered, bracts and bracteoles very small deciduous, petals $\frac{1}{6}$ in., fruit the size of a pea. *V. Kleinii*, Wall. *Cat.* 6008 A, B. *Cissus cordata*, Roxb. *Fl. Ind.* i. 407; *DC. Prodr.* i. 628. *C. glauca*, Roxb. *Fl. Ind.* i. 406; *Grah. Cat. Bomb. Pl.* 32. *C. purpureus*, Roxb. *ex Stend. ed.* ii. vol. i. 373.—*Rheede Hort. Mal.* vii. 21, t. 11.

WESTERN PENINSULA; from the Concan southwards.

Stems succulent, dark brown, cylindric, faintly striate. *Leaves* slightly puberulous when young, drying black. *Cymes* slender. *Flowers* very small; pedicels $\frac{1}{2}$ in., very slender. *Petals* distinct. *Style* long, slender. *Fruit* subglobose, 1-2-seeded. *Seed*?

VAR. *Stems* woody swollen at the nodes. *Leaves* distantly and very obtusely crenate not bristly-serrate.—Courtallam.

14. **V. assamica**, Laws.; whole plant except the youngest parts quite glabrous, branches subangular woody, leaves roundly cordate or orbicular cuspidate or suddenly and shortly acuminate bristly-serrate with recurved margins very prominently nerved beneath harsh and subcoriaceous, tendrils simple, cymes slender, petals $\frac{1}{2}$ in., fruit the size of a pea.

ASSAM, Griffith.

Stems very firm and rigid, turning black when dry; a hard harsh plant when compared with *V. glauca*. *Flowers* on slender pedicels. *Petals* distinct. *Style* $\frac{1}{2}$ in., stigma subcapitate. *Fruit* $\frac{1}{4}$ in., turbinate, dry, black, subangled, 1-seeded. *Seed* $\frac{1}{2}$ in., pyriform.—Very closely allied to *V. adnata*.

β . *Leaves pubescent or tomentose beneath.*

15. **V. gigantea**, Bedd. in *Trans. Linn. Soc.* xxv. 212; an enormous climber, branches terete round glabrous, leaves 6-8 in. cordate with a deep sinus and long point mucronate glabrous above subtomentose beneath, tendrils bifid.

WESTERN PENINSULA; Anamallay forests, alt. 2000 ft., *Beddoma*.

Stems 4-5 in. diam., bark corky. *Leaves* crenate, crenatures sharply toothed, 5-nerved; petiole 2-4 in. *Cymes* 3-5-rayed, rays bearing minute green umbellate flowers.—I have never seen this species.

16. **V. repanda**, W. & A. *Prodr.* 125; stems and leaves with appressed woolly tomentum, leaves 4-8 by 3-6 in. broadly cordate coarsely crenate or dentate or inciso-serrate or sublobed often repand densely covered when young with rust-coloured hairs at length glabrous above, tendrils forked, petals cohering at the apex, fruit $\frac{1}{3}$ in. pyriform. *V. læta*, Wall. *Cat.* 6002. *V. rosea*, Royle *Ill.* 149, t. 26, f. 1. *Cissus acuminata*, Thwaites *Enum.* 62. *C. aquosa*, Wall. *Cat.* 6000. *C. repanda*, Vahl; *DC. Prodr.* i. 627; *Grah. Cat. Bomb. Pl.* 32; *Dalz. & Gibs. Bomb. Fl.* 39. *C. repens*, Thwaites

Enum. 62. *C. riparia*, Wall. *Cat.* 6038. *C. vitiginea*, Linn. *Sp. Pl.* 117; *DC. Prodr.* i. 627 (not of Roxburgh).

NORTH WESTERN HIMALAYA; Garwhal, Falconer, &c. ASSAM, SILHET, and EASTERN BENGAL; WESTERN PENINSULA, from the Concan southwards. CEYLON, not uncommon.

Branches coarse trailing or creeping. *Stems* and older branches with wrinkled bark. *Cymes* slender, peduncle 2-5 in. bearing 3-5 rays or branching subcorymbosely with the flowers ultimately umbellate. *Bracts* and bracteoles densely woolly. *Fruit* tipped with the persistent style. *Seed* pyriform, smoothish.—Very variable; the more succulent and glabrous forms closely resembling some specimens of *V. pallida*, while those with cordate-ovate leaves and less persistent bracteoles are with difficulty distinguished from *V. adnata*, to which indeed it is very closely allied. Under *V. paniculata*, Wall. *Cat.* 6022, are two species, the one with simple leaves probably belongs to *V. repanda*, the other with 5-foliolate leaves and labelled *C. pentaphylla*? Hb. Madras, belongs to *V. tenuifolia*.

17. *V. adnata*, Wall. *Cat.* 5998; stems leaves and inflorescence clothed with a rust-coloured pubescence, leaves 4-8 by 2-4 in. cordate-ovate acute or shortly acuminate bristly-serrate, tendrils forked, cymes smaller more compact and less woolly than in *V. repanda*, bracteoles very small caducous, petals distinct, fruit about the size of a pea. *Brand. For. Fl.* 100. *V. repens*, Wall. *Cat.* 5999 b. *Cissus adnata*, Roxb. *Fl. Ind.* i. 405; *DC. Prodr.* i. 627; *Wight. Ic. t.* 144; *Thwaites Enum.* 62; *Cat. Bomb. Pl.* 32; *Dalz. & Gibs. Bomb. Fl.* 39. *C. cordata*, Wall. *Cat.* 6001. *C. Kleinii*, Wall. *Cat.* 6008 in part. *C. latifolia*, Vahl. *Symb.* iii. 18.

Hotter parts of INDIA, from the WESTERN HIMALAYAS in Garwhal to ASSAM, SILHET, BENGAL, TENASSERIM, and PENANG. WESTERN PENINSULA and CEYLON.—DISTRIB. Java, Borneo, Philippine Islds.

A slender far-climbing plant, with round woody branches. *Leaves* becoming more or less glabrous above, always pubescent beneath, sometimes even densely felted with a short soft tomentum, membranous. *Tendrils* woody. *Fruit* black, smooth. *Seed* $\frac{1}{8}$ in., pyriform, smooth.

18. *V. spectabilis*, Kurz in *Trimen Journ. Bot.* 1874, 196; a lofty scandent ferruginously hirsute shrub, leaves almost sessile broadly cordate obtuse obsoletely 3-5-lobed sinuate-cordate at the base denticulate thick membranous scabrous above.

SIKKIM HIMALAYA; damp forests near Khersiong, alt. 5-6000 ft., Kurz.

Flowers very small, on slender pedicels $\frac{1}{2}$ - $\frac{1}{4}$ in. *Cymes* pedunculate, trichotomous $\frac{1}{2}$ -1½ in. *Calyx* truncate, scarcely $\frac{1}{4}$ in. *Style* $\frac{1}{4}$ in., truncate. *Berry* (immature) obovate.—According to Kurz this has the habit and affinity of *V. Linnæi*, but widely differs by the indumentum and almost sessile leaves.—I have not seen this species.

19. *V. Linnæi*, Wall. *Cat.* 5987; stems leaves and inflorescence clothed with a short grey pubescence, leaves 2-4 in. long and broad palmately 3-5-angled or lobed slightly cordate or retusely-truncate at the base coarsely and irregularly serrate, tendrils simple, petals distinct, fruit $\frac{1}{4}$ in. *W. & A. Prodr.* 126. *Cissus angulata*, Lamk. *Dict. Supp.* i. 104; *DC. Prodr.* i. 629; *Thwaites Enum.* 62.

WESTERN PENINSULA; from the Concan southwards, and CEYLON.

Stems and leaves subfleshy. *Branches* cylindric or very obtusely angled. *Cymes* slender, about as long as the leaves. *Flowers* small. *Fruit* oblong, bluish, pruinose; pedicels recurved. *Seed* as in *V. repanda*.—A very distinct species, of which the synonymy has been much confused. I have followed Wallich in calling it *V. Linnæi*.

†† *Flowers in long whip-like dichotomous spikes. Fruit 2-seeded.*

20. **V. macrostachys**, Miq. *Ann. Mus. Lugd. Bat.* i. 94. *Cissus spicifera*, Griff. *Notul.* iv. 693.

MALACCA; Griffith, *Maingay*.—DISTRIB. Sumatra.

Whole plant quite glabrous. *Leaves* 3–8 in., oblong or ovate, cuspidate, serrate, coriaceous, with prominent nerves. *Spikes* 2 ft. long. *Flowers* sessile or very shortly pedicelled, solitary or fascicled in twos or threes on the long slender pendulous rachis. *Petals* separating; style short. *Fruit* 1 in., elliptic, fleshy. *Seed* $\frac{3}{8}$ by $\frac{1}{2}$ in., oblong, pointed at the apex, the back rounded and narrowly grooved, the face flat, rugose.

** Petals and Stamens 5.

† *Flowers umbellately-cymose. Style 0. Fruit 2-seeded.*

21. **V. sikkimensis**, Laws.; whole plant glabrous, stems weak trailing, leaves $1\frac{1}{2}$ ft. cordate, cymes small subfleshy glabrous or with a small amount of deciduous tomentum divaricately branched on long peduncles.

SIKKIM HIMALAYA and KHASIA Mts., alt. 0–4000 ft., *J. D. H. & T. T.*

Young parts often glaucous. *Leaves* membranous, denticulate, reddish. *Peduncles* 4 in. or more bearing a forked tendril a little below the cyme. *Petals* separating. *Fruit*?

22. **V. tomentosa**, Heyne in *Roth Nov. Sp.* 157; whole plant covered with a thick woolly persistent tomentum, leaves palmate 3–5-angled or lobed, flowers sessile in shortly peduncled compact densely woolly cymes. *V. lanata*, Wall. *Cat.* 5995 a, ? f, ? g; *W. & A. Prodr.* 130; *Wight Ill.* i. t. 57; *DC. Prodr.* 634. *V. cinnamomea*, Wall. *Cat.* 5989 c. *V. trifida*, *Roth Nov. Sp.* 157; *DC. Prodr.* i. 634. *V. ternata*, Heyne in *Roth Nov. Sp.* 157. *V. triloba*, Heyne l.c. 157; *Wall. Cat.* 6004 ? C.; *DC. Prodr.* i. 634. *Ampelopsis* ? *ternata*, *DC. Prodr.* i. 633.

WESTERN PENINSULA; from Canara southwards.

Leaves 3–9 in. *Flowers* scarlet, when dry dark brown, showing conspicuously in the midst of the white woolly tomentum. *Peduncles* 3–6 in., stout, woody, bearing a stiff woody forked tendril 1 in. below the cyme. *Fruit* $\frac{1}{2}$ in., black, round. *Seed* $\frac{1}{2}$ by $\frac{1}{4}$ in., broadly oblong, flat, the margin incurved, the face with a thick rounded ridge running down the middle, pale.

23. **V. nervosa**, Laws.; branches petioles and cymes glabrous, leaves cordate subpalmate, nerves beneath prominent and hairy, flowers sessile. *V. rugosa*, *Herb. Ind. Or. H. f. & T.* (not of Wallich).

SIKKIM HIMALAYA, alt. 4–5000 ft., *J. D. H.*

Stems deeply grooved, hollow. *Leaves* often nearly 2 ft., broadly cordate, rounded at the tip with 5–7 shallow lobes, coarsely and irregularly dentate, covered above with minute soft hairs. *Cymes* stoutish, bearing midway a 1–2-times forked tendril. *Fruit* the size of a currant, black, fleshy, pedicel $\frac{1}{4}$ in. *Seed* as in *V. tomentosa* but rather smaller, more pointed at the apex, and darker coloured.

24. **V. pedicellata**, Laws.; branches petioles and cymes covered with a short soft spreading pubescence, flowers on exceedingly slender pedicels $\frac{1}{2}$ in.

WESTERN HIMALAYA; Kumaon, alt. 7000 ft., *Strach. & Wint.*

Stems striated, solid. *Leaves* 1 ft. or more, cordate-ovate, serrate or dentate, glabrous above, nerves somewhat prominent below and covered with short stiff spreading rusty hairs, very thin and membranous. *Cymes* very small, on a short slender peduncle bearing midway a weak simple tendril. *Fruit*?

†† *Flowers paniculately cymose.*

25. **V. erioclada**, *W. & A. Prodr.* 130; branches and petioles covered with a dense subdeciduous tomentum, leaves cordate-ovate coriaceous, flowers sessile and often almost hidden in the woolly tomentum, cymes compact or woody, peduncle 3-12 in. bearing two-thirds of the way a stout woody simple tendril. *V. indica*, *Thwaites Enum.* 63.—*Rheede Hort. Mal.* vii. t. 7.

WESTERN PENINSULA; *Rheede, Wight*; CEYLON, common up to 3000 ft.

Stem stout, hollow, cylindric, striate. *Leaves* 6-12 by $3\frac{1}{2}$ -7 in., acute or sub-acuminate, coarsely dentate, the teeth terminated by a hard obtuse point, at length quite glabrous above, nerves very prominent beneath. *Cymes* branching divaricately. *Petals* distinct. *Style* 0. *Fruit* oblong, about the size of a grape.

26. **V. barbata**, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 478; branches petioles and peduncles covered with numerous long spreading glandular capitate hairs, leaves cordate-ovate membranous, peduncle flattened 4-8 in. bearing a long forked slender tendril above its middle, cymes regularly paniculate as long as the peduncle. *V. latifolia*, *Hb. Ham.*; *Wall. Cat.* 5994? *G. V. lanata*, *Hb. Roxb.*; *Wall. Cat.* 5995 c, d.

KHASIA MTS., alt. 0-3000 ft.; ASSAM, SILHET, PEGU, and TENASSERIM.

Branches stoutish, hollow, dark brown or nearly black. *Leaves* 8 in.-1 ft. or more, roundly cordate-ovate, sinuate-dentate, sometimes sublobed, at length glabrous above, puberulous or densely tomentose beneath. *Flowers* sessile in large lax ovate paniculate cymes. *Fruit* the size of a large currant, black, shortly pedicellate. *Seed* $\frac{5}{8}$ by $\frac{1}{2}$ in., elliptic, the back flattish and shallowly grooved, the face rather sharply ridged, nearly smooth.—A very distinct species, known at once by the long spreading black hairs. Wallich describes the flowers as being 4-cleft, but although they may be so sometimes it is certain that they are generally pentamerous.

27. **V. lanata**, *Roxb. Fl. Ind.* i. 660; branches petioles and cymes more or less pubescent or tomentose, leaves cordate-ovate shortly acuminate membranous, peduncle bearing a simple or forked tendril, petals cohering at the top. *W. & A. Prodr.* 131; *Wall. Cat.* 5995 a, b, e; *Brand. For. Fl.* 99. *V. cordifolia*, *Roth Nov. Sp.* 158. *V. indica*, *Hb. Ham.*; *Wall. Cat.* 5994? *E. V. Heyneana*, *DC. Prodr.* i. 634. *V. pentagona*, *Hb. Ham.*; *Wall. Cat.* 5994? *F. V. rugosa*, *Wall. Cat.* 5994 a, b, c, and d in part. *V. Labrusca*, *Linn. var. γ*, *Regel. Conspect. Sp. Gen.* 9. *Cissus vitiginea*, *Roxb. Fl. Ind.* i. 406 (*note of Linnaeus*). *Alima ? cristatum*, *Wall. Cat.* 4994.

TROPICAL HIMALAYA, from Kashmir and Jamu, alt. 1-4000 ft. and KUMAON, alt. 6-7000 ft., to SIKKIM, alt. 1-5000 ft.; ASSAM, the KHASIA MTS., CHITTAGONG, BIRMA, and the CIRCARS.

A very variable plant in the size shape and vestiture of the leaves, usually they are 3-6 by $1\frac{1}{2}$ -3 in., sometimes larger, and usually softly pubescent, but sometimes felted beneath, or nearly glabrous. *Flowers* small, green, forming a thyrsoid paniculate cyme. *Petals* cohering at the apex rarely separating. *Fruit* the size of a large pea, round, purple, 4-seeded. *Seed* $\frac{5}{8}$ by $\frac{1}{2}$ in., obtriangular, subemarginate, rounded and smooth on the back with a small spatulate tubercle, face wedge-shaped with a shallow linear depression on each side of the ridge.—The following varieties may be distinguished:

VAR. 1. rugosa; leaves ovate or cordate-ovate nearly 2 ft. clothed beneath with a dense matted tomentum; stems thicker than in the type with a dark deciduous bark.—Himalaya and Tenasserim.

VAR. 2. glabra; leaves almost quite glabrous; stems more slender than in the type, approaching *V. parvifolia*.—Garwhal and Khasia Mts.

28. **V. latifolia**, Roxb. *Fl. Ind.* i. 661; whole plant quite glabrous, leaves roundly cordate 3-7-angled or lobed, peduncles shortish bearing a slender forked tendril, petals distinct, flowers small reddish-brown. *V. Kleinii*, Wall. *Cat.* 6008 ? C and ? D; *W. & A. Prodr.* 130; *Brand. For. Fl.* 99. *V. glabrata*, Heyne in *Roth Nov. Sp.* 156; *DC. Prodr.* i. 634. *V. indica*, Wall. *Cat.* 5993 ? C. *V. zeylanica*, Russell Wall. *Cat.* 5993 ? D.—*Rheede Hort. Mal.* vii. 13, t. 7.

NORTH WEST INDIA; Kumaon and Moradabad. ASSAM, SILHET, and the WESTERN PENINSULA from the Concan and Coromandel coast southwards.

Stems weak, hollow, far-climbing, striate; generally quite glabrous. *Leaves* 6-8 by 6-8 in. glossy. *Flowers* very small, in small somewhat compact thyrsoid cymes. *Peduncles* bearing a long wiry tendril a little below the cyme. *Style* 0. *Fruit* the size of a currant, black, 2-seeded. *Seed* $\frac{1}{3}$ - $\frac{1}{2}$ in., elliptical, with a linear tubercle on the back and the margins transversely rugose, bluntly ridged on the face.

29. **V. vinifera**, Linn. *Sp. Pl.* 202; stems and leaves much as in *V. latifolia*, but often tomentose, peduncles destitute of tendrils, petals united at the apex, style very short thick. *DC. Prodr.* i. 633; *W. & A. Prodr.* 130; *Grah. Cat. Bomb. Pl.* 33; *Brand. For. Fl.* 98.

Perhaps wild in the N.W. HIMALAYA; cultivated extensively in N.W. India and rarely in the Peninsula and Ceylon.—DISTRIB. Native of W. Asia.

Regel, in his *Conspéctus Sp. Gen. Vitis. Amer. Bor. Chin. Bor. et Jap. Hab.* 9, considers this plant a hybrid between *V. vulpina*, Linn., and *V. Labrusca*, Linn., two American species, which he identifies with the Indian *V. parvifolia*, Roxb., and *V. lanata*, Roxb.

†† *Flowers corymbosely cymose.*

30. **V. montana**, Laws.; stems slender, young branches with long delicate white spreading hairs otherwise glabrous, style 0.

NIPAL, Wallich (in *Herb. Hook.*); SILHET, Hook. f. & T.

Leaves 8-12 by 6-8 in., cordate-ovate, or lobed as in *V. latifolia*. *Common peduncle* 3-5 in., bearing about an inch below the flowers a forked tendril; cymes small. *Petals* separating? *Fruit*?—Very closely allied to *V. latifolia*, from which it differs only in the character of the cyme, and in the long white hairs on the younger portions of the stem.

31. **V. glandulosa**, Wall. in Roxb. *Fl. Ind. ed. Carey*, ii. 479; *Cat.* 6006; branches leaves and petioles covered with a short dusky pubescence, leaves cordate-ovate crenate sometimes 3-lobed, peduncles not bearing tendrils.

NIPAL, Wallich.

Stems cylindric, solid, jointed and thickened at the nodes, with greyish dotted bark. *Leaves* 3-6 by 2-4 in. *Flowers* in small dichotomous corymbosely cymes shorter than the leaves. *Fruit* small, globose, dark-purple, 3-4-seeded. *Seed* as in *V. lanata*.—According to Wallich the peduncles sometimes bear a twice or thrice dichotomous tendril.

††† *Flowers spicately or racemosely-cymose.*

32. **V. parvifolia**, Roxb. *Fl. Ind.* i. 662; whole plant quite glabrous, leaves 2-4 in. membranous, flowers minute green pedicellate, style distinct. *Wall. Cat.* 6005; *Brand. For. Fl.* 99. *V. truncata*, Miq. *Fl. Ind. Bat.* i. ii. 609. *V. vulpina*, Linn. var. γ , Regel *Conspéct. Sp. Gen. Vitis*, 6. *V. Wallichii*, *DC. Prodr.* i. 634. ? *V. Purani*, *Don Prodr.* 188.

NORTH WESTERN HIMALAYA; from Kashmir to Nipal, alt. 3-6000 ft.; EASTERN BENGAL, *Roxburgh*.—DISTRIB. Malay Archipelago, China, Japan.

Stems solid, trailing, slender. *Leaves* ovate, acute, base truncate or cordate, sharply and deeply serrate, often 3-lobed. *Tendrils* branched. *Flowers* in erect racemes 1 in. long. *Petals* cohering. *Style* very short. *Fruit* globose, black, the size of a pea. *Seed* as in *V. lanata*.

33. **V. indica**, *Linn., Sp. Pl.* 202; branches leaves and peduncles covered with a dense woolly tomentum, leaves 4-10 in. coriaceous, flowers greenish-purple nearly sessile, style 0. *Roxb. Fl. Ind.* i. 660; *W. & A. Prodr.* 131; *DC. Prodr.* i. 634; *Grah. Cat. Bomb. Pl.* 33; *Wall. Cat.* 5993. *Vitis rugosa*, *Wall. Cat.* 5994 in part; *Brand. For. Fl.* 100. *Rheede Hort. Mal.* vii. 11, t. 6.

WESTERN PENINSULA; from the Concan southwards.

Stems slender, permanently woolly. *Leaves* at length glabrous and shining above, cordate-ovate, acute, denticulate-serrate, the points of the serratures hard almost spiny. *Peduncles* stoutish, bearing a long simple tendril. *Flowers* in short cylindric spikes about 2 in. *Petals* distinct? *Fruit* globose, the size of a large currant, 2-4-seeded. *Seed* $\frac{1}{2}$ by $\frac{1}{4}$ in., elliptic, slightly curved on the back from end to end, otherwise flattish, with a spatulate tubercle, the face wedge-shaped.—Very closely allied to *V. erioclada* in general appearance. In some specimens the flowers are 4-merous. *V. indica*, *Miq. Fl. Ind. Bat.* i. pt. ii. 609, and of *Thwaites*, are quite distinct.

++++ *Flowers in short racemose spikes at the end of long filiform tendrils bearing peduncles.*

34. **V. gracilis**, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 477; *Cat.* 6007.

SINGAPORE, *Wallich.*

Branches exceedingly slender, almost filiform, pubescent. *Leaves* 4-5 by 2-2 $\frac{1}{4}$ in., cordate, caudate-acuminate, sharply serrate, hispidly hirsute above both on the nerves and on the intercostal spaces, beneath on the nerves only. *Tendrils* short, very slender, simple. *Flowers?* *Fruit* (immature?) oblong, oblique, 1-4-seeded, sessile. *Seeds* $\frac{1}{2}$ by $\frac{1}{4}$ in., oblong-triangular, rounded on the back, the face flattened.—Not unlike some forms of *V. lanata*, but differing in the nature of the pubescence and in the character of the inflorescence.

SECT. II. *Leaves* 3-foliolate. (See *V. dubia*, *V. Hookeri*, *V. lanceolaria*, *V. pedata*, *V. tuberculata*, and *V. sulcata*.)

* *Petals and Stamens* 4.

† *Stems and leaves usually fleshy.*

35. **V. Rheedei**, *W. & A. Prodr.* 127; whole plants quite glabrous, petiole 2-3 in. *V. heterophylla*, *Wall. Cat.* 6036. *Cissus heterophylla*, *Herb. Madr.*, *Wall. Cat.* 6036 (not of *Poir.*). *C. trilobata*, *Lamk. Dict.* i. 31; *DC. Prodr.* i. 629; *Thwaites Enum.* 62; *Graham Cat. Bomb. Fl.* 33; *Dalz. & Gibs. Bomb. Fl.* 39.—*Rheede Hort. Mal.* vii. t. 45.

WESTERN PENINSULA; Malabar and Travancor. CEYLON, common.

Stems thick and weak. *Leaves* 4-8 in., the upper ones smaller three-lobed or entire; leaflets 2-5 in., shortly petioluled or sessile, the central one oblong-lanceolate, the lateral ones exceedingly oblique, all distantly often sharply toothed. *Tendrils* simple, woody. *Flowers* subumbellate, forming compact divaricating cymes 1 $\frac{1}{2}$ in. long, usually shorter than the petiole. *Petals* distinct. *Style* slender, conspicuous. *Fruit* globose, 1-seeded, the size of a currant, black? *Seed* $\frac{1}{2}$ by $\frac{1}{4}$ in., globose, smooth, testa brittle.

36. **V. setosa**, Wall. Cat. 6009; whole plant covered with long glandular bristly hairs without other pubescence, leaves sessile, fruit red. *W. & A. Prodr.* i. 127; *Wight Ic.* t. 170; *Dalz. & Gibs. Bomb. Fl.* 41. *Cissus acida*, Wall. Cat. 6009, b. (not L.) *C. setosa*, Roxb. *Fl. Ind.* i. 410; *DC. Prodr.* i. 630.

WESTERN PENINSULA; from the Circars and Maisor southwards. CEYLON, south part of the Island, Gardner.

Stem and leaves very fleshy, herbaceous, weak. *Leaflets* 1-2 in., sessile or shortly stalked, ovate or subovate, rounded at the tip, sharply and irregularly serrate-dentate. *Tendrils* usually forked, succulent. *Flowers* $\frac{1}{2}$ in. long, umbellately disposed in divaricating cymes. *Cymes* on peduncles as long as or longer than the leaves. *Petals* revolute. *Fruit* the size of a pea, when young often hairy, 1-seeded. *Seed* subglobose, nearly smooth.—Every part of the plant is exceedingly acrid.

87. **V. carnosa**, Wall. Cat. 6018; whole plant when young covered with a short dense pubescence, leaves petioled, fruit black. *W. & A. Prodr.* 127; *Wight Ic.* 171; *Brand. For. Fl.* 101. *V. crenata*, Wall. Cat. 6021. *V. trifolia*, Linn. *Sp. Pl.* 203. *Cissus acida*, Roxb. *Ic. ined.* 541. *C. auriculata*, Roxb. Wall. Cat. 6031 b. *C. carnosa*, Roxb. *Fl. Ind.* i. 409; *DC. Prodr.* i. 630; *Grah. Cat. Bomb. Pl.* 33; *Dalz. & Gibs. Bomb. Fl.* 40. *C. crenata*, Vahl *DC. Prodr.* i. 631. *C. cinerea*, Lamk.; *DC. Prodr.* i. 631. *C. obtusifolia*, Lamk. *Dict.* i. 317—*Rheede Hort. Mal.* vii. t. 9.

TROPICAL HIMALAYA and throughout the hotter parts of INDIA from the PANJAB and BURMA to CEYLON and MALACCA.

Stems more slender and less succulent than in *V. setosa*. *Leaves* 2-6 in. on long petioles; leaflets usually shortly stalked, 1-3 in., ovate or obovate, rounded or acute, serrate or dentate. *Tendrils* opposite the leaves, slender, wiry, usually branched. *Flowers* white, larger than in *V. setosa*, umbellately cymose, the peduncle equalling the petiole. *Style* conspicuous. *Fruit* turbinate, fleshy, 2-4-seeded. *Seed* $\frac{1}{4}$ by $\frac{1}{2}$ in. triangular, round on the back and with a linear tubercle, wedge-shaped on the face.

†† *Stems woody*.

a. *Fruit* under $\frac{1}{2}$ in. diam. round or ovoid (doubtful in *V. subicaulis* and *V. anamallayana*).

38. **V. bracteolata**, Wall. in Roxb. *Fl. Ind. ed. Carey*, ii. 483; Cat. 6023; stems smooth, flowers minute numerous, peduncles and pedicels filiform.

SILHET, De Silva; BHOTAN and ASSAM, Griffith.

Stems and leaves glabrous. *Branches* very slender. *Leaves* 3-5 in.; petiole nearly as long as the leaflets; leaflets nearly sessile or shortly stalked, lanceolate or ovate-lanceolate or ovate-acute, serrate, membranous or subcoriaceous. *Flowers* far the smallest of the genus, disposed in pubescent divaricating filiform cymes. *Cymes* on a long slender peduncle. *Style* 0. *Fruit* the size of a pea, round, black, 2-3-seeded. *Seed* $\frac{1}{4}$ by $\frac{1}{2}$ in., obovoid or globose, finely muricate.

39. **V. angustifolia**, Wall. Cat. 6033; stems smooth, cymes usually under 1 in. long shorter than the petiole, flowers dioecious, larger than in *V. bracteolata*, fruit the size and colour of a black currant 1-2-seeded, seed hemispherical hollow, pale. *Wight Ic.* 176. *Cissus angustifolia*, Roxb. *Fl. Ind.* i. 408; *DC. Prodr.* i. 631. *C. trifoliata* Hb. Ham. in Wall. Cat. 6013 ? K.

ASSAM, SILHET, and the KHASIA MTS.—DISTRIB. Sumatra (Roxburgh), Hongkong.

Stems flexuous, dark-coloured, glabrous. *Leaves* 3-6 in.; petiole $1\frac{1}{4}$ -2 $\frac{1}{2}$ in.; leaflets shortly stalked, lanceolate, serrate, glabrous, membranous. *Tendrils* simple.

Cymes usually nearly sessile, very much smaller and more robust than in the last species. *Flowers* green. *Style* 0; stigma large flat. *Fruit* dry, 2-4-seeded. *Seed* $\frac{1}{4}$ in. diam., girt about the middle by a ridge, hollow, the small opening closed by a thin membrane closely resembling that of *V. Roxburghii*.—Specimens from Assam have leaves 8 in. long or more, and the cymes on longer petioles and more diffuse.

40. **V. canarensis**, Dalz. in Hook. *Kew Journ. Bot.* iii. 123; stem herbaceous pale warted, cymes about 2 in. shorter than the petioles, fruit $\frac{1}{4}$ in. globose nearly smooth.

WESTERN PENINSULA; Canara, Dalzell.

Leaves 7-8 in.; petiole 3-3 $\frac{1}{2}$ in.; leaflets 4 by 2 in., shortly stalked, elliptic, pubescent on both surfaces, at length glabrous. *Petals* distinct. *Style* short, stigma acute. —Very closely allied to *V. lanceolaria*, of which it may prove to be a broad-leaved variety.

41. **V. Roxburghii**, W. & A. *Prodr.* 127 (*excl. synonyms*); quite glabrous, stems slender, bark smooth black shining, cymes longer than the petioles, fruit the size of a currant 2-4-seeded, seeds hemispheric hollow cup-shaped, the opening closed by a membrane.

WESTERN PENINSULA; Courtallam, Wight.

Leaves 5-8 in., glossy, glabrous, very membranous; petiole 2 in.; leaflets 3-7 in., stalks $\frac{1}{2}$ -1 in., elliptic-lanceolate, acute or subacuminate, entire. *Tendrils* simple, long, slender. *Cymes* shortly pedunculate, 3-4 in., branches divaricating. *Flowers* small, green. *Style* conspicuous.—The seed closely resembling that of *V. pedata*, but a little larger and darker-coloured.

This, by inspection of the specimen in Wight's herbarium, I have determined to be undoubtedly Wight and Arnott's species, although in the description they say that the cymes are much shorter than the petioles, almost approaching a panicle, and the leaves occasionally 4-5-foliolate. Roxburgh's *Cissus feminea*, which they identify with it, and owing to which the specific name of *Roxburghii* was given to Wight's plant, is *V. lanceolaria*.

42. **V. reticulata**, Thwaites *Enum.* 63 (*Cissus*); stems slender, whole plant quite glabrous, cymes longer than the petioles, leaves prominently reticulated, fruit ovoid the size of a cherry pale rose-coloured.

CEYLON; in the Ambagamowa district, Thwaites.

Leaves 6-8 in.; petiole 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in.; leaflets 4-6 in., stalks $\frac{1}{2}$ -1 in. long, broadly elliptic-ovate, cuspidate, the upper half obscurely denticulate, membranous. *Flowers* ? *Seed* $\frac{1}{2}$ in.—Thwaites remarks that this species is closely allied to some forms of *V. pedata*, differing from it chiefly in the form and character of the leaves, and larger fruit; the trifoliolate character of the leaves he suggests may not be constant.

43. **V. peduncularis**, Wall. *Cat.* 6024; stems exceedingly coarse thick and woody, young branches cymes and petioles puberulous, cymes 6 in. diffuse equalling the petioles, fruit the size of a pea red, seed $\frac{1}{4}$ by $\frac{1}{2}$ in. triangular-obovoid emarginate coarsely angled or muricate pale.

PENANG, Wallich; MALACCA, Maingay.

Leaves 1 ft. long; petiole 6 in.; leaflets elliptic, or subobovate, acute or rounded at the apex, coarsely dentate-serrate, at length glabrous, coriaceous. *Tendrils* simple, stout. *Cymes* 6 in. long; peduncle 2 in. *Flowers* very small, often unisexual. *Fruit* globose, black, pruinose, 4-seeded.

44. **V. himalayana**, Brand. *For. Fl.* 100; quite glabrous the younger parts subfleshy, stem robust, lateral leaflets very oblique, cymes as long as the leaves, flowers large, fruit the size of a pea black, seed $\frac{1}{2}$ by $\frac{1}{4}$ in. roundly obovoid nearly smooth polished black. *Vitis*

(*Ampelopsis*) *neilgherrensis*, *Wight Ic.* t. 965. *Ampelopsis himalayana*, *Royle III.* 149. *Cissus himalayana*, *Walp. Rep.* i. 441.

TEMPERATE HIMALAYA, from Kashmir, alt. 6-9000 ft., to Sikkim, alt. 6-11,000 ft. KHASIA Mts., alt. 2-4000 ft. PEGU, *Kurz.* WESTERN PENINSULA; Pulney Mts., *Wight*.

Bark smooth, or on the older branches with a few small warts. Leaves 3-8 in., membranous or subcoriaceous, often glossy; petiole $1\frac{1}{2}$ -4 in.; leaflets 2-5 in., sharply or inciso-serrate, the terminal ovate or obovate, rounded at the base or subcordate, acuminate, lateral $\frac{1}{2}$ -ovate or $\frac{1}{2}$ -cordate. Tendrils 0. Flowers $\frac{1}{2}$ in., in subcorymbose dichotomous cymes, rarely 5-merous. Style short, stout. Fruit 4-seeded.

VAR. *semicordata*, Wall. in Roxb. Fl. Ind. ed. Carey, ii. 481 (species); young branches petioles and the nerves beneath the leaves hispidly pubescent, leaves smaller than in the type, tendrils sometimes present branched, *Wall. Cat.* 6020. Himalaya and Khasia Mts.—Perhaps this ought not to be distinguished even as a variety.

45. **V. anamallayana**, *Beddome in Trans. Linn. Soc.* xxv. 213; a very large glabrous climber, petiole 1-2 in., leaflets $3\frac{1}{2}$ -4 in. ovate-lanceolate with a long acumination sharply serrate conspicuously reticulate beneath, peduncles shorter than the petioles, cymes lax.

WESTERN PENINSULA; banks of rivers on the Anamallay hills, alt. 5000 ft., *Beddome*.

Leaves of the younger branches simple, ovate-lanceolate, of the older usually trifoliate; petiole glandular; leaflets nearly equal.—The description is too imperfect to determine with exactness the proper affinities of this species.

46. **V. Gardneri**, *Thwaites Enum.* 63 (*Cissus*); branches terete rufescent, petioles about 1 in., leaflets 2-3 in. by $1-1\frac{1}{4}$ in., cymes few-flowered rufescent much longer than the petioles, fruit the size of a pea blackish-purple.

CEYLON; Matele and Hunasgirie district, *Thwaites*.

Leaflets glabrous, ovate-lanceolate, repand-dentate, cuneate at the base, lateral leaflets oblique, smaller. *Stipules* cordate-oblong, adnate.

b. Fruit globose, 1 in. or more in diameter.

47. **V. mollissima**, Wall. in Roxb. Fl. Ind. ed. Carey, ii. 482; stems slender when young covered with long hispid hairs, leaves hairy on both surfaces, style long slender, fruit dry 1 in. diam. *Wall. Cat.* 6012.

PENANG, *Wallich*; Malacca, *Griffith*, *Maingay*.

Stems at length glabrous. Leaves 5-8 in., covered with long soft dense hairs, membranous; petiole $2-3\frac{1}{2}$ in.; leaflets ovate or oblong-ovate, acute or subacuminate, faintly serrate, lateral very oblique. Tendrils very slender, forked. Flowers about $\frac{1}{12}$ in., long peduncled, divaricating cymes equalling the petioles. Fruit 2-3-seeded. Seed $\frac{3}{4}$ by $\frac{1}{2}$ in., elliptic-oblong, boat-shaped, rounded and polished on the back and with a linear tubercle hollow on the face.—*Wallich* describes the fruit as being "nearly the size of a cherry;" but the ripe ones in specimens from Malacca are very much larger.

48. **V. tuberculata**, *Blume Bijl.* 189 (*Cissus*); stem very warty glabrous, leaves quite glabrous coriaceous, style very short, stigma subpeltate, fruit dry $1\frac{1}{2}$ in. diam.

PEGU, *McClelland*.—DISTRIB. Java.

Whole plant quite glabrous. Leaves 8 in. to 1 ft.; petiole 24 in.; leaflets shortly stalked, narrowly ovate-lanceolate, shortly acuminate, entire or very faintly serrate towards the tip, margin slightly revolute. Tendrils simple or forked. Flowers very small, in dense compact cymes under 1 in., almost sessile. Fruit on very short thick pedicels, dry, membranous, brown, 1-3-seeded. Seed $\frac{3}{4}$ by $\frac{1}{2}$ in., obovoid

emarginate, grooved on the back and in the groove a long linear tubercle, the raphe also lying in a groove on the face.—According to Blume; the leaves are sometimes 4-5-foliolate.

c. *Fruit oblong subfalcate*, $\frac{1}{2}$ in. long.

49. **V. campylocarpa**, *Kurz mss.*; whole plant quite glabrous, fruit 1-seeded, seed $\frac{1}{2}$ by $\frac{1}{4}$ in. cylindrical curved transversely wrinkled, style 0, stigma large subpetalate.

ASSAM, *Griffith*; PEGU, *Kurz*.

Stems round. *Leaves* 6-8 in., coriaceous; petiole $2\frac{1}{2}$ -4 in.; leaflets stalked, obovate, suddenly and shortly acuminate, faintly serrate towards the tip. *Tendrils* 0. *Flowers* in nearly sessile very diffuse widely divaricating cymes longer than the petiole. *Fruit* dark-brown, not pulpy, pericarp reduced to a thin membrane.

** *Petals and stamens* 5.

50. **V. divaricata**, *Wall. in Hb.* 1824; *ex Cat.* 5994 h under *V. rugosa*; whole plant covered with deciduous down, stems cylindric, leaves 6 in.-1 ft., terminal leaflet ovate acute or subacuminate lateral semi-cordate.

TEMPERATE HIMALAYA, from Garwhal and Kumaon, alt. 6-700 ft., to E. Nepal, alt. 3-4000 ft.; MAISOR, *Herb. Rottler*.

Stems slender, far-climbing. *Leaves* thinly membranous, 3- rarely 5-foliolate; petiole 3-4 in.; leaflets serrate, at length glabrous or nearly so. *Flowers* dark-brown or red, in small compact umbellate cymes on long woolly peduncles, which bear a forked tendril about 1 in. from the top. *Style* very short. *Fruit* globose, the size of a currant, black, 3-4-seeded. *Seed* $\frac{1}{2}$ by $\frac{1}{4}$ in., almost round, flat, emarginate, pale coloured.—Wight & Arnott unite this with *V. tomentosa*, to which it is very closely allied, but differs sufficiently in the composition and texture of the leaves.

51. **V. araneosus**, *Dalz. & Gibs. Bomb. Fl.* 41?; whole plant covered with a deciduous down except on the under surface of the leaves where it is persistent, stems flattened, leaves 4-6 in., terminal leaflet elliptic, lateral semi-elliptic.

WESTERN PENINSULA; highest Ghats of the Concan; Pulney Mts., *Wight*.

Stems slender, far-climbing. *Leaves* membranous; petiole 1-2 in.; leaflets shortly-stalked, serrate, at length glabrous above, felted beneath. *Flowers* and *fruit* as in *V. divaricata*. *Seeds* $\frac{1}{2}$ by $\frac{1}{2}$ in., elliptic, with a round depression on the back, puckered round the margins.

SECT. III. *Leaves* mostly 5-foliolate, digitate. (See 58, *cinnamomea*.)

† *Flowers* umbellate hardly cymose.

52. **V. obtecta**, *Wall. Cat.* 6026; branches rooting, young branches petioles and peduncles clothed with soft villous red hairs, petioles $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., leaflets all under 4 in., flowers 4-merous. *V. hederacea*, *Wall. Cat.* 6019, *in part*.

WESTERN HIMALAYA, from Kumaon, alt. 6000 ft., *Thomson*; to Nipal, *Wallich*.—

DISTRIB. YUNAN.

Young branches very slender, creeping, older with a roughish bark and covered with numerous short arial rootlets. *Leaflets* ovate or obovate, sessile or nearly so, serrate, glabrous, membranous, lateral much smaller than the terminal. *Tendrils* branched, very slender, short. *Flowers* unisexual, $\frac{1}{2}$ in. long. *Style* 0, stigma flat. *Fruit* immature, the size of a currant, globose, 1-seeded, black? *Seed*?

†† *Flowers* umbellate in divaricating subcorymbose cymes.

53. **V. Thomsoni**, *Laws.*; stems cylindric slender, whole plant glabrous, leaves glaucous deep green, petiole 2-3 in., leaflets 3-4 by $1\frac{1}{2}$ -2 in.

elliptic-lanceolate serrate pale beneath, flowers 4-merous, seed dark pinkish-red.

KHASIA MTS., alt. 4-6000 ft., *H. f. & T.*

A low creeper, turning red. *Leaflets* narrowed into short stalks. *Tendrils* stoutish, branching. *Flowers* in slender widely divaricating cymes, green. *Style* subulate. *Fruit* the size of a currant, globose, 2-4-seeded, pruinose. *Seed* $\frac{1}{4}$ in., obovoid, rounded on the back, wedge-shaped on the face.

54. **V. elongata**, *Wall. Cat.* 6016; whole plant quite glabrous, branches slightly flattened thick and succulent polished, petioles 5-8 in., leaflets 5-7 by 2-2 $\frac{1}{2}$ in. elliptic-lanceolate shortly acuminate serrate membranous narrowed into a stalk, flowers 4-merous. *Cissus elongata*, *Roxb. Fl. Ind.* i. 411; *W. & A. Prodr.* 128.

SIKKIM HIMALAYA, alt. 1-5000 ft., SILHET and BENGAL; COROMANDEL, *Roxburgh*.

A very large climber running up and over the highest trees. *Branches* few or 0 until the plant arrives at a great height. *Tendrils* simple. *Cymes* di-trichotomous, the last divisions short ending in small umbels. *Style* short. *Fruit* 1 by $\frac{1}{2}$ in., elliptic, smooth, black, 1-seeded. *Seed* $\frac{3}{4}$ in., obovate, smoothish.—Wight & Arnott say that the leaves in this species, as also in the next, are sometimes pedate.

55. **V. auriculata**, *Roxb. Fl. Ind.* i. 411 (*Cissus*); branches cylindric succulent the young parts softly pubescent, petioles 4-7 in., leaflets on long stalks 2-6 by 1-4 in. obovate acute or shortly acuminate serrate membranous, flowers 4-merous. *Wall. Cat.* 6031; *W. & A. Prodr.* 129, *in part*; *Wight Ic.* 145. *Cissus auriculata*, *DC. Prodr.* i. 632; *Dalz. & Gibs. Bomb. Fl.* 40.

SIKKIM HIMALAYA; alt. 3-5000 ft., and CHITTAGONG, *H. f. & T.*; BENGAL and BIRMA, *Wallich*; MAISOIR, *Heyne*.

A large climber like *V. elongata*. *Bark* of the older stems spongy and deeply cracked. *Leaves* softly pubescent beneath when young, at length glabrous; stipules large, ear-shaped. *Tendrils* 2-3-cleft. *Flowers* small. *Cymes* on long thick weak succulent peduncles, divaricating, longer than the petiole. *Fruit* the size of a cherry, globose, red, 1-seeded. *Seed* elliptical, rounded at the base, $\frac{3}{4}$ by $\frac{1}{2}$ in.—None of the leaves in the many specimens I have met with are pedate, as Wight & Arnott say; indeed, the specimens in Wight's herbarium numbers 427 and 967 do not belong to this species, but to *V. lanceolaria*.

56. **V. planicaulis**, *Hook. f. in Bot. Mag.* t. 5685; whole plant quite glabrous, stems greatly flattened, petioles 4-7 in., leaflets on stalks $\frac{3}{4}$ -1 $\frac{1}{2}$ in. 5-8 by 2-3 in. oblong-lanceolate subacuminate obtusely-serrate membranous or subcoriaceous, flowers 4-merous.

SIKKIM HIMALAYA, and KHASIA MTS., alt. 3-4000 ft.

A vast climber reaching to the top of the highest trees, and sending down from its branches long thin leafless bands. *Stems* at the base often 1 $\frac{1}{4}$ ft. wide and 1 in. thick. *Tendrils* stout, simple. *Flowers* green. *Cymes* subcorymbose with divaricating branches. *Style* subulate; stigma 4-lobed. *Fruit* the size of a cherry, round, red? 1-2-seeded. *Seed* $\frac{1}{2}$ by $\frac{1}{4}$ in., nearly cylindrical, transversely rugose.

57. **V. obovata**, *Laws.*; branches petioles peduncles and tendrils clothed with a long soft spreading fulvous pubescence, stems much flattened, petiole 4-7 in., leaflets 6-10 in. stalked glabrous except upon the stalks obovate acute or subacuminate distantly and coarsely serrate.

KHASIA MTS., alt. 3-4000 ft., *H. f. & T.*

Tendrils stout, simple, very long. *Cymes* shortly pedunculate, subcorymbose with divaricating branches. *Flowers*? *Fruit* the size of a cherry, globose, 2-seeded.

Seeds $\frac{1}{2}$ in., obovoid?—Probably a tall climber like the last species. These five last species, though easily distinguishable by the characters given above, are very closely allied.

†† *Flowers in long pendulous racemose woolly spikes.*

58. **V. cinnamomea**, Wall. in Roxb. *Fl. Ind. ed. Carey*, ii. 483; *Cat.* 5989, in part; stems covered with a thin yellowish or pale rust-coloured closely adhering tomentum, leaves simple to 3-foliolate at length glabrous above felted beneath, spikes spreading or ascending, fruit triangular-obcordate 1-seeded, seeds $\frac{1}{3}$ by $\frac{1}{4}$ in. broadly obcordate.

MALACCA, PENANG, and SINGAPORE, Wallich, &c.

Apparently a large climber. *Stems* slender, cylindric, woody. *Leaves* usually 3-foliolate; petiole 3–6 in., sometimes simple, 3-lobed, cordate; leaflets narrowed into a very short stalk, $3\frac{1}{2}$ –8 by 2–3 in., terminal elliptic, lateral half-cordate, sharply and bristly serrate. *Racemes* cirriferous, very slender. *Seed* curved with a small round tubercle on the back, margins muricate.—The more slender habit, the thinness of the tomentum, the 1-seeded fruit and the shape of the seed, all point to this being distinct from *V. compositifolia*.

59. **V. compositifolia**, Laws.; stems covered with a very thick rust-coloured tomentum, leaves 5-foliolate glabrous above or tomentose on the principal nerves only densely felted beneath, spikes spreading very densely woolly, fruit $\frac{3}{4}$ by $\frac{1}{2}$ in. 4-angled 4-seeded, seed elliptic acute at the apex emarginate at the base slightly curved flattish and smooth on the back sharply ridged on the face. *V. cinnamomea* var. *compositifolia*, Wall. *Cat.* 5989 B.

PENANG, Phillips; MALACCA, Maingay.

A vast climber, with thick branches. *Petioles* 6–10 in.; petiolules 1 in.; leaflets 6–10 by $2\frac{1}{2}$ – $3\frac{1}{2}$ in., narrowly obovate, sharply and bristly serrate, cuspidate, coriaceous. *Racemes* 2 ft., much more robust than in *V. cinnamomea*, cirriferous. *Fruit* black, pulpy.

60. **V. elegans**, Kurz in Nat. Tydsch. v. Ned. Ind. (see Journ. Beng. As. Soc. 1870, pt. i. 74); stems covered with a very dense dark red woolly tomentum, leaves 3–5-foliolate velvety above densely felted beneath, spikes reflexed. *V. cinnamomea*, Wall. *Cat.* 5989, in part. *V. coralloides*, Hook. f. mss.

SINGAPORE, Walker, &c.

Petioles 2– $2\frac{1}{4}$ in.; leaflets 3–6 by $1\frac{1}{2}$ –3 in., sessile, obovate, bristly serrate. *Tendrils* opposite the leaves or springing from the peduncle. *Fruit*?—Much like *V. compositifolia*, but more robust, the tomentum also is darker denser and persistent on the upper surface of the leaves.

SECT. IV. *Leaves mostly pedately 5-foliolate. Flowers 4-merous.*

† *Flowers umbellately cymose.*

61. **V. capriolata**, Don Prodr. 188; whole plant quite glabrous, stipules and bracts scarious, style 0, stigma large flat. *V. serrulata*, Wall. *Cat.* 6034 a. *V. hederacea*, Wall. *Cat.* 6019, in part. *C. capriolata*, Royle Ill. t. 26. *C. serrulata*, Roxb. *Fl. Ind.* i. 414; DC. Prodr. i. 632. *C. napaulensis*, DC. Prodr. i. 632.

TEMPERATE HIMALAYA; from Garwhal? alt. 4–7000 ft., to Sikkim and Bhotan., alt. 5–8000 ft. KHASIA Mts., alt. 4–6000 ft. CHITTAGONG, Roxb.

Stems very slender, wiry. *Leaves* 5-foliolate; petiole $1\frac{1}{2}$ – $2\frac{1}{2}$ in.; leaflets $1\frac{1}{2}$ –3 by $\frac{1}{2}$ – $1\frac{1}{4}$ in., lanceolate or narrowly ovate or subobovate, acute or subacuminate, bristly-

serrate in the notches. *Tendrils* slender, simple or forked. *Cymes* axillary or terminating in short lateral branches, pedunculate; peduncles usually with several scarious conspicuous bracts, 3-5-rayed, rays several-flowered. *Flowers* pedicelled; pedicels $\frac{1}{4}$ - $\frac{1}{3}$ in. *Fruit* the size of a currant, globose, 2-4-seeded, black. *Seed* $\frac{1}{3}$ by $\frac{1}{4}$ in., pale, obovoid, thick, rounded and mucate on the back, and with a linear tubercle, flattened on the face.

†† *Flowers* subcorymbosely cymose.

62. **V. tenuifolia**, W. & A. *Prodr.* 129; whole plant quite glabrous, leaves membranous, tendrils simple or forked, peduncles long, cymes somewhat diffuse axillary but often owing to the sudden suppression of the flower-bearing branch appearing terminal, fruit the size of a pea 1-4-seeded, seed $\frac{1}{3}$ by $\frac{1}{2}$ in. triangular. *V. paniculata*, *Herb. Heyne in Wall. Cat.* 6022 a, in part, and b. *Cissus japonica*, Willd.; *DC. Prodr.* i. 632. *C. tenuifolia*, *Heyne in Wall. Cat.* 6022 a, in part. *C. cymosa*, *Wall. Cat.* 6017. *C. truncata*, *Wall. Cat.* 6032.

NIPAL, *Wallich*; SIKKIM HIMALAYA, alt. 1-5000 ft., *J. D. H.*; the KHASIA Mts., ASSAM, BIRMA, PEGU, TENASSERIM, and MALACCA. WESTERN PENINSULA, in the Southern provinces.—DISTRIB. China and Japan.

Stems slender, herbaceous. *Petiole* 2-4 in.; leaflets shortly stalked, 1-3 by $\frac{3}{4}$ -2 in., lanceolate or ovate-lanceolate, acute, sharply serrate. *Tendrils* short, slender. *Flowers* in divaricating dichotomous cymes, bisexual. *Style* short, stigma large, subpeltate. *Fruit* turbinate-globose. *Seed* rounded and mucate on the back, sharply ridged on the face.

63. **V. mollis**, *Wall. Cat.* 6025; whole plant covered with a short soft pubescence, leaves membranous, flowers fruit and seed as in *V. tenuifolia*.

SIKKIM HIMALAYA; alt. 1-3000 ft., *J. D. H.* KHASIA Mts., alt. 0-3000 ft. SILHET and CHITTAGONG. MALACCA, *Griffith*.

Closely resembling *V. tenuifolia* in habit. *Petiole* $\frac{3}{4}$ -1 $\frac{1}{2}$ in.; leaflets conspicuously stalked, 1 $\frac{1}{2}$ -3 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., ovate, broadly lanceolate or subovate, serrate.

64. **V. lanceolaria**, *Roxb. Fl. Ind.* i. 412 (*Cissus*); whole plant quite glabrous with exception of the inflorescence, branches round covered with corky warts or tubercles, leaves between fleshy and coriaceous, tendrils simple, cymes very short and compact in the axils of the leaves, flowers unisexual, fruit the size of a small cherry dry?, seed $\frac{1}{4}$ in. subpyriform or almost globose. *Wall. Cat.* 6013, in part; *W. & A. Prodr.* 128; *Wight Ic. t.* 177; *Brand. For. Fl.* 101. *V. muricata*, *W. & A. Prodr.* 128; *Wall. Cat.* 6015; *Wight Ic. t.* 740. *V. serratifolia*, *W. & A. Prodr.* 128 (*non Rottl.*). *Cissus feminea*, *Roxb. Fl. Ind.* i. 410; *DC. Prodr.* i. 631. *C. lanceolaria*, *DC. Prodr.* i. 632; *Grah. Cat. Bomb. Pl.* 33; *Thwaites Enum.* 63. *C. muricata*, *Dalz. & Gibs. Bomb. Fl.* 40; *Thwaites Enum.* 63.

ASSAM, PEGU, and the EASTERN PENINSULA, from Tenasserim to Malacca. WESTERN PENINSULA, from the Concan southwards. CEYLON, ascending to 3000 ft.

Branches woody. *Leaves* 5-foliolate, pedate, more rarely 3-foliolate; petiole 1 $\frac{3}{4}$ -3 in.; leaflets 3-5 by 1-2 in., stalked, oblong-lanceolate, distantly serrate. *Style* short, stigma peltate sublobed. *Fruit* subfleshy?, globose, 1-4?-seeded.—In all those specimens which I have examined, the fruit has been 1-2- not 4-seeded as stated by Roxburgh, Wight, and Arnott, also smaller than a cherry.

VAR. 1; stems smooth.—This appears intermediate between *V. lanceolaria* and *V. Ho-keri*, and in some respects answers better to Roxburgh's description of *V. lanceolaria* than the one given above.—Assam.

VAR. 2; *assimilis*, KURZ MSS. (*Sp.*); stems cylindric somewhat smooth, petiole

4-6 in., leaflets 4 by $2\frac{1}{2}$ in. sessile elliptic with a reflexed tip between fleshy and coriaceous nerves prominent beneath.—Probably a distinct species.—Tenasserim, *Kurz*.

VAR. 3; stems weak coarse tubercled, leaves very large subcoriaceous sharply serrate, cymes exceedingly short.—This also will probably prove to be distinct.—Penang, *Maingay*.

65. **V. sulcata**, *Laws.*; whole plant quite glabrous, branches smooth sulcate, leaves between fleshy and coriaceous, tendrils simple, cymes shorter than the leaves, fruit 1 in. diam. pulpy? 4-seeded, seed $\frac{1}{2}$ by $\frac{1}{2}$ in. oblong somewhat flattened on the face. *V. lanceolaria*, *Wight Ic. t. 28*.

WESTERN PENINSULA; *Herb. Wight*.

A climbing shrub. *Leaves* 5-foliolate, pedate, or rarely 3-foliolate; petiole $2\frac{1}{2}$ in.; leaflets 3-5 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., stalked, ovate, acuminate, serrate. *Flowers?* *Fruit* globose, smooth, black. *Seed* with a narrowly clavate tubercle on the back.—The smooth sulcate stems, large fruit, and shape of the seed, forbid this being regarded as a variety of *V. lanceolaria*, although it is very closely allied to that species.

66. **V. dubia**, *Laws.*; whole plant glabrous, branches cylindric smooth, leaves membranous, tendrils simple, cymes shorter than the petioles, fruit the size of a pea dry 2-seeded, seed $\frac{1}{4}$ by $\frac{1}{2}$ in. oblong,

SIKKIM HIMALAYA, alt. 1-4000 ft., *H. f. & T.* CHITTAGONG? *H. f. & T.*

A scandent shrub; branches slender, striate. *Leaves* mostly 3-foliolate, rarely 5-foliolate, pedate; petiole 2-4 in.; leaflets stalked, 3-8 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., ovate-lanceolate or elliptic, acuminate, deeply almost incisely serrate. *Cymes* 1- $1\frac{1}{2}$ in., compact.

67. **V. Hookeri**, *Laws.*; whole plant glabrous or the cymes only slightly pubescent, branches cylindric-smooth or only slightly warty glaucous, leaves between fleshy and coriaceous, tendrils simple, cymes shorter than the petioles, fruit 1 in. diam. pulpy 2-seeded, seed $\frac{1}{2}$ by $\frac{1}{4}$ in. oblong or subobovoid.

SIKKIM HIMALAYA, the KHASIA MTS., and CHITTAGONG, alt. 1-4000 ft., *H. f. & T.* BHOTAN and ASSAM, *Griffith*.—DISTRIB. Java.

A large climber. *Leaves* pedately 5-foliolate; petiole 4-6 in.; leaflets stalked, 4-8 by 2 - $3\frac{1}{2}$ in., elliptic, acute at both ends or shortly acuminate at the apex, serrate. *Tendrils* very long. *Cymes* $1\frac{1}{2}$ - $2\frac{1}{2}$ in.

68. **V. rumicisperma**, *Laws.*; whole plant glabrous, branches cylindric covered with corky warts or tubercles, leaves between fleshy and coriaceous, tendrils forked, cymes as long as or longer than the leaves, fruit the size of a large currant 4-seeded pulpy, seed $\frac{1}{2}$ by $\frac{1}{4}$ in. broadly triangular-obcordate. *V. lanceolaria*, *Wall. Cat. 6013 h.* *V. tuberculata*, *Wall. Cat. 6014*.

NIPAL and SIKKIM HIMALAYA, alt. 3-7000 ft., *Wallich, &c.* KHASIA MTS., *H. f. & T.*

An immense climber. *Leaves* usually pedately 5-foliolate, rarely 3-foliolate; petiole 3-6 in.; leaflets 3-6 by 1 - $2\frac{1}{2}$ in., elliptic-lanceolate, serrate. *Fruit* black. *Seed* with a broad shallow groove on the back and a sharp ridge formed by the raphe on the face. The fruit is sweet and pleasant to the taste. *J. D. H.*—Closely allied to *V. lanceolaria*, but readily distinguished by its somewhat smaller fruit, and particularly by the shape of its seed.

SECT. V. *Leaves* mostly pedately 7-9-foliolate. *Flowers* mostly 5-merous.

† *Flowers* corymbosely cymose.

69. **V. pedata**, *Vahl in Herb. Madr. ex Wall. Cat. 6027*; whole plant softly pubescent or glabrate, leaves membranous, tendrils forked, cymes as long as or longer than the petiole, fruit the size of a currant dry 4-seeded,

seed $\frac{1}{8}$ in. diam. hemispherical hollowed out on the flat side and the opening closed by a thin membrane. *W. & A. Prodr.* 128. *Cissus heptaphylla*, *Retz Obs.* 22. *C. pedata*, *Lamk.*; *Roxb. Fl. Ind.* i. 413; *DC. Prodr.* i. 632; *Grah. Cat. Bomb. Pl.* 33; *Dalz. & Gibs. Bomb. Fl.* 40; *Thwaites Enum.* 63. *C. serratifolia*, *Hb. Rottl.* *Melothrix zeylanica*, *Koen. in Hb. Banks.*—*Rheede Hort. Mal.* vii. t. 10.

BENGAL, SILHET, ASSAM, the KHASIA MTS., alt. 0–3000 ft. BURMA and from TENASSERIM to SINGAPORE and PENANG. WESTERN PENINSULA, from the Concan southwards, and in CEYLON.—DISTRIB. Malayan Archipelago.

A large weak climber, with cylindric often hirsute branches. *Leaves* usually 7-foliolate; petiole 4–6 in.; leaflets on long stalks, 4–8 by $1\frac{1}{2}$ –3 in., oblong-lanceolate, acuminate, serrate, often at length nearly glabrous. *Cymes* subcorymbose with widely divaricating branches. *Flowers* bisexual, green, covered with a greyish pubescence. *Fruit* subglobose, somewhat flattened at the apex.—The seed resembles exactly that of *V. Roxburghii*, but is rather smaller.

70. **V. novemfolia**, *Wall. Cat.* 6030; whole plant glabrous, branches cylindric smooth, leaves membranous, tendrils forked, cymes on very long peduncles nearly as long as the leaves, fruit $1\frac{1}{2}$ in. diam. pulpy 4-seeded, seed $\frac{3}{4}$ by $\frac{5}{12}$ in. boat-shaped with the ends slightly curved inwards hollow the elliptic opening closed by a thin membrane.

SINGAPORE, *Wallich, Griffith.*

Stems dark-brown, shining. *Leaves* pedately 7–9-foliolate; petiole 4–6 in.; leaflets 5–8 in., on long stalks, oblong-lanceolate, entire. *Peduncles* longer than the petioles. *Flowers* small, green. *Fruit* globose, black.

†† *Flowers in long slender pendulous racemose spikes.*

71. **V. Helferi**, *Laws.*; stems cylindric somewhat slender the young parts covered with a pale deciduous tomentum, leaves 5–7-foliolate glabrous except on the nerves beneath, petiole 3–4 in., leaflets 3–6 by $1\frac{1}{4}$ – $2\frac{1}{2}$ in. shortly stalked broadly oblanceolate serrate submembranous.

TENASSERIM OF ANDAMAN ISLS., *Helfer.*

Peduncles opposite the leaves, cirriferous. *Racemes* 1 ft. or more long, very slender. *Flowers* glabrous, black when dry, subquadrangular. *Style* 0, stigma minute. *Fruit* ?

72. **V. polystachya**, *Wall. Cat.* 6028, *in part*; stems cylindric very coarse and thick speedily becoming covered with a thick corky bark, whole plant quite glabrous with the exception of the spikelets which are slightly puberulous, petiole 6 in., leaflets mostly 6–12 by 3–4 in. elliptic-oblong cuspidate distantly serrate on long stalks coriaceous.

TENASSERIM OF ANDAMAN ISLS., *Helfer*; MALACCA, *Griffith, Maingay.*—DISTRIB. Siam.

Peduncles opposite the leaves, robust, cirriferous. *Tendrils* stout. *Racemes*, 2 ft.; spikelets 2 in., covered with a short slight appressed pubescence. *Flowers* glabrous, black when dry. *Petals* united. *Style* very short. *Fruit* (immature) $\frac{3}{4}$ in. diam., globose, succulent. *Seed* ?

73. **V. nitida**, *Laws.*; stems cylindric smooth, bark shredding, whole plant quite glabrous, petiole 4–6 in. leaflets 7 on long stalks 8–10 by 3–4 in. elliptic-oblong acute distantly and faintly serrate shining beneath membranous, stipules large broadly ovate. *V. polystachya*, *Wall. Cat.* 6028 *in part* and 9031.

PENANG, *Wallich.*—DISTRIB. Siam.

Peduncles opposite the leaves, robust, $1\frac{1}{2}$ ft., cirriferous, quite glabrous. *Flowers* small, black when dry, subquadrangular. *Petals* united? *Style* very short. *Fruit* ?—

These 3 last species are closely allied to *V. cinnamomea* and *V. elegans*, and with them form the binding link between this genus and *Pterisanthes*.

SECT. VI. *Leaves* 1-3-pinnate.

74. **V. rubifolia**, Wall. in Roxb. *Fl. Ind. ed. Carey*, ii. 480; *Cat.* 6037; branches and younger parts pubescent, leaves pinnate, leaflets closely and sharply serrate.

KHASIA MTS., alt. 4-5000 ft., *De Silva*, &c.; SILHET, Wallich. ASSAM, Masters.

A large climbing shrub, branches slender, angular. *Leaves* 6-9 in.; leaflets 2½-3½ by 1-2½ in., shortly stalked, 3-5-paired, subcordate-ovate, acute or subacuminate. *Tendrils* forked, glabrous above, pubescent beneath. *Flowers* small, green, umbellate in slender dichotomous subcorymbose cymes. *Fruit* the size of a currant, red, turning black. *Seed* ½ by ¼ in., broadly obovoid, the back rounded and with a spatulate tubercle, the margins transversely rugose, face sharply wedge-shaped, light-brown.

75. **V. cantoniensis**, Seem. *Bot. Herald Voy.* 370; whole plant quite glabrous, leaves pinnate or the lower pair of pinnæ ternately compound. *Cissus cantoniensis*, Hook. & Arn. *Bot. Beech.* 175. *C. diversifolia*, Walp. *Pl. Meyen.* 314. *Hedera hypoglauca*, Hance in Walp. *Ann.* ii. 724.

MALACCA, Griffith. — *DISTRIB.* Hongkong.

Stem slender, cylindric. *Leaflets* 5-paired, 2-3 by ½-1 in., ovate-lanceolate, coarsely crenate, whitish beneath. *Tendrils* branched. *Flowers* small, in dichotomous corymbose cymes, 5-merous? *Style* subulate. *Fruit* and *seed* as in *V. rubifolia*. — A specimen in Herb. Hook., marked Khasia, Griffith, is evidently a fragment of the plants collected in Malacca.

DOUBTFUL OR EXCLUDED SPECIES.

CISSUS ACUTIFOLIA, Poir.; *DC. Prodr.* i. 630. Description too short for identification.

C. WALLICHIANA, Turcz. in Bull. Mosc. is *Hedera Helix*, L.

VITIS ATROVIRIDIS, Wall. *Cat.* 6040, is *Gymnostemma trigyna*.

V. ERYTHROCLADA, Kurz in Journ. As. Soc. Beng. 1872, ii. 301, from Pegu (Kurz) is apparently allied to *V. obovata*, but the description is not sufficient for identification.

V. TRICHOPHORA, Wall. *Cat.* 9032, is *Gymnostemma trigyna*?

2. **PTERISANTHES**, Blume.

Large scandent or sarmentose plants furnished with tendrils. *Leaves* alternate, simple or 3-7-foliolate, digitate or pedate. *Flowers* small, 4-5-merous, inserted on a flat expanded membranous pedunculated rachis, unisexual; male flowers marginal, often pedicellate; female sessile. *Calyx* cup-shaped or obsoletely toothed. *Petals* separating. *Ovary* 2-celled; style very short, stigma capitate. *Berry* globose or obovoid, 1-4-seeded. — *DISTRIB.* Sp. 5 or 6. Malay and Indian archipelago.

Very closely allied to *Vitis*, especially to those forms of the genus in which the flowers are sessile on racemose spikes. Miquel is probably right in uniting it with *Vitis*.

1. **P. polita**, Miq. *Ann. Mus. Lugd. Bat.* i. 95; whole plant quite glabrous, leaves simple.

MARTABAN, at Moulmein, Lobb; SINGAPORE, Maingay. — *DISTRIB.* Sumatra, Borneo.

An exceedingly slender far-climbing plant. *Leaves* 4-8 by 2-3½ in., elliptic-oblong or ovate, acute, subcordate, distantly and spinosely serrate or entire, membranous. *Tendrils* bearing the red expanded rachis. *Flowers* 4-merous. *Fruit*?

2. **P. heterantha**, *Griff. Notul.* iv. 694, under *Embamma*; branches leaves and peduncles densely and persistently tomentose, leaves 3-foliolate.

MALACCA, *Griffith, Maingay*.

A very slender far-climbing plant. *Leaves* membranous; petiole 4-7 in.; leaflets 5-8 in., on stalks $\frac{3}{4}$ -1 $\frac{1}{4}$ in., terminal leaflet lanceolate, the two lateral obliquely $\frac{1}{2}$ -cordate, serrate, covered above with stiff spreading hairs, beneath with a rust-coloured felted tomentum. *Tendrils* very short, bearing the expanded rachis. *Flowers* 4-6-merous. *Fruit*?—Very nearly allied to Miquel's *V. rufula*, if not identical with it.

3. **P. cissoides**, *Blume Bijl.* 193; leaves 3-foliolate, branches leaves and peduncles covered with a sparse white deciduous flocculent down. *Miquel in Linnæa* xviii. 385, t. viii. *Cissus involucrata*, *Spreng. Syst.* iv. pt. ii. 44. *Embamma cordigera*, *Griff. Notul.* iv. 694; *Ic. Pl. Asiat.* t. 646. *Vitis pterisantha*, *Miq. Ann. Mus. Lugd. Bat.* i. 94.

MALACCA, *Griffith, Maingay*.—DISTRIB. Java.

A slender climber. *Leaves* membranous; petiole 1 $\frac{1}{2}$ -3 in.; leaflets shortly stalked, 3-4 by 2-2 $\frac{1}{2}$ in.; terminal obovate, lateral oblique, half cordate-ovate, distantly and spinosely serrate, speedily becoming glabrous above, permanently pubescent on the nerves beneath. *Tendrils* short, bearing the glabrous expanded inflorescence. *Flowers* 4-merous. *Fruit* globose, $\frac{1}{2}$ in. diam., subfleshy, 2-celled, 4-seeded. *Seed* $\frac{1}{4}$ by $\frac{1}{8}$ in., triangular, rounded on the back, and with a sharp ridge beneath.

4. **P. pedata**, *Laws.*; leaves 5-foliolate covered with a sparse white flocculent down.

MALACCA, *Griffith, Maingay*.

A slender climber, with glabrous branches. *Leaves* membranous; petiole 1 $\frac{1}{2}$ -2 in.; leaflets very shortly stalked, 2 $\frac{1}{4}$ -3 by 1-1 $\frac{1}{2}$ in., oblong-obovate, tipped with a hard bristle, distantly and spinosely serrate, at length nearly glabrous above, nerves beneath covered with a dense rusty tomentum. *Tendrils* short, bearing the glabrous inflorescence. *Flowers* 4-merous. *Fruit*?

3. **LEEA**, Linn.

Small trees shrubs or herbs. *Branches* striate or sulcate, often herbaceous. *Leaves* alternate, usually very large, simple, or 1-2-3-pinnate; petiole dilated at the base into sheathing stipules. *Peduncles* opposite the leaves. *Tendrils* 0. *Inflorescence* corymbosely-cymose. *Flowers* red, yellow or green. *Calyx* 5-toothed. *Petals* 5, connate at the base and adhering to the staminal tube, revolute. *Stamens* united at the base into a 5-lobed tube, filaments inserted between the lobes of the tube, inflexed; anthers free and exserted, or connate and included in the tube. *Ovary* inserted on the disk, 3-6-celled; style short, stigma swollen; ovules solitary in each cell, erect. *Berry* 3-6-celled, 3-6-seeded, usually succulent, subglobose, flattened at the top. *Seed* wedge-shaped.—DISTRIB. Species about 25; most abundant in the tropics of Asia and Africa, rare in Australia.

SECT. I. *Leaves* simple.

1. **L. macrophylla**, *Roxb. Fl. Ind.* i. 653; *Wall. Cat.* 6818; *Wight Ic.* 1154; *Dalz. & Gibs. Bomb. Fl.* 41; *Brand. For. Fl.* 102. *L. latifolia*, *Wall. Cat.* 6821. *L. simplicifolia*, *Griff. Notul.* iv. 697; *Ic. Pl. Asiat.* 645, f. 1.

Throughout the hotter parts of INDIA, from the TROPICAL HIMALAYA, as far west as Kumaon, to Bengal, Assam, Tenasserim? and the WESTERN PENINSULA.

Stems erect, flexuose. *Leaves* 9 in.-2 ft., broadly ovate, subcordate at the base, coarsely serrate or dentate or sublobed, repand, glabrous and dark-green above, nearly white beneath, and pubescent with minute branching hairs. *Cymes* puberulous, 1 ft. or more, freely branching. *Flowers* small, white. *Anthers* connected. *Fruit* the size of a small cherry; smooth, black, succulent.—The root is said to yield a colour fit for dyeing.

SECT. II. *Leaves* pinnate (tripinnate leaves may occasionally be found on luxuriant plants).

2. ***L. cinerea***, *Laws.*; leaflets 6-9 by 4-5 in. elliptic-ovate serrate-dentate repand dark-green and glabrous above pale beneath with minute branching hairs membranous. ? *L. macrophylla*, *DC. Prodr.* i. 635.

WESTERN PENINSULA; at Paulgautcherry (in Malabar?) *Wight*.

Stems herbaceous. *Leaves* about 2 ft.; the lower leaflets on stalks 2-3 in., the upper ones sessile. *Cymes* and *Flowers* as in *L. macrophylla*. *Fruit*?

3. ***L. coriacea***, *Laws.*; leaflets 10 by 4½ in. sessile ovate subcordate at the base serrate-dentate not repand green and glabrous above rather paler beneath and pubescent with minute nearly simple hairs coriaceous.

WESTERN PENINSULA; the Concan, *Stocks*.

Stems herbaceous. *Leaves* about 2 ft. *Flowers*? *Fruiting-cymes* large and fleshy, branching freely. *Fruit* the size of a large currant, dry.—I have seen only a single specimen.

4. ***L. alata***, *Edgeworth in Trans. Linn. Soc. xx.* 36; leaflets 12-14 by 2½-3 in. sessile oblong or oblong-lanceolate sharply and irregularly serrate quite glabrous on both sides shining beneath reddish. *Brand. For. Fl.* 102. *L. rubra*, *Royle Ill.* 145, not of *Blume*.

TROPICAL HIMALAYA; from Garwhal, *Falconer*, to Sikkim, alt. 1-5000 ft., *J. D. H.*

Stems herbaceous. *Leaves* shortly petioled; petiole winged, reddish. *Flowers* red. *Anthers* connate. *Fruit* the size of a large currant, reddish-purple, succulent.

5. ***L. angustifolia***, *Laws.*; leaflets 1-1½ ft. by ¾-1 in. on stalks ¼ in. linear-subulate acuminate subcordate at the base distantly serrate glabrous on both sides.

PEGU, at Rangoon, *M'Lelland*.

Stems herbaceous. *Leaves* shortly petioled, about 2½ ft., pale glaucous-green. *Flowers*? *Fruiting-cymes* rather small though freely branching. *Fruit* the size of a pea, dry.—Very closely allied to *V. parallela*.

6. ***L. crispa***, *Willd. Sp. Pl.* i. 1177; stems branches peduncles and petioles with crisped wings, leaflets shortly stalked 4-12 by 1½-3½ in. oblong-lanceolate or ovate-oblong acuminate or acute rounded at the base deeply and acutely serrate prominently penninerved, glabrous above minutely pubescent on the nerves beneath coriaceous, nerves parallel straight one running to each serrature. *Roxb. Fl. Ind.* i. 654; *Wall. Cat.* 6827; *DC. Prodr.* i. 635. *L. pinnata*, *Andr. Bot. Rep.* v. 355.

SIKKIM HIMALAYA and the KHASIA Mts., alt. 1-4000 ft.; *SILHET, Wallich*. ASSAM, CHITTAGONG. The CONCAN, *Law*.

Stems herbaceous or somewhat woody, jointed, 4-5 ft. *Leaves* usually quinate-pinnate. *Cymes* stoutish, small; bracts minute. *Anthers* distinct. *Fruit* the size of a cherry, black, succulent.—The crisped winged stems and petioles give to this plant a most elegant appearance.

7. ***L. aspera***, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 468; leaflets on long stalks 3-6 by 2-3 in. cordate-ovate suddenly acuminate crenate-

serrate prominently penninerved scabrous on both sides and with scattered white appressed hairs between the nerves above, nerves parallel straight one running to every other serrature. *Edgeworth in Trans. Linn. Soc. xx. 36*; *Brandis For. Fl. 102*. ? *L. herbacea*, Wall. Cat. 6829, and 6824 E & G (in part) under *L. staphylea*.

WESTERN TROPICAL HIMALAYA, from Jamu to Nipal, ascending to 6000 ft.; OUDH, KHANDEISH. WESTERN PENINSULA, *Wight*; the CONCAN, *Law*?

Stems herbaceous, erect, 2-4 ft., pubescent, not crisped. *Leaves* membranous or subcoriaceous when old. *Cymes* small, pubescent. *Anthers* distinct. *Fruit* the size of a large currant, black, succulent.—Nearly allied to *L. crispa*, from which it may be always readily distinguished by the want of the crisped wings on the stems and petioles, and by the white appressed hairs on the intercostal spaces. *L. aspera*, Wall. Cat. 6825, belongs to *L. robusta*, but the specimens in Wall. Herb. under 6824 e and g in part are the true plant.

8. *L. pumila*, *Kurz in Journ. As. Soc. Beng.* 1872, ii. 302; stems and rachis not winged, leaves abruptly or imparipinnate 4-5-foliolate, leaflets 4 in. unequal subfalcate oblong-lanceolate entire puberulous on both sides especially beneath chartaceous.

TENASSERIM, *Kurz*.

A small perennial herb, covered with a dense fulvous or cinereous pubescence. *Rachis* and *cymes* ferruginously tomentose. *Flowers* small, in axillary branching subpaniculate cymes, shorter than the leaves. *Sepals* ciliate and usually thinly hirsute. *Petals* broadly oblong, ciliate. *Squamæ* bifid woolly within.—The above description is taken from *Kurz*. I have seen no specimen. It would appear to be allied to *L. trifoliata*.

9. *L. trifoliata*, *Laws.*; young parts very slightly pubescent otherwise glabrous, leaves 3-foliolate leaflets shortly stalked 2-8 by $\frac{3}{4}$ -3 in. elliptic subacuminate sharply serrate very thin and membranous, nerves slightly arcuate one running to every other serrature.

ASSAM, *Jenkins*, &c.; BHOTAN, *Booth*; MISHMI HILLS, *Griffith*.

A small rather wiry plant, 1-2 ft. *Cymes* small. *Anthers* distinct. *Fruit* the size of a currant, black, dry.—Closely allied to *L. aspera*, but wanting the white hairs on the intercostal spaces, and differing apparently greatly in habit.

SECT. III. *Leaves* 2-3-pinnate (pinnate leaves may be occasionally found in young or starved plants).

* *Leaves* glabrous.

10. *L. parallela*, leaflets 6-10 by 1-2 in. very shortly stalked lanceolate or oblong-lanceolate sharply serrate drying a pale glaucous-green.

ASSAM, *Jenkins*; BIHMA, *Roxburgh*.

Shrubby? whole plant quite glabrous. *Leaves* pinnate or bipinnate, 2-3 ft., subcoriaceous. *Flowers* small, glabrous; peduncles long. *Cymes* freely branching. *Anthers* connate. *Fruit* the size of a pea, dry.—Very closely allied to *L. angustifolia*, differing only in the shorter broader and more sharply toothed leaves, and larger cymes.

11. *L. sambucina*, *Willd. Sp. Pl.* i. 1177; leaflets 2-10 by $\frac{3}{4}$ -4 $\frac{1}{2}$ in. narrowly-lanceolate to ovate-oblong or oblong acute or acuminate serrate shining drying black. *Roxb. Fl. Ind.* i. 657; *Wall Cat.* 6823; *DC. Prodr.* i. 635; *Griff. Notul.* iv. 698; *IC. Pl. Asiat.* 644, t. i.; *Brand. For. Fl.* 102. *L. æquata*, *Wall. Cat.* 6824 d (not of DC.). *L. acuminata*, *Wall. Cat.* 6830. *L. gigantea*, *Griff. Notul.* iv. 697. *L. læta*, *Wall. Cat.* 6831; *Kurz in Journ. As. Soc. Beng.* 1873, ii. 65. *L. ottilis*, *DC. Prodr.* i. 636. *L.* ? var. sanguinea, *Wall. Cat.* 6824 M.; *Kurz in Journ. As. Soc. Beng.* 1873, ii. 66.

L. Staphylea, *Roxb. Fl. Ind.* i. 658; *W. & A. Prodr.* 132; *Wall. Cat.* 6824 except *e*, and *g*; *Wight Ic.* 78; *Ill.* i. 58; *Dalz. & Gibs. Bomb. Fl.* 41; *Thwaites Enum.* 64. *Aquilicia sambucina*, *Linn. Mant.* 211; *Cav. Diss.* 7, t. 218. *A. ottilis*, *Gærtn. Fruct.* i. 275. *Gilibertia nalugu*, *DC. Prodr.* iv. 256. *Gustonia nalugu*, *Spreng. Syst.* ii. 440. *Ottilis zeyla nica*, *Gærtn. Fruct.* i. t. 57.; *Staphylea indica*, *Burm. Fl. Ind.* t. 24, f. 2.—*Rheede Hort. Mal.* ii. 43, t. 26.

Common throughout the hotter parts of INDIA, from the HIMALAYA as far west as Kumaon, to Birma, and southwards to CEYLON, and MALACCA.—DISTRIB. Malay Islands, China, Philippine Islands, Australia.

Stems shrubby, with straight branches. *Leaves* pinnate or tripinnate often $3\frac{1}{2}$ by 4 ft.; leaflets stalked, very variable in size and shape; nerves arcuate. *Flowers* greenish-white. *Anthers* connate. *Fruit* the size of a small cherry, dry.—Wight and Arnott discriminate two varieties, depending for their characters upon the texture of their leaves, the size of their flowers, and the nature of the staminal-tubes; but the transitional conditions between them are so numerous that they cannot be maintained. *L. æquata*, *DC. Prodr.* i. 635, with pubescent stems and leaves, belongs probably to *L. hirta* or *L. robusta*. A specimen of Griffith's, from Assam, with oblong acuminate sharply and finely serrate leaflets and prominent parallel straight nerves, is probably distinct.

** *Leaves pubescent.*

12. *L. integrifolia*, *Roxb. Fl. Ind.* i. 659; leaflets 6–8 by 2–3 in. linear-lanceolate or lanceolate acuminate entire or very slightly serrate glabrous above slightly downy beneath. *W. & A. Prodr.* 132.

WESTERN PENINSULA; moist valleys in the Circars, *Roxburgh*.

Subarborescent. *Leaves* supra-decompound, about 30 in. both ways. *Cymes* supra-decompound, large, subcorymbose. *Corolla-tube* shorter than the calyx. *Staminal-tube* cylindric, the grooves running almost to the line of union with the corolla. *Lobes* emarginate. *Anthers* oblong, pointed, connate.—I have seen no specimen, neither had Wight and Arnott, whose emended description of *Roxburgh* I follow.

13. *L. robusta*, *Roxb. Fl. Ind.* i. 655; leaflets 6–12 by $2\frac{1}{2}$ –6 in. ovate or ovate-lanceolate cuspidate serrate glabrous above pubescent on the veins beneath, cymes compact, bracts large persistent. *W. & A. Prodr.* 132; *Wall. Cat.* 6826. *L. aspera*, *Wall. Cat.* 6825, in part. *L. compactiflora*, *Kurz in Journ. As. Soc. Beng.* 1873, ii. 65.

SIKKIM HIMALAYA and KHASIA Mts., alt. 1–5000 ft., *H. f. & T.*; MARTABAN, *Kurz*; WESTERN PENINSULA, in the Northern Circars, *Roxburgh*.

A large robust shrub, 5–6 ft. *Stems* stout, the older parts glabrous, the younger covered with a harsh coarse short pubescence. *Leaves* 1–3 ft. long, often broader. *Bracts* $\frac{1}{2}$ –1 in., lanceolate. *Flowers* larger than in the other species. *Anthers* connate. *Fruit* black, succulent, the size of a small cherry.—Although *Roxburgh* describes the cymes as supra-decompound and the bracts as linear and caducous. I believe that this is the species he intended.

14. *L. diffusa*, *Laws.*; young parts covered with a short thin pubescence; leaflets 5–12 by 2–5 in. shortly stalked acuminate serrate dark-green above with a few white appressed hairs of the intercostal spaces at length glabrous paler and pubescent on the nerves beneath, cymes very large and diffuse, bracts minute caducous. *L. aspera*, *Wall. Cat.* 6825, in part.

NIPAL, *Wallich.* KHASIA Mts., alt. 2–3000 ft., *H. f. & T.* TENASSERIM or ANDAMAN ISLANDS, *Helfer*.

A somewhat weak shrub, with more slender branches than in *L. robusta*. *Leaves* thin and membranous; nerves arched. *Anthers* connate. *Fruit*?—It would seem

as though Roxburgh, in his description of the cymes of *L. robusta*, had taken his characters from specimens belonging to this species.

15. *L. hirta*, Roxb. *Fl. Ind.* i. 655; branches and leaves hairy, leaflets 4-12 by 2-4 in. lanceolate or ovate-lanceolate acuminate serrate harsh and scabrous above hairy beneath, cymes very short and compact, bracts inconspicuous. *Wall. Cat.* 6822. *L. scabra*, Steud. ii. 21.

SIKKIM HIMALAYA, ASSAM, SILHET, the KHASIA MTS., EAST BENGAL, CHITTAGONG, PEGU, and the ANDAMAN ISLANDS.—DISTRIB. Java.

Shrubby, with coarse subscabrous branches and petioles. *Veins* arched. *Cymes* 2-5 in., very compact, densely hirsute. *Flowers* large. *Anthers* connate. *Fruit* the size of a currant, black, dry?—Readily known from *L. robusta* by its abundant and harsh pubescence and inconspicuous bracts; and from *L. diffusa* by its very short and compact cymes.

DOUBTFUL AND EXCLUDED SPECIES.

LEEAE CORDATA, *Wall. Cat.* 6019, appears to be a *Vitis* near *V. pallida*; the specimen is insufficient. Kurz in *Journ. As. Soc. Beng.* 1873, pt. 2, 66, refers it doubtfully to a form of *V. Linnæi*.

LEEAE ODONTOPHYLLA, *Wall. Cat.* 6820 (leaves only), is probably a *Vitis*, allied to *V. latifolia*.

ORDER XLIV. SAPINDACEÆ. (By W. P. Hiern, M.A.)

Trees, shrubs, or rarely stout or wiry herbs. *Leaves* alternate or less commonly opposite, exstipulate or occasionally stipulate, pinnate palmate trifoliolate or simple; leaflets opposite or alternate, entire or dentate, occasionally lobed. *Flowers* mostly polygamo-dioecious and small, usually either irregular or unsymmetrical. *Calyx* mostly 4-5-lobed or -sepalous, often unequally so, imbricate or valvate in the bud. *Petals* free, equal or unequal, usually 4-5 or 0, the fifth sometimes deficient, flat or in one genus cup-shaped, often bearded or squamate at the base within. *Disk* annular or unilateral, rarely in ♂ flowers deficient. *Stamens* 5-10, inserted inside the disk at the base of the ovary or outside or on the disk, sometimes unilateral; anthers 2-celled, basifixed or versatile; filaments often pubescent, almost always free. *Ovary* centric or excentric, entire or lobed or sometimes divided nearly to the base, 1-4-celled; cells 1-2- or rarely more-ovuled. *Style* simple or divided, usually terminal; stigma usually simple. *Ovules* anatropous campylotropous or amphitropous, usually 1 or 2 together, occasionally more, affixed to the axis of the ovary, ascending. *Fruit* capsular or indehiscent, entire or lobed, sometimes winged. *Seeds* globose or compressed, arillate or naked, exalbuminous or in some genera albuminous. *Embryo* usually thick, sometimes plicate or spirally convolute.—DISTRIB. About 400 to 500 species scattered over the whole world, especially abundant within the tropics; 83 occur in Australia; 37 in Tropical Africa; 20 are given by Boissier in the "Flora Orientalis."

TRIBE I. *Sapindææ*. *Stamens* inserted inside the disk, sometimes unilateral. *Seeds* exalbuminous. *Leaves* exstipulate, alternate or in *Æsculus* opposite.

Flowers irregular. Disk unilateral or very oblique.

Ovules solitary. Leaves alternate, not digitate.

Fruit capsular, inflated, globose or pyriform. Leaflets biter-

nate 1. CARDIOSPERMUM.

- Fruit indehiscent, not divided into lobes. Leaves pinnate 2. *HEMIGYROSA*.
 Fruit deeply divided into 3 1-indehiscent lobes. Leaves
 pinnate or 3-1-foliolate.
 Leaves pinnate. Flowers not very small.
 Lobes of fruit globose 3. *DITTELARMA*.
 Lobes of fruit oblong 4. *ERIOGLOSSUM*.
 Leaves 3- or 1-foliolate. Flowers very small 5. *ALLOPHYLLUS*.
 Ovules 2 together. Leaves opposite, digitate 6. *ÆSCULUS*.
 Flowers regular. Disk annular.
 Fruit without wide membranous wings.
 Ovules solitary. Fruit not inflated.
 Petals each forming a turbinate cup 7. *SCYTHOPETALUM*.
 Petals flat, with or without scales at the base.
 Fruit capsular 8. *CUPANIA*.
 Fruit indehiscent.
 Fruit not deeply lobed.
 Sepals widely imbricated.
 Lowest pair of leaflets not stipuliform 9. *LEPISANTHES*.
 Lowest pair of leaflets stipuliform 10. *OTOPHORA*.
 Calyx small; lobes valvate or slightly imbricated.
 Petals 0. Fruit ovoid 11. *SCHLEICHERA*.
 Petals 5. Fruit globose 12. *GLENNIEA*.
 Fruit deeply divided into 3-1 lobes.
 Sepals widely imbricated.
 Fruit smooth 13. *SAPINDUS*.
 Fruit muricated 14. *XEROSPERMUM*.
 Calyx valvate or slightly imbricated.
 Flowers usually panicled and not fascicled;
 fruit muricated or tubercled or obsoletely so 15. *NEPHELIUM*.
 Flowers fascicled. Fruit smooth 16. *POMETIA*.
 Ovules 2 together. Capsule inflated 17. *HARPULLIA*.
 Fruit with 3-2 broad membranous wings 18. *ZOLLINGERIA*.

TRIBE II. Acerineæ. *Flowers regular. Stamens inserted on the disk. Lobes of the fruit indehiscent. Seeds exalbuminous. Leaves opposite, exstipulate.*

- Ovary 2-celled; ovules 2 together. Fruit consisting of a double
 samara 19. *ACER*.
 Ovary 1-celled; ovules solitary. Fruit borne on widely bracteated
 pedicels 20. *DOBINEA*.

TRIBE III. Dodonææ. *Flowers regular. Stamens inserted outside the disk. Seeds exalbuminous. Leaves alternate, exstipulate.*

21. *DODONÆA*.

TRIBE IV. Meliantheæ. *Flowers irregular. Stamens inserted inside the disk. Seeds albuminous. Leaves alternate, stipulate.*

*21. *MELIANTHUS*.

TRIBE V. Staphyleæ. *Flowers regular. Stamens inserted outside the disk. Seeds albuminous. Leaves opposite, stipulate.*

- Fruit capsular, inflated. Flowers $\frac{1}{2}$ in. long 22. *STAPHYLEA*.
 Fruit indehiscent, more or less fleshy. Flowers small 23. *TURPINIA*.

1. *CARDIOSPERMUM*, Linn.

Climbing herbs with wiry stems and branches, alternate exstipulate leaves, biternate coarsely dentate leaflets, axillary racemes, lowest pair of

pedicels developed into spiral tendrils, and irregular polygamo-diceous flowers. *Sepals* 4, concave, the 2 outer ones small. *Petals* 4, in pairs, the 2 greater lateral usually adhering to the sepals each with an emarginate scale above the base, the two smaller inferior remote from the stamens each furnished with a small crested scale. *Disk* unilateral, wavy, almost reduced to 2 round or linear glands opposite the lower petals. *Stamens* 8, excentric; filaments free or connate at base; the 4 nearest to the glands shorter than the rest. *Ovary* 3-celled; style short, trifid; ovules solitary, ascending. *Capsule* 3-celled, 3-valved, inflated, loculicidal; valves membranous, veiny. *Seeds* globose, usually arillate at the base, exalbuminous, testa crustaceous; cotyledons large, transversely conduplicate.—**DISTRIB.** Several species, mostly occurring in Tropical America and a few in Tropical Africa.

For the morphology of the flower in this genus, see *Griffith Notulæ*, iv. p. 546.

C. Schmiedelia and *C. villosa*, *Dalz. & Gibs. Bomb. Fl.* 34, are clearly meant to be *Schmiedelia villosa*, *Roxb.*

1. **C. Halicacabum**, *Linn. Sp. Pl. ed. i.* 366; thinly pubescent or nearly glabrous rather pale, leaflets much acuminate, flowers small. *W. & A. Prodr.* i. 109; *Wall. Cat.* 8030; *Griff. Notul.* iv. 546, *Ic. Pl. Asiat.* iv. t. 599, f. 3; *Stewart Punjab Pl.* 31; *Dalz. & Gibs. Bomb. Fl.* 34 *Wight Ic.* t. 508; *Thwaites Enum.* 54; *Roxb. Fl. Ind.* ii. 292; *Bot. Mag.* t. 1049; *Grah. Cat. Bomb. Pl.* 28; *Boiss. Fl. Orient.* i. 945; *Baker in Oliv. Fl. Trop. Afr.* i. 417, with syn.; *Benth. Fl. Austral.* i, 453. *C. microcarpum*, *H. B. K. Nov. Gen. & Sp. Pl.* v. 104; *Baker l.c.* 418, with syn.—*Rheede Hort. Mal.* viii. t. 28; *Rumph. Herb. Amboin.* vi. t. 24, f. 2.

Throughout INDIA, from the N.W. FRONTIER to CEYLON and MALACCA.—**DISTRIB.** Most tropical and subtropical countries.

Annual or perhaps in some cases perennial. *Branches* slender, furrowed. *Leaves* deltoid or ovate, $1\frac{1}{2}$ –3 in.; leaflets deeply cut. *Flowers* white, $\frac{1}{2}$ in. *Fruit* $\frac{1}{2}$ – $1\frac{1}{4}$ in. wide, broadly pyriform. *Seeds* officinal. *Root* aperient.—The form with smaller obversely deltoid capsule (*C. microcarpum*), being connected with the type by continuous links, does not appear to me to be a distinct species.

2. **C. canescens**, *Wall. Pl. As. Rar.* i. 14, t. 14; pale, softly pubescent, leaflets short, flowers of moderate size. *W. & A. Prodr.* i. 109; *Wight Ic.* t. 74; *Wall. Cat.* 8032; *Baker in Oliv. Fl. Trop. Afr.* i. 418, with syn. ? *C. ovatum*, *Wall. Cat.* 8031. *C. pubescens*, *Griff. Journ.* 108, not of *Lagasca*.

BIRMA, *Wallich, Griffith.* Western Peninsula, from the Concan and Circars southwards.—**DISTRIB.** Abyssinia.

Annual. *Branches* 5-furrowed. *Leaves* patent, triangular, 2–3 in. *Flowers* $\frac{1}{2}$ – $\frac{1}{4}$ in. *Fruit* nearly globose, 1 – $1\frac{1}{4}$ in.—*C. ovatum* deviates somewhat from the type in the direction of the previous species.

2. HEMIGYROSA, Blume.

Trees with alternate exstipulate abruptly pinnate pallid leaves, quite entire coriaceous oblong much reticulated leaflets, short pedicels bracteate at the base and crowded polygamo-monœcious irregular flowers on spicate racemes arranged in axillary panicles. *Sepals* 5, erect, concave, the 2 outer ones smaller. *Petals* 4–5, concave, shaggy at the claw, with an entire or bifid or crested and hooded scale inserted at the claw within; the fifth petal equal minute or obsolete. *Disk* unilateral, cushion-shaped. *Stamens* 8 or in ♂ flowers 6–10, ascending, somewhat unilateral, inserted at the base of the ovary within the disk; filaments pilose; anthers not or scarcely

exserted. *Ovary* excentric, turbinate-trigonous, 3 celled; stigma trigonous, blunt; ovule solitary. *Fruit* indehiscent, thickly coriaceous fleshy or woody, trigonous or globose, hairy, 3-celled; cells hairy inside. *Seeds* oblong, exalbuminous, exarillate, testa coriaceous; cotyledons fleshy, equal.—**DISTRIB.** A few species, confined to the tropics of the old world.

The venation of the leaflets is similar to that of the leaves of *Diospyros Embryopteris*, Pers.

1. **H. deficiens**, *Bedd. Fl. Sylv.* t. 231; leaflets 8-14 opposite subopposite or alternate oblong glabrous shining, racemes solitary crowded or panicked axillary or scattered along the boughs shortly tomentose, petals 4-5 crenulate or subentire, scales entire half the length of the petals, bracts ovate small, flowers fascicled. *Sapindus?* *deficiens*, *W. & A. Prodr.* i. 111. *Anomosanthus deficiens*, *Blume Rumph.* iii. 151; *Benth. & Hook. f. Gen. Pl.* i. 402; *Bedd. Fl. Sylv. Anal. Gen.* lxxii.

WESTERN PENINSULA, Courtallam, Cochin, Travancor, Tinnevelly Ghats, and Annamallay hills, alt. 2-5000 ft.

A middle-sized or small tree. *Bark* slightly tinged with red. *Leaves* 1-2 feet long; leaflets 5-9 by $1\frac{1}{4}$ - $2\frac{1}{2}$ in. *Inflorescence* 2-24 in. *Flowers* $\frac{1}{2}$ - $\frac{1}{2}$ in. *Stamens* 8-10, rarely only 6 in male flowers; 8 in female flowers, according to Beddome. *Fruit* unknown.—No specimens from Ceylon, as stated by *Wight Ill.* i. 141.

2. **H. canescens**, *Thwaites Enum.* 56, 408; leaflets 2-8, mostly opposite elliptic-oblong ovate or lanceolate glabrous shining, racemes simple or panicked axillary or scattered over the branches shortly tomentose, bracteoles mostly subulate, flowers fascicled, petals with short cut scales at base. *Bedd. Fl. Sylv.* t. 151. *H. trichocarpa*, *Thwaites l.c.*; *Bedd. Anal. Gen.* lxxi. *Molinæa canescens*, *Roxb. Cor. Pl.* i. 43, t. 60; *Fl. Ind.* ii. 243. *Sapindus tetraphylla*, *Vahl Symb.* iii. 54; *Wall. Cat.* 8040. *S. bijugus*, *Wall. Cat.* 8045. *Cupania canescens*, *Pers. Syn. Pl.* i. 413; *Grah. Cat. Bomb. Pl.* 29; *W. & A. Prodr.* i. 113; *Dalz. & Gibs. Bomb. Fl.* 35. *Cupania* (sp.) *Wall. Cat.* 9034. *Cupania* (sp.) 6, *Herb. Ind. Or. H. f. & T.*

TENASSERIM and BIRMA, *Wallich, Helfer*; WESTERN PENINSULA, from the Concan southwards; common on the east side of the Madras Presidency. CEYLON, near Kanally.

A shrub or good sized tree, with a trunk of considerable size but not straight. *Bark* cinereous. *Leaves* 5-22 in.; leaflets usually obtuse or emarginate, occasionally acute, $2\frac{1}{2}$ -10 by $\frac{3}{4}$ -5 in.; petiolules rugose, $\frac{1}{2}$ - $\frac{1}{2}$ in. long, slightly fuscous. *Inflorescence* shorter than the leaves. *Flowers* white, $\frac{1}{2}$ - $\frac{1}{2}$ in. *Fruit* subglobose or 3-sided, tomentose, $\frac{1}{2}$ -1 in. thick, ochre-coloured.—The pulpy mesocarp resembles an aril.

3. **H. longifolia**, *Hiern.*; leaflets 6 opposite or subopposite oblong shortly acuminate acute glabrous shining base obtuse, racemes short solitary crowded or branched axillary or supra-axillary, flowers tomentose, scale of petals short shaggy flat entire or bifid.

MALACCA, *Griffith, Maingay*.

Young parts inflorescence and fruit velvety. *Leaves* 2-2 $\frac{1}{2}$ ft.; rachis velvety or obsoletely so; leaflets 12-15 by $2\frac{1}{4}$ - $3\frac{1}{2}$ in.; petiolules $\frac{2}{3}$ - $\frac{1}{2}$ in. obsoletely velvety. *Inflorescence* 2-3 in.; flowers $\frac{1}{2}$ in.; bracteoles subulate, $\frac{1}{4}$ - $\frac{1}{2}$ in. *Petals* 5, obovate, oblong. *Fruit* 1 in. long and broad, trigonous, with 3 broad shallow furrows, setæ; setæ flexuose, tomentose.

3. **DITTELASMA**, *Hook. f.*

A tree. *Leaves* alternate, pinnate, exstipulate, leaflets subopposite or alternate, quite entire. *Panicles* terminal, bracteate. *Flowers* pale,

polygamo-monœcious. *Sepals* quincuncial, oblong, rounded at apex, rather unequal. *Petals* 4, erect, oblong, concave, tomentose outside, the place of the fifth vacant; scale as large as the petal, obovate-oblong, densely shaggy-crested incurved and cohering at apex, inserted near the base of the petal and closely applied to its lamina. *Disk* semilunate-annular, much wider towards one side, glabrous. *Stamens* 8, inserted around the base of the ovary, equal; filaments shaggy, slender at the tip; anthers small, shortly exserted. *Ovary* ovoid-globose, glabrous, 3-lobed, 3-celled, contracted at the apex into short erect style, stigma shortly 3-lobed; ovules solitary in the cells of the ovary. *Fruit* 1-3-coccous, 2 segments usually smaller or obsolete, subglobose, rather fleshy, indehiscent. *Seed* globose, exarillate, exalbuminous; testa very thick, bony, embryo curved, cotyledons large unequal incurved; radicle short, incumbent.—**DISTRIB.** A monotypic genus.

1. D. Rarak, Hook. f. in *Benth. & Hook. f. Gen. Pl.* i. 396; leaflets 14-26 usually lanceolate-acuminate delicately veined base oblique shortly petioluled, inflorescence erect ovoid-pyramidal shorter than or about equalling the leaves. *Sapindus Rarak*, DC. *Prodr.* i. 608; *Blume Rumph.* iii. 93, t. 167. ?*S. pinnatus*, Mill. *Gard. Dict.* No. 3. *S. saponaria*, Lour. *Fl. Cochinch.* 238 (not of Linn.).—*Rumph. Herb. Amboin.* ii. 134.

MALACCA, Griffith, *Maingay*. (Ceylon, introduced).—**DISTRIB.** Cochinchina, Java, Seychelles (introduced).

Trunk rising 50-60 ft., terete, covered with a glabrous tenacious smooth bark. *Leaves* ranging up to 1½ ft., pari- or imparipinnate; petiole not winged; leaflets 2-4½ by ½-1½ in., glabrous. *Panicle* 6-14 in., tawny-velvety. *Flowers* ½ in., tomentose, white or pale. *Fruit* ¾-1 in.

4. **ERIOGLOSSUM**, Blume.

Erect trees or shrubs. *Leaves* odd-pinnate, exstipulate, alternate. *Leaflets* opposite or subopposite, entire. *Panicles* terminal, erect, bearing the white irregular polygamo-diœcious flowers on elongated branches. *Sepals* 5, unequal, orbicular, concave, broadly imbricated, the two outer ones smaller. *Petals* 4, unequal, obovate, clawed, the place of the 5th vacant, scale hairy, hooded, with an apical lobed appendage. *Disk* one-sided, lobed. *Stamens* 8, more or less turned to one side, rather unequal; filaments hairy. *Ovary* stipitate, obcordate, 3-lobed, 3-celled; style slender, stigma obscurely 3-lobed; ovules solitary in the cells of the ovary. *Fruit* 1-3-lobed to the base; segments oblong, indehiscent, diverging. *Seeds* oblong, exarillate, exalbuminous, testa membranous; embryo straight; cotyledons thick.—**DISTRIB.** Species 2, one of which is at present known to occur only in Senegambia.

For the morphology of the flower in this genus, see Griffith *Notul.* iv. 549.

1. E. edule, *Blume Bijdr.* 229; *Rumphia* iii. 119, t. 166; leaflets 8-12 elliptic- or ovate-oblong often acuminate shortly pubescent at least on the veins beneath, base usually oblique obtuse shortly petioluled, flowers crowded. *Benth. Fl. Austral.* i. 454. *E. rubiginosum*, *Brand. For. Fl.* 108. *Moulinsia cupanioides*, *Cambess in Mém. Mus. Par.* xviii. 27, 40, t. 2. *Sapindus rubiginosa*, *Roxb. Cor. Pl.* i. 44, t. 62; *Fl. Ind.* ii. 282; *W. & A. Prodr.* i. 112; *Grah. Cat. Bomb. Pl.* 29; *Wall. Cat.* 8041; *Griff. Notul.* iv. 548; *Dalz. & Gibs. Bomb. Fl. Suppl.* 14; *Bedd. Fl. Sylv. Anal. Gen.* lxxiii. *S. fraxinifolius*, DC. *Prodr.* i. 608. *S. edulis*, *Blume Cat. Buitenz.* 64. *M. rubiginosa*, *G. Don Gen. Syst.* i. 667. *S. alternifolius* and *longifolius*, *Herb. Hamilt. ex W. & A. l.c.*; *Wall. Cat.* 8041 D, 8046. *S. pinnatus*, *Roxb. Ic.* 89.

SIKKIM HIMALAYA, ASSAM, OUDH, EASTERN PENINSULA, from Birma to Penang and Malacca, Western Peninsula from the Godavery southwards.—DISTRIB. Widely spread over the Indian Archipelago, and N.W. coast of Australia.

A large timber tree or shrub, with the shoots petioles and inflorescence ferruginous-pubescent. *Leaves* about 1-2 ft.; leaflets 3-15 by 1-3½ in. *Flowers* sweet-scented, shortly pedicelled in small clusters, on elongated spike-like racemes, arranged in a panicle. *Fruit* ¼ in.—Wood useful, strong, and durable, chocolate coloured in the centre. In Linnæus' Herbarium this species is named *Sapindus Saponaria*.

5. ALLOPHYLUS, Linn.

Small trees or shrubs. *Leaves* 1- or 3-foliolate, exstipulate, leaflets entire or serrate. *Racemes* simple or branched axillary. *Flowers* small, polygamodioecious, globose, shortly pedicelled, white or yellowish. *Sepals*, 4 in opposite pairs, hooded, membranous, widely imbricated; the two outer ones smaller. *Petals* 4, the place of the 5th vacant, small (or obsolete), sometimes declinate, naked inside or usually furnished with a shaggy scale above the claw. *Disk* one-sided, usually with 4 glands opposite the petals. *Stamens* 8, inserted on the receptacle inside the disk. *Ovary* usually 2-lobed and 2-celled; ovules in the cells solitary. *Fruit* indehiscent usually 1-2-lobed; lobes subglobose, fleshy or dry. *Seeds* usually with a short fleshy aril; embryo curved; cotyledons plicate.—DISTRIB. A large chiefly tropical American genus; about 12 species occur in tropical Africa, others in South Africa, the Mascarene Islands, Madagascar, &c., and several in the Indian Archipelago.

SECT. I. *Leaves* unifoliolate.

1. **A. zeylanicus**, Linn. *Nov. Pl. Gen. in Amoen. Acad.* i. 398 (1747); leaves unifoliolate ovate oblong or obovate more or less acuminate, racemes simple or slightly branched. *Schmidelia Allophylus*, DC. *Prodr.* i. 611. *Arn. in Act. Acad. Nat. Cur.* xviii. 326; *Thwaites Enum.* 55; *Bedd. Ic. Pl. Ind. Or.* t. 286. *S. bidentata*, Wall. *Cat.* 8062. *Ornitrophe Allophylus*, *Pers. Syn. Pl.* i. 412.

SIKKIM HIMALAYA, alt. 1-3000 ft. ASSAM. CACHAR. CEYLON.

A shrub or small tree with terete branches. *Leaves* 1½-16 by ½-7½ in.; petioles ¼-3 in. *Racemes* ½-9 in. *Flowers* ⅛-½ in. diam. *Fruit* globose, red.—A variable species, the principal forms of which may be indicated as follows; intermediate forms exist in some cases.

VAR. 1. *acuminata*; glabrous, leaves quite entire ovate, racemes rather long. *S. acuminata*, *Thwaites Enum.* 55; *Bedd. Ic. Pl. Ind. Or.* t. 287.—Ceylon.

VAR. 2. *assamica*; glabrous, leaves quite entire oblong, racemes short.—Assam.

VAR. 3. *hispidula*; branches midrib and margins of leaf hispid. *S. hispidula*, *Thwaites*, l.c.; *Bedd. Fl. Sylv.* t. 152.—Ceylon.

VAR. 4. *varians*; leaves small obovate toothed widely repand denticulate subcoriaceous, racemes rather elongated. *S. varians*, *Thwaites Enum.* 408; *Bedd. Ic. Pl. Ind. Or.* t. 288.

VAR. 5. *Thwaitesii*; leaves 6-10 in. obovate toothed widely repand denticulate or toothed subcoriaceous, racemes short.—Ceylon.

VAR. 6. *grandifolia*; leaves obovate toothed or widely repand denticulate, submembranous. *Schmidelia*, sp. 10, *Herb. Ind. Or. H. f. & T.*—Sikkim, Assam, Cachar.

SECT. II. *Leaves* trifoliolate.

2. **A. Cobbe**, Blume *Rumph.* iii. 131; leaves trifoliolate, leaflets obovate ovate or lanceolate mostly acuminate hairy or glabrous subcoriaceous entire dentate or serrate, racemes simple, flowers irregular, petals sometimes declinate. *Rhus Cobbe*, Linn. *Sp. Pl. ed.* i. 267. *Ornitrophe Cobbe*,

Willd. Sp. Pl. ii. 322; *Roxb. Fl. Ind.* ii. 268. *Usubis triphylla*, *Burm. Fl. Ind.* 89, t. 32, f. 1. *O. Schmiedelia*, *Pers. Syn.* i. 412. *Schmidelia* Kobbe, *Lamk. Ill.* ii. 443, t. 312, f. 2. *S. Cobbe*, *DC. Prodr.* i. 610; *W. & A. Prodr.* 109; *Grah. Cat. Bomb. Pl.* 29; *Wight Ill.* i. 141; *Wight Ic.* t. 964; *Thwaites Enum.* 55. *Toxicodendrum* Cobbe, *Gartn. Fruct.* i. 207, t. 44, f. 5. *O. serrata*, *Roxb. Cor. Pl.* i. t. 61; *Fl. Ind.* ii. 266. *S. serrata*, *DC. l.c.*; *Wight Ill.* i. 141; *W. & A. Prodr.* 110; *Benth. Fl. Austral.* i. 455; *Wall. Cat.* 8061 (*O. malabarica*, *Hb. Madr.*). *S. racemosa*, *Linn. Mant.* 67; *Wall. Cat.* 8059. *O. Aporetica*, *Roxb. Hort. Beng.* 28; *Fl. Ind.* ii. 264. *Aporetica ternata*, *J. R. & G. Forst. Charact. Gen. Pl.* 132, t. 66. *O. villosa*, *Roxb. Hort. Beng.* 28; *Fl. Ind. l.c.* 265. *S. villosa*, *Wight Ic.* t. 401; *Thwaites l.c.*; *Wall. Cat.* 8060. *S. Rheedii*, *Wight Ic.* t. 964; *Spic. Neilgh. Bot.* 33. *O. glabra*, *Roxb. Hort. Beng.* 28; *Fl. Ind. l.c.* 267. *Allophylus lanatus*, *Roxb. Hort. Beng.* 88; *Fl. Ind.* ii. 263. *S. distachya*, *DC. l.c.* 610. *S. Aporetica*, *Wall. Cat.* 8058; *Kurz in Journ. As. Soc. Beng.* 1870, ii. 74. *S. glabra*, *Wall. Cat.* 8057; *Steud. Nom. ed.* 2, ii. 531. *Pometia ternata*, *G. Forst. Fl. Ins. Austr. Prodr.* 74 (1786). ? *S. dentata*, *Wall. ex Voigt Hort. Sub. Calc.* 93. *Schmidelia* (*Allophylus ornitrophoides*, *Herb. Roxb.*); *Wall. Cat.* 8055. *S. adenophylla*, *Wall. Cat.* 8063. *S. vestita*, *Wall. Cat.* 8066. *S. timorensis*, *DC. Prodr.* i. 611. *S. orientalis*, *Sw. Fl. Ind. Occ.* ii. 666. *S. ternata*, *Cambess. in Mém. Mus. Par.* xviii. 24. *O. asiatica*, *Hort. ex Steud. Nom. ed.* 2, ii. 230.—*Rheede Hort. Mal.* v. t. 25.

ASSAM, SILHET, BIRMA, and southwards through the EASTERN PENINSULA. WESTERN PENINSULA, from the Concan southwards. CEYLON.—DISTRIB. N. Australia, Indian Archipelago, &c.

A small tree, or on the low lands and near the coast a shrub, sometimes of considerable size with a climbing habit. *Bark* grey or purple, spotted. *Leaves* very variable in size, shape, margin, and surface. *Leaflets* 1–10 by $\frac{1}{2}$ –4 in.; terminal petioles ranging up to 1 in., lateral ones very short. *Inflorescence* 3–9 in.; flowers yellowish or white, clustered, small; pedicels short. *Fruit* red, shining, globose, $\frac{1}{2}$ in.—The root is said to be astringent; the ripe fruits are eaten by the natives. According to *Wight & Arnott* in their *Prodromus*, *Allophylus ternatus*, *Lour. Fl. Cochinch.* 232 (= *S. cochinchinensis*, *DC. l.c.* 611), and *Gemella trifolia*, *Lour. l.c.* 649 (= *S. Gemella*, *Camb. l.c.*) appear to belong to this plant.

An exceedingly variable species, widely spread in India and the Archipelago, and perhaps extending to Africa and America. The following is a rough key to the principal forms, which are, however, connected by various intermediate links:—

Racemes simple, solitary. Petals somewhat declinate.

Leaflets oval or ovate.

Glabrescent or somewhat hairy.

Leaflets crenate-dentate. Bracts short *racemosus*.

Leaflets serrate-denticulate. Bracts subulate *serratus*.

Shoots and leaves very hairy *villosus*.

Leaflets oval-oblong or lanceolate-acuminate.

Leaflets subentire or serrulate. Bracts short *glaber*.

Leaflets acutely serrate. Bracts long, linear *Aporetica*.

Racemes simple, 2 together. Petals not declinate, but the place of the fifth petal vacant *distachys*.

Racemes branched, solitary *Rheedii*.

EXCLUDED SPECIES OF ALLOPHYLUS (*Schmidelia*).

ALLOPHYLUS PINNATUS, *Roxb. Ic.* t. 1407, is *Otophora fruticosa*, *Blume*.

SCHMIDELIA (sp.), *Wall. Cat.* 8056, is probably *Walsura villosa*, *Wall*.

S. (ORNITROPHE) FETHISSIMA, *Wall. Cat.* 8064. Cfr. *Gynocardia*.

S. INTEGERRIMA, *Wall. Cat.* 8065, is *Evodia Roxburghiana*, *Benth*.

6. **ÆSCULUS**, Linn.

Trees and shrubs with scaly buds. *Leaves* opposite, digitate, deciduous, exstipulate; leaflets obovate or oblong, serrate. *Panicles* terminal, thyrsoid. *Flowers* large, polygamous, irregular. *Calyx* tubular or campanulate, 5-cleft or -dentate, deciduous, with unequal imbricated lobes. *Petals* 4-5, unequal, clawed, without scales, imbricated, exceeding the calyx. *Disk* annular or unilateral, lobed or entire. *Stamens* 5-8, usually 7, inserted within the disk, free. *Ovary* sessile, 3-celled. *Style* elongated, slender; stigma simple. *Ovules* 2 in each cell of the ovary, superposed. *Fruit* capsular, 1-3-celled; valves loculicidal, coriaceous; cells 1-seeded. *Seeds* subglobose, exalbuminous, with a broad hilum; testa coriaceous; cotyledons thick, corrugated, conferruminated.—**DISTRIB.** About 14 species, natives mostly of the temperate parts of Asia and America.

Æ. Hippocastanum, Linn., is said to be indigenous in North India, but it is not now known in the wild state. See *Boiss. Fl. Orient.* i. 497.

1. **Æ.** (Pavia) **indica**, *Colebr. in Wall. Cat.* 1188; leaflets usually 7 acuminate delicately serrate submembranous distinctly petioluled, panicles oblong nearly equalling or exceeding the leaves, flowers secund. *Camb. in Jacq. Voy. Bot.* 31, t. 35; *Bot. Mag.* t. 5117; *Brand. For. Fl.* 103, t. 19; *Royle Ill.* 135; *Stew. Punjab Pl.* 31.

WESTERN HIMALAYA, alt. 4-10,000 ft. from the Indus to Nipal.—**DISTRIB.** Afghanistan.

A fine tree of 60-70 ft. in height and 10-15 in girth, with glabrous terete branches. *Leaves* glabrous; leaflets unequal, the terminal one 5-9 by $1\frac{1}{2}$ -3 in., the lateral ones smaller; common petiole 3-6 in., thickened at the base, sulcate above; petiolules ranging to $\frac{1}{2}$ in. *Calyx* tubular, $\frac{1}{2}$ in. long, frequently splitting as the flowers open; lobes short, rounded. *Petals* 4, white with red and yellow, the place of the fifth vacant. *Capsule* ovoid or subpyriform, reddish-brown, without spines, rather rough, 1-2 in. long. *Seeds* dark.—The interior of the seeds is eaten in the Himalayas, according to Dr. Royle, in time of famine; cattle habitually eat them. The bark peels off in long strips; the wood is light-coloured and easily worked. The fruit is officinal, being applied externally for rheumatism. The leaves are lopped for winter fodder in the Himalaya.

2. **Æ.** (Pavia) **punduana**, *Wall. Cat.* 1189; leaflets 6-7 acuminate delicately serrate subcoriaceous shortly petioled, panicles narrowly lanceolate nearly equalling the leaves, lower pedicels longer. *Æ. asamicus*, *Griff. Journ.* 69, 75, 80, 122. *P. khassiana*, *Voigt Hort. Sub. Calc.* 97.

TROPICAL SIKKIM HIMALAYA, *J. D. H. KHASIA Mts.*, ascending to 4000 ft. **ASSAM** and **BIIRMA**.—**DISTRIB.** Siam.

A tree with glabrous terete branches. *Leaves* glabrous; leaflets unequal, the terminal one 8-15 by $2\frac{1}{2}$ -5 in., the lateral ones smaller; common petiole $7\frac{1}{2}$ -12 in.; petiolule $\frac{1}{2}$ - $\frac{3}{4}$ in. *Calyx* tubular, $\frac{1}{2}$ in.; lobes short, rounded at apex. *Petals* 4, white and yellow.

7. **SCYPHOPETALUM**, Hiern.

A small tree. *Leaves* alternate exstipulate unequally pinnate; leaflets opposite. *Flowers* paniced, regular, hermaphrodite, 4-6-merous. *Calyx* deeply lobed, hemispherical; lobes ovate, somewhat imbricated in the bud. *Petals* shorter than the calyx, without scales, very shortly clawed, each forming a wide short turbinate somewhat compressed cup, glabrous outside, hirsute inside. *Stamens* 7-6, inserted within the short annular glabrous disk, scarcely exerted, glabrous; filaments subulate-linear, curved near the apex; anthers short, 2-celled, fixed by the base.

Ovary hairy, subsessile, 3-celled, entire; ovules solitary; style obsolete; stigma blunt.—**DISTRIB.** A monotypic genus peculiar by the cup-shaped petals.

1. **S. ramiflorum**, *Hiern*; leaflets 9 oblong obtuse or subacuminate coriaceous glabrescent base somewhat narrowed shortly petioluled, panicles from the old wood short, pedicels equalling or rather exceeding the flowers.—*Sapindacea*, *Griff. Journ.* 83.

BIRMA; hilly woods in the Hookhoom valley, *Griffith* (*Kew distrib.* 985).

Branches reddish. *Leaves* 1 ft., pallid in the dry state; petioles 2 in.; leaflets shining above, 4-8 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in.; petiolules $\frac{1}{4}$ in., puberulent; lateral veins about 16 on each side of midrib, alternate. *Panicles* $2\frac{1}{2}$ -3 in. diam. *Flowers* $\frac{1}{2}$ in. wide, shortly pubescent. *Petals* flesh-coloured.

8. CUPANIA, Plum.

Trees or tall shrubs. *Leaves* alternate, exstipulate in most cases abruptly pinnate; leaflets entire, subcoriaceous. *Panicles* axillary and subterminal, bracteoid. *Flowers* nearly regular, polygamo-dicæious. *Calyx* 5-4-cleft or sepals 5-4, roundish, concave, nearly valvate or imbricated in 2 rows. *Petals* 5-4 or obsolete, with or without 1-2 bilobed or entire scales at base inside. *Disk* regular or unequally thickened, annular, glabrous, fleshy. *Stamens* 7-10, rarely fewer, inserted within the disk, included or more usually exerted. *Ovary* ovoid obovoid or obcordate, 2-4-celled, more or less pubescent; ovules solitary. *Fruit* capsular, usually loculicidal obcordate or pyriform, 2-4-lobed or -sided and -celled; lobes connate or almost free and divaricate, sometimes compressed. *Seeds* subglobose or oblong, more or less covered with an aril, exalbuminous. *Embryo* thick, curved.—**DISTRIB.** A rather large tropical genus of both Worlds; 14 of them are endemic in Australia and only 1 in tropical Africa.

SECT. I. *Fruit* widely obcordate or 2-3-lobed.

* *Sepals* 5. *Lateral veins* of leaflets arching, not parallel.

1. **C. glabrata**, *Kurz* in *Journ. As. Soc. Beng.* xli. ii. 303 (1872); glabrescent leaflets 4-8 lanceolate or ovate-oblong acuminate subcoriaceous loosely, but prominently reticulated base cuneate oblique, panicles racemose or racemes simple, flowers pentamerous, petals shorter than the sepals squamate. *Sapindus squamosus*, *Roxb. Hort. Beng.* 88; *Fl. Ind.* ii. 282; *Wall. Cat.* 8097. *Connaraceæ* ?, *Wall. Cat.* 8550.

PEGO and MARTABAN. **PENANG.**—**DISTRIB.** Malay Archipelago (*Roxb.*).

A tree of 25-30 ft. *Leaves* abruptly pinnate, shortly petioled, quite glabrous and shining; leaflets 4-7 in. *Flowers* white; pedicels $\frac{1}{2}$ in. *Outer sepals* $\frac{1}{4}$ in. *Petals* $\frac{1}{4}$ in., glabrous outside, densely white-cottony inside. *Ovary* tawny-hairy.

2. **C. pallidula**, *Hiern*; young parts tawny-pubescent, rachis of leaves not winged, leaflets 6-8 alternate or subopposite elliptic or ovate-oblong thinly coriaceous pallid inconspicuously veined base oblique cuneate, flowers pentamerous, sepals much imbricated, petals with a large hairy scale on each side of base, capsule 2-3-lobed stipitate.

MALACCA, *Griffith*, *Maingay*.

A small tree. *Branchlets* terete, clothed with a very short tomentum. *Leaves* 6-12 in.; leaflets 2-5 by $\frac{3}{4}$ -2 in., acuminate; petiolules very short, tumid at base. *Flowers* $\frac{1}{2}$ in. wide. *Anthers* small, glabrous, exerted. *Capsule* $\frac{1}{2}$ in., lobes $\frac{1}{2}$ in. wide, nearly glabrate.—Nearly related to *C. regularis*, *Blume Rumph.* iii. 159, from Sumatra and Borneo; but differs from it by generally smaller leaves and a paler colour

in the dry state. In Dr. Brandis' herbarium there is a specimen from Salween, Burmah, named *C. regularis*, Blume; it is of a dusky colour with leaves 6-12 in., leaflets 4 opposite 4-7 by $1\frac{1}{2}$ -2 $\frac{3}{4}$ in., and inflorescence about 4 in.

3. *C. fuscidula*, Kurz in Journ. As. Soc. Beng. xli. ii. 302 (1872); puberulent, leaflets 3-6 alternate ovate or oval obtusely subacuminate thinly coriaceous dusky (in the dry state) above with lax not strongly marked nor parallel reticulation base very oblique, panicles many-flowered, scales of the petals bifid or entire not much shorter than the petals.

TENASSERIM, Helfer.

A tree. Shoots shortly pubescent. Leaves 5-8 in.; rachis not winged; leaflets $1\frac{1}{2}$ -4 $\frac{1}{2}$ by $\frac{3}{8}$ -1 $\frac{3}{8}$ in.; petiolules very short. Panicles 3-4 in. long; flowers $\frac{1}{2}$ - $\frac{1}{3}$ in. wide, pentandrous. Sepals imbricated. Anthers included or not much exerted, glabrous.

4. *C. pleuropteris*?, Blume Rumph. iii. 158; rachis of leaves narrowly winged above, leaflets 4-8 opposite or subopposite obovate or narrowly elliptic obtusely acuminate or pointed base obliquely narrowed thinly coriaceous glabrate or puberulent at least beneath, inflorescence shorter than the leaves pedicels about equalling the pubescent pentamerous flowers, sepals unequal, petals larger furnished at the base each with 2 obovate scales, stamens inserted, capsule obcordate 2-3-lobed.

SINGAPORE, Maingay. MALACCA, Maingay, Griffith. PENANG, Wallich.—DISTRIB. Borneo, Sumatra.

Young parts shortly tawny-pubescent. Leaves rather pallid especially beneath, 4-8 $\frac{1}{2}$ in.; leaflets 1-6 by $\frac{1}{2}$ -2 in., subsessile. Flowers $\frac{1}{2}$ in. diam. Calyx persistent. Disk glabrous, fleshy, annular. Filaments slender, pilose below. Style linear, glabrous. Fruit glabrous, stipitate, compressed, $\frac{1}{4}$ in.

VAR. α . BIJUGA, leaflets 4-2 glabrescent dusky.—Wall. Cat. 8094.

VAR. β . APICULATA, leaflets 6-8 shortly pubescent beneath tawny apiculate.

** Calyx 5-cleft. Lateral veins of leaflets rather straight, subparallel.

5. *C. adenophylla*, Planch. mss. in Hb. Kew.; rachis of leaves not winged leaflets 4-6 opposite ovate-oblong gradually acuminate thinly coriaceous glabrous or sparingly pubescent shining base obtusely wedge-shaped lateral veins 9-12 subparallel clearly but not stoutly marked beneath usually with small glands in the axils beneath, flowers tetramerous or pentamerous, calyx cleft subvalvate, petals with 2 obovate (or 1 bilobed) shaggy scales at base, filaments exerted pubescent, fruit obcordate or deeply bilobed glabrate. Sapindus adenophyllus, Wall. Cat. 8044.

TENASSERIM, at Mergui and Moulmein, Wallich, &c. MALACCA, Griffith.

A shrub of 10-12 ft. Young parts and inflorescence ferruginous-pubescent. Leaves 8-13 in.; leaflets 3-9 by $1\frac{1}{4}$ -2 $\frac{3}{4}$ in.; petiolules $\frac{1}{2}$ - $\frac{1}{4}$ in. Inflorescence 3-6 in. Flowers $\frac{1}{2}$ in. wide. Anthers somewhat hairy. Style equalling the ovary. Fruit $\frac{1}{2}$ - $\frac{3}{4}$ in., very shortly stipitate; one lobe sometimes abortive.

SECT. II. Fruit pyriform, 3-4-sided, not lobed.

* Petals squamate at base, exceeding the calyx.

6. *C. acuta*, Hiern; rachis of leaves not winged, leaflets 11-15 alternate or subopposite lanceolate acuminate acute glabrous shining patent shortly petioluled, flowers tawny-pubescent pentamerous, petals exceeding the calyx glabrous furnished at the base with a nearly equal densely ciliated bipartite scale, partitions obovate diverging, stamens 8, filaments hairy exerted subulate below, fruit more or less pubescent tawny pyriform 3-4-sided shortly stipitate. Sapindacea, Wall. Cat. 9036.

SINGAPORE, *Wallich*. MALACCA, *Maingay*.

Young parts and inflorescence tawny-pubescent. *Leaves* 6-12 in.; leaflets $2\frac{1}{2}$ - $4\frac{1}{2}$ by $\frac{3}{4}$ - $1\frac{1}{2}$ in.; petiolules $\frac{1}{2}$ - $\frac{3}{4}$ in., dark. *Inflorescence* about as long as the leaves. *Calyx* about $\frac{1}{2}$ in. wide, subvalvate. *Disk* fleshy, glabrous, covered with whitish inflorescence. *Ovary* conical, tomentose, not lobed. *Fruit* $1\frac{1}{2}$ -2 by $\frac{3}{4}$ - $1\frac{1}{2}$ in., somewhat fleshy, 3-4-valved, the junctions of the valves marked by slightly elevated grooved keels which unite at the apex of the fruit to form a short apiculus.

7. **C. Jackiana**, *Hiern*; shining, leaflets 6 or 8 opposite or subopposite elliptic shortly and obtusely acuminate base obtuse or somewhat cuneate shortly petiolate, fruiting panicles shorter than the leaves, fruit not lobed obovoid-oblong 2- or by abortion 1-celled mucronate-cuspidate base attenuate and shortly stipitate often compressed mostly 1-seeded. *Conarus?* *Jackianus*, *Wall. Cat.* 8552.

CAR NICOBAR ISLAND, *Jack*.

Leafy, young parts tawny-puberulent, soon glabrescent. *Upper leaves* 6-12 in.; leaflets 3-6 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in.; lateral veins 8-10 on each side, not opposite. *Panicles* near the extremities of the branches; fruiting pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in. *Fruit* $1\frac{1}{2}$ by $\frac{3}{4}$ in., glabrous; valves 2, tomentose inside; dissepiment often partly obliterated. *Seed* ellipsoidal, $\frac{3}{4}$ by $\frac{1}{2}$ in., occupying the upper part of the cell; base arillate.

8. **C. pentapetala**, *W. & A. Prodr.* 113; rachis of leaves not winged leaflets 4-8 subopposite or alternate ovate or oblong subacuminate coriaceous glabrous shining base obtuse lateral veins somewhat arching not robust, flowers pentamerous pubescent in racemes arranged in crowded panicles, calyx cleft subvalvate, petals small with two small glabrous incurved scales at base, filaments exerted pubescent, ovary pubescent 3-celled, style very short, stigma of three recurved lobes, seeds arillate. *Schleichera pentapetala*, *Roxb. Hort. Beng.* 29; *Fl. Ind.* ii. 275. *C. pentaphylla*, *Wight Ic. t.* 402. *C. Roxburghii*, *Wight Ic. text*, n. 402.

SILHET, *Roxburgh*, 1811, in *Hb. Mus. Brit.*

A pretty large tree. *Leaves* 6-12 in.; leaflets 4-8 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in.; petiolule $\frac{1}{2}$ - $\frac{3}{4}$ in. *Inflorescence* about 7 in. *Flowers* $\frac{1}{2}$ in. wide, dull yellowish green. *Stamens* 7-8; anthers glabrous. *Disk* pubescent. *Capsule* stipitate, 3-valved, $\frac{3}{8}$ in. diam., pyriform, not lobed.

** *Petals wanting or small and esquamate.*

9. **C. Lessertiana**, *Camb. in Mém. Mus. Par.* xviii. 46, t. 3; leaflets 2-6 usually 4 ovate not or obtusely acuminate delicately reticulated base rounded or shortly narrowed, petiolules short, calyx-lobes 5 valvate, petals 0, disk broad glabrous or nearly so 5-crenate, stamens 8 exerted glabrous, capsule globose-pyriform 3-sided glabrous stipitate. *Hassk. Pl. Jav. Rar.* 285. *Ratonia Lessertiana*, *Benth. & Hook. f. Gen. Pl.* i. 400. *C. Mischocarpus*, *Steud. Nomencl. Bot.* ed. 2, i. 454. *Mischocarpus sundaicus*, *Blume Bijdr.* 238; *Rumph.* iii. 167. *Molinæa?* (*sp.*) *Wall. Cat.* 8092. *Schleichera trijuga*, *Moritz Syst. Verz. Zoll.* 22, ex *Hassk. Pl. Jav. Rar.* 285 (not of *Willdenow*).

TENASSERIM; at Mergui, *Griffith*. SOUTH ANDAMAN ISLDS., *Kurz*. MALACCA, *Main-gay*.—DISTRIB. Malay Archipelago.

A tree of moderate size, sometimes a shrub; branches terete, glabrous, dark or reddish. *Leaves* 4-12 in.; rachis not winged; leaflets opposite or alternate, 2-8 by 1 - $2\frac{3}{4}$ in., shining. *Inflorescence* 2-6 in.; pedicels $\frac{1}{4}$ in., shortly pubescent. *Calyx* scarcely $\frac{1}{4}$ in. long by $\frac{1}{4}$ in. wide, shortly pubescent. *Filaments* about $\frac{1}{2}$ in. *Fruit* $\frac{1}{2}$ in. long, 1-seeded; stipes $\frac{1}{2}$ in.

10. **C. sumatrana**, *Miq. Fl. Ind. Bat.* I. ii. 566; rachis of leaves not winged somewhat trigonous above, leaflets 2-10 subalternate or subopposite

oblong or ovate-oblong slightly or scarcely acuminate glabrous thinly coriaceous delicately reticulated lateral veins rarely conspicuous sometimes with axillary glands, flowers pentamerous rarely tetramerous?, calyx cleft, petals small or wanting without scales, filaments exserted pubescent. *Mischocarpus sumatranus*, *Blume Rumph. iii.* 168. Sapindaceæ, *Wall. Cat.* 9035, 8108. C. sp. 4, *Herb. Ind. Or. H. f. & T.*

SILHET, *Gomez, H. f. & T.* TENASSERIM, at Moulmein, *Griffith.*—DISTRIB. Sumatra.

A tree of 30–40 ft. or loftier, branched high up. Branches as well as the rachis of the leaves reddish. Leaves 8–24 in.; leaflets $3\frac{1}{2}$ –11 by $1\frac{1}{4}$ –3 in.; petiolules $\frac{1}{2}$ – $\frac{3}{4}$ in. Inflorescence 6–12 in.; flowers whitish $\frac{1}{10}$ in. wide. Petals when present minute or not exceeding the calyx, narrow, somewhat pubescent. Capsule $\frac{3}{8}$ – $\frac{5}{8}$ in., pyriform, marked with 3–4 ribs, constricted at base into a thick trigonous stipes, apiculate, glabrate, red (*Blume, l.c.*).—A specimen from Pegu (*Kurz*) in Hb. Kew., consisting of a leaf 33 in. with 10 leaflets 15–18 by about 3 in., has been named *Ratonia sumatrana* by Kurz in Hb. Kew.

11. **C. Helferi**, *Hiern*; leaflets 4 alternate elliptic-oblong subacuminate glabrous delicately reticulated base obtuse, flowers pentamerous on short patent racemes arranged in racemose pubescent subterminal panicles, calyx cleft subvalvate, petals 0, filaments pubescent, ovary pyriform stipitate pubescent not lobed.

TENASSERIM, or ANDAMAN ISLANDS., *Helfer*.

Leaves about 1 ft.; rachis terete; leaflets 5–8 by $2\frac{1}{4}$ – $2\frac{1}{2}$ in.; petiolules $\frac{1}{4}$ – $\frac{1}{2}$ in. Panicles exceeding the leaves. Calyx $\frac{1}{2}$ in. diam.; lobes ovate. Stamens 8.

EXCLUDED SPECIES.

C. CANESCENS, *Pers.*, is *Hemigyroa canescens*, *Thwaites*.

C. (sp.) 6, *Herb. Ind. Or. H. f. & T.*, is *Hemigyroa canescens*, *Thwaites*.

C. (sp.), *Wall. Cat.* 8067 A, is *Nephelium Longaua*, *Camb.*

C. (sp.), *Wall. Cat.* 8067 B, is perhaps *Aglaia edulis*, *A. Gr.*

C. (sp.), *Wall. Cat.* 8069, is *Chisocheton paniculatus*, *Hiern*.

C. (sp.), *Wall. Cat.* 9034, is *Hemigyroa canescens*, *Thwaites*.

9. LEPISANTHES, Blume.

Trees or shrubs. Leaves pinnate, exstipulate, alternate; leaflets entire, subopposite. Inflorescence axillary and lateral, spike-like. Flowers regular, polygamo-dioecious. Sepals 5–4 widely imbricated in two rows. Petals 5–4, equal, furnished at the base with a short wide inflexed entire scale. Disk annular, regular. Stamens 8, erect, inserted within the disk. Ovary sessile, 3-sided, 3-celled; ovules solitary; style simple; stigma blunt. Fruit drupaceous, 3-celled, 3-sided, not lobed. Seeds solitary, erect, exalbuminous; cotyledons very thick, unequal.—DISTRIB. Species few, all except the following confined to the Indian Archipelago.

1. **L. montana**, *Blume Bijdr.* 238; *Rumph. iii.* 151; leaflets 8–10 subopposite elliptic- or ovate-oblong subacuminate base very shortly petioluled subcordate, racemes subfascicled axillary lateral simple or branched.

BIRMA; hills between Sitang and Beeling, *Brandis.*—DISTRIB. Java.

A tree with dark smooth bark. Leaves $1\frac{1}{2}$ –2 ft., paripinnate; leaflets 5–10 by 2–3 in., glabrous above, glabrate or pubescent beneath along the midrib. Inflorescence 2–10 in., shortly pubescent. Calyx $\frac{1}{2}$ in.; petals rather longer, long-clawed. Fruit hairy.—A fruiting panicle from Pegu, about 18 in. long, without leaves in the Hb. Kew., named by Kurz *L. montana*, Bl., has fruits nearly 1 in. long.

2. ***L. cuneata*, Hiern**; leaflets 6-8 opposite or subopposite elliptic-oblong shortly and obtusely acuminate glabrous base cuneate, racemes short supra-axillary, flowers very small obsoletely tomentose.

PENANG, Porter.

Nearly glabrous in all parts. Branches smooth. Leaves 12-18 in.; leaflets 3-8 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in.; petiolules $\frac{1}{2}$ - $\frac{1}{4}$ in. Inflorescence 1-1 $\frac{1}{2}$ in.; flowers $\frac{1}{2}$ in.; bracts subulate, small. Petals 5, glabrous, with a minute scale at base.

3. ***L. Browniana*, Hiern**; leaflets 6-11 alternate or sometimes opposite elliptic-oblong much acuminate glabrous base cuneate petioluled, racemes short dense axillary puberulent, flowers of moderate size. Sapindaceæ, *R. Br. in Wall. Cat.* 7497, and in *Misc. Bot.* ii. 537.

MARTABAN; Tavoy and Keloben, W. Gomez.

A small tree with smooth terete branches tinged with red. Leaves 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ ft., tending to develop further leaflets at the apex; petiole 6-12 in.; leaflets 3-9 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in.; petiolules somewhat thickened at the base; ranging up to $\frac{1}{2}$ in. Inflorescence 1-2 in.; pedicels about $\frac{1}{4}$ in. Flowers $\frac{1}{2}$ in. Sepals concave, glabrous inside, thickened at the base, the 2 outer short, the inner $\frac{1}{2}$ in. Petals obovate, pubescent at the claw outside, with 2 glabrous scales inside. Disk glabrous. Stamens 8, $\frac{1}{2}$ in.; filaments hairy. Ovary obsolete from the male flowers.

10. **OTOPHORA**, Blume.

Trees or shrubs. Leaves alternate, pinnate; leaflets entire (the lowest pair stipuliform). Inflorescence axillary and terminal. Flowers regular, polygamous. Sepals rarely 4, concave, widely imbricated. Petals 5, rarely 4 small, somewhat squamate at base by inflexion of the subauriculate base. Disk complete, annular, crenulate or entire. Stamens 8-9, rarely fewer, inserted within the disk; filaments very short; anthers oblong, included. Ovary 3-4-sided, 3-4-celled; ovules solitary, ascending; stigma subsessile, obtuse, obsoletely 3-4-rayed. Fruit baccate, not lobed, indehiscent, 3-4 or by abortion 2-1-celled; seeds arillate; embryo straight; cotyledons thick.—DISTRIB. Species about 8 confined to the Malay Peninsula and Archipelago.

O. fruticosa, Blume (= *Sapindus fruticosus*, Roxb.; *Wall. Cat.* 8043; *Allophylus pinnatus*, Roxb. *Ic. t.* 1407), has been introduced into India from the Moluccas.

1. ***O. paucijuga*, Hiern**; leaflets 2 or 4 opposite narrowly elliptic obtusely acuminate shining base cuneate, panicles racemose lax elongated, sepals 4-5 minutely ciliate, petals 4-3 scarcely bisquamate at base, stamens 5-7, disk glabrous, ovary glabrous.

MALACCA, Maingay.

Leaves 4-10 in.; petioles $\frac{3}{4}$ -2 $\frac{1}{2}$ in., base thickened and probably bearing caducous stipular leaflets; leaflets 3-6 by 1-2 in.; petiolules $\frac{3}{8}$ - $\frac{1}{2}$ in. Racemes $\frac{1}{2}$ -1 ft.; pedicels about equalling the flowers.

2. ***O. erythrocalyx*, Hiern**; glabrous, leaflets 14-19 opposite or alternate elliptic or oblong shining firmly coriaceous shortly acuminate, base more or less narrowed, lowest pair stipuliform smaller, panicles elongated much branched nearly equalling the leaves, pedicels slender, petals 5 shortly ciliate very shortly squamate at base, stamens 8, filaments fleshy hairy, anthers somewhat hairy pointed, disk glabrous, ovary 3-sided 3-celled glabrous.

MALACCA, Maingay.

A small tree. Leaves 30-45 in.; petioles thickened at base; leaflets ranging up to 9 by 3 in.; petiolule $\frac{1}{4}$ in. Flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. Sepals blood-red. Petals pale-rose, ap-

pressed. *Stigma* sessile broadly trisulcate. *Fruit* whitish, glabrous, subglobose, trigonous, 3-celled, $1\frac{1}{2}$ in. diam. *Seeds* arillate.

11. **SCHLEICHERA**, Willd.

Trees. *Leaves* alternate, exstipulate, pinnate; leaflets opposite (or alternate) quite entire, repand-wavy or slightly serrate, with subparallel lateral veins and delicate inconspicuous reticulation. *Panicles* or *racemes* simple, elongated. *Flowers* small, fascicled, regular, polygamo-diœcious. *Calyx* 4-6-fid, small, cup-shaped; lobes valvate or obscurely imbricated. *Petals* absent. *Disk* complete, glabrous, wavy. *Stamens* 5-8, exserted, inserted within the disk; filaments more or less pubescent; anthers small, glabrous. *Ovary* ovoid, 3-4-celled, narrowed into a rigid style; stigma 3-4-cleft. *Ovules* solitary, erect. *Fruit* dry crustaceo-coriaceous, indehiscent, 1-3-celled. *Seeds* erect, enveloped in a fleshy aril; embryo conduplicate, with unequal connate cotyledons.—**DISTRIB.** A small genus of India, the Indian Archipelago, and the Philippine Islands.

Beddome, in his *Flora Sylvatica Anal. Gen. p.* lxxii., speaks of a new tree found by him on the Golcondah hills, Vizagapatam district, which (he says) will probably turn out to be a species of *Schleicheria*; it is a middle-sized tree, all the young parts and the inflorescence pubescent-tomentose, leaves alternate abruptly or unequally pinnate, 8-10 inches long, leaflets 2-3 pair with or without a terminal odd one, ovate or oblong with a longish acumination subentire or distantly and rather inconspicuously serrate, quite glabrous in age except the costa, 3-4 inches long by $1-1\frac{1}{2}$ broad, petiolules $\frac{1}{4}-\frac{1}{2}$ in. long, racemes axillary paniced. The flower-buds on the specimen in the Kew Herbarium are so young that their structure cannot be determined; indeed the Natural Order to which the plant ought to be referred is uncertain. It is different from any known Indian species of *Sapindaceæ*.

1. **S. trijuga**, Willd. *Sp. Pl.* iv. 1096; leaflets 4-8 opposite elliptic or elliptic-oblong obtuse or shortly acuminate entire at length coriaceous glabrescent or subvelutinous flat base rounded or obtuse sessile or subsessile, fruit ellipsoidal glabrous apiculate smooth or spinous. *Grah. Cat. Bomb. Pl.* 29; *Dalz. & Gibs. Bomb. Fl.* 35; *Thwaites Enum.* 58; *Bedd. Fl. Sylv.* t. 119; *Brandis Fl. Sylv.* 105, t. 20; *Roxb. Fl. Ind.* ii. 277; *Roth. Nov. Sp.* 385; *W. & A. Prodr.* 114, not of Moritzi. *S. pubescens*, *Roth. l.c.* *Melicocca trijuga*, *Juss. in Mem. Mus. Par.* iii. 187, t. 8; *DC. Prodr.* i. 615; *Wall. Cat.* 8080. *Scytalia trijuga*, *Roxb. ex DC. l.c.* *Stadmannia trijuga*, *Spreng. Syst.* ii. 242. *St. pubescens*, *Spreng. l.c.* *Cussabium spinosum*, *Hamilt. in Trans. Werner. Soc.* v. 356. *C. glabrum*, *Hamilt. l.c.* *C. pubescens*, *Hamilt. l.c.* 357. *Conghas zeylonensis*, *Hb. Madr. ex Wall. l.c.* *M. pubescens*, *DC. l.c.*—*Rumph. Herb. Ambon.* 1 t. 57; *Wall. Cat.* 8106.

Dry forests, from the N.W. HIMALAYA at Sirmor; throughout CENTRAL and SOUTHERN INDIA, BIRMA, and CEYLON.—**DISTRIB.** Java, Timor.

A large tree, leafing and flowering early in the spring. *Leaves* paripinnate, 8-16 in.; leaflets 1-10 by $\frac{3}{4}-4\frac{1}{2}$ in.; the lowest pairs the smallest. *Racemes* axillary, often several on short branchlets, 2-4 in. *Flowers* yellowish or green. *Fruit* $\frac{3}{4}-1$ in. long.—The pulpy subacid aril is edible; the bark is astringent, and, according to Dr. Roxburgh, the natives rub it up with oil and use it to cure the itch. The timber is good.

EXCLUDED SPECIES.

S. PENTAPETALA, *Roxb.*, is *Cupania pentapetala*, *W. & A.*

S. TRIJUGA, *Moritzi* (not of Willd.), is *Cupania Lessertiana*, *Camb.*

12. **GLENNIEA**, Hook. f.

A large glabrous much branched leafy tree. *Leaves* alternate, exstipulate, 1-2-jugate; leaflets opposite, entire or wavy-repand, coriaceous. *Flowers* in spicate racemes forming a terminal panicle, regular, polygamous. *Calyx* 5-lobed, valvate. *Petals* minute, broader than long, shortly clawed, concave, hairy. *Stamens* 8; filaments short, subulate; anthers short. *Disk* complete, wide, fleshy, glabrous, and lobed. *Ovary* 3-sided, ovoid, contracted at the base, puberulent, 3-celled, narrowed into a very short style; stigma shortly 3-lobed. *Ovules* solitary. *Fruit* depresso-globose, indehiscent, fleshy, obscurely lobed. *Seeds* subglobose, exalbuminous, exarillate.

1. **G. [zeylanica]**, Hook. f. in Benth. & Hook. Gen. Pl. i. 404 (ex Thwaites Enum. 408); leaflets elliptic or oblong shining both ends obtuse, inflorescence shortly pubescent. Bedd. Fl. Sylv. t. 153.

CEYLON, ascending to 3-4000 ft.

Leaves 4-7 in.; leaflets $1\frac{1}{2}$ -5 by $\frac{3}{4}$ -2 $\frac{1}{2}$ in.; petiolules tumid, $\frac{1}{2}$ - $\frac{1}{4}$ in. *Calyx* $\frac{1}{2}$ in. diam.; lobes ovate, subacute. *Fruit* $\frac{3}{4}$ -1 $\frac{1}{4}$ in. diam.—Dr. Thwaites l.c. gives two varieties:—

VAR. 1, leaflets 2. *Sapindus unijuga*, Thwaites, l.c. 56.

VAR. 2, leaflets 2-4. *Nepbelium fuscatum*, Thwaites, l.c. 58; *Euphoria fuscata*, Benth. & Hook. f. Gen. Pl. i. 406. S. Gleniei, Thwaites, l.c. 408.

13. **SAPINDUS**, Plum.

Trees or shrubs. *Leaves* alternate or subverticillate (and then simple), exstipulate, usually paripinnate; leaflets coriaceous, commonly entire. *Inflorescence* terminal or axillary. *Flowers* polygamous, regular. *Sepals* 4-5 widely imbricated in 2 rows. *Petals* 4-5, with or without scales. *Disk* complete, annular, fleshy. *Stamens* usually 8-10, inserted within the disk; filaments usually pilose; anthers versatile. *Ovary* entire or 2-4-lobed, 2-4-celled. *Style* terminal; stigma 2-4-lobed. *Ovules* solitary. *Fruit* fleshy or coriaceous, 1-2-coccous; cocci oblong or globose, indehiscent. *Seeds* with a crustaceous or membranous testa; cotyledons thick; radicle short.—DISTRIB. A rather large genus inhabiting the tropical regions of the whole world.

* *Ovary* hairy

1. **S. trifoliatus**, Linn. Sp. Pl. ed. i. 367; leaves (normally) abruptly pinnate leaflets 6-4 elliptic or oblong acuminate or emarginate glabrous or especially beneath pubescent with short curved or stellate hairs base obtuse, inflorescence terminal paniced pubescent, scale of the petals membranous pilose-ciliate, ovary 3-lobed ferruginous-tomentose. S. laurifolia, Vahl Symb. iii. 54; Dalz. & Gibs. Bomb. Fl. 34; Roxb. Fl. Ind. ii. 278; W. & A. Prodr. 111; Grah. Cat. Bomb. Pl. 29; Bedd. Fl. Sylv. Anal. Gen. lxxiii.; Brand. For. Fl. 106; Wall. Cat. 8038 (not of Balb. Hb.). S. acutus, Roxb. ex W. & A. l.c.; Ic. t. 1965; not of Wall. Cat. 8096. S. emarginata, Vahl l.c.; Roxb. l.c. 279; W. & A. l.c.; Grah. Cat. Bomb. Pl. 29; Bedd. Fl. Sylv. t. 154; Brand. l.c. 107; Wight Ill. t. 51; Wall. Cat. 8039; Dalz. & Gibs. Bomb. Fl. 35. S. abstergens, Roxb. Ic. t. 1235.—Rheede Hort. Mal. iv. 43, t. 19.

Common about villages in SOUTH INDIA; cultivated in Bengal, where it is a doubtful native.

A handsome tree. *Leaves* 5-12 in.; leaflets $1\frac{1}{2}$ -8 by 1-4 in.; petiolules short. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, white, hairy. *Sepals* 5, elliptic, obtuse. *Petals* 4-5, narrower

and rather longer than the sepals; "scale fringed with a dense mass of long white hairs, more or less attached to the claw and inner surface of the petal, probably free when quite young, sometimes attached along the middle line only and free at the sides, in which case it happens that the two edges of the scale separate from the middle part and appear as lateral appendages" (*Dr. Brandis, l.c.*). *Stamens* 8; anthers apiculate. *Disk* concave, with a raised fleshy hirsute edge. *Fruit* fleshy, 2-3-lobed, $\frac{1}{4}$ - $\frac{3}{4}$ in. long, at length glaucescent, saponaceous.—There are two forms of this tree, usually regarded as distinct species, and corresponding to Vahl's names; one with acuminate glabrous leaves, the other with emarginate leaves pubescent beneath. The wood is used for making combs and other small articles.

2. **S. erectus**, *Hiern*; leaves abruptly pinnate leaflets 6-10 subopposite narrowly elliptic acuminate entire glabrous thin base more or less narrowed, panicles terminal shorter than the leaves, flowers pentamerous, petals with an erect bifid or entire shaggy scale, ovary hairy, lobes of fruit ellipsoidal nearly glabrate. *Nephelium erectum*, *Thwaites Enum.* 57.

CEYLON; in the southern provinces, alt. 3000 ft.

An erect shrub, not or sparingly branched, 6-10 ft. high. *Leaves* pallid, 1-2 ft.; leaflets 4-10 by $1\frac{1}{2}$ - $3\frac{1}{2}$ in.; petiolules $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ by $\frac{1}{4}$ in. *Calyx* shortly and appressedly pubescent outside; sepals rounded. *Petals* shortly exceeding the calyx, oblong-obovate, ciliated at the claw, glabrous and rounded above, involute at the margin; scale glabrous at the back, inserted at the top of the claw, falling rather short of the petals. *Disk* glabrous, fleshy. *Stamens* 8; filaments rather shorter than the petals, pubescent above; anthers glabrous. *Style* very short; stigma minute, 3-lobed. *Fruit* fleshy, yellow, about 1 in. long. *Aril* fleshy.

3. **S. Thwaitesii**, *Hiern*; leaves simple obovate-oblong narrowly acuminate entire glabrous pallid base attenuate, racemes terminal short simple or slightly branched obsoletely tomentose, sepals 5, rounded, petals 5, obovate obtuse upper half patent each furnished at base with an oblong hairy scale more than half the length of the petals, disk glabrous 5-cornered, filaments slender somewhat hairy above shorter than the petals, anthers small, ovary hairy 3-lobed. *Nephelium simplicifolium*, *Thwaites Enum.* 57.

CEYLON; south of the Island, at no great elevation, rare.

An erect shrub, 6-10 ft. high, sparingly branched. *Leaves* 8-12 by $2\frac{1}{4}$ -4 in.; petioles $\frac{1}{2}$ -2 in. *Racemes* 2-4 in. *Flowers* pentamerous, $\frac{1}{4}$ - $\frac{3}{8}$ in. *Petals* exceeding the calyx, not clawed. *Stamens* 8.

** *Ovary* glabrous.

† *Anthers* short.

4. **S. Mukorossi**, *Gærtn. Fruct.* i. 342, t. 70, f. 3, g, h; leaves pinnate leaflets 10-16 rarely fewer lanceolate-oblong alternate or subopposite acuminate or obtuse glabrous closely not conspicuously veined base oblique obtuse, inflorescence terminal and lateral paniced obsoletely tomentose, petals 5 each with a woolly scale on each side at the top of the claw, ovary 3-cornered glabrous. ? *S. abruptus*, *Lour. Fl. Coch.* 238.

Cultivated throughout N.W. INDIA and BENGAL. KOMAON. SILHET. ASSAM.—DISTRIB. China, Bonin Islands, Japan.

A handsome tree. *Shoots*, &c., obsoletely tomentose. *Leaves* 6-18 in., crowded near the ends of the branches; leaflets approximated, 2-6 by $\frac{3}{4}$ - $2\frac{1}{4}$ in., shortly petioluled. *Flowers* $\frac{1}{16}$ in., white or purple, ciliated. *Stamens* 8-10; anthers small, exerted, obtuse. *Disk* glabrous, flat, with 5 elevated radiated lines. *Fruit* fleshy, subglobose, somewhat glaucescent, saponaceous, $\frac{3}{4}$ in. diam., yellow.—There are two forms of this tree; one with obtuse or shortly and suddenly acuminate leaflets (*S. detergens*, *Roxb. Hort. Beng.* 29; *Fl. Ind.* ii. 280; not of *Wall. Cat.* 8042; nor *S. fuscatus*, *Hb. Ham.*

ex Wall. l.c.); the other with more lanceolate acuminate leaflets (*S. acuminata*, Wall. Cat. 8035; *Royle* Ill. 139), sometimes, as stated by Dr. Royle, with the rachis of the leaves very narrowly bordered.

†† *Anthers oblong*.

5. ***S. attenuatus***, Wall. Cat. 8037; leaves pinnate or rarely unifoliolate leaflets usually 8-10 ovate lanceolate elliptic or oblong acuminate glabrous base rounded or cuneate, inflorescence terminal and axillary puberulent or nearly glabrous, petals 4-5 imbricated about equalling the sepals, scale present or obsolete, ovary glabrous. *Scytalia rubra*, *Roxb. Hort. Beng.* 29; *Fl. Ind.* ii. 272. *Nephelium rubrum*, *G. Don Gen. Syst.* i. 671; *Wight Ic.* tt. 24, 25. *Euphoria verticillata*, Wall. Cat. 8052 D, E, not A, B, C. *E. rubra*, *Royle* Ill. 138. *E. attenuata*, *Planch. mss. in Herb. Ind. Or. H. f. & T.* Sapindaceæ, *Griff. Notul.* iv. 551; *Ic. Pl. Asiat.* t. 599, f. 2; *Itin. Notes* 112, n. 163.

ASSAM, Silhet and the Mishmi Hills, *Wallich, Griffith, &c.*; Sikkim Himalaya, *J. D. H.*; CACHAR *Keenan*; BHOTAN, *Griffith*.

A shrub or tree of moderate size. *Leaves* $\frac{1}{2}$ -3 ft.; always attenuate at base when unifoliolate; leaflets alternate or opposite, 2-18 by $\frac{3}{8}$ -1 $\frac{3}{8}$ in. *Flowers* $\frac{1}{2}$ - $\frac{1}{2}$ in., nearly glabrous, red; bud greenish. *Stamens* 6-8, not exerted; anthers yellow, oblong; filaments short or 0. *Ovary* bilobed. *Fruit* 1-2-lobed, ellipsoidal, size of an olive, red or dark purple; aril eaten.—There is a scandent state of this plant.

6. ***S. Danura***, *Voigt Hort. Sub. Calc.* 94; leaves simple alternate or at the extremities subverticillate obovate elliptic or oblong narrowed or shortly acuminate at apex glabrous gradually narrowed towards a rounded very shortly petioled base veins slender close not conspicuous, panicles terminal puberulent composed of rather remote diverging compound ramifications, petals 5 each with a very short woolly incurved scale at base, ovary glabrous 2-3-lobed. *Scytalia Danura*, *Roxb. Hort. Beng.* 29; *Fl. Ind.* ii. 274. *Sc. verticillata*, *Roxb. Hort. Beng.* 29; *Fl. Ind.* ii. 273. *Euphoria verticillata*, *Lindl. Bot. Reg.* t. 1059; *Wall. Cat.* 8052 letters A, B, C, not D, E. *Dimocarpus verticillata*, *Hb. Roxb. ex Wall. l.c.* A. *Nephelium verticillatum*, *G. Don Gen. Syst.* i. 670. *E. Danura*, *Wall. Cat.* 8051. *Didymococcus Danura*, *Blume Rumph.* iii. 103. *D. verticillatus*, *Blume l.c.*

NORTH WEST INDIA, ROHILCUND, ASSAM, SILHET, BIRMA, CHITTAGONG, and TE-
NASSERIM.

An evergreen shrub or small tree 6-10 ft. high. *Leaves* 4-12 by 1-5 $\frac{1}{2}$ in.; petioles $\frac{1}{2}$ - $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ - $\frac{1}{2}$ in., pale yellow tinged with pink. *Stamens* 6-8; anthers oblong obtuse; filaments short. *Disk* glabrous. *Fruit* 3-1-coccos, shortly stipitate, ellipsoidal, $\frac{3}{4}$ - $\frac{1}{2}$ in. long, pulpy when ripe, orange-coloured.

7. ***S. bifoliolatus***, *Hiern*; leaves bifoliolate leaflets opposite elliptic-oblong glabrous closely and inconspicuously veined both ends obtuse, panicles terminal and axillary puberulent equalling or exceeding the leaves, petals 5 each with a small rounded ciliate scale at the base, ovary glabrous bilobed. *Nephelium bifoliolatum*, *Thwaites Enum.* 57; *Bedd. Ic. Pl. Ind. Or.* t. 289.

CEYLON; lower Badulu road from Kandy. MADRAS; Kolay Mallay Hills, *Beddome*.

A much-branched tree; 20-30 ft. high. *Leaves* 2 $\frac{1}{2}$ -7 $\frac{1}{2}$ in.; leaflets 2-5 $\frac{1}{2}$ by $\frac{3}{4}$ -1 $\frac{3}{8}$ in.; petiolules $\frac{1}{2}$ - $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in. *Sepals* rounded, glabrous, shortly ciliated, connate at base. *Petals* rather exceeding the sepals, glabrous, ciliated. *Disk* fleshy, glabrous. *Stamens* usually 7, short; anthers ovate-oblong. *Young fruit* bilobed.—An allied new species from Siam, collected by Sir R. Schomburgk, differs by shorter petioles and less branched inflorescence.

DOUBTFUL AND EXCLUDED SPECIES OF SAPINDUS.

- S. ACUTUS, *Wall. Cat.* 8096, *not of Roxb.*, is a species of *Engelhardtia*.
- S. ADENOPHYLLUS, *Wall.*, is *Cupania adenophylla*, *Planch.*
- S. ALTERNIFOLIUS, *Herb. Ham.*, is *Erioglossum edule*, *Blume*.
- S. ANGUSTIFOLIUS, *Wall. ex Voigt Hort. Sub. Calc.* 94, *not of Blume*, from Khasia, is unknown to me.
- S. BENGHALENSIS, *Roxb.*, is *Nephelium Longana*, *Camb.*
- S. BIJUGUS, *Wall.*, is *Hemigyrosa canescens*, *Thwaites*.
- S. DEFICIENS, *W. & A.*, is *Hemigyrosa deficiens*, *Bedd.*
- S. DETERGENS, *Wall.*, *not of Roxb.*, is *Dittelasma Rarak*, *Hook. f.*
- S. EDULIS, *Ait.*, is *Nephelium Lit-chi*, *Camb.*
- S. EDULIS, *Blume*, is *Erioglossum edule*, *Blume*.
- S. FRAXINIFOLIUS, *DC.*, is *Erioglossum edule*, *Blume*.
- S. FRUTICOSUS, *Roxb.*, is *Otophora fruticosa*, *Blume*.
- S. FUSCATUS, *Herb. Ham.*, is *Dittelasma Rarak*, *Hook. f.*
- S. GLABRATUS, *Wall.*, is *Xerospermum Noronhianum*, *Blume*.
- S. GLENIEL, *Thwaites*, is *Glenneia zeylanica*, *Hook. f.*
- S. INDICA, *Poir. in Lamk. Dict.* vi. 667, from "the Indies," cultivated in the Paris Garden, is very little known; it has virgate glabrous branches and simple or subtrifoliolate linear-lanceolate glabrous reticulated leaves 6-8 by $\frac{1}{2}$ - $\frac{2}{3}$ in. decurrent on the petiole; the flower and fruit are unknown.
- S. LEPIDOTUS, *Wall.*, is *Aglaia Wallichii*, *Hiern*.
- S. LONGIFOLIA, *Vahl Symb.* iii. 53, a doubtful native of East India, is said by Roxburgh, *Fl. Ind.* ii. 282, to be a native of the Moluccas.
- S. LONGIFOLIUS, *Herb. Ham.*, is *Erioglossum edule*, *Blume*.
- S. MICROCARPUS, *W. & A. Prodr.* 112, is *Meliosma Arnottiana*, *Bedd.*
- S. MOLLIS, *Blume Rumphia* iii. 98 (*Dimocarpus Litchi*, *Herb. Heyne ex Blume l.c.*) may be *S. trifolius*, *Linn.* (*S. laurifolia*, *Vahl*).
- S. MONOGYNA, *Herb. Heyne*, is *Nephelium Longana*, *Camb.*
- S. MULTIJUGUS, *Wall.*, may be *Chisocheton paniculatus*, *Hiern*.
- S. OBOVATUS, *W. & A. Prodr.* 111 (*Blighia sapida*, *C. Kon.*, the "Akee,"), is *Cupania edulis*, *Schum. & Thonn*; it is cultivated in India, having been introduced from Guinea.
- S. PINNATUS, *Mill.*, is probably *Dittelasma Rarak*, *Hook. f.*
- S. PINNATUS, *Roxb.*, is *Erioglossum edule*, *Blume*.
- S. POLYPHYLLUS, *Roxb. Hort. Beng.* 29; *Voigt Hort. Sub. Calc.* 94, glabrous pallid leaves $1\frac{1}{2}$ ft. bearing 14-16 subopposite or alternate obliquely oblong entire or repand leaflets 3-6 by $1-1\frac{1}{2}$ in., and with small greenish-white flowers, is very imperfectly known; it was introduced into the Calcutta Garden from Pegu (Cfr. *S. Muko-rossi*, *Gærtn.*).
- S. RARAK, *DC.*, is *Dittelasma Rarak*, *Hook. f.*
- S. RUBIGINOSA, *Roxb.*, is *Erioglossum edule*, *Blume*.
- S. SAPONARIA, *Herb. Linn.*, *not of Linn. Sp. Pl.*, is *Erioglossum edule*, *Blume*.
- S. SAPONARIA, *Lour.*, is *Dittelasma Rarak*, *Hook. f.*
- S. SQUAMOSUS, *Roxb.*, is *Cupania glabrata*, *Kurz*.
- S. TETRAPHYLLA, *Vahl*, is *Hemigyrosa canescens*, *Thwaites*.
- S. TRAVANCORENSIS, *Wall.*, is *Canarium commune*, *Linn.*
- S. UNDULATUS, *Wall. ex Voigt Hort. Sub. Calc.* 94, is probably *Nephelium Longana*, *Camb.*
- S. UNIJUGUS, *Thwaites*, is *Glenniea zeylanica*, *Hook. f.*

14. **XEROSPERMUM**, Blume.

A tree. *Leaves* alternate, exstipulate, abruptly pinnate; leaflets opposite, entire. *Racemes* axillary and terminal. *Flowers* regular, polygamodiceious. *Sepals* 4-5, imbricated in 2 rows. *Petals* 4-5, equal, spathulate, shorter or but little longer than the sepals, hairy at the margin, without scales. *Stamens* 8-7, included, inserted within the annular glabrous disk; filaments filiform, pubescent; anthers small, glabrous. *Ovary* sessile, didymous, muricated, 2-celled; ovules solitary, ascending. *Style* short, thick; stigma thick, hairy. *Fruit* 1-2-lobed; parts ellipsoidal, diverging, muricated with pyramidal tubercles, indehiscent, glabrous inside. *Seeds* exarilate; testa coriaceous outside, fleshy, pilose, simulating an aril; embryo curved; cotyledons very large, thickly fleshy, superposed.—DISTRIB. A monotypic genus.

1. **X. Noronhianum**, *Blume Rumph.* iii. 100; leaflets 2-5 rarely only 1 elliptic lanceolate or oblong more or less acuminate glabrous closely reticulated base obtuse or cuneate, racemes short simple or branched subfascicled. *Euphoria Noronhiana*, *Blume Bijdr.* 234 (as to the fruit). *E. xerocarpa*, *Blume Bijdr.* 234. *Nephelium Noronhianum*, *Camb. in Mém. Mus. Par.* xviii. 30. *N. xerocarpum*, *Camb. l.c.* *Sapindus glabratus*, *Wall. Cat.* 8095. *Euphoria* (sp.), *Wall. Cat.* 8054.—*Wall. Cat.* 8083, 8084.

SILHET, *Wallich*; KHASIA MTS. and TENASSERIM, *Griffith*. MALACCA, SINGAPORE and PENANG, *Griffith*, &c.—DISTRIB. JAVA.

A tree, 30-45 or more feet high, with terete puberulent shoots. *Leaves* 7-13 in.; leaflets $3\frac{1}{2}$ -9 by 1- $3\frac{1}{4}$ in.; petiolules $\frac{1}{2}$ - $\frac{3}{4}$ in. *Racemes* 1-4 in. *Flowers* $\frac{1}{2}$ in., greenish or yellow. *Fruit* 1 in. or more long, yellow.—The Khasia and Silhet specimens differ from the type by lanceolate and more acuminate leaflets.

15. **NEPHELIUM**, Linn.

Trees or shrubs. *Leaves* alternate, exstipulate, pinnate or rarely simple; leaflets entire or rarely dentate more or less glaucous beneath (the lowest pair in one species simulating stipules). *Inflorescence* terminal and axillary. *Flowers* regular, polygamous. *Calyx* 4-8-lobed usually cup-shaped, subvalvate or somewhat imbricated in bud. *Petals* small, without scales, as many as or fewer in number than the calyx-lobes, or wanting. *Stamens* 5-10, inserted within the fleshy glabrous or pubescent disk; filaments usually pubescent. *Ovary* pubescent, 2-3-lobed, usually verrucose; lobes 1-celled, 1-ovuled. *Style* 2-3-lobed, erect. *Fruit* 1-3-coccos, indehiscent, globose or oblong, echinate tubercled or smooth. *Seeds* globose, included in a pulpy aril.—DISTRIB. A genus not separable from *Euphoria* (*Juss.*), and with it containing about 30 species, confined to India the Indian Archipelago S. China and Australia; in the last country about 10 species occur.

SECT. I. *Leaves* usually paripinnate; leaflets none stipuliform.

* *Petals* wanting. *Calyx* dentate or half-cleft.

1. **N. mutabile**, *Blume Rumph.* iii. 104; leaflets 4-8 opposite or subalternate oblong or oblong-elliptic obtusely acuminate entire thinly coriaceous above glabrous shining beneath glaucous marked with somewhat arching lateral veins puberulent-glandular base obtusely narrowed or rarely rounded, racemes simple or branched shortly pubescent, calyx cup-shaped 4-5-fid, petals 0, disk glabrous, stamens 7-8, fruit echinate-muricate with strong rigid setæ. *Euphoria Longana*, *Blume Bijdr.* 233 (not of

Lamk.) *N. Griffithianum*, *Kurz in Journ. As. Soc. Beng.* 1872, ii. 303. Sapindaceæ, *Griff. Notul.* iv. 550; *Ic. Pl. Ind. Or.* iv. t. 599, f. i.

AVA, at Bhamo, *Griffith*. SINGAPORE, *Anderson*. MALACCA, *Griffith*, *Maingay*.—DISTRIB. JAVA, BORNEO.

Leaves 3–18 in.; leaflets 2–7 by $\frac{3}{4}$ –2 $\frac{1}{4}$ in.; petiolules $\frac{1}{8}$ – $\frac{1}{4}$ in. *Flowers* $\frac{1}{8}$ – $\frac{1}{4}$ in. wide. *Stamens* exserted; filaments pubescent; anthers small, glabrous. *Fruit* 1–1 $\frac{1}{2}$ in. diam., red; setæ subulate, obtuse, glabrous or obsoletely tomentose, $\frac{3}{4}$ – $\frac{1}{2}$ in. long.

VAR. ? *pallens*; leaflets pallid green and nearly glabrous on both sides base more cuneate, inflorescence denser and more branched, filaments 6–8 slender longer, fruit unknown.—MALACCA, *Maingay*; TENASSERIM, *Lobb*.

2. *N. lappaceum*, *Linn. Mant.* i. 125; leaflets 2–12 opposite or alternate elliptic obovate or oblong usually obtuse quite entire glabrate base obtusely narrowed, racemes loosely paniced axillary and terminal, calyx 4–6-fid subvalvate, petals 0, ovary 2–3-dymous 2-celled densely hirsute, fruit echinate-muricate. *Gærtn. Fruct.* ii. 272, t. 140, f. 1; *Blume Rumph.* iii. 103; *Lamk. Ill.* t. 764; *Hassk. Pl. Jav. Rar.* 287. *Euphoria Nephelium*, *DC. Prodr.* i. 612; *Wall. Cat.* 8053 excl. part of *B. Scytalia* *Ramboutan*, *Roxb. Hort. Beng.* 29; *Fl. Ind.* ii. 271. *Dimocarpus crinita*, *Lour. Fl. Cochinch.* 234. *N. echinatum*, *Noronh. in Batav. Genootsch. Verh.* v. 80.

SINGAPORE, *Wallich*. MALACCA, *Griffith*, *Maingay*.—DISTRIB. MALAY ARCHIPELAGO.

A lofty tree. *Leaves* 3–18 in.; leaflets 2–9 by 1–4 in., shining and dark green above, paler and marked with subparallel lateral veins beneath; petiolules $\frac{1}{8}$ – $\frac{1}{4}$ in. *Branches of the panicle* spreading; flowers fascicled, pubescent, $\frac{1}{8}$ – $\frac{1}{4}$ in. diam. *Calyx* campanulate, at length patent. *Stamens* 5–8, exserted; filaments pubescent, especially towards base. *Style* deeply 2–3-lobed; lobes recurving. *Fruit-lobes* $\frac{1}{2}$ –2 in. long, red yellowish orange or nearly black, setæ subulate. *Aril* transparent, milky, fleshy, edible.—Hasskarl gives 15 varieties of this cultivated tree, commonly called *Ramboutan*.

3. *N. glabrum*, *Noronh. in Batav. Genootsch. Verh.* v. 80; leaflets 2–10 opposite or alternate elliptic usually obtuse at both ends sometimes shortly acuminate entire above glabrous and shining beneath glabrate or appressedly pubescent paler, racemes paniced, calyx 5–6-lobed slightly imbricated, petals 0, ovary deeply lobed, fruit tubercled. *Reinwardt in Blume Cat. Buitenz.* 111; *Hassk. Pl. Jav. Rar.* 290. *Euphoria glabra*, *Blume Bijdr.* 233.

MALACCA, *Griffith*, *Maingay*.—DISTRIB. PROBABLY MALAY ARCHIPELAGO.

A lofty tree. *Leaves* 6–12 in.; leaflets 3–6 by 1 $\frac{1}{4}$ –2 $\frac{1}{4}$ in., marked beneath with subparallel lateral veins; petiolules $\frac{1}{8}$ – $\frac{1}{4}$ in. *Branches of the panicles* less patent than in *N. lappaceum*; flowers pubescent, $\frac{1}{8}$ – $\frac{1}{4}$ in. diam., fascicled. *Calyx* campanulate at length patent. *Stamens* 5–10, exserted; filaments pilose. *Fruit* globose or ellipsoidal glabrous, 1 in. long or more, from dark red to straw-coloured. *Aril* sweet.—Very like *N. lappaceum*, except the fruit. Hasskarl gives 3 forms of it. *Blume in Rumphia*, iii. 103, treats this as a remarkable variety of *N. lappaceum*, towards which, he states, there is a transition. A form occurs, probably referable to this species, with a 1-celled ovary and unilateral style.

4. *N. Lit-chi*, *Camb. in Mém. Mus. Par.* xviii. 30; leaflets 2–8 opposite or alternate oblong-lanceolate or ovate acuminate above quite glabrous shining beneath glaucous glabrous or very nearly so, lateral veins obsolete base cuneate, panicle terminal, calyx 4–5-dentate, petals 0, disk glabrous, stamens 6–10 at length exserted, fruit tubercled. *Grah. Cat. Bomb. Pl.* 29; *Dalz. & Gibs. Bomb. Fl. Suppl.* 13; *Wight Ic.* t. 43; *Blume Rumph.* iii. 106. *Sapindus edulis*, *Ait. Hort. Kew.* ii. 36 (1789); not of *Blume*. *Euphoria punicea*, *Lamk. Dict.* iii. 573; *Ill.* t. 306. *Dimocarpus Lichi*,

Lour. Fl. Cochinch. 233. *Scytalia chinensis*, *Gærtn. Fruct.* i. 197, t. 42, f. 3. *Sc. Litchi*, *Roxb. Hort. Beng.* 28; *Fl. Ind.* ii. 269. *E. Lit-chi*, *Juss. Gen.* 248; *Wall. Cat.* 8048 (*part*). *N. dimocarpus*, *Herb. Ind. Or. H. f. & T.* (*N. duricarpus*, *T. Anders. Fl. Behar* 11).—*Sonn. Voy. Ind.* t. 129.

Widely cultivated in India; introduced from S. China.

A fine tree of moderate height, with spreading branches. *Leaves* 3–9 in.; leaflets $1\frac{1}{2}$ –6 by $\frac{1}{2}$ – $1\frac{1}{2}$ in.; petiolules $\frac{1}{2}$ – $\frac{1}{4}$ in. *Inflorescence* tawny-puberulent; flowers greenish-white, $\frac{1}{2}$ – $\frac{3}{8}$ in. wide. *Anthers* shorter than the filaments. *Disk* glabrous. *Ovary* 2–3-celled, ferruginous-hairy; style 2–3-lobed, lobes recurved. *Fruit* 2–1-lobed, globose, about 1 in. diam.; pericarp dry, at length brittle; tubercles angular. *Aril* fleshy, whitish, edible.—The Litchi of commerce.

** *Petals present. Calyx usually with deep divisions.*

† Leaflets quite entire.

‡ *Lateral veins of leaflets obsolete.*

5. **N. rubescens**, *Hiern*; leaflets 2–10 opposite or alternate lanceolate or oblong acuminate base obtuse or cuneate both sides glabrous shining lateral veins obsolete reticulation minute, panicles axillary and terminal pubescent, calyx rather deeply 4–5-lobed imbricated in bud, petals 4–5 small hairy, stamens 8–10 exserted, ovary emarginate or didymous, fruit sharply tubercled. *Euphoria Lit-chi*, *Wall. Cat.* 8048, *letters G, H only*, not of *Juss.*

MARTABAN and SINGAPORE, *Wallich*. MALACCA *Griffith*.

Glabrous and shining except the inflorescence. *Leaves* 6–18 in.; leaflets 2–7½ by ½–2½ in., turning somewhat red in drying; petiolules $\frac{1}{2}$ – $\frac{1}{4}$ in. *Flowers* $\frac{1}{6}$ – $\frac{1}{8}$ in. wide. *Petals* linear-obtuse or ovate acute. *Disk* glabrous. *Anthers* small; filaments pubescent, shorter in the female flowers. *Fruit-lobes* oblong or ellipsoidal, generally solitary, green or red, $\frac{3}{4}$ –1 in. long; setæ tubular, short, compressed.

‡‡ *Lateral veins of leaflets more or less conspicuous.*

6. **N. ? Maingayi**, *Hiern*; leaflets 2 or 4 opposite obovate or elliptic glabrous coriaceous shortly petioluled obtuse base obtusely narrowed lateral veins not much raised, flowers tetramerous, calyx-lobes shortly ciliated otherwise glabrous, petals smaller without scales, stamens 8 included, lobes of capsule usually solitary oblong nearly glabrate.

MALACCA, *Maingay*.

Glabrous except ferruginous-puberulent shoots and inflorescence. *Leaves* 4–10½ in.; rachis not winged; leaflets $2\frac{1}{4}$ – $6\frac{1}{2}$ by $1\frac{1}{2}$ – $3\frac{1}{2}$ in.; petiolules $\frac{1}{2}$ – $\frac{3}{8}$ in. *Inflorescence* ranging up to 8 in.; flowers $\frac{1}{10}$ in. diam., in interrupted globose clusters; bracts ranging up to 1 in. long or more. *Calyx* cleft, lobes imbricated. *Petals* shaggy-tomentose. *Filaments* hairy. *Ovary* hairy. *Fruit* (immature) $\frac{3}{4}$ –1 in. long, shortly stipitate.

7. **N. costatum**, *Hiern*; leaflets 4–6 opposite or alternate elliptic or oblong glabrous entire above dark green beneath pale obtuse emarginate or shortly acuminate base obtuse, flowers paniced tomentose, calyx deeply 5-lobed imbricated in bud, petals 5 minute obtuse attenuate towards base, stamens exserted

MALACCA, *Maingay*.

Leaves 6–10 in.; leaflets 3–6 by $1\frac{1}{2}$ – $2\frac{1}{4}$ in., marked with subparallel lateral veins beneath; petiolules $\frac{1}{2}$ – $\frac{1}{4}$ in. *Panicles* densely flowered, nearly equalling the leaves; flowers $\frac{1}{2}$ in. diam. *Filaments* pilose. *Ovary* pilose.

8. **N. Longana**, *Camb. in Mém. Mus. Par.* xviii. 30; leaflets 4–10 opposite or alternate elliptic ovate oblong or lanceolate usually rather

obtuse at both ends glabrous above subglaucescent glabrous or nearly so marked with lateral veins beneath wavy entire, base oblique, panicles terminal and axillary, calyx deeply 5- rarely 6-lobed somewhat imbricated in bud, petals spatulate about equalling the calyx, disk tomentose, stamens 6-10 included in the female shortly exerted in the male flowers, ovary 2-3-lobed, fruit tubercled. *Bot. Mag.* t. 4096; *W. & A. Prodr.* 113; *Grah. Bomb. Pl.* 29; *Blume Rumph.* iii. 108; *Dalz. & Gibs. Bomb. Fl.* 35; *Thwaites Enum.* 58. *N. Mora*, *Gardn. ex Thwaites l.c.* *N. bengalense*, *G. Don Gen. Syst.* i. 570. *Scytalia bengalensis*, *Roxb. ex G. Don l.c.* *Sc. Longan*, *Roxb. Hort. Beng.* 29; *Fl. Ind.* ii. 270. *Dimocarpus Longan*, *Lour. Fl. Cochinch.* 233; *Trans. Hort. Soc.* ii. t. 28. *Euphoria Longana*, *Lamk. Dict.* iii. 574; *Bot. Reg.* t. 1729; *Bedd. Fl. Sylv.* t. 156; *Wall. Cat.* 8049. ' *Sapindus benghalensis*, *Roxb. ex W. & A. l.c.* *Dimocarpus undulatus*, *Wight ex W. & A. l.c.* *E. undulata*, *Hb. Heyne ex Wall. l.c.* *S. monogyna*, *Hb. Heyne l.c.* *D. pupilla*, *Moon Cat.* 31. *N. pupillum*, *Wight Ill.* i. 141. *Euphoria pupillum*, *Steud. Nom. ed.* 2, ii. 192 (under *N. pupillum*). *N. hypoleucum*, *Kurz in Journ. As. Soc. Beng.* 1871, ii. 50.—*Cupania* (sp.), *Wall. Cat.* 8067, letter A not B.

EASTERN BENGAL. PEGU. WESTERN PENINSULA, from the Concan southwards. CEYLON. Often cultivated.—DISTRIB. Cultivated in the tropics.

A tree of 30-40 ft. *Leaves* 4-18 in.; leaflets 2-12 by $\frac{1}{2}$ -2 $\frac{1}{2}$ in.; petiolules $\frac{1}{4}$ - $\frac{1}{2}$ in. *Inflorescence* puberulent; flowers yellowish-white, $\frac{1}{2}$ - $\frac{3}{4}$ in. wide. *Calyx* shortly tomentose on both sides. *Petals* 5 rarely 6, pubescent. *Filaments* pubescent; anthers glabrous, shorter. *Fruit* reddish or purple, globose, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; tubercles rugose or at length smooth. *Aril* wholesome.

9. **N. malaiense**, *Griff. Notul.* iv. 549; leaflets 6-8 subopposite or alternate elliptic or ovate-oblong shortly acuminate above dark green glabrous beneath ferruginous-pubescent subglaucescent marked with transverse somewhat arched lateral veins base rounded, inflorescence terminal paniced glandular pubescent, calyx deeply 5-lobed somewhat imbricated, petals entire obovate shaggy inside, stamens short, fruit tubercled or almost obsoletely so globose.

MALACCA, *Griffith, Maingay.*

Young parts glandular-pubescent. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ ft.; leaflets 2 $\frac{1}{2}$ -9 $\frac{1}{4}$ by 1-3 $\frac{3}{4}$ in.; petiolules very short, $\frac{1}{4}$ - $\frac{1}{2}$ in. *Inflorescence* about 1 ft.; bracts lanceolate, obtuse; flowers fascicled, $\frac{1}{2}$ in. diam. *Calyx-lobes* obtuse, about equalling the petals. *Stamens* 8; filaments pubescent; anthers glabrous, shorter than the filaments, scarcely exerted. *Ovary* lobed, hairy, equalling the style; stigma capitate, 2-3-lobed. *Fruit* $\frac{3}{4}$ -1 in. diam.; aril fleshy.

10. **N. eriopetalum**, *Miq. Fl. Ind. Bat. Suppl.* i. 508; leaflets 6-8 opposite or alternate elliptic-oblong or oblong apex rounded emarginate or apiculate base rounded or obtuse entire beneath ferruginous subtomentose with well-defined lateral veins above shining, branches of the panicles spike-like, calyx deeply 5-lobed subvalvate, petals spatulate hairy, filaments pubescent, fruit echinate-muricate.

MALACCA, *Maingay*.—DISTRIB. Sumatra.

Young parts and inflorescence ferruginous-tomentose. *Leaves* 1-1 $\frac{1}{2}$ ft.; leaflets 4 $\frac{1}{2}$ -10 by 1 $\frac{1}{2}$ -3 $\frac{1}{2}$ in.; petiolules $\frac{1}{2}$ - $\frac{1}{2}$ in. *Inflorescence* axillary and terminal, shorter than the leaves; flowers $\frac{1}{6}$ - $\frac{1}{2}$ wide. *Calyx-lobes* ovate-elliptic, obtuse, tomentose outside, glabrous inside. *Petals* small, often some deficient. *Disk* hairy. *Stamens* 5-8, shortly exerted; anther shortly oblong, not quite glabrous. *Ovary* 2-lobed, hairy. *Cocci* of the fruit compresso subglobose, 1-1 $\frac{1}{2}$ in. diam., bright red; setæ subulate-obtuse, $\frac{1}{2}$ in.

†† Leaflets coarsely serrate.

11. **N. Gardneri**, *Thwaites Enum.* 58; leaflets 4-6 lanceolate coarsely remotely and obtusely serrate subglabrous lower surface glaucous base obliquely cuneate very shortly petioled, racemes paniced, calyx deeply lobed hoary-tomentellous, petals linear-spathulate acute, fruit smoothly tubercled. *Euphoria Gardneri*, *Benth. & Hook. f. Gen. Pl.* i. 406; *Bedd. Ic. Pl. Ind. Or.* t. 285.

CEYLON; at Puttam, *Gardner*.

Leaves 3-8 in.; leaflets 2-4 by $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Inflorescence* about as long as the leaves; flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. wide, 5-merous. *Calyx-lobes* ovate, somewhat imbricate in bud, hairy on both sides. *Petals* hairy on both sides, exceeding the calyx. *Disk* hairy. *Stamens* 7-10, short; filaments hairy; anthers small, glabrous. *Ovary* tubercled, hispid, didymous; style rather long. *Fruit* $\frac{1}{2}$ in. long.

SECT. II. *Leaves* paripinnate; leaflets with the lowest pair stipuliform.

12. **N. stipulaceum**, *Bedd. in Trans. Linn. Soc.* xxv. 212; *Ic. Pl. Ind. Or.* t. 103; *Fl. Sylv.* t. 155; leaflets 4-6 opposite or alternate elliptic obtuse glabrous lower surface pale or glaucous with clear slender lateral veins glandular in the axils base cuneate lowest pair opposite small stipuliform, panicles axillary and terminal, calyx hirsute 5-6-partite subvalvate, petals 0, stamens 5-9 short, fruit echinate.

WESTERN PENINSULA; moist forests of Malabar and the Anamallay hills, alt. 2000 ft., rare, *Beddome*.

A handsome tree of middle size, with strong wood. *Leaves* 6-14 in.; leaflets 2 $\frac{1}{2}$ -6 by 1 $\frac{1}{2}$ -3 in., lowest pair $\frac{1}{2}$ -1 in. long; petiolules short, ranging up to $\frac{1}{4}$ in. *Panicles* rather shorter than the leaves; flowers about $\frac{1}{2}$ in. wide. *Calyx* spreading. *Anthers* small. *Ovary* 2-3-lobed. *Style* 2-3-lobed; lobes recurved, glandular. *Fruit* ellipsoidal, $\frac{3}{4}$ by $\frac{1}{2}$ in.; setæ subulate obtuse, rather weak, hairy at tip. *Seeds* half covered with the succulent aril.

DOUBTFUL AND EXCLUDED SPECIES.

EUPHORA EXSTIPULATIS, *Griff.*, is *Aglaia minutiflora*, *Bedd.*

EUPHORIA ATTENUATA, *Planch.*, is *Sapindus attenuatus*, *Wall.*

E. DANURA, *Wall.*, is *Sapindus Danura*, *Voigt.*

E. FUSCATA, *Benth. & Hook. f.*, is *Glennia zeylanica*, *Hook. f.*

E. LITCHI, *Wall. Cat.* 8048 E only (*Scytalia glabra*, *Hb. Ham.*), is *Walsura robusta*, *Roxb.*

E. NEPHELIUM, *Wall. Cat.* 8053 part of B, is *Mallotus subpeltatus*, *Muell. Arg.*

E. NORONHIANA, *Blume*, is *Xerospermum Noronhianum*, *Blume.*

E. RIMOSA, *Royle Ill.* 138, is the same as *Nephelium rimosum*, *G. Don.*

E. RUBRA, *Royle Ill.* 138, is *Sapindus attenuatus*, *Wall.*

E. VERTICILLATA, *Lindl.*, is *Sapindus Danura*, *Voigt.*

E. VERTICILLATA, *Wall. Cat.* 8052 D, E, only, is *Sapindus attenuatus*, *Wall.*

E. XEROCARPA, *Blume*, is *Xerospermum Noronhianum*, *Blume.*

E. (sp.), *Wall. Cat.* 8054, is *Xerospermum Noronhianum*, *Blume.*

NEPHELIUM BIFOLIOLATUM, *Thwaites*, is *Sapindus bifoliolatus*, *Hiern.*

N. ERECTUM, *Thwaites*, is *Sapindus erectus*, *Hierp.*

N. EXIMIUM, *Thwaites*, is *Pometia tomentosa*, *Kurz.*

N. FUSCATUM, *Thwaites*, is *Glennia zeylanica*, *Hook. f.*

N. NORONHIANUM, *Camb.*, is *Xerospermum Noronhianum*, *Blume.*

N. RIMOSUM, *G. Don Gen. Syst.* i. 671; *W. & A. Prodr.* 113 (*Scytalia rimos*, *Roxb. Hort. Beng.* 29; *Fl. Ind.* ii. 272), from Silhet, is unknown to me.

N. RUBRUM, *G. Don*, is *Sapindus attenuatus*, *Wall.*

N. SIMPLICIFOLIUM, *Thwaites*, is *Sapindus Thwaitesii*, *Hiern.*

N. VARIABILE, *Wall. ex Voigt Hort. Sub. Calc.* 95, from Khasia, is unknown to me.

N. VERTICILLATUM, *G. Don*, is *Sapindus Danura*, *Voigt.*

N. XEROCARPUM, *Camb.*, is *Xerospermum Noronhianum*, *Blume.*

16. POMETIA, J. R. & G. Forst.

Tall trees. *Leaves* alternate, pinnate, leaflets subopposite, entire or serrate (the lowest pair usually stipuliform). *Racemes* simple or paniced, elongated slender. *Flowers* regular, polygamous, fascicled, small, shorter than their pedicels. *Calyx* cup-shaped, 5-4-fid, valvate in bud. *Petals* 5-4, small, usually without scales. *Disk* complete, annular, lobed. *Stamens* 4-8, usually 6-4 inserted within the disk, at length much exserted; anthers small. *Ovary* 2-3-coccous and -celled; ovules solitary. *Style* elongated; stigma obtuse, emarginate. *Fruit* 1-2-coccous; lobes subglobose or ellipsoidal, indehiscent, smooth. *Seeds* exalbuminous, covered with a mucilaginous aril.—*DISTRIB.* Species few, confined to India, Ceylon, the Indian Archipelago and the Pacific Islands.

1. *P. tomentosa*, *Kurz Andam. Rep. ed.* 2, 34; leaflets 10-26 oblong glabrescent or veins and midrib pubescent or even tomentose usually acuminate base rounded or somewhat cordate lateral veins numerous clearly marked beneath, inflorescence pubescent or glabrescent, flowers 5-4-merous. *P. eximia*, *Bedd. Fl. Sylv. t.* 157. *Irina glabra*, *Blume Bijdr.* 230. *Eccremanthus eximius*, *Thwaites in Hook. Kew Journ.* vii. 272, t. 9. *Nephelium eximium*, *Thwaites Enum.* 57.—*Rumph. Herb. Amboin.* iii. 31, t. 17.

EASTERN PENINSULA; South Andamans, *Kurz*; MALACCA, *Maingay*; CEYLON, in the Central province, *Thwaites*.—*DISTRIB.* Malay Archipelago.

A tree ranging up to 60 ft. with terete glabrate branches. *Leaves* 1-3 ft.; leaflets ranging up to 1½ by ¾ ft., the lower leaflets smaller, the lowest pair very small ¾-1½ in. diam.; lateral veins alternately ending in a tooth; petiolules very short. *Flowers* very small, 5-4-merous, yellowish-green. *Petals* white, short, glabrous or hairy near the apex inside, with or without an adnate hairy scale. *Disk* bright red or orange. *Stamens* 5-4; filaments pubescent at least below. *Fruit* deep red or brown when ripe, glabrous, ellipsoidal or subglobose, 1-2 in. diam. *Seeds* oblong; testa red; aril white, opaque.—Timber useful. For a figure and description of a monstrous leaf of this plant, see a paper by Dr. A. Braun on the subject. This perhaps ought to be united to *P. pinnata*, *J. R. & G. Forster Char. Gen.* 110, t. 55, a native of Fiji and other South Sea Islands; it differs from the latter by rather more numerous less sessile less cordate and not imbricating leaflets.

VAR. ferruginea; young parts inflorescence rachis of leaves and midrib of leaflets ferruginous-tomentose; leaflets not exceeding 7 by 2½ in.

17. HARPULLIA, Roxb.

Erect trees. *Leaves* alternate, exstipulate, pinnate; leaflets alternate, entire, acuminate, subglabrous. *Flowers* in racemes or panicles diocious or polygamous, regular. *Sepals* 4-5, erect, equal, imbricated. *Petals* 4-5, narrowly obovate, exceeding the calyx, sometimes clawed, without either glands or scales, but sometimes with inflected lobes at the base of the lamina. *Stamens* 5-8, elongated, inserted within the obscure disk. *Ovary*

tomentose, ellipsoidal or oblong, 2-celled; ovules usually 2 together, superposed. *Style* elongated; stigma linear, usually more or less twisted. *Capsule* coriaceous, inflated, 2-lobed, 2-celled, loculicidally 2-valved; cells 1-2-seeded. *Seeds* subglobose, exalbuminous, usually arillate. — **DISTRIB.** About 6 tropical Asiatic, Australian and Madagascar species.

1. **H. cupanoides**, *Roxb. Hort. Beng.* 86; *Fl. Ind. ed. Carey*, ii. 442; *ed.* 1832, i. 645; leaflets 6-12 alternate or opposite ovate or elliptic thinly coriaceous lateral nerves neither stout nor approximate base obtuse or cuneate shortly petiolate, panicles lax axillary and subterminal, fruit glabrate or nearly so. *Wall. Cat.* 8078. *Streptostigma viridiflorum*, *Thwaites in Hook.-Kew Journ.* vi. 298, t. 9 (1854). *H. imbricata*, *Thwaites Enum.* 56; *Bedd Fl. Sylv.* t. 158. *Otonychium imbricatum*, *Blume Rumph.* iii. 180 (*vide Thwaites*).

CHITTAGONG, *Roxburgh*. **BIRMA**, *Griffith*. **SOUTH ANDAMANS**, *Kurz*. **WESTERN PENINSULA**, from the Concan southwards. **CEYLON**, in the Central province. — **DISTRIB.** Sumatra, Java, Borneo.

A tree with straight trunk. *Leaves* 6-18 in.; leaflets 2-9 by 1-3 in.; petioles $\frac{1}{2}$ - $\frac{2}{3}$ in. *Panicles* erect (in flower), 2-9 in. long. *Flowers* pale-yellow or greenish, $\frac{2}{3}$ - $\frac{1}{2}$ in. long. *Calyx* $\frac{1}{2}$ - $\frac{1}{4}$ in. long, somewhat tomentose, deciduous; partitions obtuse. *Petals* glabrous except the claw, obtuse. *Capsule* 1 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., compressed, pendulous, bright orange. — Some of Blume's species of *Harpullia* are probably synonymous.

18. **ZOLLINGERIA**, *Kurz in Journ. As. Soc. Beng.* xli. ii. 303 (1872).

A glabrescent, shining tree. *Leaves* alternate, deciduous, exstipulate; leaflets alternate, entire, papery. *Panicles* axillary and terminal; flowers white, pedicelled. *Calyx* 5-partite; sepals deciduous, unequal, imbricated; the inner 2 larger. *Petals* 5, somewhat clawed, each furnished at the base with an obtuse woolly scale half as long as themselves. *Stamens* 8, inserted within the obsolete disk; filaments not exerted, longer slender; anthers oval, cells blunt. *Ovary* 3-sided, conical, attenuated into the simple 3-dentate 3-sided style, 3-celled; cells 1-2-ovuled. *Capsules* large, papery, usually 1-celled, broadly 3-2-winged, septicidally dehiscent. *Seeds* solitary or 2 together, exalbuminous, without aril; testa membranous; cotyledons large green plicate. — **DISTRIB.** A monotypic genus.

1. **Z. macrocarpa**, *Kurz l.c.*; leaves glabrous, leaflets 4-5 oblong rather obtusely narrowed scarcely acuminate base oblique, capsule-wings striate rounded at base truncate at apex.

PEGU, at Prome, *Kurz*.

A tree up to 80 ft.; young parts tawny-puberulent. *Leaves* 9-12 in., odd-pinnate or rarely subabruptly pinnate; leaflets 5-8 by $1\frac{1}{2}$ -2 in.; lateral veins subparallel; petioles $\frac{1}{2}$ - $\frac{1}{4}$ in. *Panicles* 4-6 in., somewhat drooping, obsoletely puberulent. *Pedicels* $\frac{1}{2}$ in. *Sepals* about $\frac{1}{2}$ in. long, obovate, ciliolated, subemarginate. *Petals* $\frac{1}{2}$ in. long, ciliated, oblong, obtuse. *Filaments* pubescent. *Ovary* sparingly pubescent at base. *Capsules* 2-2 $\frac{1}{2}$ in. by $1\frac{1}{2}$ -1 $\frac{3}{4}$ in., oblong, glabrate.

19. **ACER**, *Tournef.*

Trees with opposite simple or palmately lobed exstipulate leaves, terminal and lateral racemes or corymbs and polygamous regular flowers. *Calyx* usually 5-partite, imbricated, deciduous. *Petals* isomerous with the

sepals or 0, erect, shortly clawed, without scales. *Stamens* 4-12, usually 8, inserted on the glabrous disk; filaments usually shorter in the hermaphrodite than in the male flowers. *Ovary* 2- (rarely 3-) lobed and celled, laterally compressed; cells 2-ovuled. *Style* bipartite; divisions linear, stigmatose on the inner face. *Fruit* a double samara, indehiscent. *Seeds* exalbuminous, exarillate; embryo conduplicate. — **DISTRIB.** A genus of 40-50 species, found also in Europe, other parts of Asia, and in North America.

SECT. I. *Leaves* undivided.

* *Leaves* with 3 basal nerves.

1. **A. oblongum**, Wall. in *DC. Prodr.* i. 593; *Cat.* 1222; leaves undivided quite entire oblong or ovate acuminate glabrescent penninerved silvery glaucous beneath base obtuse 3-nerved, cymes paniced contemporary with the leaves pubescent. *Camb. in Jacq. Voy. Bot.* 31, t. 34; *Brand. For. Fl.* 110; *Royle Ill.* 134. *A. laurifolium*, D. Don *Prodr.* 249. *A. Buzimpala*, *Hamilt. ex D. Don l.c.*

TEMPERATE HIMALAYA; from Kashmir, alt. 2-3000 ft., to Sikkim, alt. 3-5000 ft.; Bhotan, and the Mishmi hills. — **DISTRIB.** Hongkong, Lochow Islds.

A tree of 40-50 ft.; trunk 1-2 ft. diam. *Leaves* more or less persistent, dark-green above, 2-7 by $\frac{3}{4}$ -3 in., minutely reticulated; petioles $\frac{3}{4}$ -3 $\frac{1}{2}$ in., usually about half the length of their leaves. *Sepals* and *petals* narrow, $\frac{1}{10}$ - $\frac{1}{16}$ in. *Stamens* 8, exserted, glabrous. *Ovary* hairy. *Fruit* glabrous; carpels 1-1 $\frac{1}{4}$ in. long; wings venose, diverging, contracted below, back nearly straight; cells woody, angular, clothed inside with white hairs. — Wood reddish, used for agricultural implements, and in Tibet for drinking cups.

VAR. ? microcarpum; carpels $\frac{1}{2}$ - $\frac{5}{8}$ in. long. Mishmi hills, *Griffith*.

2. **A. niveum**, Blume *Cent. Plant. Nov.*; *Rumph.* iii. 193, t. 167 B, fig. 1; leaves undivided quite entire elliptic or oblong acuminate or caudate glabrescent penninerved white-glaucous beneath base rounded 3-nerved, cymes paniced glabrous contemporary with the leaves. *A. laurinum*, Hassk. in *Tydschr. Nat. Wetensch.* x. 138 (1843); *Cat. Pl. Hort. Bog.* 222 (without description in either case). *A. javanicum*, *Jungh. in Tydschr. Nat. Wetensch.* viii. 391 (1841), not of Burmann.

UPPER ASSAM, *Griffith*. MARTABAN, at Moulmein, *Helper*. — **DISTRIB.** Sumatra, Java.

A tree of 100-150 ft. *Leaves* 3-8 by 1-3 $\frac{1}{2}$ in.; petioles 1-3 in. *Cymes* lax; flowers yellowish-green. *Sepals* lanceolate or oblong, $\frac{1}{4}$ in. *Petals* equalling or shorter than the sepals. *Stamens* 6-8, glabrous, short, included (in hermaphrodite flowers). *Ovary* hairy. *Fruit* glabrous; carpels $\frac{3}{4}$ -2 $\frac{1}{2}$ in. long; wings venose, widening upwards, back but little curved, cells not angular.

3. **A. lævigatum**, Wall. *Pl. As. Rar.* ii. 3, t. 104; *Cat.* 1223; leaves undivided quite entire or minutely serrate when young ovate or oblong acuminate glabrous shining penninerved reticulated green on both sides base rounded 3-nerved, cymes paniced glabrous contemporary with the leaves. *Brand. For. Fl.* 110, non *Hort.*

TEMPERATE HIMALAYA; alt. 5-9000 ft., from Simla to Sikkim. KHASIA Mts., alt. 5000 ft.

A large tree; trunk 30-40 ft. high, 3-4 ft. diam. *Leaves* 2 $\frac{1}{2}$ -6 by 1-2 in., more strongly reticulated than in *A. oblongum*; petioles $\frac{1}{2}$ -1 in. *Cymes* laxer than in *A. oblongum*. *Sepals* 5, ovate or lanceolate, $\frac{1}{12}$ in. *Petals* 5, obtuse, clawed, white, $\frac{1}{12}$ - $\frac{1}{8}$ in. *Stamens* 5-8, glabrous, exserted. *Ovary* hairy. *Fruit* glabrous; carpels

1-1½ in. long; wings venose, slightly diverging, widened above, back usually curved; cells not angular.—Wood used for building.

** *Leaves with 5 basal nerves.*

4. **A. sikkimense**, *Miq. in Archives Néerlandaises*, ii. 471; leaves undivided minutely serrate ovate cuspidate subcoriaceous glabrous penninerved both sides green base cordate 5-nerved, racemes spicate contemporary with the leaves glabrate.

EASTERN TEMPERATE HIMALAYA, from Sikkim, alt. 7-9000 ft., and Bhotan, to the Mishmi hills, *Griffith*.

A large tall tree. *Leaves* 3-6 by 1½-3½ in.; petioles ¾-1½ in. *Racemes* equalling or shorter than the leaves; pedicels very short alternate and opposite. *Sepals* lanceolate. *Petals* short. *Stamens* glabrous, short. *Fruit* glabrous; carpels ½-¾ in. long; wings venose, diverging, widened above, back straight or slightly curved; cells not angular.

5. **A. Hookeri**, *Miq. in Archives Néerlandaises*, ii. 471; leaves undivided finely duplicato-serrate ovate caudate-acuminate submembranous subglabrate both sides green base 5-nerved cordate, racemes simple nearly equalling and contemporary with the leaves puberulent.

EASTERN TEMPERATE HIMALAYA; Sikkim, alt. 8-10,000 ft., *J. D. H. Bhotan, Griffith*.

A tree of 40-50 ft. *Leaves* 2½-6 by 1½-3½ in.; petioles 1-2 in. *Racemes* 2-4½ in.; pedicels ½-¾ in. *Flowers* ½ in., glabrous. *Sepals* elliptic or ovate. *Petals* obovate, about equalling the sepals. *Stamens* 8, scarcely exerted. *Fruit* glabrous; carpels ¾-1 in. long; wings venose, diverging, widened above, back slightly curved; cells not angular.

6. **A. stachyophyllum**, *Hiern*; leaves undivided serrate ovate caudate-acuminate submembranous penninerved upper surface subglabrous lower surface hoary-velvety base rounded or slightly hollowed 5-nerved, racemes simple or branched about equalling the leaves.

EASTERN TEMPERATE HIMALAYA; Sikkim, in the Lachoon valley, alt. 9-10,000 ft., *J. D. H. Bhotan, Griffith*.

A small tree. *Leaves* 2½-3½ by 1½-2½ in.; petioles 1-3 in. *Flowers* unknown. *Fruit* glabrous; carpels 1½-2 in. long; wings venose, somewhat widened upwards and diverging; cells angular, cuneate at base, woody.

SECT. II. *Leaves* 3-lobed.

7. **A. isolobum**, *Kurz in Journ. As. Soc. Beng.* xli. 302, 1872; leaves deeply 3-lobed glabrous shining acutely serrulate base subcordate 3-nerved lobes lanceolate acuminate acute.

PEGU, Kurz.

A large glabrous tree. *Leaves* 3-4½ by 3-5 in. wide; petioles 1-2 in. *Flowers* and *fruit* unknown.

8. **A. pentapomicum**, *J. L. Stewart ex Brand. For. Fl.* 111; leaves 3-lobed glabrescent except tufts of hairs in the axils of the 3-5 basal nerves base truncate or cordate lobes ovate obtusely serrate, peduncles fascicled.

NORTH WESTERN TEMPERATE HIMALAYA; in hot dry places from Kashmir to Kumaon, alt. 2300-5300 ft.

A tree; girth of trunk rarely as much as 5½ ft.; twigs grey or reddish. *Leaves* 1½-4 by 2½-6 in., pale on both sides; lobes about half the depth of the leaves; petioles 1½-4 in., thinly tomentose when young, afterwards glabrate. *Flowers* unknown. *Pe-*

dundes in short little-branched corymbose cymes, which measure 2-3 in. long. *Fruit* glabrous; carpels 1 in. long; wings venose, slightly diverging, widening above, back nearly straight; cells somewhat nodose.

SECT. III. *Leaves* 5-lobed and nerved (3-lobed in *A. villosum* var. *Thomsoni*).

9. **A. cæsum**, *Wall. ex Brand. For. Fl.* 111, t. 21; leaves palmately 5-lobed pale beneath serrate base cordate 5-nerved lobes ovate acuminate basal ones smaller, cymes corymbose appearing after the leaves.

TEMPERATE WESTERN HIMALAYA, from Kashmir to Nipal, alt. 7-10,000 ft., extending to Kumaon.

A tree, 70-80 ft. high. *Leaves* $3\frac{1}{2}$ -7 by 4-8 in., thinly pubescent, especially on the veins beneath, usually glabrescent except in the axils of the 5 (rarely 7) basal nerves; petioles $2\frac{1}{2}$ - $6\frac{1}{2}$ in. *Cymes* nearly equalling the leaves; flowers pentamerous. *Petals* short, white. *Stamens* short. *Fruit* glabrate; carpels $1\frac{1}{2}$ -2 in. long; wings venose, somewhat diverging, back slightly curved; cells angular, black.—Wood soft; inferior drinking cups are made of it in Tibet.

10. **A. villosum**, *Wall. Pl. As. Rar.* ii. 4; *Cat.* 1227; leaves normally 5-lobed upper surface glabrate lower surface pubescent or nearly glabrate rather paler base cordate 5-nerved lobes ovate or lanceolate serrate or repand, racemes branched or simple pubescent usually appearing rather before the leaves. *Brand. For. Fl.* 111. *A. sterculiaceum*, *Wall. Pl. As. Rar.* ii. 3, t. 105; *Cat.* 1224.

TEMPERATE WESTERN HIMALAYA; from Kashmir to Nipal, alt. 7-9000 ft.

A large handsome tree. *Leaves* $3\frac{1}{2}$ -10 in. long and wide; petioles 2-5 in. *Cymes* lateral shorter than the leaves. *Sepals* elliptic or ovate, ciliate, 3-nerved. *Petals* linear-oblong, ciliate, about equalling the calyx. *Stamens* 5-8, glabrous, exserted. *Fruit* puberulent, brownish; carpels $1\frac{1}{2}$ - $2\frac{1}{4}$ in. long, diverging; wings venose, margins often crenulate, back rather curved; cells angular-nervose.—According to Dr. Wallich his *A. sterculiaceum* differs from the type of *A. villosum* in being much smoother; he thinks, however, that this difference may perhaps be due to its less elevated situation.

VAR. THOMSONI, *Miq. in Archives Néerlandaises*, ii. 470 (*sp.*); basal lobes of leaves obsolete, the three other lobes small, fruit 2-3 in. long.—Sikkim Himalaya, alt. 7-9000 ft., *J. D. H.*; Bhotan, *Griffith*.—This is probably *A. platanifolia*, *Griff. Itin. Notes*, 200, and perhaps distinct from *A. villosum*.

11. **A. caudatum**, *Wall. Pl. As. Rar.* ii. 4, 28, t. 132; *Cat.* 1225; leaves 5-lobed serrate submembranous nearly or quite glabrescent except axils of the 5 basal nerves base cordate or truncate lobes ovate caudate the two basal ones small, racemes short in flower longer in fruit nearly glabrous. *Brand. For. Fl.* 112. *A. pectinatum*, *Wall. l.c.*; *Cat.* 1226. *A. acuminatum*, *Wall. ex D. Don Prodr.* 249.

TEMPERATE HIMALAYA; from Chumba to Sikkim, alt. 7-11,000 ft.

A large tree, with somewhat glaucous shoots. *Leaves* in some cases with persistent puberulence especially along the veins beneath, $2\frac{1}{2}$ -5 in. long and wide; petioles $1\frac{1}{4}$ - $3\frac{1}{2}$ in., reddish, puberulent. *Cymes* appearing about the time of the leaves. *Sepals* $\frac{1}{2}$ in., oblong, obtuse, whitish, 5-4. *Petals* white, obovate, rather shorter than the calyx. *Stamens* 4-6, exserted. *Fruit* glabrous, subglaucous; carpels $\frac{3}{4}$ - $1\frac{1}{4}$ in. long, more or less diverging or (in *A. pectinatum*) quite patent; wings pink, or at length ferruginous, venose, back arcuate, front sinuous-crenulate; cells rugose, darker.—*A. pectinatum* is a form with setosely serrate leaves.

SECT. IV. *Leaves* 7-5-lobed and -nerved.

12. **A. Campbellii**, *Hook. f. & Thoms. mss. in Hb. Kew.*; *Brand. For. Fl.* 109; leaves 5-7-lobed glabrescent except axils of the 5-7 basal nerves serrulate both sides green base hollowed or truncate, cymes pyramidal or elongated subglabrous appearing with the leaves.

SIKKIM HIMALAYA, alt. 7-10,000 ft., *Herb. Griffith, J. D. H.*

A tree of 50 ft. *Leaves* of a beautifully green colour, pendulous, pilose beneath when quite young, 3-5 by 4-7 in.; lobes lanceolate or ovate-caudate; petioles reddish, 1½-3. *Cymes* 2-6 in. long; flowers short, green. *Sepals* 5, ovate. *Petals* white, shorter than the sepals, obtuse, plicate at base. *Stamens* 8, reddish, about equalling the calyx; filaments short. *Fruit* glabrous, ¾-1 in. long; carpels divaricate; wings venose, widened above, back slightly curved; cells globose darker, nearly smooth.

13. **A. pictum**, *Thunb. Fl. Jap.* 162; leaves 5-7-lobed submembranous glabrescent except hairy tufts on the axils of the 5-7 basal nerves both sides green base cordate or hollowed lobes lanceolate or caudate entire, cymes corymbose appearing with the leaves. *Brand. For. Fl.* 112; *Miq. Ann. Mus. Lugd. Bat.* i. 251. *A. lætum*, *C. A. Mey. Verz. Pfl. Cauc.* 206; *Boiss. Fl. Orient.* i. 949. *A. truncatum*, *Bunge Enum. Pl. China Bor.* 10. *A. cultratum*, *Wall. Pl. As. Rar.* ii. 4; *Wall. Cat.* 1228. *A. colchicum*, *Hort.* *A. sterculiaceum*, *Griff. Itin. Notes* 148, not of *Wall.* *A. Mono*, *Maxim. Prim. Fl. Amur.* 68.

TEMPERATE HIMALAYA, from Kashmir, alt. 4-6000 ft., to Bhotan, alt. 9-10,000 ft.—*DISTRIB.* Eastward to China, Japan, and westward to Persia and the Caucasus.

A beautiful tree of small or moderate size. *Leaves* 2-5½ by 2½-6½ in.; petioles glabrous, 1-4½ in. *Cymes* 1-6 in.; flowers ½-¾ in. long, on slender pedicels. *Sepals* oblong. *Petals* spatulate, equalling the calyx. *Stamens* 8, included. *Fruit* glabrous; carpels 1½-1¾ in. long, divaricating almost in one line; wings sinuous, venose, back arcuate; cells compressed.—Wood white, light, fine-grained.

20. **DOBINEA**, *Hamilt.*

A shrub with terete virgate branches. *Leaves* undivided, serrately toothed, opposite, exstipulate, petioled. *Panicles* terminal, pyramidal, leafy below, flowers small unisexual, glabrous. *Calyx* cup-shaped, 4-dentate, base subturbinate, altogether wanting in the female flower. *Petals* 4, lanceolate-spathulate, exceeding the calyx, wanting in the female flower. *Stamens* 8, alternately shorter, exserted, glabrous, wanting in the female flower; anthers short. *Disk* wanting in the male, annular in the female flower, glabrous. *Ovary* sessile, lenticular, 1-celled, rudimentary in the male flower; style filiform, spirally involute, stigmatose on the inner side and at the apex; ovule solitary, erect. *Fruit* compressed, shortly ciliated on the margin, indehiscent, borne on widely bracteate pedicels, the bract being adnate to the pedicel and exceeding both it and the fruit. *Seed* solitary, compressed, exalbuminous, exarillate; testa membranous; cotyledons flat, accumbent; radicle short.—*DISTRIB.* A monotypic genus.

1. **D. vulgaris**, *Hamilt. ex D. Don Prodr.* 249; leaves elliptic-lanceolate acutely acuminate minutely hairy on veins, acumen quite entire base rounded. *Wall. Cat.* 1229.

CENTRAL AND EASTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 4-7000 ft., *J. D. H.*; Mishmi hills, *Griffith*.

Branched, 5-8 ft. high, aromatic or with smell of ivy. *Branchlets* shortly pubescent.

Leaves 3-7 by 1-2 in.; petioles $\frac{1}{2}$ -1 $\frac{1}{2}$ in., pubescent. *Panicles* ranging up to 2 ft. in width. *Flowers* $\frac{1}{16}$ - $\frac{1}{8}$ in. diam.; bracts linear, shortly pubescent, free; those close to the fruit obcordate-orbicular, venose, $\frac{1}{2}$ - $\frac{3}{8}$ in. diam., rose-coloured. *Fruit* $\frac{1}{2}$ in. diam.

21. **DODONÆA**, Linn.

Shrubs rarely arborescent. *Leaves* alternate, exstipulate. *Inflorescence* lateral and terminal. *Flowers* polygamous, inconspicuous. *Sepals* 5-2, imbricated or valvate. *Petals* wanting. *Stamens* 10-5, usually 8, inserted on the outer side of the disk; filaments short; anthers linear-oblong. *Disk* obsolete in the male flower, small in the female. *Ovary* 3-6-sided and celled; style 3-6-sided, apex 3-6-cleft. *Ovules* 2 together, collateral or superposed. *Capsule* 2-6-sided, membranous or coriaceous, septically 2-6-valved; valves winged at the back; cells 1-2-seeded. *Seeds* lenticular or subglobose, compressed, exalbuminous, exarillate, funicle thickened; embryo spirally involute.—**DISTRIB.** A genus of some 40 species or more, mostly endemic in Australia.

Dodonæa (sp.) in *Herb. Hohenack.* n. 2355, is *Aspidopterys canarensis*, Dalz.

1. **D. viscosa**, Linn. *Mant. Pl. alt.* 228; leaves undivided oblanceolate viscid-shining glabrous subapiculate base cuneate-attenuate subsessile margin revolute entire or nearly so, cymes short, wings of each carpel oblong-orbicular extending from the base to the style. *Baker in Oliv. Fl. Trop. Afr.* i. 433; *Benth. Fl. Austral.* i. 475; *Brand. For. Fl.* 113; *Boiss. Fl. Orient.* i. 953. *D. angustifolia*, Linn. f. *Suppl. Pl.* 218; *Roxb. Fl. Ind.* ii. 256. *D. dioica*, *Roxb. Hort. Beng.* 28; *Fl. Ind.* ii. 256. *D. Burmanniana*, DC. *Prodr.* i. 616; *Wight Ill.* i. t. 52; *W. & A. Prodr.* 114; *Grah. Cat. Bomb. Pl.* 30; *Dalz. & Gibs. Bomb. Fl.* 36; *Thwaites Enum.* 59. *D. pallida*, Miq. in *Herb. Hohenack.* n. 1068. *D. microcarpa*, DC. *Prodr.* i. 617. *D. Wightiana*, *Blume Rumph.* iii. 189. *D. pentandra*, *Griff. Notul.* iv. 548. *D. heterophylla*, *Hortul. ex G. Don Gen. Syst.* i. 674. *Wall. Cat.* 8081. *Ptelea viscosa*, Linn. *Sp. Pl. ed.* i. 118; *Burm. Fl. Ind.* 36. *D. spathulata*, Sm. in *Rees' Cycl.* xii. n. 2. *D. arabica*, *Hochst. & Steud. in Herb. Arab. Schimp.* n. 766.—*Burm. Fl. Zeyl.* t. 23. *Rumph. Herb. Amboin.* iv. t. 50.

Throughout INDIA, from the Indus Eastwards and Southwards to CEYLON and MALACCA.—**DISTRIB.** All warm countries.

An evergreen shrub occasionally growing into a small tree. *Shoots* terete or somewhat angular. *Leaves* more or less viscid with a shining yellowish resin, very variable in breadth, 1-5 by $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Sepals* oblong, $\frac{1}{16}$ - $\frac{1}{8}$ in. long, about equalling the stamens. *Capsule* compressed, glabrous, $\frac{2}{3}$ -1 in. broad.—Several synonyms, not strictly Indian, are omitted.

21.* **MELIANTHUS**, Tournef.

Shrubby glabrous plants with a strong odour. *Leaves* alternate, stipulate, unequally pinnate; leaflets toothed, decurrent. *Racemes* axillary and terminal. *Flowers* bracteate, hermaphrodite irregular, sometimes apetalous. *Calyx* laterally compressed, 5-partite, base with a saccate gibbosity; lobes unequal, imbricated. *Petals* excentric, declinate, subperigynous, narrow, long-clawed; the fifth petal very small or wanting. *Disk* unilateral, honeyed. *Ovary* oblong, 4-lobed, 4-celled, style filiform, 4-toothed deeply at apex; ovules 2-4 together. *Capsule* papery, vesicular, deeply 4-lobed, 4-celled. *Seeds* subglobose, exarillate; albumen fleshy or horny.—**DISTRIB.** A small South African genus.

1. **Melianthus major**, Linn.; a South African plant, occurs in Kumaon, where it is said to be an introduction, and has been cultivated in the Nilghiris where it was first noticed by Wight (Kew Distrib. n. 542); it is established at Ootacamund (*Bedd. Fl. Sylv. Anal. Gen.* lxxi.), and in Bhotan reaches a limit of 9500 feet (*Griff. Journ.* 265). It is an undershrub with glabrous coarsely serrate leaves emitting a fetid scent when bruised; it is synonymous with *M. Himalayanus*, Wall. Cat. 1190; *Miq. in Herb. Pl. Ind. Or. Hohenacker.* n. 1059; *Planch. in Trans. Linn. Soc. Lond.* xx. 416, t. 20, f. 1-13; *Hook. f. in Journ. Bot.* 1873, 356.—The claw of the petals was pubescent in the flower of Wallich's specimen, which I examined, and thus the character fails which Dr. Planchon relied on for the discrimination of Wallich's species.

22. STAPHYLEA, Linn.

Branched shrubs or trees, with terete branches. *Leaves* opposite, stipulate, trifoliate or pinnate; leaflets stipellate, serrulate. *Inflorescence* lateral and terminal, bracteate, pedicels jointed in the middle. *Flowers* regular, hermaphrodite, pendulous. *Sepals* 5, oblong, imbricated, coloured, deciduous. *Petals* 5, as long as the sepals, obovate, imbricated, white. *Stamens* 5, inserted on the edge of the disk between its lobes; filaments slender, pubescent below; anthers versatile, shortly oblong. *Ovary* 3-2-lobed and -celled; styles 3-2, slender; stigmas subcapitate; ovules 6 or more in each cell, in 2 rows, anatropous. *Capsule* membranous, vesicular-inflated, 3-2-lobed and -celled; carpels dehiscent at the apex along the ventral suture. *Seeds* few, subglobose, exarillate; testa hard; albumen fleshy.—DISTRIB. About 4 species occurring in North America, Europe, and Asia.

1. **S. Emodi**, Wall. Cat. 4275; leaves glabrescent or thinly pubescent beneath trifoliate leaflets nearly equal ovate or elliptic acuminate pale beneath membranous base obtuse or cuneate lateral ones subsessile terminal one petioled, anthers shortly apiculate. *Brand. For. Fl.* 114.

WESTERN TEMPERATE HIMALAYA; from Marri to Kumaon, alt. 6-7000 ft.—DISTRIB. Afghanistan.

A small tree with spotted bark. *Leaves* 4-14 in.; leaflets 2-6 by 1-3 in.; petioles $1\frac{1}{4}$ - $6\frac{1}{2}$ in.; terminal petiole $\frac{1}{2}$ - $1\frac{3}{4}$ in.; stipules linear, stipels setaceous, both caducous. *Cymes* rather dense, $1\frac{1}{2}$ -4 in.; flowers $\frac{1}{2}$ in. long, about equalling the pedicels. *Capsules* 2-3 in. long; base turbinate.—Probably a form of the N. American *S. trifolia*, Linn., differing only from the type by less pubescent foliage and anther-tips less obtuse.

23. TURPINIA, Vent.

Glabrous and shining trees or shrubs, with smooth terete branches. *Leaves* opposite, stipulate, usually odd-pinnate; leaflets opposite, stipellate, serrulate, subcoriaceous. *Panicles* terminal and axillary; flowers small, regular, hermaphrodite. *Calyx* 5-partite, imbricated. *Petals* 5, imbricated. *Stamens* 5, inserted outside the lobed or crenulate raised disk; filaments flattened; anthers short. *Ovary* sessile, 3-lobed and -celled; styles 3, combined or distinct; stigmas subcapitate; ovules 2 together or more and then in two rows. *Fruit* subglobose, indehiscent, 3-celled. *Seeds* angular; testa hard, shining; hile large; albumen fleshy; aril 0. *Embryo* straight.—DISTRIB. A genus of a few species widely dispersed.

1. **T. pomifera**, DC. Prodr. ii. 3; leaflets 3-9 elliptic oblong or ovate acuminate, primary branches of the panicles opposite. Wall. Cat. 4276.

Dalrympelia pomifera, *Roxb. Hort. Beng.* 17; *Cor. Pl.* t. 299; *Fl. Ind.* i. 633. *T. nepalensis*, *Wall. Cat.* 4277; *W. & A. Prodr.* 156; *Wight Ic.* t. 972; *Bedd. Fl. Sylv.* t. 159; *Thwaites Enum.* 71. *T. microcarpa*, *W. & A. Prodr.* 156. *T. martabanica*, *Wall. Cat.* 4278. *T. latifolia*, *Wall. Cat.* 4939. *Canarium Sajiga*, *Ham. ex W. & A. Prodr.* 175.—*Wall. Cat.* 8104.

EASTERN SUBTROPICAL HIMALAYA, from Nipal to Sikkim, alt. 2-7000 ft.; the KHASIA Mts.; ASSAM, SILHET, CACHAR, CHITTAGONG, BURMA to PENANG. WESTERN PENINSULA; from the Concan southwards. CEYLON.—DISTRIB. Yunnan, China, &c.

A leafy tree, sometimes large, occasionally only a shrub; foliage like that of *Bischoffia javanica*, *Blume*. *Leaves* 5-20 in. long; stipules interpetiolar, triangular, caducous; leaflets $2\frac{1}{2}$ -8 by 1-3 in.; petiolules of the lateral ones short, of the terminal ones ranging up to 2 in.; stipels lanceolate-subulate, caducous. *Fruit* $\frac{1}{2}$ -2 in. diam., purplish, red, yellow or green.—There are two well marked forms of this species, connected, however, by intermediate ones; α . leaflets more oblong, branches of the corymbose panicle rather stout, flowers yellowish $\frac{1}{2}$ in. diam., petals not ciliate, ovules about 8 together, fruit very fleshy large; β . (*T. nepalensis*) leaflets more ovate, branches of the depresso-pyramidal panicle less stout, flowers white $\frac{1}{2}$ in. diam., petals shortly ciliate, ovules 2-3 together, fruit small nearly dry. The synonymy for the extra-Indian forms is not given.

INDEX OF GENERA, SPECIES AND SYNONYMS.

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* Quotation omitted p. 257 : *C. biflorum*, Turcz. Bull. Mosc. 1863, i. 580. *Hypericum*, Wall. Cat. 4820.

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* At page 194 *H. cordifolia* and *rotundifolia* should be *F. etc.*

† *G. Andersoni*, *H. f.* p. 270 is equal to *G. nervosa*, *Miq.*, which is omitted.

‡ For *G. spectabilis* under *G. malaccensis*, p. 261, read *G. speciosa*.

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* For *Wallichiana* p. 263, under *G. Cowa* read *Wallichii*.

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* A synonym of *Elæocarpus varunna*, Ham., omitted in text.

† Incorrectly quoted as of Zollinger in text.

‡ Not *Neurotoma*, as quoted at p. 131.

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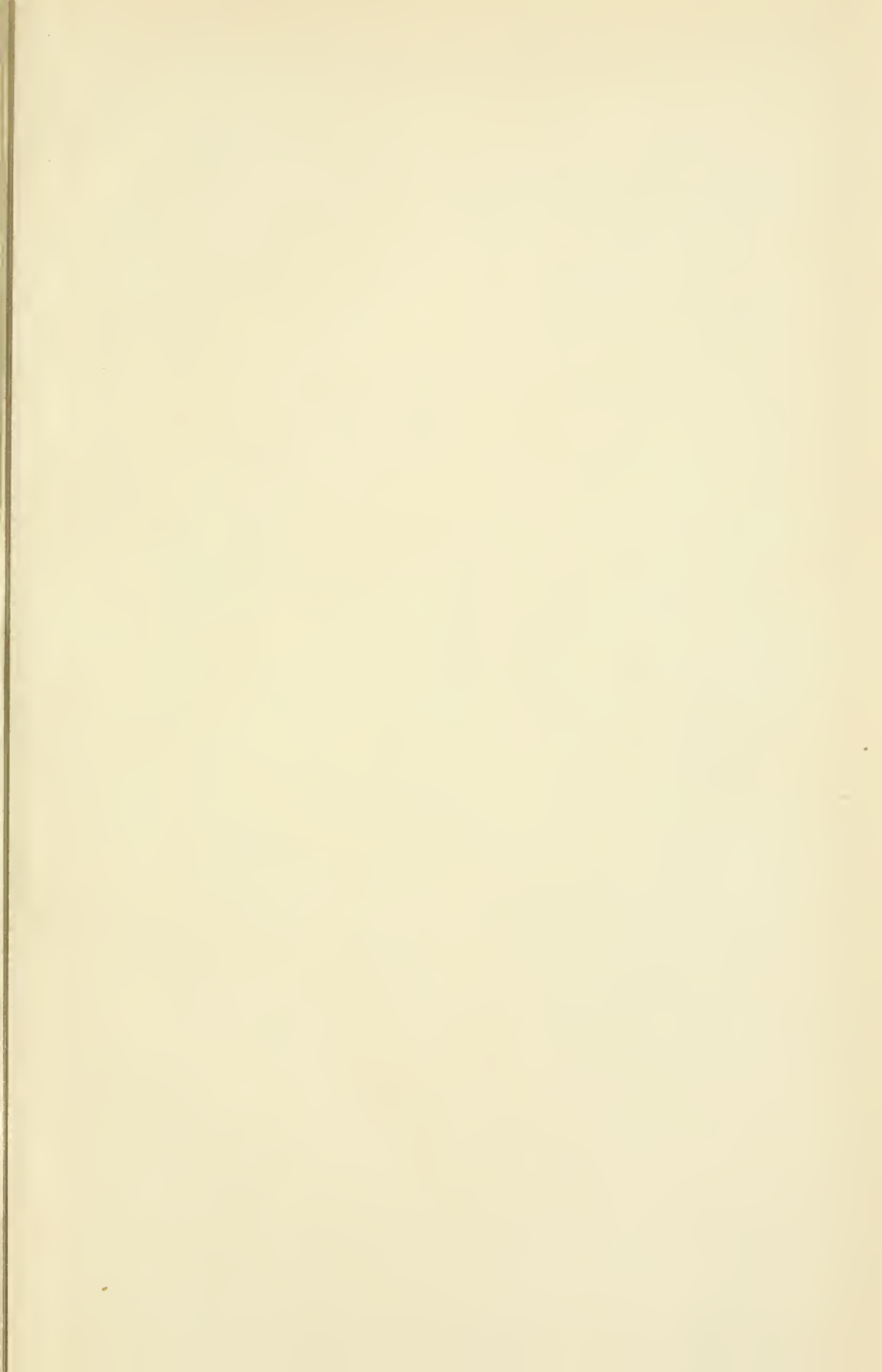
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THE
FLORA OF BRITISH INDIA.

BY

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ASSISTED BY VARIOUS BOTANISTS.

VOL. II.

SABIACEÆ TO CORNACEÆ.

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Errata in Vol. II, Pt. III.

- P. 404. Hydrangea *altissima* is a scandent tree (J. D. H.)
 „ 413. *Crassula indica* has the stem-leaves alternate.
 „ 416. *Kalanchoe brasiliensis* should include *K. olivacea*, Dalz. in
Dalz. & Gibs. Bomb. Fl. 313.
 „ 417, l. 3. Stamens 5 in some flowers, 10 in others (W. B. Hemsley).
 „ 445. *Terminalia belerica* should include *T. attenuata*, Edgw. in
Trans. Linn. Soc. xx. 46.
 „ 585. *Epilobium Hookeri* published as *E. trichoneurum*, Hausskn. in
O str. Bot. Zeit. 1879.
 „ 607, l. 38, under *T. multiloba*, in place of only half-way down read
 very rarely only half-way down.
 „ 622. Add *Bryonia dioica*, Jacq. collected in Lahul by Dr. Aitchison.
 „ 631. For *Thladiantha dubia*, Bunge read *T. calcarata*, C. B. Clarke
 in *Journ. Linn. Soc.* xv. 126—(*Momordica calcarata*, Colebr).
 The Indian *T. calcarata* has fenestrate fruit, thus differing
 specifically from the Japanese *T. dubia*. The confusion has
 arisen under Bot. Mag. t. 5469, which represents the plant
 of *T. dubia* but the fruit of *T. calcarata* (Cogniaux).
 „ 643. *Begonia fallax*. The type specimen of this species, lately
 found in Wight's private Herbarium, is *B. malabarica*, Lamk.
 „ 705, l. 5. The Kumaon plant collected by Strachey and Winter-
 bottom is *Trachydium Roylei*. Hence *Pleurospermum*
stellatum is known (very imperfectly) only by the example
 of Royle. The plant described as Var. *Lindleyana* is a
 different species, but it is very doubtful whether it is the
 same as Royle's (W. B. Hemsley).

Hooker's Flora of India, Pt. VII.

Petals small, white, oblong or obovate. *Fruit* inclosed in the calyx, of 1 carpel.

2. **N. rubiflora**, *Don Prodr.* 229; racemes solitary or shortly paniced, stipules and bracteoles usually quite entire, calyx tomentose. *DC. Prodr.* ii. 547; *Hook. f. & Thoms. in Journ. Linn. Soc.* ii. 75; *Wall. Cat.* 697.

Central and Eastern TEMPERATE HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 8-10,000 ft., *J. D. H.*

Very similar to *N. thyrsoiflora* in foliage, but leaves usually more deeply lobed: inflorescence always much shorter, petals larger, and calyx tomentose.

A D D E N D A.

P. 307. Under **TRIBE III. Spirææ**, insert:—

Seeds linear, testa membranous, albumen scanty or 0 7. **SPIRÆA**.
 Seeds turgid, testa crustaceous, albumen copious 7*. **NEILLIA**.

P. 326. Before **8. Rubus**, insert:—

7*. **NEILLIA**, *Don*.

Perennial shrubs. *Leaves* alternate, simple; stipules large, deciduous. *Flowers* racemed or paniced, white. *Calyx* persistent; tube campanulate; lobes 5. *Petals* 5. *Stamens* 10 or more. *Disc* lining the calyx-tube. *Carpels* 1-5, free or connate ventrally; ovules few or many. *Follicles* coriaceous or membranous. *Seeds* few or many, turgid; testa crustaceous, albumen copious. ---**DISTRIB.** Species 4 or 5, natives of the Himalaya, Java, N.E. Asia, and N. America.

1. **N. thyrsiflora**, *Don Prodr.* 228; stipules usually serrate, racemes slender paniced, bracteoles usually toothed, calyx silky. *DC. Prodr.* ii. 546; *Wall. Cat.* 698; *Hook. f. & Thoms. in Journ. Linn. Soc.* ii. 75. *N. virgata*, *Wall. Cat.* 7108. *Adenilema fallax*, *Blume Bijl.* 1121.

Central and Eastern TEMPERATE HIMALAYA, alt. 5-8000 ft. KHASIA Mts., alt. 5-7000 ft.—**DISTRIB.** Java.

A large shrub, with drooping slender leafy branches. *Leaves* 2 by 1½ in., ovate-cordate, 3-lobed; lobes shallow, acute, sharply irregularly toothed or serrate. *Panicles* 3-8 in. *Flowers* shortly pedicelled. *Calyx-tube* ⅓ in., base rounded; lobes shorter than the tube, lanceolate, acute, in fruit often clothed with long rigid gland-tipped bristles. *Petals* small, white, oblong or obcordate. *Fruit* inclosed in the calyx, of 1 carpel.

2. **N. rubiflora**, *Don Prodr.* 229; racemes solitary or shortly paniced, stipules and bracteoles usually quite entire, calyx tomentose. *DC. Prodr.* ii. 547; *Hook. f. & Thoms. in Journ. Linn. Soc.* ii. 75; *Wall. Cat.* 697.

Central and Eastern TEMPERATE HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 8-10,000 ft., *J. D. H.*

Very similar to *N. thyrsiflora* in foliage, but leaves usually more deeply lobed; inflorescence always much shorter, petals larger, and calyx tomentose.

FLORA OF BRITISH INDIA.

ORDER XLV. **SABIACEÆ.** (By J. D. Hooker.)

Climbing or erect shrubs, or erect trees, glabrous or with simple hairs. *Leaves* alternate, exstipulate, simple or compound. *Flowers* small or minute, hermaphrodite or polygamous, usually paniced. *Calyx* 4-5-partite, imbricate. *Petals* 4-5, equal or unequal, opposite or alternate with the sepals, imbricate. *Disk* usually small, annular. *Stamens* 4-5, opposite the petals, inserted at the base of or on the disk, all perfect or two only perfect and three without anthers; filaments clavate, flattened or subulate; anthers didymous, cells distant bursting transversely or by a deciduous cap. *Ovary* 2-3-celled, compressed or 2-3-lobed; styles 2-3, free or connate or 0, stigmas punctiform; ovules 1-2 in each cell. *Ripe carpels* 1-2, dry or fleshy, indehiscent. *Seeds* compressed or globose, basilar, hilum broad, testa membranous or coriaceous, albumen 0; embryo various, cotyledons often contorted, radicle deflexed.—**DISTRIB.** A small chiefly Indian order, with 4 genera and about 35 species.

Stamens 4-5, all perfect and equal 1. **SABIA**.
Stamens 5, very unequal 2. **MELIOSMA**.

1. **SABIA**, Coleb.

Climbing or sarmentose shrubs; branches with the bud-scales persistent at their bases. *Leaves* quite entire. *Flowers* axillary, solitary, cymose or paniced, usually hermaphrodite, 2-bracteate; bracts, calyx, corolla, stamens and carpels all opposite. *Calyx* 4-5-partite. *Petals* 4-5, with transparent lines, green, purplish or yellow. *Disk* annular, 4-5-lobed. *Stamens* 4-5, inserted at the base of the disk; anthers extrorse or introrse. *Carpels* 2, rarely 3, cohering slightly; styles 2, erect, terminal, cohering slightly; ovules 2 in each carpel, collateral or superposed, horizontal. *Ripe-carpels* 1 or 2, gibbous, with a subbasal style, dry or drupaceous. *Seed* reniform, testa coriaceous, dotted; embryo curved, cotyledons straight or incurved flat rugose or undulate, radicle cylindric.—**DISTRIB.** About 10 species, natives of tropical and temperate India.

* *Peduncles* 1-flowered.

1. **S. campanulata**, Wall. in Roxb. *Fl. Ind. ed. Carey*, ii. 311; *Cat.* 1002; leaves oblong acuminate puberulous base acute, petals elliptic nerved, filaments subulate much shorter than the petals. *Hook. f. & T. Fl. Ind.* i. 209; *Brandis, For. Flor.* 116.

TEMPERATE HIMALAYA; from Simla, alt. 5000 ft., to Sikkim, alt. 9-10,000 ft.

A climbing shrub. *Leaves* 2-4 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., membranous, puberulous on both surfaces, nerves reticulate. *Peduncles* 1-2 in., subclavate. *Flowers* $\frac{3}{4}$ in. diam.,

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subglobose or campanulate, green. *Sepals* orbicular. *Petals* $\frac{1}{3}$ – $\frac{1}{2}$ long, enlarging and persistent after flowering. *Anthers* extrorse. *Drupe* $2\frac{1}{2}$ in., pale blue, orbicular, compressed.

2. ***S. leptandra***, Hook. f. & T. *Fl. Ind.* i. 209; leaves elliptic or oblong acuminate glabrous base rounded, petals elliptic-oblong obtuse, filaments elongate.

SIKKIM HIMALAYA; alt. 5-7000, ft. J. D. H.

A shrub. *Leaves* thinly coriaceous, very variable in size and usually 3-4 by 1-1 $\frac{1}{4}$ in., rarely 6 by 3 in., beautifully reticulated between the few oblique nerves. *Peduncles* 1-2 in. *Flowers* campanulate, greenish-purple. *Sepals* 5, rounded. *Petals* $\frac{1}{3}$ in. long, punctate. *Filaments* ligulate, anthers extrorse. *Drupe* as in *S. campanulata*.

* *Flowers in 5- or more-flowered cymes or panicles.*

3. ***S. purpurea***, Hook. f. & T. *Fl. Ind.* i. 209; leaves oblong long-acuminate base usually rounded young puberulous, cymes 3-5-flowered, petals acute, filaments broadly subulate. *S. parviflora*, Wall. *Cat.* 1001, in part.

KHASIA Mts.; alt. 4-6000 ft. Wallich, etc.

Leaves 2-3 by $\frac{1}{3}$ -1 in., often 6 by 2 $\frac{1}{2}$ in. on the flowerless branches, glabrous, thinly coriaceous; nerves oblique, uniting far within the margin. *Peduncles* long, irregularly branched. *Flowers* small, purplish. *Sepals* ovate, subacute. *Petals* ovate-lanceolate, 5-nerved. *Drupe* as in *S. campanulata*.

4. ***S. malabarica***, Bedd. *Ic. Pl. Ind. Or.* t. 177; leaves elliptic-oblong acuminate margins waved base rounded, cymes very short 2-6-flowered, petals elliptic obtuse, filaments subulate.

WESTERN PENINSULA; Anamallay hills, alt. 3-4000 ft., Beddome.

A climbing shrub, quite glabrous. *Leaves* 3-5 by 1-1 $\frac{3}{4}$ in., thinly coriaceous, pale, margin cartilaginous; nerves many, spreading, much reticulated beneath; petiole $\frac{1}{2}$ -1 in. *Peduncle* $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* $\frac{1}{10}$ in. diam. *Sepals* small, ovate, acute, ciliate. *Petals* glabrous. *Stamens* shorter than the petals. *Filaments* slender. *Anthers* didymous, cells diverging. *Ovules* subcollateral. *Drupe* $\frac{1}{2}$ in., reniform, reticulated.—Beddome figures the petals as connate at the base.

5. ***S. parviflora***, Wall. in Roxb. *Fl. Ind. ed. Carey*, ii. 310; *Cat.* 1001, in part; leaves ovate or oblong acuminate margins waved, cymes dichotomous 7-11-flowered, stamens unequal. Hook. f. & T. *Fl. Ind.* i. 210.

SUBTROPICAL and TEMPERATE HIMALAYA; from Kumaon to Sikkim, alt. 3-6000 ft.

A climbing shrub; branches very slender, tips puberulous. *Leaves* 2-4 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., thinly coriaceous, glabrous, pale beneath, nerves almost horizontal. *Bracts* minute, ciliate. *Flowers* minute. *Sepals* ovate, ciliate. *Petals* narrowly oblong, 5-nerved. *Filaments* ligulate. *Drupe* $\frac{1}{3}$ – $\frac{1}{2}$ in., obovoid, oblong or subglobose; stone compressed.

6. ***S. lanceolata***, Colebrooke in Trans. Linn. Soc. xii. 355 t. 14; leaves oblong-lanceolate base acute or obtuse, cymes long-peduncled corymbose many-flowered, petals ovate-lanceolate, stamens included. Wall. in Roxb. *Fl. Ind. ed. Carey*, ii. 309; *Cat.* 999; *Blume Mus. Bot.* 368; Hook. f. & T. *Fl. Ind.* i. 210.

KHASIA Mts., SILHET and ASSAM, from the sea level to 4000 ft.

A climbing shrub. *Leaves* 4-7 by 1 $\frac{1}{4}$ -2 $\frac{1}{2}$ in., shining above, glaucous beneath, thinly coriaceous, nerves nearly horizontal, petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Peduncles* 1 $\frac{1}{2}$ -2 in., slender, sometimes supra-axillary. *Flowers* greenish, sweet-scented. *Sepals* ovate, acute. *Petals* $\frac{1}{2}$ in., subacute. *Filaments* subulate. *Anthers* introrse. *Drupe* $\frac{2}{3}$ in., pulpy, blue; stone rugose, compressed.

7. **S. limoniacea**, Wall. Cat. 1000; leaves oblong or lanceolate acute or acuminate thickly coriaceous, panicles long glabrous, petals broadly oblong, stamens included. Hook. f. & T. Fl. Ind. i. 210. Celastrinea, Wall. Cat. 9015; Griff. Notul. iv. 423; Ic. Pl. As. t. 568 f. 2.

TROPICAL SIKKIM, BHOTAN, and the KHASIA Mts., ascending to 3000 ft.; SILHET, ASSAM and CHIHTAGONG.

A lofty climber. Leaves 3-7 by $1\frac{1}{4}$ - $2\frac{1}{2}$ in., base rounded or acute, much reticulate when dry; nerves oblique, incurved. Panicles reddish, quite glabrous, axillary or a little supra-axillary, with persistent bud-scales at their bases. Flowers minute, yellowish. Sepals orbicular. Petals $\frac{1}{10}$ in., shortly clawed, obovate, 5-nerved, fleshy. Filaments fleshy, incurved.—This approaches the Javanese *S. menescorta*, Bl.

8. **S. paniculata**, Edgw. in Hook. f. & T. Fl. Ind. i. 211; branches glabrous, leaves elliptic- or oblong-lanceolate acute coriaceous base rounded or acute, panicles long pilose, petals oblong, stamens included. Brandis For. Flor. 117.

Subtropical WESTERN HIMALAYA; in Kumaon and Garwhal, ascending to 3000 ft.

Branches glabrous. Leaves 5-8 by $1\frac{1}{2}$ -3 in., glabrous, young puberulous, much reticulate; nerves oblique, arched. Sepals elliptic, 1-nerved, densely hairy. Petals $\frac{1}{12}$ - $\frac{1}{8}$ in., oblong, subacute, 3-5-nerved. Filaments ligulate. Drupes $\frac{1}{3}$ in. diam., usually solitary, orbicular, compressed.

9. **S. tomentosa**, Hook. f.; branches and nerves of leaves beneath tomentose, leaves elliptic or elliptic-lanceolate acute, petiole very short, panicles branched many-flowered and glabrous, petals linear-oblong, stamens included.

UPPER ASSAM? alt. 3500 ft., Griffith.

Branches slender, the younger clothed with soft spreading hairs, as are the petioles. Leaves $2\frac{1}{2}$ by 1 in., rather coriaceous, bullate between the spreading nerves, which are very prominent and hairy beneath; petiole $\frac{1}{10}$ in. Panicle much branched, many-flowered, peduncle puberulous; branches and pedicels slender, glabrous. Flowers $\frac{1}{2}$ in. diam. Filaments ligulate, shorter than the petals. Fruit didymous, of two obovoid diverging rugose subcompressed carpels, each nearly $\frac{1}{3}$ in. long.—The only specimen I have seen has but two leaves, and is remarkable for its very short petioles and tomentum. There is no habitat on the ticket, which resembles those of Griffith's journey from Upper Assam to Birma. It contains the following inscription:—"Sabia sp., fructibus subrotundis. 15. Alt. 3500."

10. **S. viridissima**, Kurz in Journ. As. Soc. Beng. 1872, ii. 304; glabrous, leaves obovate- to elliptic-lanceolate acuminate membranous, petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., panicles lax, style 3-fid, stigma curved.

ANDAMAN ISLDS., Kurz.

Leaves 6-8 in., acuminate at both ends. Flowers small, white, pedicels $\frac{1}{4}$ in., slender, thickened above. Sepals glabrous, ovate, obtuse. Petals almost $\frac{1}{4}$ in. long. Stigmas horse-shoe shaped. Fruit unknown.—I know nothing of this species beyond Kurz's description.

2. MELIOSMA, Blume.

(MILLINGTONIA, Roxb., WELLINGTONIA, Meissn.)

Trees or shrubs, usually pubescent or tomentose. Leaves simple or odd-pinnate; leaflets subopposite, the terminal rarely wanting. Flowers in branched terminal or terminal and axillary panicles, small or minute, hermaphrodite; bracts caducous. Bracteoles and sepals 5-9, persistent, forming an uninterrupted whorl round the much larger petals, outer smaller. Petals 5; 3 large, nearly orbicular, valvate, or imbricate; 2 smaller, interior, placed behind the fertile

stamens, either membranous and nearly free, or reduced to a bifid scale adnate to the filament. *Stamens* 5; 2 fertile, opposite the smaller petals, filament short, flattened, incurved, expanded at the top into a cup, which bears two globose cells that burst transversely, springing back elastically; 3 deformed, broad, opposite the larger petals, 2-fid with 2 empty cells, together forming a cup over the pistil. *Disk* cupular or annular, with 2-5 simple or toothed teeth. *Ovary*, sessile, 2- rarely 3-celled, contracted into a simple or 2-partible style, stigma simple; ovules 2 in each cell. *Drupe* small, oblique, subglobose; stone crustaceous, 1-celled, with usually a basilar rounded projection, over which the seed is curved. *Seed* globose, testa membranous; cotyledons conduplicate, radicle incurved.—*DISTRIB.* Species about 20, natives of Tropical Asia and the Malay Archipelago, with a very few S. America.

* Leaves simple.

† Leaves serrate-toothed (see also 3. *M. Wightii* and 4. *M. simplicifolia*).

1. *M. dillenifolia*, *Wall. mss.* (Millingtonia); leaves obovate or oblanceolate coarsely spinulose-toothed pubescent or tomentose beneath, panicles lax slender, flowers pedicelled, sepals and bracteoles ciliate, petals membranous, inner orbicular. *Brandis For. Flor.* 115; *Wt. & Arn. in Ed. New Phil. Journ.*, 1833, 179; *Wt. Ill.* i. 144 (Millingtonia); *Millingtonia, Wall. Cat.* 8116.

TEMPERATE HIMALAYA; from SIMLA, alt. 4-8000 ft., to SIKKIM, alt. 8-10,000 ft.—*DISTRIB.*? Japan.

A small tree, 20 ft.; branches, petioles, and panicles covered with soft rusty pubescence. *Leaves* 6-12 by 3-5 in., membranous, cuspidate-acuminate, narrowed into the petiole; nerves very many, parallel, ending in marginal teeth. *Panicle* as long as the leaves or longer, spreading, lax-flowered; bracts broad, deciduous; pedicels very short; flowers white. *Drupe* globose, $\frac{1}{2}$ in. diam., sometimes didymous.—This is very near indeed to the Japan *M. myriantha* Sieb. & Zucc., which is just distinguishable by the persistent subulate bracts. Wallich's 8116 seems to be a young state of this, with large leaves glabrous beneath.

2. *M. pungens*, *Wall. Cat.* 8114 *E, F* (Millingtonia); leaves oblanceolate caudate-acuminate coarsely serrate glabrous or puberulous beneath, flowers sessile glomerated, sepals and bracteoles about 7 all suborbicular ciliate, petals membranous. *Brandis For. Flor.* 116, *M. acuminata, Royle Ill.* 139. *M. integrifolia, Wall. Cat.* 8114 *G in part* (Millingtonia). *M. rigida* and *M. ferruginea, Sieb. & Zucc. (in Herb. Hook.)*

SUBTROPICAL and TEMPERATE HIMALAYA; alt. 3-8000 ft., from Marri to Nipal.—*DISTRIB.* Japan.

A small tree; branches, petioles, and panicles clothed with rusty pubescence. *Leaves* 5-9 in. by 2-3 in., very coriaceous, narrowed into the petiole, almost spinulose-serrate, apex long quite entire; nerves stout, ascending, very prominent beneath; petiole $\frac{1}{2}$ -1 in. *Panicle* often much larger than the leaves, spreading, erect; flowers densely fascicled on the ultimate branchlets, larger than in *M. dillenifolia* or *simplicifolia*. *Drupe* $\frac{1}{2}$ in. diam. globose.—The Japanese specimens have usually longer petioles, but I find no other difference. The densely glomerate larger flowers at once distinguishes this from *M. simplicifolia*. The *M. integrifolia* Wall. Herb. under 8114 G. consists of one specimen of this with nearly entire leaves, and one of *M. simplicifolia*, both from Nipal.

†† Leaves quite entire, or subserrate when young only.

3. *M. Wightii*, *Planch. in Herb. Hook.*; leaves coriaceous obovate elliptic-obovate or oblanceolate shortly acuminate glabrous or pubescent beneath, flowers sessile glomerate, sepals and bracteoles about 9 broad ciliate the outer pubescent on the back; petals membranous. *Brandis For. Flor.* 116 (under *M. pungens*). *Millingtonia simplicifolia, Wall. Cat.* 8114 *A. M. pungens*,

Wall.; *Wt. & Arn. in Ed. New Phil. Journ.* 1833, 178; *W. & A. Prodr.* 115; *Wight Ic.* t. 964, 3; *Thwaites Enum.* 59; *Bedd. Fl. Sylv. Anal. Gen.* 77; *Bedd. Fl. Sylv. Man.* 77.

WESTERN PENINSULA; from the Concan southwards. CEYLON, Central Province, alt. 5-7000 ft.

Very similar to *M. pungens*, and perhaps only a form of that plant; but the habit is more robust, the leaves usually broader in proportion, less tapered to the base, and quite entire, often more oblong-elliptic, with rarely a caudate apex, and if toothed the teeth are less spinulose; the flowers are of the same size, and similarly aggregated; the fruit also appears to be of the same size.

4. *M. simplicifolia*, *Roxb. Fl. Ind.* i. 103; *Cor. Pl.* t. 254 (Millingtonia); leaves membranous obovate oblanceolate or oblong-lanceolate quite entire or toothed when young glabrous or pubescent beneath, flowers sessile distinct, sepals and bracteoles about 6 ciliate outer narrow hairy on the back. *Wall. Cat.* 8114 B, C, D; *W. & A. Prodr.* 115 (Millingtonia); *M. integrifolia*, *Wall. Cat.* 8114 G (Millingtonia); *Thwaites Enum.* 59; *Griff. Notul.* iv. 162; *Ic. Pl. As.* t. 442; *Bedd. Fl. Sylv. Anal. Gen.* 77.

TROPICAL HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 2-4000 ft. *J. H. D.*; Bhotan *Griffith*—KHASIA Mts. ascending to 3000 ft.; ASSAM, SYLHET, TENASSERIM at Mergui, *Griffith*; WESTERN PENINSULA, in subalpine forests, *Beddome*. CEYLON, common up to an elevation of 3000 ft. **DISTRIB.** JAVA?

A large tree; branchlets and petioles puberulous, panicles pubescent. *Leaves* 6-16 by 4-7 in., narrowed into the petiole, young sometimes obtusely toothed, usually membranous, shortly acuminate, glabrous or puberulous beneath, with strong raised nerves; petiole $\frac{1}{2}$ -2 in. *Panicle* often longer than the leaves, sometimes leafy, or panicles in the upper axil; branches slender. *Flowers* much smaller than in *M. Wightii*, not glomerated, more hairy on the bracts and sepals, which are much more acute. *Fruit* about $\frac{1}{2}$ in. diam.—Miquel gives this as a native of Java, but I have seen no specimen from Java exactly according with it. I have seen no Western Peninsula specimens of this, but *Beddome* says it is common on the Ghats, about 2-3000 ft. elevation, above which its place is taken by *M. pungens* (*Wightii*).

5. *M. elliptica*, *Hook. f.*; leaves coriaceous elliptic acuminate at both ends quite entire densely rufous pubescent or tomentose beneath, panicle densely tomentose, flowers sessile distinct, sepals and bracteoles 3-6, orbicular very coriaceous subciliate, petals very coriaceous subvalvate. *Sabia?* *floribunda*, *Miq. Fl. Ind. Bat. Suppl.* i. 521.

MALACCA, *Griffith, Maingay*; SINGAPORE, *Lobb*.

A tree?; branchlets, petioles, leaves beneath and panicles clothed with very soft rusty dense almost velvety tomentum. *Leaves* 3-7 by 1 $\frac{1}{2}$ -3 in., glabrous except the pubescent midrib above, quite entire, rarely oblanceolate, narrowed into the petiole; nerves arched, very prominent beneath; petiole $\frac{1}{3}$ - $\frac{1}{2}$ in. *Panicle* as in the genus, usually larger than the leaves. *Flowers* of the size of *M. simplicifolia*, very distinct from all the preceding in the small coriaceous glabrous sepals. *Staminal scales* 2-fid, ciliate at the tip (*Maingay*)—*Kurz* (*Jour. As. Soc. Beng.* 1870, ii. 74) refers *Sabia?* *floribunda* of Miquel to *M. simplicifolia*, meaning no doubt this species, under which I hence cite it.

6. *M. lancifolia*, *Hook. f.*; clothed with spreading villous pubescence, leaves very long oblanceolate acuminate membranous, flowers sessile, aggregated, sepals and bracteoles 5 outer lanceolate ciliate and hairy on the back inner glabrous oblong.

MALACCA, *Maingay*.

Branchlets cylindric, clothed with a rough and much more spreading pubescence than in any of the other species, especially on the panicle and nerves of the leaves be-

neath. *Leaves* 12-18 by $3\frac{1}{2}$ -4 in., very long and narrow, very acuminate, but not caudate, very gradually narrowed into the short petiole; upper surface minutely scabrid; nerves numerous, arching. *Panicle* shorter than the leaves (in the only specimen). *Flowers* as small as in *M. simplicifolia*, crowded on the ultimate branchlets. *Inner sepals* very coriaceous, obtuse, quite glabrous. *Petals* and *fruit* not seen.

** *Leaves* odd-pinnate.

† *Leaflets* serrate or toothed.

7. *M. pinnata*, Roxb. *Fl. Ind.* i. 104 (Millingtonia); nearly glabrous, leaflets 6-12 pairs oblong or oblong- or linear-lanceolate acuminate more or less serrate glabrous, panicle puberulous very large, flowers pedicelled or sessile. *Maxim. Diagn. Fl. Jap. Dec.* iv. and v. 263; *Wall. Cat.* 8115 & 8117.

SIKKIM HIMALAYA, alt. 1000 ft. *J. D. H. SILHET, Roxburgh. KHASIA Mts.*, alt. 3-5000 ft. *H. f. & T. UPPER ASSAM, Griffith.*—DISTRIB. Japan?

A middling-sized tree; branches smooth. *Leaves* 6-18 in.; petiole cylindric; leaflets 3-6 by $1-1\frac{1}{2}$ in. shortly petiolulate, much acuminate, sometimes nearly entire. *Panicle* as long as the leaves, terminal; branches spreading; bracts minute, caducous, subulate. *Flowers* white, minute. *Sepals* and *bracteoles* 5, broadly orbicular-ovate, minutely ciliate, otherwise glabrous. *Petals* subvalvate, glabrous. *Disk* 3-angled. *Drupe* as large as a pea.—The *M. rhoifolia*, Maxim., of Japan seems to be the same as this.

8. *M. Wallichii*, *Planch. in Herb. Hook.*; pubescent, leaflets 3-6-pairs oblong oblong-ovate or obovate-acuminate more or less spinulose-toothed, pubescent beneath, panicle tomentose, flowers very shortly pedicelled.

TROPICAL HIMALAYA; Nipal, *Wallich*; Sikkim, *Herb. Griffith.* KHASIA Mts., alt. 4-6000 ft., *H. f. & T.*—DISTRIB. Korea.

A small tree; branchlets rusty puberulous. *Leaves*, 6-12 in.: leaflets, 3-7 in., straight or falcate, rather coriaceous; petiole, petiolules and under-surface clothed with a spreading rusty tomentum; nerves many, curved; upper surface opaque; base rounded oblique. *Panicle* stout, much branched; hairs short spreading; bracts caducous. *Flowers* minute, on short stout pedicels. *Sepals* and *bracteoles* 5, glabrous, orbicular-ovate. *Petals* subvalvate. *Drupe* globose, the size of a small pea.—Small specimens of this from Moflong in the Khasia seem identical with a Corean plant collected by Wilford.

†† *Leaflets* quite entire.

9. *M. Arnottiana*, *Wight, Ill.*, i. 144, t. 53 (Millingtonia); rusty-tomentose, leaflets 5-7 pairs subopposite ovate-lanceolate subcaudate acuminate pubescent beneath, panicles rusty pubescent, flowers crowded sessile or shortly pedicelled. *Thwaites Enum.* 59; *Bedd. Fl. Sylv. t.* 160. *Sapindus*? microcarpus, *W. & A. Prodr.* 112.

WESTERN PENINSULA; from Canara southwards, *Wight.* CEYLON; in the central province, alt. 4-7000 ft.

A tree?; branchlets, petioles, petiolules, leaflets beneath and panicle clothed with a spreading subfurfuraceous or velvety rusty pubescence. *Leaves* 6-10 in.; leaflets 3-5 by $1\frac{1}{4}$ - $1\frac{1}{2}$ in., rather membranous, lower often falcate and recurved, base rounded, nerves not prominent, tips finely drawn out, upper surface opaque; petiolules $\frac{1}{4}$ - $\frac{1}{2}$ in. *Panicle* axillary and terminal. *Flowers* very numerous, crowded on the branchlets of the panicle. *Sepals* and *bracteoles* 5, orbicular-ovate, obtuse, ciliate, rather pubescent. *Petals* subvalvate. *Drupe* globose, the size of pea.

10. *M. sumatrana*, *Jack in Mal. Misc.* ii. 30 (Millingtonia); glabrous, leaflets 3-6 pairs elliptic- or obovate- or ovate-lanceolate acuminate base acute panicle contracted pubescent, flowers large crowded. *M. nitida*, *Blume Cat.*

Hort. Brit. 32; *Rumphia*, iii. 202, tab. 169; *Nees in Flora*, 1825, 106 (Millingtonia); *Miq. Fl. Ind. Bat.* i. pt. 2, 617. *Irina integerrima*, *Blume Bijl.* 231.

MALACCA, *Griffith, Maingay*.—DISTRIB. Sumatra.

A moderate-sized tree; branchlets glabrous. *Leaves* 1-1½ ft.; petiole nearly terete; leaflets 6-10 in., opposite, very variable in shape, coriaceous, shining on both surfaces; nerves arched, much reticulate; petiolules ½-¾ in. *Panicle* stout, erect, rusty-pubescent, with rather spreading short pubescence; bracts acuminate, ciliate. *Sepals* and *bracteoles* 5, the outermost very small, broadly orbicular-ovate, rather thick, glabrous. *Petals* subvalvate. *Filaments* larger than usual in the genus, without lateral teeth, the scale (petal) behind them being larger, elliptic and entire. *Fruit* nearly ¾ in. diam.—I think there can be no doubt but that this is Jack's *M. Sumatrana*; and that it is the same with Blume's *M. nitida*. I have in proof Java specimens of the latter named by Blume. Jack states that the terminal leaflet is sometimes absent. Griffith has a single imperfect specimen of apparently this plant from Malacca, with a few spinulose teeth on the upper part of the leaflets; it may be *M. confusa*, Bl. of Sumatra.

11. *M. lanceolata*, *Blume Cat. Hort. Brit.* 32; *Rumphia*, iii. 200, t. 168 (B. excepted), var. *pubescens*; pubescent, leaflets 6-8 pairs, very coriaceous linear-oblong caudate-acuminate pubescent beneath margins recurved, panicle tomentose with very long branches.

MALACCA, Mt. Ophir, *Griffith, Maingay* (M. Sumatrana, *Kew distrib. not of Jack*).—DISTRIB. Sumatra, Borneo.

A tree; branchlets stout, rusty-pubescent. *Leaves* 1-2 ft.; petiole stout, terete; leaflets 5-7 by 1½-1¾ in., often recurved and subfalcate, base rounded, rigidly coriaceous, shining above, opaque and pubescent beneath with much raised nerves; petiolules stout, ½ in. *Panicles* very large, with long spreading branches, almost velvety with rusty tomentum. *Flowers* minute, rather scattered, sessile or nearly so. *Sepals* and *bracteoles* 4 or 5, broadly orbicular-ovate, glabrous, outer ciliate. *Petals* valvate. *Filaments* short; scales 2-fid. *Fruit* not seen.—The Bornean and Sumatra specimens are more glabrous on the leaflets beneath, but I find no other difference.

NAT. ORD. XLVI. ANACARDIACEÆ. (By J. D. Hooker.)

Trees or shrubs; juice often milky and acrid. *Leaves* alternate, opposite in *Bouea*, exstipulate, simple or compound. *Inflorescence* various; flowers small, regular, unisexual, polygamous, or bisexual. *Calyx* 3-5-partite, sometimes accrescent, spathaceous in *Gluta*. *Petals* 3-5, alternate with the sepals, free, rarely 0, imbricate or valvate in bud, sometimes accrescent. *Disk* flat, cup-shaped or annular, entire or lobed, rarely obsolete. *Stamens* as many as the petals, rarely more, inserted under, rarely on, the disk, filaments usually subulate; anthers 2-celled, basi- or dorsi-fixed. *Ovary* superior, half inferior in *Holigarna*, 1- or 2-6-celled, rudimentary or 2-3-fid in the ♂; of 5-6 free carpels in *Buchanania*; styles 1-4, or stigma subsessile; ovules solitary in the cells, pendulous from the top or wall or from an ascending basal funicle. *Fruit* usually a 1-5-celled 1-5-seeded drupe; stone sometimes dehiscent. *Seed* exalbuminous; embryo straight or curved, cotyledons plano-convex, radicle short.—DISTRIB. Chiefly tropical; genera about 45; species about 450.

Sorindeia Madagascariensis, DC. (*Wall. Cat.* 8401), is cultivated in gardens in India.

TRIBE I. *Anacardiæ*. *Ovary* 1-celled, or if 2-celled, with one cell early suppressed.

A. Ovules pendulous from a basal funicle.

* *Sepals and petals not accrescent.*

- | | |
|---|-----------------|
| Calyx 4-5-partite. Petals 4-6. Stamens 4-10. Leaves alternate, usually compound | 1. RHUS. |
| Calyx 5-partite. Petals 0. Stamens 3-4. Leaves alternate, compound | 2. PISTACIA. |
| Calyx 4-5-partite. Petals 4-5. Stamens 1-5. Style filiform. Leaves alternate, simple | 3. MANGIFERA. |
| Calyx 5-partite. Petals 5. Stamens 8-10, all or a few only perfect. Torus stipitate. Style filiform. Leaves alternate, simple | *3. ANACARDIUM. |
| Calyx 3-5-partite, valvate. Petals 3-5. Stamens 3-5, all perfect. Style short. Leaves opposite, simple | 4. BOUEA. |
| Calyx spathaceous. Petals 4-6. Stamens 4-6. Torus stipitate. Style filiform. Leaves alternate, simple | 5. GLUTA. |
| Calyx 3-5-lobed. Petals 3-5. Stamens 10. Carpels 5-6, one only perfect. Styles short. Leaves alternate, simple | 6. BUCHANANIA. |

** *Sepals or petals accrescent. Leaves simple.*

- | | |
|--|-----------------|
| Calyx spathaceous. Stamens 5 or numerous | 7. MELANORRHŒA. |
| Calyx 5-partite. Stamens 5 | 8. SWINTONIA. |

B. Ovules pendulous from the top of the cell or from the walls of the ovary above the middle.

* *Leaves 3-foliolate or pinnate.*

- | | |
|--|------------------|
| Calyx not accrescent. Petals valvate. Stamens 10. Style 1 | 9. SOLENOCARPUS. |
| Calyx not accrescent. Petals imbricate. Stamens 10. Style 1 | 10. TAPIRIA. |
| Calyx not accrescent. Petals imbricate. Stamens 5, with 5 staminodes. Style very short | 11. PENTASPADON. |
| Calyx not accrescent. Petals imbricate. Stamens 8-10. Styles 3-4 | 12. ODINA. |
| Calyx accrescent. Petals 4. Stamens 4. Style 3-fid | 13. PARISHIA. |

** *Leaves simple.*

- | | |
|--|-------------------|
| Petals imbricate. Stamens 5. Styles 3. Drupe on a much enlarged peduncle | 14. SEMECARPUS. |
| Petals imbricate. Stamens 5. Style 1. Drupe superior | 15. DRIMYCARPUS. |
| Petals valvate. Stamens 5. Styles 3. Drupe inferior | 16. HOLIGARNA. |
| Petals valvate. Stamens 5. Style 1. Drupe superior | 17. MELANOCHYLA. |
| Petals imbricate. Stamens 4. Style 1, short. Drupe superior | 18. NOTHOPEGIA. |
| Petals imbricate. Stamens 6-10. Style 1. Drupe superior | 19. CAMPNOSPERMA. |

TRIBE II. **Spondiææ.** Ovary 2-5-celled; ovules pendulous. Leaves pinnate.

- | | |
|--|--------------------|
| Flowers polygamous. Stamens 8-10. Styles 4-5, free above | 20. SPONDIAS. |
| Flowers bisexual. Stamens 10. Styles 5, thick, connate at the lips | 21. DRACONTOMELUM. |

DOUBTFUL GENUS.

- | | |
|---|----------------|
| Calyx 3-fid. Stamens 3. Ovary 3-celled. Leaves entire | ? 22. RUMPHIA. |
|---|----------------|

1. RHUS, Linn.

Trees or shrubs, with often an acrid juice. *Leaves* alternate, simple or 1-3-foliolate or pinnate; leaflets quite entire or serrate. *Flowers* small, in terminal and axillary panicles, polygamous. *Calyx* small, 4-6-parted, persistent; segments nearly equal, imbricate. *Petals* 4-6, equal, spreading, imbricate. *Stamens* 4, 5, 6, or 10, inserted at the base of the disk, free; filaments subulate; anthers short, imperfect in the ♀ flower. *Ovary* sessile, ovoid or globose, 1-celled; styles 3, free or curvate, short or long; stigmas simple or capitate; ovule pendulous from a basal funicle. *Drupe* small, dry, compressed; stone coriaceous, crustaceous or bony. *Seed* pendulous from the funicle, testa membranous, cotyledons flattish, radicle hooked short superior.—A large genus of about 120 species, natives chiefly of warm temperate regions.

SECT. 1. **Cotinus**. *Leaves* simple. *Panicle* with many flowerless finally elongate capillary hairy pedicels. *Flowers* bisexual. *Drupe* obovate, compressed, stone triangular.

1. **R. Cotinus**, Linn.; Boiss. *Fl. Orient.* ii. 4; leaves long-petioled elliptic or obovate glabrous or tomentose. Brandis *For. Flor.* 118. *R. velutina*, Wall. *Cat.* 998 (excl. *C. in Herb. Linn. Soc.*); *R. lævis*, Wall. *mss. in G. Don Gen. Syst.* ii. 65.

WESTERN SUBTROPICAL HIMALAYA; alt. 3-5000 ft., from Marri to Kumaon.—DISTRIB. from Syria westwards to France.

A shrub or small tree. *Leaves* 2-4 in., obtuse; nerves spreading, parallel; petiole very slender, 1-2 in. *Panicles* axillary and terminal, very large, slender, and many-flowered. *Flowers* $\frac{1}{8}$ in. diam.; pedicels very slender. *Sepals* linear-oblong, obtuse. *Petals* twice as long, elliptic. *Stamens* shorter than the petals; anthers large. *Disk* broad, 4-angled. *Drupe* $\frac{1}{8}$ in., compressed, covered with white hairs.—The numerous hairy flowerless pedicels of the very large copious panicles give this bush a remarkable appearance during and after flowering. Wall. *Cat.* 998 C. (in *Herb. Linn. Soc.* only) is *Rhus succedanea*.

SECT. 2. **Sumac**. *Leaves* 3-foliolate or odd-pinnate. *Flowers* polygamous dioecious or bisexual. *Drupe* ovoid or orbicular.

* Leaves trifoliolate.

2. **R. parviflora**, Roxb. *Fl. Ind.* ii. 100; softly tomentose, leaflets elliptic oblong-obovate or orbicular irregularly crenate above the middle. DC. *Prodr.* ii. 70; Wall. *Cat.* 991; Dalz. & Gibs. *Bomb. Flor. Suppl.* 19; Brandis *For. Flor.* 119.

WESTERN HIMALAYA; alt. 2-5000 ft., from Kumaon to Nipal. CENTRAL INDIA on the Pashmarchi hills, Brandis.

An unarmed shrub; branchlets, leaves beneath, petioles and panicle densely clothed with soft rusty tomentum. *Leaves* palmate, 3-foliolate; petiole 1-1½ in., stout; leaflets 1½-3 in., sessile or the terminal contracted into a petiole, coriaceous, tomentose on both surfaces especially beneath; nerves spreading, parallel. *Panicles* axillary and terminal, silky, longer than the leaves. *Flowers* $\frac{1}{16}$ in. diam.; pedicels very short; bracts linear. *Sepals* ovate, the outer hairy. *Petals* twice as long, oblong. *Disk* 5-lobed. *Drupe* $\frac{1}{8}$ in. diam., ovoid, compressed, red-brown, shining.—The Ceylon specimens alluded to in Brandis are no doubt cultivated ones.

3. **R. mysorensis**, Heyne; W. & A. *Prodr.* 172; pubescent, leaflets small obovate or cuneate sinuate-toothed or -lobed. Brandis *For. Flor.* 119; Beddome *Fl. Sylv. Anal. Gen.* 78. t. xi. f. 3; Wall. *Cat.* 997.

NORTH WESTERN INDIA; Scind, Stocks; Rohilkund, near Delhi. WESTERN PANJAB, Sulima range, alt. 2500-5000 ft. WESTERN PENINSULA; Maisor and the Dekkan.

A small shrub; branches woody, flexuous, often spinous; branchlets, petioles,

leaves beneath, and panicle clothed with a rather furfuraceous pubescence. *Leaves* palmately 3-foliolate; petiole $\frac{1}{2}$ – $\frac{2}{3}$ in.; leaflets $\frac{1}{2}$ – $1\frac{1}{2}$ in., the terminal always much the largest, lateral often very small, all sessile and contracted at the base. *Panicles* subsimple, very slender, axillary and terminal. *Flowers* $\frac{1}{2}$ in. diam.; pedicels short; bracts minute. *Sepals* ovate, 2 smaller. *Petals* oblong, much larger than the sepals. *Stamens* short. *Disk* obscurely 5-lobed. *Drupe* $\frac{1}{2}$ in. diam., subglobose, compressed, red-brown, shining.—Brandis suspects that this may be a form of *R. parviflora*, but I cannot think so.

4. **R. paniculata**, Wall. *Cat.* 993; glabrous, leaflets elliptic or elliptic-oblong obtuse entire or very obscurely sinuate-lobed.

BHOTAN, Griffith; BIRMA at Yenangheum, Wallich.—DISTRIB. Yunan.

Probably a tree; quite glabrous except the minutely puberulous panicles. *Leaves* rather coriaceous, palmately 3-foliolate; petiole 1– $1\frac{1}{2}$ in.; leaflets 3–5 by 1–2 in., rarely oblanceolate, sessile, contracted at the base, terminal the largest and sometimes petiolulate; nerves many, spreading, parallel. *Panicles* very slender, axillary and terminal, elongate; branchlets recurved. *Flowers* $\frac{1}{16}$ in.; shortly pedicelled. *Sepals* orbicular. *Petals* not much larger, ovate-oblong, obtuse. *Disk* cup-shaped. *Drupe* $\frac{1}{8}$ in. diam., nearly orbicular, depressed.

** Leaves odd-pinnate.

† Leaflets pubescent or tomentose beneath.

5. **R. semi-alata**, Murray; DC. *Prodr.* ii. 67; petiole usually winged above, leaflets 4–6-pairs sessile toothed densely pubescent beneath, panicle equalling the leaves, pericarp indehiscent. Brandis *For. Flor.* 119. *R. buckiamela*, Roxb. *Fl. Ind.* ii. 99; Wight *Ic.* t. 561; Wall. *Cat.* 994. *R. javanica*, L. (fid. DC.). *R. Amela*, Don *Prodr.* 248.

TEMPERATE HIMALAYA; from Banahal to Sikkim, alt. 3–6000 ft. KHASIA Mts., alt. 3–5000 ft.

A small tree; branchlets, petioles, leaves beneath and panicles clothed with a dense soft pubescence. *Leaves* 10–18 in.; petiole cylindric; leaflets coriaceous, sessile, oblong, acuminate, base cuneate, terminal petiolulate, opaque above, pale reddish-white beneath; nerves many, parallel. *Panicle* large, broad, with a stout peduncle. *Flowers* $\frac{1}{12}$ in., white or pale yellow-green. *Sepals* ovate, obtuse, pubescent. *Petals* much larger, oblong, ciliate, and with a ciliate median ridge on the upper surface. *Stamens* exceeding the petals; anthers large. *Disk* cup-shaped, 10-lobed. *Styles* rather long. *Drupe* $\frac{1}{4}$ in. diam., orbicular, compressed, red, shining, acid.—I have specimens from the Bombay Presidency collected by Dr. Gibson (perhaps cultivated), and from Ritchie (Griffith's Herbarium) collected at Baraghur (probably east of the Indus) with the name "Semall-Shoorooke." The leaves are very small, the leaflets about 1 in. long, more sharply serrated; it may be a different species.

6. **R. punjabensis**, Stewart in Brandis *For. Flor.* 120; petiole not winged pubescent, leaflets 5–6-pairs sessile quite entire or serrate towards the tip slightly pubescent beneath, panicles much smaller than the leaves, flowers sessile, pericarp indehiscent.

NORTH WESTERN HIMALAYA; Kunawur, alt. 6000 ft., Thomson. Rajaori and Bussahir, alt. 2500–8000 ft., Brandis.

A tree 30–40 ft.; branchlets, petioles, leaves beneath and panicles covered with a very fine pale pubescence. *Leaves* 12–18 in.; petiole slender, terete; leaflets sessile, oblong or ovate-oblong, acuminate, membranous, opaque above, base rounded; nerves numerous, slightly arched, simple. *Panicles* about half the length of the leaves, subsessile; branches dense, spreading. *Flowers* unknown. *Drupe* $\frac{1}{2}$ in. diam., orbicular, compressed, red, tomentose.

7. **R. khasiana**, Hook. f.; petiole very slender glabrous, leaflets 8–12-

pairs membranous subsessile lanceolate incised-serrate long-acuminate hairy chiefly on the nerves beneath, pericarp dehiscent.

KHASIA Mts.; at the Borpane, and at CHITTAGONG. *H. f. & T.*

A large tree. *Leaves* 1-1½ ft.; petiole terete, soft, pubescent towards the tip; leaflets 3-4 by ¾-¾ in.; base cuneate, oblique, glaucous beneath; nerves very slender, about 15 pairs, arched, clothed with soft white spreading hairs. *Flowers* not seen. *Drupes* ½ in. diam., in open panicles, pedicelled, orbicular-ovate, compressed; epicarp papery, pale, irregularly torn, exposing a fibrous endocarp.—I have only examined imperfect specimens of this very distinct plant, which approaches *R. punjabensis* in habit.

8. *R. Wallichii*, *Hook. f.*; petiole tomentose not winged, leaflets 3-5 pairs subsessile quite entire densely softly tomentose beneath, panicles much shorter than the leaves, pericarp dehiscent. *R. vernicifera* (in part), *DC. Prodr.* ii. 68; *Royle Ill.* 175; *Brandis For. Flor.* 120. *R. juglandifolia*, *Wall. Cat.* 996 (not of Willdenow).

TEMPERATE HIMALAYA; from Garwhal to Nipal, alt. 6-7000 ft.

A tree; branchlets stout, petioles and leaves beneath and panicles, clothed with a soft dense rusty tomentum. *Leaves* 12-18 in.; petiole terete; leaflets 6-9 by 2-3 in., coriaceous, elliptic or oblong, acuminate, shortly petiolulate; base rounded, upper surface pubescent or glabrous; nerves 20-25 pairs, parallel. *Panicles* much shorter than the leaves, axillary; branches short, stout. *Flowers* subsessile, ⅓ in. diam. *Sepals* small, broadly ovate, obtuse. *Petals* much larger, obovate, concave, white? with very broad dark veins. *Filaments* short; anthers large. *Disk* broad, cup-shaped, obscurely lobed. *Drupes* densely crowded, ½ in. diam., globose, puberulous; epicarp dry, crustaceous, bursting irregularly; stone globose, very thick, bony, surrounded by wax.—I agree with Brandis in regarding this as quite distinct from the Japanese wax tree (*R. vernicifera*), from which it differs in the sessile flowers and laxer and longer panicles; juice corrosive. The Sikkim specimens referred to this species by Brandis have glabrous petioles, and belong to *R. insignis*.

9. *R. insignis*, *Hook. f.*; petiole not winged glabrous, leaflets 3-4 pairs, petiolulate glabrous above tomentose beneath, panicles shorter than the leaves, drupe pedicelled, pericarp dehiscent.

SIKKIM HIMALAYA, interior valleys, alt. 3-6000 ft. *J. D. H.* KHASIA Mts. at Nurtiung, alt. 4000 ft. *H. f. & T.*

A small beautiful tree. *Leaves* 12-18 in.; petiole terete; leaflets 6-9 by 3-4½ in., coriaceous, quite entire, elliptic or oblong, abruptly acuminate, glabrous and shining above, rusty, softly tomentose beneath; nerves very numerous, as in *R. Wallichii*. *Flowers* not seen. *Fruiting panicles* axillary, stout, 10 in. long-peduncled; branches spreading. *Drupes* scattered on the panicle, globose ½ in. diam.; epicarp thin, dry, bursting irregularly and enclosing a globose white mass of wax containing a very small flattened crustaceous stone.—Similar in many respects to *R. Wallichii*, but very different in the glabrous petiole and panicle, petioluled leaflets that are often cordate at the base, large lax glabrous panicles, and smaller very different fruit. The panicles and petioles are crusted with lenticels in some Sikkim specimens.

10. *R. ? Dhuna*, *Hamilton in Wall. Cat.* 8502 (Terebinthaceæ?); petiole not winged and leaflets beneath softly tomentose; leaflets 4 pairs petiolulate oblong abruptly acuminate.

NIPAL at Patgong, *Hamilton*.

Leaves 2 ft.; petiole stout, cylindric, grooved; leaflets 6-10 by 3-4 in., coriaceous, terminal obovate, with a cuneate base, the rest oblong with a cordate base; midrib stout; nerves 25 pairs slightly arched; under surface clothed with soft spreading hairs, upper smooth, glabrous, with a slender midrib; petiolule robust, cylindric ¾-¾ in.—I have only leaves of this very fine plant, which appear to be closely allied to *R. Wallichii*, and *R. insignis*, differing from the former in the much less tomentose leaves and petiolulate leaflets, and from the latter in the pubescent petiole.

†† *Leaflets quite glabrous beneath.*

11. **R. succedanea**, Linn. ; glabrous, leaflets 3-6 pairs oblong- elliptic- or ovate-lanceolate caudate acuminate, panicle slender, flowers pedicelled, pericarp dehiscent. *DC. Prodr.* ii. 68 ; *Roxb. Fl. Ind.* ii. 98 ; *Wight. Ic.* t. 560 ; *Brandis For. Flor.* 121 ; *Wall. Cat.* 992. *R. acuminata*, *DC. Prodr.* ii. 68. *Spondias* ? *Wall. Cat.* 8479.

TEMPERATE HIMALAYA, from Kashmir, alt. 3-6000 ft. ; to Sikkim, alt. 5-8000 ft. and Bhotan ; KHASIA Mts., alt. 2-6000 ft.—DISTRIB. Japan.

A tree about 30 feet high, everywhere glabrous, except the panicle in some varieties. *Leaves* crowded at the ends of the branches, 6-18 in. ; petiole terete, slender ; leaflets 2-5 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., petiolulate, elliptic-oblong or oblong- or ovate-lanceolate, tip very slender ; base rounded or acute, straight or oblique ; nerves numerous, slightly arched, slender. *Panicles* axillary, half the length of the leaves, slender, lax, with a very few scattered hairs, or glabrous. *Flowers* $\frac{1}{12}$ th in. diam., yellow-green ; pedicel slender. *Sepals* broadly ovate, obtuse. *Petals* much larger, oblong or obtuse. *Disk* 5-lobed. *Drupe*s $\frac{1}{4}$ in. diam., in drooping panicles, gibbous, compressed, epicarp very thin, bursting irregularly ; stone compressed, bony, surrounded with wax.—Perhaps two or three species are mixed up here, but I cannot satisfactorily distinguish them without more complete specimens than I possess.

VAR. 1. *himalaica* ; shoots glabrous, leaves scattered, petiole 1-2 ft., leaflets 6-8 pairs, 4-6 by $1\frac{1}{2}$ - $2\frac{1}{4}$ in. petiolulate obliquely ovate-lanceolate acuminate very membranous, midrib often pilose beneath, nerves 10-15 pairs, much arched, panicle pubescent in flower, fruiting glabrous very lax, drupes pedicelled laterally compressed.—N.W. Himalaya, alt. 3-6000 ft., from Kashmir to Nipal. This differs from the Japanese plant in the pubescent panicle and fewer more-arched nerves. There are fruits of it from Nipal in Wallich's Herbarium on the sheet with var. 3.

VAR. 2. *sikkimensis* ; shoots pubescent, leaves as in var. 1, flowering panicle lax glabrous, fruit unknown.—A large tree of the Sikkim inner valleys, Lachen-Lachoong, etc., alt. 5-8000 ft.

VAR. 3. *acuminata*, *DC. Prodr.* ii. 68 (*sp.*) ; leaves usually crowded at the ends of the branches, petiole 6-10 in., leaflets 2-5 pairs, 2-5 by $1\frac{1}{2}$ -2 in. elliptic or elliptic-obovate or -oblong often abruptly caudate-acuminate at length coriaceous, nerves 25-30 pairs horizontal straight parallel, panicle glabrous in flower, fruiting panicle more dense, drupes on very short stout pedicels laterally compressed.—Himalaya from Nipal to Bhotan, Khasia Mts.

VAR. 4. *sphaerocarpa* ; leaves of var. 3, drupes depressed spheres.—Khasia, Griffith.

12. **R. Griffithii**, *Hook f.* ; glabrous, leaflets 4-7 pairs oblong or ovate-oblong acuminate, panicle stout pubescent, flowers subsessile, pericarp dehiscent.

KHASIA Mts. alt. 4-6000 ft., *Simons*, etc. ; MISHMI HILLS, *Griffith*.

A small tree. *Leaves* towards the ends of the branches, 1-2 ft. ; petiole stout, terete ; leaflets 5-10 by $2\frac{1}{2}$ - $4\frac{1}{2}$ in., coriaceous, quite entire, rounded or cordate, rarely acute at the base, glabrous and opaque above, very obscurely puberulous on the midrib and principal nerves beneath ; petiolules $\frac{1}{4}$ in., very stout ; nerves strong. *Panicles* 5-6 in. long, axillary ; peduncle and branches stout, pubescent. *Flowers* $\frac{1}{10}$ in. diam., almost sessile. *Sepals* broadly ovate, obtuse, pubescent. *Petals* much larger, linear-oblong, obtuse. *Stamens* exserted. *Disk* broad, sinuate-lobed. *Drupe*s on short stout pedicels, about $\frac{1}{4}$ - $\frac{1}{3}$ in. diam., nearly orbicular, compressed ; epicarp thin, bursting irregularly ; stone compressed, surrounded with wax.—A very distinct species, closely allied to *R. succedanea*, from which it differs in its much larger size, stouter habit, larger leaflets often cordate at the base, pubescent stout panicle, nearly sessile flower and smaller drupes.

2. **PISTACIA**, Linn.

Trees or shrubs. *Leaves* alternate, exstipulate, pinnate, or 3-foliate. *Flowers* small, apetalous in axillary racemes or panicles, dioecious. MALE FL. *Calyx* 3-5-fid. *Stamens* 3-7. *Disk* small. *Rudiment of Ovary* minute or 0. FEM. FL. bracteate. *Sepals* 3-4. *Stamens* and *Disk* 0. *Ovary* sessile, 1-celled; style short, 3-fid, stigmas capitate, recurved; ovule pendulous from a basal funicle. *Drupe* dry; stone bony. *Seed* with a membranous testa; cotyledons thick, oily, curved. **DISTRIB.** Species about 6, natives of Western Asia and the Mediterranean region, and one Mexican.

Several species of this genus, allied to Mediterranean forms, are found in Afghanistan and Beluchistan, but do not cross the frontier. The seeds of *P. vera*, L. the Pistachio-nut, are imported into N. Western India.

P. integerrima, Stewart in Brandis For. Flor. 122, t. xxii.; leaflets 4-5 pairs lanceolate caudate-acuminate. *Rhus integerrima*, Wall. Cat. 8474. R. Kakrasingee, Royle III. 175.

NORTH-WESTERN FRONTIER; Peshwur valley and Salt range. WESTERN HIMALAYA; alt. 1200 to 8000 ft., from the Indus to Kumaon, usually on hot slopes.

A nearly glabrous tree, 40 ft. and upwards. *Leaves* 6-9 in., with or without a terminal leaflet; petiole terete, puberulous; leaflets sub-opposite, petiolulate, coriaceous, quite entire, base oblique; nerves many, arched. *Panicles* lateral; ♂ compact, pubescent; ♀ lax, elongate; flowers pedicelled, with 2 ovate bracts. *Stamens* 5-7, filaments short; anthers large, dark red. FEM. FL. *Sepals* 4, linear, and bracts deciduous. *Style* almost 3-partite. *Drupe* $\frac{1}{4}$ in., broader than long, glabrous, rugose, grey.—Wood very hard and handsome.

3. **MANGIFERA**, Linn.

Trees. *Leaves* alternate, petioled, quite entire, coriaceous. *Flowers* small, polygamous in terminal panicles, pedicel articulate; bracts deciduous. *Calyx* 4-5 partite; segments imbricate, deciduous. *Petals* 4-5, free or adnate to the disk, imbricate; nerves thickened, sometimes ending in excrescences. *Stamens* 1-5, rarely 8, inserted just within the disk, or on it, 1 rarely more perfect and much larger than the others, the others with imperfect or smaller anthers, or reduced to teeth. *Ovary* sessile, 1-celled, oblique; style lateral; ovule pendulous, funicle basal, inserted on the side of the cell above its base, rarely horizontal. *Drupe* large, fleshy; stone compressed, fibrous. *Seed* large, compressed, testa papery; cotyledons plano-convex, often unequal and lobed. **DISTRIB.** A tropical Asiatic, chiefly Malayan genus, of about 30 species.

Of the species here described some may be referable to Malayan ones that are imperfectly described by Blume and others. The genus is a very difficult one, and the Malayan species want careful revision with many specimens.

SECT. 1. *Disk* tumid, usually 5-lobed, broader than the ovary. *Petals* free from the disk, inserted at its base.

* *Petals* with 1-5 free or confluent ridges that do not end in wart-like excrescences.

† *Panicle* pubescent or tomentose.

1. **M. indica**, Linn.; leaves oblong or linear-oblong or elliptic or obovate-lanceolate obtuse acute or acuminate, panicle usually tomentose, petals 5 with 3 ridges, stamens 1 fertile and 4 reduced to short capitate subulate filaments, style sub-terminal. Roxb. Fl. Ind. i. 641; W. & A. Prodr. 170;

Beddome Fl. Sylv. t. 162; *Wall. Cat.* 8487 (*excl. D. G. & I.*); *Dalz. & Gibs. Bomb. Flor.* 51; *Bot. Mag.* t. 4510; *Brandis For. Flor.* 125. *M. domestica*, *Gaertn. Fruct.* t. 100.—*Rheedé Hort. Mal.* iv. t. 1, 2.

TROPICAL HIMALAYA; alt. 1–3000 ft. from Kumaon to Bhotan Hills and valleys of BEHAR, the KHASIA MTS., BIRMA, OUDH, and WESTERN PENINSULA from Kandeish southwards.—DISTRIB. Cultivated as far west as Muscat, in all Eastern tropical Asia, and generally in the tropics.

A large tree, glabrous, except the panicle; branches widely spreading. *Leaves* 6–16 in., very variable in breadth, crowded at the ends of the branches, acute, acuminate or obtuse, shining, nerved, quite entire, margins often undulate; petiole 1–4 in., swollen at the base. *Panicles* a foot and more, pubescent, rarely glabrate; bracts elliptic, concave. *Flowers* yellow, odorous, subsessile, rarely pedicelled, ♂ and ♀ on the same panicle. *Sepals* ovate, oblong, concave. *Petals* twice as long, ovate, ridges 3–5, orange. *Disk* fleshy, 5-lobed. *Stamen* 1, inserted upon the disk, filament subulate; anther purple. *Ovary* glabrous. *Drupe* 2–6 in., compressed, yellow.—It is often difficult to say whether so common a tree is wild or not in a given locality, but there seems to be little doubt but that it is indigenous in the localities enumerated above. Amongst the varieties, those with an almost glabrous panicle from the Western Peninsula look the most unlike the ordinary cultivated form. One Maisor specimen has leaves 10 by $1\frac{1}{2}$ in., much resembling those of *M. oblongifolia*, Wallich's 8487 D. is a *Sorindeia*, a Madagascar plant accidentally intermixed; 8487 G. is *Buchanania? acuminata* (*Wall. Cat.* 981), and 8487 I. is, I suspect, *M. sylvatica*.

2. *M. caloneura*, *Kurz in Beng. As. Soc. Journ.* 1873, ii. 66; leaves oblong or oblong-lanceolate finely reticulated between the nerves acuminate, panicle spreading tomentose, flowers crowded sessile, petals 5 with 3 ridges, stamens 1 or 2 fertile, ovary rough, style lateral or basal.

MARTABAN, *Kurz*.

A moderate sized tree. *Leaves* 4–6 by $1\frac{1}{4}$ – $1\frac{3}{4}$ in., equally reticulated on both surfaces between the 16–20 pairs of arching nerves; petiole $\frac{2}{3}$ –1 in., much thickened at the base. *Panicle* tomentose throughout. *Flowers* much as in *M. indica*, the reflexed petals having 3 ridges. (*Fruit* as large as a hen's egg, subreniform, smooth, obtuse, yellow, sweet and acid, *Kurz*).—My specimens of this are imperfect; it is evidently very nearly indeed allied to *M. indica*, differing chiefly in the very fine reticulation of the leaves, as pointed out by *Kurz*. Wallich's *M. indica*, 8487 H. from Tavoy is possibly the same.

3. *M. pentandra*, *Hook. f.*; leaves oblong or oblong-lanceolate acuminate reticulated on both surfaces, panicle spreading tomentose, flowers crowded subsessile, petals 5 with 3 ridges, stamens 5 perfect, ovary smooth, style subterminal.

MALACCA, *Griffith, Maingay*.

A tree. *Leaves* 5–12 by 2–4 in., quite similar to those of *M. indica*, as are the panicles and flowers, except that *Maingay* describes the disk as more fully and fairly developed than in any form he had figured. The 5 stamens are all perfect and unequal. The petals are yellowish-white, with yellow brown ridges. *Maingay* figures the style as nearly terminal, and the ovule as quite laterally suspended.—The Malay name is 'Mam ploni,' which means mango ripened artificially.

4. *M. Griffithii*, *Hook. f. in Trans. Linn. Soc.* xxii. 168, *in note*; leaves small oblong or oblong-obovate obtuse reticulate between the nerves, inflorescence of many suberect compound pubescent racemes, petals 4 orbicular-oblong not much exceeding the sepals, stamen 1.

MALACCA, *Griffith*.

Branches stout. *Leaves* 3–5 by $1\frac{1}{4}$ –2 in.; nerves about 10 pairs; base narrowed; petiole stout, $\frac{1}{2}$ in. *Racemes* (branches of a reduced panicle), not much if at all longer

than the leaves, stout, finely pubescent. *Flowers* very small, $\frac{1}{8}$ in. diam., subsessile. *Sepals* broadly ovate, tomentose. *Petals* orbicular-ovate, with 2 short or more confluent ridges. *Disk* with 5 or 6 subulate points. *Stamens* short.

5. **M. sclerophylla**, *Hook. f.*; leaves glabrous broadly elliptic with obtuse narrowed tips most thickly coriaceous base acute or rounded nerves obscure, petioles much thickened at the base, panicle pubescent of many erect stout spiciform branches, petals not much exceeding the sepals, stamen 1.

MALACCA, *Maingay*.

Branches very thick, woody, glabrous, angled, and channelled. *Leaves* 4-5 by 2-2½ in., alternate, not approximate at the ends of the branches, exceedingly thick and hard when dry, smooth on both surfaces; midrib strong; nerves about 10, faint; reticulations very obscure; petiole 1 in., of the upper leaves $\frac{1}{4}$ in., extremely thickened at the back especially, the thickening sometimes extending up the midrib. *Panicle* 4-6 in. long. *Flowers* sessile, $\frac{1}{10}$ in. diam.; bracts ovate. *Sepals* ovate, pubescent. *Petals* ovate-oblong, with 3 short ridges. *Disk* small. *Young drupe* nearly orbicular.—No other *Mangifera* has foliage at all like this.

†† *Panicle quite glabrous.*

6. **M. sylvatica**, *Roxb. Fl. Ind. i.* 644; leaves lanceolate or oblong-lanceolate usually long-petioled, panicle ample glabrous, branches slender, flowers pedicelled, petals 5 with 3 ridges, stamen 1 with no imperfect ones, ovary smooth, style lateral. *M. indica*, *Wall. Cat.* 8487 I.

TROPICAL NIPAL and SIKKIM HIMALAYA, *J. D. H.*; SILHET, *Roxb.*; KHASIA MTS., *H. f. & T.*; ANDAMAN ISLS., *Kurz*.

I am in some doubt about this plant, which is well figured in Roxburgh's drawings, but of which I have seen no flowering or fruiting specimen. I believe it to be a common tree in the Silhet, Khasia and Sikkim jungles, with usually longer more membranous young leaves than the Mango, and a more open lax perfectly glabrous panicle, and loose pedicelled flowers. Roxburgh contrasts it with the cultivated sorts as having a much larger panicle, with the numerous ramifications more erect and slender, flowers more completely monandrous, disk villous. The leaves he describes as in the common Mango. The drupe he figures as ovoid, gradually narrowed at the top into a sharp curved beak. Graham (*Cat. Bomb. Pl.*) states that is a native of the Bombay Ghats, but no one has confirmed this. *Kurz's* specimens, thus named from the Andaman Islands, have leaves 10-12 by 2½-3½ in., membranous, much reticulated, elliptic-lanceolate, acuminate, petiole very slender $\frac{3}{4}$ -2 in.; nerves 16-20 pairs, slender, arched. I have gathered similar specimens in Sikkim and Silhet, with petioles 4 in. long, and Wallich's 8487 I. quite agrees with these. My Khasia ones, with slender branched panicles (as in Roxburgh's description and figure), but flowers all dropped, have leaves like those of *M. indica*. *Kurz (Journ. As. Soc. Beng. 1870, ii. 75)*, observes that Miquel has incorrectly identified this plant with *M. indica*, from which it is at once distinguished by the very different white flowers, the disk and acuminate fruit.

7. **M. longipes**, *Griff. Notul.* iv. 419; leaves oblong- or elliptic-lanceolate acuminate faintly reticulate, panicle very lax spreading branches slender, flowers pedicelled, petals 5 narrow with one slender basal ridge branching into 5 nerves, stamen 1, imperfect ones minute.

MALACCA, *Griffith, Maingay*.

A tree. *Leaves* 6-10 by 1½-3 in., with 14-10 pairs of nerves, reticulation obscure above, more distinct beneath; petiole $\frac{3}{4}$ -1½ in. *Panicles* usually longer than the leaves, branches widely spreading, pedicels $\frac{1}{4}$ in. *Flowers* $\frac{1}{6}$ - $\frac{1}{5}$ in. diam. *Sepals* ovate, subacute. *Petals* white, with yellow veins, very narrow, recurved. *Disk* broadly conical, papillose, 5-lobed. *Stamen* far exserted, filament elongated. *Ovary* smooth; style lateral, long, slender; ovule obliquely ascending.—This, as

Griffith remarks, is very near *M. sylvatica*, and as far as I can see may be a form of that plant, differing chiefly in the smaller disk and very narrow petals. Griffith describes the calyx and pedicels as puberulous, but I find no trace of this. The Malay name is 'Boa Pow.'—*Griffith*.

8. *M. zeylanica*, *Hook. f.*; leaves oblong-obovate oblong or elliptic-lanceolate obtuse or rounded at the tip reticulated, panicle glabrous stout narrow, sepals orbicular, petals 5 oblong with 5 ridges, stamen 1 with 6-8 minute subulate filaments, style subterminal. *M. indica*, *Thwaites Enum.* 75; *Buchanania? zeylanica*, *Blume Mus. Bot.* i. 185.

CEYLON; abundant up to an elevation of 3000 ft.

A tree, everywhere quite glabrous. *Leaves* small, $2-3\frac{1}{2}$ by $1-1\frac{1}{2}$ in., coriaceous, usually rounded at the tip, nerves 12-15 pairs, arching; petiole $\frac{1}{4}-\frac{3}{4}$ in. *Panicle* stout, erect, much longer than the leaves. *Flowers* $\frac{1}{6}$ in, diam.; pedicel slender. *Petals* short, elliptic-oblong, with 5 nerve-like ridges. *Disk* large. *Stamen* short. *Ovary* obscurely pubescent.—*Thwaites* identifies this specifically with the cultivated *M. indica*, but it appears to me to differ much in habit and foliage, in the contracted panicle, more pedicelled flowers, perfectly glabrous sepals, and short petals.

9. *M. gracilipes*, *Hook. f.*; leaves small elliptic-lanceolate acuminate obscurely reticulate, petiole very slender, inflorescence of many slender erect glabrous compound racemes, pedicels very slender, petals 5 lanceolate with 3-5 ridges, stamen 1 perfect slender with 4 short subulate filaments, style lateral.

MALACCA, *Maingay*.

A large tree, everywhere perfectly glabrous; branches very slender for the genus. *Leaves* 3-4 by $1-1\frac{1}{2}$ in., undulate, much narrowed at both ends, nerves faint, arched; petiole remarkably slender, $\frac{3}{4}-1$ in., not much thickened at the base. *Racemes* (branches of a sessile panicle which start in a fascicle from the tips of the branches), long, very slender, much exceeding the leaves, and bearing short lateral branches throughout their length; pedicels very slender. *Flowers* about $\frac{1}{6}$ in. diam. *Sepals* ovate, obtuse. *Petals* twice as long, pale green with purplish ridges. *Filament* slender, exserted. *Disk* rugose. *Ovary* quite smooth; ovule pendulous from a basal funicle.

10. *M. oblongifolia*, *Hook. f.*; leaves linear-oblong obtuse or subacute very coriaceous not reticulated beneath, petiole long, panicle large spreading quite glabrous, flowers pedicelled, petals 5 elliptic-oblong with a basal tubercle and 3-5 more or less confluent ridges, stamen 1 perfect with 4 shorter antheriferous ones, style subterminal.

MALACCA, *Griffith*, *Maingay* (cult.).

A very large tree, glabrous throughout; branchlets stout. *Leaves* 8-12 by $1\frac{1}{2}-2\frac{1}{2}$ in., very coriaceous, with undulate margins, faintly reticulate above, not at all or very obscurely so beneath; base usually rounded; nerves 20-25 pairs. *Panicle* very large, branches widely spreading, 2-3-chotomously divided. *Flowers* distant, $\frac{1}{4}$ in. diam.; pedicel rather stout, $\frac{1}{8}-\frac{1}{4}$ in. *Sepals* veined. *Petals* rather short, yellow, ridges tipped with red. *Fruit* 4 in. long, ovoid, dull green.—*Maingay*, from whom this description of the fruit is taken, says that this is cultivated at Malacca as the Quenee Mango.

** Petals 4, with 1-5 free or confluent ridges that terminate in wart-like excrescences.

11. *M. quadrifida*, *Jack in Roxb. Fl. Ind. ed. Carey*, ii. 440; leaves elliptic-oblong or oblong-lanceolate obtuse narrowed into long petioles reticulate beneath inflorescence of many erect stout glabrous compound racemes, petals 4

short ovate with 3 short confluent ridges, stamen 1, the others reduced to minute teeth. *Wall. Cat.* 8489.

PENANG, *Jack*; MALACCA, *Maingay*.—DISTRIB. Sumatra.

A lofty tree, perfectly glabrous throughout; branchlets very stout. *Leaves* 4-8 by $1\frac{1}{2}$ -2 in., rarely acute, very coriaceous; nerves 15-20 pairs, reticulation above obsolete; petiole 1-2 in. *Racemes* equalling or exceeding the leaves, collected on a short peduncle, rachis stout, branchlets 1-6 flowered. *Flowers* small, $\frac{1}{8}$ in. diam.; pedicel longer than the petals. *Sepals* broadly orbicular-ovate. *Petals* twice as long, pearly-white (*Maingay*); the ridges raised at their ends. *Stamens* very short, inserted on the disk. *Disk* tumid, 4-lobed. *Style* lateral. (*Drupe* roundish, becoming very dark-coloured, *Jack*).—*Maingay* in his MSS. describes the petals as 5, and stamens as usually 2, but I find the flower to be uniformly 4-merous and monandrous; *Jack* however states that a small superfluous fifth petal is sometimes placed within the rest. This is allied in flower and inflorescence to *M. Griffithii*.

12. *M. Maingayi*, *Hook. f.*; leaves elliptic-oblong acute or acuminate not reticulate on either surface or obscurely so beneath only, panicle glabrous spreading, flowers pedicelled, petals 4 oblong with 3-5 confluent ridges, stamen 1 perfect, the others reduced to teeth.

MALACCA, *Maingay*.

A tree, everywhere quite glabrous. *Leaves* 4-9 by $1\frac{1}{2}$ - $3\frac{1}{2}$ in., coriaceous, nerves 15-20 pairs, not strong, arched; petiole 1-2 in. *Panicle* equalling or exceeding the leaves, branches pale green (when dry), rather slender. *Flowers* $\frac{1}{8}$ in. diam., pedicel slender. *Sepals* ovate, obtuse. *Petals* about twice as long. *Stamen* short. *Style* subulate, subterminal.—There appear to be two varieties of this in *Maingay's* Herbarium; one (called Sapoong or Sampong), with larger leaves not narrowed into the petiole, opaque above, with sunk nerves, tumid between the nerves; the other (marked as truly wild) with brown (when dry) more shining leaves, narrowed into the petiole, more reticulated beneath, and the nerves not sunk; its leaves are like those of *M. indica*, from which its glabrous pedicelled flowers and warted petals at once distinguish it; both differ from *M. quadrifida* in the inflorescence. The first variety has, according to *Maingay*, globose green fruit 3-4 by $2\frac{1}{2}$ -3 in.

13. *M. microphylla*, *Griff. MSS.*; leaves small elliptic acuminate reticulate beneath, panicle stout contracted puberulous, flowers very shortly pedicelled, sepals broadly ovate, petals 4 oblong with 3 ridges, stamen 1 without rudiments of others.

MALACCA, *Griffith*; in orchards.

A small tree (*Griffith*). *Leaves* $1\frac{1}{2}$ -4 by $\frac{3}{4}$ - $1\frac{1}{2}$ in., shining above; nerves 8-10-pairs; petiole slender, $\frac{1}{4}$ - $\frac{1}{2}$ in. *Panicle* short, stout, rather irregular, sometimes reduced to erect compound racemes, by the abbreviation of the peduncle and the branches being erect. *Flowers* about $\frac{1}{8}$ in. diam., on short stout pedicels. *Sepals* pubescent. *Petals* about twice as long, the ridges distinct. *Filament* slender. *Style* lateral. *Fruit* oviform, green, very turpentiney, *Griffith*.—*Griffith* has what appears to be a small state of this, with small very shining leaves, quite polished on the upper surface.

SECT. 2. *Disk* narrow, often reduced to the form of a stalk to the ovary, rarely obsolete in the ♂ fl.

* *Petals* free from the disk.

14. *M. odorata*, *Griff. Notul.* iv. 417; leaves elliptic-lanceolate or oblong acute or acuminate-reticulate, panicle very stout with ascending stout branches glabrous, petals 5 linear-oblong reflexed from the middle with a thick branching ridge. *M. fetida*, var. *δ. Miquel* in *Herb. Hook.*

MALACCA, *Griffith*.—DISTRIB. Java (*Zollinger*, 430).

A tree, everywhere quite glabrous, or very obscurely pubescent on the panicle. *Leaves* 6–12 by 2–4 in., very coriaceous, reticulate on both surfaces; nerves about 20-pairs, very strong; petiole stout, $1\frac{1}{4}$ – $1\frac{3}{4}$ in., much thickened from below the middle to the base. *Panicle* with stout green branches that turn black when dry. *Flowers* $\frac{1}{4}$ in. diam., odorous, flesh-coloured. *Sepals* ovate-oblong. *Petals* three times as long, reflexed, greenish, suffused with blood-red. *Perfect stamens* sometimes 2 (*Griffith*), the imperfect ones slender, subulate, capitate. *Ovary* glabrous. (*Drupe* oblong, stinking, yellow-green, with yellow spots, filled with a sticky gum; flesh yellow, fibrous, sweet, not turpentine; stone compressed, fibrous; cotyledons rugose, equal at the base, one overlapping at the top. *Griffith*.)—Malay name “Koeene” or “Kohini,” according to Griffith, which is the name Maingay gives to *M. oblongifolia* (a totally different plant). This much resembles *M. Parih*, Miq., of Java, which has a more effuse panicle with long tertiary branchlets and very long pedicels.

15. **M. lagenifera**, *Griff. Notul.* iv. 414, t. 567, f. 3; leaves small obovate-oblong or -spathulate obtuse or rounded at the tip, panicle large spreading pubescent, petals 5 linear-oblong obscurely thickened in the middle, stamens 5 perfect.

MALACCA, *Griffith, Cumming* (2330), *Maingay*.

A very lofty tree (*Griffith*); branchlets stout, with pale bark. *Leaves* 3–6 by $1\frac{1}{4}$ – $1\frac{3}{4}$ in., very thickly coriaceous, gradually narrowed into a very stout petiole $\frac{3}{4}$ – $1\frac{1}{4}$ in., not reticulate on either surface; nerves about 20 pairs, very faint, spreading and parallel. *Panicle* on a long and stout peduncle, much exceeding the leaves. *Flowers* $\frac{1}{4}$ in. diam.; pedicels very short. *Sepals* many, orbicular, tomentose. *Petals* three times as long, concave, purple, erect till a late period. *Disk* a slender stipes. *Filaments* very slender (purple, alternating with short horns, *Maingay*). *Ovary* glabrous; style capillary, lateral. (*Drupe* pyriform, $4\frac{1}{2}$ by $2\frac{1}{2}$ in., pale green, with a pink blush, flesh livid or purplish flesh-colour; stone fibro-coriaceous, adherent to the membranous testa; radicle basal, very large. *Maingay*.)—Called Lanjoot by the Malays, according to Maingay and Griffith. The latter describes the drupe as smooth, glaucescent, fleshy, feetid, exuding a black varnish, traversed by innumerable fibres; stone ovate-lanceolate, fibro-coriaceous. *Seed* erect, adhering to the black tegument on the one side, on the other smooth; cotyledons with one half the surface smooth, the other wrinkled. Maingay describes the disk as hemispherical, but I do not find it so.

16. **M. fragrans**, *Maingay MSS.*; leaves very narrowly linear-oblong- or lanceolate acute acuminate or rounded at the tip, panicle spreading quite glabrous, petals narrow linear, stamens 5, one much longer than the others whose anthers are imperfect.

MALACCA, *Maingay*.

A tree, everywhere quite glabrous. *Leaves* much longer and narrower than in any other species, 6–10 by $1\frac{1}{4}$ – $1\frac{1}{2}$ in., coriaceous, reticulated on both surfaces, margins waved, base acute abruptly contracted into a very slender petiole 1–2 in.; nerves 25–35 pairs, slender, almost horizontal. *Panicle* longer than the leaves, peduncle long and branches thick, black when dry. *Flowers* erect, almost $\frac{1}{3}$ in. long; pedicel turbinate. *Sepals* unequal, ovate-lanceolate. *Petals* very narrow, erect, reflexed sharply from the middle, 1-nerved (*Maingay*), 3-nerved in a young state. *Disk* a slender pedicel. *Filaments* very slender, shorter than the capillary style, which is lateral. (*Drupe* obliquely broadly oblong-globose; flesh yellow, acid and terebinthine; stone thin, fibrous; testa coriaceous, *Maingay*.)—This in foliage approaches very closely Blume's *M. macrocarpa* of Java, which has still narrower leaves with crimped edges, 40 pairs of nerves, and a bitter-sweet fruit as large as a child's head.

** *Petals adnate to or inserted on the disk.*

17. **M. foetida**, *Lour. Fl. Coch.* 160; leaves large elliptic-oblong or -obovate obtuse or acute not reticulate, nerves strong, panicle very stout glabrous

spreading, flowers subsessile, petals 5 linear-lanceolate 3-ridged inserted on the disk, stamens 5 one perfect the rest shorter imperfect. *Roxb. Fl. Ind. ed. Carey*, ii. 440; *Wall. Cat.* 8488; *Griff. Notul.* iv. 419. *M. Horsfieldii* & *M. foetida*, *Miq. Fl. Ind. Bat.* i. pt. 2. 632.—*Rumph. Amb.* i. 98. t. 28.

MALACCA, PENANG, and SINGAPORE, *Jack, &c.*—DISTRIB. Throughout the Malay Archipelago.

A large tree; branchlets very stout. *Leaves* very large, 10–12 by 3–4 in., very coriaceous, pale when dry; surface raised above between the stout nerves, of which there are about 20 pairs; base acute; petiole stout, 1–2½ in. *Panicle* large, stout, with very spreading branches, and these again with short tertiary cymose branchlets (deep blood-red, *Maingay*), black when dry. *Flowers* ½ in. diam., pink or dark red. *Sepals* ovate, obtuse. *Petals* reflexed from the middle, inserted on the pedicel-like disk above its base, but not decurrent on the disk. *Ovary* glabrous; style slender, lateral. (*Drupe* variable in form, not compressed, oblique, green, smooth, very fetid; flesh yellow, thick; stone almost 2-edged, chartaceous, fibrous; cotyledons equal, auricled at the base; radicle short. *Griffith.*)—*Maingay* describes the fruit as coarse-flavoured, and not unlike *Lanjoot* (*M. lagenifera*), stringy. Malay name *Bachang* or *Bachong*. *Rumph* and *Loureiro* describe the drupe as hairy, but no one else does so; possibly the fibres of the stone are alluded to by these authors.

18. *M. cæsia*, *Jack in Roxb. Fl. Ind. ed. Carey*, ii. 441; leaves cuneate-obovate or -oblong or -elliptic with very short thick petioles, panicle branched tomentose very stout, petals 5 erect adnate to the disk long narrow with one central ridge, stamen 1. *Griff. Notul.* iv. 415. *M. foetida*, *Blume* (according to *Miquel in Herb.*).

MALACCA, *Maingay* (cult.).—DISTRIB. Sumatra, Java.

A large stately magnificent tree (*Griffith*); branchlets very stout. *Leaves* 6–16 by 2½–3½ in., very thickly coriaceous, smooth, rather shining, obscurely reticulated beneath, decurrent on the petiole, which is ¼–1 in.; nerves about 20–30 pairs, slightly arched. *Panicle* very stout and much branched (of a glaucous reddish colour, *Jack*). *Flowers* in dense heads on the tertiary branchlets, ½ in. long; bracts broad; pedicel very thick, short. *Sepals* short, broadly ovate, pubescent. *Petals* erect, adnate by the ridge to the disk, linear, concave, purple. *Disk* slightly lobed, *Imperfect stamens* reduced to mere teeth; filament of perfect one slender. *Style* lateral, slender. (*Drupe* oblong-obovate, reddish-white, *Jack*.)—*Griffith* says that the corolla is more connate with the disk in the female, and that the panicle is cream-coloured and petals white outside and lilac inside, and that the larger cotyledon alone is auricled.—Malay name *Beenjai* or *Binjaee*.

19. *M. superba*, *Hook. f.*; leaves very large subsessile cuneate-oblan-
ceolate not reticulate, panicle spreading pubescent, flowers subcapitate very large, petals 5 lanceolate acuminate adnate to the disk with a flat central ridge, stamens 5, 1 perfect.

MALACCA, *Maingay*.

A gigantic tree (*Maingay*); branchlets as thick as the thumb. *Leaves* 10–16 by 3–5 in., very thickly coriaceous and hard, obtuse, narrowed below into the short very thick petiole, not reticulate; nerves about 35 pairs, spreading, not sharply defined but prominent, midrib very stout beneath. *Panicle* hoary-pubescent, probably 2 ft. long, peduncle very thick; primary branches strict, ascending, branched at the tips and there bearing heads of flowers two inches across; bracts large, concave. *Flowers* ¾ in. diam., lilac. *Sepals* hoary, ¼ in. long, ovate-lanceolate. *Petals* adnate to the torus by the central ridge, concave, recurved. *Filaments* all slender, one antheriferous. *Ovary* oblique; style slender, subterminal; ovule laterally attached, horizontal.—This is a grand species, allied to *M. cæsia*, but far larger in all its parts than any other of the genus. It is curious that no one but *Maingay* should have met with so conspicuous a tree. Large sheathing stipule-like scales occur amongst the leaves, whose nature I cannot ascertain.

20. **M. polycarpa**, *Griff. Notul. iv.* 416 (polycarpa), t. 167, f. 2 (cæsia); leaves large sessile oblanceolate obtusely acuminate faintly reticulated undulate.

MALACCA, Griffith.

A large tree, like *M. fætida*; branches stout. *Leaves* nearly 1 foot long, very coriaceous, nerves 20–30 pairs, arched; petiole $\frac{1}{4}$ in., winged, flattened. *Flowers* unknown. *Drupe* oblong, base rather broader, brown, dusty all over, of a strong Dorian or Mango taste; flesh and juice copious acid and pleasant; stone lanceolate, compressed, coriaceous-fibrous; embryo obclavate.—*Griffith*, from whom most of the above description is taken, says that this is the ‘Camang,’ and that he proposes for it the name of *Mangifera* ? *polycarpa* (misprinted *polycarpa*, at p. 416 of the *Notulæ*), in allusion to the russet-coloured fruit, which is unique in the genus. Judging from the foliage, this is probably allied to *M. cæsia*.

DOUBTFUL SPECIES.

MANGIFERA. Pegu, *Kurz n.* 2021; leaves very like those of *M. fragrans* in shape and size and with equally slender petioles; but the nerves are far less numerous, about 20 pair, arched, very slender, and the under-surface is far less finely reticulate, pale brown and quite opaque.

MANGIFERA. Pegu, *Kurz n.* 2020; leaves 14–18 by $3\frac{1}{2}$ –4 in., narrowly elliptic-lanceolate acuminate membranous glaucous beneath, finely but not closely reticulate, nerves about 30 pair slender well defined slightly arched, petiole 2–4 in. very slender.—I give this as a *Mangifera* on *Kurz*’s authority.

*3. **ANACARDIUM**, Rottb.

Shrubs or trees. *Leaves* alternate, petioled, simple, quite entire. *Panicles* terminal, bracteate. *Flowers* small, polygamous. *Calyx* 5-partite, segments erect, imbricate, deciduous. *Petals* 5, linear-lanceolate, recurved, imbricate. *Disk* filling the base of the calyx, erect. *Stamens* 8–10, all or some fertile; filaments connate and adnate to the disk. *Ovary* obovoid or obcordate; style filiform, excentric, stigma minute; ovule 1, ascending from a lateral funicle. *Nut* kidney-shaped, seated on a large pyriform fleshy body formed of the enlarged disk and top of the peduncle; pericarp cellular and full of oil. *Seed* kidney-shaped, ascending, testa membranous, adherent; cotyledons semi-lunar; radicle short, hooked.—**DISTRIB.** A small tropical American genus, of which one species is naturalised in Asia.

A. occidentale, *Linn.*; *DC. Prodr. ii.* 62; leaves obovate or obovate-oblong glabrous obtuse retuse or rounded at the tip, base rounded or cuneate. *Roxb. Fl. Ind. ii.* 312; *Wall. Cat.* 990; *Wight. & Arn. Prodr. i.* 168; *Grah. Cat. Bomb. Pl.* 40; *Dalz. & Gibs. Bomb. Flor. Suppl.* 18; *Griff. Notul. iv.* 408, t. 565, f. 3 e. f.; *Bedd. Fl. Sylv. t.* 163.—*Rheede Hort. Mal. iii.* t. 54.

Hotter parts of **INDIA**, especially near the sea. Naturalised from America. **CEYLON.**

A small tree; trunk short, thick, crooked. *Leaves* 4–8 by 3–5 in., hard; nerves about 10 pair, nearly horizontal; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Panicles* 6–10 in., pubescent; branches long naked to the tips where the flowers are collected; bracts lanceolate, gibbous, hoary. *Flowers* $\frac{1}{3}$ in. diam., yellow with pink stripes. *Stamens* usually 9, all fertile, one larger than the rest. *Fruit* 1 in., on a pyriform fleshy receptacle 2–3 inches long.—The Cashew-nut.

4. **BOUEA**, Meissn.

Trees. *Leaves* opposite, petioled, coriaceous, glabrous, quite entire. *Flowers* small, in axillary and terminal panicles, polygamous. *Sepals* 3–5, deciduous,

valvate. *Petals* 3-5, imbricate. *Disk* very small. *Stamens* 3-5, inserted within the disk, all fertile. *Ovary* sessile; style short, terminal, stigma obscurely unequally 3-lobed; ovule ascending from the wall of the cavity. *Drupe* fleshy; stone thin, fibrous, 1-celled, 1-seeded. *Seed* suberect; cotyledons fleshy; radicle very short, inferior.—**DISTRIB.** Species 5, natives of Tropical Asia and the Malay Archipelago.

1. ***B. burmanica***, *Griff. Plant. Cantor* 14; leaves 5-7 in. elliptic-lanceolate obtusely acuminate, nerves 12-15 pairs, panicles obscurely puberulous lax-flowered, flowers 4-5-merous. *B. oppositifolia*, *Meissn. in Walp. Rep.* i. 556. *B. Brandisiana*, *Kurz in Journ. As. Soc. Beng.* 1871, ii. 50; 1873, ii. 66. *Mangifera oppositifolia*, *Roxb. Fl. Ind.* i. 640; *Hort. Bengh.* 18; *Wall. Cat.* 8490. *Cambessedea*, *Wt. & A. Prodr.* i. 170.

PEGU, TENASSERIM and the ANDAMAN ISLANDS.—**DISTRIB.** Java.

Leaves very coriaceous, pale; nerves above sunk, very slender, beneath raised with a slender incised line along the ridge. *Panicles* much shorter than the leaves, slender, spreading, lax, few-flowered. *Flowers* about $\frac{1}{2}$ in. diam., yellow, pedicelled, quite glabrous. *Sepals* rounded. *Petals* oblong, keeled on the face. *Stamens* usually 4. *Ovary* obliquely ovoid. *Drupe* 1-2 in., broadly ovoid, compressed, yellow, eatable.—‘Mariam’ or ‘Mai-een’ of the Burmese. *Kurz* states that the stamens are usually 8, perhaps a misprint for 3.

2. ***B. microphylla***, *Griff. Plant. Cantor* 15; *Notul.* iv. 423; leaves $2\frac{1}{2}$ -3 $\frac{1}{2}$ in. elliptic-lanceolate obtuse or obtusely acuminate, panicles dense-flowered obscurely puberulous, flowers 4-merous. *B. diversifolia*, *Miq. Fl. Ind. Bat. Suppl.* i. 522. ? *B. myrsinoides*, *Blume Mus. Bat. t. i.* 204; *Miquel l. c. i. pt. 2*, 635.

MALACCA, *Griffith, Maingay*.—**DISTRIB.** Sumatra.

Very similar to *B. burmanica*, but much smaller in all its parts and usually triandrous.—‘Roomaniya Paigo’ of the Burmese.

3. ***B. macrophylla***, *Griff. Plant. Cantor* 15; *Notul.* iv. 420, t. 567, f. 4; leaves 6-10 in. oblong-lanceolate obtuse or obtusely acuminate, panicle much branched dense-flowered very pubescent, flowers usually 3-merous. ? *B. gandaria*, *Blume Mus. Bot. i.* 204, *in note*; *Miquel Fl. Ind. Bat. i. pt. 2*, 635.

MALACCA, *Griffith, Maingay*.—**DISTRIB.** Java, Borneo.

A much larger plant than *B. oppositifolia*, with more oblong glossy leaves, the nerves 12-20 pairs sunk on the upper surface, raised on the lower but not grooved on the ridge. *Panicle* 2-3 in. long; branches stout, spreading horizontally and bearing densely crowded cymes of flowers about $\frac{1}{12}$ in. diam. *Sepals* 3 in the ♀ (*Griffith*). *Stamens* 3-5. *Drupe* ovoid oblong, a little oblique, as large as a hen's egg; pulp yellowish, acid, not terebinthine; stone leathery, fibrous, adherent to the testa. *Cotyledons* lilac, equal, reticulate, rugose (*Griffith*). ‘Roomaniya Baitool’ of the Malays.

5. **GLUTA**, Linn.

Trees with caustic juice. *Leaves* crowded at the ends of the branchlets, short-petioled, simple, oblong, coriaceous. *Panicles* axillary and terminal. *Flowers* small, hermaphrodite. *Calyx* spathaceous, bursting irregularly, caducous. *Petals* 4-6, adnate to the disk, imbricate. *Disk* elongate, rarely short. *Stamens* 4-6, inserted on the disk, filaments capillary. *Ovary* sessile on the disk or stipitate, oblique, 1-celled; style lateral, filiform, stigma simple; ovule 1, pendulous from a basal funicle. *Berry* stalked, dry, deformed, tubercled or ridged. *Seed* with the testa adherent to the pericarp and full of black juice; cotyledons large, connate, fleshy; radicle short, obtuse, incurved.—**DISTRIB.** About 8 species, all Malayan.

1. **G. elegans**, Wall. in Roxb. *Fl. Ind. ed. Carey*, ii. 315; *Cat.* 1003 (Syndesmis); leaves elliptic-lanceolate acuminate not reticulate above, petiole and nerves slender, panicles lax and flowers perfectly glabrous. *Indeterminata*, Wall. *Cat.* 9049.

PENANG, Porter, *Maingay*.

A small tree, perfectly glabrous throughout; much branched; trunk stout. *Leaves* 3–5 in., tapering at both ends, shining, reticulate beneath; nerves 8–12 pairs, arched; petiole $\frac{1}{2}$ – $1\frac{1}{2}$ in. *Panicles* much shorter than the leaves, slender. *Flowers* $\frac{1}{2}$ in. long, subcorymbose. *Calyx* tubular, membranous, scarlet, split, mouth 2-toothed. *Petals* linear-lanceolate. *Disk* elongate. *Stamens* 4–5, as long as the petals. *Drupe* $\frac{3}{4}$ in. long, when dry, gibbous-oblong, smooth, style-scar nearer the base than top. —A most beautiful and fragrant tree.

VAR. *Helferi*; leaves linear-oblong obtuse, nerves more oblique. Tenasserim or Andaman Islands, *Helper*.—Probably a different species.

2. **G. tavoyana**, Wall. *Cat.* 1004 (Syndesmis); leaves oblong-lanceolate obtuse acute or acuminate reticulate on both surfaces, petiole short, panicles long-peduncled puberulous. *Syndesmis* sp., *Griff. Notul.* iv. 410.

TENASSERIM, at Tavoy, Gomez, *Mergui, Griffith*.

A small tree with white branches. *Leaves* 4–12 by $1\frac{1}{4}$ –3 in., very coriaceous, brown, rather waved; nerves 15–20 pairs, arched; petiole usually $\frac{1}{2}$ in., stout. *Panicles* slender; peduncle 1–3 in.; flowers loosely corymbose, like those of *G. elegans*, but smaller, about $\frac{1}{3}$ in. long; pedicel stouter; calyx (scarlet) shorter, puberulous, not toothed. *Petals* linear-spathulate, white.

3. **G. coarctata**, *Griff. Notul.* iv. 409, t. 567, f. 1 (Syndesmis); leaves recurved conduplicate short-petioled linear- or obovate-oblong obtuse or subacute reticulate on both surfaces, margins waved, panicles pubescent, flowers large.

MALACCA, *Griffith, Maingay*.

A small tree. *Leaves* 5–10 by 2–3 in., coriaceous, bright brown when dry; nerves 15–22 pairs, very slender; petiole $\frac{1}{8}$ – $\frac{1}{3}$ in. *Panicles* much branched, 3–5 in.; flowers crowded at the tops of the branches, $\frac{1}{2}$ in. diam. *Calyx* short, almost campanulate, split and lobed, very pubescent. *Petals* 5, obovate-lanceolate tipped with red. *Stamens* 5. *Drupe* subglobose, with an irregular raised ridge round the base, others down the sides; rind dry, papillose, coriaceous; flesh white, fibrous and spongy; stone coriaceous, adnate to the testa. *Seed* erect; embryo very large, cotyledons subhemispheric unequal fleshy, opposite faces pink, radicle short.—The description of the fruit is taken from Griffith's *Notulæ* and figure. The recurved subsessile leaves and large flowers at once distinguish the species.

4. **G. travancorica**, *Bedd. Flor. Sylv.* i. t. 60; leaves subsessile small obovate-oblong rounded at the tip, panicles spreading tomentose, calyx cupular.

WESTERN PENINSULA; Ghats of Tinnevely and Travancor, *Beddome*.

A very tall timber tree. *Leaves* 4–6 by $1\frac{1}{2}$ – $1\frac{3}{4}$ in., coriaceous, reticulate on both surfaces but especially beneath; petiole very short, dilated. *Panicles* crowded, terminal and in the upper axils, subcorymbose, shorter than the leaves; bracts ovate, boat-shaped. *Calyx* truncate at the base, very short, coriaceous, irregularly toothed or lobed, split on one side, less deciduous than in the other species. *Petals* 5, elliptic-obovate, obtuse, downy on both surfaces. *Disk* very short. *Stamens* 5, filaments subulate. *Drupe* 1 in. diam., depressed-globose, stipitate.

6. **BUCHANANIA**, Roxb.

Trees. *Leaves* alternate, petioled, simple, quite entire. *Panicles* terminal and axillary, crowded. *Flowers* small, white, hermaphrodite. *Calyx* short,

3-5-toothed or -lobed, persistent, imbricate. *Petals* 4-5, oblong, recurved, imbricate. *Disk* orbicular, 5-lobed. *Stamens* 8-10, free, inserted at the base of the disk. *Carpels* 5-6, free, seated in the cavity of the disk, one fertile, the rest imperfect; style short, stigma truncate; ovule 1, pendulous from a basal funicle. *Drupe* small, flesh scanty; stone crustaceous or bony, 2-valved. *Seed* gibbous, acute at one end; cotyledons thick; radicle superior.—**DISTRIB.** A tropical Asiatic, Australian and Pacific Island genus; species about 20.

1. ***B. latifolia*, Roxb. Fl. Ind. ii. 385;** leaves usually broadly oblong rounded at the tip closely reticulate on both surfaces villous pubescent or glabrate beneath, panicle woolly or velvety, flowers crowded. *Wt. & Arn. Prodr.* i. 169; *Wall. Cat.* 983; *Bedd. Fl. Syl.* t. 165; *Dalz. & Gibs. Bomb. Fl.* 52; *Grah. Cat. Bomb. Pl.* 41; *Brandis For. Flor.* 127. *Spondias elliptica*, *Rottl.*

Hot, drier parts of INDIA, from KUMAON ascending to 1500 ft., and OUDH, through CENTRAL INDIA and to the WESTERN PENINSULA, BURMA and TENASSERIM.

A tree 40-50 ft., subdeciduous; branchlets as thick as the finger. *Leaves* 6-10 in., very coriaceous or hard, nerves 15-20 pairs, stout, nearly straight; petiole $\frac{1}{4}$ - $\frac{1}{3}$ in., stout, pubescent. *Panicles* terminal and axillary, shorter than the leaves, pyramidal, branches stout; bracts small, caducous. *Flowers* $\frac{1}{4}$ in. diam., sessile, greenish white. *Calyx* 5-toothed. *Petals* oblong. *Disk* fleshy. *Stamens* 10, spreading, as long as the petals. *Ovaries* one perfect, conical, pubescent, 4 others reduced to filaments. *Drupe* $\frac{1}{2}$ in., subglobose, slightly compressed, black; stone hard, 2-valved.—There is a specimen marked from Malacca in Griffith's Herbarium.

2. ***B. angustifolia*, Roxb. Fl. Ind. ii. 386; Cor. Pl. iii. t. 262;** leaves linear-oblong or elliptic or elliptic-lanceolate obtuse or rounded at the tip base not narrowed into the petiole glabrous on both surfaces, nerves very slender, panicles quite glabrous, flowers sessile. *Wall. Cat.* 982; *W. & A. Prodr.* 169; *Grah. Cat. Bomb. Pl.* 41; *Wight Ic.* t. 101. *Spondias simplicifolia*, *Rottl.* *Mangifera axillaris*, *Lamk.*

WESTERN PENINSULA; the Concan, from the Adjunta Jungles, *Graham*, southwards. CEYLON, in the northern parts of the island.

A tree, perfectly glabrous throughout, branchlets stout. *Leaves* 4-6 by $1\frac{1}{2}$ -2 in., thinly coriaceous, shining above, delicately reticulate beneath, rounded or acute at the base; nerves 12-15 pairs, very slender; petiole $\frac{3}{4}$ - $1\frac{1}{4}$ in., slender. *Panicles* axillary and terminal, about as long as the leaves, peduncle and branches slender, spreading. *Flowers* in small clusters $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., quite glabrous, nearly sessile. *Drupe* $\frac{1}{2}$ in. diam., obliquely spherical.—The Malayan and Australian forms referred to this appear to me to differ much in the leaf-base, narrowed into the shorter stouter peduncle, and other points.

3. ***B. glabra*, Wall. Cat. 984; leaves broadly elliptic or oblong or almost orbicular obtuse or rounded at the tip quite glabrous, base rounded, nerves strong, panicle spreading puberulous, flowers sessile.**

TENASSERIM; at Moulmein, *Wallich*.

A tree. *Leaves* 4-6 by 2-3 in., usually quite elliptic and rounded at both ends, sometimes more acute at the base, very coriaceous, upper surface raised between the nerves, faintly reticulate, lower strongly reticulate shining; nerves 12-15 pairs; petiole always short, $\frac{1}{2}$ in. *Panicle* shorter than the leaves, rusty puberulous, glabrate in fruit; branches spreading, rather stout. *Flowers* $\frac{1}{10}$ in. diam., rather crowded, very shortly pedicelled. *Fruit* unripe, glabrous.—*Wallich's* are the only specimens of this that I have seen; it is nearest *B. angustifolia*, but differs materially in the broad almost rounded leaves, very short petiole, and puberulous panicle.

4. ***B. lucida*, Blume Mus. Bot. i. 184; quite glabrous throughout, leaves**

obovate or obovate-oblong, tip rounded or obtuse reticulate on both surfaces narrowed into the petiole, panicles lax spreading, branches slender, flowers not crowded pedicelled. *Miq. Fl. Ind. Bat.* i. pt. 2, 636. *B. palembanica*, *Blume? Turcz. in Bull. Mosc.* 1858, pt. i. 473. *Hypericinea angustata*, *Wall. Cat.* 4830. *B. subobovata*, *Griff. Notul.* iv. 413.

EASTERN PENINSULA; from Tenasserim to Malacca, and Penang.—DISTRIB. Sumatra, Borneo, Australia?

A tree, quite glabrous throughout. *Leaves* 4–7 by $1\frac{1}{2}$ –2 in., coriaceous, very brown when dry and rather shining; nerves 12–15 pairs slender, arched; petiole $1\frac{1}{2}$ in., gradually dilated upwards. *Panicles* usually longer than the leaves, very many-flowered. *Flowers* $\frac{1}{2}$ in. diam. (4–5-merous, white, disagreeably-scented, *Griffith*). *Sepals* orbicular. *Petals* elliptic, obtuse. *Filaments* subulate, white. *Drupe* $\frac{1}{2}$ in. diam., orbicular, compressed with a sharp edge.—*Blume's B. arborescens*, and perhaps *B. longifolia*, are hardly distinct from this, as is *Miquel's petiolaris* and *bancana*. I should refer hither also the glabrous paniced Australian plant placed under *angustifolia*, *Roxb.*, in the *Flora Australiensis*.

VAR. *intermedia*, leaves obovate-spathulate membranous. *B. intermedia*, *Wight Ic.* t. 81.—Naggarie hills, Madras.

5. *B. acuminata*, *Turcz. in Bull. Mosc.* 1858, i. 472; glabrous throughout, leaves long- or short-petioled obovate or oblanceolate abruptly acuminate, panicles spreading exceeding the leaves long-peduncled very slender lax-flowered, flowers pedicelled. *B. sessilifolia*, *Blume Mus. Bot.* i. 184. *Hypericinea lucida*, *Wall. Cat.* 4827. *Terebinthacea*, *Wall. Cat.* 8505.

TENASSERIM; at Moulmein, *Lobb*; PENANG, *Porter*; MALACCA, *Griffith*, *Maingay*. DISTRIB. Sumatra.

A small tree. *Leaves* 4–7 by $2\frac{1}{2}$ in., thinly coriaceous, tips very acute, base much narrowed, reticulate on both surfaces, quite sessile in Penang specimens, with slender petioles sometimes $1\frac{1}{2}$ in. in Malacca and Tenasserim ones, bright brown when dry; nerves about 15 pairs, slender. *Panicles* chiefly axillary, branches divaricating. *Flowers* $\frac{1}{10}$ in. diam. *Sepals* small, orbicular. *Petals* oblong. *Filaments* compressed. *Drupe* as in *B. lucida*.—I think there is no doubt of *Blume's B. sessilifolia* being a sessile-leaved form of this, which is far more frequently a petioled plant, and therefore better fitted to *Turczaninoff's* name than to *Blume's*, though against the laws of priority.

6. *B. lanceolata*, *Wt. Ic.* t. 237; *Ill.* i. 185; leaves elliptic-lanceolate obtusely acuminate, petiole stout, panicles short pubescent, flowers crowded subsessile. *Buchanania? acuminata*, *Wall. Cat.* 981.

WESTERN PENINSULA; near Quilon, *Wight*.

A tree. *Leaves* 4–5 by $1\frac{1}{2}$ – $1\frac{3}{4}$ in., reticulate and shining on both surfaces, margin waved, base acute but not contracted into the petiole; nerves 16–20 pairs, slender arched; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., stout. *Panicles* shorter than the leaves, numerous, stout, axillary and terminal. *Flowers* $\frac{1}{2}$ in. diam., crowded on the short stout lateral branches. *Sepals* rounded. *Petals* broadly oblong. *Filaments* subulate. *Fruit* unknown.—*Wallich's B.? acuminata*, from Tavoy (*Cat.* 981), is very similar to this; it has fruit only, and the nervation is a little different.

DOUBTFUL SPECIES.

B. LANCIFOLIA, *Roxb. Fl. Ind.* ii. 386; 'a large tree, leaves lanceolate obtuse pointed lucid entire, panicles terminal.'—Chittagong.

B.? ACUMINATA, *Wall. Cat.* 981. See at end of 6. *lanceolata*. Tavoy, *Gomez*, in fruit only.

B. LAXIFLORA, *Kurz in Journ. As. Soc. Beng.* 1872, pt. 2, 304; 'leaves 6–7 in. ovate-oblong coriaceous finely tomentose glabrescent above, petiole $\frac{1}{2}$ in. stout, panicle terminal lax diffuse much branched hoary or yellowish pubescent, flowers minute,

pedicels short slender, bracts minute subulate, calyx hoary, lobes $\frac{1}{4}$ in. long oblong acute, petals $\frac{1}{12}$ in. obovate-oblong, filaments subpuberulous, ovary glabrous.—*Martaban, Kurz.*

7. MELANORRHÆA, Wall

Trees with a varnish juice: *Leaves* alternate, simple, quite entire, coriaceous. *Panicles* axillary. *Flowers* rather large, hermaphrodite. *Sepals* 5, cohering into a pointed cap, deciduous. *Petals* 5-8, linear-oblong, imbricate, much enlarged in fruit. *Disk* hemispheric or columnar. *Stamens* 5 or very numerous, inserted all over the disk; filaments capillary. *Ovary* stalked, lenticular, oblique, 1-celled; style sublateral, stigma simple; ovule 1, pendulous from a basal funicle. *Fruit* dry, sessile on a long pedicel rising from the stellately spreading persistent petals, globose coriaceous. *Seed* subglobose or oblong; testa papery; cotyledons thick, plano-convex; radicle ascending.—The following are the only species.

* *Stamens* many. *Fruit* pedicelled.

1. **M. usitata**, Wall. *Pl. As. Rar.* i. 9. t. 11, 12: *Cat.* 597; leaves obovate or elliptic obtuse softly tomentose on both surfaces.

MUNNIPORE, BIRMA and TENASSERIM, Wallich, &c.

A large deciduous tree; branchlets very stout, velvety. *Leaves* 6-14 by 4-6 in.; base cuneate; nerves 28-30 pairs, stout, straight; petiole flattened, winged, $\frac{1}{2}$ -1 in. *Panicles* 1 ft. long, peduncled, tomentose. *Flowers* lax $\frac{1}{2}$ in. diam.; pedicels slender. *Calyx* calyptriform, beaked, pubescent. *Petals* 5-6, eventually 2-4 in. long, linear-oblong, obtuse, coriaceous, reticulated, gland-dotted, pubescent. *Stamens* 20-30. *Drupe* the size of a cherry, red, glaucous; pedicel $\frac{1}{2}$ in.—The varnish tree.

2. **M. glabra**, Wall. *Plant. As. Rar.* iii. t. 283; *Cat.* 1005; leaves obovate-oblong or elliptic-lanceolate obtuse quite glabrous, nerves 16-20-pairs. *Melanorrhæa, Griff. Notul.* iv. 409.

TENASSERIM, at Tavoy, Gomez; Mergui, Griffith.

A tree; branchlets hoary. *Leaves* 6-10 in., undulate, coriaceous, shining above, reticulate on both surfaces; base cuneate; nerves 16-20-pairs, slender, arched, very different from *M. usitata*; petiole $\frac{1}{2}$ in. flattened, winged. *Panicles* lax, slender, sparingly branched, about equalling the leaves, puberulous. *Flowers* on slender pedicels, white, $\frac{1}{2}$ in. diam. *Calyx* membranous, calyptriform, acute pubescent. *Petals* linear-oblong, acute, puberulous, eventually 2-2 $\frac{1}{2}$ in. long, linear-oblong or -spatulate, coriaceous, veined. *Drupe* $\frac{2}{3}$ in. diam., depressed or globose, quite smooth; pedicel very slender, 1-1 $\frac{1}{4}$ in.

** *Stamens* 5. *Fruit* sessile.

3. **M. Maingayi**, Hook. f.; leaves broadly elliptic obtuse long-petioled, quite glabrous.

MALACCA, Maingay.

A gigantic tree (*Maingay*); branchlets rather slender. *Leaves* 4-6 by 2-3 in., very coriaceous, deeply reticulate on both surfaces; nerves 18-20-pairs, strong-parallel; petiole 1-2 in. *Panicles* terminal and axillary, longer than the leaves, long-peduncled, pubescent, curved, lax-flowered. *Flowers* $\frac{1}{2}$ in. diam. *Calyx* calyptriform, membranous, veined, split on one side as in *Gluta*, pubescent. *Petals* linear, oblong, obtuse, tomentose. *Stamens* 5; filaments filiform, hairy. *Disk* elevated. *Ovary* tomentose. *Drupe* $\frac{1}{2}$ in., oblong, obtuse, smooth.

4. **M. Wallichii**, Hook. f.; leaves petioled broadly obovate tip rounded, nerves 12-14 pairs, panicles very numerous excessively branched very long softly tomentose. *Stagmaria verniciflua, Jack?* Wall. *Cat.* 980.

SINGAPORE, *Wallich*; MALACCA, *Maingay*.

A large tree. *Leaves* 6-8 by 3-4 in., coriaceous, obscurely reticulate above, more distinctly beneath; nerves strong, nearly straight; petiole 1-1½ in. *Panicles* terminal and in the uppermost axils, branched from the base, curved, a foot long and more, together forming a drooping mass of long arched finely pubescent angled (when dry) peduncles, that branch towards their ends into slender tomentose branchlets with innumerable softly downy flowers; bracts large, obovate, concave, very membranous. *Flowers* very shortly pedicelled, ½ in. long. *Calyx* narrow-ovoid, very membranous, almost 2-valved. *Petals* linear-oblong, inserted towards the base of the disk, villous on both surfaces. *Stamens* 5. *Disk* short.—*Wallich*, who assumed this to be *Jack's Stagmaria verniciflua* (*Gluta Benghas*, L.), found a tree of it in the forest of Singapore, close to Botany Hall, which, I assume, was his temporary residence.

8. **SWINTONIA**, Griff.

A tall tree, quite glabrous. *Leaves* alternate, long-petioled, simple, quite entire. *Panicles* terminal and axillary, very large and broad. *Flowers* small hermaphrodite or unisexual. *Calyx* small, 5-lobed, lobes rounded imbricate. *Petals* 5, adnate to the middle of the disk, linear-oblong, imbricate, much enlarged and reflexed in fruit. *Disk* short or elongate or cylindric. *Stamens* 5, inserted on the top of the disk, free. *Ovary* sessile, ovoid, 1-celled, narrowed into the slender style; stigma capitellate; ovule pendulous from a basal funicle. *Drupe* ovoid, smooth, sessile, coriaceous, subtended by the 5 reflexed enlarged petals. *Seed* erect, testa thin; cotyledons amygdaloid.—**DISTRIB.** The following are the only species known.

1. **S. Griffithii**, *Kurz in Jour. Beng. As. Soc.* 1870, ii. 75; leaves elliptic-lanceolate acuminate at both ends, petiole long slender, panicle much larger than the leaves lax spreading quite glabrous, branches very slender, flowers pedicelled. *Swintonia*, *Griff. in Proc. Linn. Soc.* 1846, 283. *Astropetalum* 1, *Griff. Notul.* iv. 411, t. 565, f. 2, b. c. d.

TENASSERIM, at Mergui, *Griffith*; *Helper*.

A lofty tree, glabrous throughout; branchlets very slender. *Leaves* 4-7 by 1-1½ in., sometimes subopposite or 3-nate; tip obtuse; margin waved, obscurely reticulate above and beneath; nerves 16-20-pairs, very slender; petiole 1½ in. *Panicle* copiously branched from near the base. *Flowers* long-pedicelled, ½ in. diam. *Petals* linear-oblong, quite glabrous, rapidly enlarging. *Fruit* unknown.—I do not find the irregular pellucid dots which *Griffith* describes. Habit of a Mango, conspicuous for its dense masses of flowers which, when bruised, emit a peppery smell.

2. **S. Helperi**, *Hook. f.*; leaves narrow-lanceolate obtusely acuminate, base acute, margins undulate, petiole long slender, panicles much longer than the leaves lax spreading quite glabrous, flowers pedicelled.

TENASSERIM or ANDAMAN ISLANDS, *Helper*.

Very nearly allied to *S. Griffithii*, but branchlets stouter. *Leaves* much longer, 6-10 by 1-1½ in., drawn out into longer points, with more numerous (25-30) pairs of nerves, rather stouter petioles, and more waved margins; they are also of a dark brown colour when dry, whereas those of *S. Griffithii* are pale greyish-brown. *Drupe* (ripe) obovoid, ½ in. The reflexed petals 2 in. long, linear, obtuse, veined, glabrous.

3. **S. Schwenkii**, *Teysm. & Binnend. Cat. Hort. Bogor.* 230; leaves oblong-lanceolate tip obtuse rounded or obtusely acuminate, base rounded glaucous beneath, petiole very slender, panicles excessively branched longer or shorter than the leaves, flowers minute subsessile. *Kurz in Journ. As. Soc.*

Beng. 1870, ii. 75. *Anauxanopetalum* Schwenkii, *Teyism. & Binnend. in Miquel Journ.* i. 368. *Astropetalum* 2, *Griffith, Notul.* iv. 415.

MALACCA, *Griffith*; *Maingay*.—DISTRIB. Sumatra.

A tall tree; branchlets rather slender. *Leaves* 3–5 in., usually obtusely acuminate, rather thin; margins hardly undulate; nerves about 15-pairs; petiole very slender, 2–2½ in. *Panicles* numerous from the upper axils, branched, peduncles and branches and pedicels excessively slender and spreading. *Flowers* the smallest of the genus, when first expanded, 1/10 in. diam., shortly pedicelled. *Calyx-lobes* orbicular, glabrous. *Petals* oblong on expansion, very rapidly enlarging, finally 2½ in. long, linear, obtuse coriaceous, veined. *Drupe* ¾ in long, oblong, smooth. *Cotyledons* oblong, amygdaloid; radicle lateral, minute.—Kurz refers to this *Astropetalum* 1 of Griffith's *Notulæ*, which, as it appears to me from Griffith's notes and specimens, is his original *Swintonia*, to which he attached the MS. name of *S. floribunda*, but for which I have adopted Kurz's *S. Griffithii*. The reference to "Cat. Hort. Begor." is taken from Kurz. I do not find the name in the edition of that work at Kew.

4. *S. spicifera*, *Hook. f.*; leaves obovate or elliptic-obovate tip rounded base cuneate, panicles longer than the leaves branches strict, flowers forming pubescent spikelets at the tips of the branchlets.

PENANG? *Maingay*.

A lofty thick-stemmed tree (*Maingay*). *Leaves* 3½–7 by 1½–2 in., coriaceous, upper surface shining with very obscure nerves, under glaucous with 12–15 pairs of very slender nerves, reticulation very indistinct; petiole ¾–1 in. *Panicles* subcorymbose, sometimes leafy, repeatedly trichotomously forked; branches angular, strict, suberect, glabrous, articulate, ultimate divisions ½ in., stout, clothed with imbricating small bracts and flowers; rachis with close-set deep scars; bracts orbicular, concave, pubescent. *Flowers* ½ in. diam. when first expanded, apparently polygamous, most of them males and caducous; pedicel very short. *Calyx* hemispheric, 5-lobed, lobes orbicular, pubescent. *Petals* 5, oblong, obtuse, hoary, eventually 1–2½ in., reflexed, linear-oblong, obtuse, coriaceous in fruit. *Stamens* 5, filaments subulate; anthers oblong. *Disk* confluent with the thickened base of the filament in the male. *Drupe* ¾ in. long, obliquely ovoid, smooth; pericarp thin. *Cotyledons* amygdaloid.—I assume this to be a Penang plant from the tickets and writing being of the same kind as is attached to *Maingay's* other Penang plants. A very different species from the rest, the imbricating flowers on the thick tips of the branchlets of the panicle is a curious character.

9. SOLENOCARPUS, Wt. & Arn.

A tree. *Leaves* crowded at the ends of the branches, odd-pinnate; leaflets opposite, glabrous, crenulate. *Panicles* terminal. *Flowers* small, hermaphrodite. *Calyx* small, 5-toothed, imbricate, deciduous. *Petals* 5, ovate, valvate. *Disk* broad, annular. *Stamens* 10, inserted at the base of the disk. *Ovary* sessile, 1-celled, style clavate, stigma obliquely truncate; ovule 1, pendulous from the top of the cell. *Drupe* small, obliquely oblong, truncate, compressed; pericarp cellular, full of oil. *Stone* hard. *Seed* linear, compressed; cotyledons linear, plano-convex; radicle very short, superior.

1. *S. indica*, *Wt. & Arn. Prodr.* i. 171; *Beddome Fl. Sylv.* t. 233; *Anal. Gen.* 79.

WESTERN PENINSULA; Malabar and Travancor, ascending to 2500 ft. on the Anamally hills, *Beddome*.

Leaves 6–12 in.; petiole angled, slender, pubescent; leaflets 4–6-pairs, 2–4 in., subopposite, sessile, except the terminal, which is long-petiolulate, oblong or oblong-lanceolate acuminate; base obliquely cordate, quite entire or remotely crenate, rather coriaceous, glabrous, nerves 8–10-pairs, faint. *Panicles* much branched; branches erect.

patent, pubescent, at length glabrate. *Flowers* shortly pedicelled, $\frac{1}{6}$ – $\frac{1}{5}$ in. diam. *Drupe* $\frac{1}{4}$ in. long, pedicelled.

10. **TAPIRIA**, Juss.

Erect or scandent shrubs or trees. *Leaves* alternate, odd-pinnate; leaflets numerous, subopposite, serrate. *Panicles* axillary and terminal. *Flowers* small, green, polygamous. *Calyx* 5-partite; segments imbricate, persistent. *Petals* 5, small, oblong, imbricate. *Disk* broad, 5-lobed. *Stamens* 10, inserted at the base of the disk; anthers globose. *Ovary* in the ♂ immersed in the disk, 4–5-lobed, with 4–5 styles; in the ♀ ovoid, more free, 1-celled; style short, conic, stigma simple; ovule pendulous from the top of the cell. *Drupe* obliquely oblong, fleshy; stone rugose, crustaceous. *Seed* oblong, testa membranous; cotyledons large, plano-convex; radicle superior.—**DISTRIB.** Species 8 or 10, chiefly American.

1. **T. hirsuta**, Hook. f. in Benth & Hook. f. *Gen. Plant.* i. 423; *Robergia hirsuta*, Roxb. *Fl. Ind.* ii. 455; *Pegia nitida*, Coleb. in *Trans. Linn. Soc.* xv. 364; *Phlebochiton*, Wall. in *Trans. Med. & Phys. Soc. Calc.* vii. 230; *P. extensum*, Cat. 8499.

CENTRAL and EASTERN tropical **HIMALAYA**, from Nipal and Sikkim, ascending to 4000 ft.; to Bhotan, *Griffith*. **ASSAM**, SILHET, and CHITTAGONG.

A scandent shrub, more or less clothed with soft villous tomentum. *Leaves* 8–12 in.; petiole villous, slender; leaflets petiolulate, 5–7 pairs, 1–4 in., oblong, acuminate, membranous, rarely quite entire, base cordate. *Panicles* villous; bracts ovate. *Flowers* $\frac{1}{16}$ in. diam., pale, sweet-scented. *Drupe* the size of a currant, black; flesh next the stone cellular and full of viscid brown balsam.

11. **PENTASPADON**, Hook. f.

Trees. *Leaves* odd-pinnate; leaflets opposite subsessile, quite entire. *Panicles* axillary, peduncled, branched, branchlets very slender. *Flowers* pedicelled, minute, hermaphrodite. *Calyx-lobes* 5, imbricate. *Petals* 5, oblong-ovovate, strongly imbricate. *Stamens* 5, minute, inserted at the base of the disk, alternate with 5 short subulate staminodes which are free or adnate to the side of the disk, filaments short, broadly subulate; anthers didymous. *Disk* cupular, obscurely 10-lobed. *Ovary* seated on the disk, very minute, 1-celled, contracted into a stout short style, stigma globose or obliquely oblong, large; ovule 1, pendulous from the upper part of the cavity.

1. **P. ? velutinus**, Hook. f.; petioles leaflets beneath and panicles clothed with velvety tomentum.

MALACCA, *Maingay*.

Branchlets stout, woody, cylindric, covered with close-set scars of fallen leaves, tips velvety. *Leaves* crowded at the ends of the branches; petiole 6–10 in. stout, cylindric, velvety, bearing no leaflets on the lower third or fourth; leaflets 2–3½ in. subsessile except the petiolulate terminal one, oblong acute or acuminate, base rather oblique and rounded, thinly coriaceous, opaque above with pubescent midrib, thickly tomentose beneath; nerves 12–14 pairs, slender, arched. *Panicles* usually shorter than the leaves, triangular, densely velvety, except the flowers, peduncle 2–4 in.; branchlets very numerous, erecto-patent, strict, very slender indeed, much divided and spreading. *Flowers* $\frac{1}{16}$ in. diam. on short glabrous pedicels; bracts minute. *Calyx lobes* ovate. *Petals* spreading, minutely puberulous. *Stamens* and *Ovary* very minute, as compared to the petals. *Drupe* 1 in. long, rather scurfy outside, compressed, ovoid, obliquely beaked, 1-celled; pericarp cellular and full of black varnish, endocarp thin.

Seed pendulous, oblong, compressed; testa thin; cotyledons thin, flat; radicle superior.—Maingay notes that this tree is polygamo-dioecious, but all the flowers I have examined seem to be hermaphrodite. Owing to the minuteness of the parts of the flower he states he was unable to make out the structure of the ovary and ovules. That I have given is, I think, correct.

The genus *Pentaspadon* was founded on a Bornean plant (Trans. Linn. Soc. xxiii. 168 t. 24), afterwards published from Sumatran specimens as *Nothoprotium* by Miquel (Fl. Ind. Bat. Suppl. 527), who referred it to *Burseraceæ*. Miquel's description is most imperfect, and I added to it in the *Genera Plantarum* the character of having two styles, taken from flowers sent to me by Miquel as belonging to his plant, but which prove to belong to a totally different one. Marchand (Rev. Anacard. 90, 183) was the first to identify *Nothoprotium* with *Pentaspadon*, and his identification I have confirmed by specimens subsequently received from Miquel. The fruit of the original species being unknown, it is possible that that here described may not be congeneric.

12. ODINA, Roxb.

Trees with few stout soft branches. *Leaves* few at the ends of the branches, alternate, odd-pinnate, deciduous; leaflets opposite, quite entire. *Racemes* simple and panicled, terminal, fascicled. *Flowers* small, monœcious or dioecious, fascicled, shortly pedicelled. *Calyx* 4-5-lobed, persistent; lobes rounded, imbricate. *Petals* 4-5, imbricate. *Disk* annular, 4-5-lobed. MALE FL. *Stamens* 8-10, inserted within the disk. *Ovary* 4-5 parted. FEM. FL. *Ovary* sessile, oblong, 1-celled; styles 3-4, stout, stigmas simple or capitellate; ovule pendulous from near the top of the cell. *Drupe* small, compressed, reniform, crowned by the distant styles; stone hard. *Seed* compressed; embryo curved, cotyledons flat fleshy, radicle superior. DISTRIB. About 12 species, of which most are African.

1. *O. Wodler*, Roxb. *Fl. Ind.* ii. 293; *W. & A. Prodr.* i. 171; *Thwaites Enum.* 78; *Grah. Cat. Bomb. Pl.* 42; *Wt. Ic. t.* 60; *Bedd. Fl. Sylv. t.* 123; *Wall. Cat.* 8475; *Royle Ill. t.* 31; *Dalz. & Gibs. Bomb. Fl.* 51; *Brandis For. Flor.* 123.—*Rheede Hort. Mal.* iv. t. 32.

Throughout the hotter parts of India, from the extreme N.W. and along the foot of the Himalaya (ascending to 4000 ft.) to ASSAM, BIRMA, TENASSERIM, the ANDAMAN ISLANDS, and CEYLON.

A deciduous ugly tree 40-50 ft.; trunk very thick; branches few; bark exfoliating; young parts clothed with stellate down. *Leaves* 12-18 in.; petiole terete; leaflets 3-4 pairs, petiolulate, 3-6 in., oblong-ovate, caudate-acuminate, quite entire. *Racemes* slender, ♂ compound, ♀ simple pubescent. *Flowers* 4-merous, fascicled, shortly cymose, inodorous; bracts ciliate. *Sepals* obtuse, ciliate. *Petals* twice as long, oblong, spreading, purplish and greenish-yellow. *Stamens* equalling the petals in the ♂. *Drupe* red.—The tissues abound in starch, whence it is most easy to increase this tree by cuttings of almost any part.

13. PARISHIA, Hook. f.

Beautiful flowering trees. *Leaves* alternate, odd-pinnate; leaflets numerous, quite entire, coriaceous. *Panicles* ample, nodding. *Flowers* dioecious. MALE. *Calyx* cupular, 4-lobed; lobes ovate, valvate. *Petals* 4, oblong, imbricate. *Disk* short, annular, obscurely 4-lobed. *Stamens* 4, inserted below the margin of the disk. *Rudimentary* ovary columnar. FEM. FL. *Calyx* 4-lobed, lobes greatly enlarged in fruit. *Petals* 4. *Disk* ? *Stamens* 4 ? *Ovary* sessile, ovoid, 1-celled; style terminal, unequally 3-fid, stigmas capitate; ovule pendulous from near the top of the cell. *Fruit* dry, globose, pubescent, pointed by the style-base, pericarp thin. *Seed* pendulous, testa membranous; cotyledons amygdaloid; radicle superior.—DISTRIB. The following are the only species.

1. **P. insignis**, *Hook. f. in Trans. Linn. Soc.* xxiii. 170, t. 26; leaflets 6-8 pairs, thinly coriaceous, ovate-cordate or -oblong oblique glabrous beneath, fruiting sepals 3-3½ in. *Astronium insignis*, *Marchand Rev. Anacard.* 177.

TENASSERIM, at Mergui, *Griffith*; ANDAMAN ISLANDS., *Parish, Kurz*.

Leaves 1-2 ft., petiole cylindric, glabrous; leaflets petiolulate, 5-8 in., variable in shape, often gradually narrowed to the tip from just above the base, shining above, reticulated beneath; midrib quite excentric; nerves 12-20 pairs, slender, arched. *Panicles* as long as the leaves, villous with spreading hairs. *Flowers* ¼ in. diam., broadly campanulate. *Sepals* pubescent. *Disk* tomentose. *Drupe* the size of a large pea, globose, pointed, tomentose; enlarged sepals puberulous, acute or rounded at the tip.

2. **P. Maingayi**, *Hook. f.*; leaflets 10-12 pairs, thickly coriaceous oblong or linear-oblong obtuse puberulous beneath, fruiting sepals 6-7 in.

MALACCA, *Maingay*.

A tree abounding in a resinous slightly viscid secretion (*Maingay*). *Leaves* crowded at the ends of the branches; petiole 12-18 in., pubescent woody terete; leaflets 3-5 in., shortly petiolulate, base rounded, hard, shining above, with obscure nerves; beneath minutely puberulous, and minutely reticulated; nerves 15-30 pair, slender, spreading, nearly straight. *Panicles* apparently shorter than the leaves, pubescent. *Petals* linear-oblong. *Disk* pilose. *Young fruit* densely clothed with hispid ferruginous bristles; fruiting sepals puberulous, nearly 1 in. broad, tip rounded.—I have assumed that the fruits belong to the leaves of the plant with which *Maingay* has placed them; but in one of his Herbarium specimens, the leaves of *P. Maingayi* are fastened down with the fruit of a species with pubescent pericarp and acute fruiting sepals 4½ by 1½ in.

3. **P. pubescens**, *Hook. f.*; leaflets 5 pair thickly coriaceous oblong acute or acuminate pubescent beneath, fruiting sepals 5 in.

MALACCA, *Maingay*.

A lofty tree. *Leaves* 8-14 in.; petiole pubescent, terete; leaflets 3-5 in., subsessile, base rounded, above glabrous except the midrib, shining, beneath lurid thickly pubescent much reticulate; nerves 10-12 pairs, very strong, arched. *Panicle* divided to the base into numerous fascicled branches, densely softly tomentose. *Flowers* ½ in. diam., pedicelled. *Ovary* conical, pilose; styles 3. *Drupe* ½ in. long, between conical and spherical, densely tomentose. *Pericarp* cartilaginous; fruiting sepals ½ in. diam., tip rounded.

14. **SEMECARPUS**, Linn. f.

Trees. *Leaves* alternate, simple, quite entire, coriaceous. *Flowers* small, polygamous or dioecious, in terminal, rarely axillary panicles. *Calyx* 5-6-fid, segments deciduous. *Petals* 5-6, imbricate. *Disk* broad, annular. *Stamens* 5-6, inserted at the base of the disk, imperfect in the ♀ flowers. *Ovary* 1-celled; styles 3; ovule pendulous from a basal funicle. *Drupe* fleshy, oblong or subglobose, oblique, seated on a fleshy receptacle formed of the thickened disk and calyx base; pericarp loaded with acrid resin. *Seed* pendulous, testa coriaceous, inner coat somewhat fleshy; embryo thick, cotyledons plano-convex, radicle superior.—DISTRIB. About 20 species, tropical Asiatic and Australian.

* Leaves more or less pubescent beneath. Panicles pubescent (see also 7. *S. marginata*).

1. **S. Anacardium**, Linn. f.; leaves very large oblong or obovate-oblong tip rounded, base rounded cordate or cuneate opaque above brown minutely pubescent beneath, panicle tomentose, drupe 1 in. *Roxb. Flor. Ind.*

ii. 83; *Cor. Pl. i. t. 12*; *W. & A. Prodr. i. 168*; *Wt. Ic. t. 558*; *Grah. Cat. Bomb. Pl. 41*; *Dalz. & Gibs. Bomb. Fl. 52*; *Bedd. Fl. Sylv. t. 166*; *Brandis For. Flor. 124*; *Wall. Cat. 8473*. *S. latifolius*, *Pers. (ex Marchand)*. *Anacardium latifolium*, *Lamk. Ill. t. 208*. *A. officinarum*, *Gærtn.*

TROPICAL OUTER HIMALAYA, from Sirmore to Sikkim, ascending to 3500 ft.; and throughout the hotter parts of India, as far east as Assam (absent in the Eastern Peninsula and Ceylon).—DISTRIB. Eastern Archipelago and N. Australia.

A moderate-sized diœcious deciduous tree, exuding a dark juice; young parts petioles leaves beneath and panicle clothed with a fine pale pubescence. *Leaves* 9–30 by 5–12 in., very coriaceous, flat, margin cartilaginous, rarely linear-oblong, usually contracted below the middle; nerves 16–25 pairs, stout, slightly arched; petiole 1–2 in., rounded, not winged. *Panicle* equalling or shorter than the leaves, stout; branches spreading; bracts lanceolate. *Flowers* $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., subsessile, fascicled. *Petals* much longer than the calyx, oblong, greenish-white. *Filaments* subulate. *Drupe* 1 in. long, obliquely ovoid or oblong, smooth, shining, black; cup orange-red.

VAR. *cuneifolia*; DC. *Prodr. ii. 62*; leaves cuneate at the base often tomentose beneath. Tropical Himalaya, Khasia Mts., Behar, and the Concan.—*S. cuneifolia*, *Roxb. Fl. Ind. ii. 86*; *Grah. Cat. Bomb. Pl. 41*.

2. ***S. microcarpa***, *Wall. Cat. 989*; leaves large obovate or subpanduriform tip rounded base acute obtuse or rounded glabrous and opaque above pale with fine subscabrid pubescence beneath, drupe $\frac{1}{2}$ in.

BIRMA; on the Irawaddy, *Wallich*.

Very similar in habit and foliage to *S. Anacardium*, but the drupes are less than half the size.—Kurz's *S. albescens* (see p. 35), which he describes as having the petals valvate or subvalvate, a glabrous disk, pubescent ovary and 3 thick styles; found in the Moung forests, Pegu, by Dr. Brandis, may possibly be this.

3. ***S. pubescens***, *Thwaites Enum. 77*; leaves lanceolate finely acuminate under surface and petiole velvety-tomentose nerves nearly straight, panicles slender velvety, drupe $\frac{1}{3}$ in.

CEYLON, at Ratnapoora, *Walker, Thwaites*.

A small tree (*Thwaites*). *Leaves* 6–12 by 2–2 $\frac{1}{2}$ in., opaque and glabrous above except the pubescent midrib, densely clothed with rusty brown tomentum beneath, base acute or rounded; nerves 16–20 pairs, somewhat arched; petiole $\frac{1}{2}$ –1 in. *Panicle* with very spreading branches. *Flowers* glabrous. *Drupe* oblong, slightly oblique, as broad as the short cup.

4. ***S. Thwaitesii***, *Hook. f.*; leaves lanceolate finely acuminate under surface and petiole laxly pubescent or glabrate nerves much arched, panicles glabrate.

CEYLON, at Morowe Corle, *Thwaites*.

This, which is regarded by Thwaites as a glabrous form of *S. pubescens*, seems to me to be at once distinguished not only by the different pubescence, but by the much arched nerves.

** Leaves glabrous on both surfaces. Panicles glabrous.

5. ***S. travancorica***, *Bedd. Flor. Sylv. t. 232*; leaves very large oblong or obovate-oblong thickly coriaceous, shining and reticulate on both surfaces, tip rounded, base rounded or acute, petiole 2 in.

WESTERN PENINSULA; Travancor Ghats, alt. 2–3000 ft., *Beddome*.

A very large tree. *Leaves* 12 by 5–6 in., occasionally lanceolate and acuminate, very coriaceous, dark green and shining above, paler beneath; nerves 16–18 pairs, much reticulated beneath; petiole 2 in. *Panicles* axillary and terminal, compound, spreading, about equalling the leaves. *Flowers* diœcious, 5–6-merous. *Calyx* pubes-

cent, and ciliate, ♂ with a large turbinate rudiment of an ovary. *Drupe* 1 in., obliquely oblong, rounded at the tip; cup broad, short. *Beddome*.

6. **S. auriculata**, *Beddome Fl. Sylv.* under t. 232; *Ic. Plant. Ind. Or.*, t. 187; leaves sessile oblanceolate tip obtuse reticulate on both surfaces nerves strong beneath.

WESTERN PENINSULA; Travancor and Tinnevely Mountains, *Hayne, Beddome*.

A good-sized diœcious tree. *Leaves* 7 by $1\frac{3}{4}$ in., oblanceolate, obtusely acuminate, very gradually narrowed at the base and there furnished with 2 rounded lobes just above the petiole, dull green, glabrous, midrib slightly rusty, margin membranous, reticulations prominent beneath; petiole $\frac{1}{6}$ – $\frac{1}{4}$ in. *Flowers* ♂ 3–5-merous. *Drupe* obliquely obovate, $\frac{1}{2}$ in. diam., broader than long, very oblique; cup short, broad.—*Beddome*.

7. **S. marginata**, *Thwaites Enum.* 77; leaves 6–14 in. elliptic-obovate or oblanceolate abruptly obtusely acuminate glabrous or pilose beneath, base contracted auricled margin broadly cartilaginous, petiole very short and thick, panicle from the old wood glabrous or pilose, nut $\frac{1}{4}$ in.

CEYLON; damp forests in the Galle, Ratnapoora and Ambagamowa districts, *Walker, Thwaites*.

An erect shrub, 6–8 ft., sparingly branched. *Leaves* $2\frac{1}{2}$ –5 in. broad, bright brown when dry, but hardly shining, white margin $\frac{1}{16}$ in. broad, reticulate beneath; nerves about 12 pairs, slender, arched; midrib grooved beneath; petiole $\frac{1}{4}$ in., remarkably thick. *Panicle* short, slender. *Nut* ovoid, subcompressed, oblique, reddish; cup half as long, scarlet.—Described chiefly from Thwaites, who states that there is a form with the leaves beneath clothed with spreading rigid hairs.

8. **S. obovata**, *Moon Cat.* 22; leaves 3–7 in. subsessile very broadly obovate or oblong thickly coriaceous shining on both surfaces, tip rounded or retuse, base cordate, panicles quite glabrous. *Thwaites Enum.* 77.

CEYLON; at Caltura and Ratnapoora.

A moderate-sized tree, glabrous throughout. *Leaves* $2\frac{1}{2}$ – $3\frac{1}{2}$ in. broad, very thick, dark brown above when dry, paler beneath, reticulated on both surfaces, but the nervules not well defined; nerves 6–8 pair; petiole $\frac{1}{2}$ in. *Panicles* rather slender, branches spreading. *Flowers* minute. *Unripe nut* oblong, with a rather elongate narrow cup.

9. **S. Moonii**, *Thwaites Enum.* 77; leaves 6–12 in. oblong or oblong-lanceolate shortly acuminate thickly coriaceous many-nerved much reticulate beneath, petiole very short, panicle terminal large spreading.

CEYLON, south part of the island, *Thwaites*.

A moderate-sized perfectly glabrous tree. *Leaves* $2\frac{1}{2}$ – $3\frac{1}{2}$ in. broad, hard, rather shining grey-green above, with distinct and rather broad reticulations, which are stronger on the brown undersurface; nerves 18–20 pairs, very spreading, shining beneath, with the midrib grooved; petiole $\frac{1}{10}$ – $\frac{1}{4}$ in., very thick. *Panicle* with a stout peduncle and spreading branches. *Flowers* numerous, $\frac{1}{8}$ in. diam.

10. **S. coriacea**, *Thwaites Enum.* 76; very robust, leaves 3–7 in. obovate or obovate-oblong thickly coriaceous tip rounded much reticulate beneath base subacute not narrowed into the very short petiole, panicles very robust with spreading branches, drupe large broader than long.

CEYLON; central province, alt. 5–7000 ft., *Thwaites*.

A moderate-sized tree, glabrous throughout; branchlets as thick as the finger. *Leaves* $1\frac{1}{2}$ – $3\frac{1}{2}$ in. broad, hardly shining, pale above when dry, brown beneath, nerves 10–12 pairs, slightly arched, not well defined, as is the case with the reticulations beneath; midrib beneath grooved; petiole $\frac{1}{6}$ – $\frac{1}{4}$ in. long, and broad. *Panicles* fascicled,

rachis very stout. *Flowers* $\frac{1}{2}$ in. diam., sessile, clustered. *Nut* $1\frac{1}{2}$ in. diam., obliquely cordate, compressed, apiculate; cup short, narrow.

11. **S. subpeltata**, *Thwaites Enum.* 75; leaves peltate 10–15 in. oblong or ovate- or obovate-oblong abruptly obtusely acuminate thickly coriaceous broadly margined shining and reticulate above opaque and minutely closely dotted beneath, panicle terminal stout, nuts transversely oblong.

CEYLON; forests between Galle and Ratnapoora, *Thwaites*.

A large tree, glabrous throughout; branchlets as thick as the finger. *Leaves* 4–6 $\frac{1}{2}$ in. broad, very thick, polished above and reticulate on both surfaces, base rounded with the petiole inserted $\frac{1}{2}$ in. within it; nerves 16–20 pairs, nearly horizontal; midrib grooved on both surfaces; petiole $1\frac{1}{2}$ –2 in., very stout indeed. *Panicle* small for the size of the plant, branches spreading. *Flowers* $\frac{1}{6}$ in. diam. *Nut* $1\frac{1}{4}$ in. broad, much shorter; cup large, kidney-shaped, fleshy.—A very handsome plant.

12. **S. Gardneri**, *Thwaites Enum.* 76 & 410; leaves 6–15 in. lanceolate or elliptic or linear-lanceolate obtusely acuminate strongly closely reticulate and dark beneath, midrib broad above, petiole 1–2 in., panicles axillary and terminal, nuts $\frac{3}{4}$ in. obliquely oblong broader than long.

CEYLON, common in the central province, ascending to 3000 ft.

A moderate-sized tree, glabrous throughout; branchlets not very stout. *Leaves* usually narrowly elliptic-lanceolate, coriaceous, opaque above, dark and densely reticulate beneath; base not decurrent on the petiole; margin cartilaginous, wavy; midrib very broad and flat; nerves 10–15 pairs, nearly horizontal or arched and ascending; ultimate venules curved with free ends, pale on a dark green ground. *Panicles* numerous, axillary and terminal. *Nuts* oblique, broader than long; cup shallow.—The minute reticulation of the undersurface of the leaf of this species is quite peculiar. *Thwaites'* original 1257 (of first distribution) has leaves of the following species and fruit of this. *Marchand* (*Rev. Anacard.* 169) refers this to *S. Anacardium* var. *angustifolium* DC. (*Prodr.* ii. 62), an Amboyna plant, I know not on what authority.

13. **S. Walkeri**, *Hook. f.*; leaves 4–7 in. elliptic or oblong-lanceolate acuminate transversely strongly reticulate and pale beneath, midrib slender above, petiole 1–2 in., panicles terminal axillary and on the old wood, nut ovoid-oblong erect half sunk in the cup.—*S. obscura*, *Thwaites Enum.* 410.

CEYLON; *Walker*, *Thwaites* (C. P. 2940).

This, which was first sent out by *Thwaites* with *S. Gardneri*, and afterwards referred by him to *S. obscura*, differs from the latter in the leaves not being decurrent and the long petioles, and from the former in the very different reticulation of the pale undersurface of the leaf, as well as in the form of the nut.

14. **S. obscura**, *Thwaites Enum.* 76; leaves 3–6 in. obovate-oblong narrowed into the very short petiole tip obtuse or rounded pale and strongly reticulate beneath, midrib slender above, panicles terminal, nut ovoid-oblong. ? *S. zeylanica*, *Blume Mus. Bot.* i. 189. *S. oblongifolia*, var. *Thwaites*, C. P. 1258; *Marchand Rev. Anacard.* 169, var. 3.

CEYLON; in the central province alt. 3000 ft., *Macrae*, *Thwaites*, *Gardner*.

A moderate-sized tree, glabrous throughout. *Leaves* $1\frac{1}{2}$ –2 in. broad, gradually decurrent on the petiole, undersurface and its reticulations like those of *S. Walkeri*; petiole $\frac{1}{2}$ in. *Nut* $\frac{3}{4}$ in., half sunk in the cup.

15. **S. acuminata**, *Thwaites Enum.* 76; leaves 4–12 in. elliptic-ovate- or oblong-lanceolate finely caudate-acuminate closely reticulate and dark beneath, petiole $\frac{3}{4}$ in., panicles terminal and axillary, nut 1 in. obcordate broader than long. *S. oblongifolia*, *Thwaites Enum. l.c.* *S. oblongifolia*, var. 2, *Marchand Rev. Anacard.* 169.

CEYLON; forests in the Galle, Ratnapoora and Ambagamowa districts, *Thwaites*.

I retain this species with great hesitation, having only a flowery specimen, and finding it referred to a variety of *S. oblongifolia*, by *Thwaites*, in his Addenda. From the latter it appears to me to be wholly distinct, having precisely the peculiar reticulation and undersurface colouring of *S. Gardneri*, from which it differs in the long acute tail to the apex of the leaf and slender midrib above. According to *Thwaites*'s description, it further differs in the less coriaceous leaves, smaller panicle, and differently shaped fruit. From *S. nigro-viridis* and *S. obscura* it seems to me to differ in the leaf not being decurrent into the petiole, and in its very long acute tip.

16. ***S. nigro-viridis***, *Thwaites Enum.* 76 & 410 (excl. var. *acuminata*); leaves 3-6 in. obovate-cuneate or oblong-obovate narrowed into the petiole, tip rounded or abruptly obtusely acuminate, pale and reticulate beneath, midrib above slender, panicles terminal short, nut broader than long. *S. oblongifolia*, var. *nigro-viridis*, *Thwaites* (C.P. 631, 641, 2444, 2586); *Marchand Rev. Anacard.* 169.

CEYLON, central province, alt. 2-4000 ft., *Thwaites*.

A moderate-sized tree, glabrous throughout. Leaves $1\frac{1}{4}$ -2 in. broad, very variable in breadth, but almost always cuneate-obovate and decurrent on the petiole, which is $\frac{1}{2}$ -1 in., very dark green; nerves 6-10 pairs, much arched, reticulate as *S. obscura* and *S. Walkeri*. Panicles short, reduced to racemes. Flowers large, $\frac{1}{3}$ in. diam. Nut described by *Thwaites* as obliquely rounded or obcordate, compressed, with a hooked apiculus, and narrower cup; and this they are in his No. 2586, but in one specimen of 631 they are ovoid and erect, and quite 1 in. long. *Thwaites*'s 631 *bis*, with ♂ flowers only, also sent as *S. nigro-viridis*, has elliptic-lanceolate leaves finely acuminate and not narrowed into the petiole, which is longer, with very large spreading panicles. It is probably identical with his original 1257, mentioned under *S. Gardneri*.

17. ***S. parvifolia***, *Thwaites Enum.* 77; leaves $1\frac{1}{2}$ - $3\frac{1}{2}$ in. obovate or elliptic decurrent on the slender petiole tip rounded or obtusely abruptly acuminate, margin cartilaginous, strongly closely reticulate beneath with thick nervules, racemes terminal slender few-flowered, flowers pedicelled. *S. oblongifolia* var. 4, *Marchand Rev. Anacard.* 169.

CEYLON; Galle district, at Hinidoon Corle, *Thwaites*.

A moderate-sized tree, glabrous throughout. Leaves the smallest of the genus, $\frac{3}{4}$ - $1\frac{1}{4}$ in. broad, very thickly coriaceous, and with a remarkably strong cartilaginous border, shining above with a slender midrib, undersurface pale; nerves 7-12 pairs, nearly horizontal; petiole $\frac{1}{2}$ in., much more slender than usual in the genus. Racemes shorter than the leaves. Nut unripe, elongate-conic with a curved acuminate tip and a turbinate narrow cup.

18. ?***S. lurida***, *Hook. f.*; leaves 5-8 in. narrowly elliptic-oblong or lanceolate obtuse very coriaceous decurrent on the petiole opaque and reticulated beneath with many spreading nerves, midrib above broad, panicles terminal black when dry shorter than the leaves, flowers minute pedicelled.

MALACCA, *Maingay*.

A tree, quite glabrous throughout. Leaves $1\frac{1}{2}$ - $2\frac{1}{4}$ in. broad, almost shining above, very opaque and lurid (as if glaucous when fresh) beneath, usually suddenly contracted into an obtuse tip; nerves 30-40 pairs, very slender, but not much raised beneath; midrib convex and much broader above; petiole $\frac{3}{4}$ -1 in., stout. Panicles terminal and axillary, much branched, the lateral branches $\frac{1}{2}$ -1 in. long, bearing loose cymes of ♂ flowers not $\frac{1}{20}$ in. diam. Calyx obtusely 5-lobed. Petals broadly oblong, obtuse. Stamens 5, anthers subglobose. Disk broad, fleshy, margin lobed. Ovary imperfect. —I am very doubtful of the genus of this plant, of which I have seen no fruit.

*** Leaves glabrous on both surfaces Panicles pubescent.

19. **S. subpanduriformis**, *Wall. Cat.* 987; leaves lanceolately panduriform acuminate membranous white beneath, petiole short slender, panicle terminal much branched.

CHITTAGONG, *Wallich* (cult. in Calcutta Bot. Gardens).

Branchlets stout. *Leaves* 1 ft. and upwards by $3\frac{1}{2}$ –4 in., broadest much above the middle, thence rapidly narrowing upwards to a very acuminate point and downwards to the petiole but dilating again for one-fourth above the base, exceedingly thin and membranous, opaque above, beneath brownish white, with faint indications of pubescence on the nerves and midrib, reticulations very delicate; nerves 16–30, very slender, straight; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in. *Panicles* as long as the leaves, very robust and much branched, finely pubescent. *Flowers* unknown. *Fruit* immature, obliquely orbicular, compressed, with a small cup.

20. **S. heterophylla**, *Blume Mus. Bot.* i. 187; leaves 6–14 in. oblong or obovate-oblong thickly coriaceous tip abruptly obtusely acuminate shining above pale and reticulated beneath, petiole $\frac{1}{2}$ –1 in., panicle pubescent very large with slender erecto-patent branches, flowers minute. *Miq. Fl. Ind. Bat.* i. pt. 2, 625.

TENASSERIM OR ANDAMAN ISLANDS, *Helper*.—DISTRIB. Sumatra, Java.

Perfectly glabrous except the panicle. *Leaves* very variable according to Javanese specimens, 1–4 in. broad, thick, hard, and leathery, reticulated on both surfaces, whitish beneath, margin thickened, cartilaginous, base acute but not decurrent on the petiole; nerves 12–15 pairs, shining, somewhat arched. *Panicle* of the ♂ very large, a foot long and more, and as broad; branches strict, pale, the ultimate slender with small clusters of minute sessile flowers. *Nut* in Java specimens transversely oblong, 1 in. diam.; cup much narrower, shallow, pubescent when young.

SPECIES UNKNOWN OR IMPERFECTLY KNOWN TO ME.

S. SUBRACEMOSA, *Kurz in Jour. As. Soc. Beng.* 1872, ii. 304; young parts puberulous, leaves deciduous? distant 3–4 in. oblong or oblong-lanceolate obtuse or subobtuse subdecurrent into a broad glabrous petiole $\frac{1}{2}$ –1 in. thinly chartaceous glaucous glabrous and shining above, glaucous beneath and minutely puberulous when young, midrib thick, nerves parallel, reticulations lax and conspicuous, panicles axillary and terminal graceful puberulous, flowers small in fascicled cymes, pedicels very short densely pubescent, calyx puberulous, petals valvate, filaments capillary, disk hispid, styles 3 thick.—*Pegu, Kurz*. Probably a *Holigarna*.

S. ACUMINATA, *Kurz in Jour. As. Soc. Beng.* 1870, ii. 75; perfectly glabrous, leaves 6–12 in. cuneate-obovate or -oblong acuminate, base narrowed acute or acuminate glaucous beneath, nerves slender acutely prominent, reticulations lax conspicuous, panicles terminal slender shorter than the leaves, lax quite glabrous, calyx-teeth broad acute, petals oblong-lanceolate acuminate, disk hispid, ovary glabrous, drupe obliquely oblong broader than long, cup as broad, scarlet.—Frequent in the forests of Arracan on sandstone; also in Chittagong, *Kurz*.

S. LEVIGATA, *Thwaites in Herb. (Coll. 3948)*; a small species in a very imperfect state, with glabrous elliptic-obovate obtusely acuminate leaves 2–4 in. long shining above transversely strongly reticulated beneath,—South parts of Ceylon. *S. oblongifolia* var. 5, *Marchand Rev. Anacard.* 109.

S. ALBESCENS, *Kurz in Beng. As. Soc. Jour.* 1871, ii. 51; 'a large tree, young parts velvety-tomentose, leaves 7–12 in. elongate-obovate or cuneate-lanceolate shortly and obtusely acuminate, base cuneate rounded or obtuse shining and glabrous above except the pubescent nerves, thinly clothed with white tomentum and sparingly hairy beneath, nerves yellow conspicuous yellowish pilose not tomentose, reticulations

lax, petiole $\frac{1}{2}$ –1 in. thick tomentose, panicle densely yellow tomentose usually shorter than the leaves, flowers small racemulose, pedicels $\frac{1}{12}$ – $\frac{1}{8}$ in., calyx minute pubescent, petals valvate or subvalvate $\frac{1}{12}$ in. shortly pubescent, ovary densely appressedly hirsute, stigmas 3 thick glabrous, disk glabrous, stamens 5, filaments short rather broad 1 or 2 longer and abortive.—*Kurz*.

PEGU; in the Mounge forest. *Brandis*.

15. **DRIMYCARPUS**, Hook. f.

Lofty trees. *Leaves* alternate, petioled, simple, quite entire. *Racemes* or panicles axillary. *Flowers* small, subglobose, polygamous. *Calyx* superior; lobes 5, rounded, imbricate. *Petals* 5, erect, orbicular, imbricate. *Disk* broad, annular. *Stamens* 5, inserted at the base of the disk. *Ovary* inferior, 1-celled; style 1, very short; stigma capitate; ovule attached to the wall of the cell. *Drupe* transversely obliquely ovoid, fibrous, flesh resinous; stone coriaceous. *Seed* attached to the wall of the cell, testa membranous; embryo thick, cotyledons plano-convex radicle minute opposite the hilum; plumule hairy.—**DISTRIB.** 2 or 3 Indian species.

1. **D. racemosus**, Hook. f. in *Benth. & Hook. f. Gen. Pl.* i. 424; leaves linear-oblong or lanceolate acuminate glaucous beneath, margins waved. *Holigarna racemosa*, *Roxb. Fl. Ind.* ii. 82; *Wall. Cat.* 1006.

SIKKIM and BHOTAN HIMALAYA, alt. 2–5000 ft.; SILHET and KHASIA Mts., alt. 0–4000 ft.

A large tree; branchlets glabrous. *Leaves* 4–12 in., coriaceous, shining above, opaque and grey beneath; nerves 20–30 pairs, strongly arched; reticulations delicate; midrib above rather broad; petiole $\frac{1}{2}$ in., stout. *Racemes* branched in axillary fascicles, shorter than the leaves, pubescent or glabrate. *Flowers* $\frac{1}{10}$ in. diam., crowded, the males most so, greenish-white. *Drupe* red, 1 in. diam.—*Marchand* (*Rev. Anacard.* 172) mentions a *Holigarna angustifolia* *Roxb.* as identical with this, but I find no such name published by *Roxburgh*.

16. **HOLIGARNA**, Ham.

Lofty trees. *Leaves* alternate, simple, petioled, entire, coriaceous; petiole furnished with 2 or 4 spur-like deciduous appendages. *Racemes* or panicles axillary and terminal. *Flowers* small, crowded, polygamous. *Calyx* superior; tube cup-shaped; teeth 5, imbricate. *Petals* 5, densely villous in front, cohering with the edge of the disk and at the base, persistent, valvate. *Disk* lining the calyx-tube, obscure in the ♀. *Stamens* 5, inserted on the edge of the disk, coherent at the base with the petals, filaments subulate, glabrous; anthers small, subglobose. *Ovary* inferior, 1-celled; styles 3–5, terminal, stigmas capitate or clavate; ovule pendulous from near the top of the cell. *Drupe* subcompressed, oblong or ovoid, resinous, acrid; stone coriaceous. *Seed* parietal, testa membranous; embryo thick, cotyledons plano-convex; radicle minute next the hilum.—**DISTRIB.** 7 species, all Indian.

* *Leaves quite glabrous beneath.*

1. **H. Arnottiana**, Hook. f.; leaves cuneate-obovate obtuse or acute quite glabrous decurrent on the petiole, petiole with two tubercles at the top, panicles slender tomentose, drupe glabrous. *H. longifolia*, *Wt. & Arn. Prodr.* i. 169; *Grah. Cat. Bomb. Pl.* 41; *Dalz. & Gibs. Bomb. Fl.* 51; *Beddome Fl. Sylv. t.* 167 (not of *Roxburgh*). *Terebinthacea*, *Wall. Cat.* 8504.

WESTERN PENINSULA; from the Concan southwards on the Ghats.

A tree, branches stout. *Leaves* 6-9 by 2-3 in., coriaceous, shining above, reticulated and glaucous or not beneath; nerves 16-20 pairs, strong, nearly straight, prominent on both surfaces; petiole $\frac{1}{4}$ -1 in., rather slender; petiolar spurs early deciduous. *Panicles* of compound racemes, axillary and terminal, shorter or longer than the leaves, thickly rufous-tomentose when dry. *Flowers* crowded, minute, $\frac{3}{8}$ in. diam., enveloped in tomentum. *Drupe* 1 in., obliquely oblong, rounded at the top, quite glabrous, long pedicelled.—Wight's originally distributed specimens (No. 526) have leaves pubescent beneath.

2. **H. ferruginea**, *Marchand Rev. Anacard.* 171; leaves cuneate-obovate rounded at the tip quite glabrous decurrent on the petiole, petiole with two tubercles at the top, racemes robust clothed with dark rusty tomentum. Terebinthacea, *Wall. Cat.* 8503.

WESTERN PENINSULA: Coorg, *Herb. Stocks*; TRAVANCOR, *Herb. Wall.*; Mangalore, *Wight*.

Very similar to *H. Arnottiana*, but the racemes are short and very robust, less branched and clothed with a deeper red (when dry) tomentum, and the flowers are much larger, being fully $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. *Stamens* longer than the petals. *Styles* 3-4 in., elongate.—The terminal bud of this species seems more glabrous than in the *H. Arnottiana*.

3. **H. longifolia**, *Roxb. Cor. Pl.* iii. 79, t. 282; *Fl. Ind.* ii. 80; leaves 1-2 ft. very narrowly cuneate-oblancoelate acuminate membranous glabrous and glaucous beneath, petiole very short and thick, petiolar spurs 2 or 4 persistent or deciduous, ♂ panicle finely pubescent. *DC. Prodr.* ii. 63.

CHITTAGONG, *Roxburgh, &c.*; PEGU, *Kurz*.

A tall tree; bark white. *Leaves* thinly coriaceous, hardly shining above, ciliate when quite young, ending in a long acuminate point, gradually narrowed from above the middle to the base which is hardly decurrent on the petiole; nerves 20-25 pairs, erecto-patent, slender, reticulations large; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Panicle* very large and spreading, ♀ tomentose. *Flowers* $\frac{1}{10}$ in. diam., clustered. *Fruiting panicle* 18 in. long, with spreading decurved branches. *Drupe*s (immature) oblong.—Specimens from *Kurz*.

4. **H. Helferi**, *Hook. f.*; leaves 8-16 in. cuneate-oblancoelate acute or acuminate glaucous beneath rather coriaceous, decurrent on the very short petiole, spurs two on each side slender persistent, ♂ panicle much branched softly densely tomentose, ♀ simple racemose.

TENASSERIM; at Mergui, *Helfer*.

Branchlets stout, as thick as the finger. *Leaves* very variable in size, the smaller 7 by 2 in., with 10-12 pairs of nerves; the large 16 by 4 in., with 26 pairs of nerves; upper surface opaque, under purplish-brown when dry; midrib very prominent, grooved, nerves slightly arched, slender; transverse venules reticulated. *Panicles* ♂ rather slender, clothed with soft lax ferruginous tomentum. *Flowers* $\frac{1}{12}$ in. diam., in small glomerules; ♀ in stout simple racemes, pedicelled, very much larger than the ♂. *Drupe* subcylindric, truncate, $\frac{3}{4}$ in.—This may prove to be a form of *H. longifolia*, but I do not think so.

** *Leaves pubescent beneath.*

5. **H. Grahamii**, *Hook. f. (not of Kurz)*; leaves 12-16 in. oblancoelate-cuneate triangular above the middle and acuminate finely pubescent beneath, petiole very short and thick, petiolar spurs 2 or 4 persistent. Semecarpus *Grahamii*, *Wt. Ic.* t. 235; *Ill.* i. 185; *Dalz. & Gibs. Bomb. Fl.* 52.

WESTERN PENINSULA; Concan, *Graham, &c.*

A tree 20-30 ft.; branchlets very robust. *Leaves* 4-6 in. diam., gradually narrowed from above the middle to the base, hardly decurrent on the petiole, very rigidly

coriaceous, shining above, pale and reticulated beneath; nerves 20-30 pairs, very prominent beneath; petiole $\frac{1}{2}$ in., spurs 1 or 2 on each side $\frac{1}{4}$ - $\frac{1}{3}$ in. *Panicles* terminal, ♂ a foot long, much branched, clothed with ferruginous tomentum, ♀ shorter. *Flowers* clustered, ♂ about $\frac{1}{8}$ in. diam. *Styles* 3. *Drupe* ovoid, glabrous, $\frac{2}{3}$ in. long, upper $\frac{1}{6}$ or $\frac{1}{4}$ exserted.—Kurz gives this as a native of Pegu, but the plants he sends to Kew under this name are in part the true *H. longifolia* of Roxburgh, and in part *H. albicans*. *H. Grahamii* differs from *H. longifolia* in the leaf being more triangular at the top, not rounded and suddenly acuminate.

6. *H. Beddomei*, Hook. f.; leaves 10-22 in. cuneate-oblongate sometimes much produced below acute or acuminate densely velvety beneath young membranous and ciliate.

WESTERN PENINSULA; Anamallay hills, *Beddome*.

An enormous tree, *Beddome*. *Leaves* when old 10 in. long, coriaceous, densely velvety, rufous; nerves 18-22 pairs, stout, ferruginous, those of young plants 20 in. long, membranous, ciliate with long hairs on the margin midrib and under surfaces; nerves slender 40-50 pairs, horizontal in the lower very elongated portion, more arching above; petiole short; stipular spurs capillary, caducous.—A very fine species of which the leaves only are known.

7. *H. albicans*, Hook. f.; leaves 6-16 in. oblongate-cuneate or oblong coriaceous acuminate shining and reticulate above white beneath and glabrous or very minutely pubescent in the midrib only laxly reticulate, panicle pubescent as long as the leaf much branched, branches slender, ♂ flowers shortly pedicelled $\frac{1}{4}$ in. diam., drupe broader than long oblique. *H. Grahamii*, Kurz in *Journ. As. Soc. Beng.* 1872, ii. 205.

PEGU, MARTABAN, Kurz, McLelland, Scott.

Branchlets as thick as the thumb. *Leaves* 2-4 in. broad, base not decurrent on the petiole, obtuse; midrib stout faintly grooved; nerves 14-18 pairs all raised, arched; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Panicle* of ♂ peduncled, rachis curved, branches very slender, spreading; of ♀ also much branched and spreading. *Flowers* ♂ only seen. *Sepals* small. *Petals* obtuse, pubescent. *Filaments* very slender. *Disk* pubescent. *Drupe* pedicelled, $\frac{3}{4}$ in. diam. when dry, turgid, somewhat compressed, very oblique, the exposed portion much smaller, convex, puberulous.—Apparently a very distinct species, of which a large-leaved specimen from Kurz is marked *H. Grahamii*, Kurz (*Semecarpus*, Wight.) I find no trace of spurs on the petiole, but have seen no very young leaves. Kurz describes this as beard-like.

17. *MELANOCHYLA*, Hook. f.

Trees. *Leaves* simple, very coriaceous, exstipulate, quite entire. *Panicles* branched, axillary and terminal. *Flowers* small, unisexual. Calyx-tube persistent, enlarged in fruit and adnate to the very base of the drupe, cupular, lobes 5, erect. *Petals* 5, inserted on the edge of the disk, very coriaceous, persistent, erect or suberect, villous in front, valvate. *Disk* lining the calyx-tube. *Stamens* inserted on the edge of the disk, filaments stout, sometimes coherent at the base with the petals villous; anthers oblong. *Ovary* globose, 1-celled; style short, stigmas 3; ovule 1, pendulous from near the top of the cell. *Drupe* globose, areolate at the base by the enlarged calyx, flesh full of black varnish; stone thick, hard. *Seed* oblong, testa thin; cotyledons amygdaloid, radicle superior.—DISTRIB. The following are the only known species.

1. *M. tomentosa*, Hook. f.; branchlets petiole panicle and midrib beneath velvety-tomentose, leaves oblong acuminate rounded or subcordate at the base.

MALACCA, Maingay.

Branchlets rather stout, densely clothed with soft spreading ferruginous tomentum. *Leaves* 6-14 by 2-4 in., hard, smooth but hardly polished above, with a slender midrib, not reticulated; beneath pale with 30-35 pairs of strong arched pubescent nerves, and faint reticulations; petiole very thick, $\frac{1}{4}$ - $\frac{1}{2}$ in. *Panicle* exceeding the leaves, rachis almost villous, branches spreading pubescent. *Flowers* ♂ minute, $\frac{1}{12}$ in. diam., in small lateral cymes, shortly pedicelled. *Calyx* lobed for half way down, lobes obtuse. *Petals* oblong, obtuse, pubescent outside, villous within, very coriaceous. *Filaments* rigid nearly as long as the petals. *Drupe* elliptic, globose, 1-1 $\frac{1}{2}$ in. diam., orange-yellow, clothed with ferruginous (when dry) pubescence, and full of black varnish.

2. **M. angustifolia**, Hook. f.; leaves linear-lanceolate or -oblanceolate acuminate quite glabrous, petiole long slender, panicles slender puberulous.

MALACCA, Maingay.

Branchlets rather slender, minutely puberulous, as are the panicles. *Leaves* 6-10 by 1 $\frac{1}{4}$ -1 $\frac{3}{4}$ in., hard, base acute often unequal, margin rather waved, shining on both surfaces, reticulations not well defined; midrib slender above, strong beneath; nerves 15-20 pairs, arched; petiole 1-1 $\frac{1}{2}$ in. very slender, greatly thickened from $\frac{1}{4}$ in. above the base. *Panicles* chiefly axillary, very slender, longer or shorter than the leaves. *Flowers* in lateral cymes, ♂ $\frac{1}{12}$ in. diam.; like those of *M. tomentosa*, but much less tomentose. *Drupe* unripe $\frac{1}{2}$ - $\frac{3}{4}$ in. diam, globose, apiculate, puberulous.—Maingay describes the corolla as imbricate, but I find it to be quite valvate.

3. **M. Maingayi**, Hook. f.; leaves narrowly elliptic-oblong or -oblanceolate abruptly acuminate pubescent beneath, panicle stout tomentose.

MALACCA, Maingay.

A tree yielding a copious black varnish, *Maingay*. *Branchlets* rather slender, glabrous or pubescent. *Leaves* 5-8 by 2 $\frac{1}{4}$ -3 $\frac{1}{4}$ in., rigidly coriaceous, narrowed into the petiole, smooth but hardly shining above, beneath minutely pubescent; nerves 20-25 pairs, strong, arched; reticulations beneath distinct, transverse; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Panicle* terminal, stout, ferruginous. *Flowers* pubescent, ♂ $\frac{1}{8}$ in. diam. subsessile; ♀ more than twice as large, with an almost urceolate calyx. *Filaments* rather broad. *Ovary* globose, hairy. *Fruit* not seen.

4. **M. auriculata**, Hook. f.; leaves narrowly linear-oblong from an auricled tapering base recurved acuminate glabrous polished sessile or with a very short enlarged petiole, panicle ♂ stout pubescent.

MALACCA, Maingay.

Branchlets very thick and woody. *Leaves* 18 by 3-4 in., rigidly coriaceous, apparently folded down the middle, recurved, polished on both surfaces, base $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, auricles recurved; nerves about 30 pairs, slightly arched, more prominent above than beneath, transverse reticulations faint beneath; midrib at the base suddenly expanding into a petiole $\frac{1}{4}$ in. long and as broad, which is adnate to the branch. *Panicles* terminal, smaller than the leaves, rusty-pubescent, rachis very stout. *Flowers* ♂ clustered about $\frac{1}{8}$ in. diam. *Drupe* oblong-globose, 1 $\frac{1}{4}$ -1 $\frac{1}{2}$ in. diam., puberulous, ribbed when dry; stone very thick.

18. **NOTHOPEGIA**, Blume.

Small tree. *Leaves* alternate or opposite, petioled, entire. *Racemes* short axillary. *Flowers* small, bracteate, white, polygamous. *Calyx* small, 4-5-lobed, persistent. *Petals* 4-5, spreading, imbricate. *Disk* annular, 4-5-lobed. *Stamens* 4-5, inserted on the margin of the disk, filaments free hairy. *Ovary* free, sessile, ovoid, 1-celled; style very short, stigma simple; ovule pendulous

from near the top of the cell. *Drupe* depressed-turbinate, striate, tipped with the style, flesh cellular. *Seed* pendulous; cotyledons thick, plano-convex, radicle short sublateral.—**DISTRIB.** The following are the only species.

1. **N. Colebrookiana**, *Blume Mus. Bot.* i. 203; branchlets glabrous, leaves elliptic-lanceolate acuminate quite glabrous, margin usually waved. *Bedd. Flor. Sylv.* t. 164; *Anal. Gen.* 79. *Pegia*? *Colebrookiana*, *Wt. Ic.* t. 236; *Ill.* i. 185. *Glycyarpus racemosus*, *Dalz. in Hook. Kew Journ. Bot.* ii. 39; *Hook. Ic. Pl.* t. 842; *Dalz. & Gibs. Bomb. Fl.* 51, *excl. syn.*; *Thwaites Enum.* 78.

WESTERN PENINSULA; on the Ghats from the Southern Concan southwards. CEYLON; ascending to 3000 ft. Common.

A small tree, about 15 ft. high, with milky acrid juice. *Leaves* 2-8 by 1-2½ in., usually elliptic-oblong with a tendency to be more narrow below than above, rarely narrower and 8 by 1½ in., base decurrent on the petiole, shining above, usually white beneath; nerves 15-20 pair, not prominent beneath, arched, reticulations also not sharply defined; petiole ½-¾ in. *Racemes* much shorter than the leaves, solitary and fascicled, strict; ♂ branched, much longer and more branched than the ♀, more or less pubescent. *Flowers* minute; ♂ sessile or nearly so, ⅓ in. diam. *Petals* suberect with recurved tips, hairy on the back. *Sepals* almost orbicular. *Filaments* almost glabrous. *Drupe* ¼ in. diam., red, top depressed.

VAR. 1. *Heyneana*; leaves smaller 2-3 in. more shortly petioled obtuse, drupe blue.—*Terebinthacea*? *Wall. Cat.* 8500.

VAR. 2. *macrocarpa*; leaves 3-4 in. obovate-oblong shortly obtusely acuminate very coriaceous, drupe ½-¾ in. diam., top not depressed.—*Shevaghery hills, Wight.*

2. **N. travancorica**, *Beddome MSS.*; branchlets petiole and midrib beneath pubescent with short spreading hairs, leaves elliptic-lanceolate acuminate, petals hairy within.

WESTERN PENINSULA; Travancor, *Beddome*.

Leaves 6-7 by 1¼-1¾ in., almost membranous, margin thickened, green below, ciliate towards the base which is acute and not decurrent on the petiole; nerves 30-35 pairs, slightly arched; petiole ½ in. *Flowers* ♀ in supra-axillary glomerules, ⅓ in. diam. *Petals* ovate-lanceolate. *Filaments* hairy, broad.—I have seen only imperfect specimens.

3. **N. aureo-fulva**, *Beddome MSS.*; branchlets petiole and midrib beneath densely rufous villous, leaves opposite narrow linear.

WESTERN PENINSULA; Tinnevely, *Beddome*.

Leaves 7-8 by 1 in., obtuse or acute, rather membranous, shining above, much reticulated beneath; nerves about 30 pair, slender, arched; petiole ½ in.—I have seen only an imperfect specimen of this very curious species.

19. CAMPNOSPERMA, Thwaites.

Trees. *Leaves* alternate, very coriaceous, simple, quite entire. *Racemes* axillary, simple or sparingly branched. *Flowers* sessile, minute, hermaphrodite. *Calyx* 3-5-partite; segments erect, persistent, imbricate. *Petals* 3-6, suborbicular, erect, imbricate. *Disk* urceolar. *Stamens* 6-10; inserted at the base of the disk. *Ovary* free, sessile, ovoid, 1-celled (or 2-celled with 1 cell suppressed); style very short, stigma discoid or capitate; ovule 1, pendulous from the top of the cell. *Drupe* ovoid, fleshy; stone hard, almost 2-celled by a vertical plate from the top of the horse-shoe shaped cell. *Seed* pendulous, curved round the

imperfect septum; cotyledons curved, flattish; radicle short superior.—A genus of 6 species, of which one is a native of Madagascar, and another of the Seychelles.

1. **C. zeylanicum**, *Thwaites in Hook. Kew Journ. Bot.* vi. 65, t. i. A; *Enum.* 78; leaves glabrous above dotted beneath finely reticulate, racemes short stout glabrous.

CEYLON; Saffragan and Ambamagowa districts, generally on river banks. *Thwaites*.

A ramous tree, 30–40 ft.; branchlets stout, terete, youngest parts minutely scaly. *Leaves* 3–7 by 2–2½ in., elliptic-obovate or oblanceolate or obovate, obtuse, base decurrent on the petiole, thickly coriaceous, smooth and beautifully reticulated on both surfaces, the numerous spreading nerves hardly more distinct than the reticulations, pale brown when dry, covered beneath with minute dot-like scales; midrib prominent beneath; petiole stout ½–¾ in. *Raceme* usually shorter than the leaves, rachis stout. *Flowers* ½ in. diam. *Drupe* nearly globose, ⅓–½ in. diam. purple.

2. **C. macrophylla**, *Hook. f.*; leaves obovate-oblong or obcuneate tip rounded puberulous beneath, reticulations obscure, nerves close-set 20–35 pairs, racemes furfuraceous-pubescent.* *Buchanania macrophylla*, *Blume Mus. Bot.* i. 185; *Miq. Fl. Ind. Bat.* i. pt. 2, 637.

MALACCA, *Griffith*. SINGAPORE; Schomburgk, &c.—DISTRIB. Sumatra, Borneo.

A small tree; branchlets pubescent, as thick as the finger. *Leaves* full grown, 8–14 by 3½–6½ in., thickly coriaceous, shining above, and scarcely reticulate beneath, clothed with a very fine rusty down; nerves nearly straight, strong, transverse, venules obscure; petiole 1–3 in., very stout, winged, channelled above, pubescent all over. *Panicles* slender, very variable in length, sometimes 1 ft., lateral branches short or long. *Flowers* very minute, in clusters along the rachis and branches, globose, ⅓ in. diam., tetramerous. *Sepals* rounded, pubescent. *Petals* orbicular-ovate, obtuse, erect. *Filaments* shortly subulate. *Drupe* ½–¾ in., subacute, compressed, nearly orbicular; stone crustaceous, 3–4-celled.

3. **C. Griffithii**, *Marchand Rev. Anacard.* 174; leaves obovate-oblong or obcuneate, tip rounded perfectly glabrous reticulate on both surfaces, nerves 14–18 pairs, racemes furfuraceous-pubescent. *Semecarpus?* *grandifolia*, *Wall. Cat.* 985.

MALACCA, *Griffith*, *Maingay*; PENANG, *Porter*.

A tall shrubby tree, *Wallich*. Very similar in foliage to *C. macrophylla*, but the leaves are less thick, perfectly glabrous and reticulate on both surfaces, the nerves fewer and more distant, the petioles longer (2–3 in.) and winged to the base, and the panicles are more slender.—*Griffith* (MSS.) describes the flowers as 5-merous, but I find them to be 4-merous.

4. **C. auriculata**, *Hook. f.*; leaves obovate-spathulate auricled at the very base tip rounded quite glabrous reticulate on both surfaces, nerves 12–18 pair, panicles pubescent very slender. *Buchanania auriculata*, *Blume Mus. Bot.* i. 185; *Miq. Fl. Ind. Bat.* i. pt. 2, 637.

SINGAPORE, *Maingay*, *T. Anderson*.—DISTRIB. Sumatra, Borneo.

Leaves of the same character as those of *C. Griffithii* but smaller, 6–9 by 2–3 in., coriaceous, very gradually narrowed downwards into the petiole, which is ½–1 in., the auricles quite small, beautifully reticulate on both surfaces, as in *C. zeylanica*, nerves arched, very slender. *Panicle* as in *P. grandifolia*, but less pubescent. *Flowers* similar, 4-merous.

20. **SPONDIAS**, Linn.

Deciduous glabrous trees. *Leaves* usually crowded at the tips of the branches, alternate, odd-pinnate; leaflets sub-opposite, usually caudate-acuminate. *Panicles* terminal, spreading. *Flowers* small, polygamous. *Calyx* small, 4-5-fid, deciduous, lobes slightly imbricate. *Petals* 4-5, spreading, subvalvate. *Disk* cupular, broad, crenate. *Stamens* 8-10, inserted beneath the disk. *Ovary* sessile, free, 4-5-celled; styles 4-5, conniving; ovules solitary, pendulous in the cells. *Drupe* fleshy; stone hard, thick, 1-5-celled, the cells erect or diverging and opening by canals through the top of the stone. *Seeds* pendulous, testa membranous; embryo straight, cotyledons elongate plano-convex, radicle short superior.—**DISTRIB.** About 8 species all tropical.

SPONDIAS DULCIS, Willd.; Roxb. *Fl. Ind.* ii. 452; Wall. *Cat.* 8477 A.; with crenate longer leaflets, is a South-Sea Island plant introduced into India, and called 'Hog-plum' and 'Otaheite Apple.'—Wall. *Cat.* 8477 B. from the Calcutta gardens is in part *S. lutea*, L., the Hog-plum of the West Indies.

SPONDIAS?; Wall. *Cat.* 8479, from Hurdwar appears to be *Rhus succedanea*, Linn.

1. ***S. mangifera***, Willd.; DC. *Prodr.* ii. 75; leaflets 4-6 pairs 2-9 in. oblong acuminate quite entire, panicle 1-2 ft., drupe ovoid, stone rough and fibrous. Roxb. *Fl. Ind.* ii. 451; W. & A. *Prodr.* 173; Wt. *Ill.* i. 186, t. 76; Wall. *Cat.* 8476; Bedd. *Fl. Sylv.* t. 169; Dalz. & Gibs. *Bomb. Flor. Suppl.* 19; *Grah. Cat. Bomb. Pl.* 42; Brand. *For. Flor.* 128. *S. amara*, Lamk.; Ham. in *Trans. Linn. Soc.* xiii. 531. *Evia amara*, Comm.; Blume *Mus. Bot.* i. 234; Thwaites *Enum.* 78. *Mangifera pinnata*, Kæn. (not Lamk.).—Rheede *Hort. Mal.* i. t. 50.

Throughout India from the INDUS eastwards and southwards to MALACCA and CEYLON, ascending to 5000 ft. in the HIMALAYA. Wild and cultivated.—**DISTRIB.** Tropical Asia.

A small tree, everywhere glabrous. *Leaves* 1-1½ ft.; petiole slender; leaflets 2-9 by 1-4 in., shortly petiolulate, shining, more or less oblique; nerves 10-30 on each side, horizontal, joined by a strong intra-marginal one. *Panicles* large, spreading, sparingly branched. *Flowers* ¼ in. diam., scattered, uni- or bisexual. *Calyx* 5-toothed. *Petals* oblong, greenish-white. *Disk* broad, 10-toothed. *Filaments* short, subulate. *Drupe* 1½-2 in. long, yellow, smooth: flesh very austere; stone cavernous, usually with 1 (1-3) perfect seed.—The 'Amra' of the Hindoos, and the Hog-plum of many Europeans.

2. ***S. acuminata***, Roxb. *Fl. Ind.* ii. 453; leaflets 5-8 pair 1½-3 in. elliptic caudate-acuminate quite entire or obscurely crenulate, panicle 6-8 in., drupe ovoid-globose, stone smooth fibrous. *Grah. Cat. Bomb. Pl.* 42; W. & A. *Prodr.* 173; Wall. *Cat.* 8478.

WESTERN PENINSULA; Malabar, Heyne, Roxburgh; in the Concan hills, near Kennerly caves, Graham; Canara, Ritchie.

An elegant middling sized tree (Roxb.), apparently differing from *S. mangifera* chiefly in the smaller leaves with longer points, the very short panicle, and smooth stone (if I am right in referring a fruiting plant in Wight's Herbarium to this species).—In Wallich's Herbarium, specimens of *Odina Wodier* are mixed with this.

3. ***S. axillaris***, Roxb. *Fl. Ind.* ii. 453; leaflets 6-8-pairs ovate-lanceolate acuminate serrate, drupe ovoid-oblong, stone smooth.

NIPAL, Roxburgh.

A small *Melia*-looking tree. *Leaves* 1 ft.; petiole slender; leaflets shortly petio-

lulate, 3-4 in., pale beneath, not abruptly acuminate as in *S. mangifera* and *acuminata*; nerves free, arching. *Flowers* solitary or subsolitary on the branches, long pedicelled, $\frac{1}{4}$ in. diam., white. *Calyx* lobes acute. *Petals* elliptic, subacute. *Filaments* short, subulate. *Disk* annular, 10-lobed. *Ovary* 5-celled with 5 short erect styles. *Drupe* $1\frac{1}{8}$ in. long, rounded at the top, yellow. *Stone* 5-celled, quite small.—I know this plant only through Roxburgh's description and excellent drawing, which represents a true *Spondias* in the structure of flower, fruit and embryo; but the arched-nerved leaves which he describes as 'gash-serrate' but figures as obtusely serrate), and the subsolitary flowers on the branches with peduncles $\frac{3}{4}$ in. long, are quite unlike any *Spondias* I know.

4. **S. ? macrophylla**, Wall. Cat. 8480; leaflets 3-4 pair 6-9 in. elliptic acuminate.

BIRMA, at Taong-dong, Wallich.

This, of which there are only mutilated leaves and fragments of a panicle without flower or fruit, in Wallich's Herbarium, may be only *S. mangifera*.

21. **DRACONTOMELUM**, Blume.

Trees. *Leaves* alternate, odd-pinnate; leaflets opposite or alternate, quite entire. *Panicles* axillary and subterminal. *Flowers* small, pale, hermaphrodite. *Calyx* 5-partite, segments conniving, imbricate. *Petals* 5, suberect, subvalvate. *Disk* cup-shaped, crenulate. *Stamens* 10, inserted at the base of the disk. *Ovary* sessile, 5-celled; styles 5, thick, erect (like ovaries), connate by their obtuse, stigmatiferous tips; ovules solitary and pendulous in the cells. *Drupe* globose, fleshy, tubercled above the middle by the style-bases; stone hard, depressed, 2-5-celled; cells diverging, opening by canals through the top of the stone. *Seeds* compressed, pendulous, testa membranous; cotyledons plano-convex, radicle short superior centrifugal.—DISTRIB. 5 species natives of tropical Asia and the Pacific.

1. **D. mangiferum**, Blume Mus. Bot. i. 231, t. 42; leaflets 5-8 pairs opposite and alternate oblong-lanceolate acuminate, panicle much branched pubescent or tomentose. *Poupartia mangifera*, Blume Bijl. 1160 (excl. synonym.). *P. pinnata* Blanco Flor. Filip. 393.

EASTERN PENINSULA, South Andaman Islands, Kurz; Malacca, Griffith, Maingay; Penang, Maingay.—DISTRIB. Eastward to the Philippines and Fiji Islands, native and cultivated.

A large tree. *Leaves* 1-1 $\frac{1}{2}$ ft.; petiole cylindric, glabrous or pubescent; leaflets petiolulate, 5-7 by 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in., usually rather falcate and oblique at the rounded or cordate base, gradually narrowed to the subacute apex, glabrous above, beneath glabrous puberulous or with tufts of hair in the nerve axils; nerves 10-12 pair, arched, reticulations close small; petiolule $\frac{1}{2}$ in. *Panicle* equalling or exceeding the leaves, pubescent or tomentose; pedicels slender, ebracteate. *Flowers* campanulate, $\frac{1}{4}$ - $\frac{1}{3}$ in. diam., greenish white. *Sepals* pubescent or tomentose. *Petals* longer, recurved. *Filaments* slender. *Drupe* 1 in. diam., depressed.—A variable plant in pubescence, of which I think *D. sylvestre*, Blume, and *D. puberulum*, Miq. are varieties.

VAR. 1. Leaflets nearly glabrous beneath with occasional tufts of hair in the nerve axils.—Andaman and Malacca.

VAR. 2. Leaflets and petiole pubescent beneath.—Malacca.

VAR. 3. Leaflets glabrous beneath, panicles and flowers rusty-tomentose.—Penang.

DOUBTFUL GENUS.

22. **RUMPHIA**, Linn.

A very large tree. *Leaves* alternate, petioled, simple, broadly ovate-cordate, toothed, rough, aromatic. *Racemes* axillary. *Flowers* bitter. *Calyx* tubular, 3-fid. *Petals* 3, oblong. *Stamens* 3, exserted. *Ovary* subtrigynous; style simple. *Drupe* coriaceous, turbinate, 3-grooved; stone 3-celled, 3-seeded.

1. **R. tiliaefolia**, Lamk. *Dict.* vi. 352; *Ill.* t. 25; *DC. Prodr.* ii. 90. *R. amboinensis*, Linn. *Sp. Pl.* 49.—*Rheede Hort. Mal.* iv. t. 11.

MALABAR; stony sandy mountain woods in Parakaroo and elsewhere, *Rheede*.

A very large tree; bark red within, aromatic. *Leaves* 4–5 by $2\frac{1}{2}$ – $3\frac{1}{2}$ in., aromatic, 5-nerved at the base; petiole $1-1\frac{1}{2}$ in. *Racemes* axillary and terminal, shorter than the leaves, woolly. *Flowers* $\frac{1}{2}$ in. diam., inodorous. *Drupe* 1 in. long, obovoid obtusely 3-lobed, rough and setose, flesh bitter; stone triquetrous, 3-celled.

Of this remarkable plant nothing is known except from the plate and description of *Rheede*. I follow the majority of authors in placing it at the end of *Terebinthaceæ*, with which, however, I suspect it has nothing to do. *Jussieu* (*Gen. Pl.* 370) suggests that it may be more allied to *Sapindaceæ*. To me it looks more like a *Euphorbiaceous* or *Verbenaceous* plant.

Wallich's *TEREBINTHACEA*? No. 8501, ex Herb. Wight, is a mixture of *Garuga pinnata* fruits with the leaves and immature fruit of another plant that I do not recognise and which is in a most imperfect state.

ORDER XLVII.—**CORIARIEÆ**. (By J. D. Hooker.)

Usually glabrous shrubs, with 4-angled sarmentose branches, the lower opposite; buds scaly. *Leaves* opposite, rarely 3-nate, whorled, quite entire, sessile, exstipulate. *Racemes* axillary. *Flowers* small, green, hermaphrodite or polygamous. *Sepals* 5, spreading, imbricate, persistent. *Petals* smaller than the sepals, fleshy, keeled within, thickened after flowering and embracing the fruit. *Stamens* 10, hypogynous, free or the alternate adnate to the petals, filaments short; anthers large, oblong, rough. *Disk* 0. *Carpels* 5–10, free, 1-celled, whorled on a fleshy receptacle; styles slender, subulate, fleshy, papillose all over; ovules 1 in each cell, pendulous from the top. *Fruit* of 5 or 10 oblong compressed dry little nuts, closely embraced by the fleshy petals, 1-celled, 1-seeded. *Seed* compressed, testa membranous, albumen a thin layer; cotyledons plano-convex, radicle superior.—*DISTRIB.* 3–5 species natives of S. Europe, N. Africa, Japan, the Himalaya, New Zealand, and the Andes.

An order of doubtful affinity, perhaps nearest *Phytolacceæ*, which should in this work have been placed in *Thalamifloræ*.

CORIARIA, Linn.

Character of the order.

1. **C. nepalensis**, Wall. *Pl. As. Rav.* iii. t. 289; *Cat.* 6817; leaves ovate or elliptic 3–7 nerved, stamens 10, carpels 5. *Brandis For. Flor.* 128.

TEMPERATE and SUBTROPICAL HIMALAYA, from Marri alt. 3–6000 to Bhotan; ascending to 11,000 ft. in Sikkim.—*DISTRIB.* Yunan.

A shrub with arched branches, glabrous or puberulous on the leaves beneath and racemes. *Leaves* 1–2 by $\frac{3}{4}$ – $1\frac{1}{2}$ in., usually broadly rounded-cordate and abruptly acu-

minate, rarely ovate-oblong or elliptic and acute or acuminate, minutely serrulate. *Racemes* axillary or in the forks, solitary or clustered, 2-6 in. long, rachis glabrous or pubescent; bracteoles oblong, concave, deciduous. *Flowers* about $\frac{1}{2}$ in. diam. *Fruit* $\frac{1}{4}$ - $\frac{1}{3}$ in. diam., black.

ORDER XLVIII.—**MORINGEÆ.** (By J. D. Hooker.)

Deciduous trees with soft wood. *Leaves* alternate, odd-pinnate or 2-3-pinnate; leaflets opposite, quite entire, caducous as well as the pinnules, glandular at the base. *Panicles* axillary. *Flowers* irregular, bisexual. *Calyx* cup-shaped, 5-cleft; segments unequal, petaloid, deciduous from above the base, imbricate. *Petals* 5, unequal, upper smaller, lateral ascending, anterior larger. *Stamens* inserted on the edge of the disk, declinate, 5 perfect opposite the petals alternating with 5 (or 7) which are reduced to antherless filaments; anthers dorsifixed, 1-celled. *Disk* lining the calyx-tube. *Ovary* stipitate, 1-celled; style slender, tubular, stigma perforated; ovules numerous, in 2 series, on 3 parietal placentas. *Capsule* elongate, beaked, 3-6-angled, 1-celled, loculicidally 3-valved, corky and pitted within. *Seeds* many, in pits of the valves, testa corky winged or not, albumen 0; embryo straight, cotyledons plano-convex, radicle very short superior, plumule many-leaved—DISTRIB. 3 species, natives of Western Asia and N. Africa.

A natural order of very doubtful affinity, which has been referred to near *Resedaceæ*, *Capparideæ*, *Meliantheæ*, *Violariææ*, *Polygaleæ*, *Leguminosæ*, *Bignoniaceæ*, and others.

MORINGA, Lamk.

Character of the order.

1. ***M. pterygosperma***, Gærtn.; DC. *Prodr.* ii. 478; leaflets elliptic ovate or obovate, nerves obscure, flowers white, capsule 9-ribbed, seeds winged. *W. & A. Prodr.* 178; *Wight Ill.* i. 186, t. 77; *Bedd. Flor. Sylvat.* t. 80; *Dalz. & Gibs. Bomb. Fl.* 314; *Grah. Cat. Bomb. Pl.* 43; *Brand. For. Fl.* 129; *Wall. Cat.* 5814. *M. oleifera*, Lamk. *Encycl.* i. 398. *M. zeylanica*, Pers. *M. polygona*, DC. *Prodr.* ii. 478. *Hyperanthera Moringa*, Vahl.; *Roxb. Fl. Ind.* ii. 368; *Griff. Notul.* iv. 572, t. 609. II. *decandra*, Willd. *Guilandina Moringa*, Linn. —*Rheede Hort. Mal.* vi. t. 11.

FORESTS of WESTERN HIMALAYA and OUDH, and cultivated elsewhere throughout India.—DISTRIB. Cultivated in various tropical countries.

A small tree, bark corky, wood soft, root pungent; young parts tomentose. *Leaves* 1-2 ft., usually 3-pinnate; petiole slender, sheathing at the base; pinnæ 4-6 pairs; leaflets 6-9 pairs, $\frac{1}{2}$ - $\frac{3}{4}$ in., opposite, pale beneath; petiolules slender; glands linear, hairy. *Panicles* spreading, bracts linear. *Flowers* pedicelled, 1 in. diam., honey-scented. *Sepals* linear-lanceolate, reflexed. *Petals* narrowly spatulate. *Fertile filaments* villous at the base. *Ovary* hairy. *Pod* 9-18 in., pendulous, 9-ribbed. *Seeds* 3-gonous, winged at the angles.—The Horse-radish tree.

2. ***M. concanensis***, Nimmo in *Grah. Cat. Bomb. Pl.* 43; leaflets 1-1 $\frac{1}{2}$ in. broadly elliptic or orbicular, nerves 4-6 pair distinct. *Dalz. & Gibs. Bomb. Flor.* 311; *Brandis For. Flor.* 130.

RAJPUTANA, on dry hills: SINDH and the CONCAN.

A tree, very similar to *M. pterygosperma*, but the leaves are much larger as are the leaflets, which are often retuse at the tip; the petals are yellowish streaked with pink. *Seeds* $\frac{1}{2}$ in. long, very broadly trigonous with membranous wings. This may possibly be the red-flowered species alluded to by Roxburgh (*Fl. Ind.* ii. 368) as occurring near Maldah.

ORDER XLIX. **CONNARACEÆ.** (By J. D. Hooker.)

Erect or climbing shrubs or trees. *Leaves* alternate, exstipulate, 1-3-foliate or odd-pinnate; leaflets quite entire. *Flowers* racemed or paniced, regular or subregular, usually bisexual. *Calyx* 5-lobed or -partite, usually persistent, imbricate or valvate. *Petals* 5, usually narrow, free or slightly cohering, very rarely valvate. *Stamens* perigynous or hypogynous, sometimes declinate, 5 or 10, those opposite the petals often shorter and imperfect; filaments frequently connate at the base. *Disk* 0, or small annular or incomplete. *Carpels* 5, rarely 1-3 or 6-7, globose, hirsute, 1-celled; styles subulate or filiform, stigmas capitate simple or 2-lobed; ovules 2, collateral, ascending, orthotropous. *Fruit* usually of 1 rarely 2-3 sessile or stalked 1- rarely 2-seeded follicles. *Seed* erect, arillate or not, testa thick sometimes arilliform below the middle, aril various; cotyledons fleshy in the exalbuminous, leafy in the albuminous seeds, radicle superior, rarely ventral.—DISTRIB. 12 genera, all tropical.

The following Wallichian species of this order are to be rejected.

CONNARACEA, Wall. Cat. 8538, B. is an undeterminable apparently Connaraceous plant.

CONNARACEA ? Wall. Cat. 8534, is *Dialium platysepalum*, Baker.

CONNARACEA ? Wall. Cat. 8550, is *Cupania glabrata*, Kurz.

CONNARACEA ? Wall. Cat. 8553, consists of the foliage of a *Willoughbeia* and fruit of a *Connarus*.

TRIBE I. **Connareæ.** *Calyx* imbricate. *Seeds* exalbuminous.

- | | |
|---|----------------|
| Calyx not clasping the base of the capsule. Seeds exarillate | 1. AGELÆA. |
| Calyx accrescent, clasping the base of the sessile capsule. | |
| Seeds arillate | 2. ROUREA. |
| Calyx slightly accrescent, not clasping the base of the sessile capsule. Seeds exarillate | 3. ROUREOPSIS. |
| Calyx not accrescent, clasping the pedicel of the stipitate capsule. Seeds arillate | 4. CONNARUS. |

TRIBE II. **Cnestideæ.** *Calyx* valvate. *Seeds* albuminous or exalbuminous.

- | | |
|--|-----------------|
| Calyx 5-partite, exceeding the petals. Carpels 5, sessile. Capsule hispid within. Seeds albuminous | 5. CNESTIS. |
| Calyx 5-partite, revolute. Petals narrow. Carpels 5. Seeds exalbuminous | 6. TÆNIOCHLENA. |
| Calyx 5-partite, erect. Petals oblong. Stamens 5, perfect. Carpel 1. Seeds exalbuminous | 7. ELLIPANTHUS. |

1. **AGELÆA**, Soland.

Erect or scandent shrubs. *Leaves* 3-foliate. *Panicles* or *racemes* axillary. *Calyx* 5-partite, not accrescent nor embracing the fruit, imbricate or subvalvate. *Petals* lanceolate or ligulate, obtuse, free or connate at the middle. *Stamens* 5 or 10. *Disk* $\frac{1}{2}$ -annular or 0. *Carpels* 3-5. *Capsules* 1-2, sessile or shortly stalked, coriaceous; rugose or lamellate. *Seed* erect, exalbuminous; testa arilliform below the middle.—DISTRIB. 9 species, African and Asiatic.

1. **A. vestita**, Hook. f.; branches leaves beneath and inflorescence densely tomentose, leaflets elliptic obtusely caudate-acuminate, stamens 5, styles 5 very

slender. *Cnestis vestita*, Wall. in *Herb. Linn. Soc.* Connaraceæ, Wall. *Cat.* 8535. *Hemiandrina borneensis*, Hook. f. in *Trans. Linn. Soc.* xxiii. 171, t. 28. *Troostwyckia singularis*, Miq. *Fl. Ind. Bat. Suppl.* 531. (See Kurz in *Journ. As. Soc. Beng.* 1870, pt. ii. 76.)

EASTERN PENINSULA, Singapore, Jack; Penang, Porter; Malacca, Griffith, Maingay.—DISTRIB. BORNEO.

Densely clothed with fulvous hairs. *Leaflets* 3–6 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., lateral, subsessile, terminal petiolulate; nerves beneath very stout, strongly reticulate. *Racemes* 1 in., slender, hirsute. *Flowers* $\frac{1}{4}$ in. diam. *Capsule* $\frac{2}{3}$ in. long, ovoid with a curved beak, strongly tuberculate or sublamellate, densely tomentose. *Seed* obovoid; testa thin, arilliform towards the base.

2. **A. Wallichii**, Hook. f.; branches and leaves quite glabrous, leaflets ovate-oblong or oblong obtusely-pointed, base rounded or cordate, stamens 10, styles 5 very short. Connaraceæ, Wall. *Cat.* 8544.

EASTERN PENINSULA; Singapore, Wallich; Malacca, Griffith, Maingay.

Branches and petioles slender. *Leaflets* 4–6 by $1\frac{1}{4}$ – $2\frac{1}{4}$ in., coriaceous, lateral shortly terminal long-petiolulate; nerves strong beneath. *Racemes* $\frac{1}{2}$ –1 in., densely pubescent. *Flowers* $\frac{1}{4}$ in. diam. *Stamens* and carpels stout. *Capsule* $\frac{1}{3}$ – $\frac{2}{3}$ in. long, obtusely beaked, tubercled, rusty tomentose. *Seed* oblong, testa thin.

2. ROUREA, Aubl.

Trees or shrubs. *Leaves* odd-pinnate; leaflets subopposite or alternate. *Panicles* axillary. *Flowers* small; pedicels usually slender. *Sepals* 5, orbicular, imbricate, enlarged and clasping the base of the ripe capsule. *Petals* 5, usually linear-oblong. *Stamens* 10; filaments connate at the base. *Ovaries* 5, 4 usually imperfect; style slender. *Capsule* sessile, curved. *Seed* erect, arillate, exalbuminous.—DISTRIB. TROPICS; species about 50.

* Leaflets few, 1–6-pairs, petiolulate, glabrous.

1. **R. santaloides**, W. & A. *Prodr.* 144; quite glabrous, leaflets 2–4 pair 2–4 in. polished reticulated, elliptic or ovate, caudate-acuminate shining, principal nerves indistinct, base usually rounded, sepals orbicular not ciliate, ovaries glabrous. *Planch. in Linnœa*, xxiii. 418; *Dalz. & Gibs. Bomb. Fl.* 53. *Connarus santaloides*, Vahl *Symb.* iii. 87; *DC. Prodr.* ii. 85. *C. monocarpus*, W. & A. *Prodr.* 143 (not of Linn.). Connaraceæ, Wall. *Cat.* 8532.—*Burm. Thes. Zeyl.* t. 89.

WESTERN PENINSULAS; from the Concan to Travancor. CEYLON.

Leaflets $1\frac{1}{2}$ –3 by 1– $1\frac{1}{2}$ in., coriaceous, sometimes acute at the base; nerves rarely distinct from the reticulations of the leaflet and usually spreading horizontally from the midrib, but this is a very uncertain character. *Racemes* terminal and axillary, 2–4 in., simple or compound, slender; pedicels slender, $\frac{1}{4}$ in.; bracts small. *Flowers* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. *Petals* twice as long as the linear-oblong sepals. *Capsule* falcate, $\frac{3}{4}$ –1 in., obtuse, apiculate or pointed.

2. **R. commutata**, *Planch. in Linnœa*, xxiii. 420; quite glabrous, leaflets 2–4-pairs 3–6 in. ovate elliptic or elliptic-lanceolate caudate-acuminate shining, principal nerves usually very distinct beneath, lower pair long ascending, base usually acute, sepals orbicular not ciliate, ovaries glabrous. *Cnestis monadelphæ*, Roxb. *Fl. Ind.* ii. 454. Connaraceæ? Wall. *Cat.* 8549 (no fl. or fruit.). Connaraceæ, Wall. *Cat.* 8547, 8548.

ASSAM, SILHET, CHITTAGONG, BURMA and southwards to TENASSERIM.—DISTRIB. China.

So similar in most respects to *R. santaloides* that I scarcely doubt its being an eastern form of that plant, distinguished by the nervation of the leaflets, which are

more usually acute at the base. Some Tavoy specimens are, however, almost intermediate.

3. **R. caudata**, *Planch. in Linnæa*, xxiii. 419; quite glabrous, leaflets 3-5 pairs elliptic-ovate with long caudate-acuminate obtuse points not shining, petiole very slender, sepals ciliate, petals oblong obtuse.

ASSAM, *Jenkins*; KHASIA MTS., alt. 1-4000 ft., *Griffith, H. f. & T.*

Very similar to *R. santaloides*, but much smaller in all its parts and more slender, with more membranous leaflets 2-2½ in., of which the points are $\frac{1}{4}$ - $\frac{3}{4}$ as long as the blade, finely reticulate, not shining. *Racemes* or panicles 1-2 in. *Flowers* $\frac{1}{2}$ in. diam. *Capsule* $\frac{3}{4}$ -1 in., slightly curved, broader upwards. *Petals* not much exceeding the sepals. *Ovaries* glabrous, style short.

4. **R. pulchella**, *Planch. in Linnæa*, xxiii. 419; quite glabrous, leaflets 1-3-pair 1-1½ in. ovate-lanceolate obtusely caudate-acuminate shining, sepals suborbicular ciliate.

MALACCA, *Griffith, Maingay.*

A smaller leaved plant than *R. caudata* with more coriaceous leaflets, which are dark chestnut-brown when dry, and have slender petiolules $\frac{1}{8}$ in. long; they are uniformly reticulated on both surfaces without obvious principal nerves. *Panicles* very slender, often exceeding the leaves; pedicels $\frac{1}{4}$ in., capillary. *Flowers* $\frac{1}{4}$ in. diam. *Petals* twice as long as the sepals, linear-oblong, connate, just above the base. *Ovaries* 5, pilose; styles very slender. *Capsule* $\frac{1}{2}$ in., stout, curved, pointed.

5. **R. acuminata**, *Hook. f.*; quite glabrous, leaflets 3-4 pair elliptic or elliptic-oblong abruptly caudate-acuminate finely reticulate on both surfaces shining above subglaucous beneath, petiole very slender. *Cnestis acuminata*, *Wall. Cat.* 8533 (Connaraceæ).

SINGAPORE, *Wallich.*

Branches slender. *Leaves* 2½-6 in.; petiole quite glabrous, petiolules very short; leaflets 1½-3 by $\frac{2}{3}$ -1¼ in., thinly coriaceous, brown when dry; base rounded. *Capsule* $\frac{3}{4}$ in.—The specimens are very imperfect.

** Leaflets very numerous, small, 1½-2½ in., sessile, oblong.

† Leaflets very pubescent beneath.

6. **R. rugosa**, *Planch. in Linnæa*, xxiii. 422; branches petioles leaves beneath and inflorescence softly pubescent, leaflets 6-9-pairs 1½-2½ in. oblong obtusely acuminate, base cordate, panicles stout, pedicels shorter than the calyx. *Connarus* ? *rugosus*, *Wall. Cat.* 8527, Connaraceæ.

EASTERN PENINSULA; Singapore, *Wallich.* Penang, *Porter.* Malacca, *Griffith, Maingay.*

Branches stout, velvety. *Leaves* 1 ft.; petiole stout. *Leaflets* shining above, reticulate on both surfaces. *Panicles* shorter than the leaves. *Flowers* $\frac{1}{4}$ in. diam., rosy. *Sepals* orbicular, pubescent. *Petals* twice as long, pilose on the back. *Capsules* $\frac{1}{2}$ - $\frac{3}{4}$ in., pointed.

7. **R. villosa**, *Planch. in Linnæa*, xxiii. 422; branches petioles and inflorescence softly pubescent, leaflets 12-20 pairs $\frac{3}{4}$ in. oblong rounded at the tip pilose beneath, panicles slender, pedicels equalling the calyx.

TENASSERIM, at Mergui, *Griffith, Helfer.*—DISTRIB. Sumatra.

Branches rather stout, velvety. *Leaves* 3-8 in.; petiole slender; leaflets faintly reticulate and polished above, base oblique subcordate. *Panicles* shorter than the leaves, clothed with dense spreading soft hairs. *Flowers* $\frac{1}{6}$ in. diam. *Sepals* orbicular, scarcely pilose. *Petals* glabrous, linear-oblong, twice or thrice as long as the calyx. *Capsule* $\frac{1}{2}$ in., curved.

8. **R. fulgens**, *Planch. in Linnæa*, xxiii. 423; branches petioles leaves beneath and panicles densely shortly pubescent, leaflets 12-20 pairs in. linear-oblong rounded at the tip base oblique, racemes strict contracted. *Connarus fulgens*, (*Connaracea*?) *Wall. Cat.* 8524.

SINGAPORE, *Wallich, Maingay*.

Pubescence rusty when dry. *Leaves* 3-5 in., petiole rather stout; leaflets slightly dilated or contracted at the base, opaque, reticulation very obscure. *Racemes* (very contracted panicles) axillary, strict, shorter than the leaves; pedicels very short indeed. *Flowers* not seen. *Capsule* $\frac{3}{4}$ in., much curved, obtuse.—I do not see why Wallich proposed the trivial name of *fulgens* for this; in its dry state it is a remarkably lurid plant.

†† *Leaflets glabrous beneath or nearly so.*

9. **R. stenopetala**, *Hook. f.*; petiole and midrib of leaflets beneath pubescent, leaflets 6-10 pairs $\frac{3}{4}$ -1 in. obliquely ovate or obovate 2-lobed at the tip, racemes very short, pedicels slender. *Cnestis stenopetala* (*misprint for stenopetala*), *Griff. Notul.* iv. 433, t. 611, f. 2. *Rourea* No. 23 *indescripta*, *Planch. in Linnæa*, xxiii. 421.

TENASSERIM, at Mergui, *Griffith*.

Branches glabrous, branchlets pubescent. *Leaves* 2-4 in.; petiole slender; leaflets contracted cordate and very oblique at the base, shining above and below, nerves and reticulations obscure. *Racemes* apparently almost reduced to fascicles; bracts ovate, ferruginous. *Sepals* lanceolate, acute, spreading, imbricate, pubescent at the tip. *Petals* linear, very narrow, $2\frac{1}{2}$ times longer than the sepals. *Ovaries* pilose.—The flowers are described from Griffiths' *Notulæ*; the spreading calyx is anomalous in the genus.

10. **R. Wallichiana**, *Planch. in Linnæa*, xxiii. 421; petioles and panicles pubescent, leaflets 15-30 pairs $\frac{1}{2}$ - $\frac{3}{4}$ in. linear-oblong rounded at the tip glabrous on both surfaces, racemes slender, pedicels equalling or exceeding the calyx, flowers $\frac{1}{2}$ in. diam. *Connaracea*, *Wall. Cat.* 8525. *Connarus mimosoides*, *Vahl?* *Wall. Cat.* 8526 D.

TENASSERIM and MARTABAN; Amherst, *Wallich*; Tavoy, *Gomez*; Moulmein, *Falconer*.

Leaves 6-10 in.; leaflets very uniform, always obtuse, base rounded or subcordate, upper surface dark brown hardly shining, lower chocolate brown opaque; nerves faint. *Racemes* slender, much shorter than the leaves, villous, paniculate at the base, pedicels very slender, exceeding the calyx. *Sepals* orbicular, ciliate. *Petals* $\frac{1}{4}$ in. long, linear, glabrous. *Capsule* $\frac{1}{2}$ - $\frac{2}{3}$ in. long, curved.—A specimen of this is mixed with Wallich's 8526 B.

11. **R. concolor**, *Blume Mus. Bot.* i. 264; petioles and racemes pubescent, leaflets 15-20 pairs $\frac{1}{2}$ in. oblong rounded or retuse at the tip glabrous on both surfaces, racemes slender, pedicels about equalling the calyx, flowers $\frac{1}{4}$ - $\frac{1}{3}$ in. diam. *R. parvifolia*, *Planch. in Linnæa*, xxiii. 420. *Connarus mimosoides*, *Vahl?* *Wall. Cat.* 8526 A.B. ? *C. mimosoides*, *Jack in Mal. Misc.* 2, vii. 44.

SINGAPORE, *Prince*; MALACCA, *Griffith*.—DIST. BORNEO.

Branchlets finely pubescent. *Leaves* 2-6 in.; petiole slender; leaflets cordate at the base, shining above, chocolate-brown and minutely reticulated beneath. *Racemes* equalling or exceeding the leaves. *Flowers* the smallest of the Indian species. *Sepals* orbicular. *Petals* twice as long, linear-oblong. *Capsules* $\frac{1}{2}$ - $\frac{2}{3}$ in., pointed.—There is a Wallichian specimen in Herb. Benth. under *Wall. Cat.* 8526 B. with the leaves shining beneath.

12. **R. similis**, *Blume Mus. Bot.* i. 264; petioles and racemes pubescent, leaflets 8-12 pairs linear-oblong 2-lobed at the tip shining above, very sparsely

pubescent or glabrate beneath, racemes slender, pedicels equalling the calyx. *R. sororia* and *R. parallela*, *Planch. in Linnæa*, xxiii. 421; *Connarus mimosoides Vahl?* *Wall. Cat.* 8526 C.

EASTERN PENINSULA, Penang, *Porter*; MALACCA, *Maingay*.—DISTRIB. Sumatra, Borneo.

Branchlets pubescent, *Leaves* 3–6 in.; petiole slender; leaflets cordate at the base, usually shining above with raised nerves, or with the nerves obsolete, subglaucous beneath. *Racemes* shorter than the leaves. *Flowers* $\frac{1}{2}$ in. diam. *Sepals* broadly oblong, very pubescent. *Petals* twice as long. *Capsule* $\frac{3}{4}$ in., much curved.

3. **ROUREOPSIS**, *Planch.*

Trees or shrubs. *Leaves* odd-pinnate, leaflets few. *Flowers* in axillary panicles, pedicels slender. *Sepals* oblong, slightly imbricate, somewhat enlarged and spreading, but not clasping the base of the capsule. *Petals* linear-oblong. *Stamens* 10, the alternate longer. *Ovaries* 5; styles slender. *Capsule* linear-oblong, recurved. *Seed* ovoid, testa thin black arilliform at the base; cotyledons amygdaloid.—DISTRIB. Species 2, a Javanese and Indian.

This genus, which (*Gen. Pl.* i. 432) when the fruit was unknown I united with *Rourea*, proves to be exarillate, and I therefore restore it.

1. ***R. pubinervis***, *Planch. in Linnæa*, xxiii. 424: branchlets petioles and nerves beneath finely pubescent, leaflets 3-pairs ovate or elliptic with a contracted notched tip. *Indeterminata*, *Wall. Cat.* 9050.

EASTERN PENINSULA, Penang, *Porter*; Malacca, *Griffith*, *Maingay*.

Leaves 4–8 in.; petioles slender; leaflets, 2–4 in., alternate, petiolulate, base acute; nerves distinct, arched. *Panicles* or racemes axillary, shorter than the leaves, nearly glabrous; pedicels $\frac{1}{4}$ in. *Flowers* $\frac{1}{2}$ in. diam. *Sepals* nerved, glabrous, very obtuse. *Petals* strap-shaped, three times as long. *Ovaries* pubescent. *Capsule* 1 in., nearly straight.

4. **CONNARUS**, *Linn.*

Trees or shrubs. *Leaves* odd-pinnate; leaflets 5, rarely 3 or more, quite entire. *Panicles* axillary and terminal, branched. *Flowers* small. *Sepals* 5, deciduous or persistent and clasping the pedicel of the capsule, not accrescent, imbricate. *Petals* 5, linear or ligulate and slightly dilated upwards. *Stamens* 10, 5 shorter and sometimes without anthers. *Ovaries* 5, densely pubescent, 4 usually imperfect or obsolete, the fifth with a slender style, stigma capitellate. *Capsule* oblique, stipitate, inflated, broader upwards; valves glabrous or pubescent within. *Seeds* arillate, testa shining, albumen 0; cotyledons amygdaloid.—DISTRIB. Species about 55, all tropical.

The structure of the flowers is remarkably uniform in all the Indian species which are with difficulty distinguished.

* Valves of the capsule quite glabrous within. Leaves quite glabrous beneath in all. *Natives of the Western Peninsula*.

1. ***C. monocarpus***, *Linn.*; *W. & A. Prodr.* 143; leaflets elliptic or elliptic-lanceolate obtusely acuminate, nerves 3–5 pairs, very slender, filaments glabrous, capsule $1\frac{1}{2}$ –2 in. narrow turgid contracted into the stalk, not veined nor shining. *Planch. in Linnæa*, xxiii. 425. *C. asiaticus*, *Willd. Sp. Pl.* iii. 692. *C. pinnatus*, *Lamk. Encycl.* ii. 95; *Ill. t.* 572; *W. & A. Prodr.* 143; *Grah. Cat. Bomb. Pl.* 35; *Dalz. & Gibs. Bomb. Flor.* 53. *Omphalobium pinnatum*, *DC.*

Prodr. ii. 86. *O. indicum*, *Gærtn. Fruct.* i. 217, t. 46, fig. 3; *DC. l. c.* 85. *Connaraceæ*, *Wall. Cat.* 8539, excl. D.—*Rheede, Hort. Mal.* vi. t. 24 ? vii. t. 26.

WESTERN PENINSULA, from the Concan to Travancor. CEYLON, abundant.

Leaflets 3-4 by $1\frac{1}{4}$ - $1\frac{3}{4}$ in., glossy above, reticulations faint, quite glabrous, *Panicles* densely pubescent. *Flowers* $\frac{1}{2}$ in. long. *Sepals* ovate-oblong, subacute, pubescent. *Petals* twice as long, slightly pubescent on the back. *Longer filaments* three times as long as the shorter, all antheriferous. *Capsule* dark-coloured, rounded at both sutures, dehiscing tardily, contracted but neither acute nor apiculate at the tip. *Testa* black, shining. Very near the *C. oligophyllus* of Penang, but the capsule is quite glabrous within.—I think there can be no doubt that this, which is clearly Lamarck's *C. pinnatus*, is also Linnæus's *C. monocarpus*, which being one of the commonest plants in Ceylon, cannot have escaped Burmann's notice. Wight & Arnott describe it as having a sessile capsule, no doubt from Rheede's figure, which, if it belongs to this plant, is a very bad one, also as having a glabrous calyx, which is not the case.

2. **C. Wightii**, *Hook. f.*; leaves elliptic-ovate obtusely pointed, nerves 5-6 on each side arched slender, capsules $1\frac{1}{2}$ by $\frac{3}{4}$ in. compressed, base narrowed into the stalk shining hardly pointed. *Rourea*? *sclerocarpa*, *W. & A. in Wight Cat.* 934. (See note under *Pongamia*, *W. & A. Prodr.* 262.)

WESTERN PENINSULA, the Concan, *Stocks*.

Leaflets 3-3 $\frac{1}{2}$ by $1\frac{1}{4}$ - $1\frac{3}{4}$ in., coriaceous, hardly shining, finely reticulated, quite glabrous. *Capsules* pale chestnut coloured, shining, rounded, strongly striate on the ventral and dorsal faces, narrowly keeled at the sutures, early dehiscing, pale and quite glabrous within.—I have described this from a fruiting specimen. The capsule resembles that of *C. paniculatus*, but is quite glabrous within.

3. **C. Ritchiei**, *Hook. f.*; leaflets elliptic-lanceolate obtusely acuminate, nerves 5-7 on each side faint, capsule $\frac{3}{4}$ by $\frac{1}{2}$ in. turgidly oblong rounded at the top, base cordate.

WESTERN PENINSULA, the Concan, *Stocks*; the Ramghat near Belgaum, *Ritchie*.

Leaflets 3-4 by $1\frac{1}{4}$ - $1\frac{3}{4}$ in., finely reticulated, quite glabrous. *Panicles* rusty-pubescent. *Flowers* crowded, $\frac{1}{2}$ in. long. *Sepals* ovate-oblong. *Petals* about twice long. *Capsule* quite as broad from suture to suture as across the valves, dark-coloured, intruded at the base, which is very rounded, and suddenly contracted into the stalk.—The capsule much resembles that of *C. latifolius*, *Wall.*, but is more cordate at the base and larger.

** Valves of the capsules more or less pubescent or velvety within (unknown in *C. Griffithii* and *semidecandrus*).

† *Leaflets* more or less pubescent beneath.

4. **C. ferrugineus**, *Jack in Mal. Misc.* 2, vii. 37; branches panicles and leaves beneath densely rusty tomentose, leaflets 7 oblong or oblanceolate acuminate rugose, capsules 2-2 $\frac{1}{2}$ by $1\frac{1}{4}$ in. compressed velvety narrowed into the stalk.—*Connaraceæ*, *Wall. Cat.* 8530.

EASTERN PENINSULA, Singapore, Malacca, and Penang, *Jack, &c.*

Densely clothed with rusty velvety tomentum. *Leaflets* 3-6 by $1\frac{1}{2}$ to $2\frac{1}{4}$ in., thickly coriaceous, rugose, and pubescent above when young, glabrate above when old, base rounded or subcordate; petiolules very short and stout; nerves 6-8 pairs, arched, very much sunk above and raised beneath. *Panicles* shorter than the leaves, very stout. *Flowers* nearly $\frac{1}{2}$ in. long. *Sepals* oblong. *Petals* twice as long, narrowly linear-spathulate. *Filaments* glabrous, shorter, half as long as the others. *Capsule* almost woody, readily dehiscing, hardly pointed, densely tomentose, valves finely pubescent within.

5. **C. Griffithii**, Hook. f.; branches, petioles, and leaves beneath pubescent, leaflets ovate- or elliptic-lanceolate acuminate, nerves very indistinct.

TENASSERIM, at Mergui, Griffith.

Branches slender. Leaflets 3-5 by $\frac{3}{4}$ - $1\frac{1}{2}$ in., thinly coriaceous, finely pubescent with rusty hairs beneath, midrib distinct; nerves very faint, oblique. Panicles rusty-pubescent. Flowers $\frac{3}{8}$ in. long. Sepals linear-oblong. Petals more than twice as long, glabrous, ligulate. Filaments almost glabrous. Capsule unknown.

6. **C. semidecandrus**, Jack in Mal. Misc. 2, vii. 39; branches, petioles, and midrib beneath finely pubescent, leaflets elliptic-oblong acute, thinly coriaceous, not reticulated, nerves 5 pairs very slender. C. floribundus, Wall. in Herb. Linn. Soc. sub 8543.¹

TENASSERIM at Mergui, Griffith; PENANG, Wallich, Phillips, &c.

Leaflets pale on both surfaces. Panicle much branched, thinly pubescent. Flowers $\frac{1}{2}$ in. long, white (Wallich). Sepals linear-oblong. Petals more than twice as long, narrow, linear-spathulate, glabrous. Filaments nearly glabrous. Capsule not seen.

†† Leaflets perfectly glabrous beneath.

7. **C. paniculatus**, Roxb. Fl. Ind. iii. 139; leaflets 3-7 elliptic-oblong, -ovate or -lanceolate with a short or long obtuse point, petals glabrous, filaments puberulous, capsules $1\frac{1}{4}$ - $1\frac{1}{2}$ by $\frac{3}{8}$ - $\frac{3}{4}$ in. contracted into the stalk compressed, seed oblong compressed. ? C. pentandrus, Roxb. l. c. 140.—Connaracea, Wall. Cat. 8540 (excl. E.).

SILHET and the KHASIA Mts., ascending to 2000 ft., Roxburgh, &c.; CHITTAGONG, Roxburgh, H. f. & T.

A large climber; branches and leaves perfectly glabrous. Leaflets 3-8 by 1-2 in., coriaceous, glossy above; nerves 5-6 pairs, slender, faint, reticulations obscure; petiole stout. Panicle hoary, much branched and spreading. Flowers $\frac{1}{2}$ in. long. Sepals linear-oblong, pubescent. Petals more than twice as long, nearly glabrous, linear. Longer filaments three times as long as the short ones. Capsule shining, pale, deeply striate, finely pubescent within.—I do not see how C. pentandrus, Roxburgh, differs except in being described as truly pentandrous.

8. **C. gibbosus**, Wall. in Herb. Linn. Soc. sub 8541; leaflets elliptic-oblong or -ovate obtusely acuminate nerves 5-6 pairs, capsules 1 by $\frac{1}{2}$ in. hatchet-shaped compressed with a horizontal beak on the outer edge. Connaracea, Wall. Cat. 8538, B (in part) ? 8540 E, 8541, 8541 B. Sapind. dub. Wall. Cat. 8098.

BIRMA, at Rangoon, McLelland; TENASSERIM, at Mergui, Griffith, &c.; PENANG, Porter; MALACCA, Griffith, Maingay; SINGAPORE, Wallich.—DISTRIB. BORNEO.

Leaflets 3-5 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., quite glabrous; transverse venules distinct beneath. Panicles branched, rather slender. Flowers $\frac{1}{2}$ in. Sepals ovate-oblong. Petals about twice as long. Filaments puberulous. Capsules compressed, broad, veined, with the beak, usually very pronounced at the outer edge of the broad top; valves finely pubescent within.—Wallich suggests that this may be Jack's C. lucidus or C. grandis.

9. **C. Championii**, Thwaites Enum. 80; leaflets 5-7 elliptic acuminate, nerves 5-6 pairs very strong beneath, capsules $1\frac{1}{2}$ by $\frac{3}{4}$ in. semilunar compressed narrowed at the base but not distinctly stalked striate glabrous.

CEYLON; Central province, ascending to 4000 ft.

A climbing shrub; young parts clothed with rusty pubescence. Leaflets 3-5 by $1\frac{3}{4}$ - $2\frac{1}{2}$ in., thinly coriaceous, polished on both surfaces, reticulate beneath; petiole and petiolules slender. Panicles axillary and terminal, 4-6 in., minutely rusty-pubescent. Flowers $\frac{1}{4}$ in. long. Sepals oblong, hairy. Petals twice as long, linear-obovate, white dotted with red, sparsely hairy. Filaments included, glabrous, the longer twice as long as the shorter. Capsule apiculate, sutures not keeled; valves thin with scattered hairs within.

10. **C. latifolius**, Wall. Cat. 8537 (by error 5837); leaflets elliptic-oblong with contracted obtuse or notched points, capsule $\frac{3}{4}$ by $\frac{1}{2}$ in. shortly subcylindric very turgid abruptly contracted into the stalk, top rounded scarcely apiculate. Connaraceæ ? 8545.

MARTABAN, at Moulmein, Wallich. TENASSERIM, at Tavoy, Gomez.

Leaflets 4-7 by $1\frac{1}{2}$ -3 in., coriaceous, quite glabrous; nerves 5 pairs, slender, arched, reticulations indistinct. Panicles widely spreading. Flowers $\frac{1}{2}$ in. long. Capsules with very round tops, and an obscure sublateral point, finely puberulous within.

11. **C. grandis**, Jack in Mal. Misc. 2, vii. 40; leaflets 8-14 in. elliptic-oblong obtuse or obtusely acuminate thickly coriaceous polished, nerves 8-10 pairs, capsules 2 by $\frac{3}{4}$ -1 in. contracted into the stalk turgid woody. Planch. in Linnæa, xxiii. 429. C. Wallichii, Planch. in Linnæa, xxiii. 426. Connaraceæ, Wall. Cat. 8538, A, B (in part).

EASTERN PENINSULA, Singapore and Penang, Wallich; MALACCA, Griffith, Maingay; TENASSERIM OF ANDAMAN ISLANDS, Helfer.

Branches and petioles very robust, quite glabrous. Leaflets 3-5, much the largest, most coriaceous and polished of the genus, transverse nerves distinct beneath; petiolules short, stout. Panicles spreading, clothed with hoary down. Flowers $\frac{1}{4}$ in. long. Sepals linear-oblong, obtuse. Petals twice as long, almost glabrous, linear, dilated upwards. Filaments puberulous, longer, three times as long as the others. Capsule coarsely striated, glabrous, sutures rounded, not keeled or raised.

12. **C. Maingayi**, Hook. f.; leaflets ovate or elliptic-ovate obtusely acuminate very coriaceous pale, nerves very faint, capsules 1-1 $\frac{1}{2}$ by $\frac{1}{2}$ in. elliptic or subcylindric, stalk obscure.

EASTERN PENINSULA; MALACCA, Maingay.

Branches rather stout, glabrous. Leaflets 5, 3-5 by $1\frac{1}{4}$ -2 $\frac{1}{2}$ in., closely finely reticulated, opaque and pale grey on both surfaces. Panicles hoary-pubescent. Flowers $\frac{1}{4}$ in. long. Sepals small, ovate-lanceolate. Petals three times as long, linear, with black dots, hoary on both surfaces. Capsules, young, $1\frac{1}{2}$ by $\frac{1}{2}$ in., terete, grooved at both sutures, top rounded and mucronate, striæ quite longitudinal; old more elliptic; valves woody, velvety within.—Very near and perhaps identical with *C. falcatus*, Blume of Borneo. I find great varieties in the capsules of Maingay's specimens, in part I assume depending on age; the longer are almost straight and subcylindric and $\frac{3}{4}$ in. diam.; the shorter are ellipsoid and $\frac{3}{4}$ in. diam.; a few are 2 $\frac{1}{2}$ in. long, curved and more distinctly stalked, as in Blume's *falcatus*.

13. **C. oligophyllus**, Planch. in Linnæa, xxiii. 427; leaflets elliptic-lanceolate obtusely acuminate lower 2-3 pairs of nerves prominent beneath, panicle hoary-pubescent, capsule $1\frac{1}{4}$ -1 $\frac{1}{2}$ by $\frac{1}{2}$ in. fusiform-clavate symmetrical apiculate obscurely stalked grooved on one face. Connaraceæ, Wall. Cat. 8542 (in part) and 8539, D (in part).

PENANG, Porter.

Branches and leaves quite glabrous. Leaflets 5, 4-7 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in.; base acute, thinly coriaceous, shining on both surfaces, pale red-brown beneath, the lowest pair of nerves quite basal, the succeeding pairs distant, all very oblique; petiole and petiolules slender. Panicle subpyramidal, nearly black; branches slender, ascending, rufous-pubescent. Flowers $\frac{1}{4}$ in. long. Sepals oblong, obtuse, hoary. Capsules nearly straight, dark brown, smooth, striated longitudinally, tip rounded, apiculate; valves coriaceous, finely pubescent within.—The sheet of 8539 D. in Wall's Herb. contains three fragments of this plant without fruit, one flowering specimen of 8539 A (*C. paniculatus*), and three capsules of the same (glabrous inside). The sheet of 8542 consists of flowering specimens of this; and 8542 B. consists of this and *C. paniculatus* or *monocarpus*. The specimen given to Bentham by Wallich is in fine fruit. This seems to differ entirely from *C. Maingayi* in the foliage, large panicle, and sepals.

DOUBTFUL SPECIES.

C. SPECIES? leaflets 5-8 in. elliptic and stout, branches almost black and very polished, nerves 7-8 pair very strong beneath, panicle slender hoary, sepals ovate-lanceolate, petals glabrous.—Singapore or Penang, *Walker*.

C. SPECIES? leaflets as in *C. pinnatus*, but nerves beneath very strong.—Anamallay hills, alt. 3000 ft., *Beddome*.

CONNARUS? VELUTINUS, *Wall. Cat.* 8536, consists of foliage and diseased fruit of a *Spatholobus*, with one capsule of *Ellipanthus tomentosus*, H. f.

CONNARUS? JACKIANUS, *Wall. Cat.* 8552, is *Cupania Jackiana*, *Hiern*.

CONNARUS MIMOSOIDES, *Vahl Symb.* iii. 87; *DC. Prodr.* ii. 85, from the Nicobar Islands is indeterminate from description.

5. **CNESTIS**, Juss.

Shrubs or trees. *Leaves* odd-pinnate; leaflets many, quite entire. *Flowers* solitary, fascicled or racemed, tomentose, rarely paniced, polygamous or diœcious, rotate. *Sepals* 5, valvate or imbricate at the tip, spreading in fruit. *Petals* 5, shorter or longer than the calyx. *Stamens* 10, free. *Ovaries* 5-7, sessile; styles short, stigmas capitellate. *Capsules* 1-3, kidney-shaped, cylindric curved or waved, pubescent, often villous or clothed with rigid hairs within. *Seed* exarillate, albumen fleshy; cotyledons thin.—DISTRIB. Tropical Asia and Africa; species about 10.

1. **C. ramiflora**, *Griff. Notul.* iv. 432; softly tomentose or villous, leaflets 12-15-pairs linear-oblong, tip rounded obtuse or subacute, base rounded or cordate. *C. flaminea*, *Griff. l.c.* 433, t. 608, f. 2. *C. platantha*, *Griff. l.c.* 434; *Kurz in Jour. As. Soc. Beng.* 1870, pt. ii. 75. *Connarus foliolosus*, *Jack in Wall. Cat.* 8529. *C. igneus*, *Wall. Cat.* 8528, (Connaraceæ). *Rourea dasyphylla*, *Miq. Fl. Ind. Bat. Suppl.* 528.

BERMA, at Amherst, Chappedong and Rangoon, *Wallich*. TENASSERIM, at Mergui, *Griffith*. MOULMEIN and the S. ANDAMANS, *Kurz, &c.* PENANG, MALACCA and SINGAPORE, *Wallich, Griffith, &c.*—DISTRIB. Sumatra, Philippine Islands.

A climbing shrub. *Branches* stout, woody. *Leaves* 1 ft.; petiole slender, pubescent; leaflets subsessile, $1\frac{1}{2}$ -3 in., sometimes contracted below the middle, glabrous and shining above; nerves 6-10 pairs, slender, arched. *Panicles* axillary, fascicled, slender, much shorter than the leaves, densely clothed with pale soft tomentum. *Flowers* ♂ $\frac{1}{2}$ in. diam., rosy, ♀ smaller. *Sepals* linear-oblong, obtuse. *Petals* shorter in the ♂, longer in the ♀, linear-oblong, obtuse or emarginate, glabrous. *Filaments* slender, glabrous. *Ovaries* 5-7 (usually 6, *Griffith*), hirsute; styles short. *Capsules* 1-3 in. long, sessile, falcate, enlarged and tumid above the middle, obtuse, woody, rugged; valves thickly woody, velvety within. *Seed* short, broad, compressed, testa thin.—I think there can be no doubt but that this answers to the three species of *Cnestis* described by Griffith and cited above, though his names are not attached to any of his specimens. It has been distributed as *Cnestis foliolosus* and *C. igneus*, *Planch. MSS.* in Herb. Hook.

6. **TÆNIOCHLÆNA**, Hook. f.

A rambling shrub. *Leaves* odd-pinnate, glabrous; leaflets 5, quite entire. *Panicles* axillary, short. *Flowers* hermaphrodite. *Calyx-tube* short, hemispheric, segments 5, enlarged and revolute in fruit, valvate. *Petals* 5, much exceeding the calyx. *Stamens* 10, alternately shorter, nearly free at the base. *Ovaries* 5,

sessile; styles short, stigmas discoid. *Capsules* 1-3, ovoid, compressed, pubescent; valves glabrous within. *Seed* oblong, arillate; albumen 0; cotyledons plano-convex.

1. **T. Griffithii**, *Hook. f. in Benth. & Hook. Gen. Pl. i. 434.*

MALACCA, *Griffith, Maingay.*

Branches rather slender, quite glabrous. *Leaflets* 3-7 by $1\frac{1}{2}$ -3 in., sometimes almost orbicular, base usually cordate, shining above and beneath, nerves 3-5 pairs, arched; petiolules very short. *Racemes* 2-3 in., fascicled, densely pubescent, slender. *Flowers* rotate, $\frac{1}{2}$ in. diam. *Sepals* oblong, pubescent, recurved in flower. *Petals* twice as long, linear, dilated upwards, glabrous. *Filaments* short, subulate. *Capsules* 2-3, $\frac{1}{2}$ -1 in., obtuse, densely pubescent, valves coriaceous. *Seed* short, slightly compressed, testa black.

7. **ELLIPANTHUS**, *Hook. f.*

Trees or shrubs. *Leaves* with 1 leaflet, quite entire. *Racemes* axillary, short. *Flowers* hermaphrodite or polygamous. *Sepals* 5, not enlarged in fruit, suberect, valvate. *Petals* 5, longer than the sepals, oblong-lanceolate, densely pubescent. *Stamens* 10, 5 shorter, without anthers, filaments short subulate connate at the base. *Ovary* 1, strigose; style short. *Capsule* stalked, oblique, velvety; valves glabrous within. *Seed* arillate, albumen 0; cotyledons plano-convex.—DISTRIB. Malayan Peninsula and Islands.

* *Leaves glabrous beneath or nearly so.*

1. **E. Thwaitesii**, *Hook. f.*; leaflet elliptic obtusely caudate-acuminate, capsule curved into a semicircle beaked densely closely pubescent. *Connarus unifolius*, *Thwaites Enum.* 80 and 410.

CEYLON, Central Province, at 3-4000 ft. *Thwaites*

A moderate sized tree; branches slender, black. *Leaflet* 2-3 $\frac{1}{2}$ by 1-1 $\frac{3}{4}$ in., reticulate; petiole and petiolule $\frac{1}{4}$ - $\frac{1}{2}$ in., slender. *Racemes* 4-7-flowered, pubescent, bracts deciduous. *Flowers* subdioecious, $\frac{1}{4}$ in. diam., green. *Sepals* acute. *Petals* twice as long. *Capsule* 1 $\frac{1}{2}$ in. long, compressed, woody.

2. **E. Helferii**, *Hook. f.*; leaflet elliptic-lanceolate or linear-lanceolate acuminate, nerves 5-7 pairs strong beneath.

TENASSERIM OR ANDAMAN ISLANDS; *Helfer*.—DISTRIB. Borneo.

Branches slender, black. *Leaves* 4-7 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., very variable in length and breadth, thinly coriaceous, with slight pubescence on the petiole and midrib beneath; petiole slender, $\frac{1}{2}$ in. *Racemes* $\frac{1}{4}$ - $\frac{1}{3}$ in., pubescent. *Flower-buds*, $\frac{1}{8}$ in. long. *Fruit* unknown.

3. **E. calophyllus**, *Kurz Andam. Rep. Append. B. 6*; and in *Beng. As. Soc. Jour.* 1872, ii. 305; leaflet ovate ovate-lanceolate or elliptic long-acuminate quite glabrous, nerves 6-7 pairs very slender.

ANDAMAN ISLANDS, *Kurz.*

A tree 20-30 ft.; shoots and buds pubescent. *Leaflet* 5-7 by 2-2 $\frac{1}{2}$ in., coriaceous, finely reticulated, gradually narrowed to the obtusely acuminate tip, pale; petiole slender, $\frac{3}{4}$ -1 in. *Racemes* $\frac{1}{2}$ in., densely pubescent. *Petals* $\frac{1}{4}$ in., densely pubescent, linear-oblong. *Capsules* $\frac{3}{4}$ -1 in., obovoid or ellipsoid, subacute, densely velvety; valves woody, glabrous within.—The description of the petals and inside of the capsule is taken from *Kurz*.

**** Leaves pubescent or tomentose beneath.**

4. **E. tomentosus**, Kurz in Jour. As. Soc. Beng. 1870, pt. ii. 305; leaflet elliptic ovate or orbicular obtuse acute or obtusely acuminate densely pubescent beneath, nerves 6-8 pairs very slender. Connarus? monophyllus, Wall. Cat. 8551 (Connaraceæ).

PEGU, MARTABAN, and TENASSERIM, Wallich., &c.—DISTRIB. Siam.

Branches densely tomentose with fulvous hair. Leaflets 4-6 by 2-3½ in., usually elliptic or elliptic-lanceolate, but often broader and sometimes quite orbicular, coriaceous, glabrous, shining and very finely reticulated above; petiole ¼-½ in. Racemes ½ in., densely tomentose. Flowers ¼ in. diam. Sepals obtuse. Petals twice as long, oblong, obtuse. Filaments hairy. Ovary strigose. Capsule 1½ in. (2 in., Kurz), semicircular or obovoid, contracted into the stout stalk, obtuse, apiculate, densely velvety, sutures rounded, valves woody, glabrous within.

5. **E. Griffithii**, Hook. f.; leaves ovate-lanceolate caudate-acuminate rusty-pubescent beneath, nerves 8-10 pairs strong beneath.

MALACCA, Griffith.—DISTRIB. Borneo.

Branches slender, rusty pubescent or tomentose. Leaflet 4-5 by 1½-2 in., coriaceous, glabrous and shining above, tomentose chiefly on the nerves beneath; petiole ⅙-¼ in. Racemes ¼ in., few-flowered. Capsules ¾ in. long, curved, semicircular, beaked, densely clothed with rusty velvety tomentum, stalk very short, valves woody, glabrous within.

ORDER L. **LEGUMINOSÆ.** (By J. G. Baker, F.L.S.)

Herbs, shrubs, or trees. Leaves stipulate and usually alternate, pinnate or digitate or simple, often stipellate, sometimes with the rachis ending in a tendril. Inflorescence axillary leaf-opposed or terminal, usually simply racemose or panicled; bracts and bracteoles usually both present. Flowers usually irregular, hermaphrodite, rarely regular or polygamous. Sepals 5, combined or free, often unequal, sometimes combined into two lips. Petals 5, rarely fewer by arrest, usually free and unequal. Stamens normally ten, perigynous or almost hypogynous, rarely fewer by arrest or indefinite; filaments free or variously combined. Anthers 2-celled, the dehiscence almost always longitudinal. Ovary free; style simple, cylindrical, usually declinate; stigma capitate, terminal or oblique. Ovules one or more on the ventral suture. Fruit usually dry, a pod splitting open along both sutures, sometimes continuous and indehiscent, at others separating into 1-seeded joints. Seeds usually exalbuminous; cotyledons foliaceous or amygdaloid, with a straight or inflexed accumbent radicle.—DISTRIB. One of the most cosmopolitan of natural orders, the second largest of flowering plants, containing between 6000 and 7000 known species. Of the three suborders it is only the first that is cosmopolitan, the two others not reaching beyond the tropical and warm temperate zones.

SUBORDER I. **PAPILIONACEÆ.** Corolla papilionaceous. Petals irregular, imbricated, the uppermost (standard) outermost, the four others in two opposite pairs. Stamens definite.

Tribe I. **Podalyriææ.** Stamens free. Pod dehiscent. Leaves digitate.

Shrub with connate stipules	1. PIPTANTHUS.
Herbs with free stipules	2. THERMOPsis.

Tribe II. **Genistææ.** Stamens monadelphous. Pod dehiscent, not jointed. Leaves simple or digitately 3-foliolate.

* *Anthers uniform. Keel petals scarcely cohering.*

3. ROTHIA.

** *Anthers dimorphous. Keel petals firmly cohering.*

Leaflets entire, subsessile.

Keel obtuse.

Calyx 2-lipped 4. ARGYROLOBIUM.

Calyx subequally 5-toothed 5. LOTONONIS.

Keel beaked.

Pod flattened.

Flowers solitary in axils of leaves 6. HEYLANDIA.

Flowers in terminal racemes 7. PRIOTROPIS.

Pod turgid 8. CROTALARIA.

Leaflets toothed, stalked 9. ONONIS.

Tribe III. **Trifolieæ.** *Stamens* diadelphous. *Pod* usually dehiscent, not jointed. *Leaves* digitately or pinnately 3-foliolate; leaflets usually toothed.

* *Leaves digitately 3-foliolate.*

Petals persistent, adnate to the staminal tube 10. TRIFOLIUM.

Petals caducous, free from the staminal tube 11. PAROCHETUS.

** *Leaves pinnately 3-foliolate.*

Pod elongated, straight or recurved 12. TRIGONELLA.

Pod short, round, or oblong 13. MELILOTUS.

Pod falcate or spiral 14. MEDICAGO.

Tribe IV. **Loteæ.** *Stamens* diadelphous. *Pod* dehiscent, not jointed. *Leaves* pinnately 5-foliolate; leaflets entire.

15. LOTUS.

Tribe V. **Galegeæ.** *Stamens* usually diadelphous. *Pod* dehiscent, not jointed. *Leaves* imparipinnate; leaflets entire.

* *Anthers apiculate. Hairs fixed by the centre.*

Stamens monadelphous 16. CYAMOPSIS.

Stamens diadelphous 17. INDIGOFERA.

** *Anthers obtuse. Hairs basifixed.*

Pod 1-seeded, indehiscent. *Leaves* gland-dotted 18. PSORALEA.

Pod few- or many-seeded, subindehiscent or late in dehiscing.

Filaments filiform.

Pod membranous, inflated 19. COLUTEA.

Pod woody or very firm 20. MILETTIA.

Filaments dilated 21. MUNDULEA.

Pod many-seeded, soon dehiscing.

Flowers mostly in leaf-opposed racemes 22. TEPHROSIA.

Flowers mostly in axillary racemes.

Pod very long, distinctly septate 23. SESBANIA.

Pod linear or oblong, not septate.

Calyx very oblique 24. CARAGANA.

Calyx not oblique.

Keel very short, obtuse 25. GULDENSTÆDTIA.

Keel long, obtuse 26. ASTRAGALUS.

Keel long, appendiculate 27. OXYTROPIS.

Tribe VI. **Hedysarææ**. *Stamens* diadelphous or monadelphous. *Pod* jointed if more than 1-seeded. *Leaves* odd-pinnate.

* *Leaves exstipellate*.

Stamens monadelphous; anthers uniform.

- | | |
|---|------------------|
| Leaflets 1-3. Flowers in a lax raceme | 28. TAVERNIERA. |
| Leaflets 3. Flowers in a dense head | 29. EBENUS. |
| Leaflets 4 | 30. GEISSAPSIS. |
| Leaflets many | 31. ONOBERYCHIS. |

Stamens diadelphous (9 and 1); anthers uniform.

- | | |
|--|----------------|
| Ovule solitary. <i>Pod</i> 1-jointed | 32. LESPEDEZA. |
| Ovules few. | |

Spiny shrub, with simple leaves	33. ALHAGI.
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Herbs with imparipinnate leaves.

- | | |
|---|----------------|
| Pod distinctly jointed | 34. HEDYSARUM. |
| Pod marked only by faint transverse lines | 35. STRACHEYA. |

Stamens monadelphous; anthers dimorphous.

- | | |
|--|-------------------|
| Joints of pod 2-6, muricated | 36. ZORNIA. |
| Joints of pod 1-2, rugose | 37. STYLOSANTHES. |

Stamens in two bundles of 5 each; anthers uniform.

- | | |
|--|------------------|
| Pod twisted inside the calyx | 38. SMITHIA. |
| Pod straight exerted from the calyx | |
| Calyx 2-lipped | 39. ÆSCHYNOMENE. |
| Calyx 5-toothed | 40. ORMOCARPUM. |

** *Leaves stipellate*. (*Stamens* in all 9 and 1; anthers uniform.)

Ovary 1-ovuled.

- | | |
|--------------------------------------|------------------|
| Racemes terminal, capitate | 41. LEPTODESMIA. |
| Racemes axillary, lax | 42. ELEIOTIS. |

Ovules several. *Pod* not distinctly jointed.

- | | |
|----------------------|-------------------|
| Pod turgid | 43. PYCNOSPORA. |
| Pod flat | 44. PSEUDARTHRIA. |

Ovules 2 or more. *Pod* distinctly jointed.

Pod twisted up so that the joints are brought face to face.

- | | |
|---|-------------|
| Calyx accrescent; teeth lanceolate | 45. LOUREA. |
| Calyx not accrescent; teeth setaceous | 46. URARIA. |

Pod not twisted up.

- | | |
|-------------------------|------------------|
| Joints turgid | 47. ALYSICARPUS. |
| Joints flattened. | |

Pedicle abruptly inflexed at the tip	48. MECOPUS.
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Pedicle not inflexed.

- | | |
|--|----------------|
| Racemes in fascicles from the old wood | 49. OUGEINIA. |
| Racemes simple or paniced from the year's shoots | 50. DESMODIUM. |

Tribe VII. **Vicieæ**. *Stamens* diadelphous (the tenth abortive in *Abrus*). *Pod* dehiscent, not jointed. *Leaves* equally pinnate; petiole ending in a tendril or bristle.

Shrubs with the tenth stamen absent	51. ABRUS.
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Herbs with diadelphous stamens (9 and 1).

- | | |
|----------------------------|------------|
| Leaflets toothed | 52. CICER. |
| Leaflets entire. | |

Tube of stamens oblique at mouth	53. VICIA.
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Tube of stamens truncate at mouth	54. LATHYRUS.
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Tribe VIII. **Phaseoleæ**. *Stamens* monadelphous or diadelphous. *Pod* dehiscent, not jointed. Climbing, rarely erect herbs or shrubs, with pinnately 3-foliate leaves.

Subtribe I. GLYCINEÆ. *Leaves* not gland-dotted; leaflets stipellate. *Nodes* of racemes not tumid. *Flowers* small. *Petals* about equal in length. *Style* beardless.

* *Stamens* diadelphous. *Stipules* and bracts conspicuous persistent.

Style filiform. Calyx-teeth distinct.

Standard spurred. Flowers dimorphic 55. AMPHICARPÆA.

Standard not spurred. Flowers uniform 56. SHUTERIA.

Style flattened upwards. Calyx truncate 57. DUMASIA.

** *Stamens* monadelphous. *Stipules* and bracts minute caducous.

Anthers uniform, all fertile 58. GLYCINE.

Alternate anthers abortive 59. TERAMNUS.

Subtribe II. ERYTHRINEÆ. *Leaves* not gland-dotted; leaflets stipellate. *Nodes* of racemes tumid. *Flowers* conspicuous. *Petals* very unequal. *Style* beardless.

Keel exceeding the wings and standard.

Anthers dimorphous 60. MUCUNA.

Anthers uniform 61. APIOS.

Standard exceeding the keel and wings 62. ERYTHRINA.

Standard and keel equal; wings short 63. STRONGYLODON

Subtribe III. GALACTIEÆ. *Leaves* not gland-dotted; leaflets stipellate. *Nodes* of racemes tumid. *Petals* equal. *Style* beardless.

* *Stamens* diadelphous.

Herbs.

Two upper calyx-teeth not fused 64. GRONA.

Two upper calyx-teeth fused into one.

Keel nearly straight 65. GALACTIA.

Keel semicircular 66. COCHLIANTHUS.

Shrubs.

Pod 1-seeded, not winged.

Flowers small, paniced 67. SPATHOLOBUS.

Flowers large, racemose 68. BUTEA.

Pod many-seeded, winged 69. MASTERSIA.

** *Stamens* monadelphous.

Upper lip of calyx projecting 70. CANAVALLIA.

Upper teeth of calyx not projecting.

Pod oblong, turgid, 1-2-seeded 71. DIOCLEA.

Pod linear, flat, many-seeded 72. PUERARIA.

Subtribe IV. EUPHASEOLEÆ. *Leaves* not gland-dotted. *Stamens* diadelphous. *Style* bearded below the stigma.

* *Stigma* oblique.

Keel spiral 73. PHASEOLUS.

Keel not spiral. Style filiform 74. VIGNA.

Keel not spiral. Style flat upwards 75. PACHYRHIZUS.

** *Stigma* terminal.

Petals very unequal in length 76. CLITORIA.

Petals equal in length. Pod flattish 77. DOLICHOS.

Petals equal in length. Pod square, 4-winged 78. PSOPHOCARPUS.

Subtribe V. **CAJANEÆ**. *Leaves* gland-dotted below ; *stipellæ* often abortive. *Nodes* of raceme not tumid. *Style* not bearded.

* *Ovules* 3 or more.

Pod with depressed lines between each seed.

Seeds with a large grooved aril	79. ATYLOSIA.
Aril absent	80. CAJANUS.
Pod without depressed lines between the seeds	81. DUNBARIA.

** *Ovules* 1-2.

Calyx-teeth accrescent	82. CYLISTA.
Calyx-teeth not accrescent.	
Funiculus at the end of the hilum	83. ERIOSEMA.
Funiculus centric on the hilum.	
Leaves pinnate. Pod compressed	84. RHYNCHOSIA.
Leaves digitate. Pod turgid	85. FLEMINGIA.

Tribe IX. **Dalbergiæ**. *Stamens* monadelphous or diadelphous. *Pod* continuous, indehiscent. *Leaves* odd-pinnate.

* *Leaflets* distinctly alternate.

Flowers small, white or reddish	86. DALBERGIA.
Flowers large, yellow	87. PTEROCARPUS.

** *Leaflets* opposite.

Pod flat, almost woody, wingless	88. PONGAMIA.
Pod flat, thin, firm, winged down one or both sutures	89. DERRIS.
Pod round, subdrupaceous	90. EUCHRESTA.

Tribe X. **Sophoreæ**. *Stamens* free. *Pod* not jointed. *Leaves* odd-pinnate, rarely simple.

Leaves simple. Bract and bracteoles large, opposite, persistent	91. DALHOUSIEA.
Leaves odd-pinnate. Bracts and bracteoles small, caducous.	
Stigma terminal.	
Pod moniliform	92. SOPHORA.
Pod equal, flat, membranous	93. CALPURNIA.
Stigma oblique.	
Pod indehiscent, flattish, narrowly winged	94. PERICOPSIS.
Pod turgid, dehiscent, fleshy or coriaceous	95. ORMOSIA.

SUBORDER II. **CÆSALPINIÆ**. *Petals* imbricate, slightly unequal, the upper innermost in bud. *Stamens* definite.

Tribe XI. **Eucæsalpinieæ**. *Leaves* ample, abruptly bipinnate.

* *Calyx-disk* sub-basal ; *sepals* imbricated.

Sutures of pod not winged	96. CÆSALPINIA.
Both sutures of pod winged	97. PELTOPHORUM.
Upper suture of pod winged	98. MEZONEURON.
Pod samaroid	99. PTEROLOBIUM.

** *Calyx-disk* sub-basal ; *sepals* valvate.

Pod thin, flat	100. POINCIANA.
Pod turgid, moniliform	101. PARKINSONIA.

*** *Calyx-disk placed considerably above the base.*

102. WAGATEA.

See also MEZONEURON, § *Tubicalyx*.

Tribe XII. **Cassieæ.** *Leaves* simply pinnate. *Calyx-tube* short; disk
subbasal.

Petals 5. Anthers mostly dehiscent by a terminal pore	103. CASSIA.
Petals 5. Anthers dehiscent longitudinally	104. CYNOMETRA.
Petal 1. Stamens diadelphous (9 and 1)	105. SINDORA.
Petals none.	
Stamens 2. Leaves unequally pinnate	106. DIALIUM.
Stamens 10. Leaves equally pinnate.	
Sepals usually 5	107. HARDWICKIA.
Sepals 4	108. CRUDIA.

Tribe XIII. **Amherstieæ.** *Leaves* equally pinnate. *Disk* at the top of
prolonged calyx-tube.

Petals none	109. SARACA.
Petals 3-5.	
Stamens diadelphous (9 and 1)	110. AMHERSTIA.
Stamens monadelphous, only 3 developed	111. TAMARINDUS.
Stamens 5, free, equal	112. HUMBOLDTIA.
Stamens 3-8, free	113. AFZELIA.

Tribe XIV. **Bauhinieæ.** *Leaves* simple, mostly deeply 2-lobed.

114. BAUHINIA.

SUBORDER III. **MIMOSEÆ.** *Petals* regular, valvate, usually united above
the base. *Stamens* definite or indefinite.

Tribe XV. **Mimoseæ.** *Stamens* definite, usually ten.

* *Anthers at first gland-crested.*

Herbs with flowers in round heads	115. NEPTUNIA.
Tree with flowers in round heads	116. XYLIA.
Shrubs or trees with flowers in spikes.	
Climber with tendrils	117. ENTADA.
Erect without prickles	118. ADENANTHERA.
Erect prickly.	
Pod turgid with a thick mesocarp	119. PROSOPIS.
Pod thin, coriaceous, finally twisted	120. DICHROSTACHYS.
Pod long, thin, flat	121. PIPTADENIA.

** *Anthers not gland-crested.*

Stamens 10.	
Calyx-teeth imbricate. Stamens monadelphous	122. PARKIA.
Calyx-teeth valvate. Stamens free.	
Pod ligulate, coriaceous, continuous.	
Undershrub with clavate stigma	123. DESMANTHUS.
Tree with capitate stigma	124. LEUCÆNA.
Pod jointed	125. MIMOSA.
Stamens 6	126. ACROCARPUS.

Tribe XVI. **Acacieæ.** *Stamens* indefinite.

Stamens free	127. ACACIA.
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Stamens monadelphous.

Leaves bipinnate.

Pod thin, ligulate, the sutures not thickened	128. ALBIZZIA.
Pod large, turgid, oblong, indehiscent, the sutures not thickened	129. SERIANTHES.
Pod rather falcate, the sutures much thickened	130. CALLIANDRA.
Pod circinate	131. PITHECOLOBIUM.
Leaves simply pinnate	132. INGA.

1. **PIPTANTHUS**, D. Don.

A shrub. *Leaves* digitately 3-foliolate. *Flowers* racemed, bracteate. *Calyx-tube* campanulate; teeth equal, lanceolate. *Corolla* three times the calyx; petals all with long claws; standard orbicular, erect, margins reflexed; wings obovate; keel-petals obovate-oblong, connate down the back, slightly incurved. *Stamens* free; anthers uniform. *Ovary* linear, stalked, downy, 6-10-ovulate; style filiform, incurved; stigma minute terminal. *Pod* linear, flattened, continuous within.—**DISTRIB.** A single endemic species.

1. **P. nepalensis**, D. Don in *Sweet, Brit. Flower Gard.* t. 264; Brand. *For. Flor.* 132. *Thermopsis nepaulensis*, DC. *Prodr.* ii. 99. *T. laburnifolia*, Don *Prodr.* 239. *Baptisia? nepalensis*, Hook. *Exot. Flor.* t. 131. *Anagyris nepalensis*, Grah. in *Wall. Cat.* 5340. *A. indica*, Lindl. in *Trans. Hort. Soc.* vii. 245.

TEMPERATE HIMALAYA, from SIMLA to BHOTAN, alt. 7-9000 ft.

A shrub 6-10 feet high; habit of the laburnum; branches downy. *Stipules* small, connate, amplexicaul; petiole 1 in. or less; leaflets glabrescent, lanceolate, 2-4 in., narrowed to both ends. *Flowers* 12-20 in subdense racemes; bracts large, deciduous; bracteoles 0. *Calyx* downy, deciduous from the base. *Corolla* yellow, above 1 in. long. *Pod* 2-5 in., 3-10-seeded.

2. **THERMOPSIS**, R. Br.

Perennial herbs. *Leaves* stipulate, 3-foliolate; bracts large, leafy, free. *Flowers* showy, usually yellow, racemed. *Calyx-tube* turbinate; teeth lanceolate; two upper more or less connate. *Petals* all long-clawed; standard orbicular, sides reflexed; wings obovate; keel-petals obovate-oblong, faintly joined down the back. *Stamens* free; anthers uniform. *Ovary* linear, sessile or stalked, α -ovulate; style filiform, incurved; stigma minute terminal. *Pod* turgid, linear or oblong, straight or falcate, continuous within.—**DISTRIB.** Species 12, China, Japan, N. America.

1. **T. barbata**, Royle *Ill.* 196, t. 32, fig. 1; densely shaggy, leaflets oblanceolate, corolla deep purple, pod linear-oblong. Hook. *Bot. Mag.* t. 4868. *Anagyris barbata*, Grah. in *Wall. Cat.* 5341.

TEMPERATE AND SUBALPINE HIMALAYA, from KASHMIR and KUNAWAR to SIKKIM, ascending to 11,000 ft.

Rootstock woody. *Stems* 1 ft. or more, copiously branched dichotomously. *Leaves* sessile, subglabrescent, often opposite; stipules just like the leaflets in texture and shape. *Flowers* 6-12, short-stalked, opposite or ternate. *Calyx* shaggy, like the leaves, 3 lower teeth twice the tube. *Corolla* 1 in. long. *Pod* short-stalked, $\frac{1}{2}$ - $\frac{5}{8}$ in. broad, 1-6-seeded.

2. **T. inflata**, Camb. in Jacquem. Voy. Bot. iv. 34, t. 39; finely downy, leaflets obovate-cuneate, corolla yellow, pod broad-oblong. Benth. in Hook. Lond. Journ. ii. 431.

HIMALAYAS of TIBET and KUNAWAR, alpine region, alt. 15-17,000 ft.

General habit of the last, but not more than half a foot high. Rootstock woody, widely creeping. Leaves sessile; leaflets fleshy, glaucous, $\frac{1}{2}$ - $\frac{3}{4}$ in. Stipules like the leaflets in shape and texture. Racemes close, 6-10-flowered. Flowers short-stalked, in twos or threes. Calyx finely silky, the three lower teeth as long as the tube. Pod short-stalked, 6-10-seeded, oblong, an inch or more thick, more membranous and flexible than in *T. barbata*, and dehiscing less readily.

3. **ROTHIA**, Pers.

Diffuse annuals. Leaves, petioled, digitately 3-foliolate. Flowers copious, minute, in the axils of the leaves. Calyx-tube turbinate, the teeth as long as the tube, the two upper broader and arched. Corolla scarcely exerted, all the petals narrow, nearly straight, distinctly unguiculate, those of the keel scarcely cohering. Filaments united in a tube which is slit along the top; anthers uniform, minute. Ovary sessile, linear, ∞ -ovulate; style short, straight, filiform, stigma capitate minute. Pod linear, slender, nearly straight, compressed, continuous within.—DISTRIB. Two species, the other Trop. African.

1. **R. trifoliata**, Pers; DC. Prodr. ii. 382; Wall. Cat. 5821; Wt. & Arn. Prodr. 195; Wight Ic. t. 199. Lotus indicus, Desr. in Lam. Enc. iii. 306. Trigonella indica, Linn.; Roxb. Fl. Ind. iii. 389. Dillwynia trifoliata, Roth Cat. iii. 71. Glycine leptocarpa, Grah. in Wall. Cat. 5515. Hosackia indica, Grah. in Wall. Cat. 5940.

TROPICAL PLAINS from BUNDELKUND to CEYLON.—DISTRIB. Australia.

A copiously-branched diffuse annual with slender stems a foot or more long. Stipules free, minute, $\frac{1}{2}$ -lunate, persistent; petioles shorter than the leaflets; leaflets oblanceolate-oblong, obtuse, minutely mucronate, rather fleshy, silky, $\frac{1}{2}$ -1 in. long. Flowers 1-4, on short pedicels in the axils of most of the leaves. Calyx silky, $\frac{1}{2}$ - $\frac{1}{3}$ in. Corolla inconspicuous, fugacious. Pod $1\frac{1}{2}$ -2 in., silky. Seeds 20 or more.

4. **ARGYROLOBIMUM**, Eckl. & Zeyh.

Herbs or shrubs. Leaves digitately 3-foliolate; stipules free. Flowers yellow, in terminal or leaf-opposed racemes or umbels. Calyx 2-lipped, slit nearly to the base, with (in Indian species) 5 distinct teeth, 2 to the upper, 3 to the lower lip. Corolla scarcely if at all exerted; standard roundish; wings oblong; keel-petals broad, joined down the back to the obtuse incurved tip. Stamens monadelphous; anthers dimorphous. Ovary linear, sessile, ∞ -ovuled; style elongate, filiform, curved gradually upwards inside the keel, stigma minute oblique. Pod linear, straight, continuous within, compressed, subtorulose.—DISTRIB. Species 40-50, mostly South African.

1. **A. flaccidum**, Jaub. & Spach in Ann. Sc. Nat. ser. ii. xix. 48; terminal leaflet lanceolate acute, upper lip of calyx as long as lower, 4 upper teeth deltoid, lowest subulate. Benth. in Hook. Lond. Journ. iii. 350. Cytisus flaccidus, Royle Ill. 197. Glycine? flaccida, Wall. Cat. 5517. A. divaricatum, Jaub. & Spach. loc. cit.; Ill. Pl. Orient. i. 116.

TROPICAL and TEMPERATE tracts of north-west India, ascending from the plains to 9000 ft.

A shrub with very slender diffuse branches reaching 12–18 in. high. *Stipules* minute, linear, persistent; petioles much shorter than the leaves; leaflets pale, silky, subequal, lanceolate, acute, $\frac{1}{2}$ – $\frac{3}{4}$ in. long. *Flowers* 1–6 in leaf-opposed racemes on peduncles that exceed the leaves. *Calyx* $\frac{1}{8}$ – $\frac{1}{2}$ in.; teeth shorter than the limb. *Pod* densely silky, 6–8-seeded, $\frac{1}{8}$ in. broad.—*Cytisus languinosus*, Royle MSS., is a form with more densely silky vestiture.

2. **A. roseum**, Jaub. & Spach, in *Ann. Sc. Nat. ser. ii. xix. 51*; end leaflet obovate-cuneate very obtuse, upper lip of calyx shorter than lower, teeth all lanceolate. *Cytisus roseus*, Camb. in Jacq. *Voy. Bot. iv. 35, t. 40*. *A. ornithopodioides*, Jaub. & Spach, loc. cit.; *Ill. Pl. Orient. i. 116*. *A. Kotschyi*, Boiss. *Diagn. vi. 32*.

TROPICAL and SUBTEMPERATE tracts of the north-west, ascending from the plains to 7000 ft. in KUMAON.—DISTRIB. Persia.

General habit of *A. flaccidum*, but nearly or quite glabrous. *Stipules* the same: petioles as long as or shorter than the leaves; leaflets $\frac{1}{4}$ – $\frac{3}{8}$ in. long, often nearly as broad, point truncate or emarginate. *Peduncles* 1–4-flowered, exceeding the leaves. *Calyx* $\frac{1}{2}$ in., glabrous; teeth of upper lip exceeding limb. *Corolla* yellow tinged with red; standard longer than upper lip of calyx. *Pod* glabrous, 10–15-seeded, $\frac{1}{12}$ in. broad.—*A. trigonelloides*, J. & S., with a similar habit, but a shorter flatter pod with much fewer seeds, will probably be found in Scinde.

5. LOTONONIS, DC.

Herbs or shrubs with digitately trifoliolate leaves, stipules connate or free, flowers in terminal or leaf-opposed racemes or umbels. *Calyx-tube* narrow-turbinate; lowest tooth deeper than the other 4. *Corolla* little exserted; standard very narrow; wings shorter and still narrower; keel longer, suddenly incurved at the tip, its petals firmly joined along the back. *Stamens* united in a tube slit along the top; anthers dimorphous. *Ovary* sessile, linear, α -ovulate; style abruptly incurved at the base, stigma minute oblique. *Pod* linear, usually compressed, but in our species turgid.—DISTRIB. Species 60, nearly all restricted to South Africa.

1. **L. Leobordea**, Benth. in Hook. *Lond. Journ. ii. 607*. *Leobordea lotoides*, Delile *Fragm. Pl. Arab. 23, tab. 1*.

SCINDE; between the plains and Rohill pass, *Stocks*. PUNJAB; Peshawur, Stewart. DISTRIB. Through the desert region to Algeria, Abyssinia and the Cape.

A much-branched finely silky diffuse annual, $\frac{1}{2}$ ft. or less high. *Stipules* minute lanceolate, deciduous; petiole as long as leaf; leaflets oblanceolate, rather fleshy, obtuse, minutely mucronate, $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* 1–5, subsessile in axils of most of the leaves. *Calyx* silky, $\frac{1}{6}$ – $\frac{1}{4}$ in. *Corolla* pale yellow or red, scarcely exserted. *Pod* linear-oblong, turgid, 4–8-seeded, scarcely exserted.

6. HEYLANDIA, DC.

Calyx-tube turbinate; teeth lanceolate, three lowest deepest. *Corolla* much exserted; standard large, round; wings much smaller, obovate; keel-petals narrow, joined along the back, narrowed into an incurved beak. *Stamens* united in a tube slit above; anthers dimorphous. *Ovary* sessile, 2-ovulate; style

elongated filiform abruptly incurved at the base; stigma terminal. *Pod* oblong, flat, 1-2-seeded.—**DISTRIB.** A single endemic species.

1. **H. latebrosa**, *DC. Mem. Leg.* 201; *W. & A. Prodr.* 180; *Dalz. & Gibs. Bomb. Fl.* 54. *Hedysarum latebrosum*, *Linn. Mant.* 270. *H. leiocarpa*, *DC. loc. cit.*; *Wall. Cat.* 5342. *Hallia hirta*, *Willd. Sp. Pl.* iii. 1169. *Crotalaria uniflora*, *Koen. in Roxb. Fl. Ind.* iii. 271. *Heylandia hebecarpa*, *DC. loc. cit.* t. 34. *Goniogyna hebecarpa*, *leiocarpa* and *latebrosa*, *DC. in Ann. Sc. Nat. ser.* 1. iv. 91.

Everywhere in the tropical region from the GANGETIC plain and SCINDE to CEYLON.

A prostrate more or less silky much-branched herb. *Leaves* close-set, alternate, simple, subsessile, cordate-ovate, $\frac{1}{4}$ – $\frac{3}{4}$ in. long, more produced in the lower half. *Flowers* in the axils of most of its leaves, subsessile, solitary. *Corolla* yellow, $\frac{1}{8}$ – $\frac{1}{4}$ in. *Pod* silky, $\frac{1}{8}$ – $\frac{1}{4}$ in. long.

7. PRIOTROPIS, W. & A.

Calyx-tube campanulate; teeth subequal. *Corolla* much exserted; standard roundish; wings obovate-oblong; keel broad, with a long distinct ascending beak. *Stamens* monadelphous; anthers dimorphous. *Ovary* distinctly stalked, α -ovulate; style long, abruptly incurved at the base, bearded on the inner side, stigma capitate. *Pod* distinctly-stalked, 5-6-seeded, oblong, flattened, continuous within.—**DISTRIB.** A single endemic species.

1. **P. cytisoides**, *W. & A. Prodr.* 180; *Benth. in Hook. Lond. Journ.* ii. 594; *Walp. Ann.* iv. 461. *Crotalaria cytisoides*, *Roxb. Fl. Ind.* iii. 276; *Wall. Cat.* 5422; *DC. Prodr.* ii. 131.

TROPICAL EAST HIMALAYA; NIPAL to AVA, ascending to 6000 ft. in SIKKIM.

Undershrub, with the habit of *Crotalaria striata*, with slender glabrous branches. *Stipules* 0; petioles as long as the leaves; leaflets 3, oblong, glabrous, membranous, 2-3 in. long, narrowed to both ends. *Racemes* copious, short-stalked, leaf-opposed and terminal, closely 12-20-flowered. *Calyx* $\frac{1}{8}$ in., finely silky; teeth lanceolate, as long as the tube. *Corolla* pale yellow, glabrous, 2-3 times the calyx. *Pod* 1 in. by $\frac{1}{2}$ in., narrowed to both ends; gynophore filiform, quite as long as the calyx.

8. CROTALARIA, L.

Herbs or shrubs of very various habit and vestiture. *Leaves* simple or 3-foliate, very rarely odd-pinnate. *Flowers* in terminal or leaf-opposed racemes, often showy. *Calyx-tube* short; teeth linear or lanceolate, subequal or shortly connate in two lips. *Corolla* equalling or exceeding calyx; standard with a short claw, usually round; wings obovate-oblong, shorter; keel broad, equalling the wings, its petals joined down the back, much incurved, distinctly beaked. *Stamens* monadelphous; anthers dimorphous. *Ovary* sessile or stipitate, linear, usually multi- rarely 2-ovulate; style long, abruptly incurved at the base, bearded upwards, stigma minute oblique. *Pod* sessile or stipitate, straight, linear or oblong, turgid, continuous within, usually many-seeded.—**DISTRIB.** Species 2-300; spread everywhere in tropical and subtropical regions.

SECT. I. Arenariæ, *Benth.* Rigid copiously stiffly-branched undershrubs, often spiny, with scattered small rigid deciduous simple leaves.—A small group, characteristic of the desert Flora, reaching westward through Arabia and North Africa to Senegal.

1. **C. Burhia**, *Hamilt. in Wall. Cat.* 5386; *Benth. in Hook. Lond. Journ.* ii. 474; *Dalz. & Gibs. Bomb. Flora*, 54.

SCINDE and PUNJAB, in sandy plains, ascending to 4000 ft. CAMBAY, in the desert region, *Dalzell*.—DISTRIB. Afghanistan and Beloochistan.

A low undershrub, with very numerous stiff erect-patent branches, clothed with fine pale tomentum. *Spines* none. *Leaves* scattered, deciduous, subsessile, oblong or lanceolate, rigid, pale green, silky, $\frac{1}{2}$ – $1\frac{1}{2}$ in. long; stipules 0. *Flowers* 6–12, in elongated terminal racemes; pedicels 2-bracteolate, very short. *Calyx* densely silky, $\frac{1}{4}$ – $\frac{1}{2}$ in.; teeth long, lanceolate. *Corolla* yellow, scarce exserted. *Pod* oblong, 3–4-seeded, rather longer than calyx.

SECT. II. **Diffusæ**, *Benth.* Copiously-branched herbs with flexuose trailing stems. *Leaves* close, simple. *Stipules* 0 or small, not decurrent. *Racemes* all lateral, leaf-opposed, usually reduced to few flowers or one only. *Pods* glabrous or downy.

2. **C. biflora**, *Linn.*; pod subglobose finely silky flexible 12–20-seeded. *DC. Prodr.* ii. 127; *W. & A. Prodr.* 190. *Astragalus biflorus*, *Linn. Mant.* 273. *C. nummularia*, *Willd. Sp. Pl.* iii. 979; *Roxb. Fl. Ind.* iii. 271; *DC. Prodr.* ii. 129; *Wall. Cat.* 5417 (*ex parte*). *C. hirta*, *Roth Nov. Sp.* 339. *C. Rothiana*, *DC. Prodr.* ii. 127. *C. Rothii*, *Spreng. Syst.* iii. 237. *Cicer nummulariæfolium*, *Lamk.*; *DC. Prodr.* ii. 354.

Plains of the PENINSULA and CEYLON.—DISTRIB. Java.

A silky trailing annual, with stems 1 – $1\frac{1}{2}$ ft. long. *Leaves* close, subsessile, densely silky, ovate or roundish, $\frac{1}{2}$ –1 in. long, obtuse, mucronate; stipules minute, usually 0. *Pedicels* 2–4 times leaves, 1 or closely 2-flowered. *Calyx* $\frac{1}{4}$ in., densely silky; teeth long, upper lanceolate, lower linear. *Corolla* yellow, scarcely exserted. *Pod* compressible, $\frac{3}{8}$ – $\frac{1}{2}$ in. long, short-stalked.

3. **C. globosa**, *W. & A. Prodr.* 190; pod subglobose finely silky hard 2–4 seeded. *Benth. in Hook. Lond. Journ.* ii. 475. *C. globulosa*, *Wight in Wall. Cat.* 5412.

CARNATIC, Dindygul hills and Courtallum, *Wight, G. Thomson*.

Habit, vestiture, leaves, inflorescence, calyx and corolla just as in *C. biflora*, but pod smaller, not compressible, glabrescent before splitting, with seeds larger and much fewer.

4. **C. filipes**, *Benth. in Hook. Lond. Journ.* ii. 475; finely silky, stipules 0, leaves cordate-oblong oblique, peduncles thread-like 1–3-flowered, bracts and corolla very minute, pod oblong glabrous 8–10-seeded. *Dalz. & Gibs. Bomb. Flora*, 56.

Plains of the west side of the WESTERN PENINSULA; DEKKAN, *Edgeworth*.

Stems very slender, $\frac{1}{2}$ –1 ft., clothed with fine spreading deciduous silky hairs. *Leaves* pale, rigid, prominently veined, subsessile, obtuse, much more rounded on the lower side. *Peduncles* copious, rigid, 3–6 times the leaves, glabrous; flowers distant if more than one; bracts persistent, reflexed. *Calyx* $\frac{1}{12}$ in. long, finely silky; teeth long, all lanceolate. *Corolla* yellow, exserted; standard erect, veined, round, $\frac{1}{6}$ in. broad. *Pod* short-stalked, $\frac{1}{4}$ in. long.

5. **C. filiformis**, *Wall. Cat.* 5389; subglabrous, stipules semilunate persistent, leaves oblong, peduncles 1–2-flowered, bracts linear very minute, corolla very small, pod linear-oblong glabrous 12–16-seeded. *Benth. in Hook. Lond. Journ.* ii. 475.

AVA; Mount Prome, *Wallich*.

Stems slender, copiously branched, thinly silky when young. *Leaves* short-stalked, membranous, pale, subacute, 1–2 in. long, glaucous below; stipules small, spreading,

foliaceous. *Peduncles* very slender, sometimes pseudo-terminal by the development of leaves from their nodes; flowers if two distant. *Calyx* $\frac{1}{2}$ in. long; teeth deep, lanceolate. *Corolla* yellow, not distinctly exserted. *Pod* short-stalked, $\frac{1}{2}$ – $\frac{3}{8}$ in. long.

6. **C. trichophora**, *Benth. MSS.*; densely silky, stipules 0, leaves obliquely cordate-oblong, peduncles 1–2-flowered, bracts and corolla very small, pod oblong glabrous 6–8-seeded.

CONCAN plains, *Stocks*.

Stems slender, copiously branched, 1–1 $\frac{1}{2}$ ft., clothed with long silky yellow-brown hairs. *Leaves* sessile, membranous, $\frac{1}{2}$ –1 in. long, obtuse or subacute, pale, membranous, more broadly rounded on the lower side. *Peduncles* thread-like, rigid, clothed with long hairs, rarely two-flowered, often leafy downwards, longer than the leaves. *Calyx* $\frac{1}{2}$ in., densely silky; teeth long, linear. *Corolla* yellowish, scarcely exserted. *Pod* short-stalked, $\frac{1}{4}$ – $\frac{1}{2}$ in. long.

7. **C. Stocksii**, *Benth. MSS.*; subglabrous, stipules deciduous very minute, leaves linear-oblong, peduncles 1-flowered, bracts and corolla very small, pod linear-oblong glabrous 12–16-seeded.

CONCAN, *Stocks*; and contained also in Helfer's Tenasserim and Andaman collection.

Stems slender, very copiously branched, 1–1 $\frac{1}{2}$ ft. *Leaves* short-stalked, obtuse, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, membranous, equally narrowed on both sides at the base. *Pedicels* filiform, 2–3 times the leaves; bracts subulate. *Calyx* $\frac{1}{2}$ in.; teeth long, linear. *Corolla* yellow, slightly exserted. *Pod* sessile, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, finally black.

8. **C. vestita**, *Baker*; densely silky, leaves linear-oblong, stipules 0, bracts lanceolate persistent, racemes 4–5-flowered, corolla middle-sized, pod oblong glabrous 15–20-seeded.

Herb. *Stocks*, probably from CONCAN.

Stems slender, much branched, $\frac{1}{2}$ –1 ft., densely clothed with yellow-brown silky hairs. *Leaves* nearly sessile, moderately firm, equal-sided, $\frac{1}{2}$ –1 $\frac{1}{2}$ in. long, base rounded, point rather obtuse. *Peduncles* spreading, exceeding leaves; bracts acute, $\frac{1}{4}$ – $\frac{1}{2}$ in. long; pedicels shorter than calyx. *Calyx* $\frac{1}{4}$ in., shaggy; teeth linear, long. *Corolla* not exserted. *Pod* nearly sessile, $\frac{1}{2}$ – $\frac{3}{8}$ in. long.

9. **C. prostrata**, *Roxb. Hort. Beng.* 54; *Fl. Ind.* iii. 270; finely silky, stipules 0, leaves obovate-oblong rather oblique, racemes 2–4-flowered, bracts subulate very minute, corolla small, pod linear-oblong glabrous 12–15-seeded. *Rottl. in Willd. Enum.* 747; *DC. Prodr.* ii. 130; *Wall. Cat.* 5419; *W. & A. Prodr.* 189 (*excl. syn.*); *Mart. in Munch. Denk.* 6, t. E.

Plains from the UPPER GANGES to CEYLON, ascending to 6000 ft. in the Chenab valley.—DISTRIB. Java.

Stems slender, $\frac{1}{2}$ –1 ft., clothed with short adpressed or spreading silky yellow-brown hairs. *Leaves* nearly sessile, $\frac{1}{2}$ –1 $\frac{1}{2}$ in. long, obtuse, pale, glaucous below, produced (cordate) on the lower side at the base. *Peduncles* finely silky, usually twice the leaves. *Calyx* $\frac{1}{12}$ – $\frac{1}{8}$ in., densely silky; teeth linear, long. *Corolla* yellow, not exserted. *Pod* nearly sessile, $\frac{1}{2}$ – $\frac{3}{8}$ in. long.

10. **C. humifusa**, *Grah. in Wall. Cat.* 5421; shortly silky, stipules minute subulate, leaves round-oblong, peduncles laxly 3–6-flowered, bracts and corolla very small, pod oblong glabrous 6–8-seeded. *Benth. in Hook. Lond. Journ.* ii. 476. *C. prostrata*, *Wight Herb. ex parte*.

KUMAON to SIKKIM and KHASIA, ascending to 5000 ft. ANAMALLAY hills, alt. 4000 ft., *Beddome*.

Stems under a foot long, slender, flexuose, much branched, densely clothed with short spreading yellow-brown silky hairs. *Leaves* nearly sessile, very obtuse, membranous, pale, glaucous below, equal at the base, $\frac{1}{2}$ –1 in. long. *Peduncles* arcuate, densely silky, usually 2–3 times the leaves, sometimes leafy below; pedicels cernuous, lower as long as the calyx. *Calyx* $\frac{1}{2}$ in., densely silky; teeth linear, very long. *Corolla* yellowish, not exserted. *Pod* short-stalked, $\frac{1}{4}$ in. long.

11. *C. ferruginea*, *Grah. in Wall. Cat.* 5398; finely silky or shaggy, stipules lanceolate spreading, leaves obovate-oblong, racemes laxly 2–8-flowered, bracts small linear, corolla middle-sized, pod linear-oblong glabrous 20–30-seeded. *Benth. in Hook. Lond. Journ.* ii. 476. *C. canescens*, *Wall. Cat.* 5415. *C. crassifolia*, *Ham. in Wall. Cat.* 5416. *C. obliqua*, *Wall. Cat.* 5388. *C. leioloba*, *Bartl. Ind. Sem. Hort. Gött.* 1837; *Linnæa* xii. *Littb.* 80. *C. pilosissima*, *Miquel Fl. Ind. Bat.* i. 327.

NIPAL to ASSAM, ascending to 5–6000 ft.: AWA, MARTABAN, CEYLON.—DISTRIB. Java, Philippines, Formosa.

More robust than all the preceding. *Branches* in the type finely silky. *Leaves* short-stalked, moderately thick, pale beneath, obtuse, equal-sided, 1–2 in. long; stipules persistent, foliaceous, often deflexed. *Peduncles* usually 2–3 times the leaves; racemes much elongated; bracts persistent, spreading or deflexed. *Calyx* $\frac{3}{8}$ – $\frac{1}{2}$ in., shortly silky; teeth long, upper lanceolate, lower linear. *Corolla* not distinctly exserted. *Pod* short-stalked, 1–1 $\frac{1}{4}$ in. long.

VAR. *β. pilosissima*, *Benth. MSS.*; leaves and flowers larger, calyx and branches densely clothed with longer bright yellow-brown silky hairs.—KHASIA; 3–5000 ft., *Hook. fil. & Thomson*.

12. *C. acicularis*, *Ham. in Wall. Cat.* 5390; finely silky, stipules small lanceolate, leaves oblong oblique, racemes closely 12–20 flowered, bracts lanceolate, corolla small, pod linear-oblong glabrous 15–20 seeded. *Benth. in Hook. Lond. Journ.* ii. 476. *C. disticha*, *Zolling. in Flora*, 1847, 694.

BENGAL to AWA and TENASSERIM.—DISTRIB. Java, Philippines.

Stems slender, a foot long or more, thinly clothed with spreading silky hairs. *Leaves* nearly sessile, obtuse, glaucous-green, membranous, thinly silky, $\frac{1}{2}$ –1 $\frac{1}{2}$ in. long, rounded on the upper, cordate on the lower side at the base; stipules persistent, reflexed. *Peduncles* equalling or exceeding leaves; bracts small, persistent, reflexed. *Calyx* $\frac{1}{5}$ – $\frac{1}{4}$ in., densely silky, teeth linear, very long. *Corolla* not exserted. *Pod* sessile, $\frac{1}{4}$ – $\frac{3}{8}$ in. long.

13. *C. evoluloides*, *Wight in Wall. Cat.* 5410; finely silky, stipules linear minute, leaves round-oblong obtuse slightly oblique, racemes 3–8 flowered, bracts minute lanceolate, corolla small, pod oblong finely downy 8–10-seeded. *W. & A. Prodr.* 188 (excl. syn.); *Benth. in Hook. Lond. Journ.* ii. 477. *C. hirsuta*, *Wall. Cat.* 5413 A.C.

Tropical region, NILGHIRIS and CEYLON.

Stems 1–2 feet long, copiously branched, clothed with fine short spreading hairs. *Leaves* short-stalked, $\frac{1}{2}$ –1 in. long, moderately firm in texture, always obtuse. *Peduncles* equalling or much exceeding the leaves; pedicels cernuous, exceeding the bracts, shorter than the calyx. *Calyx* $\frac{1}{2}$ in., long densely pubescent; teeth long, linear. *Corolla* yellow, slightly exserted. *Pod* short-stalked $\frac{1}{2}$ – $\frac{3}{8}$ in. long.—The plant figured under this name in Wight's *Icones* t. 31 from Courtallum has much larger flowers and is probably a distinct undescribed species.

14. *C. hirsuta*, *Willd. Sp. Pl.* iii. 978; finely silky, stipules linear minute, leaves ovate acute slightly oblique, racemes 2–3-flowered, bracts lanceolate minute, corolla middle-sized, pod oblong finely downy 8–10-seeded. *Roxb. Fl. Ind.* ii. 270; *Wall. Cat.* 5413 B; *DC. Prodr.* ii. 126; *W. & A. Prodr.* 188.

C. dichotoma, Roth Nov. Sp. 340. *C. rubiginosa*, Roxb. Fl. Ind. iii. 269, non Willd. *C. bifaria*, Wall. Cat. 5399, in part. *C. triflora*, Heyne in Wall. Cat. 5387.

Tropical region, CENTRAL HIMALAYA, Royle, Edgeworth, Thomson; BUNDELCUND, Edgeworth; WESTERN PENINSULA, Heyne, Wight.

Very near the last. Leaves more membranous, always acute, 1-2 in. Peduncles shorter, more slender, often leafy, densely clothed with short spreading silky hairs. Calyx $\frac{1}{4}$ in., densely pubescent. Corolla yellow, distinctly exserted. Pod just the same in shape and size.

15. *C. bifaria*, Linn. Suppl. 322; inconspicuously pubescent, stipules linear minute, leaves round-oblong obtuse slightly oblique, racemes 1-2-flowered, bracts small lanceolate, corolla middle-sized, pod oblong finely downy 10-12-seeded. DC. Prodr. ii. 127; W. & A. Prodr. 188 (excl. syn.); Wt. Ic. t. 30; Wall. Cat. 5399, ex parte; Dalz. & Gibs. Bomb. Fl. 55.

Tropical regions of the WESTERN PENINSULA and CEYLON.

Habit of the two last, but pubescence short and inconspicuous. Leaves short-stalked, moderately firm, $\frac{1}{2}$ -1 $\frac{1}{2}$ in., upper casually narrow, but all obtuse. Peduncles stoutish, usually exceeding the leaves; bracts reflexed, persistent. Calyx $\frac{3}{8}$ - $\frac{1}{2}$ in., obscurely pubescent: teeth linear-lanceolate, long. Corolla yellow, slightly exserted. Pod short-stalked, $\frac{3}{4}$ -1 $\frac{1}{4}$ in. long, very turgid, glabrescent before it splits.

16. *C. multiflora*, Benth. in Hook. Lond. Journ. ii. 478; shortly silky, stipules linear minute, leaves ovate acute, racemes 2-6-flowered, bracts linear, corolla large, pod oblong 10-12-seeded. Miq. Fl. Ind. Bat. i. 328. *C. bifaria*, var. *multiflora*, Arn. in Nova Act. Nat. Cur. xviii. 329.

CEYLON, alt. 3-5000 ft., Gardner, Thwaites, &c.

The most robust and showy species of the section. Leaves distinctly stalked, subcoriaceous, dark green, glandular, punctate, usually 1-2 in., but reaching in a narrow-leaved form 4-5 in. Peduncles $\frac{1}{4}$ - $\frac{1}{2}$ foot, stout, arcuate, densely clothed like the stem with short spreading brown hairs; pedicels cernuous, $\frac{1}{2}$ in.; bracts reflexed, persistent. Calyx $\frac{3}{4}$ -1 in., inconspicuously downy; teeth lanceolate, very long. Corolla yellowish, equalling the calyx; standard nearly 1 in. broad, veined with dark purple. Pod short-stalked, 1 $\frac{1}{4}$ -2 in. long, densely clothed with dark brown silky hairs.

SECT. III. *Alatæ*, Benth. Diffuse or suberect pubescent perennials. Leaves simple. Stipules decurrent as a persistent wing to the branches. Racemes all lateral, leaf-opposed 1-3-flowered. Pod stipitate linear-oblong glabrous.

17. *C. alata*, Hamilt. ex Roxb. in Don. Prodr. 241; suberect, stipular wing broad, leaves thin oblong obtuse or subacute, peduncle elongated often leafy, pod long-stalked. Roxb. Hort. Beng. 98; Fl. Ind. iii. 274; DC. Prodr. ii. 124; Wall. Cat. 5356; Benth. in Hook. Lond. Journ. ii. 478. *C. sagitticaulis*, Wall. Cat. 5357. *C. bialata*, Roxb. Fl. Ind. iii. 274.

KUMAON to ASSAM and the KHASIA Mts. ascending to 5500 ft.; Ava, Wallich; MISHMI, Griffith; PEGU, McLelland.—DISTRIB. JAVA.

A suberect under-shrub 1-2 ft. high. Stem and leaves below clothed with short silky pubescence. Leaves subsessile, much thinner than in *C. rubiginosa*, varying from obovate to ovate-oblong, reaching 2-3 in.; stipule forming a wing from one node nearly to the next, its point lanceolate-deltoid. Racemes 2-3-flowered; bracts small, persistent, ovate, acuminate. Calyx $\frac{3}{8}$ in., densely silky; tube campanulate; bracteoles inserted above the base. Corolla pale, not exserted. Pod linear-oblong, glabrous, 1 $\frac{1}{4}$ -1 $\frac{3}{4}$ in. long, 30-40-seeded.

18. *C. rubiginosa*, Willd. Sp. Pl. iii. 973; diffuse, stipular wing narrow, leaves small round-obovate obtuse coriaceous, peduncle short not leafy, pod short-

stalked. *DC. Prodr.* ii. 125; *W. & A. Prodr.* 181; *Wt. Ic.* t. 885; *Benth. in Hook. Lond. Journ.* ii. 478. *C. ovalifolia*, *Wall. Cat.* 5411. *C. Wightiana*, *Wall. Cat.* 5358 B.

NILGHIRIS up to 4000 ft.

A spreading shrub with stems $\frac{1}{2}$ –1 foot long, densely shortly grey-downy. Leaves subsessile, rarely an inch long, dark green, always very obtuse, and densely clothed with grey or when young with yellow-brown pubescence; stipules passing suddenly into a narrow wing from the spreading deltoid points. Racemes sparse, 1–4-flowered. Bracts small, persistent, ovate; bracteoles small, lanceolate, inserted above the base. Calyx $\frac{3}{8}$ – $\frac{1}{2}$ in., densely silky. Corolla yellow, not exserted. Pod oblong, 1–1 $\frac{1}{4}$ in. long, glabrous, 20–30-seeded.

VAR. 1. *scabrella*; stems stronger and more ascending, flowers rather larger, pod more distinctly stalked. *C. scabrella*, *W. & A. Prodr.* 181.—NILGHIRIS and CEYLON.

VAR. 2. *Wightiana*; stems suberect much more robust than in the type, leaves thinner more silky larger reaching 2–3 in. long $1\frac{1}{2}$ –2 in. broad, corolla and calyx $\frac{5}{8}$ – $\frac{3}{4}$ in. long, pod $1\frac{1}{2}$ –2 in. long, 30–40-seeded. *C. Wightiana*, *Grah. in Wall. Cat.* 5358, A.; *W. & A. Prodr.* 181.—NILGHIRIS and CEYLON up to 6000 ft.

SECT. IV. *Calycinae*, *Benth.* Copiously-branched diffuse annuals or low shrubs with slender branches. Leaves simple, more or less hairy, stipules 0 or small not decurrent. Racemes all terminal or a few also lateral. Pods glabrous or pubescent, exserted or included.

* Pod decidedly exserted from the calyx.

19. *C. pusilla*, *Heyne*; *DC. Prodr.* ii. 128; annual, densely silky, stipules 0, leaves linear very small, racemes terminal and lateral laxly 3–6-flowered, bracts minute lanceolate, pod silky sessile twice the calyx. *Wall. Cat.* 5396; *W. & A. Prodr.* 189.

WESTERN PENINSULA; Bombay to Courtallum.

Stems under half a foot high, with copious ascending branches clothed with adpressed brown silky hairs. Leaves subsessile, firm, obtuse, $\frac{1}{4}$ – $\frac{3}{4}$ in. long, densely silky. Racemes very copious, short-stalked, $\frac{1}{2}$ –1 in. long. Calyx campanulate, silky $\frac{1}{12}$ in. deep; teeth deep, all linear. Corolla yellow, scarce exserted. Pod $\frac{1}{6}$ in. long, thinly silky, 4–8-seeded.—The smallest of all the species.

20. *C. hirta*, *Willd.*; *DC. Prodr.* ii. 130; annual, finely hairy, stipules 0, leaves small linear obtuse, racemes capitate 2–4-flowered, bracts lanceolate foliaceous, pod glabrous sessile twice calyx. *Mart. in Munch. Denks.* 6 t. F.; *W. & A. Prodr.* 182; *Benth. in Hook. Lond. Journ.* ii. 567. *C. chinensis*, *Roxb. Fl. Ind.* iii. 268; *Wall. Cat.* 5385, non *Linn.* *C. pilosa*, *Roxb. in E. I. C. Mus.* t. 370; *Rottl. Nova Act.* 1808.

DEKKAN, near Hydrabad.

A diffuse annual with slender branches, thinly clothed with short spreading hairs. Leaves short-stalked $\frac{1}{2}$ – $\frac{3}{4}$ in., moderately close, rounded at the base. Flowers crowded at the end of leafy branches; pedicels very short. Calyx $\frac{1}{4}$ in., densely silky; teeth long, all linear, acuminate. Corolla scarce exserted. Pod oblong, 15–20-seeded.—Differs from *chinensis* by its small obtuse leaves and much shorter calyx.

21. *C. mysorensis*, *Roth*; *DC. Prodr.* ii. 126; annual, densely silky, stipules linear persistent, leaves linear-oblong obtuse, racemes terminal and lateral laxly 6–9-flowered, bracts lanceolate foliaceous, pod subsessile glabrous twice the calyx. *Wall. Cat.* 5361; *W. & A. Prodr.* 182. *C. stipulacea*, *Roxb. Fl. Ind.* iii. 264. *C. hirsuta*, *Roxb. in E. I. C. Mus.*, t. 1595.

TROPICAL REGION, all through India proper, ascending to 4000 ft. in KUMAON.

Copiously branched, 1-2 ft. high, the stems clothed with long dense erecto-patent brown silky hairs. *Leaves* membranous, short-stalked, 1-3 in. long, rounded at both ends, thinly silky. *Racemes* stalked, reaching 6-9 in. long. *Calyx* $\frac{1}{2}$ - $\frac{2}{3}$ in. deep, densely clothed with long silky hairs; teeth all long, acuminate, upper lanceolate, lower linear. *Corolla* yellow, not exserted. *Pod* oblong, 1-1 $\frac{1}{4}$ in. long, 20-30-seeded.

22. **C. triquetra**, Dalzell in Hook. *Kew Journ.* ii. 34; suffruticose, branches triquetrous obscurely pubescent, stipules lanceolate minute, leaves lanceolate-oblong obtuse, racemes lateral and terminal laxly 2-3-flowered, pod silky short-stalked 3-4 times the calyx. *Dalz. & Gibs. Bomb. Flora*, 56.

WESTERN PENINSULA; CONCAN and MALWAN, Dalzell, *Stocks, Law*; CEYLON, Thwaites.

Suffruticose, 1-2 ft. high with copious very slender ascending branches angled down to the base. *Leaves* membranous, pale green, glabrescent, 1-2 in. long, broadly rounded at the base. *Racemes* long-stalked, very lax; bracts minute, lanceolate. *Calyx* $\frac{1}{4}$ - $\frac{1}{2}$ in. deep, thinly silky; teeth long all linear, acuminate. *Corolla* pale yellow, $\frac{1}{2}$ in. long; standard ovate, pointed. *Pod* oblong-cylindrical, $\frac{3}{4}$ in. long, thinly coated with short yellow-brown silky hairs, 15-20-seeded.

23. **C. albida**, Heyne; *DC. Prodr.* ii. 126; suffruticose, branches terete minutely silky, stipules 0, leaves linear or oblanceolate obtuse, racemes mostly terminal laxly 6-20-flowered, bracts linear very minute, pods glabrous sessile $1\frac{1}{2}$ or twice the calyx. *W. & A. Prodr.* 189. *C. montana*, Roxb. *Fl. Ind.* iii. 265; *W. & A. Prodr.* 182. *C. scoparia*, Wall. *Cat.* 5418. *C. parva*, Grah. in Wall. *Cat.* 5402. *C. punctata*, Grah. in Wall. *Cat.* 5401 *A. & C.* *C. tenuis*, Wall. *Cat.* 5403.

TROPICAL REGION through India proper and CEYLON, ascending to 5500 ft. in KUMAON, and to 6-7000 in the WEST HIMALAYAS. BIRMA, Wallich. PEGU, McClelland. TENASSERIM, Helfer.—DISTRIB. Malay Isles, China, and Philippines.

A shrub 1-2 ft. high, with very numerous firm slender, obscurely silky branches. *Leaves* short-stalked, firm, 1-2 in., thinly silky beneath, pellucido-punctate, glabrescent above. *Racemes* 2-4 in. long, rarely lateral. *Calyx* turbinate, $\frac{1}{4}$ in., finally $\frac{3}{8}$ in. long, thinly silky; teeth long, 3 lower linear acuminate, upper broader often subobtuse. *Corolla* pale yellow, glabrous, scarcely exserted. *Pod* oblong-cylindrical, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, 6-12-seeded.

VAR. 1. *epunctata*; leaves membranous pubescent not dotted, racemes very lax 3-6-flowered, calyx teeth all linear acuminate. *C. epunctata*, Dalz. in *Kew Journ.* iii. 210; *Dalz. & Gibs. Bomb. Flora*, 56.—SOUTHERN CONCAN, Dalzell.

** *Pod included or very slightly exserted.*

24. **C. nana**, Burm. *Fl. Ind.* 156, t. 48, fig. 2; leaves oblanceolate obtuse, racemes capitate 6-12-flowered, calyx densely silky, upper teeth connate, pod ovoid small glabrous sessile slightly exserted. *DC. Prodr.* ii. 127; *W. & A. Prodr.* 191; *Dalz. & Gibs. Bomb. Fl.* 56. *C. umbellata*, Wight in Wall. *Cat.* 5383; *W. & A. Prodr.* 191; *Dalz. & Gibs. Bomb. Fl.* 56. *C. biflora*, Herb. *Madr. in Wall. Cat.* 5381, not of Linn. *C. sobolifera*, Grah. in Wall. *Cat.* 5420 B.

WESTERN PENINSULA and CEYLON, ascending to 6000 ft.

An annual 1 ft. or less high, with copious slender terete ascending or spreading branches clothed with short silky hairs. *Leaves* $\frac{1}{2}$ -1 in., moderately firm, thinly silky above, densely so below, base subcuneate, stipules 0. *Bracts* and bracteoles minute, subulate; upper flowers often quasi-umbellate. *Calyx* $\frac{1}{2}$ - $\frac{1}{2}$ in. long, densely clothed with long silky hairs; teeth of lower lip narrow, acuminate. *Corolla* pale, not exserted. *Pod* 6-8-seeded, black when mature.

VAR. 1. *patula*; leaves narrow linear, calyx more shortly silky. *C. patula*, Grah. in Wall. *Cat.* 5371.—BIRMA, Wallich, Griffith.

25. **C. linifolia**, Linn. *fil.*; *DC. Prodr.* ii. 128; leaves oblanceolate obtuse rarely linear, racemes elongated laxly 6-20-flowered, calyx shortly silky, upper teeth connate, pod small ovoid-oblong sessile glabrous as long as calyx. *Roxb. Fl. Ind.* ii. 266; *Don Prodr.* 241; *Wall. Cat.* 5400 in part; *W. & A. Prodr.* 190 (*excl. syn.*); *Dalz. & Gibs. Bomb. Fl.* 56. *C. caespitosa*, *Roxb. Fl. Ind.* iii. 269. *C. montana*, *Heyne in Roth Nov. Sp.* 335; *DC. Prodr.* ii. 126, not of *Roxb.* *C. sobolifera*, *Grah. in Wall. Cat.* 5420 A. *C. stenophylla*, *Vogel in Nova Acta Nat. Cur.* xix. *Suppl.* 7. *C. saxatilis*, *Zolling. in Flora*, 1847, 694. *C. melanocarpa*, *Wall. Cat.* 5382.

TROPICAL REGION: SIKKIM, alt. 1-4000 ft. WESTERN PENINSULA, CEYLON, BIRMA, PELOU.—DISTRIB. Malay Isles, China, Philippines, N. Australia.

Annual, $\frac{1}{2}$ -2 ft. high, with copious slender firm terete branches clothed with short adpressed silky hairs. *Leaves* short-stalked, moderately firm, shortly silky, base sub-cuneate; stipules 0. *Racemes* usually terminal only, reaching $\frac{1}{2}$ -1 ft. long; bracts and bracteoles subulate, very minute. *Calyx* $\frac{1}{8}$ - $\frac{1}{4}$ in. long, deeply bilabiate, densely shortly brown-silky; teeth of upper lip very short, of lower deep linear. *Corolla* pale yellow, glabrous, scarcely exerted. *Pod* 8-10-seeded, black when mature.

26. **C. tecta**, *Roth*; *DC. Prodr.* ii. 126; suffruticose, thinly shortly silky, leaves obtuse obovate-oblong, racemes lax terminal only, calyx middle-sized, upper teeth subconnate, pod oblong as long as calyx. *Benth. in Hook. Lond. Journ.* ii. 569. *C. viminea*, *Wall. Cat.* 5397; *W. & A. Prodr.* 189. *C. linifolia* var. *Wall. Cat.* 5400 B. *C. punctata* var. *Wall. Cat.* 5401 B.

WESTERN PENINSULA, in the CONCAN, NILGHIRIES, PULNEY MTS.

A low *undershrub* with numerous stiff terete erecto-patent branches, clothed with short grey silky hairs. *Leaves* firm, $\frac{1}{2}$ -1 $\frac{1}{2}$ in., cuneate in lower half, retuse or emarginate at apex, glabrescent above, thinly silky below; stipules 0. *Racemes* 6-12-flowered, $\frac{1}{4}$ - $\frac{1}{2}$ ft. long, usually distinctly stalked; bracts and bracteoles linear, very minute. *Calyx* $\frac{3}{8}$ - $\frac{1}{2}$ in. long, shortly velvety, lower teeth linear. *Corolla* pale yellow, glabrous, equalling the calyx. *Pod* sessile, glabrous, 9-12-seeded.

27. **C. occulta**, *Grah. in Wall. Cat.* 5360; suffruticose, shortly silky, leaves oblanceolate-oblong usually acute, flowers in lax terminal racemes and often solitary from leafy nodes, calyx middle-sized shortly silky, teeth all long, upper broad rather obtuse, pod oblong included. *Benth. in Hook. Lond. Journ.* ii. 565. *C. rhizophylla*, *Grah. in Wall. Cat.* 5431.

KHASIA MTS. and SILHET, alt. 3-5000 ft.

Stems 2-3 ft. high, annual?, simple or with few or many virgate ascending branches clothed with short adpressed silky hairs. *Leaves* firm, 2-3 in., subcuneate at base, glabrous above, glaucous and obscurely silky beneath; stipules setaceous very minute. *Terminal racemes* 6-20-flowered, $\frac{1}{4}$ - $\frac{1}{2}$ ft. long; bracts linear, minute. *Calyx* $\frac{1}{2}$ - $\frac{3}{4}$ in. deep, densely clothed with short brown silky hairs; upper teeth oblong-spathulate, $\frac{1}{4}$ - $\frac{1}{2}$ in. broad. *Corolla* glabrous, deep violet-blue, as long as the calyx. *Pod* glabrous, sessile, 10-15-seeded.

28. **C. calycina**, *Schrank*; *DC. Prodr.* ii. 129; annual, shortly silky, leaves linear or lanceolate acute or rather obtuse, flowers few in lax racemes and solitary from leafy nodes, calyx large densely clothed with long silky hairs, teeth all long, upper broad rather obtuse, pod linear-oblong included. *C. stricta*, *Roxb. Fl. Ind.* iii. 265 not of *Roth*. *C. Roxburghiana*, *DC. Prodr.* ii. 129. *C. anthylloides*, *Don Prodr.* 241; *Wall. Cat.* 5366 A. *ex parte*; *W. & A. Prodr.* 181; *Dalz. & Gibs. Bomb. Fl.* 54, not of *Lam.* *C. linearis*, *Herb. Madr. in Wall. Cat.* 5370. *C. crinita*, *Grah. in Wall. Cat.* 5408. *C. salicifolia* var. ? *Wall. Cat.* 5359 B.

TROPICAL REGION, from the HIMALAYAS to CEYLON, ascending to 5,500 ft. in KUMAON.—DISTRIB. Tropical Africa, Malay Isles, China, N. Australia.

Stems 1-2 ft. high, simple or with a few slender ascending branches clothed with short adpressed silky hairs. *Leaves* moderately firm, usually 2-4 in., but in the linear form 5-6 in., usually acute, glabrous above, obscurely silky beneath; stipules subulate, very minute, deciduous. Terminal *racemes* 2-12-flowered, rarely reaching $\frac{1}{2}$ ft. long; bracts and bracteoles large, lanceolate. *Calyx* $\frac{3}{4}$ -1 in. long, persistently densely clothed with long brown silky hairs; lower teeth lanceolate-acuminate, upper oblanceolate, $\frac{3}{8}$ - $\frac{1}{2}$ in. broad. *Corolla* glabrous, pale yellow, shorter than the calyx. *Pod* sessile, glabrous, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, 20-30-seeded.

29. **C. sessiliflora**, Linn.; DC. Prodr. ii. 129; annual, shortly silky, leaves linear acute rarely lanceolate, flowers in elongated racemes rarely solitary from leafy nodes, calyx middle-sized densely clothed with long silky hairs, teeth all long, upper lanceolate acute, pod oblong as long as the calyx. *Benth. in Hook. Lond. Journ.* ii. 565. *C. anthylloides*, Lam.; Wall. Cat. 5366 A. in part, B. C. C. venusta, Wall. Cat. 5365. *C. nepalensis*, Link Enum. ii. 228. *C. brevipes*, Champ. in Hook. Kew Journ. iv. 44. *C. eriantha*, Sieb. & Zucc. Fl. Jap. 13. *C. Oldhami*, Miq. Ann. Mus. Lug. Bat. iii. 42.

UPPER PUNJAB and along the base of the Himalayas to ASSAM, ascending to 5,500 ft. in KUMAON; BIRMA, Wallich; PEGU, McLelland.—DISTRIB. China, Philippines, Japan.

Stems 1-2 ft. high, simple or furnished with few or many ascending branches. *Leaves* moderately firm, narrowed to both ends, 2-6 in., glabrous above, thinly silky below; stipules setaceous, very minute. *Flowers* deflexed, 2-20 to a raceme, close; racemes reaching 6-9 in. long; bracts and bracteoles long, setaceous, persistent. *Calyx* $\frac{3}{8}$ - $\frac{1}{2}$ in. long, brown silky hairs long and dense, but not as much so as in *calycina*; teeth all acute, upper $\frac{1}{2}$ in. broad. *Corolla* blue-white, glabrous, not exerted. *Pod* glabrous, sessile, 10-15-seeded.

30. **C. chinensis**, Linn.; DC. Prodr. ii. 130; annual, laxly silky, leaves linear or oblanceolate obtuse or subacute, flowers 3-6 densely capitate all terminal, calyx middle-sized, teeth long upper lanceolate, pod oblong as long as calyx. *Benth. in Hook. Lond. Journ.* ii. 566 (not of Roxb.)

UPPER GANGETIC PLAIN, CONCAN, MALABAR, PEGU, and TENASSERIM.—DISTRIB. Sumatra, Philippines, China.

Stems 1-2 ft. high, usually with several stout ascending branches densely clothed with long brown silky hairs. *Leaves* moderately firm, sparsely silky, 1-2 in., pale below, base rather rounded; stipules 0. *Calyx* $\frac{3}{8}$ - $\frac{1}{2}$ in., densely laxly silky; lower teeth linear; bracts and bracteoles linear, persistent. *Corolla* glabrous, not exerted. *Pod* sessile, glabrous, 15-20-seeded.

31. **C. speciosa**, Heyne; DC. Prodr. ii. 129; shrubby, densely silky, leaves linear-oblong obtuse, flowers 6-12 densely capitate all terminal, calyx middle-sized, teeth all long narrow acuminate, pod oblong included. *Benth. in Hook. Lond. Journ.* ii. 564. *C. cephalotes*, Herb. Madr. in Wall. Cat. 5373.

MYSORE, Heyne.

Stems quite woody, with rigid erecto-patent branches, densely clothed with short bright brown silky hairs. *Leaves* firm, 1-1 $\frac{1}{2}$ in., densely silky on both sides, rounded at both ends; stipules subulate, very minute. *Heads* copious, round, terminal, usually with a leaf just beneath; bracts lanceolate, as long as calyx, persistent velvety. *Calyx* $\frac{1}{2}$ in. long, densely persistently velvety. *Corolla* as long as calyx, densely silky on the outside. *Pod* sessile, glabrous, 10-12-seeded, much shorter than the calyx.

32. **C. dubia**, Grah. in Wall. Cat. 5404; annual, shortly silky, leaves obovate cuneate subacute, flowers 12-30 in dense terminal heads, calyx small densely silky, teeth all long acuminate, pod oblong as long as calyx. *Benth. in Hook. Lond. Journ.* ii. 568.

WESTERN PENINSULA, *Stocks, Beddome*. CHITTAGONG, *Hook. fil. & Thomson*. TERNASSERIM, *Griffith*.

Stems 1–2 ft. high, simple or with many subpatent or arcuate-ascending branches. *Leaves* membranous, 2–3 inches, cuneate in lower third, thinly silky above, pale and densely silky beneath; stipules minute, setaceous. *Heads* round or oblong, mostly with a leaf just beneath; bracts and bracteoles large, persistent, ovate-acuminate. *Calyx* $\frac{1}{4}$ in. deep; pubescence long, pale brown, silky, very dense; teeth linear or lanceolate. *Corolla* glabrous, as long as calyx. *Pod* sessile, glabrous, 6–8-seeded.

33. ***C. capitata***, *Benth. MSS.*; shrubby, finely silky, leaves oblanceolate subacute, flowers 6–20 in dense terminal heads, calyx middle-sized, teeth all long, upper broad subacute, pod oblong included.

KHASIA MTS., 5–7000 ft. *Hook. fil. and Thomson, Lobb, Simons*.

Branches caespitose from a perennial rootstock, 1–1½ ft. long, slender, suberect, mostly simple, clothed with short silky pubescence. *Leaves* firm, cuneate in the lower half, 1–1½ in., green, glabrous above, densely shortly silky below; stipules 0. *Heads* round or oblong, 1–2 in. long; bracts and bracteoles small, linear, persistent. *Calyx* $\frac{1}{2}$ in. deep; the vestiture and shape of teeth as in *C. sessiliflora*. *Corolla* deep violet-blue, glabrous, as long as the calyx. *Pod* sessile, glabrous, not seen mature.

34. ***C. priestleyoides***, *Benth. MSS.*; shrubby, laxly silky, leaves oblanceolate-oblong subacute, flowers few in dense terminal heads, calyx middle-sized shaggy, teeth all long, upper lanceolate acute, pod oblong included.

CONCAN, *Law, Stocks*; ANAMALLAYS, *Beddome*.

A low undershrub with long ascending branches, densely clothed with moderately long brown silky hairs. *Leaves* firm, subsessile, $\frac{1}{2}$ –1 in., glabrescent above, thinly shaggy beneath, base rather rounded; stipules 0. *Heads* 4–8-flowered; bracts lanceolate, acuminate, persistent as the calyx. *Calyx* $\frac{1}{2}$ – $\frac{3}{8}$ in. long, as densely shaggy as in *C. calycina*; upper teeth $\frac{1}{8}$ – $\frac{1}{6}$ in. broad, lower linear. *Corolla* glabrous, as long as the calyx. *Pod* sessile, glabrous, 10–15-seeded.

SECT. V. ***Glaucæ***, *Benth.* Erect herbs or shrubs, glabrous throughout. *Stipules* 0 or very minute deciduous. *Racemes* terminal.

35. ***C. lutescens***, *Dalz. in Hook. Kew Journ. ii. 34*; herbaceous, bracts linear very minute, calyx-teeth linear. *C. peduncularis*, *Dalz. & Gibs. Bomb. Flor. 55*, not of *Grah.*

CONCAN, plains, *Law, Dalzell*.

Stems erect, slender 1–3 ft. high. *Leaves* membranous, pale, nearly sessile, varying from oblong obtuse to linear acute, reaching 4–6 in. *Raceme* laxly 6–15-flowered; pedicels cernuous finally $\frac{1}{2}$ – $\frac{3}{4}$ in. long. *Calyx* $\frac{1}{2}$ in.; tube very short. *Corolla* yellow, twice the calyx; standard ovate, conspicuously veined. *Pod* 1–1½ in. long; gynophore finally equalling calyx.

36. ***C. nerifolia***, *Wall. Cat. 5362*; shrubby, bracts linear very minute, calyx-teeth lanceolate. *Benth. in Hook. Lond. Journ. ii. 560*.

AVA; mount Taong Dong, *Wallich*.

A shrub with slender terete branches. *Leaves* membranous, pale, nearly sessile, lanceolate, rather rounded at the base, subobtusely, 3–4 in. *Racemes* laxly 12–20-flowered, reaching half a foot long; pedicels slender, as long as calyx. *Calyx* $\frac{1}{2}$ in. long; tube campanulate. *Corolla* nearly twice the calyx; standard orbicular, obtuse. *Ovary* linear, silky. *Pod* unknown.

37. ***C. peduncularis***, *Grah. in Wall. Cat. 5369*; bracts large ovate acuminate persistent, calyx-teeth lanceolate. *W. & A. Prodr. 186*; *Benth. in Hook. Lond. Journ. ii. 480*. *C. elegans*, *Bedd. in Madr. Journ. iii. 178*; *Ind. Pl. Ind. Or. t. 106*.

NILGHIRIS, at about 4000 ft. elevation, *Wight, Beddôme*.

General habit of *C. peduncularis*. Leaves narrow-linear, short-stalked, reaching 5-6 in. Racemes laxly 12-20-flowered, finally a foot long; lower pedicels $\frac{3}{4}$ -1 in. long; bracts reflexed, shorter than the pedicels. Calyx $\frac{3}{8}$ in.; teeth one-third the tube. Corolla smaller than in the last; standard the same shape and colour. Pod $1\frac{1}{4}$ -2 in. long; gynophore finally exceeding the calyx.

SECT. VI. **Erectæ, Benth.** Erect herbs or shrubs, the foliage more or less silky or pubescent. Stipules 0, or small, not decurrent. Racemes rarely other than terminal. Pods glabrous, several times longer than the calyx.

38. **C. retusa, Linn.**; *DC. Prodr.* ii. 125; branches and calyx subglabrous, stipules subulate very minute, leaves obtuse glabrous above puberulent below, bracts subulate, corolla much exserted. *Roxb. Fl. Ind.* iii. 272; *Bot. Mag.* t. 2561; *Bot. Reg.* t. 253; *Wall. Cat.* 5405; *W. & A. Prodr.* 187; *Dalz. & Gibs. Bomb. Fl.* 55. *Lupinus cochinchinensis, Lour.*; *DC. Prodr.* ii. 410—*Rheede. Mal.* ix. t. 25.

Tropical region; HIMALAYAS to CEYLON and MALACCA, but often cultivated. *DISTRIB.* China, Malaya, N. Australia, Trop. Africa and America, in both the last doubtfully wild.

A robust undershrub 3-4 ft. high, with stout striated branches. Leaves short stalked, oblanceolate-oblong, moderately firm, cuneate at the base, $1\frac{1}{2}$ -3 in. Racemes laxly 12-20-flowered; pedicels shorter than calyx. Calyx $\frac{3}{8}$ - $\frac{1}{2}$ in.; teeth lanceolate, twice campanulate tube. Corolla nearly twice calyx, yellow tinged with purple. Pod linear-oblong, 1- $1\frac{1}{2}$ in. long, distinctly stalked, 15-20-seeded.

39. **C. sericea, Retz.**; *DC. Prodr.* ii. 126; branches and calyx subglabrous, stipules leafy persistent, leaves subacute or obtuse glabrous above finely silky beneath, bracts ovate foliaceous, corolla much exserted. *W. & A. Prodr.* 186; *Wall. Cat.* 5406; *Roxb. Fl. Ind.* iii. 273, not of *Burm.*; *Dalz. & Gibs. Bomb. Fl.* 55. *C. spectabilis, Roth.*; *DC. Prodr.* ii. 125. *C. macrophylla, Weinm. Syll.* ii. 26. *C. cuneifolia, Schrank Syll.* ii. 78.

Tropical region; through India proper, ascending to 3000 ft. in KUMAON. MALACCA, *Griffith*. PEGU, *McClelland*.

Habit and branches of *C. retusa*. Leaves oblanceolate-oblong, moderately firm in texture, 3-6 in., cuneate at the base. Racemes laxer, 20-40-flowered, often a foot long; bracts persistent, reflexed; pedicels exceeding calyx. Calyx $\frac{1}{2}$ in.; teeth lanceolate, twice campanulate tube. Corolla half as long again as calyx, generally purplish. Pod 1-2 in. long, distinctly stalked, $\frac{3}{4}$ - $\frac{7}{8}$ in. broad.

40. **C. assamica, Benth.** in *Hook. Lond. Journ.* ii. 481; branches and calyx silky, stipules minute subulate, leaves acute glabrous above finely silky below, bracts linear-lanceolate minute, corolla much exserted. *C. Burmanni, DC. Prodr.* ii. 126? *C. sericea, Burm. Fl. Ind.* t. 48, fig. 1?

KHASIA MTS., alt. 3-4000 ft., *Hook. fil. & Thomson, Lobb*; ASSAM, *Mrs. Mack.*—*DISTRIB.* Philippines, *Cuming*, 1886.

General habit just that of the two preceding, to which it is allied closely. Leaves oblanceolate-oblong, short-stalked, moderately firm, 2-4 in. long, cuneate at the base. Racemes laxly 20-30-flowered reaching a foot long; lower pedicels equalling calyx. Calyx $\frac{1}{2}$ - $\frac{5}{8}$ in.; teeth lanceolate, twice campanulate tube. Corolla $\frac{3}{4}$ in. deep, golden-yellow. Pod $1\frac{1}{2}$ -2 in. long, distinctly stalked.

41. **C. Kurzii, Baker**; branches and calyx silky, stipules minute subulate, leaves acute glabrous above finely silky below, bracts linear-lanceolate minute, corolla not exserted. *Kurz in Journ. Asiat. Soc. Beng.* vol. xlii. pt. 2, p. 229.

PEGU, *Kurz*, No. 1664.

Closely allied to *C. assamica*, from which it differs mainly in calyx and corolla, the

former being the same size, but cleft more deeply, with narrower teeth and the latter much smaller. *Leaves* rather more coriaceous, 3-4 in., narrowed from the middle to both ends, the adpressed brown pubescence of the underside coarser and less silky. *Pod* oblong, glabrous, distinctly stalked.

42. **C. Leschenaultii**, DC. *Prodr.* ii. 125; branches and calyx subglabrous, stipules minute lanceolate, leaves obtuse glabrous above densely grey-silky below, bracts ovate persistent, corolla much exserted. *W. & A. Prodr.* 186; *Benth. in Hook. Lond. Journ.* ii. 481; *Grah. Cat. Bomb. Pl.* 44; *Dalz. & Gibs. Bomb. Fl.* 54. *C. lupiniflora*, *Grah. in Wall. Cat.* 5407.

NILGHIRIS and highest Ghauts of CONCAN.

General habit of the three preceding, to which it is closely allied. *Leaves* oblanceolate-oblong, subcoriaceous, 3-4 in., cuneate at the base, clothed beneath with thick white silky pubescence. *Racemes* rather densely 20-30-flowered, reaching $\frac{1}{2}$ ft. long; bracts like those of *C. sericea* but smaller; lower pedicels as long as the calyx. *Calyx* $\frac{1}{2}$ in.; teeth lanceolate, twice campanulate tube. *Corolla* yellow, $\frac{3}{4}$ in. deep. *Pod* distinctly stalked, linear-oblong, $1\frac{1}{2}$ in. long.—A specimen from Ram Ghaut, Ritchie, perhaps distinct, has subulate bracts and leaves finely silky beneath.

43. **C. formosa**, *Grah. in Wall. Cat.* 5393; branches and calyx densely silky, stipules lanceolate minute, leaves obtuse glabrous above densely silky beneath, bracts linear silky persistent, corolla not exserted. *W. & A. Prodr.* 186; *Wt. Ic. t.* 981; *Benth. in Hook. Lond. Journ.* ii. 481.

NILGHIRIS.

Dwarfer and more branched than the four preceding, with woody stems densely clothed with grey or yellow-brown silky hairs. *Leaves* oblanceolate-oblong, 2-3 in. moderately firm, short-stalked, cuneate at the base. *Racemes* very dense, 1-2 in. long; pedicels $\frac{1}{2}$ - $\frac{1}{8}$ in., densely silky. *Calyx* shaggy, $\frac{1}{4}$ - $\frac{3}{8}$ in.; teeth deep, lanceolate-deltoid. *Pod* oblong, $1\frac{1}{4}$ - $1\frac{1}{2}$ in. long, distinctly stalked.

44. **C. barbata**, *Grah. in Wall. Cat.* 5394; shrubby, stipules 0, leaves oblanceolate-oblong subacute thinly silky above densely silky beneath, racemes simple 6-12-flowered, bracts minute lanceolate, pedicels as long as calyx, pod stalked. *W. & A. Prodr.* 181; *Wt. Ic. t.* 980; *Benth. in Hook. Lond. Journ.* ii. 483.

NILGHIRIS; Travancor, ascending to 6000 feet, *Beddome*.

Sparingly branched. *Branches* woody, clothed with ascending dark brown silky hairs. *Leaves* like those of *C. sericea* in shape and size, moderately firm, short-stalked, cuneate at the base. *Racemes* finally half a foot long; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in., densely silky, not bracteolate at the middle. *Calyx* $\frac{3}{4}$ in., deeply bilabiate, densely shaggy with dark brown silky hairs; teeth of lower lip linear, equalling limb. *Corolla* scarce exserted. *Pod* $1\frac{1}{2}$ in. long by half as broad, 15-20-seeded.

45. **C. longipes**, *W. & A. Prodr.* i. 183; shrubby, stipules 0, leaves obovate-oblong rather obtuse both sides minutely silky, racemes copiously paniced, bracts foliaceous ovate, pedicels as long as calyx, pod stalked. *Benth. in Hook. Lond. Journ.* ii. 483.

NILGHIRIS.

A stiff undershrub with a straight woody stem, copiously paniculately branched. *Branches* densely clothed with short ferruginous silky hairs. *Leaves* coriaceous, short-stalked, more or less rounded at base, vestiture thin and shining, lower 3-4 in. *Flowers* 3-4, close together near the top of numerous rigid branches; bracts copious, reflexed, foliaceous. *Calyx* $\frac{1}{2}$ in., densely clothed with brown silky hairs, deeply bilabiate; lower teeth reaching half way down. *Corolla* $\frac{3}{4}$ - $\frac{7}{8}$ in.; standard silky on the back. *Pod* linear-oblong, 1- $1\frac{1}{4}$ in. long, 10-12-seeded, narrowed into a long gynophore.—Except for the glabrous pod, its affinity is with *C. madurensis*.

46. **C. peguana**, Benth. MSS.; shrubby, stipules 0, leaves oblong-lanceolate both sides obscurely silky, racemes prolonged into the axils of numerous leaves, bracts subulate very minute, pod sessile.

PEGU; near Rangoon, McClelland.

Branches slender, terete, finely puberulent or glabrescent. Leaves nearly sessile, 3-4 in., narrowed to both ends, firm and thinly silky on both sides in exposure, but membranous and glabrous above in a shade form; lower pedicels as long as the calyx. Flowers beside the lax terminal racemes springing solitary or in pairs from many of the leaf-bearing nodes. Calyx $\frac{3}{4}$ in.; teeth long, linear-lanceolate. Corolla scarcely exserted. Pod cylindrical, $\frac{3}{4}$ in. long, 10-12-seeded.

47. **C. salicifolia**, Heyne in Wall. Cat. 5359 A.; herbaceous, stipules 0, leaves oblong or lanceolate acute both sides shortly silky, racemes long-stalked simple few-flowered, bracts minute lanceolate, pedicels as long as calyx, pod stalked. W. & A. Prodr. 182; Benth. in Hook. Lond. Journ. ii. 482.

WESTERN PENINSULA, Heyne.

Stem stiff, sparingly branched, densely clothed with short ascending ferruginous silky hairs. Leaves ceasing a space below the inflorescence, lower oblong or oblanceolate-oblong, upper linear-lanceolate reaching 3-4 in., both sides clothed with hairs like those of the stem. Flowers near the end of long branches. Calyx $\frac{3}{4}$ in. deep, densely coated with bright brown velvety hairs; teeth linear, all very long. Corolla bright yellow, not exserted. Pod $1\frac{1}{2}$ -2 in. long, half as broad.

48. **C. lanata**, Bedd. in Madr. Journ. iii. 178; Ic. Pl. Ind. Or. t. 105; shrubby, stipules foliaceous $\frac{1}{2}$ -lunate, leaves large oblong, racemes not panicle, bracts minute lanceolate, pedicels short, pod stalked.

WESTERN PENINSULA; Anamallay and Pulney Mts., alt. 3-4000 ft., Beddome.

A shrub 12-15 feet high, with the habit, stipules and inflorescence of *C. semperflorens*. Branches stout, densely clothed with short brown pubescence. Leaves distinctly stalked, membranous, very large, green and glabrous above, thinly matted beneath. Calyx $\frac{1}{2}$ - $\frac{5}{8}$ in. long, densely silky; teeth linear-lanceolate, twice the tube. Corolla yellow, much exserted. Pod 'glabrous' (Beddome) oblong, $1\frac{1}{2}$ - $1\frac{3}{4}$ in. long.

SECT. VII. **Eriocarpæ**, Benth. Erect shrubs, the foliage more or less silky or pubescent. Leaves simple, stipules not decurrent. Racemes terminal only or both terminal and lateral, in one group copiously panicle. Pods silky or velvety, many or few-seeded exserted or included.

*Flowers racemed.

49. **C. verrucosa**, Linn.; DC. Prodr. ii. 125; branches acutely angled, stipules foliaceous $\frac{1}{2}$ -lunate, leaves ovate the base deltoid usually obtuse, racemes lateral and terminal not panicle, pod stalked obscurely downy 4-6 times the calyx. Bot. Mag. t. 3034; W. & A. Prodr. 187; Wt. Ic. t. 200; Dalz. & Gibs. Bomb. Fl. 55. *C. angulosa*, Lamk.; Roxb. Fl. Ind. iii. 273. *C. cerulea*, Jacq. Ic. t. 144. *C. acuminata*, G. Don. Gard. Dict. ii. 134.—Rheede Hort. Mal. ix. t. 29.

TROPICAL REGION; HIMALAYAS to CEYLON (reaching 2000 ft. in SIKKIM); BURMA, Wallich; PEGU, McClelland; MALACCA, Griffith.—DISTRIB. China, Malaya, Trop. Africa, Mauritius, Trop. America.

Copiously branched, scarcely shrubby, 2-3 feet high. Branches at first puberulent, soon glabrescent. Leaves thin, obscurely downy beneath, reaching 4-6 in., casually acute. Racemes moderately close, 12-20-flowered, $\frac{1}{2}$ foot or more long; bracts linear, very minute; pedicels equalling or shorter than calyx. Calyx $\frac{1}{4}$ in., obscurely

downy; teeth lanceolate, twice tube. *Corolla* twice calyx, yellow, white and blue. *Pod* finely pubescent, 1-1½ in. long, 10-12-seeded.

50. **C. semperflorens**, *Vent.*; *DC. Prodr.* ii. 125; branches terete, stipules foliaceous ½-lunate, leaves oblong rounded at base acute or obtuse, racemes lateral and terminal not paniced, pod stalked obscurely downy 4-5 times the calyx. *Wall. Cat.* 5391. *C. Wallichiana*, *W. & A. Prodr.* 187; *Wt. Ic.* t. 982. *C. Arnottiana*, *Benth. in Hook. Lond. Journ.* ii. 560.

TROPICAL REGION; Nilghiris.—DISTRIB. Java.

More shrubby than *C. verrucosa*. Branches sulcate and puberulent when young, soon glabrescent and terete. Leaves 2-4 in., moderately firm, green and glabrous above, pale and shortly downy below, distinctly petiolate. Inflorescence like that of *C. verrucosa*; bracts minute, subulate; pedicels ¼-½ in., finely downy. Calyx ⅔-½ in., more or less densely puberulent; teeth linear, twice the campanulate tube. *Corolla* ½-¾ in., bright yellow. *Pod* 1½-2 in. long, finely downy, 10-12-seeded.

VAR. 1. *Walkeri*; stipules mostly subulate minute, leaves firmer smaller more acute nearly or quite glabrescent beneath. *C. Walkeri*, *Arnott in Nov. Act. Nat. Cur.* xviii. 398. *C. semperflorens*, *Benth. in Hook. Lond. Journ.* ii. 560. Ceylon, 4-7000 feet.—Looks generally quite distinct, but *Gardner's* No. 560 connects it with the type.

51. **C. Heyneana**, *Grah. in Wall. Cat.* 5414; branches terete, stipules small ½-lunate, leaves oblong acute narrowed at base, racemes lateral and terminal not paniced, pod subsessile obscurely downy 3-4 times the calyx. *W. & A. Prodr.* 187; *Benth. in Hook. Lond. Journ.* ii. 560; *Bot. Mag. t.* 5974.

WESTERN PENINSULA; Mysore, Travancor, and Canara.

General habit of *C. semperflorens*, of which it is most likely a mere variety. Branches woody, slender, soon glabrescent. Leaves membranous, distinctly petioled, 3-4 in., narrowed at both ends, hardly at all puberulent; stipules smaller. Inflorescence and bracts identical; pedicels ¼-½ in., slender, faintly puberulent. Calyx ⅔ in.; teeth lanceolate, very deep. *Corolla* slightly exserted. *Pod* 1¼-1½ in. long, clothed with deciduous fine pubescence, 10-12-seeded.

52. **C. leptostachya**, *Benth. in Hook. Lond. Journ.* ii. 562; branches angular, stipules 0 or minute subulate, leaves lanceolate acuminate, racemes lateral and terminal not paniced, pod oblong sessile densely velvety 2-3 times the calyx.

WESTERN PENINSULA; Concan, Jacquemont, Stocks, Law.

A stiff erect shrub with the habit and slender sulcate thinly silky branches of *C. juncea* and *tetragona*. Leaves 4-6 in., membranous, green, thinly clothed on both sides with shining brown silky hairs, rather rounded at the base. Racemes laxly 12-20-flowered, reaching ½ ft. long; bracts lanceolate very minute. Calyx ¼ in., densely silky; teeth linear, very deep. *Corolla* yellow, not exserted. *Pod* 5-6-seeded, ⅔-¾ in. long.

53. **C. tetragona**, *Roxb. Fl. Ind.* iii. 263; branches angular, stipules 0 or minute subulate, leaves large linear or lanceolate acuminate, racemes lateral and terminal not paniced, pod linear-oblong short-stalked rarely 2-3 times the calyx. *Andr. Bot. Rep.* t. 593; *DC. Prodr.* ii. 128; *Wall. Cat.* 5367, A-C.; *W. & A. Prodr.* 185. *C. grandiflora*, *Zolling. in Miq. Flor. Ind. Bat.* i. 333.

KUMAON (up to 3500 ft.), and along the Himalayas to SIKKIM and ASSAM. PEGU, *McClelland*.—DISTRIB. Java.

A stiff shrub, reaching 6 ft. high, with sulcate thinly silky slender erecto-patent branches. Leaves short-stalked, distant, membranous, both sides thinly silky or glabrescent, reaching ½-1 ft. Racemes laxly 6-10-flowered, half a foot or more long;

bracts minute, linear. *Calyx* $\frac{3}{4}$ –1 in. long, densely brown-velvety; teeth very long, linear or lanceolate, acuminate. *Corolla* lemon-yellow, glabrous, little exserted. *Pod* $1\frac{1}{2}$ –2 in. long, densely persistently dark-brown and velvety, 12–20-seeded.

54. **C. juncea**, *Linn.*; *DC. Prodr.* ii. 125; branches terete multisulcate, stipules 0 or minute subulate, leaves linear or oblong rather obtuse, racemes lateral and terminal not paniced, pod oblong sessile velvety twice the calyx. *Bot. Mag.* t. 490; *Roxb. Cor. Pl.* t. 193; *Fl. Ind.* iii. 259; *Wall. Cat.* 5409; *W. & A. Prodr.* 185; *Dalz. & Gibs. Bomb. Fl.* 54. *C. fenestrata*, *Bot. Mag.* t. 1933. *C. benghalensis*, *Lamk.*; *DC. Prodr.* ii. 125; *Wall. Cat.* 5395. *C. tenuifolia*, *Roxb. Fl. Ind.* ii. 263; *DC. Prodr.* ii. 126; *Wall. Cat.* 5368. *C. porrecta*, *Wall. Cat.* 5363. *C. viminea*, *Wall. Cat.* 5397 B. *C. sericea*, *Willd. not of Retz.*—*Rheede Hort. Mal.* ix. t. 26.

Plains from the HIMALAYAS to CEYLON, but often planted for its fibre. **BIRMA**, *Wallich*; **PEGU**, *McClelland*.—**DISTRIB.** Malay isles, Australia.

A stiff shrub several feet high, with slender virgate rigid thinly silky branches. *Leaves* rather distant, firm, linear or oblong, usually $1\frac{1}{2}$ –3 in., shining on both sides with thin short brown silky hairs. *Racemes* loosely 12–20-flowered, reaching a foot long; bracts minute, linear. *Calyx* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, densely clothed with ferruginous velvety hairs; teeth linear-lanceolate, very deep. *Corolla* bright yellow, glabrous, slightly exserted. *Pod* 1 – $1\frac{1}{4}$ in. long, clothed with short-spreading persistent silky hairs, 10–15-seeded. Yields Sun fibre.

55. **C. obtecta**, *Grah. in Wall. Cat.* 5372; branches terete, stipules 0 or minute deciduous, leaves oblong obtuse, racemes terminal and lateral not paniced, pod stalked densely velvety twice the calyx. *W. & A. Prodr.* 185; *lc.* t. 208 and 383. *C. tetragona*, *Wall. Cat.* 5367 D.

WESTERN PENINSULA; Nilghiris and Cochin.

A tall shrub, with curved woody branches densely clothed with short brown silky hairs. *Leaves* short-stalked, coriaceous, 2–4 in., both sides more or less silky. *Racemes* rather close, 12–20-flowered; bracts minute, lanceolate. *Calyx* $\frac{3}{4}$ –1 in., densely velvety, deeply bilabiate; teeth linear. *Corolla* slightly exserted; standard silky on the back. *Pod* $1\frac{1}{2}$ –2 in. long, 10–12-seeded, densely coated with dark brown velvety pubescence.

VAR. 1. *glabrescens*; branches and leaves glabrescent. *C. glabrescens*, *Benth. in Hook. Lond. Journ.* ii. 563.—**Carnatic**, near Courtallum, *Wight*.

****Flowers paniced.**

56. **C. madurensis**, *Wight in Wall. Cat.* 5376; leaves ovate-oblong closely silky, stipules 0, racemes paniced, bracts round cuspidate subdeciduous, calyx-teeth narrow, corolla exserted, pod many-seeded much exserted. *W. & A. Prodr.* 184; *Benth. in Hook. Lond. Journ.* ii. 563. *C. candicans*, *W. & A. Prodr.* 184.

NILGHIRIS and **Madura hills**, in the **CARNATIC**.

A stiff erect undershrub, copiously paniculately branched. *Branches* clothed with short dense brown silky hairs. *Leaves* short-petioled, obtuse, subcoriaceous, broadly rounded at base, 2–4 in., clothed on both sides with fine very short shining silky hairs. *Bracts* fewer and more deciduous than in other paniced *Eriocarpæ*. *Calyx* $\frac{1}{2}$ in. deep, densely silky, deeply bilabiate; teeth narrow, acuminate, two upper lanceolate. *Corolla* $\frac{5}{8}$ in.; standard rather pointed, densely silky on the back. *Pod* short-stalked, nearly glabrescent, 10–12-seeded, 1 in. long.

57. **C. subperfoliata**, *Wight in Wall. Cat.* 5377; leaves oblong acute closely silky, stipules 0, racemes paniced, bracts round spreading persistent,

calyx-teeth narrow, corolla twice calyx, pod many-seeded much exserted. *W. & A. Prodr.* 184; *Benth. in Hook. Lond. Journ.* ii. 563.

CARNATIC; Dindygul hills alt. 2000 ft., *Wight*.

General habit and inflorescence just as in *C. madurensis*, to which it is closely allied. *Leaves* thinner, narrowed to a point, less rounded at the base, 2-4 in. long. *Branches* densely clothed with short spreading silky hairs; bracts sometimes opposite, $\frac{1}{2}$ in. long, densely silky on the back. *Calyx* $\frac{1}{4}$ - $\frac{3}{8}$ in. deep, finely silky; teeth lanceolate, acuminate, with reflexed borders. *Corolla* $\frac{2}{3}$ - $\frac{3}{4}$ in.; standard rather pointed, silky on the back. *Pod* oblong, stalked, twice the calyx, with 12 or more seeds.

58. *C. fulva*, *Roxb. Fl. Ind.* iii. 266; leaves oblanceolate closely silky, stipules 0 or minute subulate, racemes paniced, bracts ovate cuspidate, calyx-teeth broad foliaceous, corolla slightly exserted, pod oblong 2-seeded included. *Wall. Cat.* 5375; *W. & A. Prodr.* 183; *Dalz. & Gibs. Bomb. Fl.* 54. *C. pulchra*, *DC. Prodr.* ii. 126, not of *Andrews*. *C. grandis*, *Hort. Calcutt.*

MAISOR, the CONCAN, NILGHIRIS, and CEYLON.—DISTRIB. Java, Sumatra, and naturalised in the Seychelles and Mauritius.

A stiff erect shrub 3-5 feet, copiously paniculately branched. *Branches* densely clothed with short brown silky hairs. *Leaves* nearly sessile, subcoriaceous, 3-4 in. long, obtuse or subacute, cuneate at the base, shining on both sides, with a silky lustre from minute hairs. *Branches* elongated with several bracts flowerless. *Calyx* $\frac{1}{2}$ - $\frac{3}{8}$ in. deep, densely silky, with a pair of conspicuous bracteoles; upper teeth oblong, lower lanceolate. *Corolla* $\frac{3}{4}$ -1 in.; standard rather pointed, densely silky on the back. *Pod* thinly silky, sessile, about as long as the calyx.

59. *C. pulcherrima*, *Roxb. Fl. Ind.* iii. 267; leaves oblanceolate-oblong closely silky, stipules 0, racemes paniced, bracts copious ovate-acuminate reflexed, upper calyx-teeth broad foliaceous, corolla scarcely exserted, pod oblong included 5-6-seeded. *Bot. Mag.* t. 2027; *Wall. Cat.* 5374; *DC. Prodr.* ii. 125; *W. & A. Prodr.* 184; *Wt. Ic.* t. 481. *C. pulchra*, *Andr. Bot. Rep.*, t. 601, not of *DC.*

NILGHIRIS.

A stiff erect shrub 3-4 ft. high, copiously paniculately branched. *Leaves* nearly sessile, subcoriaceous, obtuse or subacute, cuneate at the base, 3-4 in. long, shining on both sides with dense short close brown silky hairs. *Flowers* few, near the top of the branches; bracts numerous, large, reflexed, persistent; pedicels short, densely silky. *Calyx* $\frac{5}{8}$ - $\frac{3}{4}$ in. long; upper segments oblong, lower lanceolate; standard silky on the back. *Pod* oblong, bright brown, sessile, as long as the calyx.

60. *C. lunulata*, *Heyne in Wall. Cat.* 5378; leaves oblanceolate acute loosely silky, stipules small obtuse, racemes paniced, bracts copious persistent like the stipules, calyx-teeth narrow, corolla twice the calyx, pod oblong 1-seeded scarcely exserted. *W. & A. Prodr.* 183; *Wight Ic.* t. 480; *Benth. in Hook. Lond. Journ.* ii. 564.

Tanjore, in the CARNATIC; CEYLON.

A stiff erect undershrub, copiously paniculately branched, clothed with dense spreading brown silky hairs. *Leaves* short-petioled, moderately firm, densely silky, cuneate at the base, usually 1-2 in. *Branches* elongated, with numerous amplexicaul reflexed small bracts below the flowers. *Calyx* densely silky, $\frac{2}{3}$ - $\frac{1}{2}$ in. long; teeth long, all linear, the edges slightly recurved. *Corolla* $\frac{3}{4}$ - $\frac{7}{8}$ in.; standard rather pointed, thinly silky on the back. *Pod* sessile, finely silky, as long as the calyx.

61. *C. ramosissima*, *Roxb. Fl. Ind.* iii. 268; leaves small oblanceolate densely silky, stipules 0, racemes paniced, bracts lanceolate persistent, calyx-teeth narrow, corolla little exserted, pod 1-seeded scarcely exserted. *W. & A.*

Prodr. 183. *C. tomentosa*, Rottl. in Wall. Cat. 5380. *C. pellita*, Bert.; *DC. Prodr.* ii. 128? *C. Campbellii*, Arn. in Wight. Cat. 2316.

WESTERN PENINSULA, Rottler, Heyne; interior of BENGAL, Roxburgh.

Shrubby, erect, much branched. Stems a foot or less high, densely coated, like the leaves, with thick silky brown hairs. Leaves crowded, subsessile, subobtusely, thick, cuneate at the base, $\frac{3}{4}$ –1 in. long. Branches densely pubescent, generally short. Bracts not abundant, small, falcate, silky on the back, black and viscous on the face. Calyx $\frac{1}{4}$ in. long; teeth long, linear, with reflexed edges. Corolla $\frac{3}{8}$ in.; standard pointed, silky on the back. Pod sessile, as long as the calyx, oblong, densely silky.

62. **C. paniculata**, Willd.; *DC. Prodr.* ii. 126; leaves small oblanceolate loosely silky, stipules linear, racemes panicled, bracts copious persistent falcate linear-subulate, calyx-teeth narrow, corolla exserted, pod 1–2-seeded scarcely exserted. Roxb. *Fl. Ind.* iii. 274; Wall. Cat. 5379; W. & A. *Prodr.* 183. *C. chinensis*, Lamk. *Dict.* ii. 195, not of Linn. *Ononis glutinosa*, Mart. in Denk. Acad. Mun. vi. 155.

CARNATIC, near Vellore.—DISTRIB. JAVA.

Shrubby, 2–3 feet high, with very numerous stiff ascending branches, clothed with loose brown silky hairs. Leaves 1–1 $\frac{1}{2}$ in. long, obtuse, loosely silky, cuneate at the base, nearly sessile; stipules just like the very copious bracts, conspicuous, falcate, with reflexed glandular margins. Branches short, with a few flowers near the end. Calyx $\frac{3}{8}$ in.; teeth long, silky on the back, lanceolate or linear with recurved viscous edges like the bracts and bracteoles. Corolla $\frac{1}{2}$ – $\frac{5}{8}$ in.; standard very silky on the back. Pod oblong, sessile, finely silky.

GROUP 8. **Trifoliolatae Dispermæ.** Leaves 3-foliolate. Pod obliquely subglobose, small, sessile, 2-seeded. Perennial herbs or undershrubs. *Cyrtolobus*, R. Br.

63. **C. medicaginea**, Lamk. *Dict.* ii. 201; herbaceous, branches slender diffuse thinly clothed with adpressed silky hairs, petiole shorter than the small oblanceolate leaflets, racemes 2–6-flowered, corolla twice the calyx. W. & A. *Prodr.* 192; Benth. in Hook. *Lond. Journ.* ii. 577; Thwaites *Enum.* 82; Boiss. *Fl. Orient.* ii. 26. *C. procumbens*, Roxb. *Hort. Beng.* 98; *Fl. Ind.* iii. 278, et Wall. Cat. 5437, in part. *C. foliosa*, Willd.; *DC. Prodr.* ii. 131. *C. divaricata*, Grah. in Wall. Cat. 5436. *C. virgata*, Mart.; *DC. Prodr.* ii. 131. *Indigofera capitata*, Grah. in Wall. Cat. 5490.

Tropical region, from the WEST HIMALAYAS to CEYLON and BIRMA, ascending to 6000 ft. in Kashmir.—DISTRIB. Malay isles, Afghanistan, China and Australia.

A diffuse perennial, with slender much-branched stems, $\frac{1}{2}$ –1 ft. long, thinly silky upwards. Stipules setaceous, very minute, deciduous; leaflets $\frac{1}{4}$ – $\frac{1}{2}$ in. long, retuse emarginate, glabrous above, obscurely silky below. Racemes copious, terminal and leaf-opposed; peduncles exceeding the leaves; bracts minute, linear. Calyx thinly silky, campanulate, $\frac{1}{2}$ in. deep; teeth linear, exceeding the tube. Corolla yellow. Pod $\frac{1}{2}$ in. long, glabrescent.

VAR. 1. *herniarioides*; stems prostrate very slender, leaflets very small nearly or quite as broad as long, peduncles short 1–3-flowered. *C. herniarioides*, W. & A. *Prodr.* 192.

VAR. 2. *neglecta*; branches more robust and more ascending than in the type, racemes 6–9-flowered, leaflets rather larger. *C. neglecta*, W. & A. *Prodr.* 192. *C. procumbens*, Roxb. & Wall. *ex parte*.

VAR. 3. *luxurians*; stems much stronger. 2–3 ft. high, petioles reaching $\frac{1}{2}$ in. long, terminal leaflet $\frac{3}{4}$ –1 in., racemes 6–12-flowered. *C. luxurians*, Benth. in Hook. *Lond. Journ.* ii. 578. *C. medicaginea*, Hamilt. in Wall. Cat. 5434.

64. **C. Willdenoviana**, *DC. Prodr.* ii. 134; herbaceous or suffruticose.

branches often stiff clothed with short fine down, petiole shorter than the small oblanceolate leaflets, racemes 3-6-flowered, corolla thrice the calyx. *W. & A. Prodr.* 191; *Benth. in Hook. Lond. Journ.* ii. 579. *C. spartioides*, *Spreng.*; *Wall. Cat.* 5435. *C. genistoides*, *Willd. Sp. Pl.* iii. 987, *non Lamk.*

WESTERN PENINSULA.

Perennial, reaching 2-3 ft. high, with very numerous ascending elongated branches. *Stipules* small, setaceous, persistent; leaflets $\frac{3}{8}$ - $\frac{1}{2}$ in. long, firm, obtuse, emarginate, silky on both sides. *Racemes* copious, terminal and lateral; bracts minute, linear-setaceous, persistent. *Calyx* $\frac{1}{4}$ in. long, finely downy; teeth linear, exceeding the tube. *Corolla* yellow; keel with a narrower and longer beak than in the last. *Pod* pubescent, $\frac{1}{2}$ in. long.

65. *C. trifoliatrum*, *Willd. Sp. Pl.* iii. 983; herbaceous, branches elongated ascending finely downy, petioles exceeding the obovate-oblong leaflets, racemes elongated 12-40-flowered, corolla thrice the calyx. *Roxb. Fl. Ind.* iii. 277; *Wall. Cat.* 5432, *excl. G. H.*; *W. & A. Prodr.* 191; *Wight Ic.* t. 421. *C. virgata*, *Roxb. in E. I. C. Mus. tab.* 373. *C. medicaginea*, *DC. Prodr.* ii. 133. *C. stricta*, *Roth.*; *DC. Prodr.* ii. 133. *Lupinus trifoliatius*, *Rottl. in Nov. Act. Ber.* iv. 223, t. 5. *C. stipitata*, *Grah. in Wall. Cat.* 5425, A.

ASSAM AND WESTERN PENINSULA.

An erect *perennial* 2-3 ft. high, with numerous erecto-patent slender branches. *Petioles* an inch or more; *stipules* minute, setaceous; leaflets membranous, $\frac{1}{2}$ -1 in. long, glabrous above, obscurely silky below, obtuse at the point, often deeply emarginate. *Racemes* copious, both terminal and lateral, short-peduncled, reaching 4-6 in. long; bracts minute, setaceous. *Calyx* $\frac{1}{4}$ in. long, finely silky; teeth linear, twice the length of the tube. *Corolla* yellow, glabrous. *Pod* subquadrangular, sessile, thinly silky, $\frac{1}{2}$ in. long.

66. *C. Notonii*, *W. & A. Prodr.* 192; shrubby, branchlets elongated obscurely silky, leaflets middle-sized obovate-oblong, racemes closely 12-20-flowered, corolla 2-3 times the calyx. *Wight Ic.* t. 752. *C. trifoliatrum*, *Wall. Cat.* 5432, G. *C. rostrata*, *W. & A. Prodr.* 191.

NILGHIRIS AND PULNEY MOUNTAINS.

Branches firm, ascending, terete, clothed with minute grey silky hairs. *Stipules* setaceous, persistent, $\frac{1}{6}$ in.; petioles shorter than the leaflets; leaflets cuneate in the lower half, reaching 1-1 $\frac{1}{4}$ in. long, green and glabrous above, thinly silky below. *Racemes* copious, short-peduncled lateral and terminal, 1-3 in. long; bracts small, setaceous. *Calyx* thinly silky, $\frac{1}{8}$ in. long; teeth lanceolate, equalling the tube. *Corolla* yellow; keel with a very long beak. *Pod* $\frac{1}{4}$ in. long, subquadrangular, thinly silky.

67. *C. rigida*, *Heyne*; *DC. Prodr.* ii. 133; shrubby, branchlets short stiff obscurely silky, leaflets minute obcordate, racemes 2-6-flowered, corolla 2-3 times the calyx. *W. & A. Prodr.* 191.

CARNATIC, Heyne, G. Thomson.

A low *shrub* with very numerous woody subpatent branches, the old ones glabrescent, the copious branchlets almost spiny in old plants. *Stipules* setaceous, very minute; petiole very short; leaflets pale green, thick, obscurely silky, not more than $\frac{1}{4}$ in. long. *Racemes* copious, close, all terminal; bracts linear, very minute. *Calyx* $\frac{1}{4}$ in. long, thinly silky; teeth lanceolate, equalling the tube. *Corolla* yellow, glabrous; beak of keel long and narrow. *Pod* $\frac{1}{2}$ in. long, thinly silky.

GROUP 9. **Trifoliolatæ Polyspermæ.** *Leaves* 3-foliolate. *Pod* oblong or cylindrical, stalked or sessile, glabrous or pubescent, many-seeded. Herbs or shrubs.

68. **C. orixensis**, Rottl.; DC. Prodr. ii. 131; herbaceous, diffuse, thinly hairy, leaflets obovate-oblong obtuse, racemes very lax, bracts foliaceous persistent, corolla small scarcely exserted, pod oblong glabrous long-stalked. *Roxb. Hort. Beng.* 98; *Fl. Ind.* iii. 276; *Wall. Cat.* 5426; *W. & A. Prodr.* 193; *Dalz. & Gibs. Bomb. Fl.* 57. *C. macropoda*, *A. Rich. Fl. Abyss.* i. 157.

Plains throughout the WESTERN PENINSULA.—DISTRIB. Abyssinia.

Perennial, with spreading slender copiously-branched stems, 1–1½ ft. long, clothed with short spreading brown hairs, which are bulbous at the base. *Stipules* linear, persistent; petiole ½–1 in.; leaflets 1–1½ in. long, moderately firm, glabrous above, thinly clothed with long hairs below. Lateral racemes numerous, 3–12-flowered; bracts large, ovate-acuminate, reflexed; pedicels filiform, 3–4 times the calyx. *Calyx* ½ in. long; teeth linear, long. *Pod* ½–¾ in. long, 8–10-seeded, with a stalk as long as the calyx.—The only representative of the *Diffuse* in the trifoliate series.

69. **C. lævigata**, Lamk.; DC. Prodr. ii. 131; fruticose, obscurely downy, leaflets obovate-oblong obtuse, racemes terminal 2–4-flowered, bracts minute setaceous, corolla 2–3 times the calyx, pod oblong glabrous long-stalked. *Benth. in Hook. Lond. Journ.* ii. 576. *C. stipitata*, *Grah. in Wall. Cat.* 5425, B.; *W. & A. Prodr.* 193.

Plains of the WESTERN PENINSULA.

A small *shrub*, with long slender terete erecto-patent branches, finely downy or glabrescent. *Stipules* minute, setaceous, deciduous; petiole as long as leaves; leaflets ½–1½ in. long, green and glabrous above, pale and obscurely silky below. *Racemes* subcorymbose at the end of copious branchlets; pedicels cernuous, bracteolate, thinly silky. *Calyx* ¼ in. deep, thinly silky; teeth lanceolate, as long as the tube. *Corolla* yellow, ½–¾ in.; keel with a very long beak. *Pod* ½–¾ in. long, 8–10-seeded, with a stalk as long as the calyx.

70. **C. incana**, Linn.; DC. Prodr. ii. 132; suffruticose, loosely downy, leaflets obovate obtuse, racemes terminal and lateral elongated, bracts minute, corolla slightly exserted, pod subsessile cylindrical loosely pubescent. *Bot. Reg.* t. 377. *C. affinis*, DC. Prodr. ii. 132. *C. Schimper*, *A. Rich. Fl. Abyss.* i. 151. *C. herbacea*, *Schweig. in Schrank Syll.* ii. 77.

KUMAON; 5000 ft., *Strachey* and *Winterbottom*, *Edgeworth*; CEYLON, *Gardner*, &c. Perhaps naturalised only.—DISTRIB. Malay isles, Trop. Africa and America, common.

An *undershrub*, 2–4 ft. high, with robust terete branches, the whole plant, including calyx and pod, clothed with fine spreading brown silky hairs. *Stipules* setaceous, minute; leaflets 1½–2 in. long, very obtuse, cuneate in the lower half, membranous. *Racemes* closely 12–20-flowered, reaching 6–9 in. long. *Calyx* ¼ in. long; teeth long, lanceolate. *Pods* deflexed, rather recurved, 1–1½ in. long, 20–30-seeded.

71. **C. clavata**, W. & A. Prodr. 194; shrubby, obscurely downy, leaflets obovate obtuse, racemes terminal and lateral elongated, bracts minute setaceous, corolla much exserted, pod thinly silky oblong-cylindrical short-stalked. *Benth. in Hook. Lond. Journ.* ii. 587. *C. cytisoides*, *Wight in Wall. Cat.* 5424, D.

CARNATIC; Dindygul hills, *Wight*.

A low *shrub* with arcuate ascending terete glabrescent branches. *Stipules* setaceous, very minute; petiole shorter than the leaflets; leaflets thick, rather fleshy, obtuse, cuneate in the lower half, pale, subglabrous. *Racemes* 20–30-flowered, short-peduncled, reaching ½ ft. long. *Calyx* campanulate, thinly silky, ½–¾ in. long; teeth lanceolate, as long as the tube. *Corolla* yellow, glabrous, ¾ in. long. *Pod* deflexed, rather recurved, 10–12-seeded.

72. **C. bracteata**, *Roxb. Fl. Ind.* iii. 378; shrubby, obscurely downy, leaflets large oblong acute, racemes terminal and lateral elongated, bracts minute

setaceous, corolla much exserted, pod subsessile oblong-cylindrical densely pubescent. *Wall. Cat.* 5423; *Benth. in Hook. Lond. Journ.* ii. 586.

BHOTAN, CHITTAGONG, BURMA, PEGU, TENASSERIM.—DISTRIB. Malay isles, Philippines.

A low *shrub* with elongated flexuose slender finely downy or glabrescent branches. *Stipules* setaceous, very minute; petiole 2-3 in.; leaflets membranous, narrowed to both ends, 2-4 in. long, glabrous above, obscurely silky below. *Racemes* short-peduncled, closely 12-30-flowered. *Calyx* $\frac{1}{8}$ in. long, finely silky; teeth lanceolate, as long as tube. *Corolla* pale yellow, $\frac{3}{8}$ - $\frac{1}{2}$ in. long. *Pods* deflexed, rather recurved, hard, 8-10-seeded, densely clothed with spreading pale brown hairs.

73. **C. striata**, DC. *Prodr.* ii. 131; shrubby, obscurely silky, leaflets obovate-oblong obtuse or subacute, racemes terminal and lateral elongated, bracts setaceous minute, corolla twice the calyx, pod short-stalked glabrous cylindrical. *Bot. Mag.* t. 3200. C. Brownei, *Reich. Icon. Exot.* t. 232; DC. *Prodr.* ii. 130. C. Hookeri, *Arn. in Ann. Sc. Nat.* ser. ii. 3, 248. C. pisiformis, *Guill. & Per. Fl. Seneg.* 162. C. Saltiana, *Andr. Bot. Rep.* t. 648. C. latifolia, *Hort. Calc.* C. pallida and laburnoides, *Klotzsch in Peters. Mossam. Bot.* 57.

HIMALAYAS to CEYLON and MALACCA.—DISTRIB. Malay isles and spread through Tropical America and Africa.

An erect low *shrub* 2-4 ft. high, with robust sulcate thinly silky branches. *Stipules* minute, setaceous, deciduous; petiole 2-3 in.; leaflets membranous, 3-4 in. long, usually subobtusate, green and glabrous above, pale and obscurely silky below. *Racemes* 20-50-flowered, reaching $\frac{1}{2}$ -1 ft. long. *Calyx* $\frac{1}{4}$ in. long, thinly silky; teeth lanceolate, as long as the tube. *Corolla* glabrous, yellow striped with red. *Pods* deflexed, rather recurved, $1\frac{1}{2}$ -2 in. long, 20-30-seeded.

74. **C. laburnifolia**, Linn.; DC. *Prodr.* ii. 130; shrubby, glabrous, leaflets obovate-oblong acute, racemes elongated very lax, bracts minute deciduous, corolla large much exserted, pod cylindrical glabrous long-stalked. *Wall. Cat.* 5424, excl. D; *Roxb. Fl. Ind.* iii. 275; *W. & A. Prodr.* 193; *Dalz. & Gibs. Bomb. Fl.* 57. C. pendula, *Bert.*; DC. *Prodr.* ii. 130. C. pedunculosa, *Desv.*; DC. *Prodr.* ii. 132. Clavulium pedunculolum, *Desv. in Ann. Sc. Nat.* ix. 407; *Rheede Hort. Mal.* ix. t. 27; *Burm. Zeyl.* t. 35.

WESTERN PENINSULA, CEYLON, MALACCA.—DISTRIB. Philippines and Malay isles.

A low *shrub* with slender elongated terete branches. *Stipules* 0; petiole 2-3 in.; leaflets membranous, glabrous, 1-2 in. long, cuneate at the base. *Racemes* terminal and lateral, $\frac{1}{2}$ -1 ft. long; pedicels exceeding the calyx. *Calyx* glabrous, turbinate, $\frac{1}{4}$ - $\frac{3}{8}$ in. long; teeth lanceolate, as long as the tube. *Corolla* bright yellow, glabrous, 1 in. deep; keel very broad with a long incurved beak. *Pod* $1\frac{1}{2}$ -2 in. long, 20-30-seeded; gynophore filiform, $\frac{3}{4}$ -1 in. long, much exceeding that of any other species.

GROUP 10. **Multifoliolatae**. *Leaves* usually 5-, but varying from 3- to 7-foliolate. *Pod* glabrous, oblong or linear-oblong, distinctly stalked, many-seeded. Herbs or under-shrubs.

75. **C. quinquefolia**, Linn.; DC. *Prodr.* ii. 135; herbaceous, branches and leaves below thinly silky, leaflets linear, bracts linear thinly silky, lower pedicels at last as long as the calyx. *Roxb. Fl. Ind.* iii. 279; *Dalz. & Gibs. Bomb. Fl.* 57; *Wall. Cat.* 5429; *W. & A. Prodr.* 194; *Ill.* t. 16—*Rheede Hort. Mal.* ix. t. 28.

WESTERN PENINSULA, CEYLON, BURMA, TENASSERIM.—DISTRIB. Malay isles, Philippines.

An erect *annual* 2-4 ft. high, with robust straight sulcate branches. *Stipules* linear, subsistent; petioles 1-3 in.; leaflets usually 5, rarely 3, linear, rarely narrow oblanceolate, 2-4 in. long, obtuse, glabrous above. *Racemes* usually terminal,

laxly 10-20-flowered, reaching $\frac{1}{2}$ ft. long; bracts persistent, as long as the pedicels. *Calyx* campanulate, subglabrous, $\frac{1}{2}$ in. long; teeth lanceolate, as long as the tube. *Corolla* glabrous, twice the calyx. *Pod* oblong, glabrous, distinctly stalked, $1\frac{1}{2}$ -2 in. by $\frac{3}{4}$ -1 in., 30-40-seeded.—*C. heterophylla*, L. DC. Prodr. ii. 131, is a trifoliate form.

76. **C. Grahamiana**, W. & A. Prodr. 194; shrubby, branches and leaves below densely clothed with adpressed silky hairs, leaflets oblanceolate, bracts linear thinly silky, lower pedicels as long as the calyx. *C. digitata*, Wight in Wall. Cat. 5430, non Hook.

CARNATIC; Pulney hills at 4000 ft.

Branches firm, elongated, angular, persistently silky. *Stipules* linear, reflexed, persistent; petiole reaching 3-4 in., silky like the branches; leaflets thicker than in *C. quinquefolia*, 2-3 in. long, often 7, glabrous above, obtuse. *Racemes* closely 12-30-flowered, $\frac{1}{4}$ - $\frac{1}{2}$ ft.; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., acuminate, reflexed, persistent. *Calyx* just like that of *C. quinquefolia*. *Corolla* yellow, glabrous, half as long again as the calyx. *Pod* linear-oblong, $1\frac{1}{2}$ -2 in. long, distinctly stalked.

77. **C. digitata**, Hook. Bot. Misc. ii. 354, suppl. t. 16 (*C. quinquefolia*); shrubby, branches and leaves on both sides clothed with loose soft tomentum, leaflets obovate-cuneate, bracts lanceolate tomentose, pedicels twice the calyx. W. & A. Prodr. 194, non Wight in Wall. Cat. 5430.

CARNATIC; Madura hills, Wight.

A low shrub; the whole plant, except calyx and corolla, clothed with loose soft pale brown velvety tomentum. *Stipules* $\frac{1}{2}$ in. long. linear-setaceous, reflexed, persistent; petiole 2-3 in.; leaflets 3-5, thick and soft, cuneate in the lower half, very obtuse, the end one reaching $2\frac{1}{2}$ -3 in. long, $\frac{3}{4}$ -1 in. broad, the outermost sometimes unequal-sided. *Racemes* terminal and lateral, short-peduncled, closely 12-20-flowered; bracts lanceolate acuminate, densely velvety, patent, persistent. *Calyx* glabrous, $\frac{5}{8}$ - $\frac{3}{4}$ in. long; teeth lanceolate, as long as the tube. *Corolla* yellow, glabrous, 1 in. long. *Pod* linear-oblong, 2-2 $\frac{1}{2}$ in. long.

C. ELLIPTICA, Roxb. in Wall. Cat. 5433 (*C. Vachellii*, H. & A.), and *C. VASCULOSA*, Grah. in Wall. Cat. 5427, have no claim to rank as Indian species, having been introduced to the Calcutta Garden, the former from China, and the latter from Mauritius.

9. **ONONIS**, Linn.

Undershrubs or herbs, often viscid. *Leaves* with pinnately 3-foliolate toothed leaflets. *Calyx-tube* campanulate; teeth long, subequal. *Petals* clawed; standard roundish; wings obovate-oblong; keel incurved, acute. *Stamens* monadelphous, the alternate filaments dilated at the apex; anthers dimorphous. *Ovary* in our plant subsessile, few-ovuled; style filiform, abruptly incurved, stigma minute oblique. *Pod* oblong, turgid, continuous within.—DISTRIB. Species 60, mainly Mediterranean and European.

1. **O. hircina**, Jacq. Hort. Vind. t. 93; Boiss. Fl. Orient. ii. 56. *O. altissima*, Lam. Dict. i. 506; DC. Prodr. ii. 162. *O. arvensis*, Linn. herb. in part. *O. procurrens*, Benth. in Royle Ill. 197.

TEMPERATE WEST HIMALAYA; TIBET and KASHMIR, alt. 5-7000 ft.—DISTRIB. Orient, West Siberia, Europe.

An undershrub, with ascending unarmed pubescent stems. *Stipules* large, leafy, adnate to the short petioles; leaflets oblong, obtuse. *Flowers* reddish, in pairs at the axils of the leaves, forming a close leafy raceme at the end of the branches. *Calyx* $\frac{2}{3}$ in.; teeth linear, exceeding the tube. *Pod* oblong, downy, not exserted, 2-3-seeded.

10. **TRIFOLIUM**, Linn.

Annual or perennial herbs. *Leaves* with stipules adnate to the petiole and digitately 3-foliolate leaflets. *Flowers* small, copious, in dense axillary heads. *Calyx* tube turbinate; teeth mostly 5 subequal. *Corolla* adnate to the staminal tube, and fading without falling; standard and wings narrow; keel straight, obtuse. *Stamens* diadelphous; filaments more or less dilated; anthers uniform. *Ovary* sessile or stalked, few-ovuled; style filiform, incurved above the base; stigma oblique. *Pod* minute, included, membranous, indehiscent, 1 or few-seeded.—**DISTRIB.** Species perhaps 200, mostly European and Oriental, many N. American and Trop. African.

T. minus, *Smith*, is included in Hohenacker's Neilgherry plants, no doubt from introduced specimens.

T. resupinatum, *Linn.*, is largely cultivated in Afghanistan, Hazara and Khagan, in the subtropical zone.

1. ***T. pratense***, *Linn.*; *DC. Prodr.* ii. 195; erect, heads subtended by a pair of opposite leaves, calyx not accrescent. *Boiss. Fl. Orient.* ii. 115.

KASHMIR to GARHWAL, 4-8000 ft.—**DISTRIB.** Afghanistan, Siberia, Orient, Europe.

Perennial; stems a foot or more high, slightly downy. *Stipules* very broad; leaflets oblong; toothing obscure. *Heads* roundish; flowers very dense, usually red. *Calyx* pubescent; teeth setaceous, the lowest longer than the rest, exceeding the tube. *Pod* 1-seeded, opening by a lid.—One of the common forage clovers.

2. ***T. repens***, *Linn.*; *DC. Prodr.* ii. 198; trailing, peduncles elongated naked, calyx not accrescent. *Boiss. Fl. Orient.* ii. 145. *T. venulosum*, *Royle MSS.*

TEMPERATE and ALPINE HIMALAYA, ascending to 20,000 ft.; NILGHIRIS and Ceylon, perhaps introduced.—**DISTRIB.** Through Europe and Asia, also North America.

Stems slender, glabrous, wide-creeping. *Stipules* narrow; petioles and peduncles long, ascending; leaflets obovate emarginate, distinctly toothed. *Heads* globose, not dense; flowers finally deflexed. *Calyx* glabrous; teeth subequal, shorter than the tube. *Corolla* white or with a pink tinge. *Pod* minute, linear, 3-4-seeded.—Commonly cultivated.

3. ***T. fragiferum***, *Linn.*; *DC. Prodr.* ii. 202; trailing, peduncles elongated naked, fruit calyx accrescent. *Boiss. Fl. Orient.* ii. 135.

KASHMIR, temperate zone, *Jacquemont*, *Thomson*.—**DISTRIB.** Europe, Orient, N. Africa, Abyssinia.

Habit of *T. repens*, for which it is easily passed over in flower. *Stipules* lanceolate, with cuspidate points; petioles and peduncles elongated; leaflets less distinctly toothed. *Corolla* a deeper pink. *Calyx* in fruit becoming an ovoid membranous persistent bladder, enclosing the small 1-2-seeded pod.

11. **PAROCHETUS**, Hamilt.

A slender creeping herb. *Leaves* 3-foliolate. *Flowers* on axillary peduncles. *Calyx* tube campanulate; two upper teeth subconnate. *Corolla* free from staminal tube; standard broad, obovate clawed; wings much shorter, obtuse; keel as long as the wings, incurved and subacute at the tip. *Stamens* diadelphous; filaments not dilated; anthers uniform. *Ovary* sessile, linear, α -ovulate; style elongated, glabrous, suddenly incurved above the base, stigma terminal. *Pod* linear, turgid, continuous within. A single species.

1. ***P. communis***, *Hamilt.*; *DC. Prodr.* ii. 403; *Wall. Cat.* 5972; *Royle Illust.* t. 35; *Don. Prodr.* 241. *P. major*, *Don Prodr.* 241; *DC. Prodr. loc.*

cit.; Wall. *Cat.* 5525; *W. & A. Prod.* 252; *Wight Ic.* t. 483. *P. oxalidifolia*, Royle *Illust.* 201. *P. maculata*, R. Br. in Benn. *Pl. Jav. Rar.* 162, t. 34.

ALPINE, TEMPERATE and SUBTROPICAL HIMALAYA from SIMLA and GARHWAL to ASSAM, alt. 4–13,000 ft. NILGHIRIS, CEYLON, BIRMA, Wallich; TENASSÉRIM, Parish.—DISTRIB. Java, Zambesi-land.

Rhizome thread-like, wide-creeping. *Petiole* long, filiform, bearing leaves like those of *Oxalis Acetosella*; leaflets subsessile, obovate, cuneate, emarginate, entire, glabrous or slightly pubescent. *Peduncles* overtopping the leaves, 1–2-flowered. *Calyx* $\frac{1}{4}$ in. deep; teeth lanceolate. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in., purplish-white. *Pod* straight, glabrous, linear, $\frac{3}{4}$ –1 in. long.

12. **TRIGONELLA**, Linn.

Annual herbs. *Leaves* pinnately 3-foliolate, toothed. *Flowers* racemed, lemon-yellow. *Calyx* tube campanulate; teeth distinct, subequal. *Petals* free from the staminal tube; standard and wings narrow; keel shorter, obtuse. *Stamens* diadelphous; filaments not dilated; anthers uniform. *Ovary* sessile, many-ovuled; style glabrous; stigma terminal. *Pod* linear or linear-oblong, compressed or subterete, not spiral, usually exserted, many-seeded, continuous within.—DISTRIB. Species 50, mostly Mediterranean and Oriental. Many cultivated for forage.

* *Pod* short, turgid.

1. **T. occulta**, Delile; DC. *Prodr.* ii. 185; Boiss. *Fl. Orient.* ii. 84. *T. arguta*, Visiani *Pl. Egypt.* 33, t. 8, fig. 1.

Plains of SCINDE, Stocks; UPPER GANGETIC PLAIN, near Lucknow, Anderson.—DISTRIB. Egypt, Nubia.

Diffuse, densely cæspitose, glabrous or subglabrous, annual, with slender stems a few in. long. *Stipules* deeply laciniated; petiole exceeding the sharply-toothed minute oblanceolate cuneate leaflets. *Flowers* 2–4 together in copious sessile axillary clusters. *Calyx* $\frac{1}{8}$ in.; teeth linear-setaceous. *Corolla* slightly exserted. *Pod* elliptical, scarcely exserted, glabrous, usually 2-seeded.

** *Pod* long, turgid.

2. **T. Fœnum-græcum**, Linn.; DC. *Prodr.* ii. 182; pod large long-beaked, reticulations distant not transverse. Roxb. *Fl. Ind.* iii. 389; Wall. *Cat.* 5984; *W. & A. Prodr.* 195; Sibth. & Sm. *Fl. Græca*, t. 766; Boiss. *Fl. Orient.* ii. 70.

KASHMIR, PUNJAB, UPPER GANGETIC PLAIN, &c.—DISTRIB. South Europe and Orient, widely cultivated.

Annual, robust, erect, subglabrous. *Stipules* not laciniated; leaflets toothed, $\frac{3}{4}$ –1 in. long, oblanceolate-oblong. *Flowers* 1–2, sessile in the axils of the leaves. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in., teeth linear. *Corolla* much exserted. *Pod* 2–3 in. long, 10–20-seeded, with a long persistent beak, often falcate.

3. **T. polycerata**, Linn.; DC. *Prodr.* ii. 184; pod small not beaked, reticulations close transverse, flowers 1–6 in a sessile or short-peduncled umbel. *T. incisa*, Royle *Ill.* 197; Camb. in Jacq. *Voy. Bot.* 36, t. 42; Boiss. *Fl. Orient.* ii. 76. *T. pinnatifida*, Cav.; DC. *Prodr.* ii. 183. *T. monantha*, C. A. Meyer in Led. *Ross.* i. 534; Boiss. *Fl. Orient.* ii. 77. *T. orthoceras*, Kar. & Kir.; Walp. *Rep.* i. 637; Boiss. *Fl. Orient.* ii. 77. *T. geminiflora*, Bunge *Rel. Lehm.* 71. *T. brahuica*, Boiss. *Fl. Orient.* ii. 73.

PUNJAB and UPPER GANGETIC PLAIN, ascending to 6000 ft.—DISTRIB. West Siberia, Orient, South Europe to Spain.

Annual, more slender, branched and diffuse than in the last. *Stipules* not laciniated; points setaceous; leaflets smaller, sharply inciso-dentate or even pinnatifid,

obovate; base deltoid, entire. *Flowers* 1-6 usually 2-4, sessile or on a short common peduncle in the axil of leaf. *Calyx* $\frac{1}{6}$ in., subcylindrical; teeth setaceous, shorter than tube. *Corolla* slightly exserted. *Pod* 1-2 in. long, falcate, $\frac{1}{12}$ in. broad, much wrinkled transversely, 10-20-seeded.

4. **T. hamosa**, Linn.; DC. *Prodr.* ii. 183; pod small not beaked, reticulations close transverse, flowers 6-12 in short-peduncled racemes. Boiss. *Fl. Orient.* ii. 84. *T. obcordata*, Wall. *Cat.* 5986; Benth. in Royle *Ill.* 197. *T. nervosa*, Klotzsch in Reise Pr. Wald. Bot. 158, t. 1, fig. 1.

Included amongst Wallich's plants, with the habitat of Tikari (*Hamilton*), but a doubtful native of India proper.—DISTRIB. Afghanistan, Egypt, Nubia, Cape.

Annual, glabrous. *Stems* caespitose, diffuse, 1 ft. or more long. *Stipules* broad, deeply cut; leaflets obovate-cuneate, shallowly toothed, $\frac{3}{8}$ - $\frac{1}{2}$ in. long; base deltoid, entire. *Racemes* close, equalling or falling short of the leaves, terminated by a spine. *Calyx* short-pedicelled, under $\frac{1}{12}$ in. deep; teeth lanceolate, shorter than the tube. *Corolla* three times the calyx. *Pod* $\frac{3}{8}$ - $\frac{1}{2}$ in. long, much curved, 4-6-seeded.

*** *Pod linear or linear-oblong flat.*

5. **T. gracilis**, Benth. in Royle *Ill.* 197; glabrous, peduncles 1-3-flowered, corolla distinctly exserted, pod linear straight 6-8-seeded.

KASHMIR, KUMAON, GURWHAL, &c., alt. 5-7000 ft.

Stems very slender, trailing, 1-1 $\frac{1}{2}$ ft. long. *Stipules* linear, faintly toothed; petiole shorter than leaflets, often scarcely any; leaflets obovate-cuneate, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, finely inciso-dentate, veins raised. *Peduncles* filiform, exceeding leaves, ending in a conspicuous awn. *Calyx* $\frac{1}{8}$ in.; teeth setaceous, as long as the tube. *Pod* $\frac{3}{8}$ - $\frac{1}{2}$ in. by $\frac{1}{8}$ in., marked with distinct rather close transverse veins.

6. **T. pubescens**, Edgw. MSS.; finely downy, peduncles 1-3-flowered, corolla slightly exserted, pod linear-oblong straight 10-12-seeded.

HAZARA, KASHMIR, KUMAON, PITI, KUNAWAR, &c., alt. 5-10,000 ft.

Stems more branched and stouter than in the last, reaching 1 ft. or more long. *Stipules* linear, faintly toothed; petiole shorter than the blade; leaflets obovate-oblong, cuneate at the base, distinctly inciso-dentate, $\frac{1}{2}$ - $\frac{3}{4}$ in. long. *Peduncle* as long as the leaves, not ending in an awn. *Calyx* $\frac{1}{8}$ in., finely downy; teeth linear-setaceous, exceeding the tube. *Pod* downy at first, $\frac{1}{2}$ - $\frac{3}{8}$ in. by $\frac{1}{6}$ - $\frac{1}{8}$ in.; veins transverse, distinct, very close.

7. **T. emodi**, Benth. in Royle *Ill.* 197; flowers 4-6 rarely up to 12 closely racemose, corolla 2-3 times the calyx, pod linear-oblong straight 4-6-seeded. Melilotus emodi, Wall. *Cat.* 5941. *Trigonella himalaica*, Wall. MSS. *T. cachemiriana*, Camb. in Jacq. *Voy. Bot.* 36, t. 41. *Botryolotus cachemyrianus*, Jaub. & Spach. *Illust.* i. 125. *T. rhytidocarpa*, Boiss. & Bal. *Fl. Orient.* ii. 78.

KASHMIR to NIPAL, alt. 4-10,000 ft.—DISTRIB. Afghanistan, Persia, Orient.

Habit and inflorescence of *T. corniculata*, from which it mainly differs in pod. *Stems* glabrous, copiously branched, 1 ft. or more high. *Stipules* slightly inciso-dentate, points linear-setaceous; leaflets obovate, distinctly inciso-dentate in the wild form. *Peduncles* 1-2 in. long, terminated by a distinct point. *Calyx* glabrous, $\frac{1}{8}$ - $\frac{1}{6}$ in.; teeth linear, as long as the tube. *Pod* $\frac{1}{2}$ - $\frac{3}{4}$ in. by $\frac{1}{6}$ - $\frac{1}{8}$ in., glabrous, with close distinct raised veins.

8. **T. corniculata**, Linn.; DC. *Prodr.* ii. 184; flowers 6-12 closely racemose, corolla 2-3 times the calyx, pod narrow linear falcately recurved 4-8-seeded. Roxb. *Fl. Ind.* iii. 389; W. & A. *Prodr.* 196; Wight *Íc.* t. 384; Sibth. & Sm. *Fl. Græca*, t. 761; Boiss. *Fl. Orient.* ii. 83. *T. elatior*, Sibth. & Sm. *Fl. Græca*, t. 762. *T. fimbriata*, Royle *Ill.* 197. *T. esculenta*, Willd.; DC. *Prodr.* ii. 185; Wall. *Cat.* 5985.

BENGAL, KASHMIR and LADAK to KUMAON, alt. 5-12,000 ft.—DISTRIB. Afghanistan, Orient, South Europe.

Diffuse, very much branched, glabrous, suberect, 1 ft. or more high. *Stipules* deeply or faintly toothed, points setaceous; petiole as long as or exceeding leaflets; leaflets obovate-cuneate, faintly inciso-dentate, $\frac{1}{2}$ – $\frac{3}{4}$ in. long. *Peduncles* exceeding the leaves, awned at the tip. *Calyx* $\frac{1}{2}$ in.; teeth shorter than the tube. *Pod* $\frac{1}{2}$ – $\frac{3}{4}$ in. by $\frac{1}{8}$ in., glabrous, marked with close transverse raised veins.

13. MELILOTUS, Juss.

Annual or biennial herb. *Leaves* with toothed pinnately 3-foliolate leaflets. *Flowers* in long racemes. *Calyx*-tube campanulate; teeth 5, subequal, lanceolate. *Corolla* caducous, free from the staminal tube; standard and wings narrow; keel straight, obtuse. *Stamens* diadelphous, filaments not dilated; anthers uniform. *Ovary* sessile or stipitate, few-ovuled; style filiform, glabrous, much incurved, stigma terminal. *Pod* oblong, much exserted, indehiscent.—DISTRIB. Species about a dozen; spread through the temperate regions of the Old World.

1. **M. parviflora**, Desf.; DC. Prodr. ii. 187; annual, corolla pale yellow minute, standard exceeding wings and keel, pod glabrous. Wall. Cat. 5943 A, B.; W. & A. Prodr. 196; Boiss. Fl. Orient. ii. 108. *M. indica*, All. Fl. Ped. i. 308. *M. minima*, Roth; DC. Prodr. ii. 189. *Trifolium indicum*, Linn.; Roxb. Fl. Ind. iii. 388.

WESTERN PENINSULA, BENGAL, NORTH WEST PROVINCES, tropical zone.—DISTRIB. Orient, Europe, and introduced in many other regions.

Stems slender, 1-1½ ft. high. *Stipules* linear acuminate; leaflets obovate or oblanceolate, retuse or emarginate. *Flowering-racemes* close; fruiting-racemes 1-2 in. *Calyx* $\frac{1}{4}$ in.; teeth deltoid. *Corolla* not more than $\frac{1}{2}$ in. long. *Pod* $\frac{1}{12}$ – $\frac{1}{8}$ in., obscurely reticulato-lacunose, usually 1-seeded.—*M. parviflora*, Wall. 5943 D, is *M. italica*, Lam., only known in India in cultivation.

2. **M. alba**, Lamk. Dict. iv. 63; biennial, corolla white, standard exceeding wings and keel, pod glabrous. Boiss. Fl. Orient. ii. 109. *M. altissima*, Wall. Cat. 5942, non Thuill. *M. leucantha*, Koch; DC. Prodr. ii. 187; W. & A. Prodr. 196. *M. vulgaris*, Willd. Enum. 490.

Northern Provinces, ascending from the plains of BENGAL to 12-13,000 ft. in NUBRA, and 11,000 ft. in LADAK.—DISTRIB. Europe, Orient, Siberia, &c.

Much taller and more robust than the last. *Stipules* and leaflets similar. *Racemes* in flower 1½-2 in., in fruit 3-4 in. long. *Calyx* under $\frac{1}{12}$ in.; teeth lanceolate, shorter than the tube. *Corolla* always white, inodorous, 2-3 times the length of the calyx in the temperate zone, nearly as small as in *M. parviflora* in the plains. *Pod* as in the last, but larger, often 2-seeded.

3. **M. officinalis**, Willd.; DC. Prodr. ii. 186; biennial, corolla yellow, standard the same length as the wings and keel, pod hairy. Boiss. Fl. Orient. ii. 109. *M. macrorrhiza*, Pers.; DC. Prodr. ii. 187. *M. altissima*, Thuill. Fl. Par. 378, non Wallich. *Trifolium officinale*, Willd.; Roxb. Fl. Ind. iii. 388.

NUBRA and LADAK: 10-13,000 ft., Thomson, Stewart.—DISTRIB. Europe, Orient, &c.

Very like *M. alba* in general habit and identical in stipules and leaflets. *Racemes* denser, and not quite so long. *Calyx* $\frac{1}{12}$ in.; teeth lanceolate, as long as the tube. *Corolla* linear, yellow, odorous, usually three times as long as the calyx. *Pod* distinctly stipitate, $\frac{1}{8}$ in. long, 1-2-seeded, not so obtuse.

14. MEDICAGO, Linn.

Herbs, rarely shrubs. *Leaves* pinnately 3-foliolate; leaflets toothed. *Calyx*-tube campanulate; teeth 5, subequal. *Corolla* more or less exserted, free

from the staminal tube; standard and wings oblong; keel straight, obtuse. *Stamens* diadelphous; filaments filiform; anthers uniform. *Ovary* sessile, usually many-ovuled; style short, little incurved; stigma oblique. *Pod* usually spirally twisted, many-seeded, indehiscent, rarely sickle-shaped, in *M. lupulina* one-seeded.—**DISTRIB.** Species about 40; spread principally round the Mediterranean.

M. SATIVA, Linn.; Wall. Cat. 5945, A, B, probably a cultivated race of *M. falcata*, characterised by the pod forming a double spiral and flowers usually purple, is often grown for forage in Madras, Bengal, and the North-West Provinces.

* *Suberect, perennial.*

1. *M. falcata*, Linn.; DC. Prodr. ii. 172; Boiss. Fl. Orient. ii. 93. *M. sativa*, Wall. Cat. 5945 C, D. *M. procumbens*, Besser, Prim. Fl. Gal. ii. 127.

KASHMIR, LADAK, KUNAWAR, &c.; alt. 5–13,000 ft.—**DISTRIB.** Afghanistan, Orient, and all through Europe.

Subglabrous, copiously branched, 1–2 ft. high. *Leaflets* oblanceolate, $\frac{1}{2}$ –1 in. long. *Peduncles* exceeding leaves. *Flowers* 12–20, in close racemes. *Calyx* $\frac{1}{8}$ in.; teeth setaceous, as long as the tube. *Corolla* bright yellow, twice the calyx. *Pod* linear, sickle-shaped, glabrous, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, 5–10-seeded.

** *Diffuse trailing annuals or biennials.*

2. *M. lupulina*, Linn.; DC. Prodr. ii. 172; biennial, pod minute linear sickle-shaped unarmed one-seeded. Wall. Cat. 5944; Boiss. Fl. Orient. ii. 105.

Tropical and temperate tracts of the north-west, ascending from the INDUS valley and GANGETIC plain to 10–12,000 ft.—**DISTRIB.** Orient, Siberia, Europe, Abyssinia, often cultivated.

Stem 1 ft. or more long, finely downy. *Stipules* toothed; points lanceolate, acuminate; leaflets obovate, faintly inciso-crenate, base deltoid, entire. *Flowers* 12–20, densely capitate; peduncles exceeding the leaves. *Calyx* $\frac{1}{2}$ – $\frac{1}{4}$ in.; teeth setaceous, as long as the tube. *Corolla* slightly exserted. *Pod* $\frac{1}{12}$ in. long, indehiscent, glabrous or downy, faintly veined longitudinally, finally black.

3. *M. orbicularis*, All.; DC. Prodr. ii. 174; annual, pod spiral unarmed large vertically compressed. Boiss. Fl. Orient. ii. 97.

KASHMIR; temperate region, Falconer.—**DISTRIB.** Orient, Mediterranean, Abyssinia.

Stems slender, subglabrous, a foot or more long. *Stipules* short, deeply lacinated; leaflets $\frac{1}{2}$ – $\frac{3}{4}$ in. long, obovate-cuneate, faintly inciso-dentate. *Peduncles* shorter than the leaves, 1–3-flowered. *Calyx* $\frac{1}{8}$ in.; teeth linear-setaceous. *Corolla* yellow, much exserted. *Pod* $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, with 4–5 flattened spirals, distantly finely transversely veined.

4. *M. laciniata*, All.; DC. Prodr. ii. 180; annual, stipules lacinated, pod small subglobose spiral muricated, corolla scarcely exserted. Boiss. Fl. Orient. ii. 104.

PUNJAB; tropical region, Fleming, Jacquemont, Aitchison.—**DISTRIB.** Orient, Mediterranean, Abyssinia.

Stems glabrous, very slender, reaching a foot long. *Leaflets* $\frac{1}{4}$ – $\frac{3}{8}$ in. long, obovate-cuneate, sharply inciso-dentate or even pinnatifid; petiole equalling or exceeding leaflets. *Peduncles* filiform, awned, 1–2-flowered. *Calyx* narrowly turbinate, $\frac{1}{8}$ in.; teeth setaceous. *Pod* $\frac{1}{8}$ in. broad with 4–5 sharply muricated spirals.

5. *M. denticulata*, Willd.; DC. Prodr. ii. 176; annual, stipules lacinated, corolla twice the calyx, pod subglobose spiral muricated. Boiss. Fl. Orient. ii. 102. *M. canescens*, Grak. in Wall. Cat. 5946. *M. polymorpha*, Roxb. Fl. Ind. iii. 390.

Tropical zone of the north-west : SCINDE, BENGAL, OUDE, PUNJAB, KUMAON, &c.—
DISTRIB. Orient, Abyssinia, Europe, Japan, China, Siberia.

Stems subglabrous, more robust than in *M. minima* and *laciniata*. *Leaflets* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, obovate-cuneate, faintly toothed. *Peduncles* short, closely 2–6-flowered, not awned. *Calyx* $\frac{1}{12}$ in.; teeth lanceolate, as long as the tube. *Pod* with 2–4 spirals, the veined face $\frac{1}{8}$ – $\frac{1}{4}$ in. broad without the spines, which are $\frac{1}{12}$ – $\frac{1}{8}$ in. long in the type, but reduced down to mere tubercles in the var. *M. apiculata*, Willd.

6. ***M. minima*, Lamk.**; *DC. Prodr.* ii. 178; annual, stipules subentire, pod small subglobose spiral muricated. *Boiss. Fl. Orient.* ii. 103.

KASHMIR, alt. 5–6000 ft., *D. Thomson*.—DISTRIB. Afghanistan, Orient, Mediterranean, Abyssinia, Europe.

Finely downy, the *stems* under $\frac{1}{2}$ ft. long. *Petioles* as long as the leaflets, which are obovate-cuneate, $\frac{1}{4}$ – $\frac{3}{8}$ in. long, distinctly toothed. *Peduncles* as long as the leaves, closely 2–5-flowered, not mucronate. *Calyx* $\frac{1}{12}$ in., finely downy; teeth linear-setaceous, as long as the tube. *Corolla* distinctly exserted. *Pod* $\frac{1}{8}$ in. broad, exclusive of the long spines, formed of 4–5 close spirals.

15. LOTUS, Linn.

Herbs. *Leaves* usually 5-foliate, the lowest pair of leaflets arising from the base of the petiole like stipules. *Calyx* tube campanulate, teeth subequal. *Corolla* caducous, free from the staminal tube; standard obovate clawed, exceeding the wings and incurved shortly beaked keel. *Stamens* diadelphous, filaments dilated at the apex; anthers uniform. *Ovary* sessile, many-ovuled; style long, abruptly inflexed, stigma terminal. *Pod* linear, turgid, septate between the seeds.—DISTRIB. Species 50 or more, spread through North and South temperate regions.

L. major, Scop. is in Bellew's Kashgar collection.

1. ***L. corniculatus*, Linn.**; *DC. Prodr.* ii. 214; herbaceous, leaflets 5, upper 3 remote from lower 2, flowers in peduncled terminal umbels. *Boiss. Fl. Orient.* ii. 165. *L. bracteatus*, *Wall. Cat.* 5939.

WEST HIMALAYAS, as far east as NIPAL, principally in the temperate zone up to 10,000 ft., but descending into the plains.—DISTRIB. Europe, Orient, Abyssinia, Japan, Australia.

Perennial. *Stems* slender, glabrous or obscurely silky. *Leaflets* 5, the end one sessile and two lowest stipule like. *Flowers* 4–8 in a close umbel, subtended by a reduced trifoliate leaf, at the end of a long peduncle. *Calyx* $\frac{1}{4}$ in.; teeth lanceolate-cuspidate. *Corolla* showy, 2–3 times as long as the calyx. *Pod* cylindrical, straight, $\frac{3}{4}$ –1 in. long.

VAR. *minor*; a dwarf form, from the plains of Scinde with solitary flowers and fleshy leaflets $\frac{1}{8}$ in. long.

2. ***L. ? Garcini*, DC. Prodr.** ii. 212; suffruticose, leaflets 3 all sessile rarely 5, flowers sessile axillary solitary. *Boiss. Fl. Orient.* ii. 174. *Ononis Aucheri*, *Jaub. & Spach Ill. Pl. Orient.* t. 96. *L. Stocksii*, *Boiss. Fl. Orient.* ii. 174.

SCINDE in sandy ground near the sea, *Stocks*.—DISTRIB. Through Persia to Nubia.

Habit less like that of a *Lotus* than of an *Ononis*, to which genus it also approaches by its slightly dimorphous anthers. *Stems* $\frac{1}{2}$ –1 ft., copiously stiffly branched, covered like the leaves with short grey tomentum. *Leaflets* pale, fleshy, $\frac{1}{4}$ – $\frac{3}{8}$ in. long, obovate-cuneate. *Flowers* copious, inconspicuous. *Calyx* $\frac{1}{4}$ in., densely downy; teeth linear, twice the tube. *Corolla* not exserted. *Pod* linear, straight, 5–6-seeded, $\frac{3}{8}$ – $\frac{1}{2}$ in. long.

16. **CYAMOPSIS**, DC.

Erect annuals, with 3-foliolate leaves, laterally attached hairs and small purplish flowers in axillary racemes. *Calyx*-tube oblique; teeth unequal, the lowest elongated, setaceous. *Petals* caducous: standard and wings narrow; keel obtuse, slightly incurved. *Stamens* monadelphous; anthers uniform, apiculate. *Ovary* sessile, linear, 6–8-ovuled; style short, filiform, much incurved, stigma capitate. *Pod* linear, straight, subtetragonous, 2-valved, septate between the seeds.—**DISTRIB.** Species 2, the other Arabian and trop. African.

1. **C. psoraloides**, DC. *Prodr.* ii. 216; *Wall. Cat.* 5920; *W. & A. Prodr.* 197; *Wight Ic.* t. 248. *Psoralea tetragonoloba*, *Linn. Mant.* 104. *Lupinus trifolius*, *Cav. Ic.* t. 59. *Dolichos psoraloides*, *Lamk. Dict.* ii. 300. *D. fabæformis*, *L'Herit.*; *Roxb. Fl. Ind.* iii. 316.

Plains from the HIMALAYA to the WESTERN PENINSULA, but often, perhaps always, cultivated.—**DISTRIB.** Afghanistan.

A robust, erect annual, 2–3 ft. high, clothed with adpressed grey hairs attached by the middle, as in *Indigofera*. *Stipules* long, linear-setaceous; *leaves* petioled, 3-foliolate; leaflets ovate, acute, inciso-dentate, 2–3 in. long. *Flowers* 6–30 in copious close short-peduncled axillary racemes; bracts setaceous, protruded. *Calyx* $\frac{1}{6}$ – $\frac{1}{5}$ in. *Corolla* scarcely exerted. *Pod* thick, fleshy, straight, $1\frac{1}{2}$ –2 in. long.

17. **INDIGOFERA**, Linn.

Herbs or shrubs clothed more or less densely with adpressed hairs laterally attached, often silvery-canescens. *Flowers* in copious axillary racemes. *Calyx* minute, campanulate; teeth 5, subequal or the lowest longest. *Corolla* caducous; standard obovate; keel straight, not rostrate, spurred on each side near the base. *Stamens* diadelphous; anthers uniform, apiculate. *Ovary* sessile, usually many-ovuled; style short incurved, stigma capitate usually penicillate. *Pod* usually linear-cylindrical, rarely oblong or globose, turgid, rarely flattish, in one section crescent-shaped, densely muricated.—**DISTRIB.** Species 250–300, spread through all tropical regions and also abundant at the Cape.

SUBGEN. 1. Acanthonotus, Benth. *Pod* recurved, sickle-shaped, 1-seeded, muricated along the ventral suture.

1. **I. echinata**, Willd.; DC. *Prodr.* ii. 222; *Roxb. Hort. Beng.* 98; *Fl. Ind.* iii. 370; *Wall. Cat.* 5456; *W. & A. Prodr.* 198; *Wight Ic.* t. 316; *Dalz. & Gibs. Bomb. Fl.* 57. *Hedysarum nummularifolium*, *Linn. Sp. Pl.* 1051 (*excl. syn.*). *H. rotundifolium*, *Vahl Symb.* ii. 81. *H. erinaceum*, *Poir. Dict. Suppl.* vi. 393. *Onobrychis rotundifolia*, *Desv.*; DC. *Prodr.* ii. 348. *O. cuneifolia*, DC. *Prodr.* ii. 348. *Indigofera prostrata*, *Roxb. MSS.*

Plains of CEYLON and the WESTERN PENINSULA.—**DISTRIB.** Guinea.

A diffuse much-branched annual with stems 1–2 ft. long. *Leaves* simple, nearly sessile, broad-obovate, obtuse, mucronate, glabrescent, membranous, $\frac{1}{2}$ – $\frac{3}{4}$ in. long; stipules linear-setaceous. *Racemes* copious, short-peduncled, 6–10-flowered. *Calyx* $\frac{1}{12}$ in.; teeth setaceous, very long. *Corolla* pinkish, $\frac{1}{2}$ in. *Pod* under $\frac{1}{4}$ in. long, laterally flattened, beaked with the persistent style.

SUBGEN. 2. Sphæridiophora, Desv. *Pod* minute, unarmed, globose, 1-seeded.

2. **I. linifolia**, Retz; DC. *Prodr.* ii. 222; *Roxb. Fl. Ind.* iii. 370; *Cor. Pl.* t. 196; *Wall. Cat.* 5489; *W. & A. Prodr.* 198; *Wight Ic.* t. 313; *Dalz. & Gibs. Bomb. Fl.* 58; *Boiss. Fl. Orient.* ii. 188. *Sphæridiophora linifolium*, *Desv. Journ. Bot.* iii. 125, t. 6, fig. 35. *S. abyssinicum*, *Jaub. et Spach. Ill.* t. 494.

Throughout India from the HIMALAYAS to CEYLON, common.—DISTRIB. Abyssinia, Afghanistan, Malay Isles, N. Australia.

Annual, the whole plant persistently silvery-hoary. *Stems* slender, copiously branched both at the base and upwards, $\frac{1}{2}$ –1 ft. *Leaves* simple, subsessile, $\frac{1}{2}$ –1 in. long, typically linear, acute, but varying (var. *Campbellii*, Wight) to obovate, obtuse with a mucro; stipules minute, setaceous. *Flowers* 6–12 in copious dense subsessile racemes. *Calyx* $\frac{1}{12}$ in., silvery; teeth long, linear-setaceous. *Corolla* bright red, 2–3 times the calyx. *Pod* hard, mucronate, silvery, under $\frac{1}{12}$ in. thick.

SUBGEN. 3. **Euindigofera**, Benth. *Ovary* with at least 2 ovules, usually with many. *Pod* linear or oblong, unarmed, turgid.

Group 1. *Simplicifoliæ*. *Leaves* simple (in Sp. 6 casually 3-foliolate.)

3. **I. cordifolia**, Heyne; DC. Prodr. ii. 222; herbaceous, loosely pubescent, leaves subsessile cordate-ovate, flowers in dense sessile heads, pod oblong 2-seeded. W. & A. Prodr. 199; Dalz. & Gibb. Bomb. Fl. 58. Heylandia? cordifolia, Grah. in Wall. Cat. 5343.

Plains throughout India proper, ascending to 4000 ft. in the Chenab valley.—DISTRIB. Afghanistan, Beloochistan, Nubia, Malay Isles, N. Australia.

A copiously branched diffuse **annual** with stems $\frac{1}{4}$ – $\frac{3}{4}$ ft. long. *Leaves* subobtusate with a mucro, flexuous, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, obscurely downy above, densely below; stipules setaceous, minute. *Heads* copious, 4–8-flowered. *Calyx* $\frac{1}{8}$ in. densely downy; teeth long, setaceous. *Corolla* bright red, not exserted. *Pod* under $\frac{1}{4}$ in. long, pubescent, casually 1-seeded.

4. **I. triquetra**, Dalz. in Hook. Kew Journ. ii. 36; herbaceous, thinly argenteo-canescant, leaves subsessile oblong, flowers 6–12 in small peduncled racemes, pod linear 4–6-seeded. Dalz. & Gibb. Bomb. Flora, 58.

Plains of CONCAN, Dalzell, Stocks.

Perennial, greenish in shade, obscurely silvery in exposure. *Stems* very flexuous, trailing, 1 ft. or less long, slender, acutely triquetrous. *Leaves* firm, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, narrowed or slightly rounded at both ends; stipules setaceous, persistent. *Racemes* short-peduncled, finally an inch long. *Calyx* $\frac{1}{12}$ in., canescent; teeth long, setaceous. *Corolla* $\frac{1}{4}$ in., bright red. *Pod* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, turgid, glabrous, the flattened sutures margined by acute keels.

5. **I. caloneura**, Kurz in Journ. Asiat. Soc. Beng. 42, 2, 229; shrubby, fulvo-puberulous, leaves small petioled elliptical with veins beneath much raised, racemes short close, pods unknown.

PEGU, Kurz.

An erect branched shrub. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., rounded to both ends, mucronulate, chartaceous, glabrous above, glaucescent and softly pubescent below; petiole as long as blade; stipules minute, linear-subulate. *Racemes* usually shorter than leaves; peduncle $\frac{1}{8}$ in.; bracts subulate, moderately long. *Calyx* broad, short. *Corolla* $\frac{1}{4}$ in., probably rose. *Ovary* densely silky.

6. **I. Brunoniana**, Grah. in Wall. Cat. 5491; shrubby, argenteo-canescant, leaves large petioled oblong, racemes close elongated, pods cylindrical many-seeded. Wall. Pl. As. Rar. t. 279.

BERMA, Mount Prome, Wallich.

Branches long, virgate, terete, slender. *Leaves* oblong, casually 3-foliolate, firm, conspicuously veined below, 3–5 in. long, obtuse or subacute; stipules deciduous; petioles $\frac{1}{4}$ – $\frac{1}{2}$ in. *Racemes* short-peduncled, copious, reaching 4–5 in. long. *Calyx* oblique, argenteo-canescant, $\frac{1}{12}$ in. long; teeth short, deltoid. *Corolla* $\frac{3}{8}$ in., bright red; standard thinly canescent. *Pod* turgid, 2 in. long, thinly canescent, recurved at the tip.

Group 2. *Sessilifloræ*. *Leaves* odd-pinnate. *Flowers* in dense sessile or short-peduncled heads. *Pods* short, few-seeded.

7. **I. glandulosa**, Willd.; *DC. Prodr.* ii. 223; thinly pubescent, not at all argenteo-canescens, leaves distinctly petioled always 3-foliolate, corolla 3-4 times the calyx, pod 1-2-seeded. *Roxb. Fl. Ind.* iii. 372; *Wall. Cat.* 5461; *W. & A. Prodr.* 199; *Wight Ic.* t. 330; *Dalz. & Gibs. Bomb. Fl.* 58. I. frumentacea, *Roxb. MSS.*

Plains of WESTERN PENINSULA and BUNDELKUND.

Annual, with elongated slender branches clothed when young with spreading hairs. *Stipules* setaceous, minute; petiole nearly as long as the leaflets; leaflets oblanceolate, membranous, $\frac{1}{2}$ -1 in. long, green above, hairs adpressed obscure, pale glaucous with copious distinct black dots below. *Heads* $\frac{1}{4}$ - $\frac{3}{8}$ in. long, sessile. *Calyx* $\frac{1}{12}$ in., pubescent; teeth long, setaceous. *Pod* brown, finely pubescent, oblong, $\frac{1}{8}$ in. long, the sutures often dentate, in var. *I. Sykesii*, *Herb. Griff.*, globose, 1-seeded.

8. **I. trigonelloides**, *Jaub. & Spach. Illust.* t. 482; densely silvery, leaves distinctly petioled 5-7-foliolate, corolla scarcely exserted, pod linear 3-4-seeded. I. asperifolia, *Hochst. in Schimp. Pl. Abyss.* No. 2272. I. æruginis, *Schweinf. Fl. Æthiop.* 11.

Plains of SCINDE, *Stocks*.—DISTRIB. Afghanistan, Abyssinia.

Annual; stems caespitose, trailing, much branched, $\frac{1}{2}$ -1 ft. long. *Leaves* $\frac{1}{2}$ -1 in. long; leaflets firm, alternate, oblanceolate; stipules linear; petiole $\frac{1}{4}$ - $\frac{3}{8}$ in. *Heads* copious, always sessile, round or oblong, 12-20 flowered. *Calyx* $\frac{1}{8}$ in.; teeth long, setaceous. *Corolla* red. *Pod* $\frac{1}{4}$ in. long, cylindrical, silvery-hoary, torulose.

9. **I. enneaphylla**, *Linn.*; *DC. Prodr.* ii. 229; thinly silvery-hoary, leaves nearly sessile 7-11-foliolate, corolla slightly exserted, pod oblong 2-seeded. *Roxb. Fl. Ind.* iii. 376; *Wall. Cat.* 5444; *W. & A. Prodr.* 199; *Wight Ic.* t. 403; *Dalz. & Gibs. Bomb. Fl.* 58. I. caespitosa, *Wight in Wall. Cat.* 5447. *Hedysarum prostratum*, *Linn. Mant.* i. 102; *Burm. Fl. Ind.* t. 55, fig. 1.

Plains of India from the HIMALAYAS (where it ascends to 4000 ft.) to CEYLON and BURMA.—DISTRIB. Angola, Malay isles, North Australia.

Annual or biennial. *Stems* densely caespitose, 1-1½ ft., trailing, much branched. *Leaves* $\frac{1}{2}$ -1½ in. long; leaflets firm, oblanceolate, alternate; stipules minute, setaceous. *Heads* 12-20-flowered, dense, short-peduncled or sessile. *Calyx* $\frac{1}{12}$ - $\frac{1}{8}$ in., hoary; teeth long, setaceous. *Pod* $\frac{1}{8}$ - $\frac{1}{6}$ in. long, cylindrical, thinly hoary.

Group 3. *Digitatæ*. *Leaves* digitate or nearly so, rarely 1-foliolate, sessile. *Flowers* solitary, pedicellate.

10. **I. uniflora**, *Hamilt. MSS.*; herbaceous, branches very slender, pedicels exceeding the leaves as long as the pod. *Roxb. Fl. Ind.* iii. 374; *Wall. Cat.* 5446; *W. & A. Prodr.* 199; *Wight Ic.* t. 333; *Dalz. & Gibs. Bomb. Fl.* 58.

Plains of the WESTERN PENINSULA and CARNATIC.

Perennial. *Stems* herbaceous, very slender, copiously branched, 1-1½ ft. long. *Stipules* setaceous, very minute; leaflets 3-7, rarely 1, narrow, oblanceolate, subobtusely or subacute, $\frac{1}{8}$ - $\frac{3}{8}$ in. long, pale green, membranous, with a few obscure adpressed hairs, not always perfectly digitate. *Pedicels* filiform, $\frac{3}{8}$ - $\frac{1}{2}$ in. *Calyx* scarcely $\frac{1}{24}$ in.; teeth long, linear. *Corolla* red, $\frac{1}{8}$ in. *Pod* glabrous, straight, linear, $\frac{3}{8}$ - $\frac{1}{2}$ in. long, 4-7-seeded.

11. **I. aspalathoides**, *Vahl*; *DC. Prodr.* ii. 231; shrubby, branches woody rigid, pedicels as long as the leaves much shorter than the pod. *W. & A. Prodr.* 199; *Wight Ic.* t. 332; *Hook. Ic.* t. 188; *Dalz. & Gibs. Bomb. Fl.* 58. I. aspalathifolia, *Roxb. Hort. Beng.* 98; *Fl. Ind.* iii. 371; *Wall. Cat.* 5445. *Aspalathus indicus*, *Linn. Sp. Plant.* 1001. *Lespedeza juncea*, *Wall. Cat.* 5743, B—*Rheede Hort. Mal.* ix. t. 37.

Plains of CARNATIC and CEYLON.

A low undershrub, with copiously spreading rigid terete branches and argenteo-canescens branchlets. *Leaflets* 1-5, pale green, with a few obscure adpressed hairs, oblanceolate, $\frac{1}{12}$ - $\frac{1}{4}$ in. long, often complicate. *Pedicels* erecto-patent, $\frac{1}{8}$ - $\frac{1}{4}$ in. *Calyx* and corolla like that of *I. uniflora*. *Pod* straight, glabrous, turgid, $\frac{1}{2}$ - $\frac{3}{8}$ in. long. 6-8-seeded.

Group 4. *Dissitifloræ*. *Leaves* odd-pinnate. *Flowers* few together, in lax short-peduncled racemes.

12. ***I. pentaphylla***, Linn.; *DC. Prodr.* ii. 230; branches with only a few spreading deciduous glandless hairs, leaflets 5 obovate, racemes 2-4-flowered, pods glabrous. *W. & A. Prodr.* 200; *Wight Ic.* t. 385, non Burch. *I. glabra*, Linn.; *DC. Prodr.* ii. 229. *I. fragrans*, Retz.; *DC. Prodr. loc. cit.*; *Roxb. Fl. Ind.* iii. 375; *Wall. Cat.* 5452.

Plains throughout India Proper from the HIMALAYAS to CEYLON.—DISTRIB. Trop. Africa.

Annual, densely caespitose; branches firm, very slender, a foot or more long. *Leaves* short-petioled, $\frac{3}{4}$ -1 in. long; leaflets opposite, membranous, pale, glaucous below, with a few adpressed bristly hairs; stipules setaceous, persistent. *Calyx* $\frac{1}{12}$ in. long; teeth long, setaceous. *Corolla* $\frac{1}{8}$ in., bright red. *Pod* turgid, straight, $\frac{5}{8}$ - $\frac{3}{4}$ in. long, 8-12-seeded, not at all torulose.

13. ***I. tenuifolia***, Rottl.; *W. & A. Prodr.* 200; branches and pod with only a few adpressed hairs, leaflets 7-9 oblanceolate, racemes 3-6-flowered. *Dalz. & Gibs. Bomb. Fl.* 58.

Plains of the WESTERN PENINSULA and CEYLON.

General habit of *I. pentaphylla*, which it approaches closely. *Leaves* $\frac{3}{4}$ -1 in. long, short-petioled; leaflets opposite, firmer than in the last and much narrower, with numerous adpressed hairs on both sides; stipules setaceous, very minute. *Racemes* short-peduncled, equalling or slightly exceeding the leaves. *Calyx* and corolla as in *I. pentaphylla*. *Pod* straight, cylindrical, $\frac{3}{4}$ -1 in. long, 8-10-seeded, distinctly torulose.

14. ***I. viscosa***, Lamk.; *DC. Prodr.* ii. 227; branches and pod densely clothed with minute gland-tipped hairs, leaflets 7-9 oblanceolate, racemes 6-12-flowered. *Roxb. Fl. Ind.* iii. 377; *W. & A. Prodr.* 200; *Wight Ic.* t. 404; *Wall. Cat.* 5451; *Boiss. Fl. Orient.* ii. 189. *I. glutinosa*, Perott.; *DC. Prodr. loc. cit.* *I. lateritia*, Willd.; *DC. Prodr. loc. cit.* *I. graveolens* and *glutinosa*, *Roxb. MSS.* *Galega Colutea*, *Burm. Fl. Ind.* 172.

Plains of India from the HIMALAYAS to CEYLON; BURMA.—DISTRIB. Trop. Africa, Afghanistan, Malay isles, North Australia.

Branches densely caespitose, 1-3 ft. high, more robust and woody than in the two last, persistently densely viscous throughout. *Leaves* $\frac{3}{4}$ -1 $\frac{1}{2}$ in. long; leaflets membranous, opposite, pale green above, very glaucous below, with persistent adpressed bristly hairs; stipules setaceous, minute; petiole $\frac{1}{2}$ in. long, viscous like the branches. *Racemes* short-peduncled, about as long as the leaves. *Calyx* and corolla as in the two last. *Pod* straight, $\frac{3}{4}$ -1 in. long, 10-12-seeded, faintly torulose.

15. ***I. pedicellata***, *W. & A. Prodr.* 200; branches and pod glabrescent, leaflets 3 oblanceolate-oblong, racemes 6-12-flowered. *Wight Ic.* t. 983.

NILGHIRIS and PULNEY hills.

Perennial. *Branches* trailing, firm, very slender, a foot or more long, faintly pubescent when young. *Stipules* linear, minute; petiole shorter than the leaflets; leaflets firm, $\frac{3}{8}$ - $\frac{1}{2}$ in. long, with a few adpressed grey hairs on both sides, and black sessile glands below, the end one subsessile. *Racemes* $\frac{1}{2}$ -1 in. long, 6-12-flowered; pedicels 2-3 times the calyx, with distinct linear bracteoles. *Calyx* $\frac{1}{12}$ in., shortly pubescent; teeth long, setaceous. *Corolla* red, twice the calyx. *Pod* straight, $\frac{5}{8}$ - $\frac{3}{4}$ in. long, many-seeded, obscurely pubescent at first, not at all torulose.

Group 5. Tinctoriæ. Leaves odd-pinnate. Racemes many-flowered, usually peduncled. Pods linear, usually many-seeded.

* Leaflets 3-5.

16. **I. trifoliata**, Linn.; DC. Prodr. ii. 223; suffruticose, branches and membranous leaves thinly clothed with adpressed hairs, racemes sessile congested, leaflets 3 the end one sessile, pod straight glabrescent 6-8-seeded. *W. & A. Prodr.* 201; *Wight Ic.* t. 314; *Dalz. & Gibs. Bomb. Fl.* 59. I. prostrata, Willd.; DC. Prodr. ii. 233; Roxb. Hort. Beng. 98; Fl. Ind. iii. 373. I. moluccana, DC. Prodr. ii. 232. I. multicaulis, DC. Prodr. ii. 223. I. canescens, Grah. in Wall. Cat. 5448. I. peregrina, DC. Prodr. ii. 224. I. orixensis, Roxb. MSS. I. adenophylla, Grah. in Wall. Cat. 5462. I. congesta, Grah. in Wall. Cat. 5471.

HIMALAYAS (ascending to 4000 ft. in Kumaon) to CEYLON, TENASSERIM, Helfer.—DISTRIB. Java, China, Philippines, North Australia.

Perennial. Stems copiously branched, trailing or suberect, 1-2 ft. long, soon glabrescent. Stipules minute, setaceous; petiole shorter than the leaflets, which are always 3, digitate, oblanceolate, $\frac{1}{2}$ -1 in. long, grey-green above, glaucous below with black dots. Racemes 6-12-flowered, usually shorter than the petiole. Calyx $\frac{1}{4}$ in.; teeth long, setaceous. Corolla red, 3-4 times the calyx. Pod deflexed, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, the sutures acutely bordered, the valves not torulose.

17. **I. vestita**, Baker; suffruticose, branches and leaves densely pubescent, leaflets 3 the end one sessile, racemes sessile congested, pod straight pubescent many-seeded.

WESTERN PENINSULA; Pulney hills, Wight.

Closely allied to the preceding, differing mainly in pubescence. Branches very slender, densely cæspitose, under a foot long, ascending, clothed like the petioles, and leaves with short spreading soft brownish hairs. Petiole $\frac{1}{4}$ - $\frac{3}{8}$ in.; leaflets crowded, obovate, soft, thick, obtuse, $\frac{1}{2}$ - $\frac{3}{4}$ in. long. Racemes as in *I. trifoliata*. Calyx densely pubescent, teeth setaceous, plumose. Pod clothed with brown pubescence like that of the branches.

18. **I. trita**, Linn. fl.; DC. Prodr. ii. 232; suffruticose, branches and membranous leaves thinly clothed with adpressed grey hairs, leaflets 3 obovate the end one stalked, racemes congested, pod straight tetragonous 6-10-seeded not torulose. Roxb. Fl. Ind. iii. 371; Don Prodr. 245; Hook. Comp. Bot. Mag. t. 16; W. & A. Prodr. 204; Wall. Cat. 5449; Wight Ic. t. 315, 386; Dalz. & Gibs. Bomb. Fl. 60. I. cinerea, Willd.; DC. Prodr. ii. 232. I. timoriensis, Willd.; DC. Prodr. ii. 223. I. canescens, Lamk.; DC. Prodr. 224, non Wall. I. hedysaroides, Lamk.; DC. Prodr. ii. 232. I. arcuata, Willd.; DC. Prodr. ii. 232. I. rigida, Willd.; DC. Prodr. ii. 224. I. armata, Wall. Cat. 5453. I. argentea, Wall. Cat. 5455, in part. I. Leschenaultii, DC. Prodr. ii. 223. I. ternata, Roxb. MSS. I. virgata, DC. Prodr. ii. 224, non Roxb.

Plains of India from the HIMALAYAS to CEYLON; BIRMA.—DISTRIB. Trop. Africa, Malay isles, North Australia.

An undershrub, 2-3 ft. high, with firm slender branches, soon glabrescent. Stipules minute, setaceous; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in.; leaflets always 3, the end one 1-1 $\frac{1}{2}$ in. long, the side ones opposite. Racemes 6-12-flowered, usually sessile, seldom over an inch long. Calyx $\frac{1}{12}$ - $\frac{1}{8}$ in., white-canescant; teeth long, setaceous. Corolla purplish-red, twice the calyx. Pod deflexed, $\frac{3}{4}$ -1 $\frac{1}{4}$ in. long, the firm glabrescent valves obtusely keeled.

19. **I. subulata**, Vahl; DC. Prodr. ii. 232; suffruticose, branches and membranous leaves thinly clothed with adpressed grey hairs, leaflets 5 obovate the side ones opposite, racemes elongated, pod long recurved 10-15-seeded not

torulose. *I. mucronata*, Spreng.; *DC. Prodr.* ii. 227. *I. flaccida*, Kœnig.; *Roxb. Hort. Beng.* 98; *Fl. Ind.* iii. 375; *W. & A. Prodr.* 204; *Wight Ic.* t. 387; *Wall. Cat.* 5475. *I. scabra*, Roth; *DC. Prodr.* ii. 229. *I. Thoningii*, Thonn. et Schum. *Pl. Guin.* 366.

Plains of the WESTERN PENINSULA and CEYLON.—DISTRIB. Trop. Africa, Trop. America.

Habit and leaflets of *I. trita*, from which it differs in racemes, leaves and pod. Branches woody, virgate, soon glabrescent. Leaflets thin, glabrescent above, pale below with a few adpressed grey hairs, always 5 on the leaves of the main branches, $\frac{3}{4}$ –1 in. long. Peduncles 1–2 in. long; racemes 20–40-flowered, reaching 4–6 in. long. Calyx $\frac{1}{2}$ in.: teeth setaceous. Corolla lilac, 2–3 times the calyx. Pod 1–2 in. long, subtetragonal from the raised keel of the valves.

20. *I. marginulata*, Grah. in *Wall. Cat.* 5467; suffruticose, branches and membranous leaves thinly clothed with adpressed grey hairs, leaflets 5 opposite obovate, racemes elongated, pod straight turgid 5–6-seeded. *W. & A. Prodr.* 204.

CONCAN, Stocks; Dindygul hills, in the CARNATIC, Wight.

General habit of *I. subulata*, from which it scarcely differs, except in pod. Leaflets the same in shape, size, and vestiture. Racemes lax, short-peduncled, 2–3 in. long, exceeding the leaves. Pods deflexed, $\frac{3}{4}$ –1 in. long, clothed with minute adpressed deciduous grey hairs, the valves broadly rounded.

21. *I. angulosa*, Edgew. MSS.; suffruticose, branches and membranous leaves thinly clothed with adpressed grey hairs, leaflets opposite 5 oblong, racemes elongated, pod short moniliform 1–3-seeded. *I. subulata* var. *angulosa*, Edgew. in *Linn. Journ.* ix. 311.

BUNDELKUND, Edgeworth.

General habit, leaves and flowers of the two preceding. Leaflets 1–1½ in. long, pale grey-green. Racemes peduncled, 30–50-flowered, reaching 4–6 in. long, much exceeding the leaves. Pod $\frac{3}{8}$ –½ in. long, deeply constricted between the seeds, with a beak which is gradually narrowed into the style.

22. *I. paucifolia*, Delile; *DC. Prodr.* ii. 224; shrubby, branches and subcoriaceous leaves argenteo-canescens, leaflets 3–5 alternate, pods 6–8-seeded torulose recurved. *Wall. Cat.* 5454; *W. & A. Prodr.* 201; *Wight Ic.* t. 331; *Dalz. & Gibs. Bomb. Fl.* 59; *Boiss. Fl. Orient.* ii. 190. *I. argentea*, *Roxb. Fl. Ind.* iii. 374; *Wall. Cat.* 5455, *ex parte, non Linn.* *I. heterophylla*, *Roxb. MSS.*

Plains from SCINDE and the UPPER GANGES to CEYLON.—DISTRIB. Java, Beloochistan, Arabia, Trop. Africa.

A shrub reaching 4–6 ft. high, with copious woody branches. Leaflets firm, oblanceolate-oblong, $\frac{1}{2}$ –1 in. long, sometimes solitary on the branches; petiole short, but distinct. Racemes short-peduncled, 20–50-flowered, reaching 3–4 in. long. Calyx silvery, $\frac{1}{4}$ in.; teeth lanceolate-cuspidate, as long as the tube. Corolla red, 3–4 times the calyx, thinly silvery externally. Pod $\frac{1}{2}$ –¾ in. long, glaucous, distinctly torulose.

** Leaflets many, opposite (except *I. endecaphylla*); flowers small.

23. *I. parviflora*, Heyne; herbaceous, thinly argenteo-canescens, leaflets 7–9 linear or narrow oblanceolate opposite pod long glabrescent 15–20-seeded recurved at the tip. *Wall. Cat.* 5457; *W. & A. Prodr.* 201. *I. linearis*, *Guill. & Per. Fl. Seneg.* 184. *Indigastrium deflexum*, *Jaub. & Spach. Ill.* t. 492.

Plains of the CARNATIC and WEST PENINSULA.—DISTRIB. Arabia, Trop. Africa, N. Australia.

A suberect copiously-branched annual, 1-2 ft. high, with slender finely canescent stems. *Leaves* short-petioled, $1\frac{1}{2}$ -2 in. long; leaflets membranous, $\frac{1}{2}$ -1 in. long, obtuse or subacute, thinly argenteo-canescant; stipules minute, setaceous. *Racemes* congested, sessile, $\frac{1}{2}$ -1 in. long, 6-12-flowered. *Calyx* $\frac{1}{12}$ in.; teeth linear, long. *Corolla* lilac, 2-3 times the calyx. *Pod* 1-1 $\frac{1}{2}$ in. long, finely canescent when young.

24. **I. endecaphylla**, Jacq. *Ic. t.* 570; herbaceous, stem and leaves with only a few adpressed hairs, leaflets 5-9 oblanceolate alternate, pod straight glabrescent 6-10-seeded. *DC. Prodr.* ii. 228; *Bot. Reg.* t. 789. *I. pusilla*, Lamk.; *DC. Prodr.* ii. 229? *I. Kleinii*, W. & A. *Prodr.* 204. *I. debilis*, Grah. in Wall. *Cat.* 5466. *I. anceps*, Vahl.; *Poir. Dict. Suppl.* iii. 147. *I. Schimperiana*, Hochst. in Schimp. *Pl. Abyss.* No. 366.

Plains of the WESTERN PENINSULA. **BIRMA**, Wallich.—DISTRIB. Cape, Trop. Africa, Siam, China.

An annual or biennial, with trailing stems 1-2 ft. long. *Leaves* nearly sessile, 1-3 in. long; leaflets membranous, obtuse, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, with a few adpressed grey hairs; stipules $\frac{1}{4}$ - $\frac{1}{2}$ in., lanceolate, acuminate. *Racemes* close, usually peduncled, 1-4 in. long. *Calyx* $\frac{1}{12}$ - $\frac{1}{8}$ in.; teeth setaceous, long. *Corolla* violet-purple, twice the calyx. *Pods* deflexed, $\frac{3}{4}$ -1 in. long.—If Lamarck's name belong here it has priority.

25. **I. hirsuta**, Linn.; *DC. Prodr.* ii. 228; herbaceous, stems densely clothed with short spreading pubescence, leaflets 5-11 opposite large obovate, pod short straight pubescent 6-8-seeded. *Wall. Cat.* 5450; *W. & A. Prodr.* 204; *Roxb. Fl. Ind.* iii. 376; *Jacq. Ic. t.* 569; *Hook. Comp. Bot. Mag.* t. 24. *I. fusca*, G. Don, *Gen. Syst.* ii. 211. *I. ferruginea*, Schum. & Thonn. *Pl. Guin.* 370—*Rheede Hort. Mal.* ix. t. 30.

Plains from the HIMALAYAS (ascending to 4500 ft. in KUMAON) to CEYLON, AWA, and TENASSERIM.—DISTRIB. Trop. Africa, Trop. America, Java, Philippines, N. Australia.

Annual or biennial, suberect, reaching 2-4 ft. high, the pubescence grey or brown. *Leaves* short-petioled, 2-5 in. long; leaflets membranous, grey-green, glaucous below, reaching 1-2 in. long, densely coated with adpressed hairs; stipules setaceous, plumose. *Racemes* short-peduncled, very dense, 2-6 in. long. *Calyx* $\frac{1}{8}$ in., densely pubescent; teeth setaceous, long, plumose. *Corolla* red, not much exerted. *Pod* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, densely clothed like the branches.

26. **I. semitrijuga**, Forsk.; *DC. Prodr.* ii. 230; suffruticose, densely argenteo-canescant, leaflets opposite small obovate 5-9, pod linear straight 4-6-seeded not torulose.

Plains of SCINDE, *Stocks*.—DISTRIB. Arabia, Egypt, Abyssinia.

A low shrub, diffusely branched from the base. *Leaves* under 1 in. long; leaflets obtuse, $\frac{1}{3}$ - $\frac{1}{2}$ in. long, subcoriaceous, sometimes emarginate; stipules minute, setaceous. *Racemes* laxly 6-12-flowered, short-peduncled, usually exceeding the leaves. *Calyx* $\frac{1}{12}$ in., canescent; teeth linear-lanceolate, as long as the tube. *Corolla* twice the calyx, thinly silvery externally. *Pod* $\frac{1}{2}$ in. long, turgid, canescent.

27. **I. argentea**, Linn.; *DC. Prodr.* ii. 224; shrubby, densely argenteo-canescant, leaflets large obovate, pod reflexed 3-4-seeded torulose. *L'Her. Stimp.* t. 79; *Boiss. Fl. Orient.* ii. 190, non *Roxb. nec Wall.* *I. glauca*, Lamk. *Dict.* iii. 246. *I. articulata*, Gouan *Ill.* 49. *I. tinctoria*, Forsk. *Egypt.* 138, non Linn.

Plains of SCINDE, *Stocks*.—DISTRIB. Arabia, Egypt, Abyssinia.

A shrub several feet high, with sulcate woody branches. *Leaves* 1-2 in. long; leaflets opposite, subcoriaceous, persistently argenteous, $\frac{1}{2}$ -1 in. long; petiole $\frac{1}{2}$ in.; stipules minute, setaceous. *Racemes* subsessile, 12-20-flowered, shorter than the leaves, $\frac{1}{2}$ -1 in. long whilst in flower. *Calyx* $\frac{1}{24}$ in., campanulate, argenteous; teeth deltoid, cuspidate, as long as tube. *Corolla* $\frac{1}{2}$ in., reddish-yellow, externally canescent. *Pod* $\frac{3}{8}$ - $\frac{1}{2}$ in. by $\frac{1}{6}$ in., at first argenteous, finally glabrescent, distinctly torulose.

VAR. *cœrulea*; leaves 2-3 in. long, leaflets 7-9 less argenteous than in the type, racemes more elongated 1-2 in. long, pod less decidedly torulose. *I. cœrulea*, *Roxb. Fl. Ind.* iii. 377; *W. & A. Prodr.* 203; *Wt. Ic.* t. 366; *Dalz. & Gibs. Bomb. Fl.* 59. *I. retusa*, *Grah. in Wall. Cat.* 5476. *I. brachycarpa*, *Grah. in Wall. Cat.* 5470. *I. tinctoria*, var. *brachycarpa*, *DC. Prodr.* ii. 224. Plains of Banda and the Western Peninsula.

28. **I. tinctoria**, *Linn.*; *DC. Prodr.* ii. 224 (*excl. var. β*); shrubby, faintly argenteo-canescant, leaflets 9-13 large obovate-oblong, pod nearly straight 8-12-seeded not torulose. *Roxb. Fl. Ind.* iii. 379; *Wall. Cat.* 5474; *W. & A. Prodr.* 202; *Wt. Ic.* t. 365; *Dalz. & Gibs. Bomb. Fl.* 59; *Brand. For. Fl.* 135. *I. indica*, *Lamk. Dict.* iii. 245. *I. sumatrana*, *Gaertn. Fruct.* ii. 317, t. 148—*Rheede Hort. Mal.* i. t. 54.

The universally cultivated indigo. Whether it be truly wild is doubtful.

A shrub 4-6 ft. high, with twiggy woody thinly silvery branches. *Leaves* 1-2 in. long; leaflets opposite, membranous, turning blackish when dried; petiole $\frac{1}{2}$ -1 in. *Racemes* lax, nearly sessile, 2-4 in. long. *Calyx* $\frac{1}{24}$ in., silvery; teeth as long as the tube. *Corolla* $\frac{1}{8}$ - $\frac{1}{6}$ in., reddish-yellow. *Pod* $\frac{3}{4}$ -1 in. long, $\frac{1}{12}$ in. thick, glabrescent, scarcely at all recurved.—*I. Anil*, *Linn.*; *DC. Prodr.* ii. 225, also commonly cultivated, a native of America, differs by its short congested racemes and pod turned back like a sickle. *I. flaccida* var. *constricta*, *Thwaites Enum.* 411, from Ceylon, is probably a distinct species, but the flowers are unknown. It has the habit and leaves of *I. tinctoria*, with a slender tetraquetrous subtorulose 4-6-seeded pod.

29. **I. Wightii**, *Grah. in Wall. Cat.* 5458; shrubby, densely argenteo-canescant, leaflets 11-21 small oblanceolate, pod linear straight 8-12-seeded not torulose. *W. & A. Prodr.* 202; *Dalz. & Gibs. Bomb. Fl.* 59. *I. foliolosa*, *Grah. in Wall. Cat.* 5485. *I. polyphylla*, *Rottler MSS. non Heyne nec DC. I. inamoena*, *Thwaites Enum.* 83.

Plains of the WESTERN PENINSULA and CEYLON.

A low shrub, with numerous erecto-patent silvery woody branches. *Leaves* short-petioled, $1\frac{1}{2}$ -2 in. long; leaflets opposite, rigidly subcoriaceous, persistently silvery, obtuse, $\frac{1}{4}$ - $\frac{1}{2}$ in. long. *Racemes* sessile, dense, 1-1 $\frac{1}{2}$ in. long. *Calyx* $\frac{1}{4}$ in., silvery; teeth linear, as long as the tube. *Corolla* yellowish red, $\frac{1}{8}$ - $\frac{1}{6}$ in. long, externally canescent. *Pod* turgid, straight, finely canescent, 1-1 $\frac{1}{2}$ in. long.

*** *Leaflets many, opposite (except I. Dosua); flowers large for the genus.*

30. **I. cylindracea**, *Wall. Cat.* 5482; shrubby, branches glabrous, leaflets small oblong obscurely hispid, stipellæ and bracts minute, pedicels elongated.

NIPAL, *Wallich*.

An erect shrubby perennial, with slender woody erecto-patent branches. *Leaves* short-petioled, $1\frac{1}{2}$ -2 in. long; leaflets membranous, opposite, obtuse, green above, pale below, $\frac{3}{8}$ - $\frac{1}{2}$ in. long, both sides with a few short adpressed hairs. *Racemes* very lax,

short-peduncled, finally 3-4 in. long; pedicels $\frac{1}{4}$ - $\frac{1}{3}$ in. *Calyx* oblique, $\frac{1}{24}$ in.; teeth short. *Corolla* $\frac{1}{2}$ in. long, pale red. *Pod* straight, glabrescent, turgid, $1\frac{1}{2}$ - $1\frac{3}{4}$ in. long, 8-10-seeded.

31. **I. leptostachya**, DC. *Prodr.* ii. 225? shrubby, branches glabrous, leaflets middle-sized oblanceolate-oblong 13-19 obscurely hispid, stipellæ minute, pedicels short, bracts 0.

KHASIA and SIKKIM, temperate zone, 5-8000 ft., *H. f. & T.*

An erect shrub, reaching 10 ft. high, with slender twiggy branches, thinly silky only when young. *Leaves* short-petioled, 3-4 in. long; leaflets membranous, opposite, $\frac{1}{2}$ -1 in. long, green above, glaucous below, nearly glabrescent. *Peduncles* reaching 1-2 in.; racemes lax, finally 2-3 in. long; pedicels not much longer than the calyx. *Calyx* $\frac{1}{12}$ in., finely brown-silky; teeth short, deltoid. *Corolla* $\frac{1}{4}$ - $\frac{3}{8}$ in., pale red, canescent externally. *Pod* glabrous, straight, 1- $1\frac{1}{2}$ in. long, 6-8-seeded, turgid; with narrow sutures.—The Candollean synonym may not unlikely belong to a form of *I. pulchella*.

32. **I. Gerardiana**, Wall. *Cat.* 5486; shrubby, branchlets argenteo-canescant, leaflets small oblanceolate-oblong 9-17, stipellæ and bracts minute.

TEMPERATE and SUBTROPICAL WESTERN HIMALAYA; common, from the Saltrange to Kumaon, alt. 2-10,000 ft.—DISTRIB. Afghanistan.

A low copiously-branched shrub, the branchlets distinctly argenteo-canescant. *Leaves* short-petioled, 1-2 in. long; leaflets subcoriaceous, $\frac{2}{3}$ - $\frac{1}{2}$ in. long, opposite, pale grey-green, thinly clothed with short white bristles above, glaucous and thinly argenteo-canescant below, obtuse, often emarginate. *Racemes* distinctly peduncled, 1-2 in. long, 12-20-flowered; pedicels very short. *Calyx* obliquely campanulate, argenteous, $\frac{1}{12}$ in. long; teeth deltoid-cuspidate. *Corolla* $\frac{2}{3}$ - $\frac{1}{2}$ in., pale red, canescent externally. *Pod* $1\frac{1}{2}$ -2 in. long, subcylindrical, glabrous, 6-10-seeded; sutures narrow.

VAR. *heterantha*; leaflets more numerous 17-25 smaller, corolla and pod smaller, the former, $\frac{1}{4}$ in., the latter 1- $1\frac{1}{2}$ in. long. *I. heterantha*, Wall. *Cat.* 5480, *A.B.C. ex parte*. Brand. *For. Fl.* 135. *I. Dosua*, Wall. *Cat.* 5481 B.; *Bot. Reg.* 28, t. 57, non Hamilt. *I. virgata*, Roxb. *Fl. Ind.* iii. 383? *I. quadrangularis*, Grah. in Wall. *Cat.* 5483. *I. polyphylla*, DC. *Prodr.* 227?—Temperate and sub-tropical Himalayas, as far east as Khasia and Bhotan, ascending to 8000 ft.—Distrib. Afghanistan.

33. **I. galegoides**, DC. *Prodr.* ii. 225; shrubby, branches glabrescent, leaflets large oblong 11-25, stipellæ and bracts minute. *I. uncinata*, Roxb. *Fl. Ind.* iii. 382; Wall. *Cat.* 5472. *I. Finlaysonian*, Wall. *Cat.* 5488. *I. Zollingeriana*, Miq. *Flor. Ind. Bat.* i. 310?

Tropical zone; KHASIA and MERGUI to CEYLON, MALACCA and SIAM.—DISTRIB. Malay isles, Philippines, S. China.

A tall shrub, with twiggy woody branches, thinly coated with adpressed hairs at first. *Leaves* distinctly petioled, $\frac{1}{2}$ -1 ft. long; leaflets opposite, membranous, usually obtuse, 1- $1\frac{1}{2}$ or 2 in. long, green above, glaucous below, the hairs short, adpressed, quite obscure. *Racemes* short-peduncled, very dense, 2-3 in. long, not lengthened in fruit. *Calyx* $\frac{1}{24}$ in., canescent; teeth short, deltoid. *Corolla* pale red, $\frac{2}{3}$ - $\frac{1}{2}$ in., finely canescent externally. *Pods* glabrous, the longest of the genus, $2\frac{1}{2}$ -3 in. long, subcylindrical, straight, 15-18-seeded, beaked.

34. **I. bracteata**, Grah. in Wall. *Cat.* 5477; suffruticose, branches glabrescent, leaves middle-sized oblanceolate-oblong 7-17, stipellæ and bracts large.

KHASIA, 5-6000 ft., Hook. fil. & Thomson; NIPAL, Wallich; and an exstipellate form from KASHMIR, 5-6000 ft., Thomson.

A low shrub, with copious slender trailing branches with a few adpressed hairs at first. *Leaves* distinctly petioled, 3-4 in. long; leaflets opposite, membranous, $\frac{1}{2}$ -1 in. long, obtuse, pale green above, glaucous beneath, nearly glabrous; stipellæ setaceous, $\frac{1}{4}$ in. long. *Peduncles* reaching 2-3 in., bearing a close short raceme, bracts herbaceous, boat-shaped, with a cusp, enfolding the buds. *Calyx* $\frac{1}{2}$ in., campanulate, obscurely hairy; teeth deltoid. *Corolla* $\frac{3}{8}$ in. long, pale red. *Pod* linear, glabrous, not seen mature.

35. **I. atropurpurea**, *Hamilt.*; *DC. Prodr.* ii. 225; shrubby, branches glabrescent, leaflets large oblong 11-17, stipellæ minute, bracts lanceolate acuminate exceeding the buds. *Don Prodr.* 244; *Roxb. Fl. Ind.* iii. 381; *Wall. Cat.* 5463; *Wight Ic.* t. 369; *Brand. For. Fl.* 136; *Bot. Mag.* t. 3065; *Bot. Reg.* t. 1744. *I. Hamiltonii*, *Grah. in Wall. Cat.* 5465.

Tropical and temperate zones, through the HIMALAYAS, from Hazara and the PUNJAB to KHASIA, reaching 9000 ft.

A tall shrub, with twiggy woody branches, only thinly coated with adpressed hairs in the young state. *Leaves* reaching 6-9 in. long; leaflets opposite, membranous, obtuse, usually 1-1 $\frac{1}{2}$ in. long, green above, pale green below, glabrescent; petiole 1-2 in. *Racemes* short-peduncled, long and narrow, 4-8 in. long, dense upwards; bracts $\frac{1}{4}$ in., subsistent, narrowed gradually into a long point; pedicels very short. *Calyx* $\frac{1}{2}$ in., obliquely campanulate; teeth short, deltoid. *Corolla* $\frac{1}{4}$ - $\frac{1}{2}$ in., a much darker deeper red than in any of the others. *Pod* linear, turgid, 1-1 $\frac{1}{2}$ in. long, glabrous, 6-10-seeded, not at all reflexed or narrowed into a beak.

36. **I. hebetata**, *Benth. MSS.*; shrubby, branches glabrescent, leaflets large oblong 13-17 membranous, stipellæ distinct, bracts boat-shaped cuspidate exceeding the buds.

HIMALAYAS, from KASHMIR to SIKKIM, 6-15,000 ft.

A tall shrub, with twiggy woody branches, only thinly coated with adpressed hairs in the young state. *Leaves* 4-6 in. long; leaflets opposite, membranous, obtuse, usually 1-1 $\frac{1}{2}$ in. long, much smaller in a subalpine form, dull green above, pale but scarcely glaucous below, with a few short adpressed bristly hairs on both sides. *Racemes* peduncled, 2-4 in. long, laxly 12-20-flowered; pedicels and calyx as in the last; bracts more deciduous, enclosing the buds, with a setaceous tip protruding beyond them. *Corolla* $\frac{2}{3}$ in. deep, a much lighter and more crimson red than in *I. atropurpurea*, glabrous externally, the keel $\frac{1}{2}$ in. deep. *Pod* glabrous, turgid, straight, 1 $\frac{1}{2}$ -2 in. long, 8-10-seeded.

37. **I. pulchella**, *Roxb. Hort. Beng.* 57; *Fl. Ind.* iii. 382; shrubby, branches obscurely hispid, leaflets large obovate-oblong 13-17 subcoriaceous, stipellæ abortive or very minute, bracts exceeding the buds. *W. & A. Prodr.* 203; *Wight Ic.* t. 367; *Dalz. & Gibs. Bomb. Fl.* 60; *Bedd. Fl. Sylv.* 85; *Anal. Gen.* t. 12, fig. 1. *I. purpurascens*, *Roxb. Fl. Ind.* iii. 383. *I. cassioides*, *Rotthier*; *DC. Prodr.* ii. 225; *Wall. Cat.* 5468. *I. verrucosa*, *Grah. in Wall. Cat.* 5469. *I. glaucescens*, *Grah. in Wall. Cat.* 5484. *I. elliptica*, *Roxb. Fl. Ind.* iii. 380. *I. violacea*, *Roxb. Fl. Ind.* iii. 380; *Wall. Cat.* 5479; *Bot. Mag.* t. 3348. *I. arborea*, *Roxb. Fl. Ind.* iii. 381; *Wall. Cat.* 5478; *Wight Ic.* t. 368. *I. Jirahulia*, *Hamilt. in Wall. Cat.* 5464. *I. Gibsonii*, *Grah. Cat. Bomb. Pl.* 46.

Throughout the HIMALAYAS and hills of INDIA PROPER, ascending to 5000 ft. in KUMAON.

A shrub 4-6 feet high, the trunk reaching the thickness of a man's leg. *Branches* sulcate, thinly coated with grey adpressed hairs at first, soon glabrescent. *Leaves* short-petioled, 3-6 in. long; leaflets opposite, firmer in texture than its allies, obtuse, often emarginate, usually $\frac{3}{4}$ -1 in. long, pale green above, glaucous below, thinly

coated with short adpressed grey hairs. *Racemes* short-peduncled, moderately close. 1-3 in. long; pedicels short; bracts exceeding the buds, usually boat-shaped with a cusp. *Calyx* $\frac{1}{2}$ in. long, argenteo-canescens; teeth short deltoid. *Corolla* bright red, glabrous externally, the largest of all the species, generally $\frac{3}{8}$ - $\frac{1}{2}$ in., reaching $\frac{3}{4}$ - $\frac{7}{8}$ in. long, the standard $\frac{3}{8}$ in. broad, reflexed in the expanded flower. *Pod* straight, turgid, glabrous, $1\frac{1}{4}$ - $1\frac{3}{4}$ in. long, 8-12-seeded, the sutures broader than in the preceding.

38. **I. Dosua**, *Hamilt.*; *DC. Prodr.* ii. 225; shrubby, branches densely pubescent, leaflets small linear-oblong 21-31, stipellæ abortive, bracts exceeding the buds. *Don Prodr.* 244; *Wall. Cat.* 5481 *A*, non *B*, nec *Bot. Reg.* 28, t. 57. *I. heterantha*, *Wall. Cat.* 5480 *C*, ex parte. *I. virgata*, *Roxb. Fl. Ind.* iii. 383?

TEMPERATE CENTRAL and EAST HIMALAYAS; Simla to Bhotan and ASSAM, 6-8000 ft.

A low shrub, with woody branches, clothed with short spreading grey or brownish pubescence. *Leaves* subsessile, 1-3 in. long; leaflets usually opposite, membranous, obtuse, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, dull green above, glaucous below, more or less densely pubescent. *Racemes* distinctly peduncled, moderately close, 1-3 in. long; bracts $\frac{1}{4}$ in. long, lanceolate-cuspidate, silky; pedicels very short. *Calyx* $\frac{1}{2}$ in., densely silky; teeth deltoid-cuspidate. *Corolla* bright red, glabrous, $\frac{3}{8}$ - $\frac{1}{2}$ in. *Pod* straight, glabrescent, $1-1\frac{1}{4}$ in. long, 8-12-seeded, with very broad sutures.

VAR. tomentosæ; branches clothed with dense brown silky pubescence, leaves 6-9 in. long, leaflets 41-51 often subacute and 1 in. long, racemes longer, bracts densely brown-velvety, with a very long, cusp. *I. tomentosa*, *Grah. in Wall. Cat.* 5487. *I. stachyodes*, *Lindl. Bot. Reg.* 1843, t. 14.—Khasia, Sikkim, Silhet, Bhotan, 1-5000 ft.

Group 6. *Paniculatae*. *Leaves* odd-pinnate. *Flowers* inpanicled racemes.

39. **I. mysorensis**, *Rottl.*; *DC. Prodr.* ii. 222; *Wall. Cat.* 5459; *W. & A. Prodr.* 202. *I. polyphylla*, *Heyne MSS.*, non *DC.*

Plains of the CARNATIC, *Heyne*.

A low erect copiously-branched shrub, the young stems slender, clothed with short spreading grey pubescence. *Leaves* sessile, of the main branches 1-3 in. long; leaflets 11-21, oblong, membranous, opposite, $\frac{2}{3}$ - $\frac{1}{2}$ in. long, thinly clothed on both sides with adpressed grey hairs; stipules setaceous, $\frac{1}{4}$ in., persistent. *Racemes* lax, elongated, more or less panicled, each flower subtended by a bract just like the leaflets, and the branches furnished low down with 3-5-foliate leaves. *Calyx* $\frac{1}{8}$ in.; teeth lanceolate, very long. *Corolla* red, glabrous, twice the calyx. *Pod* linear-cylindrical, straight, $\frac{1}{4}$ - $\frac{3}{8}$ in. long, 4-6-seeded, finely pubescent.

SUBGEN. 4. **Amecarpus**, Benth. *Ovary* with at least two ovules. *Pod* linear, unarmed, flattened.

40. **I. anabaptista**, *Steud. Nom. edit.* 2, 805. *I. Hochstetteri*, *Baker in Oliv. Flor. Trop. Africa*, ii. 101. *I. ornithopodioides*, *Hochst. et Steud. in Schimp. Hb. Arab.* No. 769; *Jaub. et Spach Ill. Pl. Orient.* t. 480; *Boiss. Fl. Orient.* ii. 188, non *Schum. et Thonn.*

Plains of SCINDE and the PUNJAB.—DISTRIB. Afghanistan, Arabia, Nile-country.

A diffuse annual, with stems 1 ft. or more long, thinly clothed with adpressed white hairs. *Leaves* short-petioled; leaflets 3-7, opposite, oblanceolate $\frac{1}{2}$ -1 in. long. *Racemes* short-peduncled, closely 12-20-flowered, under an inch long. *Calyx* $\frac{1}{8}$ in., argenteo-canescens; teeth setaceous. *Corolla* scarcely exerted. *Pod* linear, reflexed, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, 6-8-seeded.

18. **PSORALEA**, Linn.

Herbs or undershrubs. *Leaves* simple or odd-pinnate, conspicuously gland-dotted. *Calyx*-tube campanulate; teeth 5, distinct. *Corolla* little exerted; petals all with distinct claws; keel obtuse, the tip slightly incurved. Upper *stamen* free or connate, the tube in an early stage often closed; anthers small, uniform or slightly dimorphous. *Ovary* sessile or short-stalked, ovulate; style long, filiform, incurved, stigma minute, terminal. *Pod* ovoid or oblong, 1-seeded, indehiscent, the pericarp adhering to the seed.—**DISTRIB.** Species about 100, mainly Cape and N. American.

1. **P. corylifolia**, Linn.; *DC. Prodr.* ii. 218; herbaceous, leaves simple, racemes dense short. *Burm. Fl. Ind.* 172, t. 49, fig. 2; *Roxb. Fl. Ind.* iii. 387; *Wall. Cat.* 5351; *W. & A. Prodr.* 198; *Bot. Mag.* t. 665; *Dalz. & Gibs. Bomb. Fl.* 60. *Trifolium unifolium*, Forsk. *Flor. Egypt. Arab.* 130; *Burm. Fl. Ind.* t. 49.

Plains from the HIMALAYAS through India proper to CEYLON.

An erect annual, 1–3 ft. high. *Branches* firm, conspicuously gland-dotted. *Leaves* distinctly petioled, roundish, 1–3 in. long, inciso-repand, firm in texture, both sides conspicuously dotted with black dots, nearly glabrescent. *Flowers* 10–30 in dense copious long-peduncled heads. *Calyx* nearly sessile, $\frac{1}{2}$ in.; teeth lanceolate, long, the lowest longest. *Corolla* yellow, little exerted. *Pod* small, black, subglobose, glabrous.

2. **P. plicata**, Delile; *DC. Prodr.* ii. 221; shrubby, leaves trifoliate, racemes lax elongated. *Delile, Egypt*, t. 37, fig. 3.

Plains of the PUNJAB, Thomson, Edgeworth, Stewart.—**DISTRIB.** Arabia, Egypt, Trop. Africa.

A low copiously-branched shrub, the stems obscurely argenteo-canescant, verrucose, the denuded branchlets subspinescent. *Leaves* short-petioled; leaflets subcoriaceous, dull green, oblanceolate, obtuse, repand, gland-dotted below only, reaching $\frac{1}{2}$ –1 in. long, the end one largest, the side ones oblique. *Racemes* short-peduncled, 2–3 in. long; lower flowers in distant fascicles; bracts ovate, very minute. *Calyx* $\frac{1}{2}$ in., clothed with adpressed white hairs, accrescent, clasping tightly the included pod; teeth short, the lowest longest. *Corolla* yellow, slightly exerted.

19. **COLUTEA**, Linn.

Shrubs with odd-pinnate leaves and showy yellow flowers in sparse copious axillary racemes. *Calyx* campanulate, with 5 short teeth. *Corolla* much exerted; standard round, fixed in its place by two basal callosities; keel broad, much incurved, not beaked. *Stamens* diadelphous; anthers uniform. *Ovary* stipitate, linear, ∞ -ovulate; style filiform, much incurved, bearded along the inner side, stigma large oblique. *Pod* large, membranous, inflated, continuous within, nearly or quite indehiscent.—**DISTRIB.** Species 3 or 4, spread through South Europe and Temperate Asia.

1. **C. arborescens**, Linn. var. NEPALENSIS. *C. nepalensis*, Sims *Bot. Mag.* t. 2622; *Lindl. Bot. Reg.* t. 1727; *Benth. in Royle Ill.* 198; *Brand. For. Fl.* 136.

TEMPERATE WEST HIMALAYA, KUNAWAR, TIBET, NIPAL, &c., alt. 8–11,000 ft.—**DISTRIB.** Orient, S. Europe.

A subglabrous shrub, 6–10 ft. high. *Leaflets* 9–13, obovate, pale green, $\frac{1}{4}$ – $\frac{3}{4}$ in. long, often emarginate, obscurely silky in the young state. *Racemes* as long as the leaves, laxly 3–4-flowered. *Calyx* $\frac{1}{6}$ – $\frac{1}{4}$ in. *Corolla* bright yellow, $\frac{3}{4}$ in. long; standard furnished at the base with two nipple-shaped papillæ. *Pod* $\frac{1}{2}$ –2 in. long, faintly downy when young, splitting at the tip before ripening.

20. **MILLETTIA**, Wt. & Arn.

Trees or large shrubs, usually climbers. *Leaves* odd-pinnate. *Flowers* showy, in axillary racemes, often fascicled, simple or paniculate and terminal. *Calyx* campanulate; teeth generally short or nearly obsolete. *Corolla* much exerted; petals with long claws; standard broad; keel not beaked. *Stamens* monadelphous or diadelphous, filaments filiform; anthers uniform. *Ovary* sessile, linear, few-ovuled; style filiform, incurved, glabrous, stigma capitate. *Pod* linear or oblong, 1- or few-seeded, flat or turgid, late in dehiscing or hardly dehiscent.—**DISTRIB.** Species 40–50, spread through the tropics of the Old World.

SUBGEN. 1. Eumillettia. *Standard* not auricled at the base. *Stamens* monadelphous or diadelphous.

* *Leaves lustrous beneath, with thin silky pubescence.*

1. **M. sericea**, W. & A. *Prodr.* 263; leaflets 7–9 coriaceous obovate-oblong cuspidate exstipellate sericeous below, standard densely silky on the back, stamens monadelphous, pod linear velvety. *Benth. Pl. Jung.* 248. *Pongamia sericea*, Vent.; DC. *Prodr.* ii. 416. *Dalbergia angustifolia*, Hassk. *Pl. Jav. Rar.* 399.

Forests of BIRMA, MALACCA, PENANG, and SINGAPORE. — **DISTRIB.** Malay Islands.

A woody climber, the branchlets covered with fine short brown pubescence. *Leaves* 1 ft. or more long; leaflets 6–9 in. long, shining and glabrous above, on petiolules $\frac{1}{4}$ – $\frac{3}{8}$ in. long; pubescence beneath grey or pale brown. *Racemes* lateral, 6–9 in. long, the lower nodes with very short branches, bearing dense fascicles of pedicellate flowers. *Calyx* $\frac{1}{8}$ in., silky, scarcely toothed. *Corolla* $\frac{3}{8}$ – $\frac{1}{2}$ in., reddish, very silky. *Pod* 4–5 in. long, densely coated with thick dark brown velvet.

2. **M. rubiginosa**, W. & A. *Prodr.* 263; leaflets 5–7 coriaceous obovate-oblong cuspidate stipellate sericeous beneath, standard densely silky on the back, stamens diadelphous, pod oblong glabrescent. *Wight Ic.* t. 207.

Hills in the CARNATIC near Courtallum, *Wight*.

Habit of the preceding, the branchlets and underside of the leaves coated with persistent shining yellowish-brown silky down. *Leaflets* 4–8 in. long, not shining, when young sericeous also above; stipellæ obscure; petiolules $\frac{1}{2}$ – $\frac{3}{8}$ in. long. *Racemes* nearly as long as the leaves, most of the nodes bearing short branchlets, on the tip of which the flowers are fascicled. *Calyx* campanulate, silky, $\frac{1}{8}$ in., short-pedicelled. *Corolla* reddish, $\frac{1}{2}$ in., densely silky. *Pod* 2–3 in. long, sublignose, 2–3-seeded, when young densely velvety.

3. **M. splendens**, W. & A. *Prodr.* 263; leaflets 7–9 coriaceous oblanceolate-oblong cuspidate stipellate sericeous below, standard densely silky on the back, stamens diadelphous.

Tropical forests of the NILGHIRIS and ANAMALLAY hills.

Habit and inflorescence of the two preceding, the branchlets and leaves beneath coated persistently with white or yellowish-brown shining short silky hairs. *Leaflets* 6–9 in. long, opaque, glabrous above; stipellæ setaceous; petiolules $\frac{1}{8}$ – $\frac{1}{4}$ in. *Racemes* shorter than the leaves, the nearly sessile flowers densely fascicled at the end of short branchlets. *Calyx* $\frac{1}{8}$ – $\frac{1}{6}$ in., densely silky, with a pair of small ovate bracteoles. *Corolla* reddish, $\frac{1}{4}$ in. long. *Ovary* linear, densely silky, 4–5 ovulate. *Pod* not seen.

** *Leaves opaque, pubescent beneath.*

4. **M. pulchra**, Benth. MSS.; leaflets small 15–19 scarcely subcoria-

ceous oblanceolate-oblong acute stipellate slightly silky below, standard glabrous on the back, stamens monadelphous, pod glabrous linear rigidly coriaceous flat smooth. *Mundulea pulchra*, *Benth. Pl. Jung.* 248. *Tephrosia pulchra*, *Coleb. in Wall. Cat.* 5630. *Pongamia cassioides*, *Wall. Cat.* 5918. *Dalbergia tephrosioides*, *W. & A. Prodr.* 210.

Forests of KHASIA, ASSAM, SILHET, AVA, and BIRMA, ascending to 4000 ft.—

DISTRIB. Philippines, *Cuming*, 1208 ?

An erect tree, with the branches and leaves below thinly clothed with opaque greyish silky pubescence. *Leaves* and leaflets the smallest of all the species, the former not more than 2–5 in. long, green and pubescent above; petiolules very short and stipellæ minute. *Racemes* copious, shorter than the leaves, the flowers fascicled, shortly peduncled from the main rachis. *Calyx* $\frac{1}{2}$ in., scarcely toothed. *Corolla* reddish, $\frac{3}{8}$ – $\frac{1}{2}$ in. *Pod* 2–4 in. long, $\frac{1}{2}$ in. broad, 1–4-seeded.

5. **M. racemosa**, *Benth. Pl. Jung.* 249; leaflets 13–15 scarcely subcoriaceous obovate-oblong acute distinctly stipellate slightly downy beneath, standard glabrous on the back, stamens diadelphous, pod coriaceous glabrous torulose. *Tephrosia racemosa*, *W. & A. Prodr.* 210 ? *Robinia racemosa*, *Roxb. Fl. Ind.* iii. 329 ? *Pongamia racemosa*, *Grah. in Wall. Cat.* 5914. *Wisteria pallida*, *Dalz. & Gibs. Bomb. Flora*, 61. *W. racemosa*, *Dalz. & Gibs. loc. cit.* *Pongamia Corcor*, *Grah. in Wall. Cat.* 5891 ? *Millettia pallida*, *Dalz. in Linn. Journ.* xiii. 187.

Tropical forests of the CONCAN and ORISSA.

A woody climber, with thinly silky branches. *Leaves* reaching 1 ft. long; leaflets 2–3 in. long, scarcely more than membranous, glabrous above, obscurely silky or glabrescent below; petiolules short, with large setaceous stipellæ. *Racemes* copiously panicled, the flowers not fascicled on short branchlets, but close shortly pedicellate on the main rachis; bracts exceeding the buds, setaceous, deciduous. *Calyx* $\frac{1}{2}$ in., densely silky. *Corolla* $\frac{3}{8}$ – $\frac{1}{2}$ in., whitish. *Pod* linear, narrow, $\frac{1}{2}$ ft. long, 4–5-seeded.

Roxburgh's plant, which inhabits the forests of Orissa, may be distinct. As figured in his set of unpublished plates it has red flowers and much smaller bracts.

6. **M. pendula**, *Benth. Pl. Jung.* 250; leaflets 7 obovate-oblong cuspidate membranous exstipellate closely silky beneath, standard glabrous, pod flat woody glabrous. *Pongamia pendula*, *Grah. in Wall. Cat.* 5902. *Millettia leucantha*, *Kurz in Journ. Asiat. Soc. Beng.* xlii. 2, 68.

AVA, Prome hills, *Wallich*; BIRMA, forests of Pegu, *McLelland, Kurz*.

An erect tree, with thinly silky branchlets, and leaves $\frac{1}{2}$ ft. long. *Leaflets* thin, flexible, 2–3 in. long, dull green, thinly silky above, when mature densely clothed with adpressed grey silky pubescence below, the lowest as long as broad; petiolules under $\frac{1}{4}$ in. *Flowers* in short dense racemes in the axils of the leaves; pedicels densely fascicled, $\frac{1}{8}$ – $\frac{1}{6}$ in. *Calyx* $\frac{1}{5}$ – $\frac{1}{4}$ in., shortly grey-silky; teeth deltoid, shorter than the tube. *Corolla* shorter than the calyx. *Pod* oblong, 3–5 in. long, $1\frac{1}{4}$ in. broad, tubercled, 1–3-seeded.

7. **M. cana**, *Benth. Pl. Jung.* 250; leaflets 7 obovate-oblong rather obtuse coriaceous exstipellate thinly matted with adpressed grey hairs beneath, standard glabrous, pod flat rigidly coriaceous obscurely grey-canescens. *Pongamia cana*, *Grah. in Wall. Cat.* 5903.

AVA; banks of the Irrawaddi at Yenanghuen, *Wallich*.

Climber, with grey pubescent branches and leaf-rachis, the latter $\frac{1}{2}$ ft. long. *Side leaflets* oblong, $2\frac{1}{2}$ –3 in. long, the end one obovate; upper surface glabrous, rather shining; petiolules $\frac{1}{2}$ in. *Buds* densely crowded; pedicels very short; bracts lanceolate, silky, as long as the calyx. *Calyx* minute, densely brown-sericeous; teeth deltoid, half as long as the tube. *Pod* dehiscing early for the genus, 2–3 by $\frac{3}{4}$ – $\frac{1}{2}$ in.

8. **M. tetraptera**, *Kurz in Journ. Asiat. Soc. Beng.* xlii. 2, 69; leaflets 7 subcoriaceous obovate-oblong exstipellate at first densely softly pubescent on both sides, standard glabrous, stamens monadelphous, pod glabrous indehiscent with each suture produced into a broad hard horizontal wing on both sides. *Pongamia tetraptera*, *Hort. Calc.* Legum. indetermin., *Wall. Cat.* 5976.

BIRMA; forests of Pegu, &c. *Wallich, Griffith, Kurz.*

An erect tree, with branchlets clothed with dense drab-brown short pubescence. *Leaflets* obtuse, 3-4 in. long, flexible and densely soft-pubescent at first, but becoming rigid and glabrescent when mature; petiolules under $\frac{1}{4}$ in. *Flowers* in short close nearly sessile racemes in the axils of the leaves; pedicels fascicled, $\frac{1}{12}$ - $\frac{1}{8}$ in. *Calyx* $\frac{3}{8}$ in., thinly clothed with adpressed hairs; teeth deltoid. *Corolla* pale blue. *Pod* subligulate, quadrangular, straight, linear 3-4 in. long, nearly an inch thick, the wings $\frac{1}{4}$ - $\frac{3}{8}$ in. broad in the middle, narrowed to each end.

9. **M. pubinervis**, *Kurz in Journ. Asiat. Soc. Beng.* xlii. 2, 68; leaflets elliptic-obovate obtusely acuminate glaucous and pubescent on the midrib below, standard glabrous on the back, ovary pubescent, pod unknown.

MARTABAN, *Kurz.*

An erect tree 20-25 ft. high, the young parts puberulous. *Leaf* $\frac{1}{2}$ ft. with a puberulous rachis; leaflets (number not stated) 2-3 in. long, thinly chartaceous. *Racemes* leaf-opposed, slender, simple, 2 $\frac{1}{2}$ -3 in. long; pedicels capillary, pubescent, solitary or fascicled. *Calyx* reddish, broader than deep, $\frac{1}{12}$ - $\frac{1}{8}$ in. long, slightly pubescent, obscurely toothed. *Corolla* yellowish-white; standard above $\frac{1}{2}$ in. long.—*Kurz loc. cit.*

10. **M. monticola**, *Kurz in Journ. Asiat. Soc. Beng.* xlii. 2, 67; leaflets 7-9 oblong shortly acuminate fulvo-pubescent beneath, standard glabrous, ovary thinly ferrugineo-pubescent, pod unknown.

MARTABAN, alt. 7000 ft., *Kurz.*

A robust climber, resembling *M. pachycarpa*, with verrucose branches and ferrugineo-pubescent glabrescent branchlets. *Leaflets* petioluled, with adpressed fulvous pubescence on the ribs. *Flowers* blue, in simple solitary racemes 4-7 in. long, arising above the scars of the fallen leaves. *Calyx* $\frac{3}{8}$ - $\frac{1}{2}$ in., longer than broad; teeth obscure, anterior one largest. *Standard* $\frac{1}{2}$ in., petals much smaller than those of *M. pachycarpa*.—*Kurz loc. cit.*

11. **M. pachycarpa**, *Benth. Pl. Jung.* 250; leaflets 11-13 subcoriaceous oblanceolate-oblong cuspidate exstipellate finely downy below, standard glabrous on the back, stamens monadelphous, pod woody rugose glabrous.

Forests of KHASIA, SIKKIM, and ASSAM up to 4000 ft. MALACCA, *Griffith.*

A large climber, with the branches and leaves below more or less densely clothed with pale brown pubescence. *Leaves* 1 ft. or more long; leaflets 6-8 in. long, glabrous, opaque above, sometimes subcaudate, the pubescences below short, loose, deciduous; petiolules $\frac{1}{6}$ - $\frac{1}{4}$ in. *Racemes* copious, 6-9 in. long, most of the nodes with short branchlets. *Calyx* $\frac{3}{8}$ - $\frac{1}{2}$ in., distinctly pedicelled, densely downy; teeth very short. *Corolla* $\frac{3}{4}$ -1 in. long. *Pod* 1-3-seeded, rugose, 1-1 $\frac{1}{4}$ in. broad, reaching 4-5 in. long.

*** *Mature leaflets glabrescent beneath.*

12. **M. cinerea**, *Benth. Pl. Jung.* 249; leaflets 5-7 obovate-oblong cuspidate membranous stipellate soon glabrescent beneath, standard densely silky on the back, stamens diadelphous, pod thick linear velvety torulose. *Pongamia cinerea*, *Grah. in Wall. Cat.* 5888. *P. palustris*, *Grah. in Wall. Cat.* 5889; *P. paniculata*, *Grah. in Wall. Cat.* 5904. *P. heterocarpa*, *Wall. MSS.* *P. oblonga*, *Grah. in Wall. Cat.* 5893?

Forests of SIKKIM, KHASIA, SILHET, ASSAM, CHITTAGONG, and BIRMA, ascending to 4000 ft.—DISTRIB. China?

A woody climber, with young branchlets and leaves below with a little opaque grey deciduous pubescence. *Leaflets* large, reaching $\frac{1}{2}$ –1 ft. long, thin and flexible; both sides green; petiolules and setaceous stipellæ $\frac{1}{8}$ – $\frac{1}{6}$ in. *Racemes* most or all in a panicle above the leaves; flowers distinctly pedicellate, not fasciated, subtended by a pair of setaceous bracteoles. *Calyx* $\frac{1}{6}$ in., densely silky, distinctly toothed. *Corolla* $\frac{1}{2}$ – $\frac{5}{8}$ in., densely coated with grey silk. *Pod* very turgid, 4–5 in. long, 1 in. broad, 3–5-seeded, sublignose.

13. **M. ovalifolia**, *Kurz in Journ. Asiat. Soc. Beng.* xlii. 2, 68, *excl. syn.* *W. & A.*; leaflets 7 ovate-elliptic shortly acuminate chartaceous glabrous, standard glabrous on the back, pod small linear-oblong glabrous flattish with obtuse sutures.

BIRMA, at Prome, *Kurz*.

An erect glabrous middle-sized tree. *Leaves* $\frac{1}{3}$ – $1\frac{1}{2}$ ft.; leaflets $\frac{1}{2}$ –1 in. long, glaucescent and finely reticulated beneath; petiolules slender, $\frac{1}{12}$ to $\frac{1}{8}$ in. *Racemes* slender, glabrous, 2–3 inches, one or several together, arising from young branchlets; pedicels capillary, solitary or fasciated. *Calyx* glabrous, purplish, broader than long, $\frac{1}{12}$ in., long, nearly truncate. *Corolla* blue; standard $\frac{1}{4}$ in. long. *Pod* 2–3 in. long, 2–3-seeded at middle, sublignose, pale, incurved, narrowed to base, sparsely verrucose.—*Kurz loc. cit.*

14. **M. cærulea**, *Baker*; leaflets 7 obovate-oblong cuspidate subcoriaceous stipellate glabrous, standard densely silky, stamens monadelphous, pod large flat rather woody finely brown-velvety. *Pongamia cærulea*, *Grah. in Wall. Cat.* 5894.

AVA, at Phanoë, *Wallich*; MALACCA, *Maingay*.

A woody climber, with glabrous branches. *Leaflets* 4–6 in. long, glabrous on both sides from an early stage; petiolules $\frac{1}{8}$ – $\frac{1}{6}$ in. *Flowers* in close short-peduncled racemes in the axils of the leaves; pedicels very short, densely fasciated. *Calyx* campanulate, $\frac{1}{12}$ long, faintly silky, nearly truncate. *Corolla* three times the calyx, the standard densely white-canescens on the back. *Pod* linear-oblong, 7–8 in. long, $1\frac{1}{2}$ – $1\frac{3}{4}$ in. broad, recurved, late in dehiscing, clothed with dense short persistent brown velvety pubescence.

15. **M. glaucescens**, *Kurz in Journ. Asiat. Soc. Beng.* xlii. 2, 67; leaflets obovate-oblong cuspidate membranous exstipellate glabrous beneath, standard glabrous on the back, stamens monadelphous, pod flat on the face woody linear-oblong glabrous not torulose with both sutures expanded into narrow wings.

BIRMA; forests of Pegu and Martaban, *Kurz*.

A woody climber, with glabrous branchlets. *Leaflets* thin, flexible, green above, dull below, reaching $\frac{1}{2}$ ft.; petiolules $\frac{1}{4}$ in. *Racemes* close, simple, $\frac{1}{2}$ ft. long, axillary on short peduncles; pedicels in pairs, exceeding the calyx. *Calyx* $\frac{1}{8}$ in., with a few minute hairs; teeth deltoid. *Corolla* $\frac{3}{8}$ in., steel-blue. *Pod* 3–4-seeded, tubercled, $\frac{1}{2}$ ft. by 1 in.

16. **M. Placidia**, *Wight Ic.* t. 86; leaflets 5–7 obovate-oblong cuspidate rigidly coriaceous exstipellate glabrous, standard glabrous on the back, stamens diadelphous, pod thin compressed oblong glabrous. *Galedupa Placidia*, *Roxb. Fl. Ind.* iii. 241.

Forests of SIKKIM, KHASIA, SILHET, and MISHMI, ascending to 4000 ft.

A woody climber, with whitish branchlets, only the youngest branchlets and leaves

finely silky. *Leaflets* of medium size, reaching 3-4 in. long, both sides green, quite glabrous; petiolules short. *Racemes* copious, short, simple, laxly flowered; pedicels $\frac{1}{4}$ - $\frac{3}{8}$ in., often geminate, neither bracteate nor bracteolate. *Calyx* $\frac{1}{8}$ - $\frac{1}{6}$ in., thinly silky; teeth short, obtuse. *Corolla* snow-white, $\frac{1}{2}$ - $\frac{5}{8}$ in. *Pod* 3-4 in. by 1-1 $\frac{1}{4}$ in., narrowed to a point; valves quite smooth, dehiscing earlier than in the other species.

17. **M. Brandisiana**, Kurz in Journ. Asiat. Soc. Beng. xlii. 2, 69; leaflets 13 or more lanceolate glabrous subcoriaceous stipellate, standard silky on the back, stamens diadelphous, pod thin compressed ligulate-oblong glabrous.

BIRMA, near Yomah, Kurz.

An erect tree, with slender terete glabrous branches. *Leaflets* 1-1 $\frac{1}{2}$ in. long, narrowed to an obtuse tip, rather rounded at the base. *Racemes* very lax, paniced at the end of the branches and sending out small shoots from the lower nodes; pedicels much shorter than the calyx; bracts minute, glabrous, lanceolate. *Calyx* $\frac{1}{4}$ in. glabrous, broadly campanulate; teeth deltoid. *Corolla* lilac, $\frac{5}{8}$ - $\frac{3}{4}$ in. *Pod* 3-4 in. long, under an inch broad, 2-4-seeded, the valves quite smooth and flat, twisting when dried.

18. **M. eriantha**, Benth. Pl. Jung. 250; leaflets 5 obovate-oblong cuspidate rigidly coriaceous exstipellate glabrous, standard densely silky, stamens diadelphous, pod oblong lignose rugose glabrescent.

Forests of MALACCA, Griffith, Maingay.

A woody climber, with only the youngest branches silky. *Leaflets* reaching 5-6 in. long, very rigid in texture, both sides green and quite glabrous; petiolules $\frac{1}{4}$ - $\frac{3}{8}$ in. *Racemes* copious, short, subsessile, dense, subspicate; bracts large, roundish, densely silky, clasping and hiding the buds. *Calyx* subsessile, $\frac{3}{8}$ in., clothed with bright yellowish-brown silky pubescence, like the bracts and standard; teeth as long as the tube, broad, imbricated. *Corolla* $\frac{3}{4}$ -1 in., densely silky. *Pod* beaked, turgid, 3 in. long, 1-seeded, subindehiscent.

19. **M. atropurpurea**, Benth. Pl. Jung. 249; leaflets 7-9 oblong acute rigidly coriaceous exstipellate glabrous, standard glabrous, stamens diadelphous, pod oblong convex smooth rather woody glabrous. *Pongamia atropurpurea*, Wall. Cat. 5910; Pl. As. Rar. t. 78.

Forests of MARTABAN, TENASSERIM, MALACCA, and PENANG.—DISTRIB. Sumatra.

An erect tree, with thick, glabrous branches. *Leaflets* 4-6 in. long, very thick and rigid, shining above, both sides quite glabrous, reticulato-venose; petiolules $\frac{1}{4}$ - $\frac{1}{2}$ in. *Inflorescence* a dense terminal panicle above the leaves; racemes not branched; bracts minute, ovate; pedicels $\frac{1}{6}$ - $\frac{1}{4}$ in. *Calyx* $\frac{1}{4}$ in., thinly silky; teeth short obscure. *Corolla* dark purple, 1 in. long. *Pod* narrowed to both ends, 3 in. long, subindehiscent, 1-seeded in our specimens.

SUBGEN. 2. **Otosema**, Benth. *Standard* auricled at the base on both sides of the claw. *Stamens* monadelphous.

20. **M. auriculata**, Baker; branchlets finely downy, leaflets 7-9 obovate obtuse or cuspidate membranous thinly silky, flowers shortly pedicellate, pod woody permanently sericeous. *Brand. For. Flor.* 138. *Robinia macrophylla*, Roxb. Fl. Ind. iii. 329. *Pongamia macrophylla*, Grah. in Wall. Cat. 5892. *Otosema macrophylla*, Benth. Pl. Jung. 249. *Amerimnum pallidum*, Hamilt. MSS.

ROHILCUND and KUMAON to SIKKIM, reaching 3500 ft.; also on Parasnath in BEHAR.

A large, robust, woody climber. *Leaves* reaching 1-2 ft. long; petiole 4-6 in. long; leaflets green, glabrescent above, 6-12 in. by 3-6 in., minutely stipellate, pale below, sometimes subcoriaceous. *Flowers* in copious close axillary racemes near the top of the branches, fasciated on a downy rachis 4-6 in. long; bracts minute, linear. *Calyx* $\frac{1}{4}$ in., densely silky; teeth very short. *Corolla* whitish, three times the calyx, densely silky. *Pod* straight, very hard, 5-6 in. long, 1 in. broad; sutures thickened.

21. **M. fruticosa**, *Benth. MSS.*; branches finely downy, leaflets 9-11 oblong-ovate-oblong obtuse or subacute thinly silky, flowers subsessile, pod woody glabrescent. *Robinia fruticosa*, *Roxb. Fl. Ind. iii.* 328. *Pongamia fruticosa*, *Grah. in Wall. Cat.* 909. *Otosema fruticosa*, *Benth. Pl. Jung.* 249. *Amerimum fasciculatum*, *Hamilt. MSS.*

Forests of BENGAL, ASSAM and PEGU.

A woody climber. *Leaves* long-petioled, $\frac{1}{2}$ -1 ft. long; leaflets 4-6 in. long, $1\frac{1}{2}$ -2 in. broad, obscurely stipellate, glabrous above, thinly sericeous beneath. *Flowers* in dense short axillary racemes and also in terminal panicles. *Calyx* $\frac{1}{4}$ in., densely sericeous, subtended by minute ovate bracts and bracteoles. *Corolla* $\frac{3}{8}$ in. red, the standard densely silky. *Pod* hard and woody, silky when young, 6-7 in. by $1-1\frac{1}{4}$ in.

22. **M. extensa**, *Benth. MSS.*; branches finely downy, leaflets 9-11 obovate-oblong membranous acute thinly silky, flowers short-pedicelled. *Pongamia? extensa*, *Wall. Cat.* 5900. *Otosema extensa*, *Benth. Pl. Jung.* 249.

MARTABAN, *Wallich.*

A little-known climbing species, closely allied to the two preceding. *Leaflets* long-petioled, distantly placed on an elongated nearly glabrous rachis, glabrescent above, not seen fully developed. *Flowers* in very copious close axillary racemes 6-8 in. long near the top of the branches. *Calyx* $\frac{1}{8}$ in., campanulate, scarcely toothed, with a pair of very minute bracteoles at the base. *Corolla* $\frac{3}{8}$ in., densely silky, reddish lilac. *Pod* like that of *M. auriculata* when young, but not seen mature.

23. **M. leiogyna**, *Kurz in Journ. As. Soc. Beng. xlii.* 2, 67; branches ferrugineo-tomentose, leaflets 9-13, flowers distinctly pedicelled, ovary glabrous.

MARTABAN, *Kurz.*

A woody climber with terete minutely lenticellate branches, all the young parts ferrugineo-tomentose. Adult *leaves* not known. *Racemes* 4-5 in., arising from shortened lateral branches, and forming usually ample lateral panicles; pedicels $\frac{1}{8}$ - $\frac{1}{4}$ in., nodding, velvety. *Calyx* broader than deep, under $\frac{1}{4}$ in. long, fulvous-velvety, obscurely toothed, upper tooth largest. *Corolla* glabrous, violet; standard $\frac{1}{2}$ in. long, emarginate, yellow at the throat. Young *pod* smooth, linear, acuminate. Placed by *Kurz* next to *M. extensa*. I have seen no specimen.

24. **M. caudata**, *Baker*; branches glabrous, leaflets 7-9 oblong caudate coriaceous glabrous, flowers pedicellate, pod glabrescent not woody. *Pongamia? caudata*, *Grah. Wall. Cat.* 5895. *Otosema caudata*, *Benth. Pl. Jung.* 249.

Forests of KHASIA and SILHET, ascending to 3000 ft.

A woody climber. *Leaflets* minutely stipellate, 6-9 in. long, firm, bright green above, glaucous below, narrowed out at the tip into a long distinct tail. *Racemes* axillary, short-peduncled, not so dense as in the others, 4-6 in. long. *Calyx* campanulate, $\frac{1}{2}$ in., scarcely toothed, densely silky. *Bracts* very minute. *Corolla* $\frac{1}{4}$ - $\frac{3}{8}$ in., densely silky. *Pod* linear, straight, rigidly-coriaceous, subequally turgid, 3-4 in. long, $\frac{1}{2}$ in. broad.

DOUBTFUL SPECIES.

The following are probable species of *Millettia*, of which either flowers or pods are unknown.

Leaflets and pod as in *M. atropurpurea*, but the latter 6-7 in. long, 2-2½ in. broad, smooth, woody, flat, perhaps indehiscent.—MALACCA, *Griffith*, 1835.

Leaflets 7, subcoriaceous, obovate, very obtuse, opaque, 3-4 in. long, obscurely grey-canescens below. *Pod* linear, 4-5 in. long, flat, ¾ in. broad, several-seeded, with similar vestiture. PEGU, *McClelland*. May be *PADBRUGGIA DASYPHYLLA*, *Miq. Flor. Ind. Bat.* i. 150.

M. MAINGAYI, *Baker*. *Leaflets* 15 or more, oblong, coriaceous, 1½-2 in. long, rounded at both ends, pubescent below. *Pod* oblong, woody, indehiscent, rounded at both ends, 4 in. long, 2½ in. broad, an inch thick, turgid, densely clothed with short brown velvety pubescence, the surfaces traversed by deep longitudinal grooves. SINGAPORE, *Maingay*.

PONGAMIA ANGUSTIFOLIA, *Ham. in Wall. Cat.* 5917. *Leaflets* 9, exstipellate, not coriaceous, glabrous, oblanceolate-oblong, acuminate, 2-3 in. long. *Inflorescence* and separate flowers just as in *M. glaucescens*. NIPAL, *Hamilton*.

21. **MUNDULEA**, DC.

Shrubs. *Leaves* odd-pinnate. *Flowers* in dense terminal racemes. *Calyx* campanulate; teeth short, deltoid. *Corolla* much exserted; standard obovate, with a long claw; wings oblanceolate, adhering to the incurved keel, which has a short obtuse point. *Stamens* monadelphous; alternate filaments slightly dilated; anthers uniform. *Ovary* sessile, linear, many-ovuled; style filiform, glabrous, much incurved; stigma capitate. *Pod* large, linear, subindehiscent. *DISTRIB.* Species 3, the two others plants of Madagascar.

1. ***M. suberosa***, *Benth. Pl. Jung.* 248; *Bedd. Fl. Sylv.* 85; *Anal. Gen.* t. 12, fig. 2. *Tephrosia suberosa*, *DC. Prodr.* ii. 249; *Hook. Ic. Pl.* t. 120; *Wall. Cat.* 5628; *W. & A. Prodr.* 210; *Wt. Ill.* t. 79 ("82"); *Dalz. & Gibs. Bomb. Fl.* 60. *Robinia suberosa*, *Roxb. Fl. Ind.* iii. 327. *R. sennoides*, *Roxb. Fl. Ind.* iii. 328. *Tephrosia sericea*, *DC. Prodr.* ii. 249; *Wall. Cat.* 5629. *Cytisus sericeus*, *Willd. Sp.* iii. 1121. *T. Petersiana*, *Klotzsch in Peters Mossamb. Bot.* t. 9. *T. ichthyica*, *Bert. Misc.* xviii. 18, t. 3.

Hill-valleys of the WESTERN PENINSULA and CEYLON.—*DISTRIB.* Trop. Africa, Natal.

A stout erect shrub, with thick corky bark. *Branches*, rachises, pedicels and leaves beneath densely sericeous. *Leaflets* 6-10-jugate, oblong-lanceolate, coriaceous, 1½-2 in. long. *Flowers* in close terminal racemes. *Pedicels* 2-3 times the campanulate calyx. *Corolla* ¾-1 in. long, reddish, thinly silvery. *Pod* 3-4 in. long, densely sericeous, 6-8-seeded, both sutures thickened so as to form prominent borders.

22. **TEPHROSIA**, Pers.

Herbs or undershrubs. *Leaves* usually odd-pinnate; leaflets opposite, subcoriaceous. *Flowers* in leaf-opposed racemes or solitary or in pairs in the axils of the leaves. *Calyx*-tube campanulate; teeth distinct, subequal. *Petals* clawed; standard suborbicular; keel incurved, not beaked. *Stamens* diadelphous; anthers obtuse, uniform. *Ovary* sessile, linear, many-ovuled; style much incurved, filiform or flattened, glabrous or bearded; stigma capitate often penicillate. *Pod* linear, flattened, many-seeded, 2-valved, continuous or obscurely septe between the seeds. *DISTRIB.* Species about 100, spread through the Tropics of both hemispheres.

SUBGEN. 1. **Macronyx** (Dalzell). Annual. Leaves simple.

1. **T. tenuis**, Wall. Cat. 5970; Dalz. & Gibs. Bomb. Fl. Gl. *Macronyx strigosus*, Dalz. in Hook. Kew Journ. ii. 35.

Plains of SCINDE, the PUNJAB and CONCAN.

Stems filiform, densely cæspitose, $\frac{1}{2}$ –1 ft. long with a few short adpressed hairs. Leaves nearly sessile, linear, 1–2 in. long, narrowed suddenly or gradually at the point, glabrous above, obscurely silky beneath; stipules minute, setaceous, ascending. Flowers 1–2 together in the axils of the leaves. Pedicels filiform, $\frac{1}{4}$ – $\frac{3}{8}$ in. Calyx $\frac{1}{12}$ in.; teeth lanceolate, much shorter than the tube. Corolla $\frac{1}{8}$ in., all the petals with very long claws. Pod linear, $\frac{1}{2}$ –1 in. long, 6–10-seeded, thinly clothed with adpressed hairs. Style short, glabrous, filiform.

SUBGEN. 2: **Brissonia** (Neck.). Shrubby. Leaves odd-pinnate. Calyx-teeth short, deltoid.

2. **T. candida**, DC. Prodr. ii. 249; Wall. Cat 5627; W. & A. Prodr. 210. *Robinia candida*, Roxb. Fl. Ind. iii. 327. *Galega arborescens*, Herb. Madras. *Kiesera sericea*, Reinw. in Miq. Flor. Ind. Bat. i. 291. *Xiphocarpus candidus*, Hassk. Pl. Rar. Jav. 336.

HIMALAYAS, tropical zone, from KUMAON eastward to KHASIA and ASSAM, ascending to 5000 ft. in Sikkim. SILHET, CHITTAGONG, MARTABAN, and TENASSERIM.—DISTRIB. Malay isles.

A low shrub, with slender woody grooved branches clothed with brown or grey persistent velvety pubescence; stipules setaceous, ascending; leaves short-petioled, reaching 6–9 in. long; leaflets 19–25, ligulate, acute, $1\frac{1}{2}$ –2 in. long, green glabrous above, grey and thinly silky beneath. Racemes copious, terminal and lateral, elongated, 6–9 in. long; lower several to a fascicle; pedicels silky, $\frac{1}{4}$ – $\frac{1}{2}$ in. Calyx $\frac{1}{6}$ – $\frac{1}{4}$ in., densely silky; teeth much shorter than the tube. Corolla $\frac{3}{4}$ –1 in., reddish or white; standard densely silky. Pod 3–4 in. long, 10–15-seeded, slightly recurved, clothed with adpressed brown silky hairs; style flattened, silky.

SUBGEN. 3. **Reineria** (Moench.). Perennial herbs or shrubs. Leaves odd-pinnate or simple. Calyx-teeth narrow, cuspidate, as long as the tube.

3. **T. calophylla**, Bedd. Ic. Plant. Ind. Or. t. 166; herbaceous, glabrous, leaves simple, flowers in lax long terminal racemes.

East slope of the NILGHIRIS, alt. 3000 ft., Beddome.

Branches slender, angular, tough. Leaves oblanceolate, obtuse, rigidly coriaceous, 3–4 in. long, cuneate at the base; veins below and edges distinct, brown; stipules linear, minute; petiole angular, 1– $1\frac{1}{2}$ in. Racemes 6–9 in. long; bracts linear, very minute; pedicels 2–3 times the calyx. Calyx $\frac{1}{8}$ in.; teeth lanceolate, cuspidate, as long as the tube. Corolla $\frac{3}{8}$ – $\frac{1}{2}$ in.; standard downy on the back. Pod $2\frac{1}{2}$ –3 in. long, recurved, glabrous, 8–10-seeded.

4. **T. tinctoria**, Pers.; DC. Prodr. ii. 252; shrubby, branches densely velvety, leaflets large 3–13 casually simple, flowers in copious long-peduncled congested racemes. W. & A. Prodr. 211; Wt. Ic. t. 388; non Wall. Cat. 5643. *T. Heyneana*, Wall. Cat. 5631. *Galega Heyneana*, Roxb. Fl. Ind. iii. 384. *T. hypargyræa*, DC. Prodr. ii. 253. *T. nervosa*, Pers.; DC. Prodr. ii. 254.

WESTERN PENINSULA AND CEYLON, ascending to 5000 ft.

An undershrub, with flexuose woody twiggy branches, densely clothed with brown or grey velvety pubescence. Leaves subsessile, very variable; leaflets usually 3–6-

jugate (reduced to one in *T. Grahami*, *Wall. Cat.* 5652), oblong, obtuse, subcoriaceous, the end one much larger than the others, 2-3 in. long, $\frac{3}{4}$ -1 in. broad, green, glabrous above, clothed with persistent white silky pubescence beneath, the nerves prominent; stipules lanceolate, ascending. *Peduncles* often exceeding the leaves; racemes closely 3-12-flowered; flowers casually also in the axils of the leaves; pedicels very short. *Calyx* $\frac{1}{2}$ in., densely silky; teeth long, setaceous. *Corolla* $\frac{3}{8}$ - $\frac{1}{2}$ in., pale red, silky. *Pod* slightly recurved, 2-2 $\frac{1}{2}$ in. long, 10-12-seeded, glabrescent. *Style* flattened, bearded throughout.

VAR. 1. *pulcherrima*; leaflets large (end one 3 in. long) coriaceous often solitary, veins below very prominent, bracts ovate-lanceolate, flowers few close, pod persistently velvety. *T. pulcherrima*, *Wight MSS.* Nilghiris and Ceylon.

VAR. 2. *coccinea*; leaflets 1-5 $\frac{3}{4}$ -1 in. broad cuneately narrowed in the lower half, branches closely argenteo-canescens, bracts linear minute, racemes elongated. *T. coccinea*, *Wall. Cat.* 5633; *Pl. As. Rar.* t. 60. Birma, *Wallich*.

VAR. 3. *intermedia*, *W. & A.*; branches velvety, leaflets much smaller 9-13 $\frac{1}{4}$ - $\frac{1}{2}$ in. broad the end one not much larger than the others, the veins less prominent; racemes not so close as in the type. *T. intermedia*, *Grah. in Wall. Cat.* 5632. Western Peninsula and Ceylon.

5. *T. spinosa*, *Pers.*; *DC. Prodr.* ii. 254; shrubby, branches closely argenteo-canescens, stipules spiny, flowers 1-2 all in the axils of the leaves. *Wall. Cat.* 5651. *W. & A. Prodr.* 214 (*excl. syn.*); *Wight Ic.* t. 372. *Galega spinosa*, *Linn.*; *Roxb. Fl. Ind.* iii. 383.

Plains of the WESTERN PENINSULA and CEYLON.—**DISTRIB.** Java.

A low shrub, with very numerous terete flexuose ascending branches. *Spines* spreading, $\frac{1}{8}$ - $\frac{1}{4}$ in. *Leaves* short-petioled, $\frac{1}{2}$ -1 in. long; leaflets 5-7, narrow-oblancoate, rigidly subcoriaceous, truncate, often emarginate, glabrous above, glaucous, nearly glabrous below. *Flowers* all axillary; 1-2 rarely 3 from the nodes; pedicels $\frac{1}{12}$ - $\frac{1}{8}$ in. *Calyx* $\frac{1}{2}$ in., teeth linear-acuminate, as long as the tube. *Corolla* red, twice the calyx. *Pod* $\frac{3}{4}$ -1 in., nearly glabrescent, recurved, 5-6-seeded. *Style* much incurved, flattened, glabrous.

6. *T. senticosa*, *Pers.*; *DC. Prodr.* ii. 254; shrubby, branches closely argenteo-canescens, stipules not spiny, flowers 1-2 all in the axils of the leaves. *W. & A. Prodr.* 211; *Wight Ic.* t. 370; *Dalz. & Gibs. Bomb. Fl.* 61. *Galega senticosa*, *Linn. Amæn.* iii. 19. *G. pentaphylla*, *Roxb. Fl. Ind.* iii. 384. *T. pentaphylla*, *Grah. in Wall. Cat.* 5650. *T. elegans*, *Wall. Cat.* 5634.

Plains of the WESTERN PENINSULA and CEYLON; **BIRMA**, *Wallich*.

A low shrub, with copious erecto-patent terete slender branches; petiole very short; stipules minute, ascending, setaceous; leaflets usually 5, rarely 3, narrow-oblancoate, 1-1 $\frac{1}{4}$ in. long, truncate or emarginate, green, glabrous above, thinly silky beneath, cuneately narrowed in the lower half. *Flowers* usually geminate; pedicels $\frac{1}{8}$ in., argenteous. *Calyx* $\frac{1}{2}$ in.; teeth linear, as long as the tube. *Corolla* more than twice the calyx, argenteous. *Pod* 1 $\frac{1}{2}$ -2 in. long, 6-8-seeded, much recurved, persistently thinly canescens.

7. *T. purpurea*, *Pers.*; *DC. Prodr.* ii. 251; herbaceous, stems glabrescent or finely downy, racemes elongated, pod glabrescent or finely downy slightly recurved 6-10-seeded. *Wall. Cat.* 5638; *W. & A. Prodr.* 213; *Dalz. & Gibs. Bomb. Fl.* 61. *T. leptostachya*, *DC. loc. cit.* *Galega purpurea*, *Linn.*; *Roxb. Fl. Ind.* iii. 386. *G. lanceifolia*, *Roxb. Fl. Ind.* iii. 386. *G. Colonila* and *sericea*, *Ham. in Linn. Trans.* xiii. 544-5. *G. tinctoria*, *Lamk.*; *Roxb. Fl. Ind.* iii. 386, non *L. T. stricta*, *Grah. in Wall. Cat.* 5639. *T. Taylorii*, *Grah. in Wall. Cat.* 5637. *T. Wallichii*, *Grah. in Wall. Cat.* 5640. *T. lobata*, *Grah. in Wall. Cat.* 5646. *T. tinctoria*, *Grah. in Wall. Cat.* 5643. *T. gale-*

goides, *Grah. in Wall. Cat.* 5649. *T. lanceæfolia*, *Link*; *DC. loc. cit.* *T. indigofera*, *Bert. Misc.* xix. 9, t. 5. *T. lanceolata*, *Grah. in Wall. Cat.* 5636. *Indigofera flexuosa*, *Grah. in Wall. Cat.* 5473—*Rheede Hort. Mal.* i. t. 55.

Tropical zone, spread universally from the HIMALAYAS to CEYLON, MALACCA and SIAM, ascending to 4000 ft. in the north-west.—DISTRIB. Everywhere in the Tropics.

A copiously-branched suberect perennial, 1–2 ft. high, with slender firm terete stems. *Leaves* short-petioled, 3–6 in. long; stipules linear-subulate, ascending or reflexed; leaflets 13–21, narrow oblanceolate, obtuse, green, glabrescent above, glaucous, obscurely silky below. *Racemes* copious, all leaf-opposed, 3–6 in. long, lax; lower flowers fascicled; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in.; bracts minute. *Calyx* $\frac{1}{4}$ – $\frac{1}{6}$ in., closely silky; teeth linear-subulate, as long as the tube. *Corolla* $\frac{1}{4}$ – $\frac{3}{8}$ in., red, thinly silky. *Pod* $1\frac{1}{2}$ –2 in. by $\frac{1}{6}$ in. broad; style subglabrous, penicillate at the tip.

VAR. 1. maxima; taller, suberect, stipules lanceolate reflexed, racemes many-flowered elongated, corolla $\frac{1}{2}$ in. long, pod glabrescent 2–2 $\frac{1}{4}$ in. long 10–12-seeded. *T. maxima*, *Pers.*; *DC. Prodr.* ii. 252. *W. & A. Prodr.* 213. *Galega maxima*, *Linn. Sp. Pl.* 1063. *T. Mitchellii*, *Grah. in Wall. Cat.* 5641.—Plains of the Western Peninsula and Ceylon.

VAR. 2. pumila; lower, more diffuse, persistently finely downy, stipules linear-setaceous, leaflets 9–11 smaller more downy, corolla rather smaller, pod 1–1 $\frac{1}{2}$ in. long finely downy. *T. pumila*, *Pers.*; *DC. Prodr.* ii. 254. *T. timoriensis*, *DC. Prodr.* ii. 254. *T. diffusa*, *W. & A. Prodr.* 213. *Galega diffusa*, *Roxb. Fl. Ind.* iii. 387. *G. procumbens*, *Ham. in Trans. Linn. Soc.* xiii. 547. *T. parviflora*, *Wight in Wall. Cat.* 5642.—Distribution of the type.

8. T. Hookeriana, *W. & A. Prodr.* 212; herbaceous, stems finely downy, racemes elongated, pod slightly recurved 8–10-seeded clothed with persistent brownish silky hairs. *T. Colutea*, *Wight*; *Wall. Cat.* 5647. *Galega hirta*, *Ham. in Trans. Linn. Soc.* xiii. 546. *T. amœna*, *Hort. Calc. non Pers.*

Plains from the HIMALAYAS to CEYLON and MALACCA.

Closely allied to *T. purpurea*, from which it scarcely differs except in the vestiture of the pod. *Stipules* linear; leaflets 13–19, narrow oblanceolate, $\frac{3}{4}$ –1 in. long, truncate or emarginate, glabrescent above, thinly persistently silky below. *Racemes* all lateral, reaching 6–9 in. long; pedicels $\frac{1}{12}$ – $\frac{1}{4}$ in. *Calyx* densely silky, $\frac{1}{6}$ – $\frac{1}{5}$ in.; teeth setaceous, exceeding the tube. *Corolla* $\frac{3}{8}$ – $\frac{1}{2}$ in. *Pod* $1\frac{1}{2}$ –2 in. by $\frac{1}{6}$ in.; style flattened, subglabrous, penicillate at the tip.

9. T. villosa, *Pers.*; *DC. Prodr.* ii. 251; herbaceous, stems finely downy, racemes elongated, pod much recurved 6–8-seeded densely clothed with white silky hairs. *Wall. Cat.* 5645; *W. & A. Prodr.* 212. *Galega villosa*, *Linn.*; *Roxb. Fl. Ind.* iii. 385. *T. argentea*, *Pers.*; *DC. Prodr.* ii. 252; *W. & A. Prodr.* 212. *Galega argentea*, *Lamk. Dict.* ii. 599. *G. Barba-jovis*, *Burm. Fl. Ind.* 172.

Plains from the HIMALAYAS to CEYLON.—DISTRIB. Mauritius, Trop. Africa.

Habit of *T. purpurea*, but stems somewhat firmer and more woody, clothed with short adpressed white hairs. *Leaves* nearly sessile, 2–3 in. long; stipules linear, ascending or reflexed; leaflets 13–19, grey-green, glabrescent above, persistently silky below, narrow oblanceolate, often emarginate. *Racemes* half a foot or more long; lower flowers in distant fascicles, lowest often in the axils of the leaves; pedicels very short; bracts setaceous, plumose. *Calyx* $\frac{1}{5}$ – $\frac{1}{4}$ in. deep, densely silky; teeth setaceous, lower exceeding the tube. *Corolla* pale red, not much exceeding the calyx. *Pod* 1–1 $\frac{1}{2}$ in. long, $\frac{1}{4}$ – $\frac{1}{2}$ in. broad, densely persistently velvety; style glabrous, flattened, densely penicillate at the tip.

VAR. 1. incana; stems clothed with short spreading pubescence, leaflets rather broader. pod still more densely silky. *T. incana*, *Grah. in Wall. Cat.* 5644;

W. & A. Prodr. 212; *Wt. Ic.* t. 371. *Galega incana*, *Roxb. Fl. Ind.* iii. 385. *G. Colutea*, *Willd. Sp. Pl.* iii. 1246 (excluding description of pod). *T. Ehrenbergiana*, *Schweinf. Pl. Æthiop.* 18.—Distribution of the type.

10. ***T. pauciflora***, *Grah. in Wall. Cat.* 5635; herbaceous, stems finely silky, flowers usually all in the axils of the leaves, pod glabrescent or finely downy slightly recurved 6–8-seeded. *T. anthylloides*, *Hochst.*; *Baker in Oliv. Flor. Trop. Africa*, ii. 118?

Plains of SCINDE, *Stocks, Dalzell*; PUNJAB, *Stewart*; BIRMA, *Wallich*.

Stems densely caespitose, under a foot high. *Stipules* ascending, setaceous; leaflets 5–9, narrow oblanceolate, finely silky beneath, 1–1½ in. long, often emarginate. *Flowers* usually all geminate on short pedicels in the axils of the upper leaves, casually produced into a sparse raceme. *Calyx* ½ in., finely silky. *Corolla* red, twice the calyx. *Pod* 1–2 in. by ½ in.; style glabrous, flattened.—Probably a third variety of *T. purpurea*. The Indian differs from the African plant by smaller flowers and fewer seeds.

DOUBTFUL SPECIES.

T. FUSCA, *W. & A. Prodr.* 210 (*T. argentea*, *Wight in Wall. Cat.* 5648, non *Pers.*), is a plant gathered by Dr. Wight on the Dindygul hills, of which the flowers are not known. In general habit, leaves, inflorescence, vestiture, and the shape of the calyx and pod, it resembles closely *Mundulea suberosa*, but the leaflets are shorter and more obtuse, and the pod dehisces readily, like that of a *Tephrosia*, and the sutures are not thickened so as to form a prominent border. The calyx is that of § *Brissonia*.

23. **SESBANIA**, *Pers.*

Soft-wooded shrubs or herbs. *Leaves* long, very narrow, abruptly-pinnate, with very numerous deciduous linear-oblong obtuse mucronate leaflets. *Flowers* in axillary racemes. *Calyx* campanulate, shallowly 2-lipped or 5-toothed. *Corolla* much exserted; petals all with long claws; standard broad; keel obtuse, straight, or in § *Agati* recurved and subrostrate. *Stamens* diadelphous; anthers uniform. *Ovary* linear, stipitate, many-ovuled; style filiform, incurved, glabrous, stigma capitate. *Pod* very long and narrow, dehiscent, with distinct septa between the very numerous seeds.—DISTRIB. Species about 20, spread everywhere through the tropics.

SUBGEN. 1. **Eusesbania**. *Flowers* small; bud straight.

1. ***S. ægyptiaca***, *Pers.*; *DC. Prodr.* ii. 264; perennial, unarmed, pod flexible twisted. *Wall. Cat.* 5656; *W. & A. Prodr.* 214; *Wt. Ic.* t. 32; *Bedd. Fl. Sylv.* 86, *Anal. Gen.* t. 12, fig. 3; *Brand. For. Flor.* 137; *Boiss. Fl. Or.* ii. 193. *Æschynomene Sesban*, *Linn.*; *Roxb. Fl. Ind.* iii. 332. *Æ. indica*, *Burm. Fl. Ind.* 169. *Coronilla Sesban*, *Willd. Sp.* iii. 1147—*Rheede Hort. Mal.* vi. t. 27.

Plains from the HIMALAYAS to CEYLON and SIAM, ascending to 4000 ft. in the north-west.—DISTRIB. Cosmopolitan in tropics of old world.

A soft-wooded shrub of short duration, 6–10 ft. high, with terete twiggy branches. *Leaves* 3–6 in. long; leaflets 21–41, glabrous, linear-oblong, pale green. *Flowers* 6–10, in copious lax axillary racemes; pedicels filiform, ½–¾ in. *Calyx* ½ in., glabrous, membranous; teeth short, deltoid. *Corolla* ½–¾ in., glabrous, pale yellow or (in *S. picta*, *Pers.*; *Bot. Reg.* t. 873), more or less tinged with deep red. *Pod* 6–9 in. long, weak, torulose; sutures little thickened.

2. ***S. aculeata***, *Pers.*; *DC. Prodr.* ii. 265; annual, muricated, pod long firm not twisted nor torulose. *Wall. Cat.* 5655; *W. & A. Prodr.* 214; *Dalz. &*

Gibs. Bomb. Fl. 62. *Æschynomene bispinosa*, Jacq. *Ic. t.* 564. *Æ. spinulosa*, Roxb. *Fl. Ind.* iii. 333. *Coronilla aculeata*, Willd. *Sp. Pl.* iii. 1147.

Plains from the WEST HIMALAYAS to CEYLON and SIAM.—DISTRIB. Cosmopolitan in tropics of old world.

Suffrutescent, reaching several feet high, the branches and leaf-rachises armed with small weak prickles. *Leaves* reaching $\frac{1}{2}$ –1 ft. long; leaflets glabrous, 41–81, smaller and narrower than in *S. ægyptiaca*. *Racemes* laxly 3–6-flowered, distinctly peduncled. *Calyx* $\frac{1}{2}$ in., glabrous. *Corolla* $\frac{3}{8}$ – $\frac{1}{2}$ in., pale yellow; standard dotted with red. *Pod* 6–9 in. by $\frac{1}{8}$ in., straight or rather falcate, beaked with the persistent style.

VAR. 1. *paludosa*; more robust, unarmed, leaves glabrous. *Æ. paludosa* and *uliginosa*, Roxb. *Fl. Ind.* iii. 333–4.

VAR. 2. *sericea*; branches robust unarmed, leaflets more or less silky even when mature, racemes subsessile. *S. sericea*, DC. *Prodr.* ii. 266—Plains of Ceylon, Fergusson, CP., 3850.

VAR. 3. *cannabina*; branches obscurely muricated, racemes subsessile 3–4-flowered, corolla and calyx smaller, the former not more than $\frac{1}{4}$ in. long. *S. cannabina*, Pers.; DC. *Prodr.* ii. 215; W. & A. *Prodr.* 215; Wall. *Cat.* 5657. *Æschynomene cannabina*, Retz. *Obs.* v. 26. *Coronilla cannabina*, Willd. *Sp. Pl.* iii. 1148. *S. affinis*, Schrad.; DC. *loc. cit.*

3. ***S. procumbens***, W. & A. *Prodr.* 215; annual, obscurely muricated, pod short flexible torulose not twisted. Dalz. & Gibs. *Bomb. Fl.* 62. *Æschynomene procumbens*, Roxb. *Fl. Ind.* iii. 337. *Æ. diffusa*, Roxb. MSS.

PLAINS of the WESTERN PENINSULA.

Branches lower and more slender than in the last. *Leaves* 2–3 in. long; leaflets 31–41, linear-oblong, glabrous, glaucous. *Flowers* solitary or geminate, without a common peduncle. *Calyx* $\frac{1}{12}$ in. long. *Corolla* 3 times the calyx. *Pod* straight, 2–3 in. long, $\frac{1}{12}$ in. thick, 15–20-seeded, distinctly torulose.

SUBGEN. 2. **Agati**, Desv. *Flowers* large; bud falcately recurved.

4. ***S. grandiflora***, Pers. *Syn.* ii. 316; Bedd. *Fl. Sylv.* 86; Brand. *For. Flor.* 137. *Æschynomene grandiflora*, Linn. *Sp.* 1050; Roxb. *Fl. Ind.* iii. 331. *Agati grandiflora*, Desv.; DC. *Prodr.* ii. 266; Wall. *Cat.* 5654; W. & A. *Prodr.* 215. *Coronilla grandiflora*, Willd. *Sp.* iii. 1145—Rheede *Hort. Mal.* i. t. 51.

PLAINS of the Western Peninsula, a doubtful native.—DISTRIB. Mauritius to N. Australia, but often cultivated.

A short-lived soft-wooded tree, 20–30 ft. high, with virgate terete branches. *Leaves* $\frac{1}{2}$ –1 ft. long; leaflets 41–61, linear-oblong, pale green, glabrous. *Flowers* 2–4, in short axillary racemes. *Calyx* 1 in. deep, glabrous, shallowly 2-lipped. *Corolla* 3–4 in. deep, white or, in *Æ. coccinea*, Desv.; DC. *loc. cit.* (*Æschynomene coccinea*, L.), more or less deeply tinged with red. *Pod* 1 foot or more long, falcate, firm, not torulose, the sutures much thickened.

24. CARAGANA, Lam.

Usually low shrubs, with the leaf-rachises and the stipules usually spine-tipped and hardened, persistent from year to year. *Calyx* campanulate, placed very obliquely on its pedicel, produced on the upper side; teeth 5, deltoid or lanceolate. *Corolla* much exserted; standard broad, with reflexed edges; keel not at all beaked, usually as long as the wings and standard. *Stamens* diadelphous; anthers uniform. *Ovary* linear, sessile, many-ovuled; style filiform, incurved, glabrous, stigma minute terminal. *Pod* linear, turgid, not at all torulose, continuous, but sometimes pubescent within.—DISTRIB. Species about 15, spread widely through Central Asia.

* *Leaf-rachis suppressed.*

1. **C. pygmæa**, DC. *Prodr.* ii. 268; leaflets 4 digitate oblanceolate glabrous, flowers solitary nearly sessile. *Brand. For. Flor.* 134. *Robinia pygmæa*, Linn. *Sp. Pl.* 1044; *Pall. Fl. Ross*, i. t. 45. *Genista versicolor*, Wall. *Cat.* 5922; *Royle Ill.* t. 34, fig. 2. *C. versicolor*, Benth. in *Royle Ill.* 198.

WEST HIMALAYAS, temperate and alpine regions; TIBET, KUNAWAR, &c., alt. 8-17,000 ft.—DISTRIB. Afghanistan, Altai to Davuria.

A low undershrub, with the habit of a prickly *Genista*, the branches armed with a pungent, ascending trifid spine under an inch long from each of the close nodes. *Leaves* solitary or geminate in the spine axils, with rarely a perceptible petiole; leaflets $\frac{1}{2}$ – $\frac{1}{2}$ in. long, firm, pale green. *Pedicels* jointed, shorter than the calyx. *Calyx* glabrous, $\frac{1}{4}$ in. long; teeth short, deltoid. *Corolla* bright reddish-yellow, $\frac{3}{4}$ in; standard glabrous. *Pod* linear, turgid, glabrous, naked within, $\frac{3}{4}$ –1 in. long.

** *Leaf-rachis produced, with a spine at the end.*

2. **C. conferta**, Benth. MSS.; leaflets 4-6 oblanceolate subglabrous, stipules spinous, flowers 1-2 subsessile.

BALTI, temperate or alpine region, *Winterbottom*.

Nodes crowded on the castaneous downy branches. *Spines* woody, an inch long. *Stipules* broad, scarious, downy, with a spiny tip; leaflets $\frac{1}{2}$ – $\frac{5}{8}$ in. long, obtuse, with a mucro, at first faintly silky beneath, subcoriaceous. *Pedicels* downy, shorter than the calyx. *Calyx* $\frac{3}{8}$ in., finely silky; teeth deltoid, ciliated, half as long as the tube. *Corolla* 1 in. long, the keel incurved, with very long claws. *Ovary* linear, densely pubescent, 10-15-ovuled; style long, much incurved. *Pod* unknown.

3. **C. Gerardiana**, *Royle Ill.* 198, t. 34, fig. 1; leaflets 8-12 oblanceolate-oblong densely pubescent, stipules not spinous, flowers 1-2 subsessile. *Brand. For. Flor.* 133. *Astragalus Gerardianus*, *Grah. in Wall. Cat.* 5938. *C. spinosissima*, Benth. in *Royle Ill.* 198; *Camb. in Jacquem. Voy. Bot.* t. 43.

WEST HIMALAYAS, temperate and alpine region, alt. 8-13,000 ft.; GURWHAL, KUMAON, KUNAWAR,

A shrub reaching 3-4 ft. high, with very close nodes and downy young branches. Old *spines* erecto-patent, pungent, 1-1 $\frac{1}{2}$ in. long, often downy. *Leaflets* $\frac{1}{4}$ – $\frac{3}{8}$ in. long, obtuse, mucronate, firm, densely silky; stipules deltoid, scarious, not spine-tipped and consequently the old spines simple, not trifid. *Calyx* shortly pedicelled, $\frac{3}{8}$ in. long, densely pubescent; teeth deltoid-cuspidate, half the tube. *Corolla* twice the calyx. *Pod* $\frac{3}{4}$ –1 in by 1 in., woolly within and persistently clothed with grey pubescence on the outside.

4. **C. polyacantha**, *Royle Ill.* 198; leaflets 10-12 obovate-oblong densely pubescent, stipules spinous, flowers 1-2 on a short peduncle. *Astragalus polyacanthus*, Wall. *Cat.* 5934.

CENTRAL HIMALAYA, alpine or temperate region; KUMAON, *Blinkworth*; GURWHAL, *Strachey and Winterbottom*.

A low shrub, with close nodes and densely downy young branches. Old *spines* 1-2 in. long, weaker and less pungent than in the last. *Leaf-rachises* densely matted with pale brown woolly pubescence; leaflets $\frac{1}{4}$ – $\frac{3}{8}$ in. long, pale green, rigidly coriaceous, truncate, mucronate. Common *peduncle* short and not always developed. *Calyx* $\frac{3}{8}$ in. long, densely silky, subtended by a pair of linear bracteoles; teeth setaceous from a deltoid base, half as long as the tube. *Corolla* yellowish, twice the calyx. *Ovary* linear, densely pubescent. *Pod* unknown.

5. **C. brevispina**, *Royle Ill.* 198; leaflets 12-16 obovate-oblong glabrous or finely silky, stipules spinous, flowers 2-4 on a common peduncle. *Brand. For. Flor.* 133.

WEST HIMALAYAS, temperate region, alt. 5-9000 ft.; KASHMIR, KUNAWAR, GURWHAL, SIMLA, &c.—DISTRIB. Chinese Tartary, Afghanistan.

A shrub several feet high, the nodes less crowded than in the preceding, the young branches finely downy. Old spine-tipped *rachises* 2-4 in. long, rigid or flexible. *Leaflets* $\frac{3}{8}$ - $\frac{3}{4}$ in. long, subcoriaceous, glabrescent on both sides or thinly pubescent below. *Peduncle* 1-2 in.; bracts and bracteoles linear, scarious; pedicels downy. *Calyx* $\frac{1}{2}$ in. long, subglabrous; teeth half the tube, lanceolate-cuspidate. *Corolla* glabrous, yellowish, twice the calyx. *Pod* glabrous, linear, 2 in. long, woolly within.

*** *Spineless leaf-rachis produced, with a leaflet at the end* (CHESNEYA, Lindl.).

6. **C. crassicaulis**, Benth. MSS.; leaflets 21-25 linear-oblong pubescent, flowers solitary. *Astragalus crassicaulis*, Griseb. in Wall. Cat. 5932. *A. nubigenus*, Don Prodr. 245? *Caragana* (*Nephelotrophe*) *nubigena*, Bunge Mon. Astrag. 240?

HIMALAYAS, alpine region, alt. 12-17,000 ft.; GURWHAL and KUMAON to SIKKIM.

Stems thick, tufted, woody, creeping for a few inches below the surface, clothed very densely with the long old tough but not pungent or spinous leaf-rachises. *Leaves* in a lax rosette at the surface, short-petioled, 1-1 $\frac{1}{2}$ in. long; leaflets green, not coriaceous, $\frac{1}{8}$ - $\frac{1}{4}$ in. long, truncate or emarginate. *Peduncle* downy, as long as the calyx. *Calyx* $\frac{3}{2}$ in. long, very oblique, densely pubescent; teeth $\frac{1}{2}$ - $\frac{3}{4}$ tube. *Corolla* reddish-yellow, twice the calyx; standard pubescent on the outside; wings and keel shorter. *Pod* linear-oblong, $\frac{5}{8}$ - $\frac{3}{4}$ in. long, finely pubescent, stuffed inside with cottony down.

7. **C. cuneata**, Baker; leaflets 11-13, flowers 1-3 long-peduncled. *Guldenstædtia cuneata*, Benth. in Royle Ill. 200. *Chesneya vaginalis*, Jaub. and Spach. Ill. 96, t. 48? (calyx teeth shorter).

TEMPERATE and ALPINE WEST HIMALAYAS, alt. 8-13,000 ft.; TIBET and KUNAWAR.—DISTRIB. Orient?; Kashgar, Bellew.

Branches 2-3 in. long, crowded from a woody rhizome. *Stipules* small, deltoid; leaf-rachis, including distinct petiole, 2-4 in. long; leaflets obovate, $\frac{3}{8}$ - $\frac{5}{8}$ in. long, truncate, emarginate, not coriaceous, densely pubescent. *Peduncle* equalling or overtopping the leaves; pedicels very short. *Calyx* $\frac{5}{8}$ - $\frac{1}{2}$ in. downy; teeth linear-lanceolate, half as long as the tube or more. *Corolla* twice the calyx; standard pubescent; wings rather shorter; keel shorter still. *Pod* straight, linear, glabrous, 2-2 $\frac{1}{4}$ in. long, 10-12-seeded, slightly stuffed within. This and the last have the oblique calyx of *Calophaca*, but in habit and corolla range better under *Guldenstædtia*.—Dr. Aitchison sends from Ladak a plant with deep purple flowers, more hoary leaves and narrower pod, which may be distinct.

25. GULDENSTÆDTIA, Fisch.

Spineless perennials. *Leaves* odd-pinnate. *Flowers* solitary or umbellate on long axillary peduncles. *Calyx-tube* campanulate, not oblique; teeth 5, distinct, upper broader. *Corolla* much exserted; standard round; keel not more than half as long as the other petals, straight, obtuse. *Stamens* diadelphous; anthers uniform. *Ovary* sessile, many-ovuled; style incurved very short, stigma capitate. *Pod* linear, turgid, not torulose, continuous within.—DISTRIB. Species 7-8, all Central Asian.

1. **G. himalaica**, Baker; shortly caulescent, leaflets 11-13 obovate-obcordate densely silky, flowers 1-3, calyx-teeth much shorter than the tube.

HIMALAYA, alpine zone, alt. 11-15,000 ft.; KUMAON and GURWHAL to SIKKIM.

Stems 1-2 in. long, caespitose from a perennial rootstock, densely silky. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in. long, distinctly petioled, densely clothed with pale brown silky hairs; stipules

large, leafy, ovate; leaflets $\frac{3}{8}$ – $\frac{1}{4}$ in. long, not at all rigid. *Peduncle* filiform, 1–3 in. long; pedicels shorter than calyx; bracts lanceolate, very minute. *Calyx* $\frac{1}{2}$ in., silky; upper teeth deltoid, lower lanceolate. *Corolla* 3–4 times calyx; standard round, glabrous. *Pod* linear, glabrous, $\frac{1}{2}$ in. long, 6–8-seeded, with a narrow border to the upper suture.

2. **G. mirpourensis**, *Benth. MSS.*; stemless, leaflets 3–7 oblong obscurely pubescent, flowers 1–3, calyx-teeth as long as the tube. *Astragalus mirpourensis*, *Camb. in Jacquem. Voy. Bot.* 39, t. 46.

UPPER GANGETIC plain at Mirpour, *Jacquemont*. *HAZARA, Dr. Stewart.*

Rhizomes slender, branched, with the leaves and peduncles in a rosette at the surface. *Petiole* $\frac{1}{2}$ –1 in., obscurely pubescent, like the rachis and underside of the leaves; leaflets $\frac{1}{4}$ – $\frac{1}{2}$ in. long, obtuse, glabrescent above, not at all rigid. *Peduncle* as long as the leaves; pedicels scarcely any. *Calyx* $\frac{1}{4}$ in. finely silky; teeth lanceolate-acuminate. *Corolla* twice the calyx. *Pod* twice the calyx, linear, finely silky.

3. **G. multiflora**, *Bunge Enum. Pl. Chin.* 18; stemless, leaflets 11–13 oblong densely silky, flowers 3–6, calyx-teeth as long as the tube.

WEST HIMALAYA, *Royle*, the exact station not known. *DISTRIB.* China.

Rosettes of leaves and peduncles densely crowded at the surface on a slender woody rhizome. *Leaf-rachis* 2–4 in., including the distinct petiole, densely pubescent; leaflets $\frac{1}{4}$ – $\frac{1}{2}$ in., obtuse, soft, not rigid. *Peduncle* equalling or overtopping the leaves; bracts linear, exceeding the very short pedicels. *Calyx* $\frac{1}{4}$ in.; teeth linear-lanceolate. *Corolla* violet or yellow, twice the calyx. *Pod* twice the calyx, linear, straight, densely pubescent.

26. **ASTRAGALUS**, Linn.

Herbs or undershrubs with pinnate leaves, the leaf-rachis terminating either in a leaflet or a spine. *Calyx* tubular or campanulate, equal or gibbous on the back; teeth 5, subequal. *Corolla* usually distinctly exserted; petals subequal or wings and keel shorter than the standard, the keel incurved, obtuse. *Stamens* diadelphous; anthers uniform. *Ovary* sessile or stalked, many-ovuled; style incurved, stigma capitate. *Pod* linear or oblong, usually turgid, continuous within or more or less completely longitudinally 2-celled from the introversion of the inferior suture.—*DISTRIB.* Belts the world in the north-temperate zone, the head quarters being Western and Central Asia. Monographed in the 11th volume of the 7th series of the *Memoirs of the Imperial Academy of St. Petersburg*, by *Bunge*, who estimates the number of species at 1150–1200.

SUBGEN. 1. **Trichostylus**, *Baker*. A herbaceous perennial, with basifixed hairs, the style bearded down the inner face below the stigma, as in *Phaseolus*.

1. **A. Heydeli**, *Baker*.

WEST TIBETAN HIMALAYAS, alpine region, alt. 15–16,000 ft., *Strachey*. By the Tso-kar sea, between Rupschu and Korsog, *Heyde*.

Rhizome slender, woody, the whole plant not reaching more than an inch above the soil. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in. long; leaflets 17–19, oblong, crowded, complicate, persistently argenteo-canescens, fleshy; stipules small, deltoid, fleshy, spreading. *Peduncles* $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* 2–4 in a close umbellate head; bracts and pedicels minute. *Calyx* $\frac{1}{2}$ in., densely argenteo-canescens; teeth lanceolate-deltoid, rather shorter than the campanulate tube. *Corolla* more than twice the calyx, rose-red with the tip deeper; petals subequal; limb of standard round, reflexed, deeply emarginate. *Pod* $\frac{1}{2}$ in. long, oblong, membranous, much inflated, short-stalked, glabrous, 1-celled, many-seeded.

SUBGEN. 2. **Pogonophace**, *Bunge*. A group of various habit, with basifixed hairs, differing from all the rest by its penicillate stigma.

* *Annuals with slender trailing stems and sessile pods* (habit of Subgen. *Trimeniæus*).

2. **A. amherstianus**, *Benth. in Royle Ill.* 199; corolla scarcely exceeding the calyx, pod 10-12-seeded with the valves but little inflexed. *Bunge Mon.* i. 5, ii. 3.

West Himalayas, temperate region, alt. 6-10,000 ft.; KISTWAR, KUNAWAR, CHAMBA, SIMLA.—DISTRIB. Afghanistan.

Stems densely caespitose, diffuse, $\frac{1}{2}$ -1 ft., clothed with dense adpressed whitish hairs. *Leaves* short-petioled, 1-1½ in.; leaflets 13-17, narrow, oblong, obtuse, $\frac{1}{8}$ - $\frac{3}{8}$ in. long, densely clothed with thick adpressed white hairs; stipules minute, lanceolate. *Flowers* 4-10, in close distinctly-peduncled racemes; pedicels very short; bracts minute, setaceous. *Calyx* $\frac{1}{8}$ - $\frac{1}{2}$ in., shaggy with hairs like those of the leaves; teeth setaceous, as long as the tube. *Corolla* primrose-yellow. *Pod* linear, turgid, $\frac{3}{4}$ -1 in. long, much recurved, rostrate, thinly pubescent.

3. **A. subumbellatus**, *Klotzsch in Reise Pr. Wald. Bot.* 159, t. 3; corolla more than twice as long as the calyx, pod 20-24-seeded with the sutures much inflexed. *A. hippocrepidis*, *Benth. MSS.*; *Bunge Mon.* i. 5, ii. 3; *Boiss. Fl. Orient.* ii. 231. *A. Scorpiurus*, *Bunge Mon. loc. cit.* *A. humifusus*, *Jacquem. MSS.*

PUNJAB, HAZARA, KASHMIR, tropical and temperate regions, ascending to 6-7000 ft.—DISTRIB. Beloochistan, Afghanistan.

Stems $\frac{1}{2}$ -1 ft., diffuse, branched, clothed with short deciduous ascending white hairs. *Leaves* 1-2 in.; leaflets 13-21, distant, oblong, glaucous, $\frac{1}{8}$ - $\frac{3}{8}$ in., thinly or densely pilose or nearly glabrescent; stipules minute, lanceolate, cuspidate. *Racemes* distinctly peduncled, 6-10-flowered, lax or close; pedicels very short; bracts setaceous, very minute. *Calyx* $\frac{1}{2}$ in., thinly pubescent; teeth setaceous, as long as the tube. *Corolla* $\frac{3}{8}$ in., yellow tinged with rose-purple; blade of wings lanceolate, shorter than the standard and keel. *Pod* $\frac{1}{2}$ - $\frac{3}{4}$ in., cylindrical, much recurved, shortly pubescent, almost completely bilocular.

** *Perennials with slender caespitose trailing stems and stalked pods* (habit of Subgen. *Hypoglottis*).

4. **A. pycnorhizus**, *Wall. Cat.* 5927; glabrous, flowers 1-2, calyx-teeth lanceolate nearly as long as the tube, wings shorter than the keel. *Benth. in Royle Ill.* 199; *Bunge Mon.* i. 4, ii. 1. *Sphærophyza pycnorhiza*, *Benth. Gen. Plant.* i. 504.

NIPAL, *Wallich.* SIKKIM, alt. 6-12,000 ft., *Hook. fil.*

Root woody, fusiform. *Stems* wiry, $\frac{1}{4}$ -1 ft. *Leaves* an inch or more long; leaflets close, 11-13, green, obovate-oblong, truncate-emarginate, $\frac{1}{4}$ in. long, clothed with only a few very short obscure hairs; stipules free, minute, membranous, deltoid. *Peduncles* equalling or exceeding the leaves, clothed with short mixed black and white hairs; pedicels very short; bracts membranous, lanceolate. *Calyx* $\frac{3}{4}$ in., gibbous, clothed with minute pubescence like that of the peduncle. *Corolla* $\frac{1}{2}$ - $\frac{3}{4}$ in., purplish; limb of standard round, $\frac{1}{2}$ in. broad; wings half as broad as the depth of the keel. *Pod* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, glabrous, inflated, 12-16-seeded, the suture not inflexed; stalk much shorter than the calyx.

5. **A. Donianus**, *DC. Prodr.* ii. 283; slightly pubescent, flowers few, wings as long as the keel, calyx-teeth half as long as the tube. *Bunge Mon.* i. 4, ii. 1. *A. macrorhizus*, *Don Prod.* 245, *non Cav.*

NIPAL, *Wallich.*

Plant prostrate, beset with a few scattered adpressed hairs. *Leaves* with 8-10 pairs of oval alternate mucronulate leaflets, which are pubescent beneath, but when

young silky; stipules connate. *Peduncles* twice as long as the leaves. *Calyx* $\frac{1}{2}$ in. long. *Corolla* purple; standard $\frac{3}{8}$ in. long, blade broad. *Pod* silky, subulate, 20-seeded. Described from *DC. and Bunge loc. cit.*—No specimen seen.

6. **A. kongrensis**, *Benth. MSS.*; green, finely silky, flowers in a dense head, wings shorter than the keel, calyx clothed with adpressed silky hairs, teeth lanceolate much shorter than the tube.

SIKKIM; Kongra Lama, alt. 15,000 ft., *Hook. fil.*

Subcaulescent, with a slender rhizome, creeping below the surface. *Leaves* distinctly petioled, 2–3 in. long; leaflets 15–17, roundish-oblong, obtuse, not complicate, pale green, thinly coated with short white hairs; stipules $\frac{1}{4}$ – $\frac{1}{2}$ in., ovate, obtuse, persistent, slightly silky. *Flowers* 5–6, ascending or cernuous, in a dense head; peduncles $1\frac{1}{2}$ –2 in., erect, clothed with adpressed black hairs; pedicels very short, densely black-silky; bracts linear, not very small. *Calyx* $\frac{1}{2}$ in. *Corolla* twice the calyx, deep purple; keel as long as the standard. *Ovary* densely silky, multiovulate, with a stalk nearly as long as the calyx-tube.

7. **A. tribulifolius**, *Benth. MSS.*; glaucous, densely tomentose, leaflets crowded, flowers few in a dense head, calyx-teeth subulate as long as the tube, wings much shorter than the keel. *Bunge Mon.* i. 4, ii. 2.

WESTERN TIBET, alpine region; valley below Hanle Rupchu, alt. 14,500 ft.; *Thomson, Heyde.*

Rootstock long, woody, fusiform. *Stems* and thick glaucous leaves densely clothed with short spreading white hairs. *Leaves* 1–2 in. long; leaflets crowded, 17–21, oblong, $\frac{1}{4}$ – $\frac{3}{8}$ in. long; stipules minute, deltoid, leaf-like, free. *Peduncles* 1–2 in., the short pubescence growing black upwards; pedicels very short; bracts subulate, conspicuous, persistent. *Calyx* $\frac{1}{4}$ in., densely clothed with short black pubescence. *Corolla* purplish, half as long again as the calyx; standard $\frac{1}{2}$ in. broad. *Ovary* silky, distinctly stalked; ovules about 20. *Pod* not seen.

8. **A. Hendersoni**, *Baker*; glaucous, densely tomentose, leaflets crowded, flowers 1–2 together, calyx-teeth lanceolate shorter than the tube.

TIBET; upper part of the Karakash valley, *Dr. Henderson.*

Closely allied to the last, the thick glaucous crowded leaflets clothed with dense white hairs, the whole plant in the single specimen gathered not more than a couple of inches high. *Leaves* $\frac{1}{2}$ – $\frac{1}{2}$ in. long; leaflets 13–17, obovate-oblong, obtuse, folded together. *Peduncles* short, clothed with short white pubescence. *Calyx* $\frac{1}{6}$ in., matted with mixed black and white hairs. *Corolla* seen in bud only. *Pod* oblong, the same size and shape, and as much inflated as in *A. pycnorhizus*, membranous, with a few short adpressed hairs and a short stalk; sutures scarcely at all intruded; seeds about 20.

*** *Tall perennials with almost woody stems, lax flowers, and long-stalked few-seeded pods* (habit of Subgen. *Phaca*).

9. **A. Falconeri**, *Bunge Mon.* i. 4; ii. 2; densely pubescent, stipules broad foliaceous, leaflets 13–17, pod turgid glabrescent. *A. acutiflorus*, *Benth. MSS.*

WEST TIBET, *Falconer*; HAZARA, *Winterbottom.*

Stems flexuous, old glabrescent, young clothed with short spreading white pubescence. *Leaves* 1– $1\frac{1}{2}$ in. long; leaflets close, glaucous, obtuse, oblanceolate-oblong, $\frac{1}{2}$ – $\frac{1}{2}$ in. long. *Racemes* few-flowered, long-peduncled; pedicels shorter than the calyx, lowny. *Calyx* $\frac{1}{6}$ in., gibbous, nearly glabrous; teeth very short. *Corolla* lilac, $\frac{1}{2}$ in.; wings lanceolate, acute, as long as the keel. *Pod* $\frac{1}{2}$ – $\frac{2}{3}$ in. long, narrowed to both ends, 4–6-seeded; stalk twice the calyx; inflexed suture reaching all through in the lower part, not in the upper.

10. **A. adesmiæfolius**, Benth. MSS.; glabrous, stipules large foliaceous, leaflets very numerous, pod flat glabrous. *Bunge Mon.* i. 4; ii. 2. Phaca Hoffmeisteri, Klotzsch Reise Pr. Wald. Bot. 159, t. 2.

West Tibetan Himalayas, alt. 8-12,000 ft.; DRAS, ZANSKAR, PITI, LADAK, NUBRA.

Branches zigzag, glabrous, terete, woody, reaching several feet in height. Leaves 2-6 in. long; leaflets 25-41, green, obovate, emarginate, rather fleshy, lower $\frac{1}{2}$ - $\frac{1}{4}$ in. long, upper growing gradually smaller; stipules persistent, obliquely cordate-ovate. Racemes very lax, $\frac{1}{2}$ -1 ft.; pedicels very short; bracts minute, linear. Calyx $\frac{1}{2}$ in., oblique, tubuloso-campanulate, glabrous; teeth minute, deltoid. Corolla lilac, $\frac{3}{8}$ in., the petals subequal in length; limb of wing lanceolate, acute. Pod oblong, $\frac{3}{8}$ - $\frac{1}{2}$ in., narrowed to both ends, 4-8-seeded; lower suture hardly at all inflexed; stalk more than twice the calyx.

11. **A. trichocarpus**, Grah. in Wall. Cat. 5926; obscurely silky, stipules minute, leaflets very numerous, pod turgid finely downy. *Bunge Mon.* i. 4; ii. 2. A. sesbanioides, Benth. in Royle Ill. 199; *Bunge loc. cit.*

Central Himalayas, temperate region, alt. 5-8000 ft.; SIMLA, GURWHAL, KUMAON

Erect, suffruticose, reaching several feet high, the branches straight, virgate, much furrowed. Leaves subsessile, 2-4 in.; leaflets 31-41, oblong, $\frac{1}{2}$ - $\frac{3}{8}$ in. long, subobtusely, pale green, clothed with minute silvery hairs. Racemes very copious, distinctly peduncled, erecto-patent, 2-4 in. long, with very numerous flowers; pedicels short, cernuous, clothed with dense short mixed black and white hairs; bracts linear, minute. Calyx glabrous, campanulate, oblique, $\frac{1}{12}$ in.; teeth deltoid. Corolla lilac, 4-5 times the calyx; limb of standard round; wings lanceolate, shorter than the keel. Pod $\frac{3}{4}$ - $\frac{1}{2}$ in. long, oblong, completely 2-celled, 4-6-seeded; stalk much exceeding the calyx.

SUBGEN. 3. **Trimeniæus**, Bunge. Annual weeds with basifixed hairs, small yellow flowers in usually dense heads, and glabrous stigmas.

12. **A. proluxus**, Sieber Pl. Egypt. Exsic.; heads dense peduncled, leaflets 11-17 oblong obtuse, pod short straight linear-oblong 6-8-seeded nearly bilocular. *Bunge Mon.* i. 9; ii. 6; Boiss. Fl. Orient. ii. 223. A. arabicus, Ehrh. in B.; *Bunge Mon. loc. cit.*; Boiss. loc. cit. Phaca Vogelii, Webb in Hook. Nigr. Fl. 123, t. 8.

Plains of SCINDE and PUNJAB.—DISTRIB. Cape Verde islands; through Egypt to Arabia.

Stems very slender, $\frac{1}{4}$ -1 ft., densely clothed upwards with adpressed white hairs. Leaves distinctly petioled, $\frac{1}{2}$ -1 $\frac{1}{2}$ in. long; leaflets distant, glaucous, $\frac{1}{4}$ - $\frac{1}{2}$ in., clothed with fine adpressed white hairs; stipules minute, lanceolate, free. Heads 6-12-flowered; peduncles rarely as long as the leaves. Calyx under $\frac{1}{12}$ in., densely matted; teeth linear-setaceous, nearly as long as the tube. Corolla little exerted. Pod sessile, turgid, $\frac{1}{4}$ - $\frac{3}{8}$ in. long, densely pubescent.

13. **A. Aitchisoni**, Baker; heads very lax short-peduncled, leaflets oblong emarginate, pod very long and slender straight or slightly recurved slightly torulose unilocular 15-20-seeded.

PUNJAB, Salt range, Aitchison.

Stem suberect, $\frac{1}{2}$ ft., slender, thinly white-canescens. Leaves distinctly petioled, 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in. long; leaflets distant, 17-25, alternate, $\frac{1}{4}$ in. long, grey-green, thinly coated with adpressed short white hairs; stipules minute, deltoid. Racemes 4-6-flowered; pedicels very short; bracts minute. Calyx $\frac{1}{2}$ in. campanulate, thinly white-silky; teeth linear or lanceolate, nearly as long as the tube. Corolla twice the calyx, white with a purple tip; standard longer than the wings and keel. Pod $\frac{1}{2}$ in. long, under $\frac{1}{24}$ in. thick, thinly white-canescens at first; dissepiment not at all incurved; seeds distant, very small.

14. **A. ophiocarpus**, *Benth. MSS.*; heads lax nearly sessile, leaflets oblong emarginate, pod very long and slender sickle-shaped slightly torulose unilocular 10-12-seeded. *Bunge Mon.* i. 10; ii. 6; *Boiss. Fl. Orient.* ii. 224.

LADAK, alt. 11,000 ft., *Thomson*.—DISTRIB. Persia.

Stems slender, diffuse, $\frac{1}{4}$ – $\frac{1}{2}$ ft., densely finely white-downy. *Leaves* distinctly petioled, $\frac{1}{2}$ –1 in. long; leaflets moderately close and thick, distinctly notched at the apex, matted on both sides with short white hairs; stipules lanceolate, very minute. *Racemes* 3-6-flowered; pedicels and bracts minute. *Calyx* under $\frac{1}{12}$ in., densely matted; teeth lanceolate, shorter than the tube. *Corolla* nearly twice the calyx, its petals subequal in length. *Pod* 1–1 $\frac{1}{2}$ in. long, thick, finely downy, the dissepiment not at all incurved, the oblong seeds with a space corresponding to the slight constrictions of the pod between them.

15. **A. tribuloides**, *Delile*; *DC. Prodr.* ii. 288; heads dense sessile, leaflets 13-15 oblong-lanceolate acute, pod short linear-oblong densely pubescent little recurved 10-12-seeded subbilocular. *Bunge Mon.* i. 10; ii. 7; *Boiss. Fl. Orient.* ii. 224. *A. minutus*, *erpocaulis* and *ammocryptos*, *Boiss. Diagn.* ix. 58-9.

Plains of PUNJAB.—DISTRIB. Canaries, through Egypt to Afghanistan.

Stems slender, densely caespitose, trailing, $\frac{1}{4}$ –1 ft., densely clothed upwards with ascending white hairs. *Leaves* distinctly petioled, 1–2 $\frac{1}{2}$ in. long; leaflets mostly close, densely clothed with long white hairs on both sides; stipules minute. *Heads* 6-10-flowered. *Calyx* tubular, $\frac{1}{8}$ – $\frac{1}{6}$ in., densely matted; teeth setaceous, shorter than the tube. *Corolla* pale yellow, little exerted. *Pods* $\frac{3}{8}$ in. long, turgid, densely pubescent, the cluster often spreading from the stem like the spokes of a wheel from the axis.

16. **A. hamosus**, *Linn.*; *DC. Prodr.* ii. 290; heads peduncled dense, leaflets 13-25 oblong emarginate, pod long cylindrical glabrous much recurved nearly bilocular 16-18-seeded. *Sibth. & Sm. Fl. Græc.* t. 728; *Bunge Mon.* i. 13; ii. 13; *Boiss. Fl. Orient.* ii. 238.

Plains of PUNJAB at Lahore, Peshawur, &c.—DISTRIB. Canaries, Mediterranean region, Orient.

More robust and less hairy than the other species, the *stems* 1-2 ft. long. *Leaves* distinctly petioled, $\frac{1}{4}$ – $\frac{1}{2}$ ft. long; leaflets distinctly stalked, pale green, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, glabrescent above, or thinly matted with silvery hairs on both sides. *Heads* 6-20-flowered; peduncles much shorter than the leaves. *Calyx* $\frac{1}{6}$ in., matted with mixed black and white hairs; teeth subulate, as long as the tube. *Corolla* pale yellow, half as long again as the calyx. *Pod* $\frac{1}{2}$ –1 in. long, cylindrical, firmer than in its neighbours, quite glabrous.

17. **A. gracilipes**, *Benth. MSS.*; heads dense peduncled few-flowered, leaflets 9-13 oblong obtuse, pod cylindrical pubescent little recurved 10-12-seeded half-bilocular. *Bunge Mon.* i. 15; ii. 17.

WEST TIBET; Zaskar and Indus valley, alt. 11-14,000 feet, *Thomson*.

Acaulescent, or stems short, suberect, densely clothed with ascending strong white hairs. *Leaves* long-petioled, 1-3 inches long; leaflets distant, greenish, $\frac{1}{4}$ – $\frac{3}{8}$ in. long, densely clothed with hairs like those of the stem; stipules minute. *Heads* 3-6-flowered; peduncles pilose, 2-4 in. *Calyx* $\frac{1}{6}$ in., tubular; teeth short, setaceous. *Corolla* pale yellow, twice the calyx; standard narrowed suddenly into a deltoid tip, the wings shorter and keel shorter still. *Pod* $\frac{1}{2}$ – $\frac{3}{8}$ in. long by $\frac{1}{6}$ in., sessile, clothed with short dense white bristly hairs.

18. **A. contortuplicatus**, *Linn.*; *DC. Prodr.* ii. 290; heads dense short-peduncled, leaflets 13-17 oblanceolate-oblong emarginate, pod cylindrical downy very much recurved nearly bilocular 20-30-seeded. *Bunge Mon.* i. 18; ii. 20; *Boiss. Fl. Orient.* ii. 230.

Plains of PUNJAB and SCINDE.—DISTRIB. East Europe, Orient, West Siberia.

Stems suberect, $\frac{1}{2}$ – $1\frac{1}{2}$ ft., densely clothed with short soft spreading white hairs. *Leaves* distinctly petioled, 3–4 inches long; leaflets $\frac{1}{4}$ – $\frac{1}{2}$ in., distant, greenish, thin at first, densely pilose on both sides; stipules lanceolate, free, larger than in all the preceding. *Heads* very dense, many-flowered, on pilose peduncles much shorter than the leaves. *Calyx* $\frac{1}{8}$ in., densely pilose; teeth setaceous, plumose, exceeding the tube. *Corolla* little exserted, the lanceolate acute wings shorter than the standard and keel. *Pod* $\frac{1}{2}$ in. long, sausage-shaped, membranous, rugose, completely conduplicate.

SUBGEN. 4. **Podolotus**, Royle. A caulescent perennial, with a few obscure basifixed hairs and naked stigma, differing from all the other groups by the endocarp of the unilocular pod separating as a thin membrane and produced into septa between the seeds.

19. **A. hosackioides**, Benth. Gen. i. p. 507. *Podolotus hosackioides* Royle Ill. 198.

KUMAON and GURWHAL, temperate region.

Stems slender, glabrous, zigzag, densely cæspitose, $1\frac{1}{4}$ – $1\frac{1}{2}$ ft. *Leaves* short-petioled, 1 – $1\frac{1}{2}$ in.; leaflets 13–15, green, glabrous, oblong, obtuse, $\frac{1}{8}$ – $\frac{3}{8}$ in.; stipules minute, deltoid. *Peduncles* equalling or exceeding the leaves, 1–2-flowered. *Calyx* $\frac{1}{8}$ in., glabrous; teeth short, deltoid. *Corolla* yellow, twice the calyx; petals equal in length, wings and keel abruptly incurved. *Pod* linear, turgid, straight, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, 5–6-seeded, with a stalk as long as the calyx.

SUBGEN. 5. **Hypoglottis**. Herbaceous perennials, with basifixed hairs, flowers in dense mostly peduncled capitate heads, and naked stigmas.

* *Heads sessile or peduncled. Flowers lilac or purple.*

20. **A. confertus**, Benth. MSS.; stems very dwarf densely cæspitose thinly clothed with adpressed white hairs, leaflets 11–13, calyx clothed with adpressed black hairs, teeth linear shorter than the tube, pod stalked unilocular few-seeded. *Bunge Mon.* i. 23; ii. 27.

WEST TIBET, alpine region; Pangong and Parang valley, alt. 15–17,500 ft., Thomson, Henderson.

Rhizome woody, fusiform, the whole plant not more than 1–3 inches high above the soil. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in. long; leaflets silvery, thick, close, complicate, oblong, densely canescent, $\frac{1}{12}$ in. or less long; stipules small, lanceolate. *Heads* 6–8-flowered; peduncle 1 – $1\frac{1}{2}$ in., mostly subradical, clothed with adpressed black and white silky hairs; pedicels and bracts very small. *Calyx* $\frac{1}{8}$ in., the tube campanulate. *Corolla* twice the calyx; keel and wings subequal, rather shorter than the standard. *Ovary* silky, not seen fully developed.

21. **A. rigidulus**, Benth. MSS.; stems very short glabrous, leaflets 17–21, calyx clothed with adpressed black silky hairs, teeth lanceolate as long as the tube, pod oblong turgid sessile unilocular 6–8-seeded. *Bunge Mon.* i. 23; ii. 25.

SIKKIM, alpine region; Tungu, alt. 13,000 ft., Hook. fil.

Rhizome slender, much branched below the surface, the whole plant closely resembling *A. alpinus* in habit, not more than 3–4 inches high above the soil. *Leaves* distinctly petioled, 1 – $1\frac{1}{2}$ in.; leaflets green, linear-oblong, obtuse, $\frac{1}{6}$ – $\frac{1}{4}$ in. long, thinly coated with adpressed white hairs; stipules $\frac{1}{2}$ in. deltoid, membranous. *Heads* 6–10-flowered; peduncles and pedicels both very short. *Calyx* under $\frac{1}{4}$ in. *Corolla* twice the calyx; limb of standard oblong, exceeding the wings and keel. *Pod* glabrous, oblong, membranous, $\frac{1}{2}$ in. long.

22. **A. alpinus**, Linn. Sp. 1070?; stems short slender clothed with adpressed white silky hairs, leaflets 11–13, calyx clothed with adpressed mixed

black and white silky hairs, teeth setaceous as long as the tube, ovary stalked glabrous few-ovuled. *Phaca astragalina*, DC. *Prodr.* ii. 274?

WEST TIBET; Burgil pass, *Winterbottom*.—DISTRIB. Alpine region through north temperate zone.

Stems 3–4 in. high, simple, ascending. *Leaves* about an inch long; leaflets oblong, acute, pale green, thinly coated with close silvery hairs on both sides; stipules deltoid, foliaceous, rather large. *Peduncles* 1–1½ in., thinly silky. *Heads* 3–6-flowered; bracts linear, exceeding the short pedicels. *Calyx* ¼ in. *Corolla* twice the calyx; wings shorter than the standard and keel. *Pod* not seen.—The Sikkim plant referred here by Bunge is our *A. kongrensis*.

23. ***A. tibetanus***, Benth. MSS.; stems slender short ascending thinly clothed with adpressed mixed black and white hairs, leaflets 21–25, calyx-teeth densely black-silky setaceous a third as long as the tube, pod linear stalked bilocular 6–10-seeded. *Bunge Mon.* i. 52; ii. 85; Boiss. *Fl. Orient.* ii. 250. A. Maxwellii, Royle III. 198?

West Tibet, temperate and alpine region, alt. 9–14,000 ft.; DRAS, ZANSKAR, NUBRA, LADAK, Thomson, Henderson.—DISTRIB. Afghanistan.

General habit of *A. Hypoglottis*, to which it is closely allied. *Stems* zigzag, firm, slender, branched, ¼–½ ft. *Leaves* 2–4 in. long, distinctly petioled; leaflets oblong, obtuse, moderately close, pale green, thinly canescent at first, glabrescent above when mature; stipules small, lanceolate or deltoid, free. *Heads* subglobose, 10–20-flowered; peduncles 1–4 in., the black hairs predominating upwards; bracts lanceolate, much exceeding the short black pedicels. *Calyx* ⅜ in., the teeth densely, the tube thinly black-silky. *Corolla* twice the calyx; wings shorter than the standard; keel still shorter. *Pod* ½–¾ in., rather recurved, finely black-silky; stalk shorter than the calyx-tube.

24. ***A. hypoglottoides***, Baker; stems slender short ascending thinly clothed with adpressed white hairs, leaflets 17–19, calyx densely coated with mixed black and white silky hairs, teeth linear a third as long as the tube, ovary stalked 8–10-ovulate.

TIBETAN HIMALAYAS, the exact station not known, Dr. Henderson.

Closely allied to the last, with which it agrees in general habit. *Leaves* 1–1½ in. long; leaflets oblong, obtuse, pale grey green, persistently coated on both sides with adpressed silvery hairs; stipules foliaceous, connate in lower half. *Flowers* 12–20, in a dense head, not more than half the size of those of *A. Hypoglottis* and *tibetanus*; peduncles 1½–2 in. long, with a few black hairs mixed with the white ones upwards. *Calyx* ⅙–⅕ in. *Corolla* deep purple, ⅜ in., the proportion of the petals as in the last. Developed *pod* unknown.

25. ***A. lessertoides***, Benth. MSS.; stems short firm erect glabrous, leaflets 9–11, calyx-teeth linear densely black-silky half as long as the nearly naked tube, pod stalked silky unilocular 3–4-seeded. *Bunge Mon.* i. 24; ii. 28.

SIKKIM, alpine region; Tungu, alt. 13,000 ft., Hook. fil.

Whole plant under a foot high. *Leaves* 1–2 in. long; leaflets green, oblong, obtuse, ¼–½ in. long, with a few black hairs; stipules foliaceous, lanceolate, ¼–½ in. long, ciliated at first with black hairs; petiole twice as long as the stipules. *Heads* 12–20-flowered. *Pedicels* very short; peduncles erect ¼–½ ft., with a few adpressed black hairs in the upper half; bracts minute, shaggy with black hairs. *Calyx* ⅙–⅕ in., tube campanulate, nearly naked; teeth black-plumose. *Corolla* ½ in., petals subequal. *Pod* ½ in. densely silky, narrowed from the middle to both ends; stalk as long as the calyx-tube.

26. ***A. strictus***, Grah. in Wall. Cat. 5924; stems short slender ascending

clothed with adpressed white silky hairs, leaflets 19-25, calyx clothed with adpressed mixed black and white hairs, teeth linear shorter than the tube, pod stalked linear-oblong unilocular 6-8-seeded. *Benth. in Royle Ill.* 198; *Bunge Mon.* i. 23; ii. 27. *A. mutabilis, Jacquem. MSS.*

Through the Himalayas in the alpine region, alt. 11-16,000 ft., from NUBRA and LADAK to SIKKIM and SILHET.

Stems densely cæspitose, firm but slender, branched, $\frac{1}{4}$ -1 ft. long. *Leaves* short-petioled, 1-1 $\frac{1}{2}$ in. long; leaflets close, oblong, obtuse, $\frac{1}{4}$ - $\frac{3}{8}$ in. long, pale green, persistently coated with adpressed white hairs; stipules small, deltoid, free, foliaceous. *Heads* very dense, 20-40-flowered; peduncles 2-4 in., with a few black hairs mixed with the silvery ones near the top; pedicels black, shorter than the minute bracts. *Calyx* $\frac{1}{8}$ in. *Corolla* twice the calyx; wings and keel shorter than the standard. *Pod* $\frac{1}{4}$ in. long, short-stalked, rather recurved, clothed like the calyx.

27. **A. oxyodon**, Baker; stems short slender ascending clothed with adpressed white silky hairs, leaflets 15-17, calyx clothed with adpressed mixed black and white hairs, teeth setaceous twice as long as the tube, ovary stalked 5-6-ovulate.

WEST TIBET, *Falconer*.

General habit of *A. strictus*. *Stems* densely cæspitose, $\frac{1}{4}$ - $\frac{1}{2}$ foot high. *Leaves* 1-1 $\frac{1}{2}$ in. long; leaflets oblong, obtuse or subacute, densely white-strigillose on the back, thinly on the face, alternate, the lower distant; stipules moderately large, connate, silky on the back. *Peduncles* 2-3 in., very slender, densely clothed with adpressed mixed black and white hairs; pedicels black, very short; bracts $\frac{1}{12}$ - $\frac{1}{8}$ in., lanceolate, membranous. *Calyx* $\frac{1}{2}$ in.; tube campanulate; teeth much longer in proportion than in any of its allies. *Corolla* $\frac{1}{2}$ in.; keel and standard equal; wings much shorter. Mature *pod* not seen; ovary thinly silky.

28. **A. densiflorus**, Kar. & Kir. *Enum. Pl. Song.* No. 245; stems elongated firm glabrous, leaflets 11-13, calyx minute clothed with mixed black and white hairs, teeth lanceolate short, pod globose sessile minute unilocular 1-2-seeded. *Bunge Mon.* i. 21; ii. 22.

West Himalayas, alpine region, alt. 12-17,000 ft.; LAHUL, SASSAR, ZANSKAR, LADAK, KUNAWAR.—DISTRIB. Afghanistan, Central Siberia.

Stems densely cæspitose, rigid, erect, $\frac{1}{4}$ -1 ft. long. *Leaves* 1-2 in. long; leaflets thick, oblong, glaucous, obtuse, $\frac{1}{2}$ - $\frac{1}{2}$ in. long, obscurely white-strigillose on both sides; stipules small, deltoid, foliaceous, free. *Peduncles* 1-4 in., with a few black and white hairs in the upper half; bracts minute, linear, black, ciliated, exceeding the very short black pedicels. *Calyx* $\frac{1}{12}$ - $\frac{1}{8}$ in., campanulate; teeth shorter than the tube. *Corolla* lilac, three times as long as the calyx; keel and wings much shorter than the standard. *Pod* rugose, silky, $\frac{1}{8}$ in. long, turgid, membranous.

29. **A. melanostachys**, Benth. MSS.; stems elongated firm glabrous, leaflets 13-15, calyx clothed with black silky hairs, teeth as long as the tube, pod oblong sessile half-bilocular 2-seeded. *Bunge Mon.* i. 21; ii. 22. *A. bracteosus, Klotzsch Reise Pr. Wald. Bot.* 160, t. 5, non Boiss.

West Himalayas, alpine region, alt. 10-15,000 ft.; KASHMIR, LAHUL, TIBET.

Stems 1 $\frac{1}{2}$ -2 ft. high, moderately stout. *Leaves* distinctly petioled, 1-3 in. long; leaflets oblong, glaucous-green, obtuse or emarginate, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, nearly naked; stipules $\frac{1}{4}$ - $\frac{3}{8}$ in., free, foliaceous, deltoid-cuspidate. *Heads* dense, 1-3 in. long; peduncles 2-6 in. long, clothed with short spreading mixed black and white hairs, dense at the base of the head; bracts $\frac{1}{8}$ - $\frac{3}{8}$ in., lanceolate, foliaceous, persistent. *Calyx* $\frac{1}{8}$ - $\frac{1}{2}$ in. nearly sessile. *Corolla* narrow, half as long again as the calyx; keel and wings shorter than the standard. *Pod* included in the calyx, $\frac{1}{2}$ in. long, clothed with fine black silky hairs.

30. **A. bhotanensis**, *Baker*; stems firm elongated glabrous, leaflets 21-25, calyx glabrous, teeth short linear, pod cylindrical sessile many-seeded half-bilocular.

BHUTAN, temperate region; grassy banks at Panga, 7000 ft., *Griffith*.

Stems 1-2 feet high, slender glabrous, terete, with distant nodes and ascending branches. *Leaves* 2-4 in. long; leaflets oblanceolate-oblong, obtuse, $\frac{1}{2}$ - $\frac{3}{8}$ in. long, green and glabrescent above, clothed with a few obscure adpressed hairs below; stipules free, lanceolate, $\frac{3}{8}$ - $\frac{1}{2}$ in. *Flowers* 12-20, in very dense heads; peduncles 2-5 in. long, with only a few obscure adpressed white hairs at the top; bracts lanceolate, glabrous, $\frac{1}{2}$ - $\frac{1}{3}$ in. *Calyx* nearly sessile, $\frac{1}{4}$ in. long, tubular; teeth a third as long as the tube. *Corolla* twice the calyx, colour uncertain; wings rather shorter than the keel and the latter than the standard. *Pod* firm, turgid, straight, $\frac{1}{2}$ - $\frac{3}{4}$ in. long; seeds about 20.

31. **A. inconspicuus**, *Baker*; stems short filiform trailing subglabrous, leaflets 15-17, calyx-tube with a few adpressed black hairs, teeth minute lanceolate or setaceous, pod stalked unilocular 10-12-seeded.

KUMAON; banks of the Ralam river, alt. 9000 ft., *Strachey and Winterbottom*.

Habit of a small *Vicia*. *Leaves* 1-1½ in. long; leaflets opposite, oblong, obtuse, $\frac{1}{2}$ in. long, green, glabrescent when mature, thinly silky at first; stipules minute, lanceolate. *Flowers* 3-4 together, on a short peduncle clothed with ascending grey silky hairs; pedicels distinct, but shorter than the minute deltoid bracts. *Calyx* $\frac{1}{8}$ in., tubuloso-campanulate, nearly naked. *Corolla* scarcely twice the calyx, the petals equal in length. *Pod* not seen mature.

32. **A. tenuicaulis**, *Benth. MSS.*; stems elongated subglabrous very weak and slender, leaflets 13-15, calyx thinly clothed with short black hairs, teeth not more than $\frac{1}{4}$ - $\frac{1}{5}$ as long as the tube, pod oblong sessile unilocular 4-6-seeded. *Bunge Mon.* i. 23; ii. 28.

SIKKIM and EAST NIPAL, temperate region, alt. 7-9000 ft., *Hook. fil.*

Stems straggling, branched, a foot or more long. *Leaves* 1-1½ in.; leaflets oblong, obtuse, opposite, thin, glaucous green, finely downy; stipules free, minute. *Heads* 4-8-flowered, not very dense; peduncles an inch or less long, finely downy; bracts lanceolate or deltoid, minute. *Calyx* $\frac{1}{8}$ in., tubuloso-campanulate. *Corolla* $\frac{1}{8}$ in.; standard slightly exceeding the keel and wings. *Pod* $\frac{1}{4}$ in. turgid, membranous, obscurely downy.—General habit of an *Ervum*.

33. **A. sikkimensis**, *Benth. MSS.*; stems elongated slender weak nearly glabrous, leaflets 19-21, calyx clothed with adpressed black hairs, teeth half as long as the tube, pod small oblong stalked unilocular 2-3-seeded. *Bunge Mon.* i. 23; ii. 28.

SIKKIM and EAST NIPAL, alt. 8-12,000 ft., *Hook. fil.*

Stems 1-2 feet, erect, very slender, with distant nodes clothed only with a little minute adpressed white pubescence. *Leaves* 1½-2 in. long; leaflets oblong, obtuse or emarginate, clothed when young with adpressed white silky hairs, green and glabrescent above when mature; stipules minute, lanceolate, falcate. *Peduncles* short, clothed with copious adpressed black hairs; flowers 20-30 in an oblong head; pedicels black, very short; bracts deltoid, minute. *Calyx* $\frac{1}{8}$ in. tubuloso-campanulate. *Corolla* twice the calyx; standard slightly exceeding the keel and wings. *Pod* $\frac{1}{4}$ - $\frac{1}{3}$ in. long, membranous, turgid, densely black-silky; stalk as long as the calyx-tube.

34. **A. himalayanus**, *Klotzsch Reise Pr. Wald. Bot.* 160, t. 4; stems elongated slender weak nearly glabrous, leaflets 21-25, calyx clothed with minute adpressed black and white hairs, teeth half as long as the tube, pod linear-oblong stalked subunilocular 5-6-seeded. *A. carinalis*, *Benth. MSS.*; *Bunge Mon.* i. 23; ii. 28. *Phaca longicaulis* and *cachemirica*, *Benth. MSS.*

WEST HIMALAYAS, temperate and alpine region, alt. 5-13,000 ft.; LAHUL, KULU, KUNAWAR, KASHMIR, GARHWAL.

Stems very slender, 1-2 feet long, with distant internodes, clothed when young with a few minute adpressed white hairs. *Leaves* $1\frac{1}{2}$ -2 in. long; leaflets thin, oblong, obtuse or emarginate, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, pale green, with a few short adpressed white hairs; stipules minute, lanceolate, spreading. *Peduncles* shorter than the leaves, clothed with mixed black and white hairs; pedicels $\frac{1}{4}$ in.; bracts very minute. *Calyx* $\frac{1}{8}$ - $\frac{1}{6}$ in., campanulate. *Corolla* $\frac{1}{2}$ - $\frac{5}{8}$ in., keel slightly exceeding the wings, falling short of the standard. *Pod* $\frac{3}{8}$ - $\frac{1}{2}$ in. long, membranous, finely black-silky; stalk exceeding the calyx.—A specimen gathered by Strachey and Winterbottom at the Melam glacier in Kumaon has setaceous calyx-teeth, twice as long as the campanulate tube, and will probably prove a new species between *A. himalayanus* and *Maddenianus*.

35. **A. Maddenianus**, Benth. MSS.; stems elongated slender weak clothed at first with short spreading black and white hairs, leaflets 19-21, calyx clothed with minute adpressed black and white hairs, teeth setaceous as long as the tube, pod stalked unilocular 3-4-seeded.

KUMAON; temperate region, alt. 10-11,000 ft., *Madden, Edgeworth*.

General habit exactly as in *A. himalayanus*, but the young branches densely beset with short spreading black and white bristly hairs. *Leaves* $1\frac{1}{2}$ -2 in. long; leaflets oblanceolate-oblong, obtuse, densely clothed at first on both sides with adpressed silvery hairs; stipules minute, spreading. *Heads* few-flowered; peduncle $\frac{1}{2}$ -1 in., clothed like the branches; bracts linear, exceeding the short black pedicels. *Calyx* $\frac{1}{6}$ - $\frac{1}{5}$ in. *Corolla* $\frac{1}{2}$ in.; wings much shorter than standard and keel. *Pod* $\frac{3}{8}$ in. long, membranous, densely white-silky, narrowed to both ends; stalk exceeding the calyx.

** *Heads peduncled. Flowers yellow.*

36. **A. cashmirensis**, Bunge Mon. i. 30; ii. 34; stems elongated shaggy with long hairs, leaflets 29-33, calyx thinly clothed with long hairs, corolla much exserted, pod sessile finely pubescent bilocular 6-8-seeded.

KASHMIR, temperate region, alt. 9-10,000 ft., *Jacquemont, Falconer*.

Stems stout, erect or ascending, under a foot high. *Leaves* distinctly petioled, 3-4 inches long; leaflets close, oblong, obtuse or acute, $\frac{3}{8}$ - $\frac{1}{2}$ in. long, dull green, clothed densely at first with long fine hairs; stipules $\frac{1}{2}$ in. long, free, lanceolate, membranous, striated. *Heads* dense, round; peduncle 1-3 in.; pedicel $\frac{1}{12}$ - $\frac{1}{8}$ in., shaggy; bracts linear, plumose, persistent, $\frac{1}{4}$ - $\frac{3}{8}$ in. long. *Calyx* $\frac{3}{8}$ - $\frac{1}{2}$ in.; teeth linear, shorter than the tube. *Corolla* $\frac{3}{4}$ in.; standard exceeding the wings and keel. *Pod* $\frac{1}{2}$ in. long, firm in texture, linear-oblong, straight, hollowed down the keel, narrowed into a long beak.

VAR. 1. *Falconeri*, Baker; taller, much less shaggy, stipules narrower an inch long, leaflets 31-34 broad-oblong obtuse.—Kashmir, *Falconer*.

37. **A. floridus**, Benth. MSS.; stems elongated clothed with minute rather spreading black hairs, leaflets 25-31, calyx densely clothed with adpressed black hairs, pod long-stalked unilocular 4-5-seeded. Bunge Mon. i. 24: ii. 28.

SIKKIM, alpine region; Tangu, alt. 13,000 ft., *Hook. fil.*

Stems moderately stout, erect, $\frac{1}{2}$ -1 ft. *Leaves* $1\frac{1}{2}$ -3 in.; leaflets linear-oblong, glaucous, subacute, $\frac{3}{8}$ - $\frac{1}{2}$ in., thinly clothed with adpressed silvery bristles; stipules lanceolate or deltoid, free, $\frac{3}{8}$ - $\frac{1}{2}$ in. *Heads* round or oblong, 12-30-flowered, the lower flowers cernuous; peduncle 1-2 in., densely black-silky; pedicels black, $\frac{1}{12}$ in.; bracts linear, minute. *Calyx* under $\frac{1}{2}$ in.; teeth short, linear. *Corolla* bright yellow, twice the calyx; petals nearly equal. *Pod* linear-oblong, $\frac{1}{2}$ in. long, narrowed to both ends, densely black-silky; stalk as long as the calyx-tube.

38. **A. leucocephalus**, *Grah. in Wall. Cat.* 5923; stems short slender densely clothed with loose white hairs, leaflets 21-31, calyx shaggy with white hairs, corolla little exserted, pod minute oblong sessile unilocular 3-4-seeded. *Benth. in Royle Ill.* 198, t. 32, fig. 2; *Bunge Mon.* i. 48; ii. 76; *Boiss. Fl. Orient.* ii. 241.

West Himalayas, temperate and tropical zone, alt. 1-7,000 ft.; PUNJAB, KASHMIR, SIMLA, GURWHAL, KUMAON.—DISTRIB. Afghanistan.

Stems densely caespitose, ascending, $\frac{1}{4}$ - $\frac{1}{2}$ ft., densely persistently tomentose. *Leaves* 1-3 in. long; leaflets close, oblong, glaucous, densely argenteo-canescens, thick, obtuse or subacute, $\frac{1}{8}$ - $\frac{1}{4}$ in. long; stipules small, foliaceous, connate below the middle. *Heads* small, very dense, oblong; peduncles 2-6 in., densely white-tomentose; bracts lanceolate, exceeding the buds. *Calyx* $\frac{1}{8}$ in. long, subsessile, very shaggy; teeth setaceous, as long as the tube. *Corolla* pale yellow, $\frac{1}{4}$ in.; keel rather shorter than the standard and wings. *Pod* $\frac{1}{8}$ in. long, included in the calyx, finely downy.

*** *Heads few-flowered, sessile or nearly so, in the axils of the leaves of an elongated stem; flowers yellow.*

39. **A. Munroi**, *Benth. MSS.*; *Bunge Mon.* i. 30; ii. 35.

Tibet Himalayas, alpine region; PITI, LAHUL, LADAK.—DISTRIB. Kashgar, Bellew.

Rhizome stout, long, woody, fusiform. *Stems* caespitose, stout, erect, $\frac{1}{2}$ -1 ft., shaggy throughout with dense spreading white hairs. *Leaves* $1\frac{1}{2}$ -2 in. long; leaflets 19-21-oblancoate, obtuse, $\frac{3}{4}$ -1 in. long, thinly clothed with loose white hairs; stipules $\frac{1}{2}$ in., free, linear, or lanceolate. *Calyx* short-pedicelled, $\frac{1}{2}$ - $\frac{5}{8}$ in., thinly pubescent; teeth linear-setaceous, nearly as long as the tube. *Corolla* $\frac{3}{4}$ - $\frac{7}{8}$ in., pale yellow; petals subequal. *Pod* oblong, sessile, membranous, much inflated, an inch long, nearly bilocular, 10-12-seeded.

SUBGEN. 6. **Phaca**.* Herbaceous perennials or undershrubs with flowers in elongated racemes, basi-fixed hairs and naked stigmas.

* *Stipules small.*

40. **A. macropterus**, *DC. Prodr.* ii. 283; shrubby, leaflets 13-17 oblancoate, calyx-teeth minute, corolla lilac, pod oblong sessile turgid bilocular 5-6-seeded. *Bunge Mon.* i. 21; ii. 22. *A. vicioides*, *Led. Fl. Alt.* 3, 301, t. 286. *A. distans*, *Benth. MSS.* *A. longipes*, *Kar. and Kir.*; *Led. Fl. Ross.* i. 618. *A. puberulus*, *K. and K. Enum. Pl. Alt.* No. 240.

Tibetan Himalayas, alpine region, alt. 9-12,000 ft.; LADAK, ZANSKAR, &c., Thomson.—DISTRIB. Western and Central Siberia.

An erect undershrub, 2-3 ft. high, with numerous erecto-patent stiff virgate glabrous branches. *Leaves* 2-3 in. long; leaflets distant, thick, pale green, glabrescent, $\frac{1}{2}$ - $\frac{3}{4}$ in. long; stipules minute, lanceolate, free, spreading, caducous. *Racemes* very lax, $\frac{1}{2}$ -1 ft. long; peduncles stiff, ascending, $\frac{1}{2}$ -1 ft.; pedicels $\frac{1}{2}$ in.; bracts very minute. *Calyx* campanulate, $\frac{1}{12}$ in. long, with a few minute adpressed black hairs; teeth deltoid-cuspidate. *Corolla* $\frac{3}{8}$ in.; keel much shorter than the wings and standard. *Pod* $\frac{1}{4}$ - $\frac{1}{2}$ in. long, glabrous, turgid, narrowed to a beak, nearly straight.

41. **A. chlorostachys**, *Lindl. in Trans. Hort. Soc.* vii. 249; shrubby, leaflets 13-17 oblong, calyx-teeth very short, bracts lanceolate, corolla pale green tinged with lilac, pod oblong turgid stalked bilocular 6-10-seeded. *Bunge Mon.* i. 27; ii. 32. *A. Govanianus*, *Grah. in Wall. Cat.* 5925. *A. himalensis*, *Jacquem. MSS.*

West Himalayas, alpine and temperate region, alt. 5-14,000 ft.; PANGI, LAHUL, KASHMIR, SIMLA, KUMAON, GURWHAL.

* Name used here in a much more restricted sense than in Bunge's Monograph.

An undershrub, several feet high, with abundant slender branches, pubescent when mature, clothed with short spreading hairs above. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ ft. long; leaflets thin, oblong, obtuse, $\frac{1}{4}$ – $\frac{3}{4}$ in. long, green, glabrescent above, glaucous, finely white-silky beneath; stipules lanceolate, free, small, spreading. *Racemes* close, copious, long-peduncled, 2–4 in. long; pedicels $\frac{1}{12}$ in. long; bracts lanceolate, scarcely exceeding the buds. *Calyx* tubular, under $\frac{1}{4}$ in. long, finely downy, oblique at the mouth, the teeth deltoid. *Corolla* twice the calyx; petals subequal. *Pod* turgid, membranous, glabrous, $\frac{1}{2}$ in. long, narrowed to both ends; its stalk twice the calyx.

42. **A. Stewartii**, Baker; shrubby, leaflets 13–15 oblong, calyx-teeth half as long as the tube, bracts long setaceous plumose, corolla pale yellow tinged with lilac, pod oblong turgid stalked bilocular 6–8-seeded.

HAZARA, temperate region, alt. 5–9000 ft., Dr. J. L. Stewart.

Habit of the last, from which it differs by its leaves persistently and densely white-silky, and long setaceous plumose calyx-teeth and bracts, the latter conspicuously protruded beyond the buds. *Stipules* $\frac{1}{4}$ in., linear-setaceous, spreading, caducous. *Branches* firm, many-ribbed, clothed with copious adpressed short white hairs. *Racemes* $\frac{1}{4}$ – $\frac{1}{2}$ ft., in the single specimen panicle near the base. *Calyx* $\frac{1}{4}$ in. long, including the teeth, densely silky. *Pod* $\frac{1}{4}$ – $\frac{1}{3}$ in. long, oblong, glabrous, very turgid, fully bilocular.

43. **A. longicaulis**, Baker; shrubby, leaflets 21–25, narrow-oblong, calyx-teeth half as long as the tube, bracts long setaceous plumose, corolla pale yellow-lilac, pod oblong turgid stalked bilocular 10–12-seeded.

KASHMIR, temperate region, Falconer.

General habit of the two preceding, to which it is closely allied. *Branches* with only a few adpressed short silky hairs. *Leaves* 4–6 in. long; leaflets $\frac{1}{2}$ – $\frac{3}{4}$ in. long, finely white-silky, greenish above, glaucous beneath; stipules minute, free, lanceolate. *Bracts* as in the last. *Calyx* $\frac{1}{4}$ in., with copious minute adpressed black hairs and deciduous longer white ones. *Pod* $\frac{1}{2}$ – $\frac{5}{8}$ in. long, glabrous, narrowed to both ends; its stalk $\frac{1}{4}$ – $\frac{1}{3}$ in. long.

44. **A. cillolatus**, Benth. MSS.; stems herbaceous, leaflets oblong 17–19, calyx-teeth elongated setaceous, corolla yellow tinged with lilac, pod oblong turgid stalked bilocular 8–10-seeded. *Bunge Mon.* i. 27; ii. 33.

West Himalayas, temperate region; LADAK, KASHMIR, KISTWAR, alt. 6–9000 ft.; Thomson, Falconer.

Stems 1–2 ft. or more high, firm, hollow, erect, glabrous. *Leaves* reaching $\frac{1}{2}$ – $\frac{3}{4}$ ft. long; leaflets thin, obtuse, green and glabrescent, $\frac{1}{2}$ – $1\frac{1}{2}$ in. long, glaucous, thinly white-silky at first below; stipules $\frac{1}{4}$ – $\frac{1}{2}$ in., free, persistent, lanceolate or deltoid. *Racemes* long-peduncled close, subsecund; bracts linear, not exceeding the buds. *Calyx* $\frac{3}{8}$ in., oblique, tubular; teeth setaceous, plumose, half as long as the tube. *Corolla* nearly twice the calyx; keel shorter than the other petals, broad, abruptly upcurved. *Pod* 1 in. long, oblong, turgid, membranous narrowed into a beak, clothed with fine short spreading black hairs; stalk as long as the calyx.

45. **A. xiphocarpus**, Benth. MSS.; herbaceous, leaflets 21–25 oblong, corolla yellow, calyx-teeth short linear, pod ensiform subcompressed stalked bilocular 8–12-seeded. *Bunge Mon.* i. 27; ii. 32.

East Himalayas, alpine region, alt. 10–11,000 ft.; SIKKIM and East NIPAL, Hook. fil.

Stems 2–3 ft. high, erect, hollow, obscurely pubescent upwards, glabrous below. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ ft. long; leaflets thin, narrow, oblong, obtuse, 1– $1\frac{1}{2}$ in. long, green, glabrescent above, glaucous. thinly silky below; stipules lanceolate, spreading, free, $\frac{1}{4}$ –1 in.

Racemes long-peduncled, at first close, finally 2-3 in. long; pedicels $\frac{1}{12}$ - $\frac{1}{8}$ in., black; bracts lanceolate, not protruded. *Calyx* $\frac{3}{8}$ in., tubular, with a few black hairs; teeth more densely black-silky, less than half as long as the tube. *Corolla* bright yellow, $\frac{1}{2}$ - $\frac{5}{8}$ in.; petals subequal. *Pod* 1-1 $\frac{1}{2}$ in. by $\frac{1}{6}$ - $\frac{1}{5}$ in., glabrous, membranous, narrowed gradually to both ends, rather recurved; stalk as long as the calyx.

46. **A. emodi**, *Steud. Nomen. edit.* 2, p. 161; herbaceous, leaflets oblong 21-25, calyx-teeth half as long as the tube, corolla yellow, pod long-stalked oblong turgid subbilocular 12-16-seeded. *Bunge Mon.* i. 28; ii. 33. *A. podocarpus*, *Grah. in Wall. Cat.* 5930, non *C. A. Meyer*.

KUMAON, alt. 10-11,000 ft., *Blinkworth, Strachey and Winterbottom*.

Stems tall, fistular, stout, erect, glabrous. *Leaves* 6-9 in. long; leaflets thin, obtuse, $\frac{3}{4}$ -1 in. long, glabrescent on both sides, green above, glaucous beneath; stipules lanceolate, acute, free, reflexed. *Racemes* long-peduncled, 2-3 in. long; pedicels ascending, $\frac{1}{6}$ in. long, finely downy; bracts lanceolate, $\frac{1}{4}$ - $\frac{3}{8}$ in. *Calyx* $\frac{1}{4}$ in., long, subglabrous, tubular. *Corolla* twice the calyx; petals equal. *Pod* oblong, turgid, membranous, glabrous, $1\frac{1}{4}$ -1 $\frac{1}{2}$ in. long, narrowed gradually into a beak; stalk $\frac{1}{2}$ - $\frac{3}{4}$ in. long.

47. **A. khasianus**, *Benth. MSS.*; shrubby, leaflets oblong 21-25, calyx-teeth minute, corolla yellow, pod oblong turgid stalked bilocular 12-16-seeded. *Bunge Mon.* i. 27; ii. 32.

KHASIA, temperate region, alt. 6-7000 ft., *Hook. fil. and Thomson, Griffith*.

Stems tall, erect, shrubby, much branched, subglabrous. *Leaves* 4 in. long; leaflets thin, narrow oblong, obtuse, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, green and glabrescent above, glaucous with a few adpressed white hairs below; stipules lanceolate, free, $\frac{1}{2}$ in. long. *Racemes* long-peduncled, moderately close, subsecund, finally 3-4 in. long; pedicels $\frac{1}{8}$ in., finely downy; bracts lanceolate, caducous, $\frac{1}{4}$ in. *Calyx* $\frac{1}{4}$ in., tubular, scarcely at all pilose. *Corolla* twice the calyx; petals subequal. *Pod* oblique oblong, very turgid, membranous, glabrous; stalk exceeding the calyx.

48. **A. coluteocarpus**, *Boiss. Diagn.* ix. 65; shrubby, leaflets round-oblong 11-13, calyx-teeth long, corolla yellow, pod oblong turgid stalked bilocular 10-12-seeded. *Bunge Mon.* i. 26; ii. 32; *Boiss. Fl. Orient.* ii. 271.

WEST TIBETAN HIMALAYAS and KUNAWAR, alt. 6-10,000 ft., *Thomson, Munro*.—DISTRIB. Afghanistan.

A tall undershrub, with copious erecto-patent terete virgate glabrous branches. *Leaves* 4-5 in. long; leaflets opposite, firm, glabrous, obtuse, glaucous, $\frac{1}{4}$ - $\frac{3}{4}$ in. long; stipules free, minute, deltoid. *Racemes* long-peduncled, at first close, finally $\frac{1}{4}$ - $\frac{1}{2}$ ft. long; pedicels short, pilose; bracts linear, not protruded. *Calyx* $\frac{3}{8}$ in., tubular, thinly pilose; teeth setaceous, half as long as the tube. *Corolla* $\frac{5}{8}$ in.; keel abruptly incurved, much shorter than the wings and standard. *Pod* glabrous, very turgid, 1-1 $\frac{1}{4}$ in. long, narrowed to both ends; stalk finally longer than the calyx.

** *Stipules large*.

49. **A. frigidus**, *Bunge Mon.* i. 25; ii. 28; herbaceous, leaflets 9-15 oblong, calyx-teeth minute, pod oblong stalked unilocular 6-8-seeded. *Phaca frigida*, *Linn.*; *DC. Prodr.* ii. 273.

WESTERN HIMALAYAS, temperate region; GURWHAL, KISTWAR, LAHUL.—DISTRIB. Mountains through the north temperate zone.

Stems 1-2 ft. high, erect, stout, glabrous. *Leaves* 4-6 in. long; leaflets opposite, thin, an inch or more long, green, glabrescent above, glaucous with a few obscure hairs below; stipules ovate or lanceolate, acute or obtuse, free, persistent, $\frac{1}{2}$ - $\frac{3}{4}$ in. long. *Racemes* long-peduncled, moderately close, subsecund, finally 2-3 in. long; pedicels black-

silky, $\frac{1}{12}$ – $\frac{1}{6}$ in. Calyx $\frac{3}{8}$ in., tubular, with a few obscure adpressed black hairs. Corolla twice the calyx, bright yellow; standard exceeding the wings and keel. Pod an inch long, glabrous, turgid, membranous, narrowed to both ends.

50. **A. vicioides**, *Grah. in Wall. Cat.* 5931, *non. Ledeb.* Herbaceous, leaflets oblong 17–21, calyx-teeth minute, pod oblong stalked bilocular 8–9-seeded. *A. concretus*, *Benth. in Royle Ill.* 199.

Central Himalayas, temperate region; NIPAL, KISTVAR and KUNAWAR.

Stems 1–2 ft. high, erect, moderately stout, hollow, glabrous. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ ft.; leaflets 1–1½ in. long, thin, oblong, obtuse, green and glabrescent above, glaucous, with a few adpressed hairs below; stipules broad, membranous, connate, $\frac{1}{2}$ – $\frac{3}{4}$ in. long. *Racemes* long-peduncled, close, 2–3 in. long; pedicels $\frac{1}{12}$ – $\frac{1}{8}$ in., subglabrous; bracts lanceolate, $\frac{1}{4}$ in. *Calyx* $\frac{1}{4}$ in., tubular, glabrous except the teeth, the mouth oblique. *Corolla* bright yellow, twice the calyx; petals equal. *Pod* glabrous, oblong, membranous, turgid, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, narrowed to both ends.

51. **A. graveolens**, *Ham. in Wall. Cat.* 5929; shrubby, leaflets 17–19 round-oblong, calyx-teeth half as long as the tube, pod ensiform subcompressed stalked bilocular 12–18-seeded. *Bunge Mon.* i. 26; ii. 31; *Benth. in Royle Ill.* 199. *A. rotundifolius*, *Royle Ill.* 199; *Bunge loc. cit.* *A. medullaris*, *Boiss. Diagn.* ix. 66; *Fl. Orient.* ii. 268; *Bunge loc. cit.* *A. Scottianus*, *Stocks MSS.* *A. stipulatus*, *Jaquem. MSS. non Don.*

West Himalayas, temperate region, alt. 4–12,500 ft.; KASHMIR, KISTVAR, PITI, GURWHAL, KUNAWAR, KUMAON.—DISTRIB. Afghanistan, Beloochistan.

A tall undershrub, with copious virgate terete glaucous branches. *Leaves* 4–6 in. long; leaflets opposite; firm, obtuse, glaucous, glabrous on both sides, subdistant, $\frac{1}{2}$ –1 in. long; stipules free, foliaceous, cordate, ovate or lanceolate, 1–1½ in. long. *Racemes* long-peduncled, $\frac{1}{2}$ –1 ft. long; pedicels, $\frac{1}{12}$ – $\frac{1}{8}$ in.; bracts linear, glabrous. *Calyx* tubular, glabrous, $\frac{3}{8}$ in. long; mouth very oblique. *Corolla* yellow, twice the calyx; standard slightly exceeding the wings and keel. *Pod* 1–1½ in. long, $\frac{1}{4}$ in. broad, glabrous, membranous, nearly straight; stalk as long as the calyx.

52. **A. stipulatus**, *D. Don in Bot. Mag.* t. 2380; *Prod. Nep.* 246; herbaceous, leaflets 31–41 oblong, calyx-teeth as long as the tube, pod oblong subsessile bilocular 15–20-seeded. *Wall. Cat.* 5928; *Benth. in Royle Ill.* 199; *Bunge Mon.* i. 28; ii. 33.

East Himalayas, temperate region, alt. 6–8000 ft.; NIPAL and SIKKIM.

Stems stout, erect, hollow, glabrous, 3–6 ft. high. *Leaves* $\frac{1}{2}$ –1 ft. long; leaflets thin, obtuse, 1–2 in. long, green, glabrescent above, glaucous with a few adpressed hairs below; stipules membranous, concrete, leaf-opposed, amplexicaul, 1–3 in. long. *Racemes* long-peduncled, $\frac{1}{2}$ –1 ft. long, at first dense; pedicels $\frac{1}{8}$ in.; bracts $\frac{1}{2}$ in., lanceolate, membranous. *Calyx* tubular, $\frac{3}{8}$ –1½ in., finely grey-downy. *Corolla* yellow, $\frac{5}{8}$ in.; petals equal. *Pod* glabrous, turgid, rather recurved, narrowed into a long beak.

SUBGEN. 7. **Myobroma**, *Bunge*. Stemless or short-stemmed perennial or low shrubs, with stipules adnate in the lower part to the petiole, leaf-rachis ending in a leaflet, large yellow flowers in close heads, gibbous calyces and naked stigmas.

* *Stemless.*

53. **A. rhizanthus**, *Royle Ill.* 200; heads subsessile, leaflets oblong obtuse densely silky, leaf-rachis not indurated, calyx-teeth linear, pod subsessile. *Bunge Mon.* i. 35; ii. 60.

West Himalayas, temperate and alpine regions, alt. 9–16,000 ft.; ZASKAR, LAHUL, KASHMIR, KUNAWAR.

Tufts one or several together at the crown of a woody rootstock. *Stipules* $\frac{3}{8}$ – $\frac{1}{2}$ in., lanceolate; petiole and leaf-rachis densely silky, the latter 2–4 in. long, not persisting after the leaflets fall; leaflets 31–41, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, glaucous, persistently silky on both sides, the upper close, the lower distant. *Heads* dense, many-flowered, usually quite sessile at the crown of the rootstock; bracts linear, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, densely silky. *Calyx* tubular, silky, $\frac{1}{2}$ – $\frac{5}{8}$ in. long; teeth half as long as the tube. *Corolla* half as long again as the calyx; wings shorter than the standard, and keel than the wings. *Pod* densely silky, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, oblong, turgid, bilocular, splitting open the calyx, 15–20-seeded, narrowed suddenly into the beak.

54. **A. acaulis**, Baker MSS.; heads subsessile, leaflets lanceolate acute glabrous, leaf-rachis not indurated, calyx-teeth lanceolate, ovary stipitate.

SIKKIM, alpine region, alt. 16–17,000 ft., Hook. fil.

Tufts several from the crown of the woody rootstock, the glabrous stems at most an inch long. *Leaves* 2–3 in. long, distinctly petioled; leaflets 25–31, green, narrowed gradually to a point, $\frac{1}{4}$ – $\frac{1}{2}$ in. long; stipules $\frac{1}{4}$ in., membranous, lanceolate. *Heads* 2–3-flowered, sessile. *Calyx* under $\frac{1}{2}$ in. long, clothed with a few adpressed hairs; teeth a third as long as the tube. *Corolla* bright yellow, twice the calyx; petals subequal; standard $\frac{1}{2}$ in. broad, *Ovary* glabrous, distinctly stalked; ovules 12–16. *Pod* not seen.

55. **A. Webbianus**, Grah. in Wall. Cat. 5936; heads subsessile, leaflets oblong obtuse glabrous, leaf-rachis indurated, calyx-teeth linear-setaceous, pod subsessile. *Benth.* in Royle Ill. 199; *Bunge Mon.* i. 39; ii. 51.

KUNAWAR and WEST TIBET, alt. 12–16,000 ft., alpine region.

Tufts densely caespitose at the crown of a thick woody rootstock. *Stipules* linear or lanceolate, $\frac{1}{2}$ – $\frac{3}{4}$ in.; petiole 1–4 in. long, stramineous, glabrous, like the leaf-rachis, which is 3–6 in. long and becomes wiry in texture; leaflets 31–51, scattered, distant, rather caducous, $\frac{3}{8}$ – $\frac{3}{4}$ in. long, glaucous with a few fine spreading hairs in the early stage. *Heads* many-flowered, sessile or short-peduncled; pedicels $\frac{1}{4}$ – $\frac{1}{3}$ in.; bracts linear, exceeding the pedicels. *Calyx* tubular, $\frac{5}{8}$ in. long; teeth a third as long as the tube. *Corolla* under an inch long; wings distinctly shorter than the standard, and keel than the wings. *Pod* oblong, turgid, glabrous, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, bilocular, 15–20-seeded, narrowed suddenly at both ends.

56. **A. bakuensis**, Bunge Mon. i. 37; ii. 45; heads long-peduncled, leaflets linear finely downy, leaf-rachis not at all indurated, calyx-teeth setaceous, pod subsessile. *Boiss. Fl. Orient.* ii. 283.

PUNJAB, subtropical zone; Salt range, Fleming, Stewart.—DISTRIB. Orient.

Leaves $\frac{1}{4}$ – $\frac{1}{2}$ ft. long; petioles 2–6 in. long, densely clothed with short spreading hairs; leaflets 31–41, distant, opposite or alternate, glaucous, distinctly stalked, $\frac{1}{2}$ – $\frac{3}{4}$ in. long; stipules lanceolate, $\frac{1}{2}$ – $\frac{3}{4}$ in. *Racemes* many-flowered, laxer than in the other species; peduncle 2–12 in. long, finely downy; bracts linear-setaceous, $\frac{1}{2}$ in. long. *Calyx* tubular, downy, $\frac{5}{8}$ in. long; teeth a third as long as the tube. *Corolla* half as long again as the calyx, considerably tinged with purple; petals subequal. *Pod* oblong, densely silky, bilocular, 15–20-seeded, not seen mature.—Connects *Myobroma* with *Phaca*.

** *Stems distinct.*

57. **A. Candolleanus**, Royle Ill. 199, non Boiss; heads subsessile, leaflets 17–25, leaf-rachises indurated persisting long after the leaflets fall, pod linear-oblong narrowed from the middle to both ends. *A. Royleanus*, Bunge Mon. i. 30; ii. 34.

West Himalayas, temperate and alpine region, alt. 8-13,000 ft.; WEST TIBET, KUNAWAR, KASHMIR, GURWHAL, KUMAON.

Stems woody, not more than a few inches long, beset below the tufts of leaves with the copious ascending woody rachises of the old leaves with the lanceolate membranous stipules still persisting. *Leaves* 3-4 in. long; leaflets oblong, obtuse, glaucous, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, more or less silky; petioles 1-2 in., finely downy. *Heads* dense, many-flowered; pedicels $\frac{1}{8}$ - $\frac{1}{6}$ in., densely silky; bracts linear. *Calyx* $\frac{1}{2}$ in., densely silky; teeth linear, a third as long as the tube. *Corolla* an inch long; wings shorter than the standard, keel than the wings. *Pod* $\frac{3}{4}$ -1 in. long, curved, short-stalked, firm, turgid, bilocular, 12-16-seeded.

A plant from Kumaon and Gurwhal, of which we have incomplete examples gathered by Falconer and Madden (var. *pindrensis*, Benth.) with the general habit and copious persistent indurated petioles of this species, but with a shorter pod rounded at both ends like the next, will probably prove distinct from both when fully known.

Bunge cites from 'Royle Ill. p. 199,' *A. subcaulescens*, which he keeps up as a species, but says he has not seen. Royle has no such plant.

58. **A. pyrrhotrichus**, Boiss. *Diag.* ix. 73; *Fl. Orient.* ii. 290; heads distinctly peduncled, leaflets 41-51 clothed with long silky hairs, leaf-rachis not indurated nor persistent. *Bunge Mon.* i. 39; ii. 54.

HAZARA, 2-6000 ft., Stewart. PUNJAB, near Atok, Gen. Eyre, Aitchison—DISTRIB. Afghanistan.

Stems short, woody, densely clothed with long soft spreading fine pale brown hairs. *Stipules* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, lanceolate, silky; leaf-rachis including petiole $\frac{1}{2}$ -1 ft. long, densely clothed with spreading hairs, much overtopping the heads; leaflets green, roundish or obovate-oblong, $\frac{1}{4}$ - $\frac{3}{8}$ in. long, obtuse, with a minute mucro. *Heads* close, 6-12-flowered; peduncle 1-4 in.; pedicels short; bracts linear-setaceous, plumose. *Calyx* densely silky, $\frac{3}{4}$ - $\frac{7}{8}$ in. long; teeth setaceous, nearly as long as the tube. *Corolla* half as long again as the calyx. *Pod* subsessile, dimidiate-oblong, densely silky, bilocular, 10-12-seeded.

59. **A. malacophyllus**, Benth. *MSS.*; heads shortly peduncled, leaflets 31-41 densely silky, leaf-rachises not indurated nor persistent, pod oblong narrowed suddenly at both ends. *Bunge Mon.* i. 36; ii. 61.

West Himalayas, temperate region, alt. 8-11,000 ft.; KASHMIR and KISTWAR.

Stems densely pubescent, usually short, but reaching a foot long. *Leaves* 2-4 in. long; leaflets close, oblong, obtuse, densely silky, $\frac{1}{4}$ - $\frac{1}{2}$ in. long; stipules lanceolate, $\frac{3}{8}$ - $\frac{1}{2}$ in. *Heads* close or rarely sublux; peduncles an inch or less; bracts linear-setaceous, exceeding the distinct pedicels. *Calyx* $\frac{1}{2}$ in., densely silky; teeth linear, a third the length of the tube. *Corolla* half as long again as the calyx; wings rather shorter than the standard; keel shorter still. *Pod* $\frac{1}{2}$ in. long, sessile, very turgid, firm, bilocular, silky, 8-10-seeded.

60. **A. anomalus**, Bunge *Mon.* i. 35; ii. 62; heads distinctly peduncled, leaflets 25-31 nearly glabrescent, leaf-rachises not indurated nor persistent.

WEST TIBET, Falconer.

Closely allied to the last, from which it mainly differs by its longer peduncles and fewer leaflets. *Leaves* 3-4 in. long; leaflets oblong, obtuse, $\frac{3}{8}$ - $\frac{1}{2}$ in. long, the upper close, the lower distant, green, with a few short silky hairs; stipules lanceolate, $\frac{1}{2}$ in. long. *Calyx* $\frac{1}{2}$ in.; teeth setaceous, plumose, half as long as the tube. *Corolla* $\frac{3}{4}$ - $\frac{1}{2}$ in.; proportion of the petals as in *A. malacophyllus*. *Ovary* linear, silky, nearly sessile; ovules about 20. *Pod* not seen.

SUBGEN. 8. **Ægacantha**, Bunge. Low shrubs, with basifixed hairs, stipules adnate at the base to the petiole, persistent rigid leaf-rachises without

any leaflet at the end, large yellow flowers in the axils of the leaves without any peduncles, gibbous calyces and naked stigmas. Included in Fischer's monograph in *Tragacantha*, from which they are separated by their pedicelled gibbous calyx.

* *Leaflets glabrescent or obscurely silky.*

61. **A. polyacanthus**, *Royle Ill.* 199, non *Wall. Cat.* 5934; spines short, stipules deltoid or lanceolate-deltoid, leaflets 9-13, flowers sessile in the axils of the leaves usually geminate, corolla twice as long as the calyx. *A. Daltonianus*, *Bunge Mon.* i. 44; ii. 69. *A. psilocentrus*, *Fisch.*; *Bunge Mon.* i. 44; ii. 70. *A. scariosus*, *Benth. MSS.*; *Bunge Mon.* i. 44; ii. 71. *A. Grahmanianus*, *Royle Ill.* 199, t. 36, fig. 2; *Bunge Mon.* i. 44; ii. 68. *A. Jacquemontii*, *Bunge Mon.* i. 44; ii. 68.

Common in the north-west, ascending from the plains of the PUNJAB to 12,000 ft., reaching east to KUMAON and GHARWAL.—DISTRIB. Afghanistan.

A copiously-branched undershrub, with short branchlets armed with the crowded ascending old leaf-rachises, which are not more than $1\frac{1}{2}$ -2 in. long. *Leaflets* oblong, glabrescent or persistently slightly silky, pale glaucous green, rather thick in texture, often complicate, $\frac{1}{4}$ - $\frac{1}{2}$ in. long. *Pedicels* silky, $\frac{1}{8}$ - $\frac{1}{4}$ in. *Calyx* tubular, $\frac{1}{2}$ in. long, glabrescent or thinly silky; mouth oblique; teeth short, linear. *Corolla* 1- $1\frac{1}{4}$ in. long; wings shorter than the standard, and keel than the wings. *Pod* $\frac{1}{2}$ in. long, dimidiate-oblong, turgid, sessile, bilocular, 15-20-seeded.

62. **A. cicerifolius**, *Royle*; *Bunge Mon.* i. 44; ii. 70; spines elongated, leaflets 31-41, stipules lanceolate or linear-lanceolate, flowers in peduncled heads, corolla not twice as long as the calyx. *A. oplites*, *Benth. MSS.* *A. tenuispinus*, *Bunge Mon.* i. 44; ii. 70. *A. microphyllus*, *Jacquem. MSS.*

West Himalayas, temperate and alpine region, alt. 10-17,000 ft.; NUBRA, LADAK, KASHMIR, GARHWAL, KUNAWAR, &c.

An undershrub, densely armed with the erecto-patent rigid stramineous leaf-rachises, which are $\frac{1}{4}$ - $\frac{1}{2}$ ft. long. *Leaflets* finely silky at first, mostly glabrescent when mature, pale green, thick in texture, obtuse, sometimes emarginate, ascending, caducous, $\frac{1}{4}$ - $\frac{3}{8}$ in. long, oblanceolate or obovate-oblong. *Flowers* usually 3-4 together on short peduncles from the axils of the leaves; pedicels $\frac{1}{8}$ - $\frac{1}{4}$ in.; bracts linear or setaceous, exceeding the pedicels. *Calyx* $\frac{1}{2}$ - $\frac{5}{8}$ in., with a few adpressed black or brownish silky hairs; teeth setaceous, a third as long as the tube. Proportion of the petals as in the last. *Pod* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, oblong, turgid, bilocular, densely silky, narrowed to the point, 15-20-seeded.

** *Leaflets persistently densely silky.*

63. **A. multiceps**, *Wall. Cat.* 5937; main stems not produced, branchlets with densely crowded nodes, flowers 1-2 together in leaf-axils usually not peduncled, corolla twice as long as the calyx. *Bunge Mon.* i. 44, ii. 69.

West Himalayas, temperate zone, alt. 10-12,000 ft.; SIMLA, KUMAON, GARHWAL.

Tufts densely congested, armed with the very crowded ascending old leaf-rachises, which are $1\frac{1}{2}$ -3 in. long. *Stipules* $\frac{1}{4}$ in., lanceolate, adnate only at the very base; leaflets 21-31, mostly crowded, obovate-oblong, $\frac{1}{12}$ - $\frac{1}{6}$ in. long, thick in texture, dull green, clothed with grey silky hairs. *Pedicels* $\frac{1}{12}$ - $\frac{1}{8}$ in.; bracts linear, exceeding the pedicels. *Calyx* $\frac{3}{8}$ in., thinly silky; teeth linear-setaceous, half as long as the tube. *Corolla* $\frac{3}{4}$ in.; standard exceeding wings and keel. *Pod* sessile, oblong, turgid, bilocular, 12-14-seeded, clothed with fine grey silky hairs.

64. **A. zanskarensis**, *Benth. MSS.*; main stems short, branchlets

with densely crowded nodes, flowers in short-peduncled heads, corolla half as long again as the calyx. *Bunge Mon.* i. 43, ii. 67.

West Himalayas, temperate and alpine region, alt. 10-14,000 ft.; ZANSKAR, Thomson.

A dichotomously-branched undershrub, with the old part of the stems densely beset with stiff persistent ascending leaf-rachises 3-4 in. long. *Stipules* lanceolate, $\frac{1}{2}$ in. long; leaflets 21-25, close, oblong, obtuse, caducous, $\frac{1}{4}$ - $\frac{3}{8}$ in. long, densely clothed on both sides with rather spreading short pale brown silky pubescence. *Flowers* up to a half-a-dozen in heads much overtopped by the leaves; pedicels $\frac{1}{2}$ in., densely pubescent; bracts linear-setaceous, plumose. *Calyx* $\frac{1}{2}$ - $\frac{5}{8}$ in., tubular, densely silky; teeth setaceous, $\frac{1}{4}$ as long as the tube. *Corolla* $\frac{3}{4}$ in.; wings shorter than standard and keel than wings. *Ovary* oblong, silky, short-stalked; ovules about 20. *Pod* not seen.

65. **A. leptocentrus**, *Bunge Mon.* i. 44; ii. 69; main stems elongated, branchlets with densely crowded nodes, flowers 1-2 together in leaf-axils not peduncled, corolla twice as long as the calyx. *A. leptacanthus*, *Benth. MSS.* non Boiss. & Buhse.

West Himalayas, alpine region. PITH, alt. 14,000 ft., Thomson; HAZARA, Winterbottom.

A low undershrub, with branches clothed with very dense short pale brown spreading pubescence. *Leaf-rachises* erecto-patent, 2-3 in. long, persistently pubescent; leaflets 21-31, oblong, obtuse, $\frac{1}{3}$ - $\frac{3}{8}$ in. long, persistently matted on both sides with thick grey-brown silky pubescence. *Pedicels* $\frac{1}{2}$ in., densely silky; bracts plumose, linear-setaceous. *Calyx* $\frac{1}{2}$ in., densely silky; teeth linear-setaceous, a third as long as the tube. *Corolla* an inch long; keel much shorter than standard and wings. *Pod* oblong, $\frac{1}{2}$ - $\frac{5}{8}$ in., sessile, silky, turgid, bilocular, 12-14-seeded.

66. **A. bicuspis**, *Fisch. Mon. Trag. No.* 94; main stems elongated, nodes not crowded, flowers 1-3 together in the axils of the leaves not peduncled, corolla half as long again as the calyx. *Bunge Mon.* i. 43, ii. 69. *A. lasiocladus*, *Benth. MSS.*

HAZARA and WEST TIBET, temperate zone, Winterbottom, Jacquemont, Falconer.

General habit of *A. polyacanthus*. Branches clothed with dense spreading or deflexed pale brown silky hairs. *Spines* 1-2 in. long, stramineous, erecto-patent. *Stipules* $\frac{1}{4}$ - $\frac{3}{8}$ in., lanceolate-cuspidate; leaflets 13-17, oblong, $\frac{1}{4}$ - $\frac{3}{8}$ in. long, obtuse, or subacute, shaggy with dense pubescence like the stem. *Pedicels* very short. *Calyx* $\frac{1}{2}$ in. long, shaggy with dense silky hairs like the stem. *Corolla* $\frac{5}{8}$ - $\frac{3}{4}$ in.; wings and keel much shorter than the standard. *Pod* shaggy, subsessile, oblong, bilocular, $\frac{3}{8}$ - $\frac{1}{2}$ in. long, 8-10-seeded.

SUBGEN. 9. **Tragacantha**, *Bunge*. A low shrub with basifixed hairs, indurated spiny leaf-rachis, caducous leaflets and sessile calyx narrowed equally to the base.

67. **A. strobiliferus**, *Royle Ill.* 199; *Bunge Mon.* i. 83, ii. 146; *Camb. in Jacquem. Voy. Bot.* 39, t. 47, not Lindl.

West Himalayas, temperate and alpine region, alt. 8-13,000 ft.; PITH, KASHMIR, KUNAWAR.—DISTRIB. Afghanistan.

A copiously-branched undershrub, not more than a few inches high, densely armed with the ascending spine-tipped stramineous petioles, which are 1-2 inches long. *Stipules* membranous, deltoid, adnate to the petiole, like those of a rose, except at the tip; leaflets 11-13, oblanceolate, glaucous, rigid, acute, $\frac{1}{4}$ - $\frac{3}{8}$ in. long, strigillose. *Flowers* a few sessile in the axil of each petiole, scarcely protruding

beyond the stipules. *Calyx* $\frac{1}{4}$ in. long, cleft down to the base, each lobe like a dense tuft of thick white pubescence. *Corolla* yellow, little exserted; petals equal, marcescent; standard panduriform. *Pod* sessile, silky, 3-4-seeded.

Bunge gives his *A. glabrifolius*, Mon. i. 93, ii. 167, gathered also by Griffith in Afghanistan, from the West Himalayas, on Falconer's authority. It has much longer petioles, longer flat glabrous leaflets, flowers of many nodes at the top of a short stem aggregated into a thick very dense oblong head.

SUBGEN. 10. **Cercidothrix**, Bunge (including *Calycocystis*). Herbaceous perennials, densely canescent with adpressed white bristly hairs fixed by the centre like those of *Indigofera*, moderately large yellow flowers and glabrous stigmas. Outlying representatives of a group of above 300 species, mostly Central Asian.

68. **A. peduncularis**, Royle III. 199; leaflets 21-25 distant narrow-oblong, racemes many-flowered lax in the lower part, calyx permanently tubular, pod linear very turgid unilocular many-seeded. Bunge Mon. i. 96, ii. 168.

WEST TIBET; Dras and Zanskar, alt. 9-12,000 ft., Thomson, Henderson; KUNAWAR, Royle.

Stems tall, erect, glabrous, firm, little branched, 1-2 ft. high, with only a few obscure adpressed bristles. *Leaves* 3-4 in. long; rachis channelled down the face; leaflets obtuse or subacute, $\frac{3}{8}$ - $\frac{1}{2}$ in. long, pale green, glabrescent above, persistently strigillose below; stipules deltoid, free, membranous. *Racemes* 2-4 in. long, dense upwards, Phaca-like; peduncles finally $\frac{1}{2}$ ft. or more; pedicels very short, cernuous; bracts lanceolate, $\frac{1}{8}$ in., subpersistent. *Calyx* $\frac{1}{4}$ in., finely downy; teeth very short, upper deltoid, lower lanceolate. *Corolla* twice the calyx; keel and wings nearly equal, rather shorter than the standard. *Pod* sessile, firm, glabrous, very turgid, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, depressed down the keel, but the suture not intruded; seeds 15-20.

69. **A. subulatus**, M. Bieb. Fl. Taur. Caucas. ii. 193; leaflets 9-13 distant linear, racemes few-flowered lax, calyx permanently tubular, pod long cylindrical half-bilocular many-seeded. Boiss. Fl. Orient. ii. 481. A. anfractu-
tuosus, Bunge Mon. i. 125, ii. 218.

WEST TIBET, alpine region, alt. 12,000 ft., Thomson, Henderson.—DISTRIB. Afghanistan, Baloochistan, Crimea, West Siberia, Chinese Tartary.

Stems under a foot high, 2-3 times dichotomously forked, the branches divaricated, thinly clothed with minute white bristles. *Leaves* $\frac{1}{2}$ -1 in. long; leaflets $\frac{1}{2}$ - $\frac{3}{4}$ in. acute, firm, pale green, persistently strigillose on both sides; stipules linear, very minute. *Racemes* 3-12-flowered, 1-2 in. long; peduncles rigid, exceeding the leaves, clothed with mixed black and white adpressed hairs; pedicels very short; bracts minute, lanceolate, persistent. *Calyx* cylindrical, $\frac{1}{2}$ - $\frac{3}{8}$ in. long, densely clothed with adpressed mixed black and white bristles; teeth minute, lanceolate. *Corolla* nearly twice the calyx; wings shorter than the standard; keel much shorter, the lamina not more than half as long as the claw. *Pod* cylindrical, 1-1 $\frac{1}{2}$ in. long, canescent with similar bristles to those of the calyx and peduncle, firm, rostrate, 20-30-seeded, straight or slightly recurved, narrowed to a short stalk.

70. **A. nivalis**, Kar. & Kir. Enum. Pl. Song. No. 272; leaflets 13-17 close oblong, racemes many-flowered capitate, calyx becoming inflated, pod very small half-bilocular few-seeded. Bunge Mon. i. 137, ii. 234. A. Thomsonianus, Benth. MSS.

WEST TIBET, alpine region, alt. 11-16,000 ft.; Zanskar, Ladak, and Sassar, Thomson, Stewart.—DISTRIB. Central Siberia.

Root thick, woody. *Stems* $\frac{1}{2}$ - $\frac{1}{2}$ ft., densely caespitose, slender, finely canescent. *Leaf*

1-1½ in.; leaflets $\frac{1}{8}$ - $\frac{3}{8}$ in., obtuse, densely white-canescenscent on both sides; stipules small, lanceolate, cuspidate, free. Flowers 6-20, in a dense head, all ascending; peduncles 1-2 in., finely canescenscent; bracts lanceolate, shaggy, exceeding the very short pedicels. Calyx $\frac{1}{2}$ in. membranous, tubular at first, densely silky, becoming much inflated after the petals fall; teeth short, lanceolate. Corolla nearly twice the calyx; wings shorter than the standard; keel shorter still. Pod $\frac{1}{4}$ - $\frac{3}{8}$ in., oblique oblong, silky, distinctly stalked, 2-4-seeded, with the introverted suture reaching half through.

UNKNOWN SPECIES.

Of *A. cæruleus*, Hort. Paris; Bunge Mon. i. 103, ii. 184, a species near *A. Onobrychis*, supposed to have been raised in the Paris garden from Ceylon seeds, we know nothing. No doubt the locality is a mistake.

27. OXYTROPIS, DC.

Herbaceous perennials with odd-pinnate leaves, the flowers usually in dense heads. Calyx tubular or campanulate, with 5 subequal teeth. Corolla more or less exserted; standard longest; keel shortest, pointed with a distinct cusp. Stamens diadelphous; anthers uniform. Ovary sessile or stalked, many-ovuled; style abruptly incurved beardless, stigma capitate. Pod oblong or roundish, turgid, continuous longitudinally within, unilocular or rarely bilocular.—DISTRIB. Species about 100, spread through the North temperate zone.

SECT. I. **Hypoglottidei**. Flowers in dense peduncled heads. Leaflets not more than one from the same point.—Habit of *Astragalus*, section *Hypoglottis*.

* Flowers purple, rarely yellow.

1. **O. lapponica**, Gaud. Fl. Helv. iv. 545; stemless or short-stemmed, leaflets lanceolate 13-25, flowers in permanently dense heads, calyx nearly sessile, pod of the lower flowers or all the flowers deflexed. *O. microrhyncha*, Benth. MSS. *Phaca lapponica*, DC. Prodr. ii. 274.

WESTERN HIMALAYAS, frequent in the alpine and temperate regions, alt. 9-17,000 ft. SIKKIM, Hook. fil.—DISTRIB. Mts. of Europe and Siberia.

Stems often not developed, sometimes $\frac{1}{4}$ - $\frac{1}{2}$ ft. long. Leaves 1-3 in. long; leaflets $\frac{1}{8}$ - $\frac{1}{2}$ in., green in the type, with a few adpressed white silky hairs or sometimes nearly glabrescent; stipules $\frac{1}{8}$ - $\frac{1}{4}$ in., leaf-opposed, connate towards the base. Peduncles $\frac{1}{4}$ - $\frac{1}{2}$ ft., with only a few adpressed hairs; flowers 6-20 in a dense rounded head; bracts minute, linear. Calyx $\frac{1}{8}$ - $\frac{1}{4}$ in., coated with adpressed nearly black silky hairs; teeth linear, shorter than the tube. Corolla bright purple, $\frac{3}{8}$ - $\frac{1}{2}$ in. long; keel much shorter than the wings. Pod linear-oblong, $\frac{3}{8}$ - $\frac{1}{2}$ in. long, unilocular, keeled down the back, 5-6-seeded, clothed with a few obscure black or white hairs; stalk as long as the calyx-tube.

VAR. 1. *Jacquemontiana*, Benth.; stemless, very dwarf, the whole plant not more than 1-3 in. high, leaflets few small thick greenish, heads 1-3-flowered, corolla rather larger than in the type. A high alpine form.

VAR. 2. *humifusa*, Kar. & Kir., sp.; stemless, leaflets densely and persistently white-silky on both sides, calyx more densely silky, the black hairs mixed with copious white ones. *O. glacialis*, Benth. MSS.—Alpine zone of Kashmir and Western Tibet.

VAR. 3. *xanthantha*, Baker; general habit and leaves of the type, but calyx longer, with teeth quite as long as the tube and corolla yellow.—East Tibet; Lama Kongra, alt. 15,000 ft., Hook. fil.

2. **O. mollis**, Royle Ill. 198; stemless, tall, leaflets densely white-

silky 13-25 oblong or lanceolate-oblong, heads finally sublaex, corolla half as long again as the calyx, pods ascending. *O. floribunda*, *Benth. in Royle Ill.* 198. *Astragalus vesiculosus*, *Jacquem. MSS.*

West Himalayas, alpine region, alt. 10-12,000 ft.; LAHUL, ZANSKAR, KUNAWAR, &c. *Tufts* $\frac{1}{2}$ -1 ft. high, crowded at the top of a woody rootstock. *Leaves* long-petioled, 2-3 in. long; leaflets $\frac{1}{4}$ - $\frac{1}{2}$ in. long, moderately thick, pale green, densely clothed on both sides with persistent adpressed white silky hairs; stipules lanceolate or deltoid-cuspidate, densely silky. *Peduncles* usually much overtopping the leaves; heads finally 2-3 in. long; pedicels very short; bracts minute, linear. *Calyx* $\frac{1}{4}$ - $\frac{1}{2}$ in. long, densely clothed with mixed black and white silky hairs. *Pod* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, oblong-cylindrical, unilocular, distinctly stalked, 6-8-seeded.

3. *O. Thomsoni*, *Benth. MSS.*; stemless, tall, leaflets lanceolate densely white-silky 13-51, heads finally sublaex, corolla twice as long as the calyx, pods ascending.

West Himalayas, temperate and alpine region, alt. 7-15,000 ft.; LAHUL, LADAK, KASHMIR.

General habit of *O. mollis*. *Leaves* long-petioled, 4-6 in. long; leaflets grey-green, narrower in proportion, $\frac{3}{4}$ -1 in. long, not so thick nor densely silky as in the last; stipules lanceolate, $\frac{1}{2}$ in. long. *Racemes* finally 3-4 in. long; peduncles equalling or overtopping the leaves; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in.; bracts linear, small. *Calyx* $\frac{1}{4}$ - $\frac{3}{8}$ in., densely clothed with mixed black and white silky hairs; teeth plumose, the lower nearly as long as the tube. *Pod* oblong-cylindrical, unilocular, 4-6-seeded, with a few minute adpressed white hairs; stalk as long as the calyx-tube.

** *Flowers mostly yellow, rarely varying to purple.*

4. *O. densa*, *Benth. MSS.*; acaulescent, very dwarf, leaflets 15-17 minute densely-silky, heads few-flowered short-peduncled, pod ovate-cylindrical bilocular.

WEST TIBET, alpine region, alt. 16-17,000 ft., *Thomson, Strachey.*

Tufts densely caespitose from a woody root, the whole plant not more than 1-1 $\frac{1}{2}$ in. above the surface. *Leaves* under $\frac{1}{2}$ in. long; leaflets $\frac{1}{12}$ in. long, close, oblong, thickly matted with persistent grey-silky hairs; stipules deltoid, membranous, 1 $\frac{1}{2}$ -2 in., connate downwards. *Heads* 3-6-flowered; peduncles densely silky, $\frac{1}{4}$ - $\frac{1}{2}$ in.; pedicels very short. *Bracts* small, linear. *Calyx* $\frac{1}{8}$ in., densely silky; tube campanulate; teeth linear, shorter than the tube. *Corolla* half as long again as the calyx. *Pod* sessile, finely silky, narrowed gradually from the middle to the point, turgid, 5-6-seeded.

5. *O. Stracheyana*, *Benth. MSS.*; stemless, very dwarf, leaflets 5-7 densely silky, heads few-flowered short-peduncled, pod round-oblong turgid unilocular.

WEST TIBET, alpine region; Darma Yankti, alt. 15,500 ft., *Strachey & Winterbottom.*

Whole plant not above a couple of inches above the surface. *Stipules* deltoid, membranous, minute; leaflets thick, complicate, oblong, $\frac{1}{8}$ - $\frac{1}{6}$ in. long, densely matted with grey-brown silky hairs. *Heads* short-peduncled, 2-3-flowered; bracts minute; pedicels very short. *Calyx* $\frac{3}{8}$ in. long, tubular, densely clothed with ascending grey silky hairs; teeth linear, $\frac{1}{4}$ - $\frac{1}{2}$ tube. *Corolla* half as long again as the calyx. *Pod* $\frac{1}{2}$ in. long, sessile, 3-4-seeded, densely clothed with long persistent pale brown silky hairs.

6. *O. tatarica*, *Jacquem. MSS.*; stemless, leaflets small 13-21 densely matted with white silky hairs, heads dense long-peduncled, bracts minute, pod sessile inflated unilocular round-oblong.

West Tibet, alpine region, frequent, alt. 13-17,000 ft.; NUBRA, ZANSKAR, PITI, PARANG, LADAK, &c.

Densely tufted, the whole plant 3-4 in. high. *Leaves* $\frac{1}{2}$ -1 in. long; leaflets close, except the lowest, oblong or oblanceolate-oblong, $\frac{1}{8}$ - $\frac{3}{8}$ long, thick, densely persistently matted with white silky hairs on both sides; stipules minute, deltoid, silky. *Flowers* 20-40, in very dense heads; pedicels scarcely any; bracts minute, linear, white-plumose. *Calyx* $\frac{1}{8}$ - $\frac{1}{4}$ in., densely white-silky; teeth nearly or quite as long as the tube. *Corolla* not more than half as long again as the calyx, usually all yellow, rarely purple or the keel tipped with purple; standard oblong-spathulate, exceeding the wings and keel. *Pod* much inflated, membranous, sessile, $\frac{1}{4}$ - $\frac{3}{8}$ in. long, 5-6-seeded, shaggy with loose dense white silky hairs.

7. **O. cachemirica**, *Camb. in Jacquem. Voy. Bot.* 38, t. 44; stem short, leaflets 13-21 oblong-lanceolate densely white-silky, heads dense long-peduncled, bracts distinct lanceolate, pod sessile inflated round-oblong unilocular.

WEST TIBET and KASHMIR, temperate zone, alt. 8-10,000 ft.—DISTRIB. Central Siberia.

Whole plant $\frac{1}{2}$ -1 ft. high. *Stems* ascending from a woody rootstock, finely pubescent. *Leaves* 1-2 in. long; leaflets $\frac{3}{8}$ - $\frac{1}{2}$ in. long, clothed on both sides with loose white silky hairs; stipules lanceolate or deltoid, connate downwards. *Flowers* 12-30 in a dense head; pedicels very short. *Calyx* $\frac{3}{8}$ in. long, densely white-silky; teeth linear, nearly or quite as long as the tube. *Corolla* half as long again as the calyx. *Pod* just like that of the last but rather larger.

8. **O. Meinshausenii**, *Schrenk; Led. Fl. Ross.* i. 786; stem distinct, leaflets 17-31 thin large oblong green pubescent, heads dense long-peduncled, bracts conspicuous, pod short-stalked oblong unilocular. *Bunge Rel. Lehm.* 76.

WEST HIMALAYAS, temperate region; valley of Kishengunga, alt. 9-11,000 ft., Stewart.—DISTRIB. Siberia.

Stems a foot or more high, at first thiply pilose. *Leaves* 3-4 in. long; leaflets $\frac{1}{2}$ - $\frac{3}{4}$ in. long, obtuse, thinly clothed with rather long whitish hairs on both sides; stipules $\frac{1}{4}$ - $\frac{1}{2}$ free, lanceolate or oblong. *Flowers* 12-20 in a dense head; peduncles erect, 4-6 in. long; pedicels $\frac{1}{24}$ - $\frac{1}{12}$ in.; bracts linear, $\frac{1}{8}$ - $\frac{1}{4}$ in. long, ciliated with black hairs. *Calyx* $\frac{3}{8}$ in., tubular, thinly clothed with adpressed black hairs; teeth linear, half as long as the tube, black-plumose. *Corolla* twice as long as the calyx. *Pod* oblong, turgid, $\frac{1}{4}$ - $\frac{3}{8}$ in. long, straight, 6-8-seeded, with a few dark silky hairs.

Dr. Hooker procured from Nipalese Tibet flower-heads of a fifth yellow-flowered species which, as far as the material goes, matches the Siberian *O. argentata*, *Led.* It differs from *O. Meinshausenii* by larger bracts, longer calyx with linear teeth as long as the tube, corolla shorter in proportion, not more than half as long again as the calyx. These two represent in the Himalayas the group of *O. campestris*.

SECT. 2. **Verticillares**, DC. Herbaceous perennials with flowers in dense heads, with leaflets often in pairs from the same point, so that they are whorled when the nodes are opposite on the two sides of the leaf-rachis.

9. **O. microphylla**, DC. *Prodr.* ii. 279; *Led. Fl. Ross.* i. 578. *O. chiliophylla*, *Royle Ill.* 198; *Camb. in Jacquem. Voy. Bot.* 38, t. 45.

West Himalayas, alpine region, alt. 11-16,000 ft.; ZANSKAR, PITI, SASSAR, NUBRA, KUNAWAR, &c.; SIKKIM, *Hook. fil.*

Stemless, erect, $\frac{1}{4}$ - $\frac{3}{4}$ ft. high, the tufts densely caespitose at the top of a woody rootstock, the deltoid imbricated stipules clothed with dense tufts of long white silky hairs. *Leaf* short-petioled, $1\frac{1}{2}$ -3 in. long; leaflets crowded, linear-oblong, $\frac{1}{8}$ - $\frac{1}{4}$ in. long, subcoriaceous, grey-green, gland-dotted, with fine deciduous pubescence, the edges much reflexed. *Peduncles* equalling or overtopping the leaves; flowers 4-15, the heads

at first close, becoming 2-3 in. long when they expand. *Calyx* $\frac{3}{8}$ in. long, tubular, clothed with large sessile glands, nearly glabrous; teeth short, linear, pubescent. *Corolla* bright purple, twice the calyx. *Pod* half-bilocular, sessile, linear, turgid, recurved, densely gland-dotted, glabrous, bilocular; seeds 20-30.

SECT. 3. **Phacoides**. Herbaceous caulescent perennials, with flowers in elongated racemes.—Habit of *Astragalus*, section *Phaca*.

10. **O. diffusa**, *Led. Alt.* iii. 281; *Icon. Ross.* t. 451. *O. glabra*, *DC. Astrag.* No. 31, t. 8; *Prodr.* ii. 280.

WEST TIBET, temperate region, alt. 7-8000 feet.—DISTRIB. West Siberia.

Caulescent, 1-2 ft. high. *Stems* copiously branched, firm, slender, zigzag, terete, glabrous. *Leaves* 2-3 in. long; leaflets 9-13, lanceolate, $\frac{1}{2}$ -1 in. long, green, rather thick, acute, glabrous or with only a few minute obscure hairs; stipules minute, free, deltoid, foliaceous. *Racemes* 2-4 in. long; pedicels very short; bracts minute, lanceolate. *Calyx* $\frac{1}{8}$ in., campanulate, with a few adpressed black and white hairs. *Corolla* yellow, twice the calyx. *Pod* $\frac{3}{8}$ - $\frac{1}{2}$ in. long, oblong, sessile, turgid, unilocular, straight, glabrous, 6-10-seeded.

28. **TAVERNIERA**, DC.

Much-branched undershrubs. *Leaves* simple or 3-foliolate. *Flowers* in lax racemes. *Calyx-tube* turbinate; teeth 5, distinct, setaceous from a deltoid base. *Corolla* marcescent, much exerted; standard obovate; wings small, much shorter; keel obtuse, as long as the standard. *Stamens* monadelphous; anthers uniform. *Ovary* stalked, 2-4-ovulate; style long, filiform, inflexed, stigma minute, capitate. *Pod* of 1-4 flattened indehiscent densely muricated joints.—DISTRIB. Species 3-4, reaching Egypt and Abyssinia.

1. **T. nummularia**, *DC. Prodr.* ii. 339; *Mem. Leg.* vi. t. 52; *Boiss. Fl. Orient.* ii. 508. *Hedysarum nummularifolium*, *DC. in Ann. Sc. Nat.* iv. 102. *H. sparteum*, *Burm. Fl. Ind.* 166, t. 51, fig. 2? *T. sparteum*, *DC. loc. cit.*? *Onobrychis diffusa*, *Camb. in Jacquem. Voy. Bot.* t. 49. *T. cuneifolia*, *Arn. in Wight Ic.* t. 1055; *Dalz. & Gibs. Bomb. Fl.* 67. *T. gonoclada* and *T. ephedroides*, *Jaub. & Spach. Ill.* t. 61 and 62. *Hedysarum Gibsoni*, *Grah. Cat. Bomb. Pl.* 49.

Plains of SCINDE and the PUNJAB.—DISTRIB. Afghanistan, Orient.

A copiously-branched undershrub, 1-2 ft. high, with slender finely canescent terete branches. *Leaves* shortly petioled, usually 3-foliolate; leaflets very variable in size, $\frac{1}{4}$ -1 in. long, obovate-oblong or nearly round, thick, pale green, thinly canescent beneath, the side ones not opposite; stipules free, minute, lanceolate, scarious. *Racemes* few- or many-flowered, usually exceeding the leaves. *Calyx* $\frac{1}{8}$ - $\frac{1}{6}$ in., thinly silky. *Corolla* red, glabrous, $\frac{3}{8}$ - $\frac{1}{2}$ in. *Joints* of pod 1-4, roundish.

29. **EBENUS**, Linn.

Villous herbs or undershrubs. *Leaves* odd-pinnate; leaflets entire, exstipellate; petiole often spinose. *Flowers* red, in dense peduncled axillary spikes. *Calyx-teeth* 5, subequal, setaceous, plumose, exceeding the tube. *Corolla* much shorter than the calyx; standard broad; keel obtuse, as long as standard; wings short. *Stamens* monadelphous, the upper free at the base; anthers uniform. *Ovary* sessile, 1-ovulate; style filiform, incurved, stigma capitate. *Pod* flat, oblong, included in the calyx-tube, membranous, indehiscent.—DISTRIB. Species 8, Oriental and Mediterranean.

1. **E. stellata**, *Boiss. Diag.* ii. 100; *Fl. Orient.* ii. 557. *E. tragacan-*

thoides; *Jaub. & Spach. Ill.* iii. 68, t. 254. *E. horrida* and *ferruginea*, *Jaub. & Spach. Ill.* p. 159-160.

PUNJAB-HIMALAYA, alt. 4-8000 ft., *Stewart*.—DISTRIB. Persia, Afghanistan, Beloo-chistan.

A low undershrub, densely armed with woody erecto-patent spines 1-1½ in. long. *Leaves* shorter than the spines, digitately trifoliate; leaflets lanceolate, subcoriaceous, sericeous, ½-¾ in. long. *Flowers* sessile in dense stalked heads, on peduncles at most as long as the spines, each head surrounded by a whorl of large lanceolate bracts. *Calyx* ½ in., densely clothed with long brown silky hairs.

30. GEISSAPSIS, W. & A.

Annuals. *Leaves* with two pairs of leaflets. *Flowers* in terminal racemes, with large membranous persistent veined ciliated persistent bracts. *Calyx* deeply 2-lipped; upper lip entire, lower obscurely toothed. *Corolla* 2-3 times calyx; standard roundish; keel obtuse. *Stamens* monadelphous; anthers uniform. *Ovary* short-stalked, biovulate; style incurved, stigma minute capitate. *Joints of pod* 1-2, turgid in the middle, with a distinct flat border, reticulately-veined, 1-seeded, indehiscent.—DISTRIB. Sp. 3, the other Trop. African.

1. *G. cristata*, W. & A. *Prodr.* 218; flowers not more than ½ as long as the long-bristled bracts. *Dalz. & Gibs. Bomb. Fl.* 62. *Zornia disperma*, *Grah. in Wall. Cat.* 5663. *Hedysarum bijugum*, *Klein MSS.*

Plains of WESTERN PENINSULA, CEYLON, AVA, MARTABAN, TENASSERIM, and PEGU.

A densely caespitose trailing annual, with slender naked branches ½-2 ft. long. *Leaves* petioled, with a very short rachis; leaflets obovate, oblique, glabrous, truncate, ¼-½ in. long; stipules lanceolate, membranous, distinctly spurred. *Heads* dense, terminal, ½-2 in. long; bracts much imbricated, ½ in. broad, reniform, ciliated with firm yellow bristles ½-⅓ in. long. *Calyx* ¼ in. long. *Corolla* twice the calyx. *Joints* 1-2, ½ in. long.

2. *G. tenella*, *Benth. in Hohen. Pl. Ind. Or.* No. 659; flowers nearly or quite as long as the short-bristled bracts.

WESTERN PENINSULA.

Habit of the last, but much smaller. *Leaflets* all four nearly from the same point, ⅓-¼ in. long, obliquely obovate, truncate, glabrous. *Racemes* copious, terminal, peduncled, 4-12-flowered; bracts obliquely oblong, less imbricated, ⅓-¼ in. broad, strongly veined, ciliato-denticulate. *Calyx* ¼ in., deeply cleft. *Corolla* yellow, ½ in., *Joints* 1-2, with a flat edge, round, with a turgid centre.

31. ONOBRYCHIS, Gaertn.

Herbs. *Leaves* numerous, odd-pinnate, exstipellate. *Flowers* numerous, red, in long-peduncled axillary racemes. *Calyx-tube* campanulate; teeth 5, distinct. *Corolla* much exerted; standard broad; wings short; keel obtuse. *Stamens* monadelphous; anthers uniform. *Ovary* sessile, 1-2-ovulate; style filiform, incurved, stigma terminal minute. *Pod* compressed, reniform, indehiscent, 1-2-seeded, alveolate or echinate.—DISTRIB. Species about 50, European and Oriental.

1. *O. Stewartii*, Baker.

PUNJAB; Hazara, *Dr. Stewart*. Rawul Pindee, *Dr. Aitchison*.

Stems slender, 1½-2 ft., glabrescent. *Leaf-rachis* 3-4 in. long, including distinct

petiole; leaflets 9-11, oblanceolate, subacute, distant, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, obscurely canescent; stipules linear, minute. *Racemes* long-peduncled, 6-9 in. long, lax; buds crowded; pedicels very short; bracts linear, minute. *Calyx* campanulate, $\frac{1}{12}$ in., silky; teeth lanceolate. *Corolla* 3-4 times calyx; standard glabrous, veined. *Pod* reniform, turgid, $\frac{1}{8}$ - $\frac{1}{5}$ in., 1-seeded; faces woody, deeply alveolate; edge muricated with close minute spines. A second species, of which we have a scrap from Hazara, gathered by Winterbottom, with oblong obtuse leaflets and a much larger calyx and corolla agrees, as far as the material goes, with *O. heterophylla*, C. A. Meyer; Led. Fl. Ross, i. 711, from Persia and the Caucasus.

32. **LESPEDeza**, Mich.

Herbs or undershrubs. *Leaves* exstipellate, trifoliate. *Flowers* copious, in racemes, or crowded in the leaf-axils. *Calyx-tube* campanulate; teeth lanceolate or linear. *Corolla* exserted; standard broad; keel obtuse or acute. *Stamens* diadelphous; anthers uniform. *Ovary* sessile or stipitate, 1-ovulate; style long, filiform, incurved; stigma minute, terminal. *Pod* small, oblong, compressed, 1-seeded, reticulato-venose, indehiscent.—**DISTRIB.** Species 20-25, the others Siberian, Chinese, Japanese, and N. American, one Javan. Monographed lately by Maximowicz.

SUBGEN. Eulespedeza. *Keel* obtuse, not much incurved.

1. **L. sericea**, Miq. *Ann. Mus. Lug. Bat.* iii. 49; petiole short, leaflets small linear-cuneate 4-6 times as long as broad grey- or white silky beneath, flowers 2-4 congested in the leaf-axils, pod small sessile. *Hedysarum sericeum*, Thunb. *Jap.* 289. *Aspalathus cuneata*, Don *Prodr.* 246. *L. cuneata*, G. Don, *Gen. Syst.* ii. 307. *Anthyllis cuneata*, Dum. *Bot. Cult.* vi. 100. *L. juncea*, Wall. *Cat.* 5743; *DC. Prodr.* ii. 348 *in part*, non Pers. *L. argyræa*, Sieb. et Zucc. *Abh.* vi. 2, 120.

Along the Himalayas from HAZARA and KASHMIR to ASSAM, alt. 3-8000 ft.—**DISTRIB.** China, Japan, N. Australia.

An erect undershrub, 2-3 ft. high, with tough long slender branches. *Leaves* ascending, crowded; leaflets $\frac{1}{4}$ - $\frac{1}{2}$ in. long, rigidly coriaceous, truncate or emarginate, narrowed gradually in the lower half, very variable in vestiture, usually glabrous above, clothed with adpressed grey or white silky hairs below, rarely both sides clothed with loose white pubescence; petiole $\frac{1}{8}$ in. *Flowers* 2-4, on short pedicels in the axils all down the branch; bracteoles linear, minute. *Calyx* $\frac{1}{12}$ - $\frac{1}{8}$ in., canescent; teeth linear-subulate, very long. *Corolla* twice the calyx, white, tinged with purple. *Pod* $\frac{1}{8}$ in., thinly silky; style twice its length,

2. **L. juncea**, Pers. *Ench.* ii. 318; petiole short, leaflets small oblanceolate 3-4 times as long as broad thinly grey-silky beneath, flowers 2-6 in umbels sessile or shortly peduncled in the leaf-axils, corolla small, pod small sessile. *DC. Prodr.* ii. 348 *in part*, non Wall. *Hedysarum junceum*, Linn. *fil. Dec.* i. t. 4. *L. variegata* and *L. kanaorensis*, Camb. in *Jacquem. Voy. Bot.* 42, t. 50, 51.

KASHMIR and KUNAWAR, temperate region, alt. 4-8000 ft.—**DISTRIB.** Siberia, North China.

Stems slender, 1-2 ft. high, finely downy, erect or decumbent. *Leaves* not nearly so crowded as in the last; leaflets $\frac{1}{4}$ - $\frac{3}{4}$ in. long, rigidly subcoriaceous, obtuse, narrowed gradually in the lower half; petioles $\frac{1}{8}$ - $\frac{1}{4}$ in. *Umbels* usually sessile, produced far down the branches. *Calyx* $\frac{1}{8}$ - $\frac{1}{6}$ in., canescent; teeth linear-setaceous, 3-4 times the tube. *Corolla* twice the calyx. *Pod* and style as in *L. sericea*.

3. **L. Gerardiana**, Grak. in Wall. *Cat.* 5744; petiole short, leaflets ob-

lanceolate grey-silky below, umbels sessile or short-peduncled in the axils of the leaves, corolla large, pod small sessile.

Along the Himalayas, temperate region, alt. 5-10,000 ft.; SIMLA and KUMAON to SIKKIM.

Stems 1-3 ft., densely pubescent. *Leaves* moderately close, ascending; leaflets $\frac{1}{2}$ - $\frac{3}{4}$ in. long, rigidly coriaceous, glabrescent on the upper side, densely grey-silky below; petioles $\frac{1}{8}$ - $\frac{1}{4}$ in. *Umbels* 4-8-flowered, usually sessile; bracteoles linear, half as long as the calyx. *Calyx* $\frac{1}{14}$ in., densely pubescent; teeth linear-subulate, 2-3 times the tube. *Corolla* $\frac{3}{8}$ - $\frac{1}{2}$ in.; keel tipped with purple. *Pod* considerably shorter than the calyx.

4. **L. elegans**, *Camb. in Jacquem. Voy. Bot.* 43, t. 52; upper leaves suppressed, petiole produced, leaflets oblong grey-silky beneath, umbels sessile, pod small sessile. *Maxim. Synop. Gen. Lesp.* 40.

KASHMIR, temperate region, alt. 5-6000 ft., *Jacquemont, Thomson.*

Stems 2-3 ft., finely downy. *Petiole* $\frac{1}{2}$ - $\frac{3}{4}$ in.; leaflets $\frac{1}{2}$ - $\frac{3}{4}$ in. long, obtuse, glabrescent above, densely grey-silky beneath. *Flowers* 6-8, in sessile umbels, rarely in short racemes, reaching low down the branches and forming at the top a close leafless panicle. *Calyx* $\frac{1}{6}$ - $\frac{1}{4}$ in., densely pubescent; teeth linear-subulate, very long. *Corolla* half as long again as the calyx. *Pod* $\frac{1}{8}$ in. long, oblong, downy.

5. **L. elliptica**, *Benth. Cat. Griff. Pl.* No. 1745; petiole produced, leaflets large obovate-oblong thinly grey-canescient beneath, flowers in peduncled racemes the upper panicked, pod stipitate exserted. *Maxim. Synops. Gen. Lesp.* 27.

KHASIA, temperate region, alt. 5-6000 ft., *Griffith, Hook. fil. and Thomson.*

Stems woody, reaching several feet high, finely pubescent. *Leaves* not crowded; leaflets subcoriaceous, 1-1 $\frac{1}{2}$ in. long, obtuse, green, glabrous above, grey, finely downy below; petiole 1-1 $\frac{1}{2}$ in. *Racemes* many-flowered, close or lax, the peduncles sometimes as long as the leaves; pedicels shorter than the calyx; bracteoles linear, as long as the tube. *Calyx* $\frac{1}{8}$ - $\frac{1}{2}$ in., densely canescent; teeth lanceolate, acute, twice as long as the tube. *Corolla* deep red, twice as long as the calyx. *Pod* oblong, $\frac{1}{4}$ in. long, finely downy, distinctly stalked.—Very near the common East Asian *L. bicolor*, Turcz. *Led. Fl. Ross.* i. 715 (*L. viatorum*, Champion), from which it differs mainly by its long acute calyx-teeth.

6. **L. tomentosa**, *Sieb.*; *Maxim. Synops.* 50; petiole short, leaflets large obovate-oblong densely downy beneath, flowers in peduncled racemes, pod sessile included. *Hedysarum tomentosum*, *Thunb. Fl. Jap.* 286. *L. glomerata*, *Hornem.*; *DC. Prodr.* ii. 350.

WESTERN HIMALAYA, temperate region, alt. 6-7000 ft., *Edgeworth.* — *DISTRIB.* China, Japan, Korea.

Stems 2-3 ft., erect, densely pubescent. *Leaves* distant; leaflets 1-2 in. long, obtuse, thick, subcoriaceous, at first thinly silky above, densely silky, and the veins raised beneath; petioles 1- $\frac{1}{2}$ in.; stipules subulate, persistent. *Racemes* distinctly peduncled, 2-4 in. long, moderately close, rarely congested, sessile (*L. glomerata*, Horn.); pedicels very short. *Calyx* $\frac{1}{5}$ - $\frac{1}{2}$ in., densely pubescent; teeth linear-subulate, 3-4 times the tube. *Corolla* whitish, half as long again as the calyx; standard not longer than the wings and keel. *Pod* shorter than the calyx, oblong, pubescent.—Very near *L. hirta*, Elliott, of North America.

SUBGEN. **Oxyramphis**, *Wall.* *Keel* acute and much incurved, like that of a *Crotalaria*. (*Campylotropis*, Bunge.)

7. **L. macrostyla**, *Baker*; petiole short, leaves small thinly clothed be-

neath with whitish silky hairs, calyx and large pod densely clothed with spreading hairs. *Oxyramphis sericea*, *Grah. in Wall. Cat.* 5349. *Lespedeza sericea*, *Royle MSS. non Miquel*. *Crotalaria macrostyla*, *Don Prodr.* 242. *Oxyramphis macrostyla*, *Wall. Cat.* 5348, *non Lindley*. *L. Royleana*, *Miquel Ann. Mus. Lug. Bat.*, iii. 50. *O. stenocarpa*, *Klotzsch Reise Pr. Wald. Bot.* 153, t. 1, fig. 2.

HIMALAYAS, tropical and temperate zones, alt. 2-7000 ft.; SIMLA and GURWHALE to KHASIA.

An undershrub, 3-4 ft. high, with woody densely pubescent branches. *Petiole* $\frac{1}{2}$ - $\frac{3}{4}$ in.; leaflets obovate-cuneate, rigidly subcoriaceous, $\frac{1}{4}$ - $\frac{3}{4}$ in. long, grey, glabrescent, venose above, usually persistently silky, rarely (*O. macrostyla*, *Wall.*) subglabrescent below, broadly rounded, sometimes deeply emarginate at the point, the petiolule of the end one not more than $\frac{1}{8}$ in. *Racemes* short, dense, many-flowered, catkin like when unexpanded, the silky ovate bracts hiding the buds; pedicels $\frac{1}{8}$ - $\frac{1}{4}$ in., densely silky. *Calyx* $\frac{1}{8}$ in.; teeth lanceolate, twice the tube. *Corolla* deep red, three times the calyx. *Pod* short-stalked, $\frac{3}{8}$ - $\frac{1}{2}$ in. long, narrowed to both ends; style persistent, $\frac{1}{2}$ in. long, densely plumose in the lower half.

8. ***L. eriocarpa*, DC. Prodr.** ii. 349; petiole produced, leaflets small thinly grey-canescient beneath, calyx and small pod clothed with adpressed silky hairs. *Oxyramphis virgata*, *Wall. Cat.* 5350. *O. macrostyla*, *Lindl. Bot. Reg.* xxxii. t. 28, *non Wall.* *L. paniculata*, *Royle MSS.* *Desmodium angulatum*, *Wall. Cat.* 5729 M.

HIMALAYAS, temperate and tropical zones, alt. 3-9000 ft.; HAZARA and KASHMIR to KHASIA and SIKKIM.

A copiously-branched erect shrub, 3-4 ft. high, with slender silky angular furrowed branchlets. *Petioles* $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; leaflets obovate-cuneate, $\frac{1}{2}$ -1 in. long, rigidly subcoriaceous, green, glabrous, reticulato-venose above, broadly rounded at the apex, the end one on a petiolule $\frac{1}{4}$ - $\frac{1}{2}$ in. long; uppermost leaves reduced or suppressed. *Racemes* copious, peduncled, not dense, many-flowered, 2-4 in. long; bracts not exceeding buds; pedicels $\frac{1}{8}$ - $\frac{1}{4}$ in. *Calyx* $\frac{1}{8}$ in.; teeth linear-subulate, twice the tube. *Corolla* deep purple-red, $\frac{3}{8}$ - $\frac{1}{2}$ in. *Pod* $\frac{1}{4}$ in., long, minutely stalked, more coriaceous than in the last; style as long as the pod, slightly pubescent near the base.—*L. paniculata*, *Royle*, is a mere form, with lax racemes and longer pedicels.

9. ***L. Thomsoni*, Benth. MSS.**; petiole produced, leaflets large densely argenteo-canescient beneath, calyx and small pod finely grey-silky.

KHASIA, temperate region, alt. 5000 ft., *Hk. fil. & Thomson, Lobb.*

Habit of the last, to which it is closely allied. *Petiole* 1-2 in.; leaflets oblong, 1-2 in. long, subcoriaceous, obtuse, green, glabrescent, less venose above. Upper leaves suppressed or much reduced, so that the racemes form a terminal panicle. *Bracts* $\frac{1}{8}$ in., linear, subpersistent, canescent on the back; pedicels $\frac{1}{8}$ - $\frac{1}{6}$ in. *Calyx* $\frac{1}{8}$ in.; teeth lanceolate, as long as the tube. *Corolla* $\frac{3}{8}$ in., deep red. *Pod* $\frac{1}{8}$ - $\frac{1}{4}$ in. long, shortly stipitate, finally glabrescent, subcoriaceous; style $\frac{1}{4}$ in., not at all plumose.

SPECIES UNKNOWN TO ME.

L. DECORA, *Kurz in Journ. Asiat. Soc. Beng.* 42, 2, 231. An erect shrub, 3-5 ft. high, with angular stems clothed with adpressed fulvous down. *Stipules* linear-subulate $\frac{1}{4}$ in.; petiole 1-1 $\frac{1}{2}$ in.; leaflets obovate-oblong, obtuse with a mucro, chartaceous, 1-1 $\frac{1}{2}$ in. long, glabrous and dark green above, glaucescent and faintly pubescent below. *Racemes* short, but slender, fulvo-pubescent; bracts ovate-lanceolate, cuspidate, $\frac{1}{12}$ in. long, persistent, glanduloso-pilose. *Calyx* $\frac{1}{4}$ in., fulvo-pubescent; teeth ovate-acuminate. *Corolla* twice length of calyx, blue. Immature *pod* oblique ovoid, compressed, shortly sericeous. *MARTABAN, Kurz.*

L. PARVIFLORA, *Kurz in Journ. Asiat. Soc. Beng.* 42, 2, 231. A shrub, with angular silky branches. *Stipules* linear-subulate, $\frac{1}{2}$ in.; petiole canescent, $\frac{1}{2}$ in.;

leaflets ovate-elliptic, $\frac{1}{2}$ –1 in. long, chartaceous, dark green and glabrous above, glaucescent and pilose below. *Racemes* axillary, stiff, fulvo-pubescent, twice as long as the leaves; bracts caducous; pedicels very short. *Calyx* densely fulvo-pubescent, $\frac{1}{4}$ in.; teeth subulate. *Corolla* scarcely twice as long as the calyx, probably blue. Immature *pod* oblique ovoid acuminate, silky. MARTABAN, Rev. F. Mason, ex Kurz loc. cit.

I cannot separate from *L. tomentosa* by the description *L. pinetorum*, Kurz in Journ. Asiat. Soc. Beng. 42, 2, 231, from Martaban.

33. ALHAGI, Desv.

Low shrub. *Leaves* simple. *Flowers* axillary. *Calyx* campanulate; teeth 5, distinct, minute. *Corolla* exserted; standard broad; keel obtuse. *Stamens* diadelphous; anthers uniform. *Ovary* linear, sessile, 6–8-ovulate; style filiform, incurved; stigma minute, capitate. *Pod* linear, subcontinuous or moniliform; joints oblong, small, turgid, smooth.—DISTRIB. Species 1, spread from Songaria to Greece and Nubia.

1. *A. mauroorum*, Desv.; DC. Prodr. iii. 352; Wall. Cat. 5760; W. & A. Prodr. 232; Dalz. & Gibs. Bomb. Fl. 67; Boiss. Fl. Orient. ii. 558. A. napaulensium, DC. loc. cit. A. mannifera, Desv.; Jaub. & Spach. Ill. t. 401. Hedysarum Alhagi, Linn.; Roxb. Fl. Ind. iii. 344. Manna hebraica and nepalensis, Don Prodr. 247.

PLAINS of the NORTH WEST PROVINCES, UPPER GANGES and CONCAN, ascending to 3000 ft. on the Kishengunga.

A low shrub, armed with copious subpatent hard pungent spines $\frac{1}{2}$ –1 in. long. *Leaves* simple, drooping from the base of the spines or branches, oblong, obtuse, rigidly coriaceous, glabrous. *Flowers* 1–6 from a spine, on short pedicels. *Calyx* glabrous, $\frac{1}{12}$ – $\frac{1}{8}$ in. *Corolla* reddish, 3 times the calyx. *Pod* 1 in. long or less, falcate or straight.

34. HEDYSARUM, Linn.

Herbs. *Leaves* numerous, odd-pinnate, exstipellate. *Flowers* usually red, in copious long-peduncled axillary racemes. *Calyx-tube* campanulate or tubular; teeth 5, distinct, long or short. *Corolla* much exserted; petals unequal in relative proportion in the different species; keel obtuse. *Stamens* diadelphous; anthers uniform. *Ovary* linear, stalked, few-ovuled; style very long, filiform, abruptly inflexed, stigma minute terminal. *Pod* of 1–3 flattened indehiscent joints, in our species not muricated, but reticulately veined on the faces, the sutures usually furnished with acute entire or toothed borders.—DISTRIB. Species about 50, spread through the North Temperate zone.

* *Calyx-teeth* equalling or exceeding the tube.

1. *H. kumaonense*, Benth. MSS.; stemless, leaflets small subcoriaceous obovate-oblong, bracts lanceolate, joints small firm turgid, sutures not bordered.

KUMAON, temperate region, alt. 9000 ft., Strachey and Winterbottom.

Leaves and peduncles in a dense rosette from a thick woody rhizome. *Leaf-rachises* 4–6 in. long, including distinct petiole; leaflets 17–25, $\frac{1}{4}$ – $\frac{3}{8}$ in. long, obtuse, with a mucro, dark green, glabrous above, pale grey with adpressed silky hairs below; veins distinct. *Inflorescence* seen only in a late stage; pedicels very short. *Calyx* $\frac{1}{4}$ – $\frac{1}{3}$ in.; teeth setaceous, from a lanceolate base, exceeding tube. *Corolla* $\frac{5}{8}$ – $\frac{3}{4}$ in. *Joints* of *pod* solitary in the specimens seen, rather downy, oblong, under $\frac{1}{4}$ in. long.

2. *H. sikkimense*, Benth. MSS.; stem dwarf, leaflets small linear-oblong subcoriaceous, standard and wings shorter than the keel, joints large membranous with toothed borders.

Sikkim, alpine region, alt. 12–16,000 ft., *Hook. fil.*

Stems slender, at first slightly downy, $\frac{1}{2}$ ft. or less high. *Leaf-rachis* 2–3 in. long; leaflets 21–27, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, obtuse, glabrous above, obscurely pubescent with raised veins below. *Heads* dense, 1–2 in. long in flower; bracts linear, minute. *Calyx* pubescent, $\frac{1}{6}$ – $\frac{1}{5}$ in.; teeth lanceolate, as long as the tube. *Corolla* bright red, $\frac{1}{2}$ – $\frac{3}{4}$ in. *Joints* of pod 1–3, roundish or oblong, $\frac{1}{4}$ – $\frac{3}{8}$ in. long; sutures irregularly faintly eroso-dentate.

3. **H. Falconeri**, *Baker*; caulescent, robust, leaflets large subcoriaceous ovate-oblong, keel and standard equal, joints large membranous with toothed borders.

WEST TIBET, temperate region, *Dr. Falconer*.

Stems $1\frac{1}{2}$ –2 ft. high, slender, firm, sulcate, glabrous. *Leaf-rachises* 6–9 in. long; leaflets 13–19, distant, $\frac{3}{4}$ – $1\frac{1}{4}$ in. long, obtuse, glabrous, full green above, grey-green, obscurely canescent with prominent veins below. *Flower-racemes* 3–4 in. long, moderately close; bracts setaceous, very small; pedicel as long as the calyx. *Calyx* $\frac{1}{6}$ in. long; teeth setaceous, as long as the tube. *Corolla* $\frac{3}{8}$ – $\frac{1}{2}$ in. *Joints* oblong, glabrous, $\frac{1}{2}$ in. long, thin, with broad irregularly eroso-dentate borders.

4. **H. astragaloides**, *Benth. MSS.*; caulescent, robust, leaflets large membranous linear-oblong, corolla yellowish, keel exceeding the standard, joints large membranous with crisped borders.

Kishtwar, alpine zone, alt. 11–12,000 ft., *Thomson. LAHUL, Jaeschke.*

Stems robust, erect, 2 ft. high, densely canescent at first. *Leaf-rachises* 4–8 in. long; leaflets 21–29, not at all coriaceous, obtuse, with a minute mucro, $\frac{3}{4}$ –1 in. long, glabrescent above, persistently grey-canescant below. *Flower-racemes* very dense, 2–3 in. long, the linear scarious bracts protruding beyond the buds; pedicels shorter than calyx. *Calyx* $\frac{1}{4}$ in., finely silky; teeth exceeding the tube. *Pod* distinctly stalked; joints 1–2, oblong, with a distinct rather crisped wing on the lower side and an obscure one on the upper.

5. **H. cachemirianum**, *Benth. MSS.*; caulescent, robust, leaflets large membranous linear-oblong, corolla red, standard exceeding wings and keel, joints large membranous with entire borders.

KASHMIR, temperate region, alt. 9–10,000 ft., *Thomson, Falconer, Winterbottom.*

Stem $1\frac{1}{2}$ –2 ft. high, erect, glabrous, many-grooved. *Leaf-rachises* $\frac{1}{2}$ –1 ft. long; leaflets 21–27, thin, obtuse, $\frac{3}{4}$ – $1\frac{1}{4}$ in. long; both sides green, glabrescent, concolorous. *Racemes* very dense, 2–3 in. long in flower, the linear setaceous bracts protruding beyond the buds; pedicels very short. *Calyx* downy, $\frac{3}{8}$ in.; teeth as long as the tube. *Corolla* $\frac{3}{4}$ –1 in. long. *Joints* 1–3, glabrous, oblong, $\frac{1}{2}$ – $\frac{3}{4}$ in. long; both sutures with a distinct entire wing.

** *Calyx-teeth shorter than the tube.*

6. **H. laxiflorum**, *Benth. MSS.*; stems slender, leaflets subcoriaceous, bracts minute setaceous, keel exceeding wings and standard, joints small entire not bordered.

WEST HIMALAYA, temperate or alpine region. WEST TIBET, *Falconer. Valley of Kishengunga, Winterbottom.*

Stems $1\frac{1}{2}$ –2 ft. high, firm, slender, glabrous. *Leaf-rachis* 3–5 in. long; leaflets 21–31, close, firm, linear-oblong, $\frac{1}{2}$ – $\frac{5}{8}$ in. long, green, glabrous above, grey, obscurely canescent with raised veins below. *Racemes* lax, 2–3 in. long in flower; pedicels as long as the calyx, finely downy. *Calyx* $\frac{1}{6}$ in.; upper teeth deltoid, lower lanceolate. *Corolla* $\frac{5}{8}$ – $\frac{3}{4}$ in. *Joints* 3–4, oblong, firm, glabrous, rather turgid, not more than $\frac{1}{2}$ in. long.

7. **H. strobiliferum**, *Baker*; stems robust, leaflets membranous, bracts large ovate-acuminate, corolla under twice the calyx, its petals equal.

KASHMIR, temperate region, *Falconer*.

Stems above a foot high, densely clothed with short adpressed whitish hairs. *Leaf-rachises* 6-8 in. long; leaflets 19-25, oblong-lanceolate, obtuse, 1-1½ in. long, flexible, glabrescent above, thinly white-silky beneath. *Racemes* dense, 2-3 in. long; the buds quite hidden by the imbricated scarious ciliated bracts; pedicels very short. *Calyx* tubular, ½-¾ in. long; teeth deltoid-cuspidate, not more than ¼-⅙ tube. *Corolla* yellowish, under ½ in. long. *Pod* unknown.

8. **H. microcalyx**, *Baker*; stems robust, leaflets large membranous, bracts linear minute, corolla several times calyx, keel exceeding standard, joints large membranous entire.

WEST HIMALAYAS, temperate region; GURWHAL, *Falconer*; KASHMIR, *Lance*; LAHUL, *Jaeschke*.

Stems 1½-2 ft. high, stout, sulcate, glabrous. *Leaf-rachises* 6-9 in. long; leaflets 11-13, distant, oblong-lanceolate, obtuse or subacute, 1-1½ in. long; both sides green, glabrous. *Flower-racemes* 2-4 in. long, lax; pedicels ⅓-¼ in. long, grey-pubescent. *Calyx* ⅓ in., campanulate, membranous, glabrous; teeth minute, deltoid-cuspidate. *Corolla* bright red, ⅝-¾ in. *Joints* 2-3, oblong, ½-⅝ in. long, thin, glabrous, the sutures both distinctly margined.

35. **STRACHEYA**, Benth.

A tufted low shrub. *Leaves* odd-pinnate. *Flowers* axillary. *Calyx-tube* turbinate; teeth 5, lanceolate, as long as the tube. *Corolla* much exserted; standard broad; keel as long as the other petals, incurved and obtuse at the tip. *Stamens* diadelphous; anthers uniform. *Ovary* linear, sessile, few-ovuled; style long, filiform, abruptly incurved, stigma minute capitate. *Pod* flat, not visibly jointed, muricated along the edge and face and marked with conspicuous transverse veins.—DISTRIB. A single endemic species.

1. **S. tibetica**, *Benth.* in *Hook. Kew Journ.* v. 306; *Walp. Ann.* iv. 545.

TIBETAN Himalayas, alpine region, from Pangong eastward to East Nipal, alt. 14-17,000 ft., *Thomson*, *Strachey & Winterbottom*, &c.

Stems densely tufted, from a slender woody rootstock, the leaves and peduncles in a rosette at the surface. *Leaves* odd-pinnate; leaflets 11-15, oblong, obtuse, faintly hairy; leaf-rachis 2-4 in. long, including a distinct petiole, articulated at the nodes. *Flowers* 1-5, shortly pedicellate, on very short peduncles; bracts lanceolate, silky. *Calyx* ¼ in., densely pubescent. *Corolla* ⅝-¾ in., reddish, glabrous. *Pod* glabrous, membranous, 1 in. long.

36. **ZORNIA**, Gmel.

Annuals, with large geminate coriaceous bracts and dotted leaflets in 1-2 opposite pairs. *Flowers* in lax racemes. *Calyx* minute; upper teeth short, connate; lowest shorter than the two middle ones. *Corolla* much exserted; standard broad; keel incurved, acute. *Stamens* monadelphous; anthers dimorphous. *Ovary* sessile, many-ovuled; style filiform, incurved, stigma minute capitate. *Pod* of several small round flattened finely muricated 1-seeded indehiscent joints.—DISTRIB. Species 10, all but two American.

1. **Z. diphylla**, *Pers.*; *Benth.* in *Mart. Fl. Bras.* xv. 80, t. 21-2. *Hedysarum diphyllum*, *Linn.*; *Roxb. Fl. Ind.* iii. 353. *Z. angustifolia*, *Smith*: *DC. Prodr.* ii. 316; *Wall. Cat.* 5660; *W. & A. Prodr.* 217; *Dalz. & Gibs. Bomb. Fl.* 62. *Z. dictyocarpa*, *DC. Prodr.* ii. 317. *Z. gibbosa* and *graminea*, *Spanoghe* in *Linnaea*, xv. 192.—*Rheede Hort. Mal.* ix. t. 82-3.

Plains from the HIMALAYAS to CEYLON and BIRMA, ascending to 4000 ft. in KUMAON.—DISTRIB. Everywhere in the Tropics.

Stems wiry, densely caespitose. *Leaves* petioled; leaflets lanceolate, acute, glabrous, rigidly coriaceous, $\frac{1}{2}$ –1 in. long, dotted with black glands; stipules lanceolate, with a long spur. *Racemes* 1–3 in. long, 3–12-flowered; bracts ovate, acute, nearly or quite hiding the flower and pod. *Joints* 2–6, under $\frac{1}{2}$ in., densely prickly.

VAR. 1. *zeylonensis*; leaflets ovate, pod much longer than the bracts, joints twice as large densely bristly. *Z. zeylonensis*, Pers.; *DC. Prodr.* ii. 317; *Wall. Cat.* 5661; *W. & A. Prodr.* 217; *Dalz. & Gibs. Bomb. Fl.* 62. *Z. conjugata*, *Smith in Rees, Cyclop.*; *Thwaites Enum.* 85. *Hedysarum conjugatum*, *Willd. Sp. Pl.* iii. 1178. Plains of the Western Peninsula and Ceylon.

VAR. 2. *Walkeri* (Arn. *Pugill.* 12, sp.); leaflets oblong $\frac{1}{4}$ –1 in. long, bracts downy at the edge, pod scarcely exserted from the bracts, joints small reticulatovenose with only a few small bristles near the edge. *Walp. Rep.* i. 726; *Thwaites Enum.* 85.—Ceylon, *Walker, Thwaites*.

37. STYLOSANTHES, Sw.

Undershrubs. *Leaves* rigid, pinnately 3-foliolate. *Flowers* inconspicuous, in small dense heads. *Calyx* with an elongated filiform tube, and 5 teeth, of which the upper 4 are subconnate. *Flowers* polygamous, the fertile ones often apetalous. *Petals* inserted at the throat of the calyx-tube; standard orbicular; keel subrostrate. *Stamens* monadelphous; anthers dimorphous. *Ovary* subsessile at the base of the calyx-tube; style long, filiform, the lower part persistent, stigma minute capitate. *Pod* with 1–2 flattened rugose joints.—DISTRIB. Species about 15. Cosmopolitan, tropical.

1. *S. mucronata*, *Willd.*; *DC. Prodr.* ii. 318; *Wall. Cat.* 5664; *W. & A. Prodr.* 218; *Bedd. Ic. Pl. Ind. Or.* t. 294. *Arachis fruticosa*, *Retz.*; *Roxb. Hort. Beng.* 54; *Fl. Ind.* iii. 282. *Hedysarum hamatum*, *Burm. Fl. Ind.* 167; *Fl. Zeyl.* t. 106, fig. 2.

Shores of WESTERN PENINSULA and CEYLON.—DISTRIB. Cape, Trop. Africa, Malay isles.

A low diffuse undershrub, with terete pubescent branches. *Stipules* scarious, adnate downwards to the petiole; leaflets $\frac{1}{4}$ – $\frac{1}{2}$ in. long, pale green, rigidly coriaceous, oblong or lanceolate; under-side a little pubescent at first. *Flowers* 1 or few, in sessile terminal heads; bracts persistent, striated, pubescent. *Corolla* $\frac{1}{2}$ in., exserted. *Pod* 1–2-jointed, tipped with the falcate indurated lower part of the style.

38. SMITHIA, Ait.

Herbs or undershrubs. *Leaflets* many, small, sensitive, leaf-rachis ending in a bristle; stipules scarious, with large auricles. *Flowers* racemose or axillary. *Calyx* deeply 2-lipped, the lips usually entire. *Corolla* exserted; standard orbicular; keel incurved, obtuse. *Stamens* in two bundles of 5 each; anthers uniform. *Ovary* linear, many-ovuled; style incurved, filiform, stigma minute capitate. *Pod* of few or many minute flattened or turgid joints, folded together inside the calyx.—DISTRIB. Species 20–30, spread through the tropics of the old world.

* *Calyx* rigid, its veins close, parallel, simple.

1. *S. sensitiva*, *Ait.*; *DC. Prodr.* ii. 323; stems not bristly, leaflets small 4–20, flowers in short simple racemes, calyx-lips equal, corolla yellow. *Roxb. Hort. Beng.* 56; *Fl. Ind.* iii. 342; *Salisb. Par.* t. 92; *Wall. Cat.* 5668, ex

parte; *W. & A. Prodr.* 220, *ex parte*; *Dalz. & Gibs. Bomb. Fl.* 63. *S. abyssinica*, *Hochst. in Schimp. Pl. Abyss.* 1838.

HIMALAYAS to TRAVANCORE and RANGOON, ascending to 3000 ft. in KHASIA.—
DISTRIB. Madagascar, Abyssinia, Java, China.

Annual, $\frac{1}{2}$ –3 ft. high. *Stems* very slender, much branched. *Leaf-rachis* bristly, $\frac{1}{2}$ –1 in. long; leaflets $\frac{1}{4}$ – $\frac{1}{2}$ in. long, with subparallel edges, bristly mainly on the midrib below. *Flowers* 1–6, in close short-peduncled racemes from the axils of the upper leaves; pedicels short, ascending. *Calyx* $\frac{1}{4}$ – $\frac{1}{3}$ in. long; lips acute, entire, with a few short deciduous scattered bristles. *Joints* 4–6, densely papillose on the faces.

2. *S. geminiflora*, *Roth*; *DC. Prodr.* ii. 323; stems not bristly, leaflets small 4–12, flowers in pairs in the axils of the leaves, calyx-lips equal, corolla yellow. *S. sensitiva*, *Wall. et W. & A. loc. cit. ex parte*.

HIMALAYAS (ascending to 1–3000 ft.) to CEYLON and TAVOY.—DISTRIB. Java, N. Australia.

General habit of the last. *Leaflets* obtuse, with parallel sides, $\frac{1}{4}$ – $\frac{3}{8}$ in. long, the bristles of the edge and midrib more copious and longer. *Calyx* $\frac{1}{4}$ in., with a few deciduous bristles; both lips entire, acute. *Corolla* about twice the calyx. *Joints* 4–6, very turgid and papillose.

VAR. 1. *conferta*; upper nodes congested into dense heads, leaves and calyx more bristly. *S. conferta*, *Sm.*; *DC. loc. cit.* *S. capitata*, *Desv. Journ. Bot.* i. 121, non *Dalz.* *S. hispidissima*, *Zolling. Genesck. Arch.* iii. 56.

3. *S. purpurea*, *Hook. Bot. Mag.* t. 4283; stems not bristly, leaflets small 12–24, flowers in subaxillary peduncled axillary racemes, lower calyx-lip shorter, corolla purple. *S. laxiflora*, *Benth. Pl. Jungh.* 211.

Plains of CONCAN.

Annual. *Stems* very slender, $\frac{1}{2}$ –2 ft. high. *Leaf-rachis* 1–2 in. long; leaflets linear, $\frac{1}{4}$ – $\frac{5}{8}$ in. long, tipped with a long awn and furnished with a few bristles on the rachis and oblique midrib. *Flowers* 6–12, in copious short-peduncled secund racemes from the axils of the upper leaves; pedicels cernuous; bracteoles acute or obtuse, $\frac{1}{4}$ – $\frac{1}{2}$ calyx. *Calyx* $\frac{1}{4}$ – $\frac{3}{8}$ in. long; upper lip obtuse, recurved, lower subacute, both without bristles. *Corolla* little exerted. *Joints* of pod 10–12, reticulato-venose, not papillose.

4. *S. setulosa*, *Dalz. in Kew Journ.* iii. 208; stems densely bristly, leaflets large 10–12, flowers in copiously paniced secund racemes, lower calyx-lip shorter, corolla yellow. *Dalz. & Gibs. Bomb. Flora*, 63; *Bedd. Ic. Pl. Ind. Or.* t. 243.

Plains of CONCAN, *Stocks, Dalzell*.

A robust annual, 2–4 ft. high, the stems densely clothed throughout with deflexed bristles. *Leaflets* linear, $\frac{3}{4}$ – $1\frac{1}{2}$ in. long, with a few bristles in the edge and subcentric midrib. *Racemes* 1–2 in. long, dichotomously forked, forming a long thyrsoid panicle, only the lowest subtended by a leaf; pedicels ascending. *Calyx* $\frac{3}{8}$ in. long, densely clothed with minute bristles; upper lip broad, obtuse, recurved; lower much smaller, lanceolate, acute. *Corolla* twice the calyx. *Joints* 10–12, reticulato-venose, not papillose.

** *Calyx membranous, its veins not so close and distinctly anastomosing.*

5. *S. bigemina*, *Dalz. in Kew Journ.* iii. 208; stems minutely bristly, leaflets 4, flowers in short axillary racemes, bracteoles minute, joints 6–8 echinulate. *Dalz. & Gibs. Bomb. Flora*, 64.

Plains of CONCAN, *Stocks, Dalzell*; DEKKAN, near Poonah, *Jacquemont*.

Annual, very diffuse, with very slender stems, 1 ft. or less high. *Leaf-rachis* $\frac{1}{5}$ in. long; leaflets membranous, oblanceolate-oblong, obtuse, $\frac{3}{8}$ – $\frac{1}{2}$ in. long, minutely bristly

on the back and edge. *Flowers* 4-6, in copious short-peduncled racemes; bracteoles linear, $\frac{1}{3}$ the calyx. *Calyx* $\frac{1}{8}$ in., turbinate, densely bristle-ciliated; lips equal, upper truncate. *Corolla* yellow, twice the calyx.

6. **S. gracilis**, *Benth. in Hohen. Pl. Ind. Or. Exsic.* No. 1182; stems naked or minutely bristly, leaflets 4-6, flowers in short axillary racemes, bracteoles minute, joints 6-8 reticulate-venose. *Benth. Pl. Jungh.* 212.

NILGHIRIS, *Schmidt, Wight*.

A diffuse, very slender, perennial, with the general habit and inflorescence of *S. bigemina*. *Leaflets* obovate-oblong, $\frac{1}{4}$ - $\frac{3}{8}$ in., minutely bristly. *Calyx* $\frac{1}{8}$ in., densely ciliated with minute bristles; lips equal, narrower than in the last, the lower acute; bracteoles linear. *Corolla* bright yellow, twice the calyx. *Joints* distinctly veined, not at all echinulate as in *S. bigemina*.

7. **S. ciliata**, *Royle Ill.* 201 t. 35, fig. 2; stems not bristly, leaflets 6-16, flowers in dense axillary racemes, bracteoles large, joints 6-8 obscurely papillose. *S. pumila*, *Royle MSS.*; *W. & A. Prodr.* 220.

SIMLA and KUMAON to KHASIA and SIKKIM, alt. 3-6000 ft. PARASNATH in BEHAR.

Annual. *Stems* slender, $\frac{1}{2}$ -2 ft. high. *Leaf-rachis* $\frac{1}{2}$ -1 in.; leaflets linear, $\frac{1}{4}$ - $\frac{3}{8}$ in. long, obtuse, distinctly bristly on the edge and midrib below. *Flowers* up to a dozen in dense copious short-peduncled second racemes; bracteoles leafy, oblong, ciliated, nearly as long as calyx. *Calyx* $\frac{1}{4}$ in., densely bristly-ciliated; upper lip truncate, finally $\frac{1}{4}$ in. broad; lower lanceolate. *Corolla* yellow, little exserted.

8. **S. capitata**, *Dalz. in Kew Journ.* iii. 208; stems not bristly, leaflets 20-30, flowers in globose terminal heads, bracteoles large, joints 5-6 smooth. *Dalz. & Gibs. Bomb. Flora*, 63, non *Desv.*; *Bedd. Ic. Pl. Ind. Or.* t. 244.

WESTERN PENINSULA.

An annual, 1-2 ft. high, with firm shrubby terete branches. *Leaf-rachis* densely bristly, $1\frac{1}{2}$ -2 in. long; leaflets linear, $\frac{1}{4}$ - $\frac{3}{8}$ in. long, bristly on the back and edge. *Flowers* in a dense globose head 1 in. thick, at the end of each branch; pedicels very short; bracteoles oblong, membranous, bristle-tipped, nearly as long as the calyx. *Calyx* $\frac{3}{8}$ in. long; both lips broad, truncated, ciliated with long bristles. *Corolla* purplish, much exserted. *Joints* neither venose, nor papillose.

9. **S. pycnantha**, *Benth. MSS.*; stems minutely bristly, leaflets 6-8, flowers in globose terminal heads, bracteoles minute, joints 5-6 venose.

CONCAN, *Stocks, Law*.

An erect annual, $\frac{1}{2}$ -2 ft. high, the stem clothed densely with small bristles dilated at the base. *Leaves* distinctly petioled; leaf-rachis $\frac{1}{2}$ in. or less long, densely bristly; leaflets linear, $\frac{3}{8}$ - $\frac{5}{8}$ in. long, with a few minute yellow bristles in the back and edge. *Heads* 1 in. or more broad, formed of densely congested racemes; pedicels shorter than the calyx; bracteoles half the calyx, obtuse. *Calyx* $\frac{1}{8}$ in., with copious sessile black glands and small yellow bristles on back and edge; lips equal, truncate. *Corolla* yellow, half as long again as calyx.

10. **S. dichotoma**, *Dalzell MSS.*; stems not bristly, leaflets 4-6, racemes forming a lax corymbose panicle, bracteoles minute, joints 10-12 papillose. *S. blanda*, *Hohen. Plant. Ind. Or. Exsic.* No. 146, non *Wall*.

WESTERN PENINSULA.

Stems annual, very slender, little branched, 1-1 $\frac{1}{2}$ ft. high. *Leaf-rachis* $\frac{1}{2}$ in. or less long; leaflets membranous, oblanceolate-oblong, obtuse, $\frac{1}{4}$ - $\frac{3}{8}$ in. long, not aristate, both sides without bristles. Lower racemes of the panicles 5-6-flowered, secund; pedicels ascending, $\frac{1}{8}$ - $\frac{1}{4}$ in.; bracteoles linear, $\frac{1}{2}$ - $\frac{3}{4}$ calyx. *Calyx* membranous, $\frac{3}{8}$ in.; lower acute lip slightly longer than the broad truncate upper one. *Corolla* yellow, half as long again as the calyx.

11. **S. grandis**, *Benth. MSS.*; stems robust not bristly, leaflets 20-24, racemes forming a lax corymbose panicle, bracteoles $\frac{1}{4}$ calyx, joints 20-25 venose.

Base of the Himalayas in SIKKIM, *Herb. Griffith, Hook. fil.*

Stems stout, erect, 3-4 ft. high. *Leaf-rachis* $2\frac{1}{2}$ -3 in. long; leaflets linear, obtuse, without bristles, $\frac{1}{2}$ - $\frac{3}{4}$ in. long; lower stipules 1 in. long. *Racemes* subsecund, 6-12-flowered, forming a corymbose panicle $\frac{1}{2}$ ft. broad; pedicels erect, $\frac{3}{8}$ - $\frac{1}{2}$ in. long, with a few deciduous bristles; bracteoles $\frac{1}{4}$ in., obtuse. *Calyx* $\frac{3}{4}$ in. long; lips equal, truncate, obtuse, with only a few small bristles at first. *Joints* largest of all, $\frac{1}{6}$ in. broad.

12. **S. blanda**, *Wall. Cat.* 5669; stems densely bristly, leaflets 6-10, racemes copiously panicled, bracteoles half as long as the calyx, joints 5-6 reticulated. *W. & A. Prodr.* 221; *Wight. Ic.* t. 986; *Dalz. & Gibs. Bomb. Fl.* 64.

EAST HIMALAYAS, tropical zone up to 4000 feet, EAST BENGAL, NILGHIRS.

Perennial, suffruticose. *Stems* $1\frac{1}{2}$ -2 ft. high, the bristles very dense, spreading, fine, fragile. *Leaf-rachis* under 1 in. long; leaflets firm, obtuse, bristle-tipped, $\frac{1}{2}$ - $\frac{5}{8}$ in. long, with copious fine deciduous bristles on the rachis, edge and midrib. *Racemes* forming a dense terminal panicle, with corymbose branches; pedicels $\frac{1}{12}$ - $\frac{1}{6}$ in., densely bristly. *Calyx* $\frac{1}{6}$ - $\frac{1}{4}$ in., densely clothed with fine bristles on back and edge; lips equal; upper broad, truncate. *Corolla* bright yellow, twice the calyx. *Joints* $\frac{1}{12}$ in. broad.

VAR. 1. paniculata; stems more slender, flowers fewer smaller crowded at the end of the peduncles. *S. paniculata*, *Arn. Pug.* 12.—Hilly tracts of Ceylon, alt. 2-7000 ft.

VAR. 2. racemosa; annual, more slender and fugacious, leaflets more membranous, calyx $\frac{1}{8}$ - $\frac{1}{6}$ in. long, corymbs formed of a few close subsecund racemes 1- $1\frac{1}{2}$ in. long. *S. racemosa*, *Heyne in Wall. Cat.* 5670; *W. & A. Prodr.* 221; *Dalz. & Gibs. Bomb. Fl.* 63. *S. hirsuta*, *Dalz. in Kew Journ.* iii. 135; *Dalz. & Gibs. Bomb. Fl.* 63.—Plains of Western Peninsula and Ceylon.

39. **ÆSCHYNOMENE**, Linn.

Erect herbs or undershrubs. *Leaves* with very numerous close sensitive odd-pinnate small linear leaflets. *Flowers* in sparse racemes. *Calyx* deeply 2-lipped, the lips faintly toothed. *Corolla* fugacious; standard orbicular; keel not beaked. *Stamens* in two bundles of 5 each; anthers uniform. *Ovary* stalked, linear, many-ovuled; style filiform, incurved, stigma terminal. *Pod* linear, with a stalk longer than the calyx and 4-8 flattened 1-seeded separating joints.—*DISTRIB.* Species about 30, spread everywhere in the tropics.

1. **Æ. indica**, *Linn.*; *DC. Prodr.* ii. 320; stems slender much branched, peduncles viscid, calyx and small corolla glabrous. *W. & A. Prodr.* 219; *Wt. Ic.* t. 405; *Dalz. & Gibs. Bomb. Fl.* 62. *Æ. aspera*, *Wall. Cat.* 5666, *non Linn.* *Æ. kashmiriana*, *Camb. in Jacquem. Voy. Bot.* 40, t. 48. *Hedysarum Neli-Tali*, *Roxb. Hort Beng.* 57; *Fl. Ind.* iii. 365. *Æ. pumila*, *Linn.*; *DC. Prodr.* ii. 321. *Æ. diffusa*, *Willd.*; *DC. Prodr. loc. cit.*; *Wall. Cat.* 5665. *Æ. viscidula*, *Willd. Enum.* 776. *Æ. Roxburghii*, *Spreng. Syst.* iii. 322. *Smithia aspera*, *Roxb., Hort. Beng.* 56; *Fl. Ind.* iii. 343—*Rheede Hort. Mal.* ix. t. 18.

HIMALAYAS to CEYLON and SIAM, ascending to 5000 ft. in KASHMIR and 4000 ft. in KUMAON.—*DISTRIB.* Japan and everywhere in tropics of old world.

A suffruticose annual, 1-3 ft. high, glabrous, pale green, with slender terete branches. *Leaf-rachis* 2-3 in. long; leaflets close, 41-61, linear, obtuse, 1-nerved; stipules lanceolate, membranous, deciduous, with a large auricle. *Flowers* 1-4, in copious axillary racemes; peduncle and pedicels usually viscid; bracts small, lanceolate,

rigid, gland-ciliated. *Calyx* under $\frac{1}{4}$ in. long. *Corolla* fugacious, twice the calyx. *Pod* 1-1 $\frac{1}{2}$ in. long, straight or rather curved; upper suture straight, lower more or less distinctly indented; joints 6-10, $\frac{1}{8}$ - $\frac{1}{6}$ in. broad, smooth or finally papillose on the face.

2: *Æ. aspera*, Linn.; *DC. Prodr.* ii. 320; stems robust simple or little-branched, peduncles calyx and large corolla hispid. *W. & A. Prodr.* 219; *Wt. Ic.* t. 299. *Æ. indica*, Wall. *Cat.* 5667, non Linn. *Hedysarum lagenarium*, Roxb. *Hort. Beng.* 57; *Fl. Ind.* iii. 365. *Æ. indica*, β *aspera*, Hassk. *Pl. Jav. Rar.* 340. *Æ. trachyloba*, Miq. *Flor. Ind. Bat.* i. 276.

Tropical Zone; BENGAL and SILHET to MALACCA and CEYLON.—DISTRIB. Malay isles, Tropical Africa.

A tall erect swamp species, with stout glabrous main stems, full of white pith. *Stipules* linear or lanceolate, auricled, deciduous; leaf-rachis 3-6 in. long; leaflets 61-101, linear, obtuse, 1-nerved. *Racemes* corymbose, 2-4-flowered; pedicels and peduncles clothed with spreading bristles. *Calyx* $\frac{3}{8}$ in., with a pair of round bracteoles. *Corolla* twice the calyx. *Pod* 2-2 $\frac{1}{4}$ in. by $\frac{1}{4}$ in.; joints 3-6, smooth or echinate on the faces over the seeds.

Æ. SURATTENSIS, *W. & A. Prodr.* 219, is altogether doubtful, the description being probably taken in part from *Sesbania aculeata*.

40. **ORMOCARPUM**, Beauv.

Shrubs. *Leaves* with odd-pinnate exstipellate leaflets and persistent striated stipules and bracts. *Flowers* in lax racemes. *Calyx*-tube campanulate; 2 upper teeth deltoid; 3 lower lanceolate. *Standard* broad; keel much incurved, not at all beaked. *Stamens* in two bundles of 5 each; anthers uniform. *Ovary* linear, few-ovuled; style filiform, inflexed, stigma minute terminal. *Pod* of a few indehiscent turgid linear or oblong joints, the lower seedless, the faces rugose, naked or muricated with weak gland-tipped prickles.—DISTRIB. Species 6, spread all round the world in the tropics.

1. *O. sennoides*, *DC. Prodr.* ii. 315; *Wall. Cat.* 5658; *W. & A. Prodr.* 216; *Wt. Ic.* t. 297. *O. coronilloides*, *G. Don Gen. Syst.* ii. 279. *Hedysarum sennoides*, Willd.; *Roxb. Hort. Beng.* 57; *Fl. Ind.* iii. 364.

Plains of the WESTERN PENINSULA and CEYLON.—DISTRIB. Siam, Philippines, Polynesia, Trop. Africa.

A low shrub, with terete slender branches, the branchlets and leaf-rachis viscid. *Leaflets* 9-17, alternate, oblong, obtuse, membranous, deciduous. *Flowers* 2-6, in copious short-peduncled axillary corymbose racemes; bracts spreading, minute, deltoid; pedicels viscid, as long as calyx. *Calyx* $\frac{1}{4}$ in. *Corolla* yellow, much exserted. *Pod* with 2-4 joints, linear or oblong, $\frac{1}{2}$ -1 in. long, horizontally plicate, smooth or muricated.

41. **LEPTODESMIA**, Benth.

Diffuse perennial herbs. *Leaves* simple or pinnately 3-foliolate, stipellate. *Bracts* large, imbricated. *Flowers* small, crowded in dense terminal racemose heads. *Calyx* with a very short tube, and 5 subequal setaceous teeth. *Corolla* minute, included; standard broad; keel obtuse. *Stamens* diadelphous; anthers uniform. *Ovary* sessile, 1-ovuled; style long, filiform, incurved, stigma capitate. *Pod* small, oblong, membranous, flattened, 1-seeded, opening widely along the ventral suture.—DISTRIB. Two species, the other a plant of Madagascar.

1. *L. congesta*, Benth. *MSS.* *Nicolsonia congesta*, *Wight Ic.* t. 1056. *Desmodium congestum*, Benth. *Pl. Jungh.* 222, non *W. & A.*

Tropical Zone; NILGHIRIS, *Gardner, Schmidt, Wight.*

A perennial, with slender firm trailing cæspitose stems 1-2 ft. long. *Leaves* short-petioled, membranous, 1 or 3-foliate, the end leaflet the largest, orbicular or oblong, obtuse, $\frac{1}{4}$ - $\frac{3}{4}$ in. long, a little hairy below. *Flowers* in copious oblong terminal capitate racemes under 1 in. long; bracts ovate, scariosæ, finely pubescent; pedicels short. *Calyx* $\frac{1}{4}$ in; teeth densely plumose. *Pod* as long as calyx.

42. **ELEIOTIS**, DC.

An annual herb. *Leaves* usually 1-foliate. *Flowers* in axillary racemes. *Calyx* with a very short tube and 5 subequal setaceous teeth. *Corolla* minute; standard broad; keel obtuse, adhering to the wings. *Stamens* diadelphous; anthers uniform. *Ovary* subsessile, 1-ovuled; style short, uncinate or nearly straight, thickened at the base, stigma capitate. *Pod* of a single dimidiate membranous veined joint, with a flattened straight dorsal and rounded ventral suture.—A single endemic species.

1. **E. sororia**, DC. *Prodr.* ii. 348; *Wall. Cat.* 5741; *W. & A. Prodr.* 231. *E. monophylla*, DC. *loc. cit.* *Hedysarum sororium*, Linn.; *Roxb. Fl. Ind.* iii. 352. *Hallia sororia*, Willd. *Sp.* iii. 1170. *Glycine monophylla*, Burm. *Fl. Ind.* 161, t. 50, fig. 2.

Plains of BUNDELKUND, WESTERN PENINSULA and CEYLON.

An annual, with slender trailing densely cæspitose glabrous stems, 1-2 ft. long. *Leaves* subglabrous, membranous, consisting usually of a single short stalked stipellate terminal leaflet, rounded or broader than long, emarginate, $\frac{1}{4}$ -1 in. long, but occasionally with a pair of minute lateral leaflets. *Flowers* in copious simple lax axillary racemes; pedicels spreading, downy, exceeding the calyx; bracts minute, ovate, scariosæ, deciduous. *Pod* $\frac{1}{4}$ in. long.

43. **PYCNOSPORA**, R. Br.

A low shrub. *Leaves* pinnately 3-foliate. *Flowers* minute, racemed, *Calyx* deeply cleft, the upper teeth subconnate. *Corolla* much exerted; standard roundish; keel obtuse, cohering to the wings. *Stamens* diadelphous; anthers uniform. *Ovary* sessile, many-ovuled; style inflexed, filiform; stigma minute capitate. *Pod* oblong, turgid, 2-valved, 8-10-seeded, continuous within, not jointed, but marked with transverse veins.—A single species, combining the habit of *Desmodium*, with a pod like *Crotalaria*.

1. **P. hedysaroides**, R. Br. in *Herb. Banks.* *P. nervosa*, W. & A. *Prodr.* 197; *Dalz. & Gibs. Bomb. Fl.* 75. *Crotalaria*? *nervosa*, *Grah. in Wall. Cat.* 5428. *Indigofera desmodioides*, Benth. in *Hohen. Pl. Ind. Or.* No. 303.

Tropical zone; KHASIA (3-5000 ft.), SILHET, TENASSERIM, WESTERN PENINSULA, CEYLON.—DISTRIB. China, Philippines, N. Australia.

A perennial herb, with slender densely cæspitose trailing stems $\frac{1}{2}$ -2 ft. long. *Leaves* pinnately 3-foliate; leaflets obovate, obtuse, $\frac{1}{4}$ -1 $\frac{1}{2}$ in. long, stipellate, subcoriaceous, glabrous above, finely downy and reticulato-venose below. *Flowers* in lax terminal racemes; bracts deciduous, scariosæ, ovate-cuspidate; pedicels downy, 2-3 times the calyx. *Calyx* $\frac{1}{12}$ in. long or less. *Pod* $\frac{3}{8}$ - $\frac{1}{2}$ in. long, finally black.

44. **PSEUDARTHRIA**, W. & A.

Habit of *Desmodium*, from which it only differs in pod. *Calyx*-teeth as long as the tube, 2 upper subconnate. *Corolla* 2-3 times the calyx; standard broad; keel obtuse. *Stamens* diadelphous; anthers uniform. *Ovary* subsessile, many-ovuled; style filiform, stigma capitate. *Pod* linear-oblong, compressed, mem-

braneous, indehiscent, continuous within, the sutures not at all indented.—DISTRIB. Species 5, the others African.

1. **P. viscida**, *W. & A. Prodr.* 209; *Wight Ic. t.* 286. *Hedysarum viscidum*, *Linn.*; *Roxb. Hort. Beng.* 57; *Fl. Ind.* iii. 356. *Desmodium viscidum*, *DC. Prodr.* ii. 336; *Wall. Cat.* 5698. *Rhynchosia viscida*, *DC. Prodr.* ii. 387. *Glycine viscida*, *Willd. in Nova Acta*, iv. 208. *Desmodium Leschenaultii*, *DC. Prodr.* ii. 336?

Tropical zone, WESTERN PENINSULA and CEYLON, up to 3000 ft.—DISTRIB. Timor.

Perennial, 2-3 ft. high, with slender stems, clothed with fine grey pubescence. *Leaves* petioled, pinnately 3-foliolate; leaflets stipellate, membranous or subcoriaceous, green, obscurely bristly above, grey, densely pubescent, rarely subglabrescent below; end leaflet round-rhomboidal, obtuse or acute, 2-4 in. long. *Racemes* axillary and terminal, sometimes branched; flowers distant, fascicled; pedicels spreading, 3-4 times the minute calyx. *Pod* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, 4-6-seeded, finely downy.

45. **LOUREA**, Neck.

Herbs. *Leaves* membranous, stipellate, 1-3-foliolate. *Flowers* in terminal simple or panicle racemes. *Calyx* membranous, accrescent, the lanceolate teeth as long as the campanulate tube. *Corolla* equalling or exceeding the calyx; standard broad; keel obtuse. *Stamens* diadelphous; anthers uniform. *Ovary* few-ovuled; style filiform, inflexed, stigma capitate. *Pod* of about 4 small distinct 1-seeded smooth veined joints, included in the calyx.—All the species are East Indian.

1. **L. paniculata**, *Wall. Cat.* 5673; leaves 1-foliolate, nearly twice as broad as long, racemes copiously panicle. *Benth. Pl. Jungh.* 215.

AVA; Taong-dong mountains, *Wallich*.

Stems erect, slender, finely downy. *Leaves* $2\frac{1}{2}$ -3 in. broad, rigidly coriaceous, glabrous; lobes spreading, rounded at the point, 4-5-nerved, base subcordate, apex rounded or slightly emarginate; petiole nearly as long as the blade. *Racemes* 1-3, forming copious terminal and lateral panicles; pedicels pubescent, cernuous, sometimes geminate, shorter than the calyx. *Calyx* slightly downy, finally $\frac{1}{6}$ - $\frac{1}{5}$ in. *Joints* downy.

2. **L. Vespertilionis**, *Desv.*; *DC. Prodr.* ii. 323; leaflets 1 rarely 3 glabrous 4-6 times as broad as long, racemes simple or slightly panicle. *W. & A. Prodr.* 221; *Wight Ic. t.* 285; *Wall. Cat.* 5671. *Hedysarum Vespertilionis*, *Linn.*; *Roxb. Hort. Beng.* 57; *Fl. Ind.* iii. 352.

Common in waste places throughout India.—DISTRIB. Tropics of both hemispheres, often planted.

Stems erect, slender, finely downy upwards. *Petiole* $\frac{1}{2}$ -1 in.; leaflets rigidly subcoriaceous, green, clouded usually with white, the end one 2-3 in. broad, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, with two linear or lanceolate spreading or slightly ascending 2-3-nerved halves; apex bristle-tipped, broadly emarginate; side leaflets, if present, much smaller, obliquely obversely deltoid. *Racemes* 3-6 in. long; pedicels pubescent, shorter than the calyx; lower geminate. *Calyx* finally $\frac{1}{4}$ - $\frac{3}{8}$ in. long. *Corolla* not exerted. *Joints* 4-5.

3. **L. obcordata**, *Desv.*; *DC. Prodr.* ii. 324; leaflets 3 rarely 1 pilose beneath on the veins, terminal roundish or obversely deltoid, racemes usually simple. *Hedysarum obcordatum*, *Poir. Dict. Suppl.* ii. 425. *H. reniforme*, *Lour. Fl. Coch.* 447. *L. reniformis*, *DC. loc. cit.* *L. microphylla*, *Wall. Cat.* 5672. *Desmodium præmorsum*, *Grah. in Wall. Cat.* 5703.

BIRMA, Wallich.—DISTRIB. Malay isles, China, Philippines, N. Australia.

Stems caespitose, very slender, wide-trailing, pubescent. *Petiole* $\frac{1}{2}$ – $\frac{3}{4}$ in.; leaflets membranous, pale green, as broad as long, truncate or rounded at the apex, pale green, not clouded, glabrous above, $\frac{1}{4}$ – $\frac{3}{4}$ in. long. *Racemes* very lax, reaching 6–9 in. long; pedicels as long as the calyx, pubescent, cernuous, rarely geminate. *Calyx* downy, finally $\frac{1}{5}$ – $\frac{1}{4}$ in. long. *Corolla* twice the flowering-calyx. *Joints* 4–5, glabrous.

4. ***L. campanulata*, Benth. Pl. Jungh.** 215; leaflets 3 rarely 1 obovate-oblong downy beneath, racemes copiously paniced. *Uraria campanulata*, *Wall. Cat.* 5685.

AVA; Taong-dong mountains, Wallich.

Erect, with the habit of a *Desmodium*. *Stems* firm, slender, finely downy. *Petioles* $\frac{1}{4}$ – $\frac{3}{4}$ in.; leaflets subcoriaceous, green, glabrous above, pale green, reticulato-venose below; and one 2–3 in. long, obtuse, with a cuneate base; side ones much smaller. *Racemes* 4–6 in. long, forming copious terminal panicles, with densely pubescent rachises; pedicels $\frac{1}{2}$ in., curved. *Calyx* $\frac{1}{3}$ – $\frac{1}{2}$ in., densely pubescent. *Corolla* twice flower-calyx. *Joints* 2–3, pubescent.

46. **URARIA**, Desv.

Suffruticose perennials. *Leaves* stipellate, with 1 to 9 leaflets. *Flowers* very numerous, minute, racemose. *Calyx-tube* very short; two upper teeth short; three lower usually elongated, setaceous. *Standard* broad; wings adhering to the obtuse keel. *Stamens* diadelphous; anthers uniform. *Ovary* sessile or short-stalked, few-ovuled; style inflexed filiform, stigma terminal. *Pod* of 2–6 small turgid 1-seeded indehiscent joints, often placed face to face.—DISTRIB. Species all here included.

* *Upper leaves* 5–9-foliolate.

1. ***U. picta*, Desv.; DC. Prodr.** ii. 324; leaflets linear clouded, pedicel clothed with short bristles. *Wall. Cat.* 5674; *W. & A. Prodr.* 221; *Dalz. & Gibs. Bomb. Fl.* 65. *Doodia picta*, *Roxb. Fl. Ind.* iii. 368. *Hedysarum pictum*, *Jacq. Ic.* t. 567; *Roxb. Hort. Beng.* 57. *U. linearis*, *Hassk. Pl. Jav. Rar.* 349.

HIMALAYAS to CEYLON, ascending to 6000 ft. in the north-west.—DISTRIB. Tropical Africa, Malay isles, Philippines.

An erect little-branched suffruticose perennial, 3–6 ft. high. *Stems* robust, finely downy. *Petioles* 1–2 in.; leaflets 4–6, rarely 9, rigidly subcoriaceous, glabrous above, reticulato-venulose, minutely pubescent below, 4–8 in. long, $\frac{1}{4}$ –1 in. broad; lowest simple, round or oblong. *Flowers* in dense cylindrical racemes, $\frac{1}{2}$ –1 ft. long, $\frac{2}{3}$ – $\frac{3}{4}$ in. broad; bracts brown, scariosc, deciduous, not distinctly ciliated; upper lanceolate, lower ovate acuminate; pedicels $\frac{1}{4}$ – $\frac{3}{8}$ in., abruptly recurved at the tip after flowering. *Corolla* purple, slightly exserted. *Joints* 3–6, glabrescent, polished, often whitish.

2. ***U. crinita*, Desv.; DC. Prodr.** ii. 324; leaflets oblong not clouded, pedicels clothed with long bristles. *Wall. Cat.* 5675. *U. picta*, *Wight Ic.* t. 411, non *Desv.* *U. comosa*, *DC. Prodr.* ii. 324. *Hedysarum crinitum*, *Linn.; Burm. Fl. Ind.* 169, t. 56; *Roxb. Hort. Beng.* 57. *Doodia crinita*, *Roxb. Fl. Ind.* iii. 369.

HIMALAYAS to CEYLON and SIAM, ascending to 9000 ft. in the north-west.—DISTRIB. China, Malay isles.

General habit of the last. *Upper leaves* 3–7-foliolate; leaflets subcoriaceous, green, smooth above, paler, reticulato-venose beneath, 4–6 in. long, 1–2 in. broad, much rounded at the base. *Racemes* dense, reaching above a foot long, 1–1½ in. thick;

lower pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. long with spreading bristles 3–4 times their thickness; bracts distinctly ciliated. *Calyx*-segments densely plumose. *Corolla* purplish, $\frac{1}{4}$ in. long. *Joints* 4–6, opaque.

** *Leaves* 1- and 3-foliolate intermixed.

3. ***U. lagopoides*, DC. Prodr. ii. 324**; stems trailing, leaflets small orbicular or oblong, heads short dense oblong-cylindrical, lower calyx-teeth elongated. *W. & A. Prodr.* 222, *non Wall.* *Hedysarum lagopoides*, *Burm. Fl. Ind.* 68, t. 53, fig. 2. *U. retusa*, *Wall. Cat.* 5680. *Doodia lagopodioides*, *Roxb. Fl. Ind.* iii. 366. *Lespedeza lagopoides*, *Pers. Ench.* ii. 308. *U. hamosa*, *Wall. Cat.* 5681, *A., non W. & A.*

Tropical zone. NIPAL and BENGAL to AVA.—DISTRIB. Malay isles, China, Polynesia, N. Australia.

Stems densely caespitose, woody, slender, pubescent. *Petiole* $\frac{1}{2}$ –1 in.; leaflets many, of both kinds, obtuse, broadly rounded at the base, 1–2 in. long, glabrous above, finely downy below. *Heads* always simple, very dense, 1–2, rarely 3 in. long, under 1 in. thick; bracts subpersistent, distinctly ciliated; pedicels densely crinite, not longer than calyx. *Calyx* $\frac{1}{2}$ – $\frac{3}{5}$ in.; lower teeth setaceous, densely plumose. *Corolla* scarcely exerted. *Joints* 1–2, brown, polished, finely pubescent. *U. cercifolia*, *Desv.*; *DC. Prodr.* ii. 325, is probably a form of this with a single leaflet.

4. ***U. lagopus*, DC. Prodr. ii. 324**; stems erect, leaflets large oblong not cordate, heads long dense cylindrical, lower calyx-teeth elongated. *Hedysarum arboreum*, *Don Prodr.* 243. *Uraria arboreum*, *G. Don Gen. Syst.* ii. 287. *U. lagopodioides*, *Wall. Cat.* 5676, *non DC.* *U. alopecuroides*, *Wright Ic.* t. 290. *Doodia alopecuroides*, *Roxb. Fl. Ind.* iii. 368. *U. hamosa*, *Wall. Cat.* 5681 *C.* *Hedysarum alopecuroides*, *Roxb. Hort. Beng.* 57.

PUNJAB, along the Himalayas to ASSAM and AVA, ascending to 6000 ft. in SIMLA.

An erect undershrub, reaching 10–12 ft., with slender woody densely pubescent branches. *Leaves* usually all 3-foliolate, subcoriaceous, glabrescent above, reticulato-venose, finely downy below; end leaflet 2–4 in. long, $1\frac{1}{2}$ –2 in. broad. *Racemes* copious, both terminal and axillary, resembling those of *U. crinita*, reaching 6–9 in. by 1–1 $\frac{1}{4}$ in.; bracts deciduous; pedicels 2–3 times the calyx, densely crinite. *Calyx* $\frac{1}{2}$ – $\frac{3}{5}$ in. *Corolla* purple, little exerted. *Joints* 2–6, dark or pale, dull or polished.

5. ***U. repanda*, Wall. Cat. 5677; stems erect, leaflets large cordate-ovate, heads dense cylindrical, lower calyx-teeth elongated. *Benth. Pl. Jungh.* 213.**

BIRMA, *Wallich*.

General habit of the last, to which it is closely allied. Pubescence of *branches* shorter. *Leaves* simple and trifoliolate intermixed, the side leaflets of the latter much smaller than the end one, which is subobtuse or subacute, deeply produced at the base. *Racemes* 2–4 in. by $\frac{2}{3}$ – $\frac{3}{4}$ in.; bracts ovate, acuminate, distinctly ciliated, not deciduous; pedicels densely crinite, shorter than the calyx. *Calyx* $\frac{1}{4}$ in.; lower teeth long, setaceous, plumose. *Joints* 2, polished, glabrous, brownish-drab.

6. ***U. hamosa*, Wall. Cat. 5681 *B*; stems erect, leaflets large oblong not cordate, racemes long lax cylindrical, lower calyx teeth not elongated. *W. & A. Prodr.* 222; *Wright Ic.* t. 284. *Hedysarum hamosum*, *Roxb. Hort. Beng.* 57. *Doodia hamosa*, *Roxb. Fl. Ind.* iii. 367. *U. lanceolata* and *desmodioides*, *Grah. in Wall. Cat.* 5682, 5683. *U. leptostachya*, *Wall. Cat.* 5684. *Desmodium Horsfieldii* and *dasyphyllum*, *Miq. Fl. Ind. Bat.* i. 251–3.**

HIMALAYAS to CEYLON, BIRMAH and PEGU, ascending in SIKKIM to 4000 ft.—DISTRIB. Malay isles.

Branches woody, slender, shortly pubescent. *Leaves* similar in texture to those of all the preceding, sometimes all simple, the end one obtuse, broadly rounded at the

base, 3-5 in. by 2-3 in. *Racemes* much laxer than in the other species, resembling those of a *Desmodium*, copiously panicle, reaching $\frac{1}{2}$ -1 ft. long; bracts ovate, cuspidate, pubescent, deciduous; pedicels $\frac{1}{2}$ - $\frac{1}{3}$ in., often fascicled. *Calyx* $\frac{1}{2}$ in., all the teeth deltoid-cuspidate. *Corolla* 2-3 times the calyx. *Joints* 4-6, opaque, drab or brown.

*** *Leaves usually all 1-foliolate.*

7. ***U. prunellæfolia***, *Grah. in Wall. Cat.* 5686; stems erect, leaflets oblong-lanceolate, racemes short close oblong. *Hedysarum hamatum*, *Heyne MSS.*

KUMAON, alt. 3000 ft., *Thomson. EAST HIMALAYAS, Griffith.*

Branches slender, shortly pubescent. *Leaflet* oblong or lanceolate, obtuse or acute, rounded at the base, 3-4 in. by 1-1 $\frac{1}{2}$ in.; petiole $\frac{3}{4}$ -1 in. *Racemes* terminal, simple, 1-2 in. by $\frac{3}{8}$ - $\frac{3}{4}$ in.; bracts small, lanceolate, deciduous; pedicels 2-3 times the calyx, shortly bristly. *Calyx* $\frac{1}{2}$ - $\frac{1}{3}$ in., lower teeth twice as long as the upper. *Corolla* under twice the calyx. *Joints* 3-4, placed end to end, opaque or polished.

8. ***U. cordifolia***, *Wall. Pl. As. Rar. i.* 33, t. 37; stems erect, leaflet cordate-ovate, racemes elongated lax cylindrical. *U. cordata*, *Wall. Cat.* 5679.

PROME and banks of the Irrawaddi, *Wallich.*

Branches stout, woody, densely clothed with short spreading hairs. *Leaves* casually trifoliolate, reaching 6-9 in. long, nearly as broad, acute, conspicuously hairy on the raised veins below; petiole $\frac{1}{2}$ -2 in. *Racemes* lateral and terminal, $\frac{1}{2}$ -1 ft. long, resembling those of *U. hamosa*; bracts small, lanceolate, deciduous; pedicels $\frac{1}{4}$ - $\frac{3}{8}$ in., densely crinite. *Calyx* $\frac{1}{2}$ - $\frac{1}{3}$ in.; teeth setaceous, nearly equal. *Corolla* scarcely exerted. *Joints* 2-3, opaque, pubescent.

47. **ALYSICARPUS**, Neck.

Diffuse annuals or biennials. *Leaves* simple, rarely 3-foliolate, stipellate, subcoriaceous. *Flowers* in copious axillary racemes. *Calyx* glumaceous; teeth deep, often imbricated, the two upper often connate. *Corolla* not exerted; standard broad; keel obtuse, adhering to the wings. *Stamens* diadelphous; anthers uniform. *Ovary* nearly or quite sessile, many-ovuled; style incurved, stigma capitate. *Pod* terete or turgid, composed of several indehiscent 1-seeded joints. —DISTRIB. Species about 15; weeds everywhere in the tropics of the old world.

* **Microcalycinæ.** *Calyx* not longer than the first joint of the pod.

1. ***A. monilifer***, *DC. Prodr. ii.* 353; stems clothed with fine spreading hairs, pod distinctly moniliform turgid veinless. *Wall. Cat.* 5769; *W. & A. Prodr.* 232. *Hedysarum moniliferum*, *Linn.*; *Burm. Fl. Ind. t.* 52, fig. 3; *Roxb. Hort. Beng.* 56; *Fl. Ind. iii.* 345. *A. Rubibarna*, *Wall. Cat.* 5771, *ex parte.*

Tropical zone; HIMALAYAS through India proper. BIRMA and TENASSERIM, *Wallich.*—DISTRIB. Nubia, Abyssinia.

Stems densely tufted, $\frac{1}{4}$ -1 ft. long. *Leaves* all simple, oblong, obtuse, glabrous, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, often cordate; petiole $\frac{3}{4}$ -1 in. long, finely downy. *Racemes* close, 4-8-flowered; pedicels very short. *Calyx* $\frac{1}{12}$ - $\frac{1}{8}$ in., obscurely hairy; teeth linear, erectopate. *Pod* $\frac{1}{12}$ in. thick, 4-8-jointed, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, densely clothed with minute hooked pubescence, not at all reticulato-venose.

2. ***A. hamosus***, *Edgew. Cat. Banda. Pl.* 47; stems densely clothed with short spreading hairs, calyx much shorter than the first joint, pod compressed reticulato-venose not moniliform. *A. rotundifolius*, *Wight MSS.*

Plain of BUNDELKUND and WESTERN PENINSULA.

Stems 1 ft. or less long, with many erecto-patent hairy branches. *Leaves* all simple; leaflet orbicular, obtuse, cordate, hairy on the veins below, $\frac{1}{2}$ – $1\frac{1}{4}$ in. long and broad; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in., hairy like the branches. *Racemes* short-peduncled, moderately close, 4–6-flowered; pedicels as long as the calyx. *Calyx* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, the linear teeth erecto-patent. *Pod* $\frac{1}{2}$ – $\frac{5}{8}$ in. long, by $\frac{1}{8}$ in., distinctly pubescent, 3–5-jointed.

3. ***A. vaginalis*, DC. Prodr. ii. 353**; stems glabrescent or with a little adpressed down, calyx as long as the first joint, pod terete reticulato-venose not moniliform. *W. & A. Prodr.* 233; *Dalz. & Gibs. Bomb. Fl.* 64. *Hedysarum vaginales*, Linn.; *Roxb. Hort. Beng.* 56; *Fl. Ind.* iii. 345. *A. Rubibarna*, Wall. *Cat.* 5771, *ex parte*. *A. diversifolius*, Wall. *Cat.* 5772. *A. Harnieri*, Schweinf. *Rel. Kotsch.* 24, t. 19.

HIMALAYAS to MALACCA and CEYLON, ascending to 4000 feet in the North-west provinces.—**DISTRIB.** Through tropics of old world, Afghanistan, introduced in America.

Stems robust, ascending, 1–3 ft. long in the type. *Leaflets* glabrous, $\frac{1}{2}$ –2 in. long, corlate at the base, usually oblong, obtuse, about twice as long as broad, rarely lanceolate, 3–6 times as long as broad; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in. *Racemes* elongated, 6–12-flowered, 2–3 in. long; pedicels shorter than the calyx. *Calyx* $\frac{1}{8}$ in., nearly glabrous; teeth linear-setaceous, exceeding the tube. *Pod* $\frac{1}{2}$ – $\frac{3}{4}$ in. by $\frac{1}{12}$ in., the joints half as long again as broad, faintly pubescent, rugose, usually a little thickened at the end, sometimes indistinctly moniliform.

VAR. 1. *nummularifolius*; dwarfier, leaflets smaller oblong or roundish obtuse, racemes more crowded. *A. nummularifolius*, DC. *Prodr.* ii. 353; *Wall. Cat.* 5767; *W. & A. Prodr.* 232; *Dalz. & Gibs. Bomb. Fl.* 64. *A. varius*, Wall. *Cat.* 5768. *Hedysarum varium*, Roth Nov. Sp. 354. *H. cylindricum*, Poir. *Dict. Suppl.* v. 400. *H. nummularifolium*, Linn. *Sp. Plant.* 1051. *Hegetschweilera pulchella*, Regel in Bot. Zeit. i. 47.—As common and widely spread as the type.

VAR. 2. *heterophyllus*; leaflets lanceolate, simple and trifoliate intermixed, racemes elongated. *A. heterophyllus*, Benth. MSS. *A. trifoliatius*, Stocks MSS.—Plains of Scinde, Dr. Stocks.

VAR. 3. *Stocksii*; stems clothed with fine spreading hairs, leaflets thinner than in the type obovate oblong hairy beneath, racemes elongated.—Plains of Concan, Stocks & Law. Intermediate between the type and *A. rotundifolius*.

**** *Macrocalycinae*.** *Calyx* much longer than the first joint of the pod, its teeth imbricated in the fruiting stage.

4. ***A. bupleurifolius*, DC. Prodr. ii. 352**; pedicels short, calyx ciliated only, joints of pod neither veined nor rugose. *Wall. Cat.* 5761, *excl. B & F*; *W. & A. Prodr.* 233; *Dalz. & Gibs. Bomb. Fl.* 64. *Hedysarum bupleurifolium*, Linn. *Sp. Pl.* 1051; *Roxb. Cor. Pl.* t. 194; *Hort. Beng.* 56; *Fl. Ind.* iii. 346. *H. gramineum*, Retz.; *Roxb. Fl. Ind.* iii. 646. *A. ludens*, Wall. *Cat.* 5762, *excl. B & F*.

HIMALAYAS to CEYLON and BIRMA, ascending to 4000 ft. in KUMAON.—**DISTRIB.** Malay isles, China, Philippines, Mauritius, Polynesia.

Stems 1–2 ft., slender, ascending, glabrous. *Leaflets* glabrous, linear or lanceolate, 1–3 in. long, acute, rather rounded at the base, rarely oblong, subobtuse. *Racemes* 3–6 in. long, the flowers in 10–20 distant pairs; pedicels very short. *Calyx* $\frac{1}{4}$ in., adpressed to the pod, hairy at the edge only; teeth twice as long as the furrowed funnel-shaped tube. *Pod* stalked, $\frac{3}{8}$ – $\frac{1}{2}$ in. long, $\frac{1}{12}$ in. thick; joints 4–6, glabrous, as long as smooth, slightly moniliform.

VAR. 1. *gracilis*; leaves oblong-lanceolate obtuse 1–2 in. long, calyx not more than $\frac{1}{8}$ in. long, pod 1–2-jointed included or little exserted. *A. gracilis*, Edgew. in Journ. Linn. Soc. ix. 312; *Cat. Pl. Band.* 46.—Bundelkund, Edgeworth. Western Peninsula, Wight.

5. **A. longifolius**, *W. & A. Prodr.* 233; pedicels short, calyx slightly pubescent and ciliated, articulations of pod glabrous finely reticulato-venose. *Wt. Ic.* t. 251; *Dalz. & Gibbs. Bomb. Fl.* 65. *Hedysarum longifolium*, *Rottl.*; *Spreng. Syst.* iii. 319. *H. bracteatum*, *Herb. Madr.* *A. vaginalis*, *Wall. Cat.* 5763 B, *C* in part. *A. spicatus*, *Royle MSS.*

Plains, scattered throughout INDIA PROPER.

Stems stout, ascending, subglabrous, reaching 4–5 ft. *Leaflets* oblong or lanceolate, 3–6 in. long, subcordate, ciliated on the veins below. *Racemes* moderately close, $\frac{1}{2}$ –1 ft. long, the flowers adpressed to the finely hairy rachis; pedicels $\frac{1}{12}$ in. *Calyx* $\frac{1}{4}$ in.; teeth lanceolate, 4–5 times the length of the funnel-shaped plicate tube. *Pod* 4–6-jointed, usually exserted, $\frac{1}{12}$ in. broad, turgid, moniliform, marked only with a few faint raised veins.

6. **A. rugosus**, *DC. Prodr.* ii. 353; pedicels short, calyx ciliated, pod turgid moniliform deeply transversely plicate included or little exserted. *Hedysarum rugosum*, *Willd. Sp.* iii. 1173. *A. Wallichii*, *W. & A. Prodr.* 234. *A. bupleurifolius*, *Wall. Cat.* 5761 B, *F. A. vaginalis*, *Wall. Cat.* 5763 C, *ex parte*. *A. glumaceus*, *Wall. Cat.* 5764. *A. glaber*, *E. Meyer Comm.* 125. *A. Hochstetteri*, *A. Rich. Fl. Abyss.* i. 209.

HIMALAYAS (up to 4–5000 ft.) to CEYLON and BIRMA.—DISTRIB. Tropics of the old world, Cape, W. Indies.

Stems 1–2 ft., ascending, subglabrous. *Leaflets* 1–3 in. long, subglabrous below, usually oblong, obtuse, 2–3 times as long as broad, rarely orbicular or linear-lanceolate. *Racemes* dense, 1–4 in. long; pedicels $\frac{1}{12}$ – $\frac{1}{8}$ in.; flowers adpressed to subglabrous rachis. *Calyx* $\frac{1}{4}$ – $\frac{3}{8}$ in., glabrous on the back; teeth lanceolate, much imbricated, reaching down nearly to the base, minutely ciliated. *Pod* 3–5-jointed, included, glabrous, $\frac{1}{12}$ in. broad; joints rather broader than long, marked with close prominent transverse ribs.

VAR. 1. *Heyneanus*; more robust, reaching 3–4 ft. high, stems and leaves below permanently pubescent, leaflets large obovate-oblong, racemes longer often 4–6 in. not so close, calyx shorter ciliated on the edge only, pod $\frac{1}{2}$ in. broad often exserted. *A. Heyneanus*, *W. & A. Prodr.* 234; *Thwaites Enum.* 88. *A. styracifolius*, *Wall. Cat.* 5770, *non DC.* *Hedysarum styracifolium*, *Roxb. Hort. Beng.* 56; *Fl. Ind.* iii. 347. *A. obovatus*, *Edgw. Cat. Band. Pl.* 45.—Plains of Bundelcund, Western Peninsula and Ceylon.

VAR. 2. *styracifolius*; dwarf, diffuse, stems and leaves below finely pubescent, leaflets small oblong obtuse, rarely (*A. pilifer*, *Wall.*) lanceolate, racemes short dense calyx $\frac{1}{4}$ in. long conspicuously ciliated, pod $\frac{1}{12}$ in. broad rarely exserted. *A. styracifolius*, *DC. Prodr.* ii. 353 (*excl. syn.*); *W. & A. Prodr.* 234; *Dalz. & Gibbs. Bomb. Fl.* 65. *A. vaginalis*, *Wall. Cat.* 5763 A. *A. pilifer*, *Wall. Cat.* 5765. *A. scariosus*, *Grah. in Wall. Cat.* 5766; *Thwaites Enum.* 88. *Hedysarum glumaceum*, *Koen. in Roxb. Fl. Ind.* iii. 247. *A. lupulinus*, *Stocks MSS.*—Ava and through India proper.

VAR. 3. *ludens*; leaves linear distant 2–3 in. long, racemes reaching $\frac{1}{2}$ ft. long the lower flowers lax, calyx $\frac{1}{2}$ in. long hairy not much ciliated. Habit of *A. bupleurifolius*. *A. ludens*, *Wall. Cat.* 5762 B & F. *A. bupleurifolius*, *Roxb. Herb. non Cor.*—Plains of Bengal, &c.

7. **A. tetragonolobus**, *Edgw. in Journ. Linn. Soc.* ix. 312; *Cat. Band. Pl.* 45; pedicels short, calyx pubescent densely ciliated, pod tetragonous moniliform deeply transversely plicate distinctly exserted. *A. quadrangularis*, *Edgw. MSS.*

Plains of BUNDELKUND, DECCAN and CONCAN.

Resembling closely the small forms of *A. rugosus*. *Stems* slender, $\frac{1}{2}$ –1 ft., finely hairy. *Leaves* simple, oblong or lanceolate, 1–1 $\frac{1}{2}$ in., ciliated on the nerves beneath. *Racemes* lax, 2–3 in. long, the lower flowers in distant pairs; pedicels $\frac{1}{12}$ in. *Calyx* $\frac{1}{6}$ – $\frac{1}{2}$ in.; teeth lanceolate, acuminate, reaching down nearly to the base. *Pod* $\frac{3}{8}$ – $\frac{1}{2}$ in. by

$\frac{1}{12}$ in., 3-4-jointed, marked with an acute angle down the face, glabrous, with as deep plications as in *A. rugosus*.

8. **A. pubescens**, *Law in Wight Ic.* t. 250; pedicels 0, calyx densely clothed with long white cottony hairs, joints of pod deeply reticulated. *Dalz. & Gibbs. Bomb. Fl.* 65.

Plains of CONCAN and DECCAN.

Stems ascending, 1-1 $\frac{1}{2}$ ft., clothed with short adpressed hairs. *Leaves* distant, linear or lanceolate, 1-2 in. long, hairy on the nerves below, strongly triplinerved. *Spikes* close, 2-6 in. long, with a plumose rachis. *Calyx* $\frac{3}{8}$ in. long; teeth lanceolate-setaceous, densely plumose, reaching down to the base. *Pod* 3-4-jointed, included in the calyx, moniliform, glabrous; joints globose, under $\frac{1}{12}$ in. thick, the veins honeycombed.

9. **A. belgaumensis**, *Wight Ic.* t. 92; pedicels elongated finely pubescent densely ciliated, pod included finely pubescent reticulato-venose. *Dalz. & Gibbs. Bomb. Fl.* 65.

Plains of CONCAN, *Dalzell, Ritchie*.

Stems 1-2 ft., clothed with dense short pubescence. *Leaves* casually 3-foliate, usually simple; leaflets oblong or lanceolate, 2-3 in. long, subcordate, clothed with adpressed short hairs beneath. *Racemes* moderately close, reaching 6-9 in. long, 1 $\frac{1}{4}$ -1 $\frac{1}{2}$ in. broad; pedicels curved, ascending, downy $\frac{1}{2}$ - $\frac{3}{4}$ in. *Calyx* $\frac{5}{8}$ - $\frac{1}{2}$ in.; teeth 5, lanceolate, reaching down to the base. *Pod* 3-4-jointed, subcompressed, scarcely moniliform, $\frac{1}{8}$ in. broad, marked on the face with fine raised honeycomb veins.

VAR. 1. racemosus; dwarf, diffuse, leaflets obovate-oblong under 1 in. long, racemes with much fewer more distant flowers, calyx smaller, pod $\frac{1}{12}$ in. broad slightly exserted. *A. racemosus*, *Benth. in Hohen. Pl. Ind. Or.* No. 212; *Bedd. Ic. Pl. Ind. Or.* t. 292.—*Nilghiris, Schmidt, Wight*. Rolampally hills, Coimbatore, alt. 2500 ft., *Beddome*.

48. **MECOPUS**, Bennett.

An annual herb. *Leaves* 1-foliolate. *Flowers* in dense racemes. *Calyx-tube* campanulate; teeth lanceolate, the two upper connate. *Standard* broad; keel incurved, obtuse. *Stamens* diadelphous; anthers uniform. *Ovary* stipitate, 2-ovuled; style inflexed, stigma minute capitate. *Pod* of one small oblong reticulato-venose joint on a long stalk thrust down by the twisting of the top of the pedicel so as to approach the rachis.—A single species.

1. **M. nidulans**, *Bennett Pl. Jav. Rar.* 154, t. 32; *Walp. Rep.* v. 524. *Uraria retrofracta*, *Wall. Cat.* 5678.

Hilly woods of BIRMA, MARTABAN and TENASSERIM.—**DISTRIB.** Malay isles.

An erect annual, 1 ft. or more high, with numerous slender spreading naked branches. *Leaves* simple; leaflet broader than long, membranous, glabrous, pale green, venose, truncate or faintly emarginate; base subcordate; petiole filiform, articulated and minutely stipellate at the tip. *Flowers* in dense oblong peduncled terminal heads 1 in. or less long; pedicels fascicled, $\frac{1}{4}$ - $\frac{3}{8}$ in. long, finely downy, exceeding the setaceous bracts. *Calyx* and corolla very small. *Pod* with a stalk 3-4 times as long as itself.

49. **OUGEINIA**, Benth.

Tree. *Leaves* pinnately 3-foliolate. *Flowers* in fascicled axillary racemes. *Calyx-tube* campanulate; teeth small, upper 2 subconnate. *Corolla* much exserted; standard broad; keel obtuse. *Stamens* diadelphous; anthers uniform. *Ovary* sessile, linear, many-ovuled; style filiform, incurved, stigma minute capitate. *Pod* linear, flat, smooth, formed of 2-5 large more or less distinct joints. —**DISTRIB.** A single endemic species.

1. **O. dalbergioides**, *Benth. Pl. Jungh.* 216; *Bedd. Fl. Sylv.* t. 36; *Brand. For. Flor.* 146, t. 23. *Dalbergia ougeinensis*, *Roxb. Hort. Beng.* 53; *Fl. Ind.* iii. 220; *Wall. Cat.* 5851; *Wight Ic.* t. 391.

Hilly tracts of NORTHERN INDIA and CONCAN, ascending to 4000 ft. in KUMAON.

An erect tree, 20–40 ft. high, with slender terete grey branches. *Leaves* distinctly petioled, pinnately 3-foliolate, stipellate; leaflets rigidly coriaceous, glabrous or downy below; end leaflet roundish or obovate, 3–6 in. long, obtuse, entire or obscurely crenate; side ones smaller, opposite, oblique. *Flowers* very copious, in short fascicled racemes, from the nodes of old branches; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., filiform, downy or glabrous. *Calyx* $\frac{1}{8}$ – $\frac{1}{6}$ in.; teeth obtuse. *Corolla* whitish or pale rose. *Pod* 2–3 in. long; joints 2–3 times as long as broad.

50. **DESMODIUM**, Desv.

Shrubs or herbs. *Leaves* 3-foliolate or simple, stipellate. *Flowers* small, red, in copious usually dense racemes. *Calyx* campanulate or turbinate; teeth longer or shorter than the tube, the two upper often subconnate. *Corolla* exserted; standard broad; wings more or less adhering to the usually obtuse keel. Upper *stamen* entirely or partially free, the other 9 united. *Ovary* sessile or stipitate, few- or many-ovuled; style incurved, stigma minute capitate. *Pod* usually composed of several one-seeded indehiscent joints, the faces compressed, never muricated, the upper suture rarely finally splitting open.—**DISTRIB.** Species about 120; cosmopolitan in the tropics and several in the Cape and North America.

D. CAJANIFOLIUM, *DC Prodr.* ii. 331 (*Hedysarum cajanifolium*, *H. B. K. Nov. Gen.* t. 528. *H. mucronatum*, *Blume; Walp. Rep.* i. 746) a species widely spread in tropical America, has been introduced in Ceylon, and is included in Wallich's distribution from the Calcutta Garden as *D. leptostachyum*, *Wall. Cat.* 5697 A.

ORNITHOPUS PERPUSILLUS is in Schmidt's Nilghiry collection, no doubt accidentally introduced.

ARACHIS HYPOGÆA is frequently cultivated, but has no claim to be regarded as a native.

SUBGEN. 1. Dendrolobium, *W. & A.* Shrubs with woody branches, 3-foliolate leaves, flowers in dense short-peduncled or sessile axillary umbels, minute deciduous bracts.

1. **D. umbellatum**, *DC. Prodr.* ii. 325; branches terete, leaflets obtuse 1–1½ times as long as broad, joints of pod large 1½–2 times as long as broad. *W. & A. Prodr.* 224; *Bedd. Fl. Sylv.* 87; *Wall. Cat.* 5687; *Dalz. & Gibs. Bomb. Fl.* 66. *Dendrolobium umbellatum*, *Benth. Pl. Jungh.* 218. *Hedysarum umbellatum*, *Linm. Sp.* 1053; *Jacq. Hort. Schoen.* t. 297, non *Roxb.* *H. arboreum*, *Roxb. Fl. Ind.* iii. 360.—*Burm. Zeyl.* t. 51.

Tropical zone; AWA, TENASSERIM, PENANG, MALACCA, CEYLON.—**DISTRIB.** Mascaren isles, Malaya, Philippines, Polynesia.

A shrub, 5–6 ft. high, with densely downy young branches. *Petioles* 1 in. or less, slightly furrowed; leaflets subcoriaceous, green and glabrous above, thinly grey-canescient or nearly glabrescent beneath, the veins not much raised; end one larger than side ones, roundish or broad-oblong, 2–3 in. long. *Umbels* 6–12-flowered; pedicels short, unequal. *Calyx* $\frac{1}{6}$ in. densely silky; teeth shorter than or as long as the tube. *Corolla* $\frac{3}{8}$ – $\frac{1}{2}$ in. *Pod* 1½–2 in. long; joints 4–5, thick, glabrescent or silky, $\frac{1}{4}$ – $\frac{3}{8}$ in. long, indented at both sutures.

2. **D. Cephalotes**, *Wall. Cat.* 5721; branches triquetrous, leaflets acuto 2–3 times as long as broad, joints of pod small as long as broad. *W. & A.*

Prodr. 224; *Wight Ic.* t. 373; *Bedd. Fl. Sylv.* 87; *Anal. Gen.* t. 12, fig. 4. *Dendrolobium cephalotes*, *Benth. Pl. Jungh.* 218. *Hedysarum cephalotes* and *umbellatum*, *Roxb. Fl. Ind.* iii. 360. *D. congestum*, *Wall. Cat.* 5723; *W. & A. Prodr.* 224; *Wight Ic.* t. 209; *Dalz. & Gibs. Bomb. Fl.* 66. *D. australe*, *Hassk. Pl. Jar. Rar.* 356, non *DC.* *D. sericatum*, *Presl, Bot. Bem.* 39. *D. lineatum*, *Span. in Linn.* xv. 193.

EAST HIMALAYAS, tropical zone. NIPAL to CHITTAGONG, ascending to 4000 ft.; through India proper to CEYLON and SIAM.—DISTRIB. China, Malay isles.

A shrub, several ft. high, with densely grey-silky acutely-angled zigzag branches. *Petiole* 1-2 in., thickened, deeply furrowed down the face; leaflets oblong or obovate-oblong, subcoriaceous, green and glabrous above, grey-silky with conspicuous parallel raised main veins below, the end one 3-6 in. long. *Flowers* 20 or more, in dense umbels; pedicels unequal, silvery, jointed at the apex. *Calyx* $\frac{1}{8}$ - $\frac{1}{6}$ in.; teeth lanceolate, as long as the tube. *Corolla* deep red, twice the calyx. *Pod* under an inch long, glabrescent or silky; joints 4-5, square, slightly indented, mainly at the lower suture.

SUBGEN. 2. **Phyllodium**, *Desv.* Shrubs with woody branches, 3-foliolate leaves, flowers umbellate, the umbels in long continuous rows and each hidden by a pair of persistent bracts.

3. **D. pulchellum**, *Benth. MSS.*; leaves finely downy beneath, bracts small close coriaceous plicate glabrous above, joints usually 2. *Hedysarum pulchellum*, *Linn.*; *Roxb. Fl. Ind.* iii. 361. *Dicerma pulchellum*, *DC. Prodr.* ii. 339; *Wall. Cat.* 5737; *W. & A. Prodr.* 230; *Wight Ic.* t. 418. *Zornia pulchella*, *Pers. Syn.* ii. 318. *Phyllodium pulchellum*, *Desv. Journ. Bot.* iii. 123, t. 5, fig. 24; *Benth. Pl. Jungh.* 217.

EAST HIMALAYAS and through India proper to CEYLON, BIRMA, and PEGU.—DISTRIB. China, Philippines, Malay isles.

A shrub, 3-6 ft. high, with slender terete finely grey-downy branches. *Petiole* $\frac{1}{4}$ - $\frac{1}{2}$ in.; leaflets rigidly coriaceous, green, glabrous above; end one much the largest, oblong, 3-6 in. long, obtuse or subacute, rounded at the base, sometimes slightly repand. *Racemes* $\frac{1}{4}$ -1 ft. long, composed of 12-50 umbels; bracts the same texture as the leaves, orbicular, rather oblique, $\frac{3}{8}$ - $\frac{1}{2}$ in., long, with a short petiole ending in a long bristle; umbels 2-6-flowered; pedicels $\frac{1}{12}$ - $\frac{1}{8}$ in., downy. *Calyx* $\frac{1}{12}$ in.; teeth lanceolate, shorter than the tube. *Corolla* 3 times the calyx. *Joints* of pod rarely 1 or 3, glabrous or downy, $\frac{1}{8}$ in. long, constricted at both sutures.

4. **D. grande**, *Kurz in Journ. Asiat. Soc. Beng.* xliii. 2, 184; leaves finely downy beneath, bracts large coriaceous plicate glabrous above not close, joints 3-4.

AVA, *Kurz. Griffith* No. 1690, the exact station not known, probably TENASSERIM.

Closely allied to the preceding, but considerably larger in most of its parts. *Branches* slender, terete, finely grey-downy. *Petiole* 1-1 $\frac{1}{2}$ in.; leaflets ovate, narrowed gradually to an acute point, the end one 4-5 in. long. *Racemes* reaching a foot long, with a downy zigzag rachis; bracts like those of the last in texture, $\frac{3}{4}$ -1 in. long, more cordate at the base; pedicels $\frac{1}{6}$ - $\frac{1}{4}$ in. long. *Calyx* $\frac{1}{8}$ in., finely downy; upper teeth deltoid; lowest lanceolate. *Joints* of pod $\frac{1}{6}$ in. long and broad, finely downy.

5. **D. vestitum**, *Benth. MSS.*; leaves densely downy beneath, bracts large membranous not plicate pubescent on both sides. *Dicerma vestitum*, *Wall. Cat.* 5739. *Phyllodium vestitum*, *Benth. Pl. Jungh.* 217; *Miq. Fl. Ind. Bat.* i. 261.

MARTABAN, *Wallich.* TENASSERIM, near Mergui, *Griffith.*

Branches slender, clothed with dense short pubescence. *Leaflets* oblong, 3-4 in. long, at first densely pubescent on both sides, glabrescent above, obtuse or subacute,

rounded at the base. *Racemes* 4-6 in. long in the specimens seen; bracts 1-1½ in. long, orbicular, not oblique, obtuse, emarginate, thinner in texture than in the other two and dissimilar to the leaves; umbels 2-3-flowered; pedicels as long as the calyx. *Calyx* ½ in.; teeth deltoid, two upper connate, lowest lanceolate. *Corolla* ⅔-½ in. *Joints* of pod 2-3, downy, ⅓ in. long.

SUBGEN. 3. **Dicerna**, DC. A trailing undershrub with small 3-foliolate exstipellate leaves, minute bracts and flowers in long racemes.

6. **D. biarticulatum**, Benth. MSS. *Hedysarum biarticulatum*, Linn.: *Roxb. Fl. Ind.* iii. 359. *Dicerna biarticulatum*, DC. *Prodr.* ii. 339; *Wall. Cat.* 5738; *W. & A. Prodr.* 230; *Wight Ic.* t. 419.

Plains of WESTERN PENINSULA, CEYLON and BURMA.—DISTRIB. Malay isles, N. Australia.

Stems slender, densely caespitose, ½-2 ft., glabrous or downy. *Stipules* scarious, connate, 2-3 cleft; petiole ⅓-¼ in.; leaflets rigidly coriaceous, pale green, subequal, oblanceolate-oblong, obtuse, subglabrous, ⅔-½ in. long, nearly digitate. *Racemes* peduncled, sublaex, ¼-½ ft., the lower flowers 2-4 together. *Calyx* scarious, subglabrous, under ⅓ in.; teeth exceeding the tube, the two upper connate. *Corolla* 2-3 times the calyx. *Joints* usually 2, rarely 1, round-oblong, pubescent, ⅓ in. long, both sutures deeply indented.

SUBGEN. 4. **Catenaria**, Benth. Shrubs with woody branches, 3-foliolate leaves, long racemes, small bracts and long pendulous many-jointed pods.

7. **D. laburnifolium**, DC. *Prodr.* ii. 337. *D. viticinum*, Wall. *Cat.* 5709. *D. cateniferum*, Arn. in *Nov. Act.* xviii. 321. *Hedysarum laburnifolium*, Poir. *Encyc.* vi. 422. *Catenaria laburnifolia*, Benth. *Pl. Jungh.* 220. II. caudatum, Thunb. *Fl. Jap.* 286?

CENTRAL and EAST HIMALAYAS, tropical zone; KUMAON to ASSAM and MISHMI, ascending to 4000 ft. in SIKKIM; CEYLON.—DISTRIB. Malay isles, China, Japan.

A shrub, with slender terete branches, soon glabrescent. *Stipules* free, minute, setaceous; petiole 1-1½ in., thickened, grooved down the face; leaflets oblong-lanceolate, acute, 2-4 in. long, rigidly subcoriaceous, shining above, hairy on ribs below. *Racemes* ¼-½ ft.; pedicels ¼ in., finally spreading. *Calyx* ½ in.; hairs adpressed; teeth lanceolate, as long as the tube, lowest linear. *Corolla* whitish, ¼-½ in. *Pod* 2-3 in. long; joints 6-8, twice as long as broad, beset with minute hooked spreading hairs.

SUBGEN. 5. **Pteroloma**, Desv. Shrub with 1-foliolate leaves, winged petioles, racemose flowers, minute bracts and acute keel.

8. **D. triquetrum**, DC. *Prodr.* ii. 326; *Wall. Cat.* 5688; *W. & A. Prodr.* 224; *Dalz. & Gibs. Bomb. Fl.* 66. *D. auriculatum*, pseudo-triquetrum and alatum, DC. loc. cit. *Hedysarum triquetrum*, Linn.; *Roxb. Hort. Beng.* 56; *Fl. Ind.* iii. 347. *H. alatum*, *Roxb. Fl. Ind.* iii. 348. *Pteroloma triquetrum*, Benth. *Pl. Jungh.* 220.

CENTRAL and EAST HIMALAYAS, through India proper to CEYLON, ascending to 4000 ft. in KUMAON, SIKKIM and KHASIA. CHITTAGONG, TAVOY, PEGU.—DISTRIB. Seychelles, China, Philippines.

Branches triquetrous, soon glabrescent. *Leaflet* ovate or lanceolate, reaching 6-8 in. long, acute, rigidly subcoriaceous, glabrous above, hairy on the ribs below; petiole ½-1½ in., with a wing on each side, like the leaflet in texture, ½-¾ in. broad. *Racemes* ½-1 ft. long, axillary and terminal; pedicels ascending, ½-¾ in. *Calyx* ⅓ in., campanulate; upper teeth deltoid, lowest linear. *Pod* 1-2 in. long, 6-8-jointed, glabrous or pubescent; joints nearly square; lower suture faintly indented.

SUBGEN. 6. **Desmodium proper**. Erect herbs or undershrubs with

large 1-3-foliolate leaves, flowers often 2 or several from a node in long racemes simple or paniced, deciduous bracts and distinctly jointed pods.

* *Joints of pod indehiscent, 3-5 times as long as broad* (SCORPIURUS, Benth.)

9. **D. ormocarpoides**, DC. *Prodr.* ii. 327; petiole produced, leaves 1-foliolate, joints 6-8 flattened distinctly constricted. *D. zonatum*, Mig. *Flor. Ind. Bat.* i. 250. *Hedysarum ormocarpoides*, Desv. *MSS.* *H. adhærens*, Poir. *Dict. Suppl.* v. 15, non Vahl.

HILLS of WEST PENINSULA; *Wight, Beddome*; and CEYLON, *Gardner, Thwaites*.

Stems woody, slender, obtusely angular, finely downy when young. *Leaflet* ovate, acute, rigidly subcoriaceous, 4-6 in. long, inconspicuously downy below; petiole $\frac{1}{2}$ -1 in. *Racemes* terminal only, 6-9 in. long; fascicles of flower few and distant; bracts minute, setaceous; pedicels $\frac{1}{4}$ - $\frac{3}{8}$ in., finally subpatent. *Calyx* $\frac{1}{12}$ in., pubescent; teeth short, deltoid. *Pod* pendulous, 3-4 in. long, under $\frac{1}{4}$ in. broad; joints ribbed horizontally, clothed with minute hooked hairs, distinctly constricted at both sutures.

10. **D. teres**, Wall. *Cat.* 5694; petiole very short, leaves 1-foliolate, joints 10-12 very narrow turgid 4-5 times as long as broad, Benth. *Pl. Jungh.* 225.

AVA; Taong-dong mountains, *Wallich*.

Branches woody, terete, very slender, finely downy. *Leaves* oblong-lanceolate, acute, 4-6 in. long, rounded at the base, subcoriaceous, glabrous above, reticulato-venose, minutely hairy on the ribs below; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in. *Racemes* terminal and axillary, lax, 6-9 in. long, sparsely paniced; bracts minute, subulate; pedicels downy, $\frac{1}{8}$ - $\frac{1}{4}$ in., finally spreading. *Calyx* $\frac{1}{12}$ in., densely hairy; teeth as long as the tube. *Pod* $1\frac{1}{2}$ -2 in. by $\frac{1}{4}$ in. br., clothed with minute hooked hairs, subsessile, scarcely constricted between the joints.

11. **D. laxiflorum**, DC. *Prodr.* ii. 335; leaves 3-foliolate, joints 6-10 narrow flattened 3-4 times as long as broad. *D. bicolor*, Wall. *Cat.* 5719. *D. elongatum*, Wall. *Cat.* 5715. *D. leptostachyum*, Wall. *Cat.* 5697 B. *D. sulcatum*, Wall. *Cat.* 5736. *D. recurvatum*, *Grah. in Wall. Cat.* 5717; *W. & A. Prodr.* 226; *Wight Ic. t.* 374. *D. diffusum*, DC. *Prodr.* ii. 335, non 336. *D. Rottleri*, G. Don *Gen. Syst.* ii. 296? non Baker. *Hedysarum recurvatum*, *Roxb. Hort. Beng.* 57; *Fl. Ind.* iii. 358; *Wight Ic. t.* 409. *H. diffusum*, *Roxb. Fl. Ind.* iii. 357, non Willd. *H. Roxburghii*, *Spreng. Syst. App.* 292. *H. Rottleri*, *Spreng. Syst.* iii. 320.

HIMALAYAS, temperate and tropical regions from GHURWHAH and KUMAON to ASSAM, ascending to 6000 ft. in SIKKIM and KUMAON. WESTERN PENINSULA, AVA, PEGU, TENASSERIM.—DISTRIB. JAVA, BORNEO, PHILIPPINES.

An erect undershrub, 3-5 ft. high, with obtusely angled branches, clothed with dense short hairs. *Petiole* 1-2 in.; leaflets membranous or subcoriaceous, glabrous above, clothed with adpressed minute hairs beneath; end one usually ovate or broad oblong, acute, sometimes obovate, subobtuse, 4-6 in. long. *Racemes* copious, axillary and terminal, the latter often compound, often a foot long; flowers several to a node and the nodes close; pedicels $\frac{1}{8}$ - $\frac{1}{4}$ in., finally spreading; bracts minute, linear-subulate. *Calyx* under $\frac{1}{12}$ in., densely hairy; teeth lanceolate, longer than the tube. *Pod* 1-1 $\frac{1}{2}$ in., rarely 2 in., by $\frac{1}{12}$ in., clothed with minute hooked hairs, not at all or slightly constricted at the joints.

** *Joints of pod indehiscent, as broad as long, spirally twisted; both sutures deeply indented* (CHALARIVM, DC.)

12. **D. spirale**, DC. *Prodr.* ii. 332; Benth. in *Mart. Fl. Bras.* xv. 105, with many synonyms. *D. Aparines*, Hassk. *Pl. Jav.* 366, non DC. *Hedysarum spirale*, Swartz *Fl. Ind. Occ.* 1273.

NORTH-WEST PROVINCES, Royle; BUNDELCUND, Edgeworth. — DISTRIB. Trop. America, Africa, Polynesia.

A caespitose erect annual, $\frac{1}{2}$ –2 feet high, with very slender glabrous stems. *Leaves* distinctly petioled, 3-foliolate, green, membranous, subglabrous; end one ovate or lanceolate, $\frac{1}{2}$ – $1\frac{1}{2}$ in. long. *Racemes* copious, axillary and terminal, the latter much panicked; bracts minute, setaceous; pedicels filiform, patent, glabrous, $\frac{3}{4}$ – $\frac{1}{2}$ in. *Calyx* $\frac{1}{4}$ in.; teeth as long as the tube. *Pod* $\frac{3}{8}$ – $\frac{1}{2}$ in. long, $\frac{1}{24}$ – $\frac{1}{12}$ broad, 4–6-jointed, glabrous.

*** *Joints of pod indehiscent, longer than broad, the lowest one distinctly stalked, the constrictions reaching from the lower nearly to the upper suture.* (PODOCARPUM, Benth.)

13. **D. podocarpum**, DC. *Prodr.* ii. 336; corolla small, bracts linear minute, stalk of pod 3–4 times as long as the calyx, pedicels short, joints truncate at the apex. *Wall. Cat.* 5711, non *Hook. & Arn. Bot. Beech.* t. 98. *D. japonicum*, *Miq. Ann. Mus. Lugd. Bat.* iii. 46.

Temperate and tropical HIMALAYAS, alt. 2–7000 ft.; from SIMLA and GURWHAL to KHASIA and SIKKIM, — DISTRIB. China, Japan.

Stems 2–3 ft., herbaceous, angular, erect, finely pubescent. *Stipules* small, setaceous; petiole 1–3 in.; leaflets 3, membranous, both surfaces subglabrescent, the lower one pale; end one roundish, subacute, 2–3 in. long, with a deltoid base. *Racemes* few, very lax, axillary and terminal, the latter reaching a foot long, copiously panicked; bracts minute, linear; pedicels under $\frac{1}{4}$ in. *Calyx* turbinate, $\frac{1}{4}$ in., slightly bristly; teeth deltoid, very short. *Corolla* $\frac{1}{8}$ in. *Joints* 1–2, $\frac{1}{4}$ in. long by half as broad, half-rhomboidal, pubescent, the upper suture flattened.

VAR. laxum; leaflets larger, the end one 2–3 times as long as broad narrowed gradually to a point. *D. laxum*, DC. *loc. cit.* *Hedysarum laxum*, *Spreng. Syst. App.* 292. *D. trinerve*, *Grah. in Wall. Cat.* 5720. — Kumaon, Nipal and Sikkim.

14. **D. Gardneri**, Benth. *Pl. Jungh.* 226; corolla small, bracts setaceous minute, stalk of pod 8–12 times the calyx, pedicels moderately long, joints oblique or truncate at the apex. *D. bambusetorum*, *Miq. Flor. Ind. Bat.* i. 256? *D. podocarpum*, *Miq. Ann. Mus. Lugd. Bat.* iii. 46, non DC.

WEST PENINSULA, Shevagerry hills, *Dr. Wight*. CEYLON, *Gardner*. — DISTRIB. Japan.

General habit of the last, of which it is perhaps a mere southern variety. *Stipules* linear, $\frac{1}{4}$ – $\frac{1}{8}$ in.; petiole 2–3 in.; leaflets 3, membranous, subglabrescent, the end one narrow-ovate, 4–6 in. long, narrowed gradually to a point. *Pedicels* $\frac{1}{4}$ – $\frac{1}{2}$ in.; bracts, calyx and corolla of *D. podocarpum*. *Joints* 2–3, $\frac{1}{2}$ – $\frac{5}{8}$ in. long, $\frac{1}{8}$ in. broad, cut away in an oblique line from opposite the point to the base; stalk of pod $\frac{1}{2}$ – $\frac{5}{8}$ in. long.

15. **D. dolabriforme**, Benth. *Pl. Jungh.* 226; corolla small, bracts minute setaceous, stalk of pod 2–3 times as long as the calyx, pedicels short, joints oblique at the apex.

WESTERN PENINSULA, CARNATIC, near Courtallum, *Wight*; Tinnevelly, *Beddome*.

Leaves crowded on an erect stem a few inches high. *Stipules* small, lanceolate, persistent; petiole 1– $1\frac{1}{2}$ in.; leaflets 3, membranous, both surfaces green, lower obscurely pilose, end one ovate, narrowed gradually to an obtuse point, twice as long as broad, $1\frac{1}{2}$ –2 in. long, base deltoid. *Racemes* simple, lax, long-peduncled, terminal, 2–3 in. long; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., finally patent. *Calyx* $\frac{1}{16}$ in., turbinate; lower tooth lanceolate, as long as the tube, upper deltoid. *Joint* solitary, half-rhomboidal, $\frac{3}{4}$ in. long, three times as long as broad, narrowed gradually from above the middle to the tip and stalk.

16. **D. Scalpe**, DC. *Prodr.* ii. 334; corolla large, bracts large ovate, pedicels very long, stalk of pod twice as long as the calyx. *D. strangulatum*, *W. & A. Prodr.* 228; *Wight Ic.* t. 985. *D. trichocaulon*, *Hassk. Pl. Jav. Rar.* 367,

non DC. *D. cafferum*, Eckl. & Zey. *Herb. Cap.* No. 1662. *D. Schimperii*, Hochst. ; *A. Rich. Fl. Abyss.* i. 205. *D. abyssinicum* and *repandum*, DC. *Prodr.* ii. 338 and 334 ?

Hills of the WESTERN PENINSULA and CEYLON.—DISTRIB. Malay and Mascaren isles, Abyssinia, Natal.

Stems 3–4 feet high, erect, woody in the lower part, densely downy. *Stipules* $\frac{1}{4}$ – $\frac{1}{2}$ in., lanceolate, persistent; petiole 2–3 in.; leaflets 3, membranous, finely downy on both surfaces, often slightly repand; end one 2–4 in. long, roundish- or obovate-rhomboidal, base and apex subdeltoid. *Racemes* very lax, mostly terminal, often a foot long, simple or forked at the base; bracts boat-shaped, enclosing the buds, soon falling; pedicels capillary, permanently ascending, lower 1–1½ in. long. *Calyx* $\frac{1}{8}$ in., downy; lower tooth lanceolate, as long as the tube; upper deltoid. *Corolla* $\frac{3}{8}$ – $\frac{1}{2}$ in., bright red. *Joints* 1–3, half-rhomboidal, $\frac{1}{4}$ – $\frac{1}{3}$ in. long by half as broad; apex oblique; upper suture rather recurved.

17. **D. obcordatum**, Kurz in *Journ. Asiat. Soc. Beng.* xlii. 2, 229; corolla small, bracts large linear-subulate caducous, stalk of pod not longer than the calyx. *Uraria obcordata*, Miq. *Flor. Ind. Bat. Suppl.* 114, 305.

TENASSERIM, Kurz.

A twining perennial, 3–4 ft. high, with puberulous stems. *Stipules* lanceolate, $\frac{1}{4}$ in.; petiole $\frac{1}{2}$ –1 in.; leaflets chartaceous, pale, thinly downy and prominently veined beneath, end one obcordate-lunate, $\frac{1}{2}$ –2 in. broad, emarginate with a mucro, lateral ones smaller, deltoid. *Racemes* slender, pubescent, axillary and forming a terminal panicle; bracts very caducous. *Calyx* $\frac{1}{12}$ in., pubescent; teeth lanceolate, acuminate. *Corolla* purple, under $\frac{1}{4}$ in. *Joints of pod* 1–3, round-hastate, $\frac{1}{2}$ in. long and broad, flat, puberulous.

**** *Joints of pod indehiscent, once or twice as long as broad; upper suture straight or slightly indented; calyx-teeth deltoid, never exceeding the tube* (DOL-LINERA, Endl.) All shrubby.

† *Leaves* 1-foliate.

18. **D. oblongum**, Wall. *Cat.* 5714; leaflets 3–4 times as long as broad thinly silky beneath. *Benth. Pl. Jungh.* 224.

AVA; Taong-dong mountains, Wallich.

Stems slender, woody, finely downy. *Leaflet* oblong, 3–5 in. long, obtuse, rounded at the base, subcoriaceous, green, glabrous above; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Racemes* very lax, axillary and terminal, copiously panicked, 4–6 in. long, most of the flowers in distant pairs; pedicels $\frac{3}{8}$ – $\frac{1}{2}$ in.; bracts $\frac{1}{8}$ in., ovate-cuspidate. *Calyx* $\frac{1}{12}$ in., lowest tooth lanceolate, as long as the tube. *Corolla* $\frac{3}{8}$ in. *Pod* $\frac{3}{4}$ –1 in. long, $\frac{1}{8}$ in. broad, 6–7-jointed, thinly closely silky, the upper suture slightly indented.

19. **D. oblatum**, Baker; Kurz in *Journ. Asiat. Soc. Beng.* xlii. 2, 230; leaflet broader than long glabrous beneath.

BIRMA; forests of Pegu, Ava and Martaban, Kurz.

Stems slender, woody, glabrous. *Leaflet* membranous, $\frac{3}{4}$ –1 in. long, 1½ in. broad, green above, grey-green beneath; petiole $\frac{1}{2}$ – $\frac{3}{8}$ in. *Racemes* very lax, axillary and terminal, the end one panicked; pedicels erecto-patent, $\frac{1}{4}$ – $\frac{3}{8}$ in. *Calyx* $\frac{1}{24}$ in., thinly silky; teeth as long as the tube, lowest lanceolate, the others deltoid. *Corolla* 3–4 times the calyx. *Pod* $\frac{1}{2}$ – $\frac{5}{8}$ in. long, $\frac{1}{8}$ in. broad, 3–4-jointed, subglabrous, distinctly stalked; upper suture slightly indented.—Very near *D. reniforme*, DC., from which it differs by its longer pedicels and more deeply indented pod.

†† *Leaves* 3-foliate.

20. **D. sinuatum**, Blume MSS.; leaflets repand, pedicels short, corolla small, bracts setaceous, joints many small clothed with minute hooked hairs. *D. strangulatum* var. *sinuatum*, Miq. *Flor. Ind. Bat.* i. 255.

KHASIA, tropical zone, alt. 3–5000 ft., *Hook. fil. & Thomson*. MISHMI, *Griffith*.—
DISTRIB. Malay isles.

Branches terete, woody, minutely downy. *Petiole* 1–1½ in.; leaflets subcoriaceous, pale, minutely downy or nearly glabrescent beneath; end one roundish-rhomboid, obtuse, 2–3 in. long, conspicuously repand in the upper half. *Racemes* copious, terminal and axillary, moderately close, not more than 3–4 in. long; pedicels $\frac{1}{8}$ – $\frac{1}{6}$ in., finely downy. *Calyx* $\frac{1}{12}$ in.; teeth as long as the tube. *Corolla* $\frac{1}{4}$ in. *Pod* 1¼–1½ in. long, under $\frac{1}{8}$ in. broad; joints 8–12, as broad as long.

21. **D. floribundum**, *G. Don Gen. Syst.* ii. 297; leaflets entire, pedicels short, corolla large, bracts lanceolate large, joints many small clothed with adpressed silky hairs. *D. multiflorum*, *DC. Prodr.* ii. 335; *Wall. Cat.* 5705. *D. angulatum*, *DC. Prodr.* ii. 335, *non Wall.* *D. dubium*, *Lindl. Bot. Reg.* t. 967; *Bot. Mag.* t. 2960. *D. sambuense*, *DC. Prodr.* ii. 335? *Hedysarum floribundum*, *Don Prodr.* 244. *H. Wallichianum*, *Spreng. Syst. App.* 292. *H. sambuense*, *Don Prodr.* 243?

HIMALAYAS, tropical and temperate zones, from the UPPER PUNJAB to KHASIA, ascending to 7000 ft.

Branches woody, angular, densely pubescent. *Stipules* lanceolate, $\frac{1}{2}$ in.; leaflets subcoriaceous, green, with a few adpressed hairs above, densely clothed with adpressed grey silky hairs and finely reticulato-venose beneath; end one obovate-oblong, 3–4 in. long, obtuse or subacute. *Racemes* very copious, axillary and terminal, moderately close, 3–6 in. long, often second; bracts acuminate, ciliated, $\frac{1}{4}$ in. long; pedicels $\frac{1}{4}$ in., erecto-patent, finely hairy. *Calyx* $\frac{1}{8}$ in.; teeth as long as the tube. *Corolla* $\frac{3}{8}$ – $\frac{1}{2}$ in. *Pod* $\frac{3}{4}$ –1 in. long, under $\frac{1}{8}$ in. br.; joints 6–8, rather longer than broad.

22. **D. confertum**, *DC. Prodr.* ii. 335; leaflets entire, pedicels short, bracts and corolla large, joints few large densely clothed with spreading silky hairs. *D. barbatum*, *Wall. Cat.*, 5724, *non Benth.* (*Hedysarum*, *Linn.*)

CENTRAL and EAST HIMALAYAS, alt. 2–4000 ft.; NIPAL, SIKKIM and KHASIA.

Branches terete, finely downy when young. *Petiole* 1–1½ in.; leaflets subcoriaceous, glabrous above, distinctly reticulato-venose, pale, minutely hairy below; end one obovate or oblong, obtuse or acute, 3–6 in. long. *Racemes* copious, short, dense, axillary and terminal, the latter paniced, often subsecond; bracts $\frac{1}{2}$ in. long, lanceolate, scariose; pedicels $\frac{1}{8}$ – $\frac{1}{4}$ in., ascending. *Calyx* $\frac{1}{8}$ in., turbinate, subglabrous; lower teeth lanceolate, as long as the tube; upper deltoid. *Corolla* 3–4 times the calyx. *Pod* 1–1½ in. long, under $\frac{1}{4}$ in. broad; joints 3–4, twice as long as broad, the constriction from below reaching more than half way through.

23. **D. oxyphyllum**, *DC. Prodr.* ii. 336; leaflets acute thinly silky beneath, pedicels long, bracts lanceolate acuminate, corolla large, joints many large glabrescent. *D. serriferum*, *Wall. Cat.* 5708 B.

CENTRAL and EAST HIMALAYAS, tropical and temperate zones. KUMAON and SIMLA to ASSAM and KHASIA, ascending to 7000 ft.

Branches slender, terete, soon glabrescent. *Petiole* 1–1½ in.; leaflets membranous or subcoriaceous, green, glabrous above, pale, thinly grey-silky beneath; end one obovate-oblong, usually twice as long as broad, narrowed gradually to a point, entire or obscurely repand, 2–4 in. long. *Racemes* copious, short, moderately close, axillary and terminal, the latter much paniced; bracts lanceolate, acuminate, ciliated, $\frac{1}{4}$ in. long; pedicels ascending, subglabrous $\frac{3}{8}$ – $\frac{1}{2}$ in. *Calyx* $\frac{1}{12}$ in., subglabrous; teeth very short. *Corolla* $\frac{3}{8}$ – $\frac{1}{2}$ in. *Pod* 2–3 in. long, $\frac{1}{4}$ in. broad, shortly stalked; joints 6–10, rather longer than broad.

VAR. *serriferum*; leaflets obtuse repand densely silky beneath, pedicels spreading or deflexed $\frac{1}{2}$ – $\frac{3}{4}$ in. long clothed with spreading silky hairs like the calyx. *D. serriferum*, *Wall. Cat.* 5708 A. *D. polycarpum*, *Wall. Cat.* 5710, *non DC.*—Nipal, *Wallich*.

24. **D. tiliaefolium**, *G. Don. Gen. Syst.* ii. 297; leaflets obtuse or subacute densely hoary beneath, pedicels moderately long, bracts lanceolate, corolla large, joints many thinly clothed with adpressed silky hairs. *Wall. Cat.* 5707. *D. nutans*, *Wall. Cat.* 5706; *Bot. Mag.* t. 2867. *D. argenteum*, *Wall. Cat.* 5713. *Hedysarum tiliaefolium*, *Don Prodr.* 244.

All along the HIMALAYAS from the UPPER PUNJAB to TAVOY, temperate and tropical zones, ascending to 9000 ft.

Branches slender, terete, finely downy. *Petiole* 2-3 in.; leaflets thick, flexible, subcoriaceous, green, glabrescent above, more or less densely persistently matted with whitish silky hairs beneath; end one broad obovate, 2-4 in. long, entire or obscurely repand, base deltoid or rather rounded. *Racemes* copious, lax, often a foot long, axillary and terminal, the latter often copiously panicle, with lower branches again compound; pedicels $\frac{1}{4}$ - $\frac{3}{8}$ in., ascending, finely downy. *Calyx* $\frac{1}{8}$ in., downy; teeth deltoid, shorter than the tube. *Corolla* $\frac{3}{8}$ - $\frac{1}{2}$ in. *Pod* 2-3 in. long, $\frac{1}{4}$ in. broad; joints 6-9, longer than broad.

***** *Joints of pod as in the last group, but the calyx-teeth narrower and longer.* (HETEROLOMA, *Benth.*)

† *Leaves* 1-foliolate.

25. **D. flexuosum**, *Wall. Cat.* 5691; leaflet membranous orbicular glabrous on the upper surface. *Benth. Pl. Jungh.* 224.

BIRMA; Prome hills, *Wallich*.

Stems slender, woody, flexuose, trailing, clothed throughout with spreading or deflexed bristly hairs. *Leaflet* 2-3 in. long and broad, obtuse, or obscurely cuspidate, rounded or slightly cordate at the base, thinly coated with adpressed grey hairs below; petiole 1-1 $\frac{1}{2}$ in. *Racemes* terminal and lateral, distinctly peduncled, 2-3 in. long, moderately close; pedicels $\frac{1}{2}$ in., slender, ascending; bracts setaceous, minute. *Calyx* $\frac{1}{12}$ in., bristly, teeth lanceolate. *Corolla* $\frac{1}{8}$ in. *Pod* glabrescent, 5-6-jointed, only seen immature.

26. **D. gangeticum**, *DC. Prodr.* ii. 327; leaflet membranous or subcoriaceous oblong entire acute glabrescent on the upper surface. *Wall. Cat.* 5689; *W. & A. Prodr.* 225; *Wight Ic.* 271; *Dalz. & Gibs. Bomb. Fl.* 66. *D. latifolium*, *Wight Ic.* t. 272, non t. 270. *Hedysarum gangeticum*, *Linn.*; *Fl. Ind.* iii. 349. *H. collinum*, *Roxb. loc. cit.*

HIMALAYAS (ascending to 5000 ft. on the Chenab) to PEGU and CEYLON.—DISTRIB. Trop. Africa, Malay isles, Philippines, China; introduced in West Indies.

Stems suberect, reaching 3-4 ft. high, woody, slightly angular, clothed with short grey down upwards. *Leaflet* oblong, usually 3-6 in. long, not more than $\frac{1}{2}$ - $\frac{1}{3}$ as broad, rounded at the base, narrowed gradually to an acute point, thinly clothed beneath with adpressed grey hairs, not reticulato-venose; petiole $\frac{1}{2}$ -1 in. *Racemes* copious, ascending, lateral and terminal, the latter subax, 6-12 in. long, simple or with a few short ascending branches in the lower part; pedicels $\frac{1}{12}$ - $\frac{1}{4}$ in., ascending; bracts minute, setaceous. *Calyx* under $\frac{1}{12}$ in., finely downy; teeth lanceolate. *Corolla* $\frac{1}{8}$ - $\frac{1}{6}$ in. *Pod* falcate, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, $\frac{1}{12}$ - $\frac{1}{8}$ in. broad, 6-8-jointed, glabrescent or clothed with minute hooked hairs.

VAR. maculatum; dwarf, a foot or less high, leaflet roundish-cordate 1 in. or less long. *Dill. Hort. Elth.* t. 141, fig. 168. *D. maculatum*, *DC. Prodr.* ii. 327; *Wall. Cat.* 5690. *Hedysarum maculatum*, *Linn. Sp. Pl.* 1051.—Rohilcund, Upper Bengal, &c.

27. **D. latifolium**, *DC. Prodr.* ii. 327; leaflet ovate thick subcoriaceous obscurely repand usually subobtuse persistently scabrous with adpressed bristly hairs on the upper surface. *Wall. Cat.* 5692; *W. & A. Prodr.* 225; *Wight Ic.* t. 270; *Dalz. & Gibs. Bomb. Fl.* 66. *D. collinum*, *Wall. Cat.* 5693. *D.*

lasiocarpum, *DC. loc. cit.* *D. virgatum*, *Zolling in Flora*, 1847, 697. *Hedysarum latifolium*, *Roxb. Hort. Beng.* 57; *Fl. Ind.* iii. 350; *Ker. Bot. Reg.* t. 355. *Anarthrosyne cordata*, *Klotzsch in Peters Mossamb. Bot.* 39, t. 7.

HIMALAYAS (ascending to 4000 ft. in SIKKIM) to BIRMA, SIAM and CEYLON.—DISTRIB. Trop. Africa, Madagascar, Malay isles, Philippines; introduced in W. Indies.

An erect undershrub, 3–6 ft. high, with terete branches densely clothed with short brown pubescence. *Leaflets* 3–6 in. long, $1\frac{1}{2}$ –2 as long, as broad, usually cordate or truncate, rarely deltoid at the base, reticulato-venose, densely clothed with short soft brown hairs beneath; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Racemes* copious, ascending, 2–6 in. long, sessile or short-peduncled, spike-like, usually dense, axillary and terminal, the latter compound; pedicels $\frac{1}{12}$ in. or less, densely downy; bracts minute, setaceous. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in.; teeth linear-lanceolate, as long as the tube. *Corolla* 3–4 times calyx. *Pod* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, $\frac{1}{12}$ in. broad, 4–6-jointed, densely clothed with minute hooked hairs, the upper suture slightly indented.

†† *Leaves* 3-foliolate.

28. **D. Thwaitesii**, *Baker*; herbaceous, stems slender terete, leaflets obovate entire, bracts lanceolate-acuminate middle-sized, joints twice as long as broad. *D. strangulatum*, var. *minor*, *Thwaites Enum.* 87.

CEYLON, *Thwaites C.P.* 3327.

Stems a foot or more long, clothed upwards with dense spreading grey hairs. *Petiole* $\frac{3}{4}$ –1 in.; leaflets membranous, green, glabrous above, clothed below with short adpressed grey hairs; end one 1– $1\frac{1}{4}$ in. long. *Racemes* few, long-peduncled, lateral and terminal, lax, few-flowered; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., spreading or ascending. *Calyx* under $\frac{1}{12}$ in.; teeth lanceolate. *Corolla* $\frac{1}{6}$ in. *Pod* 1– $1\frac{1}{4}$ in. by $\frac{1}{8}$ in.; joints about 4, minutely pubescent, scarcely constricted at the upper suture.—Habit of *D. polycarpum* var. *trichocaulon*, from which it differs by its pod, long pedicels, and lax racemes.

29. **D. Wightii**, *Grah. in Wall. Cat.* 5718; herbaceous, stems slender angular, leaflets ovate-oblong acute subrepand, bracts minute setaceous, joints small as long as broad. *W. & A. Prodr.* 226; *Thwaites Enum.* 87. *D. Walkeri*, *Arn. Pug.* 13. *D. Pryoni*, *DC. Prodr.* ii. 334?

NILGHIRI Hills and CEYLON.

Stems erect, clothed when young with fine short spreading grey hairs. *Stipules* large, lanceolate, acuminate, not amplexicaul; petiole 1– $1\frac{1}{2}$ in.; leaflets membranous or subcoriaceous, green and smooth above, grey clothed with short adpressed hairs beneath; end one 2–4 in. long, narrowed gradually to a point. *Racemes* copious, lax, lateral and terminal, the latter reaching a foot long, usually simple; pedicels $\frac{1}{4}$ – $\frac{3}{8}$ in., ascending or spreading. *Calyx* $\frac{1}{16}$ in.; teeth lanceolate, longer than the tube. *Corolla* 3 times calyx. *Pod* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, under $\frac{1}{8}$ in. broad, glabrescent, 4–6-jointed; upper suture distinctly indented.

30. **D. diffusum**, *DC. Prodr.* ii. 336, non 335; herbaceous, stems stout angular deeply sulcate, leaflets obovate entire, bracts minute lanceolate, joints small as long as broad. *W. & A. Prodr.* 226; *Wight Ic.* t. 298. *D. dichotomum*, *DC. Prodr. loc. cit.* *D. Roxburghii*, *Wall. Cat.* 5716. *D. Willdenovii*, *G. Don Gen. Syst.* ii. 296. *D. quinquangulare*, *Wight Ic.* t. 293. *Hedysarum diffusum* and *dichotomum*, *Willd. Sp. Pl.* iii. 1180. *H. articulatum* and *quinquangulatum*, *Roxb. Fl. Ind.* iii. 355.

Plains of the WESTERN PENINSULA, BUNDELKUND, BENGAL and PROME, ascending to 4000 ft. in the Vindhia chain (*Edgeworth*).

Stems 1–2 ft. long, diffuse, caespitose, prominently angled, clothed with spreading grey hairs. *Stipules* large, leafy, amplexicaul, auricled; petiole 1– $1\frac{1}{2}$ in.; leaflets

subcoriaceous, rather scabrous above, with obscure adpressed hairs, reticulato-venose, finely grey-downy below; end one obtuse, obovate, rarely roundish or oblong, 2-3 in. long. *Racemes* copious, lateral and terminal, lax or moderately close, reaching a foot long, the end one panicked; pedicels $\frac{1}{2}$ - $\frac{1}{4}$ in., pubescent, erecto-patent. *Calyx* $\frac{1}{2}$ in.; teeth deep, setaceous. *Corolla* twice the calyx, the smallest of all the species. *Pod* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, $\frac{1}{12}$ - $\frac{1}{8}$ in. broad; joints 4-6, densely clothed with minute spreading hooked grey hairs; upper suture distinctly indented.

31. **D. sequax**, *Wall. Pl. As. Rar.* t. 157; shrubby, branches terete, leaflets ovate-oblong acute repand, bracts very minute, upper suture slightly indented. *Wall. Cat.* 5712.

Along the Himalayas from SIMLA and KUMAON to SIKKIM, alt. 4-7000 ft.

A shrub, reaching 2-30 ft. high, the branches clothed with dense short grey or brown pubescence. *Petioles* 1-2 in.; leaflets subcoriaceous, subscabrous, with short obscure adpressed hairs above, grey and more densely hairy beneath; end one 3-5 in. long, narrowed gradually to a point. *Racemes* copious, moderately lax, lateral and terminal, 2-4 in. long, the end one panicked; pedicels $\frac{1}{2}$ - $\frac{1}{4}$ in., downy, spreading or ascending. *Calyx* $\frac{1}{12}$ in.; teeth lanceolate. *Corolla* 3 times calyx. *Pod* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, $\frac{1}{12}$ in. broad, 6-8-jointed, short-stalked, densely clothed with minute spreading hooked hairs.

32. **D. concinnum**, *DC. Prodr.* ii. 335; shrubby, branches terete, leaflets oblong entire obtuse, bracts large ovate, upper suture not indented. *D. pendulum*, *Wall. Pl. As. Rar.* t. 94. *D. penduliflorum*, *Wall. Cat.* 5727. *D. paucinervium*, *DC. Prodr.* ii. 336.

All along the HIMALAYAS from the UPPER PUNJAB to SILHET and KHASIA, ascending to 7000 ft. in SIMLA. PEGU, *McClelland*.

A tall shrub, with slender drooping branches, densely clothed at first with short grey pubescence. *Petioles* $\frac{1}{2}$ -1 in.; leaflets subcoriaceous, green, smooth above, with raised parallel main veins and clothed with adpressed grey or brownish silky hairs beneath; end one 2-3 in. long; side ones smaller. *Racemes* copious, lax, lateral and terminal, the latter often $\frac{1}{2}$ -1 ft. long, usually simple; pedicels $\frac{1}{2}$ - $\frac{3}{8}$ in., ascending; bracts $\frac{1}{4}$ - $\frac{3}{8}$ in., closely imbricated, densely silky. *Calyx* $\frac{1}{12}$ in.; teeth lanceolate-deltoid. *Corolla* $\frac{1}{4}$ - $\frac{1}{3}$ in. *Pod* $\frac{3}{4}$ -1 in. long, $\frac{1}{8}$ in. broad, short-stalked, 4-6-jointed, minutely downy.

VAR. amœnum; leaflets narrowed to an acute point, racemes most or all terminal. *D. amœnum*, *Wall. Cat.* 5726.—Khasia and Silhet.

***** *Joints of pod small, as long as broad, sometimes splitting along the lower suture; upper suture straight, lower slightly constricted. Calyx-teeth long.* (NICOLSONIA (*DC.*))

33. **D. retroflexum**, *DC. Prodr.* ii. 336; pedicels sharply reflexed, leaves usually 1-foliate, leaflet rotundato-cordate. *D. orbiculatum*, *Wall. Cat.* 5695. *D. rotundifolium*, *Wall. Cat.* 5696. *Uria?* *styracifolia*, *W. & A. Prodr.* 222. *Hedysarum retroflexum*, *Linn. Mant.* 103. *H. styracifolium*, *Linn. Mant.* 103, *non aliorum*.

ASSAM, SILHET and TENASSERIM, tropical zone.—DISTRIB. China.

Branches terete, woody, clothed with short spreading hairs at first. *Leaves* subcoriaceous, thick, green, glabrous above, densely coated with adpressed white silky hairs beneath, 1-2 in. long and broad; side leaflets when present much smaller than the end one; petiole $\frac{1}{2}$ -1 in., deflexed at tip. *Racemes* copious, simple, axillary and terminal, very dense, subsessile, an inch or less long; bracts ovate, ciliated; pedicels $\frac{1}{2}$ - $\frac{1}{8}$ in. *Calyx* $\frac{1}{12}$ in., densely bristly. *Corolla* twice the calyx. *Pod* $\frac{3}{8}$ - $\frac{1}{2}$ in. long, obscurely hairy, under $\frac{1}{8}$ in. broad; joints 3-5.

34. **D. capitatum**, *DC. Prodr.* ii. 336; leaflets always 3 obovate-cuneate, pedicels sharply reflexed. *D. obovatum*, *Wall. Cat.* 5722 B. *D. polycarpum*,

W. & A. Prodr. 227, *ex parte*. *Hedysarum capitatum*, *Burm. Fl. Ind.* 167, t. 64, fig. 1. *H. conicum*, *Poir. Encyc.* vi. 419. *Pseudarthria capitata*, *Hassk. Pl. Jav. Rar.* 390.

CEYLON, *Burmamn.* PROME hills, *Wallich*.—DISTRIB. Malay isles, Philippines.

Branches woody, terete, argenteo-canescens when young. *Petiole* $\frac{1}{2}$ –1 in.; leaflets subcoriaceous, green, glabrescent above, densely persistently coated with adpressed white silky hairs below; end one 1–1 $\frac{1}{2}$ in. long, retuse. *Racemes* copious, axillary and terminal, simple, dense, nearly sessile, 1–2 in. long; pedicels $\frac{1}{8}$ – $\frac{1}{4}$ in.; bracts small, ovate-cuspidate, ciliated. *Calyx* $\frac{1}{12}$ in. glabrescent; teeth deep, setaceous. *Corolla* twice the calyx. *Pod* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, glabrescent, 4–6-jointed, $\frac{1}{8}$ in. broad.

35. **D. Griffithianum**, *Benth. Pl. Jungh.* 222; herbaceous, trailing, leaflets 3, pedicels deflexed at the tip, corolla small.

KHASIA, alt. 4–6000 ft., *Griffith, Hook. fil. & Thomson*.

Stems 1–2 ft. long, moderately robust, densely clothed upwards with fine spreading hairs. *Petiole* $\frac{1}{2}$ –1 in.; leaflets always 3, subcoriaceous, green, glabrous above, clothed with short inconspicuous adpressed hairs beneath; end one obovate-oblong, obtuse, $\frac{3}{4}$ –1 in. long. *Racemes* terminal, peduncled, 2–6 in. long, dense in the upper part; bracts $\frac{1}{4}$ – $\frac{3}{8}$ in, ovate-cuspidate, densely silky; pedicels $\frac{1}{8}$ – $\frac{1}{6}$ in., silky, erecto-patent. *Calyx* $\frac{1}{8}$ in., densely silky; teeth deep, setaceous. *Corolla* twice the calyx. *Pod* $\frac{1}{2}$ – $\frac{5}{8}$ in. by $\frac{1}{12}$ in., 4–5-jointed, obscurely downy.

36. **D. brachystachyum**, *Grah. MSS.*; herbaceous, trailing, leaves 1-foliate, pedicels reflexed at the tip. *Benth. Pl. Jungh.* 223.

UPPER GANGETIC PLAIN, *Hamilton, Edgeworth, &c.*

Stems caespitose, slender, a foot long, glabrous except at the top. *Leaflets* round-or broad-oblong, cordate, $\frac{3}{4}$ –1 $\frac{1}{4}$ in. long, obtuse or emarginate, subcoriaceous, glabrous above, reticulato-venose and inconspicuous hairy below; petiole $\frac{1}{2}$ in. *Racemes* copious, close, under 1 in. long, axillary and terminal, nearly sessile; bracts lanceolate, under $\frac{1}{4}$ in.; pedicel $\frac{1}{2}$ – $\frac{1}{6}$ in., abruptly cernuous at the tip, as in *Uraria*. *Calyx* $\frac{1}{8}$ in., clothed all over with dense white hairs; teeth long, lanceolato-cuspidate. *Corolla* twice the calyx. *Pod* sessile, 2-jointed, glabrous, not longer than the calyx.

37. **D. rufescens**, *DC. Prodr.* ii. 335? erect, shrubby, leaflets 3, pedicels finally spreading or cernuous, corolla large. *W. & A. Prodr.* 228; *Wight Ic.* t. 984; *Illustr.* t. 79. *D. ferrugineum*, *Wall. Cat.* 5732; *Thwaites Enum.* 87.

NILGHIRIS and CEYLON, up to 4000 ft.

An erect undershrub, with young branches densely clothed with short ferruginous silky hairs. *Petiole* 1–1 $\frac{1}{2}$ in.; leaflets subcoriaceous, glabrous above, more or less densely argenteo-canescens beneath; end one obovate-oblong, 1–2 in. long, obtuse, with a mucro. *Racemes* usually terminal, 3–6 in. long, dense in the upper part; bracts ovate-acuminate, $\frac{1}{4}$ – $\frac{3}{8}$ in., densely silky; pedicels $\frac{1}{4}$ – $\frac{3}{8}$ in., densely silky. *Calyx* $\frac{1}{4}$ in.; teeth lanceolate, exceeding the tube; lowest linear. *Corolla* $\frac{3}{8}$ – $\frac{1}{2}$ in. *Pod* short-stalked, 1–1 $\frac{1}{4}$ in. by $\frac{1}{8}$ in., 6–8-jointed, minutely downy.

38. **D. polycarpum**, *DC. Prodr.* ii. 334; shrubby, suberect, leaflets 3, pedicels ascending, corolla, bracts and joints of pod small. *W. & A. Prodr.* 227; *Wight Ic.* t. 406, non *Wall.*; *Dalz. & Gibs. Bomb. Fl.* 66. *D. angulatum*, *Wall. Cat.* 5729 *ex parte*, non *DC.* *D. ovalifolium*, *Wall. Cat.* 5730. *D. siliquosum*, *DC. Prodr.* ii. 336. *D. heterocarpum*, *DC. Prodr.* ii. 337. *D. retusum*, *G. Don Gen. Syst.* ii. 297. *D. gyroides*, *Hassk. Pl. Jav. Rar.* 362, non *DC.* *D. Buergeri*, *Miq. Ann. Mus. Lugd. Bat.* iii. 45. *D. nervosum*, *Vogel. Pl. Meyen*, 28. *D. patens*, *Wight Ic.* t. 407. *Hedysarum polycarpum*, *Lam. Ill.* t. 628. *H. siliquosum*, *Burm. Fl. Ind.* 169, t. 55, fig. 2. *H. heterocarpum*, *Linn. Sp.* 1054. *H. purpureum*, *Roxb. Hort. Beng.* 57; *Fl. Ind.* iii. 358. *H. retusum*, *Don Prod.* 243. *H. patens*, *Roxb. Fl. Ind.* iii. 362.

HIMALAYAS, (ascending to 5000 ft.) and everywhere in the plain to BIRMA, MALACCA and CEYLON.—DISTRIB. Zanzibar, Malay isles, Philippines, China, Japan, Polynesia.

An erect or suberect undershrub, with woody slightly angular slender branches, clothed upwards with short adpressed grey hairs. *Petiole* $\frac{1}{2}$ –1 in.; leaflets subcoriaceous, green, glabrous above, thinly clothed with adpressed grey hairs beneath; end one obovate-oblong, obtuse, 1–3 in. long; side ones smaller. *Racemes* terminal and lateral, close, short-peduncled, 1–3 in. long, the end one sometimes branched; bracts $\frac{1}{2}$ – $\frac{5}{8}$ in.; pedicels $\frac{1}{8}$ – $\frac{1}{6}$ in., glabrous. *Calyx* $\frac{1}{12}$ in.; teeth acuminate, exceeding tube. *Corolla* under $\frac{1}{4}$ in. *Pod* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, $\frac{1}{8}$ in. br., glabrescent or minutely downy, 5–8-jointed.

VAR. *trichocaulon*; stems densely clothed upwards or throughout with spreading grey hairs, bracts larger. *D. trichocaulon*, DC. *Prodr.* ii. 335. *D. tenue*, Grah. in Wall. Cat. 5731. *D. serpens*, Wall. Cat. 5733. *D. angulatum*, Wall. Cat. 5729, B, D, F, *ex parte*, non DC. *D. distans*, Royle MSS.—Range of the type, ascending to 7000 ft. in Kumaon.

39. **D. jucundum**, *Thwaites Enum.* 411; shrubby, erect, leaflets 3, pedicels ascending, corolla bracts and joints of pod large.

CEYLON; Matelle district, *Thwaites*.

An erect much-branched undershrub, the young stems densely clothed with short ferruginous silky hairs. *Leaves* coriaceous, the under side densely coated with adpressed grey or pale brown silky hairs, the main veins much raised; end one obovate-oblong, obtuse, $1\frac{1}{2}$ –3 in. long; base subcuneate; petiole $\frac{1}{2}$ –1 in. *Racemes* terminal, peduncled, 4–6 in. long, close upwards; bracts $\frac{3}{8}$ in., ovate, silky; pedicels $\frac{1}{2}$ in. *Calyx* $\frac{1}{8}$ in.; teeth lanceolate, acuminate, exceeding tube. *Corolla* $\frac{1}{2}$ in. *Pod* 1– $1\frac{1}{4}$ in. by $\frac{1}{6}$ in.; joints 4–6, rather longer than broad, minutely downy.

40. **D. rotundifolium**, *Baker, non Wall.*; annual, stems very slender, leaves 1-foliolate, leaflet orbicular, racemes very lax few-flowered, pedicels ascending, corolla exserted. *Alysicarpus rotundifolius*, *Dalzell MSS.*

Plains of CONCAN, *Dr. Ritchie*.

Stems erect, under a foot high, with many ascending branches, thinly clothed with fine short spreading hairs. *Leaflet* round, $\frac{1}{4}$ – $\frac{3}{4}$ in. long, obtuse or obscurely cuspidate, slightly cordate, membranous, grey-green below with only a few obscure adpressed hairs; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Racemes* copious, terminal and lateral, the former forked, 3–4 in. long, the lower flowers in distant pairs, upper solitary; pedicels $\frac{1}{2}$ – $\frac{5}{8}$ in. long, arcuate, finely pubescent. *Calyx* $\frac{1}{8}$ in., thinly hairy; teeth linear-setaceous, very deep. *Pod* $\frac{1}{4}$ – $\frac{3}{8}$ in. long, under $\frac{1}{2}$ in. broad, falcate; joints 3–5, glabrescent, reticulate-venose.

41. **D. parviflorum**, *Baker*; annual, stems very slender, leaves oblong 1- and 3-foliolate intermixed, racemes very lax many-flowered, pedicels ascending, corolla included. *Alysicarpus parviflorus*, *Dalz. in Hook. Kew Journ.* iii. 211; *Dalz. & Gibs. Bomb. Flora*, 65.

Plains of CONCAN, *Dalzell, Ritchie*. Anamallay forest, *Wight*.

Stems diffuse, 1–2 ft. long, much branched, clothed with short spreading grey hairs. *Leaflets* membranous, mostly simple, oblong, 1– $1\frac{1}{2}$ in. long, obtuse or subacute, subcordate, with only a few adpressed grey hairs beneath; side ones, if present, much smaller; petiole $\frac{1}{4}$ – $\frac{3}{8}$ in. *Racemes* usually terminal, simple, 4–8 in. long, the lower flowers in distant pairs; pedicels capillary, $\frac{1}{2}$ – $\frac{3}{4}$ in., finely downy; bracts $\frac{1}{4}$ in., lanceolate-cuspidate. *Calyx* $\frac{1}{6}$ in., clothed with short bristly hairs; teeth setaceous, very long. *Pod* sessile, falcate, $\frac{3}{8}$ – $\frac{1}{2}$ in. by $\frac{1}{12}$ in., 4–6-jointed, glabrescent.

42. **D. auricomum**, *Grah. in Wall. Cat.* 5704; annual, stems very slender, leaves all 3-foliolate, racemes very lax few-flowered, pedicels ascending, corolla included. *Benth. Pl. Jungh.* 223; *Kurz in Journ. Asiatic Soc. Beng.* xlii. 2, 230.

Plains of M RTABAN and TENASSERIM, *Wallich, Helfer, Parish, Kurz*.

Stems caespitose, diffuse, 1-1½ ft., densely clothed throughout with spreading brown silky hairs. *Leaves* subcoriaceous, pale green, nearly glabrous beneath; end leaflet obovate-oblong, obtuse, $\frac{3}{8}$ -½ in. long; side ones smaller; petiole ¼ in. *Racemes* terminal, 2-3 in. long, the lower flowers in distant pairs, upper solitary; pedicels $\frac{1}{4}$ - $\frac{3}{8}$ in.; bracts lanceolate, ¼ in. *Calyx* ½ in., shaggy with silky hairs, like those of the stem; teeth linear-setaceous, very long. *Pod* sessile, silky, under $\frac{1}{2}$ by $\frac{1}{12}$ in., 4-5-jointed.

SUBGEN. 7. **Sagotia**, Walp. Trailing herbs, with small 3-foliolate stipellate leaves, flowers in sparse lax racemes or 1-2 in the axils of the leaves, deciduous bracts and distinctly jointed pods.

* *Flowers all 1-3 together without a common peduncle in the axils of the leaves.*

43. **D. triflorum**, DC. *Prodr.* ii. 334; *Wall. Cat.* 5734 excl. *F. ex parte*; *Benth. in Mart. Fl. Bras.* xv. 95, t. 26; *Dalz. & Gibs. Bomb. Fl.* 67. *D. triflorum* β. minus, *W. & A. Prodr.* 229; *Wight Ic. t.* 292. *D. heterophyllum*, *Wall. Cat.* 5701 C. *Hedysarum triflorum*, *Linn.*; *Roxb. Hort. Beng.* 57; *Fl. Ind.* iii. 353. *H. stipulaceum*, *Burm. Fl. Ind. t.* 54, fig. 2. *Nicolsonia reptans*, *Meissn. in Linn.* xxi. 260. *Sagotia triflora*, *Walp. & Duch. in Linn.* xxiii. 738.

Everywhere in the plains throughout India, ascending to 4000 ft. in KUMAON and 6-7000 ft. in KASHMIR and on the Chenab.—DISTRIB. Cosmopolitan in tropics.

Stems caespitose, very slender, trailing $\frac{1}{2}$ -1½ ft., copiously branched, clothed with fine spreading hairs. *Stipules* lanceolate, persistent; petiole $\frac{1}{8}$ -¼ in.; leaflets obovate, $\frac{1}{8}$ -½ in., truncate or emarginate, with a few adpressed hairs below. *Pedicels* $\frac{1}{4}$ - $\frac{3}{8}$ in. *Calyx* pubescent, $\frac{1}{12}$ - $\frac{1}{8}$ in.; teeth very long, setaceous. *Pod* $\frac{3}{8}$ -½ in. long, $\frac{1}{8}$ in. br., 3-5-jointed, pubescent; upper suture straight, lower slightly indented.

** *Flowers some racemed, the others pedicelled in the axils of the leaves.*

44. **D. reniforme**, DC. *Prodr.* ii. 327; leaves 1-foliolate, leaflet broader than long, calyx-teeth and pedicels short. *Wall. Cat.* 5702; *W. & A. Prodr.* 230; *Dalz. & Gibs. Bomb. Fl.* 67. *Hedysarum reniforme*, *Linn. Sp.* 1051; *Burm. Fl. Ind. t.* 52, fig. 1.

EAST HIMALAYAS, *Lobb*; PRÔME, AYA on the Banks of the Irrawaddi, *Wallich*; WESTERN PENINSULA, *Wight*.—DISTRIB. JAVA.

Stem 1 ft. or more long, very slender, glabrous. *Leaflet* rigidly subcoriaceous, half as broad again as long, $\frac{1}{4}$ - $\frac{3}{4}$ in. long, truncate or emarginate, glabrous; stipules linear, minute, deciduous; petiole ½ in., jointed at the apex. *Racemes* mostly terminal, laxly 10-20-flowered and a few flowers, solitary in the axils of the leaves; bracts linear, minute; pedicels $\frac{1}{8}$ - $\frac{1}{6}$ in., finally cernuous. *Calyx* under $\frac{1}{12}$ in., turbinate, glabrous. *Pod* glabrous, $\frac{1}{2}$ - $\frac{3}{4}$ in. by $\frac{1}{8}$ in.; joints 3-5, longer than broad; upper suture straight, lower little indented.

45. **D. heterophyllum**, DC. *Prodr.* ii. 334; leaves 3-foliolate, calyx-teeth and pedicels elongated. *Wall. Cat.* 5701, A, B, D. *D. triflorum* α. majus, *W. & A. Prodr.* 229; *Wight Ic. t.* 291. *D. triflorum*, *Wall. Cat.* 5734, *F. ex parte*. *D. caespitosum*, DC. *Prodr.* ii. 333. *Hedysarum heterophyllum*, *Willd. Sp. Pl.* iii. 6201. *H. reptans*, *Roxb. Hort. Beng.* 57; *Fl. Ind.* iii. 354. *Dicerma repens*, *Grah. in Wall. Cat.* 5740.

EAST HIMALAYAS, tropical zone; KHASIA and ASSAM and along the gulf to PENANG and MALACCA. Plains of PENINSULA and CEYLON.—DISTRIB. Malay isles, China, Philippines, Mascarene isles.

Stems 1-2 ft. long, copiously branched, clothed with dense spreading hairs. *Stipules* $\frac{1}{8}$ in., lanceolate-acuminate, persistent; petiole $\frac{3}{8}$ -½ in., pubescent; leaflets

oblong or obovate-oblong, $\frac{1}{2}$ –1 in. long, hairy beneath. *Flowers* solitary or geminate in leaf-axils and up to 6 in copious lax racemes; bracts rather large, lanceolate, deciduous; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. *Calyx* $\frac{1}{8}$ in., densely hairy; teeth very long, setaceous. *Pod* $\frac{1}{2}$ – $\frac{3}{4}$ in., long, $\frac{1}{8}$ – $\frac{1}{6}$ in. broad, glabrescent; joints 4–5, as broad as long; upper suture straight, lower considerably indented.

*** *Flowers all in lax racemes.*

46. **D. Rottleri**, Baker, non G. Don; stipules much shorter than the petiole, calyx-teeth short, joints 1–2, constriction between them very deep. *D. præmorsum*, Grah. in Wall. Cat. 5703? *Eleiotis Rottleri*, W. & A. Prodr. 231. *Hedysarum orbiculatum*, Rottler MSS. *Oxydium* species, Bennett Pl. Jav. Rar. 156. *Stylosanthes facie oxalidea*, Wall. Cat. 5974.

Plains of MYSORE, Rottler; PROME, Wallich.

Stems 1 ft. or more long, copiously branched, finely downy at first. *Stipules* linear-setaceous, minute; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.; leaflets 3, obovate, $\frac{3}{8}$ – $\frac{1}{2}$ in. long and broad, truncate or emarginate, with a few adpressed hairs beneath. *Racemes* copious, axillary and terminal, long-peduncled, laxly 6–8-flowered; bracts boat-shaped, hiding the buds; pedicels $\frac{1}{4}$ – $\frac{1}{3}$ in. *Calyx* $\frac{1}{8}$ in., campanulate; teeth subdeltoïd. *Joints* $\frac{1}{4}$ in. long, twice as long as broad, the constriction from below reaching nearly to the straight upper suture.

47. **D. parvifolium**, DC. Prodr. ii. 334; stipules as long as the petiole, calyx-teeth long setaceous, joints 3–4 with shallow constrictions between them. Wall. Cat. 5700; W. & A. Prodr. 229. *D. scoparium*, Wall. Cat. 5699. *D. microphyllum*, Miq. Fl. Ind. Bat. i. 239, an DC? *D. stipulaceum*, Hassk. Pl. Jav. Rar. 361. *Hedysarum tenellum*, Don Prodr. 243, non Kunth.

Everywhere in the plains, from the HIMALAYAS to CEYLON and AVA, ascending to the temperate region, reaching 7000 ft. in KUMAON.—DISTRIB. Malay isles, China, Japan.

Stems densely caespitose and branched, wide-trailing, at first pubescent. *Stipules* $\frac{1}{4}$ in., linear-setaceous, persistent; leaflets oblong or obovate, pubescent below, often not more than $\frac{1}{4}$ – $\frac{1}{2}$ in. long, sometimes $\frac{3}{8}$ – $\frac{1}{2}$ in. *Racemes* copious, but usually terminal on the short branches, laxly 6–10-flowered; bracts boat-shaped, deciduous; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., permanently ascending. *Calyx* $\frac{1}{12}$ – $\frac{1}{8}$ in., densely pubescent. *Pod* $\frac{3}{8}$ – $\frac{1}{2}$ in. by $\frac{1}{12}$ in., finely downy; joints as broad as long; both sutures distinctly indented.

VAR. *macrocarpum*; pod larger quite $\frac{1}{2}$ in. broad, the sutures less indented, the upper one nearly or quite straight.—Assam and Khasia, Griffith, Hook. fil. & Thomson.

SUBGEN. 8. **Pleurolobium**, DC. Erect undershrubs, with large leaves, racemose flowers and indistinctly jointed pods dehiscing in a continuous line along the ventral suture.—An aberrant group, which perhaps should be considered a distinct genus.

48. **D. gyrans**, DC. Prodr. ii. 326; branches scarcely woody, end leaflet usually 4–6 times as long as broad, pod glabrescent or inconspicuously downy. Wall. Cat. 5725; W. & A. Prodr. 227; Wight Ic. t. 294. *Hedysarum gyrans*, Linn.; Jacq. Ic. t. 562; Roxb. Fl. Ind. iii. 351. *Pseudarthria gyrans*, Hassk. Pl. Jav. Rar. 391. *Codariocalyx gyrans*, Hassk. in Walp. Rep. ii. 891.

All along the HIMALAYAS from HAZARA to ASSAM, ascending to 7000 ft.; WESTERN PENINSULA, CEYLON, AVA, PEGU, TENASSERIM.—DISTRIB. Malay isles, Philippines.

An undershrub, 3–4 ft. high, with subterete glabrous branches. *Petiole* $\frac{3}{8}$ – $\frac{1}{2}$ in.; leaflets 1–3, subcoriaceous, oblong-lanceolate, 3–4 in. long, obtuse, with a little inconspicuous pubescence beneath; side ones, if present, very small, moving by jerks. *Racemes* axillary and terminal, the latter copiously paniced, at first short, the flowers

hidden by the large ovate deciduous bracts, finally 3-6 in. long; pedicels $\frac{1}{4}$ in., patent, finely downy. *Calyx* $\frac{1}{12}$ in., campanulate; teeth deltoid, shorter than the tube. *Corolla* $\frac{1}{4}$ in. *Pod* 1-1 $\frac{1}{2}$ in. long, $\frac{1}{6}$ - $\frac{1}{5}$ in. broad, falcate, 6-10-jointed, straight along the upper, slightly indented along the lower suture.

VAR. *Roylei*; end-leaflet 3-4 in. long twice as long as broad, corolla rather larger. D. Roylei, W. & A. Prodr. 227.

49. **D. gyroides**, DC. Prodr. ii. 326; branches woody, end leaflet 2-3 times as long as broad, pod loosely but copiously pubescent. Wall. Cat. 5728; W. & A. Prodr. 227. D. pseudogyroides, Miq. Flor. Ind. Bat. i. 244. Hedy-sarum gyroides, Roxb. Hort. Berg. 57. Codariocalyx gyroides, Hassk. in Flora, 1842, bieb. ii. 49. C. conicus, Hassk. in Walp. Rep. i. 744. Pseudarthria polycarpa, Hassk. Pl. Jav. Rar. 393 (excl. syn.).

CENTRAL AND EAST HIMALAYAS, tropical region; GURWHAL to KHASIA and CACHAR; UPPER BENGAL, PEGU, CEYLON.—DISTRIB. Malay isles.

Closely allied to the last, but decidedly shrubby, reaching 8-10 ft. in height. Leaves obtuse, oblong or obovate-oblong, thinly or densely pubescent beneath; side ones often suppressed. Racemes shorter and the terminal ones not so copiously panicked; bracts under $\frac{1}{4}$ in. long, narrowed suddenly at the point. *Corolla* $\frac{3}{8}$ in., both standard and keel broader. *Pod* similar, except in vestiture.

51. **ABRUS**, Linn.

Climbing shrubs. Leaves with numerous deciduous leaflets. Flowers small, in dense racemes on axillary peduncles or short branches. *Calyx* campanulate, equal; teeth very short. *Corolla* much exserted; standard ovate, acute, adhering below to the staminal tube; wings narrow; keel arcuate. Stamens 9, united in a tube slit above, the tenth absent; anthers uniform. Ovary subsessile, many-ovuled; style short, incurved, beardless, stigma capitate. *Pod* oblong or linear-oblong, flat or turgid, moderately firm, thinly septate.—DISTRIB. Species 5; cosmopolitan in the tropics.

1. **A. precatorius**, Linn.; DC. Prodr. ii. 381; branches and leaves beneath glabrous or thinly silky, leaflets ligulate-oblong, pod oblong turgid 3-5-seeded. Roxb. Fl. Ind. iii. 258; Wall. Cat. 5818; W. & A. Prodr. 236; Dalz. & Gibs. Bomb. Fl. 76. A. minor and pauciflorus, Desv. in Ann. Sc. Nat. ix. 418.—Rheede Hort. Mal. viii. t. 39.

HIMALAYAS to CEYLON and SIAM, ascending to 3500 ft.—DISTRIB. Cosmopolitan in the tropics, often planted.

A copiously-branched climber, with slender branches. Leaves 2-3 in. long; leaflets 20-40, membranous, deciduous, $\frac{3}{8}$ - $\frac{5}{8}$ in. by $\frac{1}{6}$ - $\frac{1}{5}$ in. Racemes many-flowered, crowded, usually shorter than the leaves. *Calyx* $\frac{1}{12}$ in., thinly silky. *Corolla* reddish or white, 3-4 times the calyx. *Pod* 1-1 $\frac{1}{2}$ in. by $\frac{3}{8}$ - $\frac{1}{2}$ in. Seeds bright scarlet and black, black, or whitish, or mixed black and white, as large as a pea.

2. **A. pulchellus**, Wall. Cat. 5819; branchlets and leaves beneath glabrous or thinly silky, leaflets ligulate-oblong, pod linear flat incurved 9-12-seeded. Thwaites Enum. 91. A. lævigatus, E. Meyer; Harv. Fl. Cap. ii. 263. A. melanospermus, Hassk.; Miq. Fl. Ind. Bat. i. 159. A. acutifolius, Blume; Miq. Fl. Ind. Bat. i. 160.

KUMAON to CHITTAGONG, TENASSERIM and BURMA, ascending to 3000 ft. in SIKKIM; CEYLON.—DISTRIB. Malay isles, Guinea, Natal, Kaffraria.

General habit exactly of *A. precatorius*. Leaves 3-4 in. long; leaflets 24-30, similar in texture, $\frac{3}{4}$ -1 $\frac{1}{4}$ in. by $\frac{1}{4}$ - $\frac{3}{8}$ in. Racemes more numerous flowered, on longer peduncles. *Calyx* and corolla similar. *Pod* incurved, 2-2 $\frac{1}{2}$ in. by $\frac{1}{2}$ in., with thinner smooth valves.

3. **A. fruticulosus**, Wall. *Cat.* 5820; branchlets and leaves densely silky, leaflets minute ligulate-linear, pod linear-oblong flattish 4-6-seeded. *W. & A. Prodr.* 236; *Wight Ic.* t. 33.

Forests of MYSORE and the CARNATIC, tropical region.

Branches more slender than in the two others. *Leaves* and leaflets much smaller, the latter 20-50, $\frac{1}{4}$ - $\frac{1}{2}$ in. by $\frac{1}{24}$ - $\frac{1}{12}$ in., densely silky on both sides, or glabrescent above. *Racemes* few-flowered, exceeding the leaves. *Calyx* $\frac{1}{12}$ in. thinly silky; teeth distinct. *Pod* 1-1 $\frac{3}{4}$ in. by $\frac{3}{8}$ in.; valves thin, at first densely silky.

52. CICER, Linn.

Annual herbs. *Leaves* pinnate, rigid; leaflets and stipules strongly veined, deeply toothed. *Flowers* solitary in the axils of the leaves. *Calyx-tube* oblique; teeth lanceolate, subequal. *Corolla* exserted; standard broad, exceeding the wings and keel. *Stamens* diadelphous; anthers uniform. *Ovary* sessile, 2 or many-ovuled; style incurved beardless, stigma capitate. *Pod* sessile, oblong, turgid, narrowed into the persistent style.—*DISTRIB.* Species 7, Mediterranean and West and Central Asian, one widely cultivated.

1. **C. arietinum**, Linn.; *DC. Prodr.* ii. 354; leaflets close oblanceolate or oblong, corolla scarcely half as long again as the calyx, pubescence of pod short and fine. *Roxb. Fl. Ind.* iii. 324; *Wall. Cat.* 5949; *W. & A. Prodr.* 235; *Wight Ic.* t. 20; *Bot. Mag.* t. 2274; *Boiss. Fl. Orient.* ii. 560.

Commonly cultivated in the northern provinces and Nilghiris.—*DISTRIB.* Cultivated in various temperate and tropical countries.

A viscoso much-branched annual. *Leaves* 1-2 in., with usually a terminal leaflet; stipules small, with a few long teeth. *Peduncle* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Calyx* $\frac{1}{4}$ - $\frac{1}{2}$ in.; teeth linear, 2-3 times the tube. *Pod* oblong, $\frac{3}{4}$ -1 in.

2. **C. soongaricum**, Steph.; *DC. Prodr.* ii. 354; leaflets lax obovate-cuneate, corolla twice the calyx, pubescence of pod dense. *Jaub. & Spach Ill. Pl. Or.* t. 43 B. *C. microphyllum*, Benth. in *Royle Ill.* 200. *C. Jacquemontii*, *Jaub. & Spach in Ann. Sc. Nat.* ii. 18, 231; *Boiss. Fl. Orient.* ii. 563.

WESTERN HIMALAYAS, temperate and alpine region, alt. 9-15,000 ft.; PITI, LAHUL, KUMAON, TIBET, &c.—*DISTRIB.* Orient, Afghanistan, Songaria.

A very diffuse annual, with wiry finely pubescent or subglabrous stems. *Leaves* 3-4 in. long, ending in a spiral tendril; leaflets in 10-12 pairs, growing gradually smaller upwards, subcoriaceous, strongly veined; stipules $\frac{3}{8}$ - $\frac{1}{2}$ in., deeply sharply palmatifid. *Pedicels* 1 $\frac{1}{2}$ in., with a large bract at the curve. *Calyx* very gibbous, $\frac{2}{3}$ in.; teeth lanceolate, 2-3 times the tube. *Pod* linear-oblong, 1 in. long.

53. VICIA, Linn.

Annual or perennial herbs. *Leaves* equally pinnate, ending in twisted tendrils. *Flowers* subsessile, or in peduncled racemes in the axils of the leaves. *Calyx-tube* campanulate, often oblique; teeth long, often unequal. *Corolla* more or less exserted; standard broad; keel shorter than the wings. *Stamens* diadelphous, the mouth of the sheath very oblique; anthers uniform. *Ovary* nearly sessile, 2- or many-ovuled; style short, filiform or slightly flattened, stigma capitate. *Pod* flattish, continuous within.—*DISTRIB.* Species 180, spread principally through the north temperate zone.

SUBGEN. 1. **Ervum**, Linn. ex parte. Annuals, with flowers in sparse peduncled racemes, rarely solitary. *Style* finely downy all round near the tip.

1. **V. tetrasperma**, Moench *Meth.* 148; stems glabrous, peduncles 1-2-flowered, pods glabrous 3-4-seeded. Boiss. *Fl. Orient.* ii. 596. *Ervum tetraspermum*, Linn.; *DC. Prodr.* ii. 367.

NORTH-WEST HIMALAYAS, temperate region, rare; KUMAON, &c.—Thomson, *Edgeworth*, &c.—DISTRIB. Europe, Orient, &c.

Stems very slender, copiously branched. *Leaves* about 1 in. long; leaflets 3-4 pairs, obtuse or acute, $\frac{1}{2}$ – $\frac{3}{4}$ in. long. *Flowers* on copious axillary peduncles about as long as the leaves. *Calyx* $\frac{1}{12}$ in. *Corolla* lilac, distinctly exserted. *Pod* linear-oblong, $\frac{1}{2}$ in.

2. **V. hirsuta**, Koch *Synops.* 191; stems pubescent, peduncles 3-6-flowered, pods hairy 2-seeded. Boiss. *Fl. Orient.* ii. 595. *Ervum hirsutum*, Linn.; *W. & A. Prodr.* 235; *Roxb. Fl. Ind.* iii. 323. *E. filiforme*, Roxb. in *Wall. Cat.* 5955. *E. Lens*, Wall. *Cat.* 5954 C.

NORTH-WEST PROVINCES, from the PUNJAB to NIPAL, in the tropical and temperate region, frequent in cultivated grounds, ascending to 6000 ft.; NILGHIRIS.—DISTRIB. Europe, Orient, &c.

Stems rather stronger than in the last. *Leaves* longer, ending in an intricate tendril; leaflets 5-8 pairs, $\frac{1}{2}$ –1 in., truncate. *Peduncles* shorter than the leaves. *Corolla* smaller, scarcely exserted from the calyx. *Pod* $\frac{1}{4}$ – $\frac{3}{8}$ in. long, oblique, more turgid, finally black.

SUBGEN. 2. **Cracca**. Perennials with numerous flowers in peduncled racemes. *Style* finely downy all round near the tip.

3. **V. tenera**, *Grah. in Wall. Cat.* 5928; leaflets 12-16 distant narrow ligulate, racemes laxly many-flowered as long as their peduncles, lower calyx-teeth linear-subulate, corolla small pale. *Benth. in Royle Ill.* 200.

WESTERN HIMALAYAS; SIMLA, GURWHAL, KUMAON, alt. 3-8000 ft.; SILHET, Wallich.

A slender straggling subglabrous climber. *Leaves* 2-3 in. long; leaflets membranous, $\frac{3}{4}$ –1 in. by $\frac{1}{12}$ – $\frac{1}{8}$ in. broad, acute, finely silky beneath; stipules small, deeply toothed. *Racemes* 6-20-flowered, 1-2 in. long. *Calyx* $\frac{1}{12}$ in., subglabrous; teeth very unequal, upper deltoid. *Corolla* $\frac{3}{8}$ in. *Pod* oblique, linear, glabrous, rostrate, $1\frac{1}{4}$ in. long, 6-8-seeded.

4. **V. tenuifolia**, Roth; *DC. Prodr.* ii. 358; leaflets 20-24 narrow ligulate distant, racemes 20-40-flowered elongated long-peduncled, lower calyx-teeth lanceolate, corolla middle-sized deep blue. Boiss. *Fl. Orient.* ii. 586. *V. Cracca*, *Benth. in Royle Ill.* 200, not Linn.

NORTH-WEST HIMALAYAS, temperate region; Chenab valley, 6-8000 ft., Thomson. WEST TIBET, Falconer.—DISTRIB. Europe.

A subglabrous climber, a yard or more high. *Leaves* 4-6 in. long; leaflets acute, membranous, silky beneath, $1\frac{1}{4}$ – $1\frac{1}{2}$ in. long; stipules linear, with a single tooth. *Racemes* copious, reaching, as do the peduncles, $\frac{1}{2}$ ft. long. *Calyx* subglabrous, $\frac{1}{8}$ in.; teeth very unequal, all shorter than the tube, upper deltoid. *Corolla* $\frac{1}{2}$ – $\frac{3}{8}$ in. *Pod* 1 in. long, with a stalk as long as the calyx-tube.

5. **V. mollis**, *Benth. MSS.*; leaflets 16-20 close narrow ligulate, racemes few-flowered close short-peduncled, lower calyx-teeth linear, corolla large yellowish.

Valley of the Kishengunga, Winterbottom.

A suberect perennial, with the habit of *V. sepium*, with stems clothed with fine spreading hairs. *Leaves* $1\frac{1}{2}$ –2 in. long; leaflets $\frac{1}{2}$ – $\frac{3}{8}$ in. long, obtuse, clothed on both surface with adpressed, silky hairs; stipules broad, subentire. *Racemes* from the upper axils only, second, an inch long. *Calyx* $\frac{1}{4}$ in., densely silky; teeth all linear, lower as long as the tube, upper shorter. *Corolla* nearly 1 in. long.

6. **V. pallida**, Turcz.; *Led. Fl. Ross.* i. 673; leaflets 16–24 distant linear-oblong membranous, racemes long-peduncled laxly many-flowered, lower calyx-teeth deltoid-cuspidate, corolla pale lilac middle-sized. *V. sylvatica*, Benth. in Royle III. 200, not Linn.

WEST HIMALAYAS, temperate region; KASHMIR to KUMAON, 4–9000 ft.—DISTRIB. Siberia.

A tall straggling glabrous climber, with the habit of *V. sylvatica*. Leaves 2–4 in. long, ending in tendrils; leaflets obtuse, $\frac{1}{4}$ – $\frac{3}{4}$ in., the upper growing gradually shorter; stipules small, narrow, deeply toothed. Racemes 12–20-flowered, on peduncles 1–4 in. long. Calyx $\frac{1}{8}$ in., glabrous, membranous; all the teeth much shorter than the tube. Corolla $\frac{1}{2}$ in. Pod 1–1 $\frac{1}{2}$ in. long, flat, glabrous, oblique, distinctly-stalked, 5–6-seeded.

7. **V. Griffithii**, Baker; leaflets 12–16 distant linear-oblong membranous, racemes peduncled laxly 2–4-flowered, lower calyx-teeth lanceolate, corolla lilac middle-sized.

PUNJAB, at Rawul Pindee and Futtayjung, Dr. Aitchison.—DISTRIB. Afghanistan, Griffith, 1114.

A straggling annual, 1–2 ft. high, with slender stems, finely silky at first, soon glabrescent. Leaves about 2 inches long; leaflets obtuse, scattered, $\frac{1}{8}$ – $\frac{1}{4}$ in. broad, obscurely silky; stipules deltoid, deeply palmately lacinated. Racemes about as long as the leaves. Calyx $\frac{1}{8}$ in. long, rather silky, the lower teeth half as long as the tube, the upper deltoid. Corolla more than $\frac{1}{2}$ in. Pod above 1 in. long, oblong, flat, glabrous, veined, 5–6-seeded.

8. **V. rigidula**, Royle III. 200; leaflets 10–12 subdistant oblong venose, racemes 6–20-flowered close long-peduncled, calyx-teeth all very short, corolla large reddish. *Lathyrus himalensis*, Camb. in Jacquem. Voy. Bot. i. 44, t. 53. *V. dumetorum*, Benth. in Royle III. 200?

West Himalayas, temperate region; KASHMIR to KUMAON, 7–9000 ft.

A subglabrous or finely downy climber, 2–3 ft. high. Leaves 2–3 in. long, ending in intricate tendrils; leaflets obtuse, $\frac{3}{4}$ –1 in. long, firmer in texture than in the others, finely silky beneath, with veins raised like those of a *Tephrosia*; stipules small, half-hastate, deeply-toothed. Peduncles 2–3 in. long. Calyx $\frac{1}{6}$ – $\frac{1}{5}$ in., glabrous; pedicels longer than in the others, fully $\frac{1}{8}$ in. Corolla 3–4 times the length of the calyx. Pod linear, glabrous, on a stalk nearly as long as the calyx, 5–6-seeded.

SUBGEN. 3. **Euvicia**. Annuals or perennials, with the style conspicuously bearded on the lower side at the tip.

9. **V. sativa**, Linn.; DC. Prodr. ii. 360; annual, leaflets multijugate of upper leaves ligulate, flowers solitary or geminate not racemed. Roxb. Fl. Ind. iii. 323; Wall. Cat. 5957; Boiss. Fl. Orient. ii. 574.

NORTH-WEST PROVINCES, ascending from the plains of BENGAL to 7500 ft. in KUMAON, probably always cultivated.

Stems slender, suberect, glabrous or obscurely downy. Leaflets 8–12, of upper leaves $\frac{3}{4}$ –1 in. long, of lower shorter, broader; stipules small, obliquely lanceolate, deeply toothed. Calyx $\frac{2}{3}$ in.; teeth lanceolate-subulate. Corolla red-blue, twice the calyx. Pod glabrescent, 1 $\frac{1}{2}$ –2 in. long, 8–10-seeded.

VAR. *angustifolia*, Roth (Sp.), dwarfier, diffuse, leaflets shorter of lower leaves deeply emarginate at apex, flowers and pod smaller. Boiss. Fl. Orient. ii. 574. *V. Bobartii*, Forst. in Linn. Trans. xvi. 442. *V. pallida*, Jacquem. MSS. (a yellow flowered form). Plains of the north-west, a native.—Distrib. Europe, Orient.

10. **V. peregrina**, Linn.; DC. Prodr. ii. 362; annual, leaflets multijugate ligulate, flowers solitary. Boiss. Fl. Orient. ii. 576.

Plains of PUNJAB, *Aitchison*.—DISTRIB. Europe, Orient.

Stems slender, glabrous, diffuse. *Leaflets* 10–12, alternate or opposite, $\frac{1}{2}$ –1 in. long; stipules minute, bifid, with linear divisions. *Flowers* solitary, on short pedicels in the axils of the leaves. *Calyx* $\frac{1}{4}$ in.; teeth lanceolate, the upper shorter, curved upwards. *Corolla* purplish-red, twice the calyx. *Pod* linear-oblong, deflexed, glabrescent, rather recurved, 1–1 $\frac{1}{4}$ in. long, 5–6-seeded.

11. **V. sepium**, *Linn.*; *DC. Prodr.* ii. 364; perennial, leaflets multijugate oblong, racemes subsessile 2–6-flowered. *Boiss. Fl. Orient.* ii. 568.

KASHMIR, temperate region.—DISTRIB. Europe, Orient, Siberia.

Stems finely downy, suberect, 1–2 ft. *Stipules* small, deeply toothed; leaflets 10–12, membranous, truncate, $\frac{1}{2}$ –1 in. long. *Racemes* very close, secund, confined to the axils of the upper leaves. *Calyx* $\frac{1}{2}$ in., glabrous or downy; teeth deltoid-cuspidate, much shorter than the tube. *Corolla* reddish, twice the calyx. *Pod* linear-oblong, oblique, rostrate, glabrous, 1 in. long, 6–10-seeded.

12. **V. narbonensis**, *Linn.*; *DC. Prodr.* ii. 364; leaflets large of lowest leaves 2 of upper 4–6 obovate, racemes subsessile 2–6-flowered. *Boiss. Fl. Orient.* ii. 568.

PUNJAB, near Peshawur, *Vicary*, perhaps introduced.—DISTRIB. S. Europe, Orient, probably the original of the cultivated Bean.

A stout suberect annual, 1–1 $\frac{1}{2}$ foot high, glabrous or finely downy. *Stipules* large, deeply toothed; leaflets 1–2 in. long, entire in our plant. *Calyx* $\frac{2}{3}$ in.; lower teeth lanceolate, as long as tube; upper deltoid. *Corolla* purple, more than twice the calyx. *Pod* 1 $\frac{1}{2}$ –2 in. long, downy, 6–7-seeded.

ERYUM LENS, *Linn.*; *Wall. Cat.* 5954 (*Cicer Lens*, *Willd.*; *Roxb. Fl. Ind.* iii. 324) the common Lentil, and *VICIA FABA*, *Linn.*; *Roxb. Fl. Ind.* iii. 323; *Wall. Cat.* 5951, the Bean, are commonly cultivated, especially in the North-West Provinces.

VICIA BENGHALENSIS, *Linn.* seems to be the Mediterranean *V. atropurpurea*, *Desf.*, and to have no claim to be regarded as an Indian plant.

54. **LATHYRUS**, *Linn.*

Annual or perennial herbs, with equally pinnate leaves, ending in a tendril or bristle. *Flowers* racemed or solitary. *Calyx-tube* campanulate, oblique; teeth long or upper short. *Corolla* more or less exserted; standard broad; keel shorter than the wings. *Stamens* diadelphous, the mouth of the tube not oblique; anthers uniform. *Ovary* subsessile or stalked, many-ovuled; style flattened, bearded on the inner side, stigma capitate. *Pod* terete or flattish, continuous within.—DISTRIB. Species described 170, spread principally through all the north temperate zone.

SUBGEN. 1. **Eulathyrus**. Petiole terminated by a long tendril.

1. **L. Aphaca**, *Linn.*; *DC. Prodr.* ii. 372; annual, leaflets abortive, flowers 1–2 on a long peduncle. *Roxb. Fl. Ind.* iii. 322; *Wall. Cat.* 5952; *Benth. in Royle Ill.* 200; *Boiss. Fl. Orient.* ii. 602.

Spread through the northern provinces, ascending from the plains of BENGAL to the temperate zone in HAZARA, KASHMIR and KUMAON.—DISTRIB. Europe, Orient, Abyssinia.

Stems slender, wingless, much branched. *Stipules* in pairs adpressed to the stem, leaf-like, entire, truncate, hastate. *Peduncle* 2–3 times the stipule. *Calyx* $\frac{1}{4}$ in.; teeth equal, lanceolate, exceeding the tube. *Corolla* yellow, twice the calyx. *Pod* linear-oblong, wingless, 4–6-seeded.

2. **L. sativus**, *Linn.*; *DC. Prodr.* ii. 373; annual, stems winged, leaflets

2 linear or lanceolate, flowers solitary, pods oblong winged on the back. *Roxb. Fl. Ind.* iii. 321; *Wall. Cat.* 5953; *Benth. in Royle Ill.* 200; *Boiss. Fl. Orient.* ii. 606.

Spread through the northern provinces, ascending from the plains of BENGAL to 4000 ft. in KUMAON. Often cultivated.—DISTRIB. Europe, Orient, Trop. Africa.

Glabrous, much branched. *Stipules* broad, entire; petiole winged; leaflets $\frac{1}{2}$ – $\frac{1}{3}$ in. broad. *Peduncle* rather longer than the petiole. *Calyx* $\frac{3}{8}$ – $\frac{1}{2}$ in.; teeth lanceolate, subequal, twice the tube. *Corolla* $\frac{3}{4}$ in., red, bluish or white. *Pod* $1\frac{1}{2}$ in., long, glabrous, 4–5-seeded, the dorsal suture with a narrow spreading wing on each side.

The allied *L. tingitanus*, Linn., also much cultivated, with oblong leaflets and a linear many-seeded pod, is included in the set of Nilghiri plants distributed by Hohenacker, but has no claim to be considered a native.

3. ***L. sphaericus***, Retz.; *DC. Prodr.* ii. 372; annual, stems wingless, leaflets 2 narrow-linear, flowers solitary, pods linear wingless many-seeded. *Boiss. Fl. Orient.* ii. 613. *L. angulatus*, *Benth. in Royle Ill.* 200.

North-West Provinces, ascending from BUNDELKUND and the PUNJAB to 5500 ft. in KUMAON.—DISTRIB. Europe, Orient, Abyssinia.

Stems glabrous, very slender, very copiously branched. *Stipules* linear, caudate; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., winged; leaflets very narrow, reaching 3 in. long. *Peduncle* shorter than or a little exceeding the petiole, with a conspicuous linear bracteole. *Calyx* under $\frac{1}{2}$ in.; teeth equal, as long as the tube. *Corolla* reddish, twice the calyx. *Pod* 2 in. long, 10–12-seeded.

4. ***L. pratensis***, Linn.; *DC. Prodr.* ii. 370; perennial, leaflets 2 lanceolate, flowers many in long-peduncled racemes, calyx-teeth subequal. *Benth. in Royle Ill.* 200; *Boiss. Fl. Orient.* ii. 615.

WEST HIMALAYAS, temperate zone, alt. 6–8000 ft.; KASHMIR, GURWHAL, SIMLA.—DISTRIB. Europe, Orient, Abyssinia.

Stems slender, wingless, very diffuse. *Stipules* large, lanceolate-caudate; petiole distinct, angular. *Peduncles* often much exceeding the leaves. *Calyx* $\frac{1}{2}$ in.; teeth all linear, as long as the calyx. *Corolla* yellow, 3 times the calyx. *Pod* linear. *L. cashmERICUS*, Royle MSS., is a form with pubescent stems and calyx.

5. ***L. altaicus***, Led. *Fl. Alt.* iii. 355; perennial, leaflets 6–8 oblong, flowers few in long-peduncled racemes, calyx-teeth very unequal. *Led. Ic. Pl. Ross.* t. 53. *L. ovatus*, *Royle Ill.* 200.

WEST HIMALAYAS, temperate region; Baltal and Chenab valley, 6–8000 ft., *Royle, Thomson, Jacquemont*.—DISTRIB. Siberia.

A suberect glabrous perennial, $\frac{1}{2}$ –1 ft. high. *Leaves* 2–3 in. long; leaflets glaucous, membranous, venose, $\frac{1}{2}$ – $\frac{3}{4}$ in. broad; stipules lanceolate-caudate slightly toothed. *Racemes* secund, laxly 3–6-flowered; peduncles 2–4 in. long. *Calyx* $\frac{3}{8}$ in.; lower teeth linear, nearly as long as the tube; upper deltoid. *Corolla* reddish, twice the calyx.

SUBGEN. 2. ***Orobis***, Linn. Petiole terminated by a mere bristle.

6. ***L. inconspicuus***, Linn.; *DC. Prodr.* ii. 372; annual, leaflets 1–2 narrow linear, flowers solitary subsessile in the axils of the leaves. *L. erectus*, *Lag.*; *Boiss. Fl. Orient.* ii. 613.

KASHMIR, 4–5000 ft., *Thomson, Falconer*. SCINDE, *Stocks*.

Habit of *L. sphaericus*, with which it coincides in stem, leaflets, pod and stipules. *Petiole* very short, not winged; leaflets 1– $1\frac{1}{2}$ in. long. *Calyx* $\frac{1}{2}$ in.; teeth subequal, lanceolate-subulate, as long as the tube. *Corolla* lilac, twice the calyx.

7. ***L. luteus***, Baker; perennial, leaflets 6–8 oblong, flowers in peduncled racemes. *Orobis luteus*, Linn.; *DC. Prodr.* ii. 378. *O. laevigatus*, W. & K. *Pl.*

Hung. t. 243. *O. orientalis*, Boiss. *Diag.* ix. 106. *O. Emodi*, Wall. *Cat.* 5948. *O. aureus*, Stev.; Boiss. *Fl. Orient.* ii. 621.

West Himalayas, tropical and temperate zone, ascending from the salt range in the PUNJAB to 8500 ft. in KUMAON and 10,000 ft. in KHAGAN.—DISTRIB. Europe, Orient, Altai, Songaria.

Stems suberect, glabrous, 2-3 ft. high. *Stipules* large, leafy; leaflets membranous, acute, 2-4 in. long. *Racemes* 6-12-flowered, equalling or exceeding the leaves. *Calyx* $\frac{3}{4}$ -1 in.; lower teeth lanceolate, upper deltoid. *Corolla* bright yellow, twice the calyx. *Pod* linear, beaked, 2-3 in. long.

The genus *PISUM* is principally distinguished from *Lathyrus* by its thick laterally compressed style. The two subspecies of the common cultivated Pea are both often cultivated in the northern provinces; *P. SATIVUM*, Linn.; Roxb. *Fl. Ind.* iii. 321; Wall. *Cat.* 5950, with round seeds of uniform colour and 4-6 leaflets; and *P. ARVENSE*, Linn., with compressed marbled seeds and 2-4 leaflets. Royle considers the latter a true native.

55. **AMPHICARPÆA**, Elliott.

Wide-twining herbs, with 3-foliolate stipellate leaves and persistent striated stipules and bracts. *Flowers* with a strong tendency to dimorphism, those that bear the fully developed pods being, as in *Viola*, without petals. *Calyx-tube* long, equal, teeth distinct, unequal. *Corolla* much exerted; petals equal in length; standard and wings with a distinct spur on each side of the claw. *Stamens* diadelphous; anthers uniform. *Ovary* obscurely stalked, many-ovuled; style filiform, inflexed, beardless, stigma capitate. *Pod* flat, linear-oblong.—DISTRIB. Species 3, or 3 varieties of one, from the United States, Japan, and Himalayas, one in each country.

1. **A. Edgeworthii**, Benth. *Pl. Jungh.* 231.

WEST HIMALAYAS, temperate zone; Simla, 5-6000 ft., Edgeworth, Thomson.

Stems very slender, thinly shortly pubescent. *Stipules* and bracts oblong or lanceolate, subobtusate or subacute, $\frac{1}{2}$ in. long; leaflets membranous, obscurely hairy; end one broad ovate acute, side ones oblique. *Flowers* usually solitary or in pairs, but casually racemed; pedicels very short. *Calyx* $\frac{1}{2}$ in.; teeth lanceolate-subulate, much shorter than the tube. *Corolla* $\frac{1}{2}$ in., reddish. Perfect *pod* 1 in. long, linear, recurved, 2-3-seeded. Very near the Japanese species (*Shuteria trisperma*, Miq. Ann. Mus. Lug. Bat. iii. 51) and the well-known American *A. monoica*, both of which have obovate bracts and copiously racemed flowers.

56. **SHUTERIA**, W. & A.

Climbers, with 3-foliolate stipellate leaves, persistent bracts and bracteoles, and middle-sized racemose uniform flowers. *Calyx-tube* gibbous; teeth distinct, shorter than the tube. *Corolla* exerted; exauriculate standard rather exceeding the keel and distinctly spurred wings. *Stamens* diadelphous; anthers uniform. *Ovary* subsessile, many-ovuled; style incurved, filiform, beardless, stigma capitate. *Pod* flat, linear, recurved.—DISTRIB. One additional species, Trop. African.

1. **S. vestita**, W. & A. *Prodr.* 207; stems densely hairy, racemes dense sessile many-flowered, bracts and bracteoles conspicuous lanceolate, leaflets obovate-oblong or roundish obtuse. Benth. *Pl. Jungh.* 232; Wight *Ic.* t. 165; Dalz. & Gibs. *Bomb. Fl.* 68. *Glycine vestita*, Griseb. in Wall. *Cat.* 5512. *G. involucrata*, Wall. *Cat.* 5506 A, ex parte.

EAST HIMALAYAS; KHASIA, SIKKIM, BHOTAN and MISHMI, ascending to 5000 ft. Hills of WESTERN PENINSULA and CEYLON, ascending to 7000 ft.

Stems slender, woody, glabrescent. *Stipules* lanceolate, rigid, under $\frac{1}{4}$ in.; petiole 1-3 in., hairy or glabrous; leaflets membranous or subcoriaceous, obscurely hairy on both sides or glabrescent, the end one 1-2 in. long. *Racemes* copious, close, 1-4 in. long, sometimes 2-3 from same node; lower flowers often geminate; bracts rigid, about as long as the densely hairy pedicels. *Calyx* $\frac{1}{8}$ in., densely hairy; teeth shorter than tube, upper lanceolate-cuspidate. *Corolla* reddish, twice the calyx. *Pod* 1-1 $\frac{1}{4}$ in. long, linear, hairy, recurved, 5-6-seeded.

VAR. 1. *glabrata*; calyx and leaves nearly or quite glabrescent. *S. glabrata*, *W. & A. Prodr.* 207.—Khasia, *Simons*. Nilghiris, *Wight*.

VAR. 2. *involuta*; racemes laxer, their lower nodes bracteate by 2-3 reduced roundish leaflets $\frac{1}{4}$ - $\frac{1}{2}$ in. long, leaflets obovate-oblong, calyx silky. *S. involuta*, *W. & A. Prodr.* 207; *Benth. Pl. Jungh.* 232. *Glycine involuta*, *Wall. Pl. As. Rar.* iii. 22, t. 241; *Wall. Cat.* 5506, *ex parte*.—Kumaon, Gurwhal, Nipal.

VAR. 3. *densiflora*; racemes very dense, the flowers often several from the same node, bracts and bracteoles rather larger, calyx pod and oblong subcoriaceous leaflets glabrous. *S. densiflora*, *Benth. Pl. Jungh.* 232. *Glycine involuta*, *Wall. Cat.*, 5506, *ex parte*.—Gurwhal, Kumaon and Nipal, ascending to 7000 ft.

2. *S. hirsuta*, Baker; stems densely hairy, racemes peduncled many-flowered, bracts and bracteoles long linear-setaceous, leaflets ovate cuspidate.

KHASIA AND SIKKIM, 3-5000 ft., *Hook. fil. & Thomson*.

Stems firm, slender, densely clothed with conspicuous deflexed hairs. *Stipules* $\frac{1}{2}$ - $\frac{3}{4}$ in.; leaflets membranous, with a thin coating of adpressed hairs on both sides, subconcolorous; end one 2-4 in. long. *Flowers* in lax racemes, 2-3 in. long, on densely hairy peduncles as long as themselves, geminate at the nodes; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in. *Calyx* $\frac{1}{8}$ - $\frac{1}{2}$ in., thinly hairy; teeth shorter than tube, upper deltoid, lower linear. *Corolla* purple, twice the calyx. *Pod* recurved, densely hairy, many-seeded.

3. *S. ? ferruginea*, Baker; stems densely hairy, racemes peduncled many-flowered, bracts and bracteoles lanceolate conspicuous, leaflets ovate-cuspidate. *Amphicarpæa ferruginea*, *Benth. Pl. Jungh.* 231. *Glycine ferruginea*, *Grah. in Wall. Cat.* 5514. *G. cylindriflora*, *Wall. Cat.* 5516.

NIPAL, *Wallich*.

Stems slender, woody. *Stipules* and bracts less persistent than in the other species; petiole 2-3 in.; leaflets membranous, green, with inconspicuous adpressed hairs above, glaucous-grey with dense hairs below, ferruginous on the nerves; end one 2-3 in. long. *Flowers* 6-12 together, in short-peduncled racemes. *Calyx* under $\frac{1}{4}$ in., subglabrous; upper teeth deltoid, lower lanceolate. *Corolla* $\frac{1}{2}$ - $\frac{5}{8}$ in., reddish.—Recedes to *Glycine* by its subcaducous bracts and bracteoles.

4. *S. suffulta*, Benth. Pl. Jungh. 232; stems glabrous, racemes very lax few-flowered, bracts and bracteoles linear very minute, leaflets obtuse roundish. *Glycine suffulta*, *Wall. Cat.* 5507.

BIRMA; Prome hills and Taong Dong, *Wallich*. TENASSERIM, *Helper*.

Stems firm, very slender. *Stipules* linear, $\frac{1}{2}$ in.; leaflets membranous, subglabrous, glaucous-grey beneath, the end one $\frac{3}{4}$ -1 in. long. *Racemes* nearly sessile, 1-2 in. long, 6-10-flowered, the lower nodes bracteate by reduced leaves as in *S. vestita*, var. *involuta*; bracts rigid, not more than $\frac{1}{24}$ in. long; pedicels distant, solitary, very short. *Calyx* $\frac{1}{8}$ in., with a few adpressed hairs; teeth all short, lowest lanceolate. *Corolla* $\frac{3}{8}$ in., reddish. *Pod* 1 $\frac{1}{2}$ in. long, glabrous, recurved, 6-8-seeded.

57. **DUMASIA**, DC.

Climbing herbs. *Leaves* 3-foliolate, with stipellate leaflets. *Flowers* middle-sized, racemose. *Calyx-tube* cylindrical, very gibbous, with a very oblique subtruncate mouth. *Corolla* exserted; petals equal in length; standard spurred on

both sides of the base of the limb; wings and keel adherent, with small blades and very long claws. *Stamens* diadelphous; anthers uniform. *Ovary* linear, substipitate, few-ovuled; style long, flattened above its curve, stigma capitate. *Pod* linear, falcate, torulose.—**DISTRIB.** One other species, in Japan.

1. **D. villosa**, *DC. Mem. Leg.* 257, t. 44; *Prodr.* ii. 241; leaves and leaflets distinctly petioled, the latter ovate, corolla twice as long as the calyx. *Wall. Cat.* 5523. *D. pubescens*, *DC. loc. cit.* t. 45. *D. congesta*, *Grah. in Wall. Cat.* 5524; *W. & A. Prodr.* 206; *Wight Ic.* t. 445.

HIMALAYAS, from SIMLA and KUMAON to SIKKIM and KHASIA, ascending to 6-7000 ft. Hills of WESTERN PENINSULA and CEYLON.—**DISTRIB.** Java, Madagascar, Natal.

Stems slender, densely clothed with grey or ferruginous hairs. *Petiole* 1-2 in.; stipules minute, setaceous; leaflets membranous, obtuse, green, with a few obscure hairs above, grey, densely pubescent beneath; end one 2-3 in. long. *Racemes* 2-6 in. long, lax or close, 12-40-flowered, rarely (*D. congesta*, *Grah.*) close, subsessile; bracts and bracteoles minute, setaceous. *Calyx* $\frac{1}{4}$ - $\frac{3}{8}$ in., with a few adpressed hairs. *Corolla* $\frac{1}{2}$ - $\frac{3}{4}$ in., yellow or purplish. *Pod* $1\frac{1}{2}$ in. long, velvety, 3-4-seeded.

VAR. *leiocarpa*, *Benth. Pl. Jungh.* 231, sp.; pod and leaflets subglabrous.—Sikkim, Khasia, Ceylon.

2. **D. cordifolia**, *Benth. MSS.*; leaves and leaflets subsessile, the latter rotundato-cordate, corolla half as long again as the calyx.

KHASIA, 5000 ft., *Hook. fil. & Thomson.*

Stems very slender, at first finely downy. *Stipules* linear, very minute; leaflets membranous, glabrous, $\frac{1}{2}$ -1 in. long, firm, pale green. *Flowers* 6-10, in a close raceme, on a glabrous peduncle 1-2 in. long; bracts and bracteoles linear, very minute. *Calyx* glabrous, membranous, $\frac{1}{4}$ - $\frac{1}{2}$ in. long. *Corolla* pale yellow.

58. GLYCINE, Linn.

Twining or suberect herbs. *Leaves* with 3-7 stipellate leaflets. *Flowers* in axillary racemes, with minute narrow bracts. *Calyx-tube* campanulate; teeth distinct, long or short. *Corolla* mostly little exerted; petals about equal in length; standard not distinctly spurred. *Stamens* more or less completely monadelphous; anthers uniform. *Ovary* subsessile, many-ovuled; style short, incurved, beardless, stigma capitate. *Pod* linear or linear-oblong, straight or recurved, flat or rather turgid, few-seeded.—**DISTRIB.** Species about 12, spread through tropics of old world, and especially Australia.

1. **G. javanica**, *Linn.*; *DC. Prodr.* ii. 242; stems slender twining, leaflets 3, racemes elongated many-flowered, calyx-teeth long setaceous, pod narrow small. *Benth. in Journ. Linn. Soc.* viii. 266. *Soja Wightii* and *S. javanica*, *Grah. in Wall. Cat.* 5530 & 5528. *Notonia Wightii*, *W. & A. Prodr.* 208. *Johnia Wightii*, *W. & A. Prodr.* 449.

Plains of the WESTERN PENINSULA and CEYLON.—**DISTRIB.** Trop. Africa, Natal, Java.

Stems wide-climbing, more or less clothed with grey or ferruginous silky hairs. *Petioles* 1-3 in.; leaflets membranous, green, with a few adpressed hairs above, grey and pubescent below; end one ovate, acute, 2-4 in. long. *Racemes* short-peduncled, dense or lax, 1-6 in. long; pedicels very short; bracteoles long, setaceous. *Calyx* $\frac{1}{2}$ - $\frac{1}{2}$ in., densely silky; teeth setaceous, plumose. *Corolla* reddish, little exerted. *Pod* linear, straight, 1 in. by $\frac{1}{6}$ - $\frac{1}{5}$ in., 4-5-seeded, clothed with adpressed hairs.

2. **G. pentaphylla**, *Dalz. in Kew Journ.* iv. 344; stems slender twining, leaflets 5-7, racemes elongated many-flowered, calyx-teeth short, pod broad. *Benth. in Journ. Linn. Soc.* viii. 266; *Dalz. & Gibs. Bomb. Fl.* 68.

KHASIA, 3-5000 ft., *Hook. fil. & Thomson, Lobb. CONCAN, Dalzell, Stocks.*

Stems wide-climbing, with a few adpressed hairs. *Petiole* 1-2 in.; leaflets subcoriaceous, with a few adpressed hairs on both sides, green above, grey below, distant; end one oblong-lanceolate, acute, 3-4 in. long. *Racemes* lax, usually short-peduncled, reaching 6-8 in. long; pedicels very short, fascicled. *Calyx* $\frac{1}{2}$ in.; teeth deltoid, shorter than the tube. *Corolla* reddish, twice the calyx. *Pod* glabrous, flat, rather recurved, $1\frac{1}{2}$ in. by $\frac{1}{2}$ in., 4-5-seeded.

3. **G. Soja**, *Sieb. & Zucc. Fam. Nat. Fl. Jap.* 11; stems stout suberect, leaflets 3, racemes few-flowered congested sessile, calyx-teeth long setaceous, pods broad. *Benth. in Journ. Linn. Soc.* viii. 266. *Soja hispida, Moench; DC. Prodr.* ii. 396; *Wall. Cat.* 5529; *W. & A. Prodr.* 247. *Dolichos Soja, Linn.; Roxb. Fl. Ind.* iii. 314. *Soja angustifolia, Miq. Fl. Ind. Bat.* i. 223.

HIMALAYAS, tropical region; KUMAON to SIKKIM, KHASIA and AVA, often cultivated.—DISTRIB. East Asia.

Stems suberect or climbing upwards, annual, densely clothed with fine ferruginous hairs. *Leaves* long-petioled; leaflets membranous, ovate, acute, rarely obtuse, 2-4 in. long. *Calyx* $\frac{1}{2}$ in., densely hairy. *Corolla* reddish, little exserted. *Pods* usually only 2-3 developed in the axil of each leaf, linear-oblong, recurved, densely pubescent, $1\frac{1}{2}$ -2 in. by $\frac{1}{2}$ - $\frac{3}{8}$ in., 3-4-seeded, subtorulose.

59. **TERAMNUS**, Sw.

Twining herbs, with exactly the habit of *Glycine*. *Calyx-tube* campanulate; teeth distinct, subequal or two upper not so long. *Corolla* little exserted; petals about equal in length; standard not spurred. *Stamens* monadelphous; alternate anthers small, abortive. *Ovary* sessile, many-ovuled; style short, curved, beardless, stigma capitate. *Pod* linear, hooked with the persistent style at the tip, flattish, septate between the seeds.—DISTRIB. Species 4, belting the world in the tropics.

1. **T. labialis**, *Spreng. Syst.* iii. 235; leaflets small acute or subobtuse, racemes usually peduncled elongated, calyx-teeth as long as the tube. *Benth. in Journ. Linn. Soc.* viii. 265. *Glycine labialis, Linn.; Roxb. Fl. Ind.* iii. 318; *W. & A. Prodr.* 208; *Wight Ic.* t. 168; *Dalz. & Gibs. Bomb. Fl.* 68. *G. parviflora, Lam.; DC. Prodr.* ii. 242; *Wall. Cat.* 5508 A-F. *G. debilis* and *senegalensis, DC. Prodr.* ii. 242. *G. pallens, Grah. in Wall. Cat.* 5518. *G. warrensis, Dalz. in Kew Journ.* iii. 210; *Dalz. & Gibs. Bomb. Fl.* 68. *G. tenerrima, Grah. in Wall. Cat.* 5520?

Plains from the foot of the WEST HIMALAYAS to CEYLON, BURMA and PENANG.—DISTRIB. Cosmopolitan in the tropics, Natal.

Stems wide-climbing, slender, with a few fine adpressed hairs. *Stipules* minute, lanceolate, deciduous; petiole $\frac{1}{2}$ - $1\frac{1}{2}$ in.; leaflets 3, membranous or subcoriaceous, green, with a few adpressed hairs above, grey and more hairy below, the end one ovate or oblong, 1-2 in. long. *Racemes* 1-4 in. long, usually lax, the pedicels fascicled. *Calyx* $\frac{1}{2}$ - $\frac{1}{3}$ in.; teeth lanceolate. *Corolla* reddish. *Pod* linear, glabrous, recurved, $1\frac{1}{2}$ -2 in. long, 8-12 seeded.

VAR. *mollis*; stems and pods clothed with longer more spreading hairs, leaflets subcoriaceous densely pubescent beneath, calyx-teeth shorter. *G. mollis, W. & A. Prodr.* 209. *G. parviflora, Wall. Cat.* 5508, *G. H. Teramnus mollis, Benth. in Journ. Linn. Soc.* viii. 265.—Distribution of the type.

2. **T. flexilis**, Benth. in Journ. Linn. Soc. viii. 265; leaflets large acute, flowers in sessile congested racemes, calyx-teeth shorter than the tube. *Glycine flexilis*, Grah. in Wall. Cat. 5521.

EAST HIMALAYAS; forests of ASSAM, SILET and CHITTAGONG.

More robust than the last, of which it may be a mere variety. *Stems*, petioles and leaves nearly glabrous. *Leaflets* subcoriaceous, the end one 3-5 in. long. *Racemes* 1 in. or less long. *Calyx*-teeth lanceolate-deltoid. *Pods* glabrous, 2½-3 in. long.

60. **MUCUNA**, Adans.

Perennials and annuals of wide-twining habit. *Leaves* ample, stipellate, always 3-foliolate. *Flowers* large, showy, usually dark purple, turning quite black when dried. *Calyx*-tube campanulate; two upper teeth quite connate; lowest longer than the middle ones. *Corolla* much exserted; standard not more than half as long as the rostrate keel, which usually a little exceeds the wings. *Stamens* diadelphous; anthers dimorphous, like those of the *Genisteæ*. *Ovary* sessile, many-ovuled; style incurved, beardless, stigma capitate. *Pod* very variable in shape and sculpture, usually covered with brittle needle-like irritating bristles.—DISTRIB. Species above 20, spread everywhere in the tropics.

SUBGEN. 1. **Amphiptera**. *Pod* broadly winged down both sutures and the faces covered also by close oblique plaits.

1. **M. imbricata**, DC. Prodr. ii. 406. *Carpopogon imbricatum*, Roxb. Hort. Beng. 54; *M. monosperma*, Wall. Cat. 5623 C, *ex parte*.

EAST HIMALAYAS, SILHET, SIKKIM, ASSAM, tropical region, 1-4000 ft., Wallich Griffith, Hook. fil.

A woody climber, with slender glabrescent branches. *Leaflets* membranous, with a few minute adpressed grey hairs below, glabrous above; the end one oblong-cuspidate, 5-6 in. long. *Racemes* few-flowered, lax, on drooping peduncles 2-12 in. long; pedicels ¼-½ in. long; bracts large, roundish, soon deciduous. *Calyx* ¾ in. long, with a few irritating bristles; teeth all nearly as long as the tube. *Corolla* dull purple, 2-2½ in. long; keel abruptly inflexed at the tip; wings ½ in. broad; standard half as long as the keel, 1 in. broad. *Pod* oblong, 4-6 in. by 2 in., 2-4-seeded, clothed with abundant deciduous, irritating bristles; wings of sutures finally ½ in. broad.

M. acuminata, Grah. in Wall. Cat. 5621 from PENANG, may perhaps belong to this group, but the fruit is unknown. The calyx is like that of *M. imbricata*, but the corolla is smaller and the racemes are short-peduncled and corymbose like those of *M. monosperma*.

SUBGEN. 2. **Citta**, Lour. *Pod* with the faces covered by close oblique plaits, but not winged down the sutures.

2. **M. monosperma**, DC. Prod. ii. 406; leaflets with a little ferruginous down, racemes short-peduncled close, upper calyx-lip subtruncate, pod one-seeded nearly as broad as long. Wall. Cat. 5623 A, B; Wight in Hook. Bot. Misc. ii. 346, Suppl. t. 12; W. & A. Prod. 254; Dalz. & Gibs. Bomb. Fl. 70. *Carpopogon monospermum*, Roxb. Hort. Beng. 54; Fl. Ind. iii. 283. *M. cristata*, Ham. MSS. *M. corymbosa*, Grah. in Wall. Cat. 5622. *M. anguina*, Wall. Pl. As. Rar. iii. 19, t. 236. *Carpopogon anguineum*, Roxb. Cat. Hort. Beng. 54.

EAST HIMALAYAS, tropical zone; KHASIA, ASSAM, CHITTAGONG, PEGU; TAYOY, Gomez. Hills of WEST PENINSULA and CEYLON, up to 3000 ft.

A woody climber, with slender glabrescent branches. *Leaflets* membranous or subcoriaceous, thinly clothed with ferruginous pubescence beneath; the end one oblong-cuspidate, 4-6 in. long. *Racemes* 6-12-flowered, corymbose, short-peduncled, or

subsessile; bracts none seen; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in.; bracteoles linear, exceeding the bud. *Calyx* $\frac{3}{8}$ in., with copious irritating bristles; lower tooth linear; side ones deltoid. *Corolla* $1\frac{1}{2}$ in. long; keel abruptly inflexed at the tip; wings $\frac{1}{2}$ in., standard $\frac{1}{2}$ in. broad. *Pod* 3 in. long, obscurely stipitate, clothed with copious ferruginous or dull brown irritating bristles; wings $\frac{1}{4}$ – $\frac{1}{2}$ in. deep.

3. **M. atropurpurea**, DC. *Prodr.* ii. 406; leaflets glabrous, racemes long-peduncled drooping elongated often forked, upper calyx-lip more than half as long as the tube, pod two-seeded twice as long as broad, *Wall. Cat.* 5620; *W. & A. Prodr.* 254. *Carpopogon atropurpureum*, Roxb. *Hort. Beng.* 54; *Fl. Ind.* iii. 287.

Plains of WESTERN PENINSULA and CEYLON. MALACCA, *Maingay*.

A woody climber, with very slender glabrous branches. *Leaflets* membranous, subconcolorous, shining on the upper surface, the end one oblong-cuspidate, 4–6 in. long. *Racemes* pendent, not corymbose; bracts small, ovate, soon deciduous; bracteoles oblong-spathulate, obtuse, $\frac{1}{4}$ – $\frac{1}{3}$ in. *Calyx* $\frac{1}{2}$ – $\frac{3}{8}$ in. long, deeply bilabiate, with a few ferruginous irritating bristles. *Corolla* dark purple, 2–2 $\frac{1}{2}$ in. long; keel abruptly turned up at the end; wings $\frac{1}{2}$ – $\frac{3}{8}$ in., standard 1 in. broad. *Pod* sessile, 3 in. long, the faces traversed with close oblique plaits, and furnished with abundant yellow brown irritating bristles.

SUBGEN. 3. **Carpopogon**, Roxb. *Pod* broadly winged down both sutures, but not plaited on the faces.

4. **M. gigantea**, DC. *Prodr.* ii. 405; *Wall. Cat.* 5619; *W. & A. Prodr.* 254; *Wight in Hook. Bot. Misc.* ii. 351, *Suppl.* t. 14. *Carpopogon giganteum*, Roxb. *Hort. Beng.* 54; *Fl. Ind.* iii. 286. *Dolichos giganteus*, Willd. *Sp. Pl.* iii. 1041.—*Rheede Hort. Mal.* viii. t. 36.

Plains of the WESTERN PENINSULA; ANDAMANS, Kurz.—DISTRIB. Malaya, Philippines, Polynesia.

A woody climber, with slender glabrous branches. *Leaflets* subcoriaceous, subconcolorous, glabrous; end one oblong-cuspidate, 5–6 in. long. *Flowers* 12–30 in long-peduncled drooping close racemes; pedicels 1 in. long. *Calyx* $\frac{1}{4}$ – $\frac{3}{8}$ in., with a few irritating bristles; upper lip subtruncate. *Corolla* yellow, 1–1 $\frac{1}{2}$ in. long; keel not abruptly inflexed at the end. *Pod* 3–6 in. by 2 in., flat on the faces, copiously clothed with abundant deciduous yellow-brown irritating bristles, 2–6-seeded.

SUBGEN. 4. **Stizolobium**, Pers. *Pod* without either distinct plaits on the faces or wings down the sutures.

5. **M. macrocarpa**, Wall. *Cat.* 5618; woody, branches and leaves glabrous, upper lip of calyx subtruncate, pod very large subliguose glabrescent.

NIPAL and SILHET, Wallich. KHASIA and SIKKIM, 1–6000 ft., plentiful, *Hook. fil. & Thomson*.

Branchlets slender, terete. *Leaflets* subcoriaceous, the undersurface with a few adpressed deciduous hairs; end one ovate-cuspidate, 6–8 in. long. *Racemes* fascicled from the old wood, short-peduncled, with a densely brown-velvety rachis, the lower nodes sending out short branches; pedicels $\frac{3}{8}$ – $\frac{1}{2}$ in., velvety, decurved; bracteoles $\frac{1}{2}$ – $\frac{3}{4}$ in. obtuse, oblong. *Calyx* nearly 1 in. long, with a few irritating bristles; lower teeth as long as the tube. *Corolla* 2 $\frac{1}{2}$ –3 in. long; keel abruptly turned up at the tip; wings $\frac{3}{4}$ in.; standard 1 $\frac{1}{2}$ in. broad. *Pod* 1–1 $\frac{1}{2}$ ft. by 1 $\frac{1}{2}$ –1 $\frac{3}{4}$ in., 8–12-seeded, distinctly torulose, finely velvety at first, slightly channelled down both sides of both sutures.

6. **M. bracteata**, DC. *Prodr.* ii. 406; annual or perennial, branches and leaves below with a few adpressed hairs, flowers purple in short-peduncled

racemes, bracts ovate extending to the peduncle, pod glabrescent at first covered with short grey velvety tomentum without longitudinal furrows. *Kurz in Journ. Asiat. Soc. Beng.* xlii. 2, 231. *Carpopogon bracteatum*, *Roxb. Hort. Beng.* 54.

EAST HIMALAYAS, tropical zone; ASSAM, *Masters*. KHASIA, *Griffith*, *Hook. fil. & Thomson*. CHITTAGONG, *Roxburgh*. AVA, PEGU and MARTABAN, *Kurz*.

Closely allied to *M. pruriens*, with which it quite agrees in calyx, corolla and shape and texture of leaflets. *Leaves* grey, with only a few obscure adpressed hairs below. *Rachis* of the *racemes* densely grey-pubescent; bracts broader and more persistent than in the rest of the group, those of the peduncle acuminate, $\frac{1}{2}$ – $\frac{3}{4}$ in. long. *Pod* 3–4 in. long, similar in texture to that of *M. pruriens* and similarly abruptly recurved at the end.

7. *M. hirsuta*, *W. & A. Prodr.* 254; annual, branches and leaves below densely silky, flowers purple in long racemes, bracts small ovate or lanceolate, pod ribbed longitudinally clothed with yellow-brown irritating bristles.

Plains of WESTERN PENINSULA.

Branches slender, densely clothed with short fine deflexed ferruginous or grey hairs. *Leaflets* ovate-rhomboid, obtuse, with a cusp, membranous, thinly silky above, densely grey-silky beneath, ferruginous on the veins, 4–6 in. long. *Racemes* short-peduncled, $\frac{1}{2}$ – $\frac{3}{4}$ ft. long, with a densely silky rachis. *Calyx* and *corolla* as in *M. pruriens*. *Pod* 3–4 in. long, reflexed at the end, 5–6-seeded.

8. *M. pruriens*, *DC. Prodr.* ii. 405; annual, branches with a few adpressed hairs, leaves grey-silky beneath, flowers in elongated racemes, bracts small lanceolate, pod ribbed longitudinally clothed with grey rarely ferruginous weak irritating bristles. *Wall. Cat.* 5616; *Wight in Hook. Bot. Misc.* 2, *Suppl.* t. 13. *Carpopogon pruriens*, *Roxb. Hort. Beng.* 34; *Fl. Ind.* iii. 283. *Dolichos pruriens*, *Linn. Sp.* 1020. *M. prurita*, *Hook. Bot. Misc.* ii. 348; *W. & A. Prodr.* 255; *Dalz. & Gibs. Bomb. Fl.* 70. *M. utilis*, *Wall.*; *Wight Ic.* t. 280.

From the HIMALAYAS, in the plains, to CEYLON and BIRMA.—DISTRIB. Cosmopolitan in the tropics. Often cultivated, as are the two following.

An annual, with slender terete branches, glabrescent when mature. *Leaflets* membranous, ovate-rhomboid, green, glabrescent above, lustrous with fine grey silky pubescence beneath, $\frac{1}{2}$ – $\frac{3}{4}$ ft. long. *Racemes* short-peduncled, drooping, $\frac{1}{2}$ –1 ft. long, the axis finely grey-silky; pedicels $\frac{1}{2}$ – $\frac{1}{4}$ in. *Calyx* $\frac{3}{8}$ in. long, with a few irritating bristles; upper lip and lanceolate teeth as long as the tube. *Corolla* purplish, $1\frac{1}{4}$ – $1\frac{1}{2}$ in. long; wings $\frac{1}{4}$ in. broad, rather shorter than the slightly incurved keel. *Pod* 2–3 in. long, 5–6-seeded, turgid, clothed with dense persistent bristles which are usually pale brown or steel-grey.—*M. utilis*, *Wall.* is a cultivated variety with a velvety pod. A variety occurs in Ceylon with short usually two-flowered peduncles. An allied plant from Assam, *Masters*, known in bud only, has closer laxer pubescence and large linear-setaceous bracts.

9. *M. capitata*, *W. & A. Prodr.* 255; annual, stem and under surface of the leaves glabrescent, flowers in short-peduncled few-flowered corymbs, bracts small lanceolate setaceous, pod shortly velvety glabrescent ribbed longitudinally. *Carpopogon capitatum*, *Roxb. Fl. Ind.* iii. 284. *M. velutina*, *Hassk. Hort. Bogor.* 277.

Foot of the WESTERN and EASTERN HIMALAYAS.—DISTRIB. JAVA.

Closely allied to *M. pruriens*, of which it may be a cultivated race. *Leaflets* the same texture and shape, but with only a few adpressed hairs, not silky below. *Corymbs* with 5–6 flowers, on short ascending peduncles. *Calyx* and *corolla* the same. *Pod* larger, 5–6 in. long, similarly turned up at the end, but the bristles much shorter and deciduous.

10. **M. nivea**, DC. *Prodr.* ii. 406; annual, stem and leaves beneath glabrescent, flowers white in long drooping racemes, bracts small linear-lanceolate, pods shortly velvety glabrescent ribbed longitudinally. *Wall. Cat.* 5624. *Carpopogon niveum*, Roxb. *Hort. Beng.* 54; *Fl. Ind.* iii. 285. *M. nigra*, Ham. in *Wall. Cat.* 5617.

AVA and BENGAL, perhaps cultivated only.

Like the preceding, perhaps only a cultivated race of *M. pruriens*. *Leaflets* $\frac{1}{2}$ – $\frac{3}{4}$ ft. long, distinctly rhomboidal at the base, both sides at first with a few adpressed hairs. *Racemes* pendulous, often exceeding the leaves. *Pedicels*, *calyx* and *corolla* of *M. pruriens*, but the latter white. *Pod* half a foot long, black and destitute of bristles when mature, 6–8-seeded.

61. **APIOS**, Moench.

Twining herbs. *Leaves* pinnately 3–7-foliolate, stipellate. *Flowers* middle-sized, in lax racemes, with tumid nodes; bracts and bracteoles minute, deciduous. *Calyx* teeth shorter than the tube, two upper connate, lowest linear, the two others short, deltoid. *Corolla* much exserted, the much incurved narrow keel exceeding the spoonshaped standard, the wings still shorter. *Stamens* diadelphous; anthers uniform. *Ovary* subsessile, many-ovuled; style very long, filiform, beardless, much incurved, stigma capitate. *Pod* linear, compressed.—**DISTRIB.** Species 3, the two others Chinese and N. American.

1. **A. carnea**, Benth. *MSS.* *Cyrtotropis carnea*, *Wall. Cat.* 5527; *Pl. As. Rur.* 49, t. 62.

NIPAL, Wallich. KHASIA, 4–6000 ft., *Hook. fil. & Thomson, Lobb.*

Stems slender, soon glabrescent. *Petioles* 2–3 in.; leaflets usually 5, rarely 3, glabrous, green above, pale beneath, membranous, opposite, oblong, acute, 3–4 in. long. *Flowers* in long-peduncled flexuose secund racemes 6–9 in. long; lower pedicels fascicled, upper solitary; bracts and bracteoles minute, linear, caducous. *Calyx* green, glabrous, $\frac{1}{4}$ – $\frac{3}{8}$ in. *Corolla* reddish, quite twice the calyx. *Pod* 4–5 in. long, glabrous, straight, 12–16-seeded.

62. **ERYTHRINA**, Linn.

Trees with prickly branches. *Flowers* large, coral-red, in dense racemes, produced usually before the development of the large constantly 3-foliolate leaves. *Calyx* oblique, spathaceous, finally slitting down to the base or campanulato-bilabiate. *Petals* very unequal; standard always much exserted and considerably exceeding the keel and wings. Upper *stamen* free down nearly to the base or connate with the others half way up the filaments; anthers uniform. *Ovary* stalked, many-ovuled; style incurved, beardless, stigma capitate. *Pod* linear, turgid, torulose.—**DISTRIB.** Species 25–30, principally tropical, in both the new world and the old, and at the Cape.

SUBGEN. 1. **Stenotropis**, Hassk. *Calyx* spathaceous, oblique, not at all 2-lipped, finally split to the base down the back.

1. **E. indica**, Lam.; DC. *Prodr.* ii. 412; calyx 5-cleft at the tip, keel-petals free, pod 6–8-seeded. Roxb. *Fl. Ind.* iii. 249; *Wall. Cat.* 5963; *W. & A. Prodr.* 260; *Bedd. Fl. Sylv.* 87; *Wight Ic.* t. 58; *Dalz. & Gibs. Bomb. Fl.* 70. *E. spathacea*, *Wall. Cat.* 5965. *E. corallodendron*, *Linn. Sp.* 992, *ex parte*. *E. cuneata*, *Grah. in Wall. Cat.* 5967.—*Rheede Hort. Mal.* vi. t. 7.

Foot of the HIMALAYAS to CEYLON, BIRMA and MALACCA, often planted.—**DISTRIB.** Java, Polynesia.

A tall tree, with thin grey bark, the prickles minute, conical, usually black. *Petioles* 4-6 in., mostly unarmed; leaflets membranous, subconcolorous, glabrous, the end one round-cuspidate, 4-6 in. long and broad, truncate or broad-rhomboidal at the base. *Racemes* dense, $\frac{1}{2}$ ft. long, on spreading woody peduncles; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in., downy. *Calyx* 1-1 $\frac{1}{2}$ in. long, with a very oblique mouth from the first, subglabrous, minutely 5-toothed at the very tip. *Standard* 2-2 $\frac{1}{2}$ in. long, the blade 1 in. broad; wings and keel subequal, not more than half as long as the calyx. *Pod* $\frac{1}{2}$ -1 ft. long, distinctly torulose.—*E. picta*, Linn. (*Rumph. Amboin.* t. 77) appears to be a mere form of this, with variegated leaves.

2. ***E. stricta***, Roxb. *Hort. Beng.* 53; *Fl. Ind.* iii. 251; calyx entire at the tip, keel-petals connate, pod 2-3-seeded. *W. & A. Prodr.* 260; *Dalz. & Gibs. Bomb. Flora*, 70; *Bedd. Fl. Sylv.* t. 175. *Micropteryx stricta*, Walp. in *Linnæa*, xxiii. 740.

WESTERN PENINSULA, common.

A large tree. *Prickles* whitish, rarely extending to the petioles. *Leaflets* same shape as in *E. indica*, glabrescent on both surfaces. *Calyx* subglabrous, $\frac{1}{2}$ in. long. *Standard* oblong-lanceolate, 1 $\frac{1}{2}$ in. long; keel half as long as the standard, much exceeding the truncate wing. *Stamens* as in the last. *Pod* 4-5 in. long, less torulose than in the last, narrowed to both ends, glabrous, its stalk longer than the calyx.

SUBGEN. 2. ***Micropteryx***, Walp. *Calyx* campanulate, more or less distinctly 2-lipped, but not splitting down to the base. *Pod* turgid and seed-bearing through its whole length.

3. ***E. resupinata***, Roxb. *Cor. Pl.* t. 220; *Hort. Beng.* 53; *Fl. Ind.* iii. 257; herbaceous, leaflets as broad as long, limb of standard oblong. *DC. Prodr.* ii. 410; *Brand. For. Fl.* 141.

UPPER GANGETIC plain; Nawal Khar, Dr. Brandis. Oudh, Dr. Stewart.

Racemes direct from the rootstock, under a foot high, dense, appearing before the leaves. *Petioles* and peduncles prickly. *Leaflets* round-cordate, 2-3 in. long and broad. *Calyx* $\frac{1}{4}$ - $\frac{1}{2}$ in. long, campanulato-bilabiate. *Standard* 3-4 times the calyx; keel half as long as the standard tinged with red, its petals united; wings much shorter, greenish. Upper *stamen* free from low down.

4. ***E. ovalifolia***, Roxb. *Hort. Beng.* 53; *Fl. Ind.* iii. 254; arborescent, leaflets twice as long as broad, glabrous, limb of the standard as broad as long. *Wall. Cat.* 5961; *Wight Ic.* t. 247; *Bedd. Fl. Sylv.* 88; *Benth. Pl. Jungh.* 237. *E. picta*, Wall. *Cat.* 5960, non Linn. *Duchassaingia ovalifolia*, Walp. in *Linnæa*, xxiii. 742.

Forests of SILLET, ASSAM, BENGAL, CEYLON, BIRMA and MALACCA.—DISTRIB. Java, Polynesia, and perhaps not distinct from American *E. glauca*, Willd.

Branches pale grey. *Prickles* usually black, not extending to the petiole. *Leaflets* subcoriaceous, glaucous, the end one ovate or obovate-oblong, very different in shape from that of any other species, often $\frac{1}{2}$ ft. long, obtuse or subacute. *Calyx* $\frac{3}{4}$ - $\frac{1}{2}$ in., brown-velvety, splitting nearly down to the base in two halves. *Standard* deep scarlet, 1 $\frac{1}{2}$ -2 in. by $\frac{1}{2}$ in., emarginate; keel petals adherent, half as long as standard; wing rather shorter. *Pod* 6-8-seeded, $\frac{1}{2}$ ft. long, distinctly torulose, narrowed into a short stalk.

5. ***E. suberosa***, Roxb. *Hort. Beng.* 58; *Fl. Ind.* iii. 253; arborescent, leaflets as long as broad matted with pubescence beneath, limb of the standard 3-4 times as long as broad, pod turgid. *Wall. Cat.* 5959; *W. & A. Prodr.* 260; *Bedd. Fl. Sylv.* 87; *Dalz. & Gibs. Bomb. Fl.* 70. *Micropteryx suberosa*,

Walp. in Linnæa, xxiii. 744. *E. alba*, *Roxb. MSS.* *E. Nahasuta*, and *E. reniformis*, *Ham. in Wall. Cat.* 5966, 5968.

HIMALAYAS to CEYLON, ascending to 3-4000 in the north-west.

A tree, reaching 40-50 feet high, with corky deeply cracked bark. *Prickles* yellowish, longer than in the others. *Leaflets* green and glabrous above, 3-6 in. broad, often broader than deep, usually pointed, with a broad deltoid base, thickly matted with grey cottony down beneath. *Racemes* densely capitate. *Calyx* $\frac{3}{4}$ in. long, faintly downy, soon deeply bilabiate. *Standard* $1\frac{1}{2}$ -2 in. long, its blade $\frac{1}{2}$ - $\frac{3}{4}$ in. broad; keel-petals connate, less than half as long as the standard. Upper *stamen* free from low down. *Pod* $\frac{1}{2}$ ft. long, subterete, distinctly torulose, 4-5-seeded.

VAR. sublobata; *Roxb. Fl. Ind.* iii. 254 (sp.); leaflets larger conspicuously sinuated. *W. & A. Prodr.* 261; *Bedd. Fl. Sylv.* 87. *E. maxima*, *Roxb. MSS.* *Macropteryx sublobata*, *Walp. in Linnæa*, xxiii. 740. *E. tomentosa*, *Ham. in Wall. Cat.* 5964.—Orissa, *Roxburgh*. Mungger hills, *Hamilton*. Subalpine jungles of Western Peninsula, *Beddome*.

6. ***E. arborescens***, *Roxb. Hort. Beng.* 53; *Fl. Ind.* iii. 256; arborescent, leaflets as broad as long glabrous beneath, limb of the standard 2-3 times as long as broad, pod firm flattish. *Roxb. Cor. Pl.* t. 219; *Wall. Cat.* 5962; *Brand. For. Fl.* 140.

CENTRAL and EAST HIMALAYAS; KUMAON to SIKKIM and KHASIA, ascending to 7,000 ft.

A low tree, with few prickles on the branches. *Leaflets* membranous, greenish on both sides, the end one pointed, truncate or rather cordate at the base, often $\frac{3}{4}$ -1 ft. broad. *Flower* very like that of *E. suberosa*, but the calyx larger and the limb of the standard broader. *Pod* much curved, $\frac{1}{2}$ - $\frac{3}{4}$ ft. long, 1 in. or more broad, 4-6-seeded, narrowed gradually to a distinct beak and stalk.

SUBGEN. 3. ***Hypaphorus***, *Hassk.* *Calyx* as in the last. *Pod* flat, seedless and indehiscent in the lower half, bearing 1-3 seeds towards the tip.—Connects *Erythrina* with *Butea* and *Spatholobus*.

7. ***E. lithosperma***, *Blume, ex Miq. Flor. Ind. Bat.* i. 209. *E. secundiflora*, *Hassk. Pl. Jav. Rar.* 378; *Benth. Pl. Jungh.* 237, non *Brotero*.

RANGOON, *McClelland*.—DISTRIB. Java; Philippines, *Cuming*, 1161.

A tall tree, with branchlets often unarmed. *Leaflets* membranous, glabrous, greenish, the end one roundish, acute, 4-6 in. long. *Racemes* pilose, cotemporaneous with the leaves. *Calyx* velvety, $\frac{1}{4}$ - $\frac{3}{8}$ in. long, finally splitting down nearly to the base in two lips. *Standard* $1\frac{1}{2}$ -1 $\frac{3}{4}$ in. long, the limb oblong, obtuse; keel and wings subequal, $\frac{1}{2}$ in. long. *Pod* much recurved, 4-5 in. long, broader in lower half, with a stalk reaching $1\frac{1}{2}$ -1 $\frac{3}{4}$ in. long.—Kurz (*Journ. Asiat. Soc. Beng.* xlii. 2, 69) says Miquel's plant is not Blume's, and that it is *E. sumatrana*, *Miq. Fl. Ind. Bat. Suppl.* 304. I cannot, without specimens, clearly distinguish *E. holosericea*, Kurz loc. cit. from this; its pod is unknown.

63. **STRONGYLODON**, Vogel.

Twining herbs, with the habit of *Phaseolus*, with stipellate 3-foliate leaves. *Flowers* in long lax racemes. *Calyx* campanulate, gibbous; teeth short, obtuse, imbricated. *Corolla* much exerted; standard lanceolate, recurved; wings obtuse, more than a third as long; keel curved, as long as the standard, narrowed into a long beak. *Stamens* diadelphous; anthers uniform. *Ovary* stalked,

few-ovuled, style filiform, beardless, stigma capitate. *Pod* oblong, turgid. *Seeds* as large as a bean, with a hilum running more than half round.—**DISTRIB.** Species 3, Polynesian.

1. **S. ruber**, *Vogel*; *Walp. Ann.* iv. 559; *A. Gray Bot. Amer. Explor. Expedit.*, 446, t. 48; *Thwaites Enum.* 89. *Rhynchosia lucida*, *DC. Prodr.* ii. 387.

CEYLON, near Kornegalle, *Thwaites*.—**DISTRIB.** Polynesia.

Stems firm, wide-twining, glabrous. *Leaflets* green, subconcolorous, glabrous, membranous, the end one roundish with a point, 4–6 in. long. *Racemes* copious, axillary, distinctly-peduncled, $\frac{1}{2}$ –1 ft. long; pedicels geminate from the tumid nodes, filiform, drooping, $\frac{1}{2}$ –1 in. *Calyx* glabrous, $\frac{1}{4}$ – $\frac{1}{2}$ in., clasped at the base by a pair of short round deciduous bracteoles. *Corolla* bright red, 3–4 times the calyx. *Pod* oblong, 3 in. long, distinctly stalked, 2-seeded.

64. GRONA, Lour.

Twining herbs, with stipellate 1-foliate leaves, deciduous stipules and bracts. *Racemes* with obscurely-swollen nodes. *Calyx-tube* campanulate; teeth elongated, upper 2 shorter. *Corolla* distinctly exserted, its petals nearly equal in length, both standard and wings spurred; keel obtuse, nearly straight. *Stamens* diadelphous; anthers uniform. *Ovary* subsessile, many-ovuled; style long, filiform, beardless, stigma capitate. *Pod* linear, turgid, septate between the seeds.—**DISTRIB.** Another species reported from Cochin China.

1. **G. Grahami**, *Benth. Pl. Jungh.* 233; flowers in very lax fascicled racemes, bracteoles a quarter as long as the calyx. *Glycine Grahami*, *Wall. Cat.* 5513.

PROME, *Wallich*.

A lax climber or trailer, the slender stems with a few adpressed hairs. *Leaflet* subcoriaceous, glabrous, subconcolorous, reticulato-venose, 3–6 in. long, acute, lower cordate-ovate, upper oblong-lanceolate; petiole $\frac{1}{2}$ –1 $\frac{1}{2}$ in. *Racemes* 2–3 from each node, 1–3 in. long, the flowers in pairs from the distant nodes. *Calyx* glabrescent, $\frac{1}{2}$ in; teeth all exceeding tube, lower linear, upper lanceolate. *Corolla* $\frac{1}{2}$ in. reddish.

2. **G. Dalzellii**, *Baker*; flowers in dense usually sessile heads, bracteoles as long as the calyx. *Galactia simplicifolia*, *Dalz. in Kew Journ.* iii. 209; *Dalz. & Gibs. Bomb. Fl.* 69.

Plains of CONCAN, *Dalzell, Stocks*.

A herbaceous twiner, the slender stems with a few adpressed hairs. *Leaflets* membranous, with a few adpressed hairs on both sides, green above, glaucous below, ovate, acute, 2–4 in. long, lower cordate, upper rounded at the base; petiole $\frac{3}{4}$ –1 $\frac{1}{2}$ in. *Flowers* 6–12, in copious dense cymes. *Calyx* $\frac{1}{2}$ in., clothed with dense ferruginous silky hairs; lower teeth lanceolate, upper deltoid. *Corolla* twice the calyx. *Pod* linear, straight, hairy, 2–2 $\frac{1}{2}$ in. long, 8–10-seeded.

3. **G. filicaulis**, *Kurz in Journ. Asiat. Soc. Beng.* xlii. 2, 232; flowers axillary.

PEGU, *Kurz*.

Voluble, slender. *Leaves* broad cordate-ovate, obtuse, mucronate, 1–1 $\frac{1}{2}$ in. broad, palmately nerved, thinly hirsute on both sides; petiole $\frac{1}{2}$ – $\frac{2}{3}$ in. *Flowers* small, yellow, pedicellate, cirrhoso-pedunculate. *Pod* slender, linear, glabrous, 1 in. long, 5–6-seeded; seeds shining, olive-green, mottled with black.—*Kurz, loc. cit.*

65. **GALACTIA**, P. Br.

Twining herbs, with 3-foliolate stipellate leaves, like *Glycine* in habit, but with the nodes of the raceme slightly tumid. *Calyx-tube* short; teeth linear or lanceolate, the two uppermost entirely fused in one. *Corolla* little exserted; its petals nearly equal in length; keel obtuse, nearly straight. *Stamens* diadelphous; anthers uniform. *Ovary* subsessile, many-ovuled; style long, filiform, beardless, stigma capitate. *Pod* linear, flattened, recurved.—DISTRIB. Species 45, mostly Tropical American.

1. **G. tenuiflora**, W. & A. *Prodr.* 206; leaflets small obtuse, flowers in pairs from the distant nodes of elongated racemes, hairs of calyx very short adpressed. *Glycine tenuiflora*, Willd.; *DC. Prodr.* ii. 241; *Roxb. Fl. Ind.* iii. 319.

Plains from the foot of the HIMALAYAS to CEYLON and SIAM.—DISTRIB. Natal, Zambesi-land, Australia, Malay isles.

Stems very slender, obscurely grey-downy. *Stipules* deciduous, minute; petiole 1–1½ in.; leaflets ovate or oblong, 1½–2 in. long, membranous, green, glabrescent above, grey, obscurely silky below. *Racemes* copious, peduncled, ¼–½ ft. long. *Calyx* ¼–½ in. long, finely grey silky; teeth lanceolate acuminate, exceeding the tube. *Corolla* reddish, ½ in. long. *Pod* 1½–2 in. by ½ in., glabrescent, 6–8-seeded.

VAR. 1. *lucida*; leaflets linear-oblong subcoriaceous glabrous on both surfaces sublucent above, flowers smaller. *Glycine lucida*, *Grah. in Wall. Cat.* 5511. *G. graminea*, *Heyne MSS.*—Western Peninsula.

VAR. 2. *minor*; stems very slender, leaflets and flowers smaller, the former oblong ½–1 in. long thinly grey silky below, corolla ¼–½ in. long, pod 1 in. long glabrous 4–5-seeded. *Leucodictyon malvensis*, *Dalz. & Gibs. Bomb. Flora*, 73. *G. tenuiflora*, *Wall. Cat.* 5509 A.—Western Peninsula.

VAR. 3. *villosa*; stems leaves below and pods densely grey-downy, leaflets oblong 1–1½ in. long, flowers fewer and smaller than in the type. *G. villosa*, W. & A. *Prodr.* 207. *Glycine tenuiflora*, *Wall. Cat.* 5509, B, C. *G. filiformis*, *Wall. Cat.* 5510 and 5519.—Western Peninsula.

VAR. 4. *latifolia*; stems and leaves below densely pubescent, leaflets subcoriaceous roundish 1½–2 in. long, racemes elongated, calyx hoary more deeply cleft.—Concan, *Stocks*.

2. **G. ? oxyphylla**, *Benth. Pl. Jungh.* 233; leaflets large acute, flowers 2–4 in axillary nearly sessile cymes, hairs of calyx long and silky. *Glycine oxyphylla*, *Grah. in Wall. Cat.* 5522.

TENASSERIM; Tavoy, *Gomez*. Amherst, *Parish*.

Stems slender, clothed with conspicuous spreading deciduous ferruginous hairs. *Petioles* 2–3 in.; leaflets membranous, green, subconcolorous, with a few adpressed hairs on both surfaces, oblong, 3–4 in. long. *Bracts* lanceolate, nervose, subpersistent; bracteoles linear, as long as the tube. *Calyx* ¾ in. long; teeth linear-setaceous, 2–3 times as long as the tube, plumose. *Corolla* reddish, ½ in. long. *Pod* unknown.—Recedes from *Galactia* by its cymose inflorescence and persistent nervose bracts.

66. **COCHLIANTHUS**, Benth.

A climbing herb. *Leaves* pinnately 3-foliolate, stipellate. *Flowers* racemed. *Calyx-tube* campanulate; teeth short, the lowest longest, lanceolate, the two upper fused into one. *Corolla* much exserted, the petals nearly equal in length; standard broad; keel narrow, curved, rounded at the end in a semicircle. *Stamens* diadelphous; anthers uniform. *Ovary* short-stipitate, many-ovuled; style

filiform incurved; stigma large, terminal. *Pod* linear, incurved, flattish.—**DISTRIB.** A single endemic species with the habit of a slender *Mucuna*.

1. **C. gracilis**, *Benth. Pl. Jungh.* 234. *Mucuna*? *gracilis*, *Grah. in Wall. Cat.* 5626.

NIPAL, *Wallich*.

A slender twining subglabrous herb, with both leaves and flower turning black when dried. *Leaves* distinctly petioled, 3-foliate, stipellate, membranous, with a few adpressed hairs on both surfaces, grey beneath; end one ovate-rhomboidal, acuminate, 2–3 in. long. *Flowers* 6–20 in close racemes on drooping slender peduncles; bracteoles setaceous, very minute, deciduous. *Calyx* $\frac{1}{4}$ in., densely clothed with adpressed silky hairs. *Corolla* 3 times as long as the calyx.

67. SPATHOLOBUS, Hassk.

Woody climbers, with 3-foliate stipellate leaves. *Flowers* small or middle-sized, in ample terminal panicles, extending into the axils of the upper leaves, the pedicels densely fascicled at the tumid nodes. *Calyx* campanulate; teeth lanceolate or oblong-deltoid, the upper two connate. *Corolla* distinctly exserted, its petals subequal, the keel obtuse, nearly straight. *Stamens* diadelphous; anthers uniform. *Ovary* sessile or stalked, 2-ovuled; style incurved, beardless, stigma capitate. *Pod* exactly like that of *Butea*.—**DISTRIB.** Species 10, the others Malayan and one Trop. African. By the pod dehiscing only at the seed-bearing apex this and *Butea* approach *Dalbergiæ*.

1. **S. Roxburghii**, *Benth. Pl. Jungh.* 238; leaflets subcoriaceous grey-canescens beneath, end one obovate-rhomboidal, flowers middle-sized, pod stalked usually equal in width throughout. *Butea parviflora*, *Roxb. Hort. Beng.* 53; *Fl. Ind.* iii. 248; *DC. Prodr.* ii. 415; *Wall. Cat.* 5440; *W. & A. Prodr.* 261; *Wight Ic.* t. 210; *Dalz. & Gibs. Bomb. Fl.* 71. *B. sericophylla*, *Wall. Cat.* 5441.

Plains from the foot of the WEST HIMALAYAS to CEYLON, MARTABAN and TENASERIM.

A robust climber, with densely grey-downy branches. *Petiole* $\frac{1}{4}$ – $\frac{1}{2}$ ft.; leaflets subcoriaceous, dull green, glabrescent above, obtuse or shortly cuspidate, deltoid at the base, 6–9 in. long. *Panicle* reaching 1–1½ ft. long; branches very downy; pedicels $\frac{1}{4}$ in. or less long. *Calyx* $\frac{1}{2}$ – $\frac{3}{4}$ in., densely grey-velvety; lower teeth lanceolate, nearly as long as the tube. *Corolla* bright red, half as long again as the calyx. *Pod* 3–4 in. long, usually 1 in. broad, clothed with ferruginous tomentum, which is thickest and darkest towards the tip, narrowed suddenly into a stalk $\frac{1}{4}$ in. long.

VAR. 1. *denudatus*; leaves nearly concolorous, calvate beneath. *Butea gyrocarpa*, *Wall. Cat.* 5442, *in part.*—Penang.

VAR. 2. *platycarpus*; pod nearly 2 in. broad conspicuously narrowed to the seed-bearing tip.—Concan, *Stocks*.

2. **S. gyrocarpus**, *Benth. Pl. Jungh.* 238; leaflets subcoriaceous ferrugineo-pubescent beneath, end one obovate-rhomboidal, flowers small, calyx densely grey-downy, teeth very short, pod sessile narrowed to the tip. *Butea gyrocarpa*, *Wall. Cat.* 5442, *ex parte*.

Forests of PENANG and MALACCA, *Wallich*, &c.—**DISTRIB.** Philippines, *Cuming*, 945.

A robust woody climber, with densely ferrugineo-pubescent branches. *Petiole* 4–6 in.; leaflets dull green, pubescent on the ribs above, not at all canescent, but beset with short spreading hairs and reticulato-venose beneath, the base rather rounded, the end one 6–9 in. long. *Panicle* 1 ft. long; branches very downy; pedicels very short.

Calyx $\frac{1}{2}$ in.; teeth deltoid. *Corolla* reddish, $\frac{1}{8}$ in. long; limb and standard broader than deep, emarginate. *Pod* like the samara of a sycamore reversed, finely downy, 3-5 in. long, more membranous than in the last.

3. ***S. acuminatus***, *Benth. Pl. Jungh.* 238; leaflets subcoriaceous oblong cuspidate rounded at the base glabrous beneath, flowers small, calyx obscurely downy, teeth oblong half as long as the tube, pod sessile narrowed to the tip. *Butea acuminata*, *Wall. Cat.* 5443. *Pongamia rosea*, *Grah. in Wall. Cat.* 5907. *P. rigida*, *Wall. Cat.* 5908?

Forests of TENASSERIM and PENANG, *Wallich, &c.*

A robust climber, with branches minutely downy at first, soon glabrescent. *Petiole* 2-4 in. long; leaflets subconcolorous, pale grey-green on both sides, much thinner than in *S. crassifolius*, the end one 4-8 in. long. *Panicle* more than a foot long; pedicels much shorter than the calyx. *Calyx* $\frac{1}{12}$ in. *Corolla* bright red, three times the calyx; limb of the standard as long as broad. *Pod* just like that of *S. gyrocarpus*.—Here most likely belongs '*Pongamia*?' *Wall. Cat.* 9054, from Penang. We have a closely allied plant from MISHMI, *Griffith*, 1678, with a more rigid much recurved larger pod half a foot long; and another from CONCAN, *Stocks* (*S. PURPUREUS*, *Benth. MSS.*) with very dense panicles, dark purple corolla, and longer pedicels, which no doubt is distinct, but of which the pod is unknown.

4. ***S. crassifolius***, *Benth. Pl. Jungh.* 238; leaflets very thick and rigid oblong cuspidate rounded at the base glabrous beneath, flowers small, calyx densely brown-velvety, teeth deltoid half as long as the tube, pod stalked. *Pongamia crassifolia*, *Wall. Cat.* 5913.

Forests of SILHET and PENANG, *Wallich. KHASIA, Griffith.*

Branches at first clothed with ferruginous pubescence. *Leaflets* like those of *S. acuminatus*, 6-9 in. long, thicker in texture, very shining on the upper surface, quite glabrous beneath from the beginning. *Pedicels* very short, the flowers densely clustered towards the end of the branchlets. *Calyx* $\frac{1}{12}$ in. long. *Corolla* dark purple, scarcely twice as long as the calyx; limb of the standard broader than deep, emarginate. *Pod* only seen very immature.

68. **BUTEA**, Roxb.

Erect trees or climbing shrubs, with 3-foliolate large stipellate leaves. *Flowers* densely fascicled, large, showy, in axillary racemes or terminal racemes or panicles. *Calyx* broadly campanulate; teeth short, deltoid. *Corolla* much exerted; petals nearly equal in length, the keel much curved, subobtusate or acute. *Stamens* diadelphous; anthers uniform. *Ovary* sessile or stalked, 2-ovuled; style filiform, curved, beardless, stigma capitate. *Pod* firm, ligulate, splitting round the single apical seed, the lowest part indehiscent.—DISTRIB. No other species.

1. ***B. frondosa***, *Roxb. Cor. Pl.* 21, t. 21; *Fl. Ind.* iii. 244; an erect tree, lower calyx-teeth deltoid, keel much curved acute 4 times as long as the calyx, pod distinctly stalked. *Wall. Cat.* 5569, *ex parte*; *W. & A. Prodr.* 261; *DC. Prod.* ii. 415; *Wight in Hook. Bot. Misc.* iii. 102, *Suppl.* t. 32; *Beddome Fl. Sylv.* t. 176; *Dalz. & Gibs. Bomb. Fl.* 71; *Brand. For. Fl.* 142. *Erythrina monosperma*, *Lamk. Dict.* i. 391.—*Rheede Hort. Mal.* vi. t. 16-17.

Plains from the HIMALAYAS to CEYLON and BIRMA, ascending to 4000 ft. in the north-west.

An erect tree, reaching a height of 40-50 ft. *Shoots* clothed with grey or brown silky pubescence. *Petiole* $\frac{1}{4}$ - $\frac{1}{3}$ ft.; leaflets 4-8 in. long, coriaceous, glabrescent above, densely finely silky and strongly veined below; end one roundish, with a rhomboid base, obtuse, often emarginate. *Racemes* $\frac{1}{2}$ ft. long; pedicels $\frac{1}{2}$ -1 in., densely brown-velvety. *Calyx* $\frac{1}{2}$ in. long, velvety. *Petals* bright orange-red, equal, thickly clothed on the outside with silvery tomentum, the standard 1 in. broad, the keel semicircular, beaked. *Pod* 6-8 in. by $1\frac{1}{2}$ -2 in., argenteo-canescens, narrowed suddenly into a stalk longer than the calyx.

2. **B. superba**, Roxb. *Cor. Pl.* 23, t. 22; *Hort. Beng.* 53; *Fl. Ind.* iii. 247; a climber, lower calyx-teeth lanceolate-deltoid, keel much curved acute 4-5 times as long as the calyx, pod distinctly stalked. *Wall. Cat.* 5438; *DC. Prodr.* ii. 415; *W. & A. Prodr.* 261; *Dalz. & Gibs. Bomb. Fl.* 71; *Brand. For. Fl.* 143. *B. frondosa*. *Wall. Cat.* 5569, *ex parte*.

Forests of CONCAN, BENGAL, ORISSA and BIRMA.

Very near the last, from which it differs mainly by its scandent habit, not by any botanical characters. *Leaflets* and flowers larger, the former reaching 20 in. long. *Racemes* 1 ft. long; pedicels sometimes 3 times as long as the calyx.

3. **B. minor**, Ham. in *Wall. Cat.* 5439; a climber, corolla three times the calyx, keel little curved subobtusely, pod sessile.

EAST HIMALAYAS; NIPAL, *Wallich*; SILHET, *Da Silva*; KHASIA, 1-4000 ft., *Hook. fil. & Thomson, Lobb.*; MISHMI, *Griffith*.

Branches robust, clothed at first with grey or brown silky hairs. *Petiole* $\frac{1}{4}$ - $\frac{1}{2}$ ft.; leaflets obtuse or cuspidate, 6-15 in. long, coriaceous, scabrous above, finely silky beneath, the end one orbicular, with a rhomboidal base. *Racemes* $\frac{1}{4}$ -1 ft. long. *Calyx* $\frac{1}{4}$ - $\frac{1}{2}$ in., brown-velvety, as are the pedicels; teeth very short. *Corolla* dull red, 1 in. long; densely velvety on the outside; keel rather exceeding the wings and standard, which is $\frac{1}{2}$ in. broad. *Pod* 3-3 $\frac{1}{2}$ in. long by 1-1 $\frac{1}{4}$ in., cuneate at the base.

69. MASTERSIA, Benth.

Calyx-tube turbinate; teeth long, lower lanceolate, two upper connate. *Corolla* scarcely exerted; petals nearly equal in length; standard roundish; keel obtuse, little curved. *Stamens* diadelphous; anthers uniform? *Ovary* sessile, many-ovuled; style short, filiform, incurved, stigma capitate. *Pod* linear-oblong, flat, indehiscent, the dorsal suture bordered by a narrow erect wing.—*DISTRIB.* A single endemic species, combining the habit of *Phaseoleæ* with the pod of *Dalbergiæ*.

1. M. cleistocarpa, Baker.

EAST HIMALAYAS, ASSAM and MISHMI, *Wallich, Griffith*.

A woody climber, with firm terete glabrous branches. *Leaves* 3-foliolate, distinctly petioled; leaflets subcoriaceous, stipellate, glabrous above, inconspicuously downy beneath; end one obovate-cuspidate, 5-6 in. long, rounded at the base. *Racemes* reaching a foot long; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in., geminate, from very tumid nodes. *Calyx* $\frac{1}{2}$ in. long, the tube hidden by a pair of large round striated bracteoles. *Pod* shining, very flat, 3-5 in. by $\frac{3}{4}$ -1 in.

70. CANAVALIA, DC.

Large twining perennials or biennials, with stipellate 3-foliolate leaves and showy flowers. *Calyx* deep, the limb 2-lipped, the upper lip projecting, entire or emarginate, the lower shortly 3-toothed. *Corolla* much exerted; standard large, roundish; wings shorter, equalling the incurved obtuse keel. *Stamens* monadelphous; anthers uniform. *Ovary* obscurely stalked, many-ovuled; style incurved, beardless, stigma terminal. *Pod* large, linear or oblong, flattish, with a distinct rib on each valve near the upper suture.—*DISTRIB.* Species about a dozen, two widely-spread in the tropics, the others mostly American.

1. **C. ensiformis**, DC. *Prodr.* ii. 404; leaflets ovate or oblong usually acute, racemes many-flowered, pod many-seeded. *Dolichos ensiformis*, Linn. *Sp. Pl.* 1022. *C. gladiata*, DC. *loc. cit.*; *Wall. Cat.* 5531; *W. & A. Prodr.* 253.

Dolichos gladiatus, *Jacq. Ic.* t. 560; *Roxb. Fl. Ind.* iii. 300. *C. Loureirii*, *G. Don Gen. Syst.* ii. 363. *C. incurva*, *DC. loc. cit.*—*Rheede Hort. Mal.* viii. t. 44.

EAST HIMALAYAS to CEYLON and SIAM, wild and commonly cultivated.—DISTRIB. Everywhere in the Tropics.

Stems wide-twining, perennial or biennial, glabrous. *Stipules* minute, deciduous; leaflets entire, ovate, membranous, glabrous, 4–6 in. long. *Peduncles* and racemes each $\frac{1}{2}$ – $\frac{1}{2}$ ft. long; pedicels very short, geminate from the very tumid nodes; bracteoles minute, ovate, caducous. *Calyx* $\frac{3}{8}$ – $\frac{1}{2}$ in., glabrous, the upper lip a third of the length of the tube. *Corolla* more than twice as long as the calyx, red or white. *Pod* 6–9 in. by 1– $\frac{1}{4}$ in., glabrescent, rather recurved, 8–12-seeded.

VAR. 1. *virosa*; leaflets obovate or obovate-oblong smaller more obtuse glabrous, axis of raceme more densely pubescent, pod 2–4 in. long 4–6-seeded, flowers smaller. *Dolichos virosus*, *Roxb. Hort. Beng.* 55; *Fl. Ind.* iii. 301. *C. virosa*, *W. & A. Prodr.* 253; *Dalz. & Gibs. Bomb. Fl.* 69.—Perhaps rather the wild form of the plant than a proper variety. Seeds said to be bitter in the variety, eatable in the type.

VAR. 2. *turgida*, *Grah. in Wall. Cat.* 5534 (sp.); leaves like the last, but the pod larger and more turgid, 3–5 in. by $1\frac{1}{2}$ –2 in. broad. *Miq. Fl. Ind. Bat.* i. 215. *C. Stocksii*, *Dalz. & Gibs. Bomb. Fl.* 69?

VAR. 3. *mollis*, *Wall. Cat.* 5533 (sp.); branches leaves and calyx densely clothed with short grey pubescence, pod small oblong slightly downy till mature. *W. & A. Prodr.* 253.—Nilghiris and Dindygul hills, in the Carnatic.

2. ***C. obtusifolia***, *DC. Prodr.* ii. 404; leaflets obovate obtuse sometimes emarginate, racemes few-flowered, pod few-seeded. *Wall. Cat.* 5532; *W. & A. Prodr.* 253; *Clegh. in Madras Journ., new series*, vol. i. tab. iv. *Dolichos obtusatus* and *rotundifolius*, *Roxb. Hort. Beng.* 55; *Fl. Ind.* iii. 302–3. *C. rosea*, *lineata* and *rutilans*, *DC. loc. cit.* *Rhynchosia rosea*, *DC. Prodr.* ii. 387.

Coasts of WESTERN PENINSULA, CEYLON and MALAY PENINSULA.—DISTRIB. Cosmopolitan in the tropics.

A glabrous perennial. *Leaflets* thicker than in the last, 2–4 in. long, more conspicuously veined, often as broad as long. *Racemes* usually overtopping the leaves. *Flower* like that of the last, but the upper lip of the calyx rather shorter. *Pod* 4–5 in. by 1 in., glabrous, 4–6-seeded.

71. **DIOCLEA**, H.B.K.

Climbing shrubs. *Leaves* pinnately 3-foliolate, stipellate. *Flowers* blue or white, in elongated racemes with thickened nodes; bracts and bracteoles caducous. *Calyx-tube* campanulate; teeth as long as the tube, two upper quite connate. *Corolla* little exserted; petals about equal in length; keel incurved, but not beaked. *Stamens* monadelphous, but the uppermost free at the base; anthers uniform. *Ovary* subsessile, few-ovuled; style incurved, beardless, stigma capitate. *Pod* oblong, turgid, 1–2-seeded, flattened along the upper suture.—DISTRIB. Species 16, all the others Tropical American.

D. LASIOCARPA, *Mart.*, a common Tropical American species with lax racemes, small bracts, densely fasciated pedicels as long as the glabrous calyx and 6–8-seeded strap-shaped pods 4–6 in. long, is contained in the CONCAN collection of *Dr. Stocks*, probably introduced.

1. ***D. reflexa***, *Hook. fil. Niger Flor.* 306. *Dolichos coriaceus*. *Grah. in Wall. Cat.* 5562. *Dioclea javanica*, *Benth. Pl. Jungh.* 236. *D. Fergusonii*, *Thwaites Enum.* 412.

Forests of SILHET, *Hook. fil. & Thomson*. PENANG and SINGAPORE, *Wallich*. TENASSERIM, *Helfer*. CEYLON, *Ferguson*.—DISTRIB. Malay isles, Trop. Africa, Trop. America.

A woody climber, with terete branches, at first pubescent. *Leaflets* subcoriaceous, obtuse or acute, pubescent beneath, 4-6 in. long. *Flowers* in peduncled dense subsuplicate racemes $\frac{1}{2}$ -1 ft. long; bracts linear, reflexed, silky, $\frac{1}{2}$ in. long. *Calyx* $\frac{3}{8}$ - $\frac{1}{2}$ in., silky, with a pair of small obtuse bracteoles. *Corolla* reddish, half as long again as the calyx. *Pod* 3-4 in. long, glabrescent, but clothed at first with adpressed silky hairs.

72. PUERARIA, DC.

Twining shrubs or herbs, with stipellate 3-foliolate leaves; leaflets sometimes palmatifid. *Flowers* large or small, densely fascicled, in long often compound racemes. *Calyx-teeth* long or short, the two upper connate. *Corolla* distinctly exserted; standard usually spurred at the base, equalling in length the obtuse wings and keel. *Stamens* more or less thoroughly monadelphous; anthers uniform. *Ovary* sessile or nearly so, many-ovuled; style filiform, much incurved beardless, stigma capitate. *Pod* linear, flattish.—DISTRIB. Only one East Asian species not here represented.

SUBGEN. 1. **Pueraria** proper. *Flowers* produced after the leaves fall. *Pod* $\frac{1}{4}$ - $\frac{1}{2}$ in. broad, with constrictions between the seeds that recall the articulations of *Hedysarea*.

1. **P. tuberosa**, DC. *Prodr.* ii. 240; calyx densely silky, teeth subobtuse shorter than the tube, bracts very minute, lamina of wings oblique oblong, pod clothed with weak bristles. *Wall. Cat.* 5352; *W. & A. Prodr.* 205, 449; *Wight Ic.* t. 412; *Dalz. & Gibs. Bomb. Fl.* 67; *Benth. in Linn. Soc. Journ.* ix. 123. *Hedysarum tuberosum*, *Roxb. Hort. Beng.* 57; *Fl. Ind.* iii. 363.

WEST HIMALAYAS, tropical zone, ascending to 4000 ft. in KUMAON. Hills of WESTERN PENINSULA and ORISSA.

Root very large, tuberous. *Stems* shrubby, the branches finely grey-downy. *Stipules* minute, deciduous, cordate-ovate; leaflets membranous, roundish, $\frac{1}{2}$ -1 ft. long, green, glabrescent above, densely clothed with whitish adpressed hairs beneath. *Flowers* in dense virgate leafless often paniced racemes, reaching 6-9 in. long; pedicels very short, densely fascicled. *Calyx* $\frac{1}{6}$ - $\frac{1}{4}$ in. long, densely silky. *Corolla* bluish, not quite twice the calyx; limb of standard orbicular, distinctly spurred. *Pod* 2-3 in. long, membranous, flat, 3-6-seeded, clothed with long grey silky bristly hairs.

2. **P. Candollei**, *Grah. in Wall. Cat.* 5355; calyx subglabrous, teeth acute as long as the tube, bracts exceeding the buds, lamina of wings semi-circular, pod subglabrous. *Benth. in Journ. Linn. Soc.* ix. 123.

PEGU, Wallich, McClelland. MOULMEIN, Lobb.

Shrubby, with slender terete glabrous branches. *Stipules* in the last; leaflets subcoriaceous, roundish, with an acute point, $\frac{1}{2}$ - $\frac{3}{4}$ ft. long, both surfaces greenish, glabrescent. *Racemes* lax, virgate, paniced, reaching a foot or more long, the sulcate rachises subglabrous; pedicels $\frac{1}{12}$ - $\frac{1}{8}$ in.; bracts linear, $\frac{3}{8}$ - $\frac{1}{2}$ in. long. *Calyx* $\frac{1}{6}$ - $\frac{1}{5}$ in., clasped by a pair of minute persistent orate bracteoles. *Corolla* twice the calyx; limb of standard roundish, spurred. *Pod* 3 in. long, few-seeded.

SUBGEN. 2. **Neustanthus**, *Benth.* *Leaflets* entire, rarely faintly lobed, contemporaneous with the flowers. *Pod* $\frac{1}{4}$ - $\frac{1}{2}$ in. broad, not constricted, 4-12-seeded.

3. **P. peduncularis**, *Grah. in Wall. Cat.* 5354; herbaceous, stipules basifixed, flower-pedicels exceeding the calyx, calyx-teeth small deltoid, corolla middle-sized, pod glabrous membranous. *Benth. in Journ. Linn. Soc.* ix. 124. *Neustanthus peduncularis*, *Benth. Fl. Jungh.* 235.

EAST HIMALAYAS and KHASIA Mrs., temperate region, alt. 5-9000 ft.; NIPAL, SIKKIM, MISHMI.

Copiously twining, the slender firm branches clothed with short deflexed deciduous hairs. *Leaflets* membranous, green, with a few short hairs above, grey, densely shortly downy beneath; end one roundish, acuminate, 4-6 in. long. *Racemes* $\frac{1}{2}$ -1 ft., short-peduncled, moderately close; nodes never produced into branches. *Pedicels* $\frac{1}{8}$ - $\frac{1}{4}$ in., spreading, densely fascicled. *Calyx* $\frac{1}{8}$ in., finely grey-silky. *Corolla* reddish, $\frac{1}{2}$ in. long; standard $\frac{1}{4}$ in. broad, not spurred; keel with a deep purple tip. Upper *stamen* at last nearly free. *Pod* quite straight, strap-shaped, 2-3 in. by $\frac{1}{4}$ in., quite glabrous, 4-8-seeded, turgid opposite the seeds.

4. **P. Wallichii**, DC. *Prodr.* ii. 240; shrubby, stipules basifixed, flower-pedicels at most equalling the calyx, calyx-teeth deltoid, corolla middle-sized, pod glabrous rigid-coriaceous. DC. *Mem. Leg.* t. 43; Wall. *Cat.* 5353; Benth. in *Journ. Linn. Soc.* ix. 124. P. composita, Grah. in Wall. *Cat.* 5570.

EAST HIMALAYAS, tropical region; NIPAL, SILHET, KHASIA, MISHMI, ascending to 5000 ft. BURMA; Taong-dong, Wallich.

Branches slender, terete, glabrous. *Leaflets* membranous or subcoriaceous, green, glabrescent above, grey with a few adpressed hairs beneath; end one 4-6 in. long, obovate-cuspidate, with a deltoid base. *Racemes* copious, $\frac{1}{4}$ - $\frac{1}{2}$ ft. long, often fascicled or panicle; pedicels finely silky, densely fascicled, the nodes often lengthened out into short branchlets (P. composita, Wall.). *Calyx* gibbous, $\frac{1}{8}$ in.; teeth obscure. *Corolla* reddish, $\frac{1}{2}$ - $\frac{5}{8}$ in. long; limb of standard twice as long as broad, not spurred at the base. *Pod* straight, 4-5 in. long, the sutures sometimes slightly repand.

5. **P. Stracheyi**, Baker; herbaceous, stipules deciduous, flower-pedicels nearly or quite as long as the calyx, calyx-teeth large nearly as long as the tube, corolla large.

KUMAON, Kalimundi, alt. 7300 ft., Strachey and Winterbottom.

Branches slender, with a few short deciduous hairs. *Leaflets* membranous, very thin, with a few obscure adpressed hairs on both surfaces, green above, paler below; end one obovate-oblong, cuspidate, rather rounded at the base, 3-4 in. long. *Flowers* in a long lax simple subsecund raceme, with a subglabrous rachis; pedicels $\frac{1}{8}$ - $\frac{1}{4}$ in. *Calyx* subglabrous, $\frac{3}{8}$ in. long; lower tooth lanceolate, $\frac{1}{8}$ in. long, the others much shorter. *Corolla* reddish, $\frac{3}{4}$ - $\frac{7}{8}$ in. long; standard $\frac{1}{2}$ in. broad, distinctly spurred. *Pod* unknown.

6. **P. Thomsoni**, Benth. in *Journ. Linn. Soc.* ix. 122; shrubby, stipules fixed by the centre, pedicels very short, calyx-teeth 3-4 times the tube, corolla large, pod densely clothed with long silky hairs. Dolichos spicatus, Wall. *Cat.* 5557 C. D. grandifolius, Grah. in Wall. *Cat.* 5556.

EAST HIMALAYA, temperate region. ASSAM, Jenkins, Mrs. Mack. KHASIA, 5-7000 ft., Griffith, Hook. fil. and Thomson. SILHET, Gomez.

A climber, with slender branches, clothed with deciduous deflexed fine brownish hairs. *Stipules* persistent, $\frac{1}{2}$ - $\frac{3}{4}$ in. long; leaflets membranous, green, with a few obscure adpressed hairs above, grey with dense thin hairs beneath; end one roundish, obtuse or cuspidate, 6-9 in. long, rarely faintly lobed. *Racemes* close, simple, 6-9 in. long. *Calyx* $\frac{1}{2}$ in. long, densely silky; teeth lanceolate. *Corolla* reddish, half as long again as the calyx; standard $\frac{1}{2}$ in. broad, distinctly spurred. *Pod* 4-5 in. by $\frac{3}{8}$ - $\frac{1}{2}$ in., flat, straight, membranous, 8-12-seeded.

7. **P. stricta**, Kurz in *Journ. Asiat. Soc. Beng.* xlii. 2, 254; herbaceous, erect, pedicels longer than the very small calyx, pod glabrous 7-9-seeded.

PEGU and MARTABAN, Kurz.

A perennial, 2-4 ft. high, with subterete branches, tomentose when young. *Leaflets*

chartaceous, thinly clothed with adpressed hairs on both sides; end one ovate acute, 2-3 in. long. *Racemes* canescent, axillary and forming a terminal panicle; fruit-pedicels $\frac{1}{2}$ in.; bracts small, subulate, persistent. *Calyx* 1 in., puberulous. *Corolla* unknown. *Pod* linear, 1-1 $\frac{1}{2}$ in. by $\frac{1}{5}$ in., flat, pale.—I have seen no specimens.

8. **P. hirsuta**, *Kurz in Journ. Asiat. Soc. Beng.* xlii. 2, 254; herbaceous, twining, pedicels very short, calyx very small, pod clothed with few spreading hairs 2-4-seeded.

PEGU, *Kurz*.

Perennial, the obtuse angles of the branches beset with retrorse adpressed hairs. *Leaflets* chartaceous, furnished, especially below, with sparse adpressed hairs; end one ovate or ovate-lanceolate, 2 $\frac{1}{2}$ -3 $\frac{1}{2}$ in. long. *Racemes* axillary, densely pilose, usually 2-3-nate; bracts caducous; fruit-pedicels $\frac{1}{12}$ in. *Corolla* unknown. *Pod* linear-oblong, $\frac{1}{2}$ -1 in. by $\frac{1}{4}$ in., flat, slightly torulose.—I have seen no specimens.

9. **P. brachycarpa**, *Kurz in Journ. Asiat. Soc. Beng.* xlii. 2, 243; xliii. 2, 185; herbaceous, twining or diffuse, pedicels as long as the calyx, calyx very small, pod with a few adpressed hairs 5-6-seeded.

PEGU, *Kurz*.

A perennial, with long branches, clothed on the acute angles with retrorse hairs. *Stipules* small, lanceolate acuminate; leaflets chartaceous, with scattered adpressed hairs on both surfaces; end one ovate or ovate-lanceolate, 1 $\frac{1}{2}$ -2 in. long. *Racemes* 1-2, stiff, axillary, pilose; bracts minute, subulate, persistent. *Calyx* $\frac{1}{12}$ in., pubescent. *Corolla* unknown. *Pod* linear-oblong, 1 in. by $\frac{1}{5}$ in., pale, compressed, torulose.—I have seen no specimens.

SUBGEN. 3. **Schizophyllon**. *Leaflets* usually deeply lobed, contemporaneous with the flowers. *Pod* $\frac{1}{8}$ - $\frac{1}{6}$ in. broad, rather turgid, recurved at the tip, 10-15-seeded.

10. **P. phaseoloides**, *Benth. in Journ. Linn. Soc.* ix. 125. *Dolichos phaseoloides*, *Roxb. Fl. Ind.* iii. 316. *Neustanthus subspicatus* and *phaseoloides*, *Benth. Pl. Jungh.* 234, 235. *Dolichos viridis*, *Ham. in Wall. Cat.* 5559. *D. spicatus*, *Wall. Cat.* 5557 A. B. *Phaseolus decurrens*, *Grah. in Wall. Cat.* 5612. *Pueraria subspicata*, *Benth. in Journ. Linn. Soc.* ix. 125. *D. ficifolius*, *Grah. in Wall. Cat.* 5563.

EAST HIMALAYAS, tropical region; ASSAM, SIKKIM, KHASIA, SILHET, CHITTAGONG, BIRMA, PEGU, TENASSERIM, PENANG and MALACCA.—DISTRIB. China, Malay isles.

Stems wide-twining, often scarcely woody, clothed with dense spreading brown hairs. *Stipules* small, lanceolate, basifixed; leaflets membranous, green above, thinly clothed with adpressed bristly hairs, grey and densely matted beneath; end one very variable in size and shape, roundish, broad ovate or rhomboidal, entire or shallowly or deeply 3-lobed, 3-6 in. long. *Flowers* fasciated in copious long-peduncled racemes; pedicels very short; bracts and bracteoles lanceolate, strongly nerved, like those of *Shuteria*, the latter subsistent. *Calyx* $\frac{1}{4}$ - $\frac{3}{8}$ in. long, densely clothed with adpressed bristly hairs; lowest tooth lanceolate, as long as tube, others shorter, all setaceous at the tip. *Corolla* reddish, twice the calyx; blade of standard roundish, distinctly spurred. *Pod* glabrescent, 3-4 in. long.—N. SERICANS, *Miq. Flor. Ind. Bat.* i. 218, is a form with thin adpressed pubescence and large entire leaflets.

VAR. javanicus, *Benth. (sp.)*; leaflets small thick entire obtuse densely pubescent, end one nearly as broad as long with a deltoid base. *Pueraria javanica*, *Benth. in Journ. Linn. Soc.* ix. 125. *Neustanthus javanicus*, *Benth. Pl. Jungh.* 235; *Miq. Fl. Ind. Bat.* i. 218, t. 4 B. *Pachyrhizus mollis*, *Hassk. Cat. Bogor.* 280.—Khasia and Malacca.

73. **PHASEOLUS**, Linn.

Twining, usually herbaceous, with 3-foliolate stipellate leaves. *Flowers* in copious axillary racemes; bracteoles usually conspicuous and persistent. *Calyx* campanulate, the lowest tooth usually longer than the rest and the two uppermost subconnate. *Corolla* much exserted, the keel prolonged into a very long beak which forms a complete, or in § *Dysolobium*, nearly complete, spiral. *Stamens* diadelphous; anthers uniform. *Ovary* sessile, many-ovuled; style filiform, twisted round with the keel, conspicuously bearded down the side below the very oblique stigma. *Pod* linear, rarely oblong, subterete or subcompressed, more or less distinctly septate between the seeds.—**DISTRIB.** Species about 60, mostly tropical, many widely cultivated, especially in America.

SUBGEN. 1. Phaseolus proper. *Stipules* small, basifixed. *Pods* $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, subcompressed. *Keel* prolonged into a complete spiral.

1. **P. lunatus**, Linn.; *DC. Prodr.* ii. 393; twining, racemes lax short-peduncled many-flowered, pedicels longer than the calyx, corolla small greenish-yellow, bracteoles minute, pod recurved oblong 2–4-seeded. *Roxb. Fl. Ind.* iii. 287; *W. & A. Prodr.* 244. *P. vulgaris*, Wall. *Cat.* 5595, non Linn.

Everywhere cultivated, probably a native of America.—**DISTRIB.** Everywhere in the tropics.

A tall biennial, with stems at first minutely downy, soon glabrescent, easily distinguished from all the other species by the shape of the *pod*, which is 2–3 in. by $\frac{3}{8}$ – $\frac{1}{2}$ in., less turgid than in any of the others, with the upper suture recurved and the lower broadly rounded. *Racemes* reach $\frac{1}{2}$ ft. long, the lower fascicles distant, with 2–4 flowers to a node; pedicels finally $\frac{1}{4}$ – $\frac{1}{3}$ in. long. *Calyx* $\frac{1}{12}$ in.; teeth all very short. *Corolla* 3–4 times the calyx. *Seeds* large, very variable in colour.—**P. INAMENUS**, Linn., **XUARESII**, Zucc., **PUBERULUS**, H.B.K., and **TUNKINENSIS**, Lour., are cultivated varieties.

2. **P. vulgaris**, Linn.; *DC. Prodr.* ii. 392; suberect or twining, racemes lax subsessile few-flowered, pedicels longer than the calyx, corolla middle-sized white or lilac-purple, bracteoles often exceeding the calyx, pods linear recurved 4–6-seeded. *Roxb. Fl. Ind.* iii. 287; *W. & A. Prodr.* 243, non Wall. *P. nanus*, Linn.; *DC.*; *Roxb.*; *W. & A. loc. cit.* *P. compressus*, oblongus, saponaceus, tumidus, hæmatocarpus, sphæricus and gonospermus, *DC. loc. cit.*

Universally cultivated, but not anywhere clearly known as a wild plant.—**DISTRIB.** Spread everywhere, both in tropical and temperate regions.

A subglabrous annual. *Stems* low and suberect (*P. nanus*, Linn.) or twining to a height of 6–10 ft. (*P. vulgaris*, Linn.). *Racemes* much shorter than the leaves; pedicels finally $\frac{1}{4}$ – $\frac{1}{3}$ in. long; bracteoles ovate or roundish, persistent. *Pod* 4–6 in. by $\frac{1}{2}$ in., glabrous, rostrate, turgid.—The Scarlet Runner, *P. multiflorus*, Willd.; *DC. Prodr.* ii. 392; *W. & A. Prodr.* 244; *P. coccineus*, Lam., differs by its bright scarlet casually white flowers, arranged in long racemes which often overtop the leaves.

3. **P. adenanthus**, G. F. Meyer, *Prim. Fl. Esseq.* 239; twining, racemes dense capitate, pedicels very short, corolla large red, pod linear recurved many-seeded. *P. rostratus*, Wall. *Pl. As. Rav.* t. 63; *Wall. Cat.* 5610; *W. & A. Prodr.* 244; *Wight Ic.* t. 34. *P. alatus*, *Roxb. Hort. Beng.* 54; *Fl. Ind.* iii. 288, non Linn. *P. amarus*, *Roxb. MSS.* *P. cirrhosus* and *truxillensis*, H.B.K.; *DC. Prodr.* ii. 391, 392. *P. senegalensis*, Guill. & Per. *Fl. Seneg.* 217.

Spread in the plains from the HIMALAYAS to CEYLON, not cultivated.—DISTRIB. Cosmopolitan in the Tropics.

A subglabrous perennial, with firmer leaves than in the cultivated species. *Stipules* $\frac{1}{2}$ in., often reflexed; leaflets entire, 3–4 in. long, subacute. *Flowers* very showy, crowded in a short-peduncled raceme. *Calyx* $\frac{1}{4}$ in.; lower teeth lanceolate- or deltoid-setaceous. *Standard* nearly 1 in. broad. *Pod* 4–6 in. by $\frac{1}{2}$ in., glabrous, much recurved, 10–15-seeded, subtorulose.

SUBGEN. 2. **Macroptilium**. Connects § 1 and 3, agreeing with the former in its basifixed stipules and with the latter in its narrow turgid pods.

4. **P. tenuicaulis**, Baker; a subglabrous slender twiner, stipules minute lanceolate, racemes few-flowered crowded subsessile, bracteoles lanceolate very minute, calyx campanulate with deltoid teeth, corolla small. *P. sublobatus* var. ? *tenuicaulis*, *Grah. in Wall. Cat.* 5598.

BIRMA; Prome hills, Wallich.

Stems very slender, annual? at first minutely puberulent. *Stipules* not more than $\frac{1}{12}$ in.; leaflets membranous, glabrous, the end one ovate, acute, entire, 2–3 in. long. *Racemes* 5–6-flowered; lower pedicels shorter than the calyx. *Calyx* glabrous, $\frac{1}{12}$ in. *Corolla* 3 times the calyx, reddish. *Pod* unknown, so that its position is doubtful.

5. **P. Grahamianus**, W. & A. *Prodr.* 244; a glabrous perennial twiner, stipules minute lanceolate, racemes lax short-peduncled, bracteoles lanceolate very minute, calyx campanulate with deltoid teeth, corolla middle-sized. *Thwaites Enum.* 90.

CARNATIC; Courtallum, Wight. CEYLON; on the shore at Batticaloa, Thwaites.

Copiously twining, with slender woody branches. *Stipules* as in the last; leaflets quite glabrous on both sides, the end one ovate acute, 2–3 in. long, rather deltoid at the base. *Racemes* 2–4 in. long; peduncles about as long as the leaves; pedicels geminate, the lower finally as long as the calyx. *Calyx* $\frac{1}{6}$ in. long. *Corolla* reddish, 3–4 times the calyx. *Pod* linear, glabrous, rather recurved, many-seeded, $2\frac{1}{2}$ –3 in. by $\frac{1}{6}$ in.

6. **P. semierectus**, Linn.; *DC. Prodr.* ii. 396; shrubby, suberect, with flexuose branches clothed with long deciduous deflexed hairs, stipules conspicuous lanceolate-setaceous, peduncles and racemes very long, bracteoles setaceous, calyx tubuloso-campanulate with aristate teeth, corolla middle-sized. *Jacq. Ic.* t. 558; *Bot. Reg.* t. 743. *P. psoraleoides*, W. & A. *Prodr.* 244; *Wight Ic.* t. 249.

Spread through the WESTERN PENINSULA and CEYLON, but probably not wild.—DISTRIB. Trop. America, Malaya.

Stems tall, suberect and shrubby in the lower part, quite terete. *Stipules* $\frac{1}{4}$ – $\frac{3}{8}$ in. long; leaflets entire, membranous, soon glabrescent, thicker than in most of the species, the end one ovate, entire, acute or subobtusely. 2–3 in. long, usually deltoid at the base. *Peduncles* reaching a foot and racemes half a foot long; pedicels very short, geminate. *Calyx* under $\frac{1}{4}$ in. long, split open by the pod. *Corolla* deep purple and white, 3–4 times the calyx. *Pod* 3–4 in. by $\frac{1}{8}$ in., glabrous, rather recurved, many-seeded.

SUBGEN. 3. **Strophostyles**. *Stipules* inserted above the base. *Pods* under $\frac{1}{4}$ in. thick, subterete. *Keel* prolonged into a complete spiral. *Flowers* yellow. *Racemes* very close.

7. **P. trilobus**, Ait. *Hort. Kew.* iii. 30; stems slender diffuse glabrous or slightly hairy, stipules oblong, leaflets more or less deeply 3-lobed with the central division spatulate, racemes capitate, bracteoles ovate, flowers minute. *Roxb. Fl. Ind.* iii. 298; *Wall. Cat.* 5588 A–K.; W. & A. *Prodr.* 246; *Wight*

Ic. t. 94; Dalz. & Gibs. Bomb. Fl. 71. Dolichos trilobatus, Linn.; Burm. Fl. Ind. t. 50, fig. 1.; DC. Prodr. ii. 399.

HIMALAYAS to CEYLON and BIRMA, wild and commonly cultivated, ascending to 7000 ft. in the north-west.—DISTRIB. Afghanistan, Malay isles, Nubia, Abyssinia.

Perennial or annual. *Stems* trailing to a length of 1–2 feet, glabrous or furnished with a few deciduous spreading hairs. *Stipules* $\frac{1}{4}$ – $\frac{3}{4}$ in., attached near the base; leaflets membranous, glabrous, or with only a few obscure loose or short hairs, rhomboid or ovate, 1–2 in. long, very rarely entire (var. *OXALIDEUS*, *Grah.*, *P. CORNUTUS*, *Blume*), usually shallowly lobed in the annual cultivated, deeply lobed in the perennial wild form, the central divisions broad, spoon-shaped, obtuse. *Flowers* in a close, deltoid head, on a peduncle that usually overtops the leaves; pedicels very short. *Calyx* campanulate, $\frac{1}{24}$ – $\frac{1}{12}$ in., pale yellow; teeth deltoid. *Corolla* under $\frac{1}{4}$ in. long. *Pod* 1–2 in. by $\frac{1}{8}$ in., subcylindrical, glabrous, recurved, 6–12-seeded.

8. ***P. aconitifolius***, *Jacq. Obs. iii. t. 52*; stems slender suberect or diffuse slightly hairy, stipules lanceolate, leaflets deeply 3-lobed with the central division ligulate, racemes capitate, bracteoles linear, flowers minute. *Roxb. Fl. Ind. iii. 299; W. & A. Prodr. 247; DC. Prodr. ii. 394. P. trilobus, Wall. Cat. 5588 L-N. Dolichos dissectus, Lam. Dict. ii. 300.*

HIMALAYAS to CEYLON, tropical region, up to 4000 ft. in the north-west.

Closely allied to the last, with which it agrees in flowers and general habit. *Stems* more copiously clothed with loose deflexed fine brownish hairs. *Stipules* much smaller and narrower. *Peduncles* hairy, like the stems; bracteoles twice as long as the calyx, their setaceous ciliated tips protruding beyond the buds. *Pods* rather stouter than in *P. trilobus* and seeds larger.

9. ***P. grandis***, *Dalz. & Gibs. Bomb. Fl. 72, non Wall. Cat. 5602*; stems stout suberect, stipules very large obovate, leaflets obovate entire or distinctly lobed, racemes close, bracteoles enclosing the calyx and corolla, corolla middle-sized.

CONCAN, on the highest ghauts east of Bombay, *Stocks, Dalzell*.

Stems as robust as in the Common Bean, 2–4 ft. high, clothed with adpressed deciduous blackish bristles. *Stipules* persistent, ciliated, obovate-spathulate, 1–2 in. long, attached a little above the cordate base; leaflets rather fleshy, 3–4 in. long, clothed with short deciduous firm grey bristles, deltoid or rather rounded at the base, lobed only in the upper half. *Racemes* copious, on short or long suberect densely bristly peduncles; bracteoles nerved, obovate-oblong, $\frac{1}{4}$ – $\frac{1}{2}$ in. long. *Calyx* $\frac{1}{8}$ in.; teeth lanceolate. *Pod* 2–3 in. long, at first densely bristly.

10. ***P. pauciflorus***, *Dalz. in Kew Journ. iii. 209*; stems very slender twining subglabrous, stipules minute lanceolate, leaflets membranous entire or faintly lobed, racemes capitate, bracteoles linear, flowers minute, pod glabrous, *Dalz. & Gibs. Bomb. Fl. 72.*

Southern CONCAN, common, *Dalzell, Stocks*.

Stems very slender, climbing, quite glabrous when mature. *Stipules* $\frac{1}{8}$ in.; leaflets ovate, acute, $1\frac{1}{2}$ –2 in. long, green above, paler beneath. *Flowers* 2–4, at the end of a slender peduncle about as long as the leaves; bracteoles twice as long as the calyx; pedicels shorter than the calyx. *Calyx* not more than $\frac{1}{2}$ in.; teeth shorter than the tube, lowest lanceolate. *Corolla* $\frac{1}{4}$ in., pale yellow. *Pod* $1\frac{1}{2}$ –2 in. by $\frac{1}{8}$ in., subcylindrical, slightly recurved, 6–10-seeded.

P. SUBLOBATUS, *Wall. Cat. 5598 C*, from the estuary of the Irrawaddi, is closely allied to this, but at present is known only in the flowering state. It has firmer leaves, thinly clothed with adpressed grey bristles, 6–12-flowered short-peduncled racemes not closely capitate, and lanceolate bracteoles not longer than the calyx.

11. **P. Mungo**, Linn.; *DC. Prodr.* ii. 395; stems suberect or flexuose more or less densely clothed with loose deflexed hairs, stipules ovate, leaflets membranous entire, rarely faintly lobed, racemes capitate, bracteoles ovate or lanceolate, flowers middle-sized, pod clothed with long spreading deciduous silky hairs. *Roxb. Fl. Ind.* iii. 292 (seeds green); *Wall. Cat.* 5589 (in greater part); *W. & A. Prodr.* 245. *P. Max, Roxb. Hort. Beng.* 55; *Fl. Ind.* iii. 295 (seeds black); *Wall. Cat.* 5606. *P. aureus*, Ham. in *Wall. Cat.* 5590 (seeds yellow). *P. hirtus*, Retz. *Obs.* iii. 38, non Wall.

Wild and universally cultivated in the plains throughout our limits in a large number of forms, ascending to 6000 ft. in the N.W. Himalayas.—DISTRIB. Spread through tropics of Old World.

Stems annual, suberect in the typical form, 1-2 ft. high, copiously branched from the base, clothed with fine long deciduous brownish silky hairs. *Stipules* $\frac{1}{2}$ - $\frac{1}{4}$ in. long, attached near the base; leaflets membranous, with scattered adpressed hairs on both sides, 2-4 in. long, roundish, acute or subobtusely, deltoid or rather rounded at the base. *Flowers* about half a dozen at the very end of short peduncles, clothed like the stems; pedicels very short. *Calyx* $\frac{1}{8}$ - $\frac{1}{6}$ in.; lower tooth deltoid or lanceolate. *Corolla* $\frac{3}{8}$ - $\frac{1}{2}$ in., yellow. *Pod* $1\frac{1}{2}$ - $2\frac{1}{2}$ in. long by $\frac{1}{8}$ - $\frac{1}{5}$ in., subcylindrical, slightly recurved, 10-15-seeded.

VAR. 1. glaber, Roxb. *Fl. Ind.* iii. 291 (sp.), non Schlecht.; habit of the type, but stem leaves and pod quite glabrous. *Wall. Cat.* 5604. *P. Mungo*, F., *Wall. Cat.* 5589, *ex parte*. *P. glabrescens*, Steud. *Nomenc.* edit. 2, ii. 317. A cultivated form.

VAR. 2. Wightianus, Grah. in *Wall. Cat.* 5591 (sp.); stems elongated slender flexuose finely hairy, the hairs short and grey, leaflets thinner. *P. Wightii*, W. & A. *Prodr.* 245. *P. subvolubilis*, Ham. in *Wall. Cat.* 5605.

VAR. 3. radiatus, Linn. (sp.); stems elongated twining densely clothed, as are the peduncles and pod with long ferruginous deflexed silky hairs, leaflets firmer than in the last, similar to those of the type. *Roxb. Fl. Ind.* iii. 296; *Wall. Cat.* 5592; *DC. Prodr.* ii. 395. *P. Roxburghii*, W. & A. *Prodr.* 246. *P. Mungo*, *Wall. Cat.* 5589, *ex parte*. *P. setulosus*, Dalz. in *Kew Journ.* ii. 33; *Dalz. & Gibs. Bomb. Fl.* 72. *Vigna opistotricha*, A. Rich. *Fl. Abyss.* i. 220.

12. **P. trinervius**, Heyne in *Wall. Cat.* 5603; stems twining densely clothed with deflexed ferruginous hairs, stipules middle-sized oblong, leaflets entire or faintly lobed persistently pilose on both surfaces, racemes close, bracteoles oblong-lanceolate, pod at first densely silky. *W. & A. Prodr.* 245; *Dalz. & Gibs. Bomb. Fl.* 71. *P. farinosus*, Linn.; *DC. Prodr.* ii. 395?

Plains of WESTERN PENINSULA and CEYLON, ascending to 4000 ft.—DISTRIB. Malaya.

Perennial. *Stems* copiously twining, never suberect. *Stipules* like those of *P. Mungo*, but apparently attached higher up. *Leaflets* thicker in texture, often distinctly lobed, ovate, acute, 2-4 in. long, dark green, scabrous, with adpressed grey bristly hairs above, still more hairy beneath. *Flowers* 6-12, on long downy peduncles, the raceme finally 1-2 in. long; pedicels very short. *Calyx* $\frac{1}{2}$ in.; teeth deltoid. *Corolla* 3-4 times the calyx, yellow or reddish. *Pod* 2-2 $\frac{1}{2}$ in. long, 10-12-seeded, slightly recurved.—Closely allied to *P. Mungo*, var. *radiatus*, and probably a fourth variety of that species.

13. **P. calcaratus**, Roxb. *Hort. Beng.* 54; *Fl. Ind.* iii. 289; stems suberect or flexuose clothed with fine deciduous deflexed hairs, stipules lanceolate, leaflets entire or faintly lobed, racemes not capitate, bracteoles linear, flowers middle-sized, pod glabrous. *Wall. Cat.* 5611; *W. & A. Prodr.* 245. *P. sublobatus*, *Wall. Cat.* 5598 A, B. *P. hirtus*, *Wall. Cat.* 5593. *P. Mungo*, *Wall. Cat.* 5589 C, *ex parte*. *P. pubescens*, Blume; *Miq. Flor. Ind. Bat.* i. 200.

HIMALAYAS to CEYLON, in the tropical zone, both wild and commonly cultivated, ascending to 5000 ft. in KHASIA.—DISTRIB. Malaya.

Closely allied to *P. Mungo*, and equally variable in general habit. Hairs of the stem short, but spreading, not ferruginous. *Stipules* much smaller and narrower; leaflets membranous, subglabrous, 2-4 in. long, the end one broad-ovate, acute. *Flowers* 10-20, the lower pedicels as long as the calyx, and the raceme finally 2-3 in. long. *Calyx* $\frac{1}{2}$ in.; teeth short, deltoid. *Corolla* $\frac{1}{2}$ in., yellow. *Pod* $2\frac{1}{2}$ -3 in. by $\frac{1}{6}$ - $\frac{1}{5}$ in., not so cylindrical as in *P. Mungo*, 8-12-seeded, glabrous from the beginning, considerably recurved.—*P. torosus*, *Roxb. Fl. Ind.* iii. 298, is probably a cultivated form, with short suberect stems and subsessile congested racemes.

SUBGEN. 4. **Dysolobium.** *Stipules* small, basifixed, caducous. *Pod* linear, subterete, densely velvety or bristly. *Wings* distinctly shorter than the other petals. *Keel* prolonged into a long incurved beak but not forming a complete spiral.—Connects *Phaseolus* and *Vigna*

14. **P. fuscus**, *Wall. Pl. As. Rar.* 6, t. 6; *Cat.* 5613; stems slender annual, leaflets ovate acute twice as long as broad softly downy, racemes short-peduncled few-flowered lax, corolla middle-sized. *Dunbaria fusca*, *Kurz in Journ. As. Soc. Beng.* xliii. 2, 186.

BIRMA; Prome hills, *Wallich*.

Stems firm, wide-twining, with many grooves. *Leaflets* membranous, dull green, thinly pubescent above, grey-green, more densely downy beneath, always entire, rounded at the base, narrowed gradually to a point, the end one 3-4 in. long. *Peduncles* 1-1 $\frac{1}{2}$ in. long. *Racemes* 2-3 in. long, copious, much shorter than the leaves; pedicels geminate, spreading, $\frac{1}{12}$ - $\frac{1}{6}$ in. *Calyx* under $\frac{1}{4}$ in., subglabrous, very gibbous, with a few long deciduous bristles; teeth ciliated, the lowest lanceolate, shorter than the tube. *Corolla* $\frac{1}{2}$ in.; standard $\frac{1}{2}$ in. broad, yellowish with red-brown lines externally; keel and wings yellow. *Pod* linear, 2-3 in. by $\frac{1}{4}$ - $\frac{1}{8}$ in., brown, clothed with spreading brownish hairs, many-seeded.

15. **P. velutinus**, *Grah. in Wall. Cat.* 5615; stems woody, leaflets roundish cuspidate glabrescent above, racemes long-peduncled many-flowered, corolla large. *P. grandis*, *Wall. Cat.* 5602, *non Daltzell*. *Canavalia grandis*, *Kurz in Journ. As. Soc. Beng.* xliii. 2, 185.

EAST HIMALAYAS, tropical zone; NIPAL, ASSAM, CHITTAGONG. AWA, MOULMEIN, PEGU.

A woody climber, with very large leaves and flowers, by far the most showy of all the species. *Stems* terete, minutely pubescent. *Leaflets* thin, but flexible, full green, subscabrous at first above, paler green beneath, with copious obscure bristly hairs, broadly rounded at the base, 6-9 in. long. *Racemes* and woody terete peduncles reaching each 6-9 in. long; pedicels $\frac{1}{6}$ - $\frac{1}{4}$ in.; bracteoles roundish, minute, adpressed to the calyx. *Calyx* $\frac{1}{2}$ in., finely silky; lowest tooth lanceolate, shorter than of the tube, the others much shorter still. *Corolla* reddish, more than twice as long as the calyx; standard 1 in. broad. *Pod* almost woody, subcylindrical, straight, $\frac{1}{2}$ - $\frac{3}{4}$ ft. by $\frac{3}{4}$ in., deeply channelled down both sutures, densely brown-velvety.

74. **VIGNA**, Savi.

Twining herbs or shrubs, with exactly the habit of *Phaseolus*, from which they differ by having the style and keel much less curved and lengthened out. *Calyx* campanulate; teeth long or short, the upper often connate. *Corolla* much exerted; keel truncate or in § *Plectotropis* prolonged into an ascending or slightly recurved beak. *Stamens* diadelphous; anthers uniform. *Ovary* sessile, many-ovuled; style long, filiform, bearded along the inner face below the oblique stigma. *Pod* linear, subterete, subseptate.—DISTRIB. Species 40-50, mostly tropical, one widely cultivated.

VOANDEZIA SUBTERRANEA, *Thouars*; *DC. Prodr.* ii. 474, which is allied to *Vigna*, but may be easily known by its 1-2 ovulate ovary, which, by the torsion of the peduncle is thrust below the soil to ripen, and becomes a tuber-like pod, is occasionally cultivated, but less frequently than in Tropical Africa. Its native country is not clearly known.

SUBGEN. 1. **Vigna proper.** Keel not prolonged into a beak.

1. **V. repens**, *Baker*; stems trailing very slender, stipules minute lanceolate basifixed, leaflets membranous entire acute, flowers 1-2 together on very short geminate peduncles. *Phaseolus repens*, *Grah. in Wall. Cat.* 5608.

BIRMA, near Prome, *Wallich*.

Stems herbaceous, wide-creeping, glabrous. *Leaflets* firm, glabrous; the end one ovate, acute, 2-3 in. long. *Pedicels* very short, pubescent. *Calyx* $\frac{1}{4}$ in., slightly downy; teeth lanceolate-deltoid, shorter than the tube. *Corolla* reddish, 3 times the length of the calyx. *Pod* unknown.

2. **V. lutea**, *A. Gray in Bot. Wilkes Exped.* i. 452; stems perennial trailing, stipules minute lanceolate basifixed, leaflets obovate obtuse rather fleshy entire, racemes many-flowered long-peduncled, pods short few-seeded. *Dolichos luteus*, *Sw.*; *DC. Prodr.* ii. 398. *Vigna anomala*, *Walp. Rep.* i. 779. *V. retusa*, *Walp. Rep.* i. 778. *Phaseolus obovatus*, *Grah. in Wall. Cat.* 5609.

MARTABAN; Amherst, *Wallich*. ANDAMANS, *Kurz*. MALACCA, *Griffith*.—DISTRIB. Trop. America, Africa, Polynesia, Cape, N. Australia.

Stems wide-trailing, perennial, much stouter than in the last. *Leaflets* glabrous, with a subdeltoid base, the end one 2-3 in. long. *Peduncles* equalling or exceeding the leaves. *Flowers* 6-20, in a close raceme. *Calyx* campanulate, subglabrous, $\frac{1}{4}$ in.; teeth deltoid. *Corolla* yellow, 3-4 times the calyx. *Pod* 2-3 in. by $\frac{3}{8}$ in., quite glabrous from an early stage, subtorulose, 4-6-seeded.

3. **V. luteola**, *Benth. in Mart. Fl. Bras.* xv. 194, t. 50, fig. 2; stems slender herbaceous wide-twinning subglabrous, stipules minute lanceolate basifixed, leaflets ovate acute membranous entire, racemes many-flowered long-peduncled, corolla middle-sized, pod short few-seeded. *Dolichos luteolus*, *Jacq. Hort. Vind.* i. 39, t. 90. *D. gangeticus*, *Roxb. Fl. Ind.* iii. 310; *Wall. Cat.* 5546. *Vigna glabra* and *villosa*, *Savi*; *DC. Prodr.* ii. 401.

BENGAL; Sunderbunds, *Roxburgh*, *G. Thomson*. CEYLON, *Thwaites*. PEGU, *Kurz*.—DISTRIB. Cosmopolitan in tropics, Cape.

A trailing or twining perennial. *Leaflets* glabrous, or with a few spreading grey silky hairs, narrowed gradually to a point, always entire, the end one 2-3 in. long. *Flowers* 12-20, on peduncles equalling or exceeding the leaves; pedicels slightly downy, finally as long as the calyx; bracts and bracteoles very minute. *Calyx* $\frac{1}{4}$ - $\frac{1}{2}$ in., subglabrous; lower tooth lanceolate, as long as the tube, the others de' id. *Corolla* 3-4 times the calyx. *Pod* glabrescent, recurved, 2-4 in. by $\frac{1}{2}$ in., 6-12-seeded.

4. **V. Catiang**, *Endl.*; *Miq. Flor. Ind. Bat.* i. 188; annual, suberect or twining, stipules large attached above the base, leaflets membranous ovate-rhomboidal entire or slightly lobed, racemes few-flowered long-peduncled, pod very long many-seeded. *Dolichos Catiang*, *Linn*; *DC. Prodr.* ii. 399; *Roxb. Fl. Ind.* iii. 303; *Wall. Cat.* 5549. *D. sinensis*, *Linn*; *DC. loc. cit.*; *Roxb. Fl. Ind.* iii. 302; *Wall. Cat.* 5550; *Bot. Mag.* t. 2232; *W. & A. Prodr.* 250. *Vigna sinensis*, *Endl.*; *Hassk. Pl. Jav. Rar.* 386. *Dolichos tranquebaricus*, *Jacq. Hort. Vind.* iii. t. 70. *D. monachalis*, *Brot.*; *DC. Prodr. loc. cit.*

Native and universally cultivated in the tropical zone.—DISTRIB. Tropics of old world.

Low and suberect (*V. Catiang*) or tall and voluble (*V. sinensis*), always glabrous or nearly so. *Stipules* $\frac{1}{3}$ – $\frac{1}{2}$ in. long, attached and persistent as in *Phaseolus* § *Strophostylis*; leaflets membranous, 3–6 in. long, acute, very variable in shape, broad or narrow ovate, or ovate-rhomboidal, with the two sides below the middle prolonged into obtuse lobes. *Peduncles* often exceeding the leaves, 3–6-flowered; pedicels very short. *Calyx* glabrous, under $\frac{1}{2}$ in.; teeth lanceolate or deltoid-cuspidate. *Corolla* yellow or reddish, twice the calyx. *Pod* in some of the cultivated forms 1 or even 2 feet long, under $\frac{1}{2}$ in. broad, edible; seeds 10 to 20.

SUBGEN. 2. **Plectrotropis**. *Keel* prolonged into a distinct beak, so that this group connects *Vigna proper* with *Phaseolus*.

5. **V. vexillata**, *Benth. in Mart. Fl. Bras.* xv. 194, t. 50, fig. 1; stems herbaceous with a few deflexed brown hairs, leaflets membranous ovate or lanceolate acute, flowers 2–4 at the end of long peduncles, corolla large, pod slender glabrescent. *Phaseolus vexillatus*, *Linn. Sp. Pl.* 1017. *P. separius*, *Dalz. in Kew Journ.* ii. 33; *Bomb. Flora*, 72. *P. pulniensis*, *Wight Ic.* t. 202. *P. angustifolius*, *Wall. Cat.* 5596. *P. fusiformis*, *Grah. in Wall. Cat.* 5607. *Vigna carinalis*, *Benth. Bot. Sulph.* 86.—*Dill. Hort. Elth.* ii. t. 302.

Himalayas, from SIMLA to KUMAON and KHASIA, ascending to 8000 ft.. Hills of WEST PENINSULA and CEYLON.—DISTRIB. Cosmopolitan in tropics, Cape, Australia.

Root fusiform, perennial. *Stems* wide-twining, glabrescent when mature. *Stipules* $\frac{1}{4}$ – $\frac{1}{2}$ in., lanceolate, basifixd; leaflets with few or copious adpressed brownish or grey hairs, varying in shape from broad ovate to lanceolate, 2–6 in. long, always acute, the base rounded. *Peduncles* $\frac{1}{4}$ –1 ft.; bracteoles setaceous. *Calyx* $\frac{3}{4}$ – $\frac{1}{2}$ in., silky; teeth linear-lanceolate, as long as the tube. *Corolla* reddish-purple, 1 in. or more long; standard 1–1 $\frac{1}{4}$ in. broad. *Pod* 3–4 in. by $\frac{1}{4}$ in., thinly silky at first, 10–15-seeded.

VAR. *Stocksii*, *Benth.*; leaflets small ovate, brown hairs of the leaves and stem more abundant and persistent. Concan, *Stocks*.

6. **V. brachycarpa**, *Kurz in Journ. Asiat. Soc. Beng.* xliii. 2, 185; stems herbaceous slightly hairy, leaflets chartaceous linear or lanceolate-deltoid acuminate, flowers few crowded at the end of long peduncles, corolla small, pod linear-oblong with a few long hairs.

ARRACAN, *Kurz*.

A perennial climber, with filiform stems. *Stipules* $\frac{1}{4}$ – $\frac{1}{2}$ in., linear-oblong, peltate; petiole 1–1 $\frac{1}{2}$ in., pilose; leaflets 1–2 in., thinly hairy on both sides. *Peduncles* equaling or exceeding petioles; pedicels very short. *Calyx* glabrous, $\frac{1}{2}$ in.; teeth broad, short, acute. *Corolla* yellow, $\frac{1}{8}$ in. *Pod* 1 in. by $\frac{1}{2}$ in., stiff, compressed, black, many-seeded. I have seen no specimens.

7. **V. Wightii**, *Benth. MSS.*; stems woody finely grey-downy, leaflets subcoriaceous small ovate subobtus, flowers 2–3 on the end of long peduncles, corolla large. *Bedd. Ic. Pl. Ind. Or.* t. 296.

CARNATIC; Courtallum, *Wight, Thomson*.

A slender twiner, with slender sulcate glabrescent stems. *Stipules* minute, lanceolate, basifixd, caducous; leaflets glabrescent above, thinly silky below, 2–3 in. long. *Peduncles* reach 6–9 in.; pedicels very short; bracteoles minute, setaceous. *Caly.* $\frac{3}{8}$ in., finely downy; lower teeth linear, nearly as long as the tube. *Corolla* reddish, $\frac{1}{4}$ in. long; standard roundish, emarginate, $\frac{1}{2}$ in. broad. *Pod* not known.

8. **V. dolichoides**, *Baker*; stems woody with short adpressed grey hairs, leaflets subcoriaceous roundish cuspidate with copious adpressed bristly hairs, racemes many-flowered short-peduncled, corolla middle-sized, pod stout short clothed with dense firm spreading grey silky hairs. *Phaseolus dolicho-*

ides, *Roxb. Hort. Beng.* 54; *Fl. Ind.* iii. 290; *Wall. Cat.* 5600. *Mucuna recta*, *Wall. Cat.* 5625. *Dolichos dasycarpus*, *Miq. Flor. Ind. Bat.* i. 186. *Canavalia dolichoides*, *Kurz in Journ. Asiat. Soc. Beng.* xliv. 2, 185.

EAST HIMALAYAS, tropical zone; SILHET, KHASIA and ASSAM.—DISTRIB. JAVA.

Stems wide-twining, clothed densely with persistent rather bristly pale brown hairs. *Stipules* lanceolate, minute; leaflets always entire, as broad as long, flexible, 4–6 in. long, densely clothed, especially below, with short bristly hairs. *Racemes* 2–3 in., conical in bud, sometimes nearly sessile; pedicels shorter than the calyx; bracteoles minute, lanceolate. *Calyx* $\frac{1}{2}$ in., clothed with adpressed hairs; teeth deltoid, lowest lanceolate. *Corolla* reddish, 3–4 times the calyx. *Pod* 2–3 in. by $\frac{1}{2}$ in., firm, cylindrical, 5–6-seeded, the very dense spreading velvety hairs persistent.

9. **V. pilosa**, *Baker*; stems slender woody finely grey-downy, leaflets membranous ovate acute with a few short adpressed hairs, racemes many-flowered short-peduncled, corolla middle-sized, pod slender clothed with dense silky hairs. *Dolichos pilosus*, *Roxb. Hort. Beng.* 55; *Fl. Ind.* iii. 312; *DC. Prodr.* ii. 397; *W. & A. Prodr.* 249. *Phaseolus difformis*, *Wall. Cat.* 5599.

East Himalayas, tropical zone; ASSAM, NIPAL, SIKKIM, PROME, WESTERN PENINSULA and ORISSA.

Branches very slender, but firm, glabrescent. *Stipules* minute, lanceolate, caducous; leaflets usually twice as long as broad, narrowed gradually to a point, 4–6 in. long, thin, but firm, both sides subscabrous. *Racemes* 2–3 in. long, much shorter than the leaves; pedicels finally $\frac{1}{2}$ in.; bracts and bracteoles minute. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in., thinly silky, oblique; lower tooth lanceolate, as long as the tube. *Corolla* reddish, twice the calyx. *Pod* 4–5 in. by under $\frac{1}{4}$ in., beaked, rather recurved, 8–12-seeded, the short fine brown hairs spreading and persistent.

10. **V. lucens**, *Baker*; stems woody glabrous, leaflets entire membranous ovate acute glabrous, racemes sublaax many-flowered about as long as the leaves, corolla middle-sized, pod slender densely velvety. *Phaseolus lucens*, *Wall. Cat.* 5601. *Canavalia lucens*, *Kurz in Journ. Asiat. Soc. Beng.* xliii. 2, 185.

TAVOY, *Gomez*.

A wide-climbing perennial, with only the youngest branches clothed with a few adpressed grey hairs. *Leaflets* green on both sides, rounded at the base, narrowed gradually to a point, 4–6 in. long; stipules minute, lanceolate, caducous. *Racemes* and peduncles each 2–3 in. long; pedicels very short; bracteoles minute, ovate, *Calyx* $\frac{1}{4}$ in. long, nearly glabrous; lower tooth lanceolate, shorter than the tube. *Corolla* reddish, 3 times the calyx. *Pod* beaked, many-seeded.

75. **PACHYRHIZUS**, Rich.

Wide-climbing herbs. *Leaves* pinnately 3-foliate with stipellate lobed leaflets. *Racemes* long, with tumid nodes and fascicled pedicels; bracts and bracteoles setaceous, caducous. *Calyx* 2-lipped, the limb as long as the tube, the upper lip emarginate, the lower deeply 3-toothed. *Corolla* much exerted, the petals subequal; keel obtuse. *Stamens* diadelphous; anthers uniform. *Ovary* subsessile, many-ovuled; style long, circinate at the apex, bearded down the inner side below the very oblique stigma. *Pod* large, linear, turgid, deeply depressed between the seeds.—DISTRIB. Species 2 or 3, the others Mexican and Angolan.

1. **P. angulatus**, *Rich.*; *DC. Prodr.* ii. 402; *Wall. Cat.* 5526; *W. & A. Prodr.* 251. *Dolichos bulbosus*, *Linn.*; *Roxb. Fl. Ind.* iii. 309. *P. trilobus*, *DC. loc. cit.*

Cultivated throughout our limits, but not known in a wild state.—DISTRIB. Everywhere in the tropics.

Root a large tuber, like a turnip, which is eaten both raw and boiled. *Stems* wide-twinning, suffruticose, clothed with short deciduous pubescence. *Leaflets* large, membranous, glabrous, as broad as long, deeply or shallowly lobed in the upper half, the base deltoid. *Racemes* lax, $\frac{1}{2}$ –1 ft., the lower nodes often prolonged into short branches; bracteoles setaceous. *Calyx* $\frac{1}{4}$ in., as long as the pedicel. *Corolla* reddish, 1 in. or more long. *Pod* 6–9 in. long, 8–12-seeded, straight, glabrescent.

76. CLITORIA, Linn.

Scandent or suberect undershrubs, with the most showy flowers of all the *Phaseoleæ*, 3–7-foliolate leaves, stipellate leaflets and persistent membranous small stipules and bracts and large bracteoles. *Calyx* membranous, tubular; teeth deltoid or lanceolate. *Corolla* much exserted; standard spoon-shaped, very large; wings and incurved keel much shorter. *Stamens* monadelphous or diadelphous; anthers uniform. *Ovary* stalked, many-ovuled; style incurved, flattened, bearded along the inner side. *Pod* linear, flattish or turgid.—DISTRIB. Species 27, in tropics of old and new world, mostly the latter.

SUBGEN. 1. **Ternatea**. *Pod* flattish, the valves not keeled on the face.

1. **C. Ternatea**, Linn.; *DC. Prodr.* ii. 233; stems terete scandent, petioles short, leaflets 5–7, flowers solitary, bracteoles large. *Wall. Cat.* 5344; *Bot. Mag.* t. 1542; *Roxb. Fl. Ind.* iii. 321; *W. & A. Prodr.* 205; *Dalz. & Gibs. Bomb. Fl.* 68.

Tropical zone from the HIMALAYAS to CEYLON, BIRMA, and MALACCA.—DISTRIB. Cosmopolitan in the tropics, common in cultivation.

A climber, with slender downy stems. *Stipules* minute, linear; petiole $\frac{1}{2}$ –1 in.; leaflets ovate or oblong, obtuse, subcoriaceous, 1–2 in. long. *Bracteoles* roundish, obtuse, $\frac{1}{4}$ – $\frac{1}{2}$ in. long. *Calyx* $\frac{1}{2}$ – $\frac{3}{4}$ in.; teeth lanceolate, half as long as the tube. *Corolla* $1\frac{1}{2}$ –2 in.; standard 1 in. broad, bright blue, with an orange centre. *Pod* 2–4 in. long, 6–10-seeded.

VAR. 1. *pilosula*, Wall. Cat. 5347 (sp.); leaflets and flowers much smaller, the former $\frac{1}{2}$ – $\frac{3}{4}$ in. long, standard white an inch long.—Guzerat, *Stocks*.

2. **C. biflora**, Dalz. in *Kew Journ.* ii. 35; stems suberect angular, petioles very short, leaflets 5, flowers geminate, bracteoles large. *Dalz. & Gibs. Bomb. Fl.* 68.

In the CONCAN, common; *Dalzell, Stocks, Law*.

Scarcely shrubby, the young branches densely pubescent. *Stipules* minute, lanceolate; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; leaflets membranous, 2–3 in. long, ovate or oblong, usually acute. *Flowers* copious, scarcely peduncled; bracteoles $\frac{1}{4}$ – $\frac{1}{2}$ in., ovate or lanceolate aristate. *Calyx* $\frac{3}{8}$ – $\frac{5}{8}$ in.; teeth shorter than the tube, lanceolate, aristate. *Corolla* like that of the last, but much smaller. *Pod* 1–2 in. long, firm, 5–6-seeded.

3. **C. mariana**, Linn.; *DC. Prodr.* ii. 234; a climber, petioles long, leaflets 3, bracteoles small, flowers 2 peduncled, calyx glabrous, teeth much shorter than the tube. *C. mexicana*, Link. *Enum. Hort. Berol.* ii. 235. *C. acuminata*, Grah. in Wall. Cat. 5346. *C. Grahami*, Steud.; *Benth. Pl. Jungh.* 232.

KHASIA, temperate region, alt. 5–6000 ft., Hook. fil. & Thomson, Lobb. TAVOY, Wallich. DISTRIB. Mexico, United States.

Stems slender, terete, glabrous. *Stipules* lanceolate, $\frac{3}{8}$ – $\frac{1}{4}$ in.; petiole $1\frac{1}{2}$ –2 in.; leaflets membranous, glabrous, ovate, pale beneath, 2–4 in. long, acute or subobtuse. *Peduncles* $\frac{1}{2}$ –2 in., with a pair of minute lanceolate bracts at the apex; bracteoles lan-

ceolate, $\frac{1}{8}$ – $\frac{1}{4}$ in. Calyx $\frac{5}{8}$ – $\frac{3}{4}$ in. Standard pale blue, 2 in. by $1\frac{1}{4}$ in. Pod more turgid than in the two preceding.

4. **C. macrophylla**, Wall. Cat. 5345; a climber, petioles long, leaflets 3, bracteoles small, flowers 3–6 fascicled in the axils of the leaves, calyx downy, teeth as long as the tube. Benth. Pl. Jungh. 232.

MARTABAN, Parish. TENASSERIM, Helfer. BURMA, Wallich.

Similar to the last in general habit, bracteoles and corolla. Petiole 2–3 in.; leaflets subcoriaceous, glabrous, oblong or obovate-oblong, 3–5 in. long, grey beneath. Calyx $\frac{3}{4}$ in. long, veined like the stipules bracts and bracteoles; teeth lanceolate, acuminate. Pod 2 in. long, flattish, 6–8-seeded.

SUBGEN. 2. **Neurocarpum**. Pod turgid, with a rib along the face of the valves.

5. **C. cajanæfolia**, Benth. in Mart. Fl. Bras. xv. 121. *Neurocarpum cajanæfolium*, Presl, Symb. 17, t. 9. *N. retusum*, Hassk. Pl. Jav. Rar. 376.

MALACCA and SINGAPORE, G. Thomson, Griffith, &c.—DISTRIB. Java, Trop. America.

A suberect undershrub, with terete pilose branches. Leaflets 3, obovate or oblanceolate, subcoriaceous, 2–5 in. long, obtuse, grey-canescens beneath; petiole scarcely any. Flowers usually 2, distinctly peduncled; bracteoles small, ovate or lanceolate. Calyx $\frac{3}{4}$ in.; teeth much shorter than the tube. Corolla pale violet, twice the calyx or more; standard $1\frac{1}{2}$ in. broad.

77. **DOLICHOS**, Linn.

Twining herbs, with stipellate 3-foliolate leaves and minute subpersistent bracts bracteoles and stipules. Flowers racemose or axillary. Calyx-tube campanulate; teeth long or short. Corolla much exerted; its petals usually equal in length; keel obtuse or rostrate, not spiral. Stamens diadelphous; anthers uniform. Ovary nearly sessile, many-ovuled; style filiform or thickened upwards, bearded down the inner face or round the terminal stigma. Pod flat, linear or oblong, recurved.—DISTRIB. Species about 20, wide-spread in tropics of both hemispheres.

SUBGEN. 1. **Lablab**, Savi. Style thickened upwards, narrowed to the base, bearded down the inner edge.

1. **D. Lablab**, Linn.; Roxb. Fl. Ind. iii. 305; pod recurved-oblong 2–4-seeded, flowers middle-sized, pedicels short, keel narrow rostrate. Bot. Mag. t. 896. Lablab vulgaris, Savi; DC. Prodr. ii. 401; Wall. Cat. 5536; W. & A. Prodr. 250. Dolichos lignosus, Linn.; Roxb. Fl. Ind. iii. 307; Bot. Mag. t. 380. Lablab lignosus, Grah. in Wall. Cat. 5537. L. cultratus, DC. Prodr. ii. 402; W. & A. Prodr. 251. L. microcarpus, perennans, leucocarpus, and nankinensis, DC. loc. cit. D. benghalensis, Jacq. Hort. Vind. t. 124. D. purpureus, Linn.; Bot. Reg. t. 830. D. festivus, Wall. Cat. 5551. D. cuspidatus, Grah. in Wall. Cat. 5566. D. Curtisii, G. Don Gard. Dict. ii. 357.

Wild and universally cultivated throughout India, ascending in the Himalayas to 6–7000 ft.—DISTRIB. Tropics of the Old World.

Subglabrous, wide-twining, perennial, or under cultivation annual. Stipules lanceolate, basifixed; leaflets as broad as long, always entire, acute, 2–6 in. long, broad ovate, membranous, rarely downy beneath. Racemes and peduncles each reaching $\frac{1}{2}$ – $\frac{3}{4}$ ft. long; pedicels densely fascicled, $\frac{1}{8}$ or finally $\frac{1}{4}$ in.; bracteoles oblong, sometimes as long as the calyx. Calyx $\frac{1}{2}$ – $\frac{3}{4}$ in.; teeth short, deltoid. Corolla red-

dish or white, $\frac{1}{2}$ – $\frac{3}{4}$ in. Pod $1\frac{1}{2}$ –2 in. by $\frac{1}{2}$ – $\frac{3}{4}$ in., tipped with the hooked persistent base of the style.—Roxburgh describes fully 13 cultivated varieties.

2. **D. bracteatus**, Baker; flowers large, pedicels exceeding the calyx, keel broad subobtusely, pod linear many-seeded.

Plains of CONCAN, *Stocks*.

A robust glabrous perennial twiner. *Stipules* $\frac{1}{2}$ in., lanceolate, basifixed; leaflets entire, membranous, glabrous, acute or obtuse, $\frac{1}{2}$ – $\frac{3}{4}$ ft. long, and broad, the base deltoid. *Racemes* long-peduncled, reaching a foot or more long; bracts minute, linear-lanceolate, deciduous; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in.; bracteoles firm, oblong or roundish, as long as the calyx. *Calyx* $\frac{1}{4}$ in., glabrous; teeth deltoid, short. *Corolla* reddish, 1 in. long. *Pod* much recurved, 5–6 in. by $\frac{3}{8}$ in., 10–12-seeded.

SUBGEN. 2. **Macrotyloma**, W. & A. *Style* filiform, minutely penicillate round the stigma, not bearded down the edge.—Connects *Phaseoleæ*, and *Galactiææ*.

3. **D. biflorus**, Linn.; *DC. Prodr.* ii. 398; leaflets entire, flowers 1–3 in the axils of the leaves, calyx-teeth long setaceous, corolla yellow, pod linear downy 5–6-seeded. *Roxb. Fl. Ind.* iii. 313. *D. uniflorus*, Lam.; *DC. Prodr. loc. cit.*; *Wall. Cat.* 5538; *W. & A. Prodr.* 248. *Johnia congesta*, Dalz. & *Gibs. Bomb. Fl. Suppl.* 23. *Glycine uniflora*, Dalz. in *Journ. Linn. Soc.* xiii. 146, *cum icon.*

HIMALAYAS to CEYLON and BIRMA, ascending to 3000 ft. in SIKKIM, sometimes cultivated.—DISTRIB. Everywhere in tropics of Old World.

Annual, suberect (*D. uniflorus*) or lengthened out and twining (*D. biflorus*), downy, rarely glabrescent. *Stipules* basifixed, $\frac{1}{4}$ in., lanceolate, scariosely; leaflets membranous, ovate, acute, 1–2 in. long, at first finely pilose on the faces. *Flowers* 1–3 together, in the axils of the leaves, without a common peduncle. *Calyx* $\frac{1}{4}$ in., downy; teeth lanceolate-setaceous, much exceeding the tube. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in. long; keel narrow, obtuse, rather shorter than the standard. *Pod* $1\frac{1}{2}$ –2 in. by $\frac{1}{4}$ – $\frac{1}{3}$ in., much recurved, tipped with the persistent style.

4. **D. lanceolatus**, *Grah. in Wall. Cat.* 5547; leaflets entire, flowers 1–2 on a short common peduncle in the axils of the leaves, calyx-teeth shorter than the tube, corolla reddish.

BIRMA; Prome hills, *Wallich*.

Stems very slender, wide-twining, with only a few short adpressed hairs. *Stipules* minute, lanceolate; leaflets 1–1 $\frac{1}{2}$ in. long, moderately firm, oblong, acute, with a few adpressed hairs on both sides, narrowed to a rounded base. *Pedicels* shorter than the calyx; bracteoles ovate, persistent, rather shorter than the calyx. *Calyx* under $\frac{1}{4}$ in., silky. *Corolla* 3 times the calyx; petals subequal; keel distinctly incurved at the tip, subobtusely. *Style* rather thickened upwards, so that it connects the two sections. *Pod* unknown.

5. **D. ciliatus**, Klein; *DC. Prodr.* ii. 398; leaflets entire conspicuously ciliated on the edge, flowers 3–6 in subsessile cymes, calyx-teeth setaceous, corolla yellow, pod linear-oblong glabrous 3–4-seeded. *Wall. Cat.* 5558; *W. & A. Prodr.* 249. *D. prostratus*, Kænig; *Roxb. Fl. Ind.* iii. 310.

Plains of the WESTERN PENINSULA and CEYLON.

Root tuberous, perennial. *Stems* slender, firm, clothed with short spreading deciduous grey hairs. *Stipules* small, nervose, lanceolate, basifixed; leaflets oblong, rounded at the base, 1–3 in. long, with only a few adpressed hairs at first on the faces. *Pedicels* shorter than the calyx; bracteoles minute, ovate, nervose, persistent. *Calyx* under $\frac{1}{4}$ in.; lower teeth lanceolate-setaceous. *Corolla* $\frac{1}{2}$ in.; standard as in *Clitoria*, much

exceeding the wings and keel. *Pod* 1-1½ in. by ½ in., tipped with the hooked base of the style.

G. D. falcatus, Klein; *DC. Prodr.* ii. 398; leaflets entire or slightly 3-lobed, flowers 2-8 on a short common peduncle, calyx-teeth deltoid, corolla yellow, pod linear glabrous 6-8-seeded. *Roxb. Fl. Ind.* iii. 311; *W. & A. Prodr.* 249. *D. trilobatus*. Wall. *Cat.* 5541, non Linn.

Himalayas, from KUMAON to KHASIA, ascending to 7500 ft. Plains of WESTERN PENINSULA and CEYLON.

Root tuberous, perennial. *Stems* wide-twining, very slender, pilose or glabrescent. *Stipules* small, lanceolate, reflexed, persistent; leaflets membranous, 1-3 in. long, ovate, acute, entire or obtuse, 3-lobed, finely pilose on the faces, or nearly glabrescent. *Peduncles* 1-2 in. long, sometimes scarcely any; pedicels $\frac{1}{12}$ - $\frac{1}{8}$ in. *Calyx* glabrous, under $\frac{1}{4}$ in.; teeth very short. *Corolla* twice the calyx, its petals nearly equal in length; keel broad, obtuse. *Pod* substipitate, 2-3 in. by $\frac{3}{8}$ in., slightly recurved.

DOUBTFUL SPECIES.

D. SUBCARNOSUS, *W. & A. Prodr.* 249, is a plant from the Western Peninsula, of which the flower is unknown and of which the place is therefore doubtful. It has small ovate acute entire leaflets, many-flowered distinctly-peduncled racemes, and a narrow linear nearly straight glabrous many-seeded pod 3-4 in. long.

D. SUBÆQUALIS, *Grah. in Wall. Cat.* 5539, is another doubtful plant, of which the flower is unknown, gathered by Wallich in Ava, which has been referred through some confusion to *Psophocarpus palustris*, from which it totally differs. It has slender terete woody suberect stems, with short deflexed deciduous grey pubescence, caducous stipules, membranous stipellate leaflets with a few adpressed bristly hairs on both sides, the end one oblong subottuse or cuspidate 4-5 in. long, many-flowered short-peduncled racemes and a 2-3-seeded ligulate flattish pod $\frac{3}{4}$ -1 in. by $\frac{1}{4}$ in., thinly clothed with long adpressed grey hairs, faintly depressed between the seeds.

78. PSOPHOCARPUS, Neck.

Twining herbs, with large tuberous roots. *Leaves* 3-foliolate, stipellate; stipules fastened above the base. *Flowers* rather large, lilac. *Calyx* teeth shorter than the tube, the two upper connate. *Corolla* much exserted, the petals equal in length; keel much incurved, but not beaked. *Stamens* monadelphous, the upper free downwards; anthers uniform. *Ovary* substipitate, many-ovuled; style long, much recurved, flattened laterally, densely bearded round the terminal stigma. *Pod* square, with a distinct wing to each angle, distinctly septate between the seeds.—*DISTRIB.* Species 3-4, all tropical in the Old World.

1. P. tetragonolobus, *DC. Prodr.* ii. 403; leaflets entire ovate membranous, racemes few-flowered, pedicels elongated, bracteoles much shorter than the calyx, pod large glabrous. *W. & A. Prodr.* 252; *Hassk. Pl. Jav. Rar.* 388. *Dolichos ovatus*, *Grah. in Wall. Cat.* 5540. *D. tetragonolobus*, Linn.; *Roxb. Fl. Ind.* iii. 305.

PROME and MARTABAN, *Wallich*, perhaps only introduced. Cultivated elsewhere.

Root large, annual. *Stems* weak, wide-twining, glabrous. *Stipules* lanceolate each way from the attachment; leaflets broad, ovate, acute, 3-6 in. long, 2-6 in. broad, glabrous, base subdeltoid. *Racemes* lax; peduncles $\frac{1}{4}$ - $\frac{1}{2}$ ft.; pedicels geminate, as long as the calyx; bracteoles ovate, $\frac{1}{8}$ in. *Calyx* $\frac{1}{2}$ in., glabrous; side-teeth oblong; lowest shorter, deltoid. *Pod* $\frac{1}{2}$ - $\frac{3}{4}$ ft. by 1 in., the wings $\frac{1}{8}$ - $\frac{1}{4}$ in. broad, usually much crisped and toothed.

2. **P. palustris**, Desv. in *Ann. Sc. Nat.* ix. 420; leaflets ovate entire or lobed, racemes many-flowered, pedicels short, bracteoles as long as the calyx, pod small glabrous. *Dolichos suffultus*, Grah. in *Wall. Cat.* 5564. *P. longepedunculatus*, Hassk. *Pl. Jav. Rar.* 388. *P. palmettorum*, Guill. & Per. *Fl. Seneg.* 222. *Diesingia scandens*, Endl. *Atakt.* I, t. 1-2.

Cultivated in the tropics of both hemispheres; a native of Africa.

Stems slender, glabrous, firmer than in the last. *Stipules* similar; leaflets broad ovate or roundish, 2-4 in. long, acute, sometimes with two distinct obtuse lobes in the lower half. *Racemes* long-peduncled, $\frac{1}{4}$ - $\frac{1}{2}$ ft. long, dense upwards; bracteoles oblong, glabrous, quite enveloping the young calyx. *Pod* 2-4 in. long, $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, including the wings, 4-8-seeded.

We have what may prove a third species from ASSAM, *Masters*, with pubescent stems and leaves, entire lanceolate subcoriaceous prominently-veined leaflets 4-5 in. long, short sessile racemes, a straight square 6-8-seeded pod 2-2 $\frac{1}{2}$ in. long, with much less prominent wings than in the preceding, the faces densely clothed, with persistent firm short spreading grey hairs. Flowers, stipules, and bracteoles unknown.

79. **ATYLOSIA**, W. & A.

Herbs or shrubs, erect or twining. *Leaves* 3-foliolate, sometimes subdigitate, often exstipellate, gland-dotted beneath. *Flowers* axillary or racemed. *Calyx* teeth distinct, longer or shorter than the tube, the lowest the longest. *Corolla* more or less exserted, marcescent or caducous; keel not beaked. *Stamens* diadelphous; anthers uniform. *Ovary* sessile; ovules 3 or more; style filiform, incurved, glabrous, stigma capitate. *Pod* linear or oblong, turgid, marked with transverse lines between the seeds, which have a conspicuous divided strophiole.—**DISTRIB.** Species about 20, spread from India to Australia and Mauritius. Differs from *Cajanus* mainly by its arillate seeds.

SUBGEN. 1. *Atylia*, Benth. *Petals* marcescent, remaining till the pod is developed.

* *Erect. Flowers in sessile or stalked pairs. Pod not distinctly lineate between the seeds.*

1. **A. Candollei**, W. & A. *Prodr.* 257; petiole short, leaflets obovate-oblong or oblanceolate densely silky reticulato-venose beneath, pairs of flowers usually stalked, corolla large, pod 3-4-seeded densely silky. *Wight Ic.* t. 754. *A. major*, W. & A. *Prodr.* 257. *Collæa trinervia*, DC. *Mem. Leg.* p. 247, t. 41; *Prodr.* ii. 240; *Wall. Cat.* 5571. *Odonia trinervia*, Spreng. *Syst. Suppl.* 279. *Rhynchosia Wightiana*, Grah. in *Wall. Cat.* 5500.

NILGHIRIS and CEYLON, up to 4000 ft.

An erect shrub, with rigid sulcate branches, densely clothed with grey or brownish subpatent hairs. *Stipules* lanceolate, minute, silky, caducous; petioles $\frac{1}{4}$ - $\frac{1}{2}$ in.; leaflets very thick and coriaceous, almost digitate, 2-3 times as long as broad, shortly pubescent above, the underside with the veins and veinlets in relief, densely clothed with thick grey or brownish silky pubescence, usually obtuse, the end one 1-3 in. long. *Peduncles* rigid, erecto-patent, of the lower pairs of flowers 1-2 in. long, of the upper often suppressed; bracteoles oblong, caducous; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ - $\frac{3}{4}$ in., densely silky; lowest tooth linear, twice the tube, the others lanceolate. *Corolla* reddish, 1 in. long; limb of standard oblong; keel with a short obtuse beak. *Pod* straight, oblong, 1-1 $\frac{1}{2}$ in. by $\frac{1}{2}$ in., densely clothed with soft short spreading grey or pale brown silky pubescence.

2. **A. geminiflora**, Dalz. in *Journ. Linn. Soc.* xiii. 185; petiole produced,

leaflets orbicular thinly hispid on both surfaces, flowers in stalked pairs, corolla small, pod hispid 5-7-seeded.

WESTERN INDIA, Dalzell.

Branches suberect, flexuose, clothed with spreading fulvous hairs. *Petiole* 3 in.; leaflets membranous, 3-nerved, pellucido-punctate, with scattered golden glands, $1\frac{1}{2}$ - $2\frac{1}{2}$ in. long; stipules acuminate from a broad auricled base. *Calyx* tomentose; teeth acuminate, twice as long as the tube. *Corolla* $\frac{1}{2}$ in. long. *Pod* almost membranous, rounded at both ends, $1-1\frac{1}{2}$ in. by $\frac{1}{2}$ in., its hairs bulbous at the base. *Ex Dalz. loc. cit.*

3. **A. lineata**, *W. & A. Prodr.* 258; petiole short, leaflets obovate-oblong pilose beneath not reticulato-venose, pairs of flowers not peduncled, corolla small 3 times the calyx, pod 2-3-seeded finely pilose. *Cajanus lineatus*, *Grah. in Wall. Cat.* 5578. *Atylosia Lawii*, *Wight Ic. t.* 93; *Dalz. & Gibs. Bomb. Fl.* 74.

Hills of the WESTERN PENINSULA.

An erect shrub, with long straight sulcate branchlets, densely clothed with short grey pubescence. *Stipules* minute, setaceous; petiole $\frac{1}{4}-\frac{3}{4}$ in.; leaflets subcoriaceous, greenish and thinly pilose above, densely shortly grey-downy below, triplinerved, nearly digitate, obtuse, the end one $\frac{3}{4}-1\frac{1}{2}$ in. long. *Pedicels* as long as the calyx. *Calyx* $\frac{1}{6}-\frac{1}{2}$ in., densely downy; teeth deltoid-cuspidate, the lowest as long as the tube. *Corolla* twice the calyx; keel obtuse. *Pod* oblong, straight, $\frac{1}{2}-\frac{3}{4}$ in. by $\frac{1}{4}$ in., thinly clothed with fine spreading grey hairs.

4. **A. sericea**, *Benth. MSS.*; petiole short, leaflets oblanceolate silky on both surfaces especially beneath, pairs of flowers not peduncled, corolla small 3 times the calyx, pod small densely pilose 2-seeded.

CONCAN, *Stocks, Law, Ritchie.*

An erect shrub, with long straight terete branches, with many grooves, densely clothed with fine short whitish subpatent silky hairs. *Stipules* setaceous, subsistent, $\frac{1}{4}-\frac{1}{2}$ in.; petiole $\frac{1}{2}-1$ in.; leaflets flexible, moderately thick, subdigitate, 6-8 times as long as broad, subacute, triplinerved, persistently grey-silky, 1-2 in. long. *Pedicels* very short. *Calyx* $\frac{1}{2}$ in., silvery; teeth lanceolate, as long as the tube. *Corolla* $\frac{2}{3}$ in., red; keel with a short obtuse beak. *Pod* oblong, $\frac{2}{3}$ in. long, densely softly persistently grey-downy.

** *Twiners with flowers in lax peduncled racemes and distinctly lineate pods.*

5. **A. mollis**, *Benth. Pl. Jungh.* 243; branches and leaves beneath shortly densely grey-downy, stipules minute caducous, end-leaflet short-stalked, pod persistently grey-canescens. *Collæa mollis*, *Grah. in Wall. Cat.* 5574. *C. cinerascens*, *Grah. in Wall. Cat.* 5575. *Dolichos reticulatus*, *Ham. in Wall. Cat.* 5552. *D. crassus*, *Grah. in Wall. Cat.* 5553. *D. blandus*, *Grah. in Wall. Cat.* 5568. *Dunbaria Horsfieldii*, *Miq. Flor. Ind. Bat. i.* 179. *Atylosia glandulosa*, *Dalz. in Journ. Linn. Soc.* 13, 185. *Cajanus glandulosus*, *Dalz. & Gibs. Bomb. Flora*, 73.

Himalayas, from GARHWAL and KUMAON to NIPAL, ascending to 5-6000 ft. *CONCAN, Stocks, Dalzell. AYA, Wallich. PEGU, McClelland.*—DISTRIB. Malay and Philippine isles.

Branches firm, slender, terete, glabrescent. *Petioles* 1-2 in.; leaflets coriaceous, shortly pilose, greenish above, densely persistently grey-downy beneath, finally reticulato-venose, distinctly stipellate, the end one 2-4 in. long, roundish-obovate, cuspidate, spatulately narrowed to a rounded base. *Racemes* 2-3 in. long, lax, short-peduncled; pedicels geminate, $\frac{1}{4}-\frac{1}{2}$ in.; bracteoles large, roundish, reddish, forming a conspicuous tuft before the racemes expand. *Calyx* $\frac{2}{3}$ in., finely grey-downy; lowest tooth lanceolate, as long as the tube. *Corolla* yellow, twice the calyx. *Pod* straight, 1-2 in.

by $\frac{3}{8}$ in., 4-9-seeded, rounded at both ends.—*Dolichos blandus* is an imperfect flowering specimen, without locality, which resembles this closely as far as it goes, but has a much smaller corolla and shorter calyx-teeth.

6. **A. villosa**, *Benth. MSS.*; branches and leaves below thinly grey-downy, stipules minute caducous, end-leaflet short-stalked, pod densely clothed with long spreading hairs.

Lower hills of SIKKIM, alt. 4000 ft., *Hook. fil.*

Known only from two flowerless examples, which as far as they go differ from the last principally in the vesture of the pod. *Leaflets* subcoriaceous, obovate-cuspidate; petiole $\frac{1}{2}$ in. *Pedicels* decurved, finally $\frac{1}{4}$ in. long. *Pod* 1-1 $\frac{1}{4}$ in. long, $\frac{3}{8}$ in. broad, 5-6-seeded, densely clothed with persistent fine spreading pale brown silky hairs, rounded at both ends, tipped with the persistent pilose base of the style.

7. **A. kulnensis**, *Dalz. in Journ. Linn. Soc. xiii. 186*; branches thinly clothed with fine spreading hairs, leaflets subglabrous, the end one short-stalked, stipules membranous subpersistent, pod clothed with long spreading hairs. *Cajanus kulnensis*, *Dalz. in Kew. Journ. ii. 264*; *Dalz. & Gibs. Bomb. Flora, 72.*

CONCAN, near Kulna, in the Warree Country, *Stocks, Law, Dalzell.*

Branches firm, slender, terete, glabrescent. *Stipules* ovate-lanceolate, $\frac{1}{8}$ - $\frac{1}{4}$ in.; petiole 1-2 in.; leaflets thin, but firm, green on both sides, with a few obscure hairs on the ribs below, scabrous with glands above, the end one obovate-rhomboid cuspidate, 1 $\frac{1}{2}$ -3 in. long; stipellæ subulate, persistent. *Racemes* lax, short-peduncled, few-flowered; pedicels $\frac{3}{8}$ - $\frac{1}{2}$ in.; bracteoles round, enclosing the buds. *Calyx* $\frac{1}{2}$ in., finely downy, lowest tooth linear-acuminate, exceeding the tube. *Corolla* half as long again as the calyx. *Pod* 1 $\frac{1}{2}$ in. by $\frac{3}{8}$ - $\frac{1}{2}$ in., 5-6-seeded, marked with distinct oblique depressed lines.

8. **A. grandiflora**, *Benth. MSS.*; branches minutely downy, stipules minute caducous, leaflets membranous glabrous the end one long-stalked, pod clothed with fine spreading silky hairs.

KUMAON; Bagesar, alt. 3000 ft., *Strachey and Winterbottom.* UPPER GARHWAL, *Madden.*

Branches terete, firm, slender, glabrescent. *Petioles* 2-3 in.; leaflets thin, green on both sides, minutely hairy on the ribs beneath, the end one obovate-cuspidate, rounded at the base, 3-4 in. long; petiolule $\frac{3}{4}$ in. long; stipellæ distinct, setaceous. *Racemes* lax, few-flowered; pedicels finally $\frac{3}{8}$ - $\frac{1}{2}$ in., recurved. *Calyx* $\frac{3}{4}$ - $\frac{1}{2}$ in., finely downy; lowest tooth linear-setaceous, 3-4 times the tube; the others lanceolate. *Corolla* slightly exceeding the calyx. *Pod* 1 $\frac{1}{2}$ -2 in. by $\frac{1}{2}$ in., 5-6-seeded.

SUBGEN. 2. **Cantharospermum**, *W. & A.* *Petals* falling before the pod develops.

* *Leaflets subdigitate.*

9. **A. nivea**, *Benth. Pl. Jungh. 243*; shrubby, erect, leaflets obovate obtuse rigidly coriaceous white-canescens beneath, racemes few-flowered short-peduncled, calyx-teeth short, corolla much exerted, pod 4-6-seeded canescent. *Cajanus niveus*, *Grah. in Wall. Cat. 5581.*

BIRMA; Prome and near Zeranghuen, *Wallch.*

Very like *A. albicans*, with which Wight and Arnott join it, but suberect, not twining. *Branches* slender, woody, terete, grey-canescens. *Petiole* 1 in.; leaflets exstipellate, rigidly coriaceous, 1 in. long, rounded at both ends, thinly grey-canescens above, densely beneath. *Racemes* falling short of the leaves, subcorymbose; pedicels cernuous, $\frac{1}{4}$ - $\frac{1}{2}$ in. *Calyx* $\frac{1}{5}$ - $\frac{1}{2}$ in., finely downy; all the teeth deltoid. *Corolla* 4 times as long as the calyx; keel obtuse. *Pod* 1-1 $\frac{1}{2}$ in. by $\frac{1}{2}$ in., distinctly lineate, firm, rounded at both ends.

10. **A. albicans**, Benth. *Pl. Jungh.* 243; a shrubby twiner, leaflets obovate obtuse or subacute rigidly coriaceous white-canescant beneath, racemes lax short-peduncled, calyx-teeth short, corolla much exserted, pod 5-6-seeded thinly canescent. *Cantharospermum albicans*, W. & A. *Prodr.* 256, *excl. syn.* *Cajanus albicans*, *Grah. in Wall. Cat.* 5582. *C. Wightianus*, *Grah. in Wall. Cat.* 5583.

Hills of the WESTERN PENINSULA and CEYLON.

Branchlets slender, thinly canescent, with many grooves. *Stipules* minute, caducous; petiole 1-2 in.; leaflets 1-2 in. long, densely finely persistently white-canescant beneath, not reticulato-venose, greenish and obscurely canescent above, much narrowed in the lower half, the base subdeltoid, or a little rounded. *Racemes* 4-12-flowered, often corymbose, usually shorter than the leaves; bracts small, round, silvery on the back, caducous; pedicels $\frac{1}{4}$ - $\frac{1}{5}$ in. *Calyx* $\frac{1}{8}$ - $\frac{1}{5}$ in., thinly canescent; lowest tooth lanceolate, upper oblong or deltoid. *Corolla* 3 times as long as the calyx. *Pod* 1-1 $\frac{1}{2}$ in. by $\frac{3}{8}$ - $\frac{1}{2}$ in., straight, distinctly lineate, narrowed to the base, beaked with the base of the style.

11. **A. elongata**, Benth. *Pl. Jungh.* 243; a slender herbaceous twiner, leaflets membranous obovate-cuspidate obscurely hairy beneath, racemes 2-4-flowered long-peduncled, calyx-teeth long, corolla little exserted, pod 3-4-seeded glabrescent. *Dolichos elongatus*, *Grah. in Wall. Cat.* 5543.

NIPAL, KHASIA and ASSAM, ascending to 6000 ft.

Stems very slender, wide-twinning, clothed with fine spreading grey hairs. *Stipules* minute, caducous; petiole 1-4 in.; leaflets greenish on both sides, paler and inconspicuously pilose on the ribs below, always pointed, 1-1 $\frac{1}{2}$ in. long, narrowed from the middle to a rather rounded base, exstipellate. *Peduncles* 1-2 in.; pedicels as long as the calyx. *Calyx* $\frac{3}{8}$ - $\frac{1}{2}$ in., densely pubescent; lower tooth setaceous, twice the tube, the others similar but shorter. *Corolla* scarcely exceeding the calyx. *Pod* oblong, $\frac{3}{4}$ in. long by half as broad, narrowed to the base, distinctly lineate, beaked, clothed at first with short spreading hairs.

12. **A. rugosa**, W. & A. *Prodr.* 257; a woody twiner, leaflets thick obovate obtuse densely grey-canescant reticulato-venose below, flowers usually in stalked pairs, calyx-teeth long, corolla little exserted, pod 3-4-seeded densely canescent. *Rhynchosia velutina*, *Grah. in Wall. Cat.* 5501.

NILGHIRIS and CEYLON, ascending to 6000 ft.

Branches slender, sulcate, densely shortly grey-downy. *Stipules* minute, ovate, caducous; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; leaflets coriaceous, flexible, rugose on both sides, rounded at the base, 1-2 in. long, grey, thinly canescent above, densely persistently grey-canescant below, with the veinlets in relief, exstipellate. *Peduncles* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., the flowers rarely 4 to each; pedicels as long as the calyx; bracts small, round, thick, caducous. *Calyx* $\frac{1}{4}$ - $\frac{3}{8}$ in., densely canescent; lower tooth linear, exceeding the tube, the others lanceolate. *Corolla* half as long again as the calyx. *Pod* $\frac{3}{4}$ -1 in. by $\frac{3}{8}$ in., densely grey-canescant, rounded at both ends.

13. **A. scarabæoides**, Benth. *Pl. Jungh.* 243; a herbaceous twiner, leaflets obovate-oblong subcoriaceous downy beneath, corymbs few-flowered short-peduncled, calyx-teeth long, corolla little exserted, pod 4-6-seeded clothed with fine spreading hairs. *Dolichos scarabæoides*, Linn. *Sp.* 1020. *Cajanus scarabæoides*, *Thouars*; *Grah. in Wall. Cat.* 5580. *Rhynchosia scarabæoides*, DC. *Prodr.* ii. 387. *R. biflora*, DC. *loc. cit.* *Cantharospermum pauciflorum*, W. & A. *Prodr.* 255; *Dalz. & Gibs. Bomb. Fl.* 73.

Universally spread in the plains throughout India, reaching 5-6000 ft. in the West Himalayas.—DISTRIB. China, Malaya, Mauritius, Madagascar.

A biennial, with slender trailing or twining densely grey-downy stems. *Stipules* minute, caducous; petiole $\frac{1}{2}$ -1 in.; leaflets 1 $\frac{1}{2}$ in. long, flexible, twice as long as broad,

exstipellate, obtuse or subacute, triplinerved in the lower half, thinly grey-canescant above, densely beneath, with usually only the main nerves raised. *Peduncles* short, densely pubescent, 2-6-flowered; pedicels as long as the calyx. *Calyx* $\frac{1}{5}$ - $\frac{1}{4}$ in., densely grey-silky; teeth linear, the lowest twice as long as the tube. *Corolla* yellow, $\frac{1}{3}$ - $\frac{1}{2}$ in.; keel abruptly incurved at the tip. *Pod* straight, distinctly lineate, $\frac{3}{4}$ -1 in. by $\frac{1}{4}$ in., clothed with fine spreading grey or pale brown silky hairs.—*C. nervosum*, Royle MSS., is a form with thick leaves, with the veinlets raised on the under side. The descriptions of *Dolichos scarabæoides* and *medicagineus* in Roxburgh, *Flora Indica*, iv. 315, have been accidentally transposed.

** *Petiolule of the end leaflet elongated.*

14. **A. platycarpa**, Benth. *Pl. Jungh.* 243; a herbaceous twiner, leaflets exstipellate membranous roundish both surfaces finely pilose, flowers 1-2 peduncled, calyx-teeth long, corolla little exerted, pod straight thinly pilose 5-7-seeded. *Cantharospermum* ? *distans*, Royle MSS.

CENTRAL HIMALAYAS, GARHWAL, &c., alt. 1-8000 ft.

Branches very slender, climbing or trailing, densely clothed with short spreading grey hairs. *Petioles* 1-4 in.; stipules minute, linear, caducous; leaflets round-cuspidate, 1-3 in. long and broad, greenish on both surfaces, paler beneath; petiolule $\frac{1}{2}$ - $\frac{3}{4}$ in. *Peduncles* shorter than the petioles, suppressed at the end of the shoots, where the leaves also are much reduced; pedicels as long as the calyx. *Calyx* $\frac{3}{8}$ - $\frac{1}{2}$ in., densely pilose; teeth linear-setaceous. *Pod* flat, 1-1 $\frac{3}{4}$ in. by $\frac{1}{2}$ in., distinctly lineate, clothed with fine short deciduous spreading hairs.

15. **A. rostrata**, Baker; a woody climber, branches glabrescent, leaflets exstipellate roundish subcoriaceous obscurely canescent below, flowers in long-peduncled lax racemes, calyx-teeth short, corolla much exerted, pod bristly recurved 8-10-seeded.

CONCAN, *Stocks*.

Branches firm, terete, at first minutely downy. *Stipules* minute, caducous; petiole 1-3 in.; leaflets as broad as long, 3-4 in. each way, green and glabrous above, narrowed to a deltoid point, suddenly narrowed in the lower third or quarter; petiolule 1 in. *Racemes* overtopping the leaves, the flowers much the most showy in the genus; pedicels $\frac{1}{2}$ - $\frac{5}{8}$ in. *Calyx* $\frac{3}{8}$ in., broadly campanulate, with only a few deciduous bristles, all the teeth shorter than the tube. *Corolla* 1 in. long; keel broad, beaked; limb of standard 1 $\frac{1}{4}$ in. broad. *Pod* linear, distinctly lineate, 2 $\frac{1}{2}$ -3 in. long, $\frac{3}{8}$ in. broad, narrowed at the tip, thinly clothed with stiff grey bristles with bulbous bases.

16. **A. barbata**, Baker; a woody climber, branches densely pubescent, leaflets roundish stipellate subcoriaceous thinly shortly pubescent, flowers in long-peduncled racemes, calyx-teeth long, corolla little exerted, pod straight densely pilose 5-6-seeded. *A. goensis*, Dalz. in *Journ. Linn. Soc.* xiii. 186. *Dunbaria barbata*, Benth. *Pl. Jungh.* 242. *D. calycina*, Miq. *Fl. Ind. Bat.* i. 180. *Dolichos barbatus*, Wall. *Cat.* 5548. *D. ornatus*, Wall. *Cat.* 5561. *Rhynchosia vestita*, Wall. *Cat.* 5505. *Cajanus goensis*, Dalz. in *Kew Journ.* ii. 264; Dalz. & Gibs. *Bomb. Fl.* 73.

ASSAM, MARTABAN, TENASSERIM, CONCAN.—DISTRIB. Java.

Branches firm, densely clothed at first with short spreading grey pubescence. *Stipules* $\frac{1}{4}$ in., lanceolate, caducous; petiole 1-4 in.; leaflets 3-4 in. broad and long, cuspidate, broadly rounded at the base, green above, paler and greyer beneath, both surfaces minutely permanently pubescent; petiolule $\frac{1}{2}$ -1 in.; stipellæ minute, setaceous. *Peduncles* often overtopping the leaves; racemes at first close, finally 4-6 in. long, the rachis densely pilose; bracts roundish or ovate, with a cusp, shaggy, exceeding the buds; pedicels $\frac{1}{8}$ - $\frac{1}{4}$ in. *Calyx* $\frac{1}{2}$ in., shaggy; teeth lanceolate, exceeding the tube. *Standard* half as long again as the calyx; keel equalling the calyx $\frac{1}{2}$ in. broad. *Pod* 1 $\frac{1}{2}$ -2 in. by $\frac{3}{8}$ in., straight, densely clothed with long grey spreading hairs, narrowed to both ends.

80. CAJANUS, DC.

An erect shrub. *Leaves* 3-foliolate. *Flowers* racemed. *Calyx-tube* campanulate; teeth short. *Corolla* much exserted, its petals equal in length; keel truncate. *Stamens* diadelphous; anthers uniform. *Ovary* subsessile, few-ovuled; style long, filiform, much upcurved, stigma capitate. *Pod* linear, straight, narrowed at both ends, 3-5-seeded, torulose with oblique linear depressions between the non-strophiolate seeds.—DISTRIB. The only species.

1. **C. indicus**, *Spreng. Syst.* iii. 248; *W. & A. Prodr.* 256. *C. bicolor*, *Wall. Cat.* 5577. *C. flavus* and *bicolor*, *DC. Prodr.* ii. 406. *Cytisus* *Cajan*, *Linn.*; *Roxb. Fl. Ind.* iii. 325. *C. pseudo-cajan*, *Jacq. Hort. Vind.* t. 119.—*Rheede Hort. Mal.* vi. t. 13.

Wild? and cultivated throughout our limits, ascending to 6000 ft. in the Himalayas.—DISTRIB. Everywhere in the tropics, probably native of the Old World.

An erect shrub, with slender sulcate grey-silky branchlets. *Stipules* minute, lanceolate; leaflets 3, minutely stipellate, oblong-lanceolate, entire, subcoriaceous, thinly silky above, densely beneath, indistinctly gland-dotted. *Flowers* in sparse distinctly-peduncled corymbose racemes, often forming a terminal panicle; pedicels downy, 2-3 times the calyx. *Calyx* $\frac{1}{4}$ in. *Corolla* 3 times the calyx: standard yellow, (*C. flavus*) or beautifully veined with red (*C. bicolor*). *Pod* 2-3 in. by $\frac{1}{4}$ - $\frac{1}{2}$ in., finely downy, tipped with the lower half of the style.

81. DUNBARIA, W. & A.

Woody or herbaceous climbers. *Leaves* 3-foliolate, distinctly gland-dotted beneath; stipellæ rarely present. *Flowers* racemose or axillary. *Calyx*-teeth long and narrow, the lowest distinctly exceeding the others. *Corolla* more or less exserted, marcescent or caducous; keel usually not beaked. *Stamens* diadelphous, anthers uniform. *Ovary* sessile or stalked, many-ovuled; style inflexed, filiform beardless, stigma capitate. *Pod* linear, flat, not marked with depressed lines between the substrophiolate seeds.—DISTRIB. Three more species, reaching North Australia and Japan.

SUBGEN. 1. **Eudunbaria**, *Benth.* *Corolla* large, marcescent, lasting till the pod reaches full size.

1. **D. ferruginea**, *W. & A. Prodr.* 258; stems closely pubescent, stipules minute caducous, leaflets thick as broad as long densely pubescent beneath, standard exceeding the wings and keel, pod puberulent. *Collæa venosa*, *Grah. in Wall. Cat.* 5573. *C. gibba*, *Grah. in Wall. Cat.* 5572, *B.C. Dunbaria latifolia*, *W. & A. Prodr.* 258.

HILLS OF WESTERN PENINSULA AND CEYLON.

A woody twiner, with slender stems and densely downy branchlets and petioles. *Leaflets* roundish-deltoid, entire, coriaceous, 2-3 in. long, glabrescent or thinly downy above, clothed with soft grey or ferruginous pubescence beneath; stipellæ sometimes present. *Racemes* lax, many-flowered, distinctly peduncled; pedicels downy, geminate, $\frac{1}{2}$ - $\frac{3}{4}$ in.; bracts large, boat-shaped, soon falling. *Calyx* $\frac{1}{2}$ - $\frac{5}{8}$ in., densely downy; lower tooth linear, as long as the tube, the others lanceolate. *Corolla* 1-1 $\frac{1}{4}$ in. long, the standard 1 in. broad, exceeding the wings and keel, $\frac{1}{4}$ - $\frac{1}{2}$ in. *Pod* sessile, straight, 1 $\frac{1}{2}$ -2 in. by $\frac{3}{8}$ - $\frac{1}{2}$ in., 4-5-seeded, tipped with the hooked base of the style.

2. **D. Heynei**, *W. & A. Prodr.* 258; stems thinly clothed with fine spreading hairs, stipules membranous persistent, leaflets thin twice as long as

broad subglabrous, petals subequal, pod clothed with fine spreading hairs. Collæa gibba, *Grah. in Wall. Cat.* 5572 A. *Dunbaria oblonga*, *Arn. in Nov. Act. Nat. Cur.* xviii. 333.

Hills of MYSORE and CEYLON, up to 3000 ft.

A woody climber, with slender terete glabrescent stems and petioles. *Stipules* lanceolate, $\frac{1}{4}$ – $\frac{1}{3}$ in.; leaflets green on both surfaces, with a few minute deciduous hairs, membranous, the end one nearly sessile, obovate-oblong, cuspidate, 3–6 in. long; stipellæ minute, caducous. *Racemes* few-flowered, lax, distinctly peduncled; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in.; bracteoles large, oblong, caducous. *Calyx* $\frac{1}{2}$ – $\frac{3}{4}$ in., finely downy; lowest tooth acuminate, exceeding the tube. *Corolla* twice the calyx; standard $\frac{3}{4}$ in. broad; keel subtruncate. *Pod* $1\frac{1}{2}$ –2 in. by $\frac{1}{2}$ in., straight, densely pilose at first, 4–5-seeded.

3. **D. pulchra**, *Benth. MSS.*; stems finely downy, stipules caducous, leaflets thin twice as long as broad obscurely downy, standard exceeding the wings and keel, pod clothed with fine spreading hairs.

Lower hills of SIKKIM, 1–2000 ft., *Hook. fil.*

A woody climber, with slender terete glabrescent branches. *Leaflets* membranous, green, glabrescent above, greyish-puberulent beneath, the end one oblong, narrowed to a rounded base, and a long point, distinctly petioled, 3–4 in. long, stipellate. *Racemes* few-flowered, lax, distinctly peduncled; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in.; bracteoles large, navicular, caducous. *Calyx* finely downy, $\frac{3}{4}$ in. long; lower tooth setaceous, 2–3 times the tube, the others much shorter, lanceolate. *Corolla* 1– $1\frac{1}{4}$ in. long; limb of standard round. *Pod* as in the last.

SUBGEN. 2. **Rhyncolobium**, *Benth.* *Corolla* small, caducous, little exerted.

4. **D. debilis**, *Baker*; stems filiform, leaflets subcoriaceous ligulate-oblong obtuse 3–4 times as long as broad, flowers solitary in the axils of the leaves, pod sessile glabrous.

KHASIA Mts., alt. 4–5000 ft., *Hook. fil. & Thomson, Lobb.*

A twining herb, with very slender finely downy stems and distant nodes. *Stipules* minute, setaceous, persistent; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; leaflets grey-green, thinly canescent above, densely so beneath, prominently nerved, the end one short-petioled, rounded at both ends, 1– $1\frac{1}{4}$ in. long. *Pedicels* as long as the calyx. *Calyx* $\frac{1}{4}$ in., grey-downy; teeth linear, the lowest as long as the tube. *Corolla* yellowish, half as long again as the calyx. *Pod* recurved, glabrescent, $1\frac{1}{2}$ –2 in. by $\frac{1}{4}$ in., 8–10-seeded.

5. **D. conspersa**, *Benth. Pl. Jungh.* 241; stems filiform, leaflets membranous round-rhomboid, flowers 1–2 together in the axils of the leaves usually not peduncled, pod sessile glabrous. *Dolichos conspersus*, *Grah. in Wall. Cat.* 5542. *D. rhynchosioides*, *Miq. Flor. Ind. Bat.* i. 185. *D. punctatus*, *W. & A. Prodr.* 247. *D. Finlaysonianus*, *Grah. in Wall. Cat.* 5565. *Atylosia punctata*, *Dalz. in Journ. Linn. Soc.* xiii. 186.

EASTERN HIMALAYAS, tropical region; SILHET and ASSAM. WESTERN PENINSULA, Wight. *PROME, Wallich.*—DISTRIB. Malaya, China, N. Australia.

A twining herb, with very slender finely-downy stems. *Stipules* minute, linear; petiole 1 in.; leaflets thin, flexible, green, glabrescent above, pale green, obscurely downy, distinctly gland-dotted beneath, not stipellate; end one distinctly petioled, 1– $1\frac{1}{2}$ in. long and broad, subacute. *Pedicels* very short; flowers rarely 3–4 on a short peduncle. *Calyx* $\frac{1}{4}$ in., grey-downy; lowest tooth as long as the tube. *Corolla* reddish, $\frac{3}{8}$ – $\frac{1}{2}$ in.; keel distinctly beaked. *Pod* linear, $1\frac{1}{2}$ –2 in. by $\frac{1}{4}$ in., recurved, 6–8-seeded.—The Japanese *Atylosia subrhombæa* and Javan *Dolichos truncatus* of Miquel both belong to this section of *Dunbaria*, and are near this species.

6. **D. podocarpa**, *Kurz in Journ. Asiat. Soc. Beng.* xliii. 2, 185; stems herbaceous, leaflets broad ovate acuminate, flowers in pairs in the axils of the leaves on a very short peduncle, pod puberulous distinctly stalked.

TENASSERIM, Kurz.

A perennial twiner, with fine yellowish pubescence. *Petiole* $\frac{1}{2}$ –1 in.; leaflets puberulous, pale beneath. *Pedicels* pubescent, $\frac{1}{6}$ in. *Calyx* $\frac{1}{4}$ in., with adpressed yellowish pubescence; teeth lanceolate. *Corolla* middle-sized. *Pod* $1\frac{1}{2}$ –2 in. by $\frac{1}{3}$ in., flat, acuminate, many-seeded; stalk $\frac{3}{8}$ in.—Ex Kurz loc. cit.

7. **D. circinalis**, Baker; stems woody slender, leaflets thin broad-ovate acute, flowers many in close subsessile racemes, pod distinctly stalked clothed with fine spreading hairs. *Phaseolus circinalis*, Ham. in Wall. Cat. 5594, *ex parte*. *Atylosia circinalis*, Benth. Pl. Jungh. 244.

MOULMEIN, Griffith. TENASSERIM, Helfer. ASSAM, Wallich.

A slender woody climber, with terete glabrescent branches, finely grey-downy at first. *Stipules* minute, caducous; leaflets flexible, green, glabrescent above, finely grey-downy beneath, obscurely stipellate; the end one acuminate, distinctly stalked, $1\frac{1}{2}$ in. long and broad, broadly rounded at the base. *Racemes* 6–10-flowered, shorter than the leaves; pedicels short, densely grey-downy. *Calyx* $\frac{1}{2}$ in.; lowest tooth lanceolate, as long as the tube. *Corolla* little exerted; keel with a recurved beak. *Pod* incurved, 2–3 in. by $\frac{3}{8}$ in., 8–10-seeded, with a stalk $\frac{1}{2}$ in. long.—The Wallichian specimen includes the pod of a true *Phaseolus*.

82. **CYLISTA**, Ait.

A climbing shrub. *Leaves* 3-foliolate. *Flowers* racemed. *Calyx-tube* campanulate; teeth scariose and persistent, the lowest much the largest boat-shaped, the two side ones smaller than the two upper. *Corolla* enclosed in the calyx, the petals equal in length; keel much incurved, truncate. *Stamens* diadelphous; anthers uniform. *Ovary* subsessile, 1-ovuled; style long, filiform, stigma capitate. *Pod* small, oblique, oblong, enclosed in the calyx.—DISTRIB. The only species. Differs from *Rhynchosia* only by its peculiar calyx.

1. **C. scariosa**, Ait.; DC. Prodr. ii. 410: Roxb. Cor. Pl. i. t. 92; Fl. Ind. iii. 320; Wall. Cat. 5586; W. & A. Prodr. 259; Wight Ic. t. 1597; Dalz. & Gibs. Bomb. Fl. 74.

Woods of CONCAN, DECCAN, CANARA, and ORISSA.

A woody twiner, with slender finely downy branches. *Leaflets* minutely stipellate, subcoriaceous, ovate or subrhomboidal, acute, 2–4 in. long, thinly grey-downy above, densely downy below. *Flowers* in copious distinctly-peduncled lax or dense racemes; bracts large, membranous, ovate, caducous; pedicels short, densely pubescent. *Corolla* yellowish-red, $\frac{1}{2}$ in. long. *Calyx*-finally $1\frac{1}{4}$ in. long, the scariose conspicuously veined lower lip 1 in. broad.

83. **ERIOSEMA**, DC.

Shrubs or herbs, mostly suberect, with 1–3-foliolate leaves. *Flowers* racemed or axillary. *Calyx* campanulate; teeth 5, as long as the tube. *Corolla* distinctly exerted; limb of standard roundish, auricled at the base; wings and slightly beaked keel shorter. *Stamens* diadelphous; anthers uniform. *Ovary* sessile, 2-ovuled; style filiform, glabrous, stigma capitate. *Pod* oblong, turgid, 1–2-seeded; seeds oblique, the funiculus attached to the extremity of a linear hilum.—DISTRIB. Species about 50, mostly Trop. African and American.

1. **E. chinense**, Vogel, Pl. Meyen. 31. *Crotalaria tuberosa*, Hamilt. in Don Prodr. 241. *Rhynchosia virgata*, Grah. in Wall. Cat. 5503. *R. Grahami*, Wall. Cat. 5504. *Pyrrotichia tuberosa*, W. & A. Prodr. 238.

Himalayas from KUMAON and GURWHAL to KHASIA and ASSAM, ascending to

6000 ft. CEYLON, *Walker*. MALACCA, *Griffith*. PEGU, *McClelland*. — **DISTRIB.** China, Philippines, N. Australia.

Root a small woody perennial tuber. *Stems* 1–2 ft., slender, erect, woody, little branched, densely pubescent. *Stipules* linear, persistent; leaflets short-petioled, simple, linear-ligulate, 1–2 in. long, subcoriaceous, greenish with a few adpressed hairs above, glaucous, densely grey-canescens, brown on the ribs beneath. *Flowers* 1–2, short-peduncled, in leaf-axils. *Calyx* $\frac{1}{8}$ – $\frac{1}{6}$ in., densely pilose. *Corolla* twice the calyx, yellowish, purple-black when dried. *Pod* oblong, $\frac{3}{8}$ in., densely pubescent.

84. **RHYNCHOSIA**, Lour.

Twining or erect herbs or shrubs. *Leaves* pinnately 3-foliolate, gland-dotted beneath; stipellæ present or absent; stipules and bracts caducous. *Flowers* axillary or racemed. *Calyx-tube* short; teeth equalling or often much exceeding it, usually not accrescent, slightly so in *Phyllomatia*, the upper often more or less connate. *Corolla* included or exserted; keel incurved, not distinctly beaked. *Stamens* diadelphous; anthers uniform. *Ovary* subsessile, usually 2-ovuled; style long, filiform, much incurved, stigma capitate. *Pod* round or oblong, flattish or turgid, usually continuous between the seeds, the hilum parallel with the sutures and funiculus central upon it.—**DISTRIB.** Species about 80, spread everywhere in the tropics and reaching the Cape and United States.

SUBGEN. 1. *Phyllomatia*, W. & A. Calyx-teeth broad and marcescent, but not so excessively enlarged as in *Cylista*, in which Graham placed the species. *Seeds* with a large grooved white waxy arillus, as in *Atylosia*.

1. ***R. rufescens*, DC. Prodr. ii. 387**; pedicels distinct solitary distant, calyx-lobes narrowed to an obtuse point, pod globose one-seeded. *W. & A. Prodr.* 239; *Hook. Ic. Pl. t. 189*. *Glycine rufescens*, *Willd. Nov. Act. Ber.* 1803, p. 222. *G. pondicheriensis*, *Spreng. Syst. iii. 196*. *Cylista suaveolens*, *Grah. in Wall. Cat.* 5587. *Cyanospermum javanicum*, *Miq. Flor. Ind. Bat. i. 167*. *Lepedeza indica*, *Spreng. Syst. iii. 202*; *W. & A. Prodr.* 231. *Hallia trifoliata*, *Roth Nov. Sp.* 352. *Flemingia Rothiana*, *DC. Prodr. ii. 351*.

Plains of WESTERN PENINSULA and CEYLON. *Dacca, Clarke*. *KHASIA, Griffith*. — **DISTRIB.** Java.

Suberect, shrubby, with long trailing shoots, clothed with fine short grey pubescence. *Petioles* erecto-patent, 1–2 in.; stipules minute, caducous; leaflets subcoriaceous, minutely stipellate, ovate or oblong, 1–3 in. long, acute, rounded at the base, minutely pubescent, the end one distinctly stalked. *Racemes* nearly sessile, laxly 2–6-flowered; pedicels $\frac{1}{2}$ – $\frac{1}{4}$ in., cernuous. *Calyx* downy, $\frac{3}{8}$ in. deep, cut down nearly to the base into 5 subequal scarious lobes $\frac{1}{8}$ – $\frac{1}{6}$ in. broad. *Corolla* not exserted. *Pod* $\frac{1}{4}$ – $\frac{3}{8}$ in. long, roundish, turgid, finely downy.

2. ***R. Heynei*, W. & A. Prodr. 240**; flowers scarcely pedicellate geminate or ternate, calyx-lobes lanceolate narrowed at the base, pod two-seeded twice as long as broad. *Cylista reticulata*, *Heyne in Wall. Cat.* 5584. *R. coodoorensis*, *Bedd. Ic. Pl. Ind. Or. t. 297*.

Plains of MYSORE, *Heyne*. NILGHIRIS, *Beddome*.

Shrubby, with densely shortly grey-downy elongated slender branches. *Stipules* minute, caducous; petiole 1–1½ in.; leaflets oblong, acute, rounded at the base, subcoriaceous, minutely pubescent, the end one 2–3 in. long, distinctly stalked. *Flowers* in short-peduncled 2–4-nate racemes of 1–2 distant clusters. *Calyx* $\frac{1}{2}$ – $\frac{5}{8}$ in., downy;

lobes subacute, rounded at the base, $\frac{1}{6}$ – $\frac{1}{5}$ in. broad. *Corolla* included. *Pod* oblong, $\frac{1}{2}$ in. long, obliquely lineate, minutely pubescent.

SUBGEN. 2. **Nomismia**, *W. & A.* Trailing herbs with narrow setaceous or acuminate calyx-teeth. Seeds with a waxy arillus.

3. **R. nummularia**, *DC. Prodr.* ii. 386; annual, leaflets green on both surfaces finely pubescent broader than long, racemes elongated few-flowered, calyx-teeth as long as the tube, pod globose 1-seeded. *Wall. Cat.* 5493. *Glycine nummularia*, *Linn. Mant.* 571. *Nomismia nummularia*, *W. & A. Prodr.* 237; *Wight Ic.* t. 283.

Plains of the WESTERN PENINSULA and CEYLON.

Stems trailing to a length of 2–3 ft., clothed with fine grey spreading hairs. *Stipules* minute, ovate; petiole 1–6 in.; leaflets subcoriaceous, 1–2 in. broad, truncate or emarginate, glabrescent above, finely pubescent on the edge and lower surface, the end one distinctly-stalked, broadly deltoid at the base. *Racemes* 2–6-flowered, distinctly peduncled, equalling or exceeding the leaves; pedicels geminate, very short, cernuous. *Calyx* $\frac{1}{2}$ in. long, densely pubescent; teeth lanceolate. *Corolla* $\frac{1}{4}$ in. *Pod* $\frac{1}{2}$ in. each way, plicate, lenticular, clothed with fine deciduous hairs.

4. **R. aurea**, *DC. Prodr.* ii. 386; annual, leaflets green on both surfaces finely pubescent obovate-rhomboidal, racemes close many-flowered, calyx-teeth 3–4 times as long as the tube, pod globose 2-seeded. *R. elongata*, *DC. loc. cit.* *R. densiflora*, *Wall. Cat.* 5492 *D. R. capitata*, *DC. Prodr. loc. cit.* *Glycine aurea*, *Willd. in Nov. Act. Ber.* iv. 1803, 18. *G. elongata*, *Roth. Nov. Sp.* 347. *G. capitata*, *Heyne in Roth. Nov. Sp.* 346. *Dolichos rufescens*, *Grah. in Wall. Cat.* 5544. *Nomismia aurea*, *W. & A. Prodr.* 237. *N. capitata*, *W. & A. Prodr.* 237; *Wight Ic.* t. 295.

Plains from the foot of the HIMALAYAS to CEYLON.

Stems wide-trailing, very slender, clothed with fine spreading hairs. *Stipules* minute, lanceolate, caducous; petiole 1–3 in.; leaflets subcoriaceous, as long as broad, $\frac{1}{2}$ –2 in. each way, glabrescent above, obscurely pilose below, broadly deltoid at both ends, exstipellate, the end one distinctly stalked. *Racemes* short-peduncled, 6–30-flowered, about on a level with the leaves; pedicels $\frac{1}{2}$ – $\frac{1}{4}$ in., densely pubescent. *Calyx* $\frac{2}{3}$ – $\frac{1}{2}$ in., densely pubescent; teeth setaceous, the lowest the longest. *Corolla* bright yellow, scarcely exserted. *Pod* membranous, subcompressed, $\frac{3}{8}$ – $\frac{1}{2}$ in. each way, with a faint line between the seeds, thinly clothed with fine spreading hairs.

5. **R. filipes**, *Benth. in Hohen. Pl. Ind. Or. Exerc.* No. 1184; perennial, leaflets thick obovate white-canescant reticulato-venose beneath, flowers peduncled solitary, calyx-teeth as long as the tube, pod oblong two-seeded.

NILGHIRIS.

Stems woody in the lower part, wide-trailing, slender, densely tomentose. *Stipules* minute, lanceolate; petiole under 1 in.; leaflets coriaceous, very thick, $\frac{1}{2}$ –1 in. long, greenish, obscurely canescent above, covered with persistent thick white tomentum below, the end one short-stalked, obtuse, with a minute mucro, rounded at the base. *Flowers* on thread-like pedicels $\frac{1}{2}$ –1 in. long, with a persistent silky lanceolate bract a short distance below the calyx. *Calyx* $\frac{1}{2}$ – $\frac{1}{4}$ in., densely silky; teeth lanceolate. *Corolla* little exserted. *Pod* $\frac{1}{2}$ in. long by half as broad, finely downy, reticulato-venose, not lineate between the seeds.

SUBGEN. 3. **Ptychocentrum**, *W. & A.* Erect undershrubs, with lanceolate acuminate calyx-teeth. Seeds with a waxy arillus.

6. **R. suaveolens**, *DC. Prodr.* ii. 387; leaves minutely downy, flowers in peduncled pairs casually solitary, calyx-teeth twice the tube, corolla half as long again as the calyx, pod minutely downy lineate externally septate in-

ternally. *W. & A. Prodr.* 240. *Glycine suaveolens*, *Linn. Suppl.* 326. *Cajanus suaveolens*, *Grah. in Wall. Cat.* 5579.

Plains of CEYLON and both sides of the WESTERN PENINSULA.

An undershrub, 1-3 ft. high, with many stiff erecto-patent branches, clothed with fine short grey pubescence, sometimes lengthened out and half twining at the ends. *Stipules* minute, lanceolate; petiole 1-2 in., stiffly erecto-patent; leaflets almost membranous, pale green, minutely downy, especially beneath, sometimes stipellate, the end one roundish, with a long cusp, distinctly stalked, 1-3 in. long. *Peduncles* slender, erecto-patent, downy, seldom above 1 in.; pedicels shorter than the calyx. *Calyx* $\frac{1}{4}$ in., downy; teeth linear-setaceous. *Pod* oblong, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, turgid, 2-seeded.

7. **R. cana**, *DC. Prodr.* ii. 386; leaves minutely downy, flowers in peduncled pairs, calyx-teeth exceeding the tube, corolla twice the calyx, pod minutely downy neither lineate externally nor septate internally. *Wall. Cat.* 5498; *W. & A. Prodr.* 240. *Glycine cana*, *Willd. Sp.* iii. 1063.

Plains of CEYLON, and both sides of the WESTERN PENINSULA.

A dwarf undershrub, with very numerous erecto-patent slender shortly downy branchlets. *Petioles* 1-2 in. long, erecto-patent; leaflets obovate or oblong, obtuse or subacute, thicker in texture and deeper in colour than in the last, thinly pilose above, densely or thinly grey downy beneath, 1-2 in. long, exstipellate, the end one distinctly stalked. *Peduncles* slender, $\frac{1}{2}$ -1 in.; pedicels shorter than the calyx, with a small persistent lanceolate bract at the base. *Calyx* $\frac{1}{6}$ in., densely silky. *Pod* oblong, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, turgid, glabrescent, 2-seeded.

8. **R. avensis**, *Benth. MSS.*; leaflets densely tomentose beneath, flowers in peduncled racemes, lowest calyx-tooth 3-4 times as long as the tube, pod densely hairy lineate externally not septate internally. *Cajanus candicans*, *Wall. Cat.* 5576. *Atylosia candicans*, *Kurz in Journ. Asiat. Soc. Beng.* xliii. 2, 186.

AVA; Taongdong, *Wallich*. PEGU, near Rangoon, *McClelland*.

Branches slender, woody, virgate, densely clothed with grey tomentum. *Stipules* caducous; petiole 1-2 in., stiffly erecto-patent; leaflets thick, coriaceous, greenish, thinly canescent above, densely persistently thickly grey-canescant beneath, the end one ovate-acuminate, 3-4 in. long. *Peduncles* equalling or exceeding the petioles; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in.; bracts lanceolate, caducous. *Calyx* $\frac{1}{2}$ - $\frac{3}{4}$ in., densely silky; all the teeth linear-setaceous, the lowest the longest. *Corolla* not exerted. *Pod* oblique, oblong, firm, $\frac{1}{2}$ - $\frac{5}{8}$ in. long, 2-seeded.

9. **R. Beddomei**, *Baker*; leaflets argenteo-canescant on both sides, flowers in subsessile congested racemes, calyx-teeth much exceeding the tube, corolla not exerted.

WESTERN PENINSULA; Cudrape hills, *Beddome*.

An erect shrub, with terete white-canescant branches. *Petioles* erecto-patent, $\frac{1}{2}$ - $\frac{3}{4}$ in.; leaflets oblong or oblong-lanceolate, acute, subcoriaceous, thinly persistently argenteo-canescant above, densely so beneath, the veins conspicuously raised, the end one short-stalked. *Flowers* in copious cymes from the axils of reduced leaves; pedicels much shorter than calyx. *Calyx* $\frac{3}{8}$ in., thinly silky. *Corolla* bright yellow. *Pod* 1-seeded, not seen fully mature, oblong, thinly canescant.

SUBGEN. 4. **Cyanospermum**, *W. & A.* A woody twiner with broad foliaceous calyx-teeth. Seeds without an arillus.

10. **R. cyanosperma**, *Benth. in Oliv. Flor. Trop. Africa*, ii. 218. *Cyanospermum tomentosum*, *W. & A. Prodr.* 260; *Wight Ill.* t. 81 (84); *Dalz. &*

Gibs. Bomb. Fl. 75. *Cylista tomentosa*, *Roxb. Cor. Pl.* iii. t. 221; *Hort. Beng.* 55; *Fl. Ind.* iii. 319; *DC. Prodr.* ii. 410; *Wall. Cat.* 5585. *Cylista albiflora*, *Bot. Mag.* t. 1859.

Jungles of the WESTERN PENINSULA and CEYLON.—DISTRIB. Mascaren isles, Zambesi-land.

A robust woody climber, with stems clothed with short grey or brown pubescence. *Leaflets* subcoriaceous, flexible, softly pilose on both sides, 4–6 in. long, the end one ovate-cuspidate, distinctly stalked; stipellæ large, setaceous, persistent. *Racemes* close, distinctly peduncled, $\frac{1}{2}$ –1 ft. long; bracts large, round-cuspidate, caducous. *Calyx* membranous, $\frac{3}{4}$ in. long, densely clothed with grey hairs; tube short, teeth $\frac{1}{4}$ – $\frac{1}{2}$ in. broad. *Corolla* included, marcescent, bright red or white. *Pod* as long as the calyx, deeply torulose, persistently grey-canescens; seeds large, globose, shining, violet-black.

SUBGEN. 5. **Pseudo-cajan**, *Benth.* An erect shrub with narrow acuminate calyx-teeth. Seeds without an arillus.

11. **R. pseudo-cajan**, *Camb. in Jacq. Voy Bot.* 45, t. 55. *R. incana*, *Royle MSS.*

Western Himalayas; HAZARA to GURWHAL and KUMAON, ascending to 9000 ft.

An erect shrub, 4–6 ft. high, with virgate slender branches, clothed with persistent fine grey tomentum. *Petiole* $\frac{1}{2}$ –1 in.; stipules minute, caducous; leaflets subcoriaceous, 1–2 in. long, exstipellate, grey-green, thinly canescent above, densely persistently grey-canescens beneath, with raised veinlets; the end one oblong-rhomboidal, distinctly stalked, apex deltoid, subacute. *Flowers* in short-peduncled close corymbs; pedicels shorter than the calyx. *Calyx* $\frac{3}{4}$ in., densely grey-canescens; lowest tooth linear-setaceous, exceeding the tube; the others shorter, lanceolate. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in.; standard thinly silky. *Pod* oblong, an inch long, $\frac{3}{8}$ in. broad, straight, hard, persistently grey-canescens, subcompressed, bearing 1–2 seeds in the upper half.

SUBGEN. 6. **Eurhynchosia**, *W. & A.* Twining herbs or shrubs with acuminate calyx-teeth. Seeds without an arillus.

* *Leaflets small, subcoriaceous or membranous, usually obtuse. Pod much exceeding the calyx* (Copisma, *E. Meyer*).

12. **R. minima**, *DC. Prodr.* ii. 385; stems and leaves nearly or quite glabrescent, leaflets as broad as long deltoid in the lower half, racemes lax elongated, calyx-teeth exceeding the tube, pod 3–4 times the calyx small. *R. medicaginea*, *DC. Prodr.* ii. 386; *W. & A. Prodr.* 238; *Dalz. & Gibs. Bomb. Fl.* 74. *R. rhombifolia*, *DC. Prodr. loc. cit.* *R. prostrata*, *Grah. in Wall. Cat.* 5496. *R. microphylla*, *Wall. Cat.* 5497. *R. nuda*, *DC. Prodr.* ii. 385; *W. & A. Prodr.* 238; *Wall. Cat.* 5494. *R. ervoidea*, *DC. loc. cit.* *Glycine rhombifolia*, *Willd. Sp.* iii. 1065. *Dolichos minimus*, *Linn. Sp. Pl.* 1020. *D. medicagineus*, *Lam. Dict.* ii. 297; *Roxb. Hort. Beng.* 55.

Everywhere in the plains, from the HIMALAYAS, where it ascends to 4000 ft., to CEYLON and BIRMA.—DISTRIB. Cosmopolitan in the Tropics, Cape, United States.

A twining or wide-trailing annual, with very slender stems, with only a little short pubescence at the beginning. *Stipules* minute, lanceolate, caducous; leaflets subcoriaceous or membranous, $\frac{1}{4}$ –1 in. broad and deep, obtuse, usually exstipellate, the end one distinctly stalked, mostly conspicuously gland-dotted beneath. *Racemes* 6–12-flowered, short-peduncled, usually exceeding the leaves; bracts minute, linear; pedicels short. *Calyx* $\frac{1}{2}$ – $\frac{1}{2}$ in., pubescent; lowest tooth setaceous, twice the tube. *Corolla* yellow, twice the calyx. *Pod* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, under $\frac{1}{4}$ in. broad, glabrescent, turgid, slightly recurved, mostly 2-seeded.

VAR. laziflora; glabrous, leaflets larger $1\frac{1}{2}$ –2 in. long acute both the upper and

lower half subdeltoid, racemes laxer 2-4 or even 6 in. long. *R. laxiflora*, *Camb. in Jacquem. Voy. Bot.* 44, t. 54. *R. Candollei*, *Decne.*; *Miq. Flor. Ind. Bat.* i. 170. *R. tenuicaulis*, *Wall. Cat.* 5495. *R. filicaulis*, *Grah. in Wall. Cat.* 5502. *Dolichos fatmensis*, *Hochst. & Steud. in Schimp. Arab. Exsic.* No. 873.

13. ***R. Memnonia***, *DC. Prodr.* 386; stems and leaves clothed with minute persistent grey pubescence, leaflets as broad as long obtuse deltoid in the lower half, flowers few in lax racemes, calyx-teeth exceeding the tube, pod small 3-4 times the calyx. *Boiss. Fl. Orient.* ii. 625. *R. pulverulenta*, *Stocks in Hook. Kew Journ.* iv. 147; *Boiss. Fl. Orient. loc. cit.* *Glycine Memnonia*, *Delile Fl. Egypt.* 100, t. 38, fig. 3.

SCINDE, near Kurrachee, *Stocks*.—DISTRIB. Arabia, Trop. Africa.

Scarcely more than a variety of the preceding, from which it only differs in vestiture.

14. ***R. velutina***, *W. & A. Prodr.* 233; young branches minutely downy, leaflets thinly grey-canescens beneath as broad as long obtuse deltoid in the lower half, racemes 2-4-flowered cymose, calyx-teeth equalling or exceeding the tube, pod middle-sized 4-5 times the calyx.

NILGHIRIS.

Stems wide-trailing, rather stouter than in *R. minima*, glabrescent when mature. *Stipules* minute, linear, caducous; leaflets subcoriaceous, $\frac{1}{2}$ -1 $\frac{1}{2}$ in. long and broad, green, glabrous above, persistently thinly grey-canescens beneath, exstipellate, the end one distinctly stalked. *Cymes* 2-4-flowered, shorter than the leaves; pedicels $\frac{1}{8}$ - $\frac{1}{4}$ in. *Calyx* $\frac{1}{4}$ - $\frac{1}{2}$ in., finely silky; lowest tooth linear-setaceous, twice the tube, the others much shorter, lanceolate. *Corolla* $\frac{1}{2}$ in. *Pod* much recurved, 1-1 $\frac{1}{4}$ in. by $\frac{3}{8}$ in., glabrescent, 2-seeded, narrowed very gradually to the base.

15. ***R. pilosa***, *Wall. Cat.* 5499; branches and leaves clothed with long fine spreading grey hairs, leaflets oblong rounded at the base, racemes short few-flowered, calyx-teeth with long setaceous points exceeding the tube.

BRMA; banks of the Irrawaddi at Segaeen, *Wallich*.

Stems very slender, twining. *Stipules* linear, $\frac{1}{8}$ in., subpersistent; leaflets subcoriaceous, grey-green above, grey beneath, clothed on the edge and below with conspicuous long fine hairs, exstipellate, the end one oblong or ovate-oblong, rounded at both ends, 1 $\frac{1}{2}$ -2 in. long. *Racemes* like those of *R. minima*, the buds like dense tufts of silky hairs; pedicels shorter than the calyx; bracts minute, lanceolate. *Calyx* $\frac{1}{4}$ in., all the teeth with long setaceous points. *Corolla* half as long again as the calyx. *Pod* unknown.

16. ***R. Falconeri***, *Baker*; branches and leaves clothed with short spreading grey hairs, leaflets ovate-oblong rounded at both ends, racemes long-peduncled lax few-flowered, lowest calyx-tooth linear exceeding the tube, pod middle-sized 4-5 times the length of the calyx.

GURWHAL, *Falconer*.

Stems wide-trailing, slender, densely clothed with short firm deflexed grey hairs. *Stipules* $\frac{1}{8}$ - $\frac{1}{4}$ in., subpersistent, linear or lanceolate; petiole 1-2 in.; leaflets subcoriaceous, 1-1 $\frac{1}{2}$ in. long, rounded to both ends, greenish beneath, thinly clothed on both sides with persistent moderately firm grey hairs, exstipellate, the end one distinctly stalked. *Racemes* 4-6-flowered; peduncles much exceeding the leaves; pedicels shorter than the calyx. *Calyx* pilose, $\frac{1}{2}$ in.; teeth linear. *Corolla* half as long again as the calyx; standard slightly pilose. *Pod* 1 in. by $\frac{3}{8}$ in., finely pubescent, 2-seeded.

** *Leaflets larger, flexible, not coriaceous, mostly acute. Pod much exceeding the calyx.*

17. **R. viscosa**, *DC. Prodr.* ii. 387; pubescence minutely glandular, end-leaflet acute as broad as long, pedicels very short, lowest calyx-tooth as long as the tube much shorter than the corolla. *R. stipulosa*, *A. Rich. Fl. Abyss.* i. 229, t. 43. *R. villosula*, *Thwaites Enum.* 412. *Dolichos glutinosus*, *Roxb. Fl. Ind.* iii. 312; *Wall. Cat.* 5560; *W. & A. Prodr.* 248.

Plains from the HIMALAYAS to CEYLON.—DISTRIB. Malaya, Trop. Africa, Mauritius, Madagascar.

Stems rather woody, wide-twining, clothed with deciduous fine short grey viscous pubescence. *Stipules* small, deltoid, subpersistent; leaflets green on both surfaces, finely gland-dotted, often glabrescent, $1\frac{1}{2}$ –3 in. long, the apex deltoid, the base broadly rounded, sometimes faintly 3-lobed, rarely stipellate, the end one on a petiolule $\frac{3}{4}$ – $\frac{1}{2}$ in. long. *Racemes* long-peduncled, lax, 2–4 in. long; pedicels $\frac{1}{12}$ – $\frac{1}{8}$ in.; bracts minute, ovate-cuspidate, deciduous. *Calyx* $\frac{1}{4}$ in., finely gland-downy; upper teeth deltoid. *Corolla* twice the calyx. *Pod* $1\frac{1}{4}$ in. by $\frac{3}{8}$ in., 2-seeded, turgid, finely pubescent, straight, tipped with the base of the style, narrowed to both ends.

18. **R. himalensis**, *Benth. MSS.*; pubescence fine glandular, end leaflets acute longer than broad, pedicels elongated, lower calyx-tooth as long as the corolla 3–4 times as long as the tube.

Western and Central Himalayas, alt. 3–7000 ft. HAZARA, SIMLA, GARHWAL, KUMAON, &c.

Stems wide-trailing, slender, terete, clothed with fine short grey viscous pubescence. *Stipules* lanceolate, $\frac{1}{4}$ in., subpersistent, reflexed; leaflets thin, finely pubescent on both surfaces, not at all coriaceous, a much paler green beneath than above, exstipellate, 2–3 in. long; the end one ovate-acuminate, distinctly stalked. *Racemes* $\frac{1}{2}$ – $\frac{1}{2}$ ft. long, lax, distinctly peduncled; pedicels $\frac{1}{4}$ in.; bracts $\frac{1}{8}$ – $\frac{1}{4}$ in., oblong-lanceolate. *Calyx* $\frac{1}{2}$ in., densely downy; lowest tooth linear-setaceous; the others lanceolate-setaceous, twice the tube. *Standard* glabrous, yellow, very conspicuously veined with purple. *Pod* 1– $1\frac{1}{4}$ in. by $\frac{3}{8}$ in., finely downy, 2-seeded, rather recurved, narrowed to both ends.

19. **R. sericea**, *Spanoghe in Linnæa*, xv. 195; pubescence dense soft spreading, end-leaflet rotundato-rhomboidal obtuse or subacute, pedicels short, lower calyx-tooth linear as long as the tube much shorter than the corolla. *Dolichos tomentosus*, *Roth Nov. Sp.* 345; *DC. Prodr.* ii. 401; *W. & A. Prodr.* 248. *D. macrodon*, *Grah. in Wall. Cat.* 5555.

Central and Western HIMALAYAS, ascending to 5–6000 ft., and hills of WEST PENINSULA.—DISTRIB. Malaya.

Stems woody, slender, wide-climbing, densely clothed with soft short spreading grey glandular hairs. *Stipules* lanceolate, $\frac{1}{4}$ – $\frac{3}{8}$ in., subpersistent; leaflets not at all coriaceous, soft with dense short pubescence on both surfaces, sometimes stipellate, pale green both above and beneath, the end one distinctly stalked, deltoid at the tip, the lower half narrowed suddenly to a rather rounded base. *Racemes* many-flowered, moderately close, including the long peduncle reaching a foot in length; pedicels much shorter than the calyx; bracts lanceolate, silky, exceeding the buds. *Calyx* $\frac{1}{4}$ – $\frac{3}{8}$ in., densely grey-silky; upper teeth deltoid-cuspidate, shorter than the tube. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in.; standard dark purple inside, callose, distinctly auricled, silky on the back. *Pod* 1– $1\frac{1}{4}$ in. by $\frac{3}{8}$ in., finely-pubescent, turgid, 2-seeded, rather recurved, tipped with the long persistent base of the style.

20. **R. bracteata**, *Benth. MSS.*; pubescence very short canescent not glandular, leaflets rotundato-rhomboidal cuspidate, pedicels short, lower calyx-tooth linear exceeding the tube shorter than the corolla. *Dolichos bracteatus*, *Wall. Cat.* 5554.

UPPER GANGETIC PLAIN, near Benares, *Madden*. BURMA; Prome, Jenanghaen and Taong-dong, *Wallich*.

Branches twining or straight, woody, many-grooved, persistently pilose. *Stipules* minute, caducous; leaflets 2-4 in. long and broad, thick, subcoriaceous, green, thinly downy above, densely softly grey-downy beneath, exstipellate. *Racemes* moderately close, distinctly peduncled, much exceeding the leaves; pedicels shorter than the calyx. *Calyx* $\frac{1}{4}$ - $\frac{1}{2}$ in., densely downy; upper teeth deltoid or lanceolate, shorter than the tube. *Corolla* $\frac{1}{2}$ in.; standard canescent externally. *Pod* 1-1 $\frac{1}{2}$ in. by $\frac{1}{2}$ in., turgid, 2-seeded, narrowed in the lower half, minutely downy.

21. **R. acutissima**, *Thwaites*, *Enum.* 413; pubescence short not glandular, leaflets oblong-rhomboidal, pedicels exceeding the calyx, lowest calyx-tooth lanceolate much shorter than the corolla.

TRAVANCOR, *Beddome*. CEYLON, near Hantani, alt. 3000 ft., *Thwaites*.

A twiner, with stems clothed with short pale brown tomentum. *Stipules* lanceolate, caducous; leaflets 2-5 in. long, very acuminate. *Racemes* equalling or shorter than the leaves; pedicels geminate, $\frac{1}{4}$ - $\frac{1}{2}$ in. long; bracts lanceolate-acuminate, deciduous. *Calyx* $\frac{1}{4}$ in.; teeth lanceolate, the upper pair subconnate. *Corolla* $\frac{1}{2}$ in., yellow veined with red. *Ovary* 2-ovuled. *Pod* not seen.

*** *Leaflets not at all coriaceous. Calyx as long as the corolla, nearly as long as the pod.* (Arcyphyllum, *Elliott*).

22. **R. densiflora**, *DC. Prodr.* ii. 386; *Wall. Cat.* 5492, excl. *D.*; *W. & A. Prodr.* 239. *Glycine densiflora*, *Roth Nov. Sp.* 348. *Hedysarum punctatum*, *Rottl. in Berl. Mag.* 231, non *Poir.* *Desmodium punctatum*, *DC. Prodr.* ii. 338.

Plains of both sides of the WESTERN PENINSULA.—DISTRIB. Zambesi land.

Stems very slender, woody, wide-twining, finely grey-downy. *Stipules* minute, caducous; leaflets ovate-rhomboidal, obtuse or acute, 1-2 in. long, flexible, minutely grey-downy, especially below, sometimes stipellate, the end one short-stalked. *Flowers* 20-40 or more in dense nearly sessile heads usually shorter than the leaves; pedicels much shorter than the calyx; bracts linear, $\frac{3}{8}$ - $\frac{1}{4}$ in., persistent. *Calyx* $\frac{3}{8}$ - $\frac{1}{2}$ in.; teeth all lanceolate acuminate; tube very short. *Corolla* glabrous. *Pod* oblong, $\frac{1}{2}$ - $\frac{3}{4}$ in. by $\frac{1}{4}$ in., 2-seeded, pubescent, oblique, narrowed suddenly at the tip.

DOUBTFUL SPECIES.

DOLICHOS CANDICANS, *Wall. Cat.* 5567, from Ava, belongs either to § 3 or 5, but the seed is not known. It has densely tomentose virgate branches, thick coriaceous obtuse leaflets rather broader than long densely persistently grey-tomentose on the lower side with the veinlets raised, the end one distinctly stalked 1-2 in. long, racemes short-peduncled closely few-flowered, small lanceolate bracts, pedicels shorter than the calyx, calyx densely grey-pubescent $\frac{3}{8}$ in. long, lowest tooth linear exceeding the tube, the others shorter, lanceolate, corolla scarcely exerted.

R. MOLLISSIMA, *Dalz. in Journ. Linn. Soc.* xiii. 186, from Kandesh, which I have not seen, is said to differ from *R. sericea* principally by the want of callosities and auricles to the standard.

85. **FLEMINGIA**, Roxb.

Shrubs, rarely herbs, with leaves digitately 3-foliolate or simple, gland-dotted below. *Inflorescence* various; pedicels very short, not bracteolate. *Calyx*-tube short; teeth narrow, acuminate, the lowest often the longest. *Corolla* little or not at all exerted; petals equal in length; keel obtuse or slightly rostrate. *Stamens* diadelphous; anthers uniform. *Ovary* sessile, 2-ovuled; style filiform, beardless, stigma capitate. *Pod* oblong, turgid, small, usually two-seeded; seeds not strophiolate, the funicle central.—DISTRIB. Only 3 Trop. African species not here represented.

SUBGEN. 1. **Ostryodium**, *Desv.* Shrubs. *Leaves* simple. *Flowers* in

small cymes, each hidden by a large folded persistent bract, closely distichously arranged in copious simple or slightly branched racemes, both in the axils of the leaves and above them.

1. **F. strobilifera**, *R. Br. in Ait. Hort. Kew ed. 2*, iv. 350; leaves oblong subacute broadly rounded at the base, axis of racemes zigzag, bracts pointed or faintly emarginate. *DC. Prodr.* ii. 351; *Wall. Cat.* 5753; *W. & A. Prodr.* 243; *Wight Ic.* t. 267; *Dalz. & Gibs. Bomb. Fl.* 75. | *Hedysarum strobiliferum*, *Linn. Sp.* 1053; *Roxb. Fl. Ind.* iii. 350. *Zornia strobilifera*, *Pers. Ench.* ii. 319. *F. abrupta*, *Wall. Cat.* 5755.

Himalayas from SIMLA and KUMAON, ascending to 8000 ft. to ASSAM, KHASIA, CHITTAGONG, SIAM, MALACCA, and CEYLON.—DISTRIB. Malayan Islands, Philippines, Timor. Introduced in Mauritius and West Indies.

An erect shrub, 5–10 ft. high. *Branches* slender, terete, velvety. *Leaves* subcoriaceous, 3–8 in. long, green, glabrescent above, thinly silky, especially on the raised parallel erecto-patent ribs below; stipules scarious, linear, $\frac{1}{4}$ – $\frac{1}{2}$ in.; petiole stiffly erecto-patent, $\frac{1}{8}$ –1 in. *Racemes* 3–6 in. long, usually simple, the slender zigzag rachis densely grey-downy; bracts erecto-patent, short-petioled, deeply cordate, $\frac{1}{2}$ –1 in. long, membranous, finely downy, rather broader than long, obscurely cuspidate in the typical form. *Calyx* $\frac{1}{4}$ in., finely pilose; teeth lanceolate, exceeding the tube. *Corolla* purple, little exserted. *Pod* oblong, turgid, $\frac{1}{4}$ – $\frac{3}{8}$ in. long, finely downy, 2-seeded.

VAR. 1. *bracteata*; racemes copious dense panicle, bracts slightly emarginate. *F. bracteata*, *Wight Ic.* t. 268; *Benth. Pl. Jungh.* 245. *Hedysarum bracteatum*, *Roxb. Fl. Ind.* iii. 351. *F. chlorostachys*, *Wall. Cat.* 5756.—Forests of East Himalayas and Birma.

VAR. 2. *fruticulosa*; habit low and branches trailing, leaves smaller plicate, racemes fewer-flowered, bracts $\frac{1}{2}$ – $\frac{3}{8}$ in. slightly emarginate. *F. fruticulosa*, *Wall. Cat.* 5754; *Benth. Pl. Jungh.* 245.—Temperate region of Central Himalayas.

2. **F. Chapparr**, *Ham. in Wall. Cat.* 5757; leaves rotundato-cordate cuspidate, rachis of racemes straight, bracts deeply emarginate. *Benth. Pl. Jungh.* 244.

EASTERN HIMALAYAS, *Hamilton*. BEHAR, *Dr. Hooker*. AYA, *Wallich*.

General habit and inflorescence just that of the last. *Branches* terete, with a thin coating of adpressed hairs. *Leaves* nearly as broad as long, subcoriaceous, 2–4 in. each way, green, glabrous above, minutely grey-downy below; petiole longer than in *F. strobilifera*. *Racemes* often panicle; rachis more woody than in the last, and the pubescence shorter; bracts firmer, less distinctly veined, much broader than long. *Calyx* $\frac{1}{2}$ – $\frac{1}{3}$ in.; teeth lanceolate, as long as the tube. *Corolla* twice the calyx. *Pod* as in the last.

SUBGEN. 2. **Chalaria**, *W. & A.* Erect shrubs. *Leaves* simple or 3-foliate. *Bracts* minute, caducous. *Flowers* in lax panicle racemes.

3. **F. paniculata**, *Wall. Cat.* 5759; leaflets simple large cordate-ovate cuspidate thin not plicate, flowers mostly in a terminal panicle, bracts navicular as long as the calyx. *Benth. Pl. Jungh.* 245. *F. Phursia*, *Ham. in Wall. Cat.* 5758.

Central and Eastern Himalayas, tropical zone; from KUMAON to SIKKIM. MOULMEIN, *Helfer*.

An erect shrub, 4 to 6 ft. high, with finely downy slender terete branches. *Leaves* subcoriaceous, thin, full green above, paler beneath, glabrous except on the ribs of the undersurface, 3–6 in. long; petiole 1 in. or less long; stipules minute, lanceolate, caducous. Axillary racemes sometimes simple, sometimes fascicled, the end ones forming a thyrsoid panicle $\frac{1}{2}$ ft. long, with densely grey downy branches, rather laxly flowered nearly down to the base; bracts ovate, pilose, scarious; pedicels shorter than the calyx. *Calyx* $\frac{1}{6}$ – $\frac{1}{2}$ in., densely grey-downy; teeth lanceolate, acuminate; tube very short. *Corolla* reddish, little exserted; keel rostrate. *Pod* $\frac{1}{2}$ in., oblong, finely downy, 2-seeded.

4. **F. lineata**, Roxb. *Hort. Beng.* 56; *Fl. Ind.* iii. 341; leaves 3-foliate oblanceolate-oblong deeply plicate, flowers in copious axillary and terminal paniced racemes, bracts very minute linear. *Wall. Cat.* 5752; *DC. Prodr.* ii. 351; *W. & A. Prodr.* 242; *Wight Ic.* t. 327. *Hedysarum lineatum*, *Linn. Sp. Pl.* 1054. *Lespedeza lineata*, *Pers. Syn.* ii. 318.

Plains from the HIMALAYAS to CEYLON, BIRMA and SIAM.—DISTRIB. Malayan Islands, N. Australia.

An erect shrub, with the ultimate branchlets angular and grey-canescens. *Stipules* lanceolate, scarioses, subsistent, $\frac{1}{4}$ – $\frac{3}{8}$ in.; petiole $\frac{1}{2}$ –2 in., erecto-patent, deeply sulcate; leaflets rigidly subcoriaceous, 1–3 in. long, obtuse, or with a slight cusp, deltoid at the base, exstipellate, both surfaces especially the lower finely grey-canescens, sublucent. *Panicles* from the axils of most of the leaves, erecto-patent, 2–4 in. long, the flowers crowded towards the end of the branches and absent from the lower part; pedicels very short. *Calyx* $\frac{1}{8}$ – $\frac{1}{6}$ in., densely grey-downy; teeth lanceolate. *Corolla* little exerted; keel beaked. *Pod* $\frac{3}{8}$ – $\frac{1}{2}$ in., finely downy, rounded at both ends, 2-seeded.

SUBGEN. 3. **Flemingiastrum**, DC. Erect shrubs. *Leaves* digitately 3-foliate. *Flowers* in dense subspicate axillary racemes; bracts linear or lanceolate, caducous.

5. **F. stricta**, Roxb. *Cor. Pl.* iii. t. 248; *Hort. Beng.* 56; *Fl. Ind.* iii. 342; branches triquetrous, leaflets thin large acuminate obscurely silky on the ribs below, bracts linear firm much exceeding the buds, calyx silky. *DC. Prodr.* ii. 351; *Wall. Cat.* 5745, excl. E; *W. & A. Prodr.* 241; *Wight Ic.* t. 329.

Tropical regions of SIKKIM, SILHET, ASSAM; BIRMA, TENASSERIM, and the Western Peninsula.—DISTRIB. China.

A tall shrub, with woody triquetrous branches, clothed with only a few short adpressed hairs. *Stipules* large, lanceolate, rigidly scarioses, soon falling; petiole 3–6 in., triquetrous, deeply sulcate, not winged; leaflets subcoriaceous, $\frac{1}{2}$ –1 ft. long, oblong, narrowed to both ends, smooth and glabrous above, with only a few short obscure hairs on the ribs below. *Racemes* dense, oblong-cylindrical, often fascicled, 2–3 in. long, the lower bracts larger than the others and subsistent, the upper ones rigidly scarioses, linear, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, shortly silky, densely imbricated before the flowers expand; pedicels very short. *Calyx* $\frac{1}{4}$ – $\frac{3}{8}$ in.; teeth linear, the lowest twice as long as the others. *Corolla* as long as the lower tooth, much exceeding the others; keel obtuse. *Pod* $\frac{1}{2}$ – $\frac{5}{8}$ in. long, glabrescent.

VAR. *pteropus*, Baker; petiole distinctly winged, leaflets lanceolate acuminate plicate, spikes more slender densely fascicled, bracts and flowers smaller.—Pegu, McClelland.

6. **F. Grahamiana**, W. & A. *Prodr.* 242; branches subterete, leaflets obovate obtuse or subacute thinly silky below, bracts linear firm small, calyx shaggy. *F. pycnantha*, *Benth. in Hohen. Fl. Exsic.* No. 1211; *Pl. Jungh.* 245.

NILGHIRIS, *Wight, Gardner, &c.*

A low erect shrub, with tomentose young shoots. *Stipules* lanceolate, $\frac{1}{4}$ – $\frac{1}{3}$ in., caducous; petiole $\frac{1}{2}$ –1 in., erecto-patent, not winged; leaflets subcoriaceous, 2–3 in. long, plicate, glabrous above, grey-silky especially on the ribs beneath many of the veinlets raised. *Spikes* dense, oblong, 1–2 in. long, often fascicled; bracts under $\frac{1}{2}$ in. long, erecto-patent, subrigid, subsistent. *Calyx* $\frac{3}{8}$ in.; teeth plumose, linear-retaceous, subequal. *Corolla* not exerted. *Pod* oblong, $\frac{3}{8}$ in. long, finely pubescent, and often covered with red viscous glands.

7. **F. congesta**, Roxb. *Hort. Beng.* 56; *Fl. Ind.* iii. 340; branches subterete, leaflets oblong acuminate silky on the ribs below, bracts neither rigid nor protruded, calyx silky. *DC. Prodr.* ii. 351; *Wall. Cat.* 5747, in greater part; *W. & A. Prodr.* 241; *Wight Ic.* t. 390; *Dalz. & Gibs. Bomb. Fl.* 75.

F. angustifolia, Roxb. *Fl. Ind.* iii. 341? *Crotalaria macrophylla*, Willd. *Sp.* iii. 982. *Rhynchosia crotalarioides*, DC. *Prodr.* ii. 387.

CENTRAL HIMALAYAS to CEYLON and MALACCA, in the tropical region.—DISTRIB. Malay isles, China, Philippines.

An erect woody shrub, 4-6 ft. high, with terete glabrescent old and rather angular sulcate silky young branches. *Stipules* linear, $\frac{1}{2}$ in., caducous; petiole 1-4 in., sulcate down the face, not winged; leaflets subcoriaceous, thin not plicate, 4-6 in. long, narrowed to a long point, and downwards to a rather rounded base, green and glabrous above, thinly grey-silky beneath. *Racemes* oblong, dense, 1-2 in. long, sessile, often fascicled; bracts lanceolate, $\frac{1}{2}$ - $\frac{1}{4}$ in. long, silky on the back, like the calyx, deciduous, not at all rigid; pedicels very short. *Calyx* $\frac{1}{4}$ - $\frac{3}{8}$ in., densely clothed with adpressed shining pale brown silky hairs; teeth linear-lanceolate, the lowest exceeding the others. *Corolla* scarcely exserted; keel obtuse. *Pod* oblong, $\frac{2}{3}$ in. long, obscurely downy, 2-seeded.

VAR. 1. *semialata*; general habit and leaflets of the type, but the petiole narrowly winged, the racemes often rather laxer and calyx-teeth narrower. *F. semialata*, Roxb. *Fl. Ind.* iii. 340; *Don Prodr.* 242; *W. & A. Prodr.* 241; *Wight Ic.* t. 326; *Wall. Cat.* 5746, in greater part. *F. stricta*, Wall. *Cat.* 5745 E. *F. prostrata*, Roxb. *Fl. Ind.* iii. 338 (a low trailing form).—Range of the type, ascending to 5000 ft. in the Central Himalayas.

VAR. 2. *latifolia*; tall, very robust, leaflets larger acute 6-9 in. long, bracts $\frac{3}{8}$ - $\frac{1}{2}$ in. long like the calyx densely clothed with shining adpressed brown silky hairs. *F. latifolia*, Benth. *Pl. Jungh.* 246; *Miq. Fl. Ind. Bat.* i. 163.—Khasia, 2-3000 ft. Hook. fil. and Thomson, Griffith.—DISTRIB. Java.

VAR. 3. *Wightiana*; erect, branches densely silky, leaflets smaller thicker densely clothed with adpressed grey or ferruginous silky hairs below with the veinlets raised, petiole not winged, pubescence of calyx and raceme-rachis denser and less adpressed. *F. Wightiana*, Grah. in Wall. *Cat.* 5751; *W. & A. Prodr.* 242. *F. ferruginea*, Wall. *Cat.* 5750.—Nilghiris, Wight. Bhotan, Griffith. Ava, at Taong-Dong, Wallich.

VAR. 4. *nana*; a low diffuse undershrub, leaflets obtuse 1-2 in. long plicate reticulate-rugose beneath, heads few subglobose few-flowered sometimes shortly peduncled, calyx-teeth deep very narrow, pod slightly downy. *F. nana*, Roxb. *Hort. Beng.* 56; *Fl. Ind.* iii. 339; *Wall. Cat.* 5748 A; *Wight Ic.* t. 339 (suberect). *F. procumbens*, Roxb. *Fl. Ind.* iii. 338; *Wight Ic.* t. 408 (trailing diffuse); *Dalz. & Gibs. Bomb. Fl.* 75. *F. capitata*, Ham. in Wall. *Cat.* 5749.—Central and Eastern Himalayas, 2-5000 ft., Concan.

8. **F. Wallichii**, *W. & A. Prodr.* 242; branches subterete, leaflets obovate obtuse or subacute finely downy beneath, bracts small not at all rigid, calyx shaggy. *F. semialata*, var. *vestita*, Wall. *Cat.* 5746, G. *F. nana*, Wall. *Cat.* 5748, B. *F. sericans*, Kurz in *Journ. Asiat. Soc. Beng.* xliii. 2, 186.

HILLS of WESTERN PENINSULA. PROME, Wallich. MARTABAN, Kurz.

Branches slender, erect, densely clothed with short spreading hairs. *Stipules* small, caducous; petiole 1-2 in., faintly winged; leaflets obovate-oblong, 2-4 in. long, glabrous on the upper surface, nearly flat. *Heads* dense, oblong, sessile, 1-2 in. long, solitary or fascicled. *Calyx* $\frac{3}{8}$ - $\frac{1}{2}$ in., shaggy, with dense persistent firm spreading grey hairs, slit down nearly to the base into subequal linear plumose teeth. *Corolla* included. *Pod* oblong, as long as the calyx, finely downy. Not clearly distinct from the last, from which it mainly differs in vestiture.

SUBGEN. 4. **Lepidocoma**, Jungh. An erect shrub. *Leaves* digitately 3-foliolate. *Flowers* in dense globose heads surrounded by large bracts (like the capitula of Compositæ).

9. **F. involucrata**, Benth. *Pl. Jungh.* 246. *F. capitata*, Zolling.; *Miq. Flor. Ind. Bat.* i. 166. *Lespedeza involucrata*, Wall. *Cat.* 5742. *Lepidocoma trifoliatum*, Jungh. *Reise*, 338.

Eastern Himalayas, ASSAM and SIKKIM, ascending to 3000 ft. *PEGU, McClelland, Kurz. CONCAN, Stocks.*—DISTRIB. Java.

An erect shrub, 2-4 ft. high, with slender terete zigzag woody finely downy branches. *Stipules* large, scarious, caducous; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; leaflets oblong or lanceolate, narrowed to both ends, 2-3 in. long, subcoriaceous, glabrous above, grey and finely downy below. *Heads* copious, both terminal on the branches and axillary on short peduncles, an inch broad, encircled by about a dozen lanceolate acuminate scarious persistent bracts $\frac{1}{2}$ in. long. *Calyx* $\frac{1}{2}$ – $\frac{3}{8}$ in.; long, shaggy with long dense grey hairs; teeth very long, the two upper subconnate. *Corolla* included; keel obtuse. *Pod* small, oblong, included, firm, downy, 1-seeded.

SUBGEN. 5. **Rhynchosiolides**. Trailing herbs with herbaceous roots. *Leaves* digitately 3-foliolate; bracts minute, caducous.

10. **F. vestita**, *Benth. MSS.*; leaflets obovate-cuneate minutely pilose, stipules large persistent, flowers 4-10 in dense long-peduncled heads, corolla much exserted. *Dolichos vestitus, Grah. in Wall. Cat.* 5545.

Himalayas; from SIMLA, GARHWAL and KUMAON to KHASIA, ascending to 7000 ft. Sometimes cultivated for the sake of its tuberous esculent root.

Stems trailing to a length of 1-2 ft., branched, densely clothed with short grey hairs. *Stipules* $\frac{1}{4}$ – $\frac{3}{8}$ in., lanceolate, scarious; petiole $\frac{1}{2}$ –1 in.; leaflets brought close to one another by their edges, not at all coriaceous, full green above, pale green beneath, minutely hairy on both sides, exstipellate, obtuse or shortly cuspidate, $\frac{1}{2}$ –1 in. each way. *Flowers* 3-6 together, in dense heads like *Lotus*, on pilose peduncles overtopping the leaves; pedicels very short; bracts $\frac{1}{2}$ in., silky, oblong or roundish, cuspidate. *Calyx* $\frac{1}{4}$ – $\frac{3}{8}$ in., densely brown-velvety; teeth subequal, exceeding the tube. *Corolla* bright red, half as long again as the calyx; keel much incurved, distinctly rostrate. *Pod* oblong, included, subcylindrical, 1-seeded, finely hairy.

VAR. nilgheriensis; leaflets smaller firmer more acute, hairs of stem and petioles longer and denser, flowers a dozen or more in a head, calyx-teeth linear, corolla scarcely exserted. *F. procumbens, Wight Ic. t.* 987; *Dalz. & Gibbs. Bomb. Fl.* 75, non *Roxb.*—Hills of Western Peninsula.

11. **F. tuberosa**, *Dalz. in Kew Journ. Bot.* ii. 34; leaflets lanceolate glabrous, stipules minute caducous, flowers very lax in few-flowered peduncled dichotomous corymbs, corolla not exserted. *Dalz. & Gibbs. Bomb. Fl.* 75.

CONCAN, *Dalzell, Stocks.*

Stems 2-3 ft. long, copiously branched, thinly clothed with fine spreading hairs. *Leaflets* rigidly subcoriaceous, acute, 1-2 in. long, those of the lowest leaves shorter, oblong. *Corymbs* copious, terminal and axillary, distinctly peduncled, exceeding the leaves, the last branches erecto-patent, 1-2 in. long, the flowers usually solitary, rarely geminate at their tips; bracts and bracteoles minute, rigid, ovate, like those of *Shuteria*. *Calyx* $\frac{1}{4}$ in., strongly ribbed, densely pilose; teeth lanceolate, exceeding the tube. *Blade* of standard round; keel very narrow, abruptly incurved at the tip. *Pod* oblong, 1-2-seeded, if the latter slightly exceeding the calyx.

86. **DALBERGIA**, Linn. fil.

Trees or climbing shrubs. *Leaves* with alternate subcoriaceous leaflets. *Flowers* copious, small, in terminal or lateral panicles. *Calyx* campanulate; teeth 5, distinct, usually short. *Corolla* exserted; standard broad; keel obtuse, with its petals only joined at the tip. *Stamens* 9-10, monadelphous or the sheath slit down the keel; anthers minute, basifixed, with the cells back to back, and the slit mostly short and apical. *Ovary* stalked, few-ovuled; style short, incurved, glabrous, stigma capitate. *Pod* oblong or strap-shaped, usually thin and flat, 1-4-seeded, indehiscent, not thickened or winged at the sutures.—DISTRIB. Species 60-70, cosmopolitan in the tropics.

SUBGEN. 1. **Sissoa**, *Benth.* *Stamens* usually nine in one bundle, the sheath of filaments being slit only along the top. *Pod* straight, thin, 1-4-seeded.

* *Leaflets large.*

1. **D. Sissoo**, *Roxb. Hort. Beng.* 53; *Fl. Ind.* iii. 223; erect, leaflets 3-5 roundish with a very distinct cusp, flowers in short axillary panicles with racemoso-corymbose branches, pedicels short, pod 1-4-seeded not veined opposite the seeds. *DC. Prodr.* ii. 416; *W. & A. Prodr.* 264; *Wall. Cat.* 5850; *Benth. in Journ. Linn. Soc.* iv., *Suppl.* 40; *Bedd. Fl. Sylv.* t. 25. *D. pendula*, *Tenore Cat. Hort. Neap.* 84.

Plains through INDIA PROPER, ascending to 5000 ft. in the Central Himalayas.—*DISTRIB.* Afghanistan, Beloochistan.

An erect tree, with finely grey-downy branches. *Leaf-rachis* zigzag; leaflets firm, soon glabrescent, 1-3 in. long. *Panicles* much shorter than the leaves, the erecto-patent branches densely pubescent. *Calyx* $\frac{1}{2}$ in. deep, downy; teeth very short, the lowest rather the longest, lanceolate. *Corolla* yellowish, twice the length of the calyx; standard with a long claw and round limb. *Stamens* 9. *Pod* thin, strap-shaped, pale brown, glabrous, $1\frac{1}{2}$ -4 in. by $\frac{1}{4}$ - $\frac{1}{2}$ in., obtuse with a stalk twice as long as the calyx.

2. **D. latifolia**, *Roxb. Cor. Pl.* ii. 7, t. 113; erect, leaflets 5-7 orbicular obtuse, flowers in lax axillary panicles with subcorymbose branches, pedicels elongated, pod 1-3-seeded not veined opposite the seeds. *Roxb. Fl. Ind.* iii. 221; *DC. Prodr.* ii. 416; *W. & A. Prodr.* 264; *Wight Ic.* t. 1156; *Wall. Cat.* 5852; *Benth. in Journ. Linn. Soc.* iv., *Suppl.* 38; *Dalz. & Gibs. Bomb. Fl.* 77; *Bedd. Fl. Sylv.* t. 24. *D. emarginata*, *Roxb. Hort. Beng.* 53; *Fl. Ind.* iii. 224; *Wall. Cat.* 5858.

Common through the WESTERN PENINSULA, SIKKIM and BEHAR, *Hook. fil. BUNDELICUND, Edgeworth.*

An erect tree, glabrous in all its parts. *Leaves* 4-6 in. long; rachis straight; leaflets $1\frac{1}{2}$ -2 $\frac{1}{2}$ in. long, firm, greenish or glaucous below, often emarginate at the point, cuneate at the base, the petiolules unusually long. *Flowers* in lax broad panicles, shorter than the leaves; pedicels as long as the calyx. *Calyx* $\frac{1}{2}$ - $\frac{1}{3}$ in.; teeth obtuse, rather shorter than the tube. *Stamens* 9. *Corolla* white, twice the length of the calyx. *Pod* firm, brown, strap-shaped, rather shining, $1\frac{1}{2}$ -3 in. by $\frac{1}{2}$ - $\frac{3}{4}$ in., in the place of the seeds distinctly marked but not wrinkled.

VAR. sissoides; leaflets rather narrower in proportion to their length and sometimes obtusely pointed. *D. sissoides*, *Grah. in Wall. Cat.* 5876; *W. & A. Prodr.* 265; *Benth. in Journ. Linn. Soc.* iv., *Suppl.* 39. *D. javanica*, *Miq. Flor. Ind. Bat.* i. 132? —*Nilghiris. Distrib.* Java?

3. **D. ovata**, *Grah. in Wall. Cat.* 5854; scandent, leaflets 5-7 oblong acute, flowers in axillary panicles with crowded corymbose branchlets, pedicels very short, pod 1-3-seeded not veined opposite the seeds. *Benth. in Journ. Linn. Soc.* iv., *Suppl.* 40. *D. glauca*, *Wall. Cat.* 5862.

MARTABAN, Wallich. PEGU, Kurz.

Whole plant glabrous, except the branchlets of the panicle. *Leaf-rachis* 2-3 in. long; leaflets firm, greenish or slightly glaucous below, the upper oblong, 3-4 in. long, narrowed gradually to a point, the lower shorter round-ovate. *Panicle* broad, about as long as the leaves, made up of distant congested clusters, the main branches spreading or even deflexed. *Flower* and *pod* just like those of *D. latifolia*.

VAR. obtusifolia; leaflets oblong or obovate-oblong obtuse emarginate 3-5 in. long.—*Birma, Griffith, Kurz.*

4. **D. Championi**, *Thwaites Enum. Pl. Zeyl.* 95; scandent, leaflets 1-5

oblong acute, flowers in lax axillary panicles with subcorymbose branches, pedicels as long as the calyx, pod not veined opposite the solitary seed. *Benth. in Journ. Linn. Soc. iv., Suppl. 39.* *D. pseudo-sissoo, Mig. Fl. Ind. Bat. i. 128?*

CEYLON, *Gardner, Walker, &c.*—DISTRIB. Malay isles.

Branches glabrous, twining. *Leaflets* firm, glabrous, green on both surfaces, oblong, 2-4 in. long, rounded at the base, narrowed suddenly to a point. *Panicles* as long as or shorter than the leaves, the branches finely grey-downy. *Calyx* $\frac{1}{2}$ in., subglabrous; teeth short, obtuse. *Corolla* twice the length of the calyx; claws of the petals as long as the calyx. *Stamens* 9. *Pod* strap-shaped, obtuse, 3-4 in. by $\frac{3}{4}$ - $\frac{7}{8}$ in., always 1-seeded.

5. ***D. rimosa*, Roxb. Hort. Beng. 53; Fl. Ind. iii. 233;** erect, leaflets 5-9 oblong obtuse or acute, flowers very small in axillary and terminal panicles with corymbose branches, pedicels very short, pod thickened and veined opposite the solitary seed. *Wall. Cat. 5853; Wight Ic. t. 262; Benth. in Journ. Linn. Soc. iv., Suppl. 32.*

Eastern Himalayas, tropical zone, ascending to 4000 ft.; KHASIA, SILHET, ASSAM.

Leaf-rachis straight, 2-4 in. long; leaflets moderately firm, oblong or obovate-oblong, 2-4 in. long, bright green above, grey with a thin coating of grey short adpressed hairs beneath. *Panicles* broad and corymbose, with finely grey-downy branches, the very numerous small flowers in crowded corymbs. *Calyx* $\frac{1}{4}$ in., finely downy; teeth obtuse, subequal, about as long as the tube. *Corolla* white, twice as long as the calyx; claws of the petals very short. *Pod* oblong, glabrous, 2-3 in. by 1-1 $\frac{1}{4}$ in., much thickened opposite the large seed. *Seeds* very rarely 2.

6. ***D. foliacea*, Wall. Cat. 5856 A, C, D;** erect, leaflets 9-13 elongate-oblong obtuse or acute, flowers small mostly in ample terminal panicles with corymbose branches, pedicels short, pod thickened and veined opposite the usually solitary seed. *Benth. in Journ. Linn. Soc. iv., Suppl. 41.*

Forests of AVA, PEGU, and MARTABAN.

Leaf-rachis straight, 3-4 in. long; leaflets rigidly subcoriaceous, glabrous, not glaucous beneath. *Panicle* $\frac{1}{2}$ - $\frac{3}{4}$ ft., the main branches wide-spreading, rather decurved, the branchlets clothed with thin grey-brown pubescence. *Calyx* $\frac{1}{2}$ in., finely downy, the lowest tooth about as long as the tube. *Corolla* twice the length of the calyx, the claws of the petals short. *Pod* just like that of *D. rimosa*.

** *Leaflets few, small.*

7. ***D. rubiginosa*, Roxb. Cor. Pl. ii. 9, t. 115; Fl. Ind. iii. 231;** scandent, leaflets 5-7 oblong obtuse glabrous beneath, flowers in short crowded axillary panicles, pedicels very short, petal-claws as long as the calyx, ovaries 3-4-ovuled. *DC. Prodr. ii. 416; W. & A. Prodr. 265; Benth. in Journ. Linn. Soc. iv., Suppl. 43.*

WESTERN PENINSULA.—DISTRIB. South China.

Habit of *D. monosperma*, from which it may be readily known by the stamens and ovary. *Branches* glabrous, twining. *Leaflets* firm, not conspicuously veined, 1-2 in. long, rather glaucous beneath. *Panicles* 1-2 in. long, sessile, the branchlets finely pubescent. *Calyx* scarcely $\frac{1}{2}$ in. long, finely brown-silky, with a pair of small obtuse persistent bracteoles; teeth short, obtuse. *Corolla* twice the length of the calyx. *Pod* unknown.

8. ***D. congesta*, Grah. in Wall. Cat. 5872;** scandent, leaflets 7-11 oblong obtuse more or less clothed with brown pubescence beneath, flowers in short crowded axillary panicles, pedicels very short, petal-claws as long as the calyx, pod 1-2-seeded not veined opposite the seeds. *W. & A. Prodr. 265; Benth. in Journ. Linn. Soc. iv., Suppl. 43.* *D. Gardneriana, Benth. loc. cit.*

NILGHIRIS, Noton, Gardner, &c.

Closely allied to *D. rubiginosa*, of which it is perhaps a variety. *Branchlets* and leaves below at first densely clothed with brown pubescence. *Leaflets* very thick, 1-1½ in. long, emarginate. *Panicles* 1-2 in. long, dense, the branches densely brown-velvety. *Pedicels* $\frac{1}{24}$ - $\frac{1}{12}$ in. *Calyx* $\frac{1}{8}$ in., with a pair of conspicuous adpressed bracteoles; teeth short. *Corolla* twice the length of the calyx. *Pod* thin, brown, glabrous, distinctly stalked, strap-shaped, 1½-2½ in. by ¼ in.

9. **D. cultrata**, Grah. in Wall. Cat. 5861; erect, leaflets 7-11 obovate-oblong obtuse emarginate glabrous, flowers in short axillary fascicled panicles with racemose branches, pedicels as long as the calyx, petal-claws short, pod 1-3-seeded not veined opposite the seeds. *Benth. in Journ. Linn. Soc. iv., Suppl. 39.*

PROME HILLS, Wallich. PEGU, McClelland.

General habit like that of *D. lanceolaria*. *Branches* and leaves below glabrous. *Leaflets* 1½-2 in. long, moderately firm, green on both sides. *Flowers* in copious rather lax panicles, with slender ascending subglabrous branches. *Calyx* $\frac{1}{12}$ in., subglabrous; teeth short. *Corolla* twice the calyx. *Pod* just like that of *D. lanceolaria*, from which it can only be distinguished by the flowers.

*** *Leaflets many, small.*

10. **D. Junghuhnii**, Benth. Pl. Jungh. i. 254; scandent, leaflets 9-15 oblong glabrous obtuse, flowers minute mostly in ample terminal panicles with crowded cymose branches, pedicels and petal-claws very short, pod oblong not veined opposite the solitary seed. *Benth. in Journ. Linn. Soc. iv., Suppl. 33.* *D. parviflora*, Roxb. Fl. Ind. iii. 225?

MALACCA, Griffith, Maingay.—DISTRIB. Malay isles.

Branches slender, glabrous, often twisted. *Leaves* 2-3 in. long; leaflets thick, rigid, ½-1½ in. long, truncate or emarginate, glabrous, slightly glaucous below. *Branches* of the panicle downy, the ultimate branchlets forming distinct scorpioid cymes. *Calyx* glabrous, under $\frac{1}{12}$ in.; teeth short, obtuse, the lowest the longest. *Corolla* $\frac{1}{8}$ in. *Pod* thin, membranous, greenish, glabrous, distinctly stalked, 2½-3 in. by 1-1¼ in.

11. **D. confertiflora**, Benth. Pl. Jungh. i. 255; scandent, leaflets 11-15 oblong glabrous obtuse, flowers mostly in ample terminal panicles with crowded corymbose branches, pedicels and petal-claws short, pod 1-2-seeded strap-shaped rather veined opposite the seeds. *Benth. in Journ. Linn. Soc. iv., Suppl. 41.* *D. paniculata*, Wall. Cat. 5848, E & I, ex parte.

ODDH and SILLET, Wallich. CONCAN, Stocks.

Habit of *D. volubilis*, from which it can only be safely distinguished by the stamens. *Leaves* 4-6 in. long; leaflets moderately firm, 1-2 in. long, obtuse or emarginate, much paler below than above, but scarcely glaucous. *Branches* of the panicle densely pubescent. *Calyx* ½ in.; upper teeth short, obtuse, lowest lanceolate. *Corolla* not more than half as long again as the calyx. *Pod* thin, glabrous, brownish, 2-3 in. by $\frac{3}{8}$ -¾ in., narrowed to the point and to a stalk nearly half an inch long.

12. **D. velutina**, Benth. Pl. Jungh. 255; scandent, leaflets 13-17 oblong obtuse ferrugineo-pubescent, flowers in peduncled axillary panicles with corymbose branches, pedicels short, petal-claws long, pod 1-3-seeded strap-shaped not veined opposite the seeds. *Benth. in Journ. Linn. Soc. iv., Suppl. 43.* *D. stipulata*, Wall. Cat. 5868 A, B ex parte.

KHASIA, SILHET, and EASTERN PENINSULA.

Branches, pedicels, and leaves, especially on the underside, at first densely clothed with dark brown tomentum. *Leaves* 6-9 in. long; leaflets moderately firm, not

veined, rather glaucous beneath, $1\frac{1}{2}$ –2 in. long; stipules large, lanceolate, velvety, more persistent than in the other species. *Panicle* distinctly peduncled, $\frac{1}{2}$ – $\frac{2}{3}$ as long as the leaves, the branches densely brown-pubescent, spreading or ascending; pedicels shorter than the calyx, furnished with small subsistent bracts and bracteoles. *Calyx* $\frac{1}{2}$ in.; upper teeth very short; lowest lanceolate, rather longer. *Corolla* twice the calyx. *Pod* thin, obtuse, brownish, short-stalked, 2– $3\frac{1}{2}$ in. by $\frac{3}{8}$ – $\frac{3}{4}$ in.

13. **D. Stocksii**, *Benth. in Journ. Linn. Soc.* iv.; *Suppl.* 42; scandent, leaflets 11–15 oblong obtuse with a few obscure adpressed hairs, flowers in copious axillary panicles with corymbose branches, pedicels and petal-claws short, pod thin oblong veined opposite the large usually solitary seed.

CONCAN, *Stocks*.

Branches finely grey-downy. *Leaves* 4–5 in. long; leaflets thin for the genus, $\frac{3}{4}$ –1 in. long, emarginate, with only a few obscure short adpressed hairs below when mature. *Panicles* copious, distinctly peduncled, nearly or quite as long as the leaves; branches slender, densely finely grey-downy, densely corymbose at the tip, the lower ones distant. *Calyx* oblique, $\frac{1}{12}$ in., densely grey-downy; teeth half as long as the tube. *Corolla* twice the length of the calyx. *Pod* quite characteristic, thin, glabrous, $\frac{3}{4}$ – $1\frac{1}{2}$ in. by $\frac{1}{2}$ in., the usually solitary seed filling up the greater part, subacute, cuculate at the base with a very long stalk.

14. **D. sympathetica**, *Nimmo in Grah. Cat. Bomb. Pl.* 55; scandent, leaflets 11–15 oblong obtuse thinly grey-silky, flowers in dense short axillary panicles with dense corymbose branches, pedicels and petal-claws short, pod thin greenish oblong 1–2-seeded not veined opposite the seeds. *Benth. Pl. Jungh.* 255; *Journ. Linn. Soc.* iv., *Suppl.* 42; *Dalz. & Gibs. Bomb. Fl.* 78. *D. frondosa*, *Wall. Cat.* 5855 B; *W. & A. Prodr.* 266, *ex parte* (*Wt. Herb.* 918). *D. ferruginea*, *Hohen. Pl. Can. Exsic.* No. 343, *non Roxb.*

Hills of the WESTERN PENINSULA.

Trunk armed with strong large curved thorns, the branches often twisted, the young ones finely grey-downy. *Leaves* 4–6 in. long; leaflets moderately firm, obtuse or emarginate, $\frac{1}{2}$ –1 in. long, thinly silky at first, especially beneath. *Panicles* distinctly peduncled, with finely downy ascending curved branches, the ultimate branchlets secund. *Calyx* $\frac{1}{12}$ in., silky, with a pair of small obtuse adpressed bracteoles; teeth short, obtuse. *Corolla* twice the length of the calyx. *Pod* membranous, obtuse, 2–3 in. by $\frac{3}{4}$ –1 in., with an unusually short stalk.—Closely resembles *D. volubilis* in leaves and general habit.

15. **D. tamarindifolia**, *Roxb. Hort. Beng.* 53; *Fl. Ind.* iii. 233; scandent, leaflets 25–41 thinly pubescent crowded trapezoid-oblong, flowers in congested sessile axillary panicles with corymbose branches, pedicels short, petal-claws as long as the calyx, pod thin 1–3-seeded strap-shaped not veined opposite the seeds. *Wight. Ic.* t. 242; *Wall. Cat.* 5870; *Benth. in Journ. Linn. Soc.* iv., *Suppl.* 44. *D. livida*, *Wall. Cat.* 5866 A, *ex parte*, B. *D. rufa*, and *D. multijuga*, *Grah. in Wall. Cat.* 5864, 5865. *D. Blumei*, *Hassk. Pl. Jav. Rar.* 400. *Derris pinnata*, *Lour. Fl. Coch.* 432.

Eastern Himalayas; NIPAL, SIKKIM, SILHET, KHASIA, ascending to 4000 ft., and frequent down the gulf to MALACCA. Hills of WESTERN PENINSULA.—DISTRIB. Malay isles.

Branches densely clothed with fine brown-pubescent. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ foot; leaflets quite different in shape to that of all the other species, nearly sessile, caducous, moderately firm, $\frac{1}{2}$ –1 in. long, glaucous, thinly clothed with brown pubescence beneath, especially on the midrib. *Panicles* sessile, 1–2 in. long, the branches densely brown-pubescent; pedicels shorter than the calyx; bracts and bracteoles minute, downy, persistent. *Calyx* $\frac{1}{2}$ in., downy; teeth short, obtuse. *Corolla* white, 2–3 times the length of the calyx; blade of the standard orbicular. *Stamens* 10. *Pod* thin, bright brown, glabrous, long-stalked, $1\frac{1}{2}$ –3 in. by $\frac{1}{2}$ – $\frac{3}{4}$ in.

VAR. 1. *pubescens*; branches and leaves below clothed with persistent dense thick pubescence.—Concan, *Stocks*.

VAR. 2. *acaciæfolia*; leaflets thicker very oblique rigidly coriaceous glabrous bright green above glaucous beneath. *D. acaciæfolia*, *Dalz. in Kew Journ.* ii. 37.—Concan.

SURGEN. 2. **Dalbergaria**, *Benth.* Sheath of filaments slit both along the top and bottom, so that the *stamens* are in two bundles containing five each. *Pod* straight, thin, 1-3-seeded.

16. **D. lanceolaria**, *Linn.*; *DC. Prodr.* ii. 417; erect, leaflets 11-15 glabrous obtuse, flowers in copious ample terminal and axillary panicles with corymbose branches, pedicels bracteate as long as the calyx, calyx-teeth nearly as long as the tube, pod glabrous usually 1-seeded rather thickened and veined opposite the seed. *Benth. in Journ. Linn. Soc.* iv., *Suppl.* 45; *Dalz. & Gibs. Bomb. Fl.* 78. *D. frondosa*, *Roxb. Hort. Beng.* 53; *Fl. Ind.* iii. 226; *DC. Prodr.* ii. 417; *W. & A. Prodr.* 266, *in part*; *Wight Ic.* t. 266; *Wall. Cat.* 5855, A, C, D; *Bedd. Fl. Sylv.* 88. *D. zeylanica*, *Roxb. Hort. Beng.* 53; *Fl. Ind.* iii. 228; *Wall. Cat.* 5847. *D. arborea*, *Heyne*; *DC. Prodr.* ii. 417. *D. robusta*, *Wall. Cat.* 5849 A. *D. hircina*, *Wall. Cat.* 5871 A, not B.

Plains from the WESTERN HIMALAYAS to CEYLON.

An erect tree, reaching 60-80 feet in height, with glabrous branches. *Leaves* 3-6 in. long; leaflets rigidly subcoriaceous, with slightly raised veins, green above, paler and rather glaucous below, 1-2 in. long, rounded at both ends, emarginate at the apex. *Branches* of the panicle wide-spreading, silky or subglabrous. *Calyx* $\frac{1}{2}$ in., more or less silky; teeth obtuse, the lowest rather longer. *Corolla* 2-3 times as long as the calyx, the standard $\frac{1}{4}$ in. broad, with a large callosity at the base of the limb, the keel much shorter than the wings. *Pod* $1\frac{1}{2}$ -4 in. by $\frac{3}{8}$ - $\frac{3}{4}$ in., bright brown, flexible, narrowed to the point and gradually at the base into a long stalk.

17. **D. purpurea**, *Wall. Cat.* 5869; scandent, leaflets 11-13 glabrous obtuse, flowers in copious ample terminal and axillary panicles with corymbose branches, pedicels ebracteate as long as the calyx, calyx-teeth much shorter than the tube, pod glabrous 1-seeded rather thickened and veined opposite the seed. *Benth. in Journ. Linn. Soc.* iv., *Suppl.* 46.

MARTABAN, *Wallich, Griffith.* PEGU, *Kurz.*

Closely allied to *D. lanceolaria*, from which it differs by its scandent habit, smaller flowers (under $\frac{1}{4}$ in. long), and shorter calyx-teeth.

18. **D. volubilis**, *Roxb. Cor. Pl.* ii. 48, t. 191; *Fl. Ind.* iii. 231; scandent, leaflets 11-13 glabrous obtuse, flowers in copious ample terminal and axillary panicles with corymbose branches, pedicels very short ebracteate, calyx-teeth minute, pod glabrous 1-2-seeded rather thickened and veined opposite the seed. *DC. Prodr.* ii. 417; *Wall. Cat.* 5874; *W. & A. Prodr.* 265; *Benth. in Journ. Linn. Soc.* iv., *Suppl.* 46; *Dalz. & Gibs. Bomb. Fl.* 78.

CENTRAL and EASTERN HIMALAYAS, to PEGU and CEYLON.

Closely allied to the two preceding. *Branches* of the panicle densely clothed with brown velvety pubescence, the main ones horizontal or even decurved, the ultimate corymbs densely congested. *Calyx* $\frac{1}{12}$ in. long, densely velvety. *Corolla* 2-3 times the length of the calyx. *Pod* just like that of *D. lanceolaria*.

19. **D. assamica**, *Benth. Pl. Jungh.* 255; scandent, leaflets 15-21 obtuse glabrous or nearly so, flowers in axillary panicles much shorter than the leaves with corymbose branches, pedicels as long as the calyx, calyx-teeth nearly as long as the tube, pod glabrous flexible 1-2-seeded. *Benth. in Journ. Linn. Soc.* iv., *Suppl.* 45.

Tropical HIMALAYAS, from Kumaon eastwards; ASSAM, *Griffith, Jenkins*.

A twiner, with glabrous branches. *Leaves* 6–10 in. long; leaflets the same shape and size as in *D. lanceolaria*, but rather thinner, with a few hairs at the beginning on the under surface. *Panicles* deltoid, moderately close, 3–4 in. long, with slender fine silky branches. *Calyx* $\frac{1}{2}$ in., finely silky, the lowest tooth lanceolate, as long as the tube, the others obtuse, rather shorter. *Corolla* under $\frac{1}{4}$ in. *Pod* just like that of *D. lanceolaria*.

20. **D. paniculata**, *Roxb. Cor. Pl.* ii. 8, t. 114; *Fl. Ind.* iii. 227; erect, leaflets 9–15 obtuse glabrous or nearly so, flowers in copious axillary and terminal panicles with racemoso-corymbose branchlets, pedicels very short, calyx-teeth as long as the tube, pod glabrous 1–3-seeded rather thickened and veined opposite the seeds. *DC. Prodr.* ii. 417; *W. & A. Prodr.* 265; *Wall. Cat.* 5848, A to D; *Dalz. & Gibs. Bomb. Fl.* 78; *Benth. in Journ. Linn. Soc.* iv., *Suppl.* 45; *Bedd. Fl. Sylv.* 88.

Plains of the WESTERN PENINSULA.

A tall erect tree, the ultimate branches clothed with short erect grey-brown silky pubescence. *Leaflets* like those of *D. lanceolaria* in shape, size and texture. *Panicle* very different, mainly terminal, but much less ample, the branches always densely dotted with brown silky pubescence, the main ones erecto-patent. *Calyx* $\frac{1}{2}$ in., subsessile, densely silky. *Corolla* twice the length of the calyx, the limb of the standard not more than $\frac{1}{2}$ in. broad, without any callosity at the base, the keel much shorter than the other petals. *Pod* just like that of *D. lanceolaria*.

21. **D. glomeriflora**, *Kurz in Journ. Asiat. Soc. Beng.* xlii. 2, 70; erect, leaflets 7–9 acute slightly pubescent beneath, flowers in congested panicles, pedicels nearly obsolete, calyx-teeth obtuse, pod unknown.

BIRMA, at Prome, *Kurz*.

A middle-sized erect tree, with fulvo-tomentose branchlets. *Leaflets* ovate-oblong or obovate, 2–2½ in. long, thinly coriaceous, glabrous above. *Panicle* subcapitate, with villose branches. *Calyx* glabrous, $\frac{1}{2}$ in. *Corolla* white, a little longer than the calyx.—*Ex Kurz loc. cit.*

22. **D. hircina**, *Benth. in Journ. Linn. Soc.* iv., *Suppl.* 46; erect, leaflets 17–25 obtuse both surfaces clothed with short persistent grey hairs, flowers in short congested axillary corymbose panicles, pedicels ebracteate as long as the calyx, calyx-teeth nearly as long as the tube, pod small glabrous 1–3-seeded slightly thickened but not veined opposite the seeds. *Wall. Cat.* 5871 B, not A.

Central and Eastern Himalayas, tropical zone; from GARHWAL and KUMAON to BHOTAN, ascending to 4000 ft.

Leaf-rachis 6–10 in. long, finely grey-downy; leaflets obtuse at both ends, firm, with veins rather raised, emarginate at the apex, 1–1½ in. long. *Panicles* short-peduncled, 1–2 in. long, with densely pubescent ascending branches. *Calyx* $\frac{1}{2}$ in. long, densely pubescent. *Corolla* scarcely more than twice the length of the calyx; standard obovate, $\frac{1}{2}$ in. broad; keel distinctly shorter than the wings. *Pod* much smaller than that of its allies, often 3–4-seeded, 1–1½ in. by $\frac{1}{4}$ in., obtuse or subacute, narrowed gradually into a stalk twice as long as the calyx.

23. **D. Thomsoni**, *Benth. in Journ. Linn. Soc.* iv., *Suppl.* 33; scandent, leaflets 9–11 glabrous obtuse, flowers in copious ample terminal and axillary panicles, ultimate branches secund cymose, pedicels very short minutely bracteate, calyx-teeth minute, pod thin greenish rather oblique slightly thickened and veined opposite the solitary seed.

UPPER ASSAM, *Griffith*. KASIA, 2–4000 ft., *Hook. fil. & Thomson*.

A climber, with even the branches of inflorescence nearly glabrous. *Leaflets* very firm in texture, greenish on both surfaces, $\frac{3}{4}$ –1 in. long, obtuse, slightly emarginate. *Inflorescence* mainly terminal, the principal branches erecto-patent, the ultimate ones forming distinct elongated scorpioid cymes. *Flowers* much smaller than in any of its neighbours and very deciduous, the minute pedicels subtended by lanceolate bracts as long as themselves. *Calyx* $\frac{1}{4}$ in., subglabrous. *Corolla* under $\frac{1}{2}$ in. long. *Pod* 2–2½ in. by $\frac{3}{4}$ in., thin and not turning brown, narrowed from the middle to a very short stalk, the lower suture much more rounded than the upper one.

24. **D. cana**, *Grah. in Wall. Cat.* 5859; scandent, leaflets 15–19 acute glabrescent, flowers in short axillary panicles with corymbose branchlets, pedicels ebracteate as long as the calyx, calyx-teeth shorter than the tube, pod thin flat one-seeded softly pubescent not at all thickened or veined opposite the seed. *Kurz in Journ. Asiat. Soc. Beng.* xlii. 2, 70.

MOULMEIN, *Wallich*. PEGU and MARTABAN, *Kurz*.

Branches, leaf-rachises and leaves below thinly clothed with deciduous brown silky hairs. *Leaves* $\frac{1}{2}$ –1 ft. long; leaflets rigidly subcoriaceous, $1\frac{1}{2}$ –2½ in. long, rounded at the base, narrowed to a point, the veinlets rather raised on the undersurface. *Panicles* sparse, much shorter than the leaves, the erecto-patent branches finely brown-silky. *Calyx* subglabrous, $\frac{1}{8}$ – $\frac{1}{6}$ in.; teeth lanceolate-deltoid. *Corolla* twice the length of the calyx. *Pod* strap-shaped, straight, 2–2½ in. by $\frac{1}{2}$ – $\frac{2}{3}$ in., pale dull brown, narrowed suddenly at the base to a stalk twice as long as the calyx.

25. **D. stipulacea**, *Roxb. Hort. Beng.* 53; *Fl. Ind.* iii. 233; scandent, leaflets 17–25 obtuse glabrous or nearly so, flowers in copious axillary panicles with elongated racemose branches, pedicels longer than the calyx with conspicuous persistent bracts and bracteoles, calyx-teeth as long as the tube, pod firm glabrous one-seeded thickened and veined opposite the seed. *Wight Ic.* t. 453; *Benth. in Journ. Linn. Soc.* iv., *Suppl.* 47. *D. ferruginea*, *Roxb. Fl. Ind.* iii. 228. *D. tingens*, *Wall. Cat.* 5860. *D. cassioides*, *Wall. Cat.* 5863. *D. livida*, *Wall. Cat.* 5866 A. *in part.* *D. rostrata*, *Grah. in Wall. Cat.* 5867.

Eastern Himalayas, tropical zone, ascending to 4000 ft. in SIKKIM; ASSAM, KHASIA, SILHET, CHITTAGONG, PEGU, MARTABAN, TENASSERIM.—DISTRIB. Malay isles.

Branches glabrous, or at first finely grey-downy. *Leaf-rachis* 4–6 in. long; leaflets moderately firm, obtuse, 1–1½ in. long, glabrous, or at first minutely hairy beneath, green above, subglaucous beneath. *Panicles* much shorter than the leaves, with only a few lax ascending branches, the inflorescence readily distinguishable from that of all the others by the conspicuous persistent oblanceolate glabrous bracts and bracteoles. *Calyx* subglabrous, $\frac{1}{6}$ in. long; lowest tooth linear, exceeding the others. *Corolla* purplish, twice the length of the calyx; blade of the standard roundish. *Pod* the largest and thickest of the group, 2–4 in. by 1 in., strap-shaped, obtuse, narrowed suddenly into a stalk twice as long as the calyx.

SUBGEN. 3. **Selenolobium**, *Benth.* *Stamens* in two bundles of 5 each. *Pod* obliquely orbicular-oblong, rather recurved, usually 1-seeded.

26. **D. monosperma**, *Dalz. in Kew Journ. Bot.* ii. 36; scandent, spineless, leaflets 5–7 obtuse moderately small, pod flat. *Dalz. & Gibs. Bomb. Fl.* 78; *Benth. in Journ. Linn. Soc.* iv., *Suppl.* 48. *D. torta*, *Grah. in Wall. Cat.* 5879. *D. paniculata*, *Wall. Cat.* 5848 I, *ex parte*.

Shores of the WESTERN PENINSULA, CEYLON and MALAYAN PENINSULA.—DISTRIB. Malay isles, China, Philippines, N. Australia.

A wide-twining shrub, with lithe much-twisted black glabrous branches. *Leaflets* usually 5, obovate-oblong, glabrous, obtuse, often emarginate, 1–1½ in. long. *Flowers* in sessile congested axillary panicles, 1–2 in. long, the branches only inconspicuously downy; pedicels shorter than the calyx. *Calyx* $\frac{1}{8}$ in., subglabrous, with a pair of

minute obtuse bracteoles; teeth short, obtuse. *Corolla* $\frac{1}{4}$ in.; claws as long as the calyx; standard narrow. *Pod* brown, flat, glabrous, under 1 in. long, the upper suture recurved; stalk as long as the calyx.

27. **D. spinosa**, Roxb. *Fl. Ind.* iii. 233; erect, branchlets spine-tipped, leaflets 7-9 small obtuse, pod flat. *W. & A. Prodr.* 266; *Benth. in Journ. Linn. Soc. iv., Suppl.* 49. *D. horrida*, *Grah. in Wall. Cat.* 5877.

Shores of the EASTERN and WESTERN PENINSULAS. CHITTAGONG, Roxburgh.

A stiff erect shrub, with numerous short round horizontal branchlets, ending in pungent spines. *Leaves* crowded, from the nodes of the branchlets, 1-1 $\frac{1}{2}$ in. long; leaflets firm, obovate-oblong, $\frac{1}{4}$ - $\frac{1}{2}$ in. long. *Flowers* in congested sessile corymbose panicles, with minutely downy branches; pedicels shorter than the calyx. *Calyx* $\frac{1}{12}$ in., minutely downy; teeth short, obtuse. *Corolla* whitish, twice the length of the calyx. *Pod* 1 in. long, brown, glabrous, reniform.

28. **D. reniformis**, Roxb. *Hort. Beng.* 53; *Fl. Ind.* iii. 226; erect, spineless, leaflets 9-11 large acute nearly or quite glabrous, pod turgid. *Wight Ic. t.* 261. *D. flexuosa*, *Grah. in Wall. Cat.* 5875. *Benth. in Journ. Linn. Soc. iv., Suppl.* 48. *D. stipulata*, *Wall. Cat.* 5868 B, *ex parte*.

SILLET, Roxburgh, Wallich. PEGU, Kurz. TENASSERIM, Griffith.

A large crooked bushy tree, with fine brown-silky branchlets. *Leaves* 4-8 in. long; leaflets rigidly coriaceous, glabrescent, 1 $\frac{1}{2}$ -2 in. long, broadly rounded at the base. *Flowers* in deltoid close axillary panicles, shorter than the leaves, the branchlets racemose, densely brown-velvety. *Calyx* $\frac{1}{8}$ in., campanulate, densely silky; teeth deltoid, shorter than the tube. *Corolla* twice the length of the calyx, white; standard obovate-emarginate. *Pod* glabrous, rigid, usually one-seeded, an inch broad by $\frac{1}{4}$ - $\frac{1}{3}$ in., narrowed suddenly into a stalk $\frac{1}{4}$ - $\frac{1}{3}$ in. long.

IMPERFECTLY KNOWN SPECIES.

29. **D. stenocarpa**, Kurz in *Journ. Asiat. Soc. Beng.* xlv. 2, 205.

Shrub, with the young parts clothed with golden or fulvous silky pubescence. *Leaves* 5-8 in. long; leaflets 9-13, oblong, 1-1 $\frac{3}{8}$ in. long, retuse, with a minute mucro, chartaceous, glaucescent and thinly pilose beneath. *Panicles* axillary, much shorter than the leaves; rachises pilose; pedicels $\frac{1}{12}$ in. *Calyx* $\frac{1}{12}$ in., pilose; upper tooth very short, obtuse; lower very long, subulate. *Corolla* and stamens unknown. *Pod* linear, 1-2 in. by $\frac{1}{8}$ in., flat, brown, thin, narrowed gradually to a long stalk, indistinctly veined, 1-5 seeded. *Pod* of *D. Sissoo* and habit of *D. lanceolaria*. Sikkim at Pankabari, Gamble.—*Ex Kurz loc. cit.*

87. **PTEROCARPUS**, Linn.

Erect trees. *Leaves* with alternate coriaceous exstipellate leaflets. *Flowers* yellowish, in copious paniced racemes; bracts and bracteoles minute, caducous; pedicels distinctly articulated at the apex. *Calyx* turbinate, curved before expansion, the teeth short. *Petals* exserted, with long claws; standard and wings crisped; keel obtuse, the petals scarcely or not at all coherent. *Staminal* sheath slit both above and below, or above only; the upper stamen often nearly or quite free; anthers versatile. *Ovary* stalked, 2-ovuled; style incurved, stigma terminal. *Pod* orbicular, rarely other than 1-seeded, with a broad rigid wing, the point turned down to opposite the base or near it.—**DISTRIB.** Species about 15; cosmopolitan in the Tropics.

1. **P. indicus**, Willd.; *DC. Prodr.* ii. 419; leaflets 7-11 ovate acute, veining fine, racemes paniced, pedicels as long as the calyx, stamens 2-2-adelphous, stalk of pod exceeding the calyx, beak of pod a space above the outer base. *Benth. in Journ. Linn. Soc. iv. Suppl.* 77; *Bedd. Fl. Sylv. t.* 23. *P. dalbergioides*, Roxb. *Hort. Beng.* 53; *Fl. Ind.* iii. 236; *DC. Prodr.* ii. 418; *Wall. Cat.* 5843; *W. & A. Prodr.* 267. *P. Wallichii*, *W. & A. Prodr. loc. cit.*

EASTERN and WESTERN PENINSULAS.—DISTRIB. Malay isles, Philippines, China.

A tall tree, with ascending glabrous branches. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ ft. long; leaflets moderately firm, 2–4 in. long, glabrous, rounded or deltoid at the base, always narrowed to a point; petiolules $\frac{1}{4}$ – $\frac{1}{2}$ in.; main veins fine, distant. *Flowers* in copious terminal and axillary panicles, with subsecund racemose branches, clothed with fine brown pubescence; pedicels $\frac{1}{2}$ – $\frac{1}{3}$ in., furnished with a pair of linear spreading caducous bracteoles at the apex. *Calyx* $\frac{1}{2}$ – $\frac{1}{4}$ in., finely brown-silky; teeth rounded, the two upper much the largest. *Corolla* exceeding the calyx; standard $\frac{3}{8}$ – $\frac{1}{2}$ in. broad. *Pod* orbicular, 2 in. broad, silky and veined against the seed, the wing $\frac{1}{2}$ – $\frac{1}{3}$ in. broad, the style a considerable distance above the base, pointing outwards, at a right angle with the stalk.

2. **P. macrocarpus**, Kurz in *Journ. Asiat. Soc. Beng.* xliii. 2, 187; leaflets 7–11 ovate-oblong pointed, racemes simple, pedicels as long as the calyx, stamens diadelphous, beak of pod at the basal corner.

MARTABAN and TENASSERIM, Kurz.

A tree, with fulvo-pubescent branchlets. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ ft.; rachis fulvo-puberulous; leaflets coriaceous, $1\frac{1}{2}$ – $2\frac{1}{2}$ in. long, at first fulvo-pubescent beneath; petiolules $\frac{1}{12}$ – $\frac{1}{8}$ in. *Racemes* simple, axillary, fulvo-pubescent; pedicels $\frac{1}{4}$ – $\frac{1}{3}$ in. *Calyx* $\frac{1}{4}$ in., velvety. *Corolla* slightly exceeding the calyx. *Pod* canescent, roundish, $1\frac{1}{2}$ –2 in. broad; wings subpicate. *Ex Kurz loc. cit.*

3. **P. santalinus**, Linn. *fil.*; DC. *Prodr.* ii. 419; leaflets 3 ovate obtuse, veining fine, pedicels rather shorter than the calyx, stamens 2–3-adelphous, stalk of pod much exceeding the calyx, beak of pod at the basal corner. *Roxb. Fl. Ind.* iii. 234; *Wall. Cat.* 5844; *W. & A. Prodr.* 266; *Benth. in Journ. Linn. Soc.* iv., *Suppl.* 76; *Bedd. Fl. Sulv.* t. 22.

WESTERN PENINSULA.

Branches obscurely grey-downy. *Leaflets* 3 in all our specimens, but said to be sometimes 5, 2–4 in. long, rounded at both ends, slightly emarginate, clothed with obscure adpressed grey hairs below. *Racemes* shorter and less copious than in *P. indicus*, the pedicels shorter. *Calyx* $\frac{1}{2}$ – $\frac{1}{4}$ in.; teeth deltoid, minute. *Limb* of standard not longer than the calyx. *Pod* silky at first, the same size as in *P. indicus*, but the centre more turgid, wing narrower and style brought down to the basal corner.

4. **P. Marsupium**, Roxb. *Cor. Pl.* ii. t. 116; *Fl. Ind.* iii. 234; leaflets 5–7 oblong usually obtuse, veins close and prominent, pedicels shorter than the calyx, stamens monadelphous, stalk of pod scarcely exceeding the calyx, beak of pod at the basal corner. DC. *Prodr.* ii. 418; *W. & A. Prodr.* 266; *Wall. Cat.* 5842; *Bedd. Fl. Sylv.* t. 21; *Dalz. & Gibs. Bomb. Fl.* 76. *P. bilobus*, Roxb. *MSS.*; *G. Don, Gen. Syst.* ii. 376.

Plains of the WESTERN PENINSULA and CEYLON.

Leaflets thicker than in the others, green and glabrous on both surfaces, 3–5 in. long, obtuse or subacute, sometimes slightly or deeply emarginate, often twice as long as broad, the main veins much closer, more numerous, and more prominent than in the others. *Racemes* ample, copious, lateral and terminal, the branches thinly clothed with brown pubescence; pedicels $\frac{1}{24}$ – $\frac{1}{12}$ in. *Calyx* $\frac{1}{5}$ – $\frac{1}{4}$ in., finely brown-downy; teeth deltoid, the two upper ones the largest. *Corolla* twice the length of the calyx; sheath of *stamens* sometimes finally split down the keel as well as the top. *Pod* 1–2 in. broad, the same shape as in the last, but the seed smaller and wing broader.

88. PONGAMIA, Vent.

Arborescent or fruticose. *Leaves* odd-pinnate. *Flowers* racemed. *Calyx* campanulate, nearly truncate. *Corolla* much exserted; standard broad; keel obtuse, the petals cohering at the tip. *Stamens* monadelphous, the upper filament free low down; anthers oblong, versatile. *Ovary* subsessile, 2-ovuled;

style incurved, glabrous, stigma capitate. *Pod* woody, flattened, oblong, indehiscent, not at all winged or thickened at the sutures.—**DISTRIB.** A single species, with the habit of *Derris* from which it differs only in the pod.

1. **P. glabra**, *Vent. Jard. Malm.* t. 28; *DC. Prodr.* ii. 416; *Wall. Cat.* 5878; *W. & A. Prodr.* 262; *Wight Ic.* t. 59; *Dalz. & Gibs. Bomb. Fl.* 77; *Bedd. Fl. Sylv.* t. 177. *Galedupa indica*, *Lam.*; *Roxb. Fl. Ind.* iii. 239. *G. arborea*, *Roxb. Hort. Beng.* 53. *Robinia mitis*, *Linn. Sp.* 1044. *Dalbergia arborea*, *Willd. Sp.* iii. 901. *Legum. indet. Wall. Cat.* 5979.—*Rheede Hort. Mal.* vi. t. 3.

CENTRAL AND EAST HIMALAYAS, to CEYLON and MALACCA, especially near the coast.—**DISTRIB.** Malay isles, N. Australia, Polynesia, Seychelles.

A tall erect tree or climber, with glabrous branches and leaves. *Leaflets* 5–7, opposite, subcoriaceous, oblong or ovate, pointed, stalked, 2–4 in. long. *Flowers* in simple peduncled axillary racemes, nearly as long as the leaves; pedicels 2–4-nate, $\frac{1}{4}$ – $\frac{1}{2}$ in., with a pair of minute bracteoles in the middle. *Corolla* $\frac{1}{2}$ in.; standard silky on the back. *Pod* woody, glabrous, $\frac{3}{8}$ – $\frac{1}{4}$ in. thick, $1\frac{1}{2}$ –2 in. long, with a short decurved point.

89. **DERRIS**, *Lour.*

Climbers, rarely erect trees. *Leaves* odd-pinnate, with exstipellate leaflets. *Flowers* copious, usually fascicled, showy, in axillary or terminal racemes or panicles. *Calyx* campanulate, nearly truncate. *Corolla* much exserted; standard broad; keel obtuse, the petals cohering slightly. *Stamens* usually monadelphous, the upper one free in § *Aganope*; anthers versatile. *Ovary* sessile, few-ovuled; style incurved, filiform, stigma capitate. *Pod* rigid, thin, flat, indehiscent, oblong if one-seeded, strap-shaped if few-seeded, with a distinct wing down the upper or both sutures.—**DISTRIB.** Species about 40, belting the world in the tropics, but most abundant in our area.

SECT. 1. **Brachypterum**, *W. & A.* *Pod* thin, strap-shaped, narrow ($\frac{1}{2}$ in. or less broad), winged along the upper suture. *Stamens* monadelphous. *Leaflets* comparatively small. Climbers or erect trees.

1. **D. scandens**, *Benth. in Journ. Linn. Soc.* iv. *Suppl.* 103; scandent, leaflets 9–18 obtuse or acute equal at the base, flowers in very long racemes with distant nodes and many flowers to a fascicle with unequal pedicels. *Dalbergia scandens*, *Roxb. Cor. Pl.* ii. t. 192; *Fl. Ind.* iii. 232; *DC. Prodr.* ii. 417; *Wall. Cat.* 5857; *W. & A. Prodr.* 264; *Wight Ic.* t. 275. *D. timoriensis*, *DC. Prodr.* ii. 417. *Pongamia coriacea*, *Grah. in Wall. Cat.* 5905. *Brachypterum scandens*, *Dalz. & Gibs. Bomb. Fl.* 76.—*Rheede Hort. Mal.* vi. t. 22.

EASTERN HIMALAYAS, BENGAL, WESTERN PENINSULA, CHITTAGONG, SIAM, CEYLON.—**DISTRIB.** Malay isles, China, N. Australia.

A wide-climbing shrub, with branchlets and leaves below at first obscurely grey-downy. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ ft. long; leaflets rigidly subcoriaceous, oblong or obovate-oblong, short-stalked, bright green, 1–2 in. long. *Flowers* in very copious short-peduncled simple axillary racemes, often twice as long as the leaves, with raised nodes, produced sometimes into short branches, bearing each a cluster of pedicels $\frac{1}{8}$ – $\frac{1}{4}$ in. long, the different flowers from the same node expanding at different times. *Calyx* $\frac{1}{8}$ in., thinly grey-silky; teeth obscure. *Corolla* pale rose, 3 times the length of the calyx. *Ovules* 6–8. *Pod* 1–3 in. by $\frac{3}{8}$ – $\frac{1}{2}$ in., narrowed to both ends, 1–4-seeded, glabrous, turgid, and smooth against the seeds, the wing not more than $\frac{1}{24}$ in. broad.

2. **D. parviflora**, *Benth. in Journ. Linn. Soc.* iv., *Suppl.* 105; scandent, leaflets 7–9 subacute equal at the base, flowers in simple racemes shorter than the leaves, pedicels 1–3-nate subequal. *Brachypterum elegans*, *Thwaites, Enum.* 93.

CEYLON, *Thwaites*.

A climber, quite glabrous in all its parts, even the pedicels and calyx. *Leaflets* rigidly subcoriaceous, oblong or obovate-oblong, $1\frac{1}{2}$ –2 in. long, green above, rather glaucous beneath. *Racemes* axillary, short-peduncled, 2–4 in. long; pedicels twice the length of the calyx. *Calyx* campanulate, $\frac{1}{12}$ in.; teeth deltoid, minute. *Corolla* $\frac{1}{4}$ in., the claws of the petals as long as the calyx. *Ovules* 2. *Pod* ligulate, glabrous, $1\frac{3}{4}$ –2 $\frac{3}{4}$ in. by $\frac{1}{4}$ in.

3. **D. robusta**, *Benth. in Journ. Linn. Soc. iv. Suppl. 104*; erect, leaflets 7–19 usually acute oblique at the base, flowers in elongated racemes, pedicels unequal several to a fascicle exceeding the calyx. *Dalbergia robusta*, *Roxb. Hort. Beng. 53*; *DC. Prodr. ii. 417*; *Wight Ic. t. 244*. *D. Krowee*, *Roxb. Fl. Ind. iii. 229*. *D. Crowei*, *DC. Prodr. loc. cit.* *Brachypterum robustum*, *Dalz. & Gibs. Bomb. Fl. 77*.

EASTERN HIMALAYAS, WESTERN PENINSULA and CEYLON.

An erect tree, 30–40 ft. high, with branchlets and leaves below obscurely grey-silky. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ ft. long; leaflets 1–2 in. long, not so coriaceous as in *D. scandens*, green and glabrous above, grey and obscurely silky beneath. *Racemes* like those of *D. scandens*, but seldom exceeding the leaves, the flowers densely fascicled and nodes liable to be produced in the same way; pedicels $\frac{1}{6}$ – $\frac{1}{4}$ in., finely grey-downy. *Calyx* $\frac{1}{12}$ in. long; teeth minute, deltoid. *Corolla* whitish, 3–4 times the calyx; standard erect, with a round blade. *Pod* 1–5-seeded, narrowed to both ends, glabrous, 1–2 $\frac{1}{2}$ in. long, $\frac{3}{8}$ in. broad, the wing more distinct than in *D. scandens*, sometimes $\frac{1}{12}$ in. broad.

4. **D. dalbergioides**, *Baker*; erect, leaflets 25–33 obtuse rather oblique at the base, racemes close shorter than the leaves; pedicels unequal densely fascicled.

MARTABAN, *Parish*. TENASSERIM, *Helper*. MALACCA, *Maingay*.—DISTRIB. JAVA.

A small spreading tree, 15–20 ft. high, with branchlets, pedicels and calyx brown-silky. *Leaves* 6–8 in. long; leaflets close, short-stalked, not more than an inch long, rounded at both ends, emarginate, rigidly subcoriaceous, glabrous, dark green above, pale green beneath, the veins immersed. *Flowers* in copious short-peduncled racemes, like those of *D. scandens* and *robusta*, but the nodes more crowded; pedicels and calyx each about $\frac{1}{12}$ in. long; teeth minute, deltoid. *Corolla* rose-coloured, 4 times the length of the calyx; blade of the standard oblong. *Pod* just like that of *D. robusta*.

SECT. II. **Euderris**. Robust climbers, with the habit of *Millettia* and *Lonchocarpus*. *Leaflets* large. *Flowers* showy, in copious axillary racemes or panicles, with the nodes often produced into short branchlets. *Stamens* monadelphous. *Pods* flattened, broader than in the last group and distinctly winged down one or both sutures.

* *Pod distinctly winged down the upper suture only.*

† *Leaflets few; standard not callose at the base.* (*Euderris*, *Benth.*)

5. **D. uliginosa**, *Benth. Pl. Jungh. i. 252*; branches glabrous, leaflets 3–5 middle-sized rigidly subcoriaceous oblong subacute, flowers middle-sized in short-peduncled axillary racemes which are sometimes obscurely paniced. *Benth. in Journ. Linn. Soc. iv. Suppl. 107*; *Dalz. & Gibs. Bomb. Fl. 77*. *Pongamia uliginosa*, *DC. Prodr. ii. 416*; *Wall. Cat. 5879*; *W. & A. Prodr. 262*. *P. religiosa*, *Wt. in Hook. Bot. Misc. iii. 301*. *P. triphylla*, *Wt. loc. cit. Suppl. t. 41*. *Galedupa uliginosa*, *Roxb. Hort. Beng. 53*; *Fl. Ind. iii. 243*. *Robinia uliginosa*, *Willd. Sp. Pl. iii. 1133*. *Dalbergia heterophylla*, *Willd.*; *DC. Prodr. ii. 417*.

EASTERN HIMALAYAS, WESTERN PENINSULA and CEYLON.—DISTRIB. China, N. Australia, Polynesia, Madagascar, Zambesi-land.

A wide-climbing shrub, with branchlets and leaves quite glabrous from an early stage. *Leaves* distinctly petioled, $\frac{1}{2}$ – $\frac{1}{3}$ ft. long; leaflets usually 5, distinctly stalked, narrowed to a point, 2–4 in. long, the lowest pair shorter, ovate, the veins not prominent on either surface. *Racemes* short-peduncled, 2–4 in. long, the lower nodes often produced into short branches; pedicels fascicled, as long as the calyx. *Calyx* campanulate, $\frac{1}{2}$ in., subglabrous; teeth obscure. *Corolla* rose-red, $\frac{3}{8}$ in. long; blade of standard round, not callose. *Pod* sessile, glabrous, 1–2-seeded, obliquely roundish or oblong, 1–1½ in. by 1 in., thin, flat, prominently veined, with a distinct narrow wing to the upper suture.—A plant gathered at Malacca by Griffith differs by its thicker and more rigid leaves and longer pedicels. It is referred by Bentham to *D. trifoliata*, *Lour. Fl. Cochîn.* 433 (*D. affinis*, *Benth. Pl. Jungh.* i. 252), but the pod is unknown.

6. ***D. vestita*, Baker**; branches clothed with dense brown pubescence, leaflets 5 large obovate-oblong rigidly coriaceous, flowers middle-sized in sessile congested axillary racemes.

MALACCA, *Maingay*.

A climber, with the branches and under surface of the leaves densely covered with soft short brown pubescence. *Leaflets* 3–6 in. long, glabrous and rather glossy above, rather rounded at the base, pointed, with conspicuous main veins raised on the under-surface. *Panicles* 1–2 in. long, sometimes fascicled; pedicels equalling or rather exceeding the calyx. *Calyx* $\frac{1}{2}$ in., finely pubescent; teeth obscure. *Corolla* red, $\frac{3}{8}$ in. long; standard with a round not callose blade. *Pod* just like that of *D. uliginosa* in texture, veining and shape, but thinly clothed with fine brown pubescence.

7. ***D. elegans*, Benth. Pl. Jungh. i. 252**; branches clothed with fine brown pubescence, leaflets 5–7 large obovate-oblong subcoriaceous, flowers large in short sessile axillary racemes. *Benth. in Journ. Linn. Soc.* iv. *Suppl.* 109. *Pongamia elegans* and *P. floribunda*, *Grah. in Wall. Cat.* 5883, 5884.

BIKMA; Phanoë and Troglà hills, *Wallich. TENASSERIM, Griffith.*

Leaves, including the petiole, a foot long, thin but subcoriaceous, thinly clothed beneath with evanescent fine brown pubescence; leaflets narrowed to a subobtusè point, rounded at the base, the end one 6–8 in. long. *Racemes* dense or sub lax, 2–4 in. long, clothed with fine brown pubescence on the rachis and pedicels; pedicels $\frac{1}{6}$ – $\frac{1}{4}$ in., the lower nodes sometimes produced. *Calyx* under $\frac{1}{2}$ in., broadly campanulate; teeth obscure. *Corolla* bright red, $\frac{1}{2}$ in. long; blade of standard round, not callose. *Pod* just like that of *D. vestita*.

8. ***D. paniculata*, Benth. in Journ. Linn. Soc. iv. *Suppl.* 105**; branchlets clothed with fine very short brown pubescence, leaflets 5–7 middle-sized obovate-oblong rigidly coriaceous, flowers very small in copious peduncled elongated panicles. *Brachypterum Benthami*, *Thwaites Enum.* 93.

CEYLON, *Walker, Thwaites.*

Branches slender, terete, soon glabrescent. *Leaflets* subacute, rounded at the base, thick and rigid in texture, 2–4 in. long, not prominently veined, glabrescent from an early stage. *Panicles* copious, reaching a foot long, with numerous slender curved branches, clothed with finely silky brown pubescence; pedicels $\frac{1}{12}$ – $\frac{1}{6}$ in. *Calyx* $\frac{1}{12}$ in., between tubular and campanulate, brown-silky, with short obscure teeth. *Corolla* red, scarcely $\frac{1}{4}$ in. long. *Pod* 1–2-seeded, 1–2 in. by $\frac{3}{4}$ in., rigid in texture, turgid against the seeds, persistently brown-silky, not veined, with a wing under $\frac{1}{2}$ in. broad down the upper suture.

†† *Leaflets many. Standard with two callosities at the base of the limb. (Paraderris, Benth.)*

9. ***D. oblonga*, Benth. in Journ. Linn. Soc. iv. *Suppl.* 112**; branches

subglabrous, leaflets 9-15 small oblong or oblanceolate-oblong, racemes much shorter than the leaves, standard glabrous, pod broad. *D. ovalifolia*, *Benth Pl. Jungh. i. 252, in part*; *Thwaites Enum. 92*. *Pongamia elongata*, *Grah. in Wall. Cat. 5915, not 5886*.

CONCAN, *Stocks*. CEYLON, *Gardner, &c.*

The most like a *Dalbergia* in foliage of the species of this section, but very different in the flowers. *Leaves* distinctly petioled, not more than half a foot long; leaflets the smallest of the group, $1\frac{1}{2}$ - $2\frac{1}{2}$ in. long by $\frac{1}{2}$ - $\frac{3}{4}$ in., obtuse or subacute, quite glabrous, rigidly subcoriaceous when mature, rather glaucous beneath, the veins immersed. *Racemes* copious, moderately close, subsessile, many of the nodes produced into short spreading branchlets; pedicels rather exceeding the calyx, finely grey-silky. *Calyx* $\frac{1}{2}$ in. long. *Corolla* $\frac{1}{2}$ in. long; standard reflexed, nearly $\frac{1}{2}$ in. broad. *Pod* one-seeded in all our specimens, oblong, $1\frac{1}{2}$ in. by $\frac{3}{4}$ - $\frac{1}{2}$ in., thin but firm, glabrous, with a distinct wing down the upper suture.

10. ***D. cuneifolia***, *Benth. Pl. Jungh. i. 253*; branches subglabrous, leaflets 5-11 middle-sized obovate-oblong subcoriaceous, racemes much shorter than the leaves, standard glabrous, pod narrow. *Benth. in Journ. Linn. Soc. iv. Suppl. 112*. *Galedupa marginata*, *Roxb. Hort. Beng. 53*; *Fl. Ind. iii. 241*. *Pongamia marginata*, *Grah. in Wall. Cat. 5896*. *P. cuneifolia* and *P. monadelpha*, *Grah. in Wall. Cat. 5887, 5906*. *P. obovata*, *Wall. Cat. 5897*.

Eastern Himalayas, NIPAL, and SIKKIM; ascending to 5000 ft. in SILHET and EASTERN PENINSULA.

Leaves distinctly-petioled, $\frac{1}{2}$ - $\frac{3}{4}$ ft. long; leaflets usually 5-7, moderately firm, slightly silky at first beneath, 3-5 in. long, subobtuse or acute, the veins immersed. *Flowers* very copious, the nodes of the racemes usually produced into branchlets; racemes sometimes fascicled; pedicels finely grey-downy, $\frac{1}{8}$ - $\frac{1}{6}$ in. *Calyx* $\frac{1}{2}$ in., subglabrous, broadly campanulate. *Corolla* $\frac{3}{8}$ - $\frac{1}{2}$ in., bright red; blade of the standard round. *Pod* 1-3-seeded, 2-3 in. by $\frac{1}{2}$ - $\frac{3}{8}$ in., thin, flat, glabrous, with a narrow distinct wing down the upper suture and sometimes a trace of one on the lower.

11. ***D. microptera***, *Benth. in Journ. Linn. Soc. iv. Suppl. 113*; branches subglabrous, leaflets 5-9 large membranous obovate-oblong cuspidate, racemes long and lax, standard glabrous, pod broad.

SIKKIM, alt. 2-5000 ft., *Hook. fil.*

Closely allied to *D. cuneifolia*, and even more showy. *Leaves* a foot or more long, distinctly petioled; leaflets 3-6 in. long, twice as long as broad, membranous, green, glabrous on both surfaces from an early stage, with a very distinct cusp. *Racemes* peduncled, flexuose, $\frac{1}{2}$ -1 ft. long, with distant nodes, the axils and pedicels nearly glabrous, the nodes not produced into branchlets; pedicels $\frac{1}{2}$ - $\frac{1}{4}$ in. *Calyx* $\frac{1}{2}$ in., broadly campanulate. *Corolla* $\frac{1}{2}$ - $\frac{5}{8}$ in., bright red; standard erect, $\frac{3}{8}$ - $\frac{1}{2}$ in. broad. *Pod* 1-2-seeded, $1\frac{1}{2}$ -3 in. by 1 in., glabrous, thin, firm; wing very narrow.

12. ***D. elliptica***, *Benth. in Journ. Linn. Soc. iv. Suppl. 111*; branches densely clothed with brown pubescence, leaflets 9-13 large subcoriaceous obovate-oblong, racemes lax elongated, standard silky on the back, pod narrow. *Pongamia elliptica*, *Wall. Pl. As. Rar. iii. 20, t. 237*; *Cat. 5881*; *Wight. Ic. t. 420*. *Galedupa elliptica*, *Roxb. Hort. Beng. 53*; *Fl. Ind. iii. 242*. *Pongamia dubia*, *Grah. in Wall. Cat. 5899*. *P. volubilis*, *Zoll. & Moritz. Verz. 3*. *P. Horsfieldii* and *hypoleuca*, *Miq. Flor. Ind. Bat. i. 148-9*.

MARTABAN, BIRMA, PENANG, MALACCA.—DISTRIB. Siam, Malay isles.

A large handsome climber, easily distinguished from all the other species by its petals silky on the outside. *Leaves* long-petioled, a foot or more long; leaflets thin, but firm when mature green and glabrous above, glaucous and thinly brown-silky beneath,

4-6 in. long, usually twice as long as broad, obtuse or pointed. *Racemes* $\frac{1}{2}$ -1 ft. long, obtuse, very lax, with nodes copiously produced into branchlets, the axis and pedicels densely clothed with brown pubescence; pedicels $\frac{1}{2}$ - $\frac{1}{4}$ in. *Calyx* very broad, densely silky. *Corolla* bright red, $\frac{3}{4}$ in. long; blade of standard round, $\frac{1}{2}$ - $\frac{5}{8}$ in. broad. *Pod* 2-3 in. by $\frac{3}{8}$ in., 1-3-seeded, thin, flat, with raised sutures, the upper one with a narrow distinct wing.

** *Pod more or less distinctly winged down both sutures* (Dipteroderris, Benth.)

13. **D. brevipes**, Baker; leaflets 5-7 glabrous obovate-oblong middle-sized acute or subobtuse, racemes copiously panicle with densely pubescent branches, pedicels shorter than the calyx, corolla middle-sized, pod persistently silky the lower wing obscure. Derris Heyneana, var. brevipes, Benth in Journ. Linn. Soc. iv. Suppl. 110.

CONCAN, Stocks. NILGHIRIS, Hohenacker. MYSORE, Cleghorn.

Branches and leaves on both surfaces glabrous. *Leaflets* moderately firm, 2-3 in. long, rounded at the base, obtuse or acute, the upper surface rather glossy, the veins below little raised, the colour grey-green. *Flowers* crowded on the short branchlets of copious ample axillary panicles, which are as long as the leaves, with ascending branches, densely clothed with short brown pubescence. *Calyx* under $\frac{1}{2}$ in., densely silky. *Corolla* red, 3 times the length of the calyx; standard obovate, not callose. *Pod* broad, oblong, 1-seeded. $1\frac{1}{4}$ - $1\frac{1}{2}$ in. by 1 in., persistently brown-silky, with a narrow wing down the upper and a very obscure one down the lower suture.

VAR. *coriacea*, Benth.; leaflets much thicker and very rigid glossy above, flowers nearly sessile.—Nilghiris, Hohenacker, 1598.

14. **D. eualata**, Bedd. Ic. Pl. Ind. Or. 42, t. 186; leaflets 7-9 oblong middle-sized obtusely pointed, racemes copiously panicle with densely pubescent branches, pedicels as long as the calyx, corolla middle-sized, pod glabrous, lower wing as broad as upper.

WESTERN PENINSULA; common in plains of South Canara and Malabar, and at the foot of the Coorg ghauts, Beddome.

A gigantic creeper, with brown silky branchlets. *Leaflets* subcoriaceous, glabrous, 2-3 in. long, the veinlets little raised. *Flowers* in axillary racemes and an ample panicle often 1 ft. long at the end of the branches; pedicels fascicled, $\frac{1}{8}$ - $\frac{1}{6}$ in. *Calyx* $\frac{1}{8}$ - $\frac{1}{6}$ in., densely brown-silky. *Corolla* reddish, scarce $\frac{1}{2}$ in.; standard not callose. *Pod* ligulate, thin, 4-5 in. by $1-1\frac{1}{4}$ in., 1-3-seeded, each wing $\frac{1}{6}$ in. broad.

15. **D. Heyneana**, Benth. Pl. Jungh. i. 252; leaflets 5 glabrous obovate-oblong middle-sized subobtuse, racemes copiously panicle with obscurely grey-downy branches, pedicels as long or longer than the calyx, corolla small, pod glabrous with a distinct wing down the lower suture. Benth. in Journ. Linn. Soc. iv. Suppl. 110; Dalz. & Gibs. Bomb. Fl. 77. Pongamia Heyneana, Grah. in Wall. Cat. 5916.

MYSORE, Heyne. CONCAN, Stocks, Law.

A slender climber, glabrous in all its parts, except the branches of the panicle. *Leaflets* moderately firm, grey-green, obtusely pointed, broadly rounded at the base, 2-4 in. long, the veins immersed. *Panicles* copious, axillary, as long as the leaves, with numerous very slender ascending branches, with the subdistant nodes produced into short branchlets; pedicels $\frac{1}{12}$ - $\frac{1}{8}$ in. *Calyx* $\frac{1}{12}$ in., subglabrous. *Corolla* rose-red, $\frac{1}{4}$ - $\frac{1}{2}$ in.; blade of standard roundish. *Pod* oblong or ligulate, 1-3-seeded, $1\frac{1}{2}$ -4 in. by $\frac{1}{8}$ -1 in., thin, firm, rather glossy and veined, the wing of the upper suture $\frac{1}{8}$ - $\frac{1}{6}$ in. broad, of the lower much narrower.

VAR. *paniculata*; leaflets 5-7 considerably smaller and especially narrower, panicles a foot long very lax with branches clothed with fine silky pubescence, pedicels

3 times as long as the calyx. *P. paniculata*, *Wight, Herb.* 920. *P. Heyneana*, *W. & A. Prodr.* 263.—Western Peninsula, *Wight*.

16. ***D. marginata***, *Benth. Pl. Jungh.* i. 232; leaflets 5-7 large subcoriaceous obovate-oblong glabrous, racemes copiously paniced with glabrous branches, pedicels 3-4 times the calyx, corolla middle-sized, pod glabrous very distinctly winged down the lower suture. *Benth. in Journ. Linn. Soc. iv. Suppl.* 111. *Dalbergia marginata*, *Roxb. Hort. Beng.* 53; *Fl. Ind.* iii. 241; *Wight. Ic.* t. 87. *Pongamia emarginata*, *Wall. Cat.* 5909. *P. reflexa*, *Grah. in Wall. Cat.* 5898.

EASTERN HIMALAYAS, tropical zone, KHASIA and SILHET, ascending to 3000 ft.

A showy climber, glabrous in all its parts. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ ft. long; leaflets moderately firm, rather glossy above, $\frac{1}{4}$ - $\frac{1}{2}$ ft. long, narrowed into a distinct cusp, the veins little raised. *Panicles* as long as the leaves, with several spreading slender lax-flowered branches; pedicels usually solitary, $\frac{1}{2}$ in. long. *Calyx* $\frac{1}{12}$ in., broader than deep when expanded. *Corolla* pale red, $\frac{1}{2}$ - $\frac{5}{8}$ in. long; standard $\frac{1}{2}$ in. broad, not callose. *Pod* thin, flat, ligulate-oblong, glabrous, flexible, finely veined, 3-4 in. by $1\frac{1}{4}$ - $1\frac{1}{2}$ in., the upper wing $\frac{1}{4}$ - $\frac{1}{2}$ in. broad, the lower narrower,

17. ***D. platyptera***, *Baker*; leaflets 5-7 large subcoriaceous oblong subacute glabrous, racemes copiously paniced with silky branches, pedicels as long as the calyx, corolla middle-sized, pod glabrous very distinctly winged down the lower suture.

MALABAR; near Calicut, *Wight*.

Branches glabrous. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ ft. long; leaflets obtusely pointed, 3-6 in. long, broadly rounded at the base, thin, flexible, finely reticulato-venulose; petiolules $\frac{1}{4}$ in. *Panicles* as long as the leaves, with numerous short ascending fine silky branches; pedicels close, but not fascicled. *Calyx* $\frac{1}{8}$ in., subtruncate, finely silky. *Corolla* under $\frac{1}{2}$ in. *Pod* 3-4 in. by 1 in., including the wings, thin, flat, glossy, glabrous, reticulato-venulose, one-seeded, narrowed to both ends, the upper wing $\frac{1}{4}$ in. broad.

18. ***D. amœna***, *Benth. Pl. Jungh.* i. 252; leaflets 5-7 subcoriaceous glabrous middle-sized not glaucous beneath, racemes in copious panicles with glabrous branches, corolla small, pedicels exceeding the calyx, pod glabrous narrowly winged down the lower suture. *Benth. in Journ. Linn. Soc. iv. Suppl.* 110. *Pongamia amœna*, *Wall. Cat.* 5912.

MARTABAN, *Wallich*. TENASSERIM, *Griffith*. MALACCA, *Maingay*.

A climber, glabrous in all its parts. *Leaves* about $\frac{1}{2}$ ft. long; leaflets moderately firm, glossy above, 3-4 in. long, oblong-cuspidate, the veins not prominent. *Panicles* equalling or exceeding the leaves, the nodes often produced into branchlets, the flowers close and pedicels densely fascicled; pedicels $\frac{1}{4}$ - $\frac{1}{6}$ in. *Calyx* $\frac{1}{12}$ in. *Corolla* under $\frac{1}{4}$ in., bright red. *Pod* thin, glabrous, ligulate-oblong, flexible, finely veined, 3-4 in. by $1\frac{1}{4}$ in., the upper wing $\frac{1}{8}$ in. broad, the lower distinct, but much narrower.

19. ***D. Maingayana***, *Baker*; leaflets 5-7 oblong rigidly coriaceous middle-sized glabrous glaucous beneath, flowers in paniced racemes with glabrous branches, corolla middle-sized, pedicels equalling or rather exceeding the calyx, pod glabrous narrowly winged down the lower suture.

SINGAPORE, *Maingay*.

Closely allied to *D. amœna*, with which it agrees in general habit, pod and inflorescence, differing in its rather larger more rigidly coriaceous leaves glaucous beneath, and larger flowers, which are $\frac{3}{8}$ in. long with a standard with a round ecallose wing, rounded suddenly to a long claw.

20. ***D. ferruginea***, *Benth. Pl. Jungh.* i. 252; leaflets 5-9 large obovate-oblong finely ferrugineo-pubescent beneath, racemes copiously paniced with

densely pubescent branches, pedicels exceeding the calyx, corolla middle-sized, pod finely pubescent with the wing down the lower suture distinct or obscure. *Benth. in Journ. Linn. Soc. iv. Suppl.* 109. *Robinia ferruginea, Roxb. Fl. Ind.* iii. 329. *Pongamia ferruginea, Wall. Cat.* 5885. *P. oblonga, Wall. Cat.* 5893.

EASTERN HIMALAYAS, tropical zone, ASSAM and SILHET. *BIRMA, Wallich.*

Branchlets clothed with dense ferruginous pubescence. *Leaflets* 4-6 in. long, cuspidate or subobtusate, rounded at the base, subcoriaceous, green and glabrous above, finely pubescent, especially on the main raised veins beneath. *Panicles* axillary, peduncled, $\frac{1}{2}$ -1 ft. long, with slender ascending branches, clothed with dense ferruginous pubescence; pedicels $\frac{1}{4}$ in., fascicled and nodes often produced into branchlets. *Calyx* $\frac{1}{8}$ in.; teeth deltoid, minute. *Corolla* rose-red, three times the length of the calyx; standard emarginate, $\frac{1}{4}$ in. broad. Young *pod* densely brown-silky; old nearly glabrescent, 2-3 in. by 1 in., oblong or ligulate-oblong, rigid in texture, obscurely veined on the faces, the sutures much raised, the wing of the upper $\frac{1}{8}$ - $\frac{1}{6}$ in. broad, the wing of the lower one sometimes not perceptible.

21. **D. canarensis**, *Baker*; leaflets 15-21 middle-sized oblanceolate-oblong pubescent beneath, flowers in terminal panicles with pubescent branches, standard callose, pod winged down the lower suture. *Pongamia canarensis, Dalz. in Hook. Kew Journ.* ii. 37. *Brachypterum canarense, Dalz & Gibs. Bomb. Fl.* 76.

CONCAN, near Garsuppa, *Dalzell.*

Leaves a ft. long; leaflets 2-2 $\frac{1}{2}$ in. by $\frac{1}{2}$ in., glabrous above. *Panicles* terminal, shorter than the leaves; racemes simple, the branches ferrugineo-pubescent; pedicels fascicled in threes. *Corolla* reddish. *Ovary* hirsute, 2-3 ovuled. *Pod* flat, oval or elliptic, pointed at both ends winged on both sides, 1 $\frac{1}{2}$ in. long. *Dalzell, loc. cit.*—Appears to connect *Paraderris* and *Dipteroderris*.

SECT. III. **Aganope**, *Miquel*. Habit of *Euderris*, but the racemes in ample thyrsoid panicles, with the nodes not produced into branchlets, and the upper stamen distinctly free from the rest down to the base.

22. **D. sinuata**, *Thwaites Enum.* 93; leaflets subobtusate half as long again as broad, pedicels as long as the calyx, pod large deeply indented between the seeds narrowly winged down the upper suture. *Benth. in Journ. Linn. Soc. iv., Suppl.* 113. *Pongamia sinuata, Wall. Cat.* 5911. *P. grandifolia, Grah. in Wall. Cat.* 5882, not *Zoll. & Moritz*.

PEGU, MARTABAN, TENASSERIM, MALACCA, CEYLON.—DISTRIB. Malay isles.

A robust climber, with glabrous branches and leaves. *Leaflets* 5-7, ovate- or obovate-oblong, 4-6 in. long, rigidly coriaceous, all but the main veins immersed. *Panicles* $\frac{1}{2}$ -1 ft. long, with numerous ascending thinly brown-silky branches; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in. *Calyx* $\frac{1}{8}$ in., thinly silky, broadly campanulate, circumscissile above the base. *Corolla* $\frac{1}{2}$ in., turning dark purple when dried; standard erect, with a round ecalloose blade. *Pod* very different from that of any of the other species, 1-4-seeded, 2-8 in. by 1-1 $\frac{1}{4}$ in., smooth, firm, finely veined, the wing usually not more than $\frac{3}{4}$ in. broad, and sometimes not perceptible.

23. **D. thyrsiflora**, *Benth. in Journ. Linn. Soc. iv. Suppl.* 114; leaflets acute twice as long as broad, pedicels close very short, pod comparatively small not indented between the seeds, both sutures distinctly winged. *Milletia thyrsiflora, Benth. Pl. Jungh.* 249. *Amerimnum obovatum, Hamilt. MSS.* *Pongamia?* *Wall. Cat.* 9054. *Aganope floribunda, Miq. Fl. Ind. Bat.* i. 151.

EASTERN HIMALAYAS and the KHASIA Mts., ascending to 4000 ft.; EASTERN PENINSULA.—DISTRIB. Malay isles.

A robust climber, with glabrous branches and leaves. *Leaflets* 5-9, oblong or

obovate-oblong, rigidly subcoriaceous, 4-6 in. long, the veinlets distinct in the dried specimens. *Panicles* $\frac{1}{2}$ -1 ft. long, with very numerous ascending or spreading branches, clothed with dense brown-silky pubescence, the upper ones growing gradually shorter; pedicels crowded, but not fascicled, much shorter than the calyx. *Calyx* $\frac{1}{2}$ in., thinly silky. *Corolla* whitish, 3-4 times the calyx. *Pod* 1-3-seeded, $1\frac{1}{2}$ -3 $\frac{1}{2}$ in. by 1-1 $\frac{1}{4}$ in., thin, flat, glabrous, finely-veined, each wing $\frac{1}{2}$ - $\frac{1}{6}$ in. broad.

DOUBTFUL SPECIES.

Of the following species of § *Euderris* the fruit is unknown.

D. ACUMINATA, Benth. *Pl. Jung.* i. 252. (*Pongamia elongata*, Grah. in Wall. Cat. 5886, non 5915. *P. acuminata*, Grah. in Wall. Cat. 5901.) A large climber, with glabrous branches and leaves. *Leaflets* 5-7, elongate-oblong, 4-6 in. long, with a long very distinct cusp, green on both surfaces, with the main veins raised below. *Racemes* 6-9 in. long, the flowers fascicled at the distant nodes, the rachis, pedicels and calyx with a little brown pubescence; pedicels $\frac{1}{2}$ - $\frac{1}{2}$ in., equalling or exceeding the calyx. *Corolla* rose-red, $\frac{3}{8}$ in. long. *Ovary* silky, 5-6-ovuled.—NIPAL, Wallich; and a plant with 9-11 leaflets of similar shape, and shorter closer racemes of considerably larger ($\frac{3}{8}$ in. long) bright purple flowers in SIKKIM. Hook. *fl.* This last closely resembles *D. microptera*, but the standard is not callose.

D. SECUNDA, Baker. (*Pongamia secunda*, Grah. in Wall. Cat. 5890. *Amerimnum secundum*, Hamilt. MSS.) *Leaflets* 7, oblong with a long cusp, 2-3 in. long, rigidly coriaceous, glabrous rather shining above, the veins immersed. *Racemes* like those of *D. scandens*, but in a terminal panicle and in the axils of upper leaves; rachis and pedicels finely brown-silky, the latter densely fascicled, exceeding the calyx. *Calyx* $\frac{1}{2}$ in. *Corolla* reddish, $\frac{3}{8}$ in., the blade of the standard oblong, not callose. *Ovary* silky.—ASSAM, Hamilton.

D. POLYSTACHYA, Benth. in Journ. Linn. Soc. iv. Suppl. 114. *Branches* and leaves below glabrous. *Leaflets* 5-7, subcoriaceous, acuminate, pale green on both surfaces, twice as long as broad, 3-4 in. long, with a distinct point. *Racemes* long and narrow, $\frac{1}{2}$ -1 ft. long, from the upper leaves and forming an end panicle, the nodes copiously produced into branchlets, the rachises finely obscurely pubescent; pedicels exceeding the calyx, crowded on the branchlets. *Calyx* $\frac{1}{2}$ in., slightly pubescent. *Corolla* $\frac{3}{8}$ - $\frac{1}{2}$ in., rose-red. *Ovary* silky, with about 4 ovules.—KHASIA, 2-4000 ft., Hook. *fl.* & Thomson.

D. OVALIFOLIA, Benth. *Pl. Jungh.* i. 252, *ex parte*. (*Pongamia ovalifolia*, W. & A. Prodr. 262; Wight *l.c.* t. 328.) A climber, glabrous in all its parts, with general habit and leaves very like *Dalbergia volubilis*. *Leaflets* 9, long-stalked, oblong, obtuse, emarginate, $1\frac{1}{2}$ -2 in. long, membranous, with raised veinlets. *Racemes* copious, axillary, $\frac{1}{2}$ ft. long, sometimes geminate, with nodes produced and very abundant small bright red flowers; pedicels twice the calyx. *Calyx* $\frac{1}{2}$ in., broadly campanulate. *Corolla* $\frac{1}{4}$ in.; standard with a long claw and a broad blade, not callose. *Ovary* slightly hairy, 2-ovuled.—WESTERN PENINSULA, Wight.

The following are probable species of § *Dipteroderris*, of which the flowers are unknown.

D. DISCOLOR, Benth. in Journ. Linn. Soc. iv. Suppl. 111. A robust climber, glabrous throughout. *Leaves* long-petioled; leaflets 5-9 obovate-oblong, 3-5 in. long, obtusely pointed, bright green above, very glaucous below, rigidly coriaceous, with immersed veins. *Pod* oblong, 1 seeded, thicker than in the other species, $1\frac{1}{4}$ -1 $\frac{1}{2}$ in. by $\frac{3}{4}$ - $\frac{1}{2}$ in., both sutures raised and furnished with a narrow distinct wing.—SIKKIM and SILHET, Hook. *fl.* & Thomson. A different type of the pod to the admitted species, like that of *Pongamia glabra* in shape and texture, but with a double wing.

D. WIGHTII, Baker. A slender glabrous climber. *Leaflets* 5-7, oblong, obtusely pointed, broadly rounded at the base, 1-1 $\frac{1}{4}$ in. long, rigidly subcoriaceous, with immersed veins, pale grey-green on both surfaces. *Racemes* much exceeding the leaves

with produced nodes. *Pod* 1-2-seeded, 1-2 in. by $\frac{1}{2}$ - $\frac{5}{8}$ in., thin, but firm, rather veined, persistently brown-silky, with a narrow wing down the upper and a very obscure one down the lower suture.—WESTERN PENINSULA; Shevagerry hills, *Wight*. *Pod* clothed like that of *D. brevipes*, but narrower and leaves much smaller.

90. **EUCHRESTA**, Bennett.

Shrubs. *Leaves* odd-pinnate. *Flowers* racemed. *Calyx* deeply campanulate, very oblique; teeth 5, deltoid, very short. *Corolla* much exserted; standard narrow; keel obtuse, its petals scarcely cohering. *Stamens* diadelphous (9, 1), but the filaments fastened very slightly; anthers versatile. *Ovary* long-stalked, 1-2-ovuled; style filiform, stigma capitate. *Pod* the size of an olive, turgid, rather fleshy, filled up with the solitary seed.—DISTRIB. Species 2, the other Japanese.

1. **E. Horsfieldii**, Bennett *Pl. Jav. Rar.* 148, t. 31; *Benth. in Journ. Linn. Soc. iv., Suppl.* 118. *Andira Horsfieldii*, *Lesch. in Ann. Mus.* 16, 481, t. 12; *DC. Prodr.* ii. 476.

KHASIA MTS., *Hook. fil. & Thomson*.—DISTRIB. Java, Formosa.

An erect shrub, with glabrous leaves and branches. *Leaves* long-petioled; leaflets 3-5, oblong, acute, $\frac{1}{2}$ ft. long, subcoriaceous, opposite, subsessile, pale green, the veins immersed. *Flowers* (not seen in Indian specimens) in simple peduncled racemes; pedicels geminate, minutely bracteate, shorter than the calyx. *Corolla* pure white, $\frac{1}{2}$ in. long, twice the length of the calyx. *Pod* oblong, purplish-black, $\frac{1}{2}$ - $\frac{5}{8}$ in. long.

91. **DALHOUSIEA**, Grah.

A climbing shrub. *Leaves* 1-foliolate. *Flowers* in axillary corymbs. *Calyx* campanulate; teeth short, deltoid. *Corolla* exserted; petals equal in length; standard broad; keel obtuse. *Stamens* free; anthers uniform, oblong, versatile. *Ovary* subsessile, few-ovuled; style filiform, stigma capitate. *Pod* oblong, subcompressed, dehiscent, rigidly coriaceous, continuous within, 1-3-seeded.—A single species, with a peculiar distribution, as it is known only in the East Himalayas and Angola.

1. **D. bracteata**, Grah. in *Wall. Cat.* 5339; *Wight Ic.* t. 265. *Podalyria bracteata*, *Roxb. Cor. Pl.* iii. t. 259; *Fl. Ind.* ii. 317.

EASTERN HIMALAYAS, tropical region, ASSAM, SILHET, and CHITTAGONG.

A subscandent shrub, with slender finely grey-downy branches. *Leaves* simple, distinctly petioled, oblong, acute or obtuse, rigidly subcoriaceous, glabrous, 4-12 in. long; stipules small, lanceolate, subpersistent. *Flowers* in sparse lax subsessile axillary corymbs about as long as the petioles, terminal on the branchlets, which have several pairs of round membranous large persistent striated bracts; bracteoles like the bracts, but larger, completely hiding the flowers. *Calyx* $\frac{1}{2}$ in., silky. *Corolla* whitish, twice the length of the calyx. *Pod* 2-4 in. long, the thick discoid seeds an inch broad.

92. **SOPHORA**, Linn.

Trees or shrubs. *Leaves* odd-pinnate. *Flowers* showy, yellow or violet-purple, racemed or panicle. *Calyx* oblique, broadly campanulate; teeth deltoid, very short. *Corolla* much exserted; standard broad; petals equal in length, all with long claws; keel obtuse, or appendiculate in *S. Goebelii*, with a small hooked mucro. *Stamens* free, or obscurely connate at the very base; anthers uniform, versatile. *Ovary* stalked, many-ovuled; style incurved, stigma

capitate. *Pod* moniliform, subliguose or membranous in our species, usually indehiscent, the joints turgid, terete or in § *Edwardsia* furnished with four wings.—DISTRIB. Species above 20, widely spread in warm countries.

§ **Eusophora.** *Pod* wingless. *Keel* obtuse, without a mucro.

* *Stipules persistent, spiny. Pod finally dehiscent.*

1. **S. Moorcroftiana**, *Benth. MSS.* *Astragalus Moorcroftianus*, *Wall. Cat.* 5933. *Caragana Moorcroftiana*, *Benth. in Royle Ill.* 198.

Western Tibet. LADAK, *Moorcroft*. NUBRA valley, alt. 10–12,000 ft., *Thomson*. KASHMIR, *Bellev.*—DISTRIB. Kashgar, *Bellev.*

A low copiously-branched shrub, with densely grey-downy branches, armed with fine pungent spines, which are the stipules that persist, as in *Caragana*, long after the leaves fall. *Leaves* $1\frac{1}{2}$ –2 in. long; leaflets 11–17, caducous, obovate, obtuse, with a long awn, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, subcoriaceous, pale green, finely grey-silky on both surfaces, finally nearly glabrescent. *Flowers* in copious sparse axillary racemes; pedicels shorter than the calyx. *Calyx* $\frac{1}{4}$ in., densely grey-silky; teeth short. *Corolla* yellow, more than twice the length of the calyx; blade of standard oblong. *Pod* thinner than in the other species, 3–4 in. long, 5–6-seeded, densely pubescent.

** *Small spineless trees with usually indehiscent pods.*

2. **S. tomentosa**, *Linn.*; *DC. Prodr.* ii. 95; leaflets 15–19 obovate obtuse densely grey-downy beneath, pedicels as long as the densely grey-downy calyx, flowers yellow, pod finely grey-downy. *Wall. Cat.* 5333; *Roxb. Fl. Ind.* ii. 316; *W. & A. Prodr.* 179; *Bedd. Fl. Sylv.* 89. *S. glabra*, *Hussk.*; *Miq. Flor. Ind. Bat.* i. 125.

Shores of the EASTERN and WESTERN PENINSULAS, and CEYLON.—DISTRIB. Cosmopolitan in the Tropics.

Branchlets virgate, thinly persistently grey-downy. *Leaves* $\frac{1}{2}$ ft. long; leaflets flexible, subcoriaceous, 1–2 in. long, dull grey-green, thinly downy above, the veins immersed on both surfaces. *Racemes* terminal, $\frac{1}{2}$ ft. long; pedicels densely silky, articulated a little below the calyx. *Calyx* $\frac{1}{4}$ – $\frac{3}{8}$ in., nearly truncate, very oblique. *Corolla* $\frac{3}{8}$ – $\frac{1}{2}$ in.; blade of standard round, veined. *Pod* $1\frac{1}{4}$ – $\frac{1}{2}$ ft. long, 6–8-seeded, the oblong hoary joints separated by a narrow neck as long as themselves.

3. **S. violacea**, *Thwaites Enum.* 94; leaflets 19–21 oblong obtuse glabrous, pedicels as long as the subglabrous calyx, flowers violet, pod glabrous. *Bedd. Fl. Sylv.* 90.

CEYLON; Galle district, *Thwaites*.

A middle-sized shrub. *Branches* slender, virgate, obscurely silky at first. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ ft. long; leaflets subdistant, membranous, glabrous, $\frac{3}{4}$ –1 in. long, bright green above, glaucous beneath. *Racemes* axillary, close, short-peduncled, 3–4 in. long; pedicels very slender, articulated below the apex. *Calyx* very oblique, both at the base and throat; teeth obscure. *Corolla* twice the length of the calyx; blade of standard oblanceolate-spathulate, $\frac{1}{4}$ in. broad, with a very long claw. *Pod* 3–4 in. long, 4–6-seeded; joints oblong, veined, hard, with a narrow neck between them.

4. **S. glauca**, *Lesch.*; *DC. Prodr.* ii. 95; leaflets 21–25 acute densely silky beneath, pedicels shorter than the densely silky calyx, flowers purple, pod persistently velvety. *Wall. Cat.* 5334; *W. & A. Prodr.* 179; *Wight Ic.* t. 979; *Bedd. Fl. Sylv.* 89. *S. velutina*, *Lindl. Bot. Reg.* t. 1185. *Edwardsia maderaspatana*, *Wight Ic.* t. 1054 (except the pods).

Hills of the WESTERN PENINSULA.

Branches clothed with dense persistent grey or brown velvety pubescence. *Leaves* $\frac{1}{2}$ ft.; leaflets oblong, not acuminate, rarely subobtusely, $\frac{3}{4}$ –1 in. long, subcoriaceous,

green, glabrescent above, densely grey-silky beneath, finally nearly glabrescent, the hairs on the midrib brown, the veinlets immersed. *Racemes* dense, terminal, short-peduncled, $\frac{1}{4}$ – $\frac{1}{2}$ ft. long; pedicels densely silky. *Calyx* $\frac{1}{4}$ in.; teeth distinct. *Corolla* twice as long as the calyx; blade of standard obovate, $\frac{1}{4}$ in. broad. *Pod* 3–4 in. long, moderately firm, 5–6-seeded, finally dehiscent, but little moniliform when all the seeds are matured.

5. **S. heptaphylla**, Linn.; DC. Prodr. ii. 96; leaflets 7–13 oblong acuminate glabrescent beneath, pedicels exceeding the finely silky calyx, corolla small yellow, pod glabrous. Arn. Pug. 10; Bedd. Fl. Sylv. 89, ex parte.

CEYLON, alt. 4–7000 ft.—DISTRIB. China.

Branchlets at first brown-silky. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ ft.; leaflets conspicuously alternate, subcoriaceous, bright green above, 2–3 in. long, the veins rather raised on both surfaces, glaucous beneath, rounded at the base. *Racemes* short-peduncled, moderately close, $\frac{1}{4}$ – $\frac{1}{2}$ ft. long; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., articulated at the middle, thinly silky, the lower in pairs. *Calyx* $\frac{1}{2}$ in., thinly silky at first. *Corolla* twice the length of the calyx. *Pod* 2–3 in. long, rigidly coriaceous, 2–4-seeded, the joints oblong, $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, with a broad neck between them when the seeds all mature, the faces distinctly veined.

6. **S. Wightii**, Baker; leaflets 11–15 oblong acuminate thinly pubescent beneath, pedicels exceeding the finely silky calyx, corolla middle-sized yellow, pod glabrous. S. heptaphylla, Wight Ic. t. 1155; Dalz. & Gibs. Bomb. Fl. 79; Bedd. Fl. Sylv. 89, in part, non Linn.

Hills of the WESTERN PENINSULA, Mysore, Cleghorn.

Branchlets persistently brown-velvety. *Leaves* $\frac{1}{2}$ ft. long; leaflets subcoriaceous, 2–3 in. long, bright green above, very glaucous with a thin coating of bright brown pubescence, especially on the midrib beneath, the veinlets on both sides rather raised. *Racemes* lax, axillary, short-peduncled, as long as the leaves; pedicels twice the calyx. *Calyx* $\frac{1}{4}$ in., oblique at the mouth, persistently brown-silky; teeth obscure. *Corolla* more than twice the length of the calyx. *Pod* 3–4 in. long, firm, indehiscent; joints oblong, distinctly veined on the faces with a deep constriction between them.

7. **S. acuminata**, Benth. MSS.; leaflets 15–19 oblong acuminate obscurely silky beneath, pedicels shorter than the finely silky calyx, corolla yellow middle-sized, pod glabrous. *Ormosia acuminata*, Wall. Cat. 5973.

EASTERN BENGAL and the EASTERN HIMALAYAS, tropical zone, ascending to 4000 ft.; KHASIA, ASSAM, BHOTAN, MISHMI.

Branchlets thinly grey-silky at first, soon glabrescent. *Leaves* $\frac{3}{4}$ –1 ft.; leaflets subcoriaceous, 3–4 in. long, narrowed to a very long point, the upper cuneate, the lower rounded at the base, bright green above, glaucous beneath, with a few obscure adpressed hairs. *Racemes* peduncled, moderately close, axillary much shorter than the leaves. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in., very oblique, membranous, thinly grey-silky; teeth obscure. *Corolla* bright yellow, more than twice the length of the calyx. *Pod* 3–5 in. long, 3–4-seeded, moderately firm, indehiscent, with deep constrictions between the oblong strongly-veined joints.

§§ **Goebelia**, Bunge in Boiss. Fl. Orient. ii. 628, Gen. *Pod* wingless, indehiscent. *Keel* appendiculate, with a mucro like *Oxytropis*.

8. **S. alopecuroides**, Linn.; DC. Prodr. ii. 96. *Goebelia alopecuroides*, Bunge loc. cit.

WESTERN TIBET, temperate region, alt. 10–12,000 ft., Thomson, Falconer.—DISTRIB. Afghanistan, Orient.

An undershrub, with virgate branches, clothed with short adpressed grey pubescence. *Leaves* $\frac{1}{2}$ ft. long; leaflets 15–25, pale green, oblong, subcoriaceous, obtuse, $\frac{3}{4}$ –1 in. long, thinly grey-downy above, densely beneath. *Flowers* in dense terminal racemes $\frac{1}{2}$ ft. long; pedicels shorter than the calyx. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in., very oblique,

densely pubescent; teeth distinct, deltoid. *Corolla* bright yellow, 3 times the length of the calyx. *Pod* $\frac{1}{4}$ in. broad, subligulate, finely downy, 6-12-seeded, the seeds close and constrictions slight except where the ovules do not develop.

§§§ **Edwardsia**, *Salisb.* *Pod* furnished with four distinct wings.—*Keyserlingia*, Bunge.

9. **S. mollis**, *Grah. in Wall. Cat.* 5335; flowers smaller developed before the leaves in short crowded racemes. *Edwardsia mollis*, *Royle Ill. t.* 32, fig. 2. *Sophora Houghiana*, *Wall. Cat.* 5336 B.

Plains and low hills of the north-west; HAZARA and the SALT RANGE to KUMAR and NIPAL, ascending to 4000 ft.

A low spineless shrub, with finely grey-downy branches, the flowers developed first in copious short simple ascending racemes, the leaves appearing with the fruit. *Leaves* $\frac{1}{2}$ ft. long; leaflets 21-25, rigidly coriaceous, pale, grey green, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, obtuse, emarginate, prominently veined, finely grey-downy. *Racemes* 2-3 in. long; pedicels equalling or exceeding the calyx. *Calyx* $\frac{1}{8}$ - $\frac{1}{4}$ in., very oblique, finely grey-downy. *Corolla* yellow, $\frac{5}{8}$ - $\frac{3}{4}$ in. *Pod* glabrous, 3-4 in. long, 5-6-seeded, the joints with four distinct crustaceous wings and separated by distinct constrictions.

VAR. *hydaspidis*; leaves and calyx more densely and persistently silky, flowers larger.—Salt Range, Punjab.

10. **S. interrupta**, *Bedd. Ic. Pl. Ind. Or. t.* 165; *Fl. Sylv.* 90; *Anal. Gen. t.* 12, fig. 6; flowers larger developed at the same times as the leaves in their axils. *Edwardsia maderaspatana*, *Wight Ic. t.* 1054, as regards the fruit.

Hills of MYSORE, alt. 2500-3000 ft., *Wight, Beddome*.

A tall erect shrub. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ ft. long; leaflets 19-29, obtuse, emarginate, $\frac{3}{4}$ -1 $\frac{1}{4}$ in. long, thinner than in the last, with a few obscure hairs beneath. *Racemes* distinctly peduncled, shorter than the leaves; pedicels twice the length of the calyx. *Calyx* $\frac{1}{4}$ in., very oblique, obscurely silky. *Corolla* bright yellow, $\frac{3}{4}$ - $\frac{7}{8}$ in. long; blade of standard round. *Pod* just like that of *S. mollis*.—This is doubtless the plant intended by Wight, but all except the fruit in the plate appears to be drawn from *S. glauca*.

IMPERFECTLY KNOWN SPECIES.

A plant from the top of Parasnath, in Behar, seen in pod only, doubtless a new species, comes nearest to *S. Wightii*, but the 13-15 leaflets are obtuse, with thinner texture and finer veining, and the joints of the fruit smaller, with a tendency to dehisce down the sutures.

93. **CALPURNIA**, E. Meyer.

Shrubs or trees. *Leaves* odd-pinnate, with numerous leaflets. *Flowers* yellow, racemed or panicled. *Calyx* broadly campanulate; teeth deltoid. *Corolla* much exserted; petals equal in length; keel obtuse, rather incurved, its petals cohering. *Stamens* free; anthers small, oblong, versatile. *Ovary* linear stalked, many-ovuled; style filiform, stigma capitate. *Pod* strap-shaped, flat, membranous, many-seeded, indehiscent, with a narrow wing down the dorsal suture.—DISTRIB. Species 6, the others Cape and Abyssinian.

Virgilia capensis, Lam., a well-known Cape plant, allied to *Calpurnia*, is included in Hohenacker's Nilghiry plants, but is only cultivated in India.

1. **C. aurea**, *Baker in Oliv. Flor. Trop. Afric. ii.* 252; *Bedd. Fl. Sylv.* 89; *Anal. Gen. t.* 12, fig. 5. *Virgilia aurea*, Lam.; *DC. Prodr. ii.* 98; *W. & A. Prodr.* 179. *Robinia Heynei*, *Wall. Cat.* 5653.

WESTERN PENINSULA, near Courtallum, and on the Denkinacottah hills in mountain jungles.—DISTRIB. Abyssinia.

Branches slender, finely grey-silky. *Leaflets* 13–21, membranous, oblong, obtuse, glabrous, 1–1½ in. long. *Racemes* copious, short-peduncled, as long as the leaves; pedicels finely silky, much exceeding the calyx. *Calyx* ⅓–¼ in. *Pod* pliable, 3–4 in. long, 5–6-seeded, glabrous.

94. **PERICOPSIS**, Thwaites.

A tree. *Leaves* odd-pinnate, with large coriaceous leaflets. *Flowers* racemed or paniced. *Calyx* large, cleft to below the middle, the upper teeth shortest, subconnate. *Corolla* little exserted; standard round, reflexed, rather shorter than the obtuse wings and keel. *Stamens* free, as long as the corolla, recurved at the end; anthers uniform, versatile. *Ovary* stalked, few-ovuled; style long, filiform, recurved at the end, stigma oblique. *Pod* like that of a *Derris*, rigid, indehiscent, flattish, strap-shaped, with a narrow wing down each suture.—**DISTRIB.** A single species, endemic in Ceylon.

1. **P. Mooniana**, Thwaites Enum. 413; Bedd. Fl. Sylv. t. 187. *Dalbergia Mooniana*, Thwaites Enum. 93. *D. lanceolaria*, Moon Cat. 51, non Linn.

CEYLON, southern and central districts, Thwaites, Ferguson.

A large tree, with slender subglabrous branches. *Stipules*, bracts and bracteoles minute, caducous; leaflets 5–7, glabrous, subcoriaceous, conspicuously alternate, broad oblong, subacute, 2–3 in. long. *Flowers* in sparse axillary racemes and terminal corymbose panicles. *Calyx* pedicellate, glabrous, ½ in., leathery; teeth lanceolate. *Corolla* dark purple, yellowish at the base; keel-petals slightly cohering. *Pod* 3–5 in. by 1 in., 4–5 seeded, glabrous, polished.

95. **ORMOSIA**, Jacks.

Erect trees. *Leaves* odd-pinnate. *Flowers* usually in dense terminal racemes. *Calyx* campanulate, deeply 5-cleft, the upper teeth the shortest. *Corolla* not much exserted; petals all with short claws, about equal in length; standard round; keel-petals and wings oblong, obtuse, the former not connate. *Stamens* free, much incurved, often exserted when the flower expands; anthers oblong, versatile. *Ovary* subsessile; style long, filiform, circinate at the end, stigma oblique. *Pod* thick, rigid or rather fleshy, turgid, 2-valved, continuous within, the sutures not winged. *Seeds* with a bright scarlet aril or testa.—**DISTRIB.** Species above 20, cosmopolitan in the tropics.

* *Leaflets* glabrous beneath. *Seeds* (where known) large.

1. **O. robusta**, Wight Ic. t. 245 (Sophora in tab.); leaflets 7–11 oblong lanceolate dark green, racemes crowded in terminal panicles, pedicels shorter than the calyx, pod oblong with the valves round on the back. *O. floribunda*, Wall. Cat. 5337. *Sophora robusta*, Roxb. Hort. Beng. 31. *Arillaria robusta*, Kurz in Journ. Asiat. Soc. Beng. vol. xlii. pt. 2, 71.

SILHET, Roxburgh, Wallich. PEGU and TENASSERIM, Kurz.

A large tree, with thick sulcate thinly grey-downy branches. *Leaflets* opposite, 3–5 in. long, acute, rounded at the base, rigidly subcoriaceous, dull green beneath, the veins fine, rather raised. *Racemes* in a large end panicle and also from the axils of the upper leaves, the branches finely grey-downy; bracts lanceolate, minute, subpersistent; bracteoles 0. *Calyx* under ¼ in., brown-silky, the teeth as long as the tube. *Corolla* twice the length of the calyx. *Ovary* densely silky. *Pod* oblong, glabrous, bright yellow, rather fleshy, but two-valved, usually 1-seeded, 2–2½ in. long, sometimes 2-seeded. *Seeds* oblong, 1½ in. long, 'enveloped in a complete thick fleshy scarlet aril.'—Kurz.

2. **O. travancorica**, *Bedd. Fl. Sylv.* t. 45; leaflets 7-9 oblong dull green long-stalked, racemes crowded in terminal panicles, pedicels very short, pod oblong with the valves rounded on the back.

TRAVANCORE hills, *Beddome*.

A tall tree, with finely grey-downy branchlets. *Leaflets* opposite, oblong, cuspidate, rigidly coriaceous, 2-3 in. long, dull grey-green beneath, rounded at the base, slightly downy on the midrib, the veinlets immersed; petiolules $\frac{1}{4}$ - $\frac{1}{2}$ in. long. *Flowers* crowded on the finely grey-downy branches; bracts very minute. *Calyx* brown-silky, $\frac{1}{6}$ - $\frac{1}{5}$ in., deeply 5-cleft. *Corolla* whitish, under twice the length of the calyx. *Pod* glabrous, hard, oblique oblong, subacute, 3 in. long, 1-seeded. *Seed* oblong, 1 in. long, with a bright scarlet testa.

3. **O. macrodisca**, *Baker*; leaflets 7-9 rigidly coriaceous pale green oblong, short-stalked, racemes crowded in terminal panicles, pedicels shorter than the calyx, pod large orbicular with subcompressed thick valves.

MALACCA, *Maingay*.

A large tree, with very thick grey glabrous branchlets. *Leaflets* very thick and rigid in texture, pale grey-green on both surfaces, acute, broadly rounded at the base, 3-5 in. long, quite glabrous, the veins immersed. Branches of the panicle stout, sulcate, glabrous; bracts and bracteoles minute, subpersistent; pedicels brown-silky $\frac{1}{8}$ - $\frac{1}{6}$ in. *Calyx* $\frac{1}{4}$ - $\frac{1}{3}$ in., densely brown-silky, cleft considerably below the middle. *Corolla* half as long again as the calyx; standard $\frac{3}{8}$ in. broad. *Stamens* considerably exerted. *Pod* hard, thick, 3 in. broad, flat at first, turgid when the usually solitary seed swells. *Seed* oblong, 1 in. long, with a large black adnate pitted aril.

4. **O. glauca**, *Wall. Pl. Asiat. Rar.* ii. 23, t. 125; leaflets 7-9 oblong dull pale green distinctly stalked, flowers in axillary racemes, pedicels as long as the calyx, pod unknown. *Wall. Cat.* 5338.

NIPAL, *Wallich*.

A tall tree, with thinly brown-velvety stout sulcate branchlets. *Leaflets* rigidly subcoriaceous, obtusely cuspidate, 3-4 in. long, dull pale green on both surfaces, the veins immersed; petiolules $\frac{1}{8}$ - $\frac{1}{6}$ in. *Flowers* in peduncled racemes, shorter than the leaves; bracts and bracteoles minute, caducous. *Calyx* $\frac{1}{4}$ in., obscurely silky; teeth as long as the tube. *Corolla* white, twice the length of the calyx. *Ovary* linear, brown-silky, 3-4-ovuled.

** *Leaflets beneath and branchlets velvety. Seeds small.*

5. **O. microsperma**, *Baker*; leaflets 11-13 acute short-stalked, veinlets beneath slender raised anastomosing, pedicels shorter than the calyx, pod subcompressed with thin valves, seed oblong turgid.

MALACCA, *Griffith, Maingay*.

A middle-sized tree, with thick densely brown-velvety branches. *Leaflets* oblong, rigidly coriaceous, 2-4 in. long, grey-green, rather glossy above, broadly rounded at the base, densely persistently shortly pubescent beneath; petiolules $\frac{1}{12}$ in. Branches of the panicle rigidly erecto-patent, densely velvety. *Calyx* $\frac{1}{6}$ - $\frac{1}{5}$ in., with a pair of small lanceolate bracteoles at the base, densely velvety; teeth as long as the tube. *Corolla* twice as long as the calyx. *Ovary* densely silky, 3-4-ovuled. *Pod* orbicular if 1-seeded, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, oblong if 2-seeded, lineate between the seeds, the valves thin, rigid, glabrescent. *Seeds* bright scarlet, $\frac{1}{4}$ in. long, exarillate.—Closely resembles *O. coarctata*, *Jacks.* in *Trans. Linn. Soc.* x. t. 25, from Guiana, and nearly allied to the Malayan *Macrotropis sumatrana*, *Miq. Fl. Ind. Bat. Suppl.* 294. *Kurz* refers here *Chenolobium septemjugum* and *decemjugum*, *Miq. Fl. Ind. Bat. Suppl.* 302.

6. **O. parvifolia**, *Baker*; leaflets 9-13 small acute, long-stalked, veins

beneath inconspicuous, pedicels very short, pod subcompressed with thin valves, seeds oblong turgid. *Macrotripsis bancana*, *Miq. Fl. Ind. Bat. Suppl.* 295?

MALACCA, *Griffith, Maingay.*

Branches slender, persistently brown-velvety. *Leaflets* rigidly coriaceous, grey-green, oblong, distinctly cuspidate, the end one 2-2½ in. long, rather glossy above, thinly hairy beneath, the veins fine and scarcely at all raised; petiolules ⅓-½ in. *Racemes* short; flowers crowded; bracts and bracteoles distinct, ovate-lanceolate, subpersistent. *Calyx* ½ in., brown-silky, cleft half way down. *Corolla* twice the length of the calyx. *Ovary* silky. *Pod* and seeds just like those of *O. microserma*.

7. **O. venosa**, *Baker*; leaflets 7 obtuse or subobtuse nearly sessile on the rachis with thick much-raised parallel main veins beneath, pedicels long, pod-valves thick turgid, seeds orbicular subdiscoid.

MALACCA, *Maingay.*

A tall tree, with branches clothed with persistent dense velvety pubescence. *Leaflets* obovate-oblong, rigidly coriaceous, 3-4 in. long, grey-green and glabrous above, densely persistently tomentose beneath. *Flowers* crowded in terminal racemes, the branches densely velvety, not rigid as in the two preceding; bracts and bracteoles minute, but distinct and subpersistent; pedicels as long as the calyx. *Calyx* ¼ in., densely velvety, cleft down to the middle. *Corolla* half as long again as the calyx. *Stamens* distinctly exserted. *Pod* obtuse or subacute, oblong or obovoid-oblong, glabrous, 1½-1¾ in. long, 1 in. thick. *Seeds* bright scarlet, exarillate, ⅔-½ in. broad.

96. CÆSALPINIA, Linn.

Robust erect trees, shrubs or woody prickly climbers. *Leaves* large, abruptly bipinnate. *Flowers* showy, yellow, in copious axillary racemes. *Calyx* deeply-cleft, with the disk confined to its base, the lobes imbricated, the lowest the largest, cucullate. *Petals* spreading, usually orbicular with a distinct claw, the uppermost smaller than the others. *Stamens* 10, free, declinate; anthers oblong, uniform, versatile. *Ovary* sessile or subsessile, few-ovuled; style filiform, sometimes clubbed at the tip, stigma terminal. *Pod* oblong or ligulate, thin and flat, or thicker and subturgid, indehiscent or dehiscent, smooth or in subgen. *Guilandina* armed all over with wiry spines.—DISTRIB. Species about 40, widely spread in the tropics of both hemispheres.

SUBGEN. 1. **Guilandina** (Linn.) *Pod* dry, armed on the faces with abundant wiry prickles. *Petals* narrow.

1. **C. Bonducella**, *Fleming in Asiat. Res.* xi. 159; leaves stipulate, leaflets small, bracts squarrose. *Roxb. Fl. Ind.* ii. 357. *Guilandina Bonducella*, *Linn.*; *Wall. Cat.* 5803. *G. Bonduc*, *W. & A. Prodr.* 280; *Dalz. & Gibs. Bomb. Fl.* 79, in part.

From the HIMALAYAS, throughout India, ascending to 2500 ft. in KUMAON.—DISTRIB. Cosmopolitan in the tropics.

Branches finely grey-downy, with abundant small hard falcate yellow prickles. *Leaves* a foot or more long, with a pair of reduced pinnæ persistent at the base; pinnæ mostly 12-16; leaflets oblong, obtuse, mucronate, membranous, usually ½-1 in. long, rather downy beneath. *Racemes* long-peduncled, simple or panicle, dense at the top, lax downwards; pedicels as long as the calyx, finely brown-downy. *Calyx* ¼-½ in. *Petals* oblanceolate, yellow, little exserted. *Pod* short-stalked, oblong, 2-3 in. long. *Seeds* 1-2, large, oblong, lead-coloured.

2. **C. Bonduc**, *Roxb. Hort. Beng.* 32; *Fl. Ind.* ii. 362; leaves without stipules, leaflets larger, bracts ascending. *Guilandina Bonduc*, *Linn.*; *DC. Prodr.* ii. 480; *Wall. Cat.* 5806; *W. & A. Prodr.* 280, *ex parte*. *G. glabra*, *Mill. Dict.* No. 3.

EASTERN and WESTERN PENINSULAS. CEYLON.—DISTRIB. Malay isles, Polynesia, West Indies.

Very near *C. Bonducella*, from which it differs by its more robust habit, less downy branches, larger leaflets (often 2–3 in. long), the absence of the reduced stipular pinnæ, by its smaller not squarrose bracts, and more tropical dispersion.

SUBGEN. 2. **Eucæsalpinia**. *Pod* dry, naked on the valves, indehiscent or finally dehiscing, the sutures thin except in *C. sepiaria*. *Petals* broad.

3. **C. Nuga**, *Ait. Hort. Kew*, iii. 32; glabrous, pinnæ 4–6, leaflets 4–6 large ovate, stamens little exserted, pod woody broad-oblong 1-seeded. *Guilandina Nuga*, *Linn. Sp. Pl.* 546. *C. paniculata*, *Roxb. Hort. Beng.* 32; *Fl. Ind.* ii. 364; *DC. Prodr.* ii. 481; *W. & A. Prodr.* 281; *Wight Ic.* t. 36; *Dalz. & Gibs. Bomb. Fl.* 79. *C. sumatrana*, *Wall. Cat.* 5831 B, C, *non Roxb.* *C. bijuga*, *Wall. Cat.* 5833, *non Sw.* *C. scandens*, *Kæmig*; *DC. Prodr.* ii. 482; *Wall. Cat.* 5829.

CHITTAGONG, SILHET, EASTERN and WESTERN PENINSULAS, and CEYLON.—DISTRIB. Malay isles, Philippines, China, N. Australia, Polynesia.

Branches slender, very flexuose. *Prickles* copious, dark-clooured, hooked. *Leaflets* distinctly petioluled, $1\frac{1}{2}$ –2 in. long, obtuse, glossy. *Racemes* axillary and terminal, copiously paniced, with spreading branches; pedicels as long as the calyx. *Calyx* glabrous, $\frac{1}{4}$ – $\frac{1}{2}$ in. *Petals* scarcely exserted. *Filaments* densely woolly in the lower half. *Pod* 2 in. long, broad, oblong, beaked, hard, glabrous, indehiscent, rather turgid.

4. **C. Sappan**, *Linn.*; *DC. Prodr.* ii. 482; subglabrous, pinnæ 20–24, leaflets 20–30 moderately small oblong very oblique, stamens little exserted, pod oblique oblong woody 3–4-seeded. *Roxb. Cor. Pl.* i. 17, t. 16; *Hort. Beng.* 32; *Fl. Ind.* ii. 357; *Wall. Cat.* 5838; *W. & A. Prodr.* 281; *Bedd. Fl. Sylv.* 90; *Anal. Gen.* t. xiii. fig. 1. *Biancæa Sappan*, *Todaro Hort. Bot. Panorm.* 3.

EASTERN and WESTERN PENINSULAS and PEGU.—DISTRIB. Malay isles.

A small tree. *Prickles* small and few. *Leaf-rachis* $\frac{1}{2}$ –1 ft. long; leaflets close, sessile, subcoriaceous, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, attached at the lowest corner. *Panicles* often as long as the leaves, the young branches slightly ferrugineo-pubescent; bracts large, lanceolate, caducous; pedicels $\frac{1}{2}$ – $\frac{5}{8}$ in. *Calyx* $\frac{3}{8}$ in., glabrous. *Filaments* densely woolly in the lower half. *Ovary* grey-velvety. *Pod* 3–4 in. by $1\frac{1}{2}$ in., subcompressed, polished, indehiscent, with a hard recurved beak at the upper angle.

5. **C. pulcherrima**, *Swartz, Obs.* 166; glabrous, pinnæ 12–18, leaflets 20–24 small oblique-oblong, stamens much exserted, pod thin ligulate flat glabrous 6–8-seeded. *Poinciana pulcherrima*, *Linn.*; *Bot. Mag.* t. 995; *Roxb. Fl. Ind.* ii. 355; *DC. Prodr.* ii. 484; *Wall. Cat.* 5813; *W. & A. Prodr.* 282.—*Rheede Hort. Mal.* vi. t. 1.

Universally cultivated through India and elsewhere in the tropics; the native country not clearly known.

A shrub or small tree. *Prickles* few and scattered on the branches. *Leaflets* sessile, close, membranous, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, not so oblique as in the last, very obtuse. *Racemes* very broad, the lower pedicels 3–4 in. long. *Calyx* $\frac{1}{2}$ – $\frac{5}{8}$ in., glabrous. *Petals* round, crisped, reddish-yellow, with a very distinct claw, the largest and most showy of all the species. *Filaments* bright red, 3–4 times the length of the corolla. *Pod* nearly straight, 2–3 in. long, the narrowest and thinnest of that of any of the species.

6. **C. sepiaria**, Roxb. *Hort. Beng.* 32; *Fl. Ind.* ii. 360; downy, pinnæ 12-20, leaflets 16-24 small oblong, stamens little exserted, pod oblong-ligulate subturgid veined 4-8-seeded. *Wall. Cat.* 5834, excl. H.; *W. & A. Prodr.* 282; *Wight Ic.* t. 37; *Dalz. & Gibs. Bomb. Fl.* 80. *C. ferox*, Hassk. *Pl. Jav. Rar.* 400. *C. japonica*, Sieb. & Zucc. *Fl. Jap.* 9. *C. crista*, Thunb. *Fl. Jap.* 179, non Linn. *Reichardia decapetala*, Roth; *DC. Prodr.* ii. 484. *Biancæa scandens*, *Todaro Hort. Bot. Panorm.* 4, t. 1.

HIMALAYAS to CEYLON and AWA, ascending to 4000 ft. in the North-West.—DISTRIB. Malay isles, China, Japan and introduced in Tropical America.

Branches more or less densely coated with grey or brown pubescence. *Prickles* small, copious, hooked, pale brown. *Leaves* $\frac{3}{4}$ -1 ft. long; pinnæ distinctly stalked; leaflets membranous, very obtuse, $\frac{1}{2}$ -1 in. long, green and glabrous above, glaucous and slightly pubescent beneath. *Racemes* simple, distinctly-peduncled, $\frac{1}{2}$ -1 ft. long; pedicels rigidly erecto-patent, twice the length of the calyx. *Calyx* $\frac{3}{4}$ - $\frac{1}{2}$ in., more or less pubescent. *Corolla* $\frac{1}{2}$ in., bright yellow. *Filaments* densely woolly in the lower half. *Pod* 3-5 in. by above 1 in., subligulate, glabrous, rather recurved, with the upper suture dilated into a narrow *Derris*-like wing, subindehiscent.

7. **C. mimosoides**, Lam. *Ill.* t. 335, fig. 2; downy, pinnæ 20-60, leaflets 20-40 oblong very small, stamens little exserted, pod recurved oblong very turgid 2-seeded. *DC. Prodr.* ii. 482; *W. & A. Prodr.* 281; *Wight Ic.* t. 392; *Dalz. & Gibs. Bomb. Fl.* 80. *C. Simora*, Ham. in Roxb. *Hort. Beng.* 32; *Fl. Ind.* ii. 359. *C. resupinata*, Roxb. *Hort. Beng.* 32; *Fl. Ind.* ii. 362. *C. horrida*, *Wall. Cat.* 5836. *C. armata*, Grah. in *Wall. Cat.* 5840. *Biancæa mimosoides*, *Todaro Hort. Bot. Panorm.* 3.

BIRMA at Chappedong, Wallich. WESTERN PENINSULA. CEYLON.

Branches armed with copious irregular small prickles, passing down gradually into aciculi, bristles and hairs. *Leaves* 1-1 $\frac{1}{2}$ ft. long, much narrower than in the other species; leaflets sessile, membranous, sensitive, glabrous, $\frac{1}{4}$ - $\frac{3}{8}$ in. long. *Racemes* lax, simple, 1-2 ft. long, the rachis densely prickly and like the rigidly erecto-patent prickles very rough with hard raised points; pedicels 2-3 times the length of the calyx. *Calyx* $\frac{1}{4}$ - $\frac{3}{8}$ in., more or less downy. *Petals* broad, bright yellow, scarcely exserted. *Filaments* densely woolly in the lower half. *Pod* under 2 in. long, more turgid than in the other species, half an inch thick, narrowed to the base, hard, subindehiscent, clothed with minute deciduous bristles, truncate at the end with a short recurved beak, the sutures not at all thickened.

SUBGEN. 3. **Cinclidocarpus** (Z. & M.). *Pod* rather fleshy, indehiscent, naked on the faces, the sutures much thickened. *Petals* broad.

8. **C. digyna**, Rottl.; *DC. Prodr.* ii. 482; leaflets 16-20 membranous, pedicels spreading 2-4 times the length of the calyx. *Wall. Cat.* 5839; *W. & A. Prodr.* 281. *C. oleosperma*, Roxb. *Hort. Beng.* 32; *Fl. Ind.* ii. 356. *C. flavicans*, Grah. in *Wall. Cat.* 5825. *C. gracilis*, Miq. *Flor. Ind. Bat.* i. 110. *Pterolobium lacerans*, *Wall. Cat.* 5841, F. & I.

EASTERN HIMALAYAS, EASTERN and WESTERN PENINSULAS, and CEYLON.—DISTRIB. Malay isles.

Branches glabrous or slightly downy; prickles scattered, uniform. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ ft. long; leaflets close, oblong, obtuse, sessile, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, dark green and glabrous above, grey and glabrescent or obscurely downy beneath. *Racemes* peduncled, simple, equalling or exceeding the leaves; pedicels $\frac{1}{2}$ -1 in., slender, glabrous, spreading horizontally or rather deflexed. *Calyx* glabrous, $\frac{1}{4}$ - $\frac{1}{2}$ in. *Stamens* little exserted, woolly. *Pod* oblong, glabrous, 1 $\frac{1}{2}$ -2 in. long, 2-4-seeded, turgid, torulose.

9. **C. cinclidocarpa**, Miq. *Flor. Ind. Bat.* i. 110; leaflets 28-36 rigidly subcoriaceous, racemes copiously paniced, pedicels erecto-patent as long as the

calyx. *Cinclidocarpus nitidus*, Zoll. & Moritz, *Nat. Genesck.* iii. 74. *C. microphylla*, *Hamilt. in Wall. Cat.* 5826. *C. tortuosa*, *Wall. Cat.* 5827 D.

ASSAM and SILHET.—DISTRIB. Java.

Obscurely downy. *Prickles* scattered, uniform. *Leaves* a foot or more long; pinnae 20–24; leaflets close, sessile, obtuse, ligulate, caducous, $\frac{1}{8}$ – $\frac{3}{4}$ in. by $\frac{1}{8}$ – $\frac{1}{3}$ in., glossy above. *Panicles* often as long as the leaves, with finely downy rachises and pedicels. *Calyx* $\frac{3}{8}$ – $\frac{1}{2}$ in. *Petals* round with a claw, bright yellow. *Stamens* little exerted. *Pod* oblong, indehiscent, 2–3 in. by 1 in., glabrous, 3–4-seeded.

10. **C. tortuosa**, *Roxb. Hort. Beng.* 32; *Fl. Ind.* ii. 365; leaflets 40–60 rigidly subcoriaceous, racemes simple, pedicels erecto-patent as long as the calyx. *Wall. Cat.* 5827 A, B, C.

TENASSERIM, *Wallich*.—DISTRIB. Malay isles.

Branches slightly downy. *Prickles* small, scattered, uniform. *Leaves* 1–1 $\frac{1}{2}$ ft. long; pinnae 30–40; leaflets close, glossy, sessile, narrow ligulate, obtuse, $\frac{1}{4}$ – $\frac{1}{3}$ in. by $\frac{1}{12}$ in., just like those of the last in shape and texture. *Racemes* as long as the leaves. *Calyx* $\frac{5}{8}$ in., glabrous. *Pod* just like those of the two preceding.

97. **PELTOPHORUM**, *Vogel*.

Tall unarmed trees. *Leaves* abruptly bipinnate. *Flowers* showy, yellow, in axillary and paniced terminal racemes. *Calyx* with the disk confined to the base; teeth subequal, very deep, imbricate. *Petals* oblong or roundish, imbricated, spreading. *Stamens* 10, free, declinate; filaments with a dense tuft of hairs at the base; anthers uniform, linear-oblong. *Ovary* sessile, free, few-ovuled; style long, filiform, incurved, stigma large peltate. *Pod* oblong, flat, thin, hard, indehiscent, with a firm broad wing on each suture.—DISTRIB. Species 6, cosmopolitan in the Tropics.

1. **P. ferrugineum**, *Benth. Fl. Austral.* ii. 279; flowering pedicels at most as long as the calyx. *Cæsalpinia ferruginea*, *Miq. Flor. Ind. Bat.* i. 111. *C. arborea*, *Miq. loc. cit.* 112. *C. Glenniei*, *Thwaites Enum.* 414. *C. inermis*, *Roxb. Fl. Ind.* ii. 367. *Poinciana Roxburghii*, *G. Don Gen. Syst.* ii. 433.

SINGAPORE, MALACCA, ANDAMANS, and CEYLON.—DISTRIB. Malay isles, N. Australia.

Young branches clothed with thin bright reddish-brown tomentum. *Leaves* distinctly petioled, $\frac{1}{2}$ –1 ft. long; pinnae opposite, 16–20, $\frac{1}{4}$ – $\frac{1}{2}$ ft. long; leaflets 20–30, close, ligulate-oblong, sessile, obtuse, unequal-sided, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, rigidly subcoriaceous, slightly tomentose below. *Branches* of the panicle numerous, stiffly erecto-patent, conspicuously ferrugineo-tomentose, as is also the calyx; bracts minute, lanceolate, caducous. *Calyx* $\frac{1}{2}$ in. deep. *Pod* 1–4-seeded, rigid, glabrous, 2–4 in. by 1 in., narrowed to both ends, closely longitudinally veined.

2. **P. dasyrachis**, *Kurz MSS.*; flowering pedicels 3–4 times as long as the calyx. *Cæsalpinia dasyrachis*, *Miq. Flor. Ind. Bat. Suppl.* 292. *C. Finlaysoniana*, *Grah. in Wall. Cat.* 5971.

MALACCA, *Griffith*, *Maingay*.—DISTRIB. Java, Sumatra.

Very near *P. ferrugineum*, with which it agrees in vestiture and leaves. *Flower-racemes* 6–9 in. by 3 in.; lower pedicels patent or rather reflexed, 1–1 $\frac{1}{2}$ in. long; bracts linear, subpersistent, $\frac{1}{2}$ in. long. *Flowers* rather larger. *Pod* the same shape but rather larger, thinner and not reticulately veined.

98. **MEZONEURUM**, *Desf.*

Robust woody prickly climbers. *Leaves* abruptly bipinnate. *Flowers* in ample paniced racemes. *Calyx* very oblique, usually deeply cleft, with the disk

confined to the base or extending upwards, the lobes imbricated, the lowest the longest, remarkably hood-like. *Petals* spreading, obovate-spathulate, subequal. *Stamens* free, declinate, usually exserted; anthers oblong, uniform. *Ovary* sessile, many-ovuled; style filiform, incurved with the stamens, stigma small capitate. *Pod* large, oblong, flat, thin, indehiscent, with a broad wing down the upper suture.—**DISTRIB.** Species 10, mostly Trop. Asiatic, confined to the old world.

* **Eumezoneuron.** *Calyx* deeply cleft; disk basal.

1. **M. cucullatum**, *W. & A. Prodr.* 283; leaflets 8-10 large ovate acute glabrous, stamens much exceeding the calyx. *Dalz. & Gibs. Bomb Fl.* 80. *Cæsalpinia cucullata*, *Roxb. Hort. Beng.* 32; *Fl. Ind.* ii. 358; *G. Don Gen. Syst.* ii. 431; *Wall. Cat.* 5828, excl. B. *M. macrophyllum*, *Blume; Miq. Flor. Ind. Bat.* i. 104.

EASTERN HIMALAYAS from NIPAL, ascending to 4,000 ft. to the KHASIA hills, BEHAR and the WESTERN PENINSULA.—**DISTRIB.** Malay isles.

Branches glabrous, with small dark hooked scattered prickles. *Leaf-rachis* $\frac{1}{2}$ -1 ft. long; *pinnae* 4-10 long-stalked; leaflets rigidly subcoriaceous, 1-2 in. long, glabrous, dark-green above, subdistant, rather glaucous below. *Racemes* simple or forked, sometimes as long as the leaves, the rachis virgate, tinged with yellow; pedicels as long as the calyx, which is the most oblique of all the species, with the posterior sepal and petal very cucullate. *Calyx* $\frac{3}{8}$ in., glabrous, tinged with yellow. *Petals* bright yellow, streaked with red. *Filaments* faintly ciliated near the base. *Pod* like that of a *Dalbergia*, with a single large seed in the middle, 3-4 in. long, with a wing like the valves in texture $\frac{1}{4}$ - $\frac{3}{8}$ in. broad.

VAR. grandis, Heyne in *Wall. Cat.* 5830, under *Cæsalpinia*. sp.; larger in all its parts, the leaflets 3-4 in. long, and wing of the pod $\frac{1}{2}$ in. broad. *Guilandina macrocarpa*, *Grah. in Wall. Cat.* 5804.—**Distribution** of the type.

Rheede Hort. Mal. vol. vi. t. 20, on which is founded *Guilandina axillaris*, Lam. (*Cæsalpinia*? *axillaris*, DC. *Prodr.* ii. 481) is probably made up of the leaf of this and pod of *Cæsalpinia Sappan*.

2. **M. glabrum**, *Desf. in Mem. Mus.* iv. 246, t. 10; leaflets 14-16 small glabrous oblong obtuse distinctly stalked, stamens much exceeding the calyx. *DC. Prodr.* ii. 484. *Cæsalpinia furfuracea*, *Wall. Cat.* 5835.

TENASSERIM, *Wallich*.—**DISTRIB.** Philippines, Timor.

Branches glabrous, the falcate prickles almost restricted to the base of the *pinnae*. *Leaves* 1 ft. long; *pinnae* 12-14, distinctly stalked; leaflets membranous, caducous, close, dark green, alternate, $\frac{1}{2}$ - $\frac{3}{4}$ in. long. *Racemes* simple or forked, as long as the leaves; pedicels exceeding the calyx. *Calyx* glabrous, $\frac{1}{2}$ in. long, less oblique than in the last, the upper teeth reaching half down, the lowest twice as long. *Filaments* densely ciliated near the base. *Pod* 5-6 in. by $1\frac{1}{4}$ in., 2-4-seeded, with a wing $\frac{1}{2}$ - $\frac{5}{8}$ in. broad.

3. **M. enneaphyllum**, *W. & A. Prodr.* 283; leaflets 18-22 small glabrous oblong obtuse subsessile, stamens slightly exceeding the calyx. *Cæsalpinia enneaphylla*, *Roxb. Hort. Beng.* 32; *Fl. Ind.* ii. 363; *Miq. Flor. Ind. Bat.* i. 104, tab. 2 B. *C. sepiaria*, *Wall. Cat.* 5834 H.

CACHAR and CHITTAGONG, *Hook. fil. and Thomson*. TAVOY, *Gomez*. PEGU, *McClelland*. CEYLON, *Thwaites*.—**DISTRIB.** Malay isles.

Branches slender, glabrous; prickles copious, minute, falcate. *Leaves* $\frac{3}{4}$ -1 ft. long; *pinnae* 16-20, distinctly stalked, 2-3 in. long; leaflets sensitive, glabrous, membranous, $\frac{3}{8}$ - $\frac{1}{2}$ in. long. *Racemes* copiously paniced, sometimes a foot long; pedicels slender, glabrous or pubescent, twice as long as the calyx. *Flower* smaller than in the last. *Calyx* $\frac{1}{4}$ - $\frac{1}{2}$ in., glabrous. *Corolla* bright yellow. *Filaments* densely woolly at the base. *Pod* 3-4 in. long by less than 1 in., thin and glossy, 4-6-seeded; wing $\frac{1}{4}$ - $\frac{3}{8}$ in. broad.—Very like *Cæsalpinia sepiaria* in habit and inflorescence.

4. **M. pubescens**, Desf. in Mem. Mus. iv. 246, t. 11; leaflets 12-16 small oblong obtuse pubescent subsessile, stamens slightly exceeding the calyx. *Cæsalpinia hymenocarpa*, Wall. Cat. 5832.

AVA; Taong-dong, Wallich. CEYLON, Thwaites.—DISTRIB. Malay isles.

General habit and inflorescence of the last. Branches, leaves below and calyx densely finely grey-downy. Pinnæ 12-24, distinctly stalked; leaflets sensitive, $\frac{1}{2}$ - $\frac{3}{4}$ in. long. Racemes close, copiously panicked; pedicels erecto-patent, twice the calyx. Flowers larger than in the last, bright yellow. Filaments densely woolly near the base. Pod 3-4-seeded, 3-4 in. by 1 in. broad, without the wing.

** **Tubicalyx**, Miq. Flor. Ind. Bat. i. 1081. Calyx shallowly cleft with the disk extending above the base.

5. **M. sumatranum**, W. & A. Prodr. 283. *Cæsalpinia sumatrana*, Roxb. Hort. Beng. 32; Fl. Ind. ii. 366; Wall. Cat. 5831, A, not B and C.

MALACCA, Griffith, Maingay.—DISTRIB. Malay isles.

Branches thick, rather downy, armed with copious small falcate prickles. Leaves a foot or more long; pinnæ and leaflets both 8-10, the latter obovate-oblong, rigidly coriaceous, glabrous, obtuse, 2-3 in. long. Racemes as long as the leaves, forked; rachis virgate, woody; pedicels very short. Calyx glabrous, $\frac{3}{8}$ - $\frac{1}{2}$ in. long, the upper teeth not more than $\frac{1}{10}$ in. deep, the lowest rather longer, the tube splitting off at the insertion of the glabrous filaments. Petals little exerted, reddish-yellow, much narrower than in the other species, permanently imbricated, oblanceolate-spathulate. Pod thin, 3-4 in. by 1 in., 3-4-seeded, with a moderately broad wing.—The structure of the flower is so different from that of the other species that it would probably be better to separate it generically, and place it next to *Wagata*.

99. **PTEROLOBIUM**, R. Br.

Woody climbers, with the habit of *Cæsalpinia*, from which they differ only in pod. Calyx deeply cleft, with the disk near the base, the lobes imbricated, the lowest longer and more hooded than the others. Petals spreading, oblong and clawed, equalling the calyx. Stamens 10, free, declinate, little exerted; anthers oblong, versatile. Ovary sessile, 1-ovuled; style filiform, stigma small terminal. Pod indehiscent, samaroid, with a large horny oblique terminal wing.—DISTRIB. Species 4, spread through the Tropics of the old world.

1. **P. indicum**, A. Rich. Fl. Abyss. i. 246. *Cæsalpinia lacerans*, Roxb. Fl. Ind. ii. 367. *Pterolobium lacerans*, Wall. Cat. 5841, A to E; W. & A. Prodr. 283; Wt. Icones, t. 196; Kurz in Journ. Asiat. Soc. Beng. xlii. 2 71 non R. Br. *Reichardia hexapetala*, Roth; DC. Prodr. ii. 484.

WESTERN PENINSULA.

Branches slender, finely downy; prickles minute, hooked, uniform. Pinnæ 8-16; leaflets 12-16, close, sessile, oblong, obtuse, membranous, sensitive, $\frac{1}{2}$ in. long, glabrous, pale green. Racemes 2-3 in. long, copiously panicked at the end of the branches; pedicels finely downy, spreading, $\frac{3}{8}$ - $\frac{1}{2}$ in. Calyx glabrous, $\frac{1}{2}$ - $\frac{1}{4}$ in.; lowest sepal longest. Corolla yellow, not showy, as long as the lowest sepal. Pod $1\frac{1}{4}$ - $1\frac{1}{2}$ in.; wing $\frac{3}{4}$ -1 in. by $\frac{3}{8}$ - $\frac{1}{2}$ in.

VAR. 1. *microphyllum*, Miq.; Kurz, loc. cit. sp.; racemes copiously panicked, leaflets $\frac{3}{8}$ in. long, pod 2 in. long with an obtuse or obliquely acute wing $1\frac{1}{4}$ - $1\frac{1}{2}$ in. by $\frac{1}{2}$ in.—Tenasserim, Helfer. Malacca, Maingay.—DISTRIB. Malay isles.

VAR. 2. *macropterum*, Kurz, loc. cit. sp.; branches stouter, leaflets much larger, pod $2\frac{1}{2}$ - $2\frac{3}{4}$ in. long with an obtuse wing $1\frac{1}{2}$ -2 in. by $\frac{3}{4}$ - $\frac{1}{2}$ in.—Pegu, Martaban, Tenasserim.

100. **POINCIANA**, Linn.

Erect unarmed trees. *Leaves* just those of *Cæsalpinia*. *Flowers* in corymbose racemes. *Calyx* deeply cleft, with the disk a little above the base, the segments valvate, oblanceolate, subequal. *Petals* spreading, subequal, orbicular, with a claw, the blade crispato-fimbriate. *Stamens* 10, free, declinate, much exserted; anthers oblong, versatile. *Ovary* subsessile, many-ovuled; style very long, filiform, stigma minute capitate. *Pod* flat, thin, dehiscent, ligulate, continuous within, the sutures neither thickened nor winged.—**DISTRIB.** Species 2-3, Trop. African and Asiatic.

1. **P. elata**, Linn.; *DC. Prodr.* ii. 484; *Roxb. Fl. Ind.* ii. 355; *Wall. Cat.* 5812; *W. & A. Prodr.* 282; *Bedd. Fl. Sylv.* t. 178; *Cæsalpinia elata*, Swartz *Obs.* 166.

Truly wild in the WESTERN PENINSULA, planted elsewhere.—**DISTRIB.** Arabia, W. Trop. Africa.

An erect tree, 20-30 ft. high. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ ft. long; pinnæ 10-16; leaflets 30-40, membranous, caducous, close, sessile, obtuse, ligulate. *Flowers* in corymbose racemes; pedicels and obovoid buds finely grey-downy. *Calyx* very coriaceous, $\frac{3}{4}$ -1 in. long. *Petals* scarcely exserted, an inch broad, shortly clawed. *Filaments* bright red, 3-4 times the length of the calyx, downy near the base. *Pod* 6-8 in. long by above an inch, 4-8-seeded.—The Mascarene *P. REGIA*, Bojer, with petals much exceeding the calyx, is frequently planted in India.

101. **PARKINSONIA**, Linn.

Trees. *Leaves* with 2-6 pinnæ from a very short rachis. *Flowers* yellow, in short racemes. *Calyx* deeply cleft, with a subbasal disk, the divisions subvalvate, lanceolate, subequal. *Petals* exserted, broad, the upper with a long claw. *Stamens* 10, included, villous; anthers versatile. *Ovary* short-stalked, many-ovuled; style filiform, stigma terminal. *Pod* turgid, dry, moniliform, finally dehiscent.—**DISTRIB.** Species 3, of which 2 are American, the other Cape.

1. **P. aculeata**, Linn.; *DC. Prodr.* ii. 486; *Roxb. Hort. Beng.* 31; *W. & A. Prodr.* 284; *Bedd. Fl. Sylv.* 91; *Anal. Gen.* t. 13, fig. 2.

Universally cultivated and often naturalised. A native of Tropical America.

A glabrous bush or low tree, armed with sharp woody spines, which represent the primary rachis of a bipinnate leaf and have 2-6 pinnæ congested in their axils. *Pinnæ* $\frac{1}{2}$ -1 ft. long, the rachis much flattened, so that when the very minute obtuse oblanceolate leaflets have fallen or are not developed they resemble the phyllodes of an acacia. *Racemes* lax, shorter than the leaves; pedicels long, slender, erecto-patent. *Corolla* tender, yellow, $\frac{3}{8}$ - $\frac{1}{2}$ in. *Pod* 3-4 in. long.

102. **WAGATEA**, Dalz.

A climbing shrub. *Leaves* abruptly bipinnate. *Flowers* in long simple or paniced spikes. *Calyx* cleft about half way down into 5 obtuse teeth, the lowest the longest and wrapt over the others, the disk high up in the tube. *Petals* oblanceolate, obtuse, subequal, little exserted. *Stamens* 10, included, nearly straight, filaments naked; anthers oblong. *Ovary* sessile, many-ovuled; style slightly clubbed at the tip, stigma oblique. *Pod* ligulate-oblong, indehiscent, few-seeded, subtorulose, with thickened sutures, not winged.—**DISTRIB.** Endemic.

1. **W. spicata**, Dalz. in *Kew Journ.* iii. 90; *Wight Ic.* t. 1995; Dalz. & *Gibs. Bomb. Fl.* 80. *Cæsalpinia mimosoides*, Heyne in *Wall. Cat.* 5837, non Lam. *C. ferox*, Hohen. *Pl. Ind. Or. Exs.* No. 414, non Hassk.

Hills of WESTERN PENINSULA.

A robust woody prickly climber. *Leaves* $\frac{3}{4}$ –1 ft. long and broad; pinnæ 8–12; leaflets 12–14, nearly sessile, oblong, obtuse, or subacute, 1–2 in. long, rigidly subcoriaceous, glabrous, venulose. *Flowers* in long simple or paniced dense subspicate racemes with a thick furrowed woody finely brown-downy axis; bracts minute, lanceolate-cuspidate. *Calyx* $\frac{3}{8}$ in., scarlet. *Petals* orange. *Pod* like that of *Cæsalpinia digyna*.

GLEDITSCHIA SINENSIS, Linn.; *Wall. Cat.* 5811, is known in India in cultivation only.

103. **CASSIA**, Linn.

Erect shrubs or trees, rarely herbs. *Leaves* simple, abruptly pinnate. *Flowers* usually large and showy, in axillary racemes and terminal panicles. *Calyx-tube* very short; sepals broad or narrow, imbricated. *Petals* 5, imbricated, subequal, usually broad. *Stamens* normally 10, but rarely all perfect, 3–5 being often reduced to staminodia or altogether absent; anthers mostly but not invariably basifixed, dehiscing by terminal pores or with the slit more or less continued longitudinally. *Ovary* sessile or stalked, many-ovuled; style incurved, stigma terminal. *Pod* very variable, terete or flat, usually septate, the albuminous seeds flattened, sometimes parallel with the valves, sometimes with the septa, dry, dehiscent or indehiscent.—*DISTRIB.* Species 340, spread everywhere in the tropics, a few extra-tropical. Monographed by Mr. Benthams in *Trans. Linn. Soc.* xxvii. p. 503, t. 60-3.

SUBGEN. 1. **Fistula**, DC. (*Cassia*, Roxb.) *Sepals* obtuse. *Stamens* all bearing anthers, of which those of the 2-3 lowest are larger than the others and the filaments longer. *Pods* very large, terete. *Seeds* compressed parallel with the dissepiments.—*Trees.*

1. **C. Fistula**, Linn.; *DC. Prodr.* ii. 490; leaflets 8–16 large narrowed to the point, flowers in long lax racemes, bracts caducous, petals veined bright yellow. *Roxb. Hort. Beng.* 31; *Fl. Ind.* ii. 333; *Wall. Cat.* 5302; *W. & A. Prodr.* 285; Dalz. & *Gibs. Bomb. Fl.* 80; *Bedd. Fl. Sylv.* 91. *C. rhombifolia*, *Roxb. Hort. Beng.* 31; *Fl. Ind.* iii. 334; *Wight Ic.* t. 269.

CENTRAL and EASTERN HIMALAYAS to CEYLON and MALACCA, ascending to 3000 ft. in KUMAON, wild and often planted.—*DISTRIB.* China, Malay isles.

A middle-sized erect tree, glabrous in all its parts. *Leaves* a foot or more long; leaflets 2–6 in. long, ovate, distinctly stalked, usually acute, rigidly subcoriaceous, pale green, strongly veined. *Racemes* as long as the leaves; pedicels spreading, $1\frac{1}{2}$ –2 in. long. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in., glabrous, caducous. *Petals* obovate, shortly clawed, $\frac{3}{4}$ –1 in. deep. *Pod* 1–2 ft. long, above an inch thick.

2. **C. nodosa**, Ham.; *Roxb. Hort. Beng.* 31; *Fl. Ind.* iii. 336; branches slightly downy, leaflets 12–24 moderately large pointed, racemes short corymbose, bracts persistent, petals moderately large reddish not veined. *Wall. Cat.* 5331; *Wight Ic.* t. 410.

EASTERN HIMALAYAS and to MALACCA.—*DISTRIB.* Malay isles, Philippines.

A tree, reaching a height of 50 feet. *Leaves* a foot or more long; leaflets oblong, acute, distinctly stalked, 2–4 in. long, rather oblique at the base, glossy, subcoriaceous, strongly veined, with a few obscure short hairs below. *Racemes* from the old

branches, dense, under half a foot long; bracts silky, lanceolate, persistent; pedicels twice the length of the flower, lower deflexed. *Sepals* downy, $\frac{1}{4}$ – $\frac{1}{2}$ in. *Petals* oblong, acute, $\frac{3}{4}$ –1 in. deep. *Pod* a ft. long, $\frac{1}{2}$ in. thick.

3. ***C. marginata***, *Roxb. Hort. Beng.* 31; *Fl. Ind.* ii. 338; branchlets densely tomentose, leaflets 30–40 small obtuse, racemes short subcorymbose, bracts persistent, petals small reddish not veined. *C. Roxburghii*, *DC. Prodr.* ii. 489; *Wall. Cat.* 5308; *W. & A. Prodr.* 286; *Bedd. Fl. Sylv.* t. 180; *Wight Illust.* t. 83.

CEYLON and WESTERN PENINSULA.

Branches slender, sulcate. *Leaves* $\frac{1}{2}$ –1 ft. long; leaflets oblong, deeply emarginate, with a distinct mucro, 1–1 $\frac{1}{2}$ in. long, rigidly subcoriaceous, very oblique, strongly veined, persistently grey-downy beneath. *Flowers* in copious short axillary racemes and terminal panicles; bracts ovate-cuspidate; pedicels under 1 in. long.—*Flowers* and pod like that of *C. nodosa*, but much smaller.

4. ***C. renigera***, *Wall. Cat.* 5307; branches densely pubescent, leaflets 30–40 moderately small obtuse 3–4 times as long as broad, flowers unknown. *Benth. in Trans. Linn. Soc.* xxvii. 518; *Kurz in Journ. Asiat. Soc. Beng.* xlii. 2, 71.

BIRMA; Taong-dong mountains and banks of the Irrawaddi, *Wallich*.

Closely allied to *C. marginata*. *Leaves* 1 ft. long; leaflets close, nearly sessile, ligulate-oblong, 1 $\frac{1}{2}$ –2 in. long, broadly rounded at both ends, slightly oblique, rigidly coriaceous, finely grey-downy below; stipules oblong, cuspidate, large, membranous, persistent, fastened above the base. *Pod* 1 foot long, cylindrical, indehiscent, glabrous.

SUBGEN. 2. ***Senna*** (*Roxb. ex parte*, as a genus). *Sepals* obtuse. Perfect *stamens* 7, the anthers subequal or those of the 2–3 lowest larger than the others; three posterior filaments without anthers. *Pods* compressed, rarely terete, the seeds usually flattened parallel with the valves.—Some trees, some shrubby herbs.

* *Leaf with a single large gland placed just above the base of the common petiole.*

5. ***C. occidentalis***, *Linn.*; *DC. Prodr.* ii. 497; leaflets 6–10 ovate-oblong. *Roxb. Hort. Beng.* 31; *W. & A. Prodr.* 290; *Bot. Reg.* t. 83; *Dalz. & Gibs. Bomb. Fl.* 81. *Senna occidentalis*, *Roxb. Fl. Ind.* ii. 343. *C. foetida*, *Pers. Syn.* i. 457. *C. Sophera*, *Wall. Cat.* 5317, *ex parte*.

Scattered from the HIMALAYAS, to CEYLON, probably introduced.—DISTRIB. Cosmopolitan in the tropics.

A diffuse subglabrous undershrub, a few feet high, usually only of annual duration. *Leaves* $\frac{1}{2}$ ft. long; leaflets glaucous, fœtid, acuminate, 1–3 in. long, glabrous or finely pubescent. *Racemes* short-peduncled, few-flowered, corymbose, axillary and forming a terminal panicle; bracts thin, ovate-acuminate, caducous; pedicels spreading, $\frac{1}{2}$ – $\frac{3}{4}$ in. *Sepals* obtuse, glabrous, $\frac{1}{4}$ – $\frac{1}{3}$ in. *Petals* $\frac{1}{2}$ in. pale lilac, conspicuously veined. *Pod* 4–5 in. by $\frac{1}{2}$ in., rather recurved, glabrous, subcompressed, distinctly torulose. *Seeds* 15–30.

6. ***C. Sophera***, *Linn.*; *DC. Prodr.* ii. 492; leaflets 12–24 oblong-lanceolate. *Roxb. Hort. Beng.* 31; *Wall. Cat.* 5317, *ex parte*; *W. & A. Prodr.* 287; *Dalz. & Gibs. Bomb. Fl.* 81. *Senna Sophera*, *Roxb. Fl. Ind.* ii. 347. *S. esculenta*, *Roxb. Fl. Ind.* ii. 346. *Cassia esculenta*, *Roxb. Hort. Beng.* 31. *C. chinensis*, *Jacq. Ic.* t. 73. *C. frutescens*, *Mill. Dict.* No. 2. *C. coromandeliana*, *Jacq. Fragm.* 67, t. 100.—*Rheede Hort. Mal.* ii. t. 52.

HIMALAYAS to CEYLON and PENANG.—DISTRIB. Cosmopolitan in the tropics, probably native in Asia only.

Closely allied to *C. occidentalis*, from which it differs by its more shrubby habit, more numerous smaller narrower leaflets and shorter broader more turgid pods, which are not usually torulose when mature.

VAR. *purpurea*; Roxb. Hort. Beng. 31, sp.; leaflets smaller more obtuse not more than 1 in. long, branches slender purple. *C. purpurea*, Bot. Reg. t. 856. *Senna purpurea*, Roxb. Fl. Ind. ii. 342.

** Leaf furnished with glands on the main rachis between the leaflets.

7. **C. Tora**, Linn.; DC. Prodr. ii. 493; glabrous, leaflets 6 obovate-oblong, perfect stamens subequal, pod very long slender subtrigonous, seeds uniseriate. Roxb. Hort. Beng. 31; Wall. Cat. 5316; W. & A. Prodr. 290; Dalz. & Gibs. Bomb. Fl. 81. *Senna Tora* and *toroides*, Roxb. Fl. Ind. ii. 340. *C. obtusifolia*, Linn. Sp. Plant. 539. *C. fœtida*, Salisb. Prod. 326. *C. humilis* and *gallinaria*, Collad. Hist. 96. *C. toroides*, Roxb. Hort. Beng. 31.—Rheede Hort. Mal. ii. t. 53.

Universally spread through our limits in a truly wild state, ascending to 5000 ft. in the CENTRAL HIMALAYAS.—DISTRIB. Cosmopolitan in the tropics.

An annual weed, growing up into an undershrub. Leaves distinctly petioled; leaflets 1-1½ in., glaucous, membranous, glabrous; stipules large, linear-subulate, caducous. Flowers usually in nearly sessile pairs in the axils of the leaves, the upper crowded. Corolla small, bright yellow. Pods ½-¾ ft. by ½ in., membranous, the sutures very broad, the seeds flattened in the same direction as the pod.

C. BICAPSULARIS, Linn.; DC. Prodr. ii. 494; glabrous, leaflets 6-8, stamens very unequal, pod thick terete, seeds biseriate. Roxb. Hort. Beng. 31; Wall. Cat. 5313; W. & A. Prodr. 286. *Senna bicapsularis*, Roxb. Fl. Ind. ii. 342.

A native of Tropical America, not unfrequently introduced.

A shrub, with virgate woody branches. Leaves distinctly petioled; leaflets green, membranous, obtuse, ¾-1 in.; stipules small, subulate, caducous. Racemes copious, corymbose, as long as the leaves. Flowers middle-sized, bright yellow. Pods membranous, curved, sausage-shaped, ½ ft. long, ½ in. thick, the sutures very narrow.

C. TOMENTOSA, Linn.; DC. Prodr. ii. 496; densely pubescent, leaflets 12-16, stipules narrow caducous, pod narrow turgid many-seeded. W. & A. Prodr. 286. *C. Wightiana*, Grah. in Wall. Cat. 5329.

A native of Trop. America, introduced in the Nilghiris and Ceylon.

A tall shrub, with the branches and leaves beneath densely matted with grey tomentum. Leaves short-petioled, 3-4 in. long; leaflets oblong, obtuse, oblique at the base. Flowers bright-yellow, middle-sized, in copious distinctly peduncled corymbose racemes. Lower anthers much larger than the others. Pod linear, membranous, 4-5 in. long, finely downy.—*C. TOMENTOSA*, Wall. Cat. 5304 is *C. hirsuta*, Linn., a totally different species, also a native of Tropical America.

8. **C. auriculata**, Linn.; DC. Prodr. ii. 496; finely downy, leaflets 16-24, stipules broad persistent, pod thin broad few-seeded. Roxb. Hort. Beng. 31; Wall. Cat. 5303; W. & A. Prodr. 290; Dalz. & Gibs. Bomb. Fl. 81. *Senna auriculata*, Roxb. Fl. Ind. ii. 349.

Wild in the CENTRAL provinces, the WESTERN PENINSULA and CEYLON; often planted elsewhere.

A tall shrub with the virgate branches and underside of the leaves finely grey-downy. Leaves nearly sessile, 3-4 in. long; leaflets obovate-oblong, rigidly subcoriaceous, ¾-1 in., obtuse or emarginate, with a mucro; stipules large and foliaceous.

Flowers very large and showy, an inch deep, bright yellow, in copious corymbose racemes. *Pod* 4-5 in. long by $\frac{1}{2}$ - $\frac{3}{4}$ in., straight, ligulate, glabrous, flexible, dark brown, with a distinct space between the uniseriate seeds.

*** *Leaf-rachis without glands.*

9. **C. obovata**, *Collad. Hist. Cass.* 92, t. 15, A; stipules lanceolate persistent, leaflets 8-12, racemes narrow, pod flat oblong much recurved with a crest on the middle of the valve opposite each seed. *Wall. Cat.* 5319; *Boiss. Fl. Orient.* ii. 631. *C. Senna*, *Linn. Sp. Plant.* 539, *ex parte*. *C. obtusa*, *Roxb. Hort. Beng.* 31; *W. & A. Prodr.* 288; *Wight. Ic.* t. 757. *Senna obtusa*, *Roxb. Fl. Ind.* ii. 344. *C. Burmanni*, *Wight in Madras Journ.* vi. t. 5.

PUNJAB, SCINDE, WESTERN PENINSULA.—DISTRIB. Arabia, Egypt, Abyssinia.

Subglabrous, scarcely shrubby, 1-4 ft. high. *Leaves* distinctly petioled, 2-3 in. long; leaflets obovate-oblong, membranous, very glaucous, obtuse, with a minute mucro, $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Racemes* distinctly peduncled, equalling or exceeding the leaves; pedicels very short. *Sepals* glabrous, very obtuse. *Corolla* middle-sized, pale yellow. *Stamens* very unequal. *Pod* thin, glabrous, flexible, 1-1 $\frac{1}{2}$ in. by $\frac{5}{8}$ - $\frac{3}{4}$ in, short-stalked, narrowed suddenly at both ends, 6-12-seeded; sutures very thin.—*C. ANGUSTIFOLIA*, *Vahl*. (*C. lanceolata*, *Wall. Cat.* 5318, *Royle Ill.* t. 37, *W. & A. Prodr.* 288; *Senna officinalis*, *Roxb. Fl. Ind.* ii. 346), with 10-16 oblong-lanceolate acute leaflets and nearly straight oblong pods without crests, is a native of Tropical Africa and has no claim to be considered indigenous in India.

10. **C. alata**, *Linn.*; *DC. Prodr.* ii. 492; stipules deltoid persistent, leaflets 16-28 large, racemes narrow, pod long ligulate with a broad wing down the middle of each valve. *Roxb. Hort. Beng.* 31; *Wall. Cat.* 5301; *W. & A. Prodr.* 287; *Wight Ic.* t. 253. *Senna alata*, *Roxb. Fl. Ind.* ii. 349. *C. bracteata*, *Linn. fil.*; *DC. loc. cit.* *C. herpetica*, *Jacq. Obs.* ii. 24, t. 45, fig. 2.

LOWER BENGAL, WESTERN PENINSULA, BIRMA and MALACCA.—DISTRIB. Cosmopolitan in the tropics,

A shrub, with very thick finely downy branches. *Leaves* subsessile, 1-2 ft. long; leaflets oblong, obtuse, 2-6 in. long, minutely mucronate, rigidly subcoriaceous, glabrous or obscurely downy beneath, broadly rounded, oblique at the base; rachis narrowly winged on each side of the face. *Racemes* peduncled, $\frac{1}{2}$ -1 ft.; bracts large, membranous, caducous. *Corolla* yellow, very distinctly veined. *Stamens* very unequal. *Pod* membranous, dehiscent, straight, glabrous, 4-8 in. by $\frac{1}{2}$ - $\frac{5}{8}$ in. *Seeds* 50 or more.

11. **C. siamea**, *Lam.*; *DC. Prodr.* ii. 499; stipules minute caducous, leaflets 12-28 with a minute mucro, racemes corymbose forming a long end panicle, pod ligulate flat not winged, the sutures slightly thickened. *C. florida*, *Vahl*; *DC. Prodr.* ii. 499; *W. & A. Prodr.* 288; *Bedd. Fl. Sylv.* t. 179. *C. sumatrana*, *Roxb. Hort. Beng.* 31; *DC. Prodr.* ii. 506; *Wall. Cat.* 5305. *Senna sumatrana*, *Roxb. Fl. Ind.* ii. 347.

WESTERN PENINSULA, CEYLON, MALAYAN PENINSULA and SIAM.—DISTRIB. Malay isles.

A low tree, with virgate finely grey-downy terete branchlets. *Leaves* $\frac{1}{2}$ -1 ft.; leaflets oblong, glaucous, subcoriaceous, emarginate, strongly veined, subglabrous, distinctly stalked, 2-3 in. long. *Corymbs* crowded, both axillary and in a terminal panicle $\frac{1}{2}$ -1 ft. long, with grey-pubescent branches. *Sepals* downy, very obtuse. *Petals* middle-sized, bright yellow, not veined. *Stamens* subequal. *Pod* nearly straight, flat, distinctly stalked, 6-9 in. by $\frac{1}{2}$ in., firmer in texture and with thicker sutures than in the two next.

12. **C. montana**, *Heyne*; *DC. Prodr.* ii. 499; stipules minute caducous, leaflets 20-30 with a large mucro, racemes corymbose forming a long end pa-

nicle, pod ligulate thin flat not winged, with thin sutures. *W. & A. Prodr.* 289; *Dalz. & Gibs. Bomb. Fl.* 81. *C. setigera*, *DC. Prodr. loc. cit.*; *Wall. Cat.* 5330.

Hills of the WESTERN PENINSULA.

A shrub, with slender glabrous obscurely downy virgate branchlets. *Leaves* petioled, 4-6 in.; leaflets membranous, firm, oblong, obtuse, glabrous, glaucous, 1-1½ in. long, tipped with a conspicuous bristle. *Corymbs* copious, both axillary and forming long end panicles. *Sepals* obtuse, glabrous. *Corolla* yellow, middle-sized, not veined. *Stamens* subequal. *Pod* stalked, nearly straight, 3-5 in. by ½-¾ in., glossy, brown, 12-20-seeded.

13. *C. timoriensis*, *DC. Prodr.* ii. 499; stipules persistent foliaceous, leaflets 20-24 with a minute mucro, racemes corymbose forming a long end panicle, pod ligulate thin flat not winged, the sutures thin. *C. palmata*, *Wall. Cat.* 5306.

BIRMA, MARTABAN, TENASSERIM, CEYLON.—DISTRIB. Malay isles, Philippines, N. Australia.

A low tree, with slender finely downy branches. *Leaves* ½-¾ ft., distinctly petioled; leaflets oblong, obtuse, 1-2 in., membranous, pale green, finely downy below. *Sepals* downy, very obtuse. *Corolla* bright yellow, middle-sized, slightly veined. *Pod* straight, thin, glossy, flexible, dehiscent, 5-6 in. by ½-¾ in., distinctly stalked, 12-20-seeded.

SUBGEN. 3. *Psilorhegma*, *Vogel*. Like the last, but all the ten stamens perfect, with subequal anthers.

14. *C. glauca*, *Lam.*; *DC. Prodr.* ii. 495; *Wall. Cat.* 5312; *W. & A. Prodr.* 289; *Bedd. Fl. Sylv.* 91. *C. surattensis*, *Burm. Fl. Ind.* 97. *C. arborescens*, *Vahl Symb.* iii. 56; *Roxb. Hort. Beng.* 31. *C. fastigiata*, *Vahl Symb.* iii. 57; *W. & A. Prodr.* 290. *Senna arborescens*, *Roxb. Fl. Ind.* ii. 345.

HIMALAYAS to CEYLON and MALACCA.—DISTRIB. Malay isles, Trop. Australia, Polynesia.

A tall tree, with glabrous terete branchlets. *Leaves* distinctly petioled, ½-¾ ft.; leaflets ovate, acute or subobtuse, 2-4 in. long, subcoriaceous, very glaucous; rachis with conspicuous glands between the lower, rarely (*C. fastigiata*, *Vahl*), between all the leaves; stipules narrow, caducous. *Racemes* corymbose, not paniced. *Sepals* large, obtuse. *Flowers* large, bright yellow. *Pod* flat, thin, strap-shaped, glabrous, 6-8 in. long, ½-¾ in. broad, distinctly stalked, 20-30-seeded.

VAR. suffruticosa, *Koenig*; *DC. Prodr.* ii. 496, sp.; leaflets 16-18 smaller more numerous obtuse 1-2 in. long, flowers and pods much smaller, the latter not more than 3-4 in. long 10-12-seeded. *C. suffruticosa*, *Wall. Cat.* 5311; *W. & A. Prodr.* 289. *C. speciosa*, *Roxb. Hort. Beng.* 31. *Senna speciosa*, *Roxb. Fl. Ind.* ii. 347. *C. Horsfieldii*, *Miq. Fl. Ind. Bat.* i. 99.—Distribution of the type.

SUBGEN. 4. *Lasiorhegma*, *Benth.* *Sepals* narrow. *Stamens* 5-10, all perfect. *Pod* small, strap-shaped, flat, dehiscent, the seeds compressed parallel with the valves.—Diffuse low slender annual or perennial herbs.

* *Leaflets* 4, large, membranous.

15. *C. Absus*, *Linn.*; *DC. Prodr.* ii. 500; *Roxb. Hort. Beng.* 31; *Wall. Cat.* 5314; *W. & A. Prodr.* 291. *C. exigua*, *Roxb. Hort. Beng.* 31. *Senna Absus*, *Roxb. Fl. Ind.* ii. 340. *S. exigua*, *Roxb. Fl. Ind.* ii. 339. *O. coccinea*, *Wall. Cat.* 5315.

Foot of the WESTERN HIMALAYAS to CEYLON.—DISTRIB. Everywhere in the tropics of old world.

An erect annual, 1-2 ft. high, with stem and leaves clothed with grey bristly viscose hairs. *Leaves* long-petioled; leaflets oblong, very oblique, 1-2 in. long, obtuse or subacute; stipules small, linear, persistent. *Racemes* narrow, equalling or exceeding the leaves. *Sepals* lanceolate, bristly, $\frac{1}{8}$ - $\frac{1}{2}$ in. *Corolla* reddish-yellow, very small. *Pod* oblique, ligulate, 1-1 $\frac{1}{2}$ in. long, 5-6-seeded, the thin valves beset with grey bristly hairs.

** *Leaflets very numerous, close, small, narrow, rigidly subcoriaceous* (Mimosoides).

16. **C. pumila**, Lam.; DC. Prodr. ii. 504; gland of petiole stipitate, stamens 5, seeds 6-12. Wall. Cat. 5327; W. & A. Prodr. 292. C. prostrata, Roxb. Hort. Beng. 32; Dalz. & Gibs. Bomb. Fl. 82. Senna prostrata, Roxb. Fl. Ind. ii. 352.

From the HIMALAYAS (ascending to 6-7000 ft.) to CEYLON.—DISTRIB. Malay isles, Trop. Australia.

A low very diffuse shrub, with slender finely downy branches. *Leaf* 1-2 in. long; leaflets 20-40, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, distinctly mucronate, the midrib close to the upper border; stipules linear, rigid, persistent. *Flowers* usually solitary in the axils of the leaves, on very short pedicels. *Sepals* $\frac{1}{2}$ in. *Corolla* little exerted. *Anthers* 5 equal. *Pod* 3 $\frac{1}{4}$ -1 $\frac{1}{2}$ in. by $\frac{1}{8}$ - $\frac{1}{4}$ in.—Probably this and the next are mere varieties of *C. mimosoides*.

17. **C. Kleinii**, W. & A. Prodr. 293; gland of petiole stipitate, stamens 10, seeds 10-15. C. dimidiata, Klein; Wall. Cat. 5328, not Don.

WESTERN PENINSULA and CEYLON.—DISTRIB. JAVA.

Very like *C. pumila*, but more robust, the branches thinly or densely pilose. *Leaflets* 20-40, reduced to 8-12 on the lowest leaves, $\frac{3}{8}$ - $\frac{1}{2}$ in. long, rigidly coriaceous, strongly veined, with a distinct oblique mucro, the midrib close to the upper border. *Flowers* 1-3 together in the axils of the leaves, on downy bracteate pedicels. *Calyx* $\frac{1}{4}$ - $\frac{1}{2}$ in. *Petals* obovate, little exerted. *Pod* 1 $\frac{1}{2}$ -2 in. long, rather recurved, blackish, glabrescent.

18. **C. mimosoides**, Linn.; DC. Prodr. ii. 505; gland of petiole sessile, stamens 10 rarely 5, seeds 10-20. C. angustissima, Lam.; DC. Prodr. loc. cit.; W. & A. Prodr. 292. C. Roxburghiana, Grah. in Wall. Cat. 5323. C. amœna, Ham. in Wall. Cat. 5321. C. sensitiva and tenella, Roxb. Hort. Beng. 32. Senna sensitiva and tenella, Roxb. Fl. Ind. 353-4.

HIMALAYAS, ascending to 5-6000 ft. in KUMAON and KHASIA, to CEYLON and MALACCA.—DISTRIB. Cosmopolitan in Tropics.

A low diffuse perennial, with slender shrubby finely downy branches. *Leaves* 1-3 in. long, with a solitary sessile gland on the rachis below the leaflets; leaflets 60-100, linear, rigidly coriaceous, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, obliquely mucronate, with the midrib close to the upper border; stipules large, linear-subulate, persistent. *Flowers* 1-2 together in the axils of the leaves on short pedicels. *Sepals* $\frac{1}{4}$ - $\frac{1}{2}$ in., lanceolate-acuminate, bristly. *Corolla* little exerted. *Stamens* 10, alternately longer and shorter, *Pod* strap-shaped, flat, dehiscent, 1 $\frac{1}{2}$ -2 in. by $\frac{1}{2}$ in, nearly straight, glabrescent or finely downy; septa more or less oblique.

VAR. 1. *dimidiata*; Roxb. Hort. Beng. 32, sp.; leaves and flowers of the type but the stamens 5 only. Senna dimidiata, Buch. in Roxb. Fl. Ind. ii. 352.—Himalayas.

VAR. 2. *Wallichiana*; DC. Prodr. ii. 505, sp.; finely downy, leaflets larger $\frac{1}{4}$ - $\frac{1}{2}$ in. long and less rigid, flowers larger $\frac{1}{4}$ - $\frac{1}{2}$ in. long. Wall. Cat. 5320; W. & A. Prodr. 292. C. Leschenaultii, Wall. Cat. 5325. C. myriophylla, Wall. Cat. 5326. C. Telfairiana, Wall. Cat. 5324; Bot. Mag. t. 5874.—Distribution of the type.

VAR. 3. *auricoma*; Grah. in Wall. Cat. 5322, sp.; flowers and leaves of the last, but the branches densely clothed with fine spreading hairs.

DOUBTFUL SPECIES.

C. JAVANICA, Linn.; *DC. Prodr.* ii. 490, *Wall. Cat.* 5309 (*C. Bacillus*, Gaertn.; *Roxb. Fl. Ind.* ii. 337. *Wt. Icones*, t. 252) differs from *C. nodosa* by its smaller and more obtuse leaflets. It is sometimes cultivated within our limits and is wild in the Malay isles. A plant gathered by Griffith near Prome is either a variety with leaflets densely pubescent beneath or a new species. The inflorescence of both this and the Malay plant corresponds with that of *C. nodosa*.

104. **CYNOMETRA**, Linn.

Erect unarmed trees. *Leaves* with few coriaceous odd-pinnate leaflets. *Flowers* copious, minute, in axillary corymbs or racemes. *Cal.* x with a very short tube and subbasal disk; divisions 4-5, oblong, imbricated. *Petals* 5, oblongeolate, equal, not exserted. *Stamens* 10, or in *C. polyandra* indefinite, filaments erect, free, filiform, exserted; anthers small, oblong, versatile, dehiscent longitudinally. *Ovary* sessile or short-stalked, 2-ovuled; style filiform, stigma capitate. *Pod* turgid, oblique-oblong, with very thick indehiscent usually rugose tough somewhat fleshy valves. *Seed* exalbuminous, central, filling up the cavity.—*DISTRIB.* Species 20, spread everywhere in the tropics.

SUBGEN. 1. **Eucynometra**. *Stamens* 10.

1. **C. ramiflora**, Linn.; *DC. Prodr.* ii. 509; leaflets 2-4, racemes usually solitary corymbose axillary from the branchlets, pod turgid rugose. *W. & A. Prodr.* 293; *Dalz. & Gibs. Bomb. Fl.* 83; *Bedd. Fl. Sylv.* t. 315. *C. cauliflora*, *Wall. Cat.* 5816, *ex parte*.

WESTERN PENINSULA and CEYLON.—*DISTRIB.* Malay isles, Philippines, N. Australia.

Leaflets 1-jugate and 2-jugate mixed or often all 1-jugate, subsessile, if 2-jugate (var. *heterophylla*, Thwaites) the upper much the largest, oblong, subacute very oblique, 3-6 in. long; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Racemes* few-flowered, corymbose, sessile from the axils of the leaves of the branchlets, with the primary axis not produced, rarely geminate; outer scales ovate, $\frac{1}{8}$ - $\frac{1}{2}$ in.; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in. *Sepals* $\frac{1}{2}$ in. *Pods* turgid, very rugose, $\frac{1}{2}$ -1 in. long, subsessile.

VAR. mimosoides, *Wall. Cat.* 5817, sp.; leaflets all bijugate not so unequal as in the bijugate form of the type much smaller 1-3 in. long more obtuse and thicker, flowers and pod smaller, the latter pointed and very deeply wrinkled. *C. bijuga*, *Spanog.*; *Miq. Flor. Ind. Bat. i.* 78.—Western Peninsula, Pegu, Tenasserim.

2. **C. travancorica**, *Bedd. Fl. Sylv.* t. 316; leaflets 2, flowers in sessile corymbs from the branchlets, pod flat smooth.

SOUTH TRAVANCORE and in the CARNATIC near Tinnevely, alt. 2-4000 ft., *Beddome*.

Petioles $\frac{1}{8}$ - $\frac{1}{2}$ in.; leaflets always unijugate, oblique oblong-lanceolate, subacute, glabrous, 2-3 in. long. *Racemes* solitary, copious, rounded, few-flowered, with the central axis not at all produced; bracts $\frac{1}{2}$ in., deltoid; pedicels erecto-patent, $\frac{1}{8}$ - $\frac{1}{4}$ in. *Sepals* $\frac{1}{2}$ in., finally reflexed. *Filaments* twice the length of the sepals. *Pod* flat, smooth, firm, semicircular, sessile, 1-1 $\frac{1}{4}$ in. long.

3. **C. inæquifolia**, *A. Gray Bot. U.S. Expl. Expedit.* 473; leaflets 4-6, flowers in very dense oblong sessile solitary or geminate racemes from the branchlets, pod flat smooth.

MALACCA, *Maingay*.—*DISTRIB.* Philippines, *Cuming*, 1297.

Leaflets subcoriaceous, rigid, glabrous, oblique, obovate-oblong, subequal, in our specimens 2-3 in. long. *Flowers* in very dense oblong sessile cone-like racemes, 1 $\frac{1}{2}$ -2 in. long, the central axis produced; outer bracts round-cordate, obtuse, $\frac{1}{4}$ in.; pedicels

erecto-patent, $\frac{1}{8}$ – $\frac{1}{4}$ in. *Sepals* $\frac{1}{8}$ in., permanently ascending. *Filaments* twice the calyx. *Pod* $\frac{1}{4}$ in. thick, woody, oblique obovoid, 2–2 $\frac{1}{4}$ in. long, not at all wrinkled.—Col. Beddome has found a plant in South Canara with 3 pairs of leaflets and similar bracts, of which the flowers are not yet known.

4. **C. cauliflora**, Linn.; *DC. Prodr.* ii. 509; leaflets usually 2, flowers in dense sessile congested racemes from thick branches with the axis produced, pod turgid wrinkled. *Roxb. Hort. Beng.* 32; *Wall. Cat.* 5816, *ex parte*; *W. & A. Prodr.* 293; *Bedd. Fl. Sylv.* t. 315 (*analysis*).

WESTERN PENINSULA, CEYLON, MALACCA.—DISTRIB. Malay isles.

Branchlets slender, glabrous. *Petioles* very short; leaflets very rarely bijugate, and if so very unequal, rigidly coriaceous, sessile, glossy, obovate, very oblique obtuse or subacute, 3–6 in. long. *Racemes* congested in dense rounded masses, not more than an inch long, the central axis of each produced, the short erecto-patent pedicels subtended by small roundish spreading persistent bracts. *Calyx* $\frac{1}{8}$ in. *Pod* like that of *C. ramiflora*, oblique oblong, very turgid, 1–1 $\frac{1}{2}$ in. long.

SUBGEN. 2. **Pseudocynometra**, *W. & A.* *Stamens* indefinite.

5. **C. polyandra**, *Roxb. Cor. Pl.* iii. t. 286; *Hort. Beng.* 32; *Fl. Ind.* ii. 372; *DC. Prodr.* ii. 509; *Wall. Cat.* 5815; *W. & A. Prodr.* 294.

KHASIA, SILHET, PENANG, MALACCA.

Branchlets slender, glabrous. *Leaves* nearly sessile, $\frac{1}{2}$ – $\frac{3}{4}$ ft.; leaflets 4–6, usually the latter, sessile, oblique-oblong or obovate, 2–4 in. long, rigidly subcoriaceous, acute or subobtuse, glossy. *Flowers* in dense corymbs, sessile in the axils of the leaves of the branchlets; pedicels downy, $\frac{1}{2}$ –1 in. *Sepals* $\frac{3}{8}$ in., reflexed. *Stamens* 40–60, much exerted. *Pod* oblique oblong, smooth, woody, 2 in. long.

105. **SINDORA**, Miquel.

Unarmed trees. *Leaves* abruptly pinnate; leaflets few. *Flowers* small, paniced. *Calyx* with a very short tube and basal disk; segments 4, valvate, the two upper being connate. *Petal* one, the same size and shape as the upper lip of the calyx. *Stamens* 10, the upper one free from the others, shorter and anantherous, the rest declinate, shortly monadelphous, unequal, the upper longest, exerted; anthers oblong, versatile, dehiscing longitudinally. *Ovary* 2-ovuled, short-stalked; stigma long, filiform, circinate, stigma minute terminal. *Pod* like that of *Guilandina*, oblique, round-oblong, dehiscent, the flat, hard valves armed all over the face with straight large firm prickles.—DISTRIB. Another species or variety in Sumatra.

1. **S. Wallichii**, *Benth. in Hook. Ic.* t. 1017–8; branchlets and leaves below shortly tomentose, leaflets 4–6, bracts persistent, calyx prickly. *Guilandina Wallichiana*, *Grah. in Wall. Cat.* 5805. *Echinocalyx*, *Benth. Gen. Plant.* 584, 1003.

SINGAPORE, *Wallich*; MALACCA, *Griffith, Maingay*.

A small erect unarmed tree, with branches clothed with short brown pubescence. *Leaflets* rigidly coriaceous, 2–3 in. long, subobtuse, oblong, glossy above, closely pubescent beneath. *Panicles* dense, axillary and terminal; bracts cordate, roundish, spreading or reflexed; pedicels nearly as long as the calyx. *Calyx* $\frac{1}{4}$ in., brown-downy, the sepals armed towards the tip with large firm prickles. *Pod* glabrous, subglobose, 2–3 in. long.

VAR. 1. *siamensis*, *Teysm.*, sp.; leaflets 6 obovate distinctly emarginate larger thinner strongly veined the end one 3–4 in. long.—Siam, *Teysmann*.

VAR. 2. *intermedia*, *Baker*; leaflets 6–8 smaller more acute, flowers smaller, and receding towards the next by its shorter pedicels, caducous bracts, calyx without prickles and more densely velvety sepals and branches.—Malacca, *Maingay*.

2. **S. velutina**, Baker; branchlets and leaves below densely tomentose, leaflets 10-12, bracts caducous, calyx not prickly.

MALACCA, Dr. Maingay.

Leaves $\frac{1}{2}$ - $\frac{3}{4}$ ft. Pubescence of branchlets calyx and underside of leaves much longer and more dense than in the last, bright brown. Leaflets 3-3 $\frac{1}{2}$ in. long, oblong, subacute, very thick and rigid. Pedicels very short. Buds $\frac{1}{2}$ in. long. Ovary and lower part of filaments more densely pubescent than in the last. Pod not seen.

106. DIALIUM, Linn.

Erect unarmed trees. Leaves odd-pinnate, with alternate leaflets. Flowers copious, small, obscure, in ample terminal panicles. Calyx-tube very short; sepals lanceolate or ovate-lanceolate, subequal, much imbricated. Petals 0. Stamens 2, erect, included; anthers dehiscing longitudinally, attached near the base. Ovary sessile, 2-ovuled; style filiform, stigma terminal. Pod firm, dry, indehiscent, oblong, 1-seeded; endocarp pulpy. Seed albuminous.—DISTRIB. Species about 10, cosmopolitan in the tropics.

* Sepals oblong-lanceolate, not more than $\frac{7}{12}$ in. broad.

1. **D. ovoideum**, Thwaites Enum. 97; leaflets 3-5 the end one cuneate at the base, branches of the panicle ascending, pedicels nearly as long as the calyx, pod brown-velvety. Bedd. Fl. Sylv. t. 181.

CEYLON, districts north of Kandy, Thwaites.

A tall tree. Leaflets conspicuously alternate, rigidly subcoriaceous, thinner than in the following, glabrous on both sides, strongly veined, not glossy above, 2-4 in. long, subobtusate, narrowed gradually from the middle to both ends; petiolules $\frac{1}{8}$ - $\frac{1}{4}$ in. Panicle ample, with slender finely grey-downy branches. Bud lanceolate, $\frac{1}{2}$ in. long. Sepals subpetaloid, lanceolate, under $\frac{1}{12}$ in. broad, thinly grey-downy. Filament nearly as long as the anther in the developed flower. Pod ovoid, slightly compressed, $\frac{1}{2}$ - $\frac{5}{8}$ in. long, eatable, with an agreeable acid flavour; seeds round, compressed, shining, yellow or reddish-brown.—Closely allied to the Javan *D. indum*, Linn. (Bennett Pl. Jav. Rar. t. 30), which is not known within our limits, and differs by its oblong buds and shorter filaments and petiolules.

2. **D. Maingayi**, Baker; leaflets 9 rounded at the base, branches of the panicle ascending, pedicels short, pod brown-velvety.

SINGAPORE, Dr. Maingay.

Leaflets more crowded on the rachis than in the last, distinctly alternate, oblong-cuspidate, glabrous, 3-4 in. long, rigidly coriaceous, glossy above, dull and paler below; petiolules $\frac{1}{8}$ - $\frac{1}{6}$ in. Panicle ample, close, with rigidly erecto-patent main branches, the lowest springing from the axils of the upper leaf; pedicels ascending, not more than half as long as the calyx. Sepals $\frac{1}{6}$ in., oblong-lanceolate, thinly coated on the back with grey-brown pubescence. Filaments much shorter than the anthers. Pod obovoid, 1 in. long, firm, persistently brown-velvety.

3. **D. laurinum**, Baker; leaflets 7 rounded at the base, branches of the panicle ascending, pedicels short, pod not velvety.

MALACCA, Dr. Maingay.

Leaflets oblong, broadly rounded at the base, narrowed suddenly to a subobtusate point, 4-5 in. long, rigidly coriaceous, glossy above, glabrous, opaque, strongly veined beneath; petiolules $\frac{1}{4}$ - $\frac{1}{2}$ in. Panicles axillary and terminal; pedicels very short, ascending. Bud ovoid-oblong, $\frac{1}{2}$ in. long. Sepals oblong-lanceolate, densely grey-downy on the back. Filaments very short. Pod roundish, 1 in. deep, fragile, black, thinly coated with greyish-brown down. Seed as large as a bean.

4. **D. patens**, Baker; leaflets 3-5 rounded at the base, branches of the panicle spreading, pedicels as long as the calyx, pod not velvety.

MALACCA, Griffith, Maingay.

Leaflets opposite or subopposite, oblong, rigidly coriaceous or subcoriaceous, glabrous, 3-5 in. long, obtusely pointed, finely veined, rather glossy; petiolules $\frac{3}{8}$ - $\frac{1}{2}$ in. Panicles both axillary and terminal, ample, flexuose with the distant main branches spreading or even sometimes decurved; pedicels ascending, spreading or cernuous. Bud $\frac{1}{2}$ in., ovoid-oblong. Sepals oblong-lanceolate, subpetaloid, thinly grey-downy. Filaments very short. Pod 1 in. long, round-oblong, firm, black, thinly coated with grey-brown down; seed oblong, $\frac{5}{8}$ - $\frac{3}{4}$ in. long.

** Sepals ovate-lanceolate $\frac{1}{2}$ - $\frac{1}{3}$ in. broad.

5. **D. platysepalum**, Baker.

MALACCA, Griffith, Maingay.

Leaflets 5-7, distant, conspicuously alternate, oblong, pointed, 4-6 in. long, rounded or the end one subcuneate at the base, rigidly coriaceous, rather glossy above, finely veined beneath, with a persistent coating of bright yellowish-brown silky pubescence; petiolules $\frac{1}{2}$ in. Panicles ample, deltoid, moderately close, terminal and axillary, the branches clothed with fine brown silky pubescence, the main ones erecto-patent; pedicels ascending or cernuous, much shorter than the calyx. Bud ovoid, under $\frac{1}{4}$ in. long. Sepals leathery, densely brown-velvety on the back, reflexed when the flower is fully expanded. Filaments thick and fleshy, nearly as long as the anthers. Pod round-oblong, $\frac{3}{8}$ - $\frac{3}{4}$ in. long, hard, persistently brown-velvety. Seeds oblong, compressed, glossy, chestnut-brown.

VAR. *Wallichii*, Baker; leaflets 9-11 closer smaller oblong-lanceolate acuminate, the upper 2-2 $\frac{1}{2}$ in. long, petiolules shorter. "Connaracea?" Wall. Cat. 8534.—Singapore, Wallich. Malacca, Maingay.

107. **HARDWICKIA**, Roxb.

Unarmed trees. Leaves abruptly pinnate, with few leaflets. Flowers very abundant, minute, paniced. Calyx with scarcely any tube and a subbasal disk; sepals usually 5, rarely 4, oblong, imbricated, subpetaloid, persistent. Corolla 0. Stamens twice the sepals in number, included or exerted; filaments filiform; anthers versatile, dehiscent longitudinally. Ovary sessile, 2-ovuled; style filiform, stigma capitate. Pod subindehiscent, dry, with only the upper ovule perfected; seeds exalbuminous.—DISTRIB. One other species, Trop. African.

1. **H. binata**, Roxb. Cor. Pl. iii. 6, t. 209; leaflets 2 sessile oblique flabellately veined, stamens included, stigma large peltate, racemes few-flowered, pod strap-shaped thin with the seed at the tip. Roxb. Fl. Ind. ii. 423; DC. Prodr. ii. 487; Wall. Cat. 5808; W. & A. Prodr. 284; Dalz. & Gibbs. Bomb. Fl. 83; Bedd. Fl. Sylv. t. 26.

BEHAR and WESTERN PENINSULA, ascending to 3500 ft.

A tree 100 feet high, with slender glabrous branches. Leaflets like those of a *Bauhinia*, oblique, ovate-trapezoid, 1-3 in. long, obtuse or subacute, with 4-5 ribs radiating from the base. Panicles axillary and terminal; pedicels as long as the calyx, not bracteolate. Sepals oblong, obtuse, under $\frac{1}{2}$ in. long. Pod like that of *Spatholobus*, thin, flexible, 2-3 in. long.

2. **H. pinnata**, Roxb. Fl. Ind. ii. 425; leaflets 4-6 alternate petiolulate not oblique, stamens exerted, stigma minute, racemes dense narrow, pod obovoid or oblong nearly or quite filled up by the seed. Wall. Cat. 5807; DC. Prodr. ii. 487; W. & A. Prodr. 284; Bedd. Fl. Sylv. t. 255.

Ghauts of CANARA, TRAVANCORE and the CARNATIC.

Leaflets oblong, rigidly coriaceous, acute, 2-4 in. long, renulose, the upper of the uppermost pair sometimes apparently terminal; midrib central, veining pinnate; petiolules $\frac{1}{2}$ - $\frac{1}{4}$ in. *Panicles* copious, axillary and terminal, formed of dense slender cylindrical racemes; pedicels spreading, $\frac{1}{24}$ - $\frac{1}{12}$ in. *Calyx* broadly campanulate, under $\frac{1}{12}$ in. long, with a pair of minute adpressed bracteoles. *Filaments* twice as long as the sepals. *Pod* turgid, $1\frac{1}{2}$ -2 in. long, rigid, sublignose, not at all oblique.

108. **CRUDIA**, Schreb.

Glabrous shrubs or trees. *Leaves* odd-pinnate,* with conspicuously alternate leaflets. *Flowers* in terminal or lateral racemes. *Calyx-tube* very short, with the disk nearly basal; segments 4, oblong, imbricated, persistent, reflexed. *Petals* 0. *Stamens* 10, exserted, filaments free, filiform; anthers oblong, versatile, dehiscing longitudinally. *Ovary* stalked, few-ovuled; style filiform, stigma terminal capitate. *Pod* flat, rigidly coriaceous, 2-valved. *Seeds* exalbuminous.—DISTRIB. Species 10, one African, the rest Trop. American.

1. **C. zeylanica**, Benth. in Trans. Linn. Soc. xxv. 314; Bedd. Fl. Sylv. t. 190. Detarium zeylanicum, Thwaites Enum. 414.

CEYLON, near Caltura, Thwaites.

A tall tree, with slender glabrous branchlets. *Leaflets* 3-5, oblong, short-stalked, rigidly subcoriaceous, rather oblique, obtusely pointed, bright green above, paler beneath, strongly veined. *Racemes* dense, terminal, on short branches, as long as or shorter than the leaves; pedicels reflexed, finally $\frac{1}{2}$ in., equalling the reflexed coriaceous sepals. *Ovary* distinctly stalked, oblique-oblong, densely clothed with pale brown tomentum. *Ovules* 3-4. *Pod* not seen.

109. **SARACA**, Linn.

Erect trees. *Leaves* abruptly pinnate, glabrous, rigidly coriaceous. *Flowers* in dense sessile corymbose axillary panicles, with subpetaloid reddish bracteoles. *Calyx* with the disk at the summit of a cylindrical tube; divisions 4, oblong, unequal, subpetaloid. *Corolla* 0. *Stamens* 3-8, exserted with long filiform filaments, and oblong versatile anthers opening longitudinally. *Ovary* many-ovuled with a stalk produced beyond the disk; style long, filiform, stigma minute capitate. *Pod* flat, dehiscent, rigidly coriaceous. *Seeds* exalbuminous.—DISTRIB. Species 6, restricted to India and Malaya.

1. **S. indica**, Linn. Mant. 98; leaflets 6-12, petiolules short, bracteoles persistent ascending, sepals about half as long as the calyx-tube, stamens usually 7. Bedd. Fl. Sylv. t. 57. S. arborescens, Burm. Fl. Ind. 85, t. 25, fig. 2. S. minor and Zollingeriana, Miq. Fl. Ind. Bat. i. 84. Jonesia Asoca, Roxb. Fl. Ind. ii. 218; DC. Prodr. ii. 487; Wall. Cat. 5822; W. & A. Prodr. 284; Wight Ic. t. 206; Bot. Mag. t. 3018; Dalz. & Gibs. Bomb. Fl. 82. J. pinnata, Willd. Sp. Pl. ii. 287.—Rheede Hort. Mal. v. t. 59.

From the CENTRAL and EASTERN HIMALAYAS, ascending to 2000 feet in KUMAON, CEYLON and MALACCA.—DISTRIB. Malay isles.

A low erect tree. *Leaves* sessile or subsessile; leaflets oblong or oblong-lanceolate, acute or obtuse, 3-9 in. long rigidly subcoriaceous. *Corymbs* dense, 3-4 in. broad; pedicels stout, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, below the oblong-spathulate ascending amplexicaul bracteoles. *Sepals* $\frac{1}{4}$ - $\frac{1}{2}$ in., obovate-oblong. *Filaments* three times as long as

* Wrongly given as equally pinnate in the Key.

the sepals. *Pod* 4-10 in. by $1\frac{1}{2}$ -2 in., like that of a *Millettia*, 4-8-seeded. *Seeds* oblong, compressed, $1\frac{1}{2}$ in. long.

2. **S. cauliflora**, Baker; leaflets 10-12, petiolules long, bracteoles 0, corymbs dense from thick old branches, sepals half as long as the calyx-tube, stamens about 7.

MALACCA, Griffith, Maingay.

Petiolules $\frac{1}{2}$ in. long; leaflets rigidly subcoriaceous, strongly veined; upper oblanceolate-oblong, acute, a foot or more long; lower shorter, more oblong. *Corymbs* solitary or geminate, nearly sessile, ample, dense, 4-6 in. broad; main branches stout, woody; pedicels of lower flowers disarticulated at the base before the upper expand; bracteoles none to be seen in the specimens. *Flowers* the same size as in the last, but the tube and pedicels more slender.—Closely approaches the Malayan *S. declinata*, Miquel, in habit, foliage and inflorescence, but that has only 4 stamens.

3. **S. Lobbliana**, Baker; leaflets 10-12, petiolules short, bracteoles large caducous, corymbs sparse from young slender branches, sepals half as long as the calyx-tube, stamens 7-8.

MARTABAN; foot of Mount Kola, Moulmein, Lobb.

A tree 40 feet high. *Petiolules* $\frac{1}{4}$ in.; leaflets thinner than in the two last, oblanceolate-oblong, subacute, $\frac{1}{2}$ -1 ft. long. *Corymbs* solitary from leafless slender branches, with only a few erecto-patent branches; bracteoles $\frac{3}{8}$ - $\frac{1}{2}$ in., oblong-spathulate, navicular, amplexicaul, falling before the flowers expand. *Sepals* oblong, $\frac{1}{2}$ in. deep. *Stamens* twice as long as the sepals. *Flowers* yellow, turning to reddish.

4. **S. triandra**, Baker; leaflets 4-8, petiolules short, bracteoles spreading persistent, stamens 3-4. *Jonesia triandra*, Roxb. *Fl. Ind.* ii. 220. *J. scandens*, Roxb. *loc. cit.*?

TENASSERIM, MALACCA.—DISTRIB. Siam, Sumatra.

Petiolules $\frac{1}{4}$ - $\frac{1}{2}$ in.; leaflets oblanceolate-oblong, subcoriaceous, subobtuse or subacute; upper $\frac{3}{4}$ -1 ft. long. *Corymbs* sessile from the side of slender branches, round, very dense, sometimes 6-8 in. broad; bracts persistent, spreading or reflexed; bracteoles obovate, under $\frac{1}{4}$ in. long, not boat-shaped or amplexicaul, bright-coloured. *Sepals* under $\frac{1}{4}$ in. long. *Filaments* 3-4 times as long as the sepals. *Pod* oblong, 5-6 in. by $1\frac{1}{2}$ -2 in.—Very near the Malay *S. macroptera* and *palembanica*, Miquel.

110. AMHERSTIA, Wall.

An erect tree. *Leaves* abruptly pinnate. *Flowers* racemed. *Calyx* with a long cylindrical disciferous tube; sepals 4, oblong, the two lowest connate. *Petals* only 3 developed, the upper very broad, with a long claw, the two lateral as long, but narrower, oblong-spathulate, the two lowest rudimentary. *Stamens* diadelphous, 9 lower having the filaments connate in a long tube, alternately larger and smaller, the upper free from the base; anthers versatile, dehiscing longitudinally. *Ovary* stalked beyond the disk, many-ovuled; style long, filiform, stigma capitate. *Pod* large, flat, almost woody, dehiscent. *Seeds* large, round-oblong, compressed, exalbuminous.—DISTRIB. A single endemic species.

1. **A. nobilis**, Wall. *Pl. As. Rar.* i. p. 1, t. 1-2; Wall. *Cat.* 596; G. Don *Gen. Syst.* ii. 437.

MARTABAN, TENASSERIM and MALACCA, often planted.

An erect unarmed tree. *Leaves* very large, abruptly pinnate; leaflets oblong, acuminate, $\frac{1}{2}$ -1 ft., opposite, glabrous, subcoriaceous. *Flowers* in ample pendulous

racemes, the most showy of those of the Indian Leguminosæ; pedicels 2-4 in., with a pair of large lanceolate persistent coloured bracteoles at the apex enclosing the buds. *Sepals* membranous, coloured, 1 in. long. *Petals* mixed brilliant red and yellow, the upper one 2 in. long and broad; tube as long as the sepals, cylindrical. *Pod* like that of a *Milletia*, $\frac{1}{2}$ ft. long, $1\frac{1}{2}$ in. broad, glabrous, truncate, 4-6-seeded.

111. TAMARINDUS, Linn.

A spineless tree. *Leaves* abruptly pinnate. *Flowers* racemed. *Calyx*-tube turbinate; disk produced some distance above its base; teeth lanceolate, much imbricated, the two lowest connate. *Petals* only the three upper developed, the two lateral ovate, the upper hooded, the two lower reduced to scales. *Stamens* monadelphous, only 3 developed, the others reduced to mere bristles at the top of the sheath; anthers oblong, versatile, dehiscing longitudinally. *Ovary* many-ovuled, with a stalk adnate to the calyx-tube; style filiform, stigma capitate. *Pod* ligulate, many-seeded, with a thin crustaceous epicarp and thick pulpy mesocarp. *Seeds* exalbuminous.—A single species.

1. **T. indica**, Linn.; *DC. Prodr.* ii. 488; *Roxb. Fl. Ind.* iii. 215; *Wall. Cat.* 5824; *W. & A. Prodr.* 285; *Dalz. & Gibs. Bomb. Fl.* 82; *Bedd. Fl. Sylv.* t. 184. *T. occidentalis*, Gaertn.; *DC. loc. cit.* *T. officinalis*, Hook. *Bot. Mag.* t. 4563.

Diffused through India and the Tropics generally, probably indigenous in Africa.

A large unarmed tree. *Leaves* abruptly, pinnate, with 20-40, glabrescent, close obtuse opposite oblong leaflets. *Flowers* few together, in copious lax racemes at the end of the branchlets; pedicels articulated at the base of the calyx; bracts boat-shaped, enclosing the buds, caducous. *Petals* under $\frac{1}{2}$ in. long, yellow, striped with red. *Pod* 3-6 in. by 1 in. or more, 3-10-seeded.

112. HUMBOLDTIA, Vahl.

Unarmed erect small trees. *Leaves* abruptly pinnate, with persistent usually peltate stipules. *Flowers* small, in copious racemes, each furnished with a pair of persistent coloured bracteoles at the base. *Calyx*-tube turbinate, with the disk produced some distance above its base; sepals 4, oblong, subequal, imbricated. *Petals* 5 or 3, oblong-spathulate, clawed, subequal, exceeding the calyx. *Stamens* 5, equal, exserted, alternating with 5 minute staminodes, filaments filiform; anthers oblong, versatile, dehiscing longitudinally. *Ovary* with a stalk immersed in the disk, linear, few-ovuled; style very long, filiform, stigma terminal. *Pod* flat, dehiscent, rigidly coriaceous. *Seeds* exalbuminous.—**DISTRIB.** Species 5, the other Tropical African.

1. **H. laurifolia**, Vahl; *DC. Prodr.* ii. 488; branches hollow, nodes constricted, stipule-spur lanceolate, leaves nearly sessile, leaflets 8-10, petiolules short, petals 5. *R. Br. in Wall. Pl. As. Rar.* iii. 18; *W. & A. Prodr.* 285; *Wight Ic.* t. 1605; *Bedd. Fl. Sylv.* 93. *Batschia laurifolia*, Vahl, *Symb.* 39, t. 56.

MALABAR and CEYLON.

A low tree, with the internodes of the branchlets conspicuously swollen. *Leaves* $\frac{1}{2}$ -1 ft. long; leaflets oblong, cuspidate, rigidly subcoriaceous, glabrous, 3-4 in. long; stipules coriaceous, very large, oblong-lanceolate, 1 in. or more long above the attachment. *Racemes* dense, axillary, drooping, nearly sessile, 3-6 in. long; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in. *Flower* $\frac{3}{4}$ in. long, exclusive of the exserted stamens; bracteoles oblong-spathulate, half as long as the calyx. *Pod* rigid, ligulate-oblong. 3-4 in. long. *Seeds* 3-4.

2. **H. unijuga**, *Bedd. Ic. Pl. Ind. Or.* t. 108; branches solid, nodes not constricted, stipules not spurred, leaves and 2 leaflets subessile, petals 5.

TRAVANCORE mountains, alt. 3–4500 ft., *Beddome*.

A large tree, glabrous in all its parts, with terete slender branchlets. *Stipules* lanceolate, $\frac{1}{4}$ in., rigidly coriaceous; petiole very short, broadly flattened and hollowed out on the face; leaflets oblong-lanceolate, rather oblique, 5–6 in. long, obtusely acuminate, glossy on the upper surface. *Pedicels* $\frac{1}{4}$ – $\frac{1}{2}$ in., spreading, finely silky; bracteoles obtuse, half as long as the calyx. *Flower* $\frac{3}{4}$ in. long, exclusive of the exerted stamens. *Petals* bright red.

3. **H. Brunonis**, *Wall. Pl. As. Rar.* iii. 17, t. 233; branches solid, nodes not constricted, spur of stipules rounded, leaves nearly sessile, leaflets 4, petiolules short, petals 3. *Wall. Cat.* 2332; *W. & A. Prodr.* 285; *Wight Ic.* t. 1606; *Bedd. Fl. Sylv.* 93.

Ghats of NILGHIRIS and COORG.

Branchlets slender, terete. *Petiole* not flattened; stipules small, lanceolate above the attachment, with a transverse oblong spur; leaflets oblong, rigidly subcoriaceous, glabrous, obtusely cuspidate, 4–6 in. long. *Racemes* axillary, distinctly peduncled, equalling or exceeding the leaves; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., spreading or ascending; bracteoles and calyx grey-downy. *Flower* $\frac{1}{4}$ – $\frac{3}{8}$ in. long, exclusive of the exerted stamens.

4. **H. Vahlia**, *Wight Ic.* t. 1607–8; branches solid, nodes not constricted, spur of stipules rounded, leaves distinctly petioled, leaflets 6–8, petiolules long, petals 5. *Bedd. Fl. Sylv.* 93.

NILGHIRIS; jungles about Conoor, *Dr. Wight*.

Branchlets slender, terete. *Stipules* 1 in. or more long, lanceolate above, transversely oblong below the point of attachment; leaf-rachis 5–7 in. long, including the 1 in. petiole; leaflets oblong-lanceolate, acuminate, glabrous, rigidly coriaceous, 5–6 in. long, both sides finely venulose. *Racemes* peduncled, subsperate, 1–3-nate; bracteoles and sepals very downy on the back, the latter $\frac{3}{8}$ in. long. *Petals* very caducous, not exceeding the sepals. *Pod* almost woody, $\frac{1}{2}$ ft. by $1\frac{1}{2}$ in., narrowed to the point.

113. **AFZELIA**, Smith.

Erect unarmed trees. *Leaves* abruptly pinnate, with few pairs of opposite leaflets. *Flowers* in copious terminal panicles. *Calyx* with the disk produced to the top of its elongated tube; sepals 4, much imbricated, slightly unequal. Developed *petal* one, orbicular with a distinct claw, the others absent or rudimentary. *Stamens* 3–9, declinate, filaments long, pilose; anthers minute, oblong, opening longitudinally. *Pod* large, oblong, flattish, subligulate, subindehiscent.—DISTRIB. Tropics of the Old World; species 10.

1. **A. retusa**, *Kurz in Journ. Asiat. Soc. Beng.* xlii. 2, 73; leaflets 2–6, racemes simple, pedicels glabrous, calyx-tube as long as limb, fertile stamens 3.

MALACCA, *Griffith*. ANDAMANS, *Kurz*.

A shrub, glabrous in all its parts. *Leaflets* stalked, oblong, subcoriaceous, 2–3 in. long, obtuse, conspicuously emarginate. *Flowers* in simple corymbose terminal racemes; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. *Calyx*-tube $\frac{1}{4}$ – $\frac{3}{8}$ in., cylindrical; sepals $\frac{1}{8}$ in. broad. *Petal* twice as long as the sepals; blade round, $\frac{1}{2}$ in. broad. *Pod* oblong, subcoriaceous, 3–4 in. by 1–1 $\frac{1}{4}$ in.

2. **A. bijuga**, *A. Gray Bot. Amer. Expl. Expedit.* 467, t. 51; leaflets 4, panicle corymbose, pedicels pilose, calyx-tube as long as limb, fertile stamens 3.

Outea bijuga, DC. *Prodr.* ii. 511; *Wall. Cat.* No. 5823. *Macrolobium bijugum*, *Coleb. in Trans. Linn. Soc.* xii. 359, t. 17.

MALAY peninsula, *Wallich, Griffith*.—DISTRIB. Seychelles and Malay isles and Polynesia.

An erect tree, 50 feet high. *Leaflets* stalked, obliquely oblong, subcoriaceous, glabrous, 2-5 in. long, subacute or obtuse. *Flowers* in a dense terminal corymbose panicle; pedicels $\frac{1}{12}$ - $\frac{1}{2}$ in., grey-downy. *Calyx*-tube cylindrical, $\frac{1}{4}$ - $\frac{3}{8}$ in. *Petal* exserted, round, with a long claw. *Filaments* above 1 in. *Pod* rigid, flat, oblong, 6-8 in. long; seeds 4-5.

3. **A. palembanica**, *Baker*; leaflets 6-8, panicle corymbose, calyx-tube as long as limb, fertile stamens 3. *Intsia palembanica*, *Miq. Flor. Ind. Bat. Suppl.* 289.

MALACCA, *Griffith* ("The best Malacca timber tree"), *Maingay*. ANDAMANS, *Kurz*.—DISTRIB. Malay isles.

A tall unarmed erect tree. *Leaflets* stalked, oblong, subcoriaceous, obtuse, emarginate, 2-4 in. long; lowest pair distinctly smallest. *Flowers* in a dense terminal corymbose panicle; pedicels $\frac{1}{12}$ - $\frac{1}{4}$ in., grey-downy. *Calyx*-tube cylindrical, $\frac{1}{8}$ - $\frac{1}{6}$ in. *Petal* not exserted. *Filaments* $\frac{1}{2}$ -1 in. *Pod* oblong, almost woody, glossy, 6-10 in. by 3 in., straight or rather curved.

4. **A.? coriacea**, *Baker*; leaflets 4-6, panicle thyrsoid with racemose branches, calyx-tube much shorter than the limb, fertile stamens 9. *Intsia coriacea*, *Maingay MSS.*

MALACCA, *Maingay*.

Leaflets stalked, oblong, glabrous, very rigid and coriaceous, 3-4 in. long, obtuse, emarginate. *Flowers* in copious elongated terminal panicles, with distant racemose branches, clothed like the pedicels and calyx with thin rusty tomentum. *Calyx*-tube very short; sepals $\frac{1}{2}$ in., much narrower and less imbricated than in the two other species. "*Filaments* alternately longer and shorter (5 long, 4 short), in bud, connate into a partial tube at the base," *Maingay*. *Pod* not seen.—May prove a *Pakudia*, but we have young buds only.

114. **BAUHINIA**, Linn.

Unarmed erect trees or climbers with circinate tendrils. *Leaves* simple, usually deeply cleft from the tip, rarely entire or fully divided into 2 leaflets. *Flowers* showy, in copious simple or panicked often corymbose racemes. *Calyx*-tube with the disk produced to the top, sometimes long and cylindrical, sometimes short and turbinate; limb entire and spathaceous, or cleft into 2 or 5 teeth. *Petals* 5, subequal, usually with a distinct claw. *Stamens* 10, or reduced to 5 or 3, if fewer than 10 with sterile filaments absent or present, filaments free, filiform; anthers versatile, dehiscing longitudinally. *Ovary* stalked, many-ovuled; style long or short, stigma small or large and peltate, subterminal or oblique. *Pod* linear or rarely oblong, flat, continuous within, dehiscent or indehiscent. *Seeds* albuminous.—DISTRIB. Species 130, spread everywhere in the Tropics.

SECT. 1. **Pauletia**, Cav. Fertile *stamens* 10. *Calyx* with a very short tube and spathaceous limb. *Pod* narrow, dehiscent.—Erect shrubs with large showy flowers and connate leaflets.

1. **B. tomentosa**, Linn.; DC. *Prodr.* ii. 514; flowers usually in axillary pairs, petals much longer than the entire calyx-limb, pod stalked not ribbed near the upper suture. *Roxb. Hort. Beng.* 31; *Fl. Ind.* ii. 323; *Wall. Cat.* 5790, excl. *F* & *G*; *Bot. Mag.* t. 5560; *W. & A. Prodr.* 295; *Bedd. Fl. Sylv.* 92. *B. speciosa*, *Roxb.*; *Wall. Cat.* 5791.

NORTH WEST PROVINCES to CEYLON and PENANG.—DISTRIB. Malay isles, China, Trop. Africa.

An erect shrub, with downy branches. *Leaf* broader than long, not cordate, coriaceous, 1-2 in. deep, cleft less than half way down into two obtuse lobes, pubescent below, 7-nerved. *Flowers* usually in short-peduncled pairs from the axils of the leaves, rarely 1 or 3; pedicels with a pair of large persistent linear bracteoles. *Calyx*-limb broad-ovate, finely downy, $\frac{1}{2}$ in. *Petals* $1\frac{1}{2}$ -2 in. long, obovate-spathulate, yellow, the upper with a red blotch on the face. *Style* $\frac{1}{2}$ - $\frac{3}{8}$ in. *Pod* distinctly stalked, 4-5 in. by $\frac{1}{2}$ - $\frac{5}{8}$ in., 6-10-seeded, glabrous.

2. **B. brachycarpa**, Wall. Cat. 5786; flowers racemose, pod small sessile not ribbed near the upper suture. *Benth. Pl. Jungh.* 261.

AVA; Taong-dong mountains, Wallich.

A doubtful plant, known only in fruit. *Branches* slender, glabrous. *Leaf* cordate, roundish, thin, glabrous, 9-ribbed, cleft a third down into two obtuse lobes. *Racemes* short-peduncled, many-flowered, about as long as the leaves; pedicels ascending, $\frac{1}{4}$ - $\frac{1}{3}$ in. *Pod* $1\frac{1}{4}$ - $1\frac{1}{2}$ in. by $\frac{3}{8}$ in., narrowed to both ends, 2-3-seeded, dehiscent.

3. **B. polycarpa**, Wall. Cat. 5787; flowers in long racemes, calyx-limb entire, pod nearly sessile not ribbed near the upper suture. *Benth. Pl. Jungh.* 261.

MARTABAN; banks of the Attran river, Wallich.

Another doubtful species, known only in bud and pod. *Leaves* suborbicular, slightly cordate, 3-4 in. long, glabrous, flexible, obtusely lobed $\frac{1}{2}$ - $\frac{3}{4}$ down. *Flowers* in narrow close short-peduncled axillary regular racemes 3-5 in. long. *Pedicels* shorter than the bud, which is glabrous, ovoid-lanceolate, $\frac{1}{4}$ in. long. *Pod* 3-4 in. long, $\frac{3}{8}$ in. broad, glabrous, dehiscent, nearly straight, 6-10-seeded.

4. **B. acuminata**, Linn.; DC. Prodr. ii. 513; flowers in close axillary racemes, petals as long as the calyx-limb which is cleft into 5 subulate teeth at the tip, pod with a rib on each side of the upper suture. *Roxb. Hort. Beng.* 31; *Fl. Ind.* ii. 324; Wall. Cat. 5794; W. & A. Prodr. 295. B. purpurea, Wall. Cat. 5797, D. B. candida, Ait.; DC. Prodr. loc. cit., non Roxb.

NORTH WEST PROVINCES to CEYLON and MALACCA.—DISTRIB. China, Malay isles.

An erect shrub, with obscurely downy angular branches. *Leaves* slightly cordate, flexible, 3-6 in. long, 9-11-nerved, the lobes acute or subobtusely, not reaching half way down, at first finely pubescent beneath. *Racemes* axillary, short-peduncled, corymbose; pedicels erecto-patent, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, with linear-subulate bracts and bracteoles. *Calyx* $1-1\frac{1}{4}$ in., narrowed into a long point, cleft at the tip. *Petals* oblong, whitish. *Style* $\frac{1}{2}$ in. *Pod* 4-5 in. long, $\frac{5}{8}$ - $\frac{3}{4}$ in. broad, firm, glabrous, 8-12-seeded; stalk $\frac{1}{2}$ in. long.

SECT. 2. **Pileostigma**, Hochst. Fertile *stamens* 10. *Calyx* with a short tube and spathaceous or 5-cleft limb. *Pod* narrow, indehiscent.—Erect shrubs, or climbers with small flowers and connate leaflets.

5. **B. racemosa**, Lam. Dict. i. 390; erect, leaves small deeply cleft 7-9-nerved, flowers in lax simple racemes, calyx-limb entire, stigma sessile. W. & A. Prodr. 295; Hook. Ic. t. 141; Dalz. & Gibs. Bomb. Fl. 82; Bedd. Fl. Sylv. t. 182, non Vahl. B. parviflora, Vahl; DC. Prodr. ii. 514; Roxb. Hort. Beng. 31; Fl. Ind. ii. 323. B. spicata, Koenig; Wall. Cat. 5789. B. timoriensis, Decaisne in Nov. Ann. Mus. iii. 466. Pileostigma racemosa, Benth. Pl. Jungh. 262.

PUNJAB and GARHWAL to CEYLON and PEGU.—DISTRIB. China, Malay isles, Timor.

A small crooked bushy tree with drooping branches. *Leaves* broader than long, rigidly coriaceous, $1\frac{1}{2}$ –2 in. long, slightly cordate, clothed more or less densely beneath with grey pubescence. *Racemes* short-peduncled, lax, terminal and leaf-opposed, $\frac{1}{4}$ – $\frac{1}{2}$ ft. long, with densely grey-downy rachises; pedicels $\frac{1}{8}$ – $\frac{1}{4}$ in., erecto-patent. *Calyx*-tube turbinate, not more than $\frac{1}{12}$ in. long; limb $\frac{1}{4}$ – $\frac{1}{2}$ in., not splitting up. *Petals* ob-lanceolate, yellow, as long as the limb. *Pod* $\frac{1}{2}$ –1 ft. by $\frac{1}{2}$ –1 in., not venulose, falcate, firm, glabrous, turgid; stalk above an inch long. *Seeds* 12–20.

B. RUFESCENS, Lam.; DC. Prodr. ii. 514, which is sometimes cultivated, differs from this by its very small leaves, seldom over half an inch deep, short style, and much smaller pod. It is a native of Tropical Africa.

6. *B. malabarica*, Roxb. Hort. Beng. 31; Fl. Ind. ii. 321; erect, leaves 7–9-nerved slightly cordate deeply bifid, flowers in short mostly simple corymbs, bracts minute, lower pedicels $1\frac{1}{2}$ –2 the calyx, calyx-limb 5-cleft, style produced. Wall. Cat. 5793; W. & A. Prodr. 294; Dalz. & Gibs. Bomb. Fl. 82; Bedd. Fl. Sylv. 92. *B. tomentosa*, Wall. Cat. 5790 F & G. *Pileostigma malabarica*, Benth. Pl. Jungh. 261.

Western and Central Himalayas (ascending to 1000 ft. in KUMAON and 4000 feet in BEHAR) through India proper and to BURMA.—DISTRIB. *B. acida*, Reinw. (*B. purpurea* DC. of Malay isles and Timor scarcely more than a variety.)

An erect low bushy tree. *Leaves* broader than long, rigidly coriaceous, the same shape as in the last, but longer, with two obtuse lobes reaching about a quarter down, glaucous, subglabrous or finely grey-downy beneath. *Racemes* sessile, dense, axillary, as broad as long; pedicels ascending, very slender, $\frac{1}{2}$ –1 in. long. *Calyx* clothed with pale brown down; tube cylindrical, turbinate, $\frac{1}{8}$ – $\frac{1}{4}$ in.; limb $\frac{1}{4}$ in. *Petals* oblong-spathulate, little exerted. *Pod* 1 ft. by $\frac{3}{4}$ –1 in., nearly straight, firm, glabrous, rather turgid, reticulato-venulose, rostrate with the style, 20–30-seeded; stalk 1 in. long.

VAR. reniformis, Royle MSS., sp.; leaves as small as those of *B. racemosa*, densely pubescent beneath.—North-west provinces.

7. *B. unguiculata*, Baker; erect, leaves 7-nerved cordate deeply bifid, flowers in short simple corymbs, bracts large, pedicels 3–4 times the calyx, calyx-limb 5-cleft, style produced.

SIAM, Sir R. Schomburgk.

Closely allied to the last. *Leaves* broader than long, rigidly subcoriaceous, 2–3 in. long, glabrous beneath, with two obtuse lobes reaching $\frac{1}{4}$ – $\frac{1}{2}$ down. *Racemes* short-peduncled, as long as the leaves; bracts under $\frac{1}{4}$ in., oblanceolate, reflexed; pedicels slender, lower $1\frac{1}{2}$ –2 in. *Calyx* thinly grey-downy externally; tube cylindrical, turbinate, $\frac{1}{8}$ – $\frac{1}{4}$ in.; limb $\frac{1}{4}$ – $\frac{1}{2}$ in. *Petals* $\frac{1}{2}$ in., pilose, with a round limb equalling a distinct claw. *Ovary* downy, with a distinct stalk and style. *Pod* unknown.

8. *B. Lawii*, Benth. MSS.; scandent, leaves deeply cordate shortly bifid 15–17-nerved, racemes dense forming ample terminal panicles with reflexed branches, calyx-limb shortly 5-cleft, stigma sessile. ? *B. foveolata*, Dalz. in Journ. Linn. Soc. 13, p. 188.

CONCAN, Law.

Branchlets slender, terete, ecirrhose, thinly grey-downy. *Leaves* orbicular, rigidly coriaceous, 4–9 in. long and broad, finely downy, the numerous ribs thick and much raised on the under surface. *Racemes* forming an ample deltoid panicle $\frac{1}{2}$ ft. long and broad, with numerous deflexed densely pale-brown downy branches, the lower compound; bracts deltoid, minute; pedicels erecto-patent, very short. *Calyx*-tube $\frac{1}{8}$ – $\frac{1}{4}$ in., narrow, turbinate; limb $\frac{1}{4}$ – $\frac{1}{2}$ in., shortly 5-cleft. *Petals* twice the calyx. *Stigma* large, peltate, $\frac{1}{2}$ in. broad. *Pod* unknown.—Agrees with the description of Dalzell's plant except that it is not diœcious.

SECT. 3. *Lysiphyllum*, Benth. Fertile stamens 10. *Calyx* with a long tube and 5-cleft limb. *Pod* broad, indehiscent.—Leaflets distinct.

9. **B. Blancoi**, *Baker*; ecirrhose, corymbs equalling the leaves, flowers small, tube equalling the ovoid bud. *Phanera Blancoi*, *Benth. Pl. Jungh.* 264.

SIAM, *Sir R. Schomburgk*.—DISTRIB. Philippines, *Cuming*, 1518.

A glabrous erect shrub. *Leaflets* $1\frac{1}{2}$ in., rigidly subcoriaceous, obtuse, finely veined, deeply rounded below the point of insertion. *Flowers* in dense axillary corymbs; pedicels $\frac{1}{4}$ in., erecto-patent. *Calyx*-tube cylindrical, $\frac{1}{4}$ – $\frac{3}{8}$ in., finely velvety; sepals lanceolate, equalling the tube. *Petals* much exserted, oblong-spathulate, coarsely pubescent. *Pod* distinctly stalked, glabrous, 5–6 in. by $1-1\frac{1}{4}$ in., 8–10-seeded.

10. **B. diphylla**, *Hamilt. in Symes It. Avens.* t. 24; cirrhose, racemes much exceeding leaves, flowers large, tube much shorter than the lanceolate bud. *Wall. Cat.* 5784. *B. Buchanani*, *Desv. in Ann. Sc. Nat. Hist. Par. ser. i. vol. ix.* 430. *Phanera diphylla*, *Benth. Pl. Jungh.* 264.

CONCAN, *Stocks*. BIRMA, *Wallich*, *Maingay*. MALACCA, *Griffith*.

A glabrous twiner, with circinate tendrils. *Leaflets* rigidly coriaceous, 2–3 in. long, rounded at both ends. *Flowers* in lax axillary racemes, with rusty-downy branches; pedicels ascending, $1\frac{1}{2}$ in. *Calyx*-tube 1 in. long, narrow turbinate; sepals lanceolate, coriaceous, $1-1\frac{1}{2}$ in. *Petals* rather exserted, oblong, with a long claw. *Pod* $\frac{3}{4}$ –1 ft. by $1\frac{1}{2}$ –2 in., thin, glabrous, indehiscent, many-seeded down the centre; stalk finally $1\frac{1}{2}$ –2 in. long.

SECT. 4. **Phanera**, *Lour.* Fertile *stamens* usually 3, sometimes 4–5. *Calyx*-tube mostly produced; limb usually 5-cleft, sometimes spathaceous.—Erect or scandent; flowers large or small.

* *Leaves narrowed gradually or suddenly to an entire point.*

11. **B. cornifolia**, *Baker*; leaf half as long again as broad gradually pointed, calyx-tube 3–4 times as long as the limb, petals oblanceolate-oblong not clawed.

PENANG, *Griffith*.

Branches slender, glabrous, without tendrils, thinly rusty-downy. *Leaves* 2–3 in., rigidly subcoriaceous, slightly cordate, 5-nerved, thinly brown-silky beneath; petiole 1 in. *Flowers* in dense terminal corymbose racemes, 3 in. long and broad; pedicels erecto-patent, lower above 1 in. long. *Calyx* thinly rusty-downy externally; tube cylindrical, $\frac{1}{2}$ – $\frac{5}{8}$ in. long; bud ovoid, under $\frac{1}{4}$ in. *Petals* more than twice the length of the calyx-limb. *Ovary* downy, with a short distinct style and stalk; stigma large, peltate.

12. **B. Finlaysoniana**, *Grah. in Wall. Cat.* 5801; leaf once and a half to twice as long as broad gradually pointed, calyx-limb as long as the tube, petals orbicular with a distinct claw. *Phanera Finlaysoniana*, *Benth. Pl. Jungh.* 262.

MALAY PENINSULA, *Finlayson*.

Branchlets slender, glabrescent, without tendrils. *Leaves* 3–4 in. long, rigidly coriaceous, glabrous, shortly cordate, 3–5-nerved, narrowed gradually from the middle to a point; petiole very short. *Racemes* terminal and axillary, close, 3–4 in. long, the rachis thinly rusty-downy; pedicels $\frac{1}{2}$ in. *Calyx*-tube $\frac{1}{4}$ in., cylindrical. *Bud* ovoid. *Petals* $\frac{1}{2}$ – $\frac{5}{8}$ in. long, glabrous. *Ovary* rusty; style and stalk both very short.

13. **B. emarginata**, *Jack. in Mal. Misc.* i. 75; *Comp. Bot. Mag.* i. 223; leaf rather longer than broad suddenly obtusely pointed, calyx-limb as long as the tube, petals orbicular with a distinct claw. *B. lucida*, *Wall. Cat.* 5779 A. *B. cordifolia*, *Roxb. Fl. Ind.* ii. 332? *Phanera lucida*, *Benth. Pl. Jungh.* 262.

PENANG, *Porter*.—DISTRIB. Sumatra.

A cirrhose twiner, with glabrescent branches. *Leaves* rigidly coriaceous, glabrous,

3-5 in. long, 5-7-nerved, distinctly cordate. *Flowers* in copious peduncled terminal racemes 3-4 in. long; pedicels erecto-patent, lower 1 in. or more long, like the calyx densely brown-downy. *Calyx*-tube between cylindrical and turbinate, $\frac{1}{2}$ - $\frac{3}{4}$ in.; bud obovoid. *Petals* twice the length of the calyx, densely silky on the outside. *Ovary* downy, with a short distinct style.

** *Leaves round-cordate, cleft only at the very tip.*

14. **B. retusa**, Ham.; Roxb. *Hort. Beng.* 31; *Fl. Ind.* ii. 322; erect, cirrhose, pubescence grey, calyx-tube turbinate very short. *B. emarginata*, Wall. *Cat.* 5792, non Jack. *Phanera retusa*, Benth. *Pl. Jungh.* 263.

Western Himalayas; SIMLA, GURWHAL, KUMAON, ascending to 4000 ft.

Leaves rigidly coriaceous, rather broader than long, 4-6 in. long, 9-nerved, glabrous beneath, usually deeply cordate. *Flowers* in ample terminal panicles, sometimes a foot long and broad, with corymbose branches clothed with fine grey silky pubescence, the lower springing from the axils of reduced leaves; lower pedicels ascending, $\frac{1}{2}$ - $\frac{3}{4}$ in. long; bracts and bracteoles minute, caducous. *Calyx*-tube scarcely any; limb $\frac{1}{2}$ in. long, irregularly cleft; bud ovoid. *Petals* oblong, clawed, twice the sepals, yellow. *Style* produced, stigma large. *Pod* hard, flat, 5-6 in. by $1\frac{1}{4}$ - $1\frac{1}{2}$ in., glabrous, late in dehiscing, short-stalked, 6-8-seeded.

15. **B. integrifolia**, Roxb. *Fl. Ind.* ii. 331; scandent, cirrhose, pubescence ferruginous, calyx-tube cylindrical not exceeding the limb, ovary densely silky short-stalked. Wall. *Cat.* 5780. *Phanera integrifolia*, Benth. *Pl. Jungh.* 263.

PENANG and MALACCA.

Leaves rigidly subcoriaceous, glabrous, 9-nerved, deeply cordate, 3-6 in. long, with a deltoid apical sinus. *Inflorescence* as in the last, a long panicle with very dense many-flowered ascending racemose branches, clothed like the calyx with bright rusty silky pubescence; bracts small, lanceolate, subpersistent; pedicels ascending, lower $\frac{1}{2}$ - $\frac{3}{4}$ in. *Calyx*-tube $\frac{1}{2}$ - $\frac{3}{4}$ in.; sepals deltoid; bud globose. *Petals* obovate, clawed, twice the sepals, densely rusty-silky. *Style* long; stigma small. *Pod* oblong, hard, flat, short-stalked, 5-6 in. by 2 in., late in dehiscing.

16. **B. bidentata**, Jack in *Mal. Misc.* i. 76; Hook. *Comp. Bot. Mag.* i. 223; scandent, cirrhose, pubescence ferruginous, calyx-tube cylindrical exceeding the limb, ovary usually subglabrous long-stalked. Wall. *Cat.* 5778. *Phanera bidentata*, Benth. *Pl. Jungh.* 263.

PENANG and MALACCA.—DISTRIB. Philippines.

Very near *B. integrifolia*, with which it agrees in leaf, vestiture and inflorescence. Lower pedicels 1-2 in. long; bracts caducous. *Calyx*-tube cylindrical, $\frac{3}{8}$ - $\frac{1}{2}$ in. *Bud* broad-ovoid or subglobose. *Calyx*-limb under $\frac{1}{4}$ in., slit down to the base. *Petals* 2-3 times the length of the sepals, obovate, clawed, more or less silky. *Style* long; stigma large, peltate. *Pod* unknown.

*** *Leaves deeply cleft, persistently pubescent beneath.*

17. **B. Vahlil**, W. & A. *Prodr.* 297; cirrhose, pubescence dense grey or ferruginous, leaf-lobes obtuse, pedicels long, calyx-tube cylindrical, petals much exerted densely pilose. Dalz. & Gibs. *Bomb. Fl.* 83. *B. racemosa*, Vahl, *Symb.* t. 62; DC. *Prodr.* ii. 515; Roxb. *Fl. Ind.* ii. 325; Wall. *Cat.* 5775, non Lam. *Phanera Vahlil*, Benth. *Pl. Jungh.* 263.

Foot of the CENTRAL and EAST HIMALAYAS, ascending to 2500 feet in Kumaon. BEHAR, Dr. Hooker. CONCAN, Stocks. CIRCARS, Roxburgh.

An enormous climber, with densely pubescent branchlets and abundant circinate tendrils. *Leaves* rigidly subcoriaceous, rather broader than long ($\frac{1}{2}$ -1 ft.), deeply

cordate, 11-13-nerved, slit $\frac{1}{2}$ - $\frac{1}{4}$ down with an open sinus, persistently downy all over beneath. *Racemes* long-peduncled, terminal, dense, subcorymbose; lower pedicels 1-2 in., with persistent linear bracteoles. *Calyx*-tube slender, $\frac{1}{4}$ - $\frac{1}{2}$ in.; limb under $\frac{1}{2}$ in., splitting into two lobes. *Petals* 1 in. long, obovate, with a short claw. *Ovary* ferrugineo-tomentose, with a short stalk, long style and minute stigma. *Pod* subligonose, rusty-downy, $\frac{1}{4}$ -1 ft. by 2 in., 8-12-seeded, finally splitting open.

18. **B. rosea**, Kurz in Journ. Asiat. Soc. Beng. xlii. 2, 72; pubescence fulvous, leaf-lobes obtuse, pedicels long, calyx-tube short, petals much exerted slightly pilose.

MARTABAN, Brandis.

A climber, with pubescent branchlets. *Leaves* round-cordate, 3-5 in. each way, chartaceous, slit $\frac{1}{2}$ down, glabrescent above, clothed with persistent fulvous pubescence beneath. *Racemes* terminal, corymbose; pedicels $1\frac{1}{2}$ -2 in.; bracts linear-lanceolate, acuminate, $\frac{1}{2}$ in. *Calyx*-teeth linear-lanceolate, $\frac{1}{2}$ in., free and reflexed when mature. *Petals* $\frac{3}{4}$ in., with a long claw and linear-obovate undulated blade. *Ovary* fulvo-villose; style thick, shorter than the ovary. *Pod* unknown. *Ex Kurz, loc. cit.*

19. **B. rufa**, Grah. in Wall. Cat. 5798; cirrhose, pubescence thin dark ferruginous, leaf-lobes acute, pedicels long, tube slender cylindrical, petals much exerted densely silky. *Phanera rufa*, Benth. Pl. Jungh. 263.

SILHET, Wallich.

Branches, petioles, leaf-ribs beneath, pedicels and calyx densely ferrugineo-tomentose. *Leaves* rigidly subcoriaceous, 4-6 in. long, deeply cordate, 11-13-nerved, with a deltoid sinus reaching $\frac{1}{4}$ down and deltoid lobes. *Corymb* dense, terminal, subsessile; pedicels $1\frac{1}{2}$ -2 in., more slender than in *B. Vahl.* *Calyx*-tube $\frac{1}{4}$ - $\frac{1}{2}$ in.; limb equaling the tube, membranous, irregularly slit. *Petals* oblong-spathulate, twice the length of the calyx-limb, densely silky on the back. *Ovary* densely silky, with a short stalk and long style, stigma small. *Pod* unknown.

20. **B. velutina**, Wall. Cat. 5781; ecirrhose, pubescence thin grey puberulent, leaf-lobes obtuse, pedicels very short, tube cylindrical, petals little exerted obovate with a very long pilose claw. *Phanera velutina*, Benth. Pl. Jungh. 262.

TENASSERIM, Wallich, Griffith, Helfer.

Habit and inflorescence of *B. purpurea* and *variegata*. *Leaves* broader than long, rigidly coriaceous, pale green, deeply cordate, 9-11-nerved, with an open sinus reaching $\frac{1}{2}$ - $\frac{1}{3}$ down. *Racemes* few-flowered, short-peduncled, axillary, corymbose; pedicels $\frac{1}{2}$ - $\frac{1}{3}$ in.; bracts deltoid, very minute. *Calyx* thinly grey-pubescent; tube $\frac{3}{4}$ -1 in.; sepals distinct, lanceolate, as long as the tube. Claw of the *petals* three times as long as the limb. *Ovary* grey-tomentose, narrowed gradually into a long stalk and style, stigma small. *Pod* unknown.

21. **B. semibifida**, Roxb. Hort. Beng. 31; Fl. Ind. ii. 330; ecirrhose, pubescence thin dark ferruginous, leaf-lobes obtuse, pedicels elongated, calyx-tube stout ampullæform, petals oblanceolate glabrous little exerted. Wall. Pl. As. Rar. t. 253; Cat. 5783; Wight. Ic. t. 263. *Phanera semibifida*, Benth. Pl. Jungh. 263.

MALACCA, Griffith. TENASSERIM, Helfer.

Branchlets, leaf-ribs beneath, pedicels and calyx clothed with bright ferruginous silky pubescence. *Leaves* rigidly subcoriaceous, 2-3 in. long, deeply cordate, 11-nerved. *Racemes* terminal, subsessile, 3-4 in. long; pedicels 1-1 $\frac{1}{2}$ in. *Calyx*-tube $\frac{1}{2}$ in., narrowed from the base towards the neck; sepals lanceolate, distinct, coriaceous, reflexed, as long as the tube. *Ovary* densely silky, distinctly stalked, with a short thick style and large peltate stigma.—Closely allied to *B. ferruginea*.

22. **B. elongata**, *Korthals in Nat. Verh. Bot.* 89. t. 24; ecirrhose, pubescence thin dark ferruginous, leaf-lobes obtuse, pedicels short, calyx-tube cylindrical, petals oblanceolate glabrous little exserted. *B. mollissima*, *Wall. Cat.* 5782. *Phanera elongata*, *Benth. Pl. Jungh.* 262.

PENANG, *Wallich*. *BIRMA*, *Maingay*.—DISTRIB. Malay isles.

Branchlets, pedicels and calyx clothed persistently with fine ferruginous tomentum. *Leaves* rigidly subcoriaceous, deeply cordate, 11-13-nerved, 4-6 in. long, with an open sinus, reaching about $\frac{1}{2}$ down. *Corymbs* sessile, few-flowered, axillary; bracts small, lanceolate, subpersistent; pedicels erecto-patent, lower $\frac{1}{4}$ - $\frac{1}{2}$ in. *Calyx*-tube slender, $\frac{3}{4}$ -1 in.; sepals as long as the tube, distinct, lanceolate. *Petals* oblanceolate, clawed. *Ovary* tomentose, narrowed into a very long stalk and style, stigma small.

**** *Leaves deeply cleft, with acute or subacute lobes, nearly or quite glabrous beneath when mature.*

23. **B. ornata**, *Kurz in Journ. Asiat. Soc. Beng.* xlii. 2, 72; ecirrhose, leaves 9-11-nerved, pubescence ferruginous, pedicels long, flowers small, calyx-tube short turbinate, sepals 5 rather exceeding the tube, petals slightly exserted.

PEGU, *Kurz*.

Branchlets clothed with deciduous bright ferruginous silky pubescence. *Leaves* deeply cordate, firm, membranous, reaching nearly a foot long, the acute contiguous lobes reaching half way down or more, the slender veins clothed at first with ferruginous hairs. *Flowers* in dense rounded peduncled simple terminal corymbs; bracts small, lanceolate, tomentose, persistent; pedicels slender, an inch long, clothed with short spreading hairs; lower deflexed. *Calyx* thinly silky; tube $\frac{1}{2}$ in.; limb reflexed, membranous, irregularly cleft. *Petals* $\frac{1}{2}$ in., oblong, clawed, silky on the back. *Stamens* 3. *Ovary* subsessile, densely rusty-silky; style $\frac{3}{8}$ - $\frac{1}{2}$ in., stigma small pilose.

24. **B. khasiana**, *Baker*, ecirrhose, leaves 9-11-nerved, pubescence dense bright ferruginous, pedicels long, calyx-tube cylindrical-turbinate, limb 5-cleft as long as the tube, petals slightly exserted.

KHASIA hills, alt. 1-3000 ft., *Hook. fil. & Thomson*.

A climber, with branchlets clothed with bright rusty silky pubescence. *Leaves* cordate, large, thin, glabrous, the divergent subacute lobes reaching about a third down. *Flowers* in numerous contiguous short-peduncled corymbs, forming a broad terminal corymbose panicle, the lower branches subtended by large leaves; pedicels ascending, 1-1 $\frac{1}{2}$ in. long, like the calyx densely clothed with very bright rusty silky pubescence; bracts caducous. *Calyx*-tube $\frac{1}{4}$ - $\frac{1}{2}$ in.; bud subglobose; limb irregularly cleft. *Petals* obovate, clawed, densely silky on the back. *Stamens* 3. *Ovary* short-stalked, densely rusty-silky; style short, stigma small.

25. **B. glabrifolia**, *Baker*; ecirrhose, leaves 9-nerved, pubescence thin grey, pedicels long, flowers small, calyx-tube turbinate, limb rather exceeding tube, petals little exserted. *Phanera glabrifolia*, *Benth. Pl. Jungh.* 263.

TENASSERIM, *Helper*, and sent from the Calcutta gardens as *B. piperifolia*.

Branchlets slender, at first finely grey-silky. *Leaves* shallowly cordate, rigidly subcoriaceous, glabrous, shining above, moderately large, the acute lobes reaching $\frac{1}{2}$ - $\frac{3}{4}$ down. *Flowers* in dense many-flowered, short-peduncled corymbs, forming a broad terminal corymbose panicle; bracts minute, lanceolate; pedicels slender, ascending; lower $\frac{3}{4}$ -1 in., clothed like the calyx with adpressed grey silky pubescence. *Calyx*-tube $\frac{1}{2}$ in.; bud globose; limb not usually fully 5-cleft. *Petals* obovate, clawed, densely silky on the back. *Ovary* glabrous, short-stalked; style produced, stigma small.

26. **B. macrostachya**, *Wall. Cat.* 5774; cirrhose, leaves 9-nerved, pubescence thin grey, pedicels moderately long, calyx-tube turbinate very oblique,

sepals deltoid, petals much exserted. *B. scandens*, *Roxb. Hort. Beng.* 31; *Fl. Ind.* ii. 326; *Wight Ic.* t. 264, non *Linn.* *Phanera macrostachya*, *Benth. Pl. Jungh.* 262.

SILHET, *Roxburgh, Wallich.* ASSAM, *Hamilton.*

Branches glabrous, with copious stalked geminate tendrils. *Leaves* round-cordate, rigidly subcoriaceous, subglabrous, 3-4 in. long, with an open deltoid sinus reaching $\frac{1}{2}$ - $\frac{1}{4}$ down and deltoid subacute lobes. *Flowers* in forked or simple peduncled narrow sublux racemes $\frac{1}{2}$ - $\frac{1}{3}$ ft. long; bracts minute, deltoid; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in., clothed like the calyx with fine grey silky pubescence. *Calyx*-tube $\frac{1}{2}$ in.; limb campanulate, $\frac{1}{2}$ in., regularly 5-cleft half-way down. *Petals* $\frac{1}{2}$ in., obovate, clawed, densely silky. *Ovary* densely ferrugineo-tomentose; stalk and style short. *Pod* ligulate, 4-6 in. by 2 in., flat, indehiscent, persistently tomentose, 2-4-seeded.

27. ***B. divergens*, Baker**; cirrhose, leaves 7-nerved, pubescence thin grey, pedicels very short, calyx-tube cylindrical. limb spathaceous entire as long as the tube, petals much exserted.

BIRMA, *Griffith.*

Stems slender, scandent, glabrescent. *Leaves* rigidly subcoriaceous, slightly cordate, glabrous, broader than long, 3-4 in. long, with a broadly rounded sinus reaching half way down and divergent deltoid acuminate lobes. *Racemes* copious, few-flowered, congested, sessile, axillary; pedicels scarcely any; bracts minute, deltoid. *Calyx*-tube $\frac{1}{2}$ - $\frac{3}{8}$ in. long; limb tough, entire, $\frac{1}{2}$ in. broad. *Stamens* 5. *Petals* oblanceolate, three times as long as the limb, glabrous, not clawed. Immature *pod* narrow, $\frac{1}{2}$ ft. long, glabrous, with a long stalk.

28. ***B. bracteata*, Grah. in Wall. Cat.** 5802; cirrhose, leaves 9-11-nerved, pubescence grey, pedicels very long, bracteoles linear, calyx-tube short turbinate, limb exceeding the tube, petals much exserted. *Phanera bracteata*, *Benth. Pl. Jungh.* 264.

TENASSERIM, *Griffith, Helfer.* SIAMESE gulf, *Finlayson.*

Branchlets finely grey-downy, with copious stout circinate tendrils. *Leaves* rigidly coriaceous, slightly cordate, rather longer than broad, 4-6 in. long, glabrous, with a sinus reaching half way down, so narrow that the dimidiate deltoid subacute lobes touch each other. *Corymbs* many-flowered, short-peduncled, axillary, $\frac{1}{4}$ - $\frac{1}{2}$ ft long; bracts large, lanceolate, persistent; pedicels ascending, slender, clothed like the calyx with fine grey pubescence, furnished with a pair of opposite linear bracteoles above the middle, the lower ones 2-3 in. long. *Calyx*-tube $\frac{1}{8}$ - $\frac{1}{4}$ in.; sepals $\frac{3}{8}$ - $\frac{1}{2}$ in., lanceolate, subconnate. *Petals* above 1 in. long, with a tomentose claw, exceeding the cordate crisped limb. *Ovary* grey-downy, with a long style and stalk, stigma small.

29. ***B. involucellata*, Kurz in Journ. Asiat. Soc. Beng.** xlii. 2, 72; leaves 9-11-nerved, pubescence thin, pedicels very long, bracteoles large oblong, flowers large, calyx-limb as long as the tube, petals much exserted.

MARTABAN, *Dr. Brandis.*

A climbing shrub, with thinly puberulous young branches. *Leaves* thinly chartaceous, cordate-ovate, 3-4 in. long, glabrous, with a sinus reaching half-way down or more, the lobes narrowed to a subobtusate point. *Racemes* lax, terminal, glabrescent; pedicels 2-2 $\frac{1}{2}$ in.; bracteoles oblong, subobtusate, $\frac{1}{2}$ in. long, velvety within. *Calyx* velvety; tube $\frac{1}{4}$ in. or more long; teeth lanceolate acuminate, finally free and reflexed. *Petals* pale rose, 1 $\frac{1}{2}$ in. long, with an ovate-oblong obtuse blade as long as the claw. *Ovary* glabrous; style thick, moderately long. *Pod* unknown. *Ex Kurz loc. cit.*

***** *Leaves deeply cleft, with obtuse or rarely subacute lobes, nearly or quite glabrous beneath when mature.*

30. ***B. glauca*, Wall. Cat.** 5785; cirrhose, pubescence thin ferruginous, leaves 7-9-nerved cleft below the middle, pedicels moderately long, calyx-limb

2-valved much shorter than the cylindrical tube, petals glabrous exserted. *Phanera glauca*, *Benth. Pl. Jungh.* 265; *Miq. Fl. Ind. Bat.* i. 68, t. 2, A.

TENASSERIM, MARTABAN, PENANG.—DISTRIB. Malay isles, China.

Branchlets slender, soon glabrescent, with copious tendrils. *Leaves* the smallest and deepest cleft of the section, cordate, firm, 1-3 in. long, the ribs at first pilose, the apical lobes always obtuse. *Flowers* in copious dense short-peduncled or sessile terminal corymbs; pedicels slender, erecto-patent, $\frac{1}{2}$ -1 in., with several setaceous persistent bracteoles. *Calyx*-tube $\frac{1}{2}$ - $\frac{3}{4}$ in.; limb $\frac{1}{4}$ in., reflexed, thinly silky. Fertile *stamens* 3. *Ovary* glabrous, with a short stalk, moderately long style and small stigma. *Pod* thin, firm, indehiscent, glossy, 6-8 in. by $1\frac{3}{4}$ -2 in., with 10-12 small seeds down the middle, like *B. diphylla*.—Only distinguishable from the Chinese *B. corymbosa*, Roxb.; *Wall. Cat.* 5388, by its broad indehiscent pod. A plant gathered by Hooker and Thomson in Khasia, without flower, has a pod like *B. glauca*, but the leaves are larger, thinner, and much less deeply cleft.

VAR. *parvifolia*, Teysm. & Binend. sp.; leaves very small $\frac{1}{4}$ - $\frac{1}{2}$ in. long cleft nearly to base clothed beneath with fine ferruginous silky pubescence, corymbs few-flowered. SINGAPORE, *Dr. Oxley*.

31. ***B. ferruginea***, *Roxb. Fl. Ind.* ii. 331; cirrhose, pubescence bright ferruginous, leaves 9-11-nerved not cleft down to the middle, pedicels long, calyx-limb 5-cleft rather exceeding the ampullæform tube, petals exserted densely silky. *Wall. Cat.* 5776; *Korth. in Nat. Verh. Bot.* t. 23. *B. Pottsii*, *G. Don Gen. Syst.* ii. 462. *Phanera ferruginea*, *Benth. Pl. Jungh.* 262.

PENANG, MALACCA, SINGAPORE.—DISTRIB. Malay isles.

Branchlets soon glabrescent, with a few stout woody tendrils. *Leaves* rigidly subcoriaceous, deeply cordate at both ends, 2-4 in. long, with the ribs at first rusty-pubescent. *Flowers* in ample terminal racemes, $\frac{1}{2}$ - $\frac{1}{2}$ ft. long; pedicels erecto-patent, clothed like the calyx with bright rusty silky pubescence, $1\frac{1}{2}$ -2 in. long; bracts minute, lanceolate, caducous. *Calyx*-tube $\frac{1}{2}$ in. long; sepals lanceolate, coriaceous, distinct. *Petals* oblanceolate, clawed. *Stamens* 3. *Ovary* densely rusty-silky, with a long stalk and style and very large oblique stigma. *Pod* smooth, thin, $\frac{1}{2}$ ft. long, $1\frac{1}{2}$ in. broad.

VAR. 1. *Griffithiana*, (*Phanera Griffithiana*, *Benth. Pl. Jungh.* 263), a form with large round persistent stipules.—Malacca, *Griffith, Maingay*.

VAR. 2. *excelsa*, (*Phanera excelsa*, *Blume; Miq. Fl. Ind. Bat.* i. 62); calyx-tube oblong $\frac{1}{2}$ - $\frac{3}{4}$ in. long much stouter than in the type ($\frac{1}{4}$ - $\frac{3}{8}$ in.), sepals above an inch long.—Malacca, *Griffith*. Distrib. Malay isles.

32. ***B. nervosa***, *Wall. Cat.* 5777; cirrhose, pubescence thin ferruginous, leaves 11-15-nerved not lobed half-way down, pedicels long, calyx-limb 5-cleft as long as the cylindrical tube, petals silky exserted. *Phanera nervosa*, *Benth. Pl. Jungh.* 262.

SILHET, *Wallich*. ASSAM, *Griffith*. KHASIA Mts., 1-3000 ft., *Hook. fil. & Thomson*.

A robust climber, with thinly silky branchlets. *Leaves* rigidly subcoriaceous, deeply cordate, middle-sized, rather longer than broad, at first thinly silky on the ribs, the contiguous lobes sometimes subacute. *Flowers* in copious elongated terminal racemes, with branches clothed with bright rusty-silky pubescence; bracts lanceolate, silky, caducous; pedicels erecto-patent, lower $\frac{1}{2}$ -2 in. long. *Calyx*-tube $\frac{1}{2}$ - $\frac{3}{4}$ in., not narrowed upwards; sepals coriaceous, finally distinct. *Petals*, stamens and ovary as in the last. *Pod* $\frac{1}{2}$ ft. long, 2 in. broad, thin, firm, strongly veined.

33. ***B. phoenicea***, *Heyne in Wall. Cat.* 5800; ecirrhose, leaves 9-nerved, pubescence thin dark ferruginous, pedicels short, sepals not fully distinct as long as the cylindrical tube, petals glabrous little exserted. *W. & A. Prodr.* 296. *B. Benthami*, *Bedd. Ic.* t. 107. *B. ruficarpa*, *Desv. in Ann. Sc. Nat.* ix. 430? *Phanera phoenicea*, *Benth. Pl. Jungh.* 262.

Ghauts of TRAYANCORE and CANARA.

An extensive climber, with slender branches, clothed at first with fine ferruginous pubescence. *Leaves* rigidly subcoriaceous, slightly cordate, thinly silky on the ribs when young, the obtuse lobes reaching $\frac{3}{4}$ — $\frac{1}{2}$ down. *Racemes* few-flowered, short-peduncled, axillary and terminal. *Calyx*-tube $\frac{1}{2}$ — $\frac{3}{4}$ in. Fertile *stamens* 5. *Petals* oblongate, with a distinct claw as long as the limb. *Ovary* densely rusty-downy, with a long style and stalk and small stigma. *Pod* flat, finely rusty-downy, $\frac{1}{2}$ ft. long, an inch broad, with a raised rib on either side of the upper suture.

34. **B. purpurea**, Linn.; Roxb. *Hort. Beng.* 31; *Fl. Ind.* ii. 320; ecirrhose, leaves 9–11-nerved, pubescence grey, pedicels short, sepals not fully distinct exceeding the turbinate tube, petals oblongate glabrous exserted. *Ham. in Trans. Linn. Soc.* xiii. 497; *Wall. Cat.* 5797, excl. A, E, I, ex parte; *W. & A. Prodr.* 296; *Bedd. Fl. Sylv.* 92, non DC. *B. triandra*, Roxb. *Hort. Beng.* 31; *Fl. Ind.* ii. 320; *Wall. Cat.* 5799. *B. coromandeliana*, DC. *Prodr.* ii. 515. *Phanera purpurea*, Benth. *Pl. Jungh.* 262.

From the foot of the WEST HIMALAYAS and KHASIA Mts. (alt. 4000 ft.), to CEYLON and PENANG.—DISTRIB. China.

A middle-sized erect tree, with moderately stout glabrescent branchlets. *Leaves* rigidly subcoriaceous, glabrous, shallowly cordate, the lobes obtuse or subacute, reaching $\frac{3}{4}$ — $\frac{1}{2}$ way down. *Flowers* in terminal and axillary short-peduncled few-flowered corymbs; bracts minute, deltoid; lower pedicels $\frac{1}{4}$ — $\frac{1}{2}$ in. *Calyx*-tube $\frac{1}{4}$ — $\frac{1}{2}$ in.; limb $\frac{3}{4}$ —1 in., coriaceous, slit into two valves, which show a division into 5 teeth. *Petals* oblongate, with a long claw, reddish, twice the calyx. Fertile *stamens* 3–4. *Ovary* grey downy, with a long stalk and style and moderately large oblique stigma. *Pod* $\frac{1}{2}$ –1 ft., by $\frac{3}{4}$ –1 in., firm, flat, glabrous, late in dehiscing, rather decurved, 12–15-seeded.

35. **B. variegata**, Linn.; DC. *Prodr.* ii. 514; ecirrhose, leaves 9–11-nerved, pubescence grey, pedicels short, calyx-limb entire spathaceous equalling the cylindrical tube, petals glabrous obovate clawed much exserted. *Ham. in Trans. Linn. Soc.* xiii. 496; *Roxb. Hort. Beng.* 31; *Fl. Ind.* ii. 319; *Wall. Cat.* 5795; *Bedd. Fl. Sylv.* 92. *B. purpurea*, *Wall. Cat.* 5797, ex parte. *B. candida*, Roxb. *Hort. Beng.* 31; *Fl. Ind.* ii. 318; *Wall. Cat.* 5796, non Ait. *Phanera variegata*, Benth. *Pl. Jungh.* 262.

From the foot of the WESTERN HIMALAYAS, and SIKKIM, alt. 4000 ft., and through India proper, to BURMA.—DISTRIB. China.

General habit of the last, to which it is closely allied. *Leaves* rather broader than deep, middle-sized, rigidly subcoriaceous, deeply cordate, the obtuse lobes reaching $\frac{3}{4}$ — $\frac{1}{2}$ down. *Corymbs* few-flowered, lateral, sessile or short-peduncled; bracts minute, deltoid; pedicels erecto-patent, $\frac{1}{4}$ — $\frac{1}{2}$ in. *Calyx*-tube $\frac{3}{4}$ –1 in.; limb cordate-ovate, remaining to the end spathaceous and entire. *Petals* $1\frac{1}{2}$ –2 in. long, an inch or more broad, white, beautifully variegated with red and yellow, sometimes pure white (*B. candida*, Roxb.) *Stamens* 3–5. *Ovary* with a long stalk and style and a minute stigma. *Pod* $\frac{1}{2}$ –1 ft. long, $\frac{3}{4}$ –1 in. broad, hard, flat, glabrous, rather decurved, dehiscent, 10–15-seeded.

SECT. 5. **Lasiobema**, Korthals, gen. Fertile *stamens* 3. *Calyx*-tube scarcely any. *Flowers* minute, in copiously paniced racemes.

36. **B. anguina**, Roxb. *Cor. Pl.* iii. t. 285; *Fl. Ind.* ii. 328; DC. *Prodr.* ii. 516; *Wall. Cat.* 5773; *W. & A. Prodr.* 298. *B. scandens*, Linn. *Sp. Plant. edit.* i. 374, ex parte (Rheede *Hort. Mal.* viii. t. 30–31). *Lasiobema anguina* and *Horsfieldii*, *Miq. Fl. Ind. Bat.* i. 71.

From EASTERN BENGAL and SIKKIM to BURMA and EASTERN and WESTERN PENINSULA.—DISTRIB. Malay isles.

A climbing glabrous shrub, with copious circinate tendrils. *Leaves* thin, deeply cordate, 5-7-nerved, the cleft very variable, sometimes scarcely perceptible, sometimes a deep deltoid sinus and the points acuminate. *Racemes* cylindrical, 2-6 in. long, arranged in ample axillary and terminal panicles; bracts minute, linear; pedicels $\frac{1}{2}$ in., erecto-patent, finely downy. *Calyx* $\frac{1}{2}$ in. long, broadly campanulate, with 5 deltoid teeth. *Petals* white, oblanceolate, twice the length of the calyx. *Pod* thin, flat, oblong, glabrous, indehiscent, stalked, $1\frac{1}{2}$ -2 in. long, 1-2-seeded.

SECT. 6. **Casparea**, DC. *Calyx*-tube fusiform; limb spathaceous. Fertile stamen one.

37. **B. monandra**, Kurz in Journ. Asiat. Soc. Beng. xlii. 2, 73.

BIRMA, Dr. Brandis.

Young branches puberulous. *Leaves* round-ovate, truncate at the base, palmately 11-nerved, chartaceous, 1-1 $\frac{1}{2}$ in. long, glabrous above, downy on the ribs below, cut one-third down into two rounded lobes. *Racemes* short, terminal, pubescent; pedicels 1-1 $\frac{1}{2}$ in., densely puberulous; bracts minute, subulate. *Calyx* downy externally. *Petals* 1 $\frac{1}{2}$ in., obovate-cuneate, glabrous, undulated, probably whitish. *Ovary* stalked, fulvo-villose; style slender, twice as long as the ovary. *Pod* unknown.—*Ex Kurz loc. cit.*

DOUBTFUL SPECIES.

B. LUCIDA, Wall. Cat. 5779 B (totally different from 5779 A), grown in the Calcutta garden from Penang, has the fully divided leaves of section *Lysiphyllum*, but the flower is unknown. The half-leaves are dimidiate cordate-ovate, twice as long as broad, narrowed gradually to a point, rigidly subcoriaceous, 3-4-nerved, with the ribs beneath clothed with adpressed ferruginous tomentum. It may be the Malayan *Phanera diptera*, Miq. Flor. Ind. Bat. i. 70.

B. PIPERIFOLIA, Roxb. Fl. Ind. ii. 327 (*Phanera*, Benth. Pl. Jungh. 262), from the mountain forests of Silhet, is said to be a climber with entire cordate 5-7-nerved smooth lucid leaves, terminal panicles and 1-2-seeded round-oval pods.

115. **NEPTUNIA**, Lour.

Herbs without prickles. *Leaves* bipinnate, with persistent stipules and numerous small strap-shaped sensitive membranous leaflets. *Flowers* minute, dimorphous, in dense heads on axillary peduncles, polygamous, those of the lower part of the head bearing only protruded flattened staminodia. *Calyx* minute, campanulate, 5-toothed. *Petals* 5, strap-shaped, connate near the base. *Stamens* of the perfect flowers exerted; anthers gland-crested. *Ovary* stalked, many-ovuled; style filiform, stigma club-shaped. *Pod* coriaceous, flattened, ligulate or oblong, 2-valved.—DISTRIB. Species 8; cosmopolitan in the tropics.

1. **N. oleracea**, Lour.; Benth. in Hook. Journ. iv. 354; stems almost entirely prostrate, leaflets 16-30, sterile flowers numerous, pod oblique oblong 6-10-seeded. Dalz. & Gibs. Bomb. Fl. 84. *Mimosa natans*, Roxb. Cor. Pl. t. 119; Hort. Beng. 40; Fl. Ind. ii. 553. *Desmanthus natans*, Willd.; DC. Prodr. ii. 444; Wall. Cat. 5295; W. & A. Prodr. 270. *D. lacustris* and stolonifer, DC. Prodr. loc. cit.

NORTH WEST provinces, to CEYLON and MALACCA.—DISTRIB. Cosmopolitan in the tropics.

Stems stout, annual, wide-creeping, rarely throwing out suberect branches, producing copious fibrous rootlets from the same nodes that bear the leaves and peduncles. *Pinnæ* 4-6, 2-3 in. long; rachis glandless; leaflets glabrous, obtuse, $\frac{1}{2}$ - $\frac{1}{3}$ in. long. *Peduncles* ascending, $\frac{1}{4}$ -1 ft.; bracts small, ovate, subobtuse. *Staminodes* $\frac{1}{4}$ - $\frac{1}{3}$ in., strap-shaped, yellow. *Corolla* $\frac{1}{4}$ in. *Pod* $\frac{1}{4}$ -1 in. long, rostrate, dry, soon dehiscing by the upper suture.

2. **N. triquetra**, *Benth. in Hook. Journ. Bot.* iv. 355; stems slender ascending, leaflets 28–30 small, sterile flowers few, pod oblong not oblique 4–8-seeded. *Dalz. & Gibs. Bomb. Fl.* 84. *Mimosa triquetra*, *Vahl; Roxb. Hort. Beng.* 40; *Fl. Ind.* ii. 552. *Desmanthus triquetrus*, *Willd.; DC. Prodr.* ii. 444; *Wall. Cat.* 5296; *W. & A. Prodr.* 270; *Wight Ic.* t. 756.

WESTERN PENINSULA and BUNDELKUND.—DISTRIB. Brazil?

A low diffuse perennial, with slender stems, angular upwards. *Stipules* small, acute; *pinnæ* 2–6, an inch or less long, with a gland on the rachis between the lowest pair; leaflets $\frac{1}{8}$ – $\frac{1}{4}$ in. *Heads* small, globose, long or short-peduncled. *Corolla* yellow, $\frac{1}{12}$ in. long. Sterile flowers sometimes quite absent from the heads. *Pod* $\frac{1}{2}$ –1 in. long, with more membranous valves than in the two others, and a very minute beak.

N. plena, *Benth. in Hook. Journ. Bot.* iv. 355; stems stout ascending, leaflets 40–60, sterile flowers numerous, pod oblong-ligulate 15–20-seeded. *Mimosa Adenantha*, *Roxb. Fl. Ind.* ii. 554. *Desmanthus Adenantha*, *Wall. Cat.* 5298. *D. plenus*, *punctatus* and *polyphyllus*, *DC. Prodr.* ii. 444–5.

NORTH WEST PROVINCES and CEYLON, introduced. A native of Tropical America.

Glabrous throughout. *Stems* comparatively stout, suffruticose, several feet high. *Pinnæ* 6–10, with a gland between the lowest pair; leaflets like those of the last. *Stipules* and bracts copious, cordate-ovate, acuminate. *Heads* copious, oblong. *Flowers* and heads just like those of *N. oleracea*, but the pod twice as long.

116. **XYLIA**, *Benth.*

Tall unarmed tree. *Leaves* bipinnate. *Flowers* in round heads, mostly perfect. *Calyx* tubular, 5-toothed at the tip. *Petals* 5, valvate, slightly united at the base, little longer than the calyx. *Stamens* 10, free, exserted; anthers gland-crested in an early stage. *Ovary* sessile, many-ovuled; style filiform, stigma minute terminal. *Pod* large, woody, oblong-falcate, finally dehiscing, flat, septate between the oblong compressed seeds.—A single species.

1. **X. dolabriformis**, *Benth. in Hook. Journ. Bot.* iv. 417. *Dalz. & Gibs. Bomb. Fl.* 85; *Bedd. Fl. Sylv.* t. 186; *Brand. For. Fl.* 171. *Mimosa xylocarpa*, *Roxb. Cor. Pl.* t. 100; *Hort. Beng.* 40; *Fl. Ind.* ii. 543. *Inga xylocarpa*, *DC. Prodr.* ii. 439; *Wall. Cat.* 5277; *W. & A. Prodr.* 269. *I. lignosa*, *Grah. in Wall. Cat.* 5278. *I. dolabriformis*, *Grah. in Wall. Cat.* 5279.

WESTERN PENINSULA, BIRMA, SINGAPORE.—DISTRIB. Philippines.

A tall tree, without prickles. *Pinnæ* 2; leaflets 4–10, opposite, with an odd one on the outside and with a gland on the rachis between each, oblong, acute, subcoriaceous, glabrous, 3–6 in. long, the lowest much shorter. *Flowers* sessile, in dense globose peduncled heads, crowded on short branchlets developed with the young leaves. *Corolla* $\frac{1}{4}$ in. *Pod* 4–6 in. by 1–2 $\frac{1}{2}$ in., 6–10-seeded.

117. **ENTADA**, *Adans.*

Woody unarmed climbers with tendrils. *Leaves* bipinnate. *Flowers* in long narrow spikes, minute, yellowish, polygamous. *Calyx* minute, campanulate, equally 5-toothed. *Corolla* oblong in bud, the 5 long equal narrow lobes falcate in expansion. *Stamens* 10, free, shortly exserted, filaments filiform; anthers crowned with a gland. *Ovary* subsessile, many-ovuled; style filiform, stigma concave terminal. *Pod* flat, woody, very large, composed of many discoid one-seeded joints, the endocarp persisting round the large compressed orbicular seeds.—DISTRIB. Species 10, the others Trop. African and American.

1. **E. scandens**, *Benth. in Hook. Journ. Bot.* iv. 332. *Brand. For. Fl.* 167. *E. Pursætha*, *DC. Prodr.* ii. 425; *Wall. Cat.* 5293; *W. & A. Prodr.* 267; *Dalz. & Gibs. Bomb. Fl.* 83. *E. monostachya*, *DC. Prodr. loc. cit.*; *Wall. Cat.* 5293. *E. Rheedei* and *Parrana*, *Spreng. Syst.* ii. 325. *E. Pursætha* and *E. Rumphii*, *Scheff. in Natuur. Tijdschr. Ned. Ind.* xxxii. 99, t. 16-18. *Mimosa scandens*, *Linn.*; *Roxb. Fl. Ind.* ii. 554.—*Rheede Hort. Mal.* viii. t. 32-34; ix. t. 77.

Central and Eastern Himalayas, NIPAL, ascending to 4000 ft. in SIKKIM, WESTERN PENINSULA, CEYLON, MALACCA.—DISTRIB. Cosmopolitan in the tropics.

An immense climber, with slender terete woody branches. *Leaves* long-petioled, the rachis usually ending in a tendril; pinnæ stalked, mostly 4; leaflets oblong or obovate, obtuse or acute, 1-2 in. long, rigidly coriaceous. *Spikes* peduncled, $\frac{1}{2}$ ft. long or more, usually panicle from the nodes of old leafless branches, sometimes simple from the axils of the leaves (*E. monostachya*, DC.). *Flowers* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, sessile or on short pedicels. *Pod* 1-2 ft. or more by 3-4 in., curved, constricted between the seeds. *Seeds* 2 in. broad.

118. **ADENANTHERA**, Linn.

Erect trees without spines or tendrils. *Leaves* ample, bipinnate. *Flowers* minute, in narrow spike-like racemes, hermaphrodite, usually pentamerous. *Calyx* campanulate, equally toothed. *Petals* valvate, equal, lanceolate, cohering only at the very base. *Stamens* 10, free, equalling the corolla; anthers tipped with a gland. *Ovary* sessile, many-ovuled; style filiform, stigma minute capitate. *Pod* strap-shaped, torulose, falcate, the coriaceous valves much twisted after they separate. *Seeds* small, bright-coloured.—DISTRIB. Species 4, spread through tropics of Old World.

1. **A. pavonina**, *Linn.*; *DC. Prodr.* ii. 446; pinnæ 8-12, leaflets 12-18 obtuse, seeds concolorous usually bright scarlet. *Roxb. Fl. Ind.* ii. 370; *Wall. Cat.* 5300; *W. & A. Prodr.* 271; *Wight Ill.* t. 84 (80); *Bedd. Fl. Sylv.* t. 46; *Brand. For. Fl.* 168.

EAST HIMALAYAS (ascending to 4000 ft. in Sikkim), WESTERN PENINSULA and CEYLON, shore of MALAY gulf.—DISTRIB. Malay isles, Timor, China, Philippines.

Pinnæ short-stalked, 4-8 in. long; leaflets oblong, alternate, short-stalked, not coriaceous, $\frac{3}{4}$ –1½ in. long. *Racemes* short-peduncled, 2-6 in. long, $\frac{1}{2}$ in. broad, simple from the axils of the leaves and panicle at the end of the branches; pedicels as long as the flower, $\frac{1}{8}$ – $\frac{1}{4}$ in. *Pod* 6-9 in. by $\frac{1}{2}$ in., falcate, 10-12-seeded. *Seeds* rarely yellow-brown.

2. **A. bicolor**, *Moon*; *Thwaites Enum.* 98; pinnæ and leaflets 6-8, the latter acute, seeds half black half bright red. *Bedd. Fl. Sylv.* 94.

CEYLON, *Walker*, &c. MALACCA, *Griffith*, *Maingay*.

Pinnæ short-stalked, 2-3 in. long. *Leaflets* ovate, rigidly subcoriaceous, $\frac{3}{4}$ –1½ in. long. *Raceme* and *pod* just like those of *A. pavonina*, the flower perhaps rather smaller.

119. **PROSOPIS**, Linn.

Erect trees or shrubs with scattered prickles. *Leaves* bipinnate, with small narrow leaflets. *Flowers* minute, in narrow spikes or subspicate racemes, polygamous. *Calyx* minute, campanulate, subentire or faintly 5-toothed. *Petals* 5, ligulate, subcoherent at the base. *Stamens* 10, free, slightly exserted, filaments filiform; anthers crowned with a gland. *Ovary* stalked, many-ovuled; style

filiform, stigma minute terminal. *Pod* turgid, cylindrical or oblong, with a thick spongy mesocarp, septate between the seeds.—**DISTRIB.** Species 18, cosmopolitan in the tropics.

1. **P. spicigera**, *Linn.*; *DC. Prodr.* ii. 446; pinnæ mostly 4, rachis glabrous, flowers sessile, calyx truncate not ciliated, pod slender cylindrical torulose. *Roxb. Cor. Pl.* i. t. 63; *Wall. Cat.* 5299; *W. & A. Prodr.* 271; *Dalz. & Gibs. Bomb. Fl.* 84; *Bedd. Fl. Sylv.* t. 56; *Brand. For. Flor.* 169, t. 25; *Boiss. Fl. Orient.* ii. 634. *P. spicata*, *Burm. Ind.* 102, t. 25, fig. 3. *Adenanthera aculeata*, *Roxb. Fl. Ind.* iii. 371.

PUNJAB, SCINDE, WESTERN PENINSULA.—**DISTRIB.** Afghanistan, Persia.

A low tree, with slender grey branches. *Prickles* copious few or none, $\frac{1}{8}$ – $\frac{1}{4}$ in., nearly straight, at first straw-coloured. *Pinnæ* 1–2 in. long; leaflets 16–24, sessile, $\frac{1}{2}$ – $\frac{3}{4}$ in., ligulate, with an ascending cusp, grey, glabrous, rigidly coriaceous, caducous. *Flowers* in short-peduncled axillary spikes, 2–3 in. long, and terminal panicles. *Corolla* $\frac{1}{12}$ in. long. *Pod* straight, edible, glabrous, 4–6 in. long, $\frac{1}{4}$ in. thick, narrowed gradually into a short stalk, the mesocarp farinaceous. *Seeds* 10–15, dull brown, oblong.

2. **P. Stephaniana**, *Kunth*; *Benth. in Hook. Journ.* iv. 347; pinnæ 6–10, rachis downy, flowers short-pedicelled, pod thick oblong. *Boiss. Fl. Orient.* ii. 633; *Brand. For. Fl.* 170. *Lagonychium Stephanianum*, *M. Bieb.*; *DC. Prodr.* ii. 448. *Mimosa agrestis*, *Sieb.*; *Spr. Syst.* ii. 206.

PUNJAB, near Peshawur, &c., *Falconer, Stewart*.—**DISTRIB.** Caucasus, Orient, Afghanistan.

A low bushy tree, with downy slender whitish branchlets, armed with copious slender stramineous prickles. *Leaflets* like those of *P. spicigera*, but smaller and downy. *Flowers* rather larger. *Pod* oblique oblong, $\frac{1}{2}$ –1 in. long, $\frac{1}{2}$ in. thick, black, rugose, obtuse, contracted abruptly into the stalk; mesocarp pulpy. *Seeds* sub-biseriate.

120. **DICHROSTACHYS**, DC.

Shrubs. *Leaves* bipinnate, with minute coriaceous leaflets. *Flowers* minute, spicate, dimorphous, polygamous, only perfect in the upper half of the spike, those of the lower half bearing long filiform staminodia. *Calyx* minute, campanulate, 5-toothed. *Corolla* oblong, the 5 strap-shaped petals subconnate towards the base. *Stamens* of the perfect flowers slightly exserted, filaments filiform free; anthers gland-crested. *Ovary* sessile, many-ovuled; style filiform, stigma capitate. *Pod* small, strap-shaped, coriaceous, indehiscent, subarticulated, continuous within, twisted up when mature.—**DISTRIB.** Species 4–5, confined to the tropics of the Old World.

1. **D. cinerea**, *W. & A. Prodr.* 271; *Wight Ic.* t. 357; *Dalz. & Gibs. Bomb. Fl.* 84; *Bedd. Fl. Sylv.* t. 185; *Brand. For. Fl.* 171. *Mimosa cinerea*, *Linn.*; *Roxb. Cor. Pl.* t. 174; *Fl. Ind.* ii. 561. *Desmanthus cinereus*, *Willd.*; *DC. Prodr.* ii. 445. *Acacia cinerea*, *Spreng.*; *Wall. Cat.* 5231. *A. Dalea*, *Desv.*; *DC. Prodr.* ii. 459.

NORTH WEST PROVINCES, WESTERN PENINSULA, CEYLON.—**DISTRIB.** Malay isles, N. Australia, and doubtfully distinct from *D. nutans*, of Tropical Africa.

A much-branched shrub, with copious spreading branchlets, ending in spines. *Leaves* 1–1½ in. long and broad; rachises often downy; pinnæ 16–20; leaflets 24–40, strap-shaped, sessile, rigidly coriaceous, $\frac{1}{12}$ – $\frac{1}{8}$ in. long. *Spikes* axillary, short-peduncled, 1–2 in. long. *Corolla* $\frac{1}{24}$ in. *Staminodes* red-purple, $\frac{1}{2}$ in. long. *Pod* 2–3 in. by $\frac{1}{4}$ – $\frac{3}{8}$ in., 6–10-seeded, dry, glabrous.

121. **PIPTADENIA**, Benth.

Erect trees, unarmed or prickly. *Leaves* bipinnate. *Flowers* small, in dense spikes, hermaphrodite, pentamerous. *Calyx* campanulate, shortly 5-toothed. *Petals* 5, valvate, equal, lanceolate, cohering at the base. *Stamens* 10, free, as long as the corolla; anthers tipped with a deciduous gland. *Ovary* stalked, many-ovuled; style filiform, stigma terminal. *Pod* long, thin, strap-shaped, flat. *Seeds* brown, compressed.—**DISTRIB.** Species 30, all the rest but two from Africa Tropical American.

1. **P. oudhensis**, *Brand. For. Flor.* 168; *Benth. in Trans. Linn. Soc.* xxx. 366.

OUDE, in forests under the base of the hills in Gonda, *Richd. Thompson*.

A middle-sized tree, armed with large conical prickles, glabrous except the inflorescence. *Pinnæ* 4, long-stalked, each of a single pair of nearly sessile obtuse obovate coriaceous leaflets 2 in. long. *Panicles* axillary, much shorter than the leaves; spikes dense, 1-1½ in. by ½ in. *Calyx* minute; teeth obscure. *Petals* ½ in., lanceolate, greenish-yellow. *Stamens* just exerted. *Pod* 9-12 in. by ⅓ in., with a long stalk, nearly straight. *Seeds* 15-20.

122. **PARKIA**, R. Br.

Tall, unarmed trees. *Leaves* bipinnate with very numerous leaflets. *Flowers* in dense long-peduncled heads, each subtended by a coriaceous persistent ligulate bract with a spoon-shaped tip. *Calyx* tubular, shortly 5-cleft. *Corolla* tubular, cleft half-way down, the segments subvalvate. *Stamens* 10, exerted, the filiform filaments united in the lower part with each other and the corollatube; anthers narrow, glandless, the pollen cohering in irregular masses. *Ovary* stalked, many-ovuled; style filiform, stigma minute capitate. *Pod* large, flat, strap-shaped, coriaceous, finally dehiscing.—**DISTRIB.** Species 8, cosmopolitan in the tropics, mostly American.

1. **P. biglandulosa**, *W. & A. Prodr.* 279; glands of petiole 2, leaflets linear-ligulate 150-200 to a pinna. *Mimosa pedunculata*, *Roxb. Fl. Ind.* ii. 551.

MALAY peninsula, *Roxburgh*. Elsewhere cultivated.

Rachis of *leaf* downy, 1 ft. or more long; *pinnæ* 40-60, 3-4 in. long; leaflets 1-nerved, rigid, ¼ in. by ⅛ in. *Peduncle* under a foot long in the specimens seen. *Calyx* ⅓ in.; tube glabrous; teeth pilose. *Immature pod* downy, narrowed gradually into a long stalk.

2. **P. Roxburghii**, *G. Don Gen. Syst.* ii. 397; gland of petiole solitary, leaflets linear-ligulate 100 or more to a pinna. *P. Brunonis*, *Grah. in Wall. Cat.* 5288. *P. biglobosa*, *Benth. in Hook. Journ.* iv. 328. *Mimosa biglobosa*, *Roxb. Fl. Ind.* ii. 551, non *Jacq.*

ASSAM, **SILHET**, **BIRMA**, **MALAY PENINSULA**.—**DISTRIB.** Malay isles.

An erect tree, 40-60 feet high. *Leaf-rachis* a foot or more long, glabrous or pubescent; *pinnæ* 20 or more, 3-4 in. long; leaflets 100-120, ¼-½ in. by ⅛ in., with rarely any other veins than the costa perceptible. *Peduncle* 1-1½ ft.; flowers in turbinate heads 2-3 in. long. *Calyx* ¼ in.; tube cylindrical, glabrous; lobes pilose. *Pod* 1 ft. by 1-1½ in., narrowed into a 3-4 in. stalk.

3. **P. leiophylla**, *Kurz in Journ. Asiat. Soc. Beng.* xlii. 2, 73; leaflets broad-ligulate 50-60 to a pinna. *pinnæ* 20 or more.

PEGU, Kurz.

An erect tree 80–120 feet high. *Leaf* 1–2 feet long; rachis fulvo-pubescent, pinnæ 4 in. long; leaflets rigidly coriaceous, shining, glabrous, $\frac{1}{2}$ in. by $\frac{1}{2}$ in., with a distinct fork from the base of the costa and penninerved veinlets. *Peduncle* 1–1½ ft. *Calyx* $\frac{1}{2}$ in.; tube glabrous; lobes round, densely fulvo-tomentose. *Pod* 1–1½ ft. by 1½ in., glabrous, slightly torulose, narrowed into a 6–9 in. stalk.

4. **P. insignis**, *Kurz in Journ. Asiat. Soc. Beng.* xlii. 2, 74; leaflets oblong 40–50 to a pinna, pinnæ about 8.

MARTABAN, Kurz.

An erect tree, 80–100 ft. high. *Leaf* 1–2 ft. long; rachis fulvo- or ferrugineo-tomentose; leaflets 1 in. by $\frac{1}{2}$ in., coriaceous, penninerved, glabrous above except on the ribs, pubescent beneath. *Peduncles* a foot long, many arising from the apex of the branches. *Calyx* $\frac{1}{2}$ in.; tube glabrous; lobes obovate-cuneate, with adpressed fulvous pubescence. *Pod* unknown.—Ex Kurz loc. cit.

123. DESMANTHUS, Willd.

Suffruticose perennials with the habit and leaves of *Neptunia*. *Flowers* polygamous. *Calyx* minute, campanulate, 5-toothed. *Petals* 5, valvate, finally nearly free. *Stamens* 10; filaments free, filiform; anthers not gland-crested. *Ovary* sessile, linear, many-ovuled; style filiform, stigma clavate. *Pod* linear, straight, coriaceous, dehiscent.—DISTRIB. Species 8, indigenous in America only.

D. VIRGATUS, *Willd.*; *DC. Prodr.* ii. 445; *Wall. Cat.* 5297; *W. & A. Prodr.* 270. D. strictus and leptophyllus, *DC. loc. cit.* *Mimosa virgata*, *Linn. Sp.* 1502.

Scattered through India proper and Ceylon, but only introduced.—DISTRIB. Wild through Trop. America and introduced in Africa.

A glabrous shrubby perennial, 3–4 ft. high, with virgate branches; stipules subulate. *Flowers* in solitary globose peduncled axillary heads. *Leaves* with 6–8 pinnæ, with a gland on the rachis between the lowest; leaflets 30–40. *Pod* 2–3 in. long, 20–30-seeded.

124. LEUCENA, Benth.

Unarmed erect trees. *Leaves* bipinnate. *Flowers* sessile, in dense globose heads, 5-merous, usually perfect. *Calyx* cylindrical-campanulate, shortly-toothed. *Petals* valvate, free. *Stamens* 10, free, much exserted; anthers not gland-crested. *Ovary* stalked, many-ovuled; style filiform, stigma minute terminal. *Pod* flat, coriaceous, strap-shaped, dehiscent.—DISTRIB. Species 8, mostly American.

1. **L. glauca**, *Benth. in Hook. Journ. Bot.* iv. 416. *Acacia frondosa*, *Willd.*; *DC. Prodr.* ii. 468; *W. & A. Prodr.* 276. *A. Caringa*, *Ham. in Wall. Cat.* 5239. *A. glauca*, biceps and leucocephala, *DC. Prodr.* ii. 467–8.

Spread throughout India, as it is through Trop. Asia and Africa, but probably indigenous only in Tropical America.

A low erect tree, without spines. *Pinnæ* 8–16; leaflets 20–30, linear, acute, glaucous, membranous, caducous, $\frac{3}{8}$ – $\frac{1}{2}$ in., finely downy. *Heads* short-peduncled, very dense, often in pairs, $\frac{1}{2}$ – $\frac{3}{4}$ in. broad. *Corolla* whitish, $\frac{1}{2}$ in. *Stamens* twice the length of the corolla. *Pod* straight, 5–6 in. by $\frac{3}{8}$ – $\frac{1}{2}$ in., 15–20-seeded, soon dehiscent.

125. **MIMOSA**, Linn.

Shrubs or herbs, with or without prickles. *Leaves* in the indigenous species bipinnate; leaflets small, sensitive, ligulate, caducous. *Flowers* minute, in dense globose heads, polygamous, in the Indian species mostly tetramerous. *Calyx* campanulate, shortly toothed. *Petals* connate towards the base. *Stamens* twice the number of the petals, much exserted, filaments filiform, free; anthers not gland-crested. *Ovary* stalked, many-ovuled; style filiform, stigma minute terminal. *Pod* flat, membranous, made up of 1-seeded joints that separate when mature from the sutures.—**DISTRIB.** Species 230, mostly confined to Trop. America.

1. **M. pudica**, Linn.; *DC. Prodr.* ii. 426; stem and rachises copiously bristly and prickly, leaves digitate, pod small with densely prickly sutures. *Roxb. Hort. Beng.* 41; *Fl. Ind.* ii. 564; *Wall. Cat.* 5292.

Spread through the hotter parts of India, possibly introduced from Trop. America.

Shrubby, the copious bristly hairs of the branchlets and petioles deflexed, those of the leaf-rachis ascending. *Pinnæ* of the leaves 3-4, nearly sessile, 2-3 in. long; leaflets 24-40, glabrous, subcoriaceous. *Flowers* in small peduncled heads, all down the branches, 1-2 from each axil. *Pod* $\frac{1}{2}$ in. long, 3-4-seeded, with very abundant straw-coloured weak prickles from both sutures, as long as the breadth of the pod.

2. **M. rubicaulis**, Lam.; *DC. Prodr.* ii. 429; rachises copiously prickly not bristly, leaves bipinnate, pinnæ 8-20, pod strap-shaped, the sutures mostly without prickles. *Wall. Cat.* 5289; *W. & A. Prodr.* 268; *Dalz. & Gibs. Bomb. Fl.* 85. *M. octandra*, *Roxb. Cor. Pl.* t. 200; *Hort. Beng.* 41; *Fl. Ind.* ii. 564. *M. mutabilis*, *Roxb. Hort. Beng.* 41; *Fl. Ind. loc. cit.* *M. Rottleri*, *Spreng. Syst.* ii. 206.

WESTERN HIMALAYAS, ascending to 5000 ft. in KUMAON, westward to MISHMI and BHOTAN, and through India proper.—**DISTRIB.** Afghanistan.

A low tree, with slender grooved finely grey-downy branches, armed with copious small scattered hooked spines. *Leaflets* 12-24, membranous, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, rather downy below, not venulose, with an obscure recurved cusp. *Heads* $\frac{3}{8}$ - $\frac{1}{2}$ in. broad, on short simple erecto-patent peduncles, from the leaf axils and crowded at the top of the branchlets, at first reddish, afterwards bleached. *Corolla* $\frac{1}{4}$ in. *Pod* rather falcate, 3-4 in. by $\frac{3}{8}$ - $\frac{5}{8}$ in., 6-10-seeded, the sutures rarely furnished (*M. spinosissimula*, Rottler) with a few distant prickles.

3. **M. hamata**, Willd.; *DC. Prodr.* ii. 427; rachises copiously prickly not bristly, leaves bipinnate, pinnæ 6-8, pod ligulate-oblong with the sutures armed with large hooked prickles. *W. & A. Prodr.* 268; *Dalz. & Gibs. Bomb. Fl.* 85. *M. armata*, *Rottl.*; *Spreng. Syst.* ii. 206; *Wall. Cat.* 5290.

WESTERN PENINSULA.

Closely allied to *M. rubicaulis*, with which it agrees in prickles, general habit and inflorescence. *Leaflets* 12-20, oblique, ligulate-oblong, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, downy or glabrous. *Pod* rather shorter and broader, downy or glabrous, 4-6-seeded.

4. **M. sepiaria**, Benth. in *Hook. Journ. Bot.* iv. 395; rachises without either prickles or bristles, leaves bipinnate, pinnæ 12-14, pod ligulate with unarmed sutures.

SINGAPORE, Schomburgk, Maingay.—**DISTRIB.** China. Doubtless introduced into Asia from Trop. America, where it is common.

A woody shrub, glabrous except the leaf-rachises, which are slightly downy. *Leaflets* 12-20, rigidly coriaceous, narrow ligulate, caducous, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, with a

distinct midrib nearer the upper side and conspicuous veinlets. *Heads* globose, forming an ample patent panicle with compound spreading lower branches. *Flowers* sometimes pentamerous. *Corolla* $\frac{1}{2}$ in. *Pod* distinctly stalked, nearly straight, $1\frac{1}{2}$ –2 in. by $\frac{1}{4}$ – $\frac{1}{2}$ in., glossy, finely reticulato-venulose, 6–8-seeded.

126. **ACROCARPUS**, W. & A.

An erect unarmed tree. *Leaves* bipinnate. *Flowers* racemed. *Calyx* campanulate, cleft about half-way down into 5 equal lanceolate teeth, the disk completely investing the tube. *Petals* oblanceolate, equal, half as long again as the calyx. *Stamens* 5, exserted, straight, equal; anthers uniform. *Ovary* stalked, linear, many-ovuled; style incurved, very short, stigma small terminal. *Pod* long-stalked, flat, ligulate, many-seeded, with a wing down the upper suture.—**DISTRIB.** A single species.

1. ***A. fraxinifolius***, *Wight Ic. t. 254 (excluding the leaf)*; *Arnott in Jardine Mag. ii. 547*; *Wight Ill. p. 198*; *Bedd. Fl. Sylv. t. 44*. *A. combretiflorus*, *Teysm. & Binnen.*; *Walp. Ann. vii. 811*.

NILGHIRIS, *Wight, Beddome, Brandis*. **SIKKIM**, *Hook. fil.*—**DISTRIB.** Sumatra.

A large unarmed erect tree, 50 feet high before it forks. *Pinnæ* 8, a foot or more long; leaflets 10–12, nearly sessile, oblong, rather oblique, glabrous, subcoriaceous, 3–4 in. long. *Flowers* in dense simple racemes produced in February, when the leaves are fallen; pedicels short, drooping. *Calyx* $\frac{1}{4}$ in. *Petals* scarlet, slightly imbricated in bud. *Filaments* twice the length of the corolla. *Ovules* about 15. *Pod* long-stalked, thin, flat, with a wing down the upper suture.

127. **ACACIA**, Willd.

Spinose or prickly shrubs or trees, erect or climbing. *Leaves* bipinnate, with minute leaflets. *Flowers* in globoseheads or cylindrical spikes, hermaphrodite or polygamous, usually pentamerous. *Calyx* campanulate or funnel-shaped, shortly toothed. *Petals* exserted, united in the lower half. *Stamens* free, indefinite, much exserted; anthers minute, not gland-crested. *Ovary* stalked or sessile, many-ovuled; style filiform, stigma minute capitate. *Pod* ligulate or oblong, not jointed, usually compressed and dry, dehiscent or indehiscent, rarely turgid or subcylindrical, sutures straight or wavy, not thickened.—**DISTRIB.** Species 430, the foliferous groups cosmopolitan in the tropics, the great phyllo-dineous series, which comprises two-thirds of the genus, almost restricted to Australia.

A. melanoxylon, R. Br., and *A. dealbata*, Link, both Australian species, have been extensively planted in the Nilghiris.

SERIES I. *Gummiferæ globiferæ*. Erect shrubs or trees. *Spines* long and straight. *Stipules* spinescent. *Flowers* in rounded heads.

1. ***A. Farnesiana***, *Willd.; DC. Prodr. ii. 461*; pinnæ 8–16, leaflets 20–40, heads axillary, pod thick short cylindrical glabrous with straight sutures biserial seeds and pulpy mesocarp. *Wall. Cat. 5264, excl. 1.*; *Bedd. Fl. Sylv. t. 52*. *Mimosa Farnesiana*, *Linn.*; *Roxb. Hort. Beng. 40*; *Fl. Ind. ii. 557*. *Vachellia Farnesiana*, *W. & A. Prodr. 272*; *Wt. Ic. t. 300*. *Acacia indica*, *Desv.*; *DC. Prodr. ii. 462*. *Farnesia odora*, *Gaspar in Linnæa, 1839, Litter. 134*.

HIMALAYAS to CEYLON and PENANG.—**DISTRIB.** Cosmopolitan in the Tropics, but often planted.

A shrub or low tree, with slender zigzag branches, marked with grey dots. *Spines* stipular only, seldom over $\frac{1}{4}$ – $\frac{1}{2}$ in. long on the branchlets. *Leaf-rachises* downy, with a minute petiolar gland; pinnæ 1– $1\frac{1}{2}$ in. long; leaflets green, subglabrous, rigidly

coriaceous. *Peduncles* crowded in the nodes of full-grown leaves, shorter than the leaves, with the ring of bracts at or near the apex. *Heads* fragrant, bright yellow, under $\frac{1}{2}$ in. diam. *Calyx* campanulate, very minute. *Corolla* $\frac{1}{4}$ in.; teeth short, obtuse. *Pod* 2-3 in. long, $\frac{1}{2}$ in. thick, dull brown, marked with fine close horizontal striæ.

2. **A. planifrons**, *W. & A. Prodr.* 276; pinnæ 10-16, leaflets 16-24, heads axillary, pod narrow ligulate turgid with straight sutures. *Bedd. Fl. Sylv.* 95. *A. Farnesiana*, *Wall. Cat.* 5264 I. *A. Roxburghii*, *W. & A. Prodr.* 276. *A. Campbellii*, *Arn. Pug.* 15. *Mimosa eburnea*, *Roxb. Cor. Pl.* t. 199; *Fl. Ind.* ii. 558, non *Linn.* *M. horrida*, *Sm. in Rees Cyclop.*

WESTERN PENINSULA.

A tree, with a flat umbrella-like top, and glabrous branches with grey lenticular dots. *Spines* $\frac{1}{2}$ -1 in. long, the old ones spreading, $\frac{1}{4}$ in. thick, very pungent. *Leaves* glabrous, very small; glands of the rachis 0 or minute; pinnæ $\frac{1}{4}$ - $\frac{1}{3}$ in. long; leaflets $\frac{1}{12}$ - $\frac{1}{8}$ in., rigidly coriaceous, glaucous-green, glabrous. *Heads* in clusters from the axils of mature branchlets, $\frac{1}{4}$ - $\frac{1}{3}$ in. diam.; peduncles very slender, with the involucre below the middle. *Corolla* $\frac{1}{4}$ in., yellow, twice the calyx. *Pod* subcylindrical, glabrous, 2-3 in. long, $\frac{1}{4}$ - $\frac{1}{3}$ in. thick, circinate, rigidly subcoriaceous, indehiscent.

3. **A. arabica**, *Willd.*; *DC. Prodr.* ii. 461; pinnæ 6-12, leaflets 20-40, heads axillary, pod straight strap-shaped firm grey-downy with sutures deeply indented between each seed. *Wall. Cat.* 5246; *W. & A. Prodr.* 277; *Bedd. Fl. Sylv.* t. 47; *Dalz. & Gibs. Bomb. Fl.* 86. *A. vera*, *Willd. loc. cit.* *Mimosa arabica*, *Lam.*; *Roxb. Cor. Pl.* t. 149; *Hort. Beng.* 40; *Fl. Ind.* ii. 557.

PUNJAB TO BEHAR, WESTERN PENINSULA and CEYLON.—DISTRIB. Arabia, Egypt, Trop. Africa, Natal.

A shrub or tree, with straight finely grey-downy branchlets. *Spines* $\frac{1}{2}$ -2 in. long, large, white, ascending and pungent on the older branchlets. *Leaf-rachises* downy, with several glands; pinnæ $\frac{1}{2}$ -1 $\frac{1}{2}$ in. long; leaflets membranous, green, $\frac{1}{8}$ - $\frac{1}{4}$ in., glabrous or rather downy. *Peduncles* short, densely grey-downy, with the bracts above the middle, 4-6-nate, the subtending leaves of the upper nodes reduced or suppressed; heads yellow, $\frac{1}{2}$ in. diam. *Calyx* $\frac{1}{2}$ in., campanulate. *Corolla* twice the length of the calyx. *Pod* rigidly coriaceous, subindehiscent, densely persistently grey-downy, 8-12-seeded, $\frac{1}{4}$ - $\frac{1}{2}$ ft. by $\frac{1}{2}$ - $\frac{3}{8}$ in., distinctly stalked.

4. **A. eburnea**, *Willd.*; *DC. Prodr.* ii. 461; pinnæ 4-10, leaflets 12-16, heads axillary, pod straight narrow-ligulate rigidly coriaceous dehiscent glabrous with slightly repand sutures. *W. & A. Prodr.* 276; *Dalz. & Gibs. Bomb. Fl.* 85; *Bedd. Fl. Sylv.* 95; *Boiss. Fl. Orient.* ii. 637. *Mimosa eburnea*, *Linn. fl. Suppl.* 437, non *Roxb.*

EAST HIMALAYAS and PUNJAB to the WESTERN PENINSULA and CEYLON.—DISTRIB. Afghanistan, Arabia.

General habit of *A. arabica*, with fewer leaflets and a different pod. *Branchlets* slender, downy or glabrous. *Spines* $\frac{1}{2}$ -2 in., the large ones white, $\frac{1}{8}$ - $\frac{1}{6}$ in. *Pinnæ* $\frac{1}{4}$ - $\frac{1}{2}$ in. long, with a gland between the lowest pair; leaflets $\frac{1}{12}$ - $\frac{1}{8}$ in., rigidly coriaceous, grey-green. *Heads* yellow, under $\frac{1}{2}$ in. diam. from the axils of developed leaves; peduncles densely grey-downy, with the involucre about the middle. *Calyx* $\frac{1}{24}$ in., funnel-shaped, shortly toothed. *Corolla* scarcely twice the length of the calyx. *Pod* distinctly stalked, 3-6 in. by $\frac{1}{4}$ in., thin, flat, straight, drab, glossy, rather venulose, 6-10-seeded.

5. **A. Jacquemontii**, *Benth. in Hook. Journ. Bot.* i. 499; pinnæ 6-8, leaflets 12-16, heads axillary, pod thin flat broad-ligulate dehiscent glabrous with straight sutures.

Plains of the NORTH WEST provinces.

General habit of *A. eburnea*, from which it mainly differs in the pod. *Spines* slender, reaching $1\frac{1}{2}$ –2 in. long. *Pinnæ* $\frac{1}{4}$ – $\frac{1}{2}$ in. long; leaflets grey-green, sub-glabrous, rigidly coriaceous. *Heads* yellow, $\frac{1}{2}$ in. diam. *Corolla* $\frac{1}{4}$ in., twice the length of the calyx. *Pod* straight, flexible, grey, 2–3 in. by $\frac{1}{2}$ – $\frac{3}{8}$ in., 5–6-seeded, with a stalk $\frac{1}{4}$ – $\frac{1}{2}$ in. long.

6. *A. tomentosa*, Willd.; *DC. Prodr.* ii. 462; *pinnæ* 12–24, leaflets 40–60, heads axillary, pod thin flat ligulate-falcate dry dehiscent with straight sutures thinly grey-downy. *Wall. Cat.* 5247; *W. & A. Prodr.* 276. *Bedd. Fl. Sylv.* 95; *Dalz. & Gibs. Bomb. Fl.* 86. *A. chrysocoma*, Miq. *Flor. Ind. Bat.* i. 6. *Mimosa tomentosa*, Roxb. *Hort. Beng.* 41; *Fl. Ind.* ii. 558. *M. Kleinii*, Poir. *Dict. Suppl.* i. 82.

WESTERN PENINSULA and CEYLON.

A small tree, with the branchlets and leaf-rachises densely clothed with fine grey pubescence, the latter with several glands. *Pinnæ* 1–2 in. long; leaflets $\frac{1}{2}$ – $\frac{3}{8}$ in., grey-green, more or less downy, membranous or subcoriaceous. Developed spines 1–2 in. long, spreading, brown, not white. *Heads* purple, $\frac{1}{2}$ in. diam.; peduncles stout, densely downy, with a medial involucre. *Calyx* $\frac{1}{4}$ in., funnel-shaped, grey-downy. *Corolla* subcylindrical, twice the length of the calyx. *Pod* 4–6 in. by $\frac{1}{2}$ in., short-stalked, 6–10-seeded.

7. *A. leucophlæa*, Willd.; *DC. Prodr.* ii. 462; *pinnæ* 12–24, leaflets 30–60, heads in ample terminal panicles, pod narrow ligulate falcate thin flat tomentose with straight sutures. *Wall. Cat.* 5261; *W. & A. Prodr.* 277; *Dalz. & Gibs. Bomb. Fl.* 86; *Bedd. Fl. Sylv.* t. 48. *A. alba*, Willd.; *DC. loc. cit.* *A. arcuata*, Decaisne *Herb. Timor. Descr.* 133. *Mimosa leucophlæa*, Roxb. *Cor. Pl.* t. 150; *Fl. Ind.* ii. 558. *Mimosa alba*, *Rottl. in Nov. Act. Ber.* 1803, 208.

NORTH WEST provinces to CEYLON and BIRMA.—DISTRIB. Malay isles, Timor.

Easily recognisable from all the foregoing by its paniced inflorescence. *Spines* $\frac{1}{2}$ –1 in. white. *Leaf-rachises* downy, with several glands; *pinnæ* 1– $1\frac{1}{2}$ in. long; leaflets crowded, rigidly coriaceous, $\frac{1}{2}$ – $\frac{3}{8}$ in. *Panicle* reaching a foot long and broad, with long compound densely tomentose ascending branches, the lower only from leafy nodes; heads yellow, not more than $\frac{1}{2}$ in. diam.; peduncles with the bract medial, the upper very short. *Corolla* under $\frac{1}{2}$ in. *Pod* 4–8 in. by $\frac{1}{4}$ – $\frac{1}{2}$ in., sessile, subindehiscent, clothed with pale brown or grey persistent tomentum.

VAR. microcephala, Grah. in *Wall. Cat.* 5263, sp.; leaf-rachis glabrous, leaflets much larger $\frac{1}{2}$ – $\frac{3}{8}$ in. long. *A. densa*, *Wall. Cat.* 5262.—Birma, *Wallich*.

SERIES II. **Gummiferæ spicatae**. Erect trees. *Spines* short and hooked, except in *A. Latronum*. *Stipules* spinescent. *Flowers* in peduncled spikes in the axils of the leaves.

8. *A. Suma*, *Kurz in Brand. For. Fl.* 187; spines in pairs short hooked, *pinnæ* 20–40, leaflets 60–100 small ligulate, rachises densely downy, corolla scarcely exceeding the canescent calyx, pod strap-shaped straight. *Benth. in Linn. Trans.* xxx. 519. *A. Catechu*, *W. & A. Prodr.* 272 (*excl. syn.*); *Benth. in Hook. Lond. Journ.* 1842, 510; *Dalz. & Gibs. Bomb. Fl.* 86; *Bedd. Fl. Sylv.* t. 49. *A. Sundra*, *Wall. Cat.* 5227. *Mimosa Suma*, *Roxb. Hort. Beng.* 41; *Fl. Ind.* ii. 563. *Mimosa frondosa* and *tamariscina*, *Heyne MSS.* *M. albida*, *Roxb. MSS.*

BENGAL, BEHAR, WESTERN PENINSULA, CEYLON.

A middle-sized tree, with white bark and downy branchlets. *Leaf-rachis* $\frac{1}{2}$ ft. long, with a large basal gland and smaller ones between several of the upper *pinnæ*; *pinnæ* $1\frac{1}{2}$ –2 in. long; leaflets very close, rigidly subcoriaceous, pale green, under $\frac{1}{4}$ in. long. *Spikes* 1–4-nate, 3–4 in. long. *Calyx* $\frac{1}{16}$ – $\frac{1}{12}$ in., densely grey-downy;

teeth deltoid. *Corolla* nearly white. *Pod* 3-4 in. by $\frac{1}{2}$ - $\frac{3}{4}$ in., rather thicker than in the two following, veined, 6-8-seeded, distinctly beaked, subindehiscent, narrowed suddenly into a stalk $\frac{1}{2}$ - $\frac{3}{4}$ in. long.

9. **A. Catechu**, *Willd. Sp. Pl.* iv. 1079; spines short hooked in pairs, pinnae 40-80, leaflets 60-100 small ligulate, rachises downy, corolla 2-3 times the tomentose calyx, pod strap-shaped straight. *Wall. Cat.* 5228, A, B, C, F. *Acacia catechuoides*, *Wall. Cat.* 5229 *A in. part*; *Benth. in Hook. Lond. Journ.* 1842, 510. *A. polyacantha*, *Willd. Sp. iv.* 1079? *A. Wallichiana*, *DC. Prodr.* ii. 458? *Mimosa Catechu*, *Roxb. Cor. Pl.* t. 175; *Ker. Med. Obs.* v. 151, t. 4; *Roxb. Hort. Beng.* 41; *Fl. Ind.* ii. 563 (*both* No. 41 and 42). *Mimosa catechuoides*, *Roxb. Fl. Ind.* ii. 562.

Through the Himalayas from the PUNJAB to SIKKIM, ascending to 4-5000 ft. **BIRMA.**

Very near *A. Suma*, from which it differs by its brown bark, darker yellow flowers, calyx not more than half as long, both absolutely and in proportion to the corolla, and not merely downy, but clothed with distinct spreading grey hairs, and by its narrower thinner darker brown pod.

10. **A. Sundra**, *DC. Prodr.* ii. 458; spines short hooked in pairs, pinnae 30-40, leaflets 40-80 small ligulate, rachises glabrous, corolla 3 times the glabrous calyx, pod strap-shaped straight. *W. & A. Prodr.* 273; *Dalz. & Gibs. Bomb. Fl.* 86; *Bedd. Fl. Sylv.* t. 50. *A. chundra*, *Willd. Sp. iv.* 1078. *A. catechuoides*, *Wall. Cat.* 5229 *A, ex parte*. *A. Catechu*, *Brand. For. Flor.* 186, *et Benth. in Trans. Linn. Soc.* xxx. 519, *in part*. *Mimosa Sundra*, *Roxb. Cor. Pl.* t. 225; *Hort. Beng.* 41; *Fl. Ind.* ii. 562.

WESTERN PENINSULA, CEYLON, BIRMA.

Scarcely more than a variety of *A. Catechu*, from which it differs by its fewer leaflets and pinnae, and by the total absence of pubescence from the leaflets leaf-rachises and calyx, by the latter being rather shorter, and by the very dark brown colour of its branchlets.

11. **A. ferruginea**, *DC. Prodr.* ii. 458; spines short hooked in pairs, pinnae 6-12, leaflets 20-40 ligulate-oblong, rachises glabrous, corolla 2-3 times the campanulate glabrous calyx, pod straight strap-shaped. *Wall. Cat.* 5226; *W. & A. Prodr.* 273; *Bedd. Fl. Sylv.* t. 51. *Mimosa ferruginea*, *Roxb. Hort. Beng.* 41; *Fl. Ind.* ii. 561.

WESTERN PENINSULA.

A middle-sized tree, with brown bark and glabrous or slightly downy branchlets. *Prickles* sometimes suppressed. *Leaf-rachis* with a gland on the petiole and one between the uppermost pinnae; pinnae 2-3 in. long; leaflets $\frac{1}{2}$ - $\frac{3}{4}$ in. long, pale glaucous-green, rigidly subcoriaceous. *Spikes* dense, 3-4 in. long. *Corolla* yellowish, $\frac{1}{16}$ in. *Pod* 3-4 in. long, $\frac{3}{4}$ in. broad, dark brown, glabrous, veined, distinctly stalked, 4-6-seeded, the upper suture narrowly winged.

12. **A. Senegal**, *Willd.*; *DC. Prodr.* ii. 459 *in part*; spines small hooked often 3-nate, pinnae 6-10, leaflets 16-28 small ligulate, rachises finely downy, corolla twice the campanulate calyx, pod straight strap-shaped. *A. Verek*, *Guill. & Per. Fl. Seneg.* i. 245, t. 56. *A. rupestris*, *Stocks*; *Bpiss. Fl. Orient.* ii. 638.

SCINDE, *Stocks*.—DISTRIB. Arabia, tropical Africa.

A low tree, with flexuose glaucous grey branches. *Leaf-rachises* not above an inch long, with a gland at the base and one between the upper pair of pinnae; leaflets rigidly subcoriaceous, $\frac{1}{2}$ in. long, glabrous, pale, glaucous-green. *Spikes* 2-3 in. long,

not very dense. *Calyx* $\frac{1}{24}$ in., campanulate, glabrous, deeply toothed. *Corolla* yellowish. *Pod* 3 in. by $\frac{3}{4}$ in., thin, grey, firm, indehiscent, 5-6-seeded, narrowed suddenly into 2 short stalk.

13. **A. modesta**, *Wall. Pl. As. Rar.* t. 130; spines in pairs short hooked, pinnae 4-6, leaflets 6-8 obovate, corolla twice the glabrous campanulate calyx, pod straight strap-shaped. *Wall. Cat.* 5230; *Dene. in Jacquem. Voy. Bot.* t. 56. *Mimosa dumosa*, *Roxb. Hort. Beng.* 40; *Fl. Ind.* ii. 559. *M. obovata*, *Roxb. Fl. Ind.* ii. 561.

Foot of the WESTERN and CENTRAL HIMALAYAS.—DISTRIB. Afghanistan.

A middle-sized tree, with grey glabrous branches. *Prickles* dark-brown, polished. *Leaf-rachises* very slender, finely downy, with a small gland at the base and one between the uppermost pinnae; leaflets thin, rigidly subcoriaceous, $\frac{1}{8}$ – $\frac{3}{8}$ in. long, shortly stalked, glabrous, oblique at the base, pale green, obtuse or minutely cuspidate. *Spikes* 2-3 in. long, not very dense. *Corolla* $\frac{1}{12}$ in., greenish. *Pod* 2-3 in. by $\frac{3}{8}$ – $\frac{5}{8}$ in., 6-8-seeded, glossy, drab, glabrous, venulose, narrowed gradually into a short stalk.

14. **A. lenticularis**, *Ham. in Wall. Cat.* 5244; spines in pairs short hooked, pinnae 4-8, leaflets 12-16 large obovate-oblong, corolla twice the campanulate calyx, pod strap-shaped straight or subfalcate. *Benth. in Hook. Lond. Journ.* i. 508.

Foot of CENTRAL and EASTERN and WESTERN HIMALAYAS, rare, *Hamilton, Royle*.

Branches grey, glabrous. *Leaves* long-petioled, without any gland on the rachis; pinnae 3-4 in. long; leaflets much larger than in any other species, 1-1 $\frac{1}{4}$ in. long, obtuse, pale glaucous-green, glabrous, rigidly subcoriaceous, sessile, reduced on the upper side towards the base. *Spikes* very dense, short-peduncled, 3-4 in. long. *Corolla* $\frac{1}{2}$ in., grey, campanulate, deeply toothed. *Pod* 6-8 in. by $\frac{3}{4}$ in., 6-9-seeded, thin, flat, opaque, brown, venulose, with both sutures slightly thickened and furnished with a narrow wing.

15. **A. Latronum**, *Willd.; DC. Prodr.* ii. 460; spines in pairs long straight, pinnae 6-10, leaflets 20-30 minute ligulate, pod oblong thin flat rather recurved. *Bedd. Fl. Sylv.* 95; *Wall. Cat.* 5332; *Wight Ic.* t. 1157; *W. & A. Prodr.* 273; *Dalz. & Gibs. Bomb. Fl.* 87. *A. umbraculata*, *Wall. Cat.* 5245. *A. dumosa*, *W. & A. Prodr.* 274, *excl. syn.* *Roxb. Mimosa Latronum*, *Linn.; Roxb. Hort. Beng.* 40; *Fl. Ind.* ii. 558. *M. cornigera*, *Linn. Suppl.* 438.

WESTERN PENINSULA.

A low tree, forming an umbrella-like top when old, with brown glabrous branches. Full-sized *prickles* 2-2 $\frac{1}{2}$ in. long, $\frac{1}{4}$ – $\frac{3}{8}$ in. thick, connate at the base. *Leaves* shorter than the prickles; rachises very slender, glabrous or downy, with a small petiolar gland; leaflets $\frac{3}{8}$ – $\frac{1}{2}$ in., glabrous, rigidly subcoriaceous. *Spikes* abundantly produced from the close nodes of leafless branches. *Corolla* $\frac{1}{12}$ in., 3-4 times the minute glabrous campanulate calyx. *Pod* 1 $\frac{1}{2}$ –2 in. by $\frac{1}{2}$ – $\frac{3}{4}$ in., opaque, dark brown, 2-4-seeded, veined, finally dehiscing.

SERIES III. **Vulgares**. Climbers with copious scattered prickles. *Flowers* in copiously paniced globose heads.

16. **A. concinna**, *DC. Prodr.* ii. 464; pinnae 12-16, leaflets 30-50 membranous, stipules and bracts cordate-ovate, pod thick succulent when dry shrivelled and rugose with slightly waved sutures. *W. & A. Prodr.* 277; *Wall. Cat.* 5250, *excl. D*; *Dalz. & Gibs. Bomb. Fl.* 87. *A. Hooperiana*, *Zippel.; Miq. Fl. Ind. Bat.* i. 10. *Mimosa concinna*, *Willd.; Roxb. Hort. Beng.* 41; *Fl. Ind.* ii. 565. *M. rugata*, *Lam.; DC. Prodr.* ii. 431. *M. abstergens*, *Spreng. DC. Prodr. loc. cit.*

EASTERN HIMALAYAS, WESTERN and EASTERN PENINSULAS, and CEYLON.—DISTRIB. Malay isles, China.

Prickles abundant, minute, hooked. *Branchlets* and leaf-rachises finely grey-downy. *Petiole* with a large gland near the base and one between the uppermost pinnæ; pinnæ 2-3 in. long; leaflets $\frac{3}{8}$ - $\frac{1}{2}$ in. long, pale green above, glaucous beneath, subglabrous, $\frac{1}{12}$ - $\frac{1}{8}$ in. broad, with a very oblique midrib, sensitive, often not crowded. *Panicles* with densely downy branches, the lower springing from the axils of the leaves, the upper subtended by conspicuous oblique membranous subpersistent bracts; heads yellow, $\frac{3}{8}$ - $\frac{1}{2}$ in. broad. *Calyx* funnel-shaped, $\frac{1}{12}$ in. long. *Corolla* little exserted. *Pod* strap-shaped, straight, 3-4 in. by $\frac{3}{4}$ in., 6-10-seeded, with broad sutures, narrowed to a short stalk, depressed between the seeds.

VAR. *rugata*, Ham. in Wall. Cat. 5251, sp.; leaflets and pod larger, the pinnæ $\frac{1}{2}$ in. and the latter 1-1 $\frac{1}{4}$ in. broad, ovary villose.—Eastern Himalayas.

17. **A. Intsia**, Willd. in DC. Prodr. ii. 464; pinnæ 12-16, leaflets 16-24 ligulate-oblong rigidly subcoriaceous not crowded, bracts minute lanceolate, pod dry thin. Wall. Cat. 5248; W. & A. Prodr. 278; Dalz. & Gibs. Bomb. Fl. 88. *Mimosa cæsia*, Linn. Sp. Pl. 1507, ex parte. M. *Intsia*, Linn.; Roxb. Hort. Beng. 41; Fl. Ind. ii. 565.

TROPICAL HIMALAYAS, WESTERN PENINSULA, EASTERN PENINSULA, and CEYLON.

Prickles minute, hooked. *Branchlets* and leaf-rachises finely downy or glabrous, the latter with a gland at the base and between the 2-3 upper pinnæ. Pinnæ 2-3 in. long; leaflets $\frac{1}{2}$ - $\frac{3}{4}$ in., broad, minutely cuspidate, with the midrib nearer the upper margin, both surfaces glabrous or nearly so, the lower grey-green. *Peduncles* finely downy, 1-4-nate; heads yellow, under $\frac{1}{2}$ in. broad. *Calyx* shorter, and more broadly funnel-shaped than in the last. *Pod* straight, strap-shaped, glabrous, dehiscent, smooth, 4-6 in. by $\frac{3}{4}$ -1 $\frac{1}{4}$ in., 8-12-seeded, the sutures straight or slightly repand, cuneately narrowed at the base to a short stalk.

VAR. *cæsia*, W. & A. Prodr. 278, sp.; leaflets 40-60 crowded not more than $\frac{1}{12}$ - $\frac{1}{8}$ in., broad rigidly subcoriaceous obtuse with a minute cusp, pinnæ 16-30. A. Arar, Ham. in Wall. Cat. 5249. A. *alliacea*, Ham. in Wall. Cat. 5258. A. *intsioides*, DC. Prodr. ii. 464. A. *pseudo-intsia*, Miq. Fl. Ind. Bat. i. 12. *Mimosa cæsia*, Linn. ex parte; Roxb. Fl. Ind. ii. 565. M. *tenuifolia*, Roxb. Hort. Beng. 41.—Himalayas (ascending to 3000 ft. in the West and 5000 in Sikkim) Behar, Western Peninsula, Birma.—Distrib. Malay isles.

VAR. *oxyphylla*, Grah. in Wall. Cat. 5252, sp.; leaflets 40-50 more membranous than in the last and more acutely pointed.—Eastern Himalayas.

18. **A. pennata**, Willd. Sp. Pl. iv. 1090; pinnæ 16-30, leaflets 80-100 rigidly coriaceous very narrow densely crowded, bracts minute lanceolate, pod dry thin. Wall. Cat. 5254; W. & A. Prodr. 277. *Acacia megaladena*, Desv.; DC. Prodr. ii. 465. A. *prensans*, Lowe in Bot. Mag. t. 3408. A. *paludosa*, Miq. Flor. Ind. Bat. i. 14. A. *pinnata*, Dalz. & Gibs. Bomb. Fl. 87. *Mimosa pennata*, Linn. Sp. 1507, excl. syn.; Roxb. Fl. Ind. ii. 565. M. *torta*, Roxb. Hort. Beng. 41; Fl. Ind. ii. 566. M. *ferruginea*, Rottl.; DC. Prodr. ii. 431.

CENTRAL and EASTERN HIMALAYAS (ascending to 5000 ft.), BEHAR, EASTERN and WESTERN PENINSULA, BIRMA, and CEYLON.—DISTRIB. Malay isles, Trop. Africa, Natal.

Prickles generally fewer and less hooked than in *A. Intsia* and *concinna*. *Branchlets* and leaf-rachises finely downy, the latter with a large plate-shaped gland at the base of the petiole and several between the upper pinnæ. Pinnæ 2-3 in. long; leaflets firm in texture, not more than $\frac{1}{36}$ - $\frac{1}{24}$ in. broad, dark green above, grey-green below, both sides glabrous. *Peduncles* 1-4-nate, finely downy; heads $\frac{1}{2}$ in. thick. *Corolla* $\frac{1}{12}$ in., slightly exceeding the glabrous subcampanulate calyx. *Pod* straight, strap-shaped, thin glabrous, dehiscent, 6-8 in. by $\frac{1}{4}$ -1 $\frac{1}{4}$ in., distinctly stalked, 8-12-seeded, the sutures rather raised, slightly repand.

VAR. 1. *canescens*, Grah. in Wall. Cat. 5256, sp.; branches and leaf-rachises densely pubescent, leaflets slightly downy below. *A. casia*, Wall. Cat. 5253 *A. A. amblycarpa*, Grah. in Wall. Cat. 5260. *A. concinna*, Wall. Cat. 5250 D? *A. tomentella*, Zipp.; *Miq. Fl. Ind. Bat. i. 13*.

VAR. 2. *arrophula*, Don; Wall. Cat. 5257, sp.; pinnæ more numerous, leaflets duller in colour and not so firm in texture, panicle more elongated and compound, peduncles often 4-6-nate.—Eastern Himalayas.

VAR. 3. *pluricapitata*, Steud.; Benth. in Hook. Lond. Journ. Bot. 1842, 516, sp.; pinnæ 40-80 not more than $1\frac{1}{4}$ - $1\frac{1}{2}$ in. long, leaflets very narrow and crowded, petiolar glands much smaller, panicle elongated sometimes a foot long above the leaves, peduncle often 6-8-nate, heads smaller, *A. polycephala*, Grah. in Wall. Cat. 5255, non DC.—Martaban, Penang, and Malacca.—Distrib. Malay isles.

IMPERFECTLY KNOWN SPECIES.

A. WIGHTII, Baker. In Dr. Wight's collection are specimens without fruit of a well-marked species near *A. arabica*, from Travancore and Tinnevely, with glabrous branchlets and leaf-rachises, large straight dark-brown spines, 2-8 pinnæ, 12-32 oblique oblong glabrous subcoriaceous leaflets $\frac{1}{4}$ - $\frac{3}{8}$ in. long, short glabrous 2-4-nate peduncles with the involucre below the middle, funnel-shaped shortly-toothed calyx $\frac{1}{8}$ in. long, and a minute campanulate glabrous calyx.

128. **ALBIZZIA**, Durazz.

Large trees. *Leaves* bipinnate. *Flowers* in the Indian species in globose heads, sessile or pedicellate, usually pentamerous and all hermaphrodite. *Calyx* campanulate or funnel-shaped, distinctly toothed. *Corolla* funnel-shaped, petals firmly united below the middle. *Stamens* indefinite, monadelphous at the base, filaments several times the length of the corolla; anthers minute, not gland-crested. *Ovary* sessile or shortly-stalked; style filiform, stigma capitate minute. *Pod* large, thin, flat, strap-shaped, straight, indehiscent or sub-indehiscent, continuous within, the sutures not thickened.—DISTRIB. Species 25-30, spread through the Tropics of the Old World.

The Australian *A. lophantha*, which resembles *A. amara* in the leaves but has the flowers in spikes, is naturalised on the Nilghiris.

* *Leaflets oblong, at least $\frac{1}{4}$ - $\frac{1}{3}$ in. broad.*

1. **A. Lebbek**, Benth. in Hook. Lond. Journ. 1844, 87; leaflets 8-18, obtuse, heads not paniced, calyx pedicellate funnel-shaped. *Dalz. & Gibs. Bomb. Fl. 88*; *Bedd. Pl. Sylv. t. 53*; *Boiss. Fl. Orient. ii. 639*. *Acacia Lebbek*, Willd.; *DC. Prodr. ii. 466*. *A. speciosa*, Willd.; *DC. Prodr. ii. 467*; *W. & A. Prodr. 275*. *Mimosa speciosa*, Jacq. *Ic. t. 198*. *Acacia Sirissa*, Ham. in Wall. Cat. 5265. *Mimosa Sirissa*, Roxb. *Hort. Beng. 40*; *Fl. Ind. ii. 544*. *Albizzia latifolia*, Boivin; *Miq. Fl. Ind. Bat. i. 22*.

Tropical HIMALAYAS, ascending to 5000 ft. in the Central Provinces and 4000 ft. in KHASIA; through INDIA PROPER and CEYLON to BIRMA and TENASSERIM.—DISTRIB. Malay isles, China, N. Australia, Trop. Africa.

A tall tree, without prickles. *Leaves* with glabrous or downy rachises, and a large gland near the base of the main petiole; pinnæ 4-8, with or without a gland between the lowest; leaflets short-stalked, rigidly subcoriaceous, oblique, $1-1\frac{1}{2}$ in. long, glabrous or finely grey-downy. *Heads* many-flowered, short-peduncled, 3-4 together from the crowded upper nodes on downy erecto-patent peduncles. *Calyx* $\frac{1}{8}$ in., downy. *Corolla* greenish-yellow, twice the calyx, the teeth short, lanceolate. *Pod* strap-shaped, firm, yellow-brown, $\frac{1}{2}$ -1 ft. by $\frac{3}{4}$ - $1\frac{1}{2}$ in., 6-10-seeded.

2. **A. pedicellata**, Baker; leaflets 36–40 obtuse, heads not paniced, calyx pedicellate funnel-shaped. *Benth. in Trans. Linn. Soc.* xxx. 563.

MALACCA, Maingay.

Combines the leaves of *A. odoratissima* with inflorescence of *A. Lebbek*. Leaves with a gland near the base of the main petiole; rachises and leaflets finely downy; pinnæ 12–18; leaflets oblong, obtuse, sessile, rigidly subcoriaceous, little oblique, $\frac{1}{2}$ – $\frac{3}{4}$ in. long. Heads many-flowered, on crowded downy peduncles from the upper nodes. Pedicels and calyx each $\frac{3}{8}$ – $\frac{1}{2}$ in., densely pubescent. Corolla half as long again as the calyx. Pod a foot or more by 2 in., very thin and brittle, pale yellowish-brown, with repand sutures and very small seeds.

3. **A. odoratissima**, Benth. in Hook. Journ. Bot. 1844, 88; leaflets 16–40 sessile obtuse very oblique, heads copiously paniced, calyx sessile minute campanulate. Dalz. & Gibs. Bomb. Fl. 88; Bedd. Fl. Sylv. t. 54. Acacia odoratissima, Willd.; DC. Prodr. ii. 466; Wall. Cat. 5234; W. & A. Prodr. 275. A. lomatocarpa, DC. Prodr. ii. 467. A. micrantha, Boiv.; Mig. Fl. Ind. Bat. i. 24. Mimosa odoratissima, Linn.; Roxb. Cor. Pl. t. 120; Hort. Beng. 40; Fl. Ind. ii. 546. M. marginata, Lam. Dict. i. 12. A. lebekkoides, Benth. loc. cit. p. 89?

Foot of the CENTRAL HIMALAYAS to CEYLON and MALACCA.

A tall erect tree, without prickles. Leaf-rachises finely downy, with a gland at the base of the petiole and of the 1–2 upper pinnæ; pinnæ 6–8; leaflets obliquely oblong, articulated on the rachis, $\frac{3}{4}$ –1 in. long, rigidly subcoriaceous, glaucous beneath, strongly veined, with the midrib parallel with the upper edge at a short distance from it. Heads small, few-flowered, very numerous, forming ample deltoid terminal panicles crowded in peduncled corymbs at the end of the branches and smaller ones from the upper leaf-axils. Calyx under $\frac{1}{2}$ in. Corolla grey-silky $\frac{1}{2}$ in., with lanceolate teeth. Pod firm, flexible, 6–8 in. by 1–1 $\frac{1}{2}$ in., opaque or glossy, 8–12-seeded. We have not material for separating from this *A. lebekkoides*, Benth., reported by Kurz from Birma.

VAR. *mollis*, Benth.; leaflets and leaf-rachises densely grey-downy, the former less rigid than in the type.—Rohilcund, Thomson. Siwaliks, Edgeworth.

4. **A. procera**, Benth. in Hook. Journ. 1844, 89; leaflets 12–24 short-stalked obtuse, heads copiously paniced, calyx sessile funnel-shaped. Bedd. Fl. Sylv. 96. Acacia procera, Willd.; DC. Prodr. ii. 466. Mimosa procera, Roxb. Cor. t. 121; Fl. Ind. ii. 548.

CENTRAL and EASTERN HIMALAYAS, BEHAR, WESTERN PENINSULA, BIRMA.—DISTRIB. Malay isles, Philippines.

Leaf-rachises glabrescent, with a large gland near the base of the petiole; pinnæ 4–12; leaflets rigidly subcoriaceous, grey beneath, glabrous, 1–1 $\frac{1}{2}$ in. long, obliquely truncate on the lower side at the base. Inflorescence like that of *A. odoratissima*. Calyx $\frac{1}{2}$ in., shortly toothed. Corolla twice the length of the calyx, deeply cleft. Pod 4–8 in. by $\frac{1}{2}$ –1 in., thin, brown, glabrous, finally dehiscing, 8–12-seeded.

VAR. *elata*, Baker; leaflets smaller $\frac{1}{2}$ – $\frac{3}{4}$ in. long less oblique at the base. Mimosa elata, Roxb. Hort. Beng. 40; Fl. Ind. ii. 546. Acacia elata, Grah. in Wall. Cat. 5233.

5. **A. lucida**, Benth. in Hook. Journ. Bot. 1844, 86; Pl. Jungh. i. 268; leaflets 2–4 rarely 6 large acute, heads copiously paniced, calyx minute sessile campanulate. Mimosa lucida, Roxb. Hort. Beng. 40; Fl. Ind. ii. 544. Inga lucida, Wall. Cat. 5267, excl. B. et F. pro parte.

NIPAL, KHASIA, ASSAM, SILHET, AVA, and SINGAPORE.

Differs widely from all the other species except the next, by its large acute leaflets and unijugate pinnæ. Main and partial petiole each with usually a large gland. Leaflets oblong, 2–4 in. long, glabrous, membranous, firm, bright green. Ultimate

branches of the *panicle* umbellate or corymbose. *Calyx* $\frac{1}{2}$ in., faintly-toothed. *Corolla* 3-4 times the length of the calyx; teeth lanceolate. *Pod* 6-8 in. by 1-1 $\frac{1}{2}$, thin, flexible, pale brown, 6-8-seeded.

6. **A. glomeriflora**, *Kurz in Journ. Asiat. Soc. Beng.* xlii. 2, 74; leaflets usually 6 rarely 4 middle-sized acute, heads copiously panicked, calyx minute sessile campanulate. *Benth. in Trans. Linn. Soc.* xxx. 560.

MARTABAN, *Kurz*.

A shrub, 2-5 ft. high, with puberulous branchlets. *Pinnæ* unijugate; leaflets oblong- or subrhomboidal-lanceolate, 1-2 in. long, chartaceous, nearly glabrous above when mature, glaucescent and downy beneath. *Heads* the size of a pea, in axillary racemes and terminal panicles. *Calyx* under $\frac{1}{2}$ in., pubescent. *Corolla* thrice as long as the calyx, deeply lobed, pubescent, greenish-white. *Pod* unknown. *Ex Kurz loc. cit.*

** *Leaflets narrow, dimidiate-lanceolate, with the midrib close to the upper edge.*

7. **A. Julibrissin**, *Durazz.*; *Benth. in Hook. Journ. Bot.* 1844, 91; leaflets 20-50, stipules and bracts caducous, heads of flowers not panicked, corolla three times as long as the calyx. *Boiss. Fl. Orient.* ii. 639. *Acacia Julibrissin* and *Nemu, Willd.*; *DC. Prodr.* ii. 469. *Mimosa Kalkora, Roxb. Hort. Beng.* 40; *Fl. Ind.* ii. 547? *M. arborea, Thunb. Fl. Jap.* 229.

Throughout the Himalayas from HAZARA to SIKKIM, ascending to 6-7000 ft.—DISTRIB. Abyssinia, Eastern and Central Asia, China, Japan.

A middle-sized unarmed tree. *Leaf-rachises* finely downy, with a small gland at the base of the petiole, and between the upper pinnæ; pinnæ 8-24; leaflets membranous, sessile, sensitive, $\frac{1}{2}$ in. long, cuspidate, straight on the upper side, rounded on the lower, $\frac{1}{8}$ in. broad. *Heads* globose, on clustered erecto-patent peduncles from the crowded leafless upper nodes. *Calyx* $\frac{1}{8}$ - $\frac{1}{6}$ in., funnel-shaped, shortly toothed. *Filaments* rose-red, 1 in. *Pod* glabrous, membranous, grey or pale brown, 5-6 in. by $\frac{3}{4}$ -1 in., 8-12-seeded, narrowed to a beak and short stalk, indehiscent.

VAR. *mollis*, *Benth.*; leaflets broader ($\frac{3}{8}$ - $\frac{1}{2}$ in.) more coriaceous, like the peduncles and calyx densely pubescent. *Acacia mollis*, *Wall. Pl. As. Rar.* ii. 76, t. 177; *Cat.* 5235.—Simla to Nipal.

8. **A. stipulata**, *Boiv.*; *Benth. in Hook. Journ. Bot.* 1844, 92; leaflets 40-80, stipules and bracts persistent, heads of flowers panicked, corolla twice the calyx. *Dalz. & Gibs. Bomb. Fl.* 88; *Bedd. Fl. Sylv.* t. 55. *Acacia stipulata*, *DC. Prodr.* ii. 469; *Wall. Cat.* 5236; *W. & A. Prodr.* 274. *A. Smithiana*, *Wall. Cat.* 5237. *A. marginata*, *Ham. in Wall. Cat.* 5243. *Mimosa stipulacea*, *Roxb. Fl. Ind.* ii. 549. *M. Smithiana*, *Roxb. Hort. Beng.* 40; *Fl. Ind.* ii. 550. *Arthrosprium stipulatum*, *Hassk. Retz.* i. 212.

TROPICAL HIMALAYAS, ascending to 4000 ft. in KUMAON and SIKKIM, to CEYLON and BURMA.—DISTRIB. Malay isles.

A tall unarmed tree, with finely grey downy branchlets. *Leaves* with many glands on the rachis; pinnæ 12-40; leaflets $\frac{1}{2}$ in. or less broad, membranous, sensitive, $\frac{1}{4}$ - $\frac{1}{2}$ in., sessile, glaucous beneath, finely downy, with a slightly recurved acute point. *Stipules* and bracts large, membranous, downy, cordate, acute. *Heads* in copious axillary simple and compound terminal racemes with densely pubescent erecto-patent branches. *Calyx* like that of *A. Julibrissin*, but smaller. *Pod* 5-6 in. by $\frac{3}{4}$ -1 in., pale brown, thin, indehiscent, subsessile, 8-10-seeded.

*** *Leaflets very narrowly strap-shaped with a central midrib.*

9. **A. myriophylla**, *Benth. in Hook. Journ.* 1844, 90; leaflets 80-100

rigidly subcoriaceous, heads paniced stipules persistent subspinescent, pod subsessile. *Mimosa microphylla*, *Roxb. Fl. Ind.* ii. 549. *Acacia myriophylla*, *Grah. in Wall. Cat.* 5242.

EASTERN HIMALAYAS, ascending to 3000 ft. in SIKKIM. SILHET, ASSAM, and the KHASIA MTS.—DISTRIB. Siam.

A low tree, with dark brown shoots, *Leaf-rachises* finely downy, with a large gland on the petiole, and several between the upper pinnæ; pinnæ 30–40, not more than 2–3 in. long; leaflets green, closely crowded, caducous, $\frac{1}{2}$ – $\frac{1}{3}$ in. by $\frac{1}{4}$ in. *Heads* small, corymbose, forming an ample terminal panicle, with brown-tomentose branches. *Calyx* sessile, campanulate, under $\frac{1}{4}$ in. long. *Corolla* funnel-shaped, $\frac{1}{2}$ – $\frac{1}{3}$ in. *Pod* 4–5 in. by $\frac{3}{4}$ –1 in., glossy, brown, thin, flexible, 6–8-seeded, narrowed to both ends.

VAR. foliolosa; leaflets large $\frac{1}{2}$ – $\frac{3}{4}$ in. long nearly $\frac{1}{12}$ in. broad, rachises less pubescent. *Acacia foliolosa*, *Grah. in Wall. Cat.* 5241.—Martaban, *Wallich*.

10. **A. amara**, *Boivin*; *Benth. in Hook. Journ. Bot.* 1844, 90; leaflets 30–60 membranous, stipules minute caducous, heads not paniced, pod distinctly stalked. *Dalz. & Gibs. Bomb. Fl.* 88; *Bedd. Fl. Sylv.* t. 61. *Acacia amara*, *Willd.*; *DC. Prodr.* ii. 469; *Wall. Cat.* 5238; *W. & A. Prodr.* 274. *A. nellyrenza* (nella-renga), *Grah. in Wall. Cat.* 5240. *A. Wightii*, *Grah. in Wall. Cat.* 5259; *W. & A. Prodr.* 274. *Mimosa amara*, *Roxb. Cor. Pl. t.* 122; *Hort. Beng.* 40; *Fl. Ind.* ii. 548. *M. pulchella*, *Roxb. Hort. Beng.* 40; *Fl. Ind.* ii. 548. *Inga ventricosa*, *Grah. in Wall. Cat.* 5266, *ex parte*. *Albizzia affinis*, *Fourn. in Ann. Sc. Nat.* 4, xiv. 371.

WESTERN PENINSULA and CEYLON.—DISTRIB. Abyssinia (*A. sericocephala*, *Benth.*) and Kordofan.

A middle-sized unarmed tree, with densely pubescent branchlets and leaf-rachis, the latter with a small gland on the petiole; and between the lowest pair of pinnæ. *Pinnæ* 8–20, 1–3 in. long; leaflets $\frac{1}{4}$ – $\frac{1}{2}$ in. long, sessile, caducous, finely pubescent, grey or glaucous beneath. *Peduncles* copious, axillary, densely tomentose, crowded at the upper nodes in the axils of much-reduced leaves. *Calyx* $\frac{1}{24}$ in., funnel-shaped, shortly stalked. *Corolla* 3 times as long as the calyx; teeth lanceolate. *Pod* 6–9 in. by $\frac{3}{4}$ –1 in., 6–10-seeded, opaque, grey-brown.

129. **SERIANTHES**, *Benth.*

Unarmed trees. *Leaves* bipinnate. *Flowers* racemed, much larger than in the other *Mimosæ*, 5-merous, mostly hērmaphrodite. *Calyx* deeply campanulate, deeply toothed. *Petals* adnate at the base to the staminal tube, free above this. *Stamens* monadelphous, very numerous; anthers minute. *Ovary* sessile, many-ovuled; style filiform, stigma minute capitate. *Pod* large, oblong, sublignose, indehiscent, rather turgid.—DISTRIB. Another species in Polynesia.

1. **S. grandiflora** *Benth. in Hook. Lond. Journ. Bot.* 1844, 225. *Inga grandiflora*, *Wall. Cat.* 5285. *I. Finlaysoniana*, *Wall. Cat.* 5284. *I. ventricosa*, *Grah. in Wall. Cat.* 5266, *in part*.

MALACCA, *Griffith*, *Maingay*.—DISTRIB. Malay isles, Philippines.

Leaf-rachis with a gland on the common petiole and at the base of each pinna; pinnæ 6–16; leaflets 12–24, glossy green, glabrous, rigidly coriaceous, $\frac{1}{2}$ –1 in. long, oblique, rather falcate, obtuse, with the upper and lower edge subparallel. *Flowers* shortly pedicellate, in few-flowered axillary corymbose panicles, which are shorter than the leaves. *Calyx* and yellowish corolla densely felted on the outside, the former $\frac{1}{2}$ in., the latter $1\frac{1}{2}$ in. long. *Stamens* many hundreds, much exerted.

Pod $\frac{1}{2}$ ft. by 2 in., glabrous, 6-8-seeded, rather turgid, the sutures neither lobed nor thickened.

130. **CALLIANDRA**, Benth.

Shrubs or trees. *Leaves* bipinnate, with small or large leaflets. *Flowers* in globose heads, polygamous, 5-merous. *Calyx* campanulate, toothed. *Corolla* funnel-shaped, deeply 5-cleft. *Stamens* indefinite, monadelphous at the base, filaments filiform much exerted; anthers minute, not gland-crested. *Ovary* stalked, many-ovuled; style filiform, stigma minute capitate. *Pod* strap-shaped, slightly falcate, flat, rigidly coriaceous, the valves dehiscing with elasticity, bordered by much-thickened sutures, continuous within, narrowed gradually to a short stalk.—**DISTRIB.** Species 80, all the rest Tropical American.

1. **C. Griffithii**, Benth. in *Trans. Linn. Soc.* xxx. 537; spines minute, bracts linear-lanceolate.

KHASIA MTS., Griffith.

Branches slender, terete, glabrous. General and partial *petioles* very short, glandless. *Leaves* as in *C. umbrosa*; upper pair of leaflets connivent, oblong-lanceolate, oblique, acuminate, 2-3 in. long, rigidly subcoriaceous, glabrous, strongly veined, lower nearly sessile, $\frac{1}{2}$ - $\frac{1}{3}$ in. *Heads* dense, on slender glabrous ascending peduncles 1-2 in. long, from the axils of developed leaves. *Calyx* $\frac{1}{12}$ in., funnel-shaped; teeth deltoid. *Corolla* funnel-shaped, glabrous, $\frac{3}{8}$ in.; teeth lanceolate. *Pod* unknown.

2. **C. umbrosa**, Benth. in *Gen. Plant.* i. 597; spines conspicuous, bracts minute deltoid. *Inga umbrosa*, Walk. *Pl. Asiat. Rar.* t. 124; *Cat.* 5273. *Albizia umbrosa*, Benth. in *Hook. Lond. Journ. Bot.* iii. 86.

SILHET, KHASIA MTS., CHITTAGONG, and PENANG.

A tree, with slender glabrous branchlets, sometimes furnished with small erecto-patent stipular spines. *Leaves* short; pinnæ 2, with a pair of large sessile oblique oblong acute rigidly subcoriaceous leaflets at the apex, and an odd much smaller one below on the outer side, all with a gland on the rachis at the base. *Flowers* sessile, in small dense globose heads on short ascending peduncles. *Corolla* $\frac{1}{2}$ in., yellow, inodorous. *Pod* 6-9 in. by $\frac{3}{4}$ -1 in. broad, smooth, finely veined, the valves with elevated rounded thick raised edges.

131. **PITHECOLOBIUM**, Mart.

Erect trees. *Leaves* bipinnate. *Flowers* in globose heads, usually hermaphrodite and pentamerous. *Calyx* campanulate or funnel-shaped, shortly toothed. *Corolla* funnel-shaped, the petals united below the middle. *Stamens* monadelphous, much exerted; anthers not gland-crested. *Ovary* sessile or stalked, many-ovuled; style filiform, stigma minute capitate. *Pod* strap-shaped, falcate or circinate, usually dehiscent and much twisted in a late stage, the sutures not thickened.—**DISTRIB.** Species about 100, cosmopolitan in the Tropics, mostly American, only one African.

SERIES I. **Unguiscati**. Stipules spinose.

1. **P. dulce**, Benth. in *Hook. Lond. Journ.* 1844, 199; pinnæ and leaflets 2; heads in long narrow terminal panicles, flowers sessile, pod coriaceous. *Bedd. Fl. Sylv.* t. 188. *Mimosa dulcis*, Roxb. *Cor. Pl.* t. 99; *Hort. Beng.* 40; *Fl. Ind.* ii. 556. *Inga dulcis*, Willd.; *DC. Prodr.* ii. 436; *Wall. Cat.* 5282; *W. & A. Prodr.* 268; *Wight Ic.* t. 198.

Cultivated throughout India, but not indigenous. A native of Trop. America.

A middle-sized tree, with glabrous leaves and branches. Spines minute, pointing upwards. *Leaflets* approximated, oblique, obovate-oblong, rigidly subcoriaceous, obtuse. 1-2 in. long. *Heads* dense, $\frac{3}{8}$ - $\frac{1}{2}$ in. broad, shortly peduncled, on elongated branches. *Calyx* $\frac{1}{2}$ in., funnel-shaped, grey-downy. *Corolla* $\frac{1}{2}$ in. *Pod* 4-5 in. by $\frac{1}{2}$ in., 6-8-seeded, both sutures indented between the seeds, which are half enveloped in a pulpy white edible aril.

2. ***P. geminatum***, *Benth. in Hook. Lond. Journ.* 1844, 202; spines large, pinnae 2, leaflets 6-10, heads axillary, uppermost leaves much reduced, flowers sessile. *Bedd. Fl. Sylv.* 96. *Inga geminata*, *W. & A. Prodr.* 269. *I. flexuosa*, *Grah. in Wall. Cat.* 5286.

CEYLON and WESTERN PENINSULA.

A low tree, with slender pubescent branches. Common *petiole* very short, with a gland between the erecto-patent pinnae; pinnae 1-1 $\frac{1}{2}$ in. long; leaflets bright green, rigidly subcoriaceous, uppermost pair approximated, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, obtuse, oblique-obovate; lower smaller, lowest on inside absent. *Peduncles* slender, pubescent. *Calyx* campanulate, under $\frac{1}{2}$ in. *Corolla* 3-4 times the length of the calyx. *Stamens* $\frac{1}{2}$ in. long. *Pod* not seen.

P. nitidum, *Benth. in Hook. Lond. Journ.* 1844, 202 (*Mimosa nitida*, *Vahl, Symb.* ii. 103. *Acacia nitida*, *Willd.*; *DC. Prodr.* ii. 460. *Inga Kænigii*, *W. & A. Prodr.* 269), a plant unknown to recent botanists, is probably a form of this with 4 pinnae.

3. ***P. umbellatum***, *Benth. in Hook. Lond. Journ.* 1844, 202; spines minute, pinnae 2-4, leaflets 6-20, heads axillary, flowers stalked, pod subligonose. *Bedd. Fl. Sylv.* 96. *Inga umbellata*, *Willd.*; *DC. Prodr.* ii. 439; *W. & A. Prodr.* 270. *I. corcondiana*, *DC. Prodr.* ii. 441; *Wall. Cat.* 5287. *Mimosa umbellata*, *Vahl, Symb.* ii. 103. *M. concordiana*, *Roxb. Hort. Beng.* 40; *Fl. Ind.* ii. 556.

WESTERN PENINSULA and CEYLON.—DISTRIB. Malay isles.

A low tree, with the branchlets sometimes reduced to spines, but with the stipular spines often small and obscure. *Leaf-rachis* downy, with a gland between the pinnae and an obscure one between each pair of leaflets; leaflets subglabrous, rigidly coriaceous, ligulate-oblong, obtuse, $\frac{1}{2}$ -1 $\frac{1}{2}$ in. long, the uppermost pair broader upwards, the lowest on the inner side mostly absent. *Heads* long-peduncled, few-flowered. *Corolla* $\frac{1}{4}$ in., twice the length of the funnel-shaped calyx. *Stamens* $\frac{3}{4}$ -1 in. *Pod* very different to those of the other species, recurvato-falcate, indehiscent, jointed, $\frac{1}{4}$ - $\frac{1}{2}$ in. thick, 6-8-seeded.

SERIES II. ***Clypearia***. Spineless trees with coriaceous twisted pods opening from the lower suture.

* *Leaflets few and but slightly oblique at the base.*

4. ***P. bigeminum***, *Benth. in Hook. Lond. Journ.* 1844, 206; branchlets slightly pubescent, pinnae 2-4, leaflets 4-6, leaves with glands on the petiole and at the base of each pinna and leaflet, calyx subcampanulate, pod not lobed. *DC. & Gibs. Bomb. Fl.* 89; *Bedd. Fl. Sylv.* 96. *Mimosa bigemina*, *Linn.*; *Vahl, Symb.* ii. 103. *M. lucida*, *Roxb. Hort. Beng.* 40; *Fl. Ind.* ii. 544. *M. monadelphæ*, *Roxb. Fl. Ind.* ii. 544? *Inga bigemina*, *Willd.*; *DC. Prodr.* ii. 439; *W. & A. Prodr.* 269. *I. lucida*, *Wall. Cat.* 5267. *A. I. annularis*, *Grah. in Wall. Cat.* 5269. *I. Wightiana*, *Grah. in Wall. Cat.* 5281.

EASTERN HIMALAYAS, ascending to 3000 ft., WESTERN PENINSULA and CEYLON.—DISTRIB. Malay isles, Philippines.

A tall tree, with subterete branchlets with thin brown pubescence. *Pinnae* and leaves long-petioled; leaflets subcoriaceous, glabrous above, slightly pubescent at first

beneath, obovate-oblong, acute, the upper 4-6 in. long, the lower shorter, all distinctly stalked. *Heads* few-flowered, irregular, in copious ample axillary and terminal panicles. *Calyx* subsessile, $\frac{1}{16}$ - $\frac{1}{12}$ in., densely brown-silky. *Corolla* silky, 2-3 times the length of the calyx. *Stamens* $\frac{3}{8}$ - $\frac{1}{2}$ in. *Pod* once or twice spiral, 3-6 in. by $\frac{1}{2}$ - $\frac{3}{4}$ in., the valves rigidly coriaceous, slightly downy, the lower suture not at all repand.

5. ***P. affine*, Baker**; branchlets densely pubescent, pinnæ 2, leaflets 6-8, leaves with glands on the petiole and at the base of the pinnæ and leaflets, calyx funnel-shaped, pod not lobed. *Benth. in Trans. Linn. Soc.* xxx. 577.

MALACCA, Maingay.

Very near *P. bigeminum*. *Branchlets* clothed with dense spreading brown tomentum. *Leaflets* 3-6 in. long, shortly-stalked, rigidly subcoriaceous, glabrous. *Calyx* $\frac{1}{8}$ in., densely brown-silky. *Corolla* twice the calyx, narrowly funnel-shaped, shortly toothed, densely silky. *Valves* of the pod more rigid than in *P. bigeminum*, $\frac{1}{4}$ in. broad.

6. ***P. confertum*, Benth.** *in Trans. Linn. Soc.* xxx. 577; branchlets downy, pinnæ 2, leaflets 4, leaves with glands only at the base of the pinnæ, calyx campanulate, pod unknown.

MALACCA, Griffith.

Branchlets of the panicle clothed with brown pubescence. *Leaflets* rigidly coriaceous, shining, strongly veined, oblong, obtusely pointed, 3-4 in. long. *Heads* in copious short axillary and terminal corymbs. *Calyx* $\frac{1}{4}$ in., glabrous. *Corolla* $\frac{1}{4}$ in.; cylindrical tube as long as lanceolate teeth. *Stamens* twice as long as the corolla.

7. ***P. bubalinum*, Benth.** *in Trans. Linn. Soc.* xxx. 576; branchlets pubescent, pinnæ 2, leaflets 2-4, leaves with glands only at the base of the pinnæ, calyx campanulate, pod large downy not lobed. *Inga bubalina*, *Jack. in Malay Misc.* ii. 77.

PENANG and MALACCA.

A middle-sized tree. *Branchlets* clothed with pale brown pubescence. *Leaflets* coriaceous, oblong, glabrous, obtusely pointed, 3-4 in. long. *Heads* in ample axillary and terminal corymbose panicles. *Calyx* $\frac{1}{4}$ in., pubescent; teeth deltoid. *Corolla* $\frac{1}{8}$ in., $\frac{1}{3}$ - $\frac{1}{4}$ as long as stamens. *Pod* oblong-ligulate, sickle-shaped, 2-3 in. by 1-1 $\frac{1}{4}$ in., very rigid, the valves persistently clothed with fine brown down. *Seeds* as large as a bean.

8. ***P. microcarpum*, Benth.** *in Trans. Linn. Soc.* xxx. 576; branchlets pubescent, pinnæ 2-4, leaflets 4-8, leaves with glands only at the base of the pinnæ, calyx campanulate, pod small glabrous spiral not lobed. *Inga bubalina*, *Wall. Cat.* 5272, non *Jack.*

PENANG and MALACCA.

Closely allied to *P. bubalinum*, from which it differs by its more numerous and less coriaceous leaflets and especially by its pod, which is 1 $\frac{1}{2}$ in. by under $\frac{1}{2}$ in., forms a complete spiral, with thinner valves, which become much twisted when it opens, and seeds not larger than a pea.

9. ***P. fasciculatum*, Benth.** *in Hook. Lond. Journ. Bot.* 1844, 208; branchlets glabrous, glands present on the general petiole and at the base of the pinnæ and upper leaflets, pinnæ 4, leaflets 4-6, calyx campanulate, pod not lobed. *Inga Jiringa*, *Wall. Cat.* 5268, non *Jack.* I. *Clypearia*, *Wall. Cat.* 5270 B.

PENANG, SINGAPORE, MALACCA.—DISTRIB. Malay isles.

A tall tree, with terete branchlets and leaf-rachises. *Glands* flat, depressed; general and partial petioles elongated; leaflets obovate-oblong, obtuse or subacute, distinctly stalked, rigidly subcoriaceous, quite glabrous on both sides, the upper 6-8 in. long, the lower shorter and more ovate. *Heads* few-flowered, irregular, sessile or

shortly peduncled, on the elongated glabrous branches of terminal and axillary panicles, with a pair of small spreading lanceolate bracts at the base. *Calyx* $\frac{1}{4}$ in., glabrous. *Corolla* 3 times the length of the calyx. *Pod* firm, glabrous, $1\frac{1}{4}$ – $1\frac{1}{2}$ in. broad, at first forming a circle or more, the lower suture not at all waved.

10. **P. lobatum**, *Benth. in Hook. Lond. Journ. Bot.* 1844, 208; branchlets glabrous, glands 0 or confined to general and partial petioles, pinnæ 2, leaflets 4–6, calyx campanulate, pod with the lower suture deeply lobed. *Inga lobata*, *Grah. in Wall. Cat.* 5280. *I. attenuata*, *Grah. in Wall. Cat.* 5276. *Mimosa Jiringa*, *Jack in Hook. Bot. Misc.* i. 282. *M. Kæringa*, *Roxb. Hort. Beng.* 40; *Fl. Ind.* ii. 543.

PEGU, TENASSERIM and MALACCA.—DISTRIB. Malay isles, Philippines.

A tall tree, with terete grey glabrous branchlets. *Leaflets* distinctly stalked, acute, oblong or oblong-lanceolate, thin but firm, flexible, glabrous and glossy on both sides, the upper 4–6 in. long. *Heads* few-flowered, with 3–4 small spreading lanceolate bracts at the base, fascicled on short peduncles in ample copious axillary and terminal panicles. *Calyx* sessile, glabrous, $\frac{1}{24}$ in. *Corolla* 3 times calyx, glabrous. *Stamens* $\frac{1}{4}$ – $\frac{1}{2}$ in. *Pod* firmer than in its allies, $1\frac{1}{2}$ in. broad, lobed halfway down to the upper suture, into round divisions, which are hemispherical on the face when the seed is ripe.

** *Leaflets* numerous, more or less trapezoid through the lower border being cut away at the base.

11. **P. subcoriaceum**, *Thwaites Enum.* 100; branchlets subterete, pinnæ 6–12, leaflets very small obtuse or subacute, heads not at all or scarcely panicle, calyx subsessile. *Bedd. Fl. Sylv.* 96. *P. anamallayanum*, *Bedd. Fl. Sylv.* t. 189.

WESTERN PENINSULA; Anamallay hills, 5–8000 ft., *Wight, Beddome.* Ceylon, *Thwaites.*

A tree 30–40 ft. high, with branchlets clothed with dense brown pubescence. *Leaf-rachis* with 1–3 petiolar glands, and one midway between the insertion of each pair of pinnæ; leaflets oblong-trapezoid, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, rigidly coriaceous, glossy above, densely pubescent below. *Heads* many-flowered, 1 in. diam., on 1–2-nate axillary peduncles, the uppermost leaves reduced or suppressed. *Calyx* $\frac{1}{12}$ in., brown-downy. *Corolla* funnel-shaped, 3 times the calyx. *Pod* 3–4 in. long, coriaceous, twisted, 5–6 seeded.

12. **P. contortum**, *Mart. ; Benth. in Hook. Lond. Journ. Bot.* 1844, 210, branchlets subterete, pinnæ 6–12, leaflets 12–30 small obtuse, calyx sessile, heads in ample panicles. *Inga contorta*, *Grah. in Wall. Cat.* 5283. *I. Finlaysoniana*, *Grah. in Wall. Cat.* 5284.

PENANG, SINGAPORE, MALACCA.

Branchlets long and slender, densely clothed with dull brown pubescence. *Leaf-rachis* downy, with a small depressed petiolar gland and one below the upper pairs of pinnæ; upper pinnæ 4–6 in. long, lower much shorter, with fewer leaflets; leaflets $\frac{1}{2}$ – $\frac{3}{4}$ in. long, obtuse, with the upper and lower edge subparallel, subcoriaceous, shortly pubescent. *Panicles* deltoid, axillary and terminal, with long slender weak finely grey-downy branchlets. *Calyx* $\frac{1}{24}$ in., campanulate. *Corolla* 3–4 times the calyx. *Stamens* twice the corolla. *Pod* $\frac{1}{2}$ ft. by $\frac{1}{2}$ – $\frac{3}{4}$ in., at first forming a double spiral, splitting open from the lower suture and very much twisted.

13. **P. Clypearia**, *Benth. in Hook. Lond. Journ.* 1844, 209; branchlets acutely angular, pinnæ 6–12, leaflets 12–24 middle-sized obtuse or acute, calyx stalked, heads in ample panicles. *Inga Clypearia*, *Jack in Hook. Comp. Bot. Mag.* i. 224; *Wall. Cat.* 5270 A. *Mimosa trapezifolia*, *Roxb. Fl. Ind.* ii. 546. *Inga dimidiata*, *Hook. & Arn. Bot. Beech.* 181.

TENASSERIM, PENANG, MALACCA.—DISTRIB. Malay isles, China.

Branches brown-pubescent, with raised lines decurrent from the branchlets. *Leaf-rachises* acutely angled, with a conspicuous raised gland on the petiole, and one between each pair of pinnæ and leaflets; upper pinnæ 5–6 in. long; lower much shorter, with fewer leaflets; upper leaflets 1–2 in. long, with the lower and upper margin nearly parallel, rigidly subcoriaceous, glossy above, densely downy below; lower becoming gradually smaller. *Panicles* axillary and terminal, with densely pubescent erecto-patent sulcate branchlets. *Calyx* campanulate, minute, 3–4 times shorter than the whitish corolla. *Stamens* $\frac{3}{8}$ – $\frac{1}{2}$ in. *Pod* like that of *P. contortum*, but rather smaller.

14. ***P. montanum***, Benth. in Hook. Lond. Journ. 1844, 209; *Pl. Jungh.* 269; branchlets acutely angular, pinnæ 12–18, leaflets 24–32 small acute or subacute, calyx stalked, heads in ample panicles. *P. falcifolium*, Hassk, *Pl. Jav. Rar.* 418. *Inga subfalcata*, Zoll. in *Flora*, 1847, 706.

KHASIA, MISHMI.—DISTRIB. Malay isles.

Very near *P. Clypearia*, with which it quite agrees in vestiture, glands, inflorescence, calyx and corolla. *Leaflets* close, regular, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, with the midrib as in *P. Clypearia*, carried from the lowest posterior to the upper anterior corner. Lower *pedicels* 2–3 times as long as the calyx. *Branchlets* and leaves below clothed with dense short light brown silky pubescence.

15. ***P. angulatum***, Benth. in Hook. Lond. Journ. 1844, 208; branches angular, pinnæ 4–6, leaflets 6–12 large acute, calyx stalked, heads in ample panicles. *Inga acutangula*, Grah. in Wall. Cat. 5271. *Mimosa heterophylla*, Roxb. Hort. Beng. 40; *Fl. Ind.* ii. 545.

EAST HIMALAYAS and down the gulf to MALACCA.—DISTRIB. Malay isles.

A tall tree, with stout branchlets with a little fine brown pubescence. *Leaf-rachis* with a large gland at the base and one between each pair of pinnæ and leaflets; lower pinnæ and leaflets much shorter than the upper; leaflets rigidly subcoriaceous, oblong-trapezoid, slightly downy below, the upper 3–4 in. long. *Panicles* copious, ample, axillary and terminal. *Calyx* $\frac{1}{2}$ in., campanulate. *Corolla* white, funnel-shaped, 3–4 times the calyx. *Stamens* $\frac{1}{2}$ in. *Pod* just like those of *P. contortum* and *Clypearia*.

132. **INGA**, Willd.

Shrubs or trees. *Leaves* simply pinnate. *Flowers* in spikes or globose heads. *Calyx* a minute 3-toothed cup. *Corolla* a cylindrical tube, shortly 3-toothed at the tip. *Stamens* indefinite, much exceeding the corolla, monadelphous more than half-way up the corolla; anthers minute, with the pollen agglomerated in masses. *Ovary* sessile, few-ovuled; style subulate, stigma minute, terminal. *Pod* linear, rigidly coriaceous, with the valves forcibly springing back and each suture expanded into a thick raised border.—DISTRIB. A large American genus (140 species), of which we have a single unsatisfactory representative, with the pod of *Calliandra* and simply pinnate leaf of *Inga*.

1. ***I. cynometroides***, Bedd. MSS. *Calliandra cynometroides*, Bedd. *Fl. Sylv.* t. 317; Benth. in Trans. Linn. Soc. xxx. 537.

Hills of South TRAVANCORE, 3–4000 ft., Beddome.

A middle-sized tree, with slender glabrous branchlets. *Leaflets* 2, sessile at the apex of a very short petiole, rigidly subcoriaceous, venulose, oblique-oblong, subacute, 2–4 in. long. *Flowers* capitate, on short peduncles. *Corolla* $\frac{1}{2}$ – $\frac{1}{2}$ in. long. *Pod* sessile, 3–4 in. by $\frac{1}{8}$ – $\frac{3}{4}$ in. broad, rather decurved, narrowed to the base, 3–4-seeded, with a short hooked beak, the valves glabrous, flat, margined all round with a thick raised border.

ORDER LI. **ROSACEÆ.** (By J. D. Hooker.)

Herbs, shrubs or trees. *Leaves* stipulate, rarely opposite, simple or compound. *Flowers* usually bisexual and regular (very irregular in *Chrysobalanææ*). *Calyx-tube* free or adnate to the ovary, limb usually 5-lobed, often bracteolate, imbricate or valvate. *Petals* 5, rarely 0, inserted under the margin of the disk, imbricate, usually imbricate. *Disk* lining the calyx-tube or forming a ring at its base. *Stamens* perigynous, indefinite (rarely 1, 5 or 10) in one or many series, often connate and unilateral in *Chrysobalanææ*; filaments subulate or filiform, usually incurved in bud; anthers small, didymous. *Ovary* of one or more free or connate carpels, with free or connate styles, which are basal, lateral or subterminal; stigmas simple, penicillate or capitate; ovules 1 or more in each carpel. *Fruit* variable, of achenes, or berries or drupes, rarely capsular. *Seeds* erect or pendulous, testa membranous or coriaceous, albumen 0; cotyledons large, plano-convex; radicle short.—**DISTRIB.** About 1,000 species, found in all climates and countries, but chiefly in the temperate.

CHRYSOBALANUS ICACO, *Linn.*; the Cocoa-plum of the West Indies is cultivated in some parts of the Malabar Coast, but not frequently.

A. Carpels free or adnate to the side of the calyx-tube.

TRIBE I. *Chrysobalanææ.* *Flowers* usually irregular. *Carpel* 1; style basal; ovules 2, ascending. *Fruit* a drupe. *Radicle* inferior.—Trees or shrubs with simple quite entire leaves.

Calyx-tube elongate. Stamens many, unilateral. Ovary 2-locellate

1. PARINARIUM.

Calyx-tube short. Stamens 2. Ovary 1-celled

2. PARASTEMON.

TRIBE II. *Prunææ.* *Flowers* regular. *Carpel* 1, rarely 2; style subterminal, rarely basal; ovules 2, pendulous. *Radicle* superior.—Trees or shrubs with simple usually serrated leaves.

Calyx 5-lobed. Petals 5, large, glabrous. Carpel solitary

3. PRUNUS.

Calyx 5-10-toothed. Petals 5-8, minute or 0. Carpels 1 or 2.

Drupe erect, fleshy, with a bony stone

4. MADDENIA.

Calyx 5-10-toothed. Petals 5, minute or 0. Carpel 1. Drupe erect, coriaceous

5. PYGEUM.

Calyx 5-lobed. Petals 5. Carpel 1. Drupe inverted, style sub-basilar

6. PRINSEPIA.

TRIBE III. *Spirææ.* *Flowers* regular. *Calyx* ebracteolate. *Stamens* 10 or more. *Carpels* 1-8; styles ventral or basal; ovules 2 or more, pendulous. *Radicle* superior.—Shrubs, rarely herbs, with entire or serrate simple or compound leaves.

7. SPIRÆA.

TRIBE IV. *Rubææ.* *Flowers* regular. *Calyx* ebracteolate. *Stamens* very numerous. *Carpels* many; styles sub-basal or ventral; ovules 2, collateral, pendulous. *Fruit* of many dry or fleshy carpels not included in the calyx-tube. *Radicle* superior.—Usually shrubs, with often compound leaves.

8. RUBUS.

TRIBE V. *Potentillææ.* *Flowers* regular. *Calyx* usually bracteolate. *Stamens* usually numerous, rarely few. *Carpels* 1 or more; style short or much prolonged after flowering; ovule solitary, ascending. *Fruit* of many achenes, not included in the calyx-tube. *Radicle* superior.—Herbs or small shrubs with various leaves.

- Calyx bracteolate. Stamens many. Styles elongated after flowering 9. *GEUM*.
 Calyx bracteolate. Stamens many. Styles not elongating. Ripe carpels seated on a fleshy receptacle 10. *FRAGARIA*.
 Calyx bracteolate. Stamens 4 or more. Styles not elongating. Ripe carpels seated on an elevated dry receptacle 11. *POTENTILLA*.
 Calyx ebracteolate. Stamens 5. Styles not elongating. Ripe carpels seated on the base of the calyx 12. *CHAMÆRHODOS*.

B. Carpels adnate to the tube of the calyx, or, if free, included wholly within it.

TRIBE VI. **Poteriæ**. *Flowers* regular, sometimes apetalous. *Calyx-tube* often urceolate. *Stamens* 1 or more. *Carpels* 1-3; style terminal; ovule 1. *Achene* sunk in the calyx-tube.—Herbs or small shrubs.

- Calyx 4-6-bracteolate, or 8-10-12-fid. Petals 0. Carpel 1; ovule ascending 13. *ALCHEMILLA*.
 Calyx 5-lobed or spinous. Petals 5. Carpels 2-3; ovule pendulous 14. *AGRIMONIA*.
 Calyx 5-lobed, ebracteolate. Petals 5. Carpels 1-3; ovule pendulous 15. *POTERIUM*.

TRIBE VII. **Rosæ**. *Flowers* regular. *Calyx-tube* urceolate. *Petals* 5. *Stamens* very numerous. *Carpels* many, free; ovule 1, pendulous. *Achenes* included in the fleshy calyx-tube.—Shrubs, leaves compound.

16. *ROSA*.

TRIBE VIII. **Neuradæ**. *Flowers* regular. *Calyx-tube* enlarged after flowering and becoming confluent with the carpels. *Stamens* 10. *Carpels* 5-10, free, or connate into a 5-10-valved fruit; ovule 1, pendulous.—Herbs.

17. *NEURADA*.

TRIBE IX. *Flowers* regular. *Calyx-tube* (or top of the peduncle) becoming fleshy after flowering and enclosing the carpels. *Stamens* numerous. *Ovules* 2 or more, ascending. *Fruit* a pome, berry, or a drupe, with the 2-5 bony or coriaceous 1-2-seeded stones.—Shrubs or trees.

* *Ovary* 5-celled; cells 3- or more -ovuled.

- Cells of ovary many-ovuled 17.* *CYDONIA*.
 Cells of ovary 3-ovuled 18. *DOCYNIA*.

* *Ovary* 2-5-celled; cells 2-ovuled.

- Flowers paniced. Ovary 5-celled 19. *ERIOBOTRYA*.
 Flowers corymbose or fascicled.
 Ovary 5-celled. Fruit a pome or berry 20. *PYRUS*.
 Ovary 2-3-celled. Fruit 2-3-celled, endocarp thin; testa coriaceous 21. *PHOTINIA*.
 Ovary 2-3-celled. Fruit 2-3-celled, endocarp thin; testa thick reticulately lacunose 22. *POURTHILÆA*.
 Ovary 5-celled. Drupe with 5 dehiscent stones 23. *STRANVÆSIA*.
 Ovary 2-5-celled. Drupe with 1-5 bony stones. Leaves cut toothed or serrate 24. *CRATÆGUS*.
 Ovary 2-5-celled. Drupe with 2-5 bony stones. Leaves quite entire 25. *COTONEASTER*.

. **PARINARIUM**, Juss.

Trees. *Leaves* simple, alternate, evergreen, quite entire. *Flowers* hermaphrodite, in corymbose racemes, 2-bracteolate, white or pink. *Calyx-tube* oblong campanulate turbinate or funnel-shaped; lobes 5, subequal, imbricate.

Petals 5, sessile or clawed, deciduous. *Stamens* 6- ∞ , filaments united into an incomplete ring at the base, or connate into an unilateral bundle, all perfect or some without anthers. *Carpels* 1 (rarely 2), adnate to one side of the calyx-tube, 1-2-celled; style basal, filiform; ovules 2 collateral or 1 erect. *Drupe* spherical oblong obovoid or ovoid, with a 1-2-celled 1-2-seeded coriaceous woody or bony stone. *Seeds* erect, testa membranous, cotyledons large fleshy, radicle small inferior.—**DISTRIB.** About 40 species, natives of the tropics of both worlds.

The Indian species of *Parinarium* are very imperfectly known and are probably referable to several genera distinguishable by their fruit more than by any floral character. Of these, *P. costatum*, *polyneurum*, *oblongifolium* and *multiflorum*, may form one genus with a 2-celled 2-seeded drupaceous fruit and short stamens. *P. nitidum* another, with 1-celled hardly drupaceous coriaceous fruit and short stamens; and *P. asperulum* a third, with a globose 1-celled very hard drupe, glabrous, containing a solitary large glabrous seed with a solid ruminated embryo. The seeds of *P. indicum* and *travancoricum* are unknown. *P. Jackianum*, Benth. (*Petrocarya excelsa*, Jack), must, if Jack's account of the drupe being included in the enlarged calyx and having superposed cells be correct, constitute a fourth genus.

SUBGEN. 1. Grymania, Presl, (Gen.) *Leaves* eglandular or 2-glandular at the base. *Stamens* equalling or shorter than the calyx-lobes, forming an imperfect ring. *Drupe* oblong or obovoid with a very thick 2-celled stone, the cells lined with soft wool.

* *Leaves* eglandular at the base, grey or dirty white beneath, with numerous stout veins. *Stamens* 6-10, singularly inserted.

1. ***P. costatum*, Blume?**; leaves 2-4 in. elliptic-oblong obtusely acuminate shining above, base acute, nerves 8-10 pair, petiole rather slender. *Miquel Fl. Ind. Bat. i. part 1, 354.* ? *P. Sumatranum, Benth. in Hook. Niger Flora, 335. Miquel l. c. 353. Kurz, For. Flor. Brit. Burm. i. 433. Petrocarya sumatrana, Jack, Mal. Misc. ii. 67.*

Eastern Peninsula, MALACCA, and Government Hill, PENANG, *Maingay*. ? Burma, *Kurz*.—**DISTRIB.** Sumatra.

A tree 15 feet (in Penang). *Branches* slender; bark pale in the Malacca specimens, dark with minute lenticels in the Penang one; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Panicle* effuse, much branched, clothed with soft tomentum; branches slender; bracts oblong-lanceolate. *Flowers* $\frac{1}{2}$ in. long, shortly pedicelled. *Calyx-tube* clothed within with long deflexed hairs; tube longer than the lobes. *Petals* obovate, ciliate, equalling the calyx-lobes. *Carpels* 2; ovaries densely tomentose. *Fruit* (of Penang specimen) $\frac{3}{4}$ -1 $\frac{1}{2}$ in. long, rounded at the apex, when dry minutely wrinkled and covered with white scurfy spots. *Seeds* not seen.—But for the smaller leaves with more acuminate points, they agree with *P. sumatranum*, Benth. I have seen no specimen of Blume's *P. costatum*.

2. ***P. polyneurum*, Miq. Fl. Ind. Bat. Suppl. 306;** leaves 4-8 in. elliptic-oblong obtusely acuminate shining above, base rounded, nerves 12-16 pair, petiole rather slender.

MALACCA, *Griffith*; *Maingay* (*Kew Herb.*, 622).—**DISTRIB.** Sumatra.

A larger plant than *P. costatum*, differing in the form and size of the leaves and number of nerves; the inflorescence and flower are very similar indeed; the bark of the branches is black with numerous lenticels, which is hardly the case in the Sumatran specimens.

3. ***P. oblongifolium*, Hook. f.;** leaves 6-10 in. oblong or linear-oblong

obtuse shining above, base rounded and cordate, nerves 20–30 pair, petiole very stout.

MALACCA, *Griffith, Maingay* (Herb. Kew, 623).

This is very near to the two former, differing only in the shape and size of the leaves, their petiole and nervation. I cannot doubt but that one of these three is a form of the *P. sumatranum*, Bth. (PETROCARYA, Jack).

** *Leaves 2-glandular at the base, glabrous and shining on both surfaces. Stamens 20–30.*

4. ***P. Griffithianum***, Benth. in Hook. *Niger Fl.* 334; leaves elliptic-lanceolate caudate-acuminate. *P. multiflorum*, *Miq. Fl. Ind. Bat. i.* part i. 356. *Maranthes multiflora*, Korth. *Verh. Nat. Gesch. Bot.* 259, t. 70.

Eastern Peninsula. TENASSERIM OR ANDAMAN ISLANDS, *Helper*; MALACCA, *Griffith, Maingay*.—DISTRIB. BORNEO.

Branches stout, with black bark. Leaves 5–6 in., narrowed into the short petiole; nerves much arched. Panicles shortly peduncled, closely corymbose, with stout branches and pedicels; bracts very deciduous. Flower ½ in. diam. Calyx hoary; tube obconic, gibbous, glabrous within except near the ovary; lobes orbicular, linear. Petals obovate-orbicular, glabrous, equalling the calyx-lobes. Stamens 20–30; filaments united above the base into a coriaceous short tube which is open and toothed opposite the ovary. Ovary tomentose; style short, curved; stigma capitate. Drupe 1–1½ in. long, cylindric-obovoid or subclavate, hoary, 2-celled; cells stuffed with brown soft wool.—Differs from the Javanese *P. corymbosum* in the hoary calyx; and from the Philippine Island *P. salicifolium*, Benth. (*Grymania*, Presl), in the foliage.

SUBGEN. II. *Leaves eglandular at the base. Stamens shorter than the calyx-lobes, irregularly united into a ring. Drupe small, obovoid, with a thin 1-celled endocarp lined with hairs. Cotyledons amygdaloid.*

5. ***P. nitidum***, Hook. f.; branches and leaves quite glabrous, leaves elliptic or elliptic-lanceolate obtusely acuminate narrowed into the very short petiole polished on both surfaces.

MALACCA, *Griffith, Maingay* (Herb. Kew 619).—DISTRIB. BORNEO.

A small tree (*Griffith*), branchlets slender. *Leaves 3–4 in., coriaceous, very acute at the base, polished on both surfaces, especially above; nerves very slender, much arched; petiole ½ in.; stipules subulate. Panicles axillary and terminal, hoary, narrow, with rather short spreading branches. Flowers small, ⅙ in., very shortly pedicelled. Calyx-tube obconic, pubescent within; lobes short and rounded. Petals very small, obovate, tomentose. Stamens 5–7, filaments united into a short ring that is toothed opposite the ovary. Carpel (1-celled, *Griff.*) inserted almost at the base of the calyx-tube, villous. Drupe obovoid, ⅓–½ in. long, yellow, smooth, glabrous.*

SUBGEN. III. *Leaves eglandular or 2-glandular at the base. Stamens longer than the calyx-lobes, unilateral. Drupe large, globose, woody, glabrous within; unknown in P. indicum and travancoricum.*

* *Leaves eglandular at the base.*

6. ***P. asperulum***, *Miq. Fl. Ind. Bat. Suppl.* 307; branches and leaves quite glabrous, leaves elliptic-oblong obtuse or obtusely acuminate, flowers in short stout tomentose thyrsoid spikes.

MALACCA, *Griffith, Maingay* (Herb. Kew, 618).—DISTRIB. SUMATRA.

Branches black, slender, and leaves glabrous. Leaves 3–4 in., suddenly contracted to the obtuse point, shining above and covered sometimes with minute raised points, base rounded; nerves about 10 pair, very slender with intermediate reticulations; petiole very short. Spikes 2–4 in. long, the very stout angular peduncle

and rachis densely clothed with soft yellowish tomentum; bracts oblong, obtuse. *Flowers* sessile, $\frac{1}{2}$ in. long. *Calyx-tube* clavate, gibbous, clothed with silky hairs outside, and with long deflexed hairs inside; lobes broadly ovate, obtuse. *Petals* obovate, sessile, nearly glabrous. *Stamens* 12-15, $\frac{1}{2}$ in. long, circinnately incurved, united at the base into a unilateral ring which is deficient opposite the single carpel. *Ovary* densely woolly, imperfectly 2-celled; style very long and slender, stigma minute. *Drupe* the size of a small apple, spherical, very hard; outer surface rough and rust-coloured; endocarp $\frac{1}{8}$ in. thick, bony; cavity smooth with a furrow down one side and a few very stout sparingly branched raised veins. *Seed* large, testa thin; embryo with the cotyledons consolidated into a ruminated mass.

** *Leaves* obscurely 2-glandular at the base.

7. **P. indicum**, *Bedd. Ic. Pl. Ind. Or.* t. 109; *Flor. Sylvat.* t. 191; leaves elliptic-lanceolate, glabrous, nerves 8-10 pair, racemes tomentose. Entosiphon, *Bedd. in Mad. Journ. Litt. Ser.* 3. i. 44.

WESTERN PENINSULA; Wynad, in moist woods, alt. 2-3000 ft., *Beddome*.

A middling sized tree. *Leaves* 8-9 by 3 in., slightly undulate; nerves strong beneath, much arched; petiole very short. *Racemes* axillary and terminal, simple, stout, rarely divided at the base. *Flowers* shortly pedicelled, $\frac{1}{2}$ - $\frac{2}{3}$ in. long. *Calyx-tube* campanulate; lobes ovate, acute. *Petals* ovate, sessile, shorter than the calyx-lobes. *Stamens* 12-15, unilateral, twice as long as the calyx-lobes. *Ovary* hairy, 2-celled.

8. **P. travancoricum**, *Bedd. Ic. Pl. Ind. Or.* t. 189; leaves lanceolate glabrous, nerves 12-16 pair, racemes silky.

WESTERN PENINSULA, near Courtallum, alt. 2000 ft., *Beddome*.

A small graceful tree, young parts grey, silky; branchlets very slender. *Leaves* 4-5 by 1-1 $\frac{1}{4}$ in., obtusely acuminate; margins waved nerves beneath silky when young, finally glabrous; petiole very short. *Racemes* 1-2 in., few-flowered, simple or branched at the base, drooping, silky. *Flowers* $\frac{1}{2}$ in. long. *Calyx-tube* campanulate; lobes ovate, acute. *Petals* broadly ovate, obtuse, equalling or exceeding the calyx-lobes. *Stamens* 10-12, unilateral, filaments three times as long as the calyx-lobes. *Ovary* hairy, 2-celled.

DOUBTFUL, EXCLUDED AND IMPERFECTLY KNOWN SPECIES.

P. WALLICHIANUM, *Wall. Cat.* 7520; consists of branches with leaves only of a most conspicuous plant from Sincapore, which I suspect is a *Dipterocarpus*. Branchlets very stout and leaves beneath clothed most densely with appressed snow-white almost silvery tomentum; leaves 8-14 by 3-6 in., oblong, abruptly acuminate, rounded at the base, quite entire; nerves 30-35 pair, spreading; upper surface shining; petiole very short and stout; stipules sheathing, 1 in. long, membranous.—Sincapore. A lofty tree (*Wallich*).

P. HELFERI, *Hook. f.*; branchlets slender clothed with soft rusty tomentum. leaves elliptic-oblong acuminate membranous white and downy beneath, nerves about 12 pair, flowers minute in small softly tomentose panicles, calyx-tube shortly campanulate, stamens 6-7. P. sumatranum, *Kurz, For. Flor. Brit. Burm.* i. 433, not of *Benth.*?

TENASSERIM, *Helfer*.

Leaves 3-4 in., base rounded or acute; petiole and midrib beneath when young clothed with rusty soft wool; whole undersurface clothed with loose snow-white tomentum when young, hoary when old; nerves spreading, slender. *Panicle* 1 in. long. *Flowers* $\frac{1}{10}$ in., very shortly pedicelled. *Calyx-lobes* short, rounded. *Petals* very small, ovate. *Stamens* equalling the calyx-lobes.—I have seen but one specimen.

P. ? A species, apparently allied to *P. Helfer*, collected by Griffith on hills

at Palor in Mergui; it has broadly linear-oblong leaves 5-7 in., quite glabrous and shining above with 8-10 pairs of very oblique nerves, undersurface also glabrous except the puberulous midrib and nerves; petiole stout, tomentose. *Flowers* minute, in very small axillary racemes, densely tomentose, too young to discern their parts.

P.? JACKIANUM, *Benth. in Hook. Niger Flor.* 335 (*Petrocarya excelsa*, *Jack, in Mal. Misc.* ii. 66.); 'a large tree, leaves oblong acuminate glabrous, racemes ferruginous and tomentose strict erect sparingly branched, stamens 11 unilateral twice as long as the petals, drupe enclosed in the enlarged calyx and adnate to it, nuts smooth 1-celled, with an abortive cell usually above the fertile, embryo cylindric.'—*Malaya, Jack*. But for the description of the fruit, this might be *P. asperulum*, *Miq.*

PARINARIUM DILLENIFOLIUM, *R. Br. in Wall. Cat.* 7520 (*Petrocarya dillenifolia*, *Steud.*), is *Dipterocarpus cornutus*, *Dyer*.

P. EXCELSUM, *G. Don, Gen. Syst. Gard.* ii. 479; *Dalz. & Gibs. Bomb. Flor. Suppl.* 32. A tree introduced at Goa from Mozambique, and called Matomba by the Portuguese, is imperfectly known and should be ascertained.

2. PARASTEMON, A. D.C.

A shrub or small tree. *Leaves* simple, alternate, evergreen, quite entire. *Flowers* polygamo-dioecious, minute, racemose, ebracteolate. *Calyx-tube* shortly campanulate; lobes 5, imbricate. *Petals* 5 (or 6), oblong, deciduous. *Stamens* 2 perfect, unilateral. *Carpel* 1, adnate to one side of the calyx-tube, 1-celled; style basilar; ovules 2, erect. *Fruit* oblong, coriaceous, 1-celled, 1-seeded, indehiscent. *Seed* erect, testa membranous pubescent; cotyledons fleshy, radicle inferior, plumule hairy.

1. **P. urophyllum**, *A. D.C. in Ann. Sc. Nat. Ser.* 2. xviii. 208. *Embelia urophylla*, *Wall. Cat.* 2309. *Celastrus racemosa*, *Wall. Cat.* 4320.

Eastern Peninsula; SINGAPORE, *Wallich*; MALACCA, *Griffith*, *Maingay*; TENASSERIM OF ANDAMAN ISLANDS, *Helper*.—DISTRIB. Borneo.

Quite glabrous. *Leaves* 2-3 in., elliptic or elliptic-lanceolate, obtusely acuminate, shining, narrowed at the base into the very short petiole; nerves faint. *Racemes* slender, axillary, equalling the leaves, rarely branched at the base; bracts concave, at the base of the pedicel. *Flowers* $\frac{1}{16}$ in. diam., shortly pedicelled. *Fruit* $\frac{1}{2}$ in. long, ellipsoid, quite smooth and glabrous.

3. PRUNUS, Linn.

Shrubs or trees. *Leaves* alternate, simple, quite entire or serrate or crenate or glandular-serrulate; petiole often 2-glandular. *Flowers* white or red, solitary fascicled corymbose or racemed. *Calyx* deciduous in fruit; lobes 5, imbricate. *Petals* 5. *Stamens* 15-60, perigynous, inserted in the mouth of the calyx-tube, filaments free. *Carpel* 1; style terminal; ovules 2, collateral, pendulous. *Drupe* with an indehiscent or 2-valved, 1-seeded, smooth, or rugged stone. *Seed* pendulous, testa membranous or coriaceous, albumen scanty or 0.—DISTRIB. N. temp. regions, rare in the tropics; species 80.

The scented kernels of the European and West Asiatic *P. Mahaleb*, L., are sold in the bazaars of N.W. India, and the tree is cultivated in Beluchistan, and probably occurs on the N.W. frontier; it is a small tree of the *Cerasus* section, with ovate crenate leaves, fragrant flowers in peduncled corymbose racemes, and ovoid drupes $\frac{1}{4}$ in. long.

SECT. I. **Amygdalus**. *Leaves* conduplicate in bud. *Flowers* subsessile. *Drupe* usually pubescent; stone bony, rugged.

P. AMYGDALUS, *Baill.*; leaves appearing after the flowers oblong-lanceolate serrulate, petiole glandular as long as the leaf is broad or longer, stipules fimbriate, flowers peduncled, calyx campanulate, pericarp 2-valved. *Brandis For. Flor.* 190. *Amygdalus communis*, *Linn.*; *Roxb. Fl. Ind.* ii. 500.—The almond.

Cultivated in the cooler parts of India.

P. PERSICA, *Benth. & Hook. f. Gen. Plant.* i. 609; leaves appearing after or with the flowers oblong-lanceolate serrate, petiole glandular or not shorter than the leaf is broad, stipules fimbriate, flowers sessile, calyx campanulate, pericarp indehiscent. *Brandis For. Flor.* 191. *Amygdalus persica*, *Linn.*; *Roxb. Fl. Ind.* ii. 500. *A. collinus*, *Wall. Cat.* 723. *Persica vulgaris*, *Miller.* ? *P. saligna*, *Royle Ill.* 204 (name only).—The peach. *Wall. Cat.* 7120.

Cultivated in the cooler parts of India: up to 10,000 ft. in the N.W. Himalaya.

The nectarine is a form with glabrous and the peach with downy pericarp.

SECT. II. **Armeniaca.** *Leaves* convolute in bud. *Flowers* sessile or peduncled. *Drupe* large, indehiscent, downy; stone bony, smooth.

P. ARMENIACA, *Linn.*; leaves appearing after or with the flowers broadly ovate acuminate crenate, petiole glandular, stipules lanceolate, flowers shortly peduncled, calyx campanulate, stone with a thickened grooved margin. *Roxb. Fl. Ind.* ii. 501. *Brand. For. Flor.* 191.—The apricot.

Cultivated and almost naturalised in N.W. India up to 10,000 ft., and in Tibet.

VAR. dasycarpa, the black-fruited apricot, is also cultivated in Kashmir. *Brandis l. c.* Thomson's Kashmir specimens (cultivated at 5-7,000 ft.) have peduncles longer than the calyx-tube.

SECT. III. **Cerasus.** *Leaves* conduplicate in bud. *Flowers* solitary fascicled or umbelled. *Calyx-tube* short or long. *Drupe* glabrous, not glaucous.

* *Flowers appearing with the leaves.*

P. AVIUM, *Linn.*; roots without suckers, leaves flaccid drooping oblong-obovate acutely serrate pubescent beneath, petiole long 2-glandular, flower fascicled long-pedicelled, flowering buds leafless, calyx-tube urceolate constricted at the top, lobes entire, petals flaccid spreading almost obcordate, fruit sweet or bitter, stone smooth. *P. Cerasus a*, *Brandis For. Flor.* 193.—Sweet cherry or gean.

Cultivated in the N. W. Himalaya up to 8000 ft., and almost naturalised.

P. CERASUS, *Linn.*; roots with many suckers, leaves erect firm shining crenate-serrate glabrous beneath, petiole short eglandular, flowers fascicled long-pedicelled, flowering buds leafy, calyx-tube campanulate not constricted at the top, lobes crenate, petals erect stiff tip rounded, fruit acid, stone smooth. *Roxb. Fl. Ind.* ii. 501. *P. caproniana*, *DC. Prodr.* ii. 536.—Wild cherry.

Cultivated in the N. W. Himalaya up to 8000 ft.

1. **P. prostrata**, *Labill.*; *Boiss. Flor. Orient.* ii. 648; leaves small elliptic or ovate-oblong obtuse serrate glabrous above white and tomentose beneath, flowers solitary or fascicled subsessile, calyx-tube cylindric, fruit small almost dry. *Brandis For. Flor.* 193; *Sibth. Flor. Græc. t.* 478. *Bot. Reg. t.* 136.

WESTERN TEMPERATE HIMALAYA from the Sutlej westwards, alt. 5-10,000 ft., *Jacquemont, Falconer*, etc.—DISTRIB. Westward to Spain, ascending to 12,000 ft. in Afghanistan.

A scraggy shrub 5-6 ft.; branches hoary, spreading, suberect or prostrate. *Leaves* $\frac{1}{2}$ -1 in., usually snowy white beneath, rarely green, narrowed into the short eglandular petiole. *Flowers* red, on lateral buds, appearing with the leaves. *Calyx-tube* $\frac{1}{4}$ in., cylindric, glabrous or pubescent; limb with 5 oblong obtuse entire lobes. *Petals* orbicular-obovate, longer than the calyx, rosy. *Stamens* much shorter. *Fruit* $\frac{1}{3}$ in., ovoid or subglobose, red-purple, flesh scarcely eatable.

2. **P. tomentosa**, *Thunb. Fl. Jap.* 203; branchlets tomentose, leaves shortly petioled orbicular-ovate acuminate crenate-serrate sparingly hairy above densely and softly so beneath, flowers solitary pedicelled, calyx-tube shortly cylindric glabrous. *P. trichocarpa*, *Bunge, En. Plant. Chin. Bor.* 96; *Sieb. & Zucc. Fl. Japon.* t. 22; *Cerasus tomentosa*, *Wall. Cat.* 715.

North West Himalaya; KASHMIR, alt. 5-6000 ft. *Thomson*. WESTERN TIBET, Ladak, *Moorecroft*.—DISTRIB. N. China.

A shrub, with slender spreading branches. *Leaves* 1-1½ in., membranous, almost velvety beneath, base rounded, tip sometimes prolonged; petiole very short, eglandular, tomentose; stipules slender, laciniate. *Flowers* axillary. *Calyx-tube* ¼ in.; lobes oblong-lanceolate, acute, entire. *Petals* small. *Fruit* ellipsoid, young hairy pointed, ripe obtuse compressed.

3. **P. rufa**, *Wall. Cat.* 721 (*Cerasus*); young branches densely tomentose, leaves elliptic- or oblong-lanceolate caudate-acuminate serrate glabrate, petiole eglandular pubescent, flowers axillary solitary or fascicled, calyx-tube urceolate glabrous. *P. ferruginea*, *Wall. MSS.*

Central and Eastern temperate Himalaya, NEPAL, *Wallich*: SIKKIM, alt. 10-12,000 ft. J. D. H. BHOTAN, *Griffith*.

A small tree, 15-20 ft., branchlets woody. *Leaves* 1-4 in., narrowed into the short petiole, very sharply serrate, midrib puberulous above pubescent or glabrate beneath; nerves reticulated; petiole ½ in.; bud-scales linear, membranous, glandular-serrate; stipules filiform laciniate. *Flowers* pink; peduncles glabrous, longer than the petioles. *Calyx-tube* ¼ in., ventricose at the base, then contracted, mouth spreading, lobes broad short subacute crenulate. *Petals* small, orbicular. *Fruit* ellipsoid, on stout lengthened pedicels, red, fleshy, stone rugged.

** *Flowers appearing before the leaves.*

4. **P. Jacquemontii**, *Hook. f.*; dwarf, leaves small elliptic or obovate acute sharply serrate glabrous or minutely puberulous beneath, petiole eglandular, stipules setaceous, drupe globose, stone smooth. *Amygdalus humilis*, *Edgw. in Trans. Linn. Soc.* xx. 44, not of *Bunge*.

Western Himalaya; in the TIBETAN region, *Jacquemont*. GURWHAL, Malari, alt. 9000 ft., *Edgworth*; Niti, 11,500 ft., *Strachy and Winterbottom*. KUNAWUR, alt. 12,000 ft., *T. Thomson*.

Branches strict, slender, divaricating, glabrous, or puberulous in the leaf axils and buds. *Leaves* 1 in., variable in breadth, from linear-oblong to rhomboid-obovate but usually elliptic, narrowed into the short petiole, rather coriaceous; nerves nearly straight, very oblique; petiole puberulous. (*Calyx-tube* glabrous except at the base within; lobes short, crenulate. *Petals* short, obovate. *Ovary* glabrous, *Edgw.*) *Drupe* very shortly pedicelled, fleshy in *Jacquemont's* specimen, dry globose and cuspidate in *Thomson's*, stone smooth.

I refer this doubtfully to the section with the flowers appearing before the leaves; the specimens being in fruit only. This is the species mentioned by *Brandis* (*For. Flor.* 194, under *P. Puddum*) as *P. humilis*, *Bunge*, of China, and found from the Chenab to the Jumna, but it differs much from *Bunge's humilis* in the very short peduncles, and much coarser serratures of the leaves. *Edgworth* gave it the name of *Amygdalus humilis*, without reference to *Bunge's* species of *Prunus* of that name.

5. **P. Puddum**, *Roxb. MSS. in Herb. Wall.*; arboreous, leaves ovate- or oblong-lanceolate caudate-acuminate sharply serrate, petiole 2-4-glandular, flowers solitary fascicled or umbelled, calyx-tube narrowly campanulate, petals obovate or linear-oblong. *Brandes For. Flor.* 194; *Kurz, For. Flor. Brit. Burm.*, i. 434. *P. cerasoides*, *Don, Prodr.* 239. *P. sylvatica*, *Roxb. Fl. Ind.* ii. 501. *Cerasus Puddum*, *Wall. Pl. As. Rar.* ii. 37, t. 143; *Cat.* 714. *C. Phoshia*, *Ham. in Don, Prodr.* 239.

Temperate Himalaya; from GURWHAL, alt. 3-6000 ft. to SIKKIM and BHOTAN, alt. 5-8000 ft. BURMA, East of Bhamo, Kurz.

A large tree, of brilliant appearance in flower, glabrous except the puberulous young shoots. *Leaves* 3-5 in., variable in length and breadth, often doubly serrate, glabrous; petiole slender, $\frac{1}{2}$ - $\frac{3}{4}$ in.; stipules long, subulate, laciniate. *Flowers* rose red or white, from lateral buds clothed with concave rounded glabrous scales; peduncles $\frac{1}{2}$ -1 in., often subcymose, connate at the base or almost umbellate. *Calyx-tube* $\frac{1}{2}$ in., glabrous; lobes ovate, acute, quite entire. *Drupe* oblong or ellipsoid, obtuse at both ends; flesh scanty yellow or reddish, acid; stone bony rugose and furrowed. —Allied to the *C. pseudocerasus*, of Japan. In Sikkim the ovary is often (from insect puncture) enlarged into a fusiform pale smooth fleshy body 2 inches long gradually narrowed into the elongate filiform style.

SECT. IV. ***Prunus proper.*** *Leaves* convolute in bud, appearing after the flowers. *Flowers* solitary or fascicled. *Calyx-tube* short. *Drupe* glabrous, usually glaucous.

6. ***P. communis***, Huds.; var. *INSITITIA*; shrubby, unarmed or spinous, leaves obovate ovate or ovate-lanceolate serrulate obtuse acute or cuspidate, nerves hairy beneath, peduncles solitary or in pairs, calyx-tube obconic, drupe globose or ovoid drooping. *Brand. For. Flor.* 192. *P. insititia*, Linn.; *P. bokhariensis*, and *P. aloocha*, *Royle Ill.* 205 (*names only*),

Western temperate Himalaya; cultivated or indigenous from GURWHAL to KASHMIR, alt. 5-7000 ft. ('truly wild,' *T. Thomson*).

This, Thomson who gathered it in Kashmir, considers to be the common yellow fruited bullace; its fruit is eatable, and I see no character whereby to distinguish it from that plant. I have seen no specimens of *Royle's P. aloocha* and *bokhariensis*, but have no reason to doubt that they are referable to this. A dark blue damson, probably *P. communis*, var. *domestica*, and an orange red larger one, are stated by Madden (*As. Soc. Journ.* xvii. part i. 445), to be cultivated about Almorah.

7. ***P. triflora***, Roxb. *Hort. Beng.* 38; *Fl. Ind.* ii. 501 (*trifolia*); shrubby, unarmed, leaves oblanceolate crenulate shortly acuminate nerves glabrous beneath, peduncles usually in threes, calyx-tube turbinate, drupes ovoid cordiform. *Kurz, For. Flor. Brit. Burm.* i. 434; *Wall. Cat.* 720.

AVA HILLS, Kurz.—DISTRIB. China.

A bushy tree, with blackish bark, everywhere glabrous. *Leaves* 2-4 in., recurved, eglandular at the base, equitant in bud; petiole slender; stipules gland-ciliate. *Flowers* small, white, very regularly in threes from the buds; peduncle $\frac{1}{2}$ in. *Calyx-lobes* longer than the tube, ovate, acute, margins glandular. *Petals* $\frac{1}{2}$ in., broadly obovate. *Ovary* ovoid, stigma large. *Drupe* purple, glaucous, grooved on one side; pulp reddish yellow.—I have taken the characters from Roxburgh and Kurz.

SECT. V. ***Laurocerasus.*** *Leaves* conduplicate in bud. *Flowers* in axillary or terminal many-flowered racemes. *Calyx-tube* short, obconic. *Drupe* glaucous or not.

* *Leaves deciduous.*

8. ***P. Padus***, Linn; leaves oblong-obovate or -lanceolate acuminate, sharply closely serrulate, base rounded or cordate, nerves 10-20 pair, petiole often eglandular, racemes elongate pendulous, flowers $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., stamens 30-40, drupe $\frac{1}{2}$ in. diam. globose, stone rugose. *Brandis For. Flor.* 194. *Cerasus cornuta*, *Wall. Cat.* 716 and 717 in part; *Royle Ill.* 207, t. 38, f. 2.

Temperate Himalaya, from MURREE, alt. 6-9500, to SIKKIM, alt. 8-12,000 ft., and BHOTAN.—DISTRIB. Westward to Great Britain, and Siberia to Kamtschatka.

A small nearly glabrous tree, with young parts sparingly pubescent. *Leaves* very variable, 4-6 in., usually oblong-lanceolate with a cordate base, serratures often double very close-set; nerves often with hairs in the axils beneath, under-surface not glaucous; nerves spreading, slightly arched; petiole $\frac{1}{2}$ -1 in., slender, glands small or 0; stipules linear, membranous, caducous. *Racemes* from the axils of fallen leaves or terminating lateral leaf-branchlets, 4-10 in. long, drooping; peduncle and rachis glabrous pubescent or tomentose; pedicels $\frac{1}{4}$ in.; bracts linear, caducous. *Flowers* white. *Calyx-tube* hemispheric or turbinate; lobes rounded, obtuse, gland-toothed. *Petals* orbicular, concave. *Drupe* acid, the size of a large pea; stone thick, rugged,—Wallich's name of *cornuta* alludes to a diseased (by insects) condition of the ovary, which becomes elongate curved and fusiform as in *P. Puddum*. Foliage red in autumn.

9. ***P. nepalensis***, *Ser. in DC. Prodr.* ii. 540 (*Cerasus*); leaves lanceolate or oblong-lanceolate acuminate crenate-serrate glaucous beneath, nerves 16-20 pairs, base usually acute, petiole eglandular, racemes elongate, drupe globose, stone smooth $\frac{3}{8}$ in. diam. *Cerasus glaucifolia*, *Wall. Cat.* 717. *C. Lindleyana*, *Wall. Cat.* 1008.

Temperate Himalaya, from KUMAON, alt. 6000 ft. to SIKKIM alt. 7-10,000 ft. KHASIA MTS., alt. 4-6000 ft.

Very difficult to distinguish from *P. Padus* except by the fruit, which is more than twice as large, with a quite smooth thick-walled stone; leaves usually glaucous beneath and acute at the base, serratures far less sharp and more distant; calyx lobes shorter.

10. ***P. undulata***, *Ham. in Don Prodr.* 239; leaves membranous oblong-lanceolate acuminate crenate-serrate glabrous, nerves 6-10 pair, petiole usually eglandular, racemes slender, flowers $\frac{1}{2}$ in. diam., stamens 15-20, drupe globose pointed, stone smooth $\frac{1}{4}$ in. *P. adenophylla*, *Wall. MSS.* *Cerasus undulata*, *Ser. MSS. in DC. Prodr.* ii. 540. *C. capricida*, *Wall. Cat.* 718.

Temperate Himalaya from KUMAON alt. 6-8000 ft. to SIKKIM alt. 8-12,000 ft., and BHOTAN. KHASIA MTS., *Griffith*.

Branches slender, quite glabrous. *Leaves* variable, usually 2-3 in., oblong-lanceolate but often larger and almost linear-lanceolate, base acute or rounded, membranous and undulate when dry; nerves 8-10 pair, slender, spreading and arched; glands 0 or 1 or 2 at the base of the leaf, rarely on the slender petioles. *Racemes* usually more slender than in the two preceding species, glabrous or puberulous. *Flowers* white. *Calyx-tube* glabrous, lobes glabrous or ciliate. *Stamens* short. *Drupe* with a thin-walled smooth stone.—Foliage of this is often like that of *P. nepalensis*, but has usually fewer veins, and the small flowers and drupes well distinguish it—Wallich observes that the foliage is poisonous to goats.

** *Foliage persistent.*

11. ***P. martabanica***, *Wall. Cat.* 4902 (*Cerasus* ?); glabrous except the pubescent racemes, leaves oblong-lanceolate caudate-acuminate quite entire smooth, nerves very faint, racemes fascicled stout short, petals small orbicular, stamens very numerous. *Kurz, For. Flor. Brit. Burm.* i. 434.

Eastern Peninsula; MARTABAN, *Wallich*; MERGUI, *Griffith*; ANDAMAN and TENASSERIM, *Kurz*.

Branchlets quite glabrous. *Leaves* 5-7 in. long, coriaceous, very smooth on both surfaces, shining above, base rounded; nerves 6-8 pair, arched, very slender; petiole $\frac{3}{8}$ - $\frac{1}{2}$ in., slender, eglandular. *Racemes* 1-7 in., usually on the old wood; peduncle and rachis strict; pedicels $\frac{1}{2}$ in., stout. *Flowers* $\frac{1}{4}$ in. diam. *Calyx-tube* obconic, coriaceous; lobes erect, ovate, obtuse. *Petals* small, orbicular. *Stamens* 60-80 in many series. *Ovary* glabrous, style long, exserted; *Drupe* $1\frac{1}{4}$ in. long, cylindric oblong, pointed, apparently dry; stone thin-walled, smooth.—Foliage like that of *P. java-*

nica, Miq., but calyx very different and drupe larger. Kurz however refers to this both *P. javanica* and *Junghuhniana* of Miquel (Journ. As. Soc. Beng. 1871, ii. 52, and Andaman Reports, ed. ii. 37).

12. **P. acuminata**, Wall. *Pl. As. Rar.* ii. 78, t. 181 (*Cerasus*); glabrous throughout, leaves lanceolate caudate-acuminate quite entire or remotely serrate, racemes axillary solitary or fascicled very slender, petals oblong, stamens about 15. Wall. *Cat.* 719. *C. integerrima*, Wall. *Cat.* 722.

Temperate Central and Eastern Himalaya, from NEPAL and SIKKIM, alt. 5-7000 ft., to MISHMI. KHASIA MTS. alt. 4000 ft.

A tree 30-40 ft.; branches slender. *Leaves* 4-7 in., flat, smooth on both surfaces, hardly shining above, base rounded or acute, sometimes dotted beneath with minute glands, or glands 0 or few and scattered; nerves 8-10 pair, obliquely ascending, slender but evident; petiole $\frac{1}{4}$ in., eglandular; stipules linear. *Racemes* 3-5 in., suberect or drooping, many-flowered; pedicels $\frac{1}{2}$ in., slender; bracts minute. *Flowers* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., yellowish-white. *Calyx-tube* broadly campanulate; limb patent, obscurely 5-toothed. *Ovary* villous. *Drupe* ovoid, subacute, $\frac{1}{2}$ in. long; stone thin, quite smooth.

13. **P. punctata**, Hook. f. & T. in *Herb. Ind. Or.* (*Cerasus*); quite glabrous, leaves oblong-lanceolate caudate-acuminate quite entire or serrulate dotted with minute glands beneath, racemes subcorymbiform, stamens about 30.

KHASIA MTS., alt. 4-5000 ft., Jenkins, etc.

A shrub or small tree with slender pendulous branchlets, the youngest puberulous. *Leaves* 3-5 in., caudate points curved very long obtuse, base acute, smooth on both surfaces, shining above; nerves 8-10 pairs, slender, obliquely arched; petiole $\frac{1}{4}$ in., eglandular; stipules filiform. *Racemes* axillary, solitary, shorter than the leaves, 8-10-flowered; peduncle very slender; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in., subcorymbose towards the top of the peduncle. *Flowers* $\frac{1}{4}$ in. diam. *Calyx-tube* obconic; lobes 5, rounded, ciliate. *Petals* orbicular, ciliate. *Ovary* glabrous. *Drupe* globose; stone thin-walled, quite smooth.

14. **P. Jenkinsii**, Hook. f. & Thoms. in *Herb. Ind. Or.* (*Cerasus*); leaves linear-oblong caudate-acuminate serrate undulate shining eglandular, racemes axillary short cylindric dense-flowered pubescent, stamens about 50.

ASSAM, Jenkins; at Choorpura, (Upper Assam), Griffith.

Branches black, stout, glabrous. *Leaves* 5-7 in., tip obtuse, base acute, red-brown above when dry, paler beneath, margin undulate, teeth when present remote; nerves 10-15 pair, obliquely arching; petiole $\frac{1}{2}$ in., eglandular; stipules linear-lanceolate. *Racemes* $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., strict, erect, usually densely clothed with flowers to the base which is enclosed in concave orbicular scales; pedicels very smooth. *Calyx-tube* turbinate; lobes rounded, ciliate. *Petals* small, orbicular, crose. *Ovary* glabrous. *Drupe* with the stone $\frac{2}{3}$ in., broadly ovoid, obtuse, rugose, and with a thick ridge on one side, walls very thick and hard.

4. MADDENIA, Hook. f. & Thoms.

Deciduous leaved trees. *Leaves* alternate, glandular-fringed or -serrate; stipules conspicuous, gland-serrate. *Flowers* in racemes or corymbs, sub-unisexual. *Calyx-tube* turbinate, 10-lobed, some of the lobes often produced into oblong tomentose petals. *Stamens* 20-30, in one series, filaments incurved; anthers small. *Carpels* 1, with a slender style and usually not perfecting, or two with shorter or no styles and larger stigmas, one or both perfecting; ovules 2, collateral, pendulous. *Fruit* an oblong drupe; pericarp thin; stone rather bony. *Cotyledons* thick, oblong. **DISTRIB.** Two Indian species.

A form between *Pygeum* and *Prunus*, differing from both in the frequent twin

carpels, of which both often ripen, from *Pygeum* in the form of the fruit habit, and deciduous foliage, and from *Prunus* in the flower which is altogether that of *Pygeum* except for the carpels.

1. **M. himalaica**, Hook. f. & Thoms. in Hook. *Kew Journ. Bot.* vi. 1854) 380, t. xii.; racemes tomentose short dense-flowered.

Temperate Eastern Himalaya; SIKKIM, Lachen River, alt. 8-1000 ft. BHOTAN, Griffith.

A small tree, 20-30 ft.; bark of branches red brown, shining. *Leaves* 3-5 in., variable in shape, ovate or obovate-lanceolate caudate-acuminate, rather membranous, densely woolly or glabrate beneath, base acute rounded or cordate, cilia of the margin often gland-tipped especially at the base of the leaf; nerves 15-20 pair, oblique and nearly straight; petiole very short indeed; stipules large, linear-lanceolate, membranous, acuminate, gland-serrate. *Racemes* terminal, 1-3 in., dense-flowered. *Flowers* 8-20, white, shortly pedicelled. *Calyx-tube* turbinate; lobes obtuse and petals together 10, the latter minute unequal linear-oblong. *Stamens* 20-30. *Carpels* 1 or 2, fusiform, quite glabrous, tapering into short or long styles with discoid stigmas. *Drupe* $\frac{1}{2}$ in., broadly ovoid; epicarp thin; stone thickly crustaceous, quite smooth.

2. **M. pedicellata**, Hook. f.; flowers subcorymbose on long slender pedicels on a short peduncle.

MISHMI HILLS, Griffith.

I have very imperfect scraps of this curious species, in unripe fruit only, the pedicels are 2 in. long and each flower has the unripe oblong-carpels $\frac{1}{2}$ in. long.

5. **PYGEUM**, Gærtn.

Evergreens trees or shrubs. *Leaves* alternate, persistent, usually quite entire; stipules minute, fugacious, basal glands 2 or 0. *Flowers* small, racemose, sometimes unisexual by want of the ovary. *Calyx-tube* obconic urceolate or campanulate, deciduous; limb 5-15-toothed, often unequally. *Petals* minute, 5-6 in the 5-6-toothed calyx, 0 in the 10-15-toothed, villous or tomentose rarely glabrous, often undistinguishable from the calyx-lobes. *Stamens* 10-50, in one or more series at the orifice of the calyx-tube, filaments slender incurved; anthers small. *Carpel* 1, basal in the calyx-tube, ovoid or subglobose; style terminal, slender, exserted from the bud, stigma capitate; ovules 2, collateral, pendulous. *Fruit* a transversely oblong obscurely didymous rarely subglobose drupe, pericarp thin, dry or juicy. *Cotyledons* very thick, hemispheric; radicle minute, superior. **DISTRIB.** Species about 20, Tropical Asiatic and one African.

Differs from *Prunus* chiefly in the minute villous petals (when present) and form of the fruit. The often conspicuous basal pair of glands on the leaf are very variable, a few species have scattered glands, and one has bullate glands on the tip of the petiole, formed by a prolongation of the leaf-blade.

* Ovary glabrous or nearly so.

1. **P. acuminatum**, Coleb. in *Trans. Linn. Soc.* xii. 360, t. 18; leaves oblong-lanceolate caudate-acuminate quite glabrous, basal glands 0, racemes slender villous, petals 6 villous. *Kurz, For. Flor. Brit. Burm.* i. 435. *Chrysobalanus*, Wall. *Cat.* 7496.

Eastern Bengal; KHASIA MTS., Colebrooke, Wallich. CHITTAGONG, Kurz.

A tree. *Leaves* 4-6 by $1\frac{1}{2}$ -3 in.; nerves spreading; petiole $\frac{1}{2}$ in. *Racemes* almost equalling the leaves, suberect, 4-angled; pedicels slender. *Flowers* yellow-green, inodorous. *Calyx* campanulate, acutely 6-toothed. *Petals* 6, clawed, ovate, villous. *Stamens* 30-40. *Ovary* glabrous; style very slender, exserted. *Drupe* 1 in. transversely, dark-purple.

2. **P. glaberrimum**, Hook. f.; leaves oblong-lanceolate caudate-acuminate quite glabrous, basal glands 0 or obscure, racemes slender and petioles glabrous. *P. acuminatum*, Herb. Ind. Or. H. f. & T.

Eastern tropical Himalaya, SIKKIM, alt. 3-5000 ft., J. D. H. KHASIA Mts., alt. 3-4000 ft., *Simmonds*, etc. CHITTAGONG, J. D. H. & T. T.

A branching tree, 30-50 ft., glabrous in all its parts, smelling strongly when bruised of prussic acid. Leaves 4-9 in., base rounded or acute, opaque beneath, with a few large scattered glands or 0; nerves spreading and arching; petiole $\frac{1}{2}$ in. Racemes numerous, erect; rachis and pedicels slender. Calyx-tube obconic; limb obscurely 6-sinuate, disk pubescent at the base. Petals 6, oblanceolate, obtuse, hooded, quite glabrous. Ovary puberulous, soon glabrate; style slender, exerted, nearly straight; stigma capitate. Fruit on a much elongated thickened peduncle, 1 in. transversely.—Except for the perfectly glabrous inflorescence and petals, this closely resembles *P. acuminatum*.

3. **P. Wightianum**, Blume, *Melanges Bot.* 1855, n. 2 (ex Walp. Ann. iv. 642); leaves rounded-oblong or elliptic obtuse with two large glands at or near the base, racemes stout pubescent, petals 5-6 tomentose. Thwaites Enum. 102. *P. ceylanicum*, Bedd. Flor. Sylvat. t. 59, excl. synonym. *Polyodontia?* ceylanica, Wight. Ill. i. 203; Ic. t. 256.

WESTERN PENINSULA; Anamallay, Shevarry, Pulney and Tinevelly ranges, *Beddome*. CEYLON; central province, alt. 4-8000 ft., Wight, etc.

A middle-sized tree, glabrous except the young shoots and inflorescence, which are pubescent with dense appressed hairs. Leaves 3-4 in., coriaceous, base rounded or subacute; nerves arched, spreading, prominent beneath; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. Racemes 2-4 in.; axillary, rachis and peduncle stout; pedicels sometimes $\frac{1}{2}$ in. long. Flowers $\frac{1}{4}$ in. diam. Calyx-tube obconic or turbinate; limb 5- rarely 4- or 6-lobed, lobes acute. Petals 4-6, oblong, tip rounded, softly tomentose. Stamens about 20. Ovary quite glabrous; style stout. Fruit $\frac{3}{4}$ in. transversely, on very stout pedicels.

VAR. *parvifolium*, Thwaites Enum. 103; leaves smaller sometimes lanceolate, racemes shorter, pedicels very short, flowers smaller, stamens fewer, fruit $\frac{1}{2}$ in. transversely.

4. **P. lanceolatum**, Hook. f.; leaves elliptic-lanceolate obtusely acuminate, basal glands narrow oblong, racemes rarely axillary, short few-flowered pubescent, bracts deciduous, petals 6 linear-lanceolate hairy.

SINGAPORE, Lobb.

Branches very slender, young ones and petioles puberulous with appressed hairs. Leaves 3-4 in., base very acute, rather glaucous beneath; nerves very oblique, midrib with a few silky hairs; petiole $\frac{1}{4}$ - $\frac{2}{3}$ in., slender. Racemes $\frac{1}{2}$ - $\frac{3}{4}$ in. chiefly on the branches below the leaves, about 10-flowered, pubescent, sometimes almost globose, subsessile; pedicels $\frac{1}{4}$ in. Flowers $\frac{1}{2}$ in. diam. Calyx-tube turbinate, limb very shortly lobed. Stamens about 12; style slender. Ovary perfectly glabrous. Fruit not seen.—Differs from *P. persimile*, Kurz, in the pedicels and glabrous ovary.

5. **P. Maingayi**, Hook. f.; leaves elliptic-lanceolate acuminate, basal glands obscure or 0, racemes very short axillary solitary densely pubescent, bracts persistent, calyx 6-lobed, petals 0.

MALACCA, Maingay (Herb. Kew, 625),

Branchlets very slender. Leaves 2-3 in., rather coriaceous, base acute, nerves very faint spreading and arched, perfectly glabrous on both surfaces; petiole $\frac{1}{4}$ in., slender, glabrous. Racemes $\frac{1}{2}$ in. almost globose, rusty tomentose; pedicels very short, exceeding the oblong bracts. Calyx-tube obconic, glabrous within; lobes oblong, obtuse, villous. Stamens about 15, filament slender. Ovary small, often abortive and slender, style glabrous. Fruit size of a large pea, nearly globose, with a sharp mucronate apex.

6. **P. Andersoni**, *Hook. f.*; quite glabrous, leaves oblong subacute or obtuse crenate-serrate eglandular, racemes very short axillary dense-flowered glabrous, calyx 5-lobed, petals broadly ovate with villous margins.

BENGAL, summit of Parusnath, alt. 4000 ft., *T. Anderson*.

A rigid shrub, quite glabrous except the margins of the petals. *Leaves* 3 in., coriaceous, smooth above, and bright green, paler beneath with 10-12 pairs of very faint nearly straight ascending nerves; petiole $\frac{1}{2}$ in. *Racemes* 1 in.; pedicels very short; bracts concave, obtuse. *Calyx-tube* hemispheric; lobes broadly ovate, obtuse, ciliate. *Petals* membranous, twice as large as the calyx-lobes. *Stamens* about 15. *Ovary* very minute, glabrous, imperfect.

** *Ovary* hirsute or villous.

† *Leaves* glabrous beneath.

7. **P. persimile**, *Kurz in Journ. As. Soc. Beng. xli. Pars. 2, 306; For. Flor. Brit. Burm. i. 436*; leaves elliptic or elliptic-lanceolate obtusely acuminate, midrib pubescent beneath, racemes 2-3, pedicels very short.

TENASSERIM, *Kurz*.

A tree; young twigs sparingly appressed-pubescent. *Leaves* obtuse and equal or unequal at the base, glabrous above or puberulous along the impressed nerves; petiole $\frac{1}{4}$ in. slender, pubescent. *Racemes* from the scars of fallen leaves, or from the branches; pedicels very short. *Calyx-tube* short, urceolate. *Ovary* densely hirsute; style long, exserted, stigma broad.—Next to *P. Lampongo* (*Kurz, l. c.*).

I have a specimen from Helfer that may be this, but it is in a most imperfect state; the basal leaf-glands are absent or very obscure, the raceme 1 in. long with persistent bracts; the calyx-tube obconic and limb with 6 oblong obtuse lobes.—A *Malacca* plant (*Griffith 2052*) may be referable here, but differs in the shorter stout style.

9. **P. polystachyum**, *Hook. f.*; leaves oblong obtuse young hoary beneath, petiolar glands 2 very tumid, racemes fascicled elongate finely pubescent, calyx-tube shortly 10-lobed, petals 0, stamens 40-50, style glabrous.

MALACCA, *Maingay (Herb. Kew, 627)*.

'A tree, not lofty, with very thick trunk;' branches very stout, black, youngest and young leaves beneath clothed with very fine hoary down. *Leaves* 5-7 in., rounded at both extremities, very coriaceous, glabrous above with impressed veins, red-brown beneath with puberulous midrib and stout arching spreading nerves; petiole 1 in., very stout, with two oblong tumid glands at the apex in old leaves (not developed in the young). *Racemes* 2-4 in., axillary and from the scars of fallen leaves, hoary-pubescent, peduncle and rachis stout, strict; pedicels stout, $\frac{1}{2}$ in.; bracts 0; buds globose. *Calyx-tube* $\frac{1}{2}$ in. diam., urceolate; teeth rounded. *Stamens* in several series, filaments not longer than the calyx. *Ovary* hirsute; style stout, exserted.

10. **P. parviflorum**, *Teyssm. & Binnend. in Nat. Tijd. Neerl. Ind. ii. 309*; leaves oblong obtuse, basal glands 2 large, nerves puberulous beneath, racemes fascicled on the old wood elongate tomentose, bracts deciduous, calyx limb 10-12-toothed, petals 0.—*Miquel Fl. Ind. Bat. i. 361. P. arboreum, Endl. Gen. Pl. 1250* in part. *Polydontia arborea, Blume Bijl. 1105. Polydonthia, Blume Præf. Flor. Jav. viii. partim.*

MALACCA, *Griffith, Maingay*.—DISTRIB. JAVA, BORNEO.

A tree; branches stout, lenticellate; young branchlets and racemes tomentose. *Leaves* 4-6 in., variable in length and breadth, coriaceous, base usually rounded; nerves strong arching and spreading; midrib with fine appressed hairs; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Racemes* 1-3 in. long; peduncle and rachis stout; pedicels short; buds almost globose. *Calyx* urceolate; teeth small, obtuse, villous. *Stamens* about 20. *Ovary* densely villous; style slender, hairy. *Fruit* $\frac{1}{2}$ in. transversely, clothed with deciduous hairs.—Bornean specimens have no basal leaf-glands.

11. **P. brevifolium**, Hook. f.; leaves broadly oblong acute or obtuse quite glabrous beneath, basal glands minute or 0, racemes axillary globose tomentose, calyx-limb 5-6-toothed, petals 0.

MALACCA, summit of Mt. Ophir, Griffith, Lobb.

A shrub, 3-4 ft.; branches woody and leaves quite glabrous. Leaves 2-2½ in., coriaceous, usually contracted at the tip and obtuse or emarginate, rarely acute; nerves beneath faint, spreading and arching; petiole ¼-½ in. Racemes contracted, not ⅓ in. long, 6-10-fld; bracts small; pedicels short. Calyx urceolate; teeth unequal, obtuse. Stamens 10-16, filaments short. Ovary villous; style rather short, glabrous.

A specimen of this marked 'Lucon, T. Lobb,' in Herb. Hook., is probably so ticketed by mistake. Lobb having visited Mt. Ophir no doubt collected it there.

12. **P. Gardneri**, Hook. f.; leaves ovate or ovate-lanceolate acuminate, basal glands 0, racemes axillary stout elongate pubescent, bracts deciduous, calyx 12-lobed, petals 0, stamens 12 short. Pygeum? acuminatum, Wight Ic. t. 993. P. zeylanicum, Dalz. & Gibs. Bomb. Flor. 89, excl. Synon., not of Gärtn.

Western Peninsula, NILGHIRI HILLS, Gardner, Wight. GHATS OF BOMBAY, Ritchie.

A large tree, glabrous everywhere except the inflorescence. Leaves 4-6 in., very coriaceous, base acute or rounded, equal or unequal, nerves oblique; petiole ½-1 in., quite glabrous, or of young leaves silky. Racemes 3-4 in., peduncle and rachis stout; pedicels short, stout. Flowers ½ in. diam. Calyx-tube urceolate; limb with 10-12 obtuse tomentose lobes. Petals 0. Stamens 12, rather slender. Ovary hirsute; style exserted. Fruit 1-1½ in., transversely 2-lobed, shining and smooth, apiculate in the sinus at the top.

†† Leaves more or less pubescent beneath.

13. **P. ceylanicum**, Gärtn. Fruct. i. 218, t. 46; branches leaves beneath and inflorescence densely finely tomentose, leaves oblong-lanceolate obtusely acuminate, basal glands large, racemes solitary, calyx obconic obscurely 6-toothed, petals 6 acuminate, stamens about 12. Thwaites Enum. 102. excl. Syn. P. acuminatum. P. Walkerii, Blume Mel. Bot. 1855 n. 2 (ex Walp. Ann. iv. 642). Polyodontia Walkerii, Wight. Ill. i. 203.

CEYLON, warm moister parts of the island, ascending to 3000 ft., Walker, &c.

A rather large tree; branches stout, lenticellate. Leaves 5-6 in., coriaceous, base rounded; nerves rather obliquely ascending, upper surface quite glabrous, under closely and finely tomentose. Racemes axillary or from the axils of fallen leaves, 1½-2 in., densely rusty-tomentose pedicels short, stout, bracts not seen. Calyx-tube villous within, teeth obscure. Petals villous, hooded. Ovary villous; style glabrous.

14. **P. capitellatum**, Hook. f.; branchlets and leaves beneath finely pubescent, leaves broadly oblong obtuse, basal glands rather large, racemes axillary contracted into globose densely villous heads, calyx-tube campanulate obscurely 10-lobed, petals 0, stamens about 15, style hairy.

TENASSERIM, Helfer.

Branchlets rather stout, densely pubescent. Leaves 5-6 in., coriaceous, base rounded, midrib stout, pubescent above, tomentose beneath; nerves rather numerous, 8-10 pair, spreading and arched; petiole ¼ in. Racemes solitary or crowded, sessile, ½ in. long, very dense-flowered; pedicels very short. Calyx-limb tomentose on the margin. Stamens longer than the calyx. Ovary villous; style rather short, with long hairs.

15. **P. montanum**, Hook. f.; leaves oblong-lanceolate caudate-acuminate ciliate rugulose above, pubescent or tomentose beneath, basal glands deeply

sunk, racemes densely tomentose, calyx urceolate 5-toothed, petals 5 acute, stamens 12-15, style hairy. *Chrysobalanea arborescens*, *R. Br. in Wall. Cat.* 7507.

Eastern Himalaya, SIKKIM, *Herb. Griff.* KHASIA Mts., alt. 3-4000 ft, *Gomez, &c.*

A small tree; branches stout, young with short stiff hairs, older lenticellate. *Leaves* 4-7 in., coriaceous, young with appressed hairs on the upper surface and densely ciliate margins, base subacute or rounded, tip finely acuminate, above glabrous except the impressed midrib, beneath clothed with short rather stiff hairs; nerves 10-12 pair, obliquely ascending, prominent and reticulate beneath; petiole very short, $\frac{1}{8}$ in., stout. *Racemes* 1-1 $\frac{1}{2}$ in., solitary or fascicled on the old wood; pedicels short; bracts not seen. *Flowers* $\frac{1}{2}$ in. diam. *Calyx* with 5 subulate remote teeth. *Petals* villous, ovate-lanceolate. *Ovary* densely villous; style slender.

15. **P. Griffithii**, *Hook. f.*; branchlets and inflorescence densely tomentose, leaves oblong or oblong-lanceolate obtuse or obtusely cuspidate minutely puberulous beneath obscurely sinuate-toothed, basal glands small, racemes very short stout, flowers sessile, calyx 6-toothed, petals 0.

MALACCA, *Griffith.*

Branchlets stout. *Leaves* 5-6 in., coriaceous, base rounded or acute, most minutely dotted on both surfaces, smooth and glabrous above with puberulous impressed midrib and nerves, margin ciliate and obscurely toothed, beneath finely puberulous with 8-10 pair of spreading arching pubescent nerves; petiole $\frac{1}{2}$ in., very stout. *Racemes* $\frac{1}{2}$ in. long, axillary, solitary, few-flowered, densely tomentose, rachis very short. *Flowers* apparently quite sessile. *Calyx-tube* obconic, teeth oblong. *Stamens* 12. *Ovary* globose, hairy.—I have seen but one specimen and the description of the flowers is from Griffith's MSS. The sinuated margin of the leaf is a remarkable character.

16. **P. arboreum**, *Endl.*; *Kurz For. Flor. Brit. Burm.* i. 435; leaves ovate-oblong or broad-oblong shortly cuspidate glabrous or rusty-tomentose above, brown pubescent or almost tomentose beneath, racemes elongate 2-3 together in the axils of fallen leaves.

MARTABAN hills to TENASSERIM, alt. 3-4000 ft.. *Kurz.*

A tree, young branches and buds rusty-tomentose. *Leaves* 4-6 in., rigidly chartaceous or almost coriaceous, almost wrinkled above. *Racemes* 2-3 in., pedicels $\frac{1}{12}$ - $\frac{1}{10}$ in. *Calyx-teeth* minute. *Petals* hardly longer, villous. *Ovary* densely rusty villous. *Drupe* almost $\frac{1}{2}$ in. transversely, almost didymous, covered with fugacious rusty-brown stiff hairs, soon glabrescent.—I have taken the description from *Kurz*, having seen no specimens. *Miquel* divides the *P. arboreum*, *Endl.* (*Gen. Plant.* 1250) into two species, *P. parviflorum*, *Teysm. & Binnend.*, and *P. latifolium*, *Miq.* The former with a hirsute and the latter with an almost glabrous ovary—both are Javanese.

DOUBTFUL SPECIES.

Maingay's No. 628 (*Distrib. Kew*) from Malacca not being in flower is undeterminable; it has slender glabrous branchlets, oblong-lanceolate caudate-acuminate quite glabrous rather membranous leaves 3-4 in. long, with short slender petioles, very short racemes, fruit the size of a large pea, transversely elliptic-globose.

6. **PRINSEPIA**, *Royle.*

A glabrous spinous shrub. *Leaves* deciduous, lanceolate or obovate; stipules minute, deciduous. *Flowers* in short axillary racemes on the sides of the spines. *Calyx* persistent, tube cupular; lobes 5, unequal, orbicular, imbricate in bud. *Petals* 5, orbicular shortly clawed. *Stamens* numerous, many-seriate,

inserted on the mouth of the calyx-tube, filaments short; anther-cells often unequal, separated by a broad connective. *Carpel* 1, sessile; style basal, ascending, stigma capitate; ovules 2, collateral, pendulous. *Drupes* obliquely ellipsoid or cylindric, with the remains of the style at its base; epicarp thin; stone coriaceous, smooth. *Seed* erect, cotyledons amygdaloid, radicle inferior.

1. **P. utilis**, Royle *Ill.* 206, t. 38, f. 1; Brandis *For. Flor.* 196; Wall. *Cat.* 8554.

Dry rocky hills on the temperate Himalayas, alt. 4–8000 ft., from HAZARA to SIKKIM ascending to 9000 ft., and BHOTAN; KHASIA MTS., alt. 5–6000 ft.

A shrub, 3–5 ft.; branchlets green, soft, pubescent when young; pith septate. *Leaves* 1–5 in., coriaceous, acuminate, entire or serrate. *Flowers* $\frac{1}{4}$ in. diam., white, usually opening in autumn. *Drupe*s $\frac{1}{2}$ – $\frac{2}{3}$ in. purple, subtended by the withered calyx.

7. SPIRÆA, Linn.

Perennial herbs or shrubs. *Leaves* alternate, simple or compound; stipules free or adnate to the petiole, rarely 0. *Flowers* in axillary or terminal cymes, white or red. *Calyx* persistent, lobes 4–5, imbricate or valvate in bud. *Petals* 4–5. *Stamens* 20–60, filaments free or connate below. *Disk* fleshy, often hairy. *Carpels* 5 or more, free or connate below; styles subterminal; ovules 2 or more, pendulous. *Follicles* 5 or more, few-seeded.—DISTRIB. Temperate and cold regions of the N. hemisphere; species 50.

SECT. I. **Ulmaria**. Herbs. *Leaves* pinnatisect. *Disk* obsolete. *Carpels* free; ovules 2.

1. **S. vestita**, Wall. MSS.; lateral leaflets small or 0, terminal very large acutely palmately 3–5-lobed, stipules $\frac{1}{2}$ -orbicular, cymes proliferous. *S. Kamtschatica*, Wall. *Cat.* 704 (not of Pallas). *S. Kamtschatica*, var. *himalensis*, Lindl. in *Bot. Reg.* 1841, t. 4.

Western temperate Himalaya, from KASHMIR to KUMAON, alt. 7–12,000 ft.—DISTRIB. Kamtschatka.

A herb, with perennial root, 1–1½ ft., pubescent except the leaves above. *Leaves* sometimes hoary with thick white tomentum beneath, lateral lobes very variable, $\frac{1}{8}$ –1½ in., sessile, ovate, acutely toothed; terminal lobe 2–6 in. diam., palmately 3–5-lobed; lobes acuminate, acutely lobulate and toothed. *Cymes* oblong, much branched, very many-flowered. *Flowers* white, $\frac{1}{4}$ in. diam. *Calyx* small, lobes obtuse. *Petals* oblong-orbicular. *Carpels* many, villous, 2-ovuled.—Very similar indeed to *S. Kamtschatica*, a plant confined to the country whose name it bears, and to Manchuria, but quite distinct by the stipules.

SECT. II. **Aruncus**. Dioecious herbs. *Leaves* tritermately pinnate. *Disk* tumid. *Carpels* free; ovules many.

2. **S. Aruncus**, Linn.; *Led. Fl. Ross.* ii. 16; leaflets ovate caudate-acuminate acutely doubly-serrate glabrous or silky beneath, stipules obsolete, cymes paniced pubescent. *Pallas Flor. Ross.* t. 26; *Boiss. Fl. Orient.* ii. 690. *Don Prodr.* 228. *S. tritermata*, Wall. *Cat.* 706.

Western and Central temperate Himalaya; from SIRMORE, alt. 10,000 ft., T. Thomson, to NEPAL, Wallich.—DISTRIB. From West Europe to Kamtschatka and Manchuria, Japan and E. and W. N. America.

A slender herb, 2–4 ft., with stout perennial rootstock. *Leaves* with long primary and secondary petioles, petiolules short; leaflets 1–2 in. (1–10 in. in Japan specimens) rather membranous. *Flowers* dense, white, $\frac{1}{4}$ in. diam. *Calyx-tube* turbinate, lobes

oblong-ovate. *Petals* orbicular. *Carpels* 6-8, tumid, glabrous and shining when ripe. The Indian form has smaller and more numerous carpels than the European.

SECT. III. **Sorbaria**. Shrubs. *Leaves* pinnate. *Disk* adnate to the calyx-tube. *Carpels* connate below; ovules many.

3. **S. sorbifolia**, Linn.; *Led. Fl. Ross.* ii. 15; leaflets 6-9 pair sessile lanceolate- or linear-oblong acuminate doubly serrate glabrous or hairy beneath, stipules linear-subulate, cymes in branched panicles. *Pall. Flor. Ross.* t. 24, 25. *S. Lindleyana*, *Wall. Cat.* 703; *Lindl. in Bot. Reg.* t. 33.

Western temperate Himalayas; from KUNAWUR to KUMAON, alt. 7-10,000 ft.—DISTRIB. Altai Mts. to N. China and Japan.

A tall shrub, glabrous or with soft hairs in the young parts, leaflets beneath and inflorescence. *Leaves* 8-12 in.; leaflets 2-4 in., sessile, gradually narrowed from near the usually rounded base to the long tip; terminal sometimes lobed at the base; petiole cylindric. *Flowers* white. $\frac{1}{4}$ in. diam. *Calyx-tube* hemispheric; lobes rounded. *Petals* orbicular. *Carpels* 5, glabrous or pubescent; ripe oblong, dehiscent dorsally.

SECT. IV. **Chamædrys**. Shrubs. *Leaves* simple. *Disk* adnate to the calyx-tube, glandular. *Carpels* free; ovules many.

4. **S. callosa**, *Thunb. Fl. Jap.* 209; leaves oblong-ovate or lanceolate acuminate doubly inciso-serrate glaucous and pubescent or glabrate beneath, cymes much branched pubescent, flowers hermaphrodite, bracteoles equalling the calyx, ripe carpels exposed glabrate. *Lindl. & Paxt. Fl. Gard.* ii. 113, fig. 191. *S. callosa*, var. ϵ . *robusta*, *Hook. f. & Thoms. Herb. Ind. Or.* *S. Fortunei*, *Planch. in Flor. des Serres*, ix. 871; *Lindl. & Paxt. Fl. Gard.* ii. 113, with a woodcut; *Bot. Mag.* t. 5164.

KHASIA MTS. at Kullung rock, and the Boga Panee, alt. 5-6000 ft., *Simmons, J. D. H. & T. T.*—DISTRIB. N. China. Japan.

Anerect or straggling shrub, with pubescent or tomentose or glabrate striate branches. *Leaves* 1-4 in., glabrous and glaucous beneath, or more or less pubescent or tomentose, those on young twigs sometimes rhomboid-ovate; petiole very short. *Flowers* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., in very open corymbose spreading cymes, pale or deep rose-red, *Calyx-tube* obovate; lobes triangular-ovate, pubescent. *Petals* orbicular. *Disk-glands* prominent. *Ripe carpels* $\frac{1}{2}$ in., dark brown, glabrous, shining; styles nearly as long, as the valves.—I have described this from Khasia specimens, which are usually tomentose on the under surface of the leaf, but some specimens are as glabrous as the Japanese. It is remarkable that neither Jenkins, Wallich, nor Griffith had it from the Khasia Mts.

5. **S. bella**, *Sims, Bot. Mag.* t. 2426; leaves broadly oblong ovate or ovate-lanceolate doubly inciso-serrate or crenate glaucous and glabrate or pubescent beneath, cymes much branched pubescent, flowers subdioecious, bracteoles equalling the calyx, ripe carpels exposed glabrate. *Don Prodr.* 227; *Kunze in Linnaea*, xx. 60. *S. callosa* and *fastigiata*, *Wall. Cat.* 707, 708. *S. glauca* and *stellata*, *Wall. MSS.* *S. expansa*, *Wall. Cat.* 702.

Temperate Himalaya from SIRMORE alt. 7-10,000 ft., to SIKKIM and BHOTAN, alt. 6-12,000 ft.

A very variable plant, unless, as is probable, two species may be confounded under the above description, which however have not been distinguished by any botanist.—A shrub 2-6 ft.; branches erect or inclined or horizontal. *Leaves* $\frac{1}{2}$ -2 in., glaucous beneath and usually glabrate, but sometimes pubescent. The extreme forms are those of *S. bella* proper (*callosa*, *Wall. not Thunb.*) in which they are broad ovate or oblong obtusely toothed towards the apex only, and of *fastigiata*, *Wall.*, in which they are much larger ovate-lanceolate acuminate and inciso-serrate throughout; the

latter is usually a more erect plant, with shorter stricter stouter stems, and closely resembles *S. callosa*, differing chiefly in the apparently more or less diœcious flowers. *S. bella* proper, on the other hand, is more slender, often nearly prostrate, with arched branches; there are however all manner of intermediate forms, and some specimens have both types of leaf. *Flowers* pink, or rarely white. *Calyx-lobes* acute, tube villous within. *Stamens* minute and deformed in the ♀ flowers, long in the ♂. *Ovaries* small or absent, those of the ♂ flowers with long styles, of the ♀ short. *Disk* of broad incurved scales. *Ripe carpels* as in *S. callosa*.

6. ***S. micrantha*, Hook. f.**; leaves ovate-lanceolate acuminate doubly inciso-serrate glaucous hairy beneath, cymes very broad lax and open, bracteoles filiform often exceeding the calyx, flowers subdiœcious, ripe carpels exposed villous. *S. callosa* var. *macrophylla*, Hook. f. & Thoms. *Herb. Ind. Or.*

Eastern temperate Himalaya; SIKKIM alt. 6–8000 ft. *J. D. H.*; BHOTAN, alt. 5800–10,000 ft., *Griffith*.

Very similar to the *fastigiata* form of *S. bella*, but more lax in habit, leaves sometimes 7 in., very membranous or coriaceous. *Flowers* $\frac{1}{6}$ – $\frac{1}{4}$ in. diam., in very long spreading panicles, pale coloured. *Disk-glands* large. *Calyx-tube* villous within. *Bracteoles* filiform, often much produced. *Ripe carpels* much smaller than in *S. callosa* and *bella*, clothed densely with spreading hairs.

7. ***S. canescens*, Don Prodr.** 227; softly tomentose, branches stout arching, leaves small subsessile obovate or cuneate-obovate quite entire or obtusely 3–5-toothed at the tip, corymbs small compound, flowers hermaphrodite, ripe carpels half sunk in the calyx-tube villous. *S. cuneifolia*. *Wall. Cat.* 699; *Lindl. in Bot. Reg.* 1839, *Misc.* 59; *Camb. in Jacq. Voy. Bot.* 47, t. 57.

Temperate Himalaya from KASHMIR to KUMAON alt. 6–12,000 ft., and in SIKKIM alt. 10–12,000 ft.

A shrub, 6 ft., with densely leafy branches. *Leaves* $\frac{1}{2}$ – $\frac{2}{3}$ in., coriaceous, acute or obtuse; nerves very oblique; petiole very short. *Corymbs* very numerous, 1–1½ in. diam. *Flowers* pale pink or white, $\frac{1}{6}$ in. diam. *Stamens* not exceeding the petals. *Disk* with broad notched glands. *Ripe carpels* sunk half or whole way in the turbinate calyx-tube.

8. ***S. arcuata*, Hook. f.**; glabrate, branches stout arched, leaves small petioled obovate obtusely 3–8-toothed or -lobed at the rounded top rarely entire and acute, corymbs small compound puberulous, flowers hermaphrodite, ripe carpels wholly exserted glabrous shining. *S. canescens*, var. *glabra*, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, subalpine; Yemutong and Lachoong, alt. 12–14,000 ft., *J. D. H.*; Jongri, *C. B. Clarke*.

A small woody ramous shrub, with very stout horizontal arching glabrous dark brown shining deeply grooved branches, flowering branches very short. *Leaves* $\frac{1}{2}$ in., glabrous or nearly so, narrowed into a slender petiole. *Corymbs* dense-flowered. *Flowers* $\frac{1}{2}$ in. diam., red. *Stamens* not exceeding the petal. *Disk* with broad notched glands. *Ripe carpels* not at all sunk in the turbinate very short calyx-tube.—Closely allied to *S. canescens*, but more robust and glabrate, with more petioled leaves, larger red flowers and very different fruit.

9. ***S. vaccinifolia*, Don Prodr.** 227; leaves small petioled ovate or elliptic-lanceolate acute or obtuse serrate or crenate glaucous and hoary beneath, corymbs much branched tomentose, flowers hermaphrodite, ripe carpels glabrous. *Lindl. in Bot. Reg.* 1839, *Misc.* 60; 1840, t. 17. *S. laxiflora*, *Lindl. in Bot. Reg.* 1839, *Misc.* 60; *Lindl. & Paxt. Fl. Gard.* ii. 98, fig. 183. *S. rhamnifolia*, *Wall. Cat.* 700.

Western temperate Himalaya; from MURREE to KUMAON.

An erect shrub, with strict hoary branches. *Leaves* $\frac{1}{2}$ – $1\frac{1}{2}$ in., usually elliptic and acute at both ends, serratures or crenatures small; nerves beneath faint; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in., slender. *Corymbs* dense-flowered; flowers small, $\frac{1}{8}$ in. diam. *Ripe carpels* minute, glabrous, half sunk in the villous calyx-tube.

10. **S. parvifolia**, Bert. *Piant. Nuov. Asiat.* ii. 10, t. 4, glabrous, leaves broadly ovate or orbicular obtuse crenate glaucous beneath, petiole slender, corymbs in lax spreading rounded glabrous panicles with very slender peduncles and pedicels, flowers hermaphrodite, ripe carpels glabrous. *T. chamædrifolia*, Hook. f. & Thoms. *Herb. Ind. Or.*, not of Linn. ? *S. vacciniifolia*, Lodd. *Bot. Cab.* t. 1403, not of Don.

Western temperate Himalaya; KISHTWAR alt. 6–8000 ft., *T. Thomson*.

A graceful shrub, with slender branches, and drooping floriferous branchlets, glabrous throughout or with minutely downy inflorescence. *Leaves* $\frac{3}{4}$ –1 in., very rarely ovate acute and serrate, usually broadly elliptic, thin and almost membranous, flat; nerves very indistinct on both surfaces. *Inflorescence* sometimes of many simple corymbs with long capillary pedicels (sometimes $\frac{1}{2}$ in.) collected into lax broad panicles that terminate drooping lateral branches; in other specimens the corymbs are branched as in *S. bella*, &c. *Flowers* $\frac{1}{8}$ in. diam. *Ripe carpels* very small, $\frac{1}{12}$ in., half sunk in the calyx-tube, glabrous.—Very near *V. chamædrifolia*, L., of Siberia, and perhaps a form of that plant with smaller flowers and laxer habit; it is the only Himalayan species with the ultimate branches of the inflorescence bearing corymbose pedicels. Except that the leaves are acute, which is rarely the case in our plant, the figure of *S. vacciniifolia* in Loddiges admirably accords with it. Loddiges says that he raised it from seeds sent from Nepal.

11. **S. brahuica**, Boiss. *Flor. Orient.* ii. 690; a small excessively branched shrub, leaves minute obovate-cuneate entire or 3–5-lobed or -toothed tomentose, corymbs few-flowered, carpels minute.

WUZURISTAN beyond Peshawur in N. W. India, alt. 5–8000 ft., *Stewart*.—DISTRIB. Beloochistan.

A very remarkable little species, forming a low shrub with slender stiff interlaced sometimes spinescent branches. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., usually glabrous or puberulous above, and white with dense pubescence beneath, but in some of Stock's Beluchistan specimens nearly glabrous on both surfaces; petiole very short. *Flowers* $\frac{1}{8}$ in. diam., in shortly peduncled tomentose panicles.

DOUBTFUL SPECIES.

S. VENUSTULA, Kunth & Bouch. *Ind. Sem. Hort. Berol.*, 1848, 16, No. 27; *Walp. Ann.* ii. 521; *S. PULCHELLA*, Kunze in *Linnæa*, xx. 60; and *S. NEPALENSIS*, *Hort. Loddiges*, are no doubt forms of *S. bella*.

S. NUTANS, Royle (*argentea*, Loudon), is unknown.

S. CERULESCENS, *Poir. Dict.* vii. 350; *Camb. Monog. in Ann. Sc. Nat.* i. 374; *DC. Prodr.* ii. 544, brought from India by Sonnerat, with axillary panicles, is unknown, but as Sonnerat was never in any part of India where *Spiræa* is indigenous, his plant is possibly the garden *S. cantoniensis*, Lour.

S. CORYMBOSA, Roxb. *Fl. Ind.* ii. 512. *S. chamædrifolia*, L. ? *Wall. Cat.* 701, is *S. CANTONIENSIS*, Lour., a native of China only (see Benth. *Fl. Hong Kong*, 105) and not of the N. of India.

8. **RUBUS**, Linn.

Creeping herbs or erect or sarmentose shrubs, almost always prickly. *Leaves* alternate, simple or compound; stipules free or adnate to the petiole. *Flowers* in terminal and axillary corymbose panicles, rarely solitary, white or red. *Calyx-tube* broad; lobes 5, persistent. *Petals* 5. *Stamens* many. *Disk* coating the calyx-tube. *Carpels* many, on a convex receptacle; style subterminal; ovules 2, collateral, pendulous. *Drupe*s many, 1-seeded, crowded upon a dry or spongy

conical or cylindric receptacle. *Seed* pendulous.—**DISTRIB.** Abundant in the northern hemisphere, rare in the southern; species 100.

A genus of which the western European species are notoriously difficult of discrimination, as are some of the Himalayan.

SERIES 1. Leaves simple, undivided or lobed.

* Herbs with creeping or prostrate stems.

1. **R. calycinus**, *Wall. in Don Prodr.* 235; *Cat.* 737; eglandular, stem and petioles hirsute and prickly, leaves orbicular-reniform obscurely lobed toothed hairy above glabrous beneath except on the prickly nerves, flowers axillary, calyx densely prickly, lobes deeply toothed. *R. lobatus*, *Wall. MSS.* *Dalibarda calycina*, *DC. Prodr.* ii. 568.

Central and Eastern temperate Himalaya; NIPAL, *Wallich.* SIKKIM alt. 6–9000 ft. BHOTAN alt. 8500 ft. KHASIA Mts. alt. 4–5000 ft.

Almost black when dry; prickles slender, slightly curved on stem and petioles. *Stem* creeping for 1–3 ft. *Leaves* 1–3 in. diam., sometimes hairy beneath; petiole 2–4 in.; stipules $\frac{1}{4}$ – $\frac{1}{2}$ in., broadly ovate, serrate. *Flowers* 1 in. diam., solitary or twin, usually on erect 1–2-leaved shoots. *Calyx-tube* densely clothed with long straight prickles; lobes foliaceous, broad. *Petals* shorter than the calyx-lobes, erect in fruit. *Fruit* globose of few large scarlet fleshy carpels; stone rugose.—Very near a Philippine Island species which has stipules cut into narrow lobes and smaller flowers.

** Shrubs, erect sarmentose or climbing.

† *Leaves oblong, entire (obscurely lobulated in R. assamensis); stipules pectinate (except in R. acuminatus and Griffithii).* *Carpels* few, 6–12.

2. **R. acuminatus**, *Sm. in Rees Cyclop.* xxx. *Rubus* 43; eglandular, quite glabrous, prickles very few scattered curved, leaves ovate or lanceolate caudate-acuminate doubly serrate, flowers small corymbose long pedicelled, corymbs axillary and in elongated terminal panicles, bracts setaceous glandular, calyx-lobes ovate glabrous with pubescent margins, carpels about 8. *Wall. Cat.* 726. *R. oxyphyllus*, *Wall. Cat.* 7110. *R. betulinus*, *Don Prodr.* 233. *R. triflorus*, *Ham. MSS.*

Central and Eastern temperate Himalaya from KUMAON, *Blinkworth*, and NEPAL to SIKKIM, alt. 4–7000 ft. KHASIA Mts. alt. 4–5000 ft.

Scandent. *Branches* long, arching, cylindric; prickles very small, flattened, rarely on the petioles. *Leaves* 3–5 in., rather membranous; base rounded; nerves 6–8 pair; petiole slender, $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules slender, almost setaceous, glandular. *Panicles* sometimes a foot long; bracts small. *Flowers* $\frac{1}{2}$ in. diam., in threes or fives; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. *Calyx-lobes* with recurved or hooked sometimes dorsal tips, erect in fruit. *Petals* much shorter than the calyx, white. *Carpels* glabrous. *Fruit* of large globose scarlet drupes enclosed by the calyx, receptacle villous, stone rugose.

3. **R. Griffithii**, *Hook. f.*; eglandular, branches and leaves glabrous, prickles few scattered curved, leaves oblong-lanceolate caudate acuminate doubly serrate, panicles axillary and terminal elongate, flowers sessile scattered or crowded, bracts linear-oblong serrate, calyx hoary with appressed down.

Eastern Himalaya; SIKKIM, *Herb. Griffith.*

Very similar to *R. acuminatus* in foliage, but with very short petioles, a totally different inflorescence, the flowers never in corymbs or fascicles, a densely tomentose calyx, and linear serrated bracts.—I have seen but one specimen, which is in bud only. Possibly the locality is erroneous, as Griffiths' collections were in great confusion and it was often difficult to decipher the localities.

4. **R. hexagynus**, *Roxb. Hort. Beng.* 39; *Fl. Ind.* ii. 516; eglandular,

pubescent tomentose or glabrate, prickles short stout recurved, leaves oblong obtuse acute or acuminate serrate, stipules pectinate, panicles terminal, bracts tomentose pectinate not exceeding the buds, calyx hoary with white down, petals small, carpels 6. *Wight & Arn. Prodr.* 299; *Wall. Cat.* 725 in part; *R. indicus*, *Lesch. in DC. Prodr.* ii. 568. *R. pyrifolius*, *Herb. Ind. Or. Hook. f. & T. in part, not of Smith*; *Kurz For. Flor. Brit. Burm.* i. 436.

ASSAM, SILHET and the KHASIA Mts. ascending to 4500 ft. Katchyen hills, AVA, *Kurz*.—DISTRIB. YUNAN.

Climbing; stem as thick as the arm; prickles flattened. *Leaves* $1\frac{1}{2}$ –4 in., usually cordate at the base, glabrous above, beneath pubescent or tomentose wholly or on the nerves only, usually rugose when dry, not shining; nerves 8–10 pair, spreading and arched; midrib beneath prickly; petiole short, $\frac{1}{4}$ in., stout, tomentose; stipules white and hoary, with no lamina. *Panicles* large and spreading, densely white-tomentose; bracts $\frac{1}{8}$ – $\frac{1}{4}$ in. *Flowers* $\frac{1}{3}$ – $\frac{1}{2}$ in. diam. *Calyx-lobes* erect in fruit, villous within, entire, rarely 3-fid at the tip. *Petals* linear, white, shorter than the calyx. *Carpels* glabrous, with very slender styles. *Fruit* of 1–6 large red-purple drupes; receptacle villous; stone rugose.—This and the following have been usually confounded with the Java *R. pyrifolius* which has shorter leaves with fewer and more oblique nerves.

5. ***R. Hamiltoni***, *Hook. f.*; eglandular, glabrous or pubescent, prickles short stout recurved, leaves oblong-ovate or -lanceolate acuminate serrate, stipules pectinate, panicles terminal, bracts glabrous pectinately laciniate far exceeding the buds, calyx with appressed hairs, tips of lobes long acuminate usually laciniate, petals small, carpels 6. *R. pyrifolius*, *Ham. in Herb. Wall. not of Smith*; *Wall. Cat.* 725 in part.

Central and Eastern tropical Himalaya; BHOTAN alt. 5000 ft., *Griffith*; SIKKIM alt. 2–3000 ft., *J. D. H.* ASSAM, *Hamilton, Masters, &c.*

Very similar to *R. hexagynus*, but readily distinguishable by its brown colour when dry, usually narrower and more acuminate leaves, less tomentose inflorescence, which is nearly black when dry, and by the very large pectinately laciniate curved bracts which are membranous and curving over the young buds give a curiously crinite appearance to the immature panicles; the sepals also have usually longer tips split into setaceous lobes. *Fruit* as in *R. hexagynus*.

6. ***R. assamensis***, *Focke Batogr. in Abhandl. Naturwiss. Verein, Bremen*, iv. 197 (1874); eglandular, branches petioles and panicles villous with soft spreading hairs, prickles very few short, leaves oblong or ovate-oblong very obscurely lobed acuminate toothed hairy above hoary with whitish down beneath, nerves 5–6 pairs, petioles very short, panicles triangular, flowers small, calyx-lobes tomentose, carpels 10–12 glabrous. *Rubus* 20 *Herb. Ind. Or. H. f. & T.*

MISHMI HILLS, *Griffith*, and KHASIA Mts. at Syong, alt. 5500 ft., *H. f. & T.*

An erect whitish shrub; prickles hooked. *Leaves* 3–4 in., acute or obtuse at the base, rarely subcordate, nerves very oblique, margins sometimes without trace of lobing; petiole $\frac{1}{4}$ in.; stipules woolly, small, pectinately pinnatifid. *Panicles* as broad as long, shortly pyramidal; pedicels short; bracts small, cleft half way into setaceous lobes. *Flowers* $\frac{1}{3}$ in. diam., white. *Calyx-lobes* ovate, long-acuminate, usually quite entire, erect in fruit, inner surface glabrous with a broad tomentose margin. *Petals* wholly absent in Khasia specimens. *Carpels* with a few long hairs and very long styles. *Fruit* (in Mishmi specimens) globose, hardly exceeding the calyx; drupes few; receptacle villous; stone pitted.

†† *Leaves lobed at the sides towards the base, normally longer than broad; stipules pectinate. Carpels many.*

7. ***R. glomeratus***, *Blume Bijl 1111*; eglandular, branches slender and leaves beneath tomentose with white or buff down, prickles minute, leaves ovate-cordate acuminate 3–5 lobed, the lateral lobes near the base of the leaf very

shallow toothed, flowers in small axillary and terminal eglandular downy panicles, calyx-lobes villous quite entire, petals obovate equalling the calyx, carpels many. *R. Hasskarlii*, *Miquel, Flor. Ind. Bat. i. pars*, 381. *R. acerifolius*, *Wall. Cat. 744*.

PENANG, *Wallich, Maingay*.—DISTRIB. Java, Borneo, Philippines.

This resembles a slender narrow leaved small-flowered state of *R. moluccanus*, but may at once be distinguished by the narrow leaves, lobed on each side towards the base only. The flowers are small ($\frac{1}{2}$ in. diam.) usually in loose panicles, the stipules and bracts laciniate.—I have seen in Mr. Clarke's collection a small specimen very like this from the Khasia Mts., alt. 4500 ft., but it is so difficult to distinguish imperfect specimens of this from the *paniculatus* and *moluccanus*, var. *micropetalus*, that I hesitate to include the habitat of Khasia.

8. ***R. paniculatus***, *Smith in Rees Cyclop. xxx. Rubus 41*; eglandular, branches slender, leaves beneath and panicles clothed with white or buff cottony tomentum, prickles very few minute, leaves ovate-cordate or oblong-ovate caudate-acuminate obscurely lobed toothed, nerves 5-7 pair, panicles terminal very lax and much branched, bracts linear-oblong serrate, calyx-lobes silky usually entire, petals very small linear-oblong, carpels many glabrous. *Wall. Cat. 749*. *R. tiliaceus*, *Sm. l. c.*; *Wall. Cat. 745*.

Temperate Himalaya from RAJAORI, alt. 3-7000 ft. to SIKKIM, alt. 6-8000 ft. KHASIA Mts. alt. 4-5000 ft.

A very rambling climber; all parts except the leaves above densely pubescent or tomentose, with usually cottony white or buff tomentum; prickles hooked, flattened, *Leaves* 3-5 in., rarely as broad as long, rather membranous, sparsely hairy above, lateral lobes usually very obscure; midrib without prickles; petiole 1-2 in., slender, rarely with a prickle; stipules small, laciniate. *Panicles* very large and open; bracts small. *Flowers* $\frac{3}{4}$ -1 in. diam., often long pedicelled. *Calyx-lobes* ovate, acute acuminate or lanceolate and caudate-acuminate, when they are often incised towards the tip, erect in fruit. *Petals* much smaller than the calyx-lobes, white. *Carpels* glabrous. *Fruit* globose, exposed; drupes many, large, black; receptacle villous; stone rugose.

9. ***R. insignis***, *Hook. f.*; eglandular, clothed with buff cottony tomentum, prickles numerous short, leaves hastate-oblong acuminate toothed lobulate towards the base, nerves 12-15 pair, panicles very long lax open prickly, petals broadly obovate equalling the silky entire calyx-lobes, carpels numerous glabrous.

Eastern tropical Himalaya; BHOTAN, *Griffith*. KHASIA Mts. alt. 2-3000 ft., *J. D. H. & T. T.*; *C. B. Clarke*.

A very noble species, with the habit of *R. paniculatus*, but much larger in all but the flowers, and at once distinguished by its prickles, which extend along the petiole and midrib of the leaf beneath, by the numerous nerves, and large almost orbicular petals. Bhotan specimens have the flowers crowded at the end of the long branches of the panicle, whilst in the Khasia ones the branches are open and exceedingly lax to the end. Fruit as in *R. paniculatus*.

10. ***R. ferox***, *Wall. Cat. 724*, eglandular, tomentose, prickles on the stem numerous short stout, leaves cordate sharply toothed upper ovate-lanceolate entire lower more orbicular shortly 5-7-lobed glabrous above pubescent or glabrate beneath, panicles lax-flowered, margins of calyx-lobes pectinate, petals broad, carpels about 8. *Kurz, For. Flor. Brit. Burm. i. 437*.

Central Himalaya; NEPAL, *Wallich*. KHASIA Mts., alt. 3-4000 ft., *Griffith, &c.* BURMA, probably Ava, *Kurz*.

Very robust; stem and especially inflorescence and petioles densely tomentose; prickles hooked, compressed. *Leaves* not white or buff beneath; lower 3-5 in. long and broad; lobes deltoid, acute; nerves palmately spreading; petiole 1-2 in., densely

tomentose, often prickly; stipules and bracts pectinately pinnatifid. *Flowers* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. *Calyx-lobes* broadly ovate, acute, with 2–5 long marginal teeth, densely tomentose, almost villous, erect in fruit. *Petals* as long as the calyx, white. *Filaments* hairy. *Carpels* numerous, glabrous. *Fruit* of 20–30 small drupes, stone wavy on the surface.

A specimen from Birma? in Griffith's Herb. is more glabrous with more slender petioles. *R. Finlaysonianus*, Wall. Cat. 7109, from Siam, known only from a fragment in bud, differs in the apparently entire calyx-lobes clothed with buff tomentum.

††† *Leaves* normally broader than long, palmately 5–7-lobed; stipules pinnatifid or pectinate. *Carpels* many.

11. ***R. moluccanus***, Linn.; DC. Prodr. ii. 566; eglandular, tomentose villous or sublanate, prickles scattered short curved, leaves long-petioled usually deeply cordate broad ovate or orbicular obtusely or acutely 3–7-lobed toothed smooth scabrid or rugose above, beneath clothed with grey or yellow wool or pubescence, panicles axillary and terminal, calyx villous and silky, lobes lanceolate or ovate acute entire or with pectinate margins, carpels very many.—*Roxb. Fl. Ind.* ii. 518; *Miq. Fl. Ind. Ind. Bat.* i. part 1, 382; *Wall. Cat.* 743; *Kurz For. Flor. Brit. Burm.* i. 437. *R. rugosus*, Smith in Rees Cyc. xxx. *Rubus* 34; *Don Prodr.* 234; *Wight et Arn. Prodr.* 299; *Dalz. & Gibs. Bomb. Flor.* 89; *Thwaites Enum.* 101; *Wight. Ic.* t. 225; *Wall. Cat.* 743; *Plant. As. Rar.* iii. 19, t. 234 (*Hamiltonianus*). *R. alceaefolius*, Poir. *Encycl.* vi. 247. *R. micropetalus*, macrocarpus, and Fairholmianus, *Gardner in Calc. Journ. Nat. Hist.* viii. 6. *R. cordifolius*, *Don Prodr.* 233. *R. reflexus*, *Ker in Bot. Reg.* 461; *Benth. Hong-Kong Flor.* 104. *R. Hamiltonianus*. *Seringe in DC. Prodr.* ii. 566.—*Rumph. Amboin.* v. 88, t. 47, f. 2.

Central and Eastern tropical and temperate Himalaya. NEPAL, Wallich. SIKKIM, alt. 3–7000 ft. ASSAM; KHASIA MTS., alt. 3–5000 ft. BURMA. EASTERN PENINSULA. WESTERN PENINSULA or the Ghats from Bombay Southward. CEYLON ascending to 7000 ft.—DISTRIB. Malay Archipelago and Islands.

Stem very robust, with wide spreading subscent branches, densely clothed with white grey or fulvous tomentum; prickles hooked, flattened. *Leaves* 2–10 in. diam., most variable in texture and pubescence; upper surface smooth or covered with tubercles answering to the spaces between the nervules; under pubescent villous or clothed with cottony wool, grey or green or buff-coloured, never quite white; petiole 2–4 in., glabrate or tomentose; stipules variable in size, oblong, toothed pinnatifid lacinate or pectinate. *Inflorescence* usually clothed with silky buff tomentum, rarely white or glabrate. *Flowers* very variable in size, from $\frac{1}{2}$ –1 in., in rather contracted terminal panicles and axillary capitate clusters; bracts like the stipules, never bearing gland-tipped hairs. *Calyx-lobes* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, usually triangular-ovate, rarely lanceolate, and then pinnatifid in the upper part, erect in fruit. *Petals* obovate, white, shorter than the calyx-lobes. *Filaments* glabrous. *Carpels* numerous, glabrous. *Fruit* globose, succulent, of many scarlet small drupes; receptacle villous; stone rugose.

I am quite unable to arrange the form of this common and protean plant under recognisable varieties answering to its synonymy. The original *R. moluccanus*, founded on the plate and description of Rumphius, has leaves with a rugose upper surface (folia superne quam maxime rugosa) and a whitish or ochreous under surface. I have it from Assam, the Khasia Mts., Penang and Java; and with the lobes rather acute from Nepal and almost all localities, where it becomes *R. rugosus*, Sm., described as such by Wallich (Plant As. Rar.), and figured under its synonym *R. Hamiltonianus*. Specimens with acuminate leaf-lobes occur at considerable elevations in the Himalaya and Khasia Mts., where the leaves also become more membranous and very large with pale undersurface; at similar elevations and localities large leaved states occur with very large flowers, and lanceolate sepals $\frac{3}{4}$ in. long. The branches and inflorescence of Malacca specimens are most densely

villous with spreading hairs and the basal leaf-lobes overlap. The Western Ghat specimens have the leaves rugose above and thin, and the branches and inflorescence densely clothed with firm buff cottony tomentum. This is also the case with the Ceylon specimens, of which Thwaites distinguishes 4 varieties:—*α*. bracts ovate entire or cut at the tip, fruit small red (Wight. Ic. t. 225); *β*. leaves smaller narrower more acute, stipules and bracts cut into filiform segments, petals small, fruit dark red (*R. micropetalus*, Gard.); (I should refer this to *glomeratus*, Bl.); *γ*. tomentose, pale, leaves very rugose and coriaceous, stipules and bracts less deeply cut, panicle dense, calyx-lobes ovate-lanceolate toothed, fruit dark red (*R. Fairholmianus*, Gard.); *δ*. prickles short, stipules and bracts less cut, panicles few-flowered, flowers larger, petals about equalling the calyx, fruit larger black (*R. macrocarpus*, Gard.); of these *α*. only inhabits low grounds.

12. ***R. reticulatus*, Wall. Cat. 747**; eglandular, pubescent with white tomentum, prickles few minute or 0, leaves cordate-orbicular subacutely 5-7-lobed reticulated on both surfaces finely downy beneath, panicles entire or lacinate ovate acute, calyx-lobes densely tomentose, fruit globose much larger than the calyx.

Temperate Himalaya; from KUMAON, alt. 7-8000 ft., to SIKKIM, alt. 9-10,000 ft.

This I expect will prove another form of *R. moluccanus* from a higher region, the leaves of the Kumaon and Sikkim specimens are large broad and rather thin in texture; Wallich's Nepal ones are more coriaceous, narrower and elongate with many lateral lobes, more like those of *R. paniculatus*, to which Wallich says it is 'valde affinis.' Sikkim specimens have the cut calyx-lobes. The fruit is very large.

13. ***R. lanatus*, Wall. Cat. 746**; glandular, branches and leaves beneath white cottony, leaves cordate orbicular-ovate acute obscurely lobed serrate glabrous or hairy above, panicles short dense densely villous and covered with gland-tipped hairs, petals small narrowly linear-oblong, carpels numerous. *R. tiliaceus*, *Herb. Str. & Winterb.*

Central and Western temperate Himalayas. NEPAL, Wallich. KUMAON, alt. 5-8000 ft., *Madden, Strach. and Winterb.*

The very broadly ovate cordate obscurely lobed leaves, white cottony tomentum, and above all the long glandular hairs of the young shoots and inflorescence best distinguish this species, which has the other characters of *R. moluccanus*. It may be likened to a dense-flowered glandular *R. paniculatus*, with broader leaves.

14. ***R. birmanicus*, Hook. f.**; eglandular, branches petioles and leaves densely clothed with long spreading flexuous hairs, prickles very copious hooked, leaves acutely palmately 5-lobed crenate rugose above white with appressed down beneath, stipules and bracts cut into long capillary lobes, flowers large, calyx-lobes broad, petals orbicular, carpels excessively numerous.

BIRMA; in the Patkaye hills, E. of the Assam frontier, *Griffith.*

Branches flexuous, hairs red brown when dry; prickles stout recurved flattened extending to petioles and nerves beneath, but not to the panicle, compressed. *Leaves* 3-4 in. diam., rather coriaceous, lobes extending nearly half way down, triangular, dark above when dry with pubescent nerves, dirty brownish white beneath; petiole $1\frac{1}{2}$ in., stout; stipules $\frac{1}{2}$ in., as broad as long across the almost capillary divisions. *Panicle* (in bud only) narrow with short branches, and bracts as large as the stipules; buds very broadly ovoid, densely tomentose but not hairy like the peduncles and pedicels. *Calyx-tube* hemispheric, lobes broad subacute, entire. *Petals* equalling the calyx-lobes, clawed. *Stamens* excessively numerous, in many series. *Carpels* upwards of 100, glabrous, styles very slender with a few hairs on the stigma; receptacle villous.—A very remarkable species.

15. ***R. Treutleri*, Hook. f.**; more or less glandular, softly tomentose with spreading flexuous hairs, prickles slender nearly straight, leaves orbicular-

cordate with 5-7 shallow crenate lobes, stipules leafy pectinate, flowers large solitary clustered or in short panicles, bracts leafy persistent, petals orbicular small, carpels very numerous hairy.—*Rubus* No. 24, *Hook. f. & Thoms. Herb. Ind. Or.*

Eastern temperate Himalaya; SIKKIM, alt. 7-10,000 ft., *Dr. Treutler*.

A large leafy erect bush, with often glandular bristles mixed with the soft flexuous hairs that cover all parts more or less; prickles passing into bristles, sometimes slightly decurved. *Leaves* 2-6 in. diam., membranous, green, with scattered hairs above; lobes shallow, rounded or acute, crenatures acute; petiole short or long and slender, sometimes 3 in.; stipules $\frac{1}{2}$ in., almost orbicular in outline, concave, green. *Flowers* $\frac{3}{4}$ -1 in. diam., shortly pedicelled; bracts sometimes reduced to narrow segments. *Calyx-tube* hemispheric, villous and often bristly; lobes large, often leafy and laciniate, or pectinately pinnatifid. *Petals* nearly orbicular, much smaller than the calyx, white or pink. *Stamens* very numerous. *Carpels* about 100. style very slender, stigma hairy.—This and *R. birmanicus* belong to the group with *R. Hookeri*, all having very numerous carpels and dry fruits.

SERIES II. Leaves digitately or pedately 3-5-foliolate.

* *Leaves glabrous or nearly so beneath.*

16. ***R. fragarioides***, *Bertoloni Miscell.* xxii. 16, t. 5; herbaceous, unarmed, stem petioles and peduncles faintly pubescent, leaflets 3 or 5 obovate or orbicular with a cuneate base lobulate quite glabrous, lobules with acute sinus and coarse teeth, calyx-tube glabrous, lobes ovate-lanceolate quite entire.

Eastern Temperate Himalaya in swamps; SIKKIM, alt. 10-13,000 ft., *J. D. H., C. B. Clarke*.

A very small species; stem chiefly subterranean, slender, woody, sending up very short floriferous branches bearing one or two pedately 3-5-foliolate leaves. *Leaflets* membranous, contracted into the 1-3 in. very slender petiole; stipules $\frac{1}{4}$ in., broadly ovate, obtuse, toothed or quite entire. *Flowers* $\frac{3}{4}$ in. diam., white, peduncle $\frac{1}{2}$ -1 in. slender. *Calyx-tube* glabrous; lobes acuminate, tips slender. *Petals* obovate, acute. *Carpels* about 5, not seen ripe.—Very near to *R. triflorus*, Richards. *β. japonica* of Japan; see Maximovicz Diagnoses, Dec. x. 375.

17. ***R. alpestris***, *Blume, Bijd.* 1108; erect, nearly glabrous, calyx and stipules eglandular, prickles small scattered, leaflets 3-5 elliptic narrowed at both ends acutely crenate-serrate, stipules linear-lanceolate, flowers 1-3 terminal on slender peduncles, calyx prickly, lobes caudate, carpels many glabrous. *Miquel, Fl. Ind. Bat.* i. part 1, 378. *R. pentagonus*, *Wall. Cat.* 731.

Temperate Himalayas; from GARHWAL, alt. 7-8000 ft., to SIKKIM, alt. 8-10,000 ft.—DISTRIB. Java.

A straggling shrub, with the young parts pubescent; stem stout, cylindric; prickles few, short, slightly curved. *Leaflets* 2-4 in., membranous, subsessile; terminal the largest, lateral often oblique; nerves 7-10 pair, slender, arched, sometimes faintly pubescent beneath; petiole 1-2 in., sometimes pubescent, usually armed; stipules small, membranous, usually glandular. *Flowers* $\frac{3}{4}$ -1 in. diam., usually solitary, rarely 3-nate; peduncles armed or not, more or less pubescent and glandular. *Calyx* armed, rarely unarmed, densely pubescent or glabrate; lobes often $\frac{1}{2}$ in. pubescent in the outer margins and within, suberect in fruit. *Petals* white, orbicular, shorter than the calyx. *Stamens* 1-seriate. *Fruit* globose; drupes 12-15, large, glabrous, stone rugose.

18. ***R. Thomsoni***, *Focke Batogr. in Abhandl. Naturwiss. Verein, Bremen* iv. 198; prostrate, slender, eglandular, prickles few very small, leaflets 3 broad-ovate acuminate two lateral much the smallest crenate or serrate very

membranous, stipules filiform, flowers axillary solitary or in very short racemes or panicles, calyx unarmed, lobes acute or caudate, carpels many pubescent.

SIKKIM HIMALAYA, alt. 8-11,000 ft., *J. D. H.*, &c.

A slender trailing species, nearly glabrous or with pubescent branches petioles peduncles and nerves of the leaflets beneath, rarely above. *Leaflets* very membranous, terminal 2 in., often rhomboid-ovate, contracted at the base; lateral usually not half the size, petiolate; petiole slender, 1-2 in., with few prickles; stipules entire or divided. *Flowers* $\frac{1}{2}$ - $\frac{1}{2}$ in. diam., peduncles and pedicels short. *Calyx-tube* nearly glabrous; lobes pubescent, sometimes produced and leafy, suberect in fruit. *Petals* small, orbicular, red. *Fruit* globose; drupes many, pale red, pubescent; stone minutely pitted.

** *Leaves silky beneath.*

19. ***R. lineatus***, *Reinw. in Blume Bijl.* 1108; eglandular, prickles 0 or few small scattered, leaflets 3 or 5 elliptic oblong or lanceolate ciliate-serrate caudate-acuminate, beneath with many straight nerves and dense silky silvery tomentum, calyx-lobes ovate acuminate silky. *Miquel Fl. Ind. Bat. i. part i.* 378. *R. pulcherrimus*, *Hook. Ic. Pl.* t. 729-730.—*Rubus Sp.*, *Clarke in Journ. Linn. Soc.* xv. 141.

SIKKIM HIMALAYAS, alt. 6-9,000 ft.—DISTRIB. JAVA.

A strong suberect herb; branches softly pubescent, young silky; prickles when present straight. *Leaflets* 3 or 5, 4-5 by $\frac{1}{2}$ -2 $\frac{1}{2}$ in., subsessile, coriaceous, acuminate or cuneate at the base, often doubly-serrate, upper surface glabrous ribbed, under shining with 20-30 straight nerves on each side, one to every tooth; petiole 1-2 in., pubescent; stipules $\frac{3}{4}$ -1 in., membranous, ovate-oblong, obtuse, entire, glabrate. *Flowers* in axillary short heads and terminal elongate silvery panicles, $\frac{2}{3}$ -1 in. diam.; bracts large, concave, orbicular, membranous. *Petals* obovate, shorter than the calyx, white. *Drupe*s numerous, small, red, stone rugose.—Very variable in the size of the flowers and breadth of the leaflets.

VAR. 1. *angustifolia*; smaller, leaflets much narrower.

VAR. 2. *glabrior*; leaflets silky beneath on the nerves only. MISHMI, *Griffith*.

20. ***R. Andersoni***, *Hook. f.*; glandular, unarmed, young shoots petioles and inflorescence hispid with spreading gland-tipped hairs, leaflets 3 or 5 elliptic or elliptic-oblong caudate-acuminate ciliate-serrate, beneath with many straight nerves and dense silvery silky tomentum, calyx-lobes triangular-lanceolate caudate. *Rubus Sp.*, *Clarke in Journ. Linn. Soc.* xv. 141.

SIKKIM HIMALAYA, alt. 7-8000 ft., *J. D. H.*, *Anderson*.

Very similar in foliage to broad-leaved states of *R. lineatus*, but at once distinguished by the almost setose purple gland-tipped spreading hairs, the long caudate-acuminate calyx-lobes which are also setose, and flowers in terminal broad panicles with long pedicels. It is a very rare plant; I gathered it near Darjeeling, as did Mr. C. B. Clarke, and on Sinchul. Dr. Anderson's specimens are stated to be from Punkabarri in a hot region, but I suspect some error.

SERIES III. Leaves pinnately 3-foliolate.

* *Stems slender creeping or prostrate.*

21. ***R. saxatilis***, *Linn.*; *Boiss. Flor. Orient.* ii. 691; eglandular, glabrous or slightly pubescent, prickles few slender straight, leaflets 3 rhombic-ovate somewhat lobed acutely doubly-toothed, calyx unarmed, lobes ovate-lanceolate acute longer than the narrow petals, carpels few glabrous.

Western temperate Himalayas in the Tibetan region from KASHMIR to KUMAON, alt. 10-11,000 ft. WESTERN TIBET, *Dras*, alt. 10,000 ft.—DISTRIB. Caucasus and westward to the Atlantic, Siberia, Dahuria.

Stems annual from a stout woody rhizome, short, erect. *Leaflets* 2-3 in., membranous, the lateral subsessile with cuneate bases and often a lobed outer margin; petiole very slender, 3-5 in.; stipules linear or linear-oblong. *Flowers* $\frac{1}{2}$ in. diam., 1-4, shortly pedicelled on the top of a slender axillary peduncle. *Calyx-tube* short, glabrous, unarmed; lobes lanceolate, erect in fruit. *Petals* white, small, slender. *Fruit* with few large scarlet drupes; stone reticulated.

22. **R. nutans**, Wall. Cat. 738; eglandular, unarmed, stem petioles peduncles and calyx-tube clothed with flexuous hairs or bristles, leaflets 3 orbicular or subrhomboidal obscurely lobed acutely doubly toothed, calyx-lobes large caudate-acuminate pinnatifid towards the tips, shorter than the obovate petals, carpels few glabrous. Hook. Bot. Mag. t. 523; Edgworth in Trans. Linn. Soc. xx. 45.

Temperate Himalayas, from GARHWAL and KUMAON, alt. 8-10,000 ft.

Stems as thick as a sparrow quill, 1-2 ft. long from a woody rootstock; hairs rather stiff, red-brown when dry. *Leaflets* $1\frac{1}{2}$ -3 in. long and broad, membranous, glabrous and dark-green above, hairy along the nerves beneath, base cuneate, lateral shortly petiolulate; petiole 2-4 in.; stipules large, broadly ovate or oblong, entire or toothed. *Flowers* usually solitary, axillary, $1\frac{1}{2}$ in. diam.; peduncle stout. *Calyx-tube* villous, lobes $\frac{3}{4}$ - $\frac{1}{2}$ in. *Fruit* of few scarlet drupes; stone smooth.

VAR. *nepalensis*; more slender, smaller in all its parts, leaflets $\frac{1}{2}$ - $1\frac{1}{2}$ in., flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., calyx lobes acuminate, not quite entire.—East Nepal, Tambur River, alt. 9000 ft., J. D. H.

23. **R. Fockeanus**, Kurz in Journ. As. Soc. Beng. 1875, ii. 206; eglandular, unarmed, stem petioles and peduncles pubescent, leaflets orbicular finely toothed, nearly glabrous on both surfaces, flowers solitary, calyx-tube glabrous or sparsely setose, lobes ovate-lanceolate quite entire.

Eastern temperate Himalaya; SIKKIM on the Lachong River and Phullalong and Singalelah, alt. 10-14,000 ft. J. D. H., C. B. Clarke.

Stems wholly procumbent, widely creeping, slender, very sparingly pubescent. *Leaflets* $\frac{3}{4}$ -1 in. diam., not shining above, and with very few hairs on the nerves beneath, lateral petiolulate; petiole 1 in.; stipules $\frac{1}{4}$ in., oblong, obtuse, toothed or quite entire. *Flowers* on very short lateral shoots; peduncle exceeding the petiole. *Calyx* $\frac{1}{2}$ in. across the lobes, tube almost glabrous, lobes acuminate. *Petals* not seen. *Fruit* a few red drupes; stone quite smooth.—The small size, absence of long hairs, opaque foliage and smooth stone of the drupes distinguish this at once from *R. nutans*.

24. **R. Hookeri**, Focke Batogr. in Abhandl. Naturwiss. Verein Bremen, iv. 197 (1874); stem petioles and inflorescence pubescent with copious soft hairs and glandular bristles, prickles few straight, leaflets 3 large rhomboid-ovate or orbicular caudate-acuminate lobulate and toothed, stipules pectinate, flowers large solitary and in few-flowered axillary panicles, calyx hispid, lobes with filiform points, carpels very numerous. *R. macrocarpus*, Kurz MSS., Clarke Journ. Linn. Soc. xv. 141.

Eastern temperate Himalaya; SIKKIM, alt. 7-9000 ft.

A low shrub, almost hispid with gland-tipped hairs, prickles slender. *Leaflets* petiolulate, often subequal, 2-5 in., bright green, bases acute or rounded, upper surface glabrous with pubescent nerves, under also glabrous with hairy nerves; petiole 2-3 in.; stipules orbicular or broadly oblong, foliaceous, recurved, villous. *Flowers* $1\frac{1}{2}$ -2 in. diam., with often persistent foliaceous pectinate bracts. *Calyx* pubescent, bristly, lobes 1 in., triangular-ovate, often lacinate, spreading in fruit. *Petals* much smaller than the calyx, orbicular, greenish-white. *Stamens* very numerous. *Carpels* in a dense cluster of 2-300 or more, and base of long filiform conniving styles, vil-

lous. *Fruit* globose, $\frac{3}{4}$ in. diam.; outer carpels dry, glabrous below villous above, imbricating over the inner succulent carpels; endocarp pitted; receptacle broad, hemispherical, velvety, intruded at the base.

**** Stems erect sarmentose or climbing.**

25. R. niveus, Wall. Cat. 734; eglandular, bristles 0, branches and petioles glabrous or tomentose, prickles recurved, leaflets 3 (rarely 5) coarsely or finely double-toothed lateral obliquely ovate acuminate terminal elliptic ovate or rounded lobulate or lobed, glabrous above, usually white with dense pubescence beneath, stipules filiform, flowers in lateral and terminal few-flowered tomentose corymbs, calyx-lobes acuminate or caudate, petals small obovate pink, carpels many villous. *R. gracilis*, Roxb. Cat. Hort. Beng. 39; *Fl. Ind.* ii. 519.

Temperate Himalaya, from KASHMIR to BHOTAN, at elevation of 6-10,000 ft. in the west and 5-11,500 ft. in the east.

A large rambling bush, without bristles or gland-tipped hairs; very variable in all its parts. *Stem* stout and branches often purple, young often quite glabrous and glaucous or thickly or thinly tomentose; prickles short, scattered, pale. *Leaflets* 1-5 in., entire or lobulate, toothed or crenate, acute acuminate or caudate, terminal sometimes cordate, usually membranous and glabrous, above sometimes (*R. concolor*) green and glabrous beneath also; petiole slender, 1-2 in., with usually 1-2 prickles. *Flowers* $\frac{1}{4}$ -1 in. diam., usually on slender unarmed pedicels, lower axillary often solitary, upper, corymbosely arranged on a long peduncle, nodding; bracts filiform. *Calyx-tube* short, flat; lobes ovate-lanceolate, quite entire, $\frac{1}{4}$ - $\frac{1}{2}$ in., tomentose on both surfaces, spreading or reflexed in fruit. *Petals* much smaller than the calyx-lobes. *Stamens* very numerous. *Fruit* globose, large or small, of few or many dry or fleshy drupes; stone pitted.—Closely allied to *R. lasiocarpus*. I find it impossible to arrange satisfactorily the forms of this most puzzling plant; the following are noticeable.

VAR. *niveus* proper (Wall. Cat. 734), softly pubescent, leaflets 2-3 in. membranous ovate-lanceolate caudate-acuminate lobulate and very acutely deeply toothed, corymbs of 10-12 shortly pedicelled flowers $\frac{1}{2}$ in. diam.—Nepal and all along the Himalaya.

VAR. *pedunculatus*; more robust, leaflets 3-5 in. broader bases more rounded, flowers solitary or in pairs on slender pedicels $\frac{2}{3}$ in. diam., *R. pedunculatus*, Don Prodr. 234; Wall. Cat. 729.—Nepal, Sikkim.

VAR. *racemosus*; softly tomentose, flowers in short terminal racemes shortly pedicelled suberect. Kashmir, Jacquemont, Falconer. Murree, Fleming ("fruit large yellow brown"). Kashmir, Clarke (fruit bright red) who also has a densely cottony subvar. with abbreviated racemes (Kashmir, 8000 ft.). This resembles what a hybrid with *corylifolius* might be,

VAR. *hypargyrus*; leaflets $\frac{1}{2}$ -1 in., sometimes 5, doubly serrately-toothed membranous hoary beneath all over or on the nerves only, or quite glabrous. *R. hypargyrus*, Edgw. in Trans. Linn. Soc. xx. 45. *R. concolor*, Royle MSS. Approaches *R. lasiocarpus*.

VAR. *Aitchisoni*; slender, finely tomentose, leaflets broad membranous with very large crenatures, fruit $\frac{3}{4}$ in. diam. of very numerous orange fleshy almost glabrous drupes. Kashmir common at 7000 ft., Aitchison "fruit eatable."

VAR. *microcarpa*; branches and petiole (6 in.) nearly glabrous, leaflets 4-6 in. broad membranous lobulate and crenate, flowers $\frac{1}{2}$ in., fruit very small of 30-40 quite glabrous dry drupes.—Sikkim, Lachen, alt. 9000 ft., J. D. H.

VAR. *concolor*; leaflets as variable as any of above forms, usually membranous glabrous or nearly so beneath acutely inciso-serrate or toothed or coarsely crenate, flowers corymbosely, sepals $\frac{1}{4}$ -1 in. *R. concolor*, Wall. Cat. 733.—From Kashmir to Kumaon. This passes into var. *hypargyrus*.

VAR. *Falconeri*; similar to var. *concolor* but carpels quite glabrous!—N. W. India, Falconer. On the Kishengunga west from Kashmir, Stewart.—This connects *R. niveus* with *R. cæsius*, L.

According to priority, Roxburgh's name of *S. gracilis* should be retained for this

plant, but I am disinclined to replace so excellent, well known and suggestive a one as *niveus* for another that is in no way distinctive of the species.

26. **R. macilentus**, *Camb. in Jacquem. Voy. Bot.* 49, t. 60; nearly glabrous, eglandular, prickles stout flattened straight or hooked, leaflets 3 ovate or ovate-lanceolate obtuse acute or acuminate doubly-crenate-toothed, stipules setaceous, peduncles axillary and subterminal 1-3-flowered, carpels many glabrous. *R. uncatus*, *Wall. Cat.* 750. *R. asper*, *Hb. Royle*.

Temperate Himalaya; from HAZARA, alt. 4-6000 ft., *Stewart*, and KISHTWAR, alt. 5-9000 ft. to SIKKIM and BHOTAN, alt. 6-9000 ft.

Stems trailing, stout, red-brown, obtusely angled, shining; prickles much flattened, $\frac{1}{6}$ - $\frac{1}{4}$ in. *Leaflets* $\frac{1}{2}$ -2 in., rigidly coriaceous, brown when dry, glabrous on both surfaces, terminal usually ovate-lanceolate long-acuminate, lateral sessile, smaller, sometimes orbicular; midrib beneath with hooked prickles; petiole stiff, sometimes pubescent along the grooved upper surface. *Flowers* $\frac{1}{2}$ in. diam.; peduncles $\frac{1}{4}$ - $\frac{3}{4}$ in., pubescent, rarely 2-3-flowered. *Calyx* silky outside, tomentose within; lobes caudate, erect in fruit. *Petals* orbicular-obovate, clawed, exceeding the sepals, white. *Fruit* globose, enclosed in the calyx; drupes 20-30, yellow or red, glabrous, seated on a columnar pubescent receptacle; stone rugged.

27. **R. sikkimensis**, *Hook. f.*; glandular-hairy and covered with long straight prickles, leaflets 3 ovate acuminate lobulate and coarsely crenate glandular above nearly glabrous beneath, stipules linear, peduncles axillary 1-2-flowered, calyx glandular and hispid, lobes caudate, carpels numerous glabrous.

Subalpine SIKKIM HIMALAYA; Lachen, alt. 12-13,000 ft., *J. D. H.*

A small shrub, dark brown when dry; stems stout; gland-tipped hairs long spreading, half as long as the quite-straight shining prickles. *Leaflets* 1-2 in., terminal, sometimes deltoid-ovate, base rounded or subcordate, lateral subsessile, smaller, narrower; petiole 1-3 in., very slender, pubescent; stipules $\frac{1}{2}$ in. *Peduncles* $\frac{1}{4}$ -1 in., pubescent glandular and bristly as is the calyx. *Flowers* $\frac{3}{4}$ in. diam., inclined. *Calyx*-lobes lanceolate, pubescent on both surfaces. *Petals* red-purple.—This in many respects resembles *R. pungens*, *Camb.*, and *R. horridulus*, *H. f.*

28. **R. ellipticus**, *Smith in Rees Cyclop.* xxx, *Rubus* 16; shaggy with spreading flexuous hairs, prickles scattered stout hooked, leaflets 3 orbicular obovate or elliptic obtuse or abruptly acute toothed pale and pubescent beneath, panicles axillary and terminal dense-flowered, calyx-lobes mucronate or acuminate, carpels silky. *DC. Prodr.* ii. 563; *Wall. Cat.* 740 in part. *R. rotundifolius*, *Wall. Cat.* 730. *R. Gowry-phul*, *Roxb. Hort. Beng.* 39. *R. Gowreephul*, *Roxb. Fl. Ind.* ii. 517; *W. & A. Prodr.* 298; *Wight Ic.* t. 230. *R. flavus*, *Ham. in Don, Prodr.* 234; *Brand. For. Flor.* 197; *Kurz, For. Flor. Brit. Burm.* i. 438. *R. sessilifolius*, *Miq. Pl. Ind. Or. Hohenack*, 438a, 1153. ? *R. paniculatus*, *Moon. Cat. Ceyl. Pl.*

Temperate and subtropical Himalaya, from SIRMUR, alt. 2-7000 ft. to SIKKIM, alt. 4-7000 ft. and BHOTAN. KHASIA Mts., alt. 4-5000 ft. BIRMA. Western Ghats from CANARA southwards. CEYLON, central province, alt. 4-7000 ft.—DISTRIB. Yunnan.

A tall suberect bush; branches stout, spreading and recurved, obscurely angled; hairs red-brown, often very dense, covering a softer down with occasional glandular hairs; prickles stout, hardly compressed. *Leaflets* 2-4 in., coriaceous, dark green above, rarely glabrous beneath; petiole 1-3 in.; stipules subulate. *Panicles* small, many-flowered, pedicels short; bracts setaceous. *Flowers* $\frac{1}{2}$ - $\frac{1}{2}$ in. diam. *Calyx* densely pubescent and bristly or not; lobes ovate, acute acuminate or obtuse and mucronate, erect in fruit. *Petals* obovate, larger than the calyx, white. *Stamens* 1-seriate. *Fruit* globose, exposed; drupes on a cylindric hairy receptacle, many, golden yellow, succulent; stone rugose.

VAR. hirta; leaflets green beneath. *R. hirtus*, *Roxb. Hort. Beng.* 38; *Fl. Ind.* ii.

518; *R. Wallichianus*, *Wt. & Arn. Prodr.* 298; *Dalz. & Gibs. Bomb. Flor.* 89; *R. ellipticus*, in part *Wall. Cat.* 740; *R. affinis*, *Madden MSS.*—Himalaya and Western Ghats.

VAR. denudata; shaggy hairs absent or very rare. *R. rotundifolius*, *Wall. Cat.* 730 in part.—Kumaon, Bhotan.

29. ***R. fruticosus***, *Linn.*; *DC. Prodr.* ii. 560; *var. DISCOLOR*; eglandular, branches robust and leaves beneath hoary with white stellate tomentum, prickles short scattered hooked, leaflets orbicular obovate or elliptic obtuse or acute, stipules setaceous, flowers in dense thyrsoid terminal panicles, calyx-lobes short acute reflexed in fruit, carpels quite glabrous. *R. discolor*, *Weihe & Nees; Boiss. Fl. Orient.* ii. 695.

Western temperate Himalaya, alt. 3–7000 ft. from MURREE to JAMU.—DISTRIB. Afghanistan and westward to the Atlantic.

Stems arched, obtusely angled, channelled; prickles stout. *Leaflets* sometimes 5 at the base of the stem, 1–2 in., coriaceous, sometimes abruptly acuminate; petiole $\frac{1}{2}$ –1 in., flattened above; stipules subulate, velvety. *Panicles* 6–10 in.; branches short, very stout, densely tomentose; pedicels stout, short; bracts often toothed or laciniate. *Flowers* $\frac{3}{4}$ – $\frac{1}{2}$ in. diam. *Calyx-tube* short, lobes woolly on both surfaces, sharply reflexed in fruit. *Petals* obovate, pink. *Stamens* very numerous, in many series. *Fruit* small, globose; drupes many, fleshy, black; receptacle deciduous; stone pitted.

30. ***R. Clarkei***, *Hook. f.*; herbaceous?, eglandular, branches petioles and peduncles very slender faintly pubescent and with copious slender acicular straight prickles, leaflets 3 orbicular obtuse and coarsely doubly crenate laxly pubescent beneath, stipules oblong green, peduncles 1–3-flowered axillary, calyx-lobes lanceolate.

KASHMIR, at Sonamung, alt. 9250 ft., *C. B. Clarke*.

A very slender small perhaps herbaceous species; branches probably armed, soft, green, laxly clothed with spreading hairs; prickles numerous, very slender, quite straight, not extending to the midribs. *Leaflets* 2–3 in. long, nearly as broad, dark green, rounded or cuneate at the base, petiolulate; petiole 1–3 in., slender; stipules persistent, obtuse or acute, entire or serrate, pubescent. *Flowers* drooping, $\frac{1}{2}$ in. diam., solitary in the lower axils, corymbose in the upper; bracts green, small, oblong, acute. *Calyx-tube* not bristly, densely pubescent; lobes narrow-lanceolate. *Fruit* of few glabrous drupes; stone pitted.—Of this very distinct species I have seen no flowers.

31. ***R. antennifolius***, *Hook. f.*; eglandular, branches petioles and peduncles laxly pubescent and with copious slender straight acicular prickles, leaflets 3 orbicular-ovate acuminate lobulate and acutely doubly toothed, faintly pubescent beneath, stipules linear-lanceolate acuminate, corymbs axillary and terminal, calyx-lobes ovate with long slender tips, carpels very many glabrous.

KASHMIR; Sonamung, alt. 8500 ft., *C. B. Clarke*.

A much stouter plant than *R. Clarkei*, similarly clothed with slender straight prickles and soft hairs, but the leaflets are more coriaceous, very acutely toothed, the lateral sessile, the terminal cordate, and the inflorescence and flowers are quite different. *Stipules* $\frac{1}{2}$ – $\frac{3}{4}$ in., green, persistent, quite entire. *Peduncles* often 2–3 in., stiff, erect, the terminal continuing the branch and bearing a branched corymb; pedicels often long and slender; bracts filiform. *Flowers* erect, $\frac{3}{4}$ –1 in. across the sepals. *Calyx* not or hardly bristly, tomentose; lobes pubescent on both surfaces ovate, suddenly contracted into filiform tips often as long as themselves. *Petals* orbicular-obovate, white, about equalling the limb of the calyx. *Carpels* on a columnar pubescent receptacle.

32. ***R. purpureus***, *Bunge Enum. Plant. Chin. Bor.* 24; glandular, branches petioles inflorescence and calyxes densely covered with small deflexed

prickles, leaflets 3 (rarely 5) broad-ovate coarsely acutely doubly crenate white beneath, cymes axillary few-flowered, flowers drooping, carpels pubescent.

Western temperate Himalaya, KUNAWUR, in the Tibetan region, alt. 11–14,000 ft.. *T. Thomson*.—DISTRIB. N. China.

Branches stout, shining, pale or dark yellowish; purple glandular hairs few, scattered; prickles short, flattened, straighter on the petioles and inflorescence. *Leaflets* 2–4 in., glabrous above, terminal broad-ovate or orbicular, cordate; lateral sessile, smaller; petiole 1–3 in., stout, pale, coloured like the stem; stipules setaceous, glandular. *Flowers* $\frac{1}{2}$ in. diam., solitary in the lower axils, 2–4 in peduncled cymes in the upper. *Calyx* pubescent and bristly; lobes ovate-lanceolate, finely acuminate, erect in fruit. *Petals* smaller than the calyx, orbicular-oblong. *Fruit* enclosed in the calyx, globose, red, of many (about 20) tomentose drupes situated on a columnar pubescent receptacle; endocarp pitted. Very near *R. colchicus*, Herb. Stev., from the Caucasus, if not a few-flowered variety of that plant. Jaeschke sends 5-foliolate leaves of apparently this species from Lahul.

VAR. *subinermis*, more slender and lax with the prickles reduced almost to bristles. —Kishtwar, *Thomson*; Kashmir, *Falconer*, alt. 9250 ft., *C. B. Clarke*; common in water channels at 8–10,000 ft., *Aitchieson*.—Clearly a lax state of the Tibetan drier climate prickly plant.

*33. ***R. lucens***, *Focke Batogr. in Abhandl. Naturwiss. Verein, Bremen*. iv. 199 (1874); eglandular, almost glabrous, prickles scattered short hooked, leaflets 3 ovate elliptic orbicular or ovate-lanceolate caudate-acuminate serrate shining above, stipules linear, racemes axillary and terminal long slender, carpels few hirsute. *R. lævigatus*, *Wall. Cat.* 1280.

KHASIA MTS., alt. 3–4000 ft., *Simons, &c.*; ASSAM, *Jenkins*; MISHMI HILLS, *Griffith*.

Stem very stout, climbing lofty trees; branches angled, grooved, quite smooth; prickles very short. *Leaflets* 4–5 in., brown when dry, coriaceous, serratures simple, acute, petiolules short and nerves beneath puberulous; petiole 2–6 in., prickles many or few; stipules almost setaceous. *Panicles* 6–12 in., lower sometimes crowded in the leaf-axils; terminal slender, pubescent; bracts subulate. *Flowers* small, $\frac{1}{2}$ in. diam., in fascicles or short corymbs; pedicels slender. *Calyx* densely hoary; tube very short; lobes oblong, obtuse or apiculate, erect in fruit. *Petals* equalling the sepals, pink or white, obovate, clawed. *Stamens* 20–30, in one series. *Fruit* enclosed in the calyx; drupes 6–8, sweet; stone rugose; receptacle low, pubescent.

SECT. IV. Shrubs. Leaves pinnately 5–7-foliolate, upper (or all in 37. *foliolosus*) sometimes 3-foliolate.

34. ***R. biflorus***, *Ham.*; *Smith in Rees Cyclop.* xxx. *Rubus* 9; eglandular, prickles strong hooked, leaflets 3 or 5 ovate lobulate doubly toothed white and tomentose beneath, stipules linear-lanceolate, flowers 1–3 together on axillary slender peduncles drooping, calyx-lobes broad-ovate acuminate, carpels numerous woolly above. *Wall. Cat.* 735; *DC. Prodr.* ii. 558; *Bot. Mag.* t. 4678.

Temperate Himalaya; from SIRMORE, alt. 7–9000 ft., to SIKKIM, alt. 8000 ft., and BHOTAN.

A strong rambling shrub; stems and branches quite glabrous, white with glaucous bloom; prickles very strong and much recurved. *Leaves* chiefly on short lateral branches; upper sometimes 1-foliolate and 3-lobed; leaflets 1–1 $\frac{1}{2}$ in., rarely more, acutely toothed or serrate, pubescent or hairy above, densely tomentose beneath; petiole slender, 1–2 in., prickly, pubescent; stipules $\frac{1}{4}$ in. *Peduncles* $\frac{1}{2}$ –1 $\frac{1}{2}$ in., unarmed or prickly, usually glabrous; bracts subulate. *Flowers* $\frac{1}{4}$ – $\frac{3}{4}$ in. diam. *Calyx* pubescent on both surfaces or glabrate outside; lobes broad, suberect or spreading in fruit. *Petals* equalling or exceeding the calyx, orbicular, white. *Stamens* numerous. *Fruit* globose, $\frac{3}{4}$ in. diam.; drupes 20–30 golden yellow, succulent; stone reticulated with pits; receptacle columnar, villous.

35. *R. lasiocarpus*, *Smith in Rees Cyclop.* xxx. *Rubus* 6; eglandular, prickles scattered stout straight or hooked, branches glabrous very glaucous, leaflets 5-9 ovate elliptic or ovate-lanceolate acutely toothed or serrate, beneath ribbed and usually hoary with white tomentum, terminal alone lobulate, stipules subulate, corymbs small axillary and terminal tomentose, petals small red, carpels many tomentose. *DC. Prodr.* ii. 558. *Wight. & Arn. Prodr.* 299; *Wight. Ic. t.* 232; *Grah. Cat. Bomb. Pl.* 64; *Dalz. & Gibs. Bomb. Flor.* 89; *Kurz For. Flor. Brit. Burm.* i. 439. *R. distans*, *Don Prodr.* 256 (pinnatus 234). *R. Horsfieldii*, *Miq. Fl. Ind. Bat. i.* part 1, 375. *R. albenscens*, *Roxb. Hort. Beng.* 39; *Flor. Ind. ii.* 519. *R. rosæflorus*, *Roxb. Fl. Ind. ii.* 519. *R. rotundifolius*, *Royle Ill.* 203 (name only). *R. mysorensis*, *Heyne in Roth Nov. Gen. & Sp.* 235. *R. indicus*, *Heyne MSS.* ? *R. parvifolius*, *Moon Cat. Ceyl. Pl.* *R. furfuraceus*, *Wall. Cat.* 739. *R. bijugus*, *Focke Batogr. in Abhandl. Naturwiss. Verein, Bremen.* iv. 200 (1874).

Temperate Himalaya, from MURREE and KASHMIR, alt. 5-8000 ft. (ascending to 1500 ft. in Kumaon), to SIKKIM, alt. 4-10,000 ft. BURMA. WESTERN PENINSULA on the higher Ghats from Canara southwards. CEYLON, central province, alt. 4-7000 ft.—DISTRIB. Java.

A large rambling very variable plant; branches cylindric, with coloured pruinose bark, the very young only tomentose; prickles compressed, variable in size and curvature, extending to the petioles and rachis, but not or rarely to the inflorescence. *Leaves* 3-10 in.; leaflets 1-3 in., rather coriaceous, opaque, glabrous or silky above, almost plaited by the strong straight nerves, which are very prominent beneath, sometimes very acute, often doubly toothed and mucronate, terminal usually broad-ovate, or even orbicular, rounded acute or cordate at the base; lateral sessile, rarely ovate or orbicular; petiole stout, grooved above, glabrous and shining or tomentose; stipules $\frac{1}{2}$ in., linear-subulate. *Corymbs* axillary and terminal, simple or subpanicked, densely tomentose or villous, or merely puberulous, on short or long (1-2 in.) peduncles, 2-many-flowered; pedicels long or short; bracts setaceous or filiform. *Flowers* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam *Calyx* densely woolly; tube small; lobes ovate or ovate-lanceolate, acute acuminate or caudate, spreading or suberect in fruit; laciniate and much lengthened in Moulmain specimens. *Petals* deep pink, orbicular or broadly obovate, rarely exceeding the calyx. *Fruit* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., globose, hoary; drupes numerous, dry, or fleshy and then red or orange; stone pitted; receptacle columnar, villous.

It is as difficult to define the varieties of this *Rubus* as it is those of *R. niveus*, to which they are in a degree analogous, and it is also difficult to separate the three following species from it by constant definable characters.

VAR. furfuraceus; a large form, leaflets narrow 1-2 $\frac{1}{2}$ in. grey with very fine down beneath, corymbs paniculate, terminal large much branched. *R. furfuraceus*, *Wall. Cat.* 739, Ava.

VAR. pauciflorus, a large very common Himalayan form, glabrous and shining except the white undersurface of the leaves, with corymbs of many crowded small puberulous flowers. *R. pauciflorus*, *Wall. Cat.* 727; *Lindl. in Bot. Reg. t.* 854. *R. longifolius*, *Wall. MSS.* *R. Ischelus*, *Herb. Ham.* *R. distans*, *Don Prodr.* 256 (pinnatus, 234).

VAR. micranthus; much smaller in all its parts, leaves almost glaucous beneath. *R. micranthus*, *Don Prodr.* 235. Nipal, *Wallich.*

VAR. sericeus; leaflets 2-3 in. coarsely serrate pale green membranous beautifully silky on both surfaces paler but not white beneath, corymbs many-flowered, sepals lanceolate. Kishtwar, *Thomson.*

VAR. membranaceus; leaflets 2-3 in. coarsely crenate-toothed very membranous perfectly glabrous above faintly downy beneath, corymb terminal compound. Kumaon, *Strach. & Winterb.* (18). Sikkim, J. D. H.

VAR. rosæfolius; quite glabrous except the branches of the corymbs and margins of sepals, leaflets 1-1 $\frac{1}{2}$ in. inciso-serrate membranous, dark brown when dry, flowers small in axillary corymbs, sepals with filiform points.—Sikkim, alt. 9-10,000 ft., J. D. H.

VAR. subglaber, *Thwaites Enum.* 101; leaflets 1-1 $\frac{1}{2}$ in. rounded, finely crenate-

serrate faintly pubescent on the nerves beneath; dark brown when dry, midrib beneath often prickly. Ceylon.—Kurz (*Journ. As. Soc. Beng.* 1876, pt. ii. 307) refers Roxburgh's *R. rosæfolius* to *R. rosæfolius*, Sm., but a reference to Hardwick's description cited by Roxburgh proves that this cannot be correct.

36. **R. racemosus**, *Roxb. Fl. Ind.* ii. 519; branchlets petioles and inflorescence clothed with glandular hairs, prickles straight or hooked, leaflets 5-7 ovate or orbicular-ovate acutely toothed, beneath usually densely white-tomentose, stipules lanceolate, corymbs axillary and terminal, calyx prickly, petals large red, carpels many villous. *R. lasiocarpus*, Sm., *Var.?* *Miq. Pl. Exsicc. Hohenack.* No. 1152.

NILGHIRI MTS., *Adam, Gardner, &c.* PULNEY MTS., *Wight.*

I cannot doubt this being an extreme form of *R. lasiocarpus*, readily distinguishable by the copious glandular bristles and hairs, the usually densely tomentose branches, corymbs, petioles, &c., and the prickly calyx and large petals; the leaflets too are usually broader, very coriaceous, glabrous above or with sometimes copious almost woolly hairs. In Hohenacker's specimens however the branchlets and petioles are nearly glabrous, and in all the branches are beautifully pruinose. The sepals are caudate and quite entire. Wight's Pulney mountain specimens have the leaflets more membranous, almost glabrous beneath except along the nerves, like var. *subglaber* of *R. lasiocarpa*. I have seen no authentic specimen of Roxburgh's plant (which Kurz (Andaman Report) refers to *lasiocarpus*) and refer the above to it as the only Peninsular species according with his description.

37. **R. foliolosus**, *Don Prodr.* 256 (*microphyllus*, p. 234); eglandular, branches petioles and inflorescence villous or densely tomentose, prickles straight or hooked, leaflets 3-7 small ovate or almost orbicular coarsely crenate-toothed or serrate white-tomentose beneath, flowers small in axillary branched long peduncled corymbs, petals small red, carpels villous.—*R. Roylei*, *Klotzsch in Reise Pr. Waldem. Bot.* 154, t. 6. *R. parvifolius*, *Smith in Rees Cyclop.* xxx. *Rubus* 21, not of Linn.; *Wall. Cat.* 736.

Central and Western temperate Himalayas. NIPAL, *Wallich*; CHAMBA to KUMAON, alt. 5-8000 ft., *Thomson, &c.*

Except by its usually prostrate habit and much smaller size, I do not think that this is distinguishable from *R. lasiocarpus*. In Wallich's specimens the leaflets are $\frac{1}{2}$ in. long, lateral orbicular cuneate, terminal lobed, are very pubescent above and white beneath, but in Thomson's and others they become more ovate glabrous above and almost silky beneath or even glabrous except along the nerves as in varieties of *lasiocarpus*. The flowers are numerous, about $\frac{1}{4}$ in. diam., with pink petals equalling the calyx-lobes; and the fruit is very small, white and villous. Don, misled by a specimen of *R. biflorus* sent under the same name by Wallich (and fastened on the same sheet in Herb. Linn. Soc.), describes the peduncles as 3-flowered. Maximovicz *Diagn.* x. 392, is certainly wrong in referring this to the *R. parvifolius*, Linn.

38. **R. opulifolius**, *Bertol. Misc. Bot.* xxii. 16, t. 4; inflorescence glandular-hairy and as well as the stout branches and petioles densely softly tomentose, prickles few straight or hooked, leaflets 3-5 acute or acuminate crenate-toothed coriaceous densely clothed beneath with white wool, lateral elliptic terminal broader lobed, flowers in axillary and terminal subsessile abbreviated racemes, calyx with glandular bristles, petals small red, carpels many silky.

KHASIA Mt., at Moflong, alt. 5500 ft., *Griffith*; J. D. H. & T. T. Upper Kala Pani, alt. 4000 ft., *C. B. Clarke.*

A much more robust plant than *R. lasiocarpus*, with dense soft tomentum on the young and even on last year's branches, the older of which are however glaucous and pruinose (as in all these red-flowered species); prickles when straight large and much flattened. *Leaflets* $1\frac{1}{2}$ - $2\frac{1}{2}$ in., softly downy or glabrous above, very white

beneath except the nerves which have a yellowish pubescence; petiole stout, prickly or not; *stipules* setaceous, quite entire. *Flowers* much crowded, $\frac{2}{3}$ in. diam.; bracts setaceous, very tomentose. *Calyx* densely tomentose and bristly; lobes lanceolate, acuminate, quite entire. *Petals* obovate-oblong. *Carpels* with long silky hairs, not tomentose as in the ordinary forms of *R. lasiocarpus*. *Fruit* globose, of many fleshy orange-red almost glabrous drupes; stone deeply pitted.—This is possibly another extreme form of *R. lasiocarpus*, which (like *R. racemosus*) has become glandular.

39. ***R. horridulus***, *Hook. f.*; eglandular, prickles very many crowded hooked, branches arched, leaflets 5–7 densely softly hairy incised-serrate, petioles and single-flowered peduncles densely clothed with hooked prickles, calyx-tube hemispheric densely clothed with straight prickles, petals purple, carpels villous.

BHOTAN, at Panga, alt. 7600 ft., *Griffith*.

Branches cylindric, slender, glabrous, with usually straight slightly compressed prickles. *Leaves* 2–4 in.; petiole very slender, sparingly hairy, with numerous strongly hooked prickles; leaflets $\frac{1}{2}$ – $\frac{1}{2}$ in., equally clothed with long soft flexuous hairs on both surfaces, acute or acuminate. *Peduncle* clothed and armed like the petioles, 1 in., always 1-flowered. *Calyx-tube* $\frac{1}{4}$ in. diam., quite clothed with spreading straight shining prickles; lobes large, ovate-lanceolate, long-acuminate, quite entire, pubescent on both surfaces, erect in fruit. *Petals* small, purple according to Griffith's notes. *Stamens* very numerous. *Carpels* numerous, villous, with long straight white hairs. *Fruit* small, of 6–12 subpubescent drupes; stone reniform, rugosely pitted.—This appears to be in every way a very distinct species, but it is impossible to say to what extent more copious materials may modify the above description; it is allied to *R. sikkimensis*, H. f., and *pungens*, Camb.

40. ***R. pungens***, *Camb. in Jacq. Voy. Bot.* 48, t. 59; eglandular except sometimes the inflorescence and petioles, prickles many slender straight, stems very long and slender, leaflets 5–7 membranous ovate deeply inciso-serrate glabrous concolorous, flowers solitary or 2–3 axillary long-peduncled, calyx densely prickly, lobes caudate, carpels with long hairs. *Maximov. Diagn.* x. 386.

KASHMIR, *Falconer, Jacquemont*; Shapinga, alt. 7000 ft., *C. B. Clarke*; woods at Gulmuz at 8600 ft., *Aitchieson*. KHAGAN, 100 miles N.W. of Kashmir, alt. 8000 ft., *Stewart*.—DISTRIB. Japan (a variety).

Branches long, lax, cylindric, trailing, green, glabrous except the pubescent tips. *Leaves* 2–4 in., petiole very slender, sometimes glandular, unarmed or with faintly hooked prickles; leaflets 1– $1\frac{1}{2}$ in., sessile, bright-green on both surfaces, quite glabrous or faintly hairy on the nerves beneath, terminal broader, cordate, 3-lobed; stipules narrow lanceolate or setaceous. *Flowers* nearly 1 in. diam., erect; peduncle stout, slender, prickly and pubescent. *Calyx-tube* hemispheric; lobes sometimes $\frac{2}{3}$ in. long, pubescent on both surfaces, spreading in fruit. *Petals* obovate-spathulate, longer than the calyx, white(?). *Fruit* globose, small; drupes few, on a conical glabrous receptacle, pubescent, stone minutely pitted.—Clearly closely allied to *R. horridulus* and *sikkimensis*, but with more the habit of *R. idæus* or *saxatilis*. The petals are multiplied in Falconer's specimen.

41. ***R. rosæfolius***, *Smith Ic. ined.* iii. t. 60; glabrous or pubescent, glandular-hairy or not, prickles scattered hooked, leaves long, leaflets 5–7 ovate-lanceolate acuminate doubly inciso-serrate, green on both surfaces, stipules subulate-lanceolate, flowers solitary and in very loose panicles, calyx-lobes caudate, petals white exceeding the calyx, carpels excessively numerous, fruit large of innumerable orange-red minute glabrous drupes. *Roxb. Fl. Ind.* ii. 518; *Wall. Cat.* 728; *Kurz For. Flor. Brit. Burm.* i. 439; *Hook. Ic. Pl.* t. 349. *R. pinnatus*, *Willd.* *R. asper*, *Don Prodr.* 234; *Wall. Cat.* 741. *O. sikkim-*

ensis, *Otto Kunze MSS. in Herb. Clarke?* *R. paniculatus*, *Clarke in Journ. Linn. Soc.* xv. 140, *not of Smith*.

Temperate Himalayas; from KUMAON, alt. 7000 ft., to SIKKIM, alt. 4-7000 ft., *J. D. H. KHASIA Mts.*, alt. 3-4000 ft. AWA and MARTABAN Hills, *Kurz*.—DISTRIB. Java. Naturalised and cultivated in the tropics and warm temperate regions; flowers often double.

Stems erect or inclined; branches slender, glabrous, pubescent or almost villous, as are the petioles and peduncles, sometimes crinite with long dark-brown spreading simple or gland-tipped hairs (*R. sorbifolius*, Maxim.); prickles sometimes very numerous, mostly straight on the stem and hooked on the petiole leaflets and inflorescences. *Leaves* 2-5 in. long, bright green, never glaucous or white beneath; petiole slender, often prickly; leaflets 1-2 in., rarely more, membranous or coriaceous, sessile or petiolulate; stipules linear-lanceolate or filiform, long-acuminate. *Flowers* $\frac{3}{4}$ -1 in. diam.; peduncles usually slender, prickly. *Calyx* glabrous or pubescent, not prickly, tube small; lobes acute or acuminate or hair-pointed, or drawn out to a serrated limb nearly an inch long; spreading in fruit. *Petals* orbicular-obovate. *Carpels* excessively numerous, glabrous, on a villous receptacle. *Fruit* globose or more often oblong; drupes smaller than in any other species; stone deeply pitted.—*R. paniculatus*, *Roxb.* (*R. Roxburghianus*, *Wall. Cat.* 732.) from the Moluccas is *R. parvifolius*, *Linn. & Rumph.* (Amboin. v. t. xlvii.), and perhaps also *R. fraxinifolius*, *Poir.*; it has larger leaves and smaller calyx and fruit than *rosafolius*. *R. Javanicus*, *Celebicus* and others are in various respects intermediate, and all may prove forms of one common Malayan plant.

DOUBTFUL SPECIES.

R. HIBISCIFOLIUS, *Focke Batogr. in Abhandl. Naturwiss. Verein, Bremen.* iv. 197; unarmed, stem smooth, floriferous branches slender and petioles puberulous, stipules broadly linear obtuse deciduous, leaves petioled ovate or ovate-lanceolate cordate long-acuminate 3-lobed unequally subincised-serrate hairy then glabrate above, paler and puberulous on the nerves beneath, flowers crowded subfascicled shortly peduncled forming a short narrow inflorescence, bracts ovate-lanceolate acute sometimes denticulate, calyx yellow tomentose cleft hardly to the middle, lobes shortly triangular.—Leaves exactly like those of *R. palmatus*, Th., flowers like those of *R. moluccanus*. *Nipal, Wallich* in *Herb. Copenhagen (Focke)*.—I have no idea what this species can be; I find nothing like it in *Herb. Wallich*.

R. HOFFMEISTERIANUS, *Kunth & Bouché Ind. Sem. Hort. Berol.* (1817 coll.) 14, is I suppose *R. niveus*, *Wall.*

9. *GEUM*, *Linn.*

Erect perennial herbs. *Radical leaves* crowded, pinnate; terminal leaflet large; stipules adnate to the petiole. *Flowers* solitary or corymbose, white yellow or red. *Calyx* persistent, 5-bracteolate; lobes 5, imbricate or valvate. *Petals* 5. *Stamens* very many, crowded. *Disk* smooth or with radiating grooves. *Carpels* many, on a long or short receptacle; style filiform, elongating much after flowering, straight or bent; ovules ascending. *Achenes* many, on a dry receptacle, each with a long filiform straight or bent terminal style which is often hooked at the tip.—DISTRIB. Temp. and cold regions of N. and S. hemispheres; species about 30.

SECT. I. *Geum proper*. *Style* in fruit hooked at the tip or below it.

1. *G. urbanum*, *Linn.*; *Boiss. Flor. Orient.* ii. 696; erect, sparsely softly hairy, lower leaves pinnatisect, leaflets 9-11 with the alternate smaller, upper sessile, flowers erect, head of hispid achenes sessile. *G. Roylei*, *Wall. Cat.* 713.

Western temperate Himalaya, alt. 6-11,000 ft., from MURREE to KUMAON.—DISTRIB. Siberia and westwards to the Atlantic.

Stems 1-3 ft., stout or slender, from a woody rootstock. *Terminal leaflets* of radical leaves 2-3 in. diam., orbicular, lobed and crenate; lateral much smaller, often minute, sessile, cut and lobed; cauline leaves sessile, broad, variously cut and lobed; stipules leafy, lobed and toothed. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; peduncle slender. *Petals* yellow, narrowly obovate, equalling or exceeding the calyx-lobes, which are acuminate and reflexed in fruit. *Achenes* spreading and recurved, hispid with long hairs; awn $\frac{1}{4}$ in., bent, hooked at the tip; receptacle villous.—C. B. Clarke has a very robust form from Kashmir (Alibad, 9,000 ft.).

SECT. II. **Sieversia.** *Style* straight in fruit.

2. **G. elatum**, Wall. Cat. 711; sparingly hairy, leaves pinnatisect, leaflets very many short lobed and crenate, flowers erect, achenes hispid. *Sieversia elata*, Royle Ill. 207, t. 39.

Subalpine and Alpine Himalaya; from KASHMIR, alt. 9-12,000 ft. to SIKKIM, alt. 12-15,000 ft.

Rootstock stout, woody. *Leaves* 4-12 in., linear-oblong; leaflets $\frac{1}{2}$ -1 in., close and imbricating or scattered, uniform or the alternate smaller, terminal orbicular, all lobed and coarsely crenate, upper or all adnate by a broad base. *Flowering stems* with few leaves and 1-6 flowers. *Flowers* $\frac{1}{2}$ -1 $\frac{1}{2}$ in. diam.. *Calyx-lobes* deltoid-ovate, acute, silky, spreading in fruit. *Petals* orbicular, yellow, much exceeding the calyx. *Carpels* sessile on the base of the calyx, clothed with long silky hairs. *Achenes* ellipsoid, acute at both ends, hairy; style $\frac{1}{3}$ in., slender.

VAR. *humile*, Royle l. c.; smaller, 1-flowered, Nipal Kumaon and Sikkim, alt. 12-15,000 ft. *G. adnatum*, Wall. Cat. 712. *Potentilla adnata*, Wall. MSS.; *Lehm. Pugill.* ix. 9; *Revis. Potentill.* 47, t. 17.

10. **FRAGARIA**, Linn. Strawberry.

Perennial scapigerous herbs, with creeping stolons. *Leaves* digitately 3-rarely 5-foliolate very rarely pinnate or simple; stipules adnate to the petiole. *Flowers* white or yellow, often polygamous. *Calyx* persistent, with 5 bracteoles at its base; lobes 5, valvate in bud. *Petals* 5. *Stamens* many, persistent. *Carpels* many, on a convex receptacle; styles ventral, persistent; ovule 1, ascending. *Achenes* many, minute, sunk in the surface of a large fleshy receptacle.—DISTRIB. Temp. and mountain regions of the N. hemisphere, S. America, Sandwich Islands, Bourbon; species 6 or 7.

* *Flowers* yellow.

1. **F. indica**, Andr. Bot. Rep. t. 479; very slender, leaflets 3-5 obovate serrate crenate or toothed, peduncles solitary axillary 1-flowered, bracteoles large cuneate-obovate 3-5-fid. *Roxb. Fl. Ind.* ii. 520; *Wight & Arn. Prodr.* 300; *Wight Ic.* t. 989; *Bot. Reg.* t. 61; *Wall. Cat.* 1236, excl. No. 3 for the most part. *F. malayana*, *Roxb. Fl. Ind.* ii. 520. *F. nilgirica*, *Zenker Pl. Ind. Dec.* 1. 7, t. 9. *F. arguta*, *Lindl. in Wall. Cat.* 1237. *F. Roxburghii*, *Wight & Arn. Prodr.* 300, name only. *Duchesnea fragarioides*, *Sm. in Trans. Linn. Soc.* x. 373; *Miq. Fl. Ind. Bat.* i. pt. 1, 372, et *D. chrysantha*, *Miq. ibid.* *D. fragiformis*, *Don Prodr.* 233. *Potentilla denticulosa* and *Wallichiana*, *Ser. in DC. Prodr.* ii. 573, 574. *P. Durandii*, *Torr. & Gr. Fl. N. Am.* 1. 444. *P. fragariaefolia*, *Klotzsch in Reis. Pr. Waldem. Bot.* t. 10. *P. trifida*, *Lehm. in Otto Garten. und Blumenzeit.* vii. 263; *Revis. Potentill.* 175.

Temperate and subtropical HIMALAYA and along the foot of the hills from the PUNJAB to ASSAM, ascending to 7500 ft. in the east and 8000 ft. in the west. KHASIA Mts. NILGHIRI Mts. PENANG (*Roxburgh*)—DISTRIB. Afghanistan, Mountains of the Malay Islands, Japan, Corea, and Formosa.

More or less silkily hairy. *Rootstock* stout, with many long slender prostrate stems. *Leaves* distant; leaflets rarely 5, 1-1 $\frac{1}{2}$ in., petiolulate or sessile, membranous, simply

or doubly crenate or toothed or serrate, base cuneate entire, nerves parallel; petiole 1-5 in., very slender; stipules leafy, toothed. *Peduncles* very slender, equalling the petioles, naked. *Flowers* $\frac{1}{2}$ -1 in. diam. *Calyx-lobes* ovate or lanceolate; bracteoles narrow or broad, often greatly exceeding the calyx-lobes, rarely quite entire. *Petals* obovate, cordate, yellow. *Fruit* spherical or oblong, bright red, spongy, insipid; achenes minute, obscurely pitted.

A very variable plant. I refer *Potentilla denticulosa* doubtfully to it on the authority of J. Gay (in Herb.), who has further verified the reference of the American *P. Durandii* to *F. indica*; M. E. Durand in 1860 having informed him that this plant was sent to him from Savannah, where it grew in the streets, and was no doubt introduced.

** *Flowers white.*

2. ***F. vesca*, Linn.**; leaflets sessile or nearly so many-toothed, fruit globose or subglobose, calyx-teeth usually entire.

VAR. *nubicola*; slender, silvery, nearly glabrous, runners filiform, hairs on petioles and few flowered peduncles appressed, calyx-lobes narrow spreading in fruit. *F. nubicola*, Lindl. in Wall. Cat. 1238.

VAR. ? *collina*, slender or stout runners with spreading hairs, hairs on petioles and few- or many-flowered peduncles more copious spreading, calyx-lobes narrow or broad spreading or suberect in fruit.

Temperate Himalaya, from MURREE and KASHMIR, alt. 5-10,000 ft., to SIKKIM, alt. 6-13,000 ft.—DISTRIB. *F. vesca*, Afghanistan, Java, N. temp. zone.

I am quite unable to identify the Indian strawberries by means of the characters given by authors to the European species, which differ in their several works. *F. vesca* is defined by Boissier (Fl. Orient.) as having the petioles with spreading hairs, and the peduncles with spreading or appressed ones; Ledebour (Fl. Ross.) describes the hairs of its peduncles as appressed, and Decaisne (Jardin fruitier) as spreading. In the common Himalayan *Fragaria* the hairs of both petals and peduncles are appressed in some forms, in others those of the petiole are spreading and of the peduncle appressed, and in still others both petiole and peduncle have spreading hairs. As the specimens with most appressed hairs appear from dried specimens to have spreading calyx-lobes I have referred them to *R. vesca* as var. *nubigena*. I must remark however that J. Gay, who was the greatest living authority on *Fragaria*, and to whom I sent a series of specimens, has regarded most of them as *F. collina*, but evidently with doubt; for a Simla and a Kashmir specimen he tickets *F. collina*? and then crosses out the mark of interrogation, and a Kishtwar specimen he tickets first *elatior*? and then crosses that name out substituting *collina*? and finally crosses out the mark of interrogation: of those marked *collina* by Gay; some have appressed, others spreading hairs on both peduncle and petiole. The Sikkim specimens, again, which I describe above as var. *nubicola*, are marked *F. vesca* without a doubt by M. Gay. This slender silvery form occurs throughout the temperate Himalaya; it has often small accessory pinnules on the petiole far below the tip and toothed or entire calyx-lobes.

3. ***F. nilgerrensis*, Schldl. in Hohenack. Plant. Ind. Or. Exsicc. No. 1518**; very robust, runners petioles and peduncles clothed with long stout spreading hairs, fruit subglobose or depressed, calyx-lobes entire spreading or suberect in fruit. *J. Gay in Ann. Sc. Nat. Ser. 4, viii. 206. F. elatior, Wight & Arn. Prodr. 300; Wight Ic. t. 988.*

KHASIA MTS., alt. 5000 ft. *J. D. H. & T. T. NILGHIRI MTS., Wight, &c.*

This will probably prove to be another form of *F. vesca*, and I find an approach to it amongst the Himalayan specimens of that plant; and there are specimens of it marked as from Sikkim in Griffiths' collection, but they are probably from Khasia and mislabelled. Gay who elaborately describes it says that the calyx-lobes are erect; this they seem to be in dried specimens, but Wight's excellent figure (which Gay does not refer to) shows them to be spreading. The fruit is white with a pale pink tint, and not worth eating; it is globose and inclined to be conoidal in the Nilghiris, but a very depressed sphere in Khasia.

4. **F. Daltoniana**, *J. Gay in Ann. Sc. Nat. Ser. 4. viii. 204*; smaller, slender, hairy or nearly glabrous, runners filiform, leaflets petiolulate with few teeth, flowers solitary, fruit elongate-ovoid or fusiform, calyx-lobes and bracteoles toothed spreading in fruit. *F. sikkimensis*, *Kurz in Journ. As. Soc. Beng. 1875, ii. 206*.

SIKKIM HIMALAYA, alt. 10–15,000 ft., *J. D. H., Kurz, &c.*

A very distinct species, at once recognizable by its smaller proportions, petiolulate leaflets with few teeth, toothed calyx-lobes, bracteoles, and curious fruit, which is often nearly 1 in. by $\frac{1}{2}$ in. broad, of a bright scarlet but with little flavour.

11. **POTENTILLA**, *Linn.* Cinquefoil.

Perennial herbs, rarely shrubs. *Leaves* compound; stipules adnate to the petiole. *Flowers* white or yellow, rarely red, solitary or in corymbose cymes. *Calyx* persistent, 5- rarely 4-bracteolate; lobes as many, valvate in bud. *Petals* as many, sometimes narrow. *Stamens* many, rarely few and definite. *Disk* annular or coating the calyx-tube. *Carpels* many, rarely 1 or few, on a small dry receptacle; style persistent or deciduous, ventral or terminal; ovule 1, pendulous. *Achenes* many, on a dry receptacle.—*DISTRIB.* N. temp., Arctic, and mountain regions, very few are found in the south; species 120.

The species of *Potentilla* are very difficult of discrimination, being chiefly mountain plants varying in habit and stature with elevation, much as *Ranunculi* do. I have no doubt that several here regarded as peculiar, will prove forms of more western ones, and those again of one wide spread European, Asiatic, and American plant. Lehman's "Revisio Potentillarum" is of little scientific value, and the 200 species it enumerates are reducible by at least one-third. Boissier in his "Flora Orientalis" has done excellent work. The character of the calyx and petals are excessively variable, and that of the terminal and ventral style is not so good as might be supposed, the outer carpels often differing somewhat from the inner in this respect. Smooth and wrinkled achenes are not always definite characters. I am inclined to think that the structure of the stigma is useful as a guide to the affinities of the species, but I hesitate to introduce it without a study of the whole genus.

SECT. I. **Sibbaldia**. *Stamens* 4, 5 or 10. *Flowers* often unisexual.

* *Leaves simple.*

1. **P. trullifolia**, *Hook. f.*; forming dense silky moss-like tufts, leaves trowel-shaped or $\frac{3}{4}$ -orbicular tip truncate 3-fid, stamens 5, achenes many smooth, styles short ventral.

SIKKIM HIMALAYA; rocky places on the Tibet frontier, alt. 16–17,000 ft., *J. D. H.*

Tufts matted, an inch high, soft, of densely packed short branches from a woody slender rootstock. *Leaves* $\frac{1}{4}$ in., densely imbricated, flat, clothed on both surfaces with long silky hairs, tip with 3 broadly triangular obtuse teeth; petiole short; stipules very broad, membranous, with triangular acute free portions. *Flowers* solitary, subsessile, $\frac{1}{8}$ in. diam. *Calyx* hemispheric, silky; tube very short; lobes ovate, obtuse; bracteoles much smaller, narrow, oblong, obtuse. *Petals* not seen. *Stamens*, rudiments of 5 seen. *Achenes* about 10, on a villous receptacle, quite smooth.

** *Leaves digitately 3- or 5-foliolate.*

2. **P. Sibbaldi**, *Haller f. in Ser. Mus. Helvet. i. 51*; leaflets 3 obovate-cuneate truncate 3–5-fid, flowers in branched cymes yellow 5-merous, achenes smooth, style short ventral. *P. procumbens*, *Clairv. Man. d'Herbor. en Suisse*

166. *P. Sibbaldia*, *Griesselich Statistik d. Flor. Badens*. 239. *Sibbaldia procumbens*, Linn. *S. parviflora*, Willd.; Boiss. *Fl. Orient.* ii. 727. *S. cuneata*, Edgew. in *Trans. Linn. Soc.* xx. 44. *S. cuneata*, Kunze in *Linnæa*, xx. 59.

ALPINE HIMALAYA and WESTERN TIBET, alt. 12–15,000 ft.—DISTRIB. Lofty mountains of the N. temp. zone; Arctic regions.

Covered with rather stiff silky hairs; rootstock woody, depressed, branched. *Leaves* chiefly radical; petiole $\frac{1}{2}$ in., slender; leaflets $\frac{1}{4}$ – $\frac{1}{2}$ in., rounded at the base, lobes short broad subacute, nerves obscure; stipules large, membranous. *Flowering stems* $\frac{1}{2}$ –6 in.; cymes leafy and silky. *Flowers* pedicelled. *Calyx* $\frac{1}{4}$ in.; lobes triangular-lanceolate, erect in fruit; bracteoles linear. *Petals* narrowly obovate, hardly exceeding the calyx. *Stamens* 5–10 (Edgew.) short. *Achenes* ovoid, smooth, obtuse, receptacle flat hairy.—I can detect no difference whatever between the *Sibbaldia parviflora* Willd. and *S. procumbens*, L., which latter varies greatly in size and hairiness and size of petals. J. Gay (in Herb. Hook.) failed to distinguish them.

VAR. *micrantha*; more densely tufted and smaller in all its parts, flowers sometimes solitary and alternate sessile amongst the leaves, calyx $\frac{1}{8}$ – $\frac{1}{6}$ in. long. Western Tibet; Tibetan region of Sikkim, alt. 16,000 ft.

3. ***P. perpusilla***, Hook. f.; very small, silky, leaflets 3 obovate-cuneate truncate 3-fid, flowers in very short cymes 4-merous, achenes smooth, style short ventral.

ALPINE HIMALAYA, from Champura, *Jacquemont*, to KUMAON, alt. 12,000 ft. *Strach.* & *Winterb.* (with *Potentilla* 26), and the Tibetan region of SIKKIM, alt. 16,000 ft., J. D. H.

A much smaller plant than *P. Sibbaldi* in all its parts, and always 4-merous. *Leaflets* $\frac{1}{6}$ – $\frac{1}{3}$ in. *Flowers* $\frac{1}{8}$ in. diam. *Petals* narrowly obovate, *Stamens* 4. *Achenes* 10–12.

4. ***P. tetrandra***, Bunge *Enum. Pl. Alt.* 17 (*Sibbaldia*); densely tufted, dioecious, silky, shining, leaflets 3 obovate-cuneate 3-fid, flowers yellow solitary or in pairs subsessile 4-merous, achenes 4, style terminal. *Dryadanthè Bungeana*, Ledeb. *Flor. Ross.* ii. 33. *Sibbaldia procumbens*, var. *tibetica*, Hook. f. & Thoms. *Herb. Ind. Or.*

WESTERN TIBET, alt. 14–18,000 ft., Falconer, Thomson, and Tibetan region of SIKKIM, alt. 15–16,000 ft., J. D. H.—DISTRIB. Altai Mts.

Forming dense moss-like patches covered with stout silky hairs. *Stem* densely leafy, 1–2 in. *Petiole* $\frac{1}{6}$ – $\frac{1}{4}$ in.; leaflets about as long. *Flowers* rarely on short peduncles, usually sessile amongst the leaves, $\frac{1}{8}$ in. diam. *Calyx-lobes* triangular; bracteoles linear. *Petals* obovate, much larger than the calyx, golden yellow. *Stamens* 4, very short. *Achenes* glabrous, smooth.

5. ***P. axilliflora***, Hook. f.; sparsely silky, stems prostrate very long and slender leafy throughout, leaflets 3 obovate acutely toothed, stipules small ovate acute, flowers all axillary small on capillary pedicels, petals minute, stamens 5, carpels many, styles sub-basal. *Fragaria indica*, Wall. *Cat.* 1236, 3 in part.

Western Himalaya, KUMAON, *Herb. Wallich*.

Rootstock as big as a walnut, apparently very short and broad, sending off 60–100 very weak almost filiform stems 1–2 ft. long, which trail on the ground, and are leaf- and flower-bearing along their length. *Leaves* chiefly cauline; leaflets $\frac{1}{2}$ – $\frac{3}{4}$ in., sessile, membranous, base cuneate entire; petiole $\frac{3}{8}$ – $\frac{3}{4}$ in.; stipules small, broad, membranous, toothed. *Flowers* $\frac{1}{4}$ in. diam.; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. *Calyx* hairy, lobes triangular-ovate; bracteoles linear-oblong. *Petals* very small, oblong, yellow? *Sta-*

mens short. *Carpels* about 20. *Achenes* many, rounded, hard, slightly wrinkled; receptacle villous.

6. **P. purpurea**, *Royle Ill.* 208, t. 40, f. 3 (*Sibbaldia*); polygamous, leaflets 5 obovate-cuneate 3-fid, flowers purple 5-merous.

N. W. HIMALAYA, *Royle*.

I know this plant only from the figure and meagre description published by Royle, who gives no habitat, and I suppose it to be founded on a drawing of a native artist. The figure represents a procumbent branching rooting flexuous rhizome or stem 4 in. long, clothed with stipular sheaths, and bearing short lateral branches with tufts of leaves and flowers. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, hairy; leaflets 5, sessile, $\frac{1}{2}$ in., obovate-cuneate, 2–3-fid at the apex, green above, paler beneath. *Flowers* $\frac{1}{2}$ in. diam., solitary or twin from the axils of the leaves, peduncle naked. *Calyx* hairy, lobes triangular-ovate; bracteoles linear. *Petals* longer than the calyx, narrowly obovate, pale purple. *Disk* dark purple. *Stamens* 5. *Achenes* ovoid, smooth.

*** *Leaves* pinnate.

7. **P. albifolia**, *Wall. Cat.* 1018; stems very slender spreading, leaves pinnate, leaflets few subopposite or alternate obovate coarsely toothed white-tomentose beneath, stipules large, flowers solitary axillary, achenes many, style short ventral. *Sibbaldia potentilloides*, *Camb. in Jacq. Voy. Bot.* 54, t. 67.

Subalpine Himalaya from KASHMIR, alt. 8–10,000 ft., to SIKKIM, alt. 12–15,000 ft., *J. D. H., C. B. Clarke*.

Rootstock stout. *Stems* many, 6–12 in., flexuous, branched, pubescent. *Lower leaves* 2–4 in.; leaflets 5–9, very unequal, $\frac{1}{2}$ –1 in., orbicular or obovate, lateral smaller, lower smallest, green and glabrous above, snow-white beneath; petiole very slender; stipules sometimes $\frac{1}{2}$ – $\frac{3}{4}$ in., loose, sheathing, brown, acute, adnate for half their length to the petiole. *Flowers* $\frac{1}{2}$ in. diam., on slender peduncles 1–2 in. *Calyx* white-tomentose, lobes triangular; bracteoles linear-oblong. *Petals* small, oblong, obtuse, yellow. *Stamens* 5. *Achenes* numerous, large, deeply furrowed; receptacle tomentose.

SECT. II. **Trichothalamus**. *Stamens* numerous. *Flowers* sometimes dioecious. *Receptacle* with long erect stiff hairs, which entirely conceal the achenes.

* *Leaves* pinnate.

8. **P. fruticosa**, *Linn.*; *Boiss. Flor. Orient.* ii. 703; dioecious, shrubby, silky, leaflets 3–7 oblong-lanceolate or linear quite entire apiculate, flowers solitary, petals obovate exceeding the calyx, achenes furnished with a long pencil of silky hairs, style short subterminal. *P. rigida*, *Wall. Cat.* 1009; *Lehm. Revis. Potentill.* 19, t. 1. *P. Arbuscula*, *Don Prodr.* 256 (*nepalensis* 229); *Wall. Pl. As. Rar.* iii. 16, t. 228; *Lehm. Revis. Potentill.* 18. *P. reticulata*, *Bertol. Plant. Nuov. As.* i. 6, t. 2.

Temperate and subalpine Himalaya, from KASHMIR, alt. 8–12,000 ft., to SIKKIM, alt. 12–16,000 ft.—*DISTRIB.* N. Asia and Europe to the Pyrenees and England.

A much branched rigid robust erect or prostrate leafy low or tall shrub, 6 in.–4 ft. *Leaves* imbricating, $\frac{1}{2}$ –1½ in.; leaflets $\frac{1}{2}$ – $\frac{1}{2}$ in., coriaceous; petiole slender; stipules large, membranous, obtuse. *Flowers* usually solitary, $\frac{3}{4}$ –1½ in. diam.; peduncle rarely 1 in., silky; bracteoles entire or 2-fid. *Calyx*-lobes ovate or lanceolate. *Petals* broadly obovate. *Stamens* many. *Achenes* numerous, minute, with long hairs, and sunk in the long hairs of the receptacle.

VAR. glabrata; very short, glabrate, leaflets lanceolate. Sikkim, alt. 15,000 ft.

VAR. ochreatea; *Lehm.*; slender, very silky, almost white, leaflets much-reduced linear-lanceolate with revolute margins, flowers smaller. *P. ochreatea*, *Lindl. in Wall.*

Cat. 1028 ; *Lehm. Revis. Potentill.* 17. Western Tibet, from N. of Kumaon to Ladak, alt. 13–17,000 ft.

VAR. pumila; depressed, very dwarf, branches spreading, leaflets very silky $\frac{1}{8}$ – $\frac{1}{4}$ in., flowers sessile $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. *P. Lindenbergii*, *Lehm. in Otto Gart. und Blumenzeit.* vii. 339 ; *Revis. Potentill.* 14, t. 2.

VAR. Inglisii; very dwarf, most densely tufted, leaflets $\frac{1}{2}$ in. linear-lanceolate, flowers often peduncled, peduncle bracteate. *P. Inglisii*, *Royle Ill.* 207, t. 41 ; *Lehm. Revis. Potentill.* 18. Kumaon and West Tibet, alt. 14–15,000 ft.—Very near *P. biflora*, Willd. of the Altai and American Polar regions, which has obcordate petals.

VAR. arnerioides; dwarf, forming dense hard tufts or cushions, branches with the densely crowded spreading leaves $\frac{3}{4}$ in. diam., leaflets linear-lanceolate very rigid, margins revolute to the midrib, achenes glabrous. Borders of Sikkim and Tibet, alt. 17–17,500 ft., *J. D. H.*

9. **P. Salessovil**, *Steph. in Mem. Soc. Nat. Mosc.* ii. 6, t. 3; silky, shrubby below, leaflets 7–9 oblong obtuse coarsely obtusely toothed above the middle, flowers large cymose, achenes villous, style ventral very slender. *Lehm. Monogr. Potentill.* t. 1 ; *Revis. Potentill.* 13. *P. discolor*, *Camb. in Jacq. Voy. Bot.* 53, t. 65. *Comarum Salessovii*, *Bunge*; *Ledeb. Flor. Ross.* ii. 63.

WESTERN TIBET, LAHUL and northern border of KASHMIR, alt. 11–14,000 ft.—DISTRIB. Altai and Thian Schan Mts.

Stems 1–3 ft., woody and as thick as the finger below. *Leaves* 4–6 in.; leaflets 1–1 $\frac{1}{2}$ in., subopposite, subequal, petiolulate, coriaceous, white or green beneath, base rounded; petiole stout; stipules membranous, caudate. *Flowers* 1 in. diam., very numerous, peduncled, in branched leafy cymes. *Calyx* tomentose, lobes ovate or lanceolate, acuminate; bracteoles linear. *Petals* obovate-oblong, exceeding the calyx, white? *Stamens* many, filaments long. *Achenes* minute, many, immersed in the long receptacular hairs, clothed with long silky hairs.

** *Leaves digitately 3-foliate*.

10. **P. ambigua**, *Camb. in Jacq. Voy. Bot.* 51, t. 62; tufted, silky or glabrous, stem very short leafy, leaflets 3 obovate- or orbicular-cuneate obtusely 3-toothed or 3-fid at the broad tip, stipules leafy, flowers solitary peduncled, petals much exceeding the calyx, achenes many smooth, style slender ventral. *Hook. Bot. Mag.* t. 4613 ; *Lehm. Revis. Potentill.* 21. *P. cuneifolia*, *Bertol. Misc.* xxiv. 15, t. 2. *P. cuneata*, *Wall. Cat.* 1015 in part.

Temperate and Alpine Himalaya; from KASHMIR, alt. 10–14,000 ft., to SIKKIM, alt. 9–15,000 ft.

Rootstock stout or slender. *Stems* 1–6 in. *Leaflets* $\frac{1}{4}$ – $\frac{1}{2}$ in., sometimes as broad as long, sometimes glabrate and glaucous beneath; petiole $\frac{1}{4}$ –1 in.; stipules variable. *Flowers* $\frac{1}{2}$ –1 in. diam.; peduncle $\frac{1}{4}$ –1 in., naked. *Calyx* pubescent or glabrate; lobes triangular, acute; bracteoles elliptic, obtuse. *Petals* orbicular, yellow. *Achenes* sunk in the very long receptacular hairs, smooth, clothed with long silky hairs.—Foliage of *P. Sibbaldi*.

11. **P. eriocarpa**, *Wall. Cat.* 1012; nearly glabrous, rootstock very stout, peduncles and long petioles very slender, leaflets 3 cuneate incised and toothed above the middle, flowers solitary, petals much larger than the calyx, achenes very small, style slender terminal. *Lehm. Revis. Potentill.* 22, t. 4.

Tibetan region of KUNAWAR, KUMAON, NIPAL, and SIKKIM, alt. 12–14,000 ft.

Rootstock long; branches like rootstocks, ascending, 4–10 in. long, as thick as a swan's quill, densely clothed with imbricating silky or woolly stipular sheaths; flowering stems from the tips of the branches, very slender, 2–18 in., suberect, glabrous or faintly silky, with one or two subsessile leaves above the middle. *Leaves* very few;

leaflets $\frac{1}{2}$ – $1\frac{1}{2}$ in., thin, bright green on both surfaces, 3-multifid; petiole $\frac{1}{2}$ –3 in.; stipules silky, acute. *Flowers* 1– $1\frac{1}{2}$ in. diam.; peduncle $\frac{1}{2}$ –3 in., naked. *Calyx* glabrous; lobes ovate, acute; bracteoles broadly elliptic, sometimes exceeding the calyx-lobes. *Petals* orbicular-obcordate, yellow. *Achenes* minute, clothed with very long flexuous hairs.

SECT. III. **Potentilla proper.** *Stamens* numerous. *Achenes* not concealed by the long hairs of the receptacle.

* Root perennial.

† *Leaves interruptedly pinnate, the alternate one or more pairs much smaller.* (See also 19 *P. leuconota.*)

12. **P. Mooniana**, *Wight Ic.* t. 233; hirsute or villous, leaflets very many pair elliptic obtuse serrate paler beneath, the smaller orbicular or cuneate, flowers paniced or corymbose, bracteoles broad toothed, achenes quite smooth, style very short ventral. *Lehm. Revis. Potentill.* 54. *R. polyphylla* and *barbata*, *Wall. Cat.* 1030, 1026; *Lehm. l. c.* 53; *Monogr. Suppl.* 1, t. 5. *P. sordida*, *Klotzsch. in Reis. Pr. Wald. Bot.* t. 9.

Temperate Himalaya; from KUMAON, alt. 11,500 ft. to SIKKIM, alt. 10–12,000 ft. KHASIA MTS., alt. 4–5000 ft. CEYLON, Horton plains, alt. 7000 ft.

A tall erect-branched leafy plant in Ceylon and at the lower elevations of N. India, but becoming stunted with almost prostrate flowering-branches at 12,000 ft., very variable in amount of hairiness, and sometimes having a few of the early leaves silky; rarely (*P. polyphylla*) glabrate with appressed hairs. *Leaves* 6–10 in., narrow, pinnate nearly to the base, the leaflets smaller downwards; larger leaflets, $\frac{1}{2}$ – $1\frac{1}{2}$ in., smaller $\frac{1}{10}$ – $\frac{1}{2}$ in., all sessile, membranous, coriaceous at higher elevations, brown when dry; petiole slender, silky; lower stipules usually membranous, upper leafy and toothed or lobed. *Inflorescence* from an open dichotomously branched lax panicle with slender pedicels, to a short almost umbellate corymb with stiff stout pedicels (*P. barbata*). *Flowers* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. *Calyx* villous, lobes ovate, acute; bracts larger or smaller than the lobes, ovate or cuneate, usually 3-toothed or -lobed. *Petals* obovate-orbicular. *Achenes* on an elevated hairy receptacle, quite without wrinkles.—I can find no characters upon which to found definable varieties of this plant, which by its occasional silky leaves shows an affinity with *P. fulgens*.

13. **P. fulgens**, *Wall MSS. in Hook. Bot. Mag. under t.* 2700; softly silky, leaflets very many pair elliptic oblong or obovate obtuse sharply serrate clothed beneath with silvery hairs, interposed pairs minute, flowers paniced or corymbose, bracteoles quite entire or 2–3-fid, achenes small smooth, style short slender ventral. *Lehm. Revis. Potentill.* 54. *P. splendens*, *Wall. in Hook. Bot. Mag.* t. 2700; *Cat.* 1017; *Don Prodr.* 330; *Sweet Brit. Fl. Gard.* t. 191. *P. Siemersiana*, *Lehm. Ind. Sem. Hort. Hamb.* 1820, 8; *Pugill.* i. 31. *P. lineata*, *Trevir. in Spreng. Syst. Veg.* ii. 534; *Reich. Icon Exot.* t. 8. *P. Naspata*, *Ham. MSS.*

Temperate Himalaya; from KUNAWAR, alt. 6–7000 ft. to SIKKIM, alt. 7–13,000 ft. KHASIA MTS., alt. 4–5000 ft.

As variable as *P. Mooniana*, and in a very similar manner; and further almost connected with it by var. *intermedia*; but usually more robust, with more copious spreading hairs on the petiole and stem, and with the brilliant silvery clothing of the under surface of the leaves and inflorescence sometimes extending to the upper surface. *Rootstock* very stout. *Stems* 6–24 in., stout, ascending or erect, leafy. *Leaves* 2–6 in.; larger leaflets $\frac{1}{2}$ – $1\frac{1}{2}$ in., crowded or not, sometimes with deeply impressed nerves above, at others quite flat, teeth very numerous and acute; petiole rather stout; stipules and inflorescence and petals as in *P. Mooniana*, but calyx usually very silvery,

lobes acute; bracteoles very variable. *Achenes* on an elevated hairy receptacle.—Reichenbach figures the petals as retuse; they seem hardly so in our specimens, nor are they so represented in Bot. Mag. Lehmann's name *P. Siemersiana* published in 1820 has the priority, but is suppressed by the author himself (Revis. 55).

VAR. intermedia; leaflets fewer more oblong slightly silvery beneath, calyx green sparsely silky or hairy as in *P. Mooniana*.—Sikkim at Jongri, alt. 13,000 ft., C. B. Clarke.

14. *P. anserina*, Linn.; Boiss. *Fl. Orient.* ii. 707; rootstock sending out long racemes, leaves lanceolate, leaflets 6–10 pair with minute alternating ones obovate or oblong deeply sharply toothed silvery with white hairs beneath, scapes from the rootstock and from nodes on the runners slender naked 1-flowered, achenes many. *P. pseudo-anserina*, Bertol. *Misc.* xxiv. 15, t. 3.

WESTERN TIBET, PITHI, &c., alt. 12–16,000 ft., Thomson; Balti prov. of KASHMIR, alt. 7700 ft., C. B. Clarke.—DISTRIB. Kashgar, N. Asia, and from Persia westward to the Atlantic, N. America, Australia.

Rootstock very short; racemes a foot and more long. *Leaves* forming a spreading tuft from the crown, 2–10 in., green above, silky beneath; leaflets $\frac{1}{4}$ –2 in., sessile, smaller ones often minute lanceolate and entire; stipules membranous. *Flowers* $\frac{1}{2}$ –1 in. diam.; scape 1–6 in. *Calyx-lobes* lanceolate, acuminate; bracteoles lobed or cut. *Petals* yellow, orbicular. *Achenes* numerous, smooth, on a villous elevated receptacle.

†† *Leaves* not interruptedly pinnate (alternate leaflets not smaller except sometimes in 19. *P. leuconota*).

15. *P. Leschenaultiana*, Ser. in DC. *Prodr.* ii. 584; robust, villous, hairs long spreading soft and silky, leaflets 5–7 obovate or broadly elliptic obtuse coarsely toothed white beneath, flowers corymbose, petals obcordate, achenes on an elevated receptacle wrinkled, style subterminal. *Wight Ic.* t. 990; *Wight & Arn. Prodr.* 301; *Lehm. Monogr. Potentill. Suppl.* 1, t. 3; *Revis.* 41. *P. Grahamiana*, *Wight Cat.*

Temperate Western Himalaya, from KASHMIR to KUMAON. NILGHIRI HILLS abundant.

Rootstock short, stout. *Leaves* 1–10 in.; leaflets usually 5, sometimes 9 or even 11, $\frac{1}{4}$ –1 in., membranous or rather coriaceous, teeth acute or obtuse; petiole slender; stipules, lower membranous entire, upper often leafy and toothed. *Flowering stems* erect or ascending, 2–18 in., usually corymbosely branched above, the corymbs lax and spreading or close. *Flowers* subsessile or long-pedicelled, $\frac{1}{3}$ – $\frac{2}{3}$ in. diam., yellow, rarely white. *Calyx* villous or silky, lobes triangular or oblong, acute or subacute; bracteoles linear, oblong, acute. *Petals* longer than the calyx, orbicular obcordate or more obcuneate. *Carpels* numerous. *Achenes* on an elevated and often globose hairy receptacle, variable in size, minutely wrinkled.—A most variable plant, often a roadside weed.

VAR. bannehalensis; tall, more slender, copiously branched above, leaflets silvery white (rarely green) beneath, flowers 1 in. diam. on slender pedicels, calyx silky, lobes very acute. *P. bannehalensis*, Camb. in Jacq. *Voy. Bot.* 52, t. 64; *Lehm. Revis. Potentill.* 41.—Kumaon to Kashmir, alt. 6–12,000 ft.

16. *P. fragarioides*, Linn.; Ledeb. *Fl. Ross.* ii. 38; villous or hairy, hairs soft silky, leaflets 5–7 elliptic or oblong obtuse coarsely toothed hirsute but not white or silvery beneath, flowers corymbose, petals obovate or obcordate, achenes on an elevated receptacle, style subterminal. *Lehm. Revis. Potentill.* 42; *Maximov. Diagn. Dec.* xv. 158. *P. Gerardiana*, Wall. *Cat.* 1023; *Lehm. l.c.* 42. *P. variabilis*, Klotzsch in Reis. *Pr. Waldem. Bot.* t. 11. *P. Munroana*, *Lehm. Ind. Sem. Hort. Hamb.* 1849, 7; *Revis. Potentill.* 40, t. 13.

Temperate Himalaya, from WAZERISTAN, Stewart, to KUMAON and BHOTAN.—DISTRIB. Siberia to China and Japan.

A smaller plant (sometimes only 2 inches high) than *P. Leschenaultiana*, with which it is almost, if not quite, united through its var. *bannihalensis*, less villous, with smaller leaves, more branched open corymbs, longer and more slender pedicels, more acute calyx-lobes and smaller fruit.

VAR. *stolonifera*: Lehm.; Maxim. Diagn. Dec. xv. 160; stoloniferous, leaflets sometimes 9, the alternate smaller. Bhotan, *Griffith*; Sirmore, *Wallich*.—I give the Sirmore habit on Maximovic's authority; the specimens in Herb. Wallich have no stolons and are referable to the ordinary form of the plant. According to the same authority this variety is found in Japan and Kamtschatka.

17. *P. Clarkei*, Hook. f.; leafy, stout, hispid with long spreading hairs, leaves short, leaflets 5–7 lower much smaller obovate very coarsely crenate-toothed, flowers pedicelled in dichotomous cymes with very divaricate leafy branches and involucriform cut leaf-bracts, calyx-lobes acute, achenes many minutely wrinkled, style slender terminal.

KASHMIR, Sirinuggur, alt. 7000 ft., *C. B. Clarke*.

Stems 1 ft., ascending from a woody rootstock. *Leaves* 1–2 in., covered with spreading hairs on the petiole and both surfaces; leaflets $\frac{1}{2}$ –1 in., approximate, sessile, rigidly coriaceous, toothed $\frac{1}{4}$ way down, pale green when dry, lower lateral sometimes cuneate and 2–3-toothed; stipules on the stem large, semi-ovate, leafy, entire or toothed. *Inflorescence* very stiff, spreading, dichotomously branched, with sessile leaves; pedicel stout, $\frac{1}{2}$ –1 in. *Flowers* $\frac{1}{2}$ in. diam. *Petals* obovate, yellow. *Stamens* numerous. *Achenes* rather large, numerous, on an elevated hairy receptacle.—The rigid pubescence, habit, inflorescence and carpels at once distinguish this from its allies; its floral leaves form a sort of involucre of narrow almost pinnatifid spreading leaflets.

18. *P. Griffithii*, Hook. f.; tall, branched, hoary, leafy, leaves short-petioled, leaflets 5–7 white with appressed pubescence beneath 3 terminal leaflets obovate coarsely crenate-serrate lateral smaller orbicular or oblong, stipules leafy deeply toothed, flowers in paniced corymbs sessile or pedicelled, calyx-lobes obtuse or subacute, achenes very minute glabrous, style very short subterminal. *Potentilla* 15, *Herb. Ind. Or. H. f. & T.*

Eastern Himalaya, BHOTAN, alt. 6–8000 ft., *Griffith*; SIKKIM, alt. 7–14,000 ft., *J. D. H.*

Rootstock inclined. *Stem* 10–24 in., erect or ascending, stout or slender. *Leaves* small, 1–4 in.; leaflets $\frac{1}{2}$ –1 in., green and glabrous or hairy above, quite white beneath and sometimes hairy as well as clothed with white opaque down, base cuneate, lateral very irregular in size and shape, lowest pair often minute; petiole hairy; stipules large. *Flowers* $\frac{1}{2}$ –1 in. diam.; pedicel $\frac{1}{2}$ –2 in., pubescent or tomentose. *Calyx* silky, lobes acute or obtuse; bracteoles quite entire, oblong or ovate, acute or obtuse. *Petals* yellow, rounded or retuse at the tip. *Achenes* numerous, exceedingly minute, smooth, on a large globose somewhat hairy receptacle.—Near *P. discolor*, Bunge, of China, of which I have seen only a small specimen, and which is much smaller, with prostrate flowering stems and pointed tips to the calyx-lobes.

VAR. 1; very slender, flowers $\frac{1}{2}$ – $\frac{1}{2}$ in. on slender long pedicels, petals small.—Sikkim, alt. 7–9000 ft.

VAR. 2.; robust, sometimes $\frac{1}{2}$ –4 in. high, flowers $\frac{1}{2}$ –1 in. on stout shorter pedicels, petals large.—Bhotan and Sikkim, alt. 12–13,000 ft.

19. *P. peduncularis*, Don Prodr. 230; leaflets numerous oblong closely deeply serrate clothed beneath with long soft appressed silvery hairs, above silky or glabrous, flowering stems erect or ascending equalling the leaves, flowers few large corymbose, bracteoles usually 1–2-toothed, achenes very large almost globose, style very short ventral. *Lehm. Revis. Potentill.* 66, t. 25. *P. leuconota*, *Wall. Cat.* 1021, in part. *P. velutina*, *Wall. Cat.* 1016.

Alpine Central and Western Himalaya; NIPAL, *Wallich*. SIKKIM, alt 12-14,000 ft., *J. D. H.*; *C. B. Clarke*.

Rootstock very long and stout, inclined. *Leaves* 2-18 in., linear- or obovate-oblong in outline, 1-2½ in. diam. across the broadest part; leaflets usually close and often imbricate, ½-1½ in., tip rounded, sessile, many-nerved, the alternate nerves smaller, upper decurrent; petiole slender or stout; lower stipules membranous, upper leafy toothed. *Flowering stems* with one or two leaves and a few-flowered irregular corymb. *Flowers* ¾ in. diam.; pedicel elongating after flowering. *Calyx* silky, lobes triangular acute; bracteoles various, usually toothed. *Petals* orbicular, yellow. *Stamens* 20-30. *Achenes* few, ⅓ in. diam., four times as large as in any other Indian species, dark brown; receptacle low, villous.

VAR. obscura; covered with soft spreading hairs, not silvery, leaflets ½ in. broadly oblong membranous less closely serrate softly hairy on both surfaces.—Kumaon at Kalari, alt. 13,000 ft., *Strach. & Winterb.* I have but one specimen, and though I find no approach to pubescence on it, judging from the variation of *P. splendens*, *Mooniana*, and *Leschenaultiana*, it may well be referable to *peduncularis*, with which it altogether agrees in habit, flower, and achenes.

VAR. Clarkei; dwarf, sparsely silky, not silvery, leaflets narrowly oblong.—Sikkim at Yakla, alt. 14,000 ft., *C. B. Clarke*.

20. ***P. leuconota***, *Don Prodr.* 230; leaflets numerous (alternate sometimes minute) oblong obtuse sharply closely serrate clothed beneath with appressed shining silky hairs, flowering stems exceeding the leaves, flowers small subumbellate, bracteoles entire, achenes few hairy or glabrous, style very short ventral. *Wall. Cat.* 1021 (*excl. spec. of peduncularis*); *Lehm. Revis. Potentill.* 65, t. 24.

Alpine Himalaya; GARHWAL, 10,000 ft., *Madden*; NIPAL, *Wallich*; SIKKIM, alt. 10-16,000 ft., *J. D. H.*—DISTRIB. Borneo (Kina Balou, alt. 11,000 ft., *Low*).

Rootstock very stout, sometimes 1 in. diam., inclined. *Leaves* 2-6 in., very numerous, linear in outline or rather broader upwards; leaflets close or sparse, ¼-¾ in., sessile, glabrous or hairy above; petiole with appressed hairs. *Flowering stem* erect or ascending, with usually a leaf about the middle, and an imperfect whorl of reduced ones at the inflorescence. *Flowers* ½ in. diam., crowded the pedicels elongating stiffening and forming an imperfect umbel as the fruit advances. *Calyx* silky, lobes acute; bracteoles linear-lanceolate, entire. *Petals* obovate, retuse or rounded at the tip, rather longer than the calyx, yellow. *Stamens* about 20. *Achenes* not numerous.

21. ***P. microphylla***, *Don Prodr.* 231; dwarf, densely tufted, sparingly silky or glabrate, leaflets very numerous small oblong or rounded pinnatifidly toothed to the middle or deeper, scape exceeding the leaves 1- rarely 2-flowered, petals much exceeding the calyx, achenes many minute quite smooth, styles very short ventral. *Wall. Cat.* 1010.

Alpine Himalaya, from GARHWAL, alt. 10-14,700 ft. to SIKKIM, alt. 15-18,000 ft.

Very variable in habit and stature, forming at high elevations dense hard moss-like tufts, strewed with golden flowers and with the leaves so small and crowded as with difficulty to be distinguished; at lower elevations the leaves are 4-6 by ¾ in. *Leaflets* opposite and alternate, uniform, ⅓-½ in. broad, crowded and overlapping or scattered, flat, or complicate; petiole slender; stipules very large, membranous, obtuse. *Flowering stem* or scape erect, rarely shorter than the leaves, appressed-pubescent or silky, naked or with an undeveloped leaf and bud above the middle, rarely 2-3-flowered. *Flowers* ½-¾ in. diam. *Calyx*-lobes acute or obtuse; bracteoles oblong. *Petals* orbicular or obovate, yellow. *Stamens* 30-40. *Achenes* in a globose head on a villous receptacle.

VAR. a. microphylla proper; densely tufted, rootstock stout woody, leaves 1 in., petiole filiform, leaflets ⅓ in. 3-5-fid pointing forwards and upwards. *P. microphylla*, *Wall.* and *γ. depressa*, *Wall.*; *Lehm. Revis. Potentill.* 30; *Monog. Suppl.* t. 2, f. 2.

VAR. β. glabriuscula, *Wall. Cat.* 1010; less densely tufted, leaves 2-3 in., leaflets

nearly orbicular in outline flat cut in rather a fan-shaped manner, glabrous above, silky on the nerves beneath.

VAR. *δ. latiloba*, Wall. Cat. 1010; leaves 2-4 in., leaflets orbicular in outline flat toothed from below the middle to the tip, nearly glabrous beneath, scape slender 2-3-flowered sometimes decurved in fruit. *P. microphylla*, Royle Ill. 208, t. 41, f. 2.

VAR. *achilleaefolia*; leaves 1-2 in., leaflets most densely imbricate pointing obliquely forwards and upwards almost perpendicularly to the plane of the leaf very silky beneath.

VAR. *commutata*; leaves 3-4 in., leaflets $\frac{3}{8}$ in. separate flat broadly oblong pinnatifid to the middle, lobes slightly falcate glabrous above sparingly silky beneath, scapes shorter than the leaves, calyx-lobes and bracteoles obtuse. *P. commutata*, Lehm. Puggill. iii. 16; Revis. Potentill. 65.—Kumaon, Wall. Herb.; Bargi Kang Pass, Str. & Winterb. The most developed form, approaching in size and habit *P. peduncularis*, var. *obscura*, but widely differing in the fruit.

22. **P. bifurca**, Linn.; Boiss. Fl. Orient. ii. 707; small, slender, clothed with appressed silky hairs, stem leafy, leaflets 5-15 oblong entire 2-3-fid or -partite, flowers small solitary or cymose on slender peduncles, petals much exceeding the calyx, achenes glabrous except at the base, style slender ventral. *P. Moorcroftii*, Wall. Cat. 1014; Lehm. Revis. Potentill. 23, t. 3. *P. glauca*, Camb. in Jacq. Voy. Bot. 54, t. 66. *P. bidens*, Bertol. Misc. Bot. xxiv. 16, t. 4.

WESTERN TIBET, alt. 10-14,000 ft., and Tibetan border of LAHUL, KUMAON, and SIKKIM, alt. 13-17,000 ft.—DISTRIB. Soongaria, Altai Mts., Mongolia, Caucasus, Taurus.

Rootstock long, slender, branched, tortuous. Stems 4-8 in., suberect or diffuse. Leaves $\frac{1}{2}$ -2 in.; leaflets $\frac{1}{8}$ - $\frac{3}{4}$ in., usually linear-oblong, not toothed or serrate, obtuse or acute, sessile by a broad or narrow base; petiole slender; stipules acute or acuminate. Flowers $\frac{1}{2}$ in. diam.; peduncle $\frac{1}{2}$ -1 in., naked, flexuous. Calyx-lobes broad, rather obtuse. Petals obovate, yellow. Achenes few, large for the size of the plant, somewhat triangular, obtuse, quite smooth, exceeding the hairs of the elevated receptacle.

23. **P. corlandrifolia**, Don Prodr. 232; sparsely hairy or glabrate, rootstock very thick, leaflets 6-∞ pair broadly ovate deeply cut into spreading linear or subulate hair-pointed lobes, flowering stems ascending and prostrate, flowers subumbellately corymbose, petals obcordate, achenes nearly glabrous, style slender terminal. *P. meifolia*, Wall. Cat. 1011; Lehm. Revis. Potentill. 29; Monog. Suppl. i. t. 1.

Central and Eastern Alpine Himalaya; NIPAL, Wallich; SIKKIM, Jongri, alt. 13,000 ft., C. B. Clarke.

Rootstock as thick as the thumb, inclined. Leaves excessively numerous, spreading, 2-4 in.; leaflets $\frac{1}{4}$ - $\frac{1}{2}$ in. broad, opposite and alternate, sessile, glabrous except a few hairs beneath and at the tip of every segment, cut almost to the midrib in a fan-like manner, primary segments again divided, ultimate ones acute; petiole with appressed hairs; stipules subulate. Flowering stems 4-6 in., numerous, declinate and then ascending, with appressed hairs and a few much reduced leaves. Flowers $\frac{1}{2}$ in. diam. on slender pedicels. Calyx glabrate; lobes triangular, acute; bracteoles linear-oblong, acute. Petals twice as long as the calyx, yellow. Achenes smooth; receptacle hairy.—The leaflets of the Sikkim specimens are much more finely divided than those of the Nipal ones.

24. **P. multifida**, Linn.; Boiss. Fl. Orient. ii. 710; stems many and petiole and leaves beneath softly white-tomentose without silky hairs, leaves pinnate or subdigitately 3-5-foliolate glabrous above, leaflets linear-oblong or obovate pinnatifid nearly to the base, segments linear or lanceolate ascending, mar-

gins recurved, flowers yellow $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. corymbose, achenes numerous minute, style terminal. *Lehm. Revis. Potentill.* 34. *P. breviscissa*, *Bertol. Misc. Bot.* xxiv. 17, t. 5.

KASHMIR and WESTERN TIBET, alt. 10–16,000 ft.; Niti Pass, KUMAON, alt. 16,300 ft., *Str. & Wint.*—DISTRIB. Afghanistan to the Caucasus. Northern and Central Europe and Asia from Lapland and the Pyrenees; China; temperate and Arctic N. America.

As variable in stature as *P. sericea*, and in other respects also. *Rootstock* short, erect, with many crowns of leaves and stout or slender, suberect or prostrate or ascending stems. *Leaves* $\frac{1}{2}$ –2 in. diam., normally with 5 subdigitate lobes, but often with lobes more pinnately dispersed on the slender petiole which is sometimes 4 in. long; divisions of pinnules $\frac{1}{16}$ – $\frac{1}{2}$ in. broad. *Flowers* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., in close or open corymbose cymes, or few, or solitary in reduced forms, subsessile or on long slender pedicels. *Calyx* silky; lobes ovate, acute; bracteoles linear-oblong, obtuse. *Petals* orbicular-obovate, retuse. *Achenes* glabrous, exactly like those of *P. sericea*; receptacle hairy.—A considerable number of species in different sections of Lehman's "Revision" are referable to this species. *P. altaica*, Bunge is a state with leaflets reduced to three. *P. verticillaris*, Steph., referred here by Ledebour, is according to our specimens partly *P. multifida* and partly *sericea*.

VAR. glabrata; dwarf, rootstock stout, stem prostrate, leaves dense nearly glabrous, flowers small.

VAR. minor, *Ledeb. Fl. Ross.* ii. 42; very slender, leaflets pinnate cut into very slender lobes. *P. tenella*, Turcz. West Tibet, *Falconer*. Afghanistan, *Griffith*.

VAR. Saundersiana; very small, leaves palmately 3–5-foliolate, leaflets $\frac{1}{4}$ – $\frac{1}{2}$ in. deeply incised tomentose or silky beneath. *P. Saundersiana*, *Royle Ill.* 207, t. 41, f. 1; *Lehm. Revis. Potentill.* 113. Western Tibet, alt. 15–17,000 ft. Also in Siberia and Arctic latitudes. Very small 3-foliolate specimens are perhaps undistinguishable from *P. nivea*, L., and var. *hololeuca* of *P. sericea* may be referable here. Dwarf forms of these three species are hardly distinguishable in a dry state.

25. ***P. sericea***, *Linn.*; *Boiss. Fl. Orient.* ii. 709; white, densely silkily tomentose, stems many, leaves oblong pinnate, leaflets 5–11 silky on both surfaces, cut nearly to the base into linear subacute ascending lobes with recurved margins, flowers yellow $\frac{1}{4}$ – $\frac{3}{4}$ in. diam. corymbose, petals orbicular-obovate, achenes many smooth, carpels glabrous, style terminal. *Lehm. Revis. Potentill.* 33. *P. cinerascens*, *Bertol. Plant. Nuov. Asiat.* 7, t. 63. *P. soongarica*, *Bunge; Ledeb. Fl. Ross.* ii. 42.

WESTERN TIBET, and Tibetan region of the Western Alpine Himalaya, from KASHMIR, alt. 9–17,000 ft. to KUMAON.—DISTRIB. Afghanistan to the Caucasus and Armenia. Soongaria, N. China, Temperate and Asiatic N. America.

A very variable plant, diminishing in size with the increasing elevation from 18 in. to 3 in.; covered more or less densely with soft shining silky hairs. *Rootstock* very stout, perpendicular, with many heads. *Leaves* crowded, 1–6 in. long, rarely more than 1 in. broad; leaflets oblong, all cut nearly to the midrib, rarely only half way to it, the terminal leaflets pedately disposed, the lateral opposite and alternate. *Flowering stems* ascending, densely tomentose, corymbosely many-flowered in the larger specimens, few or 1-flowered in the smaller. *Calyx-lobes* triangular-ovate or lanceolate, acute; bracteoles narrowly oblong, obtuse. *Achenes* quite smooth.—I can find no character whereby to separate *P. soongarica* from the common Tibetan form of *sericea* and it is difficult to retain *hololeuca* and *polyschista* as distinct forms, to which may be added certain forms of *P. pensylvanica*, L.

VAR. polyschista, *Lehm.*; dwarf, densely tufted, leaflets 3–5 short, flowers smaller—alt. 15–17,000 ft.—*P. polyschista*, *Boiss. Flor. Orient.* ii. 710.

VAR. hololeuca, *Boiss.*; *Fl. Orient.* ii. 710 (sp.); dwarf, leaflets 3–5, ovate pinnatifid to the middle, most densely white tomentose beneath, flowers few small. *Lehm. Revis. Pot.* 69, t. 27. Perhaps referable to *P. multifida*—Pugha in Little Tibet,

alt. 14–16,000 ft., *Thomson*. Small forms of this are undistinguishable in a dry state from those of *P. multifida*, especially when the leaflets are reduced to 3 or 5; its numerous forms have many names in Europe, Asia, and America.

††† *Leaves digitately 5-foliolate, or upper 3-foliolate.* (See also states of 24. *P. multifida*, 25. *sericea*, and 37. *nivea*).

26. ***P. desertorum***, *Bunge in Ledeb. Fl. Alt. ii. 257; Fl. Ross. ii. 53; Ic. t. 337*; erect, leafy, glandular hairy, radical leaves long-petioled 5-foliolate, leaflets sessile membranous obovate coarsely crenate, cauline stipules large lanceolate quite entire, flowers in capitate leafy heads, achenes very minute wrinkled, styles short subterminal. *Lehm. Revis. Potentil. 90.*

Western Himalaya; in the dry region of KASHMIR and KISHTWAR, alt. 7–9000 ft., *Thomson, C. B. Clarke*.—DISTRIB. Soongaria.

All parts covered with soft spreading often glandular hairs. *Stems* tufted on a woody rootstock, soft, erect or ascending. *Radical leaves* 4–8 in.; leaflets 1–2 in., entire towards the cuneate base, nerves slender, green on both surfaces; petiole slender, 2–6 in.; cauline leaves short-petioled or sessile, 3-foliolate; stipules $\frac{1}{2}$ – $\frac{3}{4}$ in. *Flowers* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., sunk amongst the uppermost leaves; peduncle elongating in fruit, strict and stout. *Calyx* large, $\frac{1}{8}$ in. long; lobes lanceolate, acute; bracteoles entire or 3-fid. *Petals* orbicular-obovate, dark yellow, not much exceeding the calyx. *Achenes* very numerous, on a globose villous receptacle. *P. Kotschyana*, Fenzl, of Cilicia, &c., seems to me to be this plant.

27. ***P. nepalensis***, *Hook. Exot. Flor. ii. t. 88*; more or less clothed with long soft spreading hairs, stem leafy branched, leaves long-petioled 5-foliolate, leaflets obovate or elliptic-obovate acute or obtuse coarsely serrate green, flowers pedicelled in dichotomous panicles, petals obcordate purple, achenes minute wrinkled. *Wall. Cat. 1027; Lehm. Revis. Potentill. 91. P. bifurcata, Wall. MSS. P. formosa, Don Prodr. 232; Sweet Brit. Fl. Gard. t. 136. P. colorata, Lehm. Ind. Sem. Hort. Hamb. 1820. P. coccinea, Hoffm. Brief. aus Ind. ii. App. 511. (Engl. edit.) P. Gulielmi Waldmeri, Klotzsch in Reis. Pr. Waldem. Bot. t. 13.*

Western temperate Himalaya, alt. 5–9000 ft., from MURREE to KUMAON.

Stems erect, from a woody rootstock, 1–3-flowered, stout or slender, from densely villous to glabrate. *Radical leaves* 12 by 3 in.; leaflets sessile, 1–3 by $\frac{1}{4}$ – $1\frac{1}{4}$ in., membranous, rarely acute, teeth obtuse or acute; base entire, cuneate; petiole slender; cauline stipules $\frac{3}{4}$ –1 in., ovate or oblong, lower entire, upper lobed. *Flowers* $\frac{3}{4}$ –1 in. diam; fruiting pedicels sometimes 3 in., divaricate. *Calyx-lobes* acute; bracteoles obtuse. *Achenes* very numerous, on a globose hairy receptacle.—In English gardens this species has been long cultivated and much hybridized.

28. ***P. kashmirica***, *Hook. f.*; erect, leafy, clothed with spreading hairs, leaves short-petioled 5-foliolate, leaflets obovate-oblong very coarsely serrate lateral lobes softly hairy on both surfaces, flowers in large wide-spreading dichotomous cymes, petals obcordate yellow, achenes deeply wrinkled, style short subterminal.

KASHMIR at Nowgunge, alt. 7500 ft., *C. B. Clarke*.

Stem a foot high, rather slender; hairs soft, flexuous. *Leaves* 2–3 in.; leaflets 1– $1\frac{1}{2}$ in., sessile, the lateral much shorter and broader, all cut $\frac{1}{3}$ way down into sub-acute lobes or serratures, paler and almost silky beneath; petiole 1–2 in.; stipules lanceolate, acute. *Inflorescence* 6 in. diam., repeatedly forked and more corymbose than paniced, many-flowered. *Flowers* $\frac{1}{2}$ in. diam.; pedicels slender. *Calyx* silky; lobes ovate, acuminate; bracteoles obtuse. *Petals* about $\frac{1}{3}$ larger than the calyx. *Achenes* many, on a globose hairy receptacle.—A very distinct plant, allied to *P. nepa-*

lensis; distinguished by the shorter petioles, very deeply serrate shorter leaflets the lateral of which are lobed on the lower margin, by the yellow flowers and strongly wrinkled achenes; the broad corymbose inflorescence further distinguishes it from both *P. nepalensis* and *desertorum*. Its nearest ally is the European *P. hirta*, L. which has much larger flowers and achenes.

29. **P. argentea**, Linn.; Boiss. *Fl. Orient.* ii. 714; hoary with appressed white tomentum, stems leafy, leaflets 5 oblanceolate pinnatifidly cut into broad subacute teeth, base entire cuneate, flowers very numerous subcorymbose, pedicels slender, petals yellow, achenes minute smooth, style subterminal.

KASHMIR, Jacquemont; Pir Punjal, Stewart; Alibad, 8,000 ft., C. B. Clarke.—DISTRIB. Soongaria, N. Asia, Asia Minor westward to the Atlantic.

Stems many from the root, 6–10 in., erect or ascending. Leaflets 1–1½ in., sessile, rather stiff, lobes pointing upwards, margins slightly recurved, glabrous above; petiole 1–2 in.; stipules lanceolate, acuminate, entire. Inflorescence broad, much dichotomously branched, leafy. Flowers ½ in. diam.; pedicels ½–1½ in. Calyx densely tomentose; lobes acute; bracteoles entire. Petals rather exceeding the calyx, obovate. Achenes on a villous elevated receptacle.

30. **P. reptans**, Linn.; Boiss. *Fl. Orient.* ii. 723; glabrous, sparsely hairy, stolons long slender rooting, leaflets 5 obovate or oblanceolate crenate-serrate, peduncles axillary solitary naked 1-flowered, achenes many smooth, styles subterminal.

KASHMIR, Falconer, Jacquemont, Thomson.—DISTRIB. Siberia, Afghanistan westward to Abyssinia and in Europe to the Atlantic, N. China, Japan.

Rootstock woody; runners 1–2 ft., slender, leafy at the nodes. Leaflets 1–2 in., membranous, somewhat pedate, sometimes petiolulate; petiole 1–6 in., slender; stipules small, oblong, entire. Peduncle 1–4 in., erect. Flowers ½–¾ in. diam. Calyx-lobes broad or narrow, acute; bracteoles ovate, entire. Petals obcordate, yellow. Achenes dark brown.

VAR. *minor*; leaflets ½ in. rigid obovate quite glabrous.

VAR. ? *trifoliolata*; pubescent, leaflets 3 obovate sparingly silky beneath. Kashmir valley, Thomson.—Probably a different species.

31. **P. pteropoda**, Royle *Ill.* 207, t. 40, f. 2; silkily hairy, leaves long-petioled fan-shaped in outline, leaflets 5 cuneate-oblong toothed at the tip, stipules very long adnate to and almost equalling the petiole, stems 1–few-flowered, petals large, carpels ovoid. *Lehm. Revis. Potentill.* 157.

Mountains surrounding KASHMIR, Royle l. c.

This is the only described Indian *Potentilla* of which I have not seen a specimen. The above character is extracted from Royle's, to which the plate enables me to add that the flowering stems equal or rather exceed the leaves, and that the petals are obcordate and twice as large in the acute sepals. The drawing represents a plant with very much the habit of *P. curviseta*, but far more robust, with 3–5 much broader leaflets, that have rounded 5–7-toothed tips.

††† Leaves digitately 3-foliolate (see also 30. *P. reptans*, var. ? *trifoliolata*, states of 24. *P. sericea* and 23. *multifida*).

32. **P. argyrophylla**, Wall. *Cat.* 1020; tall, leafy, clothed with white silky hairs rarely with opaque tomentum, leaflets 3 elliptic-ovate-oblong-orbicular or obovate acutely toothed white beneath, nerves prominent, flowers many in paniced cymes usually long-pedicelled, petals large red purple or yellow, achenes smooth on a densely villous receptacle, style subterminal.

Western and Central Himalaya, from KASHMIR, alt. 8–13,000 ft. to NIPAL.

Rootstock very stout; stem 2–3 ft., finely pubescent. *Leaflets* 2–3 in., sessile or petiolulate, green, glabrous or finely silky above, dirty white beneath; nerves not very prominent, teeth acute; petiole 3–6 in.; cauline stipules ovate-oblong, acute. *Flowers* $\frac{3}{4}$ – $1\frac{1}{4}$ in. diam.; pedicels sometimes 2 in., and very slender. *Calyx* silky, lobes acuminate; bracteoles elliptic-oblong, obtuse acute or acuminate. *Petals* obcordate-cuneate, varying from red-purple to almost brown-purple. *Stamens* about 20, dark purple. *Achenes* very numerous; styles long.

Except in the colour of the petals I can find no difference between *P. atrosanguinea* and *P. argyrophylla*, and I am hence compelled to unite them; in so doing I retain the name of *argyrophylla* from its representing a character known to both forms.

VAR. argyrophylla proper; flowers yellow. *P. argyrophylla*, Wall.; *Lehm. Monogr. Potentill. Suppl.* t. 9; *Revis. Potentill.* 151. *P. Jacquemontiana*, *Cambess. in Jacq. Voy. Bot.* 51, t. 63. *P. insignis*, *Royle MSS.*; *Lindley in Bot. Reg.*, 1841, t. 37.—I have not seen the quinate leaflets which according to Lindley occasionally occur, nor the broad 2–3-fid bracteoles mentioned by Lehman.

VAR. atrosanguinea; flowers red or purple. *P. atrosanguinea*, *Lodd. Bot. Cab.* viii. t. 786; *Don Prodr.* 232; *Lehm. Revis. Potentill.* 150; *Hook. Bot. Mag.* t. 2689; *Sweet, Brit. Fl. Gard.* t. 124. *P. Wallichiana*, *Govan in Wall. Cat.* 1013.

VAR. leucochroa; much smaller, leaflets sometimes $\frac{1}{2}$ in. densely silky often on both surfaces, flowering stems 1–few-flowered, flowers yellow or red. *P. leucochroa*, *Lindl. in Wall. Cat.* 1019. *P. Cantleyana*, *Royle Ill.* 207, t. 40, f. 1. *P. cataclines*, *Lehm. Pugill.* iii. 37; *Monog. Potentill. Suppl.* i. t. 10; *Revis. Potentill.* 150. *P. vestita*, *Klotzsch in Reiss. Pr. Waldem. Bot.* t. 14.—Kashmir to Nipal, alt. 10–15,000 ft.—Lehman (*Revis.* 171) includes Lindley's *leucochroa* under the American *P. villosa*, which differs totally in the short style and glabrous receptacle.

33. **P. gelida**, *C. A. Meyer*; *Ledeb. Fl. Ross.* ii. 59; sparsely pubescent or silky or glandular, leaflets 3 small obovate or cuneate deeply crenate, cauline few much reduced with broad-ovate large entire stipules, flowering stems slender ascending, flowers on slender pedicels yellow, calyx-lobes acute longer than the oblong obtuse bracteoles, achenes smooth, styles subterminal, *Lehm. Revis. Potentill.* 154. *P. grandiflora* and *P. alpestris*, *Herb. Ind. Or. Hook. f. & T.*

Western temperate Himalaya; from KASHMIR to KUNAWUR and in WESTERN TIBET, alt. 13–17,000 ft.—DISTRIB. N. Asia from the Caucasus to Dahuria.

Usually covered with soft spreading hairs, sometimes glandular, rarely somewhat silky. *Rootstock* rarely large. *Leaflets* $\frac{1}{3}$ – $\frac{2}{3}$ in. long, sessile or petiolulate, usually entire for $\frac{1}{2}$ or $\frac{1}{3}$ upwards from the base, crenatures very large, sometimes only 4 or 5, and towards the very end of the leaflet, rather membranous, flat, nerves indistinct; petiole $\frac{1}{2}$ –1, rarely 2 in.; stipules of cauline leaves $\frac{1}{4}$ – $\frac{1}{3}$ in. long, hoary. *Flowers* $\frac{1}{2}$ –1 in. diam., usually 1–4 on slender pedicels. *Calyx* pubescent or silky. *Petals* obcordate. *Achenes* many on an elevated villous receptacle.—A very variable plant. Some specimens of Mr. Clarke's from Karakoram, alt. 14,500 ft. are upwards of 2 feet high, others from Kumaon are not as many inches and are quite glutinous. The broad entire stipules and almost naked flowering stems are its best character. I do not see how it is to be distinguished from the European *P. grandiflora* and Siberian *P. fragiformis*, Willd. (exclusive of the Japan plant so called by A. Gay).

34. **P. doubjouniana**, *Camb. in Jacq. Voy. Bot.* 50, t. 61; sparsely pubescent, leaflets 3 obovate-cuneate deeply toothed, cauline with obtuse toothed stipules, flowering stems ascending slender leafy, calyx-lobes acute longer than the obtuse 3-fid bracteoles, achenes smooth, style subterminal. *Lehm. Revis. Potentill.* 157.

KASHMIR, alt. 9–10,000 ft., *Jacquemont, Thomson.*

Very similar to *P. gelida*, but distinguished by the more leafy flowering stems,

the obtuse cut stipules and trifid bracteoles. It appears to be a very scarce plant, and I regret to find Thomson's specimens have been by me mixed in the distribution with those of *P. gelida*, under the name of *P. grandiflora*.

35. **P. monanthes**, Lindl. in Wall. Cat. 1025; glandular or sparsely pubescent, leaflets 3 broadly obtuse coarsely crenate at the apex, cauline stipules broad-ovate acute, flowering stems very many ascending leafy, flowers sessile and pedicelled at the top of the stem, calyx-lobes broad obtuse, bracteoles orbicular-oblong, achenes minute smooth, style terminal. *Lehm. Revis. Potentill.* 175. *P. cryptantha*, Klotzsch in Reis. Pr. Waldem. Bot. t. 12.

Alpine Himalaya; from KASHMIR to SIKKIM, alt. 10,000 to 15,000 ft.

Forming large spreading tufts of leaves and stems 2–12 in. high from a rather small rootstock, very variable in size. *Leaves* radical and cauline, all short petioled; leaflets $\frac{1}{2}$ – $\frac{2}{3}$ in., rather soft, glandular-pubescent on both surfaces, crenatures rounded; petiole rarely 1 in.; stipules $\frac{1}{4}$ – $\frac{1}{2}$ in., rarely cut. *Flowers* $\frac{1}{3}$ – $\frac{1}{2}$ in. diam., axillary and subterminal, shortly pedicelled. *Calyx* pubescent, hemispheric; bracteoles often larger than the lobes. *Petals* obovate-orbicular, not much exceeding the calyx, yellow. *Achenes* exceedingly numerous and minute, on a globose villous receptacle.—The rounded tips of the sepals and bracteoles are good characters of this species. The *Potentilla* 26 of Strachey and Winterbottom from 12,000 ft. in Kumaon is, I think, a minute state.

VAR. *sibthorpioides*; much smaller, stems filiform prostrate, leaflets $\frac{1}{6}$ – $\frac{1}{4}$ in. broader, flowers $\frac{1}{4}$ in. diam., calyx-lobes and bracteoles narrower.—Lachen valley, Sikkim, alt. 11–13,000 ft., J. D. H.

36. **P. curviseta**, Hook. f.; rigid, thinly silky, leaflets 3 narrowly linear-cuneate truncate and trifid at the tip, stipules forming a narrow wing to the petiole for half its length, flowering stems slender, pedicels filiform decurved, achenes 5–6 hairy, style terminal.

KASHMIR; at Tilail, alt. 12,000 ft., C. B. Clarke.

Whole plant rigidly elastic when dry. *Rootstock* slender, crowned with stiff recurved almost woody leaf bases. *Leaves* few, 2–3 in. long; leaflets $\frac{1}{2}$ –1 by $\frac{1}{5}$ – $\frac{1}{3}$ in., suberect, coriaceous, hairy on both surfaces, teeth acute, the lateral leaflets with sometimes an additional tooth on the outer margin; petiole rigid, with a rather membranous brown sheath formed by the stipules which above the base form a green narrow margin along the petiole to its middle; free parts of stipules small, subulate, entire. *Flowering stems* 2–3 in., 2–3-flowered, slender, wiry, with opposite linear bracts at the middle and a cut one at the giving off of the pedicels; pedicels circinnately incurved after flowering, naked or with a bract at the middle. *Calyx* $\frac{1}{4}$ in. diam., silky; lobes lanceolate, acuminate, much larger than the oblong bracteoles. *Stamens* and carpels about 20. *Achenes* few, large, obliquely ovoid; receptacle flat, villous.—A very remarkable species, allied to *P. tridentata*, L. *P. Saxifraga*, Ard., and *P. alba*, L. The only Himalayan one with hairy carpels. Still more near to the *P. pteropoda*, Royle, which has 3–5 much broader more toothed leaflets rounded at the tip, and apparently larger flowers. I have seen no petals.

37. **P. nivea**, Linn.; Boiss. Flor. Orient. ii. 725; dwarf, densely clothed with white appressed tomentum, leaflets 3 rarely 5 small obovate acutely serrate, flowering stem 1–3-flowered, calyx villous, petals obcordate, achenes several smooth and faintly wrinkled, style terminal. *Lehm. Revis. Potentill.* 165. *P. cæspitosa*, *Lehm. Add. Ind. Sem. Hort. Hamb.* 1849, 10; *Revis. Potentill.* 172, t. 53. *P. argyrophylla*, var. prostrata, *Herb. Ind. Or. Hook. f. & T.*

WESTERN TIBET and drier Alpine regions of the whole Himalaya, alt. 10–17,000 ft. —DISTRIB. Caucasus and westwards to the Alps, Arctic and cold regions of N. Europe, Asia and America.

A small high Alpine species, very difficult in some of its forms to distinguish from dwarf states of *P. multifida* on the one hand, and but for the smaller flowers, from *P. leucochroa* on the other, which again resembles closely *P. argyrophylla* of the Himalayas and *P. villosa* of Arctic America.—*Rootstock* very stout and woody. *Leaves* 1–2 in.; leaflets $\frac{1}{2}$ –1 in., sessile, very coriaceous, glabrous or silky above, snow-white beneath; petiole stout; stipules ovate, acute, downy, entire or toothed. *Stem* with 1 (rarely more) reduced leaf. *Flowers* $\frac{1}{2}$ in. diam., on stout peduncles. *Calyx* woolly; lobes acute; bracteoles oblong, obtuse. *Petals* yellow, obcordate. *Achenes* few, pale, tumid, on a densely woolly low receptacle.

** Root annual.

38. *P. Kleiniana*, *Wight & Arn. Prodr.* 300; sparsely silkily hairy, stems many from the root very slender prostrate leafy, leaves digitately 3–5-foliate, leaflets 5 narrowly obovate or oblanceolate obtuse obtusely serrate, stipules $\frac{1}{2}$ -lanceolate, flowers small in terminal paniced cymes, achenes minute deeply wrinkled, style terminal. *Wight. Ill. t.* 85; *Lehm. Revis. Potentill.* 79. *P. Wallichiana*, *Wall. Cat.* 1022; *Lehm. Rev. Potentill.* 80, t. 34, not of *DC. Prodr.* *P. gracilis*, *Wall. MSS.* *Duchesnea sundaica*, *Miq. Fl. Ind. Bat. i.* part 1, 372, t. 6.

Temperate Himalaya from KASHMIR, alt. 3–7000 ft., to SIKKIM, alt. 4–9000 ft. and BHOTAN. KHASIA MTS., alt 4000 ft. NILGHIRI MTS., alt. 6–7000 ft. CEYLON, central province, alt. 6–7000 ft.—*DISTRIB.* Yunnan, Java, Japan.

Annual. *Stems* 3–24 in., flexuous. *Leaflets* $\frac{1}{2}$ –2 in., variable in breadth, membranous or rather coriaceous, entire towards the cuneate base, flat or complicate, beneath glabrous or with silky hairs on the nerves; petiole very slender, 1–4 in.; stipules $\frac{1}{2}$ in., entire or toothed. *Flowers* $\frac{1}{2}$ in. diam., usually pedicelled, or in spreading cymes. *Calyx* sparsely silky; lobes entire; bracteoles acute or obtuse. *Petals* yellow, not much exceeding the calyx. *Achenes* in a globose head with a large glabrous receptacle.—*Leaflets* very rarely 7, sometimes pedate.

39. *P. supina*, *Linn.; Boiss. Fl. Orient. ii.* 725; annual, hairy, stems spreading leafy, leaves pinnate, leaflets 3–9 opposite and alternate oblong obtuse lobulate or serrate, stipules ovate entire, pedicels axillary solitary, petals small, achenes minute, styles subterminal. *Wight & Arn. Prodr.* 300; *Lehm. Revis. Potentill.* 193. *P. cicutariæfolia*, *Willd.* *P. denticulata*, *Ser.*; *Wall. Cat.* 1029. *P. Heynii*, *Roth*; *Wall. Cat.* 1024. *P. cana*, *Wall. MSS.* *P. ruthenia?* *Herb. Ham.* *P. amurensis*, *Maxim.* *P. obovata*, *Bertol. Plant. Nuov. Asiat.* 8, t. 4. *Comarum flavum*, *Roxb. Cat. Hort. Beng.* 39; *Fl. Ind. ii.* 521.

Throughout the warmer parts of India, from KASHMIR to MALACCA and the NILGHIRI HILLS; ascending the Himalaya to 8500 ft. in the north-west. Iskardo in WESTERN TIBET., alt. 7–8500 ft.—*DISTRIB.* Afghanistan and westward to the Atlantic, N. Asia and N. Africa.

Stems very numerous from the root, 6–18 in., spreading, dichotomously branched, prostrate or suberect, stout or slender. *Leaves* $\frac{1}{2}$ –3 in., flaccidly membranous; leaflets irregular in position form and cutting, usually obovate, often oblong or cuneate, obtusely crenate incised or serrate; petiole slender, $\frac{1}{2}$ –2 in.; stipules very broad or narrow. *Flowers* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam.; pedicels $\frac{1}{8}$ – $\frac{1}{2}$ in., slender. *Calyx-lobes* obtuse or acute, as are the bracteoles. *Petals* oblong, yellow, smaller than the calyx. *Achenes* very many, minute, smooth or ridged; receptacle globose, villous.—There are two extreme forms of this common plant both found everywhere in Asia and in Africa, and many intermediates; it appears to be very rare in the Western Peninsula absent from Ceylon, which is remarkable for a tropical and subtropical annual that extends to Malacca.

VAR. 1; stems excessively numerous from the root slender, flowers $\frac{1}{2}$ in. diam., achenes minute smooth. *Plains of India.*

VAR. 2; stems more robust more dichotomously branched, flowers $\frac{1}{2}$ in. diam., achenes larger ribbed. *Kashmir*.

DOUBTFUL AND UNDETERMINABLE SPECIES.

POTENTILLA *sp.* from Shillong, Khasia Mts., alt. 5,000 ft., *C. B. Clarke*; perennial, sparsely hairy, leaflets 3 sessile $\frac{1}{2}$ – $1\frac{1}{4}$ in. elliptic-ovate or obovate acutely toothed hairy beneath less so above, cauline stipules small cut, flowering stem inclined or prostrate slender 2–3-leaved, cymes corymbose rusty tomentose leafy flowers $\frac{3}{4}$ in. diam., calyx-lobes lanceolate acute, bracteoles elliptic obtuse, petals obcordate twice as long as the calyx, carpels many.

POTENTILLA *Candolleana*, *Royle Ill.* 203, name only.

POTENTILLA *Atropos* and *pteropoda* are names given without description or indication of affinity in Hofmeister's travels, and are no doubt described Himalayan plants.

12. **CHAMÆRHODOS**, *Bunge*.

Herbs with a woody rootstock, and ascending or erect leafy stems. *Leaves* alternate, divided; stipules membranous, adnate to the petiole. *Flowers* small, 5-merous, in branched cymes. *Calyx* persistent, tube ebracteolate; lobes erect, valvate. *Petals* 5, equalling or exceeding the calyx. *Stamens* 5, opposite the calyx-lobes, short. *Disk* lining the base of the calyx; its margins free, bristly. *Carpels* 5, 10, or more, sessile in the base of the calyx; style basilar, deciduous; ovule 1, ascending. *Achenes* few or many, dry, glabrous.—DISTRIB. Mountains of Northern Asia and N. America; species 4 or 5.

1. **C. sabulosa**, *Bunge*; *Ledeb. Flor. Ross.* ii. 35; *Ic.* t. 257; tufted, glandular and villous; leaves 3-partite, segments narrow lobed obtuse.

WESTERN TIBET, alt. 12–15,000 ft.—DISTRIB. Altai Mts.

Rootstock short, with many densely tufted short heads. *Stems* 2–4 in., slender, erect or ascending, branched, naked or leafy. *Leaves* with the slender petiole $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in. diam., yellow. *Achenes* smooth, ovoid, narrowed upwards.

13. **ALCHEMILLA**, *Linn.* Lady's mantle.

Annual or perennial herbs. *Leaves* orbicular, lobed or deeply divided; stipules adnate to the petiole. *Flowers* minute, in lax or crowded corymbose cymes. *Calyx* urceolate, persistent, 4–5-bracteolate; lobes 4–5, valvate in bud. *Petals* 0. *Stamens* 1–4, inserted on the mouth of the calyx. *Disk* coating the calyx-tube, and all but closing its mouth by its thickened margin. *Carpels* 1–5, basal in the calyx-tube; style basal or ventral; ovule 1, basal. *Achenes* 1–4, enclosed in the membranous calyx-tube.—DISTRIB. Natives chiefly of the American Andes; a few are European, N. Indian, and American; species 30.

1. **A. vulgaris**, *Linn.*; *Boiss. Fl. Orient.* ii. 729; leaves plaited orbicular-cordate 7–9-lobed toothed, stipules confluent into a funnel-shaped tube with short broad spreading toothed lips.

KASHMIR, alt. 8–9000 ft., *Falconer, Stewart, C. B. Clarke*—DISTRIB. Persia and westward to the Atlantic, N. Europe and Asia, Greenland and Labrador.

More or less clothed with silky hairs. *Rootstock* perennial, creeping. *Stems* 6–18 in., ascending, simple. *Radical leaves* 2–3 in. diam., basal lobes overlapping; petiole 6–18 in.; stipules usually spreading out like a fan. *Cymes* glabrous, irregularly racemed or paniced. *Flowers* $\frac{1}{2}$ in. diam., yellow-green; pedicel very short. *Achenes* 1–2.

2. **A. indica**, *Gard. in Calc. Journ. Nat. Hist.* viii. 8; villous with soft long spreading hairs, leaves orbicular-cordate 5-7-lobed minutely toothed, stipules confluent in a cylindric tube with oblong entire or toothed acute lips. *A. vulgaris*, *Wight Ic.* t. 229. *A. vulgaris* var. *sarmentosa*, *Thwaites Enum.* 102. *A. ceylanica*, *Moon Cat. Pl. Ceyl.* 37.

NILGHIRI MTS., *Wight &c.* CEYLON; Central Province, alt. 5-7000 ft.

Rootstock creeping, woody. *Stems* prostrate, stout, leafy. *Leaves* 1-2 in. diam., glabrous or silky above, margins silky, coriaceous, basal lobes overlapping or not; petiole 1-10 in.; stipules $\frac{1}{4}$ -1 in., the free portion membranous, erect or spreading, ciliate. *Cymes* globose, dense-flowered, on slender axillary peduncles 1-2 in. long. *Calyx* villous, $\frac{1}{10}$ in. long or less.

VAR. *sibthorpioides*; very slender, leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., cymes paniced.—Ceylon, *Gardner*.

14. **AGRIMONIA**, *Linn.* Agrimony.

Slender erect leafy perennial herbs. *Leaves* interruptedly pinnate; leaflets coarsely serrate; stipules partially adnate to the petiole. *Flowers* small, yellow, in terminal spikelike racemes, 2-bracteolate; pedicels bracteate at the base. *Calyx* persistent; tube turbinate, spinous; mouth contracted; lobes 5, triangular, imbricate. *Petals* 5. *Stamens* 5-10 or more, inserted at the mouth of the calyx. *Disk* lining the calyx-tube, its margin thickened. *Carpels* 2, included in the calyx-tube; styles exserted, stigma 2-lobed; ovule 1, pendulous. *Fruit* pendulous, of 1 or 2 achenes enclosed in the hardened spinous calyx.—DISTRIB. N. temp. regions, and S. America; species 8.

1. **A. Eupatorium**, *Linn.*; *Boiss. Fl. Orient.* ii. 727; hairy or villous, leaflets elliptic-ovate or lanceolate acute obtuse or acuminate, coarsely obtusely serrate, bracts slender, calyx-tube villous deeply grooved, outer spines spreading. *A. lanata*, *Wall. Cat.* 709; *Wallroth Beiträg. Bot.* 1. 54, t. 1, f. 9. *A. nepalensis*, *Don Prodr.* 229; *Camb. in Jacq. Voy. Bot.* 55, t. 68.

Temperate Himalayas, from MURREE and KASHMIR, alt. 3-10,000 to SIKKIM, alt. 7-10,000 ft. KHASIA Mts., alt. 4-6000 ft. MISHMI Hills, *Griffith*.—DISTRIB. Westwards from Persia to the Atlantic, Siberia and Java, N. America, Java?

Rootstock woody, short or long. *Leaves* 3-7 in.; leaflets 6-21, sessile, alternate often small, hairy on both surfaces; larger 1-3 in., elliptic-ovate or -obovate rarely orbicular; smaller often orbicular and minute; petiole slender; stipules large, leafy, $\frac{1}{2}$ -lunate, entire or toothed. *Racemes* slender, lengthening in fruit; pedicels reflexed in fruit; bracts 3-fid or 3-partite. *Flowers* $\frac{1}{4}$ in. diam. *Petals* oblong-obovate, yellow. *Calyx-tube* $\frac{1}{3}$ in., hardened in fruit, grooved, lobes conniving in fruit; top of tube with a dense ring of spines which become hooked in fruit and are erect with the outer spreading.—I am quite unable to correlate the India form of this plant with the characters given for the European species so called; all are more or less glandular and have a deeply furrowed calyx-tube and a horizontal rootstock.—*A. javanica*, *Miq.* seems not different as far as a single specimen enables me to judge.

2. **A. pilosa**, *Ledeb.*; *Fl. Ross.* ii. 32; sparsely hairy, leaflets elliptic-ovate -obovate or -lanceolate obtuse or acute coarsely obtusely serrate, bracts slender, calyx-tube almost glabrous deeply grooved spines all erect. *A. viscidula*, *Bunge Mem. Sav. Etr. St. Petersb.* ii. 100, ex *Walp. Rep.* ii. 41.

KASHMIR to KUNAWUR, alt. 6-8000 ft., *Thomson, C. B. Clarke*.—DISTRIB. Russia to Manchuria, China and Japan.

Very similar to *A. Eupatorium*, but more glabrous than its Indian forms, and calyx almost glabrous with erect spines.—I do not see how *A. viscidula* differs.

3. **A. zeylanica**, *Moon Cat.* 37; villous with long spreading hairs, leaflets nearly orbicular coarsely obtusely toothed, lower bracts broad leafy, calyx-tube villous deeply grooved, spines spreading. A. *Eupatorium*, *Thwaites Enum.* 102; *Wight Ic.* t. 224.

CEYLON, central province, at an elevation of 5-7000 ft.

I keep up this species with great hesitation, suspecting it to be only a tropical form of *A. Eupatorium*, and there being approaches to it amongst the Sikkim and Khasia specimens of that plant; it is however far more unlike than these to any European form in the villous pubescence, short leaves and rounded leaflets. It is further remarkable that neither this nor any other *Agrimonia* should be found in the Western Peninsular mountains of the Indian continent.

15. **POTERIUM**, Linn.

Erect perennial herbs. *Leaves* pinnate; leaflets stalked; stipules adnate to the sheathing petiole. *Flowers* small, subsessile, in dense long-peduncled heads or centrifugal spikes, bracteate, 2-bracteolate, often polygamous. *Calyx-tube* persistent, turbinate, mouth contracted; lobes 4, petaloid, deciduous, imbricate. *Petals* 0. *Stamens* 4 or more, inserted at the mouth of the calyx, filaments slender pendulous. *Disk* lining the calyx-tube and closing its mouth. *Carpels* 1-3, enclosed in the calyx-tube; styles filiform, stigma penicillate; ovule 1, pendulous. *Achenes* solitary, enclosed in the hardened 4-angled often winged or muricate calyx-tube.—DISTRIB. N. temp. regions; species 20.

* *Carpels* solitary.

1. **P. filiforme**, *Hook. f.*; glabrous, very small and slender, leaflets sessile ovate-orbicular or -cuneate deeply toothed, peduncle subradical very long and slender, heads globose white, stamens 6.

SIKKIM HIMALAYA; in marshy ground, Lachen valleys, alt. 11,500 ft., *J. D. H.*

A small and very delicate plant quite unlike its congeners in habit; the stems being short and the heads on very long 6-8 in. filiform peduncles, each with a minute reduced leaf and bud about the middle. *Stems* tufted, ascending. *Leaves* 1-3 in.; leaflets 3-5 pair, $\frac{1}{4}$ in. broad. *Heads* $\frac{1}{4}$ - $\frac{1}{3}$ in. diam., quite white; bracts orbicular or oblong, membranous, glabrous; flowers monœcious. *Calyx-tube* ellipsoid. *Style* very slender, stigma capitate.

2. **P. diandrum**, *Wall. Cat.* 710 (*Sanguisorba*); tall, quite glabrous, leaflets petiolulate oblong-cordate crenate-toothed, heads globose, stamens 2, fruit oblong deeply 4-winged.

Temperate Central and Eastern Himalaya; NIPAL, *Wallich*. SIKKIM, alt. 10-13,000 ft., *J. D. H.*

Stem erect, 2-3 ft., branched above. *Leaves* 6-10 in.; leaflets $\frac{1}{2}$ -1 in., opposite or alternate, membranous, often complicate when dry, crenatures or teeth variable, acute or obtuse. *Heads* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., on slender erect axillary peduncles; bracteoles oblong, fimbriate. *Flowers* dark-purple, hermaphrodite (polygamous?). *Calyx-tube* ellipsoid, 4-gonous, glabrous; segments orbicular, concave, 3-nerved. *Style* short, stigma large plumose. *Fruit* pendulous, $\frac{1}{4}$ in. long, smooth between the undulate wings.

3. **P. indicum**, *Gardn. in Calc. Journ. Nat. Hist.* viii. 10; tall, base of stem and petioles clothed with rusty hairs, leaflets petiolulate orbicular or cordate-ovate with few large teeth, heads globose, fruit trapezoid. *Thwaites Enum.* 102.

CEYLON, Sir J. G. McKenzie; Adam's Peak, Alwis.

Very similar to *P. diandrum* in stature, habit, foliage, &c., but leaflets with fewer teeth, petiole and midrib of leaflets underneath with flexuous hairs; bracteoles orbicular, clawed, ciliate; calyx segments slightly hairy or scabrid on the back; fruit $\frac{1}{10}$ in., trapezoid, with short wings and a bony endocarp. The flowers are probably polygamous; I find 12 imperfect ones in one bud, and fewer perfect, but my materials are very insufficient.—This is a very little known plant, the only specimen I have seen is Sir J. McKenzie's (in Herb. Benth.). Gardner described it from some found by Mr. Alwis. Dr. Thwaites says that he has searched for it in vain. Like *Agri- monia*, the genus is unknown in the Indian Western Peninsula.

4. **P. longifolia**, Bertol. Misc. Dec. xxii. 14, t. 1 (SANGUISORBA); tall, glabrous, leaflets petiolulate linear-oblong crenate with often accessory leaflets at the base of the petiolules, heads cylindric, stamens 4, fruit short 4-winged.

KHASIA Mts., alt. 5–6000 ft., Griffith, &c.

Rootstock creeping, stout. Stem 2–4 ft., strict, much branched above. Leaves 10–16 in.; leaflets 1–3 in., rigid, base subcordate oblique, under surface reticulate; petiole stiff, erect; stipules very variable, of radical leaves subulate, of cauline foliaceous fan-shaped and toothed or produced and pinnate, tip rounded. Heads 1–2½ in., panicked, on slender stiff peduncles. Flowers purple, hermaphrodite; bracteoles oblong, fimbriate. Calyx-tube ellipsoid, 4-angled, compressed, pubescent, segments in opposite pairs of which one is broader than the other, thick, and thickened towards the tip which is notched with a mucro in the notch and 3-nerved, back with a few hairs. Stamens with slender filaments. Style filiform, elongate, stigma capitate. Fruit broader than long, $\frac{1}{10}$ in. long, wings membranous.

** Carpels 2.

5. **P. Sanguisorba**, Linn.; Boiss. Fl. Orient. ii. 733; sparsely hairy, leaflets petiolulate orbicular deeply toothed, heads globose, stamens about 20, fruit trapezoid acute at both ends.

WAZURISTAN (N. W. of the Punjab), alt. 5–8000 ft., Stewart.—DISTRIB. Persia and westward to the Atlantic, N. Asia.

Stems suberect or ascending, leafy, with lax flaccid hairs. Leaves 3–6 in.; leaflets opposite or alternate, $\frac{1}{3}$ – $\frac{2}{3}$ in., membranous, base rounded, petiolules very short; petiole slender. Heads panicked.—I have seen flowering specimens only, which seem not to differ in any particular from the European plant.

16. **ROSA**, Linn.

Erect, sarmentose or climbing shrubs, usually prickly. Leaves pinnate; leaflets serrate; stipules adnate to the petiole. Flowers terminal, solitary or corymbose, white yellow or red, bracts rarely persistent. Calyx-tube persistent, globose ovoid or pitcher-shaped; mouth contracted; lobes leafy, imbricate in bud. Petals 5, large. Stamens many, inserted on the disk. Disk coating the calyx-tube, all but closing its mouth by its thickened margin, silky. Carpels many, rarely few, in the bottom of the calyx-tube; styles subterminal, free or connate above, stigma thickened; ovule 1, pendulous. Achenes coriaceous or bony, enclosed in the fleshy calyx-tube.—DISTRIB. N. temp. regions, rare in America; extending into Abyssinia, India, and Mexico; species, about 30 very distinct forms with innumerable subspecies and varieties.

The following roses are so commonly cultivated by the natives of India, that I think it right to give a synopsis of them taken from Brandis' "Forest Flora," 199.

A. *Styles distinct*.

I. BRACTEATÆ. Fruit and branchlets densely tomentose; prickles twin, mostly infra-stipular; flowers bracteate; sepals deciduous.

1. *R. LYELLII*, (including *R. involucrata*). See below.

2. *R. BRACTEATA*, *Wendl.*; flowers large white, calyx-tube clothed with prickles.—The Macartney rose. China.

II. EGLANTERIA, Prickles some stout and some slender; flowers yellow or red; sepals persistent.

3. *R. EGLANTERIA*, *Mill.* See below.

4. *R. SULPHUREA*, *Ait.*; leaflets 7 whitish beneath, flowers large yellow double. *R. Rapini*, *Boiss. Fl. Orient.* ii. 672. Asia Minor to Persia.

III. GALLICÆ; erect, prickles mixed with glandular bristles; leaflets rugose; flowers rosy or purple; sepals more or less pinnatifid.

5. *R. DAMASCENA*, *Mill.*; *Wall. Cat.* 684; pickles unequal, larger hooked, sepals reflexed in flower.—The commonest Indian garden rose; cultivated for Attar. Native country unknown.

6. *R. CENTIFOLIA*, *Linn.*; *Roxb. Fl. Ind.* ii. 513; prickles unequal large hooked, bristles numerous, leaflets and calyx glandular-ciliate, flowers nodding.—The Cabbage, Moss, and Provence roses.—Caucasus and Assyria.

7. *R. GALICA*, *Linn.*; prickles slender equal, flowers erect.—Europe, Asia Minor.

IV. CANINÆ. Prickles uniform; bristles 0; flowers purple red, rosy or white.

8. *R. INDICA*, *Linn.*; *Wall. Cat.* 85, 685; evergreen, glabrous, stipules very narrow adnate almost to the top, flowers large on long pedicels rarely single, sepals reflexed. *R. chinensis*, *Jacq.*; *Roxb. Fl. Ind.* ii. 513. *R. sinica*, *Linn.* *R. fragrans*, *Redouté*; *R. semperflorens*, *Bot. Mag.* t. 284; *Roxb. Fl. Ind.* ii. 514; *Wall. Cat.* 686.—The Indian, China, Bengal and Tea roses, and hybrid perpetuals belong here. China.

9. *R. MICROPHYLLA*, *Lindl. Bot. Reg.* t. 919; *Roxb. Fl. Ind.* ii. 515; *Bot. Mag.* t. 3490; *Wall. Cat.* 692; branchlets flexuous, prickles infra-stipular, leaflets 9-15 small, scape densely prickly, sepals short broad-toothed, flowers large double rosy.—China.

10. *R. ALBA*, *Linn.*; leaflets 5-7 large grey rugose downy and pale beneath, flowers large white pale or blush double, sepals often pinnatifid. *R. glandulifera*, *Roxb. Fl. Ind.* ii. 514.—Caucasus, Afghanistan?

V. BANKSIANÆ. Climbing; stipules small, often deciduous; flowers rather small, corymbose.

11. *R. BANKSIÆ*, *Br.*; unarmed, leaflets 3 or 5 shining, flowers white or yellow. *Bot. Mag.* t. 1954; *Bot. Reg.* t. 1105. *R. inermis*, *Roxb. Fl. Ind.* ii. 516.—China, Japan.

12. *R. MICROCARPA*, *Lindl.*; prickles hooked, leaflets usually 3 shining, flowers white, sepals deciduous, fruit small globose red.—China.

13. *R. SINICA*, *Ait.*; *Bot. Mag.* t. 2847; *Bot. Reg.* t. 1922; *Wall. Cat.* 694; prickles red hooked, leaflets 3 shining, flowers solitary large white, peduncles and calyx clothed with straight prickles, fruit muciculate crowned with the spreading sepals. *R. triphylla*, *Roxb. Fl. Ind.* ii. 515.—China, Japan.

14. *R. FORTUNEANA*, *Lindl.*; prickles small hooked, leaflets 3 or 5 dark shining, flowers solitary white double, peduncles short bristly, calyx naked and glabrous.—China.

B. *Styles united in a column; flowers corymbose; prickles uniform*.

15. *R. MOSCHATA*. See below.

16. *R. SEMPERVIRENS*. See below.

17. *R. MULTIFLORA*, *Thunb.*; *Bot. Mag.* t. 1059; *Bot. Reg.* t. 425; stipules and bracts pectinate; flowers double rosy; petioles and inflorescence with long soft hairs and no glands; sepals broad ovate.—Japan, China.

SECT. I. *Styles* distinct.* *Sepals deciduous in fruit*.

1. **R. involocrata**, Roxb. *Hort. Beng.* 38; *Fl. Ind.* ii. 513; branchlets and inflorescence densely tomentose, prickles straight, flowers shortly pedicelled, bracts large lanceolate, calyx-tube unarmed. *Don Prodr.* 235; *Bot. Reg.* t. 739; *Wight Ic.* t. 234; *Kurz For. Flor. Brit. Burm.* i. 440; *Wall. Cat.* 696; *Crepin in Bull. Soc. Bot. Belg.* xiv. 140. R. *Lyellii*, *Lindl. Monogr. Ros.* 12, t. 1; *Crepin l. c.* 143. R. *Lindleyana*, *Tratinik Ros.* i. 190. R. *palustris*, *Buch. MSS.* R. *multiflora*, *Herb. Ham.*

By the sides of streams of the GANGETIC PLAIN. Westward to Mt. Aboo in MARWAR and eastward to BIRMA and along the lower Himalaya from KUMAON eastwards. MYSORE, Munro.

A stout bush, erect or with arching subscandent branches; prickles often in stipular pairs, compressed. *Leaves* 3-4 in.; leaflets 3-4 pair, $1\frac{1}{2}$ in. and less, elliptic or oblong, acute or acuminate, finely serrate, shining above, glabrous on both surfaces or tomentose on the under; stipules small lacinate. *Flowers* 2-3 in. diam., white, fragrant, solitary or in short corymbs, rarely axillary and longer pedicelled; peduncles and pedicels sometimes with glandular hairs; bracts more or less glandular-serrate, especially below. *Calyx-tube* obovoid; lobes caudate-acuminate, quite entire, deciduous. *Petals* retuse. *Fruit* globose, densely tomentose; mass of stigmas discoid, exerted; achenes very many, $\frac{1}{8}$ in. long, pale.—Except that one is described as scandent I cannot distinguish *R. involocrata* from *R. Lyellii*. It is the common rose of the Bengal plains and foot of the Himalaya and the only really tropical species of India. Lindley's varieties *burmana*, *parvifolia*, *glabra*, and *acutifolia* (in *Wall. Herb.*) explain themselves. Wallich's specimen of *involocrata* var. *glabra* is stated to come from the mountains of Pundua on the confines of Sylhet, i. e. the Khasia Mts., which I greatly doubt, for I found it in the Jheels only of Sylhet; and Blinkworth's habitat of the Alps of Sirinuggur probably applies to the Dheyra dhoon. Wallich who procured *R. Lyellii* in Nipal describes it as a large climber in woods, possibly confounding it with *R. moschata*. Crepin hazards the conjecture that *Lyellii* is a hybrid between *involocrata* and *moschata*, and regards it as a very doubtful plant, under which circumstances I have retained Roxburgh's name of *involocrata*, which first appeared in his "Cat. Hort. Bot. Calc." in 1814.

2. **R. anserinæfolia**, Boiss. *Fl. Orient.* ii. 677; tall, subscandent, prickles hooked, bristles C, leaflets broadly elliptic obtuse simply serrate and petioles pubescent beneath or on both surfaces, flowers in few- or many-flowered corymbs shortly pedicelled white, fruit very small globose.

WUZURISTAN; alt. 5,000 ft., Dr. Stewart. — DISTRIB. Affghanistan and Beluchistan.

This is a common wild and cultivated Affghan rose, ascending to 10,000 ft., of which Griffith gathered many specimens, and which no doubt extends within the British frontier, though the nearest hitherto detected habitat is that given above, whence the specimens have very small foliage and flowers.—A shrub often 10 ft.; branches with few or many unequal stout compressed prickles often in pairs; branchlets leaves beneath petioles and calyx covered usually with a rather furfuraceous pubescence mixed on the petioles and calyx with minute prickles and glands. *Leaves* 1-3 in.; leaflets $\frac{1}{2}$ - $\frac{3}{4}$ in., rarely glabrous above, sessile, nerves beneath indistinct; petiole slender; stipules broad, with glandular ovate free portion. *Flowers* from solitary to many in a short crowded corymb, $\frac{3}{4}$ -1 $\frac{1}{2}$ in. diam., fragrant; pedicels short, glabrous or pubescent; bracts ovate-lanceolate, densely glandular. *Calyx tube* globose, usually smooth and glabrous; lobes ovate-lanceolate, caudate-acuminate, tomentose, deciduous; tips pubescent, sometimes dilated. *Fruit* smooth, $\frac{1}{4}$ in. diam.; head of stigmas very large; achenes $\frac{1}{8}$ - $\frac{1}{4}$ in. long.—The above description is of the ordinary state of the plant. Stewart's specimens have more obovate green leaflets $\frac{1}{2}$ in. long, faintly puberulous beneath, and solitary flowers barely 1 in. diam.

** *Sepals persistent in fruit.*

3. **R. macrophylla**, *Lindl. Monogr. Ros.* 35, t. 6; prickles straight or 0, glandular and pubescent or not, leaflets elliptic-ovate acuminate or cuneately finely serrate, bracts large, flowers solitary or corymbose red, sepals very long tips filiform often dilated and serrate. *Brandis For. Flor.* 203; *Wall. Plant. As. Rar.* ii. 19, t. 117; *Cat.* 690; *Don Prodr.* 235; *Crepin in Bull. Soc. Bot. Belg.* xiii. 284, xiv. 167. *R. Hoffmeisteri* and *Gulielmi Waldemarii*, *Klotzsch in Reis. Pr. Waldem. Bot.* 153, t. 7, 8. *R. Hookeriana*, *Bertol. Misc. Bot.* xxiv. 14, t. 1.

Temperate Himalaya, from MURREE, alt. 3500–10,000 ft. to SIKKIM, alt. 8–10,000 ft.—DISTRIB. China.

Erect; prickles straight or slightly curved, with broad dilated bases. *Leaves* 2–8 in.; leaflets $\frac{1}{2}$ –2 in., usually pubescent beneath, base acute rarely rounded; petiole pubescent; stipules large, broad, spreading. *Flowers* 1–3 $\frac{1}{2}$ in. diam., bright red, peduncles pedicels and calyx usually very bristly and glandular; bracts foliaceous, oblong or lanceolate, glandular on the margin. *Calyx-tube* $\frac{1}{2}$ –1 $\frac{1}{2}$ in.; lobes 1–2 in., persistent. *Petals* broadly obcordate. *Fruit* sometimes 2 in. long; styles hairy, exserted; achenes large, often $\frac{1}{2}$ in. long, few or many.

VAR. *minor*, *Lindl. l.c.*; leaflets $\frac{1}{2}$ in. often obtuse, flowers 1–1 $\frac{1}{2}$ in. diam.

VAR. *Hookeriana*; nearly unarmed, leaves very pubescent, peduncles and calyx hardly glandular. *R. Hookeriana*, *Wall. Cat.* 691, not of *Bertol.* *R. torulosa*, *Wall. MSS.*

4. **R. Eglanteria**, *Linn.; DC. Prodr.* ii. 607; erect, branches with straight prickles, branchlets prickly and bristly or naked pubescent, rarely glabrous, leaflets deeply doubly-glandular-serrate, hairy and glandular beneath, flowers few yellow, calyx-tube hemispheric or globose. *R. lutea*, *Mill.; Boiss. Flor. Orient.* ii. 671; *Bot. Mag.* t. 363; *Brandis For. Flor.* 201. *R. bicolor*, *Jacq. Hort. Vind.* i. t. 1. (The Austrian rose.)

Drier parts of the inner Himalaya, from KISHTWAR westward and in WESTERN TIBET, alt. 8–11,000 ft.—DISTRIB. Afghanistan and westward to Asia Minor, and northward to Siberia.

A small bush, very leafy; prickles slender, much compressed, pale. *Leaves* 1 $\frac{1}{2}$ –3 in., leaflets 2–4 pair, $\frac{1}{2}$ – $\frac{3}{4}$ in.; petiolulate, elliptic-ovate or orbicular, obtuse or apiculate, rather membranous, glabrous or sparsely hairy above; petiole pubescent and glandular; stipules broad, free portion half ovate, toothed. *Flowers* 2–2 $\frac{1}{2}$ in. diam.; pedicel often glabrous; bracts ovate-lanceolate, long-acuminate, glandular. *Calyx-tube* glabrous, unarmed or prickly; lobes long-acuminate, tomentose, persistent, entire or with marginal laciniae; tips usually dilated. *Petals* obcordate, variable in depth of colour.

5. **R. Webbiana**, *Wall. Cat.* 683; erect, prickles pale, bristles 0, leaflets oblong or orbicular, flowers subsolitary, calyx-tube usually glandular-bristly, sepals exceeding the petals, fruit ovoid or globose. *Royle Ill.* 208, t. 42; *Crepin in Bull. Soc. Bot. Belg.* xiii. 274; *Brandis For. Flor.* 202. *R. unguicularis*, *Bertol. Misc.* xxii. 15, t. 3. *R. pimpinellifolia*, *Herb. Ind. Or. Hook. f. & T.*

Drier inner Himalaya, from KASHMIR to KUMAON and WESTERN TIBET, alt. 5–13,500 ft.

Glabrous, or with pubescent petioles and leaves beneath; glandular hairs 0 or confined to the inflorescence; prickles copious, $\frac{1}{4}$ – $\frac{3}{4}$ in., straight or curved, with long bases, yellow. *Leaves* $\frac{1}{2}$ –2 in.; leaflets 2–5 pair, $\frac{1}{4}$ – $\frac{3}{4}$ in., rarely obovate, entire towards the usually rounded base, rarely pubescent; stipules small. *Flowers* pink, 1–3 in. diam., usually solitary. *Calyx* globose or ovoid, often densely bristly, rarely quite smooth; lobes caudate-acuminate, glandular, often with dilated tips, entire, persis-

tent. *Petals* obcordate. *Fruit* ovoid or globose, $\frac{1}{2}$ –1 in. diam., glandular or glabrous stigmas villous; achenes many, $\frac{1}{8}$ in. long, pale.—Differs from *R. pimpinellifolia* in the fewer leaflets, uniform prickles, pubescent longer sepals, and fruit not depressed.

6. **R. sericea**, *Lindl. Monogr. Ros.* 105, t. 12; suberect, prickles broad compressed, bristly or not, leaflets acutely toothed towards the rounded tip silky beneath, flowers solitary ebracteate white or pale straw-coloured, petals usually 4, fruit pyriform. *Royle Ill.* 208; *Don Prodr.* 236; *Bot. Mag.* t. 5200; *Brandis For. Flor.* 202; *Crepin in Bull. Bot. Soc. Belg.* xiv. 151; *Wall. Cat.* 695. *R. tetrapetala*, *Royle Ill.* 208, t. 42. *R. Wallichii*, *Trattin. Ros.* ii. 293.

Temperate Himalaya, from KUMAON 9–13,000 ft. to SIKKIM, alt. 9–14,000 ft. and BHOTAN, alt. 5–10,000 ft.—DISTRIB. China, Yunnan (form with leaves very hairy on both surfaces).

Erect or subscandent; branches perfectly glabrous and unarmed or prickly only, or also loosely or densely bristly and glandular; prickles $\frac{1}{2}$ –1 $\frac{3}{4}$ in., straight, brown. *Leaves* 1–3 in., crowded; leaflets 7–9, $\frac{1}{4}$ –1 in., usually oblong, obtuse with an excurrent midrib, rarely villous on both surfaces; stipules oblong, membranous, apiculate. *Flowers* 2–2 $\frac{1}{2}$ in. diam., on short lateral shoots, hence almost axillary; peduncle and calyx-tube bristly and glandular. *Calyx-lobes* pubescent, ovate-lanceolate, persistent. *Petals* obcordate, rarely 5, white rarely pink or faintly yellowish. *Fruit* subglobose or broadly pyriform, silky or glabrous; achenes few, $\frac{1}{4}$ in. long.

SECT. II. *Styles* united into a column which is exserted far beyond the calyx-tube.

7. **R. moschata**, *Mill.*; *Brandis For. Flor.* 201; climbing, prickles recurved, leaflets ovate or ovate-lanceolate puberulous beneath, flowers many in compound corymbs white, sepals often pinnatifid, fruit small subglobose. *Wall. Cat.* 688; *Bot. Reg.* t. 829, 861. ? *R. recurva*, *Roxb. Fl. Ind.* ii. 514. *R. Brunonii*, *Lindl. Monogr. Ros.* 120, t. 14; *Don Prodr.* 236; *Bot. Mag.* t. 4030; *Wall. Cat.* 689 (*Brunonis*). *R. Lindleyi*, *Herb. Wall.* *R. pubescens*, *Roxb. Fl. Ind.* ii. 514. *R. glandulifera*, *Herb. Roxb.*

Temperate Central and Western Himalaya, from MURREE to NIPAL, alt. 2–11,000 ft.—DISTRIB. Afghanistan.

A tall climber; prickles scattered, stout. *Leaves* 2–6 in.; leaflets 2–4 pair, 1–3 in., acute or acuminate, serratures very numerous and acute, base rounded; stipules glandular, free part subulate. *Inflorescence* pubescent and usually glandular, but not prickly or bristly, bracts subulate. *Flowers* 1 $\frac{1}{2}$ –2 in. diam., very numerous; pedicels 1–1 $\frac{1}{2}$ in., slender. *Calyx-tube* small, obovoid; lobes $\frac{1}{2}$ in., lanceolate, caudate-acuminate, entire or cut or pinnatifid, reflexed after flowering, deciduous. *Petals* orbicular-obovate, yellowish-white. *Fruit* $\frac{1}{2}$ in. diam., dark brown, glabrous; styles far exserted.

8. **R. longicuspis**, *Bertol. Misc. Bot.* xxi. 15, t. 3; climbing, prickles scattered curved, leaves evergreen, leaflets glabrous shining ovate-lanceolate serrate caudate-acuminate, petioles and inflorescence glandular and bristly, flowers corymbose, petals tomentose externally, fruit subglobose. *Crepin in Bull. Soc. Bot. Belg.* xiii. 256. *R. sempervirens*, *L.*; *Hook. f. & Thoms. Herb. Ind. Or.*

KHASIA MTS., alt. 2–5000 ft. MISHMI HILLS, *Griffith.*

A tall and often very strong climber, with a stout trunk. *Leaves* 3–6 in.; leaflets 2–3 pair, 2–3 in., petiolulate, firmly coriaceous, very sharply serrate, quite glabrous, base rounded; petiole stout, often glandular and prickly; stipules with ovate or subulate free portions. *Corymbs* short, more or less glandular, sometimes with minute prickles; bracts large, lanceolate, caudate, glandular all over. *Flowers* 1 $\frac{1}{2}$ in. diam.; pedicels rather stout. *Calyx-tube* broadly obovoid; lobes very large with often ciliated toothed tips, sometimes with a few long teeth at the side. *Petals* obcor-

date, silkily tomentose externally. *Fruit* $\frac{1}{3}$ – $\frac{1}{2}$ in. diam.; styles far exserted; achenes $\frac{1}{8}$ in.—Crepin sums up the distinction between this and its very near ally *R. sempervirens*, L., in the more coriaceous leaves with longer tips, the narrower stipules and bracts, the more or less pubescent pedicels and calyx, the narrower sepals, longer buds, and velvety back of the petals. Of these all but the last character are excessively variable, and I expect that the latter even may disappear.—There is a single specimen of this in Herb. Wallich from the Khasia (Pundua) under No. 696.

9. **R. Leschenaultiana**, *Wight & Arn. Prodr.* 301; climbing, prickles scattered curved, leaves evergreen usually glandular beneath, leaflets elliptic-ovate acute or acuminate serrate, petioles and inflorescence glandular-bristly, flowers corymbose, petals at length glabrous, fruit subglobose. *Wight Ic.* t. 38; *Crepin in Bull. Soc. Bot. Belg.* xxiii. 259. *R. sempervirens* var. *Leschenaultiana*, *Thory et Redouté Ros.* iii. 87. *R. sempervirens*, *Hook. f. & Thoms. Herb. Ind. Or.* *R. Wallichii*, *Sabine in Wall. Cat.* 687.

Western Peninsula; NILGHIRI and PULNEY Mts.

Very closely allied indeed to *R. brevicuspis*, and I believe only a variety of that plant, itself too near *sempervirens*; it differs in being more glandular, leaflets less acuminate, larger sepals and petals, the latter of which are pubescent only before expansion.

DOUBTFUL SPECIES.

R. Moorcroftii, *Wall. Cat.* 693 from Ladak in Western Tibet. The specimen is wanting in Herb. Linn. Soc., but is probably *R. Eglantera*.

R. Jacquemonthi, *Crep. MSS.*—I have only a fruiting specimen of this, which is quite insufficient for description. It is Jacquemont's No. 1170, p.

17. **NEURADA**, *Linn.*

An annual white woolly depressed branched herb. *Leaves* ovate, petioled, lobed; stipules minute. *Flowers* axillary, solitary. *Calyx-tube* flat, dilated, at length conic spiny and forming with the ripe carpels an orbicular disk; lobes 5, triangular; bracteoles 5, subulate. *Petals* 5, small. *Stamens* 10, inserted in the contracted mouth of the calyx, filaments subulate. *Carpels* 10 in a whorl, spreading; styles subulate, persistent; ovules solitary from the apex of the carpel. *Fruit* a depressed cone, with spinous margins; carpels 10, horizontal, dehiscing above, styles spinescent. *Seeds* curved, germinating within the carpels.—**DISTRIB.** N. Africa, Arabia, Persia, Afghanistan.

1. **N. procumbens**, *Linn.*; *Boiss. Fl. Orient.* ii. 735; *Wight Ic.* t. 1596; *Hook. Ic. Pl.* t. 840.

SCINDE, *Stocks*. SOUTHERN PUNJAB, Mooltan and Adunwhari hills.

Branches 5–10 in. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., ovate, tomentose on both surfaces. *Flowers* $\frac{1}{4}$ in. diam., shortly pedicelled. *Fruit* $\frac{1}{4}$ – $\frac{3}{4}$ in. diam., under surface quite flat. The orbicular fruit forms a persistent collar at the top of the root of the young plant.

17.* **CYDONIA**, *Tourn.*

Bushes with black bark. *Leaves* simple, quite entire; stipules ovate, oblique. *Flowers* large, solitary, white or pink, woolly; bracts herbaceous, toothed. *Calyx-tube* clavate; lobes large, spreading, toothed. *Petals* 5, contorted in bud, claw woolly or glabrous. *Stamens* 20. *Ovary* 5-celled; styles 5, connate and

woolly below the middle; ovules many in each cell, 2-seriate, ascending or horizontal. *Fruit* subglobose, intruded at the base and apex, firm and fleshy, fragrant, 5-celled, cells many-seeded. *Seeds* small, plano-convex, testa mucilaginous.—DISTRIB. S. of Europe and the East, China.

1. **C. vulgaris**, Pers.; Boiss. *Fl. Orient.* ii. 656; Dcne. *Mem. Fam. Pom.* 128; Wall. *Cat.* 665. *C. Sumboshia*, Ham. in *Don Prodr.* 237. *Pyrus Cydonia*, Linn.; Roxb. *Fl. Ind.* ii. 511; Brand. *For. Fl.* 205.—The Quince.

Cultivated in N. W. India, and up to 5500 ft. in the Himalaya.—DISTRIB. Native country unknown; is self-sown in the East and in South Europe, &c.—Decaisne refers the Quince of N. W. India to *C. lusitanica*, Mill, but it certainly in no way differs from the common fruit of Europe.

18. **DOCYNIA**, Dcne.

Small trees. *Leaves* deciduous, simple, lobed in young plants; stipules small, subulate. *Flowers* white, solitary or fascicled. *Calyx-tube* clavate; limb shortly tubular, 5-partite; lobes reflexed, toothed. *Petals* 5, with long woolly claws, imbricate in bud. *Stamens* 30–50. *Ovary* 5-celled; styles 5-celled, connate and woolly below the middle; ovules 3, subbasilar in each cell. *Fruit* rounded ovoid or pyriform, flesh hard; cells 1–3-seeded; endocarp like parchment. *Seeds* plano-convex, testa coriaceous; cotyledons amygdaloid.—DISTRIB. Himalaya and the Khasia Mts.

1. **D. indica**, Dcne. *Mem. Fam. Pom.* 131, t. 14; leaves ovate or oblong-lanceolate long-acuminate entire or serrulate glabrous above beneath densely woolly at length glabrate, fruit almost globose. *D. Griffithiana*, Dcne. l. c. *Pyrus indica*, Wall. *Pl. As. Rar.* ii. 56, t. 173; Roxb. *Cat. Hort. Beng.* 38; *Fl. Ind.* ii. 511; Kurz, *For. Fl. Brit. Burm.* i. 441. *Cydonia indica*, Spach, *Suite Buff.* ii. 158; Wenzig in *Linnaea*, 1874, 12.

Eastern temperate Himalaya; SIKKIM, alt. 4–6000 ft. *J. D. H.* BHOTAN, alt. 7500 ft. KHASIA MTS., alt. 6000 ft. *BIERMA*, Kurz.—DISTRIB. Poneshee (Yunan).

A small tree, 12–15 ft., in a young state like a *Cratægus*, having 3-lobate lobulate and sharply toothed leaves and often spinescent branches; young parts of old plants densely clothed with white woolly tomentum. *Leaves* 3–4 in., coriaceous, at length quite glabrous, with prominent arched nerves beneath, serratures chiefly beyond the middle; petiole slender, $\frac{1}{4}$ –1 in. *Flowers* 1–1½ in. diam., shortly pedicelled, densely woolly. *Calyx-tube* pyriform; lobes narrowly lanceolate. *Petals* spreading. *Filaments* long, slender. *Styles* slender, united at the base into a woolly cone. *Fruit* a nearly spherical yellow green apple, with orange spots, 1–1½ in. diam., and rather longer, rounded at the base and crowned with the broken sepals, usually 5-celled; cells 3-seeded; seeds quite like those of apple—it is rather austere with a slight quince flavour and forms a good stew.—*D. Griffithiana* from Bhotan is only *D. indica*.

2. **D. Hookeriana**, Dcne. *Mem. Fam. Pom.* 131, t. 15; leaves oblong or linear-lanceolate long-acuminate serrate, fruit between fusiform and ellipsoid contracted below the sepals.

KHASIA MTS., alt. 5000 ft., at Myrong, *J. D. H. & T. T.*

Very closely allied to *D. indica*, but the leaves are larger (4–5 in.) and narrower in proportion, and the fruit is of a wholly different shape and not half as long as broad. I have only fruiting specimens; these show no trace of wooliness, but no doubt in a younger state the branches and leaves are as woolly as those of *D. indica*.

19. **ERIOBOTRYA**, Lindl.

Small or large trees. *Leaves* simple, entire or serrate, very coriaceous; stipules lanceolate or broad. *Flowers* in thyrsoid panicles, white. *Calyx-tube* turbinate obconic or clavate; lobes small, erect or spreading, persistent. *Petals* 5, contorted or imbricate in bud, obovate or orbicular, usually oblique and notched, margins sinuate, claw glabrous or woolly. *Ovary* 2-5-celled; styles 5, connate and woolly below; ovules 2 in each cell, basal, ascending, placenta sometimes cupuliform. *Fruit* a succulent or dry rarely 1-2-celled berry; endocarp membranous, 1- rarely 2-3-seeded. *Seeds* large, ovoid and cylindric or flattened on one side, testa hard coriaceous and mucilaginous; cotyledons very thick.—DISTRIB. Himalaya, Malay Peninsula, China, Japan.

I cannot distinguish *Eriobotrya* from *Photinia*, except by the inflorescence; all the other characters given by Decaisne break down amongst the species enumerated under it; thus the petals are contorted in all but *elliptica* and *japonica*, and their claws are glabrous in several; the styles are only two in all but the above, and one other, which has 3 styles; the crown of the ovary is glabrous in *E. dubia*, and I do not find the calyptiform process of the placenta in any but *japonica*; but I have not examined all for this character, and it is one difficult to detect in dry specimens.

* *Petals contorted in bud. Styles 2 or 3.*

1. ***E. petiolata***, Hook. f.; robust, leaves 6-9 in. long-petioled elliptic-lanceolate acuminate thickly coriaceous entire or obtusely serrate glabrous beneath, nerves 12-14 pair, inflorescence clothed with appressed tomentum, flowers pedicelled, calyx-lobes rounded, styles 2. *E. elliptica*, Herb. Ind. Or. H. f. & T.; Dcne. Mem. Fam. Pom. 145 in part.

Eastern Himalaya; SIKKIM, alt. 5-9000 ft. BHOTAN at Tongsa, Griffith.

A tree; branchlets glabrous. *Leaves* firmly coriaceous, 6-9 by 3-3½ in.; base acute; petiole 1½-2 in. *Panicles* 3-6 in. long and broad, branched from the base, very spreading, clothed with rusty tomentum as are the very young leaves on both surfaces. *Flowers* ½ in. diam., not crowded, shortly pedicelled. *Calyx-tube* short, obconic; lobes also short, semicircular. *Petals* contorted, orbicular, concave, claw glabrous. — Misled by the provisional naming of the Indian collections distributed by Dr. Thomson and myself, Decaisne has included this under *E. elliptica*, from which it differs entirely in the longer petioles, appressed almost scurfy tomentum of the panicle and form of calyx.

2. ***E. latifolia***, Hook. f.; stout, leaves 6-8 in. long-petioled broadly elliptic acute at both ends quite entire glabrous above beneath with deciduous tomentum, nerves 10-12 pair, panicle softly tomentose.

MOALMAYNE; on Thoung Gyne, alt. 5000 ft., Thos. Lobb.

A shrub, 12 ft. *Leaves* firmly coriaceous, 3-4 in. broad, opaque above, quite glabrous beneath when old, without a trace of serratures, narrowed into the stout petiole which is 1½-2 in. long, and glabrous except the young leaves which are softly woolly. *Panicle* 6 in. long and as broad, much branched, clothed with rusty pubescence. *Flowers* ½ in. diam., crowded. *Calyx-tube* broadly obconic; lobes rounded. *Petals* contorted, broadly obovate or orbicular, claw glabrous. *Styles* 2.

3. ***E. longifolia***, Hook. f.; robust, leaves 7-10 in. shortly petioled narrowly oblanceolate acuminate quite entire narrowed into the petiole, nerves 25-30 pair almost horizontal, panicle glabrate. *Photinia longifolia*, Dcne. Mem. Fam. Pom. 142.

MISHMI HILLS, Griffith.

A shrub, branchlets as thick as a swan's quill. *Leaves* firmly coriaceous, $1\frac{1}{4}$ – $1\frac{3}{4}$ in. diam.; margins revolute (in drying?), perfectly glabrous, hardly shining above; petiole $\frac{1}{2}$ in. *Panicles* 4–5 in. long, glabrate; branches rather slender. *Flowers* shortly pedicelled, white. *Calyx* appressed-pubescent, tube obconic; limb $\frac{5}{8}$ in. diam.; lobes triangular, obtuse, glabrous within. *Petals* cochleate, claw glabrous. *Styles* 2, the united part pubescent.—I have not seen the petals, which Decaisne describes; he refers it to *Photinia*, but the habit foliage and inflorescence are altogether those of *Eriobotrya*.

4. **E. Hookeriana**, Dcne. *Mem. Fam. Pom.* 146; robust, leaves 8–12 in. very shortly and stoutly petioled elliptic- or oblong-lanceolate acuminate sharply coarsely serrate, more or less pubescent beneath, nerves 20–30 pair, panicle tomentose, branches spreading. *Photinia subsessilis*, King in *Herb. Calc.*

Eastern Himalaya; SIKKIM, alt. 6500–8000 ft., J. D. H. BHOTAN, alt. 4–6500 ft. Griffith.

A small tree, with very stout branches. *Leaves* 8–12 by $2\frac{1}{2}$ in., when young thickly covered with rusty tomentose, old glabrate or glabrous, very thickly coriaceous, opaque above with impressed close-set nerves, serrated nearly to the truncate rounded or subacute base; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in., very thick; stipules semi-lunate, very coriaceous. *Panicle* 4–6 in. and as broad, finely softly tomentose, almost woolly. *Flowers* $\frac{1}{2}$ in. diam., white; bracts small, ovate; pedicels short, stout. *Calyx-tube* shortly obconic; lobes rounded, obtuse. *Petals* contorted, orbicular, claw woolly. *Styles* 2, base woolly. *Fruit* $\frac{3}{4}$ in. long, ellipsoid, yellow.

5. **E. dubia**, Dcne. *Mem. Fam. Pom.* 145, excl. some syn.; rather slender, leaves 3–5 in. shortly petioled elliptic-lanceolate or oblanceolate acuminate quite glabrous shining above coarsely sharply serrate, nerves 10–12 pair, panicle softly tomentose or only puberulous, crown of ovary glabrous. *Photinia? dubia*, Lindl. in *Trans. Linn. Soc.* xiii. 104, t. 10; *Wall. Cat.* 668, l. *P. dubia*, Wenzig in *Linnaea*, 1874, 94, excl. synonym. *Cratægus? Shicola*, Ham. in *Don Prodr.* 238. *Mespilus tinctoria*, *Don Prodr.* 238.

Central and Eastern Himalaya; NEPAL, Wallich; SIKKIM, alt. 5–6000 ft., J. D. H. BHOTAN alt. 4000 ft., Griffith.

A small tree, 20–40 ft. *Leaves* thinly coriaceous, not exceeding $1\frac{1}{2}$ in. broad, gradually narrowed at the base into the petiole, which is slender and $\frac{1}{4}$ – $\frac{1}{2}$ in. *Panicles* 2–4 in. long and broad; branches rather slender. *Flowers* not crowded, $\frac{1}{2}$ in. diam., white, shortly pedicelled; bracts short, subulate. *Calyx-tube* short, obconic; lobes rather variable, short, acute or obtuse. *Petals* orbicular, claw slightly woolly. *Styles* 2, glabrous, on the short hemispheric glabrous top of the ovary. *Fruit* $\frac{1}{2}$ in. long, shortly ellipsoid, 1-seeded, eatable.

6. **E. bengalensis**, Hook. f.; rather stout, leaves 4–8 in. long-petioled elliptic or elliptic-oblong or lanceolate acuminate coarsely obtusely serrate or lobulate quite glabrous shining above, nerves 8–12 pair, panicle softly tomentose, crown of ovary woolly. *E. dubia*, Dcne. *Mem. Fam. Pom.* 145, in part; *Kurz, For. Fl. Brit. Burm.* 443. *Mespilus bengalensis*, Roxb. *Cat. Hort. Beng.* 38; *Fl. Ind.* ii. 510. *Photinia dubia*, *Wall. Cat.* 668, 2, 3, 4, and *E.*

Eastern Himalaya; SIKKIM, alt. 4000 ft., C. B. Clarke. KHASIA Mts. and Muku hills, alt. 3–4000 ft. CHITTAGONG, AVA, Wallich; TENASSERIM, Helfer; MALACCA, Griffith, Maingay.—DISTRIB. BHAMO.

A large robust tree. *Leaves* often $2\frac{1}{2}$ and sometimes $3\frac{1}{2}$ in. broad, sometimes acute, obtuse or rounded with coarse lobules or crenatures; petiole stout or slender, $\frac{3}{4}$ – $1\frac{1}{2}$ in., glabrous. *Panicles* 3–5 in. long and broad, branched from the base, branches rather stout. *Flowers* $\frac{1}{2}$ in. diam., white, smelling of hawthorn. *Calyx-tube* obconic; lobes acute or obtuse. *Petals* orbicular, claw slightly woolly. *Styles* 2, base very woolly. *Fruit* $\frac{3}{4}$ in. long, ellipsoid, 1–2-seeded, uneatable.—Confounded by Wallich, myself,

and others with *E. dubia*, but very distinct; a much larger tree, with longer broader petioled leaves with slender petioles; the top of the ovary being woolly also well distinguishes it.

7. *E. angustissima*, Hook. fil.; quite glabrous, leaves erect 2-4 in. very narrow linear-lanceolate narrowed into the short petiole obtuse remotely serrate, panicle small glabrous.

KHASIA Mts. alt. 5000 ft. Simons; Mooshye, and between Myrung and Nunklow, Hook. f. & T.

A very remarkable shrub, 4 ft. high, found by Thomson and myself in but two spots, and there forming a low fastigiate brushwood on river banks, with stout dark branches, and erect rigid leaves, not much exceeding $\frac{1}{2}$ in. in breadth; nerves 8-10 pair, ascending; petiole slender, $\frac{1}{4}$ in. Panicles $1\frac{1}{2}$ in.; branches short, erect, glabrous. Flowers few, $\frac{1}{3}$ in. diam. Calyx pubescent; tube short; lobes rounded. Petals obovate or orbiculate, claw woolly. Styles 3, slender, base and crown of ovary woolly.

** *Petals quincuncial. Styles 5.*

8. *E. elliptica*, Lindl. in Trans. Linn. Soc. xiii. 102; very robust, leaves petioled 6-10 in. obovate or oblong-lanceolate entire or coarsely serrate glabrous beneath, nerves about 20 pair, inflorescence densely clothed with soft spreading wool, flowers sessile, styles 5, fruit small obovoid or globose. Wall. Cat. 667. *E. japonica*, β . *elliptica*, Wenzig in Linnæa, 1874, 100. *Mespilus Cuila*, Ham. in Don Prodr. 238.

NEPAL, Wallich; MISHMI HILLS, Griffith.

Similar in many respects to *E. japonica*, but leaves much broader, glabrous beneath, with glabrous petioles 1-1 $\frac{1}{2}$ in. Flowers sessile or subsessile. Calyx-lobes triangular. Petals orbicular, claw woolly. Styles 5, woolly to the top; stigmas large, spatulate, recurved. Griffith's specimens have fruit, which is nearly globose upwards of $\frac{1}{2}$ in. diam. and 1-seeded.

9. *E. japonica*, Lindl.; branches very robust, and leaves beneath and inflorescence densely softly woolly, leaves subsessile narrowly oblanceolate acuminate remotely serrate woolly beneath, petiole very short, fruit ovoid large intruded at the top. W. & Arn. Prodr. 302; Dalz. & Gibs. Bomb. Flor. Suppl. 32; Wight Ic. t. 226. *Mespilus japonica*, Banks; Roxb. Fl. Ind. ii. 510. (The Loquat.)

Cultivated in many parts of India.

Branchlets as thick as the little finger. Leaves 6-8 by 1 $\frac{1}{2}$ -3 in., thick and stiffly coriaceous; base obtuse or narrowed into the very short stout woolly petiole; nerves 12-15, very prominent beneath. Panicles 3-6 in. long and broad; branches very stout. Flowers $\frac{1}{2}$ in. diam., crowded, fragrant. Calyx-tube short; lobes ovate, subacute. Petals broadly ovate. Fruit 1-1 $\frac{1}{2}$ in. long, rather narrower, yellow, rarely as many as 5-seeded.

IMPERFECTLY KNOWN SPECIES.

E. MACROCARPA, Kurz, For. Fl. Brit. Burm. ii. 443; evergreen, glabrous, leaves 5-6 in., from obovate to oblong-lanceolate shortly subobtusely acuminate quite entire narrowed into the stout $\frac{1}{2}$ - $\frac{2}{3}$ in. petiole coriaceous smooth glossy, fruit subglobose size of a bullet glabrous crowned with the calyx-limb, peduncle 1-3 in. stout simple glabrous axillary in the upper leaves of the thick branchlets.—BURMA, rare in forests on N. E. slopes of Kambala-toung; and Pegu at Yomah, alt. 2-3000 ft., Kurz.

20. *PYRUS*, Linn.

Trees or shrubs. Leaves deciduous, simple or pinnate; stipules deciduous. Flowers white red or pink, in terminal cymes or corymbs; bracts subulate or

linear. *Calyx-tube* urceolate turbinate or obconic, lobes 5 erect or reflexed, persistent or deciduous. *Petals* 5, quincuncially imbricate in bud. *Stamens* 20 or more, filaments sometimes connate at the base. *Disk* annular, or coating the calyx-tube. *Carpels* 2-5, connate and adnate to the calyx-tube, styles 2-5, free or connate below, stigmas truncate; ovules 2 in each cell, basal, collateral, ascending. *Fruit* (a pome) fleshy, 2-5-celled; cells with a membranous or cartilaginous often 2-valved endocarp, 1-2-seeded. *Seeds* when in pairs plano-convex, testa coriaceous; cotyledons amygdaloid:—DISTRIB. N. temp. and cold regions; species 40.

SECT. I. **Malus.** *Leaves* entire. *Ovary* 3-5-celled; styles more or less united below. *Fruit* globose; flesh of uniform consistence; endocarp coriaceous or like parchment.—Flowers fascicled or subumbellate.

1. **P. Malus**, Linn.; Ledeb. *Fl. Ross.* ii. 96; leaves ovate shortly acuminate crenate glabrous above tomentose beneath, calyx densely tomentose lobes persistent, petals pink, fruit large very shortly peduncled. *Roxb. Fl. Ind.* ii. 511; *Brandis For. Fl.* 205; *Wall. Cat.* 7111. *Malus communis*, Desf.; Boiss. *Fl. Orient.* ii. 656; *Dcne. Mem. Fam. Pom.* 153.

Apparently wild in the NORTH WESTERN HIMALAYA, ascending to 9000 ft., and to 11,400 in WESTERN TIBET; cultivated in N. W. India, Central India, the Dekkan, &c.—DISTRIB. from Persia westwards to the Mediterranean.

A tree, rarely exceeding 30 ft. *Branches* and foliage at length glabrous. *Leaves* 2-3 in.; petiole half the length of the blade, tomentose or woolly. *Flowers* 1½-2 in. diam. *Calyx-lobes* broad-ovate, acute, persistent. *Petals* with a tomentose claw. *Styles* 5, united below the middle. *Fruit* globose, intruded at both ends.

2. **P. baccata**, Linn.; Ledeb. *Fl. Ross.* ii. 97; leaves elliptic-ovate acuminate serrulate glabrous, calyx glabrous, peduncles very long, petals white, fruit small globose. *P. baccata* v. *himalaica*, Maxim. *Diag. Dec.* xv. 167; *Wenzig in Linnæa*, 1874, 44; *Brandis For. Fl.* 205; *Wall. Cat.* 681. *Malus baccata*, Desf.; *Dcne. Mem. Fam. Pom.* 154. (The Siberian Crab.)

Temperate Himalaya; from KASHMIR to KUMAON, alt. 6-10,000 ft. (sometimes cultivated), and in BHOTAN, alt. 7500 ft., Griffith. KHASIA Mts., alt. 6000 ft.—DISTRIB. Siberia to Manchuria.

A small tree, trunk short, head rounded. *Leaves* 2-3 in., rarely almost orbicular, young glabrous or as well as the petiole pubescent; petiole half the length of the blade. *Flowers* 1½-2 in. diam., in sessile umbels or fascicles, rarely with the pedicels collected on a short peduncle; pedicels slender, 2-3 in. *Calyx* glabrous or puberulous, without tomentum within; lobes lanceolate, deciduous. *Petals* very variable in breadth. *Styles* 3-5, nearly free, very woolly at their united bases. *Fruit* ½-1 in. diam., red or scarlet, intruded at the base.—The fruit of this is much smaller than in the common form of the plant, and often subpyriform like that figured in Pallas *Flora Rossica*, i. t. x.

3. **P. sikkimensis**, Hook. f.; leaves ovate or ovate-lanceolate acuminate serrulate tomentose beneath, calyx woolly, peduncles very long, fruit small shortly pyriform.

SIKKIM HIMALAYA, alt. 7-10,000 ft., J. D. H. BHOTAN, Griffith.

Very similar to *P. baccata*, but the leaves (which attain 5 by 3 in.) are more acutely serrate, woolly beneath and on the petiole and on the midrib above, the peduncles and calyx are also very woolly. It is marked by Decaisne as a distinct species (of *Malus*), but I suspect it will prove a form of *P. baccata*. The claw of the petals is woolly; the limb broadly obovate-oblong or almost orbicular; the styles are united below the middle into a perfectly glabrous column; the calyx-lobes deciduous; the

stamens about 25; the fruit speckled and very good stewed.—The specks on the fruit are like those of *P. variolosa*, but smaller,

SECT. II. ***Pyrus proper***. *Leaves* entire. *Petals* white, claw glabrous. *Ovary* 5-celled; styles free. *Fruit* globose or pyriform, flesh granular.—Flowers in few-flowered corymbs.

4. ***P. communis***, Linn.; Boiss. *Fl. Orient.* ii. 653; leaves oblong ovate acute crenulate or subentire hardly exceeding the slender petiole, corymbs short, calyx-lobes ovate or lanceolate persistent, fruit pyriform. *Roxb. Fl. Ind.* ii. 510; *Brandis For. Fl.* 203. (The Common Pear.)

Believed to be wild in KASHMIR (*Brandis*); cultivated in the N. W. HIMALAYA, alt. 2–8000 ft., and in WESTERN TIBET to alt. 10,000 ft.—DISTRIB. N. Persia westward to S. Europe,

A tree or shrub, glabrous or with woolly young parts and inflorescence, young often spinous. *Leaves* variable in breadth and in length of point, of young plant lobed. *Corymbs* terminating short shoots. *Flowers* $1\frac{1}{2}$ in. diam. *Calyx*-lobes variable. *Petals* obovate, white. *Fruit* 1–2 inches, gradually narrowed into the peduncle.

5. ***P. Pashia***, Ham. in *Don Prodr.* 236; young parts woolly, leaves ovate or ovate-lanceolate acuminate crenulate the young serrulate, glabrous when old, cymes corymbose or subumbellate woolly, calyx-lobes acute deciduous, petals white and pink, fruit globose warted. *Wenzig. in Linnæa*, 1874, *Décadence Jard. Fruit.*, Le Poirier, t. 7 (*Pirus*); *Kurz, For. Fl. Brit. Burm.* 441. *P. variolosa*, Wall. *Cat.* 680; *Brandis For. Fl.* 204. *P. verruculosa*, Bertol. *Plant. Nuov. Asiat.* ii. 10, t. 2. *P. nepalensis*, Herb. Ham. et. Hort.

Temperate Himalaya from KASHMIR to BHOTAN, alt. 2500–8000 ft. (sometimes cultivated, *Brandis*). KHASIA MTS., alt. 5000 ft. AVA, Wallich.—DISTRIB. Yunan.

A deciduous tree, in a young state like a *Cratægus* with 3 lobed and doubly sharply serrated leaves glabrous or woolly beneath, and often spinescent branches; branches dark, woody. *Leaves* 2–4 in., acuminate, sometimes caudate, glabrous and black when dry; petiole slender, half the length of the blade. *Inflorescence* very variable, usually corymbose with a very short peduncle and woolly, but the peduncle sometimes very thin, or is all but absent when the flowers are fascicled or umbelled; pedicels $\frac{1}{2}$ –2 in., slender in flower, stout in fruit. *Flowers* 1 in. diam. *Calyx*-lobes ovate, acute, usually very woolly, especially externally. *Petals* orbicular-obovate. *Stamens* about 30. *Styles* 3–5, quite free, more or less woolly at the base. *Fruit* very variable in size, $\frac{3}{4}$ – $1\frac{1}{2}$ in. diam., dark yellow-brown, scurfy, covered with raised white spots, austere, eatable when decaying.—A very variable plant, especially in the inflorescence; I was inclined to suppose that Khasia specimens with acutely serrated leaves and longer pedicels were different specifically, but I suspect the leaves were from young trees, and there is every gradation of pedicel from $\frac{1}{2}$ –2 in.

6. ***P. kumaoni***, Dcne. *Jard. Fruit. under Pirus Pashia*; leaves ovate or ovate-lanceolate acute or acuminate crenulate, glabrous, base acute or rounded, cymes corymbose glabrous, calyx-lobes broad rounded glabrous except the woolly margins, fruit globose warted.

Western Himalaya, from KASHMIR to KUMAON, alt. 5–8000 ft., Royle, Strach. & Winterbottom, &c.

Very similar in foliage to *P. Pashia* but at once distinguishable by the more glabrous corymbs and broad rounded calyx-lobes.

7. ***P. Jacquemontiana***, Dcne. *Jard. Fruit. (Pirus)* t. 8; leaves ovate or oblong-lanceolate acute crenulate glabrous, base rounded, corymbs laxly tomentose, lobes tomentose above, young fruit glabrate.

PUNJAB in woods by mountain torrents, *Jacquemont*.

I know this only by the above characters given by its author, who says that it much resembles *P. Pashia*, but is easily recognised by its smooth young fruit; he however does not speak positively of its being a distinct species. The form of the calyx-lobes is not stated.

SECT. III. **Aria.** Leaves simple, entire or margin lobulate. Calyx-lobes persistent. Ovary 2-5-celled, styles 2-5. Fruit pyriform or globose crowned with the calyx-lobes, flesh granular, endocarp membranous.

8. **P. lanata**, *Don Prodr.* 237; leaves broadly oblong margins lobulate lobules serrulate woolly beneath, corymbs densely woolly, petals glabrous within, styles 2-3 woolly all over. *P. kumaonensis*, *Wall. Cat.* 678. *P. Aria*, *Herb. Ind. Or. Hook. f. & Thoms.*; *Brandis For. Fl.* 206 (excl. syn. *P. vestita*). *P. Aria* var. *kumaonensis*, *Maxim. Diagn. Dec.* xv. 173. *Sorbus lanata*, *Wenzig in Linnæa*, 1874, 61.

Eastern temperate Himalaya; from KASHMIR to KUMAON, alt. 8-10,000 ft.

A middle sized tree, with the young parts densely woolly; bark of branches smooth, dark brown, shining. Leaves 5-8 by 2-4 in., acute, glabrous above when old, except often the midrib; lobules of leaf with many serratures; base acute or rounded; nerves 8-12, nearly straight; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. Corymbs short, 2-5 in. broad, terminal and subterminal, much branched. Flowers shortly pedicelled, $\frac{1}{2}$ in. diam., white. Calyx turbinate; lobes short, ovate, acute. Petals narrowly obovate, narrowed into naked claw. Stamens 20. Styles 2-3, densely woolly. Fruit very few in a corymb, or solitary, $\frac{1}{2}$ -1 $\frac{1}{2}$ in. diam., globose and 2-3-seeded, or smaller pyriform and 1-2-seeded.—This differs from *P. Aria* in the lobulate leaves (like those of *P. latifolia*, Poir.) with regularly serrulate lobes, much larger flowers and fewer very large fruits, the latter of which are very variable in size and shape according to the number of seeds ripened. I have not cited *Aria kumaonensis*, Dene., or *A. lanata*, Dene. (*Mem. Fam. Pom.* 162, 163) under this or the following, the species being so much confounded; one of them is the *Sorbus nepalensis* of gardens and *Cratægus (Aria) cuspidata*, Spach. (*Suite Buff.* ii. 106).

9. **P. vestita**, *Wall. Cat.* 679; leaves elliptic acute not or obscurely lobulate serrulate very shortly petioled most densely woolly beneath and on both surfaces when young, corymbs densely woolly, petals woolly within, styles 3-5 woolly at the base only. *P. crenata*, *Lindl. in Bot. Reg.* t. 1655, not of *Don*; *Wenzig in Linnæa*, 1874, 60.

Temperate Himalaya; from GARHWAL to SIKKIM, alt. 9-10,000 ft.

A tree very closely allied to *P. lanata*, but distinguished by the more elliptic and more woolly leaves with rarely marginal lobules, and more numerous nerves. The shorter broader petals woolly within and the styles glabrous except at the very base, are excellent characters. The figure in the 'Botanical Register' if intended for this, is a very bad one in respect of its representing slender petioles and a want of woolly clothing. I do not understand why Lindley identifies it with *Don's P. crenata*, the leaves being serrate and not crenate, and the corymbs compound. Very old leaves have the tomentum on the leaves beneath appressed, polished and silvery.

VAR. *khassiana*; leaves smaller, narrower, very membranous. *P. Aria*, L.? *Hook. f. & T. Herb. Ind. Or.*—Khasia, alt. 5-6000 ft.

SECT. IV. **Sorbus.** Leaves pinnate. Calyx-lobes persistent. Ovary 2-4-celled. Styles 2-5, free. Fruit globose crowned with the persistent calyx; endocarp membranous or coriaceous.

10. **P. Aucuparia**, *Gartn.*; *Ledeb. Fl. Ross.* ii. 100; glabrous or with white woolly down, leaflets 7-12 pair linear-oblong obtuse and apiculate or

oblong lanceolate and acuminate sharply serrate green beneath, petals orbicular. *P. ursina*, *Herb. Strach. & Wint.* No. 5. *Sorbus Aucuparia*, *Linn.*; *Boiss. Fl. Orient.* ii. 657.

Western temperate Himalaya, from KASHMIR to KUMAON, alt. 11,500–13,000 ft. *DISTRIB.* Turkestan and from the Caucasus westward to the Atlantic, and from Siberia to N. China and Japan.

A small tree, young parts with white cottony tomentum which sometimes persists on the petioles and inflorescence. *Leaves* 4–8 in.; leaflets $\frac{3}{4}$ – $1\frac{1}{2}$ in., entire towards the rounded base. *Corymbs* usually quite glabrous. *Flowers* $\frac{1}{3}$ – $\frac{1}{2}$ in. diam., pedicels short. *Calyx* glabrous, lobes broad short rounded or subacute. *Petals* white, orbicular. *Styles* 2–5, quite free, woolly at the base. *Fruit* globose, $\frac{1}{3}$ – $\frac{1}{2}$ in. diam., red.—*Strachey* and *Winterbottom's* specimens have a fine glaucous bloom on the fruit which appears to have been blue like those of *P. foliolosa*, but the specimens want the rusty tomentum of that species.

11. ***P. foliolosa***, *Wall. Pl. As. Rar.* ii. 81, t. 189; *Cat.* 667, *in part*; pubescence on leaves beneath petioles and inflorescence rusty brown, leaflets 10–15 pair linear-oblong acute or obtuse apiculate sharply serrate pale brown when dry beneath, petals orbicular-ovate, style very short. *P. ursina*, *Wall. Cat.* 675; *Brandis For. Fl.* 206. *Sorbus ursina* and *foliosa* (error for *foliolosa*), *Dcne. Mem. Fam. Pom.* 159. *S. ursina*, *Wenzig in Linnæa*, 1874, 75.

Temperate Himalaya, from KUNAWUR to SIKKIM, alt. 9–12,000 ft.

Very near *P. Aucuparia*, but a more robust plant with red-brown tomentum on the petioles inflorescence and midribs of the leaves beneath, at length glabrate; the flowers also are smaller, more densely crowded, with linear bracts intermixed, and have much stouter peduncles and pedicels. *Fruit* small, bluish-red, ovoid, globose or turbinate. *Styles* usually 5.—The flowers in Sikkim specimens are greenish white and rather fetid, but Gen. Munro sends a specimen from Kunawur with red flowers. Wallich describes the fruit as red.—There are two specimens under this name and number in Wallich's Herbarium, one with the lithographed ticket 677 attached has also a MSS. label stating it to have been procured from Gossain Than (a locality in Nepal which Wallich did not himself visit); the other specimen has a similar MSS. ticket stating it to be found at Sheepore by himself; on both tickets he has written 'an ab. *ursina*, *Wall. distincta*?'—Of these the first in no way differs from his three sheets of *P. ursina* (*Cat.* 675); whilst the second is a totally different plant, viz. *P. Wallichii*, mihi. The description in Wallich's 'Plant. As. Rar.' is that of his *foliolosa* (and *ursina*) except in that he describes the tomentum of the young plant as white, whereas it is rusty-red, as he says it is on the fully developed leaves &c. As the *ursina* of Wallich's Catalogue and Herbarium is the *foliolosa* of his Plant. As. Rar., the latter name must replace the former.

12. ***P. microphylla***, *Wall. Cat.* 676; nearly glabrous, slender, leaflets 10–17 pair small linear-oblong acute deeply and acutely serrate, corymbs long-peduncled lax-flowered, petals small orbicular. *Sorbus microphylla*, *Dcne. Mem. Fam. Pom.* 159; *Wenzig in Linnæa*, 1874, 76.

Temperate Himalaya; SIRMORE, *Webb (in Herb. Wall.)*; SIKKIM, alt. 10–14,000 ft., *J. D. H., C. B. Clarke.*

Possibly only a form (or young state?) of *P. foliolosa* or *Aucuparia*, but a very much more slender subsucculent plant with more deeply serrate leaflets, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, very slender flattened petioles, longer peduncles and pedicels and large bluish berries and 5 styles. Wallich's specimens have no flowers, those of Sikkim ones are red, and the globose fruit is white or pale blue. What pubescence is present resembles that of *P. foliolosa*. It is remarkable that no one since Capt. Webb has found this in the Western Himalaya.

13. ***P. Wallichii***, *Hook. fil.*; young parts clothed with white wool, leaflets 5–9 pair 1–2 in. linear-oblong acute or apiculate obscurely serrate

towards the tip, glaucous beneath, corymbs very tomentose compound, petals broadly obovate. *P. foliolosa*, Wall. Cat. 677, in part. *Sorbus foliosa*, Wenzig in *Linnæa*, 1874, 75, excl. synon.

Central and Eastern temperate Himalaya; NEPAL, Wallich. SIKKIM, alt. 6500–9000 ft., J. D. H., &c.

A small tree, young parts densely woolly, old glabrate except the corymb. *Leaves* 4–6 in.; leaflets coriaceous, sometimes perfectly entire, base very unequal-sided, midrib stout; nerves numerous, slender. *Corymbs* 2–3 in. diam.; peduncle and pedicels stout. *Flowers* $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., white. *Styles* 3, glabrous. *Fruit* (unripe) very small, ovoid, $\frac{1}{8}$ in. diam.—A very distinct species.

14. **P. insignis**, Hook. f.; very robust, leaflets 4–6 pair 3–4 in. linear-oblong acutely obscurely crenulate very coriaceous glaucous beneath, fruiting corymbs excessively compound, branches very stout.

SIKKIM HIMALAYA, alt. 8–11,000 ft., J. D. H., C. B. Clarke.

A small very robust tree; branchlets nearly as thick as the little finger, bud-scales rigid, chestnut-brown, shining; young parts clothed with long rather silky rusty brown wool, old glabrous. *Leaves* 6–10 in.; leaflets soon glabrate, apiculate in the sinus between the obscure crenatures, which are incurved in old leaflets, pale and rather glaucous beneath; base unequal-sided; young petioles densely silky. *Flowering corymbs* appearing with the young leaves, densely rufously woolly, with stout peduncle and branches. *Flowers* crowded, $\frac{1}{4}$ in. diam.; bracts linear. *Calyx* obovate, short, teeth triangular. *Styles* 3, glabrous. *Fruiting corymbs* branched from the base, 6 in. long and as broad; branches covered with oblong white spots, pedicels short stout. *Fruit* globose or broadly ovoid, 3-celled, $\frac{1}{3}$ in. diam. (when dry).

SECT. V. **Micromeles** (Dcne. Gen.). *Leaves* simple. *Calyx*-lobes deciduous. *Ovary* 2–3-celled; *styles* 2–3, free or united. *Fruit* globose, umbonate; endocarp membranous or coriaceous.

* *Leaves shortly petioled, narrowed to both ends; nerves very oblique close set nearly straight, very prominent.*

15. **P. Griffithii**, Dcne. Mem. Fam. Pom. 170 (*Micromeles*); leaves 5–9 in. young woolly beneath elliptic acuminate serrulate, corymbs very many-flowered densely woolly, fruit small. *P. sikkimensis* γ. *microcarpa*, Wenzig in *Linnæa*, 1874, 59.

SIKKIM HIMALAYA, alt. 6–9000 ft., J. D. H., C. B. Clarke. BHOTAN, Griffith.

A tree, with stout branches; young twigs and leaves covered beneath with a soft cottony wool that is deciduous in flakes. *Leaves* coriaceous, opaque above, paler beneath; nerves 12–15 pair, slightly curved; petiole $\frac{1}{4}$ in., stout, channelled. *Corymb* 5–6 in. diam., branched from the base, most densely woolly. *Flowers* $\frac{1}{3}$ in. diam., white. *Calyx*-tube obovate, woolly; lobes ovate, membranous, subacute. *Petals* obovate, glabrous. *Stamens* long. *Disk* tumid, 10-lobed, woolly. *Styles* 2, slender, glabrous. *Fruit* size of a pea, 1–2-celled, cells 2-seeded. *Seeds* plano-convex.—Very similar to *Pyrus vestita*.

16. **P. rhamnoides**, Dcne. Mem. Fam. Pom. 169 in part (*Micromeles*); leaves 3–5 in. very young hairy beneath elliptic acuminate serrulate, petiole short slender, corymbs tomentose many-flowered, fruit small not spotted 2-celled. *Photinia polyneura*, King in *Herb. Calc.*

SIKKIM HIMALAYA, alt. 7–9000 ft., J. D. H., C. B. Clarke.

A tree, very young branches and leaves tomentose and hairy, soon glabrous. *Leaves* coriaceous, very variable in breadth, $\frac{3}{4}$ –2 in.; nerves 12–14 pair, very prominent beneath, slightly curved; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Corymbs* branched from the base,

pubescent in flowers, glabrous in fruit. *Flowers* $\frac{1}{2}$ in. diam., white; pedicels slender. *Calyx-tube* obconic, hairy; lobes triangular. *Petals* broadly oblong, glabrous. *Stamens* long. *Disk* tumid, 10-lobed, puberulous. *Styles* 2, slender, united below the middle or free, glabrous. *Fruit* $\frac{1}{4}$ in. diam., smooth, endocarp thin; cells 2-seeded. *Seeds* plano-convex.

** *Leaves more or less ovate (rarely obovate), petiole slender. Disk in the umbo of the fruit tumid or flat not lobed.*

17. **P. khasiana**, Dcne. Mem. Fam. Pom. 169 in part (Micromeles); leaves 4 in. elliptic-obovate rather suddenly acuminate serrate, nerves very oblique nearly straight, fruit $\frac{1}{2}$ in. diam. spotted 4-celled.

KHASIA Mts.; at Nungbree wood, alt. 5000 ft., Griffith.

A tolerably large tree, in foliage more like *P. rhamnoides* than any of the following species, having many nearly straight nerves. The only specimens (Griffith, 2078, 1044 of Posth. Papers, ii. 67) are in old leaf and fruit, which latter Griffith describes as of the size of a cherry; it is constantly 4-celled; the endocarp thick and coriaceous; the cells narrow 1-seeded, the pulp granular, and is 4-angled when dry and has a narrow depressed umbo with a conical centre.

18. **P. granulosa**, Bertol. Piant. Nuov. Asiat. ii. 10, t. 3; leaves ovate-lanceolate long-acuminate serrate, base rounded or acute, nerves 8-10 pair spreading arched, fruits few in a corymb $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. spotted 4-celled. *P. sikkimensis*, Wenzig in *Linnæa*, 1874, 58, in part; Kurz, For. Fl. Brit. Burm. i. 442. *P. Karensium*, Kurz in Journ. Beng. As. Soc., 1872, ii. 306; 1873, ii. 232.

KHASIA Mts. Griffith; near Churra, Myrung and Mamloo, alt. 4-6000 ft., J. D. H. & T. T. MARTABAN, alt. 7000 ft., Kurz.

A shrub or small tree, in a fruiting state perfectly glabrous, branches with oblong white lenticels. *Leaves* 4-5 in., stiff; nerves prominent beneath; petiole 1-1 $\frac{1}{4}$ in. *Fruiting corymb* with smooth branches. *Fruit* with the flesh of large granules, endocarp thickly coriaceous, cells narrow; umbo small depressed with a small conical centre.—Differs from *P. khasiana* in the ovate leaves with arching nerves.

19. **P. polycarpa**, Hook. f.; quite glabrous, leaves ovate-lanceolate long-acuminate serrate, base rounded or acute, nerves 6-8 pair spreading arched, corymbs effuse perfectly glabrous, fruit $\frac{1}{6}$ in. unspotted. *Pyrus*, b. Herb. Ind. Or. H. f. & T.

KHASIA Mts., alt 5-6000 ft., Griffith, Simons, &c.

A small tree, foliage remarkably similar to that of *P. granulosa*, but the nerves fewer, and at once distinguished by the very small unspotted fruit, with only 2 cells both broad, and small seeds with thick plano-convex cotyledons. The only flowering specimen I have is from M. Simons, in it the *corymb* is much branched, perfectly glabrous, and smooth, somewhat warted in fruit.—*Flowers* $\frac{1}{2}$ in. diam.; pedicel slender. *Calyx-tube* rather pyriform; limb expanded; lobes triangular-ovate. *Petals* nearly orbicular, glabrous, concave. *Disk* inconspicuous, glabrous. *Stamens* long, slender. *Styles* 2, united to the middle, quite glabrous. *Fruit* rather ovoid, $\frac{1}{8}$ - $\frac{1}{4}$ in., umbo large for its size, depressed with a conical centre.

20. **P. cuspidata**, Bertol. Piant. Nuov. Asiat. ii. 9, t. 1; young parts flocculent, leaves ovate or elliptic-ovate long-petioled caudate-acuminate serrate, nerves 10-12 spreading arched, corymbs contracted densely warted when in fruit, fruit small not spotted 2- very rarely 3-celled. *Micromeles verrucosa*, Dcne. Mem. Fam. Pom. 169. *Rosacearum*? frutex, Brown in Wall. Cat. 7467.

KHASIA Mts., alt. 4-5000 ft., Wallich, &c.

A large tree, with pale foliage; branchlets stout, studded with oblong lenticels;

twigs and young parts clothed with a flocculent cotton that falls away in white flakes. *Leaves* 3-4 in., rather membranous, pale green, not shining, point very long, coarsely serrate, base acute or rounded; petiole very slender. *Corymb* more rounded than in its allies, white and tomentose when young, more rusty or glabrous when old; branches rather short; covered when fruiting with raised lenticels. *Flowers* $\frac{1}{4}$ in. diam.; pedicels slender. *Calyx-tube* pyriform; limb expanded, glabrous within, teeth triangular, acute. *Petals* obovate, woolly within in bud, claw pubescent. *Stamens* slender. *Disk* glabrous, inconspicuous. *Styles* 2, very slender, united below the middle, glabrous. *Fruit* $\frac{1}{3}$ in. diam., rather pyriform, crown tubular $\frac{1}{4}$ its own diameter, with a deep depression and conical centre.

21. **P. ferruginea**, *Hook. f.*; branchlets leaves beneath and corymbs densely clothed with rusty wool, leaves very shortly petioled broadly elliptic suddenly acuminate serrulate, corymbs few-flowered, styles 3. *Sorbus sikkimensis* var. *ferruginea*, *Wenzig in Linnæa*, 1874, 60.

BHOTAN, *Griffith*.

Branchlets with few lenticels. *Leaves* $2\frac{1}{2}$ -3 in., lower half or one-third quite entire, upper surface sparsely pubescent or glabrate; nerves 6-8 pair, spreading and arching; petiole $\frac{1}{4}$ in., densely woolly. *Corymbs* densely woolly, of few primary subumbellate branches $\frac{1}{2}$ - $\frac{3}{4}$ in., which are twice or thrice divided into erect stout pedicels. *Flowers* $\frac{1}{3}$ in. diam. *Calyx-tube* pyriform; lobes short, triangular, acute, very deciduous. *Petals* obovate, woolly on the face and claw. *Stamens* slender. *Disk* not raised. *Styles* usually 3, glabrous, united to the middle; ovules inserted in the middle of the axis.

22. **P. Thomsoni**, *King MSS.*; glabrous, leaves very shortly petioled, elliptic-lanceolate or oblanceolate acuminate serrate above the middle, corymbs glabrous, styles 2-4, fruit $\frac{3}{4}$ in. diam.

SIKKIM HIMALAYA, alt. 8-10,000 ft., *J. D. H., C. B. Clarke*.

A large tree; branches glabrous, sparingly lenticellate. *Leaves* 3 in., brown when dry, apparently glabrous at all stages; base acute, rarely rounded or obtuse; nerves 8-12 pair, spreading and arched; petiole $\frac{1}{4}$ - $\frac{1}{3}$ in. *Corymb* of few primary subumbellate erect main branches, 1 in. long, di-trichotomously forked. *Flowers* $\frac{1}{3}$ in. diam.; pedicels slender. *Calyx-tube* pyriform; limb expanded; teeth ovate, obtuse. *Petals* obovate, claw woolly. *Stamen* stout. *Styles* stout, united at the middle or base, glabrous; ovules attached in the middle of the axis. *Fruit* with few white spots, crown sunk. *Seeds* tumid.—Young flowering specimens of this were distributed as *Photinia arguta*, Wall., var. ?, and are cited by Decaisne under his *Micromeles verrucosa* (*Pyrus cuspidata*, Bertol.) from which it differs in the glabrous narrow leaves with short petioles serrated only beyond the middle.

DOUBTFUL SPECIES.

P. (MALUS) SIEVERSII, *Ledeb. Fl. Alt. ii.* 222. A Soongarian species, closely allied to *P. baccata*, differing in being branched from the base, is enumerated by Decaisne (Mem. Fam. Pirus) as having been found in Kashmir by Jacquemont.

P. (MICROMELES) CASTANEIFOLIA, *Dene. Mem. Fam. Pom.* 169; "leaves oblong or oblong-lanceolate acuminate base obtuse acutely serrate glabrous, petiole rather long slender, peduncle and pedicels floccose when young, fruit small. *Sorbus sikkimensis*, *Wenzig in Linnæa*, 1874, 58." Eastern Bengal, *Griffith*, No. 2077-1.—I cannot identify this.

P. (SORBUS) SIKKIMENSIS, *Wenzig in Linnæa*, 1874, 58; evidently includes more than one species from Sikkim and the Khasia Mts. Thus, var. *a.*, the Sikkim plant included under this variety, I cannot recognise by the description, though it is of a plant stated to be found by myself; the Khasia one includes *P. granulosa* and *verrucosa*.—Var. *β. oblongifolia*, this I do not recognise though it professes to be a Sikkim discovery of mine.—Var. *γ. microcarpa*, a Sikkim plant, is I suppose *P. Griffithii*, to which

Wenzig doubtfully (and erroneously) refers *P. Nussia*, Don.—Var. δ . *ferruginea* is *P. ferruginea*.

P. CRENATA, Don, *Prodr.* 237; "leaves long-petioled ovate acute crenate glabrous above, young beneath and branchlets white-tomentose, corymbs simply woolly, calyxlobes ovate acute.—Suemba in Upper Nepal, *Hamilton*. Obs. *P. Pollveria* differs in the shorter broader serrate not crenate leaves and in the more numerous flowers."—I do not recognise the above.—Can it be the common pear?

21. *PHOTINIA*, Lindl.

Evergreen small trees or shrubs. *Leaves* coriaceous, quite entire or serrulate; stipules subulate, deciduous. *Flowers* small, corymbose, white. *Calyx-tube* obconic; limb 5-cleft; lobes short, persistent. *Petals* 5, contorted or imbricate in bud, orbicular or obovate, claw glabrous or woolly. *Stamens* 20 or more. *Ovary* with a conical pubescent or woolly crown, 2- rarely 3-celled; styles 2, rarely 3, free, or combined at the base, short; ovules 2, collateral, nearly basal in each cell, ascending. *Fruit* small, globose or ovoid, 1-2-seeded; flesh rather hard; endocarp crustaceous or membranous. *Seeds* obovoid, triquetrous or compressed, nearly as long as the fruit, testa coriaceous.—DISTRIB. Eastern tropical and subtropical Asia; species 7 or 8.

1. *P. Lindleyana*, *Wight & Arn. Prodr.* 302; quite glabrous, leaves elliptic oblong or ovate acute crenulate or entire base rounded, nerves 13-15 pair faint, petiole long stout, flowers $\frac{1}{2}$ in. diam., claw of petal villous, fruit turbinate or subglobose. *Wight Ic. t.* 228; *Dcne. Mem. Fam. Pom.* 141. *P. Notoniana*, *Wall. Cat.* 671, not of *Wight & Arn.* *P. serrulata*, *Lindl. γ. Wenzig in Linnæa*, 1874, 94.

NILGHIRRI HILLS, *Noton, Wight, &c.*

A small tree? everywhere glabrous except the crown of the ovary and claw of the petals; branches stout. *Leaves* 3-6 in., very thickly coriaceous, not shining on either surface, flat; nerves nearly horizontal; petiole $1\frac{1}{2}$ -2 in., cylindric. *Corymbs* 3-5 in. diam., much branched from the base, branches stout. *Flowers* $\frac{1}{2}$ in. diam., pedicelled; bracts subulate. *Calyxlobes* rounded. *Petals* orbicular-obovate, claw distinct. *Styles* 2, very stout, short. *Fruit* $\frac{1}{4}$ in. long, smooth, glaucous; endocarp crustaceous.—Wallich's *P. Notoniana* is only a form of *Lindleyana*, with the crenatures few and confined to near the top of the leaf.

2. *P. Notoniana*, *Wight & Arn. Prodr.* 302 (not of *Wall. Cat.*); leaves elliptic ovate oblong or lanceolate acuminate quite entire base acute or rounded, nerves very many and slender, petiole long ($1-1\frac{1}{2}$ in.), corymbs pubescent or glabrous, flowers $\frac{1}{2}$ in. diam., fruit globose. *Wight Ic.* 991; *Ill. t.* 86; *Dcne. Mem. Fam. Pom.* 141; *Bedd. Fl. Sylv. t.* 192. *P. Blumei*, *Dcne. l. c.* 142. *Eriobotrya integrifolia*, *Kurz, For. Fl. Brit. Burm. i.* 442.

NILGHIRRI and PULNEY MTS., *Wight, &c.* KHASIA MTS., alt. 4-5000 ft. MARTABAN, alt. 7-7200 ft., *Kurz*. CEYLON; Central province, alt. 6-7000 ft.—DISTRIB. Java.

A small tree, glabrous except the inflorescence, which is finely pubescent. *Leaves* $2\frac{1}{2}$ -6 in., very variable, sometimes caudate-acuminate, thickly coriaceous, the numerous nerves very delicate, hardly shining above; petiole $\frac{3}{4}$ -2 in., flat or grooved above. *Corymb* excessively branched, 3-10 in. diam.; branches slender in flower; stout in fruit. *Flowers* pedicelled, white. *Calyxlobes* rounded. *Petals* orbicular, claw glabrous or slightly villous. *Fruit* $\frac{1}{4}$ in. diam., blue, glaucous; endocarp membranous. *Seeds* compressed, radicular end incurved.—I refer *Kurz's* plant here on the authority of his citation of *Beddome*; he describes the leaves as sometimes cuneate-oblong and with a few inconspicuous teeth.

VAR. *ceylanica*; leaves sometimes orbicular, inflorescence quite glabrous. Ceylon, alt. 6-7000 ft.—DISTRIB. Java.—Javanese specimens have sometimes crenate leaves.

VAR. *eugenifolia*; leaves from narrow lanceolate to broadly oblong, corymbs hoary with white pubescence. *P. eugenifolia*, Lindl. in Bot. Reg. sub. t. 1956; Wall. Cat. 670, in part. *P. micrantha*, Dcne. Mem. Fam. Pom. 143.—Khasia Mts.

VAR. *macrophylla*; leaves 7-9 in. ovate-lanceolate caudate-acuminate, petiole 1-2½ in., corymbs quite glabrous. Khasia Mts.

3. **P. integrifolia**, Lindl. in Trans. Linn. Soc. xiii. 103; quite glabrous, leaves oblanceolate acuminate quite entire narrowed into the short ($\frac{1}{4}$ - $\frac{1}{2}$ in.) petiole, corymbs large spreading, flowers $\frac{1}{2}$ in. diam., fruit globose. Wall. Cat. 669; Lindl. in Bot. Reg. under tab. 1956. *Pyrus integrifolia*, Don Prodr. 237.

Central and Eastern Himalaya; from NEPAL, Wallich, and SIKKIM, alt. 4-7000 ft. to BHOTAN, Griffith. KHASIA MTS. alt. 3-4000 ft.

I have great difficulty in distinguishing this from *P. Notoniana* (in the Khasia Mts. especially), its best character is the very short petiole and uniformly oblanceolate smaller leaves 3-5 in. long. In the Himalaya it is very constant in its characters, but in the Khasia Mts. it comes very near small states of *Notoniana*, var. *macrophylla*. Hence though no foliage of allied plants can be more unlike in form than the ordinary states of this plant present, I am in doubt as to their specific differences. *P. integrifolia*, Miquel (Fl. Ind. Bat. i. part i. 387), from Java, appears to be the same plant. The styles are almost invariably two, but three are said to occur. The crown of the ovary is woolly, but of the fruit glabrous.

4. **P. Griffithii**, Dcne. Mem. Fam. Pom. 142; branchlets midrib beneath petiole and inflorescence woolly, leaves oblong-lanceolate acuminate serrulate near the tip, nerves very slender, petiole 1-2 in., flowers $\frac{1}{2}$ in. diam. Pomarc. Griff. Ic. Pl. Asiat. iii. t. 573 (bad); Posth. Papers, ii. 178, No. 921.

BHUTAN HIMALAYA, at Trelagong, Griffith.

A large tree; branchlets rather slender, woolly, pubescence whitish. Leaves 5-7 by 1½-2½ in., much more membranous than in any preceding species, very finely acuminate, serratures minute, rather shining on both surfaces; nerves arched, 25-30 pair; petiole cylindric. Corymbs ample. Flowers shortly pedicelled. Calyx-lobes rounded. Petals obovate; claw woolly. Styles 2-3, woolly and connate below. Ovary with a densely woolly crown.—Griffith describes the calyx-lobes and petals as 5 or 6.

5. **P. mollis**, Hook. f.; branchlets leaves beneath short petiole and inflorescence clothed with white wool, leaves very membranous elliptic or lanceolate acuminate serrulate base acute, corymbs rounded many-flowered, flowers $\frac{1}{2}$ in. diam., styles 2-3 glabrous united at the base.

SIKKIM HIMALAYA, at a low elevation, J. D. H., Gamble.

Tree 20-30 ft. Branches slender, glabrous, with red brown bark and small lenticles; branchlets and other woolly parts white. Leaves 4-5 in., pale when dry, very membranous, serratures fewer and smaller towards the base, rather suddenly acuminate; nerves 6-10 pair, spreading, arched, very slender. Corymbs 2 in. diam., shortly peduncled, branches spreading, rather lax-flowered. Flowers white, pedicelled; bracts minute, linear, caducous, membranous. Calyx woolly; tube hemispheric; lobes rounded. Petals orbicular, retuse; claw very short, glabrous. Stamens not long, slender. Disk not thickened, woolly at the base. Styles slender; stigma 2-lobed. Fruit $\frac{1}{2}$ in. long, ovoid, crowned with the persistent calyx; endocarp thinly crustaceous, septum membranous. Seeds nearly as long as the fruit.

22. **POURTHIÆA**, Dene.

Shrubs or small trees, glabrous or woolly when young. *Leaves* simple, crenate, persistent; stipules minute, subulate. *Flowers* small, white, in few-flowered corymbs, with warted fruit-bearing branchlets. *Calyx-tube* obconic; lobes 5, acute. *Petals* 5, contorted, obovate, oblique and notched, claw glabrous. *Stamens* 20, filaments slender. *Ovary* 2-3-celled; styles 2-3, connate high up, stigma capitate 2-fid; ovules 2 in each cell, collateral, basal, ascending. *Fruit* small, globose or ovoid, 1-2-seeded, flesh granular; endocarp membranous. *Seeds* ellipsoid, plano-convex; testa thickly coriaceous with reticulated grooves on the convex side; cotyledons plano-convex; radicle curved, short, exserted.—DISTRIB. Himalaya, China, Corea, Japan.

1. **P. arguta**, Dene. *Mem. Fam. Pom.* 147. Photinia? *arguta*, Wall. *Cat.* 672; *Lindl. Bot. Reg.* under 1956; *Wenzig in Linnæa*, 1874, 90, *excl. synonym*.

KHASIA Mts., alt. 3-5000 ft., abundant. *BIRMA*, *Griffith*. Foot of the SIKKIM Terai, *Gamble* (var. *Hookeri* only).

I can distinguish but one Indian species of this very abundant Khasian bush, which occurs all over the range; all have white-woolly young leaves and inflorescence, which is thrown off with age, the fruit varies much in size.

VAR. 1. *Wallichii*; leaves $1\frac{1}{2}$ -2 in. coriaceous ovate-lanceolate acuminate quite glabrous in age, nerves 8-10 pair, corymbs subsessile few-flowered sometimes almost capitate, fruit $\frac{1}{4}$ in. diam. globose. *P. arguta*, Dene. *l. c.*

VAR. 2. *Hookeri*; leaves 3-4 in. coriaceous oblong-lanceolate caudate-acuminate, petiole longer, corymbs 2-3 in. long, fruit $\frac{1}{2}$ in. diam. globose. *P. Hookeri*, Dene. *l. c.* 148. Sikkim and Khasia.

VAR. 3. *salicifolia*; leaves 4-5 in. coriaceous narrowly lanceolate caudate-acuminate more persistently woolly beneath, corymb effuse, flowers larger. *P. salicifolia*, Dene. *l. c.* 148.

VAR. 4. *membranacea*; leaves 2-3 in. very membranous ovate-lanceolate acuminate or caudate-acuminate, corymbs of few long branches floriferous at the tip. Khasia, *Griffith* (no number). This is no doubt a lax form growing in woods.

VAR. 5. *latifolia*; leaves 4-5 by $1\frac{1}{2}$ -2 $\frac{1}{4}$ in. rather coriaceous oblong or oblong-lanceolate acuminate more persistently woolly beneath, serratures smaller, corymbs umbelliform, branches $1\frac{1}{2}$ in., flowers longer pedicelled. Hookhoom valley, Birma, *Griffith*.

VAR. 6. *parvifolia*; leaves $1\frac{1}{2}$ -2 $\frac{1}{2}$ in. coriaceous narrowly lanceolate acuminate, corymbs contracted, fruit $\frac{1}{4}$ in. rather ovoid. Khasia Mts. at Jowai, *C. B. Clarke*.

23. **STRANVÆSIA**, Lindl.

Shrubs or small trees. *Leaves* coriaceous, evergreen, quite entire or serrulate; stipules subulate. *Flowers* small, white, in compound many-flowered corymbs. *Calyx-tube* small, obovoid; limb dilated, 5-toothed. *Petals* 5, obovate, usually contorted in bud, claw naked or bearded. *Stamens* 20. *Ovary* 5-celled; styles 5, connate high up; stigma capitate 2-fid; ovules 2 in each cell, basal, collateral, ascending. *Fruit* globose, rather fleshy, 5-celled; endocarp crustaceous, dehiscing loculicidally; cells 1-seeded. *Seeds* ovoid, plano-convex; testa coriaceous, mucilaginous; embryo plano-convex.—DISTRIB. Himalaya and China; species 3 or 4.

1. **S. glaucescens**, Lindl. in *Bot. Reg.* t. 1956; leaves obovate oblanceolate or narrowly lanceolate acuminate or obtuse and apiculate entire or serrulate quite glabrous, calyx and pedicels woolly. *Brand. For. Fl.* 210; *Wenzig*

in *Linnaea*, 1874, 204. *S. glaucescens* and *S. Nussia*, *Dcne. Mem. Fam. Pom.* 178. *Cratægus glauca*, *Wall. Cat.* 673. *Pyrus Nussia*, *Ham. in Don Prodr.* 237. *Cotoneaster affinis*, *Lindl. in Wall. Cat.* 658.

Western and Central Himalaya; KUMAON, alt. 3-7500 ft. NIPAL, *Wallich. KHASIA Mts.*, alt. 4-5000 ft.

A small leafy evergreen tree, very variable in foliage, young parts tomentose in a very early state. *Leaves* in Western specimens often 6 in. long and 2-2½ broad, more obovate than is usual in the Eastern, hardly shining above, paler beneath; in Khasian specimens the leaves are sometimes 4 by ½-¾ in., long-acuminate and curved (var. *angustifolia*, *Dcne.*), always narrowing into the petiole; nerves very slender; petiole ½-¾ in. *Corymbs* 2-4 in. broad; branches slender, hairy or glabrate. *Flowers* pedicelled, ½ in. diam., pedicels woolly. *Calyx* woolly; lobes acute, persistent. *Petals* spreading, usually notched, not oblique. *Ovary* small; crown hardly raised, hairy. *Style*-column woolly below. *Fruit* ½ in. diam., orange yellow, crowned with the incurved calyx-teeth; flesh thin; crown of the crustaceous carpels exserted, glabrous.

24. CRATÆGUS, Linn.

Shrubs or small trees, often spiny. *Leaves* simple lobed or pinnatifid; stipules deciduous. *Flowers* in terminal corymbose cymes, white or red; bracts caducous. *Calyx*-tube urceolate or campanulate; mouth contracted; lobes 5, persistent or deciduous. *Petals* 5, inserted at the mouth of the calyx, imbricate in bud. *Stamens* many. *Carpels* 1-5, adnate to the calyx-tube; styles 1-5; stigma truncate; ovules 2 in each cell, ascending. *Fruit* ovoid or globose, with a bony 1-5-celled stone, or with 1-5 bony 1- rarely 2-seeded stones.—*DISTRIB.* N. temp. regions, chiefly American, extending south into New Granada; species about 50.

1. *C. Oxyacantha*, Linn.; *Ledeb. Fl. Ross.* ii. 88; leaves cuneate or triangular-ovate with a cuneate base pinnatifidly 3-5-lobed rarely pinnate sinus acute, lobes sharply toothed towards the tip, fruit glabrous ovoid, carpels 1-3 wholly adnate to the calyx-tube. *Brandis For. Fl.* 207. *C. ribesius*, *Bertol. Miscel. Bot.* xxii. 14, t. 2. (Hawthorn).

Western temperate Himalaya, from MURREE to KISHTWAR, alt. 6-9000 ft.—*DISTRIB.* Afghanistan and westward to the Atlantic, W. Siberia.

A small tree, 20-30 ft., trunk short, branches spinescent; young shoots and leaves beneath and inflorescence sparsely softly pubescent or glabrate. *Leaves* 1-2 in.; petiole very slender; stipules leafy, upper usually falcate, serrate, lower larger orbicular and cut. *Corymbs* many-flowered. *Flowers* ½ in. diam., white, odorous. *Calyx*-lobes subacute. *Petals* orbicular. *Styles* 1 or 2, slender, glabrous. *Carpels* adnate by their whole length to the calyx-tube, tips pubescent. *Fruit* scarlet, flesh scanty; endocarp of 2-3 bony pyrenes more or less firmly united.—*Boissier* regards the Himalayan plant as *C. monogyna* (itself a var. of *Oxyacantha*) but there are commonly 2 and often 3 styles and carpels.

2. *C. Clarkei*, *Hook. f.*; softly tomentose, leaves oblong pinnate or pinnatifid, base cuneate or truncate, segments oblong toothed at the broad tip, fruit pubescent globose, carpels 5, free above.

KASHMIR, at Hirpoor, alt. 8000 ft., *Thomson, C. B. Clarke.*

Pubescence soft, white, spreading. *Leaves* 2-4 in., opaque above, lower segments often free obovate and spreading, tips rounded or acute; petiole slender; stipules very large, semicircular and falcate, toothed. *Flowers* apparently smaller than in *C. Oxyacantha* and fewer in the corymb, which is clothed with spreading hairs. *Calyx*-lobes persistent, obtuse. *Petals* (from fruiting specimen) orbicular-obovate.

Styles inserted ventrally, free. *Carpels* free for nearly $\frac{1}{3}$ of the upper part from one another and the calyx-tube. *Fruit* green, 5-lobed when dry, $\frac{1}{4}$ in. diam., crowned by the reflexed calyx-lobes; pyrenes separable, free above, faces rough.—The structure of the ovary and fruit is essentially the same as in the following species, but the tops of the pyrenes are not so much protruded.

3. **C. crenulata**, Roxb. *Hort. Beng.* 38; *Fl. Ind.* ii. 509; glabrous, leaves linear-oblong or obovate crenulate obtuse very coriaceous, fruit globose, carpels 5 free above. *Wall. Cat.* 674; *Lindl. in Bot. Reg.* xxx. t. 52. *C. Pyracantha*, Brandis *For. Fl.* 208. *Mespilus crenulata*, Don *Prodr.* 238. *Pyracantha crenulata*, Roem.; *Dcne. Mem. Fam. Pom.* 171.

Temperate Himalaya in dry places from the SIRMOR to BHOTAN (exclusive of Sikkim), alt. 2500–8000 ft.

A large woody rigid spinescent shrub. *Leaves* crowded on short lateral branchlets, 1–2 in., shining, narrowed into the very short petiole; nerves indistinct. *Corymbs* short, many-flowered, glabrous or puberulous; branches slender. *Flowers* $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., white; pedicels slender. *Calyx-tube* hemispheric; lobes obtuse. *Petals* orbicular, claw very short. *Styles* 5, inserted ventrally. *Carpels* 5, free for $\frac{1}{3}$ of their upper part from one another and the calyx-tube. *Fruit* globose, orange-red, crowned with the erect calyx-lobes; pyrenes separable, faces polished, upper $\frac{1}{3}$ free and protruded between the calyx-lobes.—Differs from the European *C. Pyracantha* in the obtuse leaves and smaller flowers and fruit.

25. **COTONEASTER**, Linn.

Shrubs or small trees. *Leaves* quite entire, coriaceous, usually very downy beneath; stipules setaceous, deciduous. *Flowers* small solitary or in axillary or terminal cymes, white or pink, sometimes polygamous. *Calyx-tube* turbinate or campanulate; lobes 5, short, persistent. *Petals* 5, imbricate in bud. *Stamens* 20, inserted at the mouth of the calyx. *Carpels* 2–5, adnate wholly or by their backs only to the calyx-tube; styles 2–5, free, stigma truncate; ovules 2 in each cell, erect, basal, geminate, raphe lateral. *Fruit* small, ovoid globose or turbinate, with 2–5 bony 1-seeded stones.—DISTRIB. Europe, temp. Asia; N. Africa, Mexico; species 15.

A genus distinguishable only by habit from *Cratægus*. The species are very variable and difficult of discrimination.

A. *Leaves* deciduous (subpersistent in *nummularia* and *rotundifolia*); margins not recurved.

* *Leaves* 1–4 in. *Cymes* usually branched and many-flowered.

1. **C. bacillaris**, Wall.; *Lindl. in Bot. Reg.* under t. 1229; a bush or small tree, leaves $1\frac{1}{2}$ –3 in. oblong or obovate or oblong-lanceolate woolly or glabrescent beneath acute or obtuse narrowed into the petiole, cymes short many-flowered puberulous, fruit dark brown globose. *Brandis For. Fl.* 208; *Wall. Cat.* 660. *C. obtusa*, Wall. *in Bot. Reg.* l. c.; *Cat.* 659, in part.

Temperate Himalaya, from WAZARISTAN, alt. 4–8000 ft.; MURREE and KASHMIR, alt. 4–10,000 ft. to NEPAL, SIKKIM? and BHOTAN?. SALT. RANGE, alt. 1500–2500 ft. (*Brandis*).

A common and variable deciduous Himalayan shrub; wood much used for walking sticks, whence its specific name. Of Wallich's *C. obtusa*, I cannot distinguish three of the specimens from *bacillaris* even as a variety; Lindley's character of "cymes congested and branchlets glabrous" in *obtusa*, and "cymes divaricate and branchlets pilose" in *bacillaris*, do not distinguish Wallich's var. The other specimens marked

as *obtus*a are the *C. affinis* of Lindley and differ only in the tomentose undersurface of the leaves and corymbs, which in this respect present every intermediate with *bacillaris*; its leaves are however often smaller rounder and sometimes rounded at the base (*C. rosea*, Edgw.). I am somewhat doubtful of the Sikkim and Bhotan plants here referred to *bacillaris*. I do not remember a black or dark brown fruited large shrubby species in Sikkim, and Griffith's Bhotan specimens are in flower only; one of these has leaves under 1 in. long. The Sikkim specimens doubtfully referred here have the leaves of *affinis* and a young shoot has them sometimes almost orbicular, rounded at the base (as in *rosea*) and 2 in. diam. Except by the dark berries it is difficult to distinguish var. *affinis* from *C. frigida*.

VAR. *affinis*; leaves beneath petioles young shoots and inflorescence more or less woolly or tomentose. *C. affinis*, Lindl. in Trans. Linn. Soc. xiii. 101; Bot. Reg. undert. 1229. *C. obtusa*, Wall. Cat. 659, in part. *C. rosea*, Edgw. in Trans. Linn. Soc. xx. 46. *Mespilus affinis*, Don Prodr. 238.

VAR. *parvifolia*; leaves $\frac{1}{2}$ –1 in. elliptic acute or obtuse, cymes short dense-flowered, flowers smaller. Bhotan, Griffith, alt. 7000 ft.

2. **C. frigida**, Wall. Cat. 657; a large bush or small tree, leaves 3–5 in. oblong or oblong-lanceolate acute narrowed to the base young tomentose beneath, cymes very many-flowered woolly, fruit globose scarlet. Lindl. in Bot. Reg. t. 1229. ? *C. affinis*, Hohen. Plant. Exsicc. Nilg. No. 1575. *C. nepalensis*, Hort.

Central and Eastern Himalaya; NIPAL, Wallich, interior of SIKKIM, alt. 7–9000 ft., J. D. H.

A tree, 20 ft. high, or large bush, deciduous, similar in habit and foliage to *C. bacillaris*, but with far more numerous flowers in a cyme and scarlet berries. Hohenacker's Nilgiri specimens, which I take to be *frigida*, are from a tree cultivated in Lord Elphinstone's garden at Kaittee. Decaisne quotes Jacquemont as having found this, but I suspect that *C. bacillaris* var. *affinis* is the plant intended, as *C. frigida* occurs nowhere in Jacquemont's region of travel.

** Leaves $\frac{1}{2}$ –2 (rarely 4–5) in. Cymes few-flowered or flowers solitary.

3. **C. acuminata**, Lindl. in Trans. Linn. Soc. xiii. 101, t. 9; an erect shrub, twigs leaves beneath and inflorescence pubescent or tomentose, leaves usually 1–2 in. ovate acuminate or acute at length glabrous beneath, cymes 1–5-flowered very short, fruit turbinate scarlet. Brandis For. Fl. 209. R. Roylei or Royleana, Hort. *C. rotundifolia*, Herb. Str. & Wint., not of Wallich. *Mespilus acuminata*, Lodd. Bot. Cat. t. 919.

Temperate Himalaya, from SIRMOR and KUMAON, alt. 4500–12,000 ft., to SIKKIM, alt. 7–13,000 ft.

A deciduous shrub, sometimes 14 ft. high; wood used for walking sticks (like *bacillaris*), the most constant in form of foliage of any Indian species except *Simondsii*, also in their size, about 2 in., though in one of Wallich's specimens they exceeded 5 in. !—The fruit varies from turbinate to subcampanulate. The number of flowers in a cyme varies extremely, Brandis says from 2–10, I find 2–5 the average, but solitary flowers are not uncommon.

4. **C. vulgaris**, Lindl.; Boiss. Fl. Orient. ii. 665; an erect bush, leaves $\frac{3}{4}$ –1 $\frac{1}{2}$ rarely 2 in. broadly ovate acute or obtuse hoary or glabrous above softly tomentose beneath, cymes short few-flowered glabrescent, fruit globose black or red.

WESTERN TIBET and WAZURISTAN, alt. 5–11,000 ft.—DISTRIB. Siberia, Soongaria, Persia Westward to the Atlantic.

Usually a slender erect deciduous shrub, varying much in form of foliage and pubescence of both surfaces; its habit, more ovate leaves, and fewer flowered cymes, best

distinguish it from *C. nummularia*. In lax specimens the cymes have slender peduncles and pedicels and drooping flowers. The character of drooping fruit by which it has been sought to distinguish these two species depends on the length of the peduncle. *Fruit* very variable in size and colour. Specimens apparently of *C. vulgaris*, from Bargil, Kashmir, alt. 10,500 ft. collected by Mr. C. B. Clarke have leaves 2 in. long.

5. *C. multiflora*, Bunge; *Led. Fl. Ross.* ii. 93; an erect slender bush, leaves $\frac{3}{4}$ –2 in. ovate elliptic or obovate acute obtuse or rounded at the tip thin glabrous above, glaucous and glabrous or faintly silky beneath, petiole slender, cymes 3–10-fid on short or long peduncles nearly glabrous. *Dcne. Mem. Fam. Pom.* 174. *Cotoneaster* 6, *Herb. Strach. & Wint.*

KASHMIR, *Jacquemont*; NITI PASS KUMAON, alt. 11,500 ft. *Strach. & Winterb.*—DISTRIB. Altai, Persia, Soongaria.

I refer the Garwhal plant to Bunge's *multiflora* with some hesitation; it closely resembles the Altai and Soongaria plant in its thin pale leaves glaucous beneath, but they are usually ovate and acute whereas in the Altai and Soongarian ones they are orbicular obovate or obovate; there are however leaves on some specimens of the Himalayan plant quite like those of the other in being broadly elliptic and rounded at both ends, and Baikal specimens have all the leaves ovate acute. I have seen but few Indian specimens.

6. *C. nummularia*, *Fisch. & Mey.*; *Boiss. Fl. Orient.* ii. 666; a straggling or prostrate bush with woody often divaricate branches, leaves $\frac{1}{2}$ –1 $\frac{1}{2}$ in. orbicular or obovate obtuse or retuse or apiculate white or densely silkily woolly beneath, cymes woolly very short 2–5-flowered, flowers crowded, fruit small obovoid globose black. *Brandis For. Fl.* 209. *C. Lindleyi*, *Steud.*; *Dcne. Mem. Fam. Pom.* 176.

WESTERN TIBET and KASHMIR, alt. 6–11,000 ft.—DISTRIB. Soongaria, Afghanistan and Westward to Asia Minor.

A smaller subevergreen, more woody rigid species than *C. vulgaris*, with smaller leaves sometimes only $\frac{1}{4}$ in. long, never ovate and often orbicular. *Flowers* small; calyx usually tomentose but sometimes glabrate; fruit black, erect.—Cultivated specimens have orbicular leaves nearly 1 in. diam., and almost glabrous beneath. I do not know upon what grounds Steudel and Decaisne regard the *nummularia* of Loudon which appears to me to be the true plant, as different from that of Fischer.

7. *C. rotundifolia*, *Wall. Cat.* 663; a low rigid horizontally and distichously branched shrub, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. distichous orbicular or orbicular-obovate mucronate glabrous or sparsely hairy above and beneath, flowers solitary subsessile, fruit turbinate scarlet. *Lindl. in Bot. Reg. under t.* 1229; *Saunders Refug. Bot.* i. t. 54. *C. microphylla*, var. *uva-ursi*, *Lindl. in Bot. Reg. t.* 1187. *C. prostrata*, *Baker in Saunders Refug. Bot.* i. t. 53.

Central and Eastern Himalaya, alt. 9–11,000 ft.; from NIPAL, *Wallich*, to SIKKIM, *J. D. H., &c.*, and BHOTAN, *Griffith*.

A rigid shrub, remarkable for its almost horizontal branches and regular small orbicular mucronate leaves, which are not woolly or downy, but have sparse appressed hairs, they are very coriaceous, often a little recurved, and are subsistent in England; but as in Wallich's specimens they are all but fallen off, this character probably depends on the severity of the winter. Decaisne (*Mem. Fam. Pom.* 176) refers to this *C. nepalensis*, *alpina* and *Roylei* of gardens, but our *Roylei* is certainly *C. acuminata*. Baker's *C. prostrata* from Saunders' garden is identical with specimens of *rotundifolia* from the Hort. Soc. Gardens in Herb. Bentham, and has the peculiar appressed hairs of the twigs and under surface of the leaves of *rotundifolia*, from which I cannot distinguish it.

8. *C. Simondsii*, *Hort.*; *Baker in Saunders Refug. Bot.* i. t. 55; an erect bush with slender branches, leaves $\frac{3}{4}$ in. subdistichous rhombic-orbicular

acuminate glabrous above sparsely silky beneath, nerves distinct, margins subrecurved, flowers solitary or twin subsessile, fruit turbinate scarlet. *C. acuminata*, var. *Simondsii*, *Dcne. Mem. Fam. Pom.* 175.

KHASIA MTS. ?

The origin of this is unknown. It is probably named after Mr. Simons who collected largely in the Khasia Mts. and who may have sent seeds to England from thence or from Bhotan. It is remarkable that it occurs in no Indian Herbarium, but so would be the fact, that except this be a native of the Khasia, that range should possess no *Cotoneaster*. It very nearly resembles *C. rotundifolia*.

B. Leaves persistent, rigid, $\frac{1}{2}$ in. long; margins recurved. Flowers almost always solitary. (See also *C. nummularia*, *rotundifolia* and *Simondsii*.)

9. ***C. microphylla***, *Wall. Cat.* 662 A.; a low ramous woody intricately branched shrub, leaves $\frac{1}{2}$ in. ovate or obovate acute retuse or obtuse glossy above pubescent or tomentose beneath, margins recurved, flowers $\frac{1}{2}$ in. diam., fruit globose scarlet. *Lindl. in Bot. Reg.* t. 1114; *Saunders Refug. Bot.* i. t. 49; *Brandis For. Fl.* 209. *C. emarginata*, *Hoffm. according to Decaisne, Mem. Fam. Pom.* 176. ? *C. buxifolia*, *Baker in Saunders Refug. Bot.* i. t. 52.

Temperate Himalaya, alt. 4-8000 ft. from KASHMIR to BHOTAN;—var. *glacialis* from 9-14,000 ft.

In a dried state it is very difficult to distinguish this from the following, and from single flowered states of *C. buxifolia*. I suspect that the *C. buxifolia* of Saunders' Refugium is a state of this, though it may be a 1-flowered state of *buxifolia*.

VAR. *glacialis*; leaves glabrous and glaucous beneath, flowers smaller often pink. *C. congesta*, *Baker in Saunders Refug.* i. t. 51.

10. ***C. thymifolia***, *Hort.*; *Baker in Saunders, Refug. Bot.* i. t. 50; an almost prostrate woody intricately branched shrub, leaves $\frac{1}{4}$ - $\frac{1}{2}$ in. cuneate-obovate or oblong tip rounded or retuse glossy above pubescent or tomentose beneath, margins recurved, flowers solitary $\frac{1}{2}$ in. diam., fruit small globose scarlet. *C. microphylla*, *Wall. Cat.* 662, B. *Cratægus integrifolia*, *Herb. Ham.*

Temperate and Alpine Himalaya from KASHMIR, *Falconer*, to SIKKIM, *J. D. H.*

This so resembles certain states of *C. microphylla*, that I retain it as a species with great doubt; in habit the two are identical, but *C. thymifolia* has narrower leaves that are never elliptic or ovate or acute, but always broader upwards and rounded or retuse at the tip; the flowers are smaller, but this is not a character of much value. It was distributed with true *microphylla* by Wallich and with *buxifolia* by Strachey and Winterbottom from Nynee Tal.

11. ***C. buxifolia***, *Wall. Cat.* 661; a small rigid intricately branched woody bush, leaves $\frac{1}{2}$ in. elliptic-ovate acute or apiculate dull not shining and often pubescent above densely tomentose beneath, margins recurved, cymes 2-6-flowered tomentose short, fruit globose scarlet. *Wight Ic.* t. 992; *Beddome Fl. Sylvat. Anal. Gen.* xcvi. t. 13, f. 3. *C. affinis*, *DC. Prodr.* ii. 632 (the *Nilghiri plant*). *C. lanata*, *Hort.*; *Regel Gartenfl.* ix. 59.

Western Peninsula, NILGHIRI and PULNEY MTS. ? Temperate Himalaya from SIRMORE, alt. 4-7000 ft. to BHOTAN, alt. 10,000 ft., *Griffith*.

I have under *C. microphylla* stated that it is difficult to distinguish dried single-flowered specimens of this from that plant, though in their ordinary states they are very different, *C. buxifolia* having an opaque and often hoary or hairy upper surface to the leaf, which is more regular in shape, and several-flowered cymes, with smaller flower and fruit. I am in great doubt as to any of the Himalayan specimens referred to this being other than 2-3-flowered states of *microphylla*. The *C. lanata* of Lindley

is a garden state with rather larger leaves and long branches, both due to alteration in habit induced by culture. Decaisne refers Hohenacker's Nilghiri specimen (n. 1154) to *lanata*, saying that it is not Wallich's plant, but Wallich's and Hohenacker's specimens are identical in characters and might have come from the same branch; and there is certainly but one species known from the Nilghiris; he further describes the leaves of *lanata* as deciduous, whereas those of *burifolia* are supposed to be persistent. Decaisne (Mem. Fam. Pom.) gives the synonym of *C. lanata* as a species of Lindley's, but I do not find it alluded to elsewhere, except as a garden name. It is cultivated at Kew, and differs from ordinary *C. burifolia* only in its greater development.

ORDER LII. **SAXIFRAGACEÆ.** (By C. B. Clarke.)

Trees shrubs or herbs. *Leaves* alternate and exstipulate, or stipules adnate to the base of the petiole, or opposite and exstipulate. *Inflorescence* various; flowers hermaphrodite or polygamo-dioecious, the sepals petals and stamens symmetrically regular. *Calyx* more or less adnate to the ovary, sometimes nearly free, sometimes quite inferior; lobes imbricate or valvate. *Petals* 5 or 4, rarely 0, perigynous or epigynous, rarely subhypogynous, imbricate or valvate. *Stamens* inserted with the petals, equalling or double their number, rarely numerous; staminodes or glands sometimes present between the stamens and the ovary. *Ovary* of 2 or 3-5 carpels; usually 2- or 3-5-celled with axile placentæ, less commonly 1-celled with parietal placentæ; styles as many as the carpels, distinct or combined nearly to the summits, stigmas capitate or lateral and subcapitate; ovules numerous, anatropous, erect or pendulous. *Fruit* capsular or berried. *Seeds* numerous or several (solitary in *Polyosma*) albuminous; the albumen rarely scanty or nearly wanting.—**DISTRIB.** Species 540; in the cold or temperate regions of the whole world and in the mountains of the tropics; together with a few genera of tropical trees.

Saxifragaceæ is now extended to contain *Saxifraga* on one side, *Ribes* on another, and the tropical *Itea* and *Polyosma* between; and thus has become very difficult of definition. *Crassulaceæ* are generally recognised by their fleshy habit and distinct carpels. *Rosaceæ* are separated by no absolute line; *Astilbe* in *Saxifragaceæ* touching *Spiræa* in *Rosaceæ*.

TRIBE I. **Saxifrageæ.** *Herbs.*

* *Ovary* 2-celled.

Leaves twice ternate more than a foot long	1. ASTILBE.
Leaves simple	2. SAXIFRAGA.

** *Ovary* 1-celled.

Flowers solitary. Petals 5. Leaves opposite	3. VAHLIA.
Flowers racemose. Petals 5, minute	4. TIARELLA.
Flowers solitary. Petals 0. Leafy small plants	5. CHRYSOSPLENIUM.
Scapes 1-flowered. Petals 5. Staminodes prominent	6. PARNASSIA.

TRIBE II. **Hydrangeæ.** *Shrubs* or trees. *Leaves* opposite, exstipulate, simple. *Stamens* double the number of petals or more numerous. *Ovary* inferior or half-superior.

* *Stamens* 8, 10 or 12.

Filaments linear. Fruit capsular	7. HYDRANGEA.
Petals falling off in a cap. Glabrous	8. PILEOSTEGIA.
Petals expanding. Berry blue	9. DICHROA.
Filaments winged	10. DEUTZIA.

** *Stamens* 20-40 11. PHILADELPHUS.

TRIBE III. **Escalloniæ.** Trees and shrubs. Stamens equalling the petals in number. Ovary inferior or half-superior.

Leaves alternate. Seeds numerous 12. ITEA.

Leaves opposite. Seeds solitary 13. POLYOSMA.

TRIBE IV. **Ribesicæ.** Shrubs. Leaves alternate, simple. Ovary inferior, 1-celled. Seeds immersed in pulp.

Flowers racemose or subsolitary 14. RIBES.

1. **ASTILBE**, Ham.

Erect herbs with a perennial creeping rootstock. Leaves alternate, twice or thrice ternate; leaflets doubly serrate with prominent veins; stipules large, adnate to the petiole, sheathing. Flowers (sometimes polygamous) small, in a terminal panicle, spicate-racemose. Calyx slightly adnate to base of ovary with 5 (rarely 4) imbricate lobes. Petals 5 or 0 (rarely 4) perigynous. Stamens 10 or 5 (rarely 8) perigynous. Carpels 2, united below, narrowed upwards into a short style; stigmas small capitate; ovules numerous axile. Ripe carpels dry, acuminate or acute at the top, divaricating, dehiscing ventrally. Seeds small, narrow, oblong, tailed at both ends.—DISTRIB. Species 3 or 7; from the Himalaya, Java, Mantchuria, Japan and Virginia.

1. **A. rivularis**, Ham. in Don Prodr. 211; flowers green-yellow, petals 0, stamens 5 opposite the sepals, ripe carpels deflexed. DC. Prodr. iv. 51. *Spiræa barbata*, Wall. Cat. 705; Camb. in Jacq. Voy. Bot. t. 58.

TEMPERATE HIMALAYA, from KASHMIR to BHOTAN, alt. 5000–9000 ft., abundant. KHASIA Mts., alt. 4000–6000 ft., very common.

Stem and leaves with long fulvous hairs, especially about base of the petioles. Leaflets 1–4 in., ovate, acuminate, often cordate at the base, generally scabrous on the nerves on both surfaces. Rachis of panicle woolly-pubescent, and brown-villose; pedicels short with a small bract at the base. Sepals green, subglabrous, oblong, obtuse, erect, $\frac{1}{2}$ in. Young carpels but slightly united. Ripe carpels $\frac{1}{2}$ in. long. Seeds numerous.—*Spiræa triternata*, Wall. Cat. 708 is reduced to *Astilbe rivularis* by H. f. & T. in Journ. Linn. Soc. ii. 74, but every Wallichian specimen is referable to *Spiræa Aruncus*, L. which in fruit requires to be carefully distinguished from *Astilbe* by the carpels, suddenly narrowed at top into short divergent beaks, usually 3–4 in number, with few larger and much less tailed seeds. *Astilbe speciosa* Junghuhn (Miq. Flor. Ind. Bat. i. pt. i. 393) differs from *A. rivularis* by the flowers often 4-fid, the stamens 8 or 10, the ripe carpels broader at the base.

2. **A. rubra**, H. f. & T. in Bot. Mag. t. 4959; petals 5 pale pink linear or linear-spathulate twice or thrice the sepals in length, stamens 10, the 5 opposite the petals shorter, ripe carpels suberect.

KHASIA Mts., alt. 4000–6000 ft., Griffith, &c.

Stems and leaves with long fulvous hairs, especially about base of the petioles. Leaflets 1–3 in., ovate, acute, sometimes cordate at the base, generally scabrous on the nerves on both surfaces. Rachis of panicle woolly-pubescent and brown-villose; pedicel short with a small bract at the base. Sepals $\frac{1}{2}$ in., green, subglabrous, oblong, obtuse, erect. Young carpels united for a great portion of their length. Ripe carpels $\frac{1}{2}$ in. long.—*A. japonica*, Morr. & Decne; *A. Thunbergii*, Maxim.; and *A. chinensis*, Maxim., differ by being more slender and less villose.

EXCLUDED SPECIES.

A. Stoliczkai, Kurz in Seem. Journ. Bot. v. 240 with simple leaves, from the North West Himalaya probably does not belong to the genus; may be a *Spiræa*.

2. **SAXIFRAGA**, Linn.

Herbs, mostly small perennials. Radical leaves often rosulate; stem leaves alternate (in Sect. *Porphyron* subopposite), exstipulate, petiole sheathing at base. Flowers corymbose or paniculate or reduced to 3-1; white or yellow, rarely red. Calyx adnate to the ovary at base (rarely free) 5-fid, imbricate. Petals 5, perigynous. Stamens 10 (rarely 5) perigynous. Carpels 2 (very rarely 3-5) united below, narrowed upwards into a style, stigma lateral subcapitate; ovules numerous, axile. Ripe Carpels dry, opening at the top ventrally. Seeds small, ellipsoid in Indian species.—DISTRIB. Species 160, almost all in the Northern Hemisphere; inhabiting cool temperate, and especially alpine, localities.

SECT. I. **Nephrophyllum**. Calyx adnate to the base of the ovary, lobes erect in fruit. Petals white, much exceeding the calyx. Stems erect leafy. Radical leaves petioled, reniform, lobed. Bracts 2, unequal at base of peduncles.—In the Indian species the surculi are represented by bulbils, covered with fulvous hairs, forming a cluster at the base of the stem.

1. **S. odontophylla**, H. f. & T. in Journ. Linn. Soc. ii. 64; no bulbils in the upper axils, radical leaves crenate with 7-12 shallow rounded lobes, lobes of stem-leaves often triangular acute. Wall: Cat. 454, partly. *S. asarifolia*, Sternb. *Saxifrag. Suppl.* t. 24.

WESTERN TEMPERATE HIMALAYA, alt. 10,000 ft.; Kumaon, *Blinkworth*; Kulu, *Edgeworth*; Gurwhal, *Falconer*; Lahul, *Jaeschke*.

Laxly villose, 6-10 in. high. Flowers 3-6. Upper leaves few, sometimes 0. In the ripe fruit the calyx-tube is short campanulate or funnel-shaped; the lobes are ovate-linear, approximate, with acute sinuses.—This species bears a general resemblance to *S. granulata*, but the calyx in fruit is very different. It is more difficult to separate it from *S. sibirica*. Engler (*Monog. Saxifrag.* 99) has taken Sternb. *Saxifrag. Suppl.* t. 25 as the type of *S. odontophylla*, which should rather be referred to *S. sibirica*.

2. **S. sibirica**, Linn.; DC. Prodr. iv. 36; no bulbils in the upper axils, radical leaves with 5-7 acute or obtuse lobes, upper stem leaves often simple entire oblong or ovate acute. Sternb. *Rev. Saxifrag.* t. 25, f. 1; H. f. & T. in Journ. Linn. Soc. ii. 64; Boiss. *Fl. Orient.* ii. 807; Engler *Monog. Saxifrag.* 101. *S. odontophylla*, Wall. Cat. 454, *partim*.

WESTERN HIMALAYA and KASHMIR, alt. 9000-14,000 ft., frequent; Royle, *Falconer*, T. Thomson, &c.—DISTRIB. From Kashmir to the Caucasus and to the Altai.

Stem pubescent, 6-8 in. high. Flowers 1-10. Calyx-tube in the ripe fruit short, campanulate or funnel-shaped; lobes ovate-linear, sinuses narrow. Seeds oblong, subangular, quite smooth, testa minutely reticulate. Flowers and capsules smaller than those of *S. odontophylla*. All the Indian specimens referred to *S. granulata*, Linn. by H. f. & T. in Journ. Linn. Soc. ii. 63 are here reduced to *S. sibirica*. In the ripe fruit of *S. granulata* the calyx is divided only about half way down, the tube is hemispherical, the lobes are oblong distant with rounded sinuses.

3. **S. cernua**, Linn.; DC. Prodr. i. 36; bulbils in the upper axils, flower often terminal solitary all the lower flowers of the raceme being replaced by sessile purple bulbils, or flowers 2-3 pedicelled. Eng. Bot. t. 664; Don in Trans. Linn. Soc. xiii. 364; H. f. & T. in Journ. Linn. Soc. ii. 63; Engler *Monog. Saxifrag.* 106.

WESTERN HIMALAYA and WESTERN TIBET, alt. 14,000-17,000 ft.; N. of Ladak, T. Thomson, C. B. Clarke; Nubra, *Strachey*; Tanglang Pass, *Heyde*.—DISTRIB. Alps of Europe, Temperate and Arctic N. America and W. Asia.

Stem 4-6 in. high. *Radical leaves* reniform, palmately 4-6-lobed; upper leaves 3-1-fid passing into bracts. *Calyx-tube* in the ripe fruit short, campanulate or funnel-shaped; lobes ovate-linear, approximate, with acute sinuses.—Turczanimow judiciously remarks (*Fl. Baikal-Dahur.* i. 454) that the only reason for not treating *S. cernua* as a var. of *S. sibirica* is its much wider geographical range. The very imperfect specimens collected by Strachey and Winterbottom in Kumaon and referred to *S. orientalis*, Jacquem., by H. f. & T. doubtfully in *Journ. Linn. Soc.* ii. 63 are certainly not *S. orientalis* nor any species of the section *Cymbalaria*; they have bulbils in the upper axils and belong perhaps to *S. cernua*, β . *pauciflora*, Sternb.

SECT. II. **Hirculus.** *Sepals* nearly free, in fruit patent or reflexed. *Petals* yellow, often with 2-4 spots near their base. *Stems* erect leafy. *Leaves* entire withering not deciduous, lower petioled, upper sessile more or less stem-clasping.—DISTRIB. All Himalayan; *S. Hirculus* extending thence to Europe and North America.

* *Stem leaves* loosely overlapping each other.

4. **S. palpebrata**, H. f. & T. in *Journ. Linn. Soc.* ii. 67; densely tufted, stems 1-flowered, stem-leaves oblong narrower at the base, calyx half adnate to the ripe fruit, petals obovate. *Engler Monog. Saxifrag.* 119.

SIKKIM, alt. 13,000-15,000 ft.; Tunkra Pass, J. D. H. KUMAON, alt. 13,000 ft., Ralum, Strachey & Winterbottom.

Stems 2-5 in. high. *Leaves* ciliate; the lowest radical leaves spatulate, obtuse or orbicular; cauline $\frac{1}{2}$ in. *Styles* exceedingly short. *Ripe carpels* hardly equalling the sepals. *Seeds* trigonous, ellipsoid, smooth,

5. **S. cordigera**, H. f. & T. in *Journ. Linn. Soc.* ii. 68; tufted, stems 1-flowered, cauline leaves cordate-ovate, calyx slightly adnate to the ripe fruit, the lobes patent, petals obovate. *Engler Monog. Saxifrag.* 119.

SIKKIM and EAST NIPAL, alt. 12,000-15,000 ft.; Yeumtong and Kambachen, J. D. H.; Yakla Pass, C. B. Clarke.

Stems 2-4 in. high. *Leaves* ciliate; lowest radical spatulate, obtuse or orbicular; cauline $\frac{1}{2}$ in. *Styles* exceedingly short. *Ripe carpels* hardly equalling the sepals. *Seeds* ellipsoid, angular, smooth, testa lax somewhat plaited.

6. **S. Lychnitis**, H. f. & T. in *Journ. Linn. Soc.* ii. 68; tufted, stems 1-flowered, calyx little adnate to the ripe fruit, sepals densely brown-pubescent, petals elongate-spatulate 3-nerved. *Engler Monog. Saxifrag.* 120.

SIKKIM, alt. 14,000-16,000 ft., Lama Kongra, J. D. H. KUMAON, alt. 14,700 ft.; Barji Kang Pass, Strachey & Winterbottom.

Glandular-pubescent. *Stems* 1-5 in. high. *Radical leaves* spatulate-ovate; cauline $\frac{1}{2}$ - $\frac{3}{4}$ in., linear-oblong or elliptic. *Petals* $\frac{1}{2}$ -1 in. long. *Styles* very short. *Carpels* hardly equalling the sepals. *Seed* trigonous, ellipsoid, smooth.

7. **S. viscidula**, H. f. & T. in *Journ. Linn. Soc.* ii. 69; stems 3-1-flowered, calyx slightly adnate to the ripe fruit, sepals glandular little pubescent, petals spatulate-oblong 7-5-nerved. *Engler Monog. Saxifrag.* 120.

SIKKIM, alt. 13,000-15,000 ft., J. D. H.

Glandular-pubescent. *Stems* 3-4 in. high. *Radical leaves* spatulate-lanceolate; cauline $\frac{1}{2}$ in., oblong, subacute. *Pedicels* $\frac{1}{2}$ in. long. *Petals* $\frac{1}{2}$ in. long. *Styles* not very short.

** *Upper stem leaves* narrow linear, little overlapping each other; stems 1-flowered.

8. ***S. aristulata***, *H. f. & T. in Journ. Linn. Soc.* ii. 68; tufts mosslike, stems $1\frac{1}{2}$ –3 in. glandular but not woolly-pubescent upwards, leaves with recurved margins and terminated by a deciduous linear awn, petals broadly obovate. *Engler Monog. Saxifrag.* 121.

SIKKIM, alt. 13,000–18,000 ft.; Yeumtong and Lachen, *J. D. H.*

Stem-leaves $\frac{1}{2}$ in., shining, glabrous. *Sepals* glabrous, slightly adnate to the ripe carpels. *Petals* $\frac{1}{4}$ – $\frac{1}{2}$ in. long.

VAR. 2; stem-leaves much larger lanceolate-linear somewhat overlapping each other.—SIKKIM, Samdong, *J. D. H.* This variety approaches *S. brachypoda*, Don.

9. ***S. saginoides***, *H. f. & T. in Journ. Linn. Soc.* ii. 68; tufts mosslike, stems 1 in. woolly-pubescent upwards, leaves striate but hardly with recurved margins rarely terminated by a deciduous awn, petals oblong. *Engler Monog. Saxifrag.* 121.

SIKKIM, alt. 10,000–18,000 ft.; Lachen, &c., *J. D. H.* KUMAON, alt. 13,000 ft.: Ralum, *Strachey & Winterbottom*.

Stem-leaves hardly $\frac{1}{4}$ in. long, glabrous. *Sepals* glabrous, slightly adnate to fruiting carpels. *Petals* scarcely $\frac{1}{4}$ in. long. *Fruit* small. *Seed* trigonous, subglobose, smooth.—Hardly to be distinguished from *S. aristulata*. Moreover Sir J. D. Hooker collected in Sikkim intermediate forms having the woolly pubescent peduncle of *S. saginoides*, with the leaves and stature of *S. aristulata*.

*** *Upper stem-leaves not overlapping each other; flowers corymbose, rarely reduced to one in starved examples.*

10. ***S. latiflora***, *H. f. & T. in Journ. Linn. Soc.* ii. 71; flowers 3–1 large, sepals ovate herbaceous large, radical leaves smaller than the stem-leaves. *Engler Monog. Saxifrag.* 122.

SIKKIM, alt. 13,000 ft.; Kankala, *J. D. H.*

Stems 4–8 in. high, glabrous below, glandular-pubescent above. *Leaves* oblong-elliptic; radical petiolate, glandulose-ciliate; cauline $1\frac{1}{2}$ by $\frac{1}{2}$ –1 in. *Petals* ovate-oblong, naked at the base, a little exceeding the sepals. *Styles* very short. *Capsule* ovate-oblong.—Resembles *S. diversifolia* but has finer flowers.

11. ***S. hirculus***, *Linn.; DC. Prodr.* iv. 44; surculi decumbent, leaves subglabrous radical petioled narrow-spathulate cauline oblong narrowed at both ends, flowers 3–1, petals narrow obovate. *Eng. Bot.* t. 1009; *Don in Trans. Linn. Soc.* xiii. 372; *H. f. & T. in Journ. Linn. Soc.* ii. 69; *Boiss. Fl. Orient.* ii. 808; *Engler Monog. Saxifrag.* 122.

VAR. 1. *typica*; stems 6–12 in. 1–3-flowered, cauline leaves $\frac{1}{2}$ –1 in., sepals strongly deflexed, base often brown-villous externally, petals 2–3 times the sepals golden with red dots and 2 pits at the base, styles very short. Not yet collected in India.—DISTRIB. Arctic regions; Alps of Europe to the Caucasus.

VAR. 2. *indica*; peduncles very brown villous, capsule much shorter oval-oblong, sepals hardly deflexed even on the ripe fruit, petals shorter 1–2 times the calyx, styles often wanting, with no obvious stigmas, but the capsules produce good seed.—North Kashmir to Sikkim, alt. 11,000–17,000 ft., *Falconer, T. Thomson, J. D. H., &c.*

VAR. 3. *hirculoides* (*sp.*) *Decne. in Jacq. Voy. Bot.* t. 78; stems 2–3 in. often very villous upwards; like var. 2 but the petals have no pits or glands at the base and are shorter than sepals, or scarcely exceed them.

Kashmir, *Jacquemont*. Western Tibet, alt. 17,000 ft.; Balch Pass, *Strach. & Winterb.*

VAR. 4. *subdioica*; like var. 3, but the stems are 3–6 in. high, and carry 4–10 shortly corymbose or altogether congested flowers; the stigmas are obscure and some

of the flowers seem functionally male, though in others with no visible stigmas there are perfected seeds. *S. Hirculus*, var. γ . *H. f. & T. in Journ. Linn. Soc.* ii. 69.

Western Tibet; *Falconer*; Lanak Pass, alt. 15–17,000 ft., *T. Thomson*.

12. ***S. nutans***, *H. f. & T. in Journ. Linn. Soc.* ii. 69; pedicels short, flowers 6–12 subracemose nodding, sepals with black glands and densely pubescent. *Engler Monog. Saxifrag.* 124.

SIKKIM, alt. 10,000–12,000 ft., *J. D. H.*

Stem 5–10 in. high, densely glandular-pubescent upwards. *Radical leaves* petioled, oblong, obtuse; *cauline* about 1 in., sessile, broadly oblong. *Petals* pale yellow, spatulate, $1\frac{1}{2}$ times the calyx. *Styles* short.

13. ***S. diversifolia***, *Wall. in Sternb. Saxifrag. Suppl.* t. 22; flowers corymbose rarely 3–2, sepals ovate-oblong small, *cauline* leaves sessile often cordate and amplexicaul, radical leaves long-petioled often large. *Wall. Cat.* 452; *DC. Prodr.* iv. 44; *Hook. Lond. Journ. Bot.* iv. t. 21; *H. f. & T. in Journ. Linn. Soc.* ii. 70; *Engler Monog. Saxifrag.* 125. *S. parnassifolia*, *Wall. Cat.* 451, partly; *Don in Trans. Linn. Soc.* xiii. 405; *DC. Prodr.* iv. 25; *Sternb. Saxifrag. Suppl.* t. 25. *S. Moorcroftiana*, *Wall. Cat.* 453; *Sternb. Saxifrag. Suppl.* t. 24. *S. lysimachoides*, *Klotzsch in. Reis. Pr. Waldem. Bot.* t. 42.

Alpine Himalaya; from KASHMIR to BHOTAN, alt. 9000–17,000 ft., abundant.

Stems 8–18 in. high, leafy, glandular, often finally glabrous. *Radical leaves* long-petioled, narrowed into the petiole or (var. *parnassifolia*) ovate, subcordate; *cauline* $\frac{1}{2}$ –2 in., ovate or broad oblong. *Sepals* at length reflexed. *Petals* with 4 stalked glands at their base, $1\frac{1}{2}$ –2 times the sepals. *Styles* very short. *Capsule* ovate-oblong. *Seeds* angular, testa smooth somewhat plaited.

14. ***S. corymbosa***, *H. f. & T. in Journ. Linn. Soc.* ii. 70; flowers corymbose rarely 3–1, leaves shining generally glabrous, radical leaves long-petioled lanceolate not large, peduncles glandular upwards not villous. *Engler Monog. Saxifrag.* 126. *S. parnassifolia*, *Wall. Cat.* 451, partly.

SIKKIM and EASTERN NIPAL, alt. 11,000–14,000 ft.; Lachoong, &c., Wallanchoon, *J. D. H.*, *C. B. Clarke*.

Stems 3–8 in. high, much less stout than those of *S. diversifolia*. *Stem-leaves* $\frac{1}{2}$ –1 in., oblong or ovate, sometimes sessile and stem-clasping, sometimes narrowed suddenly just above the base. *Petals* obovate, twice the sepals. *Styles* short. *Capsule* ovate; *sepals* at length deflexed. *Seeds* ellipsoid, subtrigonal, smooth.

This differs from *S. diversifolia* in being much smaller with smaller leaves and flowers. The starved 1–3-flowered examples of *S. corymbosa* may be distinguished from the Indian *S. Hirculus* by the peduncles being glandular but scarcely brown-villous.

SECT. III. ***Boraphila*** (as to the Indian species). *Sepals* more or less united, patent or reflexed in fruit. *Petals* white. *Leaves* undivided, dentate or crenate.

15. ***S. strigosa***, *Wall. in Sternb. Saxifrag. Suppl.* t. 22; whole plant strigose, leaves near the base of the stem falsely rosulate, upper leaves small alternate sessile deflexed, calyx in fruit patent nearly free. *Wall. Cat.* 448; *H. f. & T. in Journ. Linn. Soc.* ii. 64; *Engler Monog. Saxifrag.* 136.

Central and Western Himalaya; NIPAL; Gossain Than, *Wallich*; SIKKIM, alt. 9000–14,000 ft.; Lachen, Lachoong, *J. D. H.*; Singalelah, *C. B. Clarke*. BHOTAN, *Griffith*.

Stem 4–8 in. high, somewhat rigid, paniculate upwards; upper axils generally producing hispid bulbils, so that the flowers are only 1–3. Lower subrosulate leaves

1-2 in., sessile, oblong-lanceolate, with one or two acute teeth. *Petals* small, exceeding the sepals. *Styles* short. *Capsule* less than $\frac{1}{4}$ in. long. *Seeds* minute, smooth, elliptic, angular.

16. ***S. pallida***, Wall. in Sternb. *Saxifrag. Suppl.* t. 23; scape 2-6 in. leafless with narrow bracts at the divisions of the corymb or simple, calyx in fruit adnate to base of ovary for one-third its length, lobes finally recurved, petals twice sepals, capsule $\frac{1}{3}$ - $\frac{2}{3}$ in. long. Wall. *Cat.* 450; DC. *Prodr.* iv. 38; H. f. & T. in Journ. Linn. Soc. ii. 65; Engler *Monog. Saxifrag.* 140.

Alpine Himalaya; SIKKIM, alt. 13,000-17,000 ft.; Lachen, Kankala, &c., J. D. H. NIPAL; Gossain Than, Wallich. KUMAON, alt. 14,500 ft.; Barji Kang Pass, Strachey & Winterbottom.

Slightly pubescent, sometimes glabrous. Radical leaves long-petioled, ovate, dentate-crenate. Flowers and fruit very variable in size, sometimes not larger than in the next species. Style hardly any. Seeds ellipsoid, longitudinally striated by 10-12 rows of tubercles.

17. ***S. micrantha***, Edgw. in Trans. Linn. Soc. xx. 50; scape 4-8 in. high leafless (rarely 1-leaved) with leaflike bracts at the lower divisions of the corymb, calyx in fruit shortly adnate to base of ovary, lobes finally recurved, petals hardly exceeding sepals, capsule seldom more than $\frac{1}{2}$ in. long. H. f. & T. in Journ. Linn. Soc. ii. 64; Engler *Monog. Saxifrag.* 141.

Alpine Eastern and Western HIMALAYA, alt. 9000-11,000 ft.; Edgeworth; Dhurm-sala, C. B. Clarke; Gurwhal, Falconer. SIKKIM, alt. 10,000-14,000 ft.; Lachen, Tungu, J. D. H.

Pubescent. Radical leaves long-petioled, ovate, dentate-crenate. Style exceedingly short. Seeds ellipsoid, longitudinally striated by 10-12 rows of tubercles.—This species will perhaps be merged in the preceding when more material accumulates.

SECT. IV. **Microphylla.** Flowers solitary, yellow or white, on leafless peduncles, $\frac{1}{8}$ -2 in. high.—Tufts dense formed by the stems 1-3 in. long, branching and crowded, covered upwards with densely whorled undivided small obtuse leaves about $\frac{1}{4}$ in. long.

18. ***S. imbricata***, Royle Ill. 226, t. 49; uppermost leaves with a perforated whitened pit at their apex, flowers sessile, sepals ovate obtuse glabrous or slightly ciliate pubescent. H. f. & T. in Journ. Linn. Soc. ii. 62; Engler *Monogr. Saxifrag.* 264.

ALPINE HIMALAYA, from SIKKIM to KASHMIR, alt 12,000-17,000 ft., Royle, Jacquemont, J. D. H., &c.

Leaves $\frac{1}{8}$ - $\frac{1}{4}$ in., obovate-elliptic, glabrous or a little ciliate, hardly glandular. Petals narrow, twice the sepals, deciduous; white (C. B. Clarke noted in the field, also Jacquemont and Jaeschke); yellow in the figure of Royle. Fruit less than $\frac{1}{4}$ in. long.—All the examples now referred surely to *S. imbricata* at Kew exhibit some perforated leaves; var. γ . and δ . of H. f. & T. (in Journ. Linn. Soc. ii. 62) must be referred elsewhere.

19. ***S. hemisphærica***, H. f. & T. in Journ. Linn. Soc. ii. 62; uppermost leaves with a broad scarioso lacinated margin, flowers subsessile, sepals ovate obtuse erect in fruit slightly pubescent. Engler *Monog. Saxifrag.* 212.

SIKKIM, alt. 17,000-18,000 ft., Mt. Donkiah, J. D. H.

Lower leaves $\frac{1}{4}$ in., oblong, entire, glabrescent, upper shorter, ciliate. Petals 0 in the fruiting specimens alone collected by Sir J. D. Hooker, probably deciduous as in *S. imbricata*. Fruit less than $\frac{1}{4}$ in. long.

20. **S. perpusilla**, *H. f. & T. in Journ. Linn. Soc.* ii. 72; flowers yellow on glandular peduncles $\frac{1}{4}$ – $\frac{3}{4}$ in. high, uppermost leaves about $\frac{1}{2}$ in. obovate-oblong concave white ciliate on edges otherwise glabrous, sepals ciliate erect in fruit. *Engler Monog. Saxifrag.* 210.

SIKKIM, alt. 16,000–17,000 ft.; Mt. Donkiah, *J. D. H.*

Stems scarcely an inch long. Petals golden, twice the sepals, oblong, persistent. Styles very short. Fruit ovate, subquadrate, shorter than the petals.—The tufts are small, the leaves and sepals very small.

21. **S. microphylla**, *Royle in Herb. Bth. ex H. f. & T. in Journ. Linn. Soc.* ii. 72; peduncles puberulous about $\frac{1}{4}$ in., leaves oblong glabrous, sepals much adnate below erect in fruit, petals 0 or oblong coriaceous equal to the sepals (green-white?). *Engler Monog. Saxifrag.* 210.

WESTERN HIMALAYA, *Royle*. KUMAON, alt. 14,700 ft.; Barji Kang Pass, *Strachey and Winterbottom*.

Still smaller than *S. perpusilla*, with inconspicuous flowers. Ripe carpels acuminate upwards, sometimes united conically to the top.

22. **S. Jacquemontiana**, *Dene. in Jacq. Voy. Bot.* t. 78; flowers golden subsessile or on a glandular peduncle $\frac{1}{2}$ in. long, uppermost leaves obovate-oblong, sepals broad-elliptic glandular-pubescent patent or finally deflexed. *H. f. & T. in Journ. Linn. Soc.* ii. 71; *Engler Monog. Saxifrag.* 211.

Alpine Himalaya, from SIKKIM to KASHMIR, alt. 13,000–18,000 ft.; *Jacquemont, Edgeworth, J. D. H., &c.*

Lower leaves $\frac{1}{2}$ – $\frac{1}{4}$ in., orbicular or elliptic, glabrescent; upper glandular-pubescent or nearly glabrous. Petals $\frac{1}{4}$ in. long, nearly twice the sepals, elliptic, persistent. Fruit ovate, shorter than the petals. Seeds minute, ellipsoidal, smooth, testa reticulated not tuberculate.

VAR. 2. *β. Stella-aurea*; (sp.) *H. f. & T. in Journ. Linn. Soc.* ii. 72; peduncles $\frac{1}{2}$ –2 in.—from Sikkim to Kashmir, alt. 13,500–17,000 ft.; *J. D. H.*

SECT. V. Flowers yellow, on sparsely leafy peduncles 1–3 in. from tufts formed by weak stems clothed upwards with subrosulate undivided spathulate-oblong small leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. long.

23. **S. ramulosa**, *Wall. in Sternb. Saxifrag. Suppl.* t. 26; peduncles glandular-pubescent 1–2-flowered, upper rosulate leaves glabrous rigid oblong often with 1–5 pits on their front margin, sepals glandular-pubescent in fruit much adnate, lobes triangular suberect. *Wall. Cat.* 446; *DC. Prodr.* iv. 21; *Royle Ill.* t. 49 (*bad*); *H. f. & T. in Journ. Linn. Soc.* ii. 62; *Engler Monog. Saxifrag.* 268. *S. glandulifera*, *Jacquem. Journ.*

Central and Western HIMALAYA, from NIPAL to KASHMIR, alt. 8500–12,000 ft.; *Wallich, Jacquemont, Strachey & Winterbottom, &c.*

Stems 2–6 in. long, branches crowded into tufts; branches barren or producing a flower-stem, terminated by rosulate crowded leaves. Rosulate leaves spathulate-oblong, sometimes very small, sometimes $\frac{1}{2}$ in., margins cartilaginous; leaves on the peduncle linear-spathulate or narrow-oblong. Petals obovate, clawed, much exceeding the sepals. Carpels in fruit narrowed upwards.—A species by the texture and perforations of its leaves allied to *S. imbricata*; which differs by its sessile flowers and its less glandular-pubescent sepals.

24. **S. umbellulata**, *H. f. & T. in Journ. Linn. Soc.* ii. 71; flower-stems 2–3½ in., peduncles 1–5 umbelled very glandular, rosulate leaves narrowly spathulate glabrous or slightly ciliate-pubescent. *Engler Monog. Saxifrag.* 222.

SIKKIM, alt. 12,000–14,000 ft.; Tungu, J. D. H.

Rosulate leaves $\frac{1}{2}$ in., cauline $\frac{1}{4}$ in. long, narrow oblong, very glandular-pubescent. Peduncles $\frac{1}{4}$ – $1\frac{1}{2}$ in. Petals nearly double the sepals, golden.

SECT. VI. **Spinulosæ.** Flowers yellow, peduncled, solitary or few. Stems elongate, 2–8 in. long, uniformly leafy; i.e. no whorled leaves either at the base or summit. Leaves $\frac{1}{4}$ – $\frac{3}{4}$ in. long, acute, rigid, often spinulose.

25. **S. brachypoda**, Don in Trans. Linn. Soc. xiii. 378; stem simple 1-flowered glabrous below often bearing bulbils in the upper axils, peduncle glandular-scabrous rarely glabrate, leaves linear-lanceolate shining half stem-clasping glabrous or shortly spinulose on the margin. Don Prodr. 209; Sternb. Saxifrag. Suppl. t. 24; DC. Prodr. iv. 46; H. f. & T. in Journ. Linn. Soc. ii. 66; Engler Monog. Saxifrag. 218. S. glandulosa, Wall. Cat. 442; DC. Prodr. iv. 45.

ALPINE HIMALAYA, from BHOTAN to KUMAON, alt. 9000–13,000 ft., common.

Leaves about $\frac{3}{8}$ in., densely imbricate, ascending or reflexed. Sepals ovate, acute, little pubescent, suberect in fruit. Petals broad, golden, much exceeding the sepals. Styles not much shorter than the ripe carpels. Seeds ellipsoid, subtrigonus, smooth.

26. **S. fimbriata**, Wall. in DC. Prodr. iv. 45; stem simple 1- rarely 2-3-flowered glabrous or sparsely ciliate below often bearing bulbils in the upper axils, peduncle glandular-scabrous, leaves lanceolate shining cordate at base but not stem-clasping, margins prominently spinulose. Wall. Cat. 443; H. f. & T. in Journ. Linn. Soc. ii. 67; Engler Monog. Saxifrag. 218. S. Wallichiana, Sternb. Saxifrag. Suppl. t. 22.

Alpine Himalaya, from SIKKIM to KUMAON, alt. 11,000–14,000 ft.; Wallich, J. D. H., Strachey & Winterbottom.

Leaves about $\frac{3}{8}$ in., densely imbricate, ascending or reflexed. Sepals ovate, obtuse, very glandular-pubescent, suberect in fruit. Petals broad, golden, much exceeding the sepals. Styles not much shorter than the carpels in fruit.—This hardly differs from *S. brachypoda*.

27. **S. filcaulis**, Wall. in Sternb. Saxifrag. Suppl. t. 23; stems glandular-pilose much branched, branches 1-flowered, leaves $\frac{1}{4}$ – $\frac{3}{4}$ in. linear-oblong minutely denticulate. Wall. Cat. 445; DC. Prodr. iv. 46; H. f. & T. in Journ. Linn. Soc. ii. 66; Engler Monog. Saxifrag. 221.

Alpine Western Himalaya, GURWHAL and KUMAON, alt. 10,000–11,500 ft.; Wallich, Falconer, Edgeworth, T. Thomson, &c.

Bulbiferous sometimes in the upper axils. Sepals small, ovate, glandular-pilose, erect in fruit. Petals golden, more than twice the sepals. Styles in fruit little shorter than the carpels.

28. **S. hispidula**, Don in Trans. Linn. Soc. xiii. 380; stems hispid glandular simple 1–3-flowered, leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. long oblong-lanceolate acute entire or often 1–3-toothed hispid on both surfaces. Don Prodr. 210; DC. Prodr. iv. 46; H. f. & T. in Journ. Linn. Soc. ii. 67; Engler Monog. Saxifrag. 222. S. evoluloides, Wall. Cat. 447; DC. Prodr. iv. 46; Sternb. Saxifrag. Suppl. t. 23.

Alpine Himalaya, from BHOTAN to NIPAL, alt. 13–15,000 ft. NIPAL, Gossain Than, Wallich; BHOTAN, Griffith; SIKKIM, Kankola, J. D. H., Jongri, C. B. Clarke.

Rarely bulbiferous in the upper axils. Sepals narrow, ovate, hispid-glandular, erect in fruit. Petals golden, obovate, near twice the sepals. Styles short. Seeds ellipsoid, subtrigonus, smooth.

SECT. VII. **Flagellares.** *Flowers* yellow, on leafy stems 2-8 in high rising from a basal tuft of rosulate leaves; from this tuft spread horizontally leafless thread-like surculi which terminate in rooting buds. *Stem leaves* entire, narrow.

29. **S. Brunoniana**, Wall. in *Sternb. Saxifrag. Suppl.* t. 23; stems corymbosely 1-10-flowered, pedicels long often 1-2 in., leaves linear acute shining, margins spinulose. *Engler Monog. Saxifrag.* 223. *S. Brunonis*, Wall. *Cat.* 444; *DC. Prodr.* iv. 45; *H. f. & T. in Journ. Linn. Soc.* ii. 66.

Temperate Himalaya, from SIKKIM to KASHMIR, alt. 16,000 ft.; Wallich, Jacquemont, T. Thomson, J. D. H., &c.

Glabrous; 2-8 in. high. Rosulate leaves $\frac{1}{4}$ - $\frac{3}{4}$ in.; cauline usually small. *Sepals* elliptic-oblong, small, patent in fruit. *Petals* 3 or 4 times the length of the sepals, oblong-elliptic. *Styles* short. *Seed* ellipsoid, smooth, most minutely papillose.

30. **S. pilifera**, *H. f. & T. in Journ. Linn. Soc.* ii. 66; stems corymbosely 1-4-flowered, pedicels short about $\frac{1}{4}$ in., leaves hardly $\frac{1}{8}$ in. spatulate-linear or oblong, margins not spinulose, petals equalling the sepals. *Engler Monog. Saxifrag.* 223.

SIKKIM, alt. 14-15,000 ft., J. D. H.

Stems 1-3 in. high, pubescent. Leaves $\frac{1}{4}$ - $\frac{1}{2}$ in., cauline pubescent, rosulate, nearly glabrous. *Sepals* much adnate in fruit into a campanulate tube; lobes obtuse, erect. *Styles* short. *Ripe carpels* very small.

31. **S. flagellaris**, Willd. in *Sternb. Saxifrag.* t. 6; stems 2-8 in high corymbosely 1-10-flowered, pedicels 0-2 in., cauline leaves linear-lanceolate pubescent ciliate or subspinulose, petals golden much exceeding the sepals sometimes $\frac{1}{2}$ in. long. *Don in Trans. Linn. Soc.* xiii. 373; *DC. Prodr.* iv. 45; *Ledeb. Ic. Fl. Ross.* t. 321; *H. f. & T. in Journ. Linn. Soc.* ii. 65; *Boiss. Fl. Orient.* ii. 809; *Engler Monog. Saxifrag.* 223. *S. myosotifolia*, Pall. ex *Don in Trans. Linn. Soc.* xiii. 373; *DC. Prodr.* iv. 45. *S. stenophylla*, Royle *Ill.* t. 50; *H. f. & T. in Journ. Linn. Soc.* ii. 65. *S. Hoffmeisteri*, Klotzsch in *Reis. Pr. Waldem. Bot.* t. 41. *S. aurea* and *S. radicans*, Jacq. *Voy. Bot.*; with some others; but *S. aspera*, Willd., sometimes quoted here, does not belong.

Alpine Himalaya, from KASHMIR and KUMAON, alt. 13,500-17,000 ft., common, to SIKKIM, alt. 18,000 ft., Lama Kongra, J. D. H.—DISTRIB. North Asia, Arctic regions and Rocky Mountains.

Stems pubescent upwards. *Sepals* oblong, pubescent, slightly adnate and erect in fruit. *Petals* often with red lines (not dots) near the base. *Styles* short. *Seeds* ellipsoid, smooth, testa reticulate and microscopically punctulate.—This species is called polymorphic, but without very good reason, the following three varieties being distinguished by trivial characters only, and running into each other. The Rocky Mountain var. *setigera* (sp. of Pursh) is more remote by the calyx much adnate to the fruit.

VAR. 1. *typica*; leaves pubescent, margins a little ciliate.

VAR. 2. *mucronulata* (Royle sp.); leaf margins more ciliate or glistening and subspinulose.

VAR. 3. *stenophylla* (Royle sp.); lower leaves and stem less pubescent or nearly glabrous.

SECT. VIII. **Porphyriorum.** *Leaves* sub-opposite, small, often with a pore at the apex. *Flowers* solitary, red or purple.

32. **S. oppositifolia**, Linn.; *DC. Prodr.* iv. 17; rosulate leaves $\frac{1}{4}$ - $\frac{1}{2}$ in. obovate glabrous or the upper ciliate, no disc surrounding the carpels. *Engl.*

Bot. t. 9; *Don in Trans. Linn. Soc.* xiii. 400; *H. f. & T. in Journ. Linn. Soc.* ii. 62; *Engler Monog. Saxifrag.* 276.

WESTERN TIBET, alt. 15–17,000 ft.; Sassar, *T. Thomson*.—DISTRIB. Alps of Europe and Asia, Arctic Regions.

Stems 1–2 in. long, much branched and crowded, forming dense tufts. *Leaves* densely crowded, *Flowering* stems from the ends of the branches, $\frac{1}{2}$ –2 in. long, with decussate opposite (or altogether alternate) leaves. *Sepals* ovate-oblong, nearly glabrous, erect in fruit, adnate to the ovary at the base. *Petals* $\frac{3}{8}$ in. long, obovate-oblong, twice the sepals. *Seeds* ellipsoid, rugulose, minutely papillose.—In *Dr. Thomson's* specimens some flowers have 3 carpels.

SECT. IX. **Bergenia**. *Rootstock* stout. *Leaves* ample, undivided, with a large sheath at the base of the petiole. *Scape* corymbose, 6–18 in. high. *Petals* white or red. *Calyx*-lobes erect in fruit. *Seeds* much larger than in other sections, elongate, subpyramidal, smooth.

33. **S. ligulata**, *Wall. in Asiat. Research.* xiii. 398, with a figure; leaves orbicular or obovate quite entire ciliate, base cordate, pedicels and calyx glabrous, calyx-teeth ovate not narrowed at base, fruit-pedicels cernuous. *Wall. Cat.* 449; *Don in Trans. Linn. Soc.* xiii. 348; *Hook. Exot. Flora*, i. t. 49 (excellent); *Hook. Bot. Mag.* t. 3406 (the sepals too acute, and the leaves too undulate); *DC. Prodr.* iv. 38; *H. f. & T. in Journ. Linn. Soc.* ii. 60.

Temperate HIMALAYA, from BHOTAN to KASHMIR, alt. 7–10,000 ft., common. Khasia Mts., alt. 4000 ft.

Leaves a foot in diam. in Khasia; smaller in Bhotan until 2 in. diam. in Kumaon; glabrous on both surfaces, dotted on the lower. *Petals* $\frac{1}{2}$ –1 in. long, white or rose or purplish, orbicular with a claw of variable length. *Fruit* subglobose. *Styles* very long. *Carpels* sometimes 3.

VAR. 2. *ciliata*; *Royle Ill.* t. 49 (*sp.*); *Hook. Bot. Mag.* t. 4915; *H. f. & T. in Journ. Linn. Soc.* ii. 60; leaves hirsute on both surfaces.—Nipal and Kumaon, alt. 6–8000 ft.; *Royle, T. Thomson, Edgeworth, Strachey and Winterbottom*.

34. **S. Stracheyi**, *H. f. & T. in Journ. Linn. Soc.* ii. 61; leaves obovate scarcely cordate at base, pedicels and calyx pubescent or puberulous, calyx-teeth oblong, often wider above their base, fruit-pedicels generally erect. ? *S. ligulata*, var. γ , *H. f. & T. in Journ. Linn. Soc.* ii. 61; *Lindl. in Bot. Reg.* 1843, t. 65.

KUMAON and KASHMIR, alt. 8000–14,000 ft., common.

Leaves glabrous on both surfaces margin either subentire ciliate, or crenate-serrate. *Petals* white or rose, or (according to a field note of *Dr. Thomson's*) yellow. *Fruit* ovate-lanceolate. *Styles* long.

35. **S. purpurascens**, *H. f. & T. in Journ. Linn. Soc.* ii. 61; leaves glabrous obovate entire, margins undulate, pedicels very pubescent, flowers nodding, calyx-lobes very obtuse. *Hook. Bot. Mag.* t. 5066.

SIKKIM, alt. 10–15,000 ft.; Lachen, *J. D. H.*; Yakla Pass, *C. B. Clarke*.

Leaves 2–3 in. diam., punctate beneath. *Petals* $\frac{3}{4}$ in. long, obovate-oblong. *Styles* long. *Carpels* elliptic-lanceolate. *Fruit* erect.

DOUBTFUL SPECIES.

SAXIFRAGA from Karnag in Tibet, stated to be near *S. diapiensoides* by *Kurz* (*Flora*, 1872, 286) is quite unknown to me. It is not described.

3. **VAHLIA**, Thunb.

Annual or biennial herbs. *Leaves* opposite, entire; stipules 0. *Flowers* axillary, usually geminate, subsessile or pedicelled. *Calyx-tube* entirely adherent to the ovary; lobes 5, valvate, persistent in fruit. *Petals* 5, epigynous. *Stamens* 5, epigynous. *Ovary* inferior, 1-celled, with 2 pendulous many-ovuled placentas; styles 2, stigma capitellate. *Capsule* dehiscing at the apex between the styles. *Seeds* numerous, minute, ellipsoid, smooth.—**DISTRIB.** Species 3; in tropical and subtropical Asia, and in tropical and South Africa.

1. **V. viscosa**, Roxb. *Fl. Ind.* ii. 89; flowers subsessile geminate or solitary in nearly all the upper axils, filaments with a minute hairy scale at the base. *W. & A. Prodr.* 364; *Wight Ic.* t. 563; *H. f. & T. in Journ. Linn. Soc.* ii. 74; *Dalz. & Gibs. Bomb. Fl.* 90; *Oliv. Fl. Trop. Afr.* ii. 383. *V. sessiliflora*, Wall. *Cat.* 7188; *DC. Prodr.* iv. 54. *V. Weldenii*, Reich. *Hort. Bot.* t. 91; *DC. Prodr.* iv. 53. *Bistella geminiflora*, Delile *Centurie Pl. d'Afric.* No. 91, with a figure. *Oldenlandia digyna*, Retz *Obs.* iv. 23.

Dry places of INDIA, from CEYLON to BUNDELKUND and the PUNJAB, frequent.—**DISTRIB.** Persia, Egypt, tropical Africa.

Glandular-pubescent. *Stem* 6–12 in. high, erect or diffuse, branched. *Leaves* $\frac{1}{2}$ –1 in. long, subsessile, oblong, narrowed at both ends, ovate or lanceolate. *Petals* about $\frac{1}{8}$ in. long, white (ex Roxb. yellow), obovate. *Stamens* and *styles* about $\frac{1}{8}$ in. long in the Indian specimens, these parts much larger and the filaments pubescent in the African var. *Weldenii*. *Capsule* about $\frac{1}{8}$ in. diam., subglobose.—This and the succeeding species when in fruit must be carefully distinguished from *Oldenlandia* which has the capsule completely 2-celled. The leaves of *Vahlia* have often a connecting line as if falsely stipulate. *Mitreola* which differs by its single style is also mixed with *Vahlia* in Herbaria.

2. **V. oldenlandioides**, Roxb. *Fl. Ind.* ii. 89; peduncles $\frac{1}{8}$ – $\frac{1}{4}$ in. long from nearly all the upper axils mostly 2-flowered, filaments naked at the base. *W. & A. Prodr.* 364; *Wight Ill.* t. 115; *Ic.* t. 562; *H. f. & T. in Journ. Linn. Soc.* ii. 74; *Oliv. Fl. Trop. Afr.* ii. 384. *V. Oldenlandiæ*, DC. *Prodr.* iv. 54; *Wall. Cat.* 7187. *V. silenoides*, DC. *Prodr.* iv. 54.

Tropical dry portion of the Western Peninsula and CEYLON; *Shuter*, *Perottet*, *Roxburgh*, *Wight*, &c.—**DISTRIB.** Tropical Africa.

Glandular-pubescent upwards. *Stem* 3–12 in. high, erect or diffuse, branched. *Leaves* $\frac{1}{2}$ –2 in. long, subsessile, linear or linear-ovate. *Calyx-lobes* not exceeding the tube. *Petals* about $\frac{1}{8}$ in. long, white, obovate. *Capsule* about $\frac{1}{8}$ in. diam., subglobose.

4. **TIARELLA**, Linn.

Slender erect herbs; root perennial. *Leaves* alternate; radical long-petioled with large stipules adnate to base of petiole; stipules of upper leaves small. *Raceme* terminal, subbracteate. *Calyx* shortly adnate to the ovary; lobes 5, valvate. *Petals* 5, white, or 0. *Stamens* 10, the 5 alternate with sepals sometimes without anthers. *Ovary* 1-celled of 2 carpels ending in two styles; ovules numerous, attached to two nearly basal placentas. *Ripe carpels* very unequal, diverging at top, and dehiscing ventrally. *Seeds* 6–16, near the base of the fruit, ellipsoid, smooth.—**DISTRIB.** Species 5, one Himalayan and Japanese; the other 4 North American.

1. **T. polyphylla**, Don *Prodr.* 210; stem-leaves several all petioled cordate-ovate subpentagonal crenate-serrate, petals small linear or 0, fruit cernuous

glabrous. *Wall. Cat.* 437; *DC. Prodr.* iv. 50; *H. f. & T. in Journ. Linn. Soc.* ii. 74.

Temperate Central and Eastern Himalaya; from BHOTAN to NIPAL, alt. 8–11,000 ft.; *Wallich, Griffith, J. D. H., &c.*—DISTRIB. Japan.

Stem 6–18 in. high, pubescent. *Leaves* pilose on both surfaces, lower long-petioled, blade 1–3 in. diam. *Sepals* $\frac{1}{2}$ in. long, whitish, glandular. *Petals* when present shorter than the sepals. *Ripe carpels* one $\frac{1}{4}$ in. long, the other $\frac{1}{2}$ in.

5. **CHRYSOSPLENIUM**, *Linn*

Weak, succulent herbs, growing in damp or watery places. *Leaves* undivided, petioled; stipules 0. *Flowers* axillary and terminal, short-pedicelled, small, green or yellow, 4-merous in the Indian species, rarely 5-merous. *Calyx-tube* adnate to the ovary; lobes 4, imbricate. *Petals* 0. *Stamens* 8 (or 4), subepigynous. *Ovary* 1-celled. 2-lobed above; styles short; ovules numerous, attached to parietal placentæ alternating with the stigmas. *Capsule* half-superior, dehiscent at top crosswise. *Seeds* small, ellipsoid.—DISTRIB. Species 22; North Europe, Asia (South to the Himalaya) and America; in the Andes to Magellan's Straits.

* *Leaves opposite.*

1. **C. nepalense**, *Don Prodr.* 210; glabrous, branched, or in water tufted, leaves ovate or subcordate obtuse crenate, flowers subsessile, seeds smooth shining chestnut-brown. *Wall. Cat.* 438; *DC. Prodr.* iv. 48; *H. f. & T. in Journ. Linn. Soc.* ii. 72; *Maxim. in Bull. Acad. Petersb. Mel. Biol.* ix. 766.

Temperate Himalaya; from BHOTAN to KUMAON, alt. 7000–10,000 ft., frequent.

A decumbent, weak species, with branches 6–8 in. long, closely resembling *C. oppositifolium*, L., which only differs in having its leaves entire or obsoletely crenate.

Maximowicz (in Bull. Acad. Petersb. Mel. Biol. ix. 767) has founded a new Himalayan species *C. sulcatum*, *Maxim.* on *Wall. Cat.* 438; which differs from *C. nepalense* in having the seeds profoundly 12-sulcate; but the examples of *Wall. Cat.* 438 at Kew exhibit the smooth seeds of *C. nepalense*.

2. **C. trichospermum**, *Edgew. MSS.*; *H. f. & T. in Journ. Linn. Soc.* ii. 73; glabrous, branched, leaves ovate or elliptic obtuse crenate, flowers shortly pedicelled, seeds globose shining chestnut-brown covered with golden 1-celled linear papillæ. *Maxim. in Bull. Acad. Petersb. Mel. Biol.* ix. 767.

Temperate Western HIMALAYA, alt. 7–8000 ft.; *Edgeworth, Madden*; *Dwali*, alt. 8000 ft., in KUMAON, *Strach. & Winterbottom*.

A rather stouter plant than *C. nepalense*, the leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.

** *Leaves alternate*; plant glabrous.

3. **C. alternifolium**, *Linn.*; *DC. Prodr.* iv. 48; stem weak succulent suberect 2–8 in. long, leafless (or 1-leaved) except at the base and the summit, radical leaves long-petioled suborbicular crenate-lobed, flowers subsessile. *Engl. Bot. t.* 54; *H. f. & T. in Journ. Linn. Soc.* ii. 73; *Boiss. Fl. Orient.* ii. 813; *Maxim. in Bull. Acad. Petersb. Mel. Biol.* ix. 760.

SIKKIM, alt. 12,000–15,000 ft.; *Kankola, J. D. H.*—DISTRIB. Alpine and Arctic Europe, Asia and N. America.

Leaves $\frac{1}{4}$ – $\frac{3}{4}$ in. diam., oval or cordate, rounded at the top, floral leaves golden yellow. *Seeds* shining, smooth.

4. **C. carnosum**, *H. f. & T. in Journ. Linn. Soc.* ii. 73; tufted, stems 2–4 in. high erect thick leafy, radical leaves represented by short sheathing

scales, flowers sessile. *C. carnosulum*, Maxim. in Bull. Acad. Petersb., Mel. Biol. ix. 757.

SIKKIM HIMALAYA, alt. 14–15,000 ft., Yeumtong and Kankola 'near the perpetual snow,' J. D. H.

Leaves about $\frac{1}{4}$ in. diam., glossy, very deep green, elliptic, obtuse, crenate-dentate. Flowers lurid. Calyx segments purple.—This may prove only an extreme form of *C. alternifolium*.

5. **C. Griffithii**, H. f. & T. in Journ. Linn. Soc. ii. 74; stems 4–8 in. high suberect, leafy at the summit, radical leaves represented by short sheathing scales, leaves reniform-cordate deeply crenate-lobate, flowers pedicelled. Maxim. in Bull. Acad. Petersb., Mel. Biol. ix. 759.

BHOTAN; Griffith.

Leaves $\frac{1}{2}$ –1 in. broad; lobes 6–16, very obtuse, often $\frac{1}{4}$ in. deep.—Very near *C. nudicaule*, Bunge.

6. **C. tenellum**, H. f. & T. in Journ. Linn. Soc. ii. 73; stems filiform procumbent interlacing leafy, leaves reniform cordate crenate-lobate, flowers scattered pedicelled, seeds smooth shining. Maxim. in Bull. Acad. Petersb., Mel. Biol. ix. 762.

Temperate Western HIMALAYA; Kedarkanta in GURWHAL, Royle; Madhari Pass, in KUMAON, alt. 10,000 ft., Strachey & Winterbottom.

Stems 1–3 in. long. Leaves $\frac{3}{8}$ in. broad, with 4–8 shallow lobes; radical long-petioled.

*** Leaves alternate; plant pubescent.

7. **C. lanuginosum**, H. f. & T. in Journ. Linn. Soc. ii. 74; stem 3–8 in. high erect leafy, corymb loose terminal sparingly leafy, leaves 1–2 in. long elliptic slightly crenate. *C. adoxoides*, Maxim. in Bull. Acad. Petersb., Mel. Biol. ix. 760. Saxifraga adoxioides, Griff. Ic. Pl. Asiat. t. 570.

Eastern Himalaya; BHOTAN, alt. 7500–8000 ft., Griffith. SIKKIM, alt. 7–9000 ft., T. Anderson, C. B. Clarke.

Whole plant pubescent and with brown-red wool. Corymb, when well developed, 2–3 in. across, with leaf-like bracts at a few of the divisions.—Sometimes stunted and more compact.

6. **PARNASSIA**, Linn.

Glabrous perennial scapigerous herbs. Scape angular, 1-flowered; often bearing one leaf in the middle, more rarely naked or with several leaves. Leaves entire, radical long-petioled. Calyx-tube free or adnate to the ovary, the lobes 5, imbricate. Petals 5, white or pale yellow. Stamens 5, perigynous or nearly hypogynous, alternate with 5 large staminodes. Ovary 1-celled; style short with 3–4 (or 5) nearly simple stigmas; ovules numerous attached to the parietal placenta opposite the stigmas. Capsule superior or half-inferior, loculicidally 3–4-valved. Seeds many, obovoid or subcylindric, smooth, testa sometimes lax; albumen hardly any; (in which point *Parnassia* differs from the character of the order Saxifragaceæ and is therefore placed by some authors elsewhere).—DISTRIB. Northern temperate hemisphere, extending south to the mountains of the Indian Peninsula. Species 12.

SECT. I. **Nectarodrosen**. Staminodes ending in numerous long gland-bearing processes. Petals entire.

1. **P. palustris**, Linn.; DC. Prodr. i. 320; leaves cordate at the base, cauline usually solitary, processes of the staminodes 7–21. Eng. Bot. t. 82; Bois. Fl. Orient. ii. 814; Drude in Linnaea, xxxix. 307.

WESTERN TIBET, *Falconer*; Skardo in BALTIKISTAN, alt. 7500 ft. *T. Thomson*, *C. B. Clarke*.—DISTRIB. Subalpine and subarctic regions.

Petals ovate-elliptic with a broad claw. *Stamens* nearly hypogynous. *Carpels* 4. *Capsule* superior or nearly so, oblong-elliptic, much longer than the sepals. *Seeds* cylindric; testa loosely reticulate.

SECT. II. **Fimbripetalum.** *Staminodes* ending in several long gland-bearing processes. *Petals* fimbriate.

2. **P. foliosa**, *H. f. & T. in Journ. Linn. Soc.* ii. 79; stem with 4–8 leaves, staminodes ending in 3 long processes each tipped with a distinctly clubbed gland. *P. foliosa* and *P. Nummularia*, *Drude in Linnæa*, xxxix. 313.

KHASIA MTS., alt. 5000–6000 ft., Moflong to Syung and at Nonkrem, *J. D. H.* and *T. Thomson*.—DISTRIB. West China and Japan.

Stem 8–12 in. high. *Radical leaves* orbicular, deeply cordate. *Sepals* patent or reflexed. *Petals* ovate above a short claw, fimbriated around their whole edge. *Carpels* 4. *Capsule* superior or nearly so, long-ellipsoid, much longer than the sepals.

Drude states he had no specimen of *P. foliosa*. *Kew* possesses both *P. foliolosa* collected by *H. f. & T.*, and *P. Nummularia* collected by *Maximowicz*; the two are identical.

SECT. III. **Nectarotrilobos.** *Staminodes* at the vertex 3- (rarely 5-) lobed, the lobes short or cylindric, not linear. *Stem* 1- (or 0-) leaved.

* *Capsule* triquetrous, superior or nearly so.

3. **P. Wightiana**, *Wall. in W. & A. Prodr.* 35; petals obovate-oblong margins much fimbriate, staminodes 3–5-lobed, lobes cylindric (or in the Nilghiri plant) thickened at the top, capsule 3-celled superior, obcordate. *Wall. Cat.* 3755; *Wight. Ill.* t. 21; *Ic.* t. 945; *Arn. in Hook. Comp. Bot. Mag.* ii. 315; *H. f. & T. in Journ. Linn. Soc.* ii. 80; *Drude in Linnæa*, xxxix. 314. *P. ornata*, *Wall. Cat.* 1247; *Arn. in Hook. Comp. Bot. Mag.* ii. 315. *P. Schmidii*, *Zenker Pl. Ind.* t. 5.

NILGHIRI MTS., alt. 7000 ft. KHASIA MTS., alt. 4500–6000 ft. 'HIMALAYA,' Wallich. KUMAON, sive *H. f. & T. in Journ. Linn. Soc.* ii. 80.—DISTRIB. Yunnan and interior of China.

Stem 8–18 in. high. *Leaves* often $1\frac{1}{2}$ in., reniform or oval, deeply cordate. *Petals* (at least in the Khasia plant) light yellow. *Placentæ* near the base of the capsule. *Seeds* ellipsoid; testa reticulate, not very lax.

4. **P. mysorensis**, *Heyne in W. & A. Prodr.* 35; petals obovate-oblong, margins not or obscurely fimbriate, staminodes 3-lobed, lobes cylindric or dilated upwards, capsule 3-celled superior obcordate. *Wall. Cat.* 3754; *Wight Ill.* t. 21; *Arn. in Hook. Comp. Bot. Mag.* ii. 315; *H. f. & T. in Journ. Linn. Soc.* ii. 80; *Drude in Linnæa*, xxxix. 317.

Eastern Himalaya; SIKKIM, alt. 8000–12,000 ft.; Lachen and Yeumtong, *J. D. H.* Mts. of the Western Peninsula. KHASIA MTS. alt. 3500–5500 ft.

Stem 3–8 in. high. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., reniform, deeply cordate. *Petals* small, white. *Seeds* small, ellipsoid; testa somewhat laxly reticulate.

** *Capsule* half-inferior.

5. **P. nubicola**, *Wall. in Wight Ill.* t. 21; margins of petals not (or slightly) fimbriate, staminodes broadly dilated upwards 3-lobed, capsule $\frac{1}{2}$ in. long obconic below subhemispheric above, style very short or 0. *Wall. Cat.* 1246; *Arn. in Comp. Hook. Bot. Mag.* ii. 315; *H. f. & T. in Journ. Linn. Soc.* ii. 81; *Drude in Linnæa*, xxxix. 315.

Temperate and Alpine Himalaya from SIKKIM to KASHMIR, alt. 6000–12,000 ft., frequent.

Stem 4–18 in. high, subulate with 4–5 ridges under the fruit. *Leaves* 1–2 (sometimes 3) in., ovate or cordate, oblong. *Petals* $\frac{1}{2}$ in. long, white, obovate. *Carpels* and stigmas 3; (Drude says 4 but they are nearly invariably 3 in the Kew plentiful examples). *Seeds* obovoid-ellipsoid, smooth; testa reticulate, not lax.

6. **P. ovata**, Ledeb. in *Mem. Acad. Petersb.* v. 528; margins of petals not (or slightly) fimbriate, staminodes broadly dilated upwards 3-lobed, capsule $\frac{1}{4}$ – $\frac{3}{8}$ in. long obconic below subhemispheric above, style manifest $\frac{1}{32}$ in. long. *DC. Prodr.* i. 320; *Ledeb. Ic. Fl. Ross.* t. 242; *Fl. Ross.* i. 263; *H. f. & T. in Journ. Linn. Soc.* ii. 82; *Drude in Linnæa*, xxxix. 320. *P. Turczaninowii*, *Ledeb. Fl. Ross.* i. 263; *Drude, l. c.* 321. *P. affinis*, *H. f. & T. l. c.* ii. 81; *Drude, l. c.* 317. *P. Laxmanni*, *Pall. in Roem. & Sch. Syst.* vi. 696; *Ledeb. Fl. Ross.* i. 264. *P. trinervis*, *Drude, l. c.* 322.

Temperate and Alpine Himalaya from SIKKIM to KASHMIR, alt. 8000–15,000 ft., frequent.—DISTRIB. Altai Mts.

Stem 3–8 in. high. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., ovate or ovate-oblong, often cordate; cauline usually solitary in the lower half of the stem. *Petals* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, spathulate-obovate. *Carpels* 3, rarely 4. Testa of the seed close (Drude).—This differs from *P. nubicola* by the smaller size of all its parts and the manifest style. *P. cabulica*, Planch in *Herb. Griffith*, differs by the stems being usually leafless. *P. subacaulis*, Kar. & Kir. differs by the leaves being oblong narrowed at their base; it was collected by Dr. Henderson near Yarkand, and appears in his list No. 136 under the name *P. maisorensis*.

7. **P. pusilla**, Wall. ex *H. f. & T. in Journ. Linn. Soc.* ii. 81; margins of petals slightly fimbriate or quite entire, staminodes with a very short claw hardly longer than broad dilated upwards 3-lobed, capsule $\frac{1}{4}$ in. long obovoid-ellipsoid adnate about $\frac{1}{3}$ its length, style manifest $\frac{1}{32}$ in. long. *Wall. Cat.* 1245; *Arn. in Wight. Ill.* p. 45 and in *Comp. Hook. Bot. Mag.* ii. 315; *Drude in Linnæa*, ix. 318.

ALPINE HIMALAYA from SIKKIM to KUNAWUR, alt. 12–15,000 ft., Wallich, J. D. H., Munro, &c.

Stem 1–2 $\frac{1}{2}$ in. long. *Leaves* $\frac{1}{4}$ – $\frac{3}{8}$ in., reniform or ovate-cordate; cauline leaf usually one, often in the upper half of the stem. *Petals* $\frac{1}{4}$ – $\frac{3}{8}$ in. long, obovate. *Carpels* 3. *Seeds* ellipsoid, smooth; testa reticulate not lax.—This species should probably be estimated an alpine var. of *P. ovata*, from which it differs in its stunted size and shorter staminodes.

SECT. IV. **Saxifragastrum.** *Staminodes* cylindric, undivided at the vertex.

8. **P. tenella**, *H. f. & T. in Journ. Linn. Soc.* ii. 80; petals $\frac{1}{2}$ in. long green-white reflexed obovate, capsule $\frac{1}{2}$ in. long obcordate triquetrous. *Drude in Linnæa*, xxxix. 323.

SIKKIM HIMALAYA; alt. 10,000–12,000 ft.; Lachen and Lachoong, J. D. H.

Stem 2–5 in. long, weak. Radical *leaves* $\frac{3}{4}$ in. broad, reniform, margin minutely erose; petiole with adnate fimbriate stipules at the base; cauline usually 1, cordate-ovate. *Staminodes* thick, cylindric, glandulose, clavate at its summit. *Styles* 3, short, but manifest. *Seeds* (immature) of the genus.

7. HYDRANGÆA, Linn.

Large shrubs or trees, in their young state often subscandent with smaller leaves. *Corymbs* terminal, with deciduous bracts. *Flowers* all fertile and small, or the exterior flowers of the corymb sterile apetalous with the calyx-lobes petala-

loid and greatly enlarged. *Calyx*-tube adnate to the ovary, limb 4-5-fid. *Petals* 4-5, valvate. *Stamens* 8-10, subepigynous. *Ovary* inferior; styles 2-4; ovules very numerous, axile. *Capsule* 2-4-celled, dehiscing at the apex between the styles. *Seeds* minute, shortly tailed at each end, very numerous.—**DISTRIB.** Species 33 from Java to the Himalaya and Japan (the centre of the genus), Eastern N. America, Western S. America.

The seeds of *Hydrangea* are described by many authors, as by the accurate Maximowicz, as alate. The seed in its inner coat is a perfectly smooth ellipsoid; the outer coat is a loose long cylindric sack, in the middle of which the nucleus lies; as the seed ripens the empty ends of the sack wither and contract whence results a seed 'tailed at each end.'

* *Fruit truncate at top, petals falling off in a cap, styles very generally not always separate.*

1. **H. altissima**, Wall. *Tent. Fl. Nep.* t. 50; leaves glabrous except tufts of brown hairs in the axils of the main nerves beneath which hairs sometimes are continued along the veins also, stamens 10. Wall. *Cat.* 439; DC. *Prodr.* iv. 14; H. f. & T. in *Journ. Linn. Soc.* ii. 75; Brand. *For. Fl.* 211.

Temperate Himalaya from GURWHAL to BHOTAN, alt. 4000-8000 ft. (10,000 ft. in Sikkim, J. D. H.), frequent.

A spreading shrub, 8-15 ft. high, branchlets glabrous. *Leaves* 3-6 in., ovate-lanceolate, sometimes cordate, sometimes narrow-lanceolate; usually finely (sometimes more coarsely) serrate or entire except near the apex; upper petioles often winged and woolly-hairy. *Corymb* pilose. *Flower-buds* conical, acute, but the calyptra-like corolla by the rapid swelling of the stamens becomes hemispheric before falling. *Sepals* of the radiate flowers usually entire; sometimes waved or slightly toothed. *Capsule* subhemispheric, compressed, broader than long.—*H. scandens*, Maxim., which includes several Japanese species, only differs by having 15 stamens and rather larger buds.

** *Fruit truncate at top, petals expanding.*

2. **H. robusta**, H. f. & T. in *Journ. Linn. Soc.* ii. 76; leaves large ovate or cordate at base adpressedly brown-hirsute on the nerves beneath and minutely tessellated with white hairs along the tessellations but not tomentose, styles normally 2. *H. cyanema*, Nutt. in *Bot. Mag.* t. 5038.

Temperate Eastern Himalaya; SIKKIM and BHOTAN, alt. 5000-8000 ft., frequent; Griffith, J. D. H., &c.

A spreading shrub, 8-15 ft. high; branchlets hairy or pubescent. *Leaves* up to 9 in., from narrow oblong to broad cordate, the base never acute, serrate (usually coarsely), upper surface with scattered hairs, and adpressedly brown pilose along the nerves; upper petioles often winged, sometimes incise-serrate and subtruncate. *Corymb* hirsute. *Sepals* of the radiate flowers sharply serrate or crenate or undulate. *Petals* and stamens blue. *Styles* not rarely 3. *Capsules* subhemispheric, compressed, broader than long.

VAR. *Griffithii*; upper leaves narrowed into the petiole, with scattered bristly hairs on the nerves beneath smooth not tessellated between them.—Eastern Bhotan, Griffith.

3. **H. aspera**, Don *Prodr.* 211; leaves long-lanceolate generally narrowed into the petiole, under surface with grey woolly hair, styles normally 3. *H. f. & T.* in *Journ. Linn. Soc.* ii. 75. *H. vestita* var. *fimbriata*, Wall. *Cat.* 440 β; DC. *Prodr.* iv. 14.

Temperate Himalaya, alt. 6000-7000 ft.; SIKKIM, Lachen, J. D. H.; NIPAL, Wallich; KUMAON, Upper Tola, Strachey & Winterbottom.

Arboreous, sometimes 20 ft. high, branchlets pubescent. *Leaves* 6-8 by 2-3 in.,

upper surface with scattered minute hairs, lower microscopically mealy punctate and densely clothed with long white hairs; petiole of the uppermost leaves not at all or but slightly winged. *Corymb* hirsute. *Sepals* of the radiate flowers usually serrate or toothed, sometimes quite entire. *Styles* not rarely 4, rarely 2. *Capsule* hemispheric, obscurely trigonous or subquadrate.

*** *Capsule* crowned with a disc formed by the base of the normally 3 *styles*, *petals* expanding.

4. **H. vestita**, Wall. Tent. Fl. Nep. t. 49; leaves densely pubescent-tomentose beneath, styles short. Wall. Cat. 440 a.; DC. Prodr. iv. 14, excluding var. β .; H. f. & T. in Journ. Linn. Soc. ii. 75; Maxim. in Mem. Acad. Petersb. x. No. 16. p. 10. H. heteromalla, Don Prodr. 211; DC. Prodr. iv. 15. H. Khasiana, H. f. & T. in Journ. Linn. Soc. ii. 75.

Temperate Himalaya from BHOTAN to KUMAON, alt. 8000–10,000 ft.; frequent. KHASIA Mts., alt. 4500–5500 ft.

Arborescent, 15 ft. high; branchlets hairy. Leaves 4–9 in., ovate or oblong, serrate, base sometimes cordate; upper surface with scattered hairs, lower tessellated and densely clothed with white densely papillose hairs. *Corymb* hirsute. *Sepals* of the radiate flowers entire. *Styles* occasionally 4.

5. **H. stylosa**, H. f. & T. in Journ. Linn. Soc. ii. 75; leaves glabrous, nerves beneath pubescent, styles long subulate.

SIKKIM HIMALAYA, alt. 8000 ft., Lachen, J. D. H.

Branches and branchlets puberulous. Leaves 2 in., serrate, elliptic, narrowed at the base. *Corymb* pilose. *Sepals* of the radiate flowers crenate-dentate.

DOUBTFUL SPECIES.

* **H. ANOMALA**, Don Prodr. 211; DC. Prodr. iv. 15; leaves sinuate-crenate nearly glabrous ovate rounded at the base 4 in., radiate flowers 0.—Nipal.—Of this no specimen exists at Kew. Perhaps it is but a synonym of *H. altissima*. H. f. & T. (in Journ. Linn. Soc. ii. p. 76) reduce it to *Dichroa*, but that has not ovate leaves rounded at the base.

8. **PILEOSTEGIA**, H. f. & T.

A glabrous shrub with the habit of *Viburnum* and decussate branches. Leaves coriaceous, petioled, obovate-oblong, entire, persistent. Panicles terminal. Calyx-tube adnate to the ovary; lobes 4 or 5, imbricate. Petals 4 or 5, valvate, falling off in a cap. Stamens 8 or 10, subepigynous. Ovary inferior, 4–6-celled; style thick, surmounted by a thicker truncate pyramid the 4–6 angles of which are stigmatic; ovules numerous, elongate, pendulous. Seeds (immature) numerous, testa an elongate cylindric sack at the apex of which lies the nucleus.

1. **P. viburnoides**, H. f. & T. in Journ. Linn. Soc. ii. 76, t. ii.; Maxim. in Mem. Acad. Petersb. x. No. 16. p. 18.

KHASIA Mts., alt. 3000–5000 ft.; Griffith; T. Lobb; Nunklow, J. D. H. & Thomson.—DISTRIB. Japan, Formosa.

Leaves 3–5 in. Panicle with a few linear-lanceolate bracts $\frac{1}{2}$ in. long. Flowers small; filaments elongate, $\frac{1}{4}$ – $\frac{3}{8}$ in. long.

9. **DICHRŌA**, Lour.

A shrub. *Leaves* opposite, serrate, lanceolate, persistent. *Panicle* terminal. *Calyx*-tube adnate to the ovary; limb 5-6-toothed. *Petals* 5 or 6, thickish, valvate, blue or purplish. *Stamens* 10 or 12, epigynous. *Ovary* $\frac{3}{4}$ -inferior, 1-celled; styles 3-5; ovules numerous, on 3-5 parietal placentæ formed by the inflexed margins of the carpels. *Berry* $\frac{3}{4}$ -inferior, blue. *Seeds* numerous, small, obovoid; testa with large reticulations.

1. **D. febrifuga**, Lour. *Fl. Cochinch.* 301; *Benth. Fl. Hongk.* 128; *Maxim. in Mem. Acad. Petersb.* x. No. 16, p. 2. *D. cyanitis* and *D. latifolia*, *Miq. Fl. Ind. Bat.* i. 721, 722. *Adamia versicolor*, *Fortune in Journ. Hort. Soc.* i. 298; *Lindl. & Pax. Fl. Gard.* i. t. 5. *A. cyanea*, *Wall. Cat.* 441; *Tent. Fl. Nep.* t. 36; *Pl. As. Rar.* t. 213; *Bot. Mag.* t. 3046; *DC. Prodr.* iv. 16; *H. f. & T. in Journ. Linn. Soc.* ii. 76. *A. chinensis*, *Gardn. & Champ. in Kew Journ. Bot.* i. 311. *Cyanitis sylvatica*, *Reinw. in Blume Bijdr.* 921; *DC. Prodr.* iv. 16.

TEMPERATE HIMALAYA from BHOTAN to NIPAL, alt. 5000-8000 ft., abundant. KHASIA MTS., alt. 4000-6000 ft.—DISTRIB. Java, China, Philippines.

Stems 5-9 ft. high, somewhat virgate. *Leaves* 3-8 in., tapering into the petiole, pubescent or puberulous on the nerves, otherwise glabrous, usually narrow, sometimes obovate-lanceolate. *Petals* $\frac{3}{16}$ in. long. *Berry* finally an intense blue.—The Chinese varieties have larger flowers than the Indian.

10. **DEUTZIA**, Thunb.

Shrubs with opposite branches and stellate pubescence. *Leaves* opposite serrate, ovate or lanceolate, deciduous. *Flowers* white, corymbose in the Indian species. *Calyx*-tube adnate to the ovary; teeth 5, small. *Petals* 5. *Stamens* 10, subepigynous, filaments broadly winged the wing often ending upwards in a tooth on each side. *Ovary* inferior, 3-5-celled; styles 3-5, long; ovules numerous, axile. *Capsule* 3-5-celled, hemispheric or ovoid from a rounded base, truncate at the summit, at length septicidal. *Seeds* minute, numerous, obovoid-ellipsoid; testa reticulate, a little longer than the nucleus, appearing at last as a short stalk at its base, as a point at its summit.—DISTRIB. Species 7, Himalaya to North China and Japan; and one outlier in Mexico.

1. **D. corymbosa**, Br. in *Royle Ill.* t. 46; petals obovate imbricate, calyx teeth short triangular, calyx-tube with scattered stellate hairs, corymbs many flowered, *Wall. Cat.* 3652; *H. f. & T. in Journ. Linn. Soc.* ii. 83, *excluding synonyms in Bot. Reg.; Brand. For. Fl.* 212; *Maxim. in Mem. Acad. Petersb.* x. No. 16, p. 32. ? *D. parviflora*, *Bunge Enum. Pl. Chin.*, p. 30; *Maxim. in Mem. Acad. Petersb.* x. No. 16, p. 33, *with figures*. *Philadelphus (Leptospermum) corymbosus*, *Wall. in Herb.*

TEMPERATE HIMALAYA, from KASHMIR to BHOTAN, alt. 6000-10,000 ft., frequent.—DISTRIB. China, Manchuria, Amurland.

Leaves 1-2 in., oblong or elliptic lanceolate; on the under surface the stellate hairs are often few, sometimes thickly scattered, not matted into tomentum in the mature leaves; under surface sometimes prominently reticulate. *Petals* glabrous or stellately pubescent.—Maximowicz l. c. keeps the Chinese *D. parviflora* still distinct by the puberulous smaller petals, the shorter teeth to the wing of the filament, the leaves more prominently reticulate beneath, &c., none of which distinctions appear to hold in the large Kew collection. The name *corymbosa* can only be preferred to *parviflora* if Brown's naming in Wallich's distribution be reckoned publication.

2. **D. staminea**, Br. in Wall. Pl. As. Rar. 82, t. 191; petals oblong induplicate-valvate, corymbs many-flowered, calyx-tube hoary tomentose with stellate hairs, teeth short triangular. Wall. Cat. 3651; Bot. Reg. xxxiii. t. 13; H. f. & T. in Journ. Linn. Soc. ii. 83; Brandis Forest Fl. 212; Maxim. in Mem. Acad. Petersb. x. No. 16, p. 29. D. Brunoniana, Wall. Cat. 3650. D. corymbosa, Lindl. Bot. Reg. xxvi. t. 5. Leptospermum stamineum and L. scabrum, Wall. in Herb.

TEMPERATE WESTERN HIMALAYA to KASHMIR, alt. 5000-9000 ft., common. The specimens collected by Sir J. D. Hooker in Sikkim and East Nipal and named *D. staminea* should be referred to *D. corymbosa*.

Leaves 1-2 in., oblong- or elliptic-lanceolate, grey tomentose beneath with stellate hairs.

3. **D. macrantha**, H. f. & T. in Journ. Linn. Soc. ii. 84; petals $\frac{3}{4}$ in. long oblong induplicate-valvate, corymb large 8-flowered, calyx-tube with stellate tomentum, teeth linear.

Western Himalaya; KUMAON, alt. 5500 ft.; below Binsur, Strachey & Winterbottom.

Leaves 4 in., elliptic-lanceolate from a rounded base, acuminate, with close scattered stellate hairs on both surfaces.

11. PHILADELPHUS, Linn.

Shrubs with opposite branches. Leaves opposite, deciduous. Calyx-tube adnate to the ovary; lobes 4 (rarely 5), valvate. Petals 4 (rare 5) roundish, convolute in bud. Stamens 20-40, subepigynous, filaments subulate. Ovary inferior, 3-5-celled; styles 3-5, filiform, free or combined at the base; ovules numerous, axile, pendulous. Capsule inferior, corky, 3-5-celled, turbinate from a narrow funnel-shaped base, the summit shortly conical, at length loculicidal. Seeds numerous, oblong, testa loosely reticulated.—DISTRIB. Species 8; central Europe, the Himalaya, Japan and N. America.

1. **P. coronarius**, Linn; var. TOMENTOSUS; leaves hairy beneath, margins densely hairy or glabrous except a few marginal hairs. P. tomentosus, Wall. Cat. 3563; Royle Ill. t. 4; H. f. & T. in Journ. Linn. Soc. ii. 83. P. triflorus, Wall. and P. nepalensis, Loud. ex Maximov. in Mem. Acad. St. Petersb. No. 16, 36. P. coronarius, Brand. For. Fl. 212.

Temperate Himalaya; from KASHMIR to BHOTAN, alt. 5000-9000 ft.; frequent in GURWAL and KUMAON.

Leaves $1\frac{1}{2}$ - $3\frac{1}{2}$ in., ovate-lanceolate, serrate; petiole $\frac{1}{4}$ in. Cymes few-flowered, often with linear bracts $\frac{1}{2}$ in. long; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in. Calyx-teeth elongate-triangular, acute. Petals $\frac{1}{2}$ - $\frac{3}{4}$ in. long, white. Capsule $\frac{1}{2}$ in. long.—The typical *P. coronarius* (of which *Zeyheri*, *floribundus*, *verrucosus*, *latifolius*, and many others are varieties) is a native of Europe and the East, extending to North China and Japan.

12. ITEA, Linn.

Shrubs or trees. Leaves alternate, petioled, glabrous, glandular-dentate or crenate. Racemes axillary and terminal, long, many-flowered. Calyx-tube adnate to base of the ovary, lobes 5. Petals 5, oblong, perigynous, white, valvate. Stamens 5, perigynous. Ovary $\frac{3}{4}$ -superior, 2-celled; style short, simple; ovules

many, axile. *Capsule* $\frac{3}{4}$ -superior, conical or elongate, many-seeded, splitting through the dissepiments and the style. *Seeds* elongate, testa loose more or less produced at each end.—**DISTRIB.** Species 5, the Himalaya, Indian Archipelago, Japan, Virginia.

1. **I. macrophylla**, Wall. in Roxb. *Fl. Ind.* ii. 419; leaves large rounded at the base, petals closely reflexed on the pedicel between the calyx-teeth, calyx-tube in fruit somewhat campanulate. Wall. *Cat.* 7200; DC. *Prodr.* iv. 6; H. f. & T. in *Journ. Linn. Soc.* ii. 77. Kurrimia?, Wall. *Cat.* 7200.

Subtropical Eastern Himalaya; BHOTAN and SIKKIM, alt. 1000–4000 ft., Griffith, Gamble. KHASIA Mts., alt. 2000–4000 ft., frequent.—**DISTRIB.** Java.

A small tree. *Leaves* often 6 by 3 in., broadly ovate, acute, glandular-denticulate, but sometimes not larger than in *I. chinensis* nor more rounded at the base. *Racemes* 1–3 from several upper axils, usually shorter than the leaves, and like the calyx-tube puberulous. *Capsule* $\frac{1}{4}$ – $\frac{3}{8}$ in. long, the bases of the carpels clearly sunk below the limb of the calyx-tube; the calyx-teeth finally wear off.

2. **I. chinensis**, Hook. & Arn. *Bot. Beech. Voy.* 89, t. 39; leaves usually narrowed at the base, petals erect persistent often appressed to the fruit, calyx-tube in fruit turbinate or conical. H. f. & T. in *Journ. Linn. Soc.* ii. 77; Benth. *Fl. Hongk.* 129.

KHASIA Mts., alt. 4000–5000 ft., Wallich, &c.—**DISTRIB.** China, Hong Kong, Formosa, &c.

A shrub. *Leaves* usually 3 or 4 in., oblong, narrowed at both ends, glandular-denticulate, but sometimes 6 in. by $2\frac{1}{2}$ in. and exactly resembling those of *I. macrophylla*. *Racemes* 1–2 from several upper axils, about as long as the leaves, and like the calyx-tube puberulous. *Capsule* $\frac{1}{4}$ – $\frac{3}{8}$ in., bases of the carpels hardly sunk below the calyx-tube; calyx-teeth persistent, suberect.

3. **I. nutans**, Royle *Ill.* 226; petals erect subpersistent, calyx-tube in fruit hemispherical hairy, racemes solitary terminal elongate much longer than the leaves. H. f. & T. in *Journ. Linn. Soc.* ii. 77; Brand. *For. Fl.* 213.

GURWHAL and KUMAON, alt. 3000–5000 ft., Royle, &c.

A shrub. *Leaves* 3–5 in., elliptic-oblong, acute, glandular-denticulate. *Capsule* $\frac{1}{2}$ in. long; calyx-teeth persistent, erect.

13. **POLYOSMA**, Blume.

Evergreen trees, branchlets petioles and inflorescence pubescent. *Leaves* opposite or subopposite, petioled, acuminate. *Flowers* in terminal racemes (in some non-Indian species solitary) 3-bracteolate. *Calyx-tube* entirely adnate to the ovary; lobes 4, small, persistent. *Petals* 4, epigynous, linear, valvate, white yellowish or greenish expanding by recurving, fugacious, very hairy within. *Stamens* 4, epigynous, filaments hairy. *Ovary* inferior, 1-celled; style columnar, stigma simple; ovules numerous, ascending, on two parietal placentæ which project considerably into the cavity of the ovary. *Fruit* sub-baccate, 1-seeded. *Seed* ascending, subbasal.—**DISTRIB.** Species 6, extending from East Bengal through Malaya to tropical Australia and its islands.

1. **P. fragrans**, Benn. *Pl. Jav. Rar.* p. 196; leaves entire obovate-lanceolate drying green, flowers sessile, fruits (ex Miq.) small globose rostellate. H.

f. & T. in Journ. Linn. Soc. ii. 77; *Miq. Fl. Ind. Bat.* 1, pt. i. 724; *Suppl.* i. 336. *Itea fragrans*, *Wall. in Roxb. Fl. Ind.* ii. 420; *Wall. Cat.* 8472, partly.

SINGAPORE, *Wallich*.—DISTRIB. Sumatra.

Bark of the twigs not lenticellate. *Leaves* 2–4 in., usually pubescent on the nerves on both surfaces. *Lower flowers* on the raceme $\frac{1}{4}$ in. long, quite sessile, yellowish.

2. ***P. integrifolia***, *Blume Bijl.* 659; leaves entire or denticulate, lanceolate narrowed at both ends drying black, flowers shortly pedicelled, fruits $\frac{3}{8}$ – $\frac{1}{2}$ in. long smooth ellipsoid acute at both ends. *Benn. Pl. Jav. Rar.* p. 196; *DC. Prodr.* iv. 276; *Blume Mus. Bot.* i. 260; *H. f. & T. in Journ. Linn. Soc.* ii. 77; *Miq. Fl. Ind. Bat.* i. pt. i. 724; *Suppl.* i. 335. *Itea fragrans*, *Wall. Cat.* 8472, partly. *P. Wallichii*, *Kurz For. Fl. Brit. Burm.* i. 444.

KHASIA MTS., alt. 3000–4000 ft., *De Silva, J. D. H.*, and *T. Thomson*. ASSAM, *Griffith*. MALAY PENINSULA, *Griffith, Wallich, Maingay*. ANDAMANS, *Kurz*.—DISTRIB. Java, Sumatra.

A tree 60 ft. high (*Blume*); bark of the twigs lenticellate. *Leaves* often 6–8 in., usually pubescent on the nerves beneath. *Lower flowers* of the raceme $\frac{1}{4}$ – $\frac{3}{8}$ in. long; pedicels $\frac{1}{24}$ – $\frac{1}{16}$ in.—Very near to *P. ilicifolia*, *Blume* (remarks *Mr. Kurz* in *Journ. As. Soc.*, 1876, pt. ii. 308) but the flowers are smaller and more hairy, the fruit larger, and the leaves longer and more acuminate. In both Var. 1 and Var. 2 the leaves are sometimes very hairy beneath.

VAR. 1. *typica*; leaves quite entire.

VAR. 2. *Wallichii*, *Benn. Pl. Jav. Rar.* p. 196; *Wall. Cat.* 8471; *H. f. & T. in Journ. Linn. Soc.* ii. 77; leaves denticulate.

3. ***P. mutabilis***, *Blume Mus. Bot.* i. 261; leaves leathery narrow-obovate acute drying green-yellow, flowers pedicelled very tomentose, fruit $\frac{1}{4}$ in. long ovoid obscurely rugose ultimately nearly glabrous. *Miq. Fl. Ind. Bat. Suppl.* i. 336. *P. lætevirens*, *Griff. MSS.*

MALAY PENINSULA; Malacca, *Griffith, Maingay*.—DISTRIB. Java, Sumatra.

A tree 22 ft. high, with a thick trunk (*Maingay*); branches and leaves variable in their pubescence (even more than in *P. integrifolia*) from dense woolly to nearly glabrous. *Leaves* 3–4 by 1–1 $\frac{1}{4}$ in., quite entire, rarely obscurely glandular-denticulate: upper surface sometimes softly hairy, sometimes shining and glabrous, lower always hairy. *Pedicels* $\frac{1}{18}$ – $\frac{1}{8}$ in. long, woolly. *Flowers* $\frac{1}{4}$ – $\frac{3}{8}$ in. long. *Fruit* erect on the pedicels, the bracteoles remaining horizontal become very prominent.—*P. lætevirens* *Griff.* is here reduced to *P. mutabilis*, *Blume*, from *Blume's* description only.

14. **RIBES**, *Linn.*

Prickly or unarmed shrubs. *Flowers* often unisexual. *Pedicels* bracteate at the base and 2-bracteolate at the middle. *Calyx* adnate to the ovary with 4–5 epigynous lobes, or the calyx-tube produced above the ovary. *Petals* 4–5, small, epigynous, white yellow red or purple-black. *Stamens* 4–5, epigynous. *Ovary* inferior, 1-celled; styles 2, free or connate, stigmas simple; ovules numerous, on 2 parietal placentas. *Berry* oblong or globose, crowned with the calyx, several-seeded.—DISTRIB. Species 56; temp. Europe, Asia, N. America, and the Andes.

SECT. I. **Grossularia**. *Peduncles* 1–3-flowered. Prickly.

1. **R. Grossularia**, Linn; Wall. Cat. 6835 and in Roxb. Fl. Ind. ii. 515; Eng. Bot. t. 1292; H. f. & T. in Journ. Linn. Soc. ii. 86; Boiss. Fl. Orient. ii. 815; Brand. For. Fl. 213. R. Himalensis, Royle Ill. 225. R. alpestre, DCne. in Jacq. Voy. Bot. t. 75.

Alpine Western Himalaya, from KUMAON to KASHMIR, alt. 9000–12,000 ft.; frequent.—DISTRIB. North and Alpine Europe; the Atlas, Greek and Caucasus ranges.

Prickles usually 3 beneath each axil; stems smooth or with numerous prickly setæ. Leaves suborbicular, obtusely 3–5-lobed, the lobes incise-crenate, somewhat villous beneath. Peduncles usually solitary. Calyx-tube long, produced above the fruit. Berry $\frac{1}{2}$ in. long, oblong, inedible in the Indian plant.

SECT. II. **Ribesia**. Flowers racemed. Unarmed.

* Calyx-tube hardly produced above the fruit.

2. **R. orientale**, Poir. Dict. Suppl. ii. 856; sticky glandular and minutely hairy, leaves round-reniform crenate obscurely 3–5-lobed, bracts $\frac{1}{5}$ in. long, linear often exceeding the pedicels, berry $\frac{1}{5}$ in. long yellow or reddish glandular-pubescent. Boiss. Fl. Orient. ii. 817; Brand. For. Fl. 214. R. leptostachyum, DCne. in Jacq. Voy. Bot. t. 76; H. f. & T. in Journ. Linn. Soc. ii. 86. R. villosum, Wall. Cat. 6832; and in Roxb. Fl. Ind. ii. 514. R. glutinosum, Jacq. Journ.

KASHMIR and BALTISTAN, alt. 8000–12,000 ft.; Jacquemont, Munro, Royle, &c.—DISTRIB. Cabul, Persia, Armenia, Asia Minor and Greece.

A shrub 6 ft. high, polygamo-diœcious. Leaves 1–1 $\frac{1}{4}$ in. diam. Racemes erect, somewhat dense in flower, lax and pendent in fruit. Flowers small, greenish.—R. heterotrichum, Ledeb. Ic. Fl. Ross. t. 235, only differs by the eglandular fruits; and there is a whole series of closely allied species from the Altai to Persia.

3. **R. glaciale**, Wall. in Roxb. Fl. Ind. ii. 513; stem glabrous, leaves glabrous or with scattered hairs above, bracts $\frac{1}{4}$ – $\frac{1}{2}$ in. linear-lanceolate usually much exceeding the pedicels, calyx-segments oblong, berries $\frac{1}{4}$ in. long glabrous or minutely pubescent. Wall. Cat. 6833; H. f. & T. in Journ. Linn. Soc. ii. 88; Brand. For. Fl. 214. R. acuminatum, Wall. Cat. 6834.

TEMPERATE and ALPINE HIMALAYA, from BHOTAN to KASHMIR, alt. 7000–12,000 ft.; common and often epiphytic.

Polygamo-diœcious. Leaves 1–2 in., cordate, 3–5-lobed, crenate-serrate, the middle lobe often elongate; or simple, cordate-ovate, acuminate, sometimes $\frac{1}{2}$ in. long. Racemes pubescent, sometimes elongate. Flowers brownish or pink. VAR. 2. *laciniatum*, H. f. & T. in Journ. Linn. Soc. ii. 87 (sp.), differs by the calyx-segments lanceolate. (The leaves are often not more lacinate than in examples of *R. glaciale*.)

4. **R. desmocarpum**, H. f. & T. in Journ. Linn. Soc. ii. 87; stem glabrescent, leaves softly pubescent beneath, bracts $\frac{1}{5}$ – $\frac{1}{4}$ in. long linear-lanceolate often exceeding the pedicels, calyx-segments ovate-oblong obtuse, berry $\frac{1}{4}$ in. long glandular-pubescent.

SIKKIM and BHOTAN, alt. 8500–10,000 ft.; Griffith; Lachen in SIKKIM, J. D. H.

Diœcious. Leaves 1–4 in., cordate, 3–5-lobed, crenate-serrate, the lobes often elongate. Racemes pubescent, often elongate. Flowers brownish.—Very near *R. glaciale*, Wall., differing chiefly by its very hairy berries.

5. **R. luridum**, H. f. & T. in Journ. Linn. Soc. ii. 87; branchlets and leaves glabrous, bracts $\frac{1}{2}$ in. long, spatulate-oblong much exceeding the pedicels, calyx-lobes lanceolate, berries glabrous small less than $\frac{1}{2}$ in. long.

SIKKIM HIMALAYA, alt. 10,000–12,000 ft.; Lachen, *J. D. H.*

A shrub, 4 ft. high, with erect twigs, polygamo-dioecious. *Leaves* 3–5-lobed, 1 by $1\frac{1}{4}$ in., lobes crenate-serrate. *Racemes* pubescent, erect in fruit, short. *Flowers* subsessile, chestnut. *Calyx-tube* of the flower subcampanulate.—Very near *R. glaciale*; the leaves are in general outline subreniform while those of *R. glaciale* usually have the middle lobe elongate and acuminate.

** *Calyx-tube produced above the fruit.*

6. *R. nigrum*, *Linn.*; *DC. Prodr.* iii. 481; branches and leaves nearly glabrous, racemes pubescent long pendulous, bracts $\frac{1}{16}$ – $\frac{1}{8}$ in. long narrow, berry black. *Eng. Bot.* t. 1291; *H. f. & T. in Journ. Linn. Soc.* ii. 88; *Boiss. Fl. Orient.* ii. 815; *Maxim. in Bull. Acad. Petersb., Mel. Biol.* ix. 222; *Brand. For. Fl.* 215.

Temperate Western Himalaya from KUNAWAR to KASHMIR, alt. 7000–12,000 ft., *T. Thomson.*—DISTRIB. North Europe and North Asia.

Leaves in the Kashmir examples not always punctate beneath. *Racemes* long, pendulous; no solitary peduncle at their base. *Pedicels* long. *Flowers* green.

7. *R. Griffithii*, *H. f. & T. in Journ. Linn. Soc.* ii. 88; leaves pubescent on the nerves beneath, racemes 3–6 in. long flexuose pendent very lax, bracts $\frac{1}{4}$ – $\frac{1}{5}$ in. long linear-lanceolate exceeding the pedicels, berry $\frac{1}{4}$ in. long glabrous red.

Eastern Himalaya; BHOTAN, alt. 7500 ft., *Griffith.* SIKKIM, alt. 10,000–13,000 ft., *J. D. H.*

An erect shrub 8 ft. high. *Leaves* 2–3 in., 5-lobed; lobes acuminate or caudate, sharply serrate. *Calyx-tube* in flower and in young fruit broadly campanulate.

8. *R. rubrum*, *Linn.*; *DC. Prodr.* iii. 481; branchlets glabrous, racemes pubescent elongate pendulous, bracts $\frac{1}{16}$ – $\frac{1}{8}$ in. long lower often broad or obovate, berry red smooth. *Eng. Bot.* t. 1289; *H. f. & T. in Journ. Linn. Soc.* ii. 89; *Boiss. Fl. Orient.* ii. 816; *Maxim. in Bull. Acad. Petersb., Mel. Biol.* ix. 233; *Brand. For. Fl.* 215. *R. Himalayense*, *Dcne. in Jacq. Voy. Bot.* t. 77 (not of *Royle*).

Western Himalaya, from KUMAON to KASHMIR, alt. 8000–12,000 ft., frequent; *Royle, T. Thomson, &c.*—DISTRIB. Alpine Europe, Caucasus, Altai.

Leaves long-petioled, petioles often ciliate at the base, ovate-cordate, 3–5-lobed; lobes acute, crenate-serrate; upper surface glabrous or with scattered hairs, lower glabrous or pubescent. *Pedicels* short. *Calyx-lobes* short, obtuse. *Flowers* large, greenish-yellow.

? VAR.; berries black, leaves glabrous or pubescent beneath, pedicels very short. Kashmir, alt. 9500 ft.; *Levinge.* Karakorum, alt. 11,500 ft., *C. B. Clarke.* Lahul; *Jaeschke in Brand. For. Fl.* 215.

ORDER LIII. CRASSULACEÆ.

Herbs, often with a woody perennial rootstock, or under-shrubs, usually succulent. *Leaves* alternate or opposite, usually simple but divided in *Bryophyllum* and *Kalanchoe*; stipules 0. *Flowers* often cymose, sometimes spicate-racemose in *Cotyledon*, or paniculate in *Bryophyllum*, regular, hermaphrodite or unisexual. *Calyx* 4–5-fid more rarely 6–8-fid, free. *Petals* as many as the sepals, free or connate. *Stamens* hypogynous or upon the petals, as many or twice as many as the petals. *Carpels* usually as many as the petals (fewer in *Triactina* and in a few *Sedums*) with a hypogynous gland or scale at the base of

each; free, or connate below, narrowed upwards into the styles; ovules many on the edges of the carpels (few in *Tillæa*, *Triactina* and some *Sedums*). *Follicles* dehiscing down the inner faces, many-seeded, or 1-few-seeded in *Tillæa*, *Triactina* and a few *Sedums*. *Seeds* albuminous; embryo terete, cotyledons short.—**DISTRIB.** Species 400; spread over nearly the whole globe except Polynesia; rare in Australia and South America; abundant in South Africa; general in the northern hemisphere.

* *Stamens as many as the petals, leaves opposite* (see also *Cotyledon*).

Small herbs with minute axillary sessile flowers 1. *TILLÆA*.
Succulent herbs with flowers in a paniculate cyme 2. *CRASSULA*.

** *Stamens twice as many as the petals*.

+ *Petals connate, at least at the base*.

Calyx shortly 4-fid 3. *BRYOPHYLLUM*.
Calyx 4-partite 4. *KALANCHOE*.
Calyx 5-partite 5. *COTYLEDON*.

†† *Petals free*.

Carpels 5-4 (rarely 3) free or slightly connate 6. *SEDUM*.
Carpels 6-8 7. *SEMPERVIVUM*.
Carpels 3, connate half their length 8. *TRIACTINA*.

1. *TILLÆA*, Linn.

Small glabrous succulent herbs. *Leaves* opposite, entire, flat in the Indian species. *Flowers* minute, axillary, often fasciculate, solitary or cymose, white or red. *Calyx* 4-5-fid. *Petals* 4-5, free or connate at the base. *Stamens* 4-5. Hypogynous scales 4-5 or 0. *Carpels* 4-5, free, narrowed into short styles with minute stigmas; ovules 2 to each carpel in the Indian species. *Follicles* 2-seeded.—**DISTRIB.** A genus of 20 species, widely distributed, scarcely separable from *Crassula*.

1. *T. pentandra*, Royle Ill. 222 (name only); leaves lanceolate-linear acute, flowers sessile in the axils often 2-3-nate, seeds ellipsoid subtrigonus pointed at the end. *Edgw. in Trans. Linn. Soc.* xx. 50; *H. f. & T. in Journ. Linn. Soc.* ii. 90; *Oliv. Fl. Trop. Afr.* ii. 386. *Crassula* (Disporocarpa) Schimper, *Fisch. & Mey. Ind. Sem.* viii. 56.

Subtropical Himalaya, from KUMAON to KASHMIR, alt.*3000-6000 ft., frequent. DECCAN PENINSULA; Mysore, *T. Lobb*; Nilghiris, *Hohenacker*; Concan, *Stocks*.—**DISTRIB.** Tropical Africa, Abyssinia and the Cameroons.

Stems procumbent, branched; internodes shorter than the leaves. *Leaves* $\frac{1}{4}$ - $\frac{5}{16}$ in. long, connate at the base. *Calyx*-segments lanceolate-acuminate, *Petals* elliptic, acuminate, white, not exceeding the sepals. Hypogynous scales cuneate, truncate (ex *C. A. Meyer*).

2. *T. pharnaceoides*, Hochst. in Schimp. *Herb. Abyss.* No. 104; leaves ovate-lanceolate or lanceolate, flowers densely clustered in the axils pedicelled, seeds ellipsoid blunt at the end. *Oliv. Fl. Trop. Afr.* ii. 387; *Bth. & H. f. Gen. Pl.* i. 657. *T. trichopoda*, Fenzl in Boiss. *Fl. Orient.* ii. 767. *Combesia abyssinica*, *A. Rich. Fl. Abyss.* i. 307. *Crassula* (Disporocarpa) *pharnaceoides*, *Fisch. & Mey. Ind. Sem.* viii. 56. *C. campestris*, *Harv. & Sond. Fl. Cap.* ii. 351.

PUNJAB PLAIN; Hushiarpoore, Aitchison; Peshawur, Vicary.—DISTRIB. Persia, Central and South Africa.

Stem decumbent, branched; internodes longer than the leaves. *Leaves* $\frac{1}{8}$ – $\frac{3}{16}$ in. long, connate at the base. *Pedicels* very short or $\frac{1}{4}$ in. long. *Calyx*-segments lanceolate, acuminate. *Petals* shorter than the sepals, united at the base, very acute or hair-pointed. Hypogynous *scales* minute, spatulate (*ex Richard*).—This species is still smaller than *T. pentandra*, its flowers are less than $\frac{1}{20}$ in. long.

2. CRASSULA, Linn.

Herbs, usually with thick branches and leaves. *Leaves* opposite, usually connate, fleshy and with cartilaginous margins. *Flowers* cymose, not large. *Calyx* 5-fid or 5-partite. *Petals* 5, free or connate at the base. *Stamens* 5. Hypogynous *scales* various. *Carpels* 5, narrowed into short thick styles; ovules numerous. *Follicles* 5, many-seeded.—DISTRIB. Species 120, nearly all from the Cape of Good Hope; a few in Abyssinia, one in the Himalaya.

1. *C. indica*, Dene. in Jacq. Voy. Bot. t. 73; glabrous, stem 4–12 in. high leafy, radical leaves rosulate spatulate-obovate, cauline acute, cymes forming a compound panicle. *H. f. & T. in Journ. Linn. Soc.* ii. 90. *Sedum paniculatum*, Wall. Cat. 7227.

KUMAON and GURWHAL, alt. 3000–8000 ft., frequent. BHOTAN, Griffith.

Lower *leaves* 1–1½ in. long, blunt or shortly acute; stem-leaves sessile, subdecurent, usually narrow oblong. *Panicle* sparsely leafy. *Petals* dull rose, scarcely twice the sepals. Hypogynous *glands* small, obovate. *Seeds* very numerous, oblong-ellipsoid, smooth, finely reticulate, quasi-striate.

3. BRYOPHYLLUM, Salisb.

Tall erect herbs, perennials. *Leaves* opposite, crenate. *Flowers* large, pendent, in spreading panicles with opposite branches. *Calyx* with a long inflated tube; lobes 4, short, valvate. *Corolla* with a campanulate tube and shortly 4-fid limb. *Stamens* 8, in two series, inserted on the middle of the corolla-tube. Hypogynous *scales* 4, obtuse. *Carpels* 4, free or connate at the base, attenuated into long styles; ovules very many. *Follicles* 4, many-seeded.—DISTRIB. Species 4, in tropical Africa; one extending through the tropics of the whole world.

1. *B. calycinum*, Salisb. in DC. Prodr. iii. 396; leaves petiolate simple or 3-partite, leaflets oblong or elliptic crenate or subincised-crenate. *Bot. Mag.* t. 1409; Wall. Cat. 7205; Wight in Hook. Bot. Misc. iii. 100, with a figure; W. & A. Prodr. 360; H. f. & T. in Journ. Linn. Soc. ii. 90; Oliv. Fl. Trop. Afr. ii. 390. *B. pinnatum*, Kurz in Journ. As. Soc. 1876, pt. ii. p. 309; Cotyledon rhizophylla, Roxb. Fl. Ind. ii. 456. *C. pinnata*, Lamk. Dict. ii. 141. *Kalanchoe pinnata*, Pers.; Miq. Fl. Ind. Bat. i. pt. i. 728; Dalz. & Gibs. Bomb. Fl. 105.

Tropical plains of INDIA, from the base of the Himalaya to Ceylon and Malacca; universal in Lower Bengal.—DISTRIB. Throughout the tropics of the world; presumed a native of Africa and an introduced plant in Bengal.

Glabrous. *Stems* 1–4 ft. high. *Calyx* 1–1½ in. long, purplish green. *Corolla* globose-octagonal at the base, green, constricted in the middle; the exerted parts reddish-purple. Hypogynous *scales* subquadrate, free or slightly adherent to the carpels. *Fruit* enclosed in the persistent papery calyx and corolla. *Seeds* small, oblong-ellipsoid, smooth, longitudinally obscurely striate.

In the crenatures of the leaves of this plant buds are easily formed which develop, drop off, and at once produce new plants.

4. **KALANCHOE**, *Adans.*

Erect stout perennial herbs. *Leaves* opposite or the upper alternate. *Flowers* large, erect, in many-flowered subpaniculate cymes. *Calyx* 4-partite, or 4-fid half way down. *Corolla* with a flask-shape tube and spreading 4-fid limb, much exceeding the calyx (yellow in the Indian species), persistent. *Stamens* 8, in two series, adnate to the corolla-tube. *Hypogynous scales* 4, linear or oblong. *Carpels* 4, adnate to the base of the corolla-tube, attenuated into long styles; ovules very many. *Follicles* 4. *Seeds* very many, oblong, ellipsoid, with 8-15 longitudinal ribs.—**DISTRIB.** Species 25, chiefly in tropical and South Africa; several in tropical Asia; one in Brazil.

* *Calyx divided not more than half way down.*

1. **K. glandulosa**, *Hochst. in A. Rich. Fl. Abyss. i.* 312; very glandular upwards, branches of panicle subopposite; stem-leaves stem-clasping, calyx very glandular-pubescent. *Oliv. Fl. Trop. Afr. ii.* 396. *K. Ritchieana*, *Dalz. in Hook. Kew Journ. iv.* 346; *Dalz. & Gibs. Bomb. Fl.* 105. *K. heterophylla*, *Herb. Wight. Cotyledon hirsuta*, *Herb. Heyne.*

Mrs. of the DECCAN PENINSULA; *Heyne*; *Wight, Ritchie.*—**DISTRIB.** Abyssinia.

Stem very thick at the base, 1-2 ft. high. *Leaves* obovate, nearly entire, the lowest 4-6 in. long, much tapering at the base, scarcely petioled. *Calyx*-teeth ovate, acute. *Corolla*-tube $\frac{1}{2}$ in. long. *Hypogynous scales* linear.—This species connects *Kalanchoe* with *Bryophyllum*; it has the tubular calyx and subopposite panicle branches of *Bryophyllum*; but the erect flowers, spreading corolla lobes, narrow hypogynous scales and seeds of *Kalanchoe*. The calyx is described as 'vesicular' in fruit; but it is very slightly so either in the Indian or Abyssinian examples.

** *Calyx divided nearly to the base.*

2. **K. spathulata**, *DC. Pl. Grasses, t.* 65; *Prodr. iii.* 395; glabrous, leaves spatulate-oblong crenate, upper distant and becoming very narrow sometimes 3-foliolate, the lowest bracts similar, lower panicle-branches usually opposite, sepals elongate triangular from a broad base. *Haw. in Phil. Mag. Lond. N.S. vi.* 303; *Miq. Fl. Ind. Bat. i. pt. i.* 728. *K. nudicaulis*, *Ham. in Herb. K. crenata*, *Oliv. Fl. Trop. Afr. ii.* 394, partly. *K. varians*, *Haw. in Phil. Mag. Lond. N.S. vi.* 302; *Wall. Cat. 7222*, and *Pl. As. Rar. t.* 167 (not good under the name *K. amplexans*); *H. f. & T. in Journ. Linn. Soc. ii.* 91. *K. acutiflora*, *Kurz in Journ. As. Soc. 1876, pt. ii. p.* 309, omitting the *synonyms*.

TROPICAL HIMALAYA, from **BHUTAN** to **KASHMIR**, alt. 1000-3000 ft.; common. **BURMA**; *Wallich.*—**DISTRIB.** Warm China, Java.

Stem 1-4 ft. high. *Lower leaves* commonly 3-4 (sometimes 10) in. long besides the petiole; upper leaves (with the petiole) often 3-4 in. long by $\frac{1}{2}$ in. broad, frequently sessile. *Corymb* flattish or more rarely elongate, with few scattered linear bracts $\frac{1}{4}$ - $\frac{1}{2}$ in. long. *Flowers* clear yellow, the corolla-tube glabrous. *Calyx* in fruit often as much as $\frac{3}{8}$ in. wide.—This species should probably be united with *K. aegyptiaca* (which hardly differs except by the orange tint of the flowers) and with *K. crenata* as in *Oliv. Fl. Trop. Afr. ii.* 394; but the Indian plant is very constant in its trifling characteristics and habit.

3. **K. floribunda**, *W. & A. Prodr.* 359; upper parts of the stem and cyme with short spreading glandular hairs, lower branches of the cyme usually

alternate, upper branches often long racemiform, sepals oblong acute standing apart at base. *H. f. & T. in Journ. Linn. Soc. ii. 91.* *K. Wightiana*, *Wall. Cat. 7225.* Cotyledon amplexicaulis, *Heyne in Herb. Rottl.*

Mts. of the DECCAN PENINSULA, alt. 2000–7000 ft.; common.

Stem 1–3 ft. high. *Leaves* obovate-elliptic crenate, cauline 2–3 in. long, petiole short. *Cyme* with very many flowers. *Corolla* clear yellow, tube glabrous.

VAR. glabra; cyme often level-topped, the branches perfectly glabrous not at all racemose with numerous approximate small lanceolar bracts $\frac{1}{2}$ in. long, calyx-tube in fruit $\frac{1}{2}$ – $\frac{1}{3}$ in. wide. *K. floribunda*, *Thwaites Enum. 129.* *K. spathulata*, *Wall. Cat. 7224.* Cotyledon heterophylla, *Roxb. Fl. Ind. ii. 456.* *C. corymbosa*, *Herb. Rottl.*—Mts. of the Deccan Peninsula; extending to CEYLON (*Thwaites No. 540*) and Parasnath in BEHAR, alt. 4000 ft. *J. D. H.*—This should perhaps be united with *K. crenata*; it differs from *K. spathulata* by the wider (elliptic) upper leaves, the much narrower capsule, the cyme less paniculate.

4. ***K. grandiflora***, *W. & A. Prodr. 359*; glabrous, leaves broadly obovate crenate, cyme large compound with large green-yellow flowers, sepals ovate-lanceolate. *Wall. Cat. 7226*; *Wight Ill. t. 111*; *H. f. & T. in Journ. Linn. Soc. ii. 91*; *Bot. Mag. t. 5460.*

NILOHIRI and PULNEY Mts., alt. 7000–8000 ft.; *Gardner, Wight, &c.*

Stem, leaves, and panicle often glaucous. *Stem-leaves* 2–3 in. long, subsessile. *Bracts* of cyme $\frac{1}{2}$ – $\frac{3}{4}$ in. long, elliptic, petioled, early deciduous. *Sepals* united at base for a distance often $\frac{1}{2}$ in. or more.—All the well-developed examples of *K. Wightiana*, *Wall. Cat. 7225* belong to *K. floribunda* Var. above; but under *Wall. Cat. 7225* are included several young examples of *K. grandiflora*.

5. ***K. brasiliensis***, *Camb. in Fl. Bras. Merid. ii. 196*; cyme densely glandulose-pubescent, corolla-tube and lobes without very hairy. *Mart. Fl. Brasil. t. 89.* *K. crenata*, *Oliv. Fl. Trop. Afr. ii. 394, partly.*

Mts. of the DECCAN PENINSULA; Tovequary Hill in Belgaum and North Deccan Hills, *Ritchie.*—DISTRIB. Brazil, Tropical Africa.

Stem-leaves $\frac{3}{4}$ in. long, elliptic, short petiolate, crenate. *Petals* hair-pointed (as in the allied Indian species). *Flowers* white ex *Dr. Ritchie's* field note; yellow ex *Cambess. and Oliver.*—If this plant be united with *K. crenata* as proposed by *Britten* in *Oliv. Fl. Trop. Afr. ii. 394* the species here described Nos. 2 to 5 may all be included.

6. ***K. laciniata***, *DC. Pl. Grasses, t. 100*; *Prodr. iii. 395*; leaves pinnatifid-lacinate, the lobes entire subserrate or dentate, sepals lanceolate subpatent. *Wall. Cat. 7221*; *W. & A. Prodr. 360*; *Wight. Ic. 1158*; *Thwaites Enum. 129*; *H. f. & T. in Journ. Linn. Soc. ii. 91*; *Miq. Fl. Ind. Bat. i. pt. i. 728*; *Dalz. & Gibs. Bomb. Fl. 105*; *Oliv. Fl. Trop. Afr. ii. 392.* *K. teretifolia*, *Haw. in Wall. Pl. As. Rar. 53, t. 166*; *Wall. Cat. 7223*; *H. f. & T. in Journ. Linn. Soc. ii. 91*; *Kurz in Journ. As. Soc. 1876, pt. ii. p. 309.* Cotyledon laciniata, *Roxb. Fl. Ind. ii. 456.*

TROPICAL regions of the DECCAN PENINSULA; in BENGAL at Patna, Dacca. BURMA, Wallich. MALACCA, Maingay.—DISTRIB. Yunan, Java, Tropical Africa.

VAR. 1. typica; leaves once pinnatifid, segments $\frac{1}{2}$ –1 in. broad flat incise-crenate sometimes bipinnatifid; cyme-branches and sepals often glabrous.

VAR. 2; leaves 2–3-pinnatifid, segments linear, cyme-branches and sepals pubescent.

K. teretifolia, Wall. does not appear separable from this var. *K. acutiflora*, Haw. in *Andr. Bot. Repos.* t. 560; *Miq. Fl. Ind. Bat.* i. pt. i. 728, probably is not an Indian form; it has white flowers.

5. **COTYLEDON**, Linn.

Herbs, branching or scapigerous. *Leaves* opposite or alternate, fleshy. *Flowers* in spicate racemes or cymose. *Calyx* 5-partite. *Corolla* 5-fid to the base (or in non-Indian species less deeply). *Stamens* 10 or 5, inserted on the corolla. Hypogynous *scales* oblong or quadrate. *Carpels* 5, free, attenuated into filiform styles; ovules very numerous. *Fruit* of 5 many-seeded follicles.—**DISTRIB.** Species 60; in Eastern Asia, Western and Southern Europe and the whole of Africa; also in Mexico.

The genus as it now stands includes such species as are excluded from *Crassula* by their alternate leaves, and from *Sedum* by their spicate racemes or by having only 5 stamens.

* *Stem simple, leaves alternate, spike elongate dense, stamens 10.*

1. **C. spinosa**, Linn. *Sp. Pl.* i. 615; radical leaves rosulate spatulate terminated by a spine, cauline oblong lanceolate flat, pedicels 1-flowered, corolla yellow-white twice exceeding the calyx. Umbilicus spinosus, *DC. Prodr.* iii. 400; *Ledeb. Fl. Ross.* ii. 174. *U. spinosus* and *U. fimbriatus*, *Turcz. Fl. Baikal-Dahur.* i. 432. *Sedum spinosum*, *Thunb. Fl. Jap.* 186.

WEST TIBET; *Falconer* No. 482. BALTISTAN, alt. 10,000–11,000 ft., *C. B. Clarke*. Height 6–15 in. *Leaves* 1–1½ in. long. *Pedicel* ¼ in. long, shorter than its oblong acute bract. *Sepals* ovate, very acute, greatly exceeding the tube of the corolla.

** *Stems several, leaves alternate, cymes small, stamens 5.*

2. **C. Oreades**, *C. B. Clarke*; annual, glabrous, stems branching from the base, branches ascending leafy, leaves on the sterile branches ¼ in. long, rosulate narrow lanceolate aristate, flowers at the summit of the branches 3–1 nodding white. Umbilicus Oreades, *Dene. in Jacq. Voy. Bot.* 62 (*U. luteus*, *Lo. t.* 73, except that the stamens are not ten); *H. f. & T. in Journ. Linn. Soc.* ii. 91.

Alpine Western Himalaya; KASHMIR; Pir Punjal, *Jacquemont*; Marbul Pass, *C. B. Clarke*. GURWHAL, *Falconer*. KUMAON, alt. 14,000 ft.; Shilong, *Strachey & Winterbottom*.

Stems 2–4 in. long, several, curved. *Stem-leaves* like the rosulate leaves but rather smaller. *Sepals* ¼ in. long, oblong, acute. *Petals* a little exceeding the sepals, united at their base only. *Seeds* ellipsoid, microscopically covered with tubercles.—This species has the habit altogether of *Sedum*, but it cannot be put there because it has only 5 stamens; neither can it be put in *Crassula* because *Crassula* has always opposite leaves. Therefore it is put in *Cotyledon*; though in *Cotyledon* the corolla should be tubular, the tube at least equalling the calyx. Similar remarks apply to the next species.

3. **C. spathulata**, *C. B. Clarke*; glabrous, stolon leaves rosulate ½ in. long petioled spatulate, cauline linear-oblong, flowers corymbose shortly pedicelled, sepals ¼–¾ in. long oblong acute nearly equalling the corolla and many times exceeding its tube. Umbilicus spathulatus, *H. f. & T. in Journ. Linn. Soc.* ii. 92.

SIKKIM HIMALAYA, alt. 10,000–12,000 ft., J. D. H.

Stems 3–6 in. high, throwing decumbent stolons from the base. Cauline leaves $\frac{1}{4}$ in. long, sessile. Petals united at base only. Stamens 5. Flowers sometimes 4-merous. Seeds ellipsoid, smooth, tailed.

6. **SEDUM**, Linn.

Succulent herbs. Leaves alternate or rosulate, rarely opposite; entire or lacinate. Flowers cymose, hermaphrodite, or unisexual by abortion. Calyx 5–4-partite. Petals 5–4, free. Stamens 10–8, the alternate ones adnate to the petals. Hypogynous scales quadrate or cuneate, entire or emarginate. Carpels 5–4, free or slightly united at base, narrowed into the styles; ovules very numerous. Follicles 5–4, many-seeded.—DISTRIB. Species 130; mostly in the cold and temperate regions of the northern hemisphere; one species is found in Abyssinia and one in Peru.

SECT. I. **Rhodiola**. Rootstock perennial, thick, suberect, with a crown of scales from the axils of which rise the simple leafy annual stems carrying terminal cymes. Flowers diœcious or polygamous, often 4-merous. Petals in the males often much exceeding the sepals; in the females shorter or narrower. Styles usually short, recurved in fruit. Seeds oblong-ellipsoid, compressed, testa loose produced beyond the end of the nucleus, often as a bent short tail.

* Cymes dense, not carrying bracts on the short branches (though there are frequently bracts at the base of the outer branches).

1. **S. Rhodiola**, DC. Prodr. iii. 401; leaves obovate or broadly oblong often toothed towards the apex, petals yellow, hypogynous scales in the males oblong emarginate. Ledeb. Fl. Ross. ii. 179; H. f. & T. in Journ. Linn. Soc. ii. 95. S. imbricatum, H. f. & T. in Journ. Linn. Soc. ii. 101. Rhodiola imbricata, Edgw. in Trans. Linn. Soc. xx. 47. R. rosea. Linn.; Engl. Bot. t. 508.

ALPINE WESTERN HIMALAYA; from KUMAON to KASHMIR, alt. 12,000–17,000 ft.; frequent.—DISTRIB. The arctic and alpine regions of America, Europe and Asia.

Very glaucous. Rootstock having an odour of roses. Stems 3–15 in., thick. Leaves $\frac{1}{2}$ –1 $\frac{1}{2}$ in. long, imbricated (often very closely) from a narrow or broad base. Cyme densely congested. Sepals narrow oblong. Stamens long, exsert. Carpels in fruit $\frac{1}{2}$ in. long, not narrowed gradually at the base.—The examples of *S. imbricatum* have diœcious (or functionally diœcious) heads; and the carpels have short recurved styles, altogether as in Sect. *Rhodiola*.

2. **S. heterodontum**, H. f. & T. in Journ. Linn. Soc. ii. 95; leaves ovate incise-dentate from a broad or cordate or auriculate base prominently white-margined, flowers rose-coloured? (ex H. f. & T.). S. serratum, Jacquem. Journ.

TEMPERATE and ALPINE WESTERN HIMALAYA, alt. 8000–14,000 ft.; Kashmir, Jacquemont; Kunawur, T. Thomson; Mandala, Cleghorn.

Stems 12–18 in. Leaves loosely imbricate. Cyme very dense, especially in fruit. Otherwise agrees closely with *S. Rhodiola*, of which H. f. & T. suggest it may be a variety.

3. **S. crenulatum**, H. f. & T. in Journ. Linn. Soc. ii. 96; leaves elliptic or broad oblong sessile crenulated, cymes sessile enclosed by the upper leaves and outer leaf-like bracts, sepals purple narrow-oblong, petals rose-coloured.

SIKKIM HIMALAYA, alt. 12,000–18,000 ft.; Yeumtong and Mt. Donkiah, *J. D. H., W. T. Blandford*. KUMAON, alt. 12,000–17,000 ft., Chumpua and Niti Pass, *Strachey & Winterbottom*.

Dried specimens are a ruddy chestnut colour. *Stems* 3–8 in.—Very like *S. Rhodiola*, of which it may be a variety.

**** Cymes** 1- few-flowered (except *S. tibeticum*), or in fruit somewhat lax, branches not bearing leaves (though there may be bracts at their bases).

4. *S. tibeticum*, H. f. & T. in Journ. Linn. Soc. ii. 96; leaves subentire oblong or ovate-oblong, cymes 4–20-flowered not very dense in fruit, flowers often 5-merous, sepals on the fruit triangular-acuminate.

ALPINE WESTERN HIMALAYA, alt. 12,000–16,000 ft.; KUNAWUR (Werang Pass) *T. Thomson*; LAHUL, *Jaeschke*.—DISTRIB. Cabul, *Griffith*.

Glabrous. *Stems* 4–10 in. *Leaves* $\frac{1}{2}$ – $\frac{1}{2}$ in., loosely imbricate, the upper oblong subacute, the lower often ovate. *Petals* rose or purple. *Follicles* and seeds as in *S. Rhodiola*.

VAR. *Stracheyi*, H. f. & T. in Journ. Linn. Soc. ii. 96 (sp.); leaves ovate often toothed. Alpine Western Himalaya, alt. 12,000–17,000 ft., *T. Thomson, Strachey & Winterbottom, Dr. Henderson*.—The leaves sometimes entire, and the upper oblong: it then seems undistinguishable from *S. tibeticum*.

5. *S. quadrifidum*, Pall. ; DC. Prodr. iii. 407; stems 2–5 in. numerous, leaves approximate oblong subterete, cymes 5–1-flowered, flowers red often 4-merous, sepals oblong. *Ledeb. Fl. Ross. ii. 177*; *H. f. & T. in Journ. Linn. Soc. ii. 97*. *S. coccineum, Royle Ill. t. 48*.

ALPINE WESTERN HIMALAYA, alt. 11,000–18,000 ft., from KUMAON to KASHMIR, frequent. SIKKIM, alt. 16,000–18,000 ft., *J. D. H.*—DISTRIB. Arctic Russia and Siberia.

Stems and leaves glabrous or puberulous. *Leaves* $\frac{1}{4}$ in., sometimes very acute. *Petals* usually twice the sepals. Hypogynous scales subquadrate (ex H. f. & T.). *Follicles* with short styles, recurved or sometimes erect, straight.

***** Cymes** lax, branches bearing leaves, or the flowers supported by a leafy bract.

6. *S. Himalense*, Don Prodr. 212; leaves $\frac{1}{2}$ – $\frac{3}{8}$ in. loosely imbricate narrow-obovate or lanceolate often dentate towards the summit, cymes large leafy, sepals lanceolate-linear, petals deep purple twice the sepals, pedicels much thickened under the fruit. *DC. Prodr. iii. 402*; *H. f. & T. in Journ. Linn. Soc. ii. 97*. *S. Himalayanum* and *S. hypericifolium, Wall. Cat. 7236, 7237*.

SIKKIM and NIPAL, alt. 12,000–17,000 ft., frequent; *Wallich, J. D. H., &c.*

Stems 4–14 in., usually puberulous or pubescent, sometimes glabrous. *Petals* lanceolate. Hypogynous scales black-purple, broadly triangular (ex H. f. & T.). *Follicles* $\frac{1}{2}$ in. long, black-purple.—*S. atropurpureum, Turcz.* of Central Asia differs among other things by its compact cyme.

7. *S. bupleuroides*, Wall. Cat. 7229; leaves $\frac{1}{2}$ – $1\frac{1}{2}$ in. long loosely imbricate ovate or ovate-oblong, base cordate or auriculate-bilobate, cymes large leafy, sepals lanceolate-linear, petals lanceolate small black-purple twice the sepals. *H. f. & T. in Journ. Linn. Soc. ii. 98*.

NIPAL; Gossain Than, *Wallich*. SIKKIM, alt. 10,000–14,000 ft.; Tungu, Lachen *J. D. H.*

Stems 6-14 in. high, glabrous, or the cyme puberulous. Hypogynous scales black purple, broadly cuneate-quadrate (ex H. f. & T.).

8. **S. elongatum**, Wall. Cat. 7233; leaves $\frac{3}{4}$ -2 in. long loosely imbricate oblong narrowed at base almost petioled or elliptic sessile, cymes large loose, petals lanceolate black-purple. H. f. & T. in Journ. Linn. Soc. ii. 98.

ALPINE HIMALAYA, from SIKKIM to KASHMIR, alt. 10,000-12,000 ft.

Stems 8-20 in. high, glabrous, as are the leaves. Cymes puberulo-pubescent. Sepals lanceolate-linear. Hypogynous scales broad, cuneate-quadrate (ex H. f. & T.). Follicles scarcely $\frac{1}{4}$ in.

9. **S. fastigiatum**, H. f. & T. in Journ. Linn. Soc. ii. 98; stems numerous, leaves $\frac{1}{4}$ - $\frac{1}{2}$ in. long crowded terete oblong-linear, cymes 3-8-flowered, sepals lanceolate, petals $\frac{1}{2}$ in. long linear twice the sepals.

SIKKIM, alt. 14,000-17,000 ft.; Kankola, Lama Kangra, J. D. H.

Stems 2-5 in., curved, glabrous, as are the leaves. Cymes puberulo-pubescent. Hypogynous scales quadrate. Follicles more than $\frac{1}{4}$ in. long, black-purple.—A species resembling *S. quadrifidum* but larger with larger flowers and fruit.

10. **S. humile**, H. f. & T. in Journ. Linn. Soc. ii. 99; densely tufted, stems 1-2 in. glabrous or minutely pubescent, leaves $\frac{1}{4}$ - $\frac{1}{2}$ in. long, linear or linear-oblong, cymes 1-4-flowered, sepals ovate acuminate, petals lanceolate wider upwards twice the sepals.

SIKKIM, alt. 15,000-16,000 ft.; Yeumtong and Tunkra Pass, J. D. H.

Flowers large for so small a plant. Hypogynous scales broad quadrate (ex H. f. & T.).—This species is distinct from the other Indian species by its sepals.

11. **S. coriaceum**, Wall. Cat. 7238; rootstock thick, stems numerous pubescent, cymes and leaves on both surfaces puberulous, leaves $\frac{1}{2}$ in. flat obovate, cyme with few leaves. H. f. & T. in Journ. Linn. Soc. ii. 99.

NIPAL, Wallich.

Like *S. tibeticum*, var. *Stracheyi*, but wholly puberulous; the leaves obovate and the cymes few-flowered.

SECT. II. Rootstock thick. Flowers hermaphrodite, rarely imperfect. Follicles narrow oblong-lanceolate; style nearly straight, slender, not (or scarcely at all) recurved. Seeds ellipsoid, compressed, testa loose produced beyond the end of the nucleus, often as a short bent tail.

12. **S. asiaticum**, DC. Prodr. iii. 401; stems 6-12 in., leaves 1-1 $\frac{1}{2}$ in. approximate near the cyme linear remotely dentate, cymes dense, flowers yellow, petals lanceolate-spathulate twice the sepals. Wall. Cat. 7239. *S. crassipes*, Wall. Cat. 7234; H. f. & T. in Journ. Linn. Soc. ii. 99. *Rhodiola asiatica*, Don Prodr. 213.

SIKKIM to KASHMIR, alt. 11,000-16,000 ft., frequent; Wallich, Falconer, J. D. H., &c.

Glabrous or the cyme branches minutely puberulous. Hypogynous scales very short, subquadrate (ex H. f. & T.).

VAR. *Wallichianum*, H. f. & T. in Journ. Linn. Soc. ii. 100 (sp.); Hook. Ic. Pl. t. 604; leaves broader more denticulate sometimes subpinnatifid.—H. f. & T. say that this differs by its red flowers; but Sir W. Hooker says that the plants which flowered at Kew had yellow flowers.

13. ***S. linearifolium***, Royle *Ill.* t. 48; stems 3–5 in. and with the leaves glabrous, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. imbricate narrow oblong or linear entire or toothed, cymes 2–8-flowered, sepals oblong-lanceolate, petals nearly $\frac{1}{2}$ in. long broad-lanceolate. *H. f. & T. in Journ. Linn. Soc.* ii. 100. *S. pauciflorum*, Edgw. in *Trans. Linn. Soc.* xx. 49; *H. f. & T.* 100. *S. mucronatum*, Edgw. in *Trans. Linn. Soc.* ii. 48.

TEMPERATE WESTERN HIMALAYA, alt. 7000–10,000 ft.; GURWHAL, KUMAON, &c.; Royle, Falconer, T. Thomson, &c.

A species easily recognised by the large white petals (but *H. f. & T.* say red?). *Sepals* not ovate in *Var. pauciflorum*, but as in the typical *linearifolium*.—Edgeworth's *S. mucronatum* is identically his *S. pauciflorum* as shown by *H. f. & T.*

VAR. 1. *typica*; leaves dentate.

VAR. 2. *pauciflorum*; leaves little dentate or entire.

14. ***S. trifidum***, Wall. *Cat.* 7230; stems 3–11 in. glabrous, leaves 2–4 in. petioled oblong sinuate-pinnatifid, or 1–2-pinnatifid with linear blunt lobes, cymes branched leafy, sepals narrow-lanceolate, petals linear-lanceolate twice the sepals. *H. f. & T. in Journ. Linn. Soc.* ii. 100. *S. sinuatum*, Royle *Ill.* p. 222; Edgw. in *Trans. Linn. Soc.* xx. 47.

TEMPERATE HIMALAYA from SIKKIM to KASHMIR, alt. 6000–12,000 ft., common on rocks and on trees.

Cymes leafy. *Flowers* pedicelled, pink. *Follicles* when ripe very thin-walled.—A well-marked abundant species in which however the leaves vary between the wide limits given above.

SECT. III. Annuals, or perennials with no thick rootstock. *Flowers* hermaphrodite. *Seeds* obovoid, not compressed, the testa not loose.

* *Follicles* 5, erect in fruit. *Radical leaves* rosulate.

15. ***S. rosulatum***, Edgw. in *Trans. Linn. Soc.* xx. 48; stems 2–4 in., cauline leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. somewhat remote spatulate-obovate or spatulate-orbicular, sepals oblong glabrous rarely minutely pubescent, petals white elliptic or oblong not very acute. *H. f. & T. in Journ. Linn. Soc.* ii. 101. *S. pyriforme*, Royle *Herb.* *Umbilicus radicans*, Klotzsch in *Reis. Pr. Waldem. Bot.* t. 44.

KUMAON to KASHMIR, alt. 5000–9000 ft.; frequent, Royle, Falconer, T. Thomson, Edgeworth, &c.—DISTRIB. Afghanistan.

Stem glabrous, more rarely glandular-pubescent. *Rosulate leaves* $\frac{1}{4}$ – $1\frac{1}{2}$ in. spatulate or elongate obovate. *Cymes* weak, straggling, often subsecund or subscorpioid with long pedicels $\frac{1}{2}$ –1 in. long. *Follicles* small, thin-walled, erect. *Seeds* ellipsoid, somewhat obvoid, smooth, longitudinally striate.

16. ***S. adenotrichum***, Wall. *Cat.* 7231; stems 3–9 in. glandular-pubescent, cauline leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. somewhat remote oblong narrowed below or obovate, sepals oblong minutely pubescent, petals white often with pink stripes lanceolate acute. *H. f. & T. in Journ. Linn. Soc.* ii. 101, excl. *Var. β.*; Edgw. in *Trans. Linn. Soc.* xx. 48; Baker & Saunders *Ref. Bot.* t. 296.

KUMAON to KASHMIR, alt. 3000–8000 ft.; frequent. Wallich, T. Thomson, Strachey & Winterbottom, &c.

Rosulate leaves $\frac{1}{2}$ – $1\frac{1}{2}$ in. spatulate or elongate obovate. *Cymes* lax with pedicels $\frac{1}{4}$ –1 in. long, often with two or more erect elongate branches. *Follicles* thin-walled, erect. *Seeds* obovoid, ellipsoid, smooth, longitudinally striate.—This species may be generally distinguished from *S. rosulatum* by its larger size, stronger cyme, and more

pubescent stem and sepals: but the only absolute distinction appears to lie in the more acute petals.

17. **S. Griffithii**, C. B. Clarke; stems 2-4 in. very weak glabrous, cauline leaves $\frac{1}{4}$ - $\frac{1}{2}$ in. linear, cyme leafy corymbose, sepals narrow oblong, petals white elliptic lanceolate. *S. adenotrichum*, Var. β ., H. f. & T. in Journ. Linn. Soc. ii. 101.

BHOTAN; Griffith.

H. f. & T. probably joined this with *S. adenotrichum* because of the acute petals; but in all other points, especially its weakness and glabrousness, it is nearer *S. rosulatum*. It differs from both in the linear cauline leaves and particularly in the cyme, which is corymbose and somewhat dense, with linear bracts like the cauline leaves.

18. **S. trullipetalum**, H. f. & T. in Journ. Linn. Soc. ii. 102; glabrous, stems 2-4 $\frac{1}{2}$ in., cauline leaves $\frac{1}{4}$ in. imbricate lanceolate-linear acute, cymes dense, petals white-yellow with a very long claw and ovate cordate or lanceolate limb.

TEMPERATE and ALPINE HIMALAYA from SIKKIM to KASHMIR, alt. 11,000-16,000 ft. Rosulate leaves $\frac{1}{4}$ in. long, ovate-lanceolate. Sepals elliptic-lanceolate, acute.

19. **S. Jaeschkei**, Kurz in Seem. Journ. Bot. v. 240; annual, leaves spathulate-oblong acute often rosulate, flowers large golden solitary.

LAHUL, in West Tibet; Jaeschke.

Branches 4-5 in. or less, crowded, simple, or branched from the base. Lower leaves generally densely rosulate; cauline scattered, smaller, narrower, or crowded towards the end of the branches. Flowers solitary at the end of the branches or crowded in dwarf specimens, nearly $\frac{1}{2}$ in. long. Calyx segments $\frac{1}{4}$ - $\frac{1}{2}$ in. long, fleshy, green, similar to and often larger than the leaves. Petals double the sepals, lanceolate, obtuse. Stamens less than half the length of the petals.

The above is closely copied from Mr. Kurz, who evidently possessed better materials than certain scraps transmitted to Kew by Jaeschke and referred by Dr. Thomson to *S. asiaticum*, which has not the elongate leafy branches of the corymb.

There are several points however in which Mr. Kurz' description does not fit the flowering slips (3 in. long) at Kew; Mr. Kurz says that the leaves are shorter than the sepals which are but 3 to 4 lines long; in the Kew examples the leaves on the corymb branches are $\frac{1}{2}$ in. long and more. The Kew slips may however belong to examples of *S. asiaticum* in its first year of flowering.

20. **S. Ewersii**, Ledeb. Fl. Alt. ii. 191; glabrous, stems 4-12 in., cauline leaves $\frac{1}{2}$ -1 in. diam. remote obovate or orbicular opposite or some of the uppermost alternate, cymes usually dense, flowers rose-purple. Ledeb. Fl. Ross. ii. 182, and Ic. Fl. Ross. t. 58; H. f. & T. in Journ. Linn. Soc. ii. 102. *S. Gerardianum*, Wall. Cat. 7235. *S. azureum*, Royle Ill. t. 48. *S. rubrum*, Royle Ill. p. 222; Edgw. in Trans. Linn. Soc. xx. 47.

TEMPERATE and ALPINE HIMALAYA from KUMAON to KASHMIR, alt. 9000-17,000 ft.; frequent.—DISTRIB. Alpine Siberia and Soongaria.

Leaves fleshy, glaucous, entire or sinuate. Cymes sometimes less dense, corymbose with alternate branches. That the flowers are ever blue appears to rest wholly on Royle's figure. Seeds ellipsoid, somewhat obovoid, testa not loose.

** Follicles 3-5, divaricate in fruit.

21. **S. pallidum**, Bieb. Fl. Taur. Cauc. i. 353 and iii. 314; stems 1-5 in. annual solitary cymose at top, carpels minutely squamose-tuberculate, seeds

obovoid finely striate longitudinally. *Ledeb. Fl. Ross.* ii. 185; *H. f. & T. in Journ. Linn. Soc.* ii. 102; *Boiss. Fl. Orient.* ii. 790. *S. Urvillei*, *DC. Prodr.* iii. 408.

PUNJAB PLAIN; Peshawur, *Vicary*; Hurroo and Hassababad, *Aitchison*.—DISTRIB. Afghanistan and thence to Greece.

Glabrous or minutely glandular-pubescent. *Leaves* 1 in., oblong to linear. *Flowers* 5-merous subsessile, white (or rose ex Boissier). *Petals* acute, thrice as long as the triangular acute sepals. *Cyme*-branches minutely glandular, divaricate-recurved in fruit.—A species that has been confounded with *S. multicaule*; it differs in its habitat and is absolutely separate by the seed.

22. ***S. multicaule***, *Wall. Cat.* 7232; glabrous, stem 3-8 in. high usually much divided from the base, carpels not tuberculate, seeds obovoid covered with minute tubercles. *H. f. & T. in Journ. Linn. Soc.* ii. 102. *S. japonicum*, *Sieb. Herb. in Mig. Ann. Mus. Bot. Lugd.-Bat.* ii. 156.

TEMPERATE HIMALAYA, alt. 4000-7000 ft., from KASHMIR to BHOTAN; frequent. —DISTRIB. China and Japan.

Leaves $\frac{1}{2}$ -1 in. long, linear-oblong, acute. *Flowers* subsessile, petals yellow. *Cyme* branches divaricate in fruit, usually elongate, subscorpioid.

23. ***S. perpusillum***, *H. f. & T. in Journ. Linn. Soc.* ii. 103; glabrous, stems 1-2 in. branching crowded, follicles short oblong turgid small, seeds large (therefore few in each carpel) obovoid hispid with elongate papillæ.

SIKKIM, alt. 12,000 ft., *J. D. H.*

Leaves $\frac{1}{2}$ in. long, sessile, oblong or linear. *Cyme* small, leafy. *Flowers* pedicellate, erect. *Sepals* oblong, obtuse. *Petals* white, oblong, a little longer than the sepals. *Follicles* connected $\frac{1}{2}$ their length.—The specimen referred here by *H. f. & T.* collected in the Western Himalaya has different seeds; it is in too imperfect a state for identification.

7. **SEMPERVIVUM**, *Linn.*

Fleshy herbs, often sending up annual flower-stems from a rosette of leaves crowning the perennial rootstock. *Leaves* alternate. *Cymes* paniculate. *Flowers* in the Indian species 8-merous, more rarely 6-8-merous. *Calyx* divided nearly to the base. *Petals* free, or scarcely cohering at the base, oblong-lanceolate. *Stamens* double the number of the petals, free. Hypogynous *scales* small, bifid, united in pairs. *Carpels* equal in number with the petals, free or adnate to the calyx, narrowed upwards into filiform styles; ovules very numerous. *Follicles* many-seeded.—DISTRIB. Species 40, extending from the Canary Islands across South Europe and North Africa to Asia Minor and the Western Himalaya.

1. ***S. acuminatum***, *Dcne. in Jacq. Voy. Bot.* t. 74; leaves mucronate glabrous, pedicels and sepals glabrous or slightly ciliate, sepals oblong-lanceolate acuminate scarcely pubescent, *H. f. & T. in Journ. Linn. Soc.* ii. 92. *S. himalayense*, *Klotzsch in Reis. Pr. Waldem. Bot.* t. 43. *Sedum Moorcroftianum*, *Wall. Cat.* 7228.

ALPINE HIMALAYA, from KUNAWUR to KASHMIR, alt. 10,000-15,000 ft.; WEST TIBET, *Strachey & Winterbottom*, &c.

Stems 4-8 in. high. Rosulate *leaves* 1-2 $\frac{1}{2}$ in. long, obovate-lanceolate or nearly linear; cauline $\frac{1}{2}$ - $\frac{3}{4}$ in., sessile, oblong, acuminate, but little imbricate. *Cyme* somewhat lax. *Petals* glabrous, purple-rose, twice or thrice the sepals. *Seeds* narrow obovoid, striate longitudinally.

2. **S. mucronatum**, *Edgw. in Trans. Linn. Soc. xx. 49*; basal leaves rosulate mucronate ciliate on the edge or glabrous, sepals glandular-pubescent oblong-lanceolate acuminate. *H. f. & T. in Journ. Linn. Soc. ii. 92.*

ALPINE HIMALAYA, from KUMAON to KASHMIR, alt. 10,000-12,000 ft.; KUMAON, *Strachey & Winterbottom*; NITI, *Edgeworth*; GURWHALE, *Falconer*; Kashmir, *Jacquemont*.

Stems 2-6 in. high. *Rosulate leaves* 1-1½ in. lanceolate; cauline sessile, oblong-lanceolate, more or less pubescent. *Cyme* somewhat dense. *Petals* white, scarcely twice the sepals. *Seeds* narrowly obovoid, striated longitudinally, hardly half so big as in *S. acuminatum*.

3. **S. sedoides**, *Dcne. in Jacq. Voy. Bot. t. 74*; basal leaves rosulate oblong-ovate minutely pilose, sepals oblong or somewhat obovate obtuse or at least not acuminate pubescent, carpels distinctly glandular-pilose upwards. *H. f. & T. in Journ. Linn. Soc. ii. 93.* *S. fimbriatum*, *Klotzsch in Reis. Pr. Waldem. Bot. t. 43.* *S. album*, *Edgw. in Trans. Linn. Soc. xx. 49*; *H. f. & T. l. c. 93.*

WESTERN HIMALAYA. Gurwhal, and Pir Punjal KASHMIR, *Falconer*. Kunawur and Kashmir, *Jacquemont*.

Stems 1-3 in. *Rosulate leaves* ¾ in. long; cauline ½-½ in. somewhat densely imbricate, sessile, oblong or elliptic, glandular-pubescent. *Cyme* dense. *Petals* lanceolate (white or rose-white?). *Seeds* narrowly ellipsoid, minutely striate longitudinally.

8. **TRIACTINA**, *H. f. & T.*

A weak succulent herb. *Leaves* alternate and verticillate. *Flowers* yellow, in lax leafy cymes. *Calyx* 5-partite. *Petals* 5, free, yellow. *Stamens* 10. Hypogynous glands 3, linear. *Carpels* 3, connate to the middle; ovules several in each carpel. *Follicles* 3, connate to the middle, divaricate above, 1-seeded.

1. **T. verticillata**, *H. f. & T. in Journ. Linn. Soc. ii. 103.*

SIKKIM, alt. 10,000-12,000 ft.; Lachen, *J. D. H.*; Tumbok, *C. B. Clarke*.

Glabrous. *Stems* 4-10 in. long. *Leaves* ½-1½ in. long, entire, narrowly obovate. *Flowers* subsessile. *Sepals* very small. *Seed* ellipsoid, somewhat obovoid, hispid with elongate papillæ.

This plant by the characters of its carpels and seeds is very closely allied to *Sedum perpusillum* *H. f. & T. H. f. & T. in Journ. Linn. Soc. ii. 90* characterise *Triactina* as having polyspermous follicles; the material collected by Sir J. D. Hooker was scanty, and the subsequent collections of C. B. Clarke have all the follicles 1-seeded.

ORDER LIV. **DROSERACEÆ**. (By C. B. Clarke, F.L.S.)

Herbs; catching insects by means of glandular sticky hairs, or by means of petioled leaves with automatically closing laminae. *Flowers* hermaphrodite, regular. *Calyx* 4-5- (rarely -8-)partite, or sepals free imbricate persistent. *Petals* and *stamens* as many as the sepals, hypogynous or nearly so. *Ovary* nearly free, globose or ovoid, 1-3-celled; styles 5-3, capitate fimbriate or bifid; ovules numerous, on parietal placentæ equal in number to the styles. *Capsule* membranous 5-3-valved, many-seeded. *Seeds* with fleshy albumen; embryo cylindric or minute.—**DISTRIB.** Species 110, spread over nearly all temperate and tropical lands except the islands of the Pacific.

Leaves glandular; cauline 0 or alternate 1. **DROSERA**.
Cauline leaves whorled vesicular glabrous. 2. **ALDROVANDA**.

1. **DROSERA**, Linn.

Perennial herbs, scapigerous or with a leafy stem, glandular-pilose. *Leaves* rosulate or alternate, usually circinate in veneration; stipules 0 or scarious and adnate to the petiole. *Calyx* free from the ovary, 4-8-partite, sepals persistent. *Petals* 4-8, hypogynous or scarcely perigynous, white or rose, withering persistent. *Stamens* as many as the petals, hypogynous or scarcely perigynous. *Ovary* 1-celled with 2-5 styles; ovules parietal, numerous. *Capsule* loculicidally 2-5-valved. *Seeds* numerous, in the Indian species obovoid-ellipsoid with the testa black smooth reticulate not lax.—**DISTRIB.** Species 100, scattered throughout the world except Polynesia; very numerous in Australia.

1. **D. Burmanni**, Vahl. *Symb.* iii. 50; leaves all radical rosulate cuneate-spathulate, stipules equalling half the petiole, scapes 1-3 glabrous, flowers racemose with glabrous pedicels, styles 5 undivided. *Don Prodr.* 212; *DC. Prodr.* i. 318; *Roxb. Fl. Ind.* ii. 113; *Wall. Cat.* 1242; *Wight. Ill.* t. 20 (*the styles incorrect*); *Wight Ic.* t. 944; *W. & A. Prodr.* 34; *Planch. in Ann. Sc. Nat.* ser. iii. vol. ix. 190; *Miq. Fl. Ind. Bat.* i. pt. ii. p. 120; *H. f. & T. in Journ. Linn. Soc.* ii. 82; *Thwaites Enum.* 21; *Dalz. & Gibs. Bomb. Fl.* 12; *Kurz in Journ. As. Soc.* 1876, pt. ii. 310.

Throughout INDIA in the Plains, from CEYLON and Bombay to the base of the HIMALAYA and BURMAH; abundant; ascending to 4000 ft. in the Himalaya, and 8000 ft. in the Deccan.—**DISTRIB.** China and Japan, Malaya, West Africa, Australia.

Leaves $\frac{1}{2}$ -1 $\frac{1}{2}$ in. long. *Scapes* 2-8 in. high; pedicels erect in fruit. *Calyx* minutely papillose.

2. **D. indica**, Linn. *Sp. Pl.* 403; stem decumbent elongate with alternate long linear leaves, racemes leaf-opposed, styles 3 bifid to the base. *DC. Prodr.* i. 319; *Roxb. Fl. Ind.* ii. 313; *Wall. Cat.* 1244; *Wight. Ill.* t. 20 (*the styles incorrect*); *W. & A. Prodr.* 34; *Planch. in Ann. Sc. Nat.* ser. iii. vol. ix. 204; *Miq. Fl. Ind. Bat.* i. pt. ii. p. 120; *H. f. & T. in Journ. Linn. Soc.* ii. 82; *Thwaites Enum.* 21; *Dalz. & Gibs. Bomb. Fl.* 12; *Kurz in Journ. As. Soc.* 1876, pt. ii. 310. *D. Finlaysoniana*, *Wall. Cat.* 3752. *D. serpens*, *Planch. l. c.* 204; *Rheede Hort. Mal.* x. t. 20.

CEYLON and the DECCAN as far north as CHOTA NAGPORE, frequent; BURMA and the MALAY PENINSULA (but not known in the Gangetic Plain).—**DISTRIB.** China, Malaya, Tropical Australia, Africa.

Stems 2-12 in., simple, rarely branched. *Leaves* 1-3 in., very glandular-pubescent, hardly broader than the glabrous petiole. *Racemes* 2-6 in.; pedicels $\frac{1}{3}$ - $\frac{2}{3}$ in. *Sepals* lanceolate, minutely glandulose or nearly glabrous. *Seeds* obovoid; testa prominently reticulated, not scrobiculate nor differing essentially from the seeds of the other two Indian species.

3. **D. peltata**, Sm. in Willd. *Sp. Pl.* i. 1546; stem erect leafy, leaves alternate long petioled lunate peltate, sepals ovate glabrous erose or fimbriate, styles 3 fimbriate. *DC. Prodr.* i. 319; *Sm. Exot. Bot.* t. 41 (*wrong as to colour of the flowers*); *Don Prodr.* 212; *Wight. Ill.* t. 20; *W. & A. Prodr.* i. 34; *Planch. in Ann. Sc. Nat.* ser. iii. vol. ix. 296; *Kurz in Journ. As. Soc.* 1876, pt. ii. 310. *D. lunata*, Ham.; *DC. Prodr.* i. 319; *Wall. Cat.* 1243; *Hook. Ic. Pl.* t. 54; *Planch. l. c.* 296; *Miq. Fl. Ind. Bat.* i. pt. ii. p. 120; *H. f. & T. in Journ. Linn. Soc.* ii. 82; *Thwaites Enum.* 22. *D. gracilis* and *D. foliosa*, *Hook. f.*; *Planch. l. c.* 297, 298. *D. Lobbiana*, Turcz. (*vide Kurz*).

Throughout INDIA. Var. 1 confined to the Malayan Peninsula; var. 2 ascending to 10,000 ft. in the Himalaya, and 8000 in the Nilghiris.—DISTRIB. Malay Archipelago to Australia.

Stems 3–12 in. high, simple or corymbose upwards. *Racemes* subterminal, pedicels $\frac{1}{2}$ – $\frac{2}{3}$ in. long. *Flowers* white. *Seed* as in the preceding species; with a close testa (as Benth. correctly) and not tuberculate, which Planchon says it is. This plant turns very black in drying, but often stains the drying paper purple.

VAR. 1. *typica*; rosulate leaves persistent, sepals very fimbriate. MOULMEIN and SINGAPORE.

VAR. 2. *lunata*; rosulate leaves early deciduous, sepals erose or but slightly fimbriate.

[D. INTERMEDIA of *Herb. Royle* is stated to have been collected in N. W. India; which, as Royle's specimens are *D. peltata typica*, is improbable. *D. intermedia* of W. & A. Prodr. 34 is probably founded on the specimen so named and still preserved in Wight's Herbarium which seems to have been collected, not in India, and by a Dr. Haynes, not Heyne.]

2. ALDROVANDA, Linn.

A weak succulent diaphanous glabrous floating herb in water. *Stems* articulate, with whorls of spatulate-orbicular leaves at the nodes, the laminae $\frac{1}{8}$ – $\frac{1}{4}$ in. diam., contorted, bladderly. *Flowers* peduncled, axillary, solitary. *Calyx* 5-partite. *Petals* 5, hypogynous, connivent in a cap. *Stamens* 5, hypogynous. *Ovary* 1-celled; styles 5 with terminal branching stigmas; ovules numerous, on 5 parietal placentæ. *Capsule* globose, 5-valved. *Seeds* numerous, broad, oblong, testa black shining.

1. *A. vesiculosa*, Linn.; DC. Prodr. i. 319; Reich. Iconogr. Europ. iii. t. 24; H. f. & T. in Journ. Linn. Soc. ii. 83; W. & A. Prodr. 34; Planch. in Ann. Sc. Nat. ser. iii. vol. ix. 304. *A. verticillata*, Roxb. Fl. Ind. ii. 112.

Salt-pans south of CALCUTTA; Roxburgh; T. Thomson; S. Kurz.—DISTRIB. Central Europe and Australia.

ORDER LV. HAMAMELIDÆ. (By C. B. Clarke, F.L.S.)

Trees or shrubs, often with stellate pubescence; prosenchyma of the wood marked with discs as in the *Coniferae*. *Leaves* alternate, petiolate, simple or palmately lobed; stipules 1–2, rarely wanting, deciduous or rarely persistent. *Flowers* hermaphrodite or unisexual, collected into heads, spikes, or close racemes, or spikes. *Calyx* small or 0, adnate to the ovary; free in *Distylium*. *Petals* 0, or 4–5 perigynous or nearly epigynous. *Stamens* 4– ∞ , perigynous, or in *Distylium* hypogynous; anthers dehiscent longitudinally; the valves deciduous in *Loropetalum*. *Ovary* 2-celled; styles 2, separate and ultimately divaricate, persistent (deciduous in *Altingia*); ovules 1– ∞ , axile, pendulous. *Capsule* woody, dehiscent at the vertex across the dissepiment so as to split each style in two, and in some genera also afterwards imperfectly dehiscent through the dissepiment; endocarp often horny separating from the exocarp. *Seeds* 1, or many when usually only the lowest in each cell is perfect.—DISTRIB. Species 30; found in Asia from Persia and the Himalaya to Malaya China and Japan; in North America and in South Africa.

A. Ovules solitary in each cell.

* *Petals* 0.

Ovary half-inferior. Leaves deciduous. Stamens 5-7 . . . 1. *PARROTTIA*.
 Ovary superior. Flowers separate, not in heads . . . 2. *DISTYLIUM*.
 Ovary half-inferior. Leaves persistent. Stamens 8 . . . 3. *SYCOPSIS*.

** *Petals present*.

Petals obovate-spathulate. Anthers blunt. Leaves deciduous. 4. *CORYLOPSIS*.
 Petals 4, linear. Connective horned. Leaves persistent . . 5. *LOROPETALUM*.
 Petals 5, linear. Calyx-tube circumscissile. Leaves persistent 6. *MAINGAYA*.

B. Ovules several in each cell.

Male flowers with a perianth. Leaves cordate-ovate, entire . 7. *BUCKLANDIA*.
 Male flowers without a perianth. Leaves oblong-lanceolate,
 serrate 8. *ALTINGIA*.

1. *PARROTTIA*, C. A. Mey.

Large branching shrubs. *Leaves* alternate, orbicular or oblong, crenate, deciduous; stipules large, early deciduous. *Flowers* hermaphrodite, appearing before the leaves, in capitate heads surrounded by large membranous bracts. *Calyx* half-adherent to the ovary; limb 5-7-fid. *Petals* 0. *Stamens* equal in number and opposite to the calyx-lobes, perigynous; anthers dehiscing by a longitudinal slit. *Ovary* 2-celled; styles 2, soon divaricate, with simple stigmas; ovules solitary in each cell, pendulous. *Capsule* woody; endocarp horny, separating from the exocarp. *Seed* narrowly ellipsoid, testa shining stramineous or scarcely brown.—*DISTRIB.* Species 2, one in Kashmir, one in Persia.

1. *P. Jacquemontiana*, Dcne. in *Jacq. Voy. Bot.* t. 82; anthers less than $\frac{1}{10}$ in. long subquadrate, ovary and fruit with long woolly pubescence. *H. f. & T. in Journ. Linn. Soc.* ii. 85; *Brandis For. Fl.* p. 216, t. xxviii. *Fothergilla involucreata*, Falc. in *Proc. Linn. Soc.* i. 18 (*without description*).

KASHMIR, alt. 5000-9000 ft.; common.

A gregarious bush 6-12 ft. high, closely resembling a hazel; twigs and leaves beneath with stellate pubescence. *Leaves* 2-3 in. diam., blunt, petiole $\frac{1}{2}$ in. long. *Flowers* small, involucrel bracts obovate $\frac{3}{4}$ in. long. *Calyx*-segments narrow, oblong or linear. *Fruit* in harsh spherical heads 1-1 $\frac{1}{2}$ in. diam.

2. *DISTYLIUM*, Sieb. & Zucc.

Small trees. *Leaves* alternate, persistent, coriaceous, entire, oblong-lanceolate; stipules lanceolate, early deciduous. *Flowers* small, in short upright axillary spikes, polygamous, not congested. *Calyx* free, deeply 3-5-fid, imbricate; sometimes wanting. *Petals* 0. *Stamens* 2-8, hypogynous; anthers dehiscing by a longitudinal slit. *Ovary* superior, 2-celled; styles 2, soon distant at base, with capitate stigmas; ovule solitary in each cell, attached near the upper inner angle. *Capsule* woody; endocarp horny, separating from the exocarp. *Seed* narrowly ellipsoid, testa shining, stramineous.—*DISTRIB.* Species 2; one in Khasia, one in China and Japan.

1. **D. indicum**, *Benth. in Herb., Griff.* No. 3377; leaves 3-4 in. more or less stellately pubescent beneath, petiole $\frac{1}{2}$ in., unripe fruit $\frac{3}{8}$ in. long densely stellate tomentose.

KHASIA MTS.; *Griffith.*

Griffith's specimens are all in half-ripe fruit. *Bark* lenticelled, the end of the twigs and stipules with rusty stellate pubescence. *Spikes* 1-3 in. long, with stellate pubescence, each bearing 2-4 fruits, pedicels $\frac{1}{2}$ -1 in. long. The *calyx* seems to have been early deciduous. *Styles* very long.—This species appears near the typical *D. racemosum*, Sieb. & Zucc. but has larger leaves not glabrous and much larger fruits; the ripe fruits in *D. racemosum* do not exceed $\frac{1}{2}$ in. long. *D. racemosum* is a tree 25 ft. high.

3. SYCOPSIS, Oliv.

A tree (or shrub). *Leaves* alternate, petioled, entire, coriaceous, lanceolate; stipules minute, early deciduous. *Flowers* unisexual, in small close axillary spikes, both sexes in the same spike. **MALE**: calyx very small; petals 0; stamens 8 (of which number several appear abortive); rudimentary ovary 2-fid. **FEMALE**: calyx-tube adnate to the ovary for $\frac{3}{4}$ its height; petals 0; ovary 2-celled; styles 2 separate; ovules solitary in each cell pendulous.

1. **S. Griffithiana**, *Oliv. in Trans. Linn. Soc. xxiii. 83 with a figure; Benth. & H. f. Gen. Pl. i. 666.*

KHASIA MTS.; *Griffith.*

Boughs much branched with lenticular bark. *Leaves* 2-3 in. with stellate pubescence when young but soon glabrous; petiole $\frac{1}{2}$ in. long. *Spikes* less than 1 in. stellately pubescent (and with sheathing bracts *Benth. & H. f.*). Young fruits $\frac{1}{8}$ in. diam., white-tomentose with close matted stellate hairs. *Anthers* dehiscent longitudinally.—Specimens imperfect.

4. CORYLOPSIS, Sieb. & Zucc.

Shrubs in habit leaves and inflorescence resembling hazels. *Leaves* alternate, petioled, ovate or oblong, serrate, deciduous; stipules large, deciduous. *Flowers* appearing before the leaves in pendulous racemes, each flower nearly sessile with a large sheathing bract. *Calyx*-tube adnate to the ovary, limb of 5 valvate lobes. *Petals* 5, perigynous, obovate-spathulate. *Stamens* 5, perigynous; anthers separated by a somewhat broad connective, dehiscing longitudinally laterally. *Scales* 5, alternate with the stamens, or 10-15 irregularly placed. *Ovary* half-inferior, 2-celled; styles two, soon divaricate; ovules 1 in each cell, pendulous. *Capsule* woody, endocarp horny, separating from the exocarp. *Seeds* narrowly ellipsoid, testa black shining.—**DISTRIB.** Species 4, extending from East Bengal through China to Japan.

1. **C. Himalayana**, *Griff. in Journ. Asiat. Soc. Bengal, xxiii. 642, with a figure wherein the name is changed to C. grata*; twigs petioles and peduncles stellate-tomentose or pubescent, bracts and calyces silky, racemes dense in fruit. *H. f. & T. in Journ. Linn. Soc. ii. 85.* Hamamelida, *Griff. Ic. Pl. Asiat. t. 633 (excellent).*

KHASIA MTS., alt. 4000-6000 ft., common. BHOTAN, alt. 5000-8000 ft.; *Griffith.*

About 6 ft. high; bark lenticelled. *Leaves* 4 in., round-ovate and acute, or smaller and narrower, often cordate at base with a petiole $\frac{1}{2}$ – $1\frac{1}{2}$ in., plicate, glabrous above, pilose silky or tomentose beneath; nerves straight, parallel, prominent. *Petals* obovate or elliptic, unguiculate, yellow-white.—*C. multiflora*, Hance, from the tea districts of Fokien, hardly differs except that the nerves of the leaves are much fewer and wider apart, and that the petals have a very long claw and round limb.

5. **LOROPETALUM**, Br.

A much branching woody shrub. *Leaves* alternate, oblong, entire, persistent; stipules membranous, soon deciduous. *Flower-heads* peduncled, quasi-terminal, ebracteate, of 6–8 sessile flowers. *Calyx-tube* adnate to the ovary, limb of 4 valvate lobes. *Petals* 4, perigynous, linear, circinate in æstivation. *Stamens* 4, perigynous, filaments very short, connective produced as a horn. Hypogynous *scales* 4, very small. *Ovary* half-inferior, 2-celled; styles 2, distinct, soon divergent; ovules in each cell 1, pendulous. *Capsule* woody, ovoid, endocarp horny, separating from the exocarp. *Seeds* narrowly ellipsoid, testa black shining.

L. chinense, Oliv. in *Trans. Linn. Soc.* xxiii. 459. *Hamamelis chinensis*, Br. in *Abel China*, 375, with a figure; suggesting the new genus *Loropetalum*. DC. *Prodr.* iv. 269; H. f. & T. in *Journ. Linn. Soc.* ii. 85.

KHASIA MTS. alt. 4000–5000 ft.; J. D. H. & T. Thomson.—DISTRIB. South China.

Twigs and inflorescence with much stellate pubescence. *Leaves* 1– $2\frac{1}{2}$ in. long, stellate-hairy on both surfaces (small in the Chinese specimens), acute, from a rounded base; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in. long. *Petals* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, 4 or 5 times the sepals, yellowish. *Anthers* short, the edges of the valves bent in to meet the connective, so that the young stamen has 4 pseudo-cells; the valves open from the connective and soon after drop off altogether.

6. **MAINGAYA**, Oliver.

A tree. *Leaves* alternate, undivided, petioled, persistent; stipules small, deciduous. *Heads* peduncled, quasi-terminal, ebracteate, of about 15 flowers. *Calyx-tube* adherent to the ovary; the limb closed, splitting up on one side a little way from the base and then circumscissile deciduous in a cap. *Petals* 5, perigynous, linear, circinate in æstivation. *Stamens* 5, perigynous, filaments very short, connective produced as a horn. *Scales* about 10, very small. *Ovary* half-inferior, 2-celled; styles 2 distinct, short; ovule 1 in each cell, pendulous. *Capsule* woody, ovoid, endocarp horny, separating from the exocarp. *Seeds* unknown.

1. **M. malayana**, Oliv. in *Trans. Linn. Soc.* xxviii. 517, t. 44.

PENANG; *Maingay*, No. 1871.

A tall tree with rather small stem (ex *Maingay*), glabrous, the innovations peduncles and calyx with stellate hairs. *Leaves* 3–5 in. long, oblong-lanceolate, petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. long glabrous. *Petals* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, 4–6 times the sepals. Dehiscing *capsule* $\frac{1}{2}$ in. long and $\frac{1}{2}$ in. broad.—*Maingay* differs from *Loropetalum* in the 5 not 4 petals, in the habit, but particularly in the calyx-limb circumscissile falling off in a cap before the flower expands.

7. **BUCKLANDIA**, Br.

A tree attaining 80 ft. high. *Leaves* alternate, cordate-ovate, acuminate, entire, long-petioled; stipules solitary or in pairs, large, oblong, coriaceous, deciduous. *Inflorescence* of 2-5-peduncled heads, at first enclosed between a pair of stipules; flowers adnate by their calyces, about 8 in a head, polygamous. *Calyx-tube* adnate to the ovary; limb 5-lobed. *Petals* in the ♂ flower linear-spathulate, fleshy, variable in number; in the ♀ rudimentary. *Stamens* 10-14 (in the ♀ 1 one); filaments long. *Ovary* half-inferior, 2-celled; styles 2, separate, soon divaricate; ovules in each cell 6 in two rows. *Capsule* nearly superior, woody, subglobose, endocarp horny, showing a tendency to separate from the exocarp. *Seeds* in each cell 6, oblong, trigonous; the upper wingless solid, without any embryo, the lower one in each cell winged fertile.

1. **B. populnea**, Br. in Wall. Cat. 7414; Griff. in Asiat. Res. xix. 95, with two plates. *B. populifolia*, H. f. & T. in Journ. Linn. Soc. ii. 86; Kurz Forest Fl. Brit. Burma, i. 445. *Liquidambar tricuspis*, Miq. Fl. Ind. Bat. i. pt. i. 1097 and Suppl. 346, with a figure.

TEMPERATE HIMALAYA, from NEPAL to BHOTAN, alt. 5000-8000 ft., common. KHASIA MTS., alt. 4000-6000 ft., common. BURMAH, Griffith, Kurz.—DISTRIB. Java, Sumatra.

Branches and adult leaves glabrous. *Leaves* 3-8 in. with a cartilaginous edge, quite entire or 3-cuspidate especially in young plants, petiole 1-5 in. glabrous or when young densely silky with brown hairs. *Peduncles* (at least at first) densely brown silky; as are the young ovaries.—The Malayan *Liquidambar tricuspis* does not differ in the smallest point from Himalayan specimens some of which have tricuspidate leaves and sericeous petioles. Cf. Kurz in Flora, 1871, p. 289.

8. **ALTINGIA**, Noronha.

Trees. *Leaves* alternate, petioled, ovate or oblong, glandular-serrate, persistent; stipules deciduous or persistent. *Flowers* in dense heads; heads wrapped by a large bract, males racemose, females solitary. MALE heads a mass of stamens with very short filaments, probably representing numerous achlamydeous flowers. *Anthers* obverse-pyramidal, the valves when young turned in till they reach the connective so that the young stamen is pseudo-4-celled; dehiscing longitudinally. FEMALE heads of 12-20 flowers; calyces confluent, without limb. *Petals* 0 (some rudimentary stamens have been taken for petals). *Ovary* $\frac{3}{4}$ -inferior, 2-celled; styles 2, separate, deciduous; ovules numerous, axile. *Fruit-head* globose, harsh. *Seeds* numerous; lowest 1-2 of each cell winged fertile, the upper without wing or embryo.—DISTRIB. Species 2; extending from East Bengal to China and Malaya.

1. **A. excelsa**, Noronha in Verh. Bat. Genootsch v. 41, ex Benth. & Hook. f. Gen. Pl. i. pt. ii. 669; leaves elliptic-lanceolate acuminate, petiole 1-1½ in. Kurz Forest Fl. Brit. Burma, i. 446. *Sedgwickia cerasifolia*, Griff. in Asiat. Res. xix. 99, with two plates. *Liquidambar Altingia*, Blume Fl. Jav. fasc. xvii. 8, with a figure; H. f. & T. in Journ. Linn. Soc. ii. 86; Miq. Fl. Ind. Bat. i. pt. i. 836. *L. Altingiana*, Blume Bijl. 527.

ASSAM and BHOTAN; *Griffith*. PEGU and MERGUI, *Kurz*.—DISTRIB. Java, Yunan. A tree 60–100 ft. high. *Leaves* 3–4½ in., glabrous on both surfaces, or with tufts of hairs in the axils of the nerves beneath.—The only other species, *A. chinensis*, differs in its thicker leaves, less acuminate, and much more shortly petioled.

ORDER LVI. **HALORAGÆÆ.** (By C. B. Clarke, F.L.S.)

Herbs, either weak aquatics or small land plants. *Leaves* opposite or whorled (or in the Indian species occasionally partly alternate) when submersed often pectinately pinnatifid; stipules 0. *Flowers* axillary, solitary or clustered, sessile less often pedicelled, the whorls often simulating a spike; hermaphrodite or unisexual, always small. *Calyx-lobes* 4 or 0. *Petals* 4 epigynous or 0. *Stamens* 8, 4, or 1 epigynous in the hermaph. flowers. *Ovary* inferior, 4-, 2- or 1-celled; styles 4, 2 or 1, fimbriate or simple; ovules 4, pendulous (or in *Hippuris* 1). *Fruit* small dry or drupaceous, 4–2–1-celled, indehiscent or separating into its carpels; seeds 4 or more rarely 1.—DISTRIB. Species 80, many aquatic; spread over the whole globe.

Terrestrial. Flowers all sessile or subsessile. Stamens 8 . . .	1. HALORAGIS.
Terrestrial. Male flowers pedicelled. Stamens 8	2. SERPICULA.
Aquatic. Stamen 1. Style 1. Ovule 1.	3. HIPPURIS.
Aquatic. Stamens 8 or 4. Styles 4. Seeds 4	4. MYRIOPHYLLUM.
Aquatic or subaquatic. Stamen 1. Styles 2. Seeds 4 . . .	5. CALLITRICHE.

1. **HALORAGIS**, *Forst.*

Branching wiry herbs. *Leaves* opposite, the upper sometimes alternate, toothed, rigid. *Flowers* minute, nearly sessile in the axil of bracts, spicate or racemose, partially unisexual or hermaphrodite. *Calyx-tube* 4–8-ribbed; lobes 4 erect persistent acute valvate. *Petals* 4 coriaceous, often wanting in the ♀. *Stamens* 8 epigynous. *Ovary* 2- or 4-celled with 4 pendulous ovules; stigmas 4 (in the females at least) sessile, feathery. *Fruit* a dry 2–4-celled 2–4-seeded nut; but in the two Indian species by abortion 1-celled 1-seeded.—DISTRIB. Species 40; reaching from Japan and East Bengal to New Zealand; Australia being the centre of the genus; one species found in Juan Fernandez.

1. **H. micrantha**, *Br. in Flinders Voy.* ii. 550; glabrous, leaves ovate acute denticulate, flowers in terminal often subpaniculate racemes. *Benth. Fl. Austral.* ii. 482. *H. tenella*, *Brongn. in Duperr. Voy.* t. 68. *Gonocarpus micranthus*, *Thunb. Fl. Jap.* t. 15; *DC. Prodr.* iii. 66. *Gonicarpus micranthus*, *Koen. & Sims Ann. Bot.* i. 546, t. 12.

KHASIA MTS., alt. 5000–7000 ft., *Griffith, J. D. H. & T. Thomson.* SIKKIM, alt. 8000–10,000 ft., *J. D. H.*—DISTRIB. From Sikkim and Japan across China Malaya and Australia to New Zealand.

A wiry branching herb, stems 4–16 in. *Leaves* ½ in., opposite, very shortly petioled; upper sometimes alternate passing by degrees into the lower bracts. *Flowers* very small; pedicels about ⅓ in. *Petals* thrice the triangular sepals. *Fruit* about ⅓ in. long, shining, glabrous with 8 ribs, 1-celled, 1-seeded.

2. **H. tetragyna**, *Hook. f. Fl. New Zealand*, i. 62; harshly though often minutely scabrous, leaves lanceolate (ovate in the New Zealand form) serrate, flowers in terminal often subpaniculate spikes. *H. scabra*, *Benth. Fl. Hongk.*

139. *Goniocarpus scaber*, *Koen. & Sims Ann. Bot.* i. 547, t. 12; *DC. Prodr.* iii. 66. *G. tetragyna*, *Labill. Fl. Nov. Holl.* i. t. 53.

KHASIA Mts., alt. 5000-6000 ft.; between Nunklow and Myrung, and at Kul-long; *J. D. H. & T. Thomson*.—DISTRIB. China, Malaya, Australia, New Zealand.

A suberect rigid herb 4-10 in. high with many branches. *Leaves* $\frac{3}{4}$ in. in the Khasia examples oblong acute, as in the Chinese; in the New Zealand much shorter often ovate; opposite, the upper sometimes alternate, passing by degrees into the bracts. *Flowers* sessile, very small. *Sepals* triangular with a cartilaginous recurved border. *Petals* twice the sepals, scabrous-pilose on their backs. *Fruit* with 8 (often obscure) ribs, tubercular, scabrous and covered also with most minute white points, 1-celled, 1-seeded.—The Australian specimens agree with those of Bengal in these minute points; and moreover the fruit appears in the Australian specimens uniformly 1-seeded (as stated correctly by Koenig for the Chinese plant) and not 4-seeded (as stated and figured by La Billardiére).

2. SERPICULA, Linn.

Herbs, small, decumbent, branching. *Leaves* opposite or alternate (often on the same plant). *Flowers* monœcious, minute, clustered in the same axils, the females sessile the males pedicelled. MALE: calyx-tube short, lobes 4 ovate acute; petals 4, cucullate; stamens 8; stigmas 4, rudimentary. FEMALE: calyx-tube long, lobes 4 ovate acute; petals and stamens 0; ovary 1-celled; styles 4 spreading with papillose or plumose stigmas; ovules 4, pendulous. *Nut* minute, ovate, 1-seeded, 8-ribbed or smooth.—DISTRIB. Species 2-4 in the marshes of warm Asia, Africa, and America.

1. *S. zeylanica*, *Arn. in Herb.*; suffruticose, leaves linear or linear obovate entire or with 1-3 linear small teeth on each edge, fruit glabrous 8-ribbed tuberculate on the ribs. *S. indica*, *Thwaites partim*, viz. C.P. No. 447, 146. *Haloragis oligantha*, *Arn. Pugillus Pl. Ind. Or.* 18, not of *W. & A. Prodr.*

CEYLON; Adams Peak, *Thwaites*.

Glabrous. *Stems* 6-16 in. *Leaves* $\frac{1}{4}$ - $\frac{3}{4}$ in. opposite and alternate on the same stem, densely approximated. *Pedicels* of the male fl. equalling the leaves. *Stamens* 8. *Fruit* most minutely punctulate between the ribs not pilose.

VAR. *minor*; stems very delicate scarcely 2 in. *S. indica* *Thwaites* β . *minor* No. 146 partly. Ceylon, Central Provinces; *Thwaites*. Appears worthy of specific distinction, but Mr. Thwaites treats it as a variety.

2. *S. indica*, *Thwaites Enum.* p. 123 partly; leaves obovate-oblong or obovate dentate-serrate, fruit with minute glands and very small white hairs, ribs very obscure or generally altogether wanting. *S. brevipes* and *S. hirsuta*, *W. & A. Prodr.* 338. *S. hirsuta*, *Wight. Ic.* 1001; *Arn. Pugillus Pl. Ind. Or.* 18. *Serpicula* sp., *Wall. Cat.* 7488.

CEYLON and Mts. of the DECCAN PENINSULA, alt. 6000-8000 ft., frequent. *Myrsore, T. Lobb*.

Pilose, or sometimes glabrous except the ovary and calyx. *Leaves* $\frac{1}{4}$ - $\frac{1}{2}$ in. usually minutely ciliate on the edges, opposite with the upper ones alternate, or with some lower leaves alternate also; or all opposite. *Pedicels* of the male flowers usually as long as the leaves, often much longer. *Stamens* 8. *Fruit* generally very free from ridges or tubercles.

S. veronicaefolia, Bory of Java; Tulasne in Ann. Sc. Nat. ser. 4. vi. 126, slightly differs from the most glabrous Indian specimens (*S. brevipes* W. & A.) by being quite glabrous, more robust in habit, a brighter red colour, and the fruit more tuberculate.

SERPICULA VERTICILLATA, Roxb. Cor. Pl. t. 164 and Fl. Ind. iii. 578 is Hydrilla verticillata Richard among the Vallisneriæ.

3. HIPPURIS, Linn.

A glabrous water plant, the stems thick, simple, leafy. Leaves in whorls of 4-6-12, linear or oblong. Flowers minute, solitary, sessile in the axils of the leaves; hermaphrodite or unisexual. Calyx-tube subcylindric, limb entire. Petals 0. Stamen 1, epigynous. Ovary inferior, 1-celled; style 1, linear, stigmatose along nearly its whole length; ovule 1, pendulous. Drupe ellipsoid, very smooth, indehiscent, with a thick wall.

1. *H. vulgaris*, Linn. Sp. Pl. p. 6; DC. Prodr. iii. 71; Engl. Bot. t. 763; Boiss. Fl. Orient. ii. 754.

WEST TIBET, alt. 10,000-15,000 ft.; Falconer, T. Thomson, Strachey & Winterbottom.—DISTRIB. Cabul; Dahuria; and in the frigid or cool temperate waters of the whole Northern Hemisphere; also at Magellan Straits.

Leaves in the Tibet specimens about 1 in. 6-10 in the whorl. Flowers in the upper part of the stem that emerges from the water; lowest part of the stem losing its leaves.—In all respects agreeing with the common European type.

4. MYRIOPHYLLUM, Linn.

Herbs, glabrous, their stems floating. Leaves dentate-serrate or pectinate-pinnatifid, rarely entire, whorled in the Indian species except *M. intermedium*. Flowers small, sessile or nearly so, in the axils of floral leaves or in nearly naked spikes; monœcious or hermaphrodite. MALE: calyx-tube short, limb 2-4-fid or 0; petals 2-4; stamens 2-8. FEMALE: calyx-tube deeply 4-furrowed, limb 0 or of 4 minute lobes; petals minute or 0; ovary inferior, 4- or 2-celled; styles 2 or 4, short, usually recurved with plumose stigmas; ovules solitary in each cell, pendulous. Fruit 4-furrowed or separating into 4 or 2 carpels.—DISTRIB. Species 15, found all over the world.

Wight's Herb. No. 942 named *M. indicum* Willd. consisted really of *M. intermedium* DC. and *M. tuberculatum* Roxb. mixed together. The single plate we have illustrating Indian *Myriophyllum* viz. Wight Ill. t. 102 is made up of a stem of *M. intermedium* together with an analysis of the fruit (very good) of *M. tuberculatum*.

Further, the plate of *Haloragis oligantha* Wight Ic. t. 1061 is *M. intermedium* DC., as are Wight's own herbarium specimens of his *Haloragis oligantha*; but not so Arnott's, as see under *Serpicula zeylanica* above.

Lastly, though Wight's Herb. 942 was named *M. indicum*, Willd., Wight's own Herb. No. 1094 is truly *M. indicum* as Arnott quotes it to be in W. & A. Prodr. 339.

1. *M. tuberculatum*, Roxb. Hort. Beng. 12; Fl. Ind. i. 451; spikes in fruit subterminal, floral leaves $\frac{1}{4}$ - $\frac{3}{4}$ in. linear cuneate toothed upwards, fruit $\frac{1}{8}$ in. long, a broad furrow between the acute carpel-backs, both the ridges and the broad furrows carrying pointed small tubercles. Wall. Cat. 6337; DC. Prodr. iii. 69; Miq. Fl. Ind. Bat. i. pt. i. 635. *M. intermedium*, Wight Ill. t. 102 as to the fruit only. *M. indicum*, Griff. Not. iv. 687.

ASSAM and EAST BENGAL. Very common in the jheels, but no specimen from west of Calcutta.

Upper whorls usually of male flowers, lower of female; hermaphrodite flowers

also occur. *Stamens* always 4, but the number is probably not constant. *Stigmas* pink, much fimbriate. *Fruit* looked down upon appears stellate.

2. ***M. indicum***, Willd. *Sp. Pl.* iv. 407; spikes in fruit subterminal, floral leaves $\frac{1}{2}$ in. narrow-lanceolate or linear-lanceolate, upper entire or crenate, fruit scarce $\frac{1}{16}$ in. long but much broader, carpels 4 rounded on the back but separated by wide furrows tubercled and puberulous or finally quite smooth and glabrous. Wall. *Cat.* 6338; DC. *Prodr.* iii. 68; W. & A. *Prodr.* 339; *Miq. Fl. Ind. Bat.* i. pt. i. 634. *M. tetrandrum*, Roxb. *Fl. Ind.* i. 451; *Griff. Notul.* iv. 686; W. & A. *Prodr.* 339; *Miq. l.c.* 634. [*M. indicum*, *Wight Ill.* t. 102 to be altogether excluded.]

ASSAM and BENGAL, in the jheels and canals, common, COROMANDEL coast and CEYLON.

Upper whorls of male flowers, lower of female, intermediate often hermaphrodite. *Stamens* 4. *Stigmas* green, little fimbriate. *Fruit* looked down upon appears stellate.

There is a variety with longer floral leaves, so that the inflorescence is hardly terminal, and with the leaves not quite opposite; but the fruit noway approaches that of *M. intermedium*.

3. ***M. verticillatum***, Linn.; Boiss. *Fl. Orient.* ii. 755; whorls of fruit axillary, floral leaves $\frac{1}{2}$ – $1\frac{1}{2}$ in. pectinate, segments linear, fruit about as long as broad not deeply furrowed or tuberculate. DC. *Prodr.* iii. 68; *Engl. Bot.* t. 218; not Roxb. *Hort. Beng.* 12.

KASHMIR, Falconer, Jacquemont, Thomson (all barren). Ponds above Shapiyon, alt. 7000 ft.; C. B. Clarke.—DISTRIB. Persia, Dauria, North Asia, Europe, North America.

Fruit subquadrate, backs of the carpels rounded, furrows between them broad but shallow.

4. ***M. spicatum***, Linn.; DC. *Prodr.* iii. 68; spikes always terminal, bracts oblong entire shorter than the expanded petals, fruit $\frac{1}{2}$ in. ovoid, backs of the carpels broad flattened furrows very narrow soon becoming deep, carpels more or less tubercled on the back. *Engl. Bot.* t. 83; Gaertn. *Fruct.* t. 68; *Fl. Dan.* iv. t. 681; Boiss. *Fl. Orient.* ii. 755.

KASHMIR, alt. 5000 ft. descending to 1000 ft. along the northern boundary of the Punjab; frequent. KUMAON, alt. 5000 ft.—DISTRIB. Cabul, cold and temperate Northern Hemisphere.

Fruit ovoid, seen from above appears round, the valleys between the carpels being too narrow to be noticed till closely examined. The fruit of the Indian examples is rather larger than that of the European, the backs of the carpels being very flat somewhat corky and thickened; called *M. spicatum* Linn. var. *muricatum* by Maximowicz (*Diagn. Pl.* xv. 183) who quotes correctly *Griff.* No. 2442 (Kew Distrib.).

5. ***M. intermedium***, DC. *Prodr.* iii. 69; fruit axillary, floral leaves $\frac{1}{2}$ –1 in. long alternate solitary or 2–3-nate linear and entire to lanceolate and incise-serrate, fruit very small hardly $\frac{1}{16}$ in. long but less broad, carpels rounded and most minutely scabrous on their backs, furrows shallow. *Miq. Fl. Ind. Bat.* i. pt. i. 634. *M. indicum*, *Wight Ill.* t. 102, the plant only, not the fruit. *M. variæfolium*, Hook. *Ic. Pl.* t. 289. *M. lineare*, Heyne in *Herb. Rottl.* *Haloragis oligantha*, W. & A. *Prodr.* 338; *Wight Ic.* 1061 not of Arn.

NILGHIRI MTS., alt. 7000 ft.; Hohenacker No. 1563, Gardner, Schmidt, Wight. Cuttalam, DECCAN PENINSULA, Rottler. Mayaburam, Sir T. Adam.—DISTRIB. Malaya, Australia, New Zealand, South America.

Leaves in the Indian examples sometimes whorled, more commonly in tufts of 1-3, each tuft placed irregularly round the stem. The Australian *M. variaefolium* has the leaves usually whorled; but the whorls get broken and the Australian examples become thus exactly like the Indian; the fruit is altogether the same.—The correct name of this plant is open to much question. De Candolle's is the oldest, but the accompanying description was drawn up to fit *Hottonia sessiliflora*, Vahl *Symb.* ii. 36 which probably was something altogether different; then a *Myriophyllum* is discovered in India which De Candolle's description very fairly fits, and Hohenacker and others apply it to the Candollean name.

5. **CALLITRICHE**, Linn.

Glabrous slender annual herbs growing in moist places, or their branches floating or submerged. *Leaves* opposite, linear- or obovate-spathulate, entire, the upper ones often rosulate. *Flowers* minute, axillary, unisexual, usually monœcious, solitary, or sometimes one male and one female in the same axil simulating a hermaphrodite flower; achlamydeous; bracteoles white, membranous, linear-oblong, very caducous. **MALE**: stamen 1. **FEMALE**: ovary 4-ridged 4-celled; styles 2, elongate, stigmatose their whole length; ovules solitary in each cell, pendulous. *Fruit* coriaceous, indehiscent, 4-seeded, the 4 carpels at length separating.—**DISTRIB.** Species 1 or 2 found almost all over the globe; but some authors allow 10 or 20 species.

[The distribution of such critical species as these *Callitriches* cannot be safely stated; there are examples collected in Sikkim, alt. 8000-9000 ft., by Sir J. D. Hooker which are probably *C. verna* (and not *C. stagnalis*), but they show no fruit.]

1. **C. stagnalis**, Scop. *Fl. Carniol.* ii. 251; leaves obovate-spathulate, styles subsistent, fruit suborbicular the edges acute keeled but hardly winged. *Koch Syn. Fl. Germ.* 212; *Hegelm. Monogr. Callitrich.* 58. *C. Wightiana*, Wall. Cat. 7008; *W. & A. Prodr.* 339; *Wight Ic.* 1947; *Miq. Fl. Ind. Bat.* i. pt. i. 635.

Indian mountains from the HIMALAYA, alt. 5000-10,000 ft., to the DECCAN, alt. 7000 ft. Ceylon, alt. 5000 ft., *Thwaites*.—**DISTRIB.** Europe. North Asia, Tropical Africa, Malaya, Australia and New Zealand.

2. **C. verna**, Linn.; *Koch Syn. Fl. Germ.* 212; leaves oblong-spathulate, fruit longer than broad the edges not keeled. *Hegelm. Monogr. Callitrich.* 55.

TEMPERATE WESTERN HIMALAYA, alt. 5000-8000 ft., *Edgeworth*; KASHMIR, alt. 7000 ft., *C. B. Clarke*.—**DISTRIB.** Europe. Cold and temperate Asia and North America.

ORDER LVII. **RHIZOPHOREÆ**. (By the Rev. G. Henslow, F.L.S.)

Trees or shrubs. *Leaves* opposite, stipulate (except *Anisophyllea*), usually coriaceous, glabrous; stipules interpetiolar, very caducous. *Flowers* axillary, usually bisexual, surrounded at the base with connate or cupuliform bracts or ebracteate. *Calyx* more or less adnate to the ovary (except *Blepharistemma*); limb produced beyond the ovary, 4-14-lobed; lobes valvate, persistent. *Petals* equal in number to the sepals, entire emarginate 2-fid or lacerate. *Stamens* usually twice the number of petals, in pairs opposite to and embraced by them, rarely indefinite (*Kandelia*); anthers 2-celled, rarely multi-locellate (*Rhizophora*). *Ovary* from 5- to 1-celled by solution of the septa; styles connate (except in

Anisophyllea); ovules usually 2 in each cell, pendulous. *Fruit* coriaceous, mostly indehiscent, 1-celled, 1-seeded. *Seed* pendulous, arillate or not; albumen fleshy or 0; embryo inverted, small if surrounded by albumen, elongated if exalbuminous; radicle macropodous in the tribe *Rhizophoreæ*, perforating the apex of the pericarp and germinating while the fruit still adheres to the tree.—**DISTRIB.** Tropical plants; many sharing with an arboreal vegetation the muddy shores of the estuaries of rivers. Genera 17, species about 50.

TRIBE I. *Rhizophoreæ*. *Leaves* opposite, stipulate. *Ovary* inferior; style single. *Embryo* exalbuminous, macropodous, germinating while the fruit is still on the tree.

Petals 4, entire. Stamens 8. Ovary 2-celled	1. RHIZOPHORA.
Petals 5-6, emarginate. Stamens 10-12. Ovary 3-celled	2. CERIOPS.
Petals 5-6, lacerate. Stamens ∞. Ovary 1-celled	3. KANDELIA.
Petals 8-14, 2-fid. Stamens 16-28. Ovary 2-4-celled	4. BRUGUIERA.

TRIBE II. *Legnotideæ*. *Leaves* opposite, stipulate. *Ovary* half-inferior or superior but adnate to the base of the calyx; style single. *Embryo* immersed in fleshy albumen.

Calyx-tube minutely bracteolate, half-superior, lobes erect	5. CARALLIA.
Calyx-tube ebracteolate, half-superior, lobes reflexed	6. PELLACALYX.
Calyx-tube bracteolate, adnate to the base of the ovary; cells of the ovary 4-ovuled	7. GYNOTROCHES.
Calyx-tube with connate bracteoles, adnate to the base of the ovary, lobes patent; cells of the ovary 2-ovuled	8. WEIHEA.
Calyx-tube bracteolate, adnate to the base of the ovary, lobes erect	9. BLEPHARISTEMMA.

TRIBE III. *Anisophylleæ*. *Leaves* alternate, exstipulate. *Ovary* inferior; styles 4. *Embryo* exalbuminous.

Characters of the tribe	10. ANISOPHYLLEA.
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1. **RHIZOPHORA**, Linn.

Trees. *Branches* marked by leaf-scars. *Leaves* ovate or elliptic, mucronate. *Flowers* rather large, on axillary 2-3-chotomously divided and few-flowered cymes. *Calyx* 4-lobed, surrounded at the base by connate bracteoles. *Petals* 4, entire, inserted on a fleshy disk. *Anthers* subsessile, multi-locellate. *Ovary* 2-celled, half-inferior, projecting beyond the calyx as a fleshy cone; cells 2-ovuled; stigma bifid. *Fruit* coriaceous, ovoid or obconic, crowned with the reflexed limb of the calyx. *Radicle* elongated, clavate, perforating the apex of the fruit and descending from the tree into the mud.—**DISTRIB.** About 5 species; frequent on muddy tropical shores.

1. **R. mucronata**, Lam. Dict. iv. 169; Ill. t. 396, f. 2; peduncles arising from the axils of leaves of the same year longer than the petioles about 3-flowered, flowers pedicellate. Bedd. Fl. Sylv. Anal. Gen. t. xiii. fig. 4; Dalz. & Gibs. Bomb. Fl. 95; Wight Ill. i. 209; Ic. t. 238; Kurz For. Fl. Brit. Burm. i. 447. R. macrorrhiza, Griff. in Trans. Med. Phys. Soc. Calc. viii. 2. R. candelaria, W. & A. Prodr. i. 310; Wall. Cat. 4878. R. Mangle, Linn.; Roxb. Fl. Ind. ii. 459.—Rheede Hort. Mal. vi. t. 34.

Tidal shores from the mouths of the Indus to Malacca and Ceylon.—DISTRIB. Tropical shores of Asia, Africa and Australia.

A large shrub or tree, evergreen. *Leaves* 3–7 by $1\frac{1}{2}$ –4 in., narrowed at the base. *Flowers* more or less drooping. *Calyx-lobes* triangular, narrowing upwards. *Petals* villous, shorter than the calyx-limb, subconnivent, coriaceous; margins involute.—A variety in Malacca, *R. stylosa*, Griff. (sp.) *Notul.* iv. 666; and *Ic. Pl. Asiat.* t. 640, differs according to Griffith from *R. conjugata* in its smaller stature, length of style, smaller radicle, more villous petals and more elongated base of the flowers, but the description shows a closer agreement with *R. mucronata* than with *R. conjugata*.

2. *R. conjugata*, Linn.; *DC. Prodr.* iii. 33; peduncles arising from the axils of (fallen) leaves of the previous year shorter than the petioles mostly 2-flowered, flowers sessile. *R. candelaria*, *DC.* l. c. 32. *R. apiculata*, *Blume Flor. Jav.* i. 91, and *Mus. Bot.* 134; *Wight Ill.* i. 209, t. 3; *Kurz For. Fl. Brit. Burm.* i. 447.

Tidal marshes from the mouths of the Indus to Malacca and Ceylon.—DISTRIB. Tropical shores of Asia and Africa.

Shrubby or arborescent. *Leaves* 4–8 by $1-3\frac{1}{2}$ in., usually more lanceolate than in the preceding species and subacuminate. *Calyx-lobes* ovate. *Petals* glabrous, linear, flat, submembranous. *Stamens* 11–12.

2. CERIOPS, Arn.

Trees. *Leaves* ovate or obovate. *Peduncles* axillary with subcapitate flowers. *Calyx* 5–6-merous, surrounded at the base with connate bracts. • *Petals* 5–6, inserted at the base of a 10–12-lobed fleshy disk, emarginate, appendiculate; lobes of the petals with clavate or capitate bristles. *Stamens* 10–12, filaments inserted between the lobes of the disk slender; anthers 2-celled. *Ovary* 3-celled (at least above), cells 2-ovuled; style short, stigma simple. *Fruit* coriaceous, ovoid, surrounded by the reflexed limb of the calyx, 1-celled, 1-seeded. *Germination* as in *Rhizophora*.—DISTRIB. Species 2 or 3, natives of the tropical shores of the Old World.

1. *C. Candolleana*, Arn. in *Ann. Nat. Hist.* i. 363; calyx 5-cleft, lobes linear acute, petals 5 glabrous emarginate tip with 3–4 capitate bristles. *Blume Mus. Bot.* 142; *Wight Ill.* i. 209; *Ic. t.* 240; *Bedd. Flor. Sylv. Anal. Gen. t.* xiii. fig. 5; *Miq. Fl. Ind. Bat.* i. 590; *Brandis For. Fl.* 218; *Kurz, For. Fl. Brit. Burm.* i. 448. *R. timorensis*, *DC. Prodr.* iii. 32.

Tidal forests, &c., from the mouths of the Indus to Malacca and Ceylon.—DISTRIB. of the genus.

A small shrub or small tree. *Leaves* 2–3 by 1–2 in., obovate, very obtuse, cuneate or attenuate at the base. *Flowers* in rather loose cymes or subcapitate. *Stamens* 10, alternately shorter. *Ovary* half-inferior, 3-celled. *Fruit* small, club-shaped or subovate, surrounded near the base by the reflexed segments of the calyx.

2. *C. Roxburghiana*, Arn. in *Ann. Nat. Hist.* i. 363; calyx 5–6-cleft, lobes subovate subobtuse, petals concave glabrous below setoso-ciliate above towards the apex. *Miq. Fl. Ind. Bat.* i. 591; *Kurz For. Fl. Brit. Burm.* i. 448. *Rhizophora decandra*, *Roxb. Hort. Beng.* 36; *Wall. Cat.* 4875.

Tidal forests from the Sunderbunds to Malacca.—DISTRIB. of the genus.

A dwarf tree or shrub. *Leaves* 1–4 by $\frac{3}{4}$ to 2 in., narrowed at the base, very obtuse, reddish brown beneath, glabrous. *Inflorescence* of small axillary cymes or glomerules. *Peduncle* very short. *Stamens* 10–12.

3. **KANDELIA**, *Wight & Arn.*

A small tree. *Leaves* oblong, obtuse. *Peduncles* axillary, dichotomously branched, few-flowered. *Flowers* rather large, white. *Calyx* 5-6-merous, surrounded at the base by connate bracteoles, adnate to the base of the ovary; lobes linear, valvate. *Petals* 2-fid; lobes multifid, segments capillary. *Stamens* indefinite, filaments slender exserted. *Ovary* 1-celled, prolonged above the calyx into a fleshy cone; stigma 3-lobed; ovules 6, fixed in pairs to a central column. *Fruit* ovoid, girt by the reflexed limb of the calyx, 1-celled, 1-seeded. *Radicle* fusiform, very acuminate. *Germination* as in *Rhizophora*.

1. **K. Rheedii**, *W. & A. Prodr.* i. 310; *Arn. in Ann. Nat. Hist.* i. 365; *Blume Mus. Bot.* 135; *Wight Ill.* i. t. 89; *Hook. Ic. Pl.* t. 362; *Wall. Cat.* 4876; *Bedd. Fl. Sylv. Anal. Gen.* 100, pl. xiii. fig. 6; *Kurz For. Fl. Brit. Burm.* i. 449. *Rhizophora Candel*, *Linn.*; *DC. Prodr.* iii. 32.—*Rheede Hort. Mal.* vi. t. 35.

SUNDERBUNDS and tidal shores of both Peninsulas and Ceylon.—DISTRIB. Malay Islands.

A small evergreen tree. *Leaves* 2-4 by 1-2 in., narrowed at the base, quite entire, dark green above, reddish brown beneath, glabrous. *Peduncles* about 1½ in., erect, twice branched dichotomously. *Fruit* 1 in. long, conic-ovoid.

4. **BRUGUIERA**, *Lam.*

Trees. *Leaves* usually coriaceous, oblong, quite entire. *Peduncles* axillary, recurved, 1-∞-flowered. *Flowers* rather large, coriaceous. *Calyx* 8-14-merous, obconical or campanulate, ebracteate, adnate to the base of the ovary; lobes subulate-lanceolate, valvate. *Petals* oblong, 2-lobed, appendiculate, embracing the stamens which spring elastically from them when mature. *Stamens* 16-28, filaments filiform; anthers linear, mucronate, about as long as the filaments. *Ovary* 2-4-celled, included in the calyx-tube; cells 2-ovuled; style filiform, stigma 2-4-lobed minute. *Fruit* turbinate, coriaceous, crowned with the calyx-limb, 1-celled, 1-seeded. *Germination* as in *Rhizophora*.—DISTRIB. Species about 8 in the tropics of the Old World.

1. **B. gymnorhiza**, *Lamk. Ill.* t. 397; peduncles 1-flowered, calyx about 12-cleft, lobes linear acuminate erect about ¾ in. in length equalling the tube in fruit, petals densely hairy at the base nearly glabrous above 2-lobed with 2-4 bristles on each lobe and 1 in the notch, ovary 3-4-celled. *W. & A. Prodr.* 311; *Brand. For. Fl.* 219; *Miq. Fl. Ind. Bat.* i. 586; *Blume Mus. Bot.* 136; *Kurz For. Fl. Brit. Burm.* i. 450. *B. Rheedii*, *Miq.* l. c. 587; *Blume*, l. c. 136; *Bedd. Fl. Sylv. Anal. Gen. Pl.* xix. fig. 1; *Wight Ic.* t. 239; *Dalz. & Gibs. Bomb. Fl.* 95; *Hook. Ic. Pl.* t. 397. *Rhizophora gymnorhiza*, *Roxb. Fl. Ind.* ii. 460; *Griff. Ic. Pl. Asiat.* t. 645.

Littoral and especially estuarine forests of India from the mouths of the Indus to Malacca and Ceylon.—DISTRIB. Tropical Asia, Australia, Africa and the Pacific.

A large evergreen tree. *Leaves* slightly acuminate, 3-6 by 1½-2½ in.; stipules oblong, very deciduous. *Peduncles* cernuous, shorter than the petioles. *Flowers* about 1 in. diam. *Calyx-tube* almost campanulate, limb 10-14-cleft. *Petals* 10-14. *Radicle* fusiform with about 6 prominent angles, apex obtuse.—A variety (*B. Wightii*, *Bl. sp.*) growing at the mouth of the Ganges and Indian Archipelago only differs apparently from the preceding by the entire margins of the petals being more or less hairy.

2. **B. eriopetala**, *W. & A. in Wight Ill.* i. p. 210; *Ic. t.* 239 B.; peduncles 1-flowered, calyx usually about 10-cleft, lobes linear acuminate about 1 in. exceeding the ribbed tube in fruit, petals with margins densely hirsute with silvery hairs from base to apex lobes somewhat obtuse, one seta on each lobe and one longer in the notch, ovary 3-4-celled. *Wall. Cat.* 2451; *Brand. For. Fl.* 219. *B. Rumphii*, *Blume Mus. Bot.* 138. *B. parietosa*, *Griff. Notul.* iv. 670; *Ic. Pl. Asiat. t.* 641.

MALABAR; at Quilon, *Wight*. MALAYAN PENINSULA, *Griffith*.—DISTRIB. Malay Archipelago, China.

A tree. *Leaves* ovate or oblong, acuminate at both ends. *Calyx-lobes* from 9-14, somewhat triquetrous, suberect in fruit. *Anthers* linear.

3. **B. caryophylloides**, *Blume Mus. Bot.* i. 141; peduncles about 3-flowered, calyx about 8-cleft, lobes linear subacute about $\frac{1}{4}$ in. reflexed and half the length of the tube in fruit, petals ciliate from base to apex nearly erect bifid bearing 3-4 bristles and 1 in the notch, ovary 2-celled. *Miq. Fl. Ind. Bat.* i. 589; *Kurz For. Fl. Brit. Burm.* i. 450. *Rhizophora caryophylloides* *Jack Mal. Misc.* i. 34; *Hook. Bot. Misc.* ii. 80; *Wall. Cat.* 4879; *DC. Prodr.* iii. 32, 8; *Arn. in Ann. Nat. Hist.* i. 368; *Wight Ill. t.* 210. *R. cylindrica*, *Linn. sp.* 635. *Kanilia caryophylloides*, *Blume Mus. Bot.* 141.—*Rheede Hort. Mal. vi. t.* 33.

TIDAL FORESTS OF INDIA, from Malabar to Malacca and Ceylon.—DISTRIB. Malay Archipelago.

A small tree. *Leaves* oblong to oblong-lanceolate, acuminate at both ends, scarcely coriaceous. *Peduncles* shorter or nearly equalling the petioles, 1-5- usually 3-flowered; *buds* subacute, pedicelled. *Calyx-tube* obtuse at the base, not ribbed. *Fruit* about $\frac{1}{2}$ in., urceolate, slightly constricted below the calyx-limb. *Radicle* subclavate, subacute.

4. **B. malabarica**, *Arn. in Wight Ill.* i. 210; peduncles about 3-flowered, calyx about 8-cleft, lobes subobtuse reflexed about $\frac{1}{4}$ in. and half the length of the tube in fruit, ovary 2-celled. *Rhizophora cylindrica*, *Linn. sp.* 635 in part. —*Rheede Hort. Mal. vi. t.* 33.

MALABAR COAST; *Rheede, Wight*.

A tree. *Leaves* herbaceous. *Peduncles* equalling the petioles, 3-flowered. *Buds* obtuse, sessile. *Fruit* about $\frac{1}{2}$ in. long, campanulate, not or scarcely constricted below the calyx-limb. *Radicle* as in the last species but apparently much softer than that of any other.—This may prove to be a variety or subspecies of *B. caryophylloides*.

5. **B. parviflora**, *W. & A. Prodr.* i. 311; peduncles many-flowered, calyx about 8-cleft, lobes lanceolate about $\frac{1}{12}$ in. long erect much shorter than the tube in fruit, petals with 5 bristles, ovary 3-celled, fruit subcylindric about 1 in. long, radicle subcylindric slender truncated. *Miq. Fl. Ind. Bat.* i. 588; *Wight Ill. i.* 210; *Bedd. Fl. Sylv.* 101; *Kurz For. Fl. Brit. Burm.* i. 449. *Rhizophora parviflora*, *Roxb. Fl. Ind. ii.* 641; *Wall. Cat.* 4877. *R. cylindrica*, *Roxb. Hort. Beng.* 36; *Wall. Cat.* 4877. *Kanilia parviflora*, *Blume Mus. Bot.* 140 t. 30; *Dalz. & Gibs. Bomb. Fl.* 95.

Littoral forests, from the SUNDERBUNDS to MALACCA.—DISTRIB. Malayan Archipelago.

A shrub or small tree. *Leaves* oblong or broadly lanceolate. *Peduncles* once or twice trichotomous. *Calyx-tube* tapering at the base, ribbed; lobes very short and rigid.

5. **CARALLIA**, Roxb.

Trees and shrubs. *Leaves* petiolate, ovate or elliptic. *Peduncles* short, rather thick. *Flowers* small, in short 3-chotomous axillary branching cymes, sessile and often crowded. *Calyx-tube* minutely bracteate at the base; limb 5-8-lobed, campanulate; lobes erect, short, valvate. *Petals* 5-8, inserted on the margin of a crenulated disk lining the calyx-tube, clawed, orbicular, 2-fid or entire, subserrate or lacerate at the apex. *Disk* epigynous, 10-16-lobed. *Stamens* inserted with the petals, filaments filiform; anthers small, oblong. *Style* subulate or filiform. *Fruit* small, globose, coriaceous, 1-celled, 1-seeded. *Seed* globose-reniform; testa fibrous; embryo curved.—**DISTRIB.** Species about 7, natives of the Indian Ocean.

1. **C. integerrima**, DC. *Prodr.* iii. 33; leaves quite entire or rarely serrulate towards the apex obovate elliptic or oblong, flowers usually 8-merous cymoso-capitate, petals not embracing the filaments. *Wight Ill.* t. 90; *Benth. in Journ. Linn. Soc.* iii. 67; *Bedd. Fl. Sylv.* t. cxciii.; *Dalz. & Gibs. Bomb. Fl.* 95; *Brand. For. Fl.* 219. *C. ceylanica*, corymbosa and sinensis, *Arn. in Tayl. Ann. Nat. Hist.* i. 371. *C. lucida*, *Kurz For. Fl. Brit. Burm.* i. 451; *Wall. Cat.* 4880; *Wight Ic.* t. 605. *C. timorensis*, *Blume Mus. Bot.* i. 128 (ex char.). *C. octopetala*, *F. Muell. Pl. Aust. Trop. Occid.* *C. symmetrica*, *Blume Mus. Bot.* i. 130. *Pootia cereopsifolia*, *Miq. Pl. Hochst.*

Forests of the outer SIKKIM HIMALAYA, BENGAL, ASSAM, SILHET, BURMAH, both PENINSULAS and CEYLON.—**DISTRIB.** Malay Archipelago, China, Australia.

An evergreen tree with very lucid foliage. *Flowers* small, white. *Berry* globose, size of a peppercorn, usually 1-seeded.—The leaves vary excessively. The Cingalese specimens are often all obovate and very obtuse; in some Chinese and Philippine Islands ones they are narrow-oblong and acuminate; in the majority from the greater part of the area, viz., Ceylon and the Indian Peninsulas, China, the Indian Archipelago and N. W. Australia, they are elliptic-ovate. *Bentham* (*Journ. Linn. Soc.* l. c.) has shown good cause for setting aside Roxburgh's specific name of *C. lucida*.

2. **C. lanceæfolia**, Roxb. *Fl. Ind.* ii. 481; leaves elliptic or oblong regularly serrulate, flowers 6-8-merous subcapitate, petals embracing the filaments. *Wight Ic.* iii. t. 604; *Kurz For. Fl. Brit. Burm.* i. 437; *Wight Ic.* t. 604. *C. confinis*, *Blume Mus. Bot.* i. 129. *C. lucida*, *Roxb. Cor. Pl.* iii. t. 211; *Wight Ic.* iii. t. 605. *C. lanceolaria*, *Wall. Cat.* 4881.

Tropical forests of TENASSERIM, *Kurz*.—**DISTRIB.** Sumatra.

Cymes less crowded than in the last species. *Petals* reniform, crenulate. *Fruit* larger than the preceding, turbinato-globose, 2-3-seeded.

3. **C. calycina**, *Thwaites Enum.* 121; leaves ovate or elliptical quite entire, peduncles rather long dichotomous, cymes slightly branching above the middle.

CEYLON, Singh Rajah forest, between Galle and Ratnapoora, at no great elevation, *Thwaites*.

A great tree. *Leaves* $1\frac{1}{2}$ -3 by $1-1\frac{3}{4}$ in., ovate, shortly acuminate, narrowed at the base, punctate beneath; petiole $\frac{1}{12}$ - $\frac{1}{4}$ in.; stipules about $\frac{1}{2}$ in. very deciduous. *Bracteoles* rounded, refuse, often mucronate, about $\frac{1}{12}$ in. *Flowers* subsessile, $\frac{1}{4}$ in. diam. *Calyx-lobes* 4, equalling the tube. *Petals* broadly cordate, clawed, margin incisinate. *Ovary* 4-celled; stigma crenate.

VAR. β . *Thwaites l. c.*; leaves shorter more rounded and coriaceous. Central Province, alt. 4-5000 ft., *Thwaites*.

6. **PELLACALYX**, Korth.

A small tree, ferruginously pubescent. *Leaves* oblong, minutely serrulate or entire, subsabrous above, rufescent with stellate pubescence beneath. *Flowers* subsolitary or in dichotomously branched glomerules. *Calyx* ebracteolate; limb 5-8-fid, recurved, campanulate above the ovary. *Petals* 2-6, tips lacerate. *Stamens* 10-12, inserted with the petals on the margin of a crenulated disk lining the calyx-tube, filaments short subulate; anthers small. *Ovary* with the ovuliferous part inferior, 5-10-celled; style subulate, stigma discoid, 5-10-lobed; ovules many in each cell, fascicled, pendulous from the axis. *Fruit* pisiform or turbinate, black, fleshy, 5-10-celled, many-seeded. *Seeds* ovoid, testa striated; embryo becoming green, straight, in the axis of the albumen; cotyledons scarcely broader than the terete elongated radicle.

1. **P. axillaris**, Korth in *Van der Hoeve et de Vries Tijdschr.* iii. 20, t. 2; *Benth. in Journ. Linn. Soc.* iii. 75; *Griff. Notul.* iv. 429; *Id. Pl. Asiat.* t. 486 (Cunoniaceæ).

PENANG and MALACCA, Griffith.

Leaves 5-8 by $1\frac{1}{2}$ -3 in., shortly acuminate. *Flowers* small, shortly pedicelled, erect. *Calyx-tube* $\frac{1}{8}$ in. long, densely ferruginously pubescent.

7. **GYNOTROCHES**, Blume.

Small trees and shrubs. *Leaves* oblong; stipules deciduous. *Flowers* small, axillary, fascicled; peduncles jointed in the middle. *Calyx* ebracteolate, 4-5-partite; segments valvate, reflexed. *Petals* 4-5, inserted below the margin of an 8-10-lobed perigynous disk, clawed, spatulate, fimbriate-lacerate. *Stamens* 8-10, inserted in the disk, filaments filiform; anthers small. *Ovary* superior, adhering by a broad base to the calyx, ovoid-globose, 3-6-angled, 3-6-celled; style columnar, furrowed, conical at the base; stigma 3-6-lobed, lobes emarginate recurved; ovules 4 in each cell, ascending, fascicled. *Berry* globose, 4-6-celled, many-seeded. *Seeds* small, obovoid, testa crustaceous wrinkled, albumen fleshy; embryo terete.—DISTRIB. Species 2, natives of the Malay Islands.

1. **G. axillaris**, Miq. *Fl. Ind. Bat.* i. pt. i. 592; *Blume Mus. Bot.* i. 127, t. xxxi.; *Kurz. For. Fl. Brit. Burm.* i. 451. *G. Dryptopetalum*, Blume l. c. *G. reticulata*, A. Gray, *Bot. Amer. Explor. Exped.* vol. i. 607, ex descr. *Dryptopetalum coriaceum*, Arn. in *Ann. Nat. Hist.* i. 372. *Microtropis coriacea*, Wall. *Cat. n.* 4338.

SINGAPORE and PENANG, Anderson, Wallich. MALACCA, Griffith. MOULMEIN, Lobb.—DISTRIB. Malay Archipelago.

Leaves 2-5 in., oblong or elliptic, acuminate, coriaceous. *Flowers* small, numerous, axillary, subdiœcious: male with petals and perfect stamens; ovary often empty; stigma not dilated: female or hermaphrodite flowers with longer pedicels; petals and stamens often smaller, the latter sometimes effete; stigma radially lobed. *Fruit* baccate, $\frac{1}{10}$ - $\frac{1}{8}$ in. diam.

8. **WEIHEA**, Spreng.

Trees or shrubs. *Leaves* oblong, quite entire or obtusely serrate; stipules interpetiolar, oblong, deciduous. *Flowers* in axillary 1- or more flowered peduncles. *Calyx* with connate bracts; limb 4-5-fid, patent. *Petals* inserted under the margin of an obscure disk, clawed, spatulate, fimbriate-lacerate,

longer than the sepals. *Stamens* 16–30, inserted on the margin of the disk; filaments filiform; anthers oblong. *Ovary* superior, 3–5-furrowed, 2–4-celled; style filiform, stigma with 2–4 radiating lobes; ovules 2 in each cell, collateral, pendulous. *Fruit* globose, fleshy, 2–4-celled, septicidally but slowly dehiscing into 2–4 valves; cells 1–2-seeded. *Seeds* arillate, ovoid, subtrigonal; testa coriaceous; embryo straight, cotyledons elliptical, radicle terete.—*DISTRIB.* Species 5, natives of S. and Trop. Africa, Madagascar and Ceylon.

1. **W. ceylanica**, Baill. *Adans.* iii. 38. *Anstrutheria zeylanica*, Gard. in *Calc. Journ. Nat. Hist.* vi. 344, t. 4; *Thwaites Enum.* 121; *Bedd. Fl. Sylv.* t. xciv.

MAISOR and CARNATIC, *Wight, &c.* CEYLON, Galle District, Trincomalee, &c., at no great elevation.

A very much branched shrub or small tree. *Branches* terete. *Leaves* 3–3½ by 1½ in., petioled, glabrous, acuminate, rounded at the base, green and shining above, pale beneath, nerves reticulate prominent on both surfaces; petiole about ½ in. *Peduncles* solitary or in pairs, shorter than the petioles. *Flower-buds* of full size six months before opening. *Calyx-limb* 4-fid; segments ovate, acute, persistent, densely covered with adpressed hairs, valvate. *Petals* 4, hypogynous, cuneate, imbricated in bud. *Stamens* about 30, hypogynous; anthers erect, cordate, obtuse. *Ovary* superior, 3-celled; style simple, persistent. *Berry* thick, spongy. *Embryo* in the axis of fleshy albumen; cotyledons flat, veined; radicle thick, elongated and directed upwards.

9. BLEPHARISTEMMA, Wall.

A shrub? *Leaves* opposite, petioled, membranous, elliptic-oblong, acuminate, crenately-toothed; stipules small, caducous. *Flowers* in 2–3-chotomous many-flowered axillary cymes, polygamo-dioecious. *Calyx-tube* ovoid, ebracteolate; lobes 4, minute, triangular, erect. *Petals* 4, twice the length of the calyx, inserted round a disk at the base of the calyx-tube, clawed; tips lacerate. *Disk* free; of the male, 8-toothed; of the female often cleft. *Stamens* 8, inserted upon the margin of the disk; in the female small, filaments ciliated; anthers small, oblong. *Ovary* obtusely subtrigonal, contracted at the base, ovoid, free, 3-celled; cells 2-ovuled; style of the female flower longer than the calyx, stigma obsoletely 3-lobed. *Fruit* unknown.

1. **B. corymbosum**, Wall. *Cat.* 6320; *Benth. in Journ. Linn. Soc.* iii. 78; *Bedd. Fl. Sylv. Anal. Gen. Pl.* xiv. fig. 2. *Dryptopetalum membranaceum*, Miq. in *Pl. Hohenack.* n. 713.

WESTERN PENINSULA, *Heyne, &c.*

Glabrous, excepting the inflorescence and buds. *Leaves* 1½–2½ in.; stipules lanceolate, membranous, pubescent. *Calyx* minutely roughened above. *Stamens* ciliated like the claws of the petals. *Disk* almost entirely free from the calyx. *Ovary* narrow, empty; style short. *Petals* in the female flowers, shorter. *Stamens* less; anthers small, effete? *Disk* smaller. *Style* longer than the calyx.

10. ANISOPHYLLÆA, Br.

Trees and shrubs, glabrous, young parts silky. *Leaves* exstipulate, dichotomous; alternate ones smaller or minute, and often stipuliform or 0?, oblique, ovate lanceolate or elliptic, with 3–5 main nerves branching from the base, quite entire. *Flowers* minute in axillary simple or fascicled spikes, ebracteate or minutely bracteolate bi- or unisexual. *Calyx-tube* ovoid, adnate to the ovary, terete or ribbed; limb 4-fid, lobes erect. *Petals* 4, small, involute, entire, lobed or lacerate. *Stamens* 8, filaments short, subulate; anthers small, didymous, pro-

bably abortive in the females. *Ovary* inferior, 4-celled; styles 3-4, subulate, erect or recurved, stigmas acute or subcapitate; ovules solitary in each cell, pendulous, anatropous. *Fruit* coriaceous, oblong or pyriform, ribbed or smooth, 1-seeded. *Seed* pendulous, exalbuminous, testa coriaceous; embryo clavate, cotyledons very small or 0, radicle large.—**DISTRIB.** Species 5, natives of Tropical Asia and Africa.

1. **A. zeylanica**, *Benth. in Niger Flora* 342 and 375; leaves broadly ovate-lanceolate acuminate narrowed at the base with about five prominent nerves parting from the base, inflorescence of racemes supra-axillary solitary or geminate. *Thwaites Enum.* 119; *Bedd. Fl. Sylv.* t. 195. *Tetracrypta cinnamomoides*, *Gardn. & Champ. in Hook. Kew Journ.* i. 314 and v. 378, t. 5.

CEYLON; southern and central parts ascending to 1500 ft.

A tree 40-50 ft.; bark smooth; lower branches horizontal, upper suberect; twigs puberulous. *Leaves* glabrous on both surfaces, younger red; pairs opposite in vernation, the smaller squamiform 1-nerved caducous, the larger 5-nerved with involute margins. *Flowers* small, subsessile. *Bracts* minute. *Calyx-limb* superior, 4-cleft; lobes acute, valvate, persistent. *Petals* somewhat fleshy, laciniate, induplicate in aestivation; segments 5, linear-subulate. *Stamens* 8, alternately shorter; filaments subulate, inserted on the calyx; anthers versatile. *Styles* 4, erect, conico-subulate, stigmas capitate.

2. **A. disticha**, *Hook. in Herb.*; leaves rhomboid-oblong inequilateral 5-nerved distichous entire, flowers subsolitary, petals 3-toothed. *Haloragis disticha*, *Jack. in Mal. Misc.* ii. 19; and in *Hook. Journ. Bot.* i. 371.

MALAY PENINSULA; *Jack.* SINGAPORE.—**DISTRIB.** Sumatra

A shrub with rusty hairy branches. *Leaves* in two series, one of large leaves and another of very small stipuliform ones inserted below the insertion of the larger so as to overlap their bases; the larger 1-1½ in., subsessile, nearly glabrous above, beneath with short appressed hairs, the smaller ½ in., similar in shape but more acute. *Calyx-lobes* persistent. *Petals* shorter than calyx, 3-fid. *Stamens* as long as the petals; anthers 2-celled. *Ovary* 4-gonous, ferruginous, 4-celled; styles 4, equalling the stamens; stigmas simple. *Drupe* oblong-ovate, red; stone with 8 longitudinal furrows, 1-seeded.

3. **A. Griffithii**, *Oliver in Trans. Linn. Soc.* xxiii. 460, t. 48; leaves lanceolate or ovate often slightly acuminate, spikes solitary or geminate.

MALACCA, *Griffith.*

Probably a tree. *Leaves* 3-4 by 1-1½ in., petiole $\frac{1}{10}$ -½ in., coriaceous, turning yellow on drying; nerves 3, 1 central, 2 closely parallel to the margin. *Flowers* sessile, somewhat remote. *Calyx-lobes* coriaceous, triangular, valvate. *Petals* shorter than the sepals, coriaceous, broadly quadrate-oblong, entire or scarcely 3-lobed. *Stamens* 8, 4 opposite to and closely embraced by the petals, filaments rather stout; anthers small, rounded or didymous. *Ovary* 4-celled below; styles 4.

4. **A. grandifolia**, *G. Henslow*; leaves oblong acuminate scarcely narrowed at the base 5-nerved quite entire, panicles axillary with subfasciate branches.

PENANG, *Maingay.*

A tree about 50 ft., trunk very stout. *Leaves* large, 3½-10½ in., coriaceous. *Inflorescence* of several somewhat flattened or fasciate branches, forming an irregular panicle; pedicels bearing numerous minute sessile male flowers with a few female possessing rudimentary? stamens; male buds $\frac{1}{4}$ in. in diam., female rather larger. **MALE FL.** Sepals 4, valvate, puberulous; lobes triangular. *Petals* 4, fringed. *Stamens* 8, opposite to and embraced by the petals; filaments short. *Pistil* rudimentary;

styles 4?, minute, densely hairy. FEMALE FL. *Calyx-limb* partially lined with a disk, lobes each bearing a minute rudimentary stamen; anthers dehiscing in bud? *Styles* 4, spreading, subulate, densely hairy. *Drupe* narrowly pyriform, 3 by $1\frac{1}{2}$ in.

ORDER LVIII. COMBRETACEÆ. (By C. B. Clarke, F.L.S.)

Trees, or shrubs often climbers. *Leaves* alternate subopposite or opposite, sometimes ternate, petioled, entire, simple (in *Illigera* 3-foliolate); stipules 0. *Flowers* bracteolate at base, in the tribe *Gyrocarpeæ* cymose; in the *Combretææ* spicate or racemose (the racemes often paniced); not rarely polygamo-monoecious. *Calyx-tube* adnate to the ovary and produced above it (sometimes to a great length), the limb of 4-5 (rarely 4-7) valvate lobes. *Petals* 4-5 or 0 (rarely 6-7). *Stamens* 4-5 or 8-10 on the calyx; in the *Gyrocarpeæ* the filaments have staminodes attached at the base, and the anthers dehisce by recurved lateral valves. *Ovary* altogether inferior 1-celled; style simple, stigma simple or in *Illigera* sinuate almost lobed; ovules 1-7 (usually 2-3) pendulous from the apex of the cell. *Fruit* coriaceous or drupaceous, generally indehiscent, ovate, angular or very commonly winged; in *Calycopteris* and *Gyrocarpus* crowned by the greatly enlarged calyx. *Seed* 1, without albumen; cotyledons in *Terminalia* and others convolute; in *Combretum* and others plano-convex.—**DISTRIB.** Species 240, in the tropics of the whole world; and in S. Africa outside the tropic.

SUBORDER I. Combretææ. *Calyx-lobes* valvate. *Stamens* without glands or staminodes at their base; anthers dehiscing by a longitudinal slit. *Ovules* 2-7, suspended by long funicles. *Flowers* racemose or spicate.

* *Petals* 0. *Calyx-limb* (except in *Calycopteris*) deciduous.

Flowers spiked or racemed. <i>Calyx-limb</i> deciduous	1. TERMINALIA.
<i>Calyx-limb</i> much accrescent on the fruit	2. CALYOPTERIS.
Flowers capitate. <i>Calyx-limb</i> deciduous	3. ANOGEISSUS.

** *Petals* 5-4 (except in *Combretum apetalum*).

† *Calyx limb* persistent.

Leaves alternate. Growing with the Mangroves	4. LUMNITZERA.
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†† *Calyx-limb* deciduous.

<i>Calyx-tube</i> above the ovary less than $\frac{1}{2}$ in. long	5. COMBRETUM.
<i>Calyx-tube</i> above the ovary more than $\frac{1}{2}$ in. long	6. QUISQUALIS.

SUBORDER II. Gyrocarpeæ. *Calyx-lobes* valvate or imbricate. *Stamens* with glands or staminodes at their base; anthers opening by recurved lateral valves. *Ovule* 1, suspended by a short funicle. *Flowers* cymose.

Scandent. Leaves 3-foliolate	7. ILLIGERA.
Erect tree. Leaves entire or lobed	8. GYROCARPUS.

1. TERMINALIA, Linn.

Large trees. *Leaves* alternate or subopposite, exstipulate, entire or slightly crenulate, often with glands on the petiole or near the base of the midrib beneath. *Flowers* small spicate, the racemes spikes sometimes paniced, hermaphrodite or the upper flowers on the racemes males; a narrow bract at the base of each

flower, soon deciduous. *Calyx-tube* produced above the ovary with a campanulate mouth, limb of 5 short valvate triangular lobes, deciduous. *Petals* 0. *Stamens* 10 inserted on the calyx-tube; epigynous disc within them densely hairy. *Ovary* 1-celled, inferior; style long, simple; ovules 2 or 3, pendulous from the summit of the cell. *Fruit* ovoid, very various in size, smooth or angular or winged with 2-5 wings, indehiscent, coriaceous. *Seed* solitary, ex-aluminous, cotyledons convolute.—**DISTRIB.** Species 80; in the tropics of the whole world, less numerous in America.

T. angustifolia, Jacq. *Hort. Vindob.* t. 100 *not of Roxb.*; leaves attenuated at both ends lanceolate, with two glands at the apex of the petiole, fruit narrowly 2-winged. *Willd. Sp. Pl.* iv. 970; *DC. Prodr.* iii. 11; *W. & A. Prodr.* 312; *Miq. Fl. Ind. Bat.* i. pt. i. 599. *T. Benzoin*, Linn.; *Spreng. Syst.* ii. 358; *Lamk. Dict.* i. 349; *Wall. Cat.* 3976. *Catappa Benzoin*, Gaertn. *Fruct.* ii. 127, is included in the Peninsula Flora of W. & A., but there is nothing to show that it has ever been found wild in the Deccan.—**DISTRIB.** Central Malayan Islands.

SECT. I. Catappa (including *Myrobalanus*). *Fruit* not winged, ovoid or subcompressed, sometimes showing (especially when dry) two or five obscure lines or ridges.

1. **T. Catappa**, Linn.; *Willd. Sp. Pl.* iv. 967; leaves alternate clustered towards the ends of the branches very short-petioled obovate from a cordate but very narrow base, spikes solitary axillary simple, fruit 1-1½ in. ellipsoid slightly compressed so as to show two ridges. *Roxb. Hort. Beng.* 33 and *Fl. Ind.* ii. 430; *Larck. Ill.* t. 848; *DC. Prodr.* iii. 11; *Wall. Cat.* 3975; *W. & A. Prodr.* 313; *Wight Ic.* 172; *Bot. Mag.* 3004; *Miq. Fl. Ind. Bat.* i. pt. i. 599; *Bedd. Fl. Sylv.* t. 18; *Kurz For. Fl. Brit. Burma*, i. 454. *T. Catappa* and *Badamia*, Tulasne in *Ann. Sc. Nat.* ser. iv. vol. vi. 92. *T. moluccana*, Lamk. *Dict.* i. 349, *not of Roxb.*; *DC. Prodr.* iii. 11; *Willd. Sp. Pl.* iv. 96 excluding the synonym *T. eglandulosa*, Roxb. *T. Myrobalana*, Roth. *Nov. Sp.* 378. *T. subcordata*, Willd. *Sp. Pl.* iv. 968. *T. intermedia*, Spreng. *Syst.* ii. 359. *Juglans Catappa*, Lour. *Fl. Cochinc.* 703. *Catappa domestica*, litorea and *sylvestris*, Rumph. *Herb. Amboin.* i. t. 68. *Badamia Commersoni*, Gaertn. *Fruct.* ii. 97.—*Rheede Hort. Mal.* iv. t. 3, 4.

Wild in the lowlands of MALAYA, and perhaps of the Transgangetic Peninsula; largely planted in all INDIA from the North-West Provinces to Ceylon and Burma, mostly at 0-1000 ft. alt.—**DISTRIB.** Planted in nearly all tropical countries.

Attains 80 ft., with branches in horizontal whorls. *Leaves* 6-8 in., deciduous in the cold season, usually softly hairy when young, when adult hairy or glabrous, with two glandular depressions near the base of the midrib on the under side which are often obscure or wanting; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in. *Spikes* (and innovations) grey or rusty tomentose or pilose, the upper flowers male, the lower hermaphrodite, the bracts minute. *Calyx-teeth* glabrous or nearly so within and without. Young *ovary* glabrous or hairy. *Fruit* finally glabrous.—This species may generally be recognised by the short petiole and the very narrow but cordate base of the leaf.

2. **T. procera**, Roxb. *Hort. Beng.* 33 and *Fl. Ind.* ii. 249; leaves alternate clustered towards the ends of the branches obovate attenuated into a very short petiole, spikes solitary axillary simple, fruit ellipsoid obscurely 5-sided, not in the least compressed. *Wall. Cat.* 3974; *Kurz For. Fl. Brit. Burma*, i. 454. *Terminalia* sp. nov. No. 168, *Kurz. in Journ. As. Soc.* 1876, pt. ii. 130.

ANDAMANS; Roxburgh, Kurz. NICOBARS; Kurz.

Attains 100 ft. with branches in horizontal whorls. *Leaves* 6-12 in., with two glandular depressions near the base of the midrib on the under side which are often

obscure or wanting, glabrous when adult; petiole $\frac{1}{2}$ in. Upper flowers of the spikes male, lower hermaphrodite. Fruit $1-1\frac{1}{4}$ in.—Much resembles *T. Catappa*.

3. *T. foetidissima*, Griff. Notul. iv. 685; leaves alternate clustered towards the ends of the branches, obovate attenuated into the petiole, spikes solitary axillary simple, fruit $1\frac{1}{2}$ in. obovate ellipsoid subacute, compressed with one face convex the other flat.

MERGUI and MALACCA; Griffith. Malacca, Maingay No. 644, 643 $\frac{1}{2}$.

Leaves 6 in., glaucescent reticulate beneath, coriaceous with cartilaginous margin, without glands; petiole 1 in. Flowers all or very nearly all hermaphrodite. Young ovary and bracts very hairy. Calyx-teeth glabrous or nearly so within and without.

Reduced by Mr. Kurz in Journ. As. Soc. 1877 pt. ii. 53, 54, to *T. belerica*; from which it differs so greatly in leaves and fruit that it raises a suspicion whether Mr. Kurz had the true plant of Griffith before him.

4. *T. belerica*, Roxb. Char. Reform.; leaves alternate clustered towards the ends of the branches broadly elliptic narrowed equally at both ends, petiole very long, spikes solitary axillary simple, fruit $\frac{1}{2}-\frac{3}{4}$ in. diam. globular suddenly narrowed into a short stalk smooth covered by a close fulvous tomentum, when dried obscurely 5-angled.

Throughout INDIA; common in the plains and lower hills, extending to CEYLON and MALACCA; not in the desert region of the West of India.—DISTRIB. Malaya.

Attains 60-80 ft. Leaves 3-6 in., deciduous in the cold season, when mature glabrous and generally punctate on the upper surface; the punctations being much more permanent than in the other species (whence Roth's name); petiole $1-1\frac{1}{2}$ in. Bracteoles minute. Upper flowers of the spikes male, lower hermaphrodite. Young ovary always tomentose. Calyx-teeth pubescent within and without. *T. moluccana*, Miq. Fl. Ind. Bat. i. pt. i. 601 differs from *belerica* by its short petioles; the description appears compounded out of two plants.

VAR. 1. *typica*; no glands at the apex of the petiole. *T. belerica*, Bedd. Fl. Sylv. t. 19; *T. eglandulosa*, Roxb. Herb. (wrongly referred in Willd. Sp. Pl. iv. 968); *T. moluccana*, Roxb. Hort. Beng. 33. Fl. Ind. ii. 432; *T. belerica*, W. & A. Prodr. 313 excl. syn. Wall. Cat. 3968; Wight Ic. t. 91; Thwaites Enum. 103; Dalz. & Gibs. Bomb. Fl. 91; Brand. For. Fl. 222; Kurz For. Fl. Brit. Burma i. 455; Rheede Hort. Mal. iv. t. 10. *T. Gella*, Dalz. in Hook. Kew Journ. iii. 227. *T. punctata*, Roth Nov. Sp. 381; DC. Prodr. iii. 13. *Myrobalanus belerica*, Gaertn. Fruct. ii. t. 97.

VAR. 2. *belerica*, Roxb. Hort. Beng. 33, Cor. Pl. t. 198, Fl. Ind. ii. 431; two glands at the apex of the petiole beneath the leaf. DC. Prodr. iii. 12; Miq. Fl. Ind. Bat. i. pt. i. 600.—Circar Mts., Roxb.; also Malaya, if *T. microcarpa*, Decne. Herb. Timor. 129; Miq. Fl. Ind. Bat. i. pt. i. 602; Benih. Fl. Austral. ii. 502 be referred here: the examples in the Kew Herbarium exactly agree but do not show the fruit.

It is remarkable that not one specimen of this typical *belerica* Roxb. exists at Kew; and that both W. & A. (Prodr. 313) and Brandis (Forest Fl. 222) expressly state that they have never been able to discover a single example. The distinction between it and Roxburgh's *eglandulosa* (*moluccana*, Willd. in Fl. Ind.) is indeed trivial; but the absence of the glands seems without exception in the Indian so-called *belerica*; while Roxburgh founded his *belerica* on the single character that it had two glands, thereby differing from his *T. eglandulosa*, which he subsequently renamed *T. moluccana*, Willd., a species made up of two trees.

VAR. 3. *laurinoides*, Miq. Fl. Ind. Bat. i. pt. i. 600; leaves obovate or obovate-elliptic shortly acuminate much thinner than in the typical *belerica*. Mergui; Griffith. Ceylon; Thwaites, Gardner, Col. Walker.—DISTRIB. Java, Malaya. *T. nitens* Presl. Epimel. 214 is very near but has long subsistent bracteoles.

T. bialata is much mixed (in absence of fruit) with *T. belerica*, but may generally be distinguished by the absence of punctations on the leaves.

5. **T. Chebula**, Retz Obs. v. 31; leaves not clustered often subopposite ovate or elliptic usually acute not acuminate and rounded at the base, spikes terminal often panicled, fruit $\frac{3}{4}$ – $1\frac{1}{4}$ in. ellipsoidal or obovoid from a broad base, glabrous more or less 5-ribbed when dry. Roxb. Hort. Beng. 33, Cor. Pl. t. 197, Fl. Ind. ii. 433; DC. Prodr. iii. 12; Wall. Cat. 3967; W. & A. Prodr. 313; Miq. Fl. Ind. Bat. i. pt. i. 601; Dalz & Gibs. Bomb. Fl. 91; Bedd. Fl. Sylb. t. 27; Brand. For. Fl. 223 and t. 29; Kurz For. Fl. Brit. Burma i. 456. T. reticulata, Roth. Nov. Sp. 381; DC. Prodr. iii. 13. T. Aruta, Ham. in G. Don Gen. Syst. ii. 659. Myrobalanus Chebula, Gaertn. Fruct. ii. t. 97. Embryogonia arborea, Teys. & Binn. No. 2160 in Hort. Bog.

Abundant in Northern India from Kumaon to Bengal, and southward to the DECCAN table lands at 1000–3000 ft. alt., and CEYLON, BURMA and the MALAY PENINSULA.—DISTRIB.—Siam, Malaya.

Attains 80–100 ft. Leaves 4–5 in., deciduous in the cold season, more or less hairy when young; petiole about 1 in. often with two glands near its summit. Racemes terminal. Bracteoles conspicuous in the young spikes, exceeding the flowers pubescent, but soon deciduous. Flowers all hermaphrodite. Calyx-teeth hairy within.

VAR. 1, *typica*; adult leaves nearly glabrous beneath or the interstices of the ultimate nerves with minute sunk white tomentum, young ovary shaggy without, calyx-teeth without glabrous.—Deccan, Ceylon, and Burma and Malay Peninsula.

VAR. 2 (*T. citrina* of authors partly) differs from var. 1 only in having the young ovary quite glabrous; it has the ovate fruit and round-based leaves of *T. Chebula*. Common in Northern India from Kumaon to Bengal, and in Chota Nagpore.

VAR. 3; adult leaves very shaggy beneath, fruit much smaller, often only $\frac{3}{4}$ in. Gnarled small trees on the summit of Parasnath in Behar alt. 4000 ft.: but pass by degrees into var. 2 the common form at the base of Parasnath.

VAR. 4, *tomentella*, Kurz For. Fl. Brit. Burma i. 455 (sp.); leaves when young densely coppery-pubescent beneath, when adult pubescent or glabrous beneath, young ovary glabrous, fruit ovoid hardly 1 in. Pegu, up to 2000 ft. alt.; Kurz.—This is reckoned, perhaps rightly, a species by Kurz, but the leaves are less hairy, the fruits less reduced in size than those of the preceding var.

VAR. 5, *gangetica*; Roxb. Hort. Beng. 33 and Fl. Ind. ii. 437 (sp.); adult leaves with brown-red silky hairs on both surfaces. Wall. Cat. 3967 E.; Miq. Fl. Ind. Bat. i. pt. i. 602. Banks of the Ganges; Roxburgh. North-west India, cult. Edgeworth. Very unlike the typical *Chebula* by the brown silky hair which covers the twigs leaves and whole inflorescence. It may be a good species but the fruit is similar to that of *Chebula*.—Roxburgh remarks that this tree ripens its fruit on the banks of the Ganges, a remark he would hardly have made had he thought the tree indigenous. It is therefore likely that *T. gangetica*, Roxb. does not grow wild within the limits of the Indian Flora.

VAR. 6, *parviflora*, Thwaites Enum. 103 (sp.); calyx-teeth pubescent without. T. zeylanica Heurck & Muell. Arg. Obs. Bot. 220. CEYLON; Thwaites.—The flowers are not smaller nor the fruits more acutely ribbed than in some examples of *T. Chebula*.

6. **T. citrina**, Roxb. Hort. Beng. 33, Fl. Ind. ii. 435; leaves subopposite elliptic or oblong acuminate narrowed into the petiole, spikes terminal and lateral often panicled, fruit nearly 2 in. oblong-lanceolar, while fresh obscurely 5-angular. Wall. Cat. 3970; DC. Prodr. ii. 12; Miq. Fl. Ind. Bat. i. pt. i. 602. Myrobalanus citrina, Gaert. Fruct. ii. t. 97; W. & A. Prodr. 313; Brand. For. Fl. 223.

ASSAM, EAST BENGAL, BURMA and TENASSERIM; frequent. MALACCA at Mount Ophir.

Attains 80 ft. Leaves 3-6 in., when adult glabrous shining, the interstices of the nerves beneath with sunk close white tomentum; petiole $\frac{1}{2}$ in. usually with two glands at the top or on the base of the leaf beneath. Bracteoles linear, conspicuous on the young spikes. Flowers all hermaphrodite. Calyx-teeth glabrous without, hairy within. Young ovary glabrous.—The examples from other parts of India than the East referred to *T. citrina* by collectors are in the present enumeration supposed included under *T. Chebula*. *T. citrina* has a straighter stem, a brighter foliage and narrower fruits, but ought perhaps hardly to be reckoned a distinct species.

VAR. 2. *malayana*, Kurz. in Journ. As. Soc. 1876, part ii. 130; petioles longer, fruits smaller. Nicobars; Kurz. Maingay sends a similar form from Malacca No. 643.

SECT. II. **Pentaptera.** Fruit with 5 acute subequal wings. Spikes usually paniced.

7. **T. Arjuna**, Bedd. Fl. Sylv. t. 28; leaves subopposite oblong or elliptic nearly glabrous beneath when adult, spikes usually paniced, fruits 1-2 in. nearly glabrous ovoid- or obovoid-oblong, the wings not very broad their striations curving much upwards. Dalz. & Gibs. Bomb. Fl. 91; Brand. For. Fl. 224. T. Berryi, W. & A. Prodr. 314; Dalz. & Gibs. Bomb. Fl. 92. T. glabra, W. & A. Prodr. 314; Thwaites Enum. 104; Dalz. & Gibs. Bomb. Fl. 91. T. ovalifolia, Rottl. in Herb. Pentaptera Arjuna, Roxb. Hort. Beng. 34 and Fl. Ind. ii. 438; Wall. Cat. 3981; DC. Prodr. iii. 14, Mem. Combr. t. 2. Pentaptera glabra, Roxb. Hort. Beng. 34 and Fl. Ind. ii. 440; Wall. Cat. 3979. P. angustifolia, Roxb. Hort. Beng. 34 and Fl. Ind. ii. 437.

DECCAN, CEYLON and the sub-Himalayan tracts of the NORTH WEST PROVINCES. Very common.

Attains 60-80 ft. Leaves usually 4-6 in. (sometimes 10 in.), suddenly narrowed at the base, often cordate, obtuse or very shortly acute at the apex; petiole rarely more than $\frac{1}{2}$ in., often very short, with two glands near its apex. Bracteoles very small. Calyx-teeth nearly glabrous both within and without. Young ovary very short, covered with crisped brown or rufous hair. Wings of the fruit usually truncate or suddenly narrowed at the top.—Dr. Brandis states that *T. Arjuna* is common in Bengal; it is unknown in east and central Bengal but abounds in Southern Behar, Chota Nagpore and on the Sone—i. e. along the whole northern face of the Deccan table-land.

VAR. 2. *angustifolia* (i. e. *Pentaptera* Roxb. and not *Terminalia angustifolia* Roxb.). Leaves narrow elongate-oblong suddenly narrowed into the petiole. Southern Peninsula and Concan. Wall. Cat. 3971.

8. **T. tomentosa**, Bedd. Fl. Sylv. t. 17; leaves subopposite or uppermost alternate elliptic or ovate glabrous or very hairy beneath when adult, spikes paniced, fruit 1-2 in. glabrous or hoary obovoid-oblong, wings broad striations carried horizontally to the edge. Brand. For. Fl. 225.

DECCAN, CEYLON, and the sub-Himalayan tracts of the NORTH WEST PROVINCES, NIPAL, and SIKKIM, ascending to 4000 ft.; very common. BURMA; Brandis, Kurz.

Attains 80-100 ft. Leaves 4-8 in., petiole $\frac{1}{2}$ in. Flowers often attacked by a Cynips producing numerous galls which simulate fruit. Bracteoles very small. Calyx-teeth without tomentose villous or glabrescent.

VAR. 1. *typica*; leaves cordate or suddenly narrowed into the petiole, adult more or less hairy beneath often very hairy, petiole with two glands near the base of the leaf, young ovary villous, fruit glabrous. T. tomentosa, W. & A. Prodr. 314; Wight Ic. t. 195. T. glabra, var. tomentosa, Dalz. & Gibs. Bomb. Fl. 91? T. alata, Roth Nov. Sp. 379; Kurz For. Fl. Brit. Burma i. 458. T. ovata, Herb. Rottler. T. Chebula, Retz β. minor Huerck & Muell. Arg. Obs. Bot. 219. Pentaptera tomentosa, Roxb. Hort. Beng. 34, Fl. Ind. ii. 440; DC. Prodr. iii. 14, Mem. Combr. t. 1; Wall. Cat. 3978.—Common throughout India.

VAR. 2. *crenulata*; leaves narrowed into the petiole often obovate-elliptic adult nearly glabrous beneath, young ovary glabrous. *T. crenulata*, *Roth Nov. Sp.* 380; *W. & A. Prodr.* 314. Pentaptera *crenulata*, *Roxb. Hort. Beng.* 34, *Fl. Ind.* ii. 438; *DC. Prodr.* iii. 15; *Wall. Cat.* 3978. *P. macrocarpa*, *Wall. Cat.* 3982.—Deccan and the sub-Himalaya; common. Burma; *Kurz. Kurz For. Fl. Brit. Burma* i. 458 states *T. crenulata*, Roth, to be *T. Arjuna* of Beddome and Brandis. But both Beddome and Brandis have stated that *T. crenulata* *W. & A.* is a variety included under their *T. tomentosa*. Kurz has not communicated any example of his *T. crenulata*, nor in his description does he notice the character of the venation of the fruit by which Dr. Brandis has separated *T. Arjuna* and *T. tomentosa*. The synonym *T. crenulata* Kurz remains therefore doubtful. Perhaps as Mr. Thwaites hints *T. Arjuna* (*T. glabra*, *Enum.* 104) and *T. tomentosa* should be made one species.

VAR. 3. *coriacea*; leaves as in *T. tomentosa typica* but beneath with a close hard fulvous tomentum rather than villous, fruit pubescent with minute fulvous hairs. *T. coriacea*, *W. & A. Prodr.* 315. Pentaptera *coriacea*, *Roxb. Hort. Beng.* 34, *Fl. Ind.* ii. 438.—Mountains of the Coromandel Coast; *Roxburgh. Deccan; Herb. Rottler. Malabar Hills; Dr. Ritchie.*

SECT. III. **Chuncoa.** *Fruit* with three very unequal wings, rarely more than $\frac{3}{4}$ in., often much smaller.

9. **T. paniculata**, *Roth Nov. Sp.* 383; leaves oblong or elliptic acute adult nearly glabrous, panicles compound, fruit brown-red villous with one very broad and two narrow wings. *W. & A. Prodr.* 315; *Dalz. & Gibs. Bomb. Fl.* 92; *Bedd. Fl. Sylv.* t. 20; *Brand. For. Fl.* 226. *T. monoptera*, *Roth Nov. Sp.* 382. *T. trioptera*, *Heyne in Herb. Rottl.* Pentaptera *paniculata*, *Roxb. Hort. Beng.* 34, *Fl. Ind.* ii. 442; *DC. Prodr.* iii. 14; *Wall. Cat.* 3980. *Hiptage* sp., *Wall. Cat.* 9029.

MALABAR; lower hills from Bombay to Cochin; common: NILGHIRI and KURG mountains.

A large tree, the innovations rusty-tomentose. *Leaves* 4–7 in., lower subopposite, upper alternate, base cordate, two glands generally present near the base of the midrib beneath; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Spikes* very dense, bracteoles and young ovaries villous. *Fruit* about $\frac{1}{4}$ in. long, with one wing $\frac{1}{2}$ in. broad, the other two wings hardly $\frac{1}{2}$ in. broad.

10. **T. pyrifolia**, *Kurz For. Fl. Brit. Burma* i. 457; leaves crowded towards the ends of the branches oblong- or broadly-lanceolate glabrous, spikes simple, fruit indistinctly brown velvety with two broad wings and one very narrow one. Pentaptera *pyrifolia*, *Presl Epimel. Bot.* 215.

PEGU to TENASSERIM, frequent; *Kurz, Helfer (ex Presl).* PROME; *Maolelland.*

Attains 80 ft.; glabrous except the innovations and spikes. *Leaves* 2–4 in., coriaceous, narrowed into the petiole; petiole $\frac{3}{4}$ –1 $\frac{1}{2}$ in., without glands. *Calyx* densely tawny or brown-pubescent. *Fruit* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, the two lateral wings about $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, chartaceous, rounded and striated.—Mr. Kurz cites as a doubtful synonym *T. javanica*, *Miq. Fl. Ind. Bat.* i. pt. i. 602; the example of which at Kew agrees, but has no fruit.

11. **T. myriocarpa**, *Heurck & Muell. Arg. Obs. Bot.* 215; leaves oblong or elliptic acute, adult nearly glabrous, petiole very short, spikes paniced, fruit yellow shining with two very broad wings and one narrow one. *Kurz For. Fl. Brit. Burma* i. 457. Pentaptera *Saja*, *Wall. Cat.* 3983.

Subtropical valleys in SIKKIM and BHOTAN, alt. 1000–3000 ft., abundant. ASSAM HILLS; *Simons, Griffith.*—DISTRIB. Ava, Bhamo.

Attains 80–100 ft., the innovations pubescent-tomentose. *Leaves* 4–8 in., base obtuse, nerves numerous and very parallel, upper subopposite; petiole about $\frac{1}{4}$ in.,

usually with two glands at its apex. *Spikes* dense, bracteoles and young ovaries villose. Epigynous *disc* with very little or no hair. *Fruits* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, exceedingly numerous, minutely villous, broad wings each $\frac{1}{4}$ in. wide puberulous, the third acute hardly winged.—The top of the tree in flower appears pink, the middle white, from the panicles changing colour.

SECT. IV. *Fruit* large, 1–1 $\frac{1}{2}$ in., with two very broad wings. (Really allied to Sect. *Catappa*).

12. **T. bialata**, Kurz *For. Fl. Brit. Burma* i. 456; leaves clustered near the ends of the branches obovate narrowed into a very long petiole, spikes axillary simple elongate, fruit 2–3 $\frac{1}{2}$ in. wide rusty tomentose. Pentaptera bialata, Roxb. *Hort. Beng.* 34; *Fl. Ind.* ii. 441; *Wall. Cat.* 3986.

BURMA and the ANDAMANS; Maclelland, Kurz.

Attains 80–100 ft. *Leaves* 5 in., glabrous when adult; petiole 2 $\frac{1}{2}$ –3 $\frac{1}{2}$ in. *Spikes* very long, the upper flowers male, the lower hermaphrodite. Young *ovary* and calyx brown-pubescent or tomentose. *Calyx*-teeth hairy within. *Fruit* 1 $\frac{1}{4}$ –1 $\frac{3}{4}$ in. long.

VAR. *cuneifolia*, Wall. *Cat.* 3972; leaves lanceolate rather than obovate, fruit less than 1 in. long and nearly glabrous.—Prome; Wallich. Tenasserim and Andamans; Helfer No. 2182 Kew Distrib.

DOUBTFUL SPECIES.

T. MOLUCCANA, Wall. *Cat.* 3969 consists of leaves generally resembling those of *T. procera*, and a detached fruit which also resembles that of *T. procera*. But the petioles have a thickening simulating an articulation, and M. Planchon has suggested (by a note on the specimen) that the leaves are those of an *Elæocarpus*.

T. ANGUSTIFOLIA, Roxb. *Hort. Beng.* 33 and *Fl. Ind.* ii. 437; a large tree, tender parts hairy, leaves narrow-lanceolate acuminate glandular on the margin at the base, fruit scarcely distinguishable from that of *T. Chebula*, young leaves with much ferruginous hair. *T. travancorensis*, W. & A. *Prodr.* 314. Tinnevely and Travancore, Roxburgh.—No example known and not seen by anyone except Roxburgh; if it be not a variety merely of *T. Chebula*.

T. BENGALENSIS, Roxb. in *DC. Prodr.* iii. 12; leaves alternate obovate obtuse entire glabrous on both surfaces and the petioles without glands. In Bengal.—This species is not known by any authentic specimen and is insufficiently described: it is improbable that it is distinct from all the other known species.

2. CALYCOPTERIS, Lamk.

A diffuse shrub with drooping branches. *Leaves* opposite, shortly petioled, elliptic or ovate, acuminate, entire. *Racemes* dense, axillary, and crowded towards the ends of the branches so as to form large panicles. *Flowers* small, greenish, each with a lanceolate bract. *Calyx*-tube 5-ribbed, produced above the ovary; limb 5-fid, persistent and much enlarged in fruit. *Petals* 0. *Stamens* 10, the five upper ones between the calyx-teeth, the five others alternate with them and lower down on the calyx-tube. *Ovary* 1-celled, inferior; style subulate, simple; ovules 3, pendulous from the top of the cell. *Fruit* narrow ovoid, 5-ribbed, villous, 1-seeded, surmounted by the enlarged calyx. *Cotyledons* convolute.

1. **C. floribunda**, Lamk. *Dict. Supp.* ii. 41 and *Ill.* t. 357; *Brand. For. Fl.* 220. *C. nutans*, Kurz *For. Fl. Brit. Burma* i. 468. *Getonia floribunda*, Roxb. *Cor. Pl.* t. 87 and *Fl. Ind.* ii. 428; *Roth Nov. Sp.* 216; *DC. Prodr.* iii. 15; *Dalz & Gibs. Bomb. Fl.* 91; *Miq. Fl. Ind. Bat.* i. pt. i. 605; *W. & A. Prodr.* 315; *Wall. Cat.* 4013. *G. nutans*, Roxb. *Hort. Beng.* 33 and *Fl. Ind.*

ii. 428; *Wall. Cat.* 4012; *Miq.* l. c.; *DC. Prodr.* iii. 15. *Getonia nitida*, *Roth Nov. Sp.* 217. *Combretum sericeum*, *Wall. in Herb. Calc.*

On hot hills, alt. 500–2500 ft., abundant throughout the DECCAN and from ASSAM to SINGAPORE.

A dense shrub 6–12 ft. high, often gregarious, diffuse with drooping branches, not at all scandent, generally rusty villous; in the variety *nitida* of Roth the upper surface of the leaves is glabrous shining. *Leaves* 2–5 in., not narrowed into the petiole which is $\frac{1}{4}$ – $\frac{1}{2}$ in. *Panicles* often large and then more or less nodding. *Flowers* very like those of *Terminalia* and hardly larger. Base of *stamens* and style pilose or glabrous. *Calyx*-lobes in fruit $\frac{1}{2}$ –1 in. long, broad-lanceolate, becoming more or less papery, sometimes transparent showing conspicuously the veins. *Fruit* itself less than $\frac{1}{4}$ in. long. *Kurz*, in *Journ. As. Soc.* 1877, pt. ii. 59, divides this shrub into two species, viz.:—

1. *C. nutans*; leaves pubescent rarely almost glabrous, longer *stamens* $\frac{1}{4}$ – $\frac{1}{2}$ as long as the *calyx*-lobes.

2. *C. floribunda*; leaves glabrous, longer *stamens* as long as the long bluntish *calyx*-lobes.

3. **ANOGEISSUS**, *Wall.*

Trees or shrubs. *Leaves* alternate or falsely opposite, petioled, entire. *Flowers* in dense globose heads, on axillary peduncles much shorter than the leaves. *Calyx*-tube long attenuated above the ovary, subsistent; limb small with 5 lobes, deciduous. *Petals* 0. *Stamens* 10 in two series. *Ovary* inferior, 1-celled; style filiform, simple; ovules 2 pendulous from the top of the cell. *Fruits* small, coriaceous, compressed 2-winged, packed horizontally into dense heads. *Seed* 1; cotyledons convolute.—*DISTRIB.* Species 5: of which one is Tropical African, the other four Indian.

1. ***A. latifolia***, *Wall.*; *Bedd. Fl. Sylv.* t. 15; leaves broad elliptic obtuse at both ends, peduncles 1 or more from the same axil often branched, bracteoles inconspicuous, ripe fruits shining glabrous the beak as long as the nucleus or longer. *Wall. Cat.* 4015; *Brand. For. Fl.* 227. *Conocarpus latifolia*, *DC. Prodr.* iii. 17; *Roxb. Hort. Beng.* 34 and *Fl. Ind.* ii. 442; *Royl. Ill.* t. 45; *W. & A. Prodr.* 316; *Wight Ic.* t. 994; *Dalz. & Gibs. Bomb. Fl.* 91; *Miq. Fl. Ind. Bat.* i. pt. i. 605. *Andersonia altissima*, *Herb. Madr.*

From the HIMALAYA to CEYLON; very common, ascending to 3000 ft. Not in the Transgangetic Peninsula.

Attains 80 ft., but usually occurs as a small tree; leafless during most of the hot season. *Leaves* sometimes 5 in. with a petiole $\frac{1}{2}$ in., usually much smaller, sometimes acute, never acuminate. Innovations and *peduncles* more or less rusty-pubescent. *Fruit* sometimes $\frac{3}{8}$ in. (excluding the beak) by $\frac{1}{4}$ in. including the wings, usually smaller, more or less rusty-pubescent when young.

VAR. glabra; leaves glabrous beneath.

VAR. villosa; leaves small densely rusty villous on both surfaces. Mysore, C. B. Clarke.

VAR. parvifolia; leaves small ($\frac{1}{2}$ in.) silky pubescent. Central Provinces. *Brandis For. Fl.* 228.

2. ***A. acuminata***, *Wall.*; *Bedd. Fl. Sylv.* t. 16; leaves elliptic or oblong acute at both ends villous or pubescent beneath, peduncles solitary (rarely clustered) very rarely divided, ripe fruits shining glabrous. *Wall. Cat.* 4014; *Brand. For. Fl.* 228; *Kurz For. Fl. Brit. Burma* i. 466. *A. hirta*, *Wall. Cat.* 4016. *Conocarpus acuminata*, *Roxb. Hort. Beng.* 34 and *Fl. Ind.* ii. 443; *W. & A. Prodr.* 316; *DC. Prodr.* iii. 17 and *Mem. Combr.* t. 3; *Miq. Fl. Ind. Bat.* i. pt. i. 605.

VAR 1. typica; leaves usually broad-lanceolate fulvous beneath, peduncles with obovate bracts often leaflike large, fruit very broadly winged (twice as broad as high) with a deflexed pubescent beak much longer than the nucleus. *Andersonia acuminata*, *Herb. Rottl.*

The northern edge of the DECCAN ascending to 3000 ft. *BUNDELKUND*, *Edgeworth*. Mountains above the Circars; *Roxburgh*. *GODAVERY* forests; *Brandis*. North-west India, *Royle*.

A tree, sometimes attaining 60 ft.; trunk rarely straight, when young armed with long spines (*Kurz*). *Leaves* commonly $2\frac{1}{2}$ by 1 in., upper becoming smaller, often obovate, passing into bracts; petiole less than $\frac{1}{4}$ in. *Peduncles* and neck of ovary rusty-tomentose.

VAR. 2. lanceolata, *Wall. Cat.* 4014 F; leaves usually narrow-lanceolate grey beneath, bracteoles on the peduncles small linear very deciduous, fruit winged subquadrate with an erect beak shorter than the nucleus. *Andersonia lanceolata*, *Herb. Rottl.*

PEGU, *TENASSERIM* and *KOOKIE-LAND*.

An erect elegant tree 60-100 ft. high. *Leaves* commonly 2 by $\frac{1}{2}$ in., upper long-lanceolate; petiole scarcely any. *Peduncles* and neck of ovary with dense rusty spreading hairs. *Fruits* sometimes $\frac{1}{4}$ in. broad.

3. **A. phillyrææfolia**, *Heurck & Muell. Arg. Obs. Bot.* 209; leaves narrowly lanceolate narrowed upwards obtuse, peduncles short rarely divided, heads and fruit small, beak about as long as the nucleus. *Wall. Cat.* 8557.

PROME; *Wallich*.

Apparently a shrub or small tree. *Leaves* $1\frac{1}{2}$ in., subsessile, narrowed at base, glabrous or silky beneath. *Peduncles* $\frac{1}{4}$ - $\frac{3}{8}$ in., solitary or clustered, rusty-pubescent, much less shaggy than in *A. acuminata* var. *lanceolata*. *Fruits* about $\frac{1}{16}$ in. broad.—*Kurz*, in *Journ. As. Soc.* 1874, pt. ii. 188, reduces this to *A. acuminata*; but from the example he has communicated to Kew it appears that his *A. phillyrææfolia* is not the plant of *Heurck & Muell.* but *A. acuminata* var. 2 above. The present species however may prove only a more extreme form of *A. acuminata*.

4. **A. pendula**, *Edgw. Cat. Pl. Banda*, p. 47; leaves elliptic or obovate acute or obtuse always narrowed at base, peduncles solitary simple, fruit subquadrate ultimately glabrous, beak much less than half the height of the nucleus. *Brand. For. Fl.* 229. *A. myrtifolia*, *Wall. Cat.* 4017; *Royle Ill.* p. 209.

BUNDELKUND; *Edgeworth*. *NORTH-WEST INDIA*; *Royle*. Common in *RAJPUTANA*; *Brandis*. *DEESA*; *Stocks*.

A gregarious bush or small tree. *Leaves* $\frac{3}{4}$ -1 in., usually glabrous, sometimes silky beneath. *Peduncles* sometimes with an elliptic leaflike bract.—A species which may be distinguished at once by its small leaves.

4. **LUMNITZERA**, *Willd.*

Large glabrous shrubs or small trees, growing in tropical salt marshes along with Mangroves and closely resembling them in habit. *Leaves* clustered towards the ends of the branches, alternate, thickly leathery, subsessile, narrow-obovate, entire or scarcely crenate. *Flowers* in racemes. *Calyx*-tube with two adnate bracteoles near the base, oblong, narrowed at both ends, produced above the ovary; lobes 5 persistent. *Petals* 5, oblong. *Stamens* 10 in two series, or fewer. *Ovary* inferior, 1-celled; style subulate, simple; ovules 2-5 pendulous from the top of the cell. *Fruit* woody, elliptic-oblong, $\frac{1}{2}$ -1 in. including the calyx-limb, longitudinally striate or nearly smooth. *Seed* 1; cotyledons convolute.—*DISTRIB.* Species 2; on the shores of the tropics of the Old World, and of Polynesia.

1. **L. coccinea**, *W. & A. Prodr.* 316; racemes dense terminal sometimes 2 or 3 forming a small corymb, petals scarlet $\frac{1}{4}$ in. *Miq. Fl. Ind. Bat.* i. pt. i. p. 606. *L. littorea*, *Voigt.*; *Kurz For. Fl. Brit. Burma*, i. 469. *L. pentandra*, *Griff. Notul.* iv. 684, and *Id. Pl. Asiat.* t. 644. *Pyrranthus littoreus*, *Jack. Mal. Misc.* ii. 57; *Wall. Cat.* 4018.

MERGUI; *Griffith.* NICOBARS; *Kurz.* MALACCA; *Maingay, Griffith.*—DISTRIB. Malaya, North Australia, Polynesia.

A small tree 20-40 ft. high. *Leaves* 2-3 $\frac{1}{2}$ in. *Stamens* 5-10, usually 7; twice as long as the petals, filaments crimson.

2. **L. racemosa**, *Willd.*; *DC. Prodr.* iii. 22; racemes axillary somewhat dense in flower 2-4 in. long in fruit, petals white very small. *W. & A. Prodr.* 316; *Miq. Fl. Ind. Bat.* i. pt. i. 606; *Dalz & Gibs. Bomb. Fl.* 90; *Tulasne in Ann. Sc. Nat. Ser. iv. vol. vi. p. 103*; *Bedd. Fl. Sylv. Anal. Gen. Pl.* xxi.; *Brand. For. Fl.* 221; *Kurz For. Fl. Brit. Burma* i. 468. *Pyrranthus albus*, *Wall. Cat.* 4019. *Petaloma alternifolia*, *Roxb. Fl. Ind.* ii. 372. *Bruguiera madagascariensis*, *DC. Prodr.* iii. 23.—*Rheede Hort. Mal.* vi. t. 37.

On the coasts of INDIA, CEYLON and the TRANSGANGETIC PENINSULA as on the ANDAMANS and NICOBARS (*Kurz*); general.—DISTRIB. Tropical Africa, Malaya, North Australia and Polynesia, in the Mangrove swamps.

A small tree 20-40 ft. high. *Leaves* usually 2-3 in. sometimes only 1 in. *Stamens* sometimes 5, sometimes 10 (always 10 *Kurz*) about as long as the petals, filaments white. *Racemes* in fruit ascending.

5. COMBRETUM, Linn.

Large shrubs (except *C. nanum*) with long pendent or scandent branches, without spines (except *C. spinescens*). *Leaves* entire, petioled, opposite or more seldom alternate or ternate. *Flowers* polygamo-dicæious, often in paniced spikes or racemes; bracteoles small. *Calyx*-tube constricted above the ovary, shortly or long produced, urceolate, funnel-shaped or tubular; limb 4-5-lobed, deciduous. *Petals* as many as the calyx-lobes (0 in *C. apetalum*) placed on the calyx-limb. *Stamens* twice as many as the petals, inserted in two series with them. *Ovary* inferior, 1-celled; style 1, subulate, simple; ovules 2-5, pendent from the top of the cell. *Fruit* with 4-5 wings angles or ridges, dry, generally indehiscent. *Seed* 1; cotyledons plaited or flat, in a few species convoluted.—DISTRIB. Species 120, common in the tropics of America, Africa, and Asia; also in South Africa, but not in Australia or Polynesia.

SECT. I. **Polvrea**. *Flowers* 5-merous. *Fruit* 5-winged or 5-ridged.

* *Fruit* with 5 membranous wings.

1. **C. decandrum**, *Roxb. Cor. Pl.* t. 59; leaves oblong suddenly acuminate nearly glabrous on both surfaces when adult, panicles large terminal, young ovary densely villose, calyx hardly constricted above the ovary urceolate covered with short hairs within and without. *Roxb. Hort. Beng.* 28 and *Fl. Ind.* ii. 232; *G. Don in Trans. Linn. Soc.* xv. 437; *Wall. Cat.* 4009; *Brand. For. Fl.* 221; *Kurz For. Fl. Brit. Burma* i. 460. *C. Roxburghii*, *Spreng. Syst.* ii. 331. *Polvrea Roxburghii*, *DC. Prodr.* iii. 18; *W. & A. Prodr.* 317. *Pentaptera Roxburghii*, *Tulasne in Ann. Sc. Nat. Ser. iv. vol. vi. 84.*

BENGAL, abundant, alt. 0-3000 ft. North DECCAN plateau very common, less common South. NORTH WEST PROVINCES nearly to the Punjab. TENASSERIM and the ANDAMANS.

An exceedingly large shrub with many branches pendent and subsacandent, conspicuous in flower by the floral leaves (bracts) becoming cream-white. *Leaves* opposite, 4-5 in., somewhat hairy when young, when old glabrous or rarely with tufts of hairs in the axils of the nerves beneath; petiole $\frac{1}{2}$ in. *Racemes* numerous, very villous, in large terminal quasi-panicles, the leaves thereon 2-3 in., becoming petaloid at the time of flowering; bracteoles linear, $\frac{1}{2}$ in., somewhat persistent. *Ovary* sessile. *Calyx* segments lanceolate-subulate, suberect. *Petals* oblong, glabrous, hardly exceeding the calyx or twice as long as the calyx (Kurz). *Disc* covered with short hairs. *Fruit* $\frac{3}{4}$ -1 $\frac{1}{4}$ in., oblong or elliptic, subquadrate, nearly smooth.

2. **C. pilosum**, Roxb. *Hort. Beng.* 28, *Fl. Ind.* ii. 231; leaves oblong-lanceolate adult more or less hairy beneath, panicles terminal the racemes densely fulvous-villous and congested, young ovary fulvous-villous, calyx shortly constricted above the ovary then funnel-shaped hairy within and without. *G. Don in Trans. Linn. Soc.* xv. 434; *Wall. Cat.* 4005; *Kurz For. Fl. Brit. Burma* i. 462. *C. lætum* and *spinescens*, *Wall. Cat.* 4004, 4006. *C. insigne*, *Heurck & Muell. Arg. Obs. Bot.* 247 (from description only).

EAST BENGAL; alt. 0-1000 ft., from SILHET to MERGUI frequent.

A large scandent shrub without thorns, the innovations densely rusty-villous. *Leaves* opposite, 4-8 in., usually when adult with some rusty hair at least on the lower surface (but some of Griffith's specimens are quite glabrous); petiole $\frac{1}{2}$ - $\frac{1}{4}$ in. *Bracteoles* $\frac{1}{2}$ in., narrow-lanceolate, somewhat persistent. *Ovary* sessile. *Calyx*-tube upwards 5-fluted, the segments triangular acute erect. *Petals* narrow-obovate, far exceeding the calyx, with rusty silky hairs on their backs. *Disc* low in the funnel of the calyx with short hair. *Fruit* 1 in., elliptic or circular, usually pubescent, sometimes glabrous.

VAR. 2. *spinescens*; with stout spines at the base of the branchlets, otherwise does not differ. Irrawaddy bank; *Wall. Cat.* 4006. Cachar, Keenan.

Here perhaps belongs the very doubtful species described by Kurz in *Forest Fl. Brit. Burma*, i. 462 under the name *C. ovale*, R. Br., which is said to differ from *C. pilosum* by having the innovations puberulous instead of pubescent. The fruit is unknown. It can hardly be *C. ovale*, R. Br. which considerably differs as see under *C. aculeatum*, *Vent. in Oliv. Fl. Trop. Afr.* ii. 423.

3. **C. apetalum**, *Wall. Cat.* 3990; leaves oblong-lanceolate adult nearly glabrous, panicles terminal large much divided the ultimate racemes long slender distant, young ovary densely pubescent almost tomentose, calyx-tube hardly constricted above the ovary then urceolate pubescent within and without. *Kurz For. Fl. Brit. Burma* i. 460. *C. virgatum*, *Wall. Cat.* 3992.

PEGU; Wallich, Maclelland, Kurz.—DISTRIB. Burma.

A scandent shrub or (ex Kurz) a weak tree 15-20 ft. high. *Leaves* 1-4 in., subopposite, the petiole $\frac{1}{2}$ - $\frac{1}{4}$ in., and midrib beneath usually grey puberulous, sometimes long fulvous hair near the base of the main nerves beneath. *Racemes* long, undulating, very narrow, the flowers though numerous being very small; bracteoles $\frac{1}{2}$ in., linear, exceeding the young ovaries. *Ovary* sessile. *Calyx*-teeth lanceolate, erect. *Petals* 0. *Disc* covered by short hairs. *Fruit* $\frac{3}{4}$ in., elliptic, nearly circular, glabrous, surface between the wings covered with close sessile circular glands.

4. **C. pyriformum**, *Kurz For. Fl. Brit. Burma* i. 464; leaves small ovate to broad-oblong and suborbicular glabrous, spikes puberulous in slender axillary or short terminal panicles, fruits 5- or occasionally 4-winged. *Pentaptera pyrifolia*, *Wall. Cat.* 3985.

PEGU; Kurz.—DISTRIB. Burma.

A scandent shrub, with the habit of *Combretum ovalifolium*, the innovations rusty puberulous. *Leaves* 1 $\frac{1}{2}$ -2 in., opposite or alternate, punctate on the upper surface,

petiole $\frac{1}{2}$ in. *Fruit* $\frac{1}{2}$ – $\frac{3}{4}$ in., glabrous.—Herbarium twigs of this species are much like whole plants of *C. nanum*, but the fruits are hardly half as long.

**** *Fruit with 5 sharp angles.***

5. ***C. trifoliatum*, Vent. Choix t. 58**; leaves lanceolate or elliptic narrowed at both ends glabrous, spikes lateral and terminal often compound rusty-villous, calyx-tube hardly constricted above the ovary then urceolate silky. *G. Don in Trans. Linn. Soc. xv. 439*; *Miq. Fl. Ind. Bat. i. pt. i. 610*; *Kurz For. Fl. Brit. Burma i. 461*. *C. lucidum*, *Blume Bijl. 641*. *C. undulatum* and *C. elegans*, *Wall. Cat. 3993, 4003*. *C. subalternans*, *Wall. Cat. 4008*? *Terminalia lancifolia*, *Griff. Notul. iv. 685*. *Embryogonia lucida*, *Blume Mus. Bot. ii. t. 52*. *Cacoucia*? *trifoliata*, *DC. Prodr. ii. 22*. *C. lucida*, *Hassk. in Flora 1844, p. 607*.

TRANSANGANETIC PENINSULA from PEGU to SINGAPORE, alt. 0–1000 ft., frequent.—DISTRIB. Burma, Java.

A scandent shrub. *Leaves* 2–4 $\frac{1}{2}$ in., opposite, not seldom ternate, sometimes sub-alternate, usually shining, the petiole $\frac{1}{4}$ – $\frac{3}{8}$ in. (and sometimes the midrib) pubescent. *Bracteoles* linear, small, early deciduous. *Ovary* sessile. *Calyx*-teeth lanceolate, erect. *Petals* narrow, little exceeding the calyx. *Disc* and base of the calyx-tube within covered with long hair. *Fruit* about 1 $\frac{1}{4}$ in., and half as broad, shining, black.

SECT. II. ***Tetragonocarpus***. *Flowers* 4-merous. *Fruit* with 4 obtuse or acute ridges, the ridges not expanded into thin papery wings.

6. ***C. tetralophum*, C. B. Clarke**; leaves lanceolate glabrous or nearly so, racemes in subterminal panicles which are ferruginous and covered with scales but only slightly villose, calyx-tube constricted above the ovary then urceolate covered with ferruginous scales, fruit with very acute ridges.

MALACCA, *Griffith* (Kew Distrib. No. 2195)=*Combretum* No. 19 of *Hk. f. & T. distrib.*—DISTRIB. Siam, Borneo.

A scandent shrub. *Leaves* 4–5 in., opposite, shining, often with a little rusty hair along the base of the midrib beneath; young remotely glandular-punctate; petiole $\frac{1}{8}$ – $\frac{3}{8}$ in. *Bracteoles* $\frac{1}{16}$ in., soon deciduous. Constricted part of the calyx-tube nearly as long as the young ovary, the teeth triangular erect covered without by close flat sessile ferruginous glandular scales. *Petals* narrow, hardly exceeding the calyx-teeth. *Disc* and base of the calyx within densely covered by long fulvous hair. *Fruit* $\frac{3}{4}$ –1 in. and half as broad, shining, black.—This species in the fruit and leaves so much resembles *C. trifoliatum* above that it has been mixed with it as a 4-fid variety: but the flowers are altogether different, and there is not one 5-angled fruit on any of the Kew specimens.

7. ***C. tetragonocarpum*, Kurz For. Fl. Brit. Burma i. 461**; leaves elliptic obtuse coriaceous glabrous, spikes robust fulvous-villous axillary solitary and in thin terminal panicles, calyx-tube and ovary rusty-villous, fruit with four thick coriaceous prominent angles.

Swamp forests of PEGU; frequent, *Kurz*.

A glabrous large scandent shrub. *Leaves* 3–5 in., younger remotely glandular-punctate; petiole less than $\frac{1}{4}$ in. *Flowers* small. *Calyx*-tube short; limb cup-shaped with 4 short acute teeth, scaly and pubescent without, densely villous within. *Petals* minute. *Fruit* 1 in. and more, glabrous, pale brown, elliptic-ovate, the angles thick coriaceous sharp prominent and almost winglike, much narrower than the diameter of the nut.

The example of this species communicated to Kew by Kurz exhibits neither fruit nor flowers; the character of the species is therefore copied from Mr. Kurz.

It is evidently allied to *C. tetralophum*; the leaves on Mr. Kurz' specimen are very unlike those of *C. tetralophum*, but in many *Combretums* while the typical leaves are acute lanceolate there may be found on the same shrub lower branches with obtuse obovate leaves. Kurz however says that the calyx-tube in *C. tetragonocarpum* is "short oval," whereas in *C. tetralophum* it is "elongate nearly filiform," so that the two species must be distinct. He has placed this species in his section with 10 stamens and 5-merous flowers: this it is presumed is a slip.

8. ***C. acuminatum*, Roxb. Hort. Beng. 28, Fl. Ind. ii. 228**; leaves opposite ovate-lanceolate to lanceolate adult pubescent or nearly glabrous beneath, racemes scarcely divided axillary and also in sparingly leafy terminal panicles scaly and pubescent, calyx scarcely constricted above the ovary then campanulate, fruit narrowly oblong with four thick bluntish ridges. *Wall. Cat. 3998. C. costatum, Roxb. Hort. Beng. 28 and Fl. Ind. ii. 227; Kurz For. Fl. Brit. Burma i. 465. C. stenopetalum, Heurck & Muell. Arg. Obs. Bot. 225. C. sarcopoterum, Thwaites Enum. 415. C. neurophyllum? Miq. Fl. Ind. Bat. i. pt. i. 608 ex descript.*

TRANSANGANETIC PENINSULA from ASSAM to SINGAPORE, alt. 0-1000 ft., plentiful. CEYLON; *Thwaites, Mrs. Walker. MADRAS PENINSULA? Wight No. 1014* (Wight's specimen is typical *acuminatum* but may have come from Ceylon).—DISTRIB. Malaya to the Philippines.

A large scandent shrub. *Leaves* often 6-8 in., cordate or acute at the base, somewhat densely glandular-punctate beneath, the glands often prominent or becoming scales; petiole often very short, rarely exceeding $\frac{3}{8}$ in. *Bracteoles* minute, soon deciduous. Young *ovary* and calyx-tube scaly, hardly pubescent. *Calyx*-limb campanulate, grooved or fluted (at least in the dried specimens), teeth erect short triangular. *Petals* narrow, small. *Disc* and base of calyx-tube with short hair or nearly glabrous. *Fruit* 1-2 in. about $\frac{1}{2}$ as broad as long, puberulous brown.—In this species, and in some others, in the hermaphrodite flowers before the calyx expands a very small hole appears at the top through which the style is long protruded; subsequently the calyx opens and the stamens are long extruded.

The examples of *C. acuminatum*, *Roxb.* at Kew are abundant, but the name *C. costatum* *Roxb.* does not occur in the Kew Herbarium nor is the fruit described by *Roxb.* It is clear that Mr. Kurz understands by *C. costatum*, *Roxb.* the plant named *C. acuminatum*, *Roxb.* at Kew. It is almost certain that the two species of Roxburgh are but one. The two names are of one date, and in this list the name taken up by Wallich and subsequent Indian botanists is preferred to the name taken up by Mr. Kurz, especially as there is no doubt at all what Roxburgh's *C. acuminatum* was, while a doubt may be still raised about his *C. costatum*.

SECT. III. **Eucombretum.** *Flowers* 4-merous. *Fruit* with 4 papery wings. *Calyx* not long-tubular-campanulate above the constricted portion.

† *Surface of the fruit between the wings covered densely with lanceolate-linear scales $\frac{1}{8}$ - $\frac{1}{4}$ in.* (Subsection *Flagrocarpeæ*).

9. ***C. flagrocarpum*, Herb. Calc.**; leaves opposite elliptic- or ovate-lanceolate adult pubescent and prominently glandular-punctate beneath, racemes rusty-pubescent simple axillary and also crowded towards the ends of the branches, calyx funnel-shaped above the ovary glandular and somewhat pubescent without. *Pentaptera undulata, Wall. Cat. 3984* (not *Combretum undulatum*, *Wall.*). *Combretum* sp. No. 20, *Herb. Hk. f. & T. C. Wallichii, Kurz For. Fl. Brit. Burma i. 465 not of DC.*

NORTHERN and EASTERN BENGAL, ascending the hills to 5000 ft. alt.; very common, extending to Chittagong.—DISTRIB. Upper Burma.

A large scandent shrub. *Leaves* 4-6 in. (always large and generally more than 2 in. broad), even on the upper surface glandular-punctate and pubescent on the nerves, only ultimately becoming glabrous; petiole $\frac{1}{8}$ - $\frac{3}{8}$ in. *Bracteoles* often $\frac{1}{4}$ in., linear, subsistent. *Calyx*-teeth erect, short, triangular. *Petals* obovate, much longer than the calyx. *Disc* and base of calyx within clothed with short hair. *Fruit* 1-1 $\frac{1}{4}$ in. long and as broad, puberulous, brilliantly red or dark brown.

10. **C. Wallichii**, DC. *Prodr.* iii. 21; leaves opposite elliptic or orbicular acuminate adult glabrous beneath with tufts of yellow hair in the axils of the main nerves, racemes rusty-puberulous undivided axillary solitary and approximated almost paniced in the uppermost axils, calyx shortly constricted above the ovary then funnel-shaped or subcampanulate puberulous without. *Wall. Cat.* 3999.

NIPAL; *Wallich*. Interior of SIKKIM, alt. 4000-5000 ft. (Kulhait), C. B. Clarke. A scandent shrub. *Leaves* 2-4 in., glandular-punctate on both surfaces; petiole $\frac{1}{4}$ in. *Bracteoles* minute, fugacious. *Calyx*-tube filled densely with long hairs exsert from the mouth, teeth short triangular suberect. *Petals* small, obovate. *Fruit* $\frac{3}{4}$ -1 by 1 $\frac{1}{4}$ -1 $\frac{1}{2}$ in., rich dark-brown, puberulous.—The tufts of hair are seen in all the axils of the nerves beneath of *C. Wallichii*, in none of *C. flagrocarpum*; also the leaves of *C. Wallichii* are smaller and thinner than those of *C. flagrocarpum*: the constricted part of the calyx-tube of *C. Wallichii* is shorter and the flower within densely filled with fulvous hair; the bracteoles are different.—As to *Combretum Wallichii*, *Hassk. in Flora* 1844, p. 106, and *Mig. Fl. Ind. Bat. i. pt. i. p. 608*, which these authors suggest to be allied to *C. latifolium* or *C. Wightianum*, it can only be said that as they did not possess the fruit of *C. Wallichii* it is impossible to guess to what species their remarks refer.

†† *Surface of the fruit between the wings glabrous, pubescent, or with sessile glands, but not with elongate scales*

11. **C. squamosum**, Roxb. *Fl. Ind.* ii. 231; leaves opposite lanceolate to orbicular-elliptic acute adult glabrous, racemes lateral compound and terminal glabrous but covered with round flat glandular scales, calyx-tube shortly constricted above the ovary then funnel-shaped. *Wall. Cat.* 3987; *Mig. Fl. Ind. Bat. i. pt. i. 607*. *G. Don in Trans. Linn. Soc. xv. 438* (but *flowers not 5-fid*); *W. & A. Prodr.* 317; *Kurz For. Fl. Brit. Burma i. 463*. *C. lepidotum*, *Presl Bemerk.* 142 (see *Kurz in Flora* 1871, p. 289).

NORTHERN and EASTERN BENGAL near the foot of the mountains from NIPAL to CHITTAGONG and thence to SINGAPORE; plentiful.—DISTRIB. Malaya to the Philippines.

A large scandent shrub. *Leaves* 4-6 in. from a broad base, prominently covered with flat circular glandular scales on both surfaces, those on the upper surface sometimes ultimately disappear; upper leaves usually much smaller and narrower, often lanceolate. Axillary racemes usually divided, paniced, but on some branches all undivided; bracteoles subulate, fugacious. *Calyx*-teeth short, triangular. *Petals* obovate, small. *Disc* and base of calyx-tube within clothed with long fulvous hairs which are not exserted. *Fruit* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., sometimes broader than high or not; clothed between the wings with close flat round glands.

VAR. *aureum*, Wall. Cat. 3988. *C. malulæa*, Wall. Cat. 3991; same as the type, but turns a rich brown in drying.

12. **C. quadrangulare**, Kurz in *Journ. As. Soc. Beng.* 1874, pt. ii. 188; leaves subopposite lanceolate or elliptic attenuated into the petiole, racemes lateral compound and terminal covered with round flat glandular scales, flowers small, calyx-tube above the ovary campanulate. *C. attenuatum*, Wall. Cat. 3989.

MOULMEIN, *Wallich*. TENASSERIM, *Helser* No. 2181, *Kew Distrib.*

Whole plant covered with sessile flat circular scales, otherwise glabrous or nearly so. *Branchlets* quadrangular. *Leaves* 3-4 by $1\frac{1}{2}$ in. *Fruit* $\frac{1}{2}$ - $\frac{3}{4}$ in.—Hardly distinguishable from *C. squamosum* Roxb. but by the small flowers and the leaves attenuated at the base. C. Van Heurckii, *Muell. in Heurck & Muell. Arg. Obs. Bot.* 227, may as far as the description goes be this plant but the fruit is not described. Griffith's No. 725 quoted cannot be found at Kew.

13. **C. dasystachyum**, *Kurz Journ. As. Soc. Beng.* 1874, pt. ii. 187; leaves opposite and often ternate elliptic- or obovate-oblong acuminate densely pubescent on the nerves beneath, racemes rarely divided axillary solitary and subterminal 2-4 together, young ovary (and calyx without) glandular and minutely pubescent, calyx-tube distinctly constricted above the ovary then funnel-shaped, fruit large.

PEGU; *Kurz*. CHITTAGONG; *Hk. f. & Th.* ASSAM; *Jenkins*. CACHAR; *Keenan*.

A scandent shrub, the innovations rusty-pubescent or villous. *Leaves* 5-10 in., lower surface puberulo-punctate, upper punctate-scabrous; petiole $\frac{1}{8}$ - $\frac{3}{8}$ in., densely villous. *Racemes* in flower rusty-villous; bracteoles $\frac{1}{2}$ in., linear. *Calyx*-teeth triangular, acute, erect. *Petals* narrow obovate, small. *Disc* and base of calyx densely covered with long fulvous hair. *Fruit* $1\frac{1}{2}$ by 1 in., with scattered small round glands, otherwise glabrous.

14. **C. chinense**, *Roxb. Hort. Beng.* 28, *Fl. Ind.* ii. 230, not of *G. Don*; leaves opposite or ternate obovate or lanceolate adult glabrous, racemes undivided solitary axillary and approximated subterminal, young ovary (and calyx without) glandular and minutely pubescent, calyx-tube distinctly constricted above the ovary then funnel-shaped, fruit $\frac{3}{4}$ -1 in. often bright red when ripe. *Kurz For. Fl. Brit. Burma* i. 463. C. Griffithii, *Huerck & Muell. Arg. Obs. Bot.* 231, *vide Kurz*.

TRANSANGANETIC PENINSULA from ASSAM to TENASSERIM and PENANG; alt. 0-1000 ft. frequent.—*DISTRIB.* China, according to Roxburgh.

A scandent shrub, nearly glabrous. *Leaves* 3-5 in., punctulate on both surfaces; the points often obscure in age; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in. *Calyx*-teeth triangular, erect. *Petals* narrow-obovate, small. *Disc* and base of calyx within densely covered with long fulvous hair. *Fruit* about as broad as high, subglabrous.—There is no example of *C. chinense* Roxb. at Kew; Mr. Kurz has applied that name to var. *ternatum*, and the description fits well.

VAR. *ternatum*, *Wall. Cat.* 4002 (*sp.*); leaves often 3-nate obovate obtuse usually narrowed into the petiole, uppermost sometimes lanceolate.

VAR. 2. *Porterianum*, *Wall. Cat.* 4000 (*sp.*); leaves never 3-nate lanceolate or oblong distinctly acuminate.

15. **C. nanum**, *Ham. in Don Prodr.* 219; leaves opposite or all alternate from round obovate to lanceolate glabrous, racemes undivided subterminal generally few with one greatly elongated, young ovary and calyx without glabrous sparsely glandular punctulate, calyx-tube constricted above the ovary then funnel-shaped, fruit $1\frac{1}{2}$ by 1 in. or somewhat smaller puberulous or subglabrous. *DC. Prodr.* iii. 21; *G. Don in Trans. Linn. Soc.* xv. 429; *Wall. Cat.* 3994. *Brand. For. Fl.* 221.

HIMALAYA TERRAI from SIKKIM to the PUNJAB; *Wallich*, *Royle*, *Edgeworth*, *Vicary*, *Strachey & Winterbottom*, *J. D. H.*

A decumbent low shrub, burnt down annually by the forest fires; branches 6-18 in., glabrous, the racemes minutely pubescent. *Leaves* typically 4 by $3\frac{1}{2}$ in., but often much smaller and narrower, shining, coriaceous, with scattered points on

both surfaces; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Raceme* often subterminal and solitary, 6–7 in. with a peduncle 1–2 in.; bracteoles $\frac{3}{16}$ in., linear-spathulate. *Calyx*-teeth triangular, erect. *Petals* narrow-obovate, far exceeding the sepals. *Disc* and base of calyx within covered by long fulvous hairs.

16. **C. ovalifolium**, *Roxb. Hort. Beng.* 28, *Fl. Ind.* ii. 256; leaves opposite ovate to lanceolate glabrous or nearly so, racemes lateral much divided and terminal, young ovary and calyx without very glandular and slightly pubescent, calyx-tube shortly constricted above the ovary then widely campanulate. *W. & A. Prodr.* 317; *Wight in Hook. Bot. Misc.* iii. p. 86 with a figure; *Dalz. & Gibs. Bomb. Fl.* 90. *C. Heyneanum*, *Wall. Cat.* 4001. *C. Roxburghii* and *C. albidum*, *G. Don in Trans. Linn. Soc.* xv. 429. *C. laxum*, *Roxb. Fl. Ind.* ii. 230. *C. Wightianum*, *Thw. Enum.* 103 in part. *C. Thwaitesianum*, *Heurck & Müll. Arg. Obs. Bot.* 238.

Throughout the DECCAN PENINSULA, common; and in CEYLON.

A large scandent shrub, nearly glabrous. *Leaves* typically $4\frac{1}{2}$ by 3 in., but often shorter and much narrower, shining, quite glabrous or more rarely with some brown hair about the base of the midrib beneath; petiole $\frac{1}{2}$ in. *Bracteoles* minute; buds subglobose, obtuse. *Calyx*-teeth triangular, acute, reflexed. *Petals* narrowly obovate, scarcely exceeding the calyx. *Disc* and base of the calyx within with much long hair. *Fruit* $\frac{3}{4}$ in. long and nearly the same in breadth, dark brown, nearly glabrous. —Mr. Thwaites has sent to Kew (under number 1601, named *C. Wightianum*) two plants, viz., *C. ovalifolium* *Roxb.* and *C. extensum* *Roxb.*; upon which Van Heurck and Müll. Arg. have founded two new species.

SECT. IV. **Quisqualoides**. *Fruit* with 4 membranous wings. *Calyx* constricted above the ovary and then produced into a cylindrical tube $\frac{1}{2}$ – $\frac{1}{5}$ in., terminated by a short campanulate 4-fid limb.

17. **C. extensum**, *Roxb. Hort. Beng.* 28, *Fl. Ind.* ii. 229; leaves opposite ovate or elliptic acute glabrous or nearly so, racemes lateral rarely divided often elongate and terminal subpaniculate, young ovary (and calyx without) puberulo-pubescent, calyx-teeth triangular acuminate reflexed, buds ovate very acute. *Wall. Cat.* 3996; *G. Don in Trans. Linn. Soc.* xv. 422; *Miq. Fl. Ind. Bat.* i. pt. i. 608; *Kurz For. Fl. Brit. Burma* i. 463. *C. rotundifolium*, *Roxb. Fl. Ind.* ii. 226; *Wall. Cat.* 3995. *C. Wightianum*, *Wall. Cat.* 4007; *W. & A. Prodr.* 317; *Wight Ic.* t. 227; *Dalz. & Gibs. Bomb. Fl.* 90. *C. Horsfieldii*, *Miq. l.c.* 609; *Kurz in Flora* 1871, p. 289. *C. platyphyllum*, *Heurck & Muell. Arg. Obs. Bot.* 242; *Kurz in Journ. As. Soc.* 1874, pt. ii. 188. *C. macrostachyum*, *Wall. Cat.* 3997. *C. latifolium*, *Blume Bijl.* 641; *Miq. l.c.* 609. *C. leucanthum*, *Heurck & Müll. Arg. Obs. Bot.* 240. *C. formosum*, *Griff. Notul.* iv. 682, *fide Kurz*. —*Rheede Hort. Mal.* vii. t. 23.

DECCAN PENINSULA. CEYLON. TRANSGANGETIC PENINSULA from SILHET to SINGAPORE.—DISTRIB. Malaya.

A large scandent shrub, glabrous or nearly so. *Leaves* 4–8 (sometimes 10 in.) punctate on both surfaces when young; petiole usually short but sometimes 1 in. *Racemes* very thickly covered with flowers, sometimes short but generally elongate 4–6 in. *Calyx* with a ring of hairs at the base within, but not entirely filled by long hair. *Petals* narrow-obovate, slightly exceeding the calyx. *Fruit* $1\frac{1}{4}$ in. and nearly as broad, puberulo-glandular or nearly glabrous.

18. **C. sundacum**, *Miq. Fl. Ind. Bat. Suppl.* 327; leaves opposite ovate or oblong suddenly acuminate mature nearly glabrous, spikes subglobose dense in ample terminal panicles, young ovary and calyx without punctate-glandular

scarcely pubescent, calyx-teeth triangular acuminate reflexed, buds ovate very acute.

MALACCA, *Maingay* No. 1681.—DISTRIB. Sumatra.

Leaves 3-5 in., punctulate on both surfaces; petiole $\frac{1}{2}$ in. *Calyx* with a ring of hairs at its base within but not densely filled with long hair. *Fruit* 1 in. and nearly as broad, brown, nearly glabrous.—This species so exactly coincides with *C. extensum* in its flowers and fruits that it may be doubted whether it is specifically distinct. The leaves appear smaller and thinner, and the dense heads of flowers at the ends of the branches of a large panicle give it a very different aspect.

EXCLUDED AND DOUBTFUL SPECIES.

COMBRETUM sp. 2. *Griff. Notul.* iv. 682 is probably one of the large *Terminalias*.

COMBRETUM (Sect. *Poivreia*) SEMI-ADNATUM, *Heurck & Muell. Arg. Obs. Bot.* 244; leaves ternate short-petioled elliptic acute at first simply puberulous, racemes axillary long-peduncled dense, flowers long pedicelled, bracteoles adnate to the pedicels for half their length. "In the East Indies."—This must be very distinct from all the known Indian species by its long-stalked ovary; otherwise it might be *C. trifoliatum*.

COMBRETUM OVALE, *Br.* See under 2. *pilosum*.

6. QUISQUALIS, Linn.

Rambling subscandent large shrubs. *Leaves* opposite, oblong or obovate, acuminate, entire. *Flowers* in short spikes, axillary and terminal, white or red. *Calyx*-tube prolonged long and slender above the ovary, deciduous; limb 5-fid. *Petals* 5. *Stamens* 10, short. *Ovary* 1-celled; style filiform, somewhat adherent to the calyx-tube, stigma subcapitate; ovules 3-4, pendulous from the apex of the cell. *Fruit* dry, coriaceous, 5-angled or 5-winged, subindehiscent. *Seed* 1, cotyledons (occasionally 3, *Kurz*) not convolute.—DISTRIB. Species 4, tropical; 3 Indian, 1 African.

Known from *Combretum* Sect. *Poivreia* by the elongate calyx-tube, and from *Combretum* Sect. *Quisqualoides* by the 5-merous flowers and the fruit.

1. *Q. indica*, Linn. *Sp. Pl.* 556; calyx-tube above the ovary $1\frac{1}{2}$ - $2\frac{1}{2}$ in., calyx-teeth triangular acute not acuminate, fruit with very sharp angles scarcely winged. *Lour. Fl. Cochinch.* 336; *Lamk. Ill.* t. 357; *DC. Prodr.* iii. 23; *Roxb. Fl. Ind.* ii. 427; *Wall. Cat.* 4010; *Wight Ill.* t. 92; *W. & A. Prodr.* 318; *Miq. Fl. Ind. Bat.* i. pt. i. 610; *Brandis For. Fl.* 220. *Q. villosa*, *Roxb. Fl. Ind.* ii. 426; *Spreng. Syst.* ii. 331; *DC. Prodr.* iii. 23. *Q. glabra*, *Burm. Fl. Ind.* t. 28. *Q. pubescens*, *Burm. Fl. Ind.* t. 35. *Q. ebracteata*, *Beauv. Fl. Owar.* t. 35. *Q. Loureiri*, *G. Don Gen. Syst.* ii. 667. *Q. sinensis*, *Lindl. in Bot. Reg. N.S.* vol. xxx. t. 15. *Q. longiflora*, *Presl Epinel.* 216. *Quisqualis* sp., *Griff. Notul.* iv. 683.—*Rumph. Herb. Amboin.* v. t. 38.

Throughout INDIA, alt. 0-1000 ft., cultivated: wild probably in the TRANS-GANGETIC PENINSULA.—DISTRIB. Cultivated generally in the tropics, wild in Malaya.

Leaves 4 in., nearly glabrous or in var. *villosa* shortly pubescent beneath; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., rusty villous as are the innovations. *Spikes* somewhat dense; bracteoles $\frac{3}{8}$ in., usually lanceolate, but variable, generally subpersistent. *Petals* rose or scarlet, oblong or nearly round. *Fruit* $\frac{3}{4}$ -1 $\frac{1}{4}$ by scarcely $\frac{1}{2}$ in., glabrous, black, very acute at the top.

2. **Q. densiflora**, Wall. Cat. 4011; tube of the calyx above the ovary $\frac{1}{2}$ – $\frac{3}{4}$ in., calyx-teeth lanceolate-subulate, fruit distinctly winged. *Miq. Fl. Ind. Bat.* i. pt. i. 611. *S. confertum*, Jack in Hook. *Comp. Bot. Mag.* i. 155; *Miq.* l. c. 611.

PENANG; Wallich. MOULMEIN; Falconer. MALACCA; Griffith. SINGAPORE; Lobb.

Leaves 4–6 in., nearly glabrous; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., rusty-pubescent. Spikes dense, fulvo-pubescent; bracteoles $\frac{1}{2}$ – $\frac{3}{4}$ in., lanceolate, pubescent, subpersistent. Petals less than $\frac{1}{4}$ in., scarlet. Fruit 1 by $\frac{2}{3}$ in., shining, quadrangular, oblong; the wings narrow but distinct, papery.—This species seems congeneric with *Combretum pilosum* above.

3. **Q. malabarica**, Bedd. Ic. Pl. Ind. Or. t. 155; calyx-tube above the ovary $\frac{2}{3}$ in., calyx-teeth lanceolate-subulate, petals $\frac{1}{2}$ in. and more.

DECCAN PENINSULA; Carcoor Ghat, Wynaad, alt. 1500 ft., Beddome.

A large climber, nearly glabrous, the petioles becoming permanent as rigid spines. Leaves 4–5 in.; petiole $\frac{3}{8}$ in., glabrous. Spikes somewhat few-flowered, minutely grey-puberulous or pubescent; bracteoles $\frac{1}{2}$ in., linear. Petals pink. Fruit unknown.—Much more glabrous than *Q. densiflora*, the bracteoles much smaller, the petals much longer.

7. ILLIGERA, Blume.

Scandent shrubs. Leaves alternate, petioled, with three entire petioluled leaflets. Flowers in elongate lax peduncled cymes; bracteoles 1–3 at the base of each flower. Calyx-tube shortly constricted above the ovary; limb of 5 valvate oblong deciduous lobes. Petals 5, valvate, oblong, alternate with and as long as the calyx-lobes. Stamens 5, epigynous, filament near the base carrying on each side a staminode; anthers dehiscing by lateral valves. Ovary 1-celled; style 1, filiform, ending in a dilated undulate sinuated stigma; ovule 1, pendulous from the apex of the cell. Fruit broadly 2–4-winged (2-winged in the Indian species known) the wings veined. Seed with plane-convex (not convoluted) cotyledons.—DISTRIB. Species 7 or 1, extending from Khasia to Singapore, Malaya and the Philippines: and one aberrant species in Angola having 5 leaflets.

1. **I. Coryzadenia**, Meissn. in DC. Prodr. xv. pt. i. 251; leaflets pubescent on the nerves beneath fulvo-pilose on the midrib above punctate at least while young, staminodes sub-petaloid hooded and enfolded not emarginate. *I. appendiculata*, Blume; Kurz For. Fl. Brit. Burma i. 469. *Coryzadenia trifoliata*, Griff. Notul. iv. 356.

MERGUI; Griffith. TENASSERIM, Helfer (Kew Distrib. No. 4341 partly). ANDAMANS; Kurz.

Stem striate, nearly glabrous. Petiole 2–4 in. petiolules $\frac{1}{8}$ –1 in. (variable as in most of the species), more or less fulvo-pilose; leaflets 2–4 in., oblong or broad-elliptic, suddenly acuminate, usually cordate at base but sometimes acute; the lower leaves often much larger and their leaflets nearly orbicular. Cymes often 6–8 in.; bracteoles minute, ovate, and the calyx without minutely pubescent. Fruit 1 by $2\frac{1}{4}$ in. including the wings, softly minutely pubescent.—Kurz (in Journ. As. Soc. 1877, pt. ii. 59) unites the two species of Meissner, viz., *I. Coryzadenia* and *I. appendiculata*.

2. **I. Kurzii**, C. B. Clarke; leaflets glabrous epunctate very coriaceous with an incurved cartilaginous margin, staminodes subpetaloid hooded and enfolded not emarginate, fruit $2\frac{1}{2}$ – $3\frac{1}{2}$ in. wide 2-winged.

BURMA (Karens); *Kurz*. Mikir Hills, KHASIA; *Simons*. TENASSERIM; *Helfer* (Kew Distrib. No. 4341) partly. MALACCA, *Maingay* No. 649, 650.

Stem striate, nearly glabrous. *Petiole* 2-5 in.; *petiolules* $\frac{1}{2}$ -1 in.; *leaflets* elliptic-lanceolate, those from the lower stem broader sometimes nearly orbicular. *Cymes* often 6-8 in.; *bracteoles* very small, ovate, and as the calyx without minutely pubescent. *Fruit* 1 in. long, the wings brown nearly glabrous with horizontal striations. —If *Meissner's* species are united as proposed by *Mr. Kurz*, this must be regarded as a variety.

3. **I. Khasiana**, *C. B. Clarke*; *leaflets* glabrous with tufts of long yellow hairs in the nerve-axils beneath and sometimes minutely setose on the midrib on the upper surface, *staminodes* not petaloid concave deeply emarginate, *fruit* $2\frac{1}{4}$ in. wide (not quite ripe) 2-winged.

KHASIA; *Griffith* (Kew Distrib. No. 4340); *Churra*, alt. 3000-4000 ft., *J. D. H. & T. Thomson*; *Likinsow*, 2500-3000 ft., *C. B. Clarke*.

Stem striate, nearly glabrous. *Petiole* 2-5 in.; *petiolules* $\frac{1}{2}$ -1 in.; *leaflets* elliptic-lanceolate (no lower leaves preserved). *Cymes* often 6-10 in.; *bracteoles* very small, ovate, and as the calyx without minutely pubescent. *Fruit* 1 in. long and more, the wings brown nearly glabrous with horizontal striations.

DOUBTFUL SPECIES.

I. OBTUSA, *Meissn. in DC. Prodr.* xv. pt. i. 251 founded on *Wight's Herb. No. 394* is said to have *drupes* 5 lines long 4 lines thick, and therefore cannot belong to the genus *Illigera* as at present defined. There is no example in the Kew Herbarium of any *Illigera* from the Deccan Peninsula.

8. **GYROCARPUS**, *Jacq.*

A tall tree. *Leaves* alternate, long petioled, large, entire or lobed, clustered towards the ends of the branches. *Flowers* small, unisexual, very numerous, clustered in large branched cymes without bracts. MALE flowers very numerous; *calyx* 4-7-partite; *petals* 0; *stamens* 4-7, inserted at the base of the calyx with as many alternate clavate glands, *anthers* dehiscing by valves; *ovary* 0. FEMALE or hermaphrodite flowers few; *calyx-tube* adherent to the ovary, limb 2-partite, persistent, enlarging in fruit; *petals* and *stamens* 0; *ovary* 1-celled; *style* 0, *stigma* sessile; *ovule* solitary pendulous from the apex of the cell. *Nut* bony, crowned by the elongate spathulate coriaceous calyxlobes. *Seed* with convolute cotyledons.

1. **G. Jacquini**, *Roxb. Hort. Beng.* 11, *Cor. Pl.* t. 1, *Fl. Ind.* i. 445; *Lamk. Ill.* t. 850; *Bedd. Fl. Sylv.* t. 196; *Kurz For. Fl. Brit. Burma* i. 470. *G. asiaticus*, *Willd. Sp. Pl.* iv. 982; *Wall. Cat.* 968; *Miq. Fl. Ind. Bat.* i. pt. i. 978; *DC. Prodr.* xv. pt. i. 248. *G. americanus*, *Jacq. Pl. Amer.* t. 178. *G. acuminatus*, *Meissn. in DC. Prodr.* xv. pt. i. 248. *G. sphenopterus* and *G. rugosus*, *R. Br. Prodr.* 405.

DECCAN PENINSULA, alt. 0-1000 ft., frequent. BENGAL, rare. MALAY PENINSULA, frequent. —DISTRIB. The tropics of the whole world near the sea.

Attains 60-80 ft. (*Kurz*). *Leaves* (of full-grown trees) 4-5 in. and as broad, broadly ovate, acuminate, entire, generally glabrous, those of young plants often very large deeply lobed and more or less pubescent. *Peduncles* 1-3 in., in the upper axils. *Drupes* $\frac{1}{2}$ - $\frac{3}{4}$ in., ovoid; *calyx-lobes* 2-3 in.

ORDER LIX. **MYRTACEÆ.** (By J. F. Duthie, F.L.S.).

Trees or shrubs, rarely herbs. *Leaves* opposite, seldom alternate or whorled, petioled, simple, entire, rarely denticulate or crenate, 3-nerved or pinnately-nerved and usually with an intramarginal nerve, generally coriaceous and dotted with pellucid glands. *Stimules* if present small and deciduous. *Flowers* regular, very rarely irregular, hermaphrodite or polygamous by arrest, axillary, solitary or in spikes cymes corymbs or heads, naked or with an involucre, often with 2 bracts at the base, white, pink, purple, or yellow, never blue. *Calyx* superior or $\frac{1}{2}$ -superior, limb 4-5-many-fid or -partite, persistent or deciduous, valvate or imbricate, sometimes entire or closed in bud. *Petals* inserted on a disk surrounding the cavity of the calyx, equal in number to the calyx-lobes and alternate with them, rarely 0. *Stamens* usually ∞ , inserted with the petals in several rows, rarely definite and alternate with the petals; filaments free or more or less coherent at the base or in bundles opposite the petals; anthers small roundish with parallel cells bursting longitudinally. *Ovary* inferior or $\frac{1}{2}$ -inferior, crowned by a fleshy disk, 1-celled with 1 or more ovules, or 2-many-celled with ∞ ovules; placentation axile (parietal in *Rhodamnia*); style terminal rarely lateral, smooth or bearded at the summit; stigma undivided. *Fruit* usually crowned with the calyx-limb, either 1-celled and 1-seeded by arrest, or 2-many-celled with loculicidal or septicidal dehiscence; or baccate and indehiscent with the cells many-seeded or 1-seeded by arrest. *Seeds* angular cylindric or compressed; testa hard or membranous, sometimes winged; albumen 0; embryo straight curved or spirally twisted, cotyledons usually short and obtuse sometimes combined into a mass with the radicle, very rarely leafy, radicle often thick close to the hilum.—**DISTRIB.** Tropical and subtropical regions of both hemispheres; species upwards of 1800.

Species of the Australian genus *Eucalyptus* are being successfully cultivated on the Nilghiri hills and in other parts of India. The common Myrtle (*Myrtus communis*, L.) is extensively grown in India, the leaves being used in native medicine; it extends from the Mediterranean region as far as Afghanistan and Beluchistan. Allspice (*Pimenta acris*, Wight), a West Indian tree, is much cultivated for the sake of its aromatic leaves and berries.

Glaphyria sericea, Jack. in Trans. Linn. Soc. xiv. 128, from Penang, may be a species of *Leptospermum* by description only. *Myrtus androsæmoides*, Poir. is *Myonima multiflora*, Ait. A native of Mauritius. *Hiræa Finlaysoniana*, Wall. Cat. 3566 F. is *Decaspermum paniculatum*, Kurz.

A. Fruit capsular.

TRIBE I. Leptospermææ. *Ovary* 2-5-celled. *Fruit* opening by as many valves.

Leaves narrow.

Stamens definite (10 or fewer) free, in one series. *Leaves* alternate. *Flowers* few or solitary in the axils.

1. BÆCKEA.

Stamens ∞ , free, in one series. *Leaves* alternate. *Flowers* few or solitary in the axils.

2. LEPTOSPERMUM.

Stamens ∞ , slightly combined below into bundles opposite the petals and exceeding them. *Flowers* in heads or spikes.

3. MELALEUCA.

Leaves broad. *Stamens* ∞ , united into 5 bundles opposite the petals. *Flowers* in axillary cymes.

4. TRISTANIA.

B. Fruit fleshy.

TRIBE II. **Myrteæ**. Ovary 2- or more-celled (except *Rhodamnia*). Fruit a berry or drupe.

Limb of calyx closed in bud with the lobes subimbricate, rather deeply valvately divided when in flower *4. PSIDIUM.

Limb of calyx 4-5-lobed or -partite in bud, not becoming further divided when in flower.

Ovary 1-celled with 2 parietal placentas. Leaves 3-nerved 5. RHODAMNIA.

Ovary 1-3-celled with double rows of ovules in each cell separated by spurious partitions. Leaves sometimes 3-nerved 6. RHODOMYRTUS.

Ovary 5- rarely 4-celled with 2-6 ovules in each cell. Embryo long and narrow, curved, circular, or spiral, with small cotyledons 7. DECASPERMUM.

Ovary 2-3-celled with several ovules in each cell and without spurious partitions. Embryo thick and fleshy, not divisible, or with 2 thick fleshy cotyledons and a short radicle 8. EUGENIA.

TRIBE III. **Lecythideæ** (Sub-tribe Barringtoniæ). Ovary 2- or more-celled. Fruit indehiscent, hard and fibrous or fleshy. Leaves alternate, not gland-dotted.

Stamens all perfect. Fruit angular, fibrous, 1-seeded . . . 9. BARRINGTONIA.

Outer or inner stamens or both without anthers. Fruit ovoid or globular, fleshy, many-seeded 10. CAREYA.

1. **BÆCKEA**, Linn.

Glabrous heath-like shrubs. Leaves opposite, narrow, pointed, with many pellucid glands. Flowers normally 5-merous, axillary, peduncled, with 2 minute bracts at their base. Calyx-tube campanulate; lobes 5, membranous, persistent. Petals 5, suborbicular. Stamens 10 or fewer, shorter than the petals. Ovary inferior or $\frac{1}{2}$ -inferior, 2-3-celled, with several ovules in each cell. Capsule bursting from above loculicidally. Seeds angular; embryo straight with short cotyledons.—DISTRIB. Species about 50, the greater number Australian, a few in New Caledonia, one only extending into India.

1. **B. frutescens**, Linn.; leaves linear pointed ascending or spreading, flowers axillary shortly peduncled, calyx-lobes roundish petaloid, stamens 10 rarely 8, ovary 3-celled. DC. Prodr. iii. 229; Sm. in Trans. Linn. Soc. iii. 260; Bot. Mag. t. 2802; Blume Mus. Bot. i. 69; Miq. Fl. Ind. Bat. i. pt. i. 406; Benth. Fl. Hongk. 118. B. Cumingiana, Schauer in Walp. Rep. ii. 920. B. chinensis, Gaertn. Fruct. i. 157, t. 31.—Osbeck Itin. 231, t. 1.

Eastern Peninsula; MALACCA, Griffith, Maingay, Cuming, Lobb, Low.—DISTRIB. Sumatra, Borneo, Philippines, S. China.

A slender shrub with rod-like branches. Leaves small, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, flat or somewhat channelled above, convex beneath. Peduncles usually solitary and short with 2 minute bracts at the base. Flowers small, white, 5-merous, occasionally 4-merous. Calyx-tube campanulate.

2. **LEPTOSPERMUM**, *Forst.*

Shrubs, rarely small trees, glabrous or silky-pubescent. *Leaves* alternate, entire, rigid, with 1–3 nerves or nerveless. *Flowers* solitary in the axils of the leaves, or 2–3 together at the ends of the branches, rarely peduncled, sometimes polygamous; bracts broad, scarious, often imbricate, the lower ones soon falling off. *Calyx-tube* broadly campanulate or turbinate, adnate to the ovary below, the free upper part broad; lobes 5. *Petals* 5, spreading. *Stamens* ∞ , in a single series, not longer than the petals; anthers versatile, their parallel cells bursting longitudinally; connective swollen, gland-like. *Ovary* inferior or $\frac{1}{2}$ -inferior, enclosed in the calyx-tube, 5- or more-celled, rarely 3- or 4-celled; style filiform, inserted in a deep depression of the ovary, sometimes short, stigma capitate or peltate. *Capsule* usually exceeding the calyx-tube, opening loculicidally from above. *Seeds* ∞ , linear or winged, often sterile; embryo straight.—**DISTRIB.** Species upwards of 25, chiefly Australian, a few in New Zealand and New Caledonia.

1. **L. amboinense**, *Blume Bijdr.* p. 1100; *Mus. Bot.* i. 68; glabrous or silky on the young parts, leaves linear-lanceolate or obovate obtuse, flowers sessile or nearly so solitary terminal or axillary, ovary 5-celled. *DC. Prodr.* iii. 229; *Miq. Fl. Ind. Bat.* i. pt. i. 404. *L. flavescens*, *Sin. in Trans. Linn. Soc.* iii. 262; *DC. Prodr.* iii. 227; *Bot. Mag.* 2695; *Benth. Fl. Austral.* iii. 104, var. *a.* *Macklottia amboinensis*, *Korth. in Ned. Kruidk. Arch.* i. 196.—*Myrtus amboinensis*, *Rumph. Herb. Amb.* ii. 77, t. 18.

MALACCA; *Griffith, Maingay, Low.*—**DISTRIB.** Indian Archipelago, and from Queensland to Tasmania.

A shrub. *Leaves* 1 in. and smaller, 1–3-nerved or the nerves indistinct, narrowly or broadly oblong or even obovate. *Flowers* sometimes $\frac{1}{2}$ in. across. *Calyx* glabrous, tube broadly campanulate; lobes rather shorter than the tube. *Anthers* attached to a purplish gland-like connective. *Ovary* glabrous, prominent above the calyx-tube, and with a central depression round the style.

2. **L. javanicum**, *Blume Bijdr.* 1100; *Mus. Bot.* i. 68; leaves lanceolate obtuse obscurely 3-nerved tipped with a deciduous mucro, ovary 5-celled. *L. floribundum*, *Jungh. Java* i. 578. *Macklottia javanica*, *Korth. Ned. Kruidk. Arch.* (1847), 196.

MOULMEIN; exposed rocks, alt. 5000 ft., *Lobb.*—**DISTRIB.** Java, Sumatra?

A shrub, $\frac{1}{2}$ –1 ft. high. *Leaves* $\frac{1}{2}$ –1 in. by $\frac{1}{4}$ in., narrowly obovate with silky hairs on the edges and beneath, midrib prominent beneath, lateral nerves soon vanishing upwards. *Flowers* about $\frac{1}{2}$ in. across, few or solitary, axillary. *Calyx-lobes* ovate, obtuse, membranous, deciduous. *Anthers* attached to a dark-coloured gland-like connective. *Style* about $\frac{1}{2}$ in.; stigma capitate. *Capsule* 5-celled, smooth, smaller than in Miquel's specimens from Java.

3. **MELALEUCA**, *Linn.*

Trees or shrubs. *Leaves* alternate, rarely opposite, entire, lanceolate or linear, flat or subterete, 1–3-many-nerved. *Flowers* in heads or spikes, each sessile in the axil of a floral leaf, 5-merous; bracts deciduous. *Calyx-tube* subglobose; lobes 5, imbricate or open. *Petals* 5, spreading, deciduous. *Stamens* ∞ , more or less united at their bases into 5 bundles opposite the petals; anthers versatile, the cells parallel and bursting longitudinally. *Ovary* infe-

rior or $\frac{1}{2}$ -inferior, enclosed in the calyx-tube, usually with many ovules in each cell. *Capsule* opening loculicidally from above by 3 valves. Perfect *seeds* cuneate; embryo straight, cotyledons longer than the radicle.—*DISTRIB.* Upwards of 100 species, all Australian, one of them extending into Tropical Asia.

1. **M. Leucadendron**, *Linn.*; leaves alternate elliptic or lanceolate straight oblique or falcate 3–7-nerved with anastomosing nerves, spikes long interrupted solitary or 2 or 3 together terminal at first and then surmounted by leafy branches, rachis and calyx glabrous or woolly. *Benth. Fl. Austral.* iii. 142; *Kurz in Journ. As. Soc. Beng.* xvi. (1877) pt. ii. p. 61; *For. Fl. Brit. Burm.* i. 472.

TENASSERIM and MERGUI, *Griffith*; MALACCA, *Maingay*, *Cuming*.—*DISTRIB.* Malay Islands to Australia.

A tree, often of large size, with a thick spongy bark peeling off in layers, and pendulous branches; or stunted and with stiff erect branches. *Leaves* often vertical, acuminate acute or obtuse, narrow and 6–8 in., or broader more rigid and 2–4 in. *Flower-spikes* 2–6 in. *Calyx-tube* ovoid; lobes roundish and often scarious at the margin. *Petals* $\frac{1}{2}$ in. *Staminal bundles* under $\frac{1}{2}$ in., each with 5–8 filaments. *Ovules* ∞ , ascending, attached to an oblong placenta. *Fruiting-calyx* about $\frac{1}{2}$ in. in diam. *Seeds* obovoid or cuneate; cotyledons obovate, thick, much longer than the radicle.

The following are the principal varieties of this species, concerning which Mr. Bentham remarks (*Fl. Austral.* iii. 142):—"This species, very widely spread and abundant in the Indian Archipelago and Malayan Peninsula, varies exceedingly in the size, shape and texture of the leaves, in the young shoots very silky-villous or woolly, or the whole quite glabrous; in the short and dense or long and interrupted spikes; in the size of the flowers; in the greenish-yellow, whitish, pink or purple stamens, etc., and at first sight it is difficult to believe that they all can be forms of one species; but on examination none of these variations are sufficiently constant or so combined as to allow of distinct races."

VAR. Leucadendron; spikes glabrous. *Linn. Mant.* 105 and *Suppl.* 342; *Lour. Fl. Cochinch.* 468; *Roxb. Fl. Ind.* iii. 397; *DC. Prodr.* iii. 212; *Wall. Cat.* 3646; *Blume Mus. Bot.* i. 66; *Miq. Fl. Ind. Bat.* i. pt. i. 401. *Myrtus Leucadendron*, *Linn.*—*Rumph. Herb. Amb.* ii. 72, tt. 16, 17, f. 1.—Cultivated in India.

VAR. minor; spikes villous. *M. minor*, *Sm. in Rees. Cycl.* 23; *DC. Prodr.* iii. 212; *Wall. Cat.* 3645; *Blume Mus. Bot.* i. 67; *Miq. Fl. Ind. Bat.* i. pt. i. 403. *M. Cajuputi*, *Roxb. Fl. Ind.* iii. 394; *W. & A. Prodr.* 326; *Miq. l.c.* 403. *M. Leucadendron*, *Lam. Encycl.* 641. *M. viridiflora*, *Gærtn. Fruct.* i. 173, t. 35; *DC. Prodr. l.c.*; *Wall. Cat.* 3647. *M. saligna*, *Blume Mus. Bot.* i. 66. *M. Cumingiana* and *lancifolia*, *Turcz. in Bull. Soc. Mosc.* xx. 164. *Myrtus saligna*, *Gmel. Syst.* 793.—*Rumph. Herb. Amb.* ii. 76.—This appears to be the plant from which the Cajuput-oil of commerce is chiefly obtained.

Miquel (*Fl. Ind. Bat.* i. c.) describes *M. Cumingiana* as specifically distinct, distinguishing it from *M. lancifolia* by the absence of auricles to the staminal bundles; the existence of these however in the latter does not appear to be evident. Mr. Bentham (*Fl. Austral.* i. c.) considers that both of them belong to one of the common Archipelago forms with twin leaves and small flowers.

4. **TRISTANIA**, *R. Br.*

Tall shrubs or trees. *Leaves* alternate or crowded at the summit of the branches, rarely opposite. *Flowers* small, yellow or white, arranged in axillary cymes; bracts deciduous or 0. *Calyx-tube* turbinate campanulate or open, attached below to the ovary; lobes 5, imbricate in æstivation, persistent. *Petals*

5, spreading. *Stamens* ∞ , shorter than the petals, usually united in 5 bundles and opposite to them; anthers versatile, cells parallel and opening longitudinally. *Ovary* inferior or $\frac{1}{2}$ -superior, 3-celled; ovules many in each cell, suspended or horizontal. *Capsule* loculicidally 3-valved. Perfect *seeds* few, linear, cuneate, or winged at the upper part; embryo straight, cotyledons broad, longer than the radicle.—*DISTRIB.* Upwards of 14 species inhabiting the Malay peninsula and islands, New Caledonia, and Australia.

1. **T. Wightiana**, *Griff. MSS.*; leaves alternate shortly petioled oblanceolate acuminate glabrous closely pinnate-nerved, cymes corymbose dichotomous long peduncled terminal and axillary equalling or exceeding the leaves, branches angular pubescent, bracts leaflike, flowers small on short pedicels, staminal bundles 3-androus, capsule very small almost wholly exserted, seeds narrow compressed winged. *T. sumatrana*, *Miq. Fl. Ind. Bat. Suppl.* 308. *Hypericinea pimentifolia*, *Wall. Cat.* 4828.

MALACCA, *Griffith*; *SINGAPORE*, *Wallich, Lobb*; *PENANG*, *Walker*.—*DISTRIB.* *JAVA*, *Sumatra*, *Borneo*.

A shrub. *Bark* reddish-brown. *Leaves* $4\frac{1}{2}$ –6 by 2–2 $\frac{1}{2}$ in., gradually narrowing towards the base, obtusely acuminate or cuspidate, shining above, dull and tawny-coloured beneath, margins revolute, lateral nerves slender uniting in a continuous intramarginal one. Primary and secondary branches of inflorescence very long. *Calyx-tube* broadly campanulate above, spreading or reflexed in fruit, its inner surface and the ovary clothed with pure white pubescence. *Petals* nearly round, glandular. *Style* short. *Seeds* 4–5 in each cell.

2. **T. burmannica**, *Griff. MSS.*; leaves alternate or crowded at the ends of the branches shortly petioled oblong-lanceolate obtuse or obtusely acuminate glabrous or tomentose, cymes axillary few-flowered much shorter than the leaves branches angular pubescent, flowers small yellowish on short pedicels 2 or 3 together with linear bracts at the base, calyx-lobes sub-acute, staminal bundles about 5–7-androus, capsule exserted about $\frac{3}{4}$ its length, seeds $\frac{1}{2}$ in. long winged. *Kurz in Journ. As. Soc. Beng.* xlv. (1877) pt. ii. p. 61; *For. Fl. Brit. Burm.* i. 474. “*Tristania facie*,” *Griff. Notul.* 648. *Hypericinea micrantha*, *Wall. Cat.* 4829.

TENASSERIM, *Helfer*; *MOULMEIN* and *MALACCA*, *Falconer, Griffith, Wallich*; *PEGU*, *Kurz*.—*DISTRIB.* *JAVA* and *Borneo*.

A shrub upwards of 8 ft. *Bark* grey. Young parts and upper branches of inflorescence pubescent. *Leaves* 2–4 by $\frac{3}{4}$ –1 $\frac{3}{4}$ in., shining above, lighter below or rusty-coloured, coriaceous, margins revolute, dots inconspicuous, lateral nerves slender, prominent, uniting in a continuous looping one near the margin; petiole $\frac{1}{4}$ in. or less. *Cymes* compact, dichotomous. *Petals* nearly round, shining. *Ovary* silky-pubescent; ovules many, suspended. *Capsule* $\frac{1}{2}$ in. *Seeds* compressed.

VAR. tomentosa; leaves ochre-coloured hairy on both surfaces towards the base and along the prominent midrib, cymes nearly sessile compact and densely clothed with yellow tomentum, flowers larger and calyx-tube broader above, style longer, stigma capitate, young capsule rugose pubescent, seeds about 4 in each cell.—“A small tree.” *Tenasserim* mountains, 4000 ft., *C. Parish*. There are no ripe capsules on the single specimen preserved in the Kew Herbarium. Possibly a distinct species.

VAR. ?; leaves longer (2–5 in.), cymes lax, peduncles $\frac{3}{4}$ in., the capsules and seeds however are similar to those of *Wallich's Hypericinea micrantha*; there are no flowers on this specimen.—Near *Moulmein*, alt. 1000 ft., *C. Parish*.

3. **T. merguensis**, *Griff. in Journ. As. Soc. Beng.* 1854, 637; leaves alternate or the upper nearly opposite very shortly petioled or sessile obovate-lanceolate obtuse or obtusely acuminate glabrous, panicles on long peduncles, branches angular pubescent above, bracts leaflike, calyx-lobes oblong rounded

at the apex, staminal bundles 6-10-androus, capsule roundish large exserted nearly $\frac{1}{2}$ in., seeds compressed. *Kurz For. Fl. Brit. Burm.* i. 473. "*Tristania affinis*," *Griff. Notul.* 650; *Id. Pl. Asiat.* t. 636, f. 3. *Melaleuca eugeniifolia*, *Wall. Cat.* 3648. *M. decurrens*, *Wall. Cat.* 3649.

MERGUI, *Griffith*; TENASSERIM or ANDAMAN ISLANDS, *Helpfer*; MALACCA, *Finlayson, Wallich*; Mount Ophir, *Griffith*.—DISTRIB. Borneo. *Cap. Rochardo, Wallich*.

A tree with pendent branches. *Leaves* 2-7 by $2\frac{1}{4}$ in., gradually narrowing towards the base, often retuse at the apex, pinnate-nerved, rusty red beneath, darker above and punctate. Branches of the inflorescence compressed, angular, furrowed, upper part together with the bracts and calyx covered with stiff whitish hairs. *Calyx-tube* rather less than $\frac{1}{2}$ in., broadly campanulate in fruit, its nearly truncate limb spreading or reflexed; lobes obtuse. *Petals* small, transversely oblong with a minute claw at the base. *Filaments* hairy below. *Ovary* pilose; style rather long, stigma slightly capitate; ovules ∞ , pendulous from the apex of the cells. Valves of the capsule transversely wrinkled externally. *Seeds* about 8 in each cell, compressed, $\frac{1}{4}$ in. long.—*Griffith* remarks that the flowers are white and disagreeably scented. In *Wallich's M. decurrens* the blade of the leaf extends to the base, and the leaves are less conspicuously dotted.

4. **T. Maingayi**, *Duthie*; leaves alternate shortly petioled narrowly oblanceolate attenuated at each end obtuse coriaceous glabrous, cymes chiefly from the upper leaf-axils, branches compressed or angular pubescent, flowers sessile 3-4 together, staminal bundles 5-11-androus, capsule rather large about $\frac{1}{2}$ in roundish exserted $\frac{1}{4}$ its length, seeds winged 9-10 in each cell.

MALAYA, *Maingay*; *Kew Distrib.* 767 in part.

Leaves $1\frac{1}{2}$ - $2\frac{1}{2}$ by $\frac{1}{2}$ - $\frac{3}{4}$ in., dark and polished above, rusty-yellow beneath, dotted, margins slightly revolute, nerves not prominent. *Cymes* dichotomously branched; peduncles $\frac{1}{2}$ - $1\frac{1}{2}$ in.; pedicels and calyx covered with light yellow tomentum, lobes rounded at the apex or subacute. *Petals* small, transversely oblong or orbicular, hairy outside. *Filaments* hairy below. *Ovary* pubescent with white hairs. *Capsules* $\frac{1}{2}$ in. in diam.

5. **T. Griffithii**, *Kurz in Pegu Rep. Append. B.* p. 50; leaves crowded towards the ends of the branches lanceolate attenuated at both ends, cymes subaxillary few-flowered, flowers rather large white, capsule scarcely exserted, seeds winged. *Kurz in Journ. As. Soc. Beng.* xvi. pt. ii. p. 61; *For. Fl. Brit. Burm.* i. 474. *T. conferta*, *Griff. Notul.* p. 649; *not of R. Br.*

MERGUI, *Griffith*; PEGU, *Kurz*.

A shrub. *Leaves* coriaceous, pellucid-punctate. Terminal buds with imbricating membranous scales. *Calyx-tube* turbinate; lobes 5, ovate, acuminate, falling off circumscissily at the apex of the fruit. *Petals* round. *Filaments* nearly equal to the petals. *Style* filiform, shorter than the stamens; stigma capitate.—I have not seen specimens.

4*. PSIDIUM, Linn.

Trees or shrubs. *Leaves* opposite, entire, not dotted. *Peduncles* 1- few-flowered; flowers large, white. *Calyx* urceolate or obovate; limb undivided in æstivation, separating valvately into 4-5 lobes when in flower. *Petals* 4 or 5, free. *Stamens* ∞ . *Ovary* 2- or more-celled with many ovules in each cell. *Berry* many-seeded. *Seeds* with hard testa; embryo curved, radicle long, cotyledons short.—DISTRIB. Tropical and subtropical America; about 100 species have been enumerated.

1. **P. Guyava**, Linn.; *Benth. Fl. Hongk.* 120; *Brandis For. Fl.* 232; *Griseb. Fl. Brit. West. Ind.* 241; *Kurz in Journ. As. Soc. Beng.* xlv. (1877) pt. ii. p. 62; *For. Fl. Brit. Burm.* 1. 476.

Naturalised throughout India.

A small tree, pubescent on the young branches. *Leaves* on very short petioles, ovate or oblong, and usually acuminate, 3-4 in. long, glabrous or nearly so above, softly pubescent beneath and with the principal nerves prominent. *Peduncles* axillary, $\frac{1}{2}$ in., 1-3-flowered; buds ovoid in the adnate part, the free part also ovoid but larger and more or less pointed. *Petals* broad, $\frac{1}{2}$ in. in diameter. *Fruit* globose or pear-shaped.—“Indigenous in Mexico and possibly in other parts of Tropical America, cultivated and naturalised in most tropical countries. In India the Guava is cultivated almost everywhere except in the north-western corner of the Punjab. It often run wild, but there is no ground for supposing that the Guava is indigenous in India. Wood compact, close-grained, takes a beautiful polish.” (*Brandis l.c.*)

VAR. pyrifera, Linn. (sp.); peduncles 1-fl., fruit pyriform. *Roxb. Fl. Ind.* ii. 480.

VAR. pomifera, Linn. (sp.); peduncles usually 2-3-fl., fruit globose or ovoid. *Roxb. Fl. Ind.* ii. 480.

5. **RHODAMNIA**, Jack.

Shrubs or small trees. *Leaves* opposite, 3-nerved, hoary or pubescent beneath. *Flowers* rather small, pedicels short, sometimes very shortly fasciculate or in lax racemes; bracteoles small, deciduous. *Calyx-tube* ovoid or subglobose, not produced beyond the ovary; segments 4, persistent. *Petals* 4, spreading. *Stamens* ∞ , in many series, free; filaments filiform; anthers versatile with parallel cells dehiscing longitudinally. *Ovary* 1-celled with parietal placentation and many ovules; style filiform, stigma peltate. *Berry* globose, crowned with the limb of the calyx. *Seeds* few, reniform, globose or variously compressed, testa hard; embryo horseshoe-shaped, radicle long, cotyledons very short.—*DISTRIB.* About 12? species; 3 in Australia, and the rest natives of Tropical Asia.

1. **R. trinervia**, Blume *Mus. Bot.* i. 79; leaves ovate-oblong or ovate-lanceolate acuminate glabrous or more or less reticulate above prominently 3-nerved from the base often silvery-pubescent beneath, peduncles slender axillary 1- rarely 3-fl. with minute bracteoles under the calyx, berry globose reddish. *Kurz in Journ. As. Soc. Beng.* xlv. (1877) pt. ii. p. 63; *For. Fl. Brit. Burm.* i. 474; *Benth. Fl. Austral.* iii. 278. *Myrtus trinervia*, Sm. in *Linn. Trans.* iii. 280. *Eugenia?* *trinervia*, DC. *Prodr.* iii. 279; *Bot. Mag.* 3223.

TENASSERIM, *Helper*; MALACCA, *Cuming, Griffith*; SINGAPORE and PENANG, *Walker, Wallich*; NICOBAR ISLANDS, *Kurz.*—*DISTRIB.* Malay Islands and Philippines to Australia.

A small tree or shrub with greyish wrinkled bark and pilose branchlets, young parts and inflorescence often densely silky. *Leaves* variable in size, 4-6 by $1\frac{1}{4}$ - $2\frac{1}{2}$ in., sometimes rugose beneath, shortly petioled, subacute at the base. *Peduncles* varying in length, shorter than the leaves. *Flowers* white, fragrant. *Petals* twice as long as the calyx-lobes, hairy outside. *Stamens* nearly as long as the petals. *Berry* about $\frac{1}{2}$ in. in diam.—I have adopted Mr. Kurz's nomenclature who includes the various forms under the following varieties.

VAR. concolor; leaves green on both surfaces, sparingly pubescent, peduncles 4-7- or fewer-flowered. *R. cinerea*, *Griff. Notul.* 653, not of Jack.; *Kurz in Journ. As. Soc.* l. c. *R. concolor*, *Miq. Fl. Ind. Bat. Suppl.* i. 315. *Myrtus smilacifolia*, *Wall. Cat.* 3629.

VAR. spectabilis; leaves silvery-white beneath or greyish when old, flowers usually

fewer 2 or solitary. *R. spectabilis*, *Blume Mus. Bot.* i. 78; *Miq. l. c.* 479; *Kurz l. c.* *R. cinerea*, *Jack in Mal. Misc.* *Monoxora spectabilis*, *Wight Ill.* ii. 12, t. 97*, f. 5. *R. Nageli*, *Miq. l. c.* *R. subtriflora* and *R. Mulleri*, *Bl. l. c.* 79.

6. RHODOMYRTUS, DC.

Trees or tomentose shrubs. *Leaves* opposite, 5- or 3-nerved. *Flowers* rather large, axillary. *Calyx-tube* turbinate, oblong or subglobose, hardly produced above the ovary; lobes 5 rarely 4, herbaceous, persistent. *Petals* 5, rarely 4, spreading. *Stamens* ∞, free, in many series. *Ovary* 1-2-3-celled with spurious partitions, or divided into numerous 1-ovuled superposed cells; style filiform, stigma capitate. *Berry* drupelike, globose or ovoid, with few or numerous seeds not distinctly superposed in rows. *Seeds* compressed, reniform or nearly orbicular, horizontal, testa hard; embryo curved or spiral, radicle very long, cotyledons small.—*DISTRIB.* 5 species, 4 of them inhabitants of E. Australia, and 1 widely distributed over Tropical Asia, especially throughout the Indian Archipelago as far as China.

1. *R. tomentosa*, *Wight Spicil. Neilgh.* i. 60, t. 71; branches downy above slightly compressed, leaves elliptic or obovate obtuse shortly petioled. 3-nerved hoary on the underside with soft tomentum, peduncles axillary shorter than the leaves 1-3-fl., flowers with 2 ovate bracteoles at the base, calyx tomentose 5-cleft, lobes unequal, berry oval or subglobose 3-celled, seeds compressed forming 2 rows in each cell. *Miq. Fl. Ind. Bat.* i. pt. i. 477; *Benth. Fl. Hongk.* 121; *Redd. Fl. Sylv. Anal. Gen.* t. xiv. *Myrtus tomentosa*, *Ait.*; *DC. Prodr.* iii. 240; *Vahl Symb.* ii. 56; *Blume Bijdr.* 1081; *W. & A. Prodr.* i. 328; *Wight Ill.* ii. 12, t. 97*, f. 3, *lc.* 522; *Roxb. Fl. Ind.* ii. 498; *Wall. Cat.* 3630; *Korth. in Ned. Kruidk. Arch.* i. 197. *M. canescens*, *Lour. Fl. Cochinc.* i. 311.

WESTERN PENINSULA, Pulney Hills, *Beddome*; Nilghiris, *Adam*. EASTERN PENINSULA, MALACCA, *Griffith. Maingay*; SINGAPORE and PENANG, *Thomson, Anderson*. CEYLON, alt. 6-8000 ft., *Walker, &c.*

A shrub, 4-5 ft.; young parts clothed with thick tomentum. Lower leaves in threes, upper ones and those of the branches opposite, 1-2½ in. with 3 or rarely 5 prominent nerves starting from near the base, dark brown above, at length glabrous and shining, hoary beneath and rugose. *Peduncles* about half the length of the leaves, bearing 1-3 large pink flowers ½-¾ in. across. *Petals* downy outside, shortly clawed. *Berry* about the size of a cherry, dark purple, pulp fleshy, sweet and aromatic.—*Col. Beddome* says that this is abundant on the higher mountains in the Madras Presidency, and is known at Ootacamund as "Hill Gooseberry." The fruit is eaten raw, or made into jam called "Thaonty." Its wood is white with pink heart, the grain close and cutting like cheese, but splitting when seasoned; useful for small turnery.

7. DECASPERMUM, Forst.

Shrubs or small trees. *Leaves* opposite, pinnate-nerved. *Flowers* small, in axillary racemes, and sometimes forming terminal leafy panicles, occasionally polygamous. *Calyx-tube* campanulate, scarcely or not at all produced above the ovary; lobes 4 or 5, spreading. *Stamens* ∞, in several series, free, filaments filiform; anthers small, versatile, with parallel cells opening longitudinally. *Ovary* 4- or 5-celled with 2 or very few ovules in each cell; cells often divided by spurious dissepiments; style filiform, stigma peltate. *Berry*

globular, crowned with the calyx-lobes. *Seeds* few, reniform; testa hard; embryo hippocrepiform or circular, with a long radicle and short linear cotyledons.—**DISTRIB.** Species about 4, inhabiting Tropical Asia and Australia, and the Pacific Islands.

Closely related to *Myrtus*.

1. ***D. paniculatum***, *Kurz in Journ. As. Soc. Beng.* xlv. (1877) pt. ii. p. 61; *For. Fl. Brit. Burm.* i. 475; leaves shortly petioled oblong acuminate suddenly narrowing below, flowers in terminal and axillary panicles often polygamous, calyx-lobes roundish or subacute, ovary 4-celled. *Nelitris paniculata*, *Lincl. Collect. under No. 16*; *DC. Prodr.* iii. 231; *Wall. Cat.* 3627; *Wight Ill.* ii. 12, t. 97*, f. 10, *lc.* 521; *Benth. Fl. Austral.* iii. 279. *N. polygama*, *Spreng. Syst.* ii. 488; *Korth. in Ned. Kruidk. Arch.* i. 197. *N. pallescens*, *Miq. Fl. Ind. Bat. Suppl.* i. 314. *Eugenia polygama*, *Roxb. Hort. Beng.* 92; *Fl. Ind.* ii. 491. *E. cuspidata*, *Wall. Cat.* 3627.

EASTERN BENGAL, KHASIA MTS.; PEGU, *Kurz*; MERGUI, *Griffith*; MALACCA, *Maingay, Cuming*.—**DISTRIB.** Java, Philippines, Australia.

A shrub or small tree; young parts and inflorescence covered with silky pubescence. *Leaves* 2 by about 1 in., abruptly contracted at the base, cuspidate-acuminate, dark and glossy above, paler and often of a reddish colour beneath. *Panicles* ascending, equalling or exceeding the leaves; bracts leaflike, or small and deciduous. *Flowers* small, crowded. *Calyx-tube* more or less clothed with white hairs; lobes usually less hairy or nearly glabrous. *Petals* ciliate. *Style* exserted. *Berry* globose, about $\frac{1}{8}$ in.—This plant varies much in the size of the flowers, the shape of the calyx-lobes, and in the degree of hairiness. I have given *M. pallescens* as a synonym on the authority of *Kurz* (*Journ. As. Soc. Beng.* xl. 57). Some of *Maingay's* Malacca specimens with an abnormally congested leafy inflorescence somewhat resemble *N. leucocoma*.

VAR. khasiana; leaves narrower, panicles long peduncled lax few-flowered, flowers larger, petals $\frac{3}{4}$ longer than the calyx.—Khasia, *Griffith*, *J. D. H. & T. T., Kurz*.

VAR. Finlaysoniana; leaves thicker, panicles shorter than the leaves, calyx-tube densely clothed with white tomentum, lobes all rounded and less hairy, stamens nearly equalling the petals. *N. polymorpha*, *Blume Mus. Bot.* i. 75, t. lx.; *Hiræa Finlaysoniana*, *Wall. Cat.* 7263.—No locality given, *Finlayson, Lobb*.

8. **EUGENIA**, *Linn.*

Trees or shrubs, smooth or rarely tomentose or villous. *Leaves* opposite rarely alternate, coriaceous or membranous, pinnate-nerved. *Inflorescence* centripetal with solitary axillary flowers, or in short racemes (leafless branches), or centrifugal in dense terminal cymes, or in terminal or lateral trichotomous panicles. *Bracts* usually small and deciduous. *Calyx-tube* globose or more or less elongate; lobes 4 rarely 5. *Petals* 4 rarely 5 or more or 0, free and spreading or united in a calyptra. *Stamens* ∞ , in many rows, free or slightly combined into 4 bundles, filaments filiform; anthers small, versatile, bursting longitudinally. *Ovary* 2- rarely 3-celled; style filiform, stigma small; ovules ∞ in each cell. *Berry* drupelike, rarely dry and fibrous, crowned with the persistent calyx-limb. *Seeds* few, globose, variously compressed, testa membranous or cartilaginous; embryo thick and fleshy, radicle short, cotyledons thick more or less united or distinct.—**DISTRIB.** Upwards of 700 species inhabiting chiefly tropical and subtropical America, tropical Asia, a few in Australia and Africa.

SECT. I. **Jambosa.** *Inflorescence* cymose. *Calyx* usually with a thickened staminal disk and 4 conspicuous persistent lobes. *Flowers* showy, usually 4-merous. *Berries* large, turbinate or ovoid. *Seeds* large, with a thick fleshy endocarp. (To p. 481).

* *Flowers lateral, sessile or subsessile, usually from leafless axils.*

1. **E. formosa**, Wall. *Pl. As. Rar.* ii. 6, t. 108; *Cat.* 3609, in part; leaves large opposite or in threes nearly sessile elliptic-oblong obtusely acuminate cordate or amplexicaul at the base, racemes lateral short few-flowered, calyx-tube turbinate narrowed into a long pedicel, lobes unequal, fruit subglobose pendulous crowned with the recurved calyx-limb. *Kurz in Journ. As. Soc. Beng.* xlv. pt. ii. p. 68; *For. Fl. Brit. Burm.* i. 492; *Wight Ill.* ii. 14. *Jambosa formosa*, Walp. *Rep. Bot.* ii. 191; *Blume Mus. Bot.* i. 92; *Miq. Fl. Ind. Bat.* i. pt. i. 412. *J. mappacea*, Korth. in *Ned. Kruidk. Arch.* i. 200.

EASTERN BENGAL and EASTERN PENINSULA, Chittagong, Upper Tenasserim, Moulmein. Banks of Attra R., Wallich.

A lofty tree with wide-spreading branches. *Bark* soft, ash-coloured, marked with the scars of fallen leaves. *Branchlets* alternately compressed or subtrigonal. *Leaves* crowded at the ends of the branchlets, 5- upwards of 16 by 4-4½ in., very coriaceous, shining above, paler beneath; midrib stout; lateral nerves prominent beneath, uniting within the margin. *Flowers* large, purple turning to red, scentless. *Peduncles* fleshy, branches clavate jointed near the middle; bracteoles 2, minute. *Calyx-tube* much produced; lobes spreading, orbicular. *Petals* twice as large as the calyx-lobes, shortly clawed. *Stamens* many, very long. *Ovary* turbinate. *Berry* size of a walnut, 2-celled, smooth, shining, white, insipid. *Seeds* large, rugose, greenish.

VAR. *ternifolia*, Roxb. *Hort. Beng.* 37; *Fl. Ind.* ii. 489 (sp.); leaves in threes. *Wall. Cat.* 3607; *Wight Ill.* ii. 14; *lc.* t. 611; *Blume Mus. Bot.* 92 (*Jambosa*).—SIKKIM, J. D. H.; ASSAM and SILHET, Wallich. PEGU, McClelland.

2. **E. amplexicaulis**, Roxb. *Hort. Beng.* 37; *Fl. Ind.* ii. 483; leaves opposite amplexicaul oblong with a rounded apex, peduncles short lateral 3- or 9-flowered, berries spherical size of a small apple. *Wight Ill.* ii. 14; *lc.* t. 608; *Wall. Cat.* 3612; *Lindl. Bot. Reg.* 1033; *Kurz in Journ. As. Soc. Beng.* xlv. (1877) pt. ii. p. 68; *For. Fl. Brit. Burm.* i. 493. *Jambosa amplexicaulis*, DC. *Prod.* iii. 287. *J. alba*, var. *amplexicaulis*, *Miq. Fl. Ind. Bat.* i. pt. i. 414; *Blume Mus. Bot.* i. 96.—*J. sylvestris alba*, Rumph. *Herb. Amb.* i. 127, t. 39?

CHITTAGONG, Roxburgh.

A stately tree. *Trunk* tolerably straight, quickly dividing into numerous spreading branches. *Bark* of woody parts brown. *Leaves* 6-8 by 3-4 in. *Peduncles* trifid, each division 3-flowered. *Flowers* large, white, scentless. *Berry* greenish-yellow when ripe.—*Kurz in Journ. As. Soc. Beng.* l. c. refers to specimens in Herb. Brandis collected in Upper Tenasserim as coming very near to this species, and only differing from Roxburgh's figure by having a terminal inflorescence. In the figure given by Rumphius l. c. the leaves are acute at the base.

3. **E. malaccensis**, Linn.; *Lam. Dict.* iii. 196; leaves shortly petioled large ovate or elliptic-oblong attenuated at each end coriaceous glossy, racemes lateral dense shortly peduncled, flowers red, calyx-tube turbinate narrow below, lobes unequal, fruit subglobose or depressed-turbinate crowned with the incurved calyx-lobes. *Roxb. Fl. Ind.* ii. 483; *Wall. Cat.* 3611; *Wight Ill.* ii. 14, t. 98; *Bedd. Fl. Sylv. Anal. Gen.* cx.; *Kurz in Journ. As. Soc. Beng.* xlv. pt. ii. p. 68; *For. Fl. Brit. Burm.* i. 493. *E. macrophylla*, *Lam. l. c.* *Jambosa malaccensis*, DC.; *Korth. in Ned. Kruidk.* (1847) 200; *Bot. Mag.* 4408; *W. & A. Prodr.* i. 332. *J. purpurascens*, DC. l. c. excl. syn. *Roxb. J. domestica*,

Rumph. Herb. Amb. i. 121, t. 37 (not good) and 38, f. i.; *DC. l. c.* 288; *Blume Mus. Bot.* i. 91; *Miq. Fl. Ind. Bat.* i. pt. i. 411; *Berg in Fl. Brazil* xiv. pt. i. 376. *Myrtus macrophylla*, *Spreng.*; *Blume Bijdr.* 1084. *M. malaccensis*, *Spreng.*; *Blume l. c.* 1083.—*Burm. Fl. Ind.* 114; *Rheede Hort. Mal.* i. 29, t. 18.

MALAYA, Maingay, Griffith. CHITTAGONG (cult.?) J. D. H. & T. T. Tenasserim.—DISTRIB. Malayan Islands.—Many varieties are cultivated in different parts of the world.

A shrub, 6–8 ft. high, with terete-compressed branchlets. Leaves 9–12 by $3\frac{1}{2}$ in., glossy on both surfaces; dots inconspicuous; nerves indistinct above, the primary ones few prominent beneath and uniting more or less distinctly within the margin, sometimes in double loopings; petiole stout, channelled above, $\frac{1}{4}$ – $\frac{1}{2}$ in. Flowers large and handsome. Calyx-tube $\frac{3}{4}$ in.; lobes unequal, rounded, with membranous edges, the larger pair $\frac{2}{3}$ in. long. Petals large, suborbicular, glandular. Stamens numerous, about 1 in. in length. Style long, persistent, nearly equalling the stamens. Fruit large and juicy, very generally eaten, but insipid (Roxburgh).—In a cultivated specimen from Chittagong the leaves are distinctly pellucid-punctate with large glands.

VAR. *purpurea*; fruit ovoid dark purple. *E. purpurea*, *Roxb. Hort. Beng.* 37; *Fl. Ind.* ii. 483; *Wight Ill.* ii. 14; *l. c.* ii. 549. *J. purpurea*, *Wall. Cat.* 3610. *J. domestica*, var. *purpurea*, *Blume Mus. Bot.* i. 92; *Miq. l. c.*—*J. nigra*, *Rumph. Amb.* 125, t. 38, fig. 1?

4. **E. polypetala**, *Wight Ill.* ii. 14; *l. c.* t. 610; leaves ternate linear-lanceolate, peduncles lateral 3–4-flowered, corolla many-petalled. *Wall. Cat.* 3616; *Kurz in Journ. As. Soc. Beng.* vol. xlv. pt. ii. p. 69; *For. Fl. Brit. Burm.* i. 493. *E. salicifolia*, *Buch. Cat.* 37. *E. angustifolia*, *Roxb. Fl. Ind.* 490.

SILHET, Wallich; KHASIA Mts., Griffith; CHITTAGONG, Roxburgh.

A small tree. Leaves 4–5 in. by nearly an inch in width, midrib and lateral nerves prominent beneath, uniting close within the margin. Flowers smaller than those of *E. diospyrifolia*. Calyx-tube broad, and rather more than $\frac{1}{2}$ in. long when in flower.—Roxburgh says (l. c.) that this flowers in March and April, and the fruit ripens in June and July; it is readily known by its many (12–16) petals and the ternate leaves. Allied to *Jambosa æmula*, Blume, and *J. media*, Korth

** Flowers terminal and axillary.

† Calyx-tube broadly turbinate.

§ Calyx $\frac{1}{2}$ in. or more in length.

5. **E. diospyrifolia**, *Wall. Cat.* 3617; leaves long and narrow ovate-lanceolate or oblong acutely acuminate cordate at the base and nearly sessile, flowers terminal few, calyx-tube about $\frac{3}{4}$ in. long produced beyond the ovary, lobes very broad.

SILHET, Wallich; KHASIA, Griffith.

Leaves 6–7 by $1\frac{3}{4}$ in. pale coloured and with a yellowish tinge beneath.—Allied to *E. Munronii*, but the lateral nerves of the leaf are much less prominent beneath and do not form by their union such a distinct intramarginal one; the flowers are fewer on shorter peduncles, and the calyx-tube is broader above and not so attenuated below.

6. **E. Munronii**, *Wight Ill.* ii. 14; *l. c.* t. 546; leaves shortly petioled narrowly lanceolate obtusely acuminate somewhat cordate at the base very coriaceous, nerves prominent beneath uniting in a thick waving intramarginal one, cymes terminal, flowers large reddish or white, calyx-tube attenuated

below. *Bedd. Fl. Sylv. Anal. Gen. cix.* *Jambosa samarangensis*, var. *heteromorpha*, *Blume Mus. Bot. i. 96.* *J. alba*, var. *heteromorpha*, *Miq. Fl. Ind. Bat. i. pt. i. 416.*

KHASIA MTS., *Griffith, J. D. H. & T. T.*; KURG MTS., *Munro*; NILGIRIS *Gardner.*

A middling-sized tree, 12–20 ft. in height. *Leaves* 6–9 by $\frac{3}{4}$ –3 in. *Calyx-lobes* somewhat membranous.—Some of the Khasia specimens appear to be intermediate between this and *E. aquea*: the leaves are less attenuated at the apex, and not quite so prominently nerved; the flowers are rather larger than in either, and the calyx not so slender below as in typical examples of this species.

7. ***E. aquea***, *Burm. Fl. Ind. 114*; leaves nearly sessile ovate oblong or ovate-lanceolate often cordate at the base, cymes terminal and from the upper axils shortly peduncled 3–7-flowered, fruit turbinate flattened at both ends. *Roxb. Hort. Beng. 37*; *Fl. Ind. ii. 492*; *Wall. Cat. 3613 & 3614 A. & B.*; *Wight Ill. ii. 14*; *Ic. t. 550*; *Bedd. Fl. Sylv. Anal. Gen. cix.*; *Kurz in Journ. As. Soc. Beng. vol. xvi. (1877) pt. ii. p. 69*; *For. Fl. Brit. Burm. i. 494.* *E. javanica*, *Lam. Dict. iii. 200, in part.* *Jambosa aquea*, *DC., W. & A. Prodr. i. 332 excl. Rumph. t. 39*; *Blume Mus. Bot. 102*; *Miq. Fl. Ind. Bat. i. pt. i. 421*; *Thwaites Enum. 115*; *Berg in Fl. Brazil xiv. pt. i. 378.* *J. madagascariensis*, *Blume Mus. Bot. i. 103?* *Cerocarpus aqueus*, *Hassk. Cat. Hort. Bog. 262*; *Bot. Zeit. (1814) 593.* *Myrtus javanica*, *Blume Bijl. 1084.*—*Rumph. Herb. Amb. i. 126, t. 38, f. 2.*

CHITTAGONG, AVA, PEGU, MARTABAN, and TENASSERIM (apparently only planted, *Kurz*).—CEYLON, ascending to 5000 ft.

A middling-sized tree, 20–30 ft., much-branched, variable in the form of its foliage, the shape of the calyx-tube, and the colour of the flowers. *Bark* smooth, ash-coloured. *Leaves* coriaceous, black-dotted, $1\frac{1}{2}$ –2 $\frac{1}{4}$ by 1–1 $\frac{1}{2}$ in.; midrib prominent below, primary nerves 8–10 on each side forming inconspicuous loops near the margin. *Flowers* large, white, red, or pale purple. *Calyx-tube* turbinate or cylindrical, about 1 in.

8. ***E. densiflora***, *DC. Prodr. iii. 287 under Jambosa*; leaves petioled oblong or oblong-lanceolate rounded at both ends or shortly acuminate the apex coarsely nerved and reticulated, cymes compact terminal, flowers 2 or 3 together on short pedicels, “calyx and petals tinged with clear rose-colour, filaments long rose-coloured” (*Maingay MSS.*), fruit nearly spherical 2-seeded. *E. corymbosa*, *Roxb. Fl. Ind. ii. 497*; *Wight Ic. t. 627?* *Jambosa densiflora*, *Korth. in Ned. Kruidk. Arch. i. 200*; *Blume Mus. Bot. i. 93*; *Miq. Anal. Ind. i. 17*; *Fl. Ind. Bat. i. pt. i. 416.* *Myrtus densiflora*, *Blume Bijl. 1087.*

MALACCA and SINGAPORE, *Maingay, No. 758, 760, 760 $\frac{1}{2}$.*—DISTRIB. Malayan Islands.

Upper branches stout, 4-gonous, with reddish bark peeling off in shreds. *Leaves* from 4 to upwards of 10 $\frac{1}{2}$ by $1\frac{1}{2}$ –3 in., slightly polished above, often conspicuously dotted beneath; midrib stout; primary nerves distinct on both surfaces, prominent beneath and uniting to form two conspicuous intramarginal nerves; petiole $\frac{3}{8}$ in. *Branches of inflorescence* thick and 4-gonous, often articulated and breaking up into cubical segments. *Calyx-tube* turbinate, $\frac{3}{8}$ in.; lobes 4, large, rounded, with membranous edges, opposite pairs equal. *Style* long, persistent. *Fruit* $\frac{1}{2}$ in. in diam., crowned with the persistent calyx-lobes.—Allied to *E. Jambos*, from which it differs in the shape and nerving of the leaves, smaller flowers and more unequal calyx-lobes. The leaves of the Singapore specimens are much smaller and less distinctly punctate below. *Miquel* says (*Fl. Ind. Bat. l. c.*) “seems to be the same as *E. corymbosa*, *Roxb.* (*Wight Ic. ii. 627.*)” but the petals in *Roxburgh’s* coloured fig. No. 1143 are bright yellow.

9. **E. Jambos**, Linn.; leaves narrowly lanceolate acuminate attenuated at the base into a short petiole coriaceous midrib stout nerves prominent below and uniting within the margin in a distinct and continuous one, racemes short terminal, flowers large white, calyx-tube turbinate, berry subglobose crowned with the 4 persistent calyx-lobes. *Roxb. Hort. Beng.* 37; *Fl. Ind.* ii. 494; *Wall. Cat.* 3615; *Wight Ill.* ii. 14; *Ic. t.* 435 (*vulgaris*); *Bedd. Fl. Sylv. Anal. Gen. cx.*; *Brandis For. Fl.* 233. *Kurz in Journ. As. Soc. Beng.* xlv. (1877) pt. ii. p. 69; *For. Fl. Brit. Burm.* i. 495. *Jambosa vulgaris*, DC.; *Blume Mus. Bot.* i. 93; *W & A. Prodr.* i. 332; *Bot. Mag.* 3356; *Miq. Fl. Ind. Bat. i.* pt. i. 425; *Berg in Fl. Brazil* vol. xiv. pt. i. 377. *Myrtus Jambos*, Kunth; *Korth. in Ned. Kruidk. Arch.* i. (1846) 200; *Blume Bijdr.* 1085.—*Rumph. Herb. Amb.* i. 123; *Rheede Hort. Mal.* i. 27, f. 17.

Indigenous in the SIKKIM TERAI (*Brandis*); BURMA (cult. only *Kurz*), PEGU, *McClelland*; PENANG, *Wallich*.—DISTRIB. Yunnan to Australia. (Said to be naturalised at Hong Kong).

A moderate-sized tree; branchlets compressed or sub-4-gonous. *Leaves* variable in length, $1\frac{1}{2}$ –2 in. broad; nerves reticulate beneath; midrib stout; petiole short and stout, $\frac{1}{4}$ in. or less. *Calyx-tube* produced above the ovary; lobes round. *Berries* 1–2 in. diam.

VAR. *divaricata*; branchlets stout distinctly 4-gonous, cymes terminal and from the upper axils dense subsessile, branches stout spreading. Penang (Maingay, 735).—This resembles *E. densiflora* in its inflorescence.

10. **E. macrocarpa**, *Roxb. Hort. Beng.* 37; *Fl. Ind.* 497; leaves shortly petioled lanceolate acuminate narrowed at the base rounded or subcordate coriaceous minutely dotted, midrib and nerves very prominent beneath and uniting in conspicuous double marginal loopings, interspaces reticulate, cymes compact terminal and lateral subsessile, flowers sessile, bracteoles persistent at the nodes, calyx-tube turbinate narrow below, limb suboctoid, lobes unequal, berry globose. *Kurz in Journ. As. Soc. Beng.* xlv. (1877) pt. ii. p. 68; *For. Fl. Brit. Burm.* i. 492; *Wight Ic. t.* 612. *Jambosa macrocarpa*, *Miq. Fl. Ind. Bat. i.* pt. i. 417. *J. coarctata*, *Blume Mus. Bot. i.* 99.

ASSAM and CHITTAGONG, *Wallich*; CACHAR, *Keenan*; MOULMEIN, *Falconer*; MALACCA, *Griffith*, *Maingay* (736 Kew Distrib.); PEGU and MARTABAN, ascending to 2000 ft., *Falconer*, *Brandis*.—DISTRIB. Malay Archipelago.

Branchlets 4-gonous. *Leaves* rarely subalternate, or in threes, 5–10 by $\frac{1}{2}$ –4 in.—In Maingay's Malacca specimens the angles of the branchlets are winged, and the bark is of a reddish colour; the petioles are stout, rather less than $\frac{1}{2}$ in.; calyx-tube $\frac{1}{2}$ in.; style long and persistent. Roxburgh describes the fruit as about the size of an orange, and resembling that of *Dillenia indica*; it is eaten, and ripens in August and September. In Roxburgh's figure a section of the fruit shows it to be 5-seeded. The leaves are drawn too acute. Keenan describes it as being rather a tall tree with short horizontal branches; buds roundish, rosy; the bruised leaves smell like cinnamon, and the stamens are clove-scented. In Griffith's plant the calyx-tube is finely striate, and there is a slight constriction near the middle.

11. **E. javanica**, *Lamk. Dict.* iii. 200; leaves subsessile elliptic-oblong rounded at the apex or obtusely acuminate rounded or subcordate at the base, cymes axillary and terminal shorter than the leaves long-peduncled lax many-flowered, flowers white, berries depressed-turbinate. *Kurz in Journ. As. Soc. Beng.* xlv. (1877) pt. ii. p. 69; *For. Fl. Brit. Burm.* i. 494. *E. alba*, *Roxb. Hort. Beng.* 39; *Fl. Ind.* ii. 493; *Wall. Cat.* 3614 C. *Jambosa alba*, *Rumph. Herb. Amb.* i. 127, t. 39; *W & A. Prodr.* i. 332; *Wight Ill.* ii. 14; *Ic. t.* 548; *Miq. Fl. Ind. Bat. i.* pt. i. 413 in part. *J. samarangensis*, DC. *Prodr.* iii. 286; *Korth. in Ned. Kruidk. Arch.* i. 201; *Blume Mus. Bot. i.* 95; *Bijdr.* 1084

(*Myrtus*); *Berg in Fl. Brazil* vol. xiv. pt. i. 377. *J. macrophylla*, *DC. Prodr. l.c. in part.*

MALACCA, *Griffith*; ANDAMAN and NICOBAR ISLANDS, *Kurz*.—DISTRIB. Malay Islands.

A tree; trunk rarely straight and soon divided, branchlets terete or terete-compressed. *Leaves* 5-6½ by 1¾-2¾ in., or larger in cultivated examples; nerves indistinct above, slender but prominent beneath and uniting in loops within the margin. *Calyx-tube* turbinate, about ½ in., slender below; lobes 4, rather unequal, membranous at the edges. *Berry* size of a medlar, white or red.—This tree, according to Mr. Kurz, flowers in March and April, and the fruit ripens in May and June.

VAR. *Roxburghiana*, Wall. MSS. (sp.); leaves shortly petioled cordate at the base rounded at the apex, cymes compact terminal. *E. decora*, Wall. *Cat.* 3608. Chittagong.

12. **E. pendens**, *Duthie*; young branches terete, leaves shortly petioled oblong or ovate-lanceolate narrowed below obtusely acuminate subcoriaceous pellucid-punctate, principal lateral nerves prominent beneath and widely separated, cymes terminal and axillary 5-7-flowered, flowers large the lower ones long pedicelled, calyx-tube turbinate.

MALACCA, *Griffith*, 2349, *Maingay*, 747.

"Rather a small tree with pendent branches" (*Griffith*). *Leaves* shining a little on the upper surface, 5-8 by 2-3½ in.; nerves indistinct above prominent beneath, uniting in a distinct looping one within the margin; petiole ¾ in. *Peduncles* equalling the petioles or a little longer; lower pedicels about ½ in. *Calyx-tube* ¾ in.; lobes 4, rounded, with membranous edges, opposite pairs equal, reflexed after flowering. *Petals* large, orbicular. *Style* very long, 1½ in., persistent.

§§ *Calyx* less than ½ in. in length.

a. *Flowers* pedicelled.

13. **E. Wallichii**, *Wight Ill.* ii. 17; *Ic. t.* 536; leaves lanceolate or elliptic-oblong acuminate acute at the base dark and shining above, lateral nerves uniting twice within the margin, cymes corymbose axillary and terminal shorter than the leaves, calyx-tube suddenly contracted at the base lobes prominent persistent, petals frequently expanding before falling, berries oblong. *O. bifaria*, *Colebr. in Wall. Cat.* 3606. *E. præcox*, *Roxb. Fl. Ind.* ii. 488?; *Wight Ic. t.* 619; *Kurz in Journ. As. Soc. Beng.* xlv. (1877) pt. ii. p. 66; *For. Fl. Brit. Burm.* i. 483.

SIKKIM, *J. D. H.*; KHASIA and BHOTAN, *Griffith*; ASSAM, *Masters*; SILHET, *J. D. H. & T. T.*; CHITTAGONG, *Roxburgh, J. D. H. & T. T.*; MERGUI, *Griffith*.

A tree; branchlets stout, quadrangular. *Leaves* 4½ by 1¾ in., coriaceous, rusty-coloured beneath; petiole about ½ in. *Flowers* white. *Calyx-tube* about ¼ in. long. *Stamens* about 4 times the length of the calyx. *Style* long, persistent. *Berry* about ½ in., crowned with the cup-shaped calyx-limb.—In *Roxburgh's* figure of *E. præcox* the inflorescence is more branched and the flowers rather smaller; the leaves are drawn acutely acuminate.

VAR. *lanceafolia*; leaves rounded at the base, petiole much shorter; *E. lanceafolia*, *Roxb. Hort. Beng.* 37; *Fl. Ind.* ii. 494. SILHET FORESTS, *Roxburgh*. CHITTAGONG, *J. D. H. & T. T.*

β. *Flowers* sessile.

14. **E. grandis**, *Wight Ill.* ii. 17; *Ic. t.* 614; leaves large thick hard and coriaceous shining broadly obovate or suborbicular abruptly acuminate or

rounded at the apex narrowed or rounded at the base, nerves prominent beneath or on both surfaces, panicles terminal and axillary not exceeding the leaves, flowers large, calyx-tube turbinate attenuated below, petals free and expanding, berry globose or somewhat pyriform crowned with the large spreading cup-like calyx-limb. *Bedd. Fl. Sylv. Anal. Gen. cvii.*; *Kurz in Journ. As. Soc. Beng. xli.* (1877) pt. ii. p. 67; *For. Fl. Brit. Burm. i.* 489. *E. firma*, *Wall. Cat.* 3603; not of DC. *Jambosa grandis*, *Blume Mus. Bot. i.* 108. *J. firma*, *Blume l. c.* *J. urceolata*, *Korth. in Miq. Fl. Ind. Bat. i.* pt. i. 418 in part. *Syzygium grande*, *Walp. Repert. ii.* 180; not of *Wall. Cat.* 3554. *E. cymosa*, *Roxb. Hort. Beng. 37*; *Fl. Ind. ii.* 492; not of *Lam. S. firmum*, *Thwaites Enum.* 417. *S. montanum*, *Thwaites l. c.* 116.

SILHET, *Wallich*; PEGU, MARTABAN, and TENASSERIM, *Brandis*; MOULMEIN and MERGUI, *Griffith*; MALACCA, *Griffith, Maingay*; SINGAPORE, *Walker*; CEYLON, *Thwaites*, ascending to 4000 ft.—DISTRIB. Borneo, &c.

A large tree. *Leaves* 4-8 by 3-3½ in.; lateral nerves sometimes forming double loopings within the margin; petiole ¾-1 in. *Calyx-lobes* short, rounded, unequal. *Berries* 1 in. to 1½ in.—Blume distinguishes his *J. firma* specifically by the nerves not being impressed on the upper surface, and by the more unequal calyx-lobes. The Ceylon specimens have the leaves very much polished, the lateral nerves more numerous and uniting closer to the margin, the cymes more lax and fewer-flowered. A plant from Amherst named *E. ficifolia*, MSS. in *Herb. Wallich* 3603 B, has the leaves very large and more rounded at the base.

15. ***E. lepidocarpa***, *Wall. Cat.* 3618 in part; leaves broadly ovate or elliptic-oblong abruptly acuminate or rounded at the apex shining above, nerves prominent on both surfaces, interspaces finely reticulate, panicles terminal few-flowered, flowers sessile, calyx ¼ in. campanulate spreading above, petals free and spreading. *Kurz in Journ. As. Soc. Beng. xli.* pt. ii. p. 68. *E. grandis*, var. *lepidocarpa*, *For. Fl. Brit. Burm. i.* 490. *Syzygium palembanicum*, *Miq. Fl. Ind. Bat. Suppl. i.* 313.

PEGU and TENASSERIM, *Brandis*; MALAYA, *Griffith, Maingay*; SINGAPORE, *Wallich*.—DISTRIB. Sumatra.

Branchlets greyish, more or less compressed at the nodes. *Leaves* thick, coriaceous, smaller than those of *E. grandis*; midrib furrowed above, stout beneath; petiole about ¼ in. *Panicle* branches angular, much compressed below the nodes. *Calyx* pedicel-like below; lobes rather unequal, rounded, with membranous edges. *Berries* about ½ in., subglobose, crowned with the cup-like calyx-limb, often prominently ribbed longitudinally.

VAR. *minor*; leaves and flowers smaller, panicles axillary and terminal, flowers crowded in umbel-like heads.—The leaves resemble those of *E. mangifolia* and the inflorescence has more the habit of *E. Wallichii*.—MALAYA, *Griffith* (2416).

15*. ***E. Beddomei***, *Duthie*; leaves crowded broadly ovate abruptly attenuate below very coriaceous polished above, midrib and stout lateral nerves prominent beneath freely anastomosing towards the margin and uniting at some distance from it, inflorescence elongate, branches acutely 4-gonous, petals free.

TINNEVELLY Hills; alt. 5000 ft., *Beddome*.

A large tree. *Leaves* 4½ by 3 in., rounded or emarginate at the apex; petiole ½ in. or less, stout; midrib channelled above. *Flowers* like those of *E. grandis*.

16. ***E. tetraëdra***, *Miq. Fl. Ind. Bat. Suppl. i.* 310 (*Jambosa* ?); branchlets compressed acutely 4-gonous or the older ones subterete, leaves broadly elliptic often folded very coriaceous shining above rusty coloured beneath, nerves prominent on both surfaces, cymes terminal and axillary with divaricate

branches, calyx-tube about $\frac{1}{2}$ in. gradually tapering to the base, lobes 4 prominent, petals free or slightly united, berry ovoid or subglobose size of cherry.

MALACCA, Griffith, Maingay, 732.—DISTRIB. Sumatra.

A large tree. Leaves 3-6 by $1\frac{1}{2}$ -2 $\frac{1}{4}$ in.; lateral nerves uniting close to the margin; petiole $\frac{3}{4}$ in. Branches of inflorescence flattened below the flowers. Calyx-lobes with pale membranous edges.—Kurz in a MS. note on a specimen in the Calcutta Herbarium suspects that this is the *E. tetraëdra* of Miquel, but with some hesitation on account of the terete branchlets. The examination of a more complete series of specimens in the Kew Herbarium enables me to confirm his suspicion.

17. *E. pachyphylla*, Kurz in Journ. As. Soc. Beng. xlii. 332 (1873); For. Fl. Brit. Burm. i. 490; leaves obovate or obovate-oblong more or less cuneate at the base acuminate thick and coriaceous, flowers usually solitary or in threes sessile arranged in short stout terminal 3-chotomous panicles, branches 4-gonous articulate, calyx about $\frac{1}{2}$ in. long obconical attenuate below, lobes 4 rounded persistent.

TENASSERIM, Brandis, alt. 3000 ft. MALACCA; Griffith, Maingay.

A tree. Branchlets white. Leaves 3-4 in., turning dark when dried; lateral nerves slender, prominent, distant; petiole thick, $\frac{1}{4}$ - $\frac{1}{2}$ in.—Flowers in April.

18. *E. tristis*, Kurz in Journ. As. Soc. Beng. vol. xlii. 233 (1873); For. Fl. Brit. Burm. i. 490; leaves elliptic or elliptic-obovate acute at the base obtusely apiculate coriaceous, panicles corymbose terminal sessile, branches short stout, berry size of cherry depressed-globose crowned with the 4-lobed discoid calyx-limb.

TENASSERIM, Brandis.

A tree. Branchlets terete, thick, pale brown. Leaves 4-5 in., opaque; lateral nerves rather distant, stout, prominent. Berry 2- or 1-seeded. Calyx-lobes $\frac{1}{2}$ in. (in fruit) rounded.

†† Calyx-tube hemispherical.

19. *E. hemispherica*, Wight Ill. ii. 14; Ic. t. 525; leaves opposite rarely subalternate petioled ovate-lanceolate or oblanceolate narrowed towards the base acuminate at the apex or often rounded, cymes axillary and terminal solitary or in pairs shorter than the leaves, calyx-tube short semiglobose, disk 4-gonal, petals large orbicular reflexed glandular, berry spherical. Bedd. Fl. Sylv. t. cciii. Stronglylocalyx hemisphericus, Blume Mus. Bot. i. 90. Thwaites Enum. 116.

From S. CANARA TO CAPE COMORIN, at about 3000 ft. alt., KURG MTS., ANAMALLAY AND TINNEVELLY GHATS, Beddome. CEYLON, up to alt. 4000 ft., Thwaites.

A large tree, upper branches subtetragonous. Leaves minutely dotted, 2-6 by $\frac{3}{4}$ -2 in.; nerves inconspicuous above more prominent beneath, and uniting within the margin but not very regularly, with sometimes a second but fainter nerve close to the edge; petiole $\frac{3}{8}$ - $\frac{1}{2}$ in. Inflorescence pyramidal. Peduncles 6-9-flowered. Flowers large, white, varying in size. Berries about 1 in. in diam.—This species varies much in the shape of the leaves and in their appearance when dried. The timber is useful for various purposes.

20. *E. lanceolaria*, Roxb. Hort. Beng. 37; Fl. Ind. ii. 494; leaves shortly petioled narrowly lanceolate, flowers terminal about 15 together corymbose fasciated, berries irregularly round lobate. Wight. Ic. t. 613.

SILHET, "Roxburgh."

A small tree 10-12 ft. in height. Flowers very large, rosy, and somewhat

fragrant. *Fruit* size of small apple, not eaten.—Col. Beddome believes it to be closely allied to *E. hemispherica*. I have not seen specimens.

††† *Calyx-tube* slender, conical or clavate.

§ *Flowers* on long slender pedicels.

21. ***E. bifaria***. Wall. *Pl. As. Rar.* ii. 47, t. 161, not of Wall. *Cat.* 3606; leaves very shortly petioled crowded oblong acuminate rounded at the base shining and convex above, lateral nerves uniting at some distance from the margin in two conspicuous ones, corymbs axillary solitary branched few-flowered, calyx-tube clavate narrowed into a slender pedicel, lobes 4 roundish unequal, berry oval about 1 in. long crowned with the incurved calyx-lobes. *Wight Ill.* ii. 14; *lc.* t. 609. *E. laurifolia*, Roxb. *Hort. Beng.* 92; *Fl. Ind.* ii. 489; Wall. *Cat.* 3605. *Jambosa bifaria*, Miq. *Fl. Ind. Bat.* i. pt. i. 422. *J. laurifolia*, DC. *Prodr.* iii. 287.

SILHET Mts., Wallich.

A tree, quite glabrous; branches terete or alternately compressed, or the ultimate ones obscurely 4-gonous, swollen at the nodes, ashy-coloured. *Leaves* about 5 in., twice or three times longer than the internodes; nerves prominent beneath nearly transverse; petiole terete, $\frac{1}{2}$ in. *Corymbs* rather lax, two or three times shorter than the leaves, shortly peduncled. *Flowers* large, white, on slender pedicels. *Petals* orbicular, shortly clawed, twice as large as the calyx-lobes, minutely crenulate. *Stamens* numerous, long, spreading. *Berry* pendulous, $1\frac{1}{2}$ in. long, yellow.—In some of Wallich's specimens named *E. laurifolia* the corymbs appear to be terminal.

22. ***E. filiformis***, Wall. *MSS.*; leaves petioled rather small nearly ovate with a broad obtuse acumen coriaceous pellucidly dotted, cymes laxly racemose terminal or lateral, flowers solitary on long slender pedicels, calyx-tube turbinate or subcylindrical, lobes nearly equal, berries ovoid or roundish crowned with the 4 reflexed calyx-lobes 2-seeded. *Syzygium filiforme*, Wall. *Cat.* 3580. *S. capillare*, Wall. *Cat.* 3578.

SINGAPORE and PENANG, Wallich; MALAYA, Maingay, Griffith.

Upper branches slender, rod-like, terete, or subcompressed at the nodes. *Leaves* 2-3 by $1\frac{1}{4}$ - $1\frac{1}{2}$ in.; midrib prominent beneath, lateral nerves spreading out nearly at right angles with the midrib; petiole about $\frac{1}{4}$ in. *Pedicels* $1\frac{1}{2}$ in. *Calyx-tube* $\frac{1}{2}$ in. *Berries* $\frac{1}{2}$ in. long by $\frac{3}{8}$ in.—One of Maingay's specimens has a much longer almost cylindrical calyx-tube. Wallich's *E. (Syz.) capillaris* seems to be only a state of *E. filiformis* with thinner narrower leaves, shorter pedicels, and smaller flowers.

23. ***E. Kurzii***, Duthie in *Journ. As. Soc. Beng.* xlii. (1877) pt. ii. p. 68; *Kurz For. Fl. Brit. Burm.* i. 491; leaves more or less broadly lanceolate acute or attenuate at the base obtusely acuminate coriaceous pale beneath, flowers rather small white peduncled arranged in short axillary racemes or at the axils of fallen leaves, calyx-tube clavate-turbinate spreading above, lobes 4 rounded persistent, petals free, berry globose size of pea. *E. cerasiflora*, Kurz in *Journ. As. Soc. Beng.* xlii. (1873) 233; not of Miguel.

SIKKIM, alt. 1-5000 ft., J. D. H.; ASSAM, Jenkins; KHASIA Mts., Kurz; MISHMI, Griffith; CACHAR, Keenan; PEGU and MARTABAN, Kurz.

A large tree 90-100 ft. *Branchlets* white, compressed or subtetragonous. *Leaves* 4-7 in., shining a little on the upper surface; lateral nerves slender but prominent; petiole $\frac{3}{8}$ - $\frac{1}{2}$ in. *Cymes* about 5-flowered. *Calyx-tube* $\frac{1}{2}$ - $\frac{1}{2}$ in., the produced portion $\frac{1}{4}$ in.; lobes $\frac{1}{2}$ in., reflexed after flowering. *Petals* $\frac{1}{2}$ in. *Filaments* slender. *Style* persistent. *Berry* $\frac{1}{2}$ - $\frac{3}{4}$ in., 1-2-seeded, smooth, crowned with the spreading calyx-

limb.—The Assam specimens have smaller flowers and a more slender calyx-tube. No. 2356 of Griffith's collection from E. Bengal? differs from the above in having nearly sessile leaves and flowers. It is probably distinct, but the specimen is too incomplete, and the locality somewhat doubtful.

24. **E. albiflora**, Duthie in *Journ. As. Soc. Beng.* xlv. (1877) pt. ii. 68; *Kurz For. Fl. Brit. Burm.* i. 491; leaves obovate or nearly ovate shortly and bluntly acuminate acute at the base, cymes from the upper axils or terminating older shoots few-flowered shorter than the leaves, calyx-tube narrow and slender below, lobes 4 rounded or subacute, petals united white.

BURMA, alt. 1000 ft., Griffith (2419).

A small tree with terete branchlets. Leaves 3-5 by 2-2½ in., smooth, pale and indistinctly nerved above; lateral nerves rather distant and prominent beneath faintly uniting within the margin, interspaces finely reticulate; petiole ½ in. "Buds white" (Griffith MSS.). Calyx-tube about ½ in. long.

§§ Pedicels shorter and more erect.

25. **E. fusiformis**, Duthie; young branches 4-gonous, leaves petioled obovate-lanceolate cuneate below subcoriaceous pellucid-punctate, lateral nerves rather close, cymes terminal compact branches angular and somewhat winged, flowers 2 or 3 together on short pedicels, calyx-tube narrowly fusiform much produced above the ovary.

MALAYA, Maingay No. 743.

Bark yellowish. Leaves 4½ by 3 in., shining a little above, minutely dotted; midrib and nerves dark-coloured; lateral nerves uniting within the margin; petiole about ¾ in. Calyx-tube ½ in. in length and ½ in. across at the widest part; lobes 4, rounded, reflexed after flowering. Style persistent, exserted portion equalling the calyx-tube.—Closely allied to No. 2236 of Beccari's Borneo plants.

26. **E. læta**, Ham. in *Trans. Wern. Soc.* v. 338 (excl. syn. Rumph.); leaves rather thin shortly petioled ovate-lanceolate attenuated at the base with a longish obtuse acumen pellucid-punctate, primary nerves directed upwards not distinctly uniting within the margin, peduncles terminal and axillary 1-few-flowered often jointed in the middle, calyx-tube long cylindrical tapering to the base, stamens crimson or purple numerous exceeding the large rounded petals, berry ovoid. *Jambosa læta*, Blume *Mus. Bot.* i. 104.

Moist Western Ghat forests from BOMBAY southwards, Hamilton, Beddome, Gibson, Ritchie, Stocks.

A small or middling-sized tree; branchlets terete, Leaves 4-5 by 1½-1¾ in., secondary nerves crossing the primary ones more nearly at right angles with the midrib; petiole ¼ in. Flowers large, 2-3 in. when expanded, crimson or white. Calyx-tube ¾-1 in.; lobes rounded, unequal, reflexed when in flower. Petals white, glandular. Style 1½ in. persistent.—Hamilton's type specimen in the British Museum from Mysore is certainly identical with the Western Ghat specimen named *S. pauciflora* in the Kew Herbarium.

VAR. *pauciflora*, Wight *Ill.* ii. 15; *Ic. t.* 526 (sp.); pedicels solitary from the extreme axils 1-flowered. *Jambosa pauciflora*, Dalz. & Gibs. *Bomb. Fl.* 94. *E. Wightii*, Bedd. *Fl. Sylv. Anal. Gen.* cix.—Courtallum, WIGHT.

27. **E. cylindrica**, Wight. *Ill.* ii. 14; *Ic. t.* 527; ultimate branches terete, leaves shortly petioled ovate-lanceolate acuminate coriaceous minutely pellucid-punctate, primary nerves prominent beneath forming double loops within the margin, cymes terminal or from the upper axils 3-8-flowered shorter

than the leaves, calyx-tube cylindrical tapering to the base constricted near the apex, fruit subspherical urceolate. *Bedd. Fl. Sylv.* t. 202; *Anal. Gen.* cix. *Jambosa cylindrica*, *Thwaites Enum.* 115.

CEYLON, ascending to 3000 ft., *Walker, Thwaites*.

A moderate-sized tree. *Leaves* 4-6 by $1\frac{1}{2}$ - $1\frac{3}{4}$ in. The nervation forms a characteristic feature in this species, the lateral nerves uniting in a double system of intra-marginal loopings, the inner one being situated about half-way between the midrib and the margin; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Flowers* large, $\frac{1}{2}$ to nearly 1 in. diam., white, turning to purple. *Calyx-tube* $\frac{3}{4}$ to nearly 1 in. long. *Petals* orbicular, dotted. *Fruit* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.—*Blume (Mus. Bot. i. 114)* compares this with his *Clavimyrthus virens*; but the latter is distinguished by a more contracted inflorescence and the calyx shorter and less attenuated below.

28. ***E. ramosissima***, *Wall. Cat.* 3604; leaves lanceolate or oblong-lanceolate attenuated towards the base acuminate subcoriaceous pellucid-punctate, cymes axillary and terminal much branched, branches spreading, calyx-tube clavate or narrowly obconical, lobes rounded nearly equal, petals densely glandular. *Clavimyrthus ramosissima*, *Blume Mus. Bot. i. 115*.

SIKKIM, *J. D. H. SILHET, Wallich*. KHASIA Mts., *Griffith*.

A tree; branchlets terete, with a pale yellow bark. *Leaves* 3-4 by about $1-1\frac{1}{2}$ in., shining above, obscurely dotted, with a long acumen, narrowing at the base into a short petiole, reticulate-nerved beneath; midrib prominent; primary nerves few, slender, uniting in a looping one within the margin. *Calyx-tube* $\frac{3}{8}$ in., tapering gradually to the base with nearly straight sides.—This species resembles *Jambosa glabrata* DC. but differs in the less slender and more branched peduncles; the leaves are narrower at the base and the nerves are more prominent.

29. ***E. Helferi***, *Duthie*; upper branches 4-gonous, leaves shortly petioled lanceolate or ovate-lanceolate acuminate coriaceous pellucid-dotted, nerves inconspicuous primaries numerous uniting within the margin, interspaces finely reticulate, cymes terminal and from the upper axils branched shorter than the leaves, calyx-tube clove-shaped $\frac{1}{4}$ in., lobes 4, opposite pairs equal.

MERGUI, *Helfer* (2418). SINGAPORE, *Lobb*.

Bark of upper branches and of inflorescence reddish, deciduous. *Leaves* $3\frac{1}{2}$ -4 by $1-1\frac{1}{2}$ in.; petiole about $\frac{1}{4}$ in.—Allied to *J. Teysmanni*, *Miq.* and *E. ramosissima*; from the latter it differs in having thicker leaves, the primary nerves much closer and less prominent beneath, but with a more distinctly continuous marginal one, branches of the inflorescence more erect, and flowers smaller.

30. ***E. mangifolia***, *Wall. Cat.* 3619; leaves ovate-lanceolate acuminate thick coriaceous nervation prominent on both surfaces interspaces finely reticulate, cymes axillary and terminal corymbose, flowers large numerous, calyx-tube $\frac{3}{8}$ in. dilated above, petals free. *E. reticulata*, *Wight Ill.* ii. 16; *lc.* t. 541.

ASSAM, *Griffith, G. Mann*; SILHET, *Wallich*; KHASIA Mts., alt. 3-4000 ft., *J. D. H. & T. T.*

Branchlets terete. *Leaves* 3-5 by 1-2 in., shining above; lateral nerves uniting close to the margin sometimes in two continuous ones. *Calyx* much produced above the ovary.—This differs from *E. inophylla* in the more prominent nerves of the leaves and in the shape of the calyx. *Miquel (Fl. Ind. Bat. i. pt. i. 435)* speaks of it as being closely related to *Jambosa conferta*, *Korth*.

31. ***E. inophylla***, *Roxb. Hort. Beng.* 37; *Fl. Ind.* ii. 496; leaves shortly petioled ovate-oblong with an acute base obtusely acuminate closely nerved dark above and shining, cymes terminal corymbose, calyx clove-shaped,

lobes 4-5 short obtuse, petals 4-5 distinct, berries pyriform. *Wight Ill.* ii. 17; *Ic. t.* 623. *Syzygium inophyllum*, *DC. Prodr.* iii. 260; *Wall. Cat.* 3600, *in part.* *Jambosa inophylla*, *Miq. Fl. Ind. Bat.* i. pt. i. 433. *Calyptranthes obtusifolia*, *Ham. in Wall. Cat.* 3600 B.

SILHET, *Wallich*; MERGUI, *Griffith*; SINGAPORE and PENANG, *Wallich*.

A tree. *Trunk* straight. Young branches terete-compressed, polished. *Leaves* upwards of $4\frac{3}{4}$ by $2\frac{1}{2}$ in., thickly coriaceous; lateral nerves rather close, spreading transversely; petiole about $\frac{1}{4}$ in. *Calyx* $\frac{1}{4}$ in.—In *Wallich's* specimens (3600) the petals appear to be calyptrate. Although resembling the clove-tree it possesses no kind of fragrance; the large pear-shaped berries are not eatable (*Roxburgh*).

SECT. II. **Syzygium.** *Flowers* small, in compact cymes. *Calyx* without a thickened staminal disk, tube turbinate rarely elongate; limb 4-5-lobed, or truncate. *Petals* usually calyptrate. *Berries* small, globose pyriform or oblong, 1-2-seeded (to p. 500).

* *Cymes* terminal and axillary, rarely from leafless axils (to p. 496).

† *Petals* usually free (to p. 488).

§ *Calyx* short, turbinate or subcylindrical.

‡ *Berries* globose or subglobose.

a. *Lateral nerves* of leaves rather distant.

32. **E. anisosepala**, *Duthie*; leaves ovate-lanceolate acuminate lateral nerves close uniting at some distance from the margin, cymes terminal corymbose, calyx-tube turbinate about $\frac{1}{3}$ in. lobes unequal, petals free or slightly combined.

MALACCA, *Griffith*, *Maingay* 753.

"A very large tree" (*Griff.*); branchlets terete, grey, polished. *Leaves* $3-3\frac{1}{2}$ by $1\frac{1}{4}-1\frac{1}{2}$ in., shining above, dark when dry. *Inflorescence*-branches sharply angled, alternately compressed upwards. Inner calyx-lobes broad and petaloid, appearing to fall early with the corolla, the two outer ones narrower and gibbous below. *Style* long, persistent.—In *Griffith's* plant the inflorescence is more branched and longer than the leaves, and the flowers are smaller ($\frac{1}{8}$ in.).

33. **E. Griffithii**, *Duthie*; leaves ovate or oblong-lanceolate narrowed at both ends coriaceous smooth and shining above, nerves impressed above prominent beneath, cymes terminal or from the upper axils, flowers 2 or 3 together at the ends of long compressed branches, calyx-lobes unequal, petals free thick edges membranous.

MALACCA, *Griffith* 2375.

Branchlets terete. *Leaves* 5-6 by $2-2\frac{1}{2}$ in., shortly petioled; lateral nerves uniting in conspicuous loops at some distance from the margin and with a fainter set near the margin, interspaces reticulate. *Calyx-tube* about $\frac{1}{4}$ in.

34. **E. Thumra**, *Roxb. Hort. Beng.* 92; *Fl. Ind.* ii. 495; leaves broadly ovate or ovate-lanceolate shortly acuminate base subacute dark and shining above reddish beneath, lateral nerves horizontal prominent on both surfaces uniting conspicuously within the margin, cymes terminal and axillary long-peduncled, flowers sessile umbellate, calyx-lobes 4 rounded, petals free, berry spherical or subpyriform. *Wight Ic. t.* 617; *Kurz in Journ. As. Soc. Beng.* vol. xlv. (1877) pt. ii. p. 67; *For. Fl.* i. 488. *Syz. speciosum*, *Wall. Cat.* 3568.

Marshy parts of PEGU forests, *Kurz*. RANGOON, *Maingay*. AMHERST and MOULMEIN, *Wallich*; TENASSERIM, *Helfer*.

Branchlets terete, compressed. *Leaves* 5-8 by $2\frac{1}{2}$ - $3\frac{1}{2}$ in., coriaceous, reticulate beneath; petiole $\frac{1}{4}$ in. Branches of *inflorescence* lax, quadrangular, many-flowered, bracteate.—A specimen in the Kew Herbarium under this name (I can find no type-specimens) is certainly Wallich's *S. speciosum*. Roxburgh's incomplete description and unfinished drawing (No. 2510) as far as they go agree fairly well with this latter. The flowers are sometimes 5-merous.

VAR. *ferruginea*, Wight Ic. t. 554 (sp.); petals 8. *E. octopetala*, *Ham.*—Mergui, *Griffith*.

35. ***E. rubens***, *Roxb. Hort. Beng.* 92; *Fl. Ind.* ii. 496; leaves shortly petioled opposite or subalternate ovate-lanceolate shortly acuminate thinly cartilaginous glossy above finely nerved, panicles terminal and axillary corymbose branches acutely angular ultimate divisions umbelliform, petals free, berry size of small cherry. *Wight. Ill.* ii. 17; *Ic.* t. 630; *Kurz in Journ. As. Soc. Beng.* vol. xlv. pt. ii. p. 67; *For. Fl.* i. 488. *Jambosa Wightiana*, *Blume Mus. Bot.* i. 106.

CHITTAGONG forests, *Roxburgh*. TENASSERIM from MOULMEIN to MERGUI, *Griffith, Kurz*.

Large tree; branchlets terete or subcompressed, white. *Leaves* $4\frac{1}{2}$ - $6\frac{1}{2}$ in., turning black or reddish when dried; lateral nerves slender, uniting distinctly within the margin; petiole about $\frac{1}{4}$ in.? *Panicles* on longish peduncles, but falling short of the leaves.—Closely allied to the preceding. The leaves are of a thinner texture, the stamens longer, and the sepals and petals larger (*Kurz*).

b. *Lateral nerves of leaves close.*

36. ***E. cymosa***, *Lam. Dict.* iii. 199; *not of Roxb.*; leaves ovate acuminate finely and closely nerved, cymes axillary and terminal shorter than the leaves, flowers small, calyx-tube campanulate lobes 4, petals free, berry globose size of large pea. *Wight Ill.* ii. 17; *Ic.* t. 555; *Kurz in Journ. As. Soc. Beng.* vol. xlv. pt. ii. p. 67; *For. Fl.* i. 486. *Syz. caudatum*, *Wall. Cat.* 3591. *S. vimineum*, *Wall. Cat.* 3593?. *S. concinnum*, *Wall. Cat.* 3582. *S. nelitricarpum*, *T. & B. in. Nat. Tydsch. Ned. Ind.* xxv. *S. cymosum*, *DC. Prodr.* iii. 259; *Korth. in Ned. Kruidk. Arch.* i. 202?. *E. nigrescens*, *Poir. Suppl.* iii. 123?. *E. rhodomelea*, *Commers. in DC. Prodr.* l.c. *Jambosa tenuiscuspis*, *Miq. Fl. Ind. Bat.* i. 431. *Myrtus cymosa*, *Spreng.*; *Blume Bijl.* 1086.

CACHAR, *Keenan*; SILHET and TAVOY, *Wallich*; BURMA, *Griffith*; MOULMEIN, *Helfer*; MALACCA, *Maingay*, *Griffith*; SINGAPORE and PULO DINDING, *Wallich, Kurz*.—DISTRIB. JAVA.

A large shrub or tree. *Leaves* 2-3 in., rounded at the base, smooth and polished above, often glaucous, with a longish slender but obtuse acumen; lateral nerves not very distinct, uniting close within the margin; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Peduncles* equalling the petioles or shorter. "*Berries* slightly depressed at the apex, purple-black when ripe" (*Maingay MS.*).—Wallich's *E. concinna*, which I refer here doubtfully, has the leaves rather longer and more oblong; the petals appear to be free though not expanding; the specimens however are too incomplete for a proper determination.

VAR. *rostrata*; leaves with a long slender acumen more prominently nerved, lateral nerves spreading out towards the margin, petiole longer, calyx nearly truncate.—The leaves which remain green after drying resemble those of *E. verecunda*. *E. rostrata*, *Bedd. MS.*—Anamallays. Perhaps a distinct species.

37. ***E. toddalioides***, *Wight Ill.* ii. 16; *Ic.* t. 542; leaves lanceolate acuminate attenuate towards the base coriaceous pellucid-punctate, cymes lateral

di-tri-chotomous each branch 1-3-flowered, calyx-limb dilated tube contracted not thicker than the pedicel, lobes 4 unequal shallow, petals free but not expanding.

SIKKIM, alt. 4000 ft., *Gamble?* MERGUI, *Griffith in Hb. Wight.*

A small tree. *Branchlets* subterete. *Leaves* 2-3 by 1-1½ in.; lateral nerves many uniting close within the margin. *Flowers* about ¼ in.—Habit of *E. Gardneri* and *E. lissophylla* but the petioles are shorter than those of the former and the inflorescence is different from both.

38. ***E. myrtifolia***, *Roxb. Hort. Beng.* 37; *Fl. Ind.* ii. 490; leaves elliptic-lanceolate acuminate very shortly petioled, nerves not conspicuous close interspaces finely reticulate and punctate, cymes axillary lax on longish peduncles, branches acutely angular, flowers about 3 together small, calyx-tube broadly obconical or campanulate, lobes 4 conspicuous subacute, berry globular. *Wight Ill.* ii. 15; *Ic. t.* 618; *Kurz in Journ. As. Soc. Beng.* vol. xlv. pt. ii. p. 67; *For. Fl.* i. 486. *Syzygium myrtifolium*, *DC. Prodr.* iii. 261; *Wall. Cat.* 3571; *Miquel Anal. Ind.* ii. 20; *Fl. Ind. Bat.* i. pt. i. 456. *C. oleina*, *Wight Ill.* ii. 15.

E. Bengal, Griffith; Pegu, McClelland; Singapore, Wallich.—DISTRIB. Sumatra, Borneo.

A shrub or small tree with 4-gonous branchlets. *Leaves* 1¾-3 by ¾-1 in., shining above, often rusty-red beneath. *Cymes* many-flowered, shorter than the leaves. *Petals* free or slightly united. *Style* persistent, exerted portion twice the length of the calyx-tube.—Affords a dark strong wood.

39. ***E. micrantha***, *Thwaites Enum.* 117 (*Syzygium*); leaves ovate or elliptic obtusely acuminate narrow at the base obscurely dotted, cymes about equal to the leaves, flowers small, calyx acutely 4-lobed, petals free, berries red round size of pea. *Bedd. Fl. Sylv. Anal. Gen.* cviii.

CEYLON, central province, alt. 3-5000 ft., *Thwaites, Gardner.*

A moderate-sized tree. *Leaves* 2-4 by ¾-2 in.; petiole ½ to nearly ⅓ in.—In *Wight's* herbarium there are specimens of this named *E. rubicunda* which it resembles in many respects.

40. ***E. acuminatissima***, *Kurz in Journ. As. Soc. Beng.* vol. xlv. pt. ii. p. 67; *For. Fl.* i. 487; leaves ovate-lanceolate acutely acuminate pale shining indistinctly nerved above, cymes terminal and axillary lax exceeding the leaves, flowers small, calyx broad above lobes 5, stamens short. *Myrtus acuminatissima*, *Bl. Bijdr.* 1088. *Jambosa acuminatissima*, *Hassk. in Flora* (1849) 592; *Miq. Fl. Ind. Bat.* i. 438. *Syz. altissimum*, *Wall. Cat.* 3588.

MERGUI, *Helfer*; MALACCA, *Maingay*; PENANG, *Porter.*—DISTRIB. Java.

Branchlets terete or subtetragonous. *Leaves* 3-6 by 1¼-2 in.; lateral nerves slender beneath; petiole ¼ in. *Inflorescence*-branches long, angular. *Calyx* saucer-shaped above after flowering. *Petals* only slightly united.—In *Helfer's* plant the lateral nerves unite at some distance from the margin with a second fainter one close to the edge, the inflorescence is more lax and divaricate.

†† *Berries oblong.*

41. ***E. Arnottiana***, *Wight Ill.* ii. 17; *Ic. t.* 999; leaves elliptic-oblong acuminate coriaceous closely nerved, cymes dense from the upper axils branches stout, flowers subsessile in umbels of 8-12, bracteoles long caducous, petals dis-

tinct, berries oblong. *Bedd. Fl. Sylv. Anal. Gen.* cvii. *Syzygium densiflorum*, *Wall. Cat.* 3601; *W. & A. Prodr.* i. 329.

Common on the NILGHIRI and [PULNEY HILLS, alt. 6-7000 ft., *Wight*, &c. ANAMALLAY Mts., alt. 4000 ft., *Beddome*.

A large spreading tree, trunk low; branchlets 4-gonous. *Leaves* 2-3 by 1-1½ in., obscurely dotted, the numerous nerves uniting close within the margin; petiole ½-nearly 1 in. *Flowers* cream-coloured, crimson in bud. *Fruit* dark purple.—Timber valuable (called "Nawal"); the fruit is eaten but astringent (*Beddome*).

VAR. *Benthamiana*, *Wight MSS.* (sp.); leaves almost sessile cordate-amplexicaul upper generally solitary, flowers smaller, petals apparently united.—Nilghiri Mts., *Gardner*. Perhaps distinct.

A specimen in the Kew Herbarium from the Pulney Hills (No. 254 of *Beddome's* collection) I find a difficulty in placing satisfactorily. To the above species it bears a great resemblance but for the elongate calyx-tube.

§§ *Calyx* elongate.

‡ *Flowers* axillary, racemose, calyx ½-1 in. long.

42. **E. Maingayi**, *Duthie*; leaves shortly petioled long oblong-lanceolate acuminate rounded at the base, racemes short axillary or from the leafless axils of the rugged lower branchlets, calyx-tube elongate clavate about $\frac{2}{3}$ in. glandular, lobes 4 rounded deciduous.

MALAYA, *Maingay* 750.

Older branchlets with rugged corky bark, upper stout, terete, reddish. *Leaves* 4½-7½ by 1½-2½ in., indistinctly nerved above, midrib stout beneath; petiole ½ in. *Style* short, acute.—This plant differs from the other members of the section in the rounded base of the leaves; it seems to approach nearest to *E. claviflora*, and has a general resemblance to *E. borneensis*, *Miq. Fl. Ind. Bat. i.* pt. i. 434 (*Jambosa*), but the petioles of the latter are much longer.

43. **E. claviflora**, *Roxb. Hort. Beng.* 37; *Fl. Ind.* ii. 488; leaves lanceolate narrowed at the base obtusely acuminate, corymbs lateral subsessile umbelliform, calyx-lobes rounded, flowers clavate, berries long ovate crowned with the cyathiform base of the calyx-limb. *Wight Ill.* ii. 15; *Ic.* t. 606; *Kurz in Journ. As. Soc. Beng.* vol. xlv. pt. ii. p. 65; *For. Fl.* i. 480. *Syzygium claviflorum*, *Wall. Cat.* 3575. *S. longiflorum* *Wall. Cat.* 3572. *S. excavatum*, *Wall. Cat.* 3574.

SIKKIM and KHASIA Mts., alt. 2-4000 ft., *J. D. H. & T. T.*; SILHET and CHITTAGONG, *Wallich*; PEGU, *Kurz*; NICOBAR and ANDAMAN ISLANDS, *Kurz*; TENASSERIM, *Helfer*; SINGAPORE and PENANG, *Wallich*.

A tree. *Leaves* 3-6 by about 1½ in., rather closely nerved. *Berry* about an inch long.—In Chittagong this grows to be a stout useful timber-tree of very considerable size; it flowers in March, fruits in May; fruit eaten (*Roxburgh*). *Wallich's* specimens named *S. excavatum* have very thick coriaceous leaves somewhat revolute at the margin; the berries are $\frac{3}{4}$ in. long including $\frac{1}{8}$ in. of projecting calyx-limb.

44. **E. leptantha**, *Wight Ill.* ii. 15; *Ic.* t. 528; leaves from ovate-elliptic to oblong-lanceolate obtusely acuminate narrowed into a very short petiole, cymes raceme-like arranged on the leafless axils or at the nodes of denuded branches, calyx-tube long narrow clavate, limb with broad shallow teeth or nearly truncate, berry clavate-oblong. *Benth. Fl. Austral.* iii. 283 (*Syz.*); *Kurz in Journ. As. Soc. Beng.* vol. xlv. pt. ii. p. 65; *For. Fl.* i. 480. *Syz. suavisimum*, *Wall. Cat.* 3573. *Syzyg. Griff. Notul.* 654.

SIKKIM, foot of hills, *J. D. H. & T. T.*; PEGU, *Kurz*; Rangoon, *Cleghorn*; MOULMEIN, *Falconer*; MERGUI, *Griffith*; AMHERST, *Wallich*; SINGAPORE and PENANG,

Wallich; ANDAMAN ISLANDS, *Helper, Kurz*.—DISTRIB. Malay Archipelago to Australia.

A moderate-sized tree. *Leaves* 4–5½ by 1½ in., pale, finely nerved. *Calyx-tube* about ½ in., finely attenuated towards the base; limb dilated and much produced beyond the ovary. *Berry* about ½ in.

45. **E. Wightiana**, *Wight Ill.* ii. 15; *Ic.* t. 529; leaves elliptic-oblong tapering at each end, peduncles axillary or in racemes on the leafless branches or shoots, calyx elongate clavate repandly 4–5-lobed, petals 12 or fewer by abortion the outer ones occasionally expanding. *E. lanceolata*, *Lam. Dict.* iii. 200; *Wight Ill.* ii. 15; *Ic.* t. 530; *DC. Prodr.* iii. 284; *Bedd. Fl. Sylv. Anal. Gen.* cx.; *W. & A. l. c. (Syz.)*; *Thwaites Enum.* 119 (*Acmena*). *Syzygium Wightianum*, *Wall. Cat.* 3577; *W. & A. Prodr.* i. 330. *Myrtus Sonneratii*, *Spreng. Syst.* ii. 485.

CONCAN, *Stocks*; NILGHIRI AND DINDYGUL MTS., Quilon, *Wight*. CEYLON, ascending to 2000 ft., *Walker, Thwaites*.

A very showy tree when in full blossom (Beddome). *Leaves* 3–5 by 1½ in., pellucid-dotted. *Flowers* nearly sessile.—This varies much in the length of the calyx-tube, and the number of flowers. Its numerous petals give it a relation similar to *E. polypetalata* in the *Jambosa* section.

‡‡ *Flowers in terminal and axillary corymbs. Calyx shorter.*

46. **E. pellucida**, *Duthie*; leaves narrowly oblong or oblanceolate rounded or subacute at the apex finely and closely nerved nerves and dots pellucid, cymes terminal and axillary, flowers crowded at the ends of the longish ascending branches, calyx-tube ½ in. slender below, lobes 4 prominent opposite pairs equal. *E. contracta*, *Wall. Cat.* 3602; *Kurz in Journ. As. Soc. Beng.* vol. xvi. pt. ii. p. 65; *For. Fl.* i. 481, not of *Poir.*

MARTABAN TO TENASSERIM, *Helper* (2406, 2407), *Kurz*.

A shrub; branchlets terete. *Leaves* 2–6 by about 1 in., chocolate-coloured above when dry, paler beneath; nerves rather prominently reticulated; petiole ¼ in. *Cymes* sometimes exceeding the leaves. *Petals* orbicular, free or slightly combined.

VAR. contracta; leaves narrower, lateral nerves directed upwards, cymes mostly axillary and falling short of the leaves. *Syz. contractum*, *Wall. Cat.* 3602; not of *Poir.* in *DC. Prodr.* iii. 259 (*Eug.*).—Attran river, *Wallich*. Mr. Kurz is of opinion that the Martaban specimens with dry blackish and less distinctly-nerved leaves may prove to be distinct, or may be a large and long-leaved variety of *E. cuneata*, *Wall.*

47. **E. zeylanica**, *Wight Ill.* ii. 15; *Ic.* i. 73; leaves ovate- or linear-lanceolate acuminate polished above hard and coriaceous indistinctly nerved densely glandular, cymes axillary and terminal usually compact many-flowered, flowers white conspicuous, calyx-tube elongate-turbinate usually glandular and pruinose, lobes 4–5 conspicuous, petals free or united in a calyptra, berry subglobose white. *Kurz in Journ. As. Soc. Beng.* vol. xvi. pt. ii. p. 65; *For. Fl.* i. 481. *E. spicata*, *Lam. Dict.* iii. 201; *DC. l. c. (Syz.)*. *Bedd. Fl. Sylv.* i. t. 202. *E. glandulifera*, *Roxb. Hort. Beng.* 37; *Fl. Ind.* ii. 496. *Ez. zeylanicum*, *DC. Prodr.* iii. 260; *Wall. Cat.* 3564, in part; *Dalz. & Gibs. Bomb. Fl.* 94. *S. politum*, *Wall. Cat.* 3628. *S. Belluta*, *DC. l. c.* 261. *Acmena zeylanica*, *Thwaites Enum.* 118. *A. parviflora*, *DC. l. c.* 262. *Jambosa bracteata*, *Miq. Fl. Ind. Bat.* i. pt. i. 437. *S. corticatum*, *Wall. Cat.* 3565. *Myrtus zeylanica*, *Linn. Sp. Pl.* 675.—*Rheede Hort. Mal.* v. t. 20.

WESTERN PENINSULA, from CONCAN southwards; SILHET; MALAY PENINSULA to SINGAPORE; PENANG; ANDAMAN ISLANDS, *Kurz*; CEYLON, up to 4000 ft., *Thwaites*.—DISTRIB. Sumatra, Borneo.

A large shrub or moderate-sized tree; young branches often acutely quadrangular or winged. *Leaves* 1-5 in., varying in width from $\frac{1}{2}$ -2 in., rounded or tapering at the base, giving off an aroma when bruised; petiole $\frac{1}{8}$ - $\frac{1}{2}$ in. *Flowers* in clusters of 3-5, shortly pedicelled. *Calyx* and pedicels usually rough with glands. *Petals* soon falling off. *Berry* about the size of a pea.—According to Thwaites the narrow-leaved form is the most abundant in Ceylon.

VAR. laxiflora, Bedd. l. c.; flowers in lax racemes, panicles exceeding the leaves.—In a specimen collected by Col. Beddome on the Tinnevely Hills some of the flowers have the pedicel-like calyx-tube unusually long.

48. ***E. grata***, Wall. Cat. 3586 (*Syzygium*); leaves ovate-lanceolate narrowly acuminate rounded or subcuneate at the base distinctly punctate above glaucous beneath, flowers in dense clusters terminal and axillary, calyx narrowly campanulate smooth, berries black oval or subglobose crowned with the persistent calyx-lobes. *Wight Ill.* ii. 15; *Kurz in Journ. As. Soc. Beng.* vol. xvi. pt. ii. p. 65; *For. Fl.* i. 480. *E. scabrida*, Wall. Cat. 3564 D. *Myrtus quadrangularis*, Ham.

ASSAM, Jenkins, Griffith; KHASIA MTS., Griffith; PEGU, Kurz; MOULMEIN, Wallich; MERGUI, Griffith.

A small tree. *Leaves* 3-5 by 1-2 in., sometimes almost acutely acuminate. *Calyx-tube* tapering below, pruinose, usually quite smooth or longitudinally ribbed when dried. *Berry* about $\frac{1}{4}$ in. long.—The flowers are rather larger than those of *E. zeylanica*, to which it is closely allied.

49. ***E. linearis***, Wall. Cat. 3596 (*Syzygium*); leaves linear-lanceolate acuminate subfalcate indistinctly nerved above, flowers crowded at the ends of the branchlets, calyx campanulate pruinose limb 4-partite, petals free, berry size of a pea crowned with the persistent calyx-lobes.

INDIA? *Herb. Wallich* (without locality).

Leaves 2-3 by $\frac{1}{2}$ - $\frac{3}{4}$ in., conspicuously dotted above; lateral nerves distant, uniting within the margin; petiole about $\frac{1}{4}$ in. *Flowers* larger than those of *E. zeylanica*; pedicels equal in length to the calyx-tube. *Style* nearly twice as long as calyx-tube.—A specimen of this in Rottler's Herbarium is named *Myrtus ruscifolia*, Willd., and is said to come from India.

50. ***E. penangiana***, Duthie; leaves thick elliptic-obovate obtusely acuminate attenuate at the base nerves close indistinct on both surfaces, cymes short crowded towards the ends of year-old branches, calyx-tube narrowly clavate or subcylindrical nearly $\frac{1}{2}$ in. much produced lobes 4 small, petals free.

PENANG, Government Hill, Maingay, 744.

Branchlets terete. *Leaves* $2\frac{1}{2}$ - $2\frac{3}{4}$ by about 1 in., brownish-yellow when dried.—Allied to *E. chlorantha*, and No. 1567 of Beccari's Borneo plants.

A specimen at Kew, collected by Helfer (no locality given), comes near to this. The calyx-tube is rather longer and more spreading above after flowering; the leaves are of thinner texture, and more conspicuously nerved.

51. ***E. skiofila***, Duthie; leaves elliptic-lanceolate with a slender obtuse acumen narrowed at the base subcoriaceous pellucid-punctate, calyx-lobes 4 incurved, petals small free spreading distant, berry red size of a pea.

PENANG, Government Hill, Maingay, in deep shaded ravines.

A small tree, 15 ft. *Branchlets* terete. *Leaves* shortly petioled, $4\frac{1}{2}$ -6 by $1\frac{1}{2}$ -2 in.; midrib rounded beneath; lateral nerves close, inconspicuous above, spreading at right angles and uniting close within the margin. *Calyx-tube* $\frac{1}{2}$ in. *Stamens* short.

52. **E. chlorantha**, *Duthie*; leaves ovate acuminate thick opaque shining nerves numerous close, cymes in short racemes from the upper axils or terminating previous year's shoots, calyx-tube $\frac{1}{4}$ in. cylindrical below, petals free greenish, berry globose about $\frac{1}{2}$ in. crowned with 4 rounded unequal calyx-lobes. *Syz. rigidum*, *Wall. Cat.* 3581; *not of DC. (Eug.)*.

MALACCA, *Griffith, Maingay*, 733; SINGAPORE, *Wallich*.—DISTRIB. Malay Islands.

"A very elegant tree when in flower" (*Maingay-MS.*). *Branchlets* terete. *Leaves* $2\frac{1}{2}$ – $5\frac{1}{2}$ by $1\frac{1}{4}$ –3 in.; midrib impressed above, prominent beneath; primary nerves slender prominent, on both surfaces, uniting in loops within the margin, interspaces finely reticulate. *Calyx-tube* furrowed below. *Petals* $\frac{1}{5}$ in., reflexed. *Filaments* bright red.

53. **E. lineata**, *Blume Bijl.* 1087 (*Myrtus*); *Mus. Bot.* i. 116 (*Clavi-myrtus*); leaves lanceolate-oblong or nearly elliptic obtusely acuminate narrow at the base, cymes axillary and terminal shorter than the leaves, calyx-tube clavate lobes 4, petals free, berry size of large pea crowned with the constricted calyx-limb. *E. corymbosa*, *Wall. Cat.* 3566 F. *Jambosa lineata*, *DC. Prodr.* iii. 287; *Miq. Fl. Ind. Bat.* i. pt. i. 428.

MALACCA, *Maingay* (720), *Griffith* (2390 in part); PENANG, *Jack*.—DISTRIB. Java, Borneo, Sumatra.

A shrub or small tree. *Branchlets* terete. *Leaves* 2– $3\frac{1}{2}$ by 1–2 in., coriaceous, shining above, finely nerved. Extreme branches of inflorescence 3-fl. *Calyx-tube* about $\frac{1}{4}$ in.; lobes about equal, persistent. *Petals* shortly clawed, suborbicular, twice the calyx-lobes.

54. **E. rubricaulis**, *Miq. Fl. Ind. Bat.* i. pt. i. 432 (*Jambosa*); leaves elliptic from an acute base long and obtusely acuminate shining above, smaller nerves and dots pellucid, cymes axillary and terminal, calyx-tube $\frac{1}{4}$ in. obovate-cylindrical, lobes 4, petals free.

TENASSERIM, *Helper*; MALACCA, *Griffith*.—DISTRIB. Java.

Branchlets subterete, reddish. *Leaves* 2–3 by $\frac{3}{4}$ – $\frac{5}{8}$ in., stiffly cartilaginous; midrib prominent beneath, tinged with red; lateral nerves close, distinct beneath, interspaces subreticulate; petiole $\frac{1}{12}$ – $\frac{1}{8}$ in., channelled above. *Flowers* nearly sessile. *Calyx-lobes* ovate, rounded, scarious at the edges. *Anthers* cordate-apiculate.

55. **E. pyrifolia**, *Wall. Cat.* 3584 (*Syzygium*) *not of Desv.*; leaves ovate or oblong-lanceolate with a long obtuse acumen coriaceous dark and shining above, corymbs terminal trichotomous long-peduncled, calyx-tube about $\frac{1}{4}$ in. gradually tapering to the base lobes 4 shallow, petals united, berry oblong. *Syzygium pyrifolium*, *DC. Prodr.* iii. 261 (*Syzyg.*); *Korth. in Ned. Kruidk.* i. 204; *Miq. Fl. Ind. Bat.* i. pt. i. 457. *Calyptranthes pyrifolia*, *Blume Bijl.* 1090.

SINGAPORE, *Wallich*.—DISTRIB. Java.

A tree. *Leaves* $1\frac{1}{2}$ –3 by $\frac{3}{4}$ –2 in.; acumen sometimes $\frac{1}{2}$ in. long; lateral nerves close, conspicuous; petiole about $\frac{1}{4}$ in. *Flowers* sessile, in threes.—*Syz. punctulatum*, *Wall. Cat.* 3583, with less acuminate dull-coloured leaves, nerves less distinct, and more elongate fruit, may perhaps belong here; there are no flowers with the specimens.

56. **E. tumida**, *Duthie*; leaves oblong-ovate or obovate shortly acuminate narrowed at the base closely nerved, cymes terminal and axillary equalling or exceeding the leaves, calyx-tube $\frac{3}{10}$ in. narrow swollen below the middle.

MALACCA, *Maingay*, 755.

Branchlets terete. *Leaves* $2\frac{1}{2}$ – $3\frac{1}{2}$ in., chocolate-coloured above, rusty-yellow

beneath when dried; lateral nerves slender, uniting close within the margin; petiole $\frac{1}{4}$ in. *Panicles* lax, spreading; branches acutely angular. *Calyx* with 4 nearly equal shallow lobes.—The *petals* are probably free, though not expanding. The swollen part of the calyx-tube is occupied by the ovary.

†† *Petals usually united and falling in one piece* (to p. 496).

§ *Cymes terminating the young shoots* (to p. 495).

‡ *Leaves broad, oblong or lanceolate* (to p. 494).

|| *Branchlets 4-gonous*.

57. **E. montana**, *Wight Ic. t.* 1060; young shoots acutely 4-angled, leaves petioled coriaceous lanceolate with a short obtuse acumen to obovate or orbicular obtuse, cymes terminal very numerous corymbose many-flowered branches often leafy, flowers small sessile or subsessile, fruit globose size of a currant. *Bedd. Fl. Sylv. Anal. Gen. cvii.*

NILGHIRI Mts., *Wight, Gardner, Schmidt.*

A very large tree; branchlets winged at the angles. *Leaves* occasionally alternate or subalternate, 5–6 by $2\frac{1}{4}$ in., smooth and shining above; primary nerves prominent beneath, becoming less distinct towards their union within the margin; midrib stout, channelled above; petiole $\frac{1}{4}$ –nearly $\frac{1}{2}$ in. *Peduncles* angled, often very flat and broad. *Flowers* in threes at the apex of each extreme division. *Calyx* obtusely 4-lobed. *Petals* calyptrate. *Fruit* purple, crowned with the calyx.—The wood is used for building purposes, &c.

58. **E. bracteolata**, *Wight Ill. ii.* 15; *Ic. t.* 531; young branches 4-gonous angles subacute, leaves short-petioled elliptic-lanceolate or oblanceolate acute or slightly acuminate at both ends pellucid-dotted, cymes terminal and from the upper axils shorter or not much longer than the leaves, the extreme divisions terminating in a cluster of 6–9 sessile flowers, each division and each flower with 2 small acute bracteoles, calyx-tube conical 4-gonous, limb repandly 4-lobed. *Kurz in Journ. As. Soc. Beng. vol. xlv. pt. ii. p.* 66; *For. Fl. i.* 482.

TENASSERIM, *Griffith, Helfer*; MERGUI, *Griffith*; MALACCA, *Maingay*.

A shrub or small tree. *Leaves* $4\frac{1}{2}$ –7 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in.; midrib rather prominent beneath, primary nerves slender and uniting close within the margin, coriaceous, more or less polished above, dots not conspicuous; petiole about $\frac{1}{2}$ in. Branches of inflorescence with acute angles. *Flowers* conspicuous, white according to Maingay.

59. **E. lissophylla**, *Thwaites Enum.* 117 (*Syzygium*); leaves ovate-lanceolate acuminate quite smooth faintly nerved beneath pellucid-punctate, cymes very often longer than the leaves, calyx-teeth short rounded, berry round size of a pea. *Bedd. Fl. Sylv. Anal. Gen. cviii.*

CONCAN, *Stocks*; NILGHIRI Mts., *Herb. G. Thomson*; CEYLON; forests in the Central Provinces, alt. 3–5000 ft., *Thwaites*.

A moderate-sized tree. *Branchlets* quadrangular. *Leaves* $1\frac{1}{2}$ –3 by $\frac{1}{2}$ to about 1 in.; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in.—This plant much resembles *E. Gardneri*, but can be distinguished by its 4-sided branchlets, narrower leaves and shorter petioles.

60. **E. venusta**, *Roxb. Hort. Beng.* 37; *Fl. Ind. ii.* 491; arboreous with numerous drooping branchlets, leaves shortly petioled oblong or broadly lanceolate obtusely acuminate, panicles axillary rarely terminal shorter than the leaves brachiate ultimate divisions 3-flowered, flowers myrtle-like, calyx 4-toothed, petals 4 orbicular reddish. *Wight Ic. t.* 625; *Kurz in Journ. As. Soc. Beng. vol. xlv. pt. ii. p.* 67; *For. Fl. i.* 487.

TIPPERAH HILLS, *Roxburgh*; PEGU, *Kurz*.

Bark dark brown, smooth. *Ovary* 2-celled.—Wight's figure is copied from *Roxburgh's* (*l.c.* t. 1560) with the addition of a terminal panicle. *Miquel* (*Fl. Ind. Bat. i. pt. i.* 456) compares it with *Syz. Kalahiense*, *Korth*, but the leaves of the latter are smaller and of a different shape. In *Kurz's* specimens the branchlets have white bark.

61. **E. Gardneri**, *Thwaites Enum.* 117 (*Syzygium*); leaves pale green ovate-lanceolate rostrate-acuminate faintly parallel-nerved beneath pellucid-punctate, cymes axillary and terminal shorter than the leaves, calyx obscurely 4-toothed, berry spherical size of a small cherry.

ANAMALLAY and TINNEVELLY GHATS, up to 4000 ft. alt., *Beddome*; CEYLON, Central Provinces, alt. 2–4000 ft. alt., *Thwaites*.

A moderate-sized tree; branchlets terete or subtetragonous. *Leaves* $2\frac{1}{2}$ –4 by 1–1 $\frac{1}{2}$ in.; petiole slender, about $\frac{1}{2}$ in. *Flowers* small. *Petals* cohering and falling together.—Very close to *E. venusta*, *Roxb.*, with which *Mr. Kurz* unites it; the marginal nerves are further from the edge, and the panicles are mostly terminal and more compact.

62. **E. subavenis**, *Duthie*; leaves ovate shortly and obtusely acuminate or retuse narrowed towards the base quite smooth on both surfaces nearly nerveless, cymes longer than the leaves. *E. umbrosa*, *Thwaites Enum.* 118 (*Syz.*), not of *Berg*; *Bedd. Fl. Sylv. Anal. Gen.* cviii.

CEYLON; open grassy places in the Central Provinces, alt. 5–6000 ft., *Thwaites*.

A moderate-sized tree, very much branched; ultimate branches 4-angled. *Leaves* 1–2 in. by $\frac{1}{2}$ –nearly an inch in width; petiole about $\frac{1}{8}$ in.—This differs from *E. lissophylla* in the shape and nervation of the leaves; the inflorescence is similar in both (*Thwaites*).

63. **E. valdevenosa**, *Duthie*; leaves large elliptic acuminate petioled, midrib very prominent beneath, lateral nerves uniting to form a conspicuous marginal one interspaces finely and sharply reticulate, cymes terminal lax, calyx-tube gradually tapering to the base quadrangular lobes shallow, berry globose size of a small cherry crowned with the slightly projecting calyx-limb. *E. elliptica*, *Wall.* 3587 (*Syz.*); not of *Lam.* nor *Smith*.

PENANG, *Wallich*; MALACCA, *Maingay* (723 & 762).

A tree, about 15 ft. high (*Maingay*); branchlets tetragonous. *Leaves* 8–13 by 3–4 $\frac{3}{4}$ in.; primary nerves $\frac{1}{3}$ – $\frac{1}{2}$ in. apart; marginal nerves double; petiole $\frac{1}{4}$ in. or more. Branches of inflorescence angled and winged. *Calyx-tube* about $\frac{1}{2}$ in. *Petals* falling together. *Style* persistent.

64. **E. scoparia**, *Wall. Cat.* 3594 (*Syzygium*); branchlets virgate 4-gonous leaves shortly petioled ascending elliptic-lanceolate acuminate minutely and densely glandular lateral nerves inconspicuous, cymes ascending lax few-flowered, flowers small, calyx squarrose very shortly 4-lobed, corolla calyprate, stamens short, fruit small spherical.

SINGAPORE, *Wallich*.

Leaves $2\frac{1}{2}$ –2 $\frac{3}{4}$ by $\frac{3}{4}$ –1 in., reddish-brown above and yellowish beneath when dried, margins slightly revolute; petiole $\frac{1}{4}$ in. *Berry* crowned with the remains of the calyx-limb, wrinkled in drying. *Style* short, persistent in the pit formed by the produced calyx-limb.—Resembles *Syzygium avene*, *Miq. Fl. Ind. Bat. Suppl. i.* 312, and perhaps not specifically distinct.

||| *Branchlets terete.*

¶ *Calyx-limb almost trunca.*

a. *Calyx-tube shortly turbinate.*

65. **E. crenulata**, *Duthie*; leaves broadly ovate-oblong or suborbicular very thick and coriaceous shortly obtusely acuminate crenulate, nerves close prominent on both surfaces, cymes terminal corymbose main branches long, calyx-limb truncate, petals united in a thick calyptra.

MALACCA, *Maingay*, 739.

Branchlets terete. *Leaves* $4\frac{1}{2}$ –6 by 3–4 in., dull, black-dotted; midrib stout; lateral nerves uniting close within the margin, interspaces reticulated. *Cymes* exceeding half the length of the leaves. *Bracts* small at the base of the flowers and at the joints of the inflorescence-branches. *Calyx-tube* about $\frac{1}{4}$ in., turbinate, much produced above the ovary.—The foliage very much resembles that of *E. grandis*.

66. **E. venulosa**, *Wall. Cat.* 3585 (*Syzygium*); leaves ovate or broadly obovate obtuse or shortly acuminate attenuated below into a short petiole very coriaceous polished above, nerves slender but prominent on both surfaces, flowers in terminal corymbs, branches lax spreading exceeding the leaves, calyx-tube obconical $\frac{1}{3}$ – $\frac{1}{2}$ in. limb nearly entire, corolla calyptrate, fruit subspherical crowned with the circular rim of the calyx-limb.

MALACCA, *Wallich, Maingay* 741, &c.; SINGAPORE, *Wallich, Walker*.

Bark grey; *branchlets* terete. *Leaves* $1\frac{1}{2}$ –3 by 1–2 in.; primary nerves uniting close within the margin, interspaces reticulate, dots inconspicuous; petiole about $\frac{1}{2}$ in. Main branches of *inflorescence* 1–2 in. *Berry* about $\frac{1}{2}$ in. in diam., longitudinally furrowed.—In *Maingay's* plant, which I would refer here, the corolla is rather more exserted in bud.

67. **E. caryophyllæa**, *Wight Ill.* ii. 15; *Ic. t.* 540; leaves shortly petioled obovate spatulate rarely ovate-lanceolate obtuse or with a short blunt acumen attenuated to the base, cymes terminal corymbose laxly trichotomous, flowers small about $\frac{1}{10}$ in., fruit globose size of a pea. *Bedd. Fl. Sylv. Anal. Gen.* cviii. *Eugenia corymbosa*, *Lam. Dict.* iii. 199; *DC. Prodr.* iii. 284. *Syzygium caryophyllæum*, *Gaertn. Fruct.* i. 166, t. 33; *DC. Prodr.* iii. 260; *Wall. Cat.* 3563; *W. & A. Prodr.* i. 329; *Miq. Anal. Ind.* i. 25; *Fl. Ind. Bat.* i. pt. i. 454; *Thwaites Enum.* 117. *Calyptranthes caryophyllata*, *Pers. Ench.* 4. *Myrtus caryophyllata*, *Linn.—Rheede Hort. Mal.* v. t. 27.

S. CANARA, *Law*; TRAVANCORE, *Wight*; CONCAN, *Stocks*; NILGHIRI Mts., *Kurz, G. Thomson*; CEYLON up to 3000 ft. alt., *Walker, Thwaites*.—DISTRIB. Borneo.

A large shrub, or middling-sized tree; *branchlets* terete. *Leaves* 3–4 by about $1\frac{1}{2}$ in., subcoriaceous, dark above (when dried), rusty-red beneath, inconspicuously dotted. *Calyx* shortly turbinate, lobes 4 shallow.—A distinct species though varying considerably in the foliage. The fruit is eaten.

68. **E. frondosa**, *Wall. MS.*; leaves ovate-lanceolate with a long obtuse acumen cuneate at the base polished above lateral nerves slender prominent on both surfaces, cymes axillary and terminal shorter than the leaves, calyx-tube about $\frac{1}{2}$ in. narrow below suddenly enlarging above lobes very shallow, petals united. *Syz. venosum*, *DC. Prodr.* iii. 260; *Mém. Myrt.* t. 17; *Wall. Cat.* 3590.

NIPAL, *Wallich*.

Branchlets terete. • *Leaves* 3–4 by about $1\frac{1}{2}$ in., subcoriaceous; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.—Habit of *E. mangifolia* but smaller in all its parts.

69. **E. areolata**, *DC. Prodr.* iii. 260 (*Syzygium*); *Mém. Myrt.* t. 18; leaves elliptic cuneate at the base acuminate subcoriaceous nerves reticulate marginal double, peduncles paniculate axillary and terminal 2 or 3 times shorter than the leaves, buds globose, calyx quite entire, corolla calyptrate.

NIPAL, Wallich.

Very nearly related to *E. frondosa*.—There are specimens in the Kew Herbarium, probably belonging to this species, fastened down on the same sheet with it, in which the leaves have dried of a fresher tint, and the difference in the nervation is considerable; the flowers also are rather larger.

b. *Calyx-tube slender and tapering.*

70. **E. khasiana**, Duthie; leaves narrowly lanceolate acuminate at both ends nerves and dots pellucid, cymes from the upper axils or terminal lax, flower-buds pyriform $\frac{1}{8}$ in., limb of calyx truncate.

* KHASIA MTS., Griffith, J. D. H. & T. T.

Branchlets terete. *Leaves* 3-4 by 1 in., smooth and shining above, finely reticulate between the lateral nerves which unite close within the margin; petiole $\frac{1}{8}$ in. *Inflorescence*-branches long and slender, acutely quadrangular. *Calyx* spreading above after flowering.

71. **E. oblongifolia**, Duthie; leaves oblong acuminate narrowed towards the base nerves rather close slender but prominent on both surfaces, cymes terminal corymbose much branched shorter than the leaves, calyx-tube $\frac{1}{4}$ in. or less gradually tapering to the base limb truncate, petals calyptrate.

MALACCA, Maingay (746).

Branchlets terete or subtetragonous; bark greyish. *Leaves* 3-4 $\frac{1}{2}$ by 1 $\frac{1}{4}$ -1 $\frac{3}{4}$ in., shining a little above, lateral nerves uniting close within the margin, interspaces reticulate. *Inflorescence*-branches sharply 4-angular, compressed towards the nodes. *Filaments* slender; anthers small.

72. **E. expansa**, Wall. Cat. 3567 (*Syzygium*); leaves shortly petioled ovate or oblong-lanceolate obtusely acuminate subcoriaceous, cymes axillary or terminating previous year's shoots, flowers small crowded at the ends of the long peduncles, calyx nearly truncate.

PENANG, Wallich.

Young branches subterete, compressed at the nodes. *Leaves* 3-6 by 1 $\frac{1}{2}$ -2 in., polished a little above; lateral nerves slender, raised on both surfaces, uniting within the margin, interspaces reticulate; petiole $\frac{1}{2}$ in. *Calyx-tube* $\frac{1}{2}$ in., gradually tapering to the base. *Fruit* not seen.

¶¶ *Calyx-limb 4-5-lobed.*

73. **E. cordifolia**, Wight Ill. ii. 16; Ic. t. 544; leaves sessile cordate amplexicaul ovate or ovate-lanceolate obtuse or obtusely acuminate, cymes corymbose terminal and axillary much shorter than the leaves, berry nearly round crowned with the cup-like calyx-limb. *E. androsæmoides*, Bedd. Fl. Sylv. Anal. Gen. cvii.; not of DC. *Syzygium cordifolium*, Thwaites Enum. Pl. Zeyl. 116. *Calyptanthus cordifolia*, Moon Cat.

CEYLON; Ambagamowa and Ratnapoora districts, up to 3000 ft., Thwaites.

A very large handsome tree; branchlets terete. *Leaves* 6-8 by about 3 in., often larger, thick and coriaceous, polished above; midrib stout and prominent beneath; lateral nerves usually not very distinct, sometimes forming double loopings within the margin. *Calyx-tube* about $\frac{1}{2}$ in.; lobes 4. *Petals* calyptrate. *Berries* subglobose, about an inch in diameter.—*E. androsæmoides* of Wight's Herb. is *E. obovata*, Wall.

74. **E. subdecussata**, Wall. Cat. 3589 (*Syzygium*); leaves ovate or very shortly petioled oblong-lanceolate cordate at the base subacute thick and

coriaceous midrib keeled beneath lateral nerves indistinct, cymes terminal corymbose branches stout angled compressed and flattened upwards, flowers crowded, calyx-tube shortly obconic obscurely 5-lobed, petals calyptrate.

SINGAPORE, in very dense woods, *Wallich*; Government Hill, PENANG, *Maingay*, 740.

A tree, about 15 ft. high (*Maingay*). *Branchlets* terete-compressed. *Leaves* $2\frac{1}{2}$ –4 by $1-1\frac{3}{4}$ in., smooth and polished above; lateral nerves slender beneath, uniting close to the margin, interspaces laxly reticulate. *Flowers* red and white (*Maingay*). *Calyx-tube* about $\frac{1}{8}$ in., squarrose. *Bracts* triangular. *Fruit* size of a small cherry.

75. **E. colorata**, *Duthie*; leaves very shortly petioled elliptic or oblong-obovate rounded or subcordate at the base rather acutely acuminate very thick and coriaceous, cymes terminal, branches stout alternately compressed shorter than the leaves, flowers crowded in compact corymbs, petals united, calyx about $\frac{1}{3}$ in. with 5 shallow lobes.

MALACCA, *Maingay*, 749.

Branchlets terete, reddish-brown. *Leaves* $4-5\frac{1}{2}$ by $1\frac{1}{2}$ to $2\frac{1}{4}$ in.; midrib angled beneath, tinged with red; nerves indistinct above, slender beneath, uniting close within the margin, interspaces reticulate.

76. **E. revoluta**, *Wight Ill.* ii. 17; *Ic. t.* 534; leaves lanceolate with a small obtuse point to ovate or broadly obovate and obtuse coriaceous margins often revolute, cymes terminal longish peduncled, flowers sessile congested at the ends of the branchlets, fruit spherical reddish size of a small cherry. *Bedd. Fl. Sylv. Anal. Gen.* cvii.; *not of Berg.* *Syzygium revolutum*, *Thwaites Enum.* 117.

NILGHIRI MTS., *Hb. Hohenacker*. CEYLON, in the Central Provinces, alt. 3–6000 ft. (Adam's Peak), *Walker*, *Thwaites*, &c.

A moderate-sized tree; branchlets terete or obscurely 4-gonous. *Leaves* shortly petioled, variable in size, polished above, dull and glaucous beneath. *Calyx* 4–5-toothed. *Petals* free, or cohering and falling off as a lid.—The Nilghiri specimens have the leaves smoother above and more conspicuously dotted, the nervation is not so prominent beneath. There is a small-leaved form of this in Wight's Herbarium collected in Ceylon by Col. Walker, and called *var. parvifolia*; the leaves are about 1 by $\frac{1}{2}$ in.

77. **E. oblata**, *Roxb. Hort. Beng.* 37; *Fl. Ind.* ii. 493; leaves oblong or broadly lanceolate acuminate finely nerved, panicles terminal and axillary shorter than the leaves, petals united in a calyptra, berries round or transversely oval size of a cherry. *Wight Ill.* ii. 15; *Ic. t.* 622; *Kurz in Journ. As. Soc. Beng.* vol. xlv. pt. ii. p. 67; *For. Fl.* i. 488. *S. oblatum*, *Wall. Cat.* 3569. *S. pulchellum*, *Wall. Cat.* 3566 *in part.* *Jambosa pulchella*, *Miq. Fl. Ind. Bat.* i. pt. i. 422. *E. comosa*, *Wall. Cat.* 3566 D; *l. c.* 3600 C (*under E. inophylla*).

ASSAM, *Jenkins*; KHASIA MTS., SILHET, CHITTAGONG, PEGU, and MARTABAN to TENASSERIM; PENANG and SINGAPORE, *Wallich*.—DISTRIB. Yunnan.

A tree; branchlets terete, reddish-brown. *Leaves* 3–4 in., often with a long slender point, shining above, turning dark when dried; petiole $\frac{1}{4}$ – $\frac{3}{8}$ in. *Cymes* trichotomous, on long peduncles. *Flowers* rather large, sessile. *Calyx-tube* about $\frac{1}{4}$ in., gradually tapering to the base; lobes 4 or 5, unequal, persistent. *Stamens* numerous, long; anthers with an apiculate connective.

78. **E. lævicaulis**, *Duthie*; leaves ovate-lanceolate acuminate nerves close uniting very near the edge, cymes terminal and axillary short contracted branches ascending, calyx-tube about $\frac{1}{3}$ in. turbinate lobes 5, fruit roundish or flattened at both ends size of a cherry.

MALACCA, Maingay, 753-2.

Branchlets terete, polished. Leaves 3-4 by $1-1\frac{1}{2}$ in., chocolate-coloured and shining above, rusty-red beneath when dry; petiole $\frac{1}{4}$ in. Calyx-lobes distant. Style long, persistent.—Allied to *E. oblata*, but with smoother branchlets and narrower more contracted inflorescence.

79. *E. sylvestris*, Moon in Wight Ill. ii. 15; Ic. t. 532; leaves glabrous from lanceolate with an obtuse point to obovate or spatulate obtuse coriaceous, cymes corymbose crowded terminal or from the extreme axils on long peduncles, flowers small, calyx $\frac{1}{10}$ in., fruit spherical black-purple. Bedd. Fl. Sylv. Anal. Gen. cvii. Syzygium sylvestre, Thwaites Enum. 116. Calyptanthus Jambolana, Moon Cat. p. 39.

CEYLON; common up to an elevation of 3000 ft., Walker, Thwaites.

A very large tree; branchlets terete. Leaves about 4 by $1\frac{1}{2}-2\frac{1}{2}$ in., shining above, rusty-coloured beneath, and minutely and densely punctate, closely nerved, the lateral nerves horizontal and uniting close within the margin, margins somewhat revolute; petiole $\frac{1}{2}-\frac{3}{4}$ in.—In Wight's figure the leaves are drawn too acute.

80. *E. assimilis*, Thwaites Enum. 116 (Syzygium); leaves petioled ovate-lanceolate or obovate more or less abruptly acuminate narrow at the base rarely rounded, cymes crowded at the ends of the branchlets half as long as the leaves, berries spherical. Bedd. Fl. Sylv. Anal. Gen. cvii.

CEYLON; up to alt. 5000 ft., Thwaites.

A moderate-sized tree. Leaves 2-5 by $1\frac{1}{4}-2$ in.; petiole $\frac{1}{8}$ —nearly $\frac{1}{2}$ in. Peduncles obtusely 4-sided. Flowers rather large, about $\frac{1}{2}$ in. in diam. Petals falling in one piece.—Differs from *E. Arnottiana* in the larger leaves and flowers, the united petals, and in the shape of the fruit; the nervation of the leaves is less close, and the marginal nerve is more distant from the edge.—A variety of this with larger leaves and flowers is also found in Ceylon.

81. *E. Neesiana*, Wight Ill. ii. 15; Ic. t. 533; leaves nearly sessile oblong-lanceolate obtusely acuminate subcoriaceous pellucid-punctate, cymes terminal and from the upper axils laxly corymbose, berry subglobose. Bedd. Fl. Sylv. Anal. Gen. cvii. Syzygium Neesianum, Arn. in Act. Acad. Nat. Cur. xviii. 355 (1836); Thwaites Enum. 117. Calyptanthus cordifolia, Moon Cat.

CEYLON; up to 3000 ft. alt., Thwaites, Gardner.

A good-sized tree. Branchlets terete. Leaves 3-4 by $1-1\frac{1}{2}$ in. Pedicels half the length of the shortly turbinate calyx. Flowers small. Petals free or falling in one piece. Berry $\frac{5}{8}$ in., crowned with the circular calyx-throat and the incurved acute lobes.

82. *E. microcalyx*, Duthie; leaves nearly sessile ovate or elliptic-obovate obtuse or shortly acuminate polished above nerves faintly impressed above prominent beneath, cymes terminal and axillary often exceeding the leaves, bracts small acute persistent, flowers very small, calyx-tube short subcylindrical $\frac{1}{10}$ in. or less lobes 4 distant subacute nearly equal, petals united.

MALACCA, Griffith, Maingay, 727 & 731.—DISTRIB. Bornéo?

Branchlets subterete. Leaves 2-4 $\frac{1}{2}$ by $1\frac{1}{4}-2\frac{1}{4}$ in., dark above when dried, reddish beneath; lateral nerves uniting some way within the margin. Bracts often in threes.—In Maingay's No. 727 the leaves are less distinctly nerved, the lateral nerves faintly unite close within the margin, and the flowers are rather smaller. No. 335† of Beccari's Borneo may perhaps be referred to this species. Habit of *E. olivifolia*.

†† *Leaves suborbicular.*

83. ***E. cyclophylla***, *Thwaites MSS. (Syzygium)*; leaves shortly petioled or nearly sessile broadly ovate to nearly orbicular very thick and coriaceous margins revolute, cymes terminal not exceeding the leaves, branches stout 4-gonous, berries nearly spherical crowned with the remains of the 4-fid calyx-limb.

CEYLON; Adam's Peak, *Thwaites* (C.P. 3915).

Leaves 2½–3 in. by 2 in., margins broadly and irregularly recurved in the dried specimens, black-dotted above, not glaucous beneath; midrib very stout; marginal nervation double. *Berry* about the size of a pea.—This differs from *E. revoluta* in the rounder more coriaceous leaves, shorter petioles, and the stouter inflorescence branches.

84. ***E. sclerophylla***, *Thwaites Enum.* 118 (*Syzygium*); leaves small sessile very coriaceous obovate or nearly round cordate at the base glabrous above nerved beneath, midrib thickened towards the base, cymes about equal to the leaves, berries spherical size of a small cherry.

CEYLON; Central Provinces, alt. 6–8000 ft., Adam's Peak, *Thwaites*.

A moderate-sized tree; branchlets 4-gonous. *Leaves* ½–1 in. dull. *Berries* crowned with the cup-shaped calyx-limb, turning black.

85. ***E. rotundifolia***, *Wight Ill.* ii. 17; leaves shortly petioled orbicular obtuse or obscurely acuminate subcordate at the base or attenuated coriaceous glossy and nerveless above, cymes terminal sessile few-flowered, berry spherical size of a small cherry. *Bedd. Fl. Sylv. Anal. Gen.* cviii. *Syz. rotundifolium*, *Arn. in Act. Acad. Nat. Cur.* xviii. 335; *Thwaites Enum.* 118.

CEYLON; Central Provinces, alt. 6–8000 ft., *Gardner, Thwaites*.

A small tree or shrub; young branches 4-gonous. *Leaves* ½–¾ in. long, nerved beneath, margins revolute. *Calyx* obovate, shortly 5-toothed. *Berries* red turning to black.—Closely allied to the preceding species, differing chiefly by its petioled glossy leaves.

86. ***E. calophyllifolia***, *Wight Ill.* ii. 17; *Ic.* t. 1000; leaves shortly petioled obtuse ovate obovate or orbicular very coriaceous, cymes terminal corymbose short-peduncled many-flowered, fruit ovoid or oblong. *Bedd. Fl. Sylv. Anal. Gen.* cvii. *Syz. calophyllifolium*, *Thwaites Enum.* 118.

NILGHIRI, *Wight, Adam, Gardner*; Sisparah, *Wight*. CEYLON, Adam's Peak, alt. 6–7000 ft., *Thwaites*.

A large spreading tree with a fine umbrageous head; young branches 4-gonous. *Leaves* glabrous, about 1 by ¾ in., reticulated beneath when dry, not dotted. *Calyx* repandly 4-toothed. *Petals* orbicular, falling together in one piece. *Fruit* succulent dark purple, edible.

87. ***E. oligantha***, *Thwaites Enum.* 118 (*Syzygium*); leaves small ovate obtusely and shortly acuminate or retuse narrowed towards the base faintly nerved dotted, heads terminal few-flowered shortly peduncled. *Bedd. Fl. Sylv. Anal. Gen.* cviii.

CEYLON; Ambagamowa district, alt. 3–5000 ft., *Thwaites*.

A small tree; upper branches 4-gonous, angles winged. *Leaves* ½–nearly 1 in. by ¼–½ in., shortly petioled. *Bracts* equal to about half the calyx-tube. *Calyx-tube* campanulate, much produced; lobes 4, rather conspicuous. *Berries* spherical, red turning black, size of a pea.

††† *Leaves narrow.*

88. **E. olivifolia**, *Duthie*; leaves small shortly petioled spathulate obovate or lanceolate obtuse shining above dull beneath and densely glandular, lateral nerves few directed upwards, cymes about equal to or shorter than the leaves, flowers small shortly pedicelled. *S. spathulatum*, *Thwaites Enum.* 118; *not of Berg (Eug.)*; *Bedd. Fl. Sylv. Anal. Gen.* cviii.

CEYLON, alt. 3–5000 ft., *Thwaites*.

A small tree. *Leaves* 1–1 $\frac{3}{4}$ by $\frac{1}{2}$ – $\frac{3}{4}$ in. *Berries* spherical, red turning to black, size of a pea.—This plant differs from *E. rubicunda* in the direction of the lateral nerves, and in the shape of the calyx-tube, which becomes more suddenly narrowed towards the base.

89. **E. rubicunda**, *Wight Ill.* ii. 15; *Ic. t.* 538; leaves shortly petioled narrow oblong attenuated at both ends obtuse coriaceous pellucid-punctate, primary nerves close, cymes terminal corymbose longer than the leaves, flowers minute, calyx repandly 4-lobed shortly turbinate. *Bedd. Fl. Sylv. Anal. Gen.* cviii.; *Dalz. & Gibs. Bomb. Fl.* 94. *Syzygium rubicundum*, *W. & A. Prodr.* 330. *S. salicifolium*, *Wall. Cat.* 3597; *not of Graham*.

TINNEVELLY DISTRICT, common up to 3000 ft. alt., *Beddome*.

A small tree, or large shrub; branchlets 4-gonous. *Leaves* 2 $\frac{1}{2}$ –3 by about $\frac{1}{2}$ in.; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in.—The leaves are narrower and more prominently nerved than in *E. lissophylla*, from which however Col. Beddome believes it to be not specifically distinct.

90. **E. cuneata**, *Wall. Cat.* 3598 (*Syzygium*); leaves narrow obovate-lanceolate obtuse tapering below into a short petiole lateral nerves horizontal, cymes from the terminal axils exceeding the leaves, flowers small, calyx-tube narrowly turbinate $\frac{1}{5}$ – $\frac{1}{4}$ in. truncate above, petals calyptrate, berry size of a pea.

SILHET, *Wallich*; E. BENGAL, *Griffith*; KHASIA MTS., 3–5000 ft., *J. D. H. & T. T.*

Branchlets 4-gonous. *Leaves* about 1 $\frac{3}{4}$ by $\frac{1}{2}$ in., smooth above, reticulate beneath. *Inflorescence* often leafy.

§§ *Cymes terminating previous year's branches.*

91. **E. papillosa**, *Duthie*; under surface of leaves young branches and pedicels clothed with rusty-coloured scurf, leaves large subsessile and somewhat amplexicaul obovate-oblong midrib and nerves very prominent beneath, cymes crowded at the extremities of year-old branches, calyx clove-shaped.

MALAY PENINSULA, *Maingay*, 737.

Branchlets terete or subtrigonous, stout. *Leaves* 7–9 by 3 $\frac{3}{4}$ in.; lateral nerves uniting conspicuously within the margin, dark above when dry, reddish beneath. *Inflorescence*—branches long, stout, compressed upwards. *Bracts* 2 at the base of each flower. *Calyx-tube* $\frac{1}{4}$ in.; lobes 4, prominent, subtriangular, obtuse, reflexed. *Petals* falling together.—One of Beccari's Borneo plants No. 2521, with larger leaves and flowers, has a similar clothing of reddish scurf.

92. **E. pustulata**, *Duthie*; leaves oblong acuminate narrowed below subcoriaceous nerves whitish prominent beneath distant uniting conspicuously within the margin, cymes terminating year-old branches, sepals acute, petals falling in one piece.

MALACCA, *Maingay*, (751).

Branchlets terete; rough with prominent glands, especially the upper branches, and the midribs and nerves of the leaves. *Leaves* 4 $\frac{1}{2}$ –7 by 1 $\frac{1}{4}$ –2 $\frac{1}{4}$ in., indistinctly

nerved above; midrib rounded beneath. *Inflorescence*-branches short, stout, 4-angular. *Flowers* about $\frac{1}{4}$ in.

93. ***E. brachiata***, Roxb. *Hort. Beng.* 37; *Fl. Ind.* ii. 488; leaves abruptly ovate or elliptic tip rounded or very shortly acuminate, panicles axillary or from the leafless axils much branched shorter than the leaves, flowers minute, calyx-tube obconic about $\frac{1}{12}$ in. lobes 4 shallow, corolla calyptrate, berry spherical. *E. odorata*? *Wight Ill.* ii. 16; *not of DC. (Syz.)*. *Syzygium brachiatum*, *Miq. Fl. Ind. Bat.* i. pt. i. 460. *E. cinerea*, *Kurz in Pegu For. Rep. Append. B.* p. 50; *For. Fl.* i. 483. *S. cinereum*, *Wall. Cat.* 3576. *S. ribesioides*, *Wall. Cat.* 3553 A.

PEGU, *Kurz*; MERGUI, *Griffith*; AMHERST and PENANG, *Wallich*.—DISTRIB. Amboina.

A tree. *Branchlets* terete or subtetragonous; bark white. *Leaves* $2\frac{1}{2}$ –6 by $1\frac{1}{4}$ –3 in., shortly petioled, glossy above, paler beneath; nerves finely impressed above, prominent beneath. *Bracts* ovate, acute, persistent. *Flowers* sessile in clusters of 6–9. *Berries* purplish to black.—The leaves of Wallich's specimens are much broader at the base than those of Wight. In Wallich's *S. ribesioides* the leaves are broader and less acuminate, the peduncles are shorter and the branchlets whiter.

94. ***E. verecunda***, *Wall. Cat.* 3579 (*Syzygium*); leaves ovate with a long point, nerves close reticulate, petiole about $\frac{1}{2}$ in., corymbs lax about half the length of the leaves, flowers very small, calyx with 4 shallow distant lobes broadly expanding above after flowering, petals calyptrate.

MALACCA, *Griffith*; PENANG, *Wallich*.

Branchlets terete, compressed at the nodes. *Leaves* $2\frac{1}{2}$ by 1 – $1\frac{1}{4}$ in., pale yellow; petiole midrib and margin tinged with orange.—Wallich was inclined to connect this with his *S. concinnum*; the latter however differs by having shorter petioles, the leaves less distinctly reticulated, larger flowers, free petals, and the calyx-tube more gradually tapering to the base.

** *Cymes lateral, mostly from the scars of fallen leaves.*

† *Petals free.*

95. ***E. nitida***, *Duthie*; leaves broadly ovate or oblong tip rounded or shortly acuminate polished above coriaceous, primary nerves few prominent beneath and uniting at some distance from the margin, cymes lateral chiefly from the leafless axils, calyx-tube spreading and recurved after flowering lobes prominent subpersistent, petals ?.

MALAY PENINSULA, *Maingay*, 728.

Branchlets terete, reddish-brown. *Leaves* 3 – $3\frac{1}{2}$ by 2 in., black and shining above, rusty-red beneath, dots inconspicuous not pellucid, nerves indistinct above; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.—Herbarium specimens resemble *E. brachiata*, but the flowers are larger, and the leaves broader and more shining.

96. ***E. polyantha***, *Wight Ill.* ii. 17; *Ic. t.* 543; leaves obovate or oblanceolate obtusely acuminate at the base dark and shining above rusty-red beneath dots not pellucid, cymes short many-flowered axillary and from the leafless axils, flowers small, calyx rather deeply 4-lobed, petals free and expanding. *Not of Wall. Cat.* 3603; *not of Miq. (Syz.)*. *E. lucidula*, *Miq. Fl. Ind. Bat.* i. pt. i. 444. *Myrtus cymosa*, *Blume Bijl.* 1086, *not of Spr. (ex Miquel l. c.)*.

TENASSERIM, *Helper*; MOULMEIN and MERGUI, *Griffith*.—DISTRIB. Java.

A slender tree, upwards of 80 ft. (*Griffith MS.*). *Branchlets* 4-gonous. *Leaves* the same size as those of *E. balsamea*, which it resembles in habit. *Petals* white.

97. **E. malabarica**, *Bedd. Fl. Sylv.* t. 199; *Anal. Gen.* cvii.; leaves obovate-spathulate or quite obcordate rarely oblong marginal looping inconspicuous, cymes from the old wood below the leaves rarely in the lower axils very short, flowers numerous very small bracteolate, calyx-tube with 4 indistinct triangular lobes, petals opening separately, fruit spherical about $\frac{1}{4}$ in.

Western Peninsula, WYNAAD, jungles, 2-4000 ft. alt., *Beddome*.

A middling-sized tree. *Branchlets* terete. *Leaves* 2-5 by 1-2 $\frac{3}{4}$ in., minutely dotted beneath; petiole $\frac{1}{3}$ - $\frac{1}{2}$ in. *Cymes* about $\frac{1}{2}$ in. *Calyx-tube* more or less truncate in age, about $\frac{1}{12}$ in. diam. *Petals* orbicular with a slight claw, pointed, very soon deciduous.

98. **E. conglomerata**, *Duthie*; leaves obovate or oblanceolate rounded at the apex or shortly and obtusely acuminate tapering gradually to the base margins revolute, flowers from the leafless axils in dense sessile or subsessile clusters, calyx-tube broadly campanulate lobes 4 rounded persistent, petals free.

MALAYAN PENINSULA, *Maingay*, 745.

Bark of older branchlets grey; upper branchlets subtetragonous. *Leaves* 3-4 by 1-1 $\frac{1}{2}$ in., sometimes subfalcate, coriaceous, dark and shining above, rusty-red beneath, minutely black-dotted; midrib stout beneath, lateral nerves few, prominent beneath and uniting distinctly in loops within the margin; petiole about $\frac{1}{2}$ in. *Bracts* oblong, obtuse. *Filaments* short, stout.—Resembles No. 3326 of Beccari's Borneo plants, but the flowers are larger and the peduncles longer in the latter.

†† *Petals united*.

§ *Leaves alternate*.

99. **E. alternifolia**, *Wight Ill.* ii. 16; *Ic.* t. 537; leaves alternate sub-orbicular thick and coriaceous, cymes lateral longish-peduncled corymbose dense sometimes congested near the apex of year-old branches, fruit subspherical size of a cherry. *Bedd. Fl. Sylv.* t. 198.

KURNOOL, CUDDAPAH, and N. ARCOT districts, *Teddome*; BALAGHAUT, *Wight*. ASSAM, Nagari Hills.

A large tree. *Branchlets* terete. *Leaves* 3-8 in., rounded at the apex or rather suddenly obtusely acuminate, dark green and shining above paler beneath, minutely dotted; primary nerves numerous, uniting close within the margin; petiole 1 in. or more. *Flowers* yellowish-white, sweet-scented. *Calyx* viscid and shining, entire or with 4 very minute teeth. *Petals* calyptrate.

§§ *Leaves opposite*.

100. **E. tetragona**, *Wight Ill.* ii. 16; branchlets stout acutely 4-gonous, leaves ovate-oblong or nearly oval thick and coriaceous, lateral and marginal nerves very prominent beneath, cymes from the lower leafless axils shorter than the leaves, fruit globose size of a large pea. *Syzygium tetragonum*, *Kurz in Journ. As. Soc. Beng.* vol. xlv. pt. ii. p. 66; *For. Fl.* i. 484; *Wall. Cat.* 3550. *S. ficifolium*, *Wall. Cat.* 3558. *S. rameum*, *Wall. Cat.* 3595.

SIKKIM, *J. D. H.*; BHOTAN, *Griffith*. KHASIA MTS., *J. D. H.* & T. T. SILHET, *Wallich*. AVA, *Kurz*.—DISTRIB. Yunnan.

A large tree; branchlets with the angles often winged. *Leaves* 5-6 $\frac{1}{2}$ by 2 $\frac{1}{2}$ in., attenuated at each end, dots minute but not pellucid; petiole about $\frac{1}{2}$ in. *Calyx-tube* narrow below, suddenly enlarging at the throat; lobes small, rounded. *Petals* calyptrate.—The flowers are sweet-scented according to Wallich.

The branchlets are not so acutely 4-gonous in Wallich's *S. ficifolium* and *S. rameum*, and the leaves of the former are broader.

101. **E. occlusa**, *Miq. Fl. Ind. Bat.* i. pt. i. 460 (*Syzygium*); leaves on longish petioles elliptic obtusely acuminate acute at base coriaceous shining above paler beneath, lateral nerves distant indistinctly uniting within the margin, flowers rather large in condensed lateral panicles, calyx-tube broad above and with a truncate margin.

NICOBAR ISLANDS, *Kurz.*—DISTRIB. Java.

Branchlets terete or subcompressed upwards, light brown or whitish. *Leaves* 2–4 in., varying in width, rusty-brown when dried; midrib furrowed above; petiole about 1 in. *Panicles* shorter than the leaves, branches divaricate or subdeflexed. *Buds* globose. *Calyx-tube* upwards of $\frac{1}{4}$ in.—The calyx and corolla are apparently fused together in the calyptrate operculum. Under this species Mr. Kurz refers *E. cerasoides*, Roxb., *E. polyantha*, Wight, and the specimens 2394 & 2395 of Griffith's and Helfer's collection.

102. **E. operculata**, *Roxb. Hort. Beng.* 37; *Fl. Ind.* ii. 486; leaves broadly ovate or elliptic rounded at the apex or obtusely acuminate narrowed below lateral nerves few distant prominent becoming fainter towards the margin, panicles from leafless axils lax divaricate, berry globose or ovoid. *Wight Ic.* t. 552; *Brandis For. Fl.* 234; *Kurz For. Fl.* i. 483. *E. cerasoides*, *Roxb. Hort. Beng.* 92; *Fl. Ind.* ii. 488; *Wight Ic.* t. 615; *Miq. Anal. Bot. Ind.* i. 27; *Fl. Ind. Bat.* i. pt. i. 443; *Kurz in Journ. As. Soc. Beng.* vol. xlvii. pt. ii. 66; *For. Fl.* i. 484. *Syzygium nervosum*, *DC. Prodr.* iii. 260; *Mem. Myrt.* ii. 16; *Wall. Cat.* 3551 A & B; 3553 B & C (under *E. ribesoides*); *Benth. Fl. Hongk.* 119; *Thwaites Enum.* 417; *Miq. Fl. Ind. l. c.* 460; *Bedd. Fl. Sylb. Anal. Gen.* cvi. *S. costatum*, *nodosum*, and *angolanum*, *Miq. Fl. Ind. l. c.* 448. *Calyptranthes mangiferifolia*, *Hance in Walp. Ann.* ii. 629. *C. costata*, *Ham. in Wall. Cat.* 3556. *C. grandis* and *C. Tatna*, *Ham. in Wall. Cat.* 3554, 3555.

SUB-HIMALAYAN forests from the JUMNA to ASSAM, ascending to 2000 ft. OUDH and GORAKHPUR forests, CACHAR, CHITTAGONG, PEGU, *Kurz.* CEYLON, up to 3000 ft.—DISTRIB. Indian Archipelago and S. China, Yunnan.

A large tree; branchlets subterete or 4-gonous. *Leaves* 3–8 by 2–4 in., subcoriaceous, dots often black (in the dried specimens), rarely pellucid; primary veins 8–12, curving into a rather faint intramarginal vein; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Inflorescence* often thyrsoidal. *Peduncles* long, acutely angled. *Flowers* small, greenish, in threes, nearly sessile, odorous. *Calyx* campanulate, with short obtuse lobes, or nearly truncate. *Petals* united and falling in one piece, calyptra often apiculate. *Berry* $\frac{1}{4}$ – $\frac{1}{2}$ in., rugose, juicy. The wood is used for building and for agricultural implements. The fruit is eaten.

VAR. *Paniala*; berries oval. *E. Paniala*, *Roxb. Fl. Ind.* ii. 489. *Wight Ic.* t. 616; *Kurz For. Fl.* i. 483. *Syz. Panealla*, *Wall. Cat.* 3557? *Calyptranthes cuneata*, *Ham.*?—Chittagong, Roxburgh; Silhet, Wallich; Pegu, Rangoon, McClelland.—There is no fruit with Wallich's and Hamilton's specimens. Flowers in April, fruit ripens in June.

VAR. *obovata*, *Kurz. For. Fl.* i. 482; leaves obovate or oblanceolate, cymes more compact. *Syz. obovatum*, *Wall. Cat.* 3552, not of DC. *S. vastum*, *Wall. Cat.* 3561. *S. polyanthum*, *Thwaites*; not of *Wight*.—Silhet, Chittagong, Rangoon, Wallich; Ava, Griff.

103. **E. Stocksii**, *Duthie*; leaves elliptic-obovate rounded or obtusely acuminate at the apex indistinctly nerved dots not pellucid, cymes axillary and from the leafless axils half the length of or equalling the leaves, flowers small, petals calyptrate.

CONCAN, *Stocks*. WYNAAD, *Beddome*.

A lofty tree; branches acutely 4-gonous. *Leaves* 4–6 by $1\frac{3}{4}$ –3 in., thin; lateral nerves few slender below curving upwards and becoming faint towards the margin.

Peduncles 1-2 in. *Flowers* about $\frac{1}{2}$ in. *Calyx-lobes* 4, rounded or subacute.—Habit of *E. balsamea*, but the cymes are much longer peduncled and the leaves are not pellucid-punctate.

104. **E. balsamea**, *Wight Ill.* ii. 16; leaves ovate or ovate-lanceolate narrowed below acuminate subcoriaceous pale pellucid-punctate, lateral nerves prominent widely separated, cymes lateral short compact, flowers small, berry round. *Kurz in Journ. As. Soc. Beng.* vol. xlvi. pt. ii. 66; *For. Fl.* i. 485. *Syz. balsameum*, *Wall. Cat.* 3592. *Memecylon floribundum*, *Wall. Cat.* 4113.

SIKKIM, alt. 2000 ft., *J. D. H. & T. T.*; E. BENGAL, *Griffith*; PEGU, *Kurz*; SILHET, *Wallich, J. D. H., & T. T.* ASSAM, *Masters*.—DISTRIB. Yunnan.

Branchlets subterete or obscurely 4-gonous. *Leaves* 3-5 by 1-1 $\frac{1}{2}$ in.; petiole $\frac{3}{8}$ in. *Inflorescence*-branches compressed, angular. *Calyx-tube* truncate. *Petals* united, or sometimes becoming free.

VAR. angustifolia; leaves narrowly elliptic-lanceolate, $\frac{1}{2}$ - $\frac{3}{4}$ in. wide.—Khasia Mts., 2000 ft., *J. D. H. & T. T.*

105. **E. fruticosa**, *Roxb. Hort. Beng.* 37; *Fl. Ind.* ii. 487; shrubby, leaves broadly oblong to oval acuminate finely nerved, flowers small in dense lateral panicles, berries small ovoid. *Wight Ic.* t. 624; *Kurz in Journ. As. Soc. Beng.* xlvii. pt. ii. 66; *For. Fl.* i. 485. *S. fruticosum*, *DC. Prodr.* iii. 260; *Mem. Myrt.* t. 19; *Vall. Cat.* 3559 in part.

SILHET and CHITTAGONG, *Roxburgh, Wallich*; PEGU, *Kurz*; TENASSERIM, *Helfer*.

A large shrub or small tree. *Leaves* variable as to size, very similar to those of *E. Jambolana*; petiole shorter. *Panicle*-branches divaricate, acutely angular. *Calyx* very short. *Corolla* calyptrate. *Berries* size of pea.—Resembles *E. polyantha*, *Wight*, in its inflorescence.

106. **E. Jambolana**, *Lam. Dict.* iii. 198; leaves ovate or oblong obtuse or more or less acuminate coriaceous closely nerved, panicles lateral below the leaves rarely axillary or terminal, calyx shortly turbinate limb truncate or obscurely 4-lobed, petals calyptrate, berry olive-shaped to globose purple from size of a pea to a pigeon's egg. *Ham. in. Wern. Soc. Trans.* v. 342; *Roxb. Fl. Ind.* ii. 484; *Wight Ic.* t. 535; *Benth. Fl. Austral.* iii. 283; *Bedd. Fl. Sylv.* i. t. 197; *Brandis For. Fl.* 233; *Kurz in Journ. As. Soc. Beng.* vol. xlvii. pt. ii. 67; *For. Fl.* i. 485. *Syz. Jambolanum*, *DC. Prodr.* iii. 259; *Wall. Cat.* 3560; *W. & A. Prodr.* i. 329; *Dalz. & Gibs. Fl. Bomb.* 93. *E. frondosa*, *Wall. Cat.* 3560 G; not 3590. *E. Moorei*, *F. Muell. Fragm.* v. 33. *Calyptranthes Jambolana*, *Willd. Sp. Pl.* ii. 975. *C. capitellata*, *Ham. in Wall. Cat.* 3560 B.

Common (wild or cultivated) and generally distributed throughout India in both peninsulas and in Ceylon; from the plains to 4-5000 ft.—DISTRIB. Malay Archipelago to Australia.

A tree, usually of considerable size with a thick and rather crooked trunk. *Leaves* 3-6 in., extremely variable in shape, smooth and shining, the numerous nerves uniting within the margin; petiole $\frac{1}{2}$ -1 in. *Cyme* short and compact or laxly paniculate. *Flowers* numerous, about the size of those of *E. operculata* or much smaller, sweet-scented. *Berries* often obliquely oblong.—The wood is whitish, close-grained, and durable; the bark affords brown dyes, and a kind of gum kino. The fruit is often eaten. *Roxburgh* mentions a variety having fruit of a superior quality; and as large as a pigeon's egg; probably the result of cultivation.

VAR. caryophyllifolia; leaves ovate-lanceolate with a long acumen, calyx shortly 4-toothed, berry globose size of a large pea. *E. caryophyllifolia*, *Lam. Dict.* iii. 198; *Roxb. Hort. Beng.* 37; *Fl. Ind.* ii. 486; *Wight Ic.* ii. 553. *E. calyptrata*, *Roxb. Ic.* 1142? *Syz. caryophyllifolium*, *DC. Prodr.* iii. 259; *Wall. Cat.* 3562 partly, & 3551; *C. Thwaites Enum.* 116. *S. Jambolanum*, var. *microcarpum*, *Thwaites Enum.* 417; *Wall. Cat.* 3562 C. *Syz. lateriflorum*, *Royle*. *Myrtus Cumini*, *Linn.*: exclude

syn. *Rumph. & Burm.*—*Pluk. Alm.* t. 274, 2. *Rheede Hort. Mal.* v. t. 29. *Rumph. Herb. Amb.* i. t. 41.

VAR. *obtusifolia*, leaves obtuse, berries oblong. *E. obtusifolia*, *Roxb. Hort. Beng.* 37; *Fl. Ind.* ii. 485; *Wight Ic.* t. 520. *Jambolifera pedunculata*, *Gaertn. Fruct.* i. 78, t. 36.—*Rumph. Herb. Amb.* i. t. 42. The emargination in the leaves of *Rumphius'* figure is an error.

107. ***E. tenuis***, *Wall. Cat.* 3570 (*Syzygium*); leaves ovate or ovate-lanceolate obtusely acuminate narrowed at the base coriaceous pale pellucid-punctate lateral nerves slender close interspaces finely reticulated, panicles from the leafless axils dense, calyx-tube broadly campanulate much produced lobes 4 shallow. *Calyptranthes tenuis*, *Ham. MSS.*

SUKANAGHAR, *Hamilton.*

Leaves $2\frac{1}{4}$ – $2\frac{3}{4}$ by 1 – $1\frac{1}{2}$ in.; margins slightly revolute; midrib slender, orange-coloured as well as the edges of the leaves; petiole about $\frac{1}{2}$ in. *Peduncles* $\frac{3}{4}$ in. or less. *Corolla* calyptrate. *Style* persistent, exserted.—The leaves have a close resemblance to those of *E. verecunda*.

108. ***E. Heyneana***, *Wall. Cat.* 3599 (*Syzygium*); leaves narrowly oblong or elliptic obtusely acuminate narrowed at the base into a short petiole finely and closely nerved, cymes lateral from the scars of fallen leaves rarely axillary, calyx-lobes unequal, petals united, berries oblong. *Calyptranthes Danca*, *Ham. in Herb.* *E. salicifolia*, *Grah. Cat. Bomb. Pl.* 73; not of *DC.*; not of *Berg.* or *Wall. Cat.* 3597 (*Syz.*); *Wight Ill.* ii. 16; *Ic.* t. 539; *Dalz. Bomb. Fl.* 24 excl. *syn. Wall.*; *Bedd. Fl. Sylv. Anal. Gen.* cix.

WESTERN PENINSULA; beds of rivers in BERAR; BOMBAY GHATS and CONCAN, *Stocks*; CANARA, *Ritchie*; COORG, *Heyne*; SAGOR, *Vicary*.

A small tree or shrub. *Leaves* 3–5 by $\frac{3}{4}$ –1 in., pellucid-punctate. *Cymes* lax, much branched. *Flowers* small, white. *Berries* $\frac{1}{2}$ in. or more in length, crowned with the cup-like calyx-limb.

E. salicifolia of Wight's Herbarium is certainly the *E. Heyneana* of Rottler's and Wallich's herbaria. Wallich's *E. salicifolia* is *E. rubicunda*, W. & A., a plant having very much the habit of this, but with the inflorescence terminal. The wood is used for rafters (Beddome).

VAR. *alternans*; cymes from the axils of the upper leaves. *S. alternans*, *Miq. in Herb. Hohenacker*.—Concan and Canara, *Stocks*, *Hohenacker*. The leaves are very like those of *E. pellucida*.

SECT. III. ***Eueugenia***. *Flowers* solitary or in fascicles. *Petals* distinct. (To end.)

* Young parts and inflorescence fulvous or silvery pubescent. (To p. 504.)

† *Staminal disk* broad.

109. ***E. Jossinia***, *Duthie*; leaves shortly petioled obovate-spathulate obtuse cuneate below coriaceous glabrous, peduncles axillary solitary or crowded at the end of the branches 1-flowered, pedicels and calyx rusty-pubescent, calyx-limb 4-lobed persistent, berry about the size of a sloe. *E. cuneata*, *Heyne in Wall. Cat.* 3625, not of *Wall. Cat.* 3598; *Bedd. Fl. Sylv. Anal. Gen.* cxii. *Jossinia indica*, *Wight Ill.* ii. 12, t. 122; *Ic.* t. 523; *Blume Mus. Bot.* i. 122; *Miq. Fl. Ind. Bat.* i. pt. i. 468.

SEVAGHERRY HILLS, TINNEVELLY DISTRICT, *Wight*, *Beddome*; COURTALLUM, *Wight*.

A small tree or shrub. *Leaves* 1 – $1\frac{3}{4}$ by $\frac{1}{2}$ – $\frac{5}{8}$ in., revolute at the edges; nerves inconspicuous above. *Peduncles* $\frac{3}{4}$ in. long. *Calyx-tube* subglobose; lobes rather unequal. *Petals* hairy, $\frac{3}{8}$ in. long.

110. **E. floccosa**, *Bedd. Fl. Sylv.* t. 200; young branches densely floccose, leaves ovate or suborbicular sometimes lanceolate obtuse densely floccose at length glabrous except on the ribs minutely dotted beneath coriaceous, edges revolute, flowers terminal in very short few-flowered cymes or solitary and large, calyx coriaceous densely pilose furnished at the base with 2 large bracteoles, petals exceeding the calyx-lobes white hairy at the back, fruit large size of a pigeon's egg densely woolly crowned with the persistent calyx-lobes.

S. TINNEVELLY GHATS above Calcad, 3-4000 ft., *Beddome*.

A large and beautiful tree. *Leaves* very thick, 3-5 by 2-3½ in.; nerves quite inconspicuous except in dried specimens, penninerved, with the usual marginal looping or occasionally 3-nerved at the base, the two lateral nerves not prominent; petiole densely floccose, ½-¾ in. *Flowers* about 1 in. diam. *Disk* large, subglobose, woolly.

111. **E. codyensis**, *Munro in Wight Ill.* ii. 13; leaves short-petioled ovate-oblong or obovate tapering towards the base shortly obtusely acuminate, flowers nearly sessile clustered in terminal heads at the extremities of short abortive branches or axillary and solitary or few together, fruit globose 1-2-seeded.

NILGHIRI and KURG MTS., *Munro*.

A shrub with stout terete branchlets; young parts clothed with white pubescence. *Leaves* 1½-2½ by ¾-1½ in., coriaceous, glabrous, shining above; dots minute, pellucid; lateral nerves slender, prominent, uniting within the margin; petiole ¼-½ in. *Calyx-tube* campanulate, silky-pubescent; lobes 4, broad, persistent, ciliate. *Petals* oblong, twice the length of the calyx. *Berries* about ¼ in. in diameter.—Judging from the specimen in Wight's Herbarium it seems to be closely allied to *E. elliptica*, Lam., of which it is perhaps only a variety; the leaves are rather longer petioled and the flowers larger.

Allied to this is *E. buxifolia*, Lam., a native of the Mauritius.

112. **E. lucida**, *Lam. Dict.* iii. 203; young parts and inflorescence covered with light-coloured cottony pubescence, leaves petioled broadly obovate or nearly orbicular revolute at the edges very coriaceous, flowers large solitary in the axils or collected 3 or 4 together at the ends of the former year's branches each with 2 small subacute bracts, calyx-lobes rounded unequal. *Jossinia lucida*, *DC. Prodr.* iii. 237. *E. cotinifolia*, *Jacq. Obs.* iii. 3 t. 53 *in part.* *E. hypoleuca*, *Thwaites MSS. C.P.* 3864 & 3865; *Bedd. Fl. Sylv. Anal. Gen.* cxii. *Myrtus cotinifolia*, *Spreng. Syst.* ii. 481 *in part.* *M. Commersonii*, *Spreng. l.c.* 479.

CEYLON; Wattakelle Hill, 5000 ft. alt., *Thwaites*.—DISTRIB. Bourbon, Mauritius.

Leaves 1½-2 by 1-1½ in.; nerves indistinct above, slender beneath and uniting within the margin; petiole about ¼ in. *Flowers* upwards of an inch in diam. *Pedicels* ½ in. or less. *Calyx-tube* ¼ in. "Fruit obovate or globose glabrous crowned with the obtuse calyx-lobes" (*Decandolle, l.c.*).

113. **E. macrosepala**, *Duthie*; leaves petioled ovate or oblong-lanceolate subacute at the base obtusely acuminate or sometimes rounded at each end coriaceous, flowers lateral from leafless axils sessile solitary or in pairs each with 2 linear pilose bracts equalling or exceeding the calyx-tube, calyx-lobes 4 long narrowly lanceolate acute exceeding the obtuse petals.

N. CANARA, *Stocks*.

Upper branches stout, terete or compressed at the nodes; bark brownish. *Leaves* 3-4½ by 1½-1¾ in., shining a little above and of a reddish tinge; nerves inconspicuous above, slender but prominent beneath uniting within the margin. *Calyx-lobes* clothed with long spreading white hairs. *Petals* ovate, pilose at the back and ciliate at the margin. *Stamiferous disk* not so broad and square as in *E. elliptica*, Lam.

114. **E. calcadensis**, *Bedd. Ic. Pl. Ind. Or.* 35, t. 162; *Fl. Sylv. Anal. Gen. cx.*; young parts rusty-pubescent, leaves opposite or subalternate elliptic to subobovate obtuse very rugose on the upper surface but glabrous in age except the channelled midrib, peduncles axillary solitary about equal to the petioles 2-rarely 1-flowered, flowers showy white, ovary 2-celled with numerous ovules.

Calcad Hills in S. TINNEVELLY, up to 2000 ft., *Beddome*.

A small tree. *Leaves* $2\frac{1}{2}$ –3 by $1-1\frac{1}{4}$ in., coriaceous, not dotted; nerves inconspicuous above slightly prominent beneath, the primary ones joining within the margin; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Pedicels* $1-1\frac{1}{4}$ in., with a subulate bract at the base of each. *Flowers* $1-1\frac{1}{2}$ in. in diam., with 2 small linear bracts at the base. *Calyx-lobes* rounded. *Petals* oblong ciliate $\frac{1}{2}$ – $\frac{3}{4}$ in. long. *Disk* suborbicular, densely woolly, covering the whole of the top of the ovary at the apex of the calyx-tube. *Stamens* inserted all over the disk.

†† *Staminal disk not enlarged.*

§ *Flowers pedicelled.*

115. **E. bracteata**, *Roxb. Hort. Beng.* 37; *Fl. Ind.* ii. 490; young parts and inflorescence rusty-pubescent, leaves shortly petioled ovate-oblong tapering or cuneate at the base obtusely acuminate glabrous when old coriaceous shining pellucid-dotted, peduncles axillary short 1-flowered solitary or 2–3 together or in fascicles with 2 small bracteoles under each flower, berry globose 1–2-seeded. *DC. Prodr.* iii. 264; *W. & A. Prodr.* i. 331; *Wight Ill.* t. 13; *Thwaites Enum.* 114; *Blume Mus. Bot.* i. 87 (*in part*); *Bedd. Fl. Sylv. Anal. Gen. cx.* *Myrtus bracteata*, *Willd. Sp. Pl.* ii. 969. *M. coromandeliana*, *Kön. MSS.* *M. rusciifolia*, *Willd. l. c.* 970; *DC. l. c.* 241; *Spreng. l. c.* 482. *M. latifolia*, *Heyne in Roth. nov. sp.* p. 232 (*not of Aubl.*). *M. Heynei*, *Spreng. l. c.* 482; *DC. l. c.* 241.

SILHET and Plains of S. India, especially near the sea; MADRAS, *G. Thomson, Wight, Hunter*; ANAMAILAY Mts., up to 3000 ft. alt., *Beddome*; CEYLON, Jaffna, *Gardner*.

A shrub or small tree. *Leaves* $1\frac{1}{2}$ –2 by about $\frac{3}{4}$ in. *Calyx-lobes* broad, unequal, reflexed after flowering. *Petals* ovate-oblong, twice as long as the calyx-lobes, pubescent at the back, margins ciliate.

VAR. Roxburghii; leaves broader, petioles longer, flowers larger. *E. Roxburghii*, *DC. Prodr.* iii. 271; *Wall. Cat.* 3621 (*in part*); *Hook. Journ. Bot.* i. 66, t. cxxiv.; *Miq. Fl. Ind. Bat.* i. pt. i. 441 (*in part*); *Blume Mus. Bot.* i. 87 (*in part*). *E. zeylanica*, *Roxb. Hort. Beng.* 92; *Fl. Ind.* ii. 490 *excl. syn.* *Willd.*; *W. & A. Prodr.* i. 331; *Arn. in Act. Acad. Nat. Cur.* xviii. 336 (1836). *E. Willdenowii*, *Wight Ill.* ii. 13; *l. c.* t. 545; *not of DC.*; *Thwaites Enum.* 114; *Bedd. Fl. Sylv. Anal. Gen. cx.*: *not of Wall. Cat.* 3623. *Myrtus littoralis*, *Roxb. in E. I. C. Mus.* t. 151. *M. spicata*, *Ham.*—Plains of S. India and in Ceylon.

Rottler's specimens in the Kew Herbarium, and those of Arnott from Ceylon named *E. zeylanica* have the leaves upwards of $4\frac{1}{2}$ in. long. In Wight's figure the peduncles are incorrectly represented as 2-flowered.

VAR. fasciculata; leaves $2\frac{1}{2}$ –3 in., flowers fascicled more erect peduncles shorter. *E. fasciculata*, *Wall. Cat.* 3622; *Blume Mus. Bot.* i. 87.—SILHET, *Wallich*.

116. **E. Rottleriana**, *W. & A. Prodr.* i. 331; much branched, young shoots petioles peduncles and calyx covered with rusty-silky tomentum, leaves very narrow lanceolate tapering at both ends obtuse glabrous on both surfaces except when young pellucid-dotted, peduncles axillary or somewhat lateral 3–4 together or sometimes solitary filiform scarcely one-fourth the length of the leaves, bracteoles 2 under the calyx, calyx-segments 4 triangular ovate obtuse, petals 4 much longer than the calyx villous on the margin. *Wight Ill.* ii. 13; *l. c.* t. 100; *Bedd. Fl. Sylv. Anal. Gen. cx.*

Southern provinces of the WESTERN PENINSULA, *Wight*, *Beddome*; Courtallum, *Wight*.

A small tree or shrub. *Leaves* 1-2 by $\frac{1}{4}$ - $\frac{1}{2}$ in.; petiole $\frac{1}{4}$ in. or less.—*Col. Beddome* mentions two distinct forms, the one with leaves 1-1 $\frac{1}{2}$ by $\frac{1}{4}$ in., the other 2 in. by $\frac{1}{4}$ in. The former coming very near *E. Willdenowii* (of *Wight*).^a

117. **E. terpnophylla**, *Thwaites Enum.* 114 & 417; young parts and inflorescence rusty-pubescent, leaves lanceolate or oblong-lanceolate with a long acumen narrowing towards the base lateral nerves uniting at some distance from the margin, berry spherical usually 1-seeded. *Bedd. Ic. Pl. Ind. Or.* 67, t. 283; *Fl. Sylv. Anal. Gen.* cxi.

CEYLON; up to no great elevation, *Thwaites*.

A middling-sized tree; branchlets terete. *Leaves* 2 $\frac{1}{2}$ -5 by $\frac{1}{2}$ -2 in., membranous, faintly reticulate; lateral nerves prominent beneath, 5-8 on each side marginal often double; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in. *Peduncles* axillary and terminal, short, few-flowered; pedicels about equalling the petioles. *Petals* white, twice as long as the rounded calyx-lobes. *Berry* downy, size of small cherry.

118. **E. xanthocarpa**, *Thwaites Enum.* 416; young branches and buds clothed with rusty pubescence, leaves elliptic-lanceolate obtusely acuminate glabrous acute at the base, midrib channelled above primary nerves prominent, pedicels axillary fasciculate rusty-pubescent about equalling the petioles, berry 1-4-seeded nearly spherical rusty-pilose tuberculate. *Bedd. Fl. Sylv. Anal. Gen.* cxi.

CEYLON; near the coast between Galle and Colombo, *Thwaites*.

A low tree. *Leaves* 2 $\frac{1}{2}$ -4 by 1-1 $\frac{1}{2}$ in.; petiole $\frac{1}{4}$ in. *Berries* $\frac{1}{4}$ - $\frac{1}{2}$ in., ochraceous.—Differs from *E. terpnophylla* in having more numerous primary nerves, in their being less prominent beneath, and uniting closer to the margin; and in the ochraceous berries which are often 2-4-seeded (*Thwaites l. c.*).

119. **E. rufo-fulva**, *Thwaites Enum.* 416; young parts covered with short reddish or tawny pubescence, leaves lanceolate acutely acuminate glabrous above (except when young) shining hairy covered beneath with short adpressed reddish or tawny tomentum at length glabrous, peduncles axillary fasciculate 1-3-flowered about equal to the petioles, calyx with small subulate bracteoles. *Bedd. Fl. Sylv. Anal. Gen.* cxi. *E. terpnophylla*, var β , *Thwaites l. c.* 114.

CEYLON, near Avishavelle, *Thwaites*.

A tree, 30-40 ft. *Leaves* 4-5 by 1-1 $\frac{1}{2}$ in. or much narrower in some of Mr. *Thwaites'* specimens; petiole about $\frac{1}{4}$ in. *Calyx-lobes* unequal, obtuse or subacute. "Differs from *E. terpnophylla* by the leaves being pilose beneath, and the primary nerves anastomosing nearer the margin" (*Thwaites l. c.*).

120. **E. argentea**, *Bedd. Fl. Sylv. Anal. Gen.* cix.; leaves ovate-elliptic to lanceolate with a long narrow acumen rounded at the base silvery pubescent beneath, peduncles filiform axillary pubescent, bracteoles 2 filiform exceeding the calyx-lobes persistent, fruit spherical sparingly clothed with short adpressed hairs.

S. INDIA, Wynaad, alt. 3000 ft., *Beddome*.

A small tree or shrub. *Leaves* 4-5 $\frac{1}{2}$ by 1 $\frac{1}{4}$ -1 $\frac{1}{2}$ in.; nerves rather prominent beneath, lateral spreading nearly at right angles from the midrib and running into a regular looped nerve near the margin. *Peduncles* 1 in. long, from the old axils or axillary. *Flowers* $\frac{1}{2}$ to nearly $\frac{1}{2}$ in. across. *Fruit* about the size of a large cherry, black when dry, crowned with the persistent calyx-lobes.

§§ *Flowers sessile or subsessile.*

121. **E. floccifera**, *Thwaites Enum.* 115; leaves oblong-lanceolate acutely acuminate, young parts and inflorescence densely clothed with yellow tomentum, pedicels axillary short clustered, calyx-lobes 4 lanceolate much longer than the tube. *Bedd. Fl. Sylv. Anal. Gen.* cxi.

CEYLON; Reigam Corle, at no great elevation, *Thwaites*.

A small tree; *branchlets* terete. *Leaves* acutely acuminate, 4-8 by 1-2 in., at length glabrous; primary nerves rather prominent beneath, joined into a marginal looping one; petiole $\frac{1}{4}$ - $\frac{1}{3}$ in. *Petals* white, equalling the calyx-lobes, $\frac{1}{3}$ in.

122. **E. fulva**, *Thwaites Enum.* 115; leaves elliptic or oblong abruptly and shortly acuminate rounded at the base smooth above prominently nerved beneath young parts and inflorescence clothed with yellow tomentum, flowers axillary and cauline small sessile crowded. *Bedd. Fl. Sylv. Anal. Gen.* cxi.

CEYLON; Pasdoon Corle, at no great elevation, *Thwaites*.

A small tree with terete branchlets. *Leaves* coriaceous, 4-6 by $2\frac{1}{4}$ -3 in., the young ones rusty-tomentose beneath; petiole about $\frac{1}{2}$ in.

123. **E. rivulorum**, *Thwaites Enum.* 115; leaves rather large lanceolate acuminate narrow at the base covered very slightly beneath with fulvous pubescence at length glabrous, flowers rather large sessile axillary and cauline, calyx-lobes 4 pilose externally rounded equalling the tube. *Bedd. Fl. Sylv. Anal. Gen.* cxi.

CEYLON; banks of streams in the Singherajah forest between Galle and Ratnapoora, at no great elevation, *Thwaites*.

A small tree with terete branchlets. *Leaves* 10-14 by 3-4 $\frac{1}{2}$ in.; midrib stout longitudinally striated; principal nerves very prominent below and uniting to form a conspicuous intramarginal one; petiole about $\frac{1}{2}$ in. *Petals* oblong, pale purple, $\frac{1}{3}$ - $\frac{1}{2}$ in.

124. **E. insignis**, *Thwaites Enum.* 416; young parts covered with white fugacious down, leaves rather large glabrous oblong acuminate smooth above ribs channelled paler beneath, primary nerves about 12 prominent anastomosing near the margin, interspaces smooth, flowers axillary and on the branches few sessile small, calyx with white hairs or floccose, fruit spherical. *Bedd. Fl. Sylv. Anal. Gen.* cxi.

CEYLON; Galpara in the Reigam Corle, *Thwaites*.

A low branching tree. *Leaves* 6-8 by 2-3 $\frac{1}{2}$ in., rather acute at the base; petiole $\frac{1}{2}$ - $\frac{2}{3}$ in. *Calyx-lobes* $\frac{1}{2}$ in. *Petals* rather longer than the calyx, ciliate. *Fruit* clothed with white hairs or floccose.

** *Whole plant nearly glabrous.*

† *Flowers sessile.*

125. **E. decora**, *Thwaites Enum.* 115; leaves oblong acuminate rounded at the base glabrous shining above paler beneath minutely reticulate, flowers sessile crowded axillary and cauline, berries transversely oblong 2-seeded. *Bedd. Fl. Sylv. Anal. Gen.* cxii.; not of *Wall. Cat.* 3608.

CEYLON; Galle, at no great elevation, *Thwaites*, *Champion*.

A small tree; young branches terete. *Leaves* 4-5 by about 2 in.; petiole $\frac{1}{2}$ in. *Flowers* white. *Berries* red or nearly black, $\frac{1}{2}$ by $\frac{2}{3}$ in.—*Champion's* single specimen from Galle has only one flower terminating a lateral branch; the calyx-tube is spa-

ringly clothed with adpressed hairs, the lobes large unequal rounded and ciliate, the petioles are glandular and ciliate at the edges.

†† *Flowers pedicelled.*

126. **E. amoena**, *Thwaites Enum.* 114; leaves sessile ovate-lanceolate acuminate cordate at the base or subamplexicaul glabrous coriaceous, flowers often terminal subfasciculate, pedicels much shorter than the leaves. *Bedd. Fl. Sylv. Anal. Gen.* cxi. *E. Mooniana*, *Wight. var. β.*, *Thwaites Enum.* 114.

CEYLON, Kokool Corle and Delosbage District, up to 1500 ft., *Thwaites*.

A small tree; branchlets terete. *Leaves* 2-6 by $1\frac{1}{2}$ -2 $\frac{1}{4}$ in.; nerves inconspicuous above, more prominent beneath and uniting in a distinct marginal nerve with often a second fainter one nearer the edge. *Pedicels* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Bracts* ovate, acute. *Petals* 4, oblong, white, about $\frac{1}{4}$ in. in length, longer than the roundish calyx-lobes.—Some of Mr. Thwaites' specimens, and which he considers to be merely a state of this species, have the leaves much thinner, broader at the base, and with rather different nervation, the pedicels are shorter, and the calyx-lobes sometimes acute.

127. **E. Mooniana**, *Wight Ill.* ii. 13; *Id.* ii. 551; not of *Gardner in Hook. Journ. of Bot.* ii. 352 (1843); shrubby, glabrous or the young shoots puberulous, leaves short-petioled ovate acuminate tapering at the base, peduncles axillary solitary or 2 together 1-flowered, flowers small, calyx-tube ventricose oblong, lobes 4 reflexed pointed, fruit globose or oblong size of cherry. *Thwaites Enum.* 114; *Bedd. Fl. Sylv. Anal. Gen.* cx.

Courtallum, *Wight*; NILGHIRI HILLS, *Hb. Hohenacker*; SEVAGHERY HILLS, *Wight*; CONCAN, *Stocks*; CEYLON, up to 4000 ft., *Thwaites*.

A most variable species in the shape of the leaves and the length of the petioles and flower-stalks. *Leaves* $1\frac{1}{2}$ -2 $\frac{1}{2}$ by $\frac{3}{4}$ -1 $\frac{1}{2}$ in.; acumen short and obtuse, or prolonged to a fine point. *Pedicels* about $\frac{1}{2}$ in., axillary or from the old wood below.—It approaches *E. uniflora*, but the leaves are thicker and the pedicels are less slender.—Col. Beddome says (l.c.) "I have another species allied to this which may prove to be new (specimens imperfect) the peduncles are several-flowered."

VAR. gracilis; leaves longer, fruit oblong. *E. gracilis*, *Bedd. in Trans. Linn. Soc.* xxv. 217; *Fl. Sylv. Anal. Gen.* cx.—Anamallay Hills.

E. UNIFLORA, *Linn.*; *Miq. Fl. Ind. Bat.* i. pt. i. 441; leaves nearly sessile ovate sublanceolate glabrous rather thin and pellucid-punctate, pedicels axillary usually solitary and 1-flowered shorter than the leaves, calyx-lobes 4 reflexed, berries globose, torulose. *E. Willdenowii*, *DC. Prodr.* iii. 265; *Spreng. Syst.* ii. 480 (*Myrtus*); *Wall. Cat.* 3623. *Syzyg. Michelii*, *Lam. Dict.* iii. 203; *DC. Prodr.* iii. 263. *Myrtus braziliensis*, *Linn. Sp. Pl.* 471. *Plinia rubra*, *Linn. Mant.* 243. *P. pedunculata*, *Linn. f. Suppl.* 253. *E. zeylanica*, *Willd. Sp. Pl.* ii. 963.

A native of S. America, becoming naturalised in Ceylon and parts of India.

VAR. subcordata; leaves slightly cordate at the base. *W. & A. Prodr.* i. 331; *Wight Ill.* ii. 13.

128. **E. mabæoides**, *Wight Ill.* ii. 13; shrubby, leaves short-petioled obovate-spathulate rigid glabrous shining above densely glandular, flowers on short pedicels axillary solitary or clustered on leafless branches, calyx-tube ventricose, limb 4-parted, berry spherical size of small cherry. *Thwaites Enum.* 114; *Bedd. Fl. Sylv. Anal. Gen.* cxi.

CEYLON; Central Provinces 4-7000 ft. alt., *Moon*, *Gardner*, *Thwaites*.

A shrub; much branched. *Leaves* resembling those of *Maba burxifolia*, $\frac{1}{2}$ -2 by $\frac{1}{2}$ -1 $\frac{1}{4}$ in.

129. **E. microphylla**, *Bedd. Fl. Sylv. Anal. Gen.* cx.; glabrous in all its parts, young branches angled and winged, leaves opposite occasionally alter-

nate thickly coriaceous linear obtuse nerves inconspicuous, peduncles axillary solitary shorter than the leaves 1-flowered, fruit size of large grain of pepper.

Banks of rivers, Asamboo Hills, TRAVANCORE, 4-5000 ft. alt.

A small tree, much branched and very dense. *Leaves* $\frac{1}{3}$ - $\frac{1}{2}$ by $\frac{1}{8}$ - $\frac{1}{4}$ in., bright red, quite glabrous when young, prominently black-dotted; petiole $1\frac{1}{2}$ in.—I have seen no specimens.

130. **E. Thwaitesii**, Duthie; young parts pilose, leaves shortly petioled firm ovate obtuse rather abruptly acuminate subacute at the base, pedicels axillary fasciculate twice as long as the petioles, flowers small, berry spherical glabrous shining. *Bedd. Fl. Sylv. Anal. Gen.* cxii. *E. concinna*, *Thwaites Enum.* 416; *not of Phil. in Linnæa* xxviii. 640; *Bedd. Fl. Sylv. Anal. Gen.* cxii.

CEYLON, Ambagamowa District, *Thwaites*.

A tree; branchlets terete. *Leaves* sparingly pilose, at length glabrous, 3-5 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in.; petiole nearly $\frac{1}{4}$ in. *Pedicels* about $\frac{1}{2}$ in. or more. *Calyx-lobes* unequal. *Petals* ciliate, downy outside. *Berries* red, about $\frac{1}{2}$ in. in diameter.

131. **E. singampattiana**, *Bedd. Ic. Pl. Ind. Or.* 65. t. 273; leaves ovate or ovate-oblong retuse or subacute subcordate at the base coriaceous deep green above very pale beneath quite glabrous, flowers white in very short terminal crowded racemes, calyx and bracts slightly pubescent.

SINGAMPATTY HILLS, TINNEVELLY GHATS, moist forests, alt. 3000 ft., *Beddome*.

A small dense tree. *Leaves* about 3 by $1\frac{1}{2}$ -2 in.; primary nerves numerous, forming a continuous looping one near the margin. *Flowers* about $\frac{1}{2}$ in. across. *Petals* prominently nerved.

DOUBTFUL AND EXCLUDED SPECIES.

E. CARYOPHYLLATA, *Willd.* (the Clove-tree) is a native of the Molucca Islands and not indigenous in India.

E. SP. (No. 2420 of Griffith's Herbarium) is too imperfect for description.

E. PULCHELLA, *Roxb.* is a native of the Molucca Islands.

E. WYNAADENSIS, *Bedd. in Mad. Lit. Soc. Journ. ex Ic. Pl. Ind. Or.* 35, t. 161; *Fl. Sylv. Anal. Gen.* cx.; young parts and inflorescence densely fulvo-tomentose, leaves oblong-lanceolate with a long blunt acumen quite glabrous on both surfaces when old, peduncles supra-axillary, calyx-lobes lanceolate acuminate a little longer than the corolla, bracts 2 linear much longer than the flowers, stamens inserted round the edge of the disk, ovary 2-celled, ovules pendulous from the apex about 4 in each cell.

WESTERN PENINSULA; Wynaad, alt. 2-3000 ft., *Beddome*.

A small tree or shrub. *Leaves* 3- $3\frac{1}{2}$ by 1 - $1\frac{1}{4}$ in., rather thin; lateral nerves indistinct above, slender beneath and uniting into a continuous one within the margin; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ in. *Fruit?*—This is probably, as Col. Beddome suggests, the type of a new genus intermediate between *Pimenta* and *Eugenia*. The materials at my disposal are too incomplete for the preparation of a proper generic description. The above is compiled from Col. Beddome's description of the plant.

SUBTRIBE **BARRINGTONIÆ.** (By C. B. Clarke.)

9. **BARRINGTONIA**, *Forst.*

Trees. *Leaves* alternate, crowded towards the ends of the branches, entire or slightly crenate-serrate, pinnate-nerved, not dotted. *Flowers* in elongated terminal and lateral racemes, less often in interrupted spikes; bracts small, deci-

duous. *Calyx-tube* scarcely produced above the ovary; lobes 2-4 valvate, or 3-5 imbricate. *Petals* 4, rarely 5, much imbricate, somewhat adnate at the base to the staminal tube. *Stamens* very many, in several series, connate shortly into a tube at the base; filaments filiform, long, all bearing anthers. *Ovary* inferior, 2-4-celled, crowned with an annular disc; style long, simple, stigma small; ovules 2-8 in each cell, pendulous. *Fruit* fibrous or somewhat berried, globose ellipsoid or quadrangular, crowned with the calyx, by abortion 1-seeded. *Seed* ovoid or ellipsoid, without albumen; embryo large, exhibiting two layers, cotyledons nearly obsolete.—*DISTRIB.* Species 20; in tropical Asia, Africa, Australia and Polynesia, often near the sea.

SECT. **Butonica**, *Juss.* (gen.). *Calyx* valvate, 2-3- (rarely 4-) lobed. (BARRINGTONIA, AGASTA and BUTONICA of Miers).

* *Leaves entire.*

1. **B. speciosa**, *Forst. Char. Gen. Pl.* 76, t. 38; leaves large obovate, petals 2-2½ in. *Linn. f. Suppl.* 312; *DC. Prodr.* iii. 288; *Roxb. Fl. Ind.* ii. 636; *Wall. Cat.* 3632, excl. B.; *Blume Bijl.* 1096; *W. & A. Prodr.* 333; *Wight Ic.* t. 547; *Miq. Fl. Ind. Bat.* i. pt. i. 485; *Miers in Trans. Linn. Soc. ser. ii. Bot.* i. 56, t. 10; *Kurz For. Fl.* i. 496. *B. asiatica*, *Kurz in Journ. As. Soc.* 1877, pt. ii. 70. *B. ? macrophylla*, *Miq. l. c.* 491. *Mammea asiatica*, *Linn. Sp. Pl.* 731. *Agasta splendida*, *asiatica* and *indica*, *Miers l. c.* pp. 60-64, tt. 11, 12.

CEYLON, *Thwaites* (Southern DECCAN PENINSULA probably not wild ex *Beddome*); ANDAMANS, *Kurz*; SINGAPORE, *T. Anderson*; on sea-coasts.—*DISTRIB.* The shores of Malaya, Australia and Polynesia.

Tree 30-50 ft., glabrous. *Leaves* often 15 by 7 in., obtuse, narrowed at the base, quite entire, sessile. *Raceme* short, erect; lower pedicels with a leaf-like bract, upper bracts much smaller. *Calyx* closed over the bud; lobes 2, 1½ in., oblong. *Petals* white. *Ovary* 4-celled; ovules about 6 in each cell. *Style* often exceeding 4 in. *Fruit* 3 by 3 in., quadrangular or nearly ovoid, by abortion 1-seeded.—*Mr. Miers* finds a second genus on a drawing of Forster which represents the fruit as 4-celled. But the drawing appears to be taken from the fruit of *B. speciosa*, the very anomalous embryo having misled Forster to sketch in faintly four septa.

** *Leaves crenate-denticulate.*

2. **B. racemosa**, *Blume*; *DC. Prodr.* iii. 288; racemes pendulous pedicels ½-¾ in., calyx-tube in the bud broadly funnel-shaped segments 2-3, fruit ovoid. *Roxb. Fl. Ind.* ii. 634; *Wall. Cat.* 3634; *W. & A. Prodr.* 333; *Wight Ic.* t. 152, including fruit; *Bot. Mag. t.* 3831; *Dalz. & Gibs. Bomb. Fl.* 94; *Kurz For. Fl.* i. 496. *B. speciosa*, *Wall. Cat.* 3632 B. *B. alba* and *rubra*, *Miq. Fl. Ind. Bat.* i. pt. i. 487. *Eugenia racemosa*, *Linn. Sp. Pl.* 673. *Stravadium album* and *rubrum*, *DC. Prodr.* iii. 289. *Butonica racemosa* and *alba*, *Miers in Trans. Linn. Soc. ser. ii. Bot.* i. 65, 66, t. 13, fig. 1-17. *B. rubra* and *inclyta*, *Miers l. c.* pp. 70, 71, t. 14, fig. 1-3, 19.—*Rheede Hort. Mal.* iv. t. 6.

On sea-coasts. CONCAN; *Stocks*. QUILON, *Wight* No. 1064. From the SOONDERBUN to MALACCA; *Wallich*, *Kurz*, *Griffith*, *Mainagay*. ANDAMANS; *Kurz*.—*DISTRIB.* Malaya and Polynesia.

An evergreen tree attaining 50 ft., glabrous. *Leaves* 10 by 3 in., cuneate-oblong, lightly crenate-denticulate; petiole ½-¾ in. *Racemes* 12-18 in., pendulous, flowers distant, pedicels ¼-½ in. *Calyx-lobes* ⅓ in., ovate. *Style* often 1½ in. *Fruit* 1½ by 1½ in., ovoid, obscurely quadrangular below when quite ripe; in ripening attaining

nearly its full length before one-third its full breadth; in Maingay's examples nearly ellipsoid: exocarp very thick, fibrous.

3. **B. ceylanica**, *Gardn. MS.*; racemes pendulous pedicels $\frac{1}{2}$ – $\frac{7}{8}$ in., calyx-tube in the bud broadly funnel-shaped segments 4 at first rounded rather than ovate. *B. racemosa* var. β , *Thwaites Enum.* 119. *Butonica ceylanica*, *Miers in Trans. Linn. Soc. ser. ii. Bot. i. 77.*

CEYLON, south of the island abundant; *Thwaites*.

Treated by Mr. Thwaites as a var. of *B. racemosa*, and after specific separation by *Miers l. c.* reduced to *B. racemosa* again by *Kurz in Journ. As. Soc.* 1877, pt. ii. 70. *Butonica intermedia*, *Miers l. c.* from New Caledonia differs by calyx-lobes 2–3. ovate.

4. **B. conc. dea**, *Griff. Notul* 656, *lc.* 635, 636 fig. 1; racemes suberect, calyx-tube in the bud campanulate somewhat urn-shaped, fruit ovoid with 8 wing-like descending processes from the base. *Kurz For. Fl. i.* 497. *B. alata*, *Wall. Cat.* 3633. *Butonica alata*, *Miers in Trans. Linn. Soc. ser. ii. Bot. i. 70*, t. 14, fig. 10–15.

MOULMEIN; *Wallich*. Coast forests of TENASSERIM; *Kurz. MALACCA*; *Griffith*.

An evergreen shrub or small tree (*Kurz*), glabrous. *Leaves* 7 by $2\frac{3}{4}$ in., oblong, narrowed downwards, at the very base cordate, crenulate-serrulate or nearly entire; petiole $\frac{1}{2}$ in., thick. *Raceme* 4 in., lax, but erect; pedicels $\frac{1}{4}$ – $\frac{3}{4}$ in., glabrous (or somewhat puberulous, *Kurz*). *Calyx-tube* broad at the base, the 8 descending processes often manifest in the bud as figured by Griffith. *Calyx-lobes* usually 2, $\frac{3}{8}$ in., ovate. *Petals* and *style* as in *B. racemosa*. *Fruit* $1\frac{1}{4}$ by 1 in., conically ovoid, broadest at the very base and there 8-winged; wings produced downwards in 8 semi-cordate processes.—Mr. Miers l. c. has asserted that Griffith's figures are mixed, and that part of them refer really to *B. alba*, *Miers*: but *Kurz* has rectified this in *Journ. As. Soc.* 1877, pt. ii. 70. Griffith's figures agree more closely with the material than do Miers's.

SECT. **Stravadium**, *Juss. (gen.)*. *Calyx* lightly imbricate, 3–5- (usually 4-) lobed. (STRAVADIUM and DOXOMMA of Miers).

* *Ovary* 2-celled, whole calyx less than $\frac{1}{2}$ in. (STRAVADIUM, Miers).

5. **B. acutangula**, *Gaertn. Fruct.* ii. 97, t. 101; leaves short-petioled cuneate-elliptic, racemes elongate pendulous, fruit quadrangular oblong equally narrowed towards and subtruncate at each end. *Roxb. Fl. Ind.* ii. 635; *W. & A. Prodr.* 333; *Miq. Fl. Ind. Bat. i.* pt. i. 488; *Dalz. & Gibs. Bomb. Fl.* 95; *Bedd. Fl. Sylv.* t. 204; *Brand. For. Fl.* 235; *Kurz. For. Fl. i.* 497. *Eugenia acutangula*, *Linn. Sp. Pl.* 673. *Stravadium acutangulum*, *Miers in Trans. Linn. Soc. ser. ii. Bot. i.* 80. *S. rubrum*, *Wall. Cat.* 3635. *S. obtusangulum*, demissum, *Rheedii*, *globosum*, *Miers l. c.* pp. 81, 82, 86 with syn., and probably (from the descriptions) several others of which examples authenticated by Mr. Miers have not been seen.—*Rheede Hort. Mal.* iv. t. 7.

Throughout INDIA from the HIMALAYA to CEYLON and SINGAPORE very common; no tree is more plentiful in the plain of BENGAL.—DISTRIB. Malaya; and North-West Australia (if *Stravadium gracile* Miers be considered the same species as by *Bth. Fl. Austral.* iii. 288).

Attaining 30–40 ft., glabrous. *Leaves* 5 by 2 in., minutely denticulate-crenate, narrowed into the petiole $\frac{1}{2}$ – $\frac{1}{4}$ in. *Racemes* often 1 foot, glabrous, rachis not succulent; pedicels 0– $\frac{1}{4}$ in. *Calyx-tube* in the bud very short, funnel-shaped; lobes $\frac{1}{2}$ in., roundish, not longer on the fruit. *Petals* $\frac{1}{2}$ in., pink. *Filaments* long, usually red. *Fruit* $1\frac{1}{2}$ by $\frac{1}{2}$ – $\frac{3}{4}$ in., broadest in the middle, angles broad, rounded.—“Indian Oak” of the English denizens.

VAR. *pubescens*, sp. Miers, l. c. 83 (Stravadium); leaves pubescent on the nerves beneath, racemes and pedicels often more or less pubescent. Deccan Peninsula; frequent.

** Ovary 4-celled, whole calyx more than $\frac{3}{8}$ in. (DOXOMMA, Miers).

† Petiole short usually less than $\frac{1}{2}$ in.

6. **B. augusta**, Kurz in Journ. As. Soc. 1873, pt. ii. 233; For. Fl. i. 498; leaves cuneate-obovate, flowers sessile, calyx-tube in the bud acutely 4-winged. Stravadium augustum, Wall. Cat. 3637. Doxomma angustatum, Miers in Trans. Linn. Soc. ser. ii. Bot. i. 105, excl. quotations of Jack and Helfer. D. magnificum, Miers l. c. 106.

MOULMEIN and TAVOY; Parish. AMHERST; Wallich. TENASSERIM; Kurz.

An evergreen tree 30–50 ft. Leaves 14 by 7 in., narrowed to the base, minutely serrulate or nearly entire, glabrous; petiole $\frac{1}{2}$ in. Raceme sometimes 3 ft., always elongate with a thick rachis, pendulous; bract to each flower $\frac{1}{2}$ in., ovate or lanceolate, caducous. Calyx total length $\frac{1}{2}$ in., minutely white-tomentose. Petals $\frac{3}{4}$ in., ovate, white (Parish). Fruit (half-ripe) 1 in., ellipsoid, somewhat obovoid, quadrangular, wings 4, narrow.

7. **B. Helferi**, C. B. Clarke; leaves linear-oblong, pedicels $\frac{1}{5}$ in., calyx-tube in the bud funnel-shaped. Doxomma angustatum, Miers in Trans. Linn. Soc. ser. ii. Bot. i. 105, partly.

TENASSERIM and ANDAMANS; Helfer (Kew Distrib. No. 2426).

Leaves 20 by 4 in., narrowed to the base, minutely serrulate or nearly entire, glabrous; petiole $\frac{1}{4}$ in. Raceme exceeding 1 ft., pendulous, glabrous or minutely puberulous. Calyx total length $\frac{1}{2}$ in., obscurely puberulous; tube in the bud terete or very obscurely quadrangular; whereas in *B. augusta* (to which Helfer's plant is referred by Miers) the wings are broad sinuous even in the bud.

†† Petiole long, usually more than $\frac{1}{2}$ in.

8. **B. pterocarpa**, Kurz in Journ. As. Soc. 1873, pt. 234; For. Fl. i. 498; leaves obovate-lanceolate petiole often 1 in., spike 20 in. pendulous, flowers sessile, calyx-tube in the bud 4-winged. [The syn. D. magnificum Miers, quoted by Kurz in Journ. As. Soc. 1877, pt. ii. 70, does not belong.]

PEGU and MARTABAN to TENASSERIM; Kurz No. 3021.

An evergreen tree, 30–50 ft. glabrous. Leaves 10 by 3½ in. (attain 16 in. ex Kurz), acute, attenuated at the base, minutely serrulate or nearly entire. Rachis of spike thick, glabrous or obscurely puberulous. Calyx total length $\frac{5}{8}$ in., tube obscurely puberulous, distinctly 4-winged in the bud but much less so than in *B. augusta*. Fruit (ex Kurz) 2 in. oblong, quadrangular, angles with narrow but thick wings, fibrous-fleshy.—This seems very near *B. augusta*, as Mr. Kurz states.

9. **B. macrostachya**, Kurz For. Fl. i. 498, including *B. pendula* Kurz l. c.; leaves lanceolate petiole 1–3 in., spike 20 in. pendulous, flowers sessile, calyx-tube in the bud quadrangular or nearly terete. *B. cylindrostachya*, Griff. Notul. iv. 655. *B. sarcostachys*, Miq. Fl. Ind. Bat. i. pt. i. 490. Stravadium acuminatum, Wall. Cat. 3636. Careya macrostachya, Jack in Mal. Misc. i. 47. *C. pendula*, Griff. Notul. iv. 661. Doxomma pendulum, cylindrostachya, acuminatum, sarcostachys and macrostachyum, Miers in Trans. Linn. Soc. ser. ii. Bot. i. 99, 100, 102, 104, t. 15, fig. 9–15.

MERGUI; Wallich, Griffith, Parish. MALACCA; Griffith, Maingay No. 763.—DISTRIB. Malaya to Borneo.

An evergreen glabrous tree 30-40 ft. *Leaves* 12 by $3\frac{1}{2}$ in., much narrowed at either end, minutely crenulate-dentate; petiole longer than in the other species and dilated at the base. *Spike* with thickened rachis, glabrous or scarcely puberulous; bracts subulate, small, caducous. *Calyx* total length $\frac{3}{4}$ -1 in., tube quadrangular, not winged in the bud. *Petals* high red, filaments white. *Fruit* $2\frac{1}{4}$ by $1\frac{1}{2}$ in., ellipsoid, equally tapering to each end, roundish but with 4 distinct ribs.—Kurz has reduced all the synonyms above except *Careya pendula* of Griffith, of which he appears to have possessed no example and which he supposed to differ by having the flowers pedicelled. But in Griffith's *Careya pendula* the flowers are sessile or subsessile, and it does not appear to differ in any way from *Barringtonia macrostachya*.

10. **B. rigida**, C. B. Clarke; leaves long-petioled lanceolate, spikes 2-3 in. rigid erect sub-tomentose. *Doxomma rigidum*, Miers in *Trans. Linn. Soc. ser. ii. Bot. i. 104*.

MALACCA; Maingay, No. 767.

Leaves 12 by $3\frac{1}{2}$ in., glabrous, acute at each end, entire or very nearly so; petiole $1\frac{1}{2}$ in., not dilated at the base. *Spikes* from axils not close to the end of the branches, rusty brown. *Fruits* $\frac{7}{8}$ by $\frac{1}{2}$ in., sessile, approximated, erect, with 4 obtuse angles, nearly equally wide their whole length, subtruncate at apex and base, fibrous.—This species is quite unlike all others of the section: the fruits are more like those of sect. *Stravadium*, but Miers has satisfied himself that they contain 3 abortive cells: flowers unknown.

10. CAREYA, Roxb.

Trees or very small shrubs. *Leaves* alternate, crowded towards the ends of the branches, membranous, slightly crenate-serrate, pinnate-nerved, not dotted, narrowed at the base, sessile or petioled. *Flowers* large, in racemes or interrupted spikes. *Calyx*-tube campanulate or funnel-shaped, hardly produced above the ovary; lobes 4, ovate, imbricate. *Petals* 4, imbricate. *Stamens* very many, in several series, slightly connate at the base; filaments filiform, innermost and outermost without anthers. *Ovary* inferior, 4-5-celled, crowned by an annular disc; style long, simple, stigma small; ovules very many on axile vertical placentas, in two rows in each cell. *Fruit* large, globose, fibrous, crowned with the calyx; dissepiment absorbed or obscure. *Seeds* numerous, lying in pulp, ellipsoid; albumen 0; embryo large, cotyledons obsolete.—**DISTRIB.** Species 3; confined to India.

1. **C. herbacea**, Roxb. *Cor. Pl. iii. 13, t. 217*; *Fl. Ind. ii. 638*; a small undershrub, leaves cuneate-oblong or obovate serrulate. *DC. Prodr. iii. 295*; *Wall. Cat. 3638*; *Wight Ic. t. 557*; *Brand. For. Fl. 237*; *Kurz For. Fl. i. 499*; *Miers in Trans. Linn. Soc. ser. ii. Bot. i. 96*.

Teraï of the HIMALAYA and KHASIA Mts., alt 0-1000 ft.; from KUMAON to CHITTAGONG; extending throughout dry jungles in the plain of Bengal; not rare: especially in sun-grass Teraï jungles annually burnt in the dry season.

Rootstock woody, perennial; herbaceous leafy flowering shoots 6-8 in. *Leaves* 7 by $2\frac{1}{4}$ in., obtuse, long attenuate at the base, glabrous or obscurely puberulous; petiole $0\frac{1}{2}$ in. *Flowers* 1-2 rarely several on each shoot, terminal; peduncles $\frac{1}{2}$ - $1\frac{1}{2}$ in. grey puberulo-pubescent; bracts 2, $\frac{1}{2}$ - $\frac{3}{4}$ in., linear, at the base of the calyx; flower subarticulated within the bracts. *Calyx* total length $\frac{3}{4}$ in.; tube campanulate, terete; lobes ovate, obtuse. *Petals* 1- $1\frac{1}{4}$ in., greenish-purple, elliptic. *Fruit* 1- $1\frac{1}{2}$ in. diam., globose, crowned by the persistent calyx and often by the style.—*Careya herbacea*, Griff. *Notul. iv. 660* is a confused description only partly referring to the present plant; perhaps mixed in the editing, as Miers suggests.

2. **C. arborea**, *Roxb. Cor. Pl.* iii. 14, t. 218; *Fl. Ind.* ii. 638; a tree, leaves obovate or oblong, spikes about 3-flowered, petals obtuse. *DC. Prodr.* iii. 295; *Wall. Cat.* 3640; *W. & A. Prodr.* 334; *Wight. Ill.* 99, 100; *Dalz. & Gibs. Bomb. Fl.* 95; *Bedd. Fl. Sylv.* t. 205; *Brand. For. Fl.* 236; *Kurz For. Fl.* i. 499; *Miers in Trans. Linn. Soc. ser. ii. Bot.* i. 97.—*Rheede Hort. Mal.* iii. 38.

Throughout INDIA, alt. 0–4000 ft.; from the Himalaya to Travancore and Tenasserim: no example from Ceylon.

Attaining 30–60 ft. *Leaves* 12 by 6 in., oblong or orbicular, obtuse or shortly acuminate, narrowed at the base, crenate-denticulate, glabrous; petiole 0–1 in. *Spikes* 3–8 in.; flowers usually few, sessile; bracts 3, unequal. *Calyx* total length $\frac{3}{4}$ –1 in., terete, campanulate, obscurely pubescent; lobes ovate, obtuse. *Petals* $1\frac{1}{2}$ in., white, elliptic. *Filaments* red. *Ovules* in two rows in each cell of the ovary (*Kurz*). *Fruit* $2\frac{1}{2}$ by 2 in., globose, surmounted by an enlarged mouth having a depressed pit at the vertex within the calyx-teeth. *Seeds* $\frac{3}{8}$ – $\frac{1}{2}$ in., ellipsoid.—Dissepiments of the fruit permanent, at least sometimes. *C. orbiculata*, *Miers l. c.* i. 98 t. 16, fig. 6–8 (founded on Griffith's example Kew Distrib. No. 2428 collected at Mergui) has the ovary slightly verrucose, apparently from the attack of some insect.

3. **C. sphaerica**, *Roxb. Fl. Ind.* ii. 636; a tree, leaves obovate or orbicular, spikes many-flowered, petals acute white. *Wall. Cat.* 3639; *Wight Ic.* t. 147, 556; *Kurz For. Fl.* i. 500; *Miers in Trans. Linn. Soc. ser. ii. Bot.* i. 97, t. 16, fig. 9–15.

Mountains of CHITTAGONG, *Roxburgh*.

This is very doubtfully separable from the preceding species: *Roxburgh* says that in each cell of the ovary the ovules are in six rows (not in two as in *C. arborea*). Mr. *Kurz* does not appear to have seen the tree, and closely follows *Roxburgh*. Neither Col. *Beddome* nor C. B. *Clarke* have ever distinguished *C. sphaerica* alive. Mr. *Miers* has set aside in the herbarium (as *C. sphaerica*) examples collected as *C. arborea* by *Wallich*, *Rottler*, *Ritchie* and J. D. H., so that none of these could have distinguished the tree in the field.

11. **PLANCHONIA**, *Blume*.

Trees. *Leaves* alternate, crowded towards the ends of the branches, membranous, crenulate, pinnate-nerved, without dots. *Racemes* short, terminal; flowers greenish-yellow or white. *Calyx-tube* turbinate, scarcely produced above the ovary; lobes 4, imbricate. *Petals* 4, imbricate. *Stamens* very many, in several series, slightly connate at the base, innermost without anthers. *Ovary* inferior, 3–4-celled, crowned by an annular disc; style long, simple, stigma small; ovules many in each cell. *Fruit* (ex *Miers* and *Kurz*) large, 3–1-celled, fibrous, ovoid, crowned by the calyx. *Seeds* several, ellipsoid, lying in pulp; albumen 0; embryo horseshoe-shaped, cotyledons short.—DISTRIB. Species 2, extending from the Andamans to Australia.

1. **P. littoralis**, *Van Houtte in Fl. des Serres* vii. 25; glabrous, leaves obovate-oblong, flowers greenish on very short thick pedicels. *Miers in Trans. Linn. Soc. ser. ii. Bot.* i. 94; *Kurz For. Fl.* i. 500. *P. littoralis*, *Miers l. c.* *Pirigarda valida*, *Blume Bijdr.* 1096. *Gustavia valida*, *DC. Prodr.* iii. 290; *Hassk. in Flora*, 1844, 595.

ANDAMANS, in the evergreen coast-forests; *Kurz*.

An evergreen tree 40–60 ft. *Leaves* 7 by $3\frac{1}{2}$ in., obtuse or scarcely acute, much narrowed at the base, denticulate; petiole $\frac{1}{8}$ – $\frac{1}{2}$ in. *Raceme* short, terminal; flowers middle-sized. *Calyx-tube* $\frac{1}{4}$ in., top-shaped, obsoletely 8-angled; segments $\frac{1}{2}$ in., ovate, rounded. *Petals* 1 in., obtuse, reflexed. *Filaments* $1\frac{1}{2}$ in., purple.—(Description chiefly copied from *Kurz*).

DOUBTFUL GENUS.

Leucymmaea, Presl. *Epimel Bot.* 211, a genus supposed by Kurz to come next *Planchonia*, has opposite leaves and branches, and is probably stipulate (from Presl's description): at all events it cannot be allied to *Planchonia*.

ORDER LX. MELASTOMACEÆ. (By C. B. Clarke.)

Herbs or shrubs, more rarely trees, sometimes climbers. *Leaves* opposite or rarely whorled, generally petioled, entire or nearly so, often palmately 3-5-7-nerved from near the base to the apex (usually pinnate-veined in *Memecylon*); stipules 0. *Flowers* spiked panicled or corymbed, rarely solitary or clustered, regular, hermaphrodite. *Calyx-tube* united by vertical walls to the ovary, rarely nearly free; limb usually 4-5- (sometimes 3- or 6-) lobed, sometimes truncate, rarely falling off in a cap. *Petals* as many as the calyx-lobes, contorted in the bud, on the margin of the calyx-limb. *Stamens* as many or more than (frequently twice as many as) the petals, inserted with them; alternate stamens often shorter sometimes rudimentary, filaments bent inwards in the bud; anthers opening at the summit by one or two pores, rarely by slits down the face; connective often appendaged near the base by bristles tubercles or a spur. *Ovary* 4-5- (rarely 3- or 6-) celled (in *Memecylon* 1-celled); style simple, filiform, rarely short; ovules very many (except in *Memecylon*); placentas in the *Melastomeæ* axile, in the *Astro-niææ* parietal, in *Memecylon* free central. *Fruit* included in the calyx-tube, capsular or berried, breaking up irregularly or by slits through the top of its cells. *Seeds* minute, very many (in *Memecylon* one only); albumen 0; cotyledons short (or in some of the *Memecyleæ* long thin convolute).—DISTRIB. Species 1800, tropical with a few subtropical; very many in America, many in south-east Asia, a few in Africa and Polynesia.

SUBORDER I. **Melastomeæ.** *Ovary* 3-6- (usually 4-5-) celled. *Ovules* very many, on placentas radiating from the axis. *Seeds* very many. *Anthers* opening by a single terminal pore (rarely by 2).

TRIBE I. **Osbeckiæ.** *Seeds* curved through half a circle, minutely punctate.

Stamens all alike. Fruit capsular	1. OSBECKIA.
Stamens all nearly alike. Fruit a berry	2. OTANTHERA.
Stamens very unequal	3. MELASTOMA.

TRIBE II. **Oxysporeæ.** *Seeds* straight, oblong or cuneate, raphe often excurrent. *Ovary* with the vertex usually free conical. *Petals* more than 3. *Inflorescence* not scorpioid. *Fruit* capsular.

* *Inflorescence* terminal (see also *Ochthocharis*).

Panicles broad showy.	4. OXYSPORA.
Large climber. Flowers umbellate	5. KENDRICKIA.
Panicles narrow. Flowers minute	6. ALLOMORPHIA.

** *Inflorescence* axillary, stamens equal, flowers minute.

Stamens 4	7. BLASTUS.
Stamens 10	8. OCHTHOCHARIS.
Stamens 8	9. ANERINCLEISTUS.

TRIBE III. **Sonerileæ.** *Seeds* straight, oblong or cuneate, often angular, raphe sometimes excurrent. *Ovary* flattened or depressed at the vertex. *Fruit* capsular.

- Petals 3. Inflorescence scorpioid 10. SONERILA.
 Petals 4. Flowers nearly sessile 11. SARCOPYRAMIS.
 Petals 4. Flowers in a long-peduncled head. 12. PHYLLAGATHIS.

TRIBE IV. **Medinilleæ.** *Seeds* straight, cuneate or obovate, often angular. *Connective* often appendaged near the base. *Fruit* baccate.

* *Longer stamens having two long bristles attached to the base of the connective in front.*

- Cymes lateral 13. MARUMIA.
 Panicles terminal 14. DISSOCHÆTA.

** *Longer stamens having the connective at base variously appendaged but not with two long bristles in front.*

- Four vertical plates on the ovary 15. ANPLECTRUM.

*** *Stamens equal or nearly so.*

- Connective at base without bristles behind 16. MEDINILLA.
 Connective at base with bristles behind 17. POGONANTHERA.

SUBORDER II. **Astronieæ.** *Ovary* 4-5-celled; ovules very many on parietal nearly basal placentas. *Seeds* very many. *Anthers* short opening by slits. *Fruit* baccate.

- Calyx-tube smooth. Panicles terminal 18. ASTRONIA.
 Calyx-tube verrucose. Cymes small 19. PTERNANDRA.
 Calyx-tube with scales. Flowers solitary or clustered . . . 20. KIBESSIA.

SUBORDER III. **Memecyleæ.** *Ovary* 1-celled; ovules about 9 on a basal short free central placenta. *Stamens* equal; anthers short, opening by pores or short slits. *Berry* 1-seeded.—*Leaves* usually pinnate-nerved.

- Stamens 8 21. MEMECYLON.

1. OSBECKIA, Linn.

Herbs or shrubs, mostly erect and setose; branches commonly tetragonous. *Leaves* opposite or sometimes ternate, entire, subcoriaceous, 3-7-nerved. *Flowers* terminal, solitary capitate or paniced, purple mauve or white, often bracteate. *Calyx-tube* ovoid, carrying stellate hairs or pectinate scales; limb 5- or 4-fid, usually stellately hairy (in *O. aspera* and *O. Rheedii* with simple hairs). *Petals* 5-4. *Stamens* 10 or 8, equal or subequal; anthers oblong, truncate attenuate or beaked; connective not produced at the base, slightly swollen or with two tubercles. *Ovary* inferior, 4-5-celled, more or less adherent to the calyx, setose at the apex; style long, simple; ovules very numerous on placentas radiating from the axis. *Capsule* opening by 4-5 pores in its free vertex. *Seeds* very many, curved through half a circle, covered with minute elevated points.—**DISTRIB.** An eminently Indian genus; 29 out of the 32 species being found in India, two in Malaya, one in Australia; and one Indian species extending also to China and North Australia.

[With regard to the following generally accepted sections of *Osbeckia* founded primarily on the 4-fid or 5-fid flowers it should be premised that several *Osbeckias* which have the flowers normally 4-fid carry also a few 5-fid flowers on the same plant; and that sometimes a strong plant may produce all or nearly all the flowers 5-fid. This occurs eminently in *O. crinita* and in *O. cupularis*.]

SECT. I. **Amblyanthera**. *Perianth* normally 4-merous. *Anthems* not beaked. *Herbs* or small shrubs.

1. ***O. truncata***, *Don ms.*; *W. & A. Prodr.* 322; hairs on the stem patent, flowers capitate often with two or four leaves close under the head, bristles on the apex of the ovary 16–20, fruit $\frac{1}{3}$ – $\frac{1}{5}$ in. broad 8-ribbed ovoid-oblong. *Wight Ic.* t. 375; *Triana in Trans. Linn. Soc.* xxviii. 53. *O. muralis*, *Naud. in Ann. Sc. Nat. Ser.* 3. xiv. 56. *O. Leschenaultiana*, *Dalz. & Gibs. Bomb. Fl.* 92. *O. zeylanica*, *Steud. in Herb. Hohenack.* No. 577.

Throughout the DECCAN PENINSULA, alt. 0–4000 ft.; extending plentifully to CHOTA NAGPORE. EAST BENGAL, Mudhopoor; *C. B. Clarke*.

Stems 4–16 in., annual, 4-angled. *Leaves* 1 in., elliptic, subacute, 3-nerved, hairy on both surfaces, drying yellow; petiole $\frac{1}{12}$ in. *Bracts* ovate or oblong, glabrous on their backs. *Calyx-tube* and teeth with stalked stellate hairs; teeth erect, subsistent. *Petals* less than $\frac{1}{4}$ in., purple. *Capsule* occasionally 5-celled.

VAR. Kurzii; plant scarcely 2 in. with very small leaves and flowers, capsule ovoid ribs altogether obscure.—Parasnath Summit, Behar, alt. 4200 ft.; *Kurz*.

2. ***O. cupularis***, *Don ms.*; *W. & A. Prodr.* 323; flowers subcapitate often with two or four leaves close under the head sometimes more lax, bristles on the apex of the ovary very numerous, fruit rarely less than $\frac{1}{4}$ in. broad obscurely many-ribbed ovoid. *Naud. in Ann. Sc. Nat. ser.* 3. xiv. 61; *Triana in Trans. Linn. Soc.* xxviii. 55. *O. brachystemon*, *Naud. l. c.* 57 and xiii. t. 7, f. 1; *Triana l. c.* 63. *O. truncata*, *Arn. in Hook. Comp. Bot. Mag.* ii. 308; *Naud. l. c.* 57. *O. confertiflora*, *Naud. l. c.* 59. *O. Leschenaultiana*, *Wight Ic.* t. 996; *Thwaites Enum.* 104 partly; not of DC. *O. Wightiana*, *Benth. in Wall. Cat.* 4074 (not in *Wall. Cat.* 4060).

Mountains of the southern part of the DECCAN PENINSULA and of CEYLON; *Wight* No. 1148 and 1095 (and No. 1093 with 4-fid and 5-fid flowers). Mysore; *Lobb.* Bababoodun Hills; *Law.* Nilghiris; *Hohenacker* No. 963 (named *O. Leschenaultiana*). (MERGUI? *Herb. Griffith*). Ceylon; *Gardner*.

Annual and biennial, drying yellow. *Stems* 8–20 in., tetraginous, glaucous upwards, with simple ascending often closely-adpressed hairs. *Leaves* 1–2 in., elliptic, subacute, 3- (or sub- 5-) nerved, hairy on both surfaces; petiole $\frac{1}{3}$ – $\frac{1}{4}$ in. *Bracts* ovate or oblong, glabrous on their backs. *Calyx-tube* and teeth with stalked stellate hairs; teeth patent subsistent. *Petals* $\frac{3}{8}$ – $\frac{3}{4}$ in., dark-purple or nearly white.

VAR. erythrocephala, *Naud. in Ann. Sc. Nat. ser.* 3. xiv. 58. *O. Leschenaultiana*, *Thwaites Enum.* 104.—Ceylon, alt. 6000 ft.; *Thwaites* No. 1576 and 284, *Gardner, Walker*.—Turns black in drying; stem below with deflexed hairs; stellate hairs about the inflorescence a rufous-brown; fruit sometimes large somewhat glaucous and slightly produced at the vertex; flowers in this variety seem always 4-fid.—*Triana* distinguishes (under the name *O. cupularis*) *Wight's* No. 1093 which has sometimes 5-fid flowers, the stamens 8, 9 or 10, from *Wight's* No. 1148 which he takes as *O. brachystemon*: but the two seem identical. Mr. *Thwaites* makes but one species here. *Triana* arranges the main sections of *Osbeckia* according as the flowers are 4-fid or 5-fid; he thus places *O. cupularis* in the 5-fid section at a great distance from *O. brachystemon*; then he says (under the head of *O. Leschenaultiana*) that *O. cupularis* has 4-fid flowers. *O. Leschenaultiana* is the name generally found in herbaria for this variable species, but *Triana* is right in saying that DC. meant by *O. Leschenaultiana* a very different plant.

3. **O. parvifolia**, Arn. in *Hook. Comp. Bot. Mag.* ii. 308; stems glabrous or with scattered small hairs, flowers few pedicelled with lanceolate bracts $\frac{1}{2}$ – $\frac{1}{4}$ in. but not with large floral leaves, fruit $\frac{1}{2}$ in. broad ovoid obscurely ribbed. *Naud. in Ann. Sc. Nat. ser.* 3. xiv. 58; *Triana in Trans. Linn. Soc.* xxviii. 53. *O. Leschenaultiana*, *Thwaites Enum.* p. 104, partly. *O. zeylanica*, *Bot. Reg. t.* 565.

CEYLON, *Walker No.* 332.

Small, woody, procumbent, with the habit of Thyme. *Leaves* $\frac{1}{4}$ – $\frac{3}{8}$ in., ovate-subacute, nearly sessile, shortly setose on both surfaces, drying black. *Calyx-tube* and teeth with stalked stellate rufous hairs; teeth suberect, subpersistent.—Mr. Thwaites treats this also as a var. of *O. cupularis*, and it has all the appearance of being an alpine form of that plant.

4. **O. Rheedii**, *Thwaites Enum.* p. 104; stiffly shrubby, scabrous, leaves rigid 3-nerved harshly scabrous on both surfaces or glabrous above, flowers 1–4 clustered, calyx-tube with adpressed simple hairs, teeth long-lanceolate with erect simple hairs.

CEYLON; *Wight, Walker, Thwaites.*

Small, woody, much branched. *Leaves* 1 in., elliptic or oblong, narrowed at both ends; petiole $\frac{1}{2}$ in. *Petals* $\frac{2}{5}$ in., pale purple. *Fruit* $\frac{1}{5}$ – $\frac{1}{4}$ in. broad, ovoid, truncate.—Mr. Thwaites states the flowers 4-fid, as they are in all the Kew examples; Triana puts the species in his section *Asterostoma* with 5-fid flowers without explanation. The plant differs from *Asterostoma* in the smaller flowers and (what is of more importance) in the anthers which are truncate at top and altogether those of section *Amblyanthera*.

SECT. II. **Genuinæ**. Flowers normally 4-fid, not large. *Calyx* campanulate, not produced or produced into a short neck in the fruit. *Anthers* beaked.

5. **O. chinensis**, *Linn.*; *Roxb. Fl. Ind.* ii. 224; leaves broadly oblong or linear suddenly narrowed at the base, flowers capitate, fruiting calyx-tube with few (or none) adpressed pectinate scales soon smooth shining. *Lour. Fl. Cochinch.* 228; *DC. Prodr.* iii. 141; *Bot. Mag.* t. 4026; *Triana in Trans. Linn. Soc.* xxviii. 53. *O. angustifolia*, *Don Prodr.* 221; *DC. Prodr.* iii. 142; *Wall. Cat.* 4067; *Pl. As. Rar.* t. 251; *Naud. in Ann. Sc. Nat. ser.* 3. xiv. 69. *O. japonica*, *Naud. l. c.* 70. *O. glabrata*, *Wall. Cat.* 4071. *O. myrtifolia*, *Blume Mus. Bot.* i. 51. *O. linearis*, *Blume Mus. Bot.* i. 51, with fig.; *Wall. Cat.* 4969, partly; *Miq. Fl. Ind. Bat.* i. pt. i. 519; *Naud. l. c.* 70 and xiii. t. 7, fig. 4. *O. zeylanica*, *Naud. l. c.* 71. *O. decora*, *Wall. Cat.* 4070. *Tristemma angustifolium*, *Blume Bijl.* 1079; *DC. Prodr.* iii. 144.

HIMALAYA TERAI FROM KUMAON TO BHOTAN, up to 4000 ft. alt. Abundant in NORTH AND EAST BENGAL including ASSAM and KHASIA and thence to SINGAPORE. Also in CHOTA NAGPORE, alt 2000–4000 ft.—DISTRIB. Through China and Malaya to Japan and North Australia.

Stems 2 ft., branches descending, tetragonous, with adpressed hairs. *Leaves* commonly 2 in., narrow-oblong, sometimes 6 in., long-linear, in the Parasnath variety elliptic-oblong from a subcordate base, acute, 3–5-nerved, hairy on both surfaces; petiole less than $\frac{1}{2}$ in. *Bracts* ovate, on the back glabrous or with a few scattered hairs. *Calyx-teeth* lanceolate, glabrous, not keeled on the back, ciliate on the margin; hairs at their tips not spreading stellate. *Petals* $\frac{1}{2}$ in., mauve. *Anthers* with a beak about half their own length. Bristles on the apex of the ovary about 16. *Fruit* $\frac{1}{2}$ in. wide (or much larger in the Parasnath variety), ovoid, with a short neck, often glabrous, sometimes with few or several bristles, calyx-limb never persistent; in the Pegu examples the neck is much prolonged widened at the top.—The figure *Bot. Mag.* t. 4026 rejected by Bentham and Triana, admitted by Naudin, is the true plant: the anther is drawn too long-beaked for *O. octandra* to which Triana refers it, and the accompanying text states the anthers to be “longish beaked”; also the plant is stated to

have been imported from China where *O. chinensis* is common, *O. octandra* unknown. Triana appears to have rejected the figure because it shows 5 petals; the accompanying text states the calyx to be 4-5-fid. Now there are several instances of normally 4-fid *Osbeckias* having some or many 5-fid flowers; but there is no recorded instance of a normally 5-fid *Osbeckia* producing 4-fid flowers. The *Bot. Reg. t. 542* is an inferior figure, but from similar reasoning is probably *O. chinensis* also.

6. *O. capitata*, Benth. in Wall. Cat. 4072; leaves ovate acute from a broad or cordate base subsessile, flowers capitate, calyx-segments lanceolate rounded on the back ciliate. Naud. in Ann. Sc. Nat. ser. 3. xiv. 68; Triana in Trans. Linn. Soc. xxviii. 53. *O. glauca*, Naud. l. c. *Osbeckioidea*, Griff. Ic. 639.

EAST BHOTAN, Tassangsee, alt. 4500 ft.; ex Griffith Journ. KHASIA Mts., alt. 4000-5000 ft.; plentiful.

A perennial herb 8-20 in., branched from the base; branches tetragonous, with adpressed bristles. Leaves 1 in., hairy on both surfaces, 3-9-nerved, nerves deeply sunk on the upper surface in the dried specimens. Bracts ovate, acute, hairy on the back. Calyx-tube sometimes densely covered with clustered bristles, often with pectinate bristle-bearing scales at the apex only, sometimes even when young altogether glabrous. Petals $\frac{1}{2}$ in., mauve. Anthers with a beak more than half their own length. Bristles on the apex of the ovary about 16. Fruit ovoid, $\frac{1}{2}$ in. wide, often glabrous, sometimes more or less bristle-bearing; neck short, calyx-limb never persistent.

7. *O. zeylanica*, Willd. Sp. Pl. ii. 300; leaves oblong or elliptic narrowed at both ends, petiole $0\frac{1}{4}$ in., flowers capitate, calyx-tube with spreading stellately hairy scales persistent on the fruit. Pluk. t. 173, f. 4; Roxb. Fl. Ind. ii. 223; Wall. Cat. 4069; W. & A. Prodr. 322; Miq. Fl. Ind. Bat. i. pt. i. 519; Thwaites Enum. p. 104; Triana in Trans. Linn. Soc. xxviii. 53. *O. serialis*, Naud. in Ann. Sc. Nat. ser. 3. xiv. 67. *O. debilis*, Naud. l. c. 65.

TROPICAL DECCAN PENINSULA, Wight No. 1143; Bababoodun Hills, Malabar; Law. CEYLON; Thwaites.

Erect, annual, 3-15 in.; branches ascending, tetragonous, with adpressed bristles or nearly glabrous. Leaves $\frac{3}{4}$ - $1\frac{1}{4}$ in., hairy on both surfaces. Bracts very narrow. Calyx-segments keeled on their backs, often setose, ciliate on the margin, with stellate prominently-spreading bristles at their tips. Petals $\frac{3}{8}$ in., purple-mauve. Anthers with a beak more than half their own length. Bristles on the apex of the ovary about 16. Fruit $\frac{1}{2}$ - $\frac{1}{5}$ in. broad, ovoid-oblong, calyx-limb deciduous.

VAR. *Helperi*; neck of fruit more produced upwards with 8 ribs, pectinate scales on the lower half of the fruit placed in three whorls encircling it horizontally.—Tennasserim and Andamans, Helfer. Wallich, No. 4069 partly.—*O. zeylanica* is united with *O. chinensis* Linn. by Kurz in Journ. As. Soc. 1877, pt. ii. 74

SECT. III. **Ceramicalyx.** Shrubs or stout herbs. Perianth normally 4-merous. Calyx campanulate produced in fruit into a long or short neck or altogether truncate. Anthers large, produced into a very long beak.

8. *O. hispidissima*, Wight Ic. t. 1612; stems with reflexed strong bristles $\frac{1}{8}$ - $\frac{3}{8}$ in., bracts to the pedicels round many extra ones without pedicels, calyx-segments oblong obtuse glabrous on the back strongly ciliate. Triana in Trans. Linn. Soc. xxviii. 53.

MYSORE; Wostara, Cleghorn. DECCAN PENINSULA; Munda Rani, Wight No. 1100.

Suffrutescent, erect; branches stout, tetragonal. Leaves 4-6 in., lanceolate, narrowed at both ends, with strong bristles scattered on both surfaces or in one specimen nearly glabrous, nerves 3 strong and 2-4 faint; petiole $\frac{1}{2}$ - $\frac{5}{8}$ in. Corymbs about 5-flowered; flowers dark crimson (Wight). Calyx-tube with scattered penicillate

bristle-bearing scales. *Anthers* with a beak much longer than half their length, with two tubercles at the base. Bristles on the apex of the *ovary* more than 50. *Fruit* $\frac{1}{4}$ – $\frac{1}{3}$ in. broad, urn-shaped, entirely without neck; scales permanent, calyx-segments deciduous.

9. *O. stellata*,¹ *Wall. Cat.* 4062; branches with short adpressed rigid hairs, calyx-tube most densely covered with stellate white yellow or brown hairs, teeth stellate hairy, neck of the fruit short or not exceeding half the length of the fruiting ovary dilated at the top. *DC. Prodr.* 142 as to var. a.; *Bot. Reg. t.* 674; *Hook. Exot. Fl. i. t.* 37; *Don Prodr.* 221, partly. *O. crinita*, *Naud. in Ann. Sc. Nat. ser. 3. xiv.* 72; *Smith in Wall. Cat.* 4062; *Kurz in Journ. As. Soc.* 1877, pt. ii. 75. *Melastoma crinita*, *Roxb. Fl. Ind.* ii. 402.

HIMALAYA TERAI from KUMAON to BHOTAN, common; ascending the hills to 5000 ft. alt. CHITTAGONG; *Roxburgh*.—DISTRIB. Canton.

Shrub 4–6 ft.; branches tetragonal. *Leaves* 3 in., lanceolate, 5-nerved, with short hairs on both surfaces or in hot moist valleys glabrous, narrowed or subcordate at the base; petiole $\frac{3}{8}$ in. *Flowers* large, rose-purple, clustered or in somewhat close corymbs; bracts ovate, acute, not very hairy on the back. *Calyx-tube* so densely clothed with hairs as to have a woolly appearance and texture. Bristles on the apex of the *ovary* about 20. *Fruit* $\frac{3}{4}$ by $\frac{1}{2}$ in. including the short neck, ovoid-oblong, densely woolly.—*Don's* description of *O. stellata* says the flowers are 4–5-fid; as 5-fid flowers are not known in our *O. stellata* but are frequent in our *O. crinita*, *Don* probably included under one name both our species. *Naudin's* descriptions of *O. stellata* and *O. crinita* only differ in assigning the long-necked fruit to *O. stellata*; therefore *Naudin's O. stellata* is our *O. crinita*. As *Triana* gives no descriptions or remarks, but quotes both *Wall. Cat.* 4062 and *Naudin's O. stellata* as one species, it cannot be guessed which of the two forms *Triana* took as *O. stellata*. The real distinction between *O. crinita* and *O. stellata* lies in the extreme thick woolliness of the covering of the calyx-tube in our *O. stellata*: consequently Sir J. Smith has written on the original *Wall. Cat.* 4062 (type spec.) "*Osbeckia? nov. sp. (crinita)*." Sir W. J. Hooker states (*Exot. Fl. i. c.*) that he changed the name from *O. crinita* to *O. stellata* and got *Don* to accept the name *O. stellata*. Subsequently Mr. Bentham gave the name *O. crinita* to the next species which has a less hairy calyx.

10. *O. crinita*, *Benth. in Wall. Cat.* 4066; branches with spreading hairs, calyx-tube with many stellate rufous-brown hairs teeth stellate hairy, neck of the fruit (in *Wall. Cat.* 4066 typical example not quite ripe) equalling or exceeding the fruiting ovary much longer than its own breadth. *O. stellata*, *Don Prodr.* 221, partly. *O. stellata* var. β , *DC. Prodr.* iii. 142. *O. stellata*, *Naud. in Ann. Sc. Nat. ser. 3. xiv.* 72.

SIKKIM and BHOTAN, alt. 4000–8500 ft., abundant. KHASIA Mts., alt. 3000–6000 ft. MOULMEIN, alt. 7000 ft.; *Parish*.

Shrub 4–8 ft., much branched. *Leaves* 2–4 in., lanceolate or elliptic-lanceolate, bristly on both surfaces, narrowed or subcordate at the base; petiole $\frac{1}{8}$ – $\frac{3}{8}$ in. *Flowers* large (generally smaller than those of *O. stellata*), 4-fid and not infrequently 5-fid, purple or pure white, in somewhat close corymbs; bracts ovate, acute, usually very hairy on the back. Bristles on the apex of the *ovary* about 20. *Fruit* $\frac{3}{4}$ in. including the neck, ovoid, suddenly narrowed into the cylindric neck, often nearly glabrous.—The bushes of *O. crinita* at Darjeeling have usually a few 5-fid flowers at the summits of the branches: and there is a large-flowered white variety at 4000 ft. alt. which has all the flowers 5-fid. *O. speciosa*, *Herb. Hook. (not Don)* is a low-level form with spreading hairs on the stem but the stellate hairs of the calyx white or yellow not rufous.

11. *O. rostrata*, *Don Prodr.* 221; stem quadrangular glabrous or with scattered patent hairs, corymb compound large, fruit ovoid suddenly narrowed into a long cylindric neck. *DC. Prodr.* iii. 143; *Triana in Trans. Linn. Soc.* xxviii. 53; *Kurz in Journ. As. Soc.* 1877, pt. ii. 74. *O. ternifolia*, *Don Prodr.*

221; *DC. Prodr.* iii. 142; *Wall. Cat.* 4058. *O. pulchella*, *Wall. Cat.* 4059; *Naud. in Ann. Sc. Nat. ser. 3. xiv.* 73. *O. campestris*, *Wall. Cat.* 4063; *O. longicollis*, *Wall. Cat.* 4065. *Melastoma pulchella*, *Roxb. Fl. Ind.* ii. 403.—*Melastomaceæ*, *Griff. Ic.* 638.

In the swamps at the foot of the Himalaya, from NIPAL to BURMA; abundant in NORTH and EAST BENGAL including ASSAM at 500–1000 ft. alt.; and (ex J. D. H.) ascends the hills to 4000 ft. alt.

Erect, 4–8 ft., virgate, hardly divided except towards the corymb. *Leaves* 3–8 in., 5-nerved, often in whorls of three, broadly lanceolate, glabrous or with long hairs scattered on both surfaces; petiole $\frac{1}{2}$ – $\frac{1}{3}$ in. *Corymb* often with elongated branches; bracts ovate, glabrous or little hairy. *Calyx* when young glabrous or somewhat densely stellate hairy. *Petals* rose-purple. Bristles on the apex of the ovary 0 or about 20. *Fruit* $\frac{1}{2}$ in., generally glabrous finally, sometimes with scattered stellate hairs.—A species easily recognised by its habitat (Terai- or rice-swamps), its erect undivided stem and its rose-purple flowers. It varies greatly in hairiness.

VAR. 1. *pulchella*, Benth.; stem leaves calyx and apex of ovary absolutely glabrous.

VAR. 2. *longicollis*, Wall.; stem with hispid patent scattered bristles, leaves bristly-hairy on both surfaces, young calyx somewhat densely stellate-hairy, fruit with scattered stellate hairs.

VAR. 3. *O. marginulata*, Wall. Cat. 4064; stem and capsule with ascending hairs.—Burma.

SECT. IV. *A shrub. Perianth* large 4-merous. *Anthers* without beaks.

12. *O. gracilis*, *Bedd. in Trans. Linn. Soc.* xxv. 216; erect, slender, nearly glabrous, leaves $2\frac{1}{2}$ –3 in. narrow lanceolate 3-nerved bristle-hairy on both surfaces, petiole $\frac{1}{2}$ – $\frac{1}{3}$ in., peduncles with 2–3 large flowers, calyx-tube with a few remote bristles lobes ciliate ended by a bunch of bristles, anthers without beaks. (Resembling *O. longicollis* Wallich i.e. *O. rostrata* above).

DECCAN PENINSULA; Anamallay Mts.; alt. 4000 ft., Col. *Beddome*.

This species (only known from Col. *Beddome*'s description here copied) is referred by *Triana* (*Trans. Linn. Soc.* xxviii. 54) to his section *Ceramicalyx*, which has very long beaks to the anthers. Col. *Beddome*'s plant seems really nearer *O. octandra* DC. below.

SECT. V. *Asterostoma. Shrubs. Perianth* large 5-merous. *Anthers* attenuate upwards not beaked.

[The series of species following from No. 12 to No. 19 inclusive is quite unbroken: the flowers, anthers, fruit and hairs on the ovary are much the same in all. The species are separated by minute or trifling characters only; *Triana* makes more than the following eight, *Thwaites* less, out of the same material.]

13. *O. buxifolia*, *Arn. in Hook. Comp. Bot. Mag.* ii. 309; leaves $\frac{1}{2}$ in. subsessile ovate obtuse 3–5-nerved rufous woolly beneath nearly glabrous striolate above, calyx-teeth $\frac{1}{4}$ – $\frac{1}{3}$ in. long-lanceolate acute rufous-villous without. *Naud. in Ann. Sc. Nat. ser. 3. xiv.* 63; *Thwaites Enum.* p. 105; *Triana in Trans. Linn. Soc.* xxviii. 54.

CEYLON, alt. 6000–8000 ft.; *Walker, Gardner, Thwaites*.

Small, woody, branched; branches and innovations rufous shaggy. *Flowers* 1–3, clustered at the end of the branches. *Fruit* campanulate, truncate, rufous-hairy.

VAR. 1. *typica*; hairs on the calyx-tube with a long stem standing at right angles to the surface of the tube very stellate.

VAR. 2. *minor*, *Thwaites* No. 2618; hairs on the calyx-tube simple villous adpressed, flowers smaller than in the type.

14. **O. aspera**, Blume in *Flora*, 1831, p. 474; leaves oblong-lanceolate or elliptic-acute sparsely hairy on both surfaces or nearly glabrous beneath except on the nerves, calyx-tube strigose or sparingly clothed with pectinate bristle-bearing scales, segments $\frac{1}{5}$ in. ovate-oblong obtuse ciliate with a few clustered but scarcely stellate bristles on the top. *W. & A. Prodr.* 323 (excl. syn. *O. glauca* Benth.); *Wight Ic.* 377; *Thwaites Enum.* p. 105 (as to var. α . and β . only); *Naud. in Ann. Sc. Nat. ser. 3. xiv.* 74; *Triana in Trans. Linn. Soc.* xxviii. 54. *O. Kleinii*, Arn. in *Hook. Comp. Bot. Mag.* ii. 309; *Triana l. c.* *O. minor*, *Triana l. c.* 55. *Melastoma asperum*, Linn.; *DC. Prodr.* iii. 145 (omitting syn.).

DECCAN PENINSULA; *Wight*. CEYLON; at no great elevation, *Thwaites*.

A low shrub, woody below; branches often elongate, adpressedly scabrous. *Leaves* 1-2 in.; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in. *Corymbs* usually 3-6-flowered. *Calyx-lobes* much longer than broad. *Fruit* $\frac{1}{4}$ - $\frac{1}{3}$ in. broad, campanulate, truncate.—*Triana* founded his new sp. *O. minor* on Mr. Thwaites' No. 1569; and does not state in what particulars the species differs from *O. aspera*, *O. Kleinii* and *O. glauca*; but they must be very minute.

VAR. 1. *typica*; no stellate hairs on the calyx.

VAR. 2. *Kleinii*; several or very few stellate hairs on the calyx-tube, hairs at the summits of calyx-lobes clustered but hardly stellate.

15. **O. glauca**, Benth. in *Wall. Cat.* 4073; leaves elliptic narrowed or obtuse at either end softly hairy on both surfaces, calyx-tube with scattered small stellate hairs teeth $\frac{1}{12}$ in. obtuse glabrous on the back ciliate with one stellate hair at the summit. *Triana in Trans. Linn. Soc.* xxviii. 54. *O. aspera*, *Bot. Mag.* 5085.

TRINCOMALEE, TRAVANCORE, QUILON are the localities on the examples of *Wall. Cat.* 4073.

Small, woody, branching; branches adpressedly hairy, glaucous upwards. *Leaves* 1-1½ in.; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in. *Calyx-lobes* much broader than long. *Fruit* $\frac{1}{4}$ - $\frac{1}{2}$ in. broad, campanulate, truncate.—With larger flowers and more silky hairs than *O. aspera*.

16. **O. Walkeri**, Arn. in *Hook. Comp. Bot. Mag.* ii. 309; leaves elliptic narrowed at both ends margins not recurved hairy on both surfaces, calyx-tube adpressedly fulvous-hairy teeth narrowly lanceolate or linear uniformly fulvous-hairy without cilia or stellate hairs. *Thwaites Enum.* p. 105; *Triana in Trans. Linn. Soc.* xxviii. 54, excl. var. β . *Bechetii*.

CEYLON; alt. 6000-8000 ft.; *Walker, Gardner, Thwaites* No. 1571.

A small shrub; branches hispid. *Leaves* 1 in., 3-nerved; petiole $\frac{1}{2}$ in. *Flowers* 1-3, in terminal clusters. *Calyx-tube* with small clustered substellate hairs. *Fruit* $\frac{1}{8}$ - $\frac{3}{8}$ in. broad, campanulate, truncate.—This species is close to *O. burifolia*, Arn. from which it differs by the petioled leaves without recurved margins, and by the adpressed hairs on calyx-tube. But *Thwaites'* specimen No 2618 has leaves with recurved margins and adpressed hairs on the calyx-tube: and is called *O. burifolia* β . *minor* by *Thwaites*, *O. Walkeri* β . *Bechetii* by *Triana*.

17. **O. Wightiana**, Benth. in *Wall. Cat.* 4060; silkily hairy towards the ends of the branches, leaves 5-7-nerved softly hairy on both surfaces elliptic or oblong usually acute, flowers 1-5 clustered, calyx-tube densely covered with pectinate scales fringed by long bristles, teeth $\frac{1}{2}$ in. ovate-oblong obtuse covered with simple or somewhat clustered hairs. *W. & A. Prodr.* 323; *Wight Ic.* 998; *Naud. in Ann. Sc. Nat. ser. 3. xiv.* 63; *Triana in Trans. Linn. Soc.* xxviii. 54.

DECCAN PENINSULA, Southern Mountains. CEYLON, alt. 3000-5000 ft., *Thwaites* (No. 1570 var. δ).

A branched shrub. *Leaves* $1\frac{1}{2}$ – $3\frac{1}{2}$ in.; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in. *Fruit* $\frac{1}{3}$ in. wide, campanulate, truncate.—United by Mr. Thwaites with *O. aspera* above, from which it differs by the more pectinate-scaly calyx, and hardly by any other character.

18. ***O. Leschenaultiana***, DC. *Prodr.* iii. 142; flowers 1–5 clustered with much rufous hair, leaves subsessile ovate obtuse or elliptic acute usually somewhat rounded at the base, calyx-tube densely clothed with stalked stellate rufous hairs teeth $\frac{1}{4}$ in. oblong obtuse with clustered bristles. *Triana in Trans. Linn. Soc.* xxviii. 54. *O. Gardneriana*, *Wight Ic.* 997.

NILGHIRI Mts., alt. 6000–8000 ft., frequent.

A branched shrub; stem usually patently hairy. *Leaves* 1– $1\frac{1}{2}$ in., 3–5-nerved, hairy on both surfaces. *Fruit* $\frac{1}{3}$ in. wide, campanulate, truncate.

19. ***O. rubicunda***, Arn. in *Hook. Comp. Bot. Mag.* ii. 309; branches scabrous-pilose, leaves elliptic or elliptic-oblong acute 5-nerved hairy on both surfaces petiole $\frac{1}{8}$ – $\frac{1}{4}$ in., flowers 1–5 clustered, calyx-tube densely covered with stalked stellate hairs teeth lanceolate acute covered with simple and clustered bristles. *Naud. in Ann. Sc. Nat. ser. 3.* xiv. 62; *Triana in Trans. Linn. Soc.* xxviii. 54.

CEYLON: *Wight, Walker, Gardner.*

A branched shrub. *Leaves* 1–2 in., usually rounded at the base. *Calyx-teeth* $\frac{1}{4}$ in. *Fruit* $\frac{1}{3}$ in. wide, campanulate, truncate.—Triana reduces here *O. elliptica*, Naud. l. c.: but Naudin says his *O. elliptica* has short triangular calyx-teeth: while *O. rubicunda* only exists as a species upon its lanceolate acute calyx-teeth. Thwaites is probably right in referring *O. elliptica* Naud. to *O. cupularis* var. *erythrocephala* above.

20. ***O. reticulata***, Bedd. in *Trans. Linn. Soc.* xxv. 216; branches densely clothed with adpressed hairs, leaves ovate acute petioled densely hairy on both surfaces and also alveolate-reticulate beneath, flowers 1–3 clustered, calyx-tube with large densely clustered bunches of hairs teeth short oblong-obtuse densely ciliate scabrous and with a large terminal substellate hair. *O. alveolata*, Bedd. *Ic.* t. 168.

DECCAN PENINSULA; Anamallay Mts., above 6000 ft. alt.; *Col. Beddome.*

A branched shrub. *Leaves* 1–4 in., round or subcordate at the base, 5–9-nerved; petiole $\frac{1}{2}$ –1 in. *Fruit* $\frac{1}{3}$ in. broad, campanulate, truncate.

21. ***O. Moonii***, *Thwaites Enum.* p. 105; procumbent, rooting from the nodes, peduncles 1-flowered, calyx-teeth long-lanceolate acute with stellate hairs. *Triana in Trans. Linn. Soc.* xxviii. 55.

CEYLON; Colombo and Saffragam District; somewhat rare, *Thwaites.*

Stems elongate, roundish, with scattered lax hairs. *Leaves* 1–3 in., broad-elliptic, acute, 5-nerved, hairy on both surfaces; petiole $\frac{1}{8}$ – $\frac{3}{4}$ in. Peduncles $\frac{1}{2}$ – $1\frac{1}{2}$ in., solitary or few and subumbelled, carrying small round or ovate bracts. *Calyx-tube* densely clothed with stalked stellate hairs standing at right angles to the surface. *Fruit* less than $\frac{1}{4}$ in. broad, campanulate or somewhat ovoid, truncate.

22. ***O. aspericaulis***, *Hook. f. ms.*; *Triana in Trans. Linn. Soc.* xxviii. 55; stem erect simple scabrous with short hairs ending in a robust much-branched corymb, leaves 6 in. petiole $1\frac{1}{4}$ in., fruit ovoid truncate distinctly 10-angled.

TENASSERIM or ANDAMANS, *Helper* No. 2244.

Leaves elliptic-lanceolate, rounded at the base, 5–9-nerved, hairy on both surfaces. *Bracts* lanceolate, caducous. *Calyx-tube* with scattered adpressed simple

hairs and a few compound hairs near the top, teeth long-lanceolate with simple hairs on the back. Ovary crowned with many long bristles. Petals $\frac{3}{4}$ in. Fruit $\frac{1}{2}$ in.

23. **O. octandra**, DC. Prodr. iii. 142 ex Triana; branches and branchlets woody, leaves oblong to lanceolate short-petioled 3-nerved sparingly scabrous or quite smooth on the upper surface, flowers scattered or 2-5 shortly pedicelled, calyx-teeth ovate-oblong, fruit scarcely $\frac{1}{5}$ in. broad obscurely ribbed or smooth sometimes with scattered stellate hairs. Triana in Trans. Linn. Soc. xxviii. 54 excl. nearly all syn. O. virgata, W. & A. Prodr. 323; Thwaites Enum. p. 105; Naud. in Ann. Sc. Nat. ser. 3. xiv. p. 61. O. polycephala, Naud. l. c. 67. O. Wightiana, Benth. in Wall. Cat. 4074. [Of the figures quoted by Triana, Bot. Mag. 2235 and Wight Ic. 998 do not refer to the present plant; Bot. Mag. 4026 has been referred above to O. chinensis; and Wight Ic. 376 may represent our var. major but does not give any idea of the typical O. octandra, DC.]

SOUTH DECCAN PENINSULA in and near the mountains; plentiful. CEYLON, up to 3000 ft. alt.; Thwaites.

Branches subquadrangular with adpressed hairs, or woody nearly round and glabrous. Leaves (in the typical O. octandra) not more than 1 in.; petiole $\frac{1}{2}$ in. Calyx-tube with scattered stellate hairs, teeth usually ciliate and with one stellate terminal bristle, sometimes perfectly glabrous.—This typical woody small-leaved shrub appears very distinct, but even the small-leaved branches carry sometimes large leaves also; and it thus graduates into—

VAR. major; leaves larger often 2 in. frequently hairy on the upper surface often whitened beneath, heads flowers and fruit larger than in the type. O. virgata, Wight Ic. t. 376.—This variety is confounded by many authors with O. cupularis; but it differs in the perianth being more constantly 5-merous, and in its anthers which are not truncate nor suddenly narrowed into a very short beak, but gradually narrowed upward. It has also been mixed with O. aspera, but differs by the ovary having much fewer bristles on the top.

24. **O. nutans**, Wall. Cat. 4068; leaves narrowly lanceolate 3-nerved glabrous striolate above scabrous on the nerves beneath, flowers in small clusters, calyx-tube nearly glabrous with pectinate scales between the bases of the calyx-teeth, calyx-teeth large broad lanceolate glabrous ciliate on margin hairy at the vertex, fruit often nodding. Triana in Trans. Linn. Soc. xxviii. 54.

SUBTROPICAL HIMALAYA from SIKKIM eastwards, alt. 500-2500 ft., frequent to the upper end of ASSAM; also on the northern base of the KHASIA Mts.

A woody branching small shrub. Leaves commonly $1\frac{1}{2}$ by $\frac{1}{4}$ in.; petiole $\frac{1}{2}$ in. Flowers mauve-purple, not very large. Fruit $\frac{1}{2}$ in. broad, campanulate, truncate.

25. **O. Wynaadensis**, C. B. Clarke; stems with adpressed short hairs, leaves 5 in. oblong-lanceolar petiole $\frac{3}{4}$ in., flowers in subterminal corymbs, calyx-tube with scattered flat setigerous scales otherwise glabrous teeth large broad-lanceolate glabrous shortly ciliate.

DECCAN PENINSULA, Wight No. 1099; Wynaad, alt. 4000 ft.; C. B. Clarke.

Leaves 5-nerved, scabrous-hairy on both surfaces. Fruit $\frac{1}{2}$ in. broad, ovoid, truncate, the free part of the ovary with a ring of short hairs (joined at their base into a narrow tube) near its top, otherwise glabrous.

26. **O. nepalensis**, Hook. Fl. Exot. t. 31; leaves 3-4 in. elongate oblong-lanceolate 5-nerved softly hairy on both surfaces petiole less than $\frac{1}{2}$ in., flowers in small rather close corymbs, calyx-tube with large flat scales fringed with bristles of which 5 prominently alternate with the calyx-teeth, calyx-teeth large broad-lanceolate glabrous ciliate. DC. Prodr. iii. 142; Wall. Cat. 4061;

Bot. Reg. 1475; *Naud. in Ann. Sc. Nat. ser. 3. xiv. 68 and xiii. t. 7, fig. 2*; *Triana in Trans. Linn. Soc. xxviii. 55*; *Kurz in Journ. As. Soc. 1877, pt. ii. 75*. *O. Chulesis, Don Prodr. 221*; *DC. Prodr. 143*. *O. speciosa, Don Prodr. 222*.

SUBTROPICAL HIMALAYA from NEPAL eastwards and in the KHASIA Mts.; alt. 0-4000 ft., abundant.—DISTRIB. Ava.

A shrub; branches with adpressed hairs. *Bracts* ovate, glabrous, villous, centre of the backs villose. *Flowers* purple-mauve or white. *Fruit* $\frac{3}{4}$ by $\frac{1}{2}$ in., campanulate, truncate, scales permanent.

2. *OTANTHERA*, Blume.

Shrubs. *Leaves* subcoriaceous, entire, 3-5-nerved. *Panicles* small, terminal and subterminal. *Calyx-tube* ovoid, carrying pectinate scales or simple hairs or subglabrous; teeth 5-6, deciduous. *Petals* 5-6, obovate. *Stamens* 10-12, alternate slightly longer; anthers opening by one pore at the summit, not beaked; connective not produced at the base, augmented by two auricles which are close to the anthers in the shorter stamens a little removed below them in the longer. *Ovary* half-inferior, apex carrying bristles, 5-6-celled; style filiform, simple; ovules very numerous, placentas axile, radiating. *Fruit* a berry. *Seeds* very many, curved through half a circle, minutely punctate.—DISTRIB. Species 2 or 3, extending from Burma to Singapore, Malaya, the Philippines and North Australia.

Otanthera comes between *Osbeckia* and *Melastoma*: the alternate stamens being auricled at the base exactly on the plan of those in *Melastoma*, but in a much less degree.

1. *O. moluccana*, *Blume in Flora*, 1831, p. 489; leaves sparingly shortly hairy beneath, small panicles of 3-5 flowers terminal and from one or two of the upper axils, fruit ovoid truncate with scattered shortly-stalked stellate hairs. *Blume Mus. Bot. p. 56, t. 20*; *Naud. in Ann. Sc. Nat. ser. 3. xiii. 353*; *Miq. Fl. Ind. Bat. i. pt. i. 515*. *O. cyanoides, Triana in Trans. Linn. Soc. xxv. 56*. *Melastoma cyanoides DC. Prodr. iii. 146*. *M. moluccanum, Blume Bijdr. 1078*; *DC. Prodr. iii. 146*.—(*Rheede Hort. Mal. iv. t. 43* quoted by *Triana* may be *O. rubro-limbata*).

MERGUI; *Griffith* (Kew Distrib. No. 2253).—DISTRIB. Moluccas; Sierra Leone (*Triana*).

Stems scabrous. *Leaves* 2-2 $\frac{1}{2}$ in., elliptic-lanceolate; petiole $\frac{1}{4}$ in. *Bracts* ovate, deciduous. *Petals* less than $\frac{1}{2}$ in., white. *Fruit* $\frac{1}{2}$ in. broad.

[*O. bracteata, Korth.* has the calyx-tube covered with long simple approximated ascending bristles, the broad bracts on the pedicels several close together subpersistent: otherwise it is much like *O. moluccana*. *Kurz in For. Fl. i. 502* and in *Journ. As. Soc. 1877, pt. ii. 75*, says *O. bracteata, Korth.* is not unfrequent in Tenasserim. But *Griffith's* Mergui plant is clearly *O. cyanoides* *Triana* as appears from examples named by *Triana's* hand, while *Kurz* quotes *Triana* for *O. bracteata*.]

2. *O. nicobarensis, Teysm. & Binn. Nov. Pl. Hort. Bogor. 29*; flowers terminal and axillary in small panicles, calyx-teeth glabrous acuminate ciliate, fruit oblong from a rounded base purple.

NICOBARS; collected by the Novara expedition and communicated by them to the Buitenzorg Botanic Garden; *Kurz (Journ. As. Soc. 1876, pt. ii. 131)*.

A low shrub; branches tetragonous, subglabrous, but hairy at the nodes. *Leaves* $\frac{3}{4}$ -3 in., ovate or oblong-ovate, acuminate, rounded at the base, 5-nerved, shortly strigose on both surfaces; petiole $\frac{1}{2}$ in. *Petals* 5, purple. *Stamens* subequal, anthers with two auricles added at the base.—*Not seen*.

EXCLUDED SPECIES.

O. RUBRO-LIMBATA (*Lachnopusium rubro-limbatum*, Blume) is figured by Link & Otto, *lc. Pl. Sel.* t. 41, as a plant raised in European gardens from the "East Indies." It is more likely from Malaya than India, and Mr. Benthams in *Fl. Austral.* iii. 292 thinks it probably identical with *Otanthera bracteata*.

O. KOTI-GUEDA, Naud. in *Ann. Sc. Nat. ser.* 3. xiv. 64, is reduced to *O. Wightiana* by Triana; but Naudin describes its calyx-teeth short.

3. **MELASTOMA**, Linn.

Strigose or villous shrubs. *Leaves* petioled, oblong or lanceolate, entire, 3-7-nerved. *Flowers* terminal, solitary clustered or paniced, showy, purple, 5- (rarely 6-7-) merous. *Calyx-tube* with simple (rarely with penicillate) hairs, lobes deciduous. *Petals* equal in number to the calyx-lobes. *Stamens* twice as many as the petals, very unequal, alternate longer ones with purple anthers having the connective long-produced at base and terminating in two lobes, the shorter ones having yellow anthers the connective not produced but with two tubercles in front. *Ovary* more or less united to the calyx-tube, 5- (rarely 6-7-) celled, apex bearing bristles; style filiform, simple; ovules very numerous, placentas axile, radiating. *Fruit* coriaceous or somewhat berried, bursting irregularly. *Seeds* minute, very many, curved through half a circle, minutely punctate.—**DISTRIB.** Species 40 or 8 in South-East Asia and its islands, extending to North Australia and Polynesia.

* *Hairs* closely adpressed at their base to the calyx-tube.

1. **M. malabathricum**, Linn.; *DC. Prodr.* iii. 145; stems with short dense hairs adpressed or spreading, leaves with adpressed scabrous hairs above, scabrous on the nerves beneath and shortly hairy or nearly glabrous between them, bracts large elliptic narrowed into a stalk generally enclosing the buds, scaly hairs on the calyx-tube flat lanceolate, calyx-teeth long (or very long) ovate-lanceolate to narrow-lanceolate, glabrous within or with a few short hairs near the tip only. *Roxb. Hort Beng.* 33; *Fl. Ind.* ii. 405; *Wall. Cat.* 4040; *Bot. Reg.* t. 672; *W. & A. Prodr.* 324; *Wight Ill.* t. 95; *Dalz. & Gibs. Bomb. Fl.* 92; *Naud. in Ann. Sc. Nat. ser.* 3. xiii. 285; *Thwaites Enum.* 106 (*a. and β.*); *Kurz For. Fl.* i. 503, not of *Miq. Fl. Ind. Bat.* i. pt. i. 507. ? *M. obvolutum*, *Jack in Trans. Linn. Soc.* xiv. 3. *Trembleya rhinanthra*, *Griff. Notul.* iv. 677, cf. *Kurz in Flora*, 1871, p. 289.

Throughout INDIA very abundant, from sea-level up to 6000 ft. alt. "Indian Rhododendron" of the English denizens. Not towards the Indian Desert.—**DISTRIB.** Not found out of India: i.e. the above description has been narrowed to the Indian typical plant which is not found in Malaya, etc.

A spreading shrub 6 ft. *Leaves* 3-4 in., broad-lanceolate; petiole $\frac{3}{8}$ in. *Flowers* 1-5, clustered, mauve-purple. *Fruit* $\frac{1}{4}$ in. wide, short-ovoid, truncate, becoming pulpy within. *Calyx-teeth* often $\frac{1}{2}$ - $\frac{5}{8}$ in., not shorter than the tube.—Mr. Benthams in *Fl. Austral.* iii. 293 proposes to include 24 species of Naudin under *M. malabathricum*, Linn.

VAR. adpressum, Wall. Cat. 4081; leaves narrow-lanceolate smaller than in *M. malabathricum* with a rigid more harshly scabrid pubescence. *M. anopanthum* Naud. in *Ann. Sc. Nat. ser.* vol. xiii. 277.—Mergui to Singapore, and in Penang. The Java plant under this name in the Kew Herbarium is as different from Wall. Cat. 4081 as is any *Melastoma* in this section.

2. **M. polyanthum**, Blume in *Mus. Bot.* i. 52, t. 6; stems with short dense hairs adpressed or spreading, leaves with short hairs above adpressed or

subpatent, with short often soft hairs between the nerves beneath, bracts lanceolate or lanceolate-obovate much smaller than the buds and early deciduous, scaly hairs on the calyx-tube flat lanceolate, calyx-teeth triangular acute glabrous within shorter than the tube and often (*O. brachyodon*, *Naud.*) very short. *Naud. in Ann. Sc. Nat. ser. 3. xiii. 287; Miq. Fl. Ind. Bat. i. pt. i. 502. M. malabathricum, Jack in Trans. Linn. Soc. xix. p. 4, with fig.; Benth. Fl. Austral. iii. 292, partly. M. brachyodon, Naud. l. c. 292.*

SINGAPORE; *Sir R. Schomburgk, T. Anderson.*—DISTRIB. Throughout Malaya abundant to North Australia.

Only differs from *M. malabathricum* in the smaller bracts and shorter calyx-teeth; and is united with it by Mr. Bentham.

3. ***M. normale***, *Don Prodr. 220*; branches densely shaggy, leaves with short patent hairs above and pubescent or villous beneath, calyx-teeth long lanceolate hairy within nearly to their base. *DC. Prodr. iii. 145; Naud. in Ann. Sc. Nat. ser. 3. xiii. 289; Kurz For. Fl. i. 504. M. Wallichii, DC. Prodr. iii. 146; Wall. Cat. 4039, partly. M. napalensis, Lodd. Bot. Cub. t. 707.*

NIPAL TO BHOTAN, alt. 2000–6000 ft. KHASIA Mts., alt. 4000 ft., frequent.—DISTRIB. Ava, *Kurz.*

A large shrub, reaching 20 ft. in the interior Himalaya. Leaves 3–5 in., lanceolate; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in. Flowers 3–10, clustered; bracts not large nor enclosing the buds; petals a brighter more rosy mauve than in *M. malabathricum*. Fruit as in *M. malabathricum* or rather larger.—*M. velutinum* Seem. of Polynesia does not belong here.

4. ***M. imbricatum***, *Wall. Cat. 4047*; stem densely clothed with adpressed ovate obtuse scales, leaves beneath with very small scabrous hairs, scales on the calyx-tube flat ovate acute, calyx-teeth ovate acuminate hairy within half-way down, fruit ovoid the margin at the top somewhat dilated. *Triana in Trans. Linn. Soc. xxviii. 60*, but the syn. *M. fasciculare* *Naud.* is doubtful.

EAST BENGAL; *Griffith* (Kew Distrib. No. 2242). PENANG, *Wallich*; TENASSE-RIM, *Helfer* (Kew Distrib. No. 2243).

Apparently very large. Leaves 8 in., broad-elliptic, acute; petiole 2 in. Flowers in terminal clusters of about 12; bracts not large. Fruit $\frac{1}{4}$ – $\frac{5}{8}$ in., ovoid.

** Hairs on the calyx-tube long, at their base spreading, then ascending or patent.

5. ***M. sanguineum***, *Sims in Bot. Mag. t. 2241*; stem with scattered long harsh patent hairs, leaves glabrous above scabrous beneath on the nerves and minutely hairy between them or nearly glabrous, calyx-teeth linear-lanceolate. *DC. Prodr. iii. 145; Don in Mem. Wern. Soc. iv. 289; Miq. Fl. Ind. Bat. i. pt. i. 504; Naud. in Ann. Sc. Nat. ser. 3. xiii. 281. M. decemfidum, Jack in Trans. Linn. Soc. xiv. 6; Roxb. Fl. Ind. ii. 406; Wall. Cat. 4042; DC. Prodr. iii. 146; Naud. l. c. 282; Kurz in Journ. As. Soc. 1877, pt. ii. 75.*

PENANG, SINGAPORE and MALACCA; *Wallich, Cuming, Griffith, Maingay.*—DISTRIB. Malaya and South China.

Leaves 4–5 in., narrowly lanceolate; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in. Flowers 1–4, clustered, often very large, rose-purple. Bristles on the calyx-tube often $\frac{1}{4}$ – $\frac{1}{2}$ in., hair-pointed. Fruit $\frac{1}{2}$ in. wide and upwards.

VAR. *molle*, *Wall. Cat. 4046*; leaves 6 by 2½ in. with scattered villous hairs on both surfaces. *M. crinitum, Naud. l. c. 280.*

6. ***M. Houtteanum***, *Naud. in Ann. Sc. Nat. ser. 3. xiii. 291*; branches with dense adpressed or ascending villous hairs, leaves with scattered hairs above shortly villous beneath, calyx-teeth linear-lanceolate. *Kurz For. Fl. i. 504.*

PEGU, Kurz. TENASSERIM or ANDAMANS; *Helper* (Kew Distrib. No. 2241).

Leaves 4-5 in., broad-lanceolate; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in. *Flowers* clustered. Hairs on calyx-tube $\frac{1}{4}$ - $\frac{1}{2}$ in.—This species is essentially like *M. sanguineum*, but the indumentum of the stem and branches is of a widely different character: as to the leaves, the indumentum of *M. sanguineum* var. *molle* is exactly half-way between that of *M. sanguineum* and *M. Houtteanum*.

DOUBTFUL SPECIES.

As to the numerous species of *Melastoma* admitted by Triana in *Trans. Linn. Soc.* xxviii. 59, 60 as native in India, the names *M. triflorum*, Naud.; *ellipticum*, Naud.; *microphyllum*, Naud.; *lanuginosum*, Blume; *Royenii*, Blume; *longifolium*, Naud. are not found in the Kew collection. So far indeed from multiplying species out of the existing material, it would be better to reduce the whole of the Indian forms to three, viz., *M. malabathricum* (including *M. polyanthum* and *M. imbricatum*); *M. normale*; and *M. sanguineum* (including *M. Houtteanum*).

As to the 13 species of *Melastoma* described by Roxburgh, the first eight are octandrous; the next two have been admitted; the last two are outside the limits of the present Flora.

M. FINDLAYSONII, Wall. Cat. 4041, has not the place of collection given, and it is doubtful whether it was found within the limits of the Flora Indica. The Wallichian example shows the leaves and fruit, which might be those of *Osbeckia Leschenaultiana* above described; but Triana (assuming probably that had the stamens been all similar Wallich would have named it *Osbeckia* and not *Melastoma*) has called it *Dissotis Findlaysonii*.

M. CURVA, Roxb. Fl. Ind. ii. 406. "Shrubby, all the tender parts strigose, leaves petioled ovate-cordate 5-7-nerved finely serrulate, panicles terminal subcorymbiform supra-decompound, flowers 10-androus, petals cordate ciliate."—Chittagong. Neither figure nor specimen is known: the description is too short for safe identification.

4. OXYSPORA, DC.

Large spreading shrubs with drooping branches terminated by large, lax, almost naked panicles of rose-purple flowers. *Leaves* opposite, long-petioled, large, 5-7-nerved, ovate, acuminate, uppermost pair below the panicle often sessile much smaller and subcordate at base. *Panicle* long, sometimes narrow; branches decussate; bracts very small. *Calyx-tube* ovate-cylindric; teeth 4, short, triangular. *Petals* 4, subacute. *Stamens* 8, of which 4 are purple with longer filaments, 4 are yellow; anthers narrowed upwards, at top opening by one pore, produced at base, connective with or without appendage. *Ovary* inferior, 4-celled, apex glabrous; style simple, elongate; ovules very many, placentas axile, radiating. *Capsule* dry, elliptic, elongate, with 8 ribs. *Seeds* very many, falcate; raphe lateral, produced at top in front into a point.—DISTRIB. Species 4, whereof 3 are in East Bengal, 1 in Sumatra.

1. *O. paniculata*, DC. Prodr. iii. 123; branchlets panicles and nerves of the leaves beneath with some stellate pubescence, capsule long-elliptic very little narrowed below the calyx-mouth, seeds with a sharp right angle at the top of the back and a produced angular point at the top in front. Wall. Pl. As. Rar. t. 88; DC. Mem. Melast. t. 4 (not correct as to the base of the connective); Wall. Cat. 4076; Miq. Fl. Ind. Bat. i. pt. i. p. 556. *O. vagans*, Bot. Mag. t. 4553; Lemaire Jard. Pl. t. 79. *Arthrostemma paniculatum*, Don in Mem. Wern. Soc. iv. 299; Prodr. 222 (partly). *Melastoma rugosa*, Roxb. MS.

SUBTROPICAL and TEMPERATE HIMALYA, from NIPAL to BHOTAN; alt. 3000-7000 ft. KHASIA Mts.; alt. 3000-5000 ft., common. Abundant in the interior of Sikkim covering the hill sides.

Leaves 4–5 in. (in some examples attaining $14\frac{1}{2}$ in.), ovate, acute; petiole 1–2 in., at its apex are some rough bristles. Longer *stamens* with the anther-cells diverging below the truncate base of the connective where the filament is attached. *Fruit* $\frac{3}{8}$ by $\frac{1}{2}$ in.

2. *O. vagans*, Wall. Cat. 4075, partly; branchlets petioles and nerves of the leaves beneath with some scattered patent villous hairs, capsule elliptic prominently narrowed below the enlarged calyx-mouth, seeds blunt-headed with a sharp right angle at the top of the back and a very short point at the top in front. *O. vagans*, var. *a.* Wall. Pl. As. Rar. p. 78; Triana in Trans. Linn. Soc. xxviii. 73; Kurz For. Fl. i. 505. *Melastoma vagans*, Roxb. Hort. Beng. 33; Fl. Ind. ii. 404. *Homocentria vagans*, Naud. in Ann. Sc. Nat. ser. 3. xv. 308.

MISHMEE; Griffith. KHASIA Mts., alt. 1000–3000 ft., common. CHITTAGONG; Roxburgh.

A rather smaller shrub than the preceding with the panicle generally more slender. Longer *stamens* with the anther-cells slightly produced at the base, connective having added to its base a linear spur.—Wall. Cat. 4075 contains some *O. paniculata* not any *O. cernua*.

3. *O. cernua*, Triana in Trans. Linn. Soc. xxviii. 73; glabrous, capsule elliptic truncate hardly narrowed below the calyx-mouth, seeds simply falcate. Kurz For. Fl. i. 505. *O. vagans* var. *β.* Wall. Pl. As. Rar. p. 78. *Melastoma cernua*, Roxb. Hort. Beng. 33; Fl. Ind. ii. 404. *Allozygia cernua*, Naud. in Ann. Sc. Nat. ser. 3. xv. 309.

MISHMEE; Griffith (Kew Distrib. No. 2262); CHITTAGONG, alt. 0–1000 ft.; H. f. & T.

A shrub, generally resembling *O. paniculata*. *Leaves* commonly 6 in., attaining $12\frac{1}{2}$ in. in some examples; petiole 2 in. Rachis of the panicle somewhat sharply quadrangular at the base, but cannot be said to be 4-winged in any of the specimens at Kew (as Roxburgh states it to be). Longer *stamens* with the anther-cells shortly produced and diverging below the truncate base of the connective where the filament is attached.

5. **KENDRICKIA**, Hook. f.

A climber, ascending to the top of the highest trees, when in blossom tinged the forest red. *Leaves* opposite, petioled, oblong or obovate, obtuse, fleshy. *Flowers* terminal, in few-flowered umbels or solitary, large; peduncles stout, 2-bracteolate. *Calyx* urn-shaped, rose-purple; limb shortly 4-toothed, greenish. *Petals* 4, fleshy, a fine red. *Stamens* 8, equal; anthers at the attenuated summit opening by one pore, at the base shortly produced, connective having a horn about $\frac{1}{8}$ in. at the base. *Ovary* inferior, 4–6-celled; style simple, filiform; ovules very many, placentas axile, fleshy. *Capsule* globose, 1-celled by absorption of the septa, opening at the apex by 4–6 valves. *Seeds* very many, minute, prismatic.

1. *K. Walkeri*, Hook. f. in Gen. Pl. i. 752; Triana in Trans. Linn. Soc. xxviii. p. 75, t. vi. fig. 70. *Pachycentria Walkeri*, Thwaites Enum. 107. *Medinilla*? *Walkeri*, Wight Ill. i. p. 217; Gardn. in Calc. Journ. Nat. Hist. viii. p. 11.

ANAMALLAYS; Col. Beddome. CEYLON, alt. 3000–5000 ft.; Wight; Walker; Gardner, Thwaites.

Stems in their lower part creeping up trees like ivy, hence flatterred with the leaves

distichous; at the summits spreading pendent with leaves on all sides. *Leaves* 1-2 in., narrowed at the base, minutely furfuraceous or nearly glabrous, 3-nerved from the base with two additional nerves from the midrib much higher up; petiole $\frac{1}{4}$ in. *Petals* $\frac{3}{4}$ in.—“One of the most beautiful of Ceylon plants” (Thwaites).

6. ALLOMORPHIA, Blume.

Shrubs, tall or short. *Leaves* opposite, long-petioled, large, lanceolate ovate or orbicular, 15-nerved, glabrous or nearly so. *Panicles* terminal, compound, with small flowers in clustered whorls. *Calyx-tube* funnel-shaped or campanulate, limb of 4 very short lobes. *Petals* 4, rose or white, small. *Stamens* 8, nearly equal; anthers attenuated at the top with one pore, cells long-produced and diverging at their bases; connective without appendage. *Ovary* 3- (rarely 4-) celled enclosed by but nearly free from the calyx-tube; style filiform, simple; ovules very many, placentas axile, 2-fid. *Capsule* small, dry, urn-shaped or subcylindric, ribbed, opening at the top by 3-4 valves. *Seeds* very many, narrowly obtrapezoidal.—**DISTRIB.** Species 5: whereof 4 are from the Malay Peninsula and its attached islands; 1 from Canton.

1. **A. exigua**, Blume in *Flora*, 1831, p. 523; leaves lanceolate or ovate-lanceolate not cordate at the very base, pedicels in fruit not more than $\frac{1}{5}$ in., fruit ovoid 3-celled prominently 6-ribbed contracted at the top below the permanent calyx-rim. *Naud. in Ann. Sc. Nat. ser. 3. xv. 310*; *Triana in Trans. Linn. Soc. xxviii. 74*. *Melastoma exigua*, Jack in *Trans. Linn. Soc. xiv. 10*; *DC. Prodr. iii. 149*; *Wall. Cat. 4048*.

PENANG and MALACCA; Wallich, Griffith, &c.—**DISTRIB.** Philippines.

A tall shrub, nearly glabrous. *Leaves* often 9-10 in.; petiole 1-3 in. *Panicle* minutely rusty-pubescent; bracts $\frac{1}{4}$ - $\frac{1}{3}$ in., lanceolate or narrow-spathulate. *Calyx-tube* most minutely hairy. *Ripe fruit* $\frac{1}{12}$ in. broad.

2. **A. umbellulata**, Hook. f. ms.; *Triana in Trans. Linn. Soc. xxviii. 74*; leaves lanceolate or elliptic-lanceolate often cordate at the very base, pedicels umbellulate in bud $\frac{1}{4}$ in. and more. *Kurz For. Fl. i. 506*.

TENASSERIM or ANDAMANS; Helfer (Kew Distrib. No. 2260).

Shrub 10 ft. (Helfer); nearly glabrous except the panicle which is minutely pubescent and much more lax than that of *A. exigua*. *Flowers* larger than those of *A. exigua*. *Calyx-tube* in the young flowers funnel-shaped rather than campanulate; teeth more prominent. *Fruit* unknown.

3. **A. Griffithii**, Hook. f. MS.; *Triana in Trans. Linn. Soc. xxviii. 74*; leaves round obtuse cordate at the base, panicle elongate with small distant whorls which are shortly corymbose rather than umbelled or clustered.

MALACCA, Griffith, Walker, Maingay No. 775.

Almost stemless; rootstock woody. *Leaves* 5-6 in. long and more broad, glabrous or slightly puberulous beneath. *Panicle* about 12 in., rusty-pubescent. *Calyx-tube* campanulate, minutely hairy. *Fruit* unknown.

4. **A. hispida**, Kurz in *Flora*, 1871, 290; petioles thick 5 in. hispid bristly, leaves 8-9 in. ovate 9-ribbed sparsely bristly above more densely beneath especially on the nerves, panicles glabrous or with bristles at the divisions, pedicels slender about $\frac{1}{4}$ in. so that the flowers are in subsessile clusters, calyx-tube 4-ribbed carrying some long bristles short campanulate with minute teeth, ovary adnate to the calyx near the base only.

BURMA, Martaban; Dr. Brandis (Kurz).

Not seen: the above is copied from Kurz.

7. **BLASTUS**, *Lour.*

A shrub with round branches. *Leaves* opposite, petioled, oblong-lanceolate, 3-5-nerved. *Flowers* very small, in axillary clusters; peduncles short, without bracts. *Calyx-tube* oblong, puberulous, limb shortly 4-lobed. *Petals* 4. *Stamens* 4, equal; anthers attenuate at the top, opening by one pore, cells produced and diverging at their bases; connective without appendage. *Ovary* inferior, 4-celled, puberulous at the apex; style filiform, simple; ovules very many, placentas axile, paired. *Capsule* small, obscurely 4-furrowed, opening at the summit by four pores. *Seeds* very many, raphe long, testa long-linear, produced at each end much beyond the small oblong nucleus.

1. **B. cochinchinensis**, *Lour. Fl. Cochinch.* 527; *Seemann Journ. Bot.* i. 281. *Anplectrum parviflorum*, *Benth. Fl. Hongk.* p. 116.

ASSAM; *Masters*. EAST BENGAL (prob. North-East Assam); *Griffith*.—DISTRIB. Hongkong and Formosa.

A shrub 6 ft., glabrous, innovations minutely puberulous. *Leaves* 3-4 in., lanceolate or elliptic-lanceolate; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in. *Peduncles* in fruit $\frac{1}{4}$ in. or less. *Fruit* less than $\frac{1}{2}$ in. broad.

8. **OCHTHOCHARIS**, *Blume.*

Small erect glabrous shrubs, branches round. *Leaves* opposite, petioled, oblong or lanceolate, 3-5-nerved, minutely denticulate-serrulate. *Flowers* minute in axillary clustered cymes, rarely in axillary and terminal lax cymes. *Calyx-tube* obovoid, smooth; teeth 5, small, persistent. *Petals* 5. *Stamens* 10, equal; anthers oblong, obtuse at the top opening with one pore, at the base shortly produced; connective without appendage. *Ovary* inferior, 5-celled, glabrous at the apex; style simple, filiform; ovules very many, placentas axile. *Capsule* globose, 5-valved, enclosed by the membranous calyx-tube. *Seeds* very many, irregularly club-shaped.—DISTRIB. Species 4 or 5, extending from Singapore to Borneo.

1. **O. paniculata**, *Korth. Verh. Nat. Gesch. Bot.* 247, t. 64; leaves opposite very unequal, panicle terminal. *Blume Mus. Bot.* i. 40; *Naud. in Ann. Sc. Nat. ser. 3. xv.* p. 307, with fig.; *Miq. Fl. Ind. Bat.* i. pt. i. 556; *Triana in Trans. Linn. Soc.* xxviii. 74. *Melastoma oxyphyllum*, *Benth. in Wall. Cat.* 4083.

SINGAPORE; *Wallich*.—DISTRIB. Malaya.

Branches quadrangular, nearly glabrous, becoming minutely rusty towards the panicle. *Leaves* attaining 5 in. by 2, lanceolate, 5-nerved, glabrous or minutely rusty on the nerves; petiole $\frac{3}{4}$ in. *Panicle* $1\frac{1}{2}$ by $1\frac{3}{4}$ in., rusty puberulous, short-peduncled; branches opposite, supported by small linear bracts $\frac{1}{16}$ - $\frac{1}{5}$ in., the ultimate pedicels $\frac{1}{16}$ - $\frac{1}{5}$ in. *Calyx-tube* campanulate, nearly glabrous; teeth 5, minute. *Petals* 5, $\frac{1}{5}$ in., ovate, subacute, rose-purple. *Fruit* (not ripe) $\frac{1}{2}$ in. diam. subglobose.

2. **O. javanica**, *Blume in Flora*, 1831, 523; leaves somewhat fleshy 3-nerved secondary nerves obscure, cymes 1 in. axillary, pedicels in fruit scarcely $\frac{1}{4}$ in. *Naud. in Ann. Sc. Nat. ser. 3. xv.* 307; *Miq. Fl. Ind. Bat.* i. pt. i. 556; *Kurz For. Fl.* i. 507. *Melastoma? littoreum*, *Wall. Cat.* 4087.

TENASSERIM, *Helfer* (Kew Distrib. No. 2277). SINGAPORE; *Wallich*, *Griffith* No. 2278, *T. Anderson*, *Maingay*.—DISTRIB. Java.

A small shrub, 2-3 ft. *Leaves* 2½ in., lanceolate or narrow lanceolate, narrowed at both ends, sparsely minutely bristle-serrate; petiole ¼ in. *Fruit* ½ in. diam., subglobose.—The closely allied Malayan species have the cross secondary nerves very conspicuous; by which they differ from the present fleshy seashore plant.

9. **ANERINCLEISTUS**, Korth.

Large villous shrubs; branches round. *Leaves* petioled, ovate or lanceolate, entire, 5-7-nerved, with scattered hairs above, villous beneath. *Flowers* minute (in very small axillary clusters in the Indian species). *Calyx-tube* campanulate, densely hairy; lobes 4, very small. *Petals* 4, minute, glabrous. *Stamens* 8, equal; anthers attenuate at the top, opening with one pore, scarcely produced at the base; connective with or without a short spur. *Ovary* nearly free, 4-celled; style filiform, simple; ovules many. *Capsule* opening by 4 large pores at the summit. *Seeds* exceedingly minute, cuneate-obovoid.—DISTRIB. Species 3; Tenasserim coast, Mergui and Sumatra.

1. **A. Helferi**, Hook. f.; *Triana in Trans. Linn. Soc.* xxviii. 75; branches clothed with adpressed soft hairs, midrib of the leaves beneath with ascending subadpressed soft hairs, calyx-tube with ascending hairs. *Kurz For. Fl.* i. 507.

MERGUI; Griffith, *Helper* (Kew Distrib. No. 2304).

Leaves 6 by 4 in.; petiole 2 in. Clusters of *flowers* ⅔ in. *Fruit* ½ in., ellipsoid.

2. **A. Griffithii**, Hook. f.; *Triana in Trans. Linn. Soc.* xxviii. 75; branches densely clothed with brown soft spreading and deflexed hairs, midrib of the leaves beneath densely clothed with similar patent hairs, calyx-tube with somewhat spreading hairs. *Kurz For. Fl.* i. 507.

MERGUI; Griffith (Kew Distrib. No. 2304).

Exactly as the preceding species except as to the small differences in the indumentum above stated. Probably will be found to be a variety only when more material is obtained.

10. **SONERILA**, Roxb.

Herbs, sometimes woody at the base, nearly always small, many stemless. *Leaves* opposite, equal or unequal, from round to linear, entire or serrulate, 3-5-nerved. *Flowers* in racemes or scorpioid spikes, mostly red. *Calyx-tube* campanulate or long-funnel-shaped; teeth 3, short. *Petals* 3, acute or obtuse. *Stamens* 3 (in *S. obliqua* 6), equal; anthers obtuse or attenuate at the top, cells at the base shortly divaricate; connective without appendage. *Ovary* inferior, 3-celled, glabrous at the apex; style simple, filiform; ovules many, placentas axile. *Capsule* obovoid, trigonous, elongate funnel-shaped, or campanulate, opening at the top by 3 valves. *Seeds* very many, smooth or covered by glandular points or small tubercles, ovoid or ellipsoid; raphe simple or running out into a lateral appendage, sometimes overtopping the seed.—DISTRIB. Species 58; 45 tropical Indian and Malayan, and 1 in South China.

SECTION A. Stamens 3. (To Species 42.)

* *Anthers* short, truncate or acute at the top.

† *Species* not of Ceylon or the South Deccan Peninsula

1. **S. tenera**, Royle *Ill.* 215, t. 45; stem 2-4 in. erect little-divided, pedicels $0-\frac{1}{8}$ in., anthers short oblong truncate hardly narrowed at the top. *Wall. Cat.* 4098 partly.

SUBTROPICAL WESTERN HIMALAYA, Royle, Edgeworth. CHOTA NAGPORE, alt. 1000-2000 ft., abundant; C. B. Clarke.

Stem weak, sometimes winged, puberulous or minutely pubescent. *Leaves* $\frac{1}{4}-\frac{1}{2}$ in., ovate, nearly entire, equal or unequal, with a few scattered lax hairs; petiole less than $\frac{1}{8}$ in. *Calyx-tube* puberulous and with a few scattered lax hairs; teeth (at time of flowering) ovate, acute, as long as broad. *Petals* $\frac{1}{8}$ in., ovate, acute, rose-purple. *Capsule* nearly $\frac{1}{4}$ in., trigonous, elongate funnel-shaped, ribs between the angles very obscure, often narrowed at the base so as to be subsessile. *Seeds* ovoid, smooth; raphe not excurrent.—Wallich has distributed with Royle's *S. tenera*, a Tavoy plant, *S. stricta*, and Royle has not detected the error. The pubescence of the stem as given in the figure of Royle is very unlike nature. Triana has named Royle's original specimen "*potius S. brachyandra*, Naud." a Manilla species, and has made Edgeworth's specimen and some Khasian ones of *S. stricta* the type of *S. tenera*.

2. **S. stricta**, Hook. in *Bot. Mag.* t. 4394; stem 3-7 in. erect often branched, pedicels in fruit often nearly $\frac{1}{4}$ in., anthers ovate much narrowed at the top.

KHASIA Mts., alt. 3000-4000 ft., plentiful. PEGU to TENASSERIM, frequent.

Stem more or less puberulo-pubescent, and also with long lax spreading hairs. *Leaves* $\frac{1}{4}-1$ in., lanceolate or elliptic, narrowed at each end, with scattered lax hairs. *Calyx-tube* puberulous and with a few scattered lax hairs, teeth broader than long. *Petals* $\frac{1}{8}-\frac{1}{4}$ in., obovate, rose-purple. *Capsule* $\frac{1}{4}$ in., trigonous, elongate funnel-shaped, ribs between the angles very obscure. *Seeds* ovoid, smooth; raphe not excurrent.—The type of this species is *S. burmannica* Wall. *Cat.* 4098, but the striking form *S. stricta* was first published and the name must therefore be maintained. The true *S. Rottleri* Wall. is a Courtallum species and widely different, but Wallich seems in hand-and-eye distribution to have mixed the present species with it.

VAR. typica; leaves with a few denticulations, uppermost sometimes in whorls of 4, often purplish beneath.—Moulmein; Lobb No. 347; Parish, No. 427.

VAR. burmannica, Wall. *Cat.* 4098; leaves usually entire or nearly so. *S. tenera*, Wall. *Cat.* 4098 partly; Kurz in *Journ. As. Soc.* 1877, pt. ii. 78. *S. Rottleri*, Wall. *Cat.* 4097 partly. *Sonerila* sp. 5 Griff. *Notul.* iv. 676.

3. **S. erecta**, Jack in *Mal. Misc. et in Hook. Bot. Misc.* ii. 63; stem 8-12 in. firm erect with opposite branches, racemes secund, flowers sessile, capsule long-cylindric subtrigonus, seeds hemi-ellipsoidal covered with glandular raised points, raphe shortly excurrent and overtopping the seed. *Wall. Cat.* 4092; Benn. *Pl. Jav. Rar.* p. 217; Miq. *Fl. Ind. Bat.* i. pt. i. 563; Naud. in *Ann. Sc. Nat. ser.* 3. xv. 324; Triana in *Trans. Linn. Soc.* xxviii. 75.

MOULMEIN, Lobb. PINANG, Wallich. MALAYA, Maingay.—DISTRIB. Malaya.

Stem bifariously hairy. *Leaves* $\frac{1}{2}$ in., equal or unequal, lanceolate, slightly ovate at the base, hairy on both surfaces, subentire or minutely denticulate, sessile and long-petioled on the same plant. *Racemes* 2-6-flowered. *Calyx-tube* minutely pubescent. *Petals* $\frac{1}{4}$ in., ovate, acute, rosy. *Anthers* ovate, much narrowed upwards. *Fruits* $\frac{3}{8}-\frac{1}{2}$ in., $\frac{1}{4}$ in. apart.

†† *Species of Ceylon and the South Deccan Peninsula.*

4. **S. zeylanica**, W. & A. *Prodr.* 322; branches quadrangular nearly glabrous, anthers $\frac{1}{10}-\frac{1}{8}$ in. ovate narrowed upwards, capsule $\frac{1}{4}$ in. funnel-shaped subtrigonus with 6 prominent ribs. Arn. in *Hook. Comp. Bot. Mag.* ii. 307 (Ceylanica); Naud. in *Ann. Sc. Nat. ser.* 3. xv. 321; Thwaites *Enum.* 109; Triana in *Trans. Linn. Soc.* xxviii. 75.

CEYLON, alt. 6000 ft.; *Thwaites, Walker.*

Stems 4–12 in. with many spreading branches. *Leaves* $\frac{3}{8}$ – $\frac{3}{4}$ in., ovate or narrow-oblong, acute, denticulate, with a few scattered hairs above otherwise glabrous; petiole 0– $\frac{1}{2}$ in. *Calyx-tube* glabrous or with a few lax hairs. *Petals* $\frac{1}{4}$ in., purple or white, ovate, acute. *Capsule* about as long as its pedicel. *Seeds* with minute glandular elevated points, raphe excurrent but hardly overtopping the seed.—*S. zeylanica* is only separated from *S. rostrata* and *S. affinis* by the anthers, which (as above stated) are usually $\frac{1}{10}$ – $\frac{1}{8}$ in. long in *S. zeylanica* while in *S. affinis* they are usually $\frac{1}{6}$ in. In those cases where the anthers of an authentic example of *S. zeylanica* are actually longer than those of some examples of *S. affinis*, we endeavour to fall back on the degree and nature of the attenuation of the anthers, which should be acute in *S. zeylanica*, acuminate in *S. affinis*. The var. *pumila* is more distinct from *S. zeylanica* than are *S. rostrata* and *S. affinis*. Triana has placed Thwaites' numbered specimens of these species under various others.

VAR. *pumila*. Thwaites Enum. 109 (sp.); anthers short-oblong very truncate.

VAR. *Walkera*; seed without elevated points, excurrent raphe very much overtopping the seed, being exactly over the top of the seed like a cap.—Perhaps a species. Ceylon; *Walker*.

5. ***S. tomentella***, *Thwaites Enum.* 109; branches petioles and calyx-tube rusty-pubescent, anthers ovate very short, capsule short funnel-shaped trigonous 6-ribbed bristly. *Triana in Trans. Linn. Soc.* xxviii. 75.

CEYLON; Saffragam, *Thwaites*.

Branched, 10 in. high. *Leaves* ovate and ovate-oblong, minutely denticulate, with a few scattered hairs above, slightly pubescent beneath. *Petals* $\frac{1}{3}$ in., ovate, acute, white or pale rose. *Pedicels* as long as or longer than the capsule.

6. ***S. Brunonis***, *W. & A. Prodr.* 321; stem a foot high somewhat stout branched nearly glabrous, leaves oblong-lanceolate longitudinally 5–7-nerved from near the base with very rarely one or two fainter nerves from the midrib higher up. *Wight Ill.* 94, *lc.* t. 1059.

SOUTH DECCAN PENINSULA; Courtallum; *Wight No.* 1142. CEYLON, Newera Ellia; *Thwaites*.

Stems 4-angled. *Leaves* $1\frac{1}{3}$ – $2\frac{1}{2}$ in., with a few scattered hairs above and microscopic puberulous dots beneath; petiole $\frac{1}{2}$ – $1\frac{1}{4}$ in. *Petals* $\frac{1}{2}$ in., mauve-purple, ovate acute. *Capsules* $\frac{3}{8}$ in., narrow-funnel-shaped, with six thick ribs, longer than the pedicels, clustered on the shortened racemes. *Seed* obovoid with glandular elevated points, raphe not excurrent.—The present species is exceedingly like *S. versicolor* or *S. axillaris*, but (as *Wight* observes) may always be recognised by the longitudinal nervation of the leaves.

7. ***S. pedunculosa***, *Thwaites Enum.* 109; stem 3–10 in. weak rooting at the nodes, peduncles quasi-terminal very long, capsule $\frac{3}{8}$ – $\frac{1}{4}$ in. funnel-shaped subtrigonous obscurely 6-ribbed usually shorter than the pedicel. *Triana in Trans. Linn. Soc.* xxviii. 75. *S. Rottleri*, *Wall. Cat.* 4097, partly.

TRAVANCORE, Quilon; *Wight No.* 1111. CEYLON; tropical; *Thwaites*.

Stems and peduncles glabrous or pubescent. *Leaves* $1\frac{1}{2}$ – $2\frac{1}{2}$ in., ovate or oblong, minutely serrulate, sparsely pilose above minutely dotted beneath; petiole $\frac{1}{2}$ – $1\frac{1}{4}$ in. *Peduncles* 2–6-flowered. *Calyx-tube* glabrous or with a few scattered hairs. *Petals* $\frac{1}{4}$ in., ovate, acute, reddish. *Seeds* with elevated points, raphe much excurrent on the side near the top.

8. ***S. Arnottiana***, *Thwaites Enum.* p. 108; stem 12 in. high round branched upwards at least rufous-villous, petioles nerves of the leaves beneath

and peduncles with brown-red hairs, capsule $\frac{1}{5}$ in. broadly funnel-shaped trigonous 6-ribbed somewhat scabrous usually longer than the pedicel. *Bedd. Ic. Pl. Ind. Or. t.* 300.

CEYLON, alt. 6000 ft.; *Thwaites*.

Leaves nearly 2 by $\frac{3}{4}$ in., oblong or ovate, with 3-5 longitudinal nerves, nearly glabrous or with few scattered hairs above, minutely serrulate; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Calyx-tube* with lax spreading hairs. *Petals* $\frac{1}{4}$ - $\frac{1}{3}$ in., ovate, acute, purple. *Seeds* covered with elevated points, raphe excurrent the whole length of the seed.

VAR. tenella, *Beddome* in *Trans. Linn. Soc. xxv.* 217; stem leaves petioles and calyx-tube nearly glabrous.—*Anamallays*; alt. 3000 ft., *Beddome*. Stated by Col. *Beddome* to be allied to *S. Arnottiana*, *Thwaites*, and reduced to it by *Triana* in *Trans. Linn. Soc. xxviii.* 75. The examples communicated by Col. *Beddome* to Kew do not show fruit but seem the same as *S. Brunonis*; they differ considerably in their glabrousness from *S. Arnottiana*.

9. **S. Wightiana**, *Arn. in Hook. Comp. Bot. Mag. ii.* 307; stem attaining 15 in. round branched very brown-villous, petioles nerves of the leaves beneath and peduncles with brown or yellow hair, capsule $\frac{1}{4}$ in. funnel-shaped trigonous 6-ribbed scabrous usually shorter than the pedicel. *Triana in Trans. Linn. Soc. xxviii.* 75.

CEYLON; Adam's Peak; *Thwaites*.

Leaves $\frac{3}{4}$ -1 $\frac{1}{2}$ in., elliptic or oblong, with 3-5 longitudinal nerves, serrulate, with scattered scabrous hairs often on both surfaces; petiole often 1 in. *Calyx-tube* with lax spreading hairs. *Petals* $\frac{3}{8}$ in., purple, ovate, acute. *Anthers* ovate-oblong, obtuse. *Seeds* covered with elevated points, raphe scarcely excurrent.—This species only slightly differs from *S. Arnottiana* by its greater hairiness, its rather larger flowers, and more elongate capsule.

10. **S. Hookeriana**, *Arn. in Hook. Comp. Bot. Mag. ii.* 308; stem attaining 10 in. round branched and petioles and peduncles with red villous tomentum, leaves with scattered hairs on both surfaces, nerves beneath with spreading dense red or yellow hairs, capsule $\frac{1}{5}$ in. funnel-shaped trigonous 6-ribbed scarcely scabrous usually longer than the pedicel. *Naud. in Ann. Sc. Nat. ser. 3. xv.* 321; *Triana in Trans. Linn. Soc. xxviii.* 75.

CEYLON, Adam's Peak; *Walker, Thwaites* No. 173 and 426 partly.

Leaves $\frac{3}{4}$ -1 $\frac{1}{4}$ in., ovate or oblong, with 3-5 longitudinal nerves, serrulate; petiole $\frac{1}{4}$ - $\frac{5}{8}$ in. *Calyx-tube* with many spreading rufous hairs. *Petals* $\frac{1}{2}$ in., ovate, acute (pale?). *Anthers* ovate-oblong, obtuse. *Seeds* with subtubercular raised points, raphe much excurrent near the top of the seed.

11. **S. Gardneri**, *Thwaites Enum. p.* 107; stem 12 in. round rufous-villous, leaves ovate from a broad base short-petioled, petals $\frac{1}{2}$ - $\frac{5}{8}$ in. broad-elliptic, capsule $\frac{1}{3}$ in. ovoid trigonous slightly scabrous and hispid usually longer than the pedicel. *Triana in Trans. Linn. Soc. xxviii.* 75; *Bedd. Ic. Pl. Ind. Or. t.* 298.

CEYLON, alt. 5000 ft.; Horton Plains, *Thwaites*.

Leaves $\frac{3}{4}$ -1 in., minutely serrate with scattered hairs on both surfaces, nerves beneath rufous-villous; petiole $\frac{1}{3}$ - $\frac{1}{4}$ in. *Peduncles* short and with the calyx-tube rufous-villous. *Petals* mauve-purple. *Anthers* ovate-oblong, obtuse. *Seeds* subtuberculate with raised points, raphe elongated both above and below the seed.—This species is well separated from the preceding species by its ovoid not funnel-shaped capsule.

VAR. firma, *Triana l. c.*; leaves sessile. *S. firma, Thwaites ms.*—Ceylon, alt. 5000 ft., Central Province at Wattchelle; *Thwaites* No. 3373.—The example of this communicated by Mr. *Thwaites* to Kew is in flower and does not show fruit. It seems exactly *S. Gardneri* except as to the sessile leaves, but the fruit may prove it to be something quite different.

** *Anthers long attenuated or acuminate upwards.*

† *Plants with distinct stems, the leaves of each pair not very unequal.*

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12. **S. robusta**, Arn. in Hook. Comp. Bot. Mag. ii. 308; stem attaining 21 in. shaggy with rufous-brown hair, leaves cordate-ovate sessile with long rufous hairs above and on the nerves beneath, capsule nearly $\frac{1}{4}$ in. campanulate trigonous hispid-scabrous 6-nerved, pedicel about $\frac{1}{4}$ in. Naud. in Ann. Sc. Nat. ser. 3. xv. 327; Triana in Trans. Linn. Soc. xxviii. 76.

CEYLON; Walker; Adam's Peak, alt., 5000-7000 ft. Thwaites No. 426 partly.

Branches ascending, round, with harsh or soft hairs. Leaves $\frac{1}{2}$ in., nearly entire. Calyx-tube with many spreading hairs. Petals $\frac{1}{2}$ in., elliptic, acute, purple. Anthers attenuated, long. Capsules 3-6 to the raceme, nearly sessile. Seeds with raised points, raphe excurrent on one side near the top.

VAR. *glabricaulis*, Thwaites ms.; stem 4-angular nearly glabrous, leaves sessile nearly glabrous beneath.—Ceylon; at Boputalanda, Central Provinces, Thwaites No. 3955.

13. **S. Harveyi**, Thwaites Enum. 107; stem 18 in. erect with ascending quadrangular branches nearly glabrous, calyx-tube glabrous, anthers subacuminate but much shorter and less attenuate than in *S. robusta*.

CEYLON, Central Province, alt. 6000-7000 ft.; Thwaites No. 2974.

Leaves $\frac{5}{8}$ in., rhomboid-oblong, unequal-sided, obtuse or subcordate at the base, glabrous on both surfaces, denticulate; petiole about $\frac{1}{20}$ in. Racemes short. Petals $\frac{1}{2}$ in., elliptic, acute, purple.—Triana in Trans. Linn. Soc. xxviii. 76 has erroneously called this species *S. Hartwegi*, and altered the naming of Thwaites' examples so as to confuse it with No. 12 *S. robusta*.

14. **S. affinis**, Arn. in Hook. Comp. Bot. Mag. ii. 307; stem 4-12 in. branching nearly glabrous, leaves ovate and ovate-lanceolate serrate, capsule $\frac{1}{8}$ - $\frac{1}{3}$ in. funnel-shaped trigonous 6-ribbed smooth usually shorter than the pedicel. Naud. in Ann. Sc. Nat. ser. 3. xv. 325; Thwaites Enum. 109; Triana in Trans. Linn. Soc. xxviii. 76.

CEYLON, Central Province, alt. 4000 ft.; Thwaites; Gardner, Walker.

Leaves $\frac{7}{8}$ in. (sometimes much smaller), thin, sparsely pilose above, minutely glandular-dotted and sometimes thinly hairy beneath; petiole $\frac{3}{8}$ in. Calyx-tube nearly glabrous, or with a few lax hairs. Petals $\frac{1}{2}$ in., ovate, acute, mauve. Anthers oblong, attenuated upwards. Seed with raised points, raphe excurrent on one side near the top.—See the remarks under No. 4 *S. zeylanica*.

VAR. *rostrata*, Thwaites Enum. 108 (sp.); anthers more attenuated, leaves less serrated, flowers usually a deeper colour.—Ceylon, alt. 1000-2000 ft.; Thwaites No. 2644.

15. **S. rhombifolia**, Thwaites Enum. 108; glabrous, stem 1-2 ft., leaves rhomboid narrowed at both ends crenate-serrate, capsule $\frac{1}{2}$ in. funnel-shaped trigonous 6-ribbed about as long as the pedicel.

CEYLON; at no great elevation, Thwaites.

Leaves 1 in., 3-nerved the lateral nerves near the margin, minutely glandular-punctate; petiole $\frac{1}{2}$ in. Petals $\frac{1}{2}$ in., purple-mauve. Seeds with raised points, raphe excurrent on one side near the top.

16. **S. amabilis**, Triana in Trans. Linn. Soc. xxviii. 76; branches woody round with scattered ascending bristly hairs, leaves oblong petioled 3-nerved subentire with scattered bristly hairs on both surfaces, capsule $\frac{1}{2}$ in. funnel-shaped or somewhat campanulate trigonous 6-ribbed smooth.

SOUTHERN DECCAN PENINSULA. Tinnivelly, alt. 2000 ft.; *Col. Beddome*.

Leaves $1\frac{1}{2}$ in., narrowed to each end, obtuse; petiole $\frac{1}{2}$ in. *Racemes* 3–6-flowered, crowded. *Calyx-tube* with few lax hairs. *Petals* $\frac{3}{8}$ – $\frac{1}{2}$ in., mauve. *Anthers* long, much attenuate.—Mr. Kurz had published a very different species as *Sonerila amabilis*, namely, *S. Kurzii* (No. 38).

17. ***S. travancorica***, *Bedd. Ic. Pl. Ind. Or.* t. 156; branches stout round adpressedly villous, leaves elliptic acute subentire pinnate-nerved with many long brown hairs on both surfaces, capsule $\frac{1}{2}$ in. subcampanulate trigonous 6-ribbed smooth longer than the pedicel. *Triana in Trans. Linn. Soc.* xxviii. 76.

TRAVANCORE, alt. 4000 ft.; *Col. Beddome*.

Leaves $1\frac{1}{2}$ –3 in., acute but scarcely acuminate, glandular-dotted, shaggy on the nerves beneath; petiole $\frac{1}{4}$ – $1\frac{1}{2}$ in. *Racemes* 3–9-flowered, short, pedicels with few scattered hairs. *Calyx-tube* glabrous or sparsely pilose. *Petals* $\frac{3}{8}$ – $\frac{1}{2}$ in., mauve, elliptic, acute. *Anthers* oblong, much attenuated upwards. *Seed* with raised points, raphe excurrent on one side near the top.

18. ***S. hirsutula***, *Arn. in Hook. Comp. Bot. Mag.* ii. 307; branches with spreading rufous hairs, leaves ovate or oblong subentire with many long brown hairs on both surfaces glandular-dotted and shaggy on the nerves beneath, calyx-tube with many lax patent rufous brown hairs. *Thwaites Enum.* p. 108; *Triana in Trans. Linn. Soc.* xxviii. 76.

CEYLON, Central Province, alt. 6000–7000 ft.; *Walker, Thwaites* No. 276.

Stem 1–2 ft. high, erect; branches round with four lines. *Leaves* 1–3 in., 5-nerved from near the rounded or cordate base or imperfectly pinnate-nerved; petiole often 2 in. *Racemes* short-peduncled, about 4-flowered. *Petals* $\frac{5}{8}$ in., elliptic, acute, mauve. *Anthers* greatly elongate. *Capsule* $\frac{1}{4}$ – $\frac{1}{2}$ in., subcampanulate, strongly 6-ribbed, longer than the pedicel.—This species is very near *S. travancorica*; it differs by the patent (not adpressed) hairs on the stem, and the broad or cordate (not acute) base of the leaves.

19. ***S. pilosula***, *Thwaites Enum.* p. 108; leaves ovate-lanceolate pinnate-nerved with short hairs over both surfaces very unequal at the base, calyx-tube with many short patent hairs, petals $\frac{3}{8}$ in. purple-red. *Triana in Trans. Linn. Soc.* xxviii. 76.

CEYLON, *Walker*; Saffragam District, alt. 1000–2000 ft., *Thwaites*.

Stem 6–18 in., round, striated, with many short patent hairs. *Leaves* 2–3 $\frac{1}{2}$ in., entire, somewhat acuminate; petiole 1–2 $\frac{1}{4}$ in. *Racemes* short, 6–12-flowered. *Anthers* much elongate. *Capsule* funnel-shaped, 6-ribbed (*Thwaites*).—This species is marked by the very unequal base of the leaves; one side of the blade being often continued for $\frac{1}{4}$ in. along the petiole. Perhaps a form of No. 22 *S. elegans*.

20. ***S. speciosa***, *Zenk. Pl. Ind.* 18, t. 18; stem nearly or quite glabrous below ending in a long peduncle villous upwards, leaves 5–9-nerved from the base, petals $\frac{5}{8}$ in. mauve round-elliptic acute, capsule $\frac{3}{8}$ in. hispid oblong trigonous from a subcampanulate base. *Zenk. in Ann. Sc. Nat. ser. 1.* vi. 151; *Bot. Mag.* t. 5026; *Wight Ic.* t. 995–2; *Triana in Trans. Linn. Soc.* xxviii. 76. *S. solanoides*, *Naud. in Ann. Sc. Nat. ser. 3.* xv. 324; xvi. t. 18, f. 3. *S. orbiculata*, *Lindl. in Journ. Hort. Soc.* viii. 57, with fig. *S. elegans*, *Bot. Mag.* 4978, not of *Wight*.

Hills of the South DECCAN PENINSULA, frequent. NILGHIRIS, *Wight*; MYSORE, *T. Lobb*; COURTAILLAM, *Wight*; &c.

Stems attaining 9–12 in., upper half often naked. *Leaves* 2–3 in., ovate or elliptic,

acute, glabrous or nearly so, denticulate or subserrate; petiole 1-2 in. *Raceme* often subpaniculate with 8-14 flowers and very hirsute. *Calyx-tube* generally with much lax brown hair. *Anthers* shortly beaked. *Capsule* definitely but lightly 6-ribbed, erect, usually longer than its pedicel. *Seeds* with raised points; raphe large, excurrent, like a hood near the top of the seed on one side.

21. **S. grandiflora**, *Wall. Cat.* 4099; stems very woody below branching round, leaves glabrous bristle-serrate 5-7-nerved from the base, petals $\frac{2}{3}$ - $\frac{3}{4}$ in. elliptic acute mauve. *Wight. Ic. t.* 995; *W. & A. Prodr.* 322; *Bot. Mag. t.* 5354; *Benn. Pl. Jav. Rar.* 216; *Triana in Trans. Linn. Soc.* xxviii. 76.

NILGHIRIS; near Sisparah, *Wight, Gardner.*

Leaves 1-2 in., crowded on the branchlets, oblong or elliptic, narrowed at both ends, acute, not much acuminate; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in. *Racemes* densely flowered; peduncles short, terminal. *Calyx-tube* glabrous. *Anthers* much attenuated. *Capsule* $\frac{1}{4}$ - $\frac{1}{2}$ in., funnel-shaped, smooth, obscurely ribbed.

22. **S. elegans**, *Wight Ic. t.* 995-3; leaves pinnate-nerved with a very few scattered hairs above nearly or quite glabrous beneath, raceme pubescent, pedicel and calyx-tube hairy, capsule finally with its pedicel stiffly scabrous.

NILGHIRIS, Sispara; *Wight No.* 1109 partly, *McIvor.*

Suffrutescent; branches glabrous or with few scattered hairs. *Leaves* 2-4 in., elliptic-lanceolate from a rounded base, minutely serrulate, sometimes purpurascens beneath; petiole $\frac{1}{2}$ -2 in. *Racemes* lateral and terminal, long-peduncled. *Petals* $\frac{1}{2}$ in., light mauve. *Capsule* $\frac{2}{3}$ in., erect, funnel-shaped, trigonous, rather obscurely 6-ribbed, longer than its pedicel. *Seeds* with prominent raised points, raphe much excurrent near the top on one side.—This has been confused with the next species by Triana (*Trans. Linn. Soc.* xxviii. 76) and in Herbaria. It decisively differs by the very scabrous ripe capsules: also the indumentum of the leaves is different, and the peduncle longer. *S. pilosula* Thwaites (No. 19) may be a form of this with more pubescent leaves.

23. **S. versicolor**, *Wight Ic. t.* 1057; leaves pinnate-nerved with scattered hairs on both surfaces, raceme nearly glabrous, pedicel and calyx-tube glabrous, capsule finally quite glabrous. *S. axillaris*, *Wight. Ic. t.* 1058.

NILGHIRIS; *Wight; Gardner, &c. Mysore, T. Lobb.*

Suffrutescent, branches pubescent. *Leaves* 2-4 in., elliptic-lanceolate from a rounded base, finely serrulate, sometimes purpurascens beneath, hairs above sometimes with vesicular bases (giving the leaves a spotted appearance); petiole 1-3 in. *Racemes* terminal and many lateral. *Petals* $\frac{1}{2}$ in., mauve. *Capsules* $\frac{3}{8}$ - $\frac{1}{2}$ in., erect, in crowded clusters, narrowly funnel-shaped or almost oblong, rather obscurely 6-ribbed, longer than the pedicel. *Seeds* with prominent raised points, raphe excurrent near the top on one side.—*S. axillaris* Wight is exactly the same plant the axillary racemes being placed alternately up the stem on short peduncles with some regularity. *S. pilosula* (No. 19) differs by its hairy racemes and calyx-tube. In both *S. versicolor* and *S. elegans* the leaves are more or less unequal at the base.

24. **S. lanceolata**, *Thwaites Enum. p.* 107; leaves sessile long-lanceolate from a rounded base glabrous, capsules $\frac{1}{4}$ - $\frac{1}{2}$ in. clustered glabrous oblong somewhat funnel-shaped distinctly 6-ribbed longer than the pedicel. *Triana in Trans. Linn. Soc.* xxviii. 76; *Bedd. Ic. Pl. Ind. Or. t.* 299.

CEYLON, alt. 1000 ft., *Walker, Thwaites.*

Suffrutescent; branches round, glabrous. *Leaves* 2-3 in., 3-nerved from the base distantly serrulate upwards; petiole less than $\frac{1}{8}$ in. *Petals* $\frac{1}{2}$ in., mauve, broad elliptic, acute. *Anthers* not much attenuated. *Seeds* smooth or nearly so; raphe large, hooded, excurrent the whole length of the seed.

25. **S. angustata**, *Triana in Trans. Linn. Soc.* xxviii. 76; glabrous, leaves narrowly lanceolate 1-nerved, capsule $\frac{1}{5}$ in. short funnel-shaped cernuous about equal in length to the pedicel. *S. rhombifolia* β . *angustata*, *Thwaites ms.*

CEYLON; District Galle, *Thwaites* No. 2799 partly.

Stem 6 in.; branches wiry, subquadangular. Leaves $1\frac{3}{4}$ by $\frac{1}{4}$ in., with remote shallow crenatures upwards; petiole $\frac{1}{5}$ in.—The species is distinguished from No. 15 *S. rhombifolia* *Thwaites* by *Triana*, and the leaves appear very different. The specimen of *Thwaites* has no flowers.

§§ *Species of the Transyangetic Peninsula.*

26. **S. tenuifolia**, *Blume in Flora*, 1831, 491; stem attaining a foot glabrous or with a few spreading hairs, leaves ovate-lanceolate acuminate strongly serrate, capsule glabrous with a very wide mouth. *Benn. Pl. Jav. Rar.* 211, t. 44; *Naud. in Ann. Sc. Nat. ser. 3. xv. 324*; *Miq. Fl. Ind. Bat. i. pt. i. 563*; *Triana in Trans. Linn. Soc.* xxviii. 76.

MALACCA, Mount Ophir; *T. Lobb, Maingay* No. 779.—DISTRIB. Java.

Leaves $\frac{3}{4}$ –2 in., unequal, often pilose above; petiole $\frac{1}{4}$ – $1\frac{1}{2}$ in. Anthers oblong, attenuated. Capsule $\frac{1}{5}$ – $\frac{1}{4}$ in., trigonous, shorter than its pedicel, mouth $\frac{1}{4}$ – $\frac{1}{3}$ in. broad. Seeds with raised points, raphe excurrent on one side near the top.

27. **S. linearis**, *Hook. f. ms.*; *Triana in Trans. Linn. Soc.* xxviii. 76; nearly glabrous, leaves linear-spathulate sessile minutely distantly toothed or subentire, capsule $\frac{1}{4}$ in. campanulate narrow-cylindric glabrous faintly 6-ribbed longer than the pedicel. *Kurz in Journ. As. Soc.* 1877, pt. ii. 78.

MOULMEIN, on Mount Gerai, alt. 3000 ft., *T. Lobb* No. 345, 425.

Very erect, 15 in., with small round branches. Leaves 1 by $\frac{1}{16}$ in. Racemes terminal, 2–4-flowered. Calyx-tube minutely puberulous. Petals $\frac{1}{4}$ in., mauve. Anthers slender, attenuated upwards.

28. **S. picta**, *Korth. Verh. Nat. Gesch. Bot.* 249, t. 52; leaves ovate or lanceolate pinnate-nerved serrulate, racemes about 6-flowered short-peduncled terminal, calyx-tube and pedicel puberulous subpubescent, petals $\frac{1}{2}$ in. elliptic acute mauve, anthers much elongate. *Blume Mus. Bot. i. 11*; *Miq. Fl. Ind. Bat. i. pt. i. 564*; *Naud. in Ann. Sc. Nat. ser. 3. xv. 326*; *Triana in Trans. Linn. Soc.* xxviii. 76; *Kurz in Journ. As. Soc.* 1877, pt. ii. 78.

MERGUI, *Griffith*; Moulmein, *T. Lobb, Parish*.—DISTRIB. Sumatra.

Stem 4–8 in., little divided, pubescent or subtomentose upwards. Leaves 1–4 in., nearly glabrous, pubescent on the nerves beneath, usually none of the nerve quite basal and 2–3 nerves high up the midrib, blotched white or not along the midrib above; petiole $\frac{1}{2}$ – $\frac{3}{8}$ in. Capsule (ex *Korthals*) funnel-shaped, trigonous, sparsely pilose. Seeds with raised points, raphe very excurrent, hooded.

VAR. *Lobbii*; stem very rusty tomentose, leaves small scarcely 1 in.—Top of Thoungyeen, Moulmein, alt. 4000 ft.; *T. Lobb*.

29. **S. secunda**, *R. Br. in Wall. Cat.* 4094; stem weak pubescent simple, leaves elliptic acute pinnate-nerved, peduncle capsules and pedicels glabrous, capsule $\frac{1}{5}$ in. funnel-shaped subtrigonus as long as the pedicel, ribs not prominent. *Benn. Pl. Jav. Rar.* 216; *Triana in Trans. Linn. Soc.* xxviii. 76; *Kurz in Journ. As. Soc.* 1877, pt. ii. 78.

TAVOY; *Wallich*.

Stem 2–4 in., with 4–5 large leaves approximated at its summit. Leaves 2–4 $\frac{1}{2}$ in., minutely denticulate, with scattered long lax hairs on both surfaces, hairs some-

times vesicular at the base, sometimes blotched along the midrib above; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. Peduncle terminal, 2–3 in. Flowers not seen.

§§§ *Species of Bengal.*

30. **S. squarrosa**, Wall. in Roxb. *Fl. Ind. ed. Carey & Wall.* i. 182; stem 2–4 in. little divided thick, leaves crowded towards the upper part of the stem spatulate-lanceolate serrulate, petiole jointed on a tubercle of the stem which is supported on each side by rufous bristles, flowers racemed. Wall. *Cat.* 4093, *Pl. As. Rar.* t. 102; Naud. in *Ann. Sc. Nat. ser.* 3. xv. 325; Triana in *Trans. Linn. Soc.* xxviii. 76.

KHASIA Mts., alt. 3000–4000 ft.; frequent.

Leaves $\frac{3}{4}$ – $1\frac{1}{2}$ in., glabrous, attenuated into the petiole; stipules $\frac{1}{2}$ – $\frac{3}{4}$ in. Racemes few-flowered; peduncles subterminal, short. Calyx-tube glabrous. Petals $\frac{1}{4}$ – $\frac{1}{2}$ in., ovate, acute, mauve. Capsule $\frac{1}{4}$ in., glabrous, funnel-shaped, subtrigonal, hardly ribbed, pedicel very short. Seed obovoid, without raised points, raphe not at all excurrent.

31. **S. arguta**, R. Br. in Wall. *Cat.* 4095; stems 0–2 in., leaves elongate spatulate, petiole jointed on a tubercle of the stem which is supported on each side by a rufous bristle, peduncle 1-flowered. Naud. in *Ann. Sc. Nat. ser.* 3. xv. 326; Triana in *Trans. Linn. Soc.* xxviii. 76.

KHASIA Mts., alt. 3000–4000 ft., Wallich, H. f. & T., C. B. Clarke.

Leaves (including the petiole) 1–4 by $\frac{1}{4}$ – $\frac{1}{2}$ in., attenuated into the petiole, with scattered large hairs above or glabrous, 1-nerved, very minutely denticulate. Peduncle $1\frac{1}{2}$ –2 in. Calyx-tube glabrous. Petals $\frac{3}{8}$ – $\frac{1}{2}$ in., mauve, elliptic, acute. Capsule $\frac{3}{8}$ in., oblong, glabrous, subtrigonal, ribs obscure. Seed obovoid, with minute raised points, raphe not excurrent.—One example collected by Sir J. D. Hooker has broadly lanceolate leaves, $\frac{3}{8}$ in. broad, but agrees otherwise with the type.

32. **S. maculata**, Roxb. *Fl. Ind.* i. 177; stem short decumbent round often divided and with several lateral racemes, leaves pinnate-nerved ovate or lanceolate from a rounded or narrowed base ciliate scarcely serrulate usually with many long hairs on both surfaces sometimes nearly glabrous, peduncles not very long, capsules glabrous cernuous in clusters of 5–15. Wall. *Cat.* 4091; Triana in *Trans. Linn. Soc.* xxviii. 76; Kurz in *Journ. As. Soc.* 1877, pt. ii. 78. *S. emaculata*, Roxb. *Fl. Ind.* i. 178. *S. angustifolia*, Roxb. l. c., not of Wall. *Cat.*; Wall. *Pl. As. Rar.* t. 102. *S. picta*, Griff. *Notul.* iv. 676 (ex Kurz in *Flora* 1871–90). *S. Brandisiana*, Kurz in *Flora*, 1871, 290. *Sonerila* sp. 3 and 4, Griff. *Notul.* iv. 676.

NIPAL; Wallich. ASSAM HILLS and KHASIA Mts., alt. 1000–5000 ft., plentiful. MARTABAN and TENASSERIM, Kurz.

Leaves often 4 by 2 in., frequently unequal at the base, sometimes appearing spotted above from vesicular-based hairs; petiole 1–2 in., usually ciliate and pubescent. Calyx-tube puberulous, and generally with a few scattered hairs. Petals mauve, elliptic, very acute. Capsule $\frac{1}{4}$ in., oblong or somewhat funnel-shaped, slightly trigonal, obscurely ribbed, much longer than the pedicel. Seeds with prominent raised points, raphe only slightly excurrent near the top of the seeds on one side.—Wall. *Cat.* 4090 marked *Sonerila angustifolia* Roxb. is an *Argostemma*.

†† *Plants with distinct stems, the leaves of each pair exceedingly dissimilar.*

33. **S. moluccana**, Roxb. *Fl. Ind.* i. 178; stem short hirsute, larger leaf of each pair 4–5 in. with a petiole of 1 in. the smaller one $\frac{1}{2}$ in., capsule

intensely hispid scabrous. *Wall. Cat.* 4089; *Blume Mus. Bot.* i. p. 10; *Benn. Pl. Jav. Rar.* 215; *Miq. Fl. Ind. Bat.* i. pt. i. 562; *Triana in Trans. Linn. Soc.* xxviii. 77. *S. paradoxa*, *Naud. in Ann. Sc. Nat. ser.* 3. xv. 321. *S. begoniæ-folia*, *Blume Mus. Bot.* i. p. 11; *Naud. l. c.* 322; *Triana l. c.*

PINANG; *Wallich, Griffith, Maingay.* MALACCA; *Maingay.* SINGAPORE; *Wallich, Lobb.*—DISTRIB. Malaya.

Leaves ovate-lanceolate, very unequal at the base, pinnate-nerved, with much rufous or brown hair on both surfaces, ciliate, hardly serrulate. *Calyx-tube* very shaggy. *Petals* $\frac{1}{2}$ in., elliptic, acute. *Capsule* less than $\frac{1}{2}$ in., broad-campanulate, longer than its pedicel. *Seeds* almost epunctate, raphe very strongly excurrent near the top on one side.

††† *Stemless or almost stemless species (the stem sometimes elongate in S. Griffithii).*

§ *Capsule subhemispheric, i.e. short with the three angles obscure.*

34. ***S. Wallichii***, *Benn. Pl. Jav. Rar.* 215; leaves pinnate-nerved ovate acute, capsule short subcampanulate glabrous crowned by a prominent white margin, seeds with raised points and the raphe moderately excurrent on one side towards its top. *Triana in Trans. Linn. Soc.* xxviii. 77. *S. Rheedii*, *Wall. Cat.* 4096; *W. & A. Prodr.* 321. *S. acaulis*, *Beddome in Trans. Linn. Soc.* xxv. 216.

SOUTH MALABAR GHATS. COCHIN, *Johnston*; ANAMALLAYS, *Beddome*; BABABOODUN HILLS, *Law*.

Leaves from $\frac{1}{2}$ to 5 in. often broad or cordate at the base sometimes acute, minutely denticulate or entire, usually puberulous and also with a few scattered hairs; petiole 0–2½ in. *Peduncle* 1–8 in.; flowers 3–17, crowded, subumbelled; pedicels glabrous. *Petals* $\frac{1}{4}$ in., elliptic, acute, mauve. *Anthers* not greatly elongate. *Capsule* $\frac{1}{16}$ – $\frac{1}{10}$ in. exclusive of the margin, shorter than the pedicel.

35. ***S. scapigera***, *Dalz. in Hook. Lond. Journ. Bot.* vii. 672, t. 23; leaves nerved from near the base ovate or ovate-oblong, capsule campanulate glabrous crowned by a very narrow margin, seeds without raised points or excurrent raphe. *Dalz. & Gibs. Bomb. Fl.* 93; *Triana in Trans. Linn. Soc.* xxviii. 77.

BOMBAY GHATS, *Dalzell*; CONCAN and Bababoodun Hills, *Law*; MYSORE, *Lobb*.

Leaves commonly $\frac{1}{2}$ –1½ in., broad or cordate at the base, minutely crenate-serrate, glabrous, sometimes glandular puberulous dotted above; petiole often 2 in. *Peduncle* 1–3 in.; flowers 4–10, crowded, subumbellate; pedicels glabrous or nearly so. *Petals* $\frac{1}{3}$ – $\frac{3}{8}$ in., elliptic, acute, mauve. *Anthers* much elongate. *Capsule* $\frac{1}{8}$ – $\frac{1}{2}$ in., shorter than the pedicel.—The peduncle pedicels and petioles frequently become succulent and much thickened. Generally resembling *S. Wallichii* and closely allied to it.

36. ***S. rotundifolia***, *Bedd. in Trans. Linn. Soc.* xxv. 216; leaves orbicular or ovate nerved from near the base, peduncles 1–4-flowered, raceme glabrous or nearly so, capsule short hemispheric glabrous crowned by a narrow margin, seeds with raised large subtubercular points raphe not excurrent. *Triana in Trans. Linn. Soc.* xxviii. 77; *Bedd. Ic. Pl. Ind. Or.* t. 169.

SOUTH DECCAN; Anamallays, alt. 5000 ft.; *Beddome*.

Leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., cordate at the base, minutely denticulate, glabrous and minutely puberulous, dotted on both surfaces; petiole $\frac{1}{2}$ –1½ in. *Peduncles* 1½–3 in. *Petals* $\frac{3}{8}$ in., orbicular-obovate, mauve. *Anthers* short for the genus, little attenuate, truncate. *Capsule* $\frac{1}{16}$ – $\frac{1}{10}$ in., shorter than the pedicel.

37. **S. Kurzii**, C. B. Clarke; leaves orbicular nerved from the base, pedicels 3-5 with many patent hairs, capsule short (Kurz). *S. amabilis*, Kurz in *Flora*, 1871, 290.

SIKKIM; Rungait Valley, alt. 4000-5000 ft., Kurz; Rungbee Valley, alt. 2000-3000 ft., Jaffrey.

Leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., with many long patent hairs, subentire, cordate at the base; petiole $\frac{1}{2}$ - $1\frac{1}{4}$ in., with long patent hairs. Peduncle 1-2 in., with many patent hairs; pedicels crowded, subumbelled. Petals $\frac{3}{8}$ in., broadly elliptic, obtuse, rose-mauve. Anthers narrower upwards, hardly acuminate.

§§ Capsule oblong funnel-shaped, distinctly trigonous.

38. **S. Griffithii**, C. B. Clarke; leaves glabrous minutely dotted puberulous beneath, capsule $\frac{1}{2}$ in. funnel-shaped, pedicel nearly $\frac{1}{2}$ in., seeds with very minute points raphe prominently excurrent on one side near the top.

MALACCA, Mount Ophir; Griffith (Kew Distrib. No. 2300), T. Lobb, Maingay No. 781.

Stemless, or the stem 1-2 $\frac{1}{2}$ in. Leaves $\frac{1}{2}$ -1 in., ovate, glabrous or with scattered bristly hairs above, minutely denticulate, subciliate, nerves from near the base; petiole $\frac{1}{4}$ -1 in. Peduncle 1-4 in., 2-6-flowered; raceme short, glabrous or nearly so. Petals $\frac{1}{2}$ in., broadly elliptic, acute. Anthers long, attenuate.

39. **S. nudiscapa**, Kurz in *Journ. As. Soc.* 1877, pt. ii. 78; leaves with flaccid scattered hairs beneath, capsule $\frac{1}{2}$ in. narrow funnel-shaped, pedicel much shorter, seeds with very small minute raised points raphe scarcely excurrent.

MERGUI; Griffith (Kew Distrib. No. 2303). TENASSERIM or ANDAMANS, Helfer (Kew Distrib. No. 2303).

Nearly stemless. Leaves 1-2 in., very thin, ovate or elliptic-oblong, obtuse, nearly entire, somewhat pinnate-nerved; petiole 0- $\frac{3}{4}$ in. Peduncle 1-1 $\frac{1}{2}$ in., 3-8-flowered; raceme short, glabrous or nearly so. Petals $\frac{1}{4}$ in., elliptic, acute. Seeds hardly half as large as in any other species.

40. **S. violæfolia**, Hook. f. ms.; Triana in *Trans. Linn. Soc.* xxviii. 77; glabrous, bundles of rufous bristles $\frac{1}{8}$ - $\frac{1}{5}$ in. about the base of the petioles, capsule $\frac{1}{5}$ in. funnel-shaped usually shorter than the pedicel, seeds with minute raised points raphe not excurrent. Kurz in *Journ. As. Soc.* 1877, pt. ii. 78.

MOULMEIN; Lobb No. 356.

Stemless. Leaves 1-2 in., ovate, entire or minutely denticulate, 5-nerved, the upper two nerves often branching from the midrib at a point some way above its base; petiole $\frac{1}{2}$ -2 $\frac{1}{4}$ in. Peduncle 1-3 $\frac{1}{4}$ in., 3-8-flowered. Petals $\frac{1}{2}$ in., mauve, elliptic, acute. —In this and the next species the rufous bristles at the base of the petiole are exceedingly like those in *S. arguta* and *S. squarrosa*, but they are in numerous tufts (not 2 only and quasi-stipular as in those species) and the petiole is not jointed on a tubercle of a woody stem as in those species.

41. **S. khasiana**, C. B. Clarke; bundles of rufous bristles $\frac{1}{2}$ - $\frac{1}{4}$ in. about the base of the petioles, leaves usually with scattered bristly hairs above, capsule $\frac{1}{8}$ - $\frac{1}{5}$ in. oblong shorter than the pedicel, seeds with minute dots raphe not excurrent.

KHASIA Mts., alt. 4000-5000 ft.; Mamloo, Kalapani, H. f. & T.; Jarnin in Jaintea, C. B. Clarke.

Stemless. *Leaves* less than 1 in., ovate, often acute, entire, ciliate but scarcely serrate, 5-nerved from the base or the two upper nerves from the midrib; petiole $\frac{1}{2}$ – $1\frac{1}{2}$ in. *Peduncle* 1– $2\frac{1}{2}$ in., 1–4-flowered. *Petals* $\frac{1}{4}$ in., mauve, elliptic, acute. *Anthers* long, narrowed upwards but scarcely acuminate.—Near *S. violæfolia*, and possibly a hairy dwarf mountain form of it.

SECTION B. Stamens 6.

42. **S. heterostemon**, *Naud. in Ann. Sc. Nat. ser. 3. xv. 326, xvi. t. 18, f. 4*; glabrous or nearly so, leaves unequal, stamens 3 with longer filaments and purple anthers somewhat produced at base 3 with yellow anthers not produced, capsule broadly funnel-shaped sessile.

MALACCA; *Griffith, Lobb, Cuming*. SINGAPORE; *Maingay*.—DISTRIB. Malaya.

Stems attaining 18 in., much branched, with many lateral racemes. *Leaves* 2– $4\frac{1}{2}$ in., elliptic, acuminate or acute, broad often unequal at the base, entire, with 5–7 main longitudinal nerves; petiole $\frac{1}{4}$ – $1\frac{1}{2}$ in. *Racemes* on short peduncles, elongate in fruit, 10–20-flowered. *Seeds* with raised points, raphe excurrent the whole length of the seed.—The sessile broad funnel-shaped capsules readily distinguish this species. The leaves are sometimes puberulous subpubescent on the nerves, and sometimes show spots on the upper surface. This species is reduced to *S. obliqua*, *Korth. Verh. Nat. Gesch. Bot. p. 250* by Triana and probably correctly: but *S. obliqua* *Korth.* is classed as triandrous by all who quote it: cf. *Miq. Fl. Ind. Bat. i. pt. i. 563*.

43. **S. Bensoni**, *Hook. f. in. Bot. Mag. t. 6049*; glabrous below, peduncle upwards and raceme hairy, stamens equal, anthers all yellow not produced at the base.

Raised in London from seed sent from the MALABAR GHATS by Col. Benson.

This plant seems exactly *S. speciosa* (No. 20). The change of habitat and forcing in rich soil in an English stove may have developed the three stamens usually suppressed in the genus (?).

DOUBTFUL SPECIES.

S. BULLATA, *Griff. Notul. iv. 675*, from Malacca, is not identifiable. Triana (*Trans. Linn. Soc. xxviii. 77*) thinks it may be a *Driessenia*, but the terminal panicle points rather to *Allomorphia*.

S. GLABERRIMA, *Arn. in Hook. Bot. Mag. ii. 307*. The specimen thus named in Wight's Herbarium is *S. rhombifolia*. We have seen no other.

S. HELFERI, *C. B. Clarke*; stem 8 in. branched woody round rusty-pubescent, leaves $\frac{5}{8}$ in. elliptic acute entire 3-nerved from the base rusty shortly pubescent on both surfaces as is the petiole ($\frac{1}{4}$ in.), racemes lateral 2–4-flowered on peduncles less than $\frac{1}{4}$ in., capsule $\frac{1}{4}$ – $\frac{1}{2}$ in. funnel-shaped subsessile nearly glabrous with triangular erect teeth.—TENASSERIM or ANDAMANS, *Helper* (*Kew Distrib. No. 2295*).

S. MACULATA; Rheede's plant (*Hort. Mal. ix. t. 65*) usually referred to *S. maculata* is certainly not that plant; it may be No. 20 *S. speciosa*, *Zenk.*

11. **SARCOPYRAMIS**, *Wall.*

An erect glabrous herb; stem quadrangular. *Leaves* petioled, ovate or lanceolate, serrulate, 3-nerved. *Flowers* in small clusters, pedicelled or nearly sessile, axillary and terminal, small, rose-purple. *Calyx-tube* glabrous, obpyramidal, 4-winged; limb very short, 4-toothed. *Petals* 4, ovate. *Stamens* 8, equal; anthers oblong, scarcely produced at the base, connective appendaged at the base with a spur. *Ovary* half-adnate to the calyx, 4-celled; style filiform; ovules very many, placentas axile. *Capsule* crowned with four large scales,

opening by 4 valves at the top. *Seeds* numerous, obovoid, covered with prominent raised points, raphe not excurrent.

1. **S. nepalensis**, *Wall. Tent. Fl. Nep.* t. 23; *Cat.* 4088; *Benn. Pl. Jav. Rar.* 214. *S. lanceolata*, *Wall. Cat.* 6290; *Benn. l. c.*; *Kurz in Journ. As. Soc.* 1877, pt. ii. 77. *S. grandiflora*, *Griff. Notul.* iv. 678; *l. c. Pl. Asiat.* t. 639.

NIPAL and SIKKIM, alt. 4000–9000 ft.; plentiful. KHASIA MTS., alt. 4000–6000 ft.; plentiful. BURMA and MALAY PENINSULA; *Griffith, Kurz.*

Stem often 2–6 in., succulent, weak, sometimes 18 in. with thick woody branches. *Leaves* 2–4 in., from ovate to lanceolate, long-acuminate; petiole $\frac{1}{2}$ –1 in. *Calyx-tube* glabrous, sometimes with minute bundles of hairs between the bases of the teeth. *Petals* scarcely $\frac{1}{4}$ in. *Fruit* about $\frac{1}{4}$ in., quadrangular, mouth of the calyx-tube very wide. —Triana reduces (*in Trans. Linn. Soc.* xxviii. 77, 78) to this species *Sonerila Naudiniana* *Miq. Fl. Ind. Bat.* i. pt. i. p. 565 with syn. But Miquel removed this plant from *Sarcopyramis* because it had 6 stamens: there is no authentic specimen of it at Kew.

12. **PHYLLAGATHIS**, *Blume.*

Herbaceous small shrubs with very short stems. *Leaves* opposite (or the terminal leaf solitary), large, petioled, orbicular, cordate, 7–9-nerved. *Flowers* in a peduncled dense head, purple. *Calyx-tube* campanulate, glabrous or with long bristles near the top, teeth 4 (rarely 3), acute, long-setose. *Petals* 4 (rarely 3), ovate, acute, glabrous. *Stamens* 8 (rarely 6), equal; anthers elongate, scarcely produced at the base, connective without appendage. *Ovary* adnate to the bottom of the calyx-tube, 4- (rarely 3-) celled, glabrous at the apex; style filiform; ovules very numerous, placentas large axile. *Capsule* broadly funnel-shaped, opening by 4 valves at the top. *Seeds* ellipsoid, somewhat obovoid, with glandular hardly raised dots, raphe slightly excurrent along one side of the seed its whole length.—DISTRIB. Species 2; one Malayan, one Bornean.

1. **P. rotundifolia**, *Blume in Flora*, 1831, 507; leaves glabrous or puberulo-glandular beneath, flower-heads with ovate bracts beneath. *Korth. in Verh. Nat. Gesch. Bot.* t. 57; *Naud. in Ann. Sc. Nat. ser. 3.* xv. p. 332; *Bot. Mag.* t. 5282; *Triana in Trans. Linn. Soc.* xxviii. 77. *Melastoma rotundifolium*, *Jack in Trans. Linn. Soc.* xiv. 12; *DC. Prodr.* iii. 149.

MALACCA; *Griffith, Maingay.* ? TENASSERIM or ANDAMANS, *Helfer* No. 2266.

Leaves usually 4–9 in. diam., obtuse or acute, entire, usually red beneath; petiole 2–5 in., with long pendent coarse bristles or nearly glabrous. *Bracts* to the flower head red, $\frac{1}{2}$ in. wide and upwards. *Calyx-teeth* from short-ovate with a mucro to ovate-lanceolate attenuate. *Capsule* about $\frac{1}{4}$ in., fruiting pedicel about $\frac{1}{2}$ in.—*Helfer's* No. 2266, in fruit, shows the capsule trigonous with smooth almost convex faces: the other typical examples show the fruit 6–8-ribbed, the ribs prominent: in all these the fruit is over-ripe and the wall partly broken down. *Helfer's* plant may be a new species or even a new genus; but the leaves are exceedingly like the well-marked leaves of *Phyllagathis*.

13. **MARUMIA**, *Blume.*

Twining shrubs; branches round, thickened at the nodes. *Leaves* opposite, short-petioled, coriaceous, elliptic-lanceolate, cordate at the base, 3-nerved from the base besides two submarginal nerves, entire, tomentose beneath. *Cymes* axillary; flowers 3–5, large, pedicelled, purple or white. *Calyx-tube* cylindric,

tomentose (and often bristly or stellate-hairy); lobes 4, persistent. *Petals* 4, obovate. *Stamens* 8, unequal; anthers elongate, opening by a single pore; connective of the longer anthers carrying in front two long bristles and behind often one or two spurs or several twisted bristles. *Ovary* at the base (or half its height) adnate to the calyx, 4-celled, densely hairy at the apex; style filiform; ovules numerous, placentas axile. *Berry* ellipsoid, crowned by the calyx-limb. *Seeds* numerous, oblong-ellipsoid, with glandular scarcely raised dots, raphe slightly excurrent along the whole length of one side.—**DISTRIB.** Species 10, extending from the southern half of the Transgangetic Peninsula to Borneo and the Philippines.

1. **M. nemorosa**, *Blume in Flora*, 1831, 505; branches rusty closely pubescent subtomentose, calyx-tube rusty closely pubescent stellate-tomentose sometimes scabrous subtuberculate, teeth ovate-lanceolate acuminate. *Naud. in Ann. Sc. Nat. ser. 3. xv.* 279; *Miq. Fl. Ind. Bat. i. pt. i.* 532; *Triana in Trans. Linn. Soc. xxviii.* 82. *M. affinis*, *Korth. in Verh. Nat. Gesch. Bot.* 241, t. 60; *Miq. l. c.* 533. *Melastoma nemorosum*, *Jack in Trans. Linn. Soc. xiv.* 8; *DC. Prodr. iii.* 149; *Wall. Cat.* 4043.

PINANG; *Wallich, Schomburgk, Phillips.* MALACCA; *Griffith, Maingay.*—**DISTRIB.** Borneo, Sumatra.

Leaves 3–4 in., shining, minutely puberulous above, rufous-stellate beneath; petiole $\frac{1}{4}$ in. *Peduncle* 1–2 in.; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. Connective of the longer *anthers* at the base with two long bristles in front and several short twisted hairs behind.

2. **M. zeylanica**, *Blume in Flora*, 1831, 505; branches rusty closely pubescent or subtomentose and with scattered spreading long bristles, calyx-tube rufous-stellate tomentose and with spreading bristles $\frac{1}{2}$ in., teeth triangular-lanceolate. *Blume Rumph. t. 5*; *Triana in Trans. Linn. Soc. xxviii.* 82. *M. echinulata*, *Naud. in Ann. Sc. Nat. ser. 3. xv.* 280; *Miq. Fl. Ind. Bat. i. pt. i.* 534. *Melastoma rhodocarpum*, *Wall. Cat.* 4045.

MALACCA; *Maingay.* SINGAPORE; *Wallich, Walker, T. Anderson.*—**DISTRIB.** Malaya to the Philippines.

Leaves 3–4 in., shining above, rufous-stellate beneath; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in. *Peduncle* 1 in., pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. Connective of the longer *anthers* at the base with two long bristles in front and several short twisted hairs behind.

VAR. subglabrata; leaves beneath glabrous except the nerves. Singapore, *T. Anderson.*

3. **M. reticulata**, *Blume Mus. Bot. i.* 34; branches rusty tomentose and with spreading scattered long bristles, calyx-tube rufous-stellate tomentose and with spreading bristles $\frac{1}{4}$ in. from clustered tubercular bases, teeth short triangular in the bud ovate rounded reflexed after flowering tomentose within. *Triana in Trans. Linn. Soc. xxviii.* 82. *M. stellulata*, *Korth. in Verh. Nat. Gesch. Bot.* 243, not of *Blume*.

MALAY PENINSULA; *Griffith (Kew Distrib. No. 2269).* MALACCA; *Maingay No. 784.*—**DISTRIB.** Sumatra and Java.

Leaves 2–3 $\frac{1}{2}$ in., shining impressed-reticulate above, with scattered stellate pubescence beneath; petiole $\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ –1 in., chiefly from the upper axils forming a quasi-terminal panicle; pedicels $\frac{1}{2}$ in. Connective of the longer *anthers* at the base with two long bristles in front; anthers very long, sigmoid.—*M. oligantha*, *Naud. in Ann. Sc. Nat. ser. 3. xv.* 300; *Miq. Fl. Ind. Bat. i. pt. i.* 534 is said by *Triana* to be also a syn. of *M. reticulata*, *Blume*.

14. **DISSOCHÆTA**, Blume.

Shrubs, usually twiners. *Leaves* opposite, petioled or nearly sessile, elliptic or oblong-lanceolate, rounded at the base, 3-nerved from the base besides two submarginal nerves, entire. *Flowers* large or small, in terminal sometimes leafy panicles, purple or white, bracts large or small. *Calyx-tube* campanulate-cylindric, densely stellate-tomentose pubescent or glabrous; limb obscurely 4-lobed, more rarely distinctly 4-toothed, persistent. *Petals* 4. *Stamens* 8, unequal, 4 shorter sometimes wanting, connective of the 4 longer with 2 long bristles in front at the base (in all the Indian species). *Ovary* adnate to the calyx, 4-celled, apex glabrous or densely hairy; style filiform; ovules very many, placentas axile. *Berry* ovoid or elliptic, crowned with the calyx-limb. *Seeds* ellipsoid, flattened on the side of the raphe.—**DISTRIB.** Species 16, extending from Pinang and Malacca throughout Malaya to the Philippines.

* *Anthers* very long, attenuate upwards.

1. **D. annulata**, Hook. f. ms.; Triana in Trans. Linn. Soc. xxviii. 83; branches panicle and leaves beneath with much rufous stellate tomentum, panicle narrow leafy with large bracts to the young flowers, calyx-tube of the buds more than $\frac{1}{2}$ in. densely woolly-rufous and stellate-hairy, teeth distinctly triangular. *Melastoma bracteatum*, Wall. Cat. 4044, partly.

PINANG; Wallich, Griffith (Kew Distrib. No. 2268). Mount Ophir, MALACCA, Maingay No. 788.—**DISTRIB.** Borneo.

Leaves 3–4 $\frac{1}{2}$ in., glabrous above or minutely pubescent on the nerves; petiole $\frac{1}{4}$ in. *Panicle* consisting of axillary cymes (exactly resembling that of *Marumia reticulata*); bracts $\frac{3}{4}$ in., oblong, caducous; pedicels less than $\frac{1}{4}$ in. *Fruit* (not ripe) ellipsoid, calyx-mouth enlarged, teeth somewhat rounded.—The stem of this plant has rings at the nodes as in *Marumia*: its natural affinity seems altogether with *Marumia reticulata* and *M. nemorosa*: it recedes from *M. reticulata* only by the absence of the long bristles on the calyx-tube so common in *Marumia*; from *M. nemorosa* it recedes by the quasi-paniculate inflorescence and the absence of any twisted hairs at the base of the connective other than the two long bristles in front.

2. **D. punctulata**, Hook. f. ms.; Triana in Trans. Linn. Soc. xxviii. 83; branches and panicle densely closely dark-red furfuraceous, panicle narrow not leafy, bracts small linear deciduous, calyx-tube $\frac{1}{5}$ – $\frac{1}{4}$ in. densely dark-red furfuraceous, teeth short triangular in the expanded flower.

MALACCA; Griffith (Kew Distrib. No. 2291); Maingay No. 789. SINGAPORE and PINANG; Walker.

Leaves 2 $\frac{1}{2}$ –3 $\frac{1}{2}$ in., glabrous above, with scattered dark-red stellate hairs beneath; petiole $\frac{1}{5}$ – $\frac{3}{8}$ in. *Panicle* terminal, pedicels hardly more than $\frac{1}{4}$ in. *Fruit* (not ripe) campanulate (seems about to become ovoid), calyx-teeth not then prominent, nor the mouth enlarged.

3. **D. bracteata**, Blume in Flora, 1831, 495; branches upwards and panicle with small stellate pubescence, panicle somewhat spreading not leafy, bracts large oblong longer than the expanding buds, calyx-tube of the buds $\frac{1}{4}$ – $\frac{1}{2}$ in. with more or less stellate pubescence limb (in the bud) nearly entire or very obscurely 4-toothed. *Miq. Fl. Ind. Bat. i. pt. i. 529*; Triana in Trans. Linn. Soc. xxviii. 84. *D. bracteosa*, Naud. in Ann. Sc. Nat. ser. 3. xv. 76; *Miq. Fl. Ind. Bat. i. pt. i. 527*. *Melastoma bracteatum*, Jack in Trans. Linn. Soc. xiv. 9; Wall. Cat. 4044, partly.

PINANG; *Wallich*, *Porter*. MALACCA; *Maingay* No. 791, 793.

Leaves $2\frac{1}{2}$ – $3\frac{1}{2}$ in., glabrous above, with scattered stellate hairs beneath; petiole $\frac{1}{4}$ in. *Pedicels* $0\frac{1}{4}$ in. *Petals* rose (Jack). *Fruit* ellipsoid, mouth of the calyx enlarged.—*Maingay's* example No. 791 has larger flowers than the *Wallichian* types but appears to agree otherwise: the fruits in *Maingay's* examples are more than $\frac{1}{2}$ in. long (though not ripe).

4. **D. pallida**, *Blume in Flora*, 1831, 500; branches and panicle minutely puberulous with microscopic stellate often evanescent hairs, panicle somewhat spreading not leafy with minute lanceolate caducous bracts, calyx-tube of the buds $\frac{1}{4}$ – $\frac{1}{2}$ in. minutely puberulous or glabrous, limb (in the bud) nearly entire or very obscurely 4-lobed. *Naud. in Ann. Sc. Nat. ser. 3. xv. 77, t. xv. f. 4*; *Miq. Fl. Ind. Bat. i. pt. i. 528*; *Triana in Trans. Linn. Soc. xxviii. 83*. *D. superba*, *Naud. l. c.*; *Miq. l. c.* *D. ovalifolia*, *Naud. l. c. 76*; *Miq. l. c. 527*. *D. astrostricta*, *Miq. Fl. Ind. Bat. Suppl. 318*. *Melastoma pallida*, *Jack in Trans. Linn. Soc. xiv. 12*; *DC. Prodr. iii. 150*; *Wall. Cat. 4049*.

PINANG; *Wallich*. MALAY PENINSULA; *Griffith* (Kew Distrib. No. 2292). SINGAPORE, PINANG &c.; *Walker*, *Maingay* No. 792.—DISTRIB. Malaya Archipelago.

Leaves attaining 6 by $3\frac{1}{4}$ in., glabrous above, dotted beneath with separate stellate minute hairs; petiole $\frac{3}{8}$ in. *Pedicels* less than $\frac{1}{4}$ in. *Fruit* ovoid, mouth of the calyx much enlarged.—The 4 shorter stamens are sometimes obsolete, which accounts for the multiplication of species here by authors.

** *Anthers short, oblong, truncate, not narrowed upwards.*

This section is much more distinct from section * than the latter is from *Marumia*; there is no case of intermediate anthers, they are either decidedly truncate or very elongate. The three species of this section ** are very closely allied; the panicle is large and lax, the ultimate pedicels short, the bracts caducous, the flowers small, the calyx-limb from the bud truncate or only very obscurely 4-lobed.

5. **D. intermedia**, *Blume in Flora*, 1831, 493; leaves beneath and panicle stellately tomentose sometimes ferruginous, fruit $\frac{1}{4}$ in. broad more or less pubescent crowned by the enlarged calyx-mouth not distinctly ribbed. *Naud. in Ann. Sc. Nat. ser. 3. xv. 72*; *Miq. Fl. Ind. Bat. i. pt. i. 524*; *Triana in Trans. Linn. Soc. xxviii. 83*. *Melastoma rubiginosum*, *Wall. Cat. 4052, partly*.

PINANG and SINGAPORE; *Wallich*. MALAY PENINSULA, *Griffith* (Kew Distrib. No. 2287), *Helper* (Kew Distrib. No. 2286).—DISTRIB. Malay Archipelago.

Leaves 3 in.; petiole $\frac{1}{2}$ in. Nodes of panicle often much thickened. *Flowers* rather larger than in the two following species.

6. **D. celebica**, *Blume Mus. Bot. i. 36*; leaves beneath and panicle rufous-stellate tomentose, fruit less than $\frac{1}{2}$ in. broad minutely pubescent ribbed, calyx-limb caducous leaving only a scar. *Miq. Fl. Ind. Bat. i. pt. i. 530*; *Triana in Trans. Linn. Soc. xxviii. 83*. *D. microcarpa*, *Naud. in Ann. Sc. Nat. ser. 3. xv. 72*; *Miq. l. c. 523*. *D. bancana*, *Miq. l. c. 529*. *Melastoma fallax*, *Wall. Cat. 4050*; ? *Jack in Trans. Linn. Soc. xiv. 13*. *M. rubiginosum*, *Wall. Cat. 4052, partly*.

PINANG; *Wallich*. MALAY PENINSULA; *Griffith* (Kew Distrib. No. 2288). MALACCA; *Maingay* No. 790. SINGAPORE; *T. Anderson*.—DISTRIB. Malay Archipelago.

Leaves 3 in.; petiole $\frac{1}{2}$ in. Nodes of panicle often much thickened.—Not well distinct from the preceding species.

7. **D. gracilis**, *Blume in Flora*, 1831, p. 498; leaves beneath and panicle glabrous or very nearly so, fruit less than $\frac{1}{2}$ in. broad glabrous ovoid much nar-

rowed upwards, calyx-mouth appearing only as a scar. *Korth. Verh. Nat. Gesch. Bot.* 267; *Naud. in Ann. Sc. Nat. ser. 3. xv. 75*; *Miq. Fl. Ind. Bat. i. pt. i. 526*; *Triana in Trans. Linn. Soc. xxviii. 83*. *Melastoma gracile*, *Jack in Trans. Linn. Soc. xiv. 14*; *DC. Prodr. iii. 149*. *M. fallax*, *Wall. Cat. 4080*. ? *M. glauca*, *Griff. Ic. Pl. Asiat. 637*.

PINANG and SINGAPORE; *Wallich*.—DISTRIB. Malay Archipelago.

Leaves 3 in.; petiole sometimes $\frac{3}{4}$ in. Nodes of *panicle* often thickened. *Stamens* 8 or 4, as in the two preceding species. *Petals* nearly white (Jack). *Bracts* $\frac{1}{2}$ in., oblong, much exceeding the expanding buds.

15. ANPLECTRUM, A. Gray.

Twining shrubs. *Leaves* opposite, short-petioled, entire, oblong, narrowed upwards, 3-5-nerved from the base. *Flowers* not large, white, in terminal panicles sometimes leafy at the base. *Calyx-tube* ovoid, limb obscurely 4-lobed or truncate. *Petals* 4. *Stamens* 4 perfect; anthers attenuated upwards, opening by one pore, connective at base shortly appendaged or subnude, never with two long bristles in front; imperfect stamens 4, 2, or 0, with a rudimentary anther often bicaudate. *Ovary* 4-celled, free at the apex, with 4 vertical ridges; style simple; ovules many, placentas axile. *Berry* ovoid or globose, crowned with the calyx-limb. *Seeds* very many, small, falcate, obovoid; raphe long, lateral.—DISTRIB. Species 12, extending from Mergui, Pinang and Singapore to Borneo, and the Philippines.

1. **A. glaucum**, *Triana in Trans. Linn. Soc. xxviii. 84 excl. many of the syn.*; leaves 4-6 in. from a broad or subcordate base glabrous beneath suddenly narrowed into a short obtuse subcaudate tip. *A. cyanocarpum*, *Kurz in Journ. As. Soc. 1877, pt. ii. 78, not of Triana*. *Dissochæta spoliata*, *Naud. in Ann. Sc. Nat. ser. 3. xv. 69, t. 4, fig. 1*; *Miq. Fl. Ind. Bat. i. pt. i. 521*. *Melastoma cernuum*, *Wall. Cat. 4054, not of Roxb.* *M. glaucum*, *Wall. Cat. 4055*. *Osbeckia tetrandra*, *Roxb. Fl. Ind. ii. 224*.

PINANG; *Wallich*. MERGUI and MALAY PENINSULA; *Griffith* (Kew Distrib. No. 2289); *Maingay* No. 793-2. TENASSERIM or ANDAMANS; *Helfer* (Kew Distrib. No. 2290).—DISTRIB. Malay Archipelago.

Flowers cernuous. Shorter *stamens* 4, 2 or 0. *Fruit* $\frac{1}{8}$ – $\frac{1}{10}$ in. broad. *Pedicels* and *calyx-tube* minutely puberulous, plant otherwise glabrous.—*A. cyanocarpum*, *Triana*, has the stem somewhat thickly covered with long spreading bristles. None of the plants collected within the area of the Indian Flora show such bristles: the two species may not be distinct, but Mr. Kurz, while not uniting them, says that Helfer's No. 2290 is *Triana's A. cyanocarpum*, which must be wrong, as *Triana* has written *A. glaucum* on Helfer's No. 2290.

2. **A. pallens**, *Blume Mus. Bot. i. 38*; leaves $1\frac{1}{2}$ –2 $\frac{1}{2}$ in. glabrous or minutely puberulous beneath 3-nerved (scarcely 5-nerved) suddenly narrowed into a long obtuse subcaudate tip. *Naud. in Ann. Sc. Nat. ser. 3. xv. 304*; *Miq. Fl. Ind. Bat. i. pt. i. 554*; *Triana in Trans. Linn. Soc. xxviii. 84*. *Melastoma petiolare*, *Wall. Cat. 4053*.

PINANG; *Wallich*, *Porter*. MALACCA; *Maingay* No. 795, 2663.—DISTRIB. Sumatra, Borneo.

Shorter *stamens* usually 0. *Fruit* $\frac{1}{2}$ in. broad, glabrous. Young *calyx-tube* often minutely but densely rufous tomentose.—Some of the Archipelago examples have leaves $4\frac{1}{2}$ in. and are then very like *A. glaucum*.

3. **A. divaricatum**, *Triana in Trans. Linn. Soc.* xxviii. 84, partly; branchlets panicles and leaves beneath with ferruginous stellate tomentum. *Dissochæta anceps*, *Naud. in Ann. Sc. Nat. ser. 3. xv. 70.* *D. palembanica*, *Miq. Fl. Ind. Bat. Suppl. 317.* *D. glauca*, *Blume in Flora*, 1831, p. 501. *Melastoma glauca*, *Jack in Trans. Linn. Soc. xv. 15.* *M. polyanthum*, *Benth. in Wall. Cat. 4051.*

PINANG; *Wallich, Walker.* MALACCA; *Griffith, Maingay* No. 794; *Cuming*, No. 2259.—DISTRIB. Java to Philippines.

Leaves usually 2–2½ in., oblong, acute, glabrous above or rufous stellate-tomentose on the nerves; *petiole* ⅛–¼ in. *Young calyx-tube* densely stellate-tomentose. *Shorter stamens* often 2, sometimes 4 or 0. *Fruit* less than ½ in. broad, finally glabrous.

4. **A. annulatum**, *Triana in Trans. Linn. Soc.* xxviii. 84; branches nearly glabrous but with scattered patent bristly hairs, more thickened at the nodes than the other species and with a ring of dense rufous tomentum below each node, leaves nearly glabrous beneath. *Melastoma annulatum*, *Wall. Cat. 4056.*

PINANG; *Porter.*

Leaves 4–5 in., glabrous, oblong, cordate at the base; *petiole* ⅛–½ in., with spreading bristles. *Panicle* with spreading bristles, and rufous-tomentose. *Young calyx* rufous-tomentose. *Fruit* ½ in. broad, ovoid, ultimately glabrous or nearly so.

DOUBTFUL SPECIES.

A. ASSAMICUM, *C. B. Clarke*; stem with coarse spreading bristles somewhat annulated at the nodes, leaves very large short-petioled elliptic-lanceolate with spreading bristly hairs on the nerves beneath otherwise glabrous.

ASSAM, foot of the Naga Hills, and BHOTAN, *Griffith* (Kew Distrib. No. 2285).

Branches stout. *Leaves* 5–7 in., very acute, cordate at the base; *petiole* ⅛–¼ in., densely coarsely bristly. *Panicle* (in fruit) terminal, large, repeatedly trichotomous; *fruits* very numerous (like those of *Anplectrum*), smooth, campanulate at the base (not ripe ½ in. broad).—*Flowers* not seen.

A. BARBATUM, *Triana in Trans. Linn. Soc.* xxviii. 84; *Melastoma?* *barbatum*, *Wall. Cat. 4082* from Chappedong in Martaban.

The Wallichian example exhibits neither inflorescence, flowers nor fruit, and is indeterminable. *Leaves* 4 in., ovate, shortly acuminate, glabrous; *petiole* ½ in., glabrous but with a dense erect fringe of rusty bristles on its upper face; stem nearly glabrous.

16. MEDINILLA, *Gaud.*

Branching shrubs, erect or scandent. *Leaves* opposite or whorled, entire, often fleshy, glabrous in all the Indian species, usually longitudinally 3–9-nerved. *Flowers* in terminal panicles or lateral cymes, white or rose, with or without bracts, 4- or 5- rarely 6-merous. *Calyx-tube* ovoid or cylindric, limb truncate or obscurely toothed. *Stamens* twice as many as the petals, equal or nearly equal (rarely unequal); anthers opening at the top by one pore; connective not (or very shortly) produced at the base but having two tubercles in front and a spur behind. *Ovary* inferior, 4–6-celled, usually glabrous at the apex; style filiform; ovules very many, placentas axile. *Berry* crowned by the limb of the calyx. *Seeds* very many, ovoid or subfalcate, raphe often thickened and excurrent.—DISTRIB. Species 50; mainly in Malaya, East Bengal and Ceylon; a few are found in the Fiji Archipelago and in the East African islands.

* Flowers in axillary cymes (*see also* 10. *M. himalayana*).

† *Leaves whorled.*

1. *M. rosea*, *Gaud. in Freyc. Voy. Bot.* 484, t. 106; branches round, leaves obovate-oblong 3-nerved the two lateral nerves near the margin, flowers 4-merous. *Naud. in Ann. Sc. Nat.* ser. 3. xv. 286; *Triana in Trans. Linn. Soc.* xxviii. 85.

MALACCA, Mount Ophir; *Griffith* (Kew Distrib. No. 2282), *Maingay* No. 796.—DISTRIB. Marianne Islands.

Leaves $1\frac{1}{2}$ in.; *petiole* $\frac{1}{4}$ in. *Cymes* 3-10-flowered. *Flowers* large. *Anthers* shortly produced at the base, connective having a short spur. *Berry* nearly $\frac{1}{4}$ in. broad, ovoid. *Seeds* falcate-ellipsoid, raphe not excurrent.

2. *M. macrocarpa*, *Blume Rumph.* i. 14, t. 2; branches round, leaves obovate-oblong acute 3-nerved, flowers 5-merous. *Naud. in Ann. Sc. Nat.* ser. 3. xv. 293; *Miq. Fl. Ind. Bat.* i. pt. i. 544; *Triana in Trans. Linn. Soc.* xxviii. 86.

MALACCA; *Maingay* No. 799.—DISTRIB. Malay Archipelago.

Leaves $2\frac{1}{2}$ -4 in.; *petiole* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Cyme* 3-10-flowered. *Flowers* large. *Calyx-limb* even in the bud truncate entire in *Maingay's* examples. *Anthers* long, produced at the base, spur of the connective long. *Berry* $\frac{1}{2}$ in. wide, hardly narrowed upward. *Seeds* falcate-ellipsoid, smooth, raphe not excurrent.

†† *Leaves opposite.*

3. *M. Hasseltii*, *Blume in Flora* 1831, p. 513; branches round verrucose, leaves lanceolate, flowers 4-merous, fruit ovoid, calyx-rim not produced far above the fruit, seeds obovoid smooth slightly flattened on the side of the raphe which is not produced. *Miq. Fl. Ind. Bat.* i. pt. i. 542. *M. crassifolia*, *Triana in Trans. Linn. Soc.* xxviii. 86, partly. *Melastoma laurifolium*, *Wall. Cat.* 4084.

SINGAPORE; *Wallich*. MALACCA; *Maingay* No. 797.—DISTRIB. Java, Sumatra.

Leaves 4-7 in., 3-nerved, an obscure pair of nerves very near the margin sometimes added, very acuminate, narrowed at the base in the Indian examples (less so in *Blume's* authentic specimen); *petiole* $\frac{1}{8}$ - $\frac{1}{4}$ in. *Anthers* at the base distinctly but shortly produced, spur of the connective short. *Fruit* $\frac{1}{2}$ in. diam.—Reduced to *M. crassifolia* by *Triana*; but, as *Blume* observes, the leaves are much longer, with shorter petioles, and the flowers 4-merous. The true *M. crassifolia*, *Blume*, has not been found in British India.

VAR. *Griffithii*; cymes lateral on short peduncles but greatly developed repeatedly divided with opposite branches at right angles and sometimes 40 flowers on one cyme.—Mount Ophir, Malacca; *Griffith* (Kew Distrib. No. 2282).

4. *M. rubicunda*, *Blume in Flora*, 1831, 512; branches round somewhat striated, leaves elliptic or lanceolate, flowers 4-merous, fruit ovoid, calyx-rim very short, seed obovoid smooth slightly flattened on the side of the raphe which is not produced. *Naud. in Ann. Sc. Nat.* ser. 3. xv. 288, t. 13, fig. 1; *Miq. Fl. Ind. Bat.* i. pt. i. 539; *Triana in Trans. Linn. Soc.* xxviii. 86. *M. erythrophylla*, *Lindl. in Part. Mag. Bot.* x. 79; *Naud. l. c.* 289; *Miq. l. c.* 540. *Melastoma rubicunda*, *Jack in Trans. Linn. Soc.* xiv. 18; *DC. Prodr.* iii. 148; *Wall. Cat.* 4086. *M. erythrophyllum*, *Wall. Cat.* 4085.

SUBTROPICAL HIMALAYA from SIKKIM eastward. KHASIA Mts., alt. 2000-5000 ft., common. PINANG; *Wallich*.—DISTRIB. Sumatra.

Leaves 2-6 in., narrowed at both ends, 3-5-nerved, one pair of nerves often starting $\frac{1}{4}$ in. above the base of the leaf; *petiole* 0- $\frac{1}{2}$ in. *Peduncles* rarely 1 in.

Anthers at the base very shortly produced, spur of the connective very short. *Fruit* $\frac{1}{8}$ – $\frac{1}{5}$ in. diam., when ripe black, edible though insipid, rim of the calyx then evanescent.—This plant really differs little from *M. Hasseltii*; but in its typical form the leaves are elliptic nearly sessile: also the anthers at the base and the spur of the connective are even shorter.

5. ***M. fuchsioides***, *Gardn. in Calc. Journ. Nat. Hist.* viii. 12; branches round somewhat striated, leaves subsessile elliptic-oblong subcuneate at the base, peduncles 1–3-flowered, flowers 4-merous. *Thwaites Enum.* 106; *Triana in Trans. Linn. Soc.* xxviii. 86.

CEYLON; *Gardner*; Newera Ellia and Horton Plains, *Thwaites*,

Leaves 2–3½ in., 3–5-nerved, minutely glandular beneath (*Thwaites*). *Peduncles* solitary; pedicels and calyx rose-purple. *Petals* a fine lake below, white at top. *Anthers* shortly produced at the base, connective with a short spur. *Fruit* $\frac{1}{2}$ in. diam., subglobose.—The specimens of this very succulent plant are imperfect and the above description is mainly compiled from *Gardner* and *Thwaites*' description.

6. ***M. maculata***, *Gardn. in Calc. Journ. Nat. Hist.* viii. 13; branches quadrangular angles waved winged, leaves subsessile ovate obtuse or oblong obscurely crenate, peduncles 1–3-flowered, flowers 4-merous small. *Thwaites Enum.* 106; *Triana in Trans. Linn. Soc.* xxviii. 86, *excluding the syn. Don.*

CEYLON; Central Provinces, alt. 3000–5000 ft., *Thwaites*, *Macrae*, *Walker*.

Leaves $\frac{3}{4}$ –1½ in., 3-nerved, minutely glandular beneath (*Thwaites*). *Calyx-tube* green-red. *Petals* $\frac{1}{2}$ in., pale-rose. *Anthers* shortly produced at the base, connective with a short spur. *Fruit* $\frac{1}{2}$ in. broad, very small, subcampanulate.

VAR. *Thwaitesii*, leaves cuneate-obovate.—Ceylon; Hellesseen, Pasdoon Corle, *Thwaites* No. 3443.

7. ***M. Beddomei***, *C. B. Clarke*; branches round, leaves short-petioled orbicular or broad-elliptic, peduncles 1-flowered, flowers 4-merous large. *M. radicans*, *Bedd. Ic. Pl. Ind. Or.* t. 184, *not of Blume*. *Triplettrum radicans*, *W. & A. Prodr.* 324.

WESTERN PENINSULA; KURG, *Wight*. WYNAAD, alt. 2000–3500 ft., *Beddome*.

Leaves 1–1½ in., 3-nerved, much thicker than those of *M. maculata*. *Petals* (in *Wight's* own No. 1151) more than $\frac{1}{2}$ in. *Beddome* says the flowers are “14–15 lines long.” *Anthers* prominently produced at the base, spur of the connective also prominent; four additional imperfect stamens sometimes present (*ex Beddome*).—This plant wholly differs from *M. maculata* (with which *Triana* unites it doubtfully) by its much larger flowers as well as different leaves and anthers. It does not appear however that *Triana* ever saw *Wight's* No. 1151. Nor did *Beddome*, who doubts if it can be the same as his *M. radicans*: with which however it agrees perfectly.

8. ***M. malabarica***, *Bedd. Ic. Pl. Ind. Or.* 157; branches round striate somewhat verrucose, leaves 2–3 in. elliptic narrowed to both ends 3–5-nerved, petiole less than $\frac{1}{4}$ in., flowers 4-merous, anthers oblong short truncate subnude at base.

ANAMALLAYS and NILGHIRIS, alt. 3000–4000 ft.; *Beddome*.

Peduncles axillary, 1–3-flowered. *Flowers* large. *Filaments* long, anthers short with two glandular swellings at the apex of the filament inside, spur of the connective perceptible behind but very small.—This species in leaves and inflorescence is much like *M. rubicunda*; but in its anthers it is altogether remote, and approaches *Pachycentria*.

** Flowers in terminal panicles or quasi-lateral cymes.

9. **M. speciosa**, Blume in *Flora* 1831, 515; branches thick smooth with numerous erect bristles at the nodes, leaves 6-10 in. in whorls of 4 or 3 less often in pairs subsessile obovate-lanceolate 7-9-nerved one pair of nerves starting 1-4 in. above the base of the leaf. *Bot. Mag.* t. 4321; *Naud. in Ann. Sc. Nat.* ser. 3. xv. 291; *Miq. Fl. Ind. Bat.* i. pt. i. 540; *Triana in Trans. Linn. Soc.* xxviii. 87. *Melastoma eximium*, Blume *Bijd.* 1072, not of Jack.

MALAYA; Maingay No. 798.—DISTRIB. Java, Moluccas.

Panicle long, branches whorled; bracts $\frac{1}{2}$ in., narrow obovate-lanceolate; pedicels calyx and petals rose. Anthers shortly produced at the base, spur of the connective short. Fruit $\frac{1}{2}$ - $\frac{1}{4}$ in. broad, ovoid, rim of the calyx shortly produced above the fruit.

10. **M. himalayana**, Hook. f.; *Triana in Trans. Linn. Soc.* xxviii. 88; branches round smooth striate, leaves nearly sessile broadly elliptic, cymes terminal and quasi-lateral trichotomous, peduncles 1-1 $\frac{1}{2}$ in., pedicels divaricate in fruit.

SIKKIM; alt. 3000-6000 ft.; J. D. H. KHASIA Mts.; Surareem, alt. 5000 ft.; J. D. H., C. B. Clarke.

Leaves 2 $\frac{1}{2}$ in., 3-5-nerved almost from the base, obtusely acuminate; petiole not $\frac{1}{8}$ in. Flowers $\frac{3}{4}$ in. diam., rose. Anthers 2-tubercled at the base, connective without a spur. Berry $\frac{1}{8}$ in. diam., spherical.—This species has been confounded in herbaria with *M. rubicunda*, which is found over the same area. In *M. himalayana* the terminal panicle is small and often only quasi-axillary panicles are seen: but the peduncle is much longer than in *M. rubicunda* and the branches of the panicle in fruit are divaricate, not ascending as in *M. rubicunda*.

11. **M. pauciflora**, Hook. f.; *Triana in Trans. Linn. Soc.* xxviii. 88; ultimate branchlets subquadrangular, leaves sessile elliptic, cymes terminal very short few-flowered.

SIKKIM at Darjeeling; *Herb. Griffith* (Kew Distrib. No. 2283).

Leaves 1 $\frac{1}{2}$ in., 3-nerved from the base, abruptly acuminate. Flowers $\frac{3}{4}$ in. diam., very shortly pedicelled. Calyx-tube campanulate, limb obscurely 4-toothed. Anthers small, linear, with two tubercles at the base, connective without a spur.—Only one example of this has been seen: the inflorescence is strictly terminal; the locality is not quite certain and may be "East Himalaya."

IMPERFECTLY KNOWN AND DOUBTFUL SPECIES.

M. MAINGAYI, C. B. Clarke; glabrous, branches round smooth, leaves 1-1 $\frac{1}{2}$ in. opposite sessile cuneate-obovate obtuse 3-nerved, flowers 4-fid, petals $\frac{1}{2}$ in., anthers oblong narrowed upwards opening by a terminal pore with two tubercles at base and no distinct spur on the connective, seeds oblong elliptic smooth larger than in the other species of *Medinilla*.—MALACCA; Maingay No. 807, 806.

There is nothing to show the nature of the inflorescence or the shape of the berry.

M. GRIFFITHII, C. B. Clarke; glabrous, branches round remotely verrucose, leaves 5-7 in. elliptic acuminate at both ends 3-nerved, petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., inflorescence in weak axillary cymes, fruit small, seeds of the genus.—MISHME; *Griffith* (Kew Distrib. No. 2281).

This differs by its large long-petioled leaves from all the other species.

M. MERGUIENSIS, C. B. Clarke; glabrous, branches round smooth, leaves 2-3 $\frac{1}{2}$ in. obovate-elliptic obtuse 3-nerved, petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., cyme compound, anthers oblong narrowed upwards with a terminal pore, a long spur to the connective near the base but the tubercles at the apex of the filament very obscure.—MERGUI; *Griffith* (in *Herb. Wight*).

Only a detached fragment of the panicle is preserved. This may be a *Pachycentria*.

17. **POGONANTHERA**, Blume.

Shrubs, nearly glabrous; branches round, minutely scaly. *Leaves* opposite, petioled, oblong or ovate, entire, glabrous, 3-nerved. *Flowers* small, pulverulent, in small terminal panicles having opposite branches. *Calyx-tube* campanulate, subquadrangular; limb 4-toothed. *Petals* 4, lanceolate. *Stamens* 8, equal; anthers oblong, acute, opening by a terminal pore, not produced at the base; connective at the base bearded behind with a tuft of hairs, not spurred. *Ovary* half-inferior, 4-celled, with a tuft of hairs at the apex; style filiform; ovules very many, placentas axile. *Berry* small, globose, 4-celled, crowned with the calyx-limb. *Seeds* very many, obovoid-oblong, smooth.—DISTRIB. Species 2; in Malaya from Malacca to Borneo.

1. ***P. pulverulenta***, Blume in *Flora*, 1831, 521; Korth. *Verh. Nat. Gesch. Bot.* t. 65; Griff. *Notul.* iv. 678; Miq. *Fl. Ind. Bat.* i. pt. i. 553; Triana in *Trans. Linn. Soc.* xxviii. 89. *Melastoma reflexa*, Blume l. c.; Naud. in *Ann. Sc. Nat.* ser. 3. xv. 303; Triana l. c. *M. pulverulentum*, Jack in *Trans. Linn. Soc.* xiv. p. 19; DC. *Prodr.* iii. 149; Blume *Bijd.* 1072. *M. rubicundum*, Jack l. c. 18; DC. l. c. 148; Wall. *Cat.* 4086.

MALACCA and SINGAPORE; Wallich, Griffith, Maingay.—DISTRIB. Through Malaya to Borneo.

Leaves 3–4½ by 1–2½ in., narrowed to both ends, 3-nerved with sometimes other two faint nerves close to the margin; petiole ¼–½ in., with two tubercles or auricles at its apex. *Panicle* 2–3 in. and as much broad, short-peduncled, with minute bracts at the divisions. *Berry* about ½ in. broad, narrowed beneath the small calyx-limb.—Blume distinguishes as *P. reflexa*, a form with white transparent petals having a minute tooth on each margin, and which occurs creeping on rocks near the seashore as noted by Jack and Griffith, from the typical *P. pulverulenta* which occurs in the forests, and which has red petals powdered with yellow and a tooth on each side. The distinction between the limb of the petal being toothed or only tumid cannot be traced in the dried specimens: and Blume's subsidiary distinctions regarding the texture of the leaves and the presence or absence of the extra pair of submarginal veins do not hold. Jack named the white-flowered form *rubicundum* because the panicle and calyces are in it a fine rose-purple.

18. **ASTRONIA**, Blume.

Shrubs with round branches. *Leaves* opposite, petioled, ovate or oblong, entire, 3-nerved. *Flowers* in terminal panicles, small, white or purple. *Calyx-tube* campanulate, glabrous or puberulous; limb irregularly truncate or 3–8-lobed. *Petals* 4–5. *Stamens* 8–10–12, equal; filaments short, broad; anthers short, obtuse, opening by slits down the front, connective spurred at the base or unappendaged. *Ovary* inferior, 2–5-celled, glabrous at the apex; style short, stigma capitate; ovules numerous, placentas axile, nearly basal. *Capsule* finally breaking up irregularly. *Seeds* very many, linear, raphe excurrent.—DISTRIB. Species 12; in Malaya, the Fiji and Navigator groups and Tahiti.

1. ***A. smilacifolia***, Triana in *Trans. Linn. Soc.* xxviii. 152; glabrous, panicle and calyx-tube minutely brown-rufous tomentose, calyx-limb minutely 5-lobed. *Melastoma smilacifolia*, Wall. *Cat.* 4057.

PINANG; Wallich. MALAYA; Maingay No. 808.

Leaves 4–5 in., lanceolate and broad-lanceolate, narrowed to both ends; petiole $\frac{1}{2}$ – $1\frac{1}{2}$ in. *Panicle* 1–3 in., ultimate pedicels $0\frac{1}{2}$ in. *Petals* less than $\frac{1}{2}$ in., obovate. *Capsule* $\frac{1}{2}$ – $\frac{1}{2}$ in. broad, ovoid or hemispheric.

19. **PTERNANDRA**, Jack.

Glabrous shrubs with round branches. *Leaves* opposite, sessile or short-petioled, ovate or lanceolate, entire, coriaceous, 3-nerved. *Flowers* small, in axillary (and terminal) small cymes or panicles. *Calyx-tube* verrucose, campanulate; limb truncate, obscurely 4-toothed. *Petals* 4, blueish or white. *Stamens* 8, equal; filaments short, subulate; anthers broad-oblong, obtuse at both ends, opening by slits, connective simple at the base or very shortly spurred behind. *Ovary* inferior, 4-celled, apex flat glabrous; style long, stigma clavate; ovules very many, placentas sub-basal. *Berry* ovoid, truncate. *Seeds* very many, cuneate-obovoid, raphe excurrent on one side towards the end, somewhat angular.—**DISTRIB.** Species 6 (or perhaps 2 only), from Pinang and Malacca through Malaya to the Philippines.

1. **P. cœrulescens**, Jack in *Mal. Misc.* ii. 61; leaves $2\frac{1}{2}$ – $4\frac{1}{2}$ in. ovate or lanceolate, stamens blue. *Wall. Cat.* 4077; *Triana in Trans. Linn. Soc.* xxviii. 153; *Kurz For. Fl.* i. 509 and in *Journ. As. Soc.* 1877, pt. ii. 79. *Ewyckia cyanea*, Blume *Rumph.* i. 24, t. 8; *Miq. Fl. Ind. Bat.* i. pt. i. 568; *Triana l. c.* E. Jackiana, Walp. *Rep.* v. 724. E. paniculata, *Miq. Fl. Ind. Bat. Suppl.* 321 ex *Kurz*. *Apteuxis trinervis*, *Griff. Notul.* iv. 672.—Nov. Gen. *Roxb. Fl. Ind.* ii. 225.

PINANG and MALACCA; Wallich. MERGUI; Griffith. TENASSERIM; Helfer. NICOBARS; Kurz. Malacca; Cuming, Griffith.—**DISTRIB.** Through Malaya to the Philippines.

Leaves narrowed at the base; petiole $0\frac{1}{2}$ in. *Panicles* 1–3 in., terminal and in the upper axils, very short-peduncled, often crowded with many flowers, ultimate pedicels very short, bracts minute. *Berry* $\frac{1}{2}$ in. broad, narrower at the mouth.

VAR. *Jackiana*; petioles attaining $\frac{1}{4}$ in., cymes axillary few-flowered.—Malacca; Griffith; Maingay No. 801.

2. **P. capitellata**, Jack in *Mal. Misc.* ii. *Addenda prefixed to the paper* p. 3; leaves 6–8 in. ovate or broad-elliptic, cymes hardly 1 in. axillary few-flowered dense. *Wall. Cat.* 4079; *W. & A. Prodr.* 325; *Triana in Trans. Linn. Soc.* xxviii. 153; *Kurz For. Fl.* i. 509 and in *Journ. As. Soc.* 1877, pt. ii. 79. *Ewyckia capitellata*, Walp. *Rep.* v. 724; *Miq. Fl. Ind. Bat.* i. pt. i. 568. E. medinilliformis, *Naud. in Ann. Sc. Nat.* ser. 3. xviii. 261.

PINANG; Jack, Wallich. TENASSERIM; Helfer (Kew Distrib. No. 2279). MALACCA; Maingay No. 802. SINGAPORE; Wallich.

Leaves widest near the base; petiole less than $\frac{1}{4}$ in.—Doubtfully distinct from *P. cœrulescens*: the leaves are usually much larger while the cymes are smaller.

3. **P. paniculata**, Benth. in *Wall. Cat.* 4080; leaves short-petioled normally elliptic or lanceolate, ends of the branches dividing into bundles of small-leaved branchlets on which are the scattered flowers. *P. latifolia*, *Triana in Trans. Linn. Soc.* xxviii. 153. *Ewyckia latifolia*, Blume *Mus. Bot.* i. 6.

PINANG; Porter. MALACCA; Griffith (Kew Distrib. No. 2273).—**DISTRIB.** Sarawak.

The normal leaves are about 5 by 2 in., the abnormal leaves on the "panicles" are very narrow lanceolate, often 1 by $\frac{1}{8}$ – $\frac{1}{4}$ in.—This is probably only a proliferous state of *P. cœrulescens* as Korthals and Miquel treat it.

20. **KIBESSIA**, DC.

Large shrubs, glabrous or minutely pubescent. *Leaves* opposite, short-petioled, ovate or oblong, entire, coriaceous, 3-nerved. *Flowers* axillary, long-peduncled, solitary or clustered, large (except in *K. tuberculata*); peduncles 1-3-flowered, pedicels 2-bracteolate in the middle. *Calyx-tube* campanulate or hemispheric, covered with elongated scales or simple tubercles; limb 4-lobed and persistent or calyptriform and deciduous. *Petals* 4, ovate or oblong. *Stamens* 8, equal, filaments short, subulate; anthers short, very thick, opening by slits, connective at the base naked or shortly spurred. *Ovary* inferior, 4-celled, apex glabrous depressed; style filiform, stigma clavate; ovules very many, placentas sub-basal. *Berry* subglobose, covered with scales or tubercles, or in *K. tuberculata* ultimately nearly smooth. *Seeds* cuneate-obovoid, angular.—DISTRIB. Species 14; confined to Malaya, from Pinang to Borneo.

1. **K. simplex**, Korth. *Verh. Nat. Gesch. Bot.* 253; leaves narrowed at the base, calyx-tube with oblong-linear scales those towards the top of the tube about $\frac{1}{4}$ in. persistent in the fruit, calyx-limb calyptriform, fruit $\frac{1}{2}$ in. broad. *Blume Mus. Bot.* i. 9; *Triana in Trans. Linn. Soc.* xxviii. 152. *K. cupularis*, Dcne. in *Deless. Ic. Sel.* v. t. 5 and in *Ann. Sc. Nat.* ser. 3. v. 317. *Pternandra echinata*, Jack in *Mal. Misc.* ii. *Addenda prefixed to the paper* 3; *Wall. Cat.* 4078, for the most part.

PINANG and MALACCA; Wallich, Griffith, &c. SINGAPORE; T. Anderson.—DISTRIB. Borneo, Philippines.

Young branches obscurely quadrangular, rusty puberulous. *Leaves* 2-3 in., oblong or elliptic, acuminate, when young pubescent beneath, when mature glabrescent or with rusty pubescence on the nerves; petiole $\frac{1}{2}$ - $\frac{1}{4}$ in. *Peduncles* 1- (less often 3-) flowered; bracts nearly $\frac{1}{4}$ in., oblong, persistent. Scales of the calyx-tube minutely rusty pubescent.

2. **K. pubescens**, Dcne. in *Ann. Sc. Nat.* ser. 3. v. 318; leaves oblong base somewhat rounded or subcordate, calyx-tube with triangular short subulate scales, those towards the top of the tube scarcely $\frac{1}{2}$ in., limb 4-lobed persistent, fruit $\frac{1}{2}$ in. broad. *Triana in Trans. Linn. Soc.* xxviii. 152. *Pternandra echinata*, Wall. *Cat.* 4078, letter a only.

PINANG, Wallich.

Young branches obscurely quadrangular, rusty puberulous. *Leaves* 2-3 in., oblong or elliptic, acuminate, when mature with minute rusty pubescence beneath, nerves with longer pubescence; petiole hardly $\frac{1}{2}$ in. Scales of the calyx-tube minutely rusty-pubescent. Apex of the ovary in fruit concave, with 16 radiating lines.—Very near the preceding species.

3. **K. acuminata**, Dcne. in *Ann. Sc. Nat.* ser. 3. v. 316; leaves narrowed or rounded at the base nearly glabrous, calyx-tube with triangular scales those towards the top of the tube linear elongate, limb calyptriform acuminate into a linear point. *Triana in Trans. Linn. Soc.* xxviii. 153.

SINGAPORE; Walker, *Maingay* No. 804.

Young branchlets and peduncles minutely rusty pubescent. *Leaves* 2-3 in., oblong or elliptic, acuminate, when mature glabrous or scarcely rusty pubescent on the nerves beneath; petiole scarcely $\frac{1}{2}$ in. *Bracts* of the buds $\frac{1}{2}$ in., ovate.

4. **K. tuberculata**, Hook. f. in *Gen. Pl.* i. 772; young calyx-tube covered with sessile flat tubercles, limb 4-toothed, fruit ovoid nearly glabrous finally. *Rectomitra tuberculata*, Blume *Mus. Bot.* i. 7; *Triana in Trans. Linn. Soc.* xxviii. 153. *Ewyekia tuberculata*, Korth. *Verh. Nat. Gesch. Bot.* 255; *Miq. Fl. Ind. Bat.* i. pt. i. 569.

MALACCA; *Maingay* No. 805.—DISTRIB. Sumatra.

Branchlets round, glabrous. *Leaves* 2–3 in., ovate or elliptic, shortly acuminate, glabrous; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in. *Peduncles* glabrous, clustered, 3–5-flowered; bracts less than $\frac{1}{2}$ in. *Fruit* $\frac{1}{8}$ – $\frac{1}{5}$ in. diam.

21. MEMECYLON, Linn.

Shrubs or *trees*, glabrous. *Leaves* opposite, short-petioled or sessile, coriaceous, orbicular ovate or lanceolate, entire, pinnate-nerved rarely 3-nerved. *Flowers* usually in small axillary rarely terminal simple or paniced cymes or umbels. *Calyx-tube* campanulate, glabrous; limb dilated, truncate or shortly 4-lobed. *Petals* 4, blue or white, rarely reddish. *Stamens* 8, equal, filaments long; anthers short, opening by slits in front, connective ending in a horn behind. *Ovary* inferior, 1-celled; apex glabrous surmounted by a convex or depressed disc with 8 radiating grooves; style filiform, simple; ovules 6–12 (in *M. Maingayi* 20 at least), whorled on a free central placenta. *Berry* globose or ellipsoid, crowned with the calyx-margin, 1-seeded. *Seed* large, cotyledons convolute.—DISTRIB. Species about 100 (but very difficult and many doubtful of determination) numerous in South-East Asia and its islands; a few extending into Polynesia and Australia, several in tropical Africa.

The following is merely an artificial key to the material at Kew: the species which appear tolerably distinct from *M. edule* are taken first; and the last group contains the enormous mass of specimens that appear difficult to separate from *M. edule*.

I. Leaves 3-nerved from the base.

1. **M. Arnottianum**, *Thwaites Enum.* 113; leaves long caudate-acuminate, apex obtuse, peduncle 1 in. very slender. *Triana in Trans. Linn. Soc.* xxviii. 159. *Eugenia*? *capitellata*, *Arn. Pugill.* 17.

CEYLON; “at no great elevation,” *Thwaites, Walker*.

Shrub 10–12 ft.; branchlets slender, round. *Leaves* 2–2½ in., somewhat distichous, elliptic, suddenly acuminate, base roundish, punctate on both surfaces; petiole scarcely $\frac{1}{16}$ in. *Peduncles* solitary; flowers few, very small, sessile at their apex; petals white (*Thwaites*). *Berry* scarcely $\frac{1}{4}$ in. diam., globose, areola $\frac{1}{16}$ in. wide.—A variety communicated by Mr. Thwaites has the leaves much larger, 4½ in., the acuminate apex much shorter.

2. **M. Gardneri**, *Thwaites Enum.* 113; leaves acute scarcely acuminate, inflorescence clustered, peduncle 0–¼ in. *Triana in Trans. Linn. Soc.* xxviii. 159.

CEYLON; alt. 2000–5000 ft.; *Thwaites*.

A small tree; ultimate branchlets quadrangular. *Leaves* broad-elliptic, narrowed at the base, opaque, pellucid-punctate; petiole $\frac{1}{8}$ in. *Flowers* white (*Thwaites*), very small; buds very acute. *Calyx-tube* at the time of flowering funnel-shaped, distinctly 4-toothed. *Berry* size of a pea, spherical, purple-black.

II. Leaves pinnate-nerved, often very opaque, midrib always conspicuous, nerves conspicuous or obscure.

* *Ultimate branchlets quadrangular* (see also No. 21, 22, 24, 37, 40).

† *Leaves usually more than 4 in. (nerves often distinct).*

3. **M. Wightii**, *Thwaites Enum.* 113; leaves 3–4½ in. subsessile elliptic-lanceolate base cordate, peduncle 0, pedicels clustered $\frac{1}{8}$ – $\frac{1}{6}$ in., calyx-tube at the time of flowering subcampanulate.

WESTERN PENINSULA; Canara; *Ritchie*. CEYLON, alt. 3000–4000 ft., *Thwaites*.

A tree 25 ft.; ultimate branchlets stout, acutely quadrangular. Secondary nerves conspicuous, marginal looped nerve obscure. *Buds* obtuse, calyx-limb 4-dentate. *Petals* blue. *Berry* $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., globose.—United by Triana with *M. amplexicaule* No. 24, which has round stems, much larger flowers, and the calyx-tube at the time of flowering saucer-shaped.

4. **M. Hookeri**, *Thwaites Enum.* 113; leaves 6–9 in. sessile oblong-lanceolate base cordate, peduncle 0, pedicels $\frac{1}{4}$ in. clustered, calyx-tube at the time of flowering saucer-shaped. *Triana in Trans. Linn. Soc.* xxviii. 158.

CEYLON; alt. 1000 ft.; *Thwaites*.

An erect shrub 8–12 ft., sparingly branched; ultimate branchlets stout, acutely quadrangular. *Leaves* very conspicuously nerved, secondary nerves running into a conspicuous marginal nerve. *Buds* obtuse, but apiculate; calyx-limb obscurely 4-lobed. *Petals* blue. *Berry* $\frac{1}{3}$ in. diam., spherical, finally black-purple.—*Thwaites* has sent (under No. 2686*) examples marked "*M. Hookeri*, variety with exalate branchlets, sessile flowers." These examples have perfectly round branchlets and seem in all respects identical with No. 25 *M. macrophyllum*, *Thwaites*.

5. **M. Griffithianum**, *Naud. in Ann. Sc. Nat.* ser. 3. xviii. 274; leaves 5–7 by 1–1½ in. nearly sessile linear-lanceolate rounded or somewhat acute at the base, peduncle 0, pedicels $\frac{1}{8}$ – $\frac{1}{5}$ in. clustered. *Triana in Trans. Linn. Soc.* xxviii. 158, *not of Kurz, in For. Fl.* i. 515. *M. cæruleum*, var. 3 *Griffithianum*, *Kurz, For. Fl.* i. 511.

MERGUI; *Griffith* (No. 2323 Kew Distrib.).

Ultimate branchlets 4-winged. *Leaves* somewhat opaque, secondary nerves visible, marginal quite obscure; petiole 0– $\frac{1}{8}$ in. *Flowers* rather large, pale blue (*Griffith*); buds obtuse. *Calyx-tube* at the time of flowering funnel-shaped, limb nearly truncate. *Disc* depressed, conspicuously rayed.—*M. Horsfieldii*, *Miquel*, said by *Kurz* (*Journ. As. Soc.* 1876, pt. ii. 54) to be a synonym of *M. Griffithianum*, widely differs; of *M. Campongum*, *Miquel*, also given as a synonym by *Kurz*, no authentic specimen exists at Kew. In *Journ. As. Soc.* 1877, pt. ii. 82, and *For. Fl.* i. 515, *Kurz* quotes for *M. Griffithianum* *Helfer's* No. 2331, from which it is clear that he refers to No. 20 *M. grande*, *Retz*, var. *merguica*.

6. **M. elegans**, *Kurz in Journ. As. Soc.* 1872, pt. ii. 307, *For. Fl.* i. 514; leaves 3–4 in. elliptic obtuse narrowed at the base, petiole $\frac{1}{8}$ – $\frac{1}{5}$ in., peduncles $\frac{1}{2}$ in. 3 or 4 together carrying mostly simple umbels, pedicels $\frac{1}{8}$ in.

SOUTH ANDAMAN ISLAND; *Kurz*.

A shrub; ultimate branchlets distinctly quadrangular. *Leaves* with the secondary nerves visible, marginal quite obscure. *Peduncles* quadrangular. *Flowers* blue (*Kurz*). *Calyx-tube* somewhat large, at the time of flowering saucer-shaped; disc on the apex of the ovary depressed, prominently rayed.

VAR. *dichotoma*; leaves 3–4 in. subsessile ovate-elliptic acute or shortly acuminate, cymes very short, peduncle 0– $\frac{1}{8}$ in., pedicels $\frac{1}{8}$ – $\frac{1}{5}$ in. Malacca, *Griffith* (No. 2324 Kew Distrib.); Mount Ophir, *Maingay* No. 818, 820. *Branchlets* somewhat flattened, repeatedly forked, ultimate quadrangular, at least under the nodes. *Leaves* at the base rounded or acute but not at all acuminate, secondary nerves conspicuous,

marginal obscure; petiole sometimes manifest, attaining $\frac{1}{16}$ in. Flowers blue, somewhat large, buds obtuse. *Calyx-tube* truncate even in the bud. *Disc* depressed, distinctly rayed. *Berry* $\frac{1}{4}$ in. diam., spherical, areola very small, about $\frac{1}{16}$ in. wide.

†† *Leaves rarely attaining 4 in., usually opaque, nerves obscure.*

7. **M. amabile**, *Bedd. Ic. Pl. Ind. Or.* t. 163; leaves $1\frac{1}{2}$ – $2\frac{1}{4}$ in. nearly sessile oblong-lanceolate opaque, base cordate, peduncles $\frac{1}{2}$ – $\frac{3}{4}$ in. 1–3 together axillary and terminal, pedicels $\frac{1}{5}$ in.

SOUTH CANARA GHATS, up to 2000 ft.; *Beddome*.

Cymes small, simple on each peduncle or compound but close. *Calyx-tube* funnel-shaped at the time of flowering, limb truncate; buds obtuse. *Petals* blue. *Disc* plane (*Beddome*).—Very probably a form of *M. terminale* No. 22 with quadrangular branchlets; but the peduncles are rather shorter, and the flowers smaller.

VAR. *malaccensis*; leaves $1\frac{1}{2}$ – $2\frac{1}{4}$ in. oblong acuminate base rounded very opaque coriaceous, peduncles $\frac{1}{2}$ in. clustered axillary and terminal, cymes simple, pedicels less than $\frac{1}{2}$ in.—Malacca, *Maingay* No. 819.—Branchlets quadrangular, 4-winged below the nodes. *Petiole* $\frac{1}{16}$ in. *Buds* acute, not large. *Calyx-tube* saucer-shaped at the time of flowering; limb in the bud nearly truncate. *Disc* depressed, obscurely rayed.—This is perhaps really allied to *M. pauciflorum* No. 10, but the leaves differ materially in their rounded base and acuminate apex.

8. **M. elegantulum**, *Thwaites Enum.* 112; leaves 3 in. narrow-lanceolate long acuminate apex obtuse, panicles filiform somewhat elongate few-flowered, pedicels subsolitary one half longer than the calyx. *Triana in Trans. Linn. Soc.* xxviii. 159.

CEYLON; Saffragam district at no great elevation; *Thwaites*.

Leaves acute at the base, nerves obscure; petiole $\frac{1}{8}$ in. *Flowers* white. *Berry* spherical, the size of a pea.

9. **M. gracile**, *Bedd. Ic. Pl. Ind. Or.* t. 164; leaves 1– $1\frac{1}{2}$ in. elliptic-lanceolate acuminate apex obtuse, peduncles solitary $\frac{1}{4}$ in. 8-flowered, pedicels $\frac{1}{8}$ in.

TRAVANCORE and TINNEVELLY GHATS; *Col. Beddome*.

A small tree or large shrub; branchlets slender, distinctly quadrangular. *Leaves* opaque, nerves very obscure; petiole $\frac{1}{16}$ – $\frac{1}{8}$ in. *Petals* pale blue. *Disc* distinctly rayed.—*Beddome* describes the pedicels as 2–3 in. long, probably a misprint for 2–3 lines.

10. **M. pauciflorum**, *Blume Mus. Bot.* i. 356; leaves $\frac{1}{2}$ – $1\frac{1}{2}$ in. subsessile rhomboid oblong or elliptic obtuse or acute but not acuminate opaque acute at the base, peduncles scarcely any, pedicels less than $\frac{1}{4}$ in. *Miq. Fl. Ind. Bat.* i. pt. i. 578; *Triana in Trans. Linn. Soc.* xxviii. 158; *Kurz For. Fl.* i. 514. *M. australe*, *F. Muell. ex Triana in Trans. Linn. Soc.* xxviii. 159. *M. umbellatum*, *Benth. Fl. Austral.* iii. 293, not of others.

CHITTAGONG; *H. f. & T. Mergui*; *Griffith*; TENASSERIM, *Helper* (Kew Distrib. No. 2332). ANDAMANS; *Kurz*. SINGAPORE; *Lobb*.—DISTRIB. Through Malaya to North Australia.

A tree 20–25 ft. high. *Flowers* minute, whitish (*Kurz*). *Calyx* at the time of flowering saucer-shaped. *Disc* distinctly rayed. *Buds* very acute or rostrate. *Berry* $\frac{1}{2}$ in. diam., spherical, areola scarcely $\frac{1}{16}$ in. wide; pedicel $\frac{1}{4}$ – $\frac{3}{8}$ in.—*Miquel (Fl. Ind. Bat.* i. pt. i. p. 578) says that *M. pauciflorum* is hardly more than a form of *M. myrsinoides* Blume; and Blume's authentic specimens hardly differ except

by the leaves being considerably larger. Triana in Kew Herb. has referred a totally different plant to *M. myrsinoides*, viz. *Wall. Cat. 4019 (M. umbellatum, Wall.)*, which has round stems, petioled leaves, buds not rostrate, and is *M. edule* or very near thereto.

11. ***M. ellipticum***, *Thwaites Enum.* 112; petiole $0-\frac{1}{16}$ in. but often distinct, leaves $2\frac{1}{4}$ in. broad-elliptic obtuse or shortly acuminate apex obtuse, base round or acute not acuminate, peduncles clustered $0-\frac{1}{2}$ in., pedicels attaining $\frac{1}{5}$ in. *Triana in Trans. Linn. Soc.* xxviii. 159.

CEYLON; between Galle and Ratnapoora at no great elevation; *Thwaites, Walker, Gardner.*

A small tree. *Calyx* at time of flowering saucer-shaped, small. *Flowers* white. Nerves of the *leaves* obscure, but the marginal ones visible.—Mr. Thwaites appears to have issued his No. 1557 without name: it seems the same as 3479, and has small globose berries about $\frac{1}{8}$ in. diam., the areola scarcely $\frac{1}{16}$ in. wide.

12. ***M. varians***, *Thwaites Enum.* 112; leaves $\frac{1}{2}-1\frac{1}{2}$ in. oblong acute or obovate rhomboid or elliptic obtuse always narrowed at the base, nerves very obscure, petiole $0-\frac{1}{8}$ in., inflorescence densely clustered hardly extending $\frac{1}{2}$ in. from the stem, buds obtuse, calyx-tube at the time of flowering saucer-shaped, disc very obscurely rayed. *Triana in Trans. Linn. Soc.* xxviii. 159. *M. parvifolium*, *Thwaites Enum.* 113; *Triana l. c.*

CEYLON; alt. 2000–7000 ft., *Thwaites.*

A small tree. *Petals* white or blue. *Berry* $\frac{1}{4}-\frac{1}{3}$ in. diam., spherical, shortly pedicelled, areola $\frac{1}{12}$ in. diam., prominent.—Thwaites says that his *M. parvifolium* is possibly a variety of his *M. varians* but that the leaves are cuneate at the base and a good deal smaller; but in 2927 (marked *M. varians*) the leaves are smaller than in most of his *M. parvifolium* and very cuneate at base. This species is very near *M. ellipticum* Thwaites, but differs by its leaves not acuminate. It is also very near *M. pauciflorum* (No. 10) which differs in its rostrate buds and strongly radiate disc. Lastly the branchlets are sometimes nearly round and then it has been named *M. capitellatum* or *M. edule*.

** *Ultimate branchlets round.*

† *Berry large, $\frac{1}{2}$ in. diam. or more.*

13. ***M. procerum***, *Thwaites Enum.* 415; leaves 6–10 in. elliptic acuminate subacute at the base, petiole $\frac{1}{5}-\frac{1}{2}$ in., berry $\frac{3}{8}-\frac{1}{2}$ in. diam. subsessile areola prominent $\frac{1}{5}$ in. wide. *Triana in Trans. Linn. Soc.* xxviii. 158.

CEYLON; Pasdoon and Hinidoon Corle, *Thwaites.*

A tree 30–40 ft. high. *Leaves* thick, but both the secondary and looped marginal nerves can be seen, much paler beneath; petiole grooved on the upper surface. *Calyx* $\frac{1}{8}$ in. broad (in flower?).

14. ***M. ovoideum***, *Thwaites Enum.* 112; leaves 3 in. round-elliptic base cordate sessile or exceedingly shortly suddenly narrowed into a minute petiole, peduncle 0, pedicels very short clustered. *Triana in Trans. Linn. Soc.* xxviii. 159. *M. macrocarpum*, *Thwaites Enum.* 110.

CEYLON; alt. 4000–5000 ft., near Adam's Peak; *Thwaites.*

A small tree; branchlets thick. *Leaves* very thick, coriaceous, nerves obscure. *Berry* $\frac{1}{2}$ in. diam., areola raised on a cylindric neck, disc within the mouth elevated and strongly rayed in the ripe fruit.—Thwaites *ovoideum* No. 2622, among other things differs in the mouth of the fruit which is depressed not radiate and is to be referred to *M. revolutum* No. 27.

15. **M. heteropleurum**, *Blume Mus. Bot.* i. 362; leaves 4-6 in. nearly sessile narrowly elliptic acuminate nerves distinct, inflorescence close axillary, buds obtuse, flowers large. *Miq. Fl. Ind. Bat.* i. pt. i. 579; *Triana in Trans. Linn. Soc.* xxviii. 157.

BURMA and MALAY PENINSULA; *Griffith* (No. 2337 Kew Distrib.). MALACCA; *Maingay* No. 816. SINGAPORE; *Maingay* No. 815.—DISTRIB. Sumatra and Java.

Leaves acute, but not at all acuminate at the base; both the secondary and marginal nerves prominent. *Calyx-tube* saucer-shaped at the time of flowering, limb truncate even in the bud. *Disc* flat, prominently rayed, *Berry* $\frac{1}{2}$ in. diam. or more, areola $\frac{1}{8}$ in. wide, somewhat prominent, disc much depressed.

16. **M. cerasiforme**, *Kurz, For. Fl.* i. 516; leaves 3-4 in. elliptic acuminate at both ends coriaceous, berries in short cymes $\frac{1}{2}$ in. diam. very succulent.

CHITTAGONG; *Kurz*.

Leaves dried olive-yellow, lateral nerves obscure; petiole $\frac{1}{8}$ in. *Flowers* not seen. *Peduncles* (of the fruits) $\frac{1}{2}$ in., pedicels $\frac{1}{8}$ in. *Berries* blue-black unusually succulent.

17. **M. Maingayi**, *C. B. Clarke*; leaves 8 in. subsessile oblong-lanceolate rounded or subcordate at the base secondary and marginal nerves prominent, cymes clustered axillary, peduncles and pedicels about $\frac{1}{2}$ in. stout, flowers very large, buds obtuse, calyx-tube at the time of flowering campanulate limb truncate disc somewhat convex very prominently rayed.

MALACCA; *Maingay* No. 814.

The finest species of the genus, the flowers being far larger than in any other species, the calyx-tube in bud nearly $\frac{1}{4}$ in. wide. *Maingay's* example does not show fruit, but from the size of the flower it may be presumed that it would be large.

18. **M. microstomum**, *C. B. Clarke*; leaves 5 in. sessile ovate or oblong subobtuse cordate at the base opaque, flowers small densely clustered axillary, berry nearly $\frac{1}{2}$ in. diam., calyx-limb 0, areola scarcely $\frac{1}{20}$ in. diam.

MALACCA; Keddah Peak, *Maingay* No. 821. ?MALAY PENINSULA, *Col. Low*.

A small tree (*Maingay*). *Leaves* thick, subamplexicaul, marginal nerves obscure, secondary visible. *Pedicels* less than $\frac{1}{2}$ in., slender. *Buds* obtuse; *calyx-tube* funnel-shaped at the time of flowering, rays of the disc very obscure.

†† *Berry* less than $\frac{1}{2}$ in. diam. *Inflorescence* 2 in. or more, except in *M. merguicum* and *M. grande*.

19. **M. Amherstianum**, *C. B. Clarke*; leaves 2-3 in. oblong acute very thick nerveless, petiole $\frac{1}{2}$ in., panicle large terminal. *Wall. Cat.* 9127.

AMHERST; *Wallich*.

Flowers in close umbels at the summits of the ultimate branches of the panicle.—Differs from *M. paniculatum*, *Jack*, in the much smaller and thicker leaves.

20. **M. grande**, *Retz Obs.* iv. 26; leaves 3-5 in. elliptic or somewhat ovate acuminate narrowed but not at all acuminate at the base, petiole $\frac{1}{2}$ in., peduncles $\frac{1}{2}$ -1 in. solitary or 2-3 together thick, berry nearly $\frac{1}{4}$ in. wide areola $\frac{1}{12}$ in. wide. *Wall. Cat.* 4103; *Triana in Trans. Linn. Soc.* xxviii. 158. *M. laxiflorum*, *Wall. Cat.* 4472. *M. edule* var. β , *Thwaites Enum.* 110. *M. ambiguum*, *Blume Mus. Bot.* i. 359; *Triana l.c.*

CEYLON; Thwaites, No. 3442. SINGAPORE; *Wallich*.—DISTRIB. Java.

Nerves of the *leaves* subprominent, marginal more obscure, apex obtuse often out of one plane so that in drying it is either broken off or crumpled and turned on one side. Branches of the *cyme* glabrous. *Buds* obtuse, not large. *Calyx-tube* at the time of flowering saucer-shaped, limb truncate. *Disc* scarcely depressed, rays prominent.—As regards the *name* of this species, that of Retz is cited by Triana, and his description suits the species, but will also suit several others. As regards the plant itself, the flowers and fruit are identical with *M. edule* var. *ovatum*; but the leaves are rather larger and the inflorescence rather more effuse. Thwaites is very likely right in regarding it as a variety of *M. edule*.

VAR. 1. *Horsfieldii*, Miq. Fl. Ind. Bat. i. 572 (sp.); nerves less prominent, inflorescence shorter, buds acute. *M. celastrinum*, Kurz For. Fl. i. 515.—Pegu, Kurz. Malacca; Maingay No. 811.

VAR. 2. *pubescens*; leaves 3–4½ in. glabrous elliptic suddenly acuminate, cymes proliferously umbellate, branches distinctly rusty-pubescent.—Malacca; Griffith (Kew Distrib. No. 2336). Branchlets round. *Leaves* acute, hardly acuminate at the base, secondary and marginal nerves somewhat prominent; petiole ½ in. *Inflorescence* in young flower 2 in. *Calyx* (in flower time) very small, shallow, saucer-shaped. *Disc* rayed. *Fruit* not seen.—This variety is marked by Triana, *M. ambiguum* Bl.?

VAR. 3. *khasiana*; leaves 3–4 in. elliptic acuminate at both ends, apex acute, petiole ½ in., fruit in a lax panicle extending 2–3 in., berry ¼ in. wide areola somewhat prominent ⅓ in. wide.—Khasia Mts.; Griffith (No. 2333 Kew Distrib.). *Leaves* dried yellow, not very thick but rather opaque, nerves evident, marginal obscure. *Peduncle* in fruit 1–1½ in., pedicels often ½ in. The remains of the *disc* in the mouth of the fruit show that it was in flower prominently rayed.—Very near var. *Horsfieldii* but has the leaves more acuminate at both ends.

VAR. 4. *merguica*; leaves 4–6 in. elliptic and broad-elliptic obtuse narrowed gradually to the base subpetiolate, nerves somewhat distinct, peduncles solitary or clustered ½–¾ in., cymes compound. *M. Griffithianum*, Kurz in Journ. As. Soc. 1877, pt. ii. 82, not of Naud.—Mergui; Griffith. Tenasserim or Andamans; Helfer (No. 2331 Kew Distrib.). *Leaves* (in all the examples) with scattered glands on the lower surface. *Calyx-tube* at the time of flowering saucer-shaped or almost funnel-shaped, limb subtruncate. *Buds* medium-sized, obtuse; disc on the apex of the ovary rayed prominently. *Fruit* ¼ in. diam., areola ⅓ in. wide.

21. *M. costatum*, Miq. in Blume Mus. Bot. i. 360; leaves 5–8 in. subsessile oblong-lanceolate cordate at the base secondary nerves strongly impressed, thyriform, Miquel, peduncles and pedicels exceedingly thick. *Miq. Fl. Ind. Bat. i. pt. i. 573; Triana in Trans. Linn. Soc. xxviii. 157. M. grande, Blume Bijl. 1095; Wall. Cat. 4101.*

MALACCA; Maingay No. 813.—DISTRIB. Java, Sumatra, Borneo.

A small tree; branchlets round but with four short acute wings at the base of the leaves. *Calyx-tube* at the time of flowering campanulate, limb truncate. *Disc* depressed, rays prominent. *Berry* ¼ in., ellipsoid, longer than broad; areola prominent, more than ⅓ in. wide.—A species well marked by the prominent short wings on the branchlets at the base of the very short petiole.

††† *Berry* less than ½ in. diam. *Inflorescence* less than 2 in. *Leaves* cordate at the base, sessile or very shortly petioled.

22. *M. terminale*, Dalz. in Hook. Kew Journ. iii. 121; leaves 1½–2½ in. lanceolate acute opaque, peduncles ½–1½ in. slender 1–3 from the same axil axillary and terminal, pedicels umbelled. *Triana in Trans. Linn. Soc. xxviii. 158; Dalz. & Gibs. Bomb. Fl. 93.*

Southern Ghats of the DECCAN PENINSULA; CANARA; Gibson, Dalzell.

A shrub 2-3 ft. (Dalzell). *Calyx-tube* at the time of flowering saucer-shaped, limb truncate. *Buds* not large nor acute. *Disc* depressed, rays obscure. *Berry* $\frac{1}{3}$ in. wide, ovoid, subglobose (broader than long), areola $\frac{1}{3}$ in. wide.—This species has the branchlets with 4 lines and sometimes almost quadrangular: it is probably not distinct from *M. amabile* No. 7.

23. **M. cæruleum**, *Jack in Mal. Misc.* i. 26 (not of *Guill. & Perr.*); leaves 4-6 in. ovate or oblong acute not acuminate, berry $\frac{1}{3}$ in. ellipsoid much longer than broad areola prominent $\frac{1}{3}$ in. broad. *Miq. Fl. Ind. Bat.* i. pt. i. 580; *Triana in Trans. Linn. Soc.* xxviii. 158; *Kurz For. Fl.* i. 511. *M. cordatum*, *Wall. Cat.* 4100, partly; *Griff. Notul.* iv. 673. *M. manillanum*, *Naud. in Ann. Sc. Nat.* ser. 3. xviii. 276; *Miq. l. c.* 576. *M. lutescens*, *Presl Epim. Bot.* 208, not of *Naud.*

Southern MALAY PENINSULA with its islands, plentiful.—DISTRIB. Philippines.

Shrub 10 or 12 ft. *Leaves* opaque, sessile, rounded at the base, secondary and marginal nerves inconspicuous. *Peduncles* clustered, thick; inflorescence 1-1 $\frac{1}{4}$ in. *Calyx-tube* at the time of flowering funnel-shaped; buds obtuse. *Flowers* somewhat large, intense blue. *Disc* much depressed, rays obscure.—Widely cultivated in Bengal, &c., for the sake of its bright blue flowers. The branchlets are round as *Jack* states and not quadrangular as *Presl* states: but there is no doubt as to *Presl's* plant as he describes from *Cumming's* No. 2322 which is *M. cæruleum*. Of *Kurz's M. cæruleum*, var. 2. *floribundum*, I know nothing.

VAR. *pulehrum*, *Kurz For. Fl.* i. 510 (sp.); peduncles and pedicels more slender.—Andamans, *Kurz*. *Kurz's* specimens have the inflorescence hardly more slender than in *M. cæruleum*. *Kurz* appears to have abandoned the distinction he founded on the less ellipsoid berry.

24. **M. amplexicaule**, *Roxb. Fl. Ind.* ii. 260; leaves 2-6 in. elliptic or oblong amplexicaul, peduncle 0, pedicels less than $\frac{1}{4}$ in. slender clustered, berry $\frac{1}{3}$ in. globose or subovoid, areola $\frac{1}{3}$ in. broad somewhat prominent. *Wight Ic. t.* 279; *W. & A. Prodr.* 320; *Naud. in Ann. Sc. Nat.* ser. 3. xviii. 277; *Miq. Fl. Ind. Bat.* i. pt. i. 580. *M. depressum*, *Benth. in Wall. Cat.* 4101; *Triana in Trans. Linn. Soc.* xxviii. 158. *M. sessile*, *Wall. Cat.* 4112. *M. cordatum*, *Wall. Cat.* 4100 partly.

PINANG *Roxburgh, Wallich.*

Leaves sometimes acuminate, secondary nerves prominent. *Buds* small, obtuse. *Flowers* pale yellowish-blue. *Disc* depressed, rays obscure. *Berry* not longer than broad.—This (and not *M. cæruleum*, as *Triana* says) is certainly *Roxburgh's M. amplexicaule*, for, besides other reasons, *Roxburgh's* figure, preserved at Kew, has yellow flowers.

VAR. 1. *malabarica*; leaves often not exceeding 2-3 in., sometimes distinctly petioled, never acuminate, secondary nerves obscure.—Nilghiris, Mts. of Kurg, &c., plentiful. Not from Ceylon, for *Thwaites*, No. 2570 cited by *Triana* is *M. Wightii*, No. 3.

VAR. 2. *cordata*, *Wight mss.*; branchlets distinctly quadrangular.—This seems not remote from No. 7 *amabile*.

25. **M. macrophyllum**, *Thwaites Enum.* 111; leaves 6-12 in. oblong-lanceolate, peduncles 0, pedicels short, berry $\frac{1}{3}$ in. diam. spherical. *Triana in Trans. Linn. Soc.* xxviii. 158.

CEYLON; alt. 1000-3000 ft., *Thwaites*.

Leaves with the nerves little impressed but both the secondary and marginal

are visible. *Petals* pale blue (Thwaites).—Neither Mr. Thwaites' examples nor his description show this species to differ from *M. amplexicaule* except by the leaves being larger (see No. 4. *M. Hookeri*).

26. ***M. orbiculare***, *Thwaites Enum.* 112; leaves $1\frac{1}{2}$ in. diam. orbicular very thick and opaque, pedicels less than $\frac{1}{4}$ in. clustered. *Triana in Trans. Linn. Soc.* xxviii. 158.

CEYLON; alt. 1000 ft., Hinidoon Corle; *Thwaites*.

A small tree. *Buds* small, obtuse. *Calyx-tube* at the time of flowering saucer-shaped. *Petals* blue. *Disc* obscurely rayed.

27. ***M. revolutum***, *Thwaites Enum.* 111; leaves 3 in. round-elliptic coriaceous nerves impressed, peduncles clustered rather stout in fruit $\frac{3}{4}$ in., berry $\frac{1}{4}$ in. diam. spherical mouth less than $\frac{1}{8}$ in. wide. *Triana in Trans. Linn. Soc.* xxviii. 159.

CEYLON; alt. 5000 ft., Rambodde; *Thwaites*.

A small tree. *Flowers* small, white. *Berry* black-purple. Whole inflorescence not exceeding 1 in. in the fruiting example communicated by Mr. Thwaites, but Mr. Thwaites' picture shows it 2 in. very dense and compound in flower.

28. ***M. deccanense***, *C. B. Clarke*; leaves 4–5 in. narrowly oblong-lanceolate, peduncle 0, pedicels clustered less than $\frac{1}{4}$ in., flowers small. *M. Heyneanum*, *Wight Ic. t.* 278?. *M. Wightianum*, *Triana in Trans. Linn. Soc.* xxviii. 158 (not *M. Wightii*, *Thwaites*).

DECCAN PENINSULA; *Wight*.

Branches with 4 lines, ultimate branches terete. *Leaves* rounded and almost cordate at the base, opaque, thin, secondary nerves not prominent; petiole $\frac{1}{8}$ in.—Separated by Triana from *M. Heyneanum* from which it considerably differs. As to *Wight Ic. t.* 278 it exhibits exactly the leaves of the present species, but the inflorescence appears rather to belong to the next.

†††† *Berry* less than $\frac{1}{2}$ in. diam. *Inflorescence* less than 2 in. *Leaves* 4–6 in., long-petioled, narrow-lanceolate, acuminate at the base.

29. ***M. Heyneanum***, *Benth. in Wall. Cat.* 4102; leaves 4–7 in. lanceolate elongate nerves impressed narrowed into the petiole $\frac{1}{4}$ in., inflorescence less than 1 in., peduncles usually short, buds large acute. *W. & A. Prodr.* 319; *Triana in Trans. Linn. Soc.* xxviii. 158. *M. jambosoides*, *Wight Ic. t.* 277; *Thwaites Enum.* 112; *Miq. Fl. Ind. Bat. i.* pt. i. 580.

DECCAN PENINSULA; Courtallum &c. *Wight*. CEYLON; up to 3000 ft., *Thwaites*.

Calyx-tube at the time of flowering broadly funnel-shaped, limb truncate. *Disc* obscurely rayed. *Berries* less than $\frac{1}{4}$ in. diam., spherical, nearly sessile.—The typical *M. Heyneanum* Benth. is a well marked and easily recognised plant; but the two varieties of Mr. Thwaites could never have been referred to it in the herbarium. Mr. Thwaites says the berry is as much as $\frac{1}{2}$ in. diam. in the Ceylon plants, but his specimens at Kew do not show fruit.

VAR. 1. *latifolia*; leaves broader a fresh green colour narrowed almost to the base so that there is scarcely any true petiole, nerves visible but slender and hardly at all impressed.—*Thwaites No.* 2468.

VAR. 2. *angustifolia*; leaves linear-lanceolate when dry orange yellow thick and opaque.—*Thwaites No.* 1555.

††††† Berry less than $\frac{1}{2}$ in. diam. Inflorescence less than 2 in. Leaves usually less than 4 in., distinctly acuminate, often rostrate, base not cordate, petiole short. (See also *M. grande* above). N.B. This series only differs from the *M. edule* series by the more distinct acumination of the leaves.

30. *M. lævigatum*, Blume Mus. Bot. i. 358; leaves 2-3 in. broad-elliptic suddenly shortly acuminate at both ends, petiole $\frac{1}{8}$ - $\frac{1}{4}$ in., peduncles clustered 0- $\frac{1}{4}$ in., inflorescence not $\frac{3}{4}$ in., buds large very acute. *Miq. Fl. Ind. Bat.* i. 576; *Triana in Trans. Linn. Soc.* xxviii. 157; *Kurz For. Fl.* i. 513. *M. Myrtilli*, Blume l. c. 357; *Miq. Fl. Ind. Bat.* i. 578. *M. pachyderma*, Wall. Cat. 4104. *M. Vosmaerianum*, Scheffer in *Flora* 1870, 249.

TAVOY; Wallich. TENASSERIM and ANDAMANS; Helfer (Kew Distrib. No. 2328). MALACCA; Maingay No. 817.—DISTRIB. Java, Sumatra, Borneo.

Branchlets round (Blume says subquadrangular in *M. lævigatum*, terete in *M. Myrtilli*; but they seem all the same and never distinctly quadrangular). Leaves somewhat thin but opaque, nerves obscure but can be seen. Peduncles occasionally terminal as well as axillary. Calyx-tube at the time of flowering more than $\frac{1}{8}$ in., wide, saucer-shaped. Disc on the apex of the ovary obscurely rayed. Berry $\frac{1}{4}$ in. diam., globose, subsessile, mouth small.

VAR. *sylvaticum*, Thwaites Enum. 110 (sp.); petiole somewhat shorter, leaf long decurrent (but in Thwaites' example No. 1567 the leaves are petioled exactly as in *M. sylvaticum*).—Ceylon; alt. 2000-4000 ft.; common, Thwaites. As Mr. Thwaites remarks, some of his examples of *M. sylvaticum* are very near *M. edule*; they differ by the more acuminate leaves and the larger, sharply acute buds. Triana in Herb. inquires how the two differ.

31. *M. intermedium*, Blume Mus. Bot. i. 358; leaves 2-4 in. oblong-lanceolate acuminate at each end somewhat rostrate with the apex obtuse, petiole $\frac{1}{8}$ - $\frac{1}{4}$ in., peduncles solitary axillary $\frac{1}{4}$ - $\frac{3}{4}$ in., pedicels few $\frac{1}{8}$ - $\frac{1}{4}$ in., buds somewhat large acute. *M. umbellatum*, Blume Bijdr. 1094; *Naud. in Ann. Sc. Nat.* ser. 3. xviii. 273; *Triana in Trans. Linn. Soc.* xxviii. 157. *M. garcinoides* β . *elongatum*, Blume Mus. Bot. i. 358.

TENASSERIM or ANDAMANS; Helfer (Kew Distrib. No. 2335).—DISTRIB. Sumatra, Java.

Leaves somewhat thin, nerves all slender but visible. Calyx-tube at the time of flowering saucer-shaped. Disc on the apex of the ovary obscurely rayed.—This species is exceedingly near *M. lævigatum*; the leaves are narrower with a longer acumination; the simple umbels at the summit of manifest peduncles give a slightly different look to the inflorescence.

32. *M. plebejum*, Kurz For. Fl. i. 513; leaves 2 $\frac{1}{2}$ -3 $\frac{1}{2}$ in. elliptic-lanceolate acuminate acute at the base, petiole $\frac{1}{8}$ - $\frac{1}{2}$ in., cymes lateral short, otherwise like *M. edule*.

PEGU; Kurz.

Leaves opaque, nerves scarcely visible, marginal quite obscure.—Kurz' example communicated exhibits neither flower nor fruit, so there must be doubt whether the subjoined var. belongs.

VAR. *silhetense*: peduncles 0- $\frac{1}{8}$ in. clustered, inflorescence extending hardly $\frac{1}{2}$ in., calyx-tube at the time of flowering saucer-shaped or somewhat funnel-shaped small, disc on the apex of the ovary prominently rayed. Chattuck, in the plain of Sylhet. H. f. & T.—Leaves exactly those of *M. plebejum* Kurz. Marked *M. lævigatum* Blume? by Triana, but the inflorescence as well as the leaves must be nearer *M. plebejum*, unless all are referable to one species.

33. **M. acuminatum**, *Smith ex Triana in Trans. Linn. Soc.* xxviii. 158; leaves 2–2½ in. broad-elliptic acuminate at both ends apex long rostrate obtuse, petiole $\frac{1}{8}$ – $\frac{1}{5}$ in., peduncles solitary (or 2 together) $\frac{1}{4}$ – $\frac{3}{4}$ in., cyme somewhat lax compound, buds very acute not large.

MALACCA; *Griffith* (Kew Distrib. No. 2325–1).

Leaves nearly concolorous, opaque. *Peduncles* sometimes terminal as well as axillary. *Disc* on the apex of the ovary distinctly rayed.—This can hardly be more than a variety of *M. levigatum*; it differs by its decisively rostrate leaves and smaller flowers. *Memecylon Maingay* No. 810 (from Malacca) slightly differs by having the leaves much lighter coloured on the lower surface and shortly rostrate, the peduncles shorter, and is still nearer *M. levigatum*.

VAR. *flavescens*; leaves 2½–3 in. elliptic acuminate at both ends apex rostrate obtuse secondary and marginal nerves distinct, petiole $\frac{1}{8}$ – $\frac{1}{5}$ in., inflorescence extending $\frac{1}{2}$ – $\frac{3}{4}$ in., peduncles clustered about $\frac{1}{8}$ in., cyme-branches repeatedly shortly divided, flowers very small. Malacca; *Griffith* No. 2325–2.—*Leaves* concolorous, greenish yellow in the dried examples. Branches of the cyme minutely scabrous almost puberulous. *Calyx-tube* at the time of flowering saucer-shaped, limb truncate. *Disc* on the apex of the ovary distinctly rayed.—Marked as “nov. sp.” by Triana.

34. **M. fuscescens**, *Thwaites Enum.* 111; leaves 2–2½ in. nearly sessile elliptic acuminate rostrate base acute, nerves slender but visible, inflorescence extending less than $\frac{1}{2}$ in. *Triana in Trans. Linn. Soc.* xxviii. 159.

CEYLON; Kokool Corle, at no great elevation; *Thwaites* No. 2926, 287.

Berry $\frac{1}{3}$ in. diam., spherical, ex *Thwaites*.—Mr. *Thwaites* in a note on No. 2926 doubts if it is really distinct from *M. levigatum* var. *sylvaticum* (No. 36 above).

35. **M. rostratum**, *Thwaites Enum.* 111; leaves 1½–2 in. elliptic acuminate rostrate apex obtuse base attenuate opaque coriaceous, inflorescence extending less than $\frac{1}{2}$ in. *Triana in Trans. Linn. Soc.* xxviii. 159.

CEYLON; Central Province, alt. 3000–4000 ft., *Gardner, Thwaites*.

A small tree. *Petals* white. *Berry* $\frac{1}{8}$ in. diam., spherical, mouth scarcely $\frac{1}{16}$ in. wide.

36. **M. rhinophyllum**, *Thwaites Enum.* 110; leaves 2–3 in. subsessile elliptic acuminate apex obtuse base acute opaque nerves very obscure, inflorescence extending less than $\frac{3}{4}$ in. *Triana in Trans. Linn. Soc.* xxviii. 159.

CEYLON; Central Province up to 3000 ft.; *Walker, Thwaites*, No. 2928, 2572.

A small tree. *Peduncles* about $\frac{1}{8}$ in., clustered; cymes small, somewhat dense; buds small, not acute. *Flowers* pale blue. *Berry* $\frac{1}{4}$ in. diam., black-purple, spherical.—Differs from the last species by its leaves sessile not acuminate at the base. These three Ceylon species (41, 42, 43) seem very close together, but Mr. *Thwaites*, who knows them alive, keeps them separate. But they are not so near together as the Malayan species of *Blume* in this same series. In this (as in so many other cases) there are only two courses open in order to represent all the material, viz., either a large grouping of existing species or the founding of a number of new ones on very slender grounds.

+++++ *Berry* less than $\frac{1}{3}$ in. diam. *Inflorescence* less than 2 in. *Leaves* usually less than 4 in., not acuminate though often acute, base not cordate.

37. **M. angustifolium**, *Wight Ic.* t. 276; leaves 2 in. opaque very narrow-oblong obtuse base attenuate, petiole $\frac{1}{5}$ in. *Thwaites Enum.* 111; *Triana in Trans. Linn. Soc.* xxviii. 158.

DECCAN PENINSULA; *Wight*, No. 1069. CEYLON; up to 2000 ft. alt.; *Thwaites*.

Shrub 6-8 ft. high. *Inflorescence* dense, extending hardly $\frac{3}{4}$ in.; peduncles usually $\frac{1}{8}$ - $\frac{1}{5}$ in., clustered. *Flowers* blue, as of *M. edule*. *Calyx-tube* at the time of flowering saucer-shaped, limb truncate. *Disc* on the apex of the ovary depressed, very obscurely rayed. *Berry* size of a pea, black-purple. (*Thwaites*.)

VAR. 1. *attenuata*; leaves still narrower elongate attenuate apex obtuse.—Ceylon, *Thwaites*.

VAR. 2. *Helperi*; branchlets quadrangular, berries $\frac{1}{4}$ in. diam.—Tenasserim or Andamans; *Helper* (Kew Distrib. No. 2334).—This has been placed with *M. angustifolium* because of its narrow leaves, which are, however, more obtuse and less petioled than those of *M. angustifolium*. If not placed here, it must form an additional species near *M. varians* No. 12.

38. **M. phyllanthifolium**, *Thwaites ex Triana in Trans. Linn. Soc.* xxviii. 159; leaves $\frac{1}{2}$ in. nearly sessile narrow-oblong obtuse narrowed at the base coriaceous opaque.

CEYLON, alt. 5000 ft.; *Thwaites*.

Branches wiry, leaves approximate, resembling a small woody *Phyllanthus*. *Flowers* very small, usually 3 on an axillary peduncle about $\frac{1}{2}$ in. *Berry* small, spherical, crowned prominently by the calyx-limb, but not ripe.—Entirely unlike every other species in the genus.

39. **M. campanulatum**, *C. B. Clarke*; leaves $2\frac{1}{2}$ -4 in. subpetiolate elliptic acute base attenuated opaque, calyx-tube at the time of flowering distinctly campanulate.

MALACCA; *Griffith*, Memecylon No. 5 (No. 2325 (not 2325-1 nor 2325-2) of Kew Distrib.).

Leaves suddenly narrowed, sometimes very shortly acuminate. *Peduncle* 0; pedicels $\frac{1}{8}$ - $\frac{1}{5}$ in., clustered. *Calyx-tube* even in the bud campanulate, limb truncate. *Buds* somewhat acute. *Disc* on the apex of the ovary depressed, very obscurely rayed.—This has been treated as a var. of No. 23 *M. cæruleum*, Jack; it seems very much nearer *M. lævigatum*, from which it differs chiefly in the round (not acute) base of the calyx-tube at the time of flowering.

40. **M. edule**, *Roxb. Cor. Pl.* t. 82; leaves $1\frac{1}{2}$ -3 $\frac{1}{2}$ in. elliptic or ovate acute at both ends hardly acuminate, petiole $\frac{1}{2}$ - $\frac{1}{5}$ in., nerves obscure, calyx-tube at the time of flowering saucer-shaped limb truncate.

EASTERN PENINSULA and CEYLON.

Flowers medium-sized, blue rarely white; buds obtuse or at least not very acute. *Calyx-tube* at the time of flowering saucer-shaped, limb truncate. *Disc* at the apex of the ovary depressed, obscurely rayed. *Berry* $\frac{1}{4}$ in. diam., black-purple, globose or slightly ovoid, mouth about $\frac{1}{2}$ in. wide.—The first three varieties run completely together which will account for the variety of quotation of the synonyms by authors: var. 4 recedes further from the type. The remaining varieties are called species by most authors. *M. myrsinoides*, Blume, differs from *M. edule* by its quadrangular branchlets. Triana reduces *M. umbellatum*, Wall. Cat. 4109, to *M. myrsinoides*, Blume: but the examples of Wallich 4109 have the branchlets exactly round.

VAR. 1. *typica*; peduncles clustered $\frac{1}{8}$ - $\frac{1}{4}$ in., leaves acute or obtuse. *M. edule*, *Roxb. Fl. Ind.* ii. 260; *DC. Prodr.* iii. 6; *Wall. Cat.* 4107; *Dalz. & Gibs. Bomb. Fl.* p. 93; *Kurz For. Fl.* i. 512. *M. edule* var. *a.*, *Thwaites Enum.* 111. *M. umbellatum*, *Burm. Fl. Zeyl.* t. 31. *M. tinctorium*, *Kæn. ex W. & A. Prodr.* 319; *Wight Ill.* t. 93. *M. globiferum*, *Wall. Cat.* 4108. *M. pyriform*, *Naud. in Ann. Sc. Nat.* ser. 3. xviii. p. 277.

VAR. 2. *ramiflora*; inflorescence densely clothing the branches, peduncle often (but not always) wanting. *M. edule*, *Lamk. Dict.* iv. 88; *DC. Prodr.* iii. 6; *W. & A.*

Prodr. 319. *M. sessile*, Wall. *Cat.* 4112 *ex W. & A. Prodr.* 320. Not *M. ramiflorum*, Griff. *Notul.* iv. 673.

VAR. 3. *capitellata*; peduncle more elongated sometimes 1 inch. *M. capitellatum*, Linn.; *DC. Prodr.* iii. 6; *Roxb. Hort. Beng.* 28. ? *Lamk. Ill.* t. 284.

VAR. 4. *ovata*; leaves often 4 in. more rounded at the base more acute sometimes subacuminate at the apex. *M. ovatum*, Sm. *ex Kurz For. Fl.* i. 512. *M. edule*, var. γ , *Thwaites Enum.* 110. *M. umbellatum*, Hb. *Heyne in Wall. Cat.* 4109. *M. tinctorium*, var. β , W. & A. *Prodr.* 319. *M. prasinum*, Naud. *in. Ann. Sc. Nat.* ser. 3. xviii. p. 275. *M. grande*, Wall. *Cat.* 4103, partly. *M. lucidum* and *pyrifolium*, Presl *Epim. Bot.* 209, 210.

VAR. 5. *lata*; nerves distinct, peduncles elongate often 1-1½ in., pedicels 0, calyx prominently 4-toothed. *M. capitellatum*, *Thwaites Enum.* 110 (not of Linnaeus).—Ceylon; *Thwaites* No. 1564, 1565; *Walker*; *Moon*; *Major Champion*.—Called *Samara leia* by Moon in Herb. by which he understood Burmann's *Fl. Zeyl.* t. 30; also *M. Walkeri*, Hook. in Herb.: also marked *nov. sp.* by Triana in Herb. Hook.

VAR. 6. *rubro-carulea*, *Thwaites Enum.* 415 (sp.); Triana in Trans. Linn. Soc. xxviii. 159.—Ceylon; East Matelle; *Thwaites*.—Mr. Thwaites says this differs from *M. edule* by the leaves more acuminate with the base more rounded. But the specimen (No. 3809) sent to Kew has the leaves very obtuse not at all acuminate, and narrowed into the petiole at the base: in short it is a typical example of *M. edule* var. 1 *typica*.

VAR. 7. *cuneata*, *Thwaites Enum.* 112 (sp.); Triana in Trans. Linn. Soc. xxviii. 159.—Ceylon; alt. 3000 ft.; *Thwaites* No. 2538.—The leaves are cuneate attenuate at the base, so that in some there is hardly any petiole; otherwise the same as *M. edule*.

VAR. 8. *leucantha*, *Thwaites Enum.* 110 (sp.); Triana in Trans. Linn. Soc. xxviii. 159.—Ceylon; alt. 3000-5000 ft.; *Thwaites*; *Gardner*.—This differs from *M. edule* by its white flowers and its leaves more distinctly nerved.

VAR. 9. *scutellata*, Triana in Trans. Linn. Soc. xxviii. 157. *M. myrtifolium*, Wall. *Cat.* 4111. *M. obtusum*, Wall. *Cat.* 4110. *M. punctatum*, Presl, and *scutellatum*, Naud. *ex Kurz For. Fl.* i. 513.—Transgangetic Peninsula from Chittagong to Singapore.—DISTRIB. Malay Archipelago. Leaves very thick, opaque, obscurely punctulate on both surfaces, narrowed much at the base, subepetiolate; otherwise much like *M. edule* type.—Kurz separates specifically *M. punctatum*, Presl, having the calyx with a tubercled base, from *M. scutellatum*, Naud. having the calyx with a smooth base. But both these descriptions of calyx may be seen on one branchlet, as in Helfer No. 2330 Herb. Distrib.: the tuberculation is caused by an insect.

VAR. 10. *Thwaitesii*; calyx-tube in the bud distinctly campanulate, teeth after flowering triangular. *M. umbellatum*, *Thwaites* No. 387, not of Burmann.—Ceylon, alt. 3000 ft.—Burmann states that his *umbellatum*, *Fl. Zeyl.* t. 31 is called Waryakha by the Cinghalese, a name attributed by Thwaites to *M. capitellatum*, Linn. It appears closely allied to *M. capitellatum*, Linn. but the very broad base of the calyx in bud is unlike *M. edule*.

VAR. 11. *Rottleriana*; inflorescence lax extending 2-2½ in.—Deccan Peninsula?—Called *M. capitellatum* by Heyne in Herb. Rottler and probably the extreme form of that variety.

VAR. 12. *molesta*; branchlets distinctly quadrangular.—Anamallay Mts.; *Wight* No. 1072.—Wight's specimens are ample and beautifully preserved: they are exactly *M. edule* var. 2. *ramiflorum*, except that the branchlets (and even the branches) are quadrangular. They are sufficient to shake the faith of any botanist in the whole existing arrangement of the species of *Memecylon*.

DOUBTFUL AND EXCLUDED SPECIES.

M. SUBQUADRANGULARE, *DC. Prodr.* iii. 6; no example known, and not recognisable from description.

M. ROYENII, *Blume Mus. Bot.* i. 360, is probably some form of *M. edule*, *Roxb.*, for Blume states that it is the Wellie Kala of Burmann's herbarium.

M. FLORIBUNDUM, Wall. *Cat.* 4113 is a *Eugenia*.

M. PYRIFORME, Wall. Cat. 4106 is not Melastomaceous.

M. PAUCIFLORUM, Wall. Cat. 4114 is *Canthium glomeratum*, Miq.

M. ACUMINATUM, Wall. Cat. 4105 is not a *Memecylon*.

M. SURTRINERVIUM, Miq. var. *grandifolia*, Kurz in Journ. As. Soc. 1876, pt. ii. 131, from the Nicobars, with leaves 8-10 in., and obovoid-oblong berries $\frac{2}{3}$ in. diam., is perhaps next to *M. heteropleurum* No. 19, but we have seen no specimen.

Two branchlets with detached leaves and fruits collected by Dr. T. Anderson at Singapore are referred by Triana to *Pachycentria tuberculosa*, Korths, a Borneo species. The identification appears correct; but this very imperfect material is the only ground for supposing that the species has been collected within the limits of the present Flora.

ORDER LXI. **LYTHRACEÆ.** (By C. B. Clarke, F.L.S.)

Trees shrubs or herbs; branches often quadrangular. Leaves entire, opposite, sometimes alternate or whorled; stipules 0. Inflorescence various, often in cymes or panicles. Flowers hermaphrodite, regular, rarely oblique, unisexual in *Crypteronia*. Calyx-tube free, persistent; lobes 3-6, valvate, accessory often added. Petals as many as the calyx-teeth, rarely 0, inserted near the top of the calyx-tube. Stamens definite or very many, inserted on the calyx-tube. Ovary free, in the bottom of the calyx-tube (rarely inferior), 2-6-celled; style long, stigma capitate rarely 2-lobed; ovules very many, placentas axile (rarely parietal). Fruit coriaceous or membranous, free or more or less adnate to the base of the calyx, 2-6-celled or by imperfection of the partitions 1-celled, dehiscent or not. Seeds many, various in shape, angular round or winged, albumen 0; embryo straight, cotyledons convolute in *Sonneratia* and *Punica*.—DISTRIB. Species 250; in the tropics of the whole world especially of America; a few species scattered over the temperate zones.

Nesæa triflora, Kunth, introduced into Wight and Arnott's *Prodromus* (p. 307), is a Mauritian plant collected occasionally in India.

TRIBE I. **Ammannieæ.** Low or aquatic herbs with small or minute flowers. Calyx membranous.

Herbs growing in moist places 1. AMMANNIA.

Herb growing in water the flower-spike exsert 2. HYDROLYTHRUM.

TRIBE II. **Lythreæ.** Trees or shrubs. Calyx herbaceous or coriaceous. Petals often large wrinkled.

* *Calyx curved, flowers secund.*

Stamens declinate 3. WOODFORDIA.

** *Calyx straight, flowers symmetric.*

Flowers 6-fid. Capsule circumsciss 4. PEMPHIS.

Flowers 4-fid. Capsule irregularly breaking up 5. LAWSONIA.

Flowers minute subunisexual. Capsule 2-valved 6. CRYPTERONIA.

Flowers 6-fid. Capsule 3-6-valved. Seeds winged 7. LAGERSTRÆMIA.

Flowers 4-8-fid. Capsule 4-8-valved. Seeds minute 8. DUABANGA.

Berry subglobose, 10-15-celled, ∞-seeded 9. SONNERATIA.

Anomalous genera with inferior ovary.

Calyx-lobes 5-7, thick. Stamens ∞ 10. PUNICA.

Calyx-lobes 5, small. Stamens 10 11. AXINANDRA.

1. **AMMANNIA**, Linn.

Annual glabrous herbs growing in damp places; branches often quadrangular. *Leaves* opposite and alternate, sometimes whorled, entire; stipules 0. *Flowers* small, axillary, solitary and subsessile, or in small trichotomous cymes; bracteoles usually 2. *Calyx* campanulate or tubular-campanulate, 3-5-toothed, often with minute interposed teeth or folds. *Petals* 3-5 or 0, small, inserted between the calyx-teeth. *Stamens* 2-8, inserted on the calyx-tube. *Ovary* enclosed in the calyx-tube, 1-5-celled, the septa very thin often absorbed; style filiform or short, stigma capitate; ovules very many, placentas axile. *Capsule* membranous, globose or long-ellipsoid, enclosed in the calyx, 2-3-valved, or irregularly breaking up or circumsciss. *Seeds* many, often nearly covering the placenta which is often ultimately free central, small, smooth, round on the back, raphe on the inner face, ellipsoid or nearly hemispheric.—DISTRIB. Species 30, in the tropics and warm temperate zones of the whole world.

SUBGENUS I. **Rotala**. *Flowers* axillary, solitary or in sessile spikes. *Capsule* 2-4-valved.

* *Calyx* in fruit campanulate, longer than broad.

1. **A. peploides**, Spreng. *Syst.* i. 444; cauline leaves elliptic nerves prominent beneath, capsule 2-valved, seeds narrow-oblong subfalcate. *Boiss. Fl. Orient.* ii. 742; *Kurz in Journ. As. Soc.* 1877, pt. ii. 84. *A. nana*, Roxb. *Fl. Ind.* i. 427, not of Wallich. *A. repens*, Rottl.; *DC. Prodr.* iii. 80. *Ameletia indica*, *DC. Prodr.* iii. 76; *Wall. Cat.* 2093; *W. & A. Prodr.* 303; *Blume Mus. Bot.* ii. 135, t. 47; *Dalz. & Gibs. Bomb. Fl.* 96; *Wight Ic.* t. 257. *A. elongata*, *Blume Mus. Bot.* ii. 135. *A. acutidens*, *Miq. Fl. Ind. Bat.* i. pt. i. 617. *A. polystachya*, *Wall. Cat.* 2094. *A. latifolia*, *Wall. Cat.* 2096, partly. *Peplis indica*, *Willd. Sp. Pl.* ii. 244.

INDIA; common, in rice fields &c. throughout the plains and in warm places in the lower mountains.—DISTRIB. Malaya to the Philippines and Canton; Cabul and Persia.

Stems decumbent often rooting or erect, 3-12 in. high. *Leaves* opposite, larger on the main stem, $\frac{1}{2}$ - $\frac{3}{4}$ in., elliptic, narrowed at the base, sometimes almost petioled. *Flowers* often approximate in numerous sessile axillary spikes, solitary, sessile in the axils of reduced floral leaves; bracteoles 2, minute, lanceolate: or flowers sometimes strictly axillary, distant. *Calyx-tube* long-campanulate, scarcely striate; teeth 4, often pink, acute, triangular in fruit, accessory teeth obscure or 0. *Petals* 0, or 4 small. *Capsule* ellipsoid, longer than broad. *Seeds* pink, somewhat angular, hilum quite obscure.

2. **A. Ritchiei**, C. B. Clarke; cauline leaves elliptic nerves not prominent beneath, capsule 4-valved, seeds nearly hemispheric.

BELGAUM, in rice fields, *Ritchie*.

Stems 6-12 in. rooting amongst floating weeds (*Ritchie*). *Leaves* opposite, cauline $\frac{1}{2}$ - $\frac{3}{4}$ in., elliptic, sessile. *Flowers* solitary, distant, lower distinctly pedicelled. *Calyx* long-campanulate, truncate; teeth 4, minute, hardly so large as the minute interjected ones. *Petals* 4, minute, rose. *Capsule* ellipsoid, longer than broad, as long as the calyx-tube. *Seeds* brown-yellow, elliptic, peltate.

3. **A. rotundifolia**, Ham. in *Don Prodr.* 220; leaves orbicular, flowers sessile close-packed in terminal spikes, capsule 4-valved. *Roxb. Fl. Ind.* i. 425;

DC. Prodr. iii. 79; *W. & A. Prodr.* 306; *Wall. Cat.* 2095; *Wight Ic.* t. 258; *Kurz in Journ. As. Soc.* 1877, pt. ii. 85. *A. latifolia*, *Wall. Cat.* 2096, partly. *A. subspicata*, *Benth. in Hook. Lond. Journ. Bot.* i. 484. *Ameletia rotundifolia*, *Dalz. & Gibs. Bomb. Fl.* 96. *A. subspicata*, *Benth. in Hook. Kew Journ. Bot.* iv. 81.

INDIA; common, in rice fields &c. throughout the plains and in warm places in the lower mountains; not received from Ceylon.—DISTRIB. China, Formosa.

Rooting and creeping extensively so as often to form large patches in moist turf: stems usually 4–6 in., roundish and leafy. *Leaves* $\frac{1}{2}$ in. diam., opposite, sessile or shortly petioled, nerved, approximate below becoming distant towards the spikes. *Flower-spikes* dense, pedunculate, often 3 sometimes one only, sometimes panicked; floral leaf one to each flower, ovate or oblong, bracteiform, bracteoles 0 or most minute. *Calyx-tube* campanulate, not elongate; teeth 4, acute, triangular, without interjected folds. *Petals* 4, obovate, twice the length of the calyx-teeth, bright rose. *Capsule* ellipsoid, a little longer than broad. *Seeds* brown-yellow, ellipsoid, peltate.—In this species, in *A. floribunda* below, and probably in others, the flowers are dimorphic; one kind has the stamens included and the style very long-exserted, the other kind has the stamens long-exserted and the style short: these are doubtless reciprocally fertile in the manner discovered by Mr. Darwin for *Lythrum Salicaria*. No stress must be laid on the descriptions of the length of the style in this genus.

4. ***A. tenuis***, *C. B. Clarke*; leaves opposite ovate or elliptic, flowers sessile close-packed in terminal spikes, capsule 2-valved. *Ameletia tenuis*, *Wight Ic.* t. 257; *Dalz. & Gibs. Bomb. Fl.* 96.

CENTRAL INDIA from BANDA to the CONCAN and BEHAR. EAST BENGAL; *Griffith* No. 2310.

Erect, or but shortly creeping at the base; varying from simple stems 3–4 in. to very compound stems 8–10 in. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., sessile or nearly so, often acute. *Flower-spikes* dense, on filiform peduncles; floral leaf one to each flower, oblong or lanceolate, bracteoles lanceolate, exceeding half the length of the calyx. *Calyx-tube* campanulate, much more elongate than that of *A. rotundifolia*; teeth 4, acute, without interjected folds. *Petals* 4, obovate, not much longer than the calyx-teeth. *Capsule* ellipsoid, much longer than broad. *Seeds* brown-yellow, elliptic, peltate.

5. ***A. floribunda***, *C. B. Clarke*; leaves alternate, upper narrow-oblong or linear, flowers sessile close packed in terminal spikes, capsule 2-valved. *Ameletia floribunda*, *Wight Ill.* 206, not good and the reference to the figure wrong; *Hook. Ic. Pl.* t. 826; *Dalz. & Gibs. Bomb. Fl.* 96. *Nimmonia floribunda*, *Wight in Madras Journ. of Science* vi. 34, t. 20.

Mahableshwur Hills, BOMBAY; *Law, Stocks*.

Erect or but shortly creeping at the base; stems often much branched, 8–10 in. Lower leaves 1–2 in., broad-oblong, obtuse, sessile, base broad, upper leaves $\frac{1}{4}$ – $\frac{1}{2}$ in., linear or narrow-oblong. *Flower-spikes* dense on filiform peduncles; floral leaf one to each flower, oblong or lanceolate; bracteoles lanceolate, exceeding half the length of the calyx. *Calyx-tube* campanulate, elongate, like that of *A. tenuis*; teeth 4, acute, without interjected folds. *Petals* 4, obovate, nearly twice the calyx-teeth, bright rose. *Capsule* ellipsoid, much longer than broad. *Seeds* brown-yellow, elliptic, peltate.—Very closely allied to the preceding species.

6. ***A. Rotala***, *F. Muell. Fragm.* iii. 108; leaves in whorls of 3–6 linear, flowers sessile axillary, capsule 3-valved. *Benth. Fl. Austral.* iii. 295. *Rotala verticillaris*, *Linn.*; *DC. Prodr.* iii. 76; *Wall. Cat.* 6321; *W. & A. Prodr.* 303;

Wight Ic. t. 260; *Dalz. & Gibs. Bomb. Fl.* 96; *Miq. Fl. Ind. Bat.* i. pt. i. 614. *R. apetal.*, *F. Muell. Fragm.* iii. 108.—*Rheede Hort. Mal.* ix. t. 81.

DECCAN PENINSULA; *Wight, Rottler. CONCAN, Law.* CEYLON, abundant, *Thwaites*.—DISTRIB. Australia. Tropical Africa.

Erect or shortly creeping; stems 3-6 in. *Leaves* $\frac{1}{4}$ - $\frac{1}{2}$ in., sometimes somewhat ovate at the base. Lower whorls of *flowers* often distant, upper sometimes almost spicate. *Calyx* tubular; teeth 3-5, small. *Petals* small, fugacious, or 0. *Stamens* 3-5. *Capsule* ellipsoid, longer than broad. *Seed* half-obovoid, the plane face somewhat excavated.—*Hypobrichia Spruceana, Benth. in Herb. Spruce* which has been reduced to a synonym of *Rotala verticillaris*, differs in its inflorescence and short calyx.

7. **A. dentelloides**, *Kurz in Journ. As. Soc.* 1870, pt. ii. 76; leaves opposite linear, flowers sessile axillary, capsule 2-valved.

SIKKIM TERAI near Siligori; *Kurz, C. B. Clarke.*

Stems 2-4 in., procumbent. *Leaves* $\frac{1}{4}$ - $\frac{1}{2}$ in., linear or narrow oblong, obtuse. *Flowers* scattered, not at all spicate. *Calyx-tube* elongate-campanulate, 5-ribbed; teeth 5, triangular, acute; teeth and sometimes the whole tube with minute scattered hairs, accessory teeth 0. *Petals* minute. *Capsule* ellipsoid, much longer than broad. *Seed* half-ellipsoid, excavated on the plane face.

** *Calyx in fruit hemispheric, tube as broad as or broader than long.*

8. **A. pygmæa**, *Kurz in Seemann Journ. Bot.* v. 376; very minute, leaves opposite linear, flowers sessile axillary, capsule 2-valved.

KHASIA MTS., alt. 2000 ft., *H. f. & T.*; RAJMAHAL HILLS (Bengal), *Kurz*; throughout CHOTA NAGPORE, alt. 1000-2000 ft., *C. B. Clarke.* CALCUTTA; Botanic Garden, *Kurz.*

Stems tufted, 1-3 in. *Leaves* $\frac{1}{4}$ - $\frac{1}{3}$ in., linear or narrow-oblong, at the base narrower almost petioled, obtuse often with two points (as described by Harvey in *Suffrenia capensis*). *Flowers* not spicate, most minute. *Calyx-tube* short; teeth 4, triangular, accessory teeth 0. *Petals* if any minute, not yet seen. *Stamens* 2 (occasionally 3-4 *Kurz*). *Capsule* spherical, slightly acute. *Seeds* black, half-ellipsoid or nearly half-spherical, excavated on the plane face.—*Kurz* says the capsule is 3-valved: the very perfect examples from Chota Nagpore have the capsule 2 valved. *Suffrenia capensis, Harvey Thes. Capens.* ii. t. 189, differs from the Indian plant only in the larger and longer capsule. Compare *Rotala filiformis, Hiern in Oliv. Fl. Trop. Afr.* ii. 468, where Harvey's linear-leaved plant is united with the European *Suffrenia* which has oblong, broad-based leaves.

9. **A. simpliciuscula**, *Kurz in Journ. As. Soc.* 1871, pt. ii. 54; leaves opposite narrow-oblong, flowers solitary axillary shortly pedicelled, capsule 3-valved.

CHITTAGONG; tropical rice fields; *H. f. & T., Kurz.*

Stems decumbent, 1-2½ in. Lower *leaves* $\frac{1}{2}$ in., almost petioled, upper shorter, somewhat obovate. *Flowers* small, lower distant, upper approximate. *Calyx-tube* short; teeth 4, triangular, accessory teeth 0. *Capsule* globose, much longer than the calyx. *Seeds* black, subhemispheric, excavated on the plane face.

10. **A. pentandra**, *Roxb. Fl. Ind.* i. 425; cauline leaves opposite elliptic-oblong sessile faintly nerved, flowers solitary axillary sessile, capsule 3-celled. *DC. Prodr.* iii. 79; *W. & A. Prodr.* 305; *Wall. Cat.* 2102; *Blume Mus. Bot.* ii. t. 46; *Kurz in Journ. As. Soc.* 1877, pt. ii. 85. *A. nana, Roxb. in Wall. Cat.* 2105. *A. rubra, Ham. in Don Prodr.* 220; *Wall. Cat.* 2107. *A. subspicata, Herb. Hohenack.* No. 1611. *A. densiflora, Roth Nov. Sp.* 99; *DC. l. c.* 79;

W. & A. Prodr. 305. *A. debilis*, *Ait. in Herb. Zool. & Mor.* *Rotala* Roxburghiana, *Wight Ic.* t. 260; *Wall. Cat.* 2105. *Tritheca pentandra*, *Miq. Fl. Ind. Bat.* i. pt. i. 614. *Winterlia uliginosa*, *Spreng. Syst.* i. 788. *Sellowia uliginosa*, *Roth l. c.* 163; *DC. l. c.* 380.

Throughout Tropical INDIA, in moist places, very common.—DISTRIB. China, Malaya; and (including the varieties below enumerated) Australia and Tropical Africa.

Stems 6–12 in., often with many opposite branches divergent at right angles and covered with flowers. *Cauline leaves* usually 1 in., upper floral leaves becoming bractiform, oblong, base broader. *Flowers* often approximate, never in distinct spikes; bracteoles subulate as long as the calyx. *Calyx-teeth* 5, lanceolate, very acuminate; accessory teeth 5, subulate, often as long as the primary teeth. *Petals* 5, narrow-obovate, small or 0. *Capsule* spherical or globose-depressed. *Seeds* black, hemispheric, excavated on the plane face.

VAR. *illecebroides*, Arn. in *Herb. Wight*; smaller, cauline leaves $\frac{1}{2}$ in. *A. nana*, *Wall. Cat.* partly not Roxb. nor *Rottl.* *Rotala*? decussata, *DC. Prodr.* iii. 76; *Hiern in Oliv. Fl. Trop. Afr.* ii. 467.

VAR. *fimbriata*, *Wight Ic.* t. 217 (sp.); cauline leaves longer narrower often cordate at the base, petals larger sometimes fimbriate. *A. Heyneana*, *Wall. Cat.* 2104. *A. hexandra*, *Wall. Cat.* 2103.—Wallich's example has six stamens, otherwise is exactly *A. fimbriata*, *Wight*.

SUBGENUS II. **Eu-Ammannia.** *Flowers* in whorls, cymes or clusters. *Capsule* circumsciss or bursting irregularly.

11. ***A. baccifera***, *Linn.*; *Blume Mus. Bot.* ii. 133; cauline leaves opposite or alternate oblong or narrow-elliptic narrowed at the base, flowers in dense clusters forming knots on the stem or in looser but very short axillary cymes, capsule globose. *Dalz. & Gibs. Bomb. Fl.* 97; *Kurz in Journ. As. Soc.* 1877, pt. ii. 85. *A. vesicatoria*, *Roxb. Fl. Ind.* i. 426; *DC. Prodr.* iii. 78; *W. & A. Prodr.* 305; *Wall. Cat.* 2098, partly. *A. indica*, *Lamk.*; *DC. l. c.* 77; *W. & A. Prodr.* 305; *Wall. Cat.* 2099; *Blume l. c.* t. 46. *A. debilis*, *Ait. Hort. Kew*, ed. 1, i. 163. *A. verticillata*, *Boiss. Fl. Orient.* ii. 743, not of *Link.* *Hapalocarpum vesicatorium* and *H. indicum*, *Miq. Fl. Ind. Bat.* i. pt. i. 618. *Cryptotheca apetalata*, *Blume Bijdr.* 1128; *DC. l. c.* 76.

Throughout Tropical INDIA, in moist places, very common.—DISTRIB. Afghanistan. Malaya. China. Australia. Tropical Africa.

Glabrous, erect, 6–8 in. sometimes 2 ft. Lower leaves and branches usually opposite; cauline leaves 1–2½ in., usually narrow but obtuse. *Calyx-tube* hemispherical; teeth 4, broad, triangular, accessory folds or teeth small. *Petals* usually 0, or small. *Capsule* depressed, imperfectly circumsciss above the middle. *Seeds* black, subhemispheric, excavated on the plane face.

12. ***A. salicifolia***, *Monti ex Blume Mus. Bot.* ii. 132; glabrous, leaves sessile lanceolate rounded at the base, flowers densely clustered in the axils, capsule globose depressed not covered by the calyx-teeth. *Dalz. & Gibs. Bomb. Fl.* 97. *A. egyptiaca*, *Willd. Hort. Berol.* t. 6. *A. verticillata*, *Lamk.* III. t. 77. f. 3, not of *Wight*; *DC. Prodr.* iii. 79. *A. glauca*, *Wall. Cat.* 2100; *W. & A. Prodr.* 305. *A. densiflora*, *Miq. in Herb. Hohenack.* No. 770.

PUNJAB; *Edgeworth, T. Thomson.* KUMAON, alt. 4000 ft.; *Strachey & Winterbottom.* BEHAR; *J. D. H.* EAST BENGAL; *Griffith.* CONCAN; *Stocks, Ritchie.* DECCAN PENINSULA; *Wight* 981; *Perottet.*—DISTRIB. Tropical Africa.

Glabrous, erect, sometimes 2 ft. high, leaves and branches opposite. Cauline leaves often 2 in. by less than $\frac{1}{2}$ in., frequently cordate at the base. *Calyx* in fruit hemispheric; teeth 4, erect, triangular, too short to close over the capsule; accessory

folds usually present but small. *Capsule* reddish, exactly like that of *A. baccifera*. *Seed* half-obovoid, excavated on the plane face, one end much smaller than the other.—*A. verticillata*, Boiss. *Fl. Orient.* ii. 743, has the leaves attenuated to the base; and is therefore *A. baccifera*, *Linn.*, for the only character by which *A. baccifera* can be distinguished from *A. salicifolia*.

13. ***A. cordata***, *W. & A. Prodr.* 304; glabrous, leaves sessile oblong cordate subamplexicaul, flowers 2–5 shortly pedicelled in each axil, capsule globose covered by the calyx-teeth. *Wall. Cat.* 6322. *A. salicifolia*, *Monti var. β.* *Thwaites Enum.* 121.

EAST BENGAL, Noakhali, *C. B. Clarke*. DECCAN PENINSULA; *Wight*. CEYLON; *Thwaites*.

Glabrous, erect, 12–18 in., leaves and branches opposite. *Cauline leaves* 1–1½ in., margins often white cartilaginous. *Flowers* very shortly pedicelled, but not congested. *Calyx-tube* campanulate with 4 green striations; teeth 4, triangular, connivent over the capsule; accessory teeth as 4 small prominent horns. *Capsule* globose, much larger than that of *A. salicifolia*, not becoming red pseudo-baccate as does that of *A. baccifera* and *A. salicifolia*. *Seeds* subhemispheric, excavated on the plane face.

14. ***A. lanceolata***, *Heyne in Wall. Cat.* 2106 *B., C.*; leaves opposite oblong-elliptic attenuate to the base scarcely petioled, flowers 2–5 shortly pedicelled in each axil, calyx campanulate minutely pubescent, petals large. *A. verticillata*, *W. & A. Prodr.* 304, *exclud. all syn.* *A. salicifolia*, *Thwaites Enum.* 121, *as to var. α. only.*—*Rheede Hort. Mal.* ix. t. 84?

DECCAN PENINSULA, *Wight*. Red hills of the Carnatic; *G. Thomson*. CEYLON; *Thwaites*.

Erect, 4–16 in., branches numerous, opposite. *Cauline leaves* 1–1½ in., margins often white cartilaginous, younger leaves usually puberulous punctate or subpubescent. *Flowers* not congested, often whorled; bracteoles linear, obtuse, green, as long as the calyx. *Calyx-tube* campanulate, ovoid; teeth 4, triangular, short, with 4 shorter triangular exterior teeth. *Petals* exceeding much the calyx, larger than in any other species of *Eu-Ammannia*. *Capsule* globose. *Seed* subhemispheric, excavated on the plane face.

15. ***A. senegalensis***, *Lamk. Ill.* t. 77, f. 2.; leaves opposite elongate-oblong sessile subauriculate at the base, cymes peduncled compound, capsule $\frac{1}{12}$ in. diam. globose. *DC. Prodr.* iii. 77. *A. auriculata*, *Willd. Hort. Berol.* t. 7; *DC. l. c.* 80; *Boiss. Fl. Orient.* ii. 743.

Plains of the PUNJAB and of NORTH-WEST HINDOSTAN, ascending to 5000 ft. *Royle, T. Thomson, Edgeworth.*—DISTRIB. Afghanistan. Persia. Egypt. Tropical Africa. Australia.

Glabrous, erect, 6–24 in., branches sharply quadrangular. *Cauline leaves* 1–2 in. *Bracteoles* on the cyme-branches minute, linear. *Calyx* campanulate, with 4 or 8 green lines becoming indistinct in fruit; teeth 4, broad-triangular, teeth obscure. *Petals* 0 or caducous. *Stamens* 6 or 8. *Capsule* becoming ultimately red, much exceeding the calyx-tube. *Seeds* half-ellipsoid, excavated on the plane face.—This species is distinct so far as the Indian material is concerned. Some African examples have the cyme much closer and are doubtfully separable from *A. salicifolia* above. *Kurz (in Journ. As. Soc.* 1877, pt. ii. 85. 86) gives Chittagong as a locality for this plant: which may be so, or his plant may have been *A. cordata* No. 13.

16. ***A. multiflora***, *Roxb. Fl. Ind.* i. 426; leaves opposite elongate-oblong sessile subauriculate at the base, cymes peduncled compound, capsule $\frac{1}{20}$ in. diam. globose. *DC. Prodr.* iii. 79; *W. & A. Prodr.* 305; *Wall. Cat.* 2101;

Boiss. Fl. Orient. ii. 743; *Dalz. & Gibs. Bomb. Fl.* 97; *Kurz in Journ. As. Soc.* 1877, pt. ii. 85.

Throughout INDIA on the plains.—DISTRIB. Afghanistan. Persia. Australia.

Glabrous, very erect, 6–24 in.; branches numerous, sharply quadrangular. Cauline leaves 1–1½ in. *Bracteoles* on the cyme-branches most minute, linear. *Calyx* campanulate, hemispheric or scarcely elongate; teeth 4, short-triangular. *Petals* 0, or small and caducous. *Stamens* 4, 6 or 8. *Capsule* often ultimately red, globose, not enclosed by the calyx. *Seeds* half-ellipsoid, excavated on the plane face.—Very closely allied to *A. senegalensis* and united with it by Mr. Hiern, perhaps correctly, but the two forms do not meet or pass into each other in India. *Cryptotheca dichotoma*, *Blume Bijdr.* 1128; *DC. Prodr.* iii. 76 (*Ammannia microcarpa*, *DC. Prodr.* iii. 77), from Java and Timor, has been united with *A. multiflora* Roxb. by *Kurz in Journ. As. Soc.* 1871, pt. ii. 56, but differs in the much more elongate calyx-tube and larger cauline leaves: it is certainly very near *A. multiflora*.

17. **A. octandra**, *Linn. f. Suppl.* 127; leaves opposite linear-oblong subauriculate at the base, cymes very shortly peduncled 3–5-flowered, calyx in fruit large campanulate 4-angled with 8 distinct ribs. *Roxb. Cor. Pl.* t. 133; *Fl. Ind.* i. 425; *DC. Prodr.* iii. 80; *Wall. Cat.* 2097; *W. & A. Prodr.* 304; *Blume Mus. Bot.* ii. 132; *Dalz. & Gibs. Bomb. Fl.* 97; *Kurz in Journ. As. Soc.* 1877, pt. ii. 86. *Ammanella linearis*, *Miq. Fl. Ind. Bat.* i. pt. i. 619. *Diplostemon octandrum*, *Miq. l.c.* 615.

DECCAN PENINSULA; *Rottler*; *Heyne*; *Wight*; *G. Thomson*. CEYLON; *Thwaites*. CHITTAGONG; *Kurz*.—DISTRIB. Malaya.

Erect, 6–18 in., branches quadrangular, often scabrous. Cauline leaves 1–2 in., sometimes very narrow. *Calyx* in fruit $\frac{1}{5}$ in., often minutely pubescent or scabrid, nearly truncate; teeth 4, small. *Petals* $\frac{1}{12}$ in., obovate, rose-coloured. *Stamens* 8, filaments long, dark-red. *Capsule* somewhat ellipsoid, as long as the calyx. *Seeds* subhemispheric.—This species is reduced to *A. latifolia* Linn. by *Griseb. Fl. Brit. West Indies* 270; but the West Indian specimens, though like the Indian in leaves and habit, are entirely without the subulate angles of the ripe fruit which form the essential character of *A. octandra*.

18. **A. subrotunda**, *Wall. ex Kurz in Journ. As. Soc.* 1871, pt. ii. 55; “leaves sessile almost orbicular pinnate-nerved, flowers on slender short pedicels forming shorter or longer slender racemes.”

BURMA or EAST BENGAL; *Kurz*.—DISTRIB. Ava.

Not seen: diagnosis copied from Mr. Kurz.

2. **HYDROLYTHRUM**, *Hook. f.*

A glabrous aquatic herb. Lower leaves whorled, linear. *Spikes* exsert out of the water with oblong bractiform leaves. *Flowers* whorled, subsessile in the axils of bracts, lower whorls distant, upper approximate, often with opposite bracts; bracteoles 2, subulate. *Calyx* campanulate; teeth 4, triangular; accessory teeth 0. *Petals* 4, inserted between the calyx-lobes. *Stamens* 4, on the middle of the calyx-tube. Hypogynous scales 4, bifid. *Ovary* in the bottom of the calyx, free, 2-celled; style simple, stigma capitate; ovules not many, placentas axile. *Capsule* small, globose, 2-celled. *Seeds* 3 or 4 in each cell, ovoid, concave.—A genus only separable from *Ammannia* by habit: for hypogynous glands exist in *Amm. rotundifolia*.

1. **H. Wallichii**, *Hook. f. in Gen. Pl.* i. 777; *Hook. Ic. Pl.* t. 1007. *Rotala*, sp. *Wall. Cat.* 9059. R. (*Mirkocœ*) *myriophylloides*, *Welw.*; *Oliv. Fl. Trop. Afr.* ii. 469. *Ammannia Wallichii*, *Kurz in Journ. As. Soc.* 1877, pt. ii. 84.

TAVOY; *Wallich*. MOULMEIN; *Lobb*.—DISTRIB. Java, Angola.

Stems 8 in., weak, little divided, probably erect in the water. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., about 8–12 in each whorl; emerged leaves $\frac{1}{4}$ in., acute or obtuse. *Calyx* without accessory teeth. *Petals* elliptic, rose-coloured, far exceeding the calyx-teeth. *Capsule* not ripe in the Indian examples, dehiscing septicidally from the apex in the African. —Mr. Hiern says (in *Oliv. Fl. Trop. Afr.* ii. 469) that the Angola plant is congeneric with the Tavoy plant; but it appears conspecific.

3. **WOODFORDIA**, *Salisb.*

A shrub. *Leaves* opposite, subsessile, entire, lanceolate, beneath whiter and with black glandular dots. *Flowers* in short panicle cymes on axillary peduncles, rarely solitary, scarlet; pedicels 2-bracteate at their base. *Calyx* long-tubular, slightly curved, mouth oblique; teeth 6, short, with 6 minute accessory teeth. *Petals* 6, small or 0, inserted at the top of the calyx-tube. *Stamens* 12, declinate, inserted on the calyx-tube below its middle. *Ovary* at the bottom of the calyx-tube, free, sessile, oblong, 2-celled: style filiform, stigma small; ovules very many, placentas axile. *Capsule* ellipsoid, membranous, included in the calyx. *Seeds* very many, narrowly cuneate-obovate, quite smooth, without hairs or papillæ.

1. **W. floribunda**, *Salisb. Parad. Lond.* t. 42; *Boiss. Fl. Orient.* ii. 737; *Brand. For. Fl.* 238. *W. tomentosa*, *Bedd. Fl. Sylv. Anal. Gen.* t. xiv. fig. 4. *W. fruticosa*, *Kurz in Journ. As. Soc.* 1871, pt. ii. 56; *For. Fl.* i. 518. *Grislea tomentosa*, *Roxb. Cor. Pl.* t. 31; *Fl. Ind.* ii. 233; *DC. Prodr.* iii. 92; *Bot. Mag.* t. 1906; *Wall. Cat.* 2110; *W. & A. Prodr.* 308; *Blume Mus. Bot.* ii. t. 45; *Miq. Fl. Ind. Bat.* i. pt. i. 621; *Dalz. & Gibs. Bomb. Fl.* 97. *G. uniflora*, *Rich. Fl. Abyss.* t. 52. *G. punctata*, *Ham.*; *DC. l.c.* 92; *W. & A. Prodr.* 308. *G. micropetala*, *Hochst. et Steud. in Herb. Schimp.* 1906. *Lythrum fruticosum*, *Linn. Sp. Pl.* 641.

Throughout INDIA, common; ascending to 5000 ft.; but not seen in the alluvial mud of Bengal.—DISTRIB. Beloochistan, Tropical Africa, Madagascar, China.

A shrub with long spreading branches, brilliantly red with flowers in the hot season. *Leaves* 2–4 in., opposite or subopposite, usually rounded or cordate at the base (but one African form has leaves attenuate at the base); usually grey pubescent beneath, sometimes quite glabrous. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in., bright red. *Petals* scarcely longer than the calyx-teeth. *Seed* (figured by Blume and by Beddome as densely covered by long papillæ and stated by Kurz to be papillose-pilose) in every example at Kew entirely glabrous not exhibiting at any period of its development the smallest trace of a papilla.—This shrub is very uniform in character throughout India: the African examples vary much more. It is trimorphic after the manner described by Mr. Darwin in *Lythrum Salicaria*. See *Hiern in Oliv. Fl. Trop. Afr.* ii. 481.

4. **PEMPHIS**, *Forst.*

A maritime shrub or tree, attaining 35 ft. *Leaves* opposite, oblong, entire, very thick, fleshy. *Flowers* axillary, solitary, peduncles 2-bracteate at their base. *Calyx-tube* campanulate, 12– ∞ -ribbed; teeth 6, short, with 6 shorter accessory teeth. *Petals* 6, inserted at the top of the calyx-tube, nearly as long as

it, obovate, wrinkled, white or rose. *Stamens* 12, inserted in two series towards the middle of the calyx-tube. *Ovary* free, at the bottom of the calyx-tube, 3-celled at the base; style long, stigma capitate; ovules many, ascending, placentas 3 sub-basal. *Capsule* coriaceous, obovoid or nearly globose, included in the calyx-tube or exsert nearly half its length, circumsciss somewhat irregularly, ultimately 1-celled. *Seeds* very many, long cuneate-obovoid, angular, smooth, standing out in all directions from what appears to be a free central placenta.

1. **P. acidula**, *Forst. Gen. t. 34*; *DC. Prodr. iii. 89*; *Wall. Cat. 2108*; *W. & A. Prodr. 307*; *Griff. Notul. iv. 510*; *Blume Mus. Bot. ii. t. 43*; *Miq. Fl. Ind. Bat. i. pt. i. 619*; *Bedd. Fl. Sylv. Anal. Gen. t. xiv. fig. 5*; *Kurz For. Fl. i. 518*. *P. angustifolia*, *Roxb. Fl. Ind. ii. 465*. *Maclellandia Griffithiana*, *Wight Ic. t. 1996*. *Lythrum Pemphis*, *Linn. f. Suppl. 249*; *Lamk. Ill. ii. 408*, fig. 2. *Melanium fruticosum*, *Spreng. Syst. ii. 455*.

Southern coasts of both PENINSULAS and of CEYLON.—DISTRIB. Tropical coasts of the Old World

Branchlets young leaves and inflorescence with short grey hairs. *Leaves* 1 by $\frac{1}{2}$ in. *Peduncles* $\frac{1}{4}$ – $\frac{3}{8}$ in. *Capsule* $\frac{1}{2}$ in. diam.

5. LAWSONIA, Linn.

A glabrous erect shrub with round branches, sometimes spinous. *Leaves* opposite, entire, lanceolate. *Flowers* rather small, in large terminal paniced cymes; bracts small, deciduous. *Calyx-tube* exceedingly short; lobes 4, ovate. *Petals* 4, obovate, wrinkled, inserted at the top of the calyx-tube. *Stamens* usually 8, inserted in pairs between the petals, sometimes 4 only or 8 not paired. *Ovary* free, 4-celled (or 4-celled at the base); style very long, stigma capitate; ovules many, placentas axile. *Capsule* coriaceous, globose, exsert, irregularly breaking up, ultimately 1-celled. *Seeds* many, angular, pyramidal, smooth, packed on a central placenta.

1. **L. alba**, *Lamk. Ill. t. 296*, fig. 2; *DC. Prodr. iii. 91*; *Wall. Cat. 2109*; *W. & A. Prodr. 307*; *Wight Ill. t. 87*; *Miq. Fl. Ind. Bat. i. pt. i. 620*; *Boiss. Fl. Orient. ii. 744*; *Dalz. & Gibs. Bomb. Fl. 97*; *Bedd. Fl. Sylv. Anal. Gen. xiv. fig. 6*; *Brand. For. Fl. 238*. *L. inermis*, *Roxb. Fl. Ind. ii. 258*; *Griff. Ic. Pl. Asiat. t. 580*. *L. spinosa*, *Linn.*; *Lour. Fl. Cochinc. 281*. *L. purpurea*, *Lamk.*; *Spreng. Syst. ii. 217*.

Throughout INDIA, very common, cultivated; perhaps wild in Western India.—DISTRIB. Cabul, Persia. Cultivated in many tropical and warm temperate regions.

About 6 ft. high, often trimmed so as to make a close fence. *Leaves* $\frac{3}{4}$ –1 $\frac{1}{2}$ in., narrowed at the base, sometimes very shortly petioled, acute or obtuse. *Flowers* $\frac{1}{2}$ in. diam., sweet-scented, rose or white. *Sepals* $\frac{1}{12}$ in., permanent. *Capsule* size of a pea.

6. CRYPTERONIA, Blume.

Trees. *Leaves* opposite, petioled, entire, ovate or lanceolate. *Racemes* elongate, in branched panicles. *Flowers* minute, white or green, with short linear bracts at the base of the pedicels, polygamo-dioecious. *Calyx-tube* short, saucer-shaped, or longer subhemispheric; teeth 5 (rarely 4), valvate, persistent. *Petals* 0. *Stamens* as many as the calyx-teeth, inserted between them near the

top of the calyx-tube. *Ovary* free, globose, 2-celled; style long, stigma capitate sub-2-fid; ovules many, placentas axile. *Capsule* 2-celled, globose, pubescent, crowned by the persistent style, dehiscent at the vertex across the dissepiment so as to divide the style; fruit-pedicle deflexed. *Seeds* many, long-ellipsoid, testa produced at each end.—**DISTRIB.** Species 5 extending from Eastern Bengal to the Philippines.—The branches appear all functionally dioecious: those that perfect seed have all the stamens with short filaments: those that have stamens with long filaments have an ovary and style but set no seed.

1. **C. pubescens**, *Blume Mus. Bot.* ii. 123; leaves pubescent beneath, calyx-teeth short triangular, ripe capsule $\frac{1}{16}$ in. broad. *Henslowia pubescens*, *Wall. Cat.* 4904, and *Pl. As. Rar.* iii. 14, t. 221; *Miq. Fl. Ind. Bat.* i. pt. i. 716. *H. pubescens* together with the pubescent portion of *H. affinis*, *Planch. in Hook. Lond. Journ. Bot.* iv. 477, t. xvi. B.

RANGOON; McClelland. MERGUI; Griffith, No. 2512-2 (marked *H. affinis* by Planchon). PINANG.

Tree 30 ft. (attaining 80 ft. fide Kurz); branchlets nearly glabrous. *Leaves* 3-4½ in., from broad-elliptic to lanceolate, narrowed at both ends; pubescence beneath yellowish or brownish. *Panicles* pubescent; pedicels scarcely $\frac{1}{20}$ in. *Calyx* very small, in fruit being quite flat, not at all cup-shaped. *Capsule* in *H. pubescens* Wall. exactly the same size as in *H. affinis* Planch.: in both the fruits are sometimes barren and twice the normal size, probably from the attack of an insect.

VAR. Hookeri; leaves glabrous beneath, panicle pubescent or rarely glabrous. *C. paniculata*, Kurz in *Journ. As. Soc.* 1877, pt. ii. 86; *For. Fl.* i. 519, not of Blume. *Henslowia Hookeri*, *Wall. Cat.* 8566. *H. affinis*, as to the glabrous portion, *Planch. in Hook. Lond. Journ. Bot.* iv. 477. *H. pubescens*, *Griff. Notul.* iv. 404 and *Ic. Pl. Asiat.* t. 564, fig. ii.—Amherst and Tavoy; Wallich. Mergui; Griffith and Helfer (No. 2512 Kew Distrib.). Malaya; Maingay No. 650-2.—*Henslowia leptostachys*, Planch. (with which *H. paniculata*, Miq. coincides) differs by the smaller flowers much more remotely placed on more slender racemes. From Kurz's description (glabrous leaves) it seems that his *C. paniculata* exactly coincides with Wallich's *H. Hookeri*, and does not include (as Mr. Kurz supposes it does) the plant of Griffith. *C. pubescens* and *C. glabra* may possibly be united under *C. paniculata*, Blume, but *C. Griffithii* is distinct.

2. **C. glabra**, *Blume Mus. Bot.* ii. 123; leaves glabrous beneath, calyx in fruit somewhat cup-shaped with triangular-lanceolate suberect teeth, capsule $\frac{1}{18}$ in. broad. *Henslowia glabra*, *Wall. Cat.* 4093; *Planch. in Hook. Lond. Journ. Bot.* iv. 478; *Miq. Fl. Ind. Bat.* i. pt. i. 716.

KHASIA MTS., alt. 1000-3000 ft.; Wallich; *H. f. & T.* CHITTAGONG, alt. 1000 ft.; *H. f. & T.*—**DISTRIB.** Philippines.

An erect tree, 50-60 ft. *Leaves* lanceolate or elliptic-lanceolate, narrowed at both ends, membranous, nerves prominently raised beneath but slender. *Panicle*-branches glabrous or minutely pubescent; pedicels $\frac{1}{18}$ in.

3. **C. Griffithii**, *C. B. Clarke*; leaves glabrous very coriaceous, panicles and calyx covered with rusty red pubescence, pedicels $\frac{1}{20}$ in., calyx of male flower $\frac{1}{8}$ in. broad with lanceolate erect teeth. *Henslowia* sp. *Griff. Notul.* iv. 406, and *Ic. Pl. Asiat.* t. 564, fig. i.

MALACCA; Griffith No. 2513. MALAYA; Maingay.

Leaves 5-7 in., elliptic-lanceolate, the nerves raised beneath and thick.—This is very near *C. Cumingii*, Planch. of the Philippines, and may be a variety of it. *C. Cumingii* has a grey pubescence on the panicle, the pedicels are $\frac{1}{8}$ in. or more, the calyx is smaller.

7. **LAGERSTRÆMIA**, Linn.

Trees or shrubs. *Leaves* opposite, distichous (or the uppermost alternate), entire, oblong or ovate. *Panicles* axillary and terminal, usually trichotomous, sometimes dense; peduncles 2-bracteate at their apex; pedicels 2-bracteolate. *Flowers* often large. *Calyx-tube* funnel-shaped, smooth grooved angular or subulate; lobes 6 sometimes 7-9, ovate, subacute, valvate. *Petals* 6 sometimes 7-9 (or 0), inserted at the summit of the calyx-tube, clawed, wrinkled, margin crisped erose or fimbriate. *Stamens* very many, inserted near the bottom of the calyx-tube; filaments long, exsert. *Ovary* sessile, in the bottom of the calyx, 3-6-celled; style long, bent, stigma capitate; ovules very many, ascending, placentas axile. *Capsule* more or less adnate to the calyx, ellipsoid, coriaceous, smooth, 3-6-celled, 3-6-valved. *Seeds* many (rarely few), elongate, flat, erect, winged from their summit.—**DISTRIB.** Species 18, in South-east Asia extending to Australia; Burma being the centre of the genus.

SECT. I. Velaga. *Calyx-tube* smooth, neither ribbed nor subulate.

* *Calyx* glabrous or puberulous, not fulvous-tomentose.

1. **L. indica**, Linn.; DC. Prodr. iii. 93; petals $\frac{1}{2}$ – $\frac{3}{4}$ in. long-clawed, capsule $\frac{1}{2}$ in. diam. nearly globose, calyx-teeth erect on the fruit. *Roxb. Hort. Beng.* 38; *Fl. Ind.* ii. 505; *Bot. Mag.* t. 405; *W. & A. Prodr.* 308; *Wight Ill.* t. 86; *Kurz For. Fl.* i. 521. *L. elegans*, Wall. in *Part. Mag. Bot.* xiv. 269, with fig. *Velaga globosa*, Gaertn. *Fruct.* t. 133.

Throughout INDIA; common in gardens; possibly wild in the eastern boundary.—**DISTRIB.** Cultivated throughout the warm parts of Asia originally from China.

A shrub, showy in flower. *Leaves* 2 in., glabrous, elliptic or oblong, sessile, acute or somewhat obtuse at each end, never acuminate. *Panicle* not condensed, minutely pubescent or glabrous. *Petals* bright pink. *Calyx-teeth* on the fruit long-triangular, erect but distant, thin not woody. *Seed* $\frac{1}{4}$ in. including its wing.

2. **L. parviflora**, Roxb. *Hort. Beng.* 38; *Cor. Pl.* t. 66; *Fl. Ind.* ii. 505; leaves glabrous or shortly pubescent beneath, petiole less than $\frac{1}{2}$ in., petals less than $\frac{1}{4}$ in., calyx-teeth ultimately woody erect closely adpressed to the fruit. DC. Prodr. iii. 93; Wall. Cat. 2119 altogether not partly as say W. & A. Prodr. 308; *Wight Ic.* t. 69; *Griff. Ic. Pl. Asiat.* t. 592; *Bedd. Fl. Sylv.* t. 31; *Dalz. & Gibs. Bomb. Fl.* 98; *Brand. For. Fl.* 239; *Kurz For. Fl.* i. 521. *L. Fatioa*, Blume Mus. Bot. ii. 125. *Fatioa nepaulensis*, Wall.; DC. Prodr. iii. 89.

At the base of the WESTERN HIMALAYA, alt. 1000 ft. Throughout the DECCAN PLATEAU (i.e. everywhere south from the Gangetic Plain), alt. 1000-3000 ft.; abundant. Not in Central Bengal, nor Ceylon.—**DISTRIB.** Ava.

A tree, attaining 60 ft. *Leaves* 2-3 $\frac{1}{2}$ in., glabrous in the typical plant, oblong, acute or acuminate with the apex obtuse, beneath a lighter colour, often prominently reticulate. *Panicles* many- or few-flowered, not condensed. *Calyx* glabrous puberulous or minutely pubescent, in fruit somewhat funnel-shaped at the base, teeth small. *Petals* narrow, white. *Capsule* variable in size, in the typical plant $\frac{3}{4}$ –1 by $\frac{1}{2}$ – $\frac{3}{8}$ in. *Seeds* (with the wing) $\frac{1}{2}$ in. and upwards.

VAR. 1. majuscula; leaves glabrous larger sometimes 4-5 by 2 in., fruit very large, sometimes exceeding 1 $\frac{1}{2}$ by 1 in. *L. lanceolata*, Bedd. *Fl. Sylv.* t. 32, not of Wall.—Common on the north-eastern edge of the Deccan Plateau in Chota Nagpore and Behar.—Dr. Brandis (*For. Fl.* 240) supposes that Col. Beddome has made the grave

error of adding the fruit of one species to the leaves and flowers of another. Col. Beddome's figure is correct, but it is not *L. lanceolata* Wall. *L. corymbosa*, Griff. in *Herb.* is this, but the ticket of locality "East Bengal" is doubtful. This variety is not known from East Bengal.

VAR. 2. *benghalensis*; leaves pubescent beneath at least on the midrib, fruit smaller than in the type, often less than $\frac{1}{2}$ in., fruit-calyx campanulate instead of funnel-shaped at base. — Nipal; Wall. *Cat.* 2119 partly. Sikkim; alt. 1000–5000 ft.; J. D. H., Gamble, C. B. Clarke. Assam; Mrs. Mack. Birma; Griffith, whence his *Ic. Pl. Asiat.* t. 592.

3. *L. lanceolata*, Wall. *Cat.* 2120; leaves glabrous often very white beneath, petiole usually $\frac{1}{4}$ in., petals $\frac{1}{4}$ – $\frac{1}{2}$ in., calyx-teeth ultimately thick patent or reflexed. *W. & A. Prodr.* 309; *Dalz. & Gibs. Bomb. Fl.* 98?; *Brand. For. Fl.* 240. *L. microcarpa*, Wight *Ic.* t. 109; *Bedd. Fl. Sylv.* t. 30.

MALABAR COAST; from Bombay to Travancore, plentiful; no specimen from Coromandel.

Tree 30–50 ft. *Leaves* 3 in., elliptic-lanceolate, narrowed to both ends. *Panicle* generally compound, never condensed. *Calyx* rarely glabrous usually pubescent, sometimes white and shortly tomentose. *Capsule* usually smaller than that of *L. parviflora*, $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{2}$ in.—A species distinguishable from all the forms of *L. parviflora* by its calyx-teeth patent in fruit and its longer petioles. Wallich's name is adopted in preference to that of Wight who confounded the plant with *L. parviflora*.

4. *L. venusta*, Wall. *Cat.* 2117; calyx-tube in bud smooth ovoid white puberulous with 6 linear accessory teeth outside the primary teeth, appearing as prominent horns on the buds.

BIRMA; Melloon on the Irrawaddy near Thayet Myoo; Wallich.

Leaves 3–4 $\frac{1}{2}$ in., elliptic-oblong, acute, glabrous. *Panicle* large, not condensed, white, puberulous. *Bud* as large as a pea, much larger than that of *L. parviflora*.

**** *Calyx with abundant fulvous or brown-red tomentum.***

5. *L. Rottleri*, C. B. Clarke; leaves stellately fulvous-tomentose beneath, capsule $\frac{3}{4}$ in. resembling that of *L. parviflora*.

DECCAN; Rottler.

Leaves 3 in., lanceolate, glabrous above, midrib tomentose; petiole $\frac{1}{2}$ in. *Panicle* lax, tomentose. *Calyx* in the bud fully $\frac{1}{2}$ in., with dense brown-red stellate wool without any trace of grooves or ribs. *Seed* $\frac{1}{2}$ in. including the wing.—Named by Rottler *L. hirsuta*? *Rheede Hort. Mal.* iv. t. 22; but this species, which is only known from Rheede's figure, is represented as having a deeply-grooved calyx.

6. *L. calyculata*, Kurz in Journ. As. Soc. 1872, pt. ii. 307; *For. Fl.* i. 522; leaves puberulous beneath, capsule $\frac{1}{4}$ – $\frac{1}{2}$ in.

MARTABAN; Kurz.

A tree, 60–70 ft. *Leaves* 5–7 in., oblong, acuminate, short-petioled. *Panicles* compound, with ferruginous or fulvous tomentum. *Calyx* in fruit cup-shaped campanulate, closely adpressed to the capsule, without grooves or ribs, densely ferruginous-tomentose; lobes short-triangular, reflexed. *Capsule* oblong, shining.

SECT. II. *Adambea*. *Calyx-tube* grooved, ribbed or subulate.

† *Adult leaves glabrous or nearly so.*

7. **L. Flos-Reginæ**, Retz Obs. v. p. 25; petiole distinct usually $\frac{1}{4}$ in., calyx covered with hard white (sometimes ferruginous) tomentum, ribs 12-14 flat or round not acute on the back, apex of the ovary glabrous. *Kurz For. Fl.* i. 524. *L. Reginæ*, Roxb. Cor. Pl. t. 65; *Hort. Beng.* 38; *Fl. Ind.* ii. 505; *DC. Prodr.* iii. 93; *Wall. Cat.* 2114; *W. & A. Prodr.* 308; *Wight Ic.* t. 413; *Blume Mus. Bot.* ii. t. 41; *Miq. Fl. Ind. Bat.* i. pt. i. 623; *Bedd. Fl. Sylv.* t. 29; *Dalz. & Gibs. Bomb. Fl.* 98; *Brand. For. Fl.* 240. *L. macrocarpa*, Wall. Cat. 2114. *Adambea glabra*, Lamk. Dict. 39.—*Rheede Hort. Mal.* iv. t. 20, 21.

From ASSAM to MALACCA, abundant. Hills of the DECCAN PENINSULA, common; and in CEYLON. In North-West India only cultivated?—DISTRIB. Malaya and China, in many cases perhaps cultivated.

A tree, reaching 50-60 ft., sometimes when old having on its trunk and larger branches a few strong straight spines 1-3 in. (See *Ham. in Trans. Linn. Soc.* xvii. 177.) *Leaves* 4-8 in., from broad-elliptic obtuse to long-lanceolate. *Panicle* large, lower branches often 6 in., curved, ascending, flowers scattered. *Petals* commonly 1 in. (sometimes more), mauve, margins erose-undulate, hardly fimbriate. *Calyx* in fruit thickened, woody; lobes triangular spreading. *Fruit* large, sometimes reaching $1\frac{1}{4}$ in. by 1 in. (Wallich reduced his *L. macrocarpa* number 913 to *L. Flos-Reginæ*, and also sank his herbarium names *L. oblonga* and *L. glaucescens*.)

VAR. angusta, Wall. Cat. 2113; leaves 15 (excl. petiole) by 6 in.; fruit $1\frac{3}{4}$ in., more acute at the apex. Irrawaddy, Wallich. Rangoon; McClelland.—This may possibly be the plant which Mr. Kurz (*For. Fl.* i. 524) means to preserve as the species *L. macrocarpa*. Not merely the leaves on young plants but the leaves on Wallich's specimens near the panicle are very large.

8. **L. hypoleuca**, Kurz in Journ. As. Soc. 1872, pt. ii. 307; *For. Fl.* i. 523; leaves shortly petioled sometimes glaucous white beneath, calyx covered with hard white tomentum, ribs 12 acute.

ANDAMANS, Kurz.

Tree 60-70 ft. *Leaves* 6-8 in., from ovate to ovate-lanceolate, acuminate or scarcely acute, attenuate or obtuse at the base. *Panicle* large, 1 ft. long, narrow-clongate, white, puberulous. *Petal's* $\frac{1}{2}$ in., oblong, lilac, undulate on the margin (Kurz). *Capsule* $\frac{2}{3}$ in. (Kurz), oblong, mucronate, woody. *Calyx* much more acutely ribbed than that of *L. Flos-Reginæ*, but the teeth of the alternate ribs are very obscurely excurrent in Mr. Kurz's specimens.

9. **L. floribunda**, Jack in Mal. Misc. i. 38; petiole very short, calyx covered with ferruginous stellate woolly tomentum with 12 acute ribs, apex of hairy ovary. *DC. Prodr.* iii. 93; *Wall. Cat.* 2115; *Miq. Fl. Ind. Bat.* i. pt. i. 623 (not *Blume Mus. Bot.* ii. t. 41); *Griff. Notul.* iv. 509; *Kurz For. Fl.* i. 522.

BURMA to SINGAPORE; frequent.—DISTRIB. Siam, Malaya, China.

Tree 30 ft. *Leaves* 5-7 in., oblong, acute, sessile, rounded at the base. *Panicle* large, lower branches often 6 in., ascending, curved, with rich brown stellate woolly tomentum. *Calyx* nearly equally 12-ribbed accessory teeth obsolete or obscure. *Petals* smaller than in *L. Flos-Reginæ*, at first of a more rosy colour but withering to mauve-purple. *Fruit* $\frac{1}{2}$ by $\frac{1}{4}$ in.; calyx-teeth spreading, small, not woody.

VAR. cuspidata, Wall. Cat. 2116 (sp.); accessory teeth of the calyx in the bud prominent appearing as 6 cusps at the summits of the alternate ribs.—Tavoy, Amherst, Wallich, who marks the species as *L. floribundæ prox.* It differs from the type in no point except the cusps mentioned.

10. **L. hexaptera**, *Miq. Fl. Ind. Bat.* i. pt. i. 623; calyx grey puberulous, teeth 6-9, ribs 6-9 almost winged alternate with the teeth, calyx-teeth in fruit spreading woody.

MALACCA; *Maingay* No. 653, 654.—DISTRIB. Celebes.

A moderate-sized tree (*Maingay*). *Leaves* 2–3 in., narrow elliptic-oblong, not acuminate, oblique, twisted at the apex, minutely ashy-puberulous beneath; petiole $\frac{1}{8}$ in. *Panicle* 4–6 in.; branches stout, ashy- or grey-puberulous. *Calyx* in the bud funnel-shaped not campanulate, smaller than that of *L. Flos-Reginæ*. *Petals* $\frac{1}{2}$ – $\frac{3}{4}$ in., flat, shortly clawed, sparingly erose-undulate on the margin. *Fruit* $\frac{1}{4}$ by $\frac{5}{8}$ in., calyx-wings slightly enlarged on the fruit.—The specimens of *Maingay* are very perfect but are identified with Miquel's plant from his description only.

†† *Adult leaves pubescent beneath.*

11. ***L. villosa***, *Wall. ex Kurz Pegu For. Report Append. B. 54*; leaves lanceolate acuminate pubescent on both surfaces, flowers small apetalous congested at the summits of the panicle-branches, calyx-ribs 6 obscure in the bud. *Kurz For. Fl. i. 524.*

BURMA; *Griffith* (Kew Distrib. No. 2240); *McClelland* (*Lagerstrœmia* sp. 9); *John Scott*; *Kurz*.

Tree 40–50 ft. (*Kurz*); branchlets panicles and leaves ashy-grey, pubescent. *Leaves* 2–3 in., finely acuminate, narrowed to the very short petiole. *Buds* very small, calyx-tube smooth, ribs only to be seen near the summit of the tube as six horns alternating with the primary calyx-teeth. *Capsule* $\frac{5}{8}$ – $\frac{3}{4}$ by $\frac{1}{4}$ in., the calyx-tube finally distinctly ribbed.—The name *villosa* is not in Wallich's Catalogue nor does it exist on any specimen at Kew, so that it cannot be guessed where Mr. Kurz found it: but the species is very good and unmistakable.

12. ***L. tomentosa***, *Presl Bot. Bermerk. 142*; leaves lanceolate acuminate stellately pubescent beneath, flowers with petals scattered on the panicle, calyx-ribs 12 prominent in the bud. *Kurz For. Fl. i. 522.* *L. pubescens* *Wall. Cat. 2112.*

BURMA; *Griffith & Helfer* (Kew Distrib. No. 2238, 2239); *John Scott*; *Kurz* No. 1976; *Brandis*.

Tree 70–100 ft. (*Kurz*); branchlets petioles and panicle fulvous stellate-woolly tomentose. *Leaves* 3–6 in., elliptic-lanceolate to narrow-lanceolate, adult glabrous reticulate above except the midrib which is fulvous stellate-tomentose; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in. *Calyx* in the bud fulvous, tomentose, with 12 blunt ribs to the base. *Petals* $\frac{3}{8}$ in., finely clawed, erose, subfimbriate on the margin. *Capsule* $\frac{5}{8}$ by $\frac{1}{4}$ in., calyx-tube ultimately 6-ribbed (ribs corresponding to the primary teeth becoming obsolete); teeth triangular, reflexed.—In fruit the capsule and calyx become exactly like those of *L. villosa* and when the condensed panicle of *L. villosa* opens out in fruit, the two species are easily confounded. One sheet of *Wall. Cat. 2112* marked *L. pubescens* is really *L. villosa*, but all the other sheets of *Wall. Cat. 2112* are true. Among other tests, the leaves of *L. pubescens* are stellately hairy beneath, those of *L. villosa* are simply pubescent.

VAR. *Loudoni*, Teym. & Binn. Pl. Nov. in Hort. Bogor. cult. 1863, p. 27; leaves acute not acuminate, flowers not larger than in the type. *Kurz For. Fl. i. 523.*

8. **DUABANGA**, *Ham.*

Large glabrous trees with pendent quadrangular branches. *Leaves* opposite, distichous, large, short-petioled, long-oblong, acute, entire, cordate or rounded at the base. *Panicles* large, terminal, with opposite branches; flowers large. *Calyx-tube* wide, adnate to the base of the ovary; lobes 4–7, thick, valvate in the bud. *Petals* 4–7, clawed, obovate, crisped and undulate, white. *Stamens* very many, inserted on a perigynous ring. *Ovary* conical, 4–8-celled; style

bent, long, stigma capitate 4-8-lobed; ovules very many, ascending, placentas covering nearly the whole interior surface of the ovary-cells. *Capsule* globose on the thick spreading calyx, coriaceous, perfectly or imperfectly 4-8-celled, 4-8-valved. *Seeds* innumerable, minute, ellipsoid, testa produced at both ends in two tails much exceeding the length of the nucleus.—**DISTRIB.** Species 2, extending from Nipal south-eastwards to the Philippines and Borneo.

1. **D. sonneratioides**, *Ham. in Trans. Linn. Soc. xvii.* 178; flowering calyx nearly 1 in. wide at the base, petals 4-7 nearly 1 in., capsule 4-8-valved. *Hook. f. Ill. Him. Pl. t. 11*; *Kurz For. Fl. i.* 525. *Lagerstroemia grandiflora*, *Roxb. Hort. Beng. 38*; *Fl. Ind. ii.* 503; *DC. Prodr. iii.* 93; *Wall. Cat. 2111*; *Blume Mus. Bot. i.* 109. *Leptospartion grandiflorum*, *Griff. Ic. Pl. Asiat. t.* 591.

NIPAL to MARTABAN; alt. 500-3000 ft.; common in the SIKKIM and BHOTAN TERAI.

Tree attaining 100 ft. *Leaves* commonly 10 by $3\frac{1}{2}$ in; petiole usually $\frac{1}{2}$ - $\frac{1}{4}$ in.—*D. moluccana* differs by the calyx in flower much narrower at base, the petals 4 smaller, the capsule 4-valved: but agrees closely in habit.

9. SONNERATIA, Linn. f.

Trees, growing near the sea, glabrous. *Leaves* opposite, petioled, coriaceous, entire. *Flowers* without bracts, large, three together at the summits of the branches, or axillary solitary. *Calyx* thick, coriaceous; lobes 4-8, lanceolate, valvate. *Petals* 0 or as many as the calyx-lobes and linear-oblong. *Stamens* very many, inserted in a circular band on the calyx-tube. *Ovary* nearly free, or adnate at the base to the calyx-tube, many-celled; style long, stigma capitate; ovules very many, ascending, placentas axile. *Berry* subglobose, supported by the persistent calyx, 10-15-celled. *Seeds* very many, small, curved, angular; cotyledons convolute.—**DISTRIB.** Species 4-5 on the tropical sea-shores of the Eastern hemisphere.

† *Stigma* very large, umbrella-shaped.

1. **S. apetala**, *Ham. in Syne Emb. Ava iii.* 313, t. 25; leaves narrow-oblong, calyx-lobes 4, petals 0, stigma more than $\frac{1}{2}$ in. broad, capsule $\frac{1}{2}$ - $\frac{3}{4}$ in. broad globose. *DC. Prodr. iii.* 231; *Roxb. Hort. Beng. 38*; *Fl. Ind. ii.* 506; *Roth Nov. Sp. 233*; *Wall. Cat. 3642*; *W. & A. Prodr. 327*; *Griff. Notul. iv.* 650; *Kurz For. Fl. i.* 527.

Common in the SOONDERBUN. DECCAN PENINSULA as far as the Concan, *Law. TRANSGANGETIC PENINSULA* to Moulmein, *Falconer*.

Tree attaining 40 ft., growing in mangrove swamps flooded by the tide. *Leaves* 3-4 by $1-1\frac{1}{2}$ in., always narrow, attenuated at the base; petiole $\frac{1}{4}$ in. *Calyx* in flower $\frac{3}{4}$ in., style included or scarcely exsert. *Capsule* broader than high, convex at the top, walls not thickened.

†† *Stigma* capitate, not very large.

2. **S. acida**, *Linn. f. Suppl. 252*; leaves oblong or narrowly obovate-elliptic, calyx-lobes 6, petals 6 linear-oblong dark-red, capsule globose much depressed often 2 in. broad. *Roxb. Hort. Beng. 38*; *Fl. Ind. ii.* 506; *Roth Nov. Sp. 233*; *DC. Prodr. iii.* 231; *Wall. Cat. 3641*; *W. & A. Prodr. 327*; *Wight Ic. t.* 340; *Griff. Notul. iv.* 652; *Blume Mus. Bot. i.* 336; *Miq. Fl. Ind. Bat. i.* pt. i. 496; *Dalz. & Gibs. Bomb. Fl. 98*; *Brand. For. Fl. 242*; *Kurz For. Fl.*

i. 526. *Rhizophora caseolaris*, Linn. *Sp. Pl.* 635. *Aubletia caseolaris*, Gaertn. *Fruct.* i. t. 78.—*Rheede Hort. Mal.* iii. t. 40; *Rumph. Amb.* iii. t. 74.

BENGAL; *Griffith*. Soonderbun; C. B. Clarke. RANGOON, *McClelland*. PEGU; *Kurz*. DECCAN PENINSULA; *Rottler*. CEYLON; *Thwaites*.—DISTRIB. Java, Siam.

A small tree, not exceeding 15 ft. (*Kurz*), growing in mangrove swamps flooded by the tide. *Leaves* 3-4 by 1-1 $\frac{3}{4}$ in., attenuate almost to the base so that the petiole is subobsolete. *Buds* ellipsoid, calyx-tube not in the least angular. *Calyx* in flower 1 in. or more; style long-exserted sometimes 3 in. *Capsule* thick-walled, sometimes more than 2 in. broad, concave at the summit.—The Kew specimens are all narrow-leaved, the flowers 6-fid not 7-8-fid; but the examples are few and it is probable that to the synonyms above cited should be added *S. Pagatpat*, *obovata*, *evenia*, *lanceolata* for which see *Miq. Fl. Ind. Bat.* i. pt. i. 496, 497.

3. ***S. Griffithii***, *Kurz Pegu For. Report Append.* B. 54; *For. Fl.* i. 527; leaves broad obovate obtuse, calyx-tube not at all angular, lobes 6-8, petals 0. *S. alba*, *Griff. Notul.* iv. 652 not *Smith*. ? *S. neglecta*, *Blume Mus. Bot.* i. 338.

BURMA; *Griffith* (Kew Distrib. No. 2433). PEGU and TENASSERIM; *Kurz*.

Leaves 3 by 2 $\frac{1}{4}$ in., narrowed at the base; petiole more than $\frac{1}{8}$ in. *Buds* flowers and calyx exactly of *S. acida*; calyx-tube ovoid, perfectly free from ribs, petals wanting. *Fruit* unknown.—This seems an apetalous form of *S. acida*, but the leaves slightly differ from all the examples of that plant.

4. ***S. alba***, *Smith in Rees Cyclop.* xxxiii. No. 2; leaves elliptic obtuse or obovate narrowed to a short petiole, calyx-tube 6-8-angular (obscurely so in the bud distinctly in fruit), lobes 6-8, petals 0, fruit broadly obconic. *DC. Prodr.* iii. 231; *Blume Mus. Bot.* i. 338; *Miq. Fl. Ind. Bat.* i. pt. i. 497; *Kurz For. Fl.* i. 526. *S. mossambicensis*, *Klotzsch in Peters Reis. Mossamb. Bot.* t. 12. *S. acida*, *Benth. in Fl. Austral.* iii. 301; *Hiern in Oliv. Fl. Trop. Afr.* ii. 483.—*Rumph. Amb.* iii. t. 73.

MERGUI; *Griffith* (Kew Distrib. No. 2432). PEGU; *Kurz*. MALAYA; *Maingay* No. 654-2.—DISTRIB. Tropical shores of Africa with its islands, Malaya and Australia.

A small tree not exceeding 15 ft. (*Kurz*), growing in the saline littoral forests. *Leaves* 3 in., oblong or nearly round, narrowed at the base; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in. *Flowers* the size of *S. acida*, with a very long style. *Fruit* 1 in. broad, calyx obconical at the base (not flat as in *S. acida*) ribbed as shown in *Klotzsch*' picture above cited.—This species was united with *S. acida* by Mr. Bentham, and the other writers at Kew have followed. Mr. Kurz has pointed out the distinction in the calyx; and there is a wide difference between the fruits so far as at present known; but the material is not ample.

10. **PUNICA**, Linn.

A large shrub; branchlets round, often armed. *Leaves* opposite subopposite or clustered, oblong or obovate, obtuse, entire. *Flowers* shortly pedicelled, axillary, solitary or somewhat clustered, large, orange-red. *Calyx-tube* funnel-shaped, coriaceous, adnate to the ovary below, enlarged above the ovary; lobes 5-7, persistent on the fruit. *Petals* 5-7, lanceolate, wrinkled, inserted between the calyx-lobes. *Stamens* very many, inserted round the mouth of the calyx. *Ovary* inferior with many cells in two whorls; style long, bent, stigma capitate; ovules very many, placentas in some cells axile in others parietal. *Berry* inferior, globose, many-celled. *Seeds* very many, angular, testa coriaceous with a watery outer coat; cotyledons convolute.

1. **P. Granatum**, *Linn. Sp. Pl.* 676; *DC. Prodr.* iii. 3; *Roxb. Hort. Beng.* 38; *Fl. Ind.* ii. 409; *Wall. Cat.* 3659; *W. & A. Prodr.* 327; *Wight Ill.* t. 97; *Griff. Ic. Pl. Asiat.* t. 634; *Boiss. Fl. Orient.* ii. 737; *Brand. For. Fl.* 241; *Kurz For. Fl.* i. 528. *P. nana*, *Linn.*; *Bot. Mag.* 634.

Cultivated throughout INDIA; probably wild in the north-west.—DISTRIB. Wild in Cabul and Persia; cultivated throughout the warmer regions of the globe.

Leaves commonly 2 by $\frac{1}{2}$ – $\frac{3}{4}$ in., narrower at both ends especially at the base, intra-marginal nerve distinct or obscure. *Flowering calyx* about 1 in., mouth $\frac{1}{2}$ in. broad. *Petals* $\frac{1}{2}$ in. or more. *Fruit* often 2 in. diam., containing much red juice round the seeds. (*The Pomegranate*.)

11. AXINANDRA, Thwaites.

Trees, glabrous or nearly so, branches quadrangular or terete. *Leaves* opposite, petioled, coriaceous, entire, acuminate, finely nerved beneath with an intramarginal nerve. *Racemes* simple, axillary, erect, the 3–5 terminal paniced; flowers small, pedicels short; bracteoles 3 at the base of each pedicel, minute, linear. *Calyx* superior, 5-lobed. *Petals* 5, small, triangular, caducous, inserted at the top of the calyx-tube. *Stamens* 10, in two whorls, 5 alternating with the petals and 5 others inserted just below; connective large; anthers small, subterminal. *Ovary* inferior, 5–6-celled; style straight, stigma simple; ovules in each cell 1–2, erect. *Capsule* half-superior, woody, ellipsoid, below adnate to the calyx-tube, above loculicidally 3–4 (rarely 5–6-) valved. *Seeds* erect, oblong, compressed, produced upwards into a wing; cotyledons flat.—DISTRIB. Species 4–5 from Ceylon, Malacca and Borneo.

A. EU-AXINANDRA. *Petals* convolute. *Ovule* 1 in each cell.

1. **A. zeylanica**, *Thwaites in Hook. Kew Journ.* vi. 66; branchlets acutely quadrangular, leaves rounded at the base, petiole about $\frac{1}{2}$ in., calyx-tube without ribs, style very short. *Bedd. Fl. Sylv.* t. 207.

CEYLON; Ambagamowa district, alt. 1500 ft.; *Thwaites*.

A large tree, 50–60 ft. (*Thwaites*). *Leaves* 4 by 2 in., gradually or suddenly acuminate. *Racemes* 2 in.; pedicels less than $\frac{1}{2}$ in., hardly lengthened in fruit. *Calyx* glabrous or microscopically puberulous. *Petals* falling off in a cap before expansion (*Thwaites*). *Capsule* 1 by $\frac{1}{2}$ in.; valves usually 3, very thick, woody.

B. NAXIANDRA, *Baillon*. *Petals* induplicate-valvate. *Ovules* 2 in each cell.

2. **A. Maingayi**, *C. B. Clarke*; branchlets terete, leaves narrowed at the base, petiole often $\frac{1}{4}$ in., calyx-tube at the time of flowering 10-ribbed, style long (exserted portion longer than the whole flower).

MALACCA; *Maingay* No. 654–2.

Leaves 4 by 2 in., gradually or suddenly acuminate. *Racemes* 2 in., more paniced than in *A. zeylanica*, panicle-branches quadrangular. *Calyx* and pedicel minutely puberulous, larger than in *A. zeylanica*. *Petals* expanding but caducous. *Fruit* not seen.—Closely allied to *A. Beccariana*, *Baill. in Bull. Soc. Linn. Paris* 1877, No. 16, 127, which has rather slenderer racemes and smaller flowers, the calyx hardly ribbed at the time of flower.

GENUS IMPERFECTLY KNOWN.

DICHOTOMANTHES, *Kurz in Seemann Journ. Bot.* ix. 194, is a tree imperfectly known possibly Lythraceous, collected by Dr. John Anderson in Yunnan, as yet not found within the limits prescribed for the Flora of British India.

ORDER LXII. **ONAGRACEÆ.** (By C. B. Clarke, F.L.S.)

Herbs, rarely undershrubs, sometimes aquatic. *Leaves* opposite or alternate, entire or toothed, undivided (in *Trapa* the submersed leaves pinnatifid), exstipulate. *Flowers* hermaphrodite, mostly axillary and solitary, or spiked or racemed towards the ends of the branches; subirregular. *Calyx-tube* wholly adnate to the ovary (half-adnate in *Trapa*), limb of 2-5 valvate lobes. *Petals* epigynous, alternate with the calyx-lobes, rarely 0. *Stamens* as many or twice as many as the petals, inserted with them. *Ovary* inferior (half-inferior in *Trapa*), 1-6-celled, most often 4-celled; style 1, cylindric or subulate, stigma capitate or nearly 2-lobed or 4-fid; ovules one or many in each cell, pendulous or half-ascending, placentas axile. *Fruit* various, dehiscent or indehiscent, membranous capsular or bony, 1- or several-celled, 1 or ∞ -seeded. *Seeds* without albumen, or nearly so.—DISTRIB. Species 300, spread throughout the world, most abundant in the North Temperate Zone.

Enothera is an American genus of which several species are cultivated in India: and among these *E. rosea* has run wild in the North-west Himalaya and in the Nilghiris; *E. tetraptera* and *E. odorata* have also run wild on the Nilghiris.

* *Seeds very many.*

† *Seeds comose.* 1. **EPILOBIUM.**

†† *Seeds not comose.*

Stamens twice as many as calyx-lobes 2. **JUSSLEA.**

Stamens as many as calyx-lobes 3. **LUDWIGIA.**

** *Seeds one or two.*

Terrestrial. Stamens 2 4. **CIRCEÆA.**

Aquatic. Stamens 4 5. **TRAPA.**

1. **EPILOBIUM, Linn.**

Herbs. *Leaves* alternate or opposite, undivided, entire or toothed. *Flowers* axillary and solitary, or racemed or spiked towards the ends of the branches, purple or white, regular or irregular. *Calyx-tube* scarcely produced above the ovary, linear; teeth 4, lanceolate, deciduous. *Petals* 4, obovate, retuse or notched. *Stamens* 8, epigynous, 4 shorter. *Ovary* inferior, 4-celled; style cylindric, stigmas 4 spreading or more or less combined; ovules many, axile, ascending, attached along a double placental vertical line in the inner angle of each cell. *Capsule* linear, 4-celled, dehiscing from the apex loculicidally, valves 4 recurved from the seed-bearing quadrangular column. *Seeds* very many, obovoid or ellipsoid, crowned by long silky hairs.—DISTRIB. Species 50; spread throughout the temperate and cold regions of the world, plentiful in New Zealand: appearing in the mountains only of the warmer regions.

SECT. I. **Chamænerium.** *Flowers* irregular. *Stamens* deflexed on one side. *Style* bent on one side in æstivation.

1. **E. angustifolium, Linn.; Boiss. Fl. Orient. ii. 745;** leaves narrow lanceolate glabrous beneath or nearly so reticulating nerves prominent primary nerves diverging nearly at right angles from the midrib, peduncles approximate

in long terminal spikes. *E. spicatum*, *Lamk. Dict.* ii. 373; *DC. Prodr.* iii. 40; *Wall. Cat.* 6324.

Temperate WESTERN HIMALAYA, alt. 8000–12,000 ft.; from KASHMIR and Baltistan to GURWHAL.—DISTRIB. Western Asia, Europe, North America.

Glabrous or nearly so, except the calyx-tube which is covered with close white tomentum. *Stem* 2–4 ft. *Leaves* often 4–6 by $\frac{3}{4}$ in., all scattered, nearly sessile, acute, entire or obscurely denticulate. *Spike* of flowers soon naked, bracts narrow, caducous. *Calyx-segments* lanceolate, acuminate, purplish, subpetaloid, free to the base. *Petals* $\frac{1}{2}$ – $\frac{5}{8}$ in., rose-purple, obovate, clawed. *Style* somewhat hairy above the base; stigmas 4, distinct, spreading. *Capsule* $2\frac{1}{2}$ – $3\frac{1}{2}$ in., closely pubescent. *Seed* narrowly obovoid, smooth, coma fulvous.

2. *E. reticulatum*, *C. B. Clarke*; leaves narrow-lanceolate pubescent beneath reticulating nerves prominent primary nerves diverging at acute angles from the midrib, peduncles distant in the axils of leaves that are not bractiform nor caducous.

SIKKIM; alt. 10,000–14,000 ft.; Lachoong and Kongra Lama; *J. D. H.*

Stem round, uniformly pubescent, apparently of the height of that of *E. angustifolium*. *Leaves* 4 by $\frac{5}{8}$ in., all scattered, nearly sessile, minutely denticulate, acute. *Calyx-segments* broad-lanceolate, acuminate, purplish, subpetaloid, free to the base. *Petals* $\frac{1}{2}$ – $\frac{5}{8}$ in., rose-purple, obovate. *Style* densely hairy above the base; stigmas 4, distinct, spreading. *Capsule* (not ripe) 3 in. on a peduncle $1\frac{1}{2}$ in.—This species has leaves somewhat like those of *E. angustifolium* but the inflorescence of *E. latifolium*.

3. *E. latifolium*, *Linn.*; *DC. Prodr.* iii. 40; leaves oblong narrowed at both ends glabrous or minutely pubescent without reticulating veins, peduncles distant in the axils of leaves that are not bractiform nor caducous. *E. speciosum*, *Dene. in Jacq. Voy. Bot.* t. 69. *E. Gerardianum*, *Wall. Cat.* 6326.

ALPINE WESTERN HIMALAYA; alt. 11,000–14,000 ft. KASHMIR; *Jacquemont*, *C. B. Clarke*. SIRMORE; *Gerard*, *Edgeworth*. KUMAON; *Strachey & Winterbottom*.—DISTRIB. Dauria, Altai, Arctic Asia, Europe and America.

The typical plant is 1 ft. high and glabrous except the calyx-tube; some of the Himalayan examples have the stem pubescent apparently much taller and the leaves minutely pubescent. *Leaves* $1\frac{1}{2}$ –3 by $\frac{1}{4}$ – $\frac{3}{4}$ in., scattered and opposite, entire or very obscurely denticulate, obtuse rarely somewhat acute. *Calyx-segments* broad-lanceolate, acuminate, purplish, subpetaloid, free to the base. *Petals* $\frac{1}{2}$ – $\frac{5}{8}$ in., rose-purple, obovate. *Style* with a few scattered hairs above the base; stigmas 4, distinct, spreading. *Capsule* 3 in., closely pubescent. *Seeds* narrowly obovoid, smooth, coma fulvous.

SECT. II. *Lysimachion*. *Flowers* regular. *Stamens* and style erect.

* *Stigma* distinctly 4-cleft with spreading lobes.

4. *E. hirsutum*, *Linn.*; *DC. Prodr.* iii. 42; hairy, middle cauline leaves opposite or alternate sessile obovate-lanceolate narrowed nearly to the base denticulate-serrulate. *Boiss. Fl. Orient.* ii. 746. *E. serratum*, *Jacq. Journ.*

TEMPERATE WESTERN HIMALAYA; alt. 5000–7000 ft.; from KASHMIR to KUMAON; *Royle*, *Madden*, *Jacquemont*. *T. Thomson*, &c.—DISTRIB. Europe, Africa, Asia from the Himalaya northwards and westwards.

Stem 2–5 ft., round, uniformly hairy with glandular pubescence, and with scattered long white hairs numerous towards the ends of the branches. Middle cauline leaves usually opposite, often 3 in. or more by $\frac{3}{8}$ in., sessile, semi-amplexicaul but not decurrent as lines down the stem, green and softly pubescent on both surfaces. *Sepals* green, oblong, acute in the expanded flower, in æstivation mucronate. *Petals* $\frac{3}{4}$ in. *Stigmas* 4, distinct, spreading. *Capsule* 2– $3\frac{1}{2}$ in., hairy, lower peduncles $\frac{1}{2}$ –1 in.

Seeds ellipsoid or obovoid, $2\frac{1}{2}$ times as long as broad, little narrowed at the base, punctulate, not papillose, coma fulvous.

VAR. *sericeum*, Benth. in Wall. Cat. 6325 (sp.); pubescence of the stem and leaves densely white silky (not tomentose). *E. tomentosum*, Vent. Hort. Cels. t. 90.—Distrib. the same as that of the typical *E. hirsutum*; into which this variety graduates.

VAR. *latum*, Wall. Cat. 6329 (sp.) in part; middle cauline leaves much smaller often about 1 in. not semi-amplexicaul at the base little pubescent, no white silky hairs on the plant.—Kashmir; *Jacquemont*. Chumba, alt. 3000 ft.; *C. B. Clarke*. Kumaon; *Wallich*; near Almora, alt. 5000 ft.; *Strachey & Winterbottom*. Julundur, alt. 1000 ft.; *C. B. Clarke*.—This plant has been from the leaves supposed near *E. tetragonum*; but the examples show the stigmas decisively spreading, so that it is either a var. of *E. hirsutum* or a new species.

5. *E. parviflorum*, Schreb.; DC. Prodr. iii. 43; middle cauline leaves mostly opposite sessile oblong-lanceolate hairy, broadest part of the leaf in its basal third portion. *Boiss. Fl. Orient. ii. 747*.

WESTERN HIMALAYA; *Edgeworth*; Simla, *T. Thomson*.—**DISTRIB.** West Asia, Europe, North Africa.

Stem 2-3 ft., round, without lines, pubescent and with much crisped white hair. Middle cauline leaves $1\frac{1}{2}$ -2 by $\frac{1}{2}$ - $\frac{3}{4}$ in., dentate, pubescent over both surfaces. *Sepals* green, oblong, acute, in the bud mucronate. *Petals* usually smaller than those of *E. hirsutum* but are $\frac{3}{8}$ in. in the Himalayan plant. *Stigmas* 4, distinct, spreading but hardly revolute. *Capsule* 2-3½ in., sparingly hairy, lower peduncles $\frac{1}{2}$ -1 in. *Seeds* ellipsoid or obovoid, $2\frac{1}{2}$ times as long as broad, little narrowed at the base, punctulate, not papillose, coma fulvous.—*Seed* exactly as that of *E. hirsutum*; punctulate by raised points, but these papillæ excessively minute.

VAR. *vestitum*, Benth. in Wall. Cat. 6327 (sp.); stem and leaves with fulvous shaggy hair, the stem itself somewhat glaucous.—Nipal; *Wallich*.

**** *Stigmas* combined or stigma clavate.**

† *Stem* round, the hairs sometimes in lines and the bases of the leaves somewhat decurrent in lines, but the stem not clearly quadrangular.

6. *E. roseum*, Schreb.; Boiss. Fl. Orient. ii. 749; stem uniformly hairy or with hairy lines, leaves petioled (shortly in nearly all the Indian forms) from ovate to narrow-lanceolate, seeds obovoid not fusiform nor gradually narrowed at the top.

TEMPERATE HIMALAYA, alt. 5000-11,000 ft.; common.—**DISTRIB.** West Asia and Europe.

VAR. *indicum*; middle cauline leaves lanceolate or ovate with crisped pubescence on the midrib beneath, lateral nerves slightly raised glabrous or hairy, capsules scattered long-pedicelled, seed punctulate points raised most minutely.—Baltistan and Kashmir to Kumaon, alt. 5000-11,000 ft., common.—*Stem* 2 ft., usually hairy all round, sometimes with four well-marked lines. Middle cauline leaves 1-2 in. opposite sometimes ternate, sometimes glabrous beneath except the midrib, more often with crisped hairs on the primary nerves also; petiole often less than $\frac{1}{2}$ in. but sometimes nearly $\frac{1}{4}$ in. *Peduncle* of the lower capsules often 1 in. or more. Coma of the seed very white in well-preserved examples, but often discoloured in others.—*E. latum*, Wall. Cat. 6329, belongs mainly to *E. hirsutum*; but some of it belongs here and some to *E. tetragonum*. Large quantities of the form of this plant with broad ovate leaves and a petiole of $\frac{1}{4}$ in. or thereabout constitute *E. montanum* var. *himalayense* of Indian herbaria: but in all these the style is unmistakably clavate, not at all (or most obscurely) lobed at the summit.

VAR. *Dalhousieanum*; capsules often approximate, the lowest with a very short peduncle, seed rather narrowly ellipsoid prominently papillose.—From Kashmir to Sikkim, alt. 6000-9000 ft.; abundant about Dalhousie.—*Stem* round, uniformly pu-

bescent. *Capsules* typically in erect clusters, lowest peduncle usually less than $\frac{1}{4}$ in.—This is one of the best marked forms of Indian *Epilobiums* and may be a good species; it is common in herbaria marked *E. montanum* var., or *E. organifolium* var. (by H. f. & T., *roseum* var.).

VAR. *anagallidifolium*, Lamk. (sp.) in Syme Engl. Bot. t. 506; stem 4-12 in. glabrous near the base with hairy lines in the middle uniformly minutely pubescent near the top, leaves small oblong obtuse nearly glabrous beneath, seeds most minutely papillose.—West Tibet; *Thomson*.—Agrees exactly with the figure of Syme: reduced to *E. alpinum* Linn. in *Boiss. Fl. Orient.* ii. 750 and in *Hk. f. Student's Brit. Fl.* 145. It differs slightly from *E. alpinum* by the less elongate seed very obtuse at the summit and the more petioled leaves; but runs into var. *indicum*.

VAR. *cylindricum*, Don Prodr. (sp.) 222; stem glabrescent often with distinct hairy lines, leaves linear-lanceolate on longer petioles very little pubescent, capsules long-peduncled, seeds obovoid most minutely papillose. *DC. Prodr.* iii. 43; *Wall. Cat.* 6328.—From Kashmir to Sikkim, alt. 6000-10,000 ft.—This plant has numerous axillary short branchlets covered with linear-lanceolate leaves and has thus a general resemblance to *E. palustre*, but the petioles are long and the seeds not elongate.

7. *E. Hookeri*, C. B. Clarke; stem without lines uniformly pubescent, middle cauline leaves opposite nearly sessile elliptic-oblong broad or rounded at the base, glabrous beneath except the greatly raised nerves, seeds ellipsoid. *Epilobium* No. 11, *Herb. Ind. Or., H. f. & T.*

KHASIA MTS., alt. 3000-6000 ft., common.—**DISTRIB.** Japan.

Stem 2-3 ft., quite round, usually thick set with leaves. *Leaves* $1\frac{1}{2}$ by $\frac{5}{8}$ in., denticulate; nerves much impressed above, elevated and covered with crisped pubescence beneath. *Petals* $\frac{1}{4}$ in., purple. *Stigma* clavate, elongate. *Capsules* 2-3 in., scattered, lower peduncles often $\frac{1}{2}$ in. *Seeds* obtuse, not narrowed at the apex, only slightly narrowed at the base, most minutely papillose, coma fulvous.

8. *E. khasianum*, C. B. Clarke; stem without lines uniformly villose, middle cauline leaves opposite subsessile elliptic-oblong villous over both surfaces, seeds ellipsoid. *Epilobium* No. 6, *Herb. Ind. Or., H. f. & T.*

KHASIA MTS., alt. 4500-5500 ft.; *T. Lobb, Griffith, H. f. & T., C. B. Clarke.*

Stem 2-3 ft., quite round. *Leaves* $1\frac{1}{2}$ by $\frac{5}{8}$ in., approximate, clothed with tawny hair, nerves impressed. *Petals* $\frac{1}{2}$ in. and upwards. *Stigma* clavate, very obscurely lobed. *Capsules* 2-3 in., scattered, little pubescent, lower peduncles $\frac{1}{2}$ -1 in. *Seeds* obtuse, not narrowed at the summit, only slightly narrowed at the base, most minutely papillose, coma fulvous.—This differs from *E. Hookeri* in its villous indumentum and very large flowers, but may be a form of it. It also in its hairiness and shape of the leaves resembles *E. parviflorum* var. *vestitum*; but the stigma in *E. khasianum* is hardly lobed.

9. *E. palustre*, Linn.; DC. Prodr. iii. 43; stem without lines glabrous or with scanty sparse pubescence, leaves narrow-oblong rarely elliptic sessile or nearly so glabrous or nearly so, seeds (in the Indian forms) obovoid not narrowed upwards. *Boiss. Fl. Orient.* ii. 748.

NORTHERN KASHMIR and Baltistan, alt. 8000-14,000 ft.; *T. Thomson, C. B. Clarke.*—**DISTRIB.** Northern Asia, Europe and America; but the Indian three forms all recede from the European type in their abbreviated seeds.

VAR. *typicum*; stem 8-10 in., middle cauline leaves $1-1\frac{1}{4}$ by $\frac{1}{2}$ in., entire or scarcely dentate, capsules 2 in., scattered, lower peduncle often $\frac{3}{4}$ in., seeds ellipsoid, not at all narrowed at top not greatly narrowed at the base most minutely papillose, coma fulvous.—This form agrees closely with the European type, but the seed is entirely without the beak or production of the testa at the apex.

VAR. *majus*; stem 1-2 ft., middle cauline leaves 2-3 in. often much denticulate, sometimes petioled and sometimes broader elliptic when the plant can only be dis-

tinguished from *E. roseum* var. *indicum* by its greater glabrousness and obtuser leaves.

VAR. *minimum*; stem 3–4 in. with 1–2 capsules, flowers and leaves very small. —This in general appearance coincides with *E. alpinum*, Linn. but the seeds are broadly obovoid not at all elongate upwards.

10. ***E. organifolium***, Lamk. *Dict.* ii. 376; middle cauline leaves opposite sessile or very shortly petioled ovate or ovate-oblong, seeds elongate narrow obovoid somewhat narrowed at the top. DC. *Prodr.* iii. 41; Boiss. *Fl. Orient.* ii. 750.

ALPINE HIMALAYA, alt. 9000–14,000 ft.; from KASHMIR to SIKKIM.—DISTRIB. Northern cool temperate and Arctic zone.

Greatly varying in the size of stem, leaves and flowers. Stem usually 8 in., sometimes 2 ft., usually with 2 hairy lines, sometimes exactly terete and uniformly pubescent. Middle cauline leaves usually 1 in., sessile, ovate, pubescent only on the somewhat raised nerves beneath; but the leaves are sometimes petioled, nearly 3 in., pubescent, sometimes $\frac{1}{2}$ in. sessile glabrous. Flowers usually few, approximated towards the ends of the branches. Petals usually less than $\frac{1}{4}$ in.; in the var. *E. Balanœ* Boiss. (collected by J. D. H. also in Sikkim) the petals exceed $\frac{3}{8}$ in. Capsule $1\frac{1}{2}$ –3 in., peduncle also variable in length. Seed minutely punctulate, coma fulvous.

VAR. *villosum*; stem villous, leaves $\frac{3}{4}$ –1 in. villous over both surfaces sessile ovate. —Sikkim, alt. 10,000–12,000 ft.; Latong, J. D. H. *Epilobium* No. 7, *Herb. Ind. Or. H. f. & T.*—Stems 4–8 in., little divided. Leaves acute, nearly all opposite. Flowers few, approximated, not large. Stigma clavate. Capsule half-ripe, seeds not seen.—A remarkable plant. The lowest leaves are small thick obovate rounded glabrous, greatly resembling the similar leaves in *E. organifolium*.

11. ***E. alpinum***, Linn.; DC. *Prodr.* iii. 41; stems weak somewhat pubescent, middle cauline leaves opposite small subsessile narrow-elliptic glabrous or pubescent on the nerves beneath, flowers few towards the end of the branches. Boiss. *Fl. Orient.* ii. 750.

SIKKIM; alt. 12,000 ft.; Lachen, J. D. H.; Jongri, C. B. Clarke.

Stems 2–10 in., slender, scarcely divided. Middle cauline leaves $\frac{1}{4}$ –1 in., denticulate obscurely or prominently, scarcely acute. Capsule $1\frac{1}{2}$ in., peduncle $\frac{1}{4}$ – $\frac{1}{2}$ in. Seeds minutely papillose, narrowly ellipsoid, little narrowed at the summit; coma silky, white.—This is perhaps *E. alpinum* of Boissier but is not the ordinary European plant which has a beaked seed as described in Hk. f. *Student's British Flora*, p. 145; the European examples also have a fulvous coma.

†† Stem clearly quadrangular.

12. ***E. tetragonum***, Linn.; DC. *Prodr.* iii. 43; middle cauline leaves mostly opposite oblong or narrow-elliptic glabrous but with crisped hair on the raised nerves beneath usually denticulate-serrulate rarely acute. Boiss. *Fl. Orient.* ii. 748. *E. brevifolium*, Don *Prodr.* 222.

SIKKIM, alt. 5000–12,000 ft., very common. KHASIA Mts., alt. 4000–6500 ft., common.—DISTRIB. Cold and cool temperate zones of both hemispheres, and at temperate elevations on mountains in the warmer zones.

Stems 1–3 ft., with crisped pubescence on the four angles. Middle cauline leaves opposite, $\frac{1}{2}$ –2 in., usually sessile, but in some Indian examples distinctly petioled, nerves beneath raised often very prominently, above much impressed. Flowers rose or purple, rather small. Capsule $1\frac{1}{2}$ –2 in.; peduncle $\frac{1}{4}$ – $\frac{1}{2}$ in. Seeds narrowly elliptic, not narrowed at the summit, very little narrowed at the base, minutely papillose, coma fulvous.

VAR. ? amplexans, Wall. Cat. 6330; stem obscurely quadrangular or the bases of the leaves confluent and decurrent in two hairy lines, leaves nearly sessile often somewhat rounded at the base.—Kumaon; Wallich. Sikkim, alt. 10,000–13,000 ft. (Tungu and Lachen); J. D. H.

Except that the hairy lines down the stem are strongly marked this plant might be *E. organifolium* above.

DOUBTFUL SPECIES.

E. laxum, Royle Ill. p. 211, t. 43. The figure shows the stem uniformly hairy, while the letterpress states that there are four lines on the stem.

2. JUSSIÆA, Linn.

Herbs or undershrubs, growing usually in swamps. Leaves alternate, undivided, mostly entire. Flowers yellow or white, axillary, solitary; pedicel usually 2-bracteate at the apex. Calyx-tube scarcely produced above the ovary, linear; teeth 4–6, acute, persistent. Petals 4–6, epigynous. Stamens double the number of petals, epigynous. Ovary inferior, 4–5-celled; style simple, usually very short, stigma 4–5-lobed; ovules ∞ , axile, in several vertical rows at the inner angle of each cell. Capsule linear, round or angular, 4–5-celled, 8–10-ribbed, opening septicidally in valves separating from the persistent ribs or irregularly between the ribs. Seeds very many, without coma.—DISTRIB. Species 30, in the tropics of the whole world, most numerous in America.

1. **J. repens**, Linn.; DC. Prodr. iii. 54; creeping or floating, leaves obovate or oblanceolate obtuse narrowed into the petiole, petals 5 (rarely 6) white the veins at base slightly yellow, capsule woody, seeds quadrate with a white corky testa. Ham. in Trans. Linn. Soc. xiv. 305; Roxb. Hort. Beng. 33; Fl. Ind. ii. 401; Wall. Cat. 6331; Hook. Bot. Misc. iii. 800, t. 40; W. & A. Prodr. 336; Miq. Fl. Ind. Bat. i. pt. i. 628; Gibs. & Dalz. Bomb. Fl. 98; Boiss. Fl. Orient. ii. 751; Kurz in Journ. As. Soc. 1877, pt. ii. 90. *J. fluviatilis*, Blume Bijl. 1132; DC. l. c. *J. Swartziana*, DC. l. c. *J. floribunda*, Griff. Notul. iv. 688. *Cubospermum palustre*, Lour. Fl. Cochinc. 337.—Rheede Hort. Mal. ii. t. 51.—Probably *Jussiea diffusa*, Forsk. in Oliv. Fl. Trop. Afr. ii. 488 with many others.

Throughout INDIA with CEYLON; very common.—DISTRIB. The warmer parts of the whole world.

Herbaceous, often creeping on the margins of tanks, the stems also spreading on the water and sustaining themselves on the surface by white vesicles $\frac{1}{2}$ – $1\frac{1}{2}$ in. Leaves very variable in size, $\frac{1}{2}$ –3 in., usually glabrous sometimes hairy, upper usually 1–2 in., nearly always obtuse in the Indian examples. Pedicel usually as long as the capsule, sometimes quite short. Petals about $\frac{1}{2}$ in., obovate. Capsule $\frac{1}{2}$ – $1\frac{1}{2}$ in., linear-cylindric, glabrous or with scattered hairs. Seeds smooth, reticulated.

2. **J. suffruticosa**, Linn.; DC. Prodr. iii. 58; erect, leaves lanceolate, petals 4 all yellow, capsule not woody, seeds subhemispheric, testa with a prominent raphe shining brown not corky. Wall. Cat. 6334; Miq. Fl. Ind. Bat. i. pt. i. 628; Kurz in Journ. As. Soc. 1877, pt. ii. 90. *J. exaltata*, Roxb. Hort. Beng. 33; Fl. Ind. ii. 401. *J. villosa*, Lamk. Dict. iii. 331; DC. Prodr. iii. 57; Wall. Cat. 6333; W. & A. Prodr. 336; Gibs. & Dalz. Bomb. Fl. 98. *J. fruticosa*, DC. l. c. *J. scabra*, Willd.; DC. l. c. *J. Burmanni*, and *octophila*, DC. l. c. *J. longipes*, Griff. Notul. iv. 689. *J. decumbens*, Wall. Cat. 6322. *J. angustifolia*, Lamk. Dict. iii. 331 and Ill. t. 280, fig. 3; DC. Prodr. iii. 55; Miq. Fl. Ind. Bat. i. pt. i. 627. *Epilobium fruticosum*, Lour. Fl. Cochinc. 226.—Rheede Hort. Mal. ii. t. 50.

In all INDIA except the western desert region; and in CEYLON.—DISTRIB. The warmer moist parts of the whole world.

Erect, branching, sometimes 4-6 ft. *Leaves* 3 by $\frac{3}{4}$ in., more or less villous (rarely in Indian examples subglabrous), sometimes short, ovate-lanceolate, sometimes nearly linear, shortly petioled or sessile. *Pedice*l very short, bracts inconspicuous, or (in var. *bracteata* of Rottler) foliaceous, 1 in. *Petals* $\frac{1}{4}$ – $\frac{3}{8}$ in. *Capsule* 1-2 in., linear-cylindric, more or less villous or finally glabrous, 8-ribbed, membranous, breaking up between the ribs.—The form called *J. angustifolia* which has very narrow nearly glabrous leaves is found in Burma and thence to Australia, but there are no examples from Cis-Gangetic India.

3. **LUDWIGIA**, Linn.

Herbs. *Leaves* alternate, undivided, subentire. *Flowers* usually axillary, solitary, sessile or nearly so, peduncle 2-bracteate at its apex. *Calyx-tube* scarcely produced above the ovary, linear in the Indian species; teeth 3-5, acute, persistent. *Petals* 3-5 (or 0), epigynous. *Stamens* equal in number to the calyx-segments, epigynous. *Ovary* inferior, 4-5-celled; style simple, stigma capitate; ovules very many, attached in 2 or more vertical rows to the inner angle of each cell. *Capsule* linear or oblong (in the Indian species), 4-5-celled, opening by terminal pores or breaking up irregularly along the sides. *Seeds* numerous, obovoid, smooth, raphe obscure or prominent but not large, without coma.—DISTRIB. Species 20, mostly in North America; extending from the cool temperate zone to the equator; chiefly inhabiting marshes.

1. **L. parviflora**, Roxb. *Hort. Beng.* 11; *Fl. Ind.* i. 419; capsule $\frac{1}{2}$ by $\frac{1}{8}$ – $\frac{1}{12}$ in. linear-oblong, seeds in many rows in each cell, raphe obscure. DC. *Prodr.* iii. 59; *Wight Ill.* t. 101; *W. & A. Prodr.* 336; *Dalz. & Gibs. Bomb. Fl.* 99; *Benth. Fl. Austral.* iii. 307; *Boiss. Fl. Orient.* ii. 752; *Kurz in Journ. As. Soc.* 1877, pt. ii. 91. *L. lythroides*, Blume *Bijd.* 1134; DC. l.c. *D. jussiaeoides*, Wall. *Cat.* 6335 not of Linn. and others.

Throughout INDIA and CEYLON; common in rice fields and other moist places.—DISTRIB. Malaya. North Australia. Persia. Abyssinia.

Erect, 8-24 in., glabrous. *Leaves* 2-3 by $\frac{1}{2}$ – $\frac{3}{4}$ in., lanceolate or linear-lanceolate, narrowed to the base. *Flowers* very shortly pedicelled, commonly 4-fid. *Petals* small, yellow. *Capsule* inflated, smooth, the seeds not separately distinguishable through its walls.

2. **L. prostrata**, Roxb. *Hort. Reng.* 11; *Fl. Ind.* i. 420; capsule $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{20}$ in. linear, seeds in one row in each cell, raphe narrow but prominent. DC. *Prodr.* iii. 59; *Wight Ic.* t. 762; *Kurz in Journ. As. Soc.* 1877, pt. ii. 91. *L. diffusa*, Ham. in *Trans. Linn. Soc.* xiv. 301 *Wall. Cat.* 6336. DC. l.c. *L. fruticulosa*, Blume *Bijd.* 1133; DC. l.c. *Nematopyxis prostrata*, pusilla, and *fruticulosa*, Miq. *Fl. Ind. Bat.* i. pt. i. 630.

NORTH-WEST INDIA; Royle. ASSAM. SILHET. RANGOON. CEYLON. Madras? Heyne in *Herb. Rottler*.—DISTRIB. Malaya, Japan.

Prostrate, or decumbent and then erect, 8-24 in., glabrous. *Leaves* 2-3 by $\frac{1}{2}$ – $\frac{3}{4}$ in., lanceolate, narrowed to the base. *Flowers* sessile, 4-fid. *Capsule* not inflated, the walls drawn tightly over the seeds so that each seed can be counted from without.—This species of Roxburgh's was extricated by Mr. Bentham in *Fl. Austral.* iii. 308, where the synonymy is cleared up. Some of the Sillet examples however have some of the capsules very like those of *L. parviflora*, and others inflated for half their length like *L. parviflora*, and for the other half linear constricted like *L. prostrata*. The two species are identical except as to their capsules and seeds.

4. **CIRCÆA**, Linn.

Herbs. *Leaves* opposite, petioled, ovate, sinuate-dentate, membranous. *Flowers* small, white, pedicelled, in terminal and lateral peduncled racemes, finally lax; pedicels spreading, with minute subulate (or 0) bracts at their base. *Calyx-tube* ovoid, scarcely produced above the ovary, limb bipartite. *Petals* 2, obcordate, 2-lobed, epigynous. *Stamens* 2, epigynous. *Ovary* inferior, 1-2-celled; style filiform, stigma capitate almost 2-lobed; ovules attached to the inner angle of the cells, solitary or rarely 2 superimposed. *Fruit* small, pyriiform, subcoriaceous, indehiscent, 1-2-celled. *Seeds* 1 in each cell, ellipsoid.—**DISTRIB.** Species 2 or 3, in subarctic and cool temperate regions of the northern hemisphere, extending southwards to the tropics on mountains.

1. **C. lutetiana**, Linn.; *DC. Prodr.* iii. 63; leaves ovate-lanceolate more or less pubescent not pellucid, fruit 2-seeded narrowed at the base patent-deflexed shorter than its pedicel covered with long hooked hairs. *Lamk. Ill.* t. 16, fig. 1; *Boiss. Fl. Orient.* ii. 753. *C. repens*, *Wall. Cat.* 6341.

TEMPERATE HIMALAYA from KUMAON to SIKKIM, alt. 7000–10,000 ft.; *Wallich, Major Madden, J. D. H., T. Thomson*; examples few.—**DISTRIB.** The northern hemisphere, extending south to near the tropic of Cancer.

Stems 1–2 ft., erect or decumbent at the base only, puberulous or pubescent. *Leaves* 2 by 1–1½ in., long-petioled, rounded or narrowed at the base. *Bracts* 0. *Petals* white or pinkish. *Fruit* ½ in., obovoid, the hooked hairs usually longer than half the width of the fruit.—The *C. repens* of Wallich agrees closely with the European common type; the stem is decumbent for a short space at the base only.

2. **C. cordata**, Royle *Ill.* t. 43; leaves ovate-lanceolate cordate at the base more or less pubescent not pellucid, fruit 2-seeded broad-elliptic patent-deflexed little longer than broad from a broad rounded unequal base covered with long hooked hairs, not shorter than its pedicel.

WESTERN HIMALAYA; *Royle*; alt. 7000–8000 ft.; *T. Thomson*. KASHMIR, *C. B. Clarke*. SIMLA, *Jacquemont*; DALHOUSIE, Chumba, alt. 7000–9000 ft. plentiful, *C. B. Clarke*.—**DISTRIB.** Mandshuria, Japan.

Stems 1–2 ft., stouter and more hairy than of *E. lutetiana*, erect. *Leaves* 3½ by 2 in., sometimes larger; petiole often 1½ in. *Bracts* 0. *Petals* yellow (ex Royle) and appear so in the dried examples. *Fruit* scarcely ½ in., nearly or quite as much broad, the two carpels at the base generally descending unequally on the pedicel.

3. **C. alpina**, Linn.; *DC. Prodr.* iii. 63; leaves ovate glabrous or slightly pubescent often pellucid, fruit 1-seeded narrowed at the base shorter than its pedicel, glabrous or not densely hairy. *Lamk. Ill.* t. 16, fig. 2; *Wight Ill.* t. 101*; *Boiss. Fl. Orient.* ii. 753. *C. intermedia*, *Wall. Cat.* 6342.

TEMPERATE HIMALAYA, from KASHMIR to SIKKIM, alt. 7000–11,000 ft., not rare. KHASIA Mts., alt. 4500–6000 ft. NILGHIRIS and PUNEY Mts., alt. 7000 ft.—**DISTRIB.** The Temperate Northern hemisphere.

Erect, 6–8 in., typically nearly glabrous. *Leaves* ¾ in., and about equally broad, long-petioled, rounded or cordate at the base, often deeply sinuate-toothed subangulose, glabrous or pubescent on the nerves. *Bracts* minute, subulate, sometimes obscure. *Petals* white. *Fruit* less than ½ in., obovoid, sometimes nearly glabrous, sometimes with many hooked hairs, but the hairs neither so many yellow nor long as commonly are those of *C. lutetiana*.

VAR. *himalaica*; stem taller 10–18 in., leaves much larger 1½ in. more pubescent not pellucid.—In the Himalaya only; the type of Wallich's *C. intermedia*. This plant has only one seed to the fruit and differs only in trivial characters from *C. alpina*.

5. **TRAPA**, Linn.

Floating herbs. *Leaves* dimorphic; submersed opposite, root-like, pinnatifid, with filiform segments; emersed rosulate, rhomboidal, the petiole with a spongy dilatation near its apex. *Flowers* axillary, solitary, peduncled. *Calyx-tube* short, adnate to the lower part of the ovary; limb 4-partite, 2 or all the segments persistent and becoming spinescent on the fruit. *Petals* 4, white, small, inserted at the margin of an epigynous disc. *Stamens* 4. *Ovary* half-inferior, with a conical vertex, 2-celled; style subulate, stigma capitate; ovule solitary in each cell, pendulous from the upper inner angle. *Fruit* bony, 1-celled, large, obovoid, with 4 angles, 2 or all of which carry spines, indehiscent, with a short cylindric beak at the top through which the radicle is protruded. *Seed* 1, inverse, cotyledons very unequal.—**DISTRIB.** Species 2, extending through the warmer parts of the Old World, from Central Europe to China and to Tropical Africa.

1. **T. bispinosa**, Roxb. *Cor. Pl.* 234; *Hort. Beng.* 11; *Fl. Ind.* i. 428; leaves usually very villous beneath, fruit with 2 angles spinescent. *DC. Prodr.* iii. 64; *Wall. Cat.* 6339; *W. & A. Prodr.* 337; *Miq. Fl. Ind. Bat.* i. pt. i. 636; *Dalz. & Gibs. Bomb. Fl.* 99; *Kurz in Journ. As. Soc.* 1877, pt. ii. 91. *T. quadrispinosa*, *Wall. Cat.* 6340 not *Roxb.*—*Rheede Hort. Mal.* xi. t. 33.

Throughout INDIA and CEYLON.—**DISTRIB.** South-eastern Asia and Malaya; Tropical Africa.

In the Roxburghian type, floating leaves 2 by $2\frac{1}{2}$ –3 in., very villous beneath, posterior margin entire, anterior lightly crenate; petiole 4–6 in., woolly. *Fruit* $\frac{3}{4}$ in. long and broad, glabrous or hairy; two opposite angles each with an often retrorsely scabrous spine, the other two angles sometimes obsolete.—Very doubtfully distinct from the next species as Wallich has noted on his specimens.

VAR. incisa, *Wall.*; leaves much smaller about $\frac{3}{4}$ in. much less villous beneath incise serrate on the anterior margin.—Marked also *T. quadrispinosa* by Wallich; but though the leaves are the leaves of *T. natans*, the fruit is that of *T. bispinosa*.

2. **T. natans**, Linn.; *DC. Prodr.* iii. 63; leaves sparingly villous on the nerves beneath, fruit with all 4 angles carrying spines. *Lamk. Ill.* t. 75; *Boiss. Fl. Orient.* ii. 753. *T. quadrispinosa*, *Roxb. Hort. Beng.* 11; *Fl. Ind.* i. 451; *DC. l. c.*

KASHMIR; *Falconer, Jacquemont.* SILHET; *Roxburgh* (but no example thence at Kew).—**DISTRIB.** Persia to Central Europe and the Upper Nile.

Floating leaves 1 in., dentate or incise-dentate on the anterior margin; petiole 2–4 in., glabrescent. *Fruit* $\frac{3}{4}$ in. broad, the 4 angles all spinescent but the two lateral spines shorter.

ORDER LXIII. **SAMYDACEÆ.** (By C. B. Clarke, F.L.S.)

Trees or shrubs. *Leaves* alternate, often distichous, petioled occasionally subsessile, simple, entirely or lightly crenate or serrate, often closely punctulate beneath; stipules small, deciduous. *Flowers* regular, small, axillary, shortly pedicelled, densely fascicled or in long simple or paniced racemes. *Calyx* coriaceous, persistent; tube short, free, or longer and adnate to the ovary; limb 3–7-fid. *Petals* as many as the calyx-lobes (or 0), perigynous, imbricated. *Stamens* definite or indefinite, often with staminodes between or united in a tube with them. *Ovary* superior or half-superior, 1-celled; style 1, capitate or

3-fid at the apex, or styles 2-5; ovules many or several, placentas 2-5 (usually 3), parietal. *Fruit* loculicidally 2-5- (usually 3-) valved, valves carrying the seeds on their medial line. *Seeds* several (usually few sometimes many), oblong or angular, albuminous, usually drilled.—**DISTRIB.** Species 150, scattered through the tropical regions of the globe, rarely also in the subtropical.

Petals 0, flowers in axillary fascicles 1. CASEARIA.
 Petals 0, racemes slender in a terminal panicle 2. OSMELIA.
 Petals present, racemes axillary and terminal 3. HOMALICUM.

1. CASEARIA, Jacq.

Shrubs or small trees. *Leaves* alternate, distichous, petioled, undivided, entire or slightly serrate, often minutely punctate beneath; stipules small, lateral, caducous. *Flowers* small, greenish-yellow, clustered in the axils (in the Indian species); pedicels short, jointed above their base, surrounded by small scales. *Calyx* inferior, deeply 4-5-lobed; lobes imbricate, obtuse, persistent. *Petals* 0. *Stamens* double the number of calyx-lobes or thereabout, united in a tube with staminalodes alternating with the free portion of the filaments; staminal tube hypogynous, sometimes very short so that the filaments are nearly or quite free. *Ovary* free, ovoid, 1-celled; style simple; stigma capitate or 3-fid; ovules many, parietal. *Capsule* succulent, globose or ovoid, ellipsoid (when dry somewhat 3-angular or 6-ribbed), 3- rarely 2-valved. *Seeds* many, angular or obovoid, with a fleshy usually coloured aril; embryo straight.—**DISTRIB.** Species 80, in the warmer parts of the whole globe, most plentiful in America.

* *Adult leaves and petioles glabrous.*

1. **C. glomerata**, Roxb. *Hort. Beng.* 33; *Fl. Ind.* ii. 419; leaves lanceolate or elliptic-lanceolate acuminate denticulate or crenate often obscurely and minutely so but never quite entire, acute or obtuse but not rounded cordate at the base, pedicels with minute yellow hair, fruit $\frac{1}{2}$ in., ellipsoid. *DC. Prodr.* ii. 49; *Benth. Fl. Hongk.* 122; not of Kurz *Flor. Fl.* i. 530. *C. ovata*, Wall. *Cat.* 7192 E, not of Roxb.

SIKKIM, BHOTAN and KHASIA, alt. 3000-5000 ft., common.—**DISTRIB.** Hong Kong (and probably Malaya, for the examples of *C. glabrata* Miq. collected in Sumatra appear *C. glomerata*).

A shrub, or in interior Sikkim a tree 20-30 ft.; branchlets somewhat angular, glabrous, not or but little lenticellate. *Leaves* commonly 4 by $1\frac{3}{4}$ in. (in Sikkim frequently 9 in.); petiole $\frac{1}{2}$ in. *Pedicels* usually very many, $\frac{1}{2}$ in. *Calyx* small, more or less pubescent in the bud. *Stamens* 7-10, staminalodes yellow.—A plant collected in Sikkim by Mr. Kurz, marked "*C. glabra*," has bark densely uniformly lenticellate, petioles $\frac{1}{2}$ - $\frac{1}{2}$ in. and the young buds and pedicels without the smaller yellow hairs; it can scarcely be Roxburgh's *C. glabra* from the Moluccas and which is not represented in the Kew Herbarium.

2. **C. leucocolepis**, Turcz. in *Bull. Soc. Nat. Mosc.* 1858, pt. i. 463; leaves oblong acute crenulate base rounded unequal, pedicels with minute grey hairs. ? *C. viridiflora* Lamk. *Dict.* vi. 493.

SINGAPORE; *T. Lobb*.—**DISTRIB.** Java, Philippines.

Branchlets nearly glabrous. *Leaves* 5-6 by 2 in.; petiole $\frac{1}{2}$ in. *Pedicels* $\frac{1}{2}$ in.; buds minutely hairy, larger than those of *C. glomerata*.—There is a doubt whether Thos. Lobb's No. 468 on which Turczaninow founded the species was not collected at Luzon instead of Singapore. If so the species has not yet been found in British India.

Also, Turczaninow's description is not correct as to the absolute glabrousness of the species. The sepals and tips of the branchlets of Lobb No. 468 are minutely pubescent; and the examples of *C. angustata*, *Teys. & Binn.* (see *Miq. Fl. Ind. Bat.* i. pt. i. 710) only differ by being slightly more pubescent. Lastly, the whole does not differ from *C. glomerata* so much as *C. glomerata* if cultivated at Singapore might be expected to vary from the Sikkim type.

3. *C. graveolens*, *Dalz. in Hook. Journ. Bot.* iv. 107; leaves elliptic obtuse or shortly acute more or less crenate, base of the calyx pubescent, pedicel above the articulation glabrous, fruit $\frac{3}{4}$ in. ellipsoid. *Dalz. & Gibs. Bomb. Fl.* 11; *Brand. For. Fl.* 243. *C. Hamiltoni*, *Wall. Cat.* 7195 chiefly. *C. macrogyna*, *Turcz. in Bull. Soc. Nat. Mosc.* 1858, pt. i. 463; *Kurz in Journ. As. Soc.* 1877, pt. ii. 92; *For. Fl.* i. 529.

GURWHAL and KUMAON; *Royle, Wallich, &c. SIKKIM*; alt. 1500 ft., *C. B. Clarke*. DECCAN PENINSULA, especially the western side, common; *Wight, &c. BURMA*; *McClelland, Kurz*.

A shrub, or tree 20 ft.; branchlets glabrous to the final stipules. *Leaves* (in the type) 4 by $2\frac{3}{4}$ in., broadly elliptic, little acuminate, rounded at the base; petiole $\frac{1}{4}$ in.; but the leaves are often narrower, almost lanceolate, and acute at the base. *Pedicels* usually short, sometimes $\frac{1}{4}$ in., jointed at or above the base, aureo-pubescent below the articulation glabrous above to near the base of the calyx. *Calyx* always pubescent at the base, above sometimes densely aureo-pubescent sometimes glabrous.—This species is to be separated from *C. glomerata* by the pedicel glabrous above its articulation and by its geographic locality; from *C. esculenta* by its less entire less thick leaves and the calyx pubescent at its base. As to the Wallichian Number quoted: in the large paper type, *Wall. Cat.* 7195, A and one sheet of B is *C. graveolens*; the other part of B does not belong to the genus. The Burmese plant is distributed by Mr. Kurz under the name *C. Hamiltoni*, *Wall.* correctly: but in *Journ. As. Soc.* and *For. Fl.* he has changed the name to *C. Canziana*, *Wall.* (see 10. *C. tomentosa*.) Now Roxburgh says his *C. ovata* has the leaves downy beneath, whereas Mr. Kurz says (truly) that his plant has all parts glabrous: Wallich's own *Canziana* is hairy.

4. *C. esculenta*, *Roxb. Fl. Ind.* ii. 422; leaves elliptic-lanceolate entire acute at the base or at least not rounded, pedicel above its articulation and calyx glabrous, fruit $\frac{1}{2}$ – $\frac{3}{4}$ in. ellipsoid. *C. lævigata*, *Dalz. in Hook. Journ. Bot.* iv. 107; *Dalz. & Gibs. Bomb. Fl.* 11. *C. Championii* and *zeylanica*, *Thwaites Enum.* p. 19. *C. varians*, *Thwaites Enum.* 19 at least as regards var. a; *Bedd. Fl. Sylv.* t. 208.

MALABAR, from BOMBAY to KURG, frequent. CEYLON, plentiful; *Thwaites*. MOULMEIN and SINGAPORE, *Lobb. Griffith, Maingay*.

A shrub or small tree, branches glabrous. *Leaves* 3–6 by 1–2 in., broad-lanceolate, narrowed to both ends, entire or most obscurely crenate, thick, subcoriaceous; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Pedicels* short, usually less than $\frac{1}{4}$ in. in fruit, jointed at the base. *Carpels* 2, with 2-fid stigma (*Thwaites* No. 2604, 2657); but carpels often 3 (see *Beddome Fl. Sylv.* 208).—*C. Championii* *Thwaites* with very entire coriaceous acuminate leaves is exactly the form sent from Moulmein and Singapore.

VAR. *angusta*; leaves narrow-lanceolar 4 by 1 in.—Ceylon; *Thwaites* No. 2603 reduced with hesitation to *C. esculenta* by Mr. Benthham in *Fl. Austral.* iii. 309.

5. *C. coriacea*, *Thwaites Enum.* 20; leaves obovate obtuse or rounded at the vertex entire, pedicel above its articulation and calyx glabrous, fruit $\frac{1}{2}$ – $\frac{3}{4}$ in. ellipsoid. *C. varians* var. γ obovata *Thwaites l. c.*

CEYLON, alt. 6000–8000 ft.; *Thwaites, Gardner, Walker*.

A small tree, branches glabrous. *Leaves* 2 in., much narrowed at the base; petiole $\frac{1}{2}$ in. *Carpels* always 2 (*Thwaites*).

6. **C. rubescens**, *Dalz. in Hook. Journ. Bot.* iv. 108; leaves elliptic-lanceolate entire acute or obtuse base not rounded, pedicels minutely pubescent, fruit $\frac{3}{4}$ in. and upwards ellipsoid. *Dalz. & Gibs. Bomb. Fl.* 11.

BOMBAY GHATS, CONCAN AND KURG; *Dalzell, Stocks, Ritchie.*

A shrub 4-6 ft. (*Dalzell*); branches glabrous to the final stipules. *Leaves* $4\frac{1}{2}$ by $2\frac{1}{2}$ in., acuminate, coriaceous often ruddy (but not more so than some examples of *C. esculenta*); petiole $\frac{1}{4}$ in. *Pedicels* short, usually less than $\frac{1}{2}$ in., jointed at the base. *Calyx-lobes* broad, minutely pubescent.—This species is here distinguished from *C. esculenta* solely by the minute pubescence of the pedicels.

7. **C. macrocarpa**, *C. B. Clarke*; leaves narrowly lanceolate, pedicels glabrous, fruit $1\frac{1}{4}$ by $\frac{5}{8}$ in.

PINANG; *Maingay* 660-2.

Branchlets reddish, glabrous. *Leaves* 5 by $1\frac{1}{4}$ in., entire, acute at both ends, reddish, reticulate, shining; petiole $\frac{1}{4}$ in. *Pedicels* few, not exceeding $\frac{1}{2}$ in., glabrous, reddish, buds glabrous. *Seeds* $\frac{1}{4}$ in., obovoid, compressed.

8. **C. albicans**, *Wall. Cat.* 7197; leaves oblong acute at both ends, pedicels glabrous, fruit 2 by $1\frac{1}{8}$ in. ovoid bright yellow when ripe (*Maingay*).

PINANG; *Wallich.* MALACCA; *Maingay*, No. 660.

Branchlets thick, glabrous, striate. *Leaves* 9 by $2\frac{3}{4}$ in., entire, coriaceous, nerves much raised beneath; petiole $\frac{3}{8}$ in. *Pedicels* clustered, $\frac{1}{4}$ in., buds glabrous.—It is possible that this species may prove a variety of the preceding, but the leaves are much broader, the fruit ovoid (instead of narrowly ellipsoid) as noted by Dr. Maingay.

** *Adult leaves on the midrib beneath together with the petiole more or less pubescent.*

9. **C. Vareca**, *Roxb. Hort. Beng.* 33; *Fl. Ind.* ii. 418; leaves oblong closely serrate softly hairy beneath, pedicels above the articulation glabrous, fruit $\frac{1}{2}$ in. broadly ellipsoid yellow or pinkish yellow. *Wall. Cat.* 7194; *Kurz For. Fl.* i. 530.

TERAI of the Himalaya from SIKKIM eastward and of KHASIA, at 500-3000 ft. elevation, plentiful.—DISTRIB. Ava.

A shrub, branchlets pubescent. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., often somewhat cbovate, obtuse suddenly narrowed but sometimes acuminate; petiole $\frac{1}{4}$ in. *Pedicels* less than $\frac{1}{4}$ in., usually jointed far above the base, very hairy below the articulation. *Staminal* tube elongate, stamens often 10. *Seeds* in bright red pulp.—The leaves have regularly and closely placed serrations which prominently mark this species from all others and appear to have completely protected it against synonyms.

10. **C. tomentosa**, *Roxb. Fl. Ind.* ii. 421; leaves elliptic-oblong or lanceolate entire or crenate not acuminate base acute or rounded, pedicels and calyx hairy, fruit $\frac{1}{2}$ - $\frac{3}{4}$ in. broad-ellipsoid. *Wall. Cat.* 7191; *Brand. For. Fl.* 243, t. 31. *C. Anavinga*, *Dalz. & Gibs. Bomb. Fl.* 11. *C. ovata*, *Roxb. Fl. Ind.* ii. 420 (not of Willd.); *Wall. Cat.* 7192 excl. E. *C. Canziana*, *Ham. in Wall. Cat.* 7192; *Voigt Hort. Sub. Calc.* 78; *Kurz in Flora* 1871, 294. *C. elliptica*, *Willd. Sp. Pl.* ii. 628; *DC. Prod.* ii. 51; *Wight Ic.* t. 1849; *Wall. Cat.* 7193; *Blume Mus. Bot.* i. 253; *Miq. Fl. Ind. Bat.* i. pt. i. 709. *C. glabra*, *Hort. Calc. in Herb. Wall. and Herb. Heyne.* *C. Dallichii*, *F. Muell.*; *Benth. Fl. Austral.* iii. 309. *Samyda piscidia*, *Ham. in Wall. Cat.* 7193 D?—*Rheede Hort. Mal.* v. 50.

Throughout INDIA and CEYLON, common.—DISTRIB. Malaya and North Australia.

A shrub, or tree attaining 25 ft.; branchlets tomentose pubescent or nearly glabrous. *Leaves* 4 by $1\frac{1}{2}$ in., tomentose beneath or pubescent or only slightly hairy about the base of the midrib, rarely so closely serrate as in *Wight Ic.* t. 1849, often nearly entire; petiole variable from $\frac{1}{3}$ – $\frac{3}{8}$ to 6 in. in Central India examples. *Pedicels* usually numerous, less than $\frac{1}{4}$ in.; buds usually hairy, sometimes nearly glabrous. *Staminal* tube short, stamens 7–10 (sometimes 12 Benth.). *Seeds* in red pulp.—The typical *C. tomentosa* of North-West India has softly villous oblong nearly entire leaves; the South Indian examples (var. *elliptica*) have the leaves more glabrous, more crenate-serrate and more narrowed at base. With these the Malayan examples agree. As to *C. Canziana*, Wall. Cat. 7192 stated by Wall. to be equivalent to *C. ovata* Roxb. the numerous examples of Wight and Wallich have the pedicels buds and leaves beneath villous and if it is separable as a species it is certainly not *C. graveolens*. Willdenow says his *C. elliptica* has glabrous leaves and Roxburgh says his *C. glabra* has glabrous leaves; so that these synonyms as known only from description must be excluded. But it is very probable that they relate to the nearly glabrous form *C. Dallachii* (see Benth. *Fl. Austral.* iii. 309).

11. **C. Lobbiana**, Turcz. in *Bull. Soc. Nat. Mosc.* 1858, pt. i. p. 463; leaves oblong-lanceolate acuminate entire softly hairy beneath, flowers almost sessile, fruit less than $\frac{1}{4}$ in. diam. nearly globose.

MOULMEIN and SINGAPORE, *T. Lobb*; MALACCA, *Griffith*.

Branchlets round, softly hairy. *Leaves* $2\frac{1}{2}$ – $3\frac{1}{2}$ by $\frac{3}{4}$ – $1\frac{1}{4}$ in.; petiole $\frac{1}{8}$ – $\frac{1}{2}$ in. *Buds* most minutely pubescent. *Fruit* subsessile.—Scarcely differs from *C. tomentosa* but by the more acuminate leaves.

12. **C. grewiae-folia**, Vent. *Choix.* 48; leaves large oblong hairy beneath entire or crenulate base rounded or cordate, pedicels pubescent, fruit $\frac{3}{4}$ –1 in. *DC. Prodr.* ii. 51; *Miq. Fl. Ind. Bat.* i. pt. i. 706. *C. variabilis* Blume *Mus. Bot.* i. 252. *C. subcuneata*, *Miq. l. c.* *C. cinerea*, Turcz. in *Bull. Soc. Nat. Mosc.* 1858, pt. i. 462.

MALACCA, *Maingay* No. 659, 661.—DISTRIB. Malaya to the Philippines.

A small tree (*Maingay*), branchlets more or less pubescent. *Leaves* 7 by $2\frac{1}{2}$ in.; petiole $\frac{1}{2}$ in. *Pedicels* often $\frac{1}{4}$ in., jointed at the base, buds generally pubescent.—Differs little from *C. tomentosa* but by the cordate base of the leaves as Ventenat mentions. Miquel says his *C. subcuneata* differs from the typical *C. grewiae-folia*; being less hairy; but in Miquel's own communicated examples there is hardly any difference even in this respect.

13. **C. wynadensis**, Bedd. *Ic. Pl. Ind. Or.* t. 160; leaves elliptic-lanceolate acuminate denticulate-serrate pubescent beneath narrowed into the petiole, pedicels pubescent.

WYNAAD; alt. 2000–3000 ft.; *Beddome*.

A small tree (*Beddome*), branchlets aureo-villous. *Leaves* 4–6 by $1\frac{1}{4}$ –2 in.; petiole $\frac{1}{4}$ – $\frac{3}{8}$ in. *Pedicels* not very many together, $\frac{1}{2}$ in. or less; buds minutely pubescent. *Stigma* 4-lobed (*Beddome*).—Differs considerably from *C. tomentosa* among other things by the leaves being acuminate to a very sharp point.

14. **C. Kurzii**, C. B. Clarke; leaves lanceolate or oblong-lanceolate narrowed at the base with spreading yellow hairs beneath crenate or nearly entire, pedicels pubescent very long, fruit ellipsoid ($\frac{3}{4}$ in. ?). *C. glomerata* var. *puberula*, Kurz in *Journ. As. Soc.* 1877, pt. ii. 92; *For. Fl.* i. 530.

CHITTAGONG; *H. f. & T.*—DISTRIB. Northern Burma.

Branchlets minutely pubescent. *Leaves* 5 by 2 in.: petiole nearly $\frac{1}{2}$ in. *Pedicels* not very many together, $\frac{1}{4}$ – $\frac{1}{2}$ in. *Calyx* minutely pubescent. *Fruit* not ripe but

cannot become very large.—The pedicels are much longer in this species than in any of the others; and the pubescence of the leaves beneath differs from all except that of *C. grewiaefolia*. A *Casearia* collected by Griffith in fruit in Assam may be this, but the pedicels are shorter, and some of the leaves rounded at the base, approaching thus *C. grewiaefolia*.

IMPERFECTLY KNOWN AND EXCLUDED SPECIES.

C. ASTYLA, Turcz. in Bull. Soc. Imp. Mosc. 1863, 608; branchlets pubescent, leaves glabrous, sterile stamens densely white-hirsute, style 0.

EAST INDIES; Roxburgh (fide Turcz.).

Leaves lanceolate, somewhat long but obtusely acuminate, margin revolute entire, shining, not punctate; petiole short. Pedicels 3 or few. Calyx-tube top-shaped, contracted in the middle, segments reflexed.—A very distinct species in the structure of its flowers, forming the type of a separate subgenus.—Not seen; the foregoing is taken from Turczaninow.

CASEARIA ? CORIACEA, Wall. Cat. 7196, is *Chætocarpus castanocarpus*, Thwaites Enum. 275.

CASEARIA ? ACUMINATA, Wall. Cat. 7198, has opposite leaves and is remote from the genus and order.

CASEARIA ? LUCIDA, Wall. Cat. 7199, is a Euphorbiaceous plant, possibly the male of Wall. Cat. 7196.

2. OSMELIA, Thwaites.

Trees. Leaves alternate, petioled, ovate or oblong-lanceolate, entire or obscurely serrate, epunctate; stipules minute, deciduous. Flowers small, very nearly sessile, in long racemes which are simple or panicked. Calyx inferior, divided nearly to the base; lobes 5, rounded, imbricate. Petals 0. Stamens 10 (or 8), 5 alternating with as many 2-lobed hairy scales and 5 inserted in the notches of those scales. Ovary superior, 1-celled; styles 3, short, with capitate stigmas; ovules few, placentas 3, parietal. Capsule subglobose, 3-valved. Seeds few, subglobose, with red fleshy aril.—DISTRIB. Species 3; one in Ceylon, two in the Philippines.

1. *O. zeylanica*, Thwaites Enum. 20; leaves glabrous narrow elliptic-lanceolate acuminate nearly entire, panicle terminal. Benth. in Journ. Linn. Soc. v. Suppl. 89; Bedd. Fl. Sylv. t. 209. *Casearia paniculata*, Gardn.

CEYLON; Gardner; Central Province, alt. 3000 ft., not common; Thwaites.

Younger branches and panicle pubescent. Leaves 2–4 by 1–1½ in., narrowed at the base; petiole ½ in. Panicle lax, racemes 4–6 in. Flowers white tinged with red, each supported by a single cup-shaped bract. Stamens 10. Ovary very hairy. Capsule ¾ in., coriaceous. Seeds 1–4, subglobose.

3. HOMALIUM, Jacq.

Shrubs or trees. Leaves alternate, crenate or subentire, petioled or sessile, rarely punctulate. Flowers hairy, small, in slender axillary and sub-terminal simple or panicked racemes; bract at the base of the pedicel often prominent but caducous. Calyx-tube funnel-shaped, adnate to the base of the ovary; lobes 5–7, narrow, persistent. Petals 5–7, inserted in the throat of the calyx, linear-oblong, persistent. Disk tomentose. Stamens solitary or in fascicles of 1–7, opposite the petals with alternating glands. Ovary half-superior, 1-celled:

styles 2-5, filiform, stigmas capitellate; ovules many or several, placentas parietal, extending only down the upper free portion of the ovary. *Capsule* half-superior, coriaceous, 2-5-valved at the apex. *Seeds* few, angular or oblong. —**DISTRIB.** Species 30, scattered over the hot regions of nearly the whole globe.

As no one of the Indian specimens exhibits fruit, the description of the capsule and seeds in the above diagnosis has been assumed to apply to the Indian species.

SECT. I. **Blackwellia**. *Stamens* 1 opposite each petal.

* *Racemes* paniced.

1. **H. nepalense**, *Benth. in Journ. Linn. Soc.* iv. 34; leaves ovate or elliptic subacute petioled crenate glabrous, panicles with divaricate branches minutely tomentose or nearly glabrous. *Blackwellia nepalensis*, *Wall. Pl. As. Rar.* t. 179; *Wall. Cat.* 4900; *DC. Prodr.* ii. 54. B. (*Astranthus*) *acuminata*, *Wall. in Herb.*

NIPAL; *Wallich*.

Leaves $4\frac{1}{2}$ by $2\frac{1}{2}$ in., subacute obtuse or scarcely rounded at the base; petiole $\frac{1}{2}$ in. *Panicles* 3-4 in. long and broad, axillary. *Flowers* small, short-pedicelled, 6-7-fid.

** *Racemes* elongate simple.

2. **H. tomentosum**, *Benth. in Journ. Linn. Soc.* iv. 34; leaves nearly sessile obovate repand-crenate pubescent or tomentose beneath, flowers clustered subsessile. *Kurz For. Fl.* i. 531. *Blackwellia tomentosa*, *Vent. Choix* t. 57; *DC. Prodr.* ii. 55; *Miq. Fl. Ind. Bat.* i. pt. i. 714. B. *spiralis*, *Wall. Cat.* 4897, partly; *DC. l. c.*

PEGU; *Wallich, Kurz*.—**DISTRIB.** Java.

Leaves 5 by 3 in., narrowed or scarcely rounded at the base; petiole $\frac{1}{2}$ in. or less. *Racemes* 6 in., axillary, scattered, tomentose. *Flowers* small, 5-6-fid. *Calyx-tube* not elongated, segments about equalling the petals.

3. **H. longifolium**, *Benth. in Journ. Linn. Soc.* 35 (*excl. syn.*) leaves petioled oblong or oblong-lanceolate not rounded at the base entire or nearly so glabrous, flowers clustered pedicelled, calyx-tube short segments nearly as long as the petals. *Blackwellia macrostachya*, *Turcz. in Bull. Soc. Imp. Mosc.* 1863, 610 *ex descr.*

PINANG; *Phillips*. MATAYA; *Maingay* No. 665.

Tree not very large but high (*Maingay*). *Leaves* 4-7 by $1\frac{1}{4}$ - $2\frac{1}{4}$ in.; petiole $\frac{1}{4}$ in. *Racemes* 6 in., axillary, scattered, but mostly towards the ends of the branchlets, tomentose or scarcely more than puberulous; pedicels short, usually less than $\frac{1}{2}$ in. *Flowers* small, 6-8-fid.—For the synonym *Wall. Cat.* 4897 in part adduced by Mr. Bentham see *H. propinquum* below.

4. **H. minutiflorum**, *Kurz For. Fl.* i. 532; glabrous, leaves petioled oblong coarsely crenate, pedicels glabrous, flowers minute about $\frac{1}{24}$ in. long.

BURMA, probably Martaban or Tenasserim; *Brandis*.

An evergreen tree. *Leaves* 3-5 in., obtusely apiculate, thin, coriaceous; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., stout. *Racemes* glabrous, simple or slightly branched, in pairs or solitary, axillary. *Calyx* glabrous; segments oblong-linear, villous-ciliate. *Filaments* slender, one before each petal. Not seen: description copied from Mr. Kurz.

5. **H. zeylanicum**, *Benth. in Journ. Linn. Soc.* iv. 35; leaves petioled elliptic narrowed at both ends crenate glabrous, flowers clustered pedicelled,

calyx-tube oblong top-shaped segments shorter than the petals. *Bedd. Fl. Sylv.* t. 210. *Blackwellia zeylanica*, *Gardn. in Calc. Journ. Nat. Hist.* vii. 452. *B. tetrandra*, *Wight Ic.* t. 1851.

MALABAR, up to 4000 ft., not uncommon; *Law, Stocks, &c.* CEYLON, moister parts up to 3000 ft.; *Walker, &c.*

A tree 40–50 ft. *Leaves* 4 by 2 in., obtusely acuminate; petiole $\frac{3}{8}$ in. *Racemes* axillary, scattered, also approximated at the ends of the branches, often dense with flowers; pedicels short, usually about $\frac{1}{2}$ in. *Flowers* small (but varying considerably in size), 4–6-fid. *Styles* 3–4.

SECT. II. **Racoubea.** *Stamens* 2–7 opposite or subopposite each petal: some of the filaments sometimes having no anthers.

* *Racemes* paniced or more or less divided.

6. **H. Schlichii**, *Kurz For. Fl.* i. 532; leaves petioled elliptic narrowed at both ends coarsely crenate glabrous, racemes terminal or subterminal, paniced grey-pubescent, stamens 3 before each petal.

CHITTAGONG, in tropical forests; *Kurz.*

7. **H. propinquum**, *C. B. Clarke*; leaves petioled oblong undulate-crenate pubescent on the midrib beneath, racemes often simple, flowers clustered pedicelled, calyx-tube oblong top-shaped segments nearly as long as the petals. *H. longifolium*, in part *Benth. in Journ. Linn. Soc.* iv. 35. *Blackwellia propinqua*, *Wall. Cat.* 4898. *B. spiralis*, *Wall. Cat.* 4897 A.

PEGU; *Wallich.*

Leaves 4–8 by $1\frac{1}{2}$ –3 in., obtuse, base usually narrowed sometimes unequally rounded; petiole scarcely $\frac{1}{4}$ in., villous. *Racemes* 6 in., towards the ends of the branches, villous-tomentose, simple or branched once; pedicels about $\frac{1}{2}$ in. *Flowers* small, 6-fid. *Stamens* 2 before each petal, both bearing anthers.

** *Racemes* elongate, simple.

8. **H. Griffithianum**, *Kurz in Journ. As. Soc.* 1877, pt. ii. 93; *For. Fl.* i. 531, character emended and all syn. excl.; leaves short-petioled elliptic-rounded subcordate at the base pubescent on the nerves above aureo-villous beneath crenate, flowers clustered very short-pedicelled 8–10-fid, calyx-tube very short. *H. foetidum*, *Benth. in Journ. Linn. Soc.* iv. 37 partly, not of others. *Blackwellia dasyantha*, *Turez. in Bull. Soc. Imp. Mosc.* 1863, 610. *Blackwellia* sp. *Griff. Notul.* iv. 584.

MERGUI, *Griffith* No. 991. TENASSERIM, *Helper.*

Branchlets with spreading yellow hairs. *Leaves* 3 by 2 in., not much acuminate, above densely yellow villous-pubescent on the nerves with scattered hairs on the surface especially near the margin; long golden spreading hairs on the midrib beneath, and bundles of similar hairs in the axils of the nerves; petiole scarcely $\frac{1}{2}$ in., densely villous. *Racemes* 6 in., tomentose; pedicels very short, less than $\frac{1}{2}$ in. *Flowers* small, but larger and more hairy than those of *H. foetidum*. *Calyx-segments* shorter than the petals. *Styles* 5.—*Griffith* states in *Notul.* that his plant has two stamens before each petal, as his specimens clearly show: it is by oversight that Mr. Kurz has described one only.

9. **H. foetidum**, *Benth. in Journ. Linn. Soc.* iv. 37; leaves petioled elliptic narrowed at both ends glabrous crenate, flowers clustered pedicelled 6–8-fid, calyx-tube short segments a little shorter than the petals. *Blackwellia foetida*,

Wall. Cat. 4899; *Deless. Ic. Sel.* iii. 53; *Miq. Fl. Ind. Bat.* i. pt. i. 714. *As-tranthus foetida*, *Wall. in Herb. Ludia foetida*, *Roxb. Fl. Ind.* ii. 508 *ex Wallich.*

MALACCA; *Griffith, Maingay* No. 664.—DISTRIB. Malaya.

A tree, branchlets leaves and petioles glabrous. *Leaves* 4–7 by $1\frac{1}{2}$ – $3\frac{1}{2}$ in., base narrowed; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Racemes* 6 in., minutely tomentose or glabrous; pedicels short, often $\frac{1}{2}$ in. *Stamens* 2 or 3 before each petal. *Ovary* densely villous. *Styles* 3–4 (5 *ex Maingay*). *Fruit* 1-seeded according to a note of *Maingay*.

10. **H. grandiflorum**, *Benth. in Journ. Linn. Soc.* iv. 37; leaves short-petioled elliptic-oblong entire coriaceous glabrous, flowers pedicelled solitary 6–7-fid, calyx-tube short, segments enlarged after flowering and longer than the petals, stamens about 7 to each petal.

MALACCA; *Griffith*.—DISTRIB. Sumatra.

Leaves 6 by $2\frac{1}{2}$ in.; petiole hardly $\frac{1}{4}$ in. *Racemes* 6 in., puberulo-pubescent or tomentose, pedicels about $\frac{1}{4}$ in. *Flowers* large, calyx-segments after flowering $\frac{3}{8}$ in. *Ovary* even in flower with the apex much elevated. *Styles* 5.

11. **H. travancoricum**, *Bedd. Fl. Sylv.* t. 211; leaves petioled elliptic crenate glabrous, flowers subsessile clustered usually 5-fid, calyx-tube short turbinate segments hardly half the length of the petals, stamens 3–4 opposite each petal.

SOUTH MALABAR MTS.; Travancore and Tinnivelly Ghauts; *Beddome*.

A handsome middle-sized tree (*Beddome*). *Leaves* 3–4 by $1\frac{1}{2}$ – $1\frac{3}{4}$ in., obtuse acute or acuminate, base subacute or obtuse hardly rounded; petiole less than $\frac{1}{4}$ in. *Racemes* 2–4 in., axillary, puberulo-pubescent, not so dense-flowered as in *H. zeylanicum* (*ex Beddome*); but the flowers appear as dense as in other species.

DOUBTFUL SPECIES.

H. foetidum, *Kurz For. Fl.* i. 532 *not of others*; all parts quite glabrous, leaves broadly-oblong coarsely crenate, stamens in pairs opposite the petals, ovary glabrous.

TENASSERIM, *Kurz*.

The ovary is densely villous in all the *Kew H. foetidum*.

ORDER LXIV. PASSIFLOREÆ. (By M. T. Masters.)

Twining herbs or shrubs, rarely erect. *Leaves* alternate, stipulate, simple or lobed, penni- or palmi-nerved, frequently glandular beneath. *Petiole* usually provided with glands. *Stipules* foliaceous or minute. *Tendrils* axillary or 0. *Inflorescence* axillary, cymose, sometimes with one or more branches cirrose, rarely flowers solitary. *Bracteoles* 3, minute and scattered, or foliaceous and forming an epicalyx, rarely 0. *Flowers* regular, unisexual or bisexual. *Calyx* tubular at the base, fleshy, subcoriaceous or membranous; segments imbricate, 5. *Petals* 0 or as many as the calyx-lobes, springing from the tube of the calyx, membranous or fleshy, imbricate, marcescent. *Corona* of one or more rows, filamentous or membranous or both, arising from various portions of the calyx-tube, rarely 0; basilar corona urceolate or cup-shaped, surrounding the base of the andrœcium, sometimes represented by five separate glands of the disc; rarely 0. *Stamens* 5, on a gynophore or free at the base, perigynous; anthers oblong, 2-celled, basi- or dorsi-fixed, dehiscing laterally or introrsely. *Ovary* superior, on a gynophore or subsessile, 1-celled with 3 parietal placentas, rudimentary or absent in the male flowers. *Styles* 1 or 3; stigmas reniform,

capitate or flattened. *Ovules* numerous, pendulous, anatropous; funicle expanded into a cup-shaped arillus. *Fruit* baccate or capsular. *Seeds* numerous, ovoid or flattened, often pitted, covered with a fleshy arillus, albumen fleshy, rarely scanty; embryo straight, cotyledons flat leafy, radicle short terete.—**DISTRIB.** Chiefly tropical; most numerous in South America. Genera about 20; species about 300.

Carica Papaya, L. The Papaw is commonly cultivated, and is more or less naturalized in various parts of India.

TRIBE I. Passifloreæ. *Flowers* hermaphrodite. *Stamens* hypogynous.

Twining herbs or shrubs 1. PASSIFLORA.
Erect shrubs 2. PAROPSIA.

TRIBE II. Modeceæ. *Flowers* unisexual. *Stamens* perigynous.

3. MODECCA.

1. PASSIFLORA, Linn.

Twining shrubs. *Leaves* simple or palmilobed, usually with glands on the under surface and on the petiole; stipules thread-like or leafy. *Flowers* pedunculate; peduncles simple or cymose. *Bracteoles* 3, small, scattered. *Calyx-tube* fleshy, limb 5-lobed. *Petals* 5, springing from the throat of the calyx. *Corona* of one or more rows of fine threads springing from the throat of the calyx-tube and of one or more membranous folds arising lower down. *Gynophore* surrounded at the base by a shallow membranous cup or basilar corona; filaments 5, flat; anthers oblong, 2-celled, dorsifixed; pollen grains reticulate on the surface. *Ovary* 1-celled; styles 3, stigmas reniformi-capitate. *Fruit* baccate. *Seeds* arillate.—**DISTRIB.** A large genus most abundant in tropical and subtropical America. A few are Malayan and two Chinese.

In addition to the following species, several others are cultivated in Indian gardens, and some have become more or less naturalized, as indeed in all hotter countries. Among these may be mentioned varieties of *P. fetida* and *suberosa*. A form of the latter species was described by Wight as indigenous to Ceylon under the name of *P. Walkeriæ*, 39 Ill. ii. (t. 108), but there is no reason to suppose it indigenous.

1. *P. Leschenaultii*, DC. *Prodr.* iii. 326; leaves semiorbicular truncate palminnerved shortly 3-lobed glandless pubescent especially beneath. *Wall. Cat.* 1231; *W. & A. Prodr.* 352; *Hook. Ic. Pl.* t. 353; *Wight Ic.* t. 39.

KHASIA, PULNEY and NILGHIRI Mts.

A climbing shrub. *Branches* slender, angular. *Leaves* broader than long, more or less pubescent, especially on the under surface and along the 3 nerves, rarely entirely glabrous, base rounded or cordate, apex truncately 3-lobed, lateral lobes spreading lanceolate, central lobe very small; petiole 1 in., with 2 sessile glands below the middle. *Peduncles* in pairs in the axils of the leaves, simple, longer than the petiole; bracteoles 3, remote, linear. *Flowers* 2 in. diam.; tube short, saucer-shaped. *Sepals* oblong, obtuse. *Petals* white, equalling the sepals in length but narrower. *Outer corona* near the base of the tube, of two rows of linear filaments, the outer rather shorter than the petals, the inner much shorter; *inner corona* short, tubular, membranous, plicated, margin incurved and crisped; *basilar corona* small, cup-shaped, surrounding the base of the gynophore. *Anthers* linear. *Ovary* elongate-oblong. *Fruit* 1½ by 1 in., ovoid, glabrous, yellowish; rind leathery.

2. **P. nepalensis**, Wall. *Tent. Fl. Nep.* 20, t. 11; *Cat.* 1230; leaves ovate or ovate-lanceolate entire glaucous beneath. *Griffith Itin. notes*, 24; *Ic. Pl. Asiat.* t. 605, fig. 4. *P. geminiflora*, Don *Prodr.* 63.

NIPAL, Wallich. SIKKIM, alt. 4-6000 ft. KHASIA MTS., alt. 3-6000 ft., *H. f. & T.*

A glabrous climber with slender angular branches and distant leaves. *Stipules* $\frac{1}{2}$ in., linear-subulate. *Leaves* $2\frac{1}{2}$ -4 by 2-3 in., thin, membranous, deep green above, glaucescent beneath, marked near the base with 2-3 flat circular glands, rounded or cordate at the base, apiculate, 1- or sub-3-nerved, nerves prominent, smaller nerves arched, remote, inconspicuous; petiole $\frac{1}{2}$ in., usually with two glands above the middle. *Peduncles* simple, in pairs in the axils of the leaves, about half the length of the petiole, slender, 1-flowered, jointed above the middle, rarely cymose; cymes lax, few-flowered. *Flowers* less than $\frac{1}{2}$ in. diam., cup-shaped; tube short, cylindrical. *Calyx-lobes* longer than the tube. *Petals* equal to the calyx-lobes. *Corona* of many rows of short threads. *Gynophore* shorter than the flower. *Ovary* ovoid or subglobose, glabrous. *Fruit* subglobose, the size of a large pea, purplish.

EXCLUDED SPECIES.

P. CALONEURA, Kurz in *Journ. As. Soc.* 1877, ii. 95, described as from "Burma probably Upper Tenasserim or Martaban, Brandis," is, according to an authentic specimen sent by Dr. Kurz from the Calcutta Herbarium, the *Aristolochia trilobata*, L., of the West Indies and South America, no doubt introduced into India; it is not in flower or fruit, but the nervation of the leaf, no less than its form and indumentum, leaves no doubt as to this identification.

P. HEYNEANA, Wall. *Cat.* 1233 bis (alias 2248) is an *Olacinea*, probably referable to *Erythropalum populifolium*, Mast.

2. PAROPSIA, Noronh.

Shrubs. *Leaves* simple. *Flowers* in dense axillary cymes. *Calyx-tube* short; limb 5-parted. *Petals* 5, springing from the base of the calyx-tube. *Corona* of fine threads springing from the tube of the calyx and more or less divided into five antipetalous phalanges. *Gynophore* short; filaments flat; anthers oblong. *Ovary* subglobose. *Style* short dividing into three branches; stigmas reniformi-capitate. *Fruit* capsular.—DISTRIB. 4 or 5 species, natives of tropical Africa and Malaya.

1. **P. malayana**, Planch.; Mast. in *Trans. Linn. Soc.* xxvii. 639; leaves oblong finely serrated with a long abrupt acumen, calyx-tube campanulate, ovary globose.

MALACCA, Maingay, Griffith.

A shrub. *Leaves* $3\frac{1}{2}$ by 1 in.; petiole $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in. in diam. *Calyx* campanulate, tube short covered with tawny down; lobes oblong, obtuse, 4 or 5 times longer than the tube. *Petals* oblong, 1-nerved, half the length of the sepals. *Corona* of a single row of flat, villose threads, half the length of the petals and arising with them from the margin of the tube. *Gynophore* shorter than the petals. *Stamens* 5, filaments filiform; anthers oblong. *Ovary* globose, villose. *Stigmas* large, capitate-reniform.

2. **P. vareciformis**, Mast. in *Trans. Linn. Soc.* xxvii. 639; leaves oblong-obovate acuminate entire, calyx-tube very short, ovary turbinate. *Trichodia vareciformis*, Griff. *Notul.* iv. 571.

MALACCA, Griffith.

Shrub, more or less rusty pubescent. *Leaves* 6 by $2\frac{1}{4}$ in., coriaceous, glabrous

above; petiole under $\frac{1}{2}$ in. *Peduncles* $\frac{1}{8}$ in. *Flowers* nearly $\frac{1}{2}$ in. *Calyx*-segments leathery. *Petals* narrow at the base, ciliated. *Ovary* turbinate, villous. *Fruit* the size of a hazel nut, subglobose; rind dry, leathery. *Seeds* ovoid, flattened, pitted.—Larger in all its parts than *P. malayana*.

3. **MODECCA**, Lam.

Twining herbs or undershrubs. *Leaves* entire or palmilobed, usually with two or more flat, circular glands on the under surface and with similar glands at the apex of the petiole. *Cymes* axillary, few- or many-flowered, on long peduncles one or more of which is sterile and tendril-like. *Male flower*: *Calyx* tubular or bell-shaped; limb 5-lobed, lobes leathery, imbricate. *Petals* 5, free, membranous, 1-nerved, springing from the calyx-tube. *Corona* a ring of threads arising from near the base of the calyx-tube, or wanting. *Glands of the disc* 5, opposite the sepals, strap-shaped or capitate. *Andræcium* cup-shaped, membranous beneath; filaments 5, linear-subulate; anthers linear-oblong, 2-celled. *Ovary* rudimentary or 0. *Female flower*: *Calyx* and *corolla* as in the male. *Corona* a membranous fold, springing from near the base of the calyx-tube or none. *Glands of the disc* 5, strap-shaped, capitate, opposite the sepals. *Staminal nodes* 5, forming a membranous cup surrounding the base of the ovary, above dividing into barren filaments. *Ovary* globose or elliptic, sessile or stalked; style cylindrical or none; stigmas 3, capitate or flat and dilated. *Fruit* capsular, 3-valved. *Seeds* numerous, attached by long funicles to parietal placentas.—**DISTRIB.** A small genus, native of the tropics of the Old World.

SECT I. Microblepharis, W. & A. *Petals* springing from the throat of the calyx-tube, stigmas sessile.

1. **M. Wightiana**, Wall. Cat. 6764; leaves membranous uniform or diverse all cordate ovate acute or some more or less palmately 3-lobed. *Wight Ic.* 179; *W. & A. Prodr.* i. 353; *Thwaites Enum.* 128. *M. diversifolia*, Wall. Cat. 6763.

Hills of the WESTERN PENINSULA, and CEYLON.

Root tuberous. *Branches* striated, roughish. *Leaves* 2–3 by 2 in., glabrous, from ovate entire rounded or slightly cordate at the base to hastate or palmately lobed; the central lobe longest, obtuse; nerves remote; petiole about 1 in., with a sessile gland on each side at the top. *Peduncles* axillary, filiform. *Flowers* not seen. *Calyx*, according to Wight's figure, small; tube short, lobes ovate. *Petals* broad, shorter than the sepals, attached to the throat of the calyx. *Ovary* subglobose, surmounted by three cuneate, fringed, reflexed stigmas. *Fruit* glabrous, the size of a small plum, subglobose or ovoid, 3-valved. *Seeds* flattened, heart-shaped, rugulose, with parallel ridges around the margins.—Wight and Arnott refer Wallich's *M. diversifolia* to *Vitis lanceolaria*, but the type specimen in Wallich's herbarium clearly belongs to the present species.

2. **M. singaporeana**, Mast.; leaves leathery shortly petioled oblong acuminate, flowers elongate, anthers apiculate. *Passiflora singaporeana*, Wall. Cat. 1232.

MALACCA. Singapore, Wallich.—**DISTRIB.** Borneo.

Glabrous. *Leaves* 3–4 by 2 in., coriaceous, oblong-obovate, obtuse, tapering to the base, midrib prominent, secondary nerves remote; petiole $\frac{1}{2}$ in., with a large sessile gland on either side at the top. *Tendrils* as long as the petiole. *Male flowers* $\frac{1}{2}$ in., elongate-fusiform. *Calyx* leathery, shortly 5-lobed, lobes ovate, connivent (? always). *Petals* thick, leathery, oblong acute, springing from the calyx-tube just

beneath the throat. *Corona* none (?). *Glands of the disc* 5, small, oblong, at the base of the calyx-tube, opposite to its lobes. *Stamens* 5; anthers subsessile, erect, linear; connective long, thread-like. *Rudimentary ovary* fusiform. *Fruit* 2 in., long, glabrous, fusiform.—Maingay's specimens, like Wallich's, are very imperfect, but the two are sufficiently alike to leave no doubt of their specific identity.

3. **M. cardiophylla**, *Mast.*; leaves membranous long petioled cordate-ovate acute shortly acuminate, anthers muticous.

SIKKIM, KHASIA MTS., and ASSAM.

Glabrous. *Branches* terete. *Leaves* remote, 6-8 by 4-5 in., entire, rarely palmately lobed, basal lobes rounded divaricate; petiole 2-3 in., with a sessile gland on either side at the apex. *Cymes* many-flowered, on a cylindrical peduncle as long as the petiole, one branch cirrose. *Male flowers* $\frac{1}{2}$ in., bell-shaped. *Calyx* leathery, spotted, 5-lobed to the middle; lobes oblong, obtuse. *Petals* membranous, white, ovate, obtuse, springing from about the middle of the tube. *Andræcium* membranous and tubular below, above divided into five filaments; anthers linear-ovate, acute. *Glands of the disc* 5, small, opposite to the sepals. *Female flower*: *Calyx* $\frac{1}{2}$ in., funnel-shaped, slightly dilated above the base, leathery, spotted; lobes oblong, 3-nerved. *Petals* membranous, springing from the middle of the calyx-tube, oblong, 1-nerved, entire or minutely serrulate. *Glands of the disc* opposite the sepals, small, oblong, curved. *Barren stamens* forming a shallow membranous tube, divided above into filiform segments. *Ovary* raised on a short gynophore, ovoid, surmounted by a large peltate stigma with 3 reflexed wedge-shaped laciniate lobes.—In foliage very like the entire-leaved form of *M. palmata*, but the anthers and stigmas are quite different.

4. **M. cordifolia**, *Blume Bijdr.* 939; *Rumphia*, i. t. 49; leaves membranous cordate roundish acute not acuminate bullate, fruit elongate tapering to both ends. *Miq. Fl. Ind. Bat.* i. 702; *Kurz in Journ. As. Soc.* 1876, ii. 132 and 1877 ii. 95. ? *M. heterophylla*, *Kurz Andam. Rep. Append. A.* 39.

ANDAMAN ISLANDS, *Kurz*.—DISTRIB. JAVA.

Leaves 2-3 by 2 in., shortly petiolate, slightly glaucous beneath. *Calyx* elongate, constricted at the neck. *Petals* small. *Anthe*rs oblong muticous. *Fruit* 3 by 1 in.—I have seen no authentic specimen of this either from the Andamans or from Java. The specimen labelled by *Kurz heterophylla* in the herbarium has much larger and markedly acuminate leaves. It is probably an entire-leaved form of *M. palmata* or *M. trilobata*.

SECT. II. **Blepharantes**, *W. & A.* *Petals* springing from the base of the calyx-tube. *Style* trifid or styles 3; stigmas capitate.

5. **M. trilobata**, *Roxb. Cor. Pl.* t. 297; *Fl. Ind.* iii. 133; leaves membranous cordate 3-lobed with a gland under each sinus, anthers muticous, fruit oblong. *Wall. Cat.* 1234; *Kurz in Journ. As. Soc.* 1877, ii. 95.

SIKKIM, ASSAM, KHASIA MTS., CACHAR, CHITTAGONG.

Glabrous. *Branches* terete, glabrous, sulcate. *Leaves* remote, broader than long, 6-8 by 8-9 in., 3-5-lobed, cordate or hastate at the base; lobes oblong-obovate, acuminate, central one narrowed to the base. *Glands* 2, orbicular, flat, on the under surface of the leaf near the base; petiole 4 in., cylindrical, with a pair of glands at the extreme apex. *Peduncles* axillary, 5-6 in., divided near the apex into a leafless, many-flowered cyme, one branch of which is cirrose. *Male flower*: *Calyx* less than $\frac{1}{2}$ in., campanulate, 5-lobed, lobes oblong, obtuse. *Petals* oblong-obovate, springing from the base of the calyx-tube. *Stamens* 5, united at the base, filaments slender; anthers linear, obtuse. *Glands of the disc* 5, ligulate, incurved, opposite the sepals. *Rudimentary ovary* minute. *Female flower*: *Calyx* and *petals* as in the male, but larger. *Glands of disc* 5, ribbon-like, recurved. *Staminodes* 5, united at the base

into a membranous cup. *Gynophore* short. *Ovary* elongate, ovoid; style short, stigma large capitate 3-lobed. *Fruit* scarlet, oblong, $2\frac{1}{2}$ by $1\frac{1}{2}$ in.

6. **M. palmata**, Lam. *Encycl.* iv. 209; leaves membranous glabrous glandular palmately lobed or entire, anthers obtuse muticous, fruit globose. Wall. Cat. 6762 A and B; Wight Ic. t. 201; W. & A. Prodr. 353; Thwaites Enum. 128; Dalz. & Gibs. Bomb. Fl. 104; Mig. Fl. Ind. Bat. i. 703. M. tuberosa, Roxb. Fl. Ind. iii. 134. M. integrifolia, Lam. l. c. (not of Wall. Cat. 6765).—Rheede Hort. Mal. viii. t. 20-23.

WESTERN PENINSULA AND CEYLON.

Glabrous. *Branches* sulcate. *Leaves* remote, broader than long, 4-5 by 6-7 in., roundish, cordate, usually 3-5-lobed nearly to the base with a single circular flat gland beneath the sinus, sometimes entire, cordate, ovate, acuminate; lobes oblong-lanceolate, acuminate, tapering to the base; petiole 2 in., with a gland on either side at the apex. *Male flower*: *Calyx* about $\frac{1}{2}$ in., campanulate, 5-lobed, dilated at the base, lobes ovate-acute. *Petals* linear-oblong, 3-nerved, ciliate, springing from the base of the calyx-tube. *Corona* a ring of threads from the tube of the calyx, just above the dilated portion. *Filaments* subulate, united at the base; anthers linear-oblong. *Female flower*: *Calyx* $\frac{1}{2}$ in., campanulate; lobes ovate-acute. *Petals* linear, acute, ciliated, springing from the base of the tube. *Corona* a membranous fold fringed with white hairs, arising from near the base of the flower tube. *Glands* of disc oblong, opposite the sepals. *Staminodes* 5, forming a membranous cup surrounding the base of the ovary and above divided into flat strap-shaped filaments nearly as long as the glabrous subglobose ovary. *Style* nearly as long as the ovary, dividing into 3 branches; stigmas large capitate. *Fruit* the size of a small apple, subglobose. *Seeds* large, pitted, ribbed at the edges.—Root said to be poisonous, used as medicine by the Cingalese (Thwaites l. c.). M. integrifolia, Wall. Cat. 6765, is a garden specimen of uncertain identity not referable to the present species.

IMPERFECTLY KNOWN SPECIES.

M. ALIENA, Wall. Cat. 6766, from Silhet, is an Asclepiad, the flowers of which are too imperfect for determination.—There is no specimen in Wallich's herbarium.

M. APICULATA, Mast.; leaves membranous cordate roundish deeply 5-sect, segments lanceolate narrow at the base with a gland beneath the sinus on the under surface, anthers apiculate, fruit ovoid.—Burma, Pegu, McClelland.

Glabrous. *Branches* sulcate. *Petiole* 2 in. *Tendrils* very long. *Anthers* linear with a long slender apiculus. *Fruit* $1\frac{1}{4}$ in., ovoid, acute. *Seeds* subglobose slightly flattened.—Imperfect specimens only exist in the Kew herbaria, Sir Joseph Hooker who analysed the flower states in a note that it differs from M. trilobata by the apiculate anther. Possibly it may be the M. furfuracea of Wallich (see below).

M. FURFURACEA, Wall. Cat. 1235. Prome, Wallich.—There is no specimen of this in Wallich's herbarium.

M. NICOBARICA, Kurz in Trimen Journ. Bot. 1875, 327; Journ. As. Soc. 1876, ii. 132; leaves subcoriaceous oblong-acuminate rounded at the base and subpetate. Passiflora penangiana, Wall. Cat. 1233.—Penang, Wallich. Malacca, Griffith.

Glabrous. *Stems* very slender, sulcate. *Leaves* 4 by 1-2 in., oblong or oblong-lanceolate, 1-nerved, secondary nerves remote, arched; petiole eglandular, $\frac{3}{4}$ in. attached to the blade just within the base. *Tendrils* about 2 in. branched, thickened at the ends. *Fruit* $1\frac{1}{2}$ -2 in. long, glabrous, oblong, acute, 3-valved. *Seeds* discoid.—The specimens of Wallich and of Maingay are imperfect, but evidently belong to the same species.

M. POPULIFOLIA, Blume Rumphia, i. t. 50.—To this I refer with doubt Maingay n. 668 with cordate ovate-acute leaves, petioles with two large apical glands, fruits about 3 in. long tapering to both ends.

ORDER LXV. **CUCURBITACEÆ.** (By C. B. Clarke, F.L.S.)

Climbing herbs or shrubs; tendrils solitary, lateral, spiral, simple or divided. *Leaves* alternate, petioled, frequently cordate, simple lobed or pedately divided. *Flowers* monœcious or diœcious, yellow or white, racemed and solitary, less commonly paniced. *Calyx-tube* wholly adnate to the ovary (except in *Actinostemma*); limb rotate campanulate or tubular; lobes 5 (rarely 3), imbricate. *Petals* 5, inserted on the calyx-limb, united in a tube or nearly or quite free, sometimes fimbriated at the margin, valvate or involute in the bud. *Stamens* inserted at the mouth or about the middle or at the base of the calyx-tube, usually 3 (sometimes 5 or 2); anthers free or united into a tube, one usually 1-celled and the other two 2-celled, cells straight or flexuose or conduplicate, the connective sometimes crested or produced. *Ovary* inferior (in *Actinostemma* half-superior), usually 3-carpellary; style 1 with 3 stigmas, more rarely styles 2-3-4; placentas usually 3, vertical, in double lines, the edges of the carpellary leaves being often turned in so far that the ovary (in flower time even) is spuriously 3-celled; ovules usually many, horizontal, rarely pendulous, sometimes few and pendulous from near the top of the ovary (in *Dicalospermum* 3 erect from the base of the ovary?). *Fruit* generally berried or fleshy, indehiscent or dehiscing by valves or by a stopple, often 1-celled, the seeds being often packed in pulp or fibre. *Seeds* usually many, often compressed, horizontal, pendulous (or in *Dicalospermum* erect), frequently corrugated or subspinose on the margins, albumen 0.—**DISTRIB.** Species 400, in the warmer parts of the whole globe especially in the tropics.

TRIBE I. Cucumerinæ. *Ovules* horizontal (or pendulous). *Female flowers* usually solitary, never paniced. *Leaves* not divided into distinct leaflets (except rarely in *Thladiantha*).

A. *Anther-cells conduplicate or sigmoid.*

* *Corolla divided nearly or quite to the base into 5 petals.*

† *Petals fimbriate at their margin.*

Seeds 6. Calyx-tube 3-4 in. 1. HODGSONIA.

Seeds many. Calyx-tube less than 3 in. 2. TRICHOSANTHES.

†† *Petals entire.*

a. *calyx-tube of the male flower elongate; anthers usually included in the tube or nearly so.*

Seeds many, horizontal. Tendrils rarely divided 3. GYMNOPTALUM.

Seeds many, horizontal. Tendrils 2-3-fid. Petiole without glands. 4. WAREA.

Seeds 12-18, pendulous 5. HERPETOSPERMUM.

Tendrils divided. Fruit very large. Petiole with 2 glands at apex 6. LAGENARIA.

b. *Calyx-tube of the male flower short; anthers usually exerted from the tube or nearly so.*

a. *Stamens inserted near the mouth of the calyx-tube; anthers hardly or not at all cohering.*

- Male flowers (partly) in racemes. Fruit opening by
 a stopple 7. LUFFA.
 Flowers all solitary. Fruit very fleshy, indehiscent . 8. BENINCASA.

*β. Stamens inserted below the mouth of the calyx-tube; anthers
 more or less cohering.*

- Male flowers (partly) racemed. Tendrils simple . . 9. MOMORDICA.
 Male flowers clustered or solitary. Tendrils simple . 10. CUCUMIS.
 Flowers all solitary. Tendrils 2-3-fid 11. CITRULLUS.

*** Corolla campanulate, divided half way down or thereabout.*

- Tendrils simple. Flowers white 12. CEPHALANDRA.
 Tendrils divided. Flowers yellow 13. CUCURBITA.

B. Anther-cells straight (or in Bryonia somewhat curved).

** Flowers not large, yellow, male racemes or pedicels not stout.*

† Male and female pedicels 1-flowered, clustered.

- Tendrils 2-fid 14. BRYONIA.
 Tendrils simple 15. MUKIA.

†† Male flowers corymbose or subumbellate or racemed.

- Fruit shortly peduncled. Connective not produced . 16. ZEHNERIA.
 Fruit on a capillary peduncle. Connective produced . 17. MELOTHRIA.
 Fruit sessile, beaked 18. RHYNCHOCARPA.
 Fruit circumsciss near the base 19. CORALLOCARPUS.
 Fruit subsessile, indehiscent, without a beak . . . 20. CERASIOCARPUM.
 Ciliate bracts resembling stipules at base of the
 petioles 21. CTENOLEPIS.

*** Flowers large deep yellow, male raceme stout.*

- Calyx-tube short. Seeds very many 23. THLADIANTHA.
 Calyx-tube elongate. Seeds 3-9 24. EDGARIA.

TRIBE II. Orthospermeæ. *Ovules and seeds erect.*

- Seeds 3, each with two empty cells 22. DICÆLOSPERMUM.

TRIBE III. Zanoniææ. *Ovules pendulous. Flowers small, the females
 in panicles or many-flowered racemes. Stamens 5, free, each with a single
 small straight anther.*

A. Leaves not divided into separate leaflets.

- Fruit small circumsciss. Leaves serrate 26. ACTINOSTEMMA.
 Fruit long clavate. Leaves subentire 28. ZANONIA.

B. Leaves pedately divided into 3-5 leaflets.

- Fruit trigonous obovoid. Leaflets serrate. Tendrils
 bifid 25. GOMPHOGYNE.
 Fruit pea-like. Leaflets serrate. Tendrils simple . 27. GYNOSTEMMA.
 Fruit elongate clavate. Leaflets entire 29. ALSOMITRA.

1. **HODGSONIA**, *H. f. & T.*

A large climber. *Leaves* coriaceous, 3-5-lobed, long-petioled; tendrils 2-3-fid. *Flowers* large, dioecious; males in long racemes; bracts oblong, entire, deciduous; females solitary. **MALE:** calyx long-tubular, mouth shortly campanulate, teeth 5, short; petals 5, connate at the base, very long-fimbriate; stamens 3, filaments very short; anthers exserted, connate, linear, one 1-celled, two 2-celled, cells conduplicate. **FEMALE:** calyx and corolla as in the male; ovary globose, 1-celled; style long, stigmas 3 oblong bifid exserted; placentas 3, parietal, near the base of the ovary, 2-ovulate on each side. *Fruit* large, depressed globular, 12-grooved, flesh hard; perfect seeds usually six, each having a smaller commonly barren one attached to its side, flat-ellipsoid, with sunk veins.

1. **H. heteroclita**, *H. f. & T. in Proc. Linn. Soc.* ii. 257; *Hk. f. Ill. Himal. Pl.* t. 1, 2, 3; *Fl. d. Serres*, t. 1262; *Kurz in Journ. As. Soc.* 1877, pt. ii. 97. *Trichosanthes heteroclita*, *Roxb. Fl. Ind.* iii. 705; *Wall. Cat.* 6684, A, B, C. *T. grandiflora*, *Wall. Cat.* 6685 not of Blume.

SIKKIM; alt. 0-4000 ft. ASSAM. KHASIA MTS. alt. 0-3000 ft. EAST BENGAL and CHITTAGONG; PEGU and MARTABAN; *Kurz*. PINANG and MALACCA.

Stem extending sometimes 100 ft. *Leaves* 6-8 in. long and broad, glabrous, deeply lobed; lobes entire or very sparingly denticulate, acute. Male racemes 8 in.; bracts $\frac{1}{2}$ in. *Calyx* often rusty-pubescent without, tube 3-4 by $\frac{3}{8}$ in. *Corolla-lobes* 2 in., brown-villous, 3-nerved without, white, tinged yellow within, ending in a fringe 4 in. *Fruit* 4-10 in. wide, red-brown, closely tomentose. *Seeds* 2-3 by 1-1 $\frac{1}{2}$ in.

2. **TRICHOSANTHES**, *Linn.*

Scandent herbs. *Leaves* entire or 3-9-lobed, denticulate; tendrils usually 2-5-fid. *Flowers* dioecious less often monœcious, white; male peduncles usually in axillary pairs, one 1-flowered caducous, the other racemose; bracts large or small or 0; female flower solitary. **MALE:** calyx long-tubular; teeth 5, lanceolate, entire serrate or laciniate. *Corolla* 5-fid nearly to the base, lobes long-fimbriate; stamens 3; anthers almost included, connate (free in *T. dioica*), long-linear, one 1-celled, two 2-celled, cells conduplicate. **FEMALE:** calyx and corolla as in the male. *Ovary* inferior, at the base of the calyx-tube, 1-celled; style filiform, 3 or 6-fid at apex; placentas 3, parietal; ovules very many, horizontal, half-pendulous. *Fruit* lanceolate or globose, smooth, acute or obtuse at the apex. *Seeds* many, horizontal, packed in pulp, compressed, ellipsoid, sometimes angular on the margin.—**DISTRIB.** Species 20, in South-East Asia, extending through Malaya to North Australia in one direction, through China to Japan in another.

* *Bracts of the male raceme large, sheathing the flowers from a broad base.*

1. **T. palmata**, *Roxb. Fl. Ind.* iii. 704; leaves palmate half-way down in 5 or 3-7 broad lobes (but vary from angular nearly entire to deeply palmate with linear-oblong lobes), bracts ovate or obovate lacerate or strongly serrate, fruit globose the size of a small orange, seeds $\frac{3}{8}$ in. scarcely angular on the margins. *Wall. Cat.* 6688 excl. C, F; *W. & A. Prodr.* 350 as to α and β ; *Wight Ill.* t. 104, 105; *Dalz. & Gibs. Bomb. Fl.* 103. *T. laciniosa*, *Wall. Cat.* 6689 A, B. *T. aspera*, *Heyne in Herb. Rottler.* *T. tricuspis*, *Miq. Fl. Ind.*

Bat. i. pt. i. 679. *T. cordata*, Wall. Cat. 6686 excl. A and B. *T. anguina*, Wall. Cat. 6687 F partly. *T. bracteata*, Kurz in Journ. As. Soc. 1877, pt. ii. 99. *Cucurbita Melopepo*, Wall. Cat. 6725. *Involucraria Wallichii*, Seringe in DC. Prodr. iii. 318. *Bryonia palmata*, Wall. Cat. 6711 F.

From the HIMALAYAS to CEYLON and SINGAPORE; very common in all moist thickets, ascending to 5000 ft.—DISTRIB. Malaya, China, Japan, North Australia.

Climbing often 30 ft. *Diœious* so far as all the examples go, but Roxburgh has placed it in Monœcia without remark. *Leaves* 2–6 in. diam., not at all hairy beneath, usually glabrous or less commonly scabrous on the nerves, often with several large glands near the apex of the petiole, cordate at the base; segments dentate, serrate, divaricate, sometimes subpinnatifid (var. *incisa* Heyne), usually acute (but obtuse in var. *sinuata*, Heyne); petiole 1–3 in. *Tendrils* commonly 3-fid. Male *peduncles* usually paired, the racemed one 6 in., naked below; bracts ovate or obovate, glabrous or viscid with scattered glands or pubescent. *Calyx-tube* 1½ in., closely tomentose or glabrous; sometimes much larger in the Sikkim examples; teeth long-lanceolate, sometimes dentate serrate or subpinnatifid. *Fruit* 1½–2 in. diam., not acute, bright red with 10 orange streaks. *Seeds* very many, immersed in green pulp.—The extreme forms of the leaves are var. *laciniosa*, Wight, which has the leaves palmate nearly to the base the segments scarcely ¼ in. wide and sometimes subpinnatifid; and var. *Thomsoni* from Moradabad with the leaves entire and slightly 5-angular; in both the leaves are coriaceous and with their petioles more or less covered with scattered round white minute flat scales. The Himalayan specimens recede further by their large subsucculent flaccid leaves and very large flowers.

VAR. *Scotanthus*, C. B. Clarke; calyx-teeth broad-lanceolate entire, petals nearly destitute of fimbriations especially in the female.

VAR. *tomentosa*, Heyne in Herb. Rottler; leaves tomentose beneath divided not more than half-way down.—Deccan Peninsula Mts.; Wight No. 1134, 1136 partly; G. Thomson. Ceylon, alt. 2600 ft.; Gardner.—This looks like a good species but the fruit and seeds are as in var. 1. This closely resembles the Australian *T. subvelutina* Muell. in Herb. referred to *T. palmata* by Benthams. The distribution of *T. palmata* is extended to Japan on the faith of two examples collected by Maximowicz. They belong to the commonest Bengal type of *T. palmata*, but bear the name *T. japonica*, Regel, which in Regel Ind. Sem. 1868, p. 90, is said to have solitary male flowers, and has been referred by authors to the neighbourhood of *T. cucumerina*. A *Trichosanthes* collected in Mergui by Griffith No. 759 (No. 2532 Kew Distrib.) has the leaves with short hairs beneath; otherwise resembles the var. *tomentosa*.

2. ***T. multiloba***, Miq. Ann. Mus. Lugd. Bat. ii. 82; leaves deeply (only half-way down) palmate in 5 or 3–9 lobes narrowed near their base, bracts ovate or obovate deeply serrate, fruit 2–4 in. ovoid or oblong acute, seeds ¾–1 in. more or less angular on the margins. *T. grandibracteata*, Kurz in Journ. As. Soc. 1877, pt. ii. 99 ex descr.

SIKKIM, East Himalaya and KHASIA Mts.; alt. 2000–6000 ft.; plentiful. MALACCA? Maingay 671.—DISTRIB. China?. Bhamo. Japan.

Rambling extensively. *Diœious*. *Leaves* 3–6 in. diam., usually glabrous beneath or less commonly scabrous with scattered bristles, subcordate at the base; segments serrate (sometimes lobed), ascending, less divaricate than in *T. palmata*, acute; petiole 1–3 in., often with several large glands near the apex; tendrils commonly 3-fid. Male *peduncles* usually paired, the racemed one 6 in., naked below. *Calyx-tube* 1–2½ in.; teeth lanceolate-subulate, entire. *Fruit* bright red with orange streaks. *Seeds* very many in green pulp.—This is perhaps a variety of *T. palmata*, the Himalayan large form of which it so closely resembles, that in the absence of the fruit it cannot always be distinguished from it.—The locality “China” is added on the faith of Hance’s No. 13,745 marked *T. palmata* Roxb. which it may be, as it does not exhibit fruit nor does Maingay’s Malacca example.

VAR. ? *majuscula* (*Trichosanthes* sp. 7 *Herb. Ind. Or. Hk. f. & T.*); male raceme stout more than 1 ft., bracts long little serrate, leaves very large. Khasia Mts.; alt. 4000 ft.; *Hk. f. & T.*—Perhaps a new species, but the examples consist of male racemes and leaves only. No. 12,298 C. B. Clarke (Darjeeling alt. 3000 ft.) seems the same.

3. ***T. cordata***, *Roxb. Fl. Ind.* iii. 703; leaves cordate-ovate acute entire or obscurely angular-lobed hairy beneath, bracts elongate obovate entire or scarcely serrate, fruit globose size of a small orange, seeds $\frac{1}{2}$ in. scarcely angular on the margins. *Wall. Cat.* 6686 A.; *Kurz in Journ. As. Soc.* 1877, pt. ii. 99. *T. tuberosa*, *Roxb. Ic. ined.* *T. palmata*, *Wall. Cat.* 6688 F partly, & C.

From the base of the EASTERN HIMALAYA in SIKKIM and ASSAM to PEGU. Frequent in the KHASIA Terai and CACHAR.

An extensive climber. *Diœcious*. Leaves often 6–8 in., dentate-serrate; tendrils usually 3-fid. Male *peduncles* usually paired, the racemed one often 8 in., stout; bracts pubescent. *Calyx-tube* $1\frac{1}{2}$ in., densely hairy without, segments finely acuminate. *Fruit* almost exactly as in *T. palmata*, bright red, orange-streaked, apex not acute.

VAR. *subpedata*; leaves pedately lobed almost to the base.—Cachar; C. B. Clarke.—The bracts and indumentum are exactly as in the type. Judging by the description, *T. macrosiphon*, *Kurz in Journ. As. Soc.* 1872, pt. ii. 308, differs less from *T. cordata*, *Roxb.* than does this var. *subpedata*.

** *Bracts of the male raceme large, subpersistent, narrowed to the base, not sheathing.*

4. ***T. truncata***, C. B. Clarke; leaves ovate from a truncate hastate or obtuse (not cordate) base sometimes subpeltate entire or irregularly tricuspid glabrous denticulate or not, bracts ovate slightly serrate nearly glabrous, female plant unknown.

SIKKIM, alt. 1000 ft.; J. D. H. KHASIA Mts., alt. 4000 ft. (Cherra Coal-pit) *H. f. & T.*; C. B. Clarke.

Stem twining; tendrils 2–3-fid. Leaves glabrous coriaceous or membranous, polymorphous, sometimes exactly ovate with a rounded subentire margin sometimes deeply 3-cuspidate. Male *peduncle* 6 in. *Calyx-tube* $\frac{3}{4}$ – $1\frac{1}{2}$ in., somewhat tomentose without: corolla (ex *Hook. f.*) greenish-white.

5. ***T. himalensis***, C. B. Clarke; leaves palmately 3-lobed deeply cordate villous or pubescent beneath, bracts lanceolate incise-serrate, fruit 3–4 in. long-cylindric tapering at both ends. *T. cordata*, *Wall. Cat.* 6686 B. *Cucurbita ficifolia*, *Wall. Cat.* 6721.

SIKKIM, alt. 2000–5000 ft. from Yoksun to the plains; J. D. H., C. B. Clarke.

Stems extensively climbing, with the petioles and leaves pubescent and hairy. *Diœcious*. Leaves 5 in., usually deeply palmate, irregularly serrate; tendrils 3-fid. Male *peduncles* 3–4 in., bracts $\frac{1}{2}$ – $\frac{3}{4}$ in. *Calyx-tube* $1\frac{1}{2}$ –2 in., very narrow, little hairy without. *Fruit* 3–4 by $1\frac{1}{4}$ in., nearly circular in section. *Seeds* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., polymorphous, sometimes obovoid the broader part subtrimerous, sometimes drum-shaped.—Certain seeds were sent by Dr. Anderson to Naudin, who grew them and has placed the resulting leaves in the Kew Herbarium accompanied by a drawing of the seed, and has attached the name *Platygonia himalensis* thereto. These leaves may belong to the present species.

VAR. *glabrior*; leaves glabrous above pubescent or scabrous on the nerves beneath.—Khasia; alt. 4000 ft. *Trichosanthes* sp. 9 *Herb. Ind. Or., H. f. & T.*—The examples are of leaves and male racemes only.

*** *Bracts of the male raceme 0 or minute.*

6. **T. dicælosperma**, C. B. Clarke; leaves cordate-ovate acute denticulate softly shortly pubescent on both surfaces, fruit $1\frac{1}{2}$ in. diam. globose, seeds $\frac{1}{2}$ in. compressed subquadrate equally 3-celled the lateral cells empty. ?*T. reniformis*, Kurz in *Flora* 1871, 294.

SIKKIM, alt. 2000–5000 ft.; J. D. H. KHASIA Mts., alt. 4000 ft.; H. f. & T.

Stems long, twining, innovations at least pubescent. *Diœcious*. Leaves 4 by $3\frac{1}{2}$ in., not at all lobed; petiole $1\frac{1}{2}$ in.; tendrils 2-fid. Male *peduncles* paired, one early 1-flowered, the other 2–3 in., racemed, ebracteate. *Calyx-tube* $1\frac{1}{4}$ in., narrow, pubescent. *Fruit* pubescent, with 10 paler vertical bands. *Seeds* in orange pulp.—This is perhaps Kurz's *reniformis* obtained in Sikkim, but it can hardly be *T. reniformis*, Mig. *Fl. Ind. Bat.* i. pt. i. 675, which has obtuse lobes to the leaves and the male spikes leafy-bracteate.

7. **T. dioica**, Roxb. *Fl. Ind.* iii. 701; leaves cordate oblong acute, petiole scabrous woolly, male flowers not racemed woolly without, anthers free. *Wall. Cat.* 6692 A, B, D.

Throughout the plain of NORTH INDIA from the PUNJAB to ASSAM and EAST BENGAL; common.

Stems twining extensively, more or less woolly and scabrous. *Diœcious*. Leaves 3 by 2 in., harsh, sinuate-dentate, not lobed; petiole $\frac{3}{4}$ in.; tendrils 2-fid. Male *peduncles* paired, the second-flowering often 2 in. but not racemed in any example at Kew. *Calyx-tube* $1\frac{3}{4}$ in., narrow. *Fruit* 2– $3\frac{1}{2}$ in., oblong or nearly spherical, acute, orange-red. *Seeds* $\frac{3}{8}$ – $\frac{1}{2}$ in., half-ellipsoid, compressed, corrugate on the margin.—United with the next species by Benth. in *Fl. Austral.* iii. 315. Roxburgh says "Stamens three distinct" which has been repeatedly verified in the living plant.

8. **T. nervifolia**, Linn.; DC. *Prodr.* iii. 314; leaves cordate oblong acute, petiole glabrous, male flowers partly racemed glabrous. W. & A. *Prodr.* 349. *T. cuspidata*, Lamk.; DC. *Prodr.* iii. 314.—Rheede *Hort. Mal.* t. 16, 17.

DECCAN PENINSULA; Quilon, Wight. Kurg (tropical region); G. Thomson. CEYLON; not uncommon up to 5000 ft.; Thwaites.

Stems twining, glabrous. *Diœcious*. Leaves 3 by $1\frac{1}{2}$ –2 in., membranous, sinuate-dentate, not lobed; petiole $\frac{3}{4}$ in.; tendrils 2-fid. Male *peduncles* usually paired, the second-flowering carrying a raceme (finally elongate and zigzag) of about 12 flowers. *Calyx-tube* $1\frac{1}{2}$ in. *Fruit* (and seeds from Rheede's drawing) 2–3 in., circular in section, about twice as long as broad, acute. *Seeds* $\frac{3}{8}$ – $\frac{1}{2}$ in., half-ellipsoid, compressed, corrugated on the margin.

9. **T. cucumerina**, Linn.; DC. *Prodr.* iii. 315; leaves cordate subreniform 5- (3–7-) lobed or 5-angular lobes not acuminate pubescent or puberulous on both surfaces, fruit 1–3 in. ovoid-conical, seeds corrugate. Roxb. *Fl. Ind.* iii. 702; *Wall. Cat.* 6690 A, B, C, D, F; *Blume Bijl.* 933; *Dalz. & Gibs. Bomb. Fl.* 102; *Mig. Fl. Ind. Bat.* i. pt. i. 676; *Naud. in Ann. Sc. Nat. ser. 4*, xviii. 191; *Kurz in Journ. As. Soc.* 1877, pt. ii. 98. *T. laciniosa*, Klein in *Herb. Rottler*. *T. pilosa*, Wall. *Cat.* 6691. *Bryonia umbellata*, Wall. *Cat.* 6700 D. *Cucumis Missionis*, Wall. *Cat.* 6728.

Throughout INDIA and CEYLON.—DISTRIB. Malaya, North Australia.

Stems twining, more or less pubescent. *Diœcious* or less often (? when cultivated) *monœcious*. Leaves 2–4 in. diam., usually 5-lobed about half-way down, lobes obtuse or if acute not acuminate; petiole $\frac{3}{4}$ in.; tendrils 2-fid. Male *peduncles* in pairs, the earlier 1-flowered, the later racemed; occasionally in place of the earlier is found a female. *Calyx-tube* 1 in. *Seeds* $\frac{3}{8}$ – $\frac{1}{2}$ in., half-ellipsoid, compressed, in red pulp.—In Bth. & Hk. f. *Gen. Pl.* i. 833, under *Ceratosanthes*, *T. cucumerina* is a misprint for *T. corniculata*.

10. **T. anguina**, Linn.; *DC. Prodr.* iii. 314; leaves cordate subreniform 5- (3-7-) lobed or 5-angular lobes not acuminate pubescent or puberulous on both surfaces, fruit elongate cylindric sometimes contorted, seeds corrugate. *Roxb. Fl. Ind.* iii. 701; *Bot. Mag.* t. 722; *Blume Bijl.* 933; *W. & A. Prodr.* 350; *Wall. Cat.* 6687; *Lamk. Ill.* t. 794; *Miq. Fl. Ind. Bat.* i. pt. i. 677?; *Naud. in Ann. Sc. Nat.* ser. 4, xviii. 91; *Kurz in Journ. As. Soc.* 1877, pt. ii. 98.

INDIA, cultivated.—DISTRIB. China, Malaya.

Except in the fruit this agrees altogether with *T. cucumerina*, of which it is probably a cultivated form. The fruit, used as a vegetable, is eminently polymorphous. Miquel places this species at the head of his *Involucrarie* which he states to have great leafy sheathing bracts to the male flowers, but in the Indian *T. anguina* these bracts are minute.

11. **T. lobata**, *Roxb. Fl. Ind.* iii. 701; leaves cordate orbicular 5-lobed half-way down or more lobes acuminate pubescent, fruit oblong acute, seeds smooth. *Wall. Cat.* 6693.

DECCAN PENINSULA; *Wight*; *Rottler, G. Thomson, &c.*

Stem and petioles with flaccid hairs. *Leaves* pubescent beneath, and with flaccid hairs; tendrils 3-5-fid. *Fruit* 2-4 by 1-2 in., acute at both ends. *Seeds* half-ellipsoid, compressed, margins entire.—Probably a variety of *T. cucumerina* as suggested by *W. & A. Prodr.* 350. *T. lobata*, *Kurz in Journ. As. Soc.* 1877, pt. ii. 98, having the seeds tubercled (from Chittagong) is perhaps nearer *T. cucumerina* or *T. anguina* as here understood: but the three species are difficult to separate.

12. **T. integrifolia**, *Thwaites Enum.* 127, *not of Kurz*; dioecious, leaves glabrous nerved elliptic or ovate acuminate less often lanceolate 3-nerved entire coriaceous base rounded or cordate, tendrils simple, flowers somewhat large solitary, fruit spherical shortly apiculate, seeds numerous crowded.

CEYLON, alt. 2000-4000 ft.; *Thwaites*.

Leaves $2\frac{1}{2}$ -6 by $1\frac{1}{2}$ -2 in.; petiole $\frac{3}{8}$ in. *Fruit* 2 in. diam., red. *Seeds* $\frac{1}{2}$ in., smooth, oblong, oblique, compressed, truncate at the hilum, with two indentations at the vertex, testa blackish green.—Not seen. The above description is translated from Mr. Thwaites, who has been careful in communicating examples to Kew of all his types; but his No. 1629 is not to be found in its place. Mr. Thwaites describes no bracts to the male inflorescence, and if the male flowers are all solitary the species must be near *T. dioica*, *Roxb.*

DOUBTFUL SPECIES.

T. MACROSIPHON, *Kurz in Journ. As. Soc.* 1172, pt. ii. 308, from Tenasserim, in the absence of both the male inflorescence and the fruit cannot be identified from the description. It might be *T. cordata*, *Roxb.*

TRICHOSANTHES SP. *Griffith* (No. 2543 Kew Distrib.); nearly glabrous, tendrils 2-fid, leaves 3-foliolate very coriaceous, leaflets lanceolate nearly entire the central one somewhat obovate the lateral ones unequally auricled on the outer base, petiole nearly 2 in., petiolules $\frac{1}{2}$ in., fruit oblong-ovate but nearly spherical red with yellowish streaks, seeds very many in green pulp brown compressed, margin somewhat angular at the hilum end.—Malacca, *Griffith*.—This imperfect description is drawn up from a fragment with leaves and from Griffith's note of the fruit attached thereto. The characters appear nearly those of *Telfairia*, but the habit and texture are those of *Hodgsonia*; while from Griffith's description of the fruit it appears he did best by placing it provisionally in *Trichosanthes*.

3. **GYMNOPETALUM**, Arn.

Twining herbs, tendrils usually simple or 2-fid. *Leaves* petioled, 5-angular, nearly entire or deeply lobed. *Flowers* white (or yellow ?), somewhat large; monœcious at least sometimes: male peduncles in fully developed plants 2 from each axil, the earlier 1-flowered, the later longer racemose, either often suppressed; bracts in the racemes persistent, large lanceolate incised or small; females 1-flowered usually in separate axils. **MALE**: calyx-tube long, contracted near the mouth, limb of 5 lanceolate segments; petals 5, not fimbriate on margin; stamens 3; anthers included, connate, elongate, 1-celled, 2-celled, cells conduplicate; rudiments of the ovary 1, or 3, small, linear. **FEMALE**: calyx and corolla as in the male; ovary oblong; style long, stigmas 3 short linear; ovules horizontal, many; placentas 3, long, vertical. *Fruit* ovate-oblong, acute at both ends. *Seeds* many or few, ellipsoid, compressed, margined, nearly smooth.—**DISTRIB.** Species 5; in India, China and Malaya.

1. **G. cochinchinense**, Kurz in *Flora* 1871, 295; leaves 5-angled or lobed about half-way down, bracts to the male racemes prominent narrowed at the base deeply lacerate at the apex. *Bryonia cochinchinensis*, Lour. *Fl. Cochinch.* 595; *DC. Prodr.* iii. 305. *Momordica tubiflora*, Roxb. *Fl. Ind.* iii. 711, not of Wallich. *Tripodanthera cochinchinensis*, Roem. *Synops.* ii. 48. *Scotanthus tubiflorus*, Naud. in *Ann. Sc. Nat.* ser. 4, xvi. 172, t. 3. *Trichosanthes cucumerina*, Wall. *Cat.* 6690 E. T. ? Fatoa, Ham. in Wall. *Cat.* 6695. *Bryonia grandis*, Wall. *Cat.* 6700 K, L.

SIKKIM, up to 2000 ft. alt. ASSAM, CACHAR and BENGAL, common. CHOTA NAGPORE. TENASSERIM; Helfer.—**DISTRIB.** Malaya, China.

Stems slender, 5-angular, more or less scabrous-hairy. *Leaves* 2-3 in. diam., scabrous on both surfaces; tendrils simple or 2-fid. Male racemed *peduncle* sometimes 6-8 in., usually shorter; bracts $\frac{3}{4}$ in., incise-serrate, lobes often again incised. *Calyx-tube* $\frac{3}{4}$ in., villous, closed by deflexed hairs within above the stamens. Rudiments of the ovary in the male flower 3. *Petals* $\frac{1}{2}$ in., ovate, entire or somewhat crenate. *Fruit* 2 by $\frac{3}{4}$ in., orange-red, somewhat scabrous, with 10 longitudinal ribs, pulp greenish, not very succulent. *Seeds* $\frac{1}{4}$ by $\frac{1}{12}$ and $\frac{1}{20}$ in. thick.

2. **G. quinquelobum**, Miq. *Fl. Ind. Bat.* i. pt. i. 681; leaves suborbicular deeply 5-lobed lobes often subpinnatifid, bracts of the male racemes oblong serrate. *Scotanthus Porteanus*, Naud. in *Ann. Sc. Nat.* ser. 5, v. 25. ? *G. heterophyllum*, Kurz in *Trimen Journ. Bot.* 1875, p. 326.

RANGOON; McClelland. PINANG; Porter. MALAY PENINSULA; Griffith. SINGAPORE; G. Thomson.—**DISTRIB.** Malaya to Borneo.

Agrees very closely with the last species: the segments of the leaves are here narrow, subsinuate, 3-fid or pinnatifid, but graduate towards the half-lobed form of *G. cochinchinensis*.—Kurz's *G. heterophyllum* agrees as described with the present species; it is perhaps a specimen with poorly developed male racemes. Kurz says the flower is white, and quotes *Bryonia heterophylla*, Wall. *Cat.* 6711, which obscures the whole matter, for that plant is *Bryonia palmata*, Wall. (now *Cephalandra*) while *B. heterophylla*, Wall. No. 6704 (and of which there is a solitary sheet) differs altogether from Mr. Kurz' description and is a *Cerasiocarpum*.

3. **G. Wightii**, Arn. in *Hook. Journ. Bot.* iii. 278; leaves 5-angled or -lobed, bracts of the male racemes small simple linear. *Thwaites Enum.* 127. *G. zeylanicum*, Arn. l.c. *Bryonia tubiflora*, W. & A. *Prodr.* 347. *Cucurbita umbellata*, Wall. *Cat.* 6724.

SOUTH DECCAN PENINSULA; *Wight*; CANARA, *Hohenacker* No. 662. CEYLON, ascending to 5000 ft., *Walker, Gardner, Thwaites*.

Leaves 2 in. diam., more or less pubescent on both surfaces, denticulate, lobes acute or obtuse or 0; petiole 1 in. Male racemed *peduncle* 2 in.; flowers crowded, subumbellate; bracts $\frac{1}{4}$ in., linear, pedicels often $\frac{1}{4}$ in.; peduncle of the female flowers $\frac{3}{8}$ in. *Calyx-tube* $\frac{3}{4}$ in., slender, with scattered hairs or very pilose, lobes small. *Petals* $\frac{1}{4}$ in. (yellow according to Arnott and Hook. f., white according to Thwaites). Rudiment of the *ovary* in the male flower simple. *Fruit* $1\frac{1}{2}$ –2 in., red, more or less hairy, not ribbed. *Seeds* $\frac{1}{4}$ by $\frac{1}{12}$ in., without corrugations or angles.—*Bryonia tubiflora*, *Wight* No. 1118 has the calyx-tube pubescent and is nowise distinguishable from the Ceylon plant as Mr. Thwaites surmised in *Enum.* p. 127.

4. **G. integrifolium**, *Kurz in Flora* 1871, 295; leaves cordate-ovate nearly entire, male peduncles 1-flowered solitary without bracts. *Cucumis integrifolius*, *Roxb. Fl. Ind.* iii. 724; *Wall. Cat.* 6730. *Trichosanthes officinalis*, *Wall. Cat.* 6694. *T. integrifolia*, *Kurz in Journ. As. Soc.* 1877, pt. ii. 99.

BENGAL; *Roxburgh*. Ponlong (IRRAWADDY estuary); *Wallich*.

Stem scabrid; tendrils undivided in *Wallich's* specimen (2-fid in *Roxburgh's* drawing. *Leaves* 3 in. diam., very harshly scabrous above, densely villous beneath, margin undulate scarcely denticulate; petiole 1 in. *Flowers* monœcious, all solitary, white; male peduncle $1\frac{1}{2}$ in., female peduncle $\frac{1}{4}$ in. MALE: calyx-tube elongate, densely brown-villous, teeth 5, lanceolate; corolla divided nearly to the base, lobes obovate, entire, yellow-veined, pubescent. FEMALE: calyx and corolla as in the male; stigmas 3, oblong. *Fruit* from *Roxburgh's* figure $\frac{5}{8}$ – $\frac{3}{4}$ in. diam., orange-red, globular, smooth.—*Wall. Cat.* 6694 consists of three leaves with one male peduncle and calyx, and a detached fruit; the leaves resemble those of *Trichosanthes dioica*, *Roxb.*

4. **WAREA**, *C. B. Clarke*.

Extensively scandent, tendrils 2–3-fid. *Leaves* long-petioled, ovate or deeply 5-lobed. *Flowers* large, yellow, diœcious; males frequently two peduncles from one axil, one early deciduous 1-flowered, the other bearing a raceme without bracts; females solitary on long peduncles. MALE: calyx-tube cylindric, narrow, then suddenly widened campanulate subhemispheric, teeth 5, linear; petals 5, ovate, nearly separate, entire; stamens 3; anthers connate, included, one 1-celled, two 2-celled, cells conduplicate. FEMALE: calyx and corolla as in the male; ovary oblong; style long, with 3 wide stigmatic lobes; ovules horizontal, many, placentas 3, vertical. *Fruit* oblong, attenuate at both ends, 3-angular, 6-ribbed, 3-valved nearly to the base. *Seeds* in each cell about 16, in two rows, horizontal, compressed, ellipsoid, smooth.

Differs from *Gymnopetalum* by the large campanulate mouth to the calyx, by the divided tendrils, and the anthers exerted from the tubular portion of the calyx. Named after *J. Ware Edgar, C.S.I.*

1. **W. tonglensis**, *C. B. Clarke in Journ. Linn. Soc.* xv. 129. *Gymnopetalum* sp. No. 6, *Herb. Ind. Or., H. f. & T.*

SIKKIM, alt. 6000–10,000 ft., very common; *H. f. J. D. H.*; Tonglo N., *C. B. Clarke*.

Stem and peduncles nearly glabrous. *Leaves* 6–9 by 4–5 in., polymorphous, cordate, denticulate, nearly glabrous, ovate acute or 5-lobed or cut nearly to the base into narrow segments; petiole 4 in. Male *peduncle* 8 in., pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. *Calyx-tube* $1\frac{1}{4}$ in., pubescent, cylindric portion more than $\frac{3}{4}$ in. *Petals* $\frac{3}{4}$ in. *Fruit* 4 by $1\frac{1}{2}$ in. *Seeds* $\frac{3}{8}$ in., packed in a fibrous almost juiceless pulp.—This is one of the three species included in *Herpetospermum* by *J. Hooker* in *Gen. Pl.* i. 834.

5. **HERPETOSPERMUM**, Wall.

Extensively scandent, tendrils 2-3-fid. *Leaves* long-petioled, cordate, ovate, little lobed. *Flowers* large, yellow, dioecious; males frequently two peduncles from one axil, one early deciduous 1-flowered the other racemose without bracts; females solitary on very short peduncles. MALE: calyx-tube elongate, cylindric at the base, above narrow funnel-shaped; teeth 5, long, linear; petals 5, elliptic, nearly separate, entire; stamens 3; anthers connate, included, one 1-celled, two 2-celled, cells conduplicate. FEMALE: calyx and corolla as in the male; ovary oblong, 3-celled, style long, with three oblong bifid stigmatic lobes; ovules pendulous, 4-6 in each cell. *Fruit* broad-oblong, narrowed at both ends, 3-angular, irregularly sinuate-costate, valves 3 separating from the axis nearly to the base. *Seeds* in two rows in each cell, flat, oblong, pendulous, the lower end corrugate or almost 3-lobed.

1. **H. caudigerum**, Wall. Cat. 6761. Bryonia? pedunculosa, Seringe in DC. Prodr. iii. 306. Rampinia herpetospermoides, C. B. Clarke in Journ. Linn. Soc. xv. 130.

TEMPERATE HIMALAYA, from SIMLA and KUMAON to BHOTAN, alt. 5000-8000 ft.; very common in Sikkim. KHASIA Mts.; Wallich.

Stem and peduncles more or less pubescent. *Leaves* 4-6 in. long and broad, usually pubescent on both surfaces, serrate, acuminate; petiole 2-4 in. Male peduncle 8 in., pedicels 1 in., hairy. *Calyx-tube* 1 in., pubescent without. *Petals* often 1 in. Rudiment of the ovary in the male linear, simple. *Fruit* 3 by 1½ in., more or less pubescent. *Seeds* usually 12 sometimes 18, ½ by ¼ and ⅓ in., thick, often exhibiting (when dried) wavy marks on the surface, packed in a fibrous almost juiceless pulp.—Wallich's Khasia specimen exhibits ripe seeds which are very narrow, incised at the lower end so that the middle lobe appears as a spinous tooth. Lady Dalhousie's examples collected at Simla are nearly glabrous with smaller flowers. *Herpetospermum* of Bth. & Hk. f. Gen. Pl. i. 834, described from imperfect materials, includes *H. caudigerum*, *Warea tonglensis* and *Edgaria darjeelingensis*. The generic character did not fit *Warea* or *Edgaria* and required emendation as to the ovules and seeds of Wallich's *Herpetospermum*.

6. **LAGENARIA**, Seringe.

Large climbers, pubescent, tendrils 2-fid. *Leaves* ovate or orbicular, cordate, dentate; petiole long, with two glands at its apex. *Flowers* large, white, solitary, monoecious or dioecious, the males long- the females short-peduncled. MALE: calyx-tube funnel-shaped subcampanulate, teeth 5 narrow; petals 5, free, obovate; stamens 3; anthers connate, included, one 1-celled, two 2-celled, cells conduplicate; rudiment of ovary 0. FEMALE: calyx and corolla as in the male; ovary oblong, style short with 3 bifid stigmatic lobes; ovules many, horizontal; placentas 3, vertical. *Fruit* large, ultimately thick membranous or almost woody, indehiscent, polymorphous, usually broader upwards. *Seeds* very many, horizontal, compressed, with a marginal groove, smooth.

1. **L. vulgaris**, Seringe in DC. Prodr. iii. 299; W. & A. Prodr. 341; Wight Ill. t. 105*; Kurz in Journ. As. Soc. 1877, pt. ii. 100. *L. vittata*, hispida and idolatrica, Seringe l. c. 299. Cucurbita Lagenaria, Linn.; Lamk. Ill. t. 795; Roxb. Fl. Ind. iii. 718; Wall. Cat. 6719.—Rheede Hort. Mal. viii. t. 5.

Cultivated throughout INDIA.—DISTRIB. Cultivated in the tropics and warm temperate zones of the whole world.

Leaves often 6 in. diam., softly pubescent on both surfaces, more or less 5-angular or 5-lobed. Male *peduncle* often 6 in., female 1 in. *Calyx-tube* $\frac{1}{2}$ in., pubescent. *Petals* 1–2 in. *Fruit* often $1\frac{1}{2}$ ft., in India usually bottle- or dumb-bell-shaped. *Seeds* $\frac{3}{4}$ by $\frac{3}{8}$ and $\frac{1}{8}$ in. thick, with an impressed groove parallel to and near the margin.

7. **LUFFA**, Cav.

Climbers, large or small, pubescent or nearly glabrous; tendrils 2–5-fid. *Leaves* cordate, usually 5-angular or 5-lobed; petiole without glands at its apex. *Flowers* yellow or white, monœcious, males and females often from the same axil; females solitary or panicled, males on long or short racemes or clustered. MALE: calyx-tube top-shaped, lobes 5, triangular or lanceolate; petals 5, obovate; stamens 3, rarely 5, filaments 3 free or connate; anthers exserted free, one 1-celled, the others 2-celled, cells sigmoid often on the margin of the broad connective. FEMALE: calyx-tube shortly produced above the ovary; lobes and corolla as in the male; ovary oblong, style cylindric, stigma 3-lobed; ovules very many, horizontal. *Fruit* large or small, oblong (not spherical), smooth or angular or spinous, ultimately fibrous, not succulent, 3-celled, usually circumsciss near the top. *Seeds* many, oblong, compressed.—DISTRIB. Species 10, in the warmer regions of the Old World several widely cultivated, one indigenous in America.

* *Stamens* 5.

1. **L. graveolens**, Roxb. *Fl. Ind.* iii. 716; male pedicels clustered in the axils without bracts, females often in the same axils 1–3 on the peduncle each 1-bracteate, fruit with numerous soft bristles. *Wall. Cat.* 6752; *Naud. in Ann. Sc. Nat.* ser. 4, xii. 124; *Kurz in Journ. As. Soc.* 1877, pt. ii. 101.

SIKKIM, alt. 1000–2000 ft.; J. D. H. RAJMAHAL HILLS; Roxburgh. Plain of EAST BENGAL; C. B. Clarke. CHITTAGONG; Kurz.—DISTRIB. North Australia.

Stems long, little villous; tendrils 3–5-fid. *Leaves* 3 in. diam., reniform-orbicular, 5-angled, denticulate, punctulate, scabrous above, pubescent on the nerves beneath; petiole 2–3 in. Male *pedicels* few, much shorter than the petiole; *petals* 5, $\frac{1}{4}$ in., yellow, entire; stamens 5. Female *peduncle* short, sometimes divided with 2–3 flowers, each pedicel carrying a small ovate entire thick bract $\frac{1}{8}$ in. *Fruit* 2 by 1 in., covered with papillæ, scarcely spinous, obscurely 10-striate, dehiscing horizontally near the top, stopple without papillæ. *Seeds* scarcely $\frac{1}{4}$ in., very many, packed in fibres, smooth, not margined.

2. **L. ægyptiaca**, Mill. ex Hook. f. in Oliv. *Fl. Trop. Afr.* ii. 530; male flowers racemed on long peduncles, fruit elongate clavate smooth 10-ribbed or somewhat 10-angular. *DC. Prodr.* iii. 303. L. pentandra, Roxb. *Fl. Ind.* iii. 712; *W. & A. Prodr.* 343; *Wall. Cat.* 6751; *Wight. Ic.* t. 499. L. racemosa, Roxb. l. c. 715. L. clavata, Roxb. *Hort. Beng.* 104, *Fl. Ind.* iii. 714. L. acutangula, W. & A. l. c., not of Roxb. L. cylindrica, Roem. *Synops.* ii. 63; *Naud. in Ann. Sc. Nat.* ser. 4, xii. p. 119; *Kurz in Journ. As. Soc.* 1877, pt. ii. 100. L. Petola and Cattu-picinna, Seringe in *DC. l. c.* L. Parvala, Wall. *Cat.* 6758. L. Gosa, hederacea and Satpatia, Wall. *Cat.* 6753, 6755, 6757. Bryonia cheirophylla, Wall. *Cat.* 6715 A. Momordica Luffa, Linn.—Rheede *Hort. Mal.* viii. t. 8, with many other synonyms for which see Naudin l. c.

Throughout INDIA very common, often cultivated.—DISTRIB. Cultivated throughout the tropics, native country uncertain (Naudin).

Extensively climbing hairy; tendrils 2-3-fid. *Leaves* 4 in. diam., reniform-orbicular, 5-angled or somewhat 5-lobed, dentate, usually scabrous, punctate on both surfaces, pubescent on the nerves beneath; petiole 2 in. Male *peduncle* 6 in., flowers often approximate near the summit; pedicels short, each carrying a small ovate viscid entire bract sometimes obsolete. *Petals* 5, $\frac{3}{4}$ -1 in., yellow, often with elevated hairy green veins. *Stamens* 5. Female *flower* solitary, peduncle 1-3 in. *Fruit* 5-12 in. *Seeds* $\frac{3}{8}$ by nearly $\frac{1}{4}$ in., usually black, very narrowly winged, smooth or very sparingly tubercled.—The pedicels are rarely elongated (*L. Satpatia*, Wall.); one example of Falconer's has the racemes compound. The fruit being the part eaten and attended to in cultivation is hence very variable: and no good character founded on it can be drawn between this species and *L. acutangula*.

** *Stamens* 3.

3. *L. acutangula*, Roxb. *Fl. Ind.* iii. 713; fruit elongate 10-angled not covered by spines or papillæ. *DC. Prodr.* iii. 302; *Wall. Cat.* 6759; *Hook. f. in Oliv. Fl. Trop. Afr.* ii. 530, excl. syn.; *Kurz in Journ. As. Soc.* 1877, pt. ii. 101, excl. many syn. *Cucumis acutangulus*, Wall. *Cat.* 6736.

NORTH-WEST INDIA; Royle. SIKKIM; J. D. H. ASSAM; Masters. Plain of EAST BENGAL; C. B. Clarke. CEYLON; Thwaites.—DISTRIB. Malaya.

Very near *L. pentandra* from which it differs by having 3 stamens as noted by Roxburgh and verified by Thwaites. The fruit is usually smaller, often only 3-4 in.—The figure of *L. fetida* in Cav. Ic. i. t. 9, shows clearly 5 stamens and is not Roxburgh's plant. *Rheede Hort. Mal.* viii. t. 7, is much more probably *L. ægyptiaca* than this species. *L. acutangula* No. 1106 in *Herb. Wight* is pentandrous and is *L. ægyptiaca* exactly. All these, and all descriptions founded on them, are not here included in *L. acutangula*, Roxb.

VAR. *amara*, Roxb. *Fl. Ind.* iii. 715 (sp.); fruit oblong 10-angled without spines or papillæ. *Wall. Cat.* 6754 A; *W. A. Prodr.* 343; *Dalz. & Gibs. Bomb. Fl.* 102; *Naud. in Ann. Sc. Nat.* ser. 4, xii. 123. *L. Plukenetiana*, DC. *Prodr.* iii. 302. *Momordica tubiflora*, Wall. *Cat.* 6749.—From nearly all India especially the Western side. Naudin, who retains *L. amara* as a species, says it is "exceedingly near *L. acutangula* but distinguished by the leaves a little smaller and sometimes whitish." The typical *L. amara* has the leaves softly pubescent at least while young, for they become in age scabrous.

4. *L. echinata*, Roxb. *Hort. Beng.* 104; *Fl. Ind.* iii. 716; fruit ellipsoid densely covered with bristles. *Wall. Cat.* 6756; *W. & A. Prodr.* 343; *Dalz. & Gibs. Bomb. Fl.* 102; *Kurz in Journ. As. Soc.* 1877, pt. ii. 101. *L. Bindaal*, Roxb. *Hort. Beng.* 104; *Fl. Ind.* iii. 717.

GUJERAT; Dalzell. SCINDE; Stocks. PURNEAH (Bengal); Kurz. DACCA; C. B. Clarke.—DISTRIB. Tropical Africa.

Climbing not extensively, sparingly scabrous-pilose; tendrils 2-fid. *Leaves* 1-2 in. diam., cordate, reniform-orbicular, entire or obscurely 5-angular or 5-lobed, or cut almost to the base into 5 narrow sinuate-pinnatifid segments, dentate; petiole 1-2 in. Male *peduncles* normally paired, one 1-flowered the other racemed very long 6 in. or more, pedicels 1 in.; flowers small, white, without bracts. *Filaments* 3, two with 2-celled anthers. *Peduncle* of the solitary female very short. *Fruit* $1\frac{1}{4}$ by $\frac{3}{8}$ in., ribs not visible; spines $\frac{1}{4}$ in., ciliate; stopple without spines, calyx-teeth persistent. *Seeds* $\frac{1}{2}$ in., many, slightly scabrous.

VAR. *longistylis*, Edgw. in *Journ. As. Soc.* 1852, p. 270 (sp.); male raceme shorter than the leaves, spines of the fruit fewer themselves glabrous.—Banda, Edgeworth.—The leaves are not more dissected than in some Bengal typical *L. echinata*, nor are the styles longer. The whole male raceme is much shorter than the accompanying 1-flowered male peduncle.

5. **L. Kleinii**, *W. & A. Prodr.* 344; young fruit spinous, spines densely woolly. *L. umbellata*, *Roem. Synops.* ii. 63. *Cucurbita umbellata*, *Heyne in Herb. Rottler*; *Wall. Cat.* 6724; *DC. Prodr.* iii. 318.

TRAVANCORE; Klein. COROMANDEL (?) Wight.

Agrees closely with *L. echinata* and may be a variety of it, but the *stamens* differ; the filaments being three, of which two are bifid below the anthers.

8. **BENINCASA**, *Savi*.

A large climber, softly hairy, tendrils 2-fid. *Leaves* cordate, reniform-orbicular, more or less 5-lobed; petiole without glands. *Flowers* large, yellow, monœcious, all solitary, without bracts. MALE: calyx-tube campanulate, lobes 5, leaf-like, serrate; petals 5, nearly separate, obovate; stamens 3, inserted near the mouth of the tube; anthers exsert, free, one 1-celled, two 2-celled, cells sigmoid. FEMALE: calyx and corolla as in the male; ovary oblong, densely hairy; style thick, with 3 flexuose stigmas; ovules numerous, horizontal; placentas 3. *Fruit* large, fleshy, oblong, pubescent, indehiscent. *Seeds* many, oblong, compressed, margined.

1. **B. cerifera**, *Savi*; *DC. Prodr.* iii. 303; *W. & A. Prodr.* 344; *Miq. Fl. Ind. Bat.* i. pt. i. 665; *Naud. in Ann. Sc. Nat.* ser. 4, xii. 87; *Kurz in Journ. As. Soc.* 1877, pt. ii. 101. *Cucurbita Pepo*, *Lour. Fl. Cochinc.* 593; *Roxb. Fl. Ind.* iii. 718. *C. hispida*, *Wall. Cat.* 6723. *C. farinosa*, *Blume Bijl.* 931. *Gymnopetalum* ? *calyculatum*, *Miq. Fl. Ind. Bat. Suppl.* 332.—*Rheede Hort. Mal.* viii. t. 3.

Throughout INDIA cultivated.—DISTRIB. Cultivated in Malaya, China, Japan, Tropical Africa; where wild uncertain.

Leaves 4–6 in. diam.; petiole 3–4 in. Male *peduncle* 3–4 in., female *peduncle* 1–2 in. *Calyx-teeth* when young often narrow, scarcely serrate. *Fruit* 1–1½ ft., cylindric, without ribs, hairy, ultimately covered with a waxy bloom. *Seeds* ½ by ¼ in.

9. **MOMORDICA**, *Linn.*

Climbing, with simple tendrils. *Leaves* cordate, petioled, undivided in the Indian species. *Flowers* yellow or white, monœcious or dioecious, females solitary peduncled, males solitary or racemed, bracteate or not. MALE: calyx-tube short, campanulate (with 2–3 basal oblong incurved scales ex Hook. f.) lobes 5; *corolla* 5-partite nearly to the base; stamens 3 (2 in *M. Cymbalaria*): filaments short; anthers at length free, one 1-celled, one or two 2-celled, cells conduplicate, or in *M. Cymbalaria* horse-shoe-shaped. FEMALE: calyx and corolla as in the male; ovary oblong; style long, stigmas 3; ovules very many, horizontal placentas 3. *Fruit* oblong or spherical, rough or smooth, indehiscent or 3-valved, many- or few-seeded. *Seeds* obovate or complanate, smooth corrugate or sculptured.—DISTRIB. Species 26, chiefly in the warmer parts of Africa, several in Tropical Asia, few in Tropical America.—The genus is here artificially separated from *Luffa* by its simple tendrils.

* *Male peduncles* 1-flowered.

1. **M. Charantia**, *Linn.*; *DC. Prodr.* iii. 311; monœcious, bract about the middle of the male peduncle orbicular entire, fruit ovoid narrowed to both ends many-ribbed covered with triangular tubercles. *Roxb. Fl. Ind.* iii. 707;

Wall. Cat. 6746; *W. & A. Prodr.* 348; *Bot. Mag.* t. 2455; *Miq. Fl. Ind. Bat.* i. pt. i. 663; *Wight Ic.* t. 504; *Dalz. & Gibs. Bomb. Fl.* 102; *Naud. in Ann. Sc. Nat.* ser. 4, xii. 131; *Kurz in Journ. As. Soc.* 1877, pt. ii. 102. *M. humilis*, *Wall. Cat.* 6747. *M. muricata*, *DC. l.c.*; *Roxb. l.c.*; *Wall. Cat.* 6745; *Miq. l.c.* *M. senegalensis*, *Lamk.*; *DC. l.c.* *Cucumis africanus*, *Bot. Reg.* t. 980.—*Rheede Hort. Mal.* viii. t. 9, 10.

Throughout INDIA, cultivated.—DISTRIB. Malaya, China, Tropical Africa.

Leaves 1-3 in. diam., orbicular, glabrous or slightly pubescent, cut nearly to the base into 5-7 narrow sinuate or subpinnatifid lobes. Male *peduncle* 2-4 in., slender, bract. *Calyx-lobes* ovate, acute. *Petals* $\frac{3}{8}$ - $\frac{3}{4}$ in., yellow. Female *peduncle* 2-4 in., slender, bracteate near the base; ovary fusiform, muricate. *Fruit* 1-3 in., rostrate. *Seeds* $\frac{1}{3}$ in., compressed, corrugate on the margin, somewhat sculptured.

2. ***M. Balsamina***, *Linn.*; *DC. Prodr.* iii. 311; monœcious, bract very near the top of the male *peduncle* orbicular denticulate variegated, fruit ovoid narrowed to both ends smooth. *Miq. Fl. Ind. Bat.* i. pt. i. 664; *Boiss. Fl. Orient.* ii. 757, *excl. syn.* *Wight*; *Hook. f. in Oliv. Fl. Trop. Afr.* ii. 537, *not of Wallich*, nor of *W. & A. Prodr.* 349.

PUNJAB; *T. Thomson, Edgeworth.* NORTH-WEST INDIA; *Royle.* SCINDE; *Stocks.*—DISTRIB. Malaya, Australia, Western Asia, Africa to the Cape.

Glabrous or nearly so. *Leaves* $1\frac{1}{2}$ -3 in. diam., orbicular, palmately 3-5-lobed to about the middle, lobes acutely lobulate, punctulate on both surfaces; petiole $\frac{3}{4}$ -1 $\frac{1}{2}$ in. Male *peduncle* 1-3 in.; calyx-lobes ovate or oblong, acute; petals $\frac{1}{4}$ - $\frac{1}{2}$ in., yellowish, black at the base. Female *peduncle* short, less than $\frac{1}{2}$ in., ebracteate. *Fruit* 1-3 in., rostrate, red, usually quite smooth, in the example of *Edgeworth's* obscurely ribbed and slightly muricate. *Seeds* $\frac{1}{3}$ in., compressed, nearly smooth.

3. ***M. dioica***, *Roxb. Fl. Ind.* iii. 709; dicecious, petiole without glands, bract near the top of the male *peduncle*, flowers large yellow, fruit densely covered with soft spines. *DC. Prodr.* iii. 312; *W. & A. Prodr.* 348; *Wight Ic.* tt. 505, 506; *Dene. in Jacq. Voy. Bot.* t. 71; *Dalz. & Gibs. Bomb. Fl.* 102; *Naud. in Ann. Sc. Nat.* ser. 4, xii. 133; *Thwaites Enum.* 126, *as to var. a.*; *Kurz in Journ. As. Soc.* 1877, pt. ii. 102. *M. Balsamina*, *Wall. Cat.* 6741; *W. & A. Prodr.* 349, *not of others.* *M. Wallichii*, *Roem. Synops.* ii. 58; *Miq. Fl. Ind. Bat.* i. pt. i. 664. *M. renigera*, *Hamiltoniana*, and *Heyneana*, *Wall. Cat.* 6743, 6744, 6748. *M. Missionis*, *Wall. Cat.* 6739; *Dennst. in Miq. l.c.* *M. subangulata*, *Blume ex Kurz in Journ. As. Soc.* 1877, pt. ii. 102. *Trichosanthes Russeliana*, *Wall. Cat.* 6696. *Bryonia grandis*, *Wall. Cat.* 6700 L.

Throughout INDIA, from the HIMALAYA to CEYLON and SINGAPORE, ascending to 5000 ft. alt. on the hills.—DISTRIB. Malaya.

Leaves 2-4 in. long and broad, cordate, ovate, acute, entire, denticulate or more or less 3-5-lobed, glabrous, often punctate beneath; petiole 1-2 in. Male *peduncle* 2-6 in.; bract large, cowl-like, embracing the expanded flower, glabrous, thin or (in *M. Missionis*) thick soft pubescent; calyx-lobes oblong with a narrow termination; petals 1 in., full-yellow, the two 2-anthered filaments 2-fid half way down. Female *peduncles* as long as the male, bract small usually near the base. *Fruit* 1-3 in., ellipsoid, acute, without ribs. *Seeds* nearly $\frac{1}{2}$ in., many, compressed, broad-oblong, with a few well-marked corrugations on the margins, nearly smooth on the surface.—The large succulent Lower Bengal form cannot well be confounded with any other; but both from the Deccan Peninsula and Punjab there is a much slenderer form, the males of which have been referred to *M. Balsamina* (the intense spinousness of the young ovary prevents the female plants being mistaken): they usually have the leaves much less dissected, and *M. Balsamina* almost invariably exhibits both male and female flowers on the same branch. *M. Missionis*, *Wall.*, is the slender form

with a glabrous small bract to male flower: *M. renigera*, Wall. has a large woolly bract: *M. Heyneana*, Wall. has the leaves deeply 3-lobate: *M. Hamiltoniana*, Wall. has the bract foliaceous crumpled serrate. *M. Balsamina*, Wall. is the typical *M. dioica*, Roxb. Thwaites' *M. dioica* β *denudata* is altogether remote from *M. dioica* (see No. 5).

4. ***M. cochinchinensis***, Spreng. *Syst.* iii. 14; dioecious, petioles glandular, bract near the top of the male peduncle, flowers large white, fruit muricated, seeds large. *Kurz in Journ. As. Soc.* 1877, pt. ii. 102. *M. mixta*, Roxb. *Fl. Ind.* iii. 709; *W. & A. Prodr.* 349; *Miq. Fl. Ind. Bat.* i. pt. i. 664; *Bot. Mag.* t. 5145; *Naud. in Ann. Sc. Nat.* ser. 4, xii. 132. *M. dioica*, Wall. *Cat.* 6750 A, B, C, D, E, F. *Muricia cochinchinensis*, Lour. *Fl. Cochinch.* 733; *DC. Prodr.* iii. 318.

BENGAL to TENASSERIM, common. DECCAN PENINSULA; *Wight*. CANARA; *Law*.—DISTRIB. Formosa, Philippines.

Leaves 4–5 in. diam., cordate, ovate, usually 3-lobed, glabrous or a little pubescent, often punctate beneath, little dentate; petiole 2–3 in., almost invariably glandular on its middle as well as apex. Male *peduncle* 2–6 in., bract often pubescent, embracing the expanded flower; petals 1–2 in., white tinged with yellow, 3 with black spots at the base 2 with yellow glands; the two 2-anthered filaments not 2-fid. Female *peduncle* 1–2 in., bract small about the middle. *Fruit* 4–5 in., ovate, pointed, bright red, very fleshy, without ribs, covered with conical points nearly $\frac{1}{8}$ in. high. *Seeds* $\frac{7}{8}$ by $\frac{5}{8}$ and $\frac{1}{5}$ in. thick, many, horizontal, irregular, ovate, compressed, black, corrugated on the margins, sculptured on the faces.

** *Male peduncles several-flowered*.

5. ***M. denudata***, Thwaites *Enum.* 126; dioecious, leaves ovate-lanceolate, flowers small, many males on one raceme with inconspicuous bracts, filaments 3, anthers conduplicate, fruit ovoid rostrate muricated with triangular papillæ.

CEYLON; alt. 3000–4000 ft.; *Gardner, Thwaites, Walker*.

Slender, climbing, nearly glabrous; tendrils simple. *Leaves* 2–4 by 1–2 in., deeply cordate, often 3–5-angled or sparingly 3–5-lobed, central lobe always long acute; petiole 1 in. Male *peduncle* 2 in., often somewhat paniced nearly from the base and 10–20 mostly pedicelled flowered; bracts at the base of the pedicels minute; sepals ovate, acuminate; petals $\frac{1}{5}$ – $\frac{1}{3}$ in.; filaments inserted near the top of the calyx-tube, anthers much exsert. Female *peduncle* 1-flowered, about as long as the male, bract minute near the middle. *Fruit* $\frac{3}{4}$ in. long and broad, suddenly rostrate.

This species is evidently closely allied to the next which Sir J. Hooker removed from *Luffa* (where Roxburgh placed it) because of its simple tendrils. But the exsert anthers, the shape of the flowers and their being pedicelled, all ally *M. denudata* and *M. Cymbalaria* with *Luffa* rather than *Momordica*.

6. ***M. Cymbalaria***, Fenzl in *Pl. Kotschy*, No. 147; monœcious, leaves reniform-orbicular, flowers small, males few on one raceme with inconspicuous bracts, filaments 2, anthers horseshoe-shaped, fruit obovate-oblong acute 8-ribbed smooth. *Hook. f. in Oliv. Fl. Trop. Afr.* ii. 540. *Luffa tuberosa*, Roxb. *Hort. Beng.* 104; *Fl. Ind.* iii. 717; *W. & A. Prodr.* 344. *L. amara*, Wall. *Cat.* 6754 B.

DECCAN PENINSULA; *Wight*. MYSORE; *Heyne*. Concan; *Stocks*.—DISTRIB. Tropical Africa.

Root a large woody tuber as in many others of the genus. *Leaves* 1–2 in. broad, 5-angular or slightly 5-lobed, middle lobe not elongated, glabrous or slightly pubescent, often punctulate on both surfaces, dentate; petiole $\frac{1}{2}$ – $1\frac{1}{2}$ in. Male *raceme* 1–2 in., with usually only 2–4 flowered; calyx-lobes lanceolate; petals $\frac{1}{4}$ in., yellow; filaments 2,

one 2-fid one 3-fid so each with one anther-cell; filaments inserted near the top of the calyx-tube, anthers completely exsert. Female *peduncle* $\frac{3}{4}$ -2 in., 1-flowered, ebracteate. *Fruit* $\frac{3}{4}$ by scarcely $\frac{1}{4}$ in. *Seeds* $\frac{1}{6}$ - $\frac{1}{4}$ in., few, shortly obovoid, smooth, shining.

10. CUCUMIS, Linn.

Climbing herbs, hispid or scabrous; tendrils simple. *Leaves* petioled, palmately 3-7-lobed or 5-angled or entire, dentate or serrate. *Flowers* yellow, monœcious, males clustered in the axils, females solitary, all shortly peduncled. MALE: calyx-tube top-shaped or campanulate, lobes 5. *Stamens* 3; anthers free, one 1-celled, two 2-celled, cells conduplicate or much flexuose, connective produced in a crest. FEMALE: calyx and corolla as in the male; ovary ovoid, style short, with three obtuse stigmas; ovules very many, horizontal; placentas 3. *Fruit* fleshy, indehiscent, large or small, spherical or elongate, smooth or tuberculate. *Seeds* very many, oblong, compressed, mostly smooth.—DISTRIB. Species 25, of which half are African, a few in the tropical regions of Asia, Australia and America, and several widely cultivated of doubtful origin.

1. **C. trigonus**, Roxb. *Fl. Ind.* ii. 722; leaves and petioles scabrid not softly hairy, petioles $\frac{1}{4}$ - $\frac{3}{8}$ in., flowers small, ovary hairy sometimes densely white woolly or silky, fruit about 1½ in. ultimately glabrous ellipsoid or obovoid round or obscurely trigonous. *W. & A. Prodr.* 342; *Wight Ic.* t. 497; *Wight Ill.* t. 105; *Boiss. Fl. Orient.* ii. 758; *Dalz. & Gibs. Bomb. Fl.* 103; *Naud. in Ann. Sc. Nat.* ser. 4, xi. 30. *C. turbinatus*, Roxb. *Fl. Ind.* iii. 723; *W. & A. Prodr.* iii. 342; *Miq. Fl. Ind. Bat.* i. pt. i. 671. *C. maderaspatanus*, Roxb. *l. c.* 723; *Wall. Cat.* 6734. *C. Melo* var. *agrestis*, *Naud. l. c.* 73. *C. pubescens*, *Wall. Cat.* 6729; *W. & A. Prodr.* 342; *Royle Ill.* t. 47; *Wight Ic.* t. 496; *Dalz. & Gibs. Bomb. Fl.* 103, perhaps not of Willd. and others. *C. pseudo-colocynthis*, *Royle Ill.* t. 47. *C. eriocarpus*, *Boiss. Diagn.* ii. 59. *Bryonia callosa*, *Herb. Rottler*; *Wall. Cat.* 6710.

Throughout INDIA.—DISTRIB. Malaya, North Australia, Afghanistan, Persia.

Root perennial, by which character alone it can be distinguished from *C. Melo* according to Naudin, but the examples seen and collected in India are almost invariably less than one year old. *Stem* in the typical examples scabrid; tendrils short. *Leaves* 1-2 in. diam., orbicular subpentangular, in the typical plant deeply palmately-lobed, lobes very scabrid and often narrow; in the more flaccid *C. pubescens* the hairs more scattered, the leaves entire, 5-angled 5-lobed; petiole $\frac{1}{4}$ -1½ in. *Peduncles* of males and females $\frac{1}{2}$ -1 in. *Fruit* sometimes with a few scattered hairs, often with 10 stripes.—The plants marked by Indian botanists as *C. pubescens* are reduced to *C. trigonus* by Naudin in the Kew Herbarium. Kurz (in *Journ. As. Soc.* 1877, pt. ii. 103) separates *C. trigonus* with solitary peduncles from *C. pubescens* with clustered peduncles and makes the latter a variety of *C. Melo*, Linn. *C. pubescens* of Thwaites *Enum.* (C.P. 3534) has remarkably acute lobes to the leaves and resembles *C. Hardwickii*, but there is no note of the fruit.

2. **C. prophetarum**, Linn.; *DC. Prodr.* iii. 301; leaves and petioles scabrid not softly downy, flowers small, petals $\frac{1}{4}$ in., ovary very tuberculate, fruit about 1 in. more or less tuberculate ellipsoid. *Wall. Cat.* 6733; *W. & A. Prodr.* iii. 342; *Boiss. Fl. Orient.* ii. 758; *Naud. in Ann. Sc. Nat.* ser. 4, xi. 14.

SCINDE; *Stocks*.—DISTRIB. Beloochistan, Arabia, Tropical Africa to Guinea.

Stem scabrid; tendrils short. *Leaves* 1-1½ in., reniform, subtriangular, much lobed; petiole $\frac{1}{2}$ -1 in. Female *peduncle* less than $\frac{1}{2}$ in., stout. *Fruit* green, with paler vertical stripes.

3. **C. Melo**, *Linn.*; *DC. Prodr.* iii. 300; leaves orbicular-reniform 5-angular or lobed lobes neither deep nor acute scabrid on both surfaces and also often with soft hairs, petals $\frac{5}{8}$ in., fruit glabrous or somewhat hairy not spinous nor tuberculate. *Roxb. Fl. Ind.* iii. 720; *Wall. Cat.* 6738; *W. & A. Prodr.* 341; *Jacq. Monog. du Melon*, t. 1-33. *C. utilissimus*, *Roxb. l. c.* 721; *Wall. Cat.* 6731; *W. & A. Prodr.* 342. *C. flexuosus*, *Linn.*; *DC. l. c.*; *W. & A. Prodr.* iii. 342. *C. maculatus*, *Willd.*; *DC. l. c.* 301; *W. & A. Prodr.* iii. 342. *C. Gurmia* and *C. Chata*, *Wall. Cat.* 6726? and 6727. *C. cicatrisatus*, *Stocks in Hook. Kew Journ. Bot.* iv. 148.

Throughout INDIA, cultivated.—DISTRIB. Cultivated in most hot countries, and perhaps the cultivated form of *C. trigonus*.

Stems scabrous. *Leaves* 3 in. diam.; petiole 2 in. Female *peduncle* sometimes 2 in. *Fruit* spherical ovoid elongate or contorted.—The *Melon*.

4. **C. sativus**, *Linn.*; *DC. Prodr.* iii. 300; leaves ovate 5-angular or slightly lobed, lobes acute hispidulous on both surfaces and also often with soft hairs, petals $\frac{5}{8}$ in., fruit glabrous sometimes tuberculated commonly elongate. *Lamk. Ill.* t. 795; *Roxb. Fl. Ind.* iii. 720; *Wall. Cat.* 6737; *W. & A. Prodr.* 342; *Miq. Fl. Ind. Bat.* i. pt. i. 671; *Naud. in Ann. Sc. Nat.* ser. 4, xi. 27; *Kurz in Journ. As. Soc.* 1877, pt. ii. 103. *C. muricatus*, *Wall. Cat.* 6735 A. *C. Hardwickii*, *Royle Ill.* t. 47.—*Rheede Hort. Mal.* t. 6.

Throughout INDIA, cultivated.—DISTRIB. In all warm and warm temperate countries, cultivated; where wild unknown.

Stems scabrous. *Leaves* 3-5 in. diam.; petiole 2-3 in. Female *peduncle* sometimes 2 in. Young *ovary* muricate with rigid prickles. *Fruit* commonly cylindric, 12 by $1\frac{1}{2}$ in.—The *Cucumber*.

VAR. *sikkimensis*, *Hook. f. Bot. Mag. t.* 6206; fruit 15 by 6 in. clavate with 5 placentas. Concombre du Sikkim, *Naud. in Ann. Sc. Nat.* ser. 4, xi. 28. Cultivated in Nipal and Sikkim, *J. D. H.*, &c.

11. CITRULLUS, Schrader.

Climbing herbs, hispid or scabrous; tendrils 2-3-fid. *Leaves* petioled, palmately 3-7-lobed, usually deeply with narrow sinuate-pinnatifid segments, but sometimes little lobed. *Flowers* monœcious, all solitary, tolerably large: MALE: calyx-tube campanulate, lobes 5; stamens 3, short; anthers scarcely cohering, one 1-celled, two 2-celled, cells conduplicate, connective not produced FEMALE: calyx and corolla as in the male; ovary ovoid; style short, stigmas 3, reniform; ovules very many, horizontal; placentas 3. *Fruit* globose or ellipsoid, smooth, fleshy, indehiscent. *Seeds* very many, oblong, compressed, smooth.—DISTRIB. Species 2, widely cultivated.

1. **C. Colocynthis**, *Schrader. in Linnæa* 1833; 414; leaves deeply divided harshly scabrid, fruit globose rarely 3 in. diam. intensely bitter. *Arn. in Hook. Journ. Bot.* iii. 276; *Wight Ic. t.* 498; *Miq. Fl. Ind. Bat.* i. pt. i. 662; *Naud. in Ann. Sc. Nat.* ser. 4, vol. xii. 99; *Dalz. & Gibs. Bomb. Fl.* 101; *Boiss. Fl. Orient.* ii. 759. *Cucumis Colocynthis*, *Linn.*; *DC. Prodr.* iii. 302; *Roxb. Fl. Ind.* iii. 719; *Wall. Cat.* 6732; *W. & A. Prodr.* iii. 342.

Throughout INDIA, cultivated and also very often apparently wild.—DISTRIB. Western Asia, Arabia, all Africa except the Cape, Spain.

Whole plant scabrid. *Leaves* $2\frac{1}{2}$ by scarcely 2 in. in the typical wild very scabrous form, larger in the cultivated forms approaching *C. vulgaris*, ovate, middle segment compound-pinnatifid; petiole 1 in. *Petals* $\frac{1}{2}$ in., obovate, light yellow. *Ovary* villous. *Fruit* smooth, variegated green and white. *Seeds* $\frac{1}{8}$ - $\frac{1}{4}$ in., not margined.

2. **C. vulgaris**, Schrad. in *Linnaea* 1848, 412; leaves deeply divided or but moderately lobed glabrous or somewhat hairy hardly scabrid, fruit often 10 in. diam. sometimes much smaller. Naud. in *Ann. Sc. Nat.* ser. 4, xi. 100; Dalz. & Gibs. *Bomb. Fl.* 102; Kurz in *Journ. As. Soc.* 1877, pt. ii. 103. *C. fistulosus*, Stocks in *Hook. Kew Journ. Bot.* iii. t. 3. *Cucumis Citrullus*, DC. *Prodr.* iii. 301. *Cucurbita Citrullus*, Linn.; Roxb. *Fl. Ind.* iii. 319; Wall. *Cat.* 6717; W. & A. *Prodr.* 351.

Throughout INDIA, cultivated.—DISTRIB. In all warm countries of the world, cultivated.

Said to be annual while *C. Colocynthis* is perennial; but the distinction between the cultivated form of *C. Colocynthis* and the divided-leaved forms of the water-melon is very small. The water-melon has either sweet or bitter fruit: when the latter, it is *Citrullus amarus* of authors.—*C. fistulosus*, Stocks, has thick stems, leaves sparingly lobed, and is plentifully supplied with long somewhat hispid hairs.—The *Water-Melon*.

12. CEPHALANDRA, Schrader.

Climbing herbs, scarcely hairy; tendrils simple. *Leaves* petioled, 5-angular or 5-lobed, toothed. *Flowers* dicecious, moderately large, all solitary and white in the Indian species, ebracteate. MALE: calyx-tube campanulate, short, limb 5-lobed; corolla campanulate, 5-lobed about half-way down; stamens 3; anthers exsert, connate, one 1-celled, two 2-celled, cells conduplicate. FEMALE: calyx and corolla as in the male; ovary oblong, style long with 3 bifid stigmas; ovules many, horizontal; placentas 3, vertical. *Fruit* fleshy, indehiscent, cylindric, smooth. *Seeds* many, ovoid, compressed, margined.—DISTRIB. Species 12; all African, one extending to India and Malaya.

1. **C. indica**, Naud. in *Ann. Sc. Nat.* ser. 5, v. 16; leaves 5-angular occasionally 5-lobed, fruit 1-2 by $\frac{1}{2}$ -1 in. Kurz in *Journ. As. Soc.* 1877, pt. ii. 103. *Momordica monadelpha*, Roxb. *Fl. Ind.* iii. 708. *Bryonia grandis*, Linn. f. *Suppl.* 126; Wall. *Cat.* 6700, except D, I, K, L. *B. palmata*, Wall. *Cat.* 6711 A, B, C. *Coccinia indica*, W. & A. *Prodr.* 347; Wight *Ill.* t. 105; DCne. in *Jacq. Voy. Bot.* t. 72; Hook. *Ic. Pl.* t. 138; Miq. *Fl. Ind. Bat.* i. pt. i. 673; Dalz. & Gibs. *Bomb. Fl.* 103. *C. Schimperii*, Naud. l.c. ser. 4, xii. 16. *C. Wightiana*, Roem. *Synops.* ii. 93; Miq. l.c. 674.—Rheede *Hort. Mal.* viii. t. 14.

Throughout INDIA, common.—DISTRIB. Malaya, Africa.

Leaves 2-4 in. diam., 5-angular, papillose, scabrid; petiole 1 in. MALE: peduncle 1 in., jointed below the flower; calyx-lobes linear-oblong; corolla nearly 1 in., lobes long-triangular. Female *peduncle* about $\frac{1}{4}$ in. *Ovary* smooth. *Fruit* bright scarlet.

VAR. *palmata*, W. & A. *Prodr.* 348; leaves deeply lobed segments sometimes narrow and sinuate. *B. alceaefolia*, Herb. *Rottler*.—Principally in the Deccan Peninsula. Hook. f. in *Oliv. Fl. Trop. Afr.* ii. 551 keeps *C. quinqueloba* (Schrad. in Eckl. & Zeyh. *Enum.* 280) distinct from this var., but it is not easy to do so.—Whether this plant is *Bryonia grandis*, DC. *Prodr.* iii. 305 with aculeate fruit, or *B. Mormoi* of the same work, also said to have aculeate fruit, is perhaps now not material.

13. CUCURBITA, Linn.

Large climbing herbs, hispid or hairy; tendrils 2-4-fid. *Leaves* petioled, cordate, ovate, 5-angular or lobed. *Flowers* monœcious, all solitary, yellow, very large. MALE: calyx-tube campanulate, lobes 5, linear or foliaceous; corolla

campanulate, 5-lobed hardly half-way down; stamens 3, inserted low in the calyx-tube, anthers connate, one 1-celled, two 2-celled, cells conduplicate. FEMALE: calyx and corolla as in the male; ovary oblong, style short, stigmas 3, bifid; ovules very many, horizontal; placentas 3. *Fruit* fleshy, indehiscent, often large. *Seeds* ovoid or oblong, compressed, margined or not.—DISTRIB. Species 5, whereof 4 are cultivated, 1 is said to be wild in Africa.

1. **C. maxima**, *Duchesne in Lamk. Dict.* ii. 151; leaves with 5 shallow lobes or subentire sinus between the lobes narrow, hairs of the petiole equal not pungent, calyx-segments lanceolate-linear, fruiting peduncle stout corky striated not grooved. *DC. Prodr.* iii. 316; *Wall. Cat.* 6720; *Naud. in Ann. Sc. Nat.* ser. 4, vi. 17.

Throughout INDIA, cultivated.—DISTRIB. Cultivated in all warm and temperate parts of the globe.

Annual. *Leaves* 4–6 in. diam., hispidulous and also with much soft hair, denticulate; petiole often nearly as long as the blade. Male *peduncle* 4 in., female 1½ in. *Corolla* 3–4 in.—The *Common Gourd*.

2. **C. moschata**, *Duchesne*; *DC. Prodr.* iii. 317; hairs of the petiole equal not pungent, calyx-segments spatulate or foliaceous. *Naud. in Ann. Sc. Nat.* ser. 4, vi. 47; *Kurz in Journ. As. Soc.* 1877, pt. ii. 104. *C. maxima*, *W. & A. Prodr.* 351; *Wight Ill.* t. 105; *Wight Ic.* t. 507. *C. Melopepo*, *Roxb. Fl. Ind.* iii. 719; *Wall. Cat.* 6725. *C. Camolenga*, *Wall. Cat.* 6718.—*Rheede Hort. Mal.* viii. t. 2.

Throughout INDIA, cultivated.—DISTRIB. Widely cultivated in tropical and sub-tropical regions.—The *Musk-Melon*.

3. **C. Pepo**, *DC. Prodr.* iii. 317; leaves 5-lobed sinus between the lobes broad, hairs on the petiole beneath rigid almost prickly, fruiting peduncle woody strongly grooved. *Roxb. Fl. Ind.* iii. 718; *W. & A. Prodr.* 351; *Naud. in Ann. Sc. Nat.* ser. 4, vi. 29; *Wall. Cat.* 6722.

Throughout INDIA, cultivated.—DISTRIB. Cultivated in all warm and temperate parts of the globe.

Annual. *Leaves* 4–6 in. diam., with much soft hair, hispidulous on the nerves beneath, denticulate, lobes acute often slightly lobed; petiole often nearly as long as the blade. Male *peduncle* 4 in. or more, female 1½ in. *Corolla* 3–4 in.—The *Pumpkin*.

14. **BRYONIA**, *Linn.*

Climbing herbs, scabrid or glabrous; tendrils 2-fid in the Indian species. *Leaves* petioled, palmately 5-lobed or 3–5-angular. *Flowers* small, yellowish, males and females clustered in the same axils (in the Indian species shortly pedicelled). MALE: calyx-tube widely campanulate, 5-toothed; corolla 5-partite; stamens 3, inserted low down the calyx-tube, anthers free, two 2-celled one 1-celled; cells curved or somewhat sigmoid, never quite conduplicate, connective not produced; rudiment of ovary 0. FEMALE: calyx and corolla as in the male; ovary ovoid; style slender, 3-fid at the top, no disc at the base in the Indian species; ovules many, horizontal, placentas 3. *Berry* spherical, indehiscent. *Seeds* not very many, oblong or ovoid, compressed.—DISTRIB. Species 12, in the warm and temperate regions of the old world.

1. **B. laciniosa**, *Linn.*; *DC. Prodr.* iii. 308; scabrous or nearly glabrous, leaves generally deeply palmately 5-lobed sinus sometimes shallow, fruit nearly

sessile often 2-3 together, seeds ovoid with a thickened corrugate margin often with large protuberances on the faces. *Roxb. Hort. Beng.* 104; *Fl. Ind.* iii. 728; *Blume Bijl.* 927; *Wall. Cat.* 6699; *Wight Ic.* t. 500; *W. & A. Prodr.* 345; *Miq. Fl. Ind. Bat.* i. pt. i. 660; *Dalz. & Gibs. Bomb. Fl.* 101; *Kurz in Journ. As. Soc.* 1877, pt. ii. 104. *Bryonopsis courtallensis*, *Arn. in Hook. Journ. Bot.* iii. 274. *B. erythrocarpa*, *Naud. in Ann. Sc. Nat.* ser. 4, xviii. 194. *B. laciniosa*, *Hook. f. in Oliv. Fl. Trop. Afr.* ii. 556. *Cucumis verrucosus*, *Herb. Rottler.*

From the HIMALAYA to CEYLON. PEGU; *Kurz*.—DISTRIB. Trop. Africa, Mauritius, Malaya, Australia.

Stems angular, slender, usually glabrous or nearly so. *Leaves* often scabrous, punctate above, lobes 2-3 in., with a broad or narrow sinus; petiole often longer than the blade, sometimes mucronate near the apex. Male *pedicels* less than 1 in., usually glabrous, female still shorter. *Calyx-teeth* subulate. *Fruit* $\frac{3}{4}$ in. diam., green with white vertical stripes. *Seeds* $\frac{1}{4}$ in.

15. MUKIA, Arn.

Scabrous climbing herbs; tendrils simple. *Leaves* 3-7-angular, not deeply lobed, cordate, petioled and subsessile on the same plant. *Flowers* small, yellow, males and females clustered in the same axils; males very short-peduncled, females subsessile. MALE: calyx campanulate, teeth 5, subulate; corolla 5-partite; stamens 3, inserted low in the calyx-tube, anthers free, two 2-celled one 1-celled; cells straight, connective not produced. FEMALE: calyx and corolla as in the male; disk annular; ovary ovoid, hispid; style thick, apex 3-2-lobed; ovules not very many, horizontal; placentas 3-2. *Berry* globose, small, indehiscent. *Seeds* not very many, ovoid, compressed, strongly margined, faces rough or smooth.—DISTRIB. Species 2; one South Indian; the other African, Asiatic, and Australian.

1. *M. scabrella*, *Arn. in Hook. Journ. Bot.* iii. 276; very scabrous, leaves rough hispid beneath, seeds rough on their faces. *Naud. in Ann. Sc. Nat.* ser. 4, xii. 142; *Dalz. & Gibs. Bomb. Fl.* 100. *M. maderaspatana*, *Kurz in Journ. As. Soc.* 1877, pt. ii. 104. *Bryonia scabrella*, *Linn. f. Suppl.* 424: *DC. Prodr.* iii. 306; *Wall. Cat.* 6708; *W. & A. Prodr.* 305; *Wight Ic.* t. 501; *Roxb. Fl. Ind.* iii. 724; *Miq. Fl. Ind. Bat.* i. pt. i. 658. *B. Wightiana*, *Wall. Cat.* 6703. *B. maderaspatana* and *althæoides*, *DC. l. c.* 306. *Cucumis maderaspatanus*, *Linn. Sp. Pl.* 1438. *Karivia javanica*, *Miq. l. c.* 661. *Trichosanthes dioica*, *Wall. Cat.* 6692 C.

Throughout INDIA, common: ascending the hills as far as subtropical warmth extends.—DISTRIB. Africa, Malaya, Australia.

Stem angular, slender, hispid or scabrid. *Leaves* 1-3 in., serrate; petiole often very short, sometimes 1 in. or more. *Flowers* $\frac{1}{8}$ - $\frac{1}{6}$ in. diam. *Ovary* very hispid. *Fruit* $\frac{3}{8}$ - $\frac{1}{2}$ in. diam., bright red.

VAR. *gracilis*; leaves $4\frac{1}{2}$ by $2\frac{1}{2}$ in. hastate elongate very acute wide at the base long-petioled nearly entire. *Bryonia gracilis*, *Wall. Cat.* 6714.—Pagamew (BURMA); *Wallich*. Possibly a distinct species.

2. *M. leiiosperma*, *Thwaites Enum.* 125; scabrous, leaves hispid beneath and with much long soft hair, seeds smooth on their faces. *Bryonia leiiosperma*, *W. & A. Prodr.* 345. *B. mysorensis*, *Miq. in Herb. Hohenack.*

DECCAN PENINSULA; Pulney Mts., *Wight*. Nilghiris, *G. Thomson*, *Hohenacker*. CEYLON; alt. 4000-5000 ft., *Thwaites*.

Nearly allied to *M. scabrella*. Leaves densely softly villose beneath when young and often when old, elongated acute at the apex.—Mr. Thwaites says the rudimentary pistil in the male flowers is more developed than in *M. scabrella* and is surrounded at the base with an annulus.

16. ZEHNERIA, Endl.

Climbing herbs; tendrils simple. Leaves long- or short-petioled, dentate, angular or deeply lobed, polymorphous. Flowers small, yellowish, monœcious or diœcious, males in a peduncled corymb, females solitary on short peduncles or sometimes subcorymbose on a longer peduncle; bracts 0 or very small. MALE: calyx tubular-campanulate, teeth 5 small; corolla divided nearly to the base into 5 triangular segments; stamens 3, inserted low in the calyx-tube, filaments glabrous or hairy (in the same species), anthers free, all 2-celled or (in the same species) one 1-celled; anther-cells curved or (in the same species) flexuose or sigmoid; connective often papillose at the top, scarcely produced. FEMALE: calyx and corolla as in the male; ovary globose or oblong, glabrous or very hairy; style cylindric, 3-lobed, surrounded at the base by an annular disc; ovules many, horizontal; placentas 3. Fruit succulent, indehiscent, globose ellipsoid or cylindric. Seeds many or few, obovoid rounded or compressed, with or without a margin, faces smooth or somewhat tubercular or pitted.—DISTRIB. Species 15 (according to Bth. & Hk. f.) or 5 only; in tropical Asia, Australia, and Africa, with one species in South America.

1. **Z. Baueriana**, Endl. *Iconogr.* t. 116, 117; leaves cordate acute simple or 3-5-lobed half way down, petiole longer than the auricles, fruit $\frac{1}{2}$ by $\frac{3}{8}$ in. when dry reticulate-rugose ellipsoid, seeds much compressed oblong margined smooth or slightly tuberculate on the faces. *Z. mucronata*, *Miq. Fl. Ind. Bat.* i. pt. i. 656. *Bryonia mucronata*, *Blume. Bijl.* 923. *B. mysorensis*, *Wall. Cat.* 6702; *W. & A. Prodr.* 345; *Wight Ic.* t. 758; *Dalz. & Gibs. Bomb. Fl.* 101. ? *B. filiformis*, *Roxb. Fl. Ind.* iii. 727. *Karivia samoensis*, *A. Gray in Seem. Fl. Viti* 103.

DECCAN PENINSULA: *Wight*; *Heyne*; Nilghiris, *G. Thomson*; Canara, *Stocks*; Belgaum, *Ritchie*.—DISTRIB. Malaya, Japan, Norfolk Island, Feejees; but the area cannot be separated from that of the next species.

Weak, nearly glabrous. Leaves 2 in. diam., generally sharply denticulate; petiole $\frac{3}{4}$ in. or short. Flowers frequently monœcious in the same axils, sometimes apparently diœcious; male peduncle usually 1-2 in., female less than $\frac{1}{4}$ in., undivided in all the Indian examples, but occasionally the female peduncle is elongate umbellate according to *Wight*.—*Roxburgh's Bryonia filiformis* perhaps belongs here, but the ripe fruit is said to be near 1 in. It has been referred to *Melothria indica*, but the inflorescence is quite unlike that, as are the yellow flowers and stamens of *Roxburgh's* picture.

2. **Z. Hookeriana**, *Arn. in Hook. Journ. Bot.* iii. 275; leaves cordate acute simple or angular or 3-5-lobed half-way down, petiole longer than the auricles, fruit $\frac{3}{8}$ in. diam. when dry reticulate-rugose globose, seeds much flattened oblong margined smooth or slightly tuberculate on the faces. *Kurz in Journ. As. Soc.* 1877, pt. ii. 105. *Z. exasperata*, *Miq. Fl. Ind. Bat.* i. pt. i. 655. *Z. scabra*, *Harv. & Sond. Fl. Cap.* ii. 486; *Bryonia Hookeriana*, *W. & A. Prodr.* 345. *B. cissoides*, *Wall. Cat.* 6698. ? *B. oxyphylla*, *Wall. Cat.* 6697 (no flowers).

NORTH BENGAL; common in SIKKIM, ASSAM, KHASIA, and CACHAR, ascending to 5000 ft. alt. DECCAN PENINSULA and CEYLON, common; apparently always in the lower hills.—DISTRIB. Ava, Malaya, Africa.

Very near *Z. Baueriana* and possibly not distinct: but the ovary is globose even before the expansion of the flower. The leaves are also generally asperous above and sometimes much more hairy beneath than in any undoubted examples of *Z. Baueriana*. The African distribution of this cannot be defined, as *Z. scrobiculata* and even *Pilogyne lucida*, Naud. can hardly be distinguished from it.

3. *Z. umbellata*, *Thwaites Enum.* 125; leaves cordate or hastate rounded angled lobed or 3-5-partite nearly to the base, petiole usually shorter than the auricles, fruit $\frac{3}{4}$ -1½ in. smooth or shortly silky cylindric not rugose, seeds few obovoid only slightly compressed margin obscure rounded faces quite smooth or slightly rough. *Kurz in Journ. As. Soc.* 1877, pt. ii. 105. *Z. hastata* and connivens, *Miq. Fl. Ind. Bat.* i. pt. i. 656. *Karivia umbellata*, *Arn. in Hook. Journ. Bot.* iii. 275; *Miq. l. c.* 661. *K. Rheedii*, *Roem.*; *Miq. l. c.* 661. *Momordica umbellata*, *Roxb. Fl. Ind.* iii. 710. *Bryonia umbellata*, *Klein*; *DC. Prodr.* iii. 305; *Wall. Cat.* 6705; *W. & A. Prodr.* 345; *Dalz. & Gibs. Bomb. Fl.* 101. *B. sinuosa*, *Wall. Cat.* 6716, partly. *B. amplexicaulis*, *Lamk. Dict.* i. 496; *DC. l. c.* 306; *W. & A. Prodr.* 346. *B. sagittata* and *Rheedei*, *Blume*; *DC. l. c.* 305, 306. *Harlandia bryonioides*, *Hance in Walp. Ann.* ii. 648.—*Rheede Hort. Mal.* viii. t. 26.

Throughout INDIA and CEYLON, very common.—DISTRIB. Malaya, China, North Australia.

Stem and *leaves* usually nearly glabrous, or leaves scabrous above; petiole short, often hispid. *Leaves* polymorphous; sometimes 6 by scarcely 1 in., narrow triangular-lanceolate, sometimes cordate-oblong much rounded, often palmate nearly to the base with 3-5 narrow divaricate segments; basal lobes usually produced strongly backwards, rounded subacute or most acute. *Inflorescence* usually diœcious, male corymbose on a peduncle 2-4 in. or sessile; *pedicels* glabrous or hairy, subbracteate; females solitary, very short peduncled. Young *ovary* narrow-oblong, glabrous or somewhat pubescent. *Fruit* bright-red, usually much larger than that of the two preceding species. *Seeds* about 12; sometimes only 4-6 in the typical *Z. umbellata*, as said always in *Z. amplexicaulis* by W. & A.—Wight says that *Z. umbellata* may be distinguished from *Z. amplexicaulis* by having small oblong bracts on the middle of the pedicels, but these cannot be made out even in Wight's own specimens.

VAR. nepalensis, leaves deeply 5-palmate with narrow lobes, scattered glands, young ovary densely velvety, seeds oblong slightly compressed quite smooth and rounded with no trace of a margin. *Bryonia nepalensis*, Seringe in *DC. Prodr.* iii. 307.—Temperate Western Himalaya, alt. 4000-7000 ft.; *Royle*; *Thomson*; *Jacquemont*; *Strachey & Winterbottom*, &c.—A variety many times collected but only within a very limited area in Gurwhal, Kumaon and Kunawur.

17. MELOTHRIA, Linn.

Climbing herbs; tendrils simple or 2-fid. *Leaves* petioled, deltoid, truncate or hastate, entire or deeply 3-lobed, little hairy, often punctate. *Flowers* small, white, usually monœcious, males and females often from the same axil; male pedicels long, clustered (rarely subsolitary) in the axils, or clustered on long racemes resembling branches without leaves; female long-pedicelled. *MALE*: calyx-tube short, teeth 5, small; corolla 5-partite; stamens 3, inserted in the middle of the calyx-tube; anthers free, one 1-celled, two 2-celled; cells free, straight, simple, more or less lateral, connective prolonged, undivided, glabrous. *FEMALE*: calyx and corolla as in the male; ovary oblong, style long, stigmas 3 subglobose; ovules many, horizontal; placentas 3, vertical. *Fruit* indehiscent, globose, acute, or fusiform subrostrate. *Seeds* many, small, oblong, much compressed, obscurely margined, smooth or very nearly so.—DISTRIB. Species 25, all tropical.

* *Fruit fusiform, subtrigonus.*

1. **M. zeylanica**, *C. B. Clarke*; tendrils simple, leaves not lobed little cordate, male pedicels clustered in the axils, fruit $1\frac{3}{4}$ in. fusiform. *M. deltoidea*, *Thwaites Enum.* 124. *Æchmandra deltoidea*, *Arn. in Hook. Journ. Bot.* iii. 274. *Bryonia deltoidea*, *Arn. Pugill.* 19.

CEYLON; common up to 5000 ft., *Walker*; *Gardner*.

Nearly glabrous, stems thin. *Leaves* 2 by $1\frac{1}{2}$ in., acute, often punctate on both surfaces; petiole 1 in. *Pedicels* of males and females about as long as the petioles. *Corolla* hairy round the throat; rudimentary ovary of the male depressed-globose. *Ovary* fusiform; stigma large, 3-lobed. *Fruit* $\frac{1}{2}$ in. broad, obtusely trigonous, almost rostrate. *Seeds* $\frac{1}{8}$ in., packed in three columns.—The name *M. deltoidea* is preoccupied by *Benth. in Flora Nigrit.* 368 for a different plant.

2. **M. Wallichii**, *C. B. Clarke*; tendrils simple, leaves not lobed little cordate, male peduncle racemed, fruit 2 in. fusiform. *Bryonia odorata*, *Wall. Cat.* 6706 D.

PROME (Burmah); *Wallich*.

Stem glabrous. *Leaves* 2-3 by $2\frac{1}{2}$ - $3\frac{1}{2}$ in., very broadly deltoid, sharply triangular, sinuous scarcely denticulate, scabrous above with flat round glands, slightly hispid beneath. Male *raceme* nearly as in *M. odorata*. *Fruit pedicel* $\frac{3}{4}$ in. *Fruit* rostrate, attenuate at the base, resembling closely that of *M. zeylanica* but rather larger. *Seeds* nearly $\frac{1}{4}$ in., larger than those of *M. zeylanica*, many, oblong, very complanate, hardly margined, smooth on the faces.

** *Fruit globose, subquadrate, obtuse.*

3. **M. indica**, *Lour. Fl. Cochinch.* 43; tendrils simple, leaves more or less cordate entire or somewhat 3-lobed, male pedicels clustered in the axils, fruit $\frac{1}{2}$ in. ellipsoid pointed. *DC. Prodr.* iii. 313; *Naud. in Ann. Sc. Nat.* ser. 4, xvi. 169, with a fig.; *Kurz in Journ. As. Soc.* 1877, pt. ii. 105. *M. Regelii*, *Naud. l. c.* ser. 5, v. 35. *Æchmandra indica*, *Arn. in Hook. Journ. Bot.* iii. 274; *Miq. Fl. Ind. Bat.* i. pt. i. 658. *Bryonia tenella*, *Roxb. Fl. Ind.* iii. 725.

SIKKIM, alt. 3000 ft.; *C. B. Clarke*. SILHET in the Jheels; *H. f. & T.* CHITTAGONG; *Kurz*.—DISTRIB. Malaya to the Philippines, China, Japan.

Nearly glabrous, stem slender. *Leaves* $1\frac{1}{2}$ by $1\frac{1}{2}$ in., acuminate or scarcely acute, often punctate on both surfaces; petiole 1 in. *Pedicels* of males and females about as long as the petioles. Point of the *connective* short. *Fruit* white, seeds strongly margined (*ex Naudin*).—This appears exceedingly rare in India; but it may be doubted whether the next is other than a form of it: see *Benth. Fl. Hongk.* 125.

4. **M. odorata**, *Hk. f. & T. in Herb.*; tendrils simple, leaves more or less cordate entire or somewhat 3-lobed, male pedicels in distant clusters on long racemes, fruit $\frac{3}{8}$ - $\frac{1}{2}$ in. globose quadrate very obtuse. *Bryonia odorata*, *Ham. in Wall. Cat.* 6706 A. B. C.

NORTH-WEST HIMALAYA; *Royle*. Throughout the plain of EAST BENGAL, common, and ascending the hills to 7000 ft. alt.

Nearly glabrous, stem often stouter than in *M. indica*. *Leaves* 2-3 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., acute, often punctate on both surfaces; petiole $1-1\frac{1}{2}$ in. Male *peduncle* long, somewhat zigzag, with a cluster of pedicels (each $\frac{1}{2}$ - $\frac{3}{4}$ in.) at each angle; female pedicel as long as the petiole. *Corolla* white, with much hair round the throat. *Connective* not much produced; rudiment of ovary in the male flower globose depressed. *Seeds* $\frac{1}{8}$ - $\frac{1}{6}$ in., not or very obscurely margined.—This species has been separated from *M. indica* by the long raceme of the male flowers, which, however, does not essentially differ. The fruit appears very obtuse, the degree of margination of the seeds can hardly be relied on.

VAR. *triloba*; lobes of leaf divaricating sometimes very narrow and long, petiole often shorter than in the type. *Bryonia triflora*, *Wall. Cat.* 6707.—East Bengal;

Soorma Bank, *Griffith* (Kew Distrib. No. 2530).—The male inflorescence and the fruit are altogether those of *M. odorata*; the leaves unlike.

5. *M. bicirrhusa*, C. B. Clarke; tendrils 2-fid, leaves deeply cordate ovate caudate-acuminate, male inflorescence elongate racemed.

BIRMA; *Griffith* (Kew Distrib. No. 2522).

Nearly glabrous; stem like that of *M. odorata*; tendrils stout all 2-fid. Leaves 4 by 3 in.; petiole 2-3 in. Inflorescence exactly as in *M. odorata*. Male flower altogether of the genus, anthers lateral on the connective which is long produced above them: rudiment of the ovary depressed globose. Fruit not seen.—This appears as an excessively developed *M. odorata*.

18. *RHYNCHOCARPA*, Schrader.

Climbing herbs; tendrils simple. Leaves petioled, orbicular and undivided in the Indian species. Flowers monœcious or dioecious, very small; males subcorymbose on a short peduncle; females solitary (rarely aggregated), subsessile, sometimes in the same axil with the male. MALE: calyx-tube campanulate, teeth 5, small; corolla 5-partite; stamens 3 (rarely 5); anthers free or united one 1-celled, the others 2-celled; cells straight; connective crested 2-lobed or long-produced in two points. FEMALE: calyx and corolla as in the male; ovary ovoid, beaked; style ending in 2 rarely in 3 long stigmas; ovules not many, horizontal; placentas 2 rarely 3, vertical. Fruit ovoid, rostrate, indehiscent. Seeds ovoid, compressed, not very many.—DISTRIB. Species 5; in warmer Africa, one also in Western India.

1. *R. foetida*, Schrad. in *Linnaea*, xii. 404; foetid, scaberulous-pubescent, stigmas 2, fruit $\frac{1}{2}$ in. globose pubescent beak nearly $\frac{1}{2}$ in., seeds 4-6. Naud. in *Ann. Sc. Nat. ser. 4*, xii. 146. *R. rostrata*, Kurz in *Journ. As. Soc.* 1877, pt. ii. 105. *Æchmandra rostrata*, Arn. in *Hook. Journ. Bot.* iii. 274; Dalz. & Gibs. *Bomb. Fl.* 100. *Bryonia pilosa*, Roxb. *Hort. Beng.* 104, *Fl. Ind.* iii. 726. *B. filicaulis*, Wall. *Cat.* 6713. *B. rostrata*, Rottler; DC. *Prodr.* iii. 304; Wall. *Cat.* 6701; W. & A. *Prodr.* 346. *B. Perottetiana*, Seringe in DC. l. c. *Trichosanthes foetidissima*, Jacq. *Ic. Rar.* t. 624, *Melothria foetida*, Lamk. *Dict.* iv. 87. *Cyrtanema convolvulacea* and *divergens*, Rich. *Fl. Abyss.* i. 286.

GUZERAT; Dalzell. DECCAN PENINSULA; Rottler; Wight. Malabar Hills? Stocks; Dr. Ritchie. AYA, Wallich.—DISTRIB. Tropical Africa and Natal.

Stem somewhat stout, pubescent. Leaves 2 in. diam., orbicular or ovate, cordate, dentate; petiole $\frac{1}{2}$ -1 in. Male racemes small, scarcely 1 in. Calyx hairy with subulate teeth. Connective of each anther produced into a long curved pointed horn. Fruit bright red, 2-celled. Seeds $\frac{1}{2}$ in., distinctly margined.

SPECIES IMPERFECTLY KNOWN.

R.? DELTOIDEA, Kurz in *Journ. As. Soc.* 1877, pt. ii. 105; leaves deltoid with spreading acute basal lobes rough above, berries smooth glabrous.

Upper TENASSERIM, Attaran, Brandis; PEGU and PROME, Kurz.

Not seen; from the description it may be a variety of *R. foetida*.

19. *CORALLOCARPUS*, Welw.

Climbing or prostrate herbs, scabrid or submentose; tendrils simple. Leaves petioled, roundish-cordate, somewhat thick, entire lobed or palmate. Flowers

very small, monœcious; males in a small corymb at the apex of a long peduncle; females short-pedicelled or subsessile, solitary or clustered. MALE: calyx-tube campanulate, lobes 5, short; corolla 5-partite; stamens 3, nearly sessile at the mouth of the calyx-tube, anthers free, all 2-celled or one 1-celled; cells straight, oblong, lateral on the thin connective which is not produced; ovary rudimentary. FEMALE: calyx and corolla as in the male; ovary ovoid; disc 0; stigmas 3 or 2; ovules not very many, horizontal; placentas 3-2, vertical. *Berry* ovoid, circumsciss near the base, usually rostrate. *Seeds* not very many, ellipsoid or nearly globose, somewhat compressed, smooth or nearly so, little margined.—DISTRIB. Species 6, in Tropical Africa, the Persian Gulf, and Western India.

1. **C. epigæa**, *Hook. f. in Gen. Pl. i.* 831; leaves punctate or scabrid with minute hairs, fruit ellipsoid or ovoid suddenly contracted into the beak distinctly pedicelled, seeds ellipsoid slightly margined. *Æchmandra epigæa*, *Arn. in Hook. Journ. Bot. iii.* 274; *Wight Ic. t.* 503; *Dalz. & Gibs. Bomb. Fl.* 100. *Bryonia epigæa*, *Rottler; Willd. Sp. Pl. iv.* 619; *Wall. Cat.* 6709; *W. & A. Prodr.* 346. *B. glabra*, *Roxb. Hort Beng.* 104, *Fl. Ind. iii.* 725. *B. sinuata*, *Wall. Cat.* 6711 D.

PUNJAB, Rawul Pindee; *J. E. T. Aitcheson*. SCINDE and GUJERAT; *Dalzell*. DECCAN PENINSULA; *Rottler; Wight*. Belgaum; *Ritchie*. CEYLON; *Thwaites*.

Leaves 2 in. diam., nearly entire 3-5-angular or 3-5-lobed; lobes usually broad sometimes narrow, commonly roundish or sinuous on the margin; petiole 1 in. Male *peduncle* $1\frac{1}{2}$ -2 in., female $\frac{1}{4}$ - $\frac{1}{2}$ in. or sometimes 1 in. *Fruit* $\frac{3}{8}$ in., beak $\frac{1}{4}$ in. more. *Seeds* about six, much longer than broad.

2. **C. conocarpa**, *Hook. f. in Gen. Pl. i.* 831; leaves with minute white hairs on both surfaces hardly scabrid, fruit sessile conical not suddenly contracted into the beak, seeds ellipsoid not margined. *Æchmandra conocarpa*, *Dalz. & Gibs. Bomb. Fl.* 100? *C. Fenzlii*, *Hook. f. in Oliv. Fl. Trop. Afr. ii.* 565.

GUJERAT, near Malpor and Gundar; *Dalzell*. Also in *Stocks'* collection probably from Scinde.—DISTRIB. Central Africa.

Hardly differs from *C. epigæa* but in the points specified in the diagnosis. The leaves are 5-lobed, the lobes lanceolate, acute, narrow at each end.

3. **C. velutina**, *Hook. f. in Gen. Pl. i.* 831; leaves shortly villous on both surfaces, peduncles pedicels and calyx villous, fruit ellipsoid sessile suddenly narrowed into a short beak, seeds globose compressed hardly margined. *Æchmandra velutina*, *Dalz. & Gibs. Bomb. Fl.* 100. ? *C. ethaicus*, *Hook. f. in Oliv. Fl. Trop. Afr. ii.* 567.

SCINDE; *Dalzell*.—DISTRIB. Persian Gulf and Tropical Africa?

Whole plant villous. *Leaves* 2 in. diam., subentire or more or less 3-5-lobed, lobes rounded; petiole $\frac{3}{4}$ in. Male *peduncle* 3 in. with 12 flowers at the top. Male and female *flowers* as in *C. epigæa*. *Fruit* $\frac{1}{2}$ in. the beak $\frac{1}{2}$ in. *Seeds* about 12, $\frac{1}{8}$ in. diam.

20. CERASIOCARPUM, *Hook. f.*

Climbing glabrous herbs; tendrils simple. *Leaves* long-petioled, oblong, cordate, nearly entire. *Flowers* very small, monœcious; male peduncle carrying a few clustered flowers at the top; female flower sessile, solitary, often in the same axil with the male. MALE: calyx-tube short campanulate with 5 minute teeth; corolla 5-partite; stamens 3; anthers subsessile, distinct, one 1-celled, two 2-celled; cells oblong, lateral on the connective which is not produced;

rudiment of the ovary 0. FEMALE: calyx and corolla as in the male; ovary ovoid; disc 0, stigmas 3; ovules few, horizontal; placentas vertical. Fruit ellipsoid, sessile, indehiscent, without a beak. Seeds 2-6, ovoid, smooth, slightly compressed.

1. *C. zeylanicum*, Hook. f. in Gen. Pl. i. 832, female flower subsessile, seeds ovoid smooth slightly compressed. *Æchmandra zeylanica*, Thwaites Enum. 125.

CEYLON; alt. 3000-5000 ft.; Thwaites.

Leaves 3-6 in., obtuse or acute, cordate or hastate, almost 3-lobed, entire or undulate-denticulate; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in. Flowers $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., yellow; petals broad, acuminate. Berry at most $\frac{1}{2}$ in. diam. Seeds $\frac{1}{8}$ - $\frac{1}{4}$ in. diam., little compressed, incompletely margined, 2-6 to each fruit.

DOUBTFUL SPECIES.

2. C.? PENANGENSE, C. B. Clarke; female peduncle $\frac{3}{4}$ -1 $\frac{1}{2}$ in., seeds much compressed somewhat rugose on the faces. *Bryonia heterophylla*, Wall. Cat. 6704.

PINANG; Wallich.

Stems rather strong, minutely pilose; tendrils simple. Leaves cordate-oblong, acute, entire slightly denticulate, scabrous above minutely hispid beneath. Flowers monœcious, all peduncled, solitary female and racemed males from the same axil; male peduncle 1 $\frac{1}{2}$ in. with 8 small pedicels at the summit. Fruit $\frac{3}{4}$ -1 in. diam., smooth, nearly globose. Seeds 4 to 6, $\frac{1}{8}$ in., somewhat margined, oblong.—Closely resembles *C. zeylanicum* except as to the peduncled female: but there are no flowers on Wallich's example.

3.? C. MAINGAYI, C. B. Clarke; leaves 3-lobed and entire, female peduncle $\frac{1}{2}$ - $\frac{3}{4}$ in., seeds margined not much compressed very rugose pitted on the faces.

MALACCA; Maingay No. 1268.

Stems nearly glabrous; tendrils simple. Leaves 2 by 1 $\frac{1}{2}$ in., with three divaricate lanceolate lobes or entire, not much cordate, scabrous on both surfaces; petiole $\frac{1}{2}$ in. Male peduncle 1 $\frac{1}{2}$ in. with 8 minute pedicels at the summit; female from the same axil. Stamens of the genus. Fruit $\frac{5}{8}$ by less than $\frac{3}{8}$ in., oblong, subacute. Seeds 10-12, less than $\frac{1}{2}$ in.—This may be a *Melothria*, but the long male peduncle with short pedicels and the unproduced connective do not suit. The capsule and seeds do not suit *Cerasiocarpum*.

21. CTENOLEPIS, Hook. f.

Climbing or prostrate scabrous herbs, turning black in drying; tendrils simple. Leaves cordate, orbicular, 5-7-lobed; stipuliform bracts at the axils of the leaves large round or elliptic, ciliate or dentate. Flowers minute, monœcious; males in small racemes on inconspicuous axile peduncles; female solitary, short-peduncled, in the same axil with the male. MALE: calyx-tube short, campanulate, lobes 5, subulate; corolla 5-partite; stamens 3, filaments very short; anthers free, one 1-celled, two 2-celled; cells straight, connective not produced; rudiment of ovary 0. FEMALE: calyx and corolla as in the male; ovary ovoid; 1-celled; disc 0; style columnar, stigmas 2 or 3; ovules 2 or 3, horizontal; placentas parietal. Fruit small, globose or subquadrate, oblique, indehiscent. Seeds 2 or 3, ellipsoid, much compressed, acutely margined, somewhat boat-shaped.—DISTRIB. Species 3; in India, Tropical Western Asia and Tropical Africa. The remarkable stipuliform bracts are characteristic of this genus.

1. *C. Garcini*, Naud. in Ann. Sc. Nat. ser. 5, vi. 13; middle lobe of the

leaf not very acute nor much longer than the others, male peduncle less than $\frac{1}{2}$ in., fruit not longer than broad. *Bryonia Garcini*, DC. *Prodr.* iii. 308; *Roxb. Fl. Ind.* i. 127; *Wall. Cat.* 6712; *W. & A. Prodr.* 344. *Zehneria Garcini*, *Stocks in Hook. Kew Journ. Bot.* iv. 149; *Dalz. & Gibs. Bomb. Fl.* 99.

BUNDELKUND; *Edgeworth*. DECCAN PENINSULA; *Rottler, &c.* CEYLON; *Thwaites*.

Annual; stem not elongate, more or less scabrous and punctate, scarcely at all hairy. *Leaves* 1– $1\frac{1}{2}$ in. diam., lobes often sinuate and lobed; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipuliform bracts $\frac{1}{4}$ in. and more, elliptic, with long cilia. *Fruit* $\frac{1}{2}$ by $\frac{1}{4}$ in.

2. ***C. cerasiformis***, *Naud. in Ann. Sc. Nat.* ser. 5, vi. 13; middle lobe of the leaf acute longer than the others, male peduncle $\frac{1}{2}$ –1 in., fruit ellipsoid not in the least narrowed into the peduncle. *Zehneria cerasiformis*, *Stocks in Hook. Kew Journ. Bot.* iv. 149.

SCINDE; *Stocks*. GUJERAT; *Dalzell*.—DISTRIB. Tropical and Southern Africa.

Hardly distinguishable from *C. Garcini*. *Leaves* usually larger, sometimes 3 in. diam.

22. **DICHELOSPERMUM**, C. B. Clarke.

A climbing scabrous herb; tendrils simple. *Leaves* petioled, cordate or hastate, ovate, acute, little lobed. *Flowers* minute; males and females clustered in the same axils, short-pedicelled. MALE: calyx-tube short, campanulate, teeth 5, minute; corolla 5-partite; stamens 3, filaments very short, anthers free, one 1-celled, two 2-celled; cells oblong, straight; connective not produced. *Fruit* small, membranous, obovoid, subtrigonus, 1-celled, with 3 basal erect seeds. *Seeds* with three parallel equal cells, the two lateral empty.

1. ***D. Ritchiei***, C. B. Clarke.

BELGAUM; *Ritchie*. Also in Herb. *Stocks* doubtless from Western India.

Exceedingly like *Mukia scabrella* except as to the seeds, and the flowers are smaller. *Leaves* $2\frac{1}{2}$ by $1\frac{3}{4}$ in., scabrid and somewhat hispid on both surfaces; petiole $\frac{3}{4}$ in. *Fruit* $\frac{1}{4}$ in. diam. *Seeds* $\frac{1}{8}$ by $\frac{1}{5}$ and $\frac{1}{10}$ in. thick, attached to the very bottom of the fruit, erect.—Female *flowers* not seen.

23. **THLADIANTHA**, Bunge.

Climbing herbs; tendrils simple, rarely 2-fid. *Leaves* petioled, entire or tripartite, deeply cordate, denticulate, softly pubescent or nearly glabrous. *Flowers* dioecious, yellow, large or small. Male *peduncles* in the fully developed plant paired, one 1-flowered ebracteate caducous, the other racemed the flowers with or without bracts; female peduncle elongate, 1-flowered, ebracteate. MALE: calyx-tube shortly campanulate, the bottom shut by a horizontal scale; segments 5, lanceolate; corolla campanulate, 5-partite, segments revolute about half-way down; filaments 5, inserted near the mouth of the calyx-tube; anther 1-celled, narrow-oblong, straight. FEMALE: calyx and corolla as in the male; ovary oblong, style deeply 3-fid with 3 reniform stigmas; ovules many, horizontal; placentas 3, vertical. *Fruit* ellipsoid, obtuse, indehiscent, green, cylindric with vertical ribs. *Seeds* many, horizontal, small, obovoid, compressed, smooth.—DISTRIB. Species 2, Bengal, Malaya, China.

The generic character is here widened to include the *Khasia* species. As in most Cucurbits with paired male peduncles, either the simple or the racemed one is often wanting, and the two do not flower together; the simple peduncle generally falls off

by the time the racemed one is in blossom. The corolla is slightly oblique; in *T. dubia* besides the normal large male flowers much smaller imperfect ones are often found.

1. **T. dubia**, *Bunge Enum. Pl. Chin. Bor.* 29; leaves deeply cordate ovate acute undivided, male racemes with prominent bracts, petals $\frac{3}{4}$ in. golden yellow. *Naud. in Ann. Sc. Nat.* ser. 4, xii. 150, t. 10; *Bot. Mag. t.* 5469; *Kurz in Journ. As. Soc.* 1877, pt. ii. 102. *Momordica calcarata*, *Wall. Cat.* 6740. *Gymnopetalum Horsfieldii* and *piperifolium*, *Miq. Fl. Ind. Bat. i.* pt. i. 680.

Plain of EAST BENGAL common, ascending to 8000 ft. in the hills. The female plant is rare and has never been collected in the plains. *PEGU*; *Kurz*.—*DISTRIB.* Malaya, China.

A large climber. *Leaves* 4 by $2\frac{1}{2}$ in., denticulate, not at all angular, usually villous beneath sometimes nearly glabrous; petiole $1\frac{1}{2}$ in. *Tendrils* simple in all the wild examples, but in Naudin's strong cultivated plants bifid. Male racemes 2-3 in., flowers approximated, bracts serrate or incise-serrate; calyx-teeth very narrow; filaments minutely hairy. Female peduncle 2-3 in., more or less hairy; young ovary densely woolly. *Fruit* $1\frac{1}{2}$ by $\frac{3}{4}$ in., glabrous, obtuse at both ends. *Seeds* scarcely $\frac{1}{4}$ in.—There is an admirable picture of this plant amongst Roxburgh's drawings.

2. **T. Hookeri**, *C. B. Clarke*; leaves deeply cordate-ovate acute entire and tripartite with lanceolate segments, male racemes without bracts, petals less than $\frac{1}{2}$ in.

ASSAM; *Griffith* (Kew Distrib. No. 769, 2553). KHASIA Mts., alt. 4000-6000 ft.; Myrung and Nunklow; *H. f. & T.*

A large climber; tendrils simple. *Leaves* polymorphous, acute, resembling altogether those of *T. dubia*, but generally less hairy and thinner, or tripartite, with segments 4 by $1\frac{3}{4}$ in., the two lateral lobes very cordate and auricled on the outer base; petiolules hardly $\frac{1}{8}$ in.; petiole 2 in. The female flower in Griffith's example resembles that of *T. dubia* but is smaller though the petals are slightly more than $\frac{1}{2}$ in.; peduncle about 1 in. Male racemes $1\frac{1}{2}$ in., slender; flowers pedicelled, scattered, yellow; petals scarcely $\frac{1}{4}$ in.; these small flowers probably correspond to the small imperfect males often found in *T. dubia*; if so the large perfect males of *T. Hookeri* are as yet unknown. *Fruit* (and seeds) altogether like those of *T. dubia*, but rather smaller, $1\frac{1}{2}$ in.—The ebracteate male raceme of this with pedicels $\frac{1}{2}$ in. is exceedingly unlike that of *T. dubia*: but in all other points they appear congeneric, and the habit is the same.

24. **EDGARIA**, *C. B. Clarke.*

A large scandent herb; tendrils 2-fid. *Leaves* petioled, entire, ovate, acute, deeply cordate, more or less pubescent. *Flowers* large, diœcious, yellow. Male peduncles paired, one 1-flowered caducous, the other racemed; bracts 0 or inconspicuous; female peduncle elongate, 1-flowered. MALE: calyx-tube elongate, funnel-shaped, teeth 5, subulate; corolla deeply 5-partite, with obovate acute segments; stamens 3, included in the calyx-tube; filaments exceedingly short; anthers connate into a cylindric tube, one 1-celled, two 2-celled; cells straight, linear-oblong, connective not appendaged. FEMALE: calyx and corolla as in the male; ovary narrow-obovoid, 3-celled; style long, stigmas 3, oblong, 2-fid; ovules 1-3 superimposed in each cell, horizontal or subpendulous. Capsule large, broadly fusiform, trigonous, 3-celled, fibrous, dry, 3-valved, valves dehiscing downwards and leaving the trigonous central axis. *Seeds* 1-3 in each cell, pendulous, compressed, subquadrate, large, corrugate or somewhat 3-lobed at the lower end and faces when dry.

1. **E. darjeelingensis**, C. B. Clarke in Journ. Linn. Soc. xv. 114. *Gymnopetalum* sp. 5, *Herb. Ind. Or., H. f. & T.*

GURWHAL; *Falconer*. SIKKIM, alt., 5000–8000 ft., very common; *J. D. H.*; *C. B. Clarke*.

Leaves 4 by $3\frac{1}{2}$ in., serrate and denticulate; petiole 3 in. Male raceme 6 in., female 3–4 in. Calyx-tube $\frac{3}{4}$ in. Petals $\frac{3}{4}$ in., widely patent. Fruit 3 by $1\frac{1}{4}$ in., somewhat pilose, with 2 wavy vertical ribs on each face. Seed $\frac{1}{2}$ by $\frac{1}{2}$ and $\frac{1}{10}$ in. thick.

25. GOMPHOGYNE, Griff.

Climbing, weak, succulent herbs, tendrils 2-fid or simple. Leaves petioled, pedate, with 5–7 lanceolate serrate leaflets. Flowers small, monœcious (sometimes at least), males racemed; females paniced or clustered. MALE: calyx rotate, 5-partite, with oblong segments; corolla 5-partite, with elongate erose segments; stamens 5, filaments united at the base; anthers globose, 1-celled, straight. FEMALE: calyx produced above the ovary and corolla as in the male; corolla-segments caudate; ovary top-shaped, 1-celled; styles 3, 2-fid at the apex; ovules 3, pendulous. Capsule top-shaped, 3-valved at the wide truncate summit, crowned by the persistent styles. Seeds 3 (2–1), ellipsoid, little compressed, black, obscurely margined.—DISTRIB. Species 2, one in the Himalaya one in Burma.

1. **G. cissiformis**, Griff. *Pl. Cantor.* p. 26; capsule somewhat succulent $\frac{1}{2}$ in. wide at the summit, seeds $\frac{1}{4}$ in. oblong with scaly tubercles on the rounded faces.

GURWHAL, alt. 7500 ft.; *Madden*. KUMAON; alt. 7000 ft.; *Edgeworth, Strachey & Winterbottom*. SIKKIM, alt. 5000–7000 ft.; *Lachong, J. D. H.*; *Doobdi, C. B. Clarke*.

Leaves $2\frac{1}{2}$ in. diam., glabrous or slightly pubescent; petiole $1-1\frac{1}{2}$ in. Male racemes 1–6 in., often compound (or appearing so), towards the end of leafless branchlets. Females clustered near the axils or on panicles 2–4 in. Capsule $\frac{3}{4}$ in.

2. **G. heterosperma**, Kurz in Journ. As. Soc. 1878, pt. ii. 105; capsule dry 9-ribbed $\frac{1}{5}$ in. wide at the summit, seed $\frac{1}{8}$ in. ovoid rugose-lacunose. *Zanonia?* heterosperma, *Wall. Cat.* 3728.

BURMA; at Taong-dong; *Wallich*.

The leaves and inflorescence closely resemble *G. cissiformis*. The capsule is $\frac{1}{2}$ in., but narrow linear-oblong.

26. ACTINOSTEMMA, Griff.

A climbing weak herb; tendrils simple and 2-fid. Leaves petioled, deeply cordate or hastate, elongate, much toothed, nearly glabrous. Flowers small, monœcious, in lax axillary panicles, pedicels jointed about their middle; panicles frequently male with a few females near the base. MALE: calyx rotate, 5-partite, with lanceolate-linear segments; corolla 5-partite, segments lanceolate-caudate; stamens 5, free; connective dilated-papillose on one side with a narrow straight oblong anther-cell on the other. FEMALE: calyx and corolla as in the male; ovary subglobose, verrucose, 1-celled; style short, with 2 reniform stigmas; ovules 2–4, pendulous, subparietal. Capsule ovoid-conical, half-superior, covered with rough points, circumsciss above the middle. Seeds 2–4, compressed, ovate, corrugated and denticulate on the margin.

1. **A. tenerum**, *Griff. Pl. Cantor.* 25; *Naud. in Ann. Sc. Nat. ser.* 5, v. 39. *Mitrosicyos lobatus*, *Maxim. in Prim. Fl. Amur.* 112, t. vii. *Pomasterion japonicum*, *Miq. Ann. Mus. Lugd. Bat.* ii. 80. *Sicyos oxyacanthus*, *Wall. Cat.* 6683. *Momordica Paina*, *Wall. Cat.* 6742. Cucurbitaceæ, *Wall. Cat.* 9060.

Plain of EAST BENGAL, frequent. ASSAM. SILHET.—DISTRIB. Amurland, Japan. *Leaves* 4 by 2½ in., acute, scarcely lobed in the Bengal specimens, palmately lobed in *Maximowicz*; petiole often 2 in. *Panicles* 3–6 in. *Fruit* ¾ by ½ in., not at all trigonous, upper part muricated as well as the lower. *Seeds* ½ by ⅔ in.

27. **GYNOSTEMMA**, *Blume.*

A climbing herb; tendrils simple. *Leaves* pedate; leaflets 3–5, ovate-lanceolate, serrate, membranous. *Flowers* small, diœcious, in axillary diffuse panicles, greenish. MALE: calyx short, with 5 small lobes; corolla rotate, 5-partite, with lanceolate segments; stamens 5, filaments connate below; anthers 2-celled; cells long, straight. FEMALE: calyx and corolla as in the male; ovary spherical, 3–2-celled; styles 3–2, united at the base, at the apex 2-fid; ovules in each cell 2; pendulous. *Fruit* globose, size of a pea, umbonate, indehiscent, 1–3-seeded. *Seed* not winged, verrucose, submuricate.

1. **G. pedata**, *Blume Bijl.* 23; leaflets glabrous beneath or slightly pubescent, panicles more or less pubescent. *Miq. Fl. Ind. Bat.* i. pt. ii. 687. *G. cissoides*, *pedata* and *Wightiana*, *Bth. & Hk. f. Gen. Pl.* i. 839. *Enkylia digyna* and *trigyna*, *Griff. Pl. Cantor.* 27. *Zanonia Wightiana*, *Arn. in Hook. Journ. Bot.* ii. 272. *Z. cissoidea* and *laxa*, *Wall. Pl. As. Rar.* ii. 28, 29; *Wall. Cat.* 3726, 3727. *Z. pedata*, *Miq. Fl. Ind. Bat.* i. pt. i. 683. *Pestalozzia pedata*, *Zoll. et Mor. Syst. Verz.* 31. *P. laxa*, *Thwaites Enum.* 124.

KUMAON; *Strachey & Winterbottom*. NIPAL; *Wallich*. SIKKIM, ASSAM, KHASIA, common up to 5000 ft. alt. CEYLON; *Thwaites*.—DISTRIB. Malaya, Japan.

Glabrous or pubescent. *Leaflets* 5 or 3 by 1½–2 in., lanceolate or obovate-lanceolate; petiolules ⅓–½ in.; petiole 1–1½ in., often pubescent with a line of crisped hairs. *Panicles* usually 3–6 in., sometimes 15 in. by nearly a foot broad, leafless. *Styles* 3 and 2 on the same plant. *Fruit* ½ in. diam., glabrous or puberulous. *Seed* ½ in., ellipsoid, subtrapezoid.

28. **ZANONIA**, *Linn.*

Climbing herbs; tendrils simple. *Leaves* long-petioled, simple, ovate or oblong. *Flowers* diœcious, in large compound pendulous racemes, males pedicelled, females subsessile. MALE: sepals 3, oblong or orbicular, concave; corolla rotate, 5-partite, segments subacute; stamens 5, free, inserted on a fleshy disc, filaments very short; anthers 1-celled, transversely oblong. FEMALE: calyx and corolla as in the male; ovary subclavate, at first 3-celled, styles 3, spreading, 2-fid at the apex; ovules in each cell 2 or many, pendulous, attached in 2 series to a fleshy parietal placenta. *Capsule* large, elongate-cylindric, clavate, 3-valved at the truncate apex. *Seeds* large, oblong, pendulous, compressed, surrounded by a large membranous wing.—DISTRIB. Species 2–3, extending from India to Borneo.

1. **Z. indica**, *Linn.*; *DC. Prodr.* iii. 298; leaves ovate rounded or cordate at the base glabrous or nearly so, fruit 4 in., seeds few pendulous from the summit of the fruit (*Dalzell*) wing 2–3 in. *Lamk. Ill.* t. 816; *Blume Bijl.* 937;

W. & A. Prodr. 340; *Wight Ill.* t. 103; *Dalz. & Gibs. Bomb. Fl.* 99; *Miq. Fl. Ind. Bat.* i. pt. i. 682.—*Rheede Hort. Mal.* viii. t. 47, 48, 49.

ASSAM and EAST BENGAL; *Griffith.* DECCAN PENINSULA; *Wight.* MALABAR MTS.; *Stocks, Law, Dalzell.* CEYLON; not uncommon up to 2000 ft., *Thwaites*.—DISTRIB. Malaya.

Leaves 6-8 by 3-4 in., usually acute; petiole 1 in. Male flowers very small, pedicels $\frac{1}{8}$ - $\frac{1}{4}$ in.; female flowers including the ovary $\frac{1}{2}$ in. *Ovary* early becoming 1-celled by the separation of the 3 fleshy placentas which only at first meet in its centre. *Seeds* much compressed, hardly $\frac{1}{10}$ in. thick.

DOUBTFUL SPECIES.

? *ZANONIA*; leaves 5 by 2 in. narrow-oblong rounded at the base, tendrils lateral.

CHITTAGONG; *H. f. & T.*—The example contains neither flowers nor fruit, but has all the appearance of *Zanonia* to which genus the collectors referred it in the field.—The only other species of the genus (collected by Beccari in Borneo) has the seed (including the wings) 6 in. broad curved lunate.

29. *ALSOMITRA*, *Bth. & Hk. f.*

Large climbers; tendrils simple or 2-fid. *Leaves* with 3 oblong entire leaflets. *Flowers* small, dioecious, white, in compound panicles, with filiform branches. MALE: calyx rotate, 5-partite, segments oblong, acute; corolla rotate, 5-partite, segments obtuse; stamens 5, filaments short, near together at the base; anthers small, oblong, straight, 1-celled. FEMALE: calyx and corolla as in the male; ovary elongate-clavate, 1-celled; styles 3-4, conical, with semi-lunate stigmas; ovules very many, pendulous; placentas 3, thick, vertical, parietal. *Capsule* large, elongate-clavate, truncate and 3-valved at the apex. *Seeds* very many, compressed, vertical, in six rows, much corrugated, incised or horned on the margin with a terminal membranous wing longer than the seed or 0.—DISTRIB. Species 3-5, extending from Nipal through Malaya to North Australia.

1. *A. sarcophylla*, *Hook. f. in Gen. Pl.* i. 840; leaves very fleshy, fruit $1\frac{1}{4}$ by $\frac{3}{8}$ in. at the top, seeds including the wing $\frac{5}{8}$ in. very verrucose on the rounded faces. *Kurz in Journ. As. Soc.* 1878, pt. ii. 106. *Zanonia sarcophylla*, *Wall. Pl. As. Rar.* t. 133; *Cat.* 3724.

BIUMA; from MANDALAY to PROME, *Wallich, Kurz*.—DISTRIB. Siam.

Leaflets $2\frac{1}{2}$ by $1\frac{1}{2}$ in., obtuse; petiolule scarcely $\frac{1}{4}$ in. *Seeds* black, not much compressed, narrowed nearly to a point at the base with 2 flat thin (not 2-fid) curved horns at the apex, between which rises the wing.

2. *A. clavigera*, *Hook. f. in Gen. Pl.* i. 840; leaves herbaceous, fruit 3 by $\frac{3}{4}$ in. at the top, seeds including the wing 1 in. slightly muricate on the flat faces. *Zanonia clavigera*, *Wall. Pl. As. Rar.* ii. p. 28, partly?; *Cat.* 3725.

SIKKIM, ascending to 4000 ft., *J. D. H., Gamble, C. B. Clarke.* KHASIA MTS., alt. 3000-4000 ft.; *H. f. & T.* SILHET; *Wallich.* TENASSERIM; *Helper* (Kew Distrib. No. 2520).

Leaflets 3 by $1\frac{1}{2}$ in., acute; petiolule often exceeding $\frac{1}{4}$ in. *Seeds* yellowish-white, much flattened, with several deep triangular spinose teeth at the apex, teeth of 2 lamellæ, between which the wing is inserted, split in the plane of complanation of the fruit, and the wing springing from these narrow splits.—*Wallich's* description of the seed of *Z. clavigera* is incorrect and appears to be taken from that of *Z. indica*, which grows in the same locality.

VAR.? *Hookeri*; seeds without any wing.—Khasia Mts., alt. 3000–4800 ft.; *J. D. H.*—The example is a stout leafless one with large ripe fruits. The seeds are in situ in the capsule so that the wing cannot have been broken off (as happens with seeds of *Zamia* kept separate). This may be an accidental var. of *A. clavigera* or it may be a new species.

ORDER LXVI. BEGONIACEÆ. (By C. B. Clarke.)

Succulent herbs or undershrubs; stem often reduced to a rhizome or tuber. *Leaves* alternate (sometimes falsely whorled in *B. verticillata*), more or less unequal-sided, entire toothed or lobed; stipules 2, free, frequently deciduous. *Peduncles* axillary, divided into dichotomous cymes, the branches and bracts at their divisions generally opposite. *Flowers* white rose or yellow, showy, sometimes small, monœcious. **MALE**: perianth (of the only Indian genus) of 2 outer valvate opposite sepaloïd segments, and 2–0 inner smaller segments; stamens indefinite often very many, free or monadelphous, anthers narrowly obovoid. **FEMALE**: perianth (of the only Indian genus) of 5–2 segments. *Ovary* inferior (in *Hildebrandia* half-superior), 2–3–4-celled; placentas vertical, axile (at the time of æstivation), divided or simple; styles 2–4, free or combined at the base, stigmas branched or tortuous; ovules very many. *Fruit* capsular, more rarely succulent, often winged, variously dehiscent or irregularly breaking up. *Seeds* very many, minute, globose or narrow cylindric, testa reticulated: albumen very scanty or 0.—**DISTRIB.** Species 400 (of which 398 belong to the genus *Begonia*), in all tropical moist countries; not yet met with in Australia.

1. BEGONIA, Linn.

Character of the Order.

SECT. I. Casparya. *Stamens* numerous, shortly monadelphous; anthers narrowly oblong, connective slightly produced, obtuse. *Ovary* 4-celled (in *B. Candollei* 3-celled), placentas 2-fid or 2-partite. *Fruit* more or less fleshy, not dehiscent on the faces; carpels not much compressed, nor having their backs produced into a thin wing. (None small: leaves in all very unequal at the base.)

1. **B. Roxburghii**, *A. DC. Prodr.* xv. pt. i. 398; stem lengthened with inflorescence clustered near the axils, leaves ovate nearly glabrous sinuate-toothed scarcely serrate, fruit subpyramidal 4-celled very succulent angles obtuse ending in 4 small horns upwards. *Kurz in Journ. As. Soc.* 1877, pt. ii. 107. *B. malabarica*, *Roxb. Fl. Ind.* iii. 648, not of *Lamk.* *Diploclinium Roxburghii*, *Miq. Fl. Ind. Bat.* i. pt. i. p. 692. *Casparya?* *oligocarpa* and *polycarpa*, *DC. Prodr.* xv. pt. i. 276, 277.

From NIPAL to BURMA; not uncommon in NORTH and EAST BENGAL with ASSAM, ascending to 4000 ft.

Root fibrous, not tuberous. *Stem* usually 1–3 ft., erect, succulent, glabrous or minutely pubescent when young. *Leaves* 6–9 in., acuminate, glabrous or minutely pubescent on the nerves of both surfaces; petiole 2–5 in.; stipules lanceolate, glabrous, deciduous. *Cymes* short, axillary, dichotomous, with narrow lanceolate linear bracts, often few-flowered, producing but one or two fruits from each axil. **MALE FL.**: sepals 2, large, glabrous, nearly white; petals usually 2, smaller than the sepals, white or nearly so; stamens about 50. **FEMALE**: ovary cells 4; placentas very

thick, succulent, equally 2-partite; styles 4, 2-fid nearly from the base, stigmas winding spirally with 3 turns. *Fruit* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam pendent; walls very thick, succulent, indehiscent or finally dehiscent at the angles. *Seeds* shortly ellipsoid, somewhat obovoid.—Cathcart *lc. Ined.* represents the cells of the ovary as occasionally 3 which is not improbable, or his artist may have confounded *B. Candollei* (No. 4) with the present species.

2. ***B. silhetensis***, C. B. Clarke; stemless, inflorescence shorter than the petioles, leaves ovate finely denticulate hardly serrate or lobed, fruit globose thick-walled 4-celled densely covered with shaggy brown hair. *B. gigantea*, Wall. Cat. 3677 *B. Casparya?* *silhetensis*, A. DC. Prodr. xv. pt. i. 277. *Begonia* sp., Wall. Cat. 9107.

KHASIA Mts.; Wallich. EAST BENGAL; Griffith (Kew Distrib. No. 2569). CACHAR; Keenan.

Rootstock short, thick, fibrous on all sides, scarcely tuberous. *Leaves* 6 in., broadly ovate, not acuminate, shaggy on both surfaces in Griffith's examples, only slightly hairy in Wallich's. *Petiole* 6–18 in., hirsute in Griffith's examples, less hairy in Wallich's. *Scapes* 2–4 in., 1–7-flowered. MALE: sepals 2, hairy without, $\frac{1}{2}$ in. in Griffith's examples, smaller nearly glabrous in Wallich's; petals 2, smaller than the sepals, glabrous; stamens numerous, shortly monadelphous, anthers narrowly oblong. FEMALE: styles bifid with tortuose stigmas. *Fruit* $\frac{1}{2}$ in. and upwards in diam., globose or ovoid, without angles or protuberances. *Seeds* many, shining brown, shortly ellipsoid.—Griffith's No. 2569 (with which Wallich's No. 3677 B agrees), differs considerably in hairiness and in size of the flower from Wallich's No. 9107 on which A. DC. founded his *Casparya?* *silhetensis*: two species are possibly here mixed, but the material is not sufficient to justify a new species.

3. ***B. tessaricarpa***, C. B. Clarke; nearly stemless, inflorescence much shorter than the petioles, leaves ovate nearly glabrous sinuate-denticulate hardly serrate, fruit subpyramidal 4-celled laxly hairy, carpels acutely keeled and ending upwards in a short linear patent horn.

ASSAM; Griffith (Kew Distrib. No. 2586).

Creeping stem 0–2 in. *Leaves* 2–4 in., broadly ovate, glabrous or minutely pubescent on the nerves beneath; petiole 6–12 in., pubescent upwards. *Inflorescence* 2–4 in. *Flowers* much smaller and fruit less succulent than in *B. Roxburghii*. *Fruit* about $\frac{3}{4}$ in. diam., slightly pubescent.—This solitary example may be possibly a stunted example of *B. Roxburghii*, from which it does not differ in any essential particular though it is very unlike it in general aspect; the seeds are alike.

4. ***B. inflata***, C. B. Clarke; stem lengthened, inflorescence axillary, leaves oblong-lanceolate glabrous or nearly so sinuate-dentate scarcely serrate, fruit 3-celled.

DARJEELING, alt. 3000 ft.; C. B. Clarke. BHOTAN? Griffith (Kew Distrib. No. 2587).

Erect, 3–4 ft., branched. *Leaves* 4 by $1\frac{1}{4}$ – $1\frac{1}{2}$ in., acuminate, very unequally cordate; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in.; stipules lanceolate-subulate, glabrous. *Flowers* in short axillary dichotomous cymes from several axils on each branch; bracts lanceolate-subulate. MALE: sepals 2, white, obovate, glabrous; petals 2, linear-obovate; stamens about 50, scarcely monadelphous; anthers narrow-oblong; connective produced, obtuse. FEMALE: perianth of 4 segments; ovary 3-celled, placentas 2-fid. *Fruit* $\frac{3}{8}$ in. diam., trigonous or almost triquetrous; carpels round, as it were inflated, with a narrow line down the back, glabrous or nearly so, indehiscent or probably at length dehiscing down the ridges as in *B. Roxburghii*. *Seeds* short, ellipsoid somewhat obovoid.—Griffith's examples are in good fruit but the locality is doubtful: his ticket is marked "Umb. ascent. 4 day."

5. **B. Dux**, C. B. Clarke; stem lengthened, inflorescence axillary not diffuse, leaves ovate with scattered hairs above denticulate somewhat ciliate.

MOULMEIN; Moolee alt. 6000 ft.; Parish.

Stem exceeding a foot, succulent, tubercular. *Leaves* 8 in., acuminate, much auricled on one side at the base, somewhat angular, pubescent on the nerves beneath; petiole 4 in., pubescent upwards; stipules $\frac{3}{4}$ in., ovate-lanceolate, glabrous, persistent. *Flowers* (all male in the solitary example) large, glabrous, in short few-flowered cymes with bracts resembling the stipules. *Sepals* 2, round; petals 2, narrower. *Stamens* very many, shortly monadelphous; anthers narrow-oblong; connective hardly produced.—The section is doubtful, the female flowers being unknown: it may be a *Platycentrum*: Parish remarks that it looks like *B. Rex*; but the thick erect tall stem differs.

SECT. II. **Alæcida**. *Fruit* triquetrous, faces with a medial line; carpels dehiscing dorsally, angles with short subequal wings below the middle; placentas divided.—Small small-flowered plants; filaments monadelphous; styles connate.

6. **B. alæcida**, C. B. Clarke; stem branched, cymes elongate subproliferous laxly pubescent, fruit inflated glandular-pubescent.

MOULMEIN; Parish.

Rootstock small, fibrous. *Stem* 3 in., nearly glabrous. *Leaves* $1\frac{1}{2}$ – $4\frac{1}{2}$ in. diam., cordate, round, minutely denticulate, puberulous-punctate above, nearly glabrous beneath; petiole 1– $2\frac{1}{2}$ in.; stipules ovate, acute, minute. *Cymes* 3–6 in., weak, somewhat panicle; bracts small, ovate, persistent, with lax hairs. **MALE**: sepals 2, round; petals 2, narrow-oblong; stamens not very many; anthers very short, obovoid; connective not produced. **FEMALE**: styles united a long way, stigmas lunate; ovary with glandular hairs. *Capsule* scarcely $\frac{1}{4}$ in. broad including the wings, ripe green, with 6 lines equally diverging from the base of the styles. *Seeds* short, ellipsoid.

7. **B. tricuspidata**, C. B. Clarke; stem short or 0, leaves ovate crenate puberulous on the nerves beneath, scape pubescent, capsule stellately tricuspidate glabrous.

MOULMEIN; Parish.

Rootstock small, fibrous. *Stem* sometimes 1–2 in., pubescent. *Leaves* round or ovate, somewhat cordate, crenate or nearly entire, with scattered minute hairs above; petiole $\frac{1}{4}$ –1 in., pubescent; stipules minute. *Cymes* 2–3 in., minutely pubescent; bracts ovate, minute. **MALE**: sepals 2, obovate; petals 2, narrowly obovate; stamens not many; anthers very short, ovoid; connective not produced. **FEMALE**: perianth of 4 segments, much as in the male; styles combined below, each with two curved branches. *Capsule* less than $\frac{1}{4}$ in. broad including the wings, with six lines equally diverging from the base of the styles, wings acute. *Seeds* very small, shortly ellipsoid.

8. **B. triradiata**, C. B. Clarke; stem short or 0, leaves ovate serrate or doubly crenate glabrous and white beneath, scape glabrous, capsule stellately 3-rayed glabrous.

MOULMEIN; Parish.

Rootstock a small cluster of tubers. *Stem* 0– $\frac{1}{2}$ in., glabrous. *Leaves* $\frac{1}{2}$ – $1\frac{1}{2}$ in., somewhat cordate, incise-crenate, minutely pilose above; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in., glabrous; stipules small, lanceolate. *Cymes* 2–3 in., glabrous; bracts small, lanceolate, glabrous, persistent; flowers pink. *Flowers* fruit and seeds closely resembling those of *B. tricuspidata*.

SECT. III. **Knesebeckia**. *Capsule* 3-celled, triquetrous, the angles produced into three often unequal papery wings; faces flat with a rib or line down

the middle; dehiscing by the falling away of 2 or 3 of the faces; placentas 2-fid. *Stamens* very shortly monadelphous, anthers obovoid, connective not produced.

A. Segments of female flower 5 (rarely 6), imbricate, inner smaller, innermost often smallest or 0. Sect. *Knesebeckia* A. DC.

* *Ovary and young capsule very pubescent.* (See also 12. *B. Josephi*.)

9. **B. picta**, Sm. *Exot. Bot.* t. 101; leaves ovate acuminate, capsule with one wing much elongate. *Hook. Exot. Fl.* ii. t. 89; *Wall. Cat.* 3685 B and part of A; *Bot. Mag.* t. 2962; *A. DC. Prodr.* xv. pt. i. 312. *B. echinata*, *Royle Ill.* 313, t. 80. *B. erosa*, *Wall. Cat.* 3688, partly.

HIMALAYA, alt. 2000–6000 ft.; from KUNAWUR to BHOTAN, frequent. KHASIA MTS., alt. 3000–4000 ft.; *H. f. & T.* Throughout CHOTA NAGPUR, alt. 1000–4200 ft.; C. B. Clarke.

Rootstock of one or few tubers; plant 6–15 in., the inflorescence scarcely exceeding the leaves, stem glabrous or obscurely pubescent. *Leaves* 3–5 by 2–3 in., nearly equally cordate, doubly finely serrate, pilose above, villous on the nerves beneath; petiole of the cauline leaf usually 1 in. at least; stipules lanceolate, hairy, scarcely exceeding the leaves. *Peduncle* more or less pubescent upwards; bracts oblong-lanceolate, persistent, pubescent. *MALE*: outer segments 2, pubescent; petals 2, smaller; stamens shortly monadelphous, about 30; anthers obovoid; connective not produced. *FEMALE*: perianth of 5 segments, outer larger, pubescent. *Styles* 3, nearly separate, divided half way up into two tortuose branches. *Capsule* large, 1 in., usually pubescent, sometimes nearly glabrous when quite ripe; one wing $\frac{1}{2}$ in. broad, another $\frac{1}{4}$ in., the third $1\frac{1}{2}$ in. in a large example; styles persistent; wings slightly ascending, dehiscing by the three faces falling off. *Seeds* light brown, shortly ellipsoid.—Flowers pale rose, medium large; leaves often variegated.

10. **B. Satrapis**, C. B. Clarke; leaves reniform or shortly ovate-cordate not acute, capsule with 3 wings no one of them greatly elongate.

SIKKIM; above the Rungait, alt. 2000 ft.; *Herb. Griffith*, C. B. Clarke, Dr. Treutler.

Rootstock of a few tubers. *Stem* erect, usually elongate above the leaves, pubescent, whole plant 12–18 in. *Leaves* 2–3 by 3–4 in., nearly equally cordate, minutely denticulate-ciliate, closely pubescent above, rufous-villous on the nerves beneath; petiole of the cauline leaf usually short often less than 1 in.; stipules lanceolate, pubescent. *Peduncle* elongate, very pubescent, bright rose-red, often rising 6 in. above the highest leaf; bracts oblong-lanceolate, persistent, very hairy, laciniated, sometimes divided to the base. *MALE*: sepals 2, pubescent; petals 2, smaller; stamens shortly monadelphous, about 50; anthers obovoid; connective not produced. *FEMALE*: perianth of 5 (or 6) segments, outer larger, pubescent; styles 3, nearly separate, each divided half-way up into two tortuose branches. *Capsule* large, very pubescent, length $\frac{1}{2}$ in., wings not very unequal about $\frac{1}{4}$ in. broad (but the capsule not well ripe). *Seeds* (not well ripe) like those of *B. picta* but narrower.—A very beautiful plant with bright rose flowers.

** *Ovary and capsule glabrous* (except sometimes in 12, *B. Josephi*).

11. **B. Evansiana**, Andr. *Bot. Rep.* t. 627; stem elongate, leaves ovate-cordate acute unequal at the base, bracts glabrous oblong-obovate, capsule with three unequal wings. *Bot. Mag.* t. 1473; *A. DC. Prodr.* xv. pt. i. 313. *B. obliqua*, *Thunb.*; *Banks Ic. Kämpf.* t. 20. *B. sinensis*, *A. DC. l. c. ex descr.*

PINANG; *Evans* ex Andrews.—DISTRIB. Java, China, Japan.

Rootstock tuberous (ex A. DC.). *Stem* 2 ft., nearly glabrous; peduncles from the upper axils, elongate, several times dichotomous. *Leaves* 3-6 in., somewhat angular and denticulate; petiole 2-6 in.; stipules ovate-lanceolate, glabrous. *Flowers*, bracts, and pedicels rose. *MALE*: sepals 2, round, glabrous; petals 2, smaller; stamens very many (more than 50), long monadelphous; anthers obovoid; connective not produced. *FEMALE*: perianth-segments 5, glabrous, inner smaller; styles 3, nearly distinct, divided about half-way into two tortuous branches. *Capsule* $\frac{3}{4}$ by $1\frac{1}{4}$ in. including the wings, the faces ribbed down the middle; styles persistent; wings slightly ascending; capsule dehiscing by two valves on each face, one valve on either side of the central rib.—There is no example from Pinang in the Kew Herbarium.

12. **B. Josephi**, A. DC. *Prodr.* xv. pt. i. 313; little hairy, leaves ovate little unequal at the base peltate (at least when young), capsule 3-winged, one wing much the longer. *B. scutata*, Wall. *Cat.* 3686 A, not of A. DC.

SIKKIM, alt. 3000-8000 ft., the commonest species. KHASIA Mts., alt. 4000-6000 ft.; *H. f. & T.*

Very variable in size and habit, stemless or stem leafy, always easily recognised by the peltate leaves. *Rootstock* of one or few tubers. *Stem* generally 0. Radical leaves (on petioles 4-10 in.) often 6 in., sometimes nearly regularly ovate acuminate, acutely 3-lobed or orbicular with numerous acute lobes, serrate or doubly serrate or less often almost entire, usually nearly glabrous but often slightly pubescent on the nerves beneath sometimes weakly pilose above; stipules ovate, deciduous, glabrous or nearly so. *Scape* 1 ft., usually repeatedly dichotomous with long lower branches, soon entirely naked; bracts caducous, caulescent and leafy; flowers rather small, rose. *MALE*: sepals 2, caducous; petals 2, smaller; stamens shortly monadelphous, sometimes 8-30; anthers obovoid; connective not produced. *FEMALE*: perianth-segments 4-6; styles 3, nearly separate, 2-fid near the top, stigmas in large specimens 2 tortuous, in small simple lunate. *Capsule* $\frac{1}{2}$ by $\frac{3}{4}$ in. including the wings, styles persistent, upper margin of the wing horizontal, narrow between the two very narrow wings, the other faces broader below; dehiscing first by 4 lines, two on either side of each of the two narrow wings. *Seeds* short-ellipsoid.—All three varieties are equally common in Sikkim and pass into each other: only the typical has been collected in Khasia. The plant is believed to be very plentiful in West Bhotan and East Nipal, but all the numerous Himalayan examples at Kew are from Sikkim itself. As regards the name: Wallich's Begonias are greatly mixed: even on the same sheets. The three sheets of No. 3686 at Kew are *B. scutata*, A. DC., but the type sheet of *B. scutata* No. 3686 in the Linnean Society's Herbarium is *B. Josephi*, A. DC., which is also mixed with *B. picta* in the sheet of 3685 A.

VAR. 1. *typica*; peduncles elongated, leaves large often lobed, ovary flowers and capsule glabrous. *B. Josephi*, A. DC. l. c.

VAR. 2. *macrocarpa*, A. DC. l. c.; ovary flowers and capsule with lax hairs.—Both large and very small plants occur with a hairy ovary; the fruit is not larger than in the typical form.

VAR. 3. *minima*; scape 2-3 in., leaf small without lobes, ovary usually glabrous.

13. **B. pedunculosa**, Wall. *Pl. As. Rar.* 82, t. 97; *Cat.* 3672 A not B; caulescent with subterminal inflorescence, leaves narrow-oblong acute from an unequally cordate base pilose above, stipules and bracts persistent. A. DC. *Prodr.* xv. pt. i. 314.

KHASIA Mts., alt. 3000-6000 ft., frequent. BHOTAN; *Griffith*.

Rootstock tuberous, or elongate woody. *Stem* erect, 4-8 in., usually with some brown hairs and zigzag, not unfrequently bearing bulbils in the upper axils. *Leaves* 2-3 in., sharply doubly-serrate, pubescent on the nerves beneath; petiole usually short (less than 1 in.) but sometimes elongate; stipules $\frac{3}{4}$ -1 in., ovate, acute, ciliate. *Cyme* repeatedly dichotomous; bracts ovate, acute, ciliate; flowers small, rose-red.

MALE: sepals 2, glabrous or nearly so; petals 2, smaller; stamens shortly monadelphous, about 30, anthers obovoid, connective not produced. **FEMALE**: perianth, lobes 4-5, persistent, somewhat enlarged on the fruit; ovary glabrous; styles 3 nearly separate, divided near the top into two curved branches. *Capsule* scarcely $\frac{1}{4}$ by $\frac{3}{8}$ in. including the wing, upper margin of the longest wing horizontal; capsule dehiscing by its three faces falling off. *Seeds* short-ellipsoid.

14. **B. surculigera**, Kurz in *Flora* 1871, 296; weak, caulescent with terminal inflorescence, leaves cordate-ovate crenate and denticulate, bracts minute ovate persistent, capsule with 3 subequal wings.

BRITISH BURMA; Akyab and Arracan, on low sandstone hills, Kurz.

Weak, succulent, 3-10 in., glabrous or slightly glandular-pubescent, frequently proliferous, or the peduncle going off into a runner. *Leaves* 1-1 $\frac{1}{2}$ by 1-1 $\frac{1}{4}$ in., nearly glabrous, obscurely acuminate, obtuse at the apex, base equal or unequal; petiole $\frac{1}{4}$ in.; stipules small, ovate, glabrous. *Peduncle* weak, terminal, dichotomous, lax, slightly glandular-pubescent. *Flowers* small (white ex Kurz). **MALE**: sepals 2, obovate, glabrous or with few paleaceous hairs; petals 2, much smaller; stamens monadelphous, about 8, anthers obovoid, connective apiculate, but not produced. **FEMALE**: perianth-segments 5; ovary 3-celled, glabrous, placentas bipartite (Kurz); styles 3, nearly distinct, divided only near the top, stigmas lunate. *Capsule* less than $\frac{1}{5}$ by $\frac{3}{8}$ in. including the wings, styles deciduous in the few examples seen, upper margin of the wings convex, dehiscing by its three faces. *Seeds* short-ellipsoid.

15. **B. modestiflora**, Kurz in *Flora* 1871, 296; caulescent, inflorescence terminal elongate and paniced in fruit, leaves ovate-acuminate from a very oblique base denticulate-serrate nearly glabrous, capsule unequally 3-winged. *B. parviflora*, Wall. Cat. 3674.

MORUNG HILLS, NIPAL; Hamilton. BRITISH BURMA: Akyab on sandstone rocks, Kurz. MOULMEIN on limestone rocks, Parish.—DISTRIB. YUNAN.

Glabrous or nearly so. *Rootstock* tuberous. *Stem* erect, sometimes a foot. *Leaves* 3-4 by 2 in., not lobed, caudate-acuminate, base very unequally cordate or very obliquely subtruncate; petiole 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in.; stipules small, lanceolate. *Cymes* elongate, narrow, slightly paniced; bracts small, lanceolate, ciliate, caducous; flowers numerous, small, white. **MALE**: sepals 2, petals 2, smaller; stamens (about 12), free ex Kurz (distinctly monadelphous ex Parish), anthers obovoid, connective slightly produced in a triangular point. **FEMALE**: perianth-segments 5, much enlarged in fruit; ovary glabrous, 3-celled, placentas 2-partite; styles 3, nearly distinct, broader upwards, stigma lunate. *Capsule* rather more than $\frac{1}{2}$ by 1 in. including the wings; styles deciduous; 3 wings prominent, their upper margins horizontal, one often very greatly produced; capsule dehiscing by the three faces. *Seeds* short-ellipsoid.—Kurz placed this species next *B. scutata*, but the 5 female perianth segments refer it to *Knesebeckia* proper, and not to *Trilobaria*, A. DC. Possibly two species are mixed here. Wallich's very immature specimen has exceedingly small flowers and weak inflorescence and is referred by Meissner in ms. to *B. hydrophila*.

16. **B. parvuliflora**, A. DC. *Prodr.* xv. pt. i. 355; stem with 1 or no leaf, leaves round or ovate-cordate subequal at the base, capsule 3-winged one of the wings very long produced. *B. Lobbiana*, A. DC. ms. not *B. Lobbii*, Hassk. *B. velutina*, Parish ms.; Kurz in *Journ. As. Soc.* 1873, pt. ii. 81.

MOULMEIN and MARTABAN; T. Lobb; on limestone rocks, Parish. TENASSERIM; Dr. Stoliczka (ex Kurz).

Rootstock of 1 or 2 tubers. *Stem* 0-2 in., glabrous or nearly so, whole plant 6-12 in. *Leaves* 1-3 in. diam., softly pubescent above and on the nerves beneath, sometimes nearly glabrous, doubly serrate-ciliate or simply crenate; petiole of the cauline leaf $\frac{1}{2}$ -1 in., of the radical leaves often much longer, slightly pubescent; stipules very

small, lanceolate. *Peduncles* 4–10 in., nearly glabrous, laxly dichotomous; bracts $\frac{1}{8}$ – $\frac{1}{4}$ in., lanceolate, sometimes fimbriate; flowers not many, small, white tinged with rose. **MALE**: sepals 2, broad-elliptic, glabrous or with a few scattered hairs; petals 2, narrowly oblong; stamens about 25, monadelphous, anthers obovoid, connective not produced. **FEMALE**: perianth of 5 or 4 segments; styles 3, somewhat combined, each divided into two curved branches. *Capsule* $\frac{1}{2}$ by $\frac{1}{2}$ in. including the wings, one wing very long, margins of all extended horizontally from the summit of the capsule, dehiscing on all three faces. *Seeds* short-ellipsoid.—Kurz (*in Journ. As. Soc.* 1877, pt. ii. 107) keeps *B. parvuliflora* “a caulescent wholly glabrous herb” distinct from *B. velutina* “a scapigerous herb with leaves pilose above:” but A. DC.’s type of *B. parvuliflora* (marked by him *B. Lobbiana*) has the leaves decidedly pilose above and the stems not more caulescent than some of Parish’s *B. velutina*. The only difference between the two is that in *B. velutina* the leaves are often beautifully variegated and doubly serrated; but not always Parish’s specimens.

17. **B. gemmipara**, Hook. f. *Ill. Him. Pl.* t. 14; caulescent, leaves incise-serrate or lobed, peduncles axillary short few-flowered, 2 large round persistent bracts on each pedicel near the flower, seeds with adpressed papillæ. *A. DC. Prodr.* xv. pt. i. 314.

SIKKIM, alt. 6000–11,000 ft.; plentiful round Darjeeling.

Rootstock tuberous. *Stem* 6–16 in., succulent, glabrous. *Leaves* ovate-cordate, acuminate, often with acute or lanceolate lobes, glabrous beneath, often pilose above; petiole 1–3 in.; stipules ovate. *Peduncles* short, axillary, little divided, pedicels longer; flowers pendulous, medium-sized, white or with rose stripes, usually monœcious. **MALE**: sepals 2; petals 2, narrower; stamens numerous, shortly monadelphous, anthers obovoid, connective not produced. **FEMALE**: perianth-segments 5, nearly equal, persistent; styles 3, nearly distinct, broader upwards, stigmas lunate. *Capsule* $\frac{1}{2}$ by $\frac{1}{2}$ in. including the wings, somewhat inflated, with a medial line on each face; wings nearly equal, upper margins horizontal.—In some of the axils the peduncle instead of producing flowers is very shortly once or twice divided, each branch terminating in 4 quadrangular cups, each packed closely with oblong viviparous bulbils. Alph. DC. gives diœcious as a character of his section *Putzeysia*, but this, the only species of that section is, as all other Indian Begonias, monœcious or occasionally diœcious.

18. **B. cordifolia**, Thwaites *Enum.* 129; stemless, leaves orbicular-cordate crenate-serrate, capsule with 3 subequal not broad wings. *A. DC. Prodr.* xv. pt. i. 328; *B. Arnottiana*, *A. DC. l. c.* 322. *Diploclinium Arnottianum* and *cordifolium*, *Wight Ic.* t. 1815, 1816.

SOUTH DECCAN PENINSULA; Courtallum; Wight. CEYLON; Thwaites.

Rootstock tuberous. *Leaves* $1\frac{1}{2}$ –3 in. diam., rarely subacute, nearly equal at the base, pilose above, laxly pubescent on the nerves beneath; petiole 2–5 in., laxly pubescent; stipules $\frac{3}{8}$ in., ovate-lanceolate, glabrous. *Scape* 6 in., repeatedly dichotomous; flowers medium-sized, numerous; bracts $\frac{1}{4}$ in., lanceolate. **MALE**: sepals 2, round; petals 2, smaller, narrow; stamens numerous, shortly monadelphous, anthers obovoid, connective not produced. **FEMALE**: perianth-segments 5–4 (3 in. Wight’s Icon 3-lobed); styles 3, nearly separate, divided half way up into two curved branches. *Capsule* $\frac{3}{8}$ by $\frac{3}{8}$ in. including the wings, perianth deciduous, styles persistent; wings narrow, upper margin rounded or shortly horizontal, dehiscing on all three faces. *Seeds* shortly ellipsoid.—Wight finally united his *D. Arnottianum* with his *D. cordifolium*. Alph. DC. separated them again on the sole ground that *D. Arnottianum* had 4 segments to the female perianth, *D. cordifolium* only 3. But in Wight’s specimens of *B. cordifolium* all the female flowers examined have 5. The var. *insularis* of A. DC. founded on Mr. Thwaites’ No. 3584 has the leaves acute with the nerves beneath more shaggy than in the type.

B. Segments of female flower 3, with sometimes a small fourth; two outer large, third small lateral. (*Trilobaria*, A. DC.)

19. **B. amoena**, Wall. Cat. 3682; leaves ovate or oblong caudate-acuminate equally cordate, capsule-wings nearly equal, seeds slender cylindric, tip curved acute. A. DC. Prodr. xv. pt. i. 327. B. tenella, Don Prodr. 223; Wall. Cat. 3681. B. erosa, Wall. Cat. 3688, partly.

Temperate Central and Western HIMALAYA; alt. 5000-7000 ft. from DALHOUSIE to SIKKIM; among the commonest species at Simla.

Rhizome tuberous. *Stem* usually 0 or very short, in Wallich's specimen nearly 1 ft. *Leaves* 3 by 2 in., glabrous, crenate-serrate; petiole 2-3 in.; stipules ovate, glabrous. *Scape* 3-8 in., glabrous, loosely dichotomous, few-flowered; bracts ovate-oblong, caducous; flowers medium-sized. *MALE*: sepals 2, ovate; petals 2, elliptic, smaller; stamens numerous, shortly monadelphous; anthers obovoid, connective not produced. *FEMALE*: perianth-segments 2, large, ovate, opposite, and one smaller lateral, all enlarged and persistent on the fruit; styles 3, nearly separate, divided near the top into two curved branches. *Capsule* $\frac{3}{8}$ by nearly $\frac{3}{4}$ in. including the wings, styles persistent, upper margins of wings horizontal, dehiscing on all the faces. *Seeds* smooth, reticulated; far more elongate than those of any other Indian species.

20. **B. scutata**, Wall. Cat. 3686, partly; leaves ovate cordate-acuminate often unequal at the base, capsule-wings unequal, larger one much ascending. A. DC. Prodr. xv. pt. i. 328; ? Kurz in Journ. As. Soc. 1877, pt. ii. 108. B. rubella, Wall. Cat. 3687.

NIPAL; Wallich. East Nipal, alt. 4000 ft.; J. D. H. SIKKIM, alt. 4000 ft.; C. B. Clarke. ? BURMA, Kurz.

Nearly glabrous. *Rootstock* tuberous. *Stem* in fruit often leafless, scape-like. *Leaves* 2-6 in., sinuate-toothed or slightly angular not serrate, glabrous or minutely pubescent on the nerves beneath; petiole very long, of the radical leaves often 6 in.; stipules ovate-lanceolate, deciduous. *Scape* or stem reaching 9 in., laxly dichotomous upwards; bracts oblong, acute, caducous; flowers medium-sized, many or few. *MALE*: sepals 2, round; petals 2, narrower; stamens numerous, shortly monadelphous; anthers obovoid, connective not produced. *FEMALE*: perianth-segments 3, 2 larger round opposite, the third smaller lateral, all deciduous; styles 3, nearly distinct, divided about half-way up into two curved branches. *Capsule* nearly $\frac{1}{2}$ by $\frac{3}{4}$ in. including the wings; styles persistent; upper margin of the wings concave, dehiscing by all three faces. *Seeds* short-ellipsoid.

21. **B. ovatifolia**, A. DC. Prodr. xv. pt. i. 328; stem short or 0, leaves ovate sometimes acute more or less serrate equal or scarcely unequal at the base, capsule-wings unequal the larger slightly ascending. B. subovata, Wall. Cat. 3688.

SIKKIM, alt. 4000 ft.; J. D. H.; alt. 1000 ft.; C. B. Clarke, Dr. Treutler. KHASIA Mts., alt. 4000 ft.; H. f. & T.

Rootstock of several tubers; whole plant rarely exceeding 6 in. *Cauline leaf* 1 or 0. *Leaves* 1-2 $\frac{1}{2}$ in. diam., roundish or ovate, cordate or scarcely rounded at the base, pubescent on the nerves beneath; petiole 1-4 in., pilose above, usually pubescent towards its summit; stipules very small, lanceolate. *Peduncles* lax, succulent, glabrous or slightly pubescent, 4-8-flowered; bracts oblong or lanceolate; flowers rather small, white or rose. *MALE*: sepals 2, obovate; petals 2, narrow-obovate; stamens about 20, shortly monadelphous, anthers obovoid, connective not produced. *FEMALE*: perianth-segments 3, 2 obovate subequal, 1 lateral much smaller, deciduous; styles 3, nearly distinct, divided half-way up into two curved branches. *Capsule* $\frac{1}{2}$ by 1 in. including the wings, styles persistent, upper margin of longer wing straight or convex upwards, capsule dehiscing on all three faces. *Seeds* short-ellipsoid.

VAR. *cretacea*; leaves stouter shaggy on the nerves beneath, peduncles firmer, female perianth of 4 segments (almost exactly like the male).—Bhotan; *Griffith*. (Kew Distrib. No. 2583.) Limestone rocks near Cherra in Khasia, alt. 4000 ft.; *C. B. Clarke*.

22. *B. subperfoliata*, *Parish ms.*; *Kurz in Journ. As. Soc.* 1877, pt. ii. 109; stemless, glabrous, leaves ovate crenate-dentate subpeltate prominently reticulated on both surfaces, bracts laciniated acutely.

MOULMEIN, on limestone rocks; *Parish*.

Root tuberous. **Leaf** solitary, radical, $3\frac{1}{2}$ by 2 in., acute not acuminate, hardly serrate, equal at the base, peltate or the auricles only overlapping; petiole 2-4 in. **Peduncle** 3 in. with about 10 small flowers; bracts $\frac{1}{2}$ in., persistent, divided to near the base or sharply serrate. **MALE**: sepals 2, elliptic; petals 2, narrow-oblong; stamens about 25, much monadelphous, anthers obovoid, connective not produced. **FEMALE**: perianth very nearly as in the male; styles 3, combined half-way up, stigmas lunate. **Capsule** 3-celled, $\frac{3}{8}$ by $\frac{1}{2}$ in. including the wings, styles persistent, wings 2 short 1 longer, upper margin of each horizontal, dehiscing by all three faces. **Seeds** short-ellipsoid.

23. *B. moulmeinensis*, *C. B. Clarke*; stemless, very pubescent throughout, leaves ovate serrate, bracts incise-serrate or laciniate.

MOULMEIN; *T. Lobb* No. 380.

Closely resembling *B. subperfoliata*. The specimens which are in bud differ in pubescence and in the leaf being slightly cordate (not at all peltate), serrate, almost lobed, and not prominently reticulate on either surface.

24. *B. fallax*, *A. DC. Prodr.* xv. pt. i. 329; glabrous or nearly so, leaves elliptic acuminate angular toothed very unequal at the base, capsule equally 3-winged wings narrow their upper margins shortly horizontal. *Diploclinium Lindleyanum*, *Wight Ic.* t. 1817.

SOUTH DECCAN PENINSULA; **COURTALLUM** and **MALABAR**; *Wight*.

The branch figured by *Wight* is 8 in. long with a peduncle from a lower axil and *A. DC.* conjectures the plant may be suffrutescent. **Leaves** 4 by 2 in.; petiole 1 in.; stipules oblong, deciduous. **Peduncle** many times dichotomous, many-flowered, shorter than the leaf; bracts numerous, minute; flowers medium-sized. **MALE**: sepals 2, rounded; petals 2, narrow-elliptic; stamens numerous, shortly monadelphous, anthers obovoid, connective not produced. **FEMALE**: perianth-segments 3, 2 large round, 1 small narrow lateral; styles 3, nearly separate, divided half-way up into two curved branches. **Capsule** $\frac{1}{2}$ - $\frac{3}{4}$ in. long and broad including the wings. **Seeds** shortly-ellipsoid, somewhat obovoid.—Not seen: the above is drawn up from *Wight's* figure: the plant is of the section *Trilobaria* if all *Wight's* details are without error.

SECT. IV. *Platycentrum*. **Capsule** 2-celled compressed, triquetrous, having one broad and two narrow papery wings; dehiscing by the falling away of the faces between the wings; placentas 2-fid.

A. Female perianth-segments 4-3.—Genus *Meziera*, *A. DC.*

25. *B. gigantea*, *Wall. Cat.* 3677; stem tall unbranched glabrous upwards, peduncles from the upper axils glabrous, male sepals 2. *Meziera nepalensis*, *A. DC. Prodr.* xv. pt. i. 406.

NIPAL; *Wallich*. **SIKKIM**, alt. 3000-6000 ft.; *Herb. Griffith, J. D. H.*; alt. 1000-4000 ft., frequent, *C. B. Clarke*.

Rootstock thick, woody, not tuberous. **Stem** 2-3 ft., rarely branched. **Leaves** 9-12 by 3 in., caudate-acuminate (sometimes larger and ovate), undulate, toothed,

pubescent on the nerves beneath otherwise glabrous, base very unequal deeply auricled on one side; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in.; stipules narrow-lanceolate, glabrous, deciduous. *Peduncles* short, dichotomous, with many rather small white or pale pink flowers; bracts ovate, acute, deciduous. **MALE**: sepals 2, ovate, subacute, glabrous; petals 0; stamens about 40, shortly monadelphous, anthers obovoid, connective not produced. **FEMALE**: perianth-segments 3, 2 outer ovate subacute resembling but smaller than the male sepals, inner small lateral; ovary (at the time of expanding of the flower) completely 2-celled with 2-fid placentas (exactly as in *Platycentrum*); styles 2–3 (sometimes 4, A. DC.) nearly free, or one free the other two combined, sometimes simply branched upwards, often 3–4-fid and more or less contorted. *Capsule* $\frac{3}{4}$ by 1 in. including the wing, styles persistent, oblong, concave upon its narrow face (between the two very narrow wings), broad wing extending the whole length of the capsule, its upper margin horizontal convex, narrow face first falling away. *Seeds* ellipsoid.—This is the largest Indian *Begonia*: the description and remarks of Alph. DC. must have been founded upon very imperfect materials.

26. *B. episcopalis*, C. B. Clarke; stem tall much branched pubescent upwards, peduncles axillary, male sepals 4. *Mezierea Griffithiana*, A. DC. *Prodr.* xv. pt. i. p. 407.

BHUTAN; *Griffith* (Kew Distrib. No. 2504, 2573). **KHASIA MTS.**, alt. 4000 ft.; *H. f. & T.*, C. B. Clarke.

Leaves 6 by 1 in., narrow-lanceolate, cordate, toothed, membranous, with scattered pubescence above, very pubescent or almost glabrous on the nerves beneath, base very unequal deeply auricled on one side; petiole $\frac{1}{2}$ – $1\frac{1}{2}$ in.; stipules $\frac{3}{4}$ in., very persistent, lanceolate, subulate, glabrous. *Inflorescence* often from the middle and lower axils in short dichotomous peduncles, usually pubescent; bracts oblong-lanceolate, glabrous, persistent; flowers somewhat numerous, rather small. **MALE**: sepals 2, ovate; petals 0; stamens about 40, shortly monadelphous, anthers obovoid, connective not produced. **FEMALE**: perianth-segments 4, 2 outer ovate, 2 inner narrow-oblong; styles 3 or 2, nearly free at the base, divided into long curved branches. *Capsule* as in *B. gigantea* but the upper margin of the larger wing is concave and somewhat descending. *Seeds* short-ellipsoid.—In Griffith's Bhotan examples, the stems upwards peduncles and leaves on both surfaces are very pubescent, and the petioles are $\frac{1}{2}$ – $\frac{1}{4}$ in.; Clarke's examples (from Bishop's Falls, Shillong) are very nearly glabrous with the petioles $1\frac{1}{2}$ in. The Khasia examples of *H. f. & T.* are intermediate.

B. Female perianth-segments 4–6.—Sect. *Platycentrum*, A. DC.

* *Connective produced above the anther-cells.*

27. *B. xanthina*, Hook. Bot. Mag. t. 4683; leaves large ovate denticulate and angular not ciliate-serrate, petiole hairy, cyme and ovary nearly glabrous, flowers yellow. A. DC. *Prodr.* xv. pt. i. 347. *B. xanthina*, var. *pictifolia*, *Bot. Mag. t. 5102*. *B. xanthina*, var. *Lazuli*, *Bot. Mag. t. 5107*.

EAST SIKKIM, alt. 4000–5000 ft.; *J. D. H.* Dumsong, **BHUTAN**, alt. 6000 ft.; C. B. Clarke.

Rhizome thick. *Stem* (in the wild examples) 0. *Leaves* 6–8 in., acute, unequally cordate at the base, pubescent on the nerves beneath, otherwise nearly glabrous; petiole 3–4 in.; stipules ovate, acute, glabrous or pubescent. *Scape* 1 ft. with spreading hairs below, nearly glabrous upwards; bracts at its first division $\frac{3}{4}$ in., oblong-lanceolate, glabrous; flowers medium large, full yellow (in the wild examples). **MALE**: sepals 2, round; petals 2, elliptic; stamens about 100, shortly monadelphous; connective produced, triangular. **FEMALE**: perianth-segments 5, outer round, inner gradually smaller; styles 2, shortly combined below, each dividing half-way up into two tortuous branches; ovary (in the wild specimens) glabrous. *Capsule* with the unequal wing very much elongated, descending, its upper margin concave.—In some cultivated specimens, the stem is elongated and leafy.

28. **B. rubro-venia**, Hook. Bot. Mag. t. 4689; caulescent, leaves elliptic or lanceolate acuminate entire or slightly angular undulate outer perianth-segments white with rose-red veins. A. DC. Prodr. xv. pt. i. 347. B. barbata, Wall. Cat. 3679 B, partly.

SIKKIM, BHOTAN and KHASIA Mts., alt. 3000-6000 ft., frequent.

Rootstock thick. *Plant* 8-16 in., stem puberulous or minutely pubescent. *Leaves* 3-6 in., usually narrow, sometimes elliptic, shortly pubescent on the nerves beneath otherwise glabrous, base unequal rounded scarcely cordate; petiole 1-2 in.; stipules persistent, lanceolate, caudate, glabrous. *Peduncles* axillary, 3-6 in., usually divided only near the top and few-flowered; bracts like the stipules and persistent; flowers medium-sized. *MALE*: sepals 2, rounded; petals 2, narrower, white; stamens numerous, very shortly monadelphous; connective produced, obtuse. *FEMALE*: perianth-segments 5, 3 inner gradually smaller, white; ovary glabrous; styles 2, combined at the base, very tortuous. *Capsule* $\frac{1}{2}$ - $\frac{5}{8}$ by 1-1 $\frac{1}{2}$ in. including the wings, often recurved in fruit, the broad wing much descending its upper edge concave; broader faces first falling away. *Seeds* ellipsoid.

VAR. Meisneri, Wall. Cat. 6294; shortly caulescent, leaves linear-lanceolate very tomentose on the nerves beneath.—Khasia Mts., Wallich; alt. 3500 ft., C. B. Clarke. —*Leaves* 2-4 by $\frac{1}{2}$ - $\frac{1}{2}$ in.; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in., pubescent, tomentose. *Flowers* and *capsules* like those of *B. rubro-venia* but smaller. Wallich's type examples look like a distinct species, but the examples of *C. B. Clarke* connect the two.

29. **B. laciniata**, Roxb. Fl. Ind. ii. 649; caulescent, leaves roundly ovate acutely lobed with soft pubescence, petioles brown-tomentose, outer perianth-segments rose-red pubescent on the back, ovary pubescent. Bot. Mag. t. 5021; A. DC. Prodr. xv. pt. i. 347; Wall. Cat. 3678; Kurz in Journ. As. Soc. 1877, pt. ii. 107. ? *B. palmata*, Don Prodr. 223. *B. Bowringiana*, Champ. in Hook. Kew Journ. iv. 120; Bot. Mag. t. 5182.

NIPAL to BURMA; ascending in SIKKIM to 7000 ft. Very common in KHASIA and CHITTAGONG.—DISTRIB. South China.

Rootstock long, creeping, neither woody nor tuberous. *Stem* 6-24 in., more or less brown-tomentose. *Leaves* 4-6 in. diam., always more or less lobed, lobes usually many, caudate-acuminate, often 2 in. long, ciliate, usually but slightly serrate, rounded or cordate more or less unequally at the base, pilose above, pubescent on the nerves beneath and more or less villous or tomentose; petiole 1 $\frac{1}{2}$ -4 in.; stipules $\frac{3}{4}$ in., persistent, lanceolate, mucronate, pubescent. *Peduncles* 3-6 in., usually from one or two uppermost axils, tomentose; bracts large, oblong, tomentose; flowers medium, not very many, always more or less glandular-pubescent on the back, from nearly white to deep rose. *MALE*: sepals 2, long-elliptic; petals 2, narrowly obovate; filaments nearly free, about 50, anthers obovoid; connective little produced, obtuse. *FEMALE*: perianth-segments 5-4, inner gradually smaller; ovary with pubescent, not mere glandular, roughness; styles 2, divided from near the base into 2 much contorted branches. *Capsule* $\frac{1}{2}$ by 1 in. including the wings, often recurved in fruit, with a descending wing; dehiscing by 4 lines adjacent to, and one on each side of, the two narrow wings. *Seeds* ellipsoid, somewhat obovoid.

VAR. ? flava; flowers full yellow, leaves green finely serrate, ovary and sepals pubescent or nearly glabrous.—Sikkim, alt. 5000 ft.; J. D. H., Treutler; Darjeeling, 7000 ft. alt.; C. B. Clarke; Herb. Griffith (Kew Distrib. No. 2577).—Perhaps a species: the plant has not the brown-red tint of *B. laciniata*, the leaves are thinner and less softly hairy. Alph. DC. doubts the correctness of the colour of the flowers; it is a full deep yellow as noted on the specimens of J. D. H. and C. B. Clarke, and as shown in the excellent figure of Cathcart preserved at Kew.

VAR. tuberculosa; ovary with glandular tubercles not pubescent, flowers pale pink glabrous.—Sikkim, alt. 6000 ft.; J. D. H., Treutler.

30. **B. barbata**, Wall. Cat. 3679 A and part B; caulescent, leaves not lobed, ovate acuminate hispid beneath denticulate ciliate, bracts cyme and ovary pubescent. *A. DC. Prodr.* xv. pt. i. 348; *not of Kurz.*

From SILHET and CACHAR to BURMA, alt. 0–2000 ft. CHITTAGONG, abundant in the hills.

Rootstock creeping, not thick, nor tuberous. *Stem* decumbent, usually short, with much spreading brown hair. *Leaves* 2–5 in., unequal cordate at the base, hispid on both surfaces, margin very entire; petiole 1–4 in., with spreading hairs; stipules persistent, lanceolate-subulate, ciliate. *Peduncles* from the upper axils, not more than 3 in., pubescent to the summit except in ripe fruit, few-flowered; flowers medium, white to pink. *MALE*: sepals 2, ovate, pubescent; petals 2, narrowly obovate; stamens 50 or more, scarcely monadelphous, anthers obovoid; connective much produced, ovate-oblong. *FEMALE*: perianth-segments 5, outer pubescent, inner gradually smaller; ovary shaggy. *Capsule* $\frac{1}{2}$ by 1 in. including the wings, hairy at least until the seeds are scattered, recurved in fruit with a descending wing, dehiscing by four lines one on either side of the two narrow wings. *Seeds* ellipsoid, brown.

31. **B. megaptera**, *A. DC. Prodr.* xv. pt. i. 348; caulescent, glabrous or very nearly so, leaves cordate-ovate acuminate undulate angular hardly serrate. *Kurz in Journ. As. Soc.* 1877, pt. ii. 108. *B. malabarica*, Wall. Cat. 3676 D.

NIPAL; Wallich. SIKKIM, alt. 2000–8000 ft., frequent. EAST BENGAL, Patkoye summit, Griffith. MARTABAN HILLS; *Kurz.*

Rootstock thick, woody. *Stem* erect, 12–18 in. when well developed. *Leaves* 4–6 in., unequal at the base, nerves beneath and petiole unusually glabrous; petiole 1–4 in.; stipules lanceolate-subulate, glabrous, persistent. *Peduncles* elongate, from the upper axils, often 8 in.; bracts large, oblong, glabrous, caducous; flowers large, not very many, pink. *MALE*: sepals 2, ovate; petals 2, ovate, little smaller; stamens 50 or more, monadelphous, anthers obovoid; connective produced, obtuse. *FEMALE*: perianth-segments 5, nearly equal; styles 2, long, combined at the base, with long tortuous branches. *Capsule* and seeds as in *B. rubro-venia*.

32. **B. sikkimensis**, *A. DC. Prodr.* xv. pt. i. 349; caulescent, glabrous or nearly so, leaves round lobed often nearly to the base lobes often again incised or lobed.

SIKKIM, alt. 3000–7000 ft.; *J. D. H.*; *C. B. Clarke.*

Rootstock thickened, woody. *Stem* erect, 12–18 in. when well developed. *Leaves* 4–6 in. diam., not very unequal nor very cordate at the base, denticulate-ciliate; petiole 1–4 in., glabrous; stipules nearly 1 in., lanceolate-linear. *Peduncles* from the upper axils, elongate, often 6–9 in.; bracts elliptic, deciduous, bright-red, as are the pedicels and flowers; flowers medium, not very many. *MALE*: sepals 2, ovate; petals 2, elliptic, smaller; stamens 50 or more, monadelphous; anthers obovoid; connective produced, triangular, obtuse. *FEMALE*: perianth-segments 5, inner bright-red gradually smaller; styles 2, combined at the base, branches very tortuous. *Capsule* and seeds as in *B. rubro-venia*.

33. **B. Cathcartii**, Hook. f. *Ill. Him. Pl.* t. 13; caulescent, leaves cordate-ovate acute glabrous beneath except a few paleaceous hairs on the nerves, peduncles and petioles with deflexed paleaceous hairs, ovary pubescent. *A. DC. Prodr.* xv. pt. i. 349. *B. nemophila*, *Kurz in Journ. As. Soc.* 1877, pt. ii. 108. *Begonia* sp. *Griff. Notul.* iv. 583 and *Ic.* t. 612.

SIKKIM, alt. 3000–8000 ft.; *J. D. H.*; *C. B. Clarke.* BIRMA; Griffith (Kew Distrib. No. 2582); *Kurz.* MOULMEIN; *Parish, Thos. Lobb.*

Near *B. barbata* and best distinguished by the hairs on its stems petioles and peduncles, which are numerous but scattered, long from a lanceolate paleaceous base

and deflexed, by the leaves much less hairy beneath, often quite glabrous; stipules nearly or quite glabrous. Flowers fruit and seeds as in *B. barbata*.

34. **B. Thomsonii**, *A. DC. Prodr.* xv. pt. i. 349; caulescent, leaves ovate acuminate hispid beneath denticulate-ciliate not lobed, petioles densely shaggy, bracts cyme and ovary shaggy.

KHASIA Mts., alt. 3000-4000 ft.; *Griffith* (Kew Distrib. No. 2570); *Hk. f. & T.*; *C. B. Clarke*.

This only differs from *B. barbata* by being everywhere more hairy, the petioles are densely shaggy as is the stem.—One example referred here of Griffith's has the stem and petioles covered with a close brown tomentum without any spreading hairs, and appears much more different from *B. Thomsonii* than is *B. Thomsonii* from *B. barbata*.

35. **B. Griffithii**, *Hook. Bot. Mag.* t. 4984; stemless, leaves cordate-ovate acute pubescent beneath hardly ciliate on the margin, peduncle bracts ovary and flowers pubescent. *A. DC. Prodr.* xv. pt. i. 349.

BHOTAN; *Griffith* No. 2505 (Kew Distrib. No. 2571).

Appears to be a variety of *B. barbata* or *B. Thomsonii* with an abbreviated stem. The capsules are not ripe but are very like unripe capsules of *B. barbata*. The leaves are much less ciliate barbate on the margin than in *B. barbata*. But for the great authority of Alph. DC., the three *B. barbata*, *B. Thomsonii* and *B. Griffithii* might be united.

36. **B. Rex**, *Putzeys in Fl. des Serres*, t. 1255, 1256; stemless, leaves cordate-ovate acute pubescent on the nerves beneath, peduncle upwards bracts ovary and flowers glabrous. *Bot. Mag.* t. 5101; *A. DC. Prodr.* xv. pt. i. 350.

ASSAM and MISHMEE; *Griffith* (Kew Distrib. No. 2588, 2589, 2591, 2592); *Masters*.

Leaves 4-6 in., unequal at the base, undulate, ciliate-denticulate, with a few scattered hairs above; petiole 1-4 in. with spreading hairs. Scapes 4-9 in., glabrous except a few hairs near the base; flowers medium, rose, not very many. MALE: sepals 2, ovate; petals 2, elliptic; stamens numerous, monadelphous, anthers ob-ovoid; connective produced, acutely triangular. FEMALE: perianth-segments 5, inner gradually smaller; styles 2, combined below, branches very tortuous. Capsule $\frac{1}{2}$ - $\frac{3}{4}$ by 1-1 $\frac{1}{2}$ in. including the wings: much as that of *B. rubro-venia*.—The whole plant is much less hairy than *B. barbata* and the allied species: the capsule is glabrous and its body is less than half the diameter of the pubescent capsules of *B. Griffithii*.

37. **B. brevicaulis**, *A. DC. Prodr.* xv. pt. i. 350; stemless, leaves cordate broad-ovate obtuse or scarcely acute, petioles scape flowers and ovary glabrous or very nearly so.

KHASIA; Terai, alt. 1000 ft.; *H. f. & T.*

Flowers and fruit much smaller than in any of the preceding species of this section. Rootstock tuberous. Leaves 1-3 $\frac{1}{2}$ in., nearly orbicular, not very unequal at the base, crenate-denticulate, hardly ciliate, glabrous or with a few scattered hairs above, rarely with minute pubescence on the nerves beneath; petiole 1-3 in., succulent; stipules oblong, acute, glabrous. Scape 3-6 in., sometimes with a small leaf above the base, weak, succulent, with few small flowers; bracts ovate, acute, very small. MALE: sepals 2, round; petals 2, narrower; stamens about 25, shortly monadelphous, anthers oblong; connective much produced, obtuse. FEMALE: not seen. Capsule $\frac{1}{2}$ by $\frac{1}{2}$ in., recurved, styles deciduous; two smaller wings very narrow, broader wing descending its upper margin concave very thin; dehiscing by 4 lines one on either side of each of the two narrower wings. Seeds short-ellipsoid.—This species resembles in habit many of the sections *Parvibegonia* and *Knesebeckia*, and is very unlike any *Platycentrum* with a produced connective.

** *Connective not produced above the anther-cells.*

38. **B. integrifolia**, Dalz. in Hook. *Kew Journ.* iii. 230; caulescent, leaves ovate-oblong nearly entire ciliate very unequally cordate, petioles succulent laxly pubescent, inflorescence glabrous. *A. DC. Prodr.* xv. pt. i. 351; Dalz. & Gibs. *Bomb. Fl.* 104.

Western Ghauts from BOMBAY to MYSORE; Law, Dalzell, &c. MOULMEIN; Parish.

Rootstock tuberous. *Stem* 6-12 in., succulent. *Leaves* 3-6 in., hardly acute, pilose above, laxly pubescent on the nerves beneath, finely ciliate; petiole 1-5 in.; stipules lanceolate, upper ones glabrous lower with lax hairs. *Peduncle* as though terminal; flowers white, medium-sized, not very many; bracts broad, ovate, lower with some lax hairs, upper glabrous. *MALE*: sepals 2, round; petals 2, narrow-oblong; stamens about 50, monadelphous, anthers obovoid. *FEMALE*: perianth-segments 5, inner gradually smaller; styles 2, combined below, branched and much twisted upwards. *Capsule* $\frac{3}{8}$ by $\frac{3}{8}$ - $\frac{1}{2}$ in. including the wings, recurved, smaller wings very narrow, broad wing descending, dehiscing primarily by the narrow face. *Seeds* short-ellipsoid.—Alph. DC. gives Ceylon as a locality, quoting Thwaites No. 2597, which is Thwaites's *B. subpeltata*.

39. **B. guttata**, Wall. *Cat.* 3671 A; caulescent, leaves ovate-oblong nearly entire not ciliate, petioles pubescent, inflorescence glabrous. *A. DC. Prodr.* xv. pt. i. 352.

PINANG; Wallich. MALAYA; Maingay No. 675 partly.

Differs from *B. integrifolia* only in having the leaves nearly without cilia: the flowers appear somewhat smaller, but the two species are probably one. Wallich's specimen is very large with a thick woody rootstock, the petioles 10 in.

40. **B. procridifolia**, Wall. *Cat.* 6292; nearly glabrous, stem erect simple, leaves subsessile oblong acuminate entire or denticulate. *A. DC. Prodr.* xv. pt. i. 352; Kurz in *Journ. As. Soc.* 1877, pt. ii. 108.

MARTABAN; near Tavoy, Wallich.

Rootstock fibrous. *Stem* 6-9 in., weak. *Leaves* 3-5 by $\frac{1}{2}$ -1 $\frac{1}{2}$ in., very unequal at the base, glabrous beneath, sometimes with a few scattered hairs above; petiole $\frac{1}{10}$ - $\frac{1}{4}$ in.; stipules $\frac{1}{2}$ in., oblong, acuminate. *Peduncles* from the upper axils, hardly so long as the leaves; bracts ovate, deciduous. *MALE*: sepals 2, $\frac{1}{8}$ in., round, rose-coloured; petals 2, smaller, narrow-obovate; stamens many, monadelphous, anthers obovoid; connective not produced. *FEMALE*: not known. *Capsule* more than $\frac{1}{2}$ by $\frac{1}{2}$ in. exclusive of the wings, recurved; styles deciduous; the two narrow wings ovate the broad wing much descending.—This may, in the absence of female flowers, belong to the section *Mezierea*, but the ovate narrow wings of the capsule suggest the present section where it has been placed by Alph. DC.

41. **B. goniotis**, C. B. Clarke; nearly glabrous, stem elongate branching, leaves narrow-oblong caudate excessively unequal at base.

BURMA, alt 3700-4000 ft.; Griffith (*Kew Distrib.* No 2579).

Stem 2 ft. *Leaves* 5-6 by $\frac{3}{4}$ -1 in., nearly entire or serrate near the apex, one auricle excessively produced backwards often in an angular or quadrate form; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; stipules persistent, ovate, acute, mucronate not acuminate, cordate. *Peduncles* axillary, few-flowered, glabrous; bracts deciduous. *Flowers* not seen. *Capsule* $\frac{1}{2}$ by 1 $\frac{1}{4}$ in. including the wings, glabrous, recurved; styles deciduous; the two narrower wings more than $\frac{1}{2}$ in. broad towards the top of the capsule, the larger descending, dehiscing by 4 lines, one on either side of the narrower wings. *Seeds* short-ellipsoid.—The breadth of the narrower wings of the capsule renders it unlikely that this is a *Mezierea*; but the habit is that of *B. piscopolis*, No. 26.

42. **B. sandalifolia**, C. B. Clarke; nearly glabrous, stem elongate, leaves oblong acute very unequal at the cordate base.

BURMA; Griffith (Kew Distrib. No. 2585).

Rootstock not much thickened, nor tuberous. Stem 15 in., glabrous except the extremities of the branches. Leaves 5-6 by $1\frac{1}{2}$ -2 in., nearly entire or serrate, pubescent on the nerves beneath, otherwise glabrous; petiole $\frac{1}{2}$ -1 in., pubescent; stipules oblong, acute, persistent, glabrous. Peduncles near the end of the branches, few-flowered, not elongated; bracts large, elliptic, glabrous; pedicels slightly pubescent. MALE: sepals 2, round, nearly $\frac{3}{4}$ in. diam., with some pubescence; petals 2, oblong; stamens 50 or more; anthers obovoid, emarginate. FEMALE: not seen. Capsule $\frac{3}{4}$ by 1 in. including the wings, glabrous, recurved; styles deciduous; the two narrower wings $\frac{1}{4}$ in. broad and nearly an equal breadth for the whole length of the capsule, the broad wing descending, dehiscing by 4 lines one on either side of the two narrower wings.

SECT. V. **Papyraceæ**. Capsule 2-celled (3-celled in *B. delicatula*), papyraceous dehiscing by the very thin faces breaking up irregularly, placentas 2-fid.—Small plants with small flowers.

A. Ovary 2-celled. Capsule winged, the wings not much produced above or below the cells. Sects. *Parvibegonia*, *Lauchea* and *Monophyllon*, Alph. DC.

43. **B. verticillata**, Hook. Ic. Pl. t. 811; radical leaf 0 at the time of flowering, cauline leaves often whorled, bracts ovate marginal with stalked glands. A. DC. Prodr. xv. pt. i. 353; Kurz in Journ. As. Soc. 1877, pt. ii. 108.

MOULMEIN; Lobb No. 382; Parish.

Glabrous, or the leaves slightly pilose above. Rootstock small, tuberous. Stem erect, 2-6 in., whole plant sometimes 1 ft. Leaves 1-2 in., 3-8 in. a whorl at the summit of the stem, or alternate, oblong-lanceolate, rounded and nearly equal at the base, coarsely crenate-serrate; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; stipules minute, lanceolate. Peduncles 1-4 axillary, slender, with numerous small white flowers; bracts persistent. MALE: sepals 2, round; petals 2, linear-oblong; stamens about 8, long-monadelphous, anthers oblong, connective not produced. FEMALE: perianth-segments usually 4, inner 2 considerably smaller; styles 2, combined at the base, clavate upwards, branches two short simple curved. Capsule less than $\frac{1}{4}$ by $\frac{1}{4}$ - $\frac{3}{8}$ in. including the wings, the two smaller wings exceedingly narrow-linear the larger triangular, its upper margin slightly descending. Seeds shortly-ellipsoid, minutely papillose on the margins of the reticulations of its surface.

44. **B. prolifera**, A. DC. Prodr. xv. pt. i. 353; glabrous, radical leaf 0 at the time of flowering, cauline solitary sessile, peduncles 1-4 axillary. Kurz in Journ. As. Soc. 1877, pt. ii. 108. ? B. Finlaysoniana, Wall. Cat. 3684.

MOULMEIN; Lobb No. 381; on limestone rocks, Parish. ? PINANG, Finlayson.

Rootstock a tuber. Stem $\frac{1}{2}$ -4 in. Leaf 3-8 in. diam., round-ovate, acute, nearly equally deeply cordate. Peduncles 2-10 in., repeatedly dichotomous; bracts hardly $\frac{1}{4}$ in., ovate. MALE: sepals 2, broad-elliptic, rose-coloured, sometimes slightly hairy; petals 2, oblong; stamens about 12, much monadelphous, anthers oblong, connective not produced. FEMALE: perianth of 5 much imbricated segments; styles 2, branches two incurved. Capsule $\frac{1}{2}$ by $\frac{1}{2}$ in. including the wings, recurved; styles deciduous; two smaller wings very narrow above, enlarged and produced below, the upper margin of the larger nearly horizontal from the top of the capsule. Seeds globose.—A. DC. describes this plant as stemless, on theoretic grounds, considering that the apparent stem is formed by a complete adhesion of the petiole to the scape, and supporting this view by the statement that there are no stipules at the point whence the peduncles spring. If there were none at that point it would not establish the

above view, but there are two small ovate acute bracts placed at that point.—*B. Finlaysoniana* possibly belongs here: but the example is very imperfect and the leaves are 2-3, some of them petioled.

45. ***B. paleacea***, Kurz in *Flora* 1871, 297; cauline leaf 1 obliquely cordate-ovate or orbicular, petioles and inflorescence with short paleaceous hairs, capsule winged below.

MARTABAN; Attaran Valley; Brandis.

An erect low herb, simple or nearly so, succulent; rootstock tuberous. Leaf 3-6 in., sometimes proliferous, obtuse or obtusely acuminate, entire or deeply crenate, often finely ciliate, membranous, glabrous or sometimes papillose and hairy on the nerves beneath; petiole $\frac{1}{2}$ -1 in. or 0; stipules lanceolate, acuminate, pilose. Cymes long-peduncled, slender, few-flowered, springing from the base of the ribs of the leaves; pedicels capillary, glandular-pubescent; flowers small, white; bracts of the male flowers $\frac{1}{2}$ in., broad-ovate, obtuse, glabrous, deciduous, the female smaller, lanceolate, acuminate, pilose, more persistent. MALE: sepals $\frac{1}{2}$ in., broadly round, slightly hairy without; petals a little smaller; stamens many, monadelphous, anthers obovoid, emarginate. FEMALE: styles 2, connate, shortly 2-lobed. Capsule nearly $\frac{1}{2}$ in., glabrous or slightly hairy, oblong, 2-celled, 3-winged; wings $\frac{1}{2}$ in. broad, truncate at the apex, or the medial wing twice as broad; placentas 2-fid.—The above copied from Kurz, who has placed the species between *B. prolifera* and *B. sinuata*; the very imperfect specimen communicated seems *B. integrifolia*, No. 38.

46. ***B. sinuata***, Wall. Cat. 3680; caulescent, leaves cordate-ovate covered on both surfaces by minute but thickly placed stellate hairs, capsule winged below. A. DC. Prodr. xv. pt. i. 354; Kurz in Journ. As. Soc. 1877, pt. ii. 108. Diplocinium biloculare, Wight Ic. t. 1814. *B. guttata*, elongata, and subrotunda, Wall. Cat. 3671 B, 6291, 6293.

PINANG; Wallich, &c. TENASSERIM, Parish, &c. MALAYA; Maingay No. 674.

Rootstock small with small tubers. Whole plant 10 in. but more often quite small, covered (except the upper part of the cymes) with much minute stellate pubescence. Stem 1-6 in. Leaves 1-5 in. diam., nearly equal at the base, denticulate-sinuate; petiole $\frac{1}{2}$ -3 in. or 0; stipules less than $\frac{1}{2}$ in., lanceolate, acuminate, stellately pubescent. Cymes weak; lower bracts lanceolate, stellately hairy; upper often quite glabrous, sometimes lobed; flowers not very numerous, small, pink, glabrous. MALE: sepals 2, roundish; petals 2, narrower, obovate; stamens about 20, much monadelphous, anthers obovoid, connective not produced. FEMALE: perianth-segments 5, inner gradually smaller; styles 2, combined half-way up, stigmas lunate. Capsule $\frac{1}{4}$ by $\frac{3}{8}$ in. including the wings; wings from the lower part of the capsule, two smaller triangular acute. Seeds short-ellipsoid, somewhat obovoid.

47. ***B. andamensis***, Parish ms.; caulescent, nearly glabrous, leaves cordate-orbicular shortly petioled or the upper sessile; capsule winged below.

ANDAMANS and MOULMEIN; Parish.

Rootstock tuberous. Stem erect, whole plant 6-10 in. Leaves 1-4 in. diam., entire or minutely closely denticulate, equal at the base, with few lax hairs on the nerves beneath, sometimes minutely pilose above; petiole of the radical leaves elongate, of the cauline usually 0- $\frac{3}{4}$ in.; stipules small, ovate, acute, glabrous. Peduncles very glabrous upwards; bracts very small, ovate, acute; flowers not very many, rose-coloured, rather larger than in the allied species. Flowers capsule and seeds almost identical with those of *B. sinuata* but the styles are less combined.—The capsule is quite membranous but shows a tendency to dehisce along either side of the narrow wings, exactly as in *Platycentrum*: and the present species (with *B. sinuata*) seems closely allied to the small species of that section. This species is reduced to *B. sinuata* by Kurz, but it does not exhibit the stellate hairs on the upper surface of the leaf and the flowers are much larger.

48. **B. martabanica**, A. DC. *Prodr.* xv. pt. i. 354; caulescent, leaves petioled cordate-ovate, petioles and nerves of the leaves beneath pubescent. *Kurz in Journ. As. Soc.* 1877, pt. ii. 108.

MOULMEIN; *Lobb* No. 393; *Helpfer* (Kew Distrib. No. 2575).

This differs from *B. sinuata* by the absence of the stellate pubescence: and from *B. andamensis* in the leaves being longer-petioled, none sessile, more acute with a serrate ciliate margin; and in the generally greater pubescence; the stipules being pubescent and the lower bracts often ciliate or fimbriate.

49. **B. Parishii**, C. B. Clarke; cauline leaves 1-3 all sessile cordate orbicular with lax scattered pubescence above and on the nerves beneath, capsule winged above.

MOULMEIN; on limestone rocks; *Parish*.

Tuber rather large. Erect, nearly 1 ft., stem and lower part of the peduncle with some lax pubescence. *Leaves* $1\frac{1}{2}$ - $3\frac{1}{2}$ in. diam., subequal at the base, crenate-serrate; petiole of the cauline 0, of the radical 2-8 in.; stipules of the cauline $\frac{1}{2}$ in., ovate, acute, ciliate. *Pedicels* and flowers glabrous; lower bracts $\frac{1}{2}$ in., ciliate or fimbriate, ovate, acute. *Flowers* few, medium, rose-coloured. MALE: sepals 2, $\frac{1}{2}$ in., round; petals 2, obovate, narrower, rather shorter; stamens about 40, long-monadelphous, anthers elongate-obovoid, connective not at all produced. FEMALE: perianth of 4 (perhaps of 5) segments; styles 2, long combined, stigmas curved complex. *Capsule* (only half ripe) more than $\frac{1}{4}$ in.—The ripe capsule not being seen, this species may be a *Platycentrum*, as the size of the flowers indicates, but the styles are combined nearly to the base of the stigmas.

50. **B. flaccidissima**, *Kurz in Journ. As. Soc.* 1872, pt. ii. 308; caulescent, minutely sparsely pubescent, leaves petioled cordate orbicular obtuse, petals in the male 0.

TENASSERIM; *Kurz*.

A tender very flaccid herb, 4-5 in. high. *Leaves* 2 in. diam., deeply crenate-dentate, almost lobed; petiole 2-3 in.; stipules hyaline, obtuse, about $\frac{1}{2}$ in. *Cymes* dichotomous, minutely sparsely pubescent; bracts linear, minute; flowers small, white, on capillary pedicels. MALE: sepals 2, $\frac{1}{6}$ - $\frac{1}{4}$ in., rotund-ovate; petals 0; stamens many, very monadelphous, anthers subovoid. FEMALE: perianth-segments 4; styles 2, free from the base, each dilated into a concave semilunate stigma; ovary sparsely and crisply pilose, 2-celled. *Capsule* unknown.—Plant not seen. The above copied from Mr. Kurz. The general description is like that of *B. delicatula*, No. 54.

B. *Ovary* 2-celled. *Capsule* winged, wings irregular and much produced below the cells. *Perianth* accrescent on the fruit. Sect. *Dysmorphia*, A. DC.

51. **B. crenata**, *Dryand. in Trans. Linn. Soc.* i. 162, t. 14, fig. 3; pedicels and young ovary often with minute scattered glandular pubescence, sepals of the male $\frac{1}{4}$ - $\frac{1}{2}$ in. A. DC. *Prodr.* xv. pt. i. 356; *Dalz. & Gibs. Bomb. Fl.* 104. B. *minima*, *Bedd. Ic. Pl.* t. 110.

MALABAR coast, alt. 0-3000 ft., from BOMBAY to WYNAAD. ?TENASSERIM, *Helpfer*, No. 2584.

Nearly glabrous. *Rootstock* slender, tuberous. *Stem* slender, 4-10 in., 1-4 leaved. *Leaves* $1\frac{1}{2}$ -2 in. (sometimes much smaller), ovate, slightly cordate at the base, crenate or serrate, glabrous or with slight pubescence on the nerves beneath; petiole $\frac{1}{2}$ -2 in.; stipules small, ovate, acute, glabrous. *Peduncles* weak; bracts less than $\frac{1}{2}$ in., ovate, acute, glabrous; flowers not numerous, white or pinkish. MALE: sepals 2, elliptic; petals 2, narrower; stamens 8-16, very monadelphous, anthers oblong, connective not produced. FEMALE: perianth-segments 5, outer elliptic, inner oblong, soon becoming larger than the male flower; styles 2, combined at base,

stigmas lunate. *Capsule* scarcely $\frac{1}{4}$ by $\frac{1}{2}$ in., membranous, crowned by the accrescent perianth. *Seeds* short-ellipsoid.—Col. Beddome's *B. minima* is reduced by inspection of his figure merely. Helfer's No. 2584 is in fruit and is either this or some very closely allied species.

52. **B. canarana**, *Miq. Anal. Bot. Ind.* iii. p. 18; pedicels and ovary glabrous, sepals of the male $\frac{1}{2}$ in. *A. DC. Prodr.* xv. pt. i. 356. *B. rubella*, *Miq. in Pl. Hohenack.* No. 843, not of Ham.

MANGALOR, in Canara; *Hohenacker*.

Closely resembling the preceding species: but the leaves flower and fruit are rather smaller. The styles in *B. canarana* are combined higher up (ex *A. DC.*).

C. Ovary 3-celled. *Capsule* membranous, globose, wingless.

53. **B. delicatula**, *Parish ms*; styles long combined.

MOULMEIN; *Parish*.

Rootstock small, fibrous. *Stem* 5–12 in., slightly dividing, with several leaves and peduncles from all the axils, glabrous, weak. *Leaves* 2–3 in. diam., broad-orbicular, cordate, subequal at the base, doubly serrate, very delicate, with weak scattered pubescence above and on the nerves beneath; petiole of the cauline leaves long, attaining 3–4 in.; stipules less than $\frac{1}{2}$ in., lanceolate, glabrous. *Peduncles* repeatedly dichotomous, with very many flowers; bracts numerous, small, hyaline, subsistent, oblong, ciliate or fimbriate, pedicels and young ovary with minute sparse lax pubescence. *MALE*: sepals 2, $\frac{1}{4}$ in., round; petals 0; stamens 20, much monadelphous, anthers narrow-obovoid, connective not produced. *FEMALE*: perianth of 4 segments, inner two obovate, not very narrow; styles 3, stigmas lunate. *Capsule* $\frac{1}{6}$ in. diam., almost exactly globose, very membranous, breaking up irregularly, wingless. *Seeds* shortly ellipsoid.

SECT. VI. **Uniplacentales**. *Placentæ* undivided. *Capsule* 3-celled with 3 thin not very unequal wings, dehiscing by lines within the margins of its three faces.

* *Stemless, or stemmed having the peduncles long and from the upper axils only.*

54. **B. fibrosa**, *C. B. Clarke*; cauline leaves 2 orbicular sessile with many peduncles from the axils of each.

MOULMEIN; on limestone rocks; *Parish*.

Rootstock fibrous, no root-leaves in the dried examples; plant 6–10 in., glabrous or nearly so. *Leaves* orbicular, larger 6–8 in. diam., nearly entire. *Peduncles* rather stout, as many as 7 from one axil, minutely sparsely puberulo-pubescent; bracts foliaceous; lower $\frac{3}{4}$ in., elliptic, glabrous, often petioled; upper smaller. *MALE*: sepals 2, $\frac{1}{4}$ in., ovate; petals 2, oblong, smaller; stamens about 10, nearly free, anthers short-obovoid, connective not produced. *FEMALE*: perianth of 3 segments; styles 3, combined less than half their length, each dividing into two curved branches. *Capsule* $\frac{3}{8}$ by $\frac{1}{2}$ in. including the wings, upper margin of the broader wing horizontal or somewhat descending. *Seeds* small, ellipsoid.

55. **B. tenera**, *Dryand. in Trans. Linn. Soc.* i. 169, t. 16; stemless, leaves ovate, petioles peduncles and young ovary with much lax pubescence. *A. DC. Prodr.* xv. pt. i. 386. *B. Thwaitesii*, *Hook Bot. Mag.* 4692; *A. DC. l. c.*

CEYLON, *Walker*. Pas-dom Corle; *Thwaites*.

Rootstock somewhat thick, tuberous. *Leaves* 2–4 in. diam., obtuse or subacute,

subequally cordate at the base, minutely denticulate not serrate, with scattered weak pubescence on both surfaces, the young leaves very shaggy; petiole 2-5 in.; stipules nearly $\frac{1}{2}$ in., ovate, acute, glabrous. *Peduncles* 3-6 in., not exceeding the leaves, with a few flowers towards their summits; bracts ovate, acute, ciliate, pubescent or the lower ones glabrous. **MALE**: sepals 2, $\frac{1}{4}$ - $\frac{3}{8}$ in., round, pubescent on the back; petals 2, oblong; stamens about 40, anthers obovoid, connective not produced. **FEMALE**: perianth of 5 segments, inner narrower; styles 3, nearly free, 2-lobed near their summit. *Capsule* $\frac{1}{2}$ by $\frac{1}{2}$ in. including the wings, wings not very unequal, their upper margins straight from the top of the capsule slightly descending. *Seeds* short-ellipsoid.—The example of Walker marked *B. tenera*, *Dryand.* in the writing of M. Alph. DC. is identical with Thwaites' No. 2808.

56. **B. subpeltata**, *Wight Ic.* t. 1812; stemless, leaves ovate, petioles pubescent, pedicels and young ovary glabrous. *A. DC. Prodr.* xv. pt. i. 386.

SOUTH DECCAN PENINSULA; probably Malabar or Travancore, *Wight*. CEYLON, *Thwaites*.

This differs from *B. tenera*, *Dryand.* in the glabrous pedicels and ovaries, in the larger flowers, in the somewhat angular leaves which are slightly more serrate. (See *Thwaites Enum.* p. 128.) It is hardly distinct from *B. tenera*.

57. **B. concanensis**, *A. DC. Prodr.* xv. pt. i. 314; caulescent, glabrous or nearly so, leaves ovate serrate and sometimes lobed. *Dalz. & Gibs. Bomb. Fl.* 104.

CONCAN, tropical region, *Stocks*. BOMBAY, above the Ghats, *Law*.

Rootstock a tuber. *Stem* elongated, whole plant sometime 1 ft. *Leaves* 3-5 in., acute not acuminate, cordate, subequal at the base, young leaves with a little lax pubescence beneath, the older leaves with a few scattered hairs or quite glabrous; petiole of the cauline leaves 1-2 $\frac{1}{2}$ in., of the radical often very long; stipules $\frac{1}{2}$ in., ovate, acute. *Peduncles* elongate, dichotomous; bracts lanceolate; flowers rose-coloured, not very many. **MALE**: sepals 2, nearly $\frac{1}{2}$ in., elliptic; petals 2, smaller, narrower; stamens about 40, nearly free, anthers obovoid, connective not produced. **FEMALE**: perianth of 5 segments, 3 inner much narrower; styles 3, nearly free, bifid near the apex. *Capsule* $\frac{1}{2}$ - $\frac{3}{8}$ by $\frac{2}{3}$ - $\frac{3}{4}$ in. including the wings, wings from the upper part of the capsule, their upper margins slightly descending. *Seeds* ellipsoid.—This slightly differs from *subpeltata* by having a distinct (often elongate) stem and the petioles without patent hairs. As to the placentas which are taken as bipartite by Alph. DC., but are at least sometimes undivided, it is curious that the example of *B. concanensis* at Kew authenticated in A. DC.'s handwriting is typical *B. trichocarpa*.

58. **B. trichocarpa**, *Dalz. in Hook. Kew Journ. Bot.* ii. 230; caulescent, leaves ovate serrate, flowers large, ovary with much lax pubescence. *A. DC. Prodr.* xv. pt. i. 350; *Dalz. & Gibs. Bomb. Fl.* 104.

MALABAR GHATS; CONCAN, CANARA, MYSORE, MALABAR, frequently collected.

Rootstock large, tuberous. *Stem* elongate, often exceeding 1 ft., glabrous or nearly so. *Leaves* 3-5 in., acute scarcely acuminate, cordate, subequal at the base, with scattered pubescence on both surfaces; petiole of the cauline leaves often 3-4 in., little pubescent; stipules $\frac{1}{2}$ in., ovate, lanceolate. *Peduncles* scarcely elongate, repeatedly dichotomous; bracts $\frac{3}{8}$ in., lanceolate, ciliate, pubescent; pedicels and ovary with lax long hairs; flowers white. **MALE**: sepals 2, elliptic, sometimes exceeding $\frac{3}{4}$ in., more or less pubescent without, usually entire, sometimes fimbriate or ciliate; petals 2, narrower, shorter; stamens 40 or more, nearly free, anthers oblong-obovoid, connective not produced. **FEMALE**: perianth of 5 segments, inner narrower; styles 3, nearly free, each divided into two branches. *Capsule* $\frac{1}{2}$ - $\frac{5}{8}$ by nearly 1 in. including the wings, ultimately glabrous, wings not much unequal, their upper margins from the summit of the capsule slightly ascending; placentas undivided.

59. **B. nivea**, *Parish ms.*; *Kurz in Journ. As. Soc.* 1873, pt. ii. 81; radical leaf solitary elliptic-oblong doubly serrate, petiole 0- $\frac{1}{2}$ in., scape leafless or with two very small leaves near its base.

MOULMEIN; *Parish*.

Rootstock tuberous. Radical leaf 2-3 $\frac{1}{2}$ in., obtuse, subequal scarcely cordate at the base, glabrous, white beneath, with scattered very coarse bristles above. *Scape* 6-8 in., glabrous, leafless, or with a pair of opposite leaves near its base which resemble the radical leaf but are less than 1 in., divided near the summit; bracts ovate or oblong, very obtuse, entire, glabrous; flowers medium-large, white. MALE: sepals 2, $\frac{3}{8}$ - $\frac{1}{2}$ in., round; petals 2, not much shorter but narrow; stamens about 10, much monadelphous, anthers oblong, connective not produced. FEMALE: perianth of 5 (or 6) segments; styles 3, much combined, each ending in two curved branches. *Capsule* $\frac{1}{2}$ by $\frac{1}{2}$ - $\frac{5}{8}$ in. including the wings, wings not very unequal, their upper margins horizontal.

60. **B. albo-coccinea**, *Hook. Bot. Mag.* t. 4172; stemless, leaves broadly round peltate entire. *A. DC. Prodr.* xv. pt. i. 389. *B. Grahamiana*, *Wight Ic.* t. 1811. *B. Wightiana*, *Wall. Cat.* 3673.

COURTALLUM; *Wight*. MYSORE and CARNATIC, alt. 1000 ft.; *G. Thomson*.

Rootstock elongate, thick. *Leaves* 3-4 $\frac{1}{2}$ in., usually broader than long, nearly glabrous when mature but often ciliate on the margin; petiole 3-6 in., pubescent often tomentose; stipules large, sometimes exceeding 1 $\frac{1}{2}$ in., lanceolate, glabrous. *Scapes* 4-9 in., usually glabrous below, above with the bracts and pedicels pubescent; bracts $\frac{1}{2}$ in., lanceolate; flowers many, bright rose-coloured. MALE: sepals 2, $\frac{3}{8}$ in., round; petals 2, elliptic; stamens 40, very shortly monadelphous, anthers shortly obovoid, connective not produced. FEMALE: young ovary almost tomentose; styles 3, little combined below, 2-lobed and much contorted above. *Capsule* $\frac{1}{2}$ by $\frac{1}{2}$ in. including the wings; wings equal, continued at nearly equal breadth entirely round the capsule which is thus exactly elliptic in outline. *Seeds* ellipsoid.

61. **B. floccifera**, *Bedd. Ic. Pl. Ind. Or.* 111; scape elongate far above the leaves many-flowered, leaves broadly rounded with whitish tomentum beneath.

TRAVANCORE and SOUTH TINNEVELLY HILLS, alt. 3000 ft.; *Beddome*.

Leaves 1 $\frac{1}{2}$ -3 in., broader than long, subequally cordate at the base, denticulate or nearly entire, thickly coriaceous, with close whitish or yellowish tomentum on both surfaces, becoming at length nearly glabrous above; petiole 1-3 in., with similar tomentum; stipules $\frac{3}{4}$ in., broad-elliptic, acute, scarious. *Scape* 18 in., very firm, branching at 15 in. high into a very compound cyme; bracts many, small, lanceolate, glabrous, persistent; pedicels and flowers glabrous. MALE: sepals 2, scarcely $\frac{1}{4}$ in., round; petals 0; stamens 40, shortly monadelphous, anthers obovoid, connective not produced. FEMALE: perianth of 4 nearly equal segments, persistent on the fruit; styles 3, nearly free, 2-lobed near the apex. *Capsule* $\frac{1}{2}$ by $\frac{3}{8}$ in. including the wings; wings subequal, rounded, broadest at the height of half the capsule. *Seeds* ellipsoid.

62. **B. Brandisiana**, *Kurz in Flora* 1871, 295; radical leaves long-petioled deeply 5-7-lobed, cauline small, perianth both of male and female of 2-segments.

MARTABAN; Attaran Valley; *Dr. Brandis*.

Rootstock tuberous; stem succulent, nearly glabrous and simple. Radical leaves 5-7 in., rather broader than long, membranous, base subcordate, lobes acuminate and obtusely repand-toothed; petiole 5-8 in., glabrous; cauline leaves much smaller and shorter-petioled, usually 5-lobed. *Peduncle* very long, subradical, many times dichotomous; pedicels capillary; bracts lanceolate, minute; flowers very many, white.

minute. *Sepals* of either sex 2, $\frac{1}{10}$ in., round, emarginate, a little broader than long; *petals* of either sex 0; *stamens* many, free, anthers oblong. *Styles* 3, bifid at the apex. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in., ovate, acute, glabrous, 3-winged; wings retrorsely produced below the cells, 2 broad-oblong obtuse, the other linear-oblong; placentas undivided. *Seeds* small, short, ellipsoid.

** *Stem elongate with lateral inflorescence.*

† *Perianth of the male flower of 4 segments.*

63. **B. Wallichiana**, A. DC. *Prodr.* xv. pt. i. 383; young parts pedicels and ovary with short viscid pubescence.

Morung Mountains; *Hamilton* ex Wall. Cat.

Branch more than 10 in. long, dividing repeatedly, with many leaves, and flowers from the lowermost as well as the upper axils. *Leaves* 2–3 in., cordate, ovate, very unequal at the base, dentate-serrate, with very short viscid pubescence on both surfaces; petiole $\frac{1}{2}$ –1 in., viscidly pubescent; stipules $\frac{1}{2}$ in., ovate, acute, ciliate. *Peduncles* 2 in., few-flowered; bracts $\frac{1}{2}$ in., ovate, acute, scarious, pubescent, persistent. **MALE**: sepals 2, $\frac{1}{4}$ in., round-elliptic; petals 2, narrower; stamens (ex A. DC.) monadelphous, anthers ovoid, connective not produced. **FEMALE**: styles 3, free, each ending in two long curved and twisted branches. *Capsule* $\frac{3}{4}$ by $\frac{5}{8}$ in. including the wings, at length glabrous, wings subequal, broadest near the base of the capsule, their margin everywhere rounded. *Seeds* ellipsoid.—The locality of this plant is very doubtful. By *Morung* Hamilton understood the Terai from the river Teesta to the Kooshee (see *Hamilton's Nepal* p. 151): this tract has been explored by very good collectors (J. Scott, Gamble, &c.) since, and no plant at all corresponding to the present large species has been obtained: indeed Alph. DC. doubts (and with reason) whether any such plant has ever been found in Asia.

†† *Perianth of the male flower of 2 segments only.*

64. **B. malabarica**, Lamk. *Dict.* i. 393, not of Roxb.; flowers medium large, capsule more than $\frac{1}{2}$ in. Wall. Cat. 3676, excl. D; A. DC. *Prodr.* xv. pt. i. 392; *Thwaites Enum.* 128 (β) only. *B. dipetala*, Grah. in *Bot. Mag.* t. 2849; *Lodd. Bot. Cab.* t. 1730; *Lindl. & Paxt. Flow. Gard.* i. t. 14; *Wight Ic.* t. 1813; A. DC. l.c. 391. *B. tuberosa*, Herb. Mad.; Wall. Cat. 3675. *B. hydrophila*, Mig. in *Flora* 1853, 769; A. DC. l.c. 392.

MALABAR MTS.; common, ascending to 6000 ft.; and in CEYLON.

Stem often 2 ft., repeatedly dividing, with many leaves. *Leaves* 2–4 in., cordate, acute, very unequal at the base, crenate or serrate, pilose above and sometimes pubescent beneath, or altogether glabrous; petiole 1–5 in.; stipules $\frac{3}{8}$ in., persistent, ovate, acute, glabrous. *Peduncles* axillary, rarely exceeding 2–3 in., glabrous or nearly so; bracts $\frac{3}{8}$ in., lanceolate, acute; flowers rose-coloured, not very many on one peduncle. **MALE**: sepals 2, $\frac{3}{4}$ – $\frac{1}{2}$ in., round, glabrous; petals 0; stamens 40, shortly monadelphous, anthers obovoid, connective not produced. **FEMALE**: perianth nearly as in the male; styles 3, little combined at the base, each dividing into two curved and twisted branches. *Capsule* $\frac{3}{4}$ by $\frac{3}{4}$ in. including the wings; wings little unequal, continued all round the capsule, rounded altogether or having an obtuse angle at the outer upper margin. *Seeds* ellipsoid, slightly obovoid.—The following are distinguished as species by Alph. DC.

VAR. 1. dipetala; leaves pilose above and sometimes pubescent beneath, capsule without any angle on the wings.—This is the old *B. tuberosa* of the Madras Herbarium and *B. dipetala vera* of Thwaites. But there are examples at Kew in ripe fruit which have most of the capsules round-winged, others on the same stem angularly winged; and in the large series of examples the pubescence is often evanescent or all but so.

VAR. 2. hydrophila; leaves pilose above, capsule shorter than in var. 1, the wings broader and more unequal.

VAR. 3. *malabarica*; leaves glabrous, capsules large slightly subquadral rather than elliptic.—As to *Rheede Hort. Mal.* ix. t. 86 referred here, it may be the present plant as it is difficult to guess what other species Rheede could have got in Malabar: though it differs not merely in the points mentioned by Alph. DC.; but in the male flowers with two sepals and two petals.

DOUBTFUL AND EXCLUDED SPECIES.

65. *B. KHASIANA*, C. B. Clarke; flowers minute, capsule less than $\frac{1}{4}$ in. *B. pedunculosa* Wall. Cat. 3672 B.

SYLHET Mts. (which means Khasia); *Wallich*.

Branches weak, succulent, scarioso winged, repeatedly divided with many leaves. *Leaves* $1\frac{1}{2}$ –2 in., cordate, acute, very unequal at the base, serrate, pilose above, laxly sparsely villous on the nerves beneath; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in.; stipules $\frac{1}{4}$ in., persistent, oblong, acute, glabrous. *Peduncles* from the lower as well as from the upper axils, 1 – $1\frac{1}{2}$ in., few-flowered; bracts minute, elliptic, acute, ciliate, fimbriate. **MALE:** sepals 2, scarcely $\frac{1}{8}$ in., round, glabrous; petals 0; stamens about 8, anthers oblong, connective not produced. **FEMALE:** perianth of 5 segments; styles 3, divided upwards. *Capsule* $\frac{1}{4}$ by $\frac{1}{4}$ in. including the wings; wings 3, one about twice as broad as the others, its margin from the top of the capsule first horizontal then rounding away without angles; capsule dehiscing by marginal lines within the margins of its faces; placentas not seen.

B. TENUIFOLIA, *Dryand. in Trans. Linn. Soc.* i. 162, from Pulo Pontangh, is not a Pulo Pinang plant as A. DC. suspects from the similarity of the names (see *Prodr.* xv. pt. i. 351).

ORDER LXVII. **DATISCEÆ.** (By C. B. Clarke.)

Trees or herbs. *Leaves* petioled, simple or pinnate; stipules 0. *Flowers* small, dioecious in the Indian species, clustered racemed or paniced. **MALE:** calyx-tube short, teeth 3–9; petals 0; stamens 4–25. **FEMALE:** calyx-tube adnate to the ovary, lobes 3–8 short; petals 0; ovary 1-celled, open or closed at the vertex; styles lateral, alternating with as many parietal placentæ, simple or 2-partite; ovules very many, ascending or horizontal. *Capsule* coriaceous or membranous, opening at the vertex between the styles. *Seeds* very many, small, albuminous; embryo straight, radicle next the hilum.—**DISTRIB.** Species 4; natives of the Mediterranean, Central Asia, Java, and North-West America.

Herb. Styles 3, deeply divided. Lower leaves pinnate 1. **DATISCA.**

Tree. Styles 4, simple. Leaves all simple 2. **TETRAMELES.**

1. **DATISCA**, *Linn.*

Tall glabrous erect herbs. *Leaves* 3-partite or unequally pinnate, the uppermost undivided; leaflets lanceolate, strongly serrate. *Flowers* dioecious, axillary, clustered, short-pedicelled. **MALE:** Calyx-tube very short, lobes 4–9, unequal; stamens 9–25; no rudiment of the ovary. **FEMALE:** Calyx-tube ovoid, trigonous upwards; styles 3, divided nearly to the base into two linear stigmas. *Capsule* narrow-oblong, trigonous, coriaceous, opening at the vertex between the styles. *Seeds* many, ellipsoid, coarsely reticulated.—**DISTRIB.** Species 2, one in Western Asia, the other in California.

1. **D. cannabina**, *Linn.*; *Boiss. Fl. Orient.* ii. 763; leaves from the flowering branches long-petioled very narrowly linear-lanceolate attenuated at

both ends, flowers fascicled, rarely on short lateral branches and falsely racemed. *Lamk. Ill.* t. 823; *Wall. Cat.* 4664; *A. DC. Prodr.* xv. pt. i. 410; *Sibth. Fl. Græc.* t. 960. *D. nepalensis*, *Don Prodr.* 203.

Temperate and Subtropical Western Himalaya from KASHMIR to NIPAL, alt. 1000–6000 ft.; *Wallich, Thomson, &c.*, not very common.—DISTRIB. Westward to the Levant.

Stem 2–6 ft., stout, branching. *Lower leaves* 1 ft., pinnate; leaflets 7–11, 6 by $1\frac{1}{2}$ in., petioluled; upper much smaller and less divided; floral simple, 3 by $1\frac{1}{4}$ in. *Pedicels* often carrying linear bracts. *Anthers* oblong, rather large; filaments very short. *Styles* $\frac{1}{4}$ in. *Capsule* $\frac{1}{3}$ by less than $\frac{1}{8}$ in.

2. TETRA MELES, *R. Br.*

A large tree. *Leaves* petioled, ovate, pubescent beneath at least on the nerves. *Flowers* dioecious, appearing before the leaves; males panicked, females in elongate racemes, clustered near the ends of the branchlets. MALE: Calyx-lobes short; teeth 4, ovate, one or two smaller teeth sometimes added; petals 0; stamens 4, opposite the calyx-teeth, inserted round a depressed disc; rudiment of the ovary 0 or quadrangular. FEMALE: Calyx-tube ovoid; teeth 4, short; petals 0; styles 4, short, stigmas simple somewhat club-shaped. *Capsule* ovoid, with 4 lines or slight ridges, membranous, opening at the top between the styles. *Seeds* very many, minute, flattened, ellipsoid, testa very lax and extending much beyond the nucleus as a loose ragged large-reticulated membrane.

1. **T. nudiflora**, *R. Br. in Benn. Pl. Jav. Rar.* 79, t. 17; *A. DC. Prodr.* xv. pt. i. 411; *Bedd. Fl. Sylv.* t. 212; *Brand. For. Fl.* 245; *Kurz For. Fl.* 535. *T. Grahamiana*, *Wight Ic.* t. 1956; *A. DC. l.c.* *T. rufinervis*, *Miq. Fl. Ind. Bat.* i. pt. i. 726; *A. DC. l.c.* *Anictoclea Grahamiana*, *Nimmo in Grah. Cat. Bomb. Pl.* 252.—Indeterminata, *Wall. Cat.* 9045.

SIKKIM, alt. 2000 ft.; *J. D. H.* WESTERN GHATS from BOMBAY to CEYLON. BURMA, TENASSERIM and ANDAMANS, frequent, *Kurz*.—DISTRIB. Java.

Attains 100–150 ft. *Leaves* 5–6 by 4–5 in. roundly ovate, shortly acuminate, serrate or nearly entire, pubescent on both surfaces when young, glabrescent when old, glabrous in Mr. Kurz's Andaman plant except the nerves beneath. *Racemes* and *panicles* pubescent; flowers sessile or nearly so, bracts minute or 0. *Anthers* small, roundish; filaments long. *Capsule* $\frac{1}{5}$ by $\frac{1}{8}$ in., glandular.

ORDER LXVIII. CACTEÆ. (By C. B. Clarke.)

Herbs, shrubs, or trees; branches often thickened, striated, or angled. *Leaves* usually represented by tufts of spines, or by prickles or small tubercles. *Flowers* solitary, sessile, hermaphrodite, regular. *Calyx-tube* adnate to the ovary, lobes 3– ∞ , small, imbricate. *Petals* ∞ , free or shortly united at the base, imbricate. *Stamens* ∞ , free or adnate to the base of the petals; filaments filiform. *Ovary* 1-celled; style filiform or cylindric, stigma 2– ∞ rayed; ovules very many on parietal placentas, horizontal. *Berry* 1-celled, placentas pulpy. *Seeds* very many, oblong or reniform; albumen plentiful, or scanty, or almost 0; embryo straight or curved.—DISTRIB. Species 1000, confined to America, except *Rhipsalis cassytha*.

OPUNTIA DILLENII, *Haw.*; *DC. Prodr.* iii. 472; *Cactus indicus*, *Roxb. Hort. Beng.* 37, *Fl. Ind.* ii. 475; *Wight Ill.* 114; an American plant, is naturalised in India, and

is nearly or quite the same species as that on which cochineal is tended in Teneriffe; see *Lowe Fl. Madeira*, 313-319; *Brand. For. Fl.* 245-247. Roxburgh states that the cochineal "insects" brought from America thrive and multiplied abundantly on his *Cactus indicus*.

1. **RHIPHALIS**, Gaertn.

Small fleshy shrubs; branches long, terete, or flattened and leaf-like. *Leaves* represented by small scales. *Flowers* lateral, small. *Calyx-tube* not produced above the ovary, lobes 3- ∞ . *Petals* 6-10, spreading, oblong. *Ovary* smooth; style filiform, stigma 3- ∞ -rayed. *Berry* globose, smooth; the placentas projecting inwards nearly to the axis. *Seeds* obovoid; albumen 0.—**DISTRIB.** Species 30, confined to Tropical America, except the one species below.

1. **R. Cassytha**, Gaertn. *Fruct.* 137, t. 28. fig. 1; branches round pendulous whorled, petals 5-6. *DC. Prodr.* iii. 476; *Lodd. Bot. Cab.* t. 865; *Hook. Exot. Fl.* t. 2; *Bot. Mag.* t. 3080; *Thwaites Enum.* 129.

CEYLON; upon rocks and trees throughout the Central Province and certainly indigenous, *Walker*; *Thwaites*.—**DISTRIB.** Mauritius, South and Central Africa, Tropical America.

Calyx-segments 4-5, acute, very unequal, tinged with red at the apex. *Corolla* white. *Stamens* about 20. *Placentas* 3-4; stigma 3-4-rayed. *Berry* size of a pea, transparent, white. *Seeds* oblong, shining, black, obscurely striate.

ORDER LXIX. **FICOIDEÆ**. (By C. B. Clarke.)

Herbs. *Leaves* simple, often fleshy, usually opposite or whorled; stipules 0 or scarious. *Flowers* usually in cymes or clusters, rarely solitary, regular, hermaphrodite rarely polygamous. *Calyx* of 4-5 segments, united into a tube or nearly distinct, free from the ovary in the Indian genera, often persistent. *Petals* usually wanting, when present small. *Stamens* perigynous or hypogynous, definite or indefinite; staminodes sometimes present. *Ovary* free (except in *Mesembryanthemum*), 2-5-celled, syncarpous (except in *Gisekia*); styles as many as the carpels; ovules many in each carpel and axile, or solitary basal. *Fruit* usually capsular, splitting dorsally or circumsciss, more rarely the carpels separate into cocci. *Seeds* many or 1 in each carpel, usually reniform, compressed; embryo curved or annular, surrounding the farinaceous albumen, radicle next the hilum.—**DISTRIB.** Species 450, chiefly African, a few are scattered through most tropical and subtropical regions.

TRIBE I. **Aizoideæ**. *Calyx-tube* elongate. *Stamens* inserted on the calyx-tube.

* *Carpels* dehiscing dorsally.

Hairy woody small herbs. 1. AZOON.

** *Capsule* circumsciss.

Ovary (and capsule) 3-5-celled. 2. SESUVIUM.

Ovary (and capsule) 1-2-celled. 3. TRIANTHEMA.

TRIBE II. **Molluginææ.** *Calyx* deeply 5-partite. *Stamens* hypogynous.

† *Carpels* dehiscing dorsally.

Petals many, small, hypogynous 4. ORYGIA.
 Petals 0. Stipules scarious, fugacious 5. MOLLUGO.

** *Capsule* of separate cocci.

Carpels 3-5, separate in the flower 6. GISEKIA.
 Carpels 2, combined in the flower 7. LIMEUM.

1. AIZOON, Linn.

Spreading procumbent herbs, or small shrubs. *Leaves* alternate or falsely opposite, entire; stipules 0. *Flowers* axillary, solitary or in spikes or cymes. *Calyx-tube* short; lobes 5-4, spreading, yellow within. *Petals* 0. *Stamens* many, inserted near the top of the calyx-tube. *Ovary* free, 5-4-celled, depressed, nearly included in the calyx-tube; styles 5-4, free, subulate; ovules several in each cell. *Capsule* almost woody, surrounded by the persistent calyx, 5-celled, cells splitting from the top downwards dorsally. *Seeds* 2 or several in each cell, reniform; embryo annular.—DISTRIB. Species 8, from Europe to S. Africa, and from the Canaries to Scinde: one aberrant species in Australia.

1. **A. canariense**, Linn.; Boiss. *Fl. Orient.* ii. 765; leaves petioled hairy elliptic, capsules sessile numerous, the valves inflexed. DC. *Pl. Grass.* t. 136, *Prodr.* iii. 453.

SCINDE; *Stocks*, Vicary.—DISTRIB. Afghanistan, Arabia, Africa.

Small, woody, closely procumbent, repeatedly dividing. *Leaves* 1-1½ in., papillose and simply hairy or tomentose, petiole 0-¼ in. *Flowers* in nearly every axil. *Calyx-lobes* ⅔ in. ovate. *Capsule* ⅔ in. broad, the summit when looked down upon pentagonal. *Seeds* black, smooth, with a few continuous raised ridges concentric with regard to the unappendaged hilum.

2. SESUVIUM, Linn.

Succulent branching herbs. *Leaves* opposite, fleshy; stipules 0. *Flowers* axillary, sessile or peduncled, solitary, rarely in cymes. *Calyx-tube* short; lobes 5, triangular-lanceolate, persistent, often coloured. *Petals* 0. *Stamens* many or 5, inserted round the summit of the calyx-tube. *Ovary* free, 3-5-celled; styles 3-5; ovules many, axile. *Capsule* ovate-oblong, membranous, 3-5-celled, circumsciss. *Seeds* many in each cell, reniform; embryo annular.—DISTRIB. Species 4, littoral in warm climates.

1. **S. Portulacastrum**, Linn.; Roxb. *Fl. Ind.* ii. 509; glabrous, styles 3-5, seeds black shining smooth. Dalz. & Gibs. *Bomb. Fl.* 15; Kurz in *Journ. As. Soc.* 1877, pt. ii. 110. S. repens, Willd.; DC. *Prodr.* iii. 453; Wall. *Cat.* 6836; W. & A. *Prodr.* 361; Wight in. Hook. *Comp. Bot. Mag.* ii. 71, t. 23. Psammanthe marina, Hance in Walp. *Ann.* ii. 660.

Seashores of INDIA, from BOMBAY to CALCUTTA and SINGAPORE.—DISTRIB. Tropical and subtropical seashores.

Small, or extensively creeping and rooting in sand. *Leaves* ½-2 in., from obovate to linear spatulate or subcylindric; petiole often dilated at base with scarious mar-

gins. *Flowers* solitary, axillary pedicel $\frac{1}{4}$ in. *Calyx* within a bright rose; segments $\frac{1}{4}$ in., cuspidate. *Stamens* 15–40, free or nearly so. *Styles* 3, less commonly 4 or 5. *Capsule* $\frac{1}{2}$ in. *Seeds* not very many, obtusely keeled on the margin.

3. **TRIANTHEMA**, Linn.

Diffuse prostrate branched herbs, glabrous or papillose. *Leaves* petioled, opposite, unequal, from linear to ovate or obovate, entire; petioles connected at base by their dilated membranous margins; stipules 0. *Flowers* small, axillary, sessile or peduncled, solitary or in cymes or clusters. *Calyx-tube* short or long, lobes 5, often cuspidate, coloured within. *Petals* 0. *Stamens* 5–10 or more, inserted near the top of the calyx-tube. *Ovary* free, 1–2-celled; styles 1 or 2, subulate; ovules 1 or many, basal. *Capsule* membranous or coriaceous, clavate, circumsciss, the upper portion often carrying away 1 or 2 seeds attached to or enclosed in it, the lower portion 2– ∞ -seeded. *Seeds* reniform; embryo annular.—**DISTRIB.** Species 10, tropical and subtropical.

* *Style* 1.

1. **T. monogyna**, Linn. *Mant.* 69; calyx-tube scarious thin closely sheathed by the base of the petiole, stamens about 15. *DC. Prodr.* iii. 352, *Pl. Grass.* t. 109. *T. obcordata*, Roxb. *Hort. Beng.* 34, *Fl. Ind.* ii. 445; *Wall. Cat.* 6837, excl. F; *W. & A. Prodr.* 355; *Wight Ic.* t. 228; *Dalz. & Gibs. Bomb. Fl.* 14; *Kurz in Journ. As. Soc.* 1877, pt. ii. 110. *T. pentandra* β . *obcordata*, *DC. Prodr.* iii. 352.

Throughout INDIA and CEYLON, common.—**DISTRIB.** Malaya, Western Asia, Africa, Tropical America.

Glabrous. *Leaves* $\frac{1}{2}$ –1 $\frac{1}{2}$ in., obovate; petiole $\frac{1}{2}$ in. *Flowers* solitary. *Calyx-lobes* obtuse, cuspidate. *Stamens* 10–20. *Capsule* $\frac{1}{2}$ in., scarious below, beak exserted coriaceous somewhat mitriform adnate to the enclosed seed, lower part 3–5-seeded. *Seeds* black, scarcely shining, with concentric broken undulating raised lines.

2. **T. crystallina**, Vahl. *Symb.* i. 32; calyx-tube herbaceous with many ribs not sheathed by the base of the petiole, stamens 5. *Roxb. Hort. Beng.* 34, *Fl. Ind.* ii. 444; *Wall. Cat.* 6840; *W. & A. Prodr.* 355; *Edgw. in Journ. Linn. Soc.* vi. 203; *Dalz. & Gibs. Bomb. Fl.* 14; *Kurz in Journ. As. Soc.* 1877, pt. ii. 110. *T. triquetra*, *Rottl.*; *DC. Prodr.* iii. 352. *T. sedifolia*, *Visian. Pl. Æg.* t. 3. *Papularia crystallina*, *Forsk. Fl. Æg. Arab.* 69.

From the PUNJAB to CEYLON: not in Bengal.—**DISTRIB.** Throughout Africa.

Minutely papillose or glabrous. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., narrowly oblanceolate or elliptic; petiole very short or obscure. *Flowers* often very many, solitary densely clustered. *Calyx-lobes* triangular, cuspidate. *Capsule* $\frac{1}{2}$ in.; beak a circular corky flat disc depressed in the centre, deciduous often with one seed attached beneath or imperfectly included by a membrane. *Seeds* 2, super-imposed, discoid, black, scarcely shining, with concentric broken undulating raised lines.

** *Styles* 2.

3. **T. pentandra**, Linn. *Mant.* 79; stamens 5, beak of the fruit mitriform separating into two 1-seeded parts, lower portion of the fruit 2-seeded.. *DC. Prodr.* iii. 352; *Edgw. in Journ. Linn. Soc.* vi. 202; *Boiss. Fl. Orient.* ii. 766. *T. obcordata*, *Wall. Cat.* 6837 F. *T. Govindia*, *Wall. Cat.* 6838.

The PUNJAB, SCINDE and plains of NORTH-WEST INDIA.—**DISTRIB.** Western Asia and Tropical Africa.

Papillse or nearly glabrous. *Leaves* 1-1½ in., oblong or elliptic; petiole ¼ in. *Flowers* in sessile clusters. *Calyx-lobes* ovate, often scarious on the margin, bracts scarious. *Capsule* ½ in.; beak consisting of two lanceolar portions acute upwards, coriaceous, closely adnate to the included seed. *Seeds* in the lower half of the capsule 2, dull black, roughly puberulous, the concentric lineation very obscure.

4. **T. decandra**, *Linn. Mant.* 70; stamens 10, beak of the fruit truncate consolidated with the two included seeds indehiscent or only finally splitting. *Roxb. Hort. Beng.* 34, *Fl. Ind.* ii. 444; *DC. Prodr.* iii. 352; *Wall. Cat.* 6839; *W. & A. Prodr.* 355; *Wight Ic.* t. 296; *Dalz. & Gibb. Bomb. Fl.* 15; *Kurz in Journ. As. Soc.* 1877, pt. ii. 110. *Zaleya decandra*, *Burm. Fl. Ind.* t. 31, fig. 3.

DECCAN PENINSULA and CEYLON.—DISTRIB. Timor; Ava (*ex Kurz*).

Glabrous or minutely papillose. *Leaves* 1-1½ in., oblong or elliptic; petiole ¼-½ in. *Flowers* in nearly sessile clusters. *Calyx-lobes* ovate, usually obtuse, often scarious on the margins; bracts scarious. *Capsule* ½ in., beak a truncate solid cylinder, not at all or very obscurely mitriform. *Seeds* 4, 2 lower dull black puberulous, with numerous faint concentric raised lines.—Closely allied to the preceding species.

5. **T. hydasgica**, *Edgw. in Journ. Linn. Soc.* vi. 203; stamens 5-7, beak of the fruit conical thin not completely enclosing a seed. *T. polysperma*, *Hochst. in Oliv. Fl. Trop. Afr.* ii. 588.

MOOLTAN; *Edgeworth*. SCINDE; *Stocks*. BOMBAY; *Law*.—DISTRIB. East Tropical Africa.

Minutely papillose or glabrous. *Leaves* ½-1 in., oblong or elliptic, often with scarious margins; petiole ¼-½ in. *Flowers* sessile, solitary and clustered. *Calyx-tube* 10-ribbed; lobes triangular-elongate, acute, dilated at base so that there appear to be 5 intersected auricles. *Capsule* ½ in.; beak elongate-conical, hollow. *Seeds* about 10-15, dull black, with puberulous raised undulating lines that radiate from the centre (and thus are in a direction at right angles to the lines on the seeds of the four preceding species).—Flowers separated, or clustered. *T. polysperma*, *Oliv.* is undistinguishable from some of *Stocks'* Scinde specimens. *Diplochonium sesuvioides*, *Fenzl. in Harv. & Sond. Fl. Cap.* ii. 473 is separated by the very numerous stamens and shining seeds, as *Edgeworth* has noted.

4. **ORYGIA**, *Forsk.*

A rigid branched glabrous herb. *Leaves* opposite and alternate, fleshy, entire; stipules 0. *Cymes* terminal and leaf-opposite, lax, few-flowered. *Sepals* 5, nearly free, ovate. *Petals* 0. *Staminodes* many, small, subhypogynous. *Stamens* 12 or more, subhypogynous. *Ovary* free, globose, 5-ribbed, 5-celled; styles 5, filiform; ovules many, axile. *Capsule* globose, papery, wrapped in the persistent sepals; cells 5, dehiscing dorsally. *Seeds* many, reniform, strophiolate; embryo annular.

1. **O. decumbens**, *Forsk. Fl. Æg. Arab.* 103; *DC. Prodr.* iii. 455; *Boiss. Fl. Orient.* i. 755. *Glinus trianthemoides*, *Heyne in Roth Nov. Sp.* 231; *DC. l. c.*; *W. & A. Prodr.* 362; *Wight Ill.* t. 113. *G. mucronata*, *Klotzsch. in Peters Reis. Mossamb. Bot.* 140, t. 25. *Portulaca decumbens*, *Vahl Symb.* i. 33. *Talinum decumbens*, *Willd. Sp. Pl.* ii. 864. *Axonotichium trianthemoides*, *Fenzl. in Ann. Wien. Mus.* i. 354.

Dry and hot INDIA from the PUNJAB and SCINDE to MYSORE and Coimbatore. Not in Bengal.—DISTRIB. Western Asia and the whole of Africa.

Stems 6–18 in., somewhat angular or trigonous. *Leaves* $\frac{3}{4}$ –1 in., obovate, cuspidate; petiole $\frac{1}{2}$ in. *Cymes* with small lanceolate bracts at their divisions; flowers $\frac{1}{2}$ in. diam., pedicelled. *Sepals* purplish-green, with scarious edges, acute. *Capsule* $\frac{1}{2}$ in. diam. *Seeds* black, not shining, with numerous concentric elevated lines.

5. **MOLLUGO**, Linn.

Herbs, branched, often dichotomous. *Leaves* often falsely whorled, or alternate, or all radical, from linear to obovate, entire; stipules quickly disappearing. *Flowers* axillary, sessile or pedicelled, clustered or in cymes or racemes, small, greenish; bracts inconspicuous. *Sepals* 5, persistent. *Petals* 0; staminodes 0 or small in the same species. *Stamens* 5–3, rarely many. *Ovary* free, globose or ellipsoid, 3–5-celled; styles 3–5, linear or very small; ovules many, axile. *Capsule* membranous, sheathed by the sepals, 3–5-celled, dehiscing dorsally. *Seeds* several in each cell, rarely 1, reniform, appendaged or not at the hilum; embryo annular.—DISTRIB. Species 12, tropical and subtropical.

* *Seeds with an appendage at the hilum, inflorescence in axillary clusters.*

1. **M. hirta**, Thunb. *Fl. Cap.* 120; flowers sessile or pedicelled, appendage of the seed a membranous scale from which proceeds a linear bristle that curls half round the seed. *DC. Prodr.* i. 391. *M. Glinus*, *A. Rich. Fl. Abyss.* i. 48; *Kurz in Journ. As. Soc.* 1877, pt. ii. 110. *Glinus lotoides*, Linn.; *Lamk. Ill.* t. 413; *DC. Prodr.* iii. 455; *Wall. Cat.* 1517; *W. & A. Prodr.* 362; *Sibth. Fl. Græc.* t. 472; *Dalz. & Gibs. Bomb. Fl.* 16; *Boiss. Fl. Orient.* i. 755. *G. dictamnoides*, Linn. *Mant.* 243; *DC. l. c.*; *Wall. Cat.* 1518; *W. & A. Prodr.* 362. *Boiss. l. c.* i. 756. *G. parviflora*, *Wall. Cat.* 1519. *Pharnaceum pentagonum*, *Roxb. Hort. Beng.* 22, *Fl. Ind.* ii. 103. *Tryphera prostrata*, *Blume*; *A. DC. Prodr.* xiii. pt. ii. 424.

Throughout INDIA and CEYLON, common.—DISTRIB. All warm regions.

Stellately woolly, sometimes less hairy, rarely glabrous. *Stem* prostrate, much branching, leafy. *Leaves* $\frac{1}{2}$ –1 in., opposite or whorled, usually obovate but vary from round to narrow-lanceolate; petiole 0– $\frac{1}{4}$ in. *Flowers* usually sessile or nearly so; pedicels sometimes $\frac{3}{4}$ in. *Sepals* $\frac{1}{2}$ – $\frac{3}{4}$ in., elliptic or oblong, acute. *Staminodes* linear or 0. *Stamens* usually 10 or more but vary to 5. *Styles* 3–5, linear, short. *Capsule* a little shorter than the sepals, oblong. *Seeds* many, covered with raised tubercular points; the appendage sometimes carrying more than one bristle.—A variable weed of which the following are the most notice-worthy varieties.

VAR. 1. *typica*; flowers sessile, sepals $\frac{1}{2}$ in. more or less stellately tomentose. *Glinus dictamnoides*, *W. & A. Prodr.* 362.

VAR. 2. *lotoides*, *W. & A. Prodr.* 362 (sp.); pedicels of the flowers $\frac{1}{2}$ – $\frac{3}{4}$ in., sepals $\frac{1}{4}$ in. stellately tomentose.—Hills of the DECCAN PENINSULA.

VAR. 3. *Keenani*; stem slightly pubescent, leaves glabrous petioled lanceolate, flowers sessile, sepals $\frac{1}{2}$ in. glabrous with scarious margins, capsule oblong the seeds clearly seen through the walls, seeds exactly of Var. 1 but smaller than usual.—Cachar, *R. L. Keenan*; possibly a good species but it can be nearly matched out of the African bundles of Var. 1.

2. **M. Spergula**, Linn.; *DC. Prodr.* i. 391; glabrous or nearly so, flowers pedicelled, seed appendaged by a minute short subulate bristle. *Wall. Cat.* 653; *W. & A. Prodr.* 44; *Kurz in Journ. As. Soc.* 1877, pt. ii. 111. *M. verticillata*, *Roxb. Hort. Beng.* 9, *Fl. Ind.* i. 360, not of Linn. *M. parviflora*, *DC. Prodr.* i. 391. *Pharnaceum parviflorum*, *Roth, Nov. Sp.* 186. *P. Mollugo*, Linn. *Mant.* 561; *Roxb. Hort. Beng.* 22, *Fl. Ind.* ii. 102. *Glinus Mollugo*, *Fenzl in Ann. Wien. Mus.* i. 359.—*Rheede Hort. Mal.* x. t. 24.

From the base of the EASTERN HIMALAYA to CEYLON and BURMA; common. (No example from North-West India, the Punjab or Scinde.)—DISTRIB. Tropical Africa and Australia.

Stem branching, diffuse, leafy. *Leaves* $\frac{1}{2}$ –1 in., usually whorled, spathulate lanceolate or elliptic; petiole 0– $\frac{1}{2}$ in. *Pedicels* $\frac{1}{2}$ – $\frac{1}{3}$ in. *Sepals* $\frac{1}{2}$ – $\frac{1}{3}$ in., oblong, margins often membranous. *Stamens* 5–10. *Stigmas* 3, minute. *Capsule* ellipsoid, a little shorter than the sepals. *Seeds* many, covered with raised tubercular points, the appendage sometimes comprises a second, yet more minute, bristle.

** *Seeds not appendaged, inflorescence in terminal cymes or racemes.*

3. **M. stricta**, Linn.; DC. Prodr. i. 391; glabrous, stems much branched leafy, seeds covered with raised tubercular points. Wall. Cat. 649; W. & A. Prodr. 44; Dalz. & Gibs. Bomb. Fl. 16; Kurz in Journ. As. Soc. 1877, pt. ii. 111. M. triphylla, Lour. Fl. Cochinc. 79; DC. Prodr. i. 392; Roxb. Hort. Beng. 9, Fl. Ind. i. 360; Wall. Cat. 651; W. & A. Prodr. 44. M. Linkii, Seringe in DC. l.c. M. pentaphylla, Linn.; DC. Prodr. i. 391; Roxb. l.c.; Wall. Cat. 650; W. & A. Prodr. 44; Dalz. & Gibs. l.c. Pharnaceum strictum, triphyllum and pentaphyllum, Spreng. Syst. i. 949.—Rheede Hort. Mal. x. t. 26.

Throughout INDIA and CEYLON, very common.—DISTRIB. Eastward to Malacca, China, Japan, Fiji.

Often a foot high. *Leaves* $\frac{3}{4}$ –1 $\frac{1}{2}$ in., whorled or opposite, varying from lanceolate acute to obovate obtuse, much narrowed at the base; petiole hence obscure. *Cymes* compound, the branches sometimes racemed so that the inflorescence becomes like that of *M. disticha*. *Sepals* $\frac{1}{16}$ in., elliptic or round. *Stamens* 3–5, filaments dilated. *Styles* 3, short, linear. *Capsule* as long as the sepals, globose, many-seeded, the walls thin. *Seeds* dark chestnut-coloured; embryo curled into three-quarters of a complete circle.

4. **M. Cerviana**, Seringe in DC. Prodr. i. 392; glabrous, branched, cauline leaves linear-oblong, seeds reticulated without tubercular raised points. Wall. Cat. 7128; W. & A. Prodr. 44; Boiss. Fl. Orient. i. 756. M. umbellata, Seringe l.c. Pharnaceum Cerviana, Linn.; Lamk. Ill. t. 214.

From the PUNJAB to CEYLON, in the hotter drier parts of India; not in Bengal.—DISTRIB. Asia, Africa to the Cape, Australia.

Stems 3–6 in., erect, usually several. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., radical tufted spathulate or obovate, cauline linear-oblong often 4–8 in a whorl, whence spring umbellately many branches. *Peduncles* trichotomous or umbellate-cymose. *Sepals* $\frac{1}{2}$ in., elliptic or round. *Stamens* 5. *Styles* very small. *Capsule* as long as the sepals, globose, many-seeded. *Seeds* pink-chestnut or yellowish, covered with slightly elevated oblong reticulations, bluntly ridged on the back; embryo curled through less than a semicircle.

5. **M. disticha**, Seringe in DC. Prodr. i. 392; glabrous, branched, cauline leaves lanceolate, seeds smooth. Wall. Cat. 652; W. & A. Prodr. 44; Wight Ic. t. 3. Pharnaceum distichum, Linn. Mant. 221.

SOUTH DECCAN PENINSULA and CEYLON.

Stems often 12–18 in. *Leaves* $\frac{1}{2}$ –1 in., usually whorled, tapering almost to the base. *Flowers* in cymes, the branches often ultimately prolonged as racemes. *Sepals* $\frac{1}{6}$ – $\frac{1}{8}$ in., ovate. *Stamens* 5. *Styles* 3, short. *Capsule* as long as the sepals, globose or shortly ellipsoid, many-seeded. *Seeds* obscurely reticulated, shining chestnut, bluntly ridged on the back; embryo curved through three-quarters of a circle.—Wight's figure represents this plant as hairy: it is glabrous or sometimes microscopically puberulo-glandular.

6. **M. nudicaulis**, Lamk. *Dict.* iv. 234; glabrous, stems many leafless rising from a tuft of radical leaves. *DC. Prodr.* i. 391; *Wall. Cat.* 648; *W. & A. Prodr.* 43. *M. bellidifolia*, Seringe in *DC. Prodr.* i. 391. *Pharnaceum spathulatum*, Spreng. *Syst.* i. 948.—*Alsine*, Burm. *Fl. Zeyl.* t. 8.

From the PUNJAB to CEYLON in the hotter drier parts of India; not in Bengal.—DISTRIB. New Caledonia, Tropical Africa, Cuba.

Leaves 1–2 in., elliptic, tapering to the base. *Scapes* 3–8 in., wiry, repeatedly dichotomous. *Sepals* $\frac{1}{2}$ in., oblong. *Stamens* 5–3 (Oliver). *Stigmas* 3, very small. *Capsule* as long as the sepals, somewhat ellipsoid, many-seeded. *Seeds* black, a microscopic scale appendaged to the hilum, obscurely ridged on the back, shining, closely densely reticulated, very obscurely rough not tuberculated; embryo curved through half a semicircle—New Caledonian examples have the seeds rougher, and a very short linear spur added to the appendage. Cuban examples resemble generally the Indian, but one of them has the stem very woody thick branched densely packed with leaves.

6. **GISEKIA**, Linn.

Diffuse branched herbs. *Leaves* opposite or falsely whorled, fleshy, spatulate, abounding in raphides; stipules 0. *Flowers* sessile and pedicelled, hermaphrodite or polygamous, small, greenish or purplish, in axillary cymes. *Sepals* 5, nearly free, ovate, herbaceous with membranous margins. *Petals* 0. *Stamens* (in the Indian species) 5, hypogynous. *Carpels* 5–3, distinct; each ending in a short simple style and containing one basal ovule. *Fruit* of 5, free, membranous, papillose, indehiscent, carpels. *Seeds* vertical, subreniform; embryo curved.—DISTRIB. Species 5, in India, Arabia, and Africa.

1. **G. pharnaceoides**, Linn. *Mant.* 562; cymes dense, carpels covered with papillæ. *Roxb. Cor. Pl.* t. 183 (not good); *Wight Ic.* t. 1167; *A. DC. Prodr.* xiii. pt. ii. 27; *Kurz in Journ. Linn. Soc.* 1877, pt. ii. 111. *G. moluginoides*, *Wight Ic.* t. 1168. *G. linearifolia*, Schum.; *A. DC. Prodr. l. c.* *Pharnaceum occultum*, Forsk. *Fl. Æg. Arab.* 58.

The PUNJAB, SCINDE, SOUTH DECCAN PENINSULA and CEYLON.—DISTRIB. Afghanistan, Africa, Ava (*Wallich*).

Glabrous. *Stems* 8–18 in. *Leaves* $\frac{3}{4}$ –1 $\frac{1}{2}$ in., oblong or elliptic, entire, narrowed at the base; petiole 0– $\frac{1}{4}$ in. *Sepals* $\frac{1}{8}$ in. *Filaments* dilated below. *Carpels* usually 5, in fruit as long as the sepals. *Seeds* blackish, smooth, minutely glandular-punctate; embryo curved less than a semicircle.

7. **LIMEUM**, Linn.

Branched, mostly prostrate herbs; glandular or glabrous. *Leaves* alternate or subopposite; stipules 0. *Flowers* bracteate, cymed, hermaphrodite or unisexual, small, green. *Sepals* 5, nearly free, ovate, herbaceous with membranous margins. *Petals* (in the Indian species) 3–5, small. *Stamens* 5–10, hypogynous; filaments dilated downwards and somewhat connate at the base. *Ovary* globose, 2-celled; stigmas 2, short; ovule 1 in each cell, basal. *Fruit* separating vertically into two coriaceous hemispherical cocci, which at length dehisce ventrally. *Seeds* vertical, reniform; embryo annular.—DISTRIB. Species 10, African, one reaching the west of India.

1. **L. indicum**. *Stocks ms. ex T. Anders. in Journ. Linn. Soc. v. Suppl.* 30; leaves spatulate round, capsule smooth. *Oliv. Fl. Trop. Afr.* ii. 596.

PUNJAB; *Edgeworth, Vicary, Aitcheson*. SCINDE; *Stocks*.—DISTRIB. Aden, Nubia.

Subprostrate, glandular-puberulous or glabrate; branches 8-18 in., much divided. *Leaves* $\frac{1}{4}$ - $\frac{1}{2}$ in., opposite or nearly so petiole $\frac{1}{2}$ in. *Cymes* sessile (or nearly so) at the nodes. *Sepals* $\frac{1}{2}$ in., roundish. *Petals* much shorter than the sepals, obovate, clawed, the upper margin incised or nearly fimbriate. *Stamens* 6-7 (Oliver). *Carpels* in fruit as long as the sepals, hemispheric, dehiscent ventrally; margins of the valves inflexed so as to retain the seed until moistened. *Seed* reniform, longer than broad, compressed, concavo-convex, perfectly smooth, whitish.

ORDER LXX. UMBELLIFERÆ. (By C. B. Clarke.)

Herbs (rarely in non-Indian species shrubs or trees). *Leaves* alternate, usually divided or dissected, sometimes simple, petiole generally sheathing at the base; stipules 0. *Flowers* hermaphrodite or polygamous, in compound umbels (simple in *Hydrocotyle* and *Bupleurum*), exterior of the umbel sometimes radiant; umbels with involucriform bracts at the base of the general one and bracteoles at the base of the partial ones (umbellules). *Calyx-tube* adnate to the ovary, limb 0 or 5-toothed. *Petals* 5, epigynous, often unequal, and with a median fold on the face, plane or emarginate or 2-lobed with the apex inflexed; imbricated in bud, in *Hydrocotyle* sometimes valvate. *Stamens* 5, epigynous. *Ovary* inferior, 2-celled, disc 2-lobed; styles 2, stigmas capitellate; ovules 1 in each cell, pendulous. *Fruit* of 2 indehiscent dorsally or laterally compressed carpels, separated by a commissure; carpels each attached to and often pendulous from a slender often forked axis (carpophore), with 5 primary ridges (1 dorsal, 2 marginal and 2 intermediate) and often 4 secondary ones intercalated between these; pericarp often traversed by oil canals (vittæ). *Seed* 1 in each carpel, pendulous, albumen cartilaginous; embryo small, next the hilum, radicle superior. — DISTRIB. Species 1,300, mainly in Europe, North Africa, West Central and North Asia; a few are North American, tropical, and natives of the Southern Hemisphere.

Tordylium is stated in *Gen. Pl.* i. 871 to be Himalayan. We have seen no specimens.

An umbellifer in flower, Edgw. No. 175 $\frac{1}{2}$ from the North-west Himalaya, alt. 6000-7000 ft., may be *Johrenia alpina*, Fenzl.

Clavis of the Genera (as to the Indian species only).

SERIES I. **Heterosciadiæ.** Umbels simple or irregularly compound. Vittæ 0.

Leaves undivided. Stipulate. Fruit laterally compressed	1. HYDROCOTYLE.
Leaves spinulose-serrate. Flowers capitate	2. ERYNGIUM.
Leaves compound not spinulose. Umbels subcorymbose	3. SANICULA.

SERIES II. **Haplozygiæ.** Umbels compound. Secondary ridges of the fruit inconspicuous (except in *Trachydium 9-jugum*).

TRIBE I. **Aminnæ.** Fruit laterally compressed, or at least constricted at the commissure, not or very obscurely winged.

* *Carpels* in outline ovate or oblong, not distinctly narrowed upwards, excavated or concave on the inner face; seed grooved or concave on the inner face.

Bracteoles simple, linear	4. VICATIA.
Bracteoles lobed or pinnatifid	5. TRACHYDIUM.
Bracteoles entire, lanceolate, white-margined	6. ELÆOSTICTA.

**** Carpels in outline ovate or oblong, not distinctly narrowed upwards, plane on the inner face; seed plane or concave on the inner face.**

Leaves entire. Flowers yellow or lurid	7. BUPLEURUM.
Umbels short-peduncled, leaf-opposed, ebracteolate	8. APIUM.
Ridges of the fruit thick, corky	9. CICUTA.
Stem rigid, branched, almost leafless. Fruit densely hairy	10. PITURANTHOS.
Ridges of the fruit slender, valleys 1-vittate	11. CARUM.
Ridges of the fruit obtuse, corky, valleys 2-3-vittate	12. SIUM.
Ridges of the fruit slender, valleys 2-3-vittate	13. PIMPINELLA.

***** Carpels in outline elongate oblong; seed in horizontal section nearly circular, grooved on the inner face.**

Ultimate segments of the leaves large, fruit attenuate at base	14. OSMORRHIZA.
Fruit oblong, narrowed upwards, distinctly ridged, glabrous	15. CHÆROPHYLLUM.
Fruit narrowed upwards into a long beak	16. SCANDIX.
Fruit oblong, narrowed upwards, obscurely ridged, hispid	17. ANTHRISCUS.

TRIBE II. Seselinæ. Fruit widest at the commissure, in horizontal section circular or somewhat dorsally compressed.

*** Primary ridges of the fruit more or less distinct, not alate.**

Fruit globose or subcylindric, ridges distinct. Petals white	18. SESELI.
Central flower of the umbellule sessile perfect, lateral male pedicelled	19. PYCNOCYCLA.
Leaves cut into filiform segments. Bracts 0. Petals yellow	20. FENICULUM.
Fruit $\frac{3}{4}$ in., roughly corrugate between the ridges	21. PRANGOS.
Fruit with all the ridges equal, broad, obtuse, corky	22. CENANTHE.
Bracts prominent. Fruit ovoid, vittæ ∞	23. SCHULTZIA.
Bracts 0, or small. Fruit ovoid, vittæ ∞	24. POLYZYGUS.

**** Primary ridges of the fruit (or the lateral only) more or less excurrent, winged.**

† Valleys next the dorsal ridge 2-3-vittate.

Petals emarginate. Fruit less than $\frac{1}{4}$ in.	25. LIGUSTICUM.
Petals subentire. Fruit $\frac{1}{4}$ in.	30. ARCHANGELICA.

†† Valleys next the dorsal ridge 1-vittate (very rarely 1 or 2 additional small superficial vittæ are present), in Pleurospermum Candollii 3-2-vittate.

Tall. Leaves very compound. Seed plane on the inner face	26. SELINUM.
Stemless, or short. Carpels much compressed dorsally	27. CORTIA.
Seed grooved or concave on the inner face	28. PLEUROSPERMUM.
Leaves compound pinnate with large segments. Fruit $\frac{1}{2}$ in.	29. ANGELICA.

TRIBE III. Peucedanæ. Fruit much dorsally compressed, dorsal ridges slightly excurrent lateral winged, wings of the opposite carpels closely applied face to face.

Petioles of the leaflets winged. Petals yellow. Fruit $\frac{1}{2}$ in.	31. FERULA.
Flowers not radiant. Ovary glabrous	32. PEUCEDANUM.
Ovary pubescent. Vittæ rarely reaching the base of the fruit	33. HERACLEUM.
Wings of carpels hyaline with a very thick border	34. ZOSIMIA.

SERIES III. **Diplozygiæ.** *Umbels* compound. Secondary ridges of the fruit prominent, primary equally or less prominent or inconspicuous.

* *Fruit glabrous.*

Fruit globose. Bracts 0 34.* CORIANDRUM.
Fruit narrowly oblong. Bracts slender, simple 34.** CUMINUM.

** *Fruit hirsute or setose.*

Bracts pinnate. Seed plane on the inner face 35. DAUCUS.
Bracts linear, or 0. Seed grooved on the inner face 36. CAUCALIS.
Bracts linear-lanceolate, membranous 37. PSAMMOGETON.

1. HYDROCOTYLE, Linn.

Prostrate herbs, rooting at the nodes. *Leaves* (in the Indian species) cordate or hastate, not peltate, round or 5-9-gonal, subentire or palmately lobed, palmate-nerved, long-petioled; stipules small, scarious. *Umbels* (in the Indian species) simple, small; bracts small or 0; flowers white, sometimes unisexual. *Calyx-teeth* 0 or minute. *Petals* entire, valvate or imbricate. *Fruit* laterally compressed, commissure narrow; carpels laterally compressed or subpentagonal; lateral primary ridges concealed within the commissure, or distant therefrom and prominent; vittæ 0, or most slender, obscure; carpophore 0. *Seed* laterally compressed.—DISTRIB. Species 70; in wet places in tropical and temperate regions, more numerous in the Southern Hemisphere.

SECTION I. **Eu-Hydrocotyle.** *Petals* acute, valvate. Secondary ridges 0. *Pericarp* not thickened.

1. **H. javanica**, Thunb. *Dissert.* ii. 415, t. 3; leaves 1-3 in. diam. cordate crenate, subentire or lobed to the middle, petiole laxly pubescent, peduncles long upper often clustered, fruit much compressed not pentagonal. *DC. Prodr.* iv. 67; *Miq. Fl. Ind. Bat.* i. pt. i. 734; *Kurz in Journ. As. Soc.* 1877, pt. ii. 113. *H. hispida*, Don *Prodr.* 183. *H. nepalensis*, Hook. *Exot. Fl.* t. 30; *Wall. Cat.* 561; *DC. l. c.* 65; *Miq. l. c.* 735. *H. zeylanica*, *DC. l. c.* 67; *W. & A. Prodr.* 366; *Miq. l. c.* 734. *H. hirsuta*, *Blume Bijl.* 884. *H. polycephala*, *W. & A. Prodr.* 366; *Wight Ic.* t. 1003. *H. hirta*, *R. Br. Var. acutiloba*, *F. Muell.*; *Benth. Fl. Austral.* iii. 340. *H. Heyneana*, *Wall. Cat.* 563. *H. strigosa*, *Ham. in Wall. Cat.* 7219.

HIMALAYA; from KASHMIR to BHOTAN, alt. 2000-8000 ft.; KHASIA Mts., alt. 2000-6000 ft., common. Mts. of MALABAR and CEYLON, common. PEGU and TENASSERIM, alt. 2000-5000 ft.—DISTRIB. Malaya to the Philippines and Australia, Mozambique.

Leaves 1-3 in. diam., pubescent or glabrous. *Peduncles* $\frac{1}{4}$ -2 in., lower solitary, leaf-opposed. *Umbels* many-flowered; bracts minute lanceolate scales among the pedicels; pedicels $0-\frac{1}{2}$ in., glabrous. *Fruit* $\frac{1}{10}$ in., orbicular or subquadrate, reticulate-rugose or smooth (sometimes deformed, enlarged, obovoid, corky); lateral primary ridges commissural, intermediate faint or 0; pericarp hard, thin.—*Fruits* exceedingly uniform even in minute characters from the Himalaya to Ceylon. Thunberg describes *H. javanica* as glabrous, but all the specimens so named from Java have at least the petioles and peduncles pubescent and are identical with the Indian. *H. hirsuta*, *Blume*, is a form with fulvous pubescence abundant in the Eastern Himalaya.—*H. polycephala*, *Wight Ill.* t. 117, fig. 1, represents the carpels as subpentagonal and little compressed laterally, and perhaps was taken from *H. rotundifolia*.

VAR. 1. *podantha*, Molkenboer in Pl. Jungh. 89 (sp.); pedicels $\frac{1}{4}$ in. *Miq. Fl. Ind. Bat.* i. pt. i. 732.—Sikkim, Bhotan, Khasia, frequent.—Peduncles sometimes 3 in. Fruits ovoid, intermediate primary ridges 0.—Referred to *H. podantha* from the description only; Molkenboer relies partly on the leaves being setulose, but so they are in typical *H. javanica*. *H. laxiflora*, *DC. Prodr.* iv. 61 (= *H. densiflora*, *DC. Prodr.* iv. 61), does not differ unless by the fruits being slightly less compressed.

VAR. 2. *Hookeri*; leaves very pentagonal little lobed, peduncles 6 in., fruit little compressed yellowish shining with red glandular dots.—Khasia, alt. 5000–6000 ft.; *H. f. & T.*—Leaves $2\frac{1}{2}$ in. diam., sparingly setulose. Fruit somewhat pentagonal, the immediate primary ridges more defined, nearly as in *H. rotundifolia*. This may be a distinct species.

2. *H. burmanica*, *Kurz in Journ. As. Soc.* 1871, pt. ii. 60, and 1877, pt. ii. 113; quite glabrous, leaves 5-lobed to the middle, lobes triangular acute crenate, peduncles long, pedicels $\frac{1}{8}$ in., fruit moderately compressed somewhat pentagonal.

UPPER TENASSERIM; alt. 3000–5000 ft.; *Brandis, Parish*.

Leaves $1-2\frac{1}{2}$ in. diam. Peduncles $1-2\frac{1}{2}$ in., lower solitary leaf-opposed, upper 2–3-nate. Umbels many-flowered; bracts minute. Fruit $\frac{1}{10}$ in., broadly orbicular, obscurely punctate not reticulate; lateral primary ridges commissural, intermediate appearing as slightly elevated angles; pericarp hard, thin.—Very near *H. javanica*, differing in its glabrousness, 5-gonous leaves, and less compressed fruits. It may be *H. javanica* (cf. *Hiern in Oliv. Fl. Trop. Afr.* iii. 4) when No. 1 must be called *H. hirsuta*, *Blume*.

3. *H. conferta*, *Wight Ic.* t. 1002; leaves cordate crenate subentire or lobed to the middle, petiole laxly pubescent, umbels subsessile, fruit somewhat compressed subpentagonal.

SOUTH DECCAN; Pulney Mts., *Wight*; Nilgherry Mts., *Gardner, Schmidt*.

Leaves $1-2\frac{1}{2}$ in. diam., setulose. Umbels 5–15-flowered; peduncle when visible glabrous, any bracts obscure. Fruit $\frac{1}{10}$ in., orbicular, obscurely punctate, not reticulate; lateral primary ridges commissural, intermediate, appearing as slightly elevated angles; pericarp hard, thin.—From the size and hairiness of the leaves this has been supposed near *H. javanica*, differing by its sessile clusters of fruit in the axils; but in the structure of its fruit it is exceedingly like *H. rotundifolia* with which indeed it is mixed by *Wight*; and from some forms of which it hardly differs but by the larger more hairy leaves.

4. *H. rotundifolia*, *Roxb. Hort. Beng.* 21, *Fl. Ind.* ii. 38; leaves orbicular-cordate subentire or lobed to the middle or lower, pedicels 0, fruit somewhat compressed pentagonal. *Wall. Cat.* 562; *DC. Prodr.* iv. 64; *Wight Ic.* t. 564. *H. nitidula*, *A. Richd.*; *DC. Prodr.* iv. 66; *Hook. Ex. Fl.* t. 29. *H. tenella*, *Don Prodr.* 183; *DC. l. c.* 64; *W. & A. Prodr.* 366. *H. ranunculoides*, *Blume Bijdr.* 884 (*vide Molkenboer*). *H. puncticulata*, *Miq. Fl. Ind. Bat.* i. pt. i. 733. *H. Zollingeri*, *Molkenb.*; *Miq. l. c.* 733. *H. perexigua*, *Hance in Walp. Ann.* ii. 691.

NORTH-WEST HIMALAYA; alt. 4000–7000 ft. BENGAL PLAIN, ascending to 4000 ft. in SEKKIM and KHASIA, frequent. Mts. of MALABAR and CEYLON, *Wight*.—DISTRIB. Throughout Malaya. Guinea.

Leaves $\frac{1}{2}-1$ in. diam., glabrous and shining or pubescent or subvillous on both surfaces. Peduncles glabrous, $0-\frac{3}{4}$ in., sometimes on the same specimen; bracts obscure; umbels 10–15-flowered. Fruit $\frac{1}{12}$ in., broadly orbicular, smooth, sometimes punctate; lateral primary ridges commissural (more prominent than in the three preceding species), intermediate forming elevated angles; pericarp hard, thin.—Easily separated from the three preceding species by the much smaller leaves. The multiplication of names is chiefly due to the variability in the length of the peduncle, the specimens

being in other respects very uniform. Some of the hill examples have shining glabrous subserrate leaves, the peduncles $\frac{3}{4}$ in.; other plains' examples closely procumbent on mud are villous with sessile umbels. *H. hirta*, R. Br. differs (if at all) by its laxly hairy peduncles: see *Benth. Fl. Austral.* iii. 340, as to *Var. pusilla* only. *H. sibthorpioides*, Lamk.; *DC. Prodr. l. c.* 66, which extends throughout South-Eastern Asia and Japan, only differs (from the form *nitidula*) by the rather larger leaves and longer peduncles.

SECTION II. **Gentella.** *Petals* obtuse, imbricate. Secondary ridges as distinct as the primary. *Pericarp* much thickened.

5. **H. asiatica**, Linn.; Roxb. *Hort. Beng.* 31, *Fl. Ind.* ii. 88; leaves orbicular-reniform entire crenate or lobulate, peduncle short, bracts small ovate embracing the flowers, pedicels 0, umbel 3-6-flowered. *Wall. Cat.* 560; *DC. Prodr.* iv. 62; *W. & A. Prodr.* 366; *Wight Ic.* t. 565; *Dalz. & Gibs. Bomb. Fl.* 105; *Kurz in Journ. As. Soc.* 1877, pt. ii. 113. *H. Wightiana*, *Wall. Cat.* 7220. *H. lurida*, *Hance in Walp. Ann.* ii. 690.—*Rheede Hort. Mal.* x. t. 46.

Throughout INDIA, alt. 0-2000 ft.; from the HIMALAYA to CEYLON and MALACCA; frequent.—DISTRIB. Tropical and subtropical regions.

Leaves $\frac{1}{2}$ -2 $\frac{1}{2}$ in. diam., usually glabrous or nearly so; petiole pubescent or glabrous. *Peduncles* about $\frac{1}{4}$ in., often 2-3-nate, laxly pubescent or glabrous; bracts $\frac{1}{8}$ - $\frac{1}{4}$ in., not scattered among the pedicels (as in *Eu-Hydrocotyle* and in *Araliaceæ*). *Fruit* $\frac{1}{8}$ - $\frac{1}{4}$ in. *Carpels* oblong, subcylindric, curved, slightly compressed, much longer than broad, reticulate-rugose, often crowned by the subsistent petals, each with 9 curvilinear subsimilar ridges, and 2 within the commissure; pericarp thickened, woody, white. *Seed* compressed laterally.—In this species it seems to be the endocarp that is so greatly thickened, and that is adnate to the exocarp, thus invalidating one of the most uniform distinctions between *Umbelliferae* and *Araliaceæ* (see *Gen. Pl.* i. 861).

2. **ERYNGIUM**, Linn.

Spinescent, glabrous, erect, perennial *herbs* (the Indian species). *Leaves* spinous-toothed, entire lobed or dissected. *Flowers* in simple heads, each bracteolate; bracts stellate, spinulose (in Indian species). *Calyx-tube* covered with ascending hyaline scales; teeth rigid, acute. *Petals* white, narrow, erect, emarginate, scarcely imbricate. *Fruit* ellipsoid, nearly cylindric: carpels dorsally subcompressed, subconcave on the inner face; primary ridges obtuse not prominent, secondary 0; vittæ in the primary ridges inconspicuous or 0, with some very slender scattered in the endocarp; carpophore 0. *Seed* semi-terete, dorsally subcompressed, subconcave on the inner face.—DISTRIB. Species 100, temperate and tropical; plentiful in Western Asia.

1. **E. cæruleum**, Bieb. *Fl. Taur. Cauc.* i. 200, *excl. syn.*; radical leaves long-petioled cordate-oblong undivided crenate not spinulose, upper cauline sessile palmately divided into lanceolate spinulose segments. *Boiss. Fl. Orient.* ii. 823.—*E. planum*, Lindl. in *Royle Ill.* 232, *not of Linn.*

KASHMIR, alt. 5000-6000 ft.; Falconer, T. Thomson, Levinge.—DISTRIB. Cabul, Persia, Turkestan.

Stems 2-3 ft., erect, undivided below, corymbose and often bluish above. Radical leaves 5 by 1 $\frac{3}{4}$ in., petiole 2-6 in.; lower cauline often similar smaller with shorter petioles, but more often subsessile, elliptic, acute, undivided, serrate or subspinulose. *Bracts* 5-6, 1 in., linear, with a few spines on the margins, sometimes short exterior spines alternating with them; *bracteoles* linear, spinulose, simple, exceeding the flowers; a few (in the outermost row but one) sometimes spinous, subtrifid. *Calyx-tube* densely scaly; teeth lanceolate-subulate, spinescent. *Fruit* $\frac{1}{8}$ in.—This

has been referred to *E. dichotomum*, Desf. which has the radical leaves oblong entire not spinulose and altogether differs. It is certainly Boissier's plant referred by him to Biebersteins.

2. **E. Billardieri**, Delaroche *Eryng.* 25, t. 2; radical leaves long-petioled 3-partite segments 3-fid or pinnatifid spinous-toothed, cauline sessile palmately 3-5-partite. *DC. Prodr.* iv. 88; *Boiss. Fl. Orient.* ii. 825. *E. Kotschy*, Boiss. *Diagn. ser.* 2, v. 97. *E. cærulescens*, Jacquem. *Journ.*

KASHMIR, alt. 5000-6000 ft.; Jacquemont, Falconer, &c. LADAK; T. Thomson, SCINDE; *Stocks*.—DISTRIB. Western Asia.

Stem 6-18 in., erect or branching from the base, corymbose often bluish above. *Radical leaves* 2-4 in. diam., often hastate; petiole 2-4 in.; lower cauline sometimes similar but short-petioled. *Bracts* 5-7, 1 in., linear, with few or 0 spines on the margins; short spines alternate with and somewhat exterior to the bracts; *bracteoles* linear, spinulose, simple, exceeding the flowers. *Calyx-tube* with lanceolate scales, teeth lanceolate-subulate spinescent. *Fruit* $\frac{1}{2}$ in.—The Indian examples are all smaller with smaller heads than the type-specimens of *E. Billardieri* and are perhaps *Var. meiocephalum*, Boiss. l. c. The bracts are frequently without spines, but the radical leaves are not narrowly dissected enough for *E. Heldreichii*, Boiss. l. c. 826. The radical leaves early disappear, it is then much like *E. cæruleum* but can generally be distinguished by its much less strict stem and dissected lower cauline leaves.

3. **SANICULA**, Linn.

Erect *herbs*. *Leaves* palmately 3-5-partite, segments toothed lobed or dissected. *Umbels* irregularly compound, rays few; bracts sessile, leaf-like; umbellules usually small with small bracteoles. *Flowers* mostly unisexual. *Calyx-tube* villous, subechinate; teeth herbaceous. *Petals* white, emarginate, slightly imbricate. *Fruit* echinate, ovoid or slightly compressed laterally, commissure broad, carpophore 0; carpels $\frac{1}{2}$ -terete or subterete, plane on the inner face, ridges all obscure, lateral primary commissural; vittæ small, solitary in each primary ridge, with some very slender scattered in the endocarp. *Seed* nearly terete.—DISTRIB. Species 10, 1 only in the Old World.

1. **S. europæa**, Linn.; *DC. Prodr.* iv. 84; leaves glabrous mucronate-serrate, bracteoles linear shorter than the fruits, perfect flowers sessile male usually pedicelled. *Boiss. Fl. Orient.* ii. 832; *Kurz in Journ. As. Soc.* 1877, pt. ii. 114. *S. elata*, Ham.; *Don Prodr.* 183; *Wall. Cat.* 559; *DC. l. c.* 85; *W. & A. Prodr.* 367; *Wight. Ill.* t. 117, fig. 2; *Wight Ic.* tt. 334, 1904. *S. javanica*, *Blume Bijl.* 882; *DC. l. c.* 85. *S. montana*, Reinw.; *DC. l. c.* 85. *S. hermaphrodita*, Ham.; *Don Prodr.* 183.

HIMALAYA; from KASHMIR to BHOTAN; alt. 4000-12,000 ft.; common. KHASIA Mts., alt. 3000-5500 ft.; common. BURMA. Mts. of MALABAR and CEYLON.—DISTRIB. Europe, Asia, Africa.

Height 1-3 ft. *Radical leaves* 2-6 in. diam., persistent; petiole 1-6 in. *Umbel* 2-3 to 18 in. diam.; rays divaricate, repeatedly 2-3-lobed. *Umbellules* few-flowered; male pedicels often $\frac{1}{2}$ in. *Calyx-teeth* lanceolate. *Fruit* $\frac{1}{10}$ in., densely covered with hooked bristles, slightly compressed laterally.

4. **VICATIA**, DC.

Perennial *herbs*, glabrous. *Leaves* pinnately compound, ultimate segments narrow. *Umbels* compound; bracts 1 linear, small, or 0; bracteoles several, linear. *Calyx-margin* obsolete. *Petals* obovate, emarginate, white pink or

purple-red. *Fruit* ovoid, narrowed at the apex, scarcely laterally compressed, distinctly constricted at the commissure. *Carpels* grooved on the inner face, subpentagonal or subterete, dorsally subcompressed; lateral primary ridges commissural, intermediate slender but distinct; vittæ 2-3 in each furrow, not large; carpophore entire or bifid. *Seed* subterete, grooved on the inner face.—**DISTRIB.** Species 2-3, Himalayan.

Separable from *Pimpinella* only by the deeper groove on the inner face of the mericarps as DC. states.

1. **V. conifolia**, DC. *Prodr.* iv. 243; ultimate segments of the leaves linear, carpels ovate broadly grooved on the inner face. Sison? *coniifolium*, Wall. *Cat.* 591. *Chærophyllum gracillimum*, Klotzsch in *Reis. Pr. Waldem. Bot.* 149, t. 46. *Ligusticum*? *meoides*, Jacquem. *Journ.*

HIMALAYA, alt. 6000-12,000 ft., from BALTISTAN and KASHMIR to NIPAL, common.

Stem 1-2 ft., ascending, divided, striate, sparingly leafy. *Leaves* usually 3-pinnate, ultimate segments linear or narrowly oblong-linear, acute. *Peduncle* 2-6 in. *Bract* rarely exceeding $\frac{1}{2}$ in., very rarely more than 1 or slightly divided; primary rays of the umbel 6-12, $\frac{3}{8}$ -2 in., rigid, angularly striate; bracteoles 3-6, often as long as the umbellule. *Fruit* $\frac{1}{8}$ - $\frac{1}{6}$ in., disc prominent, styles short.

2. **V. millefolia**, C. B. Clarke; ultimate segments of the leaves setaceous, carpels oblong narrowly grooved on the inner face. *Chærophyllum millefolium*, Klotzsch in *Reis. Pr. Waldem. Bot.* 149, t. 45.

KASHMIR; Tragbol, alt. 11,400 ft., C. B. Clarke. ? NIPAL; Hoffmeister. SIKKIM; Jongri, alt. 12,000-13,000 ft., C. B. Clarke.

Stem 4-6 in., rarely 12 in. *Cauline leaves* 2-4 in., 2-3-4-pinnate, ultimate segments scarcely $\frac{1}{2}$ in. *Fruit* $\frac{1}{16}$ - $\frac{1}{12}$ in., oblong or narrow-oblong; disc prominent; styles short.—United with *V. conifolia* by Bentham (*in Gen. Pl.* i. 883), but the fruit is very much smaller, less grooved on the inner face, and the leaves are much more finely cut.

3. **V. ? Stewartii**, C. B. Clarke; secondary pinnæ of the cauline leaves deeply cut into small narrow-lanceolate teeth, carpels plane on the inner face, seed with a T-shaped groove on the inner face.

GURWHAL, alt. 6500 ft., Stewart.

Bracts small or 0. *Bracteoles* linear, unequal, some overtopping the flowering umbellules. *Fruit* (not quite ripe) $\frac{1}{8}$ in., rather larger than that of *V. conifolia*, ridges obscure; vittæ in each furrow 3-4, small.

5. TRACHYDIUM, Lindl.

Perennial herbs, glabrous or minutely hirsute. *Leaves* 1-2- or 3-pinnate. *Umbels* compound, sometimes sessile, when the inflorescence appears to consist of simple umbels on clustered long peduncles; bracts several, foliaceous, lobed or pinnate; bracteoles 5-10, similar, often united at the base, sometimes white membranous on the margins, often equalling the rays. *Calyx-margin* obsolete or prominent, entire or nearly so. *Petals* white or pink, elliptic, subacute, or emarginate by the greater or less inflexion of the apex. *Fruit* ovoid or subquadrate, laterally subcompressed, slightly constricted at the commissure, smooth or tubercled; carpels terete; primary ridges distinct, sometimes thickened, spongy, rugose or tubercled, lateral at the commissure; secondary

ridges 0, or like the primary; vittæ 1-2 between each primary ridge; carpophore entire 2-fid or 2-partite. *Seed* subpentagonal, lunate, dorsally subcompressed, concave on the inner face.—**DISTRIB.** Species 10, Himalayan or Central Asiatic, and 1 Abyssinian.

SUBGEN. Enneazygon. *Fruit* truncate; calyx-margin spongy, patent; ridges of the carpels 9, equal, hollow, obtuse.

1. **T. novem-jugum**, C. B. Clarke; radical leaves pinnate, pinnæ orbicular crenate.—*Trachydium* sp. 5, *Herb. Ind. Or. H. f. & T.*

Sikkim, alt. 12,000-15,000 ft.; Lama Kangra, Tungu, and Yeumtong; *J. D. H.*
Stem 0-2 in., grooved, thick, hollow. *Radical leaves* 3 in.; pinnæ 7, $\frac{1}{2}$ in. diam., reticulate-nerved. *Bracts* like reduced leaves with narrower pinnæ; bracteoles linear-obovate, toothed lobed or subpinnatifid. *Umbels* often subsessile; rays 2-3 in., thick, often hollow; rays of the umbellule often 15-20. *Petals* lurid green. *Styles* very small. *Fruit* $\frac{1}{12}$ - $\frac{1}{10}$ in., ovoid, subquadrate, somewhat cordate at the base, slightly narrowed close under the calyx-margin which is wider than the summit of the fruit; style bases depressed, inconspicuous. *Carpels* semi-terete; primary and secondary ridges cellular, hollow, almost covering the carpel, smooth; vittæ about 8 (excluding those on the commissure); carpophore 2-partite. *Seed* $\frac{1}{2}$ -terete, dorsally subcompressed, slightly grooved on the inner face.

SUBGEN. Pentazygon. *Fruit* narrowed upwards or truncate; calyx-margin not prominent; ridges of the carpel 5, simple inflated rugose or tubercled, secondary wanting.

2. **T. Roylei**, Lindl. in *Royle Ill.* 232; radical leaves 2- sub-3-pinnate ultimate segments lanceolate-linear, ridges tubercled. *Dene. in Jacq. Voy. Bot.* 67, t. 79.

WEST TIBET; *Falconer*. **NORTH-WEST HIMALAYA**; *Lance*; Lanjar, alt. 17,500 ft., *Strachey & Winterbottom*. **KASHMIR**; alt. 11,000-14,000 ft.; in many places, C. B. Clarke.

Stem 0-2 in., thick, grooved, often hollow. *Radical leaves* 3 in. (including petiole), oblong-lanceolate. *Umbel* solitary, sessile, with some of the rays (peduncles of single umbels?) again umbelled; bracts leaf-like; bracteoles 6-10, 1-2-pinnate, with lanceolate acute ultimate segments, often white-membranous on the margin. *Fruit* $\frac{1}{8}$ - $\frac{1}{5}$ in., ellipsoid, narrowed upwards; primary ridges inflated, spongy, of cellular tissue, nearly covering the carpel, glistening when very young, then rugulose, lax, finally tubercled; vittæ usually 2 between the primary ridges. *Seed* $\frac{1}{2}$ -terete, dorsally subcompressed, subpentagonal.

3. **T. dissectum**, C. B. Clarke; radical leaves 2-pinnate, secondary pinnæ pinnatifid glabrous ultimate segments small linear acute, fruit small ovoid truncate, ridges narrow not rugose.—*Cortia*, sp. 3, *Herb. Ind. Or. H. f. & T.*

Sikkim; Tungu, alt. 13,000-14,000 ft. *J. D. H.*

Stem 0-7 in., not thickened. *Peduncles* 1-4 in.; bracts linear-oblong, pinnatifid, segments lanceolate-linear acute; bracteoles pinnate with narrow acute segments; primary rays $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Style*-bases prominent in the young fruit. *Fruit* $\frac{1}{12}$ in., slightly narrowed upwards; pericarp thin, slightly inflated; ridges hollow, much narrower than in the preceding species, furrows nearly covering the fruit, vittæ 1-2 in each furrow. *Carpophore* slender, 2-partite. *Seed* lunate, dorsally compressed.

4. **T. hirsutulum**, C. B. Clarke; radical leaves 2-pinnate, secondary pinnæ pinnatifid hirsute ultimate segments small linear acute, fruit small ovoid truncate ridges narrow not rugose.

SIKKIM; Tungu, alt. 13,000–14,000 ft., *J. D. H.*

Stem 0, crown greatly thickened. *Leaves* with ascending fine hairs on the midrib. *Umbel* solitary, sessile, with some of the rays again umbelled. *Bracteoles* 3–6, $\frac{1}{2}$ –1 in., 3-fid or pinnatifid. *Carpophore* stout, 2-fid. *Fruit* nearly as of *T. dissectum*, but the ridges less acute, the style-bases less prominent.

5. ***T. obtusiusculum***, *C. B. Clarke*; cauline leaves pinnate pinnæ pinnatifid ultimate segments lanceolate subacute, fruit ovoid-oblong narrowed upwards, ridges narrow undulated not rugose. *Ligusticum obtusiusculum*, *Wall. Cat.* 543. *Hymenolæna obtusiuscula*, *DC. Prodr.* iv. 246.—*Trachypodium* sp. 3, *Herb. Ind. Or. H. f. & T.*

NIPAL, Gossain Than; *Wallich*. SIKKIM, alt. 11,000–13,000 ft.; Tungu, Lachen, Jongri; *J. D. H.*; *C. B. Clarke*.

Stem (including the terminal peduncle) often 1 foot, grooved, hollow. *Radical leaves* (including the petiole) 3–4 by 1 in., in Sikkim examples twice as large as Nipal ones; pinnæ 7–11, segments oblong toothed or lobulate. *Bracts* of a dilated narrow oblong entire petiole and sub-bipinnate limb with narrow remote segments in Sikkim examples, ovate pinnatifid with approximate broad lanceolate segments in Nipal ones. *Fruit* $\frac{1}{8}$ in.; style-bases conical, prominent; primary ridges lax; pericarp thin, somewhat inflated; vittæ usually 2 between the primary ridges; carpophore 2-fid. *Seed* semiterete, dorsally subcompressed, hardly concave on the inner face.

VAR. stricta; ultimate segments and bracts more acuminate, primary rays shorter, fruit more truncate less narrowed upwards. *Trachydium*, sp. 6. *Herb. Ind. Or. H. f. & T.*—Sikkim, Chola Pass, alt. 10,000–12,000 ft., *J. D. H.* This may be a distinct species. *Stems* very erect, rays of the umbel 1–1½ in., not much divaricate; but the only distinction of importance is in the fruit which, though not well ripened, is unlike that of *T. obtusiusculum* at the same stage.

6. **ELÆOSTICTA**, Fenzl.

Annual *herbs*, glabrous, erect, corymbose upwards or simple. *Leaves* 1–3-pinnate, ultimate segments linear. *Umbels* compound; bracts and bracteoles several, scarious. *Calyx-teeth* 0. *Petals* obovate, emarginate. *Disc* depressed, inconspicuous. *Styles* short. *Fruit* elliptic, truncate, laterally compressed, didymous; primary ridges very slender or 0, vittæ in each furrow 3–1, minute; carpophore 2-partite or entire. *Seed* lunate, margins incurved, hence broadly grooved on the inner face.—*DISTRIB.* Species 4, in Western and Central Asia.

This genus is placed by Benthams (*Gen. Pl.* i. 896) under *Conopodium*, but differs in the short truncate fruit, the deeply grooved seed, and scarious bracts.

1. ***E. meifolia***, Fenzl in *Flora* 1843, 458; bracts 5–6 lanceolate, bracteoles similar but smaller, fruit broader than long. *Scaligeria meifolia*, *Boiss. Fl. Orient.* ii. 887. *S. elata*, *Boiss. & Haussk.*; *Boiss. l. c.* *Butinia libanotica*, *Boiss. in Ann. Sc. Nat.* ser. 3, ii. 62.

PUNJAB PLAIN; *Aitcheson*—*DISTRIB.* Persia, Syria.

Root fusiform. *Stem* 1–3 ft., erect, paniced upwards or (in the small Indian example) simple. Rays of the umbel 5–11, $\frac{3}{4}$ –1½ in. *Pedicels* 6–12, $\frac{1}{8}$ in. *Fruit* $\frac{20}{100}$ by $\frac{1}{16}$ in., depressed didymous; ridges obsolete; vittæ minute, 2–1 in each furrow.—The Indian solitary example may be a new species, but is more probably only a small specimen; the fruit is even smaller than in *E. meifolia* type, the carpophore subentire.

7. **BUPLEURUM**, Linn.

Glabrous *herbs*, or shrubs. *Leaves* entire. *Umbels* compound; bracts and bracteoles foliaceous, or setaceous, or 0. *Flowers* yellow or lurid, pedicelled or subsessile. *Calyx-teeth* 0. *Petals* obovate, emarginate. *Styles* short. *Fruit* laterally compressed, slightly constricted at the commissure; carpels terete or subpentagonal; primary ridges distinct, sometimes subalate, rarely obscure; secondary 0, or obscure; vittæ 1-3 between the primary ridges, rarely 0 or many; carpophore entire 2-fid or 2-partite. *Disc* depressed, rarely prominent in fruit. *Seed* terete, sometimes slightly grooved on the inner face.—**DISTRIB.** Species 60, European and temperate Asiatic: 1 South African, 1 Arctic American.

A genus at once recognised by its absolutely entire leaves.

1. **B. plantaginifolium**, *Wight Ic. t. 281*; upper cauline leaves broadly oblong obtuse mucronate, bracts 3-5 elliptic foliaceous, fruit $\frac{1}{3}$ in. oblong subquadrate subalate, furrows 1-vittate.

Mts. of the DECCAN PENINSULA; Nilghiris, alt. 6000-8000 ft., *Wight, &c.*

Stout, bushy, 2-7 ft. Lower leaves linear-oblong; upper cauline 2-4 by $\frac{3}{4}$ -1 $\frac{1}{4}$ in., subsessile, shortly narrowed at the base; nerves 10-30, subpalmate; secondary numerous, distinct, reticulate. Bracts $\frac{1}{3}$ -1 in., subequal; bracteoles 4-5, $\frac{1}{4}$ - $\frac{1}{2}$ in., oblong-elliptic, mucronate; rays 6-12, grooved; pedicels 4-12, shorter than the fruit. Carpels strongly pentagonal; ridges thick, obtuse, suborbicular, corky; furrows glaucescent, vittæ very large; carpophore 2-fid, often 2-partite. Seed subterete, deeply but obtusely 5-ridged.

2. **B. lanceolatum**, *Wall. Cat. 551*; middle cauline leaves petioled ovate or broadly lanceolate, bract 1 small lanceolate or 0, fruit ovoid-oblong, ridges obscure, furrows 3-vittate. *DC. Prodr. iv. 132.*

NORTH-WEST HIMALAYA; from KASHMIR to NIPAL, alt. 4000-9000 ft., common.

Perennial, 1-5 ft., erect, nearly simple, or sometimes subpanicled with spreading horizontal branches 1 foot long. Lower leaves long-petioled, lanceolate; middle cauline 3-5 by $\frac{1}{4}$ -3 in., ovate, acuminate, occasionally rounded at the base, nerves 5-7, subpalmate; secondary nerves numerous, distinct, reticulate. Bracts $\frac{1}{4}$ in., acute; bracteoles less than $\frac{1}{8}$ in., linear, usually obsolete in the fruit; rays 5-8, unequal; pedicels 6-12, $\frac{1}{2}$ in., subequal. Fruit $\frac{1}{6}$ - $\frac{1}{5}$ in. Carpels much incurved when ripe, yellowish-brown, subviscid; ridges distinct in imperfectly ripe fruit, small obsolete in the fully ripe; carpophore entire. Seed terete.

3. **B. Candollii**, *Wall. Cat. 552*; upper cauline leaves subsessile oblong or ovate hardly cordate lower linear-oblong, bracteoles 4-5 elliptic or oblong usually as long as the flowering umbellule, fruit ellipsoid-oblong, ridges prominent, furrows 3-vittate. *DC. Prodr. iv. 131.*

HIMALAYA, from KASHMIR to SIKKIM, alt. 8000-12,000 ft.; frequent.

Perennial, 1-3 ft., erect: more or less corymbose upwards. Lower cauline leaves 2-5 by $\frac{1}{5}$ - $\frac{1}{2}$ in.; upper 1-4 by $\frac{1}{4}$ - $\frac{3}{4}$ in., acute, rarely acuminate, narrowed shortly at the base, subsessile or sessile and amplexicaul; primary nerves 8-12, often subpinnate, oblique; transverse nerves numerous, distinct, reticulating. Bracts 2-3 or 0, $\frac{1}{4}$ -1 $\frac{1}{4}$ in., ovate or oblong, acute, foliaceous, angular; bracteoles $\frac{1}{6}$ - $\frac{1}{3}$ in., foliaceous, frequently longer than the fruiting umbellule; rays 5-8, rather short; pedicels about half as long as the carpels. Carpels $\frac{1}{8}$ in., yellowish-brown, semi-terete or dorsally subcompressed; ridges distinct, but not thick nor winged; carpophore entire.

Seed nearly terete.—The Kashmir and Chumba examples are much more slender than the Sikkim.

4. **B. jucundum**, *Kurz in Seem. Journ. Bot.* 1867, 240; lower cauline leaves short-petioled obovate upper ovate amplexicaul deeply cordate, bracteoles 4-5 oblong acute usually shorter than the umbellule, fruit elliptic-oblong, ridges prominent, furrows 3-vittate. *B. sachinalense*, *F. Schmidt Reis. Amurlande*, 135. *B. heterophyllum*, *Jacquem. mss.* (not of Link).

KASHMIR; Budrawur, alt. 7000 ft., *C. B. Clarke*. LAHUL; *Jaeschke*.—DISTRIB. Amurland.

Stems 1-2 ft., erect from a decumbent base, corymbose with long branches. Lower cauline leaves 1-1½ in., orbicular, petiole scarcely ½ in.; upper 1-2 in., orbicular or ovate-oblong, mucronate, not peltate; primary nerves 10-20, palmate; transverse nerves numerous, distinct, oblique, reticulating. *Bract* 1, ¼-¾ in., ovate, foliaceous, often amplexicaul or cordate, occasionally 0; bracteoles 4-5, usually ½ in., often 0; rays 5-8, somewhat stout, angular; pedicels about half as long as the carpels. *Carpels* nearly as in *B. Candollii*, but rather longer, ½ in.—*B. aureum*, *Fisch.*, differs in the much larger bracteoles, and the often perfoliate upper leaves.

VAR. *cachemirica*; lower cauline leaves linear-oblong or linear, upper ovate-lanceolate, ridges subulate.—Kashmir, alt. 7500-10,000 ft., *C. B. Clarke*; common. Lower cauline leaves 5 by ½ in. Bracts often 0; bracteoles of 1-4 oblong or linear frequently 0.—The extreme forms of this with tall simple stem corymbose near the summit, narrow leaves, and umbels nearly without bracts or bracteoles appear very distinct from *B. jucundum*, but there are numerous intermediate forms.

5. **B. Thomsoni**, *C. B. Clarke*; cauline leaves linear upper lanceolate or ovate cordate-amplexicaul, bracteoles 5-9 lanceolate acuminate or linear, carpels glaucous 5-winged, furrows 4-3-vittate.

KASHMIR; Sonamurg, alt. 9250 ft., *C. B. Clarke*. NORTH-WEST HIMALAYA, alt. 7000-9000 ft., *T. Thomson*.

Erect, 2-3 ft., corymbose. Upper cauline leaves 2-4 in., lanceolate, acuminate, uppermost sometimes ovate, transverse reticulating nerves obscure. *Bracts* usually 0, sometimes 1-2 lanceolate: rays of the umbel 6-10, 1-2½ in.; bracteoles usually as long as the flowering umbellules, caudate; rays of the umbellule often 20, about half as long as the mericarp. *Fruit* ⅝ in., oblong, subquadrate; carpels terete, wings more than half as broad as the nucleus; carpophore very thin, 2-partite.—This has been supposed to be allied to *B. diversifolium*; but the foliage seems nearer that of *B. jucundum*, var. *cachemirica*; it should be compared with *B. polyphyllum*, *Ledeb.*; *Boiss. Fl. Orient.* ii. 851, of which no authentic example is at Kew.

6. **B. diversifolium**, *Rochel Pl. Ban.* 68, t. 28, fig. 57; upper cauline leaves lanceolate caudate base ovate amplexicaul scarcely cordate, bracteoles 5-8 narrow-lanceolate acuminate shorter than the fruiting umbellules, ridges distinct, furrows 3-vittate. *Reich. Ic. Pl. Germ.* t. 1885.

NORTH-WEST HIMALAYA, alt. 7000-9000 ft., *Thomson*. KASHMIR and BALTIKISTAN, alt. 9000-12,000 ft., *C. B. Clarke*.—DISTRIB. West Asia, South-East Europe.

Lower cauline leaves linear, hardly broader upwards; middle cauline completely amplexicaul. *Bracts* 0, or 1, small, lanceolate: rays of the umbel 8-14; pedicels ⅓-½ in. *Fruit* ⅙ in. glaucous, in outline oblong; disc brown, subprominent.—United with *B. falcatum*, *Linn.* both by *Reichenbach l.c.* and in *Boiss. Fl. Orient.* ii. 850: it differs in the completely amplexicaul, usually inflated, base of the cauline leaves, the lower leaves linear not at all obovate, the fruits glaucous much more strongly ribbed. Whether regarded as a species or variety, India produces the plant of *Rochel* in its most characteristic form.

7. **B. falcatum**, Linn.; DC. Prodr. iv. 132; radical leaves linear broader upwards middle cauline linear acute narrowed at the base more or less amplexicaul, bracts 1-5 lanceolate small or 0, bracteoles 4-5 distinctly shorter than the fruiting umbellule, carpels narrowly oblong, ridges not prominent, furrows 3-vittate. Jacq. Fl. Austr. t. 158; Boiss. Fl. Orient. i. 850. B. imaicolum, A. Kerner Nov. Sp. Pl. dec. ii. 19.

HIMALAYA; alt. 3000-12,000 ft., from KASHMIR to BHOTAN, frequent. KHASIA Mts.; alt. 3000-6000 ft., frequent.—DISTRIB. Central and W. Asia, S. Europe.

Stem 1-4 ft., erect, corymbose upwards. Radical leaves spatulate-oblong in the typical European specimens, in the Indian (which belong to the form *B. gramineum* Vill.) they are but slightly broader upwards. Cauline leaves $\frac{1}{2}$ -amplexicaul or sessile, long acuminate, secondary nerves not prominent. Bracts usually 0 in the Indian forms, sometimes a few scarcely $\frac{1}{4}$ in.; bracteoles usually not longer than the flowering umbellule, narrowly lanceolate; rays 5-8, $1\frac{1}{2}$ in.; pedicels .5-1.5, usually less than half the length of the fruit. Fruit $\frac{1}{8}$ - $\frac{1}{4}$ in., brown; carpels terete, ridges distinct; disc yellow or brownish, not prominent.

VAR. 1. *marginata*, Wall. Cat. 566 (sp.); margins of the leaves prominently cartilaginous. DC. Prodr. iv. 132.—Himalaya and Khasia Mts.; the most frequent form.—Middle cauline leaves often completely amplexicaul, but narrowed not widened close to the base.

VAR. 2. *Hoffmeisteri*, Klotzsch in Reis. Pr. Waldem. Bot. 146, t. 52 (sp.); cauline leaves numerous less acuminate scarcely at all amplexicaul, carpels $\frac{1}{2}$ in. glaucous, ridges very prominent.—Kashmir, alt. 8000 ft., C. B. Clarke; Falconer.—Leaves somewhat suddenly acute, mucronate, glaucous, primary nerves strong, secondary subprominent.

VAR. 3. *nigrocarpa*, Jacquem. ms. (sp.); stems numerous from the crown, often procumbent, cauline leaves ovate-lanceolate or linear widest very near the amplexicaul base, bracts 3-4, $\frac{1}{2}$ in. lanceolate-linear, disc prominent on the half ripe fruit purple-black. B. virgatum, Wall. Cat. 555 not of W. & A. B. gracillimum, Klotzsch in Reis. Pr. Waldem. Bot. 148, t. 50 (sp.)—Baltistan, Kashmir, and N.W. Himalaya; alt. 10,000-14,000 ft. frequent. Sikkim; Yakla alt. 10,000 ft., C. B. Clarke.—This has all the appearance of an alpine variety of *B. falcatum*. The leaves vary a good deal in width; the lower always linear, the uppermost sometimes ovate. In habit it agrees with an authentic example of *B. baldense*, var. *æneum*, Boiss. Fl. Orient. ii. 849, but the leaves seem never oblong.

8. **B. mucronatum**, W. & A. Prodr. 370; cauline leaves linear or linear-oblong mucronate often subobtuse narrowed at the base, bracts 4-5 lanceolate prominent, carpels elliptic, ridges prominent, furrows 2-1- (rarely 3-) vittate. B. ramosissimum, W. & A. Prodr. 370; Wight. Ic. t. 1007. B. falcatum, Var. ramosissimum, Dalz. & Gibs. Bomb. Fl. 108. B. virgatum, W. & A. Prodr. 370, not of Wall. B. nervosum, Moon Cat. 22.

Mts. of the SOUTH DECCAN and CEYLON; alt. 5000-8000 ft.; plentiful.

Differs essentially from *B. falcatum*, Linn. in the fruit being elliptic instead of oblong, shorter, and narrowed at the apex. Also there are invariably present 4 or 5 bracts, often $\frac{1}{2}$ - $\frac{3}{4}$ in., the bracteoles are more prominent usually exceeding the flowering umbellules, and the upper cauline leaves are less acuminate. W. & A. have distinguished three forms as under:

VAR. 1 *typica*; stem little branched, upper leaves linear-oblong obtuse mucronate, bracteoles sometimes exceeding the fruiting umbellules, carpels strongly ridged, furrows usually with solitary large vittæ.—South Deccan.

VAR. 2. *ramosissima*, W. & A. l. c. (sp.); stem corymbose upwards, leaves less obtuse, bracteoles about as long as the flowering umbellules, carpels distinctly ridged, furrows usually 2-vittate.—South Deccan.

VAR. 3. *virgata*, W. & A. l. c. (sp.); habit nearly of *B. falcata* but the fruit very markedly ellipsoid, often only $\frac{1}{8}$ in. long and nearly as broad, ridges not very promi-

ment, furrows usually 3-vittate.—Ceylon.—*Stem* usually simple, erect, laxly corymbose above, cauline leaves subacute.—It is the existence of this var. that has led to the referring the South Indian species to *B. falcatum*. This Ceylon plant differs from the Himalayan *B. falcatum* not only in the shortened fruit but in the invariable presence of 4-5 bracts.

9. **B. distichophyllum**, *W. & A. Prodr.* 370; lower cauline leaves distichous bases closely imbricate sheathing, upper linear broadest at the base, fruit elliptic, ridges distinct, furrows generally 1-vittate. *Wight Ic. t.* 1006.

NILGHIRI MTS., alt. 7000 ft.; *Wight, &c.*

Stem 4-14 in., slender, erect; otherwise closely resembling *B. mucronatum* from which it differs chiefly in the very small fruits ($\frac{1}{12}$ in.). The lower distichous leaves are in the typical examples very closely packed, 12-16 in the space of 1 in.; but when these are absent it is difficult to distinguish from small examples of *B. mucronatum*.

10. **B. longicaule**, *Wall. Cat.* 557; lower cauline leaves linear or lanceolate acute upper often wider at the base, bracteoles 5-8 elliptic-acuminate foliaceous longer than the flowering umbellule, fruit oblong, ridges subalate, furrows 3-vittate. *DC. Prodr.* iv. 131. *B. rupestre*, *Edgw. in Trans. Linn. Soc.* xx. 52.

HIMALAYA, alt. 8-13,000 ft.; from KASHMIR to SIKKIM; common.

Stem 8-24 in., erect, corymbose upwards; sometimes branching from the root. *Leaves* very variable; in the Wallichian type narrow-linear acute, the uppermost (and the bracts) little wider, hardly broader at the base, transverse nerves not prominent; in other examples upper leaves (as the bracts) ovate, acute, with very prominent secondary nerves. *Bracts* 1-3; bracteoles 5-8, very prominent, with reticulating nerves, often longer than the fruiting umbellule; rays 3-8, 1-2½ in., somewhat stout, striate. *Petals and disc* usually black. *Fruit* $\frac{1}{8}$ - $\frac{1}{6}$ in.

VAR. 1. *himalensis*, Klotzsch in *Reis. Pr. Waldem. Bot.* 146, t. 51 (sp.); upper leaves ovate-lanceolate base amplexicaul ovate almost cordate, bracteoles 8-10 very broad imbricate.—Kashmir, alt. 12,000 ft., frequent.—Connected by imperceptible gradations with the Eastern plant.

VAR. 2. *Dalhousieana*; upper leaves and bracts ovate-lanceolate narrowed at the base, petals yellow, disc brown, fruit strongly ridged hardly winged usually thrice as long as the pedicel.—Dalhousie and Dhurmsala, alt. 8000-12,000 ft.; plentiful, *C. B. Clarke*.—Stems 4-8 in., sometimes erect 24 in., much divided or simple, corymbose at the top. Upper leaves and bracts with the transverse nerves obscure. Bracteoles smaller than in typical *B. longicaule*, less acuminate, and much less foliaceous, the transverse nerves far less prominent.—The true affinity of this form is very doubtful: it differs from *B. Candollii* in the cauline leaves being narrower with obscure secondary nerves, and by having all the leaves more acute: from *B. tenue* in the acute leaves, stout rays of the umbel, and much stronger umbellules.

VAR. 3. *stricta*; stems 12-15 in. usually simple terminated by a strict umbel, bracts and bracteoles elliptic-oblong hardly acute pendent in fruit.—Sikkim; Jongri, alt. 12,000-13,000 ft., *C. B. Clarke*. *Stem* very erect. Lower leaves linear, upper rather broader, all narrowed at the base. Bracts several, sometimes nearly 2 in.; bracteoles orbicular or oblong, sometimes $\frac{3}{4}$ in., longer than the fruiting umbellule; rays of the umbel stout, ascending not divaricate. *Fruit* longer than in any form of *B. longicaule*, sometimes $\frac{1}{5}$ in.—This is almost surely allied to Var. *Dalhousieana*: but it may be doubted whether it should be attached to *B. longicaule*, Wall.

11. **B. tenue**, *Don Prodr.* 182; upper leaves linear-oblong subobtuse mucronate narrowed at the base, bracts and bracteoles not prominent, primary rays of the umbel slender, fruit $\frac{1}{10}$ - $\frac{1}{8}$ in., ridges prominent, furrows 1-vittate. *Wall. Cat.* 553; *DC. Prodr.* iv. 128. *B. flexuosum*, *Wall. Cat.* 554.

HIMALAYA; from KASHMIR to SIKKIM, alt. 1-9000 ft.; common in the West, and in the lower hills, extending in the plains to Jullundur.

Stem 1-3 ft., solitary, erect, much branched upwards, usually with numerous umbels. *Lower leaves* linear; oblong leaves usually with 5-9 somewhat distant primary nerves and numerous prominent reticulating secondary ones. *Bracts* 1-4, $\frac{3}{8}$ - $\frac{1}{2}$ in., lanceolate or obovate-lanceolate; bracteoles 4-5, $\frac{1}{8}$ in., obovate-lanceolate, often as long as the fruiting umbellule or longer; rays 3-8, usually less than 1 in., never stout; pedicels rarely exceeding $\frac{1}{20}$ in. *Fruit* broadly oblong, yellowish brown; carpels terete; vittæ in each furrow solitary, sometimes obscure.—Distinguished from *B. Candollii* *Var. minor* by the delicate primary rays of the umbel and the much smaller fruit.

VAR. khasiana; upper leaves linear or lanceolate acute or acuminate, bracts and bracteoles narrow-lanceolate prominent, fruit rather longer.—Khasia Mts., alt. 4000-6000 ft.; common; Tenasserim; Martaban Hills, alt. 7000 ft., *Kurz.*—Stem often very bushy from the base, corymbosely dichotomous with ascending branches, whereas in *B. tenue* type there is a simple main stem with divaricate sub-horizontal branches. Bracts often $\frac{1}{2}$ in.; bracteoles overtopping the fruits.—This variety has always been referred to *B. tenue*, Don, with which the fruit closely agrees; it resembles *B. mucronatum*, var. *ramosissima* in its leaves bracts and bracteoles, but differs in its smaller, shorter pedicelled fruit. We have not seen Martaban specimens, but as *Kurz* (*Journ. As. Soc. 1877*, pt. ii. 114) gives *tenue*, Don, as a native, we assume he alludes to this variety.

12. **B. Maddeni**, *C. B. Clarke*; cauline leaves small linear acuminate narrowed at the base, bracteoles few not prominent, pedicels less than $\frac{1}{20}$ in., fruit $\frac{1}{8}$ in. oblong strongly ridged, furrows 2-3-vittate.—*Bupleurum* No. 8, *Herb. Ind. Or. H. f. & T.*

NORTH-WEST HIMALAYA; Mussoorie, *Madden, Jameson*; Simlâ, *Lady Dalhousie*; Kunawur, alt. 6000-8000 ft., *Thomson*.

Stems 1-2 ft., several from the root, erect, simple below, with numerous leafy branches upwards. *Lower leaves* linear, almost subulate; upper $\frac{1}{2}$ -1 $\frac{1}{2}$ in., scarcely amplexicaul. *Bracts* 1-3, $\frac{1}{8}$ in., lanceolate, often 0; bracteoles 3, less often 4-5, $\frac{1}{8}$ in., lanceolate or linear, rays 5-8, less than $\frac{1}{2}$ in. *Fruit* broadly oblong, glaucous.—*Thomson* regarded this as a new species near *B. tenue*, with which it agrees in having very small umbels with subsessile flowers, but it seems more closely allied to *B. falcatum*, var. *Hoffmeisteri*, of which it may possibly be a depauperated mountain form.

13. **B. setaceum**, *Fenzl in Tchih. As. Min.* i. 418; stem slender diffusely dichotomously branched, leaves setaceous, umbels simple few-flowered subracemed with capillary peduncles, fruit $\frac{1}{10}$ in. ellipsoid, ridges distinct, furrows 1-vittate. *Boiss. Fl. Orient.* ii. 847.

KASHMIR, alt. 4500 ft.; Kishtwar, *C. B. Clarke*; *Stewart*.—DISTRIB. Bithynia.

Annual. *Stem* 18 in., erect, above divaricately branched. *Cauline leaves* 1-1 $\frac{1}{2}$ in., uppermost $\frac{1}{4}$ in., setaceous, 3-nerved. *Peduncles* $\frac{1}{4}$ -1 $\frac{1}{4}$ in., usually springing as though from a bifurcation whereof one branch is arrested. *Bracts* 1-4, $\frac{1}{8}$ - $\frac{1}{6}$ in., narrowly linear-lanceolate, usually longer than the fruiting umbel; pedicels 1-4, less than $\frac{1}{24}$ in. *Fruit* obscurely transversely rugose between the ridges; vittæ large, distinct, alternating with the ridges; carpels terete, slightly pentagonal.—Identified with *B. setaceum* from Fenzl's description only. There are several closely allied species perhaps not really distinct: *B. trichopodum*, *Boiss. & Sprun.* (*Boiss. Fl. Orient.* ii. 864) is much less compound, and the fruits have the furrows 3-vittate.

8. **APIUM**, *Linn.*

Herbs, annual or perennial, glabrous. *Leaves* pinnate, 3-partite, or compound. *Umbels* compound, often leaf-opposed. *Bracts* and bracteoles 0 (in the Indian species). *Flowers* white. *Calyx-teeth* obsolete. *Petals* ovate, acute,

tip inflexed. *Fruit* orbicular or elliptic, slightly longer than broad, laterally subcompressed; carpels semi-terete, subpentagonal, plane on the inner face; primary ridges distinct, filiform; secondary 0; furrows 1-vittate; carpophore undivided, or shortly 2-fid. *Seed* semi-terete, dorsally subcompressed.—**DISTRIB.** Species 14, scattered throughout the world.

The genus is hardly separable from *Carum*; the one Indian species is easily recognized by its short-peduncled umbels opposite a leaf without bracts or bracteoles.

1. **A. graveolens**, *Linn.*; *DC. Prodr.* iv. 101; radical leaves pinnate with large deeply lobed segments, cauline 3-partite, segments once or twice trifid coarsely toothed. *Wall. Cat.* 7212; *W. & A. Prodr.* 367; *Boiss. Fl. Orient.* ii. 856.

Base of the NORTH-WEST HIMALAYA, and outlying hills in the PUNJAB; *Falconer, Jacquemont, &c.*—**DISTRIB.** Cabul, West Asia, Europe, North Africa.

Biennial. *Stem* 1–8 ft., erect, branched. *Peduncle* 0– $\frac{1}{4}$ in., leaf-opposed: rays of the umbel 5–10, $\frac{1}{2}$ – $1\frac{1}{2}$ in.; pedicels 6–16, $\frac{1}{4}$ – $\frac{1}{2}$ in. *Fruit* $\frac{1}{16}$ – $\frac{1}{12}$ in.; ridges narrow, vittæ broad, occupying the whole breadth of the furrows.—Wild celery.

9. **CICUTA**, *Linn.*

Herbs, perennial, tall, glabrous. *Leaves* usually compound-pinnate. *Umbels* compound, rays numerous. *Bracts* 0, or few; bracteoles many, small. *Flowers* white. *Calyx-teeth* acute, minute. *Petals* obovate, emarginate. *Fruit* ovoid, not longer than broad, subcompressed, distinctly narrowed at the commissure; carpels semi-terete, dorsally compressed, plane on the inner face; primary ridges broad, corky, obtuse; furrows very narrow, 1-vittate; carpophore 2-partite. *Seed* semi-terete, dorsally compressed.—**DISTRIB.** Species 3, in the North Temperate Zone.

1. **C. virosa**, *Linn.*; *DC. Prodr.* iv. 99; cauline leaves 2–3-pinnate, segments lanceolate serrate. *Engl. Bot.* t. 479; *Reich. Ic. Fl. Germ.* t. 1853. *Cicutaria aquatica*, *Lamk. Dict.* ii. 2, *Ill.* t. 195.

KASHMIR; *Falconer*; Srinuggur, alt. 5200 ft., *C. B. Clarke*.—**DISTRIB.** Throughout Europe and Temperate Asia; in marshes and ditches.

Stem 2–5 ft., striate, hollow. *Leaflets* 1–2 by $\frac{1}{8}$ – $\frac{1}{2}$ in. *Peduncles* 2–3 in., terminal and leaf-opposed. *Bracts* 0; bracteoles 2–8, $\frac{1}{2}$ in., linear or narrowly lanceolate-linear; rays often 15, $1\frac{1}{2}$ – $2\frac{1}{2}$ in.; pedicels often 30–40, $\frac{1}{4}$ – $\frac{1}{2}$ in. *Fruit* $\frac{1}{16}$ in. in Indian examples (often $\frac{1}{12}$ in. in European), lateral primary ridges commissural; commissure obscurely constricted, in some Indian examples.—Water hemlock.

10. **PITURANTHOS**, *Viv.*

Perennial *herbs*, branched, somewhat rigid. Radical *leaves* 2–3-pinnate, cauline much reduced. *Umbels* compound; bracts and bracteoles lanceolate-linear, small, or 0. *Calyx-teeth* obsolete. *Petals* white, ovate, emarginate. *Fruit* ovoid or oblong, more or less laterally compressed, usually hairy; carpels terete, subpentagonal; primary ridges distinct (when the hair is removed), obtuse; furrows 1-vittate; carpophore 2-partite.—**DISTRIB.** Species 5 African, 2 Indian.

SUBGEN. **Eriocycla**. *Lindley* (Gen.). *Stem and leaves pubescent. Disc conical, very prominent. Styles long, early divergent, recurved. Ovary and young fruit densely hairy. Fruit oblong, much longer than broad.*

1. **P. nuda**, *Benth. in Gen. Pl. i.* 890; much branched upwards with virgate almost naked branches, umbels long-peduncled, rays 3-6, fruit scarcely laterally compressed. *Eriocycla nuda, Lindl. in Royle Ill.* 232, t. 51.

NORTH-WEST HIMALAYA; Kunawur, alt. 10,000-11,000 ft., *Royle, T. Thomson; Jacquemont.*

Stem 2-3 ft., glabrescent upwards. Lower cauline leaves 2-pinnate, ultimate segments $\frac{1}{2}$ in., oblong, lobed and toothed; upper much reduced, often to oblong acute sheaths $\frac{1}{2}$ in. Bracts 1-5, $\frac{1}{4}$ in.; bracteoles 5-10, $\frac{1}{12}$ - $\frac{1}{4}$ in., linear; rays 1-4 in.; pedicels 8-12, $\frac{1}{12}$ - $\frac{1}{4}$ in., obscurely pubescent. Fruit $\frac{1}{8}$ in., at first densely hairy, ultimately much less so; carpels oblong, narrower upwards; lateral primary ridges marginal.

2. **P. Thomsoni**, *C. B. Clarke*; stem with many lateral branches and umbels, rays 4-8, fruit much laterally compressed.—*Eriocycla* sp. ? 2, *Herb. Ind. Or. H. f. & T.*

WEST TIBET; Piti, alt. 10,000-12,000 ft., *Thomson. HIMALAYA; Jacquemont.*

*Stem 12-18 in., grey-pubescent. Lower cauline leaves 2-pinnate; ultimate segments $\frac{3}{4}$ in., ovate, deeply pinnatifid, toothed; upper leaves greatly reduced. Umbels long- or short-peduncled, sometimes sessile; bracts 4-8, $\frac{1}{2}$ in., linear; rays $\frac{1}{2}$ - $1\frac{1}{2}$ in., pubescent, subtomentose; bracteoles and pedicels much as in *P. nuda*, but more hairy. Fruit $\frac{1}{8}$ in.; carpels oblong, hardly narrowed upwards; lateral primary ridges within the distinctly constricted commissure.*

11. **CARUM**, *Linn.*

Herbs, perennial or annual. Leaves pinnate, or decomposed. Umbels compound; bracts few or many, simple or rarely divided; bracteoles several or many, undivided. Flowers white (in Indian species), polygamous, sterile flowers often with enlarged or irregular petals. Calyx-teen small, or 0. Petals retuse or emarginate. Fruit ovoid ellipsoid or oblong, laterally compressed and more or less constricted at the commissure; carpels terete, subpentagonal, plane on the inner face; primary ridges slender, conspicuous or obscure, lateral commissural; furrows 1-vittate; carpophore 2-fid or 2-partite. Seed terete, dorsally subcompressed, plane or obscurely channelled on the inner face.—DISTRIB. Species 50 in Europe, Temperate Asia, S. Africa and N. America.

This genus as modelled by Mr. Bentham differs from *Pimpinella* in its solitary vittæ, from *Seseli* by the fruit being more or less constricted at the commissure. (See *Pimpinella cæspitosa* which has solitary vittæ.)

* *Fruit glabrous or very nearly so.*

1. **C. Carui**, *Linn.; DC. Prodr. iv.* 115; ultimate segments of the lower leaves lanceolate, of the upper linear, bracteoles small linear or 0, fruit elliptic-oblong. *Boiss. Fl. Orient. ii.* 879.

BALTIKISTAN, KASHMIR AND GURWHAL, alt. 9000-12,000 ft., *Royle, &c.*—DISTRIB. W. and N. Asia, Europe (often cultivated).

Glabrous. *Stem 1-3 ft., branched, erect or diffuse. Leaves 2-pinnate, finely dissected; ultimate segments of the lower leaves $\frac{1}{2}$ - $\frac{1}{6}$ in., of the upper $\frac{1}{4}$ -1 in. Bracts 1-3, small, linear, or 0, rarely divided; rays 3-8, $\frac{1}{4}$ -2 in., unequal; pedicels 3-8,*

$\frac{1}{20}$ – $\frac{1}{2}$ in., unequal. *Fruit* $\frac{1}{8}$ – $\frac{1}{6}$ in., yellowish-brown, almost viscid; carpels terete narrowed upwards, primary ridges thin but very distinct; vittæ solitary, rather large; carpophore entire, or shortly 2-fid.—*C. meifolium*, *Bieb. Boiss. Fl. Orient.* differs by its lower leaves with linear segments, its more numerous bracts; but is perhaps hardly distinguishable.—*Caraway*.

2. **C. ? diversifolium**, *C. B. Clarke*; upper leaves 3-partite, pinnæ narrow-oblong or linear entire, fruit elliptic-oblong prominently ridged. *Sison diversifolium*, *Wall. Cat.* 592. *Falcaria ? diversifolia*, *DC. Prodr.* iv. 110.

NIPAL; *Wallich*.

Glabrous. *Stem* 3 ft. or more, much branched, sparingly leafy upwards, *Leaves* 2–3 in.; pinnæ $\frac{3}{4}$ by $\frac{1}{10}$ in., acute, or in the upper leaves often linear. *Bracts* 1–3, $\frac{1}{2}$ in. linear or 0; bracteoles 0–5, $\frac{1}{6}$ in., linear; rays 8–14; pedicels numerous. *Flowers* minute, all fertile. *Calyx-teeth* 0. *Petals* obovate, slightly emarginate. *Styles* somewhat long on conical style-bases. *Fruit* immature, $\frac{1}{2}$ in., nearly terete, probably resembling that of *C. Carui*, but may become broad at the commissure when it may be referable to *Fœniculum*.

3. **C. nothum**, *C. B. Clarke*; ultimate segments of all the leaves short linear, bracteoles 4–5 linear-oblong exceeding the pedicels, fruit nearly as in *C. Carui*.

CEYLON ?

Glabrous. *Stem* 4–5 in., erect, branched. *Leaves* 2–3-pinnate, finely dissected; ultimate segments $\frac{1}{8}$ in., somewhat distant and rigid. *Bracts* 4–5, $\frac{1}{2}$ in., very narrowly oblong, subobtuse; rays 3–7, 1–1 $\frac{1}{2}$ in.; pedicels 3–8, rarely attaining $\frac{1}{2}$ in. *Calyx-teeth* minute. *Fruit* rather more strongly ribbed than that of *C. Carui*, less narrowed upwards; carpophore 2-partite.—There is little doubt regarding the genus of this plant, it having been originally referred to *Ptychotis* by Sir J. D. H. and having been again dissected by Bentham and marked *Carum*. The doubt is as to its birth-place; it is marked "Ceylon," but not on an original ticket, and there is no collector's name. Its aspect is Alpine Himalayan, not at all Cinghalese. There is another small specimen collected by T. Lobb in Mysore that seems the same thing.

4. **C. Bulbocastanum**, *G. D. J. Koch in Nov. Act. Acad. Cæs. Leop.* 1825, 121; ultimate segments of all the leaves linear, bracteoles 0–8 linear, fruit oblong not narrowed upwards. *DC. Prodr.* iv. 115. *Bunium Bulbocastanum*, *Linn.*

KASHMIR, alt. 6000–9000 ft.; *Jacquemont*, &c.—DISTRIB. Beloochistan, N. Asia, Europe, N. Africa.

Glabrous. *Root* tuberous. *Stem* 6–30 in., erect, branched. *Leaves* 2–3-pinnate, finely dissected, ultimate segments of the lower often $\frac{1}{2}$ –1 in., of the upper leaves very narrow. *Bracts* 0, or several, linear, sometimes divided; rays 6–16, 1 $\frac{1}{2}$ in.; pedicels 10–15, $\frac{1}{8}$ – $\frac{1}{2}$ in. *Fruit* $\frac{1}{8}$ – $\frac{1}{6}$ in., yellowish-brown, almost viscid; carpels exactly oblong, hardly widened at the middle, semi-terete, dorsally subcompressed; ridges thin, distinct; vittæ solitary, rather large.

5. **C. stictocarpum**, *C. B. Clarke*; ultimate segments of the lower cauline leaves narrowly linear-lanceolate, bracteoles 4–8 linear-lanceolate with scarious ciliate margins, fruit shining minutely pubero-punctate.—*Ptychotis* sp. 3, *Herb. Ind. Or. H. f. & T.*

CONCAN; *Stocks, Law*.

Glabrous or minutely hairy. *Root* fusiform. *Stem* 1–3 ft., erect, much branched. *Leaves* 2-pinnate, ultimate segments often 1 by $\frac{1}{12}$ in., upper often with linear segments. *Bracts* 3–6, $\frac{1}{4}$ – $\frac{1}{3}$ in., nearly linear; bracteoles $\frac{1}{4}$ in.; rays 6–12, $\frac{1}{2}$ –2 in., equal, slender; pedicels 8–20, $\frac{1}{8}$ – $\frac{1}{4}$ in. *Ovary* minutely pubero-pubescent. *Fruit*

$\frac{1}{34}$ – $\frac{1}{16}$ in., ovoid, ultimately shining, yellow, the dots microscopical, ridges faint; carpels semi-terete; vittæ solitary, small.

VAR. *hebecarpa*; fruit $\frac{1}{16}$ – $\frac{1}{12}$ in. hispidulous sometimes densely so and fuscous. Ptychotis sp. 4. *Herb. Ind. Or. H. f. & T.*—Concan; *Stocks, Law.*

** *Fruit hispid or muricate* (see also *C. stictocarpum* No. 4).

6. **C. Roxburghianum**, *Benth. in Gen. Pl. i.* 891; ultimate segments of the lower cauline leaves narrowly linear-lanceolate, bracteoles 4–8 linear-lanceolate with scarious ciliate margins, fruit hispid. *Kurz in Journ. As. Soc.* 1877, pt. ii. 114. *Apium involucratum*, *Roxb. Hort. Beng.* 22, *Fl. Ind.* ii. 97; *Fleming Cat. Ind. Med. Pl.* 6; *Wight Ic.* t. 567. *Pimpinella?* involucrata, *W. & A. Prodr.* 369; *Wight Ic.* t. 335; *Dalz. & Gibbs. Bomb. Fl.* 106. *Athamantha Roxburghiana*, *Wall. Cat.* 571. *Ptychotis Roxburghiana*, *DC. Prodr.* iv. 109.—*Phellandrium* sp., *Wall. Cat.* 7217, *fide W. & A.*

Throughout INDIA extensively cultivated from HINDOOSTAN and BENGAL to SINGAPORE and CEYLON. Not known wild.

Probably a cultivated form of *C. stictocarpum* which it exactly resembles except as to the fruit which is $\frac{1}{12}$ – $\frac{1}{10}$ in., the part used by man and therefore that which has varied under cultivation. This shows a wide difference in size, colour, and hairiness in the two forms, but there is a series of connecting links through the var. *hebecarpa*. In *C. Roxburghianum*, the fruit is more distinctly ridged, subpentagonal; the vittæ are most minute, *W. & A.* say several in each furrow, but they appear generally 1 or 0. The petals are hairy.—*Wight* doubts whether his t. 567 (which is copied from *Roxburgh*) is the *Pimpinella?* involucrata of *W. & A. Prodr.* 369; but a reference to his Herbarium shows that it is; the fruit varying somewhat in size and a good deal in hairiness. The only scrap *Wight* got of *C. stictocarpum* he arranged (without name) in *Ptychotis*.

7. **C. copticum**, *Benth. in Gen. Pl. i.* 891; ultimate segments of all the leaves linear, bracteoles 3–5 small linear, fruit muricate subhispid. *Ammi copticum*, *Boiss. Fl. Orient.* ii. 891. *Ligusticum Ajawain*, *Fleming Cat. Ind. Med. Pl.* 25. *L. Ajowan*, *Roxb. Hort. Beng.* 21, *Fl. Ind.* ii. 91. *Athamantha Ajowan*, *Wall. Cat.* 572. *Ptychotis coptica*, *DC. Prodr.* iv. 108. *P. Ajowan*, *DC. l. c.* 109; *W. & A. Prodr.* 368; *Wight Ic.* t. 566. *Bunium aromaticum*, *Linn. Mant.* 218. *Seseli ammoides*, *Jacq. Hort. Vind.* t. 52. *Sison Ammi*, *Jacq. Hort. Vind.* t. 200.

INDIA, extensively cultivated from the PUNJAB and BENGAL to the SOUTH DECCAN.—DISTRIB. *W. Asia, S. Europe, N.-E. Africa.*

Minutely pubescent, or the stem and leaves glabrescent. *Root* fusiform. *Stem* 1–3 ft., erect, branched, leafy. *Leaves* 2–3-pinnate; ultimate segments linear, often $\frac{1}{2}$ –1 in. *Bracts* several, linear, rarely 0, sometimes divided; rays 4–12, $\frac{1}{2}$ –1½ in.; pedicels 6–16, $\frac{1}{20}$ – $\frac{1}{4}$ in., more or less pubescent. *Fruit* $\frac{1}{12}$ in., ovoid; carpels subpentagonal, dorsally compressed, nearly plane on the inner face; ridges usually distinct; vittæ solitary, small.—The bracts are in the Indian *Ajowan* not rarely divided, when it is undistinguishable from the West Asian *C. copticum*. *Boissier l. c.* maintains that the genus should be *Ammi* because the petals are destitute of a transverse fold; but *W. & A.* are correct in saying (*Prodr.* 368) that they are just like those of other *Carums*.

8. **C. khasianum**, *C. B. Clarke*; lower leaves 3-partite pinnate or sub-2-pinnate ultimate segments oblong crenate-serrate, fruit very nearly as in *C. copticum*, but shorter.—*Ptychotis?* sp. *Wall. Cat.* 7218. *Ptychotis* sp. 9, *Herb. Ind. Or. H. f. & T.*

KHASIA Mts.; alt. 3000–5000 ft., common, *Wallich, &c.*

Pubescent throughout, or the lower part glabrescent. *Root* fusiform. *Stem* 2–4 ft.,

erect, corymbose upwards. Ultimate segments of the radical leaves often 2 by $\frac{1}{2}$ in., narrowed at the base, distinctly reticulate-nerved, of the upper narrower, sometimes filiform. Bracts 0-5; $\frac{1}{4}$ in., linear; rays 4-8, $\frac{1}{2}$ - $1\frac{1}{2}$ in., hispid; pedicels 8-16, $\frac{1}{8}$ - $\frac{1}{4}$ in., bracteoles shorter than the pedicels. Fruit $\frac{1}{16}$ in., ovoid, mucronate hispidulous, ridges prominent; carpels subpentagonous; dorsally subcompressed; vittæ solitary, small.

9. **C. anethifolium**, Benth. in Gen. Pl. i. 891; leaves 2-3-pinnate ultimate segments linear, bracts 4-5 linear, rays 15-40 very pubescent. *Athamanta anethifolia*, Wall. Cat. 569. *Ptychotis anethifolia*, DC. Prodr. iv. 108. *Pimpinella anethifolia*, Don Prodr. 184.

NIPAL, Wallich. KUMAON; Almora alt. 5000 ft., Strachey & Winterbottom.

Puberulo-pubescent. Root fusiform. Stem 2-4 ft., erect, leafy, corymbose upwards with long peduncles. Leaves 2-3-4-pinnate, ultimate segments $\frac{3}{8}$ - $\frac{1}{2}$ in., sometimes lanceolate-linear; rays $\frac{1}{2}$ - $1\frac{1}{4}$ in.; bracteoles 4-8, $\frac{1}{8}$ - $\frac{1}{4}$ in., linear; pedicels 15-30, $\frac{1}{8}$ - $\frac{1}{2}$ in.—Ripe fruit not seen; young very pubescent.

10. **C. Falconeri**, C. B. Clarke; leaves 2-3-pinnate ultimate segments linear, bracts 4-5 narrowly oblong-linear subobtuse, rays 3-7 glabrous or nearly so.—*Ptychotis* sp. 8, Herb. Ind. Or. H. f. & T.

GURWHAL; Falconer; alt. 7000-9000 ft., Edgeworth; Chiringa, alt. 7000 ft., Strachey & Winterbottom; Mussooree, Dr. Bacon.

Glabrous except the pedicels, flowers, and fruits. Root fusiform. Stem 2-4 ft., erect, corymbose upwards. Upper leaves reduced sometimes to the dilated sheaths; ultimate segments very long in all the leaves, sometimes 2-3 by $\frac{1}{16}$ in.; rays $\frac{1}{2}$ - $1\frac{1}{2}$ in.; bracteoles 4-6, $\frac{1}{8}$ in., oblong, subobtuse; pedicels 8-16, $\frac{1}{8}$ - $\frac{1}{4}$ in., with scattered hairs. Petals pubescent. Fruit $\frac{1}{12}$ in., ovoid, narrowed upwards, densely hairy.—Appears closely allied to *C. anethifolium*; possibly De Candolle's description of *P. anethifolia* (Prodr. iv. 108) was intended to include this.

12. SIUM, Linn.

Glabrous herbs. Leaves pinnate, pinnæ toothed. Umbels compound terminal and lateral; bracts and bracteoles several. Calyx-teeth acute, or obsolete. Petals white, emarginate. Fruit ovoid or oblong, laterally compressed, constricted at the commissure (but the constriction masked in the Indian species by the large corky lateral ridges); primary ridges prominent, obtuse, frequently thickened; furrows 3-2- (or 1-) vittate; carpophore (ex DC.) completely bipartite, each half adnate to the adjoining mericarp. Seed terete.—DISTRIB. Species 4, in the N. Temperate Zone: 1 in South Africa.

The generic character is here somewhat altered from Benth's (in Gen. Plant.), in order to retain the Indian species in *Sium* rather than in *Pimpinella*. *Sium* is here separated by the large simple pinnæ of the leaves, and the thickened prominent ridges of the fruit.

1. **S. latijugum**, C. B. Clarke; pinnæ of the lower leaves 1 in. ovate or ovate-lanceolate, calyx-teeth 0, fruit elliptic, ridges triangular obtuse corky much wider than the 1-vittate furrows.

KASHMIR and BALTISTHAN, in ditches, alt. 5000-9000 ft.; very common.

Root, stem, leaves, and flowers closely resembling *S. latifolium*, which differs in its smaller pinnæ, acute calyx-teeth, less thick ridges of the fruit, and many vittæ scattered nearly all round the carpels. *S. latijugum* is that plant which Benth (in Gen. Pl. ii. 893) refers to as that variety of *S. lancifolium* in which the ridges are broader nearly completely covering the furrows: but it can hardly belong to the

same genus as the true *S. lancifolium* in which the fruits are much smaller the ridges slender with broad 3-vittate furrows. *S. nipponicum*, Maxim. in Bull. Acad. Petersb. Mel. Biol. ix. 766, is very near *S. latijugum*, but its calyx-teeth are manifest, and there are vittæ scattered under the ridges besides the subsolitary vittæ in the furrows. In *S. multijugum* the lateral ridges are rather larger than the others, and form with the commissure a wide plane face, there are 2 vittæ only on the commissure close to its medial line. The 4 vittæ on the outer faces of the carpels are large, exactly occupying the furrows. The seed is very accurately terete.

13. PIMPINELLA, Linn.

Herbs, biennial or perennial. *Leaves* 1-2-pinnate or 1-2-ternate or decomposed, rarely undivided, toothed. *Umbels* compound; bracts few or 0; bracteoles usually linear, sometimes 0. *Flowers* hermaphrodite or polygamomonœcious. *Calyx-teeth* 0 or small, lanceolate. *Petals* usually emarginate, ovate acute or lanceolate caudate. *Fruit* laterally compressed, usually constricted at the commissure, ovate or ovate-oblong or narrow-oblong; carpels terete or subpentagonal, often dorsally compressed, plane on the inner face; ridges slender, obscure or prominent; furrows 2-3-vittate (in *P. cæspitosa* 1-vittate); carpophore entire 2-fid or 2-partite. *Seed* terete, $\frac{1}{2}$ -terete or dorsally subcompressed, inner face plane or nearly so. — **DISTRIB.** Species 70, in the northern hemisphere, with a few in S. Africa and S. America.

* *Fruit* glabrous or very nearly so. (See also No. 16, *P. diversifolia*, var. *alpina*).

1. **P. achilleifolia**, C. B. Clarke; glabrous, lower cauline leaves 3-4-pinnate ultimate segments linear-lanceolate, bracts 1-5 $\frac{1}{3}$ - $\frac{2}{3}$ in. linear, rays 6-10. *Athamanta achilleifolia*, Wall. Cat. 568. *Ptychotis achilleifolia*, DC. Prodr. iv. 109.

Temperate and subalpine HIMALAYA, Wallich, &c.; from KUMAON; Naini Tal, alt. 8500 ft., *Str. and Wint.*; to SIKKIM; Jongri, 13,000 ft., C. B. Clarke.

Stem 3-4 ft., erect, corymbose upwards, with long peduncles. Quaternary pinnæ $\frac{1}{4}$ - $\frac{1}{5}$ in., often 3-furcate, somewhat rigid, upper leaves reduced, sometimes almost to the inflated sheaths. *Bracteoles* 4-6, $\frac{1}{8}$ in., linear; rays $\frac{1}{2}$ -2 $\frac{1}{2}$ in.; pedicels 8-20, $\frac{1}{12}$ - $\frac{1}{4}$ in. *Fruit* $\frac{1}{10}$ in., elliptic, oblong, glabrous, laterally compressed, ridges distinct, furrows 2-3-vittate; disc conical, prominent.

2. **P. nervosa**, C. B. Clarke; cauline leaves twice 3-partite secondary pinnæ 1-2 in. broadly lanceolate serrate nerves beneath much elevated minutely scabrid.

KHASIA Mts.; Nonkreem, alt. 5500 ft., H. f. & T.

Nearly glabrous. *Stem* 2-3 ft., stout. *Peduncles* 1-6 in. *Bracts* 0; rays 6-12, 1-2 $\frac{1}{2}$ in.; bracteoles 3-8, linear, overtopping the umbellules. *Flowers* all hermaphrodite. *Calyx-limb* 0. *Petals* emarginate, white or purplish. *Styles* short. *Fruit* $\frac{1}{8}$ in., crowned by short conic style-bases, glabrous; carpels subpentagonal, dorsally subcompressed; ridges distinct, furrows 2-1-vittate.—This from its coarse habit and foliage may be an *Ægopodium*, but there are small vittæ in the unripe fruit.

3. **P. Heyneana**, Wall. Cat. 566; lower cauline leaves 3-partite or twice or thrice 3-partite, ultimate segments ovate or ovate-lanceolate narrowed at the base, fruit didymous broader than long. Kurz in Journ. As. Soc. 1877, pt. ii. 115. *Helosciadium*? *Heyneanum*, DC. Prodr. iv. 106; W. & A. Prodr. 368; Dalz. & Gibs. Bomb. Fl. 106. *Sium triternatum*, Moon Cat. 22. *Seseli*

zeylanicum, *Herb. Rottler & Klein*. *Anethum trifoliatum*, *Roxb. Fl. Ind. ii.* 96 ?.

CIRCARS, *Roxburgh*; DECCAN PENINSULA and CEYLON, frequent in the hills. CHITTAGONG; at Burkul, *C. B. Clarke*. PEGU, *Kurz*.

Nearly glabrous, or the leaves pilose. Stem 2-4 ft., erect, branched. Ultimate segments of the lower leaves often 1-2 by $\frac{1}{4}$ - $\frac{1}{2}$ in., serrate, of the upper narrower sometimes linear. Bracts 0; rays 6-12, 1-2 in., glabrous or nearly so; bracteoles 1-2, $\frac{1}{8}$ in., often 0; pedicels 6-10, $\frac{1}{10}$ - $\frac{1}{5}$ in. Fruit $\frac{1}{20}$ - $\frac{1}{16}$ in.; carpels ellipsoid, almost globose, ridges slender, rarely white and conspicuous; disc obsolete; carpophore 2-fid, sometimes deeply. Seed nearly terete, not concave on the inner face.—*Roxburgh's* description of *Anethum trifoliatum*, a native of the Circars, will apply to both *P. Heyneana* and *diversifolia*. Wallich identified it with his *trifoliata* (*diversifolia*, DC.) a Himalayan plant, but W. & A. with more probability refer it to *P. Heyneana*.

4. **P. sikkimensis**, *C. B. Clarke*; cauline leaves 2- sub-3-pinnate, ultimate segments oblong bristle-serrate, fruit $\frac{1}{8}$ in. elliptic longer than broad.—*Ptychotis* sp., *Herb. Ind. Or. H. f.*

SIKKIM; common in damp forests, alt. 4-7500 ft., *J. D. H.*, *C. B. Clarke*.

Glabrous or sparsely setulose. Stem 2-4 ft., corymbose. Leaves large, ovate; pinnae and pinnules ($\frac{1}{4}$ in.) opposite. Bracts 0 or 1-2, scarcely $\frac{1}{4}$ in., linear; rays 6-14, 1-3 in., stout, angular, divaricate; bracteoles few, scarcely $\frac{1}{6}$ in., linear; pedicels very many, but only 6-12 fruiting, $\frac{1}{2}$ - $\frac{3}{4}$ in. Calyx-teeth lanceolate. Petals emarginate, greenish-white; disc prominent; styles very short. Fruit slightly narrowed upwards; ridges not prominent; carpophore stout, undivided; carpels much dorsally compressed, inner face concave; vittæ usually solitary in the two dorsal furrows, and in pairs in the two lateral ones.

5. **P. Wallichii**, *C. B. Clarke*; cauline leaves 2-3-pinnate tertiary pinnae pinnatifid ultimate segments narrowly lanceolate, fruit ellipsoid broader than long.

NIPAL; *Wallich in Herb. Hook.* SIKKIM; alt. 4000-6000 ft., frequent, *C. B. Clarke*.

Glabrous. Stem 2-4 ft., erect, branched. Leaves large, ovate, pinnae and pinnules opposite, all similarly cut, ultimate segments $\frac{1}{10}$ - $\frac{1}{4}$ in., often 3-fid, not setulose. Bracts 0; rays 6-12, $\frac{3}{4}$ in., rigid; bracteoles 1-2, less than $\frac{1}{4}$ in., linear, or 0; pedicels 8-12, hardly $\frac{1}{6}$ in. Fruit $\frac{1}{12}$ in., laterally subcompressed; disc inconspicuous; ridges prominent; carpophore slender, 2-partite; carpels dorsally compressed, subpentagonal, plane on the inner face; vittæ externally somewhat conspicuous, usually 3 in each furrow and 4 on the commissure.

6. **P. Saxifraga**, *Linn.*; *DC. Prodr.* iv. 120; radical leaves pinnate pinnae round or elliptic toothed upper sub-2-pinnate, fruit ellipsoid rather longer than broad. *Boiss. Fl. Orient.* ii. 873.—*Var. dissectifolia*; pinnae (even of the radical and lower cauline leaves) deeply lobed, lobes lanceolate.

VAR. *dissectifolia*; KASHMIR; Tilail, alt., 13,000 ft., and WESTERN TIBET; KARAKORUM, alt 14,000 ft.; *C. B. Clarke*.—DISTRIB. Europe, Northern and Western Asia.

Glabrous or very nearly so, branched from the root. Stem 8-16 in., curved, striate, little leafy upwards. Leaves oblong, pinnae $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. Bracts 0; rays 5-10, $\frac{1}{8}$ - $1\frac{1}{2}$ in., unequal, stout, ascending; bracteoles 3-5, $\frac{1}{6}$ in., linear; pedicels 5-10; $\frac{20}{100}$ - $\frac{10}{100}$ in. Petals often pink or purplish. Fruit $\frac{1}{4}$ in.; carpels $\frac{1}{2}$ -terete, subpentagonal, dorsally subcompressed; inner face plane; ridges thin, distinct; vittæ 2-3 in each furrow; carpophore stout, often 2-partite. Seed concave on the inner face.—This does not exactly agree in the cutting of the leaf with any described form of *P. Saxifraga* and the styles are very short; it may be *P. rhodantha*, *Roiss. in Tchih. As. Min.* i. 414, *Fl. Orient.* ii. 874.

7. **P. acuminata**, C. B. Clarke; lower cauline leaves 2-pinnate secondary pinnæ toothed or incised, pedicels slender, fruit terete. *Reutera acuminata*, Edgw. in *Trans. Linn. Soc.* xx. 52

FROM KASHMIR to KUMAON, alt. 4–8000 ft., frequent.

Glabrous, or the leaves obscurely pubescent. *Stem* 3–4 ft., corymbose upwards. Secondary *pinnæ* 1–2 in. *Bracts* 1–5, $\frac{1}{2}$ – $\frac{3}{4}$ in., linear; rays 5–10, 1–3 in.; bracteoles 3–5, $\frac{1}{2}$ in., linear; pedicels $\frac{1}{2}$ – $\frac{1}{2}$ in. *Petals* yellowish-green or nearly white. *Fruit* nearly globose, laterally compressed, yellowish-brown, subviscid; carpels terete, ridges slender, furrows 2–3-vittate; disc small.—Easily recognised by the long slender pedicels.

8. **P. bella**, C. B. Clarke; leaves all similarly cut 2-pinnate secondary pinnæ pinnatifid ultimate segments oblong entire mucronate, fruit narrowly oblong.

SIKKIM; alt. 10,000–12,000 ft., Thomson, C. B. Clarke, N. Gamble; on the watershed between Sikkim and Nipal.

Glabrous. *Rootstock* long, fusiform. *Stem* 1–3 ft., corymbose upwards. *Leaves* large, ovate, pinnæ and pinnales opposite, often white beneath. *Bracts* 0, or 1 linear, 1 in.; rays 10–15, 1–2 in., angular, stout; bracteoles 2–5, $\frac{1}{4}$ in., linear; pedicels 8–16, $\frac{1}{2}$ – $\frac{3}{4}$ in. *Calyx-margin* obsolete. *Petals* ovate-lanceolate, plane. *Disc* large, conical. *Carpophore* 2-partite. *Fruit* $\frac{1}{2}$ in.; carpels terete, subpentagonal, inner face hardly grooved; ridges slender, furrows 2–3-vittate.

9. **P. Hookeri**, C. B. Clarke; leaves pinnate sub-2-pinnate segments of the lower leaves oblong of the upper linear, fruit ovate as long as broad.—*Acronema* sp. 2, *Herb. Ind. Or. H. f. & T.*

SIKKIM, Northern valleys, Samdong and Lachen, alt. 8–11,000 ft., J. D. H.

Glabrous. *Root* tuberous. *Stem* 1–2 ft., slender, sparingly leafy, remotely corymbose or subvirgate. Lower *leaves* cut and whitened beneath as in *P. bella*, segments 1–2 in.; upper much reduced with very narrow segments. *Umbels* subracemose upwards, rays few and slender; bracts and bracteoles 0, or inconspicuous; pedicels 4–6, $\frac{1}{2}$ – $\frac{3}{4}$ in., slender. *Petals* very small, often elongate with a whip-like tail much exceeding their own length (but this does not appear uniformly present, some petals on the same plants being emarginate with a short inflexed point). *Fruit* $\frac{1}{16}$ – $\frac{1}{12}$ in. globose, narrowed at the apex, laterally subcompressed, yellow-brown; ridges obscure; furrows 2–3-vittate; disc evanescent; carpophore slender, 2-partite.

10. **P. tenera**, Benth. in *Gen. Pl.* i. 894; lower cauline leaves pinnate pinnæ ovate ultimate segments of the upper small, fruit ovate-oblong conspicuously narrowed upwards. *Sison* ? tener, Wall. Cat. 593. *Helosciadium* ? tenerum, DC. *Prodr.* iv. 105. *Acronema tenerum*, Edgw. in *Trans. Linn. Soc.* xx. 51.

HIMALAYA, alt. 8–15,000 ft.; from GURWHAL to SIKKIM; Wallich, Falconer, J. D. H., C. B. Clarke.

Root tuberous (not annual as Benth. l. c.). *Stem* 6–8, rarely 12 in. *Petals* often excessively elongate as in *P. Hookeri*. *Furrows* 2–3-vittate.—Closely resembling *P. Hookeri* but smaller, the ultimate segments of the upper leaves not exceeding $\frac{1}{4}$ in., the carpophore undivided thick; fruit $\frac{1}{16}$ in., elongated, narrower upwards.

VAR. *dissecta*; leaves 2–3-pinnate ultimate segments scarcely $\frac{1}{8}$ in. ovate acutely 3-lobed or longer linear subobtusely.—With the type.

11. **P. acronemæfolia**, C. B. Clarke; leaves 2–3-pinnate ultimate segments ovate acutely 3-lobed or longer linear subobtusely, peduncles 1–2 on each stem 2–6 in. stout, bracts 1–5 $\frac{1}{2}$ in. linear.

SIKKIM, alt. 11,000 ft., Chola, Lachoong, *J. D. H.*; Singaleh, alt. 10,000 ft., *C. B. Clarke.*

Glabrous, 3-8 in.; root tuberous. *Leaves* exceedingly like those of *P. tenera* var. *dissecta*; segments $\frac{1}{2}$ in. *Rays* 6-12, 1-1 $\frac{1}{2}$ in., stout; bracteoles small; pedicels 10-16, $\frac{1}{6}$ - $\frac{1}{3}$ in. *Petals* elliptic, obtuse, plane, white or pinkish. *Fruit* nearly as that of *P. tenera*.—This closely resembles *Vicatia millefolia*, but the plane petals exclude it from that genus.

12. **P. hastata**, *C. B. Clarke*; lower cauline leaves cordate or hastate triangular-lanceolate crenate serrate villous beneath, fruit ovate as broad as long.—*Pimpinella*, sp. 17, *Herb. Ind. Or. H. f. & T. Umbellifera*, No. 875, *Griff. Itin. Notes* 56.

KHASIA MTS.; Moflong, alt. 6000 ft., *Griffith, H. f. & T.*; Mairung, alt. 5000 ft., *C. B. Clarke.*

Root fusiform. *Stem* 3 ft., erect, obscurely pubescent, sparingly leafy, laxly corymbose upwards. *Leaves* 2-4 by 1-1 $\frac{1}{2}$ in., nearly glabrous above; upper cauline sometimes 3-partite with cordate ovate leaflets, uppermost sometimes reduced with narrow segments. *Bracts* 0; rays 5-8, 1-1 $\frac{1}{2}$ in., scabrid, subpubescent; bracteoles 0, or 1-2, $\frac{1}{6}$ in., linear; pedicels 5-10, $\frac{1}{10}$ - $\frac{1}{8}$ in. *Fruit* $\frac{1}{12}$ - $\frac{1}{10}$ in., brown, subdidymous, acute upwards, dorsally subcompressed, inner face slightly concave; ridges obscure, furrows 2-vittate; disc prominent, conical; carpophore 2-fid or 2-partite. *Seed* $\frac{1}{2}$ -terete, dorsally compressed, inner face slightly concave.

13. **P. Leschenaultii**, *DC. Prodr.* iv. 122; lower cauline leaves cordate orbicular serrate slightly pubescent beneath, fruit ovate-oblong glabrous or when young with a few scattered hairs. *W. & A. Prodr.* 369; *Wight Ic. t.* 1005; *Thwaites Enum.* 131.

NILGHIRIS, alt. 6-8000 ft.; *Wight, &c.* CEYLON, alt. 6000 ft., *Thwaites.*

Root fusiform, perennial. *Stem* 1-2 ft., virgate, obscurely pubescent. *Leaves* 1-2 in. diam., glabrous above or nearly so; upper reduced to sheaths, or 0. *Bracts* 0, or 1 small linear; rays 6-16, 1-1 $\frac{1}{2}$ in., scabrid-pubescent; bracteoles 1-3, $\frac{1}{6}$ in., linear; pedicels 6-12, $\frac{1}{8}$ - $\frac{1}{5}$ in. *Fruit* $\frac{1}{10}$ - $\frac{1}{8}$ in., narrowed upwards, strongly compressed, brown, finally glabrous; carpels $\frac{1}{2}$ -terete, not dorsally compressed, inner faces plane; ridges not prominent, furrows 3-vittate; disc prominent, conical.—*Thwaites* says his Ceylon examples are intermediate between *P. Leschenaultii* and *P. Candolleana*; but they are typical *P. Leschenaultii* with large laterally compressed fruits, &c.

** *Fruit papillose-scabrous or pubescent.* (See also No. 13, *P. Leschenaultii*).

14. **P. Candolleana**, *W. & A. Prodr.* 369; lower cauline leaves ovate-cordate serrate pubescent beneath, fruit ovate scabrid with clustered hairs when ripe. *Wight Ic. t.* 341.

Mts. of the SOUTH DECCAN, alt. 5-8000 ft., frequent.

Resembles generally *P. Leschenaultii* but is more pubescent. Lower leaves usually subacute, often pubescent above, sometimes 3-partite with petioluled leaflets; upper often 1-2-pinnatifid, ultimate segments oblong acute. *Fruit* very scabrid, shortly acute at the apex, very slightly compressed laterally, always much smaller and shorter than that of *P. Leschenaultii*; carpels $\frac{1}{2}$ -terete, dorsally subcompressed, inner face plane; ridges prominent, furrows 2-3-vittate; carpophore stout, entire.—*P. javana* *DC. Prodr.* iv. 122 is nearly allied to this but has the upper leaves reduced and not pinnatifid, and the fruits less strongly ribbed.

15. **P. monoica**, *Dalz. in Hook. Kew Journ.* iii. 212; lower cauline leaves 3-partite leaflets long-petioluled cordate-ovate, fruit terete papillose subscabrid.

Dalz. & Gibs. Bomb. Fl. 106. *Helosciadium Wallichianum*, *Miq. in Pl. Hohenack.* No. 633.—*Pimpinella* sp. 10, *Herb. Ind. Or. H. f. & T.*

MTS. of MALABAR and the SOUTH DECCAN; *Wight, &c.*

Minutely pubescent or nearly glabrous. *Stem* 7-8 ft. (*Dalzell*), much divided upwards. *Leaflets* 2-3 by 1-2 in., sharply serrate; petiolules $\frac{1}{2}$ -2 in.; upper leaves often much reduced, cut into setaceous linear segments. *Bracts* 0, rarely 1 linear; rays 6-12, $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; bracteoles 1-3, $\frac{1}{8}$ in., linear, or more often 0; pedicels 8-20, outer $\frac{1}{4}$ in. male, inner $\frac{1}{8}$ in. hermaphrodite. *Fruit* $\frac{1}{16}$ in., subdidymous, scarcely acute; carpels $\frac{1}{2}$ terete, inner face plane; ridges obscure, furrows 2-vittate; disc not prominent; carpophore entire, or very shortly 2-fid.

16. **P. diversifolia**, *DC. Prodr.* iv. 122; cauline leaves entire 3-partite or sub-2-pinnate leaflets ovate or cordate-lanceolate pubescent, fruit ovate narrowed upwards hispidulous papillose-rugose or finally nearly glabrous. *P. pubescens*, *Wall. Cat.* 567. *P. trifoliata*, *Wall. Cat.* 565. *P. sinica*, *Hance in Seem. Journ. Bot.* 1868, 113. *Helosciadium*? *trifoliatum* and *pubescens*, *DC. Prodr.* iv. 106.

Throughout the HIMALAYA, alt. 4-10,000 ft., very common. KHASIA Mts. alt. 3-6000 ft., common.—DISTRIB. China.

Villous, subtomentose, or scarcely pubescent. *Stem* 2-5 ft., corymbose upwards. Radical and lower cauline leaves often round-ovate; cauline often with 3-5-leaflets, or twice 3-partite or sub-2-pinnate; segments of the uppermost narrower, occasionally almost linear; leaflets usually 1-3 by $\frac{1}{2}$ -1 in., serrate, sometimes lacinate or subpinnatifid. *Bracts* 0, or 1-2, $\frac{1}{4}$ - $\frac{1}{2}$ in., linear; rays 6-16, $\frac{1}{2}$ -1 $\frac{1}{2}$ in., sometimes villous, never quite glabrous; bracteoles 3-8, $\frac{1}{8}$ in., or 0; pedicels 8-16, $\frac{1}{8}$ - $\frac{1}{2}$ in., all fruiting. *Petals* emarginate, white greenish or lurid. *Fruit* $\frac{1}{12}$ - $\frac{1}{10}$ in., laterally compressed, ridges never prominent sometimes quite obscure, furrows 2-3-vittate; disc not prominent; carpels $\frac{1}{2}$ -terete, scarcely subpentagonal, dorsally subcompressed, inner face plane.—A common and variable plant; the north-west examples frequently have the peduncles rays and fruits very villous and the leaves glabrous above. The Khasian have deeply cordate leaflets and papillose-rugose fruit: from these *P. monoica* *Dalz.* differs only by the minute fruits and the barren outer pedicels.

VAR. 1. alpina; petals ovate acute plane, young ovary glabrous, fruit shining yellow-brown glabrous much attenuated upwards. *P. trifoliata*, *Wall. Cat.* 565 (*type specimen*).—Sikkim, alt. 9-10,000 ft.—Rays of the umbel pubescent.

VAR. 2. divisa; lower cauline leaves pinnate and 2-pinnatifid, young fruit terete clavate upwards, disc yellow-brown. *Pimpinella* sp. 5 *Herb. Ind. Or. H. f. & T.*—Kashmir and Kistwar, alt. 7000-8000 ft., *Thomson*.—Probably a new species but there is no ripe fruit.

17. **P. Stracheyi**, *C. B. Clarke*; leaves simple and 3-partite leaflets ovate pubescent, fruit oblong narrowed at both ends, style-bases cylindric apex conical.—*Pimpinella* sp. 3, *Herb. Ind. Or. H. f. & T.*

KUMAON; Dhaulī River, Samangentha, alt. 7500 ft., *Strachey & Winterbottom*.

Generally resembling *P. diversifolia* on a small scale; stems 6-16 in., grey-villous, as the Kumaon examples of *P. diversifolia* generally are. *Fruit* $\frac{1}{2}$ in.; carpels terete, ridges slender, furrows 2-vittate. Young ovary villous. *Fruit* ultimately glabrescent shining yellow-brown.—Nearly allied to No. 22, *P. cæspitosa*.

18. ? **P. Parishiana**, *Kurz in Journ. As. Soc.* 1872, pt. ii. 309, and 1877, pt. ii. 115; leaves pinnate or 2-3-partite leaflets ovate acute serrate or lacinate, bracts 2-5 almost sheathing the rays, ovary minutely pubescent.

MOULMEIN, and MARTABAN, *Kurz*; on the Zwabakin; *Parish*.

Habit of *P. diversifolia*, much divided and very leafy upwards. *Leaflets* 1-2 by

$\frac{1}{2}$ –1 in., sparingly pubescent, very irregularly cut, sometimes pinnatifid. *Umbels* pubescent, nearly as in *P. diversifolia*, but with bracts and prominent bracteoles. *Bracts* $\frac{1}{8}$ – $\frac{1}{4}$ in., pubescent, lanceolate or the bases broad and subconnate; bracteoles very similar, exceeding the flowering umbellules. *Fruit* not seen.—This resembles *P. diversifolia*, differing in the more developed involucre: in the absence of ripe fruit, it may be a *Heracleum* or some other genus.

19. ***P. tomentosa***, Dalz. ms.; lower cauline leaves 2–3-pinnate ultimate leaflets ovate acutely lacinate, fruit narrowly oblong attenuate upwards scabrid with many ascending ovate small scales.—*Pimpinella* sp. 8, *Herb. Ind. Or. H. f. & T.* ? *Heracleum tomentosum*, Dalz. & Gibs. *Bomb. Fl.* 108, 313 (not of Smith).

BOMBAY (probably in the Ghats) Dalzell; Concan, Stocks.

Pubescent, somewhat villous upwards, hardly tomentose. *Stem* 2–4 ft., much branched upwards. Lower leaves large, ovate, ultimate leaflets 1 in., petioluled, serrated with very long teeth; upper often reduced to sheaths. *Bracts* 0; rays 4–8, 1 in.; bracteoles 0, or 1–2 very small linear; pedicels 3–10, $\frac{1}{12}$ – $\frac{1}{8}$ in. *Fruit* $\frac{1}{8}$ in., almost rostrate, laterally compressed, hardly constricted at the commissure; style-bases elongate, conical, yellow-brown; carpels terete, obscurely pentagonal; ridges very obscure, furrows 2–3-vittate; carpophore slender, 2-fid.

20. ***P. adscendens***, Dalz. in Hook. *Kew Journ.* ii. 261; lower cauline leaves oblong pinnate pinnæ ovate or round rarely 3-partite, fruit ovate minutely pilose. Dalz. & Gibs. *Bomb. Fl.* 106.

BOMBAY, Dalzell; Nasik, Edgeworth; BELGAUM, Dr. Ritchie; CONCAN, Stocks.

Minutely pubescent or glabrous. *Stems* many, 8–24 in. Lower leaves with 4–8 pair of pinnæ, terminal leaflet often large, pinnæ $\frac{1}{4}$ – $\frac{3}{8}$ in. diam., acutely serrate; upper leaves reduced, often more divided. *Bracts* 4–7, $\frac{1}{6}$ – $\frac{1}{8}$ in., linear; rays 4–12, 1 in., glabrous; bracteoles 4–7, $\frac{1}{8}$ in., linear, minutely ciliate-pubescent; pedicels 8–16, $\frac{1}{8}$ – $\frac{1}{2}$ in. *Fruit* $\frac{1}{16}$ in., brown, hardly acute, laterally compressed, disc not prominent; carpels terete, hardly pentagonal, not dorsally compressed; ridges obscure; furrows 2–3-vittate.

21. ***P. lateriflora***, Dalz. & Gibs. *Bomb. Fl.* 106; “leaves ternate leaflets twice ternate lobes of the lower leaves lanceolate of the upper linear all acute mucronate, fruit densely covered with small granular tubercles.” Dalz. l. c.

DECCAN; in ravines, common; Dalzell.

Puberulous, 1–1 $\frac{1}{2}$ ft., erect. *Peduncles* long, slender, leaf-opposed; umbels 3–10; bracts 3–7, subulate; bracteoles 7, subulate, as long as the pedicels. *Flowers* pink.—Not seen; the above copied from Dalzell.

22. ***P. cæspitosa***, Benth. in Gen. Pl. i. 895; pubescent, lower leaves oblong pinnate pinnæ ovate, bracts 4–5 linear-lanceolate villous, fruit oblong, furrows 1-vittate. *Petrosiadium cæspitosum*, Edgw. in Trans. Linn. Soc. xx. 51. ? *Thaspium foliosum*, Royle Ill. 40.

GURWHAL; Niti, alt. 12,000 ft., Edgeworth, Strachey & Winterbottom. KUNAWUR; above Rogi, alt. 9–10,000 ft., Thomson.

Rootstock short, woody, branched. *Stems* many, 4–8 in., sparingly leafy upwards. *Pinnæ* of the lower leaves $\frac{1}{4}$ – $\frac{3}{8}$ in. diam., coarsely serrate, hardly mucronate, sometimes lobed or 3-fid. *Bracts* $\frac{1}{4}$ – $\frac{1}{3}$ in.; rays 4–6, $\frac{3}{8}$ in., with much spreading soft white hair; bracteoles 4–6, $\frac{1}{8}$ in., lanceolate; pedicels 6–12, $\frac{1}{5}$ in. *Fruit* $\frac{1}{12}$ – $\frac{1}{10}$ in., very villous when young, ultimately glabrescent, laterally compressed; style-bases

large, subglobose on the young fruit; carpels $\frac{1}{2}$ -terete, dorsally compressed; ridges obscure; furrows 1-vittate on the few fruits available.—Strach. & Wint. suggest that this is the *Thaspium foliosum*, Royle.

14. OSMORRHIZA, DC.

Perennial herbs. *Leaves* twice 3-partite or sub-2-pinnate, ultimate segments large. *Umbels* compound, very lax; bracts few narrow, or 0; bracteoles much shorter than the pedicels. *Calyx-teeth* obsolete. *Petals* emarginate, white. *Fruit* linear-oblong, long-attenuate at base; laterally compressed, somewhat constricted at the commissure; carpels terete, subpentagonal, grooved on the inner face; primary ridges slender, distinct, secondary 0; furrows 2-3-vittate; carpophore slender, 2-fid. *Seed* $\frac{1}{2}$ -terete, dorsally subcompressed, inner face grooved.—DISTRIB. Species 4, North Asia, Japan, North America, Andes.

1. **O. Claytoni**, C. B. Clarke; leaves pubescent, bracts 1-5, fruit hispid below with erect adpressed bristles. *O. brevistylis*, DC. *Prodr.* iv. 232; *Royle* III. p. 233. *O. longistylis*, DC. l. c. 232. *O. laxa*, *Royle* III. 233 t. 52.

NORTH-WEST HIMALAYA, from KASHMIR to KUMAON, alt. 5000-8000 ft., frequent.—DISTRIB. N.E. Asia, Japan, temperate N. America.

Rootstock not tuberous. *Stem* 2-5 ft. *Leaves* large, ovate; ultimate segments 1-2 in. coarsely toothed, sometimes larger and pinnatifid. *Bracts* $\frac{1}{3}$ in., linear; rays 3-6, 1-4 in.; bracteoles 4-6, $\frac{1}{4}$ in., lanceolate; fruiting pedicels 3-6, $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; several other short abortive pedicels indicate male flowers. *Fruit* $\frac{3}{4}$ by $\frac{1}{12}$ - $\frac{1}{10}$ in., rather suddenly narrowed into conical style-bases; styles in fruit variable in length.—The Japanese examples have the pinnæ more pinnate, the Himalayan have the pinnæ generally 3-partite: the length of styles cannot be invariably connected with any other character, geographical or morphological.

15. CHÆROPHYLLUM, Linn.

Herbs, glabrous or hairy. *Leaves* pinnately decompose, or 2-pinnate with pinnatifid pinnules. *Umbels* compound; bracts 1-2, linear, or 0; bracteoles 3-6, lanceolate, or linear, or 0. *Flowers* white, usually polygamous; the central subsessile fertile, others pedicelled male or hermaphrodite. *Calyx-teeth* obsolete (Indian species). *Petals* emarginate. *Fruit* oblong, narrowed upwards, glabrous (in the Indian species), laterally compressed, narrowed at the commissure; primary ridges broad, obtuse, prominent (in *C. cachemiricum* obscure); furrows 1-vittate (or vittæ 0 in *C. capnoides*); carpels terete, inner face with a deep T-shaped groove; carpophore stout, undivided or shortly 2-fid; disc not prominent on the fruit. *Seed* terete, inner face with a deep narrow groove, widened into a hollow in the centre of the seed.—DISTRIB. Species 30; in temperate regions.

Technically separated from *Anthriscus* by the more prominent ridges of the fruit. As regards the Indian species, the only one referred to *Anthriscus* is easily distinguished by the very scabrid fruit.

1. **C. villosum**, Wall. *Cat.* 558 chiefly; stem with many long deflexed white hairs especially below, upper leaves 2-3-pinnate more finely divided than

the lower ultimate segments small, fruit oblong scarcely beaked. *DC. Prodr.* iv. 225.

HIMALAYA, from KASHMIR to SIKKIM; alt. 5000–12,000 ft., frequent. KHASIA Mts., alt. 4000–6000 ft., frequent.

Root fusiform. *Stem* 1–4 feet, erect, branched, always hispid below, often hairy upward. *Leaves* large, secondary pinnæ of the upper pinnate or pinnatifid, ultimate segments scarce $\frac{1}{2}$ in., with 2–4 lanceolate teeth, often with scattered hairs; segments of the lowest often 1–3 by 1 in. pinnatifid scarcely half-way down; upper sheaths usually inflated, hairy, with prominent white margins. *Bracts* 0; rays 3–6, 1–3 in., stout; bracteoles 2–5, $\frac{1}{2}$ – $\frac{3}{4}$ in., linear, often white margined, soon reflexed; pedicels 10–15, often 3–8 fruiting. *Fruit* $\frac{1}{2}$ in., equally broad its whole length, narrowed somewhat suddenly at the tip.

2. *C. reflexum*, *Lindl. in Royle Ill.* 232: glabrous or very sparsely pilose, upper leaves 2-pinnate more finely divided than the lower ultimate segments small, fruit oblong narrowed into a thick cylindric beak. *C. villosum*, *Wall. Cat.* 558 in part.

North-west HIMALAYA; from DALHOUSIE to KUMAON; alt. 5000–9000 ft., frequent.

Much less hairy than *C. villosum*, the fruit larger, and usually 1 (sometimes 2–3), ripen in each umbellule; pedicels of the other flowers being reflexed, as sometimes in a much less degree in *C. villosum*. *Fruit* $\frac{1}{2}$ – $\frac{3}{4}$ in., beak $\frac{1}{2}$ in.; vittæ of the commissure 2, in the narrow part of the groove.

3. *C. acuminatum*, *Lindl. in Royle Ill.* 232; more or less hairy, upper leaves 1–2-pinnate pinnæ large oblong closely regularly falcate-serrate, fruit oblong narrowed close under the style-bases.

HIMALAYA from KASHMIR to KUMAON; alt. 5000–9000 ft., frequent.

Stem 2–4 ft., usually with some long white hairs. Lower leaves often with ultimate pinnæ 2 by $\frac{1}{2}$ in., oblong, acute, upper reduced with narrower segments. *Umbels* bracts bracteoles and fruit much resembling those of *C. villosum*; petals somewhat larger, often somewhat radiant; fruits smaller ($\frac{1}{2}$ in.) fewer (often 2–3) to the umbellule.—Closely allied to *C. villosum*, though very different in the cutting of the leaves. *Lindley* puts it next *C. aromaticum*, *Jacq.*, but it more resembles *C. aureum*, *Linn.*

4. *C. capnoides*, *Benth. in Gen. Pl.* i. 898; root tuberous, leaves 1–2-pinnate ultimate segments oblong entire, fruit oblong-lanceolate vittæ 0. *Butinia capnoides*, *Decne. in Jacquem. Voy. Bot.* 70, t. 80.

KASHMIR; *Jacquemont*. KISHTWAR and BANAHAL; alt. 6000–8000 ft., *Thomson*.

Nearly glabrous. *Stem* 12–24 in. *Leaves* 4–8 in., lax, ovate; ultimate segments $\frac{1}{4}$ – $\frac{3}{4}$ by $\frac{1}{8}$ – $\frac{1}{2}$ in., undulate, mucronate. *Bracts* 0; rays 4–8, 1–3 $\frac{1}{2}$ in., stout; bracteoles 4–7, $\frac{1}{6}$ in., lanceolate; pedicels 6–12, $\frac{1}{2}$ –1 in., most of them fruiting. *Fruit* $\frac{1}{4}$ in., black, minutely punctate, very much constricted at the commissure, narrowed upwards, scarcely beaked; style-bases narrow, conical; carpels subtrapezoid from the extreme narrowing of the inner face; furrows subconcave, epicarp thin, no trace of vittæ.—The Algerian *Balansea Fontanesii*, *Boiss. & Reut.*, said hardly to differ from this by *Benth., l. c.*, apart from the crenate lobed leaflets, the large style-bases, and other prominent specific marks, has the fruits broadly grooved on the very wide commissure, and has large vittæ.

5. *C. cachemiricum*, *C. B. Clarke*; upper leaves sub-2-pinnate secondary pinnæ oblong deeply toothed or subpinnatifid, fruit oblong-lanceolate, ridges obscure.

NORTH-WEST HIMALAYAS; Dalhousie, alt. 7000 ft.; C. B. Clarke.

Stem 2-3 ft., hispid with reflexed hairs. *Bracts* 0; rays 5-8, $\frac{1}{2}$ -1 in.; bracteoles 1-4, $\frac{1}{2}$ in., linear, obscure; pedicels 12, the central alone fruiting. *Fruit* $\frac{1}{2}$ in.; carpels terete; ridges so obscure that the species should perhaps be referred to *Anthriscus*; furrows 1-vittate, no vittæ in the groove.

VAR. dissecta; glabrous, leaves 3-pinnate finely cut, fruit nearly $\frac{1}{4}$ in. sometimes 2 to the umbellule.—Kashmir, Sind Valley, alt. 12,000 ft., C. B. Clarke.—Rays longer and stouter than in the type. Perhaps a distinct species, but the fruit closely agrees with that of *C. cachemicum* except that it is a little larger.

16. **SCANDIX**, Linn.

Annual herbs. *Leaves* pinnately decompound, ultimate segments small, narrow. *Umbels* compound or simple; bracts 1 or 0, bracteoles several. *Flowers* white, polygamous, often radiant. *Calyx-teeth* 0, or minute. *Petals* emarginate. *Fruit* oblong, laterally compressed, beak many times longer than the seed; carpels terete or dorsally subcompressed, with a T-shaped groove on the inner face; primary ridges distinct, broad or narrow, secondary 0; vittæ solitary in each furrow, slender, or 0; carpophore undivided or 2-fid. *Seed* terete, dorsally subcompressed.—DISTRIB. Species 10; all northern, mostly Mediterranean.

1. **S. Pecten-veneris**, Linn.; DC. Prodr. iv. 221; bracteoles lanceolate often incised or lobed at the apex, beak of the fruit dorsally compressed hispidulous on the margins, fruit 1-2 in. Boiss. Fl. Orient. ii. 914.

KASHMIR; alt. 5000-6000 ft., Falconer, Thomson. PUNJAB; Salt Hills, Cleghorn, Aitchison, Jameson.—DISTRIB. Cabul to Western Europe.

Stem 6-12 in., glabrous or pilose as are the leaves. *Umbels* simple or compound, short-peduncled; bracteoles $\frac{1}{4}$ in., lanceolate, pubescent or ciliate; pedicels 3-8, hardly $\frac{1}{10}$ in. in fruit. Beak of fruit twice as long as the seed; ridges broad, obtuse.

17. **ANTHRISCUS**, Hoffm.

Herbs. *Leaves* 2-3-pinnate, ultimate segments pinnatifid or toothed, often broad. *Umbels* compound; bracts 1-2 or 0; bracteoles several, undivided. *Flowers* white, often polygamous. *Calyx-teeth* 0, or minute. *Petals* emarginate. *Fruit* oblong or ovate-oblong, narrowed shortly at the apex, laterally compressed, constricted at the commissure; often scabrous; carpels terete or dorsally subcompressed, with a T-shaped groove on the inner face; primary ridges not prominent, vittæ solitary in each furrow, minute, or 0; carpophore undivided or 2-fid. *Seed* terete, dorsally subcompressed.—DISTRIB. Species 10, the north temperate regions of the Old World, 1 extending to North-west America.

1. **A. nemorosa**, Spreng. Pl. Umb. Prodr. 27; rays 10-15 stout glabrous, bracteoles 5-7 lanceolate pubescent, fruit ovate-oblong clothed with ascending hispid hairs. DC. Prodr. iv. 223; Boiss. Fl. Orient. ii. 911.

KASHMIR, alt. 7000-11,000 ft.; plentiful.—DISTRIB. N. Asia to E. Europe.

Stem 5-8 ft., sparingly hairy. *Leaves* large with large pinnæ and segments, glabrous, or pubescent beneath. Bracteoles $\frac{1}{4}$ in. *Flowers* often radiant. *Fruits* $\frac{1}{2}$ in., numerous in each umbellule, black, minutely punctulate as well as prominently hispid, ridges acute at the apex.

18. **SESELI**, Linn.

Herbs, glabrous or pubescent. *Leaves* 2-3-pinnate or twice 3-partite. *Umbels* compound; bracts 0 few or many, undivided or pinnate; bracteoles several or many. *Calyx-teeth* minute, lanceolate or linear, or 0. *Petals* emarginate, white. *Fruit* oblong ovate or circular, not laterally compressed, broadest at the commissure; carpels $\frac{1}{2}$ -terete or (in *S. trilobum*) much dorsally compressed; inner face plane or (in *S. trilobum*) concave; ridges strong, obtuse or subacute, lateral hardly larger than the dorsal; vittæ in each furrow solitary, usually prominent; carpophore 2-partite, 2-fid or entire; disc not prominent on the fruit. *Seed* $\frac{1}{2}$ -terete; in *S. trilobum* dorsally compressed, inner face excavated.—**DISTRIB.** Species 40; in the N. temperate zone of the Old World; with 2 doubtful Australian.

1. **S. sibiricum**, Benth. in Gen. Pl. i. 901; lower leaves 2-pinnate secondary pinnæ large ovate toothed and pinnatifid sessile or decurrent, calyx-teeth triangular minute deciduous, fruit cylindric villous. Boiss. Fl. Orient. ii. 967.

WEST TIBET; Falconer. KASHMIR; Jacquemont. Kishtwar, alt. 7000-8000 ft., Thomson.—**DISTRIB.** Asia, Russia.

Minutely pubescent or nearly glabrous, 2-4 ft. Lower leaves often 1 ft., upper often pinnate; pinnæ somewhat firm in texture, subspinulose, secondary 1-2 in. Bracts usually 0 or 1; in the Siberian examples sometimes many; rays 15-40, 1-2½ in., pubescent; bracteoles 5-10, $\frac{1}{2}$ in. lanceolate; pedicels 10-25, $\frac{1}{4}$ - $\frac{1}{2}$ in. Young fruit $\frac{1}{2}$ in., densely villous, in age less so; carpels $\frac{1}{2}$ -terete, dorsally compressed, inner face plane; epicarp somewhat thickened, ridges strong, subequal, vittæ large; carpophore slender, 2-partite. *Seed* plane on the inner face.

2. **S. indicum**, W. & A. Prodr. 371; lower leaves 2-pinnate secondary pinnæ ovate lobed pubescent, calyx-teeth 0, fruit subglobose ridges thick. Cnidium diffusum, DC. Prodr. iv. 153; Wight Ic. t. 569. Athamantha diffusa, Wall. Cat. 570. Ligusticum indicum, Wall. Cat. 7215. L. diffusum, Roxb. Hort. Beng. 21, Fl. Ind. ii. 92.

Plains of INDIA; from the foot of the SIWALIKS to ASSAM and COROMANDEL; frequent in CENTRAL BENGAL.

Annual, erect or diffuse, 4-12 in., often much branched. *Leaves* all similarly cut, upper without linear segments. *Bracts* 4-5, $\frac{1}{2}$ in., narrowly lanceolate, caudate, pubescent; rays 8-16, $\frac{1}{4}$ -1 in.; bracteoles like the bracts but rather smaller; pedicels 8-16, $\frac{1}{6}$ in. *Flowers* white or pinkish. *Fruit* $\frac{1}{12}$ - $\frac{1}{10}$ in. (in Roxburgh's drawing copied in Wight Ic. t. 569) glabrous; in Wall. Cat. 7215, and W. & A. Prodr. 371, very hirsute (and hardly half as large); hairs often clubbed or stellate at the apex; carpels $\frac{1}{2}$ -terete; vittæ distinct; carpophore entire.—There are examples with fruit intermediate between the two extreme types above described.

3. **S. daucifolium**, C. B. Clarke; leaves 2-3-pinnate ultimate segments linear or narrowly lanceolate, bracts many often divided, fruit globose glabrous. Ammi daucifolium, Wall. Cat. 7209.—Discopleura sp., Benth. in Gen. Pl. i. 907.

EAST BENGAL; from BHOTAN and ASSAM to DACCA and CHITTAGONG; Wallich, &c.—**DISTRIB.** China.

Annual, erect, 8-16 in., glabrous or nearly so, very leafy upwards. Margin of the leaves minutely serrulate. *Peduncles* often leaf-opposed, short, stout; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., sometimes pinnate; rays 8-16, usually shorter than the bracts; bracteoles 6-12, $\frac{1}{2}$ in., linear; pedicels 10-25, $\frac{1}{8}$ - $\frac{1}{2}$ in. *Calyx-teeth* 0. *Petals* white or pinkish.

Fruit much like *S. indicum* but smaller and quite glabrous; ridges subequal.—Mr. Bentham did not possess well-ripened fruit when he referred this species to *Discopleura*. Hence referred the Chinese examples doubtfully to *Cnidium Monnieri*, Cuss.; *DC. Prodr.* iv. 152; to which *Seseli daucifolium* bears a general resemblance; but it is more leafy upwards with short peduncles, and the fruit is much smaller and not dorsally compressed.

4. ***S. trilobum***, Benth. in *Gen. Pl.* i. 901; lower leaves 2-pinnate or twice 3-partite, secondary pinnæ ovate lobed petioluled villous or tomentose beneath, calyx-teeth subulate minute deciduous, fruit ovate acute villous. *Sca-phespermum trilobum*, Edgw. in *Trans. Linn. Soc.* xx. 58.

North-West Himalaya; NITTI, alt. 8000–10,000 ft., Edgeworth. GURWHAL, *Falconer*. KUMAON; Millem, alt. 11,000 ft., *Strachey & Winterbottom*.

Stem 8–24 in., villous and little leafy upwards. *Leaves* minutely pubescent above; secondary pinnæ $\frac{1}{4}$ – $\frac{3}{4}$ in., crenate-serrate or irregularly lobed. *Bracts* 3–5, $\frac{1}{2}$ in.; rays 5–10, 1–2 in.; bracteoles 5–8, $\frac{1}{8}$ – $\frac{1}{4}$ in., linear; pedicels 10–20, $\frac{1}{8}$ – $\frac{1}{4}$ in. *Fruit* $\frac{1}{8}$ – $\frac{1}{4}$ in., but little longer than broad; carpels convexo-concave, much dorsally compressed; ridges strongly marked, subequal, vittæ prominent; carpophore deeply 2-fid. *Seed* excavated on the inner face, differing thus from all other species of *Seseli*.—Perhaps a *Pycnocycla*.

19. **PYCNOCYCLA**, Lindl.

Perennial herbs; branches rush-like, few-leaved. *Leaves* pinnately dissected, ultimate segments narrow. Rays of the umbels very short; bracts and bracteoles many, small; umbellules containing one central sessile fertile flower, and several pedicelled males. *Calyx-tube* hairy; teeth small, lanceolate, often unequal. *Petals* obovate, emarginate, hairy. *Fruit* oblong-lanceolate, hairy, terete (one carpel is frequently aborted), surrounded by the inflated pedicels of the barren flowers, receptacle not (or very obscurely) enlarged; carpophore 0; carpels $\frac{1}{2}$ -terete, inner face deeply grooved; primary ridges filiform, minute, lateral at the margin of the broad commissure; vittæ numerous, very slender, usually 1 under each primary ridge and several still more minute scattered in the endocarp. *Seed* lunate or with a T-shaped groove on the inner face.—DISTRIB. Species 7, in N.E. Africa and W. and Central Asia.

Whether one or more flowers in each umbellule perfect seed is hardly a character of generic importance in this order, as may be seen in *Cherophyllum*, wherein *C. reflexum* is hardly separable specifically from *C. villosum*. If this point be withdrawn from the generic character of *Pycnocycla*, it will include *Seseli trilobum*, Benth.

1. ***P. glauca***, Lindl. in *Royle Ill.* 232, t. 51; branches slightly pubescent, ultimate segments of the leaves long-linear subterete, umbels on long pubescent peduncles. *Hiern* in *Oliv. Fl. Trop. Afr.* iii. 8. *P. abyssinica*, *Hochst.*; *A. Rich. Fl. Abyss.* i. 333.

NORTH-WEST INDIA, *Royle*; Sutledge banks, *Falconer*. JUBBULPORE; *Beddome*. SATPURA HILLS, *G. Thomson*.—DISTRIB. Abyssinia.

Branched from the base, 1–2 ft.; branches terete, striate, subglaucous. Radical leaves long-petioled, pinnately dissected; segments remote, glabrous or nearly so; cauline similar, but smaller more shortly petioled. Umbels in flower $\frac{1}{2}$ in. diam., resembling those of a *Scabiosa*; bracts 5–6, $\frac{1}{2}$ in., oblong-linear or linear, hairy; bracteoles similar but smaller; rays $\frac{1}{4}$ in., hairy; pedicels hairy. Flowers in the umbellule about 9; petals white, with reddish midrib, hairy. *Fruit* $\frac{1}{4}$ by $\frac{1}{10}$ in.; carpel with a T-shaped groove on the inner face.—Beddome's examples have the two carpels producing perfect and similar seeds.

20. **FŒNICULUM**, *Adans.*

Glabrous *herbs*, biennial or perennial, tall. *Leaves* 2-3-4-pinnate, ultimate segments linear. *Bracts* 0; bracteoles 0, or few small linear. *Calyx-teeth* 0. *Petals* yellow, emarginate. *Fruit* not laterally compressed, oblong or ellipsoid; carpels $\frac{1}{2}$ -terete, ridges prominent subequal, furrows 1-vittate; carpophore 2-partite. *Seed* somewhat dorsally compressed, inner face slightly concave.—**DISTRIB.** Species 3-4, from the Canaries to Western Asia, 1 widely cultivated.

1. **F. vulgare**, *Gaertn. Fruct.* i. 105, t. 23, fig. 5; *DC. Prodr.* iv. 142; *W. & A. Prodr.* 371; *Wight Ic.* t. 515; *Kurz in Journ. As. Soc.* 1877, pt. ii. 115. *F. officinale*, *Allion.*; *Boiss. Fl. Orient.* ii. 975. *F. dulce*, *C. Bauh.*; *DC. l. c.*; *F. Panmorium*, *DC. l. c.*; *Wight Ic.* t. 570. *Anethum Fœniculum*, *Linn.*; *Roxb. Hort. Beng.* 22. *A. Panmorium*, *Roxb. Hort. Beng.* 22, *Fl. Ind.* ii. 94; *Fleming Cat. Ind. Med. Pl.* 6; *Wall. Cat.* 7211. *Ozodia fœniculacea*, *W. & A. Prodr.* 375.

Commonly cultivated throughout India, alt. 0-6000 ft.; often appearing wild.—**DISTRIB.** Widely cultivated.

The Indian examples have the ultimate segments of the leaves very long; the form *F. piperitum* *DC.*; *Boiss. Fl. Orient.* ii. 975; *Reich. Ic. Fl. Germ.* t. 1931 (with short linear ultimate segments) has not been communicated from India.

21. **PRANGOS**, *Lindl.*

Tall, perennial *herbs*. *Leaves* 3-4-pinnate. *Umbels* compound; bracts and bracteoles many. *Calyx-teeth* 0. *Petals* emarginate, yellow. *Fruit* oblong, commissure broad; carpels $\frac{1}{2}$ -terete, dorsally compressed, inner face nearly plane but the epicarp there thin, introflexed in a deep T-shaped groove; epicarp spongy; primary ridges large, subequal or the lateral larger; vittæ small, numerous; carpophore 2-partite. *Seed* dorsally compressed, inner face slightly concave, with a deep narrow T-shaped groove.—**DISTRIB.** Species 25, in the Mediterranean and West Asian regions.

1. **P. pabularia**, *Lindl. in Quart. Journ. Sc.* xix. (1824) 7; glabrous, ultimate segments of the leaves $\frac{1}{2}$ -1 in. setaceous, fruit ridges undulate furrows rough with corrugations. *DC. Prodr.* iv. 239; *Wall. Pl. As. Rar.* ii. 7, t. 212. *Laserpitium* sp. *Wall. in Trans. Agri. & Hort. Soc. Ind.* i. 74-82.

KASHMIR and **BALTISTHAN**, alt. 6000-11,000 ft., *Falconer, &c.*—**DISTRIB.** Cabul, Kashgar.

Stem 4-5 ft. *Leaves* 12-18 in., very compound. *Umbels* 6-18 in. diam., sometimes very compound. *Bracts* 4-8, $\frac{3}{4}$ in., linear. *Pedicels* 15-25, $\frac{1}{2}$ - $\frac{1}{4}$ in., whereof 4-8 may produce fruit. *Fruit* $\frac{1}{4}$ - $\frac{3}{8}$ in.; wings $\frac{1}{8}$ in. broad; style-bases depressed; styles short, early reflexed. *Seed* $\frac{1}{12}$ - $\frac{1}{10}$ in. diam.

22. **ŒNANTHE**, *Linn.*

Herbs, growing in wet places; root fibrous creeping or stoloniferous (in Indian species). *Leaves* 1-3-pinnate, ultimate segments large or linear or minute, rarely reduced almost to sheaths. *Umbels* compound; bracts 0-1 (in Indian species); bracteoles several linear. *Flowers* white, often polygamous, males sometimes radiant. *Calyx-teeth* small, acute. *Petals* emarginate. *Fruit*

glabrous, ellipsoid, longer than broad, or globose, nearly terete, commissure broad; carpels $\frac{1}{2}$ -terete, dorsally compressed, inner face plane; lateral primary ridges large, triangular, corky; dorsal and intermediate primary ridges much smaller, sometimes obsolete, or all subequal; furrows 1-vittate; carpophore 0; disc usually not prominent. *Seed* terete or dorsally compressed, inner face plane.—**DISTRIB.** Species 25, in the northern hemisphere and S. Africa.

1. **Æ. stolonifera**, Wall. Cat. 585; stoloniferous, stem long-decumbent often floating, leaves 1-2-pinnate secondary pinnae lanceolate or rhomboid-lanceolate serrate or lobed scarcely half-way down, peduncles usually elongate. *DC. Prodr.* iv. 138; *Wight Ic.* t. 571; *Kurz in Journ. As. Soc.* 1877, pt. ii. 115. *Æ. javanica*, *DC. Prodr.* iv. 138. *Phellandrium stoloniferum*, *Roxb. Hort. Beng.* 21, *Fl. Ind.* ii. 93. *Dasyloma latifolium*, *Lindl. in Royle Ill.* 232. *D. javanicum*, *Miq. Fl. Ind. Bat.* i. pt. i. 741. *D. sub-bipinnatum*, *Miq. in Ann. Mus. Lugd. Bat.* iii. 59. *Cyssopetalum javanum*, *Turcz. in Bull. Soc. Nat. Mosc.* 1849, pt. ii. 25.

Northern INDIA from KASHMIR and the PUNJAB to ASSAM and PEGU; alt. 0-5000 ft., frequent; common in the plains of BENGAL.—**DISTRIB.** Java, China, Japan.

Glabrous or nearly so, 2-4 ft., rooting freely from many of the lower nodes. *Leaves* from 3-partite to 2-pinnate; ultimate segments 1-2 by $\frac{1}{2}$ -1 in., those of the upper leaves never linear. *Rays* 6-30, $\frac{1}{2}$ -2 in., stout. *Carpels* $\frac{1}{2}$ by $\frac{1}{16}$ in., subquadrate-ellipsoid, sometimes shorter scarcely longer than broad; dorsal and intermediate ridges usually distinct, scarcely prominent. *Seed*, in horizontal section, nearly circular.—*Dasyloma japonica*, *Miq. in Ann. Mus. Lugd. Bat.* iii. 59, has the leaflets rather more lobed than any Indian examples, but is (*ex Maximowicz. ms.*) only a variety of *Æ. stolonifera*. From this *Æ. laciniatum*, *Miq. Fl. Ind. Bat.* i. pt. 741, does not appear to differ.

VAR. 1. khasiana; very large, secondary pinnae large, nerves beneath reticulated elevated scabrid subpubescent, rays 3 in.—Khasia Mts., near Moflong, alt. 6000 ft., *H. f. & T.*—Calyx-teeth less prominent than in the type; bracteoles much exceeding the flowering umbellules.—This may be a distinct species; but the examples do not exhibit fruit.

VAR. 2. corticata, *Edgw. in Trans. Linn. Soc.* xx. 53 (sp.); leaves often simply 3-partite, fruit scarcely $\frac{1}{12}$ in. subglobose.—Banks of the Delhi Canal, *Edgeworth*.

2. **Æ. benghalensis**, *Benth. in Gen. Pl.* i. 906; roots fibrous, stem erect divided often from the base, leaves 2-pinnate secondary pinnae lanceolate or ovate often deeply pinnatifid ultimate segments never linear, peduncles usually short often 0. *Kurz in Journ. As. Soc.* 1877, pt. ii. 115. *Seseli benghalensis*, *Roxb. Hort. Beng.* 22, *Fl. Ind.* ii. 94. *Dasyloma benghalense*, *DC. Prodr.* iv. 140; *Wight Ic.* t. 568. *D. glaucum*, *DC. Prodr.* iv. 140. *Biforis benghalensis*, *Wall. Cat.* 588. *B. glauca*, *Wall. Cat.* 587.

BENGAL PLAIN and ASSAM, common.—**DISTRIB.** Formosa, Bonin, Loo-choo.

Glabrous or nearly so; 8-16 in.; usually erect on muddy banks. Secondary pinnae $\frac{1}{2}$ -1 in., of the lower leaves often ovate, of the upper lanceolate. *Umbel* often sessile. *Bracts* 0; rays 4-6, rarely $\frac{3}{4}$ in., stout. *Calyx-teeth* small. *Carpels* $\frac{1}{12}$ - $\frac{1}{10}$ by $\frac{1}{16}$ in., subquadrate ellipsoid; dorsal and intermediate ridges usually distinct scarcely prominent. *Seed* nearly terete.—The Indian specimens of *Æ. stolonifera* are readily separated from *Æ. benghalensis*. *Æ. stolonifera* is usually much larger with thickened hollow stems; the leaves are less compound, the rays more numerous and longer, the fruits longer. It is more difficult to separate the Chinese and Japanese specimens.

3. **Æ. linearis**, Wall. Cat. 586; stem decumbent, nodes rooting freely, leaves 2-pinnate ultimate segments of the upper $\frac{1}{2}$ -1 in. linear, peduncles and umbels nearly as in *Æ. stolonifera*. *DC. Prodr.* iv. 138.

NIPAL; Wallich.

Closely allied to *Æ. stolonifera*, and only differing in the more narrowly cut leaves, ultimate segments of the uppermost often $\frac{3}{4}$ by $\frac{1}{16}-\frac{1}{12}$ in. Wallich's specimens have no fruit. Mr. Benthām (in *Gen. Pl.* i. 906) has admitted this plant to specific rank.

4. **Æ. Hookeri**, C. B. Clarke; stem decumbent, nodes rooting, leaves mostly reduced to a fistular rachis with a very few remote pinnæ, pinnæ $\frac{1}{4}$ in. linear often 0.—*Dasyloma* sp. 1, *Herb. Ind. Or. H. f. & T.* Umbellifera, No. 985, *Griff. Itin. Notes* 57.

KHASIA MTS., alt. 5000-6000 ft.; Griffith, H. f. & T., C. B. Clarke.

Glabrous, or the rays sometimes pubescent. Stem 2 ft., erect, fistulous, scarcely divided. Peduncles elongate. Bract 1, $\frac{1}{3}$ in., linear, or 0; rays 4-8, $\frac{1}{2}-2\frac{1}{2}$ in.; bracteoles often longer than the flowering umbellule. Calyx-teeth obsolete. Carpels $\frac{1}{16}-\frac{1}{12}$ by $\frac{1}{12}$ in., almost exactly as in *Æ. benghalensis*, much smaller than in *Æ. fistulosa*, which this plant resembles in habit.

5. **Æ. Thomsoni**, C. B. Clarke; leaves finely 3-4-pinnate ultimate segments scarcely $\frac{1}{8}$ in. linear, peduncle elongate, carpels dorsally compressed.—*Dasyloma* sp. 2, *Herb. Ind. Or. H. f. & T.* Umbellifera, No. 1001, *Griff. Itin. Notes* 65.

SIKKIM and BHOTAN, alt. 5000-8000 ft., frequent. KHASIA MTS., alt. 4500-6000 ft., frequent.

Glabrous, 2-3 ft., weak, diffuse, branched. Leaves 6 in., ovate, sometimes 5-pinnate. Rays 4-8, $\frac{1}{2}-1\frac{1}{2}$ in.; bracteoles not prominent. Carpels $\frac{1}{12}$ by $\frac{1}{12}$ in. dorsally compressed, otherwise much resembling *Æ. benghalensis* and *Æ. Hookeri*. Seed dorsally compressed.

23. SCHULTZIA, Spreng.

Glabrous perennial herbs. Leaves 1-2-pinnate, ultimate pinnæ toothed pinnatifid or multifid. Bracts several, entire or divided; bracteoles numerous. Calyx-teeth prominent (in Indian species). Petals obovate, emarginate, white. Fruit ovate-oblong, commissure broad; carpels dorsally compressed; primary ridges slender; furrows 2-4-vittate; carpophore 2-partite.—DISTRIB. Species 3 in Central Asia, 1 in India.

1. **S. ? Benthami**, C. B. Clarke. *Pimpinella involucrata*, Mig. in *Pl. Hohenack*. No. 657 not of W. & A.

CANARA; Hohenacker.

Calyx-teeth narrow-lanceolate, small. Fruit $\frac{1}{8}-\frac{1}{6}$ in. subquadrate, ellipsoid; ridges distinct, very slightly elevated, the two intermediate approximated to the dorsal. Carpels lunate, compressed, face somewhat excavate. Seed compressed, lunate, inner face concave.—The examples in ripe fruit have the aspect leaves and umbels of *P. involucrata*, W. & A., but the fruit (several still attached) is altogether different, and the plant is referred by Benth. (in *Gen. Pl.* i. 909) to *Schultzia* though the fruit does not quite fit that.—If not a *Schultzia*, the three approximate ridges on the back of the carpels must still bring the plant to this position in the Umbelliferous series.

24. POLYZYGUS, Dalz.

A glabrous herb; root tuberous. Leaves 2-pinnate or twice 3-partite, secondary pinnæ ovate lobed or deeply pinnatifid. Umbels compound; bracts 0, or few small; bracteoles few, small, linear. Calyx-teeth small, or the outer

slightly larger. *Petals* oblong, emarginate, white. *Fruit* ovoid, terete; commissure broad; primary ridges slender; furrows wide, 1-3-vittate; carpophore 2-partite. *Seed* $\frac{1}{2}$ -terete, dorsally compressed, inner face plane.

1. **P. tuberosus**, *Dalz. in Hook. Kew Journ.* ii. 260; *Dalz. & Gibs. Bomb. Fl.* 107.

BOMBAY and MALWA, *Dalzell*; CONCAN, *Stocks*; CANARA and MYSORE; *Law*.

Stems 8-18 in., several, weak. Secondary pinnæ of the leaves $\frac{1}{2}$ -1 $\frac{1}{2}$ in., ultimate segments lanceolate or ovate. *Rays* 3-8, $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; pedicels 6-12, $\frac{1}{8}$ - $\frac{1}{4}$ in. *Fruit* $\frac{1}{2}$ in.; style-bases depressed, inconspicuous.—This resembles a *Pimpinella*, but the habit is weak, straggling.

25. **LIGUSTICUM**, *Linn.*

Perennial herbs. *Leaves* 1-2-3-pinnate or twice 3-partite, ultimate pinnæ large minutely pubescent in the Indian species. *Umbels* compound, usually of many rays; bracts many, few, or 0; bracteoles many, rarely divided. *Calyx-teeth* obsolete. *Petals* obovate, emarginate, white. *Fruit* ovoid or ellipsoid, terete or dorsally subcompressed, commissure broad; carpels dorsally compressed, inner face plane; primary ridges very conspicuous, often subalate, subequal or the lateral wider; dorsal furrows at least 2-vittate, lateral at least 3-vittate; carpophore 2-partite. *Seed* dorsally compressed, about twice as broad as thick, inner face plane or slightly concave.—DISTRIB. Species 20, in the northern hemispheres.

1. **L. Thomsoni**, *C. B. Clarke*; leaves 1-pinnate pinnæ oblong lobed or pinnatifid, fruit ellipsoid terete, lateral ridges scarcely wider than the dorsal.—*Oreocome* sp. 2, *Herb. Ind. Or. H. f. & T.*

WEST TIBET, alt. 11,000-13,000 ft., *Thomson*.—DISTRIB. Afghanistan.

Nearly glabrous; top of the peduncle pubescent. *Stem* 2 ft. Lower leaves 6 by 2 in., oblong, primary pinnæ 1 by $\frac{3}{4}$ in., lobed, or sometimes deeply pinnatifid; upper leaves reduced nearly to sheaths, or small more finely cut. *Bracts* 5-8, $\frac{1}{3}$ - $\frac{2}{3}$ in., white-margined, deciduous; rays 10-20; bracteoles like the bracts but smaller. *Fruit* $\frac{1}{8}$ by $\frac{1}{10}$ - $\frac{1}{12}$ in.; ridges subalate; dorsal furrows 3-2-vittate, lateral 3-vittate, commissure 6-10-vittate.

VAR. *evolutior*; larger, leaves larger 2-pinnate nerves pubescent.—North Kashmir, alt. 6000-9000 ft., frequent. *Stem* usually 3-5 ft., often leafy upwards. *Umbel* very many-rayed, dense. *Fruit* exactly as in the type.

2. **L. marginatum**, *C. B. Clarke*; lower leaves pinnate pinnæ large deeply pinnatifid, carpels orbicular with prominent lateral ridges much dorsally compressed.

North-west HIMALAYA; alt. 7000-10,000 ft.; Simla and Naini Tal; *Thomson*.

Glabrous or nearly so, 2-4 ft., corymbose, nearly naked upwards. Lower cauline leaves 8-10 by 3 in., pinnæ 1-1 $\frac{1}{2}$ in. deeply pinnatifid, lower sometimes subpinnate; segments oblong, serrate or lobed, often minutely pubescent. *Peduncles* long, pubescent upwards. *Bracts* 1-5, $\frac{1}{4}$ in., linear; rays 12-20, $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; bracteoles 4-8, $\frac{1}{8}$ - $\frac{1}{4}$ in., linear. *Fruit* larger than in *L. Thomsoni*, the lateral ridges much wider than the dorsal; vittæ 3 in each furrow, 8 on the commissure. *Seed* 4-6 times as broad as thick, inner face slightly convex.—Undistinguishable from *L. Thomsoni* in the absence of fruit.

3. **L. elatum**, *C. B. Clarke*; lower cauline leaves 2-pinnate secondary pinnæ 1-3 in. ovate pinnatifid, fruit elliptic much dorsally compressed. *Cortia*

elata, Edgw. in *Trans. Linn. Soc.* xx. 55. ? *Levisticum argutum*, Lindl. in *Royle III.* 232.

North-west Himalaya; Simla, alt. 7000-8000 ft., *Edgeworth*. LAHUL; *Jaeschke*.
Stem 2-3 ft. *Lower leaves* 12 by 8 in., secondary pinnæ distant; upper pinnate or reduced to sheaths. *Bracts* 1-4, $\frac{1}{2}$ in., linear, or 0; rays 12-40, 1-1 $\frac{1}{2}$ in.; bracteoles 6-12, $\frac{1}{2}$ in., linear; pedicels very many. *Fruit* $\frac{1}{8}$ - $\frac{1}{2}$ in., nearly as in *L. marginatum*, but the carpels are longer than broad; dorsal furrows 2-3-vittate, lateral 3-vittate, commissure 6-8-vittate. *Seed* 4-6 times as broad as thick, inner face plane.—*Edgeworth's* description is most accurate; the word *bivittatis* in the specific character being a misprint for *trivittatis*. He suggests that it may be the imperfectly described *Levisticum argutum*, Lindl.

26. SELINUM, Linn.

Perennial, branched herbs. *Leaves* pinnately compound. *Umbels* compound; rays numerous; bracts many, linear or pinnatifid, or few, small, or 0; bracteoles numerous, linear, serrate or pinnatifid, sometimes few small. *Calyx-teeth* obsolete, or lanceolate or linear. *Petals* obovate, emarginate, white or yellowish-green. *Fruit* ovoid or subquadrate, commissure broad, more or less dorsally compressed or complanate; lateral primary ridges winged, corky or papery, dorsal and intermediate ridges approximate, equal or unequal, as wide as the lateral or not, sometimes excurrent, not winged; dorsal furrows 1-vittate (or rarely 1 large deep-seated 2 small lateral superficial) or 0, lateral furrows 1-4 vittate; carpophore slender, 2-partite; style-bases not prominent in fruit. *Seed* subterete, or more or less dorsally compressed, inner face plane or slightly concave, not grooved.—*DISTRIB.* Species 35, chiefly north temperate, with a South African and Andean.

The Indian species are uniform in habit, having very compound leaves, large umbels with prominent involucre, three approximated ridges excurrent on the back of each carpel, and the seed not grooved on the inner face. *Ligusticum* differs by having the dorsal furrows 3-vittate. *S. tenuifolium* has the three dorsal ridges not excurrent, often subobsolete, and is therefore hardly different from *Angelica*. *Pimpinella sikkimensis* (p. 685) was referred to *Selinum* by Benth.

1. *S. striatum*, Benth. in *Gen. Pl.* i. 914; ultimate segments of the leaves $\frac{1}{8}$ in. narrowly oblong-lanceolate, fruit little dorsally compressed, ridges subequally winged, vittæ all solitary, seed about twice as broad as thick. *Laserpitium striatum*, Wall. *Cat.* 583 (not *Ligusticum striatum*, DC. *Prodr.* iv. 158).

NIPAL; *Wallich*. KHASIA MTS.; alt. 3500-6000 ft., abundant.

Glabrous or nearly so; 1-4 ft., frequently with many withered fibres at the base. *Leaves* 4-8 in., ovate, 3-4-pinnate, uppermost sheath often extending the whole length of the petiole. *Bracts* 4-6, $\frac{1}{4}$ - $\frac{3}{4}$ in., linear: rays glabrous or obscurely pubescent; bracteoles 4-8, $\frac{1}{4}$ in., linear, minutely white on the margin, hardly serrate, not divided. *Calyx-teeth* linear, oblong, twice as long as broad. *Fruit* $\frac{1}{8}$ - $\frac{1}{2}$ in., lateral furrows 1-vittate, vittæ twice as wide as those in the dorsal; commissural vittæ 2, wide apart. *Seed* obscurely 2-grooved on the inner face.—Easily recognised by the little-compressed fruits and seeds. All the specimens are Khasian, except *Wallich's*, which have the ultimate segments of the leaves less narrowly cut, showing the secondary nerves impressed: the fruit is exactly as in the Khasian examples. In *Ligusticum striatum*, DC. *Prodr.* iv. 158, the furrows are multi-vittate. Benth., l.c., assuming that DC. possessed the true *S. striatum*, points out that he was mistaken on this point. But DC. also says that his *Ligusticum striatum* had "leaves 2-pinnate the lobes acute entire seldom incised," so that his plant cannot be

referred to any Indian *Selinum*. Wallich must have distributed two plants mixed under one name in this as in so many other cases.

2. ***S. tenuifolium***, *Wall. Cat.* 579, chiefly; ultimate pinnæ $\frac{1}{2}$ in. broad-elliptic pinnatifid deeply into narrow lanceolate acute segments, fruit $\frac{1}{2}$ in. much dorsally compressed, lateral ridges much the broadest, dorsal furrows 1-vittate lateral 2-3-vittate, seed 4-6 times as broad as thick. *S. Candollii*, *Edgw. in Trans. Linn. Soc.* xx. 55, not of DC. *Peucedanum Wallichianum*, DC. *Prodr.* iv. 181. *Pleurospermum cicutarium*, *Lindl. in Royle III.* 233. *Oreocome Candolliana*, *Edgw. l. c.*

Himalaya; alt. 6000-13,000 ft., from KASHMIR to BHOTAN, very common.

Stem 2-6 ft. *Lower leaves* often 1 ft., in outline ovate, usually 3-pinnate, tertiary pinnæ 1-2-pinnatifid, glabrous or pubescent; upper leaves reduced, sheath often as long as the petiole. *Bracts* 4-8, $\frac{3}{4}$ -1 $\frac{1}{2}$ in., linear, often toothed or slightly lobed, rarely pinnate; rays generally villous; bracteoles 5-12, often longer than the umbellule, white-margined, often lobed rarely pinnate or 2-pinnatifid. *Calyx-teeth* linear; carpels slightly elliptic, longer than broad; dorsally compressed, subcomplanate, 3 dorsal ridges approximate, often hardly elevated (whence DC. considered the plant a *Peucedanum*); commissural vittæ 4-6, distant from the medial line. *Seed* complanate, inner face plane or subconvex.

VAR. 1. *filicifolia*; quaternary pinnæ pinnatifid into more remote lobes. *Oreocome filicifolia*, *Edgw. in Trans. Linn. Soc.* xx. 55. ? *Laserpitium conifolium*, *Wall. Cat.* 584.—Kashmir and N.W. Himalaya, alt. 6000-10,000 ft., frequent.—Wallich's *L. conifolium* is without fruit and the leaves appear to belong to two species. *Ligusticum conifolium*, DC. *Prodr.* iv. 158, from the description appears the same plant; DC. says that the furrows are multi-vittate; referring probably to the lateral ones, which have 2-4 vittæ.

VAR. 2. *elata*; quaternary pinnæ $\frac{1}{2}$ -1 in. broad-elliptic, fruit $\frac{1}{4}$ in. much dorsally compressed, dorsal and intermediate ridges distinctly winged, but less so than the lateral, dorsal furrows 1-vittate, lateral 2-3-vittate, seed 4 times as broad as thick. *Oreocome elata*, *Edgw. in Trans. Linn. Soc.* xx. 54.—North-west Himalaya, alt. 6000-10,000 ft.; from Kashmir to Kumaon; frequent.—This seems to differ from *S. tenuifolium* in the winged 3 dorsal ridges: the fruit also is somewhat larger. As regards Edgeworth's main character of "primary pinnæ of the upper leaves sessile at the apex of the sheath," it is common to *S. tenuifolium* and most other Indian species.

3. ***S. Candollii***, DC. *Prodr.* iv. 165; quaternary pinnæ $\frac{1}{2}$ - $\frac{3}{4}$ in. broad-elliptic pinnatifid deeply into narrow-lanceolate acute segments, fruit $\frac{1}{4}$ in. somewhat dorsally compressed, ridges all distinctly subequally winged, furrows all 1-vittate, seed 2 $\frac{1}{2}$ times as broad as thick. *Angelica* ? *Candollii*, *Wall. Cat.* 582.

KASHMIR; alt. 7000-8000 ft., *Thomson*. NIPAL and KUMAON; *Wallich*. SIKKIM; alt. 12,000 ft., C. B. Clarke.

Stem, leaves, bracts and umbels generally like *S. tenuifolium*, but the fruit very distinct. *Fruit* subquadrate, longer than broad; 3 dorsal ridges approximate; vittæ in the lateral furrows solitary, but twice as broad as the dorsal, commissural 2, thick, somewhat widely separated. *Seed* convexo-concave, margins obtuse.

4. ***S. vaginatum***, C. B. Clarke; secondary pinnæ mostly 1 in. lanceolate serrate scarcely lobed or pinnatifid, bracteoles 1-2-pinnate, fruit $\frac{1}{2}$ in. dorsally compressed, ridges all winged the lateral more broadly, vittæ obsolete, seed 3 times as broad as thick. *Cortia vaginata*, *Edgw. in Trans. Linn. Soc.* xx. 55.

From KASHMIR to KUMAON, alt. 6000-12,000 ft., frequent.

Glabrous, or nearly so, 2-4 ft. *Leaves* 4-10 in., elliptic; lower like *Sium lati-*

folium; upper reduced; primary pinnae sometimes sessile on the sheath. *Bracts* few, usually inconspicuous; bracteoles 8-12, $\frac{1}{2}$ -1 $\frac{1}{2}$ in., usually exceeding the umbellule. *Calyx-teeth* long linear lanceolate. *Fruit* subquadrate, longer than broad, 3 dorsal ridges approximate. *Seed* plane on the inner face, or slightly concave.—The Herbarium specimens are largely mixed with fruits of *S. elatum*: and Edgeworth's descriptions of the fruit and bracteoles seem taken from these: the true plant has very large compound bracteoles, and the above description of the fruit is of ripe ones attached to unmistakable leaves. Mr. Benthams has referred it to *Ligusticum*, from the leaves approaching the Indian *Ligusticum*s and the obsolete vittæ; but the compound bracteoles and long calyx-teeth refer it to *Selinum*.

5. ***S. papyraceum*, C. B. Clarke**; tertiary pinnae $\frac{1}{2}$ in. ovate serrate or half-pinnatifid into lanceolate segments, fruit $\frac{1}{2}$ in. much dorsally compressed, lateral wings papery wider than the 3 dorsal, dorsal furrows 1-vittate lateral usually 2-vittate, seed in horizontal section elliptic twice as broad as thick.

From BALTISTHAN and KASHMIR to SIKKIM, alt. 8000-12,000 ft.; frequent.

Resembling *S. tenuifolium* so closely that it is difficult to separate until the fruit is nearly ripe: the leaves are usually less compound, the rays less villous, the bracteoles not white-margined. *Fruit* often longer than the umbellule, subquadrate, rather longer than broad, very strongly compressed; lateral ridges, quite unlike the white corky wings of the other Indian *Selinums*: 3 dorsal ridges very close together, usually very small, but in some examples the intermediate ridges are developed, nearly as wide as the lateral, the dorsal remaining minute. *Seed* very narrow compared with the breadth of the carpel, commissural vittæ close to the carpophore.

DOUBTFUL SPECIES.

?*S. DISSECTUM*, Wall. Cat. 581; leaves pinnate segments twice pinnatifid, lobes linear-oblong acute, bracts 0, bracteoles few, flowers yellowish, fruit nearly orbicular narrowly margined, furrows 1-vittate, vittæ very distinct, commissural pair close to the carpophore. *Peucedanum dissectum*, DC. Prodr. iv, 178.—NIPAL; Gossain Than, Wallich. Habit of *Ethusa*.—The sheet in the Wallichian Herbarium contains—1, a good specimen in flower having 4-8 bracts and prominent bracteoles; 2, a young flowering specimen, exinvolucrate; 3, a detached umbel in fruit. DC.'s description, copied above, appears made up from 2 and 3, excluding 1; 1 certainly does not belong to 2, and it is possible that the fruit 3 belongs to neither.

27. **CORTIA, DC.**

Perennial herbs, often nearly stem-less. *Leaves* 3-4-pinnate, mostly radical, ultimate segments linear. *Umbels* compound, central one often sessile on the rootstock with numerous unequal rays; bracts rays and bracteoles many, often pinnate or 2-pinnate. *Calyx-teeth* prominent, sub-linear. *Petals* obovate, emarginate, white or purplish. *Fruit* orbicular or elliptic, much dorsally compressed; lateral ridges winged, dorsal and intermediate approximated much narrower sometimes hardly winged; dorsal vittæ solitary, lateral solitary or in pairs; carpophore 2-partite. *Seed* much dorsally compressed, inner face plane.—DISTRIB. Species 2; Himalayan.

This genus only differs from the Indian species of *Selinum* in the elongate unequal rays of the umbel; *C. Lindleyi* differs from all the *Selinums* by its compound pinnate bracteoles, *C. Hookeri*, by being stemless.

1. **C. Lindleyi**, DC. Prodr. iv. 187; bracteoles 2-pinnate, styles of the fertile flowers short; fruit commissure 4-vittate. *Schultzia*? *Lindley*, Wall. Cat. 589. *Athamantha depressa*, Don Prodr. 184 (ex Wall. Herb.).

From KUMAON to BHOTAN, alt. 12,000–16,000 ft; *Wallich*, &c.

Stem 0–8 in. *Leaves* glabrous or nearly so, ultimate segments rarely $\frac{1}{10}$ in., setaceous. *Umbel* often sessile; bracts (in the peduncled umbels) many large 2-pinnate; rays often pubescent, very unequal, sometimes 8–12 in. *Fruit* $\frac{1}{8}$ – $\frac{1}{6}$ in.; carpels elliptic, slightly cordate at base; 3-dorsal ridges slightly equally winged, much narrower than the lateral: dorsal furrows 1-vittate, lateral usually 2-vittate. *Seed* 4–5 times as broad as thick.

2. **C. Hookeri**, *C. B. Clarke*; bracteoles long simple or slightly lobed, styles of the fertile flowers very long, fruit commissure 2-vittate.—*Cortia* sp. 1, *Herb. Ind. Or. H. f. & T.*

SIKKIM; alt. 13,000–18,000 ft., Donkiah, Jongri, &c., *J. D. H.*; Yakla, alt. 16,000 ft., *C. B. Clarke*; Phaloot, *S. Kurz*.

Stemless, with the fruit packed in dense masses over the crown, and a few long umbel-rays often added. *Leaves* glabrous or minutely pubescent, ultimate segments $\frac{1}{12}$ – $\frac{1}{4}$ in., linear. *Rays* usually pubescent; bracteoles $\frac{1}{2}$ – $\frac{3}{4}$ in.; pedicels of the fruit $\frac{1}{12}$ – $\frac{1}{4}$ in., often ultimately thickened; umbellules generally unisexual, males with long stamens and obsolete styles. *Fruit* $\frac{1}{4}$ by $\frac{1}{8}$ in., depressed-circular, base cordate; 3 dorsal ridges slightly equally elevated, or the dorsal slightly winged, the intermediate nearly as broad as the lateral: furrows all 1-vittate, vittæ rather large. *Seed* 4–5 times as broad as thick.—The variation in the wings of the fruit of this species may be seen in one umbellule. But the great difference in the ultimate segments of the leaves is only seen in different plants, and may indicate two species: in one they are about $\frac{1}{12}$ in., in the other about $\frac{1}{4}$ in., and much more remote.

28. **PLEUROSPERMUM**, *Hoffm.*

Perennial or biennial *herbs*, glabrous or nearly so. *Leaves* 1–4-pinnate, ultimate pinnæ ovate, pinnatifid or multifid, setaceous. *Umbels* compound, rays many; bracts many, or few, often pinnatifid or compound, frequently white-margined; bracteoles many, broad, more or less white-margined, entire toothed or pinnatifid. *Calyx-teeth* small, or 0. *Petals* obovate, emarginate, white or dark purple. *Fruit* elliptic or oblong, terete or dorsally subcompressed; epicarp often lax; commissure broad; primary ridges winged, lateral narrower broader than the others; furrows 1-vittate, or the lateral 2-vittate, or vittæ many; carpophore 2-partite. *Seed* dorsally compressed, 2–3 times as broad as thick, inner face grooved concave or nearly plane.—*DISTRIB.* Species 16; Asiatic and Russian.

1. **P. Govanianum**, *Benth. in Gen. Pl.* i. 915; leaves pinnate pinnæ $\frac{1}{2}$ – $\frac{1}{2}$ in. toothed or pinnatifid, bracteoles obovate toothed or subpinnatifid at the apex, fruit $\frac{1}{2}$ in. lateral ridges narrowest. *Ligusticum Govanianum*, *Wall. Cat.* 546. *Hymenolæna Govaniana*, *DC. Prodr.* iv. 246; *Royle Ill.* 233, t. 52.

From KASHMIR to GURWHAH, alt. 10,000–15,000 ft., *Jacquemont*, &c.

Stem 1 foot or less, thick, hollow. *Leaves* 4–8 in., oblong, pinnæ often distant never finely cut, rarely deeply pinnatifid. *Bracts* 1–3 in., of an oblong entire white-margined sheath and divided often 2-pinnatifid limb; rays 1–5 in.; pedicels very many, short; umbellule capitate embraced by the bracteoles. *Fruit* ellipsoid or subquadrate; epicarp very lax, glistening, reticulate, ridges hollow, furrows 1-vittate. *Seed* distinctly grooved on the inner face.

2. **P. sikkimense**, *C. B. Clarke*; leaves pinnate rarely 2-pinnate pinnæ $\frac{1}{2}$ –2 in. toothed or pinnatifid, bracteoles obovate toothed or subpinnatifid at the apex, fruit $\frac{1}{2}$ in. equally 5-ridged hardly winged, epicarp not loose.

Sikkim, alt. 13,000–16,000 ft.; *J. D. H., C. B. Clarke.*

Stem 2–24 in., thick, hollow. *Leaves* 4–8 in., oblong; pinnæ often distant, never finely cut. *Bracts* 1–1½ in., usually pinnatifid at the apex; rays 1–5 in.; pedicels very many, short; umbellules capitate and embraced by the bracteoles. *Fruit* narrow-oblong, rather broader upwards; calyx-teeth small; disc depressed; epicarp dull brown, somewhat corky; furrows 1-vittate. *Seed* concave or slightly grooved on the inner face.

3. **P. Candollii**, *Benth. in Gen. Pl. i.* 884, 916; leaves pinnate pinnæ ½–1½ in. toothed or pinnatifid, bracteoles elliptic or oblong entire, fruit ½ in. lateral ridges broadest, furrows 3–2-vittate. *Ligusticum Candollii*, *Wall. Cat.* 544. *Hymenolæna Candollii*, *DC. Prodr. iv.* 245. *H. latifolia*, *Lindl. in Royle Ill.* 233. *H. pimpinellifolia*, *Osten-Sacken & Ruprecht Sert. Tianschan*, 50.

From KASHMIR to KUMAON, alt. 10,000–15,000 ft.; frequent.—**DISTRIB.** Tianschan Mts.

Stem 6–18 in., usually very thick. *Leaves* 4–8 in., oblong; pinnæ often distant, never finely cut. *Bracts* 0–3 in., often like reduced upper leaves, sometimes a mere sheath; rays many, 2–8 in., sometimes carrying scattered white elliptic veined bracts; bracteoles obtuse, sometimes mucronate, embracing and usually overtopping the umbel. *Fruit* ellipsoid; ridges narrowly winged. *Seed* grooved on the inner face.—This has numerous vittæ, but the bracteoles and broad commissure are of *Pleurospermum*.

4. **P. ? rotundatum**, *Benth. in Gen. Pl. i.* 915; leaves pinnate or 3-partite, leaflets of the lower 1–3 in. diam. with 3 rounded lobes, bracts 0 or 1 small, bracteoles 5–8 ¼ in. narrow-lanceolate caudate entire white-margined. *Ligusticum rotundatum*, *Wall. Cat.* 549. *Hymenolæna rotundata*, *DC. Prodr. iv.* 245.

NIPAL; Gossain Than, *Wallich.*

Stem 2 ft., not very thick. *Leaflets* 3–5, petioluled, distant, entire or crenate, scarcely serrate, more often with 3 rounded lobes. *Rays* 8–12, 1–1½ in.; pedicels 8–16, some as long as the bracteoles. *Calyx-teeth* 0. *Disc* and *styles* small. *Young fruit* subcylindric with incipient ridges.—*Wallich's* examples show no ripe fruit, so that the genus is doubtful. The elongate not thick stem, the subobsolete bracts, and the little-prominent bracteoles do not look like *Pleurospermum*.

5. **P. Benthami**, *C. B. Clarke*; leaves pinnate or sub-2-pinnate pinnæ 1–3 in. deeply lobed, bracteoles oblong toothed scarcely pinnatifid at the apex, fruiting pedicels ½–1½ in., fruit ½–¾ in., lateral ridges widest. *Ligusticum Benthami*, *Wall. Cat.* 542. *Hymenolæna Benthami*, *DC. Prodr. iv.* 246.

NIPAL; Gossain Than, *Wallich.*

Stem 2–3 ft. *Pinnæ* pinnatifid; lobes distant, large, coarsely serrate *Bracts* 4–6, 1–1½ in., oblong, coarsely lobed or pinnatifid at the apex; rays 4–12, 1–2½ in. *Fruit* ellipsoid, dorsally compressed; calyx-teeth obsolete, style-bases somewhat prominent; furrows 1-vittate. *Seed* broadly concave on the inner face, hardly grooved.

6. **P. angelicoides**, *Benth. in Gen. Pl. i.* 915; leaves 1–2-pinnate pinnæ 3–6 in. with oblong segments, bracteoles 5–8 ¾ in. narrow-lanceolate entire, fruit ½ in. narrowly oblong. *Ligusticum angelicoides*, *Wall. Cat.* 548. *Hymenolæna angelicoides*, *DC. Prodr. iv.* 245. *Pterocyclus angelicoides*, *Klotzsch in Reis. Pr. Waldem. Bot.* 150, t. 47.

KASHMIR; *Falconer.* **KUMAON**; Rutam River, alt. 11,500 ft., *Strachey & Winterbottom.* **NIPAL**; *Wallich.*

Stem 3–4 ft. *Leaves* 12–18 in.; segments of the secondary pinnæ often 1–3 in.,

serrated somewhat closely and regularly. *Bracts* 5-8, 1-1 $\frac{3}{4}$ in., narrowly-lanceolate, entire, white-margined; rays 10-20, 1-4 in.; pedicels in fruit $\frac{1}{2}$ - $\frac{3}{4}$ in., often exceeding the bracteoles. Ridges of the *carpels* thin, narrowly winged, lateral rather the broadest.—The fruit is dorsally compressed; Klotzsch's figure must have been taken from very immature fruit, and does not show correctly the shape of the *carpel* in horizontal section at any period.

7. ***P. dentatum***, *Benth. in Gen. Pl.* i. 915; leaves 2-pinnate *pinnæ* $\frac{1}{2}$ -2 in. ovate, bracteoles 5-8 $\frac{1}{2}$ in. lanceolate entire or minutely denticulate near the apex, fruit $\frac{1}{4}$ in. ellipsoid. *Ligusticum dentatum*, *Wall. Cat.* 547. *Hymenolæna dentata*, *DC. Prodr.* iv. 245.

From KUMAON to SIKKIM, alt. 9000-13,000 ft., *Wallich, &c.*

Stem 2-4 ft. Segments of the *pinnæ* $\frac{1}{2}$ in., oblong or ovate, serrate. *Bracts* 3-0, 1 in., lanceolate, white-margined; rays 5-15, 1-3 in.; bracteoles usually undulate on the margin, crenulate or denticulate, or quite entire; pedicels in fruit usually shorter than the bracteoles. *Carpels* elliptic, dorsally compressed; ridges thin, narrowly alate, lateral broadest; dorsal furrows 1-vittate, lateral 2-vittate; commissure plane, 4-vittate; calyx-teeth 0; style-bases not prominent. *Seed* very obscurely concave on the inner face, or plane.—*Cnidium cuneatum*, *Ledeb. Fl. Alt.* i. 331 (*Aulacospermum*, *Ic. Fl. Ross.* iv. 7, t. 312) appears the same, but the authentic example is in young flower only. It is said to differ by the upper branches and leaves being opposite and whorled: but this is occasionally seen in many species of *Pleurospermum*. *P. dentatum*, in the absence of fruit, is very difficult to distinguish from *P. angelicoides*; but the leaves and leaflets are generally smaller, the bracteoles lanceolate (rather than narrow-lanceolate) and slightly crenulate or serrulate. In defining the area of the species; all Sir J. D. Hooker's examples distributed as *P. angelicoides* have been referred to *P. dentatum*; though the leaflets are large, the fruit is small, and the bracteoles distinctly serrulate.

VAR. erosa, *DC. l.c.*; bracts 4-5, leaflets more irregularly incise-serrate.—Mixed with the type as *DC.* states. There appear two states of the bracts, and two very differently cut leaves; the latter may indicate a different species as *DC.* suggests, but the typical *P. dentatum* has sometimes many bracts.

8. ***P. pumilum***, *Benth. in Gen. Pl.* i. 915; leaves pinnate *pinnæ* $\frac{1}{2}$ -1 in. ovate lobed or subpinnatifid, bracts 1-2 small linear or 0, bracteoles 3-7 $\frac{1}{4}$ in. linear entire obscurely white-margined. *Ligusticum pumilum*, *Wall. Cat.* 550. *Hymenolæna pumila*, *DC. Prodr.* iv. 245.

NIPAL; *Wallich*. SIKKIM; Islumbo, alt. 11,000 ft., *C. B. Clarke*.

The specimens are without fruit. The species is very near *P. dentatum*, and differs only in the subobsolete bracts and very narrow bracteoles. The Sikkim example must have been at least 3 feet high, so that the name *pumilum* is not well applied to the species.

9. ***P. stylosum***, *C. B. Clarke*; leaves 2-pinnate *pinnæ* 1-3 in. often pinnatifid, bracteoles 6-10 lanceolate entire or incise-serrate at the apex, fruit $\frac{1}{8}$ in. subglobose transversely plicate-rugose.

KASHMIR; *Falconer*. LAHUL; alt. 11,000-12,000 ft., *Rev. H. Jaeschke*.

Stem 2-4 ft. Segments of the secondary *pinnæ* $\frac{1}{2}$ -1 in., pinnatifid or serrate. *Bracts* 4-6, 1-3 in., lobed or pinnatifid at the apex; rays 10-35, 1 $\frac{1}{2}$ -3 in.; bracteoles white-margined, entire, incised or lobed in the same umbel. *Fruit* slightly longer than broad; epicarp of very lax tissue (as in *P. Govanianum*) the transverse folds occupying the whole back except the ridges; style-bases prominent even on the ripe fruit; calyx-teeth obsolete; ridges subequal, hardly winged.

10. ***P. stellatum***, *Benth. in Gen. Pl.* i. 915; leaves 1-2-pinnate *pinnæ* $\frac{1}{4}$ in. serrate or pinnatifid with small narrowly lanceolate lobes, bracteoles 5-8

oblong white-margined obtuse lobed or very shortly pinnatifid at the apex, fruit $\frac{1}{8}$ in. ellipsoid somewhat longer than broad, epicarp of very lax tissue, seed grooved on the inner face. *Selinum stellatum*, *Don Prodr.* 185; *DC. Prodr.* iv. 165. *Hymenolæna stellata*, *Lindl. in Royle Ill.* 233.

North-west HIMALAYA; *Royle*. KUMAON; Milam Glacier, alt. 13,000 ft., *Strachey & Winterbottom*.

Stem 1-6 in. *Leaves* 2-4 in., oblong; pinnæ ovate, acutely serrate, or sublobately pinnatifid or nearly 2-pinnate with mucronate lobes. *Bracts* 1-4, $\frac{1}{2}$ -1 $\frac{1}{2}$ in., pinnatifid; rays 3-5, 1-6 in., glabrous; pedicels very short. *Fruit* dorsally compressed; style-bases globose, depressed; calyx-teeth obsolete; petals often persistent. *Carpels* plane on the inner face; lateral ridges hardly so wide as the intermediate and dorsal, all obtuse, hollow; epicarp rugose, but hardly plicate; furrows 1-vittate.

VAR. *Lindleyana*; bracteoles entire or slightly lobed, leaves often 2-pinnate ultimate segments oblong or obovate obtuse. *Hymenolæna Lindleyana*, *Klotzsch in Reis. Pr. Waldem. Bot.* 150, t. 49. *H. nana*, *Osten-Sacken & Ruprecht Sert. Tianshan.* 49. *Hymenolæna*, sp. No. 9, *Herb. Ind. Or. H. f. & T.* ? *Aulacospermum simplex*, *Ost. & Rup. l. c.*—West Himalaya, alt. 13,000-16,000 ft.; Kashmir, *Thomson*. LAHUL; *Rev. H. Jaeschke*.—Distrib. Karakorum (Northern slope); Tianshan Mts.—Except as to the obtuse (not mucronate) ultimate segments of the leaflets, there seems no difference between this and *P. stellatum* type. Of *Aulacospermum simplex*, the authentic example has the fruit not half-ripe, the bracteoles are rather smaller.

11. **P. apiolens**, *C. B. Clarke*; leaves pinnate pinnæ $\frac{1}{2}$ -1 $\frac{1}{2}$ in. ovate often pinnatifid with 3-5-7 lobes, bracteoles 6-10 obovate caudate often toothed near the apex, calyx-teeth obsolete, fruit $\frac{1}{8}$ - $\frac{1}{6}$ in. ellipsoid subquadrate.—*Hymenolæna* sp. 10, *Herb. Ind. Or., H. f. & T.*

Interior valleys of SIKKIM, alt. 11,000-14,000 ft.; *J. D. H.*; *Flwies*; *C. B. Clarke*.

Stem 3-18 in. *Leaves* 4-8 in., oblong, mucronate-serrate. *Bracts* 4-5, $\frac{3}{4}$ -1 $\frac{1}{4}$ in., obovate-lanceolate, toothed, sometimes slightly pinnatifid, rarely subentire; rays 8-16, 1-2 in.; pedicels many, scarcely $\frac{1}{4}$ in. in fruit, much shorter than the bracteoles. *Carpels* dorsally compressed; epicarp loose but not of open tissue; ridges narrowly winged, subequal; furrows 1-vittate. *Seed* twice as broad as thick, inner face exactly plane.—Smells of celery (*J. D. H.*).

12. **P. Hookeri**, *C. B. Clarke*; leaves 2-3-pinnate ultimate pinnæ $\frac{1}{4}$ - $\frac{1}{2}$ in. ovate or oblong toothed or pinnatifid, bracteoles 6-10 obovate-lanceolate subentire white-margined, calyx-teeth ovate.—*Hymenolæna* sp. 8, *Herb. Ind. Or., H. f. & T.* *Oreocome* sp. 1, *Herb. Ind. Or. H. f. & T.*

SIKKIM, alt. 10,000-16,000 ft.; *J. D. H.*

Stem 8-20 in. *Leaves* 6-12 in., ovate, mucronate-serrate. *Bracts* 4-7, 1-1 $\frac{1}{2}$ in. lanceolate, often toothed or pinnatifid at the apex; rays 4-8, 1-3 in.; pedicels very many, $\frac{1}{4}$ - $\frac{1}{3}$ in., shorter than the bracteoles. *Petals* persistent. *Fruit* not ripe, but will be nearly as in the var. *Thomsoni*.

VAR. *Thomsoni*; bracteoles narrowly lanceolate (not at all obovate) narrow and narrowly white-margined often not prominent. WEST TIBET, alt. 14,000-16,000 ft., *Thomson*; Shelshed River, alt. 15,500 ft., *Strachey & Winterbottom*.—*Fruit* $\frac{1}{4}$ in., ellipsoid; epicarp loose but not of open tissue; ridges thin, narrowly winged, lateral a little broadest. *Seed* plane on the inner face or nearly so.—United with *P. Hookeri* by *H. f. & T.* in *Herb.* and it agrees with it as to the ovate calyx-teeth, but differs in the much smaller bracteoles and the remote locality. It has been placed next *Selinum tenuifolium* by *H. f. & T.* (mss.) and its bracts and bracteoles are hardly more prominent than in that species: but *P. Hookeri* type must be placed in *Pleurospermum*, which here touches *Selinum*.

13. **P. densiflorum**, Benth. in Gen. Pl. i. 916; leaves 3-4-pinnate ultimate segments very narrowly lanceolate or linear, bracteoles 5-8 elliptic entire or somewhat pinnatifid at the apex, fruit $\frac{1}{2}$ - $\frac{1}{4}$ in. with 5 subequal somewhat broad ridges, seed distinctly grooved on the inner face. Hymenidium? densiflorum, Lindl. in Royle Ill. 233. ? H. suaveolens, Klotzsch in Reis. Pr. Walden. Bot. 148, t. 48.

North-west HIMALAYA; Royle. KASHMIR, alt. 11,000-14,000 ft., Levinge, C. B. Clarke. GURWHAL, Falconer.

Stem 6-15 in. Leaves 3-4 in., ovate. Bracts 5-6, 1-2 in., oblong, tips usually pinnatifid or pinnate; rays 5-12, 1-2 in.; bracteoles prominently white-margined, exceeding the umbellule, often entire obtuse with the green midrib subexcurrent. Calyx-teeth obsolete. Fruit ellipsoid subquadrate, nearly terete; epicarp thin, loose, not of lax tissue; dorsal furrows 1-vittate, lateral 2-vittate, commissure 4-vittate. Carpels plane on the inner face. Seed about twice as wide as thick.—Hardly distinguishable from *P. Brunonis* but by the larger more winged fruit: it is doubtful to which of these species *H. suaveolens* belongs, the drawing being made from immature fruit: the leaves of *P. Brunonis* are usually more finely cut than as in Klotzsch's figure.

14. **P. Brunonis**, Benth. in Gen. Pl. i. 916; leaves 3-4-pinnate ultimate segments setaceous, bracteoles 5-8 elliptic or obovate often pinnatifid at the apex, fruit $\frac{1}{2}$ - $\frac{1}{4}$ in., dorsal and intermediate ridges narrowest, seed exactly plane on the inner face. Ligusticum Brunonis, Wall. Cat. 545. Hymenolæna Brunonis, DC. Prodr. 245. Hymenidium Brunonis, Lindl. in Royle Ill. 233.

From KASHMIR to NIPAL, alt. 9000-14,000 ft., frequent.

Closely resembling *P. densiflorum* except as to the smaller fruit. Fruit ellipsoid subquadrate, much dorsally compressed; epicarp thin, loose, not of open tissue; furrows all 1-vittate, commissure 2-vittate; carpels plane on the inner face. Seed 4-5 times as wide as thick.—Bentham not having seen ripe fruit doubted the seed being plane on the inner face as described by Lindley and upon which character he founded the genus *Hymenidium*.

29. **ANGELICA**, Linn.

Herbs, usually tall. Leaves 1-2-3-pinnate, pinnæ toothed, usually large. Umbels compound, rays many; bracts few, narrow, or 0; bracteoles small. Calyx-teeth obsolete. Petals obovate, emarginate, white or lurid-purple. Fruit ovoid or ellipsoid, dorsally compressed, commissure broad; lateral ridges broadly winged, dorsal and intermediate not prominent; carpels complanate, broadly margined; furrows 1-2-vittate; carpophore 2-partite. Seed much dorsally compressed, inner face plane concave or almost grooved.—DISTRIB. Species 18 in the north-temperate and arctic regions, and New Zealand.

1. **A. glauca**, Edgw. in Trans. Linn. Soc. xx. 53; leaves twice or thrice 3-partite or 2-pinnate, leaflets few 1-3 in. ovate serrate glaucous beneath.

From KASHMIR to SIMLA, alt. 8000-10,000 ft., Falconer, &c.

Glabrous, 4-12 ft. Bracts several, 1 in., linear; bracteoles many, $\frac{1}{4}$ in. Rays often 20-30, 1-3 in., equal; pedicels hardly half as long as the fruit. Fruit $\frac{1}{2}$ by $\frac{1}{4}$ in., subquadrate; dorsal and intermediate ridges approximate, rounded, somewhat corky; furrows 1-vittate; commissure 2-4-vittate; carpels plane on the inner face. Seed less than $\frac{1}{16}$ in. wide, but about twice as wide as thick; almost grooved on the inner face.

30. **ARCHANGELICA**, Hoffm.

Tall perennial herbs. *Leaves* 2-3-pinnate, ultimate pinnæ toothed, usually large. *Umbels* compound, rays many; bracts few, small, or 0; bracteoles many, linear, or obsolete. *Calyx-teeth* obsolete (in India). *Petals* ovate, subentire, white. *Fruit* ellipsoid, subquadrate, or oblong; commissure broad; carpels dorsally compressed, lateral ridges winged or acute, dorsal and intermediate narrower, distinct; vittæ many; carpophore 2-partite. *Seed* dorsally much compressed, inner face plane.—**DISTRIB.** Species 5, in North Temperate regions.

1. **A. officinalis**, Hoff. *Pl. Umb. Gen.* i. 168; leaflets $1\frac{1}{2}$ -4 by $\frac{3}{4}$ -2 in., bracteoles as long as the flowering umbellule, fruit $\frac{1}{4}$ in. *DC. Prodr.* iv. 169. *A. decurrens*, Ledeb. *Ic. Fl. Ross.* ii. 21, t. 166. *Angelica Archangelica*, Linn.

VAR. *himalaica*; flowers twice as large, fruit $\frac{1}{2}$ by $\frac{1}{2}$ in.

KASHMIR; 8-13,000 ft., C. B. Clarke; Aitchieson. **JOGI**; alt. 11,000 ft., Thomson. **SIKKIM**; Lachen, alt. 10,000-11,000 ft., J. D. H.—**DISTRIB.** (of the type) North Europe, Asia, and America.

Stem 5-10 ft. *Leaves* 1-3 ft., ovate, ultimate pinnæ sessile, rarely decurrent, terminal often 3-lobed. *Bracts* small; rays 10-30, $1\frac{1}{2}$ -4 in.; *pedicels* very numerous, $\frac{1}{4}$ - $\frac{1}{2}$ in. Lateral ridges usually winged; pericarp somewhat corky, easily separating from the seed; vittæ numerous, small, on the inner surface of the pericarp.—The fruit of the Himalayan variety is much larger than that of any other *Archangelica* preserved at Kew. It closely resembles the flowering example of *A. decurrens*, but in Ledebour's figure of that species its fruit is no larger than in ordinary *A. officinalis*.

31. **FERULA**, Linn.

Perennial herbs. *Leaves* 2-4-pinnatifid or 2-4-pinnate. *Umbels* compound. *Flowers* yellow, often polygamous. *Calyx-teeth* obsolete. *Petals* ovate, obtuse, or emarginate. *Fruit* orbicular or ellipsoid, much compressed dorsally; lateral ridges winged, dorsal and intermediate filiform or obscure; vittæ many or few; carpophore 2-partite. *Seed* much dorsally compressed, inner face plane.—**DISTRIB.** Species 60, in Europe, N. Africa, Central Asia.

Ferula is difficult to separate from *Peucedanum*. The Indian species all belong to the section *Narthex*.

SECT. Narthex, Falconer (Gen.) Segments of the *leaves* 1-4 in., oblong, often pubescent. *Bracts* 0, or small, deciduous; bracteoles 0, or very small. Dorsal furrows 1-vittate (rarely a small vitta added); lateral 1-2-vittate; commissure 2-14-vittate.

1. **F. Narthex**, Boiss. *Fl. Orient.* ii. 994; secondary and tertiary pinnæ decurrent entire or very irregularly crenate-serrate, ovary glabrous, fruit $\frac{1}{2}$ by $\frac{1}{2}$ in., vittæ manifest broad 1 (rarely 1-2) in the dorsal furrows. *Flück. & Hanb. Pharm.* 280; *Bentl. & Trim. Med. Pl.* t. 126. *Narthex Asafetida*, Falc. in *Trans. Linn. Soc.* xx. 285; *Bot. Mag.* t. 5168; *Balf. in Trans. R. Soc. Edinb.* xx. 366, tt. 21, 22.

BALTISTHAN; Astor, Falconer.

Stem 5-8 ft. *Leaves* pubescent, at least when young; lower leaves 1-2 ft., ovate, cauline sheaths large, from which spring simple or scarcely compound umbels. Terminal umbel large, compound, leafless. *Vittæ* broad, usually occupying the whole furrow, and as long as the carpel; commissural usually 4, 2 slender sometimes added.

—This is certainly not *F. Asafetida*, Boiss. l. c., which is *Scorodosma fetidum*, Bunge in *Borcz. Ferul.* tt. 1, 2, with hairy ovary and many very minute (or 0) vittæ. Whether it is the *F. Asa-fetida* founded by Linnæus on the figure in *Kæmpf. Aman.* p. 536, is a disputed point. That figure does not represent the numerous lateral subsimple umbels arising from the sheaths of the cauline leaves which characterise this, but this character varies so in *F. Jaeschkeana* (No. 3) that it is impossible to rely upon it. The fragments of Kæmpfer's plant preserved in the British Museum do not suffice to determine the point. *T. Thomsoni* (No. 2) has the subsimple umbels of Falconer's plant (in cultivation), and has also a divaricate corymb very like that figured by Kæmpfer.

2. **F. Thomsoni**, C. B. Clarke: glabrous, tertiary pinnæ 2 by $\frac{1}{2}$ in. subentire mostly petioluled, inflorescence as in *F. Narthex*.—Dorema No. 5, *Herb. Ind. Or. H. f. & T.*

KASHMIR; Banahal, alt. 5000–6000 ft., Thomson.

Resembling *F. Narthex*, but with leaves cut into remote lanceolate subacute leaflets.—Thomson's examples are in flower, but a fruiting corymb of this, or an allied *Ferula*, from Kashmir at Nowgunge (alt. 8000 ft., C. B. Clarke), has umbels and flowers as in the terminal umbel of *F. Narthex*; pedicels $\frac{1}{2}$ – $\frac{1}{4}$ in., clavate at the apex; carpels $\frac{1}{2}$ by $\frac{1}{4}$ in., much compressed, elliptic narrowed at both ends, plane or almost convex on the inner face: dorsal and intermediate ridges filiform, lateral narrowly winged; vittæ 3–2 in the dorsal furrows, minute, as long as the carpel, and seeds very much compressed.

3. **F. Jaeschkeana**, Vathe Append. in *Sem. Hort. Berol.* 1876, 2; secondary and tertiary pinnæ decurrent regularly closely crenate, carpel $\frac{3}{8}$ by $\frac{3}{8}$ in., vittæ very large solitary in each furrow. *F. foetidissima*, Regel & Schmalh. in *Gartenfl.* 1878, 195–198, t. 944.—Dorema sp. 3 and 4, *Herb. Ind. Or. H. f. & T.*

KASHMIR; alt. 6000–12,000 ft., plentiful; Falconer, Thomson, &c.—DISTRIB. Turkestan.

Stem, leaves, and inflorescence as in *F. Narthex*, except that the leaves are closely crenate or doubly crenate or almost serrate. As in *F. Narthex*, the fruiting corymb often appears elongate subpaniculate, sometimes divaricate and corymbose; peduncles bearing nearly simple umbels also proceed from the large sheaths of the cauline leaves. *Fruit* much larger and thicker than in *F. Narthex*, vittæ much the largest of any Indian umbellifer: the commissural often 2 only near the medial line, sometimes 4 or 6.—Regel and Schmalh. think that this plant probably produces the *Asafetida* of commerce; this may be so, as it is an abundant species in Kashmir, and very largely supplied with oil: but it is not the *Asafetida* of Linnæus, because Kæmpfer's figure has entire not crenate leaflets.

32. PEUCEDANUM, Linn.

Perennial glabrous or pubescent herbs (the Indian species). *Leaves* 1–3-pinnate or twice or thrice 3-partite, ultimate leaflets lanceolate or ovate, rarely linear, toothed or entire. *Umbels* compound, rays usually numerous; bracts various, bracteoles many few or 0. *Flowers* often polygamous, white or yellow, rarely pink. *Calyx-teeth* obsolete or small. *Petals* obovate, emarginate or 2-fid. *Ovary* glabrous. *Fruit* much dorsally compressed, ellipsoid, oblong, or orbicular, carpels scarcely convex on the back, more or less acutely winged on the margin, dorsal and marginal ridges little elevated or obsolete, lateral winged; dorsal furrows 1-vittate, lateral 1- rarely 2-vittate. *Seed* much dorsally compressed, inner face plane.—DISTRIB. Species 100, throughout nearly the whole world, few tropical.

The species (formerly referred to *Pastinaca*) having the ovary and young fruit hairy have been transferred by Mr. Benthams to *Heracleum*, whether the vittæ are abbreviated or not.

* *Ultimate segments of the leaves* $\frac{1}{2}$ –1 in., linear.

1. **P. graveolens**, *Benth. in Gen. Pl.* i. 919; bracts and bracteoles 0, petals yellow, fruit $\frac{1}{8}$ by $\frac{1}{2}$ in. narrowly winged plano-convex 2–3 times as broad as thick. *P. Sowa, Kurz in Journ. As. Soc.* 1877, pt. ii. 116. *Anethum graveolens*, *Linn.*; *DC. Prodr.* iv. 186; *Wall. Cat.* 7210; *Boiss. Fl. Orient.* ii. 1026. *A. Sowa, Roxb. Hort. Beng.* 22, *Fl. Ind.* ii. 94; *Fleming Cat. Ind. Med. Pl.* 5; *Wall. Cat.* 595; *DC. Prodr.* iv. 186; *W. & A. Prodr.* 372; *Wight Ic.* t. 572.

Throughout tropical and subtropical INDIA; often cultivated.—DISTRIB. Cultivated in S. Europe and W. Asia.

Glabrous, 1–3 ft. *Leaves* 2–3-pinnate. *Pedicels* many, $\frac{1}{2}$ in. *Styles* small. Dorsal and intermediate ridges distinct, slender; vittæ large, solitary in each furrow, 2 on the commissure.—The fruits are as broad and as much winged in the Indian *P. Sowa* as in the ordinary *P. graveolens*: never subobsolete, as shown in *Wight Ic.* t. 572. In the European *P. graveolens* the carpels are plano-convex, and not so subpentagonal as depicted by Reichenbach, as Benthams has observed *l. c.*

** *Ultimate segments of the leaves* $\frac{1}{2}$ –2 in., linear-oblong or ovate, entire or remotely sparingly toothed; bracts 0 or very small.

2. **P. Dhana**, *Ham. in Wall. Cat.* 7216; leaves twice or thrice 3-partite or sub-2-pinnate leaflets 2 by $\frac{1}{4}$ in. sessile usually entire, carpels $\frac{1}{4}$ by $\frac{1}{2}$ in.

NORTH-WEST INDIA; Sub-sewaliks up to 4500 ft.; *Edgeworth*. KUMAON, in the subtropical region; *Strachey & Winterbottom*. NORTH BENGAL; Goruckpore, *Hamilton*; Dinajpur, *C. B. Clarke*.

Glabrous, 6–24 in., subnude upwards. *Bracts* 3–5, $\frac{1}{4}$ in., linear or linear-lanceolate; rays 5–10, 1–2 $\frac{1}{2}$ in.; bracteoles 4–8, $\frac{1}{8}$ in., linear; pedicels numerous $\frac{1}{4}$ in. *Flowers* small, yellow. *Calyx-teeth* obsolete. *Styles* somewhat long. *Carpels* greatly compressed, subquadrate, tip obtuse, often truncate or emarginate; dorsal and intermediate ridges filiform, subobscure, lateral with a wing as thick as the seed; dorsal furrows 1-vittate lateral 2-vittate; vittæ nearly as long as the carpel, commissural 6–4.

VAR. *Dalzellii*; leaflets shortly oblong or suborbicular. *Pastinaca glauca*, *Dalz. in Hook. Kew Journ.* iv. 293; *Dalz. & Gibs. Bomb. Fl.* 107.—Belgaum, *Dalzell*, *Ritchie*. Jubbulpore, *McLeod*. Chota Nagpore, *C. B. Clarke*.—Leaflets usually 1 by $\frac{1}{2}$ – $\frac{2}{3}$ in., very unlike those of *P. Dhana*, but the plants in every other point agree. There has been considerable confusion between *Pastinaca glauca*, *Dalz.* (*Peucedanum*, sp. *Benth.*) and *Peucedanum glaucum*, *Wall.*: two widely different plants.

*** *Ultimate segments of the leaves* linear- or ovate-lanceolate serrate; bracts 0 or very small.

3. **P. ramosissimum**, *Wall. Cat.* 578; segments of the lower leaves ovate-lanceolate of the upper narrow-lanceolate, pedicels in fruit $\frac{1}{8}$ – $\frac{1}{4}$ in., fruit $\frac{1}{4}$ by $\frac{1}{8}$ – $\frac{1}{6}$ in. winged commissure evittate. *Palimbia ramosissima*, *DC. Prodr.* iv. 176.

KHASIA Mts., alt. 4000–6000 ft., common.

Glabrous, 2–5 ft. *Leaves* 2–4-pinnate, much and acutely serrate. *Bracts* 0, or 1–3, $\frac{1}{4}$ in.; rays 4–8, $\frac{1}{2}$ –1 $\frac{1}{2}$ in., divaricate; bracteoles 0–5, $\frac{1}{8}$ in., linear; pedicels 5–10. *Calyx-teeth* minute. *Styles* very short. *Carpels* elliptic, narrowed at both ends, entire or subemarginate at the apex: dorsal and intermediate ridges obscure,

wings of lateral as thick as the seed; furrows 1-vittate; vittæ nearly or quite as long as the carpel.

4. **P. sikkimense**, *C. B. Clarke*; segments of the lower leaves ovate-lanceolate of the upper narrow-lanceolate, pedicels in fruit $\frac{1}{4}$ – $\frac{3}{4}$ in., fruit $\frac{1}{4}$ – $\frac{1}{2}$ by $\frac{1}{8}$ – $\frac{1}{4}$ in. broadly winged deeply emarginate at both ends, commissure evittate.

SIKKIM; alt. 3000–7000 ft., frequent; *J. D. H., C. B. Clarke*.

Resembling *P. ramosissimum* closely except as to the fruit, which has a broader wing; the seed is not larger than in that plant, but the pedicels are usually longer and more slender, and there are often no bracteoles.

5. **P. anamallayense**, *C. B. Clarke*; segments of the leaves very narrowly lanceolate, pedicels in fruit $\frac{1}{2}$ – $\frac{1}{3}$ in., fruit $\frac{1}{2}$ in. orbicular commissure 6–4 vittate.

ANAMALLAY MTS.; *Wight, Beddome*.

Resembling *P. ramosissimum*, but the segments of the leaves narrower, the fruit different. Umbel as in *P. ramosissimum*; bracts 0, or 1–4, $\frac{1}{2}$ – $\frac{1}{4}$ in., linear, sometimes narrowly oblong, sub-serrate. Calyx-teeth small, lanceolate. Styles long. Dorsal and intermediate ridges scarcely excurrent, lateral with a prominent wing as thick as the seed; dorsal furrows 1-vittate, lateral 2–1-vittate; vittæ large usually as long as the carpel, commissural prominent.

6. **P. ceylanicum**, *Gardn. MS.*; pedicels in fruit $\frac{1}{2}$ –1 in., fruit $\frac{1}{4}$ by $\frac{1}{8}$ in., commissure 6–4-vittate. Palimbia ramosissima, *Thwaites Enum.* 131, not of *DC.*

CEYLON; *Gardner*; Galagama, *Thwaites*.

Resembling *P. anamallayense*, and perhaps a variety of it, but the (unripe) fruits are elliptic and less winged, the pedicels very much longer, and the calyx-teeth much smaller. Styles long.

7. **P. glaucum**, *DC. Prodr.* iv. 179; segments of the middle cauline leaves narrow-lanceolate serrate of the upper linear entire, fruit $\frac{1}{2}$ by $\frac{1}{4}$ in. truncate commissure 2-vittate. *Selinum glaucum*, *Wall. Cat.* 580.

NIPAL; *Wallich*.

Glabrous 2–4 ft. Segments of the cauline leaves 2 by $\frac{1}{2}$ in., entire in most of Wallich's examples, serrate in the only fruiting one. Bracts 0; rays 12–16, $\frac{1}{2}$ – $1\frac{1}{4}$ in.; bracteoles 0, or minute; pedicels 8–16, $\frac{1}{2}$ – $\frac{1}{3}$ in. Calyx-teeth obsolete. Styles subprominent. Fruit subquadrate, somewhat emarginate at both ends; dorsal and intermediate ridges obscure, lateral subprominently winged, the wing as thick as the seed; vittæ solitary, nearly as long as the carpel.

VAR. ? *nagpurensis*; bracteoles 4–7 $\frac{1}{2}$ in. linear, fruit narrowed at the base, margin thicker than the seed, commissure evittate.—Chota Nagpore, alt. 1500–2000 ft.; Ramghur and Bagoda, *C. B. Clarke*; Behar, at Monghyr, *G. Lockwood*.—Lower leaves twice 3-partite, leaflets 3 by $1\frac{1}{2}$ in., strongly serrate: upper with linear segments. Fruit truncate emarginate at the narrowed base.—This may be a distinct species.

**** Ultimate segments of the leaves 1–2 in., serrate; bracts prominent.

8. **P. grande**, *C. B. Clarke*; leaves 2-pinnate leaflets with 3 large rounded lobes, fruit $\frac{1}{2}$ in. obovate obtuse. *Pastinaca grandis*, *Dalz. & Gibs. Bomb. Fl.* 107.

BOMBAY GHATS; *Dalzell*.

Glabrous, 3 ft. Leaves mostly radical, long-petioled, ovate, shining on both surfaces, leaflets 1–3 in. Bracts oblong or obovate, obtuse; rays 20, 2–3 in., stout;

bracteoles oblong, obtuse; pedicels 10-16, $\frac{1}{2}$ - $\frac{2}{3}$ in. *Petals* yellow. *Ovary* glabrous. *Fruit* narrowed to the base and not there emarginate, nearly as broad as long; dorsal and intermediate ridges triangular, small, obtuse, lateral narrowly winged; dorsal furrows 1-vittate, lateral 2-1-vittate; vittæ nearly as long as the fruit or the lateral abbreviated, commissural 4 abbreviated. *Seed* much broader than thick.—Perhaps a *Heracleum*, but the ovary is glabrous.

**** *Leaves* 3-4-pinnate, ultimate segments $\frac{1}{2}$ in. ovate or lanceolate.

9. **P. Thomsoni**, C. B. Clarke; quaternary pinnæ $\frac{1}{2}$ in. ovate deeply pinnatifid, bracts hardly any, styles long.—*Peucedanum* sp. 5, *Herb. Ind. Or. H. f. & T.*

KASHMIR; alt. 5000-9000 ft.; KISHTWAR and BANAHAL, *Thomson*.

Glabrous, or the leaves sometimes minutely hispidulous, 3-4 ft., stem subnude upwards. *Lower leaves* 6-8 in., broadly ovate, ultimate segments scarcely $\frac{1}{2}$ in. linear-oblong, subobtuse. *Umbels* large, irregular, and often twice or thrice divided; rays unequal; bracteoles hardly any; pedicels 8-12, $\frac{1}{2}$ in. *Calyx-teeth* 0. *Ovary* glabrous. *Fruit* only half-ripe; will be at least $\frac{1}{2}$ in.—The very compound leaves and irregular umbels easily distinguish this species. The genus is doubtful in the absence of ripe fruit, but Dr. Thomson marked it *Peucedanum*, and it has all the appearance of being so.

DOUBTFUL SPECIES.

P. ? **SKARDICUM**, C. B. Clarke; glabrous, leaves twice 3-partite secondary pinnæ ovate or elliptic denticulate, bracts 0, bracteoles 4-7 $\frac{1}{2}$ in. lanceolate-linear scarious, petals yellow.—Baltisthan, near Skardo, alt. 12,000 ft., C. B. Clarke.—*Stem* 3-4 ft., corymbose. *Pinnæ* $\frac{1}{2}$ -1 in. diam., shining, yellowish green; nerves prominent, flabellate and pinnate, hardly reticulate. *Peduncles* 5-8 in.; rays 10-12, $1\frac{1}{2}$ -2 in., subequal; pedicels 12-20, $\frac{1}{2}$ in. *Calyx-teeth* 0. *Petals* obovate, emarginate. *Disc* large; styles short. *Fruit* very immature, but about to be winged.

33. **HERACLEUM**, Linn.

Herbs, biennial or perennial, never quite glabrous. *Leaves* 1-2-3-pinnate, segments never minute nor filiform. *Umbels* compound; rays usually many; bracts few simple, or 0, rarely many foliaceous; bracteoles many, rarely divided. *Flowers* polygamous, often radiant, white or yellowish. *Calyx-teeth* obsolete, rarely small linear-lanceolate. *Petals* obovate, emarginate or 2-fid. *Ovary* hairy or pubescent. *Fruit* orbicular obovate or elliptic, much dorsally compressed; dorsal and intermediate ridges small or 0, lateral usually winged or rarely acute; vittæ usually solitary in each valley, as long as the carpel or abbreviated and dilated below; carpophore 2-partite. *Seed* much dorsally compressed, plano-convex.—DISTRIB. Species 50; in Temperate Europe and Asia; 1 in N. America, 1 in Abyssinia.

* Species of Northern and North-Eastern India.

† *Not large, drying green, pubescence grey or whitish; fruit when ripe greenish or whitish.* (Approaching *Pastinaca* in habit.)

1. **H. Thomsoni**, C. B. Clarke; lower leaves 2-pinnate, bracts small, fruit elliptic $\frac{1}{2}$ - $\frac{1}{4}$ by $\frac{1}{8}$ - $\frac{1}{6}$ in. winged minutely pubescent.—*Pastinaca* sp. i., *Herb. Ind. Or. H. f. & T.*

LADAK and PITI; alt. 11,000-15,000 ft., T. Thomson. LAHUL; alt. 10,000 ft., Jaeschke. KASHMIR; Tilail, alt. 9000 ft., C. B. Clarke.

Stems 12–20 in., grey puberulo-pubescent, naked upwards. *Leaves* 6–10 in., ovate-lanceolate, ultimate segments $\frac{1}{2}$ –1 in. pinnatifid. *Bracts* 4–5, $\frac{1}{8}$ – $\frac{1}{4}$ in.; rays 4–10, 1–2 in.; bracteoles 5–8, $\frac{1}{8}$ in., ovate-lanceolate, white-margined. *Ovary* hairy. *Petals* white. *Fruit* distinctly but not broadly winged, greenish-pubescent when ripe, dorsal ridges hardly excurrent; dorsal vittæ extending nearly to the base; commissural 2, near the medial line, half as long.—*H. tragoides*, *Benth. in Gen. Pl. i. 924* (*Zozimia tragoides*, *Boiss.*), is very near this, but in it the lower leaves are pinnate and lobed.

VAR. glabrior; leaves nearly glabrous more acutely serrate. *Pastinaca* sp. 2. *Herb. Ind. Or. H. f. & T.*—North-west Himalaya and Kashmir; alt. 9000–12,000 ft., *Jacquemont*, *Thomson*.

2. **H. pinnatum**, *C. B. Clarke*; leaves pinnate pinnæ ovate toothed or pinnatifid, bracts small or 0, fruit $\frac{1}{4}$ – $\frac{1}{5}$ in. obovate winged.—*Heracleum* sp. 14, *Herb. Ind. Or. H. f. & T.*

KASHMIR northwards to the KARAKORUM, alt. 10,000–16,000 ft.; *Thomson*, *C. B. Clarke*.

White-pubescent, 1–3 ft., sparingly corymbose, little leafy upwards. *Leaves* 6–10 in., oblong; pinnæ usually $\frac{1}{2}$ –1 in. sometimes 2–3 in., sessile, serrate. *Bracts* 0–4, $\frac{1}{8}$ – $\frac{1}{4}$ in., linear or oblong; rays 8–20, 1–3 in.; bracteoles 5–8, $\frac{1}{8}$ – $\frac{1}{4}$ in., linear or oblong; pedicels 10–30, $\frac{1}{8}$ in. *Petals* white. *Ovary* hairy. *Fruit* rather broadly winged, minutely pubescent, whitish; dorsal and intermediate ridges excurrent; vittæ broad extending $\frac{2}{3}$ the length of the carpel, a minute vitta added in the centre of the wing; commissural 2, near the medial line, often more than half as long as the mericarp.

3. **H. Jacquemontii**, *C. B. Clarke*; leaves pinnate or 3-partite, segments ovate, bracts 0, fruit orbicular $\frac{1}{8}$ in. winged.

NORTH-WEST HIMALAYA?, *Jacquemont*.

Villous with lax white hairs, 1 ft., nude upwards. *Leaves* ovate, segments $\frac{1}{2}$ – $\frac{3}{4}$ in., serrate. *Rays* 7, 1–2 in.; bracteoles 4–8, $\frac{1}{8}$ – $\frac{1}{4}$ in., linear; pedicels 10–12, $\frac{1}{8}$ in. *Fruit* minutely pubescent, dorsal and intermediate ridges not excurrent, lateral excurrent in a continuous circular narrow wing; vittæ nearly as long as the carpel, commissural 4.—Very distinct by the small fruits.

4. **H. cachemiricum**, *C. B. Clarke*; lower leaves 2-pinnate pinnæ narrowly oblong entire or remotely obtusely toothed, bracts small, fruit $\frac{1}{4}$ by $\frac{1}{5}$ in. elliptic winged.—*Peucedanum glaucum*, *Herb. Ind. Or. H. f. & T.*, not of *Wall*.

MURREE, *Falconer*; JAMU, alt. 5000–6000 ft., *Thomson*; KASHMIR; Nowgunge, alt. 8000 ft., *C. B. Clarke*.

Minutely pubescent, 2–3 ft., naked, sparingly corymbose upwards. *Leaves* 6–12 in., ovate, secondary pinnæ 1–3 by $\frac{1}{12}$ – $\frac{1}{8}$ in., sessile, subobtusely. *Bracts* 2–4, $\frac{1}{8}$ – $\frac{1}{4}$ in., lanceolate; rays 6–10, 1–2 in.; bracteoles 5–8, $\frac{1}{8}$ in., lanceolate; pedicels 8–20, $\frac{1}{8}$ – $\frac{1}{5}$ in. *Fruit* pubescent; dorsal and intermediate ridges hardly excurrent, lateral forming a continuous narrow wing; vittæ broad nearly as long as the carpel, commissural 2, near the medial line.

†† *Large, drying brown; fruit when ripe brown, often with a very thin wing.*

5. **H. Wallichii**, *DC. Prodr. iv. 195*; glabrescent upwards, upper leaves 3-partite or pinnate, bracts 1–2 small deciduous or 0, calyx-teeth linear prominent, fruit $\frac{3}{8}$ by $\frac{1}{4}$ in. obovate, commissure evittate. *H. diversifolium*, *Wall. Cat. 574*.

NIPAL; *Wallich*. SIKKIM: on Singaleleh, alt. 10,000 ft., *C. B. Clarke*.

Stem 3–4 ft., white-hirsute beneath the nodes. *Leaves* serrate, pilose above and

on the nerves beneath. *Bracts* 1, $\frac{1}{4}$ in., linear; rays 6-8, 1-2 $\frac{1}{2}$ in., glabrous; bracteoles 0-5, $\frac{3}{4}$ in., linear; pedicels 8-16, $\frac{1}{2}$ - $\frac{3}{4}$ in. *Fruit* glabrous, brown, dorsal and intermediate ridges not prominent, wing broad having a narrow median vitta; vittæ about half as long as the fruit subclavate below.

VAR. elatior; more hairy upwards, bracts 4-6, rays 20-30 hairy.—Nipal.—This may be a different species but contains only very immature fruit. The upper leaves are lobed, not divided, more hairy than in the type, and the bracteoles are much more prominent. Bentham (*Gen. Pl.* i. 922) referred *H. diversifolium* to *Peucedanum*: but is not now certain to which of the many plants mixed under the name *H. diversifolium* he referred. *H. Wallichii* is a typical *Heracleum*, with the vittæ hardly half as long as the mericarp.

6. *H. nubigenum*, C. B. Clarke; upper leaves 3-partite or pinnate glabrescent, bracts several deciduous, calyx obsolete, fruit $\frac{1}{4}$ in. orbicular emarginate at both ends, commissure subvittate.

SIKKIM, alt. 10,000-14,000 ft.; Chola Pass, *J. D. H.*; Yakla Pass, *C. B. Clarke*.

Stem 3-5 ft., pubescent. Tertiary pinnæ 1-3 in., ovate, serrate, often lobed, slightly pubescent. *Bracts* 4-12, $\frac{1}{2}$ in., linear; rays 30-50, 2-6 in., pubescent; bracteoles 4-10, $\frac{1}{4}$ in., linear; pedicels 15-30, $\frac{1}{4}$ - $\frac{3}{4}$ in. *Fruit* glabrous, brown; dorsal and intermediate ridges obtuse, little excurrent, much broader than the vittæ; wing broad interrupted at the apex and base; vittæ nearly as long as the fruit, commissural usually 0, or 1-2 very short near the apex, sometimes fragments of an interrupted vitta are seen.—The fruit of this plant is much like that of *Cortia Hookeri*.

7. *H. Brunonis*, Benth. in Gen. Pl. i. 921; upper leaves pinnate oblong, bracts 5-8 $\frac{1}{2}$ -1 in. lanceolate hirsute sometimes divided or foliaceous, fruit $\frac{1}{4}$ - $\frac{1}{3}$ by $\frac{1}{6}$ - $\frac{1}{4}$ in. elliptic. Tordylium ? *Brunonis*, *Wall. Cat.* 590. Tordyliopsis *Brunonis*, *DC. Prodr.* iv. 199.

From KUMAON; *Wallich*; to SIKKIM; alt. 10,000-13,500 ft.

Stem 1-3 ft., pubescent. Cauline leaves 6-8 by 2-3 in.; pinnæ subsessile, ovate, lobed or pinnatifid, serrate, sparingly pubescent. *Rays* 4-8, 1-1 $\frac{1}{4}$ in.; bracteoles 5-6, $\frac{1}{2}$ in., lanceolate; pedicels 8-16, much shorter than the bracteoles. *Flowers* greenish-white or purple (*J. D. H.*), outer often radiant, large. *Calyx-teeth* minute. *Styles* long. *Fruit* glabrous, brown; dorsal and intermediate ridges filiform, hardly excurrent; wing prominent with a minute marginal vitta; vittæ $\frac{2}{3}$ or $\frac{3}{4}$ the length of the fruit, commissural 0, or 2 and short.

8. *H. sublineare*, C. B. Clarke; pinnæ of the upper leaves linear or nearly linear, bracts small or 0, calyx-teeth linear, fruit $\frac{1}{5}$ - $\frac{1}{4}$ by $\frac{1}{6}$ - $\frac{1}{8}$ in. elliptic, commissure 2-vittate.—*Pastinaca* sp. 4, *Herb. Ind. Or. H. f. & T.*

SIKKIM, alt. 10,000-13,000 ft., *J. D. H.*, &c.

Stem 2-4 ft., pubescent. Lower leaves 6 in., ovate, 2-pinnate; pinnæ lanceolate, serrate, little pubescent, upper pinnate, pinnæ often 4 by $\frac{1}{4}$ in., or 2 by $\frac{1}{2}$ in. *Bracts* 1-3, $\frac{1}{4}$ in., linear, often 0; rays 4-8, 1-1 $\frac{1}{2}$ in., hairy; bracteoles 2-5, $\frac{1}{5}$ - $\frac{1}{4}$ in., linear; pedicels 6-16, $\frac{1}{4}$ in. *Flowers* white, outer often radiant, large. *Fruit* glabrous, brown, dorsal and intermediate ridges filiform hardly excurrent; wing broad, continuous, with a minute marginal vitta; dorsal vittæ more than half as long as the fruit, commissural 2, usually slender, close to the medial line, nearly as long as the mericarp, rarely shorter or interrupted.

9. *H. canescens*, Lindl. in Royle Ill. 232; stem and leaves softly hairy, upper leaves mostly pinnate, bracts small or 0, fruit $\frac{1}{2}$ by $\frac{1}{4}$ in. obovate, commissure 2-vittate. *H. hirsutum*, *Edgw. in Trans. Linn. Soc.* xx. 57. ? *H. cinereum*, *Lindl. in Royle Ill.* 232.

NORTH-WEST HIMALAYA, alt. 6000–8000 ft.; Kishtwar and Banahal, *Royle, Thomson*; Simla, *Lady Dalhousie*, &c.

Stem 1–4 ft., subnude upwards, hirsute with white lax hairs at the apex of the peduncles. *Leaves* 3–12 in., 1–2-pinnate, oblong or ovate; pinnæ $\frac{1}{2}$ –3 in., ovate or oblong, acute or obtuse, crenate-serrate or lobed, rhachis with lax white hair. *Bracts* 1–4, $\frac{1}{2}$ in., linear or lanceolate, or 0; rays 6–16, 1–3 in.; bracteoles 4–8, $\frac{1}{2}$ in., linear or linear-lanceolate; pedicels 8–16, 0– $\frac{2}{3}$ in. *Calyx-teeth* linear, small. Young *ovary* very hairy, rarely slightly pubescent. Dorsal and intermediate *ridges* filiform, distinctly elevated; wing broad; dorsal vittæ $\frac{2}{3}$ the length of the fruit, not clavate below, commissural distinct, near the medial line, more than half as long as the carpel.—Easily separated from *H. candicans* by the indumentum. The leaves are most variable. No example exists at Kew of *H. cinereum*, but there appears no reason why it should not belong here.

10. *H. candicans*, *Wall. Cat.* 573; leaves pinnatifid or pinnate, pinnæ obtusely lobed or pinnatifid tomentose or white-villous beneath, bracts small or 0, fruit $\frac{1}{2}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in. obovate, commissure 2-vittate. *DC. Prodr.* iv. 192.

From KASHMIR to KUMAON, alt. 6000–12,000 ft., common.

Stem 2–6 ft., pubescent or closely villous. *Pinnæ* often 8 by 6 in., crenate-serrate, thickly white-tomentose, or only slightly grey-pubescent. *Bracts* 1–3, $\frac{1}{2}$ – $\frac{1}{2}$ in., linear, or 0; rays 10–40, 1–4 in.; bracteoles 4–8, $\frac{1}{2}$ in., linear; pedicels 8–16, $\frac{1}{2}$ – $\frac{1}{2}$ in. *Calyx-teeth* linear. Dorsal and intermediate *ridges* filiform slightly excurrent, wing broad with a small distinct median vitta; vittæ in Wallich's example $\frac{1}{2}$ the length of the fruit, in others (with less elongate-obovate fruits) $\frac{2}{3}$ the length; commissural in the type more than $\frac{1}{2}$ the length, or minute near the apex, or 0.

11. *H. obtusifolium*, *Wall. Cat.* 577; upper leaves 3-fid or 3-partite lower 3–5-partite, pinnæ round crenate white-tomentose beneath, bracts 2–5 $\frac{1}{2}$ –1 in. deciduous. *DC. Prodr.* iv. 192.

NIPAL; *Wallich*. SIKKIM; Lachen, alt. 12,000 ft., *J. D. H. Bhotan, Griffith*.

Stem 1–3 ft., pubescent or villous. *Pinnæ* 1–4 in. diam., sometimes 2–3-lobed, always rounded, scarcely serrate. *Rays* 10–16, 1–3 $\frac{1}{2}$ in.; bracteoles 4–8, $\frac{1}{2}$ – $\frac{1}{2}$ in.; pedicels 10–20 $\frac{1}{4}$ – $\frac{1}{2}$ in. *Calyx-teeth* linear, small. Outer *flowers* of the umbel moderately or not at all radiant. *Fruit* (ex *DC.*) obovate, commissure 4-vittate, dorsal vittæ linear, extending $\frac{2}{3}$ its length in the unripe fruit.

12. *H. nepalense*, *Don Prodr.* 185; upper leaves acutely 3-lobed rarely divided sparingly pubescent, lower pinnate, bracts 0 or inconspicuous, fruit $\frac{1}{2}$ by $\frac{1}{4}$ in. obovate, commissure 4-vittate. *Wall. Cat.* 576; *DC. Prodr.* iv. 192.

From NIPAL to BHOTAN, alt. 5000–12,000 ft.; frequent.

Stem 2–5 ft., sparingly pubescent. *Pinnæ* often 6 by 4 in., deeply lobed or pinnatifid, serrate. *Bracts* 3–5, $\frac{1}{2}$ in., linear, sometimes 0; rays 8–20, 1 $\frac{1}{2}$ –3 in.; bracteoles 0–6, $\frac{1}{2}$ in., linear; pedicels 8–20, $\frac{1}{4}$ – $\frac{1}{2}$ in. *Calyx-teeth* linear, small. Outer *flowers* of the umbel radiant or not. Dorsal and intermediate *ridges* hardly excurrent; wing broad, with a prominent small marginal vitta; dorsal vittæ $\frac{2}{3}$ the length of the fruit, commissural 4, $\frac{2}{3}$ the length in Wallich's examples, shorter in others.

VAR. bivittata; fruit $\frac{1}{2}$ in. elliptic or subobovate, commissure 2-vittate.—Sikkim and Bhotan, common.—Uppermost leaves sometimes 3-partite, and middle cauline leaves sub-2-pinnate. A very doubtful plant, some specimens of which have been referred to a variety of *H. diversifolium* with 2-vittate commissure, but the cutting of the leaves is that of *H. nepalense*.

13. *H. barmanicum*, *Kurz in Journ. As. Soc.* 1872, pt. ii. 309, and 1877, pt. ii. 116; lower leaves 1–2-pinnate hairy, bracts 5–8 $\frac{3}{4}$ in. lanceolate,

fruit $\frac{1}{2}$ by $\frac{1}{4}$ in. obovate, furrows between the lateral and intermediate ridges 2-vittate, commissure 2-vittate.—*Heracleum* sp. 5, *Herb. Ind. Or. H. f. & T.*

KHASIA Mts., alt. 4000–6000 ft., common. PEGU, alt. 2500–3000 ft., frequent, *Kurz.*

Stem 2–4 ft., villous. *Upper leaves* 3-fid or 3-partite, pinnæ 1–3 in., cordate or ovate-lanceolate, serrate. *Rays* 6–12, $1\frac{1}{2}$ in.; bracteoles 5–10, $\frac{1}{4}$ – $\frac{1}{2}$ in. *Calyx-teeth* linear, small. *Petals* white, of the outer flowers radiant or not. Dorsal and intermediate ridges elevated hardly excurrent, vittæ between them 1 rarely 2; wing broad with a narrow marginal vitta; vittæ in the furrows between the intermediate and lateral ridges usually 1–3, more than half the length of the mericarp, commissural 2, usually more than half as long, 2 fragmentary often added.

** Species of Southern India and Ceylon.

14. **H. Hookerianum**, *W. & A. Prodr.* 373; lower leaves undivided roundly 3-lobed villous often woolly beneath, upper much reduced often to mere sheaths, bracts not prominent, fruit $\frac{1}{4}$ – $\frac{1}{2}$ in. broadly elliptic scarcely obovate obtuse at both ends. *Pastinaca Hookeriana*, *Wight Ic.* t. 1010.

NILGHIRI Mts.; *Wight, Gardner, G. Thomson.*

Stem 12–18 in. villous or pubescent, subnude upwards. *Leaves* 2–4 in. diam., sometimes peltate, often 3-lobed, lobes 2–3-fid, lobes rounded, crenate, not serrate. *Bracts* 1–5, $\frac{1}{4}$ – $\frac{1}{2}$ in., lanceolate or 0; rays 4–10, 1–3 in., hairy, unequal, sometimes compound; bracteoles 0–8, 0– $\frac{1}{4}$ in., lanceolate or linear, very variable; pedicels 4–10, $\frac{1}{4}$ in. *Calyx-teeth* small, lanceolate. *Outer flowers* of the umbel radiant or not. *Fruit* obtuse, dorsal and intermediate ridges slender, hardly elevated; wing broad, with a narrow marginal vitta; vittæ solitary in the furrows, large, nearly as long as the carpel, commissural 4–2, the 2 longer extending nearly to its base.—Distinguished from *H. rigens*, of which it may be a form, by the undivided leaves: it appears uniformly smaller, more naked upwards, the fruits shining scarcely narrowed at the base.

15. **H. rigens**, *Wall. Cat.* 575; lower leaves pinnate, pinnæ 3–5 rarely 7 orbicular villous beneath upper much reduced, bracts not prominent, fruit $\frac{1}{2}$ by $\frac{1}{4}$ in. obovate-elliptic. *DC. Prodr.* iv. 191; *W. & A. Prodr.* 373. ? *H. spengelium*, *Dalz. & Gibs. Bomb. Fl.* 108. *Pastinaca rigens*, *Wight Ic.* t. 1009.

Mts. of the DECCAN PENINSULA; *Heyne; Rottler; Nilghiris* and near Courtallum, *Wight*. CEYLON, *Walker, Thwaites* (No. 145 partly).

Near *H. Hookerianum*, but usually larger (2–3 ft.) with larger umbels. *Lower leaves* 3–12 in.; pinnæ 1–3 in. diam., obtuse, crenate not serrate. *Fruit* nearly as in *H. Hookerianum* but dull reddish-brown, often more elongate at the base, in which case the vittæ extend only $\frac{2}{3}$ the length of the carpel; commissural vittæ 2–6, usually 4.

VAR. Candolleana; lower leaves 2-pinnate, pinnæ lobed crenate or crenate-serrate. *Pastinaca Candolleana*, *W. & A. Prodr.* 372. *P. ligusticifolia*, *Wight Ill.* t. 116; *W. & A. Prodr.* 372.—Mts. of the Deccan Peninsula; plentiful.

16. **H. aquilegifolium**, *C. B. Clarke*; glabrous, lower leaves 3-partite or pinnate, pinnæ large ovate 3-lobed, fruit $\frac{1}{4}$ – $\frac{1}{2}$ in. orbicular or subelliptic, vittæ in the lateral furrows usually 2–3. *Heracleum* sp. 11, *Herb. Ind. Or. H. f. & T.*

CONCAN; tropical region, *Law, Stocks.*

Stem 2–3 ft. Pinnæ of the lower leaves 2–4 in. diam., denticulate: upper leaves often undivided, uppermost reduced to sheaths. *Umbels* often in a nearly naked raceme. *Bracts* 3–5, $\frac{1}{4}$ – $\frac{1}{2}$ in., lanceolate; rays 6–10, $1\frac{1}{2}$ – $2\frac{1}{2}$ in.; bracteoles

3-5, $\frac{1}{4}$ in., lanceolate or linear, sometimes obtuse. Dorsal ridges distinct, shortly excurrent, wing broad with a minute marginal vitta; dorsal vittæ produced nearly to the base; commissural 6-8.—Very near *H. rigens* var. *ligusticifolium* which has the leaves sometimes nearly glabrous, but the leaves are less serrate, and the vittæ are usually 2-3 in the lateral furrows.

17. **H. ceylanicum**, *Gardn. ms.*; lower leaves pinnate pinnæ deeply pinnatifid, lobes oblong hairy above villous beneath, fruit as in *H. rigens*. *H. Sprengelianum*, *Thwaites Enum.* 131, not of *W. & A.*

CEYLON; *Walker, Gardner, Wight, Thwaites* (No. 145 partly).

Pinnæ of the lower leaves 1-2 by $\frac{1}{4}$ - $\frac{1}{2}$ in., sharply closely serrate or crenate. Outer flowers of the umbel somewhat radiant, with lanceolate acute calyx-teeth. Fruit $\frac{1}{3}$ - $\frac{1}{2}$ by $\frac{1}{4}$ in., obovate, totally unlike that of *H. Sprengelianum* *W. & A.*, but altogether that of *H. rigens* from which this differs only in the cutting of the leaves, which is uniform in the numerous examples.

18. **H. Sprengelianum**, *W. & A. Prodr.* 372; lower leaves 1-2 pinnate hairy, pinnæ large ovate pinnatifid or lobed, fruit $\frac{1}{5}$ - $\frac{1}{4}$ by $\frac{1}{6}$ - $\frac{1}{5}$ in. elliptic narrowly winged. *Pastinaca Sprengeliana*, *Wight Ic.* t. 1008.

NILGHIRI MTS., *Wight, Gardner.*

Stem 2-4 ft. Lower leaves 8-16 in., ovate; secondary pinnæ often 4 by 3 in., lobed, crenate-serrate. Bracts usually 0; rays 6-16, 1-2 $\frac{1}{2}$ in., nearly glabrous; bracteoles 3-5, $\frac{1}{4}$ in., lanceolate, caducous; pedicels 8-16, in fruit $\frac{1}{2}$ in. Calyx-teeth obscure, in the radiant flowers small, ovate, obtuse. Dorsal and intermediate ridges obsolete; wing less than $\frac{1}{10}$ in. wide; vittæ often $\frac{3}{4}$ the length of the carpel, or more; commissural 2-4.—Easily distinguished from the foregoing species by the small fruit.

19. **H. concanense**, *Dalz. in Hook. Kew Journ.* ii.; 260; lower leaves 2-3-pinnate pubescent, fruit $\frac{1}{5}$ - $\frac{1}{4}$ by $\frac{1}{6}$ - $\frac{1}{5}$ in. elliptic not winged, primary ridges obtuse equally prominent. *Dalz. & Gibs. Bomb. Fl.* 107. *H. grandiflorum*, *Dalz. & Gibs. l. c.* 108.

CONCAN HILLS; *Dalzell, &c.*

Stem 2-4 ft., more or less hispid. Tertiary pinnæ of the lower leaves often 1-2 in., ovate, deeply 3-lobed, serrate; upper leaves much reduced, uppermost often to sheaths. Bracts 3-5, $\frac{1}{8}$ - $\frac{1}{6}$ in., oblong, obtuse, or 0; rays 5-10, 1-2 in.; bracteoles very variable, 5-7, lanceolate and longer than the umbellule, or small, linear. Calyx-teeth obscure, or small, oblong. Outer flowers usually radiant, large. Fruit exceedingly hard, much less dorsally compressed than in other species, ridges prominent; vittæ as long as the carpel, those of the lateral furrows usually 2, commissural 2-4.

VAR. ? *Stocksii*; dorsal and intermediate ridges (in the unripe fruit) slender lateral ridges excurrent into a narrow very thin ring. *Heracleum* sp. 10, *Herb. Ind. Or. H. f. & T.*—*Concan*; *Stocks*. Fruit the same size as in *H. concanense* type, and vittæ the same. This may be a new species; for the wing of the unripe fruit will almost certainly dilate and will then be unlike that of *H. concanense*.

20. **H. pedatum**, *Wight. Ic.* t. 342; cauline leaves pedately 5-7-foliate, leaflets lanceolate serrate hairy sometimes again lobed deeply.

DECCAN; *Shevagherry Hills, Wight.* BELGAUM; *Law.*

Stem 12 in., or more, remotely hirsute. Petioles 2-6 in.; leaflets 1-2 by $\frac{1}{2}$ - $\frac{3}{4}$ in. Bracts usually 1, $\frac{1}{3}$ in., linear-lanceolate; rays 5-6, 1-1 $\frac{1}{2}$ in.; bracteoles 0-5, $\frac{1}{8}$ - $\frac{1}{6}$ in., lanceolate; pedicels 8-12, $\frac{1}{8}$ in., in young fruit. Outer flowers of the umbel radiant; calyx-teeth linear, prominent; style-bases large conical. Fruit very immature in our specimen and in *Wight's* drawing.—The large style-bases and pedate leaves are not like *Heracleum*; the fruit promises to be like that of *Schultzia*.

21. **H. Pinda**, Dalz. & Gibs. *Bomb. Fl.* 107; clothed with long weak white flat hairs, lower leaves bipinnate, pinnæ cuneate coarsely toothed, vittæ 2 in the lateral furrows, commissure 2-vittate.

BOMBAY; On Hursur and Hurry-chunder hill forts, *Dalzell*.

Stem 1-1½ ft., erect, branched. *Leaves* mostly radical, long-petioled. *Bracts* 1-3, broad-ovate, acute, foliaceous; rays 6-8, unequal; bracteoles 3, like the bracts. *Flowers* white, exterior radiant.—Not seen: the foregoing copied from Dalzell, l. c.

34. **ZOSIMIA**, Hoffm.

A perennial herb, pubescent or hirsute. *Leaves* 2-4-pinnate, segments small. *Umbels* compound, rays numerous; bracts and bracteoles usually many, small. *Calyx-teeth* linear, somewhat prominent. *Petals* obovate, emarginate, white or yellowish, often unequal sometimes radiant. *Fruit* elliptic or orbicular, dorsally compressed, complanate; dorsal and intermediate ridges filiform or obscure, lateral hyaline, with a thick corky obtuse wing; furrows with solitary large vittæ; carpophore 2-partite. *Seed* 4-6 times broader than thick.

1. **Z. absinthifolia**, DC. *Prodr.* iv. 195; Boiss. *Fl. Orient.* ii. 1037. *Z. orientalis*, Hoffm. *Gen. Umb.* 148, t. 4. *Z. radians*, Boiss. & Hohen. in Boiss. l. c. 1037. *Heracleum absinthifolium*, Vent. *Choix* t. 7. *H. tomentosum*, Smith, not of Dalz.

SCINDE; *Stocks*. PUNJAB; base of Suleiman Mts., Edgeworth.—DISTRIB. Beloochistan and Cabul to S.E. Europe.

Stem 1-3 ft., pubescent or hirsute. *Leaves* 4-8 in., oblong-lanceolate, pubescent, ultimate segments ¼-½ in. narrowly lanceolate or linear. *Bracts* and bracteoles variable, usually 5, ¼-½ in., lanceolate; rays 6-16, 1-3 in., often stout; pedicels 8-20, ⅓-½ in. *Fruit* ⅓ by ¼ in., elliptic or somewhat obovate, variable in size and shape, pubescent till fully ripe.

34.* **CORIANDRUM**, Linn.

A herb, annual, branched, glabrous. *Leaves* decompound. *Umbels* compound, rays few; bracts 0, or small linear; bracteoles few, filiform. *Calyx-teeth* small, acute, often unequal. *Petals* obovate, emarginate, white or purplish, of the outer flowers unequal, often radiant. *Fruit* subglobose; ridges not prominent, dorsal primary and adjacent secondary strongest, lateral primary and secondary obscure; vittæ obscure, solitary, under the secondary ridges; carpels slightly concave on the inner face, commissure distinctly 2-vittate; carpophore 2-partite. *Seed* convexo-concave, about thrice as broad as thick.

1. **C. sativum**, Linn.; DC. *Prodr.* iv. 250; ultimate segments of the lower leaves ovate or lanceolate of the upper linear. *Roxb. Hort. Beng.* 21, *Fl. Ind.* ii. 94; *Wight Ill.* t. 117, fig. 9, *Ic.* t. 516; Boiss. *Fl. Orient.* ii. 920. *Cuminum Cyminum*, Wall. *Cat.* 594.

Throughout INDIA; cultivated.—DISTRIB. Widely cultivated.

34.** **CUMINUM**, Linn.

A slender, annual herb, glabrous except the fruit. *Leaves* twice or thrice 3-partite, ultimate segments filiform. *Umbels* compound, rays few; bracts and bracteoles several, linear, rigid. *Calyx-teeth* small, subulate, unequal.

Petals oblong or obovate, emarginate, white, often unequal. *Fruit* cylindric, tip narrowed; primary ridges filiform, distinct; secondary usually hispidulous; vittæ large, solitary under each secondary ridge; carpophore 2-partite or 2-fid. *Seed* somewhat dorsally compressed, convexo-concave.

1. **C. Gyminum**, Linn.; *DC. Prodr.* iv. 201; *Roxb. Hort. Beng.* 21, *Fl. Ind.* ii. 92; *Wall. Cat.* 7213; *Wight Ill.* t. 117, *fig.* 6; *W. & A. Prodr.* 372; *Boiss. Fl. Orient.* ii. 1080.

PUNJAB PLAIN, DECCAN, &c., cultivated.—DISTRIB. Widely cultivated.

35. **DAUCUS**, Linn.

Annual or biennial herbs, usually hispid. *Leaves* 2–4-pinnate, ultimate segments narrow or small. *Umbels* compound, rays usually many; bracts generally very many, pinnate; bracteoles many, 3-fid entire or 0. *Calyx-teeth* small, or obsolete. *Petals* obovate, emarginate, white, outer often radiant. *Fruit* elliptic, terete or somewhat dorsally compressed; ridges all prominent, all or secondary only bristly, lateral primary little developed, lateral secondary usually the widest almost in the plane of the commissure; vittæ solitary, under the secondary ridges; carpophore undivided or 2-fid. *Seed* $\frac{1}{2}$ -terete, dorsally subcompressed, inner face plane.—DISTRIB. Species 20, mostly Mediterranean and temperate Asiatic; 2 N. American, 1 Australian.

1. **D. Carota**, Linn.; *DC. Prodr.* iv. 211; hispid, leaves 2–3-pinnate, pinnæ pinnatifid segments narrow-lanceolate, outer rays connivent in fruit, bristles of the secondary ridges as broad as the fruit, of primary shorter or 0. *Roxb. Hort. Beng.* 21, *Fl. Ind.* ii. 90; *Wall. Cat.* 7214; *W. & A. Prodr.* 374; *Wight Ill.* t. 117, *fig.* 7; *Boiss. Fl. Orient.* ii. 1076.

KASHMIR and the WESTERN HIMALAYA, alt. 5000–9000 ft.; cultivated elsewhere in India.—DISTRIB. Of the genus.

Stem 1–4 (in the Himalaya often 6) ft. *Bracteoles* many, 3-fid and simple. *Fruit* $\frac{1}{10}$ in.; bristles on the secondary ridges glistening white, connate at the base only, of the primary ridges small or sessile, subglochidiate; carpophore undivided.—The carrot.

36. **CAUCALIS**, Linn.

Annual herbs, scabrid or hispid. *Leaves* 2–4-pinnate. *Umbels* compound, rays few (in Indian species); bracts 0, or linear, inconspicuous; bracteoles usually several, linear or oblong, membranous. *Calyx-teeth* small, acute, or obsolete. *Petals* obovate, emarginate, white or purplish, outer often radiant. *Fruit* elliptic or oblong, terete, subcompressed laterally, constricted at the commissure; primary and secondary ridges prominent or not, with 1 or 3 rows of bristles or tubercles; vittæ solitary, under the secondary ridges; carpophore undivided or 2-fid. *Seed* $\frac{1}{2}$ -terete, deeply grooved on the inner face.—DISTRIB. Species 18, principally in the temperate Old World.

1. **C. Anthriscus**, Scop.; *Don Prodr.* 183; bracts 1–5 $\frac{1}{2}$ – $\frac{1}{3}$ in. linear, fruit $\frac{1}{2}$ in., primary and secondary ridges equally bristly not prominent. *C. elata*, *Wall. Cat.* 564; *Don Prodr.* 183. *Tordylium Anthriscus*, Linn. *Torilis Anthriscus*, Gmel.; *DC. Prodr.* iv. 218; *W. & A. Prodr.* 374; *Boiss. Fl. Orient.* ii. 1081. *T. japonica* and *elata*, *DC. Prodr.* iv. 219, 220.

HIMALAYA, alt. 3000-9000 ft.; from KASHMIR to SIKKIM, frequent.—**DISTRIB.** N. Asia, Europe, N. Africa.

Addressedly hispid; 1-2 (in the Himalaya 5) ft. Secondary *pinne* 1 in., pinnatifid half-way down into lanceolate acute lobes. *Umbels* long-peduncled, rays 5-12; bracteoles linear, not white-margined. *Petals* purplish or white, not radiant. Bristles scattered over the whole surface of the *fruit*, rough, curved or almost hooked, not glochidiate.

2. **C. leptophylla**, Linn.; *DC. Prodr.* iv. 216; bracts 0, fruit $\frac{1}{2}$ - $\frac{1}{4}$ in., secondary ridges prominent, primary filiform minutely hispid, bristles in 1-3 rows. *Boiss. Fl. Orient.* ii. 1084.

KASHMIR, alt. 4000-6000 ft., *Jacquemont, Thomson.* **PUNJAB**; *Falconer.*—**DISTRIB.** W. Asia, S. Europe, N. Africa.

Resembling *C. Anthriscus*, but the leaves rather more finely cut, ultimate segments narrower, sometimes almost linear; fruit larger, bristles longer, shining, scarcely scabrous, subglochidiate. *Umbels* often lateral, peduncle 1-2 in., stout; rays usually 2-5.

3. **C. latifolia**, Linn. *Syst. Nat.* ii. 205; bracts and bracteoles small oblong white-membranous, fruit $\frac{1}{2}$ in., primary and secondary ridges equally prominent and aculeate. *Tordylium latifolium*, Linn. *Sp. Pl.* 345. *Turgenia latifolia*, Hoffm.; *DC. Prodr.* iv. 218; *Boiss. Fl. Orient.* ii. 1087.

KASHMIR; *Falconer*; alt. 5000-8000 ft., frequent, C. B. Clarke.

Hispid, almost prickly, 4-24 in., rigid, erect or divaricate. *Leaves* 1-2-pinnate, *pinne* often 1-2 in., oblong, serrate or pinnatifid half-way to the midrib. *Rays* 3-4, 1-3 in.; pedicels hardly $\frac{1}{4}$ as long as the fruit. *Carpels* with 7 subequally aculeate ridges, the two lateral primary ridges within the commissure less prominent; bristles stout, rough, curved or nearly straight at the apex, hardly glochidiate.

37. **PSAMMOGETON**, Edgw.

A small annual, pubescent or glabrous. *Leaves* 1-2-pinnate, *pinne* laciniate. *Umbels* compound; bracts and bracteoles many, small, lanceolate or linear, scarious. *Calyx-teeth* obsolete. *Petals* obovate, emarginate, white or purplish, not or but slightly radiant in the outer flowers. *Fruit* small, ovoid or lanceolate commissure slightly constricted; primary and secondary ridges hairy, elevated, scarcely winged, secondary rather the more prominent; vittæ solitary, under the secondary ridges; carpophore 2-fid. *Seed* somewhat dorsally compressed, inner face plane or scarcely concave.

1. **P. biternatum**, Edgw. in *Trans. Linn. Soc.* xx. 57; segments of the lower leaves ovate pinnatifid into narrow lobes of the upper narrowly cuneate lacinate, hairs on the ridges white capitellate 1-seriate scattered longer than the carpel is broad. *P. crinitum*, *Boiss. Fl. Orient.* ii. 1078. *Pimpinella crinitum*, *Boiss. in Ann. Sc. Nat.* 3rd ser. i. 131.

PUNJAB PLAIN, ascending the Himalaya to 3000 ft.; frequent. **SCINDE**.—**DISTRIB.** Beloochistan, Cabul, Persia.

Stem 2-8 in., divaricately branched, pubescent or grey subtomentose, not villous. *Peduncles* 1-3 in., stout, lateral and terminal. *Bracts* 3-8, $\frac{1}{4}$ - $\frac{1}{2}$ in., narrowly lanceolate or linear; rays 5-10, $\frac{1}{2}$ -1 in.; bracteoles 4-8, $\frac{1}{4}$ in., lanceolate, sheathing the young umbellule; pedicels 6-16, $\frac{1}{4}$ in. *Fruit* scarcely $\frac{1}{4}$ in., lanceolate, thinly hairy in the Indian plants; styles very long.

VAR.? *villosa*; much taller with patent soft hairs, ridges of the fruit with several dense rows of often brown hairs.—Scinde, *Stocks*: a frequent form in Beloochistan

and Cabul.—Very unlike the type, but there are intermediate forms. Probably *P. brevisetum* and *setifolium*, Boiss. *Fl. Orient.* ii. 1079, are other varieties

DOUBTFUL UMBELLIFERÆ.

SISON TRINERVE, *Ham. in Don Prodr.* 184; *DC. Prodr.* iv. 111.

ATHAMANTHA GIGANTEA, *Don Prodr.* 184; *DC. Prodr.* iv. 156.

ATHAMANTHA TERES, *Don Prodr.* 185; *DC. Prodr.* iv. 156.

LIGUSTICUM ? NEPALENÆ, *Don Prodr.* 125; *DC. Prodr.* iv. 159. (An *Hymenolæna*? *DC. l. c.*)

ORDER LXXI. **ARALIACEÆ.** (By C. B. Clarke.)

Trees or shrubs, very rarely herbs, sometimes scandent or scandent when young and finally self-supporting, not rarely prickly. *Leaves* alternate, the uppermost rarely sub-opposite, long-petioled, large, simple or compound; stipules adnate to the petiole, sometimes inconspicuous or 0. *Flowers* regular, small, sometimes polygamous, in umbels racemes or paniced heads; bracts and bracteoles small or conspicuous; pedicels continuous with the base of the calyx or there jointed. *Calyx-tube* adnate to the ovary; limb truncate, obsolete or with small teeth. *Petals* 5 rarely 6-7 or many, valvate or sub-imbricate, expanding or deciduous in a cap. *Stamens* as many as and alternate with the petals (very many in *Tupidanthus*), inserted round an epigynous disc. *Ovary* inferior, 2-celled, or cells as many as the stamens (in *Arthrophyllum* 1-celled); styles as many as the cells, distinct or united; ovules solitary and pendulous in each cell. *Fruit* coriaceous or drupaceous usually small, one or more cells sometimes suppressed. *Seed* pendulous, albumen uniform or ruminated; embryo minute, radicle next the hilum.—DISTRIB. Species 340, chiefly tropical and subtropical, a few in the cool temperate zones.

SECT. I. **Araliæ.** *Petals* imbricated (but only lightly). *Pedicels* jointed.

Styles 2-5, free. Leaves compound	1. ARALIA,
Styles 5, combined	2. PENTAPANAX.
Styles 4-3, free. Leaves pinnatifid	3. ARALIDIUM.

SECT. II. **Panaceæ.** *Petals* valvate. *Albumen* uniform.

* *Ovary* 2-celled.

Pedicels jointed. Leaves decompose	3.*PANAX.
Pedicels continuous. Leaves digitate	4. ACANTHOPANAX.

** *Ovary* 4-10-celled.

† *Umbels sessile on the back of the leaf.*

Leaves simple	5. HELWINGIA.
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†† *Pedicels jointed.*

Leaves once pinnate	6. POLYSCIAS.
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††† *Pedicels continuous. Leaves not pinnate.*

Fruit angular the size of a pea	7. HEPTAPLEURUM.
Fruit more than $\frac{1}{2}$ in. long	8. TREVESIA.
Flower sessile embraced by 4 bracteoles	9. BRASSAIA.
Leaves simple (except the lowermost)	10. DENDROPANAX.

SECT. III. **Hedereæ.** *Petals* valvate. *Albumen* ruminated.

* *Ovary* 1-celled.

Leaves pinnate or undivided 11. ARTHROPHYLLUM.

** *Ovary* 2-celled.

Pedicels continuous. Styles distinct 12. HETEROPANAX.

Pedicels continuous. Styles combined 13. BRASSAIOPSIS.

Pedicels jointed. Styles combined 14. MACROPANAX.

*** *Ovary* 5-4-celled; styles combined.

† *Leaves* simple lobed or pinnate.

Pedicels continuous 15. HEDERA.

Pedicels jointed 16. HEDEROPSIS.

†† *Leaves* digitate.

Tree. Leaflets ciliate 17. GAMBLEA.

SECT. IV. **Plerandreeæ.** *Petals* valvate. *Stamens* 20-50.

Petals united, falling off in a cap 18. TUPIDANTHUS.

1. **ARALIA**, Linn.

Herbs shrubs or small trees, glabrous hairy or prickly. *Leaves* alternate or whorled, digitate pinnate or compound-pinnate; leaflets serrate or nearly entire; stipules not prominent. *Umbels* solitary or in racemes or panicles rarely in compound umbels; pedicels jointed close under the flower or not. *Flowers* often polygamo-monoecious. *Calyx* margin truncate or 5-toothed. *Petals* 5, ovate, imbricate in bud. *Stamens* 5. *Ovary* 2-5-celled; styles 2-5, free or shortly connate at base (at least in the seed-producing flowers). *Fruit* 4-5-celled 4-5-angular, or subglobose 2-3-celled. *Albumen* uniform.—DISTRIB. Species 30; extending from India and Malaya to Japan and North America.

SECT. I. **Ginseng.** Herbs 1-2 feet with a whorl of digitate leaves. *Styles* 2-3. *Fruit* red or red and black, shining, globose, subdidymous.

1. **A. Pseudo-ginseng**, Benth. in *Gen. Pl.* i. 936; leaflets lanceolate with scattered bristles especially on the upper surface. *Panax Pseudo-ginseng*, Wall. *Pl. As. Rar.* t. 137, Cat. 3730; C. A. Mey. in *Gaug. Repert. Pharm. & Chem.* 1842, p. 525, with fig.; *Seem. Rev. Heder.* 99.

NIPAL, SIKKIM, and BHOTAN, alt. 6000-12,000 ft., frequent. KHASIA Mts., alt. 5000 ft.; *H. f. & T.*

Rootstock horizontal, tuberous or tuberiferous. *Stem* 6-15 in., erect, smooth, terminated by a whorl of leaves; the scale at its base deciduous or persistent. *Leaflets* 5 rarely 3, 2-6 by $\frac{1}{2}$ -1 $\frac{1}{4}$ in., acuminate often caudate, rounded or tapering at the base, closely serrate or deeply doubly serrate, glabrous except the scattered bristles; petiole 1-6 in., glabrous; petiolules 0-1 in. *Peduncles* shorter or longer than the leaves, glabrous or nearly so, solitary or 2-4, simple or with 2-5 umbellate heads; pedicels $\frac{1}{4}$ -1 in., pubescent or puberulous; bracteoles $\frac{1}{4}$ in., narrow lanceolate-linear. *Flowers* polygamo-monoecious; styles in the male flowers sometimes united nearly to their summit. *Fruit* red, or half-black half-red.

Doubtfully separable from the true Ginseng of Japan, *Panax Ginseng*, C. A. Mey. l. c. 524, which differs by having broader, more obovate, less bristly leaves, and not by the characters relied on by C. A. Meyer. The Indian examples show every

form of rootstock and tuber attributed specially to *P. Ginseng* and to *P. quinquefolius*, Linn.: the scale at the base of the stem is persistent even in some of Wallich's specimens.

2. **A. bipinnatifida**, C. B. Clarke; leaflets pinnatifid the lobes serrate or bipinnatifid pilose above. *Panax bipinnatifidum*, Seem. Rev. Heder. 100.

SIKKIM HIMALAYA, alt. 8500–11,500 ft.; J. D. H.; C. B. Clarke.

Generally resembles *A. Pseudo-ginseng*, and perhaps not distinct. Leaflets petioluled or sessile, lanceolate acuminate or caudate. Rootstock horizontal, quite like that of some examples of *A. Pseudo-ginseng*, and doubtless, like it, produces tubers not rarely.

SECT. II. Shrubs, erect or scandent, or small trees. Leaves digitate. Styles 5 (or 4). Fruit carpels 5–4, ridged on the back.

3. **A. cissifolia**, Griff.; Seem. Rev. Heder. 91; leaflets 5 rarely 3 lanceolate narrowed at each end, a tuft of fulvous hairs or spines often at the apex of the petiole, umbels simple.—*Araliad* sp. 4, Herb. Ind. Or., H. f. & T.

TEMPERATE HIMALAYA; Kumaon, Sikkim, and Bhotan.

A shrub 10 ft. or erect small tree, branches with short strong deflexed prickles which are sometimes clustered at the nodes. Petioles 5 in., glabrous or pubescent, often with scattered prickles; stipules large, ovate, often deciduous; leaflets 2–3 in., lanceolate, acuminate, pilose above; petiolule 0– $\frac{1}{2}$ in. Peduncles 2–5 in., solitary, pubescent upwards, carrying each one many-flowered umbel; bracteoles among the pedicels few, linear, small. Fruit glabrous.

VAR. 1. *normalis*; a small tree, branchlets and leaves prickly, leaflets fulvous-pubescent beneath doubly serrate, pedicels pubescent. Sikkim; alt. 9000–13,000 ft., Lachen, J. D. H. Bhotan; Griffith (Kew Distrib. No. 2669).

VAR. 2. *scandens*, Edgew. in Herb.; scandent (?) without spines, glabrous, leaflets simply serrate. Kumaon; alt. 9000 ft., Madhari Pass, Strachey & Winterbottom.

SECT. III. **Eu-Aralia**. Erect lax shrubs. Leaves 1–3-pinnate. Styles 5 (or 4). Fruit carpels 5–4, ridged on the back.

4. **A. cachemirica**, Dene. in Jacq. Voy. Bot. 72, t. 81; unarmed no leaflets at the points of division of the leaf-rachis, leaflets elliptic shortly acuminate base often rounded minutely fulvo-pubescent on the nerves above. Seem. Rev. Heder. 91; Brand. For. Fl. 248. *A. macrophylla*, Lindl. in Bot. Reg. 1844, Misc. 73. *Panax tripinnatum*, Wall. Cat. 4934; G. Don Gen. Syst. iii. 384. *P. decompositum*, Wall. Cat. 4935; DC. Prod. iv. 255.—*Araliad* sp. 43, Herb. Ind. Or., H. f. & T.

TEMPERATE HIMALAYA; from SIKKIM, alt. 7000–8000 ft., to KASHMIR, alt. 9000–12,000 ft.; frequent.

A lax shrub, 5–10 ft. Leaves 1–3-pinnate, ultimate pinna with 5–9 leaflets, petiolules 0– $\frac{1}{4}$ in.; leaflets 3 $\frac{1}{2}$ by 1 $\frac{1}{2}$ in., often cordate at base, usually simply regularly serrate, pilose above, glabrous or hispid on the nerves beneath. Umbels in elongate panicles a foot long, but many smaller panicles occur; bracts $\frac{1}{2}$ in., few, lanceolate, or sometimes leaf-like 1 $\frac{1}{2}$ in.; panicle-branches and pedicels pubescent.

5. **A. malabarica**, Bedd. Fl. Sylv. ii. 121, and Anal. Gen. t. 15; aculeate, panicle-branches and pedicels glabrous or sparingly bristly, bracts $\frac{1}{2}$ in. narrow lanceolate acute ciliate.

WESTERN GHATS, from MALABAR to TRAVANCORE: common on the Carcoor Ghat in Wynaad; Beddome.

A large shrub, nearly glabrous, with scattered weak prickles and bristles. Leaves

2-3 ft., 2-pinnate with a pair of leaflets at each division of the rachis; petiolules $0\frac{1}{2}$ in.; leaflets 3-5 $\frac{1}{2}$ by 1-1 $\frac{1}{4}$ in., 5-9 to each pinna, simply or doubly serrate, ciliate, acuminate, narrowed ovate or cordate (*Beddome*) at the base, when young weakly aculeate, when older nearly glabrous on both surfaces. *Umbels* in a compound spreading panicle, at least 8 in. *Fruit* slightly 10-ribbed (*Beddome*).

6. **A. Thomsonii**, *Seem. Rev. Heder.* 91; prickles short strong, stem upwards fulvous villous and woolly, pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in.—*Araliad* sp. 42, *Herb. Ind. Or.*, *H. f. & T.*

ASSAM; in the plains, *Jenkins*. KHASIA Mts., alt. 2000-4000 ft.; *H. f. & T.*; *C. B. Clarke*.

A large prickly shrub, all parts softly villous. *Leaves* large, 2-3-pinnate, with a pair of leaflets at each division of the rachis, petiolules $0\frac{1}{2}$ in.; leaflets 3-4 by 1 $\frac{1}{2}$ in., 5-9 to each ultimate pinnule, elliptic, acuminate, base broad, sparingly often very obscurely serrate. *Panicles* 1 $\frac{1}{2}$ ft., compound; bracts $\frac{1}{2}$ in., narrow-lanceolate.—Resembles *A. chinensis*, Linn., and *A. montana*, Blume, but differs from both in its long-pedicelled flowers. It is much more hairy than the other Indian *Aralias*.

7. **A. foliolosa**, *Seem. Rev. Heder.* 91; very prickly, leaflets glabrous beneath or sparingly bristly on the nerves, bracts narrow-oblong somewhat obtuse persistent, pedicels glabrous or nearly so. *Panax* (?) *foliolosum*, *Wall. Cat.* 4928.—*Araliad* sp. 44, *Herb. Ind. Or.*, *H. f. & T.*

SIKKIM, alt. 5000 ft., *J. D. H.*; BHOTAN, *Griffith*. KHASIA Mts., *Griffith* (*Kew Distrib. No.* 2659); alt. 3000-4000 ft.; *H. f. & T.*

A large lax shrub, glabrous or nearly so; prickles short strong spreading. *Leaves* large, 2-3-pinnate, with a pair of leaflets at each division of the rachis; petiolules $0\frac{1}{2}$ in.; leaflets 2-3 by 1-1 $\frac{1}{4}$ in., 5-9 to each ultimate pinnule, elliptic, acuminate, usually rounded at the base, sparingly serrate, glabrous or minutely pilose above, pilose on the nerves beneath. *Panicle* 1 ft., compound; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in.

VAR. *sikkimensis*; leaflets more slender more serrate, at their base are often needle-like spines $\frac{1}{2}$ - $\frac{3}{4}$ in., panicle very large.—Sikkim, alt. 2000-6000 ft.; *J. D. H.*, *N. Gamble*, *C. B. Clarke*.

8. **A. armata**, *Seem. Rev. Heder.* 91; prickly, upper part of stem and petioles glabrous, leaflets pilose on both surfaces, upper part of panicle and pedicels pubescent, bracts 0 or caducous. *Kurz For. Fl.* i. 536. *Panax armatum*, *Wall. Cat.* 4933; *G. Don Gen. Syst.* iii. 386.—*Araliad* sp. 45, *Herb. Ind. Or.*, *H. f. & T.*

SIKKIM, alt. 2000-6000 ft., frequent. KHASIA Mts., alt. 2000-4000 ft.; *H. f. & T.* TENASSERIM; *Kurz*. TAVOY; *Wallich*.

A shrub. *Leaves* very large, usually 3-pinnate, with a pair of leaflets at each division of the leaf-rachis; petiolules $\frac{1}{2}$ in.; leaflets $4\frac{1}{2}$ by 2 in., 5-9 to each ultimate pinnule, acuminate, round or cordate at the base, distinctly serrate. *Panicle* often 1 $\frac{1}{2}$ ft., the lower part of the rachis glabrous; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in.—*Panax Finlaysonianum*, *Wall. Cat.* 4933, from Turong Bay, Cochin China, hardly differs from this except that the leaflets have soft brownish-red hairs on the lower surface instead of bristly hairs.

2. PENTAPANAX, *Seem.*

Trees or large scandent shrubs. *Leaves* simply pinnate with 5-9 leaflets, or digitate with 3-5 leaflets glabrous; leaflets entire crenate or serrate. *Flowers* hermaphrodite or polygamous, in compound racemes or umbelled, pedicels jointed close under the flowers. *Calyx*-teeth 5. *Petals* 5, imbricated in bud.

Stamens 5. *Ovary* 5- (or 4-) celled; styles 5-4, combined to the summit or free for more than half their length. *Fruit* 5-4-celled and angled. *Albumen* uniform.—*DISTRIB.* Species 5, confined to continental India.

* *Flowers in panicked racemes.*

1. ***P. racemosum***, *Seem. Rev. Heder.* 21; panicles unisexual elongate oblong with racemes diverging from the rachis divaricately to its summit, styles in the perfect flowers half- or more- free recurved.—*Araliad* sp. 41, *Herb. Ind. Or., H. f. & T.*

SIKKIM; alt. 6000-8000 ft.; *H. f. & T.*; *Gamble*; *C. B. Clarke*.

A tree 60 ft. (*ex H. f. & T.*), or a large climber (*ex Gamble*). *Leaflets* 4-9 by 2½-5½ in., usually 5-7, elliptic, acuminate, often rounded or cordate at the base, sinuate-denticulate; petiolules often ½-¾ in. *Panicles* glabrous or villous, often 1 ft. by 4-6 in., 3-9 clustered at the ends of the branchlets; branches 2-3½ in., racemed, flowering from their base; pedicels 0-½ in., with a minute linear bract at their bases. *Styles* in the male flowers combined nearly to their summit, in the perfect flowers 3-5, recurved free sometimes almost to the base. *Fruit* (not ripe) small, subglobose; probably less angular and elongate than that of *P. Leschenaultii*; disc not elongate-conical.

2. ***P. subcordatum***, *Seem. Rev. Heder.* 22; panicle ovate acuminate, racemes ascending, rachis unbranched upwards, styles combined nearly to their summits. *Hedera subcordata*, *Wall. Cat.* 4917; *G. Don Gen. Syst.* iii. 394.—*Araliad* sp. 41, *Herb. Ind. Or., H. f. & T. partly.*

• KHASIA MTS., alt. 4000-6000 ft.; *Wallich, Griffith, &c.*, not rare.

A small tree. *Leaflets* 3½-4½ by 2 in., usually 3-5, elliptic, acuminate, often rounded or cordate at the base, sinuate-crenate; petiolules often ¼-⅓ in. *Panicles* 8 in., with 3-8 racemed branches ascending from its lower half; panicle-branches 2-4 in., glabrous racemed flowering from their base; pedicels often ¼ in. (rarely 0-⅛ in.), with a minute linear bract at their bases. *Flowers* appear all perfect. *Fruit* (nearly ripe) small, subglobose, obscurely 5-angled, disc not elongate-conical.

** *Flowers umbelled, umbels simply panicked.*

3. ***P. parasiticum***, *Seem. Rev. Heder.* 22; leaflets 5 lanceolate entire glaucous beneath. *Brand. For. Fl.* 248. *Hedera parasitica*, *Don Prodr.* 188; *DC. Prodr.* iv. 265. *H. glauca*, *Wall. Cat.* 4921; *G. Don Gen. Syst.* iii. 394. *Aralia parasitica*. *Ham. MS.*

NIPAL; *Hamilton*. KUMAON; *Wallich, Royle*. Binsar, alt. 7,600 ft., *Strachey & Winterbottom*.

Scandent, glabrous. *Leaflets* 2¾ by 1¼ in. (or smaller), scarcely acuminate, base rounded or subacute; petiolules 0-⅛ in. *Panicles* 3-4 in., simple with 2-8 umbels; pedicels ½-¾ in., glabrous. *Styles* long, combined to near the top. *Fruit* (not ripe) small, subglobose, obscurely 5-angled; disc not elongate-conical.

VAR. 1. *khasiana*; pedicels and rachis of panicle pubescent.—Khasia Mts.; Myrung, alt. 5000 ft., *Griffith* (*Kew Distrib.* No. 2680), *Simons*.

4. ***P. Leschenaultii***, *Seem. Rev. Heder.* 22 partly; leaflets 3-5 elliptic-acuminate bristle-serrate, fruit ovoid not very angular, disc not elongate-conical. *Bedd. Fl. Sylv. Anal. Gen.* t. 15. *Panax Leschenaultii*, *DC. Prodr.* iv. 254. *P. micranthum*, *Wall. Cat.* 4938; *Excl. A.* *Hedera Leschenaultii* and *H. trifoliata*, *W. & A. Prodr.* 377; *Wight Ic.* t. 307.—*Araliad* sp. 39, *Herb. Ind. Or., H. f. & T.*

SIKKIM, alt. 6000-1000 ft.; *J. D. H.* SOUTH DECCAN and CEYLON in the mountains. BURMA, Taong-dong; *Wallich*.

A tree 30–50 ft., or scandent shrub. *Leaflets* $3\frac{1}{2}$ by $2\frac{1}{4}$ in., 3 (or 5 in Wight's No. 1204), base rounded or cordate; petiolules often $\frac{1}{4}$ – $\frac{3}{8}$ in. *Panicles* 3–6 in., with 3–6 heads; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., glabrous or puberulo-pubescent. *Styles* combined nearly to their summits. *Fruit* $\frac{1}{2}$ in. long and broad subcampanulate; ribs not prominent.

The typical form of the fruit in the Nilgherries, accurately described and figured by Wight and Beddome, differs from the Himalayan, but the large series of examples bridges over the gap completely.

VAR. umbellatum, Seem. Rev. Heder. 22 (sp.); fruit oblong strongly-ribbed, disc often elongate-conical, pedicels glabrous or pubescent. *P. Leschenaultii*, Seem. Rev. Heder. 22, partly; *Brand. For. Fl.* 248. *Hedera fragrans*, *Don Prodr.* 187, not of Roxb. *Panax bijugum*, *Wall. Cat.* 4937; *C. Don Gen. Syst.* iii. 386, &c.—Temperate Himalaya from Kumaon to Bhotan, alt. 4000–10,000 ft.; common. Khasia Mts., alt. 3000–5000 ft.—Resembles the type except in the fruit: the pedicels are either glabrous, or more or less pubescent. Seemann has marked as *P. Leschenaultii* examples with pubescent pedicels.

3. **ARALIDIUM**, Miq.

Leaves large, simply pinnatifid, glabrous. *Panicles* male or hermaphrodite, males much larger and more compound; pedicels jointed close under the flowers; flowers small. *Calyx-teeth* 5, triangular. *Petals* 5, imbricate. *Stamens* 5. *Ovary* 4–3-celled; styles 4–3, separate, linear-cylindric, stigmatose on all sides. *Fruit* 1-seeded.—*DISTRIB.* Species 2, Malayan.

1. **A. pinnatifidum**, Miq. *Fl. Ind. Bat.* i. 763, t. 13; leaves 12–18 in. lobed nearly (sometimes quite) to the rachis, panicles upwards and flowers tawny-pubescent.

MALACCA: Griffith (Kew Distrib. No. 2702); Maingay No. 676.

Lobes of the *leaves* 4–6 by 1–2 in., oblong-lanceolate. *Male panicles* 15 by 12 in., compound, with innumerable minute pubescent flowers. *Petals* pubescent. *Young ovary* with 1 pendulous ovule in each cell. *Fruit* (unripe) $\frac{1}{4}$ in. long.—Maingay notes “Drupes 1-seeded, cotyledons crumpled leafy.” The albumen in the imperfectly ripe seeds seems much ruminated. The seeds of the closely allied *A. dentatum* are 1 in. long.

3.* **PANAX**, Linn.

Shrubs or trees. *Leaves* pinnate or digitate rarely undivided; leaflets entire or serrate. *Umbels* paniced (in Indian species), pedicels jointed close under the flowers. *Flowers* often polygamous. *Calyx-limb* 5-toothed or nearly entire. *Petals* 5, valvate. *Stamens* 5. *Ovary* 2- (rarely 3-) celled; styles 2 (rarely 3), distinct. *Fruit* subcompressed or globose, 2- (rarely 3-) seeded, carpels rounded on the back.—*DISTRIB.* Species 25, Polynesian, Australian, and Malayan, extending to Manchuria and Tropical Africa.

1. **P. fruticosum**, Linn.; *DC. Prodr.* iv. 254; leaves tripinnate, leaflets lanceolate bristle-serrate, fruit compressed laterally. *Blume Bijl.* 880; *Roxb. Hort. Beng.* 21, *Fl. Ind.* ii. 76; *Wall. Cat.* 4932; *W. & A. Prodr.* 376; *Wight Ic.* t. 573; *Kurz For. Fl.* i. 537. *Nothopanax fruticosum*, Miq. *Fl. Ind. Bat.* i. pt. i. 765; *Seem. Rev. Heder.* 70.—*Rumph. Amb.* iv. t. 33.

Throughout the warmer parts of INDIA, cultivated.—*DISTRIB.* Malaya and Polynesia, cultivated; wild state unknown.

A shrub, 3–6 ft. *Leaflets* 2–3 by $\frac{1}{4}$ – $\frac{1}{2}$ in., but varying greatly in size and often irregular in shape, usually much setose-serrate or incised, sometimes nearly entire. *Panicles* 3–6 in.; bracts minute, deciduous; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. *Fruit* $\frac{1}{2}$ in. long and broad and $\frac{1}{16}$ in. thick; styles persistent recurved.

4. **ACANTHOPANAX**, Dcne. & Planch.

Shrubs or small trees, glabrous (or in non-Indian species tomentose). *Leaves* palmate or digitate (in Indian species). *Umbels* paniced or subsolitary; pedicels not jointed under the flower. *Flowers* polygamous or hermaphrodite. *Calyx-teeth* 5, small. *Petals* 5-4, valvate. *Stamens* 5-4. *Ovary* 2- (rarely 3-4) celled; styles 2 at the apex of a conical disc, distinct or combined at the base. *Fruit* laterally subcompressed or subglobose. *Albumen* uniform.—**DISTRIB.** Species 6; Japan to Malaya, and E. Bengal.

1. ***A. aculeatum***, Seem. *Rev. Heder.* 86; glabrous, prickly, leaves digitate, leaflets 3-5 elliptic attenuate at base toothed, umbels in small panicles or solitary, fruit compressed. *A. sepium*, Seem. *Rev. Heder.* 86. *Panax aculeatum*, Ait. *Hort. Kew*, v. 482; Jacq. *Ic. Rar.* t. 634; Wall. *Cat.* 4926; DC. *Prodr.* iv. 252. *P. Loureiranum*, DC. *l.c.* *Plectronia chinensis*, Lour. *Fl. Cochinch.* 162. *Xanthoxylon trifoliatum*, Linn. *Sp. Pl.* 1455.—*Araliad* sp. 5, *Herb. Ind. Or.*, *H. f. & T.*

MISHMEE; Griffith (Kew Distrib. No. 2665). KHASIA MTS., alt. 4000 ft., frequent.—**DISTRIB.** China, Japan.

A shrub or small tree; branches angular; spines short, broad-based, stout, often deflexed. *Leaves* of 3-5 leaflets; petiole 1-2 in., often bearing one or more prickles; leaflets 2 by $\frac{3}{4}$ -1 in., subacute, denticulate or serrate, sometimes with a few stiff bristles on the nerves beneath; petiolules usually distinct, $\frac{1}{4}$ - $\frac{1}{2}$ in. *Umbels* often solitary; pedicels numerous, $\frac{3}{4}$ -1 in. *Fruit* $\frac{1}{2}$ in. long and broad; styles persistent, recurved, united for half their length.—Seemann has marked some of the Kew examples *A. sepium*, others *A. aculeatum*, between which no difference can be discovered, and his diagnosis of *A. sepium* applies to the examples he has marked *A. aculeatum*. It is very doubtful whether *Panax spinosum*, Linn. f. (*Acanthopanax*, Miq.), specifically differs: the leaflets in this seem quite sessile and the prickles are less deflexed.

5. **HELWINGIA**, Willd.

Glabrous under-shrubs. *Leaves* petioled, simple, lanceolate or ovate-lanceolate, bristle-serrate; stipules a tuft of linear bristles seen only at the base of the young petioles. *Umbels* unisexual, simple, very small, sessile about the middle of the back of the leaf, or on phyllodes; females 1-4-flowered; males with more flowers; bracts 0, pedicels not jointed under the flower. *Calyx-margin* obsolete. *Petals* 3-5, valvate. *Stamens* 3-5. *Ovary* 3-4-celled; styles 3-4, combined at base, rising from a conical disc. *Fruit* ovoid or ellipsoid, usually 2-3-celled; carpels rounded on the back. *Seed* compressed; albumen uniform.—**DISTRIB.** Species 2, an Indian and a Japanese.

1. ***H. himalaica***, Hk. f. & T. ms.; leaves lanceolate, fruit $\frac{1}{4}$ in. ellipsoid.

SIKKIM, alt. 7000-9000 ft., frequent. EAST HIMALAYA; Griffith. KHASIA MTS., alt. 5000-6500 ft., *H. f. & T.*

Stem woody, branched. *Leaves* 3 by 1 in., tapering at both ends; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Phyllodes* when present spatulate-oblong, sessile, $1\frac{1}{2}$ in., entire below bristle-serrate near the apex, midrib strong, the wing membranous imperfectly herbaceous. *Flowers* $\frac{1}{20}$ in. diam., greenish. *Fruit* 1-3 on the leaf; pedicels hardly $\frac{1}{2}$ in. *Seeds* narrowly-oblong, compressed, more than twice as long as broad.—This hardly differs from *H. rusciflora*, Willd., which has elliptic (rather than lanceolate) leaves, the fruit shorter subglobose, the seeds less than twice the length of their breadth.

EXCLUDED SPECIES.

Helwingia populifolia, *Spreng. Pugillus* ii. 89, said to be from Bengal, does not belong to the genus.

6. **POLYSCIAS**, *Forst.*

Glabrous trees or large shrubs. *Leaves* pinnate, leaflets coriaceous entire. *Umbels* paniced (in Indian species); bracts $\frac{1}{2}$ in., lanceolate or 0; pedicels jointed under the flower. *Calyx-margin* truncate or toothed. *Petals* 5-4 (in Indian species), valvate. *Ovary* 5-4-celled (in Indian species), summit flat; styles 5-4, distinct. *Fruit* ellipsoid or globose, prominently ribbed. *Seed* compressed; albumen uniform.—**DISTRIB.** Species 8; E. African Islands, S. India, and Malaya.

1. **P. acuminata**, *Seem. Rev. Heder.* 56; leaflets 5-13 oblong much acuminate, panicle narrowly oblong simple, branches short ending in an imperfect umbel. *Bedd. Fl. Sylv.* t. 213, *excl. syn.* *Hedera acuminata*, *Wight Ic.* t. 1062; *Thwaites Enum.* 181, *excl. syn.* *Eupteron acuminatum*, *Miq. Fl. Ind. Bat.* i. pt. i. 762.

DECCAN MTS., alt. 5000 ft.; NILGHIRIS; *Wight.* ANAMALLAYS and TINNEVELLY GHATS; *Beddome.* CEYLON, Adams Peak, alt. 4000-5000 ft.; *Thwaites.*

A tree. *Leaflets* 5 by $1\frac{3}{4}$ in., attenuated at both ends, margin thickened, petiole $\frac{1}{4}$ in. *Panicle* 8-10 by 1-3 in., branches stout, umbel at the end of each subcapitate the pedicels not rising from the same point and being sometimes again divided so that the panicle may be called compound, but the umbels altogether are not above 1 in. diam.; bracts caducous. *Ovary* truncate, ellipsoid, soon becoming distinctly ribbed. *Ripe fruit* not seen. [The Andaman leaves distributed by Mr. Kurz as *Eupteron* sp. nov.? *Andaman Rep. Suppl.* B. 9 appear to be *Arthrophyllum diversifolium*, *Blume.*]

2. **P. pinnata**, *Forst. Char. Gen.* p. 64, t. 32; leaflets orbicular subentire or with small remote teeth base cordate. *DC. Prodr.* iv. 257; *Seem. Rev. Heder.* 56. *Panax*? *Heyneanum*, *Wall. Cat.* 4927; *G. Don Gen. Syst.* iii. 385. *Nothopanax tricochleatum*, *Miq. Fl. Ind. Bat. Suppl.* 340. *Aralia latifolia*, *W. & A. Prodr.* 376.

INDIA? *Wight* No. 1213.—**DISTRIB.** Malaya, Polynesia.

This plant is noticed here because taken up in *W. & A. Prodr.* and because Dr. Seeman supposed it might be a new genus. *Wight's* Herbarium specimen is without locality, there is therefore small probability that the plant is Indian.

7. **HEPTAPLEURUM**, *Gaertn.*

Large shrubs or trees, glabrous or tomentose, without prickles. *Leaves* digitate rarely compound-digitate or 1-foliolate; leaflets coriaceous, entire or remotely toothed or lobed, never closely serrate nor ciliate, those near the panicle usually entire; stipules often connate within the petiole and prominent. *Umbels* (rarely capitate) paniced or in compound racemes; bracts woolly, deciduous or persistent; pedicels not jointed under the flower; bracteoles few or 0, or rarely densely tufted. *Calyx-margin* toothed or truncate. *Petals* 5-8 or many, valvate. *Stamens* as many as the petals. *Ovary* cells as many as the petals, disc small or large; styles small, separate or combined in a short conical narrow cylindric column. *Fruit* subglobose, 5-6-angled. *Seeds* compressed; albumen uniform.—**DISTRIB.** Species 50, in the tropics of the old world.

SUBGEN. I. **Agalma**. *Stigmas* connate into a narrow cylindric style.

† *Umbels* perfect, *pedicels* not racemed.

1. **H. impressum**, C. B. Clarke; leaflets (from leaves near the panicle) lanceolate nearly entire nerves impressed above stellately woolly beneath, petals sparingly stellate-woolly. *Agalma tomentosum*, *Seem. Rev. Heder.* 25. *Hedera tomentosa*, *Ham. in Don Prodr.* 187; *Wall. Cat.* 4922; *DC. Prodr.* iv. 264. *Panax tomentosum*, *DC. Prodr.* iv. 254.—*Araliad* sp. 13, *Herb. Ind. Or. H. f. & T.*

Temperate Himalaya, alt. 6000–11,000 ft.; from KUMAON to BHOTAN, frequent.

A tree, 60 ft. *Leaflets* often 10 by $2\frac{1}{4}$ in., rugose above from the impressed nerves, lanceolate or oblanceolate, acuminate; petiolules rarely more than 1 in.; leaflets from young trees often distantly lobed or serrate. *Panicle* 12–15 in., stellate-tomentose; bracts very shortly ovate, somewhat persistent; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in.—Seeman has applied the name *H. tomentosum* to a different Malayan plant: hence the new name *H. impressum*.

2. **H. hypoleucum**, *Kurz For. Fl.* i. 539; leaflets with scattered lax stellate wool or glaucous beneath glabrous and not rugose above, petals covered with dense stellate wool.—*Araliad* sp. 15, *Herb. Ind. Or. H. f. & T.*

KHASIA Mts., alt. 4000–6000 ft. frequent; *Griffith, H. f. & T., C. B. Clarke, MARTABAN*, alt. 6000 ft.; *Kurz*.

A small branched tree. *Leaflets* 4–8 by $1\frac{1}{2}$ – $3\frac{1}{2}$ in., those even from leaves next the panicle polymorphous, oblong or ovate, acute, quite entire or serrulate or lobed or irregularly pinnatifid, the stellate wool beneath deciduous, leaving a glaucous surface; petiolules $\frac{1}{2}$ –3 in. *Panicle* often 12–15 in., lower branches often elongate with several umbels, stellately woolly; bracts shortly ovate, somewhat persistent; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in.—Closely allied to the preceding. From Mr. Kurz's description it would seem that the rarer Khasian form with perfectly glabrous glaucous leaves, is the only Burman one.

3. **H. elatum**, C. B. Clarke; leaflets near the panicle nearly entire oblong lanceolate glabrous not rugose above, petals glabrous or sparingly stellate woolly. *Hedera elata*, *Ham. in Don Prodr.* 187; *DC. Prodr.* iv. 264; *Wall. Cat.* 4914. *Agalma elatum*, *Seem. Rev. Heder.* 25.—*Araliad* sp. 6, *Herb. Ind. Or. f. & T.*

KUMAON to BHOTAN, alt. 5000–7000 ft., not uncommon; *Wallich, &c.*

A tree 30–40 ft. *Leaflets* 4–7 by 1 – $2\frac{1}{2}$ in., broadest below the middle, in young trees but sparingly toothed or lobed; petiolules often 1–2 in. *Panicle* 12–18 in., lower branches usually compound; bracts very short, ovate, auriculate; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., glabrous pubescent or stellately woolly; buds usually glabrous.

VAR. *Griffithii*; pedicels very woolly, young petals more pubescent. *Heptapleurum glaucum*, *Kurz For. Fl.* i. 538. *Agalma Griffithii*, *Seem. Rev. Heder.* 25.—Bhotan; *Griffith* (Kew Distrib. No. 2698 and E. I. C. No. 2064). Burma; Martaban, alt. 5000–7000 ft.; *Kurz*; Moolee Mt., *Parish*.

4. **H. glaucum**, C. B. Clarke (not of Kurz); leaflets near the panicle nearly entire glabrous obovate-lanceolate with impressed nerves above, petals with minute white stellate tomentum. *Agalma glaucum*, *Seem. Rev. Heder.* 25.—*Araliad* sp. 14, *Herb. Ind. Or. H. f. & T.*

KHASIA Mts., alt. 4000–6000 ft.; *H. f. & T., C. B. Clarke.* EAST BENGAL; *Griffith* (Kew Distrib. No. 2660).

A small tree. *Leaflets* 6 by 2 in., broadest above the middle, the tertiary nerves impressed above but less deeply than in *H. impressum*, leaflets of young plants with

remote serratures or shallow lobes; petiolules 1 in. *Panicle* much as in *H. elatum*, nearly glabrous or more or less pubescent or stellately woolly.

5. **H. rostratum**, *Bedd. Fl. Sylv.* ii. p. 122; leaflets glabrous lanceolate or elliptic narrowed at both ends coriaceous, tertiary nerves obscure above, petals glabrous or nearly so. *Hedera rostrata*, *Wight Ic.* t. 1013. *Agalma rostratum*, *Seem. Rev. Heder.* 25.

NILGHIRIS; *Wight*; *Gardner*, alt. 7000 ft.; *C. B. Clarke*. (The Sikkim locality given by Seeman is an error.)

A small branched tree. *Leaflets* $4\frac{1}{2}$ by $1\frac{1}{4}$ –2 in., entire or denticulate; petiolules $\frac{3}{4}$ –1 in. *Panicle* 8 in., branches often bearing one umbel each only; bracts shortly ovate, persistent; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., glabrous or stellately pubescent, springing from a dense tuft of permanent bracteoles.

VAR. *micrantha*; flowers and fruit smaller, pedicels and bracteoles glabrous.—Sisparah, Nilghiri Mts., *Wight*.

†† *Pedicels usually racemed.*

6. **H. racemosum**, *Bedd. Fl. Sylv.* t. 214; leaflets glabrous entire narrowed at both ends, pedicels glabrous or often rusty stellately woolly. *Hedera racemosa*, *Wight Ic.* t. 1015; *Thwaites Enum.* 132. *Agalma racemosum*, *Seem. Rev. Heder.* 24.

NILGHIRIS; *Gardner*; Cancor, alt. 6000 ft., *Wight*. ANAMALLAY Mts. alt. 3000–5000 ft.; *Beddome*. CEYLON, alt. 3000–5000 ft.; *Thwaites*.

A large tree. *Leaflets* 6 by $2\frac{1}{2}$ in., elliptic or lanceolate, subobtusate or cuspidate, coriaceous, tertiary nerves above, obscure; petiolules often 1– $1\frac{1}{2}$ in. *Panicle* 6–12 in., the ends of the branches bracts and pedicels rusty pubescent while young; bracts shortly ovate, persistent; pedicels $\frac{1}{2}$ in. *Flowers* at first often umbelled, the fruits usually distinctly racemed.—Closely allied to the preceding species: some of *Thwaites'* specimens are not racemed at all, even in fruit.

SUBGEN. II. **Eu-Heptapleurum**. *Styles* short, not connate into a narrow cylindric column.

* *Leaves* 1- (rarely 1-3-) foliolate.

7. **H. emarginatum**, *Seem. Rev. Heder.* 44; leaves cuneate-oblong emarginate, panicles 1-2 in., umbels 2-5-flowered. *Hedera emarginata*, *Moon Cat. Pl. Ceylon*; *Thwaites Enum.* 132.

CEYLON, up to 4000 ft.; *Walker*, *Thwaites*.

A climbing glabrous shrub. *Leaflets* $\frac{3}{4}$ – $1\frac{1}{2}$ by $\frac{3}{8}$ – $\frac{3}{4}$ in., narrowed at the base, sessile, broadest at the very summit and there distinctly emarginate or 2-lobed, nerves on both surfaces raised. *Pedicels* $\frac{1}{4}$ in., spreading; bracts 0 or early fugacious. *Flowers* very small, white tinged red (*Thwaites*).

** *Leaves* simply digitate; leaflets usually 5-7.

† *Reticulating nerves prominent on the upper surface of the leaflets.*

8. **H. venulosum**, *Seem. Rev. Heder.* 44; leaflets oblong or elliptic acute usually broadest below the middle. *Brand. For. Fl.* 249; *Kurz For. Fl.* i. 538. *H. ellipticum*, *Seem. Heder.* 43. *Paratropia venulosa*, *W. & A. Prodr.* 377; *Wight Ill.* t. 118. *P. elliptica* and *macrantha*, *Miq. Fl. Ind. Bat.* i. pt. i. 756. *Hedera venosa*, *Wall. Cat.* 4923. *H. terebinthacea*, *Wall. Cat.* 4920 partly. *Aralia digitata*, *Roxb. Hort. Beng.* 22, *Fl. Ind.* ii. 107. *Sciadophyllum ellipticum*, *Blume Bijdr.* 878; *DC. Prodr.* iv. 260.—*Rheede Hort. Mal.* vii. t. 28. *Araliad* sp. 18, *Herb. Ind. Or. H. f. & T.*

Throughout tropical and subtropical INDIA, from the NORTH-WEST HIMALAYA to the SOUTH DECCAN and SINGAPORE.—DISTRIB. Malaya and Tropical Australia.

A small glabrous tree or climbing shrub. *Leaflets* 4 by 2 in., glabrous, entire, acuminate, base subacute or rounded; petiolules 1 in. or larger. *Panicle* small or large; lateral branches sometimes 10 in., compound; bracts caducous, large, ovate, hairy in the young panicle; branchlets and pedicels glabrous or pubescent; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. *Buds* varying in size, and the disc after flowering is very prominent or not.—The panicle branches become more delicate and the buds smaller in Burma, where the plant is exactly *Paratropia elliptica*, Miq.; while at Malacca the form collected by Dr. Maingay (No. 680) is *P. micrantha*, Miq.

VAR. *macrophylla*, Wall. Cat. 4918 (sp.); leaflets 6–8 in.—Amherst; Wallich.

9. **H. stellatum**, Gaertn. *Fruct.* ii. 472, t. 178; leaflets obovate obtuse. *Seem. Rev. Heder.* 45. *Hedera* obovata, *Wight Ic.* t. 1011. *H. Vahl.* *Thwaites Enum.* 132. *H. terebinthacea*, *Vahl Symb.* iii. 42; *DC. Prodr.* iv. 265; *Wall. Cat.* 4920 partly. *Paratropia terebinthacea*, Arn. *Pugill.* 20.

SOUTH DECCAN PENINSULA; near Coimbatore, *Wight*. NILGHIRI MTS., *Hohenacker* No. 1472. CEYLON, abundant up to 3000 ft. alt.; *Thwaites*.

Altogether resembles *H. venulosum* except as to the obtuse obovate leaflets, and may be merely a South Indian and Ceylon form of it.

10. **H. subulatum**, *Seem. Rev. Heder.* 42; leaflets often 4–3 more rarely 5 oblong or elliptic acuminate, panicles linear. *Paratropia subulata*, *Miq. in Ann. Mus. Lugd. Bat.* i. 22.

PINANG and MALACCA; *Griffith* (Kew Distrib. No. 2690); *Maingay*, No. 681.—DISTRIB. Sumatra.

Branchlets glabrous. *Leaflets* $5\frac{1}{2}$ by $2\frac{1}{2}$ in., narrowed at both ends, glabrous or rarely with scattered stellate woolly hairs beneath, entire or with a few teeth. *Panicle* in flower 10 by 1 in., in fruit nearly 3 in. broad, when young with scattered white stellate wool; bracts $\frac{1}{2}$ in., lanceolate, stellately white woolly, soon deciduous; branches usually very short, sometimes 1 in.; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., always stellately tomentose when young. *Fruit* pentagonal, disc large, prominent.—May this be a state of *H. heterophyllum*?

†† *Leaves coriaceous, tertiary nerves not prominent above.*

11. **H. Wallichianum**, C. B. Clarke (not of Seemann); pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. glabrous, buds $\frac{1}{2}$ in. broad. *H. exaltatum*, *Seem. Rev. Heder.* 44. *Paratropia Wallichiana*, W. & A. *Prodr.* 377. *Hedera exaltata*, *Thwaites Enum.* 44. *H. Wallichiana*, Dalz. & Gibs. *Bomb. Fl.* 108.—Araliad sp. 19, *Herb. Ind. Or. H. f. & T.*

SOUTH DECCAN PENINSULA; Kurg, *Wight*. NILGHIRIS, alt. 4000–6000 ft., near Canoor, C. B. Clarke. CEYLON, alt. 4000–6000 ft.; *Thwaites*.

A large glabrous tree. *Leaflets* 5–10 by $2\frac{1}{2}$ –4 in., oblong or elliptic, acute, rounded at the base, very leathery. *Panicle* oblong, about 12 by 3 in.; buds glabrous, unusually large. *Fruit* crowned by the much enlarged pentagonal disc.

12. **H. khasianum**, C. B. Clarke; pedicels $\frac{1}{2}$ in. stellately tomentose when young, buds $\frac{1}{2}$ in. broad. *H. Wallichianum*, *Seem. Rev. Heder.* 44.—Araliad sp. 20, *Herb. Ind. Or. H. f. & T.*

BHOTAN, Mishmee; *Griffith* (Kew Distrib. No. 2694). KHASIA MTS., alt. 3000–6000 ft.; *H. f. & T.*; C. B. Clarke.

Leaflets attain 11 by 3 in., usually much smaller, narrow-oblong or lanceolate, acuminate, glabrous, the base sometimes almost rounded, very coriaceous, entire; petiolules often $1\frac{1}{2}$ in. *Panicle* with white stellate tomentum on the branches pedicels and backs of the petals, often a foot long in fruit; lower branches elongate, ascend-

ing, compound; bracts $\frac{1}{4}$ in., oblong, acuminate, caducous; pedicels $\frac{1}{4}$ in. in fruit. *Fruit* globose, hardly pentagonal, disc depressed conical, not pentagonal.

13. **H. Cephalotes**, C. B. Clarke; panicle pubescent, flowers sessile, bracts deciduous. *H. capitatum*, Seem. *Heder.* 45 partly.

MALACCA; Griffith (No. 2700 Kew Distrib.).

Apparently a large tree. *Leaflets* 14 by $4\frac{1}{2}$ in., oblong-elliptic, acuminate, rounded or little narrowed at the base, coriaceous, entire, shining, glabrous above, with scattered loose woolly hairs that easily wear off beneath; petiolules 3-4 in., stout. *Panicle* 15 in. with stellate pubescence from the base. Heads of *fruit* globose, close packed without bracteoles. *Fruit* much longer than broad, 5-8-ribbed, stellately white-tomentose, crowned by the broad short cluster of styles; disc enlarged, somewhat corky.—Very unlike *Paratropia capitata* W. & A. (a *Brassia*), with which, regardless of geography, Dr. Seeman united it.

*** Leaves twice digitate or digitately decompound.

14. **H. heterophyllum**, Seem. *Rev. Heder.* 42; leaves twice digitate, panicle narrowly oblong or linear stellately white-pubescent. *Hedera heterophylla*, Wall. *Cat.* 4919; *G. Don. Gen. Syst.* iii. 394. *Paratropia heterophylla*, Presl *Epimel. Bot.* 250; *Miq. Fl. Ind. Bat. i.* pt. i. 761.

PINANG; Wallich.—DISTRIB. Java.

Branchlets glabrous. *Leaves* digitately 3-4-petioluled, each petiolule bearing 3-4 rarely 5 leaflets; leaflets 4-5 by 1-3 in., oblong or elliptic, acuminate, rounded or somewhat acute at the base, glabrous, entire, membranous; tertiary nerves prominent above, secondary petiolules much varying in length from $\frac{1}{2}$ - $1\frac{1}{2}$ in. at the same cluster. *Panicle* 8-12 by 1-3 in., branches slender, little compound; bracts $\frac{1}{4}$ in., ovate-oblong, stellately white tomentose, caducous or sometimes persistent. *Flowers* small. *Fruit* pentagonal.

15. **H. binternatum**, C. B. Clarke; leaves digitately decompound or twice pinnate with ternate leaflets at each node of the rhachis.

MALACCA; Maingay No. 684.

A small tree; trunk about 3 ft. (*Maingay*). *Leaflets* 5 by $\frac{3}{4}$ in., linear-oblong, acuminate, unequal subacute at the base, entire, the reticulating nerves prominent on both surfaces, with scattered stellate hairs (easily wearing off) beneath; petiolules $0\frac{1}{16}$ in. *Panicle* 8 by $1\frac{1}{2}$ in., branches hardly divided, with scattered stellate hairs; bracts deciduous; pedicels less than $\frac{1}{4}$ in. *Flowers* small, altogether of a *Eu-Heptapleurum*.—May prove a form of *H. heterophyllum*.

DOUBTFUL SPECIES.

HEDERA MOLLIS; Wall. *Cat.* 4924; the example consists of leaves only; it may be *Heptapleurum Cephalotes* above.

8. TREVESIA, Vis.

Shrubs or small trees, prickly or unarmed, glabrous or stellate-hairy. *Leaves* palmate or digitate; petioles often united by a wing at their base; stipules united within the petiole or obsolete. *Flowers* polygamous, large for the Order; umbels paniced; pedicels not jointed under the flower; bracts small or 0. *Calyx-margin* entire or toothed. *Petals* 8-12, valvate, somewhat thick, often cohering as a cap in the fertile flowers. *Stamens* as many as the petals. *Ovary* with as many cells as the petals; styles united into a small boss or short column. *Fruit* ovoid, large for the Order. *Seeds* compressed; albumen uniform.—DISTRIB. Species 8; inhabiting Eastern India, Malaya and Polynesia.

Hardly separable from *Heptapleurum* by the larger flower and fruit, and the usually more numerous carpels.

1. **T. palmata**, *Vis. in Mem. Acad. Torino*, ser. 2, iv. 262, with fig.; leaves large palmate or digitate nearly glabrous, lobes serrate or again lobed, petiolules connected at base by a serrate or lobed wing. *Seem. Rev. Heder.* 77; *Kurz For. Fl.* i. 539. *Gastonia palmata*, *Roxb. Hort. Beng.* 33, *Fl. Ind.* ii. 407; *Lindl. in Bot. Reg.* t. 894. *Gilibertia palmata*, *D.C. Prodr.* iv. 256. *Hedera ferruginea* and *palmata*, *Wall. Cat.* 4909 and 4910 partly. *Brassaiopsis confluens*, *Seem. Rev. Hed.* 18 (as to the leaves).—*Araliad* sp. 30 and 31, *Herb. Ind. Or. H. f. & T.*

From NIPAL and SIKKIM to PEGU, alt. 1000–5000 ft., frequent.

A small tree 10–15 ft., the shoots with reddish hair and many prickles. *Leaves* 1–2 ft., adult glabrous or with scattered stellate hairs on both surfaces deeply palmate, in young plants often digitate; petiole often prickly. *Panicles* 18 in., straggling, young with red-brown tomentum; bracts 1 in., oblong, usually deciduous; pedicels 1–1½ in. *Buds* exceeding ¼ in. diam. *Fruit* ⅝ by ½ in., ovoid, glabrate, ribs not prominent, crowned by the stout style.

VAR. 1. insignis, *Miq. in Ann. Mus. Lugd. Bat.* i. 220 (sp.); leaves very large, segments lobed or subpinnatifid. Khasia Mts.; *Griffith* No. 2664 (Kew Distrib.).

VAR. 2. cheirantha; leaves palmate nearly glabrous, lobes serrate, petiolules when present with entire wing. *Hedera* ? *Aralia*, *Jack* in *Wall. Cat.* 4925. Chittagong, alt. 0–1000 ft.; *H. f. & T.* Pinang and Malay Peninsula, *Porter, Sir W. Norris*; *Wall. Cat.* 4910 partly. Malacca, *Griffith* (No. 2661 Kew Distrib.).—Distrib. Philippines.—These are the examples (leaves only) referred in *Gen. Pl.* i. 943 to *T. sundauca*, *Regel* (*Gartenfl.* 1864, t. 438, not of Miquel). In *T. palmata* the young plants only, and only occasionally, produce digitate leaves; and such are often only imperfectly digitate, the central leaflets being frequently petioluled the lateral leaflets continuous. There may be more than one species of *Trevesia* here included, but no species can be founded on imperfectly digitate leaves. One sheet of *Wall. Cat.* 4910, marked *Hedera confluens*, consists of the fruit of *Brassaiopsis* (probably *B. Hainla*) mixed with leaves of *Trevesia* and constitutes the *Brassaiopsis confluens*, *Seem. Rev. Heder.* 18.

9. **BRASSAIA**, *Endl.*

Unarmed glabrous trees. *Leaves* digitate; leaflets large, leathery, entire; stipules united within the petiole. *Panicle* stout, long, branches mostly undivided; umbels contracted into heads; each flower surrounded by 4 ovate bracteoles, as long as the ovary and united below into a tube. *Calyx-margin* entire or nearly so. *Petals* 6–18, valvate, thick. *Stamens* as many as the petals. *Ovary* cells as many as the petals; styles very short, scarcely united as a short cone. *Fruit* obconic and ribbed below, hemispheric above. *Seed* compressed; albumen uniform.—**DISTRIB.** Species 2, extending from the Deccan Peninsula to Northern Australia.

Separated from *Heptapleurum* *Cephalotes* by the floral bracteoles.

1. **B. capitata**, *C. B. Clarke*; bracts at the base of the panicle-branches ovate short very persistent, petals and carpels 6–10. *Heptapleurum capitatum*, *Seem. Rev. Heder.* 45 partly. *Paratropia capitata*, *W. & A. Prodr.* 378.

NILGHERRY MTS., Kotagherry and Vellyengry Hill; *Wight*.

Leaflets 6–8, 6 by 2½ in., elliptic-oblong subacute, somewhat rounded at the base, very coriaceous, entire; petiolules 2 in., very stout. *Panicle* 16 by 3–4 in., branches very stout.—Doubtfully separable from *B. actinophylla*, *Endl.* (see *Benth. Fl. Austral.* iii. 385) by its persistent bracts, less numerous flower-parts. *Wight's* examples are very good, but the species seems rare, as *Col. Beddome* has never met with it.

10. **DENDROPANAX**, *Dene. & Planch.*

Trees or shrubs, glabrous, unarmed. *Leaves* simple, entire, on young shoots polymorphous, palmately 3-5-lobed; stipules small, scarcely united within the petiole. *Umbels* solitary or in small panicles; bracts small or 0; pedicels not jointed under the flower. *Calyx-margin* entire or 5-toothed. *Petals* 5, valvate, somewhat thick. *Stamens* 5. *Ovary* 5-celled; styles united into a column at the base, their summits (in the Indian species) spreading. *Fruit* globose or ellipsoid, distinctly or obscurely 5-ribbed. *Seeds* compressed; albumen uniform.—**DISTRIB.** Species 20, mostly tropical American; four species in China, Japan, and E. India.

1. **D. japonicum**, *Seem. Rev. Heder.* 27; leaves densely glandular, fruit ellipsoid much longer than broad distinctly ribbed. *Hedera japonica*, *Jungb. in Walp. Rep.* ii. 431 (*ex Seem.*).—*Araliad* sp. 34, *Herb. Ind. Or. H. f. & T.*

KHASIA Mts., alt. 4000-5000 ft.; *H. f. & T.*; *Griffith* (Kew Distrib. No. 2681, 2679).—**DISTRIB.** Japan.

Appears to be an erect shrub or very small tree. *Leaves* (those near the umbels) 4 by 2-3 in., oblong or elliptic, acute, entire, 1-3-5-nerved from the base; petiole $\frac{1}{2}$ -2 in.; polymorphous leaves on young shoots sometimes 8 in. diam., deeply 3-5-palmated; segments narrowly lanceolate, often remotely and minutely toothed; petiole 6-8 in. *Umbels* solitary or 2-3, panicked; pedicels $\frac{1}{2}$ in. *Fruit* $\frac{3}{8}$ by $\frac{1}{2}$ in., somewhat pentagonal.

2. **D. parviflorum**, *Benth. Fl. Hongk.* 137; leaves not densely glandular usually 3-nerved at the base oblong or elliptic acute, fruits subglobose obscurely ribbed. *Seem. Rev. Heder.* 27. *Hedera parviflora*, *Champ. in Hook. Kew Journ. Bot.* iv. 122.

Mount Ophir, MALACCA; *Griffith* (Kew Distrib. No. 2685); *Maingay*, No. 682.—**DISTRIB.** Hongkong.

Apparently an erect shrub. *Leaves* $3\frac{1}{2}$ by $2\frac{1}{4}$ in., entire or very obscurely toothed, glands not visible on the young leaves even; petiole $\frac{1}{4}$ - $1\frac{1}{2}$ in. *Umbels* mostly solitary; pedicels $\frac{1}{2}$ in. *Fruit* $\frac{1}{4}$ in. diam.—The branchlets from Mount Ophir have all entire leaves as they carry umbels; the Hongkong young shoots have polymorphous palmate leaves. *D. proteum*, *Benth. Fl. Hongk.* 136, has the upper leaves very narrowly lanceolar, mostly 1-nerved from the base, but is perhaps only a variety of the present species.

11. **ARTHROPHYLLUM**, *Blume.*

Shrubs or small trees, unarmed. *Leaves* glabrous or nearly so, lower usually alternate and compoundly pinnate, uppermost opposite and simple, intermediate 3-foliolate; leaflets easily separable from the rhachis; stipules united within the petiole. *Peduncles* mostly forming a terminal umbel, each ending in a simple (or slightly compound) umbel of flowers; bracts very small; pedicels not jointed under the flower. *Calyx-teeth* 5, small. *Petals* 5, valvate. *Stamens* 5. *Ovary* 1-celled 1-ovuled; style short, simple. *Fruit* (in the Indian species) ovoid, not angular. *Seed* subglobose; albumen ruminated.—**DISTRIB.** Species 3, Malayan.

1. **A. diversifolium**, *Blume Bijl.* 879; leaves near the umbels usually all simple, leaflets subobtuse or shortly acuminate. *DC. Prodr.* iv. 266;

Miq. Fl. Ind. Bat. i. pt. i. 767. *A. javanicum*, *Blume Bijdr.* 879; *DC. l. c.*; *Kurz For. Fl.* i. 540. *A. ellipticum*, *Blume and DC. ll. c.* *A. Blumeianum*, *Zoll. & Mor. Verz.* 41; *Miq. l. c. i.* 768. *A. ovalifolium*, *Jungh. & De Vriese in Miq. l. c. t.* 14. *Panax polycarpum*, *Wall. Cat.* 4930. *P. Jackianum*, *Wall. Cat.* 4931. *Hedera Jackiana*, *G. Don Gen. Syst.* iii. 394. *H. ? ovata*, *Wall. Cat.* 4911. *Eupteron* sp. nov. *Kurz Andam. Rep. Suppl.* B 9.

SOUTH ANDAMAN, *Kurz*. PINANG, *Phillips*. MALACCA, *Griffith*, &c.—DISTRIB. Throughout Malaya.

Lower leaves a yard across, decompose-pinnate, with pairs of opposite leaflets at the divisions of the main rhachis, upper smaller simply pinnate, uppermost 1-3-foliate; leaflets 3 by $1\frac{1}{2}$ in., oblong or elliptic, glabrous, entire, reticulations distinct; petiolule $0\frac{1}{2}$ in. *Peduncles* 2 in., stout, many in the umbel, with very small acute scattered bracts or naked; pedicels $\frac{1}{2}$ in., quite glabrous even when young, or with more or less rusty stellate wool. *Fruit* $\frac{1}{2}$ by $\frac{1}{2}$ in.

2. ***A. pinnatum***, *C. B. Clarke*; uppermost leaves usually 3-foliate or pinnate, leaflets much acuminate often obtusely. *Panax pinnatum*; *Lamk. Dict.* ii. 715; *DC. Prodr.* iv. 254; *Wall. Cat.* 9057. *P. secunda*, *Schultz Syst.* vi. 215. *Nothopanax ? pinnatum*, *Miq. Fl. Ind. Bat.* i. pt. i. 766.—*Rumph. Amb.* iv. t. 32.

PINANG; *Wallich, Maingay*, No. 679. MALAY PENINSULA, *Griffith, Maingay*, No. 677.—DISTRIB. Malay Islands.

Leaves pinnate and 2-pinnate, leaflets sometimes ternate; uppermost often pinnate with 5-17 leaflets, but sometimes with only 3-1 leaflets; leaflets varying greatly in size on the same branchlet, much narrowed to both ends, reticulations obscure, glabrous, entire; petiolule $0\frac{1}{2}$ in. *Peduncles* usually much fewer than in *A. diversifolium* and evidently only pseudo-terminal; pedicels glabrous or with rusty stellate wool. *Flowers* yellow (*Maingay*) and *fruits* nearly as in *A. diversifolium*.—The fruits are said by Miquel to be sometimes 2-seeded, but all the Kew examples are 1-seeded. Both Rumphius and Maingay note two forms of this plant, which are, however, connected by a series of intermediates:

VAR. latifolia, *Rumph l. c.*; leaflets few 4 by $1\frac{1}{2}$ in. *A. pinnatum*, *Maingay MS.*, No. 679.

VAR. angustifolia, *Rumph l. c.*; leaflets many $1\frac{1}{2}$ by $\frac{1}{2}$ in. *A. alternifolium*, *Maingay MS.*, No. 677.

12. **HETEROPANAX**, *Seem.*

A small unarmed tree. *Leaves* glabrous or nearly so, very large, pinnately decompose; stipules not prominent. *Panicles* large; umbels racemed, more or less stellate-hairy; bracts small, ovate, obtuse, persistent; pedicels not jointed under the flower. *Flowers* polygamous, the terminal umbel of each panicle-branch usually alone fruiting. *Calyx-margin* nearly entire. *Petals* 5, valvate. *Stamens* 5. *Ovary* 2-celled; styles 2, distinct from the base, spreading. *Fruit* much laterally compressed, 2-seeded. *Seeds* compressed; albumen ruminated.—DISTRIB. Species 1 or 2; Western Himalaya, Java, China.

1. ***H. fragrans***, *Seem. Rev. Heder.* 73; leaves often a yard across with pairs of opposite leaflets at the nodes of the rhachis. *Brand. For. Fl.* 249; *Kurz For. Fl.* i. 541. *Panax fragrans*, *Roxb. Hort. Beng.* 21, *Fl. Ind.* ii. 76; *Wall. Cat.* 4929; *DC. Prodr.* iv. 254, excl. syn. of *Don*.—*Araliad* sp. 47, *Herb. Ind. Or. H. f. & T.*

From the SEWALIK HILLS to BURMA, alt. 0-4000 ft.; common in BENGAL.—DISTRIB. Java, China.

Leaflets $3\frac{1}{2}$ by $1\frac{1}{4}$ in., elliptic, shortly acuminate, little narrowed at the base, glabrous, entire, nerves not very prominent; petiolules $0\frac{1}{4}$ in. *Panicle* often 12-16 in., branches 4-8 in.; umbels dense subcapitate in flower; pedicels in fruit elongating to $\frac{1}{2}$ in. and more. *Fruit* $\frac{1}{4}$ by $\frac{1}{2}$ in. and $\frac{1}{8}$ in. thick, ultimately glabrous and often glaucous.

VAR. 1. *typica*; leaflets elliptic shortly acuminate, base slightly narrowed.

VAR. 2. *subcordata*; leaflets ovate shortly acuminate, base rounded or even cordate.

VAR. 3. *attenuata*; leaflets $4\frac{1}{2}$ by $1\frac{1}{4}$ in., attenuate acuminate, much narrowed at base.—Bengal Plain. China.—This may be a distinct species.

13. **BRASSAIOPSIS**, Dcne. & Planch.

Large shrubs or trees, glabrous or tomentose, armed or not. *Leaves* digitate or palmate or angled; stipules connate within the petiole, not prominent. *Umbels* in large compound panicles, young parts at least stellately tomentose; bracts not large, often persistent; pedicels rising from a dense cluster of persistent bracteoles, not jointed under the flower; flowers often polygamous. *Calyx* 5-toothed. *Petals* 5, valvate. *Stamens* 5. *Ovary* 2-celled; styles 2, united, long or short. *Fruit* broadly globose or turbinate, 2- or by abortion 1-seeded. *Seed* not compressed; albumen ruminated.—DISTRIB. Species 10, from Nipal to Java.

* *Leaves undivided.*

1. **B. simplicifolia**, C. B. Clarke; upper leaves simple lanceolate serrate, adult glabrous.

MISHMEE; Griffith (Kew Distrib. No. 2699).

Branchlets prickly, glabrous or with a little hard close tomentum. *Leaves* near the panicle alone seen (the lower may be divided) 9 by $3\frac{1}{4}$ in., acute, subacute at the base, sharply serrated, membranous, nerves much elevated; petiole $1\frac{1}{4}$ in.; stipules not prominent. Young *panicle* 5 in., nearly glabrous, branches slightly compound; bracts $\frac{1}{2}$ in., lanceolate; pedicels $\frac{1}{2}$ in. with scattered stellate hairs, rising from a dense tuft of bracteoles.—Marked by Seemann as new genus, with a note that the petals are imbricate. They are, however, valvate, and it is clearly a *Brassaiopsis*.

2. **B. Hainla**, Seem. Rev. Heder. 18, partly; leaves divided less than half-way down into triangular cuspidate segments, fruit broadly orbicular. *Brassaiopsis* confluens, Seem. Rev. Hed. 18 (as to the fruit). *Hedera* Hainla, Ham. in Don Prodr. 187; DC. Prodr. iv. 253. *Panax curcifolia*, Griff. Itin. Notes, 145.—Araliad sp. 28, Herb. Ind. Or. H. f. & T.

TEMPERATE HIMALAYA, alt. 3000-6000 ft., from NIPAL to BHOTAN; Griffith (Kew Distrib. No. 2668); J. D. H.; C. B. Clarke.

A small tree, the ends of the branches prickly, young parts stellately tomentose. *Leaves* 4-9 in. diam., truncate or cordate at the base, subspinose-toothed, finally glabrous above and nearly so beneath the hispidulous or stellate hairs distantly scattered. *Bracts* to the panicle-branches ovate, short, densely stellate-tomentose, persistent. *Buds* densely stellate-tomentose. *Pedicels* $\frac{1}{2}$ - $\frac{3}{4}$ in., rising from a dense cluster of bracteoles $\frac{1}{3}$ in. oblong and very tomentose. *Fruit* $\frac{1}{4}$ by $\frac{1}{2}$ in., globose, subdidymous. *Style* $\frac{1}{2}$ in. on the fruit.

3. **B. palmata**, Kurz For. Fl. i. 537; leaves palmate divided about half-way down into oblong acute segments, fruit ellipsoid or urbinat, longer than broad. *Panax palmatum*, Roxb Hort. Beng. 21, Fl. Ind. ii. 74. *Araliopsis* andamanica, Kurz in Andaman Rep. App. B. 9. *Hedera polyacantha*, Wall. Pl. As. Rar. t. 190.—Araliad sp. 33, Herb. Ind. Or. H. f. & T.

NIPAL; *Wallich*. SIKKIM TERAI; *J. D. H.* Subtropical zone of EAST BENGAL and BURMA. CHITTAGONG; *Roxburgh, J. D. H.* BURMA; *Griffith* (Kew Distrib. No. 2663). SOUTH ANDAMAN; *Kurz*.

Closely resembles *B. Hainla*; sparingly prickly. *Pedicels* springing from a dense cluster of bracteoles $\frac{1}{2}$ in., oblong and very tomentose. *Fruit* often 1-seeded, when 2-seeded it is $\frac{1}{2}$ by $\frac{3}{8}$ in., turbinate-ellipsoid. *Style* on the fruit $\frac{1}{8}$ in. or rather more. —*Wallich's* plate belongs to this plant, as he mentions the fruit as turbinate (as also does *Roxburgh*). *Aralia palmata*, *Lour. Fl. Cochinch.* 187, doubtfully referred here by *Seeman*, is an *Acanthopanax*.

4. **B. alpina**, *C. B. Clarke*; leaves cordate-ovate acute or slightly 3-5-cuspidate densely stellate-tomentose, bracts to the panicle-branches lanceolate. —*Araliad* sp. 27, *Herb. Ind. Or. H. f. & T.*

ALPINE SIKKIM, alt. 10,000–11,000 ft.; Tonglo and Lachen, *J. D. H.*

An unarmed tree, 30 ft.; young branches densely villous and tomentose with yellow or brown stellate hair. *Leaves* 4–5 in. and nearly as wide, softly serrate, membranous, thickly tomentose on both surfaces when young, when older the scattered stellate hairs wear off, but much remains on both surfaces. *Panicle* (very young) densely tomentose; buds completely enclosed in thick stellate wool; bracts at the base of the panicle-branches $\frac{1}{4}$ in., very narrow. —Can this be a woolly alpine form of *B. Hainla*?

5. **B. hispida**, *Seem. Rev. Heder.* 18; stem panicle and petioles prickly, leaves deeply palmate spinosely serrate, reticulating nerves beneath much raised and ultimately nearly glabrous. —*Araliad* sp. 30, *Herb. Ind. Or. H. f. & T.* partly.

SIKKIM, alt. 6000–7000 ft.; *J. D. H.* MISHMEE; *Griffith* (Kew Distrib. No. 2696).

Yellowish when dried; prickles numerous and often whorled, lanceolate, compressed, deflexed. *Leaves* 1 ft. diam. and more, segments oblong-lanceolate narrower towards the base, coriaceous, lower surface glabrous or sparingly hispidulous; stipules united within the petiole with two free linear points. *Panicle* very large; bracts to the branches $\frac{3}{4}$ in., lanceolate, tomentose, persistent; pedicels very many, rising amid numerous bracteoles $\frac{1}{8}$ – $\frac{1}{2}$ in. lanceolate closely tomentose. Young *calyx-tube* closely densely stellate-tomentose. *Petals* glabrous, appear yellow. *Style* after the petals have fallen scarcely $\frac{1}{16}$ in. *Fruit* not seen.

6. **B. mitis**, *C. B. Clarke*; branches prickly, leaves deeply palmate softly serrate, the reticulating nerves scarcely raised beneath ultimately pubescent or hispidulous. —*Araliad* sp. 29, *Herb. Ind. Or. H. f. & T.*

SIKKIM, alt. 4000–8000 ft., not rare; *J. D. H.*, *C. B. Clarke*, *N. Gamble*.

An erect small tree, 20 ft., the panicle and petioles usually without prickles. *Leaves* 1 ft. diam. and more; segments oblong-lanceolate, narrowed towards the base, membranous, adult beneath softly hairy and not shining; stipules large, lanceolate-subulate, nearly distinct. *Panicle* very large, often with dense bundles of bristles on the rachis and at the top of the petiole; bracts on the branches $\frac{3}{4}$ in., lanceolate, caducous; pedicels very many, arising amid numerous lanceolate closely-tomentose bracteoles $\frac{1}{8}$ – $\frac{1}{2}$ in. Young *calyx-tube* more or less stellate-tomentose. *Petals* glabrous. *Style* after the petals have fallen $\frac{1}{8}$ in.; the disc large, subhemispheric. Ripe *fruit* not seen.

7. **B. Griffithii**, *C. B. Clarke*; leaves very large palmate divided half-way down or more serrate-denticulate, adult glabrous or the nerves beneath minutely hispidulous.

EAST BENGAL; Namroo (? Upper Assam), *Griffith* (Kew Distrib. No. 2697).

No prickles seen on the end of the branchlets nor elsewhere. *Leaves* 16 in. diam.; lobes oblong or elliptic, acuminate, tertiary nerves prominent on both surfaces.

Panicle very large and compound, much more glabrous than in the allied species; bracts to the branches short, ovate, persistent; pedicels $\frac{3}{4}$ in., very numerous, bracteoles at their base minute. Young *calyx-tube* sparingly stellate-tomentose, limb distinctly toothed. *Disc* of the young *fruit* much elevated; style scarcely $\frac{1}{20}$ in. *Fruit* $\frac{1}{2}$ in. diam., globose.

** *Leaves digitate.*

8. **B. speciosa**, *Dcne. & Planch. in Revue Hort.* 1854, 106; petiolules long, leaflets lanceolate or elliptic rounded or attenuate at the base entire crenulate or lightly subserrate, adult glabrous or nearly so beneath. *Seem. Rev. Heder.* 19. *B. floribunda*, *Seem. Rev. Heder.* 19. *Hedera floribunda*, *Wall. Cat.* 4912; *G. Don Gen. Syst.* iii. 394. *H. glomerulata*, *DC. Prodr.* iv. 265; *Hook. Bot. Mag.* t. 4804; *Regel in Gartenfl.* 1863, t. 411. *Aralia glomerulata*, *Blume Bijdr.* 872. *Macropanax glomerulatum*, *Miq. Fl. Ind. Bat.* i. pt. i. 764.—*Araliad* sp. 9, 10, and 11, *Herb. Ind. Or. H. f. & T.*

From NIPAL and ASSAM to CHITTAGONG; alt. 0–5000 ft., frequent.—DISTRIB. Java.

A small tree; upper part of the branches (and sometimes the panicle also) prickly; innovations stellately tomentose often rusty reddish brown. *Leaflets* 4–8 by 1–3 in., when young often with scattered stellate hairs above and some clustered stellate wool beneath, acuminate, herbaceous, reticulations moderately conspicuous; petiolules usually more than 1 in., summit of the petiole without dense clustered bristles. *Panicle* large, usually a foot long or more; bracts at the base of the branches oblong or lanceolate, persistent; pedicels $\frac{3}{4}$ in. rising from a dense cluster of rusty stellately hairy persistent bracteoles $\frac{1}{2}$ in. *Fruit* $\frac{1}{4}$ by $\frac{3}{4}$ in., didymo-globose, or 1-seeded and subglobose.—There are many forms of this plant, but these being large, it is not easy to establish species upon them. In the young fruit the disc is sometimes very elevated, and the style is long or short, as mentioned by *Dcne. & Planchon*: the calyx-tube of the young fruit is shortly hemispheric, or more often long and obconic. These differences appear to depend on the stage of ripening at which the fruit is gathered.

VAR. 1. *typica*; leaflets $6\frac{1}{2}$ by 2 in. oblong acuminate entire, base not rounded under surface of the adult glabrous. *Wall. Cat.* 4912.

VAR. 2. *subovata*; leaflets 7 by $4\frac{1}{2}$ in. ovate or elliptic shortly suddenly acuminate entire or very nearly so base rounded adult glabrous beneath.—Sikkim, *J. D. H.*

VAR. 3. *hirta*; leaflets 5 by $1\frac{1}{4}$ in. lanceolate narrowed to both ends entire midrib beneath when young with needle-like spreading hairs (unlike those of any other plant in the order).—The leaflets are detached from the panicle, but except as to the hairs they appear to belong to the species. *Cachar, R. L. Keenan.*

VAR. 4. *rufo-stellata*; leaflets oblong-lanceolate from a rounded base somewhat closely denticulate-serrate in nearly their whole extent with scattered rusty-stellate hairs above, when young rusty villose pubescent beneath, panicle densely rufous-stellate tomentose.—Chiefly from low levels in Cachar, Khasia, and Chittagong.

VAR. 5. *serrata*; leaflets 7 by $2\frac{1}{2}$ in. elliptic-lanceolate dentate-serrate base subacute, panicle very sparingly stellate-woolly. *Darjeeling, Griffith* (*Kew Distrib. No.* 2689).

9. **B. Hookeri**, *C. B. Clarke*; petiolules distinct or long, leaflets very large oblong narrowed at each end serrate, mature more or less stellate-woolly beneath.—*Araliad* sp. 12, *Herb. Ind. Or. H. f. & T.*

SIKKIM, alt. 2000–5000 ft.; Yoksun, *J. D. H.* KHASIA Mts., alt. 4000 ft.; Nunklow, *H. f. & T.*

A small prickly tree. *Leaflets* attaining 18 by 8 in., somewhat leathery, nerves above subimpressed; petiolules $\frac{1}{2}$ –2 in. *Panicle* 2 ft., the branches more than a foot with broad oblong persistent bracts at their base, the young parts densely white

stellate-woolly; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., stout, rising from numerous persistent bracteoles $\frac{1}{2}$ in., less hairy than those of *B. floribunda*. Young fruit much as in *B. floribunda*; calyx-tube campanulate or obconic; disc prominently rayed, not greatly elevated; style $\frac{1}{2}$ in.—Possibly a large form of *B. floribunda*.

10. ***B. aculeata***, *Seem. Rev. Heder.* 19; leaflets serrate attenuate at base subsessile and often enveloped densely by bristles with stellate hairs on both surfaces when adult. *Hedera aculeata*, *Don Prodr.* 187; *DC. Prodr.* iv. 264. *H. æsculifolia*, *Wall. Cat.* 4913. *Agalma æsculifolium*, *Seem. Rev. Heder.* 25.

KUMAON; *T. Thomson*. NIPAL; *Wallich*. KHASIA Mts., alt. 4000 ft., *C. B. Clarke*.

A small prickly tree. *Leaflets* 9 by $2\frac{3}{4}$ in., narrowly lanceolate-obovate, acuminate, herbaceous, soft in texture, rusty stellate-tomentose, apex of the petiole very hispid; in one example of *Dr. Thomson*'s the digitate leaf is sometimes replaced by a single entire leaf cordate at base. *Panicle* large, compound, greatly resembling that of *B. floribunda*, young parts stellate rusty-woolly; bracts at the base of the branches ovate, short, persistent; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., springing from a dense cluster of lanceolate hairy persistent bracteoles $\frac{1}{2}$ in. *Fruit* $\frac{1}{4}$ in. long and broad, globose, subdymous; disc on the ripe fruit flat; style $\frac{1}{2}$ – $\frac{3}{4}$ in.—*Wallich's Hedera æsculifolia*, in the Linnæan Society's herbarium, and those marked *Agalma æsculifolium* in the British Museum by *Seemann*, are all 2-ovuled, and identical with *Brassaiopsis aculeata*.

14. **MACROPANAX**, *Miq.*

Unarmed small trees. *Leaves* digitate, 3–5-foliolate, leaflets entire or serrate, in the Indian species glabrous; stipules shortly connate within the petiole or 0. *Panicles* large, branched; bracts small, deciduous; pedicels jointed under the flowers; flowers umbelled, polygamous. *Calyx-teeth* 5. *Petals* 5, valvate. *Stamens* 5. *Ovary* 2-celled; styles united. *Fruit* ovoid or subglobose or somewhat elongated upwards, striated or ribbed but hardly angular. *Seeds* dorsally compressed; albumen ruminated or very rugose.—DISTRIB. Species 2, Nipal to Java.

1. ***M. oreophilum***, *Miq. Fl. Ind. Bat.* i. pt. i. 764; leaflets usually denticulate serrate or crenulate, panicle-branches spreading stellately rusty-tomentose. *Seem. Rev. Heder.* 20; *Kurz For. Fl.* i. 541. *M. floribundum*, *Miq. Fl. Ind. Bat.* i. pt. i. 764. *Panax serratum*, *Wall. Cat.* 4915; *DC. Prodr.* iv. 253. *Aralia disperma*, *Blume Bijl.* 872. *Hedera disperma*, *DC. Prodr.* iv. 265.—*Araliad* sp. 8, *Herb. Ind. Or. H. f. & T.*

From NIPAL and ASSAM to TENASSERIM, alt. 500–7000 ft., frequent.—DISTRIB. Malaya.

Attains 30 ft. *Leaflets* 5 by $1\frac{1}{2}$ in., lanceolate, acuminate, sometimes longer and very narrow, sometimes almost elliptic, base narrowed or rounded; petiolules 1–3 in. *Panicle* 1 ft., compound; bracts usually deciduous, inconspicuous; pedicels $\frac{1}{2}$ in., stout, more or less stellate-hairy, the bracteoles few or deciduous. *Fruit* $\frac{1}{4}$ in., ovoid, sometimes elongated upwards; disc large, conical, often wider than the top of the fruit, crowned with the permanent style $\frac{1}{2}$ – $\frac{3}{4}$ in.

2. ***M. undulatum***, *Seem. Rev. Heder.* 20; leaflets entire or very nearly so, panicle-branches ascending glabrous. *Hedera undulata*, *Wall. Cat.* 4916; *G. Don Gen. Syst.* iii. 394.—*Araliad* sp. 5, *Herb. Ind. Or. H. f. & T.*

SIKKIM, BHOTAN, ASSAM and KHASIA, alt. 500–5000 ft., common. SILHET station. A small tree. *Leaflets* 3–4 by $1\frac{1}{4}$ in., lanceolate, acuminate, rarely elliptic-

lanceolate, entire rarely minutely denticulate, base narrowed often very acute; petiolules $\frac{1}{2}$ –2 in. *Panicle* 1 ft., compound; bracts $\frac{1}{2}$ in., triangular, caducous; pedicels $\frac{1}{2}$ in., angular, perfectly glabrous; bracteoles 0 or caducous. *Fruit* as in *M. oreophilum*.

15. **HEDERA**, Linn.

Shrubs, climbing extensively, or small trees. *Leaves* simple, lobed or pinnate, glabrous; stipules 0. *Flowers* polygamous; umbels panicled; bracts very small, pedicels not or very obscurely jointed under the flowers. *Calyx-margin* 5-toothed or sub-entire. *Petals* 5, valvate. *Stamens* 5. *Ovary* 5-celled; styles connate into a column. *Fruit* globose, almost berried. *Seeds* ovoid; albumen ruminated.—Species 2; one in all temperate regions of the Old World; the other Australian.

1. **H. Helix**. Linn.; *DC. Prodr.* iv. 261; leaves simple, panicle not elongated. *Don Prodr.* 187; *Wall. Cat.* 4908; *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 515; *Brand. For. Fl.* 248.

Throughout the HIMALAYA alt. 6000–10,000 ft.; KHASIA Mts., alt. 4000–6000 ft.; not rare.—DISTRIB. From W. Europe to Japan.

Stem glabrous climbing adhesively by means of numerous extra-axillary rootlets. *Leaves* 3–4 in., varying from linear-lanceolate to cordate-ovate, entire or variously lobed palmate or subpinnatifid; petiole $\frac{1}{2}$ –2 in. *Panicle* often depressed, subcorymbose, or shortly ovate, never large compound; bracts scarcely $\frac{1}{4}$ in., triangular; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., stellately hairy; bracteoles minute or 0. *Fruit* black, more rarely yellow or red.—There is no note of red fruit from India; yellow fruit is not uncommon there.

16. **HEDEROPSIS**, C. B. Clarke.

A glabrous unarmed tree. *Leaves* 1–3-foliolate; leaflets lanceolate, denticulate or nearly entire; base of petiole much dilated; stipules inconspicuous. *Umbels* panicled; bracts and bracteoles deciduous; pedicels jointed close under the flowers. *Calyx* margined, 5-toothed somewhat prominently. *Petals* 5, valvate. *Stamens* 5. *Ovary* 5-celled; styles connate. *Fruit* berried, large, subglobose, crowned by the stout persistent style. *Seeds* 5–4; albumen ruminated.

Differs technically from *Hedera* in the jointed pedicels: the serrate leaflets and large fruit give to it a widely different aspect.

1 **H. Maingayi**, C. B. Clarke.

MALACCA; *Maingay*, No. 683.

Leaflets of the compound leaves $3\frac{1}{2}$ by $1\frac{1}{2}$ in., simple leaves attain $8\frac{1}{2}$ by 4 in., membranous, opaque, base subacute, secondary nerves raised tertiary obscure; petiole 1–2 in. *Panicle* glabrous or obscurely pubescent; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. Young *flowers* small, petals expanding, reflexed. *Fruit* (not quite ripe) more than $\frac{1}{2}$ in. exclusive of the conical disc and stout style.—Dr. Maingay's examples are in fragments; the size of the panicle is doubtful, and it is not improbable that some at least of the leaves may have more than 3 leaflets or may be pinnate.

17. **GAMBLEA**, C. B. Clarke.

A tree. *Leaves* digitate, 5–3–1-foliolate; stipules within the petiole. *Umbels* panicled, bracts 0, pedicels continuous. *Flowers* polygamous. *Calyx-margin* minute. *Petals* 5, valvate. *Stamens* 5. *Ovary* 3–5-celled: styles 3–5,

combined nearly half their length. *Fruit* globose, 3-5-celled. *Seed* not compressed; albumen lightly ruminated, nearly as in *Hedera*.

1. *G. ciliata*, C. B. Clarke; leaflets oblanceolate or if solitary cordate harshly pilose above margin bristle-ciliate.—Araliad sp. 3, *Herb. Ind. Or. H. f. & T.*

SIKKIM; Tonglo, alt. 10,000 ft., J. D. H., Gamble; Jongri, C. B. Clarke.

Unarmed, 30 ft. *Leaflets* $6\frac{1}{2}$ by $2\frac{1}{2}$ in., acuminate, hairs on both surfaces harsh in age, or nearly glabrous beneath; petiolules $0-\frac{1}{4}$ in., densely rusty villose. *Umbels* in small panicles; pedicels $\frac{1}{2}-\frac{3}{4}$ in., puberulo-pubescent. *Fruit* $\frac{1}{4}$ in. diam., ultimately glabrous.

18. TUPIDANTHUS, H. f. & T.

A glabrous small tree at first erect, afterwards a lofty climber. *Leaves* digitate; leaflets glabrous, leathery, entire; stipules connate within the petiole. *Umbels* in a compound umbel or small panicle; pedicels thick, not jointed under the flowers. *Calyx-margin* obsolete. *Petals* closely connate, falling off in a cap. *Stamens* very many, in two or several series. *Ovary* cells very numerous; stigmas very many (90), sessile, radiating, contiguous but not connate. *Fruit* globose, depressed (not seen ripe).

1. *T. calyptratus*, H. f. & T. in *Bot. Mag.* t. 4908; *Seem. Rev. Heder. G.*

KHASIA Mts., alt. 2000-3000 ft.; Borpani, H. f. & T. EAST BENGAL; Griffith (Kew Distrib. No. 2701).

Leaflets 7-9, 7 by $2\frac{1}{2}$ in., narrowly oblong, shortly acuminate, narrowed at the base; petiolule 2 in. Main *umbel* about 3-rayed, branches 3 in., very stout with large ovate sheathing leathery persistent bracts at their base; partial umbels 5-7-fid; pedicels $1-1\frac{1}{4}$ in., glabrous, stout. *Buds* $\frac{5}{8}$ in. diam., nearly globose; calyx-tube leathery, smooth. *Stamens* about 50-70, densely packed; filaments and anthers as in most of the order but larger. Unripe *fruit* more than $\frac{3}{4}$ by 1 in., will be berried. *Seeds* numerous, 20-30 at least.

ORDER LXXII. CORNACEÆ. (C. B. Clarke.)

Shrubs or trees. *Leaves* opposite or alternate, generally petioled, entire or occasionally angular lobed or serrate, frequently unequal at the base; stipules 0. *Flowers* usually small, regular, hermaphrodite or unisexual, in axillary or terminal cymes panicles or heads. *Calyx-tube* adnate to the ovary; limb truncate or 4-5-toothed, persistent. *Petals* 0 or 4-5 (occasionally indefinite), epigynous, imbricate or valvate. *Stamens* inserted with the petals and equal to them in number, rarely twice or thrice as many. *Ovary* inferior, 1-4-celled, crowned by a usually fleshy sometimes inconspicuous disc; style single, short or long, stigma capitate or branched; ovule solitary (very seldom 2-3), pendulous from the apex of the cell. *Fruit* generally succulent, 1-4-celled, less often with 2 pyrenes. *Seed* oblong, pendulous, albumen copious, fleshy; embryo minute or cotyledons flat leafy nearly as wide as the seed.—DISTRIB. Species 75, chiefly in the northern hemisphere.

* Flowers hermaphrodite.

† *Petals* narrow much elongate.

Stamens twice or thrice the petals. Cotyledons crumpled . . . 1. *ALANGIUM*.
 Stamens equalling the petals in number. Cotyledons flat . . . 2. *MARLEA*.

†† *Petals short or oblong.*

Ovary 2-celled . . . 3. *CORNUS*.
 Ovary 1-celled . . . 4. *MASTIXIA*.

** Flowers unisexual

† *Leaves opposite.*

Petals 4. Stamens 4 . . . 5. *AUCUBA*.

†† *Leaves alternate.*

Ovary 1-celled. Flowers in dense heads . . . 6. *NYSSA*.
 Ovary 4-celled. Flowers in large panicles . . . 7. *TORICELLIA*.

1. *ALANGIUM*, Lamk.

Shrubs or small trees, armed or not. *Leaves* alternate, petioled, oblong, entire, 3-nerved at the base, persistent. *Flowers* in axillary fascicles or condensed cymes, hermaphrodite, silky, white, jointed on the pedicel; bracts 0. *Calyx-tube* adnate to the ovary, limb 5-10-toothed or truncate. *Petals* 5-10, linear-oblong, valvate, then reflexed. *Stamens* twice as many as the petals or more, filaments hairy; anthers very long. *Ovary* inferior, 1-celled, surmounted by a disc; style very long, stigma large, capitate; ovule pendulous. *Fruit* a berry, crowned by the somewhat enlarged calyx-limb. *Seed* oblong, albumen ruminated; cotyledons leafy, crumpled; radicle elongate.—*DISTRIB.* Species 2; tropical and subtropical Asia and Africa.

The species with stamens equal in number to the petals in which the structure of the embryo is unknown are here for convenience placed under *Marlea*; Sir J. Hooker (*Gen. Pl.* i. 949) has placed them in *Alangium*, but till the embryo is known their position must be uncertain.

1. *A. Lamarckii*, *Thwaites Enum.* 133; calyx-tube in the bud not furrowed, fruit ellipsoid quite smooth with slight vertical ribs when dry. *Dalz. & Gibs. Bomb. Fl.* 109; *Brand. For. Fl.* 250. *A. decapetalum*, Lamk. *Dict.* i. 174; *DC. Prodr.* iii. 203; *Wall. Cat.* 6884; *W. & A. Prodr.* 325; *Wight Ic.* t. 194; *Miq. Fl. Ind. Bat.* i. pt. i. 774; *Kurz For. Fl.* i. 543. *A. hexapetalum*, Lamk. & *DC. Ilc.*; *Roxb. Hort. Beng.* 38, *Fl. Ind.* ii. 502; *Wall. Cat.* 6883; *W. & A. Prodr.* 326; *Wight Ill.* t. 96. *A. tomentosum*, Lamk. & *DC. Il. c.*; *Wall. Cat.* 6885. *A. sundanum*, *Kurz l. c.* *A. latifolium*, *Miq. in Pl. Hohe-nack.* No. 719.—*Rheede Hort. Mal.* iv. tt. 17, 26.

Throughout India from the N.W. HIMALAYA to CEYLON and TENASSERIM; very common.—*DISTRIB.* Malaya and South China to the Philippines. East Africa.

A small tree or rambling shrub, armed or not. *Leaves* 3-6 by 1-2 in., oblong (*A. decapetalum*), or elliptic (*A. hexapetalum*), acute or subobtus, the base unequal somewhat rounded, above nearly glabrous with pubescent nerves, beneath with more or less scattered hair and often with tufts of hairs or hollow glands in the axils of the primary nerves; petiole $\frac{1}{4}$ in., hairy, often villous or woolly. *Flowers* in small close fascicles; peduncles pedicels and calyx-tube usually woolly. *Calyx-limb* minutely toothed. *Petals* 5-10 usually 6-7, $\frac{1}{2}$ -1 $\frac{1}{4}$ in. woolly without. *Stamens* about 20-30. *Style* glabrous, uniformly cylindric, stigma large subglobose. *Fruit* $\frac{5}{8}$ by $\frac{3}{8}$ in., black, closely pubescent or finally glabrous; endocarp bony.—The examples of *A. sundanum*

communicated by Miquel to the British Museum agree with Mr. Kurz's, which have the calyx-tube not furrowed, and do not materially differ from *A. Lamarckii*, but the examples of *A. sundanum* at Kew have the calyx-tube (even in the bud) deeply grooved and appear a distinct species.

VAR. *glandulosum*, Thwaites Enum. 133 (sp.); young parts ruddy-furfuraceous, leaves ovate or oblong rostrate-acuminate, beneath with most minute shining glands and with glandular pores at the axils of the primary nerves, flowers glandular sparingly hairy, pedicels and calyces furfuraceous with red glands.—Ceylon, Central Province, alt. 2000–4000 ft.; *Thwaites*.—According to Mr. Thwaites a closely allied but distinct species. The peduncles, calyx-tube, and petals are much less woolly than in *A. Lamarckii*; these and the tender surfaces of the leaves are not (in Thwaites' No. 381) glandular, but covered with most minute glistening hairs, giving under a common lens a glandular appearance. *A. glandulosum* thus has much shorter hairs than the ordinary forms of *A. Lamarckii*, while some examples of *A. Lamarckii* have the under surface of the leaves glabrous or very nearly so.

2. **MARLEA**, Roxb.

Trees or shrubs. *Leaves* alternate, petioled, orbicular or oblong from an oblique base. *Flowers* in axillary contracted cymes, white, jointed on the pedicel, hermaphrodite. *Calyx-tube* adnate to the ovary, limb toothed or truncate. *Petals* 4–8, linear, free or slightly cohering at the base, valvate. *Stamens* 4–8, filaments attached to the petals slightly at the base and there usually hairy; anthers linear. *Ovary* 1–3-celled or 1-celled at the apex 2–3-celled at the base, crowned by a disc; style long, often thicker upwards and pubescent, stigma simple or lobes 4 linear or sub-clavate; ovule solitary in each complete or incomplete cell. *Berry* 1–2-celled, 1–2-seeded. *Seed* (in *M. begoniæ-folia* and *ebenacea*) oblong, compressed; cotyledons orbicular, thin, leafy; radicle short.—**DISTRIB.** Species 8; India, to Japan, Malaya, Australia, and Polynesia.

SECT. I. *Pseudalangium*, F. Muell. *Ovule* 1. *Embryo* of *Marlea*. (**RHYTIDANDREA**, *A. Gray.*)

1. ***M. Griffithii***, *C. B. Clarke*; leaves oblong acuminate, cymes repeatedly divided, flowers numerous and close, style glabrous, stigma simple sub-globose.

MALACCA; *Griffith* (No. 3387 Kew Distrib.); *Maingay* No. 708.

A tree (*Maingay*); branchlets minutely rusty-pubescent. *Leaves* $5\frac{1}{4}$ by $1\frac{3}{4}$ in., very unequal auricled at the base, nearly glabrous or minutely pubescent on the nerves above, beneath with spreading fulvous hairs on the main nerves and the surface minutely dotted and with more or less scattered villous hairs; petiole $\frac{1}{2}$ in., fulvous, villous. *Cyme* with minute close fulvous pubescence rather longer and softer on the calyx-tube; bracteoles most minute, linear, deciduous. *Calyx-tube* not furrowed, limb almost truncate. *Petals* 5, $\frac{1}{3}$ in., nearly glabrous. *Stamens* 5, filaments short with much wool at their summit. *Ovule* 1.

2. ***M. ebenacea***, *C. B. Clarke*; leaves oblong acuminate, cymes few-flowered, style hairy, stigma lanceolate grooved. *Alangium ebenaceum*, *Griff. in Herb.*

MALACCA; *Griffith* (No. 3383 Kew Distrib.); *Maingay* No. 706.

Branches stout, glabrous or nearly so. *Leaves* 10 by $3\frac{1}{4}$ in., glabrous, entire, thick and somewhat coriaceous, base subacute slightly unequal; petiole $\frac{3}{8}$ – $\frac{1}{2}$ in. thick. *Cyme* short, 4–8-flowered, minutely fulvous-pubescent. *Calyx-tube* more softly pubescent, not grooved, limb much dilated, truncate. *Petals* $\frac{3}{4}$ –1 in., 6 (sometimes 5),

with minute close tomentum. *Stamens* 6 or 5, filaments short, woolly. *Style* shortly hairy, stigma an elongate quadrangular pyramid; ovule 1. *Fruit* $\frac{7}{8}$ by $\frac{1}{2}$ – $\frac{3}{8}$ in., nearly glabrous and without ribs, crowned by the short cylindric truncate little-enlarged limb of the calyx. *Seed* much compressed, albumen fleshy; cotyledons orbicular, thin, flat.

3. **M. nobilis**, C. B. Clarke; leaves elliptic or orbicular, cymes few-flowered, calyx-tube in the bud deeply grooved.

MALACCA; Griffith (Kew Distrib. Nos. 3384, 3385); Maingay No. 707. SINGAPORE, Maingay No. 705.

Branchlets petioles cymes and leaves beneath densely fulvous-villous. *Leaves* often 8 by $5\frac{1}{2}$ in. (sometimes only half these dimensions), not acuminate, from cordate to subacute at the base, firm, at length glabrous above; petiole often $\frac{3}{4}$ in. *Cyme* short, 4–8-flowered. *Calyx-tube* deeply grooved, teeth prominent rising from the angles. *Petals* 6–5, $\frac{3}{4}$ in., much dilated at the base, very villous. *Stamens* 6–5; filaments short woolly. *Style* cylindric densely villous, the very apex narrowed, stigma as in *M. ebenacea*; ovule 1. *Fruit* 1 by $\frac{5}{8}$ in., ellipsoid, compressed, very woolly, with 10 or 12 light vertical ridges, crowned by the incurved calyx-teeth.

4. **M. barbata**, R. Br. in Wall. Cat. 7129; shaggy with much soft spreading hair, leaves elliptic or ovate acuminate, cymes many-flowered, style glabrous apex almost divided into two subclavate stigmas.

BHOTAN and ASSAM; Griffith (Kew Distrib. No. 3388). KHASIA Mts.; Wallich.

Leaves 4 by $2\frac{1}{2}$ in., entire, rounded or subcordate at the base, with scattered golden or brownish hairs on both surfaces especially beneath; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., densely hairy. *Cyme* 12–30-flowered with spreading golden hairs. *Calyx-tube* shaggy, not grooved, teeth lanceolate. *Petals* 6–5, $\frac{3}{8}$ – $\frac{1}{2}$ in., hairy on the back. *Filaments* short, hairy. *Ovule* 1. *Fruit* $\frac{1}{2}$ by $\frac{1}{2}$ in., ovoid, finally glabrous, slightly striated longitudinally, crowned by the erect calyx-teeth.

SECT. II. **Eu-Marlea**. *Ovules* 2, rarely 1 or 3. *Fruit* normally 2-seeded.

5. **M. begoniæfolia**, Roxb. Cor. Pl. t. 283, Hort. Beng. 28, Fl. Ind. ii. 261; young leaves and innovations villous, mature leaves more glabrous broad angular lobed or entire, connective hairy or nearly glabrous, style glabrous or with scattered hairs. DC. Prodr. iv. 267; Bot. Reg. 1838, t. 61; Wall. Cat. 3719; Miq. Fl. Ind. Bat. i. pt. i. 744; Brand. For. Fl. 251; Kurz For. Fl. i. 544. *M. affinis*, Dene. in Jacq. Voy. Bot. t. 83. *M. tomentosa*, Endl. ex Hassk. in Flora 1844, p. 605; Miq. l. c. 775; Kurz l. c. 545. *Diaccarpium tomentosum*, Blume Bijl. 657; Hassk. in Bonpland. vii. 173. *D. rotundifolium*, Hassk. l. c. 172. *Stylidium chinense*, Lour. Fl. Cochinch. 221. *Strax javanicum*, Blume Bijl. 671 (ex Kurz).

Throughout Northern India, alt. 1000–6000 ft., common from the PUNJAB to BENGAL and BURMA.—DISTRIB. China, Japan.

A tree, often small, but attains 60 ft.; branches horizontal. *Leaves* $4\frac{1}{2}$ by $3\frac{1}{2}$ in., sometimes very large, from orbicular to broad oblong, acuminate, base rounded or subcordate unequal, not serrate nor denticulate, above glabrous when mature or villous on the nerves rarely with scattered fulvous hairs on the surface also, mature usually glabrous beneath with or without tufts of hairs in the axils of the main nerves, which are puberulous, or closely hairy on the nerves; petiole 1– $1\frac{1}{4}$ in., fulvous-hairy or glabrous. *Cymes* 1–3 in., dichotomous, 8–12-flowered, more or less fulvous-hairy; bracts inconspicuous. *Calyx-tube* not grooved; limb shortly toothed. *Petals* usually 6–8, slightly hairy. *Filaments* short, hairy. *Style* usually glabrous, stigma capitate, sub-2–4-lobed. *Fruit* $\frac{1}{2}$ by $\frac{1}{4}$ in., ovoid, glabrous, obscurely ribbed, crowned with the very

narrow calyx-limb.—The Japan *M. macrophylla* and *M. heterophylla* hardly differ from this.

VAR. *alpina*; leaves not angular, hairy all over beneath and no tufts in the nerve-axils.—Sikkim, alt. 6000–9000 ft.; *H. f.* & *T.* *Marlea* sp. 2.

3. **CORNUS**, Linn.

Trees and shrubs, glabrous or hairy, hairs often centrally attached. *Leaves* opposite or alternate, petioled, entire. *Flowers* small, hermaphrodite, white or yellow, in branched cymes or in involucrate heads. *Calyx-tube* campanulate or urn-shaped; limb with 4 short or long teeth. *Petals* 4, oblong, valvate. *Stamens* 4, anthers oblong. *Ovary* 2- (very rarely 3-) celled; style filiform or cylindrical, stigma capitate sub-2-lobed; ovule solitary pendulous in each cell. *Drupe* ovoid, 2-celled, 2-seeded; endocarp bony. *Seeds* oblong, compressed, albumen fleshy; cotyledons leafy.—**DISTRIB.** Species 15, in N. temperate regions, and 2 in Burma and Hongkong.

SECT. I. *Thelycrania*, Endl. *Flowers* cymose, without bracts.

1. **C. *sanguinea***, Linn.; Boiss. *Fl. Orient.* ii. 1092; a shrub, leaves opposite rarely exceeding 3 in. shortly or not at all acuminate not very glaucous beneath. *DC. Prodr.* iv. 272; *Brand. For. Fl.* 253. *C. australis*, *C. A. Mey.*; Boiss. *l. c.*

KASHMIR; alt. 7000 ft.; Gulmurg, *Stewart*.—**DISTRIB.** W. and N. Asia, Europe.

An erect shrub, branchlets leaves beneath and cymes with minute white hairs. *Leaves* (in Kashmir examples) $1\frac{1}{2}$ by $1\frac{1}{4}$ in., ovate from a rounded base, obtuse, beneath paler and with appressed hairs, nerves 4 on each side with spreading crisped hairs beneath; petiole nearly $\frac{1}{4}$ in. *Fruit* $\frac{1}{5}$ in. diam., subglobose, minutely hairy.

2. **C. *macrophylla***, Wall. in *Roxb. Fl. Ind. ed. Carey & Wall.* i. 433; a tree, leaves opposite or alternate usually exceeding 3 in. distinctly acuminate glaucous beneath. *Don Prodr.* 141; *Wall. Cat.* 469; *DC. Prodr.* iv. 272; *Brand. For. Fl.* 252, t. 32. *C. brachypoda*, *C. A. Mey.*; *Walp. Ann.* ii. 725.

Throughout the HIMALAYA, alt. 4000–8000 ft., frequent.—**DISTRIB.** China, Japan.

An erect tree 40 ft., branches horizontal. *Leaves* 6 by $3\frac{1}{4}$ in. (often much larger), ovate; base rounded or subacute; secondary nerves 6 on each side, ultimately glabrous above, beneath with scattered minute appressed hairs; petiole 1 in. *Panicles* terminal, erect, often 4–5 in. diam., branches opposite or alternate. *Calyx-tube* urn-shaped, whitish from the numerous appressed hairs. *Fruit* $\frac{1}{2}$ – $\frac{1}{3}$ in. diam., globose.—*C. alternifolia*, Linn. f., a N. American species differs very little, if at all, from this.

VAR. *Stracheyi*; panicle densely clothed with spreading fulvous hairs, young leaves silky hairy.—Kumaon, alt. 7000 ft., Kathi; *Strachey & Winterbottom*.

3. **C. *oblonga***, Wall. in *Roxb. Fl. Ind. ed. Carey & Wall.* i. 432; leaves narrowly oblong narrowed at both ends adult glabrous or minutely hairy beneath. *Don Prodr.* 140; *Wall. Cat.* 468; *DC. Prodr.* v. 272; *Brand. For. Fl.* 253; *Kurz For. Fl.* i. 545.

From the JHELMUM to NIPAL, alt. 4000–7000 ft.; frequent. BHOTAN *Griffith*. KHASIA Mts., alt. 4500 ft.; *C. B. Clarke*. MARTABAN HILLS; alt. 4000–7000 ft. *Kurz*.

A tree 20–30 ft. *Leaves* 5 by $1\frac{1}{4}$ in., somewhat coriaceous, nerves much elevate beneath; petiole $\frac{1}{4}$ in. *Pedicels* and cyme-branches minutely pubescent; bracteoles small. *Calyx-tube* campanulate, hardly urn-shaped. *Petals* almost glabrous. *Fruit* $\frac{1}{2}$ by $\frac{1}{3}$ in., ellipsoid, glabrous or nearly so.

VAR. *Griffithii*; leaves beneath with spreading hairs.—Bhotan; *Griffith*, No. 2091.

SECT. II. **Benthamia**, Lindl. (gen.) *Flowers* connate in dense heads subtended by 4 large white bracts.

4. **C. capitata**, Wall. in Roxb. *Fl. Ind. ed. Carey & Wall.* i. 434; leaves oblong or elliptic adult closely covered above with minute hairs, calyx-teeth distinct reflexed. *Don Prodr.* 141; *Wall. Cat.* 467, *Pl. As. Rar.* t. 214; *Brand. For. Fl.* 253. *Benthamia fragifera*, Lindl. in *Bot. Reg.* t. 1579; *Wight Ill.* t. 122.

From KULU and KUMAON to BHOTAN, alt. 4000–7000 ft., not rare.

A small tree, the tender parts densely clothed with minute bicuspidate hairs. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., narrowed at both ends, hardly acuminate. *Heads* hemispherical, $\frac{3}{8}$ – $\frac{1}{2}$ in. wide; bracts 1 by $\frac{1}{2}$ in. *Fruiting* heads depressed, globose, 1 in. wide, succulent, of numerous coalesced pericarps; endocarp about $\frac{1}{4}$ in., bony, ellipsoid or obovoid, compressed; calyces spreading on all sides from the young fruit heads, ultimately deciduous.

VAR. *khassiana*; adult leaves glabrous or very nearly so.—Khasia, alt. 5000–6000 ft., Kalapani; *H. f. & T.* This variety approaches *C. japonica*, *Thunb.* which is closely allied but has the calyx-limb subtruncate.

4. **MASTIXIA**, Blume.

Trees, young parts more or less pubescent. *Leaves* alternate or opposite, petioled, entire. *Flowers* hermaphrodite, 2-bracteolate, small, in terminal many-flowered panicles; bracts small or lengthened, pedicels short or 0, jointed under the flower. *Calyx-tube* campanulate, pubescent or silky; limb 5–4-toothed. *Petals* 5–4, ovate, leathery, valvate, silky. *Stamens* 5–4; anthers cordate-oblong. *Ovary* 1-celled; disc fleshy; style cylindric, simple; ovule 1, pendulous from one side of the cell very near its summit. *Drupe* ellipsoid or ovoid, crowned by the calyx-teeth or a scar; putamen grooved down one face; endocarp protruded inwards down one side. *Seed* ellipsoid; albumen fleshy; embryo small, radicle elongate, cotyledons thin, elliptic.—DISTRIB. Species 8; S. India and Malaya.

* Leaves all alternate.

† Bracts about $\frac{1}{2}$ in., acute.

1. **M. tetrandra**, C. B. Clarke; bracts caducous, calyx-teeth in the bud shortly triangular, stamens usually 4. *Bursinopetalum tetrandrum*, *Wight ms.*; *Thwaites Enum.* 42.

CEYLON; *Thwaites*.

A large tree, foliage heavy green. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., elliptic or obovate-oblong, suddenly obtusely acuminate, narrowed at the base, glabrous, drying green; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., minutely pubescent when young. *Panicle* 2–3 in. diam., branches and calyx-tube with close fulvous pubescence. *Calyx-teeth* rarely 5. *Style* $\frac{1}{16}$ in. *Fruit* 1 by $\frac{3}{8}$ in., almost cylindric, or $\frac{3}{4}$ by $\frac{1}{2}$ in. ellipsoid.

VAR. *Thwaitesii*; leaves $1\frac{3}{4}$ by $\frac{1}{2}$ – $\frac{3}{4}$ in. obtuse turning black in drying, panicle and petals glabrous.—Ceylon; *Thwaites*. Very different in general appearance from *M. tetrandra*, but Mr. Thwaites regards it as a variety.

2. **M. arborea**, C. B. Clarke; bracts acute persistent till after the petals drop, calyx-teeth in the bud triangular-lanceolate, stamens 5. *Bursino-*

petalum arboreum, *Wight Ic.* t. 956; *Thwaites Enum.* 42; *Bedd. Fl. Sylv.* t. 216.

CACHAR; Calacherra, *R. L. Keenan*. NILGHIRI Mts.; near Sisparah, *Wight*. CEYLON; alt. 4000-7000 ft., *Gardner, Thwaites*.

A large tree, foliage dark green. *Leaves* 3 by 2 in., elliptic or obovate-oblong, suddenly shortly acuminate, narrowed at the base, glabrous, drying black; petiole $\frac{1}{2}$ -1 in., minutely pubescent when young. *Panicle* 2-3 in. diam., branches and calyx-tube with close fulvous pubescence. *Style* less than $\frac{1}{16}$ in. *Fruit* $1\frac{1}{2}$ by $\frac{1}{2}$ - $\frac{5}{8}$ in., ellipsoid.—Closely allied to the preceding. Possibly not distinct from *M. pentandra*, *Blume Mus. Bot.* i. 256, of which there is no authentic example at Kew; the description agrees except that the leaves are much larger, 4-8 in.

†† *Some of the bracts* $\frac{1}{2}$ - $\frac{3}{4}$ in., linear-oblong, obtuse.

3. *M. pentandra*, *Blume Mus. Bot.* i. 256; leaves 4-7 in., bracteoles and calyx-tube very hairy, calyx-teeth 5 ovate subacute. *M. cuspidata*, *Blume l. c.*, *ex Miq. Fl. Ind. Bat.* i. pt. i. 1095.

MALABAR; CANERA, Dharwar and Bellary; *Law*; Concan; *Stocks*.

A tree. *Leaves* 4-7 by $1\frac{1}{4}$ - $2\frac{1}{4}$ in., oblong or elliptic, narrowed to each end, puberulous on both surfaces at least when young, drying green, whiter beneath; petiole $\frac{3}{4}$ -1 $\frac{1}{2}$ in., pubescent when young. *Panicle* 3-6 in. diam., very pubescent towards the extremities. Some of the lower bracts $1\frac{1}{4}$ in., leaflike though narrow, many of the upper exceeding $\frac{1}{4}$ in. *Buds* silky. *Style* less than $\frac{1}{16}$ in. *Fruit* $1\frac{1}{4}$ by $\frac{2}{5}$ in., elongate-ellipsoid.—Identified from description only: *Blume* does not mention the large bracts, so that this is possibly a new species.

4. *M. bracteata*, *C. B. Clarke*; leaves 2 in., bracteoles and calyx-tube minutely silky or almost glabrous, calyx-teeth 5 short triangular.

MALACCA; *Maingay*, No. 710.

Branchlets glabrous. *Leaves* 2-3 by 1-1 $\frac{1}{2}$ in., elliptic, suddenly and obtusely acuminate, narrowed at the base, glabrous, drying an olive green; petiole $\frac{1}{4}$ in. *Panicle* 2 in. diam., nearly glabrous. Some of the lower bracts nearly 1 in., leaflike though narrow, many of the upper nearly $\frac{1}{4}$ in. and obtuse. *Buds* silky. *Style* less than $\frac{1}{16}$ in. *Fruit* not seen.

** Leaves subopposite and opposite.

5. *M. Junghuhniana*, *Miq. Fl. Ind. Bat.* i. pt. i. 772; leaves glabrous beneath or shortly hairy on the main nerves, calyx-teeth 4 roundish minutely pubescent.

MALACCA; *Maingay* No. 709.

A tree of moderate size; tips of branchlets pubescent. *Leaves* $4\frac{1}{2}$ by 2 in., oblong, narrowed to both ends, drying a shining green above, much whiter beneath; petiole $\frac{1}{2}$ in., pubescent when young. *Panicle* 2-3 in. diam., trichotomous; bracteoles $\frac{1}{8}$ - $\frac{1}{2}$ in., pubescent. Young petals most minutely silky. *Fruit* not seen.—Identified with *M. Junghuhniana* by the description, which closely agrees. It has been named *M. trichotoma*, *Blume*, in the Kew Herbarium, of which species it is very possibly a variety.

6. *M. Maingayi*, *C. B. Clarke*; under surface of the leaves and panicle densely softly woolly.

SINGAPORE; *Maingay* No. 711.

Branchlets densely woolly. *Leaves* 5 by 2 $\frac{1}{4}$ in., elliptic, acute not acuminate, narrowed at the base, shining green above, with much spreading soft hair and rugose beneath; petiole 1 in. *Panicle* 4 in. diam.; branches thick; bracts $\frac{1}{2}$ in., ovate, obtuse, thick. Young flowers densely woolly. *Fruit* $1\frac{1}{4}$ by $\frac{5}{8}$ in., ovoid, much narrower upwards.—A very fine and distinct species.

5. **AUCUBA**, *Thunb.*

Glabrous branching shrubs. *Leaves* opposite, petioled, ovate or lanceolate, obtusely serrate, leathery, shining, turning black in drying. *Flowers* small, dioecious, in pseudo-axillary panicles, lurid purple; bracts inconspicuous; pedicels jointed and 2-bracteolate. **MALE**: calyx small, 4-toothed; petals ovate or lanceolate, valvate; stamens 4; disc quadrangular, fleshy; no rudiment of an ovary. **FEMALE**: calyx-tube ovoid, limb 4-toothed; petals as in the male; no rudiments of stamens; ovary 1-celled, disc fleshy; style short, thick, stigma capitate; ovule solitary, pendulous. *Berry* ellipsoid, crowned by the calyx-teeth and style. *Seed* oblong, albumen copious; embryo minute, radicle superior near the summit of the seed.—**DISTRIB.** Species 3 or 1, Sikkim, Hongkong, Japan.

1. **A. himalaica**, *Hook. f. Ill. Him. Pl. t. 12*. leaves lanceolate or narrowly lanceolate acuminate, branches of the panicle very pilose.

SIKKIM and BHOTAN, alt. 6000–9000 ft., *Griffith, &c.*—**DISTRIB.** Japan.

A stout shrub, 6–12 ft., branching dichotomously. *Leaves* 8 by 1½ in., narrowed at the base, denticulate or serrate; petiole ¾–1 in. *Panicles* ¾ in. diam., terminal on very short lateral branches. *Fruit* ½ by ¼ in., smooth, shining, variable in colour, orange yellow or scarlet.—Yokohama specimens, named *A. longifolia* in *Herb. Hook.*, are identical with the Indian. *A. japonica* differs by having rather broader less acuminate leaves and less hairy panicles. The increase of material renders more probable the suggestion made by Sir J. Hooker l. c. that there is but one and that a very variable species of *Aucuba*.

6. **NYSSA**, *Linn.*

Trees (or shrubs), innovations silky. *Leaves* alternate, petioled, entire. *Flowers* capitate, on axillary peduncles, polygamo-dioecious, 1 or few females and many males in a head, each 3–4-bracteolate, or the males irregularly coalescing. **MALE**: calyx short, cup-shaped, 5–7-toothed; petals 5–7, imbricate, hairy; stamens usually 10 (in the Indian species) around a large circular disc; rudiment of the ovary 0 or small. **FEMALE**: calyx-tube campanulate; limb 5-toothed; petals 0 or minute; no rudiments of stamens; ovary 1-celled; style cylindric, simple or shortly 2-fid; ovule solitary, pendulous. *Berry* oblong or ovoid. *Albumen* copious; cotyledons flat, leafy, nearly as broad as the seed.—**DISTRIB.** Species 5–6, in N. America, and from Sikkim to Java.

1. **N. sessiliflora**, *Hook f. in Gen. Pl. i. 952*; leaves oblong acuminate, flowers sessile. *Daphniphyllopsis capitata*, *Kurz For. Fl. i. 240*; and in *Journ. As. Soc. 1875*, part ii. 201, *with fig.* *Ilex daphnephylloides*, *Kurz in Journ. As. Soc. 1870*, pt. ii. 72. *Agathisanthes javanica*, *Blume Bijl. 645*; *Miq. Fl. Ind. Bat. i. pt. i. 839*. *Ceratostachys arborea*, *Blume Bijl. 644*; *Miq. l. c.*

SIKKIM, alt. 5000–8000 ft.; *J. D. H., Kurz. KHASIA MTS.: H. f. & T. Cachar*; *R. L. Keenan. MARTABAN*, alt. 5000–7000 ft.; *Kurz.*—**DISTRIB.** Java.

A tree, 60 ft. *Leaves* 6 by 2 in., serrate at the base, punctate on both surfaces, adult glabrous beneath, rarely pubescent and chiefly on the nerves; petiole 1 in. *Peduncles* 1–1½ in., more or less pubescent. *Calyx-teeth* rounded, pubescent and ciliate. Ripe *fruit* ½ by ⅓ in., ovoid, narrowed upwards to a point, glabrous.

7. **TORICELLIA**, DC.

A small tree, branches thick. *Leaves* alternate, long-petioled, deciduous, broadly cordate, acute, sharply serrate; petiole sheathing at base. *Flowers* small, white, diœcious, numerous in pendulous panicles; pedicels short, bracteolate, in the female jointed under the flower, in the male not. MALE: calyx-tube short, lobes generally 5; petals 5, oblong, acuminate, induplicate-valvate; stamens usually 5; disc flat; rudiment of ovary 0 or of 1-3 small bristles. FEMALE; calyx-tube ovoid; limb minute, 3-5-toothed; petals and stamens 0; ovary 3-5-celled, disc inconspicuous; style very short, stigmas 3-5, cylindric; ovule solitary pendulous in each cell. *Drupe* small, purple, obliquely ovoid, crowned by the stigmas, 4-celled, 1-seeded. *Seed* linear, curved; albumen fleshy; embryo minute.

1. **T. tiliæfolia**, DC. *Prodr.* iv. 257; *Seem. Journ. Bot.* iii. 361, t. 41. *Sambucus tiliæfolia*, Wall. *Cat.* 483.

NIPAL; Wallich. SIKKIM, alt. 6000 ft., J. D. H. BHOTAN; Griffith.

Leaves 6 in. diam., adult glabrous or slightly pubescent on the nerves beneath, membranous, palmately nerved from the base; petiole often 3-4 in. Male *panicle* 1 ft., very compound, minutely pubescent or glabrous, with a few scattered linear bracts $\frac{1}{2}$ in.: fem. sometimes nearly as long as the male, but much less dense and with far fewer more scattered flowers. *Fruit* $\frac{2}{3}$ in., ovoid, glabrous.

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THE
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ASIATIC SOCIETY OF BENGAL.

ASSISTED BY VARIOUS BOTANISTS.

VOL. III.

CAPRIFOLIACEÆ TO APOCYNACEÆ.

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FLORA OF BRITISH INDIA.

ORDER LXXIV. **CAPRIFOLIACEÆ.** (By C. B. Clarke.)

Shrubs, erect or scandent, or small trees (*Adoxa*, a herb), branches round. *Leaves* opposite, rarely 3-nate; stipulate or not. *Flowers* hermaphrodite, cymose or paniced, capitate in *Adoxa*, regular or irregular. *Calyx-tube* adnate to the ovary; limb 3-5-toothed or -lobed. *Corolla* gamopetalous; limb often 2-lipped, 5-lobed, lobes imbricate in bud. *Stamens* 5 (in *Adoxa* 8-12), on the corolla alternate with its lobes. *Ovary* inferior (in *Adoxa* $\frac{1}{2}$ -inferior), 2-8-rarely 1-celled; style long, with capitate stigma, or short, 2-5-lobed; ovules solitary, pendulous, or several on axile placentas. *Fruit* a drupe (in *Abelia* dry), with 1-8 cartilaginous pyrenes, or a many-seeded berry. *Seeds* 1 or many in each cell, albumen copious fleshy; embryo usually minute.—Species 200; mostly Northern, with a few Australian and S. American.

Distinguished from *Rubiaceæ* chiefly by habit and the frequently irregular flowers and rarity of stipules.

TRIBE I. Sambuceæ. *Corolla-limb* regular. *Style* short, 2-5-lobed. *Ovary-cells* 1-ovuled.

Leaves 2-ternatisect. Flowers capitate. Stamens 8-12	1. ADOXA.
Leaves pinnate; leaflets 5-9, serrate	2. SAMBUCUS.
Leaves undivided	3. VIBURNUM.

TRIBE II. Lonicereæ. *Corolla-limb* regular or irregular. *Style* long; stigma capitate.

Leaves sessile, connate, obovate. Ovary-cells 3, 1-ovuled	4. TRIOSTEUM.
Calyx-lobes elongate. Fruit elongate, coriaceous, 1-seeded	5. ABELIA.
Leaves entire. Flowers paired. Berry 2-3-celled	6. LONICERA.
Leaves exstipulate. Branches fistular. Ovary 5-8-celled	7. LEYCESTERIA.
Leaves stipulate. Branches solid. Ovary 5-celled	8. PENTAPYXIS.

1. **ADOXA**, Linn.

A small glabrous succulent herb. *Radical* leaves long-petioled, 3-ternatisect; cauline 3-fid. *Flowers* small, green, in a peduncled head. *Calyx-tube* hemispheric; limb $\frac{1}{2}$ -superior, 2-4-lobed. *Corolla* rotate, 4-6-lobed. *Stamens* 8-12, in pairs alternating with the corolla lobes; anther-cells 2, confluent above. *Ovary* 3-5-celled; styles 3-5; ovules 1 in each cell. *Drupe* subglobose; pyrenes 4-5, compressed. *Seeds* obovate, flattened.

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A genus differing much from the order in habit. Perhaps nearer *Chrysosplenium*.

1. **A. Moschatellina**, Linn.; Boiss. *Fl. Orient.* iii. 2.

VAR. *inodora*, Falc. mss.; inodorous, cauline leaf often solitary, flowers 5-6-merous.

KASHMIR, Falconer; Pir Pinjal, alt. 11,500 ft., C. B. C.—DISTRIB. N. Europe, Asia, and America.

Rootstock short, creeping. Stem simple, 3-6 in., terminating in a solitary peduncle. Radical leaves $\frac{1}{2}$ -2 in. diam., with a long 2-6 in. petiole; cauline 2 in European, often 1 in Kashmir specimens, smaller, petiole short or 0; segments obtuse or mucronate. Heads $\frac{1}{2}$ in. diam., green, in European specimens with a terminal 4-merous and 4 lateral 5-merous flowers; in Kashmir with a terminal 5-merous and 4 or more lateral 6-merous ones. Drupe $\frac{1}{8}$ in. diam.; endocarp and seeds flattened.—Odour of the European plants musky, of Kashmir 0, on which account and the 5-6-merous flowers Falconer regarded the latter as a distinct species (*A. inodora*, Falc.), but its habit and all other characters are identical with the European.

2. **SAMBUCUS**, Linn.

Shrubs or small trees. Leaves unequally pinnate, large, often stipulate; leaflets serrate or laciniate. Corymbs large, very compound, bracteate; flowers small, jointed with the pedicel, very rarely bracteolate. Calyx-limb 3-5-toothed. Corolla rotate or campanulate, 3-5-partite. Stamens 5, attached to the base of the corolla. Ovary 3-5-celled; style short, 3-5-partite, or stigmas 3-5-sessile; ovules 1 in each cell, pendulous. Drupe crowned by the calyx-teeth, 3-5-celled. Seeds compressed; embryo long.—DISTRIB. Species 10-12, in all temperate regions (except S. Africa).

1. **S. Ebulus**, Linn.; herbaceous, leaflets free, stipules often foliaceous serrate, drupes black. *H. f. & T. in Journ. Linn. Soc.* ii. 179; *Brundis For.* Fl. 260; Boiss. *Fl. Orient.* iii. 2.

KASHMIR; alt. 6000-10,000 ft., plentiful; *T. Thomson*, &c.—DISTRIB. Europe, N. Africa, and to the Elburz Mts.

Gregarious; stems mostly simple, 3-6 ft. high. Leaves 9 in.; leaflets 5-9, oblong-lanceolate, 3-6 in., puberulous or nearly glabrous. Corymb peduncled or leafy at the base, compact and 3-rayed in English, usually larger and many-rayed in Kashmir specimens; bracteoles minute, linear. Corolla $\frac{1}{2}$ in. diam., broadly campanulate, white pink or dark purple. Drupe $\frac{1}{2}$ in. diam., globose.—Flowers with a strong peculiar odour, both in Kashmir and Europe, uppermost usually barren.

2. **S. javanica**, Blume *Bijd.* 657; a straggling shrub, leaflets free, stipules usually small or 0, drupes black. *DC. Prodr.* iv. 322, *Miq. Fl. Ind. Bat.* ii. 124; *H. f. & T. in Journ. Linn. Soc.* ii. 180. *S. Wightianus*, Wall. *Cat.* 6303; *W. & A. Prodr.* 388. *S. rubra*, Ham.; Wall. *Cat.* 482. *S. chinensis*, Lindl. in *Trans. Hort. Soc. Lond.* vi. 297; *DC. l.c.* *S. Thunbergiana*, *Miq. in Ann. Mus. Lugd. Bat.* ii. 265; *Kurz For. Fl.* ii. 3. *Sambucus* sp., *Griff. Notul.* iv. 259.

ASSAM and EAST BENGAL PLAIN; ascending in KHASIA to 5000 ft. alt., in SIKKIM to 6000.—DISTRIB. Java, China, Japan.

Leaves 18 in., of 5-9 oblong-lanceolate leaflets 3-8 in., puberulous or nearly glabrous. Corymb usually leafy at the base, often 1 ft. diam., puberulous or almost villous; bracteoles minute, ovate. Corolla $\frac{1}{2}$ in. diam., broadly campanulate, white or pink. Berry $\frac{1}{8}$ - $\frac{1}{4}$ in. diam., globose.—Uppermost flowers usually barren; female

apetalous in the cultivated *S. chinensis* (Lindley), but not usually so in the wild plant. The Khasia examples have the fruits mostly sessile, agreeing thus more closely with *S. chinensis* than with *S. javanica*, in which the fruits are usually shortly pedicelled.

3. ***S. adnata*, Wall. Cat. 482**; a spreading shrub, leaflets often decurrent, stipules usually small or 0, drupes red. *DC. Prodr.* iv. 322; *H. f. & T. in Journ. Linn. Soc.* ii. 180.

NIPAL, *Wallich*; Tambur Valley, alt. 5000–10,000 ft., *J. D. H. Sikkim*; Singalalah, alt. 10,000 ft., *Gamble, C. B. C.*

A shrub, 4–8 ft. *Leaves* 12 in.; leaflets 5–9, 3–5 in., oblong-lanceolate, puberulous or nearly glabrous. *Corymb* usually leafy at the base, often 9 in. diam., puberulous, bracteoles minute or 0. *Corolla* $\frac{1}{2}$ in. diam., broad-campanulate. *Drupe* $\frac{1}{8}$ in. diam., globose.

3. **VIBURNUM**, *Linn.*

Shrubs or small trees. *Leaves* opposite, rarely 3-nate; stipules inconspicuous (in the Indian species). *Flowers* in terminal or subterminal corymbose or panicked cymes, all fertile in Indian (outer radiant and neuter in some European, &c., species). *Calyx-tube* turbinate or subcylindric; limb short, 5-toothed, persistent. *Corolla* campanulate rotate or tubular; lobes 5, equal. *Stamens* 5, inserted on the corolla-tube. *Ovary* 1–3-celled; style short, stigma sub-3-lobed; ovules 1 in each cell, pendulous. *Drupe* 1- or sub-2–3-celled, 1-seeded. *Seed* oblong, compressed, concave on the ventral face or with the margins greatly incurved; albumen fleshy, uniform or ruminated; embryo minute.—**DISTRIB.** Species 80, in N. temperate regions and in the Andes; a few in the West Indies and Madagascar.

SECT. I. *Eu-Viburnum* (Oersted). *Cymes* corymbose. *Drupe* 1-celled, compressed; endocarp not intruded. *Albumen* uniform, margins little incurved.

* *Corolla rotate or shortly campanulate, lobes spreading* (in *V. corylifolium* unknown).

1. ***V. cotinifolium*, Don Prodr. 141**; leaves ovate or elliptic base obtuse usually woolly beneath, corymb-branches stellately tomentose, calyx glabrous limb very short, corolla shortly campanulate lobes about as long as the tube. *DC. Prodr.* iv. 327; *Wight Ill. t.* 121, A fig. 1–5; *Bot. Reg. t.* 1650; *H. f. & T. in Journ. Linn. Soc.* ii. 174; *Brandis For. Fl.* 258. *V. polycarpum*, *Wall. Cat.* 455; *DC. l.c.* 328.

KASHMIR; alt. 6000–11,000 ft., to KUMAON, frequent. EAST BHOTAN; *Griffith* (Kew Distrib. No. 3399).

A spreading shrub, 5–10 ft. high. *Leaves* 3 by 2 in., obtuse or subacute, subentire rarely coarsely crenate, stellately-woolly at least when young, in age often glabrous except on the nerves beneath; petiole $\frac{1}{4}$ in. *Corymbs* 2–3 in. diam., generally terminal, dense, branches stout; bracteoles linear, equalling the calyx-tube. *Corolla-tube* $\frac{1}{2}$ by $\frac{1}{10}$ in., glabrous, lobes round. *Anthers* large, subexsert. *Style* very short, conical. *Drupe* $\frac{1}{4}$ by $\frac{1}{2}$ in., compressed, broad-oblong, red. *Seed* dorsally 2-grooved, ventrally sub-concave 3-grooved.—*Leaves* usually thick, reticulately rugose and entire, but sometimes thin, glabrous, and somewhat strongly crenate. *V. Lantana*, *Linn.*, differs but slightly by the denticulate leaves and shorter corolla-tube.

2. ***V. corylifolium*, H. f. & T. in Journ. Linn. Soc.** ii. 174; branchlets and large fruiting corymb rufous-hirsute, leaves ovate or elliptic base subcordate, softly hairy beneath.

KHASIA Mts., alt. 5-6000 ft.; Moleem, *Griffith* (Kew Distrib. No. 3402); Kala-Pani, *H. f. & T.*: Moflong, *C. B. C.*

Leaves $2\frac{1}{2}$ by $1\frac{1}{2}$ in., acute, dentate, parallel-nerved. *Corymbs* often on short lateral branches. *Flowers* not seen. *Drupe* $\frac{1}{4}$ by $\frac{1}{5}$ in., compressed ovate-oblong, bright red; seed dorsally convex shallowly 2-grooved, ventrally concave and 2-grooved close to the medial line.

3. *V. stellulatum*, *Wall. Pl. As. Rar.* ii. 54, t. 169; *Cat.* 463; leaves shortly petioled elliptic-lanceolate acuminate toothed stellately pubescent rarely glabrate beneath, corolla small rotate. *DC. Prodr.* iv. 327; *H. f. & T. in Journ. Linn. Soc.* ii. 174; *Brandis For. Fl.* 258. *V. Mullaha*, *Ham.*; *Don Prodr.* 141; *DC. l. c.*

TEMPERATE HIMALAYA, alt. 6000-11,000 ft.; from KASHMIR to SIKKIM, common.

A large shrub: branches puberulous. *Leaves* 3 by $1\frac{1}{2}$ in., base obtuse or cuneate, parallel-veined; petiole $\frac{1}{2}$ in. *Corymbs* terminal, in fruit divaricate, 3-5 in. diam., subglobose; bracts $\frac{1}{2}$ in., linear, membranous, caducous. *Calyx-tube* stellately hairy; lobes minute, ovate. *Corolla-lobes* $\frac{1}{10}$ in., round, pubescent in bud. *Style* short, stigma capitate. *Drupe* $\frac{1}{2}$ by $\frac{1}{5}$ in., compressed, broadly oblong, yellow-red; seed 2-grooved on both faces, hardly concave ventrally.

VAR. 1. involucratum, *Wall. Cat.* 458 (sp.); branchlets and leaves rufous-villous, corymbs densely villous, bracts lanceolate herbaceous persistent.—*Nipal, Wallich*; *Kumaon, Edgeworth*.—*V. forma monstrosa*, *H. f. & T. l. c.* 175.

VAR. 2. glabrescens; corymbs with a few scattered hairs, leaves glabrescent except on the nerves beneath, bracts caducous?—*V. involucratum*, *H. f. & T. l. c.*

4. *V. Griffithianum*, *C. B. Clarke*; leaves short-petioled elliptic or subobovate acute toothed villous beneath, corymbs densely villous umbellately 4-7-rayed, calyx-tube glabrous, corolla very small rotate. *V. foetidum*, var. *Griffithianum*, *Kurz in Journ. As. Soc.* 1877, pt. ii. 121. *V. foetidum*, var. *grandifolium*, *Kurz For. Fl.* ii. 2. *Viburnum* sp., *Griff. Notul.* iv. 259; *l. c. Pl. Asiat.* t. 480, fig. 1.

EAST ASSAM; banks of the Kamyoon in the Naga country, *Griffith* (Kew Distrib. 3403).

Branchlets stout, fuscous villous. *Leaves* $4\frac{1}{2}$ by 2 in., often unequal-sided, base obtusely cuneate, nerves parallel, the lowest not uniting nor quite reaching the base of the leaf; petiole $\frac{1}{2}$ in. *Corymbs* terminal, peduncled, 1-3 in. diam., dense even in young fruit; bracts 0, or few, lanceolate, $\frac{1}{2}$ in. *Calyx-tube* glabrous, viscid and black in the young fruit; teeth broad-oblong. *Corolla-lobes* $\frac{1}{16}$ in., round.—More nearly allied to *V. stellulatum* than to *V. foetidum*.

5. *V. foetidum*, *Wall. Pl. As. Rar.* i. 49, t. 61; *Cat.* 466; leaves oblong-rhomboid 3-nerved at the base remotely toothed nerves beneath stellately pubescent, corymbs subumbellate stellate-pubescent, calyx-tube glabrous. *DC. Prodr.* iv. 325; *H. f. & T. in Journ. Linn. Soc.* ii. 175; *Kurz For. Fl.* ii. 2.

KHASIA Mts. and ASSAM, alt. 3000-5000 ft., common.—*DISTRIB.* North Birma.

An erect shrub, 6-10 ft.; branchlets stellate-hairy. *Leaves* $2\frac{1}{2}$ by $1\frac{1}{4}$ in., scarcely acuminate, base cuneate or rounded, axils of the primary nerves with tufts of hair. secondary transverse conspicuous beneath; petiole $\frac{1}{2}$ in. *Corymbs* terminal, 2-4 in. diam., 4-8-rayed, peduncled; bracts and bracteoles from linear-oblong to spatulate-oblong, hairy. *Calyx-teeth* minute, triangular. *Corolla-lobes* $\frac{1}{16}$ in. diam., round, white. *Drupe* $\frac{1}{5}$ by $\frac{1}{6}$ in., compressed, subacute, red. *Seed* dorsally 2-grooved, ventrally 3-grooved and hardly concave.—Specimens of this in *Herb. Griffith.* are ticketed as from Darjeeling, whither he sent a collector; but the collections from thence were so mixed with others that no confidence is to be placed in their habitats.

VAR. premnacea, *Wall. Cat.* 461 (sp.); bracts at the base of the umbel large leaf-

like sometimes $1\frac{1}{2}$ in. long. *DC. Prodr.* iv. 325.—Khasia Mts. and Birma.—Hardly distinguishable as a variety, the bracts varying from 1 to 8, and from $\frac{1}{2}$ to $1\frac{1}{2}$ in.

6. **V. Colebrookianum**, *Wall. Cat.* 460; leaves large oblong crenate-serrate nearly glabrous, corymbs large on very short axillary branches stellate-hairy, corolla rotate, drupe ellipsoid, seed hardly grooved. *V. lutescens*, *H. f. & T. in Journ. Linn. Soc.* ii. 176, not of *Blume*; *Kurz For. Fl.* ii. 2 (as to *Var. 2 only*).

Subtropical HIMALAYA, alt. 1–5000 ft.; SIKKIM and BHOTAN, common. ASSAM and KHASIA Mts., alt. 0–4000 ft., frequent.

A large spreading shrub, 6–15 ft.; flowering branches usually pendent with large terminal leaves, corymbs from axils below them. *Leaves* $5\frac{1}{2}$ by 2 in., shortly acuminate, cuneate at the base, young and petiole ($\frac{1}{4}$ – $\frac{1}{2}$ in.), stellately pubescent. *Corymbs* umbelliform, dense on a portion of the branch bare of leaves; bracts minute, bracteoles 0. *Calyx-tube* glabrous, teeth minute. *Corolla*-lobes $\frac{1}{10}$ in., round, white. *Drupe* $\frac{1}{5}$ by $\frac{1}{6}$ in., hardly compressed, red: seed obscurely convex dorsally, concave ventrally.—*V. lutescens*, *Blume*, united with this by *H. f. & T.* has berries $\frac{1}{2}$ in. long, narrowly obovoid-oblong, with deeply grooved seed, and terminal inflorescence.

7. **V. punctatum**, *Ham. in Don Prodr.* 142; leaves elliptic-lanceolate coriaceous subentire glabrous punctate beneath, corymb branches angular and calyx-tube minutely scaly, corolla rotate. *Wall. Cat.* 456; *DC. Prodr.* iv. 324; *H. f. & T. in Journ. Linn. Soc.* ii. 176; *Brandis For. Fl.* 260.

NIPAL, *Wallich*. KUMAON; Sarju Valley, alt. 4000 ft., *Strach. & Winterb.*

A stout spreading shrub. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., acute at both ends, often with peltate scales on the midrib beneath; petiole $\frac{1}{2}$ in. *Corymbs* terminal, sessile, in flower 2–6 in. diam., branches umbellate or corymbose, cinnamonaceous when dried; bracts $\frac{1}{2}$ in., lanceolate, deciduous; bracteoles scarcely $\frac{1}{10}$ in., ovate. *Calyx-teeth* minute, obtuse. *Corolla*-lobes $\frac{1}{12}$ in., round, white. *Anthers* large, much exerted. *Drupe* $\frac{1}{4}$ by $\frac{1}{5}$ in., ellipsoid, succulent. *Seed* 2-grooved dorsally, concave 3-grooved ventrally.

Var. acuminata, *Wall. Cat.* 465 (sp.); leaves acuminate, bracts persistent, berry $\frac{1}{2}$ by $\frac{1}{5}$ in., squamulose, seed much compressed obscurely grooved. *V. acuminatum*, *DC. Prodr.* iv. 324; *W. & A. Prodr.* 388; *Wight Ic.* t. 1021; *Bedd. Fl. Sylv.* t. 217. *V. Wightianum*, *Herb. Hohen.* No. 1381, not of *Wall.*—Deccan Mts. alt. 4000–7000 ft., common.—The berry looks so different that it may indicate a distinct species.

8. **V. sambucinum**, *Reinw.; Blume Bijl.* 656; leaves elliptic-lanceolate entire nearly glabrous, corymb-branches and calyx-tube pubescent, corolla rotate. *DC. Prodr.* iv. 325; *Miq. Fl. Ind. Bat.* ii. 120; *Oersted in Vidensk. Meddel.* 1860, t. 7, fig. 11–13. *V. integrerrimum*, *Wall. Cat.* 457; *DC. Prodr.* iv. 324; *H. f. & T. in Journ. Linn. Soc.* ii. 176.

PINANG and SINGAPORE; *Wallich, Walker*. MALACCA; Maingay *Kew Distrib.* 712/2.—DISTRIB. Malaya.

A stout shrub, or small tree, 20 ft. *Leaves* 5 by $2\frac{1}{2}$ in., shortly acuminate, base broad-cuneate, impunctate, minutely pilose on the midrib beneath (or in Java examples often more hairy); petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., pilose. *Corymb* terminal, peduncled, umbellate, 2–4 in. diam.; bracts 0, or rarely caducous; bracteoles minute, linear-oblong. *Corolla*-lobes $\frac{1}{12}$ in., round, yellow-white. *Drupe* $\frac{1}{4}$ by $\frac{1}{5}$ in., compressed, ovate, suddenly acute; endocarp thickened, subosseous. *Seed* dorsally 2-grooved, ventrally 3-grooved little concave.—Leaves in some Japan specimens are hairy beneath, in others as in *Wallich's V. integrerrimum*.

** *Corolla tubular, lobes very short erect or scarcely spreading.*

9. **V. coriaceum**, *Blume Bijl.* 656; leaves oblong-lanceolate acuminate coriaceous glabrous with tufts of hairs on the axils of the nerves beneath,

corymbs pubescent upwards, bracteoles 0 or caducous, corolla-tube glabrous. *DC. Prodr.* iv. 329; *H. f. & T. in Journ. Linn. Soc.* ii. 179; *Miq. Fl. Ind. Bat.* ii. 120; *Brandis For. Fl.* 259; *V. cylindricum*, *Ham. in Don Prodr.* 142; *DC. l. c.* 329.

TEMPERATE HIMALAYA, alt. 4–8000 ft.; from KUMAON to BHOTAN and KHASIA Mts., alt. 3–5000 ft., frequent.—DISTRIB. North Birma; Java.

A large shrub, or small tree, 15–20 ft. Leaves 4–9 by 2–2½ in., base cuneate or obtuse, quite entire in some Himalayan, often toothed in Javanese and Sikkim specimens, often punctate beneath; petiole ½–1 in., glabrous or subpilose. *Corymb* terminal, peduncled or sessile, umbellate or corymbose; bracts ¼ in., linear, caducous; bracteoles minute, ovate. *Calyx-tube* glabrous or puberulous; limb 0. *Corolla-tube* ½ in., white. *Anthers* oblong, exserted. *Drupe* ½ by ¼ in., moderately compressed, elliptic, shortly acute, black. *Seed* 2-grooved dorsally; endocarp subosseous, 3-grooved ventrally little concave.

VAR. capitellata, *Wight Ic.* t. 1022 (sp.); leaves entire or subsinuate, corolla glabrous (pilose in *Wight's Ic.*), drupe ½ by ¼ in., much compressed. *V. hebanthum*, *Thw. Enum.* 136 partly, not of *W. & A.*—Deccan Mts. alt. 4–7500 ft. Ceylon on Adam's Peak (C. P. n. 39).

VAR. zeylanica, *Gardner ms.* (sp.); berry ¼ by ½ in. broad ovoid very little compressed. *Oersted in Vidensk. Meddel.* 1860, t. vii. fig. 24, 25. *V. hebanthum*, *Thw. Enum.* 136 partly. *V. coriaceum*, var. β , *H. f. & T. in Journ. Linn. Soc.* ii. 179.—Ceylon, alt. 6000 ft., *Gardner, Thwaites*.

10. ***V. hebanthum***, *W. & A. Prodr.* 388; leaves oblong acuminate coriaceous sinuate or sinuate-dentate glabrous with tufts of hairs in the axils of the nerves beneath, corymbs minutely pilose upwards, bracteoles ½ in. linear, corolla-tube densely pubescent. *Wight Ic.* t. 1023; *H. f. & T. in Journ. Linn. Soc.* ii. 179, excl. syn. *V. pubigera*; not of *Thwaites*.

NILGHERY Mts., alt. 4–7500 ft., frequent; Mayaburam, *Sir F. Adam*.

A large shrub, doubtfully distinct from *V. coriaceum* by the densely pubescent yellowish corolla. The fruit resembles that of *V. coriaceum*, var. *capitellata*, but the leaves are rarely entire as in var. *capitellata*, and are less acuminate.

SECT. II. **Pseudo-Tinus**. *Cymes* corymbose or umbellately divided. *Drupe* succulent, 1-celled, compressed; endocarp slightly intruded. *Albumen* ruminated, margins incurved.

11. ***V. cordifolium***, *Wall. Cat.* 462; leaves elliptic cordate acuminate sharply serrate, stellately pubescent on the nerves beneath, corymbs not radiant terminal sessile stellately hairy, corolla rotate. *DC. Prodr.* iv. 327; *H. f. & T. in Journ. Linn. Soc.* ii. 175.

TEMPERATE HIMALAYA, alt. 9–12,000 ft., from KUMAON to BHOTAN, frequent.

A large shrub, flowering before leafing. Leaves 4½ by 2½ in., nearly glabrous above, parallel-veined; petiole ½–1 in. *Corymb* in flower small dense, in fruit 3–5 in. diam.; bracts ½ in., linear-oblong, woolly, caducous. *Calyx-tube* soon glabrous, lobes lanceolate, stellately woolly. *Anthers* small, shortly exserted. *Berry* ¼ by ½ in., little compressed. *Seed* dorsally with one shallow furrow, ventrally with much inflexed edges; testa full of red glands following the ruminations of the albumen.—*V. lantanoides*, *Michx.*, of N. America, has broader less serrate leaves, the corymbs usually radiant and the normal flowers much smaller; *V. furcatum*, *Blume*, of Japan, is almost identical with *V. lantanoides*. The three are closely allied and united by *Miquel in Ann. Mus. Lugd. Bat.* ii. 265.

SECT. III. **Tinus**, *Oerst.* (genus). *Cymes* umbellate. *Drupe* dry, hard, blue. *Albumen* ruminated.

12. **V. atro-cyanea**, C. B. Clarke; glabrous, leaves oblong narrowed at both ends not acuminate entire or obscurely sinuate-dentate, berry ellipsoid very smooth. *Viburnum* sp., *Griff. Itin. Notes*, 118.

MISHMI Mts., Thumathu summit, *Griffith* (Kew Distrib. No. 3406).

A shrub, resembling *V. Tinus*, L. Leaves 3 by $1\frac{1}{4}$ in., axils of the nerves beneath naked. *Cymes* terminal, subsessile; branches angular, red, slightly thickened; bracts small, caducous. *Flowers* not seen. *Berry* $\frac{1}{2}$ by $\frac{1}{4}$ in.; endocarp slightly intruded. *Albumen* strongly ruminated; testa with many red glands.—The European *V. Tinus* has a much larger, ovoid, somewhat ribbed drupe, and hairy nerve-axils beneath.

SECT. IV. **Microtinus**, Oerst. (genus). *Cymes* panicled. *Corolla* rotate. *Drupe* succulent, sub-2-celled, 1-seeded. *Albumen* uniform, margins incurved so as nearly to include the barren cell.

13. **V. odoratissimum**, Ker in *Bot. Reg.* t. 456; leaves elliptic acute coriaceous subentire glabrous, panicle glabrous, bracts and bracteoles lanceolate stellately-hairy caducous. *H. f. & T. in Journ. Linn. Soc.* ii. 177; *Benth. Fl. Hongk.* 143; *Oersted in Vidensk. Meddel.* 1860, 294, t. 6, fig. 7-10 (*Microtinus*).

KHASIA Mts., alt. 4000 ft., Mrs. Mack, &c.—DISTRIB. N. Birma, China.

A shrub, 6-10 ft. Leaves $5\frac{1}{2}$ by $2\frac{1}{4}$ in.; base cuneate, entire or sparingly sinuate-dentate, primary nerves remote pinnate glandular, sometimes slightly hairy in the axils beneath; petiole $\frac{1}{2}$ -1 in., stout. *Corymb* 2-4 in. high, mostly peduncled; bracts $\frac{1}{2}$ in., lanceolate, woolly in the Indian examples, minutely pubescent in the Chinese. *Calyx-limb* very wide, with shallow triangular teeth. *Corolla-lobes* $\frac{1}{2}$ in., elliptic, white. *Berry* nearly $\frac{1}{3}$ by $\frac{1}{5}$ in., ovoid-oblong, hardly compressed.

14. **V. Simonsii**, H. f. & T. in *Journ. Linn. Soc.* ii. 177; leaves elliptic-lanceolate coriaceous denticulate or subentire glabrous, panicle pubescent, bracts and bracteoles lanceolate pubescent persistent.

KHASIA Mts., alt. 4-6000 ft.; not rare; *Simons*, &c.

A shrub, 6-15 ft. Leaves 4 by 2 in.; base rhomboid or obtuse, nerves parallel, much closer than in *V. odoratissimum*, with large tufts of hairs in the axils beneath; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Corymb* flowers and fruit nearly as in *V. odoratissimum*, but both corolla and berry somewhat smaller.

SECT. V. **Solenotinus**, Oersted (genus). *Cymes* panicled, or thyriform. *Corolla* tubular. *Drupe* succulent, sub-3-celled, 1-seeded. *Albumen* uniform, margins incurved forming a T-shaped ventral groove.

15. **V. erubescens**, Wall. *Pl. As. Rar.* ii. 29, t. 134; *Cat.* 459; leaves oblong acute serrulate pilose on the nerves beneath otherwise glabrous, panicles peduncled terminal and many on shortened lateral branches. *DC. Prodr.* iv. 329; *H. f. & T. in Journ. Linn. Soc.* ii. 177; *Thwaites Enum.* 136; *Brandis For. Fl.* 258. *V. Wightianum*, Wall. *Pl. As. Rar.* ii. 29; *Cat.* 3729; *W. & A. Prodr.* 388; *Wight Ic. t.* 1024. *V. pubigerum*, W. & A. *Prodr.* 389. *Viburnum* sp., Wall. *Cat.* 7474.

HIMALAYA, alt. 3-10,000 ft.; from KUMAON to BHOTAN, common. DECCAN Mts., alt. 5-8000 ft., common. CEYLON.

A large shrub, or small tree. Leaves never large, $2\frac{1}{2}$ -3 by $1\frac{1}{4}$ in., from ovate to narrow-oblong, base obtuse, axils of nerves beneath very hairy in Deccan examples nearly glabrous in the others; petiole $\frac{1}{4}$ in. *Corymb* usually pendulous, small in the Deccan examples, sometimes 3-5 in. in the Himalayan, pubescent, nearly glabrous or sometimes stellately tomentose; bracts linear, $\frac{3}{4}$ in., glabrous, sometimes $\frac{1}{2}$ in. and pubescent. *Calyx-teeth* small, oblong, glabrous or pubescent. *Corolla-tube* $\frac{1}{2}$ in.; lobes $\frac{1}{2}$ in., round, spreading, white. *Stamens* inserted at the same height near the

summit of the tube. *Drupe* $\frac{1}{4}$ by $\frac{1}{2}$ in., ellipsoid, scarcely compressed, red, crowned by the thick short style.—Deccan specimens have more slender panicles, smaller flowers and rather narrower berries than Himalayan, but some Ceylon specimens appear altogether undistinguishable from the Himalayan.

16. **V. nervosum**, *Don Prodr.* 141, not of *Hk. & Arn.*; leaves elliptic-oblong acute crenate-serrate parallel-nerved hairy on the nerves beneath, cymes subcapitate silky, bracts oblong obtuse silky deciduous. *DC. Prodr.* iv. 327; *H. f. & T. in Journ. Linn. Soc.* ii. 178; *Brandis For. Fl.* 259. *V. grandiflorum*, *Wall. Cat.* 464; *DC. l. c.* 329; *Oersted in Vidensk. Meddel.* 1860, 295, t. 6, fig. 1-4 (*Solenotinus*).

HIMALAYA, alt. 10-13,000 ft., from KASHMIR to SIKKIM, not common; *Wallich, &c.*

A large shrub, or gnarled small tree; branchlets pilose. *Leaves* $2\frac{1}{2}$ -3 by $1\frac{1}{4}$ in., scarcely acuminate, base cuneate, adult glabrous above; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Cymes* appear before the leaves; branches very short; outer bracts ovate, $\frac{3}{4}$ in. diam., obtuse; inner $\frac{3}{4}$ by $\frac{1}{4}$ in., oblong. *Calyx-tube* glabrous, teeth small, irregular, often ciliate. *Corolla-tube* $\frac{1}{4}$ - $\frac{1}{2}$ in.; lobes $\frac{1}{6}$ in., elliptic, spreading, rose. *Stamens* inserted 2 near the top of the corolla-tube, 3 somewhat lower down. *Drupe* nearly $\frac{1}{2}$ by $\frac{1}{4}$ in., ellipsoid, hardly compressed.

17. **V. foetens**, *DCne. in Jacq. Voy. Bot.* 75, t. 84; leaves elliptic or oblong crenate-serrate glabrous, cymes thyrsiform branches glabrous or sparingly pilose ultimately lax. *Hk. f. & T. in Journ. Linn. Soc.* ii. 178; *Brandis For. Fl.* 259.

KASHMIR, alt. 6-10,000 ft., from MURREE to CHUMBA; *Jacquemont, &c.*, not rare.

A large shrub; branchlets glabrous, or laxly pubescent. *Leaves* 3 by $1-1\frac{1}{2}$ in., shortly acute, base cuneate or obtuse, parallel-nerved, adult glabrous except tufts of hairs in the axils of the nerves beneath. *Inflorescence* nearly as in *V. nervosum*, *Don*, but soon more lax and corolla larger; outer bracts ovate or oblong, deciduous; bracteoles linear, scarious, pubescent. *Stamens* inserted 2 near the top of the corolla-tube, 3 lower down. *Drupe* $\frac{1}{2}$ - $\frac{1}{2}$ by $\frac{1}{4}$ in., ellipsoid, little compressed, red edible.

4. **TRIOSTEUM**, *Linn.*

Herbs; stems from a perennial stock, simple, erect. *Leaves* opposite, sessile, connate, obovate, entire or sinuate. *Flowers* whorled in short terminal spikes (axillary in the non-Indian species), lurid, 2-bracteolate. *Calyx-tube* ovoid; lobes 5, short or long and foliaceous, persistent. *Corolla* narrow funnel-shaped, gibbous at the base; lobes 5, unequal, obtuse, imbricate. *Stamens* 5, inserted on the corolla-tube; anthers linear, included. *Ovary* 3-5-celled; style filiform, included, stigma capitate 3-5-lobed; ovules solitary in each cell, pendulous. *Berry* 2-3- (rarely 4-5-) celled, 2-3-seeded. *Seeds* oblong, angular; testa bony; albumen fleshy; embryo minute.—Species 3; 2 N. American, 1 Himalayan.

1. **T. hirsutum**, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 180; hairy, spike short terminal, calyx-lobes minute, drupe 3-seeded. *DC. Prodr.* iv. 330. *T. himalayanum*, *Wall. Cat.* 484; *DC. Prodr. l. c.*; *H. f. & T. in Journ. Linn. Soc.* ii. 173.

NIPAL; Gossain Than, *Wallich*. SIKKIM; alt. 10-12,000 ft., *J. D. H.* KUMAON; alt. 10,500 ft., *Strach. & Winterb.*

Patently hairy. *Stems* 18 in. *Leaves* broadly elliptic-obovate obtuse, hairy on

both surfaces. *Spike* hardly 1 in.; peduncle scarce $\frac{1}{2}$ in. *Calyx-teeth* $\frac{1}{20}$ in. *Corolla-tube* $\frac{1}{2}$ in. long, green without purple within. *Drupe* $\frac{1}{2}$ in., ovoid or ellipsoid trigonous, hairy towards the apex.—H. f. & T. have been misled by DC. into supposing that Wallich described *T. hirsutum* from Chittagong as a different species from *T. himalayana*. The origin of the error appears to have been that DC. read Wallich's ms. locality "Gossain Than" as the Sanskrit spelling of Chittagong. DC. further misprints the fruit as 5-seeded, whereas Wallich states (rightly) 3-seeded.

5. ABELIA, Br.

Shrubs, branchlets slender. *Leaves* opposite, sometimes ternate, petioled, entire or toothed; stipules 0. *Flowers* axillary and terminal, in small trichotomous cymes or solitary, 2-4-bracteolate, white or rose. *Calyx-tube* narrow, striate; teeth 5, long, narrow, persistent. *Corolla* tubular or funnel-shaped, nearly regular; lobes 5, short, round. *Stamens* 4, inserted on the corolla-tube, subdidynamous. *Ovary* 3-celled; style filiform, stigma capitate subexserted; ovules in 2 cells several, in the 3rd solitary. *Fruit* coriaceous, narrowly oblong, surmounted by the long calyx-teeth, cells 3, 2 empty, the 3rd 1-seeded. *Seed* subcylindric, testa membranous, albumen fleshy; embryo short, cylindric.—DISTRIB. Species 5, from Kashmir to China and Japan; and 1 Mexican (perhaps a distinct genus).

1. **A. triflora**, Br. in Wall. Pl. As. Rar 14, t. 15; leaves lanceolate entire, cymes 3-8-flowered, bracts lanceolate shining glabrous reticulate. Wall. Cat. 815; DC. Prodr. iv. 339; Wight Ill. ii. 72, t. 121 C.; H. f. & T. in Journ. Linn. Soc. ii. 174; Lindl. & Paxt. Fl. Gard. t. 91; Brandis For. Fl. 257.

Temperate Himalaya from KASHMIR to KUMAON, alt. 5-10,000 ft., frequent.

An erect shrub, 3-6 ft. *Leaves* $2\frac{1}{2}$ by $\frac{3}{4}$ -1 in., acute, broadest near the cuneate or subobtus base, reticulate-nerved beneath, pilose especially on the margin or glabrous; petiole $\frac{1}{2}$ - $\frac{3}{8}$ in. *Cymes* sessile, i.e. bracts at their base 1 in. leaflike, but intermediate between the leaves and bracts. *Calyx-teeth* $\frac{1}{4}$ - $\frac{1}{2}$ in., linear, striate, ciliate. *Corolla-tube* $\frac{1}{4}$ - $\frac{1}{2}$ in., glabrous or pilose without; lobes $\frac{1}{5}$ - $\frac{1}{4}$ in., spreading. *Fruit* $\frac{1}{2}$ - $\frac{1}{4}$ in., linear, narrowed upwards, glabrous or pilose.

VAR. *parvifolia*; leaves much smaller $\frac{3}{4}$ in. sometimes lobed or subpinnatifid, corolla smaller pubescent within and without.—Jhelum Valley and Wuzaristan, Stewart.

6. LONICERA, Linn.

Shrubs, erect or scandent; buds scaly. *Leaves* opposite, petioled, sessile or connate, entire or in *L. heterophylla* sinuately-lobed. *Flowers* (in the Indian species) in peduncled pairs, often connate by their ovaries, bracteate and usually 2-bracteolate; peduncles axillary, solitary, or in subterminal panicles heads or clusters subtended by floral leaves. *Calyx-tube* ovoid; limb short, 5-toothed, deciduous or persistent. *Corolla* tubular, funnel-shaped or campanulate, tube short or long, gibbous or equal at the base, limb subequally 5-lobed or 2-lipped; lobes short or long. *Stamens* 5, inserted on the corolla-tube. *Ovary* 2-3-celled; style slender, stigma capitate; ovules several in each cell in double rows on axile placentas. *Berry* 2-3-celled or sub-1-celled. *Seeds* few in each cell, ovoid or oblong, albumen fleshy; embryo terete.—DISTRIB. Species 80, in temperate and subalpine regions of the Northern Hemisphere.

SUBGEN I. **Caprifolium**, DC. Scandent. Pairs of *flowers*, or some of

them, capitate or paniced. *Bracts* linear or small. *Corolla* 2-lipped. *Berry* crowned with the calyx-teeth.

In the simple lateral peduncles the bracts are undistinguishable from floral leaves; in the paniculate inflorescence of *L. japonica* the bracts are small linear.

1. ***L. Leschenaultii***, Wall. in Roxb. *Fl. Ind. ed. Carey & Wall.* ii. 178; *Cat.* 471; leaves ovate or oblong, beneath and calyx grey tomentose, corolla long closely pubescent. *DC. Prodr.* iv. 334; *Wight Ill.* ii. t. 120 and 121 B.; *W. & A. Prodr.* 389; *H. f. & T. in Journ. Linn. Soc.* ii. 173, not of *Miq.* *L. mollis*, *Wight Ill.* ii. 71; *Wall. Cat.* 6301.

DECCAN MTS., alt. 5-8000 ft.; *Wight, &c.*

Branchlets tomentose. *Leaves* $1\frac{1}{2}$ - $2\frac{1}{2}$ by $1-1\frac{3}{4}$ in., acute or rounded, base cordate or obtuse, above glabrous or puberulous on the impressed nerves; petiole $\frac{1}{8}$ in. *Flowers* in shortened panicles; floral leaves $\frac{1}{2}$ -1 in., petioled, ovate; bracts linear, $\frac{1}{2}$ - $\frac{3}{4}$ in.; bracteoles ovate, minute. *Calyx-teeth* $\frac{1}{12}$ in., linear. *Corolla-tube* $1-1\frac{1}{2}$ in., hairy within. *Style* glabrous or nearly so.—Rarely the pairs of flowers are solitary, when the elongate floral leaves which are close beneath the flower have been described as bracts.

2. ***L. glabrata***, Wall. in Roxb. *Fl. Ind. ed. Carey & Wall.* ii. 175; *Cat.* 474; leaves cordate-oblong acute coriaceous glabrous or nearly so rarely villous beneath, bracts $\frac{1}{2}$ - $\frac{3}{4}$ in. lanceolate, calyx glabrous or nearly so, corolla glabrous. *DC. Prodr.* iv. 334; *H. f. & T. in Journ. Linn. Soc.* ii. 172, excl. syn. *L. ovata*, Ham.

Temperate Himalaya, alt. 4-8000 ft.; from NIPAL to BHOTAN; Wallich, &c.

Branchlets glabrous, or closely pubescent. *Leaves* 3 by $1\frac{1}{2}$ in.; nerves glabrous or pilose or villous beneath; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flower-spikes* short, often paniced; floral leaves gradually reduced, sometimes minutely pilose above, the uppermost lanceolate, sessile; bracteoles ovate, minute. *Calyx-tube* somewhat glaucous, rarely slightly hairy; teeth $\frac{1}{16}$ in, lanceolate. *Corolla-tube* $\frac{1}{2}$ in., rarely with a few scattered hairs without, hairy within. *Style* glabrous, or with scattered hairs.—Griffith's specimens from East Bhotan have the leaves very villous beneath.

3. ***L. macrantha***, DC. *Prodr.* iv. 333; leaves cordate-oblong acute coriaceous villous beneath, floral usually greatly reduced, calyx-teeth hairy in fruit, corolla-lobes hirsute in bud white fading to yellow. *Benth. Fl. Hongk.* 144; *Miq. in Ann. Mus. Lugd. Bat.* ii. 269; *Maxim. in Bull. Acad. Petersb. Mel. Biol.* x. 58. *L. japonica*, Wall. *Cat.* 473, and in Roxb. *Fl. Ind. ed. Carey & Wall.* ii. 174; *H. f. & T. in Journ. Linn. Soc.* ii. 171, not of Linn. *Caprifolium macranthum* and *japonicum*, Don *Prodr.* 140.

Temperate Himalaya from NIPAL to BHOTAN, alt. 6-10,000 ft., frequent. KHASIA Mts., alt. 4-6000 ft.

Leaves $2\frac{1}{2}$ by 1 in., glabrescent or pilose on the surface above. *Peduncles* in sub-terminal panicles; upper floral leaves usually linear-lanceolate. *Bracts* $\frac{1}{2}$ - $\frac{3}{4}$ in., linear; bracteoles very small. *Calyx-tube* glaucous, glabrous. *Corolla-tube* $\frac{3}{4}$ -1 $\frac{1}{4}$ in.—*L. japonica*, L., which is very closely allied, differs in the less coriaceous leaves, usually petioled ovate or spatulate floral leaves, more or less hairy calyx-tube, and less hirsute unexpanded pink or reddish corolla.

4. ***L. acuminata***, Wall. in Roxb. *Fl. Ind. ed. Carey & Wall.* ii. 472; leaves oblong cordate acute, bracts $\frac{1}{2}$ - $\frac{3}{4}$ in. linear, calyx-tube glabrous, corolla-tube hairy lobes pubescent or glabrous, style densely fulvous hairy. *Wall. Cat.* 472; *DC. Prodr.* iv. 334. *L. Loureirii*, *H. f. & T. in Journ. Linn. Soc.* ii. 172, not of DC.

Temperate Himalaya from NIPAL, Wallich, to SIKKIM, alt. 7-11,000 ft.; *J. D. H.* &c.

Branchlets hairy. *Leaves* 4 by $1\frac{1}{2}$ - $1\frac{3}{4}$ in., with scattered hairs on both surfaces, or glabrescent; petiole $\frac{1}{8}$ in., hairy. *Inflorescence* in terminal many-flowered heads, and also often axillary 2-flowered peduncles; floral leaves gradually reduced, the uppermost linear-lanceolate, bracteiform; bracteoles $\frac{1}{16}$ in., subquadrate, ciliate. *Calyx-teeth* glabrate or ciliate in fruit. *Corolla-tube* $\frac{1}{2}$ in., funnel-shaped.—*L. Loureirii*, from Java? differs in the glabrous corolla-tube and style.

5. ***L. ovata***, *Ham. in Wall. Cat.* 6300; leaves ovate or ovate-oblong obtuse membranous nearly glabrous, bracts $\frac{1}{16}$ - $\frac{1}{12}$ in. ovate-lanceolate, calyx-tube glabrous, corolla-tube $\frac{1}{4}$ in. very slender glabrous, style hairy. *Lonicera* sp., *Griff. Journ.* 90.

ASSAM; *Hamilton, Masters.*—DISTRIB. Birma.

A slenderer plant, with much smaller flowers than in *L. glabrata*. *Branchlets* pubescent. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$ -1 in., base rounded or subcordate, minutely pilose on both surfaces or glabrescent; petiole $\frac{1}{2}$ - $\frac{1}{4}$ in. *Upper peduncles* in terminal panicle; bracteoles minute, ovate. *Flowers* white, fading to yellow. *Calyx-teeth* glabrous or ciliate.

SUBGEN. II. ***Xylosteum***, DC. Erect. *Peduncles* not paniced. *Calyx-limb* deciduous (in *L. asperifolia*; *L. rupicola* and others, subsistent).

* *Bracts* large, ovate; *bracteoles* 0 or minute.

6. ***L. hispida***, *Pall.; DC. Prodr.* iii. 338; glabrous or hairy, leaves elliptic-oblong, peduncles $\frac{1}{2}$ -1 in., bracts obovate-elliptic boat-shaped hardly connate. *Ledeb. Fl. Ross.* ii. 389, *Ic. t.* 212; *H. f. & T. in Journ. Linn. Soc.* ii. 165. *L. bracteata*, *Royle Ill.* 237, t. 53.

Temperate and alpine HIMALAYA, alt. 9-13,000 ft.; from KASHMIR to KUMAON, frequent. SIKKIM, alt. 13-15,000 ft., *J. D. H.*—DISTRIB. Central Asia, Siberia.

Branchlets hispid-pilose or glabrescent. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$ in., subobtusely, base rounded, hairy on both surfaces or glabrescent; petiole $\frac{3}{8}$ in. *Bracts* $\frac{1}{2}$ - $\frac{2}{3}$ in., hispid ciliate or glabrescent. *Corolla-tube* $\frac{1}{2}$ by $\frac{1}{2}$ in., often hairy; lobes $\frac{1}{4}$ - $\frac{1}{2}$ in., rounded, pink. *Style* glabrous or with scattered hairs. *Drupe*s more than $\frac{1}{4}$ by $\frac{1}{2}$ in., ellipsoid, confluent or entirely separate. Cf. *Maxim. in Bull. Acad. Petersb. Mel. Biol.* x. 73.—Exceedingly variable as to hairiness; the branchlets, leaves and bracts are sometimes absolutely glabrous, and the leaves subscabrid beneath.

7. ***L. glauca***, *H. f. & T. in Journ. Linn. Soc.* ii. 166, not of *Meerb.*; leaves small oblong obtuse glabrous hispidly ciliate, peduncle hardly any, bracts $\frac{1}{4}$ - $\frac{1}{2}$ in. ovate flat, calyx-limb deciduous.

Temperate N.W. HIMALAYA and WESTERN TIBET, 12-16,000 ft.; Nubra, Zaskar and Piti, *Thomson*; Tilail in Kashmir, *C. B. C.*; Gurwhal and Kumaon, *Strach. & Winterb.*

A glaucous, densely-branched wiry undershrub, glabrous except as to the margins of the leaves. *Leaves* $\frac{3}{4}$ by $\frac{1}{4}$ in., obtuse, base hardly rounded; petiole $\frac{1}{12}$ in. *Bracts* glaucous, hispidly ciliate on the margins, usually free, or when the fruits coalesce sometimes much connate. *Calyx* glabrous, or nearly so. *Corolla-tube* $\frac{1}{4}$ - $\frac{1}{2}$ by $\frac{1}{2}$ in., glabrous; lobes $\frac{1}{2}$ in., elliptic, yellow. *Style* glabrous. *Berry* $\frac{1}{4}$ by $\frac{1}{2}$ in., ellipsoid, pairs sometimes confluent into a spherical fruit. (Both confluent and non-confluent berries occur on one branch.)

8. ***L. asperifolia***, *H. f. & T. in Journ. Linn. Soc.* ii. 166; leaves ovate-oblong subcordate, margin crisped and hispid, peduncle 0- $\frac{1}{2}$ in., bracts ovate

flat, berry crowned by the funnel-shaped calyx-limb. *Xylosteum asperrium*, *Dcne. in Jacq. Voy. Bot.* 77, t. 85.

WESTERN TIBET, *Falconer*; ZANSKAR, alt. 13,000 ft., *Thomson*. KASHMIR to the KARAKORUM, alt. 12,000 ft., *C. B. C. Rimkim* (Tibet), alt. 13,500 ft., *Strach. & Winterb.*

A shrub, 2-4 ft.; branchlets sparsely hispid. *Leaves* $1\frac{1}{4}$ by $\frac{3}{4}$ in., subacute or obtuse, shining and glabrous above; petiole $\frac{1}{5}$ - $\frac{1}{4}$ in. *Bracts* $\frac{1}{2}$ in., and ovaries free. *Calyx-tube* glabrous; limb ciliate or glabrous. *Corolla-tube* $\frac{1}{2}$ by $\frac{1}{2}$ in., glabrous or slightly hairy; lobes $\frac{1}{4}$ in. or more. *Style* glabrous. *Drupe* $\frac{1}{2}$ by $\frac{1}{4}$ in., or more, oblong.

** *Bracts* linear or narrow-oblong (broad in *L. parvifolia*); *bracteoles* often connate or prominent.

† *Corolla* not distinctly two-lipped, often gibbous at the base, and limb unequal.

9. ***L. ligustrina***, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 179; *Cat.* 479; branchlets pubescent, leaves lanceolate obtusely acuminate margin and midrib beneath ciliate or glabrescent, peduncle hardly any, bracteoles connate. *DC. Prodr.* iv. 334; *W. & A. Prodr.* 389; *Wight Ic.* t. 1025; *H. f. & T. in Journ. Linn. Soc.* ii. 166; *Bedd. Fl. Sylv. Anal. Gen.* t. 15, fig. 5. *L. Wightiana*, *Wall. Cat.* under 1520, in *Herb. Linn. Soc.*

? NIPAL; *Wallich*. KHASIA Mts., alt. 4000-6000 ft., *H. f. & T. Mts. of the South DECCAN*, alt. 6-7000 ft., frequent.

A shrub, 5-15 ft. *Leaves* $1\frac{3}{4}$ by $\frac{1}{2}$ in., base narrowed or scarcely rounded, firm, shining; petiole $\frac{1}{10}$ in. *Bracts* $\frac{1}{10}$ in., glabrous; bracteoles at first small, in fruit sometimes $\frac{1}{2}$ by $\frac{1}{4}$ in., forming a boat-shaped involucre half-enclosing the fruit. *Calyx-limb* tubular; margin irregular. *Corolla-tube* $\frac{1}{4}$ by $\frac{1}{12}$ - $\frac{1}{16}$ in., narrowly funnel-shaped, base very gibbous, slightly pubescent; lobes $\frac{1}{8}$ in., obtuse, yellowish-white (*Wallich*). *Style* patent hairy. *Drupe*s usually confluent into a single small spherical fruit, ovaries free or half-coalescent in bud.—*Wallich's* Nipal habitat must be considered doubtful till confirmed, owing to the mixture of specimens on one sheet.

10. ***L. tomentella***, *H. f. & T. in Journ. Linn. Soc.* ii. 167; branchlets pubescent, leaves oblong villous or pubescent beneath, peduncles $0\frac{1}{4}$ in., bracteoles short connate.

Temperate HIMALAYA; SIKKIM, Lachen and Lachoong, alt. 8-12,000 ft., *J. D. H.*

A shrub, 10-12 ft. *Leaves* $1\frac{1}{4}$ by $\frac{1}{2}$ - $\frac{2}{3}$ in., obtuse at both ends; petiole $\frac{1}{2}$ in., tomentose. *Bracts* $\frac{1}{4}$ - $\frac{1}{2}$ in., narrowly oblong, foliaceous; bracteoles $\frac{1}{20}$ - $\frac{1}{16}$ in. long in fruit. *Calyx* glabrous. *Corolla-tube* $\frac{1}{4}$ by $\frac{1}{2}$ in., subequal, pilose without and within; lobes hardly $\frac{1}{8}$ in., little spreading, white. *Style* glabrous. *Berry* $\frac{1}{4}$ by $\frac{1}{2}$ in., black, often coalescent in pairs into one spherical fruit. *Seeds* numerous, small.

11. ***L. purpurascens***, *H. f. & T. in Journ. Linn. Soc.* ii. 169; leaves oblong or obovate-oblong hairy at least beneath, peduncles $\frac{1}{2}$ -1 in., bracteoles small quadrate subobsolete in the fruit, calyx-limb patelliform truncate glabrous. *L. sericea*, *Royle Ill.* 236; *H. f. & T. in Journ. Linn. Soc.* ii. 167. *Xylosteum purpurascens*, *Dcne. in Jacq. Voy. Bot.* 79, t. 87.

Subalpine Himalaya; KASHMIR, alt. 9-12,000 ft.; Pir Pinjal, *Jacquemont*, *C. B. C.* Goolmurg, *Stewart*. KUNAWUR; alt. 12-13,000 ft., *Munro*. SIKKIM, Yeumtong, alt. 11,000 ft., *J. D. H.*

A shrub, 8 ft.; branchlets pilose, ultimately glabrous. *Leaves* 1 by $\frac{1}{2}$ in., obtuse, base narrowed or obtuse, above softly pilose or glabrescent, beneath villous or hairy on the nerves only; petiole $\frac{1}{2}$ in. *Bracts* $\frac{1}{6}$ - $\frac{1}{4}$ in., linear or lanceolate-linear; bracteoles distinct or connate. *Corolla-tube* $\frac{1}{4}$ by $\frac{1}{16}$ in., base gibbous, hairy within and

without; lobes short, purple. *Style* sparsely pilose. *Fruit* usually of two confluent drupes, $\frac{1}{4}$ in. diam., globose, black. *Seeds* many or few.—*Royle's* specimens have the leaves and flowers more hairy: the number of seeds varies on the same branch.

12. ***L. angustifolia***, Wall. Cat. 480; leaves lanceolate white beneath, peduncles $\frac{1}{2}$ –1 in., bracts $\frac{1}{8}$ – $\frac{1}{2}$ in. linear or linear-lanceolate, bracteoles connate often half as long as the fruit, calyx-limb distinctly 5-toothed. DC. Prodr. iv. 337; Journ. Hort. Soc. Lond. iii. 238, with a fig.; H. f. & T. in Journ. Linn. Soc. ii. 167; Brandis For. Fl. 255.

Temperate Himalaya; from KASHMIR and KUMAON, alt. 6–12,000 ft., frequent, to SIKKIM; Lachen, alt. 10–12,000 ft., J. D. H.

A shrub, 6–12 ft.; branchlets glabrescent. *Leaves* $1\frac{1}{4}$ by $\frac{1}{4}$ in. (nearly $\frac{1}{2}$ in. broad in Sikkim sp.), narrowed at both ends, beneath pubescent or glabrous; petiole $\frac{1}{8}$ in. *Bracts* linear or foliaceous. *Corolla-tube* $\frac{1}{4}$ by $\frac{1}{10}$ in., glabrous or pubescent, subequal; lobes hardly $\frac{1}{8}$ in., white or rose. *Style* short, glabrous. *Fruit* usually of two confluent drupes, $\frac{1}{4}$ in. diam., globose; calyx-limb often subpersistent. *Seeds* few.

13. ***L. rupicola***, H. f. & T. in Journ. Linn. Soc. ii. 168; leaves oblong tomentose beneath, peduncles hardly any, bracteoles small quadrate distinct obsolete in the fruit, calyx-teeth $\frac{1}{8}$ in. narrow-lanceolate pubescent.

EASTERN TIBET (North of Sikkim), alt. 16–17,000 ft., J. D. H. Rimkim, WESTERN TIBET (North of Kumaon), alt. 13,500 ft., Strach. & Winterb.

A rigid shrub, 2–4 ft.; branchlets pubescent, becoming leafless and subspinescent. *Leaves* $\frac{1}{2}$ by $\frac{1}{8}$ in., subobtuse at both ends, nearly glabrous above; petiole $\frac{1}{16}$ in. *Bracts* $\frac{1}{4}$ in., linear-obovate, often subfoliaceous, tomentose beneath. *Corolla-tube* $\frac{1}{4}$ by $\frac{1}{8}$ in., pubescent; lobes $\frac{1}{2}$ in. broad-oblong, spreading. *Style* short, glabrous. *Berries* $\frac{1}{8}$ – $\frac{1}{4}$ in., ellipsoid, not confluent in pairs, crowned by the long calyx-teeth.

14. ***L. spinosa***, Jacquem. ms.; H. f. & T. in Journ. Linn. Soc. ii. 168; glabrous, leaves small narrow-oblong, peduncles hardly any, bracteoles quadrate connate inconspicuous in fruit, calyx-teeth $\frac{1}{12}$ in. narrow-oblong obtuse. *Xylosteum spinosum*, Dene. in Jacq. Voy. Bot. 78, t. 86.

ALPINE HIMALAYA, alt. 11–16,000 ft.; from KASHMIR to Tibet north of SIKKIM. —DISTRIB. Kashgar.

A rigid shrub, 2–4 ft.; branchlets glaucous, often leafless and spinescent. *Leaves* $\frac{1}{2}$ by $\frac{1}{8}$ – $\frac{1}{6}$ in., obtuse, margins recurved, base narrowed; petiole hardly any. *Flowers* subfasciculate; bracts $\frac{1}{8}$ – $\frac{1}{2}$ in., linear-oblong. *Corolla-tube* $\frac{1}{4}$ – $\frac{1}{2}$ by $\frac{1}{12}$ – $\frac{1}{8}$ in., glabrous, subequal; lobes $\frac{1}{8}$ in., elliptic. *Style* glabrous, exserted. *Berries* $\frac{1}{8}$ by $\frac{1}{6}$ in., ellipsoid, not confluent in pairs, crowned by the subpersistent calyx-limb.

15. ***L. parvifolia***, Edgw. in Wall. Cat. 9058, and in Trans. Linn. Soc. xx. 60; leaves small oblong or obovate glabrous, peduncles $\frac{1}{2}$ – $\frac{1}{3}$ in., bracts $\frac{1}{8}$ – $\frac{1}{3}$ in. oblong or ovate foliaceous, corolla-tube not widened upwards, style included. H. f. & T. in Journ. Linn. Soc. ii. 168. *L. depressa*, Royle Ill. 226.

Alpine Himalaya; KUMAON; Blinkworth; Pindari, alt. 12,000 ft., Strachey & Winterbottom. SIKKIM; alt. 12–14,000 ft., Lachen and Lama Kangra, J. D. H.

A small, rigid, nearly glabrous, shrub; branches often prostrate. *Leaves* $\frac{1}{2}$ by $\frac{1}{8}$ – $\frac{1}{6}$ in., obtuse, base cuneate rarely obtuse; petiole $\frac{1}{16}$ in. *Bracteoles* connate, often nearly as long as the ovary, inconspicuous in fruit. *Calyx* glabrous; teeth minute, triangular. *Corolla-tube* $\frac{1}{4}$ by $\frac{1}{8}$ in., exactly cylindric, equal, glabrous without, hairy within; teeth $\frac{1}{10}$ in., round, pink-purple. *Style* short, glabrous. *Berries* $\frac{1}{4}$ by $\frac{1}{8}$ in., ellipsoid, not confluent in pairs; seeds few.

VAR. *Myrtillus*, H. f. & T. in Journ. Linn. Soc. ii. 168 (sp.); bracts linear-oblong or sublinear. Brandis For. Fl. 255.—Kashmir to Kumaon, alt. 8–12,000 ft. Sikkim; alt. 11–14,000 ft., Lachen, J. D. H.

16. **L. obovata**, *Royle mss.*; *H. f. & T. in Journ. Linn. Soc.* ii. 169; glabrous, leaves small obovate-oblong, peduncle $\frac{1}{2}$ – $\frac{1}{4}$ in., bracts $\frac{1}{2}$ – $\frac{1}{4}$ in. linear ovate or oblong rarely foliaceous, corolla tube widened upwards, style exserted glabrous.

Temperate Himalaya, from KASHMIR to KUMAON, alt. 8–13,000 ft., frequent. SIKKIM, Lachen, alt. 12–14,000 ft., *J. D. H.*

A shrub, 6 ft. *Leaves* $\frac{1}{2}$ by $\frac{1}{4}$ – $\frac{1}{3}$ in., subsessile, obtuse, base narrowed. *Bracteoles* small or 0, distinct or connate, obsolete or cupshaped in fruit. *Calyx-limb* very short, undulate, hardly toothed. *Corolla-tube* $\frac{1}{4}$ by $\frac{1}{2}$ in., tubular-funnel-shaped, base narrowed prominently gibbous or campanulate and subequal, glabrous without, hairy within; teeth $\frac{1}{2}$ in., round, suberect, yellowish-white. *Berries* spherical, $\frac{1}{5}$ in. diam., with 2. calyx-scars, calyx-tubes more or less coalescent even in the bud.

†† *Corolla* prominently 2-lipped.

a. *Bracteoles* connate into a cup.

17. **L. quinquelocularis**, *Hardwick in As. Res.* vi. 351; leaves ovate or broad-lanceolate hairy beneath, peduncles hardly any, bracts $\frac{1}{2}$ – $\frac{1}{3}$ in. linear, calyx-limb short funnel-shaped teeth triangular ciliate. *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 174; *H. f. & T. in Journ. Linn. Soc.* ii. 169; *Brandis For. Fl.* 255. *L. diversifolia*, *Wall. l. c.* 178, *Cat.* 477; *Hook. Ic. Pl.* t. 807; *Lindl. in Bot. Reg.* 30, t. 33. *L. Royleana*, *Wall. Cat.* 478.

TEMPERATE HIMALAYA from Kashmir to Kumaon; alt. 4–12,000 ft., common. BHOTAN; *Griffith.*

A shrub 5–10 ft.; branchlets pubescent. *Leaves* $1\frac{1}{2}$ –2 by $\frac{3}{4}$ – $1\frac{1}{2}$ in., acute or obtuse at either end, nearly glabrous above, pubescent pilose or villous beneath; petiole $\frac{1}{2}$ in. *Flowers* clustered, axillary; bracteoles pubescent, usually scarcely $\frac{1}{2}$ the length of the fruit. *Corolla* hairy without and within, yellow; tube $\frac{1}{2}$ by $\frac{1}{2}$ in. *Style* hairy, exsert. *Berries* $\frac{1}{4}$ by $\frac{1}{2}$ in., ovoid, not connate; crowned, till ripe often, by the calyx-limb.

18. **L. hypoleuca**, *DCne. in Jacq. Voy. Bot.* 81, t. 89; leaves ovate obtuse pubescent white beneath, peduncle $\frac{1}{2}$ – $\frac{1}{4}$ in., bracts $\frac{1}{2}$ in. lanceolate foliaceous, bracteoles hairy as long as the glandular-pubescent calyx-tube. *H. f. & T. in Journ. Linn. Soc.* ii. 170; *Brandis For. Fl.* 256. *L. elliptica*, *Royle II.* 236.

NORTH-WEST HIMALAYA, alt. 8–10,000 ft., *Royle, Edgeworth.* KUNAWAR, *Thomson, Lance.* Gurwhal, *Strach. & Winterb.*

A low shrub; branchlets pilose. *Leaves* $\frac{3}{4}$ by $\frac{1}{2}$ in., subsessile, obtuse at both ends, upper narrower, passing into the bracts. *Calyx-teeth* minute, lanceolate. *Corolla-tube* $\frac{1}{4}$ by $\frac{1}{2}$ in., base gibbous; lobes $\frac{1}{4}$ in. and more, linear-oblong, orange-red; style hairy below. *Berries* $\frac{1}{2}$ by $\frac{1}{2}$ in., ellipsoid, hairy, distinct or nearly so, nearly included by the bracteoles.—*H. f. & T.* say the ovaries are usually connate, but they appear rarely and imperfectly so.

19. **L. decipiens**, *H. f. & T. in Journ. Linn. Soc.* ii. 170; leaves oblong-lanceolate acuminate minutely hairy, peduncles $\frac{1}{2}$ – $\frac{1}{4}$ in. pubescent, bracts $\frac{1}{2}$ in. linear, bracteoles ovate nearly glabrous as long as the glabrate calyx-tube. *L. lanceolata*, *Wall. Cat.* 475. *Symphoricarpos* sp., *Griff. Itin. Notes*, 191.

Central and Eastern Himalaya; Nipal; *Wallich.* SIKKIM, Lachen, alt. 10–12,000 ft., *J. D. H., Elwes* BHOTAN; Timboo River, alt. 6500 ft., *Griffith.*

A small shrub; branchlets pubescent. *Leaves* 2 by $\frac{3}{4}$ in., subsessile, base obtuse, more or less pubescent on the midrib and nerves above, beneath glandular-pubescent with the midrib hairy; petiole $\frac{1}{12}$ in. *Calyx-teeth* minute, ovate acute ciliate.

Corolla-tube $\frac{1}{2}$ by $\frac{1}{2}$ in., base gibbous, glabrous without, hairy within; lobes $\frac{1}{2}$ in., red-purple. *Style* shortly exsert, hairy to the summit. *Drupe*s distinct or completely confluent.

β . *Bracteoles* small or 0, except 21. *L. orientalis*.

20. ***L. microphylla***, Willd.; Roem. & Schult. Syst. v. 258; leaves small oblong or obovate pubescent beneath, peduncles $\frac{1}{2}$ –1 in., bracts $\frac{1}{2}$ – $\frac{1}{2}$ in. linear, bracteoles 0, calyx-limb truncate. DC. Prodr. iv. 336; H. f. & T. in Journ. Linn. Soc. ii. 171. *L. Sieversiana*, Bunge Verz. Altai-Geb. 18.

WESTERN TIBET; Kashmir to the Karakorum, alt. 11–14,000 ft., frequent.—DISTRIB. Northward to the Altai Mts.

A small, erect, shrub; branchlets glabrous or nearly so. *Leaves* subsessile, $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{2}$ – $\frac{1}{2}$ in., obtuse, base narrowed. *Peduncle* minutely pubescent, slender. *Corolla-tube* $\frac{1}{2}$ by $\frac{1}{2}$ in., base gibbous, glabrous without sparsely pilose within; teeth $\frac{1}{2}$ in., suberect. *Style* subexsert, very hairy below. *Berries* $\frac{1}{2}$ in., ellipsoid; usually connate half-way.

21. ***L. orientalis***, Lamk. Dict. i. 731; leaves ovate-lanceolate acute finely nerved above more or less pubescent beneath, peduncles $\frac{1}{2}$ –1 in. pubescent, calyx-teeth linear-lanceolate, corolla glabrous without or nearly so, tube short. DC. Prodr. iv. 337; Jaub. & Spach. Ill. t. 71; H. f. & T. in Journ. Linn. Soc. ii. 170; Boiss. Fl. Or. i. 8; Brandis For. Fl. 256. *L. Govaniana*, Wall. Cat. 481; DC. l. c. 337.

TEMPERATE HIMALAYA, alt. 7–11,000 ft.; from Kashmir common, rarer eastward, to Kumaon.—DISTRIB. Western Asia.

A large shrub or tree, 25 ft., branches horizontal, flattened. *Leaves* $2\frac{1}{2}$ by $1\frac{1}{2}$ in., acute, mucronate hardly acuminate, base narrowed or scarcely obtuse, midrib above pubescent, nerves fine and elevated when dried, beneath dotted and more or less pubescent; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in. *Peduncle* stout, or slightly flattened, thickened upwards. *Bracts* $\frac{1}{2}$ in., linear-lanceolate; bracteoles 0 or small, but in the Kashmir arboreous form larger, well-marked even in fruit. *Corolla-tube* $\frac{1}{2}$ in., base gibbous; limb $\frac{1}{2}$ in., pink. *Style* hairy, usually to the summit. *Berries* generally confluent.

VAR. *discolor*, Lindl. in Bot. Reg. xxxiii. 1847, t. 44 (sp.); leaves glaucous beneath. H. f. & T. in Journ. Linn. Soc. ii. 171.—Kashmir, alt. 9–11,000 ft., Thomson.—Lindley's figure shows the corolla glabrous without, the calyx-teeth not shorter than occurs in *L. orientalis*. This agrees perfectly with Thomson's examples. But with these occur (as *L. discolor*) plants with pubescent leaves and corollas, which we refer to *L. alpigena*.

22. ***L. heterophylla***, Dene. in Jacq. Voy. Bot. 80, t. 89; glabrous or nearly so, leaves narrow oblong reticulate-nerved beneath, peduncle $\frac{1}{2}$ – $1\frac{1}{2}$ in., calyx-teeth short-triangular, corolla sparsely pilose, tube short. H. f. & T. in Journ. Linn. Soc. ii. 170.

WESTERN ALPINE HIMALAYA and W. TIBET; KASHMIR; Choupienne, Jacquemont; Burjila and Karakorum, alt. 12,000 ft., C. B. Clarke.

An erect shrub, 3 ft., branches glabrous, rigid, ascending. *Leaves* $2\frac{1}{2}$ by $\frac{1}{2}$ –1 in., upper narrow-oblong, narrowed at both ends, margin irregularly sinuate or sublobate, above glabrous, even on the midrib; petiole $\frac{1}{2}$ in. *Peduncles* rigid, compressed, thickened upwards, scarcely pubescent. *Bracts* $\frac{1}{2}$ in., linear. *Corolla* nearly of *L. orientalis*. *Style* hairy to the summit. *Drupe*s $\frac{1}{2}$ by $\frac{1}{2}$ in., never connate.—Appears distinct from every form of *L. orientalis*; but when Hk. f. & T. suggested it might be a variety thereof, they had seen no specimens.

23. ***L. alpigena***, Linn.; DC. Prodr. iv. 336; leaves elliptic or oblong acute or acuminate pilose beneath, peduncles 1–2 in., calyx-tube pubescent limb

short, corolla glandular-hairy, tube very short. *Reich. Ic. Fl. Germ.* t. 1173; *H. f. & T. in Journ. Linn. Soc.* ii. 171; *Boiss. Fl. Orient.* iii. 8; *Brandis For. Fl.* 256. *L. Webbiana*, *Wall. Cat.* 476; *DC. l. c.* 336. *L. oxyphylla*, *Edgw. in Trans. Linn. Soc.* xx. 60.

KASHMIR to KUMAON, alt. 9–12,000 ft.; *Blinkworth*, &c.—DISTRIB. European Alps.

A large shrub; branchlets pubescent. *Leaves* 4 by 1–2 in., base rounded or cuneate, hairy or glabrate above, with pubescent nerves; nervation not prominent on either surface; petiole $\frac{1}{5}$ in. *Peduncle* stout, flattened, slightly thickened upwards, nearly glabrous. *Bracts* $\frac{1}{3}$ in., lanceolate or linear; bracteoles very small. *Corolla* nearly as in *L. orientalis*. *Drupe*s free in the Indian specimens.—Not a Bhotan plant (as stated by Hook. f. and Thomson).

DOUBTFUL SPECIES.

LONICERA FINLAYSONIANA, *Wall. Cat.* 6302, was perhaps collected in Cochin-China: the specimen is poor, and may be *L. confusa*, *DC.*

L. CHINENSIS, *CONFUSA* and *LONGIFOLIA*, mentioned by *Royle* (*Ill.* 236) as common to the Himalaya, China, and Japan, are probably referable to *L. macrantha*, *DC.*

7. *LEYCESTERIA*, *Wall.*

Under-shrubs, with fistular stems and branches. *Leaves* opposite, distichous, caudate-acuminate, membranous, glaucous beneath, exstipulate or with very small stipules, entire or toothed. *Flowers* whorled, in terminal or axillary erect or drooping spikes subtended by small or large foliaceous bracts, 2-bracteolate. *Calyx-tube* ovoid, limb unequally 5-lobed, persistent. *Corolla* funnel-shaped, gibbously swollen at the base and limb subequally 5-lobed. *Stamens* 5, inserted on the throat of the corolla. *Ovary* 5–8-celled; style slender, stigma capitate; ovules many, 2-seriate in each cell. *Berry* oblong or subglobose, 5–8-celled, many-seeded. *Seeds* minute, testa crustaceous shining.

1. *L. formosa*, *Wall. in Roxb. Fl. Ind. ed. Wall. & Carey*, ii. 181; *Pl. As. Rar.* ii. 20, t. 120; *Cat.* 470; branches stout, leaves ovate-toothed, bracts large leafy, ovary 5-celled. *Bot. Mag.* t. 3099; *Wight Ill.* ii. t. 121 D. *Brandis For. Fl.* 256.

TEMPERATE HIMALAYA, alt. 5–10,000 ft., from Kumaon to Bhotan. KHASIA Mts., alt. 5–6000 ft., *H. f. & T.*

Branching from the base, branches 6 ft. *Leaves* 2–5 by 1–3 in., broadly ovate or ovate-lanceolate long acuminate, entire or irregularly toothed, white and more or less puberulous beneath, base rounded subacute or cordate; petiole $\frac{1}{8}$ –1 in. *Spikes* 2 in., pubescent; bracts cordate laxly leafy, often purplish; bracteoles variable. *Flowers* glandular, puberulous. *Corolla* $\frac{1}{2}$ –1 in., purplish-pink. *Style* glabrous. *Berry* subglobose, red.—*Flowers* rarely 3–4-merous.

2. *L. glaucophylla*, *Hook. f.*; branches slender, leaves lanceolate sinuate-toothed, bracts much shorter than the flowers, berry 7–8-celled. *Lonicera glaucophylla*, *H. f. & T. in Journ. Linn. Soc.* ii. 165; *Gard. Chron.* 1858, 700, with fig. *L. gracilis*, *Kurz in Journ. As. Soc.* 1870, pt. ii. 77. *Pentaptyxis* sp., *Hook. f. in Gen. Pl.* ii. 6.

SIKKIM HIMALAYA, alt. 5–6000 ft.; *Yoksun*, *J. D. H.*; *Simonbong*, *Kurz.*

A much more slender plant than *L. formosa*, with narrower shorter-petioled leaves, and small axillary few-flowered spikes of puberulous flowers, the bracts of which.

are shorter than the ovary and ovate-subulate. The stipules are entirely absent or more or less developed into a small semicircular coriaceous lamina. In the "Genera Plantarum," this species, of which the flower and fruit were then unknown, was supposed to be a *Pentaptyxis* on account of the presence of stipules.

8. **PENTAPTYXIS**, Hook. f.

A woolly erect shrub with solid stems and branches. *Leaves* opposite, distichous, coriaceous, ovate-lanceolate, caudate-acuminate, sinuate-toothed; stipules very large leafy, orbicular margins recurved. *Flowers* in axillary peduncled or sessile rarely terminal woollen spikes, with short bracts and bracteoles. *Calyx* funnel-shaped, subequally 5-cleft, persistent. *Corolla* funnel-shaped, gibbously swollen at the base; limb subequally 5-lobed. *Stamens* 5, inserted on the throat of the corolla. *Ovary* 5-celled; style slender, stigma capitate; ovules many, 2-seriate in each cell. *Berry* ellipsoid, 5-celled, many-seeded. *Seeds* minute; testa crustaceous, shining.

Closely allied to *Leycesteria*, but differing in the solid branches, calyx, and habit.

1. **P. stipulata**, Hook. f. *Lonicera stipulata*, Hk. f. & T. in *Journ. Linn. Soc.* ii. 165; *Gard. Chron.* 1858, 700, with fig.

SIKKIM HIMALAYA; at Darjeeling, alt. 6-10,000 ft., J. D. H.

A shrub, 6-8 ft., densely clothed except the leaves above with soft, white wool. *Leaves* 4-8 by 2-3 in., base rounded, subentire or sinuate-toothed, puberulous above or glabrate with deeply impressed nerves. *Stipule* $\frac{1}{4}$ - $\frac{2}{3}$ in. diam., erect or reflexed. *Heads* dense, rarely subsopicate; peduncle very stout; bracts about equalling the calyx, ovate. *Flowers* $\frac{2}{3}$ in. long, woolly, white. *Berry* hairy, $\frac{3}{4}$ in., pulp thin. *Seeds* ellipsoid.—Flowers sometimes 4-merous.

ORDER LXXV. **RUBIACEÆ**. (J. D. Hooker.)

Trees, shrubs or herbs, rarely annual, erect or twining, unarmed or spiny, rarely truly prickly. *Leaves* simple, opposite or whorled, quite entire, stipulate (except in *Galiceæ*). *Inflorescence* various. *Calyx-tube* adnate to the ovary; limb various. *Corolla* regular, usually 4-5-lobed, lobes valvate, imbricate or contorted (to the left as seen from outside). *Stamens* as many as the lobes, inserted on the mouth or tube of the corolla, filaments short or long; anthers 2-celled, usually dorsifixed and dehiscing laterally or in front. *Disk* epigynous, usually annular or cushion-shaped. *Ovary* wholly inferior, 2-10-celled; style simple or cleft, stigmas various; ovules 1 or more in each cell. *Fruit* berried, capsular, drupaceous or of dehiscent or indehiscent cocci, 2-10-celled. *Seeds* various, albumen fleshy or horny. *Embryo* straight or curved; cotyledons flat or semiterete, radicle superior or inferior.—DISTRIB. Genera about 340 and species 4000, chiefly tropical and subtropical.

SERIES A. Ovules numerous in each cell (rarely solitary in *Cephalanthus* and a few *Hedyotidæ*).

TRIBE I. **Naucleææ**. *Flowers* collected into dense globose heads. *Corolla* funnel-shaped; stigma simple.

* *Ovaries confluent; fruits forming a globose fleshy mass; corolla-lobes imbricate in bud.*

Ovary 2-celled, ovules numerous	1. SARCOCEPHALUS.
Ovary 4-celled above, 2-celled below, ovules many	2. ANTHOCEPHALUS.
Ovary 2-celled, ovules solitary in each cell	3. CEPHALANTHUS.

** *Ovaries free or nearly so; fruits free, capsular.*

- | | |
|---|----------------|
| Flowers bracteolate, calyx-limb 5-lobed, corolla-lobes valvate | 4. ADINA. |
| Flowers bracteolate, calyx-limb entire, corolla-lobes valvate | 5. STEPHEGYNE. |
| Flowers ebracteolate, corolla-lobes imbricate | 6. NAUCLEA. |
| Flowers ebracteolate, corolla-lobes valvate, climbers with hooked peduncles | 7. UNCARIA. |

TRIBE II. **Cinchonæ.** *Corolla-lobes valvate, imbricate, or twisted in bud. Fruit capsular, 2-celled. Seeds winged.*

- | | |
|--|--------------------|
| Corolla-lobes valvate, style 2-fid, bracts leafy | 8. HYMENOPOGON. |
| Corolla-lobes twisted, style entire, flowers paniced, bracts simple | 9. COPTOSAPelta. |
| Corolla-lobes valvate, style entire, flowers in paniced spikes, bracts leafy | 10. HYMENODICTYON. |
| Corolla-lobes imbricate, style 2-fid | 11. LUCULIA. |

TRIBE III. **Bondeletieæ.** *Corolla-lobes (in the Asiatic genera) twisted in bud. Fruit capsular, 2-celled. Seeds angled, not winged. Shrubs or trees.*

- | | |
|--|-----------------|
| Flowers simply paniced | 12. WENDLANDIA. |
| Flowers in subscorpoid cymes | 13. GREENIA. |

TRIBE IV. **Hedyotideæ.** *Corolla-lobes valvate in bud. Fruit a loculicidal or septicidal 2- rarely 4-celled capsule, or of 2 or 4 dehiscent or indehiscent cocci, rarely altogether indehiscent. Seeds small or minute, rarely winged. —Herbs. rarely shrubs, never trees.*

A. Leaves quite entire, stamens 4 or 5.

* *Fruit 2-celled, usually indehiscent, stipules entire.*

- | | |
|---|-----------------|
| Corolla funnel-shaped, lobes 4-5-toothed | 14. DENTELLA. |
| Corolla rotate, anthers large, stigma capitellate | 15. ARGOSTEMMA. |
| Corolla funnel-shaped, stigma minute | 16. CLARKELLA. |
| Corolla rotate, anthers connate, stigmas 2 | 17. NEUROCALYX. |

** *Fruit 4-celled, indehiscent, cells with 1 erect ovule.*

- | | |
|--|------------------|
| Fruit with 4 bony indehiscent pyrenes; stigmas 4 | 18. ALLÆOPHANIA. |
| Fruit membranous, indehiscent, stigmas 2 | 19. FERGUSONIA. |

*** *Fruit oblong subglobose or orbicular, 2- rarely 4-celled, usually dehiscent, cells many- rarely 1-seeded.*

- | | |
|---|------------------|
| Capsule loculi- or septicidal, rarely indehiscent, with contiguous calyx-teeth, seeds usually angular | 20. HEDYOTIS. |
| Capsule loculicidal above the remote calyx-teeth, rarely indehiscent, seeds minute, angular | 21. OLDENLANDIA. |
| Capsule loculicidal above the remote calyx-teeth, rarely indehiscent, seeds plano-convex, or globose with a ventral cavity | 22. ANOTIS. |
| Capsule subglobose loculicidal, strongly ribbed, seeds minute angular, flowers in secund cymes | 23. SPIRADICLIS. |
| Capsule globose septicidal, seeds minute angular, flowers crowded in the short recurved distant branches of an erect peduncle | 24. POLYURA. |

**** *Fruit broadly didymously obcordate, of 2 compressed spreading lobes, loculicidal above the calyx.*

- Flowers crowded on the upper side of the branches of a peduncled cyme 25. *OPHIORRHIZA*.
 Flowers scattered on the branches of a peduncled cyme 26. *PARAOPHIORRHIZA*.

B. Leaves crenate-serrate or undulate, stamens 2.

- Capsule dry, 2-valved 27. *CARLEMANNIA*.
 Capsule fleshy, 5-valved 28. *SILVIANTHUS*.

TRIBE V. **Mussaendæ**. *Corolla-lobes* valvate in bud. *Fruit* fleshy or drupaceous, indehiscent (rarely dehiscent). *Seeds* minute.

a. *Inflorescence terminal*. (See also 35. *Adenosacme*, and 41. *Keenania*.)

- Flowers paniced or corymbose, calyx with one lobe usually forming a coloured leaf 29. *MUSSÆNDA*.
 Calyx-lobes 5 slender, *ovary* 1-celled 30. *ACRANTHERA*.
 Flowers capitate, calyx quite entire, stamens 4 31. *LUCINÆA*.
 Calyx irregularly fissured, stamens 5 32. *LEUCOCODON*.
 Calyx 5-lobed, stamens 5 33. *POLYSOLENIA*.
 Flowers umbelled 34. *TRISCIADIA*.

β. *Inflorescence usually axillary, flowers not involucrate*.

- Calyx 4-5-lobed, corolla reduplicate-valvate, berry 2-5-celled, cymes loose 35. *ADENOSACME*.
 Calyx-lobes 5 rigid, drupe with 2 pyrenes, flowers capitate 36. *MYRIONEURON*.
 Calyx-limb 8-16-sinuate, corolla 8-16-partite, stamens 8-16, cymes axillary 37. *AULACODISCUS*.
 Calyx 4-7-toothed, corolla 4-7-lobed, cymes axillary 38. *UROPHYLLUM*.
 Calyx-lobes 5 unequal leafy 39. *SCHIZOSTIGMA*.

γ. *Flowers capitate, involucrate*.

- Climbing shrub, heads axillary 40. *LECANANTHUS*.
 Erect or prostrate shrub, head terminal 41. *KEENANIA*.

TRIBE VI. **Gardeniæ**. *Corolla-lobes* twisted in bud. *Fruit* berried, fleshy or dry. *Seeds* usually large; cotyledons often foliaceous.

* *Seeds many in each cell, or few in 41, 45 and 46.*

- Inflorescence terminal, flowers 2-sexual, stigma fusiform 42. *WEBERA*.
 Inflorescence terminal, flowers diœcious, stigma fusiform 43. *BYRSOPHYLLUM*.
 Inflorescence leaf-opposed, flowers diœcious, style-arms 2 44. *BRACHYTOME*.
 Inflorescence lateral, corymbose, style-arms 2 45. *ANOMANTHODIA*.
 Inflorescence usually axillary, stigma fusiform, ovary 2-celled 46. *RANDIA*.
 Inflorescence usually axillary, stigma fusiform, ovary 1-celled 47. *GARDENIA*.

** *Style-arms 2, free (rarely combined), ovary 2-celled, seeds usually few in each cell, inflorescence always axillary.*

- Calyx-limb cupular 4-lobed, flowers in small cymes, testa coriaceous 48. *HYPOBATHRUM*.
 Calyx-limb minutely 5-toothed, flowers in spikes, testa grooved 49. *PETUNGA*.
 Calyx-limb cupular or 4-toothed, flowers diœcious capitate 50. *MORINDOPSIS*.
 Calyx-lobes 4-5 oblong, corolla rotate, testa plicate 51. *HYPTIANATHERA*.
 Calyx-teeth 4-5 very short, albumen ruminant 52. *NARGEDIA*.

Calyx-limb elongate 4-lobed, flowers in spikes, testa grooved 53. *SCYPHOSTACHYS*.
 Calyx calyculate, limb truncate or 4-5-lobed, flowers fasciated,
 rarely cymose 54. *DIPLOSPORA*.

SERIES B. Ovules 2 in each cell (ovary 2-celled). See also 53. *Diplospora*.
 (Genera of uncertain affinity.)

Corolla-lobes twisted, ovules inserted together half-way up
 the cell, 1 pendulous, 1 erect 55. *SCYPHIPHORA*.
 Corolla-lobes valvate, ovules erect on the top of an erect
 basilar placenta 56. *JACKIA*.

SERIES C. Ovules solitary in each cell. (See also 3. *Cephalanthus*, 18
Alæophania, 19. *Fergusonia*, 20. *Hedyotis*, 21. *Oldenlandia* and 41. *Webera*.)

SUBSERIES a. Radicle superior.

TRIBE VII. **Guettardæ**. *Corolla-lobes* imbricate or valvate in bud.
Stamens inserted on the mouth of the corolla. *Fruit* drupaceous with 2-many
 free or cohering pyrenes. *Seeds* cylindric; albumen scanty or 0.

Corolla imbricate, calyx-limb deciduous 57. *GUETTARDA*.
 Corolla imbricate, calyx-limb persistent 58. *ANTIRRHŒA*.
 Corolla valvate, calyx-limb cupular, ovary 4-12-celled 59. *TIMONIUS*.
 Corolla valvate, calyx 5-toothed, corolla curved 2-lipped,
 ovary 2-celled 60. *DICHLANTHE*.

TRIBE VIII. **Knoxieæ**. *Corolla-lobes* valvate in bud. *Stamens* inserted
 on the mouth of the corolla. *Fruit* of 2-cocci. *Seeds* dorsally compressed.

Albumen copious, herbs, fruit very small 61. *KNOXIA*.

TRIBE IX. **Albertææ**. *Corolla-lobes* twisted in bud. *Stamens* inserted
 in the mouth of the corolla. *Ovary* 1-celled with 1-2 pendulous ovules, or
 2-∞-celled with 1 ovule in each cell.

Corolla campanulate, style 8-grooved, ovary 1-celled,
 1-2-ovuled 62. *OCTOTROPIS*.

TRIBE X. **Vangueriææ**. *Corolla-lobes* valvate in bud. *Stamens* inserted
 in the mouth of the corolla. *Drupe* with 2-many free or cohering pyrenes. *Seeds*
 various; albumen copious.

Ovary 2-celled, stipules equal 63. *CANTHIUM*.
 Ovary 3-5-celled, stipules equal 64. *VANGUERIA*.
 Ovary 2-celled, one stipule very large 65. *MESOPTERA*.

SUBSERIES β. Radicle inferior.

TRIBE XI. **Ixoreæ**. *Corolla-lobes* twisted in bud. *Ovary* 2-4-celled;
 ovules usually inserted about the middle of the cell, rarely basilar. *Fruit* a
 2-4-celled berry or drupe with 2-4 free or united pyrenes. *Seeds* usually
 plano-convex.

Flowers paniced or corymbose, bracts coriaceous not
 sheathing 66. *IXORA*.
 Flowers paniced or corymbose, bracts membranous lower
 sheathing 67. *PAVETTA*.
 Flowers axillary fasciated or solitary 68. *COFFEA*.

TRIBE XII. **Morindeæ**. *Corolla-lobes* valvate in bud. *Stamens* inserted
 in the mouth or throat of the corolla. *Ovules* usually inserted below the middle

of the cell, and amphitropous. *Fruit* a 2-4-celled berry, or a drupe with 2-4 pyrenes.

* *Calyx-tubes cohering in a head.*

Heads many-fld. solitary or umbelled 69. *MORINDA*.
Heads few-fld. somewhat spiked 70. *RENNELLIA*.

** *Flowers free.*

Calyx-limb 4-5-fld, corolla-throat villous, drupe with 1-4 pyrenes, flowers axillary. 71. *DAMNACANTHUS*.
Calyx-limb truncate, corolla-throat glabrous, berry 1-2-seeded, flowers terminal and axillary 72. *PRISMATOMERIS*.
Calyx-limb truncate, drupe with 4 pyrenes, flowers umbellate 73. *CELOSPERMUM*.
Calyx-limb annular, corolla-throat woolly, flowers in axillary heads 74. *GYNOCHTHODES*.

TRIBE XIII. **Psychotriæ.** *Corolla-lobes* valvate in bud. *Stamens* inserted near the mouth of the corolla. *Ovules* basilar, cuneate, anatropous. *Drupe* with 2 or more pyrenes. (See also 18. *Alleophania*, and 19. *Fergusonia*.)

* *Flowers in terminal rarely axillary corymbose or paniced rarely capitate cymes.*

Calyx-limb short 4-5-toothed, corolla usually short straight 75. *PSYCHOTRIA*.
Calyx-limb short 5-toothed, corolla-tube usually long curved 76. *CHASALIA*.

** *Flowers capitate or fascicled, axillary or terminal (or solitary in Geophila).*

Calyx with 4-7 rather long lobes, creeping herbs, leaves cordate 77. *GEOPHILA*.
Calyx with 4-5 short teeth, style arms 2, heads involucred . 78. *CEPHEALIS*.
Calyx-limb 3-6-fld, style-arms 3-9, leaves distichous . . . 79. *LASIANTHUS*.

*** *Flowers axillary and terminal, solitary or few, anthers 4 subsessile.*

Calyx-limb dilated unequally 4-lobed, drupe with 2 pyrenes, fetid shrubs 80. *SAPROSMA*.
Calyx-limb truncate, drupe with 2 pyrenes, stem tuberous, epiphytes 81. *HYDNOPHYTUM*.
Calyx-limb truncate, drupe with 3 pyrenes, stem tuberous, epiphytes 82. *MYRMECODIA*.

TRIBE XIV. **Pæderiæ.** *Corolla-lobes* valvate in bud. *Stamens* inserted on the throat or base of the corolla. *Style-arms* 2-5, papillose all over. *Ovules* basilar, erect. *Fruit* capsular, 5-valved, or with 2 dorsally compressed pyrenes often pendulous from a columella; albumen copious or scanty.—Usually fetid climbing or erect shrubs.

Styles 2 capillary twisted, pyrenes 2, twining shrubs . . . 83. *PÆDERIA*.
Style 5-fld, capsule 5-valved at the top, testa reticulated, erect shrubs 84. *HAMILTONIA*.
Style-arms 5, capsule 5-valved at the base, enclosing 5 pyrenes with reticulated coats, erect shrubs 85. *LEPTODERMIS*.

TRIBE XV. **Spermacocææ.** *Corolla-lobes* valvate in bud. *Ovary* 2- rarely 3-4-celled; style entire, stigma capitate or 2-fld, rarely style-arms elongate; ovules attached to the septum of the ovary, amphitropous. *Fruit* small, dry, capsular or of 2 cocci, or circumsciss at the base. *Seeds* usually oblong, deeply grooved on the ventral face.—Herbs, rarely undershrubs, leaves opposite, stipules usually setaceous.

- Fruit of 2 indehiscent at length separating cocci 86. HYDROPHYLAX.
 Fruit of 2 separable cocci, both or one only dehiscing
 ventrally 87. SPERMACOCE.
 Fruit of 2 connate cocci, calyx-limb greatly enlarged . . . 88. GAILLONIA.

TRIBE XVI. **Galiceæ**. *Corolla-lobes* valvate in bud. *Ovary* 2-celled: style-arms 2; ovules attached to the base of the septum. *Fruit* of 2 small coriaceous or fleshy indehiscent lobes. *Seeds* peltate, usually hollowed ventrally. —Herbs; leaves usually whorled, without stipules.

- Corolla rotate or shortly campanulate 5-merous 89. RUBIA.
 Corolla rotate 4-merous 90. GALIUM.
 Corolla funnel-shaped 91. ASPERULA.

TRIBE I. NAUCLEÆÆ.

1. SARCOCEPHALUS, Afzel.

Shrubs or trees, sometimes climbing. *Leaves* petioled; stipules large or small. *Flowers* in axillary or terminal peduncled globose heads, without bracteoles, united by their confluent calyx-tubes; bracts 2, stipular. *Calyx* 4-6-toothed with deciduous appendages. *Corolla-tube* long, funnel-shaped, throat glabrous; lobes 5-6, orbicular, imbricate. *Stamens* 5-6, on the corolla mouth; anthers sessile, acute. *Ovary* 2-celled; style filiform, exerted, stigma capitate, oblong or spindle-shaped; ovules very many, imbricating upwards on pendulous placentas. *Fruits* combined in a fleshy globose mass of 2-celled pyrenes with very thin septa. *Seeds* few in each cell, minute, testa crustaceous, albumen fleshy; embryo rather large, radicle inferior.—DISTRIB. Species 8, tropical Asiatic, African, and Australian.

1. **S. cordatus**, *Miq. Fl. Ind. Bat.* ii. 133; leaves elliptic ovate or cordate obtuse, peduncles solitary stout 1-headed, heads of fruit smooth. *Bedd. Fl. Sylv.* t. 318; *Kurz For. Fl.* ii. 63. S. Horsfieldii, *Miq. l. c.* 134. *Nuclea cordata*, *Roxb. Hort. Beng.* 14; *Fl. Ind.* i. 509. N. coadunata, *Roxb. in Rees Cyclop.* N. Roxburghii, *G. Don Gen. Syst.* iii. 467, excl. synonym. N. Wallichiana, *Br. in Wall. Cat.* 6098. N. parvifolia, *Wall. Cat.* 6093 B. *Platanocarpum cordatum*, *Korth. Naocl. Ind.* 16.

MALAY PENINSULA, from Pegu and Mergui to Malacca, Wallich, &c. CEYLON, Walker, &c.—DISTRIB. Malay and Philippine Islands, N. Australia.

A small tree. *Leaves* 5-12 by 4-8 in.; petiole $\frac{3}{4}$ -1 in.; stipules oblong, elliptic or obovate. *Heads* $\frac{1}{2}$ -1 in. diam., drooping; peduncle 1-1 $\frac{1}{2}$ in.; stipular bracts broad, almost basal. *Flowers* yellow, fragrant; calyx-lobes clavate.—A form with leaves pubescent beneath, from the Malay Islands, is N. undulata, *Wall. Cat.* 6094 (not of *Roxb.*). The true N. undulata, *Roxb.*, is not Indian, it is Wallich's N. purpurea, 6090 D. (N. stipulacea, *Herb. Roxb.*, not N. Roxburghii, *G. Don Gen. Syst.* iii. 467, which from the description is S. cordatus itself).

2. **S. subditus**, *Miq. Fl. Ind. Bat.* ii. 134; leaves lanceolate obtusely acuminate, peduncles solitary 1-headed, heads of fruit rough. *Platanocarpum subditum*, *Korth. Verh. Nat. Gesch. Bot.* 133, t. 32.

MALACCA, Griffith.—DISTRIB. Sumatra, Java.

Much more slender than S. cordatus. *Leaves* glabrous, 3-5 by 1 $\frac{1}{2}$ -2 in., narrowed into the slender petiole, black when dry. *Peduncles* slender, pubescent, bracteate

about the middle. *Heads* $\frac{1}{2}$ in. diam., fruiting with concave summits to the carpels and raised edges.

3. **S. Junghuhnii**, *Miq. Fl. Ind. Bat.* ii. 134; leaves elliptic abruptly obtusely pointed, peduncles 1-3-nate 1-3-headed, heads nearly smooth.

MALACCA; Mt. Ophir, *Griffith* (Kew Distrib. 2772), *Maingay* (Kew Distrib. 822, 822').—DISTRIB. Sumatra.

Branchlets and peduncles puberulous. *Leaves* 4-5 by 2-2 $\frac{1}{2}$ in., rather coriaceous, nerves with minute tufts of hair in the axils; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules oblong. *Peduncles* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., with a small 4-lobed cup of bracts below the middle, of which 2 opposite are larger than the others. *Heads* $\frac{1}{4}$ - $\frac{1}{3}$ in. diam., in fruit $\frac{2}{3}$ in. diam.—I have seen no authentic specimen of *Junghuhnii*, but find the name attached by *Maingay* to his specimens. *Miquel's* description is most meagre.

2. **ANTHOCEPHALUS**, *A. Rich.*

A glabrous tree. *Leaves* petioled; stipules lanceolate, caducous. *Flowers* in terminal globose peduncled solitary heads, without bracteoles, united by their confluent calyx-tubes; peduncles with basal stipular bracts. *Calyx-limb* tubular, 5-lobed, persistent or deciduous. *Corolla-tube* long, funnel-shaped, throat glabrous; lobes 5, imbricate. *Stamens* on the throat of the corolla, filaments short. *Ovary* 4-celled above, 2-celled below; style exserted, stigma spindle-shaped; ovules very many, horizontal on 2 bifid placentas, which ascend from the septa below its middle, and send an arm into each of the 4 upper cells. *Fruits* confluent into a fleshy globose mass of many few-seeded coriaceous pyrenes. *Seeds* minute, testa rather thin; embryo clavate in fleshy albumen.

1. **A. Cadamba**, *Miq. Fl. Ind. Bat.* ii. 135; leaves elliptic-oblong ovate or ovate-cordate acute. *Bedd. Fl. Sylv.* 127, t. 35; *Brand. For. Fl.* 261. *A. morindæfolia*, *Korth. Verh. Nat. Gesch. Bot.* 154, t. 48. *Nauclea Cadamba*, *Roxb. Hort. Beng.* 14; *Fl. Ind.* i. 512. *Sarcocephalus Cadamba*, *Kurz For. Fl.* ii. 63; *Wall. Cat.* 6088, excl. C.

FROM THE HIMALAYA TO CEYLON AND MALACCA, wild or cultivated; Forests of PEGU, *Kurz*.—DISTRIB. Sumatra, Borneo.

A large tree; branches spreading. *Leaves* coriaceous, 5-9 in., shining above, pubescent beneath. *Heads* 1-2 in. diam., peduncles stout. *Flowers* orange-coloured with white stigmas, scented at night. *Fruit* as large as a small orange.—*Wallich's* 6088 C. a cultivated plant from Ava, is very different, having membranous leaves and very oblique nerves.

3. **CEPHALANTHUS**, *Linn.*

Shrubs or small trees. *Leaves* opposite or whorled, stipules short. *Flowers* densely crowded in terminal or axillary solitary simple or paniced globose heads mixed with setaceous or paleaceous bracteoles; peduncles with stipular caducous bracts about the middle. *Calyx-tube* obpyramidal; limb cup-shaped, 4-5-toothed or -lobed. *Corolla-tube* long, funnel-shaped; throat glabrous or hairy; lobes 4, imbricate. *Stamens* on the mouth of the corolla, filaments short; anthers 2-cuspidate at the base. *Ovary* 2-celled; style filiform, stigma capitate or clubbed; ovules 1 pendulous in each cell. *Fruit* of numerous obpyramidal indehiscent 1-seeded cocci. *Seeds* pendulous, with a fungoid aril, testa membranous sometimes winged; embryo in horny albumen, cotyledons flat.—DISTRIB. Species 6, tropical Asia, Africa, and America.

1. **C. naucleoides**, DC. *Prodr.* iv. 539; glabrous pubescent or tomentose, leaves ovate or ovate-lanceolate acuminate. *Kurz For. Fl.* ii. 68. *C. aralioides*, Zoll. & Mor. *Syst. Verh.* 61. *Nauclea tetrandra*, Roxb. *Hort. Beng.* 14; *Fl. Ind.* i. 576; *Wall. Cat.* 6101.

SIKKIM HIMALAYA, alt. 2000 ft., J. D. H. ASSAM, CACHAR, and SILHET.—DISTRIB. N. Birma, Java, China.

A small tree. *Leaves* opposite or 3-4-nate, 3-5 by 1-2 in.; petiole short; stipules acuminate, often gland-tipped. *Peduncles* often whorled, slender; bracteoles linear-clavate, hairy. *Heads* $\frac{3}{4}$ in. diam., yellowish-white. *Calyx-lobes* short, with interposed black glands.—Very closely allied to the N. American *C. occidentalis*, Linn., and perhaps a form of it.

4. **ADINA**, Salisb.

Trees or shrubs. *Leaves* petioled; stipules large, caducous. *Flowers* bracteate or not, densely crowded in solitary or paniced globose heads; receptacle hairy. *Calyx-tube* angled, lobes 5. *Corolla* funnel-shaped, tube long, throat glabrous; lobes 5, valvate. *Stamens* 5, on the mouth of the corolla, filaments short. *Ovary* 2-celled; style filiform, stigma capitate or clubbed; ovules numerous, imbricated on a pendulous placenta in each cell. *Capsule* of 2 dehiscent cocci, many-seeded. *Seeds* oblong, testa winged; embryo in abundant fleshy albumen, radicle superior.—DISTRIB. Species 6, tropical Asiatic and American.

1. **A. cordifolia**, Hook. f. in *Gen. Pl.* ii. 30; leaves petioled orbicular cordate abruptly acuminate pubescent beneath, peduncles 1-3-axillary 1-headed. *Brand. For. Fl.* 263, t. 33. *Nauclea cordifolia*, Willd.; Roxb. *Hort. Beng.* 14; *Cor. Pl.* 1, t. 53; *Fl. Ind.* i. 514; *Wall. Cat.* 6092; *W. & A. Prodr.* 391; *Kurz For. Fl.* ii. 66; *Dalz. & Gibs. Bomb. Fl.* 118.

Dry forests, alt. 1-3000 ft., from KUMAON to SIKKIM, PEGU and TENASSERIM, and throughout the hilly parts of India to CEYLON.

A large or small tree, wood hard. *Leaves* deciduous, coriaceous, 4-12 in. diam.; petiole 2-3 in., stout; stipules orbicular or oblong. *Heads* $\frac{3}{4}$ -1 in. diam.; peduncle stout, 1-2 in.; bracts small towards the apex. *Flowers* yellow; corolla downy; stigma clavate. *Capsule* $\frac{1}{2}$ in., cuncate, downy; cells about 6-seeded.

2. **A. sessilifolia**, Hook. f. in *Gen. Plant.* ii. 30; leaves sessile oblong glabrous base cordate tip rounded, peduncles 1-3 terminal solitary 1-headed, corolla shaggy. *Nauclea sessilifolia*, Roxb. *Fl. Ind.* i. 515; *Kurz For. Flor.* ii. 65. *N. sericea*, Wall. *Cat.* 6095; *G. Don Gen. Syst.* iii. 467.

CHITTAGONG, Roxburgh, &c. CACHAR, Keenan. PEGU, Wallich, &c.

A small tree. *Leaves* rather coriaceous, 6-10 by 3-6 in., glossy above; petiole very short and stout, stipules broadly oblong. *Heads* $1\frac{1}{2}$ in. diam., silkily villous; peduncle very stout, 1-2 in.; flowers shaggily silky; stigma clavate. *Capsules* $\frac{1}{2}$ in., cuncate.

3. **A. Griffithii**, Hook. f.; leaves shortly petioled elliptic oblong or obovate shortly obtusely acuminate glabrous, peduncles 1-2 terminal 1-headed, corolla glabrous.

KHASIA Mts.; Mahadeb, alt. 3000 ft., Griffith, J. D. H., and T. T. ? NICOBAR Islands, Kurz.

A small quite glabrous tree. *Leaves* persistent, coriaceous, 4-7 by $1\frac{1}{2}$ - $3\frac{1}{2}$ in., narrowed into the short stout petiole; nerves 6-7 pair, prominent beneath, transverse ones slender; stipules not seen. *Peduncles* 1-2 in., very stout, smooth. *Heads* $1\frac{1}{4}$ in. diam.; bracteoles of short stiff conical-subulate spines shorter than the silky calyces and apparently persistent; corolla quite glabrous.—The Nicobar specimen has rather

more flaccid and broader leaves than the Khasian, with 8-9 pairs of nerves, and a longer peduncle; its corollas have fallen away.

4. **A. polycephala**, *Benth. Fl. Hongkong*, 146; leaves shortly petioled lanceolate caudate-acuminate glabrous, heads in trichotomously branched panicles, corolla glabrous. *Nauclea polycephala*, *Wall. Cat.* 6100; *G. Don Gen. Syst.* iii. 467; *Kurz For. Fl.* ii. 65.

SILHET and KHASIA Mts., *De Silva, Griffith, &c. CHITTAGONG, J. D. H. & T. T. TENASSERIM, Kurz.* Moulmein on Thounggyun, alt. 4000 ft., *T. Lobb.*

A small evergreen tree. *Leaves* 3-5 by 1-1½ in., rather thin, glossy above; nerves 5-9 pair, caudate apex obtuse and variable in form and length, sometimes strap-shaped; petiole ½-¾ in.; stipules long. *Heads* ½ in. diam.; peduncles and pedicels slender, glabrous or puberulous. *Capsule* obovoid.

VAR. macrophylla; leaves broader 6-9 by 2½-4 in. oblanceolate with more numerous nerves (10-12 pairs) and much shorter tips.—*N. microcephala*, *Wall. in Herb. Hook.* *Cephalanthus aralioides*, *Zoll. & Morr. Syst. Verz.* 61; *Miq. Fl. Ind. Bat.* ii. 152, 344. *Nauclea trichotoma*, *Zoll. & Morr. l.c.* *N. aralioides*, *Miq. l.c. Suppl.* 538.—*Silhet, Wallich*; *Mergui, Griffith.*—Sumatra and Java: probably the Silhet habitat is erroneous, the authority being a garden specimen.

5. STEPHEGYNE, Korth.

Shrubs or trees. *Leaves* petioled; stipules large, caducous. *Flowers* crowded in globose axillary and terminal solitary panicked or subumbelled heads united by their confluent calyx-tubes, each peduncle with 2 deformed leaves at the top, within which are 2 caducous bracts; bracteoles paleaceous. *Calyx-tube* short; limb cupular or tubular, truncate or 5-toothed. *Corolla* funnel-shaped, tube long, throat hairy or glabrous; lobes 5, short, valvate. *Stamens* 5, on the throat of the corolla, filaments short. *Ovary* 2-celled; style filiform, stigma capitate or mitriform; ovules imbricated upwards on pendulous placentas. *Fruit* of 2 dehiscent cocci, many-seeded. *Seeds* small, testa winged, albumen fleshy.—*DISTRIB.* Species 10, tropical African and Asiatic.

1. **S. parvifolia**, *Korth. in Verh. Gesch. Nat. Bot.* 161; leaves orbicular oblong ovate or cordate, tip rounded acute or acuminate, calyx-limb very short, corolla-tube much exceeding the lobes. *Brand. For. Fl.* 262. *Nauclea parvifolia*, *Willd.*; *Roxb. Hort. Beng.* 14; *Cor. Pl.* i. 40, t. 52; *Fl. Ind.* i. 513; *Wall. Cat.* 6093, *excl. B. partly*; *W. & A. Prodr.* 391; *Wt. Ill.* t. 123; *Bedd. Fl. Sylv.* t. 34. *N. parviflora*, *Pers.*; *Dalz. & Gibs. Bomb. Fl.* 118. *Cephalanthus pilulifer*, *Lamk.*

Dry forests of the TROPICAL HIMALAYA, from the Chenab to Birma, ascending to 4000 ft., and throughout the drier parts of India to CEYLON.

A small or large tree, glabrous or pubescent. *Leaves* extremely variable in size and shape, deciduous, 2-6 in., with 6-8 pair of oblique nerves; petiole short; stipules obovate. *Heads* about 1 in. diam., with 2 linear-oblong leaves at the base; bracts caducous; peduncles ½-3 in. *Corolla* glabrous within, stamens inserted in the tube. *Capsules* ½ in.

2. **S. tubulosa**, *Hook. f. in Gen. Pl.* ii. 31; leaves elliptic-oblong or ovate-cordate shortly acuminate, calyx-limb tubular truncate, corolla-tube much exceeding the lobes. *Bedd. Fl. Sylv., Anal. Gen.* 128, t. xxix. f. 1 (*excl. name parvifolia*). *Nauclea tubulosa*, *Arn. in Thwaites Enum.* 137; *Bedd. Ic. Pl. Ind. Or.* t. 18.

WESTERN PENINSULA; *Cochin, Johnson.* CEYLON, *Macrae, &c.*

A small glabrous tree. *Leaves* 2-6 in., rather membranous, sometimes pubescent beneath, variable in shape, rarely acute at both ends, sometimes cordate; nerves

10-12 pair; petiole $\frac{1}{4}$ -1 in.; stipules large, obovate, membranous. *Peduncles* terminal, usually 3-nate with the middle ones very short or 0, the lateral 1-3 in.; bracted leaves petioled; bracts very caducous. *Heads* $1\frac{1}{2}$ in. diam.; flowers glabrous; stigmas cylindric, truncate at both ends. *Capsules* $\frac{1}{2}$ in. including the calyx ribbed, nearly glabrous.

3. ***S. diversifolia***, *Hook. f.*; leaves orbicular-cordate oblong or elliptic, tip rounded, calyx-limb 0, corolla-tube equalling the bearded lobes. *N. diversifolia*, *Wall. Cat.* 6096; *G. Don Gen. Syst.* iii. 467. *N. paryifolia*, *var. 2*, *Kurz For. Fl.* ii. 67. *N. rotundifolia*, *Roxb. Fl. Ind.* i. 516; *Kurz l. c.* *N. Brunonis*, *Wall. Cat.* 6097; *G. Don l. c.* 467.

CHITTAGONG, *Roxburgh*, &c. TENASSERIM and BIRMA, *Wallich*, &c.—DISTRIB. Philippines.

A small tree. *Leaves* deciduous, glabrous or pubescent beneath; the lower orbicular-cordate, 10 in. diam., coriaceous, the upper 4-6 by 2-3 in. and membranous, nerves oblique; petiole $\frac{3}{4}$ -1 $\frac{1}{2}$ in.; stipules obovate-oblong. *Heads* white, in spreading 3-chotomous panicles, nearly 1 in. diam.; foliar bracts long-petioled; corolla glabrous except the lobes within; stigma elongate, mitriform. *Capsules* $\frac{1}{2}$ in. long, smooth, ribbed.—I have preferred Wallich's and Don's name of *diversifolia* to Roxburgh's of *rotundifolia*, as expressing the very remarkable difference between what I take to be the upper and lower leaves of the branches.

6. **NAUCLEA**, *Linn.*

Trees or shrubs. *Leaves* usually large, sessile or petioled; stipules large, caducous or subsistent. *Flowers* crowded in globose peduncled bracteate solitary or subpanicled heads. *Calyx-tube* turbinate or obconic; lobes 5, usually tipped with valvate processes. *Corolla* elongate-funnel-shaped, throat glabrous; lobes short, imbricate. *Stamens* 5, on the throat of the corolla, filaments 0 or short or long. *Ovary* 2-celled; style filiform, stigma capitate cylindric or submitriform; ovules many, pendulous on adnate ascending placentas. *Fruit* of 2 dehiscent many-seeded cocci. *Seeds* imbricate, testa winged; embryo clavate in fleshy albumen.—DISTRIB. Species about 30, tropical Asiatic, and Polynesian.

* *Stigma capitate, stipules flat caducous.*

1. ***N. purpurea***, *Roxb. Cor. Pl.* i. 41, t. 54; *Fl. Ind.* i. 515; leaves elliptic or elliptic-lanceolate subacute, heads 1-3 long peduncled, corolla glabrous. *Wall. Cat.* 6090, excl. D.; *W. & A. Prodr.* 391, partly; *Bedd. Fl. Sylv.* 129; *l.c. Pl. Ind. Or.* t. 19. *N. lanceolata*, *Blume Bijl.* 1009. *Anthocephalus indicus*, *Richd. in Mem. Soc. Hist. Nat. Paris*, v. 237. *A. chinensis*, *Hassk. in Flora*, 1845, 231. *Cephalanthus chinensis*, *Lamk. Dict.* i. 678, excl. *syn. Rumph.*—*Rheede Hort. Malab.* iii. t. 33.

WESTERN PENINSULA; from the Concan to the Circars, and southwards, not common.

A small tree, quite glabrous. *Leaves* 4-8 by $1\frac{1}{2}$ -5 in., membranous, shining on both surfaces; petiole $\frac{1}{2}$ -1 $\frac{1}{4}$ in. *Heads* $1\frac{1}{2}$ in. diam., palæ of conical bristles; peduncles about 2-3 in., bracteate about the middle. *Calyx* silky.

2. ***N. zeylanica***, *Hook. f.*; leaves elliptic or oblanceolate obtuse, peduncles 1-3 slender, corolla silky. *N. peduncularis*, *Thwaites Enum.* 137, not of *Wallich*; *Bedd. Fl. Sylv.* 129; *l.c. Pl. Ind. Or.* t. 235.

CEYLON; Saffragam and contiguous districts, ascending to 1000 ft. not uncommon; central province rare, *Gardner, Thwaites*.

A middle-sized tree. *Leaves* 4-5 by 1-2 in., opaque when dry, nerves 6-8 pair;

petiole $\frac{1}{2}$ – $\frac{1}{2}$ in.; stipules linear-oblong. *Heads* $2\frac{1}{2}$ in. diam.; peduncles slender, 1–2 in., with 4 bracts below or above the middle. *Flowers* ochreous-purple; style rather short.

3. **N. peduncularis**, Wall. Cat. 609; leaves large elliptic or elliptic-oblong coriaceous obtusely acuminate, peduncles 3-nate very stout, corolla silky. *G. Don Gen. Syst.* iii. 469.

PENANG, Porter.—DISTRIB. Sumatra.

Branches very robust. *Leaves* 6–12 by 3–5 in., shining above, cordate or tapering into a very stout petiole $\frac{1}{2}$ –1 in.; nerves strong beneath. *Peduncles* 1– $2\frac{1}{2}$ in., lateral spreading, central short or long. *Heads* $1\frac{1}{2}$ in. diam.; calyx-lobes long, slender, clavate, acuminate, very silky, longer than the tube of the glabrous corolla.

** *Stigma elongate acute, stipules concave sub-persistent.*

4. **N. missionis**, Wall. Cat. 6099; leaves elliptic-lanceolate acute or obtuse membranous glabrous, peduncles short stout solitary, calyx and corolla tomentose. *W. & A. Prodr.* 392; *Arn. Pugill. Pl. Ind. Or.* 20. *N. oblongata*, *Miq. in Herb. Hohenack.* 717. *N. orientalis*, *Herb. Madr.* *N. elliptica*, *Dalz. & Gibs. Bomb. Fl.* 118.

TRAVANCOR, Rottler, Wight. MALABAR, Hohenacker. CONCAN, Stocks.

Very similar to *N. purpurea*, but distinguished by the sessile leaves of which the petioles are usually winged to the base, and the elongate stigma, and the remarkable stipules. *Leaves* 4–7 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., shining above; petiole rarely $\frac{1}{2}$ in.; nerves 10–12 pair, slender; stipules forming an appressed cylindric coriaceous sheath, more or less connate, sometimes half-way up, glabrous, obtuse, very persistent. *Peduncles* usually inclined, $\frac{2}{3}$ –1 in., with stipular sheathing bracts at the base, and 4 small bracts united below into a cup above the base, of which 2 are shorter than the others. *Heads* $1\frac{1}{4}$ in. diam.; calyx-lobes and corolla-lobes tomentose.—Of Dalzell's *N. elliptica* there are authentic specimens, but in bud only. He describes the stigma as 'round,' but his specimens accord so entirely with Wight's, Rottler's, &c., in all other respects, that I suspect some mistake. His plant should be searched for 'near Sura, and the village of Hoolun, not far from Chorla Ghaut.'

5. **N. Maingayi**, Hook. f.; leaves broadly elliptic or elliptic-obovate coriaceous obtusely acuminate, nerves beneath pubescent, peduncles solitary very short, calyx and corolla-lobes tomentose.

MALACCA; *Maingay* (Kew Distrib. 823).

Branches stout, glabrous. *Leaves* 4–6 by 2–3 in., shining above, contracted into a short petiole which is almost winged to the base; nerves 12–14 pair, strong, spreading; stipules $\frac{2}{3}$ in. long, forming an appressed cylindric sheath, obtuse, coriaceous. *Peduncle* $\frac{1}{2}$ in., curved, with basal sheathing stipular bracts, and broad subsistent ones under the head. *Head* $1\frac{1}{2}$ in. diam.—Very near to *N. missionis*, with similar remarkable stipules, but the leaves are much broader, very coriaceous, with more numerous more spreading strong nerves, which are pubescent beneath; the bracts under the head appear to be very large and orbicular, but they are much withered, and I have seen only 2 specimens.—A Bornean species (Beccari, n. 681) is probably the same as this, but the heads are larger.

DOUBTFUL SPECIES.

N. ovalifolia, Roxb. *Hort. Beng.* 14; *Fl. Ind.* i. 576; *Ed. Carey & Wall.* ii. 124; 'leaves sessile oval and elliptic, flowers terminal solitary.'—'Forests of Silhet': called Shāl by the natives.—Possibly *Adina sessilifolia*. Don refers it to *Uncaria elliptica*, which is not a Khasian plant.

N. excelsa, Blume; *Kurz For. Fl.* ii. 65, from Pegu. This is certainly not Blume's plant, if Kurz is correct in describing it as having no bracteoles, and the

peduncles only 2-3 lines, for Blume's *N. excelsa* is a true *Adiantum* with slender cuneate bracteoles amongst the flowers, and peduncles sometimes 2 in.

N. ORIENTALIS, Lamk. *Ill. t.* 153, f. 1; *Blume Bijl.* 1066; *Ham. in Trans. Linn. Soc.* xv. 94, is altogether doubtful.

7. *UNCARIA*, Schreb.

Climbing shrubs. *Leaves* shortly petioled; stipules entire or 2-fid. *Flowers* in globose axillary peduncled solitary or paniced heads; peduncles often headless converted into hooked tendrils. *Calyx-tube* spindle-shaped; limb 5-lobed or -parted. *Corolla-tube* long, funnel-shaped; limb 5-lobed, valvate; throat glabrous. *Stamens* 5, on the throat of the corolla, filaments short; anthers with 2 basal bristles. *Ovary* 2-celled; style slender, stigma capitate; ovules many, ascending on projecting placentas. *Capsule* elongate, septicidally 2-valved, many-seeded. *Seeds* imbricating upwards, testa winged above and below; embryo clavate, in fleshy albumen.—*DISTRIB.* About 30 species, tropical Asiatic, except 1 African and 1 American.—The Gambier of commerce is the produce of *U. Gambier*.

* *Calyx-limb long funnel- or bell-shaped, teeth lanceolate, corolla hirsute or villous.*

1. *U. sclerophylla*, *Roxb. Fl. Ind.* i. 520; branches robust obtusely 4-angled pubescent or villous, leaves short-petioled large ovate suborbicular or oblong rigid pubescent beneath shining and reticulate above, peduncles all axillary bracteate above the middle, heads very large, flowers pedicelled, corollas villous. *U. sclerophylla*, insignis, ferruginea, and pedicellata, *DC. Prodr.* iv. 347, 348. *U. speciosa*, *Wall. Cat.* 6106. *U. ferruginea*, *Kurz For. Fl.* ii. 69. *Nauclea sclerophylla*, *Hunter in Trans. Linn. Soc.* ix. 223. *U. pedicellata*, *Bl. Bijl.* 1012.

PENANG, *Hunter*, &c. MALAY PENINSULA, common from Pegu and Mergui to Malacca, *Wallich*, &c.—*DISTRIB.* Java, Borneo, Philippines.

Very large and stout. *Leaves* 5-6 by $3\frac{1}{2}$ -4 in., base rounded or cordate, rusty-pubescent beneath with strong transverse nerves between the 8 pairs of stout principal ones; petiole $\frac{1}{4}$ -1 in.; stipules hairy, rounded, 2-fid. *Peduncle* very stout, 2-4 in.; bracts 6 in a whorl, $\frac{1}{2}$ in. long. *Heads* 4 in. diam.; calyx tomentose, limb campanulate, lobes triangular acute; corolla 1 in., silky or densely villous all over. *Capsules* 1-1 $\frac{1}{2}$ in., longer than their pedicels, very variable.—Stems shaggy with long hairs in a specimen from Penang (Maingay), with capsules shorter and more turgid, and leaves ovate very hairy beneath. The corollas vary from densely shaggy with spreading fulvous hairs, to silkily shaggy with appressed hairs.

2. *U. pedicellata*, *Roxb. Fl. Ind.* i. 520; *Ed. Wall. & Carey*, ii. 128; branches robust 4-angled, leaves short-petioled oblong ovate-oblong or elliptic shining above puberulous beneath rigid, peduncles axillary and in terminal panicles bracteate about the middle, flowers pedicelled, corolla $\frac{1}{2}$ - $\frac{3}{4}$ in. with long silky hairs. *U. sclerophylla*, *Wall. Cat.* 6105. *U. ferruginea*, *DC. Prodr.* iv. 348. *U. Hallii*, *Korth. Verh. Nat. Gesch. Bot.* 165, t. 33. *Nauclea ferruginea*, *Bl. Bijl.* 1013.

PENANG and SINGAPORE, *Wallich*, &c. MALACCA, *Griffith* (*Kew Distrib.* n. 2755), *Maingay* (*Kew Distrib.* n. 326).—*DISTRIB.* Java, Borneo.

Closely allied to *U. sclerophylla*, but smaller in all its parts, with more oblong leaves not so reticulate above and only minutely pubescent beneath; heads nearly as large, but flowers smaller and capsules much shorter and more turgid (as in one specimen of *sclerophylla*).

** *Calyx-limb small, funnel-shaped, limb with short teeth, corolla glabrous or pubescent (not shaggy).*

3. *U. attenuata*, Korth. in *Verh. Nat. Gesch. Bot.* 170, t. 34; branches 4-angled puberulous, leaves elliptic obtusely acuminate shining above puberulous beneath, flowers shortly pedicelled, calyx-teeth very short obtuse, corolla $\frac{1}{2}$ in. silky, tube very slender. *U. sclerophylla*, Deless. *Ic. Select.* iii. t. 81, not of Roxburgh. *U. Gambier*, Wall. Cat. 6103 C. in part.

PENANG, Phillips. SINGAPORE, Wallich. TENASSERIM, Helfer.—DISTRIB. Sumatra. Branches nearly glabrous. Leaves 4-6 by 2-3 $\frac{1}{2}$ in., firm, base rounded; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in.; nerves about 8 pair, very obliquely ascending, strong, with transverse veins, axils with tufts of hair. Peduncles 1-2 in. Heads 1 $\frac{1}{2}$ in. diam.; pedicels very short, elongating to $\frac{1}{2}$ in. in fruit and calyx rufous-tomentose. Capsules (unripe) $\frac{2}{4}$ in.

4. *U. ovata*, Br. in Wall. Cat. 6112, in part; 6103 D. (*U. Gambier*) and 6107 in part (*U. macrophylla*); branches glabrous, leaves petioled oblong obtusely acuminate glabrous and ashy beneath, peduncles long stout straight axillary and in terminal panicles bracteate above the middle, flowers sessile, calyx-lobes ovate acute, corolla silky.

SINGAPORE, SILHET, and 'HB. FINLAYSON,' Wallich.

Foliage identical with that of *U. canescens*, Korth., but nerves usually 8 pair, always without tufts of hairs in the axils; and the peduncles long and stout, 1 $\frac{1}{2}$ -2 in., with the bract-scar $\frac{1}{2}$ in. below the head, and the silky calyx-lobes ovate and acute; the heads also are larger, and the corollas more silky. It differs from a Philippine Island plant of Cuming (n. 1470, 1503) in the calyx-lobes very short and ovate, not linear or subclavate. Of Wallich's Herbarium specimens (the only ones I have seen) one is from Singapore, on sheet 3112, with *U. Gambier*; another is on a sheet by itself, marked '6103 D. *U. Gambier*, Herb. Finlayson' (probably from Siam, where Finlayson collected); the third, also on a sheet by itself, is marked '6107. *U. sessilifolia*, Roxb. *Ic. pict.* Sylhet.' The latter is probably an erroneous habitat. There is a very similar plant in Maingay's herbarium from Penang (*U. sclerophylla*, Kew Distrib. 828), with the leaves slightly scabrid beneath.

5. *U. canescens*, Korth. *Verh. Nat. Gesch. Bot.* 172; branches glabrous or puberulous, leaves petioled oblong obtusely caudate-acuminate glabrous ashy beneath, peduncles very short bracteate near the base, calyx densely tomentose lobes rounded, corolla pubescent.

MALACCA or PENANG, Maingay (Kew Distrib. 1768, in part).

I have very imperfect specimens of this mixed with *U. ovata*, Br.; they precisely accord with others from Sumatra, collected by Korthals. These differ from all described species by the glabrous foliage, glaucous beneath, together with the very short curved peduncles, bracteate towards the base. Leaves 4-6 by 1 $\frac{1}{2}$ -2 $\frac{3}{4}$ in., rather membranous; nerves slender, 7 pair; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. Peduncle $\frac{1}{2}$ in., decurved; bracts ovate, acute, pubescent. Heads 1 $\frac{1}{2}$ in. diam.; flowers at first sessile, pedicelled later.—Identical in foliage with *ovata*, Br., and a Philippine Island species (Cuming, 1470, 1503), differing in the peduncle and calyx from both.

6. *U. pteropoda*, Miq. *Fl. Ind. Bot.* ii. 343; branches 4-angled glabrous, leaves large very coriaceous very broadly elliptic or ovate obtuse narrowed into the short winged petiole quite glabrous, peduncles short stout all axillary bracteate above the middle, heads large, flowers sessile, calyx-teeth obtuse.

PENANG, Phillips. MALACCA, Maingay (Kew Distrib. n. 829).—DISTRIB. Sumatra, Borneo.

A very distinct species (the Indian specimens are in fruit only) of a pale colour. Branches rather slender. Leaves 6-8 by 4-5 in., not shining above or beneath, point suddenly contracted but obtuse; nerves 6 or 7 pair, very strong beneath, arched,

veins very slender. *Peduncles* $\frac{1}{2}$ –1 in. *Fruiting heads* 3–4 in. diam. *Capsules* $\frac{3}{4}$ –1 in., on pedicels as long or longer, crowned with a very small almost cupular calyx-limb.—Bornean specimens have silky corollas.

7. *U. sessilifructus*, *Roxb. Fl. Ind. i.* 520; branches slender 4-angled glabrous, leaves elliptic obtuse or obtusely acuminate shining above glabrous and rather glaucous beneath, nerves 5 pair, peduncles axillary and in terminal panicles bracteate in the middle, corolla-tubes glabrous lobes silky or glabrous, capsules sessile. *Wall. Cat.* 6109; *Kurz For. Fl. ii.* 71. *Nauclea scandens*, *Roxb. mss. Ic. pict.* No. 1218.

Eastern Bengal, from SIKKIM and the KHASIA Mts. to CHITTAGONG, PEGU, and TENASSERIM.

Branches rather acutely angled. *Leaves* very uniform, pale-coloured, 4–4½ by 2–2½ in., coriaceous, smooth on both surfaces, tip sometimes produced; nerves often with tufts of hairs in the axils, very oblique, veins obscure; petiole $\frac{1}{4}$ in.; stipules 2-partite. *Peduncles* 1–1½ in. slender, often forming terminal panicles, puberulous; bracts 4, subulate, subequal. *Heads* 1 in. diam.; fruiting not much larger. *Calyx-lobes* small, rounded; corolla-tube slender, lobes glabrous in Griffith's Khasian specimens, silky in Wallich's. *Capsules* turgid, $\frac{1}{2}$ in. long, pubescent.—I follow Wallich in accepting this as *Roxburgh's U. sessilifructus*, though the leaves are not as described in the *Flora Indica*, 'soft underneath.' The stipules appear 2-partite, but are not perfect.

8. *U. lavigata*, *Wall. Cat.* 6111; branches 4-angled glabrous, leaves elliptic-lanceolate glabrous on both surfaces shining above not glaucous beneath, nerves 5–6 pair slender, stipules 2-fid, peduncles axillary and in terminal panicles bracteate about the middle, bracts short obtuse, calyx obscurely toothed, corolla glabrous, capsules sessile.

TENASSERIM and PEGU, *Wallich, Falconer, Kurz*; KHASIA Mts., *Griffith* (Kew Distrib. 2769).

Very near *U. sessilifructus*, but the leaves are not at all glaucous beneath, the bracts broad and obtuse, and the corolla perfectly glabrous.

9. *U. homomalla*, *Miq. Fl. Ind. Bat. ii.* 343; branches tomentose or puberulous, leaves ovate-lanceolate long acuminate opaque and puberulous above especially on the nerves, shortly hairy beneath, nerves 6–8 pair, veins remote, stipules 2-partite, peduncles all axillary bracteate above the middle, flowers sessile, calyx-limb very short obscurely toothed, ovary minute cuneate silky, corolla pubescent. *U. pilosa*, *Wall. Cat.* 6108 C., not of *Roxburgh*.

EASTERN BENGAL; Jyntea hills, *Wallich*.—DISTRIB. Sumatra.

Branches lower acutely 4-angled, upper nearly terete, closely finely pubescent. *Leaves* 2½–3½ by 1–1½, gradually tapering to the long points, base rounded; petiole slender, $\frac{1}{2}$ in.; stipules each divided into 2 subulate-lanceolate recurved subsistent segments. *Peduncles* stout, 1 in., tapering from the base; bracts obtuse. *Heads* $\frac{3}{4}$ in. diam.; receptacle small; corolla $\frac{1}{2}$ in. long. *Capsules* probably sessile.—Differs entirely from *Roxburgh's U. pilosa* in the fine pubescence, smaller size, petioled leaves, and calyx-teeth.

10. *U. ovalifolia*, *Roxb. in Wall. Cat. under* 6103 B. C. (*U. Gambier*); branches slender glabrous, leaves broadly elliptic-ovate or orbicular obtusely acuminate membranous opaque concolorous and quite glabrous on both surfaces, wrinkled when dry, stipules 2-fid, peduncles short slender all axillary bracteate near the base, flowers pedicelled, calyx-lobes small round, corollas small uniformly pubescent, capsules very slender. ? *U. ovalifolia*, *Roxb. Fl. Ind. i.* 128.

PENANG. *Porter*. SINGAPORE, *Wallich, T. Anderson*. MALACCA, *Griffith* (Kew Distrib. 2758, 2759, an abnormal state), *Cuming* (n. 2292).

Branches slender. *Leaves* 2-3 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., red-brown and quite opaque when dry; nerves about 5 pair, very slender; petiole slender, base rounded, rarely subcordate. *Peduncles* $\frac{1}{2}$ -1 in., slender, pubescent; bracts orbicular. *Heads* $\frac{3}{4}$ in. diam.; calyx villous, lobes very distinct and almost orbicular; corolla $\frac{1}{2}$ in., very slender. *Capsules* $\frac{1}{2}$ - $\frac{3}{4}$ in., twice as long as the filiform pedicels, rusty-puberulous.—A very distinct species, easily recognised by the broad thin quite glabrous wrinkled (when dry) leaves with faint nerves, the 2-fid stipules, small flowers, calyx, and very slender capsules. It is one of the 6 species included under Wallich's *U. Gambier* (n. 6103), and under letter B. is called '*U. Gambier* et *U. ovalifolia*, Roxb. Hb. 1824.' I do not find the peduncles to be 'axillary and terminal, compound,' as described by Roxburgh.

11. **U. dasyoneura**, Korth. *Verh. Nat. Gesch. Bot.* 169; branches 4-angled glabrous, leaves elliptic obtusely acuminate narrowed into the rather long petiole shining above, nerves 4-5 pair strong with scattered hairs beneath, stipules entire, peduncles short all axillary bracteate about the middle, flowers subsessile, calyx shortly 5-toothed, corolla puberulous. *Miq. Fl. Ind. Bat.* ii. 143. *U. elliptica*, Br. in Wall. *Cat.* 6104, A. in part, B.

PENANG, Porter, Phillips. MALACCA, Griffith (Kew Distrib. 2756, *U. brevispina* ?), Maingay (Kew Distrib. 827/2, *U. acida*). SINGAPORE, Lobb (No. 331).

Leaves very uniform, 3- $3\frac{1}{2}$ by 2- $2\frac{1}{2}$ in., coriaceous, dark brown, veins very faint beneath; petiole $\frac{3}{4}$ in. *Peduncles* generally shorter than the petioles; bracts ovate-lanceolate, glabrous. *Heads* 1 in. diam.; calyx shortly tomentose, limb a small very shortly toothed cup; corollas slender. *Capsules* slender, 1 in., on filiform pedicels.—There are three plants under Wallich's 6104 A., of which this is the principal; No. 6104 B., from Herb. Finlayson (probably from Siam), has rather more obovate leaves.

VAR. *Thwaitesii*; leaves sometimes almost glabrous beneath, flowers and fruit more tomentose and ferruginous. *U. Gambier*, *Thwaites Enum.* 138, not of Roxburgh.—Ceylon; at Colombo, &c., in the central provinces, alt. 3000 ft.

*** *Calyx-tube very short, lobes oblong or linear or filiform, corolla glabrous or pubescent.*

12. **U. Gambier**, Roxb. *Fl. Ind.* i. 517: leaves ovate or ovate-lanceolate obtusely subcaudate or acuminate glabrous on both surfaces, base rounded or acute not glaucous beneath, nerves 5 pair, peduncles all axillary bracteate in the middle flowers pedicelled, calyx-lobes oblong, corolla-tube puberulous lobes white silky externally and with a white beard within. Korth. *Verh. Nat. Gesch. Bot.* t. 34; Wall. *Cat.* 6103, A. E. C. in part, and 6107 (*U. macrophylla*) in part; Hayne *Arzn. Gesch.* x. t. 3. ? *Nauclea Gambier*, Hunter in *Trans. Linn. Soc.* ix. 218, t. 22; Fleming in *Asiat. Researches*, xi. 187.

HAB. MALACCA, PENANG, and SINGAPORE (wild or cultivated).—DISTRIB. Java, Sumatra.

It is impossible to pronounce, from the descriptions of Rumph and Hunter, what they intended by their 'Gambier.' I have assumed that Roxburgh's is the right plant, both from his accuracy, and because I find that Maingay's specimens marked as 'the cultivated plant of commerce' agree both with Roxburgh's description and with the specimen in Wallich's Herbarium (6103 A.), which bears Roxburgh's ticket of *Gambier*. Its characters are, in addition to those given above, leaves coriaceous, 4-5 by 2- $2\frac{1}{2}$ in., always glabrous beneath except small tufts of hairs in the nerve-axils, hardly shining above; stipules entire; peduncles rarely more than an inch long; heads $1\frac{1}{2}$ in. diam.; calyces tomentose; corollas $\frac{1}{2}$ in. long with the orbicular white silky lobes contrasting strongly when dry with the dark tube, the lobes inside bearded towards the base with white hairs (rarely absent): and glabrous fusiform capsules $\frac{3}{4}$ in. long on short pedicels. The tuft of white hairs on the corolla-lobes is not represented in Roxburgh's *Icones*, though described by him.

13. **U. jasminiflora**, Wall. Cat. 6103 C. F.; branches glabrous or puberulous, leaves elliptic obtusely acuminate glabrous base acute coriaceous, nerves 4-5 pair very slender, peduncles all axillary bracteate about the middle, flowers shortly pedicelled, calyx tomentose, lobes linear-oblong longer than the tube, corolla pubescent, capsules pedicelled almost glabrous.

MALACCA, Griffith (Kew Distrib. 2766), Maingay (Kew Distrib. 832). SINGAPORE, T. Anderson; Hb. Finlayson, Wallich.

A very distinct species, well-marked by the elliptic perfectly glabrous leaves narrowed into the petiole, and the linear-oblong calyx-lobes. I have seen neither stipules nor bracts.—Leaves 2-3 by $1\frac{1}{2}$ -2 in., somewhat shining above, opaque beneath veins very inconspicuous; petiole slender, $\frac{3}{4}$ in. Heads $1\frac{1}{2}$ in. diam. Capsules turgid, $\frac{1}{2}$ in., on very slender pedicels.—Maingay's specimens are very pale coloured.

14. **U. pilosa**, Roxb. Fl. Ind. i. 520; branches peduncles and leaves beneath tomentose with short hairs, leaves short-petioled oblong-ovate abruptly caudate-acuminate, above pilose or scaberulous and pubescent on the 8-10 pair of nerves, stipules 2-partite, peduncles all axillary very stout bracteate above the middle, calyx-lobes linear obtuse, corolla hairy, capsules obtuse sessile. Wall. Cat. 6108 A. B. Nauclea scandens, Smith in Rees. Cyclop.

TROPICAL HIMALAYA, alt. 1-2500 ft. from GARHWAL to SIKKIM. KHASIA MTS., J. D. H. & T. T. CHITTAGONG, Roxburgh, J. D. H. & T. T. BIRMA, Griffith (Kew Distrib. 2760); PEGU and TENASSERIM, Kurz.

A stout hairy species. Leaves 4-6 by 2-2 $\frac{1}{2}$ in., rather membranous, greenish when dry, base rounded; nerves rather delicate, veins distinct; petiole $\frac{1}{2}$ in.; stipule-segments lanceolate recurved. Peduncles stout, 1-3 in., tapering from the base; bracts on the upper $\frac{2}{3}$, about 6 in a whorl, linear-lanceolate. Heads $1\frac{1}{2}$ in. diam.; calyx-lobes equalling the tube, sometimes clavate, corolla-tube very slender. Capsules $\frac{1}{2}$ in., quite sessile, clavate, tipped by the long calyx-lobes, nearly glabrous.

15 **U. Roxburghiana**, Korth. in Verh. Nat. Gesch. Bot. 172; branches terete, peduncles and leaves on both surfaces strigose scabrid or hispid, leaves short-petioled ovate finely acuminate rigid, stipules 2-partite glabrous, peduncles short stout all axillary bracteate at the top, calyx-lobes linear-subulate, corolla glabrous, capsules sessile small.

MALACCA, Maingay (Kew Distrib. 831). SINGAPORE, T. Anderson.—DISTRIB. Sumatra.

A stiff scabrid species. Leaves 2 $\frac{1}{2}$ -3 by 1-1 $\frac{3}{4}$ in., rigid, paler beneath; nerves 5 pair, very stout, spreading; petiole $\frac{1}{2}$ in.; stipules large, broad, coriaceous, concave, subpersistent. Peduncles $\frac{1}{2}$ -1 in., tapering from the base; bracts close to the head, oblong, obtuse. Capsules $\frac{1}{4}$ in., quite sessile, strigose.

16. **U. macrophylla**, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. ii. 132; Cat. 6107, in part; branches stout, leaves beneath and stout peduncles finely rusty-tomentose, leaves short-petioled broadly elliptic or elliptic-obovate or oblong acuminate above glabrous except on the 6 pair of nerves, stipules 2-partite, peduncles axillary and terminal bracteate near the top, calyx-teeth linear, corolla pubescent, capsules pedicelled. U. sessilifolia, Roxb. mss. in Wall. Cat.

BHOTAN and ASSAM, Griffith (Kew Distrib. 2763). KHASIA MTS., alt. 0-4000 ft. common. CACHAR, Keenan

A large stout species. Leaves 5-7 by 2 $\frac{1}{2}$ -4 in., rather coriaceous, opaque above, base cordate or rounded; nerves rather stout, oblique, not strongly curved; petiole $\frac{1}{2}$ in., stout; stipules small, segments ovate-lanceolate, pubescent. Peduncles 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in.; bracts near the head, 6 in a whorl, lanceolate, densely tomentose. Heads $1\frac{1}{2}$ in. diam., fruiting 3 $\frac{1}{2}$ in. diam.; flowers subsessile, tomentose; calyx-lobes equalling the

tube, narrow; corolla-lobes whiter than the tube. *Capsules* very numerous, $3\frac{1}{4}$ in., fusiform, beaked, shorter than the slender pedicels, nearly glabrous.—One sheet of Wallich's 6107 is *U. Gambier*, Roxb.; another is *U. ovata*.

17. **U. lanosa**, Wall. in Roxb. *Fl. Ind.*, ed. Carey & Wall. ii. 131; *Cat.* 6110; branches subterete hairy, leaves very short-petioled ovate-lanceolate finely acuminate slightly hairy above softly so beneath, stipules 2-partite, peduncles all axillary short bracteate in the middle, calyx-lobes long linear, capsules long-pedicelled glabrous. *Nauclea lanosa*, Poir. *Dict. Suppl.* iv. 64. *N. setigera*, Blume *Byd.* 1013.

PENANG, Wallich, Phillips.—DISTRIB. Sumatra, Malay Islands.

Slender. *Leaves* 3-4 by $1\frac{1}{2}$ -2 in., membranous, yellow-brown, opaque above when dry with scattered hairs or glabrate, paler beneath with soft appressed hairs, base acute or rounded; nerves 6 pair, very distinct, obliquely arching, transverse nerves very slender; petiole $\frac{1}{8}$ in.; stipular segments ovate-oblong, recurved, quite glabrous. *Peduncles* $\frac{1}{2}$ $\frac{3}{4}$ in., narrowed from the base; bracts 4, slender, recurved. *Heads* $\frac{2}{3}$ in. diam., in fruit 2 in.; receptacle very small and pedicels slightly hairy; calyx-lobes longer than the tube. *Capsules* fusiform, $\frac{1}{8}$ in., glabrous, on filiform pedicels twice their length, acute, hardly beaked.—I have seen no corollas. Wallich describes the tube as capillary, smooth, and the lobes as a little hairy.

18. **U. Lobbii**, Hook. f.; branches subterete glabrous, leaves short-petioled elliptic-ovate abruptly obtusely acuminate glabrous membranous, nerves 7 pair, stipules 2-fid, peduncles all axillary bracteate above the middle, calyx villous, lobes linear longer than the tube, corolla-tube glabrous, lobes pubescent.

SINGAPORE, Lobb (n. 332).

Slender, very glabrous. *Leaves* 3-3 $\frac{1}{2}$ by $1\frac{1}{2}$ -1 $\frac{3}{4}$ in., green when dry, shining above, almost so beneath; nerves slender, arching upwards, with minute axillary tufts and a few scattered hairs; petiole slender, $\frac{1}{8}$ in.; stipules membranous, reflexed. *Peduncles* narrowed from the base, shining; bracts 6, large, ovate, acuminate, membranous, reflexed. *Heads* 1 in.; flowers sessile.

19. **U. ferrea**, DC. *Prodr.* iv. 348; branches subterete, peduncles and petioles and leaves beneath densely tomentose or villous, leaves short-petioled ovate or elliptic-ovate obtusely acuminate with scattered hairs and tomentose on the 8-9 pair of nerves above, stipules 2-fid and large bracts tomentose, peduncles all axillary bracteate above the middle, calyx hirsute, lobes very long filiform, corolla glabrous, capsules slender long-pedicelled. *Nauclea ferrea*, Blume *Byd.* 1014.

MALAY PENINSULA, from Mergui, Griffith (Kew Distrib. 2762), Helfer (Kew Distrib. 2761), to MALACCA, Maingay (Kew Distrib. 830).—DISTRIB. Sumatra, Java, Borneo.

Rather robust and very hairy. *Leaves* 3-4 $\frac{1}{2}$ by 2-2 $\frac{1}{2}$ in., rather coriaceous, rusty-brown above when dry, paler beneath, base rounded, nerves strong spreading, transverse ones distinct; petiole $\frac{1}{8}$ in.; stipules broad, recurved. *Peduncles* 1-1 $\frac{1}{4}$ in., narrowed upwards; bracts 4-6, nearly $\frac{1}{2}$ in., ovate, acuminate. *Heads* 2 in. diam., fruiting not much larger; flowers subsessile; calyx-tube much shorter than the lobes. *Capsules* $\frac{1}{8}$ in., fusiform, shorter than the pedicels, acuminate, hairy.—*U. Horsfieldiana*, Miq., is a variety with leaves less hairy beneath. Cuming's 1128, from the Philippines, is a closely allied species with much smaller bracts and stipules.

DOUBTFUL SPECIES.

U. ACIDA, Roxb. *Fl. Ind.* i. 520. *Nauclea acida*, Hunter in *Trans. Linn. Soc.* ix. 223. It is impossible from Hunter's or Roxburgh's descriptions to say to what

species this name applies; it is a native of Penang, and stated to have acid foliage. Wallich does not include it in his Catalogue. Miquel (*Fl. Ind. Bat.* ii. 145) records it as a native of Sumatra, Java, Borneo, and the Moluccas, and from his allusion to its often monstrous state from Borneo he probably refers to it the *U. ovalifolia*.

U. CIRRHIFLORA, Roxb. *Fl. Ind.* i. 520, doubtfully referred in *Fl. Ind.*, ed. Carey & Wall. ii. 129 to *U. pedicellata*, is not determinable.

TRIBE II. CINCHONEÆ.

8. HYMENOPOGON, Wall.

An epiphytic undershrub. *Leaves* petioled, deciduous; stipules large, persistent, with fleshy axillary bristles. *Flowers* rather large, corymbose, white; corymbs with large white leafy reticulated bracts. *Calyx-lobes* elongate, persistent. *Corolla-tube* long, limb salver-shaped, throat with reflexed hairs; lobes 5, valvate in bud. *Stamens* 5, inserted below the throat, filaments short; anthers linear, included. *Ovary* 2-celled; style filiform, 2-grooved, stigmas 2 linear; ovules many, subulate, imbricate on peltate placentas. *Capsule* crowned with the calyx, septicidally 2-valved, many-seeded. *Seeds* imbricate, linear, with long tails at each end, hilum lateral; embryo minute in copious albumen. —DISTRIB. 2 Indian species.

1. *H. parasiticus*, Wall. in Roxb. *Fl. Ind.*, ed. Carey & Wall. ii. 157; *Pl. As. Rar.* iii. t. 227; *Cat.* 6113; leaves elliptic-lanceolate or oblanceolate acuminate, corymbs shorter than the leaves, flowers pedicelled, corolla-lobes villous. *Kurz For. Fl.* ii. 73. *Mussaenda cuneifolia*, Don *Prodr.* 139.

TEMPERATE HIMALAYA, from Kumaon to Bhotan, alt. 6–8000 ft., Wallich. &c. KHASIA Mts., alt. 4–6000 ft. PEGU, alt. 3000 ft., Kurz.

A small straggling often epiphytic shrub. *Stem* curved, rooting, shoots villous. *Leaves* at the ends of the branches, 3–12 by 2–4 in., membranous, narrowed into the short petiole, midrib broad, nerves about 20 pair; stipules ovate, acute. *Corymbs* 3-chotomous; peduncle 2–3 in.; bracts at the axils stipule-like, those at the pedicels foliaceous, long-petioled, 3–4 in. long, narrow oblong, obtuse or acute, finely reticulated. *Calyx-lobes* linear. *Corolla* $1\frac{1}{2}$ in. *Capsule* membranous, turbinate.

2. *H. assamicus*, Hook. f.; leaves elliptic-lanceolate finely acuminate, corymbs longer than the leaves, flowers subsessile, corolla-lobes glabrous.

ASSAM, Masters (*Herb. Hort. Bot. Calc.*).

Stem as in *H. parasiticus*. *Leaves* 5–10 by 2–2½ in., subfalcate, narrowed into the shorter pubescent petiole, glabrous, midrib slender, nerves 30–40 pair; stipules ovate, acuminate. *Peduncle* slender, 5 in., with the rachis 8 in.; branches long, slender; bracts at the axils whorled, ovate, acute, at the pedicels petioled foliaceous lanceolate acute. *Calyx-lobes* broadly ovate. *Corolla* $\frac{3}{4}$ in.

9. COPTOSAPelta, Korth.

Climbing tomentose shrubs. *Leaves* coriaceous; stipules small, triangular, deciduous. *Flowers* in terminal pendulous panicles, buds angular. *Calyx-tube* turbinate or subglobose; teeth 5, short, persistent. *Corolla* coriaceous, tube very short; lobes 5, linear, twisted in bud. *Stamens* 5, on the throat of the corolla; filaments short, subulate; anthers elongate, 2-fid at the base, back hairy. *Ovary* 2–3-celled; style short; stigma long fusiform, with 4 pubescent angles; ovules many, ascending, placentas on the septum. *Capsule* 2–3-celled,

loculicidally 2-3-valved. *Seeds* many, peltate, imbricate, winged; embryo straight in fleshy albumen.—**DISTRIB.** Species 4, all Malayan.

1. ***C. flavescens***, *Korth. in Ned. Kruidk. Arch.* ii. 113; branches inflorescence and leaves beneath softly tomentose or glabrate, leaves elliptic acuminate, calyx-limb short small, corolla tube silky lobes glabrous. *Stylodyne macrophylla*, *Wall. Cat.* 8405, *excl. syn.* *Webera macrophylla*, *Roxb.*

MALAYAN PENINSULA, from Tenasserim to Singapore and Penang, *Porter, Griffith* (Kew Distrib. 2708), *Maingay* (Kew Distrib. 908).—**DISTRIB.** Sumatra, Java, Borneo.

A shrub, branches terete. *Leaves* coriaceous, 3-4 by 2 in., shining above, green when dry, nerves 3 or 4 pair prominent beneath; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Flowers* 1 in. diam., fragrant. *Calyx-limb* short, lobes oblong. *Corolla-tube* $\frac{1}{4}$ in.; lobes twice as long, linear, obtuse. *Capsule* $\frac{1}{2}$ in. diam.

2. ***C. Griffithii***, *Hook. f. Ic. Pl.* t. 1089; branches inflorescence and leaves beneath softly tomentose or glabrate, leaves elliptic or orbicular acuminate, calyx-limb cupular, corolla-tube and lobes silky.

MALACCA and SINGAPORE, *Griffith* (Kew Distrib. 2789), *Maingay* (Kew Distrib. 907).

Very similar to *C. flavescens* in foliage, but more tomentose, calyx-limb larger almost inflated, corolla-tube shorter and much broader, and together with the lobes very silky; fruit and seeds all larger.

10. **HYMENODICTYON**, *Wall.*

Trees or shrubs with thick branches and bitter bark. *Leaves* petioled, deciduous; stipules deciduous. *Flowers* small, spicate; spikes in axillary and terminal nodding panicles with 1 or 2 large leafy reticulate persistent bracts. *Calyx-tube* short; lobes 5-6, ovate or subulate, deciduous. *Corolla* funnel- or bell-shaped, glabrous within; lobes 5, short, valvate in bud with everted margins. *Stamens* 5, inserted below the throat, filaments short dilated upwards; anthers linear. *Ovary* 2-celled; style filiform, stigma spindle-shaped; ovules numerous, on cylindric placentas adnate to the septum. *Capsule* loculicidally 2-valved, many-seeded; placentas at length free. *Seeds* imbricating upwards, testa broadly winged; embryo small, in fleshy albumen.—**DISTRIB.** Species 4-5 tropical Asiatic and African.

1. ***H. excelsum***, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 149; leaves ovate elliptic or almost orbicular abruptly acuminate finely pubescent on both surfaces, stipules subentire, panicles large spreading compound. *W. & A. Prodr.* 392; *Wt. Ic.* t. 79; *Dalz. & Gibs. Bomb. Fl.* 117; *Brand. For. Fl.* 267. *H. thyrsoflorum*, *Wall. l. c.* 151; *Cat.* 6114 and 6115 D. (*flaccidum*); *Kurz For. Fl.* ii. 72. *H. utile*, *Wight Ic.* t. 1159 (*letterpress*); *Bedd. Fl. Sylv.* 130, t. 219, *A. only.* *H. obovatum*, *Wt. Ic.* t. 80 (*copied from Roxburgh*). *H. Horsfieldianum*, *Miq. Fl. Ind. Bat.* ii. 154. *Cinchona excelsa*, *Roxb. Cor. Pl.* t. 106; *Fl. Ind.* i. 529. *C. thyrsoflora*, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 530.

Dry hills, base of the WESTERN HIMALAYA from Garwhal to Nepal, ascending to 2500 ft., throughout the DECCAN and Central India to the Annamallays; and in TENASSERIM and CHITTAGONG.—**DISTRIB.** JAVA.

A deciduous tree, 30-40 ft., with smooth bark. *Leaves* 4-10 by 3-5 in.; mem-

branous, narrowed into a petiole 1-3 in., nerves 7-10 pair; stipules broad, recurved, usually glandular-serrate. *Panicles* large, pubescent often drooping; floral leaves long-petioled, 3-5 in., strongly nerved. *Flowers* small, white, pedicelled, clustered. *Calyx* $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ in. *Capsules* on thick decurved pedicels, $\frac{2}{3}$ in. long, ellipsoid.

2. **H. flaccidum**, Wall. in Roxb. *Fl. Ind.*, ed. Carey & Wall. ii. 152; (at. 6115 A. C.; *Tent. Fl. Nap.* t. 22; *Pl. As. Rar.* ii. 81, t. 188; leaves elliptic abruptly acuminate glabrous or puberulous only on the nerves beneath, racemes spiciform nearly simple, capsules deflexed. *Brand. For. Fl.* 268.

TEMPERATE HIMALAYA, alt. 3-6000 ft., from Garwhal to Bhotan frequent. KHASIA Mts., alt. 4-5000 ft.

A deciduous tree, with ashy bark, young often epiphytic. *Leaves* 5-8 by 3-6 in., narrowed into the petiole of 1-4 in., nerves 7-8 pair; stipules broadly obovate oblanceolate or ovate, glandular-serrate. *Racemes* 4-10 in., pubescent, curved, dense-flowered; peduncle 1-3 in.; floral bracts as in *H. excelsum*, white, convex. *Flowers*: subsessile, white. *Calyx* $\frac{1}{2}$ in. *Corolla* about twice as long. *Capsules* $\frac{1}{2}$ in. long, ellipsoid.

3. **H. obovatum**, Wall. in Roxb. *Fl. Ind.*, ed. Carey & Wall. ii. 153; *Cat.* 6116; leaves elliptic or broadly obovate abruptly acuminate glabrous or pubescent beneath, racemes spiciform, capsules erect. *W. & A. Prodr.* 392; *Wt. Ic.* t. 1159; *Dalz. & Gibs. Bomb. Fl.* 117; *Bedd. Fl. Sylv.* t. 219; *Brand. For. Fl.* 268.

WESTERN PENINSULA, from Bombay to Travancore, on the Ghauts, frequent.

In its extreme form, with broadly obovate leaves, from the southern part of the Peninsula, this looks very different from *H. flaccidum*; but specimens from the Concan almost unite them; but both specimens from the Bababoodan hills, with elliptic leaves, and Wight's figured from Coimbatore, with broadly obovate ones, have erect capsules, which I have not observed in any specimen of *H. flaccidum*. The differences in the length, &c., of the anthers and filaments are probably sexual.

11. LUCULIA, Sweet.

Shrubs. *Leaves* petioled; stipules cuspidate, deciduous. *Flowers* rosy or white, in terminal many-fld. corymbs, odorous; bracteoles deciduous. *Calyx-lobes* 5, elongate, unequal, linear-oblong, deciduous. *Corolla* salver-shaped, tube long; lobes 5, simple or with 2 calli at the base, imbricate in bud. *Stamens* 5, in the tube of the corolla, filaments very short; anthers linear. *Ovary* 2-celled; style slender, stigmas 2 linear included; ovules many, on 2 revolute longitudinal placentas in each cell. *Capsule* almost woody, septicidally 2-valved, many-seeded. *Seeds* minute, imbricate upwards, testa rough winged toothed; embryo minute in fleshy albumen.—DISTRIB. 2 Indian species.

1. **L. gratissima**, Sweet *Brit. Fl. Gard.* t. 145; leaves oblanceolate lanceolate or elliptic-lanceolate acuminate, nerves usually spreading, inflorescence pubescent, corolla-lobes without interposed tubercles. *Kurz For. Fl.* ii. 71; *Hook. Bot. Mag.* 3946. *Cinchona gratissima*, Wall. in Roxb. *Fl. Ind.*, ed. Carey & Wall. ii. 154; *Tent. Fl. Nap.* t. 21; *Cat.* 6117 A. *Mussaenda Luculia*, Ham. in *Don Prodr.* 139.

TEMPERATE HIMALAYA, from Nipal to Bhotan, not frequent, alt. 4-6000 ft. *Wallich*, &c.—DISTRIB. Ava (*Kurz*).

A spreading shrub, 10-16 ft.; branches lenticellate. *Leaves* membranous or coriaceous, 6-9 by 2-4 in., very variable in breadth, sometimes pubescent beneath, acuminate, narrowed into the petiole; nerves 9-12 pair. *Corymbs* sometimes 8 in. diam, very many flowered; flowers 3-nate, pink, shortly pedicelled. *Calyx-tube* $\frac{1}{4}$ in.,

limb twice as long, glabrous or pubescent. *Corolla-tube* 1-1½ in., lobes 1½ in. across. *Capsule* ½-⅔ in., obovoid, apparently very variable; in Nipal specimens obovoid ½ by ⅓ in., in Bhotan ones ¾ by ¼ in.

2. **L. Pinceana**, Hook. Bot. Mag. t. 4132; leaves elliptic-lanceolate acuminate, nerves suberect, inflorescence glabrous, corolla-lobes with interposed pairs of tubercles at their bases. *L. gratissima*, Wall. Cat. 6117 B.

KHASIA MTS., Mrs. Mack, &c., alt. 3-5000 ft. MISHMI HILLS, Griffith.

A bush 4-5 ft., very similar to *L. gratissima*, but with leaves smaller, narrower, more coriaceous with more numerous (12-14 pair of) nerves which are more straight and ascending. The inflorescence is quite glabrous, calyx-lobes larger, corolla-tube 1½-2 in., and lobes nearly 2 in. across, with a pair of raised tubercles one on each side of the sinus. *Capsule* ⅓-½ in. and broadly obovoid in Khasian specimens, very much larger, nearly 1 in. long with strongly ribbed valves in Mishmi ones.

TRIBE III. RONDELETIÆ.

12. WENDLANDIA, Burtl.

Shrubs or small trees. *Leaves* opposite or ternately whorled; stipules entire or 2-fid. *Flowers* small, rosy or white, in terminal dense thyrsoid or paniced cymes, 2-3-bracteolate. *Calyx-lobes* 4-5, subequal, small, persistent. *Corolla* tubular- salver- or funnel-shaped, throat glabrous or hairy; lobes 4-5, imbricate in bud. *Stamens* 4-5, between the corolla-lobes, filaments 0 or elongate; anthers versatile, exserted. *Ovary* 2- (rarely 3-) celled; style filiform, stigma entire 2-fid or 2-partite: ovules numerous, on small globose placentas adnate to the septum. *Capsule* small, globose, loculicidally, rarely septicidally 2-valved, many-seeded. *Seeds* very minute, horizontal, compressed, testa membranous obscurely winged; embryo short, cylindric, in fleshy albumen.—**DISTRIB.** Species about 16, tropical Asiatic.

A. Leaves opposite.

* *Corolla-tube* short, not twice the length of the oblong lobes; anthers large, much exserted. *Stipules* persistent or caducous.

1. **W. exserta**, DC. Prodr. iv. 411; softly tomentose or pubescent all over, leaves opposite ovate-lanceolate glabrate above finely acuminate, stipules persistent recurved, calyx hairy lobes ovate or subulate, corolla-tube shorter than the lobes, stigma 2-partite. *W. & A. Prodr.* 402; *Wall. Cat.* 6267 A. C. D. E. F. in part; *Bedd. Fl. Sylv.* 130; *Brand. For. Fl.* 268. *W. cinerea*, Wall. Cat. 6268; DC. Prodr. iv. 412. *Rondeletia exserta*, Roxb. Hort. Beng. 14; *Fl. Ind.* i. 523. *R. cinerea*, Wall. in Roxb. Fl. Ind., ed. Carey & Wall. ii. 141. *R. thyrseiflora* and *orissensis*, Roth Nov. Gen. & Sp. 142. *R. Heynei*, Roem. & Sch. Syst. v. 234.

Dry forests of the TROPICAL HIMALAYA, from the Chenab eastward to Nipal and Sikkim, ascending to 4000 ft. ORISSA, CENTRAL INDIA, N. DECCAN, and CONCAN.

A small crooked tree; branches terete. *Leaves* coriaceous, 4-9 by 1-3½ in.; nerves 10-18 pair, arched; stipules ovate, acute, recurved. *Panicles* sessile, pyramidal, 6-10 in. broad and long. *Flowers* ½ in. diam., white, fragrant, sessile. *Stamens* nearly as large as the corolla-lobes. *Capsule* ⅓ in. diam., white, tomentose.

2. **W. puberula**, DC. Prodr. iv. 412; leaves opposite elliptic-lanceolate acuminate glabrous except the nerves above slightly hairy chiefly on the nerves beneath, stipules persistent erect, panicle pubescent, calyx hairy, lobes triangular

or subulate, corolla-lobes shorter than the tube. *Wall. Cat.* 6270. *W. scabra*, *Kurz in Journ. As. Soc. Beng.* 1877, ii. 310. *W. appendiculata*, *Wall. mss.*

Dry forests of the TROPICAL HIMALAYA from Gurwhal to Nipal, alt. 0–4000 ft., *Wallich, &c.* *AVA, Kurz.*

Habit of *W. exserta*, but with smaller (4–6 by 2–3 in.) nearly glabrous elliptic leaves, which are more membranous, with fewer (10–12 pair) of nerves, and longer calyx-tubes often smaller panicles and nearly glabrous capsules; stipules very variable.

3. **W. Wallichii**, *W. & A. Prodr.* 402, in note; branches glabrous or puberulous, leaves opposite elliptic or elliptic-lanceolate acuminate at both ends glabrous or puberulous on the nerves beneath, stipules very caducous broad rounded, panicle pubescent, calyx glabrous teeth short triangular, corolla-tube a little longer than the lobes. *Wall. Cat.* 6269 B., in part (*tinctoria*).

SIKKIM HIMALAYA, alt. 2000 ft., *J. D. H.* KHASIA Mts., alt. 4000 ft.; *De Silva, &c.*, *Griffith* (Kew Distrib. 2834).

An erect nearly glabrous shrub; branches swollen at the nodes when dry. *Leaves* 3–7 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., rather coriaceous; nerves 10–12 pair, prominent beneath; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules so deciduous that I found only one in ten specimens, it is imperfect, broad, and apparently acute. *Panicle* moderate. *Flowers* like those of *W. puberula*.

** *Corolla-lobes rounded or shortly oblong, much shorter than the usually slender tube; anthers included or exserted. Stipules more or less persistent.*

† *Calyx-teeth shorter than the tube.*

4. **W. tinctoria**, *DC. Prodr.* iv. 411; leaves opposite elliptic ovate or obovate acuminate glabrous or pubescent beneath, stipules erect large with a subulate point or a laterally flattened rigid appendage, calyx-teeth ovate. *Brand. For. Fl.* 269; *Kurz For. Fl.* ii. 74; *Bedd. Fl. Sylv.* t. 130. *Rondeletia tinctoria*, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 522.

TROPICAL HIMALAYA, from GARWHAL and from BENGAL and OUDH, to the KHASIA Mts., ASSAM, CHITTAGONG, PEGU, and TENASSERIM.—DISTRIB. JAVA? *AVA.*

A small tree. *Leaves* 4–8 by 2–4 in., always narrowed into the petiole, glabrous and often shining above, paler rarely glabrous beneath, oftener pubescent on the nerves, sometimes tomentose all over; nerves 10–12 pair; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Stipules* variable in length, always with erect points. *Panicles* large, spreading, pubescent pilose or tomentose; flowers sessile, fascicled, white, $\frac{1}{4}$ in. long; corolla-tube usually slender, the lobes forming a capitate not ovoid head; anthers shortly exserted. *Stigmas* oblong.—There are two principal forms.

VAR. 1. normalis; leaves 3–5 by 2– $2\frac{1}{2}$ in. elliptic more or less pubescent beneath, petiole $\frac{1}{4}$ in., panicle tomentose. *Wall. Cat.* 6267; (*exserta*) *F.* in part, 6269 D., 6269 D. 3. *W. proxima*, *DC. Prodr.* iv. 411. *Rondeletia proxima*, *Don Prodr.* 139.

VAR. 2. grandis; leaves 5–7 by 2– $3\frac{1}{2}$ in. elliptic perfectly glabrous, petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., panicle tomentose. *Wall. Cat.* 6266 B. A. (*paniculata*), the lower specimen only, 6269 A. *W. budleoides*, *Wall. mss. in W. & A. Prodr.* i. 402.—Khasia and Jyntea hills, *Wallich, &c.*; Naga hills, *Griffith*; Sikkim, *Herb. Griffith*; Assam, *Jenkins*.

5. **W. nitens**, *Wall. Cat.* 6271; robust, leaves opposite elliptic-oblong obtuse coriaceous shining above glabrous or puberulous on the nerves beneath, stipules erect very short triangular or broadly reniform apiculate, panicle pubescent, flowers in glomerules, calyx hairy, teeth short triangular.

TENASSERIM, Attran river. *Wallich, Helfer* (Kew Distrib. 2380).

Branches robust, glabrous. *Leaves* 4–5 by $1\frac{1}{2}$ –2 in., rarely obovate or subacute, nerves 6–8 in *Helfer's* specimen, 8–12 in *Wallich's*. *Panicle* robust. *Corolla* slender, lobes very small.—This may be a form of *W. tinctoria*, with which it is perhaps

united by a plant of Griffith's (Kew Distrib. 2835) from Menkroom, in Birma, with elliptic-lanceolate acuminate leaves, and much more pubescent panicles.

6. **W. glabrata**, DC. *Prodr.* iv. 411; glabrous or with the branches, leaves beneath and panicle minutely pubescent, leaves opposite petioled elliptic-lanceolate subacute obtuse or obtusely acuminate shining above, stipules erect small triangular cuspidate or acuminate, calyx glabrous, teeth minute triangular. *Kurz For. Fl.* ii. 74. *W. Heyneana*, Wall. in *W. & A. Prodr.* 403; *Cat.* 6274. *W. sumatrana* and *W. lævigata*, Miq. *Fl. Ind. Bat.* ii. 159, 346. *Rondeletia tinctoria*, Blume *Bijd.* 974.

MAISOR, Heyne; TENASSERIM, Griffith (Kew Distrib. 2836), Helfer (Kew Distrib. 2831 and 2832).—DISTRIB. Yunan, Malay Islands, Formosa.

A shrub or small tree. Leaves of the form, &c., of *W. tinctoria*, always glabrous except sometimes the midrib beneath, panicle glabrous or minutely puberulous (more so in *W. lævigata*, Miq.), flowers as in *W. tinctoria*, but calyx always glabrous with very short teeth. No one has sent this plant from Western India but Rottler, whose specimens (in Herb. Kew) are marked "Nundry dr, Mars 17, 1806." A single specimen from Parish has 3-nately whorled leaves.

W. tenuiflora, Miquel mss., appears a form with the slender branches of the panicle covered with empty bracteoles.

7. **W. coriacea**, DC. *Prodr.* iv. 412; everywhere quite glabrous, leaves opposite coriaceous petioled narrowly lanceolate finely acuminate shining above, stipules erect very short and broad with an erect laterally compressed appendage, panicles very many and dense-fld., calyx glabrous, teeth short. *Wall. Cat.* 6279. *Rondeletia coriacea*, Wall. in *Roxb. Fl. Ind.*, ed. Carey & Wall. ii. 142.

TROPICAL HIMALAYA; Nipal, Wallich; Sikkim, alt. 2-4000 ft., J. D. H.

A small tree or large shrub. Leaves 5-6 by $1\frac{1}{2}$ -2 in., coriaceous, pale when dry, narrowed into a petiole $\frac{1}{2}$ in.; nerves about 10 pair, very delicate. Panicles 4-5 in. high and broad, branches flowering all over. Flowers sessile, $\frac{1}{2}$ in. long. Calyx-teeth triangular or ovate-lanceolate. Corolla-tube slender, lobes broadly oblong. Anthers shortly exserted, stigmas short.—This differs from *glabrata* in the longer narrower coriaceous leaves with faint nerves and finely acuminate points and the larger flowers.

8. **W. paniculata**, DC. *Prodr.* iv. 411; leaves opposite elliptic or elliptic-lanceolate acuminate more or less pubescent beneath, stipules recurved broad orbicular or oblong with tips rounded, panicle spreading villous, calyx-teeth rounded. *Wall. Cat.* 6266 A. (*upper specimen only*); 6269 (*tinctoria*), B. in part; 6267 (*exserta*), B. in part. *W. luzoniensis*, DC. l. c., 412. *Rondeletia paniculata*, Roxb. *Hort. Beng.* 15; *Fl. Ind.* i. 521. *Gardenia Burha*, Ham. in *Wall. Cat.* 8298.

ASSAM, SILHET, and KHASIA Mts., alt. 0-4000 ft. BIRMA, Griffith (Kew Distrib. 2837).—DISTRIB. Java, Moluccas.

A tree. Leaves usually large, 5-8 by 2-4 in., membranous, usually tapering to both ends, rarely narrowly obovate, nerves 8-10 pair, petiole usually $\frac{1}{2}$ - $\frac{3}{4}$ in.; stipules coriaceous, pubescent. Panicle ample. Flowers as in *W. tinctoria*.

†† Calyx-teeth longer than the tube.

9. **W. ligustrina**, Wall. *Cat.* 6272; branches slender glabrous, leaves opposite elliptic or elliptic-ovate acute glabrous or puberulous on the nerves beneath, petiole rather long, stipules broadly triangular cuspidate, panicle lax pubescent, calyx glabrous, teeth filiform longer than the tube.

AVA; Taong-dong Mts., Wallich.

Much branched, leafy. Leaves 4-5 by 1-2 in., acute not acuminate, rather coriaceous, nerves 6-8 pair, petiole $\frac{1}{2}$ - $\frac{3}{4}$ in.; stipules appressed. Panicle-branches slender. Corolla-lobes oblong, half as long as the tube; stamens and styles much exserted.—

Wallich's specimen alone seen; well distinguished by the simply acute leaves and glabrous calyx with long teeth.

10. **W. glomerulata**, *Kurz in Journ. As. Soc.* 1872, ii. 310; 1877, ii. 129; *For. Fl.* ii. 77; branches slender glabrous, leaves opposite narrow-lanceolate long-acuminate glabrous membranous, stipules large orbicular recurved, panicle small pubescent, calyx hirsute, teeth much longer than the tube.

TENASSERIM; at Mergui, *Griffith, Helfer* (Kew Distrib. 2838), *Kurz*.

An evergreen small tree or shrub. *Leaves* 6-7 by $\frac{3}{4}$ - $1\frac{1}{4}$ in., much attenuate at both ends; nerves 12-15 pair; petiole $\frac{1}{4}$ -1 in.; stipules leafy, sometimes 2-fid, very persistent. *Panicle* with slender branches. *Corolla-tube* funnel-shaped, twice as long as the calyx-teeth. *Stamens* much exserted. *Capsule* hispid.—The narrow leaves, stipules, and hispid calyx with long teeth, well distinguish this species.

B. Leaves usually 3-nately whorled (see also 6. *W. glabrata*).

11. **W. Notoniana**, *Wall. in W. & A. Prodr.* 403; *Cat.* 6273, 6267 G. (*W. exserta*); robust tomentose except the leaves above, leaves usually 3-nately whorled rarely opposite short petioled elliptic or elliptic-lanceolate acuminate, stipules recurved with rounded or 2-fid. tips rarely straight and acute, panicle pyramidal hirsute dense-fid., calyx hirsute, teeth ovate-lanceolate. *Wt. Ic.* t. 1033; *Dalz. & Gibs. Bomb. Fl.* 117; *Bedd. Fl. Sylv.* t. 224. *Webera thyrsoides*, *Roth Nov. sp.* 149. *Canthium thyrsoides*, *Roem. Sch. Syst.* v. 207. *Ixora montana*, *Miq. in Herb. Hohen.* n. 336.

Hills of the DECCAN PENINSULA, alt. 2-6000 ft., common. CEYLON, hills of the central province, ascending to 7000 ft.

A shrub or small tree. *Leaves* 3-5 $\frac{1}{2}$ by 2 $\frac{1}{2}$ in., coriaceous, rarely obovate, nerves 8-10 pair, strong beneath, not shining above, pale when dry, petiole $\frac{1}{8}$ - $\frac{1}{4}$ in.; stipules variable, usually smaller than in *W. tinctoria*. *Flowers* reddish-white (Wight), odorous. *Calyx* hairy, teeth variable in length.—This is the southern representative of *W. tinctoria*.

VAR. 1. *bicuspidata*; leaves nearly glabrous longer petioled, stipules entire or 2-fid or divided into 2, calyx glabrous or hairy, teeth short obtuse. *W. bicuspida*, *W. & A. Prodr.* 403.—Mts. of Travancore and Ceylon.

VAR. 2. *zeylanica*; leaves nearly glabrous lanceolate narrowed into a slender petiole, panicle pubescent very large and lax with long filiform spreading and drooping branches, flowers scattered sessile and on slender pedicels, calyx quite glabrous, teeth very minute.—Ceylon, *Thwaites*.

12. **W. Lawii**, *Hook. f.*; branches and inflorescence tomentose, leaves ternately whorled lanceolate obtuse pubescent on the nerves beneath, stipules broadly triangular acute, panicles very large, branches 3-nate very slender erect, flowers often long pedicelled, calyx hairy lobes filiform longer than the tube.

MAISOR; on the Bababoodan hills, *Law*.

Branches slender. *Leaves* (upper alone seen) 3-4 by 1 in., quite glabrous above, paler and almost shining beneath, nerves 8-9 pair, strong; petiole $\frac{1}{4}$ in.; stipules short, broad. *Panicle* a foot long, softly downy with white hairs. *Branches* very long and slender, forming a rather flat-topped corymb. *Flowers* laxly scattered, mixed with subulate or linear bracteoles, most of which are not floriferous. *Calyx-teeth* variable, sometimes short. *Corolla-tube* $\frac{1}{8}$ in., very slender.—Closely allied to *W. Notoniana*, differing in the form of the panicle and calyx-teeth.

13. **W. angustifolia**, *Wight mss.*; everywhere glabrous, leaves ternately whorled narrowly linear-lanceolate acute, stipules triangular-ovate acute, panicle slender pyramidal, calyx-teeth short subulate.

TINNEVELLI; at Coetallum, *Wight*.

Branches rather slender. *Leaves* 3-4 by $\frac{1}{3}$ - $\frac{2}{3}$ in., narrowed into the short petiole, coriaceous, not shining, midrib strong, nerves about 8 pair very slender; stipules persistent. *Panicle* leafy below. *Flowers* rather crowded, often pedicelled. *Corolla-tube* slender, $\frac{1}{8}$ in.; lobes almost orbicular, small. *Anthers* shortly exserted. *Stigma* shortly clavate, entire or 2-fid.—A very distinct species.

14. **W. pendula**, DC. *Prodr.* iv. 412; branches and inflorescence pubescent, leaves 3-nately whorled sessile ovate or ovate-lanceolate obtusely acuminate puberulous on the nerves beneath, stipules small very shortly triangular, panicle small, calyx glabrous, teeth lanceolate about equalling the tube. *Wall. Cat.* 6275.

NIPAL, *Wallich*; Pemmi river, alt. 4000 ft., *J. D. H.*

A shrub, branches slender. *Leaves* 3-4 by $1\frac{1}{4}$ - $1\frac{3}{4}$ in., thin, shining and reticulated above, base rounded or subacute, nerves 6-7 pair, petiole hardly any; stipules very inconspicuous. *Panicle* 4-6 in. long, branches stout. *Flowers* rathered clustered, often pedicelled. *Corolla-tube* $\frac{1}{8}$ in., slender, lobes oblong. *Stamens* shortly exserted; stigma clavate.—A most distinct species.

13. **GREENEA**, W. & A.

Shrubs. *Leaves* opposite or whorled in threes; stipules various. *Flowers* small, white, sessile in terminal paniced scorpioid cymes, bracteoles slender or 0. *Calyx-tube* globose; lobes 4-5, subulate or ovate, persistent, one longer than the others. *Corolla* funnel-shaped, tube long, glabrous within; lobes 4-5, twisted in bud. *Stamens* 4-5 in the corolla-throat, filaments short; anthers linear, 2-fid at both ends. *Ovary* 2- rarely 3-celled; style filiform, stigmas 2 linear revolute; ovules numerous on peltate placentas adnate to the septum. *Capsule* small, globose, 2-celled, septicidally 2-valved, valves with separable endocarp, placentas at length free many-seeded. *Seeds* falcate, or subcubical, or angled, testa narrowly winged; embryo club-shaped in fleshy albumen.—DISTRIB. Species 5 or 6, Burmese and Malayan.

1. **G. Jackii**, W. & A. *Prodr.* 404; inflorescence and leaves beneath softly tomentose or villous, leaves oblanceolate obtusely acuminate, stipules large, flowers close-set. *Rondeletia corymbosa*, *Jack in Mal. Misc.* i. 4. *R. spicata*, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 139. *Wendlandia?* *corymbosa*, *Wall. Cat.* 6276; *DC. Prodr.* iv. 413; *Kurz For. Fl.* ii. 75. *W.?* *spicata*, *DC. l. c.* 412.

MALAYAN PENINSULA, from Tenasserim to Singapore, *Jack*, &c.

An evergreen shrub. *Leaves* membranous, 8-20 by $1\frac{1}{2}$ -6 in., puberulous or glabrate above, narrowed into the very short petiole; nerves 20-30 pair, slender; stipules very variable in length and breadth, $\frac{1}{2}$ -1 in., acute. *Panicle* subsessile, primary branches 3-chotomous, ultimate 2-chotomous; bracteoles filiform. *Corolla-tube* $\frac{1}{4}$ in., hairy, twice as long as the 4 ovate lobes. *Capsule* $\frac{1}{8}$ in. diam., pubescent.

2. **G. Wightiana**, W. & A. *Prodr.* 404; inflorescence puberulous, leaves elliptic-lanceolate or oblanceolate acuminate glabrous except sometimes the midrib beneath, stipules with long subulate points, flowers separate. *Wt. Ic.* t. 1151. *Wendlandia?* *Wightiana*, *Wall. Cat.* 6277; *G. Don Gen. Syst.* iii. 520. *W. secunda*, *Griff. Notul.* 266; *Kurz For. Fl.* ii. 75. *Guettarda*, sp. *Wall. Cat.* 8400.

TENASSERIM, *Gomez*, &c. **BIRMA**, *Griffith*.

A shrub or small tree. *Leaves* much like those of *G. Jackii*, but glabrous with longer petioles and fewer nerves; stipules usually suddenly contracted to a long point. *Panicles* sessile or long- or short-peduncled, branches very slender. *Corolla-tube* $\frac{1}{2}$ in., puberulous, thrice as long as the 4-5 ovate lobes. *Capsules* puberulous.

TRIBE IV. **HEDYOTIDÆ.**14. **DENTELLA**, *Forst.*

A small weak prostrate annual or perennial-rooted herb. *Leaves* small; stipules connate, scarious. *Flowers* minute, solitary, axillary and in the forks, sessile or pedicelled, white. *Calyx-tube* globose; limb tubular, persistent. *Corolla* funnel-shaped, hairy within; lobes 5, 2-3-toothed, induplicate-valvate. *Stamens* 5, in the middle of the corolla-tube, filaments short; anthers linear. *Ovary* 2-celled; style short, stigmas filiform; ovules numerous on hemispheric placentas. *Fruit* small, dry, globose, 2-celled, indehiscent, many-seeded. *Seeds* minute, angled, testa dotted.

1. **D. repens**, *Forst. Char. Gen.* 26, t. 13; *Roxb. Fl. Ind.* i. 532; *Wall. Cat.* 6206; *W. & A. Prodr.* 405; *Dalz. & Gibs. Bomb. Fl.* 115. *Oldenlandia repens*, *Linn. Mant.* 40. *Hedyotis repens*, *Lam. Ill.* 1424, not of *Don*. *Lippaya telephioides*, *Endl. Atakt.* t. 13.

In moist places throughout Bengal and eastward to Birma, and in both Peninsulas to Ceylon and Singapore.—**DISTRIB.** Malayan Islands, N. Australia, Polynesia.

A straggling weed, stems rooting at the joints. *Leaves* $\frac{1}{4}$ in., obovate spatulate or elliptic, ciliate or glabrous. *Flowers* $\frac{1}{12}$ in. *Style* cleft nearly to the base. *Capsule* $\frac{1}{10}$ in. diam., hispid or glabrous.

15. **ARGOSTEMMA**, *Wall.*

Small delicate herbs. *Leaves* usually membranous, opposite, pairs very unequal, or falsely whorled; stipules entire, persistent or obsolete. *Flowers* white, in peduncled cymes or umbels. *Calyx-tube* short; lobes 5, rarely 3-7. *Corolla* rotate, 4-5-partite, valvate. *Stamens* 4-5, filaments short; anthers large, free, conniving or cohering, erect or declinate, dehiscing by 1-2 terminal pores, rarely longitudinally. *Ovary* 2-celled; style filiform, stigma capitate; ovules very many on projecting placentas. *Capsule* coriaceous or membranous, 2-celled, dehiscing at the apex or by an operculum. *Seeds* minute, angled or compressed, testa granulate or reticulate; embryo most minute, in dense fleshy albumen.—**DISTRIB.** Species about 40, all from subtropical Asiatic and Malayan Mts., except one African (which is also Indian).

* *Leaves* opposite or whorled.

† *Flowers* 4-merous.

1. **A. sarmentosum**, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 324; *Cat.* 8396; leaves sessile or petioled opposite or in whorls of 4 orbicular elliptic or broadly obovate obtuse sparingly pubescent, umbels terminal, calyx pubescent, teeth ovate obtuse, anthers 4 free slender opening by pores. *Benn. Pl. Rar. Jav.* 95. *Sonerila angustifolia*, *Wall. Cat.* 4090.

SUBTROPICAL HIMALAYAS, from Garwhal to Bhotan, alt. 2-5000 ft. **KHASIA Mts.**, alt. 2-4000 ft., *J. D. H. & T. T.*

Stems 2 in. to a span, often with filiform very long simple or branched runners from buds below the leaves. *Leaves* 1-4 in., 4 in a whorl, or in 2 rarely more pairs, equal or more or less unequal or dissimilar. *Umbels* simple, 1- many-fld.; bracts ovate; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in., very stout. *Flowers* white, with a green eye, $\frac{3}{4}$ in. diam. *Calyx-lobes* ovate. *Corolla* segments acuminate.

2. **A. courtallense**, *Arn. in Ann. Nat. Hist.* iii. 22; sparsely pubescent, leaves subsessile in whorls of 4 ovate or orbicular-ovate subacute or obtuse base contracted rounded or cordate, umbel terminal simple, calyx-teeth

acute, anthers 4 free oblong-lanceolate curved opening by pores. *Wt. Ic. t.* 1160. *A. connatum*, *Dalz. in Hook. Kew Journ.* iii. 345; *Dalz. & Gibs. Bomb. Fl.* 118 (*by error cuneatum*).

Mountains of the WESTERN PENINSULA, from Canara to Travancore, *Rottler, Heyne, &c.*

Three inches to a span high. *Leaves* never more than 4, very variable in size and shape, rarely acute or shortly petioled. *Umbels* 3- many-fld. *Flowers* about $\frac{2}{3}$ in. diam., white. *Corolla-lobes* acute.

3. **A. tavoyanum**, *Wall. in Benn. Pl. Jav. Rar.* 95; *Cat.* 8393; leaves subsessile opposite or in whorls of 4 ovate acute base contracted or cordate, umbels terminal, calyx pubescent teeth ovate, anthers 4 free oblong-lanceolate with terminal pores.

TENASSERIM; Tavoy, *Wallich*. MARTABAN, at Moulmein, *Parish*.

Sparsely pilose; stem 2-4 in. *Leaves* sometimes only one pair, usually 4 in a whorl, rarely with a smaller pair added, equal or more or less unequal. *Umbels* simple, many-fld. *Flowers* $\frac{1}{4}$ in. diam. *Corolla* $\frac{1}{2}$ in. diam., and segments acute short.—This may prove to be a variety of *A. courtallense*, but the leaves are more acute and the calyx-lobes more obtuse, and the corolla smaller with shorter lobes, as far as I can make out by moistening the dried specimens.

4. **A. khasianum**, *C. B. Clarke*; leaves sessile or petioled opposite or in whorls of 4, elliptic ovate acute or subacute glabrous, umbels terminal and axillary and their peduncles pubescent, calyx-teeth broad acute, anthers 4 free linear-oblong straight opening by pores. *A. verticillatum*, *Wall. Cat.* 8394, *in part*.

KHASIA Mts., alt. 2-4000 ft., *De Silva, &c.*

Closely allied to *A. courtallense*, differing in the much narrower glabrous leaves, often 2-3 umbels, which are more closely pubescent; the anthers, too, are more strictly oblong. There are sometimes as many as 8 leaves of very various size in irregularly superposed pairs, and the midrib and nerves are sometimes white.

†† *Flowers* 5-merous.

5. **A. pictum**, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 327; *Cat.* 8392; leaves sessile or shortly petioled, usually in a whorl of 4 of which 2 are very small and 2 very large, broadly ovate or almost orbicular obtuse or subacute glabrous or with a few short scattered hairs, umbels 1-3 terminal simple glabrous, anthers 5 coherent linear-oblong straight opening by pores. *Benn. Pl. Jav. Rar.* 94.

PENANG; *Wallich, &c.*

3-4 in. high. *Leaves* usually large, sometimes 4 by 3 in., often variegated along the midrib and nerves. *Peduncle* slender. *Calyx-teeth* broad, acute.

6. **A. verticillatum**, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 325; *Pl. As. Rar.* ii. 80, t. 185; *Cat.* 8394, *in part*; leaves sessile 4 in a whorl lanceolate or ovate-lanceolate finely acuminate glabrous unequal, umbels 1 or more terminal sometimes branched, anthers 5 free linear-oblong straight apiculate opening by pores. *Benn. Pl. Jav. Rar.* 94. *A. glaberrimum*, *Dalz. in Hook. Kew Journ.* iii. 345; *Dalz. & Gibs. Bomb. Fl.* 118. *A. acutum*, *Wall. mss.*

TEMPERATE HIMALAYA, from Kumaon to Sikkim, alt. 2-6000 ft. KHASIA Mts., alt. 4000 ft. CANARA; in the WAREE country, on trees, *Dalzell*. MARTABAN, at Moulmein, *Parish*. PENANG, *Wallich*.

Leaves 1-5 in., broader more ovate and distinctly petioled only in Moulmein specimens, very rarely with an additional pair of leaves below the whorl. *Umbels* 1-3, sometimes compound, all terminal. *Flowers* about $\frac{1}{2}$ in. diam. *Calyx-teeth* acute.

7. **A. Parishii**, *Hook. f.*; quite glabrous, leaves sessile in whorls of 5 or 6 or oftener in several superimposed pairs elliptic-lanceolate acuminate, umbels branched terminal, calyx-teeth very short, anthers 5 free linear-lanceolate straight obtuse opening by pores.

MARTABAN; hills behind Moulmein, *Parish*.

Similar in many respects to *A. verticillatum*, and, like it, quite glabrous; but the leaves are far more numerous, usually in approximate pairs, the corolla lobes longer and very acute, the anthers much longer and obtuse.

8. **A. pumilum**, *Benn. Pl. Jav. Rar.* 95; glabrous, leaves sessile about 10 almost whorled lanceolate tip rounded lowest obovate, umbels very shortly peduncled irregularly few-flowered, calyx-teeth broad obtuse, corolla-lobes long subacute, anthers 5 free oblong opening by slits throughout their length. *A. verticillatum*, *Wall. Cat.* 8394 B., chiefly; *Hiern in Fl. Trop. Africa*, iii. 44.

KHASIA MTS., alt. 0-2000 ft., *De Silva, &c.*—DISTRIB. W. trop. Africa.

A very small rather rigid species, 1-1½ in. high; stem stiff. *Leaves* 1-1½ in., more coriaceous than usual in the genus. *Umbels* smaller than the leaves, few-fl. *Flowers* ¼ in. diam.—The West African specimen from Mt. Sierra del Crystal (on the upper Gaboon river) differs only in the anthers opening towards the summit.

9. **A. Lobbii**, *Hook. f.*; very slender, quite glabrous, leaves in numerous superposed whorls of 4-6, of which 1 is much the longest linear-lanceolate subacute, umbels axillary and terminal, pedicels slender divaricate, calyx-teeth short, corolla-lobes long, anthers 5 free linear-lanceolate curved with minute pores.

MARTABAN; at Moulmein on limestone rocks, *Lobb, Parish*.

Stem succulent, 4-6 in. *Leaves* in about 5-8 equidistant whorls, the long ones 1-1½ in., curved upwards, the short ones ¼-½ in. *Umbels* branched from the base, or peduncles forked. *Flowers* ⅕ in. diam. *Calyx* very small. *Anthers* not conniving. *Stigma* minute.

10. **A. rostratum**, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 326; *Cat.* 8395; quite glabrous, leaves whorled or in superimposed pairs linear or elliptic-lanceolate acuminate with often bulbiferous axils, umbels small solitary simple or compound, corolla-lobes caudate-acuminate, anthers 5 coherent oblong with long slender beaks opening by pores. *Benn. Pl. Jav. Rar.* 95.

KHASIA MTS., alt. 3-5000 ft., *De Silva, &c.*

Very variable indeed in stature and foliage. *Stem* 3-10 in., slender or robust. *Leaves*, the larger on each plant 1½-8 in., membranous, sessile or shortly petioled. *Umbels* very various, few-fl. *Peduncles* 1-3 in. *Flowers* ½ in. diam. *Calyx* small, lobes short broad. *Anthers* very large for the size of the flowers, erect; straight beaks as long as the cells.—The beaked anthers distinguish this from all allied species. The bulbiferous specimens have smaller leaves and long capillary runners; they often somewhat resemble *A. Lobbii*.

** Stem with a terminal pair of leaves, one very large, the other very small, and sometimes one or more pairs of very small leaves lower down.

11. **A. humile**, *Wall. in Benn. Pl. Jav. Rar.* 94; *Cat.* 8391; leaves glabrous, uppermost pair of a very large ovate-lanceolate acuminate and a very small ovate one, lower pairs few or solitary very small ovate subequal, umbels solitary puberulous, bracts large, corolla-lobes lanceolate, anthers 4 linear-subulate straight free obtuse opening by pores.

KHASIA MTS.; Mahadeb, *Griffith*; Churra, *J. D. H. & T. T. PENANG, Jack.*

Very variable in size. *Stem* 1-2 in., very short in comparison with the large leaf, which is 2-5 in. long, sessile, membranous, the smaller leaf is ovate, ¼-½ in. long. *Umbels* 3-many-fl.; bracts ovate or orbicular. *Anthers* more than half the length of the corolla-lobes. *Stigma* minutely capitate.

12. **A. unifolium**, Benn. *Pl. Jav. Rar.* 94; quite glabrous, leaves 2 only larger long-petioled ovate caudate-acuminate smaller (stipule?) sessile ovate-cordate, umbels compound, pedicels slender, anthers 5 coherent elongate-subulate opening by pores.

PENANG, Porter. MALACCA? Maingay.

Stem slender, a span high. Larger leaf membranous, 5-8 by 2-4½ in., base rounded or cordate, petiole 1-1½ in.; smaller, ¼-1 in., recurved. Flowers numerous, ½ in. diam. Calyx-lobes small, broad, obtuse. Corolla-lobes lanceolate, equalling the anthers. Stigma minute, capitate.—The largest-leaved species of the genus.

13. **A. Kurzii**, C. B. Clarke; quite glabrous, leaves 2 only, larger sessile broadly ovate obtuse or obtusely-acuminate, smaller (stipule?) ovate, umbels simple, bracts 4, anthers 5 free broadly oblong-obtuse dehiscing by their whole length. *A. unifolium*, Kurz in *Journ. As. Soc.* 1877, ii. 131, not of Blume.

MARTABAN; at Moulmein, Parish; Attran, Scott.

Stem simple, 3 in., forked, in one specimen stout, succulent. Leaves membranous, large, 3½-5 by 2½-3 in., base rounded, smaller, ½ in., obtuse. Umbel 4-8-fld; bracts almost orbicular, equal. Flowers ½ in. diam. Calyx-teeth very short, broad acute. Corolla-lobes lanceolate, much longer than the anthers.—Only three specimens seen.

*** Stem prostrate with many subequal pairs of thick distichous leaves, one of each pair very large, the other very small.—Habit of *Elatostemma*, anthers with long beaks.

14. **A. Elatostemma**, Hook. f.; stem umbel and leaves beneath furfuraceously tomentose, large leaf of each pair shortly petioled obovate-oblong obtuse base contracted cordate, smaller sessile ovate-cordate, umbels few-fld simple or compound, corolla-lobes lanceolate, anthers 5 coherent subulate produced into a long straight beak opening by pores.

PENANG, Griffith. SINGAPORE, Lobb.

Stem 6-8 in., prostrate, very robust, simple or branched, sometimes rooting at the nodes. Leaves 6-8 pairs, larger 2-2½ in., coriaceous; nerves about 10 pair, united by very stout reticulating nerves. Peduncle softly tomentose. Flowers ¾ in. diam. Calyx small, lobes triangular, acute. Stamens as long as the puberulous corolla-lobes.—This species singularly resembles an *Elatostemma* in habit.

15. **A. parvifolium**, Benn. *Pl. Jav. Rar.* 96; stem hispid, large leaf of each pair petioled elliptic-ovate acute with few scattered cellular hairs above, glabrous beneath except the midrib, smaller sessile ovate, umbels few-fld., simple pubescent, corolla-lobes lanceolate, anthers 5 coherent subulate produced into a long straight beak. *Miq. Fl. Ind. Bat.* ii. 165, t. 31 D.

SINGAPORE, Lobb.—DISTRIB. Java.

Stem 4-8 in. slender, prostrate, simple or branched, rooting at the nodes. Leaves thick and succulent, in 4-8 distant or approximate pairs; larger ½-1¼ in., base rounded or cordate and equally or unequally auricled; smaller ½ in.; nerves indistinct. Flowers similar to those of *A. Elatostemma*, but beak of anthers shorter.

16. **A. ophirense**, Maingay mss.; stem robust sparsely hairy, leaves coriaceous glabrous, larger of each pair subsessile oblanceolate or obovate obtuse or acuminate obliquely auricled at the base, smaller obliquely ovate-cordate sessile, umbels few-fld.

MALACCA; on Mt. Ophir, Maingay.

Stem 8-10 in., ascending, nodose, copiously rooting at the base, succulent. Leaves thick and succulent, in many pairs, larger 2-3½ by ¾-1½ in., smaller ¾-¼ in. Calyx-lobes very broad, acute. Corolla and stamens not seen.

17. **A. spinulosum**, C. B. Clarke; stem stout hispid with curled hairs, large leaf of each pair petioled oblanceolate acute, glabrous above with minute spinulose hairs on and near the margin, hairy on the nerves beneath, smaller ovate-lanceolate acuminate, umbels forked compound many-fld., anthers 5 coherent subulate produced into a short beak.

SINGAPORE, Lobb.

Only one specimen seen. *Stem* 4 in., very stout, flexuous and rooting below: *Leaves* rather thick and succulent in 4 pairs, the larger 4-5 by $1\frac{1}{4}$ in., base contracted obliquely, auricled, nerves spreading raised beneath, petiole $\frac{1}{2}$ in.; smaller $\frac{1}{2}$ in., more membranous. *Umbel* and *peduncle* quite glabrous. *Flowers* $\frac{1}{2}$ in. diam. *Calyx-lobes* triangular-ovate, acuminate. *Corolla-lobes* lanceolate.

DOUBTFUL SPECIES.

A. INÆQUILATERUM, Benn. *Pl. Jav. Rar.* 95; "leaves usually 4 in a whorl more or less unequal, lanceolate or ovate-lanceolate unequal-sided acuminate glabrous; umbel subsimple few-fld; flowers 5-merous."—Perhaps *A. verticillatum*.

A. SONERILOIDES, Kurz in *Journ. As. Soc.* 1872, ii. 310; calyx-lobes 3-4; corolla subcampanulate, 3-4-lobed; leaves whorled; anthers oblong obtuse.—Andaman Islands, Kurz.—Very imperfect specimens from Dr. King do not enable me to refer this satisfactorily to any described species: it resembles *tavoyanum*.

A. OLIGANTHA, Kurz in *Journ. As. Soc.* 1877, ii. 131.—An Andaman species and another of Kurz, from Boronga Island, on the Arracan coast, are not recognisable.

16. **CLARKELLA**, Hook. f.

A very small erect glabrous puberulous herb. *Leaves* opposite, petioled, ovate, one of the lower pair usually suppressed, the other very large; stipules minute, broadly ovate, or obsolete. *Flowers* 1-6 in., in peduncled terminal bracteate cymes, white. *Calyx-tube* obconic, produced above the ovary; limb dilated, 5-7-toothed. *Corolla-tube* long, slender, funnel-shaped above, throat glabrous; lobes 5, lanceolate, valvate. *Stamens* 5, near the bottom of the tube, filaments short slender; anthers linear-oblong. *Ovary* 2-celled; style short, arms 2 slender hairy; ovules many, on ascending placentas attached to the septum below its middle. *Capsule* obconic, 5-7-ribbed, crowned with the dilated calyx-limb, membranous, indehiscent, many-seeded. *Seeds* very minute, irregularly ellipsoid, testa black papillose.

1. **C. nana**, Hook. f. *Ophiorhiza nana*, Edgw. in *Trans. Linn. Soc.* xx. 60.

TEMPERATE HIMALAYA, alt. 4-8000 ft. Kumaon, Edgworth, &c.; Garwhal, Falconer.

A very singular little plant, requiring examination in a living state as to its mode of growth. *Stem* 1-3 in., slender, simple, curved upwards, terminating below in a small fleshy tuber enclosed in a rather thick sheathing coat, the outer surface of which coat is clothed with short rigid rootlets that adhere to surrounding particles of sand and ground by suckers. *Radicle-leaf* $\frac{3}{4}$ - $1\frac{1}{4}$ in. diam., solitary, orbicular or broadly ovate, obtuse, membranous; nerves 4-5 pair, spreading and arching; petiole slender; besides this leaf there is a single pair of small leaves close to the cyme. *Cyme* on a stout peduncle $\frac{1}{2}$ - $\frac{1}{4}$ in. long; bracts small, oblong. *Flowers* shortly pedicelled, erect, $\frac{1}{2}$ in. long. *Calyx-lobes* triangular with acuminate tips. *Corolla* pubescent. *Stamens* and *style* near the very base of the corolla-tube. *Fruit* $\frac{1}{4}$ in. long.—Named after my coadjutor in this work, C. B. Clarke, F.L.S.

17. **NEUROCALYX**, Hook.

Low herbs. *Leaves* opposite, crowded, membranous, entire or toothed, reticulate; stipules large, 2-fld, or multifid. *Flowers* rather large, pale purple,

in short axillary nodding racemes or heads; bracts simple or 3-toothed or -partite. *Calyx-lobes* 5, broad, membranous, reticulate. *Corolla* rotate; lobes shorter and narrower than the calyx-lobes, valvate. *Stamens* 5, filaments very short; anthers connate in a conical tube, bursting inwards. *Ovary* 2-celled; style filiform, stigma capitate; ovules numerous on swollen peltate placentas. *Fruit* coriaceous or fleshy, usually irregularly bursting, many-seeded. *Seeds* minute, globose, testa crustaceous pitted; embryo obovoid in fleshy albumen.—**DISTRIB.** Species 6-8, on the Dekkan Mts., Ceylon, and Borneo.

1. **N. zeylanicus**, *Hook. Ic. Pl.* t. 174; glabrous, leaves oblanceolate acuminate narrowed into slender petioles, nerves beneath and inflorescence puberulous, flowers racemose, calyx-lobes lanceolate.

CEYLON; Suffragam district, ascending to 4000 ft., *Walker*, &c.

Stem woody, 2-8 in., clothed with spreading subspinescent stipular segments. *Leaves* 4-8 by 1-2 in.; nerves about 20 pair. *Peduncles* numerous, half as long as the leaves. *Flowers* $\frac{3}{4}$ in. diam. *Corolla* not half as long as the calyx, lobes lanceolate.

2. **N. Wightii**, *Arn. in Ann. Nat. Hist.* ii. 22; leaves sessile oblanceolate acuminate glabrous above, nerves beneath and inflorescence furfuraceous, flowers racemose, calyx-lobes ovate acute. *N. Hookeriana*, *Wt. Ic. t.* 52. Argostemma calycinum, *Br. in Benn. Pl. Jav. Rar.* 97; *Wall. Cat.* 8397.

Southern Mountains of the WESTERN PENINSULA; Wynaad, *Hamilton*, &c.; Nilgherri, *Munro*. CEYLON, ascending to 2000 ft., *Walker*, &c.

Stem 2-4 in., woody, tortuous. *Leaves* 6-9 by $1\frac{1}{2}$ -3 in.; nerves 12-15 pair; stipules lanceolate, membranous. *Peduncles* not half so long as the leaves. *Flowers* $\frac{3}{4}$ in. diam. *Corolla* nearly as long as the calyx, lobes ovate.

3. **N. capitata**, *Benth. mss.*; leaves oblanceolate narrowed into long stout petioles, nerves beneath and inflorescence pubescent, flowers capitate, calyx-lobes ovate acute.

CEYLON, *Walker*, *Champion*.

Stem erect, stout, a foot or more high, with distant pairs of large leaves, glabrous. *Leaves* 10-12 by $2\frac{1}{2}$ -4 in.; nerves 15-20 pair; stipules membranous, 2-partite, segments ovate caudate-acuminate, *Peduncles* axillary, shorter than the petioles; heads of flowers globose or oblong. *Flowers* $\frac{3}{4}$ in. diam. *Corolla-lobes* broadly ovate, obtuse, half as long as the calyx.—Very different from *N. Wightii* in the long stout stem, much larger petioled leaves with more numerous nerves, and larger flowers.

4. **N. Championii**, *Benth. in Thw. Enum.* 139; leaves sessile or petioled obovate-lanceolate obtuse bullate above, nerves beneath and inflorescence villous, flowers racemed, calyx-lobes ovate acute.

CEYLON; Kokool Corle, *Thwaites*.

Stem very short, woody. *Leaves* 3-6 by 1-2 in., midrib hairy above, base obtuse or narrowed into the petiole; nerves about 10 pair; stipules membranous, 2-partite. *Racemes* half as long as the leaves. *Flowers* $\frac{1}{2}$ in. diam. *Corolla-lobes* narrow, oblong, equalling the broadly ovate acute calyx-lobes.

5. **N. Gardneri**, *Thw. Enum.* 139; leaves obovate-lanceolate with rounded apiculate tips narrowed into a very short petiole hairy above and beneath, inflorescence racemose villous, calyx-lobes ovate- or orbicular-cordate.

CEYLON; Pasdoon Corle and Hewetsea, *Gardner*, *Thwaites*.

Stem short, stout, woody, villous. *Leaves* 4-10 by $1\frac{1}{2}$ -3 $\frac{1}{2}$ in., very membranous, ciliate, obscurely crenulate; nerves 15-18 pair; stipules 2-partite, segments caudate-acuminate. *Corolla* not seen.

18. **ALLÆOPHANIA**, *Thwaites*.

Undershrubs; branches 4-angled. *Leaves* sessile or shortly petioled, ovate or lanceolate; nerves close; stipules connate into a scarious bristly tube. *Flowers* minute, polygamo-dicecious, in axillary dense cymes, pale purple. *Calyx-tube* obconic; limb bell-shaped, 4-ribbed and with 4 bristle-like teeth, persistent. *Corolla* funnel-shaped; tube and throat hairy; lobes 4, valvate in bud. *Stamens* 4, inserted between the corolla-lobes, filaments of ♂ long exserted; anthers linear-oblong, obtuse. *Ovary* 4-celled; style filiform, ♀ exserted, arms 4 linear; ovules 1 basilar erect in each cell. *Fruit* small, turbinate, with 4 bony indehiscent pyrenes. *Seeds* erect, minute, broadly oblong or subglobose, compressed, narrowed at the base, testa membranous; embryo short, cylindric.—**DISTRIB.** Species 3, one Malayan, the others as below.

1. **A. decipiens**, *Thw. Enum.* 147; more or less hirsute ca. glabrate, leaves sessile or petioled ovate or lanceolate acute or acuminate, nerves strong beneath, stipules broad, calyx-teeth equalling the hairy fruit. *Hedyotis nodulosa*, *var. a. Thw. Enum.* 143, as to *C. P.* 105, not of *Arnott*.

CEYLON; Central Province, alt. 3–7000 ft.

An erect 3-chotomously branched shrub. *Leaves* 1–2½ by ½–1½ in., usually coriaceous and hairy or scabrid above, very variable in shape from broad ovate to narrow-lanceolate, base acuminate rounded or cordate, upper surface flat or bullate; petiole 0 or ¼–½ in.; stipular bristles hairy. *Calyx-limb* membranous. *Corolla-tube* hairy, lobes narrow, villous within. *Style* slender, hairy, arms spreading.—There are three varieties: one with broad sessile or petioled coriaceous leaves, scabrid above, with very strong nerves beneath; the second (*var. flavescens*, *Thw. l. c.*) with ovate-cordate petioled membranous very hairy leaves; the third with narrow-lanceolate coriaceous leaves glabrous and wrinkled above and strong hairy nerves beneath.—Closely allied to *Hedyotis rugulosa*, *Korth.*, of the Malayan Islands, which has much longer calyx-teeth, on which Miquel founded the section *Tetragyneia* of *Hedyotis*.

2. **A. Arnottii**, *Hook. f.*; glabrous or nearly so, leaves petioled ovate-lanceolate acuminate nerves distinct, stipules caducous ovate with few subterminal bristles, calyx-teeth shorter than the glabrous fruit.—*Hedyotis nodulosa*, *var. a. Thwaites Enum.* 143, as to *C. P.* 87, not of *Arnott*.

CEYLON; Newera Ellia, *Gardner*; Adam's Peak, *Thwaites*.

Closely allied to *A. decipiens*, but almost glabrous, with longer differently shaped stipules, smaller glabrous fruit and shorter calyx-teeth; the style, too, is quite glabrous.

19. **FERGUSONIA**, *Hook. f.*

A slender procumbent herb, branching from the base; branches very long, rooting below, acutely 4-angled; nodes ciliate. *Leaves* opposite, subsessile, lanceolate, scaberulous, 1-nerved, margin recurved; stipules connate with the petioles, erect, herbaceous, lanceolate, ciliate, persistent. *Flowers* small, axillary, shortly pedicelled, 2-bracteolate. *Calyx-tube* subpyriform; lobes 4, erect, lanceolate, ciliate, persistent. *Corolla* funnel-shaped, throat glabrous or hairy; lobes 4, short, valvate in bud, tips ciliate. *Stamens* 4, inserted between the corolla-lobes, filaments short; anthers linear-oblong. *Disk* epigynous, 4-lobed. *Ovary* 4-celled; style filiform, arms 2 linear hairy; ovules 1 basilar erect in each cell. *Fruit* of 4 pear-shaped coriaceous cocci crowned with the calyx-teeth. *Seeds* erect, pyriform; embryo compressed, subcylindric, radicle inferior.

1. **F. zeylanica**, *Hook. f. in Hook. Ic. Pl. t. 1124*. *Borreria tetracocca*, *Thw. Enum.* 442; *Bedd. Ic. Pl. Ind. Or. t. 39*.

COORG, *Beddome*; CEYLON, near Colombo, *W. Ferguson*.

Branches 1-2 ft. *Leaves* 1-1½ in., and whole plant pale green when dry. *Corolla* ½ in. long.—A very singular plant, which I was at first disposed to consider as belonging to *Psychotriæ*, but which I think now to be closely allied to *Allæophania*, as I suspected when placing it in that tribe in the "Genera Plantarum." It differs remarkably from the other Hedyotidean genera in the form and insertion of the seed, and in the dimerous style with a 4-merous ovary, but is united with them through *Allæophania*.

20. HEDYOTIS, L.

Herbs, undershrubs or shrubs. *Leaves* very rarely ternately whorled; stipules free or combined in a bristly sheath. *Flowers* white or lilac, in terminal or axillary open close or capitate cymes. *Calyx-lobes* 4, acute, persistent, without interposed teeth. *Corolla* funnel- or bell-shaped; lobes 4, ovate, or linear, valvate in bud. *Stamens* 4, in the tube or throat of the corolla. *Ovary* 2-celled; style filiform, stigma 2-fid or 2-lobed; ovules numerous on sessile or pedicelled placentas, attached to the septum at or below the middle. *Fruit* small, membranous coriaceous or crustaceous, indehiscent or septi- or loculicidal or of 2 separable or connate cocci, 2-many-seeded. *Seeds* plano-convex or angled, testa very rarely winged; embryo clavate in horny albumen.—DISTRIB. Species about 80, chiefly tropical Asiatic.

A very difficult genus to define, a few species being intermediate between it, *Anotis* and *Oldenlandia*. Flowers rarely 5-merous. The solitary ovules on the face of the septum in each cell, and the seeds, distinguish *Spermacoce* from it; in habit they are often very similar.

SECT. I. **Diplophragma.** *Capsule* septicidally splitting into two 1-4 (rarely more-) seeded cocci, which dehisce ventrally, top not protruded between the calyx-teeth.—Erect or decumbent shrubs or herbs; stipules various.

* *Erect shrubs; cymes terminal or axillary, rarely corymbose or panicled, very rarely capitate; stipules not large and sheathing.*

† *Stipules entire or gland-serrate or -crenate, rarely pectinate.*

1. **H. fruticosa**, Linn.; glabrous, branches obtusely 4-angled, leaves petioled lanceolate acuminate, nerves distinct, stipules gland-crenate, cymes terminal panicled, calyx-teeth triangular recurved shorter than the ovoid smooth capsule. *W. & A. Prodr.* 408; *Burm. Fl. Zeyl.* t. 107. *Spermacoce*? hedyotideæ, *DC. Prodr.* iv. 555.—*Rheede Hort. Mal.* iv. t. 57.

TRAVANCORE Mts., *Rottler, &c.* CEYLON, common up 3000 ft.

An erect shrub, green when dry. *Leaves* 2-4 in., coriaceous; nerves 6-12 pair. *Corolla-throat* woolly. *Seeds* 4 in each cell, plano-convex, or concavo-convex.—Wight and Arnott's var. *B.*, with hispid cymes, appears to be *H. pruinosa*; Wallich's 837 *b*, the same authors refer to this species because it was gathered by Rottler, but Rottler's Herbarium contains Malayan plants, and that in question is *H. capitellata*. Wallich's 837 *a*, also from Rottler's Herbarium, is *H. pruinosa*.

2. **H. Maingayi**, Hook. f.; glabrous, leaves shortly petioled lanceolate or ovate-lanceolate acuminate nerveless, stipules entire eglandular, cymes terminal panicled, calyx-teeth lanceolate longer than the capsules.

MALACCA; on Mt. Ophir, *Griffith, Maingay* (*Kew Distrib.* 887).

A short much branched shrub, green when dry, 12-18 in. *Leaves* 1-2 in, acute or rounded at the base, petiole winged. *Flowers* more crowded than in *H. fruticosa*; flowers and fruit and seeds similar, except that the calyx-teeth are much longer and lanceolate.

3. **H. evenia**, *Thwaites Enum.* 140, 419; shining, branches and inflorescence puberulous, leaves shortly petioled elliptic or ovate-lanceolate acute glabrous nerveless, margins recurved, stipules with sparingly glandular tips, cymes terminal paniced, calyx-lobes triangular obtuse shorter than the capsule.

CEYLON; Adam's Peak, *Gardner*.

A small shrub, yellow when dry; branches acutely 4-angled. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., coriaceous above, varnished and with a few scattered raised points. *Cymes* few-fl. —Fruit unknown, and hence the position of the species in the genus.

4. **H. cymosa**, *Thwaites Enum.* 142; glabrous, leaves sessile lanceolate obtuse or acute, nerves very faint, stipules ovate-lanceolate long-acuminate gland-serrate, cymes terminal paniced, calyx-teeth in fruit lanceolate exceeding the capsule. *Bedd. Ic. Pl. Ind. Or.* t. 35.

CEYLON; Hinidoon Corle, alt. 1000 ft., *Thwaites*.

A shrub, black when dry; branches obtusely angled. *Leaves* 2–3 in., coriaceous, margins not recurved. *Cymes* flat-topped, very minutely puberulous. *Calyx-teeth* much enlarged in fruit. *Capsule* almost didymous. *Seeds* solitary in each cell, much compressed, plano-convex (winged when ripe?).

5. **H. Macraei**, *Hook. f.*; softly pubescent, leaves petioled recurved lanceolate acuminate many-nerved, stipules broader than long abruptly cuspidate eglandular, cymes terminal paniced, calyx-teeth shorter than the capsule.

CEYLON, *Macrae*.

Grey-green when dry; branches obscurely 4-angled. *Leaves* 3–4 in., recurved and complicate, narrowed into a petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. long, rather scabridly pubescent above, softly tomentose beneath; stipules tomentose. *Cymes* large, rounded, with whorled spreading branches. *Flowers* small, $\frac{1}{4}$ in. *Calyx* pubescent, as are the corolla-lobes within. *Capsule* small, ellipsoid, cells many-seeded.

6. **H. purpurascens**, *Bedd. Ic. Pl. Ind. Or.* t. 5 (*purpurea*); quite glabrous, leaves petioled ovate or ovate-lanceolate obtuse or obtusely-acuminate, nerves faint, stipules gland-serrate or pectinate, cymes terminal paniced, calyx-tube produced and teeth much longer than the capsule.

Mts. of TRAVANCORE and TINNEVELLI, *Wight* (Kew Distrib. 1357. *H. stylosa*, var.), *Beddome*.

A small woody shrub, yellow-green when dry; branches tortuous and nodose below. *Leaves* 1–3 in., coriaceous, margins flat, nerves variable in number; stipules pubescent. *Cymes* rounded in flower, flat-topped in fruit. *Calyx-lobes* oblong, obtuse. *Corolla* small, with small lobes. *Capsules* large, $\frac{1}{2}$ in., with the enlarged calyx narrowly ellipsoid, cells many-seeded.—There being an *H. purpurea* previously published (by A. Gray), but unknown to Col. Beddome, I have substituted that of *purpurascens* for his plant.

7. **H. scaberula**, *Hook. f.*; finely scaberulous throughout, branches slender elongate terete, leaves petioled ovate acute flat, nerves faint arched, stipules triangular obtuse appressed, margins glandular, cymes in a loose erect bracteate terminal leafy panicle, flowers pedicelled divaricate, calyx-teeth triangular much shorter than the subglobose capsule.

MARTABAN; at Moulmein, *Lobb*.

A very distinct species, rough to the touch all over, of which I have but one specimen, and that in fruit, pale green when dry; branches strict, slender, with long internodes. *Leaves* 2–3 in., base acute, equally scaberulous on both surfaces; petiole $\frac{1}{8}$ in. *Panicle* elongate, pyramidal in outline, with distant internodes; branches strict rather depressed, the lower with large leaves at the axils, uppermost naked, 3-chotomously branched at the ends. *Capsule* septicidal, the valves loculicidal. *Seeds* about 8 on each placenta.—This may be a climbing species, but there is no evidence of it.

†† *Stipules pectinate.*

8. **H. stylosa**, Br. in Wall. Cat. 853; glabrous, leaves petioled ovate or elliptic-ovate acute glabrous or hairy on the distinct nerves beneath, stipules connate pectinate with long subulate segments, cymes terminal, calyx-tube produced above the ovary, teeth short acute. W. & A. Prodr. 407; Wt. Ic. t. 1027. H.? *Leschenaultiana*, DC. Prodr. iv. 422, excl. var. β . *Knoxia Wightiana*, Schlecht. in Herb. Hohenack., not of Wallich.

Mountains of MALABAR and TRAVANCORE, alt. 5–6000 ft., common, Noton, &c.

A much branched shrub, yellow-green when dry. Leaves 1–2 in., very variable in breadth and shape, coriaceous, margins flat or recurved, nerves few obscure above; stipules pubescent. Cymes short, flowers crowded. Corolla-lobes woolly within. Capsules globose, many-seeded.

9. **H. articularis**, Br. in Wall. Cat. 854; quite glabrous, leaves sessile small lanceolate or elliptic-lanceolate subacute, margins recurved, nerves below very broad, stipules connate pectinate with long subulate segments, calyx-tube produced above the ovary, lobes very short. W. & A. Prodr. 407; Wt. Ic. t. 1028.

NILGHERY Mts., Noton, Wight, &c.

A small rigid stout leafy bush, yellowish when dry. Leaves $\frac{3}{4}$ –1 in., very rigid, with 8–10 very broad and much raised longitudinal nerves beneath, marked by channels above. Cymes terminal, small, dense-flowered. Calyx-limb a 4-toothed cup, unaltered in fruit. Corolla puberulous, lobes glabrous, mouth woolly. Capsule very variable, from $\frac{1}{2}$ in. globose to $\frac{1}{2}$ in., obovoid; cells with 8–10 angular seeds.

10. **H. pruinosa**, W. & A. Prodr. 408; leaves petioled ovate-lanceolate or lanceolate acuminate glabrous, nerves distinct, stipules free pectinate, segments subulate, cymes pruinose, calyx-limb not produced, teeth subulate recurved shorter than the capsule. H. corymbosa, Wall. Cat. 6202, chiefly; 837 a. H. lentiginosa, Bedd. Ic. Pl. Ind. Or. t. 6.

TRAVANCORE and MALABAR; Quilon, Wight; in the backwaters, Beddome.

A shrub, yellowish when dry. Leaves 2–2 $\frac{1}{2}$ in., margins flat; nerves few, slender; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; stipules not connate, short. Cymes spreading, many-flowered, hoary. Corolla-mouth woolly. Capsules small, obovoid, subclavate or globose, many-seeded.

11. **H. swertioides**, Hook. f.; leaves sessile glabrous elliptic acute margins undulate, stipules free very long slender pectinate with distant subulate segments, cymes very many in the upper axils and terminal densely pubescent, calyx-limb not produced, lobes lanceolate longer than the tube.

TINNEVELLI; in the Pulney Mts., Wight (Kew Distrib. 359).

A very fine and remarkable species, tall, erect, stout, with distant nodes, and a profuse oblong head of cymes, yellow when dry. Leaves 3 by 1 $\frac{1}{2}$ –1 $\frac{3}{4}$ in., coriaceous, contracted at the base, but hardly petioled; nerves few, hardly raised; stipules $\frac{1}{2}$ – $\frac{3}{4}$ in., erect, stiff. Cymes very many-flowered. Corolla woolly at the mouth. Fruit not seen. —The stout strict branches and erect sessile broad coriaceous opposite leaves give the plant a gentianoid aspect.

12. **H. obscura**, Thwaites Enum. 14; glabrous except the youngest shoots and sometimes the nerves beneath, leaves sessile or petioled elliptic-lanceolate or ovate or suborbicular acute obtuse or acuminate, stipules connate pectinate, peduncles axillary filiform, cymes few-flowered, calyx-teeth subulate shorter than the capsule.

CEYLON; Central provinces, alt. 6–8000 ft., Walker, Gardner, &c.

A rigid woody shrub, black when dry, occurring under three very dissimilar forms, which Thwaites unites.—1. leaves petioled lanceolate 1–3 in., nerves very obscure,

peduncle with often 2 leafy bracts; 2. leaves sessile or subsessile ovate-lanceolate obtuse or subacute, nerves very obscure. *H. ovata*, var. *minor*, *Thwaites in Herb.*; 3. leaves petioled orbicular or broadly ovate acute or obtuse, nerves beneath very strong elevated, peduncles usually filiform very short and 3-8-fld. *H. ovata*, var. *β*. *Thwaites Enum. l. c.*—This last resembles a New Zealand *Coprosma* in habit; grows in shady places; its branches and peduncles are sometimes supra-axillary.

13. **H. Beddomei**, *Hook. f.*; stipules and inflorescence hairy, leaves small petioled elliptic-ovate subacute, nerves strong beneath, stipules broad ovate shortly united pectinate, cymes terminal subsessile capitate, calyx hispid tube shortly produced together with the ovate-lanceolate teeth about equalling the capsule. *H. capitata*, *Bedd. Ic. Pl. Ind. Or. t. 191*.

TRAVANCORE; on the Palghat hills, alt. 6500 ft., *Beddome*.

Stem woody with white bark. *Leaves* yellow when dry, 1-1½ in., contracted into a short flattened petiole, margin recurved when dry; stipules ½ in., acute. *Cymes* axillary and terminal, involucrate. *Corolla-tube* and lobes outside hispid, lobes inside glabrous except at the woolly mouth. *Capsules* sessile, cells about 4-seeded.

14. **H. burifolia**, *Bedd. Ic. Pl. Ind. Or. t. 1*; glabrous, leaves small short-petioled ovate or ovate-cordate acute nerveless margins recurved, stipules connate at the base broad pectinate ciliate, cymes terminal and axillary 3-flowered, calyx-tube produced, teeth lanceolate.

TRAVANCORE; on the higher ranges of the Anamallay Mts., *Beddome*.

A large shrub, branches terete. *Leaves* ¼-½ by ¼ in., glabrous, shining, very coriaceous; stipules with a line of hairs down the centre. *Peduncles* ¼ in. *Flowers* subsessile; bracts filiform, ciliate. *Corolla-lobes* within and mouth villous. *Seeds* numerous.—Description from *Beddome*.

** *Erect shrubs; cymes terminal, capitate, or paniced. Stipules large, forming loose sheaths, which often become white with age.*

15. **H. quinquenervia**, *Thwaites Enum. 141*; nearly glabrous, leaves very coriaceous sessile orbicular very convex with margins and tips especially strongly recurved, very strongly 5-nerved from the base, stipular sheath cupular ciliate, cymes terminal sessile, calyx-tube produced and large ovate teeth together equalling the capsule. *Bedd. Ic. Pl. Ind. Or. t. 8*.

CEYLON; Central province, alt. 7-8000 ft., *Walker, &c.*

Stem woody, di-trichotomously branched; branches white below, above dark (when dry), with 2 lines of pubescence. *Leaves* dark or yellow-brown when dry, ½ in. diam., sometimes obovate-orbicular, abruptly contracted at the base; nerves deeply sunk above, beneath very thick; stipular sheath ½ in. long, loose. *Corolla-tube* glabrous, lobes hispid at the tip, glabrous within, except at the mouth. *Capsule* glabrous, cells 4-seeded.

16. **H. Lessertiana**, *Arn. Pugill. Pl. Ind. Or. 21*; glabrous or nearly so, leaves petioled ovate elliptic or lanceolate acuminate very coriaceous, nerves very strong, stipular sheath ciliate, cymes terminal capitate and subumbelled, calyx-tube more or less produced, teeth and limb together much shorter than the capsule. *Thwaites Enum. 141*; *Bedd. Ic. Pl. Ind. Or. t. 31*. *C. flavescens*, *Thwaites l. c. 141 and 419*.

CEYLON; Central province, alt. 3000 to 8000 ft., abundant.

A shrub with stout branches and leaves very variable in size, sometimes the largest of the genus, yellowish or brownish-green when dry; young shoots sometimes sparsely puberulous. *Leaves* 3-8 by 1-3 in., narrowed into a slender or stout petiole ¼-1½ in., almost plaited (rarely flat with slender nerves), the nerves being deeply sunk in the upper surface and highly raised on the under, where they are sometimes hairy, margins flat or recurved rarely ciliolate; stipular sheath ½-1½ in. long, some-

times 1 in. diam. *Cymes* glabrous or sparsely hairy, more or less umbellate, usually dense-flowered and rounded, sometimes quite capitate. *Corolla-tube* variable in length, lobes and throat usually densely woolly. *Capsule* ellipsoid, cells about 4-seeded.—In a form (*H. marginata*, Thw. mss., N. 3935), from Kotteyagalla, alt. 5000 ft., the leaves are ciliolate, the flowers in dense heads, the calyx-teeth longer, lanceolate, and the corolla-lobes glabrous except at the base.

17. **H. Gardneri**, *Thwaites Enum.* 142; glabrous, leaves sessile recurved lanceolate acuminate, nerves very indistinct, stipular sheath very broad, panicle erect terminal elongate pyramidal, calyx-tube produced and together with the lanceolate teeth equalling the capsule.

CEYLON; Adam's Peak, *Gardner*.

I have seen but one specimen of this remarkable species, which has much the habit of a South Brazilian *Eryngium*; it consists of a stout cylindric stem 6 in. long, clothed with somewhat corky white remains of the stipules, and bears several subterminal crowded rosettes, about 6 in. diam. of recurved yellowish when dry leaves, and a very stout erect branched panicle, 8 in. high by 4 broad, with distant opposite 3-chotomously divided flowering branches. The panicle is evidently a last year's one, and is white with age. *Leaves* 3–3½ by ½ in., complicate, very coriaceous, their bases concealed by the remains of the large stipules. *Capsules* sessile, turbinate, ½ in.

*** *Herbs*, all? annual, with terminal panicked or subumbelled cymes, small flowers, and globose capsules; stipules very small.

18. **H. Wallichii**, *Kurz in Journ. As. Soc.* 1876, ii. 136; a slender sparingly hairy or hispid annual, leaves subsessile ovate or elliptic acute, stipules subulate ciliate, cymes excessively 3-chotomously branched, pedicels long slender, flowers minute, capsule globose with minute calyx-teeth. *H. galioides*, *Wall. Cat.* 866.

TENASSERIM, *Gomez, &c.*; NICOBAR Islands, *Kurz*.—DISTRIB. Borneo.

Stem trichotomously branched from the base; branches acutely 4-angled, all floriferous. *Leaves* ½–¾ in., in remote pairs, ciliate; nerves few, slender. *Pedicels* spreading, often 2–3-nate. *Flowers* about ⅓ in. long. *Capsules* ⅓ in. diam., cells about 6-seeded. *Seeds* microscopic, angled, smooth.—Possibly an *Oldenlandia*, but the capsules dehisce septicidally to the base.

19. **H. elegans**, *Wall. Cat.* 887; quite glabrous, very slender, leaves subsessile ovate-lanceolate long acuminate, nerves very obscure, stipules small very broad acute or cuspidate, flowers sessile on the branches of terminal and axillary subumbellate cymes, calyx-teeth obtuse.

TENASSERIM, *Gomez, Helfer*.

Probably perennial, bright green when dry; stem very long and slender, terete, simple or sparingly branched. *Leaves* in distant pairs, 2–4½ by 1–1¾ in., narrowed into short petioles, margins flat. *Cymes* long-peduncled umbellately or 2–3-chotomously branched from above two linear or oblong bracts; branches 1–3 in. long, spreading or divaricate, rather stout. *Flowers* very shortly pedicelled, ⅓ in. long. *Capsules* ⅓ in. diam., crowned with the triangular obtuse calyx-teeth; cells about 4-seeded.—This resembles a species of *Hance*, No. 11,230, which has broader less acuminate leaves and pedicelled flowers; also very near the Chinese *H. acutangula*, which has acutely angled stem and sessile leaves.

20. **H. Helferi**, *Hook. f.*; quite glabrous, leaves subsessile ovate obtuse or subacute nerveless margin recurved, stipules small broad, cymes small terminal shortly peduncled, branches short, capsules subsessile, calyx-teeth very short obtuse.

TENASSERIM or the ANDAMAN Islands, *Helfer* (Kew Distrib. 2909).

A small species, black in drying; branches stiff, 4-angled. *Leaves* sometimes

3-nate, 1-1½ in., midrib distinct beneath; stipules very inconspicuous. *Cymes* small, bracteate, branches 3-6-flowered. *Capsules* as in *H. elegans*.—Certainly closely allied to *H. elegans*, but the habit is very different, the leaves small and not acuminate, black-brown when dry, and the cymes small. Flowers not seen. It approaches Hance's No. 978, from Whampoa, with narrower ciliate leaves.

**** *Herbs or shrubs, cymes axillary (never terminal), sessile or peduncled, dense- or lax-flowered (or flowers solitary in 27. travancorica); stipules nearly simple or pectinate.*

21. **H. membranacea**, *Thwaites Enum.* 143; quite glabrous, stem obtusely 4-angled, leaves petioled lanceolate or elliptic-lanceolate acuminate, nerves very slender, stipules free ½-circular pectinate, cymes axillary sessile capitate, calyx-teeth foliaceous oblong-lanceolate very much larger than the small ovary.

CEYLON; at no great elevation, *Walker, Thwaites*.

Stem woody below, stout, subsimple. *Leaves* bright green when dry, 3-6 by ¾-1½ in., rather coriaceous, narrowed into the petiole, margins flat; stipules large. *Heads* ½-1 in. diam., surrounding the stem. *Flowers* (not seen) mixed with chaffy bracts. *Capsules* very small, together with the very large calyx-limb ¼ in. long, cells few or many-seeded.

22. **H. macrophylla**, *Wall. in W. & A. Prodr.* 408; *Cat.* 841; annual, stem acutely 4-angled or -winged, leaves petioled ovate elliptic or lanceolate acuminate, nerves distinct, stipules free broad toothed or pectinate, cymes axillary sessile capitate, calyx-teeth lanceolate as long as the small capsule. II. *nodiflora*, *Wall. Cat.* 855; *G. Don Gen. Syst.* iii. 526. *Scleromitrum tetrandrum*, *Kurz in Journ. As. Soc.* 1877, ii. 136. *Rondeletia tetrandra*, *Roxb. Fl. Ind.* i. 524 (according to *Kurz*). *Wendlandia?* *tetrandra*, *DC. Prodr.* iv. 412.

TENASSERIM, *Gomez, Helfer* (Kew Distrib. 2889, 2892). PENANG, *Wallich*. MALACCA, *Griffith* (Kew Distrib. 2889). NICOBAR Islands, *Kurz*.

Stem usually very stout, short, 6-10 in., simple. *Leaves* green or brown when dry, very variable in size and breadth, 3-6 by ½-3 in., sometimes a little rough above; nerves faint; petiole ¼-1 in.; stipules very variously cut, segments sometimes filiform and pubescent. *Heads* often surrounding the stem. *Capsules* small, glabrous or pubescent.

23. **H. Thwaitesii**, *Hook. f.*; stem obtusely 4-angled, leaves petioled elliptic- or ovate-lanceolate acuminate scaberrulous above, nerves distinct, stipules pectinate segments long or short hispid, heads axillary sessile capitate, calyx-teeth foliaceous oblong-lanceolate much longer than the small capsule. H. *macrophylla*, *Thwaites Enum.* 142.

CEYLON; forests about Adam's Peak, *Walker, Thwaites, &c.*

Slender or robust, sparingly branched. *Leaves* 3-8 by 1-2½ in., narrowed into a stout or slender petiole ½-1 in., rather coriaceous, ciliate; stipules ¼-½ in. *Heads* surrounding the stem 1 in. diam. *Capsules* with large calyx ½ in. long, cells 3-seeded.

24. **H. nodulosa**, *Arn. Pugill.* 22; hirsute throughout, branches obtusely 4-angled, leaves petioled ovate or lanceolate acuminate flat, nerves distinct, stipules setose, heads axillary sessile, calyx very hairy, teeth subulate-lanceolate equalling or exceeding the hirsute capsule. H. *nodulosa*, var. *β. Thwaites Enum.* 143. H. *axillaris*, *Gardn. mss. (Thwaites)*.

CEYLON; Adam's Peak, Newera Ellia, and Ambagowa, *Walker, &c.*

Branches or stems 1-2 ft., rather stout, shaggy, especially above and at the nodes and petioles with purplish soft spreading hairs. *Leaves* 2-4 by 1-1½ in., base narrowed or rounded; petiole ¼-1 in.; stipules membranous, connate into a truncate tube with villous bristles. *Heads* very dense. *Corolla-tube* long, glabrous, lobes

lanceolate, mouth woolly. *Capsule* of 2 hard cocci splitting ventrally, each with about 6 angular seeds.—This is certainly Arnott's *H. nodulosa*, who describes it as 2-coccous, and not the *H. nodulosa* α. of Thwaites, which has 4 indehiscent cocci, and is an *Allæophania*.

VAR. *Walkerii*; leaves glabrous above. *H. Walkerii*, Arn. in Nov. Act. Acad. xviii. i. 339; *Walp. Rep.* ii. 493.—Ceylon, *Walker*.

25. **H. cinereo-viridis**, *Thwaites Enum.* 419; slender, much branched, stem obtusely 4-angled, leaves petioled lanceolate acuminate, nerves indistinct, stipules very short cuspidate, cymes opposite on slender peduncles or sessile few-flowered, calyx-teeth triangular-ovate acute or obtuse shorter than the capsule. *H. inamœna*, *Thwaites l. c.* 143, partly.

CEYLON; in the central province, *Thwaites*.

Stem apparently erect; branches acutely 4-angled. *Leaves* green when dry, 2-6 by $\frac{1}{2}$ -2 in., narrowed into a petiole $\frac{1}{4}$ - $\frac{3}{4}$ in.; cusp of stipules longer than the body. *Peduncles* of cymes in one form $\frac{1}{4}$ -2 in. long, in β. of Thwaites 0, with 2 foliaceous bracts under the head. *Flowers* crowded, subsessile. *Capsules* ovoid, smooth, cells 3-4-seeded.

26. **H. albo-nervia**, *Bedd. Ic. Pl. Ind. Or.* t. 3; quite glabrous, much branched, stem obtusely 4-angled, leaves petioled elliptic-lanceolate acuminate, nerves distinct, stipules free deeply pectinate glabrous, cymes small axillary sessile, calyx-teeth lanceolate much longer than the capsule.

TINNEVELLI and TRAVANCORE Mts., alt. 3-4000 ft., rare, *Beddome*.

Very nearly allied to *H. cinereo-viridis*, but differing remarkably in the stipules, the segments of which are sometimes filiform, and in the long lanceolate acuminate calyx-lobes.

27. **H. travancorica**, *Bedd. Ic. Pl. Ind. Or.* 7; quite glabrous, much branched, branches obtusely 4-angled, leaves small petioled elliptic acute or acuminate, nerves indistinct, stipules semi-orbicular pectinate, peduncles axillary capillary 1-flid., calyx-lobes elongate subulate longer than the capsule.

TRAVANCORE and TINNEVELLI Mts., alt. 3-4000 ft., *Beddome*.

A small species; branches woody, divaricating, white when old, youngest only acutely 4-angled. *Leaves* towards the end of the branches, green when dry, $\frac{1}{3}$ -1 $\frac{1}{4}$ in., rather coriaceous; stipules scurfy. *Peduncles* shorter than the leaves, filiform. *Flowers* solitary, $\frac{1}{3}$ in. long, without bracts. *Calyx-tube* not produced above the ovary. *Corolla* funnel-shaped, glabrous except the woolly mouth. *Capsules* glabrous with stiff erect calyx-teeth, cells few-seeded.

28. **H. hirsutissima**, *Bedd. Ic. Pl. Ind. Or.* t. ii.; woody, robust, branches and leaves beneath hirsute, leaves petioled elliptic-lanceolate acuminate scabrid above, nerves strong beneath, stipules very large connate deeply pectinate, cymes on axillary slender peduncles, calyx-teeth ovate-lanceolate equalling the hirsute capsule.

NILGHERY Mts.; between Avalanche and Sispara, alt. 7000 ft., *Wight, Gardner, Beddome*.

Stem terete, spreading, short spreading branches densely clothed with stipular scars, as thick as a goose-quill. *Leaves* crowded at the end of the branches, yellow-brown when dry, 1-3 by $\frac{1}{2}$ -1 in., very coriaceous; petiole short, stout; stipules sometimes $\frac{1}{2}$ in. diam., coriaceous, hirsute; segments subulate. *Peduncles* shorter than the leaves when bearing flowers only and slender, when bracteate with a branched cyme stouter. *Capsule* globose, cells several-seeded.

***** *Herbs with terminal or terminal and axillary globose dense-flowered cymes, often bracteate or involucrate at the base.*

29. **H. verticillaris**, *W. & A. Prodr.* 409; quite glabrous, stem 0 or very short, leaves rosulate sessile linear-lanceolate acuminate strongly nerved, stipules very long narrow, heads small on axillary 3-chotomously forked bracteate branches, calyx-teeth ovate-lanceolate much longer than the tube. *Wight Ic.* t. 1029; *Wall. Cat.* 6188. II. *plantaginifolia*, *Arn. Pugill. Pl. Ind. Or.* 22.

NILGHERY Mts., alt. 7000 ft., *Wight, &c.* CEYLON; in the central province, alt. 7-8000 ft., *Walker, &c.*

Stem as thick as the forefinger, usually inclined and rooting, rarely 1 in. *Leaves* yellow when dry, very numerous, spreading flat on the ground, 3-15 by 1-2 in., straight, longitudinally channelled above and ribbed beneath by the parallel nerves; stipules of the radical leaves hidden, of the branches $\frac{1}{2}$ - $\frac{3}{4}$ in., very slender, gland-toothed entire or divided. *Branches* (or peduncle) horizontal or ascending, rather longer than the leaves, naked below, trichotomously forked above with linear bracts at the forks, and below the head. *Heads* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. *Corolla-tube* short, lobes linear, mouth woolly. *Capsule* (not seen) small, cells many-seeded (in *Wight's* figure).

30. **H. uncinella**, *Hook. & Arn. Bot. Beech. Voy.* 192; erect, glabrous, stem 4-winged, internodes long, leaves sessile or petioled ovate or ovate-lanceolate acuminate, nerves distinct, stipules small broad pubescent gland-serrate or pectinate, heads terminal and axillary globose bracteate, calyx-teeth ovate-lanceolate recurved equalling the glabrous capsule. *Benth. Fl. Hongkong*, 149. *H. borreroides*, *Champ. in Hook. Kew Journ.* iv. 171. II. *cephalophora*, *Br. in Wall. Cat.* 842.

KHASIA and JYNTEA Mts.; alt. 4-5000 ft., *Wallich, &c.*—DISTRIB. China.

Root perennial. *Stem* usually simple and erect, stout. *Leaves* $1\frac{1}{2}$ -3 by $\frac{1}{3}$ - $1\frac{1}{2}$ in., smooth or slightly rough above; stipules pubescent, cuspidate, produced into a long point. *Heads* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Calyx-lobes* glabrous or ciliate. *Corolla-tube* short, glabrous, lobes linear. *Capsule* broadly ovoid, cells about 6-seeded.—I follow *Bentham* in regarding the Khasian plant as a form of the Chinese, which differs in the narrower often petioled leaves and more pectinate stipules.

SECT. II. **Dimetia**. *Capsule* septicidally splitting into two several-seeded cocci, the top raised and protruding between the calyx-teeth; cocci dehiscing ventrally.—Shrubs usually climbing.

31. **H. Lawsoniæ**, *W. & A. Prodr.* 407 (not of *Wight Ic.* t. 1026); erect, glabrous, branches terete, leaves petioled elliptic-ovate or -lanceolate acute or obtuse, stipules broadly ovate entire, peduncles axillary slender, flowers pedicelled, calyx-teeth very short, top of capsule produced between them.

CEYLON; central province, common between 5-8000 ft.

An erect shrub, variable in habit, greenish when dry. *Leaves* 1-3 in., narrowed into the petiole, pale beneath. *Peduncles* equalling or shorter than the leaves. *Flowers* few, $\frac{1}{2}$ in. long. *Calyx-tube* obconic, limb dilated with 5 small teeth. *Corolla* funnel-shaped, glabrous, mouth woolly. *Capsule* urceolate, cells about 4-seeded.—*Gardner* has collected at Neuera Ellia an abnormal state with obovate convex leaves with revolute margins. *Wight's* figure of *Lawsoniæ* represents the corolla as 5-fid and the fruit as pubescent, and of a totally different shape from this, with different placentation. It is probably a composite plate, in part of an *Ophiorhiza*. De *Candolle's Wendlandia Lawsoniæ*, founded on *Lawsonia purpurea*, *Lamk.*, which again is founded on the "Pontaletsje" of *Rheede* (*Hort. Mal.* iv. t. 57), is a totally different and a Cochin plant, supposed by *Wight* and *Arnott* to be identical with this Ceylon one, but differing in the square stems and terminal cymes, and is *H. fruticosa*.

32. **H. capitellata**, *Wall. Cat.* 837 (excl. *H. fruticosa*, *Hb. Rottler*); glabrous, climbing, branches round, leaves shortly petioled ovate- or elliptic-lanceolate acuminate, nerves distinct, stipules very short cuspidate or toothed,

cymes axillary and terminal, flowers capitate, capsule globose, tip produced between the calyx-teeth. *G. Don Gen. Syst.* iii. 527; *Kurz in Journ. As. Soc.* 1877, ii. 135 (excl. var. γ). *Oldenlandia rubioides*, *Miq. Fl. Ind. Bat.* ii. 353. *H. Finlaysonian*, *Wall. Cat.* 6189.

MALAY PENINSULA; from Tenasserim, *Gomez*, to Malacca, *Griffith* (Kew Distrib. 2903, *H. verticillaris*), *Maingay* (Kew Distrib. 890).—DISTRIB. Sumatra, Banca, Borneo, Yunnan.

A tall climber, greenish when dry. *Leaves* 2-4 in., quite smooth on both surfaces, nerves slender; stipules transverse, ciliate. *Cymes* pyramidal, branches trichotomous, distant, horizontal. *Heads* $\frac{1}{2}$ in. diam., 8-20-flowered, the flowers sessile and radiating. *Calyx* small, limb cupular 4-toothed. *Corolla* glabrous, nearly 4-partite; segments narrow, bearded within. *Capsules* globose, crown loculicidally and septically dehiscing, cells several-seeded.

33. *H. mollis*, *Wall. Cat.* 859; climbing, slender, leaves sessile elliptic-lanceolate acuminate glabrous or hairy above, softly hairy beneath with strong nerves, stipules short connate 2-3-cuspidate, cymes axillary and terminal, flowers umbellulate shortly pedicelled, top of capsule produced between the very short calyx-teeth. *G. Don Gen. Syst.* iii. 527.

PENANG, *Wallich*.

Stem and branches terete, glabrate below, above softly laxly hairy as are the leaves below and young leaves above and cymes. *Leaves* pale and wrinkled when dry, $2\frac{1}{2}$ - $3\frac{1}{2}$ in., contracted at the base sometimes into a very short petiole. *Cymes* sessile or shortly peduncled, sparingly branched and few-flowered; umbellules subglobose, $\frac{1}{2}$ - $\frac{1}{2}$ in. diam. *Calyx-teeth* short. *Corolla* deeply divided, lobes linear, glabrous, bearded at the base, as are the bases of the filaments.—Closely allied to *H. capitellata*, as observed by *Wallich*.

34 *H. scandens*, *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 364; climbing, glabrous, branches terete, leaves sessile or shortly petioled elliptic or lanceolate acuminate, nerves faint, stipules connate into a short truncate 2-cuspidate cup, cymes terminal, flowers pedicelled, top of capsule produced between the short calyx-teeth. *DC. Prodr.* iv. 422; *Don Prodr.* 134; *Wall. Cat.* 839. *H. polycarpa*, *Br. and H. volubilis*, *Wall. Cat.* 838, 840.

TROPICAL and SUBTROPICAL Himalaya, alt. 2-6000 ft., from Nipal, *Wallich*, to Sikkim, *J. D. H. KHASIA Mts.* and *SILHET*, alt. 0-6000 ft., and *CHITTAGONG*, abundant.—DISTRIB. Upper Birma.

A much-branched climber. *Leaves* 3-5 in., green when dry, sometimes caudate-acuminate, smooth, flat; stipules membranous, ciliolate. *Cymes* spreading, leafy, flat- or round-topped, sometimes puberulous; flowers subumbellate, pedicels $\frac{1}{10}$ - $\frac{1}{8}$ in. *Calyx* obconic; teeth ovate, acute or obtuse. *Corolla-tube* short, glabrous, lobes long bearded within. *Capsule* broadly obovoid, crown very prominent, loculicidally gaping, cells many-seeded.

35. *H. viscida*, *Bedd. Ic. Pl. Ind. Or.* t. 4; climbing? glabrous, slender, leaves long-petioled ovate acuminate, nerves slender, stipules small triangular gland-toothed and bracts viscid, cymes axillary and terminal, peduncles and branches very slender, calyx-teeth lanceolate much longer than the capsule, the tip of which is produced between them.

TINNEVELLY; in the beds of mountain streams, alt. 3000 ft., *Beddome*.

A large handsome shrub, branches very slender. *Leaves* green when dry, 3-5 in., membranous, base rounded; stipules green. *Cymes* on filiform peduncles equalling the leaves, branches few subumbellate few-flowered; flowers shortly pedicelled. *Calyx-tube* obconic, lobes long. *Corolla* glabrous, lobes short bearded within.—*Beddome* figures the stipules as entire, and describes them and the bracts as viscid, the bracts allude to are no doubt those at the ultimate forks of the cyme, which are stipular.—The ripe fruit is unknown.

36. *H. fulva*, Hook. f.; perennial, erect, villous, leaves sessile narrow lanceolate acuminate plaited, nerves 2 pair, stipules membranous with long cilia, cymes glabrous small axillary shortly peduncled, calyx glabrous teeth subulate, tip of capsule produced between them.

KHASIA MTS.; on dry hills near Nurtiung, alt. 4-5000 ft., *J. D. H. & T. T.*

Rootstock woody, sending up strict terete stems a foot high, which and the leaves are bright yellow when dry. *Leaves* 1-1½ in., coriaceous. *Cymes* on short peduncles ¼ in., flowers subcapitate.—This resembles *H. villosa* in many respects, but differs in the strict habit, sessile leaves, with only two pairs of nerves and quite glabrous inflorescence.

37. *H. Griffithii*, Hook. f.; woody, branches erect acutely 4-angled puberulous, leaves sessile lanceolate acuminate coriaceous scaberulous nerveless, stipules short cuspidate coriaceous, heads terminal sessile involucrate, calyx-teeth subulate much shorter than the globose glabrous pedicelled capsule which has a large protruded top.

BHOTAN; in woods, alt. 4200 ft., *Griffith (Bootan Journal, n. 318)*.

An erect shrub, 2 ft. high, with strict stem and branches, nodes distant. *Leaves* 1½-2 in., deflexed, with recurved margins in the fruiting state of the plant, yellowish when dry. *Heads of fruit* globose, ½ in. diam., involucrate by the large upper leaves. *Capsule* smooth, crustaceous, with very many small angular seeds.—A very distinct species, seen in fruit only, the tip of which often exceeds the calyx-teeth; it resembles in habit *H. uncinella*, W. & A.

SECT. III. *Euhedyotis*. *Fruit* indehiscent or tardily dehiscent, or the crown only dehiscing loculicidally.—Herbs, diffuse or subscandent, with usually axillary dense-fl. cymes.

* *Fruit* hard, minute, indehiscent; cells few-seeded. *Cymes* almost all axillary. *Leaves* usually plaited longitudinally with very strong nerves, rarely flat with slender nerves, never only 1-nerved (nerves faint in *H. paradoxa*); stipules ciliate.

38. *H. vestita*, Br. in Wall. Cat. 847; diffuse, villous, leaves petioled elliptic-lanceolate acuminate plaited, nerves 5-7 pair, stipules membranous with long cilia, cymes villous small axillary shortly peduncled, fruit minute globose hairy indehiscent, calyx-teeth subulate. *G. Don Gen. Syst.* iii. 526. *H. costata*, Kurz in Journ. As. Soc. 1877, ii. 135, not of Wallich. *H. coerulea*, Korth. in Ned. Kruidkund. Arch. ii. 160. *H. capituliflora*, Mig. Fl. Ind. Bat. ii. 183. *Metabolus coeruleus*, Blume Bijl. 992; DC. Prodr. iv. 435. *M. lineatus*, Bartl. in DC. l. c. *Spermacece costata*, Roxb. Hort. Beng. 10; Fl. Ind. i. 370.

Subtropical SIKKIM and the KHASIA MTS., alt. 1-5000 ft. ASSAM, CACHAR, the MALAY PENINSULA, and PENANG, common.—DISTRIB. Malay and Philippine Islands.

A stout herb, 1-2 ft. long, branches terete. *Leaves* 2-4 in., greenish when dry; stipules villous, with 1-3 subulate processes. *Cymes* inconspicuous, peduncle 0 or ¼-½ in., simple or branched; flowers very small, crowded in heads ¼-½ in. diam., lilac or pink. *Capsules* ⅛ in.

39. *H. Auricularia*, Linn.; DC. Prodr. iv. 420; annual, suberect or diffuse, branches glabrous or hirsute especially at the nodes, leaves sessile subsessile or petioled ovate or lanceolate acuminate smooth or scabrid above often pubescent beneath, stipules membranous hairy with long cilia, cymes axillary sessile small very dense-flowered, flowers subsessile, calyx-teeth small shorter than the indehiscent glabrous or hispid fruit. Roxb. Fl. Ind. i. 365; ed. Carey & Wall. i. 370, excl. remarks; W. & A. Prodr. 412; Bedd. Ic. Pl. Ind. Or. t. 27. *H. nervosa*, Wall. Cat. 857 (? of Lamk.). *H. procumbens*, Wall. Cat. 861. *H.*

lineata, Wall. Cat. 6198, not of Roxb. *H. costata*, Br. in Wall. Cat. 849; *G. Don Gen. Syst.* iii. 526. *H. multicaulis*, Schldl. Pl. Hohen. No. 845. *H. venosa*, Korth. in Ned. Kruidk. Arch. ii. 160. *Metabolus venosus*, Bl.; DC. Prodr. iv. 435. *Spermacece hispida*, Miq. Pl. Hohen. No. 44. ? *S. lineata*, Roxb. Fl. Ind. ii. 369.—*Rheede Hort. Malab.* x. t. 32.

Throughout eastern Bengal from NIPAL, SIKKIM, and the KHASIA Mts. to ASSAM, CHITTAGONG, MUNEEPOOR, BIRMA, and southward to MALACCA, *Maingay* (Kew Distrib. 891, *H. vestita*). WESTERN PENINSULA, from CANARA, southwards. CEYLON, abundant.—DISTRIB. Yunnan, Malay Archipelago, S. China, Philippines, Australia.

Branches 6–18 in., terete. *Leaves* usually pale green when dry, 1–3 in.; stipules as in the two previous species. *Cymes* always sessile. *Calyx-teeth* variable.—There are several very distinct looking varieties, but I am unable to define them clearly enough for diagnosis. Wallich's *H. lineata*, from the Deccan (No. 6198), is almost glabrous throughout, as are some Khasian specimens. The stems appear to be erect and woody in Wallich's *H. nervosa* (No. 857), and the calyx-teeth are longer in specimens gathered by Thomson and myself in the Khasia at 4–6000 ft., and at Chittagong and Muneypoor by C. B. Clarke. Some Ceylon specimens have leaves with petiole $\frac{1}{2}$ in., and long caudate points, as in Beddome's figure.

40. ***H. lineata***, Roxb. Hort. Beng. 10; Fl. Ind. i. 365; annual, pubescent, suberect or diffuse, leaves sessile ovate- or elliptic-lanceolate acute or acuminate, stipules membranous villous with one or more long cilia, cymes axillary hispid shortly peduncled, branches few-fl., calyx-teeth much longer than the hispid indehiscent pedicelled fruit. DC. Prodr. iv. 420; Don Prodr. 134. *H. ulmifolia*, Wall. in Roxb. Fl. Ind., ed. Carey & Wall. i. 173; Cat. 862; DC. Prodr. iv. 421.

TROPICAL HIMALAYA of NIPAL and SIKKIM, alt. 1–2000 ft. EASTERN BENGAL, SILHET, CHITTAGONG, and TENASSERIM.

Very similar to *H. Auricularia*, but more finely pubescent, with pedicelled branched cymes $\frac{1}{2}$ – $\frac{3}{4}$ in. long, and long calyx-teeth.—I reluctantly postpone Wallich's well-known name of *H. ulmifolia* for Roxburgh's earlier one of *H. lineata*, though there is no convincing evidence of this being Roxburgh's plant; the name has been misapplied to *H. Auricularia* by Wallich.

41. ***H. glabra***, Br. in Wall. Cat. 848; glabrous, diffuse, stem elongate, leaves subsessile elongate-lanceolate caudate-acuminate membranous, stipules short with long simple or branched cilia, cymes on filiform axillary peduncles puberulous small loosely branched spreading, calyx-teeth much shorter than the glabrous indehiscent globose pedicelled fruit. Miq. Fl. Ind. Bat. ii. 183. *Spermacece glabra*, Roxb. Fl. Ind. i. 368. *Knoxia glabra*, DC. Prodr. iv. 569.

SILHET, De Silva. CACHAR, J. D. H. & T. T., &c. BIRMA, Griffith. PENANG, Wallich, Maingay.

Stems 2–3 ft., slender, smooth, terete, fistular; nodes distant. *Leaves* 3–5 by $\frac{1}{4}$ – $1\frac{1}{2}$ in., point often almost filiform, nerves slender; stipules with very slender spinous processes sometimes $\frac{1}{2}$ in. long and much branched. *Peduncles* $\frac{1}{4}$ – $\frac{1}{2}$ in., bracts small. *Flowers* minute, as are the fruits.

42. ***H. paradoxa***, Kurz in Journ. As. Soc. 1876, ii. 135; glabrous, branches obtusely 4-angled robust, leaves sessile long linear or linear-lanceolate acute, nerves beneath very faint, stipules membranous with ciliate bristles, cymes capitate axillary globose very dense-flowered, calyx-teeth subulate hispid longer than the globose pedicelled fruit.

SOUTH ANDAMAN ISLAND; Escape Bay, Kurz.

Apparently a large species; branches smooth, thick, almost terete. *Leaves* 4–6 by $\frac{3}{4}$ –1 in., narrowed at both ends, flat, nerves very oblique; stipular bristles longer

than the sheath. *Cymes* enclosing the nodes, 1 in. diam. *Fruit* small, crustaceous, smooth; cells about 6-seeded.—I have seen but one specimen, and in fruit only.

**** Capsule crustaceous, rarely coriaceous, loculicidal on the crown only; cells many-seeded; seeds usually angular. Cymes sessile, capitate or few-flowered, axillary or terminal; leaves glabrous or hispid, with one central nerve; stipules with long bristles.**—*SCLEROMITRION*, W. & A.

43. ***H. pinifolia*, Wall. Cat. 850**; branches acutely 4-angled, angles sometimes hispid, leaves very narrow linear acuminate scabrid above 1-nerved, margins revolute, stipules with many rigid bristles, cymes sessile capitate axillary and terminal, calyx-teeth subulate shorter than the ovoid hispid capsule. *G. Don Gen. Syst.* iii. 525. *Scleromitron rigidum*, Kurz in *Journ. As. Soc.* 1877, ii. 136, excl. *Syn. Miquel*.

BEHAR and CHOTA-NAGPore, alt. 1-2000 ft., *T. Anderson, C. B. Clarke*. MALAYAN PENINSULA, from Pegu and the Andaman Islands to Singapore and Penang.—DISTRIB. Sumatra, Java, Borneo.

A slender diffuse wiry much-branched annual, 4-8 in. high, black when dry. *Leaves* often fascicled, 1-1½ in., spreading and recurved, rigid; stipules very short. *Heads* ¼-½ in. diam., 3- many flowered.—Kurz's *S. rigidum* agrees with this in the form of the leaves, but he describes these as glabrous, whereas they are distinctly scabrid in *H. pinifolia*; he further, by some error, quoted Miquel's *Hedyotis rigida* (*Fl. Ind. Bat.* ii. 181), a shrubby species described as having lanceolate leaves 6 in. long,

VAR. *cæspitosa*; shorter, branches tortuous, leaves quite glabrous and smooth, much closer set, cymes 1- few-flowered, capsules quite glabrous. *Scleromitron cæspitosum*, Miquel. *Fl. Ind. Bat. Suppl.* 540. Malacca, Griffith; Singapore, G. Thomson; Java, Barnes.—Possibly a different species.

44. ***H. cœrulea*, W. & A. Prodr. 412**; erect, branches terete puberulous, leaves opposite or fascicled linear-subulate aristate smooth above or scabrid 1-nerved, margins revolute, stipules pectinate with filiform bristles, cymes sessile capitate axillary and terminal, calyx-teeth triangular with hair-points rather shorter than the glabrous capsule. *Bedd. Ic. Pl. Ind. Or.* t. 30. *H. pygmæa*, Wall. Cat. 6199. *H. brachiata*, Miquel. *Pl. Hohenack.* No. 373. *H. cyanantha*, Kurz in *Journ. As. Soc.* 1876, ii. 136.

WESTERN PENINSULA from Dharwar southwards, and in CEYLON; in sandy places. A slender strict annual 6-14 in. high, much branched. *Leaves* brown when dry, ½-1½ in., very narrow. *Heads* much fewer-flowered than in *H. pinifolia*, from which the hair-pointed leaves and calyx-teeth well distinguish this.

45. ***H. tenelliflora*, Blume Bijl. 971**; glabrous, diffuse, branches acutely 4-angled, leaves sessile linear-lanceolate acuminate 1-nerved, margins revolute, stipules with long cilia, flowers 1-3 axillary sessile, calyx-teeth rigid ovate or lanceolate equalling the ovoid glabrous capsule. *DC. Prodr.* iv. 419. *H. angustifolia*, Cham. & Schlect. in *Linn.* iv. 153. *H. approximata*, Br. in Wall. Cat. 852. ? *Spermacoe tubularis*, Br. in Wall. Cat. *Scleromitron tenelliflorum*, Korth. & S.; *tetraquetrum*, Miquel. *Fl. Ind. Bat.* ii. 185, 186. *Oldenlandia angustifolia*, Benth. *Fl. Hongk.* 151.

SIKKIM HIMALAYA, *Hb. Griffith*. KHASIA Mts., alt. 1-4000 ft., *J. D. H. & T. T. Nicolson's*, Kurz. PENANG, Wallich.—DISTRIB. Malay Islands, S. China, Philippines.

Stems much branched, slender, 6-18 in. *Leaves* blackish-brown when dry, 1-2 by ½-¾ in., stiff, pale beneath, stipular hairs often exceeding the capsule. *Calyx-teeth* ciliate, variable in breadth and length.—The smooth surfaces of the very narrow leaves distinguish this from *H. hispid*a.

46. ***H. hispida*, Retz Obs. iv. 23**; diffuse, branches and leaves on both surfaces scabrid, leaves sessile elliptic- or linear-lanceolate acute or acuminate

1-nerved, margins recurved, stipules with long cilia, flowers 2-6 in axillary clusters, calyx-teeth triangular about equalling the hispid ovoid capsule. *Roxb. Fl. Ind.* t. 364; *Wall. Cat.* 845. *Scleromitrium hispidum*, *Korth.*; *Miq. Fl. Ind. Bat.* ii. 185. *Oldenlandia hispida*, *Benth. Fl. Hongk.* 150.

TROPICAL HIMALAYA, from Chamba and Kangra, *C. B. Clarke*, to SIKKIM and the KHASIA MTS., ASSAM, CACHAR, CHITTAGONG, and the MALAYAN PENINSULA from Tenasserim to Malacca.—DISTRIB. Malay Islands, S. China.

Annual; branches 6-18 in., terete below, 4-angled above. *Leaves* $1\frac{1}{2}$ - $2\frac{1}{2}$ in., very variable in width, rough and rigid. *Capsule* similar to that of *H. tenelliflora*, but glabrous.

47. **H. nitida**, *W. & A. Prodr.* 412; branches diffuse elongate acutely 4-angled, leaves sessile elliptic- or linear-lanceolate acute scaberulous or smooth above smooth beneath 1-nerved, margins recurved, stipules with long cilia, flowers 1 or few axillary sessile, calyx-teeth triangular erect equalling the glabrous capsule. *H. Neesiana*, *Arn. Pugill.* 23. *H. glabella*, *Br. in Wall. Cat.* 886; *Bedd. Ic. Pl. Ind. Or.* t. 36.

WESTERN PENINSULA, from Dharwar southwards to Travancore and CEYLON? TENASSERIM, *Kurz.*

A slender annual, similar in habit to *H. hispida*, but with leaves smooth or sparingly scabrid towards the margins above only, shining and green, and glabrous capsules.—I have seen no Tenasserim specimens, and it is possible that *Kurz's* plant is *H. hispida*, of which this may be a smooth variety.

*** *Fruit* crustaceous, indehiscent; cymes axillary (and terminal in *H. scabra*), sessile, capitate or few-fld.; leaves flat, with or without lateral nerves; stipules triangular, entire or gland-serrate or fimbriate, not bristly; corolla very short.

48. **H. inamoena**, *Thw. Enum.* 143 in part; shrubby, glabrous, erect, 3-chotomously branched, branches subterete, leaves petioled ovate-lanceolate caudate-acuminate nerves arching faint, stipules connate below triangular glandular-pubescent caducous, cymes axillary very short few-flowered subsessile, calyx-limb cup-shaped teeth broad shorter than the smooth fruit.

CEYLON; Adam's Peak, *Thwaites.*

A tall slender shrub, with long slender erecto-patent branches, obscurely 4-angled above, black when dry. *Leaves* dark brownish-green when dry, 3-5 by $\frac{1}{2}$ - $1\frac{1}{2}$ in., leathery, smooth, with a distinct midrib and faint-arching nerves; stipules short. *Flowers* 3-5, almost sessile, small, glabrous. *Calyx-tube* hemispheric. *Ripe fruit* not seen.—Very like *H. cinerco-viridis*, with which it has been mixed in Herbaria.

49. **H. congesta**, *Br. in Wall. Cat.* 844; robust, glabrous, branches acutely 4-angled, leaves sessile or shortly petioled elliptic or ovate-lanceolate acutely or obtusely acuminate leathery, nerves arching faint, stipules elongate ovate with a long entire serrate or lacerate point, flowers in crowded axillary heads, calyx-teeth broadly triangular obtuse shorter than the ovoid thick smooth fruit. *G. Don Gen. Syst.* iii. 525. *H. argentea*, *Wall. Cat.* 858.

MALAYAN PENINSULA from Tenasserim to Malacca, *Wallich*, &c.; PENANG, *Maingay*. —DISTRIB. Sumatra, Borneo.

A stout shrub with brachiate branches. *Leaves* pale when dry, 3-5 by 1-2 in., quite glabrous and smooth on both surfaces; stipules sometimes $\frac{1}{2}$ in., coriaceous, segments sometimes branched. *Flowers* clustered, small. *Calyx-tube* hemispheric. *Fruit* subdrupaceous, white.

50. **H. prostrata**, *Korth. in Ned. Kruidk. Arch.* ii. 160; glabrous, branches long flexuous prostrate or scandent? obtusely 4-angled, leaves petioled elliptic-lanceolate acuminate, nerves distinct, stipules elongate coriaceous toothed or subpectinate, cymes axillary small subsessile few-flowered, calyx-

teeth triangular. *H. subcarnosa*, Wall. Cat. 860. *Metabolus prostratus*, Bl.; DC. Prodr. iv. 435.

TENASSERIM; Chappedong Hills, Wallich, Helfer.—DISTRIB. Java, Borneo.

Stem flexuous, rooting below, sending out long slender flexuous branches with distant internodes. *Leaves* green when dry, 3-4 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., quite smooth, rather membranous, narrowed into a slender petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules coriaceous, very variable in length, with glandular teeth, erect or recurved. *Cymes* very small, flowers not seen. *Fruit* small, smooth, cells about 6-seeded.—This, though referred in Miquel's Flora to § *Diplophragma*, is certainly a *Euhedyotis*.

51. *H. scabra*, Wall. Cat. 880; a low woody herb, branches terete young pubescent, leaves subsessile lanceolate acuminate scaberulous or glabrous, uppermost involucriform, nerves faint, stipules small triangular, cymes terminal (and axillary?) capitate sessile, calyx-teeth triangular-subulate shorter than the small globose glabrous fruit.

MARTABAN and TENASSERIM; Moulmein, Wallich; Mergui, Griffith, &c.

Very much branched, branches woody, whitish, the younger and leaves dark-brown when dry. *Leaves* 1-2 in., the upper stellately spreading round the cymes, base very acute, very obscurely scabrid; stipules pubescent, teeth few glandular. *Cymes* globose, $\frac{1}{2}$ in. diam.; flowers very shortly pedicelled. *Corolla* very small, tube and lobes short. *Fruit* crustaceous, many-seeded, apparently indehiscent, but there is a trace of a loculicidal groove on the crown between the calyx-teeth.—Very near a N. Celebes species, which has longer calyx-lobes.

SECT. IV. *Involucrella*. *Fruit* membranous, 2-3-celled, very many seeded, indehiscent, top not protruded between the calyx-teeth.—A herb with a terminal capitate sessile cyme, which is sunk amongst the bases of the involucriform uppermost leaves, stipules membranous with many very long subequal stiff recurved bristles.

52. *H. connata*, Wall. Cat. 856; decumbent, branches 4-angled pubescent, leaves sessile oblong or linear-oblong acute coriaceous flat, nerves faint, stipular bristles longer than the sheath, calyx-teeth broadly lanceolate many times longer than the oblong fruit. *H. merguensis*, Hook. f. in Gen. Pl. ii. 57.

TENASSERIM; Tavoy, Gomez; Amherst, Wallich; Mergui, Griffith. ANDAMAN Islands, Kurz.

A stout-branched low herb, root woody. *Leaves* 2-3 by $\frac{1}{2}$ -1 in., suddenly narrowed at the base, but hardly petioled, puberulous on the faint nerves beneath; stipules connate, bristles $\frac{1}{2}$ in. long. *Cymes* quite hidden; flowers mixed with long stipular bracteoles, rarely cymes are formed in the lower axils. *Fruit* often 3-celled, bursting irregularly, walls full of raphides. *Seeds* angular, dotted.

SECT. V. *Anotidopsis*. *Fruit* membranous, rarely crustaceous, 2-celled, indehiscent or obscurely dehiscing loculicidally between the calyx-teeth, crown not protruded between the calyx-teeth.—Herbs or small shrubs, with axillary or terminal sessile or peduncled cymes; stipules membranous, usually bristly.—Habit of *Anotis*.

53. *H. cyanescens*, Thwaites Enum. 143; hairy, stems decumbent rooting acutely 4-angled, leaves petioled elliptic-ovate acute membranous nerves distinct, stipules short bristly, cymes axillary dense many-flowered, flowers pedicelled, calyx-teeth lanceolate ciliate many times longer than the membranous many-seeded fruit.

CEYLON; Ambagowa district, Thwaites.

An undershrub, often bluish-purple (Thwaites), branches glabrous or hairy. *Leaves* 1-3 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., with short scattered hairs above, more pubescent beneath. flat; nerves 5-6 pair, arched; petiole slender, $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules short, membranous,

with short bristles. *Cymes* compound, branches dense. *Flowers* pedicelled, bluish, mixed with linear ciliate bracteoles. *Corolla-tube* and short lobes hairy, mouth not bearded or villous. *Fruit* elongate obconic, apparently indehiscent, very membranous.

54. **H. monocephala**, Br. in Wall. Cat. 846 (corrected from *macrocephala*); glabrous or puberulous, flaccid, branched, decumbent, leaves subsessile elliptic-lanceolate acuminate, nerves obscure, stipules slender recurved toothed or pectinate, cymes terminal capitate sessile glabrous, calyx-teeth lanceolate longer than the young fruit.

SILHET, Wallich. ASSAM, Hamilton, Masters; UPPER ASSAM, Griffith.

A slender straggling species, dark brown when dry; branches 4-angled, grooved, the ridges puberulous. *Leaves* 1-1½ in., base very acute, quite glabrous on both surfaces; stipules variable, sometimes of one long recurved very slender simple or cut bristle, at others with 2 or more long bristles. *Cymes* ¼-½ in. diam., terminal or rarely on short axillary branches with usually small leaves at their base. *Flowers* quite glabrous, except the corolla-lobes within, larger than in *H. scabra*, but still small. *Ripe fruit* not seen.—An allied plant from Tenasserim or the Andamans (Helfer, Kew Distrib. 2884) is much stouter, with caudate-acuminate leaves. Specimens from Griffith in Herb. Bentham are marked as from Darjeeling, but are probably from Assam. The species was originally found by Hamilton at Birnasherva in 1808 (probably in Assam).

55. **H. stipulata**, Br. in Wall. Cat. 6195 and 863 a; stems lax diffuse rooting below glabrous or puberulous, leaves ovate or lanceolate acute membranous, nerves slender, stipules with long bristles, cymes capitate sessile or peduncled axillary or terminal glabrous, calyx-teeth lanceolate recurved longer than the membranous broadly globose fruit. *H. Lindleyana*, Hook. mss. in W. & A. Prodr. 409. *Oldenlandia japonica*, Miq. in Ann. Mus. Lugd. Bat. ii. 194. *O. hirsuta*, Linn. fil.; DC. Prodr. 127. ? *Anotis capitata*, Korth. in Ned. Kruidk. Archiv. ii. 151.

TEMPERATE HIMALAYA, alt. 3-8000 ft., from Dalhousie to BHOTAN, common. KHASIA MTS., alt. 4-5000 ft.—DISTRIB. Java, Japan.

Branches slender, decumbent, 1-2 ft., terete and leaves dark brown when dry. *Leaves* ¾-2 in., variable in width, glabrous or with a few soft scattered hairs above and on the nerves beneath, base acute or rounded; petiole ½-¾ in.; stipules cut into filiform bristles nearly to the base. *Cymes* ¼-½ in. diam. *Flowers* quite glabrous, pedicelled. *Fruit* membranous, indehiscent or with a loculicidal fissure on the crown between the calyx-teeth. *Seeds* many, small, angular and pitted.—Very similar to *Anotis ingrata*.

56. **H. Thomsoni**, Hook. f.; annual, short, suberect, much branched from the base, leaves fascicled sessile narrow-linear acute margins recurved, stipules forming a short sheath with the petioles bristly, cymes dense in all the axils and terminal, calyx-teeth lanceolate recurved longer than the broadly obconic membranous fruit.

EAST BENGAL; banks of the Megna and Mahanudde, J. D. H. & T. T.

Stem very short with fibrous roots, branches suberect 4-angled leafy. *Leaves* ¾-1 by ⅓ in., spreading and recurved, minutely rough above, midrib strong beneath, rather dilated at the base and united with the stipules into a short membranous sheath, proliferous in the axils; nerves 0. *Flowers* pedicelled. *Corolla* very minute, glabrous, tube and lobes short. *Fruit* apparently quite indehiscent, but there is a loculicidal furrow between the calyx-teeth, pericarp with raphides (as in *H. connata*). *Seeds* very numerous, small, angular, pitted, pale.—A very remarkable little plant, 3-6 in. high, blackish when dry, not found by any previous collector, with the habit of an *Oldenlandia*, but the fruit appears quite indehiscent and the calyx is altogether that of *Hedyotis* and approaches *H. pinifolia*.

ANOMALOUS SPECIES.

57. *H. andamanica*, Kurz in Journ. As. Soc. 1872, ii. 311; annual. succulent, stems furfuraceous, short stout, leaves large sessile or short-petioled oblong or ovate-oblong apiculate flat, stipules bristly, cymes terminal 1-3 in. long, peduncles erect, flowers subcapitate, calyx-teeth longer than the corolla-tube and than the small didymous capsule.

SOUTH ANDAMAN and NICOBAR ISLANDS, Kurz.

Stems 4-6 in. high, erect, simple or branched. Leaves 3-5 pair, 1-2½ by ½-1½ in., membranous, quite glabrous. Peduncles 1-2 in., slender, strict, erect, bearing 2-3 small bracteate heads of subsessile flowers. Calyx-tube short; teeth large, ovate-lanceolate, recurved. Corolla funnel-shaped; tube broad and glabrous; mouth with a few hairs; lobes linear. Stamens much exserted, anthers linear. Capsule with the crown not protruded, gaping loculicidally. Seeds many in each cell, angular, smooth.—Resembles an *Oldenlandia* near *O. nudicaulis*, but the calyx-teeth are close together in fruit, and the seeds, though not ripe, have no appearance of pitting; the corolla, too, resembles that of *Hedyotis*, and the stamens have linear anthers.

21. *OLDENLANDIA*, L.

Slender erect or diffuse di-tri-chotomously branched herbs. Leaves usually small and narrow; stipules acute or bristly. Flowers small, white or pink, in dichotomous axillary and terminal usually paniced cymes, rarely solitary. Calyx-teeth 4, rarely 5, usually erect and distant in fruit, with sometimes alternating teeth. Corolla rotate funnel- or salver-shaped, tube short or long; lobes 4, rarely 5, obtuse, valvate. Ovary 2-celled; style filiform, stigmas 2 linear; ovules numerous, placentas attached to the septum. Capsule small, usually membranous, terete didymous or angled, loculicidal at the top, rarely indehiscent, many-seeded. Seeds angled or globose, testa not winged, smooth or pitted; embryo clavate in fleshy albumen.—DISTRIB. Species about 70, tropical and subtropical, chiefly Asiatic.

SUBGEN. I. *Euoldenlandia*. Corolla-tube usually short, ovary terete. Capsule didymous. Seeds numerous, angled, testa smooth.—Herbs, diffuse or branching, usually very slender, stipules with bristles.

* Peduncles 1-4-fl., from the lower or all the axils.

1. *O. corymbosa*, Linn.; Hiern in Oliv. Fl. Trop. Afr. iii. 62; annual, slender, glabrous, rarely scaberulous, leaves linear or narrowly elliptic-lanceolate, margins often recurved nerveless, peduncles solitary 1-4-flowered (rarely 2-nate 1-2-flowered) and pedicels long capillary, calyx-teeth subulate rather shorter than the corolla-tube, crown of capsule low. *O. biflora*, Lamk. (not of Linn.); Roxb. Fl. Ind. i. 423. *O. ramosa*, Roxb. l. c. 424. *O. herbacea*, DC. Prodr. v. 425 (not of Linn.). *O. scabrida*, DC. l. c. *O. alsinifolia*, G. Don Gen. Syst. iii. 529. *Hedyotis Burmanniana*, Br. in Wall. Cat. 868, in part; W. & A. Prodr. 415; Dalz. & Gibs. Bomb. Fl. 116. *H. biflora*, Roth Nov. sp. 92; Kurz in Journ. As. Soc. 1877, ii. 133. *H. ramosa*, Bl. Bijdr. 973 (? Wt. Ic. t. 822). *H. intermedia*, W. & A. Prodr. 415. *H. alsinæfolia*, Br. in Wall. Cat. 873. *H. graminicola*, Kurz in Trimen. Journ. Bot. 1875, 326. *Gerontogea biflora*, Cham. et Schl. in Linnæa, iv. 155.—Rheede Hort. Mal. x. t. 38.

An abundant weed throughout INDIA, from the Punjab southward and eastward to Ceylon and Malacca.—DISTRIB. Tropical E. Asia to Java and the Philippines; Trop. Africa and America.

Very variable, not always distinguishable from *O. diffusa* and *O. Heynii*. It varies from a diminutive straggling herb, with branches 1-2 in., to an erect one a foot and more high. Leaves from ½-2 by ⅛-½ in., erect spreading or recurved, sometimes

as broad as in narrow-leaved forms of *H. pumila*; stipules small, membranous, irregularly-cut, with a long and several shorter teeth or bristles. *Peduncles* rarely in pairs or 4- or more-flowered, or reduced and very short as in *O. brachypoda*. *Capsule* usually broad, didymous, sometimes hemispheric or narrowed below the calyx-teeth, base acute or rounded, crown usually not rising above the base of the calyx-teeth, at others hemispheric and approaching that of *O. Heynii*.—The various forms of this plant are distinguished by botanists as species; but these run so much into one another, that it is impossible to correlate their descriptions exactly with the specimens in Wallich's and Wight's herbaria. *O. scabrida* is a very scabrid form; *O. alsinifolia* a glabrous, broad membranous leaved one, like a short-capsuled *O. pumila*; its tissues are sometimes full of cystoliths, in specimens from Penang, S. India, and N.W. India. I have followed Mr. Hiern in adopting Linnæus' name of *corymbosa*; it is certainly the plant so named in the Linnæan Herbarium, though whether it is that of the "Species Plantarum" is doubtful, in my opinion.

2. *O. diffusa*, Roxb. *Hort. Beng.* 11; *Fl. Ind.* i. 423; annual, diffuse, glabrous, leaves linear nerveless, margins usually recurved, flowers solitary sessile or shortly peduncled, calyx-teeth subulate rather shorter than the corolla-tube, capsule didymous, crown low. *DC. Prodr.* iv. 426. *O. brachypoda*, *DC. l. c.* 424; *Wall. Cat.* 864. *Hedyotis ramosissima*, *Kurz in Journ. As. Soc.* 1877, ii. 133. *H. diffusa*, *Willd. Sp. Pl.* i. 566.

An abundant weed throughout INDIA, from Rohilkund to Ceylon and Malacca.—**DISTRIB.** Tropical Asia to Borneo, the Philippines, and Japan.

I keep this distinct from *O. corymbosa* on the ground of its being a generally recognised form, more constantly diffuse, always glabrous, with shorter stouter peduncles or pedicels and larger capsules. It is, however, united by many aberrant specimens with that plant.

VAR.? *extensa*; more robust, stems as thick as a crow-quill shining 2 ft. long, leaves often $2\frac{1}{4}$ by $\frac{1}{4}$ in., peduncles longer 1-2-fl., capsule $\frac{1}{2}$ in. diam. *Hedyotis extensa*, *Br. in Wall. Cat.* 869.—Silhet, Wallich, Griffith (Kew Distrib. 2910).

VAR.? *polygonoides*; perennial-rooted, leaves very small $\frac{1}{4}$ — $\frac{1}{2}$ in. narrow. *Hedyotis polygonoides*, *Wall. Cat.* 872.—Birma, Wallich.

3. *O. Heynii*, *Br. in Wall. Cat.* 867, partly (*Hedyotis*); annual or biennial, glabrous, erect, much branched, leaves linear- or linear-lanceolate nerveless, margins usually recurved, peduncles solitary capillary 1-flowered, calyx-teeth subulate much shorter than the slender corolla-tube, capsules didymous globose or ovoid, crown much protruded. *O. herbacea*, *Willd.*; *Roxb. Fl. Ind.* 424 (? of Linnæus). ? *O. linearis*, *linifolia*, and *asperula*, *DC. Prodr.* iv. 425. *Hedyotis Heynii*, *W. & A. Prodr.* 416; *Dalz. & Gibs. Bomb. Fl.* 116.—*Rheede Hort. Mal.* x. t. 23.

Mountainous part of INDIA from Kumaon, alt. 5500 ft., to the Khasia Mts., alt. 4000 ft., and southward to Ceylon; not found in the Malay Peninsula or the Eastern Himalaya.—**DISTRIB.** Malay Islands, Tropical Africa.

Usually a taller stricter much more robust plant than *O. corymbosa*, with a longer more ovoid capsule, having a much protruded crown and usually 1-flowered solitary or 2-nate filiform peduncle equalling the leaves; but these characters are far from constant, and in some examples the flowers are paniced towards the ends of the branches as in the next subsection. The name *Heynii* may have to give place to some of the synonyms cited, if ever these are cleared up.

4. *O. crystallina*, *Roxb. Hort. Beng.* 11; *Fl. Ind.* i. 422; annual, glabrous, branches low diffuse leafy, leaves elliptic- or elliptic-lanceolate subacute flat, peduncles solitary 1-2-fl. filiform equalling the leaves, calyx-teeth triangular-lanceolate, bases touching in fruit, a little shorter than the corolla-tube, capsule obovoid, crown low. *DC. Prodr.* iv. 426. *O. pumila*, *DC. l. c.* 425. *Hedyotis numila*, *Linn. f.*; *Wall. Cat.* 8200. *chiefu*: *W. & A. Prodr.* 414.

Not uncommon in the PLAINS of INDIA from Rohilkund southwards and eastwards, but local. EAST BENGAL, *Griffith* (Kew Distrib. 2912). CHITTAGONG, *C. B. Clarke*. DECCAN not uncommon. (Not found yet in East Himalaya, Assam, the Khasia or Malay Peninsula).—DISTRIB. JAVA.

A diffuse flaccid herb; branches 2-3 in. Leaves $\frac{1}{2}$ – $\frac{2}{3}$ in.—The large calyx-teeth well distinguish this from any of the foregoing species. The tissues are sometimes full of raphides, as in some states of *O. corymbosa*.

** *Peduncles from the upper axils chiefly, many-flowered.*

5. *O. umbellata*, Linn.; DC. *Prodr.* iv. 425; annual, diffuse, glabrous or scaberulous, leaves often fascicled linear flat or almost acicular with recurved margins acute nerveless, peduncles in the upper axils stout 3-many-flowered, pedicels short, calyx-teeth a little shorter than the corolla-tube subulate, capsule didymous, crown low. *Roxb. Cor. Pl. t. 3*; *Fl. Ind. i. 421*. *O. puberula*, *G. Don Gen. Syst.* iii. 530. *Hedyotis umbellata*, *Lamk.*; *W. & A. Prodr.* 413, *excl. some synonyms*; *Wall. Cat.* 871. *H. linearifolia* and *puberula*, *Wall. Cat.* 870 and 884.

WESTERN PENINSULA, from Orissa southwards, *Roxburgh*, &c. CEYLON, common.—DISTRIB. N. BIRMA, *Kurz*.

Stem woody, much branched from the base. Leaves $\frac{1}{2}$ – $1\frac{1}{2}$ in., spreading or recurved. Cymes sometimes sessile and terminal. Capsules much as in *O. corymbosa*.

6. *O. Wightii*, *Hook. f.*; perennial, scabrid, stem woody flexuous, branches rigid diffuse leafy, leaves squarrose linear-lanceolate acuminate, margins revolute, peduncles chiefly in the upper axils strict with terminal capitate cymes, calyx-teeth triangular-lanceolate pungent equalling the broad hemispheric didymous capsule.

WESTERN PENINSULA, *Herb. Wight* (Kew Distrib. 1511).

Stems creeping in red soil or prostrate, several inches long; branches 4-6 in., tufted, erect or ascending. Leaves $\frac{1}{2}$ –1 in., sessile, pungent, scabrid on both surfaces; stipules short, bristly. Peduncles usually exceeding the leaves, stout, scabrid. Heads $\frac{1}{4}$ in. diam.; flowers sessile. Capsules large, scabrid, with a broad low crown and long spreading teeth.—This approaches a *Hedyotis* of the section *Scleromitron*, but the foliage is not that of the majority of that group, and the form of the capsule and distant calyx-teeth well distinguish it.

*** *Flowers sessile, chiefly in the upper axils, solitary or crowded; corolla rotate.* (See also 2. *O. diffusa*.)

7. *O. trinervia*, *Retz Obs.* iv. 23; annual, glabrous or hairy, branched low diffuse leafy, leaves small subsessile ovate elliptic or orbicular, nerves distinct, flowers solitary or clustered in the axils sessile or subsessile, calyx-teeth very short equalling the rotate corolla, capsule small didymous hairy crown low. *O. repens*, *Burm. Fl. Ind. t. 15, f. 2?* *Hedyotis trinervia*, *W. & A. Prodr.* 414; *Dalz. & Gibs. Bomb. Fl.* 115; *Bedd. Ic. Pl. Ind. Or. t. 29*. *H. rotundifolia*, *DC. Prodr.* iv. 420. *H. serpyllifolia*, *Poir. in DC. l. c. 421*. *H. orbiculata*, *Heyne*; *Wall. Cat.* 6191.

WESTERN PENINSULA, from the Concan southwards. CHITTAGONG, *J. D. H. & T. T. Arracan, Kurz*. CEYLON.—DISTRIB. Sumatra, Java, Tropical Africa.

A flaccid green weed, with straggling branches. Leaves $\frac{1}{4}$ in., rarely more, $\frac{3}{4}$ in. a Pondicherry specimen, and more ovate and petioled. Stipules 2-partite, segments acuminate. Corolla purplish.

**** *Flowers partly in axillary peduncles, chiefly in open terminal panicked cymes.*

8. *O. brachiata*, *Wight in W. & A. Prodr.* 416 (*Hedyotis*), and *Wall. Cat.* 6201, *in part*; annual, glabrous, very slender, stem erect acutely 4-angled,

leaves slender narrow-linear, peduncles capillary solitary axillary and 1-flowered and in open dichotomous terminal cymes, calyx-teeth subulate rather shorter than the corolla-tube, capsules small broadly didymous, crown low. *O. pusilla*, Roth; *DC. Prodr.* iv. 428. *Hedyotis angustifolia*, Wall. *Cat.* 6203. *H. attenuata*, Willd.; *Herb. Madr.*, in part.

ROHILKUND, Royle, T. Thomson. BEHAR, Hamilton. WESTERN PENINSULA, Wight, &c.

A very slender erect species, resembling a state of *O. biflora*, with paniculate terminal inflorescence.—According to the rules of priority, the name of *O. pusilla* should take precedence, but it is not applicable.

9. *O. dichotoma*, Koen.; Roth Nov. Sp. 93 (*Hedyotis*); annual, very slender, glabrous or sparsely hairy, stem erect terete, nodes distant, branches filiform, leaves linear-lanceolate acute flat nerveless, peduncles capillary axillary and in open terminal panicles, pedicels very long, calyx-teeth subulate much shorter than the slender corolla-tube, capsule globose. *O. linarifolia*, Herb. Madr. *O. affinis*, *DC. Prodr.* iv. 428. *Hedyotis dichotoma*, Wall. *Cat.* 6204, in part; *W. & A. Prodr.* 416 (excl. some synonyms). *H. affinis*, Roem. & Sch. II. Heynii, Bedd. *Ic. Pl. Ind. Or.* t. 33 (not Br.).

BANDELKUND and southward through the WESTERN PENINSULA to Travancore, on dry hills, alt. 1–3000 ft., Rottiler, &c.

Stem simple in small plants, much branched in large ones, 18 in. high; branches shining, divaricating, copiously flowering throughout their length, ultimate ones and peduncles and pedicels like fine hairs, 1 in. and more long. Flowers very minute. Capsules smaller than in its congeners, cells about 6-seeded.—Beddome's figure is, I think, this plant; it does not agree with his description, called *H. Heynii* (t. 33).

10. *O. arguta*, Br. in Wall. *Cat.* 864 (*Hedyotis*); annual, erect, stiff, stem simple or 3-chotomously branched furfuraceous or hispid, leaves semi-amplexicaul subulate or triangular-lanceolate acuminate scabrid, margins revolute, cymes terminal lax few-flowered scabrid, peduncles and pedicels filiform, calyx-teeth subulate-lanceolate shorter than the funnel-shaped corolla-tube and longer than the didymous hemispheric hispid capsule. *Hedyotis linoides*, Griff. *Notul.* iv. 265; *Kurz in Journ. As. Soc.* 1877, ii. 134.

MARTABAN and TENASSERIM; Moulmein, and Mergui, in wet sand, Gomez, &c.

A few inches to a span high; branches terete, spreading. Leaves $\frac{1}{2}$ in., rigid, pale beneath. Cymes twice or thrice forked; flowers blue. Seeds ellipsoid, angled, testa smooth.

11. *O. Stocksii*, Hook. f. & T. *Herb. Ind. Or.* (*Hedyotis*); tufted, glabrous, stems filiform simple or branched above, leaves subulate, stipules with bristles, cymes with few very large flowers, calyx-teeth elongate subulate almost equalling the very broadly campanulate corolla-tube.

MALABAR; in the Bababooden hills, Stocks, Law.

A very slender annual, apparently growing in masses amongst grass, 4–8 in. high. Stems simple below or throughout their length, branches ending in di-trichotomous cymes, with capillary pedicels. Leaves (not fascicled) $\frac{1}{2}$ – $\frac{1}{2}$ in. Calyx-tube short, obconic, much smaller than the long erect or recurved teeth. Corolla much the longest of the genus, quite campanulate, blue, $\frac{1}{6}$ – $\frac{1}{4}$ in. diam. Capsules hemispheric or turbinate, smooth.

SUBGEN. II. *Kohautia*. Corolla-tube usually long cylindric or funnel-shaped, with included or shortly exerted anthers. Ovary terete. Seeds numerous, angled.—Usually strict erect, annual or perennial herbs, rarely diffuse, sometimes shrubby below with stiff erect branches, very narrow leaves and terminal open cymes; stipules with bristles.

* Corolla-tube very slender.

12. *O. aspera*, DC. *Prodr.* iv. 428; stems stout and branches scabrid, leaves in fascicled whorls erect narrow-linear acute margins revolute, stipules with median bristles, capsules solitary or 2-3-nate subsessile on the slender erect branches of the cymes rough globose didymous, calyx-teeth subulate shorter than the corolla-tube. *Hedyotis aspera*, Heyne in *Roth Nov. Sp.* 94; *W. & A. Prodr.* 417; *Dalz. & Gibs. Bomb. Fl.* 115. H.? elongata, Br. in *Wall. Cat.* 865; *G. Don Gen. Syst.* iii. 527.

THE PUNJAB, Aitchison. ROHILKUND, and southwards to MYSORE, Rottler, &c.—DISTRIB. Tropical Africa.

A stout annual herb, 6-8 in. high, trichotomously branched. *Leaves* 2-3 in., glabrous above, coriaceous. *Cymes* branched in fruit, 1-6 in. long; flowers small, pale blue, $\frac{1}{8}$ in. long, corolla about $\frac{1}{10}$ in. diam. *Capsules* $\frac{1}{8}$ in. diam.

13. *O. ? senegalensis*, Hiern in *Oliv. Fl. Trop. Afric.* iii. 56; glabrous or minutely scaberulous, stem extremely slender erect simple, leaves not fascicled linear-lanceolate acuminate flat or with recurved margins, stipules with lateral bristles, cymes in a very loose open terminal panicle with divaricate very long capillary peduncles and pedicels, calyx-teeth subulate much shorter than the slender corolla-tube, corolla-lobes acuminate, capsules hemispheric. *Kohautia senegalensis*, Endl. *Atakt.* t. 23.

CHOTA NAGPORE; Hazaribagh, alt. 2200 ft., C. B. Clarke.—DISTRIB. ? W. Tropical Africa.

Annual, 8-16 in. high; stem wiry, terminating in a wide spreading very thin very few-flowered pyramidal panicle cyme, with capillary pedicels 1-2 in. long. *Flowers* very small. *Capsules* $\frac{1}{8}$ in. diam., the minute subulate teeth very distant.—Easily confounded with *O. dichotoma*, but distinguished by the divaricate cyme-branches, corolla, and larger capsules. I refer it with hesitation to the Senegal plant, which has an equally open pyramidal cyme and long-pedicelled flowers, and of which there is a variety with sessile or short pedicelled flowers. The corolla is much shorter in the Indian plant, but the specimens are too few for a strict comparison.

14. *O. retrorsa*, Boiss. *Fl. Or.* iii. 12; stem retrorsely scabrid, leaves in fascicled whorls short linear-oblong obtuse flat scabrid, stipules with median bristles, cymes glabrous spreading, capsules sessile and pedicelled didymous, calyx-teeth much shorter than the long slender corolla-tube, corolla-lobes short.

SCINDE; near Kurrachee, Stocks.—DISTRIB. Arabia.

Stock woody, branched from the base; branches 12-18 in., slender. *Leaves* $\frac{3}{4}$ -1 in.; nerves indistinct. *Flowers* scattered on the long cyme-branches. *Corolla-tube* $\frac{1}{8}$ in., glabrous. *Capsule* $\frac{1}{8}$ in. diam., glabrous.

15. *O. gracilis*, DC. *Prodr.* iv. 431 (*Kohautia*); stem below scaberulous or glabrate, leaves not fascicled narrow linear acuminate glabrous flat, stipules truncate, cyme-branches slender, capsules pedicelled obovoid globose or hemispheric, corolla-lobes linear. *Hedyotis gracilis*, Wall. in *Roxb. Fl. Ind.*, ed. Carey & Wall. i. 371; *Cat.* 843. H. stricta, Wall. in *As. Res.* xiii. 369. H. fusca, Ham. in *Don Prodr.* 134. H. aspera, Bedd. *Ic. Pl. Ind. Or.* t. 32. *Kohautia* sp., Griff. *Notul.* iv. 265; *Ic. Pl. Asiat.* t. 477.

Hilly districts of India. TROPICAL HIMALAYA, alt. 1-5500 ft., from Garwhal to Sikkim, Birma, and plains of N. BENGAL. BELGAUM, Ritchie; TRAVANCORE, Beddome.—DISTRIB. Ava.

Slender, erect, 6-12 in., sparingly branched. *Leaves* erect, 2-3 $\frac{1}{2}$ by $\frac{1}{10}$ - $\frac{1}{4}$ in.; nerves indistinct. *Cyme-branches* spreading in flower, erect in fruit; pedicels very slender. *Corolla* $\frac{1}{8}$ in., brown. *Capsules* very variable in length, $\frac{1}{8}$ - $\frac{1}{4}$ in.

16. *O. stricta*, Linn. *Mant.* 200; slender, glabrous, diffusely branched, leaves from linear-lanceolate and flat to almost filiform with recurved margins, stipules truncate, cyme-branches long slender, calyx-teeth subulate not equalling

the short corolla-tube, capsules pedicelled small obovoid. *Hedyotis maritima*, Wall. Cat. 6192, in part; *W. & A. Prodr.* 417. *H. graminifolia*, Linn. f. *Suppl.* i. 119. *O. graminifolia* and *O. linifolia*, DC. *Prodr.* iv. 425.

Sandy sea-coasts of TINNEVELLY and S. CARNATIC, Rottler, Wight, &c. CEYLON, common near the sea.

Annual, repeatedly trichotomously branched from the base, 4 in.-2 ft. high; branches very slender, ending in wiry raceme-like cymes with distant flowers. *Leaves* 1-2 in., very variable, sometimes membranous and $\frac{1}{2}$ in. broad. *Flowers* all pedicelled. *Corolla-tube* funnel-shaped, $\frac{1}{2}$ in. *Capsules* $\frac{1}{2}$ in. long or less.

17. **O. Shuteri**, Hook. f.; branches stout woody below ascending sparingly divided, leaves short linear-lanceolate scabrid above, margins revolute, stipules truncate, cyme-branches short stiff, calyx-teeth subulate shorter than the cylindric corolla-tube, capsules pedicelled small ovoid. *Hedyotis maritima*, Wall. Cat. 6192, in part; *Wight Cat.* 1314.

MADRAS, Shuter, Wight.

Very different from *O. stricta*, with which it is mixed in Herb. Wallich; much stouter, with scabrid rigid leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. long and abbreviated cymes, in which the capsules are sometimes almost crowded into heads; the corolla-tube, too, appears to be cylindric- not funnel-shaped.

18. **O. coccinea**, Royle Ill. 241, t. 53 (Kohautia); very slender, erect, scaberulous, leaves opposite not fascicled narrowly linear-lanceolate acute margins recurved, stipules bristly, cymes sparingly branched few-flowered, calyx-teeth very long equalling or shorter than the cylindric corolla-tube, capsules oblong or subglobose.

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 3-8000 ft., Royle, &c.

Annual; stem 12-18 in., simple below or throughout its length; branches erect, terminating in long-peduncled cymes. *Leaves* in distant pairs, 1-2 by $\frac{1}{10}$ - $\frac{1}{2}$ in., rough to the touch. *Flowers* subsessile, pedicels lengthening in fruit. *Corolla* scarlet, tube $\frac{1}{2}$ in., lobes oblong. *Capsules* very variable, $\frac{1}{8}$ - $\frac{1}{4}$ in. long, often shorter than the slender calyx-teeth.

SURGEN. III. **Gonotheca**. *Calyx-teeth* short, broadly triangular, very small in fruit. *Corolla-tube* short. *Ovary* terete, 4-angled or 4-winged. *Seeds* numerous, subglobose, testa deeply coarsely pitted.

19. **O. paniculata**, Linn.; *Burm. Fl. Ind.* 38, t. 15, f. 1; annual, glabrous, branches erect or ascending succulent, leaves petioled elliptic-ovate or oblong subacute flat, stipules truncate with median points or bristles, cymes 3-8-fld. subterminal, calyx-tube not produced above the ovary, capsules on slender pedicels didymous. DC. *Prodr.* iv. 427. *O. alata*, Roxb. *Fl. Ind.* i. 421 (not of Koenig). *O. multiflora*, Cav. *Ic.* vi. 53, t. 574, f. 2. *O. racemosa* and *ramosissima*, Bl. *Bijd.* 972. *Hedyotis racemosa*, *W. & A. Prodr.* 414; *Wt. Ic.* t. 312; *Wall. Cat.* 865, in part. *H. paniculata*, Dene.; *Kurz in Journ. As. Soc.* 1877, ii. 134. *H. minima*, Heyne; *Wall. Cat.* 877.

EASTERN BENGAL, SIKKIM, ASSAM, SILHET, PEGU, the MALAY PENINSULA, the CARNATIC, and CEYLON.—DISTRIB. Birma, Malay, and Philippine Islands, China, Polynesia.

Stout or slender, succulent, 6-18 in. high, erect or diffuse, branched from the base; branches obtusely 4-angled, robust or slender. *Leaves* $\frac{1}{2}$ -3 by $\frac{1}{4}$ -1 $\frac{1}{2}$ in., bright green, soft, nerves indistinct, narrowed into the short or long petiole. *Cymes* in the upper axils, short, 3-8-fld., paniced, peduncles and pedicels stout or slender. *Flowers* minute, white. *Capsules* very variable, $\frac{1}{2}$ - $\frac{1}{2}$ in. diam., turbinate didymous or hemispheric, terete or 4-ribbed, membranous; crown usually exceeding the calyx-teeth.—A very variable weed, sometimes erect, with stem and lower branches as stout as a

goose-quill, at others slender and diffuse; cymes and fruit especially variable, the former in slenderness and length, the latter in size and shape. There are no specimens of *H. paniculata* in Herb. Linn., but as Burman's figure of what he assumes to be Linnæus' plant is a fair one, I have adopted the name. Roxburgh's *O. paniculata*, from the Moluccas, with rooting stems and biennial root, must be a different plant. Lamarcks' *H. racemosa*, usually cited under this, is figured as having smooth seeds, and is therefore a *Eu-oldenlandia*. *H. minima*, Heyne (Wall. Cat. 877), is a seedling state, apparently, of this species.

20. *O. biflora*, Linn.; *W. & A. Prodr.* (Hedyotis); annual, glabrous, diffuse, succulent, leaves petioled elliptic or oblong acute or subobtuse flat, stipules truncate with a few points or short bristles, cymes short 1-4-fid., calyx-tube not produced above the ovary, capsules shortly pedicelled turbinate 4-angled base acute. *Hedyotis biflora*, Wall. Cat. 879.

CARNATIC, *Rottiler, Wight, &c.* CEYLON, *Gardner, Keelart.*

This very closely resembles small specimens of *O. paniculata*, and is distinguished by the cymes seldom having more than 3 flowers, and often reduced to 1, and by the larger fruit, more turbinate and angled, and with usually larger calyx-teeth.—This Brown declares to be the true *O. biflora* of Linnæus, not that of Roxburgh and De Candolle, which is *O. corymbosa*.

21. *O. alata*, Koen. in *W. & A. Prodr.* 413 (Hedyotis); glabrous, succulent, branches stout, leaves subsessile elliptic or elliptic-lanceolate subacute or obtuse, stipules truncate toothed, cymes axillary subcapitate, calyx-tube 4-winged produced above the ovary and cupular, capsule large turbinate 4-angled and -winged. *O. pterita*, Miq. *Fl. Ind. Bat.* ii. 193. *Hedyotis alata*, Koen. in Wall. Cat. 6196. *H. pterita*, Bl. *Bijd.* 972. *Gonotheca Blumei*, DC. *Prodr.* iv. 429; *Endl. Atakt.* t. 22.

CIRCARS, *Rottiler, Roxburgh, Wight.*—DISTRIB. Malay Islands.

A stout annual, 6-12 in. high, with the habit of branching and foliage of *O. paniculata*, but the leaves are almost sessile, the cymes reduced to axillary and terminal heads, and the capsules are much larger, $\frac{1}{4}$ in. long, very shortly pedicelled, surmounted by a cupular 4-lobed prolongation of the calyx-tube, and has 4 lateral wings, of which 2 are shorter than the others.—The cellular tissue is full of raphides.

22. *O. nudicaulis*, Roth Nov. Sp. 95; annual, erect, sparsely hairy, stem furfuraceous short naked or with 2 leaves below, leaves 4 in a whorl rarely opposite large membranous elliptic or ovate, nerves distinct, cymes long-peduncled fascicled terminal much dichotomously branched, branches capillary, calyx-teeth minute subulate or shorter than the corolla-tube obscure in fruit, capsule hemispheric. *O. rotundifolia*, G. Don Gen. Syst. iii. 530. *O. ovatifolia* and *spergularacea*, DC. *Prodr.* iv. 427, 428. *Hedyotis scapigera*, Br. in Wall. Cat. 881. *H. nudicaulis*, W. & A. *Prodr.* 416; *Bedd. Ic. Pl. Ind. Or.* t. 34. *H. ovatifolia*, Cav. Ic. 573. *H. rotundifolia*, Ham. in Wall. Cat. 6190 (not of DC.). *H. spergularacea*, Kurz in Journ. As. Soc. 1877, ii. 134.

TROPICAL HIMALAYA, from Kumaon to Sikkim, the KHASIA Mts., and ASSAM, ascending to 5000 ft. TRAVANCORE and MAISOR. (Not in Ceylon.)—DISTRIB. JAVIA.

Much resembling *Mollugo nudicaulis* in the inflorescence. Stem stout, erect, 1-2 in., with or without a pair of small leaves, naked to the first whorl of leaves, simple or 3-chotomously forked, each branch usually bearing 4 unequal leaves in a whorl. Leaves shortly petioled, $\frac{3}{4}$ -2 in., tip obtuse or rounded. Cymes very open; flowers very small, as are the capsules.

23. *O. Parishii*, Hook. f.; annual, very slender, sparsely hairy, stem short simple, leaves petioled ovate acuminate membranous, cymes terminal dichotomous open few-flowered, peduncles and pedicels capillary, calyx-teeth minute

much shorter than the campanulate corolla, capsule broadly turbinate, crown hemispheric.

MARTABAN; at Moulmein, *Lobb, Parish.*

Whole plant 4-6 in., very flaccid; stem almost filiform. *Leaves* $\frac{3}{4}$ -1 $\frac{1}{2}$ in.; petiole very slender. *Cymes* shortly peduncled, terminal, with sometimes very reduced ones in the lower axils. *Capsules* the smallest of the genus, with very obscure calyx-teeth.

DOUBTFUL INDIAN SPECIES.

O. CAPILLARIS, DC. l. c. 426, is probably *O. corymbosa*, L.

O. LACTEA, Cham. & Schlecht. in *Linnaea*, 1829, 159 (Gerontogea); DC. l. c. 427, is quite undeterminable.

O. ? HISPIDA, DC. l. c. 428. *Hedyotis hispida*, Roth Nov. Sp. 95, is also undeterminable.

O. ? DEPRESSA, Willd. Sp. i. 675; DC. l. c. 429. *Hedyotis depressa*, Roem. & Sch., is probably *O. corymbosa*.

22. **ANOTIS**, DC.

Herbs, prostrate or ascending, rarely erect; stipules usually membranous or with marginal bristles. *Calyx-tube* short; lobes 4, with broad intervening sinuses. *Corolla* tubular or funnel-shaped; lobes 4, usually shorter than the tube, valvate in bud. *Stamens* 4, on the mouth of the corolla; anthers included or exserted. *Ovary* 2- rarely 3-4-celled; style filiform, stigmas 2-4 linear; ovules few or rarely solitary in each cell, on placentas ascending from near the base of the septum. *Capsule* didymous or laterally compressed, crown produced between the calyx-lobes, loculicidally 2-valved at the top, rarely indehiscent, cells 1- or few-seeded. *Seeds* peltate boat-shaped or rarely plano-convex, testa very rarely winged, coarsely pitted; embryo clavate in horny albumen.—**DISTRIB.** Species about 25, tropical Asiatic and Australian, with 1 American.

SECT. I. Euanotis. *Capsule* turgid, dehiscing loculicidally by a broad top above the calyx-teeth.

* Perennials.

1. **A. ingrata**, Wall. Cat. 863, in part (*Hedyotis*); root perennial, branches stout elongate diffuse glabrous or hairy at the nodes, leaves petioled ovate-lanceolate acuminate puberulous above and beneath, nerves numerous, stipules with many long bristles, cymes terminal and subterminal, flowers crowded, calyx-teeth large, capsules shortly pedicelled hemispheric didymous, cells many-seeded. *Hedyotis stipulata*, Br. in Wall. Cat. 619b, in part.

Moist places in the TEMPERATE HIMALAYA, from Nipal, Wallich, to Bhotan, Griffith, alt. 4-8000 ft. KHASIA Mts., alt. 4-6000 ft.

Stem 2-3 ft., straggling, rooting at the nodes below, brittle. *Leaves* 1 $\frac{1}{2}$ -3 in., membranous, blackish when dry; nerves 8-10 pair; stipular bristles hairy, $\frac{1}{2}$ in. *Flowers* shortly pedicelled, white. *Corolla-tube* $\frac{1}{2}$ in. long, broad, lobes oblong, glabrous or hairy. *Capsules* glabrous or hairy.—Whole plant fœtid.

2. **A. gracilis**, Hook. f.; very slender, diffuse, stem glabrous or pubescent, leaves petioled ovate acuminate sparsely hairy above and beneath, stipules bristly, cymes axillary and terminal once or twice unequally 2-3-chotomously forked with capitate clusters of glabrous flowers, calyx-teeth lanceolate recurved.

TEMPERATE SIKKIM and E. NIPAL, alt. 5-6000 ft., J. D. H. KHASIA Mts., at Moflong, alt. 5-6000 ft., J. D. H. & T. T.

A very slender perennial, with the stem rooting for a considerable length; internodes long. *Leaves* 1-1 $\frac{1}{2}$ in., membranous, dark above when dry, paler beneath,

nerves 6-8 pair. *Cymes* on slender peduncles much longer than the leaves; heads of flowers $\frac{1}{2}$ in. diam. *Corolla* white, glabrous; tube broad, much longer than the lobes.—Fruit unknown.

3. *A. Leschenaultiana*, W. & A. Prodr. 411 (Hedyotis); root perennial, branches diffuse ascending villous or glabrate, leaves sessile or petioled ovate obtuse or acute more or less hairy or hirsute above and beneath, stipules bristly, cymes terminal corymbose hispid or glabrous, capsule subglobose didymous with the calyx-teeth near the top, cells 1-8-seeded, seeds deeply pitted.

Throughout the mountains of the WESTERN PENINSULA, from the Concan to Travancore, alt. 4-7000 ft.

A most variable plant in habit, stature, hairiness, and length of the calyx-teeth, which often enlarge and are sometimes somewhat toothed after flowering. There are three principal forms.

VAR. 1. *Leschenaultiana proper*; stout, stems often villous 1-2 ft., leaves 1-2 in. ovate or ovate-lanceolate often cordate and sessile, cymes 2-4 in. diam., calyx-teeth usually short.—*Hedyotis Leschenaultiana*, *Wt. Ill. t. 125*; *Dalz. & Gibs. Bomb. Fl. 115*.

VAR. 2. *affinis*; smaller, more slender, stem 4-8 in. usually almost hispid, leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. petioled coriaceous ovate, cymes 1-2 in. diam., calyx-teeth often very long.—*H. affinis*, *W. & A. Prodr. 411*; *Wt. Ic. t. 1030*. *H. cymosa*, *Br. in Wall. Cat. 885*.

VAR. 3. *delloidea*; dwarf, glabrous or sparsely hispid, leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. coriaceous petioled ovate obtuse. *H. delloidea*, *W. & A. Prodr. 410*.

4. *A. decipiens*, Hook. f.; perennial, stems elongate slender diffusely branching and leaves sparsely pilose, leaves petioled ovate acuminate flat membranous, stipules with long bristles, cymes terminal and axillary subpaniculately branched many-flowered puberulous or glabrate, capsules small subglobose didymous, crown shorter than the lanceolate calyx-teeth, cells 1-3-seeded.

WESTERN PENINSULA; Concan, *Stocks*; Travancore and Pulney Mts., *Wight*.

Habit of glabrate slender forms of *H. Leschenaultiana*, but the leaves have petioles $\frac{1}{2}$ -1 in.; the cymes are not at all corymbose, the branches being very unequal. The capsules much resemble those of *A. monosperma* at first sight, but are more hemispheric, didymous, and dehisce across the cells between the calyx-teeth. *Corolla* nearly $\frac{1}{4}$ in. long, tube narrowly funnel-shaped, much longer than the calyx-tube.

5. *A. oxyphylla*, Wall. Cat. 6193 (Hedyotis); glabrous, root perennial, stem stout erect, leaves petioled linear-lanceolate, stipules long lanceolate simple toothed or lacinate, cymes terminal subcorymbose many-flowered, peduncles and pedicels erect, calyx-teeth short broad, capsules pedicelled turgid hemispheric, cells 5-8-seeded. *Oldenlandia oxyphylla*, *G. Don Gen. Syst. iii. 531*.

KHASIA Mts.; in marshy places, alt. 2-5000 ft., common.

Stem 12-18 in., simple, rarely branched above, as thick as a goose-quill below, and rooting at the lower nodes. *Leaves* 4-6 by $\frac{1}{4}$ - $\frac{3}{4}$ in., tapering to the base, dark when dry; stipules $\frac{1}{2}$ in., base ovate, not connate, coriaceous, erect. *Cymes* much divided with slender erect peduncles and pedicels. *Corolla* pale lilac, much longer than the calyx-teeth.—Specimens from Griffith's collection are marked as from Darjeeling, probably by mistake for Khasia.

6. *A. urophylla*, Wall. Cat. 6197 (Hedyotis); glabrous, root perennial, stem erect simple, leaves sessile lanceolate caudate-acuminate, stipules cut into many bristles, cymes terminal many-flowered, peduncles and pedicels divaricate in fruit, calyx-teeth short broad, capsules shortly pedicelled turgid hemispheric, cells 5-8-seeded.

KHASIA and JYNTEA Mts., alt. 4-6000 ft., *Gomez, Griffith, &c.*

Resembles *A. oxyphylla* in habit, but is more slender, with shorter broader sessile

leaves shorter stipules cut to near the base into bristles, and more spreading shorter cymes with divaricating capsules.

7. **A. lancifolia**, Dalz. in Hook. *Kew Journ.* ii. 135 (Hedyotis); perennial?, erect, branched, leaves short-petioled ovate or ovate-lanceolate acuminate pubescent, stipules with short bristles, cymes terminal and subterminal many-flowered corymbose glabrate or hispid, capsules sessile subsolitary didymous hispid much broader than long, crown very prominent 2-lobed, cells 2-4-seeded. *Hedyotis lancifolia*, Dalz. & Gibs. *Bomb. Fl.* 116. *H. tubularis*, Wall. *Cat.* 876 A. (a seedling state).

MYSORE, Rottler, Heyne. THE CONCAN, Nimmo, Dalzell, &c.

Stem stout, shining, 2-3 ft., brittle, most diffusely branched. Leaves 1-2½ in., membranous; stipules short. Cymes often 4-6 in. diam., with slender di-trichotomous divaricating branches. Calyx-teeth subulate, many times shorter than the slender cylindric corolla-tube. Capsules always hispid with recurved calyx-teeth, sometimes ¼ in. across the long axis.

** Annuals.

† Capsules pedicelled or sessile, solitary or subsolitary, not collected into heads.

8. **A. Rheedii**, W. & A. *Prodr.* 409 (Hedyotis); annual, very slender, nearly glabrous, branches suberect, leaves petioled ovate or ovate-lanceolate acuminate very membranous with minute scattered short hairs on both surfaces, stipules short crenate, cymes axillary and terminal very lax and open with long capillary peduncles and pedicels, capsules solitary or 2-nate short-pedicelled puberulous broadly didymous, crown much longer than the calyx-tube, cells 1-2-seeded, calyx-teeth very minute. *Hedyotis latifolia*, Dalz. in Hook. *Kew Journ.* ii. 133; Dalz. & Gibs. *Bomb. Fl.* 116. *H. racemosa*, Wall. *Cat.* 875, in part. *H. capillipes*, Schlecht. in Herb. *Hohen.* No. 847.—*Rheede Hort. Mal.* x. t. 25.

WESTERN PENINSULA; on the hills from the Concan southwards.

Stem 6 in.-2 ft., quite erect from the base. Leaves 2-3 in., narrowed into the slender petiole. Cyme-peduncles sometimes 3 in., branches 1-2 in. Flowers very minute. Corolla rose, tube short cylindric. Capsules $\frac{1}{10}$ in. diam., rather membranous, after bursting appearing as 4 connate cups; the calyx-tube in fruit very much smaller than in any other species, and the dehiscence proportionably low.

9. **A. calycina**, Wall. *Cat.* 878 (Hedyotis); annual, erect, slender, glabrous, leaves small ovate-lanceolate acuminate ciliolate, cymes axillary and terminal few-flowered, capsules sessile and pedicelled broader than long with very short calyx-teeth, cells 20-40-seeded, seeds peltate reticulate.

TEMPERATE HIMALAYA, from Kashmir to Bhotan, alt. 3-7000 ft. KHASIA Mts., alt. 3-6000 ft. CHOTA NAGPORE, alt. 2-4000 ft.

Stems 4-8 in., simple or copiously branched from the base, shining, 4-angled. Leaves ¼-1 in., membranous with sometimes a few minute scattered hairs; stipules with short lateral bristles. Cyme-peduncles and branches capillary. Corolla short, pale-purple. Capsules didymous, truncate, crown tumid often exceeding the minute distant calyx-teeth.

†† Capsules in clusters or heads.

10. **A. Montholoni**, Hook. f.; annual, erect, glabrate or hispid, diffusely branched, leaves petioled ovate or ovate-lanceolate acute, stipules with short bristles, cymes terminal and subterminal peduncled rounded many-flowered not capitate, calyx-teeth small subulate with short hair-points, capsules clustered didymous broader than long with a large double convex crown, cells 1-3-seeded.

WESTERN PENINSULA; on the Ghauts from Concan southwards, *De Montholon* (in *Herb. Gay*), *Ritchie*, *Dalzell*, &c.

This resembles a good deal a short annual state of *A. Leschenaultiana*, but the capsules are subsessile, collected in small clusters, and the crown so protruded in 2 hemispheric bosses that the calyx-teeth are nearer the pedicel than the top. *Corolla* funnel-shaped, purple. *Seeds* subglobose, pitted, and with a deep ventral pit.—The short hair-point of the calyx-teeth and bracts is a good character.

11. ***A. quadrilocularis***, *Thw. Enum.* 144 (*Hedyotis*); annual, diffusely branched, branches slender glabrous, leaves petioled ovate subacute membranous slightly hairy on both surfaces, stipules truncate the upper with short bristles, cymes very small capitate peduncled and terminal or axillary and sessile, capsules sessile 2-4-lobed 2-4-celled with very small calyx-teeth. *H. tubularis*, *Br. in Wall. Cat.* 876 b.

MYSORE; on the Bababoodan hills, *Rottler*; Belgaum, *Ritchie*. TRAVANCORE; Courtallum, *Wight*. CEYLON; Badulla district, rare, *Thwaites*.

Much more slender than *A. carnosa*, not at all fleshy, with membranous petioled leaves and much smaller calyx-teeth and longer corolla-tube. *Seeds* about 3 in each cell.

12. ***A. carnosa***, *Dalz. in Hook. Kew Journ.* ii. 135 (*Hedyotis*); annual, diffusely branched from the base, glabrous, fleshy, leaves ovate- or oblong-lanceolate obtuse, margins recurved, stipules truncate or obsolete, cymes capitate sessile and axillary or peduncled and terminal, capsules sessile broader than long with large lanceolate calyx-teeth, cells 5-6-seeded. *Hedyotis carnosa*, *Dalz. & Gibs. Bomb. Fl.* 116.

CANARA; on the sea-shore at Malwan, *Dalzell*; Mangalore, *Hohenacker*.

Branches very numerous, rather stout, 5-6 in. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., pruinose. *Heads* 3-6-flowered, on strict peduncles $\frac{1}{2}$ -1 in. *Calyx-teeth* as long as the very short funnel-shaped corolla-tube. *Capsules* $\frac{1}{2}$ in. diam., with a very wide tip and spreading calyx-teeth.

13. ***A. foetida***, *Dalz. in Hook. Kew Journ.* ii. 134 (*Hedyotis*); annual, erect, filiform, glabrous, leaves linear or narrowly linear-lanceolate subacute scaberulous above, margins recurved, stipules minute bristly, cymes of 2-3 subsessile flowers terminating simple or forked slender subterminal peduncles, capsules sessile broader than long didymous crown very prominent, cells 1-6-seeded. *Hedyotis foetida*, *Dalz. & Gibs. Bomb. Fl.* 116. *H. tenella* and *H. subtilis*, *Miq. in Herb. Hohen.* No. 173. *H. tenuiflora*, *Schlecht. l. c.* No. 848.

The CONCAN and CANARA at Malwan, in stony ground, *Stocks*, *Dalzell*, &c.

A very slender annual, 4-6 in. high, simple or excessively branched, the branches erect. *Leaves* sessile, 1 by $\frac{1}{10}$ - $\frac{1}{8}$ in. *Cymes* on capillary erect peduncles; flowers capitate. *Corolla* funnel-shaped. *Capsules* about $\frac{1}{2}$ in. diam.

14. ***A. Ritchiei***, *Hook. f.*; annual, stem 6 in. high very slender acutely 4-angled hispid above, leaves shortly petioled small lanceolate or oblong-lanceolate acute or obtuse hispid on both surfaces, stipules inconspicuous rounded toothed, cymes terminal short few-flowered shortly peduncled hispid, flowers sessile, calyx-teeth lanceolate acuminate much shorter than the very slender corolla-tube.

CONCAN; Belgaum? *Ritchie*.

A very small slender species, growing in tufts apparently as if drawn up amongst grass, the internodes very long. *Leaves* $\frac{1}{4}$ - $\frac{1}{2}$ in., flat. *Cymes* $\frac{1}{4}$ - $\frac{1}{2}$ in., with few and short branches, hispid with white hairs, as is the unopened corolla; flowers 2-3-nate. *Corolla* purple, lobes short rough within. *Stamens* exerted; anthers linear. *Ovary* 2-celled; cells about 4-ovuled. *Fruit* unknown.

SECT. II. **Patzia**. Fruit compressed or flattened, tardily dehiscent or indehiscent.

* *Fruit much flattened, indehiscent or obscurely dehiscent in the crown.*

15. **A. nummularia**, Arn. *Pugill. Pl. Ind. Or.* 23 (Hedyotis); perennial, hairy, stems long stout ascending, leaves sessile orbicular or broadly ovate obtuse or apiculate glabrous or hairy, stipules of a few bristles or obsolete, cymes terminal long-peduncled simple or 3-chotomous, flowers capitate, fruit flat orbicular indehiscent, cells 1-2-seeded.

CEYLON; abundant in wet places; alt. 5-8000 ft.

Stem 8-18 in. from a creeping base, sparingly branched, nodes often distant. *Leaves* uniform throughout the stem, $\frac{1}{3}$ - $\frac{2}{3}$ in. diam., coriaceous, usually with crisped hairs, especially beneath. *Cymes* on stout peduncles 1-4 in., each usually once 3-chotomously divided, branches terminating in a head of flowers $\frac{1}{4}$ - $\frac{1}{3}$ in. diam.; flowers sessile. *Calyx-teeth* short. *Fruit* with 2 ridges on each face, not at all didymous, contracted below the short calyx-teeth.

VAR. glabra, Thw. Enum. 142; quite glabrous, leaves ovate very coriaceous flat or with recurved margins. *H. nummulariformis*, Arn. l. c.—I reluctantly follow Thwaites in regarding this distinct-looking plant as a variety of *A. nummularia*.

16. **A. Wightiana**, Wall. *Cat.* 6194 (Hedyotis); perennial, tomentose, diffuse, leaves sessile or subsessile ovate subacute, stipules short deeply toothed, cymes small terminal and on short axillary branches sessile capitate few-flowered involucre, fruit orbicular compressed indehiscent 2-4-celled, cells 1-2-seeded. Hedyotis Wightiana and H. Finlaysoniana, Wall. *Cat.* 6194, 6189. Oldenlandia Teymaniana, Miq. *Fl. Ind. Bat.* ii. 354. *Spermacece compressa*, Wall. *Cat.* 6187.

TEMPERATE HIMALAYA, alt. 4-8000 ft., from Nepal to Bhotan. KHASIA MTS., alt. 4-5000 ft. Mountains of the WESTERN PENINSULA, alt. 5-7000 ft.—DISTRIB. Ava, Malay Islands, Cochinchina.

Stems 2-18 in., leaves clothed with soft curly spreading hairs. *Leaves* $\frac{1}{2}$ -1 in., variable in breadth. *Heads* involucre by 2 leaves. *Flowers* white blue or purplish, shortly pedicelled. *Fruit* very small, contracted towards the short calyx-teeth, grooved at the union of the carpels, rugose when dry.—The Western Peninsula specimens are much shorter than the Northern or Eastern. Clarke has observed that the flowers are white in the 2-carpellary, light blue in the 3-carpellary, and blue in the 4-carpellary specimens.

** *Fruit compressed, finally septicidally dehiscent.*

17. **A. monosperma**, W. & A. *Prodr.* 410 (Hedyotis); perennial, slender, diffuse, more or less hairy, leaves petioled small ovate subacute, stipules with short lateral bristles, cymes small short terminal peduncled sparingly unequally forked few-flowered bracteate, capsules shortly pedicelled subglobose, cells 1-2-seeded. *H. monosperma*, Wight *Ic.* t. 1031. *H. mysurensis*, Wall. *Cat.* 882. Oldenlandia mysurensis, G. Don *Gen. Syst.* iii. 531.

NILGHERY and PULNEY MTS., Heyne, Wight, &c.

A small-leaved much branched delicate species, more or less clothed with crisped hairs. *Leaves* $\frac{1}{3}$ -1 in., petiole often half their length. *Cymes* including the peduncles rarely $\frac{1}{2}$ in. long; flowers minute. *Corolla-tube* broadly funnel-shaped, about twice the length of the subulate calyx-lobes. *Capsules* $\frac{1}{10}$ in. diam., with recurved calyx-teeth, didymous; cells usually 1-seeded. *Seeds* ellipsoid, deeply pitted.

18. **A. Richardiana**, Arn. *Pugill. Pl. Ind. Or.* 22 (Hedyotis); perennial, diffuse, slender, glabrous, or more or less hairy or villous, leaves petioled ovate acute, stipules with long hairy bristles, cymes terminal and subterminal on

slender peduncles unequally forked few-flowered bracteate, capsules sessile turbinate with the crown very convex, cells 1-seeded. *Hedyotis monosperma*, var. *subglabra*, *Thw. Enum.* 142.

CEYLON; *Neuera Ellia*, abundant in the more elevated districts.

Very near *H. monosperma*, with which Thwaites unites it, but the stipules are much longer, as are the cymes, and the fruit is very different, twice as large and more elongate with a tumid crown, and larger ellipsoid seeds.—Very fetid (Thwaites).

23. **SPIRADICLIS**, *Blume*.

Annual herbs or undershrubs. *Leaves* opposite and falsely whorled, narrowed into a slender petiole; stipules long, subulate, persistent. *Flowers* minute, white or yellow, shortly pedicelled along one side of the branches of a dichotomous axillary or terminal spicate or paniculate cyme. *Calyx-tube* ovoid or cylindric, ribbed; lobes 5, small, obtuse, persistent. *Corolla* funnel-shaped, tube long or short; lobes 5, short, obtuse, valvate in bud. *Stamens* 5, in the corolla-tube, filaments short; anthers oblong. *Ovary* 2-celled; style filiform, glabrous or hairy, stigma 2-lobed; ovules numerous, on placentas attached to the middle of the septum. *Capsules* small, subglobose or linear-oblong, loculicidally 2-valved, many-seeded. *Seeds* minute, angled, testa reticulate; embryo microscopic in fleshy albumen.—DISTRIB. Species 3, Asiatic.

1. ***S. cæspitosa***, *Blume Bijl.* 975; stem creeping below, leaves small elliptic obtuse, spike shortly peduncled unilateral few-fl., capsules linear-oblong. *Kurz in Journ. As. Soc.* 1877, ii. 129, *excl. syn.*

MARTABAN rare, *Kurz*.—DISTRIB. Java.

Whole plant a span long; stem ascending from a rooting base. *Leaves* 1-1½ in., in few pairs, elliptic, glabrous or faintly puberulous beneath. *Spikes* ½-¾ in.—I have seen no Martaban specimens, but have Javan from *Kurz*, who consequently knew the species.

2. ***S. cylindrica***, *Wall. Cat.* 6215 (*Pleotheca*); erect, leaves elliptic or elliptic-lanceolate caudate-acuminate, cymes simply dichotomous, capsules linear-oblong.

KHASIA MTS., alt. 2-4000 ft., *De Silva, &c.* MISHMI HILLS, *Griffith*.

Stem 6-18 in., simple or branched. *Leaves* 2-6 by ½-2½ in., glabrous or puberulous beneath, upper often fascicled as if whorled. *Cymes* 1-6 in. long, on slender peduncles, branches long or short; flowers close or distant; bracteoles minute or 0. *Capsules* ⅙ in. long, clavate in dehiscence.

3. ***S. bifida***, *Wall. Cat.* 6216 (*Pleotheca* ?); erect, leaves elliptic or elliptic-lanceolate caudate or acuminate, cymes in slender panicles, capsules subglobose. *Kurz in Journ. As. Soc. Beng.* 1872, ii. 311.

KHASIA MTS., alt. 2-4000 ft., *De Silva, &c.* UPPER ASSAM, *Griffith*. CACHAR, *Keenan*.

Stem slender or robust, 1-several feet high, puberulous. *Leaves* 6-12 by 1½-4 in., shining above, puberulous on the midrib above and nerves beneath. *Panicles* 4-10 in., many-flowered; branches short, spreading.

24. **POLYURA**, *Hook. f.*

A low herb with rooting stem. *Leaves* opposite or falsely whorled; stipules filiform or subulate. *Flowers* shortly pedicelled, crowded along one side of the short alternating recurved branches of a terminal panicle; bracts leafy, imbricate. *Calyx-lobes* 5, persistent. *Corolla* funnel-shaped, tube short; throat densely

bearded; lobes 5, short, obtuse, valvate in bud. *Stamens* 5, in the middle of the tube, filaments subulate; anthers shortly 2-fid at both ends. *Ovary* 2-celled; style filiform, puberulous, stigmas 2 obtuse; ovules numerous, on subglobose placentas inserted on the middle of the septum. *Capsule* small, subglobose, septidial, 2-celled, many-seeded. *Seeds* obtusely angled, testa crustaceous; embryo minute in fleshy albumen.

1. **P. geminata**, Hook. f. in *Ic. Pl.* t. 1049. *Ophiorhiza* ? *geminata*, Wall. Cat. 6237.

KHASIA MTS., alt. 2-4000 ft., Hamilton, Gomez, &c. MISHMI HILLS, Griffith.

Whole plant 4-10 in. high, simple or branched from the base, pubescent. *Leaves* 2-4 in., elliptic-oblong or -lanceolate, obtuse or obtusely acuminate; petiole long or short, often winged; nerves many, very spreading, often red-brown when dry; stipules filiform.

25. OPHIORRHIZA, L.

Erect creeping or decumbent small herbs, rarely undershrubs. *Leaves* usually elliptic-lanceolate; stipules caducous. *Flowers* white pink or greenish, secund on the branches of axillary or terminal dichotomous cymes; bracts or bracteoles various or 0. *Calyx-tube* short; lobes 5, small, persistent. *Corolla* tubular or funnel-shaped; lobes 5, short, valvate in bud, back often winged, often also with a fold in the sinus. *Stamens* 5, inserted on the tube; anthers linear. *Disk* very large, 2-lobed. *Ovary* 2-celled; style filiform, stigmas broad or linear; ovules many, inserted on basal ascending placentas. *Capsules* coriaceous, compressed, obcordate, girt in the middle by the calyx-tube, the crown dehiscent by 2 broad gaping valves; placentas divaricating, many-seeded. *Seeds* minute, angled, testa crustaceous; embryo clavate, in fleshy albumen.—DISTRIB. Species about 50, tropical Asiatic, with a few Australian and Polynesian.

A very difficult genus; the characters taken from the position of the stamens on the corolla-tube, the hairiness within of the latter, the length and smoothness or hairiness of the style, and the form of the stigma, have not been made diagnostic, as being probably sexual to a very great degree.

* *Bracteoles* 0, or if present very narrow and caducous, falling away before the capsules are fully formed. *Corolla* usually under $\frac{1}{2}$ in. long (except in *O. Wallichii*). The species of this group are very closely allied indeed and difficult of definition.

1. **O. Mungos**, Linn.; erect, glabrous, or stem petioles cymes and leaf nerves beneath puberulous, stipules small, cyme-branches subumbellate very spreading, bracts 0, calyx-teeth very short, corolla glabrous rounded at the tip in bud $\frac{1}{2}$ in., mouth not dilated, lobes very short obtuse keeled at the back. Gaertn. *Fruct.* i. t. 55; Roxb. *Fl. Ind.* i. 701; W. & A. *Prodr.* 404.

KHASIA MTS. and ASSAM, ascending to 2000 ft. BIRMA, TENASSERIM, ANDAMAN and NICOBAR ISLANDS. Mts. of the WESTERN PENINSULA and CEYLON.—DISTRIB. Sumatra, Java.

A suffrutescent herb. *Leaves* 2-5 by 1-2 $\frac{1}{2}$ in., very thin, elliptic or elliptic-lanceolate, long-acuminate, narrowed into the petiole. *Cymes* 1-3 in. diam., flat-topped, glabrous or pubescent. *Corolla* white. *Capsules* $\frac{1}{2}$ - $\frac{1}{3}$ in. diam., pedicelled.—The following varieties may be referable to *O. Harrisiana*.

VAR. *nemorosa*, Thw. Enum. 139 (sp.); leaves elliptic or obovate-lanceolate, stipules rounded with 1-2 long points, cymes fewer-flowered tomentose or glabrate.—Ceylon.

VAR. *angustifolia*, Thw. Enum. 140 (sp.); leaves narrower, calyx-teeth longer, corolla-tube shorter.—Ceylon.

2. **O. Harrisiana**, Heyne in *W. & A. Prodr.* 405; herbaceous or shrubby below, stem above leaf-nerves beneath and cymes pubescent or tomentose, leaves ovate or ovate- or elliptic-lanceolate obtuse acute or acuminate glabrous or with minute scattered hairs above, stipules with 1 or more long points, cymes tomentose or glabrate rather contracted, bracteoles few filiform caducous or 0, calyx-teeth subulate, corolla glabrous or pubescent $\frac{1}{4}$ – $\frac{1}{3}$ in. tubular, lobes short keeled on the back, capsule glabrous.

Hilly districts of India from NIPAL eastward to the KHASIA Mts., alt. 0–5000 ft. ASSAM, SILHET, CHITTAGONG, TENASSERIM, *Helper* (Kew Distrib. 2857), *Griffith* (Kew Distrib. 2857–8–9); EASTERN PENINSULA, from the Concan southwards; CEYLON.

A common and variable plant, probably a variety of *O. Mungos*, but smaller, more pubescent, with longer stipules, usually longer subulate calyx-teeth, and setaceous or filiform bracteoles, less spreading cymes, and smaller capsules.—The following seem referable to it, and are scarcely distinguishable.

VAR. 1. *Harrisiana*, Wall. Cat. 6236; slender, rooting below, leaves $1\frac{1}{2}$ –2 in. broadly ovate often obtuse base often rounded or even subcordate glabrous above, cymes small. *Wight Ic.* t. 1162 (*Harrisonii*).—Mysore, Heyne, &c.

VAR. 2. *rugosa*, Wall. Cat. 6235 (sp.); slender, leaves 1–2 $\frac{1}{2}$ in. ovate-lanceolate acuminate at both ends with minute scattered hairs above, cymes few-fl.—*O. prostrata*, *Don Prodr.* 136.—Sikkim and Nipal.

VAR. 3. *decumbens*, Gardn. Mss.; stems decumbent often much branched, leaves $1\frac{1}{2}$ –4 in. obtuse or acute narrowed at the base glabrous above, cymes contracted, corolla very short.—Ceylon, alt. 5–6000 ft.; abundant in the Eastern Peninsula and Tenasserim.

VAR. 4. *argentea*, Wall. Cat. 6229 (sp.); more glabrous, leaves $1\frac{1}{2}$ –4 in. ovate or narrowly lanceolate usually white beneath and sometimes along the midrib above glabrous or with short hairs above, cyme and flowers glabrous.—Khasia Mts., Sylhet, Chittagong, Mergui, Ceylon, Nilgherries, and other Peninsula Mts.

VAR. 5. *merguensis*; like var. *argentea*, but cyme and corolla very tomentose, leaves either glabrous or with scattered short hairs above.—Mergui, Nilgherries.

3. **O. trichocarpa**, Bl. *Bijd.* 977; stem erect branched, leaf-nerves beneath and cyme densely pubescent, leaves ovate acute or acuminate glabrous or with scattered hairs above, stipules filiform from a subulate base, cymes small sessile or shortly peduncled dense-flowered tomentose, bracteoles 0, calyx-teeth subulate, corolla $\frac{1}{4}$ in. puberulous, tube narrow, capsules pubescent. *O. hispidula*, Wall. Cat. 6234; *G. Don Gen. Syst.* iii. 523. *O. villosa*, Kurz in *Journ. As. Soc.* 1877, ii. 130, excl. *synon.*

CHITTAGONG, *Lister*. TENASSERIM, and the ANDAMAN ISLANDS, *Gomez*, *Griffith* (Kew Distrib. 2869).—DISTRIB. Java.

This may be only a form of *Harrisiana*, and if so this latter name must give place to Blume's. I see little but the pubescent capsules whereby it is to be distinguished.

4. **O. ochroleuca**, Hook. f.; shrubby, glabrous except the cymes, leaves large quite glabrous beneath, stipules lanceolate 2-fl. caducous, cyme-branches spreading, bracts 0 or minute and caducous, calyx-teeth very short, corolla cylindric fleshy mouth not dilated, lobes short recurved pubescent within with a short dorsal spur below the top not keeled at the back, capsule glabrous. *Ophiorrhiza*, 5 *Herb. Ind. Or. H. f. & T.*

SIKKIM and BHOTAN HIMALAYA, alt. 1–5000 ft., common. KHASIA Mts., alt. 0–4000 ft. CACHAR, *Keenan*.

A small shrub. Leaves 4–9 by $1\frac{1}{2}$ –3 in., elliptic or elliptic-lanceolate, caudate-acuminate, nerves 10–15 pair; petiole long. Cyme-peduncles and branches very stout, more irregularly branched than in *O. Mungos*. Corolla $\frac{2}{3}$ – $\frac{1}{2}$ in., primrose-yellow orange or greenish. Capsules pedicelled, $\frac{1}{2}$ in. diam.

5. **O. rosea**, Hook. f.; shrubby, glabrous except the cymes, leaves glabrous or with the nerves beneath puberulous, stipules minute 2-fl. caducous,

bracts minute or 0, calyx-teeth very short, corolla (rounded at the tip in bud) glabrous or puberulous cylindric glabrous within mouth not dilated, lobes short rounded recurved not keeled or spurred at the back. *O. discolor*, *Wall. Cat.* 6232 B. *Ophiorrhiza*, 6 *Herb. Ind. Or. H. f. & T.*

EASTERN HIMALAYA from Sikkim to Mishmi, and KHASIA Mts, alt. 4-7000 ft., common.

Very similar to *O. ochroleuca*, but inhabiting a higher level and differing in the corolla, which is $\frac{1}{3}$ - $\frac{1}{2}$ in. long, rose, not fleshy, and very different in bud.

6. ***O. Wallichii***, *Hook. f.*; quite glabrous or the cymes puberulous, leaves elliptic-lanceolate caudate-acuminate rather coriaceous, petiole slender, cymes short-peduncled few-flowered, branches very short, bracteoles subulate, calyx-teeth very short subulate, corolla 1 in., tube slender terete, lobes short broad tomentose within. *Psychotria* sp., *Wall. Cat.* 8358.

KHASIA MTS., *De Silva*; JYNTEA HILLS, *Gomez*; BIRMA, *Griffith* (*Kew Distrib.* 2683).

Stem branched, rather thickened at the nodes. *Leaves* 4-6 in., stiff, pale reddish beneath when dry; stipules not seen. *Cyme-peduncle* $\frac{3}{4}$ in., slender; flowers crowded. *Fruit* unknown.—A very distinct species, easily distinguished by the long stiff leaves, reddish beneath, and the long corolla with short lobes.

7. ***O. discolor***, *Br. in Wall. Cat.* 6232 A.; tall, branched, quite glabrous, leaves elliptic-lanceolate long-acuminate membranous red beneath when dry, petiole very slender, stipules long slender, cymes puberulous, branches spreading, bracteoles 0, corolla $\frac{1}{4}$ in., tube cylindric smooth, lobes not keeled, capsules glabrous. *G. Don Gen. Syst.* iii. 522.

PENANG, *Wallich*.

Apparently a tall slender shrub. *Leaves* 5-8 in., gradually narrowed at both ends, membranous, nerves slender. *Cymes* as in *O. Mungos*.

8. ***O. villosa***, *Roxb. Fl. Ind.* i. 702; stem stout shrubby and leaf-nerves below and cymes densely tomentose, leaves ovate or ovate-lanceolate acute or acuminate rather coriaceous glabrous above white beneath, cymes dense subcapitate, branches very short, bracteoles 0, calyx-teeth short, corolla $\frac{1}{4}$ in. puberulous, tube angular. *Wall. Cat.* 6230.

CHITTAGONG HILLS, *Roxburgh*.

This differs from all the forms of *Harrisiana*, var. *argentea* (also a Chittagong plant), in the robust habit, coriaceous leaves, and almost capitate cyme densely clothed with a rusty-red pubescence. The buds are truncate with 5 points, and the short corolla lobes strongly keeled.—*Roxburgh's* drawing (in *Bibl. Kew*) of this plant is quite unlike the specimens in *Wallich's* Herbarium, which agree with the description in the *Flora Indica*.

9. ***O. tomentosa***, *Jack in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 546; erect, softly pubescent throughout, leaves elliptic-lanceolate acuminate white beneath, stipules subulate, cymes with spreading branches, bracteoles 0, calyx-teeth small, corolla $\frac{1}{4}$ in. pubescent, lobes not keeled, capsule glabrate or puberulous. *Wall. Cat.* 6231.

PENANG, *Wallich, Phillips, Maingay* (*Kew Distrib.* 898).—DISTRIB. Sumatra.

Stem 1-2 ft., stout. *Leaves* 3-5 in., petiole slender, both surfaces powdery. *Flowers* small.

VAR. ? *glabrata*; leaves larger broader less pubescent, cyme glabrate.—Malacca? *Maingay* (*Kew Distrib.* 899).

10. ***O. Brunonis***, *W. & A. Prodr.* 404; shrubby, branched, quite glabrous except the puberulous cymes, leaves ovate or ovate- or elliptic-lanceo-

late acute, stipules subulate, cymes subcorymbose many-flowered rounded, bracteoles long linear or filiform deciduous, calyx-teeth subulate, corolla glabrous tip 5-angled in bud, capsules glabrous.

NILGHERRY Mts., *Wight, &c.* COCHIN, *Johnson*.

The rounded cymes, and numerous long subsistent bracteoles, are good characters for the species. *Leaves* 3-4 in., usually ovate or ovate-lanceolate, base acute, very membranous; petiole slender. *Cyme-peduncles* $\frac{1}{2}$ - $\frac{1}{2}$ in., longer in fruit. *Corolla* $\frac{1}{2}$ in. long, cylindric, lobes narrow. *Capsules* crowded, $\frac{1}{4}$ in. diam.

VAR. ? *Johnsoni*; corolla narrower and longer $\frac{3}{8}$ in. puberulous.—Cochin, *Johnson*.

VAR. ? *hirsutior*, *Wight* mss.; branches petioles and cymes densely tomentose.—Nilgherry Mts., *Gardner*.—I have seen neither flower nor fruit of this.

11. ***O. gracilis***, *Kurz in Journ. As. Soc.* 1872, ii. 311; annual, erect, perfectly glabrous, leaves lanceolate with very long slender points, cyme long-peduncled, branches slender, bracteoles subulate, calyx-teeth minute, corolla-tube $\frac{1}{4}$ in. terete glabrous.

TENASSERIM, *Kurz*; BIRMA, *Brandis*.

I have seen a single specimen only. It is at once distinguished by the very long slender points of the membranous leaves, which are 5-9 in. long and rather oblique.

12. ***O. radicans***, *Gardn. in Thw. Enum.* 139; stems densely tufted slender creeping; leaves small ovate-cordate or orbicular obtuse glabrous above nerves beneath petioles and cymes pubescent, stipules minute subulate, cymes small few-flowered contracted, bracteoles few subulate, calyx-teeth subulate, corolla small, lobes short keeled on the back.

CEYLON; Central Province, *Gardner, Thwaites*.

Stems flexuous, a foot long, rooting at every node. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. *Cyme-peduncles* usually shorter than the leaves, but sometimes longer. *Corolla* $\frac{1}{8}$ - $\frac{1}{4}$ in. long. *Fruit* not seen.

13. ***O. oppositiflora***, *Hook. f.*; stem erect woody and petioles leaf-nerves beneath and peduncle appressedly rusty-pubescent, leaves ovate-lanceolate acute glabrous rather rigid, stipules subulate, cymes terminal and opposite in the leaf-axils corymbose many-flowered, bracteoles minute or 0, calyx-teeth lanceolate-obtuse, corolla $\frac{1}{2}$ in. glabrous within and without tubular 5-angled, lobes oblong obtuse keeled.

KHASIA Mts. (tropical?), *C. B. Clarke*.

Stem rigid, scabrid, 1-2 ft. *Leaves* 2-3 in.; petiole slender. *Cymes* often in the axils of all the 3-5 upper pairs of leaves, $\frac{1}{2}$ -1 in. diam.; peduncles slender, $\frac{1}{2}$ -1 in.; branches erect; flowers numerous, slender, erect.—A very remarkable species, the only one with opposite cymes.

** *Bracteoles* very slender, persistent or subsistent. *Corolla* an inch or more long, pubescent or hairy, lobes broad acute.

14. ***O. grandiflora***, *Wight Ic.* t. 1069; erect, glabrous except the hairy corolla, leaves elliptic-lanceolate acuminate, stipules minute lanceolate, cymes contracted, bracteoles very long filiform, calyx-tube ribbed teeth lanceolate, corolla 1-1 $\frac{1}{2}$ in. hairy, tube slender funnel-shaped above glabrous within, lobes large broadly ovate acute, capsules glabrous.

THE CARNATIC; Shevagherry hills, *Wight*.

An erect undershrub. *Leaves* 5-7 in., membranous, almost caudate-acuminate. *Cymes* 1-1 $\frac{1}{2}$ in. diam.; peduncles short, $\frac{1}{2}$ -1 in.; branches suberect; bracts and bracteoles $\frac{1}{2}$ -1 in. *Calyx-teeth* equalling the tube. *Corolla* $\frac{3}{4}$ in. across the lobes.—I have seen no fruit.

15. *O. Roxburghiana*, *Wight Ic. t.* 1068; erect, branches leaf-nerves beneath and cymes densely pubescent, leaves elliptic-lanceolate acuminate glabrous, stipules large ovate or ovate-oblong entire or 2-fid, cymes contracted, bracteoles many linear-subulate, calyx-tube terete, lobes lanceolate, corolla 1-1½ in. pubescent, tube slender funnel-shaped above hairy within, lobes large broadly ovate acute, capsule hairy.

THE CARNATIC; Shevagherry or Pulney hills, *Wight*.

Similar in habit, stature, foliage and flowers to *O. grandiflora*, but the cyme is longer peduncled densely pubescent, the calyx-tube terete, bracteoles much shorter, and capsules hairy.—*Wight* in his *Icones* states that this is a native of the Shevagherry hills, but the ticket on his specimen says Pulney Mts., Sept. 1836.

16. *O. eriantha*, *Wight Ic. t.* 1067; erect, branches and petioles pubescent or villous, leaves elliptic-lanceolate acuminate glabrous above puberulous on the nerves beneath, stipules subulate-lanceolate equalling the petioles, cymes villous with long soft hairs contracted, bracteoles filiform caducous, calyx-tube terete, lobes subulate, corolla 1 in. villous with long soft hairs, tube slender funnel-shaped above lobes large broadly ovate acute, capsules hairy.

THE CARNATIC; Shevagherry or Travancore hills, *Wight*.

This resembles both *O. grandiflora* and *Roxburghiana*, differing from the former in the stipules, terete calyx, and hairy capsules, and from both in the villous cyme.—This again is stated by *Wight* in the *Icones* to be a native of the Shevagherry hills, but his specimens bear 2 tickets of Courtallam, one of July, the other of August, 1835.

17. *O. hirsutula*, *Wight mss.*; erect; stem petioles and cymes softly rusty-tomentose, leaves ovate-lanceolate acuminate sparsely hairy above furfuraceous beneath, stipules subulate-lanceolate, cymes axillary subcorymbose, peduncles stout, bracteoles very narrow subsistent, calyx-teeth lanceolate obtuse hispid, corolla hirsute, tube cylindric.

NILGHERY Mts.; Sisparah, *Wight*.

Apparently shrubby. Leaves 4-6 in., scabrid above when dry, pale and reddish beneath; petiole short. Cyme 1 in. diam.; peduncle 2 in.; branches spreading; bracteoles scattered, pubescent; flowers few and scattered. Flowers seen in bud only. Capsule pubescent.

*** Bracteoles linear or oblong, with a distinct midrib, persistent in fruit. Corolla less than an inch long (except in *O. calcarata*).

† Bracteoles quite glabrous.

18. *O. pectinata*, *Arn. Pugill. Pl. Ind. Or.* 20; erect, glabrous, leaves elliptic-lanceolate long-acuminate, stipules subulate from a broad base, cymes capitate many-flowered, peduncle strict axillary or terminal, bracteoles many lanceolate glabrous, calyx-teeth subulate, corolla ½ in., tube cylindric, lobes short keeled villous within. *Thw. Enum.* 140. *O. imbricata*, *Gardn. mss.* *O. Mungos*, *Wall. Cat.* 6227 D. *Psychotria*, *Wall. Cat.* 8356.

WESTERN PENINSULA; Shevagherry hills, Malabar and Quilon, *Wight*. CEYLON; abundant up to 5000 ft., *Walker*, &c.

Stem a foot high, stout, rarely branched, sometimes puberulous upwards. Leaves 4-7 in., variable in breadth, pale beneath, midrib very stout. Cymes globose, ⅓-1½ in. diam.; peduncle 1-4 in., glabrous or pubescent, stout or slender; flowers usually densely compacted, rarely loose and pedicelled; bracteoles ¼ in., green, imbricate. Capsules ½ in. diam., glabrous or puberulous.

19. *O. pallida*, *Thw. Enum.* 140; procumbent, creeping below, stem and petioles subtomentose, leaves small elliptic-ovate subacute or acuminate with

short curly hairs on both surfaces, stipules setaceous, cymes contracted long-peduncled glabrous, bracteoles numerous persistent linear glabrous, calyx-tube ribbed, teeth lanceolate obtuse, corolla $\frac{1}{4}$ in., lobes very short broadly winged.

CEYLON; forests of the Ambagamowa district, *Thwaites*.

A small species, of lax habit, more or less clothed everywhere, except the glabrous cyme, with short curly hairs. *Leaves* 1-4 in. *Cymes* smaller and more lax than in *O. pectinata*.—A small, quite creeping form has leaves very broad, not 1 in. long.

20. ***O. succirubra***, *King mss.*; erect, nearly glabrous throughout, cymes and leaves beneath red-purple when dry, leaves elliptic-lanceolate acuminate, stipules lanceolate 2-fid, cymes short-peduncled contracted branches glabrous or pubescent above, bracteoles large linear-lanceolate persistent glabrous, calyx-tube broadly trapezoid, teeth triangular obtuse, corolla $\frac{1}{2}$ in. glabrous within, lobes short keeled, capsules puberulous. *Ophiorrhiza* 17, *Herb. Ind. Or. H. f.* & *T.*

SIKKIM HIMALAYA; in wet forests, alt. 5-8000 ft., *J. D. H.*, *Dr. Treutler*.

Stem branched, glabrous, or with a line of hairs which runs up the peduncle, and stout short cyme-branches. *Leaves* 4-7 in., quite glabrous beneath, with sometimes a few scattered short hairs above. *Cymes* 1 in. diam., flat-topped, few-flowered, drooping, then erect; branches suberect; bracts veined, exceeding the glabrous capsules. *Calyx* puberulous, tube much broader than the pink corolla. *Disk-lobes* very large.—*Dr. King* has attached the *mss.* name of *succirubra* to this, no doubt from the colouring of the dried leaf resembling that of *Cinchona succirubra*.

21. ***O. Griffithii***, *Hook. f.*; erect, glabrous, branches fleshy, leaves long-petioled elliptic acute, upper stipules large coriaceous oblong acute lower lanceolate, cymes contracted, bracteoles large linear-lanceolate glabrous, calyx-tube ribbed, teeth triangular, corolla-tube $\frac{3}{4}$ in. 5-angled villous within, lobes short broadly winged. *Ophiorrhiza*, *Griff. Ic. Pl. Asiat.* t. 475.

At Kuttack boom in the NAGA HILLS (Assam), *Griffith*.

A very fine species, of which I have seen no capsules. *Leaves* 3-5 in., elliptic and acute at both ends; petiole long, $1\frac{1}{2}$ -2 in.; upper stipules $\frac{1}{2}$ in. and upwards. *Cymes* nodding on a stout short peduncle; flowers amongst the largest of the genus, crowded, purple, fleshy.—The leaves in *Griffith's* drawing have short thick petioles, but very slender ones in his 2 specimens.

22. ***O. Thomsoni***, *Hook. f.*; slender, glabrous, stem puberulous creeping below, leaves ovate or elliptic-ovate subacute glabrous above nerves puberulous beneath, stipules filiform from a broad base, cymes small glabrous on slender axillary and terminal peduncles, bracteoles narrow persistent glabrous, calyx-teeth subulate, corolla-limb very broadly funnel-shaped, lobes broadly ovate acute. *O. rugosa*, *Herb. Ind. Or. H. f.* & *T.*

SIKKIM HIMALAYA., alt. 4-6000 ft., *Herb. Griffith, J. D. H. & T. T.*, &c.; BHOTAN, alt. 4000 ft., *C. B. Clarke*.

Stem 6-8 in., rooting below. *Leaves* 2-5 in.; petiole rather short. *Cymes* small, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., branches spreading. *Corolla* $\frac{1}{2}$ in., tube short, soon expanding into the very broad funnel-shaped limb. *Stamens* at the base of the tube. *Capsules* glabrous, $\frac{1}{2}$ in. diam.

23. ***O. lurida***, *Hook. f.*; stem 0 or short rooting at the base ascending and petioles and leaf-nerves beneath pubescent, leaves elliptic-oblong obtuse glabrous above, stipules filiform from a triangular base, cymes long-peduncled contracted glabrous, bracteoles linear glabrous persistent, calyx-teeth subulate, corolla $\frac{1}{4}$ in., limb funnel-shaped. *Ophiorrhiza* No. 12, *Herb. Ind. Or. H. f.* & *T.*

SIKKIM HIMALAYA, alt. 3-4000 ft., *Herb. Griffith* (Kew Distrib. 2852), *J. D. H. & T. T., C. B. Clarke.*

A small species, with a short copiously rooting stem. *Leaves* $\frac{1}{2}$ -3 in., rather long-petioled, lurid green both when fresh and dry. *Cymes* $\frac{1}{2}$ -1 in.; peduncle slender, long or short. *Corolla* $\frac{1}{2}$ in. white, like that of *O. Thomsoni*, but having a short tube soon expanding into a funnel-shaped limb, with (I think winged) ovate lobes. *Capsules* glabrous.

24. **O. Treutleri**, *Hook. f.*; herbaceous, pubescent throughout with crisped hairs, stems stout fleshy erect, leaves elliptic-ovate or lanceolate subcaudate-acuminate, stipules lanceolate entire or 2-fid, cymes many-flowered on short peduncles hirsute, bracteoles long linear hispid persistent, calyx-teeth subulate, corolla hirsute, limb funnel-shaped with short spreading broad lobes glabrous within, capsules pubescent. *Ophiorrhiza* No. 16, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 5-7000 ft., *Herb. Griffith* (Kew Distrib. 2854), *J. D. H. & T. T., Treutler.* KHASIA MTS., alt. 5-6000 ft., *J. D. H. & T. T., C. B. Clarke.*

A low stout species, 6-10 in., with very persistent large stipules. *Leaves* 2-4 in., sometimes almost glabrous above. *Cyme-branches* stout, ascending; bracteoles $\frac{1}{2}$ in. or less, slender, 1-nerved. *Corolla* pink in Sikkim, white in Khasia.

25. **O. fasciculata**, *Don Prodr.* 136; erect, stem woody below pubescent above as are the petioles leaf-nerves beneath and cymes, leaves elliptic-ovate or lanceolate glabrous, stipules lanceolate long-acuminate, cymes spreading, bracteoles many lanceolate pubescent persistent; calyx-tube orbicular compressed, teeth very short, corolla pubescent, tube slender, lobes small, capsules pubescent. *O. bracteolata*, *Br. in Wall. Cat.* 6228. *O. villosa*, *Wall. Cat.* 6230 B.

SUBTROPICAL HIMALAYA; from Gurwhal, alt. 4000 ft., to Sikkim and Bhotan, alt. 4-7000 ft. KHASIA MTS., alt. 3-5000 ft.

Stem 6-18 in., simple or branched from the woody base. *Leaves* $1\frac{1}{2}$ -5 in., membranous; petiole slender. *Cymes* 1-2 in. diam., axillary and terminal, few or many-fid; bracteoles $\frac{1}{4}$ in. *Corolla* pure white, $\frac{1}{2}$ - $\frac{3}{4}$ in., tube much more slender than in the allied species, throat very short, lobes oblong.

26. **O. hispida**, *Hook. f.*; stem above petioles and capitate cyme hispid, leaves elliptic-lanceolate long-acuminate glabrate or with scattered hairs above, nerves hispid beneath, stipules large oblong-lanceolate, cymes shortly peduncled dense-flowered subglobose clothed with linear ciliate bracteoles, calyx-teeth subulate, corolla $\frac{1}{4}$ in., tube slender, lobes oblong hispid with long hairs, capsules hispid. *Ophiorrhiza* No. 20, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 4000 ft., *J. D. H. & T. T.* CACHAR; at Shapore, *Keenan.*

Stem woody below, ascending, 8-12 in.; hairs white, stiff, suberect and spreading. *Leaves* 3-6 in. *Cymes* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; peduncle hispidly hairy; branches very stout; bracteoles linear, ciliate; flowers greenish-white. *Corolla-tube* dilated below, narrowing upwards to the spreading lobes.

27. **O. subcapitata**, *Wall. Cat.* 6238; softly hairy, stem slender creeping below, leaves elliptic-lanceolate acuminate, stipules ovate acuminate, cymes small subcapitate on slender peduncles, bracts large lanceolate obtuse ciliate concealing the flowers, calyx-tube ribbed teeth membranous ovate-lanceolate ciliate, corolla-tube cylindric, lobes short hispid at the back glabrous within, capsules glabrous.

KHASIA MTS., alt. 3-4000 ft., *Gomez, &c.*

Stem long, slender, creeping below, ascending. *Leaves* 2-6 in., softly hairy, especially beneath. *Cymes* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; bracteoles pinkish when dry; flowers very small, pedicelled. *Ovary* globose. *Corolla* glabrous, except the bristly back of the lobes.

28. **O. calcarata**, *Hook. f.*; stem slender creeping below and petioles leaf-nerves beneath and cymes softly pubescent, leaves elliptic-lanceolate acuminate glabrous above, stipules lanceolate entire or 2-fid, cymes contracted, bracteoles linear pubescent, calyx-teeth lanceolate, corolla $\frac{3}{4}$ –1 in. hairy tubular, lobes very short each with a long spur at the back. *Mussaëda repens*, *Wall. Cat.* 6263. *Ophiorrhiza* No. 19, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 4–5000 ft., *Gomez, Griffith, &c.* (*Kew Distrib.* 2783.) MISHME HILLS, alt. 4000 ft., *Griffith.*

Stem 10–18 in., flexuous. *Leaves* 2–4 in., lurid green above, pale beneath. *Cymes* 8–20 flowered; branches short ascending; bracteoles much shorter than the flowers, linear, pubescent. *Corolla-tube* narrow, puberulous or tomentose, pink or white, throat hardly dilated; lobes erect, much shorter than their recurved hispid dorsal spur, glabrous within. *Fruit* not seen.

29. **O. nutans**, *C. B. Clarke*; stem erect and cymes rough with crisped hairs, leaves elliptic-lanceolate acuminate glabrous above or with scattered hairs, nerves pubescent beneath, stipules large subulate-lanceolate ciliate entire or 2-fid, cymes contracted peduncle very stout deflexed, bracteoles large lanceolate or linear-oblong ciliate, calyx-teeth ovate acute, corolla $\frac{3}{4}$ in. villous within tubular glabrous, lobes short broad, capsule hispid.

SIKKIM HIMALAYA, alt. 7000 ft., *Dr. Treutler.* KHASIA MTS., alt. 5–8000 ft., *C. B. Clarke.*

Stem creeping below, then erect. *Leaves* 3–5 in., lurid when dry. *Cyme* 1–2 in. diam., flat-topped; branches thick, suberect; bracteoles half as long as the flowers. *Calyx-tube* globose, hispid, teeth glabrous. *Corolla* tubular, dilated at the base, narrowing upwards, white.

30. **O. pauciflora**, *Hook. f.*; stem extensively creeping slender pubescent as are the petioles leaf-nerves beneath and cymes, leaves ovate obtuse or subacute glabrous or with a few scattered hairs above, stipules small filiform, cymes small contracted few-flowered, bracteoles linear ciliate persistent, calyx-teeth lanceolate obtuse, corolla $\frac{1}{2}$ in. funnel-shaped, tube glabrous, lobes very short broad hispid at the back. *Ophiorrhiza* No. 18, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 5–6000 ft., *J. D. H. & T. T., C. B. Clarke.*

A small, slender, prostrate species. *Leaves* $\frac{3}{4}$ –2 in., lurid green. *Cymes* lax, $\frac{1}{4}$ – $\frac{1}{2}$ in. diam.; branches erect, 3–4-flowered; bracteoles half as long as the flowers. *Calyx* pubescent, teeth longer than the compressed tube. *Fruit* not seen.

31. **O. glechomæfolia**, *Thw. Enum.* 140; small, creeping, hispidly pubescent or tomentose throughout, leaves broadly elliptic or orbicular-ovate apiculate, stipules obscure, cymes small contracted hispid, bracteoles linear ciliate persistent, calyx-lobes membranous ovate-lanceolate ciliate much larger than the minute ovary, corolla $\frac{1}{10}$ in.

CEYLON; in forests of the central province, *Thwaites.*

The smallest of the Indian species; branches creeping nearly throughout their length, rather stout. *Leaves* $\frac{1}{3}$ – $\frac{1}{2}$ in. diam., lurid green, sometimes almost cordate, very hairy on both surfaces. *Cymes* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam.; peduncle slender, longer or shorter than the leaves; flowers pedicelled, white.

DOUBTFUL SPECIES.

O. ERUBESCENS, *Wall. Cat.* 6233; stem woody, scaberrulous, leaves 4–6 in. elliptic or ovate-lanceolate of usely acuminate glabrous above whitish and puberulous beneath, flowers not seen.

AVA; Chappadong hills, *Wallich.*

26. **PAROPHIORRHIZA**, *C. B. Clarke.*

A very small villous herb; branches round; habit altogether of *Ophiorrhiza*. *Leaves* opposite, petioled; stipules deciduous. *Cymes* axillary, long-peduncled, ultimately ebracteolate; flowers small, scattered. *Capsule* widely-obovate, divaricate, two-horned at the summit, dehiscent as in *Ophiorrhiza*. *Seeds* very many, black, spherical, covered with raised points.

This genus closely resembles *Ophiorrhiza* and *Polyura*, but the seeds are altogether different; the cymes are not clearly secund.

1. **P. khasiana**, *C. B. Clarke.*

KHASIA Mts.; Churra Coal Hill, alt. 4200 ft., *C. B. Clarke.*

Woody stem, very short; annual flowering branches decumbent, short. *Leaves* $2\frac{1}{2}$ by 1 in., oblong, narrowed at each end, not very acute; petiole $\frac{1}{4}$ in. *Peduncles* 1-2 $\frac{1}{2}$ in. *Capsule* $\frac{1}{2}$ by $\frac{1}{2}$ in.—Described from Mr. Clarke's mss.

27. **CARLEMANNIA**, *Benth.*

Branched herbs. *Leaves* obliquely elliptic, crenate-serrate; stipules of minute interpetiolar teeth. *Flowers* small, white, yellowish or pink, in terminal peduncled cymes. *Calyx-tube* subglobose; lobes 4-5, unequal, persistent. *Corolla* tubular; lobes 4-5, short, subequal, subimbricate in bud. *Stamens* 2, in the middle of the tube, filaments short, flattened; anthers dehiscing laterally included. *Disk* 2-4-lobed or -parted. *Ovary* 2-celled; style filiform, stigma clavate 2-fid; ovules numerous, on basal ascending placentas. *Capsule* membranous, more or less pyramidal and 4-lobed, 2-celled, loculicidally 2-valved, many-seeded. *Seeds* minute, ovoid, testa smooth or reticulated, adhering to the granular or horny albumen; embryo microscopic.—DISTRIB. Indian.

1. **C. Griffithii**, *Benth. in Hook. Kew Journ.* v. 308; cymes glabrous or puberulous, bracteoles and calyx-teeth small, capsule obscurely pyramidal 4-lobed.

EASTERN HIMALAYA; Sikkim and Bhotan, alt. 2-6000 ft. KHASIA Mts., alt. 2-5000 ft., *Griffith, &c.*

A tall branched herb, glabrous except the cymes. *Leaves* 3-5 in., caudate-acuminate, membranous, serrate; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in. *Cymes* open, panicled or corymbose, 1-1 $\frac{1}{2}$ in. diam.; bracteoles $\frac{1}{10}$ in., linear; flowers yellow, $\frac{1}{2}$ in. *Calyx-tube* globose; lobes linear-oblong, obtuse. *Corolla-limb* narrowly funnel-shaped; lobes small, rounded. *Capsules* $\frac{1}{2}$ in. diam.

2. **C. congesta**, *Hook. f. in Herb. Ind. Or.*; cymes sparsely hispid, bracteoles large oblong ciliate, calyx-teeth oblong-lanceolate ciliate much larger than the ovary, capsule broadly pyramidal sparsely hispid.

SIKKIM HIMALAYA, alt. 4-7500 ft., *J. D. H. & T. T., C. B. Clarke.*

Foliage and habit of *C. Griffithii*, but leaves sparsely hairy on both surfaces, cymes often dense-flowered with large bracteoles, calyx quite different, corolla sparsely hispid, larger, more funnel-shaped, with larger lobes.

3. **C. tetragona**, *Hook. f.*; cymes pubescent, branches elongate slender with subsessile secund flowers, bracteoles minute, calyx-teeth linear erect much longer than the ovary, capsule broadly pyramidal and stellately 4-lobed.

MISHMI HILLS; in shaded cultivated places, *Griffith* (*Kew Distrib.* 2841).

Apparently a prostrate shrub rooting at the nodes, with ascending pubescent branches. *Leaves* 1-2 $\frac{1}{2}$ in., with scattered pubescence on both surfaces. *Cyme-branches* 1-2 in., suberect, very slender, bearing on one side distant single or pairs of shortly

pedicelled flowers $\frac{1}{4}$ in. long. *Corolla* pubescent. *Capsules* $\frac{1}{6}$ in. diam., broader than long, much contracted at the tip, base flattened; lobes 4, stellately spreading. *Seeds* reticulate.—A very remarkable species.

28. *SILVIANTHUS*, Hook. f.

A glabrous branched shrub. *Leaves* broad, irregularly toothed; stipules 0. *Flowers* rather large, purplish in subsessile dense-flowered opposite axillary cymes; bracts oblong, obtuse. *Calyx-tube* obconic; lobes 5, rarely 4, subfoliaceous, unequal, enlarging after flowering, persistent. *Corolla* funnel-shaped, tube hairy within; lobes 5, short, orbicular, papillose, induplicate-valvate with plaited sinuses. *Disk* large conic. *Stamens* 2 in the corolla-tube, filaments short; anthers linear-oblong. *Ovary* 2-celled; style long, stigma spindle-shaped; ovules many, on globose placentas attached to the septum. *Fruit* fleshy, 2-celled, dehiscing from the top to the base between the calyx-lobes into 5 valves, and exposing the many-seeded placentas. *Seeds* rather large, imbricate, obliquely oblong, testa spongy; embryo minute, in fleshy albumen.

1. *S. bracteatus*, Hook. f. *lc. Pl. t.* 1048. *Psychotria*, Wall. *Cat.* 8367

SILHET and CACHAR, *De Silva, Griffith, &c.*

Stem stout, 2–3 ft., branched, woody. *Leaves* 6–10 in., elliptic, acuminate, membranous; petiole 1–3 in. *Cymes* 1–2 in. diam., broader in fruit. *Corolla* $\frac{1}{2}$ in. long, white. *Fruit* $\frac{1}{4}$ in. diam., crowned with the enlarged membranous or subcoriaceous calyx-lobes.

TRIBE V. MUSSÆNDÆ.

29. *MUSSÆNDA*, Linn.

Shrubs or undershrubs, rarely herbs, erect or climbing. *Leaves* opposite or 3-nately whorled; stipules solitary or in pairs between the petioles. *Flowers* yellow scarlet or rarely white, in terminal cymes; bracts and bracteoles deciduous. *Calyx-tube* oblong or turbinate; lobes 5, usually deciduous, one frequently forming a large petioled white or coloured leaf. *Corolla* tubular, funnel-shaped above, tube usually silky, throat villous; lobes 5, valvate in bud with everted margins. *Stamens* 5, on the throat of the corolla or lower down, filaments very short; anthers linear. *Ovary* 2-celled; style filiform, stigmas 2 linear; ovules numerous, on peltate fleshy placentas. *Berry* fleshy and areolate at the top, many-seeded. *Seeds* minute, testa pitted; embryo minute, in dense fleshy albumen.—*DISTRIB.* Species about 40, tropical African, Asiatic, and Polynesian.

It is a very difficult thing to assign limits to the species of this genus, and more so to define them.

* *Flowers* solitary; *calyx-teeth* all similar, none white and leaf-like.

1. *M. uniflora*, Wall. *Cat.* 6264; hairy, stem very slender prostrate and ascending, leaves small ovate subacute or obtuse, flowers solitary, calyx hirsute teeth subulate equalling the ovary, corolla hairy, tube slender, lobes large oblong lanceolate. *Acranthera uniflora*, Kurz in *Journ. As. Soc.* 1872. ii. 312; 1877. ii. 160.

MARTABAN and TENASSERIM; at Tavoy, Gomez; Moulmein, Parish, &c.

Stem 6–10 in., simple or branched, terete. *Leaves* subsessile or petioled, 1–1 $\frac{1}{2}$ in., with scattered hairs on both surfaces. *Flowers* sessile or peduncled, terminal or axillary. *Corolla* nearly 1 in. long, and as much across the subacute membranous lobes, white. *Berry* ellipsoid, hirsute, with a few calyx teeth remaining.

** *Flowers in cymes; calyx-teeth persistent till the fruit is ripe.*

2. **M. Roxburghii**, *Hook. f.*; erect, stem hairy above, leaves short-petioled oblong-lanceolate glabrous above, stipules triangular-lanceolate, cymes very dense many-flowered crinite from the filiform hairy calyx-teeth, corolla silky, tube narrow, lobes very small with filiform tips, berries glabrous, crowned with the calyx-lobes. *M. corymbosa*, *Wall. Cat.* 6252 A. B. *in part*, C. D. *in part*. ? *M. corymbosa*, *Kurz For. Fl.* ii. 58. ? *M. pubescens*, *Wall. Cat.* 6257 B. *M. frondosa*, *Wall. Cat.* 6250 E. ? and C. *in part*. *Mussaenda*, No. 18 and 19, *Herb. Ind. Or. H. f. & T.*

TROPICAL HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 1-4000 ft., *Herb. Griff.* (Kew Distrib. 2780), *J. D. H.*, &c. KHASIA MTS., *Gomez*, &c.; alt. 3-4000 ft., *J. D. H.* & *T. T.* CACHAR, *Keenan*. CHITTAGONG, *J. D. H.* & *T. T.* ? ARRACAN and TENASSERIM, *Kurz*.

This is the *M. corymbosa* of the Calcutta Gardens, and of Roxburgh, according to Wallich, but is certainly not the plant described under that name by Roxburgh in the *Flora Indica*, which has "ovate-lanceolate bracts," and ovate pointed lobes of the corolla, which are "convex and villous above," and which is stated to be a native of Ceylon and Malabar. There is, however, on one of Wallich's sheets of this plant a single specimen of a plant, also from the Calcutta Gardens, which agrees better with Roxburgh's description, having large convex pubescent corolla-lobes, and which probably does not differ from the *M. frondosa* of Malabar and Ceylon. *M. Roxburghii* is best known by its dense cyme, long tube and small limb of the corolla, with a filiform tip; the leaves are always glabrous above, and the fruit globose and glabrous; the large white calycine leaf is always glabrous. Wallich's 6257 B, a Calcutta Garden plant, is certainly not *pubescens*, and has the filiform corolla-lobes of *M. Roxburghii*, but differs in the branches clothed with spreading hairs. There are two varieties of *M. Roxburghii*.

VAR. 1; branches nearly glabrous, leaves oblong-lanceolate 4-6 by 2 in., and bracts and flowers silky.—Assam, Silhet, Cachar, Chittagong.

VAR. 2; branches more or less villous above, leaves longer petioled broader and more membranous elliptic 6-12 in., bracts and flowers villous.—Nipal, Sikkim, Khasia Mts., alt. 3-4000 ft.

3. **M. incana**, *Wall. in Roxb. Fl. Ind. ed. Wall. & Carey*, ii. 229; *Cat.* 5256; stem erect subsimple softly tomentose or villous as are the leaves beneath and cymes, leaves shortly petioled ovate subacute hairy above white beneath, calyx-teeth filiform twice as long as the ovary, corolla silky, lobes ovate acuminate, berry globose with subpersistent calyx-teeth. *DC. Prodr.* iv. 371. *M. pubescens*, *Ham. in Wall. Cat.* 6257.

TROPICAL HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 2-4000 ft., *Herb. Griffith* (Kew Distrib. 2781, 2782), *J. D. H.* ASSAM; Sukanugur and Goalpara, *Hamilton*. KHASIA MTS., alt. 2000 ft., *Griffith*, *J. D. H.* & *T. T.*

Stem erect, simple and herbaceous or branched, 2-3 ft., covered with soft shining appressed hairs. *Leaves* 5-6 in., stiff, rounded or acute at the base, nerves many and strong; stipules tapering from a broad base, bifid. *Cymes* small, subsessile. *Leafy white calyx-lobe* pubescent. *Corolla* $\frac{3}{4}$ in. long; tube slender. *Berries* at first hairy, then glabrous; areola small.

4. **M. Keenani**, *Hook. f.*; subherbaceous, very robust, leaves petioled broadly elliptic acuminate coriaceous densely tomentose beneath, nerves very strong, stipules very broadly ovate acuminate, cymes dense-flowered glabrous or pilose crinite with the filiform calyx-teeth, corolla glabrous, tube slender, lobes small ovate-lanceolate acuminate.

CACHAR; on the margins of flats, &c., *Keenan*.

A remarkable plant, described by its finder as herbaceous, large and robust in all

its parts, and flowering later than the other Cachar species. It may be a form of *M. incana* or *Roxburghii*, but if so it is a remarkable one.—*Stem* as thick as the little finger, pubescent above. *Leaves* 8–12 by 4–6 in., thick and leathery, quite glabrous above, abruptly acuminate; petiole $\frac{1}{2}$ –2 in., very robust; stipules $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{4}$ in., leathery, hairy, erect or recurved. *Cymes* 2–3 in. diam., almost capitate, on stout peduncles. *Calyx-teeth* $\frac{1}{2}$ in. *Corolla* nearly 1 in. long. *Buds* obtuse (without subulate points).

5. *M. tomentosa*, *Wight in Wall. Cat.* 6265; erect, shrubby, branches and leaves on both surfaces densely clothed with velvety tomentum, leaves all petioled ovate-elliptic or ovate-lanceolate acute or obtuse white beneath, stipules narrow 2-fid, cymes sessile contracted, bracts and calyx-teeth elongate subulate twice as long as the ovary, corolla velvety, tube 1 in., limb $1\frac{1}{4}$ in. diam., lobes broad acute, berry puberulous crowned with the long calyx-teeth. *W. & A. Prodr.* 394?

CARNATIC; Ginger Hills, amongst masses of rock in shade, *Herb. Wight*.

Leaves 3–5 in., narrowed into the petiole. *Cymes* with no leafy white calyx-lobes. —A very distinct species, badly described by Wight and Arnott as hairsutely villous, the pubescence being singularly soft, velvety and close, more so than in any other species. It resembles in some respects var. 2 of *M. frondosa*, but is distinguished by the dense soft pubescence, the much larger flowers, and persistent calyx-teeth. It is not the *M. tomentosa* of Wight's own Herbarium, No. 1271, which is var 7 of *M. frondosa*, and from which possibly the description in the Prodr. is taken; there is, however, a specimen of this in Wight's own Herbarium, marked in mss. 1271 A.

6. *M. Wallichii*, *G. Don Gen. Syst.* iii. 490; glabrous, leaves elliptic ovate or lanceolate acuminate nerves beneath pubescent, stipules long gradually narrowed from the base entire or 2-fid, cymes glabrous, bracts subulate, calyx-teeth half as long as the elongate ovary or longer, corolla quite glabrous, tube slender, lobes narrow finely acuminate, berries subglobose with persistent calyx-teeth. *M. longifolia*, *Wall. Cat.* 6258. *M. glabra*, *Wall. Cat.* 6251 A. in part. *M. Jelinckii*, *Kurz in Journ. As. Soc.* 1876, ii. 135.

RANGOON, *Wallich, McLelland*; and TENASSERIM, at Tavoy, *Gomez*. GREAT NICOBAR ISLAND, *Jelinck*.

Branches robust. *Leaves* in small specimens 4–5 by 2 in., elliptic, sometimes broadly, in larger ones much longer, 12 by $4\frac{1}{2}$ in., usually abruptly or caudately acuminate, rather membranous, quite glabrous above; stipules narrow, $\frac{3}{4}$ –1 in., persistent, erect. *Cymes* lax-flowered, quite glabrous, as are the white calycine leaves. *Corolla-tube* 1 in.; lobes $\frac{1}{2}$ in., glabrous.—Very variable in foliage, and sometimes approaching *M. glabra*, but the cymes are always glabrous and the calyx-teeth persistent. *Kurz's* Nicobar specimen (*M. Jelinckii*) has very small calyx-teeth and obliquely oblanceolate very membranous leaves, with slender petioles, very like those of *M. Griffithii*, which differs in the silky corolla.

7. *M. Griffithii*, *Wight mss. in Herb.*; branches with stiff appressed hairs, leaves petioled 12 by 3 in. obliquely oblanceolate finely acuminate very membranous, midrib and very slender nerves beneath hairy, petiole slender 1–2 in., stipules 2-fid villous, cymes sessile with several short hispid dense-flowered branches crinite with the filiform bracts and calyx-teeth which latter are twice as long as the ovary and persistent in the young fruit, corolla 1 in., tube slender silky, lobes narrow acuminate, berries ovoid glabrous.

TENASSERIM; Mergui, *Griffith*.

The only specimen I have seen is in Wight's Herbarium, and the leaves entirely resemble those of *M. Jelinckii*, but the corolla is densely silky, and the calyx-teeth very long, as in *M. Roxburghii* and in *pavettaefolia*, which has a glabrous corolla. The white calycine leaves are 2–3 in. long, ovate-lanceolate with very long points.

*** Flowers in cymes, calyx-teeth deciduous almost immediately after flowering.

8. *M. macrophylla*, Wall. in Roxb. *Fl. Ind. ed. Carey & Wall.* ii. 228; erect or subscent, branches' leaves beneath and cymes hirsute or villous, leaves short-petioled broadly elliptic acute, bracts and calyx-lobes foliaceous oblanceolate obtuse caducous, corolla lobes orbicular apiculate, berries hairy. Wall. *Pl. As. Rur.* ii. 77, t. 180; *Cat.* 6295; *Bot. Reg.* xxxii. t. 24; *DC. Prodr.* iv. 370. *M. hispida*, Don *Prodr.* 139; *DC. l. c.* *M. calycina*, Wall. *Cat.* 6253; *Kurz For. Fl.* ii. 58. *M. frondosa*, Wall. *Cat.* 6250 A.

TROPICAL HIMALAYA; Nipal, Wallich. KHASIA MTS., alt. 1-4000 ft., J. D. H. & T. T., C. B. Clarke. PEGU and ANDAMAN and NICOBAR ISLANDS, Kurz. MALAY PENINSULA, Maingay (Kew Distrib. 8357/2 and ? 941).—DISTRIB. Ava, Philippine Islands.

Usually a subscent shrub; branches stout; hairs rufous when dry. Leaves 4-10 by 2-3½ in., slightly hairy above; stipules acute or 2-fid, broad, recurved. Cymes short-peduncled, often 3-chotomous; flowers crowded; bracts large, laciniate. Calyx-lobes ½-¾ in., nerves parallel, leafy white lobe 2-5 in. Corolla 1 in., tube hirsute, lobes orange, throat villous. Berries broadly ellipsoid, ½ in. long; areole very broad.—Kurz distinguishes *M. calycina* as a scendent shrub with lanceolate calyx-teeth ½ in. long, and corolla-lobes ¼ as long as the corolla-tube, from *M. macrophylla*, which is a large shrub, or small tree, with calyx-teeth ⅙-¼ in. and corolla-lobes nearly ½ as long as the corolla-tube; but his *macrophylla* is not the Wallichian plant of that name, and is, I think, *M. frondosa*, var. 5.

9. *M. frondosa*, Linn.; *DC. Prodr.* iv. 370; glabrate tomentose or hirsute, leaves sessile or petioled elliptic oblong or ovate acuminate, stipules long or short often 2-fid, cymes contracted or open softly silkily tomentose, bracts and caducous calyx-lobes elongate-lanceolate much longer than the ovary, corolla pubescent silky or hirsute, lobes broadly ovate acute or acuminate, berries obovoid glabrous, areole broad. Roxb. *Fl. Ind.* i. 557; Wall. *Cat.* 6250 in part; Wight *Ill.* t. 124; Dalz. & Gibs. *Bomb. Fl.* 111; Bedd. *Fl. Sylv. Anat. Gen.* xvi. f. 3. *M. flavescens* and *M. Dorinia*, Ham. in *Trans. Linn. Soc.* xiv. 203. *M. formosa*, Linn. *Mant.* 338. *M. villosa*, Wall. *Cat.* 6254. ? *M. corymbosa*, Roxb. *Fl. Ind.* i. 556. *M. zeylanica*, Burm. *Fl. Zeyl.* 165, t. 76.—Rheede *Hort. Mal.* ii. t. 18.

TROPICAL HIMALAYA, from Nipal eastward; ASSAM, KHASIA MTS., alt. 1-4000 ft.; ANDAMAN ISLANDS, Kurz. WESTERN PENINSULA, from the Concan southwards.—DISTRIB. Malay Islands.

It is difficult to limit this species, which passes into *M. glabra* on the one hand, and almost into *M. macrophylla* on the other; and quite impossible to define its varieties, which may be approximately diagnosed as follows.

VAR. 1. *zeylanica*; branches leaves on both surfaces especially beneath and cymes velvety, leaves sessile or shortly petioled 3-6 in. abruptly acuminate, base acute rarely rounded, stipules short and broad, cymes tomentose, bracteoles and calyx-lobes ¼-½ in. lanceolate not twice the length of the ovary, white leafy lobe orbicular elliptic or cordate pubescent, corolla-tube densely tomentose, limb quite obtuse in bud, lobes short broad subacute.—Ceylon only.—I have not seen the berries, which Vahl (under *M. glabra*) states to be hairy.

VAR. 2. *ingrata*; branches leaves and cymes velvety, very like those of var. 1, stipules short and broad, cymes contracted crinite from the long lanceolate sub-setaceous bracts and calycine lobes which are ⅓-⅔ in. long, greatly exceeding the ovary, corolla as in var. 1 but limb with 5 points in bud.—Wall. *Cat.* 6250 F.; Wight *Cat.* 1267. *M. ingrata*, Wall.?

VAR. 3. *laxa*; branches stipules and cymes finely densely tomentose, leaves all petioled broadly elliptic rounded at the base with fine short appressed hairs, stipules short 2-fid, cymes very open lax-flowered, bracteoles and calyx-teeth as in var. 2 but spreading, corolla as in var. 2.—Quillon, Wight.

VAR. 4. *glabrata*; branches glabrous or with scattered spreading hairs, leaves all petioled broadly or narrowly elliptic glabrous or sparingly hairy beneath or on both surfaces, stipules sometimes very narrow, cymes open with long bracts and calyx-teeth as in var. 3, corolla-tube silky, lobes apiculate as in var. 3.—*Wall. Cat.* 6250 A. C. G., *all for the most part*; *Wight Cat.* 1269, 1270 (a form with lanceolate white calycine leaf).—The common Western Peninsula form. Fruit hairy in a specimen from Stocks.

VAR. 5. *grandifolia*; branches with spreading hairs, leaves all petioled 6–12 in. often almost as broad, elliptic abruptly acuminate membranous glabrous above acute at both ends more or less pubescent on the nerves beneath, stipules broad 2-fid, cymes large contracted, bracts and calyx-teeth lanceolate broader than in the southern forms, flowers larger, buds with 5 points, corolla-limb broad acuminate.—*Nipal, Wall. Cat.* 6250 E.; Sikkim, alt. 2–6000 ft., *J. D. H., Treutler*; Assam, *Jenkins, Griffith*; Khasia Mts., 2–5000 ft., *J. D. H. & T. T.* ? *M. macrophylla, Kurz For. Fl.* ii. 57, *not of Wallich*.—This approaches forms of *M. Roxburghii*, but has a much larger flower and broader bracts and calyx-teeth, which latter are deciduous. Large calycine white leaf sometimes 6 by 4 in.

VAR. 6. *hirsutissima*; branches cymes petioles and leaves on both surfaces hirsute with often shaggy hairs, leaves subsessile 2–3 rarely 4 in. broadly ovate-elliptic rarely elliptic-lanceolate, stipules short, cymes shortly stoutly peduncled contracted few-flowered, bracts and calyx-lobes $\frac{1}{2}$ – $\frac{3}{4}$ in. broadly lanceolate, flowers very large, corolla hirsute often $1\frac{1}{4}$ in. long and 1 in. across the lobes, tube slender or very broad sometimes $\frac{1}{2}$ in. diam. at the base and slightly contracted above it, lobes broad apiculate, berry large globose, leafy calyx-lobe often absent cordate.—*M. frondosa, Wall. Cat.* 6250 H. (*from Herb. Heyne*); var. β . *Wight Cat.* 1268. *M. tomentosa, Wight Cat.* 1271 (*not of Wallich*). *M. villosa, Schlecht. in Pl. Hohenack.* N. 1382. Nilgherry, Pulney, Shevaroy, and Shevaghery hills, *Wight*; Concan, alt. 6–8000 ft., *C. B. Clarke*, who remarks that the broader flowers are injured by insects, and have the corolla-tube within glabrous below the throat and larger disk-glands; a similar state is also recorded from Java.—Probably a distinct species, but it appears to pass into forms of *frondosa*.

10. **M. variolosa**, *Wall. Cat.* 6259; scandent, hispid with spreading rufous hairs, leaves subsessile lower petioled ovate or oblong or obovate-oblong acuminate, stipules small, cymes small 2–3-chotomous, calyx-teeth equalling the ovary or shorter deciduous in fruit, corolla-tube slender glabrate or hirsute, lobes small broad not pointed, berries broadly obovoid. *G. Don Gen. Syst.* iii. 490; *Kurz For. Fl.* ii. 56.

TENASSERIM, PEGU, and ARRACAN, common, *Wallich, Helfer, &c.* (Kew Distrib. 2777.)

Apparently a slender climbing species. *Leaves* membranous hairy on both surfaces or glabrate above, upper sessile 3–4 by $1\frac{1}{2}$ –2 in., lower often more elongate and narrowed into a slender petiole, rarely all petioled. *Cymes* generally rather open with spreading branches and pedicelled flowers, sometimes dense. *Flowers* small for the genus. *Calyx-teeth* very variable, sometimes elongate after flowering; leafy white one small 2 in. long, orbicular or broadly elliptic, obtuse, glabrous or puberulous. *Berries* glabrous, small, sometimes covered with broad pale warts.

11. **M. glabra**, *Vahl Symb.* iii. 38; a rambling or climbing almost glabrous shrub, leaves shortly petioled elliptic or oblong acuminate, nerves beneath often hairy, stipules small simple or 2-fid, cymes glabrous or sparsely appressed-hairy branched, bracts and calyx-teeth subulate or lanceolate shorter or longer (never twice as long) as the ovary early deciduous after flowering, corolla-tube 1 in. very slender glabrous or with appressed hairs, lobes very short acute, berries globose glabrous. *DC. Prodr.* iv. 370; *Wall. Cat.* 6251; *Kurz For. Fl.* ii. 56. *M. penangensis, Miq. Fl. Ind. Bat.* ii. 214. *M. frondosa, Wall. Cat.* 6250, B. and E. both in part.

NIPAL and SIKKIM HIMALAYA, alt. 1-5000 ft.; ASSAM, KHASIA Mts., alt. 0-4000 ft.; CACHAR, CHITTAGONG, TENASSERIM (*Helper*, Kew Distrib. 2778; *Griffith*, 2775, 2776); SINGAPORE; MALACCA (*Maingay*, Kew Distrib. 834; *Griffith*, 2779) and PENANG.—DISTRIB. Malay Islands.

The very glabrous habit, rather coriaceous leaves, smaller calyx-teeth, long slender hairy (rarely glabrate) corolla-tube, and small broad acute corolla-lobes, distinguish this from its allies. The leaves do not exceed 5 inches in length; the calycine white leaf is never more than 3 in. long, very broad obtuse and glabrous; the calyx-teeth vary from quite minute to almost twice as long as the ovary; the berries are sometimes mottled as in *M. variolosa*.

VAR. 1; leaves narrowed at the base glabrous or sparsely pubescent beneath, calyx-teeth subulate about equalling the ovary.—From Sikkim and Bhotan to Chittagong.

VAR. 2; leaves narrowed at the base glabrous or softly pubescent beneath, calyx-teeth lanceolate longer than the ovary.—Malacca and Singapore.

VAR. 3; leaves acute or rounded at the base quite glabrous, calyx-teeth equalling or shorter than the ovary.—Tenasserim (fruit not seen).

VAR. 4; leaves usually obtuse or rounded at the base setulose on the midrib above. *M. setulosa*, *Klotzsch in Monatsb. Berlin. Akad.* 1853, 510.—Pegu to Penang.

IMPERFECTLY KNOWN AND DOUBTFUL SPECIES.

M. CORDIFOLIA, *Wall. Cat.* 6260; glabrous, branches woody, leaves subsessile ovate-cordate rather coriaceous, fruiting cyme often sparsely hairy, berries obovoid glabrous areola large without calyx-teeth.—Penang, *Wallich*.

M. MACROPHYLLA, *Kurz Herb.* (? of *For. Fl.* ii. 57, not of *Wallich*); branches glabrous, leaves 7-10 by 3-4½ in. broadly elliptic or obovate acuminate very membranous, nerves beneath hairy, petiole ½-1 in., stipules subulate-lanceolate hairy, cymes silky, flowers crowded, calyx-lobes much longer than the ovary and bracteoles lanceolate, corolla hirsute (in bud only), large white calycine leaf 4-6 in. long glabrous.—A small tree, South Andaman Island, *Kurz*. Probably a form of *M. frondosa*, var. 5.

M. PAVETTEFOLIA, *Kurz For. Fl.* ii. 57; branches tomentose, leaves 10-12 in. shortly petioled oblanceolate caudate-acuminate very membranous glabrous above pubescent on the nerves beneath, stipules broadly triangular acuminate, cymes small axillary and terminal very shortly peduncled villous, calyx-teeth filiform hairy longer than the ovary, corolla (in bud) quite glabrous.—Pegu, at Tonkyeghat, *Kurz*.

M. PARVA, *Wall. Cat.* 6261; *G. Don Gen. Syst.* iii. 491; stem very slender scandent, sparsely hairy as are the leaves beneath, and sometimes above, leaves 2 in. subsessile lanceolate subacute, stipules small, cymes subsessile contracted villous, bracts and calyx-teeth subulate much longer than the ovary, corolla 1 in., tube very slender appressed-pubescent, lobes small acute.—This, from its slender habit and foliage, appears distinct from any described species.—A single specimen from Tavoy.

M. VILLOSA, *Wall. Cat.* 6254; climbing, branches and leaves beneath almost hispid with spreading rufous hairs, leaves 3-4 in. subsessile ovate or elliptic with scattered hairs above finally glabrate abruptly acuminate, cymes with spreading hispid branches and appressed hirsute bracts and calyx-teeth which are lanceolate and much longer than ovary, corolla ½-¾ in., tube very slender with appressed hairs, lobes small broadly ovate not apiculate.—Penang, *Wallich*, *Phillips*.—This resembles a very hairy *M. glabra*, or a form of *variolosa*, but the bracts and calyx-teeth are much longer; the flowers are smaller than in any form of *frondosa*.

M. CORYMBOSA, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 556; *W. & A. Prodr.* 393.—This is a Calcutta garden plant of Roxburgh's, which he states to be a native of Malabar and Ceylon, and to differ from *M. frondosa* in being glabrous, amongst other characters. No Ceylon or Malabar plant known to me answers to his description, or to a figure of a Calcutta Garden plant which bears this name in a collection of drawings at Kew made for Dr. Roxburgh (not the Roxburghian drawings cited by W. & A.). *Wallich's M. corymbosa*, *Roxb.* 6252, consists of two plants, of which one (A. B. in part, C. and D.), from the Khasia Mts. and Nipal, differs wholly from Roxburgh's description, and is that I have called *Roxburghii*; the others (B. in part and D. in part, both from Calcutta Garden) do agree with his description and drawing in the

glabrousness of the corolla and the very large stipules. I have seen neither of these last in fruit, or from their native locality; they may be forms of the protean *M. frondosa*. Wight and Arnott refer Roxburgh's drawing marked *M. frondosa* (from the Indian Museum collection) to *M. corymbosa*, Roxb., I do not know on what authority. *M. corymbosa* hence remains a doubtful plant, allied to *M. Roxburghii*, differing in the very large persistent stipules, and large glabrous flowers with broad not appendaged corolla-lobes. As Roxburgh does not describe the calyx-teeth as persisting on the berry it may be assumed that they are caducous, as in *M. frondosa*.

M. CUNEIFOLIA, Don *Prodr.* 139; branches and cuneate-oblong acuminate leaves on both surfaces pubescent, bracts lanceolate, calyx-teeth linear acute 5 times shorter than the corolla.—Nipal, Wallich. This is probably *M. incana*, but the description applies as well to *M. frondosa*, *Roxburghii*, *glabra*, and *macrophylla*, all Nipalese species.

30. **ACRANTHERA**, Arn.

Hairy herbs or low undershrubs. *Leaves* large, membranous, stipules triangular. *Flowers* blue, in sessile or stoutly peduncled subterminal bracteate cymes. *Calyx-tube* oblong; segments 5, usually very long and persistent. *Corolla* funnel- or salver-shaped, hairy without; lobes short, valvate in bud with everted margins. *Stamens* 5, included within the tube, filaments filiform; anthers included, cohering in a tube, pointed and spurred at their tips. *Ovary* 1-celled; style filiform, stigma clavate furrowed; ovules numerous, on 2 parietal 2-lamellate placentas. *Berry* oblong or fusiform, 2-celled, many seeded. *Seeds* minute, subglobose, testa crustaceous pitted; embryo clavate, in dense albumen.—DISTRIB. Species 10, Indian and Malayan.

1. **A. Maingayi**, Hook. f.; stem slender woody, leaves elliptic abruptly acuminate glabrous, cymes terminal, calyx-lobes oblong-lanceolate, corolla-tube very slender tomentose, lobes ovate-lanceolate.

MALACCA, *Maingay* (Kew Distrib. 940).

Stem branched. *Leaves* 5-7 by $2\frac{1}{2}$ -4 in., very membranous, base acute or rounded, petiole slender; stipules triangular-lanceolate, 2-fid. *Cymes* subsessile. *Calyx-lobes* $\frac{1}{4}$ in., puberulous, acute, deciduous. *Corolla-tube* $1\frac{1}{2}$ in., throat not swollen; limb $1\frac{1}{4}$ - $1\frac{1}{2}$ in. diam., divided nearly to the base into pubescent lobes. *Berry* $\frac{1}{2}$ in., ellipsoid, 2-celled, areolate, not crowned by the calyx-lobes.

2. **A. Griffithii**, Hook. f.; stem slender woody, branchlets and petioles silky, leaves broadly elliptic abruptly acuminate finely pubescent beneath, cymes terminal, calyx-lobes linear-lanceolate, corolla-tube very slender tomentose, lobes lanceolate acuminate.

EASTERN HIMALAYA, *Griffith* (Kew Distrib. 3089).

This so closely resembles *A. Maingayi* that I doubt its locality being correct; it differs in the silky branchlets and petioles, the much longer narrower calyx-lobes $\frac{2}{3}$ in. long, and the larger corolla with the limb $2\frac{1}{2}$ in. diam. with lanceolate lobes, and the throat dilated and cylindrical.

3. **A. tomentosa**, Br. in Wall. Cat. 8398 (Androtropis); hirsutely tomentose, stem very stout, leaves elliptic or oblanceolate acute hirsute on both surfaces, cymes short-peduncled subterminal, calyx-lobes linear-lanceolate, corolla villous, tube funnel-shaped, lobes short rounded.

KHASIA MTS., *De Silva, Griffith*. CACHAR, Keenan.

Stem short (epiphytic, Keenan) cylindric. *Leaves* 4-10 in., black when dry, rugose; stipules broad, acute. *Calyx-lobes* $\frac{2}{3}$ -1 in. *Corolla* $1\frac{1}{2}$ in. long, blue?, densely villous. *Ovary* long, fusiform. *Berry* $1\frac{1}{2}$ in., with persistent calyx-lobes.

4. **A. zeylanica**, Arn. in Ann. Nat. Hist. iii. 21; hirsute, stem very short, leaves oblanceolate tip rounded hirsute on both surfaces, cymes subter-

minally usually long-peduncled, calyx-lobes linear-lanceolate, corolla villous, tube funnel-shaped, lobes oblong rounded. *Bedd. Ic. Pl. Ind. Or.* t. 24.

CEYLON; central province, alt. 3-5000 ft. on shaded banks, *Macrae*, &c.

A low herb. *Leaves* 4-7 by $1\frac{1}{2}$ -3 in., rugose, black when dry, narrowed into the petiole. *Cyme* and its stout peduncle densely hirsute. *Calyx-lobes* $\frac{1}{4}$ - $\frac{1}{3}$ in. *Corolla* 1 in. long. *Berry* hirsute, $\frac{2}{3}$ in., fusiform.

5. **A. grandiflora**, *Bedd. Ic. Pl. Ind. Or.* t. 25; silkily villous, stem short, leaves elliptic or oblong-obovate tip rounded glabrate above pubescent on the nerves beneath, cymes subterminal long-peduncled silky, calyx-lobes linear acute or obtuse, corolla villous, tube very long narrowly funnel-shaped, lobes oblong rounded.

TINNEVELLY; in moist forests, alt. 2-3000 ft., *Beddome*.

Very near *A. zeylanica*, but the pubescence of the stem and peduncle and cyme is more silky, the leaves glabrous or with soft hairs above, quite glabrous beneath between the nerves; the calyx-lobes are under $\frac{1}{2}$ in. and quite linear, and the pale blue corolla-tube $1\frac{1}{2}$ in. long.

6. **A. anamallica**, *Bedd. Ic. Pl. Ind. Or.* t. 25; almost stemless, leaves elongate obovate-oblong tip rounded with scattered bristly hairs above, pubescent on the nerves beneath, cymes sessile silkily pubescent, calyx-lobes short ovate or elliptic spreading, corolla funnel-shaped pubescent, lobes oblong rounded.

TINNEVELLY; Anamallay Mts., alt. 4500 ft. in moist woods, *Beddome*.

Stem $\frac{1}{2}$ -1 in., with strong roots from the base. *Leaves* 2-6 by $1\frac{1}{2}$ in., black when dry, narrowed to the base but not into the petiole, which is $\frac{1}{2}$ - $\frac{3}{4}$ in., and densely tomentose. *Cymes* many-flowered, flowers pedicelled. *Calyx-lobes* $\frac{1}{8}$ in. *Corolla* 1 in. long, deep blue.

31. LUCINÆA, DC.

Erect or twining glabrous shrubs. *Leaves* coriaceous, stipules small or large. *Flowers* white, 6-10 together, crowded on peduncled discoid receptacles which are axillary or terminal and solitary or umbelled. *Calyx-tube* turbinate, limb annular or cupular, quite entire persistent. *Corolla* funnel-shaped, tube broad, throat bearded, lobes 4, coriaceous, valvate in bud. *Stamens* 4, in the tube of the corolla, filaments short villous; anthers narrow, included. *Ovary* 2-celled; style filiform or thickened below the middle, stigmas 2 linear or spatulate; ovules numerous, on fleshy peltate placentas. *Berry* globose or turbinate, 2-celled, many-seeded. *Seeds* compressed, testa thickly coriaceous smooth; embryo minute in fleshy albumen.—*DISTRIB.* Species 6, Malayan.

1. **L. Morinda**, *DC. Prodr.* iv. 368; branches flexuous, leaves elliptic or ovate acute shortly petioled, stipules triangular. *Wall. Cat.* 8437. *Morinda polysperma*, *Jack in Mal. Misc.* i. 14; *Roxb. Fl. Ind., ed. Carey & Wall.* ii. 204.

Littoral. SINGAPORE, *Jack*; Malacca, *Griffith*, *Maingay*; PENANG, *Wallich*.—*DISTRIB.* Malay Archipelago.

Erect, glabrous or nearly so, branches stout. *Leaves* 2-3 in., brown when dry, nerves slender; petiole $\frac{1}{2}$ in. *Peduncles* solitary in opposite axils, or terminal and often subumbellate. *Heads* $\frac{3}{4}$ in. diam., few-flowered. *Corolla* $\frac{1}{10}$ in., densely hairy within. *Berries* crowded, 6-8 in a head, broadly turbinate, areolate.

32. LEUCOCODON, Gardn.

A climbing glabrous epiphytic rooting shrub. *Leaves* coriaceous; stipules large, oblong, connate at the base, tip 2-toothed. *Flowers* white, in solitary terminal peduncled involucrate heads; involucre bell-shaped with the flowers

in the bottom. *Calyx-tube* subglobose; limb cylindric, irregularly split, persistent. *Corolla* funnel-shaped, throat glabrous; lobes 5, thickly coriaceous, valvate in bud. *Stamens* 5, inserted in the tube; anthers sessile, linear, included. *Ovary* 2-celled; style filiform, stigmas 2 linear thick; ovules crowded on broad peltate placentas. *Seeds* compressed, boat-shaped, testa thick striate; embryo minute, in fleshy albumen.

1. **L. reticulatum**, *Gardn. in Calc. Journ. Nat. Hist.* vii. 5; *Thw. Enum.* 138; *Bedd. Ic. Pl. Ind. Or.* t. 94.

CEYLON; central province, alt. 3-5000 ft., *Walker, Gardner, &c.*

Branches stout. *Leaves* 3-4 by $1\frac{1}{4}$ - $1\frac{1}{2}$ in., dark brown when dry, elliptic-lanceolate, acute, opaque above, shining and reticulate beneath; petiole $\frac{1}{4}$ -1 in. *Involucre* shortly stoutly peduncled, $1\frac{1}{2}$ in. long by 2 across the lobed mouth, sides much folded. *Corolla* $1\frac{1}{2}$ - $\frac{3}{4}$ in. *Berries* $\frac{1}{4}$ in. diam., white.

33. **POLYSOLENIA**, *Hook. f.*

An erect glabrous undershrub? with a flexuous stem leafy towards the top. *Leaves* membranous; stipules large, erect, 3-fid or torn, persistent. *Flowers* in solitary terminal peduncled heads, sessile or pedicelled; peduncle naked or involucrate about the middle by torn stipular bracts; bracteoles 3-fid. *Calyx-tube* short, limb short, 5-fid. *Corolla* pubescent, tube slender funnel-shaped above, throat villous; lobes 5, short, valvate in bud. *Stamens* 5, inserted below the throat, filaments short; anthers linear, included. *Ovary* 2-celled; style filiform, stigmas 2 short dilated; ovules very many, on oblong tumid peltate placentas. *Fruit* unknown.

1. **P. Wallichii**, *Hook. f. in Gen. Pl.* ii. 68. *Morinda* sp., *Wall. Cat.* 8424.

KHASIA MTS., *Gomez*; CACHAR, *Keenan*.

Stem cylindric, woody, simple or branched, glabrous or pubescent above. *Leaves* 3-5 in., brown when dry, lanceolate, acuminate, narrowed into a petiole, $\frac{1}{4}$ -1 in., pubescent; nerves many, slender; stipules $\frac{1}{2}$ -1 in. *Heads* $\frac{1}{2}$ in. diam., tomentose; peduncle 2-3 in., slender, pubescent; bracts few, irregular, ovate or linear-oblong; flowers subsessile. *Calyx-lobes* broadly ovate. *Corolla* 1-1 $\frac{1}{2}$ in. long, tube very slender pubescent, lobes obtuse.—In the absence of fruit the position of this genus remains doubtful.

34. **TRISCIADIA**, *Hook. f.*

A glabrous twining shrub, branches stout. *Leaves* softly coriaceous, nerves few; stipules short, broad, shortly connate below, acute or 2-toothed, caducous, leaving an annular scar. *Flowers* white, scented, in 3-6-flowered paniced or ternate peduncled terminal umbels; bracts and bracteoles 0 (perhaps caducous). *Calyx-tube* campanulate; limb membranous, cupular, 5-toothed, ciliate, deciduous. *Corolla* coriaceous, funnel-shaped; tube short, hairy within; throat glabrous; lobes 5, lanceolate, valvate in bud, with incurved tips. *Stamens* 5, on the throat of the corolla, filaments filiform; anthers slender, versatile, exerted. *Ovary* 2-celled; style filiform; stigmas 2 linear-lanceolate; ovules 2 or more in each cell, sunk in a fleshy placenta adnate to the septum. *Fruit* unknown.

1. **T. truncata**, *Hook. f. in Gen. Pl.* ii. 69. *Webera truncata*, *Roxb. Fl. Ind.*, ed. *Carey & Wall.* ii. 538. *Stylocoryne truncata*, *Wall. Cat.* 8403. *Cupia truncata*, *DC. Prodr.* iv. 394. *Pseudixora truncata*, *Miq. Fl. Ind. Bat.* ii. 210.

PENANG; on the hill, Wallich.

Branches cylindric, with pale smooth bark. *Leaves* 4-5 by $1\frac{1}{2}$ -2 in., elliptic, subsacate, brown and shining when dry, nerves few; petiole $\frac{1}{4}$ - $\frac{1}{3}$ in. *Peduncles* 1-2 in.; flowers few, small, shortly pedicelled. *Corolla* $\frac{1}{2}$ in., fleshy, lobes longer than the tube.—This curious plant has been collected by Wallich alone in 1822.

35. ADENOSACME, Wall.

Small shrubs. *Leaves* very membranous, many-nerved; stipules oblong or lanceolate or foliaceous, sometimes toothed and glandular. *Flowers* white, yellow or greenish, in axillary and terminal paniced cymes with spreading branches; bracts often glandular. *Calyx-tube* globose or hemispheric, lobes 4-6, persistent. *Corolla* tubular, short or long; lobes 4-6, triangular, valvate in bud, with everted margins. *Stamens* 4-6, inserted in the tube, filaments short; anthers linear-oblong. *Ovary* 2- or 5-6-celled; style slender or thickened above, stigmas 2- or 5-6 linear; ovules very numerous, on fleshy peltate placentas. *Berry* small, globose, 4-6-lobed, coriaceous or fleshy, 2- or 5-6-celled, indehiscent or loculicidal at the crown, many-seeded, placentas globose. *Seeds* minute, angled, testa dotted; embryo minute, in fleshy albumen.—**DISTRIB.** Species 4-5, Indian and Malayan.

The flowers of this genus are di- or tri-morphic.

* *Berry* 2-celled, white.

1. **A. longifolia**, Wall. Cat. 6280; leaves elliptic-lanceolate, narrowed to a long acuminate point pubescent or puberulous beneath, stipules small oblong-lanceolate, cymes terminal and axillary sessile or shortly peduncled, branches slender divaricating, corolla $\frac{1}{4}$ - $\frac{3}{4}$ in. *Kurz For. Fl.* ii. 160. *A. malayana*, Wall. Cat. 6282. *Bertia javanica* and fasciculata, *Blume Bijdr.* 987; *DC. Prodr.* iv. 392. *Mycetia javanica*, *Reinw.* *Rondeletia longifolia*, Wall. in *Roxb. Fl. Ind.*, ed. Carey & Wall. ii. 137; *Don Prodr.* 138. *Wendlandia longifolia*, *DC. l. c.* 412. *W. malayana*, *G. Don Gen. Syst.* iii. 519.

SUBTROPICAL HIMALAYA and mountains of Eastern Bengal from KUMAON, alt. 4000 ft., to SIKKIM, alt. 2-5000 ft.; KHASIA Mts., alt. 0-5000 ft.; ASSAM, CACHAR, CHITTAGONG, MUNNIPORE, TENERASSERIM, MALACCA, and PENANG.

A bush with very brittle branches, covered with smooth yellowish shining spongy bark. *Leaves* 4-10 in., very variable in width, narrowed into the slender petiole $\frac{1}{4}$ - $2\frac{1}{2}$ in. long, above glabrous puberulous pubescent or with small scattered hairs, beneath always more pubescent or tomentose than above; stipules oblong-lanceolate entire or 2-fid, glabrous hairy or with marginal glands. *Cymes* often 6-8 in. across, 3-chotomously branched, glabrous or pubescent; branches very slender, zig-zag; bracts and bracteoles small, glandular; flowers pedicelled, solitary or fascicled. *Calyx-tube* $\frac{1}{2}$ in., hemispheric or subglobose; teeth about as long, ovate subulate or lanceolate and sinus glandular, persistent. *Corolla* fleshy, $\frac{1}{4}$ - $\frac{3}{4}$ in., glabrous or pubescent, tubular, yellow; lobes small, broadly ovate. *Berries* $\frac{1}{4}$ in. diam., always white.—Flowers (as observed by Wallich and C. B. Clarke) di- or tri-morphous; one form has short styles and stamens inserted over the ring of hairs above the middle of the tube; in another the style is long, and the stamens basal inserted below the ring of hairs; the third has a short wide corolla with the stamens about its middle. In diseased specimens the bracts and calyx-teeth become very hard short broad and toothed, reflexed, white like the bark, and shining.

2. **A. stipulata**, Hook. f.; leaves elliptic or elliptic-lanceolate, acuminate, nerves puberulous beneath, stipules very large foliaceous, cymes terminal with their peduncles pubescent shorter than the leaves, bracts linear, flowers shortly pedicelled corymbose.

E. NIPAL and SIKKIM, alt. 2-5000 ft. in very wet places, J. D. H., C. B. Clarke, &c.

A lax rooting shrub, bark green opaque. *Leaves* 7-10 in., black when dry; petiole $1\frac{1}{2}$ -3 in.; stipules $\frac{3}{4}$ -1 in. diam., orbicular, obtuse, glabrous. *Flowers* in rounded corymbs at the ends of the horizontal cyme-branches. *Calyx-tube* hemispheric, teeth oblong-ovate recurved. *Corolla* in the only flowers seen shorter than the calyx-teeth, with lanceolate lobes and exserted stamens. *Berries* 2-celled, white.

3. *A. macrostachya*, Hook. f.; leaves elliptic-lanceolate acuminate quite glabrous on both surfaces, stipules very large foliaceous, cymes terminal with their peduncles glabrous very slender longer than the leaves, bracts ovate, flowers on slender pedicels lax.

MISHMI hills, in Upper Assam, Griffith.

Very similar to *A. stipulata*, but the leaves, which are a foot long, are quite glabrous, the glabrous cyme far more slender, a foot long, with a peduncle 8 in. long and very distant slender branches 3-5 in. long, bearing loose 3-chotomous peduncles with slender pedicels; the bracts, too, are short and broad.

** *Berry* 5-6-celled.

4. *A. Lawii*, Hook. f.; leaves elliptic-lanceolate acuminate puberulous beneath, stipules small oblong-lanceolate, cymes terminal and axillary sessile or shortly peduncled pubescent, branches divaricating. *Lawia acuminata*, Wight Ic. t. 1070, and in *Calc. Journ. Nat. Hist.* vii. 15.

Mountains of the CARNATIC and TRAVANCORE, Law, Wight, &c.

So similar to *A. longifolia* that I doubt its being other than a form of that plant, with a 5-6-celled ovary. The corolla in the only flowers seen is very shortly tubular, shorter than the subulate-lanceolate calyx-teeth and basal stamens; no doubt there are other forms (as in the case of *A. longifolia*).

36. MYRIONEURON, Wall.

Small shrubs with stout branches and spongy bark. *Leaves* and stipules large. *Flowers* white, in large peduncled terminal rarely axillary capitate or corymbose cymes; bracts rigid, lanceolate. *Calyx-tube* ovoid; lobes 5, lanceolate, exceeding the corolla, rigid, persistent. *Corolla* small, tubular, throat villous; lobes short, erect, hispid, valvate in bud. *Stamens* 5, in the tube of the corolla, filaments short, subulate; anthers linear, included. *Ovary* 2-celled; style short, stigmas 2 linear-oblong coherent; ovules very numerous, on hemispheric placentas. *Berry* ovoid, white, dry or fleshy, with 2 many-seeded cells. *Seeds* minute, angled, testa pitted; embryo minute in fleshy albumen.—DISTRIB. Species 6 or 8, in India beyond the Ganges and Borneo.

1. *M. nutans*, Wall. Cat. 6225; leaves broadly elliptic or obovate abruptly acuminate, nerves 15-20 pair nearly horizontal, heads terminal and axillary shortly peduncled dense-flowered, calyx-teeth subulate-lanceolate rigid. Kurz For. Fl. ii. 55.

ASSAM, Hamilton; KHASIA Mts., alt. 0-3000 ft., De Silva, &c.; CHITTAGONG HILLS, C. B. Clarke.

A small erect shrub, 2-3 ft.; branches very stout, woody, with thick pale spongy bark. *Leaves* 5-10 by $3\frac{1}{2}$ - $5\frac{1}{2}$ in., coriaceous, green when dry, nerves often pubescent beneath; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in.; stipules $\frac{1}{2}$ - $\frac{3}{4}$ in., triangular-lanceolate. *Heads* 1- $1\frac{1}{2}$ in. diam., usually globose, rarely loose with the peduncles exposed, glabrous or pubescent; bracteoles and calyx-teeth $\frac{1}{2}$ in., subulate, rigid, persistent, longer than the tubular corolla, which has short obtuse lobes pubescent on the back. *Fruit* dry.

VAR. *parviflora*; flowers corymbose smaller.—Birma, Griffith.

2. *M. Clarkii*, Hook. f.; leaves elliptic-lanceolate acuminate, nerves 12-15 pair slender very obliquely arched, peduncles simple or branched, calyx-teeth filiform.

CHITTAGONG, J. D. H. & T. T., C. B. Clarke.

Very near *M. nutans*, if not a variety of it; the leaves are much narrower, and longer petioled with fewer and much less prominent obliquely arching nerves, and the bracteoles and calyx-teeth are much more slender and not rigid.

3. **M. angustifolium**, Hook. f.; leaves narrowly elliptic-lanceolate acute, nerves 12-15 pair slender very obliquely arched, bracteoles and calyx-teeth subulate-lanceolate rigid.

BIRMA; hills west of the Hookhoom valley, Griffith.

This again is very near *M. nutans*, differing in the form of its leaves and their nervation, but agreeing in the bracteoles and calyx-teeth.

37. **AULACODISCUS**, Hook. f.

A small glabrous tree, branches thick. *Leaves* coriaceous; stipules triangular, long-acuminate. *Flowers* small, polygamous, in short axillary panicle peduncled cymes, ebracteate. *Calyx* tube broadly hemispheric; limb short, truncate. *Corolla* coriaceous, rotate, 8-16-partite, throat hairy; segments triangular, valvate in bud with incurved tips, margins webbed. *Stamens* 8 or 16, alternate ones irregularly imperfect, filaments flexuous; anthers minute, didymous. *Disk* large, prominent, 8-16-lobed, lobes opposite the petals with hooked tips. *Ovary* 6-16-celled; style very short, thick, stigma large peltate fleshy, 6-16-lobed; ovules numerous, on prominent placentas in the inner angles of the cells. *Berry* small, globose, areolate, usually 8- (6-16-) celled, many-seeded. *Seeds* minute, subglobose, testa thick crustaceous pitted; embryo pyriform, in fleshy and oily albumen.

1. **A. premnoides**, Hook. f. in *Gen. Pl.* ii. 71. *Axanthes enneandra*, Wight in *Calc. Journ. Nat. Hist.* vii. 144.

MALAY PENINSULA, from Tenasserim or the Andaman Islands, Helfer (Kew Distrib. 2938), to MALACCA, Griffith, Maingay (Kew Distrib. 938).

Branches stout, obtusely 4-angled. *Leaves* 5-9 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., linear-oblong, acute, pale brown when dry, nerves numerous; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules $\frac{1}{4}$ - $\frac{1}{2}$ in. *Cymes* 1- $1\frac{1}{2}$ in. diam., corymbose, trichotomous, pubescent; peduncles $\frac{1}{2}$ -1 in., suberect; bracts leafy. *Flowers* $\frac{1}{10}$ in. diam. *Berry* $\frac{1}{4}$ in. diam., globose.

38. **UROPHYLLUM**, Wall.

Trees or bushes with slender terete branches. *Flowers* (sometimes unisexual) small, in axillary sessile or peduncled heads cymes or corymbs, pedicels short bracteolate at the base. *Calyx*-tube short; limb cup-shaped, 5- (4-7-) toothed, persistent. *Corolla* coriaceous, tube short, throat villous; lobes 5 (4-7) triangular, valvate in bud. *Stamens* 5 (4-7) on the throat of the corolla, filaments short; anthers linear, acute. *Ovary* 5- (4-7-) celled; style short, often swollen at the base, stigma various; ovules numerous, placentas attached to the inner angles of the cells. *Berry* small, 4-5-celled, many-seeded. *Seeds* minute, subglobose, testa crustaceous pitted; embryo clavate, in fleshy albumen. —DISTRIB. Species about 35, tropical Asiatic and African, and 1 Japanese.

* *Branches and leaves beneath glabrous.* (See also Sp. 6, 7, and 8.)

1. **U. ellipticum**, Thw. *Enum.* 419; quite glabrous, leaves 6-9 in. oblong-lanceolate acuminate, stipules long, cymes sessile dense-fl., flowers unisexual glabrous without, petals bearded within. *Axanthes elliptica*, Wight in *Calc. Journ. Nat. Hist.* vii. 147, t. 2, f. 3; *Ic.* t. 1164; *Thw. l. c.* 139.

CEYLON; central province, alt. 4-7000 ft., *Wight, Walker, &c.*

A tree? (*Wight*). *Branches* terete, puberulous upwards. *Leaves* rather coriaceous, narrowed at both ends; petiole $\frac{1}{2}$ -1 in., and midrib above with a few short appressed hairs; stipules $\frac{3}{4}$ in., rigid, erect, narrowly lanceolate, coriaceous. *Cymes* $\frac{1}{2}$ in. diam. *Flowers* very shortly pedicelled, black when dry, $\frac{1}{4}$ in., dull orange (*Thwaites l. c. 139*), white (*Ic. 419*). *Berries* orange.

2. *U. zeylanicum*, *Thw. Enum.* 418; quite glabrous, leaves 3-5 in. ovate or elliptic-lanceolate obtusely acuminate, stipules short, cymes peduncled umbellate, flowers unisexual. *Axanthus ceylanica*, *Wight in Calc. Journ. Nat. Hist.* vii. 146, t. 2, f. 2; *Ic. t. 1163*; *Bedd. Fl. Sylv. Anal. Gen.* xvi. f. 2.

CEYLON; central province, alt. 4-7000 ft., *Wight, Walker, &c.*

Branches terete, more slender than in *U. elliptica*. *Leaves* coriaceous, narrowed at both ends; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in.; stipules triangular. *Cymes* solitary or in pairs; peduncle shorter than the petiole; pedicels $\frac{1}{2}$ in. *Flowers* about $\frac{1}{2}$ in. diam., sometimes puberulous. *Berries* orange-yellow.

3. *U. Griffithianum*, *Wight in Calc. Journ. Nat. Hist.* vii. 147 (*Axanthus*); leaves 6-9 in. glabrous elliptic or obovate-oblong abruptly caudate-acuminate, stipules $\frac{3}{4}$ in. lanceolate from a broad base, cymes umbellate, corolla-lobes acute. *Urophyllum* sp., *Wall. Cat.* 8322.

SINGAPORE, *Wallich*; MALACCA, *Griffith* (Kew Distrib. 2945, 2946), *Maingay* (881).

Branches rather slender. *Leaves* shortly petioled; stipules $\frac{1}{2}$ in., coriaceous, erect, lanceolate from a broad base. *Cymes* solitary or in pairs from each axil; peduncle longer or shorter than the petiole, and pedicels and calyx usually minutely warted and puberulous; pedicels $\frac{1}{2}$ - $\frac{1}{4}$ in. *Flowers* $\frac{1}{2}$ in. diam.; corolla-lobes glabrous, triangular, acute, membranous.—*Griffith's* No. 2945 has large leaves rounded at the base, longer petioles, and very broad ovate-oblong stipules.

4. *U. glabrum*, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 186; *Cat.* 8316, excl. B.; glabrous, leaves elliptic-oblong or lanceolate or linear or obovate-lanceolate caudate-acuminate, stipules very narrow linear silky, cymes glabrous or hoary sessile or peduncled and umbellate, calyx-lobes obtuse. *DC. Prodr.* iv. 441; *Kurz For. Fl.* ii. 53. *Urophyllum*, *Wall. Cat.* 8318, 8319. *U. arboreum*, *Korth. in Ned. Kruidk. Arch.* ii. 194. *U. repandulum*, *Miq. Fl. Ind. Bat.* ii. 353. *Axanthus arborea*, *Blume Bijl.* 1603. *Wallichia arborea*, *Reinw. ex Blume in Flora*, 1825, 107.

SOUTH TENASSERIM, *Kurz, Helfer*. SINGAPORE, PENANG, and MALACCA, *Wallich, Maingay, &c.* (Kew Distrib. 883).—DISTRIB. Java, Borneo.

Very near indeed to *U. Griffithianum*, and probably not specifically distinct, but the stipules are always very narrow, the leaves (which vary greatly in shape and from 3-10 in. in length) have more regular transverse veins, and the corolla-lobes appear to be obtuse. The leaves are either gradually or abruptly narrowed into narrow ligulate points sometimes nearly 1 in. long; the cyme, peduncles and pedicels are sometimes pubescent, and the flowers vary much in size; hence more than one species may be confounded under the above synonyms and numbers. *Helfer's* Tenasserim plant has longer petioles, sessile cymes, and a hairy midrib beneath; it more resembles *Griffithianum*, but has very narrow stipules.

** *Branches* more or less hairy (sometimes glabrate in sp. 6, 7, and 8).

5. *U. hirsutum*, *Wight in Calc. Journ. Nat. Hist.* vii. 148 (*Axanthus*); branches densely tomentose, leaves subsessile ovate- or oblong-lanceolate caudate-acuminate pubescent beneath, stipules $\frac{1}{2}$ -1 in. linear-lanceolate, cymes small sessile capitate, calyx and corolla tomentose. *Wendlandia*? *bifaria*, *Wall. Cat.* 6278.

SINGAPORE, *Wallich*; MALACCA, *Griffith* (Kew Distrib. 2939), *Maingay* (873).

Branches slender, and stipules, petioles, leaf-nerves beneath and cymes with

spreading pubescence. *Leaves* 3-4 in., glabrous or pubescent above, base rounded or cordate; stipules slender, gradually tapering from the base upwards. *Cymes* $\frac{1}{4}$ - $\frac{1}{3}$ in. diam.; flowers small, subsessile, $\frac{1}{2}$ in. diam. *Berries* pedicelled, pubescent.—Wallich's *Urophyllum*, 8315, from Singapore, resembles this, but has much larger leaves, 6-8 in., narrowed at the base, petioles $\frac{1}{2}$ in., and shortly peduncled cymes with glabrous fruit. The specimens are very imperfect.

6. ***U. longifolium***, *Wight in Calc. Journ. Nat. Hist.* vii. 145, t. 2, f. 1; *Id.* t. 1165 (*Axanthes*); young branches villous or glabrate, leaves large petioled membranous elliptic-lanceolate acuminate, nerves beneath and lanceolate stipules tomentose, cymes sessile with the peduncles and pedicels tomentose, flowers glabrous. *U. strigosum*, *Kurz For. Fl.* ii. 53, *not of Korthals*.

TENASSERIM, *Helfer* (Kew Distrib. 2940); Mergui, *Griffith, Kurz*.

Branches slender, obtusely 4-angled, the last internode usually villous. *Leaves* 6-10 in., hardly caudate at the tip, base acute or rounded, midrib above pubescent, beneath tomentose, as are the petiole and stipules. *Bracts* conspicuous though small.—Kurz refers this (*Journ. As. Soc. Beng.* 1877, ii. 161) to *U. glabrum*, which differs in the glabrous cyme and leaves, and in the Forest Flora to Blume's *Axanthes strigosa*, a Javanese mountain plant, described by its author and by Miquel as having silky strigose branches, cymes, and nerves beneath, acute calyx-teeth and subcoriaceous leaves, characters wholly different from those of *U. longifolium*. The Tenasserim form of *U. glabrum* almost unites that variable species with this.

7. ***U. streptopodium***, *Wall. Cat.* 8317, *partly*; branches petioles nerves beneath stipules and cymes thinly appressed-hairy, leaves petioled elliptic-oblong or lanceolate, stipules linear-lanceolate, cymes sessile, male calyx truncate, female 5-toothed, corolla glabrous tubular cleft at the top, style elongate. *U. parviflorum*, *Wall. Cat.* 8320. *Geniostoma acuminatum*, *Wall. in Roxb. Fl. Ind.*, ed. Carey & Wall. ii. 316; *Cat.* 9067. *Urophyllum*, *Wall. Cat.* 8316, *in part*, and 8316 B.

MALACCA and PENANG, *Wallich, Griffith* (Kew Distrib. 2941, 2942), *Maingay* (882).

Whole plant pale blue when dry, and best distinguished by the appressed white hairs on the branches, narrow stipules, toothed female calyx, and form of the corolla; but I find great difference in the size of the corolla, which is sometimes cleft at the top only, and at others much lower down.—Wallich's 8316 B., from "Herb. Finlayson" (from Siam, I suppose), has very fine points to the leaves, and large flowers; his 8320 (*U. parviflorum*) has slender branches, small narrow leaves and stipules, and minute imperfect flowers; it may be a different species.

8. ***U. Blumeum***, *Wight in Calc. Journ. Nat. Hist.* iv. 145 (*Axanthes*); branches slender slightly hairy, leaves petioled elliptic-lanceolate or oblanceolate caudate-acuminate, petioles and cyme-branches and linear-lanceolate stipules silkily-pubescent, cymes peduncled subumbellate simple or branched lax-flowered, female calyx truncate, corolla glabrous. Timonius? *acuminatus*, *Wall. Cat.* 6218. *U. streptopodium*, *Wall. Cat.* 8317, *in part*, and *U. glabrum*, 8316, *in part*, and ? 8315.

PENANG, *Porter, Wallich*; MALACCA, *Griffith* (Kew Distrib. 2943); SINGAPORE, *Wallich, Lobb*.

Very closely allied to *U. streptopodium*, differing in the less silkily hairy branches, peduncled more pubescent cymes with looser flowers, and apparently always truncate male calyx, though of this I am not quite sure.—Wallich describes the calyx as "hairy without," which I do not find to be the case. The contents of the sheet to which the ticket *U. glabrum* of Wallich's 8317 is attached, are four specimens of this and one of a non-rubiaceous plant. Wallich's 8315 may be a large state of this, but it is far more robust and in an imperfect state.

9. ***U. villosum***, *Wall. in Roxb. Fl. Ind.*, ed. Carey & Wall. ii. 185; *Cat.* 8314; branches very stout petioles cymes and nerves beneath densely tomen-

tose, leaves very large ovate-lanceolate or linear-oblong coriaceous caudate-acuminate, stipules linear-lanceolate, cymes sessile or peduncled capitate and flowers densely tomentose. *DC. Prodr.* iv. 441.

PENANG, Wallich, Maingay (Kew Distrib. 884); SINGAPORE, Lobb.

Branches as thick as the little finger, cylindric. Leaves 6-12 by 2-4 in., tail very slender 1-1½ in., pubescent, especially on the nerves beneath, green when dry. Cymes ½-1 in. diam.; bracts often exceeding the flowers, which are the largest of the genus; peduncle, if present, very stout. Berry ¼ in. diam., pubescent, crowned with the calyx-teeth.

39. SCHIZOSTIGMA, Arn.

A creeping hirsute herb. Leaves membranous; stipules broadly ovate, acute. Flowers 1-3 together, subsessile, axillary with 2 stipular bracts. Calyx-tube obovoid; limb produced, throat hirsute; lobes 5, lanceolate, unequal, persistent. Corolla funnel-shaped, throat pubescent; lobes 5, ovate-lanceolate, valvate in bud with incurved tips. Stamens 5, in the throat of the corolla, filaments short; anthers linear, half exserted. Ovary 5-7-celled; style filiform, stigmas 5-7 linear; ovules crowded on placentas in the inner angles of the cells. Berries ovoid, 5-7-celled, many-seeded. Seeds minute, ovoid, testa mucilaginous; embryo clavate, in fleshy oily albumen.

1. *S. hirsutum*, Arn. in *Ann. Nat. Hist.* iii. 20; *Thw. Enum.* 139; *Bedd. Ic. Pl. Ind. Or.* t. 95. Rubiaceæ, Wall. Cat. 8463.

CEYLON; southern districts, ascending to 2000 ft., Walker, &c.

Stem flexuous, extensively creeping and rooting, sending up short erect leafy branches 4-8 in. high. Leaves 1½-2½ in., pale brown when dry, elliptic, acute, hirsute on both surfaces, nerves slender; petiole ¼-½ in.; stipules ½ in. Flowers white, ⅔ in. diam. Berries the size of a small cherry.—Wallich's specimens are marked as from Hb. Finlayson, but as Finlayson collected only in Siam and the Malay Peninsula (so far as is known) there is no doubt some error.

40. LECANANTHUS, Jack.

A rooting small glabrous shrub, branches acutely 4-angled. Leaves petioled stipules large. Flowers reddish, crowded in axillary sessile or peduncled nodding involucrate heads. Calyx-tube ovoid or turbinate; limb obliquely campanulate, unequally obtusely 2-4-lobed or 2-lipped, persistent. Corolla funnel-shaped; tube inflated at the base; lobes 5, thick, obtuse, bearded at the tip, valvate in bud. Stamens 5, on the throat of the corolla, filaments short; anthers 2-lobed. Disk urn-shaped. Ovary 2-celled; style filiform, stigmas 2 linear or oblong; ovules numerous on spongy placentas attached to the septum. Fruit membranous, 2-celled, mucilaginous within, many-seeded, placentas thick. Seeds obtusely angled, testa thick smooth; embryo small in fleshy albumen.

1. *L. erubescens*, Jack in *Mal. Misc.* ii. 83; *Wall. in Roxb. Fl. Ind.*, ed. Carey & Wall. ii. 319; *Cat.* 6224; *DC. Prodr.* iv. 620. *Lecananthus* sp., *Griff. Notul.* iv. 272.

SINGAPORE, Wallich, Lobb; MALACCA, Griffith (Kew Distrib. 2784), Maingay (912). —DISTRIB. Sumatra, Borneo.

Stem a foot high, stout, brown when dry. Leaves 3-6 by 1-2 in., elliptic elliptic-ovate or linear-oblong, acuminate, opaque, nerves faint; petiole short; stipules ½ in., ovate-lanceolate, acuminate. Heads ¾-1 in. diam.; the foliaceous calyces imbricating; peduncle 0 or short, glabrous or puberulous; involucre small, lobed. Calyx purplish, limb enlarged in fruit. Corolla pink.—I know of but one species of this genus.

41. **KEENANIA**, Hook. f.

A low subherbaceous shrub; stem woody, flexuous, cylindric. *Leaves* opposite, elongate-oblongate, abruptly acuminate, narrowed into the petiole, membranous; stipules long, interpetiolar, subulate from an ovate-lanceolate base. *Flowers* sessile, in dense bracteate terminal solitary subsessile involucrate heads, mixed with coriaceous imbricating concave bracts; outer bracts orbicular, inner oblong or spatulate, concave; bracteoles 2, spatulate, coriaceous, equalling the flowers. *Calyx-tube* fleshy, shortly oblong; limb of 5 rarely 6 large oblong or spatulate, coriaceous, obtuse or acute, unequal, erect, concave, imbricating lobes. *Corolla* about equalling the calyx-lobes; tube inflated, glabrous; lobes 5, short, orbicular-ovate, apiculate, papillose externally, valvate in bud; throat with a ring of stiff hairs. *Stamens* 5, epigynous, seated at the base of the broad-lobed disk; filaments short; anthers small, linear, obtuse, without pollen. *Ovary* 2-celled; style short, stigmas 2 flat ovate acute; ovules very numerous, crowded on globose placentas adnate to the membranous septum.

1. **K. modesta**, Hook. f.

CACHAR; at the Doarband Pass, R. L. Keenan.

Stem as thick as a goose-quill, apparently inclined or prostrate, puberulous above, as are the petioles. *Leaves* 6–12 by $1\frac{1}{2}$ –3 in., membranous, green when dry, midrib slender, and 15–20 pair of almost horizontal slightly arched nerves, puberulous beneath; petiole $\frac{3}{4}$ –1 in.; stipules $\frac{1}{2}$ –1 in., somewhat recurved. *Heads* nodding, globose, 1 in. diam.; bracts and bracteoles green. *Flowers* probably unisexual, those of the specimens ♀. *Calyx* $\frac{1}{2}$ in. long, the lobes much longer than the tube.—A very distinct genus, allied to *Lecananthus*, but differing widely in the calyx and terminal inflorescence. The distinctly epigynous stamens (evidently those of a ♀ plant) resemble those of one form of *Adenosacme*. I have named it after Mr. Keenan, once an employé of Kew, who formed an excellent collection of Cachar plants in 1874, which he presented to the Herbarium of the Royal Gardens.

TRIBE VI. **GARDENIÆ.**42. **WEBERA**, Schreb.

Trees or shrubs. *Leaves* opposite, petioled; stipules triangular-ovate, usually deciduous. *Flowers* in terminal corymbiform cymes, sessile and 2-bracteole at the ovary, or pedicelled and bracteolate on the pedicel. *Calyx-tube* ovoid or turbinate; limb short or long, 5- very rarely 4-fid or -partite. *Corolla* funnel- or salver-shaped, tube short or long, throat glabrous or pubescent; lobes 5, rarely 4, narrow, rarely short, spreading or reflexed, twisted in bud. *Stamens* 5, rarely 4, on the corolla-mouth; filaments short or 0; anthers slender, exerted. *Ovary* 2-celled; style stout, usually pubescent; stigma long and spindle-shaped, grooved, usually far exerted; ovules numerous, rarely few or 2 or solitary in each cell, often immersed in fleshy peltate placentas. *Berry* small, globose, 2-celled, cells 1-many-seeded. *Seeds* plano-convex or cupped, rarely angled; testa various, albumen fleshy or horny; embryo small, cotyledons leafy, radicle pointing variously.—DISTRIB. About 40 species, tropical Asiatic.

As here defined *Webera* includes the 5-merous-flowered plants with 1-ovuled ovarian cells which have been hitherto referred to *Ixora* and *Pavetta*, from which they further differ in their short pubescent styles and stout fusiform grooved stigma.

SECT. I. **Euwebera**. Ovules 2 or more in each cell.

* *Corolla-tube equalling or shorter than the lobes.*

1. **W. corymbosa**, Willd.; *Roxb. Fl. Ind.* i. 696; glabrous, leaves elliptic- or oblong-lanceolate acute or acuminate, corolla glabrous externally, tube broad about equalling the lobes, berries few-seeded. *Gaertn. Fruct.* t. 192; *Bot. Reg.* t. 119. *W. asiatica*, Bedd. *Fl. Sylv.*, Anal. Gen. xvi. f. 2; *Kurz For. Fl.* ii. 47. *W. glomeriflora*, Kurz l. c. *W. cerifera*, Moon Cat. 19. *Rondeletia asiatica*, Linn. *Canthium corymbosum*, Pers. *Synops.* i. 200. *Cupea corymbosa*, DC. *Prodr.* iv. 394. *Stylcoryne* sp., Wall. Cat. 8408. *S. Webera*, A. Rich.; *W. & A. Prodr.* 401; Wall. Cat. 8401, excl. A. in part. B. C. E. F. G. H.; *Thw. Enum.* 148; *Wt. Ic.* t. 309, 584; *Dalz. & Gibs. Bomb. Fl.* 119. *S. rigida*, Wt. *Ic.* t. 1064. *Polyozus*? *madraspata*, DC. l. c. 495. *Pavetta Wightiana*, Wall. Cat. 6167.—*Rheede Hort. Mal.* ii. t. 23.

WESTERN PENINSULA, from the Concan southwards, and CEYLON, common.—
DISTRIB. Malay Islands.

A large shrub or small tree, glabrous except the cymes sometimes, almost olive-black or brown when dry. Leaves 3–8 by $\frac{3}{4}$ –3 in., coriaceous, shining above, often glaucous beneath; petiole short, stout; stipules very coriaceous, acute or mucronate, often sheathing. Cymes and flowers very variable in size, faintly odorous. Calyx glabrous or pubescent; limb shortly or deeply lobed, lobes glabrous or ciliate. Corolla $\frac{1}{3}$ – $\frac{3}{4}$ in. diam., lobes glabrous or puberulous within, white. Style hairy or glabrous. Berries size of a pea, with the calyx-limb persistent or not.—A very variable plant. Var. *cerifera* of Thwaites, from Ceylon is remarkable for its very coriaceous leaves, and the copiously resinous secretion at the nodes, &c.; a character, however, of usual occurrence, according to Roxburgh. *S. rigida*, Wt., is a robust small-leaved form.

2. **W. odorata**, Roxb. *Hort. Beng.* 15; *Fl. Ind.* i. 699; leaves elliptic-lanceolate acuminate glabrous, cymes many-fl. pubescent, flowers pedicelled, corolla-tube slender pubescent shorter than the linear lobes. *W. macrophylla*, Roxb. l. c. 697. *Pavetta weberæfolia*, Br. in Wall. Cat. 6182 A., in part. *P. cerberæfolia* (by error), Miq. *Fl. Ind. Bat.* ii. 279. *Stylcoryne Webera*, Wall. Cat. 8401 K. *S. penangensis*, Miq. l. c. 207. *Cupia macrophylla*, DC. *Prodr.* iv. 394.

SILHET, ASSAM, and the KHASIA MTS., De Silva, Griffith, &c. (Kew Distrib. 3009).
MUNEYPOOR, C. B. Clarke. PENANG, Roxburgh, Wallich.

A shrub, black when dry. Leaves 5–9 by 2–3 in., membranous; petiole short; stipules acute, deciduous. Cymes large, corymbose; bracts linear; pedicels slender. Calyx minutely toothed. Corolla-tube $\frac{1}{4}$ in., lobes nearly twice as long. Ovules few. Berries “size of a pea” (Roxb.).—I find no difference between the flowering specimens from Bengal and Penang, but have seen fruits of neither. Roxburgh describes the berry of the Penang plant (*macrophylla*) as “many-seeded, as in *W. corymbosa*,” that of the Silhet one (*odorata*) as having only 3–4 ovules in each cell. This differs from *corymbosa* in the slender pubescent corolla-tube and the bracts.

3. **W. disperma**, Hook. f.; leaves elliptic- or linear-lanceolate acuminate glabrous, cymes pubescent many-flowered, corolla-tube broad pubescent shorter than the lobes, berries 2-seeded.

SILHET and the KHASIA MTS., Griffith (Kew Distrib. 2786); alt. 1–4000 ft., J. D. H. & T. T.

A shrub. Leaves olive-brown when dry, 4–10 by $1\frac{1}{2}$ –3 in., very variable in width; petiole $\frac{1}{2}$ – $\frac{2}{3}$ in.; stipules triangular-lanceolate. Cymes shortly peduncled, more robust shorter and fewer-flowered than in *W. odorata*; calyx larger obtusely-toothed. Corolla similar, but with a broader tube. Ovary with 2 ovules in each cell (rarely more), sunk collaterally in a large spongy placenta. Berries very much larger, $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., with one hemispheric seed in each.—A Bornean species (Beccari, 380) resembles this closely in foliage and flowers, but I have not seen its fruit.

4. **W. pumila**, *Hook. f.*; dwarf, leaves small rigid lanceolate glabrous apiculate, corymbs small subcapitate hirsute, corolla glabrous externally, tube equalling the limb, berries several-seeded.

KHASIA Mts.; Borpane river, alt. 1-1500 ft., *Simons, Lobb, J. D. H. & T. T.*

A rounded erect shrub, a foot or two high, with very woody short crowded branches. *Leaves* $1\frac{1}{2}$ -2 in., subsessile, pale brown when dry, margin recurved; petiole and triangular stipules pubescent. *Cymes* $\frac{1}{2}$ -1 in. diam., hirsute. *Calyx-teeth* minute. *Ovary-cells* 3-4-ovuled. *Corolla* white, tube and lobes about $\frac{1}{4}$ in. long. *Berries* size of a small pea, shortly pedicelled, crowned by the calyx-limb. *Seeds* angled.—Quite unlike its congeners in its dwarf size, pale brown colour when dry, and the contracted corymbs.

** *Corolla-tube longer than the lobes.*

5. **W. monosperma**, *W. & A. Prodr.* 401 (Stylcoryne); glabrous, leaves oblanceolate acuminate, corolla glabrous externally, tube much longer than the lobes, berry 1-seeded. *Wt. Ic. t.* 317.

TRAVANCORE; at Courtallam, *Wight*.

A shrub, olive-brown when dry, branches rather slender. *Leaves* 4-9 by $1-2\frac{1}{2}$ in., rather thin, narrowed into the short petiole; stipules triangular. *Cymes* many-flowered, corymbose, glabrous. *Calyx-teeth* minute. *Corolla-tube* $\frac{2}{3}$ in., lobes $\frac{1}{3}$ in. *Ovary-cells* 2-3-ovuled. *Berries* "white, size of a small cherry" (*Wt.*).

6. **W. fragrans**, *Blume Bijl.* 982 (Stylcoryne); branches and leaves glabrous, leaves elliptic or elliptic-lanceolate acute, cymes pubescent open many-flowered, corolla-tube very long slender much longer than the lobes, berries many-seeded. Stylcoryne fragrans, *DC. Prodr.* iv. 377. *S. laxiflora*, *Blume Bijl.* 983; *DC. l. c.* *S. lucida*, *Mig. Fl. Ind. Bat. Suppl.* 541. *Rondeletia lucida*, *Wall. Cat.* 8453. *Ceriscus fragrans*, *Nees in Flora*, 1825, 116. *Wahlenbergia fragrans*, *Blume Cat. Hort. Buit.* 13.

MALACCA and SINGAPORE, *Wallich, &c., Maingay* (Kew Distrib. 893).—DISTRIB. Banca, Java, Borneo.

A small tree, "sometimes 60 ft." (*Hasskarl*), branches 4-angled. *Leaves* pale brown, 4-6 in., narrowed into the petiole, rather shining above, nerves beneath sometimes puberulous; stipules triangular. *Cymes* 3-4 in. diam.; pedicels slender, bracts linear. *Calyx-teeth* triangular. *Corolla-tube* 1 in., 5 times as long as the linear-oblong lobes. *Berries* size of a pea. *Seeds* angular.

7. **W. costata**, *Mig. Fl. Ind. Bat.* ii. 203 (Stylcoryne); leaves obovate obtuse or subacute glabrous or with midrib beneath and nerve-axils pubescent, cymes many and dense-flowered densely pubescent, corolla-tube slender pubescent much longer than the short lobes.

MALACCA, *Griffith* (Kew Distrib. 2791), *Maingay* (945).—DISTRIB. Sumatra, Banca.

A large tree, branches woody, branchlets tomentose. *Leaves* 6-9 by $2\frac{1}{4}$ - $4\frac{1}{2}$ in., dark brown when dry, coriaceous, narrowed into the short petiole. *Cymes* shortly peduncled, $1\frac{1}{2}$ -2 in. diam., bracts minute. *Calyx-lobes* very short, limb deciduous. *Corolla-tube* $\frac{3}{4}$ in.; lobes $\frac{3}{8}$ the length of the tube, oblong. *Berries* size of a pea, many-seeded.—I have seen only imperfect fruiting specimens of *Miquel's W. costata*, which agree perfectly with this.

8. **W. Maingayi**, *Hook. f.*; branches leaves beneath and cymes tomentose, leaves ovate caudate-acuminate glabrous above, cymes subcapitate, corolla-tube slender tomentose much shorter than the lobes, berries many-seeded.

MALACCA; Mount Ophir, *Griffith* (Kew Distrib. 3081), *Maingay* (932).

A shrub, branches terete. *Leaves* brown when dry, 3-6 in., coriaceous, base rounded; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules lanceolate, tomentose. *Cymes* 2-3 in. diam.,

almost hispid; bracts linear. *Calyx-teeth* subulate. *Corolla-tube* $\frac{1}{2}$ in.; lobes $\frac{1}{2}$ the length of the tube, oblong. *Berries* size of a pea; with persistent calyx-teeth. *Seeds* broadly cuneate, sides smooth, back granulate.—Very near a Bornean species (Beccari, n. 1263).

9. **W. mollis**, *Wall. Cat.* 8454 (Rondeletia?); softly tomentose, leaves elliptic or elliptic-lanceolate or oblanceolate acuminate, cymes open many-flowered with long spreading hairs, calyx-tube slender pubescent much longer than the lobes, berries many-seeded.

SINGAPORE, *Wallich*; PENANG, *Maingay* (Kew Distrib. 894).

A small tree; branches robust, softly tomentose and covered with long spreading hairs, as are the cymes petioles and midrib beneath. *Leaves* either broad, 6–8 by 3–4 in., or narrow 4–5 by 1–2 in., uniformly tomentose above, pale brown when dry; petiole short; stipule large, ovate-lanceolate. *Cymes* subsessile, very many-flowered. *Calyx-teeth* lanceolate, deciduous. *Corolla-tube* $\frac{1}{2}$ in., 4 times as long as the oblong short lobes. *Berries* size of a pea. *Seeds* angular.

SECT. II. **Pseudixora**. Cells of the ovary 1-ovuled.

† *Tube of the corolla shorter than the lobes.*

10. **W. stellulata**, *Hook. f.*; quite glabrous or nearly so, leaves elliptic-lanceolate acuminate, nerves 7–9 pair, petiole slender, cymes small sessile or shortly peduncled, flowers sessile 2-bracteolate; calyx-teeth ovate-lanceolate, corolla-lobes longer than the tube, the minute subulate tips stellately spreading in bud. *Stylocoryne* *Webera*, *Wall. Cat.* 840, I. *in part.* ? *Pavetta aristata*, *Wall. Cat.* 6169.

PENANG, *Wallich*, *Griffith* (Kew Distrib. 3086); MALACCA, *Maingay* (850): ? TAVOY, *Gomez*.

Branches slender, smooth, and whole plant either black or dirty green when dry. *Leaves* 6–9 by 2–3 in., membranous, shining above, glabrous or puberulous beneath; nerves slender; petiole $\frac{1}{4}$ –1 in.; stipules with a slender cusp. *Cymes* 1–1 $\frac{1}{2}$ in. diam.; bracts subulate-lanceolate, persistent; branches short and calyx puberulous; flowers $\frac{1}{4}$ in. long. *Corolla* with a ring of hairs in the throat; lobes lanceolate, ciliolate. *Style* hirsute; stigma long, fusiform, grooved.—I have not in any specimens (I have examined 7) found the corolla to open; the stellate tips of its lobes are remarkable. A mere scrap is on the sheet 8401 I. of Wallich's Herbarium, but good specimens were distributed by him under that number to both the Hookerian and Benthamic Herbaria. Wallich's specimen of *Pavetta aristata* is probably the same, but I have no other Tenasserim example. The nerves are more numerous, and it has longer cusps to the stipules; it is in young fruit only. *Maingay* in his notes states that the ovary-cells have several ovules; I find only one in each.

11. **W. attenuata**, *Hook. f.*; quite glabrous, leaves elliptic-lanceolate or oblanceolate acuminate polished above, nerves 5–7 pair very oblique, cymes sessile or shortly peduncled brachiate glabrous lower branches rather long, flowers pedicelled ebracteolate, calyx-teeth short triangular, corolla glabrous, lobes linear longer than the tube, throat pubescent. *Stylocoryne* *attenuata*, *Voigt Hort. Suburb. Calcut.* 377. S. *Webera*, *Wall. Cat.* 8401 F. (*in Herb. Hook. & Benth.*); *Benth. Fl. Hongk.* 156.

Cultivated in the Calcutta Botanic Gardens; no doubt from China or the Khasia Mts.—DISTRIB. Hongkong.

A shrub or small tree, black when dry. *Leaves* 3–4 by 1–1 $\frac{1}{2}$ in., coriaceous, narrowed into a petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Cymes* 1–2 in. high, branches not divaricate except in fruit; bracts and bracteoles on the pedicels small; flowers white, $\frac{1}{2}$ in. diam., quite glabrous. *Stigma* fusiform. *Fruit* size of small pea.—There are no specimens of this in Wallich's Herbarium, but good ones were distributed by him to Herbariums

of Hooker and Bentham, under the number 8401 F., and it is unquestionably the Hongkong plant. We have also Calcutta Garden specimens from Griffith (Kew Distrib. 2794) with the name *W. attenuata*. Voigt (Hort. Subub. Calcutta) couples it with *St. coriacea*, giving to both the habitat "(China) Khasia hills," and so many Chinese plants are Khasian that it may well be found there.

12. **W. longifolia**, *Hook. f.*; branches petioles leaves beneath and cymes softly-tomentose, leaves petioled elongate elliptic-lanceolate or oblanceolate caudate-acuminate membranous, nerves 16-30 pairs, peduncles long slender, flowers pedicelled, corolla pubescent. *Ixora longifolia*, *G. Don Gen. Syst.* iii. 573; ? *Kurz For. Fl.* ii. 17. I. macrophylla, *Br. in Wall. Cat.* 6165, not of *Bartl.* *Pavetta longifolia*, *Miq. Fl. Ind. Bat.* ii. 275.

PENANG, *Wallich, Phillips*.

Branches slender. *Leaves* 10-12 by 2-3 in., membranous, glossy above, brown when dry, narrowed into the 1-1½ in. petiole, nerves very slender; stipules short, broad. *Peduncle* very slender, 4-6 in., brachiate at the top; bracts ¼ in., filiform. *Flowers* shortly pedicelled. *Calyx-teeth* subulate-lanceolate, as long as the tube. *Corolla* not seen. *Ovules* 1 in each cell.

13. **W. grandifolia**, *Hook. f.*; leaves elliptic or obovate-lanceolate caudate-acuminate glabrous, nerves 12-15 pairs, cymes long-peduncled tomentose, flowers pedicelled pubescent ebracteolate at the base, corolla-tube much shorter than the linear lobes. *Ixora grandifolia*, *Br. in Wall. Cat.* 6134.

SINGAPORE, *Wallich*; MALACCA, *Griffith* (Kew Distrib. 2795, 2796), *Maingay* 854.

Branches glabrate. *Leaves* 5-12 by 2½-4½ in., membranous, blackish when dry, polished above; petiole ¼-1 in.; stipules triangular, acuminate. *Cymes* brachiate, long peduncled, or with long deflexed branches; lowest bracts foliaceous, upper filiform. *Flower-buds* ½ in. *Calyx-teeth* rounded, shorter than the tube. *Corolla-tube* short, nearly glabrous within. *Ovules* 1 in each cell.

14. **W. Wallichii**, *Hook. f.*; glabrous, leaves long-petioled elliptic-lanceolate caudate-acuminate, nerves 12-15 pairs, cymes sessile glabrous lower branches long suberect, flowers 2-bracteolate at the base sessile, calyx-teeth triangular acute, corolla glabrous, lobes linear-oblong much longer than the short tube, throat woolly, seeds plano-convex. *Stylocoryne Webera*, *Wall. Cat.* 8401 L., for the most part. *Pavetta weberifolia*, *Wall. Cat.* 6182 A., in part, B.

PENANG, *Wallich*; MALACCA, *Griffith* (Kew Distrib. 3004, 3084), *Maingay* (851). —DISTRIB BORNEO.

A bush; branches slender, and leaves black when dry. *Leaves* 5-7 by 1½-2 in., membranous, usually shining above; petiole slender, ½-1 in.; stipules triangular, cuspidate. *Cymes* 2-3 in., not brachiate, branches with sometimes a line of pubescence on one side, lower suberect; bracts linear-lanceolate, persistent; bracteoles triangular, acute. *Corolla-tube* ½ in.; lobes linear, much longer, margins sometimes ciliate. *Style* villous, stigma narrowly fusiform. *Fruit* size of a pea. *Seeds* plano-convex. — At first sight like *W. odorata*, but the cymes are glabrous, as is the much shorter corolla-tube; the flowers are sessile and 2-bracteolate, and the ovules solitary. A similar plant from the confines of Birma and Assam, collected by Griffith on the Tsegai hills, has shorter very coriaceous leaves, with fewer nerves.

15. **W. Kurzii**, *Hook. f.*; glabrous, leaves petioled elliptic- or obovate-lanceolate acuminate, nerves 8-10 pair, cymes sessile glabrous, flowers pedicelled ebracteolate at the base, calyx-teeth triangular obtuse, corolla glabrous, lobes linear-oblong much longer than the tube, throat woolly, seeds concavo-convex. *Ixora weberifolia*, *Kurz in Journ. As. Soc.* 1877, ii. 146; *For. Fl.* ii. 18. *Stylocoryne Webera*, *Kurz in Andaman Rep.* B. 10.

ANDAMAN and NICOBAR ISLANDS, in the coast forests, *Kurz*.

Very similar to *W. Wallichii*, but differing in the pedicelled ebracteolate flowers, and more obtuse calyx-lobes, and the seeds, which are deeply excavated ventrally.

16. **W. lucens**, *Hook. f.*; quite glabrous, leaves small linear-oblong narrowly elliptic-lanceolate obtuse or acute black and shining when dry, cymes sessile, branches spreading, flowers pedicelled, calyx ebracteolate, teeth short triangular, corolla-tube equalling the linear lobes, throat pubescent. *Pavetta* sp., *Bedd. Fl. Sylv., For. Man.* 134/8. *P.?* *lucens*, *Br. in Wall. Cat.* 6168. *Stylocoryne breviflora*, *Schlecht. in Herb. Hohen.* No. 1374.

NILGHERRY and TRAVANCORE MOUNTAINS, *Heyne, Wight.*

A bush, very black when dry. *Leaves* 2-4 by $3\frac{1}{4}$ - $1\frac{1}{2}$ in., rather coriaceous, nerves 6-7 pair; petiole very short; stipules triangular. *Cymes* 1-2 in.; lower bracts often foliaceous. *Corolla* $\frac{1}{2}$ in. diam., 4-5-cleft. *Style* hairy; stigma slender fusiform, shortly exserted. *Ovules* 1 in each cell. *Fruit* size of a large pea, sometimes oblong and diseased; calyx-limb persistent.

VAR. 1. leaves narrowly oblong-lanceolate. *Coffea alpestris*, *Wt. Ic. t.* 1040.

VAR. 2. leaves obovate. *Coffea Grumelioides*, *Wt. Ic. t.* 1041.

†† *Tube (or tube and limb in W. campaniflora) of corolla longer than the lobes.*

17. **W. campaniflora**, *Hook. f.*; leaves elliptic or elliptic-lanceolate acuminate above glabrous or scaberulous beneath pubescent or glabrate, nerves 12-15 pair, cymes sessile or deflexed in bud hirsute, flowers sessile and pedicelled, calyx hirsute teeth ovate-lanceolate, corolla puberulous, tube short, limb campanulate, lobes short ovate acute. *Stylocoryne* *Webera*, *Wall. Cat.* 8401 K.

CHITTAGONG, *Bruce*; Sektakoond, *J. D. H. & T. T.*; Burkul, *C. B. Clarke.*

A large bush or small tree; branches rather slender, glabrous, except the young shoots. *Leaves* 4-12 by 2-4 in., nearly black when dry, membranous, usually shining above, beneath hispidly pubescent or puberulous or glabrate, nerves slender; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., hispid or glabrate; stipules triangular, cuspidate. *Cymes* at first sharply decurved, at length horizontal or suberect, 1-3 in. long, lower branches spreading; bracts persistent, lanceolate, lower stipuliform; flowers $\frac{2}{3}$ in. long, when pedicelled ebracteolate at the base; buds with a very short tube and large fusiform acute limb. *Calyx-teeth* longer than the ovary. *Corolla-limb* $\frac{1}{2}$ - $\frac{2}{3}$ in. diam., throat glabrous, tube villous within. *Anthers* long, sessile. *Style* short, hairy; stigma very long, fusiform, curved, grooved. *Ovules* solitary in each cell.—A very remarkable species; the corolla is quite unlike that of any other. A Malacca plant in young fruit of Griffith's (*Kew Distrib.* 2795) may be it, as also a Mergui one of Griffith's in *Wight's Herbarium*, also in fruit only.

18. **W. canarica**, *Hook. f.*; glabrous, leaves elliptic or oblanceolate acuminate glabrous on both surfaces, nerves about 15 pair, cymes small sessile few-fld. puberulous, branches very stout, flowers shortly pedicelled ebracteolate at the base, calyx obconic obscurely toothed, corolla-tube cylindric about twice as long as the linear lobes, style pubescent. ? *Pavetta canarica*, *Bedd. Fl. Sylv., For. Man.* 134/8.

SOUTH CANARA; on the Ghats, *Beddome.* COCHIN, *Wight.*

Branches stout. *Leaves* 6-8 by 2-2 $\frac{1}{2}$ in., dark green when dry, membranous; petiole $\frac{1}{8}$ - $\frac{1}{2}$ in. *Bracts* short, triangular. *Buds* 1 in., cylindric, obtuse; corolla lobes linear, half the length of the tube or more, throat glabrous, tube villous within. *Anthers* sessile. *Style* pubescent; stigma very long, narrowly fusiform. *Ovules* one in each cell, on large placentas.—Doubtfully identified with *Beddome's* insufficient diagnosis.

19. **W. ? nilagirica**, *Hook. f.*; young branches pubescent, leaves obovate-lanceolate subcaudate-acuminate pubescent beneath, nerves 12-15 pair, cymes

small sessile few-flowered pubescent, flowers shortly pedicelled ebracteolate at the base, calyx obconic, teeth short broad, corolla-tube cylindric much longer than the short lobes, style glabrous, stigma very slender. ? *Pavetta nilagirica*, *Bedd. Fl. Sylv., For. Man.* 134/8.

NILGHERY MTS.; Sispara Ghat and Peria Peak, Wynnad, *Beddome, G. Thomson*. Branches stout. *Leaves* 4-9 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., greenish when dry, glabrous above; petiole $\frac{1}{2}$ in., stout; stipules shortly triangular. *Cymes* 1 in., and buds similar to those of *W. canarica*, but the branches more pubescent, and the calyx-teeth more prominent. *Corolla* (seen in bud only) more resembling a *Pavetta* than a *Webera*, as do the very slender styles with the stigma not thickened or fusiform at all, and the sessile anthers; but the flowers are 5-merous. It is probably a 5-merous *Pavetta*, and possibly a form of the protean *P. indica*.

20. **W. Helferi**, *Hook. f.*; branches slender glabrous, leaves elliptic-lanceolate or oblanceolate caudate-acuminate membranous glabrous, nerves 10 pair, peduncle long slender glabrate branches pubescent, flowers pedicelled ebracteolate at the base, calyx-teeth subulate shorter than the tube, corolla puberulous, tube slender much longer than the short broad lobes. *Ixora Helferi*, *Kurz in Journ. As. Soc.* 1872, ii. 316; *For. Fl.* ii. 17.

TENASSERIM, *Helfer*.

Leaves 5-8 by $1\frac{1}{2}$ -2 in., blackish when dry, narrowed into the short petiole; stipules ovate, acuminate, glabrous. *Peduncle* 4-6 in., inclined or drooping; cyme brachiate, branches slender; bracts linear-subulate, or the lower pair leafy. *Flowers* pedicelled. *Calyx-teeth* subulate. *Corolla-tube* $\frac{3}{4}$ in.; lobes broadly oblong, $\frac{1}{4}$ the length of the tube; throat glabrous. *Style* fusiform, slender; stigma shortly exserted, slender, fusiform. *Ovules* 1 in each cell.

43. **BYRSOPHYLLUM**, *Hook. f.*

Glabrous shrubs or small trees; branches robust, terete. *Leaves* very coriaceous; stipules large, deciduous. *Flowers* large, dioecious, white or pink, in terminal few-fl. corymbs or fascicles; bracteoles small, scale-like. *Calyx-tube* (of ♀) hemispheric; limb short, cupular, persistent. *Corolla* coriaceous, tube long, throat campanulate, mouth contracted, villous; lobes oblong, obtuse, twisted in bud. *Stamens* 4-6, on the mouth of the corolla; anthers sessile, linear-oblong, included. *Ovary* 2-celled; style filiform, stigma spindle-shaped or stigmas 2 acute cohering; ovules numerous, immersed in fleshy placentas adnate to the septum. *Berries* ovoid or globose, 2-celled, many-seeded. *Seeds* oblong, flattened, imbricate in 2 series, immersed in pulp.—DISTRIB. 2 Indian species.

1. **B. ellipticum**, *Hook. f. in Gen. Pl.* ii. 83; leaves elliptic or elliptic-obovate cuspidate, flowers 4-6-merous, stigma 2-lobed. *Coffea*? elliptica and *Stylocoryne elliptica*, *Thw. Enum.* 154 and 421; *Bedd. Ic. Pl. Ind. Or.* t. 96.

CEYLON, at no great elevation, *Thwaites*.

A small tree, dark brown when dry. *Leaves* 4-7 by 2-3 in., sometimes obovate; petiole very stout, $\frac{1}{2}$ -1 in.; stipules convolute, oblong, acute. *Peduncles* 1-3, $\frac{1}{2}$ - $\frac{3}{4}$ in. *Calyx* small, truncate. *Corolla* white; tube slender, $\frac{3}{4}$ -1 in.; lobes $\frac{1}{2}$ in. *Berries* 1 in. diam., globose, about 10-seeded.

2. **B. tetrandrum**, *Hook. f. in Gen. Pl.* ii. 83; leaves obovate or elliptic-oblong, tip rounded, flowers 4-merous, stigma entire. *Bedd. Fl. Sylv.* t. 326. *Gardenia tetrandra*, *Bedd. Ic. Pl. Ind. Or.* t. 20.

TRAVANCORE MTS., alt. 5000 ft.; Athraymallay, *Captain Davidson*.

A shrub or small tree, dark brown when dry. *Leaves* 3-5 by $1\frac{1}{2}$ -2 in., shining

above; petiole very stout, $\frac{1}{2}$ –1 in.; stipules some triangular-lanceolate acuminate, others complicate broadly oblong, subacute. *Peduncles* 1–3, $\frac{1}{4}$ – $\frac{1}{2}$ in. *Calyx* small, truncate. *Corolla* white tinged with rose; tube 1 in.; lobes $\frac{1}{2}$ in. *Berry* about $\frac{3}{4}$ in. diam.

44. **BRACHYTOME**, *Hook. f.*

A glabrous shrub or small tree; branches slender, terete. *Leaves* petioled, membranous, caudate-acuminate; stipules triangular, acuminate, persistent. *Flowers* polygamo-diœcious, white, small, in slender panicles. *Cymes* from the axil of an undeveloped leaf (hence leaf-opposed); bracts minute. *Calyx-tube* oblong; limb cupular, 5-toothed, persistent. *Corolla* long or funnel-shaped; tube (in fl. ♂ shorter) within and throat glabrous; lobes 5, short, twisted in bud. *Stamens* 5, inserted on the corolla-throat; anthers subsessile, included, linear-oblong, imperfect in fl. ♀. *Disk* in ♀ small, in ♂ cupular. *Ovary* 2-celled; style filiform (short in ♂), stigmas 2, shortly oblong obtuse grooved; ovules very numerous, superficial on peltate tumid placentas. *Berries* small, ellipsoid, 2-celled, many-seeded. *Seeds* crowded, cuneate, compressed, testa thin reticulate, albumen fleshy; embryo small, sub-cylindric.—Perhaps better united with *Randia*, but the habit and flowers are peculiar, and the seeds have a reticulated testa.

1. **B. Wallichii**, *Hook. f. in Ic. Pl. t.* 1088; *Kurz For. Fl. ii.* 51. Rubiaceæ, *Wall. Cat.* 8464, 8466.

KHASIA Mts., alt., 3–4000 ft., *De Silva, Griffith* (Kew Distrib. 2787), &c.—DISTRIB. Ava; Birma, alt. 5500 ft. (*Griffith*).

Pale brown when dry. *Leaves* 5–9 by 1–2 in., oblong or obovate-lanceolate, almost caudate-acuminate; nerves slender; petiole $\frac{1}{4}$ in. *Cymes* short, irregularly branched, $\frac{1}{2}$ –2 in. diam., lax-flowered. *Corolla* $\frac{1}{2}$ in. long. *Berry* $\frac{1}{2}$ in. long, crowned with the calyx-limb.—*Griffith's* specimens are marked Darjeeling, but as no other collector has found it in Sikkin, I suspect some error.

45. **ANOMANTHODIA**, *Hook. f.*

A subscaudent glabrous shrub; branchlets soft compressed and inflorescence hairy. *Leaves* bifarious, obliquely auricled; stipules interpetiolar, triangular, deciduous. *Corymbs* appearing supra-axillary (from the suppression of the leaves at the flowering nodes); peduncles 3-chotomous; bracts small, triangular, and bracteoles persistent. *Flowers* small, white, sessile, polygamo-diœcious. *Calyx-tube* turbinate; limb cylindric or cupular, 5–6-toothed, deciduous. *Corolla* salver-shaped, tube short, throat with reflexed hairs; lobes 5–6, longer than the tube, reflexed, twisted in bud. *Stamens* 5–6, subsessile on the corolla-mouth; anthers narrow, acute (recurved in the male), cells septate. *Disk* tubular. *Ovary* 2-celled; style stout, branches 2-lanceolate ribbed; ovules many. *Berries* globose, 2-celled, very many-seeded. *Seeds* minute, crowded, cuneate, testa thick.

1. **A. auriculata**, *Hook. f. in Gen. Pl. ii.* 87; *Webera auriculata*, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall. ii.* 537. *Stylacoryne auriculata*, *Wall. Cat.* 8402. *Cupia auriculata*, *DC. Prodr. iv.* 394. *Pseudixora*? *auriculata*, *Miq. Fl. Ind. Bat. ii.* 210. *Psychotria*? *Wall. Cat.* 8338.

SINGAPORE, PENANG, and MALACCA, *Porter, Wallich, Maingay* (Kew Distrib. 903, 904, 936).—DISTRIB. Borneo.

Branches stout, and leaves dark brown when dry. *Leaves* 4–9 by 2 $\frac{1}{4}$ –4 in., coriaceous, elliptic or elliptic-oblong, shining above; nerves slender; stipules $\frac{1}{2}$ in. *Cymes* corymbose, 4–8 in. diam., very many-flowered; stout peduncle and branches com-

pressed; leaf at the node very small. *Flowers* subsessile. *Calyx* $\frac{1}{8}$ in. long. *Corolla* $\frac{1}{2}$ in. diam. *Berries* size of a pea.—The inflorescence is that of *Randia densiflora*, to which genus this might be reduced.

46. **RANDIA**, Linn.

Shrubs or trees, unarmed or spinous. *Leaves* opposite or with one often arrested; stipules short, intra-petiolar, free or connate. *Flowers* in axillary or leaf-opposed cymes on solitary or fascicled or corymbose, rarely terminal, white or yellowish. *Calyx-tube* various; limb often tubular; lobes short, long or leafy. *Corolla* funnel-salver- or bell-shaped, tube long or short, throat glabrous or hairy; lobes 5, rarely more, short or long, twisted in bud. *Stamens* 5; anthers subsessile, narrow. *Disk* annular or cushion-shaped. *Ovary* 2-rarely 3-4-celled; style short or slender, stigma usually fusiform, entire or 2-fid; ovules usually numerous, sunk in placentas attached to the septum. *Berries* globose, ellipsoid or ovoid, 2-celled, many-seeded. *Seeds* often immersed in pulp, angled, testa thin, albumen horny; cotyledons orbicular.—**DISTRIB.** Species about 90, all tropical.

SECT. I. Eurandia. Erect unarmed or spinous shrubs. *Flowers* small or moderate-sized, solitary or few and fascicled. *Corolla* tubular or funnel-shaped, glabrous or nearly so. *Berry* small. *Albumen* uniform.

1. **R. tétrasperma**, Roxb. *Fl. Ind.* i. 709 (Gardenia): branches spinosecent, leaves elliptic or obovate glabrous, flowers subsolitary, calyx-tube terete hardly produced above the ovary, corolla-tube very short, berry globose 4-seeded. *Brand. For. Fl.* 272. *Gardenia densa*, Wall. in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 559. *G. tetrasperma and densa*, DC. *Prodr.* iv. 381, 383. *G. longispina*, Wall. *Cat.* 8277 D. partly. *G. sp.*, Wall. *Cat.* 8276, 8278, 8280, 8286.

SALT RANGE and SUBTROPICAL HIMALAYA, from Kashmir eastwards, ascending to 4-6000 ft. in Kumaon and to 7000 ft. in Sikkim and Bhotan. **ASSAM.** SILHET.

An erect rigid bush, 6 ft.; branches woody; bark rough. *Leaves* towards the tips of the branchlets, $\frac{3}{2}$ -2 in., pale brown when dry, narrowed into the short petiole; stipules small, triangular-subulate. *Flowers* sessile, greenish-white, fragrant, $\frac{1}{4}$ in. diam. *Calyx-teeth* subulate. *Corolla-tube* $\frac{1}{8}$ in. long; lobes oblong. *Anthers* exserted, tip subulate. *Stigma* spindle-shaped. *Berry* $\frac{1}{4}$ in. diam.

2. **R. fasciculata**, DC. *Prodr.* iv. 386; spines axillary, leaves ovate elliptic or lanceolate acute glabrous or slightly hairy, flowers fascicled, calyx-tube terete produced above the ovary, corolla-tube long slender, berry globose many-seeded. *Brand. For. Fl.* 273. *R. rigida*, DC. l. c. *R. malabarica*, Wall. *Cat.* 8255 A. B. D. *Gardenia fasciculata*, Roxb. *Hort. Beng.* 15. *G. rigida and parviflora*, Wall. *Cat.* 8257 A. B., 8256. *Posoqueria fasciculata*, Roxb. *Fl. Ind.* i. 717. *P. rigida*, Wall. in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 570. *Webera fasciculata*, Kurz *For. Fl.* ii. 49. **Rubiacea**, Wall. *Cat.* 8283.

TROPICAL HIMALAYA, from Nipal to Bhotan, ascending to 4000 ft. **KHASIA MTS.**, ASSAM, SILHET and TENASSERIM, Wallich, &c.

A spreading shrub; branches glabrous, hairy or tomentose; bark smoothish. *Leaves* 1-5 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., pale when dry, base rounded or narrowed; petiole short; stipules narrowly lanceolate. *Calyx-limb* produced after flowering, cylindric, circumsciss, glabrous or pubescent, teeth linear. *Corolla* white (yellow in Roxburgh's drawing), fragrant; tube $\frac{1}{2}$ -1 $\frac{1}{4}$ in.; limb $\frac{3}{4}$ -1 $\frac{1}{2}$ in. diam.; lobes oblong, apiculate. *Stigma* large, fusiform, shortly exserted. *Berry* purple, size of a pea; cells about 6-seeded.

SECT. II. Ceriscus. Erect unarmed or spinous shrubs. *Flowers* small or moderate-sized, solitary or few and fascicled. *Calyx-lobes* broad, obtuse. *Corolla*

campanulate, tube usually short, lobes broad reflexed. *Berry* large, many-seeded, crowned with the calyx-limb.

3. ***R. uliginosa*, DC. Prodr. iv. 386**; glabrous, spines short straight or 0, leaves obovate or oblong obtuse, flowers solitary white, calyx-tube terete, corolla glabrous externally. *W. & A. Prodr. 398*; *Wight Ic. t. 397*; *Dalz. & Gibs. Bomb. Fl. 119*; *Brand. For. Fl. 273*; *Kurz For. Fl. ii. 44*; *Clarke in Journ. Linn. Soc. Bot. xvii. 161*. *Gardenia uliginosa*, *Retz Obs. ii. 14*; *Roxb. Cor. Pl. t. 135*; *Wall. Cat. 8295*. ? *G. pomifera*, *Wall. Cat. 8296* (an unarmed specimen). *Posoqueria uliginosa*, *Roxb. Fl. Ind. i. 712*.

Eastern, Central, and Southern India, not common northwards. **SIKKIM**, *J. D. H.*; **ASSAM**, *Hamilton*.—**DISTRIB.** *Ava (G. pomifera, Wall.)*.

A small, usually very rigid tree, with thick woody 4-angled branches, and leaves (except on young shoots) at the ends of the branchlets. *Leaves* 2-8 by 1-4 in., pale when dry, narrowed into the short slender petiole; stipules triangular. *Flowers* dimorphic, either large and sessile, or small and peduncled. *Calyx-tube* $1\frac{1}{2}$ in.; lobes rounded. *Corolla* of the large form 1 to nearly 2 in. diam.; lobes rounded; tube with a ring of hairs within; of the small form with a very short tube glabrous within. *Stigma* fusiform, 2-lobed in the sessile-flowered, entire in the peduncled. *Berry* 2 in. long, yellow, ellipsoid in the sessile-flowered, smaller in the peduncled-flowered. *Seeds* compressed, smooth.—Fruit sold in the markets, eatable.

4. ***R. dumetorum*, Lamk. Ill. t. 156, f. 4**; *DC. Prodr. iv. 385*; spines stout straight, leaves obovate glabrous or pubescent, flowers solitary, calyx-tube terete strigose, corolla hairy externally, berry many-seeded. *W. & A. Prodr. 397*; *Wight Ic. t. 580*; *Dalz. & Gibs. Bomb. Fl. 119*; *Bedd. Fl. Sylv., Anal. Gen. t. xvi. f. 1*; *Brand. For. Fl. 273*. *R. nutans*, longispina and floribunda, *DC. & W. & A.*; *Dalz. & Gibs. l. c.*; *Kurz For. Fl. 45*; *Wight Ic. t. 581, 582, 583*. *R. Rottleri*, *W. & A. l. c.* *R. stipulosa*, *Miq. Fl. Ind. Bat. ii. 228*. *R. spinosa*, *Blume Bijl. 981*. *R. malabarica*, *Wall. Cat. 8255 e.* ? *R. tomentosa*, *W. & A. Prodr. 398*; *Wall. Cat. 8264 A*. *Gardenia nutans*, *Roxb. Hort. Beng. 15*; *Wall. Cat. 8290*. *G. spinosa*, *Linn. jil. G. longispina* and *floribunda*, *Roxb. and others*. *G. dumetorum*, *Retz.*; *Roxb. Cor. Pl. t. 136*; *Wall. Cat. 8259*. *G. stipularis*, *Rottl. & Willd.*; *DC. l. c. 383*. *G. glabra* and *G. propinqua*, *Br. in Wall. Cat. 8258, 8260*. *G. latifolia*, *Schlecht in Herb. Hohen. No. 861*. *Posoqueria dumetorum*, *P. nutans*, *P. longispina*, and *P. floribunda*, *Roxb. Fl. Ind. i. 713 to 719*. *Ceriscus malabaricus*, *Gaertn. Fruct. i. t. 28*

SUBTROPICAL HIMALAYA from **Jamu** eastwards, ascending to 4000 ft. in **Sikkim**; and thence southwards to **CHITTAGONG**, **PEGU**, **MARTABAN**, the **WESTERN PENINSULA**, and **CEYLON** (not recorded from **Assam**, the **Khasia Mts.**, **Silhet**, or the **Eastern Peninsula**).—**DISTRIB.** *Java*, **Sumatra**, **S. China**, **E. trop. Africa**.

A small tree or rigid shrub; spines horizontal, often long and strong. *Leaves* 1-2 in., glabrous or harshly or softly pubescent on one or both surfaces, obtuse or subacute, narrowed into the short petiole; stipules ovate, acuminate. *Flowers* rarely 2-3 on a peduncle, subsessile, greenish yellow or white. *Calyx* strigose; teeth very variable, sometimes spatulate. *Corolla* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; lobes oval or oblong. *Berry* globose or ovoid, $\frac{3}{4}$ -1 $\frac{1}{2}$ in. long, glabrous or pubescent, smooth or obscurely ribbed, yellow, pericarp thick. *Seeds* compressed, imbedded in pulp.—**Wight and Arnott's** *R. tomentosa*, of which very imperfect fruiting specimens only are known, is either a form with leaves softly tomentose beneath, and a globose slightly ribbed peduncled fruit, or a different species.

5. ***R. tomentosa*, Blume in DC. Prodr. iv. 379** (*Gardenia*); spines very long, shoots and leaves beneath densely velvety, leaves obovate or orbicular subacute pubescent above, calyx-tube ribbed and corolla velvety, berry many-seeded. *Gardenia tomentosa*, *Wall. Cat. 8264 B*. *G. dasycarpa*, *Kurz in Journ. As. Soc. 1872, ii. 412*.

TENASSERIM, MARTABAN, and PEGU, Wallich, &c.; Helfer (Kew Distrib. 2823).—DISTRIB. JAVA.

A large shrub; branches very stout; spines horizontal, 1–2 in., very stout. Leaves brown when dry, 1–2 in., often subcuneate, coriaceous; stipules triangular. Flowers subsolitary, subsessile, 1 in. diam. Calyx-teeth 5–10, linear, erect. Corolla-lobes oblong-obovate, silky within. Stigma globose, 2-lobed. Berry broadly ellipsoid, $1\frac{1}{2}$ – $1\frac{3}{4}$ in. diam., velvety, ribbed.

SECT. III. *Oxyceros*. Climbing or erect, armed (or young shoots unarmed) shrubs or trees. Flowers in shortly peduncled cymes. Corolla salver-shaped, tube longer or (in *R. malabarica*) shorter than the limb, glabrous externally. Berry small, about 8-seeded, the calyx-limb deciduous.

6. *R. malabarica*, Lamk. Dict. iii. 25; erect, glabrous, spines straight or 0, leaves elliptic obovate or oblong, cymes short, flowers fascicled, corolla-tube shorter than the lobes. *Gardenia fragrans*, Koen.; Roxb. Cor. Pl. t. 137; Roth Nov. Sp. 150; Wall. Cat. 8267. *Posoqueria fragrans*, Koen. in Roxb. Fl. Ind. i. 717. *Stylocoryne Pandaki* and *S. malabarica*, DC. Prodr. iv. 377. *Griffithia fragrans*, W. & A. Prodr. 400; Wight Ic. t. 310. *Canthium parviflorum*, Schlecht. in Herb. Hohen. No. 816. *Gardenia* sp. and *Rubiacea*, Wall. Cat. 8281, 8287.

WESTERN PENINSULA; on the hills, &c., from Canara southwards. CEYLON; not uncommon up to 3000 ft., Walker, &c.

An erect shrub; young shoots unarmed, “as is the whole plant when growing in a rich soil” (Roxb.). Leaves 1–2½ in., coriaceous, pale when dry; stipules small, triangular. Cymes subsessile, glabrous or puberulous, few or many-flowered, with connate triangular coriaceous bracts at the forks. Calyx-tube obconic, teeth minute. Corolla $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. Stigma fusiform. Berry size of a pea, areole not raised. Seeds rough; albumen ruminated.—Ceylon specimens have more elliptic leaves, looser cymes, larger flowers and more acute buds.

7. *R. longiflora*, Lamk. Dict. iii. 26; Ill. t. 156, f. 3; climbing, glabrous, spines short recurved or 0, leaves ovate elliptic or oblong, stipules broadly triangular, cymes short, corolla-tube much longer than the lobes. DC. Prodr. iv. 386. *R. scandens*, DC. l. c. 387. *Posoqueria longiflora*, Roxb. Fl. Ind. i. 718. *Griffithia curvata*, Kurz in Trimen Journ. Bot. 1875, 325. *G. siamensis*, Miq. Fl. Ind. Bat. ii. 158. *Canthium recurvum* and *angulosum*, Wall. Cat. 8284, 8285. *Webera scandens*, Roxb. Fl. Ind. i. 698. *W. longiflora*, bispinosa, and *siamensis*, Kurz For. Fl. ii. 48, 49. *Tocoyena scandens*, Blume Bijl. 980. *Gardenia patula*, Horsf. in Miq. Fl. Ind. Bat. ii. 232. *Pseudixora javanica* and *Zollingeriana*, Miq. l. c. 210. *Stylocoryne bispinosa*, Griff. Notul. iv. 260.

ASSAM, SILHET, and KHASIA Mts., ascending to 2000 ft.; common. CHITTAGONG, and southwards to MALACCA and PENANG. ANDAMAN and NICOBAR ISLANDS.—DISTRIB. Birma, Malay Islands.

A large shrub. Leaves 2–8 by 1–3 in., pale or dark when dry, coriaceous, often glandular at the nerve-axils beneath, Peduncles short or long, often from alternate axils of reduced leaves; cymes trichotomous; bracts as in *R. malabarica*. Calyx glabrous or puberulous, limb dilated, lobes triangular. Corolla white, then yellowish; tube $\frac{1}{2}$ – $1\frac{1}{2}$ in.; lobes $\frac{1}{2}$ in. long, oblong. Stigma 2-fid. Berries globose, $\frac{1}{3}$ – $\frac{1}{2}$ in. diam., obscurely ribbed; areole flat or raised. Seeds rugose, imbedded in pulp; albumen ruminated.—A very variable plant, especially in the length of the corolla, but I cannot limit the varieties according to the definitions given to the species which I have here included under *R. longiflora*. Wallich's No. 8284 E. from Singapore (Finlayson) has a calyx $\frac{1}{3}$ in. long, with almost filiform lobes half as long as the tube, and quite unlike those of any other variety. Others in Herb. Hooker and Bentham both from Wallich, with the ticket 8284 D. (Penang and Singapore) and 8284 C. (Silhet), but which are

not the plants thus numbered in the Linnæan Society's Herbarium, have very much larger flowers, the calyx $\frac{1}{2}$ – $\frac{3}{4}$ in. long, with a cylindric tube above the ovary $\frac{1}{2}$ in. long and irregularly cut at the top into 5 triangular teeth; the corolla-tube 1 in. and lobes $\frac{2}{3}$ in. long: the same, but with shorter calyces, is in Maingay's Herbarium.

8. **R. Griffithii**, *Hook. f.*; erect, glabrous, spines short straight or 0, leaves ovate or ovate-lanceolate acuminate, stipules subulate, berries globose. *Griffithia*, sp. 13, 14, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 2–4000 ft.; Mamloo, *Griffith* (Kew Distrib. No. 2800); Nurtinung and Nunklow, *J. D. H. & T. T.*

A small bright green tree; spines ascending, $\frac{1}{4}$ in. Leaves green or pale when dry, 2–5 by 1– $1\frac{1}{2}$ in., gradually acuminate, base acute; petiole $\frac{1}{6}$ – $\frac{1}{4}$ in. Cymes few-flowered, subsessile; bracts as in *R. malabarica*. Flowers not seen. Calyx-tube after flowering, urn-shaped; limb dilated, minutely toothed, deciduous. Berries size of a pea, areolate, black. Seeds few, smooth; albumen even.—A very distinct species.

SECT. IV. **Gynopachys**. Shrubs or trees, erect or scandent, unarmed. Leaves in equal pairs except sometimes those at the flowering nodes. Cymes axillary, leaf-opposed. Calyx-lobes small. Corolla-tube rarely exceeding the lobes. Berry globose, usually small and soft.

9. **R. densiflora**, *Benth. Fl. Hongk.* 155; glabrous, unarmed, branches 4-angled, leaves elliptic-oblong or lanceolate, cymes leaf-opposed or from leafless nodes, bracts persistent, corolla-tube much shorter than the lobes, throat villous, berries globose many-seeded. *Webera densiflora*, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 536. *W. oppositiflora*, *Roxb. Fl. Ind.* i. 698; *Kurz For. Fl.* ii. 47. *Stylocoryne densiflora*, *Wall. Cat.* 8404 excl. A.; *Miq. in Ann. Mus. Lugd. Bat.* iv. 128, t. 5 A. *S. dimorphophylla*, *Teysm. & Binn. Pl. Nov. Hort. Bogor.* 4. *Cupia densiflora* and *oppositifolia*, *DC. Prodr.* iv. 394. *Gynopachys axilliflora* and *oblongata*, *Miq. Fl. Ind. Bat.* ii. 221. *Urophyllum coriaceum*, *Miq. l. c. Suppl.* 542. *Ixora Thozetia*, *F. Muell. Fragm.* ii. 132. *Psychotria* sp. *Wall. Cat.* 8332. *Rubiacea*, *Wall. Cat.* 8455, 8456, 8465.

ASSAM and NAGA hills, *Griffith*; CACHAR, *Keenan*; TENASSERIM, *Wallich*; ANDAMAN and NICOBAR ISLANDS, *Helfer*, *Kurz*; MALACCA, SINGAPORE, and PENANG, *Wallich*, *Griffith*, *Maingay*, &c.; TRAVANCORE, *Wight*, *Beddome*.—DISTRIB. Malayan Archipelago, N. Australia, Hongkong.

A large shrub or small tree, "sometimes epiphytal" (*Keenan*); branches glabrous or puberulous. Leaves dark brown when dry, 4–8 by 1–3 in., coriaceous, smooth; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; stipules triangular, acuminate. Cymes sessile or shortly peduncled, solitary or opposite from leafless nodes, or solitary and opposite a reduced leaf, or from the axil of a reduced leaf and opposite a developed one, branched from the base; branches flattened, divaricate, glabrous, puberulous or pubescent; bracts small, triangular. Flowers numerous, pedicelled. Calyx $\frac{1}{4}$ in.; teeth minute or 0. Corolla $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; lobes glabrous or silky externally. Stigma slender, exerted. Berry size of a pea, areolate; cells 8- or more-seeded. Seeds rugose; albumen ruminate.—The inflorescence is that of *Anomanthodia*.

10. **R. Gardneri**, *Thw. Enum.* 158 (*Griffithia*); erect, glabrous, unarmed, leaves lanceolate acuminate, cymes axillary, bracts persistent, corolla-tube much longer than the lobes, throat pubescent or villous, berries longer than broad many-seeded. *Griffithia Gardneri*, *Bedd. Ic. Pl. Ind. Or.* t. 38. *Randia Gardneri* and *laurifolia*, *Hook. f. in Gen. Pl.* ii. 88.

CEYLON; Central Province, alt. 2–4000 ft., *Gardner*, &c.

Very closely allied indeed to *R. densiflora*, and perhaps better considered as the Ceylon form of that plant, but the leaves are more strictly lanceolate, the cymes always from the axils of fully formed leaves, and the berry is not globose but evidently, though slightly, elongated; the flowers are quite glabrous, except at the throat of the corolla, which is less villous than in *R. densiflora*.

11. **R. Wallichii**, *Hook. f.*; glabrous, subscent, unarmed, branches robust rough, leaves elliptic-lanceolate acuminate, cymes solitary on the branches axillary sessile, bracts caducous, flowers very small glabrous, corolla-tube much shorter than the lobes, berries many-seeded. Rubiaceæ, *Wall. Cat.* 8445, 8466. Griffithia, sp. 11, *Herb. Ind. Or. H. f. & T.*

BHOTAN, *Griffith*; SILHET and KHASIA Mts., alt. 1-4000 ft., *De Silva*; CHITTAGONG, *J. D. H. & T. T.*; PEGU, *Kurz*; TENASSERIM, *Helper*, &c.—DISTRIB. Yunnan, Java.

A tree; branches flexuous (as if twining), very stout, with rough soft red-brown bark. *Leaves* 4-9 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., brown when dry, smooth, coriaceous, shining above, narrowed at the base; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., stout; stipules broadly ovate-lanceolate, sheathing, coriaceous. *Cymes* from the upper axil of each branch; branches spreading, stout in fruit, ebracteate or with a few caducous triangular bracts. *Flowers* shortly pedicelled. *Calyx* turbinate, minutely toothed. *Corolla* $\frac{1}{2}$ in. diam. *Stigma* entire. *Berry* globose, $\frac{1}{3}$ - $\frac{2}{3}$ in. diam. *Seeds* peltate, smooth; albumen uniform.

12. **R. rugulosa**, *Thw. Enum.* 159 (Griffithia); glabrous, climbing, unarmed, leaves elliptic obtuse or obtusely acuminate, cymes several on each branch leaf-opposed, bracts large subsistent, corolla-tube much shorter than the lobes, mouth pubescent, berries several-seeded. Stylocoryne, sp. *Wall. Cat.* 8406.

WESTERN PENINSULA; on the Ghats, from the Concan southwards, ascending to 4000 ft., *Heyne, Wight, &c.* CEYLON; Ambagamowa, Saffragan and Galle districts, not common, *Champion, Thwaites*.

A large climbing shrub with stout pendulous branches. *Leaves* 3-7 by $1\frac{1}{2}$ -3 in., sometimes lanceolate, rarely acute, coriaceous; nerves very strong; stipules broad, coriaceous, acute, 2-glandular at the base within (*Thwaites*). *Cymes* with a short stout peduncle, glabrous or puberulous; branches very stout, spreading; bracts coriaceous, obtuse, often connate in pairs. *Flowers* pedicelled. *Calyx* hemispheric, glabrous or puberulous; teeth very variable, acute or obtuse. *Corolla* $\frac{1}{3}$ - $\frac{2}{3}$ in. diam., white; tube and lobes quite glabrous. *Berries* size of a pea. *Seeds* rugose.

VAR. *speciosa*; flowers $1\frac{1}{2}$ in. diam. Griffithia speciosa, *Bedd. Ic. Pl. Ind. Or.* 8, t. 37.—South Canara to Travancore, *Beddome*.—I see nothing but the size of the flower to distinguish this from *R. rugulosa*. Though stated to be found over so great an area, I have seen no specimens.

13. **R. Candolleana**, *W. & A. Prodr.* 399; erect, unarmed, branches very stout, leaves long-petioled obovate or orbicular obtuse glabrous pubescent or velvety beneath, cymes subterminal axillary or from naked nodes, corolla silky externally, lobes much longer than the tube, berries several-seeded. *R. corymbosa*, *W. & A. l. c.* *R. deccanensis*, *Bedd. Ic. Pl. Ind. Or.* 57, t. 137. Rubiaceæ, *Wall. Cat.* 8293.

WESTERN PENINSULA; Nagur Hills, Mysore, *Wight*; Nallay Mallay Hills, near Kurnook, *Beddome*.

A small tree with naked woody branches and rough bark. *Leaves* 1-3 in., sometimes nearly as broad, glabrous above, beneath softly velvety or glabrous or with axillary tufts of hairs, dark brown when dry; petiole $\frac{1}{2}$ - $1\frac{1}{2}$ in.; stipules broadly ovate. *Cymes* sessile, branches spreading; bracts caducous. *Calyx-tube* glabrous, campanulate; limb produced, much dilated, teeth subulate. *Corolla* $\frac{1}{2}$ in. diam.; lobes broadly oblong, glabrate within. *Stigma* globose. *Berries* $\frac{2}{3}$ in. diam., globose, with a small elevated areole; pericarp thin, crustaceous and shining within. *Seeds* numerous, small, imbedded in pulp, compressed, quite smooth.

SECT. V. **Anisophyllea**. Unarmed shrubs or trees with unequal pairs of leaves. *Cymes* axillary, tomentose or silky. *Corolla* densely silky or tomentose, tube equalling or exceeding the lobes. *Berry* large, endocarp woody, many-seeded. (Fruit unknown in *R. sikkimensis*.)

14. **R. anisophylla**, *Jack in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 561; softly villous or tomentose, erect, unarmed, leaves large obovate cuspidate pairs unequal, cymes axillary villous, corolla silky, lobes equalling the tube, berry woody ellipsoid tomentose many-seeded crowned with a tubular calyx-limb. *Gardenia?* *anisophylla*, *Wall. Cat.* 8399; *DC. Prodr.* iv. 381.

MALACCA, PENANG, and SINGAPORE, *Jack, &c.*

A small tree; branches robust, villous. *Leaves* 9–15 by $3\frac{1}{2}$ –5 in., pale brown, variable as to pubescence, narrowed at the base; petiole short; stipules united into a villous 2-lipped tube bearded within. *Cymes* stoutly peduncled, many-flowered; bracts deciduous. *Flowers* pedicelled, white. *Calyx* ovoid, tomentose; limb tubular, silky within; teeth ovate-subulate, deciduous. *Corolla* coriaceous, $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; lobes oblong. *Stigma* fusiform. *Berry* 1–1 $\frac{1}{2}$ in. long; pericarp thin with a woody endocarp. *Seeds* many, compressed, smooth.

15. **R. sikkimensis**, *Hook. f.*; pubescent, erect, shrubby, unarmed, leaves in unequal pairs elliptic or elliptic-lanceolate acuminate slightly pubescent above more so beneath, cymes axillary tomentose, corolla densely silky tomentose, tube longer than the oblong lobes bearded within below the middle.

Foot of the SIKKIM HIMALAYA; on dry hills below Kursiong, alt. 4000 ft., *J. D. H.*

A woody shrub; branches stout, leafy at the tips. *Leaves* brown when dry, 4–7 by $1\frac{1}{2}$ –2 $\frac{1}{2}$ in., rather membranous, with scattered hairs above, tomentose especially on the nerves beneath; petiole short, tomentose; stipules very broad, acute or cuspidate, connate in a glabrous or hairy tube, or free. *Cymes* sessile; branches erect, short, bracts small, acute. *Flowers* pedicelled, erect. *Calyx* pubescent, funnel-shaped; limb dilated, teeth subulate. *Corolla* 1 in. diam.; tube nearly 1 in. long, very silky; lobes not half as long, obtuse, glabrous within; mouth glabrous. *Stigma* clavate, 2-lobed. *Ovary* 2-celled, many-ovuled; ovules apparently not sunk in the placenta.—Specimens not numerous or good.

SECT. VI. **Gardenioides**. An unarmed tree. *Flowers* cymose. *Calyx-lobes* small. *Corolla-tube* very short; limb inflated, very large, 5-lobed. *Berry* large, globose, with a woody rind, many-seeded.

16. **R. exaltata**, *Griff. Notul.* iv. 262; glabrous, erect, unarmed, leaves elliptic or elliptic-lanceolate acute or subacute, cymes axillary or leaf-opposed pubescent, corolla very large, tube short, limb inflated, berry large woody many-seeded. *Kurz For. Fl.* ii. 46. *Gardenia pulcherrima*, *Kurz in Journ. As. Soc.* 1872, ii. 312; 1877, ii. 155; *For. Fl.* ii. 43.

TENASSERIM; Mergui, in Mangrove Swamps, *Griffith* (*Kew Distrib.* 2826). ANDAMAN ISLANDS, *Kurz*.

A tree, 50 ft.; trunk slender; branches with pale bark, youngest compressed and pubescent. *Leaves* 4–7 by 2–3 $\frac{1}{2}$, greenish when dry, coriaceous; petiole short; stipules broadly triangular. *Cymes* subsessile; branches stout, short, few-flowered. *Calyx* tomentose; teeth triangular. *Corolla* white, sweet-scented, 3 in. long; limb campanulate, $1\frac{1}{2}$ in. across the broad ovate lobes; throat naked. *Anthers* slender, included. *Style* filiform; stigma included, clavate, 2-lobed. *Berry* globose, 1–1 $\frac{1}{2}$ in. diam.; pericarp smooth, very woody. *Seeds* imbedded in pulp, $\frac{1}{2}$ in. across, much compressed, obtusely angled, smooth or wrinkled.—*Griffith*, and *Kurz* (copying him), describes the leaves as unequal subrepand and pubescent at the nerve-axils beneath.

SECT. VII. **Euclinia**. Unarmed erect shrubs. *Leaves* in equal pairs. *Flowers* solitary or fascicled, axillary or terminal. *Calyx-lobes* very long. *Corolla* large, funnel-shaped.

17. **R. macrophylla**, *Br. in Wall. Cat.* 8304 (*Rothmannia*); erect, unarmed, branches and leaves beneath hispid or glabrate, leaves subsessile nar-

rowly elliptic-oblong or oblanceolate, flowers 1-2 subterminal, corolla 6 in. hairy.

MALACCA, PENANG, and SINGAPORE, *Wallich, Griffith, &c.*

A shrub, 3-4 ft. high; branches few, 2-leaved at the top (*Griffith*). *Leaves* 10-12 by 2-3 in., acuminate, coriaceous, glossy above with pubescent midrib, more or less hispidly pubescent in the midrib and strong arched nerves beneath, base acute or obtuse; petiole very short, stout, hispid; stipules long-subulate from a broad triangular base. *Flowers* subsessile, fragrant. *Calyx-tube* oblong; lobes 1 in., linear, erect, hairy. *Corolla* white with purple spots in lines on the throat, 4 in. across the short reflexed lobes. *Anthers* very long. *Stigma* clavate, notched.

18. **R. hygrophylla**, *Kurz in Journ. As. Soc. ii. 321; For. Fl. ii. 44* (*Gardenia*); glabrous, shrubby, erect, unarmed, leaves small shortly petioled elliptic obovate or lanceolate subacute, flowers solitary subsessile axillary or in the forks of the branches, corolla 1 in. glabrous.

PEGU; frequent in swampy forests, *Kurz*.

An evergreen shrub, 1-3 ft., often spreading. *Leaves* 2-3 in., black when dry, very variable in breadth, quite glabrous, base acute; petiole $\frac{1}{2}$ in.; stipules connate, glabrous or hairy. *Calyx-tube* short, pubescent; lobes much longer than the tube, linear-subulate, ciliate. *Corolla* rather broadly funnel-shaped; lobes unequal, about $\frac{1}{2}$ in. long. *Ovary* completely 2-celled.

47. **GARDENIA**, *Linn.*

Shrubs or trees, armed or not. *Leaves* opposite, rarely 3-nately whorled; stipules intrapetiole, often connate. *Flowers* often very large, terminal or axillary, solitary fascicled or rarely cymose, often dimorphic and polygamous. *Calyx-tube* various; limb tubular or dilated, variously cleft or lobed. *Corolla* very various, lobes 5-12, twisted in bud. *Stamens* as many as the corolla-lobes; anthers sessile or subsessile, linear, included, inserted in the tube. *Ovary* 1-celled; style stout, stigma clavate fusiform or 2-cleft; ovules numerous, 2-seriate on the 2-6 parietal placentas. *Fruit* often large, ovoid ellipsoid or globose, coriaceous, or fleshy with a woody endocarp polished within which sometimes splits along the placental sutures. *Seeds* very many, imbedded in the placenta, compressed; testa thin; embryo small, in horny albumen.—*DISTRIB.* Species about 60, tropical and subtropical.

G. FLORIDA, *L.*; *Roxb. Fl. Ind. i. 703, &c.; Wall. Cat. 8268*, is often cultivated in Indian gardens; it is an unarmed shrub, native of Japan and China, with small ovate acute leaves, white very strongly scented axillary flowers 1 in. diam. (often double), and an ellipsoid 5-ribbed fruit crowned by subulate calyx-teeth. The orange pulp of the fruit is used as a dye.

SECT. I. **Eugardenia**. Unarmed shrubs. *Flowers* large, axillary, solitary. *Corolla* salver-shaped; tube long, slender; lobes 4-9.

* *Calyx-limb tubular, $\frac{1}{2}$ - $\frac{1}{2}$ in.; teeth 5-9, ovate-lanceolate or linear or short.*

1. **G. lucida**, *Roxb. Hort. Beng. 15; Fl. Ind. i. 707*; glabrous, leaves short-petioled elliptic obtuse or subacute shining many-nerved, flowers solitary axillary, calyx-teeth elongate, fruit ellipsoid or globose, placentas 2. *DC. Prodr. iv. 381; W. & A. Prodr. 395; Wt. Ic. t. 575; Dalz. & Gibs. Bomb. Fl. 120; Bedd. Fl. Sylv. Anal. Gen. xv. f. 6; Brand. For. Fl. 271; Wall. Cat. 8270. G. resinifera, Roth Nov. Sp. 150; Kurz For. Fl. ii. 42.*

WESTERN PENINSULA, common from the Concan southwards. CHITTAGONG, *Roxburgh, &c.* BURMA, *Brandis*.

A small deciduous tree, shoots resinous. *Leaves* 3-10 by 2-5 in., green when dry, base narrowed; nerves 20-30 pair, with often bearded axils; stipules large, broadly ovate, connate. *Flowers* peduncled, fragrant, white turning yellow. *Calyx* variable, tube oblong; limb tubular; lobes narrow lanceolate, persistent. *Corolla-tube* $1\frac{1}{2}$ -2 in., glabrous or puberulous; limb $1\frac{1}{3}$ -3 in. diam., lobes 5 oblong. *Fruit* smooth; pericarp thick, woody (endocarp 2-valved, *Roxburgh*).

2. *G. gummifera*, Linn. f.; *DC. Prodr.* iv. 381; glabrous, leaves sessile or subsessile obovate acute or obtuse shining, calyx-teeth short ovate acute, fruit ellipsoid or oblong, placentas 4-5. *Roxb. Fl. Ind.* i. 709; *W. & A. Prodr.* 395; *Dalz. & Gibs. Bomb. Fl.* 270, excl. syn.; *Thunb. diss. Gard.* t. 2, f. 3. *G. arborea*, *Roxb. l. c.* 708. *G. inermis*, *Dietr. Vollst. Lex.* iv. 285. *Rubiacea*, *Wall. Cat.* 8294 A.

WESTERN PENINSULA, from the Satpura range southwards, *Heyne*, &c.

A woody bush; buds resinous. *Leaves* $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., coriaceous, base obtuse acute or cordate, sometimes puberulous beneath; nerves 15-20 pair; stipules connate, truncate or mucronate. *Flowers* subsessile, white. *Calyx-limb* shortly tubular, teeth stout subulate. *Corolla-tube* 1-2 in., glabrous or pubescent; limb 1-3 in. diam., lobes 5 oblong obtuse. *Fruit* 1-1 $\frac{1}{2}$ in., with a stout beak, smooth; pericarp thin, woody (endocarp 4-5-valved, *Roxburgh*).—*Roxburgh's* name *G. arborea* is attached to *Heyne's* specimen in *Herb. Wallich (Rubiacea 8294)*.

3. *G. obtusifolia*, *Roxb. Hort. Beng.* 15; glabrous, leaves sessile obovate-oblong tip rounded, nerves rather distant, calyx-teeth very short obtuse, fruit subglobose warted, placentas 4. *Kurz For. Fl.* ii. 43. *G. suavis*, *Wall. Cat.* 8274. *Rubiacea*, *Wall. Cat.* 8294 B.

PEGU and TENASSERIM, *Roxburgh*, &c., *Griffith (Kew Distrib.* 2819).

A small deciduous tree; shoots resinous. *Leaves* 2 $\frac{1}{2}$ -4 in., greenish when dry, rough to the touch on both surfaces; nerves 12-15 pair; stipules connate, sheathing. *Flowers* solitary, shortly pedicelled, white turning yellow. *Calyx* $\frac{1}{2}$ in., tube puberulous, teeth very short. *Corolla-tube* $1\frac{1}{2}$ -2 in., limb 2-3 $\frac{1}{2}$ in. diam.; lobes 5, linear-oblong, obtuse. *Fruit* as large as a pigeon's egg, beaked with the stout short calyx-tube; pericarp fleshy, warted with lenticels; endocarp thin, shining, crustaceous.

4. *G. latifolia*, *Ait. Hort. Kew.* i. 294; branches very stout, leaves opposite or 3-nate subsessile large broadly elliptic or orbicular obtuse glabrous or pubescent beneath, calyx-teeth subulate-lanceolate unequal pubescent, fruit globose smooth, placentas 4-5. *Roxb. Fl. Ind.* i. 706; *Cor. Pl.* t. 134; *DC. Prodr.* iv. 380; *W. & A. Prodr.* 395; *Wt. Ic.* t. 759; *Dalz. & Gibs. Bomb. Fl.* 120; *Brand. For. Fl.* 271; *Wall. Cat.* 8275; *Gaertn. Fruct.* i. t. 193.

Dry hilly districts of WESTERN, CENTRAL and SOUTH-WESTERN INDIA, from the N. W. HIMALAYA, in Garwhal only, ascending to 3000 ft., southwards to BEHAR and W. BENGAL; absent to the eastward of those limits.

A small tree with woody resinous branchlets as thick as the little finger. *Leaves* greenish, 4-8 in. long and sometimes almost as broad; nerves about 12 pair, axils glandular-hairy beneath; stipules large, tumid, connate, often split or toothed. *Flowers* solitary or 2-nate, subsessile, white changing to yellow, fragrant. *Calyx-limb* campanulate; segments 5-9, unequal, recurved. *Corolla-tube* 2-3 in., pubescent or hirsute; limb 2-4 $\frac{1}{2}$ in. diam.; lobes 5-9, obovate, oblique. *Fruit* 1-2 in. diam., beaked by the calyx-limb, greenish, speckled; endocarp woody, shining within.—*Roxburgh's* drawing represents the calyx-teeth as very small, short and obtuse, and his description (*Fl. Ind.* l. c.) says calyx small, irregularly divided; my specimens in *Herb. Wallich* have teeth long and subulate. (See *G. enneandra* at end of genus)

** *Calyx-limb* tubular obconic or campanulate, 1-3 in., truncate toothed or sinuate, entire or split on one or both sides.

5. **G. coronaria**, Ham. in *Syme's Embassy to Ava*, iii. 307, t. 22; leaves subsessile obovate shortly acuminate above shining glabrous or pubescent beneath, calyx-limb terete $\frac{1}{4}$ –1 in. often spathaceous, corolla 5-lobed, tube 2–3 in., fruit ellipsoid 5-ribbed, placentas 2. *Kurz For. Fl.* ii. 43; *Wall. Cat.* 8273. *G. costata*, Roxb. *Hort. Beng.* 15; *Fl. Ind.* i. 704; *DC. Prodr.* iv. 380; *Wall. Cat.* 8272. ? *G. carinata*, Griff. *Notul.* iv. 261; *Ic. Pl. Asiat.* t. 474, f. 3.

CHITTAGONG, Roxburgh, &c.; RANGOON, McClelland; MARTABAN, at Moulmein, Falconer, &c.

A deciduous tree 25–30 ft.; branches stout, youngest hairy; buds resinous. Leaves greenish when dry, 6–12 by 3–5 in., shining on both surfaces; nerves about 20 pair; stipules $\frac{1}{2}$ in., connate, lanceolate. *Flowers* subsessile, terminal, white changing to yellow, fragrant. *Calyx-limb* cylindric, shining, thin; mouth obscurely lobed, 5-angled, caducous. *Corolla-tube* 2–4 in., puberulous; limb 3–4 in. diam., lobes broad butte or acute. *Fruit* 1 in. long, smooth between the ribs; endocarp thick, woody. —In Roxburgh's drawings and Wallich's specimens of *G. costata* the calyx-limb is tubular, rather scarious, and cleft on one side, the mouth oblique. There are no fruits on Wallich's specimens. The endocarp is represented in Roxburgh's drawings as thin, but described as thick in the "Flora Indica." Wallich's specimens of *G. coronaria* have a thick woody endocarp, and shorter more coriaceous calyx-tube.

6. **G. carinata**, Wall. in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 560; *Cat.* 8271; leaves subsessile obovate shortly acuminate shining above more or less pubescent beneath, calyx-limb 5-winged below the truncate mouth, corolla 6–9-lobed, tube 1 in., fruit ellipsoid 5-ribbed, placentas 2.

PENANG, Porter; MALACCA, Maingay (Kew Distrib. 837).

Closely allied to *G. coronaria*; differing in the thick wings of the truncate calyx-limb, which are sometimes produced quite up to its mouth and elongated into large teeth, and are decurrent on the peduncle; the corolla-tube is only 1 in. in all Wallich's specimens, though he describes it as "very long." The endocarp of the fruit is thin, as in that described under *G. coronaria*. Leaves in some of Maingay's specimens 16 by 7 in. and membranous.

7. **G. tubifera**, Wall. in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 562; *Cat.* 8266; leaves obovate-lanceolate abruptly acuminate glabrous or puberulous on the nerves beneath, calyx $\frac{1}{2}$ in. limb elongate obconic terete, mouth truncate, corolla-tube many times longer than the calyx very slender, fruit globose, endocarp very thick and woody, placentas 5–8. *DC. Prodr.* iv. 381. *G. resinifera*, Korth. in *Ned. Kruidk. Arch.* ii. 191; *Kurz in Journ. As. Soc.* 1876, ii. 134 (not of Roth). *G. glutinosa*, Teyssm. & Binnend. in *Herb. Lugd. Bat.*

SINGAPORE, Wallich; MALACCA, Maingay (Kew Distrib. 838).—DISTRIB. Sumatra, Java, Borneo.

Subarborescent, young parts resinous. Leaves 5–9 in., shortly petioled, much narrower at the base, coriaceous; nerves 12–14 pair; petiole $\frac{1}{4}$ –1 in.; stipules short, sheathing. *Flowers* subsessile. *Calyx* $\frac{3}{4}$ in. long, gradually dilated upwards, terete. *Corolla-tube* $1\frac{1}{2}$ –3 in., limb 1 in. diam., lobes 6–9 short. *Fruit* 1– $1\frac{1}{2}$ in. diam., smooth or obscurely ribbed, crowned with the trumpet-like calyx-limb $1\frac{1}{2}$ – $\frac{3}{4}$ in. long; endocarp $\frac{1}{4}$ in. thick, very hard. *Seeds* rather large.

8. **G. speciosa**, Hook. *Ic. Pl.* t. 824 (Randia); leaves petioled obovate-oblong tip rounded or cuspidate, nerves puberulous beneath, calyx $1\frac{1}{2}$ in. limb elongate obconic terete, mouth truncate, corolla-tube many times longer than the calyx.

SINGAPORE, Lobb.

Leaves 4–6 in. by 2 in., much broader than in *G. tubifera*, rounder at the tip, more abruptly narrowed at the base; nerves 12–14 pair; petiole longer; stipules short, sheathing. *Calyx-tube* longer and broader. *Corolla-tube* much stouter, 3– $3\frac{1}{2}$ in.; limb 6–9-lobed, 4 in. diam.; lobes narrowly ovate-oblong, obtuse. *Fruit* unknown.

9. **G. Griffithii**, *Hook. f.*; leaves subsessile elliptic-obovate cuspidate, nerves beneath puberulous, calyx-limb 3 in. tubular with a trumpet-shaped mouth, corolla-tube little longer, the calyx lobes broad, fruit large globose, pericarp very thick, placentas several.

MALACCA, *Griffith* (Kew Distrib. 2821).

Branches resinous. *Leaves* 6-8 by $1\frac{1}{2}$ -3 in., coriaceous, much narrowed at the base; nerves 10-14 pair; stipules $\frac{1}{2}$ in., sheathing. *Flowers* sessile. *Calyx-tube* very coriaceous, terete; mouth oblique, $\frac{3}{4}$ in. diam., waved and wrinkled. *Corolla-tube* $2\frac{1}{2}$ -4 in., one quarter or less exserted; limb 3 in. diam., many- (12-) lobed. *Fruit* large, probably $1\frac{1}{2}$ in. diam., with a thick exocarp and woody not very thick endocarp; placentas probably 5.—I have seen only a very imperfect fruit.

VAR. *Maingayi*; mouth of calyx irregularly cut into triangular coriaceous teeth. —Malacca, *Maingay* (Kew Distrib. 841).

SECT. II. **Geriscus**. Shrubs, armed or unarmed. *Flowers* dimorphic, monœcious or diœcious. *Calyx-teeth* in the ♀ large, subfoliaceous; in the ♂ usually minute. (See *Clarke in Journ. Linn. Soc. Bot.* xvii. 310.) *Corolla* small (less than 1 in.), cylindric or campanulate.

10. **G. turgida**, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 711; spines straight or 0, leaves elliptic obovate or orbicular obtuse acute or subacute coriaceous glabrous pubescent or tomentose beneath, ♂ flowers fascicled ♀ solitary, corolla salver-shaped, tube subcylindric, fruit not beaked. *DC. Prodr.* iv. 382; *Wt. Ic.* t. 579; *Brand. For. Fl.* 270; *Kurz For. Fl.* ii. 41; *Bedd. Fl. Sylv. Anal. Gen.* t. 15, f. 6; *Wall. Cat.* 8269; *Clarke in Journ. Linn. Soc. Bot.* xvii. 310. *G. cuneata*, *Br. in Wall. Cat.* 8263. *G. Donia*, *Ham. in Wall. Cat.* 8292.

TROPICAL HIMALAYA, ascending to 4000 ft., from Kumaon to Bhotan; OUDH, BEHAR, SILHET, PEGU and the WESTERN PENINSULA.—DISTRIB. Ava, *Wallich*.

A small deciduous tree, 25 ft.; branches rigid, robust; bark pale. *Leaves* 1-4 in., narrowed into a short petiole, pale when dry; stipules triangular, caducous. *Calyx* of ♂ small, $\frac{1}{8}$ in.; mouth wide, truncate; of ♀ $\frac{1}{3}$ - $\frac{2}{3}$ in., limb shortly campanulate; teeth oblong or subspathulate, foliaceous. *Corolla* white, fragrant; tube slightly dilated upwards, $\frac{1}{2}$ - $\frac{3}{4}$ in. long; limb 1 in. diam. *Fruit* 1-3 in.; ovoid or globose, smooth, pericarp thick; endocarp woody, shining within; placentas 5 or 6.

VAR. *montana*, *Roxb. Fl. Ind.* i. 709 (sp.); leaves often orbicular densely tomentose beneath. *G. montana*, *DC. Prodr.* iv. 383; *W. & A. Prodr.* 396; *Wt. Ic.* t. 577; *Dalz. & Gibs. Bomb. Fl.* 120.—Occurs with *G. turgida*, and is even more common.

11. **G. campanulata**, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 710; glabrous, spines straight, leaves obovate or elliptic-lanceolate membranous, ♂ flowers fascicled, ♀ solitary sessile, corolla campanulate, fruit not beaked. *Wall. Cat.* 8279; *DC. Prodr.* iv. 383; *Wt. Ic.* t. 578; *Kurz For. Fl.* ii. 40. *G. longispina*, *Wall. Cat.* 8277 *D. in part.* ? *G. Blumeana*, *DC. Prodr.* iv. 383.

Foot of the SIKKIM HIMALAYA, *J. D. H.*; ASSAM, SILHET, and CHITTAGONG, *Roxburgh, Griffith, &c.*; BEHAR, summit of Parus-nath, *J. D. H.*; PEGU, *Kurz*.—DISTRIB. Java?

A shrub, 15-20 ft.; shoots puberulous; spines $\frac{1}{2}$ -1 $\frac{1}{2}$ in., often leafy. *Leaves* $1\frac{1}{2}$ -3 by $\frac{1}{2}$ -1 $\frac{1}{2}$ in., narrowed into the short petiole, midrib slender, nerves faint; stipules triangular, caducous. *Calyx* of ♂ $\frac{1}{2}$ in., urn-shaped, mouth truncate dilated; of ♀ limb campanulate, teeth oblong or subspathulate, foliaceous. *Corolla* $\frac{1}{4}$ in., white; lobes short, obtuse. *Fruit* $\frac{3}{4}$ -1 $\frac{1}{4}$ in., ellipsoid or subglobose, obscurely 5-ridged; pericarp very thick, endocarp woody, placentas 5.—Wight has figured the calyx as intermediate between the ♂ and ♀ form. *G. campanulata*, *Blume (G. Blumeana, DC.)*, appears from the description and an imperfect specimen to be this.

12. **G. sessiliflora**, *Wall. Cat.* 8291; spines straight very strong, leaves elliptic or elliptic-lanceolate membranous puberulous on both surfaces or beneath,

flowers greenish polygamo-monoëcious, ♂ fascicled pedicelled, ♀ sessile terminal, corolla velvety, tube very short and wide, fruit ovoid with a thick beak. *Kurz For. Fl.* ii. 40. *G. oxycarpa*, *Br. in Wall. Cat.* 8261.

PEGU and TENASSERIM, *Wallich, Kurz.*—DISTRIB. Ava.

A deciduous tree, 15–18 ft.; branches and spines very stout. *Leaves* very like those of *G. campanulata*, base much produced and narrowed. *Calyx* of ♀ flask-shaped, densely pubescent; lobes foliaceous, obovate-oblong or orbicular, exceeding the velvety corolla. *Fruit* $1\frac{1}{2}$ in. long; pericarp rough, thick, fleshy, with a thin shining endocarp and 5? placentas.

13. *G. erythroclada*, *Kurz in Journ. As. Soc.* 1877, ii. 311; *For. Fl.* ii. 40; branches red stout, spines short or 0, leaves connate obovate or suborbicular pubescent or tomentose, flowers greenish polygamo-dioëcious fascicled or cymose pedicelled, ♀ solitary sessile, fruits dimorphic of the ♂-hermaph. smaller globose, of the ♀-hermaph. ovoid.

PEGU; at Rangoon, *McClelland*. TENASSERIM and BURMA, common in forests, *Kurz.*—DISTRIB. Ava.

A small deciduous tree with very stout branches of a curious brick red colour, shortly pubescent, or the leaves at length glabrate. *Leaves* 4–10 in., often as broad as long, rather rough to the touch; petiole 1–2 in.; stipules ovate, acute. *Flowers* densely tomentose, pedicels of ♂ very unequal. *Calyx-lobes* $\frac{1}{4}$ in. in flower, $\frac{1}{2}$ in fruit, orbicular or broadly obovate. *Fruits*, the larger 2 in. long, broadly ovoid, obscurely angled; pericarp $1\frac{1}{2}$ in. thick, dense, with a crustaceous shining lining; smaller globose, size of a cherry; placentas I think 2 only. *Seeds* small, black.

SECT. III. *Rothmannia*. Shrubs, unarmed. *Flowers* axillary (in the Indian species), solitary or fascicled; calyx-teeth linear. *Corolla* inflated.

14. *G. tentaculata*, *Hook.*; branches slender pubescent, leaves elliptic-lanceolate or oblanceolate caudate-acuminate membranous glabrous or puberulous beneath, flowers axillary polygamous, calyx-lobes filiform flexuous, corolla campanulate.

MALACCA, *Griffith, Maingay* (Kew Distrib. 2810, 839); foot of Mount Ophir, *Lobb*.

A shrub, unarmed. *Leaves* 4–9 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., sessile or narrowed into a very short petiole, dark green when dry; stipules ovate, acute, connate. *Flowers* in fascicles of 3–6; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., narrowly campanulate; limb dilated, with 5 spreading filiform curving pubescent teeth $\frac{1}{2}$ – $\frac{2}{3}$ in. long. *Corolla* $\frac{3}{4}$ in. long, glabrous; lobes ovate, obtuse. *Fruit* $\frac{1}{2}$ – $\frac{2}{3}$ in. long, broadly ellipsoid, crowned with the long tentacle-like calyx-teeth, smooth; pericarp thin, brittle, polished within; placentas 2. *Seeds* many, compressed.

DOUBTFUL AND EXCLUDED SPECIES.

G. IXOREFOLIA, *Br. in Wall. Cat.* 8262; glabrous, unarmed, branches angled, leaves 4–7 by $1\frac{1}{2}$ –4 in. ovate- or linear-oblong obtuse very coriaceous narrowed to the base, nerves 10–12 pair very distant, petiole very short, fruit sessile broadly ovoid shortly beaked by the calyx-tube $1\frac{1}{4}$ in. long smooth, pericarp very thick polished within, placentas 2, seeds very broad and flat.—Tavoy, *Wallich*.—Perhaps a *Randia*.

G. CALYCVLATA, *Roxb. Fl. Ind.* i. 704; “arboreous, leaves petioled ovate acuminate smooth, flowers terminal solitary sessile, germ involuclled, calycine segments ensiform, anthers within the swelling tube of the 5-cleft corolla.” *DC. Prodr.* iv. 380; *W. & A. Prodr.* 396.—Native place uncertain, said to be brought from Hyderabad to Madras, where Roxburgh saw it in a garden. “Probably *G. latifolia*,” *W. & A.*

G. ENNEANDRA, *Koen.*; *W. & A. Prodr.* 395; this differs from *G. latifolia*, *Ait.*, in the very short obtuse calyx-teeth, and in the thin pericarp of the fruit. Under *G. latifolia* I have stated that Roxburgh’s drawing and description of that plant differs from Aiton’s in these points, but without more materials it is impossible to say whether this is to be regarded as a specific distinction.

G. CUNEATA, Br.; *Kurz For. Fl.* ii. 41: "a small glabrous tree, branches silvery, spines few solitary or paired 1-2 in., leaves subsessile obovate cuneate obtuse thickly coriaceous, flowers 2-3-nate white turning yellow rather small, calyx puberulous, teeth 5 linear-lanceolate with a pair of minute ones in each sinus, corolla subrotate $\frac{1}{2}$ in. diam., tube as long as calyx, throat bearded, lobes obovate obtuse, fruit globose size of a wood-apple smooth."—Ava.

G. DASYCARPA, *Kurz For. Fl.* ii. 42; "a deciduous tree, spines straight sharp, soft parts villous pubescent, leaves 1-2 in. obovate-oblong obtuse or acute coriaceous retrorse-pubescent above, villous pubescent beneath, petiole very short, flowers solitary sessile on thick wart-like branchlets, fruit globose corticate size of a small apple velvety crowned with the tubular calyx-limb."—Forests of Upper Tenasserim; Prome, not unfrequent, *Kurz*.

G. PUBESCENS, *Roth Nov. Sp.* 151; *DC. Prodr.* iv. 383; *W. & A. Prodr.* 396; the description is insufficient to refer this to any genus, and, according to W. & A., it is certainly not a *Gardenia*.

G. CARINATA, *Thw. Enum.* 159 (C. P. 1655 in part); specimens imperfect, leaves sessile elliptic tips rounded, fruit ellipsoid obscurely 5-ribbed, endocarp rather thick woody, placentas 3.—Ceylon, Batticaloa, *Gardner*. This may be a form of *G. coronaria*, with 3 placentas and obscure ribs.

G. LATIFOLIA, *Thw. Enum.* 421 (C. P. 3617); this has the winged calyx-limb of *G. carinata*, but not so strongly, and the fruit is more globose; it may be a form of *G. latifolia* (the calyx being a very variable character).—Ceylon, near Colombo, *W. Ferguson*.

48.* **HYPOBATHRUM**, Blume.

49. **PETUNGA**, DC.

Glabrous shrubs; branches slender, strict, terete. *Leaves* petioled, narrowed at both ends; stipules triangular or oblong-ovate. *Flowers* small, in axillary spikes, 2-bracteolate, white. *Calyx-tube* ovoid; limb minute, 4-toothed, persistent. *Corolla* funnel-shaped, throat villous; lobes 4, spreading, twisted in bud. *Stamens* 4; anthers subsessile, linear, connective thickened at the tip. *Ovary* (often incompletely) 2-celled; style filiform, branches linear hairy; ovules 2-8, pendulous from the top of each cell. *Berry* small, 2-celled. *Seeds* imbricate; testa thick, grooved and plaited; cotyledons linear.—DISTRIB. 4 or 5, Bengal and Malay.

1. **P. Roxburghii**, *DC. Prodr.* iv. 399; stipules deciduous, spikes glabrous elongate, berry subglobose. *P. microcarpa*, *DC. l. c.* *P. variabilis*, *Hassk. in Flora*, 1845, 232. *Higginsia microcarpa*, *Blume Bijl.* 988. *Spicillaria Leschenaultii*, *A. Rich. in Mem. Hist. Nat. Paris*, v. 252. *Randia racemosa* and *polysperma*, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 525, 527. *R. polysperma*, *DC. l. c.* 389. *Hypobathrum racemosum*, *Kurz For. Flor.* ii. 51. Rubiaceæ, *Wall. Cat.* 8302, 8312.

EAST BENGAL (Suckshmee-poorā), *Hamilton*; SILHET, *Wallich*; CHITTAGONG, *Roxburgh*; PEGU, *M'Clelland*; TENASSERIM and the NICOBAR ISLANDS, in swamp forests, *Kurz*, &c.; MALACCA, *Griffith*.—DISTRIB. Java, Borneo.

An evergreen shrub, 3-8 ft. *Leaves* 2-5 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., brown when dry, thinly coriaceous; petiole $\frac{1}{4}$ in.; stipules broad, caducous, with an axillary ring of brown hairs. *Spikes* sessile or short-peduncled, 1-2 in., erect spreading or recurved. *Flowers* $\frac{1}{2}$ in. long. *Berry* globose or shortly ellipsoid, pedicelled, orange-yellow.—Griffith's Malacca specimen has smaller very shining leaves.

2. **P. longifolia**, *DC. Prodr.* iv. 399; stipules persistent, spikes densely pubescent very short. *Higginsia longifolia*, *Blume mss.*

* This genus is introduced into the Key (p. 19) because it most probably occurs in the Malayan Peninsula, though it is as yet unrecorded.

PENANG, *Phillips, Wallich*.—DISTRIB. Java.

Leaves 5-8 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., brown when dry, caudate-acuminate; petiole $\frac{1}{4}$ in.; stipules broad, $\frac{1}{4}$ in. long, with a hairy keel; axils hairy as in *P. Roxburghii*. *Spikes* sessile or shortly-peduncled, $\frac{1}{2}$ in. *Fruit* not seen.—*Leaves* much longer, broader and more acuminate than in *P. Roxburghii*, and spikes very different.

3. **P. venulosa**, *Hook. f.*; stipules persistent, spikes elongate glabrous, berry pyriform. *Randia venulosa*, *Wall. Cat.* 8301.

PENANG and SINGAPORE, *Wallich, Griffith* (Kew Distrib. 2829); *Maingay* (911).

Leaves 5-7 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., caudate-acuminate, much more coriaceous than in *P. Roxburghii* and *longifolia*; petiole stout, $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules $\frac{1}{2}$ in., keeled, oblong-ovate. *Spikes* stout, 1-3 in., erect horizontal or deflexed. *Berry* $\frac{1}{3}$ in. long, on a pedicel of equal length.

50. MORINDOPSIS, *Hook. f.*

A small glabrous tree, branches rounded, ultimate compressed. *Leaves* subsessile; stipules broad, persistent. *Flowers* dioecious, small, white, in opposite supra-axillary peduncled heads, or ♀ rarely solitary. Fl. ♂: *calyx-tube* hemispheric, 4-5-toothed. *Corolla* shortly campanulate, throat villous; lobes 4-5, rounded, twisted in bud. *Anthers* 4-5, sessile, linear-oblong, acute. *Disk* hemispheric. *Style* with 2 erect hairy arms. Fl. ♀: *calyx-tube* oblong, 8-grooved; limb cupular, 4-lobed, hairy within. *Corolla* and *style* of the ♂. *Ovary* 2-celled; ovules many on peltate placentas. *Berry* elongate-oblong, 3-grooved, crowned by the calyx-limb, 2-celled, few- or many-seeded. *Seeds* imbricated downwards, ovoid, acute at both ends.

1. **M. capillaris**, *Kurz in Journ. As. Soc.* 1874, ii. 189; *For. Fl.* ii. 52. *Psilobium capillare*, *Kurz l. c.* 1872, ii. 313. *Morinda*, *Wall. Cat.* 8433, 8434.

PEGU and TENASSERIM, common, *Wallich, &c.*

An evergreen tree; 25 ft. *Leaves* 3-6 by 1-2 in., polymorphous, brown when dry, lanceolate oblong or elliptic, acute or acuminate, base acute rounded or subcordate; stipules ovate, acute. *Peduncles* of ♂ $\frac{1}{2}$ -3 in., often capillary, often opposite; of ♀ 0 or very short, rarely long. *Heads* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.; ♂ fl. $\frac{1}{2}$ in.; ♀ larger; ovary urceolate, crowned with the triangular ciliate calyx-teeth. *Berry* 1 in.—*Kurz*, who must know this genus well, reduces all the forms to one; they differ, however, greatly in length, breadth, and shape of leaves, and in the length of the peduncles.

51. HYPTIANThERA, *W. & A.*

A glabrous shrub, branches terete. *Leaves* shortly petioled; stipules triangular, persistent. *Flowers* small, white, sessile in axillary fascicles, bracteolate. *Calyx-tube* turbinate; lobes 5, acute, persistent. *Corolla-tube* short, hairy within; lobes 4-5, spreading, twisted in bud. *Anthers* 4-5, sessile, oblong, obtuse, pubescent at the base and back. *Disk* annular. *Ovary* 2-celled; style short, included, branches large long erect hispid; ovules 6-10 in each cell, pendulous from its apex. *Berry* ovoid or globose. *Seeds* pendulous, imbricated, compressed and angled, testa thick fibrous and plaited; embryo small.

1. **H. stricta**, *W. & A. Prodr.* 399; *Brand. For. Fl.* 274. *Randia stricta*, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 526; *DC. Prodr.* iv. 386. *Macrocneum strictum*, *Willd. in Roem. & Sch. Syst.* v. 6. *Rondeletia stricta*, *Roth Nov. sp.* 140, *excl. syn.* *Hypobathrum strictum*, *Kurz For. Fl.* ii. 50. *Rubiaceæ*, *Wall. Cat.* 8138 in part, 8313, 8307.

NORTHERN INDIA and BENGAL, from Oudh to Birma, common, especially in E. Bengal, ascending the outer Himalaya and Khasia Mts. to 4000 ft.—DISTRIB. Ava.

A shrub or small tree, 5-10 ft., branching from the base, branchlets decussate. *Leaves* 3-9 by $\frac{1}{4}$ - $1\frac{1}{4}$ in., lanceolate or ovate or linear-lanceolate, long-acuminate, coriaceous, glabrous or nerves beneath pubescent, brown when dry; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules triangular, persistent. *Flowers* $\frac{1}{2}$ in. long; bracts 2-3. *Berry* size of a pea.

52. **NARGEDIA**, Beddome.

A glabrous unarmed shrub. *Leaves* elliptic or lanceolate, acuminate; stipules triangular, acuminate, persistent. *Flowers* small, axillary, or supra-axillary, solitary or fascicled. *Calyx-tube* ovoid; limb short, irregularly 4-5-lobed. *Corolla-tube* short, cylindric, hairy within, longer than the 4-5 orbicular lobes, which are twisted in bud. *Anthers* 4-5, sessile, linear, glabrous. *Ovary* 2-celled; style short, stigma fusiform 2-cleft or -grooved; ovules 4 in each cell, pendulous from subapical placentas. *Fruit* pedicelled, nearly globose, 1-celled, 2-few-seeded. *Seeds* much compressed, testa?, albumen deeply ruminate; cotyledons ovate, radicle slender.

1. **N. macrocarpa**, Bedd. *Fl. Sylv.* cxxxiv. t. 328. Hyptianthera macrocarpa, Thw. *Enum.* 157, 421.

CEYLON; Ambagamowa, and between Galle and Ratnapoora, Walker, Thwaites.

A shrub 8-10 ft. *Leaves* 5-8 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., rather coriaceous, brown when dry, nerves reticulate; petiole $\frac{1}{2}$ in. *Calyx-tube* rounded, apiculate. *Corolla-lobes* hairy down the middle. *Fruit* about 1 in. long, pedicelled.—I have only imperfect specimens, and have taken the character of the fruit from Thwaites.

53. **SCYPHOSTACHYS**, Thwaites.

Erect shrubs, branches terete. *Leaves* short-petioled, linear- or oblong-lanceolate; stipules connate. *Flowers* small, in axillary or supra-axillary peduncled spikes, bracteate and with connate sheathing bracteoles. *Calyx-tube* short; limb produced, persistent, obtusely 4-lobed. *Corolla-tube* short, throat villous; lobes 4, short, recurved, twisted in bud. *Anthers* 4, subsessile, oblong. *Ovary* 2-celled; style short, branches short pilose; ovules about 4 in each cell, pendulous, placentas small on the septum. *Berry* ovoid or oblong, 1-celled, areolate. *Seeds* few, pendulous, ovoid, testa coriaceous grooved; embryo small, in fleshy albumen.—DISTRIB. Confined to Ceylon.

1. **S. pedunculatus**, Thw. *Enum.* 157; branches scabrous, stipules and bracteoles cuspidate striate hairy internally, corolla hairy externally.

CEYLON; at Pasdoon Corle, at no great elevation, Thwaites.

Leaves 3-6 by $1-1\frac{1}{2}$ in., brown when dry, glabrous or pubescent on the nerves beneath; petiole short. *Peduncles* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Spike* like a small catkin, bracts 5-8, imbricate. *Fruit* $\frac{1}{2}$ in. long, ovoid, purplish-black. *Seed* usually solitary, linear-oblong.

2. **S. coffeoides**, Thw. *Enum.* 157; branches glabrous, stipules and bracts obtuse glabrous internally, corolla glabrous externally.

CEYLON; Ratnapoora district, at no great elevation, Thwaites.

Leaves 3-4 by $\frac{3}{4}$ - $1\frac{1}{4}$ in., brown when dry, petiole very short; stipules ovate, scarious. *Peduncles* very short or 0. *Spikes* ovoid, few-flowered. *Berry* red. *Seeds* oblong, striate.

54. **DIPLOSPORA**, DC.

Evergreen shrubs or trees, branches terete. *Leaves* shortly petioled; stipules triangular, long pointed or acuminate. *Flowers* small in axillary fascicles or short cymes, polygamo-dioecious, white or greenish; bracts free or connate in a

cup. *Calyx-tube* short; limb truncate or 4-5-lobed or toothed. *Corolla-tube* short, cylindric or bell-shaped; lobes 4-5, spreading, twisted in bud. *Stamens* 4-5, filaments short or long; anthers oblong or linear, often recurved. *Ovary* 2- rarely 3-celled; style short or long, branches linear or oblong; ovules 2-3 in each cell, placentas on the septum. *Berry* ovoid or globose. *Seeds* few in each cell, imbricate, testa various; embryo small.—**DISTRIB.** Species 6 or 8 tropical Asiatic and Malayan.

SECT. I. Eudiplospora. *Bracteoles* connate, sheathing the pedicel and base of the ovary.

1. **D. singularis**, Korth. in *Ned. Kruidk. Arch.* ii. 201; glabrous, leaves elliptic or oblong acuminate, flowers fascicled, calyx deeply 4-lobed, fruit globose. *Kurz For. Fl.* ii. 50, in part. ? *Vangueria palembanica*, *Miq. Fl. Ind. Bat., Suppl.* 544. *Rubiacea*, *Wall. Cat.* 8299, 8321.

KHASIA MTS., at Mamloo, alt. 3-4000 ft., *J. D. H. & T. T.* **PEGU** and **TENASERIM**; Amherst, *Wallich*. Moolget, *Gallaily*.—**DISTRIB.** Sumatra, Banka, Borneo.

A small tree. *Leaves* pale when dry, 3-7 by $1\frac{1}{2}$ -2 in., coriaceous, shining; petiole short; stipules triangular, acute, tip not setaceous. *Pedicels* 3-4-nate, sheathed by the short imbricating bracts, which form a cup round them. *Calyx-teeth* enlarged after flowering. *Corolla-tube* $\frac{3}{8}$ in., throat villous; lobes $\frac{1}{10}$ in., linear-oblong. *Fruit* $\frac{3}{8}$ in. diam., smooth, calyx-limb persistent; pericarp very thick. *Seeds* 8-10, broad much compressed.

SECT. II. Discospermum. *Bracteoles* very small, not sheathing, connate or free.

* *Stipules acuminate, point not long and setaceous.*

2. **D. apiocarpa**, Dalz. in *Hook. Kew Journ.* ii. 257, and in *Bomb. Fl.* 120 (*Discospermum*); glabrous, leaves ovate- or elliptic-lanceolate obtusely acuminate, calyx-limb truncate minutely 4-toothed. corolla-tube very short, fruit sessile ellipsoid subglobose or obovoid. *Discospermum apiocarpum*, *Bedd. Fl. Sylv.* t. 223; *Ic. Pl. Ind. Or.* t. 40.

WESTERN PENINSULA; on the Ghats from the Concan southwards, ascending to 5000 ft.

A small tree. *Leaves* pale when dry, 3-7 by $1\frac{1}{2}$ -3 in., coriaceous; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in.; stipules triangular, acuminate, tip not setaceous. *Flowers* fascicled, subsessile. *Corolla-tube* $\frac{1}{2}$ in., throat glabrous, lobes oblong. *Stamens* in δ much exserted. *Fruit* $\frac{3}{4}$ in. long, crown conical within the narrow calyx-limb. *Seeds* few.

3. **D. sphærocarpa**, Dalz. in *Hook. Kew Journ.* ii. 257, and in *Bomb. Fl.* 120 (*Discospermum*); glabrous, leaves elliptic-lanceolate obtuse or acute, calyx-limb 4-lobed, corolla-tube very short, fruit pedicelled globose. *Discospermum sphærocarpum*, *Bedd. Fl. Sylv., For. Man.* 134, 3, excl. syn.

WESTERN PENINSULA, or the Ghats from Bombay southwards.

A small tree. *Leaves* 2-6 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in.; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in.; stipules short, acute, tip not setaceous. *Flowers* fascicled, shortly pedicelled. *Calyx-teeth* obtuse, ciliate. *Corolla-tube* shorter than the calyx-teeth, throat glabrous, lobes $\frac{1}{2}$ in. *Filaments* very short. *Fruit* $\frac{3}{4}$ in. diam., calycine areole raised. *Seeds* few, vertically imbricate, much compressed.

4. **D. Dalzellii**, Thw. *Enum.* 158 (*Discospermum*); glabrous, leaves elliptic or elliptic-lanceolate obtuse, calyx-limb 4-lobed, corolla-tube of φ elongate cylindric, fruit globose subsessile.

CEYLON; central province, alt. 1-3000 ft.

Very similar to *D. sphærocarpa*, and reduced to it by Beddome (*For. Man.* 134, 3),

but the leaves are smaller and more obtuse, the corolla-tube of the female much longer, and the globose fruit has the pericarp thicker than the cell.—*Thwaites* describes the fruit as 1 in. diam.; in the dried specimens it is $\frac{2}{3}$ in., and many-seeded.

5. **D. erythrospora**, *Thw. Enum.* 158 (*Discospermum*); glabrous, leaves obovate or elliptic, tip rounded or narrowed, calyx-limb truncate subentire, corolla-tube very short, fruit very small peduncled globose.

CEYLON; Ambagamowa district, alt. 5000 ft., *Thwaites*.

Leaves 3-5 by $1\frac{1}{2}$ -2 in., greenish when dry, coriaceous; petiole $\frac{1}{4}$ - $\frac{1}{3}$ in.; stipules triangular, acuminate. Flowers in small cymes; bracteoles minute, triangular. Corolla yellow, throat hairy, lobes oblong. Filaments of σ exserted. Ovary-cells each with 3-4 ovules. Fruit $\frac{1}{4}$ in. diam., pericarp thin. Seeds 1-5, compressed; testa red, thick.

6. **D. malaccense**, *Hook. f.*; glabrous, slender, leaves elliptic obtusely acuminate thinly coriaceous narrowed into the slender petiole, nerves 5-6 pair slender, flower σ clustered φ solitary shortly pedicelled, bracteoles 0, calyx-lobes 4 rounded.

MALACCA, *Griffith*.

Branches slender, pale brown. Leaves 3-4 by $1\frac{1}{2}$ -2 in., pale brown when dry, paler beneath, opaque, veins obsolete; petiole $\frac{1}{4}$ in.; stipules triangular, acuminate. Flowers very small, σ sessile; φ shortly pedicelled, with 2 tubercles on the pedicel in the position of bracteoles. Corolla-tube funnel-shaped, rather longer than the glabrous lobes, hairy within. Anthers erect, sessile, exserted. Style of φ glabrous, thickened above the middle, arms rather long, stout. Ovary cells 2-3-ovuled.

** *Stipules with long setaceous points.*

7. **D. confusa**, *Hook. f.*; glabrous, leaves elliptic obtusely acuminate, flowers sessile in dense fascicles, stipules with long setaceous points, calyx truncate, corolla-tube very short, throat villous, fruit sessile. *D. singularis*, *Kurz For. Fl.* ii. 50, in part.

TENASSERIM; at Mergui, *Griffith* (*Kew Distrib.* 2798), *Kurz*.

An evergreen tree. Leaves 3-5 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., pale when dry, opaque; petiole $\frac{1}{4}$ - $\frac{1}{3}$ in. Flowers almost capitate, very small. Corolla-lobes about equalling the tube. Filaments short. Fruit not seen.

8. **D. pubescens**, *Hook. f.*; branches petioles and nerves beneath pubescent, leaves elliptic or elliptic-lanceolate obtusely caudate-acuminate, stipules with long setaceous points, calyx obscurely 4-lobed, corolla-tube short, throat villous. ? *Wall. Cat.* 8297 q. v.

TENASSERIM; at Mergui, *Griffith, Helfer* (*Kew Distrib.* 2799).

Branches very slender. Leaves 5-8 by 2-3 in., pale when dry, base obtuse or rounded; petiole very short; stipules $\frac{1}{2}$ in. long, base triangular, gradually tapering to the bristle-like point. Flowers in small axillary heads, black when dry, as are the very young leaves. Fruit not seen.—A very distinct species.

9. **D. Griffithii**, *Hook. f.*; glabrous, leaves oblanceolate abruptly acuminate membranous, stipules with setaceous points, cymes subspicate, calyx obscurely toothed, corolla-throat glabrous.

BIRMA; near Tselow on the Irawaddi, *Griffith*.

A shrub 3 ft. high. Leaves 5-7 by $1\frac{3}{4}$ -2 $\frac{1}{2}$ in., pale greenish when dry, much narrowed into the short petiole; stipules deciduous. Cymes $\frac{1}{3}$ - $\frac{2}{3}$ in., sometimes shortly peduncled, dense-flowered, glabrous; bracteoles minute, triangular. Calyx minute. Corolla-tube and lobes short. Anthers sessile. Fruit not seen.

10. **D. Kurzii**, *Hook. f.*; glabrous, leaves narrowly elliptic-lanceolate subcaudate-acuminate membranous, secondary nerves horizontal, stipules with setaceous points, flowers subcapitate minute, calyx calyculate, limb truncate, fruit small globose. Urophyllum biloculare, *Kurz in Journ. As. Soc.* 1872, ii. 313; *For. Fl.* ii. 53.

MARTABAN; in tropical forests, alt. 2-3000 ft., very rare, *Kurz*.

A small evergreen tree. *Leaves* 5-7 by $1\frac{1}{2}$ -2 in., pale greenish when dry, shining above, membranous; nerves arched, joined by the very slender horizontal veins; petiole very short; stipules connate, bases triangular, puberulous. *Flowers* in very slender clusters. *Calyx* puberulous. *Fruit* about $\frac{1}{4}$ in. diam., sessile, orange-coloured; pericarp thin; cells 3-4-seeded. *Seeds* rugulose on the back.—The veins are more regular and parallel than in any other species, recalling those of a *Urophyllum* or *Lasianthus*.

DOUBTFUL SPECIES.

D. ?; Malacca, *Maingay (Kew Distrib.* 906, *Coffea*); glabrous, leaves elliptic 2-3 in. very opaque, nerves indistinct, stipules triangular acuminate, fruit sessile globose $\frac{1}{2}$ - $\frac{2}{3}$ in. diam., pericarp thick, cells 2- or more-seeded, seeds large much compressed.—Resembles a plant from the Buitenzorg garden in Java, marked *Canthium*? in the Calcutta Herbarium.

55. SCYPHIPHORA, Gaertn.

A glabrous tree, branches stout, nodose, terete, young gummy. *Leaves* coriaceous, obovate, obtuse; stipules broad. *Flowers* small, in dense shortly peduncled axillary cymes. *Calyx-tube* elongate-obconic; limb cupular, 4-5-toothed, persistent. *Corolla-tube* cylindric, throat dilated, hairy; lobes 4-5 oblong, twisted in bud. *Stamens* 4-5, filaments inserted between the lobes short subulate; anthers narrowly sagittate. *Disk* annular, lobed. *Ovary* with 2 narrow cells; style filiform, branches linear obtuse; ovules 2 in each cell, inserted on the middle of the septum, upper ascending, lower pendulous, funicles contiguous dividing the cell into two. *Drupe* subcylindric, 8-10-grooved and winged, with 2 crustaceous connate 4-5-ribbed pyrenes. *Seeds* subcylindric, testa membranous, albumen scanty; cotyledons oblong.

1. **S. hydrophyllacea**, *Gaertn. Fruct.* iii. 91, t. 196; *DC. Prodr.* iv. 577; *Kurz For. Fl.* ii. 4. *Epithinia malayana*, *Jack in Mal. Misc.* i. 12; *Wall. Cat.* 8444; *DC. l. c.* 478; *W. & A. Prodr.* 424. *Epithinia* sp., *Griff. Notul.* iv. 269; *Ic. Pl. Asiat.* 478 and 644 A. (Lumnitzera). Rubiaceæ, *Wall. Cat.* 9055, A. in part.

Mangrove swamps on the CARNATIC coast, *Wight*; MALAYAN PENINSULA, the ANDAMAN ISLANDS, and CEYLON.—DISTRIB. Malay Archipelago to N. Australia, Philippines, and New Caledonia.

A small evergreen tree; trunk short, simple; crown rounded. *Leaves* 2 by $1\frac{1}{2}$ in., tip rounded, brown when dry, glossy, nerves few and inconspicuous; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* subsessile, white or reddish. *Calyx* $\frac{1}{8}$ in. *Corolla-tube* exceeding the calyx. *Drupe* $\frac{1}{2}$ in. long.

56. JACKIA, Wall.

A lofty umbrageous tree; branches robust, 4-angled. *Leaves* intra-petiolar, broad, sheathing, ciliate, hairy within. *Flowers* spicate, recurved; spikes opposite, in long peduncled pendulous axillary cymes; bracts distichous, lower subfoliaceous often connate. *Calyx-tube* obconic, limb unilateral; lobes 5, spreading, with interposed teeth, at length foliaceous, coriaceous, veined, persistent. *Corolla* funnel-shaped, throat pubescent; lobes 5, plaited, lanceolate, cuspidate, valvate in bud. *Anthers* 5, subsessile in the throat. *Disk* hairy.

Ovary 2-celled; style capillary, exerted, thickened and hairy in the middle, branches 2 short narrow; ovules 2 in each cell, inserted on the top of a basilar erect placenta. *Fruit* dry, 2-celled, cells 1-seeded. *Seeds* unknown.

1. **J. ornata**, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. ii. 321; Pl. As. Rar. t. 293; Cat. 6284, DC. Prodr. W. 621.

MALACCA and SINGAPORE, Wallich, &c.

Branchlets as thick as the middle finger, and all young parts, the petiole, midrib, and inflorescence, rufous-tomentose. *Leaves* 5-18 in.; brown when dry, coriaceous, tip rounded, narrowed into the short robust petiole, shining above, hairy beneath or glabrate; stipules short, cylindric, coriaceous, bristles $\frac{1}{2}$ -1 $\frac{1}{2}$ in. long. *Cymes* in slender peduncles 5-6 in. long; branches slender, spreading, primary opposite with sheathing stipular bracts; bracteoles broadly ovate, silky, imbricate. *Calyx-lobes* minute in flower, $\frac{1}{2}$ in. long, oblong-lanceolate in fruit. *Corolla* $\frac{1}{2}$ in., villous.

TRIBE VII. GUETTARDEÆ.

57. GUETTARDA, Linn.

Shrubs or trees. *Leaves* opposite or 3 in a whorl; stipules intra-petiole, deciduous. *Flowers* second on the branches of axillary forked peduncled usually opposite cymes. *Calyx-tube* short; limb tubular, toothed, usually deciduous. *Corolla-tube* long, cylindric, straight or curved, throat naked; lobes 4-9, oblong, imbricate in bud. *Anther* 4-9, subsessile within the tube, linear. *Ovary* with 4-9 elongate cells; style filiform, stigma subcapitate; ovules solitary in each cell, pendulous, funicle thickened. *Drupe* globose or ovoid, endocarp 4-9-celled, and -grooved or -angled, perforated at the top opposite the cells, which are often displaced. *Seeds* pendulous, testa membranous, albumen scanty or 0; embryo slender.—DISTRIB. About 45 species, all but 1 American.

1. **G. speciosa**, Linn.; DC. Prodr. iv. 455; leaves broadly obovate base obtuse or cordate pubescent beneath, corolla silky. Lamk. Ill. t. 154, f. 2; Roxb. Fl. Ind. i. 686; Wall. Cat. 6219; W. & A. Prodr. 422; Wt. Ic. t. 40; Bedd. Fl. Sylv. Anal. Gen. t. 17, f. 2; Kurz For. Fl. ii. 37. Cadamba jasminiflora, Sonner. Voy. Ind. ii. t. 128. Nictanthes hirsuta, Linn. Sp. Pl. 8. Jasminum hirsutum, Willd. Sp. Pl. i. 36; Rheede Hort. Mal. t. 47, 48.

Littoral and tidal forests of the WESTERN and EASTERN PENINSULAS, the ANDAMAN ISLANDS, and CEYLON.—DISTRIB. Tropical shores of the old and new world.

A small evergreen polygamous tree; branchlets stout, short, petioles leaves beneath and usually inflorescence pubescent. *Leaves* 5-10 by 4-7 in., tip acute obtuse or rounded, green when dry; petiole 1-1 $\frac{1}{2}$ in.; stipules ovate, pubescent, caducous. *Cymes* usually from the axils of fallen leaves, long-peduncled, with spreading dichotomous few-flowered branches. *Calyx* velvety, truncate. *Corolla* 1-1 $\frac{1}{2}$ in., softly pubescent; limb 1 in. diam., segments obovate. *Drupe* woody, globose, obscurely lobed.—Roxburgh observes that he never met with hermaphrodite flowers.

58.* ANTIRRHÆA, Comm.

59. TIMONIUS, Rumph.

Shrubs or trees. *Leaves* opposite; stipules ovate-lanceolate, deciduous. *Flowers* polygamo-diceious in axillary cymes; ♂ cymes with few or many-second flowers, ♀ 1-3-flowered, pedicels 2-bracteolate. *Calyx-tube* short, limb

* This genus is introduced into the Key (p. 20) because a common Sumatran species probably occurs in the Malayan Peninsula, though hitherto unrecorded.

cupular, persistent. *Corolla* pubescent, coriaceous, funnel-shaped, glabrous within; lobes 4-5 (-10), valvate or slightly overlapping in bud. *Anthers* subsessile in the throat, linear. *Disk* hispid. *Ovary* 5-10-celled; style short, stout, hairy, branches 4-12, more or less combined; ovules solitary, pendulous in each cell, funicle thickened. *Drupe* ellipsoid, ovoid or globose; pyrenes 4-10, slender, erect or radiating outwards, or superposed. *Seeds* cylindric, testa membranous, albumen scanty or 0; embryo slender.—**DISTRIB.** Species about 20, tropical Asiatic and Oceanic.

1. **T. Jambosella**, *Thw. Enum.* 153; leaves elliptic-lanceolate acuminate minutely silky on the nerves beneath; ♀ solitary long-peduncled. *Bedd. Ic. Pl. Ind. Or.* t. 190. *T. flavescens*, *Baker Fl. Maurit.* 144. *Nelitris Jambosella*, *Gaertn. Fruct.* i. 134, t. 29, *excl. syn.* *Heliospora flavescens*, *Jack in Trans. Linn. Soc.* xiv. 127, t. 4, f. 3; *DC. Prodr.* iv. 391. *Eupyrena glabra*, *W. & A. Prodr.* 423. *Bobea glabra*, *Korth. in Ned. Kruidk. Arch.* ii. 211. *Polyphragma flavescens*, *Kurz For. Fl.* ii. 38. *Guettarda* ? *peduncularis*, *Wall. Cat.* 6222; *Don Gen. Syst.* iii. 551. *G. Brunonis* and *G. missiones*, *Wall. Cat.* 6220, 6221.

ANDAMAN ISLANDS, MALAY PENINSULA, and CEYLON.—**DISTRIB.** Malay Archipelago, Mauritius.

A small evergreen tree; branches slender. *Leaves* 3-6 by 1-2½ in., brown when dry, coriaceous, nerves few; petiole ¼-¾ in.; stipules ½ in. *Cymes* ♂ long- or short-peduncled, 3-12-flowered, flowers sessile. *Calyx-tube* obscurely toothed; ♀ terminal on a stout peduncle, urn-shaped, campanulate in fruit. *Corolla* very variable, ½-½ in. long, silky-pubescent, lobes rounded. *Drupe* globose, ¼-½ in. long, rarely oblong, ribbed.—There may be more than one Indian species, but the plant is so variable that I am unable to decide. Wallich's *G. ? Brunonis*, from Singapore, has very small leaves, and the ♂ cymes have spreading many-flowered branches. The Ceylon specimens have larger flowers than the Malayan.

2. **T. Rumphii**, *DC. Prodr.* iv. 461; leaves elliptic-lanceolate silky beneath. *Wall. Cat.* 6217. *Bobea Wallichiana*, *Korth. in Ned. Kruidk. Arch.* ii. 211.—*Rumph. Herb. Amb.* iii. 216, t. 140.

PENANG, MALACCA, and SINGAPORE, *Wallich, &c.*—**DISTRIB.** Malay Archipelago.

Very similar to *T. Jambosella*, but the ♂ cymes are usually shorter peduncled and smaller, and the leaves often very silky beneath. I have, however, great difficulty in distinguishing these species, and both seem to vary much in the pubescence of the leaves and size of flowers; the drupes are oblong or globose. Penang specimens from Maingay have small leaves, 2½-3 in., almost glabrous beneath, and ♂ fl. not ½ in. long; they have ellipsoid or globose berries, and may be a different species.

3. **T. Finlaysonianus**, *Wall. Cat.* 6223 (*Guettarda*); glabrate, leaves obovate or elliptic-oblong tip rounded or obtuse glabrous beneath. *Timonius, Wall. Cat.* 8446. *Guettarda peduncularis*, *Wall. Cat.* 6222, *in part.*

SINGAPORE, *Wallich, G. Thomson.*

Branches stout, glabrous. *Leaves* 3-5 in., narrowed into the very short petiole; midrib strong, red; nerves very slender. *Flower* ♂ not seen; ♀ solitary or 2-nate on pedicels ½-1½ in. *Drupe* globose, nearly ½ in. diam.—I doubt this being anything but a variety of *T. Jambosella*, though the form of the leaf is very different, the petiole shorter, and flower larger. The specimens of this genus in Wallich's Herbarium are much mixed. The sheet marked *Finlaysonianus* (6223) contains two specimens of what I think are different things (from *Herb. Finlayson*): one has small (2 in.) elliptic acute leaves, and long pedicelled quite glabrous ♂ flowers ½ in. long, fascicled on a very short peduncle, with a glabrous long-pedicelled young fruit from a lower axil; the other specimen has ♀ flowers only, solitary in the axils, a

glabrous ovary, and pubescent corolla. It is this latter I have described as *Finlaysonianus*; there is another specimen of it on the sheet with *T. Jambosella*, and it is also Wallich's 8446.

60. **DICHILANTHE**, *Thwaites*.

Trees with stout spreading branches, and resinous buds and nodes. *Leaves* rigid, elliptic-lanceolate, acuminate; stipules connate into a short intra-petiolar ring. *Flowers* small, sessile on a terminal sessile or peduncled orbicular receptacle formed of connate bracts. *Calyx-tube* elongate, curved; limb obliquely funnel-shaped, persistent; lobes 5, rigid, with toothed interposed segments. *Corolla* silky, funnel-shaped, tube curved, throat villous; limb 2-lipped, upper lip 2-, lower 3-toothed, lobes valvate in bud. *Stamens* 5, anthers included, oblong. *Disk* elevated, crenulate. *Ovary* with 2 narrow cells; style elongate, stout, stigma exserted clavate 2-lobed; ovules 1 pendulous in each cell, cylindric, funicle thickened. *Fruit* obovoid, gibbous, 2-celled, outer in each head incurved, pericarp thick. *Seeds* cylindric, albumen fleshy; radicle superior.—**DISTRIB.** Species 2, Ceylon and Borneo.

1. **D. zeylanica**, *Thw. in Hook. Kew Journ.* vii. 270, 376, t. 8, f. A. (excl. stipules); *H. f. & T. in Journ. Linn. Soc.* ii. 174; *Bedd. Fl. Sylb., Anal. Gen.* t. xv. f. 4.

CEYLON; between Galle and Ratnapoora, alt. 1000 ft., *Thwaites*.

A tree 30-40 ft. *Leaves* 4-6 by $1\frac{1}{2}$ -2 in., glossy, red-brown when dry, finely reticulate, very coriaceous, narrowed into the stout short petiole. *Peduncles* very short; heads $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. *Calyx-lobes* $\frac{1}{2}$ in. *Corolla* $\frac{3}{4}$ -1 $\frac{1}{4}$ in. long, purplish.—The irregular flower is very anomalous, and resembles that of *Caprifoliaceæ*.

TRIBE VIII. **KNOXIEÆ**.

61. **KNOXIA**, *Linn.*

Erect herbs or undershrubs; stems terete or obtusely angled, with 2 lines of pubescence. *Leaves* opposite; stipules connate with the petiole into an entire or bristly sheath. *Flowers* dimorphous, pink or lilac, subsessile on the elongating branches of terminal cymes, rarely spicate. *Calyx-tube* ovoid or didymous; teeth 4, minute and subequal, or 1 or 2 elongate, persistent. *Corolla-tube* long, throat villous; lobes 4, valvate in bud with inflexed tips. *Stamens* 4, inserted within the throat; anthers linear, exserted or included. *Ovary* 2-celled; style filiform, stigma included or exserted 2-lobed; ovules 1 pendulous in each cell. *Fruit* very small, of 2 semi-terete or dorsally compressed indehiscent cocci. *Seeds* with a thickened funicle, testa membranous, albumen fleshy; embryo axile, cotyledons thin, radicle superior.—**DISTRIB.** Species 8 or 9, Indian, Malayan and Australian.

The synonymy of the Indian species is very confused, owing to the incomplete descriptions of the earlier authors. Some of the citations of De Candolle and Roxburgh may be open to question. Roxburgh's descriptions do not accord with his drawings.

* *Ripe fruit separating from the persistent subulate columella by a basal perforation; mericarps closely united, rarely separating.*

1. **K. corymbosa**, *Willd. Sp. Pl.* i. 582; pubescent villous or tomentose, leaves petioled or sessile linear- or ovate-lanceolate or -oblong, stipular bristles hairy, cymes 3-chotomous, fruits spicate secund indehiscent perforate at the

base. *W. & A. Prodr.* 439; *Wt. Ill.* t. 128; *Dalz. & Gibs. Bomb. Fl.* 111. *K. teres*, *DC. Prodr.* iv. 569; *Wall. Cat.* 819, in part. *K. exserta*, *DC. l. c.* *K. umbellata*, *Banks; Spreng. Syst.* i. 406. *K. sumatrensis*, *Wall. Cat.* 6183. *K. mollis*, *Br. in Wall. Cat.* 820, not of *W. & A.* *K. stricta*, *Thw. Enum.* 152. *Spermacoce?* *teres* and *S. exserta*, *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 367, 368; *ed. Carey & Wall.* i. 373, 374. *S. sumatrensis*, *Retz Obs.* iv. 23, *ex Cham. & Schl. in Linnæa*, iii. 316, not of *Roxb. Fl. Ind.* i. 366. ? *Cuncea trifida*, *Ham. in Don Prodr.* 135.

Throughout tropical India, from Garwhal in the WESTERN HIMALAYA, eastward to Sikkim, ascending to 5000 ft., and in the KHASIA MTS. to 4000 ft.; to CEYLON and MALACCA.—DISTRIB. Malay Archipelago and Tropical Australia.

An erect slender annual, 1-4 ft.; stem cylindric or obscurely 4-angled, sparingly 3-chotomously branched, internodes long. *Leaves* 3-5 by $\frac{1}{2}$ -1 in., pale greenish or brown when dry, narrowed into the short petiole; stipular bristles $\frac{1}{2}$ in. *Flowers* $\frac{1}{10}$ - $\frac{1}{8}$ in., very small, white or purplish. *Calyx-teeth* minute, triangular, subequal. *Corolla-tube* hairy within. *Fruit* $\frac{1}{16}$ in., sessile or shortly pedicelled, 4-angled.—I do not doubt this being the *Cuncea trifida* of Don's Prodrômus, though the flowers are described as yellow and the fruit as a berry. Roxburgh's figure of *Spermacoce teres* differs from his description in the 2-partible fruit and plano-convex seed; he describes the seed of *S. teres* as round, which it should not be.

**** Ripe mericarps either connate, the fruit falling away as a whole with the central columella, or the mericarps separating from one another and falling away from the columella.**

† *Calyx-teeth* all very small, equal or one rather larger than the rest.

2. ***K. mollis***, *W. & A. Prodr.* 439, not of *Br.*; pubescent villous or tomentose, leaves petioled rarely sessile ovate or lanceolate, stipules with hairy bristles, fruits crowded ellipsoid, mericarps connate and adnate to the columella. *K. corymbosa*, *Thw. Enum.* 151; *Schlecht. in Herb. Hohen. n.* 991. ? *K. stricta*, *Gaertn. Fruct.* i. 122, t. 25. *K. teres*, *Wall. Cat.* 819, in part.

Mountains of the WESTERN PENINSULA, from the Concan southwards, alt. 3-7000 ft. CEYLON, *Walker*; Hangalle, alt. 5000 ft., *Thwaites*.

An erect annual?, 1-3 ft., very variable in size; much more robust branched and leafy than *K. corymbosa*; branches 4-angled. *Leaves* $1\frac{3}{4}$ -5 by $\frac{1}{2}$ -1 $\frac{1}{2}$ in., brown when dry, with often rufous hairs; petiole $\frac{1}{8}$ - $\frac{1}{2}$ in. *Cymes* with short spreading branches; flowers crowded, blueish, $\frac{1}{8}$ in. long. *Fruits* smooth, terete, glabrous, $\frac{1}{12}$ in. long, black when dry, crowned with the rounded calyx-teeth.—In Ceylon specimens the petiole is 1 in. and very slender, in a specimen from Ritchie the leaves are quite sessile. Gaertner represents the mericarp of his *K. stricta* (from Ceylon) as separating and subacute dorsally, as in *K. zeylanica*, which has, however, very different calyx-teeth from Gaertner's figure.

3. ***K. Heyneana***, *DC. Prodr.* iv. 570; glabrous or nearly so, leaves petioled ovate or linear-lanceolate, stipules with long rigid glabrous bristles, fruits racemose linear-oblong, mericarps separating. *W. & A. Prodr.* 440. *Spermacoce corymbosa*, *Roth Nov. Sp.* 98 (*ex W. & A.*).

SOUTHERN MYSORE and CARNATIC; Dindygul Mts. and Courtallum, *Wight*.

Erect, leafy; branches robust, terete, shining. *Leaves* 2-3 by $\frac{3}{4}$ -1 $\frac{1}{4}$ in., rather coriaceous, brown when dry, acute or acuminate; stipular bristles stout, smooth, $\frac{1}{2}$ - $\frac{3}{4}$ in. *Cymes* puberulous, branches elongating after flowering as in *K. corymbosa*, but fruits pedicelled. *Fruit* pale, narrow, with a groove on each side where the mericarps separate.

4. ***K. Wightiana***, *Wall. Cat.* 6184; glabrous, slender, leaves sessile linear obtuse recurved, stipules entire or 2-3-cleft, fruits few short didymous truncate, mericarps separating. *W. & A. Prodr.* 440.

NILGHIRI and SHEVAGHERRY HILLS, *Wight, &c.*

Rigid; stems 8–18 in., terete. *Leaves* 2–3 by $\frac{1}{2}$ in., rigidly coriaceous, pale brown when dry, complicate; stipules erect, triangular-lanceolate, often quite entire. *Cyme-branches* puberulous or glabrous. *Fruits* apparently angled, somewhat laterally compressed, shortly pedicelled, as broad as long.

5. **K. brachycarpa**, *Br. in Wall. Cat.* 821; more or less pubescent, stem with 2 lines of pubescence, leaves sessile linear-oblong obtuse, stipules entire or 3- or more-cleft, cymes open or capitate, fruits short didymous truncate. *K. macrocarpa*, *Kurz in Journ. As. Soc.* 1877, ii. 138. *K. lævis*, *DC. Prodr.* iv. 570. *Spermacoce Brunonis*, *Wall. Cat.* 822. *S. lævis*, *Roxb. Hort. Beng.* 10, *Fl. Ind.* 1368; *Wt. Ic.* t. 193. *S. Roxburghii*, *Spreng. Syst.* i. 404.

TROPICAL HIMALAYA; Kumaon, alt. 3500–4000 ft., *Blinkworth, &c.*; Nepal, *Hamilton*. BEHAR; top of Parus-nath, alt. 4000 ft., *Anderson*. PEGU, *M'Clelland*; MARTABAN, *Kurz*.

An erect strict herb, 2–4 ft., internodes long; stem slender or robust; more or less hairy or glabrate, with always 2 more or less distinct lines of pubescence. *Leaves* 2–4 by $\frac{1}{4}$ – $\frac{3}{4}$ in., usually quite sessile and minutely pubescent on the margins and nerves beneath, more rarely elsewhere, base acute or rounded, pubescence of midrib continued down the stem; stipules pubescent, upper often entire. *Cymes*, if branched, main branches pubescent in 2 lines, the smaller puberulous; when capitate often tomentose; flowers small. *Calyx-teeth* very small, obtuse, one larger. *Fruit* as in *K. Wightiana*.—I suspect this to be Roxburgh's *Sp. lævis*; it is the only "interior of Bengal" plant at all answering to his description and drawing, from which it differs in the hairiness and large flowers. The Nipal and Bengal specimens have open cymes, the Kumaon ones globose terminal and sessile axillary heads, like *Hedyotis*; the Pegu ones have long brachiate branches with trichotomous terminal peduncles bearing capitate cymes at their ends.

†† *One or two calyx-lobes in fruit much elongate, subulate.*

6. **K. plantaginea**, *Wall. Pl. As. Rar.* 27, t. 32; *Cat.* 818; hirsute, subscape, leaves sessile linear-oblong obtuse or subacute, stipular bristles very short or 0, flowers capitate, fruits racemose, mericarps keeled with 1 or 2 elongate calyx-teeth. *DC. Prodr.* iv. 570; *Kurz in Journ. As. Soc.* 1877, ii. 138.

PEGU at Prome, *Wallich*; rare and sporadic, *Kurz*.

Rootstock thick, tortuous, woody, giving off short woody leafy branches, from which the very slender simple flower-bearing stems arise. *Leaves* on the stem 3–5 by $\frac{1}{2}$ – $\frac{3}{4}$ in.; softly hairy on both surfaces, green when dry; stipules usually reduced to a truncate sheath. *Flowering stems* 10–16 in., softly hairy, each bearing one or two very distant pairs of small leaves 1 in. long, apparently without stipules, sparingly trichotomously branched at the tip, each branch bearing a head of flowers which elongates into a spike or raceme of distant fruits several inches long. *Calyx-teeth* subulate, one or two much elongate and exceeding the mericarps. *Corolla* $\frac{1}{2}$ in. long, pale blue. *Fruit* (in *Wallich's* figure) $\frac{1}{2}$ in., apparently flattened, with keeled mericarps, the elongated calyx-tooth often much exceeding the fruit.

7. **K. zeylanica**, *Linn.*; *DC. Prodr.* iv. 569; glabrous or glabrate, leaves shortly petioled ovate or ovate- or oblong-lanceolate, stipules entire or with nearly glabrous bristles, flowers capitate or spicate, fruits spicate, mericarps dorsally rounded and keeled. *Burm. Fl. Ind.* t. 13, f. 2; *A. Rich. in Mem. Soc. Hist. Nat. Par.* v. t. 15; *W. & A. Prodr.* 440, excl. syn. *K. stricta*.

CEYLON; common in the southern part of the island.

A small leafy rigid annual?; stem erect or ascending, and branches terete, smooth and scabrid above. *Leaves* 1–2 by $\frac{1}{4}$ – $\frac{1}{2}$ in., narrowed at both ends, obtuse or subacute, margins recurved. *Spikes* and flowers glabrate or hispid, when fruiting sometimes $\frac{1}{2}$ in. long and quite simple. *Corolla-tube* very slender. *Fruit* $\frac{1}{10}$ in., broadly ovoid, the long calyx-tooth equalling the mericarp, glabrous.

8. **K. platycarpa**, *Arn Pugill.* 26; hirsute or glabrate, leaves ovate linear-oblong -ovate or -lanceolate, stipular bristles many hairy, cymes with short crowded branches but lengthening much in fruit, mericarps dorsally flattened and deeply keeled.

CEYLON; abundant in the central province, alt. 4-7000 ft.

According to Thwaites a very variable species, of which he distinguishes the three following forms, which look very unlike; all have short branched cymes and two forms of flowers, which are either hirsute glabrate or glabrous, and resemble those of *K. zeylanica*, but are often larger.

VAR. 1. platycarpa, *Arn. l. c.*; nearly glabrous, branches with two obscure lines of pubescence, leaves narrowly oblong-lanceolate ciliolate, stipular bristles short nearly glabrous.—Resembles in foliage *K. zeylanica*, and as the cyme branches frequently run out I suspect these species may prove the same.

VAR. 2. hirsuta, *Thw. Enum.* 152; hirsute or tomentose, leaves broader, stipular bristles longer and hirsute, cymes very dense, flowers larger usually very hirsute — *K. hirsuta*, *Arn. l. c.*

VAR. 3. foliosa, *Thw. l. c.*; hirsute or glabrate, branches very stout, leaves more coriaceous broadly ovate, stipular bristles very rigid, large calycine lobe sometimes foliaceous.

DOUBTFUL SPECIES.

K. SUMATRENSIS, *DC. Prodr.* iv. 569, from the Circars;—it is impossible to say to what this refers. Roxburgh's *Spermacoce sumatrensis* (which is referred to it) is described as having the corolla with a broad gibbous tube, and a 2-valved capsule 2-partible from the base; it is probably a *Hedyotis*.

TRIBE IX. ALBERTEÆ.

62. **OCTOTROPIS**, *Bedd.*

A glabrous shrub; branches slender. *Leaves* elliptic-lanceolate, caudate-acuminate, membranous; stipules triangular, persistent. *Flowers* in peduncled axillary or supra-axillary corymbose cymes. *Calyx-tube* turbinate, 5-toothed. *Corolla* campanulate, tube short, throat villous; lobes 5, ovate, acute, twisted in bud. *Anthers* 5, sessile on the mouth of the corolla, linear, cuspidate, base 2-fid, exserted. *Disk* small. *Ovary* 1-celled; style stout, pubescent, 8-ribbed; arms 2, short, acute, glabrous; ovules solitary or a pair pendulous from the top of the cell. *Fruit* ovoid, smooth, coriaceous, 1-seeded. *Seed* oblong, pendulous.

1. **O. travancorica**, *Beddome Fl. Sylv.* t. 327; *For. Man.* 134/12.

TRAVANCORE, alt. 3-3500 ft.; Shevagherry hills, *Wight, Beddome.*

Leaves $3\frac{1}{2}$ -5 in.; petiole $\frac{1}{4}$ in. *Peduncles* capillary, half as long as the leaves; cyme-branches opposite; bracts small; flowers $\frac{1}{2}$ in. diam., shortly pedicelled, 2-bracteolate.—A very singular genus, belonging to an otherwise exclusively African tribe. *Octotropis* is further unique in the Order, in having a 1-celled ovary with 1 or 2 pendulous ovules. Specimens of this in Wight's Herbarium are fastened on a sheet with a *Canthium*.

TRIBE X. VANGUERIEÆ.

63. **CANTHIUM**, *Lam.*

(*PLECTRONIA*, *Linn. in part.*)

Unarmed or spinous shrubs, erect or climbing; branches terete. *Leaves* opposite; stipules connate. *Flowers* small, axillary, fasciated or in peduncled corymbose cymes, white or greenish, sometimes polygamous. *Calyx-tube* short; limb very short, persistent or deciduous, 4-5-toothed. *Corolla-tube* funnel-

shaped, campanulate, globose or urceolate, with a ring of deflexed hairs within; throat villous; lobes 4-5, at length reflexed, valvate in bud. *Anthers* 4-5, subsessile on the throat or mouth of the corolla. *Ovary* 2-celled; style stout, stigma large; ovules 1 pendulous in each cell. *Drupe* didymous or subglobose, or with one carpel suppressed then reniform or oblong, with 1-2 pyrenes or a 2-celled putamen. *Seeds* oblong, testa membranous, albumen fleshy; embryo long, with short cotyledons.—**DISTRIB.** About 70 species, in the tropics of the old world.

* *Unarmed, flowers 5-merous.*

1. **C. didymum**, *Roxb. Fl. Ind. i.* 535; unarmed, glabrous, leaves ovate lanceolate or suborbicular, cymes compressed shortly peduncled, bracts short or 0, flowers 5-merous, fruit $\frac{1}{4}$ – $\frac{1}{2}$ in. globose ellipsoid or obovoid compressed subdidymous, putamen rugose. *Roxb. Fl. Ind. i.* 535; *W. & A. Prodr.* 425; *DC. Prodr. iv.* 473; *Wall. Cat.* 8413 excl. A. *Plectronia didyma*, *Kurz For. Fl. ii.* 35. *Psydrax dicoccos*, *Gaertn. Fruct. t.* 26; *DC. l. c.* 476. *Vangueria spirostylis* and *lucidula*, *Miq. Fl. Ind. Bat. ii.* 250, and suppl. 544 (*fid. Kurz*). Indeterm., *Wall. Cat.* 9069.

SIKKIM HIMALAYA, alt. 1,500 ft., at Sittong, *King*; **KHASIA** and **JYNTEA MTS.**, *De Silva*; **WESTERN PENINSULA**, from the Concan southwards; **MALAYAN PENINSULA**, from Mergui southwards; **CEYLON**, common.—**DISTRIB.** Malay Archip., S. China.

A stout evergreen shrub; branches smooth. *Leaves* very variable, 2-6 by $\frac{1}{2}$ –4 in., very coriaceous, polished above, usually obtusely caudate-acuminate, base acute obtuse or even cordate, nerve-axils eglandular; petiole $\frac{1}{2}$ – $\frac{1}{4}$ in. *Cymes* subsessile or on a short peduncle, $\frac{1}{4}$ –1 in., sometimes puberulous. *Calyx* truncate or obscurely toothed. *Corolla* campanulate, tube $\frac{1}{10}$ – $\frac{1}{4}$ in.; lobes 5, subacute. *Style* glabrous; stigma subquadrate, notched or 2-fid. *Fruit* very variable.—*Thwaites' var. rostrata* is founded on the rostrate (that is caudate-acuminate) leaves, which, however, do not differ from those of a common Eastern or Western form; it has also often beaked elongate fruits, the result of insect injury.

VAR. lanceolata, *Thw. mss.*; leaves narrowly elliptic-lanceolate obtuse 4-5 by $\frac{3}{4}$ –1 $\frac{1}{4}$ in. *Canthium lanceolatum*, *Arn. Pugill.* 24. *Webera lanceolata*, *Moon. Cat.* 19.—**Ceylon**, *Thwaites*.—Amongst Wight's duplicates (*Kew Distrib.* 1414) are specimens marked from Courtallam, but as none such are in Wight's own Herbarium I suspect some mistake.

VAR. grandifolia, *Thw. Enum.* 152; leaves very large 6-8 by 3-4 in., base rounded. **Ceylon**.

VAR. Kingii; leaves more membranous elliptic-lanceolate very finely acuminate, cymes deflexed corymbiform, flowers large, corolla-tube $\frac{1}{2}$ in. quite glabrous.—**Sikkim**, *Dr. King*.—This may prove a different species, but in the absence of fruit this is uncertain.

2. **C. montanum**, *Thw. Enum.* 152; unarmed, glabrous, leaves small orbicular or ovate obtuse, cymes shortly peduncled subumbellate, flowers 5-merous.

CEYLON; central province, alt. 4-7000 ft., *Thwaites*.

Probably, as *Thwaites* suspects, a small-leaved form of *C. didymum*. The fruit is unknown.

3. **C. umbellatum**, *Wight Ic. t.* 1034; unarmed, glabrous, leaves elliptic obtuse or obtusely acuminate, flowers umbellate on a short very stout compressed peduncle, flowers 5-merous, fruit $\frac{1}{4}$ – $\frac{1}{2}$ in. broad oblong or subquadrate didymous, putamen rugose. *Dalz. & Gibs. Bomb. Fl.* 113 (*not of Korth.*). *C. didymum*, *Bedd. Fl. Sylv. t.* 221; *Wall. Cat.* 8413 A. *C. lucidum*, *Schlecht in Pl. Hohen. n.* 1377. *Plectronia didyma*, *Brand. For. Fl.* 276. **Rubiacea**, *Wall. Cat.* 8451, 8452.

WESTERN PENINSULA, on the Ghats, alt. 4-8000 ft., from the Concan southwards. TENASSERIM, *Wallich, Helfer* (Kew Distrib. 2972); *AVA, Wallich.*

An evergreen tree, 50 ft. *Leaves* very coriaceous, similar to the ordinary form of *C. didymum*, of which this is probably a variety. Korthal's *C. umbellatum*, with a slender peduncle, is a very different plant.

4. ***C. nelgherrense***, *Wight Ic. t. 1064 bis*; unarmed, leaves elliptic-ovate obtuse glabrous or setose beneath, flowers 5-merous, pedicels very short axillary fascicled, fruits obovoid or obcordate compressed subdidymous, putamen smooth. *Bed. Fl. Sylv. t. 221 A.*; *For. Man. 134, 6* (Plectronia).

NILGHERY and PULNEY Mts., *Wight, G. Thomson.*

An evergreen shrub or tree; branches opposite, glabrous. *Leaves* $3\frac{1}{2}$ - $4\frac{1}{2}$ by $1\frac{1}{2}$ -2 in., rather coriaceous, dark green or black when dry; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* shortly pedicelled, sometimes on a very short peduncle; pedicels $\frac{1}{2}$ - $\frac{1}{2}$ in. *Fruit* nearly $\frac{3}{4}$ in.; pericarp thin.

VAR. 1; leaves coriaceous glabrous, stipules $\frac{1}{2}$ - $\frac{1}{2}$ in.—Nilgherrys, *Wight* (Kew Distrib. 1424, 1425).

VAR. 2; leaves less coriaceous hirsute beneath or covered with scattered rigid hairs, stipules small.—Pulney Mts. (Kew Distrib. 1422, 1426).

5. ***C. ficiforme***, *Hook. f.*; unarmed, glabrous, leaves elliptic obtusely acuminate, flowers 5-merous fascicled on a very short peduncle, fruit very large pyriform stoutly pedicelled, putamen thick woody very deeply sinuously grooved.

MYSOORE; Shevagherry hills, *Wight.*

Branches very stout, and leaves almost black when dry. *Leaves* 3-4 by $1-1\frac{1}{2}$ in., very thickly coriaceous, narrowed into a very stout petiole; nerves oblique, slender; stipules short, broad. *Peduncles* $\frac{1}{2}$ in. or less, sometimes branched; pedicels as long. *Fruit* $1-1\frac{1}{4}$ in., somewhat compressed, narrowed into a pedicel $\frac{1}{2}$ in. long; putamen resembling a small walnut.

6. ***C. glabrum***, *Blume Bijl. 967*; unarmed, glabrous, leaves large ovate subacute, cymes small compressed shortly peduncled, flowers 5-merous, fruit large ellipsoid or subovoid with 2 very smooth 3-gonous pyrenes. *DC. Prodr. iv. 474*; *Kurz For. Fl. ii. 35* (Plectronia). *Vangueria ? atroviridis, Wall. Cat. 8412.* Rubiacea, *Wall. Cat. 8303.*

From TENASSERIM, PEGU, and the ANDAMAN ISLANDS, to SINGAPORE and PENANG, *Wallich, &c., Maingay* (Kew Distrib. 863).—DISTRIB. Java.

A small tree; branches stout, upper compressed. *Leaves* 4-6 by $1\frac{1}{2}$ -3 in., dull green when dry, thinly coriaceous; nerves few, distant; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in.; stipules short. *Cymes* with short spreading branches; flowers small, shortly peduncled. *Corolla-tube* subglobose, $\frac{1}{2}$ in.; lobes as long. *Stigma* mitriform, notched. *Fruit* $\frac{3}{4}$ -1 in. long; pyrenes abruptly narrowed and compressed parallel to the ventral face at the top.

7. ***C. confertum***, *Korth. in Ned. Kruidk. Arch. ii. 235*; unarmed, glabrous, leaves elliptic or elliptic-lanceolate obtusely caudate-acuminate, flowers fascicled shortly pedicelled 5-merous, fruit small obovoid or obcordate subcompressed, putamen woody rugose. *C. glomerulatum, Miq. Fl. Ind. Bat., suppl. 585.* *Memecylon pauciflorum, Wall. Cat. 4114.*

PENANG, SINGAPORE, and MALACCA, *Wallich, Griffith* (Kew Distrib. 2973), *Maingay* (862, 942).—DISTRIB. Malay Archipelago.

Branches slender. *Leaves* 3-5 by $\frac{3}{4}$ -2 in., dull green when dry, opaque, coriaceous; nerves slender; petiole and stipules short. *Flowers* small, often unisexual; buds obtuse; pedicel $\frac{1}{10}$ - $\frac{1}{6}$ in. *Corolla-tube* and lobes very short. *Style* glabrous. *Fruit* $\frac{1}{2}$

in. long.—Miquel says the flowers are 4-5-merous; all other authors say 5-merous, as I find them.

** *Unarmed; flowers 4-merous.*

8. **C. travancoricum**, *Bedd. Ic. Pl. Ind. Or.* t. 239; unarmed, glabrous, leaves long-petioled ovate obtusely acuminate, cymes long-peduncled, branches slender.

TRAVANCORE and TINEVELLY hills; Beddome.

A tree; branchlets woody with rough bark. *Leaves* clustered on short lateral shoots, $1\frac{1}{2}$ –2 in., bright green beneath when dry; petiole very slender, $\frac{1}{4}$ in.: stipules triangular with long subulate points. *Peduncle* of cyme sometimes 1 in., stout and compressed, or shorter or 0; branches very slender. *Flowers* very small, $\frac{1}{10}$ in. diam. *Calyx-teeth* subulate. *Corolla-tube* shortly campanulate. *Stigma* capitate. *Fruit* unknown.

9. **C. gracilipes**, *Kurz in Journ. As. Soc.* 1872, ii. 314; *For. Fl.* ii. 36 (*Canthium*); unarmed, short petioles and nerves beneath puberulous, leaves elliptic obtusely acuminate, flowers 4-merous solitary or in pairs, pedicels capillary, fruit subquadrately didymous or reniform, pyrenes rugose thinly woody remote.

ANDAMAN ISLANDS; rather frequent, *Kurz*.

Shrubby; pubescence fulvous; branches slender. *Leaves* 3–5 by $1\frac{1}{4}$ –2 in., green when dry, membranous; nerves very slender; petiole very short; stipules finely acuminate. *Flowers* very small; pedicels $\frac{1}{2}$ – $\frac{2}{3}$ in., hairy, arising from very short shoots. *Calyx-teeth* subulate. *Fruit* $\frac{1}{4}$ in. across, with a very broad sinus at top, blueish-black.

*** *Armed; stamens 4 or 5.*

10. **C. puberulum**, *Thw. mss.*; spinescent, pubescent, leaves small elliptic acute, peduncles fascicled, flowers 4-5-merous, calyx-lobes long recurved, corolla-tube broadly campanulate.

CEYLON; central province, *Thwaites* (C. P. 3995).

Branches slender, elongate; spines short, straight. *Leaves* $\frac{3}{4}$ –1 in., bright green when dry, finely pubescent on both surfaces; petiole short; stipules with slender points. *Peduncles* always bracteate, 1-3-flowered, $\frac{1}{4}$ – $\frac{1}{2}$ in., fulvous pubescent, as are the bracts and calyx. *Calyx-tube* campanulate; lobes longer than the corolla, narrowly lanceolate. *Corolla-tube* $\frac{1}{12}$ in., lobes acute. *Style* glabrous; stigma subglobose. *Fruit* unknown.

11. **C. Rheedii**, *DC. Prodr.* iv. 474; spinescent, shining, branches divaricate, leaves ovate obtusely caudate-acuminate, petiole and very short fascicled pedicels pubescent, flowers 5-merous, fruit suborbicular compressed. *W. & A. Prodr.* 426; *Dalz. & Gibs. Bomb. Fl.* 113. *Webera tetrandra*, *Wall. Cat.* 8265 *A. in part*; *Rheede Hort. Mal.* v. t. 37.

WESTERN PENINSULA; from the Concan southwards. CEYLON; southern and central part.

Shrubby, "scandent" (*Dalzell*); branches slender, short, pubescent; spines short, slightly recurved. *Leaves* 1– $4\frac{1}{2}$ by 1–2 in., dark brown or black when dry, rarely green; base rounded, sometimes acute or cordate; nerve-axils sometimes hairy; petiole very short and triangular; stipules appressed, hairy. *Pedicels* $\frac{1}{2}$ – $\frac{1}{3}$ in., shorter than the flowers. *Calyx-teeth* minute. *Corolla-tube* very short and broad; lobes lanceolate, acuminate, forming a long beak in bud, glabrous. *Style* hairy. *Fruit* $\frac{1}{2}$ in. diam., subdidymous, truncate with a broad sinus above; pyrenes crustaceous, contiguous.—*Wight & Arnott* (*Prodr.* 427) have a var. β with the under surface of the leaves sprinkled with hairs, and a var. γ with cordate base to the leaves. *Thwaites* makes a var. δ minus for a very small-leaved form with straight ascending spines.

12. **C. angustifolium**, *Roxb. Fl. Ind.* i. 533; spinescent, branches divaricate, leaves ovate or elliptic-lanceolate obtusely caudate-acuminate, petioles and very short fascicled pedicels glabrous, flowers 5-merous, fruit suborbicular compressed. *DC. Prodr.* iv. 474. *C. Leschenaultii*, *W. & A. Prodr.* 426; *Wt. Ic.* t. 826; *Dalz. & Gibs. Bomb. Fl.* 113; *Wall. Cat.* 8414. *Dondisia Leschenaultii*, *DC. l. c.* 469. *Rubiacea*, *Wall. Cat.* 8308.—*Rheede Hort. Mal.* vii. t. 17.

WESTERN PENINSULA, on the coast and hills from Belgaum southwards; the SUNDERBUNDS, SILHET, and CHITTAGONG, *Roxburgh*, &c.

Very near indeed to *C. Rheedii*, and I expect only a glabrous variety; the fruit and flowers are the same. I find traces of pubescence in the shoots of Bengal specimens.

13. **C. macrocarpum**, *Thw. Enum.* 152; spinescent, pubescent, leaves ovate or elliptic-lanceolate acuminate, cymes shortly peduncled, flowers 5-merous pedicelled, fruit large subglobose, putamen very thick and bony undulate externally rugose internally.

CEYLON; Hantani, alt. 3000 ft., *Thwaites*.

A subscandent shrub; short petioles and nerves rufous-tomentose. *Leaves* 2-3 in., dull green when dry, base rounded; petiole $\frac{1}{2}$ in.; stipules minute. *Cyme* subumbellately branched, pubescent; peduncles about $\frac{2}{3}$ in., pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in. *Calyx* 5-toothed. *Corolla* dirty white; lobes lanceolate, rather longer than the tube. *Fruit* 1 in., usually irregular in form, only one carpel maturing.—I have seen no flowers, nor spines.

14. **C. campanulatum**, *Thw. Enum.* 153; spinescent, glabrous, leaves small ovate or elliptic obtuse, pedicels 1-4 slender, flowers 5-merous, corolla campanulate. *Bedd. Fl. Sylv., For. Man.* 134/6.

CEYLON; Deltotte, in the central province, alt. 3000 ft., *Thwaites*.

A subscandent shrub; branches slender, rough, youngest scaberulous; spines small, straight. *Leaves* $\frac{3}{4}$ -1 $\frac{1}{2}$ in., green when dry, coriaceous; petiole $\frac{1}{10}$ in.; stipules minute. *Pedicels* $\frac{1}{2}$ in.; flowers quite glabrous. *Calyx*-lobes short, acute. *Corolla* $\frac{1}{2}$ in. diam., tube shorter than the acuminate lobes. *Stigma* obconic with a truncate base, entire. *Fruit* the size of a pea (not seen by me).

15. **C. parvifolium**, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 534; spines straight, branches slender and petioles and leaves beneath or on both surfaces hirsute, leaves small ovate or elliptic subacute, flowers 5-merous subsessile, fruit small suborbicular compressed, putamen tubercled. *DC. Prodr.* iv. 474. *C. scandens*, *Blume Bijl.* 966; *DC. l. c.* 475. *Rubiacea*, *Wall. Cat.* 8288 B. *Gardenia rigida*, *Wall. Cat.* 8257 in part.

BEHAR; Monghir, *Hamilton*. KHASIA MTS., alt. 2-3000 ft., *J. D. H. & T. T., C. B. Clarke*. CHITTAGONG, *Wallich, J. D. H. & T. T.* PEGU, *Kurz*.—DISTRIB. Malay Archipelago, S. China.

A rambling shrub with spreading slender pubescent or hirsute branches; spines slender, supra-axillary. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., green when dry; petiole very short; stipules ovate-lanceolate. *Calyx* minutely 5-toothed. *Corolla*-tube subglobose, glabrous; teeth lanceolate, acute. *Disk* villous. *Fruit* $\frac{1}{2}$ in. diam., like that of *C. Rheedii*.

16. **C. horridum**, *Blume Bijl.* 966; spines hooked, branches slender petioles and leaves beneath pubescent or hirsute, leaves small ovate subacute, flowers 5-merous subsessile, fruit large subglobose. *DC. Prodr.* iv. 474; *Kurz For. Fl.* ii. 36 (*Plectronia*). *C. zizyphinum*, *Wall. Cat.* 8288 A. C. *Hyptianthera rhamnoides*, *Morr. & Zoll. Syst. Verh.* 60. *Dondisia horrida*, *Korth. in Ned. Kruidk. Arch.* ii. 236.

TENASSERIM, *Gomez*; SINGAPORE and PENANG, *Wallich*, &c.—DISTRIB. Malay Archipelago, Philippine Islands.

Differs from *C. parvifolium* only in the shorter hooked compressed spines and much

larger fruit, which I have not seen, but which is described by Kurz as equalling a small cherry.

17. *C. parviflorum*, Lamk. Dict. i. 602; spinescent, glabrous, leaves small ovate obovate or orbicular obtuse, cymes peduncled many-flowered, flowers 4-merous, fruit suborbicular compressed emarginate at both ends, endocarp woody undulate. *DC. Prodr.* iv. 474; *Gaertn. f. Fruct.* t. 196, f. 3; *Roxb. Cor. Pl.* t. 57; *Fl. Ind.* i. 534; *W. & A. Prodr.* 426; *Dalz. & Gibs. Bomb. Fl.* 113; *Wall. Cat.* 8289. *Webera tetrandra*, *Willd. Sp. Pl.* i. 1224 excl. syn. *Rheede*; *Wall. Cat.* 8265 in part.—*Rheede Hort. Mal.* v. t. 36.

WESTERN PENINSULA; from the Concan southwards. Ceylon; abundant up to 4000 ft.

A rigid shrub; branches often thickly covered with stout straight spines 1-2 in. long. *Leaves* usually crowded on shortened lateral shoots, $\frac{1}{2}$ -1 in., rather coriaceous, dirty green when dry, opaque, base cuneate; petiole slender, $\frac{1}{10}$ - $\frac{1}{4}$ in.; stipules small with long cuspidate points. *Cymes* $\frac{1}{4}$ - $\frac{3}{4}$ in.; peduncle and pedicel slender, short or long; flowers very small, yellowish. *Calyx-teeth* minute. *Corolla-tube* subglobose; lobes ovate. *Style* glabrous, stigma capitate. *Fruit* subquadrate or obcordate subdidymous, $\frac{1}{2}$ in. diam.—“Spines sometimes three-fold” (Roxburgh).

64. **VANGUERIA**, Juss.

Characters of *Canthium*, but ovary 3-6- (usually 5-) celled, and fruit larger.—DISTRIB. Species about 30, in the tropics of the old world.

V. EDULIS, *Vahl (Wall. Cat.* 8410), a native of Madagascar, a small tree resembling *V. spinosa*, but unarmed, is cultivated in India for the sake of its eatable fruit.

1. *V. spinosa*, Roxb. Fl. Ind. i. 536; spinescent, leaves glabrous villous or tomentose. *Wall. Cat.* 8409; *DC. Prodr.* iv. 454. *V. mollis*, *Wall. Cat.* 8411. *V. spinosa* and *V. pubescens*, *Kurz For. Fl.* ii. 34. *V. edulis*, *Miq. in Herb. Hohenack.* n. 127, not of *Vahl*. *Pyrostria*? *spinosa*, *Miq. Fl. Ind. Bat.* ii. 313. *Canthium*, *Wall. Cat.* 8415, 8417.

From NORTHERN BENGAL to CANARA, PEGU, TENASSERIM, and BIRMA.—DISTRIB. Java.

A small tree or large bush, with straight opposite simple or 3-nate spines. *Leaves* 3-4 in., opposite or 3-nately whorled, ovate or oblong, acute or acuminate; petiole $\frac{1}{2}$ -1 in.; stipules cuspidate from a broad base. *Cymes* 1-1 $\frac{1}{2}$ in., shortly peduncled; flowers greenish, pedicelled. *Calyx* 5-toothed. *Corolla-tube* subglobose; lobes triangular, acute. *Style* glabrous; stigma 4-5-lobed. *Drupe* $\frac{3}{4}$ in. diam., subglobose or turbinate, smooth, fleshy; pyrenes 4-5, woody, smooth.—Fruit eatable.

VAR. 1. *spinosa proper*; leaves glabrous or nearly so. *V. spinosa*, *Roxb.*

VAR. 2. *mollis*, *Wall. Cat.* 8411 (sp.); leaves more or less pubescent or tomentose on both surfaces. *V. pubescens*, *Kurz*.

65. **MESOPTERA**, Hook. f.

A tree; branches robust, terete. *Leaves* opposite, petioled, large and broad, very coriaceous, tomentose beneath; nerves strong; stipules large, rigidly coriaceous, interpetiolar, one much larger than the other, obliquely oblong, very obtuse, with strong parallel or subflabellate nerves, the other shorter, rounded. *Flowers* minute, in small dense axillary cymes, ebracteolate. *Calyx-tube* short, hemispheric, 5-toothed. *Corolla-tube* short; throat hairy; lobes 5, short, acute, valvate in bud. *Stamens* 5, on the corolla-throat; filaments short subulate; anthers oblong, apiculate. *Ovary* 2-celled; style short, stout, stigma capitate 10-lobed; ovules 1 in each cell, attached to the septum, amphitropous? *Fruit* small, 2-celled, didymous (or 1-celled and globose), smooth; pericarp coriaceous with a thin fleshy covering. *Seeds* cup-shaped, embracing a thick horny projection from the middle of the inner angle of the cell, testa adnate to the dense

fleshy albumen; embryo slender, cylindric, occupying the whole axis of the albumen, hence coiled almost in a circle, cotyledons very short obtuse, radicle very long superior.

1. **M. Maingayi**, Hook. f. in *Gen. Plant.* ii. 131.

MALACCA, *Maingay* (Kew Distrib. 939).

Branches as thick as a goose-quill. *Leaves* 8–12 by 4–5 in., ovate or elliptic, acuminate, brown when dry, glabrous and shining above, rusty beneath; nerves 9–10 pair, impressed above; petiole $\frac{1}{2}$ in., very stout; larger stipule 1 in. *Cymes* small and dense in flower, open in fruit, much branched, hirsute, branches slender. *Fruit* when didymous $\frac{1}{2}$ in. diam., black when dry.—The description of the flowers is aided by Maingay's mss., where the ovules are described as inserted near the base of the cell, whence I assumed the plant to belong to *Psychotriæ*, and so classed it in the *Genera Plantarum*; the fruit, then unknown, shows it to belong to *Vangueriæ*, though it resembles more outwardly that of an *Ixora*.

TRIBE XI. IXOREÆ.

66. **IXORA**, Linn.

Shrubs or small trees; branches terete. *Leaves* opposite, rarely in threes; stipules interpetiolar. *Flowers* in terminal 3-chotomously branched often corymbiform cymes, 2-bracteolate, very rarely 5-merous. *Calyx-tube* ovoid; limb 4-toothed, persistent. *Corolla-tube* long, very slender; lobes 4, spreading, twisted in bud. *Stamens* 4, on the mouth of the corolla; filaments short or 0, rarely half as long as the anther; anther slender, tip often mucronate, base 2-fid. *Ovary* 2-celled; style filiform, exserted, never twice as long as the corolla-tube; stigma slender, fusiform; branches 2, rarely persistently connate; ovules solitary, peltately attached to the septum in each cell. *Fruit* globose or didymous with 2 plano-convex or ventrally concave coriaceous pyrenes. *Seeds* peltate, testa membranous, albumen horny; cotyledons flat thin, radicle inferior.—**DISTRIB.** Species about 100, tropical Asiatic and African, rarely American.

A genus with difficulty distinguished from the 1-ovuled species of *Webera*, except by habit, the slender corolla-tube, and 4-merous flowers. The species are most difficult to limit and diagnose, and the subdivisions here proposed are only approximately reliable. Probably more of the Indian species are referable to Malayan, and especially Bornean ones than I have ventured to identify with these. *Pavetta* differs in the bracts and very long style, always twice as long as the corolla or more.

SECT. I. Euixora. *Flowers* 4- very rarely 5-merous, 2-bracteolate. *Corolla-tube* very slender.

* *Calyx-teeth* longer than the ovary, lanceolate subulate or filiform. *Cymes* corymbiform (except in *I. lanceolaria* and *Notoniana*).

1. **I. acuminata**, Roxb. *Hort. Beng.* 10; *Fl. Ind.* i. 383; glabrous, leaves petioled elliptic or linear-oblong acuminate coriaceous, floral pair obovate or oblanceolate from a sessile auricled or rounded base, cymes sessile or subsessile corymbiform contracted dense-flowered, bracteoles elongate subulate, calyx glabrous teeth lanceolate much longer than the ovary, corolla-tube very slender 1–1 $\frac{1}{2}$ in., lobes narrowly obovate, mouth pubescent or villous. *DC. Prodr.* iv. 488; *Wight Ic.* t. 706 (not good); *Wall. Cat.* 6126.

SIKKIM HIMALAYA, alt. 3000 ft., C. B. Clarke; BHOTAN, Griffith; ASSAM, KHASIA Mts., ascending to 4000 ft., and CACHAR, Hamilton, &c.; CHITTAGONG, C. B. Clarke.

A robust glabrous shrub; branches smooth. *Leaves* very variable, floral sometimes only $\frac{1}{2}$ in., rounded or linear-oblong, in extreme forms 12 by 6 in. with a cordate base;

other leaves 5-9 by $1\frac{1}{2}$ to 3 in., narrowed into a very short petiole $\frac{1}{3}$ - $\frac{1}{2}$ in., pale when dry, very coriaceous; nerves 15-20 pair, slender, arching; stipules broad with very short points. *Cymes* 2-4 in. diam., sometimes almost capitate, quite glabrous; flowers white, sweet-scented, sometimes 5-merous; bracts and bracteoles long, filiform. *Calyx* $\frac{1}{4}$ - $\frac{1}{2}$ in. *Corolla* $\frac{2}{3}$ in. across the narrow obtuse lobes. *Anthers* sessile. *Stigma* fusiform or 2-fid, with short arms. *Fruit* $\frac{1}{4}$ - $\frac{3}{4}$ in. long, ellipsoid or oblong, straight or oblique, crowned with the slender calyx-teeth.—The extreme forms are the Sikkim, with 5-merous flowers and very small orbicular floral leaves; and Upper Assam ones, with these sometimes 20 in. long and 7 broad. Griffith's Bhotan specimens (Kew Distrib. 2983) have calyx-teeth sometimes hardly longer than the tube.

2. ***I. lanceolaria***, Colebr. in Roxb. *Fl. Ind.* i. 387; glabrous or the cymes pubescent, branches slender, leaves short-petioled lanceolate or linear-lanceolate subacute, nerves very slender, cymes sessile or peduncled corymbiform or brachiate, branches slender, calyx-teeth oblong-lanceolate much longer than the ovary, corolla glabrous, tube very slender $\frac{1}{2}$ - $\frac{3}{4}$ in., lobes linear-oblong obtuse, mouth naked. *DC. Prodr.* iv. 484; *W. & A. Prodr.* 429; *Wt. Ic.* t. 827; *Wall. Cat.* 6125; *Bot. Mag.* t. 4399. *I. leucantha*, Heyne in *Wall. Cat.* 6148; *G. Don Gen. Syst.* iii. 572. *I. Wallichii*, *Herb. Wight*, not of *W. & A. Prodr.*

WESTERN PENINSULA, from Belgaum southwards, *Berry*, &c.

An erect shrub with "ash-coloured branches and pendulous slender green branchlets with compressed joints" (*Roxb.*). *Leaves* spreading, 5-7 by $\frac{3}{4}$ -2 in., quite smooth and rather shining on both surfaces, pale and reticulate when dry; nerves numerous, slender, often almost horizontal; base rounded or acute; stipules short, with long slender points. *Cymes* 2-3 in. diam., from glabrous to hoary-pubescent; branches erecto-patent; bracts and bracteoles oblong-lanceolate, caducous. *Calyx* $\frac{1}{4}$ in. long, glabrous, with 2 erect appressed bracteoles; teeth linear-oblong or lanceolate. *Corolla* white, $\frac{2}{3}$ in. across the narrow lobes. *Filaments* slender. *Stigma* slender. *Fruit* globose or didymous, calyx-teeth persistent.—In *W. & A. Prodr.* is a var. β , founded on Wight's n. 1341, and described as having oblong-lanceolate leaves sometimes pubescent beneath; I do not find the latter character on Wight's specimens. *I. Wallichii* of Wight's Herbarium is not the plant described under that name in the *Prodromus*, not having leaves pubescent beneath, but a slight variety of *I. lanceolaria* with narrower bracts and elliptic-lanceolate leaves.

3. ***I. calycina***, *Thw. Enum.* 155; glabrous, leaves subsessile ovate oblong or orbicular obtuse or acute, base acute rounded or cordate, nerves horizontal, cymes subsessile corymbiform contracted dense-flowered, calyx-teeth lanceolate much longer than the ovary, corolla $\frac{2}{3}$ in., lobes ovate acute, mouth glabrous. *Bedd. Ic. Pl. Ind. Or.* t. 97.

CEYLON; Central Province, ascending to 7000 ft., *Macrae*, *Walker*, &c.

A small tree. *Leaves* $1\frac{1}{2}$ -3 in., coriaceous, midrib stout, dark brown and reticulate when dry; nerves 6-8 pair, slender; stipules cuspidate. *Cymes* rarely peduncled, peduncles puberulous; flowers white tinged with rose, subsessile; bracts and bracteoles slender. *Stigma* short thick with short recurved arms. *Filaments* short. *Fruit* $\frac{1}{4}$ in., ovoid or spherical; calyx-teeth persistent.

4. ***I. Thwaitesii***, *Hook. f.*; glabrous or shoots and cymes pubescent, leaves short-petioled oblanceolate oblong or elliptic acute flat or undulate, nerves ascending, cymes sessile corymbiform contracted dense-flowered, calyx-teeth acute longer than the ovary, corolla 1- $1\frac{1}{2}$ in., lobes obovate acute. *I. acuminata*, *Thw. Enum.* 155, *excl. var. β , not of Roxb.*

CEYLON; not uncommon, ascending to 3000 ft.

Leaves $3\frac{1}{2}$ -5 in., thinly coriaceous, opaque, margins usually undulate, always narrowed into the short petiole; stipules with long cuspidate points. *Cymes* as in *I. calycina*, but calyx-teeth shorter and corolla longer with longer lobes, stigmas the same. *Corolla-throat* glabrous, in which it differs from Roxburgh's *R. acuminata*.

Anthers sessile. *Fruit* globose or didymous, $\frac{1}{2}$ in. diam., smooth.—I have seen no specimen of Thwaites' var. β , with the branches and leaves on both sides velvety.

5. **I. Notoniana**, Wall. Cat. 6132; robust, glabrous except the puberulous cyme, leaves petioled elliptic or oblong obtuse thickly coriaceous, nerves 12–15 pair, cymes peduncled brachiate many-flowered clusters rounded, calyx-teeth lanceolate longer than the ovary, corolla $\frac{1}{2}$ in., tube very slender, lobes oblong obtuse glabrous, mouth glabrous. I. Wightiana, Wall. Cat. 6161. I. grandiflora, Schlecht. in Herb. Hohen. No. 1369.

NILGHERRY and PULNEY MTS., Wight, &c.

Branches thick, bark rough. *Leaves* 6–8 by 1–3 in., rarely obovate, pale brown when dry, base acute or obtuse; nerves 10–12 pair, strong, ascending; petiole stout, $\frac{1}{4}$ – $\frac{3}{8}$ in.; stipules with long strong cuspidate points, glabrous. *Cymes* sometimes 6 in. diam.; peduncles stout, 2–6 in.; lower bracts often leafy; bracteoles setaceous; flowers red, shortly pedicelled, glabrous. *Anthers* sessile, nearly as long as the corolla-lobes, base subentire. *Stigma* small, clavate, entire or cleft. *Fruit* glabrous, $\frac{1}{3}$ in. diam.

6. **I. Johnsoni**, Hook. f.; glabrous, branches robust, leaves petioled large elliptic acute at both ends, stipules triangular acute, cymes sessile corymbiform, branches very short and flowers densely crowded, calyx-teeth linear-lanceolate much longer than the tube, corolla-tube $\frac{3}{4}$ in., lobes linear-oblong acute, mouth naked.

WESTERN PENINSULA, near Wenna Mala in Cochin, Rev. Mr. Johnson.

Leaves crowded on the young branches, 6–8 by 3–3 $\frac{1}{2}$ in., thinly coriaceous, brown when dry, opaque; nerves 12–15 pair, arched, prominent beneath; petiole very stout, $\frac{1}{8}$ in.; stipules short, appressed. *Cymes* 1 $\frac{1}{2}$ in. long, branches rather slender but very short and much divided; bracts and bracteoles lanceolate, coriaceous, numerous. *Calyx-teeth* rigid, erect, broader as well as longer than the ovary. *Filaments* and anthers slender. *Stigma* fusiform, cleft. *Fruit* not seen.—I have seen but one specimen of this fine species.

7. **I. subsessilis**, Wall. Cat. 6139; glabrous, leaves petioled lanceolate elliptic or oblanceolate acuminate, stipules with long cusps, cymes subsessile brachiate, branches slender lax-flowered, calyx-teeth filiform much longer (rarely only equalling) than the ovary, corolla-tube $\frac{1}{2}$ –1 $\frac{1}{2}$ in., excessively slender, lobes narrowly oblong acute mouth glabrous. G. Don Gen. Syst. iii. 572. I. oxyphylla, Wall. Cat. 6159.

ASSAM and KHASIA Mts., ascending to 4000 ft., De Silva, &c.

A shrub or small tree; branches with pale bark. *Leaves* very variable, 4–8 by $\frac{3}{4}$ –3 in., thinly coriaceous, pale when dry, opaque or shining; nerves very slender; subulate points of stipules much longer than the short sheath. *Cymes* 1–5 in. diam.; bracts elongate-subulate or filiform; flowers white or rosy. *Calyx-teeth* variable in length. *Corolla-limb* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. *Filaments* long, flattened; anthers very slender. *Stigma* slender, entire or cleft. *Fruit* $\frac{1}{2}$ in. diam., gibbous, crowned with the slender calyx-teeth.—Wallich's *I. oxyphylla* has shorter calyx-teeth, but seems connected by intermediates with *subsessilis*. Some Assam specimens have teeth even shorter than the ovary.

8. **I. Brunonis**, Wall. Cat. 6136; branches tomentose, leaves long sessile narrowly oblanceolate caudate-acuminate pubescent with spreading hairs, base cordate, cymes sessile corymbiform hirsute, flowers subcapitate, calyx-teeth linear-lanceolate about equalling the ovary, corolla-tube $\frac{1}{2}$ in. hairy, mouth naked. G. Don Gen. Syst. iii. 573; Kurz For. Fl. ii. 20. Pavetta Brunonis, Mig. Fl. Ind. Bat. ii. 270 (not of Wt. Ic.). Rubiacea, Wall. Cat. 8447.

FEJU and TAVOY, Kurz. PENANG and SINGAPORE, Wallich, Phillips, &c. Maingay (Kew Distrib. 858).

A shrub or small tree. *Leaves* 7-12 by $1\frac{1}{2}$ - $3\frac{1}{2}$ in., brownish when dry, membranous, points long and slender, above often glabrate, beneath hairy chiefly on the 15-20 pair of slender nerves, sometimes obscurely contracted above the cordate base (panduriform); stipules villous with very long filiform hairy points. *Flowers* sessile amongst filiform bracteoles. *Calyx-teeth* very slender. *Corolla* $\frac{1}{2}$ in. diam.; lobes lanceolate, acuminate, $\frac{1}{5}$ the length of the tube. *Filaments* subulate. *Stigma* small. *Fruit* ellipsoid or globose, $\frac{1}{2}$ in. long, glabrous.

** Calyx-teeth longer and broader than the ovary, elliptic oblong or suborbicular; cymes corymbiform.

9. **I. polyantha**, *Wight Ic. t. 1066*; robust, glabrous except the villous or pubescent cymes, leaves large sessile or short-petioled obovate elliptic-oblong or -lanceolate acuminate coriaceous, cymes subsessile corymbiform contracted or open very many-flowered branches robust, calyx-lobes ovate-lanceolate very much longer and larger than the ovary, corolla glabrous, tube slender $\frac{1}{2}$ - $1\frac{1}{2}$ in., lobes narrowly obovate obtuse, mouth glabrous. I. corymbosa, *Heyne in Wall. Cat. 6155*. I. grandis, *Miq. in Herb. Hohenack. n. 517*.

WESTERN PENINSULA; on the Ghats from the Concan to Cochin, *Wight, Law, &c.*

Shrubby, branches robust. *Leaves* 6-12 by $2\frac{1}{2}$ -5 in.; pale greenish when dry, narrowed to the short stout petiole; stipules broad with long cuspidate points. *Cymes* either collected into a globose sessile head or more open and 4 by 5 in. long and broad; branches suberect, sometimes white with dense woolly spreading hair; bracts and bracteoles oblong, acute, membranous, caducous; flowers sessile. *Calyx* sometimes $\frac{1}{2}$ in. long, pubescent, lobes like the bracteoles. *Corolla* $\frac{3}{4}$ in. diam., quite glabrous. *Filaments* flattened. *Stigma* rather large, with stout recurved arms. *Fruit* not seen.—The bracts and calyx are very different from those of any congener.

10. **I. Kingstoni**, *Hook. f.*; glabrous, branches and leaves above shining, leaves petioled elongate oblong or oblanceolate obtusely acuminate membranous, cymes sessile between two small leaves corymbiform contracted dense-flowered, branches short and stout puberulous, calyx-teeth membranous glabrous almost orbicular larger than the ovary, corolla-tube 1 - $1\frac{1}{2}$ in. very slender, lobes obovate obtuse, mouth naked.

MALACCA, *Griffith* (Kew Distrib. 2996).

Branches as thick as a duck's quill. Black, smooth, and polished when dry, internodes long. *Leaves* 7-12 by $2\frac{1}{2}$ - $3\frac{1}{2}$ in., pale brown when dry, deflexed in flower, erect in the fruit, base acute; nerves slender, 15-20 pair; petiole $\frac{1}{2}$ in., black; stipules short, closely appressed, apiculate. *Cymes* 4 in. diam., very dense-flowered; bracts and bracteoles broadly elliptic, coriaceous, deciduous. *Calyx* $\frac{1}{2}$ in. long, glabrous. *Corolla* red?, limb $\frac{3}{4}$ in. diam. *Stigma* small, entire or notched. *Filaments* flattened. *Fruit* $\frac{1}{2}$ in. long, globose or obliquely ovoid, crowned by the broad calyx-lobes.—The membranous leaves, stout short cyme-branches and the calyx, afford good characters. It is clearly allied to *I. acuminata*. Mr. Kingston, whose services this very handsome species commemorates, was for some years an active assistant in the Herbarium department of Kew.

11. **I. merguensis**, *Hook. f.*; glabrous, very robust, leaves large obovate or oblong-obovate abruptly acuminate opaque coriaceous, cymes sessile corymbiform globose densely many-flowered excessively branched from the very base, calyx-teeth puberulous elliptic longer than the ovary, corolla-tube $\frac{3}{4}$ in. slender, lobes obovate or oblong obtuse, mouth nearly naked.

TENASSERIM; Mergui, *Griffith* (Kew Distrib. 3003).

A low shrub; branches stout, cylindric, grey and opaque when dry. *Leaves* 7-12 by $2\frac{1}{2}$ -5 in., pale when dry and quite dull, narrowed into a short stout petiole; stipules very short, coriaceous, apiculate. *Cymes* 3-4 in. diam.; branches quite hidden by the flowers; bracts broad, deciduous; flowers odorous, white or pale pink with a red

or rosy tube. *Corolla-throat* with a few hairs. *Anthers* sessile, base subentire. *Stigma* rather large, with short diverging arms. *Fruit* not seen.

*** Calyx-teeth equalling or shorter than the ovary.

† *Cymes* long-peduncled, peduncles 2 in. long or more, often inclined or pendulous, cymes brachiate in all. See also under §§ (sp. 25 to end).

12. ***I. elongata***, Heyne in Wall. Cat. 6131; glabrous except the hairy flowers, leaves petioled elliptic or elliptic-lanceolate or oblanceolate, peduncles 4-8 in. with 2 sessile leaves below the middle, cymes brachiate, calyx-teeth subulate equalling the ovary, corolla-tube very slender $\frac{1}{2}$ in., lobes very small short oblong, throat naked. *G. Don Gen. Syst.* iii. 571. *I. pedunculata*, Dalz. in Hook. Kew Journ. iii. 121; Dalz. & Gibs. Bomb. Fl. 113.

The CONCAN and CANARA; from Bombay to Kurg, Heyne, &c.

A shrub; branches slender, smooth. *Leaves* 6-9 by $2\frac{1}{2}$ -4 in., membranous, pale when dry, narrowed into a petiole $\frac{1}{2}$ -1 in., the pair on the peduncle 1-4 in. more oblong with rounded or cordate bases; stipules broadly ovate, cusp slender. *Cyme* 4-5 in. diam.; peduncle strict, glabrous, branches 1-3 in., and pedicels pubescent; flowers fascicled, pink; bracts and bracteoles subulate. *Calyx-teeth* subacute, pubescent. *Corolla* with spreading hairs or glabrate, limb $\frac{1}{2}$ in. diam. *Filaments* very short. *Stigma* small, simple or cleft. *Fruit* (not seen by me) smooth, slightly 2-lobed.

13. ***I. spectabilis***, Wall. Cat. 6133; quite glabrous, or calyx puberulous, leaves petioled elliptic-oblong obtuse or acute, peduncles 6-10 in. with 2 sessile leaves below the middle, cymes brachiate, calyx-teeth subulate shorter than the ovary, corolla-tube very slender $\frac{1}{2}$ - $\frac{2}{3}$ in., lobes linear, mouth naked. *G. Don Gen. Syst.* iii. 572; Kurz For. Fl. ii. 22.

ARRACAN to TENASSERIM, frequent, Wallich, &c.

An evergreen tree. *Leaves* 5-8 by 2-3 in., varying in form, equally rounded at both ends or tapering towards the tip or base, membranous or coriaceous, pale when dry, the pair on the peduncle occupying the same position as in *I. elongata*; rarely a similar pair occurs at the base of the peduncle, or several upper pairs are sessile or cordate; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules short, cusp compressed subulate. *Cymes* and bracts as in *I. elongata* but glabrous, the flowers looser and the corolla-lobes much larger and longer, nearly $\frac{1}{4}$ in. long. *Filaments* slender; anthers very long. *Fruit* size of a pea, globose or didymous.

14. ***I. pendula***, Jack in Mal. Misc. i. 11; quite glabrous, leaves petioled large linear-oblong or -ovate or -oblanceolate obtuse, cymes pendulous brachiate, peduncle 2-7 in. naked, calyx-teeth shorter than the ovary obtuse, corolla-tube very slender 1-1 $\frac{1}{2}$ in., lobes linear-oblong, mouth naked. *DC. Prodr.* iv. 487; Wall. Cat. 6127. *Pavetta pendula*, Mig. Fl. Ind. Bat. ii. 269.

PENANG, Wallich, Phillips, Maingay (Kew Distrib. 842); MALACCA, Griffith (Kew Distrib. 2991).

A shrub 3-4 ft.; branches slender for the size of the foliage, smooth. *Leaves* 8-12 by 2-5 in., coriaceous, pale, sometimes whitish beneath, narrowed to the base; nerves slender, about 12 pair; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in.; stipules broad, cusp long. *Peduncle* 3-8 in., slender, with sometimes a small pair of oblong sessile leaves near the base; cyme 4-6 in. diam.; flowers red, not fascicled; bracts and bracteoles minute, filiform. *Anthers* sessile. *Stigma* small, entire or cleft. *Fruit* not seen.

15. ***I. diversifolia***, Wall. Cat. 6146; glabrous, leaves petioled linear-oblong or -lanceolate or ovate-lanceolate obtuse, upper pair often sessile, cymes brachiate, peduncle 3-6 in. very slender, calyx-teeth triangular shorter than the ovary, corolla-tube slender $\frac{1}{2}$ in., lobes linear obtuse, mouth naked. Kurz For. Fl. ii. 22.

MARTABAN, TENASSERIM, and ANDAMAN ISLANDS, in forests, *Wallich, Helfer* (Kew Distrib. 2992).

A large evergreen shrub. *Leaves* 4-9 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., rather membranous, brown when dry, shining above; nerves 15-18 pair, very slender, horizontal or arched; floral pair very variable, large or small, base rounded or cordate; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in.; stipules with long cusps. *Peduncles* very slender, often from short lateral shoots; cyme 2-3 in. diam., few-flowered; flowers loose, white, sessile or pedicelled; bracts and bracteoles minute, subulate or obsolete. *Filaments* slender. *Stigma* cleft. *Fruit* size of a pea, didymous.

16. **I. Brandisiana**, *Kurz in Journ. As. Soc.* 1872, ii. 316; *For. Fl.* ii. 25; glabrous except the cyme, leaves short-petioled elliptic- or oblong-lanceolate acuminate, peduncles 4-5 in. drooping, cymes small subbrachiate branches short, calyx-teeth triangular shorter than the ovary, corolla-tube $\frac{3}{4}$ -1 in. ($1\frac{1}{2}$ -2 in., *Kurz*), lobes oblong, mouth villous.

UPPER TENASSERIM, *Helfer*; at Attrani, *Brandis*.

An evergreen shrub. *Leaves* 4-6 by $1\frac{1}{2}$ -2 in., rather membranous, dark brown when dry, finely acuminate, base rounded or acute; nerves 12-14 pair, slender; uppermost pair often small and sessile; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules broad, cusp long. *Cyme* $\frac{1}{2}$ -2 in. diam.; branches short, pubescent, soon dividing and rather stout, puberulous; bracts and bracteoles minute, subulate; flowers rather fascicled, white. *Corolla* very long (*Kurz*). *Anthers* sessile, base entire. *Fruit* unknown.—I have only two indifferent specimens from Dr. King and Helfer: both agree in all respects with *Kurz*'s description, except that the peduncles are not short, nor the corolla-lobes acute, and the flowers do not exceed 1 in. in length. The remarkable acumination of the leaves, and the cymes being hardly brachiate, distinguish it from all others of this group.

†† *Peduncle of cyme less than 2 in.; erect or suberect, or O.*

§ *Cymes not articulate at the ramifications, brachiate, rarely corymbiform.*

17. **I. brachiata**, *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 381; quite glabrous or cymes pubescent, leaves petioled oblong or elliptic obtuse, cymes sessile or shortly peduncled brachiate with 2-3 pairs of long branches, flowers in globose clusters, calyx-teeth shorter than the ovary, corolla-tube $\frac{1}{2}$ in., lobes short obtuse globose in bud, mouth naked. *DC. Prodr.* iv. 488; *W. & A. Prodr.* 429; *Wight Ic.* t. 710; *Wall. Cat.* 6142. *I. obtusata* and *I. Arnottiana*, *Miq. in Herb. Hohenack.* 161 and 565.

WESTERN PENINSULA; on the Ghats from the Concan southwards.

A tree 30 ft., or a stout shrub. *Leaves* 3-7 by $1\frac{1}{2}$ -3 in., pale when dry, always obtuse, coriaceous or rather membranous, narrowed or rarely rounded at the base; nerves as faint as the veins; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in.; stipules short, cusps short. *Cymes* 4-6 in. long and broad, rachis and long horizontal branches slender inarticulate, internodes distant; lower bracts stipuliform, bracteoles minute; flowers white, odorous, sessile or pedicelled. *Anthers* sessile. *Style* glabrous or pubescent; stigma subcapitate, simple or cleft. *Fruit* globose or obscurely didymous. *Seeds* very thin, sides incurved so that the transverse section represents a dorsally compressed tube.—Flowers the smallest of the genus, and the only one with globose buds.

18. **I. parviflora**, *Vahl Symb.* iii. 11, t. 52; glabrous, or the cymes pubescent, leaves subsessile oblong or elliptic obtuse base rounded or cordate very rarely narrowed, cymes sessile brachiate with 3-5 pairs of short branches, flowers in subglobose clusters, calyx-teeth very short obtuse, corolla glabrous, tube $\frac{1}{4}$ in., lobes oblong, buds ovoid. *Roxb. Fl. Ind.* i. 383; *DC. Prodr.* iv. 488; *Wight in Hook. Bot. Misc.* iii. 293, *Suppl.* t. 34; *Ic.* t. 711; *W. & A. Prodr.* 429; *Bedd. Fl. Sylv.* t. 222; *Dalz. & Gibs. Bomb. Fl.* 113; *Brand. For. Fl.* 275; *Kurz For. Fl.* ii. 21. *I. arborea*, *Roxb.*; *DC. l. c.* *I. decipiens*, *DC. l. c.* *I. Pavetta*, *Andr. Bot. Rep.* t. 78 (not of *Roxb.*).

Hilly districts of W. BENGAL, BEHAR, and the WESTERN PENINSULA, from the Satpura range southwards. CHITTAGONG, *C. B. Clarke*. PEGU, *Kurz*. CEYLON; hot drier parts of the island.

An evergreen tree. *Leaves* 3-6 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., very coriaceous, pale when dry; nerves slender, rather stronger than the reticulate venules; petiole very stout; stipules short, cusps short. *Cymes* 2-6 in., inarticulate, internodes shorter than in *I. brachiata*, and branches much shorter; lower bracts stipuliform, upper and bracteoles minute or obsolete; flowers white, odorous, sessile or pedicelled. *Filaments* short. *Style* very pubescent; stigma subcapitate, simple or cleft. *Fruit* small, didymous. *Seeds* plano-convex.—I have seen no Pegu specimens.—*Touch-wood*.

? *VAR. zeylanica*; leaves longer petioled broadly elliptic or obovate acute or acuminate cuneate at the base more membranous less reticulate, stipules with longer cusps, cyme-branches longer.—*I. jucunda*, var. γ , an species distincta? *Thwaites Enum.* 155. Ceylon, *Walker*. &c.—This is certainly very near indeed to *I. parviflora*, agreeing entirely even to the pubescent style and the anthers and form of seed; as far as I can ascertain from imperfect fruits, and differs from *I. jucunda* widely in the cymes, length of the corolla, and form of its lobes.

19. ***I. grandifolia***, *Zoll. & Morr. Syst. Verz.* 65; glabrous or the cymes puberulous, leaves often very large petioled elliptic ovate oblong or lanceolate obtuse or acute, stipules large with a long cusp or the upper 2-fid, cymes sessile brachiate or corymbiform ramifications inarticulate, branches more or less stout, bracts and bracteoles obsolete, flowers pedicelled, filaments subulate, anthers very slender, calyx-lobes small triangular or obtuse, corolla glabrous, tube $\frac{1}{2}$ - $1\frac{1}{2}$ in., lobes oblong obtuse, mouth naked. *I. elliptica*, *Br. in Wall. Cat.* 6153.

ANDAMAN and NICOBAR ISLANDS to SINGAPORE, MALACCA, and PENANG, *Wallich*, &c.—*DISTRIB.* Malay Archipelago (all the forms).

I am quite unable to distinguish specifically various of the very dissimilar forms that occur in the localities specified: all have pedicelled white or pale pink flowers, fruit the size of a large or small pea, and their seeds are very concave ventrally. The principal are:

VAR. coriacea, *Br. in Wall. Cat.* 6151 (sp.); *I. macrosiphon*, *Kurz in Trimen. Journ. Bot.* 1875, 327; *For. Fl.* ii. 24; branches very stout with whitish bark, leaves 12-18 by 4-5 in. elliptic base acute obtuse or rounded, petiole very robust, cymes with very thick suberect flowering branches spreading in fruit, corolla-tube $\frac{1}{2}$ in.—Penang, *Wallich*.—Griffith's specimens from Malacca (*Kew Distrib.* 2999) have narrower lanceolate bases and shorter petioles, and the cymes reduced to a fascicle of thick primary branches starting from the end of the branch. *Kurz's* from S. Andaman have dark leaves 12-14 by $4\frac{1}{2}$ -5 in., with rounded bases, almost black, and similar cymes.—*Pavetta macrophylla*, Blume, appears a large flowered form of this, as is probably *P. Teysmannidna* and *P. macrocoma* of Miquel.

VAR. arborescens, Hassk. (sp.) in *Retzia*, i. 22; branches more slender usually with white bark, leaves 4-10 by 2-3 in., usually more membranous, rachis of cyme elongate, branches horizontal, flowers looser, corolla-tube $\frac{1}{2}$ in.—Penang and Malacca, *Griffith* (*Kew Distrib.* 2987).

VAR. kurzeana, *Teysm. & Binnend.* (sp.) in *Nat. Tijdsch. Ned. Ind.* xxvii. 100, *ex Kurz in Journ. As. Soc.* 1876, ii. 134; leaves lanceolate thin narrowed into a stout petiole, cymes corymbiform, corolla $1-1\frac{1}{2}$ in.—Nicobar Islands, *Kurz*.

VAR. rosella, *Kurz For. Fl.* ii. 23 (sp.); leaves 6-8 by $3\frac{1}{2}$ - $4\frac{1}{2}$ in. thin elliptic-oblong or obovate acute or acuminate margins often undulate, nerves nearly horizontal, petiole $\frac{1}{2}$ -1 in., cymes corymbiform, corolla $\frac{1}{2}$ - $\frac{3}{4}$ in.—South Andaman Islands, *Kurz*.

20. ***I. brunnescens***, *Kurz in Journ. As. Soc.* 1872, ii. 317; *For. Fl.* ii. 24; glabrous, leaves sessile or subsessile broadly obovate obtuse on tip rounded opaque, base rounded or cordate, nerves very faint horizontal, cymes small

brachiate sessile or peduncled, flowers all pedicelled, calyx-teeth minute triangular, corolla glabrous, mouth naked.

ANDAMAN ISLANDS, in beach jungles, *Helper, Kurz*; NICOBAR ISLANDS, *Kurz*.

Possibly a form of *I. grandifolia*, but the leaves are of a very different shape, almost or altogether sessile, very opaque, 5-8 by 3-4 in., with very slender nerves and the veins not raised, margins often undulate; stipules broad, cusps short. *Cymes* ebracteate even in bud; ramifications inarticulate; fully formed flowers not seen. *Fruits* globose, size of a small pea; pedicel sometimes $\frac{1}{4}$ in., slender.

21. ***I. jucunda***, *Thw. Enum.* 155, *excl. var. γ* (not of *Bot. Mag.*); cymes puberulous, leaves lanceolate oblong elliptic or oblanceolate obtuse or obtusely acuminate narrowed into a short petiole, stipules very short mucronate or shortly cuspidate, cymes sessile corymbiform usually with many branches from the base, bracts or bracteoles minute or obsolete, flowers pedicelled, calyx-teeth minute obtuse, corolla white glabrous, tube 1-1½ in., lobes ovate acute, mouth naked. *Pavetta Wyckii, Hassk. Retz.* i. 21, *ex. Kurz in Journ. As. Soc.* 1877, ii. 149.

CEYLON; common, ascending to 4000 ft., *Walker, &c.*

This again is very near *I. grandifolia*, but the leaves are narrower and never so large as they become in that plant, usually 4-5 by 1½-2 in., but sometimes 6-8 by 3-3½ in., base rarely rounded, membranous or coriaceous, stipules much shorter, ramifications of cyme inarticulate and corolla-lobes acute, fruit the same, flowers white or pink.

§§ *Branches tomentose or pubescent. Cymes articulate at the ramifications, brachiate.*

22. ***I. villosa***, *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 383; branches nerves, petioles and cymes pubescent or tomentose, leaves large elliptic-oblong lanceolate or oblanceolate caudate-acuminate, base narrowed or rounded, stipules with long often spreading filiform points, cymes peduncled, branches long brachiate, flowers white, calyx-teeth short, corolla glabrous, tube 1 in. very slender. *DC. Prodr.* iv. 488; *Wight Ic.* t. 150; *Kurz For. Fl.* ii. 21; *Wall. Cat.* 6137.

SIKKIM HIMALAYA, *J. D. H.*; ASSAM, the KHASIA Mts., SILHET, CACHAR, PEGU, and PENANG, *Wallich, &c.*

Shrubby. *Leaves* 6-16 by 2½-5½ in., very variable in shape, brown when dry, thinly coriaceous, glabrous above, beneath pubescent chiefly on the 10-12 pair of nerves or glabrate; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in.; stipules $\frac{1}{2}$ -1 in., tomentose. *Peduncle* stout, 2-4 in.; cymes and ramifications hardly articulate; lower bracts often leafy, upper inear-subulate; flowers crowded, fragrant, shortly pedicelled. *Corolla-lobes* oblong, notched. *Filaments* subulate; anthers slender. *Style-arms* slender, free or connate. *Fruit* size of a pea, smooth, red. *Seeds* concave ventrally, with a median ridge (in Roxburgh's figure).—After flowering the calyx-teeth sometimes exceed the tube, when the latter does not swell and form fruit.

23. ***I. cuneifolia***, *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 380; branches short, petioles and cymes pubescent or puberulous, leaves lanceolate or oblong- or elliptic-lanceolate or oblanceolate obtusely acuminate coriaceous base acute, stipules with short filiform cusps, cymes sessile or short-peduncled brachiate, branches short, calyx-teeth equalling or shorter than the ovary, corolla glabrous, tube $\frac{1}{2}$ - $\frac{3}{4}$ in. very slender, mouth naked. *DC. Prodr.* iv. 487; *W. & A. Prodr.* 428; *Wt. Ic.* t. 709; *Wall. Cat.* 6140; *Kurz For. Fl.* ii. 21; *Bot. Reg.* t. 648. *I. puberula, Wall. Cat.* 6145, *excl. c. I. rosea, Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* i. 398 (not of *Wall. Cat.*); *Lindl. in Bot. Reg.* t. 540. *Pavetta Ackeringæ, Teysm. & Binn. fide Kurz.*

SILHET, *De Silva*; PEGU, TENASSERIM, and MARTABAN, *M'Clelland, Kurz, Griffith* (*Kew Distrib.* 2995).

Shrubby. *Leaves* 5-8 by 2-3 in., coriaceous, pale when dry, variable, base always cuneate or narrowed into the petiole, sometimes puberulous beneath; stipules $\frac{3}{4}$ in. *Cymes* and white flowers very much as in *I. villosa*, but sessile or shortly pedicelled, puberulous or glabrate, and the flowers shorter and corolla-lobes not notched. *Filaments* slender. *Fruit* the size of a pea, red. *Seeds* ventrally concave with no median ridge (in Roxburgh's drawing).—A very large specimen from Rangoon has elliptic leaves 9 by $3\frac{1}{2}$ in. Wight and Arnott describe the calyx-teeth as twice the length of the ovary, which is not the case. Kurz enumerates 3 varieties:—1. *Roxburghii*, with glabrous leaves and sessile or short-peduncled cymes; 2. *puberula*, with leaves puberulous beneath and larger peduncled cymes; 3. *pumila*, 1-3 ft., flowers often pale rose, cymes small short more slender.

§§§ *Branches* glabrous. *Cymes* articulate at the ramifications, corymbiform, rarely brachiate.

24. **I. coccinea**, Linn.; *Roxb. Fl. Ind.* i. 375; glabrous, leaves sessile or subsessile shortly oblong, base rounded or cordate rarely cuneate, tip rounded or apiculate, cymes sessile corymbiform dense-flowered, calyx-teeth minute shorter than the ovary, corolla-tube 1-1 $\frac{1}{4}$ in., lobes broad acute, mouth naked. *W. & A. Prodr.* 427; *Wight Ic.* t. 153; *Dalz. & Gibs. Bomb. Fl.* 112; *Brand. For. Fl.* 275; *Kurz For. Fl.* ii. 26. *I. grandiflora*, *Br. in Bot. Reg.* t. 154; *DC. Prodr.* iv. 486; *Wight in Hook. Bot. Misc.* iii., *Suppl.* t. 35. *I. propinqua*, *Br. in Wall. Cat.* 6119. *I. incarnata*, *DC. l. c.* ? *I. obovata*, *Heyne in Roth Nov. Sp.* 90. *I. Bandhuca*, *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 376; *Wall. Cat.* 6120; *DC. l. c.*; *Bot. Reg.* t. 513; *Wight Ic.* t. 149. *Pavetta coccinea* and *P. incarnata*, *Blume Bijl.* 950. *P. Bandhuca*, *Miq. Fl. Ind. Bat.* ii. 266.—*Rheede Hort. Mal.* ii. t. 12; *Burm. Fl. Zeyl.* t. 57.

Cultivated throughout India, a native of the WESTERN PENINSULA, in the Concan, &c., *Dalzell & Gibson*. CHITTAGONG, apparently indigenous, *J. D. H. & T. T.* Cultivated in AVA, MARTABAN, and BURMA, *Kurz*. CEYLON; common, ascending to 2000 ft., *Thwaites*.

A branching shrub; branches strict, rather stout. *Leaves* 2-4 by 1-2 in., coriaceous, pale when dry; nerves 8-10 pair, distinct; stipules with rigid cusps. *Cymes* rarely shortly peduncled; ramifications very short, articulate; bracts and bracteoles subulate; flowers scarlet, sessile or very shortly petioled. *Filaments* long and anthers short for the genus. *Stigma* with short revolute arms. *Fruit* sometimes fleshy, size of a pea, crowned by the calyx-teeth. *Seed* very concave ventrally.—Roxburgh distinguishes *I. Bandhuca* from *I. coccinea* by being more branched, with stem-clasping obtuse leaves and ovate obtuse corolla-lobes. These characters should be looked to in India; they point to intermediates between *I. coccinea* and *stricta*. He further figures the seed of *coccinea* as plano-convex. A yellow flowering variety is said to be in cultivation.

25. **I. stricta**, *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 379; glabrous, leaves sessile or subsessile obovate or obovate-oblong obtuse or subacute base cuneate, cymes corymbiform sessile or peduncled, calyx-teeth shorter than the ovary obtuse or acute, corolla-tube $\frac{3}{4}$ -1 in., lobes rounded, mouth naked. *DC. Prodr.* iv. 486; *W. & A. Prodr.* 427; *Wight Ic.* t. 184; *Kurz For. Fl.* ii. 26; *Wall. Cat.* 6123. *I. coccinea*, *Bot. Mag.* 169. *I. alba*, *Roxb. ll. cc.*; *Wight Ic.* t. 707; *Wall. Cat.* 6122. *I. blanda*, *Ker in Bot. Reg.* t. 100; *DC. l. c.* 487. *I. incarnata*, *Roxb.*; *D. C. l. c.* 486. *I. crocata*, *Lindl. in Bot. Reg.* t. 782; *DC. l. c.* 486. *I. rosea*, *Wall. Cat.* 6124; *Bot. Mag.* t. 2428; not of *Wall. in Roxb. Fl. Ind.*

Cultivated in various parts of India, but a native of the Moluccas and China, according to Roxburgh. Kurz regards it as indigenous in RANGOON and Upper TENASSERIM.

There is little to distinguish this from *I. coccinea* but the smaller corolla-lobes and form of the leaves. Roxburgh figures the seeds as plano-convex, a character I

have no means of verifying. The flowers vary from scarlet and pink to white and yellowish.—Kurz makes 2 varieties:—1. *Roxburghiana*, with almost sessile leaves often rounded at the base, and subsessile or sessile cymes; and 2. *Blumeana* (*Pavetta javanica*, *Blume*), with short-petioled leaves acute at the base and laxer cymes on peduncles 1–1½ in. The latter of these I take to be *I. amœna*, Wall. Cat. 6121 A. B. C. *I. rosea*, Wall. Cat. 6124, from the Calcutta Garden, is probably a variety of this with acute calyx-teeth and narrower corolla-lobes.

26. ***I. amœna***, Wall. Cat. 6121, D. E. F.; *G. Don Gen. Syst.* iii. 571; glabrous or cymes puberulous, leaves petioled lanceolate or oblong- or obovate-lanceolate acuminate, base acute, cymes sessile or peduncled corymbiform, flowers crowded, calyx-teeth ovate-lanceolate shorter than the ovary, corolla-tube 1–1½ in., lobes oblong obtuse, mouth naked.

TENASSERIM, at Mergui, *Griffith* (Kew Distrib. 2986); PENANG, *Wallich, Phillips, Maingay* (Kew Distrib. 846).—DISTRIB. JAVA.

This differs from *I. stricta* in its laxer more slender habit and longer lanceolate-acuminate, more membranous leaves with petioles $\frac{1}{8}$ – $\frac{1}{4}$ in., but I suspect it will prove only a form of that plant.

27. ***I. fulgens***, *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 378; glabrous, branches slender polished, leaves petioled linear- or obovate-oblong abruptly acutely or obtusely acuminate, base acute, shining above with 20–30 pair of deeply sunk nerves, cymes large sessile or shortly peduncled corymbiform and very open or sub-brachiate, branches long slender spreading, flowers shortly pedicelled, calyx-teeth very short obtuse, corolla-tube 1–1½ in., lobes ovate acute, mouth naked. *DC. Prodr.* iv. 486; *Wight Ic.* t. 151; *Wall. Cat.* 6152 A. *I. salicifolia*, *DC. l. c.* 487; *Bot. Mag.* t. 4523. *Pavetta fulgens*, *Miq. Fl. Ind. Bat.* ii. 264. *P. salicifolia*, *Blume Bijl.* 951. *P. Lobbii*, *Teysm. & Binnend. in Miq. Ann. Mus. Ludg. Bat.* iv. 194.

TENASSERIM, *Helper* (Kew Distrib. 2998); MALACCA, *Griffith* (2985), *Maingay* (845); SINGAPORE, *Lobb*; PENANG, *Wallich*.—DISTRIB. JAVA, BORNEO.

A shrub, branches erect. Leaves 5–9 by 1½–2 in., membranous, dark brown when dry, surface often raised between the nerves, base always acute; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; stipules closely grasping the stem, with slender cusps. Cyme quite sessile, secondary branches long spreading horizontally, the whole forming a loose inflorescence 5–7 in. broad but not so high; bracts and bracteoles short, ovate, acute; flowers shortly pedicelled, orange then scarlet. Fruit spherical or didymous, “succulent and seed rugose,” *Roxb.*

28. ***I. congesta***, *Roxb. Fl. Ind.* i. 387; glabrous except the puberulous cymes, leaves large petioled elliptic or elliptic-oblong or -lanceolate abruptly obtusely acuminate, base rarely rounded, nerves strong 12–15 pair, stipules short with short cusps, cymes sessile or subsessile corymbiform, branches very stout suberect fastigate, calyx-teeth very short broadly triangular, corolla-tube 1–1½ in., lobes obtuse, mouth naked. *DC. Prodr.* iv. 486; *Wall. Cat.* 6138. *I. Griffithii*, *Hook. Bot. Mag.* t. 4325. *I. fulgens*, *Wall. Cat.* 6512 B. *Pavetta congesta*, *Miq. Fl. Ind. Bat.* ii. 269.

TENASSERIM; TAVOY and ATTRAN, *Wallich, Gomez*. PENANG and SINGAPORE, *Wallich, &c.* MALACCA, *Griffith* (Kew Distrib. 2984), *Maingay* (848).

An evergreen tree (*Kurz*), closely allied to *I. fulgens*, differing in the stouter habit, very large usually coriaceous broader leaves 6–12 by 2–4 in., with nerves very prominent beneath, and petioles $\frac{1}{2}$ – $\frac{3}{4}$ in., and the very stout cyme-branches, which do not spread, but are fastigate; the stipules, too, are broader and shorter; the bracts are the same, very triangular, and the flowers are sometimes sessile, at others on stout pedicels; fruit ovoid or globose or didymous.

29. ***I. rugosula***, *Wall. Cat.* 6158; glabrous except the cymes, leaves petioled ovate or elliptic or lanceolate acuminate, base acute or rounded, stipules

short, cymes sessile corymbiform dense-flowered, branches fastigate, calyx-teeth short acute, corolla-tube $\frac{1}{2}$ in., lobes linear-oblong obtuse, mouth naked. *Kurz For. Fl.* 25. ? *I. sessiliflora*, *Kurz in Journ. As. Soc.* 1872, ii. 316; *For. Fl.* ii. 25.

PEGU and TENASSERIM; Attran, *Wallich*; Tavoy, *Gomez, Parish, Kurz*.

Differs from *I. congesta* in the leaves with fewer (8-10 pair) nerves, and the much smaller flowers with longer corolla-lobes and more slender anthers. Except in the smaller leaves, and according to Kurz, the shrubby habit and glabrous peduncled cyme and pale rose-coloured flowers *I. sessiliflora* does not seem to differ from *I. rugosula*, of the which it has the few nerves; it is perhaps a mountain form, found at 3000 to 4000 ft. elevation; I have, however, seen but one poor specimen, kindly sent by Dr. King. The flowers of *I. rugosula* are white.

30. ***I. concinna***, *Br. in Wall. Cat.* 6149; glabrous, branches slender, leaves not large petioled elliptic-lanceolate obtusely acuminate, cymes small sessile or subsessile corymbiform, flowers mostly pedicelled, calyx-teeth ovate-lanceolate equalling the tube, corolla-tube $\frac{1}{4}$ in., lobes linear-oblong obtuse, mouth naked. Rubiaceæ, *Wall. Cat.* 8449.

MALACCA; Mt. Ophir, *Lobb, Maingay* (Kew Distrib. 847). SINGAPORE, *Wallich, &c.*

Leaves 3-5 by $\frac{3}{4}$ -1 $\frac{1}{4}$ in., thin, pale brown when dry, hardly shining, base acute; nerves 10-12 pair, distinct arched; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules $\frac{1}{2}$ in. broad, cusp compressed rigid. Cymes quite sessile, or if peduncled with 2 small leaves at the top of the peduncle; branches erect; bracts and bracteoles subulate; pedicels short. Calyx-teeth subacute. Filaments subulate, half as long as the slender anther. Stigma cleft. Fruit size of a pea, pedicelled, globose or didymous, with persistent calyx-teeth. Seed thin, ventrally very concave.

31. ***I. opaca***, *Br. in Wall. Cat.* 6141; glabrous except the puberulous cymes, branches slender, leaves petioled long narrow coriaceous linear-oblong or lanceolate obtuse, base acute or rounded, upper pair sometimes sessile, nerves 20-25 pair usually deeply impressed, cymes shortly peduncled corymbiform dense-flowered, branches very short fastigate, flowers sessile or subsessile, calyx-teeth very short obtuse, corolla-tube 1 in., lobes linear-oblong, mouth naked. *G. Don Gen. Syst.* iii. 573. *Pavetta opaca*, *Miq. Fl. Ind. Bat.* ii. 270.

PENANG, *Wallich*. MARTABAN; Moulmein, *Parish*.—DISTRIB. Siam.

A very distinct-looking plant, from the slender branches, long narrow 6-10 by 1 $\frac{1}{4}$ -2 in., opaque pale brown leaves with spreading usually sunken nerves, and petioles $\frac{1}{2}$ in. long; stipules short, cusps slender, as long as the broad portion. Flowers pink (*Parish*), bracts and bracteoles small. Corolla-tube obscurely puberulous in Mergui specimen, glabrous in Penang ones. Fruit not seen.

§§§§ Branches glabrous. Cymes articulate at the ramifications, brachiate, rarely corymbiform.

32. ***I. undulata***, *Roeb. Hort. Beng.* 10; *Fl. Ind.* i. 385; glabrous or cymes pubescent, branches slender, leaves petioled elliptic or linear-lanceolate acuminate margins often undulate, cymes peduncled or sessile brachiate with 3-4 pair of slender branches, flowers loosely fascicled pedicelled and sessile, calyx-teeth lanceolate equalling the ovary, corolla-tube $\frac{1}{4}$ - $\frac{1}{2}$ in., lobes linear obtuse, mouth naked. *Roth Nov. Sp.* 91; *DC. Prodr.* iv. 488; *W. & A. Prodr.* 428; *Wight Ic.* t. 708; *Wall. Cat.* 6129, excl. *Herb. Ham.* *I. canjia*, *Wall. Cat.* 6130.

EASTERN TROPICAL HIMALAYA; Nipal, Sikkim, and Bhotan, *Hamilton, Griffith, J. D. H., &c.* ASSAM, *Jenkins*. SILHET, at the foot of the Khasia Mts., *J. D. H. & T. T. BEHAR*, woods at Monghir, *Hamilton*.

Shrubby. Leaves 5-9 by 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in., thin, shining above, pale when dry, base acute; nerves 20-30 pair, slender; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules $\frac{1}{2}$ - $\frac{3}{4}$ in., cusps com-

pressed. Cymes 4-8 in. and as broad, obscurely articulate; peduncle sometimes 2-3 in.; bracts and bracteoles subulate, persistent; flowers small, white. *Filaments* slender; anthers nearly equalling the corolla-lobes. *Stigma* cleft. *Fruit* pedicelled, size of a pea. *Seed* thin, with strongly incurved margins.

33. **I. barbata**, *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 384; glabrous, leaves petioled elliptic subacute thin upper pair at base of pedicels usually small sessile cordate, cymes shortly peduncled brachiate much broader than high, branches long slender divaricate, calyx-teeth very short subulate, corolla-tube 1-1½ in., lobes narrow, mouth woolly. *DC. Prodr.* iv. 487; *Wight Ic.* t. 185; *Kurz For. Fl.* ii. 22; *Bot. Mag.* t. 2505, 4513; *Wall. Cat.* 6128.

ANDAMAN and NICOBAR ISLANDS; frequent in forests, *Kurz*.

A large shrub. *Leaves* 6-8 by 2½-3½ in., usually elliptic and narrowed at the base, rarely rounded; nerves about 12 pair, slender; upper pair oblong-ovate, acute, from ½-3 in. long; petiole ¼-½ in.; stipules short, broad, cusp short. *Cymes* quite glabrous, 3-4 in. by 4-12 broad, the 2-3 pairs of branches being very long and wide-spread, much divided towards the end with slender branchlets and pedicelled lax white flowers; bracts at all the divisions narrowly lanceolate or the upper subulate. *Fruit* not seen.—Introduced into the Calcutta Garden before Roxburgh's time, but its native country unknown till Kurz found it in the Andamans, &c.

34. **I. oblonga**, *Br. in Wall. Cat.* 6147 A.; glabrous, branches stout, leaves petioled oblong obtuse at both ends, nerves about 12 pair, upper pair smaller sessile, stipules short, cymes peduncled small short brachiate, branches stout, calyx-teeth very short, corolla-tube ½-¾ in., lobes oblong obtuse, mouth naked.

TENASSERIM; at Amherst, *Wallich*.—DISTRIB. Java, Siam.

Leaves 3½-5 by 1-1½ in., thinly coriaceous, greenish when dry, similar and rather shining on both surfaces; nerves faint; petiole ⅙ in.; stipules with short cusps. *Cymes* 1 in. high by 2-3 broad; peduncle and two pair of branches stout, the latter divided at the ends; bracts and bracteoles subulate, persistent; flowers white, odorous.—The Java, Siam, and Tenasserim specimens are singularly alike in size, colour, and form of leaves, and size and form of cymes, but the specimens are not numerous.

35. **I. lucida**, *Br. in Wall. Cat.* 6135; glabrous, shining, black when dry, branches slender, leaves very shortly petioled elliptic-ovate or -lanceolate long-acuminate base rounded or acute, nerves about 20 pair horizontal, cymes small peduncled corymbiform few-flowered, branches slender, bracts and bracteoles persistent, calyx-teeth lanceolate equalling the tube, corolla-tube 1 in. very slender, lobes linear acuminate, mouth pubescent, stigma short cleft. *G. Don Gen. Syst.* iii. 571.

PERANG, *Wallich*.

Leaves 3-5 by 1½-2 in., thin; nerves very slender, raised on both polished surfaces; petiole ⅓-½ in.; stipules very short, cuspidate. *Cymes* trichotomously branched, 1 in. long with very few branches, and rigid persistent subulate bracts; bracteoles also rigid, nearly as long as the calyx.—The specimens are very insufficient; the habit and colour are those of *I. nigricans*, but the calyx-teeth, long corolla-tube with pubescent mouth, broader buds, and short stigma with short recurved arms, are very different.

36. **I. nigricans**, *Br. in Wall. Cat.* 6154; glabrous or cymes pubescent, black when dry, branches slender, leaves petioled elliptic-oblong or -lanceolate or -obovate obtusely and acutely acuminate, nerves 12-15 pair arched, cymes sessile or peduncled brachiate broader than long, branches slender, stipules with long cusps, calyx-teeth lanceolate or subulate acute, corolla-tube ½ in., lobes slender, mouth naked, stigmas long slender arms. *W. & A. Prodr.* 428;

Wight Ic. t. 318; *Dalz. & Gibs. Bomb. Fl.* 113; *Kurz For. Fl.* ii. 23. *I. affinis*, *Wall. Cat.* 6144. ? *I. densa*, *Br. in Wall. Cat.* 6150.

WESTERN PENINSULA, or the Ghats from the Concan southwards; EASTERN PENINSULA, from PEGU to MALACCA; PENANG, *Maingay* (Kew Distrib. 859); CACHAR, *Keenan*.—DISTRIB. Birma, Malay Archipelago.

An evergreen tree or large shrub, branchlets and inflorescence as well as the leaves black when dry. *Leaves* 5–7 by 1–2½ in., membranous, base rounded or acute, upper pair rarely small elliptic and sessile; nerves very slender; petiole ⅓–¼ in.; stipules with long hair-like cusps ½ in. long, or broad and shortly cuspidate. *Cymes* 2–6 in. broad, shorter than broad; peduncles erect, 2 in. and under or 0; bracts very slender, persistent or not; bracteoles subulate, very persistent; flowers few or numerous, white, odorous; lobes of corolla forming a very narrow bud not much broader than the tube. *Calyx-teeth* short or long, always acute or acuminate. *Filaments* slender; anthers very long, almost filiform. *Fruit* size of a pea, glabrous or didymous. *Seed* plano-convex (as far as I can ascertain).—The Cachar specimens have shorter calyx-lobes than the others. Apparently a common and a variable Malayan plant, published under several names, as *laxiflora*, Hassk.; *subulata*, Teysm. & Binnend.; and *acutiflora*, Reinw. The *I. densa*, Br., from Penang, is probably a state of this with more coriaceous elliptic-lanceolate leaves, of a paler colour; the flowers are stated to be red, but as there are two plants on the sheet no confidence can be placed in the ticket.

VAR. arguta; leaves narrowly oblanceolate or elliptic-lanceolate acuminate 4–5 by 1–1½ in.—*I. ? arguta*, *Br. in Wall. Cat.* 6157. Western Peninsula, *Heyne*; Purwur Ghat, Bombay, *Ritchie*.

37. *I. erubescens*, *Wall. Cat.* 6143; glabrous, black when dry, branches slender, leaves sessile or subsessile elliptic-oblong, tip rounded or obtuse, base cuneate or rounded, nerves 8–12 pair, upper pair often cordate, cymes peduncled or sessile brachiate, branches slender, stipules with slender cusps, calyx-teeth very small subacute, corolla-tube ½ in., lobes slender, mouth naked, stigma long arms slender. *G. Don Gen. Syst.* iii. 571 (*character erroneus*). *I. memecylifolia*, *Kurz in Journ. As. Soc.* 1872, ii. 316; *For. Fl.* ii. 24.

MARTABAN and TENASSERIM, *Wallich, Helfer, Kurz*; Moulmein, *Griffith*.

Doubtfully distinct from *I. nigricans* by the subsessile more oblong leaves, obtuse at both ends, with fewer nerves; the peculiar buds are identical. *Kurz* makes *I. erubescens* a var. of *nigricans*, distinguished by the obtuse corolla-lobes, but does not describe those of his *I. memecylifolia*, which is identical with *Wallich's erubescens*, and the corolla-lobes of which are exactly like that of *nigricans* proper.

IMPERFECTLY KNOWN, DOUBTFUL, AND REJECTED SPECIES.

I. GLAUCINA, *Kurz For. Fl.* ii. 27; glabrous, leaves 4–6 in. oblong to elliptic-lanceolate shortly acuminate, base acute, petiole ½–¾ in., cymes corymbiform sessile, flowers crowded scarlet, calyx globose, teeth short triangular 2 acute 2 obtuse, corolla-tube 1½ in., lobes ovate-lanceolate acute.—Upper Tenasserim.

I. PANICULATA, *Hb. Rottler in Wall. Cat.* 6163; glabrous, slender, leaves 3–4 in. oblong obtuse thin, petiole very short, stipules short cuspidate, peduncles 3 in. slender, cymes brachiate, branches 1–2 in. slender shortly branched at the end, flowers few sessile and pedicelled, calyx-teeth minute acute, corolla-tube 1 in., lobes linear-oblong, mouth glabrous.—*Herb. Heyne*, from Rottler.—I think this is *I. oblonga*, Br., of Singapore and Java, whence possibly Rottler procured it.

I. WALLICHII, *W. & A. Prodr.* 428; *not of Wight Herb.* This is probably *I. cuneifolia*.

I. ATTENUATA, *Wall. Cat.* 6164, is *Chasalia curviflora*, *Thw.*

67. **PAVETTA**, *Linn.*

Characters of *Ixora*, but stipular bracts membranous, leaves usually more membranous. stipules more united into an intrapetiolar sheath, style much

longer, and ovules usually attached to a prominent placenta.—DISTRIB. Species about 60, in the tropics of the Old World.

Pavetta, as here limited, differs from *Ixora* in the usually membranous more or less sheathing stipulary bracts at the lower cyme branches, and the style twice as long as the corolla-tube with a slender entire rarely notched stigma, often more slender than the style itself. Various pentamerous species placed in *Pavetta* by authors are in this work referred to *Webera*, with which they agree in habit, and the short hairy style with a long fusiform grooved stigma.

* *Calyx-teeth much shorter than the ovary.*

1. ***P. indica***, Linn.; DC. *Prodr.* iv. 490; glabrous pubescent or tomentose, leaves membranous elliptic elliptic-lanceolate obovate or oblanceolate rarely orbicular obtuse acute acuminate or caudate, cymes terminal sessile corymbiform, flowers pedicelled, calyx truncate or with very short triangular teeth, corolla-tube $\frac{1}{2}$ – $\frac{3}{4}$ in.

Throughout India from the WESTERN HIMALAYA in GARHWAL (var. *tomentosa*), ascending to 4000 ft., to BHOTAN and BIRMA, and southwards to CEYLON, MALACCA, and PENANG.—DISTRIB. Malay Archipelago, S. China, N. Australia.

One of the most common and variable Indian small trees or bushes. Leaves pale or greenish when dry, 3–9 by $\frac{3}{4}$ –3 in., a foot long in some Khasian specimens; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in. stipules short, broad. Cymes 1–5 in. diam., rounded, or reduced to few scattered flowers; bracts broad, membranous, lower cupular; flowers on slender pedicels, white, rather fragrant. Corolla-tube twice or thrice as long as the oblong lobes. Stigma very slender, fusiform. Berry size of a pea, 2-seeded.—Flowers occasionally 5-merous (Wight & Arnott).

VAR. 1. *indica proper*; leaves glabrous beneath or nearly so, cymes glabrate, corolla glabrous. *P. indica*, Linn.; Wall. Cat. 6175, excl. Fl.; W. & A. *Prodr.* 431; Wight Ic. t. 148; Thw. Enum. 155; Dalz. & Gibs. Bomb. Fl. 112; Brandis For. Fl. 275. *P. Finlaysoniania*, Wall. Cat. 6177, and *P. graciliflora*, 6178. *P. alba*, Vahl Symb. iii. 11. *P. petiolaris*, Wall. Cat. 6186. *Ixora paniculata*, Lamk. Dict. iii. 344. *I. Pavetta*, Roxb. Fl. Ind. i. 385; Kurz For. Fl. ii. 18; Rheede Hort. Mal. xix. t. 10. Thwaites discriminates two varieties:—1. With few-flowered cymes, slender pedicels, and narrow lanceolate leaves; 2. With puberulous cymes and leaves pubescent beneath: both are found in Continental India, with many more founded on as slight characters. A third Ceylon one, *montana*, I have retained as distinct.

VAR. 2. *polyantha*; Wall Cat. 6176 (sp.); cymes pubescent, flowers densely crowded. *P. indica*, Wall. Cat. 6175 F.; Bot. Reg. t. 198. *P. Rothiana*, DC. *Prodr.* iv. 491; W. & A. *Prodr.* 431. *P. villosa*, Heyne in Roth Nov. Sp. 88, not of Vahl. *Ixora tomentosa*, var. *glabrescens*, Kurz For. Fl. ii. 19.

VAR. 3. *tomentosa*, Roxb. in Smith Cyclop. (sp.); leaves glabrous or softly or harshly puberulous above, beneath and the cymes pubescent tomentose or softly villous. *I. tomentosa*, DC. *Prodr.* iv. 490; Heyne in Roth Nov. Sp. 89; W. & A. *Prodr.* 431; ? Thw. Enum. 156; Brand. For. Fl. 275; Wall. Cat. 6173. *P. Brunonis*, Wight Ic. t. 1065. *P. velutina*, mollis, and *canescens*, Wall. Cat. 6174, 6179, 6181. *Ixora tomentosa*, Roxb. Hort. Beng. 11; Fl. Ind. i. 386; Wight Ic. t. 186; Kurz For. Fl. ii. 19.—As common and widely spread as var. 1, but less variable in form of leaf.

VAR. 4. *montana*, Thw. mss.; quite glabrous, leaves 2–3 in. coriaceous narrowly elliptic-oblong, tip rounded, corolla-tube $\frac{1}{2}$ in., style stout, stigma clavate.—Ceylon common, alt. 3–4000 ft., Thwaites.

VAR. 5. *minor*; quite glabrous, leaves small (2–4 in.) narrowly obovate or elliptic-lanceolate obtuse or acute, cymes terminal sessile corymbiform, calyx-teeth subulate acute, corolla $\frac{1}{2}$ – $\frac{1}{2}$ in., stigma subclavate.—Shevagherry hills, Wight (Kew Distrib. 1483).—Looks different from *P. indica* in the smaller size of all its parts, acute calyx-teeth, and rather more clavate stigma.

2. ***P. subcapitata***, Hook. f.; leaves elliptic-lanceolate caudate-acuminate finely pubescent beneath, cymes terminal sessile capitate many-flowered,

branches very short and sessile, flowers densely crowded, calyx puberulous, teeth very short, corolla glabrous, tube $\frac{1}{2}$ in. *Ixora subcapitata*, *Wall. Cat.* 6160.

JYNTEA HILLS (east of the Khasia), *Gomez*.

Possibly a form of *P. indica*; if so a very distinct one, having the cymes contracted into a head; the leaves are 4-6 by $1\frac{1}{2}$ -2 in., and quite like those of *P. indica*.

3. *P. humilis*, *Hook. f.*; stem low simple or forked very robust hispidly hirsute above, internodes very short, leaves oblanceolate caudate-acuminate glabrous above pubescent beneath, cymes terminal sessile very short subcapitate, flowers densely crowded, calyx truncate or teeth very short obtuse, corolla glabrous, tube $\frac{1}{2}$ in.

MALACCA, *Griffith* (Kew Distrib. 3007), *Maingay* (855).

Stem 1-2 ft. high, as thick as a goose-quill, suberect, rooting below, bark white; nodes with the cupular remains of coriaceous stipules. Leaves crowded, 5-7 by 1-2 in., narrowed into a short or long petiole, greenish when dry. Cymes about 1 in. diam.—The habit of this plant differs entirely from that of *P. indica*.

4. *P. hispidula*, *W. & A. Prodr.* 431; leaves glabrous or pubescent beneath narrowly or broadly lanceolate oblanceolate or elliptic membranous, cymes open, branches spreading, flowers pedicelled, calyx-teeth very shortly triangular, corolla-tube 1 in., glabrous.

WESTERN PENINSULA, or the Ghats from the Concan southwards. CEYLON, central province, alt. 3-5000 ft., *Walker, &c.*

There is little to distinguish this from some of the forms of *P. indica* but the usually much larger yellowish flowers, the more prominent calyx-teeth, and style often thickened towards the middle of the exerted portion. The specific name is badly chosen, as there is nothing hispidulous about it; the stigma described as slightly hispid is quite glabrous.

VAR. 1; leaves lanceolate and oblanceolate nearly glabrous above softly pubescent beneath black when dry. Courtallan and Quilon, *Wight. Beddome (Fl. Sylv. For. Man.* 134/7) includes this under *P. tomentosa*, and keeps var. *siphonantha* as a different species.

VAR. 2. *siphonantha*; leaves lanceolate and elliptic-lanceolate acuminate black when dry. *P. siphonantha*, *Dalz. in Hook. Kew Journ.* ii. 133 (sp.); *Dalz. & Gibs. Bomb. Fl.* 112; *Bedd. Fl. Sylv. For. Man.* 134/8.—Canara, *Dalzell*.

VAR. 3. *zeylanica*; leaves obovate or oblanceolate brownish pale when dry glabrous or sparingly pubescent beneath, cyme branches more robust and flowers larger, corolla-lobes sometimes $\frac{1}{2}$ - $\frac{3}{4}$ in. long obtuse or acute.—Ceylon.

VAR. 4. *angustifolia*; glabrous, leaves very narrowly lanceolate 4-6 by $\frac{1}{2}$ - $\frac{3}{4}$ in. almost black when dry. *P. angustifolia*, *Thw. Enum.* 156; *Bedd. Ic. Pl. Ind. Or. t.* 99; *Fl. Sylv., For. Man.* 134/8.—Ceylon; banks of streams in the central province.

5. *P. breviflora*, *DC. Prodr.* iv. 491; glabrous, black when dry, leaves elliptic-obovate or oblanceolate acute or acuminate, cymes sessile or shortly peduncled small glabrate open brachiate, branches short stout, calyx cupular, teeth triangular, corolla glabrous, tube longer than the linear-oblong lobes, style thick shortly exerted. *Wight Ic. t.* 1035; *Bedd. Fl. Sylv. For. Man.* 134/7.

NILGHERY HILLS; alt. 7000 ft., in woods, *Leschenault, &c.*

A bush, branches stout with yellow bark. Leaves 2-3 by $\frac{3}{4}$ -1 $\frac{1}{4}$ in., narrowed into the petiole, shining above, with sometimes a few scattered hairs beneath; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. Cymes 1 in. diam., branches glabrous or pubescent; lower stipular bracts large, membranous. Calyx-teeth hirsute or glabrous. Corolla glabrous, rather fleshy, $\frac{1}{2}$ in. diam. Stigma clavate, obtuse. Seeds subglobose with a narrow ventral slit opening into a large cavity.—This has quite the habit and short style of a *Webera*, but the stipular bracts and 4-merous flowers are those of *Pavetta*: it resembles *W. lucens*, but is distinguished at once by the glabrous style.

6. **P. naucleiflora**, Wall. Cat. 6171; densely pubescent, greenish when dry, leaves elliptic caudate-acuminate softly tomentose beneath, cymes open terminating long axillary naked branches with a pair of leaves at the top, peduncles and pedicels crowded hirsute with dense white spreading hairs, calyx-teeth subulate, corolla hairy or glabrous, tube $\frac{3}{4}$ in. twice as long as the lobes. *G. Don Gen. Syst.* iii. 575. *Ixora naucleiflora*, Kurz For. Fl. ii. 19.

BHOTAN; banks of the Kollery, alt. 2500 ft., Griffith. SILHET and PENANG, Wallich. TENASSERIM, Helfer, Kurz.

A shrub or tree. Leaves 4-6 by 1-2 in., with short scattered hairs above, petiole $\frac{1}{2}$ -1 in. Cymes sessile, 2-3 in. diam.; flowers very many, white, much like those of *P. indica*, var. *tomentosa*, of which it is perhaps only a form. Fruit hispid.

** Calyx-teeth elongate, equalling or longer than the ovary.

7. **P. involucrata**, Thw Enum. 156; glabrous, almost black when dry, leaves elliptic obovate oblong or oblanceolate obtuse or subacute, cymes terminating axillary naked branches sessile capitate surrounded at the base by broad large sheathing stipular bracts, calyx-teeth equalling or longer than the ovary, corolla-lobes linear exceeding the tube, throat with a ring of hairs. *Bedd. Ic. Pl. Ind. Or.* t. 100; *Fl. Sylv. For. Man.* 134/7.

CEYLON; central province, alt. 5-7000 ft., Walker, &c.

A large shrub; branches robust, bark yellowish. Leaves 2-3 by 1-1 $\frac{1}{2}$ in., thinly coriaceous, brown beneath when dry, narrowed into the short petiole. Cymes 1 in. diam., globose or compressed; branches 2-4 in., terminated usually by a pair of leaves; stipular bracts pale brown, often cuspidate; flowers sessile, white, densely crowded. Calyx-teeth ovate-lanceolate, ciliate, pubescent within. Corolla-tube $\frac{1}{4}$ in., campanulate, lobes acuminate. Style stout; stigma hardly thickened. Fruit smooth. Seeds orbicular, ventrally deeply hollowed.—This has the black look and short flowers of a *Webera*.

8. **P. Brunonis**, Wall. Cat. 6172; softly tomentose, greenish when dry, leaves obovate or oblanceolate obtuse or acute softly hirsute beneath, cymes terminal sessile contracted densely tomentose, branches 3 very stout short with a fastigate cluster of flowers, stipular bracts large, calyx-teeth lanceolate recurved, corolla glabrous, tube $\frac{1}{2}$ in. twice as long as the lobes, stigma narrowly clavate.

NILGHERY HILLS, Noton, Wight, G. Thomson.

This resembles *P. indica*, var. *tomentosa*, but the cymes are dense with short stout main branches, the calyx-teeth are entirely different, and the flowers are smaller. One of Wallich's specimens was received from Wight, but I find none in the Herbarium of the latter botanist, where the specimen named *Brunonis* has the truncate calyx and loose cyme of *P. indica*, var. *tomentosa*.

9. **P. Wightii**, Hook. f.; nearly glabrous, pale greenish when dry, leaves elliptic-lanceolate acute puberulous beneath with large oblong thickened glands, cymes terminating slender axillary naked branches open much divided glabrate, flowers long-pedicelled, calyx-teeth slender lanceolate acuminate longer than the ovary, corolla glabrous, tube $\frac{2}{3}$ in. slender 2-3 times as long as the narrow acute lobes.

NILGHERY HILLS, Wight.

This, but for the very long slender teeth of the calyx, would be put with *P. indica*. The slender naked axillary flowering branches are compressed, but not so much as in *P. involucrata*, and are 2-3 in. long; sometimes they are leafless at the summit, when the inflorescence appears peduncled and axillary. The calyx-teeth are erect and twice as long as the puberulous ovary, and the styles are very slender and glabrous. I have seen only one specimen.

10. **P. Gleniei**, Thw. mss.; glabrous or velvety, leaves elliptic-lanceolate or broadly elliptic obtuse or acute, cymes terminating axillary slender leafless

branches brachiate, calyx-teeth linear or filiform many times longer than the ovary persistent and exceeding the diameter of the fruit, corolla glabrous, tube $\frac{1}{2}$ in. twice as long as the lobes. I. tomentosa, *Thw. Enum.* 156.

CEYLON; at Damboul, and abundant in the Batticaloa district, *Walker, Thwaites*.

Of this remarkable plant there are two forms, one quite glabrous, green when dry, with leaves 5 in. long; it is in fruit, and has very slender peduncles and pedicels, and filiform calyx-teeth nearly $\frac{1}{4}$ in. long crowning the ripe fruit; the other is more or less black when dry, softly velvety all over, with smaller broader leaves $2\frac{1}{2}$ –3 in. long; it is in flower, and has shorter calyx-teeth in the fruit. Thwaites first regarded this as a form of *P. indica*, var. *tomentosa*, with longer calyx-teeth; but variable as that plant is, I have seen no specimen from any part of India with anything but very short triangular calyx-teeth, nor any with the inflorescence of this, in which the leaves at the end of the axillary flowering branches are wholly suppressed.

DOUBTFUL SPECIES.

P. COMPACTIFLORA, *Kurz in Journ. As. Soc.* 1872, ii. 315; *For. Fl.* ii. 17 (*Ixora*); quite glabrous, leaves 3–5 in. elliptic to broadly lanceolate acuminate tapering into the stout petiole blackish when dry, flowers subsessile in dense involucred heads 1 in. diam. terminating axillary branches, involucre bracts small inconspicuous broad ovate imbricate, calyx-teeth oblong rounded, corolla-tube $\frac{1}{2}$ in. rather wide, lobes oblong obtuse equalling the tube.—Upper Tenasserim, alt. 2000 ft., *Kurz*.—Possibly a *Webera*, though placed by *Kurz* along with tetramerous species.

P. ? ARISTATA, *Wall. Cat.* 6169, from Tavoy; the specimens have no flowers; the name suggests its being possibly *Webera stellaris*, with which the foliage agrees, as do its 5 calyx-teeth.

P. ? OBLONGA, *Wall. Cat.* 6170 ("Herb. Finlayson" from Siam?) is pentamerous and a *Webera*.

P. ? COFFEACEA, *Wall. Cat.* 7290, is probably *Webera attenuata*.

68. COFFEA, Linn.

Shrubs, branchlets compressed. Leaves opposite, rarely in threes; stipules broad. Flowers in axillary fascicles or cymes or solitary, white or yellowish, often scented; bracteoles often connate. Calyx-tube short; limb short, often glandular, persistent. Corolla-tube short or long; lobes 4–7, spreading, twisted in bud. Anthers 4–7, sessile on the corolla-tube or throat, narrow, often recurved and twisted. Ovary 2-celled; style filiform, smooth, branches linear or subulate; ovules 1, peltately attached to the septum in each cell. Drupe with 2 plano-convex or ventrally concave coriaceous or cartilaginous pyrenes. Seeds plano-convex, concave or grooved ventrally, albumen horny; embryo short, towards the base of the seed, curved, cotyledons thin cordate, radicle inferior.—DISTRIB. Species about 20, in the tropics of the old world.

Coffea arabica, the coffee plant, is abundantly cultivated in various parts of Southern India.

SECT. I. **Eucoffeea**. Calyx-limb irregularly few or many-toothed. Corolla-tube long, slender. Fruit didymous when 2-seeded. Flowers solitary or fasciated; lobes 5, rarely more, large, obtuse.

1. **C. bengalensis**, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 540; glabrous, leaves broadly ovate or elliptic obtusely acuminate membranous not shining, flowers 1–3-nate 5-merous appearing before the leaves, calyx-limb many-toothed, corolla-tube $\frac{1}{2}$ – $1\frac{1}{4}$ in., fruit ovoid-oblong. *Roth Nov. sp.* 148; *DC. Prodr.* iv. 499; *Wall. Cat.* 6244; *Wight & Arn. Prodr.* 435; *Brand. For. Fl.* 277; *Kurz For. Fl.* ii. 28; *Bot. Mag.* t. 4917. *C. Horsfieldiana*, *Miq. Fl. Ind. Bat.* ii. 308.

TROPICAL HIMALAYA, from Kumaon to Mishmi, ascending to 3000 ft. BENGAL, ASSAM, SILHET, CHITTAGONG, and TENASSERIM.—DISTRIB. Siam, Java.

A shrub with horizontal slender branches. *Leaves* deciduous, sometimes 5 by 3 in., but usually much smaller, membranous, green when dry, nerves beneath somewhat hairy, base rounded or acute, always shortly contracted into the short petiole; stipules subulate. *Flowers* axillary, pure white, fragrant, 1-1½ in. diam.; corolla-lobes obovate-oblong. *Calyx-limb* with many glandular teeth. *Fruit* ½ in. long, didymous when 2-seeded, "black, and size of a small cherry," Roxb.

2. **C. Wightiana**, *W. & A. Prodr.* 436; glabrous, leaves small subsessile ovate obtuse glabrous or woolly in the nerve-axils beneath, flowers subsolitary 5-merous appearing before the leaves, calyx-limb many-toothed, corolla-tube ½ in., fruit small broadly didymous. *Wight Ic. t.* 1598; *Wall. Cat.* 6246; *Thw. Enum.* 154.

WESTERN PENINSULA; in arid places from Kurg to Travancore, *Wight*, &c. CEYLON; in hot drier parts of the island.

A much branched almost spinescent shrub, with slender divaricate branches. *Leaves* ½-1½ in., rather coriaceous, pale when dry; stipules spinescent. *Flowers* white, with much narrower corolla-lobes than *C. bengalensis*. *Fruit* much broader than long, ½ in. diam., with a deep furrow between the lobes.—*Thwaites* and *Wight & Arnott* regard this as a probable variety of *C. travancorensis*.

3. **C. travancorensis**, *W. & A. Prodr.* 435; glabrous or branches puberulous, leaves elliptic-lanceolate or broadly elliptic obtuse or obtusely caudate-acuminate, flowers 3-4-nate 5-merous appearing with the leaves, calyx-limb subentire or 2-3-toothed, corolla-tube ¾-1 in., fruit broadly didymous.—*Wall. Cat.* 6245; *Thw. Enum.* 154. *C. triflora*, *Moon. Cat.* 15.

WESTERN PENINSULA; TRAVANCORE, *Wight*. CEYLON; in warm moist parts of the island, ascending to 3000 ft., *Thwaites*.

A bush. *Leaves* pale yellowish when dry, 3-4 by 1-1½ in., in Ceylon specimen very broadly orbicular-elliptic and 2½ in. diam. *Flowers* much as in *C. bengalensis*, but smaller. *Fruit* broader than long, ½ in. diam.

4. **C. fragrans**, *Wall. mss.*; glabrous or branches puberulous, leaves elliptic-lanceolate obtuse or obtusely caudate-acuminate, flowers subsolitary 5-merous appearing with the leaves, calyx many-toothed, corolla-tube ¾-1 in. *Coffea*, *Wall. Cat.* 8450.

SILHET, *Gomez*; TENASSERIM, *Helper*; MERGUI, *Griffith*.

Very similar indeed to *C. travancorensis*, and perhaps a variety of it, but the leaves are more shining, with the nerves more raised, and the calyx-limb, which is deeply cupped, is many-toothed. *Fruit* in Tenasserim examples ½ in. diam., broadly didymous, exactly as in *C. travancorensis*.

SECT. II. **Lachnostoma**, *Korth.* (Gen.) *Calyx-limb* regularly 4-toothed. *Corolla-tube* short; lobes 4, small, acute. *Fruit* glabrous or ellipsoid, not didymous when 2-seeded.—*Flowers* very small, in small axillary cymes.

5. **C. khasiana**, *Hook. f.*; branches and nerves beneath puberulous, leaves elliptic-lanceolate caudate-acuminate, base acute, nerves 7-8 pair, calyx-teeth 4 acute, corolla-tube equalling the lobes, mouth villous, lobes acute, fruit globose.—? *Lachnostoma triflorum*, *Korth. in Ned. Kruidk. Arch.* ii. 202; *Miq. Fl. Ind. Bat.* ii. 257. *Coffea*, No. 6, *Herb. Ind. Or. H. f. & T.*

KHASIA and JYNTEA Mts., alt. 2-4500 ft. frequent, *J. D. H. & T. T., C. B. Clarke*.

A large rambling bush or small tree; branchlets with appressed hairs. *Leaves* greenish when dry, 3-8 by 1-3 in., membranous, not shining, nerves very oblique; petiole ¼ in.; stipules triangular, cusp long slender. *Flowers* in very short branched pubescent cymes; pedicels very short with a cup of connate bracteoles. *Calyx*

glabrous; teeth erect, triangular. *Corolla* $\frac{1}{10}$ in. yellowish; lobes short. *Style* short, arms linear. *Fruit* $\frac{1}{4}$ in. diam., smooth; calyx-teeth persistent. *Seeds* orbicular, ventrally concave.—The specimens seen of *Lachnostoma triflorum* are imperfect, and have smaller leaves than this, and the corolla is less hairy. *Coffea densiflora*, Blume, of Java and Sumatra, is evidently allied, but the description and our specimens are insufficient.

6. **C. Jenkinsii**, Hook. f.; glabrous, leaves elliptic-lanceolate caudate-acuminate, base acute, nerves 5-6 pair, calyx-teeth 4, corolla-tube longer than the lobes, mouth glabrate, lobes acute, fruit ellipsoid.

KHASIA Mts., alt. 3-4000 ft., *Jenkins*, *Griffith* (Kew Distrib. 3015).

Closely allied to *C. khasiana*, but almost entirely glabrous, the young shoots only puberulous, the leaves are narrower with fewer stronger nerves, the flowers are rather larger and the fruit and seeds quite different, the former being ellipsoid $\frac{1}{2}$ in. long, and the latter plano-convex.—This approaches *C. salicifolia*, Miquel, of Java. It is remarkable that no *Coffea* has been collected in the Malay Peninsula, though such near allies of this and *C. khasiana* inhabit Sumatra and Java.

TRIBE XII. MORINDEÆ.

69. MORINDA, Linn.

Erect or climbing shrubs or trees, branches terete or 4-gonous. *Leaves* opposite, rarely in threes; stipules connate, sheathing. *Flowers* in axillary or terminal simple paniced or umbellate peduncled heads, white, more or less connate by the calyces. *Calyx-tube* short; limb short or 0. *Corolla-tube* short or long; lobes 4-7, coriaceous, valvate in bud. *Stamens* 4-7, filaments short; anthers linear or oblong. *Ovary* 2- or spuriously 4-celled; style slender, branches long or short; ovules solitary, ascending from towards the base of the septum in each cell. *Fruit* compressed, formed of the succulent enlarged calyces enclosing many cartilaginous or bony 1-seeded pyrenes, which sometimes cohere into a 2-4-celled putamen; rarely of nearly free drupes. *Seeds* obovoid or reniform, testa membranous, albumen fleshy or horny; embryo terete, radicle inferior.—DISTRIB. Species about 40, all tropical.

* *Corolla* 5-7-merous, tube long.

1. **M. citrifolia**, Linn.; DC. Prodr. iv. 446; glabrous, leaves usually 6-10 in. broadly elliptic acuminate acute or obtuse shining, peduncles solitary leaf-opposed rarely 2-3-nate at the ends of the branches, flowers 5-merous, fruit of many drupes coalescent into a fleshy globose or ovoid head 1 in. diam.

Cultivated and wild? throughout the hotter parts of India and Ceylon.—DISTRIB. Malay Archipelago, Australia, Pacific Islands.

A small tree; trunk straight, bark smooth, branches obtusely 4-angled. *Leaves* shining, short-petioled, one of the pair next the peduncle often suppressed; stipules large, broadly oblong or semi-lunar, entire or 2-3-fid, glabrous. *Peduncles* usually in the axils of every other pair of leaves, 1 in. long or more. *Calyx-limb* truncate. *Corolla* white, tube $\frac{1}{2}$ in. or less; lobes glabrous, fusiform in bud, throat pubescent. *Anthers* partly exserted. *Head* of fruit yellowish.—I have united *M. citrifolia* and *bracteata*, as this seems to meet the views of most Indian botanists, though Roxburgh, who alone seems to have studied these *Morindas*, keeps them apart, regarding *M. bracteata* as a native (of Ganjam, in Crissa). He, however, gives us other distinctive characters of the latter than the foliaceous calyx-lobes and included anthers (a sexual character). Thwaites regards *M. bracteata* as both wild and cultivated in Ceylon, and finds the presence of bracts inconstant. Both are regarded by others as cultivated forms of *M. tinctoria*, which, however, looks different. Rheede, whose figures Roxburgh quotes for *citrifolia*, represents the flower of the upper head as with calycine lobes.

VAR. 1. *citrifolia* proper; calyx-limb without a foliaceous lobe. *M. citrifolia*, Linn.; Roxb. *Fl. Ind.* i. 541; Hunter in *As. Res.* iv. 35; Ham. in *Trans. Linn. Soc.* xiii. 533; W. & A. *Prodr.* 419; Wall. *Cat.* 8418; Dalz. & Gibs. *Bomb. Fl.* 114; Brand. *For. Fl.* 277; Kurz *For. Fl.* ii. 60, var. 1; Rheede *Hort. Mal.* i. t. 52; Gaertn. *Fruct.* i. t. 29.—Truly wild in Malacca, Maingay.

VAR. 2. *bracteata*; stipules more acute, calyx-limb often with a lanceolate or spatulate white foliaceous lobe sometimes 3 in. long. *M. bracteata*, Roxb. *Hort. Beng.* 15; *Fl. Ind.* i. 544; Ham. in *Trans. Linn. Soc.* xiii. 534; DC. *Prodr.* iv. 447; W. & A. *Prodr.* 419; Wight *Ill.* t. 126; Wall. *Cat.* 8419; Thw. *Enum.* 144; Dalz. & Gibs. *Bomb. Fl.* 114; Brand. *For. Fl.* 277.—Wild and cultivated in various parts of India and Ceylon. Not unfrequent in the forests of the Andamans, Kurz, who ascribes more acute stipules to this form and smaller fruit.

VAR. 3. *elliptica*; leaves 6-8 in. elliptic polished acuminate, nerves strong on both surfaces. Tavoy, Gomez, Wall. *Cat.* 8434. Concan, Stocks. Malacca, Griffith.—This looks intermediate between *angustifolia* and *citrifolia* in foliage. The drupes are partially free in the Tavoy specimen.

2. **M. tinctoria**, Roxb. *Hort. Beng.* 15; *Fl. Ind.* i. 543; leaves usually 4-8 in. broadly or narrowly elliptic acute at both ends, base very rarely cordate glabrous or pubescent or tomentose beneath or on both surfaces not shining, peduncles solitary or 2-nate leaf-opposed rarely terminal and paniced, flowers 5-merous, fruit of many drupes coalescent into a globose or ovoid fleshy head 1 in. diam. or less.

Throughout India from the Sutelj eastwards, and southwards to Ceylon and Malacca.—DISTRIB. Malay Archipelago.

Considered by many Indian botanists to be the wild form of *M. citrifolia*; but if *M. bracteata* is truly wild in India, as is asserted on good authority, it may be safer to regard *tinctoria* as a separate plant, characterised by its smaller foliage, which is never shining. The following are prevalent forms, but are neither constant nor always recognisable (in a dried state at any rate) from one another and from *M. citrifolia*.

VAR. 1. *tinctoria* proper; often shrubby, leaves glabrous rarely pubescent beneath, peduncles leaf-opposed. *M. tinctoria*, Roxb. *l. c.*; DC. *Prodr.* iv. 447; W. & A. *Prodr.* 419; Brand. *For. Fl.* 277. *M. aspera*, W. & A. *Prodr.* 420. *M. Coreia* and *nodosa*, Ham. in *Trans. Linn. Soc.* xiii. 537; DC. *l. c.* 448. *M. leiantha*, Kurz in *Journ. As. Soc.* 1872, ii. 313; *For. Fl.* ii. 59. *M. citrifolia*, Bedd. *Fl. Sylv.* t. 220. *M. Zollingeriana* and *Teysmanniana*, Miq. *Fl. Ind. Bat.* ii. 243, 244. *Morinda*, Wall. *Cat.* 8430.

VAR. 2. *tomentosa*; leaves tomentose on both surfaces, peduncles leaf-opposed. *M. tomentosa*, Heyne in *Roth Nov. Sp.* 147; DC. *l. c.* 448; W. & A. *Prodr.* 420; Dalz. & Gibs. *Bomb. Fl.* 114; Kurz *For. Fl.* ii. 60. *M. Naudia* and *Chacuca*, Ham. in *Trans. Linn. Soc.* xiii. 536. *M. stenophylla*, Spr.; DC. and W. & A. *ll. cc.* *M. angustifolia*, Roth *Nov. Sp.* 147, not of Roxb.

VAR. 3. *multiflora*; leaves glabrous or pubescent, peduncles axillary and terminal simple and paniculate. *M. multiflora*, Roxb. *Hort. Beng.* 15; *Fl. Ind.* i. 546; DC. *Prodr.* iv. 447; Brand. *For. Fl.* 227.

VAR. 4. *aspera*; leaves lanceolate or elliptic-lanceolate acuminate and branches uniformly scabrid, stipules broad reflexed cleft to the base into two oblong obtuse lobes, peduncles leaf-opposed or axillary slender scabrid, corolla pubescent. *M. aspera*, W. & A. *Prodr.* 420. *Morinda*, Wall. *Cat.* 8429, ex Herb. Wight.

FORMA *exserta*. *M. exserta*, Roxb. *Hort. Beng.* 15; *Fl. Ind.* i. 545; DC. *Prodr.* iv. 447; Wall. *Cat.* 8421; W. & A. *Prodr.* 419; Brand. *For. Fl.* 276; Thw. *Enum.* 145 and 430; Kurz *For. Fl.* ii. 59.—Under Roxburgh's descriptions and the above citations are included various forms of *Morinda* with exserted anthers, of which some are referable to *citrifolia* and others to the varieties of *tinctoria*; and as the character of the anthers is sexual, this form must be abandoned even as a variety, as Thwaites has pointed out.

3. **M. angustifolia**, Roxb. *Hort. Beng.* 15; *Cor. Pl.* t. 237; *Fl. Ind.* i. 547; glabrous, leaves large elliptic or obovate-lanceolate caudate-acuminate.

tapering into the petiole, peduncles long or short solitary leaf-opposed rarely 2-3-nate and terminal, drupes free. *Wall. Cat.* 8420; *DC. Prodr.* iv. 447; *Kurz For. Fl.* ii. 61. *M. squarrosa*, *Ham. in Trans. Linn. Soc.* xiii. 535; *DC. l. c.* *Morinda* sp., *Wall. Cat.* 8423 in part, 8426, 8427, and *Psychotria* (♀ *Morinda*), 8365.

TROPICAL HIMALAYA, wild and cultivated, from Nipal eastwards, ascending to 6000 ft. in Sikkim. ASSAM and KHASIA Mts., ascending to 4000 ft. CHITTAGONG and TENASSERIM.

An erect bush or small tree. *Leaves* often a foot long, narrowed into a petiole sometimes $1\frac{1}{2}$ in., glabrous or puberulous on the nerves beneath; stipules acute or obtuse, entire or 2-fid. *Flowers* very numerous, white, fragrant. *Corolla-tube* $\frac{3}{4}$ in., glabrous; lobes globose in bud. *Fruit* 1 in. diam. or less; drupes turbinate, black.—Foliage often like that of *M. citrifolia*.

4. *M. persicæfolia*, *Ham. in Trans. Linn. Soc.* xiii. 535; glabrous or scaberulous, leaves obovate-lanceolate or oblanceolate or linear caudate-acuminate narrowed into the petiole, peduncles short solitary leaf-opposed, drupes coalescent. *DC. Prodr.* iv. 447; *Kurz For. Fl.* ii. 61. *M. lanceolata*, *Wall. Cat.* 8435

CHITTAGONG and PEGU, *Hamilton, M'Clelland*. BIRMA, *Wallich*. TENASSERIM, in savannah forests, *Kurz*. SINGAPORE, *Maingay*.—DISTRIB. Sumatra, Siam.

A small low diffuse shrub; branches flexuous. *Leaves* 2-6 in., very variable in breadth, tapering into the slender petiole or rarely rounded at the base; stipules subulate. *Flowers* rather small, white. *Corolla* funnel-shaped, quite glabrous. *Fruit* the size of a cherry, smooth.—Leaves in Rangoon specimens very narrow 5 by $\frac{1}{2}$ in.

** *Corolla* 4- rarely 5-merous; *tube* short, not $\frac{1}{4}$ in.

5. *M. umbellata*, *Linn.*; *DC. Prodr.* iv. 449; leaves membranous from broadly obovate to elliptic- or linear-lanceolate obtuse acute or caudate-acuminate glabrous pubescent or tomentose beneath, nerves very distinct, heads in terminal sessile umbels, drupes connate. *W. & A. Prodr.* 420; *Wall. Cat.* 8431; *Kurz For. Fl.* ii. 62. *M. scandens*, *Roxb. Fl. Ind.* i. 548; *DC. Prodr.* iv. 449. *M. tetrandra*, *Jack in Mal. Misc.* i. 13; *Wall. Cat.* 8432; *Roxb. Fl. Ind.*, ed. *Carey & Wall.* ii. 203; *DC. l. c.* *M. Padavara*, *Juss.* *Morinda*, *Wall. Cat.* 8429.—*Rheede Hort. Mal.* vii. t. 27.

Hills of EASTERN BENGAL and the MALAY PENINSULA, from the Khasia Mts., ascending to 4000 ft. to Penang and Singapore. WESTERN PENINSULA; South Concan, Nilgherry, and Travancore mts. CEYLON, ascending to 4000 ft.—DISTRIB. Malay Archipelago, China, Japan, N. Australia.

A diffuse shrub, with sometimes tomentose climbing branches. *Leaves* extremely variable, rarely 5 in., sometimes obcuneate with a retuse apex, usually elliptic-lanceolate and quite glabrous, or scaberulous, or sometimes even softly tomentose beneath in both eastern and western specimens, narrowed into the slender petiole; stipules acute, connate. *Peduncles* 5-10, $\frac{1}{2}$ -1 $\frac{1}{2}$ in., glabrous or tomentose. *Corolla* almost rotate, throat bearded. *Fruit* size of a large pea or larger, irregularly lobed.—Some Nilgherry Mt. specimens have the leaves not shining. A Singapore specimen from Dr. Anderson has leaves more coriaceous, softly villous beneath, with the nerves obscure on the upper surface, thus approaching *M. rigida*, but the nerves are distinct beneath, and the heads are those of *M. umbellata*.

6. *M. rigida*, *Miq. Fl. Ind. Bat.* ii. 246; leaves very coriaceous elliptic abruptly obtusely acuminate glossy above brown and sometimes puberulous beneath, nerves obscure on both surfaces, heads axillary solitary or 2-4-nate and terminal subsessile, drupes connate.

MALACCA, *Griffith, Maingay*.—DISTRIB. Sumatra, Borneo.

Branches cylindric, polished, glabrous. *Leaves* very uniform, 3-4 by 1 $\frac{1}{2}$ -2 in., dark

blackish-brown and highly polished above, rusty-brown and very opaque beneath, narrowed into a slender petiole; stipules connate, ovate. *Peduncles* stout, glabrous or pubescent. *Corolla-tube* $\frac{1}{2}$ in., puberulous. *Heads* 1 in. diam. and under, with few very large pyrenes.

7. **M. villosa**, Hook. f.; branches and leaves beneath hirsute, leaves elliptic-obovate or -lanceolate acuminate opaque and pubescent above, nerves distinct, peduncles terminal umbellate long or short; drupes confluent. *Morinda*? *Wall. Cat.* 8425.

KHASIA MTS., *De Silva*; at the Bor Panee river, J. D. H. & T. T.

A climbing shrub. *Leaves* greenish when dry, 3-4 by $1\frac{1}{4}$ - $1\frac{3}{4}$ in., membranous; nerves numerous; petiole very short; stipules connate with subulate points. *Peduncles* $\frac{1}{2}$ -2 in., stout or slender, villous. *Heads* in flower small. *Corolla* small, pubescent. *Fruit* 1 in., pale red.

DOUBTFUL SPECIES.

M. WALLICHII, *Kurz, For. Fl.* 61; a small quite glabrous evergreen tree?, leaves 3-5 in. oblong-lanceolate to linear acuminate at both ends pale beneath, petiole $\frac{1}{2}$ - $1\frac{1}{2}$ in., flowers rather small white in small heads forming a terminal glabrous stiff-peduncled small cyme, calyx truncate, the tube (in bud) only $\frac{1}{4}$ in. long, lobes as long oblong-linear rather blunt.—Tenasserim, *Kurz*.—Probably in the above description, copied from Kurz, the tube alluded to and lobes are those of the *corolla*, which word has been omitted accidentally.

70. **RENNELLIA**, Korthals.

Characters of *Morinda*, but the terminal heads few-flowered and paniculate, ovules peltate, and seeds orbicular thin and much dorsally compressed.—*DISTRIB.* Species 2 or 3, Malayan.

1. **R. speciosa**, Hook. f. in *Gen. Plant.* ii. 118; quite glabrous, leaves elliptic-lanceolate acuminate. *Morinda speciosa*, *Wall. Cat.* 8436; *Kurz For. Fl.* ii. 62.

TENASSERIM; Cheppedong hills, *Wallich*. MALACCA, *Griffith*, *Maingay*.

A stout evergreen climbing shrub. *Leaves* 6-9 by 2-2 $\frac{1}{2}$ in., brown or pale green when dry, thinly coriaceous, tapering into a petiole $\frac{1}{2}$ -1 in.; stipules free or connate, short. *Inflorescence* 1-3 in., erect, quite glabrous; peduncle rachis and short branches very stout; heads pedicelled, 3-6-flowered. *Calyx-limb* short, cupular, truncate. *Corolla-tube* $\frac{1}{2}$ - $\frac{3}{4}$ in.; limb glabrous within, lobes linear-oblong. *Fruit* $\frac{1}{2}$ in. diam., globose.

71. **DAMNACANTHUS**, Gaertn.

A small rigid much-branched shrub covered with slender spines. *Leaves* small, subsessile, ovate, acuminate; stipules minute, 3-cuspidate. *Flowers* small, white, axillary, solitary or in pairs, pedicels short, bracteolate. *Calyx-tube* obovoid; limb 4-5-fid, persistent. *Corolla* funnel-shaped, throat villous; lobes 4-5, triangular-ovate, valvate in bud. *Stamens* 4-5, on the throat of the corolla; filaments short, anthers with a broad connective, exerted. *Ovary* 2-4-celled; style filiform, stigma 2-4-cleft; ovules 1 in each cell, pendulous by a broad base from above the middle of the septum. *Drupe* small, globose, with 1-4 hard plano-convex pyrenes. *Seeds* peltate, testa thin, albumen horny; embryo minute, radicle inferior.—*DISTRIB.* Species 1 or 2, East Bengal, China, and Japan.

1. **D. indicus**, Gaertn. f. *Fruct.* iii. 18, t. 182; *DC. Prodr.* iv. 473.

MISHMI HILLS (Upper Assam), *Griffith*.—*DISTRIB.* Japan.

Branches slender; spines straight, needle-like. *Leaves* $\frac{1}{2}$ in. long in Griffith's specimens, often longer in Japanese; nerves obscure. *Corolla-tube* $\frac{1}{4}$ in., segments

half as long. *Fruit* $\frac{1}{8}$ in. diam.—Griffith's is the only Indian specimen I have seen, and no further habitat is given than Mishmi. Considering the confusion in which Griffith's collections were when received at Kew, the locality may be doubtful, and the specimen a Garden one: it is an extensively cultivated plant, but being Chinese, may be indigenous in Mishmi.

72. **PRISMATOMERIS**, *Thwaites*.

Shrubs with compressed 4-gonous branches. *Leaves* opposite; stipules 1-2-cuspidate. *Flowers* unisexual, in axillary and terminal fascicles, white. *Calyx-tube* of ♂ small, turbinate; of ♀ larger, cupular, persistent. *Corolla-tube* cylindric, throat glabrous; lobes 4-5 spreading, valvate in bud. *Stamens* 4-5, in the corolla-tube; filaments short; anthers linear, included. *Ovary* 2-celled; style filiform, branches 2 free or united; ovules 1 attached above the middle of the septum in each cell. *Berry* small, 1-2-celled, 1-2-seeded. *Seeds* subglobose, peltate, ventrally excavated, testa membranous; embryo small, cotyledon reniform, radicle inferior.—DISTRIB. 2-3 species, tropical Indian and Malayan.

1. **P. albidiflora**, *Thw. in Hook. Kew Journ.* viii. 268, t. vii.; *Enum.* 154; 421; leaves elliptic or elliptic-lanceolate shining. *Bedd. Ic. Pl. Ind. Or.* t. 93; and *Anal. Gen. t.* 29, f. 4. *Coffea tetrandra*, *Roxb. Fl. Ind. i.* 538; *Wall. Cat.* 6242; *DC. Prodr.* iv. 499; *Kurz For. Fl. ii.* 28. *Rubiæ*, *Wall. Cat.* 8470.

KHASIA Mts., ascending to 4000 ft., and southwards to MALACCA. CEYLON, ascending to 4000 ft.—DISTRIB. Malay Archipelago.

An evergreen tree or shrub; branches slender, 4-gonous; bark yellow, polished. *Leaves* pale when dry, 3-5 by 1-1 $\frac{1}{2}$ in., coriaceous; nerves slender; petiole $\frac{1}{2}$ -1 in.; stipules triangular, acuminate. *Flowers* subumbellately fascicled, rarely in peduncled axillary umbels, pedicels filiform, $\frac{1}{2}$ -1 in., ebracteolate. *Calyx-limb* truncate. *Corolla* white, tube $\frac{3}{4}$ -1 in.; lobes linear-oblong. *Fruit* globose, $\frac{1}{4}$ in. diam.

2. **P. Fergusonii**, *Thw. mss.*; *Bedd. Fl. Sylv., For. Man.* 134/10; very similar to *P. albidiflora*, but leaves rather larger, pedicels shorter all terminal and more numerous and the corolla much less fleshy.

CEYLON, near Colombo.

The above is all the information I have as to this species, except an observation by Beddome, that "the imbrication of the corolla-lobes is easily seen in this species." In reference to this point, Beddome also says in the generic character, "Corolla-lobes subimbricate (or valvate?)." Finding the corolla to be strictly valvate in *P. albidiflora*, as Thwaites first described it, I suspect *P. Fergusonii* may not be congeneric.

73. **CÆLOSPERMUM**, *Blume*.

Scandent glabrous trees or shrubs; branchlets compressed. *Leaves* opposite; stipules connate, rarely free. *Flowers* in terminal cymose thyrsoid or panicked cymes, white or yellowish, often scented. *Calyx-tube* short; limb short, persistent. *Corolla* coriaceous, funnel- or salver-shaped; lobes 4-5, narrow, spreading or reflexed, valvate. *Stamens* 4-5, on the throat of the corolla, filaments filiform; anthers versatile, exserted, slender. *Ovary* 2 or 4-celled; style filiform, branches 2 short or long; ovules 1 in the 4-celled, geminate in the 2-celled ovaries, pendulous. *Drupe* globose, with 2-4 pyrenes. *Seeds* erect.—DISTRIB. Species 4-5, Malayan and Australian.

1. **C. scandens**, *Blume Bijl.* 994; leaves broadly elliptic acuminate-coriaceous. *DC. Prodr.* iv. 468.

MALACCA, *Griffith* (Kew Distrib. 3087), *Maingay* (933).—DISTRIB. Malay Archipelago.

A climber; branches cylindric, smooth. *Leaves* 4-5 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., opaque or shining above, base acute or rounded, not narrowed into the petiole; nerves faint, spreading and arched; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in.; stipules triangular. *Cymes* 2-5 in., umbellately branched, puberulous; pedicels umbellate, $\frac{1}{2}$ in.; bracteoles minute. *Corolla* white, tube $\frac{1}{4}$ in., hairy within; segments narrow, yellow, pubescent on the inner face.—I have seen only flowers and fruit of an authentic specimen of *C. scandens*, and have no reason to doubt its identity with this, it being a widely diffused Malayan plant likely to occur at Malacca. The structure of the ovary is difficult to observe in dried specimens. I find 4 1-ovuled cells in one specimen, 2 1-ovuled cells in most, 2 2-ovuled cells in an authentic specimen, and *Maingay* says ovary by abortion 2-3-celled. In the Australian *C. paniculatum* and *reticulatum* I find the ovary 4-celled above, 2-celled below, with 2 ovules in each cell.

74. **GYNOCHTHODES**, *Blume*.

Twining glabrous shrubs; branches terete. *Leaves* opposite, coriaceous; stipules broad, acute. *Flowers* small, unisexual, in axillary cymose fascicles or peduncled heads; pedicels short; bracts deciduous. *Calyx-tube* small, turbinate; limb annular truncate or 5-toothed, persistent. *Corolla* coriaceous, tube short, throat woolly; lobes 4-5, oblong-lanceolate, valvate in bud with inflexed tips. *Stamens* 4-5, in the corolla-tube, filaments stout; anthers linear-oblong, exserted. *Ovary* 4-celled; style of ♂ entire, of ♀ stout, branches oblong; ovules 1 in each cell, attached to the inner angle by a broad base. *Drupe* globose, with 2-4 pyrenes. *Seeds* compressed, ascending, testa membranous; embryo basal, small, radicle inferior.—DISTRIB. Species 3 or 4, all Malayan.

1. ***G. sublanceolata***, *Miq. Fl. Ind. Bat. Suppl.* 548; branches slender twining, leaves elliptic-lanceolate acuminate, nerves very indistinct, fruit the size of a pea. *G. coriacea* var., *Miq. in Ann. Mus. Lugd. Bat.* iv. 244. *Pæderia tetrandra*, *Wall. Cat.* 6249. ? *Psychotria*, *Wall. Cat.* 8385. ? *Rubiaceæ*, *Wall. Cat.* 8297.

MALACCA, SINGAPORE, and PENANG, *Wallich*, *Maingay*. (*G. coriacea*, Kew Distrib.)—DISTRIB. Bangka.

Branches with long almost filiform tips, their nodes sometimes leafless but with triangular stipules. *Leaves* black when dry, 3-4 by $\frac{1}{2}$ -1 in., not shining, base narrowed into the petiole; nerves without axillary glands; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* fascicled or in much reduced cymes. *Corolla-tube* very short, woolly within. *Style* glabrous. *Fruit* with 3-4 pyrenes.—*Wallich's* 8385 is possibly a young state of this, the branches root like ivy, and the distichous leaves are sessile, linear-oblong, acute, with cordate bases; it has neither flower nor fruit. *Miquel* has (in the *Annales*) reduced this to a variety of *G. coriacea*, which appears to me to be an entirely different plant.

2. ***G. macrophylla***, *Kurz in Journ. As. Soc.* 1872, ii. 314; *For. Fl.* ii. 33; leaves elliptic-oblong subacute or obtuse, fruit the size of a cherry.

SOUTH ANDAMAN ISLAND and MALACCA, *Kurz*, *Maingay* (Kew Distrib. 934).

Branches stout. *Leaves* brown when dry, 4-6 by 2 in., tip rounded, base subacute, very coriaceous, opaque, with nerves slender in *Kurz's* specimen, shining above, with very distinct nerves in *Maingay's*. *Flowers* very numerous, larger than is *G. sublanceolata*; calyx-tube more distinct; corolla-lobes longer. *Fruit* sea-green.—I have seen no Andaman specimen, and only one of *Kurz's*, sent by Dr. King, and marked as from Nankoury, Malacca; it has leaves of the colour and texture of *G. sublanceolata*, and wants the hollow fringed glands in the nerve axils described by *Kurz*; these are present in none of the axils of *Maingay's* specimen, the leaves of which are brown and shining above.

TRIBE XIII. **PSYCHOTRIÆ.**75. **PSYCHOTRIA**, Linn.

Shrubs or small trees, rarely herbs, erect, rarely climbing or twining. *Leaves* opposite, very rarely in whorls of 3 or 4; stipules intrapetiolar, often connate, solitary or in pairs, with often glandular axillary hairs. *Flowers* in terminal (rarely axillary) cymes, heads or fascicles, not involucrate (in Indian species), bracteate or not. *Calyx-tube* short, limb often deciduous. *Corolla-tube* straight, short (in Indian species), throat naked or hairy; lobes 5, rarely 4 or 6, valvate in bud. *Stamens* as many, on the corolla-throat or mouth, filaments short or long; anthers included or not. *Ovary* 2-celled; style short or long, branches 2; ovules 1 basal erect in each cell, usually cuneiform. *Fruit* small, ovoid, globose or oblong, rarely didymous with two 1-seeded plano-convex pyrenes, rarely separating into 2 cocci. *Seeds* plano-convex, ventrally flat or grooved, testa thin, albumen hard sometimes ruminant; embryo small, basal, cotyledons broad thin, radicle inferior.—**DISTRIB.** Species about 500, all tropical or subtropical.

SECT. I. *Seeds* semi-terete or plano-convex, dorsally smooth and convex, ventrally flat without any groove; albumen strongly ruminant.—*Corolla-tube* very short in all but *P. platyneura* and *malayana*. (**GRUMILEA**, Gaertn.)

* *All or lower branches of the cymes whorled, very rarely (in P. congesta) opposite, in P. Thwaitesii, sometimes capitate (see also 15. P. malayana).*

1. **P. stenophylla**. *Thw. Enum.* 147 (**Grumilea**); glabrous, leaves narrowly linear-lanceolate, stipules broad nearly orbicular obtuse coriaceous concave, cymes peduncled, branches whorled, flowers small capitate.

CEYLON; at no great elevation, *Thwaites*.

Branches compressed, leaf-axils and nodes of cyme glandular and with ferruginous hairs. *Leaves* green when dry, coriaceous, 2-6 by $\frac{1}{2}$ -1 in., midrib yellow very prominent and grooved on the upper surface, nerves slender; petiole short; stipules deciduous. *Cymes* with 5 branches in a whorl, each $\frac{1}{2}$ in. long; heads of minute flowers $\frac{1}{2}$ in. diam. *Calyx-limb* sinuate. *Corolla-tube* very short, throat bearded. *Fruit* size of a pea, globose, black, smooth.—I follow *Thwaites* in placing this amongst the *Grumilicæ*, having seen no fruit.

2. **P. glandulifera**, *Thw. mss.*; glabrous, leaves elliptic-oblong abruptly acuminate narrowed into the petiole, axillary nerve-glands large and deep, stipules broad very obtuse, cymes very short subsessile ebracteolate 3-chotomous, flowers small crowded.

CEYLON, *Thwaites*.

Branches terete. *Leaves* 5-7 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., pale green when dry, coriaceous, nerves 9-10 pair, spreading, arched; petiole $\frac{1}{2}$ -1 in.; stipules coriaceous, deciduous. *Cymes* (young) 1 in.; branches very stout. *Flowers* (in young bud only) small, sessile; calyx-limb hardly toothed.—The specimens are very imperfect, and I follow *Thwaites* in placing it amongst the *Grumilicæ*.

3. **P. Gardneri**, *Thw. Enum.* 147 (**Grumilea**); glabrous, leaves cuneate-obovate the broad end very suddenly contracted into a broad caudate obtuse tip, nerves 14-18 pair, stipules obtuse, cymes peduncled brachiate, branches whorled, flowers capitate.

CEYLON; central province, alt. 3-6000 ft., *Gardner, &c.*

Branches stout, compressed, smooth. *Leaves* 4-8 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., coriaceous, pale brownish green when dry, narrowed into the short stout petiole; nerves spreading,

axils sometimes minutely glandular; stipules ovate, obtuse, deciduous. *Cymes* broad; peduncles 1-2 in., and branches stout; bracteoles rounded; flowers 3-4-nate, subsessile. *Calyx* obscurely 5-toothed. *Corolla-tube* very short. *Fruit* small, spherical, smooth. *Seed* $\frac{1}{2}$ -terete; ventral surface flat; albumen ruminant.

4. **P. Thwaitesii**, *Hook. f.*; glabrous, leaves elliptic-lanceolate oblong or obovate acuminate or acute, nerves 12-16 pair, stipules triangular acute or cuspidate, cymes peduncled, branches stout whorled, flowers capitate or cymes sessile reduced and capitate mixed with rufous hairs, calyx-limb in the ellipsoid fruit minute. *P. Heyneana*, *Wall. Cat.* 8327; upper right hand specimens. *Grumilea nudiflora*, *Thw. Enum.* 147, not of *W. & A.* ? *G. nigra*, *Gaertn. Fruct.* 138, t. 28.

WESTERN PENINSULA; on the Ghats, from the Concan southward. CEYLON; alt. 3-6000 ft., common.

A glabrous bush; branches smooth, compressed. *Leaves* 3-6 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., greenish when dry, rather coriaceous; petiole $\frac{1}{2}$ - $1\frac{1}{2}$ in.; stipules very variable. *Cymes* variable, peduncle and short branches 4-angled in fruit; bracteoles caducous; flowers small. *Calyx-teeth* 5, small. *Corolla-tube* very short, glabrous externally and nearly so within. *Fruit* ellipsoid, smooth. *Seed* $\frac{1}{2}$ -terete; ventral surface flat; albumen ruminant.—There are two principal forms of this and a subordinate third.

VAR. 1. *zeylanica*; cymes peduncled, branches distinct.

VAR. 2. *peninsularis*; leaves usually smaller more obovate, cymes always sessile, branches moderate or short or 0, or the inflorescence a peduncled globose head.

VAR. 3. *coronata*; leaves small, fruit with the calyx-limb distinct 5-toothed (as in *P. congesta*, but smaller).—Ceylon at Ramboddi, alt. 4000 ft., *Gardner*.

5. **P. congesta**, *W. & A. Prodr.* 432; glabrous, leaves obovate or oblanceolate subacute, nerves 8-10 pair, stipules ovate, cymes sessile or peduncled, branches opposite, flowers crowded very shortly pedicelled not capitate without rufous hairs, calyx-limb crowning the ellipsoid fruit. *Wight Ic.* t. 1037. *G. patens*, *Schlecht in Pl. Hohen. n.* 1373. ? *P. elongata*, *Bedd. Fl. Sylv. Anal. Gen.* t. xvii.

NILGHERRY and PULNEY MTS.; alt. 7-8000 ft., *Wight, &c.*

An evergreen leafy bush. *Leaves* $2\frac{1}{2}$ -5 by 1-2 in., rather coriaceous, greenish when dry; nerves strong; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in.; stipules deciduous. *Cymes* with short thick branches and branchlets, quite glabrous, ebracteolate. *Calyx* 4-5-toothed. *Corolla-tube* very short, glabrous or pubescent within. *Fruit* ellipsoid, smooth; calyx-limb tubular, toothed, sometimes very low or even reduced to teeth sessile on the top of the fruit. *Seed* semiterete, ventral face flat, albumen grooved.

VAR. *astephana*; cymes less crowded, fruit with a scarcely raised calyx-limb.

6. **P. macrocarpa**, *Hook. f.*; glabrous, leaves elliptic or oblanceolate obtuse or obtusely acuminate, stipules very broad, cymes peduncled, branches very short and thick lower whorled, flowers crowded very shortly pedicelled, fruit ellipsoid $\frac{3}{4}$ in. crowned by the very short calyx-teeth. *Rubiaceæ, Wall. Cat.* 8460.

TRAVANCORE; at Courtallam, *Wight*.

Branches pale, smooth, branchlets compressed. *Leaves* 5-8 by 2- $2\frac{1}{2}$ in., thinly coriaceous, narrowed into a rather slender petiole $\frac{1}{2}$ -1 in.; stipules coriaceous, deciduous. *Cymes* short, not 1 in. high and hardly so broad; peduncles 1 in. or less; bracts caducous; flowers larger than in the preceding species. *Calyx-teeth* 4-5, triangular. *Corolla-tube* very short, woolly within. *Fruit* ellipsoid, smooth. *Seeds* $\frac{1}{2}$ -terete, ventral face flat; albumen ruminant.

7. **P. subintegra**, *W. & A. Prodr.* 432 (*Grumilea*); glabrous, leaves elliptic-lanceolate obtuse or obtusely acuminate, petiole slender, stipules very broad, cymes axillary and terminal peduncled brachiate broadly corymbose,

lower pair of branches long spreading rachis above them arrested, flowers in many small heads terminating the branchlets, fruit globose areole small. *Psychotria*? *Wall. Cat.* 8345.

WESTERN PENINSULA; Shevagherry and Dindygul hills, *Wight*.

Branches stout, smooth. *Leaves* 6-8 by 2-3 in., green and rather flaccid when dry, base narrowed into a petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; nerves distant, about 10 pair; stipules caducous, variable, sometimes toothed. *Cymes* large, 3-4 in. diam.; peduncles stout, 3 in. and less, lower pair of branches ascending or recurved branched at the end, and bearing small heads $\frac{1}{8}$ - $\frac{1}{4}$ in. diam. of glabrous flowers; bracts caducous. *Calyx-limb* membranous, teeth very short, obtuse or acute. *Corolla-tube* broadly shortly funnel-shaped, mouth villous. *Fruit* $\frac{1}{2}$ in. diam., smooth. *Seed* $\frac{1}{2}$ -terete, ventral face flat, albumen ruminated.—*Wight's* originally distributed specimens have a terminal cyme, with an elongated rachis; all the numerous others have the rachis exceeded in height by the ends of the lower branches of the cyme.

8. *P. truncata*, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall. ii.* 162; glabrous, leaves large cuneate-obovate or orbicular rarely elliptic-obovate abruptly apiculate coriaceous base cuneate, nerves 14-16 pair close and strong, stipules very large, cymes peduncled or sessile brachiate, lower branches whorled, berry ellipsoid. *P. Heyneana*, *Wall. Cat.* 8327, *in part*.

WESTERN PENINSULA; on the Ghats from Concan southwards, *Heyne, &c.*

Branches stout, smooth. *Leaves* 6-8 by 3-4 in., pale green when dry, narrowed into a stout petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in., upper surface usually raised between the spreading nerves; stipules sometimes 1 $\frac{1}{2}$ in., broadly ovate or oblong, free or connate below, coriaceous. *Cymes* terminal, often short and dense in flower, in fruit 5-6 in. diam., stout, 3 in. and under; branches long or short; bracts deciduous; flowers small, subsessile. *Calyx-limb* truncate. *Corolla-tube* very short, glabrous, mouth with a fringe of hairs. *Berry* $\frac{1}{2}$ in., smooth. *Seed* $\frac{1}{2}$ -terete, ventral face flat; albumen ruminated.—The ticket of *Heyne* marked March 20, 1837, identifies the *H. Heyneana* of *Wallich's* catalogue with the *H. truncata* of his and *Carey's* edition of the "Flora Indica."

9. *P. Dalzellii*, *Hook. f.*; glabrous, very robust, leaves obovate or oblong- or obcuneate-obovate coriaceous tip obtuse or rounded, base cuneate, nerves 12-20 pair strong, stipules very large, cymes terminal peduncled brachiate, branches whorled very stout with terminal capitate flowers, and large persistent bracts. *P. bracteata*, *W. & A. Prodr.* 434, *not of DC.*

WESTERN PENINSULA; from Canara southwards.

Branches sometimes as thick as the little finger, smooth, cylindric. *Leaves* 5-10 by 2-4 in., pale or black when dry, nerves strong on both surfaces; petiole very short, stout; stipules broadly oblong or orbicular, coriaceous, sometimes $\frac{3}{4}$ in. diam., axils glabrous. *Cyme-peduncle* 3 in. or less, lower branches 4-5 in a whorl, 1-2 in.; bracts $\frac{1}{4}$ - $\frac{1}{2}$ in., broadly ovate or orbicular, very coriaceous; bracteoles concave as long as and forming an involucre round the heads of flowers. *Calyx-teeth* 5, short, rounded, ciliate. *Corolla-tube* $\frac{1}{2}$ in., glabrous, throat villous. *Fruit* young, glabrous, crowned with the enlarged calyx-limb.—*Dalzell* has called this a *Grumilea*. I have seen no ripe fruit.

** *Cyme-branches opposite, whorled in 15. P. malayana.*

10. *P. elongata*, *Wight Ic. t.* 1036 (*Grumilea*); glabrous, leaves elliptic or obovate obtuse subacute or cuspidate, base cuneate, nerves 10-14 pair, axils sometimes perforated, uppermost stipules connate obtuse, cymes terminal, fruiting elongate racemiform, branches very short opposite and peduncles very stout, flowers crowded, fruit globose, calyx-limb minute. *Psychotria*, *Wall. Cat.* 8350.

NILGHERY and SHEVAGHERY HILLS, *Noton, &c.* CEYLON; Central Province, alt. 7000 ft., *Thwaites*.

Shrubby. *Leaves* 3-5 by 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in., pale when dry; nerves slender, spreading;

petiole very short; stipules forming a sheathing 2-fid tube to the peduncle, obtuse or subacute, axils glabrous. *Cymes* 2-3 in. long in fruit; peduncle 2 in. and under, stout; branches not $\frac{1}{2}$ in., bracts caducous; flowers sessile or very shortly pedicelled. *Calyx* minutely 5-toothed. *Corolla-tube* very short, throat villous. *Fruit* size of a small pea; calyx-limb obsolete. *Seeds* $\frac{1}{2}$ -terete, ventral face flat; albumen ruminate.—Leaves of the Ceylon specimen broader and with more nerves than the peninsular. Beddome's figure of *P. elongata* (Fl. Sylv. Anal. Gen. xvii. f. 6) has glabrous throat to the corolla, and is a different plant. From the appearance of the inflorescence and persistent large calyx-limb it is probably *P. congesta*.

11. ***P. adenophylla***, Wall. in Roxb. Fl. Ind., ed. Carey & Wall. ii. 166; Cat. 8349; glabrous, leaves elliptic-lanceolate or oblong acute acuminate or cuspidate, nerves 14-20 pair, axils minutely perforated, upper stipules connate sheathing truncate, axils hairy, cymes terminal rarely axillary fruiting elongate racemiform, branches short opposite and slender, flowers pedicelled, fruit pyriform, calyx-limb minute. DC. Prodr. iv. 520. *P. connata*, Kurz For. Fl. ii. 10, not of Wallich.

KHASIA MTS. and CACHAR, alt. 0-4000 ft. PEGU, McClelland; CHITTAGONG, J. D. H. & T. T.; TENASSERIM and ANDAMAN ISLANDS, Helfer, Kurz, &c.

A shrub. *Leaves* very variable, 4-7 by 1-2 $\frac{1}{2}$ in., tip rounded and cuspidate or more or less gradually acuminate, base the same; nerves variable in number; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules $\frac{1}{4}$ - $\frac{1}{2}$ in., truncate, obtuse or subacute. *Cymes* with the peduncle 3-5 in., or 7 when fruiting; branches opposite and subopposite; bracts caducous; flowers very small. *Calyx-limb* truncate, quite entire. *Corolla-tube* $\frac{1}{16}$ in., throat villous. *Fruit* $\frac{1}{4}$ in. long. *Seeds* $\frac{1}{2}$ -terete, ventral face flat; albumen ruminate.—Very different from *P. congesta* in the shape of the leaves, slender cymes, flowers, calyx-limb, and fruit. The hollow glands at the nerve-axils from which Wallich derived the specific name are minute and not always visible.

12. ***P. tylophora***, Kurz in Lond. Journ. Bot. 1875, 328; glabrous, leaves elliptic-obovate or -lanceolate abruptly acuminate narrowed into the petiole, nerves 12-16 pair axils perforate, stipules ovate-oblong acute, cymes peduncled terminal erect, rachis slender elongate, opposite and alternate short branches slender, fruit ellipsoid pedicelled, calyx-limb minute.

NICOBAR ISLANDS; woods of Katchall, Kurz.

A shrub. *Leaves* 4-7 by 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in., rather membranous, pale when dry; nerves slender, arched; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in.; stipules glabrous, axils hairy. *Cymes* racemose in fruit, 3-4 in. long, short, branches dichotomously divided. *Fruit* nearly $\frac{1}{2}$ in. long.—I have seen but one imperfect specimen.

13. ***P. pendula***, Hook. f.; glabrous, leaves elliptic-obovate or -lanceolate abruptly obtusely acuminate, narrowed into the petiole, nerves 12-16 pair, axils imperforate, cymes peduncled terminal, fruiting pendulous very long, rachis and very short distant opposite branches stout, fruit depressed-globose sessile crowned with the enlarged calyx-limb.

ANDAMAN ISLANDS; Passage Bay, Helfer.

Branches smooth, stout, pale green. *Leaves* 4-6 by 1 $\frac{3}{4}$ -2 $\frac{1}{2}$ in., pale green when dry, nerves slender; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules not seen. *Fruiting cymes* racemose, 5-7 in. long. *Fruit* $\frac{1}{2}$ in. broad, somewhat contracted at the base, obscurely didymous; calyx-limb cupular, 5-toothed, with a central obtuse projecting enlarged disk. *Seeds* hemispheric, ventral face flat; albumen not deeply ruminate.—This differs from *P. tylophora* in the imperforate nerve-axils and long pendulous fruiting cymes with very stout branches, and sessile fruit of a totally different shape, and large calyx-limb.

14. ***P. platyneura***, Kurz in Trimen Journ. Bot. 1875, 327; For. Fl. ii. 10; glabrous, leaves elliptic-obovate or -lanceolate abruptly acuminate narrowed into the stout petiole, nerves about 20 pair, stipules broad ovate upper

obtuse cymes terminal, peduncle and subopposite corymbose branches stout, flowers pedicelled, fruit large subglobose, calyx-limb very small.

ANDAMAN ISLANDS, *Kurz*.

A shrub. *Leaves* 6-7 by $1\frac{3}{4}$ - $2\frac{1}{2}$ in., thinly coriaceous, dull green when dry, nerves slender; petiole $\frac{1}{2}$ -1 in. *Cymes* 1-2 in.; branches subopposite, short, dichotomously divided; pedicels stout. *Calyx-teeth* 5, minute. *Corolla* small. *Fruit* $\frac{1}{2}$ in. long, slightly obovoid, base suddenly contracted. *Seeds* $\frac{1}{2}$ -terete, ventral face flat; albumen ruminate.—The seeds are not very satisfactory.

15. **P. malayana**, *Jack in Mal. Misc.* i. 3; glabrous, branches robust: leaves elliptic-lanceolate acute or acuminate, nerves 12-16 pair, axils imperforate, stipules large acute or upper apiculate, cymes terminal peduncled many-flowered, branches stout lower or all whorled and with whorled branchlets, flowers pedicelled and sessile in the forks, corolla-tube elongate. *DC. Prodr.* iv. 520. *P. aurantiaca*, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 165; *Cat.* 8335; *DC. l. c.* 519. *P. expansa*, *Blume Bijl.* 963; *DC. l. c.* 521. *Grumilea aurantiaca* (excl. *descript. of fruit*) and *Chasalia expansa*, *Miq. Fl. Ind. Bat.* ii. 296 and 281.

PENANG, *Jack*.—DISTRIB. Java.

Branches soft, smooth, upper compressed. *Leaves* 4-8 by $1\frac{1}{2}$ -3 in., greenish when dry, nerves slender; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules coriaceous. *Cymes* stout, puberulous or glabrous, very many-flowered; peduncle 3 in. and less, and branches angled or compressed; bracteoles caducous. *Calyx-limb* truncate, obscurely 5-toothed. *Corolla-tube* $\frac{1}{4}$ in., lobes lanceolate, and throat villous. *Fruit* "obovoid, as large as a cherry stone, orange-coloured," *Wallich*.—*Jack's* description is too imperfect for identification, but as *Wallich* has his *aurantiaca* from *Jack*, there is little room for doubt as to this being his species. I have seen no fruit, but that of a very similar Bornean species differing only in the opposite cyme branches is that of a *Grumilea*. Some of *Miquel's* synonyms are too unsatisfactory to be quoted: his *G. aurantiaca* is described as having 10-ribbed fruit; of the loose fruits transmitted with his *Chasalia expansa* to *Herb. Kew*, one is 10-ribbed, and does not, I suspect, belong to the plant.

16. **P. polycarpa**, *Miq. Fl. Ind. Bat.* ii. 295 (*Grumilea*); scandent, glabrous, leaves obovate or elliptic-obovate acute or abruptly acuminate, nerves 5-7, axils imperforate, cymes terminal brachiate, branches elongate, branchlets divaricate, flowers pedicelled, fruit very small ellipsoid umbonate. *P. obovata*, *Wall. Cat.* 8380 A.

MALACCA, *Griffith* (*Kew Distrib.* 3042), *Maingay* (924); SINGAPORE, *Wallich*.—DISTRIB. Sumatra.

Branches soft, cylindric, smooth. *Leaves* $2\frac{1}{2}$ -3 in., variable in width, dull greenish when dry, coriaceous, nerves indistinct, veins 0; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules ovate, obtuse, caducous. *Cyme* much corymbosely branched, sometimes 6 in. diam.; peduncle 3 in. and less, and the branches angled; flowers very small, on divaricating pedicels. *Calyx-limb* truncate. *Corolla* $\frac{1}{12}$ in., throat villous. *Fruit* $\frac{1}{8}$ in. long; calyx-limb depressed, surrounding the prominent exerted obtuse stout disk, as in *P. pendula*.—This species, notwithstanding its ruminated albumen and $\frac{1}{2}$ -terete seed, must stand next to *P. sarmentosa*.

SECT. II. *Seeds* dorsally convex with 4 furrows.

* *Stem scandent*.

17. **P. sarmentosa**, *Blume Bijl.* 964; climbing, glabrous, leaves elliptic or elliptic-obovate acute or acuminate, nerves 6-8 pair, petiole slender, cymes terminal subsessile compressed corymbiform or brachiate, branches opposite, flowers pedicelled, fruit small obovoid 8-grooved, calyx-limb very small. *DC. Prodr.* iv. 522; *Wight Ic. t.* 1038; *Thw. Enum.* 148; *Kurz For. Fl.* ii. 14. *P. scandens*,

Moon. Cat. 14. *P. obovata*, *Wall. Cat.* 8380. *Grumilea Junghuhniana*, *Miq. Fl. Ind. Bat.* ii. 296. *Psychotria* Nov. Sp., *Miq. in Pl. Hohen.* n. 809. *Psychotria* Sp., *Wall. Cat.* 8382, ? 8381, ? 8384.

WESTERN PENINSULA, from Canara southwards. CEYLON, ascending to 4000 ft. EASTERN PENINSULA, from Tenasserim southwards to Singapore and Penang.—DISTRIB. Malay Archipelago.

A twining shrub, 10 ft. and upwards; branches slender, smooth pale. *Leaves* $2\frac{1}{2}$ – $3\frac{1}{2}$ by $\frac{3}{4}$ – $1\frac{1}{2}$ in., greenish or yellowish when dry, thin or coriaceous, base far produced on the petiole, nerves faint, veins inconspicuous; stipules ovate, caducous. *Cymes* broad, 2–3 in. diam., rachis and branches angled; bracteoles caducous. *Flowers* very small, greenish. *Calyx-teeth* minute. *Corolla-tube* $\frac{1}{2}$ in., villous within. *Fruit* $\frac{1}{2}$ in., white, fleshy. *Seed* dorsally 4-grooved, ventrally concave; albumen equable.—Some of Wallich's 8381 and 8384 are no doubt young states (flowerless) of this, or possibly of *P. polycarpa*.

18. ***P. Maingayi***, *Hook. f.*; climbing, shoots petioles and cymes hairy, leaves elliptic-lanceolate acuminate at both ends, nerves 8–10 pair, stipules persistent connate membranous toothed, cymes axillary small peduncled, fruit broadly ellipsoid 8-grooved, calyx-limb large, lobes broad recurved.

SINGAPORE, *Maingay*.

Branches slender, smooth. *Leaves* 2–3 by $\frac{1}{2}$ – $1\frac{1}{4}$ in., rather thin, narrowed into the very short slender petiole; nerves faint; stipules pubescent. *Cymes* almost tomentose; peduncle slender, compressed; branches few, opposite; bracts linear, persistent. *Fruit* subsessile, $\frac{1}{2}$ in. long; calyx-limb cupular, pubescent. *Seed* as in *P. sarmentosa*.

19. ***P. ovoidea***, *Wall. Cat.* 8383; climbing and rooting, branches leaves beneath and cymes villous, leaves petioled elliptic or ovate cuspidate, nerves 5–6 pair, cymes terminal small sessile or peduncled umbellately branched, flowers subcapitate, fruit small pedicelled ellipsoid 8-grooved, calyx-limb with erect acute teeth.

SINGAPORE, *Wallich*; MALACCA, *Maingay* (*Kew Distrib.* 923).—DISTRIB. Malay Archipelago?

Branches slender; pubescence spreading, dark, rufous when dry. *Leaves* $1\frac{1}{2}$ – $2\frac{1}{2}$ in., brown especially beneath when dry, coriaceous, margin often recurved, base acute obtuse or subcordate, nerves strong beneath; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules connate, caducous. *Cymes* with spreading stout compressed branches; peduncle 1 in. or less; bracteoles elongate, linear, very persistent, tomentose; flowers very small. *Corolla-tube* pubescent, villous within. *Fruit* $\frac{1}{2}$ in., pubescent; calyx-limb cupular. *Seed* as in the section.

20. ***P. morindæflora***, *Wall. Cat.* 8438, A. B. C. in part; climbing, rooting, quite glabrous, leaves petioled elliptic obtusely acuminate shining, nerves 5–7 pair, cymes terminal subsessile and pedicelled small, flowers capitate at the end of the short branches, fruit small ellipsoid 8-grooved, calyx-limb small. ? *Psychotria*, *Wall. Cat.* 8355.

PENANG and SINGAPORE, *Wallich*, *Porter*.

Branches smooth, slender, dark brown when dry. *Leaves* 3–5 by $1\frac{1}{2}$ –2 in., coriaceous, usually red-brown when dry, base acute, nerves slender; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules connate, caducous. *Cymes* with few short or long spreading compressed naked branches bearing globose heads $\frac{1}{4}$ in. diam. of small flowers; bracts and bracteoles linear, caducous. *Calyx-limb* truncate, obscurely toothed. *Corolla-tube* glabrous, mouth villous. *Fruit* $\frac{1}{2}$ in. long, sessile or peduncled. *Seed* as in the section.—Amongst Wallich's specimens are some with sessile and others with pedicelled fruit; it is possible that these may belong to different species. His No. 8355 from Singapore has narrow oblong-lanceolate leaves, very long (4–5 in.) peduncles, bearing a puberulous umbel of 6–10 rays, each ray bearing a head of sessile flowers $\frac{1}{4}$ in. diam.

** *Erect shrubs.*

21. **P. Wightiana**, *Thw. Enum.* 148 (Grumilea); branches leaves beneath and cymes villous with rufous hairs, leaves elliptic-lanceolate finely acuminate, nerves 8-10 pair, cymes terminal cruciately brachiate, branches few naked with terminal globose heads of sessile flowers or cymes reduced to a solitary long peduncled or sessile globose head. *Lasianthus?* *dubius*, *Wight in Calc. Journ. Nat. Hist.* vi. 516.

CEYLON; Ambagamowa and Saffragan districts, on banks of streams, *Walker, &c.*

A small shrub, branches stout. *Leaves* 5-7 by 2-3½ in., rather coriaceous, brownish green when dry, smooth and opaque above, nerves strong beneath; petiole ½-¾ in.; stipules oblong, connate, villous. *Cymes* densely villous, sessile or peduncled; branches and peduncle stout, the latter sometimes deflexed; bracteoles minute, obtuse; heads of sessile flowers dense, villous, ¼-½ in. diam. *Calyx* very short, cupular, limb truncate, teeth triangular. *Corolla-tube* very short, pubescent; throat hairy. *Fruit* "subspherical, hairy, ¼-½ in. diam., subcarinate," *Thwaites*.

VAR.? *affinis*; leaves sparsely hairy narrowly elliptic-lanceolate 4 by ½-¾ in. *Grumilea affinis*, *Thw. Enum.* 148.

22. **P. madraspatana**, *Hook. f.*; petioles leaves beneath and inflorescence rusty-tomentose, leaves large long-petioled elliptic or elliptic-obovate obtuse or subacute, nerves 20-30 pair, cymes reduced to a globose sessile head, fruit ellipsoid and grooved, calyx-limb very short. *Psychotria*, *Wall. Cat.* 8366.

"*HERB. MADRAS*," *Wallich*.

Branches very stout, woody, covered with brown shining bark, tips pubescent with spreading hairs. *Leaves* 6-12 by 2½-4 in., thinly coriaceous beneath, finely pubescent between the rufous-tomentose numerous slender nerves; base narrowed into a 1½ in. petiole; stipules connate, villous, membranous. *Head* 1 in. diam., terminating the stout branch, and in one specimen covering the bases of the pair of petioles, densely rufous-pubescent; bracts and bracteoles numerous, as long as the flowers, linear or oblong, membranous, villous, persistent, outer broader. *Calyx-tube* shorter than the 5 unequal lanceolate villous lobes. *Corolla* not seen. *Fruit* ½ in. long, villous, crowned by the lanceolate calyx-lobes. *Seed* with very deep dorsal and 2 narrow ventral grooves.—In habit and appearance this resembles *P. Wightiana* and *Helferiana*, but differs entirely from both; I have seen no specimen but that in Wallich's Herbarium.

23. **P. stipulacea**, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 164; *Cat.* 8329; very robust, glabrous, leaves very long oblanceolate or obovate-oblong acuminate narrowed into the very stout winged petiole, nerves about 20 pair, cymes trichotomous, peduncle and branches very stout, flowers pedicelled, fruit ellipsoid deeply 4-grooved. *DC. Prodr.* iv. 519.

PENANG, *Jack, Phillips, Wallich*.

Branches as thick as the middle finger, soft, compressed, and foliage reddish brown when dry. *Leaves* 8-14 by 3-5 in., not coriaceous, nerves slender; petiole 1-1½ in.; stipules ½-¾ in. long, broadly ovate, acute, often 2-fid. *Cymes* 2-3 in. diam., broader than long; peduncle and branches very stout; bracts and bracteoles triangular, upper persistent; flowers very small. *Calyx-teeth* short, triangular. *Corolla-tube* ⅙ in., glabrous, villous within. *Fruit* ¼ in. long, grooves deep; calyx-limb small. *Seed* ventrally concave.

24. **P. Jackii**, *Hook. f.*; glabrous, leaves petioled elliptic or obovate-lanceolate obtusely acuminate, nerves 10-12 pair, cymes shortly peduncled brachiate, branches slender, fruit pedicelled 8-grooved. *Psychotria*, *Wall. Cat.* 8343.

PENANG, *Jack, Wallich*; MALACCA, *Griffith* (Kew Distrib. 3021).

Branches slender, polished, nodes with broad stipular scars. *Leaves* 5-7 by 1½-2½

in., rather thin, red-brown when dry and shining above, midrib and nerves slender; base narrowed into the slender petiole; stipules oblong-ovate, deciduous. *Cymes* 3-4 in broad; branches angled, sometimes obscurely puberulous, divaricate, much 3-chotomously divided; flowers pedicelled, minute. *Calyx* truncate, teeth obscure. *Corolla-tube* very short, glabrous, villous within. *Fruit* $\frac{3}{8}$ - $\frac{1}{2}$ in. long, arcuate, calyx-teeth very obscure. *Seeds* of the section, ventral face plane.—A near ally of the Chinese *P. elliptica*, Ker in Bot. Reg. t. 607 (*P. Reevesii*, Wall. Cat. 8330, and in *Roze's Fl. Ind.* ii. 164), but more slender, leaves less coriaceous, with slender midrib and nerves, and smaller flowers.

25. *P. divergens*, Kurz *For. Fl.* ii. 13; and in *Journ. As. Soc.* 1877, ii. 143, not of Blume; glabrous, leaves lanceolate to linear-lanceolate acuminate tapering into a long petiole, cymes long-peduncled trichotomous, flowers shortly pedicelled, calyx-teeth obsolete, fruit ovoid 5-ribbed and furrowed crowned by the calyx-limb.

PEGU, MALABAR, and TENASSERIM, in tropical forests, Kurz.

An evergreen shrub, 1½-2 ft. *Leaves* 5-8 in., firmly membranous or thinly coriaceous, usually brownish when dry; petiole $\frac{1}{2}$ -1 in.; stipules variable, often very large and elongate, entire or 2-cleft. *Flowers* greenish. *Corolla* $\frac{1}{2}$ - $\frac{1}{2}$ in., lobes as long, throat villous. *Fruit* $\frac{3}{8}$ - $\frac{1}{4}$ in. long, smooth. *Albumen* equable, sparsely ruminant, or rather 5-ribbed.—I have seen no authentic specimen, and take the description from Kurz, who says that it differs from *P. andamanica* only in the glabrous cymes. It cannot be Blume's *P. divergens*, which has a prominently toothed calyx and very large flowers; it is probably a glabrous form of *P. sulcata*.

26. *P. andamanica*, Kurz in *Lond. Journ. Bot.* 1875, 328; *For. Fl.* ii. 13; glabrous except the cymes, leaves long-petioled elliptic-obovate or -lanceolate caudate-acuminate, nerves 8-10 pair remote, cymes subsessile much trichotomously branched, fruit ellipsoid 8-grooved.

ANDAMAN and NICOBAR ISLANDS Kurz.

A small evergreen shrub; branches stout, pale, the wood shrinking in drying. *Leaves* 6-9 by 2½-3½ in., membranous, greenish-brown when dry, often subfalcate; nerves slender, arched; base narrowed into the 1-2 in. long petiole; stipules large, oblong, 2-cleft, deciduous. *Cymes* glabrous or rusty-puberulous, 3 in. diam., branches divaricate; flowers shortly pedicelled, greenish-white. *Calyx* almost truncate; teeth short, broad. *Corolla* glabrous, tube $\frac{1}{2}$ in., much exerted, throat villous. *Fruit* $\frac{1}{4}$ in. long, smooth, calyx-limb persistent.—I have seen no fruit, nor any Andaman specimens; it is probably a broad-leaved form of the following.

27. *P. sulcata*, Wall. Cat. 8370; leaves long-petioled elliptic-lanceolate or oblanceolate acuminate membranous puberulous or glabrate beneath, nerves 10-15 pair, stipules very large lax, cymes axillary or terminal sessile or peduncled repeatedly trichotomously divided, fruit pedicelled broadly ellipsoid 8-grooved, calyx very small.

TENASSERIM, MALABAR, and BIRMA, Wallich, Helfer, &c.

Branches rather slender, smooth. *Leaves* 3-9 by 2-2½ in., greenish or brown when dry, nerves slender, base narrowed into a petiole $\frac{1}{2}$ -1½ in. long; stipules $\frac{1}{2}$ - $\frac{2}{3}$ in., straight or falcate, obtuse acute or acuminate, rather persistent for the genus. *Cymes* small, 1-2½ in. diam.; branches divaricate; bracts triangular; flowers very small, glabrous. *Calyx-limb* truncate. *Corolla-tube* glabrous, very short. *Fruit* $\frac{1}{2}$ in. long, grooves not deep. *Seed* flat on the ventral face.

28. *P. erratica*, Hook. f.; glabrous, leaves lanceolate or elliptic acuminate, petiole slender, nerves 9-12 pair, stipules usually cleft, cymes axillary and terminal sessile glabrous or puberulous rather shortly trichotomously branched, fruit pedicelled 8-grooved, calyx-limb small.

NIPAL and SIKKIM HIMALAYA, alt. 4-6000 ft., J. D. H., &c.; BHOTAN, alt. 5000 ft., C. B. Clarke; KHASIA MTS., alt. 4-6000 ft., Griffith, &c.

Shrubby. *Leaves* 5-7 by 1-2½ in., green when dry, rather thin, base narrowed into a petiole $\frac{1}{4}$ - $\frac{3}{4}$ in., nerves slender; stipules with often 2 recurved acute lobes. *Cymes* 1 in. diam., often inclined; branches flattened, soon dividing; bracts elongate, slender. *Calyx* minute; teeth broad or narrow, subacute, sometimes glandular. *Corolla-tube* very short, hairy within. *Fruit* $\frac{1}{6}$ - $\frac{1}{3}$ in., red and yellowish, grooves shallow. *Seed* undulated on the ventral face.—This is one of the very few species that wanders westward as far as the valley of Nipal.

VAR. latifolia; leaves broadly elliptic.—Khasia Mts., *De Silva*.—Psychotria sp., *Wall. Cat.* 8340.

VAR. pedunculata; cymes axillary, peduncle 1-2 in.—Nipal, *Wallich*.—Psychotria, *Wall. Cat.* 8369.

29. **P. fulva**, *Ham. in Wall. Cat.* 8336, *excl. B.*; glabrous or pubescent, branches stout, leaves petioled elliptic oblong obovate or lanceolate, stipules large cleft, cymes axillary and terminal peduncled or sessile, branches trichotomous or whorled, flowers usually in dense globose heads, bracts broad often whorled persistent, fruit large ellipsoid 8-grooved, calyx-limb persistent. *P. monticola*, *Kurz in Journ. As. Soc.* 1872, ii. 315; *For. Fl.* ii. 11. Psychotria, *Wall. Cat.* 8337; *Griff. Notul.* iv. 268; *Ic. Pl. Asiat.* t. 479, f. 2.

ASSAM and the KHASIA Mts., ascending to 4000 ft.; CACHAR, MUNNIPORE, and PEGU.

A large shrub. *Leaves* a foot long and under, very variable in breadth, usually narrowed into the petiole, rarely rounded at the base, variously coloured when dry, often purplish-brown or reddish, thinly coriaceous; nerves slender, spreading, sometimes pubescent beneath; petiole $\frac{1}{2}$ -1 in.; stipules $\frac{1}{2}$ -1 in., axils villous, segments sometimes hooked and recurved. *Cymes* large or small, rarely 2 in. across; peduncle 4 in. or less, pubescent or villous; branches stout, short or long; bracts and bracteoles excessively variable, more or less persistent; flowers subsessile, glabrous or pubescent. *Calyx* minute; teeth 5, short or long. *Corolla-tube* short, glabrous, villous within. *Fruit* capitate, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, variable in shape, ellipsoid or ovoid, sometimes narrowed towards the top; grooves very shallow. *Seed* flat ventrally, with or without a 2-fid groove.—A very variable plant, covered with yellowish flowers in May, whence its name, which, never having been published, would be superseded by Kurz's of *P. monticola*, were not the plant to which he gave that name an aberrant form, which is moreover erroneously described as glabrous in the Forest Flora; under which circumstances, and considering that the name *monticola* has been since applied to a tropical African species, it is advisable to retain Hamilton's appropriate one of *fulva* for this species.

VAR. monticola; leaves more coriaceous, nerves distant pubescent beneath. *P. monticola*, *Kurz in Journ. As. Soc.* 1872, ii. 315; *For. Fl.* ii. 11.—Karen hills, *Kurz*.

30. **P. tortilis**, *Blume Bijl.* 958; subherbaceous, stem simple, leaves long-petioled broadly elliptic-ovate acute membranous puberulous beneath, base cuneate rarely cordate, nerves 15-20 pair, veins reticulate, cymes all axillary small subsessile rounded, fruit very small didymous compressed, grooves 8 very shallow. *DC. Prodr.* iv. 520. *P. microcarpa*, *Wall. Cat.* 8344. *Streblosa tortilis*, *Korth. in Ned. Kruidk. Arch.* ii. 246.

PENANG, *Wallich*; SINGAPORE, *Lobb*.—DISTRIB. Java, Sumatra.

Stem 1 foot from a woody base, sparsely pubescent. *Leaves* 4-7 by 2-4½ in., green when dry, very membranous, nerves spreading, slender; petiole very slender, 1-2 in.; stipules ovate, acute, or broader with a long cusp. *Cymes* often from all the axils, pubescent, contracted and dense-flowered but not capitate; pedicels rarely 1-2 in.; bracts very small; flowers minute. *Calyx-teeth* very minute, triangular. *Corolla-tube* very short, hairy within. *Fruit* $\frac{1}{14}$ - $\frac{1}{12}$ in. diam., broader than long, pale. *Seed* flat on the ventral face.—A very peculiar species, quite unlike any other in habit and fruit.

SECT. III. *Seeds* with one obtuse dorsal ridge and 2 dorsal broad shallow furrows.

* *Cymes capitate*.

31. **P. Moonii**, *Thw. Enum.* 148 (Grumilea); glabrous, leaves elliptic or elliptic-lanceolate acuminate, narrowed into the stout petiole, flowers in dense peduncled heads mixed with large villous-edged bracts, fruit narrowly ovoid.

CEYLON; Reigam Corle, at no great elevation, *Walker, Thwaites*.

Branches stout, ultimate compressed. *Leaves* 5-7 by $1\frac{1}{2}$ - $2\frac{1}{4}$ in., greenish or reddish when dry; nerves 12-14 pair, stout, much arched; stipules oblong, connate, ciliate. *Cymes* of 3-5 terminal stout branches 1 in. long, each bearing a subglobose head $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., the main peduncle suppressed, the lateral deflexed, the central simple or 3-chotomous; bracteoles large, rounded, coriaceous, persistent, hairs rufous; flowers sessile. *Calyx-limb* tubular, 5-toothed, ciliate. *Fruit* $\frac{1}{2}$ in., crowned with the cupular calyx-limb, nearly circular in section with 4 broad shallow furrows. *Seeds* plano-convex; albumen equable.

32. **P. sordida**, *Thw. Enum.* 149; glabrous, leaves petioled lanceolate or oblong-lanceolate caudate-acuminate, nerves very faint, stipules ovate, flowers 3-4-nate in small peduncled deflexed heads, fruit oblong, calyx-limb obsolete.

CEYLON; central province, alt. 4-8000 ft., *Walker, Thwaites*.

Branches slender, ultimate-compressed. *Leaves* 3-5 by $\frac{3}{4}$ - $1\frac{1}{4}$ in., pale or dark brown when dry, coriaceous; nerves 6-8 pair, sometimes hardly visible; petiole $\frac{1}{4}$ in.; stipules acute. *Cymes* of 3-5 short stout branches $\frac{1}{4}$ - $\frac{3}{4}$ in. long, the main peduncle short or 0; bracteoles minute, caducous; flowers minute, sessile. *Calyx* with a funnel-shaped 5-toothed limb. *Corolla-tube* short, broad, glabrous within and without. *Fruit* $\frac{1}{4}$ in.; pyrenes with broad shallow dorsal furrows.

** *Cymes not capitate*.

33. **P. longipetiolata**, *Thw. Enum.* 149; glabrous, leaves long-petioled elliptic-oblong or ovate-oblong acuminate base rounded or cordate, cymes terminal peduncled, lower branches whorled trichotomous few-flowered, fruit ovoid crowned with the minute calyx-teeth.

CEYLON; Saffragan district, alt. 3-4000 ft., *Thwaites*.

Leaves 5-6 by $1\frac{1}{2}$ -2 in., yellowish when dry, midrib stout; nerves 6-10 pair, very spreading; petiole $1-1\frac{1}{2}$ in., slender; stipules oblong, acute. *Cymes* small, about $1\frac{1}{2}$ in. broad, nearly glabrous; bracts minute, caducous; flowers very small. *Calyx-tube* obconic; teeth triangular. *Corolla-tube* very short. *Fruit* $\frac{1}{2}$ in.; pyrenes dorsally compressed, with very broad shallow lateral furrows.—The specimens are not copious.

34. **P. plurivenia**, *Thw. Enum.* 147; glabrous, leaves narrowly oblanceolate acute narrowed into a very short petiole, marginal nerves very numerous slender horizontal, fruit fusiform.

CEYLON; Hewahette, in the central province, alt. 3-4000 ft., *Thwaites*.

Branches slender. *Leaves* 3-4 by $\frac{3}{4}$ -1 in., dark green and wrinkled when dry, margin thickened and often yellowish; nerves 30-40 pair, slender and undulating, hardly distinguishable from the veins; stipules lanceolate, $\frac{1}{4}$ in. *Cymes* very sparingly branched, glabrous, trichotomous; bracteoles minute; flowers ternate, shortly pedicelled. *Calyx-teeth* lanceolate, exceeding the very short corolla-tube, which is hairy within. *Seed* "furrowed," *Thwaites*.—I have seen a single specimen without fruit.

35. **P. filipes**, *Hook. f.*; glabrous, leaves oblanceolate acuminate narrowed into a very short petiole, nerves numerous, stipules broad, cymes terminal irregularly branched peduncles and pedicels very slender, fruit oblong or subfusiform truncate. ? *P. bisulcata*, var. β , *Thw. Enum.* 148.

CEYLON; Hantani, alt. 3000 ft., *Gardner*.

Branches pale. *Leaves* 5-7 by $1-1\frac{1}{2}$ in., yellowish-green when dry; nerves 15-20

pair, obliquely arched, slender; petiole short; stipules terminal ovate-oblong, obtuse or 2-fid, lower broader sometimes rounded. *Cymes* subsessile; branches spreading in fruit, 2-3-chotomously divided; flowers not seen. *Fruit* $\frac{1}{2}$ in., deeply grooved, pyrenes ventrally flat, dorsally with a very prominent broad rounded rib, and two broad deep furrows.—I have seen no specimen of Thwaites' *P. bisulcata*, var. β , the character of which applies to this, and which he suggests being a distinct species.

36. **P. bisulcata**, *W. & A. Prodr.* 434; glabrous, leaves obovate or elliptic-obovate or subcuneate narrowed into the petiole obtuse acute or acuminate, nerves 6-10 pair, cymes peduncled subbracteolate trichotomous, flowers sessile, fruit ovoid or ellipsoid crowned with the small calyx-teeth. *Wt. Ic.* t. 1039. *P. Dodda-Jervam*, *Schlecht. Pl. Hohenack. n.* 1372, Rubiaceæ, *Wall. Cat.* 8458.

NILGERRY MTS., *Wight, &c.* CEYLON, alt. 5-7000 ft., *Walker, &c.*

Branches rather stout. *Leaves* 2-5 by 1-2 in., rarely lanceolate, usually pale green with often a yellow midrib, coriaceous, base always cuneate; petiole $\frac{1}{2}$ - $\frac{1}{3}$ in.; stipules $\frac{1}{4}$ in., ovate, acute. *Cymes* stoutly peduncled, rarely sessile, erect; branches opposite, short or long, suberect; bracteoles minute, caducous; flowers very small, sessile. *Calyx-teeth* small, triangular. *Corolla-tube* short, villous within. *Fruit* $\frac{1}{2}$ in.; pyrenes with a broad rounded dorsal ridge and two shallow broad lateral furrows. *Seed* flat ventrally.

37. **P. connata**, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 163; glabrous, leaves subsessile elliptic or oblanceolate obtuse or obtusely acuminate coriaceous shining above, cymes terminal peduncled, branches whorled, bracts coriaceous connate persistent, fruit ellipsoid crowned with the calyx-limb. *Wall. Cat.* 8347; *DC. Prodr.* iv. 519; *W. & A. Prodr.* 433. *P. lævigata*, *W. & A. Prodr.* l. c.; *Wt. Ic.* t. 828.

TRAVANCORE; at Courtallam, *Heyne, Wight.*

Branches smooth, pale. *Leaves* 4-7 by 1-1 $\frac{3}{4}$ in., narrowed into a very short stout petiole, reddish brown when dry, nerves 8-12 pair; stipules ovate or lanceolate, simple or 2-fid. *Cymes* erect; peduncle 2 in. and under, and branches stout; bracts coriaceous, broad, ovate, whorled and connate, $\frac{1}{2}$ in. long; bracteoles ovate, acute, ciliolate; flowers sub-3-nate, sessile. *Calyx* urceolate, 5-toothed. *Corolla* funnel-shaped, lobes lanceolate, throat woolly. *Fruit* $\frac{1}{2}$ in.; pyrenes with a broad rounded dorsal ridge and two shallow broad furrows. *Seed* ventrally flat.

38. **P. anamallayana**, *Bedd. Ic. Pl. Ind. Or.* t. 236; glabrous, leaves large very long-petioled oblanceolate acute or abruptly acuminate, nerves 8-12 pair, cymes terminal peduncled, branches stout whorled, bracts small caducous, fruit ovoid, calyx-limb small. *Grumilea longifolia*, *Bedd. in Trans. Linn. Soc.* xxv. 218.

TRAVANCORE; Anamallay hills, *Beddome.*

Branches stout, soft. *Leaves* 8-10 by 1 $\frac{1}{2}$ -3 in.; gradually narrowed at the base into a petiole 1 $\frac{1}{2}$ -3 in., greenish when dry, rather membranous; nerves spreading, slender; stipules 1 in., ovate or oblong-lanceolate, acuminate. *Cymes* 2-3 in. long and broad; peduncle very stout; bracts and bracteoles very inconspicuous; flowers shortly pedicelled. *Calyx* broadly obconic; limb broad, truncate. *Corolla-tube* broad, with a ring of hairs within. *Fruit* $\frac{1}{2}$ in., immature, but apparently as in *P. connata*.

39. **P. Griffithii**, *Hook. f.*; glabrous or the cymes puberulous, leaves large petioled linear-oblong or elliptic-lanceolate or sublanceolate acuminate coriaceous, nerves strong 15-20 pair, cymes terminal peduncled short dense-flowered, branches short stout irregular, bracts small caducous, fruit large ellipsoid truncate deeply furrowed.

MALACCA, *Griffith* (Kew Distrib. 3044), *Maingay.*

Branches stout, woody. *Leaves* 5-12 by 1 $\frac{1}{2}$ -3 $\frac{1}{2}$ in., very pale and shining when

dry; midrib stout; nerves stout on both surfaces, obliquely arching; petiole $\frac{1}{2}$ –1 in.; stipules $\frac{1}{4}$ – $\frac{1}{2}$ in., "fleshy" (Griffith), ovate-cordate or -lanceolate, entire or 2-fid. *Cymes* short; peduncle 2 in. or less; branches usually whorled, whorled, sometimes irregularly alternate, very short and stout; flowers subsessile. *Calyx* obconic, limb broad; teeth 5, triangular. *Corolla-tube* broad, mouth villous. *Fruit* $\frac{1}{2}$ in. long and upwards, shining; dorsal ridge of pyrenes very strong and furrows broad and deep. *Seed* flat ventrally.

40. ***P. angulata***, Korth. in *Ned. Kruidk. Arch.* ii. 243; glabrous, leaves obovate cuneate-obovate or oblanceolate rarely elliptic acute or abruptly acuminate coriaceous narrowed into the short or long petiole, cymes terminal peduncled, branches stout whorled, bracts persistent, flowers subcapitate, fruit shortly ellipsoid truncate, calyx-limb persistent. *Miq. in Ann. Mus. Lugd. Bat.* iv. 210. *Psychotria*, Wall. *Cat.* 8348. *Chasalia perforata*, *Miq. Fl. Ind. Bat. Suppl.* 546.

TENASSERIM; Mergui, Griffith, Helfer. MALACCA, Griffith. SINGAPORE, Wallich.⁴ PENANG, Porter.—DISTRIB. Banca, Java, Borneo.

Branches rather rough. *Leaves* 4–8 by 2–2 $\frac{1}{2}$ in., rather shining, pale greenish when dry, or dark; nerves slender, arching; petiole $\frac{1}{4}$ – $\frac{2}{3}$ in.; stipules, upper ovate connate, lower rounded and cuspidate. *Cymes* very variable; peduncle 3 in. and less, stout, branches very stout; bracts broadly ovate, coriaceous; bracteoles small or 0; flowers sessile. *Calyx-limb* truncate. *Corolla-tube* very short, throat woolly. *Fruit* $\frac{1}{4}$ in., dorsal ridge of pyrenes rounded. *Seed* flat ventrally.

41. ***P. symplocifolia***, Kurz *For. Fl.* ii. 11; glabrous, leaves small obovate or elliptic-obovate or -lanceolate caudate-acuminate narrowed into a short petiole, nerves 6–10 pair, stipules acuminate, cymes terminal peduncled, branches slender trichotomous, fruit ellipsoid, calyx-limb minute. *Psychotria*, Wall. *Cat.* 8357; *Herb. Ind. Or. H. f. & T. n.* 27. *Morinda?* Wall. *Cat.* 8428.

KHASIA MTS., alt. 3–6000 ft., abundant, De Silva, &c.; MARTABAN HILLS, alt. 5–7000 ft., Kurz.

A shrub or small tree, branches slender. *Leaves* 3–5 by 1–1 $\frac{1}{2}$ in., green when dry with pale midrib nerves and sometimes margins; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; stipules $\frac{1}{4}$ in. and less, ovate, acute or with subulate points. *Cymes* very variable, rarely sessile; branches opposite, usually long, spreading, slender and trichotomously divided at the top with short divisions; bracts, bracteoles, and flowers very small. *Calyx-teeth* triangular. *Corolla-tube* short, throat villous. *Fruit* $\frac{1}{4}$ in., sometimes truncate, not deeply ridged and furrowed. *Seed* flat ventrally.—This is the Eastern representative of the Western *P. bisulcata*. Kurz's Martaban specimens have much shorter and stouter cyme-branches than the Khasian.

42. ***P. Helferiana***, Kurz in *Journ. As. Soc.* 1872, ii. 314; *For. Fl.* ii. 11; hirsute, leaves large broadly elliptic or lanceolate acuminate base narrowed into a long or short petiole, flowers in dense heads, mixed with hirsute persistent bracteoles in axillary or terminal peduncled or subsessile cymes, fruit ovoid crowned by the dilated calyx-limb. *Psychotria*, Wall. *Cat.* 8368.

EASTERN PENINSULA; from Pegu, M'Clelland, to Tenasserim, the Andaman Islands, Singapore, and Penang, Wallich, &c.

An erect shrub; branches stout. *Leaves* very variable, 5–10 by 2–5 in., red-brown when dry, rather membranous; nerves 12–15 pair, oblique or very spreading; petiole $\frac{1}{2}$ –2 in.; stipules 1 in., lanceolate, acuminate, 2-cleft, hirsute. *Cymes* very variable; heads of flowers 1–1 $\frac{1}{2}$ in. diam.; peduncle very stout; bracts large, deciduous, and numerous small bracteoles hirsute. *Calyx* minute, teeth lanceolate. *Corolla-tube* short, glabrous, throat villous. *Fruit* hirsute or glabrate; pyrenes with a broad dorsal ridge and 2 lateral shallow furrows. *Seed* flat ventrally.

43. ***P. nicobarica***, Kurz in *Lond. Journ. Bot.* 1875, 328; shoots petioles and nerves beneath pubescent or glabrate, leaves large broadly elliptic acute,

petiole stout, nerves 12-14 pair, stipules large rufous, cymes subsessile, flowers crowded, bracts and bracteoles minute, fruit broadly ellipsoid, calyx-limb minute.

NICOBAR ISLANDS; coral-reef forests on the east coast of Katchall, Kurz.

Stem subsessile, 1-2 ft., very stout, rusty-pubescent. *Leaves* 6-10 by 2-4 in., rather succulent, base acute, brown when dry; petiole very stout, $\frac{1}{2}$ -1 in.; stipules $\frac{1}{2}$ - $\frac{3}{4}$ in., broadly ovate, 2-fid. *Cymes* puberulous; branches very short in a flowering specimen, long and spreading in fruiting ones; flowers pedicelled, very small. *Calyx-teeth* ovate, acute. *Corolla-tube* ovoid, throat villous; lobes acute, reflexed. *Fruit* $\frac{1}{4}$ in. long, glabrous, pyrenes acutely ribbed.—I have very imperfect materials, and depend on Kurz's character. This describes the albumen as spuriously ruminat, alluding, no doubt, to the furrows.

SECT. IV. *Seeds* dorsally convex and rounded, not or slightly ridged or grooved.

44. **P. calocarpa**, Kurz in *Journ. As. Soc.* 1872, ii. 315; *For. Fl.* ii. 9; subherbaceous, young parts and leaves beneath puberulous with crisped hairs finally glabrate, leaves long- or short-petioled lanceolate or elliptic-lanceolate acuminate often variegated margins entire or broadly crenate, intra-marginal nerve conspicuous, stipules large ovate often 2-fid, cymes small axillary and terminal shortly peduncled, calyx-teeth slender, fruit ellipsoid or subglobose crowned with the calyx-teeth. *P. asiatica*, Wall. in Roxb. *Fl. Ind.*, ed. Carey & Wall. ii. 160; *Cat.* 8331; not of Linn. or of Roxb. *P. viridiflora*, Reinw. var. 2, Kurz *For. Fl.* ii. 13. *P. picta*, Wall. *Cat.* 8353; and *Psychotria*, 8359. *Psychotria*, 24, 25, 26, *Herb. Ind. Or. H. f. & T.*

NIPAL, Wallich. SIKKIM HIMALAYA, alt. 2-4000 ft., J. D. H. UPPER ASSAM; Suddya, Griffith. KHASIA MTS., ascending to 4000 ft., De Silva, &c. CACHAR, Keenan. CHITTAGONG, MARTABAN, and TENASSERIM, Gomez, &c.

A small evergreen subherbaceous bush, 1-3 ft. high, with often a creeping stem sending up erect soft branches. *Leaves* very variable in size and shape, 4-8 by 1-3 in., dark or pale green when dry, narrowed into a petiole $\frac{1}{2}$ -2 in. long, shining or opaque above, thinly coriaceous or membranous, nerves sometimes margined with white; margin often crenate, the crenatures following the loops of the intramarginal nerve; stipules usually ovate or orbicular, and 2-cuspidate, $\frac{1}{3}$ - $\frac{1}{2}$ in. diam. *Cymes* often secund and drooping, with spreading or reflexed fruiting branches, glabrous or pubescent, lax or dense-flowered; bracts lanceolate, caducous or subsistent; flowers subsessile, pink greenish or white. *Calyx-teeth* linear, ciliate. *Corolla tube* very short, throat villous. *Fruit* $\frac{1}{4}$ in. long, succulent, orange or red; pyrenes dorsally obscurely 4-ribbed. *Seed* with or without a T-shaped ventral groove.—*P. viridifolia*, Reinw., referred here by Kurz, is a *Grumilea*. I have not seen his specimens, of which he makes 2 varieties: one with entire leaves and inconspicuous calyx-teeth, the other (from Chittagong) with waved leaves and larger calyx-teeth.

45. **P. Thomsoni**, Hook. f.; cymes pubescent, leaves petioled lanceolate caudate-acuminate, intra-marginal nerve conspicuous, stipules large 2-cuspidate, cymes terminal long-peduncled trichotomous, calyx-teeth triangular. *Psychotria*, No. 25, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., Griffith (Kew Distrib. 3027); Churra, alt. 4000 ft., J. D. H. & T. T.

Very similar to *P. calocarpa* in foliage, but quite different in the elongate cyme, which is stout erect and with the peduncle 3-4 in. long, and the very short broad calyx-teeth. The stipules are $\frac{1}{2}$ - $\frac{3}{4}$ in. long, orbicular, with two long cusps, and the bracteoles are subulate.

46. **P. denticulata**, Wall. in Roxb. *Fl. Ind.*, ed. Carey & Wall. ii. 166; *Cat.* 8326; glabrous or leaf-nerves beneath and cymes puberulous, leaves petioled large broadly elliptic or obovate or oblanceolate acute or abruptly acuminate,

nerves 15–20 pair, cymes terminal and axillary long-peduncled corymbiform ebracteolate, fruit small subglobose smooth. *DC. Prodr.* iv. 520. *S. polyneura*, *DC. l. c.* P.? *Ohloranthus*, *Herb. Ham. in Wall. Cat.* 8336 B. *Psychotria*, *Wall. Cat.* 8372.

Central and Eastern Tropical Himalaya; NIPAL, *Wallich*; SIKKIM, alt. 6000 ft., *J. D. H.*; BHOTAN and ASSAM, *Jenkins, Griffith* (Kew Distrib. 3024); and KHASIA Mts., alt. 2000 ft., *J. D. H. & T. T.* MARTABAN, *Wallich*.

Branches robust. *Leaves* very variable, 6–7 by 2–2½ in. in the oblanceolate forms, 8–10 by 4–6 in. in the broader forms, pale green or dark when dry, base acute or rounded; nerves strong, close-set, subhorizontal or ascending, not arched; petiole ¼–¾ in.; stipules ¾ in., ovate, lax, entire or 2–3-cleft. *Cymes* 2–3 in. diam.; peduncle stout, 4 in. or less; branches whorled or opposite, together forming a flat-topped corymb; bracts and bracteoles minute, caducous; flowers minute, subsessile. *Calyx* hemispheric; limb truncate, obscurely toothed. *Corolla-tube* very short throat villous. *Fruit* ½ in. diam.; pyrenes semi-circular in section, quite smooth. *Seed* ventrally flat with a forked median groove.

47. ***P. silhetensis***, *Hook. f.*; cymes and leaves beneath pubescent or glabrate, leaves large stoutly petioled oblong or elliptic acuminate coriaceous, nerves 15–20 pair strong, cymes terminal and axillary long-peduncled corymbiform ebracteolate, fruit large pedicelled ovoid globose or ellipsoid smooth. *P. fulva*, *Wall. Cat.* 8336 C. *Psychotria* sp. 23, *Herb. Ind. Or. H. f. & T.*

UPPER ASSAM, *Griffith*; SILHET, CACHAR, and the KHASIA Mts., ascending to 4000 ft., *De Silva*, &c.

Branches very stout. *Leaves* 6–14 by 3–5 in., pale when dry, coriaceous; nerves strong, arched; petiole ½–1½ in.; stipules 1 in., broadly ovate, often cleft. *Cymes* 2–4 in. diam., pubescent or puberulous; peduncle 3 in. and less, very stout; branches usually whorled, very stout, forming a corymb, spreading or deflexed in fruit; bracts and bracteoles minute, caducous; flowers small, pedicelled. *Calyx* obconic; limb almost truncate. *Corolla-tube* very short, throat with an exerted brush of erect hairs. *Fruit* ½–¾ in., base rounded, smooth; pyrenes semicircular in section, quite smooth. *Seed* ventrally flat.—My own Khasian specimens have large ovoid fruits with no trace of a ventral groove in the seed and corymbiform cymes. Cachar ones from Keenan have a more irregular cyme, with smaller broader fruits and a deep T-shaped ventral groove, which, however, sometimes quite disappears. This species very closely resembles *P. fulva*, differing in the ebracteolate flowers and in the fruit.

48. ***P. montana***, *Blume Bijl.* 960; glabrous, leaves on long slender petioles elliptic oblong or lanceolate acuminate very membranous, nerves 8–10 pair distant slender, cymes terminal and axillary sessile or peduncled, subcorymbiform branches slender, bracteoles minute, corolla-tube elongate, berry subglobose or obovoid, calyx-limb minute. *DC. Prodr.* iv. 521. *P. viridissima*, *Kurz in Journ. As. Soc.* 1872, ii. 315; *For. Fl.* ii. 13. *Chasalia montana*, *Miq. Fl. Ind. Bat.* ii. 281. *O. expansa*, var. *montana*, *Miq. in Herb. Psychotria*, *Wall. Cat.* 8371, 8378; and Rubiaceæ, 8339.

ASSAM PLAINS from Gualpara to Suddya, *Hamilton, Griffith*; SILHET, *De Silva*; TENASSERIM and ATTRAN, *Wallich, Helfer*, &c.—DISTRIB. Java.

A small subherbaceous species; branches slender, soft. *Leaves* 3–7 by 1–3 in., usually pale green when dry; nerves slender, arched; petiole ¼–1½ in.; stipules ¼ in., triangular, entire. *Cymes* usually peduncled with whorled branches 2–3 in. diam.; flowers dense or lax, pedicelled. *Calyx-limb* spreading, teeth triangular. *Corolla-tube* long for the genus, 1½–2 in., glabrous, throat with a brush of hairs. *Fruit* ½–¾ in., pedicelled, red, rugose, ridged at the commissure. *Seed* thin, plano-convex, flat ventrally, without a groove.—Habit entirely of a *Chasalia*, but the corolla-tube is very short and the seed not concave ventrally.

VAR. ? *tabacifolia*; leaves 12–14 by 4–4½ in. oblong, nerves about 15 pair. *P. (Coffea?) tabacifolia*, *Wall. Cat.* 8334.—Singapore, *Wallich*.

SPECIES OF WHICH THE FRUIT IS UNKNOWN.

49. **P. polyneura**, Kurz in *Lond. Journ. Bot.* 1875, 327; *For. Fl.* ii. 11, not of DC.; all parts except the leaves above ferruginous-pubescent or -tomentose, leaves very large long-petioled broadly or narrowly elliptic acute at both ends, nerves 30 pair close-set and spreading, stipules very large, cymes terminal small subsessile trichotomous ebracteolate, flowers sessile crowded.

SOUTH ANDAMAN ISLAND, Kurz.

Branches stout. *Leaves* 7-12 by $3\frac{1}{2}$ - $5\frac{1}{2}$ in., membranous, red-brown when dry, nerves slender; petiole 2-2 $\frac{1}{2}$ in.; stipules $\frac{3}{4}$ in. broadly ovate, connate, entire or cleft at the top. *Cymes* densely tomentose, 2-3 in. diam., branches spreading; flowers small. *Calyx* minutely 5-toothed. *Corolla-tube* very short.—Habit a good deal of *P. Helfferiana*, but less hirsute, with fewer nerves, and wanting the bracteoles.

50. **P. penangensis**, Hook. f.; scandent, glabrous, leaves rhombic-elliptic or -obovate abruptly acuminate narrowed into the petiole, nerves very obscure, cymes terminal long-peduncled, branches umbellate, flowers pedicelled umbellate, bracts and bracteoles persistent.

PENANG; top of Government Hill, Maingay.

Dark brown or blackish when dry, apparently rather fleshy when fresh. *Leaves* 4-5 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., thin when dry, nerves 6-8 pair, very spreading and arched; petiole $\frac{3}{4}$ -1 in.; stipules rounded, connate, persistent. *Cymes* with a very stout erect peduncle 2-3 in.; primary branches about 5, stout, $\frac{3}{4}$ -1 $\frac{1}{2}$ in.; bracts $\frac{1}{4}$ in., subulate; umbellules $\frac{1}{2}$ in. diam., very many-flowered; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in., bracteoles subulate. *Calyx-tube* obconic; teeth triangular, glabrous or puberulous. *Corolla-tube* broad, much longer than the calyx, hoary; throat hirsute. *Fruit* (unripe) stoutly pedicelled, $\frac{1}{2}$ - $\frac{1}{2}$ in. long, narrowly ellipsoid, furrowed, crowned by the calyx-teeth.

51. **P. Johnsoni**, Hook. f.; glabrous, leaves obovate or elliptic-obovate or oblanceolate acute or abruptly acuminate tapering into a very short petiole, nerves 6-10 pair very slender, cymes terminal sessile or subsessile very small short ovoid or subglobose dense-flowered ebracteolate villous at the base, flowers sessile. *Psychotria*, Wall. Cat. 8352.

WESTERN PENINSULA; Cochin, Wight (Kew Distrib. 1442), Johnson.

Branches stout, smooth, terete, pale. *Leaves* 3-5 by $1\frac{1}{2}$ -2 in., pale when dry, rather coriaceous, nerves finely reticulate; stipules ovate, acute or rounded and cuspidate, coriaceous, glabrous. *Cymes* very rarely effuse and $1\frac{1}{2}$ in. diam.; peduncle 0 or short, arising out of long villous hairs; branches stout, short, opposite; flowers subternate, very small, glabrous. *Corolla* very shortly funnel-shaped, throat villous.—A very distinct species, of which I have seen no fruit.

52. **P. nudiflora**, W. & A. *Prodr.* 434; glabrous, leaves obovate cuneate-obovate or oblanceolate abruptly acuminate narrowed into the petiole, nerves 12-15 pair very slender, stipules connate ovate obtuse, cymes peduncled subcapitate or shortly paniced ebracteolate, calyx-limb truncate, corolla-tube elongate cylindric. *Psychotria*, Wall. Cat. 8346.

TRAVANCORE, Heyne; Courtallam, Wight.

Branches smooth. *Leaves* 4-7 by 1-2 $\frac{1}{2}$ in., brown or greenish when dry, thin; nerves hardly stronger than the veins, very spreading; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in.; stipules $\frac{1}{4}$ - $\frac{1}{2}$ in., coriaceous, broad, obtuse. *Cyme-peduncle* 1 in. and less; branches opposite subopposite and obscurely whorled, very stout, short, irregularly dichotomously divided; flowers nearly $\frac{1}{2}$ in. long. *Calyx* very short, limb quite entire. *Corolla* the longest of the Indian species, 4-lobed, glabrous without and within.—Wight labels this *Grumilea*, but there is no fruit advanced enough to determine this point.

DOUBTFUL AND EXCLUDED SPECIES.

P. WALLICHIANA, DC. *Prodr.* iv. 520. P. nervosa, Don *Prodr.* 137; "leaves oval

acuminate serrulate nerves glabrous, stipules simple, calyx-teeth rounded membranous, panicles terminal glomerate."—Nipal, *Wallich*.

I suspect that this is *P. denticulata* badly described. The term serrulate is applicable to no Rubiaceous genus but *Carlemannia*, which is not Nipalese, and which Don would never have referred to *Psychotria*. The only other Nipalese species are *P. calocarpa*, which has broadly crenulate leaves, but slender calyx-teeth, and *P. erratica*, which differs in the cyme and calyx too.

P. SPHEROCARPA, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall. ii. 161*; glabrous except the cymes, leaves petioled large broad elliptic acuminate or acute coriaceous, nerves strong close-set, cymes terminal peduncled compact subglobose villous, flowers subcapitate, fruit spherical smooth.—Silhet hills, *Wallich*.

Shrubby; branches thick, ends compressed. Leaves 8–12 in., base sometimes rounded, shining above; petiole 1 in., rounded; stipules large, ovate, 2-lobed, lobes acuminate. Calyx-teeth subulate. Corolla-tube short, throat villous. Fruit size of a large pea, petioled, without ribs; septum at length obliterated. Seeds hemispheric, ventral face flattened with a T-shaped groove.—I have seen no specimens, and have taken the description from *Wallich*. It evidently resembles *P. silhetensis*, of which the leaves are never rounded at the base, and the flowers not capitate; moreover, *Wallich* has *silhetensis* under another name. He says he received it in 1815 and 1821, and I find in his herb. a specimen of *P. fulva* marked as *P. sphaerocarpa*?, received from Silhet in the latter year. Possibly *P. sphaerocarpa* is made up of leaves and flowers of *fulva* and fruit of *silhetensis*, or it may be a form of *P. denticulata*.

P. VAGINANS, *DC. Prodr. iv. 520*, from Ceylon, is not identifiable from the description; it may be a *Gaertnera*.

P. ? VAGINANS, *DC. of W. & A. Prodr. 434*; *Wight Cat. 1352*.—I find no specimens of this in Wight's Herbarium, and, the fruit being unknown, it is unrecognisable.

P. (Grumilea) VAGINANS, *Dalz. mss. in Dalz. & Gibs. Bomb. Fl. 111*; shrubby, erect, glabrous, leaves large obovate, stipules ovate or lanceolate acute caducous $1\frac{1}{2}$ –2 in. long, combined in a sheathing tube, cymes terminal peduncled paniculate 3-chotomous puberulous, flowers small white, fruit like a black peppercorn.—Chorla Ghat and Mahableshwur, rare.—I suspect this to be *P. truncata*.

P. AMPLA, *Wall. Cat. 8333*, is a *Pavetta*.

P. ASIATICA, *Linn. Amœn. Acad. v. 395*, is a Jamaican plant received by Linnæus from Patrick Browne, and is *P. Brownei*, Spreng.

P. OXYPHYLLA, *Wall. Cat. 8374*, is a *Gaertnera*, as are *Psychotria*, 8341, 8342, 8388, 8389.

PSYCHOTRIA, *Wall Cat. 8362*, is in part *Chasalia curviflora* and in part a *Morinda*; 8363 is in part *Chasalia curviflora* and in part a *Leea*; 8376 is an *Ixora*, as is 8387; 8379 is an *Apocynaea*.

76. CHASALIA, Comms.

Characters of *Psychotria*, but corolla-tube usually slender and curved; seeds orbicular, dorsally much compressed, ventrally deeply concave, hence somewhat cup-shaped; albumen equable.—DISTRIB. About 10 species, tropical Asiatic and African.

1. *C. curviflora*, *Thw. Enum. 150, 421*; glabrous, leaves membranous from broadly elliptic to obovate-lanceolate oblanceolate or narrowly linear-oblong acute cuspidate acuminate or caudate-acuminate, base narrowed into a long or short petiole, nerves few or many, cymes terminal bracteate trichotomous dense or lax-flowered, corolla tubular curved. *Kurz For. Fl. ii. 14*. *C. lurida*, *curviflora*, *tetrandra* (*excl. syn. rostrata*), and *Sangiana*, *Mig. Fl. Ind. Bat. ii. 282*, *Ann. Mus. Lugd. Bat. iv. 202, 203*, and *Fl. Ind. Bat. Suppl. 546*. *Psychotria lurida*, *Bl. Bijl. 959*; *DC. Prodr. iv. 521*. *P. curviflora* and *ophioxylodes*, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall. ii. 167, 168, Cat. 8360, 8364*; *DC. l. c. 520*. *P. ambigua*, *W. & A. Prodr. 433*; *Wt. Ic. t. 127*. *P. tetrandra*,

Bl. & DC. Il. cc. Zwardekronia lurida, Korth. in Ned. Kruidk. Arch. ii. 252. *Ixora attenuata*, Wall. Cat. 6164. *Psychotria*, Wall. Cat. 8361, 8362, 8363, 8364 (in part), 8375, 8386 (a very narrow-leaved form), 8390. Rubiacea, Wall. Cat. 8461.

EASTERN TROPICAL HIMALAYA; Sikkim, alt. 2-6000 ft. ASSAM, CACHAR, and the KHASIA MTS., ascending to 5000 ft. TENASSERIM, the ANDAMAN ISLANDS, MALAYAN PENINSULA, and PENANG. WESTERN PENINSULA; the Ghats from Bombay southwards. CEYLON, ascending to 4000 ft.—DISTRIB. Malay Islands to Borneo.

An evergreen small weak shrub 2-4 ft. high. Leaves greenish when dry, in the most frequent form obovate-lanceolate 4-6 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in. diam., narrowed into a slender petiole $\frac{1}{2}$ -3 in. long; in a common Malayan form almost elliptic, in Tenasserim ones 8-10 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in.; in Ceylon ones they vary from $2\frac{1}{2}$ -5 by $\frac{1}{2}$ - $1\frac{1}{2}$ in., always membranous with slender distant nerves, arching upwards; stipules triangular or ovate or broader, acute obtuse or rounded, entire or 2-fid, often connate and persistent. Cymes rarely 2 in. long, more or less pyramidal or rounded; peduncle 2 in. long and under; branches short, soft, rather stout, often purplish; bracts persistent, ovate-lanceolate or subulate; flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. long, suffused, sessile, 4-5-merous. Calyx short, teeth triangular. Corolla variable in length, dimorphic, one form with exerted anthers and included stigmas, the other with these positions reversed; throat glabrous. Fruit size of a pea, globose, more or less didymous, smooth; pyrenes thin. Seed orbicular and cupular, smooth.—This plant was first published as a *Chasalia* by Miquel, in 1856, under the name of *C. lurida*, founded on Blume's *Psychotria lurida*; but Wallich's *P. curviflora* antedates Blume's *lurida* by two years, and as it is by far the most expressive specific name, and is also taken up as a *Chasalia* by Miquel after Thwaites (*Ann. Mus. Lugd. Bat.* iv. 202), I adopt it here.

VAR. 1. *longifolia*; leaves 8-12 by $1\frac{1}{2}$ -2 in., nerves more numerous spreading. *Psychotria longifolia*, Dalz. in Hook. Lond. Journ. Bot. ii. 133, not of Beddome. *Psychotria*, Wall. Cat. 8386.—Cachar, Keenan; Bombay, Dalzell, Stocks; Malacca, Maingay (Kew Distrib. 3052).—Though so dissimilar, this is obviously an extreme form of *C. curviflora*, connected by intermediates; indeed, one specimen (from Cachar) has the lower part of the leaf with the numerous spreading nerves of the variety, and the upper part with the distant arched ones of the type.

VAR. 2. *ellipsoidea*; leaves as in the common form of the species, fruit ellipsoid. —Khasia Mts.; Jarain in Jyntea, alt. 3000 ft., C. B. Clarke.

2. *C. rostrata*, Miq. in *Ann. Mus. Lugd. Bat.* iv. 203, excl. syn. tetrandra; glabrous, leaves short-petioled elliptic-lanceolate caudate-acuminate, cymes terminal peduncled very small lax-flowered bracteate, corolla-tube very short. *Psychotria rostrata*, Bl. and Polyozus latifolia (fid. Miquel), Bl. Bijdr. 961, 948; DC. Prodr. iv. 521, 494.

MALACCA, Griffith (Kew Distrib. 3045), Maingay (n. 937).—DISTRIB. Java.

Branches slender. Leaves 4-5 by $\frac{3}{4}$ - $1\frac{1}{2}$ in., greenish when dry, membranous, base acute; nerves 6-8 pair, arched; stipules short, broad, entire or toothed. Cymes slender, trichotomous, branches often drooping, few-flowered; bracts subulate; flowers minute. Calyx-teeth triangular. Corolla glabrous. Fruit much as in *C. curviflora*.—This unites *Psychotria* and *Chasalia*, having the flowers of *P. montana* and fruit of *C. curviflora*.

77. GEOPHILA, Don.

Small, slender, creeping, perennial herbs. Leaves long-petioled, orbicular reniform or cordate; stipules interpetiolar, ovate, entire. Flowers small, solitary or umbelled, subsessile or on axillary or terminal peduncles; bracts subulate linear or leafy. Calyx-tube obovoid, lobes or segments 5-7, slender, persistent. Corolla elongate funnel-shaped, throat hairy; lobes 4-7, valvate in bud. Stamens 4-7, on the corolla-throat, filaments filiform; anthers linear. Ovary 2-celled; style slender, arms short or long; ovules 1 basal, erect in each cell.

Drupe fleshy, pyrenes 2, plano-convex. *Seeds* plano-convex, not grooved ventrally; embryo basal, minute, radicle inferior.—**DISTRIB.** Species 8 or 10 tropical.

1. **G. reniformis**, *Don Prodr.* 136; pubescent, leaves orbicular deeply cordate, umbels 1-3-flowered peduncled. *DC. Prodr.* iv. 537; *W. & A. Prodr.* 436; *Wt. Ic.* t. 54; *Dalz. & Gibs. Bomb. Fl.* 111. *G. diversifolia*, *DC. l. c.*; *Wall. Cat.* 8325. *Psychotria herbacea*, *Linn.*; *Roxb. Fl. Ind.* i. 533. *Cephaelis herbacea*, *Kurz in Journ. As. Soc.* 1877, ii. 140.—*Rheede Hort. Mal.* x. t. 21.

SILHET and PHASIA HILLS, *Roxburgh, De Silva*. TENASSERIM and ANDAMAN ISLANDS, *Griffith, Kurz*. Western Peninsula; or the Ghats from the Concan southwards. CEYLON, common.—**DISTRIB.** Malay Archipelago, S. China, Polynesia, Tropical Africa and America.

Stems a foot or less long. *Leaves* $\frac{3}{4}$ – $1\frac{1}{2}$ in. diam., more or less pubescent; petiole 1–3 in.; stipules ovate, obtuse. *Peduncle* $\frac{1}{4}$ – $1\frac{1}{2}$ in.; bracts subulate-lanceolate. *Calyx-teeth* herbaceous, persistent. *Corolla* $\frac{1}{3}$ – $\frac{1}{2}$ in., glabrous. *Fruit* small, globose, purple.

78. CEPHAELIS, Swartz.

Characters of *Psychotria*, but flowers in involucrate heads, ovary rarely 3-4-celled. *Albumen* equable.—**DISTRIB.** Species 70, all tropical.

The cultivation of *Ipecacuanha* (*Cephaelis Ipecacuanha*, Rich.), an American plant, has been introduced into India, but with hitherto scanty success.

1. **C. Griffithii**, *Hook. f.*; leaves long-petioled oblanceolate acuminate, nerves 16–20 pair glabrous beneath, stipules 1 in. diam., heads sessile, bracts orbicular connate.

MALACCA, *Griffith* (Kew Distrib. 3032), *Maingay* (928).

Branches (or stem?) as thick as the little finger. *Leaves* 12–16 by 3–5 in., brownish when dry, narrowed into a petiole often 3 in. long, coriaceous; stipules very coriaceous, orbicular, upper half withered and discoloured. *Head* 1–2 in. diam.; bracts like the stipules. *Calyx-teeth* obtuse. *Corolla* $\frac{1}{2}$ in., glabrous, throat villous. *Fruit* $\frac{1}{2}$ in. long, obovoid-oblong, 4-angled, crowned by the tubular calyx-limb; pyrenes with a broad dorsal rib, ventrally concave. *Seed* very thin, pyrene dorsally ridged.—The more numerous nerves and sessile large heads distinguish this from the closely allied Malayan *C. stipulacea*, Bl.

2. **C. cuneata**, *Korth. in Ned. Kruidk. Arch.* ii. 248; leaves very narrowly oblanceolate acuminate, nerves quite glabrous beneath, stipules $\frac{1}{2}$ in. diam., heads stoutly peduncled, bracts connate. *Miq. Fl. Ind. Bat.* ii. 311.

MALACCA, *Griffith* (Kew Distrib. 3085), *Maingay* (929).

Stem simple, as thick as a goose-quill or less. *Leaves* 6–12 by $\frac{3}{4}$ – $1\frac{1}{2}$ in., membranous, greenish when dry, narrowed into very long petioles; nerves very variable in number, ascending; stipules small, much withered and discoloured. *Heads* $\frac{1}{2}$ in. diam.; peduncle stout, simple, 2–4 in.; bracts connate in a coriaceous cup; flowers smaller and fewer than in *C. Griffithii*. *Calyx-teeth* rounded. *Fruit* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, almost globose, very fleshy, calyx-limb inconspicuous; pyrenes and seeds as in *C. Griffithii*.

79. LASIANTHUS, Jack.

Shrubs, often foetid; branches terete, compressed at the nodes. *Leaves* opposite, distichous, usually caudate-acuminate with arching nerves and close-set transverse veins, which are simple or forked or branched and reticulate; stipules interpetiolar, broad, rarely narrow. *Flowers* small, in axillary rarely peduncled often bracteate clusters, cymes or heads. *Calyx-tube* short; limb

short or long, 3-7-toothed, rarely truncate, persistent. *Corolla* funnel- or salver-shaped, throat villous; lobes 3-7, valvate in bud. *Stamens* 4-6 on the corolla-throat, filaments short; anthers linear or oblong, often apiculate, included. *Ovary* 4-9-celled; style short or long, glabrous or hairy, arms or stigmas 3-9 short obtuse; ovules 1 linear basal erect in each cell. *Drupe* small, pyrenes 3-9, 3-quetrous and 1-seeded. *Seeds* narrow, testa membranous; embryo terete, radicle slender inferior.—**DISTRIB.** Species about 80 tropical Asiatic, with single species in Japan, Australia, W. Africa, and Cuba.

A very difficult genus to describe, though the nervation and venation of the leaves afford very good characters. The foliage closely resembles that of *Urophyllum*.

SECT. I. Stipulares. *Cymes* sessile, embraced by the large coriaceous stipules.

1. **L. Griffithii**, *Wight in Calc. Journ. Nat. Hist.* vi. 505; robust, leaves large elliptic-lanceolate caudate-acuminate narrowed into a very short petiole pubescent beneath, nerves 18-20 pair, veins reticulate, clusters of flowers large capitate very dense villous involucre by the very large broad stipules, bracts densely filiform villous equalling the flowers.

MALACCA, *Griffith* (Kew Distrib. 2935).

Branches as thick as a swan's-quill, black when dry, glabrous. *Leaves* 10-12 by 3-3½ in., brown when dry, coriaceous, glabrous above, rusty beneath; nerves 16-20 pair; petiole very short and stout; stipules ¾ in. diam., broadly triangular, with rounded angles, acute or obtuse, very coriaceous and persistent, glabrous. *Heads* densely villous; bracts close-packed, filiform, equalling the flowers. *Calyx-limb* large, glabrous, funnel-shaped, about 7-cleft, teeth villous. *Corolla-tube* glabrous; limb villous, 7-cleft. *Drupe* small, nearly globose, about ½ in. diam., glabrous; pyrenes about 7.

2. **L. stipularis**, *Blume Bijl.* 997; slender, glabrous except the bracts, leaves subsessile oblanceolate-oblong caudate-acuminate, nerves 9-10 pair, veins faint sparingly branched, clusters of flowers small sessile involucre by the large and broad stipules, bracts lanceolate ciliate exceeding the flowers. *Kurz For. Fl.* ii. 32. *Mephitidia stipularis*, *DC. Prodr.* iv. 453.

TENASSERIM OR ANDAMAN ISLANDS, *Helfer* (Kew Distrib. 2937).—**DISTRIB.** Sumatra, Java, Borneo.

An evergreen low shrub. *Leaves* 4-6 by 1-2 in., rather narrowed towards the subacute or rounded oblique base, greenish-brown when dry, membranous; midrib beneath sometimes with scattered hairs; nerves 10-12 pair, slender; petiole very short; stipules ½-¾ in. diam., rounded or broadly triangular-ovate or oblong coriaceous, glabrous, very persistent, concealing the flowers. *Bracts* ½-1 in. long, often exceeding the stipules. *Calyx-teeth* hirsute, sometimes ½ in. long. *Corolla* white. *Drupe* ½ in. diam., subglobose, smooth; pyrenes 4-5.

SECT. II. Bracteatae. *Cymes* sessile, not embraced by the large stipules, accompanied by evident long or short bracts. (*Cymes* peduncled in 5. *L. Moonii*.)

* *Bracts* equalling or exceeding the flowers. *Branches* hirsute or tomentose.

3. **L. cyanocarpus**, *Jack in Trans. Linn. Soc.* xiv. 125; hirsute, leaves petioled elliptic-lanceolate or oblanceolate caudate-acuminate, nerves 8-12 pair, veins lax sparingly branched, base acute, cymes sessile, bracts many ovate-lanceolate leafy exceeding the sessile flowers. *Kurz For. Fl.* ii. 32. *L. bracteatus* and *L. Roxburghii*, *Wight in Calc. Journ. Nat. Hist.* vi. 501, 502. *L. oculus-cati*, *Miq. Fl. Ind. Bat.* ii. 315. *L. lævicaulis*, *Kurz in Trimen. Journ. Bot.* 1875, 327. *Lasianthus*, ? *Wall. Cat.* 8440. *Mephitidia cyanocarpa*, *DC.*

Prodr. iv. 452. *M. rhinocerotis*, *Kurz in Andaman For. Rep., Append. A.* 40; not of *Bhume*? *Triosteum hirsutum*, *Roxb. Fl. Ind.* i. 538. Rubiaceæ, *Wall. Cat.* 8305.

ASSAM, *Simons*; NAGA HILLS, *Griffith* (*Kew Distrib.* 2917); SILHET, CHITTAGONG, ANDAMAN and NICOBAR ISLANDS, TENASSERIM, SINGAPORE, MALACCA and PENANG, *Wallich, &c.*—DISTRIB. Malay Archipelago to Borneo.

An evergreen bush, softly hirsute all over, or with the branches and leaves above glabrate. *Leaves* 6–10 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., brown when dry; nerves 7–10 pair, very obliquely arched; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules ovate, acute. *Bracts* $\frac{1}{2}$ – $1\frac{1}{2}$ in., outer ovate acuminate, inner lanceolate or subulate. *Calyx-teeth* linear, ciliate. *Corolla-tube* $\frac{1}{2}$ in., hispid, yellow. *Drupe* (dry) $\frac{1}{2}$ – $\frac{1}{4}$ in. long, broadly obovoid or subglobose, obscurely 4-lobed, glabrous or pubescent, bright blue, smooth; pyrenes 4–5.—*Kurz* and *Jack* describe the fruit as the size of a gooseberry. *Wallich's* specimen, 8305 A., is marked as from Herb. Madras; if correct, this is no doubt one of several plants procured by the missionaries from the Eastern Peninsula.

4. **L. Jackianus**, *Wight in Calc. Journ. Nat. Hist.* vi. 502; hirsute, leaves subsessile oblong abruptly acuminate or caudate-acuminate base rounded, cymes sessile, nerves 6–7 pair, veins rarely branched, bracts few outer ovate or linear-lanceolate exceeding the sessile flowers. *Bedd. Ic. Pl. Ind. Or.* t. 12. *Lasianthus*, *Wall. Cat.* 8439.

NILGHERY MTS., *Heyne, &c.*; Sisparah Ghat, *Beddome*.

An evergreen bush, softly hirsute all over. *Leaves* 4–6 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., dark brown when dry; nerves 6–8 pair; petiole very short; stipules ovate, acute. *Bracts* rarely ovate-lanceolate, $\frac{1}{2}$ –1 in.; calyx-teeth 4 ovate-lanceolate, hispid, shorter than in *L. cyanocarpus*. *Drupe* $\frac{1}{2}$ in. long, obtusely octahedroid smooth; pyrenes 4.

5. **L. Moonii**, *Wight in Calc. Journ. Nat. Hist.* vi. 504; hirsute, leaves petioled elliptic or elliptic-oblong acuminate base acute or rounded, nerves 7–8 pair, veins branched and reticulate, cymes capitate peduncled, bracts ovate-lanceolate about equaling the flowers. *Mephitidia Moonii*, *Thw. Enum.* 145.

CEYLON; Saffragam district, common, *Walker, Thwaites*.

Harshly hirsute. *Leaves* 5–7 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in.; hispid or glabrous above, brown or greenish when dry; petiole stout, $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules ovate, acute. *Cymes* capitate, $\frac{3}{4}$ – $\frac{1}{2}$ in. long and broad; peduncle stout, shorter than the petioles. *Calyx-teeth* linear-lanceolate, hispid. *Corolla* white, tube short. *Drupe* “red, hairy, size of a cherry,” *Thwaites* (dry); $\frac{3}{8}$ – $\frac{1}{2}$ in. diam., globose, smooth; pyrenes 4.

6. **L. sikkimensis**, *Hook. f.*; branches petioled bracts and leaves beneath finely tomentose, leaves petioled lanceolate or elliptic-lanceolate finely acuminate, base acute, nerves 8–9 pair, veins often branched, bracts subulate longer than the few sessile flowers.

SIKKIM HIMALAYA, alt. 2–3000 ft., *J. D. H. & T. T.*

A shrub; branches with appressed hairs. *Leaves* 6–8 by $1\frac{1}{2}$ – $1\frac{3}{4}$ in., brownish when dry, glabrous above, nerves not impressed above, prominent beneath, veins slender parallel; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; stipules $\frac{1}{2}$ – $\frac{3}{4}$ in., lanceolate. *Bracts* $\frac{1}{4}$ – $\frac{1}{2}$ in. *Calyx-teeth* 5, narrow, lanceolate. *Drupe*s subglobose (dry), $\frac{1}{8}$ in. diam., nearly glabrous; pyrenes 5.

7. **L. Wallichii**, *Wight in Calc. Journ. Nat. Hist.* vi. 503; branches petioled and leaves beneath hirsute with spreading hairs, leaves small shortly petioled oblong or oblong-lanceolate cuspidate acuminate or acute, base rounded or cordate often unequally, nerves 7–8 pair, veins branched laxly reticulate, bracts subulate longer than or equaling the few axillary sessile flowers. *Wall. Cat.* 8442, in part; *Kurz For. Fl.* ii. 31. *L. plagiophyllus*, *Hance in Trimen Journ. Bot.* 1875, 196. *Nonatelia*? *hispida*, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 187. *Mephitidea Wallichii*, *W. & A. Prodr.* 390.

SILHET, ASSAM and KHASIA MTS., ascending to 2000 ft., *De Silva*, &c. MARTABAN, TENASSERIM and ANDAMAN ISLANDS, *Kurz*.—DISTRIB. Hongkong.

Shrubby. *Leaves* 4–6 by 1–1½ in., pale when dry, thinly coriaceous, above glabrous often shining, nerves beneath strong; stipules ¼ in., linear-lanceolate. *Bracts* ½–1 in. *Calyx-teeth* 5, subulate-lanceolate. *Corolla-tube* ½ in. (1 in., *Wallich*), white, hispid. *Drupe* ½ in., ovoid, glabrous; pyrenes 5 (4–6, *Hance*).—This closely resembles *L. attenuatus*. I have seen no specimen from *Kurz*'s localities.

VAR. ?*penangensis*; leaves narrower, base acute. *Lasianthus*? *Wall. Cat.* 8441 (*one sheet*).—Penang and Singapore, *Wallich*.—I suspect this to be a different species, but the specimens are insufficient.

8. ***L. tentaculatus***, *Hook. f.*; branches glabrous, leaves subsessile oblong or obovate-oblong rather abruptly acuminate, base rounded unequal-sided, nerves 9 pair spreading minutely hairy beneath, veins branching, flowers sessile much shorter than the erect subulate or filiform hispid bracts, calyx-teeth linear hispid. Rubiaceæ, *Wall. Cat.* 8306.

SILHET, *Wallich*.

Branches pale when dry. *Leaves* 5–7 by 2–2½ in., pale green when dry, membranous, rather shining above, base of lower rounded, of upper acute; petiole ⅙ in., hispid; stipules ¼–3 in., lanceolate-subulate, hispid. *Bracts* numerous, ¼–¾ in., rigid. *Calyx* small. *Corolla-tube* ⅔ in., narrow, hispid. *Drupe* not seen.

9. ***L. attenuatus***, *Jack in Trans. Linn. Soc.* xiv. 126; slender, branches and leaves beneath softly hirsute, leaves subsessile oblong-lanceolate acuminate from a broad rounded or cordate base, nerves 9–10 pair, veins loosely reticulate faint, cymes sessile, bracts linear-lanceolate equalling the flowers. *Wight in Calc. Journ. Nat. Hist.* vi. 504. *Mephitidia attenuata*, *DC. Prodr.* iv. 452.

MALACCA, *Griffith* (*Kew Distrib.* 2926);? SILHET, *De Silva*.—DISTRIB. Sumatra, Java.

Much branched. *Leaves* 2½–4 by ¾–1½ in., pale when dry, rather membranous, base often oblique, glabrous above, petiole very short; stipules ovate-lanceolate. *Bracts* ½ in. long, narrowed at the base. *Calyx-teeth* 4 linear acute. *Corolla* yellow, hairy within and without. "*Drupe* ovoid, hairy, dark blue, pyrenes 4," *Jack*.—In *Wight's Herbarium* this species is fastened on a sheet with *L. appressus*, to which his description of the moniliform hairs especially applies.

10. ***L. appressus***, *Hook. f.*; branches petioles and leaves beneath and cymes hirsute with erect or appressed pale hairs, leaves small petioled oblong-lanceolate acute, base acute, nerves 6–7 pair deeply impressed above much raised beneath, veins straight sparingly forked, bracts subulate longer than the solitary flowers. *Lasianthus*, *Wall. Cat.* 8443 and 8442, *in part*.

PENANG, *Wallich*. MALACCA; Mount Ophir, *Griffith* (*Kew Distrib.* 2927)

Branches with very dense stiff fulvous strongly septate hairs. *Leaves* 2–3 by ¾–1 in., coriaceous, very pale when dry, shining and glabrous except on the hairy midrib above, nerves above slender; petiole ⅙ in., shaggy, stout; stipules lanceolate. *Bracts* stiff, erect, ¼ in. *Flowers* very small. *Drupe* ⅙ in. diam., subglobose, crowned by the triangular acute calyx-teeth, glabrous; pyrenes 8.

11. ***L. retosus***, *Wight in Calc. Journ. Nat. Hist.* vi. 506; branches and cymes hirsute with spreading hairs, leaves shortly petioled oblong-lanceolate, midrib pubescent and 12 pair of nerves deeply impressed above, very prominent and pubescent beneath, veins straight often forked, cymes sessile small few-flowered, bracts linear or lanceolate equalling the flowers, drupes glabrous subglobose with long calyx-teeth.

MALACCA, *Griffith* (*Kew Distrib.* 2918).

Leaves 5 by $1\frac{1}{2}$ in., pale greenish brown when dry, shining above, base rounded or subacute, veins strong prominent beneath; petiole very short; stipules small, $\frac{1}{4}$ in., triangular-lanceolate. *Bracts* $\frac{1}{4}$ – $\frac{1}{2}$ in., few. *Calyx-teeth* 5 very slender, hirsute. *Corolla* 7-cleft (*Wight*). *Drupe* subglobose, not longer than its calyx-teeth, about $\frac{1}{2}$ in. diam., smooth; pyrenes 6–8.

12. ***L. pilosus***, *Wight in Calc. Journ. Nat. Hist.* vi. 506; branches and cymes hirsute with spreading hairs, leaves shortly petioled oblong-lanceolate caudate-acuminate, midrib pubescent, veins reticulating and 15–20 pair of nerves not deeply impressed above pubescent beneath, cymes sessile few-flowered, bracts subulate equalling or shorter than the flowers, drupes glabrous subglobose with long calyx-teeth.

MALACCA, *Griffith, Cuming, Maingay* (Kew Distrib. 869).

Very similar to *L. retosus*, but the leaves are larger, 4–7 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., more membranous, their bases cordate, the more numerous nerves are hardly impressed. *Calyx* hispid; teeth 5–7, filiform. *Corolla-tube* hairy, lobes 5–7. *Drupe* as in *L. retosus*, as long as its calyx-teeth; pyrenes 5–7.

VAR. ? *angustifolia*; branches more densely hirsute, leaves narrower hispid above. —Tenasserim, at Mergui, *Griffith*.

13. ***L. densifolius***, *Miq. Fl. Ind. Bat.* ii. 321; branches leaves on both surfaces and cymes hirsute with spreading hairs, leaves subsessile small close-set linear-oblong acuminate, base cordate, nerves 10–12 pair not impressed above, veins very faint loosely reticulate, cymes sessile few-flowered, bracts lanceolate or subulate, drupes pubescent 4-lobed, calyx-teeth inconspicuous. *Lasianthus*? *Wall. Cat.* 8441, *in part*.

MALACCA, PENANG, and SINGAPORE, *Wallich, Maingay* (Kew Distrib. 868), &c. —DISTRIB. Banka, Java.

Much smaller than the two preceding; internodes $\frac{1}{2}$ in. *Leaves* $1\frac{1}{2}$ – $2\frac{1}{2}$ by $\frac{1}{2}$ – $\frac{2}{3}$ in., equally hairy on both surfaces, dirty greenish when dry; stipules lanceolate, much longer than in *L. pilosus*. *Bracts* few, $\frac{1}{4}$ in. *Flowers* not seen. *Drupe* $\frac{1}{6}$ in. long, deeply 4-lobed, with very minute calyx-lobes; pyrenes 4 (4–5, *Miquel*).

14. ***L. crinitus***, *Hook. f.*; branches petioles and leaves beneath rusty-tomentose, leaves oblong acute or obtuse coriaceous, base rounded glabrous above with 8–9 pair of very indistinct nerves, veins much branched and reticulate, clusters of flowers capitate sessile dense concealed amongst the numerous filiform subsquarrose hirsute bracts. *Lasianthus*? *Wall. Cat.* 8441, *in part*.

PENANG or SINGAPORE, *Wallich*.

Leaves 5–6 by $1\frac{1}{4}$ – $1\frac{1}{2}$ in., red brown when dry, nerves and veins prominent beneath. *Cymes* meeting and almost embracing the stem, forming sessile heads $\frac{1}{4}$ in. across; bracts $\frac{1}{2}$ in. long, several to each flower. *Buds* hirsute, minute. —Of this very peculiar species I have seen a fragment in bud only in Wallich's Herbarium, fastened on a sheet with *L. densifolius*.

15. ***L. ellipticus***, *Wight in Calc. Journ. Nat. Hist.* vi. 507; branches petioles and bracts hirsute with spreading hairs, leaves shortly petioled broadly elliptic or subobovate-lanceolate acuminate, glabrous shining above with 6–8 pair of slender nerves and numerous parallel rarely forked veins which are finely silky beneath, bracts lanceolate longer than the few sessile fascicled flowers.

MALACCA, *Griffith* (Kew Distrib. 2934).

Branches not densely hirsute. *Leaves* 4–6 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., pale brown when dry, thinly membranous, base acute, very shining above; petiole $\frac{1}{8}$ in.; stipules $\frac{1}{4}$ in., lanceolate. *Bracts* $\frac{1}{4}$ – $\frac{1}{2}$ in. *Calyx-teeth* 5, $\frac{1}{8}$ – $\frac{1}{6}$ in., triangular-lanceolate, hirsute. *Corolla* not seen (hairy, 5-cleft, *Wight*). *Drupe* $\frac{1}{6}$ in. long, obovoid, hairy; pyrenes 5.

** *Bracts much shorter than the flowers.*

16. **L. tubiferus**, *Hook. f.*; glabrous, or nerves beneath and bracts puberulous, leaves petioled elliptic or elliptic-lanceolate narrowed and acuminate at both ends, nerves 5-6 pair, veins sparingly branched, flowers sessile clustered longer than the orbicular coriaceous bracts, calyx-limb campanulate shortly 5-toothed tubular after flowering. *Mephitidia*, No. 9 *Herb. Ind. Or. H. f. & T.*

KHASIA and JYNTEA HILLS, alt. 3-5000 ft., *Griffith*, &c. (*Kew Distrib.* 2923, 4, 5).

Branches dark brown or black when dry. *Leaves* 5-7 by $1\frac{1}{2}$ -2 $\frac{1}{4}$ in., rather rigid, brown when dry, opaque above; petiole $\frac{1}{6}$ - $\frac{1}{3}$ in.; stipules small, $\frac{1}{8}$ - $\frac{1}{4}$ in., triangular. *Bracts* coriaceous, glabrous and ciliate or pubescent. *Calyx* the largest of the Indian species, $\frac{1}{2}$ in., black, glabrous or pubescent; limb cylindric after flowering, and as long and nearly as broad as the ovary, coriaceous, with 5 erect triangular or lanceolate hispid teeth. *Corolla-tube* longer than the calyx, pubescent, throat villous. *Drupe* $\frac{1}{2}$ in., ovoid, black, crowned by the broad calyx-limb; pyrenes 5.

17. **L. oblongifolius**, *Bedd. Ic. Pl. Ind. Or.* t. 11; branches glabrous, petioles and nerves beneath and stipules strigose, leaves oblong or elliptic-oblong abruptly caudate-acuminate, base rounded or subacute, nerves 7 pair, veins close-set prominent sparingly branched, petiole and subulate bracts and flowers sessile fascicled hispid, calyx-teeth 5 triangular-lanceolate.

TINNEVELLY; in the Pampanussam hills, alt. 2500 ft., *Beddome*.

Shrubby. *Leaves* 6-7 by 2 in., midrib and prominent nerves slightly strigose, veins parallel and venules also very prominent; petiole $\frac{1}{2}$ in.; stipules triangular. *Flowers* 2-5 in a cluster. *Corolla-tube* very short, lobes 4.

18. **L. obscurus**, *Blume in DC. Prodr.* iv. 453 (*Mephitidia*); branches petioles stipules and nerves beneath softly tomentose, leaves petioled elliptic-lanceolate finely acuminate, base acute, nerves 7-8 pair, veins faint rarely forked, flowers fascicled sessile, bracts strigose outer ovate or oblong inner filiform or subulate, calyx-teeth lanceolate.—*Miquel Fl. Ind. Bat.* ii. 317.

MARTABAN, at Moulmein, *Parish*; SOUTH ANDAMAN ISLANDS, *Kurz*.—DISTRIB. Sumatra, Java.

Branches almost black when dry, hairs spreading, soft. *Leaves* 4-7 by 1-2 in., greenish brown when dry, smooth and opaque above, with the midrib often pubescent, beneath pubescent on and between the nerves; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules $\frac{1}{4}$ in., oblong-triangular, substrigose. *Flowers* not numerous; bracts scattered, $\frac{1}{8}$ - $\frac{1}{4}$ in.; calyx-limb cleft to the base. *Drupe* glabrous, "snow-white," *Parish*; pyrenes 5.—The Moulmein specimen precisely accords with the Sumatran and Javanese.

19. **L. Kurzii**, *Hook. f.*; branches petioles and nerves beneath hoary with minute appressed pubescence, leaves shortly petioled elliptic-oblong or lanceolate finely acuminate, base acute, nerves 9-10 pair, veins faint straight not reticulate, bracts outer ovate inner lanceolate equalling the fascicled sessile strigose flowers, calyx-teeth 5-7 lanceolate. *L. stercorarius*, *Kurz For. Fl.* ii. 31, not of *Blume*. *Rubiaceæ*, *Wall.* *Cat.* 8310, 8311.

MARTABAN, at Chappedong, *Wallich*; TENASSERIM and ANDAMAN ISLANDS, frequent, *Kurz*; PENANG ? *Wallich*.

Branches pale reddish-brown, smooth. *Leaves* 5-8 by $1\frac{1}{4}$ -2 in., firmly membranous, pale brown when dry, smooth and opaque above, finely softly pubescent on the nerves beneath, veins close-set; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules $\frac{1}{4}$ - $\frac{1}{2}$ in., oblong-lanceolate, pubescent. *Bracts* glabrous or ciliate, small, outer more or less confluent, membranous, shorter than the flowers, inner ovate. *Calyx* strigose; limb dilated, deeply cleft. *Corolla* infundibular, $\frac{1}{2}$ in., slender. *Drupe* very small, glabrous; pyrenes 5.—*Wallich's* 8310 and 8311 appear conspecific, and as his habitat of Penang is given with a doubt, they probably both come from Martaban; No. 8310 has a 6-7-cleft

calyx, larger leaves, and less crowded flowers, of which the corolla has dropped. I have seen no specimen of Kurz.

SECT. III. **Nudifloræ.** *Cymes* sessile. *Bracts* very inconspicuous, minute subulate or 0.

* *Calyx-teeth* elongate, lanceolate, rarely large and broad.

20. **L. lucidus**, *Blume Bijl.* 997; branches glabrous or minutely strigose, leaves petioled elliptic-ovate-oblong or -lanceolate caudate-acuminate, base acute, nerves 4-6 pair minutely hairy beneath, veins distant sparingly branched, flowers few sessile ebracteate, calyx-teeth lanceolate. *Miq. Fl. Ind. Bat.* ii. 319; *Kurz For. Fl.* ii. 30. *Mephitidia lucida*, *DC. Prodr.* iv. 453. *Mephitidia* No. 17, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 4-6000 ft., *Griffith, J. D. H. & T. T., &c.* UPPER TENASSERIM; Tabora (*fid. Kurz*).—DISTRIB. Java.

Branches slender, pale. *Leaves* 3-4 by 1-1½ in., green when dry, membranous, sometimes rather oblique; petiole slender, ⅓-¼ in., strigose; stipules minute, ⅓ in., triangular, acute, strigose. *Flowers* 2-3, small, sessile or very shortly pedicelled, calyx-teeth glabrous or strigose. *Corolla* ½ in., white; tube slender, hairy; lobes hairy within. *Drupe* ¼ in. diam., pale blue, glabrous, smooth, crowned by the calyx-teeth; pyrenes 4.

21. **L. Hookeri**, *C. B. Clarke mss.*; branches petioles stipules and nerves beneath puberulous or minutely strigose, leaves petioled elliptic-lanceolate caudate-acuminate, base subacute or rounded, margins obscurely waved or crisped, nerves 5 pair, veins sparingly forked, flowers sessile fascicled ebracteate, calyx-teeth lanceolate. *Mephitidia* No. 18, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., near Churra, alt. 4000 ft., *J. D. H. & T. T., C. B. Clarke.*

Branches pale. *Leaves* often deflexed, 6-9 by 1-2½ in., pale green when dry, opaque, rigidly membranous; nerves obliquely arched; petiole ⅓-¼ in.; stipules ½ in. *Flowers* 3-8 in a fascicle; bracts very minute or 0. *Calyx* glabrous or nearly so, teeth erect. *Corolla-tube* hairy. *Drupe* ovoid, ½ in. diam., crowned by the calyx-limb and teeth; pyrenes 6.

22. **L. Blumianus**, *Wight in Calc. Journ. Nat. Hist.* iv. 507; glabrous except at the bases of the flowers and tips of the shoots, leaves stoutly petioled elliptic-lanceolate caudate-acuminate, base subacute or obtuse, nerves 4-5 pair, veins very slender branched and reticulate, flowers sessile or subsessile, bracts minute subulate, calyx-teeth lanceolate membranous much longer than the tube. *Bedd. Ic. Pl. Ind. Or. t.* 22.

TRAVANCORE, at Courtallam, alt. 3500 ft., *Wight, Beddome.*

Branches slender, pale. *Leaves* 3-6 by 1-2 in., greenish or brown when dry, stiffly membranous, opaque above, with faint arching nerves; petiole ⅓-½ in.; stipules triangular-lanceolate, ⅓ in., glabrous or pilose. *Flowers* few or crowded, on a thickened pubescent axis, sometimes very shortly pedicelled; bracts rarely ½ in., strigose. *Calyx* ¼-½ in. long, tube short; lobes 4-5, narrow, erect. *Corolla* glabrous or nearly so, tube hardly equalling the calyx. *Ovary* "3-5-celled," *Wight*. *Drupe* not seen.—The calyx is quite peculiar.

23. **L. ciliatus**, *Wight in Calc. Journ. Nat. Hist.* vi. 509; branches petioles leaves beneath and cymes densely villously hirsute with spreading hairs, leaves stoutly petioled elliptic-oblong acute or acuminate coriaceous, base acute, nerves 6-8 pair deeply impressed above, veins beneath strong often forked, bracts obsolete, flowers sessile fascicled 3-4-merous, calyx-teeth broad large.

NILGHERY MTS.; Sisparah, *Wight, &c.*

Branches stout, densely clothed with fulvous or brown hairs. *Leaves* 6-8 by 1-1½ in., yellowish brown when dry, opaque, with glabrous nerves above, margins usually

strongly ciliate, veins beneath strong, parallel; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; stipules $\frac{1}{2}$ – $\frac{3}{4}$ in., lanceolate, hirsute. *Bracts* replaced by stiff bristly hairs. *Calyx-teeth* obconic; lobes 3–4, broadly oblong, obtuse, hispid. *Corolla* “small, very hairy on both sides,” *Wight*. *Drupe* size of a pea, subglobose, glabrous; pyrenes 3–4, rugose on the back.

VAR. rostrata; leaves shorter more cuspidate, venules closer. *L. rostratus*, *Wight Ic.* 510.—Shevagherry hills and Courtallam, *Wight*.

24. ***L. Thwaitesii***, *Hook. f.*; branches slender and petioles and leaves beneath softly tomentose, leaves petioled lanceolate acuminate, coriaceous, base acute nerves 4 pair obscure above, veins laxly reticulated, flowers few or sub-solitary sessile ebracteate, calyx tomentose, lobes lanceolate spreading. *Mephitidia tomentosa*. *Thw. Enum.* 145.

CEYLON; Ambagamowa district, alt. 3000 ft., *Thwaites*.

Branches slender, pubescence dark brown. *Leaves* 2–4 by $\frac{1}{2}$ –1 in., coriaceous, brown when dry, rather shining above, rusty-brown beneath; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; stipules $\frac{1}{2}$ in., lanceolate. *Flowers* small, $\frac{1}{4}$ in. long. *Calyx-tube* campanulate. *Corolla* white, pubescent, tube short. *Drupe* “size of a pea, black,” *Thwaites*.—*Thwaites* considers this closely allied to, and perhaps a form of *Gardneri*. I have seen but one specimen of each, and they are very dissimilar.

25. ***L. rhizophyllus***, *Thw. Enum.* 145 (*Mephitidia*); branches slender compressed scabrid, leaves petioled lanceolate long acuminate, membranous glabrous shining, base acute, veins delicate, flowers few sessile, calyx hairy, teeth rather long linear-lanceolate.

CEYLON; Adam's Peak, *Gardner*.

Leaves 2–3 by $\frac{1}{2}$ –1 in., petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.—The above description is copied from *Thwaites*, whose specimens are not perfect enough to enable him to complete the diagnosis.

** *Calyx-teeth minute, subulate or triangular.*

26. ***L. strigillosus***, *Hook. f.*; branches petioles and nerves beneath strigillose with appressed soft hairs, leaves petioled narrowly oblong-lanceolate acuminate, base acute or rounded, nerves 8 pair strong beneath, veins sparingly forked, bracts obsolete, flowers few sessile 5-merous, calyx-teeth minute triangular. *L. acuminatus*, *Wight Herb. Rubiaceæ, Wall. Cat.* 8324, *in part*.

TRAVANCORE; Shevagherry Hills and Courtallam, *Wight*.

Branches rather short. *Leaves* 4–6 by 1–1 $\frac{1}{2}$ in., pale when dry, rigid, coriaceous, not ciliate, midrib and nerves glabrous and rather raised above; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; stipules $\frac{1}{2}$ in., triangular. *Flowers* subsolitary or fascicled, sessile. *Calyx* hispid. *Corolla* hirsute, tube probably elongate. *Drupe* (unripe) $\frac{1}{2}$ in. diam., glabrous, crowned with the triangular calyx-teeth.—Allied to *L. truncatus*, *Bedd.*, but the nervation and calyx are different. *Wallich's* specimen on the same sheet with *L. venulosus* (also a Western Peninsula plant) is marked by error as from *Silhet*. Near *L. ciliatus*, but the leaves are nearly glabrous beneath and the calyx-teeth very different.

27. ***L. acuminatus***, *Wight in Calc. Journ. Nat. Hist.* vi. 511; branches petioles and nerves beneath appressed puberulous or glabrate, leaves petioled elliptic-lanceolate finely acuminate thin and rigid, base acute, nerves 5 pair strong, veins very close, flowers 1–5 sessile ebracteate, calyx hairy, teeth triangular, corolla glabrous externally.

TRAVANCORE; Pulney and Shevagherry Hills, alt. 7000 ft., *Wight, Beddome. MALABAR? Stocks. NILGHERY MTS.*, at Conoor, alt. 6000 ft., *C. B. Clarke*.

Branches slender, pale. *Leaves* 4–5 by 1–1 $\frac{1}{2}$ in., pale greenish brown when dry, nerves beneath pale, veins closer than in any Indian species except *L. parvifolius*; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules $\frac{1}{2}$ in., triangular-lanceolate. *Flowers* 3–4-merous. *Calyx* hirsute, teeth minute. *Corolla-tube* $\frac{1}{10}$ in., glabrous, hairy within. *Ovary* 3–4-celled. *Drupe* not seen.

28. **L. parvifolius**, *Wight in Calc. Journ. Nat. Hist.* vi. 512; quite glabrous, leaves small petioled elliptic acute shining above coriaceous, base acute, nerves 2-3 pair strong, veins very close much forked, flowers 2-3 sessile 4-merous, bracts minute or obsolete, calyx-teeth small obtuse, corolla glabrous externally.

TRAVANCORE; Courtallam, *Wight*.

Branches slender. Leaves $1\frac{1}{2}$ -2 by $\frac{2}{3}$ -1 in., pale brown when dry; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in.; stipules $\frac{1}{10}$ - $\frac{1}{8}$ in., triangular, acute. Flowers very small. Calyx glabrous; teeth minute, triangular. Corolla-tube $\frac{1}{4}$ in., glabrous; throat and lobes within hairy. *Drupe* "size of a pea," *Wight*, globose, glabrous; pyrenes 3-4.

29. **L. obovatus**, *Bedd. Ic. Pl. Ind. Or.* t. 10; glabrous, leaves small petioled obovate obtuse coriaceous, nerves 4-5 pair and veins very indistinct, flowers 1-3 sessile ebracteate, calyx-teeth ovate or triangular.

TRAVANCORE, on the Athramallay Mts., alt. 5000 ft., *Beddome*.

Shrubby, much branched; branches very short with short internodes, black. Leaves hardly distichous, 1 by $\frac{2}{3}$ in. almost black when dry, with recurved margins; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in.; stipules triangular, $\frac{1}{8}$ in. Flowers 4-merous. Calyx campanulate, puberulous; teeth ovate or triangular. Corolla-tube very short, glabrous, throat villous. *Drupe* not seen.

30. **L. Walkerianus**, *Wight in Calc. Journ. Nat. Hist.* vi. 512; quite glabrous or young shoots puberulous, leaves petioled elliptic-oblong or lanceolate or obovate apiculate acute or acuminate very coriaceous, nerves 7-8 pair very slender, veins copiously reticulate hardly parallel, flowers fascicled sessile, bracts 0, calyx-teeth 4 small triangular obtuse. *Mephitidia Walkeriana*, *Thw. Enum.* 145. *M. varians*, *Thw. l. c. in part* (C. P. 290).

CEYLON; Central Province, alt. 5-6000 ft., *Macrae, Walker, &c.*

Thwaites distinguishes this doubtfully as a species from *L. strigosus* by the narrower more acuminate leaves almost or wholly glabrous beneath, and shorter flowers; but these are not the characters of *Wight's* authentic specimens, which have shorter more coriaceous leaves than *L. strigosus*, with very much reticulated venules; in small specimens the leaves are only 2 in. long, obtuse and apiculate, with a longer petiole in proportion. It looks more like a mountain dwarf form of *L. strigosus* with rigid leaves and small flowers, but the calyx is quite different; it accords with Thwaites sessile flowered form of *Mephitidia varians*.

VAR. *lanceolatus*; leaves narrowly lanceolate 3-5 by $\frac{1}{2}$ -1 in.—Ceylon, *Macrae* and *Thwaites* (C. P. 80, 340, 1728).

31. **L. oliganthus**, *Thw. Enum.* 146 (*Mephitidia*); branches slender tips and petioles appressed pubescent, leaves elliptic-lanceolate long-acuminate membranous shining, nerves 5 pair very slender hardly distinguishable from the laxly reticulating veins, flowers subsolitary ebracteate.

CEYLON; Hantani district, *Thwaites*.

Very closely allied to *L. strigosus*, and, as Thwaites remarks, probably a form growing in poor dry soil, but the nervation of the leaf is different. The only specimens seen have no flowers; Thwaites describes them as in few-flowered heads, small, with short acute calyx-teeth.

32. **L. Gardneri**, *Thw. Enum.* 145 (*Mephitidia*); stem stout glabrous or nearly so, leaves large petioled oblong-lanceolate acuminate, base acute glabrous or hairy on the 8 pair of nerves beneath, veins faint and reticulated, flowers crowded sessile ebracteate, calyx substrigose, teeth ovate-lanceolate acute.

CEYLON; Newera Ellia and Adam's Peak, *Gardner*.

Branches black, as thick as a goose-quill. Leaves 3-8 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., brown when dry, coriaceous, opaque; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in., glabrous or strigose; stipules very small, $\frac{1}{8}$

in., triangular strigose. *Flowers* rather numerous; bracts 0 or minute, subulate. *Calyx* black, tube obconic; teeth coriaceous, hispid at the tips. *Corolla* "somewhat hairy without, villous within, tube short," *Thwaites*.—I have seen but one specimen from Adam's Peak (C. P. 348), which differs from Thwaites' description in the glabrous branches, and in the veins being only obscurely parallel (for the genus); it a good deal resembles a form of *L. strigosus*.

33. *L. inconspicuus*, Hook. f.; glabrous, leaves petioled elliptic caudate-acuminate opaque above, base acute, nerves 5–6 pair spreading and veins inconspicuous, flowers clustered sessile small ebracteate, calyx-teeth 5 triangular acute. *Hypatianthera stricta*, *Wall. Cat.* 8313 L.

SILHET, Wallich.

Branches very slender, strict, quite glabrous except the youngest tips. *Leaves* $3\frac{1}{2}$ –5 by $1\frac{1}{4}$ to $1\frac{3}{4}$ in., rigid, dull greenish when dry, tip very long and slender; nerves very obscure above, veins beneath visible rather distant branched; petiole slender, $\frac{1}{4}$ in., puberulous; stipules small, triangular, tips pubescent. *Flower* in very small pubescent axillary clusters. *Calyx* glabrous; limb dilated, cup-shaped; teeth erect. *Corolla-tube* slender, pubescent (seen in bud only about $\frac{1}{4}$ in. long). *Drupe* $\frac{5}{8}$ in. diam., globose, smooth, crowned by the calyx-teeth; pyrenes 4–5.

34. *L. lancifolius*, Hook. f.; branches above petioles and midrib beneath hoary-puberulous, leaves petioled long narrowly oblong-lanceolate caudate-acuminate membranous, nerves 9 pair very slender, veins horizontal sparingly forked, flowers sessile ebracteate, calyx-teeth subulate short. *Mephitidia*, 12 *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 3–4000 ft., *Griffith* (Kew Distrib. 2916), *J. D. H. & T. T.*

Branches pale. *Leaves* 7–9 by 1 – $1\frac{1}{2}$ in., greenish when dry, somewhat shining on both surfaces; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; stipules $\frac{3}{8}$ – $\frac{1}{2}$ in., narrowly triangular, villous. *Flowers* crowded. *Calyx* puberulous. *Corolla-tube* $\frac{1}{2}$ in., puberulous, slender; lobes hairy within. *Drupe* $\frac{1}{4}$ in. diam., globose, blue; pyrenes 5.

35. *L. chinensis*, Benth. Fl. Hongk. 160; branches short petioles nerves beneath and flowers finely appressed pubescent, leaves large stoutly petioled elliptic-lanceolate caudate-acuminate coriaceous, base acute, nerves 10–12 pair, veins much reticulated, flowers sessile clustered ebracteate, calyx-teeth small narrow ovate-lanceolate. *Mephitidia chinensis*, *Champ. in Kew Journ. Bot.* iv. 196.

MALACCA; Pulo Bissar forest, *Griffith* (Kew Distrib. 2920), *Maingay* (865).—*DISTRIB.* Hongkong, Formosa.

Branches as thick as a goose-quill, black when dry. *Leaves* 6–8 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., brown when dry, rather shining and quite glabrous above; nerves not strong above, prominent beneath; petiole $\frac{3}{8}$ – $\frac{1}{2}$ in.; stipules small, $\frac{1}{2}$ in., narrowly triangular. *Calyx-limb* campanulate, tomentose. *Drupe* subglobose, obtusely angled, $\frac{1}{8}$ in. diam., pubescent, crowned by the calyx-teeth; pyrenes 4–5.

36. *L. longifolius*, Wight in Calc. Journ. Nat. Hist. vi. 514; branches stout glabrous, leaves very large shortly stoutly petioled elliptic-oblong or oblong-lanceolate acuminate shining above scabrid beneath, base acute, nerves 15–18 pair, veins much reticulated, stipules very coriaceous, flowers sessile crowded ebracteate or bracts minute, calyx-teeth short triangular.

MALACCA, *Griffith* (Kew Distrib. 2936), *Maingay* (867).

Branches as thick as a goose-quill, black when dry. *Leaves* 12–16 by $3\frac{1}{2}$ – $4\frac{1}{2}$ in., thinly coriaceous, brown when dry, nerves moderately arching, scabridity of under-surface from rigid minute hairs on the nerves to microscopic points on the leaf-surface; petiole $\frac{1}{2}$ in., black, glabrous; stipules $\frac{1}{4}$ – $\frac{1}{2}$ in. long, oblong-ovate, obtuse, very coriaceous, glabrous. *Flowers* sessile and subsessile; bracts minute, subulate, strigose. *Calyx* hemispheric, black, glabrous; limb shortly tubular, truncate or obscurely irre-

gularly toothed. *Corolla* infundibular; tube glabrous, hardly exceeding the calyx-limb; lobes 5, triangular-lanceolate, narrow, villous within. *Ovary* 1-celled. *Drupe* unripe, glabrous, crowned with the tubular calyx-limb.—This very fine species is by the stipules and other characters closely allied to *L. Helferi*, next which it should rank though it has minute bracts.

37. **L. Maingayi**, *Hook. f.*; branches petioles nerves beneath and flowers minutely substrigose appressed-pubescent, leaves large shortly petioled elliptic-oblancheolate or elliptic-oblong membranous acuminate, base acute, nerves 7 pair, veins strong sparingly reticulate, flowers densely clustered sessile and shortly pedicelled ebracteate, calyx-teeth 4 triangular minute.

MALACCA, *Maingay* (Kew Distrib. 871).—DISTRIB. Sumatra.

Branches slender for the size of the foliage, minutely granulate, pale yellowish red when dry, and rather rough to the touch. *Leaves* 8–10 by $2\frac{1}{2}$ – $3\frac{1}{2}$ in., pale greenish when dry, thinly scaberulous beneath, opaque on both surfaces, nerves oblique: petiole $\frac{1}{2}$ in.; stipules very small, $\frac{1}{2}$ in., triangular, acute, strigose. *Flowers* crowded. *Calyx* short, pubescent. *Corolla* funnel-shaped, $\frac{1}{2}$ in. long, puberulous or glabrate; lobes pubescent within. *Drupe* not seen.

38. **L. pterospermus**, *Wight in Calc. Journ. Nat. Hist.* vi. 510; branches petioles and nerves beneath glabrous or finely puberulous, leaves subsessile oblong or elliptic-oblong acuminate, base rounded often oblique rarely acute, nerves 10–12 pair, veins reticulate, flowers sessile crowded hispid, calyx-teeth triangular, pyrenes 2-winged.

MALACCA, *Griffith* (Kew Distrib. 2929), *Maingay* (866).

Branches as thick as a crow-quill. *Leaves* 4–7 by $1\frac{1}{2}$ – $2\frac{1}{4}$ in., pale brownish when dry, rather coriaceous; petiole $\frac{1}{10}$ in.; stipules oblong-lanceolate, $\frac{1}{2}$ in., strigose. *Flowers* numerous, bracts very minute or 0. *Calyx* hispid. *Corolla* glabrate. *Drupe* large, $\frac{1}{2}$ in. diam., globose, glabrous, black, crowned by the shortly tubular calyx-limb; pyrenes 3–5, trigonous, with a longitudinal wing on each side of the convex or keeled back.—Wight is in error in calling the stipules small.

39. **L. Wightianus**, *Hook. f.*; branches petioles and leaves beneath scaberulous or strigillose, leaves petioled oblong acuminate rigid, base subacute or rounded, nerves 12–13 pair, veins branched and reticulate, flowers sessile clustered ebracteate, calyx-teeth triangular. *L. venosus*, *Wight in Calc. Journ. Nat. Hist.* vi. 514, not of *Blume*.

MALACCA; on Mt. Ophir, *Griffith*.

Branches very stout, woody, brown. *Leaves* 3–4 by 1 – $1\frac{1}{2}$ in., dark brown when dry, midrib and nerves very strong beneath, pubescent on both surfaces; petiole $\frac{1}{2}$ in., stout; stipules $\frac{1}{2}$ – $\frac{3}{4}$ in., broadly triangular or lanceolate, coriaceous, hirsute. *Flowers* few. *Calyx* $\frac{1}{2}$ in., fulvous-pubescent. *Corolla* (in bud) hirsute. *Drupe* not seen.

*** *Calyx-limb tubular or cupular, truncate or minutely toothed.*

40. **L. constrictus**, *Wight in Calc. Journ. Nat. Hist.* vi. 515; branches petioles stipules and nerves beneath sparsely strigose, leaves petioled oblong-lanceolate acuminate, base acute, nerves 5–6 pair, veins loosely reticulate, flowers small sessile crowded subebracteate, calyx constricted at the base of the cupular shortly 4-toothed limb. *Kurz For. Fl.* ii. 31. *Mephitidia* sp., *Griff. Notul.* iv. 267, t. 474, f. 4.

TENASSERIM and the ANDAMAN ISLANDS, *Griffith, Kurz*.

Branches slender, pale. *Leaves* 3–7 by 1 – $1\frac{1}{2}$ in., very pale, yellowish brown, hardly shining, texture thin; petiole $\frac{1}{2}$ in.; stipules small, $\frac{1}{2}$ in., triangular, acuminate. *Flowers* pale, sparsely pubescent; bracts 0 or minute, subulate, deciduous. *Calyx* $\frac{1}{12}$ in., tube ellipsoid. *Corolla* "hirsute, tube $\frac{1}{4}$ in., lobes as long. *Drupe* ovoid, size of a small pea, glabrous, crowned by the large almost truncate calyx-limb": *Kurz*.

41. **L. pauciflorus**, *Wight in Calc. Journ. Nat. Hist.* vi. 515; branchlets petioles and leaves beneath softly hispid with close-set spreading white hairs, leaves subsessile elliptic-lanceolate acuminate, base acute, nerves 4-5 pair, veins faint loosely reticulate, flowers few sessile ebracteate.

TENASSERIM; at Mergui, *Griffith*.

Branches very slender, pale straw-coloured. *Leaves* 3-4 by $\frac{3}{4}$ - $1\frac{1}{2}$ in., very thin, pale brownish when dry, glabrous above; petiole $\frac{1}{12}$ in.; stipules lanceolate with long subulate points, strigose, deciduous.

42. **L. truncatus**, *Bedd. Ic. Pl. Ind. Or.* t. 9; branches petioles and nerves beneath appressed-pubescent, leaves petioled narrowly elliptic-lanceolate finely acuminate, base acute, nerves 7-8 pair and parallel, veins strong beneath, flowers subsolitary sessile ebracteate, calyx-limb tubular truncate subentire, corolla pubescent.

ORISSA; Myhendra Mts., in Ganjam, alt. 4500 ft., *Beddome*.

Shrubby; branches black when dry. *Leaves* 5-6 by $\frac{3}{4}$ - $1\frac{1}{2}$ in., grey-brown when dry, shining above, finely pubescent beneath; petiole $\frac{1}{10}$ - $\frac{1}{8}$ in.; stipules $\frac{1}{2}$ - $\frac{3}{4}$ in., triangular, acuminate, hirsute. *Flowers* often solitary, ebracteate. *Calyx* glabrous, tube ovoid, limb narrowed upwards. *Corolla* $\frac{2}{3}$ in. long; tube slender, pubescent; lobes 5. *Drupe* not seen.

43. **L. strigosus**, *Wight in Calc. Journ. Nat. Hist.* vi. 512; young branches petioles and nerves beneath strigillose with appressed hairs, leaves shortly petioled elliptic-lanceolate acuminate shining above, base acute, nerves 7-9 pair, slender veins parallel branched and sparingly anastomosing, flowers few sessile, bracts 0 or minute, calyx-limb truncate, teeth 5 minute. *Mephitidia strigosa*, *Thw. Enum.* 146. *M. varians*, *Thw. l. c.* (C. P. 80, 1728).

CEYLON; Central Province and Saffragam district, alt. 2-5000 ft., *Walker, &c.*

Branches slender. *Leaves* 4-6 by $1-1\frac{3}{4}$ in., rather coriaceous, brown when dry, nerves not very prominent beneath; petiole $\frac{1}{2}$ - $\frac{1}{3}$ in.; stipules small, triangular, acute. *Flowers* in small fascicles. *Calyx* glabrous or strigose. *Corolla* white; tube $\frac{1}{2}$ in., glabrous or nearly so; throat villous, limb $\frac{1}{4}$ in. diam. *Drupe* $\frac{1}{2}$ in. ($\frac{1}{2}$ in. diam. when fruiting, *Thwaites*), subspherical, black, opaque; pyrenes 4-5.

VAR. nitida, *Thwaites*? *an species distincta*; leaves small $2\frac{1}{2}$ - $3\frac{1}{2}$ in. narrowly lanceolate very coriaceous pale when dry shining on both surfaces, midrib beneath very stout, veins obscure.—Adam's Peak, *Thwaites* (C. P. 3910).—This is a very doubtful plant; I have seen no flowers or fruit.

VAR. protracta; leaves lanceolate finely acuminate 7-8 by $1\frac{1}{2}$ -2 in., veins less branched straighter. *Mephitidia protracta*, *Thw. Enum.* 146.—Ceylon, Central Province, *Gardner*.

44. **L. andamanicus**, *Hook. f.*; branches petioles nerves beneath and flowers finely appressed pubescent, leaves petioled narrowly elliptic-oblong or lanceolate acuminate, base acute, nerves 9-10 pair, veins somewhat reticulate, flowers sessile clustered pubescent ebracteate, calyx-limb shortly tubular truncate. *Rubiacea*, *Wall. Cat.* 8309.

TENASSERIM; at Amherst, *Wallich*. ANDAMAN ISLANDS, *Helper* (Kew Distrib. 2993), *Kurz*.

Branches almost black when dry. *Leaves* 6-8 by $\frac{3}{4}$ -2 in., rather coriaceous and shining above, brown when dry; petiole $\frac{1}{4}$ in.; stipules small, $\frac{1}{2}$ in., triangular, pubescent. *Clusters* of flowers small. *Calyx-limb* enlarged, cupular, margin entire. *Corolla-tube* slender, $\frac{1}{2}$ in., and lobes villous without and within; limb $\frac{1}{2}$ in. diam. *Drupe* $\frac{1}{2}$ in., globose, obtusely angled, crowned by the large tubular calyx-limb, pubescent; pyrenes 4.

45. **L. Helferi**, *Hook. f.*; branches robust glabrous, leaves petioled narrowly oblong-lanceolate acuminate, base acute, nerves 10-12 pair finely pubescent

beneath, veins much reticulated, stipules coriaceous glabrous, flowers sessile clustered ebracteate glabrous, calyx-limb very shortly tubular truncate obscurely lobed.

TENASSERIM OF ANDAMAN ISLANDS, *Helper* (Kew Distrib. 2921).

Branches black when dry, perfectly glabrous, as are all parts of the plant except the nerves beneath and inside of stipules. *Leaves* 4-6 by 1-1½ in., pale brownish when dry, shining above, hardly coriaceous; nerves and veins very slender; petiole ¾-1 in.; stipules ¼ in., triangular-lanceolate, very coriaceous, glabrous without, hirsute within, pressed outwards and downwards by the enlarging ovaries, finally pale brown and polished. *Flowers* in small clusters. *Calyx* quite black when dry, limb coriaceous. *Corolla* not seen. *Drupe* ⅙ in. diam., glabrous, subglobose, 6-lobed, areolate at the top, the shortly 5-lobed calyx-limb pressed flat on the crown; pyrenes 6.

SECT. IV. **Pedunculatæ.** *Cymes* peduncled (see also *S. L. Moonii*).

46. **L. longicauda**, *Hook. f.*; glabrous, leaves petioled lanceolate very long caudate-acuminate, base acute, nerves 8-10 pair very slender spreading hardly distinct from the veins, cymes or short peduncles few-flowered, bracts 0 or minute, calyx-teeth triangular. *Mephitidia* 18, *Herb. Ind. Or. H. f. & T.*

MISHMI HILLS (Upper Assam), *Griffith*; KHASIA Mts., alt. 5-7000 ft., *J. D. H. & T. T.*

A branching bush; branches slender, tips puberulous. *Leaves* 4-5 by ¾-1½ in., greenish when dry, opaque, tailed extremity one third of their length very slender (by far the most so of the genus), midrib strong, nerves looped; petiole ¼-½ in.; stipules ⅙ in., rusty-pubescent. *Peduncle* ⅛-¼ in., 3-8-flowered; flowers sessile, usually 4-merous. *Calyx* minute, puberulous. *Corolla* ⅙ in., glabrous. *Drupe* ⅙ in. diam., globose, blue, calyx-teeth inconspicuous; pyrenes 4.

47. **L. micranthus**, *Hook. f.*; young shoots petioles nerves beneath and cymes minutely strigose, leaves petioled ovate-lanceolate acuminate, base rounded membranous, nerves 5-6 pair, veins rarely branched, flowers very small sessile on a short peduncle ebracteate, calyx-teeth triangular-subulate.

MISHMI HILLS (Upper Assam), *Griffith*.

Branches slender, glabrous, pale. *Leaves* 4-6 by 1-1½ in., very pale greenish when dry; petiole ⅙-¼ in.; stipules small, ⅙-¼ in., triangular strigose. *Peduncles* shorter than the petioles; flowers sessile. *Calyx* ⅛ in.; teeth spreading, hirsute. *Corolla* and *Drupe* not seen.

48. **L. Biermanni**, *King mss.*; branches petioles cymes and nerves beneath minutely strigose, leaves petioled elliptic or elliptic-lanceolate cuspidate acuminate or caudate, base acute, nerves 5-7 pair, veins branched and reticulate, flowers sessile or pedicelled in short peduncles bracteolate, calyx-teeth ovate or lanceolate.

SIKKIM HIMALAYA, alt. 5-8000 ft., *Thomson, &c.*; KHASIA Mts., alt. 4-6000 ft., *Griffith, &c.*

Branches slender, pale when dry. *Leaves* 5-7 by 1-2 in., greyish green when dry, rather membranous, opaque, sometimes pale beneath, tip sometimes 1-1½ in., and very slender; petiole ¼-½ in.; stipules ⅙ in., triangular, hairy. *Peduncles* equalling the petioles; flowers sessile and pedicelled; bracts small, linear or subulate. *Calyx* strigose. *Corolla* ⅙-½ in., rosy or pale lilac, glabrous, throat and 5-6 lobes villous. *Drupe* ¼ in. diam., subglobose, blue, crowned by the conniving calyx-teeth, glabrous; pyrenes 6, rugose on the back.—Some Sikkim specimens have very small corollas, ⅙ in. long and pubescent, probably the flowers are dimorphic. The species approaches a Bornean one (*Beccari*, n. 3227).

49. **L. venulosus**, *Wight in Calc. Journ. Nat. Hist.* vi. 508; glabrous, leaves small petioled ovate oblong or elliptic acute acuminate or mucronate,

very coriaceous, base rounded, nerves 7-9 spreading, veins closely reticulated, flowers sessile or pedicelled and subracemose on a short stout peduncle, bracts subulate, calyx-teeth subulate. *Wight Ic. t. 1032*; *Bedd. Fl. Sylv. Anal. Gen. t. xvii. f. 5. Santia venulosa, W. & A. Prodr. 422. Rubiacea, Wall. Cat. 8324, in part (locality of Silhet erroneous), 8459.*

NILGHERRY Mts., alt. 6-8000 ft., common.

A very robust leafy much-branched shrub; branches black when dry. *Leaves* 1-3½ by ½-1 in., reddish-brown when dry, midrib and petiole (½-¾ in.) very stout, nerves prominent on both surfaces; stipules small, ½ in., triangular or narrower. *Peduncles* longer than the petioles, pedicels hairy. *Calyx* hirsute, teeth 4-5, erect or recurved. *Corolla* ½ in., yellowish, glabrous without, throat and lobes within villous. *Drupe* ½ in. diam., blue, crowned by the calyx-teeth; pyrenes 3-5, thick-walled.

50. ***L. capitulatus***, *Wight in Calc. Journ. Nat. Hist. vi. 511*; branches strigose pubescent or glabrate, leaves petioled lanceolate acuminate base acute coriaceous, nerves 7-9 pair, veins sparingly branched and reticulate, flowers sessile on a short peduncle bracteate, calyx-teeth small.

NILGHERRY Mts.; Sisparah, *Wight*; Conoor, alt. 7000 ft., *C. B. Clarke*.

A much larger and longer-leaved plant, with a narrower leaf-base than *L. venulosus*, not so stout, with less reticulated veins, the flowers capitate and corolla hirsute without; but my specimens are very incomplete. *Leaves* 4-6 by 1-1½ in. in one of *Wight's* specimens, 4-5 by 1½-2½ in. in another, which has the veins scarcely branched. *Peduncles* shorter than the petioles; bracts subulate; flowers pubescent. *Drupe* globose, ½ in. diam., crowned by the recurved calyx-teeth, smooth, glabrous; pyrenes 2-4, larger and much thinner-walled than in *L. venulosus*.

51. ***L. dichotomus***, *Wight in Calc. Journ. Nat. Hist. vi. 508*; glabrous, leaves petioled oblong or ovate-rarely obovate-oblong base rounded or cordate, nerves 6-8 pair, veins very close-set straight, flowers sessile and on the branches of a slender peduncle, bracts subulate, calyx-teeth long lanceolate. *Bedd. Ic. Pl. Ind. Or. t. 13.*

TRAVANCORE; Shevagherry and Courtallam hills, *Wight, Beddome*.

Branches pale. *Leaves* 2-4 by ¾-1½ in., pale brown when dry, rather thin, nerves strong, veins faint; petiole ½ in., sometimes strigose on the upper face; stipules small, ⅙ in., lanceolate, acute, glabrous. *Cymes* including the very slender peduncle 1-1½ in., irregularly sparingly dichotomously branched; bracts ⅙-½ in. long. *Calyx* ½ in. long, teeth 3-4, spreading tips hairy. *Corolla-tube* exceeding the calyx-teeth, at length glabrous, lobes hirsute within. *Ovary* 3-4-celled. *Drupe* not seen.

52. ***L. varians***, *Thw. Enum. 146 (Mephitidia)*, partly; quite glabrous, leaves small petioled shortly oblong apiculate base subacute or rounded, nerves 6-8 pair hardly distinguishable from the loosely reticulated veins, flowers few sessile or shortly pedicelled on the top of a rigid filiform peduncle, bracts subulate, calyx-teeth subulate.

CEYLON; Central Province, Galagama, alt. 5-8000 ft., *Thwaites*.

Branches slender, black when dry. *Leaves* 1½-2 by ¾-1½ in., coriaceous, black-brown when dry, midrib excurrent as a firm point; petiole long and slender for the genus, ½-¾ in.; stipules very small, ⅙ in., triangular. *Peduncles* very slender, strict, 1 in. and less, surmounted with a pair of subulate bracts ⅙ in. long. *Calyx* glabrous, tube unecolate glabrous, longer than the subulate teeth. *Corolla* and *Drupe* not seen. *Ovary* 3-celled.—*Thwaites* includes under this species some states of *strigosus*, which differs in the inflorescence and calyx, as does its much nearer ally *L. Walkerianus*, which has a similar venation and excurrent midrib, and specimens of which are also included by *Thwaites* under *L. varians*.

DOUBTFUL SPECIES.

L. OBLIQUUS, *Thw. Enum.* 146 (*Mephitidia oligantha*, var. *β. obliqua*); branches slender with scattered strigose hairs, leaves subsessile ovate or oblong-lanceolate from a rounded or cordate oblique base caudate-acuminate membranous shining above, nerves 5-6 pair very slender hardly distinguishable from the laxly reticulating veins.—Ceylon; Saffragam district, up to 3000 ft., *Gardner, Thwaites*.—The broad leaves with rounded or cordate bases, and wide-spreading nerves of this plant, are so different from any of the many forms of the preceding described species, that I adopt Thwaites' opinion of its being distinct.

MEPHITIDIA, sp., *Griff. Ic. Pl. Asiat.* t. 476, is probably a *Psychotria*.

80. *SAPROSMA*, *Blume*.

Shrubs, fœtid when bruised, with often subulate bristles at the tips of the branches and bases of the peduncles. *Leaves* opposite or 3-4 whorled, membranous; stipules interpetiolar, usually connate, 1-3-pointed, deciduous. *Flowers* small, white, axillary or terminal, solitary or fascicled, sessile or cymose and peduncled; bracts and bracteoles minute, often connate. *Calyx-tube* obconic; limb dilated, 4-6-lobed or -toothed, persistent. *Corolla* bell- or funnel-shaped, throat villous; lobes 4-5, broad, obtuse, valvate with inflexed flat or crisped margins. *Stamens* 4-5 in the corolla-throat, filaments short or 0; anthers linear or oblong. *Ovary* 2-celled; style filiform, arms 2 short; ovules 1 basal erect in each cell. *Drupe* small; pyrenes 1-2 crustaceous. *Seeds* ellipsoid and solitary or 2 and plano-convex, ventral face not grooved, testa membranous; cotyledons small foliaceous, radicle slender inferior.—*DISTRIB.* Species 8, tropical Asiatic and Malayan.

SECT. I. *Eusaprosma*. *Flowers* in small cymes. *Anthers* subsessile. *Seeds* ellipsoid, usually solitary.—*Leaves* opposite.

1. *S. indicum*, *Dalz. in Hook. Kew Journ.* iii. 37; glabrous, leaves sessile oblong or elliptic-oblong acuminate base narrowed or rounded, flowers few terminal, calyx-teeth minute triangular. *Dalz. & Gibbs. Bomb. Fl.* 112. *Dysodidendron glomeratum*, *Gardn. in Calc. Journ. Nat. Hist.* vii. 3. *S. glomeratum*, *Bedd. Ic. Pl. Ind. Or.* t. 16.

WESTERN PENINSULA; on the Ghats from Bombay southwards, ascending to 4000 ft.

Branches pale, ultimate compressed. *Leaves* 3-5 by $\frac{3}{4}$ -1 $\frac{3}{4}$ in., thin; stipules $\frac{1}{6}$ in., connate, often 3-cuspidate. *Flowers* shortly pedicelled, with a basal toothed calyculus. *Calyx* unequally 4-5-toothed. *Corolla* $\frac{1}{4}$ in. long, white. *Style* shortly 2-fid. *Fruit* $\frac{1}{2}$ - $\frac{3}{4}$ in., ellipsoid. *Seed* solitary, broadly ellipsoid or globose.

VAR. *Gardneri*; leaves usually broadly ovate-cordate. *Serissa Gardneri*, *Thw. Enum.* 150.—Ceylon; forests about Galagama, *Thwaites*.

2. *S. consimile*, *Kurz For. Fl.* ii. 29; glabrous, leaves petioled or sessile elliptic or lanceolate acuminate or caudate, base acute, flowers solitary or few terminal, calyx-teeth lanceolate. *Psychotria*, *Wall. Cat.* 8351. *Coffea*, *Wall. Cat.* 8450. *Rubiacea*, *Wall. Cat.* 8467.

KHASIA MTS., *De Silva*; **MARTABAN** and **TENASSERIM**, in dry hill forests, alt. 3-5000 ft., *Falconer, Kurz*.

Branches pale, ultimate minutely strigose or glabrate, not compressed. *Leaves* 3-5 by $\frac{1}{2}$ -1 $\frac{1}{2}$ in., membranous, pale greenish when dry; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in.; stipules connate, mouth bristly. *Flowers* sessile and shortly pedicelled, pedicels with basal bristles. *Calyx-tube* funnel-shaped; lobes lanceolate, spreading. *Corolla* $\frac{1}{4}$ in. long. *Style* subentire. *Fruit* "broadly obovoid, smooth, and seed usually solitary," *Kurz*.—Some of the Tenasserim specimens have quite sessile leaves and look different, but, having no flowers, it is impossible to say whether they are so specifically.

3. **S. fragrans**, *Bedd. Fl. Sylv., For. Man.* 134/11; glabrous, leaves shortly petioled elliptic obtusely acuminate, flowers in small axillary and terminal cymes, calyx-teeth broadly triangular. *Serissa fragrans*, *Bedd. Ic. Pl. Ind. Or.* t. 14.

NILGHERRY MTS., on the western slope; and TINNEVELLY HILLS, alt. 2000 ft., *Beddome*.

"Fœtid when crushed" (*Bedd.*). Branches smooth, ultimate compressed. Leaves 3-4 by $1\frac{1}{2}$ -2 in., green when dry, membranous; petiole $\frac{1}{12}$ - $\frac{1}{10}$ in.; stipules entire or toothed. Cymes small, rarely $\frac{1}{2}$ in. long, few-flowered, trichotomous; bracts minute. Flowers very odorous. Calyx cupular. Corolla $\frac{1}{4}$ in. Style-arms 2 linear, short. Fruit ellipsoid, 1-seeded.

4. **S. scabridum**, *Bedd. Fl. Sylv., For. Man.* 134/12; branches scabrid, leaves long-petioled elliptic acuminate, base acute, petiole and midrib scabrid, flowers terminal sessile, calyx hairy, teeth 4 linear-lanceolate. *Serissa scabrida*. *Thw. Enum.* 151.

CEYLON; near Ratnapoora, *Thwaites*.

Leaves 2-3 by $\frac{3}{4}$ -1 $\frac{1}{4}$ in.; petiole $\frac{1}{4}$ in.; stipules connate, scabrid, aristate-fimbriate. —This I have not seen. The character is taken from Thwaites, who had but one specimen, without flowers or ripe fruit.

SECT. II. **Dysodidendron**. Peduncles 1-3-flowered. Anthers with filaments. Seeds usually 2, plano-convex. Leaves opposite.

5. **S. ceylanicum**, *Bedd. Fl. Sylv., For. Man.* 134/12; glabrous, leaves shortly petioled elliptic or lanceolate acuminate, peduncles axillary and terminal 1-3-flowered slender, calyx-teeth 4 triangular. *Dysodidendron ceylanicum* and *Wightii*, *Gardn. in Calc. Journ. Nat. Hist.* vii. 2, 3. *Serissa ceylanica*, *Thw. Enum.* 150. *S. Wightii*, *Bedd. Ic. Pl. Ind. Or.* t. 15. *Lasianthus fœtens*, *Wight in Calc. Journ. Nat. Hist.* vi. 517.

WESTERN PENINSULA; on the Ghats, alt. 3-6000 ft., from Malabar southwards in moist woods, *Wight*, &c. CEYLON; in forests of the central province, alt. 3-6000 ft., *Walker*, &c.

A shrub or small tree, fœtid when bruised; branches pale, smooth, ultimate compressed. Leaves 4-5 by $\frac{3}{4}$ -2 in., sometimes oblanceolate, green when dry, membranous; petiole $\frac{1}{10}$ - $\frac{1}{4}$ in.; stipules connate, toothed. Peduncles $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; bracts and bracteoles minute. Calyx-tube obconic, glabrous. Corolla $\frac{1}{2}$ in., purple. Style-arms 2, short, linear. Fruit $\frac{1}{2}$ in., obovoid, obtuse, "bright blue, very fœtid" (*Bedd.*). Seeds plano-convex.

SECT. III. **Triadicta**. Flowers in corymbose cymes. Anthers subsessile. Seeds ellipsoid. Leaves often 3-4-nately whorled.

6. **S. ternatum**, *Hook. f. in Gen. Pl.* ii. 131; glabrous, leaves 3-nately whorled petioled elliptic or lanceolate acuminate, cymes axillary solitary or fascicled, flowers corymbose, calyx-teeth 4-6 triangular. *Kurz For. Fl.* ii. 29. *Pæderia ternata*, *Wall. Cat.* 6248, and in *Roxb. Fl. Ind.*, ed. Carey & Wall. ii. 520; *DC. Prodr.* iv. 471. *Serissa ternata*, *Kurz Andam. Rep. App. A.* 40. *Mephitidia*, sp., *Griff. Notul.* iv. 267; *Ic. Pl. Asiat.* t. 476.

EASTERN HIMALAYA; Mishmi and Bhotan mts., *Griffith*. KHASIA MTS., alt. 2-3000 ft., *De Silva*, &c. BURMA, *Griffith*. ANDAMAN ISLANDS, *Kurz*.

Branches pale or dark, smooth, rather stout, ultimate angled. Leaves 4-10 by 1-3 $\frac{1}{2}$ in., rather coriaceous, greenish when dry, midrib and petiole ($\frac{1}{4}$ in.) sometimes scaberrulous; veins often straight and parallel, as in *Lasianthus*; stipules $\frac{1}{2}$ in., lanceolate with needle-like points, glabrous or pubescent. Peduncles $\frac{3}{8}$ -1 $\frac{1}{4}$ in., with bristles at its base, bracts and bracteoles small lanceolate; pedicels $\frac{1}{4}$ in. Calyx glabrous; shortly campanulate. Corolla $\frac{1}{4}$ in., pubescent, white. Style-arms 2, linear. Fruit

ellipsoid, $\frac{1}{2}$ by $\frac{1}{4}$ in., smooth, crowned by the conical disk, which is girt at its base by the very short calyx-limb.—Kurz distinguishes the Andaman form as var. *puberula*, with the petioles, stipules, nerves beneath, pubescent.

7. **S. corymbosum**, *Bedd. Fl. Sylv., For. Man.* 134/12; glabrous, leaves opposite and 3-4-nately whorled, petioled elliptic acute or acuminate, cymes axillary and terminal trichotomously paniculately branched, calyx-teeth 4 minute. *Serissa corymbosa*, *Bedd. Ic. Pl. Ind. Or.* t. 17.

TINNEVELLY HILLS, south of Courtallam, alt. 3-4000 ft., *Beddome*.

Branches pale or dark, smooth, 4-gonous. Leaves 4-8 by 1-2 $\frac{1}{2}$ in., dull greenish when dry, veins reticulate; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules not seen. Peduncles slender, $\frac{1}{4}$ -1 in., bristles at their base very short; cyme-branches opposite or whorled, slender, horizontal; bracts and bracteoles minute. Calyx shortly obconic, glabrous. Corolla $\frac{1}{4}$ in., papillose, margins of lobes hardly induplicate. Anthers exserted. Style-arms 2, flattened. Fruit unknown.

81. **HYDNOPHYTUM**, Jack.

Epiphytic glabrous shrubs, with a deformed fleshy tuberous simple or lobed stock, excavated by ants; branches square. Leaves opposite, leathery, obtuse; stipules interpetiolar, deciduous. Flowers small, axillary, solitary or fascicled, sessile, white. Calyx-tube ovoid, limb obscure. Corolla funnel- or salver-shaped, tube long or short; lobes 4, short, valvate. Anthers 4, subsessile on the corolla-throat, oblong. Ovary 2-celled; style-arms narrow or broad; ovules 1, basal, erect in each cell. Drupe small; pyrenes 2, plano-convex. Seeds oblong; testa thin with black lines; embryo?—DISTRIB. 2 or 4 species, Malayan, N. Australian, and Fijian.

1. **H. formicarium**, *Jack in Trans. Linn. Soc.* xiv. 124; leaves obovate oblong or elliptic, tip rounded. *Blume Bijdr.* 956; *DC. Prodr.* iv. 451; *Kurz For. Fl.* ii. 8. *H. montanum*, *Blume DC. ll. cc.* *Lasiostoma formicarium*, *Spreng. Syst.* i. 423.—*Rumph. Herb. Amb.* vi. t. 55, f. 1.

SOUTH ANDAMAN ISLAND, *Kurz*. MALACCA; Pulo Bissar, *Griffith* (*Kew Distrib.* 2975), *Maingay* (864).—DISTRIB. Sumatra, Java, Borneo.

Tuberous stock 6-14 in., smooth, rooting from its under surface; branches few, simple, or sparingly divided, stout. Leaves 3-4 by 1-2 in., pale brown when dry, coriaceous, nerves obscure, narrowed into the very short stout petiole. Flowers few. Corolla-tube $\frac{1}{2}$ in., glabrous without; lobes oblong, acute. Fruit oblong, crowned by the crateriform calyx-limb, smooth, glossy, orange-crimson.—The specimens I have seen are very insufficient as to flowers and fruit, the characters of which are in part borrowed from *Kurz*.

82. **MYRMECODIA**, Jack.

Characters (as far as known) of *Hydnophytum*, but fruit with 4-5 pyrenes.—DISTRIB. Species 2, Malayan and N. Australian.

1. **M. armata**, *DC. Prodr.* 450?; leaves petioled elliptic or cuneate-oblong, spinules in vertical series on the stock. ?*M. tuberosa*, *Blume Bijdr.* 1101. ?*M. echinata*, *Gaud. in Freyc. Voy. Bot.* t. 96.

SINGAPORE, *A. Wallace*.—DISTRIB. Malay Archipelago, N. Australia?

This is a very little known plant, of which my only materials are tubers and seeds sent by Mr. Wallace in 1855, with an excellent sketch containing some analyses. The sketch represents a nearly globose tuber, 2 $\frac{1}{2}$ in. diam., excavated by ants, depressed at the top, irregularly grooved, studded with spinules irregularly disposed in longitudinal lines. Short thick-simple curved branches, 4-5 in., proceed from a very short stock on the crown of the tuber; these are covered throughout their length with ovoid

patches of apparently close-set spinules (or bracts?), amongst which the flowers nestle. *Leaves* irregularly scattered, 3 by 1 in., elliptic, subacute, narrowed into a petiole $\frac{1}{2}$ –1 in.; stipules not represented. *Calyx* not represented. *Corolla* funnel-shaped, inflated below, 4 erect recurved triangular acute teeth, glabrous without; tube with a ring of hairs within below the stamens. *Stamens* 4, on the corolla-brood filaments very short; anthers broadly oblong. *Style* stout; stigmas 6, or 3 each 2-fid, erect. *Fruit* crowned with the calyx-limb, narrowly obovoid, "smooth, yellow, gooseberry-like," *Wallace*; pyrenes 5; these I have examined; they are narrowly oblong, coriaceous, and contain 1 erect seed with a membranous testa, fleshy albumen, and cylindric embryo $\frac{2}{3}$ the length of the seed, cotyledons small, radicle elongate inferior.—Whether this is De Candolle's or Blume's or Gaudichaud's plant is doubtful; the latter has intrapetiole 2-fid stipules connate at the base. Both this and *Myrmecodia* present a most interesting study, both in respect of their growth and structure and of their relation to the ants which inhabit them. Good specimens preserved in spirits are much wanted.

TRIBE XIV. PÆDERIÆ.

83. PÆDERIA, Linn.

Slender twining shrubs, foetid when bruised; branches terete, flexuous. *Leaves* opposite, rarely whorled in threes, petioled; stipules intrapetiole, triangular, deciduous. *Flowers* in axillary and terminal 2–3-photomously branched paniced cymes, bracteolate or not. *Calyx-tube* ovoid or turbinate; limb 4–5-toothed, persistent. *Corolla* tubular or funnel-shaped, pubescent, throat glabrous or villous; lobes 4–5, valvate with inflexed crisped margins, tip often 3-lobed. *Anthers* 4–5, subsessile in the corolla-tube, linear-oblong, obtuse. *Ovary* 2-celled; stigmas 2, capillary, twisted; ovules 1, basal, erect in each cell. *Fruit* globose or compressed; epicarp thin, fragile, shining, separating from 2 orbicular or oblong dorsally compressed membranous or coriaceous pyrenes. *Seeds* much dorsally compressed, testa thin adnate to the pyrene; cotyledons large cordate thin, radicle short inferior.—DISTRIB. Species 9 or 10, in tropical Asia and 1 in Brazil.

* *Fruit much compressed; pyrenes separating from a filiform carpophore, more or less winged.*

1. *P. foetida*, Linn.; *Roxb. Fl. Ind. i.* 683; glabrous or nearly so, leaves opposite long-petioled ovate or lanceolate base acute rounded or cordate, cyme-branched opposite, calyx-teeth short triangular, fruit broadly elliptic compressed, pyrenes black with a broad pale wing. *Wall. Cat.* 6247, excl. E.; *W. & A. Prodr.* 424; *DC. Prodr. iv.* 471; *Griff. Notul. iv.* 267; *IC. Pl. Asiatic.* t. 479, f. 3; *Kurz in Journ. As. Soc.* 1877, ii. 139; *For. Fl.* ii. 26. *P. ovata*, *Miq. in Ann. Mus. Lugd. Bat. iv.* 255. *P. sessiliflora*, *DC. Prodr.* 472.

From the CENTRAL and EASTERN HIMALAYA, ascending to 5000 ft., southward to MALACCA and westward to CALCUTTA.—DISTRIB. Malay Archipelago to BORNEO (Mauritius introduced?).

Leaves 2–6 by $\frac{3}{4}$ –2 $\frac{1}{2}$ in.; petiole $\frac{1}{2}$ –1 in. *Panicle* 2–6 in. long, puberulous; branches long in distant pairs, cymose at the extremity; bracts minute, ovate or subulate, ciliolate; flowers sessile and pedicelled. *Calyx* small, tube campanulate. *Corolla* $\frac{1}{2}$ – $\frac{2}{3}$ in., tomentose. *Fruit* $\frac{1}{4}$ – $\frac{1}{2}$ in., polished, crowned by the conical disk and minute calyx-teeth.

VAR. microcarpa, *Kurz in Journ. As. Soc.* l. c.; panicles very slender, flowers more numerous, calyx minute, fruit orbicular $\frac{1}{4}$ in. diam.—Ava at Taongdong, *Wall. Cat.* 6247.

2. *P. verticillata*, *Blume Bijl.* 968; glabrous, leaves opposite and 3-

nately whorled petioled broadly oblong upper lanceolate acuminate, cyme-branches whorled, calyx-limb truncate, corolla glabrous. *DC. Prodr.* iv. 471.

MALACCA, *Maingay* (Kew Distrib. 885).

Very similar to *P. foetida*, except in the characters indicated, and the much narrower panicles with short ($\frac{1}{4}$ – $\frac{1}{2}$ in.) stouter branches.

3. ***P. calycina***, *Kurz in Journ. As. Soc.* 1873, ii. 74; *Fr. Fl.* ii. 76; leaves opposite long-petioled cordate-ovate or -lanceolate acuminate hispidulous especially beneath, calyx-lobes lanceolate subfoliaceous, fruit broadly ellipsoid compressed, pyrenes with a very narrow black thickened margin. *P. foetida*, *Wall. Cat.* 6247 E.

TENASSERIM; at Tavoy, *Wallich*.

Branches glabrous. Leaves 4–5 by 1 $\frac{1}{2}$ –2 in., very membranous, deeply cordate with the sinus open and lobes incurved; petiole 1–2 in., hispidulous. Flowers not seen. Fruit $\frac{1}{4}$ – $\frac{1}{3}$ in., shining, about twice as long as the stellately spreading calyx-lobes.—*Wallich's* specimens are the only ones I have seen.

4. ***P. lanuginosa***, *Wall. Pl. As. Rar.* ii. 52, t. 165 (not *Wall. Cat.* 7293); petioles and panicles scurfily tomentose, leaves opposite long-petioled all broadly ovate-cordate acuminate scaberulous above woolly beneath, panicle with the branches short stout, fruit large compressed ellipsoid with erect calyx-teeth, pyrenes black with a broad pale wing. *P. macrocarpa*, *Wall. Cat.* 7292; *G. Den Gen. Syst.* iii. 561.

RANGOON; at Pegu, *Wallich*. MARTABAN; at Moulmein, *Parish*.

Leaves 4–6 by 2 $\frac{1}{2}$ –4 $\frac{1}{2}$ in., rather coriaceous, dull greenish when dry above, buff beneath, the upper not narrower; petiole 2–4 in. Panicles elongate; branches $\frac{1}{4}$ – $\frac{1}{2}$ in., opposite; bracts subulate or triangular-lanceolate. Corolla $\frac{3}{4}$ in. long, pink, woolly within. Fruit $\frac{3}{4}$ in. long, pale-brown, puberulous, the very short obtuse teeth erect and girding the base of the conical disk.

5. ***P. Wallichii***, *Hook. f.*; petioles and panicles finely pubescent, leaves opposite petioled ovate-cordate the upper much narrower scabrid above, woolly beneath, panicles with slender branches, flowers subcapitate, fruit small broadly ellipsoid compressed with broadly triangular reflexed calyx-teeth. *P. lanuginosa*, *Wall. Cat.* 7293, in part (not of *Pl. As. Rar.*); *Kurz For. Fl.* ii. 76.

TENASSERIM; Atran river, near the hot wells, *Wallich*, *Helfer*.

Leaves 5–6 by 2 $\frac{1}{2}$ –3 in., dull green above when dry, buff beneath, rigid, and clothed with short rigid hairs, base deeply cordate with incurved lobes, upper not half the breadth of the lower; petiole stout, 1–1 $\frac{1}{2}$ in. Panicles long, slender, branches and flowers pubescent and with short spreading hairs; flowers in small heads about $\frac{1}{2}$ in. diam. Corolla $\frac{1}{3}$ in. Fruit (young) broadly ellipsoid, nearly orbicular, $\frac{1}{4}$ in. diam.—I suspect that *Kurz's P. lanuginosa* includes this and the true plant; he describes the leaves as sometimes ovate-lanceolate, which is not the case in *Wallich's lanuginosa (macrocarpa)* of his *Cat.*, and states that it is common in mixed forests from Burma to Tenasserim.

6. ***P. pillifera***, *Hook. f.*; branches petioles and panicles clothed with long spreading hairs, leaves opposite subbastately-lanceolate acuminate scaberulous above woolly beneath, calyx-teeth triangular-lanceolate, fruit orbicular compressed, pyrenes black with a broad pale wing. *Wall. Cat.* 7293, in part.

TENASSERIM; Atran river, *Wallich*.

Has it of *P. lanuginosa*, but differing widely in the long spreading hairs that clothe those parts which in that plant present a close short soft pubescence. Fruit $\frac{1}{4}$ in. diam., pale, shining, the broad short calyx-teeth sharply reflexed.

** *Fruit subglobose, pyrenes not separating from a filiform carpophore.*

7. **P. tomentosa**, *Blume Bijl.* 968; glabrous or sparsely pubescent, leaves opposite petioled ovate or lanceolate acute or acuminate, base rounded or cordate, calyx-teeth very short, fruit subglobose, pyrenes not winged. *DC. Prodr.* iv. 471; *Kurz For. Fl.* ii. 76. *P. barbata*, *Miq. in Ann. Mus. Lugd. Bat.* 255. *P. foetida*, *Benth. Fl. Hongk.* 162. *Pæderia* sp., *Griff. Notul.* iv. 268; *Ic. Pl. Asiat.* t. 479, f. 4.

From the EASTERN HIMALAYA and KHASIA MTS., ascending to 6000 ft. to SINGAPORE.—DISTRIB. Malay Islands, S. China, Japan.

Leaves 2-4 by 1-2½ in., above glabrous or sparsely hairy, beneath glabrous pubescent or subtomentose; petiole 1-3 in. *Panicle* as in *P. foetida*, but branches usually shorter and the ultimate often scorpioid with secund sessile flowers. *Calyx* and *corolla* as in *P. foetida*. *Fruit* ½-¾ in. diam., with 2 orbicular much compressed pyrenes.

? 8. **P. linearis**, *Hook. f.*; glabrous, very slender, leaves opposite subsessile narrowly linear acute, calyx-teeth minute, corolla pubescent.

TENASSERIM; at Mergui, *Griffith* (*Kew Distrib.* 2911).

Branches shining. *Leaves* 2-3 by ½ in., nerves very obscure; petiole ½ in. or less. *Panicles* spreading, broad; branches very slender, repeatedly trichotomous; bracteoles minute, flowers remote, often on long pedicels, like those of *P. foetida*. *Fruit* (unripe) subglobose, glabrous, ½ in. diam.—This is probably allied in the fruit to *P. tomentosa*.

EXCLUDED SPECIES.

P. RECURVA, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 684; *DC. Prodr.* iv. 471, appears from Roxburgh's drawing to be *Isora recurva*, *Kurz*.

P. ERECTA, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 685; *DC. Prodr.* iv. 471, is probably a *Psychotria*.

84. **HAMILTONIA**, *Roxb.*

A hispid pubescent or glabrate erect 3-chotomously branched undershrub, foetid when bruised, branches terete. *Leaves* opposite, petioled, nerves many, stout; stipules intrapetiolar, short, acute, persistent. *Flowers* small, in broad terminal 3-chotomously branched paniced or subumbellate cymes, white or blue, sweet-scented, bracteate and bracteolate. *Calyx-tube* ovoid; limb of 4-5 subulate persistent segments. *Corolla* funnel-shaped, tube long; lobes 4-5, short, valvate. *Stamens* 5, inserted in the corolla-throat, filaments short subulate; anthers obovate-oblong, obtuse. *Ovary* 5-furrowed, outer coat almost free from the 5-celled inner coat; style filiform, arms 5 linear; ovules 1, basal, erect in each cell. *Capsule* 1-celled from the absorption of the septa, 5-valved at the top, 5 (or fewer-) seeded. *Seeds* 3-quetrous, outer coat of testa reticulate 3-valved at the base, inner thick; cotyledons cordate induplicate, radicle inferior.

1. **H. suaveolens**, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 554; *DC. Prodr.* iv. 462; *Brand. For. Fl.* 278; *Bedd. Fl. Sylb. Anal. Gen.* 134/12, t. 17, f. 3. *H. scabra*, *Don Prodr.* 137; *DC. l. c.* *H. mysorensis*, *W. & A. Prodr.* 423; *Dalz. & Gibs. Bomb. Fl.* 115. *H. propinqua*, *Dcne. in Jacq. Voy. Bot.* t. 91. *Lasianthus tubiflorus*, *Blume Bijl.* 999. *Spermadietyon suaveolens*, *Roxb. Cor. Pl.* t. 236; *Wall. Cat.* 6239; *Bot. Reg.* t. 348. *S. azureum*, *Wall. in Roxb. Fl. Ind.*, ed. *Carey & Wall.* ii. 225; *Cat.* 6240; *Bot. Reg.* t. 1235.

TROPICAL and SUBTROPICAL HIMALAYA and the Salt Range, alt. 2-5000 ft., from Kashmir to Bhotan. CENTRAL INDIA and the WESTERN PENINSULA, ascending to 4000 ft. from Marwar and Behar southwards to Mysore on dry rocky hills.—DISTRIB. China (probably introduced).

An undershrub 4–12 ft. high, with spreading branches. *Leaves* rather rigid, 6–12 by 2–4 in., elliptic-lanceolate or ovate, acute, glabrous or pubescent, base acute; petiole $\frac{1}{2}$ –1 in. *Flowers* in subglobose heads, most copiously produced in terminal trichotomous pubescent panicles, fragrant, white or blue, sessile or pedicelled; bracts subulate. *Calyx-teeth* very variable in shape, longer than the ovary, glabrous pubescent or hairy, with often interposed gland-tipped processes. *Corolla-tube* $\frac{1}{2}$ in., pubescent or woolly. *Stamens* and *style* more or less exserted according to sex. *Capsule* $\frac{1}{8}$ – $\frac{1}{6}$ in., ellipsoid.—Bhotan specimens have very short broad calyx-teeth.

85. **LEPTODERMIS**, Wall.

Shrubs, foetid when bruised; branches terete. *Leaves* opposite, the pairs often fascicled; stipules small, acute or pungent, persistent. *Flowers* bracteate and bracteolate, 3-nate or in terminal fascicles, white or purplish, subsessile; bracteoles connate into a 2-cuspidate scarious tube. *Calyx-tube* obconic, lobes 5 (4–6), coriaceous, persistent. *Corolla* funnel-shaped, tube slender, hairy within; throat glabrous; lobes 5 (4–6), valvate with inflexed edges. *Stamens* 5 (4–6), inserted in the corolla-throat, filaments short; anthers linear-oblong, ♂ exserted, ♀ included effete. *Ovary* 5-celled; style filiform, arms 5 linear ♀ exserted; ovules 1, basal, erect in each cell. *Capsule* cylindric or ovoid, 5-valved to the base, apex deciduous between the hardened persistent calyx-teeth, valves separating from 3–5 erect free fibrous pyrenes, the fibres simple or reticulating, loose or appressed. *Seeds* erect, testa membranous; cotyledons orbicular, radicle short slender inferior.—DISTRIB. Species 5 or 6, a Chinese, and the following.

1. ***L. lanceolata***, Wall. in Roxb. *Fl. Ind.*, ed. Carey & Wall. ii. 191; Cat. 6241; leaves ovate elliptic or elliptic-lanceolate puberulous or hispid above, stipules small acute appressed, capsule cylindric. *DC. Prodr.* iv. 462; *Dcne. in Jacq. Voy. Bot.* t. 90; *Brand. For. Fl.* 279. *Hamiltonia suaveolens*, *Don Prodr.* 137.

TEMPERATE HIMALAYA, alt. 4–10,500 ft., from Kashmir to Bhotan, Wallich, &c.

A rigid erect shrub; branches glabrous, scabrid or hispid. *Leaves* very variable, $\frac{1}{4}$ –4 by $\frac{1}{8}$ –1 $\frac{1}{2}$ in., more or less hairy beneath, rigid or rather membranous; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in. *Flowers* subcapitate, terminal, and on short lateral branches, white, 4–6-merous. *Bracts* tubular, glabrous or puberulous. *Calyx-teeth* triangular, acute. *Corolla* $\frac{1}{2}$ in. long, glabrous or hairy. *Capsule* $\frac{1}{4}$ – $\frac{1}{2}$ in., cylindric, truncate, crowned by the persistent ciliate calyx-teeth; fibrous utricle enclosing the seed long and very lax.

2. ***L. virgata***, Edgew. in Aitchison Cat. Punjab. Pl. 70; leaves very small linear or oblong acute scabrid above, stipules with long pungent recurved points, capsule cylindric.

WESTERN HIMALAYA, alt. 4–7000 ft. from Murree, Falconer to Kulu, Edgeworth. SALT RANGE, Fleming.

A slender rigid excessively branched shrub; branches very slender, erect or divaricate, white with spreading pubescence. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{12}$ – $\frac{1}{8}$ in., fascicled, straight or somewhat falcate, margins flat or recurved, pale beneath, nerves obscure; stipules triangular with rigid long pungent points and thickened margins, white. *Bracts* often equalling the capsule. *Calyx* glabrous, teeth lanceolate ciliate, much longer than in *L. lanceolata*. *Corolla* $\frac{1}{2}$ in. long, pubescent, purplish. *Capsule* $\frac{1}{2}$ in., subcylindric. *Seed* with a few free fibres attached to the integument.

3. ***L. Griffithii***, Hook. f.: leaves elliptic-lanceolate acute narrowed into the petiole smooth or scabrid above, stipules small appressed, capsule ovoid twice as long as the bracteoles and as the lanceolate glabrous calyx-teeth.

KHASIA Mts., alt. 3-5000 ft., *Griffith* (Kew Distrib. 2964), &c.

A small rigid bush; branches stout; branchlets slender, furfuraceous. *Leaves* $\frac{1}{2}$ - $1\frac{1}{2}$ in., brown when dry, nerves 2-3 pair, glabrous or nearly so beneath. *Calyx-teeth* nearly glabrous, lanceolate. *Corolla* white, $\frac{1}{2}$ in. long. *Capsule* $\frac{1}{2}$ in. long, brown. *Seed* enclosed in an adnate reticulate fibrous coat.

4. ***L. scabrida*, Hook. f.**; leaves small elliptic-lanceolate subacute scabrid above coriaceous, stipules with recurved pungent points, capsules ovoid twice as long as the bracteoles, much longer than the short obtuse glabrous calyx-teeth.

MISHMI HILLS (Upper Assam), towards the summit of Thumathya, *Griffith*.

Evidently nearly allied to *L. Griffithii*, having a turgid capsule, but this and the leaves are smaller, the calyx-teeth shorter and more obtuse, and the utricle quite loose. "Corolla tinged with purple," *Griffith*. *Seeds* enclosed in a loose reticulate fibrous coat.

IMPERFECTLY KNOWN SPECIES.

L. sp.?; an excessively branched shrub, branches slender hispid interlaced, leaves $\frac{3}{4}$ -1 in. linear or linear-lanceolate acute hispid above or on both surfaces, stipules small appressed, bracteoles short pubescent, capsules cylindric $\frac{1}{2}$ in. long, calyx-teeth very short.—Nipal, *Wallich* (Cat. 6241 A., in part).—Habit of *L. virgata*, Edgw.

L. sp.?; branches stout, leaves $\frac{1}{2}$ in. elliptic or ovate obtuse hirsute on both surfaces, stipules small appressed, capsules cylindric $\frac{1}{4}$ in., calyx-teeth broad short. Bhotan near Telagoung, *Griffith*.—Specimens of an allied species or variety from below Chupcha, 7000 ft., *Griffith*, have very slender branches and obovate or oblong leaves $\frac{1}{8}$ - $\frac{1}{3}$ in.

TRIBE XV. SPERMACEÆ.

86. **HYDROPHYLAX**, Linn. fil.

Creeping glabrous stout succulent herbs, branches terete. *Leaves* opposite, sessile, ovate-oblong; stipules combined with the petioles into an entire or toothed cup. *Flowers* solitary, axillary, shortly pedicelled, lilac. *Calyx-tube* 4-angled; segments of limb ovate-lanceolate, persistent. *Corolla* rather fleshy, between bell- and funnel-shaped, tube with a ring of hairs within; lobes 4, ovate, valvate. *Stamens* 4 on the corolla-throat, filaments filiform; anthers linear. *Ovary* 2-celled; style filiform, pubescent, stigma obscurely 2-lobed; ovules 1, peltately attached to the septum in each cell. *Fruit* large, corky, oblong-ovoid, compressed, curved, acutely 3-4-keeled between the acute margins, 1-2-celled, 2-seeded.—DISTRIB. An Asiatic, a Natal, and a Madagascar species.

1. ***H. maritima*, Linn. f.**; leaves obovate acute. *Roxb. Cor. Pl.* t. 233; *Fl. Ind.* i. 373; *DC. Prodr.* iv. 576; *Wall. Cat.* 6205; *W. & A. Prodr.* 441; *Wt. Ic.* t. 760. *Sarissus anceps*, *Gaertn. Fruct.* i. 118, t. 25.

Sand-hills on the shores of the WESTERN PENINSULA and CEYLON.

Stems a foot long, sparingly branched. *Leaves* $\frac{1}{2}$ -1 by $\frac{1}{4}$ - $\frac{1}{2}$ in., often recurved, sometimes papillose or subsabrid, stipules broad sheathing. *Calyx-tube* $\frac{1}{4}$ in., longer than the lobes. *Corolla* $\frac{1}{3}$ - $\frac{1}{2}$ in. long, and as broad across the lobes. *Fruit* $\frac{1}{2}$ - $\frac{2}{3}$ in. long, crowned with the enlarged calyx-teeth.

87. **SPERMACEE**, Linn.

Herbs or low undershrubs; branches usually square. *Leaves* opposite; stipules connate with the petioles into a broad truncate tube with marginal bristles. *Flowers* small or minute, solitary or in axillary or terminal fascicles heads or cymes. *Calyx-tube* various, limb of 2-4 (rarely 5) teeth with often interposed teeth or bristles. *Corolla* funnel- or salver-shaped; lobes 4, valvate.

Stamens 4, on the throat or tube of the corolla, filaments short or long; anthers linear or oblong. *Ovary* 2-celled; style filiform with 2 short arms or a capitate stigma; ovules 1 in each cell, on the middle of the septum, amphitropus. *Fruit* of 2 coriaceous or crustaceous mericarps which dehisce variously. *Seeds* oblong, grooved ventrally, testa thin often granulate; cotyledons thin, broad; radicle inferior.—*DISTRIB.* Species about 150, tropical and subtropical.

* *Capsule dehiscing septicidally, both mericarps then dehiscing ventrally.*

1. ***S. stricta***, Linn. f.; DC. *Prodr.* iv. 554; annual, stem usually erect and leaves more or less scabrid, leaves from linear to ovate acute, calyx hispid or pubescent, teeth slender, seeds linear-oblong highly polished. *Roxb. Fl. Ind.* i. 370; *Kurz in Journ. As. Soc.* 1877, ii. 137. *S. lasiocarpa*, Br. in *Wall. Cat.* 832. *S. pusilla*, Wall. in *Roxb. Fl. Ind.*, ed. Carey & Wall. i. 379; *Cat.* 823; *Don Prodr.* 134. *S. filina*, Gardneri, and *angustifolia*, Wall. *Cat.* 830, 834, 835. *S. triandra*, Ham. in *Don Prodr.* l. c. *Bigelovia stricta*, Blume *Bijl.* 945. *B. lasiocarpa*, Roxburghiana, and *Kleinii*, W. & A. *Prodr.* 437. *B. myriantha*, Miq. *Fl. Ind. Bat.* ii. 334. *Borreria pusilla*, DC. l. c. 543. *B. gracilis*, Miq. in *Pl. Hohen.* No. 705.

TROPICAL HIMALAYA from Kashmir eastwards, ascending to 5500 ft., and throughout India to SINGAPORE and CEYLON.—*DISTRIB.* Tropical Asia and Africa.

Stem 6–14 in., simple or branched from the base, angles more or less scabrid. *Leaves* subsessile, 1–2 by $\frac{1}{2}$ – $\frac{1}{2}$ in., green when dry, narrowed at both ends, horizontal or deflexed, more or less coriaceous, glabrous or with scabrid nerves beneath. *Heads* globose, usually very many- and dense-flowered; bracteoles filiform, exceeding the calyx. *Corolla* $\frac{1}{4}$ in. long, white. *Stigma* subglobose. *Capsule* narrowed at the base, glabrous below, rather membranous.—The two most prominent forms of this variable plant are small fruited ones with globose heads and very narrow leaves, the *S. pusilla*, DC., and *B. myriantha*, Miq., and a large coarser plant, *S. lasiocarpa*, Br.; but there are no limits between these forms.

2. ***S. ocymoides***, Burm. *Fl. Ind.* 34, t. 13, f. 1; perennial, glabrous or nearly so, stems branched from the base decumbent and ascending, leaves ovate elliptic or lanceolate acute glabrous or scabrid above, calyx glabrous or glabrate, teeth lanceolate, seeds oblong black granulate opaque. *S. stricta*, Schlecht. in *Pl. Hohen.* No. 998. *S. ramosa*, tenera, ocymoides, and Roxburghiana, Wall. *Cat.* 831, 833, 6185, 6186 excl. *B. Borreria ocymoides*, DC. *Prodr.* iv. 544. *Bigelovia Roxburghiana*, Wight *Cat.* 1360 (not of W. & A. *Prodr.*). *B. lævicaulis* and *setidens*, Miq. *Fl. Ind. Bat.* ii. 334, 336.

WESTERN PENINSULA; from MALABAR and the NILGHERY HILLS southwards, Heyne, &c. MALACCA, Griffith; CEYLON, Gardner, &c.—*DISTRIB.* Malay Islands, Mauritius, Trop. Africa.

Root more or less woody (except in seedlings). *Branches* 4–16 in., stout or more often slender, rarely scabrid on the angles and only beneath the leaves. *Leaves* much broader than in *S. stricta*, often membranous, quite glabrous or scabrid above, sometimes petioled. *Flowers* fewer and in smaller heads than *S. stricta*, with usually shorter bracteoles. *Calyx* rarely puberulous, teeth often unequal. *Seeds* usually broader and shorter than in *S. stricta*.—I follow Wallich in referring this to Burmann's plant. Wight & Arnott's *B. Roxburghiana* is not Wallich's 6186 of that name, nor is it Wight's plant of that name, nor is Wight & Arnott's *B. Kleinii* Wallich's *S. ocymoides*, No. 6185, as cited; both these plants of W. & A. having hispid calyces are referable to *S. stricta*.

** *Capsule septicidal, one mericarp remaining closed by the septum (which finally separates as a membranous plate), the other dehiscing ventrally.*

3. ***S. hispida***, Linn.; DC. *Prodr.* iv. 555; procumbent, scabrid hirsute or hispid, leaves obovate spatulate oblong or elliptic obtuse or acute margins

flat or waved, capsule hispid or pubescent, seeds oblong granulate opaque. *Roxb. Fl. Ind.* i. 373; *Wall. Cat.* 825; *W. & A. Prodr.* 438; *Dalz. & Gibs. Bomb. Fl.* 111. *S. articularis*, *Linn. f.*; *Roxb. l. c.* 372; *Wall. Cat.* 827; *W. & A. l. c.*; *Kurz in Journ. As. Soc.* 1877, ii. 137. *S. scabra*, *Willd.*; *Roxb. l. c.* 371; *Wall. Cat.* 824. *S. hirta*, *Rottler in Nov. Act. Berol.* 1803, 95. *S. longicaulis*, *Wall.*; *avana*, *Wall.*; *ramosissima*, *Wall.*; and *tubularis*, *Br. in Wall. Cat.* 826, 828, 829, 836.—*Burm. Thes. Zeylan.* t. 20, f. 3. *Rheede Hort. Mal.* ix. t. 76.

Throughout India, from the WESTERN HIMALAYA at Simla, ascending to 3000 ft. to ASSAM, and southwards to CEYLON and SINGAPORE.—DISTRIB. S. China, Malayan Archipelago.

Root annual or perennial; branches 6–14 in., ascending, stout, 4-angled, scabrous hirsute or glabrous. *Leaves* $\frac{1}{2}$ – $1\frac{1}{2}$ by $\frac{1}{2}$ – $\frac{2}{3}$ in., often rounded at the tip, rigidly coriaceous, pale when dry, margins sometimes thickened and cartilaginous, usually very scabrid above; nerves rarely impressed. *Flowers* 4–6 in a whorl; bracteoles filiform, equalling the calyx. *Calyx-teeth* linear-lanceolate. *Corolla* $\frac{1}{2}$ – $\frac{1}{2}$ in., blue or white. *Stigmas* 2, very short. *Capsule* pubescent or hispid, rounded at the base. *Seeds* very variable, $\frac{1}{10}$ – $\frac{1}{8}$ in. long, narrow or broad.—A maritime Carnatic form has very hairy branches and stout waved apiculate leaves with cartilaginous edges; it is Roxburgh's typical *S. hispida*, and passes by insensible gradations into other forms.

4. ***S. scaberrima***, *Blume Bijl.* 946; leaves elliptic or elliptic-lanceolate acute scabrid above with deeply impressed nerves, capsule glabrous, seeds oblong granulate shining. *DC. Prodr.* iv. 555; *Miq. Fl. Ind. Bat.* ii. 331.

MALACCA, *Griffith*.—DISTRIB. Sumatra, Java, Banca.

Rather stout, 12–16 in., brown when dry; branches ascending, rather shining, nearly glabrous but scabrid or retroversely hairy on the angles below the nodes. *Leaves* $1\frac{1}{2}$ in., subsessile, rigidly coriaceous, very scabrid above, hardly so beneath; nerves very oblique. *Flowers* few. *Corolla* not seen. *Calyx-teeth* lanceolate. *Capsule* brown. *Seeds* small, oblong, with a large ventral cavity.

DOUBTFUL SPECIES.

S. BURMANNI, *DC. Prodr.* iv. 555. *S. corymbosa*, *Burm. Fl. Ind.* 34, non *Linn.*, is undeterminable.

S. ? PROCUMBENS, *Linn.*; *DC. l. c.* is probably a *Hedyotis*.

S. ? HEDYOTIDEA, *DC. l. c.* *Hedyotis fruticosa*, *Retz Obs.* ii. 8, an *Linn.*? See p. 49.

88. **GAILLONIA**, *A. Rich.*

Low rigid shrubs. *Leaves* small, opposite, linear or subulate; stipules usually connate with the petioles into an entire sheath with 2 bristles or obsolete. *Flowers* small, solitary, or in simple spiciform cymes, white. *Calyx-limb* 2–5-toothed, dilated after flowering into a scarious crenate wing or feathery bristles. *Corolla* funnel-shaped, throat naked; lobes 4–5, valvate in bud. *Stamens* 4–5, in the throat or tube of the corolla, filaments short; anthers linear-oblong. *Disk* inconspicuous. *Ovary* 2-celled; style filiform, arms 2 short; ovules 1 in each cell on the centre of the septum, amphitropous. *Fruit* ovoid, of 2 terete indehiscent cocci crowned with the enlarged calyx. *Seeds* oblong, grooved ventrally, albumen horny; cotyledons flat, radicle slender inferior.—DISTRIB. Species 10, N. African and W. Asian.

1. ***G. calycoptera***, *Jaub. & Spach Ill. Pl. Or.* i. 147, t. 80; glabrous, leaves linear, stipules of the floral leaves minutely 6–8-toothed, flowers spicate, fruit with erect wings. *Boiss. Fl. Or.* iii. 15. *Spermacoce calyptera*, *Dcne. Flor. Sinaic.* 29.

THE PUNJAB; dry hills near Attock, *Falconer, Stewart*.—DISTRIB. Nubia, Arabia, Persia.

A small shrub, with slender, erect, terete, strict, dichotomously forked branches, the lower white. *Leaves* in distant pairs, $\frac{1}{2}$ –1 in., black when dry, scaberulous, margins revolute. *Fruit* about $\frac{1}{4}$ in. long, of 2 narrowly oblong puberulous cocci surmounted by an erect scarious calyx-limb; segments of limb free or connate, elliptic, acute, white, veined, much longer than the cocci.—The Indian specimens are very imperfect.

2. *G. hymenostephana*, *Jaub. & Spach Ill. Pl. Or. i. 146, t. 79*; hoary and scaberulous, leaves linear-oblong with obsolete stipules, floral connate with 2-lobed stipules, flowers terminal solitary and fascicled, fruit with a large orbicular horizontal 5-lobed wing. *Boiss. Fl. Or. iii. 15*.

PUNJAB, *Fleming*. WUZURISTAN, alt. 3500 ft., *Stewart*.—DISTRIB. Arabia, Beluchistan, Afghanistan.

A very small shrub, "most foetid when fresh," *Stewart*, with opposite divaricating strict slender branches. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., margin revolute. *Fruit* of 2 small hispid cocci; the calyx-limb $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., pubescent or glabrate, membranous, reticulately veined.

TRIBE XVI. GALIÆÆ.

89. RUBIA, *Linn.*

Scabrid hispid or prickly erect diffuse or climbing herba; stems square, slender. *Leaves* 4–8 in a whorl, rarely opposite and stipulate. *Flowers* small or minute, in axillary and terminal cymes, pedicel jointed with the ovary. *Calyx-tube* ovoid or globose; limb 0. *Corolla* rotate or shortly bell- or funnel-shaped; lobes 4–5, valvate. *Stamens* 4–5, inserted on the corolla-tube, filaments short; anthers globose or oblong. *Ovary* 2-celled; style 2-fid or styles 2, stigma capitate; ovules 1 erect in each cell, attached to the septum. *Fruit* small, didymous, fleshy, or globose by the suppression of a carpel. *Seeds* sub-erect, adhering to the pericarp, testa membranous; cotyledons broad thin, radicle slender inferior.—DISTRIB. Species about 30, chiefly temperate.

1. *R. cordifolia*, *Linn.*; *DC. Prodr. iv. 588*; scandent, leaves 4 in a whorl petioled ovate-cordate acute, nerves 3–7 from the base very strong. *Wall. Cat. 6209*; *W. & A. Prodr. 442*; *Dalz. & Gibs. Bomb. Fl. 121*; *Wt. Ill. t. 128, bis. f. 1*. *R. Munjistha*, *Roxb. Hort. Beng. 10*; *Fl. Ind. i. 374*; *DC. l. c.*; *Wt. Ic. t. 187*. *R. Mungistha*, *Desv. Journ. Bot. 1814, 207*. *R. javana*, *DC. l. c.* *R. secunda*, *Moon Cat. 10*. *R. alata*, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall. i. 384*; *Cat. 6208*; *DC. l. c.* *R. purpurea*, *Decne. in Jacq. Voy. Bot. 84, t. 92*. *R. scandens*, *Zoll. & Morr.; Mig. Fl. Ind. Bat. ii. 338*. *R. chinensis*, *Regel & Maack in Reg. Fl. Ussur. 76, f. 8, t. 1*. *R. mitis*, *Miq. in Ann. Mus. Lugd. Bat. iii. 112*.

Throughout the hilly districts of India, from the N.W. HIMALAYA eastwards, ascending to 8000 ft., and southwards to CEYLON and MALACCA.—DISTRIB. N.E. Asia from Dahuria to Japan and Java, Tropical Africa.

Climbing; root perennial; branches stout, smooth, or more often with the nerves beneath (usually) retrorsely scabrid. *Leaves* smooth or scabrid; lower 2–4 in.; petiole 1–3 in., 2 often longer and with larger blades, upper leaves sometimes acute at the base, shorter petioled. *Cymes* paniced, terminal; branches trichotomous, spreading, with opposite sessile leafy cordate bracts. *Flowers* minute, 5–rarely 4-merous. *Corolla-lobes* lanceolate, tips incurved. *Anthers* globose. *Fruit* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., didymous or globose.—A very variable plant. The Khasian specimens have usually 3-nerved leaves, not impressed above; in Western Peninsula the nerves are 5–7, and deeply impressed. Eastern Himalayan specimens of Griffith's

have hispid branches and leaves pubescent beneath; they have neither flowers nor fruit.

2. **R. tinctorum**, Linn.; *DC. Prodr.* iv. 589; scandent, leaves sessile 4-6 in a whorl elliptic or lanceolate acuminate penni-nerved, nerves very obscure. *Boiss. Fl. Or.* iii. 17.

KASHMIR, *Falconer*, and SINDH, *Stocks*; cultivated in both.—DISTRIB. Afghanistan and westward to Spain, cultivated or wild.

Stem elongate; angles scabrid or prickly. *Leaves* 2-4 by $\frac{1}{2}$ -1 $\frac{1}{4}$ in., acuminate, margins and nerves beneath prickly. *Cymes* terminal, paniced, spreading, leafy. *Corolla* rotate; lobes ovate-lanceolate, apiculate. *Anthers* linear-oblong. *Fruit* $\frac{1}{2}$ - $\frac{1}{3}$ in. diam., didymous and globose.

3. **R. himalayense**, Klotzsch in *Pr. Wald. Reise Bot.* 86, t. 76; leaves elliptic-ovate or obovate subacute or tip rounded often apiculate penni-nerved, nerves very obscure. *R. aculeata*, *Royle Ill.* 237, name only.

WESTERN HIMALAYA; Kunawur, *Royle*, Munro. Kashmir, *Falconer*.—DISTRIB. Afghanistan

This differs markedly from *R. tinctorum* in its slender habit, shorter broader more distinctly petioled leaves, which are also membranous and are usually obovate with a rounded apiculate tip; the corolla, too, is more funnel-shaped. Griffith observes that it occurs in hedges and fields, and that he did not see it cultivated, whereas he marks *R. tinctorum* as cultivated.

4. **R. sikkimensis**, Kurz in *Journ. As. Soc.* 1874, ii. 188; scandent, scabrid, leaves sessile 4 in a whorl elliptic or ovate-lanceolate acute or acuminate 3-5-nerved from the base.

EASTERN HIMALAYA; from Sikkim, alt. 2-5000 ft., *J. D. H.*, &c.; and Bhotan, *Griffith*, to the Mishmi mountains (Upper Assam).

A stout climber, branches retrorsely scabrid. *Leaves* 3-6 by 1-2 in., sometimes cordate, scabrid on both surfaces, sometimes pubescent beneath, base acute or rounded; nerves deeply impressed above. *Cymes* large, paniced; branches short, spreading, leafy. *Corolla* rotate, lobes subacute. *Anthers* globose. *Fruit* $\frac{1}{2}$ in., smooth.—The handsomest species of the genus.

5. **R. Edgeworthii**, Hook. f.; scandent, pubescent all over, leaves short-petioled 4 in a whorl lanceolate acuminate 3-5-nerved from the base.

WESTERN HIMALAYA; Kumaon, alt. 3-4000 ft., *Edgeworth*, *Strachey* & *Winterbottom*, *Madden*.

Branches hardly scabrid, 8-ribbed, clothed, as are all parts (but less so on the leaves above), with white spreading pubescence. *Leaves* 2-3 by $\frac{1}{2}$ - $\frac{3}{4}$ in., membranous, margins hardly scabrid, nerves deeply impressed above. *Cymes* as in *R. sikkimensis*, but more slender, and the branches ascending. *Corolla-lobes* lanceolate, acuminate. *Anthers* ellipsoid. *Fruit* glabrous.

6. **R. angustissima**, Wall. *Cat.* 6207; scandent, slightly scabrid, shining, leaves sessile 4-8 in a whorl very narrowly linear keeled nerveless. *G. Don Gen. Syst.* iii. 643; *Kurz in Journ. As. Soc.* 1877, ii. 162. *R. charæfolia*, *Wall. Cat.* 6210; *G. Don l. c.*

CENTRAL and EASTERN HIMALAYA, ascending to 4000 ft.; Nipal, *Wallich*; Sikkim, *J. D. H.*, *C. B. Clarke*.—DISTRIB. Ava.

Stem excessively branched, ribbed, branches with short internodes. *Leaves* 1-4 by $\frac{1}{12}$ - $\frac{1}{2}$ in., young filiform, thin and brittle, flat above, midrib strong beneath, smooth or sparingly scabrid. *Cymes* very small, often of only 3-5-flowers on a peduncle not longer than the small floral leaves or (the ♀?) on a slender peduncle $\frac{1}{2}$ in. or less. *Flowers* minute. *Corolla-lobes* ovate, acute. *Anthers* ellipsoid. *Fruit* $\frac{1}{4}$ in. diam. when didymous, on a slender peduncle, solitary, globose or didymous, smooth.—Habit and aspect of a climbing *Asparagus*.

7. **R. tibetica**, *Hook. f.*; erect, short, scabrid, leaves sessile opposite or 4 in a whorl broadly ovate suborbicular or elliptic ovate or lanceolate, nerves obscure.

WESTERN TIBET; Nubra and Piti, alt. 10–14,000 ft., *Thomson, Lance*; Kulu, *Hay*; Karakorum mountains, alt. 10,700 ft., *C. B. Clarke*.

Root (or rhizome?) long woody brown, sending up fascicles of short stout erect stems as thick as a crow-quill, and covered with smooth glistening white bark, from which again arise fascicles of erect annual simple or sparingly divided branches 6–10 in. high; nodes of the stem below shortly sheathed with membranous bases of old leaves. *Leaves* $\frac{1}{2}$ –1 by $\frac{1}{4}$ – $\frac{1}{2}$ in., coriaceous, margins and midrib scabrid. *Cymes* axillary and terminal, shorter than the leaves, or flowers solitary on long axillary peduncles. *Flowers* rather large, $\frac{1}{4}$ in. diam. *Corolla-segments* lanceolate, acute. *Anthers* globose. *Fruit* $\frac{1}{8}$ in. diam., smooth.—The habit of this species is very peculiar, like that of some *Galiea*.

8. **R. albicaulis**, *Boiss.*; var. *stenophylla*, *Boiss. Fl. Orient.* iii. 19; scandent? scabrid or almost smooth, leaves sessile opposite or 4 in a whorl linear or linear-lanceolate rigid, nerves 3 from the base the lateral marginal. *R. Kotschy*, *Boiss. Il. cc.*

NORTH-WESTERN INDIA and Salt Range, alt. 2–8000 ft.; Murree, *Fleming*; Wuzuristan, *Stewart*.—DISTRIB. Afghanistan, Persia.

Stem woody below; branches rather stout, often white, quite smooth, upper green with white thickened angles. *Leaves* 1–4 by $\frac{1}{8}$ – $\frac{1}{4}$ in., midrib and thickened marginal nerve almost quite smooth. *Cymes* axillary and terminal, much shorter than the leaves, many-flowered; peduncles and pedicels stout. *Flowers* minute, yellow. *Corolla-segments* lanceolate, acuminate. *Anthers* ovoid. *Fruit* smooth.—The flowers of Boissier's specimen of his var. *Kotschy*, from Schiras, are smaller and more rotate than Griffith's Afghanistan ones, which he refers to it. They are funnel-shaped and glabrous in the Murree, &c., specimens.

90. **GÁLIIUM**, *Linn.*

Glabrous, hispid, scabrid or prickly erect or scandent weak herbs; branches square. *Leaves* 3 or more in a whorl, rarely opposite and stipulate, broad or narrow. *Flowers* minute, in axillary and terminal cymes or peduncles, white yellow or greenish; pedicel jointed with the ovary. *Calyx-tube* ovoid or globose; limb 0. *Corolla* rotate or shortly funnel-shaped, lobes 4, rarely 3, valvate. *Stamens* 4, rarely 3, in the corolla-tube; filaments short; anthers didymous. *Ovary* 2-celled; style short, arms 2 with capitate stigmas; ovules 1 erect in each cell, attached to the middle of the septum. *Fruit* small, didymous, dry or nearly so, smooth granulate or tubercled, glabrous pubescent or hispid with hooked hairs. *Seed* adhering to the pericarp, plano-convex, grooved ventrally, testa membranous; cotyledons broad thin, radicle elongate inferior.—DISTRIB. About 150 species, chiefly temperate.

* Fruit covered with hooked hairs or bristles (rarely glabrous in *G. rotundifolium*). See also 17. *G. setaceum*.

† *Leaves* 3-nerved from the base.

1. **G. rotundifolium**, *Linn.*; *DC. Prodr.* iv. 599; diffuse, leaves sessile or subsessile 4 in a whorl ovate or elliptic acute mucronate or obtuse 3-nerved from the base, cymes exceeding the leaves, branches divaricate. *Reichb. Ic. Fl. Germ.* t. 1198; *Boiss. Fl. Orient.* iii. 49. *G. latifolium*, *Ham. in Don Prodr.* 133. *G. Hamiltoni*, *Spreng.*; *DC. Prodr.* iv. 600. *G. elegans*, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* i. 382; *Cat.* 6212; *DC. l. c.* *G. punduanum*, *Wall. Cat.* 7291.

Throughout the HIMALAYA and KHASIA Mts., alt. 4–10,000 ft., common. WESTERN PENINSULA; Nilgherry mts.—DISTRIB. Europe, N. Africa, W. Asia.

Perennial, glabrous or pubescent; stem and branches trailing. *Leaves* $\frac{1}{2}$ –2 by $\frac{1}{2}$ – $\frac{3}{4}$ in., rarely glabrous, margins usually flat. *Cymes* terminal; branches, peduncles, and pedicels very slender. *Corolla* white or yellowish-green, segments acute. *Fruit* small, clothed with hooked hairs, rarely glabrous.

VAR. *javanicum*; very hairy, internodes shorter, leaves often suborbicular or obovate apiculate, corolla more or less hairy. *G. javanicum*, *Blume Bijdr.* 943; *DC. l. c.* *G. Requienanum*, *W. & A. Prodr.* 443; *Wt. Ic. t.* 1042 (hairs of fruit erroneous).—Nilgherry hills. Java.

VAR. *leiocarpa*, *Miq. Fl. Ind. Bat. ii.* 339; ovary and fruit glabrous.—Khasia mts., *J. D. H. & T. T.*—Java.

2. **G. boreale**, *Linn.*; *DC. Prodr.* iv. 600; erect, leaves sessile 4 in a whorl lanceolate obtuse rigid margins scabrid 3-nerved from the base, cymes axillary and terminal many-flowered. *Reichb. Ic. Fl. Germ. t.* 1186; *Boiss. Fl. Orient.* iii. 48.

WESTERN TEMPERATE HIMALAYA, alt. 5–11,000 ft.; Kashmir, *Falconer, Thomson; Lahul, Jaeschke.*—DISTRIB. N. and Central Europe, Asia and America, the Caucasus and Armenia.

Perennial, glabrous or pubescent; stems 1–2 ft. *Leaves* 1–2 by $\frac{1}{2}$ – $\frac{1}{2}$ in., margins recurved when dry. *Cymes* suberect with short divaricate branches and ovate bracts. *Corolla* white, segments subacute. *Fruit* $\frac{1}{12}$ in. diam., clothed with hooked hairs.

†† *Leaves penni-nerved, or nerves obsolete (never 3-nerved from the base).*

3. **G. triflorum**, *Michx.*; *DC. Prodr.* iv. 601; erect or decumbent, almost smooth, leaves sessile 6–8 in a whorl penni-nerved and narrowly elliptic or lanceolate acuminate, or petioled and shorter and broader elliptic or obovate apiculate or acute, cymes few-flowered axillary and terminal. *Willd. Hort. Berol. t.* 66. *G. gratum*, *Wall. Cat.* 6211. *G. asperuloides*, *Edgew. in Trans. Linn. Soc. xx.* 61. *Asperula galioides*, *Jacq. Journ. A. consanguinea*, *Klotzsch in Pr. Wald. Reise. Bot.* 87, t. 74.

TEMPERATE HIMALAYA, alt. 6–10,000 ft., from Kashmir to Bhotan.—DISTRIB. N. Europe, Asia and America, Central America.

Perennial; stems usually straggling. *Leaves* very variable, the longer sessile forms $\frac{1}{2}$ –2 $\frac{1}{2}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in., the shorter petioled ones $\frac{1}{2}$ 1 by $1\frac{1}{2}$ – $\frac{1}{2}$ in., upper sometimes 4 in a whorl, margins flat. *Cymes* small. *Fruit* small, clothed with hooked bristles.—Habit and odour of *Asperula odorata*.

VAR. *Hoffmeisteri*; leaves petioled obovate-spathulate rounded at the tip. *Asperula Hoffmeisteri*, *Klotzsch. l. c. t.* 75.

4. **G. Aparine**, *Linn.*; *DC. Prodr.* iv. 608; climbing, scabrid with reflexed hairs or prickles, leaves sessile 6–8 in a whorl linear or narrowly obovate-oblong usually narrower below the middle cuspidate, nerves obsolete, peduncles axillary 3-flowered. *Reichb. Ic. Fl. Germ. t.* 1197; *Boiss. Fl. Orient.* iii. 68; *Wall. in Roxb. Fl. Ind., ed. Carey & Wall. i.* 382; *Cat.* 6213.

TEMPERATE HIMALAYA and WESTERN TIBET, ascending to 12,000 ft., from Kashmir and the Salt Range to Sikkim.—DISTRIB. Europe, N. Africa, N. and W. and Central Asia.

Annual, extensively rambling or climbing. *Leaves* very variable, $\frac{1}{2}$ –1 $\frac{1}{2}$ by $\frac{1}{2}$ – $\frac{1}{2}$ in., always mucronate with scabrid midrib and margins. *Peduncles* axillary and in terminal leafy panicles, longer or shorter than the leaves, rarely 1-flowered, peduncles stout. *Fruit* clothed with spreading hooked bristles.

5. **G. pauciflorum**, *Bunge Enum. Pl. Chin.* 35; nearly smooth, very slender, leaves sessile opposite or 4–6 in a whorl oblanceolate cuspidate penni-

nerved, nerves very slender, peduncles axillary and terminal 1-flowered. *G. Aparine*, var. *pauciflorum*, *Maxim. in Bull. Imp. Acad., Mel. Biol.* ix. 269.

WESTERN TIBET; Nubra, Pangim and Karakoram mts., alt. 12–14,000 ft., *Thomson*, *C. B. Clarke*, *Henderson*.—DISTRIB. N. China.

Annual, very much more slender than *G. Aparine*, and almost quite smooth. *Stems* filiform or capillary. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., membranous, midrib slender, margins minutely scabrid. *Peduncle* $\frac{1}{4}$ – $\frac{1}{2}$ in., rarely 2-flowered. *Flowers* minute, white. *Fruit* very small, covered with hooked hairs.

6. *G. vestitum*, *Don Prodr.* 133; suberect, scaberulously pubescent all over, leaves sessile 4–5 in a whorl oblong obtuse rigid, margins recurved, nerves obsolete, cymes small terminal and axillary few-flowered.

WESTERN and CENTRAL HIMALAYA, alt. 6–10,000 ft.; Garwhal, *Falconer*, &c.; Nipal, *Wallich*.

Perennial; stems stout for the size of the plant, ascending. *Leaves* $\frac{1}{2}$ – $\frac{2}{3}$ in., equally pubescent on both surfaces. *Cymes* short, but longer than the leaves, branches short, divaricate. *Flowers* minute. *Fruit* very small, clothed with hooked hairs.

7. *G. hirtiflorum*, *Requien in DC. Prodr.* iv. 600; suberect or decumbent, glabrate or laxly clothed with long weak hairs, leaves sessile 4-nate linear obtuse or subacute, margins recurved, nerves obscure, cymes axillary and terminal longer than the leaves paniculate. *G. ciliatam*, *Don Prodr.* 133. *G. Aparine*, *Wall. Cat.* 6213, in part.

TEMPERATE HIMALAYA; Garwhal, *Falconer*; Nipal, *Wallich*; Sikkim, alt. 6–10,000 ft., *J. D. H.*

Stems weak, 1–2 ft., branched, shining, never scabrid, the spreading or reversed hairs being weak and long, or absent. *Leaves* $\frac{1}{2}$ –1 by $\frac{1}{8}$ – $\frac{1}{4}$ in., rather rigid, covered all over, or on the stout midrib beneath and margins only, with long hairs. *Cymes* horizontal, 1–2 in. long, slender, and with few slender divaricate distant pairs of branches. *Flowers* on slender pedicels, minute. *Corolla-segments* ovate, obtuse, ciliate. *Fruit* very small, $\frac{1}{10}$ in. diam., clothed with hooked bristles.

8. *G. confertum*, *Royle mss.*; clothed with soft spreading hairs, stems weak interlaced, leaves sessile 4–5 in a whorl broadly elliptic or obovate obtuse, margins flat, nerves obsolete, peduncles axillary and terminal very short 1-flowered.

WESTERN HIMALAYA; Kunawur, alt. 7–8000 ft., *Royle*, *Thomson*.

Root woody, giving off innumerable interlaced slender stems, 6–8 in. long. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ by $\frac{1}{8}$ – $\frac{1}{4}$ in., floral minute. *Peduncles* $\frac{1}{16}$ – $\frac{1}{8}$ in. when flowering. *Corolla-segments* ovate-lanceolate, acuminate. *Ovary* hispid. *Fruit* not seen.

9. *G. paradoxum*, *Maxim. in Bull. Acad. Petersb., Mel. Biol. Dec.* xvi. 263; procumbent, very slender, quite smooth and almost glabrous, leaves petioled opposite and stipulate rarely 4 in a whorl orbicular or orbicular-ovate obtuse apiculate penni-nerved, flowers axillary and solitary and in very small terminal few-flowered cymes. *G. stellarisefolium*, *Franch. & Savat. Enum. Pl. Jap.* i. 213; ii. 392.

SIKKIM HIMALAYA; by water courses at Choongtam, alt. 8–9000 ft., *J. D. H.*—DISTRIB. Manchuria, Japan.

Annual? *Stems* flexuous, a span long, almost filiform, quite smooth, succulent. *Leaves* in distant pairs, $\frac{1}{4}$ – $\frac{1}{2}$ in. long and as broad or rather less, perfectly smooth, very rarely with a few scattered appressed hairs; base rounded or narrowed into the distinct petiole $\frac{1}{8}$ – $\frac{1}{4}$ in. long; nerves and midrib faint; stipules minute, interpetiolar, subulate. *Flowers* minute, if solitary and axillary on a pedicel $\frac{1}{8}$ in., when terminal 3-nate, or several on a very short branched peduncle. *Corolla-segments*

ovate, obtuse, glabrous. *Style* 2-fid at the top. *Ovary* densely clothed with hooked hairs. *Fruit* not seen.—A very curious *Galium*; the Sikkim specimens are smaller than the Manchurian, and resemble a *Nertera*.

10. **G. exile**, *Hook. f.*; minute, procumbent, stems capillary interlaced flexuous, leaves minute petioled opposite elliptic acute penninerved, peduncles solitary axillary and terminal 1-flowered.

SIKKIM HIMALAYA, by rivulets in the interior, alt. 12–14,000 ft.

A most delicate annual with soft weak stems a few inches long, procumbent amongst moss and not thicker than horse-hair. *Leaves* in distant pairs, $\frac{1}{12}$ – $\frac{1}{8}$ in. long, narrowed into a short petiole, midrib and margins quite smooth; stipules interpetiolar, low, broad, most minute. *Fruiting peduncles* longer than the leaves. *Corolla* not seen. *Ovary* pubescent, about $\frac{1}{30}$ in. diam. *Fruit* $\frac{1}{16}$ in. diam., didymous, laterally much compressed, chestnut brown, rather shining, covered with hooked hairs.

** *Fruit* without hooked hairs (except 18. *setaceum*), tomentose pubescent scabrid tubercled granular or smooth. (See also 1. *rotundifolium*.)

† *Leaves* penni-nerved, or nerves obsolete (never 3-nerved from the base).

11. **G. serpylloides**, *Koyle mss.*; softly pubescent, suberect, stem short much branched, leaves close-set sessile 4 in a whorl ovate oblong or elliptic obtuse margins recurved, nerves obscure, peduncles axillary and terminal 3-flowered, fruit densely clothed with long woolly straight (not hooked) hairs.

WESTERN HIMALAYA; Kunawur and Lahul, *Royle, Thomson, Jaeschke*.

Root woody, sending up innumerable suberect rather stout stems 2–4 in. high. *Leaves* $\frac{1}{8}$ – $\frac{1}{4}$ by $\frac{1}{16}$ – $\frac{1}{8}$ in., midrib beneath strong. *Peduncles* stout, equalling or exceeding the leaves; pedicels short, stout. *Flowers* minute. *Calyx-segments* ovate, acute. *Fruit*, including the hairs $\frac{1}{8}$ in. broad.

12. **G. Mollugo**, *Linn.*; *DC. Prodr.* iv. 596; glabrous or slightly scabrid hispid or pubescent, stems long flaccid much branched, leaves sessile or petioled 6–8 in a whorl linear or narrowly linear-obovate acute or cuspidate, nerves obscure, cymes axillary and terminal paniced many-flowered, fruit glabrous granulate. *Reichb. Ic. Fl. Germ.* t. 1187; *Boiss. Fl. Orient.* iii. 53. *G. asperifolium*, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* i. 381; *DC. l. c.* 598; *W. & A. Prodr.* 442. *G. parviflorum*, *Don Prodr.* 133. *G. Aparine*, *Wall. Cat.* 6213 in part. *G. lividum*, *Jacq. Journ.*

Mountainous parts of India, alt. 3–10,000 ft.; throughout the HIMALAYA, KHASIA MTS., BURMA, the higher Ghats of the WESTERN PENINSULA, and MOUNTAINS of CEYLON.—DISTRIB. Europe, N. Africa, Temperate Asia, Ava.

Perennial; very variable. *Stems* 2–3 ft., scandent and rambling. *Leaves* $\frac{1}{2}$ –1 by $\frac{1}{8}$ – $\frac{1}{2}$ in., rather rigid, often polished above, margins usually recurved, midrib strong beneath. *Cymes* with short slender stiff divaricate branches, pedicels recurved in fruit. *Corolla* small, white, segments ovate. *Fruit* black, $\frac{1}{10}$ in. diam.

13. **G. tricorne**, *With.*; *DC. Prodr.* iv. 608; very scabrid, stems stout, leaves sessile 6–8 in a whorl linear or oblanceolate cuspidate, nerves obscure, peduncles stout axillary 1–3-flowered, fruit glabrous or scabrous granulate. *Reich. Ic. Fl. Germ.* t. 1198; *Boiss. Fl. Orient.* iii. 67.

WESTERN HIMALAYA; Kashmir, ascending to 13,000 ft.; and WESTERN TIBET, *Thomson*. Hills at ATTOCK, *Falconer*. WUZURISTAN, *Stewart*.—DISTRIB. Central and S. Europe, N. Africa, W. Asia.

A stout annual, 1–2 ft., retrorsely scabrid. *Leaves* 1–1 $\frac{1}{2}$ by $\frac{1}{8}$ – $\frac{1}{6}$ in., rigid, midrib strong beneath. *Peduncles* longer or shorter than the leaves, stout and elongate, with decurved tips in fruit. *Corolla* white; segments ovate, acute. *Fruit* large, $\frac{1}{8}$ in. diam.

14. **G. spurium**, Linn.; DC. Prodr. iv. 608; scaberulous, leaves sessile 4-6 in a whorl elliptic-lanceolate or oblanceolate obtuse or acute penninerved cymes slender elongate terminal and axillary, fruit glabrous smooth. Boiss. Fl. Orient. iii. 69.

KASHMIR, Falconer, Thomson.

Annual, glabrous; stems 2-3 ft., flaccid, rambling. Leaves 1-1½ in., usually obtuse, rather thin, midrib not strong beneath, and margins minutely scabrid. Cymes much longer than the leaves, with slender distant divaricate branches. Corolla minute, white; segments ovate, obtuse. Fruit $\frac{1}{10}$ in. diam., black.

15. **G. verum**, Linn.; DC. Prodr. iv. 603; erect, smooth, stem pubescent upwards, leaves sessile 8-10 in a whorl linear cuspidate glabrous margins revolute, nerves obscure, cymes numerous short many-flowered, fruit glabrous granular. Reichb. Ic. Fl. Germ. t. 1187; Boiss. Fl. Orient. iii. 62.

WESTERN HIMALAYA; Kashmir, alt. 5-10,000 ft., Falconer, &c.; Lahul, Hay, Jaeschke.—DISTRIB. Europe, N. Africa, N. and W. Asia.

Perennial; stems erect or rambling, 1-3 ft., terete. Leaves usually deflexed, very narrow, $\frac{1}{2}$ -1 by $\frac{1}{12}$ - $\frac{1}{8}$ in., rigid. Cymes very numerous, pedicels short, straight in fruit. Corolla bright yellow; segments ovate, acute. Fruit $\frac{1}{10}$ in., often pubescent in Europe.

16. **G. acutum**, Edgew. in Trans. Linn. Soc. xx. 61; smooth, glabrous, stems interlaced, leaves sessile 6 in a whorl very small elliptic-lanceolate aristate margins recurved, nerves obsolete, peduncles axillary short 1-flowered, fruit glabrous granulate. G. floribundum, Jacq. Journ. G. himalayense, Klotzsch in Pr. Wald. Reise Bot. 88, t. 73.

TEMPERATE HIMALAYA; Kunawur, alt. 5000 ft., Edgeworth; Garwhal, alt. 10,000 ft., Falconer, &c.; Sikkim, alt. 9-13,000 ft., J. D. H., C. B. Clarke.

Perennial, black when dry; suberect and stiff, or flaccid and decumbent; stems 6-12 in., very leafy. Leaves close-set, often recurved, $\frac{1}{8}$ - $\frac{1}{4}$ in., midrib strong beneath. Peduncle very stout when flowering, much shorter than the leaves, elongate and straight in fruit. Corolla very minute; segments lanceolate, acuminate. Fruit $\frac{1}{10}$ in. diam.—I have noted the flowers as purplish in some Sikkim specimens, yellowish-white in others.

17. **G. tenuissimum**, Bieb. Fl. Taur. Cauc. i. 104; erect, scabrid, glabrous, excessively slender, widely divaricately branched, leaves 6 in a whorl narrowly linear scabrid aristate, nerves obsolete, cymes very large lax very slender few-flowered, fruit minute smooth glabrous. DC. Prodr. iv. 607; Boiss. Fl. Orient. iii. 73.

WESTERN HIMALAYA; Kashmir, alt. 5000-6500 ft., Clarke. PUNJAB; at Rawul Pindee, Aitchison.—DISTRIB. W. Asia, from Syria and the Caucasus to Greece.

Annual. Stem 6-12 in., usually retrorsely scabrid, subterete, di-tri-choriomously divided from the base, so that the whole plant forms a triangle with the apex at the root, leafy at the forks only. Leaves $\frac{1}{2}$ - $\frac{3}{4}$ by $\frac{1}{12}$ in., rather broader beyond the middle, ciliate with rigid hairs, margins revolute. Cymes many times longer than the leaves, and very long pedicels capillary. Corolla minute, white or yellowish; segments cuspidate. Fruit $\frac{1}{12}$ in. diam., mericarps often free.—Too closely allied to *G. divaricatum*, Lam., which extends from Europe to Syria.

18. **G. setaceum**, Lamk.; DC. Prodr. iv. 609; erect, short, minutely scabrid or glabrous, branches filiform erect or divaricate, leaves 4-8 in a whorl filiform acute margins recurved lower short elongate-spathulate not aristate upper setaceous, cymes terminal and lateral capillary few-flowered, fruit most minute glabrous or with a few hooked hairs. Boiss. Fl. Orient. iii. 77. G. capillare, Cav. Ic. t. 191, f. 1.

THE PUNJAB, at Hussar, *Aitchison*.—DISTRIB. Beluchistan, Afghanistan, Asia Minor, and Greece.

Annual; stem erect, 6–8 in., terete. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{50}$ in., the lower shorter and broader, margins revolute, hardly scabrid. *Cymes* equalling and exceeding the leaves; branches and pedicels capillary. *Corolla* most minute, glabrous, yellow. *Fruit* $\frac{1}{20}$ in. diam., glabrous or with a few short hooked hairs.—Described from Beluch and Afghan specimens, the Punjab ones being very imperfect.

19. **G. ceratophylloides**, *Hook. f.*; stems erect subsimple short very slender smooth and glabrous, leaves in close-set whorls of 6 horizontal and recurved very slender soft flat aristate, peduncles axillary shorter than the leaves 3-flowered, ovary glabrous.

KASHMIR, at Poosiana, alt. 8500 ft., *C. B. Clarke*.

Perennial? *Stems* 4–6 in., 4-angled, weak, filiform, perfectly smooth. *Leaves* $\frac{1}{2}$ in., rather flaccid, longer than the internodes, finely acuminate and aristate, minutely scabrid towards the apex, margins hardly recurved, midrib not prominent beneath. *Peduncles* erect, with 2 subulate bracts at the tip. *Corolla* yellowish; segments lanceolate, long-acuminate. *Fruit* not seen.

†† *Leaves* 3-nerved from the base.

20. **G. vernum**, *Scop.*; *DC. Prodr.* iv. 605; slightly scabrid or pubescent, decumbent, weak, leaves shortly petioled 4 in a whorl elliptic tip rounded 3-nerved from the base, peduncles axillary shorter than the leaves few-flowered, fruit smooth glabrous. *Reich. Ic. Fl. Germ.* t. 1185; *Boiss. Fl. Orient.* iii. 80.

WESTERN HIMALAYA; Chumba, alt. 9000 ft., *C. B. Clarke*.—DISTRIB. Central and S. Europe, Siberia.

Perennial. *Stem* 6–10 in., sparingly branched, hairs reflexed. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{8}$ – $\frac{1}{4}$ in., membranous, nerves slender. *Peduncle* horizontal, ebracteate, pedicels very short. *Corolla* yellow, green; segments lanceolate.—The specimens are very scanty, and not in fruit; in the European plant the flowers are polygamous, the lateral ♂. the terminal hermaphrodite, and the peduncle is recurved in fruit.

91. **ASPERULA**, *Linn.*

Characters and distribution of *Galium*, but the corolla funnel-shaped.

1. **A. cynanchica**, *Linn.*; *DC. Prodr.* iv. 582; glabrous, stems very numerous ascending or erect, leaves small linear-oblong obtuse lower in whorls of 4 upper opposite, flowers glabrous in terminal fascicles, bracts linear acute, fruit granulate. *Wight Ill.* t. 128 bis; *Reich. Ic. Fl. Germ.* t. 1181; *Boiss. Fl. Orient.* iii. 40.

WESTERN HIMALAYA; Kashmir, alt. 8000 ft., *Falconer*, *C. B. Clarke*; Kistwar, alt. 7–9000 ft., *Thomson*; Garwhal, at Niti, alt. 11,500 ft., *Strach. & Winterb.*—DISTRIB. Europe, Asia Minor.

Glabrous, rarely sparsely pubescent, 4–10 in. high; stock woody; stems slender terete, branches 4-angled. *Leaves* scattered, $\frac{1}{2}$ – $\frac{2}{3}$ by $\frac{1}{12}$ – $\frac{1}{8}$ in., mostly opposite, often recurved, acute or obtuse, flat, thick, nerveless. *Flowers* at the naked tips of the slender branches in corymbiform fascicles or heads, subtended by 2 small linear-oblong bracts. *Corolla* pink or white, about $\frac{1}{10}$ in. long; segments 4, triangular, shorter than the tube. *Fruit* $\frac{1}{12}$ in. diam.

2. **A. brachyantha**, *Boiss.*; *Fl. Orient.* iii. 45; *Vak.* with longer corolla; glabrous or puberulous, stems very numerous erect virgate, leaves opposite shortly linear oblong obtuse, flowers tomentose in terminal heads or fascicles, bracts very short oblong obtuse, corolla funnel-shaped, fruit globose smooth.

WESTERN HIMALAYA; Kashmir, alt. 7-12,000 ft., Falconer, C. B. Clarke; Kunawur, Royle, Thomson, &c.—DISTRIB. Persia.

Very similar to *A. cynanchica*, and scarcely distinguishable except by the shorter always opposite leaves, shorter blunter bracts, and tomentose more capitate flowers; these latter have a longer corolla than in Persian *brachyantha*, in which the corolla is described by Boissier as of a dirty yellow colour. The colour of the Indian ones is not recorded.

ORDER LXXVI. VALERIANEÆ. (By C. B. Clarke.)

Herbs or (a few non-Indian species) shrubs. *Leaves* opposite, exstipulate, but often united at the base by a stipule-like line or rim, entire pinnatifid or pinnate. *Flowers* sessile, cymose, sometimes polygamous or diœcious, bracteate. *Calyx-tube* adnate to the ovary; limb obsolete in flower, in fruit often enlarged or pappose. *Corolla* superior; tube equal or gibbous or spurred at the base; lobes 3-5, imbricated in bud. *Stamens* 1-4, on the corolla-tube. *Ovary* inferior, 3-celled; cells 1-ovuled, or one 1-ovuled, the others barren or imperfect; style filiform, stigma 2-3-lobed or undivided; ovules pendulous. *Fruit* indehiscent, dry, 1-seeded, the two barren cells enlarged or reduced to filiform ridges. *Seed* pendulous; albumen 0 or scanty; embryo straight, radicle superior.—DISTRIB. Species 300, all cool and temperate regions except Australia and S. Africa.

Stamen 1, corolla yellow, calyx in fruit very small	1. PATRINIA.
Stamens 4, corolla red, calyx in fruit equally 5-lobed	2. NARDOSTACHYS.
Stamens 3, calyx pappose in fruit	3. VALERIANA.
Stamens 3, calyx epappose in fruit	4. VALERIANELLA.

1. PATRINIA, Juss.

Erect, perennial herbs. *Leaves* entire or 1-2-pinnatifid or pinnate. *Cymes* corymbosely panicked; bracts narrow, free. *Calyx-limb* small or 0, not enlarged in fruit. *Corolla-tube* short or long; lobes 5, subequal, spreading, yellow. *Stamens* 1, or 3-5. *Ovary* 3-celled; stigma capitate; ovules 1 in each cell, or more often 2 cells barren. *Fruit* small, 3-celled, 1-seeded, the barren cells equalling the fertile or nearly so.—DISTRIB. Species 12, N. Asiatic and Sikkim.

1. **P. monandra**, C. B. Clarke; corolla small symmetric shortly funnel-shaped, stamen 1, fruit within an orbicular scarious veined bracteole.

SIKKIM HIMALAYA, alt. 4000 ft.; Simonbong, J. D. H.; Yoksun, Hee, C. B. Clarke.

Stem 2-4 ft., pubescent. *Leaves* entire or pinnatifid, terminal lobe oblong or linear, coarsely crenate-serrate or entire, sparsely pubescent. *Panicle* often 1½ ft. long, and broad. *Corolla* $\frac{1}{16}$ in. long. *Stigma* peltate. *Bracteole* of the fruit $\frac{1}{4}$ in. diam., as broad or broader than long, beautifully veined.—Hance (*Symb. ad Fl. Sinic.* 5) does not mention the number of stamens in his *P. graveolens*, which may hence be either the Indian plant or the 4-stamened *P. ovata*, Bunge (Nov. Gen. et Sp. Chin. et Monghol. 23, t. 2).

2. NARDOSTACHYS, DC.

Erect, perennial herbs. *Leaves* entire, radical elongate spatulate; cauline few. *Flowers* capitate, heads in cymes; bracts oblong, free or nearly so. *Calyx-limb* 5-lobed; in fruit enlarged, membranous, veined. *Corolla* tubular-campanulate, base subequal; lobes 5, spreading, rosy. *Stamens* 4. *Ovary* 3-celled, 1-ovuled; style linear, stigma capitate. *Fruit* obovate, compressed, 3-celled, 1-seeded, the 2 barren cells smaller than the fertile. *Seed* obovate, compressed.

N. Jatamansi, DC. *Mem. Valer.* 7, t. 1, *Prodr.* iv. 624; *Royle Ill.* 242-244, t. 54. *N. grandiflora*, DC. l. c. 8, t. 2, *Prodr.* iv. 624; *Wall. Pl. As. Rar.* iii. 40. *Patrinia Jatamansi*, Don *Prodr.* 159, and in *Lamb. Cinch.* 177, with fig. *Valeriana Jatamansi*, Wall. *Cat.* 431, not of Jones and Roxb. *Fedia grandiflora*, Wall. *Cat.* 1187.

ALPINE HIMALAYA, alt. 11-15,000 ft.; from KUMAON to SIKKIM, ascending to 17,000 ft. in Sikkim, J. D. H.

Rootstock woody, long, stout, covered with fibres from the petioles of withered leaves. *Stem* 4-24 in., more or less pubescent upwards, often glabrate below, subscape. *Radical leaves* 6-8 by 1 in., longitudinally nerved, glabrous or slightly pubescent, narrowed into the petiole; *cauline* 1 or 2 pairs, 1-3 in. long, sessile, oblong or subovate. *Flower-heads* usually 1, 3 or 5; *bracts* $\frac{1}{2}$ in., oblong, usually pubescent. *Corolla-tube* $\frac{1}{2}$ in. long, somewhat hairy within, as are the filaments below. *Fruit* $\frac{1}{2}$ in. long, covered with ascending white hairs, crowned by the ovate, acute, often dentate calyx-teeth.—There are two forms of this plant: a large-flowered, with usually glabrous bracts, and a smaller one, with the corolla-tube scarcely $\frac{1}{2}$ in. long, and the bracts densely shortly hairy; various intermediates occur. The product spikenard discussed by Sir W. Jones (*Asiat. Research.* ii. 405) was doubtless derived from *Nardostachys*; but the plant figured as *Valeriana Jatamansi* is *V. Wallichii*, DC.

3. VALERIANA, Linn.

Perennial herbs (the Indian species). *Leaves* entire pinnatifid or pinnate, radical often long-petioled and undivided. *Cymes* corymbosely paniced; bracts small, oblong or linear, persistent, free or nearly so. *Calyx-limb* in flower obscure, unrolling in fruit into 5-15 plumose bristles united at base into a short wide funnel-shaped tube. *Corolla-tube* funnel-shaped, base equal or sub-gibbous; lobes 5, spreading, pink or white. *Stamens* 3. *Ovary* 3-celled, 1-ovuled; stigma shortly 2-3-fid or subentire. *Fruit* oblong-lanceolate, compressed, plano-convex, with 3 dorsal, 1 ventral, and 2 submarginal ribs, 1-celled, the 2 barren cells obsolete, crowned by the persistent pappus-like calyx.—DISTRIB. Species 150, in moist temperate and cool regions.

1. **V. dioica**, Linn.; DC. *Prodr.* iv. 637; glabrous, radical leaves long-petioled ovate entire obtuse, cauline pinnatifid, lateral lobes few narrow terminal obtuse, fruit glabrous. *Boiss. Fl. Orient.* iii. 85. *V. pusilla*, *Royle Ill.* 241.

TEMPERATE WESTERN HIMALAYA, from Kashmir to the Karakorum, alt. 11-13,000 ft.; frequent, C. B. Clarke, &c., and in Lahul, Jaeschke.—DISTRIB. N. W. Asia, Europe.

Rootstock slender, decumbent, stoloniferous. *Stem* 8-16 in., erect, simple, nodes microscopically pilose. *Flowers* diœcious or polygamo-monoœcious; corymbs of ♂ compact, of ♀ more lax, especially in fruit; upper bracts $\frac{1}{2}$ in., broadly linear, usually exceeding the fruit.

2. **V. officinalis**, Linn.; DC. *Prodr.* iv. 641; subglabrous, leaves pinnate, segments numerous narrow entire or toothed, corymb large lax, fruit glabrous. *Boiss. Fl. Orient.* iii. 89. *V. dubia*, Bunge in *Ledeb. Fl. Alt.* i. 52; *Ledeb. Ic. Fl. Ross.* t. 350.

NORTH KASHMIR; Sonamurg, alt. 8-9000 ft., Thomson, Levinge, C. B. Clarke; Kunzlwán, alt. 7500 ft., C. B. Clarke.—DISTRIB. North and West Asia, Europe.

Rootstock short, suberect, hardly thicker than the stem, stoloniferous. *Stem* 1-3 ft., erect, corymböse above, nodes minutely hairy. *Radical leaves* 0 at flowering time or pinnate; the leaves on lateral autumn offsets near the root are often ovate entire or slightly toothed; *cauline* several, all pinnate; lobes (in the Indian plant, which is exactly *V. dubia*, Bunge) narrowly oblong or linear, often entire, much or sparingly toothed. Upper bracts $\frac{1}{10}$ in., oblong-linear, shorter than the fruits.—The European

V. officinalis has lanceolate and ovate-lanceolate leaflets, often much toothed or serrate.

3. **V. Jaeschkei**, *C. B. Clarke*; small, glabrous, radical leaves pinnate, pinnules many obtuse, cauline few pinnules linear, fruit hairy.

WESTERN HIMALAYA, Lahul, *Jaeschke*.

Rootstock short, thickened, emitting thick horizontal fibres. *Stem* 6-9 in., erect, simple, nodes minutely pilose. *Radical leaves* numerous at flowering time, segments 5-9, $\frac{1}{2}$ in. long, ovate to oblong; cauline 1 or 2 distant pairs, segments $\frac{1}{4}$ -1 by $\frac{1}{20}$ - $\frac{1}{10}$ in. *Corymbs* 1 in. diam.; flowers small; upper bracts $\frac{1}{10}$ in., narrow oblong.—Resembles generally *V. oligantha*, Boiss. (Fl. Orient. iii. 87), of which it might be the fully developed form; but that the fruit is pilose and the root is not long nor branching.

4. **V. elegans**, *C. B. Clarke*; puberulous, leaves all entire spatulate ovate or oblong obtuse, fruit hairy.

BALTISTHAN; Skardo, alt. 9000 ft., *C. B. Clarke*.

Rootstock woody, thick, branching, with thick horizontal fibres. *Stem* 6-9 in., erect, frequently branched from near the base, glabrous upwards. *Radical leaves* several at fruit-time, ovate; cauline several, similar, oblong. *Panicle* lax, in fruit dichotomously dividing into linear subsimple spikes; upper bracts oblong, small, hardly half the length of the fruit. *Flowers* small, bright pink (pappus red in dried specimens).

5. **V. Roylei**, *Klotzsch in Reis. Pr. Waldem. Bot.* 83, t. 85; stem glabrous, leaves all undivided petioled orbicular or cordate-ovate uppermost pair sessile, fruit glabrous.

WESTERN HIMALAYA, *Hoffmeister*.

Root tuberous. *Stem* 8 in., erect, simple. *Leaves* $\frac{1}{3}$ - $\frac{1}{2}$ in., at first puberulous, entire, or the lowest obscurely toothed; radical several at flower-time; cauline several pairs, all but the uppermost petioled. *Corymb* 1-2 in. diam.; upper bracts oblong-linear, as long as the fruit.—Not seen, the foregoing drawn up from Klotzsch's figure and description. The plant seems very near *V. pyrolæfolia*, which, however, has a different root.

6. **V. pyrolæfolia**, *Dcne in Jacquem. Voy. Bot.* 85, t. 93; sparingly pubescent, leaves all subtire, radical petioled orbicular or elliptic obtuse, cauline sessile ovate, fruit glabrous. *V. bracteata*, *Royle Ill.* 241, without description, *fide T. Thoms. ms.* *Valeriana*, sp. No. 12 and 13, *Herb. Ind. Or. H. f. & T.*

TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 9-14,000 ft., *Jacquemont*, &c.

• *Rootstock* thick, branching, subhorizontal, with thick fibres. *Stem* 2-10 in., erect, simple, succulent, often pubescent, at least when young. *Radical leaves* often 1 in. diam., several at fruit-time; cauline $\frac{1}{2}$ in., all pubescent when young, subsucculent, nerved when mature. *Corymb* 1-2 in. diam., much more lax in fruit; upper bracts $\frac{1}{2}$ in., linear-oblong, equalling the fruit.—Can this be a form of *V. Wallichii*?

7. **V. Stracheyi**, *C. B. Clarke*; slender, pubescent, leaves lyrate-pinnate terminal lobe rhomboid, corymb lax dichotomously branching into straight slender spikes, fruit very pilose. *Valeriana*, sp 6, *Herb. Ind. Or. H. f. & T.*

TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 4-8000 ft., *Thomson*, *Strachey & Winterbottom*, &c.

Rootstock woody, very stout. *Stems* 6-12 in., erect, often branching from near the base, uniformly minutely pubescent. *Radical leaves* at flower-time 0; cauline leaves several, minutely pubescent, terminal lobe toothed or nearly entire. *Corymb* slender, lax in fruit; ultimate branchlets 1-2 in., simple, with distant minute lanceolate bracteoles which are much shorter than the fruit.

8. **V. Wallichii**, *DC. Mem. Valer.* 15, t. 4; pubescent, radical leaves several long-petioled cordate-ovate; cauline few or much smaller entire or pinnate, fruit hairy or nearly glabrous. *DC. Prodr.* iv. 640; *Wall. Pl. As. Rar.* iii. 40. *V. villosa*, *Wall. Cat.* 433, *not of Thunb.* *V. Jatamansi*, *Jones in Asiat. Research.* ii. fig. at p. 405; *Roxb. in Asiat. Research.* iv. 433, *Fl. Ind.* 163 (see *Royle Ill.* 243). *V. Spica*, *Vahl Enum.* ii. 13.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 10,000 ft. KHASIA Mts., alt. 4-6000 ft.—DISTRIB. Afghanistan.

Rootstock horizontal, thick, with thick descending fibres. *Stem* 6-18 in., often decumbent below, very rarely divided. *Radical leaves* often 1-3 in. diam., deeply cordate, usually acute and toothed. *Corymb* 1-3 in. diam., not very lax even in fruit; bracteoles oblong-linear, as long as the fruit.—The typical large form of this, with acute toothed radical leaves and pilose fruits, is easily separable from *V. pyrolæfolia*; but there are smaller examples with the radical leaves elliptic entire, the fruits nearly glabrous, which are very near *V. pyrolæfolia*. Jones and Roxburgh named this plant *V. Jatamansi*, under the misapprehension (subsequently corrected by Wallich and Royle independently) that it produced the Jatamansi spikenard of *Nardostachys*. The name *V. Jatamansi* is hence to be suppressed.

9. **V. Hardwickii**, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* i. 166; pubescent below, leaves pinnate, pinnules 1-5 lanceolate acute, radical undivided usually disappearing before fruit-time, corymb in fruit lax, fruit hairy. *Wall. Cat.* 432, *Pl. As. Rar.* 39, t. 263; *Don Prodr.* 159; *DC. Prodr.* iv. 640. *V. Hardwickiana*, *Roem. & Schult. Syst. i. Mant.* 259. *V. tenera*, *Wall. Cat.* 435; *DC. Mem. Valer.* 16, *Prodr.* iv. 640. *V. elata*, *Don Prodr.* 159. *V. javanica*, *Blume Bijl.* 919. *V. acuminata*, *Royle Ill.* 241.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 4-12,000 ft. KHASIA Mts., alt. 4-6000 ft.—DISTRIB. Java.

Rootstock hardly thickened, descending, fibrous. *Stem* 1-5 ft., erect, usually simple or corymbose only upwards, above often glabrous, nodes little pilose or sometimes densely white-barbate (*V. acuminata*, Royle). *Radical leaves* long-petioled, ovate, acute; lower rarely undivided (*V. tenera*, Wall.); cauline several, leaflets often 3, rarely more than 5, upper small. *Corymb* in fruit often 1 foot, repeatedly dichotomous, ultimate branchlets very short; upper bracteoles much shorter than the fruit.

VAR. Hoffmeisteri, Klotzsch in *Reis. Pr. Waldem. Bot.* 84 (sp.); stem strict slenderer nearly glabrous, leaves smaller, fruits glabrous or nearly so. *Valeriana*, sp. 10, *Herb. Ind. Or. H. f. & T.*—Himalaya, alt. 10-12,000 ft.—Identified with *V. Hoffmeisteri* from Klotzsch's description only; it is not rare at high levels.

VAR. Arnottiana, Wight *l.c.* t. 1045-6 (sp.); large, middle cauline leaves often large with 7-9 large lanceolate pubescent leaflets, corymbs often large dense with ultimate branchlets 1-2 in. long.—Neilgherry Mts., alt. 6-8000 ft., *Wight*.

10. **V. Moonii**, *Arn. in Herb. Hook.*; sparingly pubescent, large, radical and lower cauline leaves pinnate with many leaflets, middle cauline pinnate with 3-5 leaflets, fruits glabrous. *V. villosa*, *Moon Cat.* 5, *not of Thunb.* *V. Hardwickii*, *Thwaites Enum.* 159.

CEYLON; alt. 6000 ft.; frequent.

Rootstock long, horizontal, not woody nor thickened, fibrous at the distant nodes. *Stem* often 4 ft., nearly glabrous. *Leaves* gradually reduced in size and number of leaflets from the base upwards. *Corymb* close in flower, not exceeding 6 in. *Fruit* larger and wider than in *V. Hardwickii*, with the dorsal nerves wider apart, perfectly glabrous.—Thwaites has sent this plant as *V. Hookeriana* (C.P. 159), and as *V. Arnottiana* (C.P. 1729): these are exactly alike, and there is no other Ceylon form; which (as noted by Sir J. D. H. in *Thwaites Enum.*) may be a var. of *V. Hardwickii* with glabrous fruit. It dries very black.

11. **V. Hookeriana**, W. & A. Prodr. 444; sparingly pubescent, radical and lower cauline leaves pinnate with numerous leaflets, upper cauline few reduced or 0, fruit hairy. *Wight Ill.* t. 129.

MTS. of the DECCAN, NILGHERRY, PULNEY, and KURG, *Wight, G. Thomson.*

Rootstock woody, thick, horizontal, fibres thick. *Stem* 10–30 in., subscapose, nodes bearded. *Leaves* bracteiform except near the base of the stem, where they are pinnate with a large ovate toothed terminal lobe. *Corymb* usually compact in flower, in fruit sometimes elongate and laxly paniced.—Very doubtfully distinct from *V. Moonii*.

12. **V. Leschenaultii**, DC. *Mem. Valer.* 17; sparingly pubescent, radical leaves petioled oblong subentire, cauline few or several often sub-lyrate with small basal lobes, corymb contracted, fruit hairy. DC. *Prodr.* iv. 640; *Wall. Cat.* 6636; W. & A. *Prodr.* 444; *Wight Ic.* t. 1044.

NEILGHERRY MTS. and others in MYSORE and KURG, alt. 4–7000 ft.

Rootstock short, enveloped by the thick fibres. *Stem* 8–20 in., nearly glabrous, simple, often subscapose, nodes more or less hairy. *Radical leaves* 2–4 by $\frac{1}{2}$ –2 in., narrowed or almost rounded at the base, entire or sinuate-crenate.—The scapose form has sometimes hairy fruits, and Wight has been unable in his own herbarium to settle what he would call *V. Leschenaultii* and what *V. Brunoniana*.

VAR. *Brunoniana*, W. & A. *Prodr.* 443 (sp.); cauline leaves small undivided or hardly any, fruit glabrous. *Wight Ic.* t. 1043. *V. aquatica*, *Schldl. in Herb. Hohenacker*, n. 1339 (sp.).—Neilgherry Mts., frequent.

13. **V. Beddomei**, C. B. Clarke; glabrous, radical leaves pinnate with numerous oblong leaflets, cauline smaller with several linear leaflets, corymbs contracted, fruit glabrous. *V. microphylla*, *Bedd. in Trans. Linn. Soc.* xxv. 219, not of H. B. K.

ANAMALLAY MTS., alt. 7000 ft., *Beddome*.

Rootstock (summit alone seen) horizontal, not woody nor thickened. *Stem* 4–12 in., erect, simple, nodes hairy. *Radical leaves* 3 by $\frac{3}{4}$ in.; leaflets 11–25, $\frac{1}{3}$ by $\frac{1}{8}$ in., with few irregular obtuse teeth, sublobed or entire; leaflets of cauline 5–13; $\frac{1}{4}$ by $\frac{1}{16}$ in. *Corymb* in young fruit $2\frac{1}{2}$ in. long.

4. VALERIANELLA, Moench.

Annual herbs, dichotomously branching. *Radical leaves* rosulate, entire; cauline entire or toothed, rarely pinnatifid. *Cymes* corymbosely paniced or subcapitate; bracts free. *Calyx-limb* at flower-time small or obsolete; in fruit variously enlarged, equal or one-sided, sometimes aristate, never plumose. *Corolla-tube* short, base equal or gibbous, never spurred; lobes 5, spreading, white rose or pale blue. *Stamens* 3. *Ovary* 3-celled, 1-ovuled; style minutely 3-fid or subentire. *Fruit* ovoid or cylindric, straight or curved, the 2 barren cells inflated, as large as the fertile, or small, or reduced to filiform ridges.—DISTRIB. Species 47, European, Asiatic, N. American.

1. **V. dentata**, Poll. *Hist. Pl. Palat.* i. 30, not of DC.; leaves oblong entire or sparingly toothed, fruit ovoid subconical pubescent barren cells reduced to filiform ridges, calyx-limb obliquely truncate toothed much shorter than the fruit. *V. Morisonii*, DC. *Prodr.* iv. 627; *Boiss. Fl. Orient.* iii. 105; *Krok Valerianella*, 42, t. i. fig. 6. *V. microcarpa*, *Lois.*; *Krok. l. c.* 36, t. i. fig. 3.

KASHMIR, *Thomson*.—DISTRIB. of the genus.

Stem 3–12 in., often much branched from the base, glabrous or minutely pubescent. *Leaves* 1–1 $\frac{1}{2}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* white, in small heads; bracts small, narrow-lanceolate. *Fruit* $\frac{1}{12}$ in., the two filiform cells forming a rim round an ovate-oblong slight depression.

2. **V. Szovitziana**, Fisch. & Mey. *Ind. Sem.* iii. 48; leaves oblong-linear

entire and sparingly irregularly toothed, fruit ovate-oblong pubescent or hairy barren cells as large as the fertile, calyx-limb shortly cylindric truncate reticulately nerved with one long horizontal linear tooth as long as the capsule or nearly so. *Krok. Valerianella*, 58, t. 2, fig. 17; *Boiss. Fl. Orient.* iii. 101. V. Aucheri, *Boiss. Diagn.* 1 ser. iii. 58.

KASHMIR, alt. 5-6000 ft., *Falconer, Thomson, &c.*

Stem 2-20 in., minutely pubescent. *Leaves* 2 by $\frac{1}{3}$ in., glabrous or obscurely puberulous. *Corymbs* in fruit subpaniculate; bracts small, narrow-oblong. *Fruit* $\frac{1}{8}$ - $\frac{1}{4}$ in., scarcely curved, hairy especially on one side, or pubescent, or with microscopic short hairs resembling glistening dots.

ORDER LXXVII. DIPSACEÆ. (By C. B. Clarke.)

Herbs or (non-Indian species) rarely shrubs, glabrous, hairy, or prickly. *Leaves* opposite or whorled, exstipulate, sometimes connate at the base, entire, toothed, lobed or pinnate. *Flowers* scattered in cymes, whorled in spikes, or more often in dense heads, surrounded by bracts; bracteoles often present as scales of the receptacle; ovary free or adnate to a narrow funnel-shaped or utricular enveloping involucl. *Calyx-tube* adnate to the ovary, usually constricted above it; limb expanded, cup-shaped or bristly. *Corolla* funnel-shaped; limb 2-5-fid, equal or 2-lipped, or in the ray-flowers 2-labiate; disk-flowers equal. *Stamens* 4 or 2, inserted high on the corolla-tube; anthers exserted, linear-oblong. *Ovary* 1-celled; style filiform, stigma capitate or linear terminal or lateral; ovule 1, pendulous. *Achene* dry, enveloped by the involucl and often adnate thereto, crowned usually by the calyx-limb. *Seed* pendulous, albumen copious or scanty; embryo straight, radicle superior.—DISTRIB. Species 120, chiefly Mediterranean, Western Asiatic, South African, Japanese, and Cingalese; none in America, Polynesia, or Australia.

Flowers small, scattered in 2-3-chotomous cymes. 1. *TRIPOSTEGIA*.
Flowers 2-lipped, whorled on a spike 2. *MORINA*.
Flowers in dense peduncled heads, calyx-limb muticous 3. *DIPSACUS*.
Flowers in heads, calyx-limb bristly 4. *SCABIOSA*.

1. *TRIPOSTEGIA*, Wall.

An erect, perennial, slender herb, glandular-pubescent upwards. *Leaves* petioled, toothed or pinnatifid, uppermost distant, small, sessile. *Cymes* lax, 2-3-chotomous; bracts at the divisions, small, narrow-oblong; flowers very small, sessile or shortly pedicelled, with 2 opposite, free, narrow-lanceolate, small bracts, and 4 similar bracteoles, glandular; involucl an 8-ribbed utricle, nearly closed at the mouth over the fruit. *Calyx-limb* minute, obscurely toothed. *Corolla-tube* funnel-shaped; lobes 5, equal, spreading, pink-purple. *Stamens* 4, inserted near the base of the corolla-tube, subincluded. *Style* linear, stigma capitate. *Achene* shortly beaked, free within the utricular involucl, obscurely 4-ribbed, crowned by the unaltered calyx-limb. *Seed* pendulous, albumen plentiful; embryo scarcely shorter than the seed.

1. *T. glandulifera*, Wall. *Cat.* 436; *DC. Prodr.* iv. 642. *T. glandulosa*, *DC. Mem. Valer.* 20, t. 5.

TEMPERATE and ALPINE HIMALAYA, alt. 8-14,000 ft.; from Gurwhal to Bhotan. *Wallich, &c.*

Rootstock slender, horizontal. *Stem* 6-24 in., erect, simple or corymbosely branched, below pubescent or nearly glabrous, above with hairs tipped by large glands. *Leaves* 2 by 1 in., hairy. *Flowers* $\frac{1}{12}$ in. *Achenes* $\frac{1}{12}$ in.; involucl as long.—In fruit the ovary-wall becomes excessively thin, and on a cross-section may be mistaken for

the involucl. The achene may be recognised by its short beak crowned by the much wider calyx-limb.

2. *MORINA*, Linn.

Perennial herbs, resembling spiny *Labiata*. Leaves opposite or whorled, narrowly oblong or linear, spinous-toothed, or in *M. nepalensis* unarmed. Flowers whorled; whorls in spikes, surrounded by wide-based floral leaves; bracteoles among the flowers few, spinous; involucl long funnel-shaped, mouth truncate, aristate or spinous. Calyx-limb herbaceous, 2-lipped; lips entire or 2-fid. Corolla-tube elongate funnel-shaped, curved; mouth oblique, 2-labiate 5-lobed. Stamens inserted at the mouth of the corolla-tube, 2 fertile (with or without 2 rudimentary,) or 4 fertile. Style subexsert, stigma entire. Achene free in the base of the involucl; pericarp usually thickened, wrinkled; apex oblique.—DISTRIB. Species 7 or 8, in West and Central Asia.

1. *M. persica*, Linn.; DC. Prodr. iv. 644; tall, calyx-lobes subequal obovate-oblong entire or emarginate, corolla pink, fertile stamens 2, filaments usually as long as the corolla-lobes. Sibth. F. Græc. t. 28; Boiss. Fl. Orient. iii. 114. M. Wallichiana, Royle Ill. 245, t. 55, fig. 1. M. Tournefortii, Jaub. & Spach. v. Ic. Pl. Or. 32, t. 429. M. græca and Aucheri, Jaub. & Spach. l. c.

WESTERN HIMALAYA, alt. 7-9000 ft. from Kashmir to Kumaon, frequent.—DISTRIB. From Persia to Greece.

Stem 3-4 ft., pubescent or villous upwards. Leaves 6 by 1 in., sessile, doubly spinous-toothed, pubescent or glabrous. Spikes elongate. Bracts free or nearly so, and involucls hairy or villous. Calyx-lips $\frac{1}{2}$ - $\frac{3}{4}$ by $\frac{1}{8}$ - $\frac{1}{4}$ in. Corolla-tube 1-1 $\frac{1}{2}$ in.

2. *M. longifolia*, Wall. Cat. 426; tall, calyx-lobes unequal 2-fid with rounded not spinous lobes, corolla pink, fertile stamens 2, filaments much shorter than the corolla-lobes. DC. Prodr. iv. 644; Wall. Pl. As. Rar. iii. 1, t. 202; Bot. Reg. 1840, t. 36; ? Bot. Mag. t. 4092. M. elegans, Fisch. et Lallemand. Ind. Sem. Petrop. viii. 67.

TEMPERATE and ALPINE HIMALAYA, alt. 9-14,000 ft., from Kashmir to Bhotan.

Stem 3-4 ft., pubescent or villous upwards. Leaves 6 by 1 in., sessile, doubly spinous-toothed, pubescent or glabrous. Bracts free or nearly so, and involucls hairy or villous. Calyx-lips, one $\frac{1}{2}$ by $\frac{1}{2}$ in., the other usually much smaller. Corolla-tube 1 in.—Closely allied to the preceding species.

3. *M. Coulteriana*, Royle Ill. 245; tall, calyx-lobes subequal bifid with lobes acute mucronate or spinous, corolla yellow, fertile stamens 2, filaments half as long as the corolla-lobes. M. breviflora, Edgew. in Trans. Linn. Soc. xx. 62.

SUBALPINE HIMALAYA, alt. 9-13,000 ft., from Kashmir to Gurwhal.—DISTRIB. Kashgar.

Stem 2-3 ft., more or less hairy upwards. Leaves 6 by $\frac{3}{4}$ in., sessile, spinous-toothed, glabrous. Bracts free or nearly so, and involucls hairy. Calyx-lips $\frac{1}{2}$ by $\frac{1}{2}$ in. Corolla-tube $\frac{1}{2}$ - $\frac{3}{4}$ in. Seeds $\frac{1}{4}$ by $\frac{1}{8}$ in., with a deep longitudinal furrow on one side.—Bunge Rel. Lehm. 321, places this plant in the sect. *Acanthocalyx* erroneously, for the fertile stamens are 2 only.

4. *M. polyphylla*, Wall. Cat. 425; tall, leaves many in a whorl, bracts to each flower whorl numerous linear-lanceolate, calyx-lips subequal 2-lobed. DC. Prodr. iv. 644.

TEMPERATE HIMALAYA; Nipal, at Gossainthan, Wallich; Gurwhal? Falconer.

Stems 2 ft., pubescent upwards. Lower leaves 12 by 1 in., doubly spinous-toothed, glabrous; upper similar but much smaller, often 6 in a whorl. Flower-whorls very

close together; bracts to each whorl often 6, adnate by their bases into a short campanulate cup $\frac{1}{4}$ to $\frac{1}{2}$ in. long; their free portions $1-1\frac{1}{2}$ in., very narrow, shining. *Calyx-lips* $\frac{1}{5}$ by $\frac{1}{5}$ in., deeply lobed. *Flowers* not seen.

5. **M. nepalensis**, *Don Prodr.* 161; low, all the leaves without spines except the uppermost and the floral leaves, fertile stamens 4 subequal. *M. nana*, *Wall. Cat.* 424; *DC. Prodr.* iv. 645.

NIPAL; Gossainthan, *Wallich*.

Stem 3-6 in., pubescent upwards. *Leaves* 4 by $\frac{1}{3}$ in., entire, sinuate, glabrous; leaves near the flower-whorls spinous, obscurely toothed. *Flowers* few in few approximate whorls, forming one small terminal head. *Calyx-lip* $\frac{1}{5}$ in., obovate, subentire or mucronate, with 1 or 2 teeth; the other lip obsolete or nearly so. *Corolla-tube* $\frac{1}{2}$ in. *Filaments* hardly any.

6. **M. betonicoides**, *Benth. in Hook. Ic. Pl.* t. 1171; low, leaves all spinous scarcely toothed, fertile stamens 4 subequal.

SIKKIM HIMALAYA, alt. 10-13,000 ft.; Lachen and Yeumtong, *J. D. H.*; Singalehlah and Tumbok, *C. B. Clarke*.

Stem 6-18 in. Heads of *flowers* few, the lower sometimes remote. *Corolla* pale-purple.—This is perhaps the fully developed state of *M. nepalensis*, from which it only differs in having the lower leaves spinous as well as the uppermost.

3. DIPSACUS, Linn

Stout erect herbs, prickly or bristly. *Leaves* opposite, toothed or pinnatifid. *Heads* terminal, long-peduncled; bracts subtending the heads, and bracteoles rigid, bristly or prickly. *Involucel* 4-8-ribbed, adnate often nearly its whole length to the ovary. *Calyx-limb* cup-shaped, 4-angled, 4-lobed. *Corolla-tube* funnel-shaped; limb 4-lobed, equal or sub-bilabiate, pale blue, white, yellowish, or black-purple. *Stamens* 4, perfect. *Style* filiform; stigma oblique or lateral. *Achene* adnate to the involucel in the Indian species, 8-ribbed, crowned with the (often deciduous) calyx-limb.—DISTRIB. Species 12, European, Abyssinian, and Asiatic.

1. **D. inermis**, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* i. 367, as to var. β ; lower leaves pinnatifid with distant segments shortly hairy on both surfaces, upper leaves 3-fid or a few uppermost simple, heads subglobose, bracteoles obovate-oblong with a linear bristly mucro, flowers white or yellowish. *Coul.* *Dips.* 23; *DC. Prodr.* iv. 646; *Wall. Cat.* 427, mainly. *D. mitis*, *Don Prodr.* 161. *D. Roylei*, *Klotzsch in Reis. Pr. Waldem. Bot.* 83, t. 84. *Cephalaria cachemirica*, *Dcne in Jacquem. Voy. Bot.* 86, t. 94.

TEMPERATE HIMALAYA, alt. 6-12,000 ft., from Kashmir to Bhotan.

Stem 1-6 ft., bristly-hirsute, prickly or unarmed upwards, more hirsute under the flower-heads. *Flower-heads* solitary or several; bracts linear, acute or ovate obtuse, rigid or herbaceous, deflexed or adpressed, hairy or coarsely bristly. *Involucel* closely adnate to the pericarp, tipped by 4 minute points on the neck of the achene. *Calyx-limb* subquadrangular, glistening, white, hairy, deciduous.—Perhaps only a form of *D. pilosus*, Linn., which differs by the long hairs on the leaves, and by the flowers white to faint blue; there is no difference in the degree of freedom of the involucel, as Coulter (with scanty material) supposed.

VAR. *longicaulis*, *Wall. Cat.* 6856 (sp.); leaves on the nerves beneath and angles of the stem minutely prickly, otherwise glabrous or nearly so. *D. strictus*, *Var. Kurz in Journ. As. Soc.* 1877, pt. ii. 162.—Ava, *Wallich*; Martaban, alt. 2500 ft., *Brandis*.

2. **D. strictus**, *Don Prodr.* 160; many of the middle and upper cauline leaves undivided lanceolate sparingly hairy, heads subglobose, bracteoles obovate-oblong with a lanceolate bristly mucro, corolla cream-coloured. *DC. Prodr.* iv.

646. *D. inermis*, Wall. in Roxb. *Fl. Ind.*, ed. Carey & Wall. i. 367, as to var. *a* only; Wall. *Cat.* 427, partly. *D. auriculatus*, Royle *Ill.* 245.

NORTH-WEST HIMALAYA, alt. 7000 ft., from Chumba to Kumaon.

Stem often 6-10 ft., and then with 3-1 heads only.—Probably a var. of *D. inermis*.

3. *D. asper*, Wall. *Cat.* 428; lower leaves pinnatifid with distant segments shortly pilose on both surfaces and scabrous beneath, heads subglobose, bracteoles obovate-oblong shortly mucronate, corolla white. *DC. Prodr.* iv. 646.

KHASIA MTS., alt. 4-6000 ft.; common.

Closely resembling *D. inermis*; the leaves are more hairy above, and on the nerves beneath nearly bristly.

4. *D. atratus*, H. f. & T. *ms.*; leaves pinnatifid or the upper trifid hairy on both surfaces, heads subglobose, bracteoles obovate-oblong with a lanceolate very hairy mucro, corolla intense blue-black.

SIKKIM HIMALAYA, alt. 10-12,000 ft.; Yeumtong and Lachen, J. D. H., *Elwrs.*

Closely allied to *D. inermis*. *Stem* villous, as well as bristly. *Leaves* with larger hairs than *D. inermis*. *Bracts* ovate or oblong, obtuse; bracteoles blackish. *Corolla* only slightly pilose without.

5. *D. Leschenaultii*, Coul. & DC. *Prodr.* iv. 647; leaves pinnatifid lowest elongate with numerous approximate upper segments hairy on both surfaces, heads subglobose, bracteoles obovate-oblong with long-lanceolate densely hairy mucros, flowers white. *Wight. Ill.* t. 130; *W. & A. Prodr.* 445. *Scabiosa Brunoniana*, Wall. *Cat.* 429.

MTS. of the SOUTH DECCAN, alt. 7-8000 ft.; Neilgherries and Pulneys, frequent.

Lowest leaves often a foot or more by 3 in.; terminal lobe oblong, with numerous approximate falcate-oblong lobes next to it, with longish hairs on both surfaces; otherwise undistinguishable from *D. inermis*.

6. *D. Walkeri*, Arn. *Pugill. Pl. Ind. Or.* 26; bracteoles obovate-oblong with short-lanceolate sparsely hairy mucros, otherwise as *D. Leschenaultii*. *Wight. Ic.* t. 1166. *D. Leschenaultii*, *Thwaites Enum.* 160.

CEYLON, alt. 6-7000 ft.; frequent.

Dries blackish, while *D. Leschenaultii* dries green; the two are hardly distinct.

4. *SCABIOSA*, Linn.

Annual or perennial herbs, never bristly nor prickly. *Leaves* opposite, undivided, lobed or pinnatifid. *Heads* bracteate; bracteoles (scales of the receptacle) small or 0, or (in non-Indian species) herbaceous. *Involucel* 2-8-ribbed, adnate to the pericarp; limb generally expanded, broad funnel-shaped. *Calyx-limb* with short teeth and generally with long bristles. *Corolla* tubular; limb 4-5-fid, equal or, especially in the ray flowers, obliquely expanded. *Stamens* 4, perfect. *Style* filiform; stigma capitate or subpeltate, sometimes sublateral. *Achene* crowned by the persistent scarious expanded limb of the involucel, and by the persistent, usually aristate, calyx-limb.—*DISTRIB.* Species 80, chiefly European, West Asiatic, and African.

SECT. I. PTEROCEPHALUS. *Bracteoles* narrow. *Involucel-mouth* short, ciliate, pubescent. *Calyx-limb* of 12-24 long bristles. *Corolla* 5-fid.

1. *S. Hookeri*, C. B. Clarke; hairy, scapose, leaves linear-spathulate runcinate or subentire, corollas all subequal exceeding the calyx-bristles.

ALPINE SIEKIM, alt. 10–14,000 ft.; Tungu, *J. D. H., Elwes.*

Rootstock woody. *Leaves* all subradical, 6 by $\frac{3}{4}$ in., alternate at the base, sessile or p.tioled. *Peduncles* 4–14 in., radical, 1-headed; heads 1–1 $\frac{3}{4}$ in. diam., globose, many-flowered. *Bracts* $\frac{1}{2}$ by $\frac{1}{5}$ in., ovate-oblong, bracteoles $\frac{1}{2}$ in., linear-spathulate. *Involucel* $\frac{1}{2}$ in., hairy, not scarious. *Calyx-bristles* 20–24, $\frac{1}{2}$ in., filiform, hairy. *Corolla* $\frac{3}{4}$ in., tubular-funnel-shaped, hairy without.

SECT. II. ASTEROCEPHALUS. *Bracteoles* small or 0. *Involucel-mouth* funnel-shaped, scarious in fruit. *Calyx-limb* of 5 long bristles. *Corolla* 5-fid.

2. **S. Olivieri**, *Coult. Dips.* 36, t. 2, fig. 10; hairy, stem leafy, leaves narrowly oblong subentire or pinnatifid, heads small, bracts oblong-lanceolate, corollas all equal small much shorter than the calyx-bristles. *DC. Prodr.* iv. 656; *Boiss. Fl. Orient.* iii. 141.

WEST PUNJAB; Peshawur, *Vicary*; Rawul Pindee and Huzaree, *Stewart*.—DISTRIB. Afghanistan to Armenia and Arabia.

Stem 3–15 in., annual, often much branched. *Leaves* 2 by $\frac{1}{4}$ in., narrow-oblong and entire, or 4 by 2 in., deeply pinnatifid. *Heads* few-flowered; bracts scarcely $\frac{1}{4}$ in. *Flowers* purple, hairy without, little longer than the involucel. *Involucel* $\frac{1}{4}$ in. diam. in fruit, 16–20-ribbed, scarious between the ciliate-pilose ribs. *Calyx-bristles* $\frac{1}{2}$ in., barbellate, brown. *Achene* silkily hairy.

3. **S. Candolliana**, *Wall. Cat.* 430; subglabrous, leaves very distant linear subentire, heads small radiate, bracts ovate obtuse, corollas some exceeding the calyx-bristles. *S. Candollii*, *DC. Prodr.* iv. 654.

WESTERN HIMALAYA; from Murree to Kumaon, alt. 3–5000 ft., *Blinkworth*, &c.

Stem 12–18 in. from a perennial rootstock, little branched. *Leaves* 1 $\frac{1}{2}$ by $\frac{1}{8}$ in., lower subspathulate, puberulous. *Heads* few-flowered; bracts $\frac{1}{8}$ – $\frac{1}{6}$ in. *Flowers* purple, hairy without; of the ray sometimes $\frac{1}{2}$ in. long. *Involucel* $\frac{1}{4}$ in. diam. in fruit, 16–20-ribbed, scarious between the pubescent ribs. *Calyx-bristles* $\frac{1}{3}$ in., barbellate, brown.

4. **S. speciosa**, *Royle Ill.* 245, t. 55, fig. 2; stem pubescent leafy, leaves oblong often pinnatifid at the base with small lobes, heads large radiate, bracts narrowly oblong, corollas much exceeding the calyx-bristles.

TEMPERATE HIMALAYA; from Kashmir (abundant) to Gurwhal, alt. 7–11,000 ft.

Stems 1–2 ft., often branched, from a perennial rootstock. *Leaves* 2 by $\frac{1}{2}$ in., hairy on both surfaces. *Heads* many-flowered; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in. *Flowers* bright-mauve, hairy without; those of the ray $\frac{3}{4}$ in. long, those of the disk exceeding the calyx-bristles. *Involucel* in fruit $\frac{1}{6}$ in., subcampanulate, nearly glabrous without, scarious between the 16–20 ribs. *Calyx-bristles* $\frac{1}{2}$ in., barbellate, nearly black. *Achene* $\frac{1}{4}$ in. and upwards, silky below, the upper $\frac{1}{3}$ 8-ribbed, with long deep pits between the ribs.

ORDER LXXVIII. COMPOSITÆ. (By J. D. Hooker.)

Herbs or shrubs, rarely trees. *Leaves* alternate, rarely opposite or whorled, simple or compound; stipules 0. *Inflorescence* a centripetal head of many small flowers, sessile on the dilated top of the peduncle (receptacle), enclosed in an involucre of whorled bracts; floral bracts 0, or reduced to paleæ scales or bristles on the receptacle. *Flowers* all tubular (head discoid), or the outer, or all, ligulate (head rayed), all 2-sexual, or the inner 2-sexual or male, the outer female or neuter, sometimes diœcious. *Calyx* superior; limb 0, or of hairs (pappus) or scales. *Corolla* of 2 forms: 1st, tubular or campanulate, 4–5-lobed, lobes valvate, with marginal nerves; 2ndly, ligulate, lobes elongate and connate into a strap-shaped or elliptic ligule. *Disk* epigynous. *Stamens* 4–5, inserted within the corolla-tube; filaments usually free; anthers basi-fixed, usually connate; connective produced upwards; cells simple or tailed at the base; pollen sub-

globose, rough. *Ovary* 1-celled; *style* slender, 2-fid; *arms* (sometimes connate) linear, $\frac{1}{2}$ -terete, naked or externally pubescent or tipped by pubescent cones, margins stigmatic; *ovule* solitary, basal, erect, anatropous, nucleus with one coat. *Fruit* (an achene) dry, indehiscent. *Seed* erect, testa membranous, albumen 0; embryo straight, cotyledons plano-convex, radicle short.—**AFFINITIES.** Close with *Dipsacæ*, *Valerianæ*, and *Lobeliacæ*. **DISTRIB.** Co-extensive with dicotyledonous vegetation; genera about 1000; species about 8000.

The Indian *Compositæ* have been more sedulously studied than any other equally large and intricate Indian family of plants. The first important contribution to our knowledge of them under well characterised genera is contained in Don's "*Prodromus Floræ Nepalensis*," wherein upwards of 60 species are described. Next came "Wight's Contributions to the Botany of India," where 126 species are described by De Candolle. This was followed by the great distribution of Wallich's *Herbafium*, in which 400 species are enumerated, many named for the first time, after having been referred in great part to their proper genera by Wallich himself, Brown, Bentham, and others. These numbers, however, do not represent more than about 300 distinct species. The volumes containing the *Compositæ* of De Candolle's *Prodromus* include most of the species distributed by Wallich, together with Wight's Peninsular ones, which were studied and named chiefly by Arnott, and distributed in like manner to Wallich's. The labours of these individuals and authors laid the foundation of all future knowledge of the Order in India. The greatest subsequent accession of species was the result of Dr. Thomson's journeys in the N. W. Himalaya and Tibet, and his and my own in East Nipal and Sikkim, which were hurriedly distributed after much labour in referring the *Compositæ* to their genera, and in many cases to their species, by myself; whilst at the same time I arranged the whole of the Indian material in the Hookerian and other herbaria of Indian plants then at Kew, which were in great confusion. After Dr. Thomson's return to India as Superintendent of the Calcutta Botanic Gardens, he devoted several years to a critical study of the Indian species, and on his retirement left in the Calcutta Gardens a ms. catalogue of all that were known to him. In 1873 appeared the first part of the second volume of Mr. Bentham's and my "*Genera Plantarum*," containing the *Compositæ* elaborated by Mr. Bentham. In this work many of the Indian genera were for the first time studied in relation to their allies in other countries, and various important changes were made as to their limitation and disposition in the Order, and suggestions as to the classification of their included species. This was followed in 1876 by the publication by my coadjutor, Mr. C. B. Clarke, of his "*Compositæ Indicæ*," founded on the "*Genera Plantarum*" in respect of the genera, and on the rich Calcutta collections and Thomson's mss. in respect of the species. This valuable and very laborious work has been since annotated for me by its author with the Wallichian and Kew herbaria, and with various works to which he had not access in Calcutta. In the following revision of the genera and species I have adhered as closely as I could to the lines of Mr. Clarke's work, whilst describing the genera and discussing the species in accordance with my own views.

TRIBE I. Vernoniæ. *Heads* with the flowers all similar and tubular. *Anthers* cleft at the base. *Style-arms* subulate, hairy.—*Leaves* usually alternate. *Flowers* never yellow.

Subtribe 1. **EUVERNONIÆ.** *Heads* distinct, many-flowered.

Achenes 4-5-angled. Pappus 0	1. ETHULIA.
Achenes 8-10-ribbed. Pappus short, fugacious	2. CENTRATHERUM.
Achenes terete, shining. Pappus scanty	3. LAMPRACHENIUM.
Achenes 10-ribbed. Pappus 0	4. ADENON.
Achenes 10-ribbed. Pappus long, copious	5. VERNONTIA.

Subtribe 2. **LYCHNOPHOREÆ.** *Heads* 1 or few-flowered, crowded into dense masses like single heads.

Corolla usually cleft laterally. Pappus chaffy 6. ELEPHANTOPUS.

TRIBE II. Eupatoriæ. *Heads* with the flowers all similar and tubular.

Anthems subentire at the base. *Style-arms* obtuse, papillose.—*Leaves* opposite or alternate. *Corolla* rarely orange, never yellow. *Pappus* usually bristly.

Subtribe 1. PIQUIRIÆ. *Anther-tip* truncate.

Achenes 5-angled 7. ADENOSTEMMA.

Subtribe 2. AGERATÆ. *Anther-tip* appendiculate. *Achenes* 5-angled.

Pappus paleaceous 8. AGERATUM.

Pappus of slender hairs. *Invol. bracts* ∞ 9. EUPATORIUM.

Pappus of slender hairs. *Invol. bracts* 4 10. MIKANIA.

TRIBE III. Asteroides. *Heads* with the flowers all similar, or the outer ligulate. *Anthems* subentire (cells not tailed) at the base. *Style-arms* flattened or plano-convex, all or those of the disk-flowers terminated by a cone.—*Leaves* usually alternate. *Receptacle* almost always naked. *Disk-flowers* yellow; ray-flowers yellow, white or purple.

Subtribe 1. HOMOCHROMEÆ. *Flowers* all yellow, those of the ray ligulate.

Ligules few. *Heads* in scorpioid panicles 11. SOLIDAGO.

Subtribe 2. GRANGEINÆ. *Flowers* all yellow, ray 0. *Pappus* hardly any.

Receptacle usually elongate, top flat. *Achenes* obtuse, flat, with a thickened border 12. DICHROCEPHALA.

Receptacle elongate, top convex. *Achenes* obtuse, flat, without a thickened border 13. CYATHOCLINE.

Receptacle conic or convex. *Achenes* with a terminal, toothed or bristly ring 14. GRANGEA.

Subtribe 3. BELLIDÆ. *Ray-flowers* ♀, ligulate, never yellow. *Disk-flowers* yellow. *Pappus* 0 or very short.

Erect herbs. *Achenes* viscid, hardly beaked 15. MYRIACTIS.

Erect rigid herbs. *Achenes* of ray beaked 16. RHYNCHOSPERMUM.

Small, stemless herb. *Scape* with 1 head 17. LAGENOPHORA.

Stem branched, branches with single heads. *Achenes* beaked 18. BRACHYCOME.

Subtribe 4. HETEROCHROMEÆ. *Ray-flowers* ♀, ligulate, never yellow. *Disk-flowers* yellow. *Pappus* hairs long, copious, except *Boltonia*.

Pappus of short bristles and 2-4 long hairs 19. BOLTONIA.

Outer *invol. bracts* green. *Ligules* long, 1-seriate 20. ASTER.

Outer *invol. bracts* green. *Ligules* very short 21. BRACHYASTER.

Outer *invol. bracts* green, narrow. *Ligules* 2-3-seriate 22. ERIGERON.

Subtribe 5. CONYZÆ. *Ray-flowers* very slender, tubular, or with very short ligules, and *disk-flowers* yellow. *Pappus* copious or scanty.

Tall or climbing herbs. *Heads* very small. *Pappus* long 23. MICROGLOSSA.

Erect herbs. *Heads* various. *Pappus* long 24. CONYZA.

An erect herb. *Heads* small. *Pappus* scanty, short 25. THESPIA.

TRIBE IV. Inuloides. *Heads* with the flowers all similar, or the outer ligulate. *Anther-cells* (except *Laggera* and *Phagnalon*) tailed. *Style-arms* linear, obtuse, or styles of the sterile fl. undivided.—*Leaves* usually alternate. *Disk* and *ray-flowers* usually both yellow.

Subtribe 1. PLUCHEINÆ. *Heads* androgynous. *Invol. bracts* dry or herbaceous, rarely subscarious. *Receptacle* naked. *Style-arms* of ♂ fl. filiform, not truncate, or style of sterile fl. entire.

* *Heads* corymbose or panicled, not in globose masses (except in some *Blumeas*).

Herbs. *Invol. bracts* narrow. *Pappus* copious 26. BLUMEA.

Herbs. *Invol. bracts* narrow. *Anther-cells* ecaudate 27. LAGGERA.

Shrubs or undershrubs. Invol. bracts broad. Pappus copious 28. *PLUCHEA*.

A small rigid herb. Heads sessile. Corolla of ♂ fl. 2-lipped.

Pappus 0 29. *NANOTHAMNUS*.
Erect or diffuse herbs. Corolla of ♂ fl. tubular. Pappus 0 . 30. *EPALTES*.

**** Heads in dense, globose or ovoid masses. Corolla of ♀ fl. filiform.**

Herbs with winged stems. Pappus 0 31. *SPHÆRANTHUS*.

Herbs with winged stems. Pappus hairs slender 32. *PTEROCAULON*.

Subtribe 2. FILAGINÆÆ. Heads androgynous, often in dense clusters. Ray-flowers ♀, filiform, numerous, often enclosed in the long outer scales of the receptacle; disk-flowers ♂, central, with undivided styles, or, if divided with the arms, obtuse or subulate, not truncate. Invol. bracts scarious or hyaline, rarely radiating.

*** Achenes large, 2-4-angled, or many-ribbed, ciliated.**

Glabrous shrubs or undershrubs. Pappus hairs many, short, unequal. 33. *BLEPHARISPERMUM*.

Glabrous or woolly herbs. Pappus bristles very short, connate into a fimbriate ring 34. *ATHROISMA*.

**** Achenes small, not ribbed. Small woolly herbs.**

Pappus hairs simple 35. *FILAGO*.

Pappus hairs plumose 36. *IFLOGA*.

Subtribe 3. GNAPHALIEÆ. Heads androgynous or homogamous. Invol. bracts scarious, usually hyaline, or the inner radiating. Receptacle usually naked. Style-arms of ♂ fl. truncate.

*** Fl. ♂ all sterile, with undivided or merely notched styles. Inner invol. bract often radiating. Heads often unisexual.**

Heads corymbose, always dioecious. Pappus hairs connate at the base 37. *ANTENNARIA*.

Heads glomerate, involucre. Pappus hairs subconnate at the base 38. *LEONTOPODIUM*.

Heads corymbose. Pappus hairs quite free 39. *ANAPHALIS*.

**** Fl. ♂ all, or mostly fertile, with divided styles.**

Pappus hairs plumose. Minute herb 40. *LASIOPOGON*.

Anther-cells obtuse or apiculate (*without tails*) 41. *PHAGNALON*.

Fl. ♀ 2-∞-seriate. Pappus hairs never barbellate 42. *GNAPHALIUM*.

Fl. ♀ 1-, rarely 2-seriate. Pappus hairs various 43. *HELICHRYSUM*.

Subtribe 4. ANGIANTHÆÆ. Heads homogamous, discoid, small, in crowded clusters. Invol. bracts few, hyaline. Fl. ♂ with truncate style-arms.

Heads 1-flowered in a leafy involucre. Pappus 0 44. *CÆSULIA*.

Subtribe 5. EUINULÆÆ. Heads heterogamous, radiate, rarely subdisciform or homogamous. Flowers usually all fertile. Receptacle naked. Fl. ♂ with linear style-arms, rounded or dilated at the top.

Heads rayed. Pappus hairs few or many, subequal. 45. *INULA*.

Heads usually rayed. Achenes hardly ribbed. Pappus hairs slender, of ray few or 0 46. *VICOA*.

Heads rayed or discoid. Achenes ribbed. Outer pappus of scales, inner of hairs 47. *PULICARIA*.

Heads discoid. Achenes slender, striate, beaked. Pappus 0 48. *CARPESUM*.

TRIBE V. Hellanthoidææ. Heads usually radiate. Receptacle paleaceous. Anther-cells not produced into tails. Style-arms truncate or appendicu-

late, or style of sterile fl. entire. *Achenes* 3-4-angled or terete or compressed. *Pappus* of 2-4 bristles or paleaceous or 0.

Subtribe 1. LAGASCEÆ. *Heads* 1-flowered in globose clusters; invol. bracts forming a 5-fid tube.

A villous or scabrid herb; lower or all the leaves opposite . 48*. *LAGASCEA*.

Subtribe 2. MILLERIEÆ. *Heads* few-flowered. *Fl.* ♂ sterile with undivided styles. *Receptacle* naked in the centre.

Achenes and inflorescence with stipitate glands 49. *ADENOCALON*.

Subtribe 3. MELAMPODIEÆ. *Heads* many-flowered. *Fl.* ♂ sterile with undivided styles. *Receptacle* paleaceous all over.

Achenes dorsally compressed, with acute margins, embraced by the paleæ of the receptacle 50. *CHRYSOGONUM*.

Subtribe 4. AMBROSIEÆ. *Heads* heterogamous or unisexual. *Fl.* ♂ sterile with undivided styles; ♀ apetalous. *Anthers* nearly free, with inflexed appendages.

Invol.-bracts of ♂ fl. free; of ♀ forming a 2-flowered 2-celled capsule armed with glochidiate spines 51. *XANTHIUM*.

Subtribe 5. VERBESINÆ. *Heads* hetero- or homogamous. *Fl.* ♂ all fertile. *Achenes* of the disk angled, subterete, or laterally compressed, crowned with 2-3 bristles or scales or naked.—*Leaves* usually opposite.

* *Inner invol.-bracts embracing the achenes.*

Outer invol.-bracts 5-glandular 52. *SIEGESBECKIA*.

Outer invol.-bracts 4, broad, in opposite pairs, a marsh herb 53. *ENHYDRA*.

** *Inner invol.-bracts not embracing the achenes. Paleæ of receptacle flat, narrow.*

Outer invol.-bracts many 54. *ECLIPTA*.

*** *Inner invol.-bracts not embracing the achenes. Paleæ of receptacle concave, embracing the achenes.*

Ray-fl. ligulate, sterile. *Achenes* not winged nor ciliate . . . 55. *SCLEROCARPUS*.

Ray-fl. with small ligules. *Achenes* not winged 56. *BLAINVILLEA*.

Ray-fl. with large yellow ligules. *Achenes* thick 57. *WEDELIA*.

Ray-fl. with white or yellow ligules. *Achenes* ciliate 58. *SPILANTHES*.

Subtribe 6. COREOPSIDÆ. *Heads* hetero- or homogamous. *Fl.* ♂ all fertile or neuter. *Achenes* dorsally compressed, 2-4-awned or naked.

* *Outer invol.-bracts herbaceous, subequal; inner shorter like the paleæ of the receptacle.*

Achenes small, sub-4-angled, sheathed at the tip by the hairy corolla. *Pappus* 0 58*. *GUIZOTIA*.

Achenes flat, margins lacerate and winged. *Pappus* of bristles 58*. *SYNEDRELLA*.

** *Outer involucrel bracts few, small; inner membranous, connate below.*

Style-arms with short appendages. *Leaves* alternate . . . 59. *GLOSSOCARDIA*.

Style-arms with short appendages. *Leaves* opposite. *Achenes* usually 2-4-awned 60. *BIDENS*.

Style-arms with long appendages. *Achenes* with 2 bristles . 61. *GLOSSOGYNE*.

Style-arms with long appendages. *Achenes* awnless 62. *CHRYSANTHELLUM*.

Subtribe 7. GALINSOGÆ. *Heads* hetero- or homogamous. *Fl.* ♂ all fertile. *Achenes* with short bristle-like paleæ.

Pappus paleæ entire or fimbriate 62*. *GALINSOGA*.

Pappus paleæ awned, plumose 62*. *TRIDAX*.

TRIBE VI. **Anthemideæ**. *Heads* heterogamous, rayed or disciform, or rayless and homogamous. *Invol.-bracts* 2- ∞ -seriate, dry or with scarious tips. *Receptacle* naked or paleaceous. *Anther-cells* not produced into tails. *Style-arms* truncate. *Pappus* 0 or a crown of short paleæ.—*Leaves* usually alternate. *Disk-fl.* yellow, *ray-fl.* variously coloured.

* *Receptacle paleaceous. Heads usually rayed.*

Achenes margined. Heads corymbose 63. **ACHILLEA**.
Achenes 4-5-angled or many-ribbed. Heads peduncled . . . 64. **ANTHEMIS**.

* *Receptacle naked or with fimbriate pits.*

Heads rayed, shortly peduncled. Achenes 5-angled. 65. **ALLARDIA**.
Heads rayed, usually long-peduncled. Achenes 5-10-ribbed. . . 66. **CHRYSANTHEMUM**.
Heads rayed. Achenes ventrally 3-5-ribbed, dorsally ∞ -ribbed
or plane 67. **MATRICARIA**.
Heads disciform, peduncled. *Invol.-bracts* 1-2-seriate 68. **COTULA**.
Heads disciform, subsessile. *Invol.-bracts* spreading in frt. . . 69. **CENTIPEDA**.
Heads disciform, subsessile, *invol.-bracts* 3-4-seriate incurved
in frt. 70. **SPHEROMORPHEA**.
Heads disciform, corymbose. *Invol. bracts* ∞ -seriate 71. **TANACETUM**.
Heads small, disciform, racemose or panicled 72. **ARTEMISIA**.

TRIBE VII. **Senecionideæ**. *Heads* heterogamous, rayed or disciform. *Invol.-bracts* usually 1-seriate and subequal, with a few short outer at their base, rarely ∞ -seriate. *Anther-cells* obtuse below or with 2 short points rarely tailed. *Style-arms* of σ fl. truncate or appendaged. *Pappus* of fine hairs.—*Leaves* usually alternate. *Disk-fl.* yellow; rays usually also yellow.

Subtribe 1. **Tussilagineæ**. *Invol.-bracts* 1-2-seriate, subequal, free nearly to the base. *Style-arms* of fl. σ flattened or narrowly clavate, papillose, not hairy all round (as in *Eupatoriaceæ* or *Inuloideæ*).

Invol.-bracts 1-seriate. Heads rayed, bracteolate, solitary . 73. **TUSSILAGO**.
Invol.-bracts 2- or few-seriate. Heads rayed, drooping,
usually solitary 74. **CREMANTHODIUM**.

Subtribe 2. **Eusenecionideæ**. *Invol.-bracts* 1-2-seriate, free nearly to the base, usually with a few smaller outer ones. *Style-arms* of σ fl. truncate or obtuse, penicillate or with a hairy tip.

* *Invol.-bracts herbaceous, broad, acuminate. Heads large, rayed, long-peduncled.*

Receptacle hemispheric. Herbs, leaves alternate 75. **DORONICUM**.

** *Invol. bracts narrow, with a few much shorter outer ones (calyculate), except Emilia and some Senecios.*

Heads homogamous. Style-tips long, hairy 76. **GYNURA**.
Heads homogamous, ebracteolate 77. **EMILIA**.
Heads homogamous. Style-tips ovate. Fleshy shrubs 78. **NOTONIA**.
Heads rayed or disciform, homogamous. Style-tips truncate
or short or 0. Leaves radical or alternate 79. **SENECIO**.
Heads heterogamous. Fl. σ sterile. Glabrous undershrubs. 80. **OTHONNOPSIS**.

Subtribe 3. **Othonneæ**. *Invol.-bracts* 1-seriate, united to above the middle into a cup. *Fl.* σ fertile; style-arms truncate.

Heads large, solitary, erect, sessile or peduncled. Alpine herbs 81. **WERNERIA**.

TRIBE VIII. **Calendulaceæ**. *Heads* rayed. *Invol.-bracts* 1-2-seriate, narrow, subequal. *Receptacle* naked. *Anther-cells* mucronate. *Style-arms* of σ fl. truncate, or in sterile fl. undivided. *Achenes* usually large and thick and deformed, without pappus.

Achenes incurved. Herbs with alternate leaves 82. CALENDULA.

TRIBE IX. Cynaroideæ. *Flowers* all tubular. *Invol.* bracts many-seriate, imbricate; tips scarious, spinous or foliaceous. *Receptacle* densely bristly or paleaceous, rarely simply pitted. *Corolla-limb* slender, deeply 5-fid. *Anther-cells* tailed. *Styles* subentire, or arms short hairy or thickened towards the base. *Achenes* often hard; pappus various, rarely 0.—*Leaves* alternate, often spinous.

Subtribe 1. ECHINOPSIDÆ. *Heads* 1-flowered, crowded into involucrate globose balls.

83. ECHINOPS.

Subtribe 2. CARDUINÆ. *Heads* ∞ -flowered, separate. *Achenes* glabrous, basal areole horizontal. *Pappus hairs* distinct or connate.

* *Filaments* free, glabrous. *Pappus hairs* free, caducous. *Leaves* armed.

Invol. bracts with hooked bristles. *Leaves* unarmed 84. ARCTIUM.

Invol. bracts spinulent. *Leaves* spinulent 85. COUSINIA.

** *Filaments* papillose-hairy. *Pappus hairs* connate into a deciduous ring.

Pappus hairs simple, not feathery. 86. CARDUUS.

Pappus hairs feathery. 87. CNICUS.

*** *Filaments* glabrous, connate.

Invol. bracts spinous. *Receptacle* bristly. *Pappus* simple 88. SILYBUM.

**** *Filaments* free, glabrous (hairy in Goniocaulon). *Leaves* unarmed.

Pappus hairs 1-seriate, feathery, with a few outer simple 89. SAUSSUREA.

Pappus hairs ∞ -seriate, subpaleaceous. *Filaments* hairy 90. GONIOCAULON.

Pappus hairs ∞ -seriate, rigid, rough or feathery 91. JURINEA.

Subtribe 3. CENTAURÆ. *Heads* separate, ∞ -flowered. *Achenes* glabrous; basal areole oblique or lateral.

* *Involucre* not bracteate at the base, or rarely so.

Filaments glabrous. *Anther-tails* short or 0 92. SERRATULA.

Filaments papillose. *Anther-tails* lacerate. *Achenes* smooth 93. TRICHOLEPIS.

Achenes terete, 10–15-ribbed 94. VOLATURELLA.

Achenes compressed or 4-angled, 4–5-ribbed 95. CENTAUREA.

** *Involucre* bracteate at the base by spinous leaves.

Achenes compressed or angled. *Pappus* paleaceous or 0 96. CARTHAMUS.

TRIBE X. Mutisiaceæ. *Heads* hetero- or homogamous, rayed or not. *Invol.* bracts ∞ -seriate, unarmed. *Receptacle* rarely paleaceous. *Corolla* 2-lipped, ligulate, or deeply 5-fid. *Anther-cells* usually tailed. *Style-arms* rounded or truncate, not appendaged. *Pappus* various. —*Leaves* rarely opposite. (See also *Nanothamnus*, *Tridax* and some *Senecios*.)

Subtribe 1. GOCHNATIÆ. *Corollas* all tubular; segments narrow, equal or obscurely 2-lipped.

Pappus hairs simple. A shrub with alternate entire leaves 97. LEUCOMERIS.

Pappus hairs feathery. Rigid shrubs 98. DICOMA.

Pappus scales 10, ending in bristles. Rigid shrubs. *Heads* solitary 99. HOCHSTETTERIA.

Pappus hairs feathery. Erect herbs, heads subracemose 100. AINSLIEA.

Subtribe 2. GERBERÆ. *Heads* rayed. *Corolla* 2-lipped or ligulate.

Heads few-flowered; fl. all ligulate. An undershrub 101. CATAMIXIS.

Heads many-flowered; ray-fl. 2-lipped. Scapigerous herbs 102. GERBERA.

TRIBE XI. Cichoriaceæ. *Heads* homogamous. *Corollas* all ligulate; ligule truncate, tip 5-toothed. *Anther-bases* sagittate, rarely tailed. *Style-arms* slender.—Herbs, juice usually milky. *Leaves* radical or alternate, never opposite. (See also 101. *Catamixis*.)

Subtribe 1. HYOSERIDÆ. Achenes truncate. Pappus of scales, with sometimes alternating hairs, or 0.

Rigid herbs. Fl. blue; inner invol. bracts coriaceous, concave 103. CICHORIUM.

Subtribe 2. LAPSANÆ. Achenes obtuse. Pappus 0.

Heads small, panicled. Achenes many-ribbed 104. LAPSANA.

Subtribe 3. RHAGADIOLEÆ. Achenes narrowed upwards or beaked. *Pappus* short, of scales or bristles, or 0.

Achenes elongate, incurved, spinous 105. KOLPINIA.

Achenes elongate, smooth 106. RHAGADIOLUS.

Subtribe 4. CREPIDÆ. Usually leafy herbs, not woolly nor with stellate hairs. *Involucre* calyculate, inner bracts often thickened. *Achenes* usually contracted at both ends.

Receptacle naked. Achenes ribbed, rugose; pappus hairs feathery 107. PICRIS.

Receptacle naked. Achenes ribbed; pappus hairs simple, free, white 108. CREPIS.

Receptacle naked. Achenes with slender ribs; pappus hairs copious, slender, subcrenate below 109. PHÆCASIUM.

Receptacle bristly. Achenes 8-10-ribbed; pappus hairs simple 110. PTEROTHECA.

Subtribe 5. HIERACTEÆ. Herbs, usually perennial, more or less stellately hairy. *Achenes* truncate. *Pappus* hairs simple.

Pappus hairs rigid, bristles usually rough, brown 111. HIERACIUM.

Subtribe 6. HYPOCHÆRIDÆ. Scapigerous herbs, hairs various. *Achenes* contracted below, usually beaked above. *Pappus* hairs simple or feathery.

Receptacle paleaceous. Pappus hairs feathery 111.* HYPOCHÆRIS.

Receptacle naked. Pappus hairs simple 112. TARAXACUM.

Subtribe 7. LACTUCEÆ. Herbs, rarely shrubby below, glabrous or hispid, rarely scapigerous. *Achenes* usually narrowed below, and beaked or not above. *Pappus* hairs many, simple.

Achenes subterete, beaked, toothed below the beak 113. CHONDRILLA.

Achenes compressed, beaked, ribs smooth 114. LACTUCA.

Achenes subterete, 3-5-angled, not beaked 115. PRENANTHES.

Achenes oblong, not beaked, with 4-5 rugose ribs 116. PICRIDIUM.

Achenes compressed, not beaked, many-ribbed, ribs smooth or rough 117. SONCHUS.

Achenes narrow, truncate at both ends, 4-5-ribbed 118. LAUNÆA.

Subtribe 8. SCORZONEREÆ. Herbs, glabrous, woolly or hispid. Achenes with a broad base, or curved hollow stipes, above narrowed or beaked.

Invol. bracts 1-seriate. Achenes long-beaked 119. TRAGOPOGON.

Invol. bracts ∞ -seriate, outer not leafy. Achenes not beaked 120. SCORZONERA.

Cutler invol. bracts leafy. Achenes not beaked 121. EPILASIA.

TRIBE I. VERNONIÆ.

1. *ETHULIA*, Linn.

Branched herbs. *Leaves* alternate, serrate. *Heads* small, corymbose, homogamous. *Invol.* subcampanulate; bracts ∞ -seriate, imbricate. *Receptacle* flat, naked. *Corollas* all tubular, equal, regular, slender; limb campanulate; lobes 5, narrow. *Anthers* obtusely auricled. *Style-arms* subulate. *Achenes* glandular between the 4-6 prominent ribs; areole broad with a callous ring; pappus 0.—
DISTRIB. Species 2, a Javan and the following.

1. **E. conyzoides**, Linn.; *DC. Prodr.* v. 12; heads $\frac{1}{2}$ – $\frac{1}{4}$ in. diam. *Bot. Reg.* t. 695; *Wall. Cat.* 3196; *Clarke Comp. Ind.* 1. *E. ramosa*, Roxb. *Fl. Ind.* iii. 413; *Wall. Cat.* 2987. *E. gracilis*, Delile; *DC. l. c.* *E. angustifolia*, Bojer; *DC. l. c.*

EASTERN BENGAL, ASSAM, and SILHET.—DISTRIB. Sunda Archipelago and Java? E. Tropical Africa, Madagascar.

An erect glabrous or puberulous leafy annual. *Leaves* 2–5 in., narrowly or broadly elliptic-lanceolate, acuminate, narrowed and entire at the base, glandular-dotted; serratures coarse, distant. *Heads* very numerous; peduncles short or long; flowers purplish or reddish.—African specimens are usually more slender and pubescent.

2. **CENTRATHERUM**, Cass.

Erect or diffusely branched herbs. *Leaves* alternate, petioled, toothed. *Heads* homogamous. *Invol.* subhemispheric; bracts ∞ -seriate, inner dry or scarious, outer herbaceous often leafy. *Receptacle* flat, naked or pitted. *Corollas* all tubular, equal, slender; limb campanulate, lobes 5, narrow. *Anthers* obtusely auricled. *Style-arms* subulate. *Achenes* obtuse, 8–10-ribbed; pappus short, scabrid, fugacious.—DISTRIB. Species about 10 Asiatic, with 2 American and an Australian.

* *Leaves* white beneath. Outer invol. bracts large, often leafy.

† *Pappus* yellowish.

1. **C. reticulatum**, Benth. in *Gen. Pl.* ii. 225; robust, scabridly tomentose, leaves sessile ovate or oblong base acute or cordate scabrid above pale tomentose beneath, nerves reticulate, pappus equalling the corolla-tube. *Clarke Comp. Ind.* 2. *Decaneuron reticulatum*, *DC. in Wight. Contrib.* 3; *Prodr.* v. 66; *Mem. Comp.* t. 1. *Rolfinkia centaurioides*, Zenk. *Pl. Ind.* t. 14. *Amphiraphis indica*, Less. in *Linnaea*, vi. 686; *Wall. Cat.* 2956. *Gymnanthemum reticulatum*, *Schultz-Bip. in Walp. Rep.* ii. 948.

WESTERN PENINSULA; Nilgherry and Pulney Mts., alt. 5–7000 ft., *Wight*, &c.

Stem 2–3 ft., stout, erect, branched. *Leaves*, 2–3½ in., rigid, dirty white beneath; nerves elevated, much reticulated; margins narrowly recurved. *Heads* subsolitary, 1–1½ in. diam., inner bracts broad, acute, pubescent, outermost leafy but short. *Achenes* $\frac{1}{10}$ in. long.

2. **C. molle**, Benth. in *Gen. Pl.* ii. 225; branches and invol. bracts pubescent and with white wool, leaves petioled elliptic-ovate or lanceolate coarsely toothed hairy above white-tomentose beneath, pappus very short. *Decaneuron molle*, *DC. Prodr.* v. 67; *Wight Ic.* t. 1082. *D. Epilejum* and *D. scabridum*, *DC. in Wight Contrib.* 7. *Diospermum molle*, *Deless. Ic. Sel.* iv. t. 2. *Amphiraphis mollis*, *Wall. Cat.* 2957.

WESTERN PENINSULA; Courtallam, *Wight*.

Annual, erect, branched, 1–2 ft. *Leaves* 3–6 by 1–2½ in., rather membranous, narrowed portion quite entire. *Heads* $\frac{1}{2}$ – $\frac{3}{8}$ in. diam.; outer invol. bracts, if leafy, usually shorter than the head; inner often spreading or reflexed. *Corolla* $\frac{1}{4}$ in. *Achenes* $\frac{1}{14}$ – $\frac{1}{12}$ in., linear-oblong, smooth, glabrous; pappus very short.—*D. scabridum*, *Wight Herb.* n. 1392, differs not at all from *C. molle*; his n. 1532, quoted by *Clarke* under var. *scabridum* is *C. courtallense*.

3. **C. courtallense**, Benth. in *Gen. Pl.* ii. 225 (not of *Clarke*); branches and invol. bracts coarsely hairy, leaves petioled elliptic-ovate or lanceolate entire or toothed, pappus very short. *Decaneuron courtallense*, *Wt. Ic.* t. 1081; *Steetz in Peters Mosamb. Bot.* 353. *D. molle*, var. *Herb. Wt.* (*Kew Distrib.* 1532).

WESTERN PENINSULA; Courtallam and Anamallay hills, *Wight*; Canara, *Hohenacker*.

Very near *C. molle*, but distinguished by the often quite entire leaves, usually

larger stouter peduncles, broader shorter and more regular invol. bracts, and especially by the coarse hairs of the peduncles and involucre. The achenes are the same in both.

†† *Pappus reddish*.

4. **C. Ritchiei**, *Hook. f.*; branches glabrate, leaves petioled elliptic or elliptic-lanceolate toothed white-tomentose beneath, outer invol. bracts leafy base cordate, pappus equalling the corolla-tube. *Gymnanthemum molle*, *Schultz-Bip. in Pl. Hohenack.* n. 93, a.

The CONCAN and CANARA, *Stocks, Ritchie, &c.*

A more slender annual than *C. molle*, and at once distinguished by its glabrate often shining branches, the 2-6 or more large leafy oblong cordate outer invol. bracts, and the longer pappus. *Heads* $\frac{1}{2}$ to nearly $\frac{1}{2}$ in. diam. *Achenes* very small, about $\frac{1}{16}$ in.

5. **C. phyllolænum**, *Benth. in Gen. Pl.* ii. 225; branches glabrate pubescent or subtriglose, leaves elliptic toothed or serrate white-tomentose beneath, outer involucre leafy bracts several base contracted, pappus equalling the corolla-tube. *Decaneuron phyllolænum*, *DC. Prodr.* vii. 264. *Gymnanthemum phyllolænum*, *Schultz-Bip. in Pl. Hohenack.* n. 274. *D. molle*, *Dalz. & Gibs. Bomb. Fl.* 122.

The CONCAN, *Roux, Law, Jacquemont, &c.* MARWAR, on Mt. Aboo, *King.*

Very variable, annual, stout or slender; branches usually spreading. *Leaves* 2-5 in., usually elliptic, petioled, sometimes hardly white beneath. *Heads* $\frac{1}{2}$ -1 in. diam.; peduncles usually slender; outer invol. bracts 1- ∞ , spreading or deflexed, linear or lanceolate, rarely oblong, sometimes much longer than the heads, white beneath; middle bracts extremely variable, obtuse, acute or rounded, green or scarious at the tip, erect or recurved, margins ciliate or not. *Achenes* $\frac{1}{10}$ in.; pappus reddish or almost white.

6. **C. tenue**, *Clarke Comp. Ind.* 5; branches slender glabrous, leaves elliptic sparingly toothed, heads small, peduncles very slender, invol. bracts glabrous outer 1 or 2 elongate linear or oblong, pappus much shorter than the corolla-tube.

WESTERN PENINSULA; the CONCAN, *Gibson, Law, &c.*

Closely allied to *C. phyllolænum*, but much more slender, with always small heads $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., and only 1 or 2 leafy invol. bracts, much shorter pappus, and more turgid achenes only $\frac{1}{16}$ in. long.

** Leaves not white beneath. Outer invol. bracts shortest.

7. **C. Hookeri**, *Clarke Comp. Ind.* 3; pubescent, branches angled and grooved, leaves linear-lanceolate obscurely toothed, pappus long. *Decaneuron angustifolium*, *Herb. Ind. Or. Hook. f. & T.*

The CONCAN, *Law, Stocks.*

Annual, erect, 18-24 in., stiff, branched above. *Leaves* scattered, 2-3 by $\frac{1}{4}$ - $\frac{1}{2}$ in., and, as well as the branches, brownish when dry and puberulous on both surfaces. *Heads* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; peduncles slender, hoary-pubescent; bracts numerous, small, none leafy. *Corolla* $\frac{1}{2}$ in. long, red. *Pappus* single, equalling the corolla. *Achenes* $\frac{1}{10}$ in., linear-oblong.

IMPERFECTLY KNOWN SPECIES.

C. METZIANUM (*Diospermum Metzianum*, *Schultz.* *Bip.* in *Herb. Hohenack.* from Canara) resembles *C. molle*, but has the hairy invol. bracts of *C. courtallense* and no pappus. The specimen is a very indifferent one.

3 **LAMPRACHÆNIUM**, *Bth.*

An erect branched annual smelling of chamomile, with crisped hairs. *Leaves* alternate, petioled, toothed. *Heads* small, subcorymbosely paniced, homogamous. *Involucre* subcampanulate; bracts ∞ -seriate, dry, inner acute. *Receptacle*

flat, naked. *Corollas* all tubular, equal, slender; lobes 5, narrow. *Anthers* obtusely auricled. *Style-arms* subulate. *Achenes* obovoid, turgid, a little compressed, smooth, shining; pappus hairs few, short, fugacious, red.

1. **L. microcephalum**, *Benth. in Gen. Plant.* ii. 225. *Decaneuron microcephalum*, *Dalz. in Hook. Kew Journ.* iii. 231; *Dalz. & Gibs. Bomb. Fl.* 122; *Clarke Comp. Ind.* 5.

The CONCAN; at Parwar Ghat, Bombay, *Gibson, Dalzell*.

Habit, pubescence and foliage of *Centratherum tenue*. Stem 1-2 ft., simple or branched from the base, glabrous hairy or glandular. *Leaves* petioled, 2-4 in., hairy above, white-tomentose beneath. *Heads* $\frac{1}{4}$ - $\frac{1}{3}$ in. diam.; peduncles slender, hispid or glabrate; invol. bracts acute, ciliate, none leafy, erect or recurved. *Achenes* $\frac{1}{12}$ in.; pappus reddish, equalling the corolla-tube.

4. **A. ADENON**, *Dalz.*

An erect rigid herb. *Leaves* alternate, sessile. *Heads* corymbosely paniced, homogamous. *Involucre* campanulate; bracts many-seriate, coriaceous, oblong-lanceolate, aristate, outer gradually shorter. *Receptacle* flat, minutely fimbriate. *Corollas* all tubular, equal, slender; limb narrow, 5-cleft. *Anther-bases* sagittate. *Style-arms* subulate, hairy. *Achenes* obovoid, obtuse, subcompressed, 10-ribbed; pappus 0.

1. **A. indicum**, *Dalz. in Hook. Kew Journ.* ii. 344; *Dalz. & Gibs. Bomb. Fl.* 121; *Steetz. in Peters Mosamb. Bot.* 352; *Clarke Comp. Ind.* 5. *Ethulia* sp. v. *Gen. nov. Grah. Cat. Bomb. Pl.* 101.

The CONCAN; Parwar Ghat, Bombay, *Ritchie, Law, &c.*; Belgaum, *Law*.

A rather stout erect hairy or hispid annual, 2-3 ft.; stem angled and grooved, branched above. *Leaves* shortly petioled, 1-4 in., broadly ovate obovate or almost orbicular, coarsely unequally toothed, hairy on both surfaces. *Heads* $\frac{2}{3}$ in. diam., sessile and peduncled; peduncles stout or slender, hispid or tomentose; bracts at the forks subulate; corolla $\frac{1}{2}$ in.; limb as long as the tube. *Achenes* $\frac{1}{12}$ in., glandular; ribs very stout.

5. **V. VERNONIA**, *Schreb.*

Herbs, shrubs, climbers or small trees. *Leaves* alternate. *Heads* terminal or axillary, solitary cymose or paniced, homogamous. *Involucre* ovoid globose or hemispheric, equalling or shorter than the flowers; bracts in many series, inner longest. *Receptacle* naked or pitted, sometimes shortly hairy. *Corollas* all equal, tubular, slender; lobes 5, narrow. *Anther-bases* obtuse. *Style-arms* subulate. *Achenes* striate ribbed or angled, rarely terete; pappus of many hairs, often girt with a row of outer short hairs or flattened bristles.—DISTRIB. About 380 species, chiefly tropical, and mostly American.

I have found it impossible to classify the Indian *Vernonias* under the commonly recognised sections of the genus as defined in the "Genera Plantarum," and have had recourse to what appear to me to be more natural divisional characters, but they are extremely vague. The species are most difficult to limit and define, the involucre bracts being especially variable.

A. *Invol. bracts* all or the outermost subulate or lanceolate, often aristate (inner linear and obtuse in *V. Helferi* and *peguensis*, outer ovate acute).

* *Heads* $\frac{1}{2}$ -1 in. diam., rarely less, few, in open terminal or lateral corymbs or panicles, or solitary and axillary.

1. **V. teres**, *Wall. Cat.* 2926; rigid, scabrid, leaves hard subsessile obovate or obovate- or elliptic- or oblong-lanceolate acute subserrate heads 30-50-

flowered large solitary and axillary or few and terminal subsessile, invol. bracts very many long subulate-lanceolate subsquarrose, achenes silky, pappus yellowish or reddish. *DC. Prodr.* v. 15; *Clarke Comp. Ind.* 16. *V. riparia*, *Wall. Cat.* 2925. *V. rigiophylla*, *DC. l. c.* 15. *V. squarrosa*, *Less. in Linnaea*, 1831, 627. *Eupatorium rigidum*, *Wall. Cat.* 2925. *Acilepis squarrosa*, *Don Prodr.* 169.

TROPICAL HIMALAYA, from Kumaon, alt. 5000 ft., to Sikkim. BEHAR, CENTRAL INDIA, PEGU and BIRMA, in dry forests.

Stem simple, terete, erect, leafy, pubescent or tomentose with brown hairs. *Leaves* 2-5 by 1-2 in., base acute rounded or cordate, usually scabrid on both surfaces, reticulate beneath. *Heads* $\frac{3}{4}$ -1 in. diam.; inner invol. bracts nearly $\frac{1}{2}$ in., sparsely woolly, outer small, often squarrose; corolla glabrous. *Achenes* $\frac{1}{8}$ in.; pappus $\frac{1}{3}$ in., outer hairs few, short, caducous.

2. ***V. subsessilis***, *DC. Prodr.* v. 62; shrubby, branches nerves beneath and corymbs pubescent or tomentose, leaves large sessile oblanceolate or obovate acute or acuminate toothed serrate or sinuate-crenate glabrous above, heads many $\frac{2}{3}$ in. diam. 30-40-flowered corymbose or paniced, invol. bracts very many elongate-subulate or acicular strict, achenes silky, pappus reddish.

NIPAL, *Wallich*. KHASIA MTS., ASSAM and BIRMA, *Griffith*, &c.

Stout, shrubby. *Leaves* 4-12 by 1-4 in., glabrous above. *Heads* 40-50-flowered, $\frac{3}{4}$ in. diam., branches of corymb sometimes woolly, bracts at the forks slender. *Invol.* obconic; bracts spreading from the base, outer subulate, very narrow, rigid, pubescent sometimes recurved; corolla glabrous. *Achenes* $\frac{1}{8}$ in., striate; pappus nearly $\frac{1}{2}$ in., persistent, outer very short, unequal.—There are three forms of this.

VAR. 1. *subsessilis* proper; leaves narrowly lanceolate sharply irregularly toothed or serrate acuminate, heads corymbose, peduncle naked or with solitary subulate bracts. *Conyza subsessilis*, *Wall. Cat.* 300.—Khasia Mts., alt. 500-2000 ft.

VAR. 2. *bracteolata*; more shrubby, leaves obovate-lanceolate acuminate obscurely sinuate-toothed, heads corymbose, peduncles with often many subulate bracts. *V. bracteolata*, *DC. Prodr.* v. 62. *Conyza bracteolata*, *Wall. Cat.* 3036.—Nipal, Khasia Mts., Assam and Birma.

VAR. 3. *macrophylla*; shrubby, leaves 10-12 by 3-3 $\frac{1}{2}$ in. obovate acute coarsely crenate-toothed, heads paniced, peduncles with filiform bracts.—East Nipal, dry rocks on the Tambur river, *J. D. H.*

3. ***V. malabarica***, *Hook. f.*; branches and leaves beneath softly tomentose, leaves shortly petioled elliptic-lanceolate serrulate acuminate puberulous above, heads few $\frac{1}{2}$ in. diam. terminal corymbose, invol. bracts few suberect linear-subulate pubescent, achenes obtusely 5-angled glabrate equalling the invol. bracts, pappus yellowish.

NILGHERY Mts.; Sisparah Ghat, *Beddome*.

Apparently shrubby; branches strict, pubescence of very soft, pale brown, close-set hairs. *Leaves* 2 $\frac{1}{2}$ -3 by $\frac{3}{4}$ -1 in., rather thin. *Heads* all peduncled; corolla-lobes glandular-pubescent. *Achenes* $\frac{1}{8}$ in.; pappus $\frac{1}{4}$ in., outer very distinct, short, paleaceous.

4. ***V. Gardneri***, *Thw. Enum.* 160, excl. var. β ; herbaceous, branches leaves beneath and inflorescence puberulous, leaves petioled elliptic-lanceolate finely acuminate acutely serrate, nerves not prominent above, invol. bracts narrow subulate finely acuminate, achenes puberulous, pappus pale reddish. *Clarke Comp. Ind.* 11.

CEYLON, Central Province; Adam's Peak, *Walker*; Ambagamowa, *Thwaites*.

Stem and branches slender. *Leaves* usually 4-5 by $\frac{1}{2}$ - $\frac{3}{4}$ in., rarely 5-6 by 2-2 $\frac{1}{2}$, rather membranous, teeth gland-tipped. *Heads* $\frac{1}{2}$ - $\frac{3}{4}$ in.; peduncles slender; outermost invol. bracts somewhat spreading; corolla glabrous. *Pappus* $\frac{1}{3}$ in., outer very short.

5. **V. Thwaitesii**, *Clarke Comp. Ind.* 11; branches and corymbs finely pubescent, leaves sessile ovate or elliptic-ovate acute acutely serrate rigidly coriaceous reticulated, nerves prominent on both surfaces, invol. bracts linear-oblong obtuse or acute, achenes puberulous, pappus pale reddish. *V. Gardneri*, *B, Thwaites Enum.*, 161.

CEYLON, Central Province; Adam's Peak, Horton Plains, and Galagama, *Walker*, &c.

Branches slender, rigid. *Leaves* 2-2½ by ¾-1½ in., narrowed at the base, rarely almost orbicular, puberulous beneath, tip and teeth almost pungent. *Heads* few, hardly corymbose; peduncles often very long; outermost invol. bracts very short, subulate; corolla glabrous. *Pappus* ½ in., outer very short.

6. **V. Beddomei**, *Hook. f.*; glabrous, much branched, upper leaves shortly petioled lanceolate caudate-acuminate coarsely serrate those on the slender peduncles narrow and recurved, invol. bracts linear acuminate, achenes hairy, pappus white.

WESTERN PENINSULA; South Travancore, *Beddome*.

Branches ribbed, slender. *Leaves* (lower not seen) 4-6 by 1-1½ in., rather rigid, reticulated on both surfaces, long apex quite entire. *Heads* 1-1½ in. diam., few or in much branched corymbs; branches and peduncles very slender; outer invol. bracts very short, subulate. *Pappus* ½ in.; outer hairs few, short.

7. **V. attenuata**, *DC. Prodr.* v. 33; rigid, branches leaves beneath and inflorescence puberulous, leaves hard sessile obovate or oblong-obovate acute coarsely toothed or serrate reticulate on both surfaces, invol. bracts linear-lanceolate finely acuminate outermost subulate, achenes striate villous, pappus white. *Kurz in Journ. As. Soc.* 1877, ii. 201; *Clarke Comp. Ind.* 12. *Conyza attenuata*, *Wall. Cat.* 3020.

EASTERN HIMALAYA and ASSAM, in dry tropical forests; alt. 1-5000 ft. *TENASSERIM*, *Wallich, Falconer*, &c.

Erect, 2-3 ft., slender, branches grooved. *Leaves* very variable, 3-5 by 1-2½ in. *Heads* paniced corymbose, or solitary and axillary, when they are sometimes sessile, ½-¾ in. diam.; peduncles short, slender, often divaricate; inner invol. bracts nearly ½ in.; corolla glabrous. *Achenes* ⅓ in.; pappus ¼ in., persistent, outer hairs few short. —A Siam form (*V. juncea*, *Kurz*) has heads sessile on long slender leafless branches, and rufous pappus.

8. **V. Helferi**, *Hook. f.*; nearly glabrous, stem simple slender, leaves sessile elliptic acute entire or serrate shining and minutely reticulate on both surfaces, heads 1-2 30-40-flowered, invol. bracts linear-oblong obtuse outermost ovate acute, achenes silky 10-ribbed, pappus white.

TENASSERIM, *Helfer*.

Stem 6-10 in., erect, above and peduncles pubescent, rather flexuous. *Leaves* 1½-2 by ½-1 in., thinly coriaceous, brown and shining when dry. *Heads* shortly peduncled, ½ in. diam.; invol. bracts glabrous, not numerous, innermost less than ½ in., flat; corolla glabrous. *Achenes* ⅓ in.; pappus ¼ in., outer hairs numerous short flattened. —This has altogether the habit of *V. attenuata*, to which it is indeed closely allied, differing chiefly in its slender habit and the linear obtuse invol. scales.

9. **V. Lobbiai**, *Hook. f.*; corymbs softly tomentose, leaves shortly petioled broadly obovate subacute obscurely toothed glabrous above with raised dots beneath with fine lax hairs, heads sessile in axillary and terminal fascicled corymbs very shortly peduncled, invol. bracts linear aristate scarious outermost subulate, achenes villous, pappus white.

TENASSERIM; hills on the Attran, *Lobb*.

Leaves 6-7 by 3-3½ in., rather rigid, narrowed to the base but not into the short

stout petiole, finely reticulate on both surfaces, those on the inflorescence linear-oblong. *Heads* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., clothed with white woolly tomentum; invol. bracts $\frac{1}{2}$ in., white. *Achenes* (unripe) $\frac{1}{16}$ in.; pappus $\frac{1}{4}$ in.; hairs slender, persistent, outer very short.

10. **V. olivorum**, *Hance in Seem. Journ. Bot.* 1869, 164; branches leaves beneath and inflorescence puberulous, leaves shortly petioled lanceolate acuminate distantly serrate reticulate beneath, heads small corymbose on short lateral branches, invol. bracts linear acute outermost subulate, achenes pubescent, pappus white. *V. Kingii*, *Clarke Comp. Ind.* 12.

PEGU and MARTABAN, *Kurz*. UPPER BIRMA, *J. Anderson*.—DISTRIB. Canton.

Branches grooved and ribbed. *Leaves* 3–5 by $\frac{3}{4}$ –2 in., tip entire, base rounded, rather rigid. *Heads* $\frac{1}{4}$ in. diam., 15–20-flowered; peduncles slender; outer invol. bracts short, subulate; corolla glabrous. *Pappus* $\frac{1}{4}$ in.; hairs slender, persistent, outer few, very short.—I have seen only Hance's Canton specimen, to which Clarke refers his *V. Kingii*: the achenes are immature.

11. **V. peguensis**, *Clarke Comp. Ind.* 13; branches and corymbs finely pubescent, leaves petioled oblanceolate or linear-lanceolate acute or acuminate serrate glabrate on both surfaces, heads in simple axillary and terminal branched panicked corymbs, invol. bracts few lanceolate aristate-acuminate inner linear-oblong obtuse or acute, outermost ovate minute, achenes slightly hairy, pappus white.

PEGU; Irawaddy and Saluen valleys, *Kurz*.

Apparently a robust tall species. *Leaves* 12 by 4 to 6 by 1 in., rather membranous, puberulous when young, narrowed into the petiole. *Heads* $\frac{1}{2}$ – $\frac{3}{4}$ in., 12–20-flowered; inner invol. bracts $\frac{1}{4}$ in., membranous, green. *Achenes* (immature) $\frac{1}{8}$ in.; pappus hairs fine, persistent, outer many, very short, rigid.

12. **V. Thomsoni**, *Hook. f.*; half-shrubby, much branched, branches corymbs and leaves above scaberulous, leaves subsessile lanceolate acuminate serrate puberulous beneath, heads obconic 10–15-flowered in small short axillary corymbs, peduncles slender, invol. inner bracts linear acuminate outermost needle-shaped, achenes glabrous strongly 10-ribbed, pappus white.

CHITTAGONG; at Seetakoond, *J. D. H. & T. Thomson*.

A straggling undershrub; branches ribbed and grooved. *Leaves* 4–8 by $1\frac{1}{2}$ –3 in., membranous. *Heads* on slender pubescent pedicels, $\frac{1}{2}$ in. diam.; invol. bracts glabrous, shining, recurved, inner $\frac{3}{4}$ in. *Achenes* $\frac{1}{8}$ in.; pappus $\frac{1}{2}$ in., very fine, persistent, outer hairs very few.—This is probably the Seetakoond plant which *Kurz* includes under *V. saligna*, from which it widely differs in the larger heads and much longer narrower white invol. bracts.

13. **V. bracteata**, *Wall. Cat.* 2921; rigid, scabrid or scaberulous, leaves sessile or shortly petioled elliptic or elliptic-lanceolate acute remotely serrate, heads 30-flowered few large corymbose peduncled, invol. bracts not numerous linear-oblong with slender often recurved awns, outermost subulate, achenes glabrous, pappus reddish. *Clarke Comp. Ind.* 17 excl. syn. *Wight*. *Decaneuron silhetense*, *DC. Prodr.* v. 67. *Xipholepis silhetensis*, *Steetz in Peter's Mosamb. Bot.* 345?

EASTERN HIMALAYA; Sikkim and Bhotan. KHASIA Mts., alt. 2–6000 ft. BIRMA; Karen hills, *Kurz*.

Shrubby below, erect, sparingly branched, leafy; branches terete, pubescent or roughly tomentose. *Leaves* usually narrow, 2–4 by $\frac{1}{2}$ –1 in., rarely 4 by 2 in., more or less rigid and scabrid. *Heads* rarely many, $\frac{3}{4}$ in. diam.; peduncles erect or ascending, scabrid; invol. bracts few, inner often $\frac{1}{2}$ in., thin, glabrate. *Corolla* glabrous. *Achenes* quite glabrous; otherwise and pappus as in *V. Roxburghii* and *teres*.

14. **V. Roxburghii**, *Less. in Linnæa*, 1831, 674; rigid, scabrid, leaves hard subsessile or petioled elliptic- or obovate-lanceolate acuminate acutely

serrate, heads 30-flowered large fascicled in terminal paniced corymbs, invol. bracts linear obtuse and apiculate or acuminate or pungent outermost subulate, achenes sparsely hairy, pappus dirty white or reddish. *Kurz in Journ. As. Soc.* 1877, ii. 200. *V. aspera*, *DC. Prodr.* v. 31, not of *Ham.*; *Wall. Cat.* 2922, excl. A.; *Clarke Comp. Ind.* 17. *Eupatorium asperum*, *Roxb. Hort. Beng.* 61; *Fl. Ind.* iii. 415. *E. pyramidale*, *Don Prodr.* 170. *Xipholepis aspera*, *Steetz in Peters Mosamb. Bot.* 345? excl. *syn.*

WESTERN HIMALAYA; Kumaon, *Royle, Edgeworth.* CHOTA-NAGPORE, and CENTRAL INDIA, alt. 1-4000 ft. BEHAR, *J. D. H. CONCAN, Law* (perhaps cult.); BIRMA, at Bhamo, on dry hills, *Griffith.*

More branched than *V. teres*; leaves often narrowed into a slender petiole, acuminate and deeply serrate; heads smaller, very numerous; invol. bracts fewer and broader, inner $\frac{1}{2}$ in., quite linear; achenes as large, less hairy and only between the ribs; outer pappus hairs often absent.

15. ***V. peninsularis***, *Clarke mss.*; roughly pubescent, stem flexuous ribbed, leaves petioled elliptic acute serrate, heads 20-30-flowered few corymbose, invol. bracts oblong with very long slender often recurved awns outer filiform squarrose, achenes glabrous, pappus pale reddish. *V. bracteata*, var. *peninsularis*, *Clarke Comp. Ind.* 18. *Decaneuron silhetense*, *Wt. Ic.* t. 1083.

TRAVANCORE, at Courtallam, *Wight.*

Stem nearly simple, deeply furrowed. *Leaves* 2-4 by $1\frac{1}{2}$ -2 in., rather membranous, scabrid above. *Heads* $\frac{3}{4}$ in. diam.; outer invol. bracts $\frac{1}{4}$ - $\frac{1}{2}$ in.; awns often as long as the lamina, woolly. *Achenes* and *pappus* as in *V. bracteata*.

16. ***V. anceps***, *Clarke mss.*; shrubby, branches slender terete and corymbs brown-pubescent, leaves petioled lanceolate or narrowly elliptic-lanceolate acuminate distantly serrulate puberulous on both surfaces or beneath only, heads 30-40-flowered in open corymbs, inner invol. bracts short oblong-lanceolate acute outer subulate, achenes strongly 4-5-ribbed puberulous, pappus dirty white, outer a ring of short paleaceous scales. *V. Wightiana*, var. β , *Thwaites Enum.* 160.

CEYLON; Adam's Peak, *Thwaites.*

Branches woody, as thick as a crow- or goose-quill. *Leaves* 2-3 by $\frac{1}{2}$ - $\frac{3}{4}$ in. *Achenes* $\frac{1}{10}$ in., twice as long as the invol. bracts.—This, *Thwaites*, considering the close similarity of their floral characters, does not venture to separate from *V. Wightiana*; but the foliage, &c., is so entirely different in form, membranous consistence, toothing, and glabrousness, that I cannot but agree with Mr. *Clarke* in keeping it distinct; the corollas are nearly glabrous.

17. ***V. revoluta***, *Ham. in Trans. Linn. Soc.* xiv. 218; dwarf, puberulous, leaves sessile linear apiculate margins revolute, heads 30-40-flowered subsolitary, invol. bracts few broadly oblong-lanceolate acuminate, achenes hairy terete, pappus white. *Clarke Comp. Ind.* 22. *V. oligocephala*, *Edgew. in Trans. Linn. Soc.* xx. 63.

WESTERN HIMALAYA; Kumaon and Garwhal, *Royle, Falconer, &c.* BHOTAN, *Griffith.*

A perennial woody-rooted herb, branched from the base; stems 2-6 in., ascending or erect, slender, angled and grooved. *Leaves* erect, 1 by $\frac{1}{10}$ - $\frac{1}{2}$ in., with a strong midrib and strongly revolute entire margins. *Heads* $\frac{1}{2}$ in. diam.; peduncles striate; bracts subulate or 0; invol. bracts puberulous; outermost very narrow, subulate, often recurved; inner $\frac{1}{2}$ in. long, scarious; corolla-lobes hairy. *Achenes* (unripe) $\frac{1}{2}$ in., sparingly hairy; pappus $\frac{1}{2}$ in. long, persistent, outer hairs 0.

** *Heads* small, about $\frac{1}{4}$ in. long, numerous or few, corymbose.

† *Annual*; achenes terete, not angled or ribbed.

18. ***V. cinerea***, *Less. in Linnæa*, iv. 291, and vi. 673; herbaceous, hoary-

pubescent, leaves petioled ovate or lanceolate obtuse or acute obscurely or deeply obtusely or acutely toothed, heads about 20-flowered in loose corymbs, invol. bracts linear-lanceolate tips awned glabrous, pappus white or dirty white outer hairs short. *DC. in Wight Contrib.* 6; *Prodr.* v. 24; *Wall. Cat.* 3008. *V. conyzoides*, *DC. in Wight Contrib.* 6; *Prodr.* v. 25; *Dalz. & Gibs. Bomb. Fl.* 121. *V. rhomboidea* and *montana*, *Edgew. in Trans. Linn. Soc.* xx. 62. *V. albicans*, *DC. in Wight Contrib.* 6, *in part*; *Wight Ic.* t. 1076 (achenes wrongly figured as 5-ribbed). *V. abbreviata* and *leptophylla*, *DC. l. c.* 25. *V. laxiflora*, *Less. in Linnæa*, vi. 646; *DC. l. c.* 25. *V. physalifolia*, *DC. in Wight Contrib.* 6; *Prodr.* l. c. 24. *V. parviflora*, *linifolia*, and *fasciculata*, *Reinw. in Bl. Bijdr.* 893. *V. Zollingeriana*, *Schultz-Bip. in Miq. Fl. Ind. Bat.* ii. 16. *V. cyanonioides*, *Walp. in Linnæa*, xv. 509. *Conyza abbreviata*, *Wall. Cat.* 3048; *bellidifolia*, 3047; *cinerascens*, 3062; *incana*, 3046; *linifolia*, 3063; *elegantula*, 3049; *ovata*, 3097; and *subsimplex*, 3003. *C. cinerea*, *Linn.*; *Wall. Cat.* 3008. *C. mollis*, *Willd. (fid. Lessing)*. *C. prolifera* and *heterophylla*, *Lamk. Encycl.* ii. 84. *Serratula cinerea*, *Roxb. Hort. Beng.* 60. *Cacalia rotundifolia*, *Willd. Phyt.* ii. t. 6, f. 1. *Chrysocoma purpurea*, *Forst. Prodr.* 54. *C. violacea*, *Schum. Pl. Guin.* 384. *Cyanopis decurrens*, *Zoll. in Geneesk. Archiv.* ii. 563; and *Chlaotrachelus rupestris*, *Zoll. l. c. fid. Miquel*. *Synanthera*, *Wall. Cat.* 7137.—*Rheede Hort. Mal.* x. t. 64.

Throughout INDIA, ascending to 8000 ft. in the Himalaya, Khasia and Peninsular Mts.—DISTRIB. Trop. Asia, Africa, and Australia.

One of the commonest Indian weeds, erect, rarely decumbent, 6–18 in. high; stem slender, grooved and ribbed. *Leaves* rarely 3 in. long or $1\frac{1}{2}$ in. broad, membranous or rather coriaceous; petiole very variable. *Heads* about $\frac{1}{2}$ in. diam., in rounded or open and flat-topped corymbs; branches usually divaricate; peduncles slender, with small bracts at the axils; invol. scales about $\frac{1}{2}$ – $\frac{3}{4}$ in.; corolla with pubescent lobes. *Achenes* $\frac{2}{3}$ in.; pappus $\frac{1}{2}$ in., outer hairs very short indeed.—It is impossible to define the forms of habit and foliage of this very variable plant, which is on the whole remarkably uniform in its flowers; of these the most marked are *V. physalifolia*, which is stout, very tomentose, with broad leaves; and *V. conyzoides*, with short or no outer pappus, and ovate-lanceolate or ovate sharply toothed leaves narrowed into long petioles. To these may be added var. *montana*, Clarke (Comp. Ind. 21), from 4–6000 ft. on the Khasia Mts., and from the N. W. Himalaya, with villous fulvous leaves and stems and yellowish pappus, and which is Edgeworth's *V. rhomboidea*; and the var. *ludens*, Clarke l. c., with dimorphic achenes, of which the inner are normal, the outer almost beaked and seedless; it is a native of Assam, the Malay Peninsula, and China. To the many synonyms cited, Benthams (*Fl. Austral.* iii. 459) adds *V. erigeroides*, *DC. Prodr.* v. 25, and suggests that nearly all the species of *DC.*'s section *Tephrodes* may follow.

†† *Perennial, rarely annual; achenes ribbed.*

19. ***V. divergens***, *Benth. in Gen. Pl.* ii. 229; stout, erect, pubescent tomentose or scabrid, leaves petioled elliptic-ovate or lanceolate serrate, heads small 8–12-flowered in usually dense much branched panicle rounded corymbs, invol. bracts few oblong obtuse outermost ovate, achenes glabrous 10-ribbed, pappus pale reddish-brown or dirty white. *Clarke Comp. Ind.* 14. *V. aspera*, *Hamilt. in Trans. Linn. Soc.* xiv. 219, *in part*; *Kurz in Journ. As. Soc.* 1877, ii. 201. *V. nilgheryensis*, *DC. Prodr.* v. 32; *Wt. Ic.* t. 1078. *V. multiflora*, *DC. l. c.* 31. *V. Metziana*, *Schultz-Bip. in Herb. Hohenack.* n. 1342. *V. aspera*, *Less. in Linnæa*, 1831, 643? *Decaneuron divergens*, *DC. l. c.* 63; *Wight Contrib.* 8; *Ic.* t. 1084. *Conyza divergens*, *multiflora*, and *lanceolata*, *Wall. Cat.* 3027, A., 3032 a., 3059. *Eupatorium versicolor* and *polyanthemum*, *Wall. Cat.* 3167, 3171. *E. divergens*, *Roxb. Hort. Beng.* 61; *Fl. Ind.* iii. 415. *Gymnanthemum Metzianum*, *Schultz-Bip. l. c.* n. 542. *Lysistemma divergens* and *multiflorum*, *Steetz in Peters Mosamb. Bot.* 341.

BEHAR, on Parusnath, alt. 4000 ft. CENTRAL INDIA, and from the CONCAN to the TRAVANCOR MTS., RANGOON, BIRMA, and TENASSERIM.

Stem shrubby, 4-8 ft. *Leaves* 2-5 by 1-4 in., varying much in texture; nerves spreading, reticulate beneath. *Heads* $\frac{1}{2}$ in. diam., usually clustered; peduncles very short; invol. bracts with greenish tips; corolla glabrous. *Achenes* $\frac{1}{2}$ in.; pappus $\frac{3}{4}$ in., hairs scabrid, outer very few or 0.—This cannot be the plant described by Hamilton as *V. aspera* (as supposed by Kurz), for that is stated to have a short outer pappus, and to be Roxburgh's *Eupatorium asperum*; as, however, Wallich's 3032 B. (under *Conyza multiflora*) is an authentic specimen of Hamilton's *V. aspera*, and so named, it is probable that this author had two plants under his eye.

20. *V. chinensis*, Less. in *Linnaea*, vi. 674; puberulous or tomentose, branches slender terete, leaves sessile or petioled ovate elliptic or elliptic-lanceolate subserrate, heads 20-30-flowered scattered or 2-3-nate, invol. bracts pubescent lanceolate awned, achenes 4-5-ribbed glabrous glandular, pappus white. *Clarke Comp. Ind.* 18. *V. albicans*, DC. in *Wight Contrib.* 6; *Prodr.* v. 26, in part. *Cyanopsis pubescens and villosa*, DC. *Prodr.* v. 69. *Conyza chinensis*, Lamk. *Dict.* ii. 83, not of Linn. *C. punctulata*, Wall. *Cat.* 2995. *Eupatorium menthaefolium*, Wall. *Cat.* *Isonema ovata*, Cass. in *Dict. Sc. Nat.* xxiv. 25. *Cynanthidium villosum and pubescens*, Blume *Bijd.* 889 and 890. *Centratherum chinense*, Less. in *Linnaea*, 1829, 320.—*Synanthera*, Wall. *Cat.* 7136.

EASTERN PENINSULA, from Pegu to Malacca.—DISTRIB. Java, China, Philippines. Annual; branches divaricate. *Leaves* 1-3 in., membranous. *Heads* $\frac{1}{2}$ in. diam.; peduncles slender; invol. bracts not numerous, glabrous or puberulous; receptacle pitted; corolla glabrous. *Achenes* $\frac{1}{2}$ in.; pappus $\frac{1}{2}$ in., hairs few, outer 0.—*Conyza patula*, Ait. *Hort. Kew*, v. 26, quoted under this by Lessing, is a very doubtful Chinese plant.

21. *V. saligna*, DC. *Prodr.* v. 33; much branched, glabrous or slightly scabrid, leaves sessile or shortly petioled elliptic-oblong or oblanceolate acuminate coarsely serrate, heads 6-12-flowered in terminal branched rounded corymbs, inner invol. bracts linear-oblong acute or acuminate scarious purplish outermost subulate, achenes strongly 10-ribbed glabrous, pappus reddish or white. *Clarke Comp. Ind.* 13. *V. longicaulis*, DC. l. c. *Conyza saligna*, Wall. *Cat.* 3061. *Eupatorium longicaule*, Wall. *Cat.* 3169.

TROPICAL HIMALAYA, from Nipal eastward, ascending to 4000 ft.; ASSAM, KHASIA MTS., CHITTAGONG, and BIRMA.

A coarse, leafy, almost shrubby, very variable herb. *Leaves* 3-6 by $\frac{1}{2}$ -2 $\frac{1}{2}$ in., rather rigid, often a little scabrid on both surfaces. *Heads* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.; peduncles slender; invol. bracts rigid, outermost very short, subulate, inner $\frac{1}{2}$ in. *Achenes* $\frac{1}{10}$ in., compressed; pappus $\frac{1}{2}$ in., outer hairs 0.

VAR. ? *nilghirensis*; branches and inflorescence glandular-pubescent, pappus pale reddish-brown.—Nilgherry Mts., *Wight* (Kew Distrib. 1525). *Clarke*.—This much resembles *V. pectiniformis*.

22. *V. setigera*, Arn. *Pugill.* 27; tomentose or villous, branches grooved, leaves petioled ovate acuminate serrate, heads 6-10-flowered small in rounded terminal ebracteate corymbs, invol. bracts few linear shortly awned, achenes 4-5-angled nearly glabrous glandular, pappus yellowish. DC. *Prodr.* vii. 263; *Clarke Comp. Ind.* 18. *V. neilgheryensis*, *Thwaites Enum.* 160, not of DC.

CEYLON; Central Province, alt. 6-7000 ft., *Walker, &c.*

Erect, stout or slender, much branched, leafy. *Leaves* 2-3 in., narrowed into the petiole, glabrate above, black when dry. *Corymbs* lax, ebracteate; heads $\frac{1}{2}$ in. diam., obconic; invol. bracts few, puberulous; corolla glabrous. *Achenes* $\frac{1}{16}$ in., with a few short hairs; pappus $\frac{1}{2}$ in., outer very short or 0.

23. *V. Hookeriana*, Arn. *Pugill.* 28; hoary-puberulous, branches terete

or obscurely grooved, leaves petioled ovate acuminate serrate, heads small 20-flowered in lax open ebracteate corymbs, invol. bracts linear-oblong obtuse or mucronate pubescent, achenes 5-angled almost glabrous, pappus white. *DC. Prodr.* vii. 263; *Clarke Comp. Ind.* 19. *V. conyzoides*, *Thwaites Enum.* 160, *not of DC.*

CEYLON; Central Province, alt. 1-4000 ft., *Walker*, &c.

Very similar in habit to *V. setigera*, but only hoary, with looser corymbs, longer peduncles, smaller heads, with much shorter more obtuse invol. bracts and whiter pappus.

24. ***V. Candolleana***, *Wt. & Arn. in Wight Cat.* 1509; branches terete villous, leaves subsessile elliptic or elliptic-lanceolate acute serrate, heads 15-flowered few small in a spreading villous corymb, invol. bracts few oblong pungent, achenes 4-angled glabrous, pappus white. *Clarke Comp. Ind.* 19. *V. dindigulensis*, *DC. Prodr.* vii. 263. *V. conyzoides*, *Wt. Ic.* t. 829, and vol. iii. part iv. p. 16 (*errata*), *not of DC.*

NILGHERRY and PULNEY MTS., *Wight*.

Apparently a low herb or shrub. *Leaves* 2-3 by $\frac{1}{2}$ -1 in., puberulous above, pubescent beneath. *Heads* $\frac{1}{3}$ in. diam.; peduncles with a few setaceous bracts; invol. bracts puberulous, purple-tipped, outermost filiform; corolla glabrous. *Achenes* $\frac{1}{2}$ in.; pappus $\frac{1}{4}$ in., outer hairs subsistent.—Collected by *Wight* alone, and the specimens are very poor, and, I suspect, all from the Pulneys, or other collectors would have found it in the Nilgherries.

25. ***V. scariosa***, *Arn. Pugill.* 28; hispidly pubescent, leaves petioled elliptic acute serrate, heads 12-14-flowered small sessile terminal fascicled, invol. bracts linear-oblong awned glabrate outermost ovate acuminate, achenes glabrous, pappus reddish. *Thwaites Enum.* 161. *Decaneuron* ? *scariosum*, *DC. Prodr.* vii. 264. *Centratherum scariosum*, *Clarke Comp. Ind.* 4.

CEYLON; Central Province, alt. 4-7000 ft., *Walker*, &c.

Branches grooved and ribbed, clothed with spreading and curled hairs. *Leaves* 1-5 by $\frac{1}{2}$ -2 $\frac{1}{2}$ in., scabrid above, beneath hairy like the branches. *Heads* narrow, $\frac{1}{4}$ and $\frac{1}{3}$ in. diam.; outer invol. bracts $\frac{1}{4}$ - $\frac{1}{3}$; corolla glabrous. *Achenes* $\frac{1}{10}$ in.; pappus $\frac{1}{4}$ in., outer hairs few, short.—*Thwaites*' var. *β crassa* is only a more luxuriant state.

B. Invol. bracts all obtuse or apiculate, usually linear or oblong, rarely ovate and acute.

* Outer invol. bracts very large, broad, concealing the inner.

26. ***V. calycina***, *Wall. in DC. Prodr.* v. 60; *Cat.* 2924; nearly glabrous, upper branches involucre and upper leaves beneath hoary-pubescent, leaves subsessile elliptic quite entire obtuse, heads subcorymbose, outer invol. bracts very large green elliptic or oblong obtuse inner linear acute.

BIRMA; Prome, *Wallich*.

Herbaceous, erect, black when dry. *Leaves* 2-4 by 1-2 $\frac{1}{2}$ in., upper subobovate, rather unequal-sided, glabrous above, puberulous beneath. *Heads* 1 in. diam., shortly peduncled; corollas 40-50, puberulous. *Achenes* stellately pubescent and glandular; pappus $\frac{1}{2}$ in. long; hairs reddish, shining; outer few, half as long as the inner.

** Outer invol. bracts longer than the inner, linear, with leafy tips; annual.

27. ***V. anthelmintica***, *Willd.*; *DC. Prodr.* v. 61; tall, branched, glandular-pubescent, leaves petioled lanceolate or ovate-lanceolate coarsely serrate, heads subcorymbose, invol. bracts linear with broad purplish tips. *Ham. in Trans. Linn. Soc.* xiv. 217; *Wall. Cat.* 2920; *Wight Contrib.* 7; *Dalz. & Gibs. Bomb. Fl.* 313; *Kurz in Journ. As. Soc.* 1877, ii. 202; *Clarke Comp. Ind.* 10. *Conyza anthelmintica*, *Linn.* *Serratula anthelmintica*, *Roeb.*

Fl. Ind. iii. 405. *Ascaricida indica*, Cass in *Dict. Sc. Nat.* iii. *Suppl.* 38.—*Burm. Thes.* 210 t. 95. *Rheede Hort. Mal.* ii. t. 24.

Throughout INDIA; from Kashnir to Ceylon (nowhere ? indigenous) and Malacca, ascending to 5500 ft. in the Himalaya and Khasia Mts.—DISTRIB. Afghanistan.

A tall robust leafy annual. *Leaves* 3–8 in., rather membranous. *Heads* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., about 40-fld. *Achenes* $\frac{1}{2}$ in., 10-ribbed, pubescent; outer pappus rather longer, shining, reddish, flattened, deciduous; inner very short, rigid, paleaceous,

*** Outer invol. bracts much shorter than the inner.

† *Heads very small. Leaves not thickly clothed beneath with white woolly tomentum.*

28. **V. cinerascens**, *Schultz-Bip. in Schweinf. Ethiop.* 162; low, shrubby, much branched, clothed with ashy pubescence, leaves elongate spathulate tip rounded sessile with a very narrow base punctate, heads few small solitary on the divaricating branches of terminal cymes, invol. bracts linear subacute, achenes silky, pappus white. *Oliv. Fl. Trop. Afr.* iii. 275. *V. spathulata*, *Hochst. in Herb. Schweinf.* n. 2133.

The PUNJAB; at Peshawar, *Vicary, Talbot.* SALT RANGE, *Fleming.* WUZURISTAN, *Stewart.* SCIND, at Kurrache, *Stocks.*—DISTRIB. Beluchistan, Abyssinia.

Branches white, quite terete. *Leaves* $\frac{1}{2}$ – $1\frac{1}{2}$ in., green when dry, both surfaces alike. *Heads* $\frac{1}{4}$ in. diam.; peduncles with rarely minute bracts; invol. bracts linear, $\frac{1}{2}$ in.; corolla glabrous. *Achenes* $\frac{1}{10}$ in., densely silky; pappus $\frac{1}{2}$ in.; hairs all persistent, outer many short rigid.—The achene is incorrectly described in the *Flor. Trop. Africa.*

29. **V. elæagnifolia**, *DC. Prodr.* v. 22; climbing, branches petioles and inflorescence hoary, leaves petioled oblong linear-oblong or elliptic-lanceolate quite entire obtuse or acute glabrous and reticulate above loosely silky beneath, heads 3–5-flowered in narrow terminal short loose panicles all pedicelled, invol. bracts few small ovate obtuse, achenes compressed 5–8-ribbed glabrous, pappus white outer hairs few. *Clarke Comp. Ind.* 24; *Kurz For. Fl.* 11, 80. *V. elliptica*, *DC. in Wight Contrib.* 5; *Prodr.* v. 22. *Conyza elæagnifolia*, *Wall. Cat.* 3041.

PEGU; Maclelland. TENASSERIM, *Wallich, Griffith, &c.*—DISTRIB. Siam.

Branches long, woody, finely grooved. *Leaves* 1–3 by $\frac{1}{2}$ –1 in., pale and almost silky beneath; petiole slender. *Heads* $\frac{1}{2}$ in. diam., about 3 at the end of the rigid divaricating branches of the panicle; invol.-bracts $\frac{1}{10}$ in.; corolla glabrous. *Achenes* $\frac{1}{2}$ in.; pappus $\frac{1}{2}$ in., persistent.

30. **V. nemoralis**, *Thw. Enum.* 160; herbaceous, branches and heads puberulous, leaves petioled elliptic- or linear-lanceolate acuminate distantly serrate glabrous on both surfaces nerves obscure, invol. bracts linear-oblong obtuse, achenes hairy, pappus white. *Clarke Comp. Ind.* 11.

CEYLON; Saffragam, Galagama, &c. *Walker, &c.*

Apparently a slender herb. *Leaves* 2–4 by $\frac{1}{2}$ –1 in., young slightly pubescent beneath. *Heads* sometimes corymbose, $\frac{1}{4}$ – $\frac{1}{2}$ in. diam.; outermost invol. bracts short, obtuse. Corolla glabrous. *Achenes* obscurely 10-ribbed; pappus $\frac{1}{2}$ in., outer bristles very short.

†† *Heads large or small. Leaves thickly clothed beneath with dense white or buff woolly tomentum. Shrubs.*

31. **V. salviæfolia**, *Wight Ic.* t. 1079; branches woody, inflorescence and leaves beneath clothed densely with white wool, leaves crowded at the ends of the branches sessile linear-lanceolate obtuse crenulate rugulose above, heads 10–14-flowered in open corymbs, invol. bracts short oblong acute, achenes com-

pressed obscurely 3-4-angled glabrous, pappus pale reddish. *Clarke Comp. Ind.* 20. *V. Arnottiana*, *Thoms. mss. ex Clarke*.

TRAVANCORE, at Courtallam, *Wight*.

Branches very thick. *Leaves* 4-6 by $\frac{1}{2}$ - $\frac{3}{4}$ in., thick, above almost tubercled by the short close-set high wrinkles between the numerous nerves. *Heads* $\frac{1}{2}$ in. diam., subsessile; peduncles with few small linear axillary bracts; invol. bracts $\frac{1}{8}$ in.; corolla glabrous. *Achenes* $\frac{1}{4}$ in.; pappus as long; outer hairs very numerous, short, flat, persistent, inner caducous.

32. *V. Wightiana*, *Arn. Pugill.* 27; shrubby, branches leaves beneath and corymbs clothed with dense buff wool, leaves shortly petioled elliptic or elliptic-lanceolate obtuse or acute obscurely toothed woolly but finally glabrate above, heads 30-40-flowered in terminal open corymbs, invol. bracts short oblong acute, achenes 4-5-ribbed glabrous, pappus dirty white. *DC. Prodr.* vii. 263; *Thuaites Enum.* 160, excl. var. β ; *Clarke Comp. Ind.* 19.

CEYLON; central province, alt. 5-8000 ft., *Macrae*, &c.

Branches terete, stout or slender, leafy. *Leaves* 2-5 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., coriaceous; petiole sometime $\frac{3}{4}$ in. *Heads* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; peduncles stout, with a few narrow bracts; invol. bracts $\frac{1}{8}$ in., woolly; corolla laxly hairy. *Achenes* $\frac{1}{12}$ in.; pappus $\frac{1}{8}$ in., outer hairs very short flattened.

33. *V. indica*, *Clarke Comp. Ind.* 16; branches leaves beneath and inflorescence clothed with dense soft whitish tomentum, leaves subsessile elliptic or almost orbicular acute serrate-toothed coriaceous, heads numerous in broad terminal corymbs 6-10-flowered, invol. scales broad oblong mucronate, achenes glabrous, pappus yellowish. *Conyza indica*, *Wall. Cat.* 3042. *Decaneuron dendigulense*, *DC. in Wight Contrib.* 7; *Prodr.* v. 67. *Lysistemma dendigulense*, *Steetz in Peters Mosamb. Bot.* 341.

WESTERN PENINSULA; on the Ghats, from the Concan to Travancore.

An undershrub, 2-3 ft., erect; branches terete. *Leaves* 3-6 by 1 $\frac{1}{2}$ -5 in., rigid, scaberulous above; nerves many, much raised beneath, petiole rarely 1 in. *Heads* $\frac{1}{2}$ in. diam., crowded at the end of the stout branches; inner invol. bracts $\frac{1}{8}$ in., tomentose, closely imbricate, outermost minute ovate; corolla glabrous. *Achenes* $\frac{1}{10}$ in.; pappus $\frac{1}{4}$ in.; outer hairs 0.

34. *V. zeylanica*, *Less. in Linnæa*, 1829, 344; branches leaves beneath and corymbs ashy tomentose or woolly, leaves shortly petioled ovate with a lyrate usually auricled base acute coarsely crenate, heads 4-8-flowered small fascicled in large terminal corymbs, invol. bracts very short ovate acute, achenes 5-ribbed puberulous, pappus pale reddish. *DC. in Wight Contrib.* 5; *Prodr.* v. 26; *Clarke Comp. Ind.* 20. *Eupatorium zeylanicum*, *Linn.*—*Cacalia*, *Burm. Thes. Zeyl.* 52 t. 21.

CEYLON; hilly parts of the island ascending to 3000 ft.

Branches slender, grooved and ribbed. *Leaves* 1-2 $\frac{1}{2}$ by $\frac{1}{2}$ -1 in., coriaceous, puberulous above, densely woolly and reticulate beneath, basal auricles horizontal. *Heads* $\frac{1}{4}$ in. diam.; peduncles with few small axillary bracts; invol. bracts few, woolly, $\frac{1}{10}$ in. long; corolla glabrous. *Achenes* $\frac{1}{18}$ in. long; pappus $\frac{1}{8}$ in.; outer hairs few, very short.

††† *Heads* usually large. *Leaves* not clothed with white wool beneath.

35. *V. extensa*, *DC. Prodr.* v. 33; branches and inflorescence pubescent, leaves petioled lanceolate acuminate sharply serrate glabrous or scaberulous above pubescent or glabrate beneath, heads in loose terminal corymbs 8-10-flowered, invol. bracts few linear-oblong concave obtuse coriaceous, outermost very short obtuse, achenes pubescent, pappus reddish. *Clarke Comp. Ind.* 15.

Conyza extensa, Wall. Cat. 3016. *Gymnanthemum extensum*, Steetz in *Peters Mosamb. Bot.* 337.

CENTRAL AND EASTERN TROPICAL HIMALAYA; Nipal, Wallich; Sikkim, J. D. H.; Bhotan, Griffith.

Erect, 6-8 ft., branched. Leaves 6-10 by $2\frac{1}{2}$ -3 in., narrowed into a short or long petiole, membranous. Heads $\frac{1}{2}$ in. diam., longer than broad; peduncles very slender; invol. scales not numerous, hard, closely imbricate, puberulous, inner $\frac{1}{4}$ in.; corolla pubescent. Achenes $\frac{1}{8}$ in.; pappus $\frac{1}{3}$ in., outer hairs few or 0.—Clarke likens this to *V. blanda*, and suggests its being a variety of that plant, but the sharply serrate long leaves are very different.

36. **V. pectiniformis**, DC. in *Wight Contrib.* 2; *Prodr.* v. 31; shrubby, branches glabrate pubescent scabrid villous or glandular, leaves petioled elliptic-lanceolate acuminate serrate glabrous or scabrid above puberulous pubescent or tomentose beneath usually many-nerved, heads 10-25-flowered in short broad terminal corymbs, inner invol. bracts oblong obtuse or apiculate, outer small acuminate, achenes glabrous, pappus dirty white or reddish. *Arn. Pugill.* 27; *Wight Ic.* t. 1077. *V. punctulata*, DC. *Prodr.* vii. 264. *Lyxistemma pectiniforme*, Steetz in *Peters Mosamb. Bot.* 343.

NILGHERY Mts., alt. 8000 ft. CEYLON; central province, alt. 6-7000 ft., Walker, &c.

Branches usually stout, ribbed and grooved. Leaves often close-set, 3-6 by 1-2 $\frac{1}{2}$ in., rigid, narrowed into the petiole, nerves 6-12 pair. Heads $\frac{1}{2}$ in. diam., peduncles short; invol. bracts hard, concave, usually with rounded coloured tips, outer gradually smaller, often subulate and recurved; receptacle fimbriate; corolla glabrous. Achenes $\frac{1}{8}$ in.; pappus $\frac{1}{2}$ in. long, outer hairs short, sometimes numerous, most red in Ceylon specimens.

37. **V. arborea**, Ham. in *Trans. Linn. Soc.* xiv. 218; a tree, branches and corymbs pubescent tomentose or woolly, leaves large petioled elliptic or elliptic-ovate acuminate quite entire glabrous or beneath pubescent, base acute rounded or cordate, heads 1-6-flowered small in large leafless terminal panicles, invol. bracts very small oblong obtuse, achenes compressed or 3-4-gonous obscurely 8-10-ribbed puberulous, pappus white or yellowish hairs persistent all equal. DC. *Prodr.* v. 22; *Kurz For. Fl.* ii. 80. *V. javanica*, DC. l. c.; *Bedd. For. Man.* 125. *V. Blumeana* and *celebica*, DC. l. c. 22. *Eupatorium celebicum* and *javanicum*, *Blume Bijl.* 903. *Conyza acuminata* and *arborea*, Wall. Cat. 3034 A., 3074. ? *Gymnanthemum acuminatum*, Steetz in *Peters Mosamb. Bot.* 336.

ASSAM, the KHASIA Mts., SILHET, CACHAR, BIRMA, TENASSERIM, MALACCA, and SINGAPORE. WESTERN PENINSULA on the Ghats, from the Concan, southwards. CEYLON, ascending to 5000 ft.—DISTRIB. Java, Borneo, Philippines.

A large shrub or small tree. Leaves 5-8 by 2-3 in., coriaceous, quite glabrous in northern specimens, more or less pubescent in Malayan; petiole $\frac{1}{2}$ -1 in. Heads $\frac{1}{2}$ in. diam.; involucre small; bracts few, $\frac{1}{10}$ in. long, tomentose; corolla glabrous. Achenes $\frac{1}{2}$ in., pale; pappus $\frac{1}{2}$ in., hairs few, all equal and in one row.—A Philippine Island's var. has branches inflorescence and leaves beneath densely clotted with white or buff velvety pubescence. The Malaccan and Silhet forms have the leaves usually quite glabrous, the Tenasserim ones pubescent, the Ceylon densely pubescent.

VAR. ? *Wightiana*; branches leaves beneath and inflorescence very densely woolly, petioles usually shorter and stout, heads often 1-fl. *V. monosis*, DC. in *Wight Contrib.* 5; *Ic.* t. 1085; *Clarke Comp. Ind.* 24; *Bedd. Fl. Sylv.* t. 225. *Conyza Wightiana*, Wall. Cat. 3028.—Western Peninsula, on the Ghats, from the Concan southwards.—I can scarcely doubt this being a form of *V. arborea*, with which it perfectly agrees in the form of the leaves, heads, achenes, and pappus, but the petioles are usually very short and thick, as in *V. solanifolia*, sometimes however long and slender as figured by Wight.

38. **V. solanifolia**, *Benth. in Lond. Journ. Bot.* i. 486; *Kew Journ.* iv. 232; *Fl. Hongk.* 169; subarboreous, branches leaves beneath and panicles densely softly woolly, leaves petioled ovate-oblong or elliptic obtuse or acute entire or sinuate-toothed base rounded or cordate, heads 3-5-flowered in open large terminal panicles, invol. bracts few small ovate obtuse woolly, achenes 8-10-ribbed glabrous, pappus yellowish persistent with short outer bristles. *V. Kurzii*, *Clarke Comp. Ind.* 24; *Kurz For. Fl.* ii. 80.

MARTABAN and PEGU; in dry forests, *Kurz*.—DISTRIB. China.

A large weak shrub or small tree, which I cannot distinguish from the densely woolly form of *V. arborea*, except by the leaves being usually tomentose above with a shorter very stout petiole, and the presence of the outer pappus bristles.

39. **V. volkameriæfolia**, *DC. Prodr.* v. 32; a tree, branchlets and panicles pubescent or tomentose, leaves large petioled obovate or obovate-oblong or lanceolate acute or obtuse glabrous above pubescent on the nerves beneath entire or subserrate, heads 3-10 flowered in large terminal leafless panicles, invol. bracts puberulous few linear-oblong obtuse, achenes 10-ribbed nearly glabrous, pappus whitish persistent. *Kurz in Journ. As. Soc.* 1877, ii. 202. *V. punduana*, *DC. Prodr.* v. 32. *V. acuminata*, *DC. l. c. excl. syn.*; *Clarke Comp. Ind.* 22; *Kurz For. Fl.* ii. 79. *V. punduana*, *vulgaris* and *volkameriæfolia*, *Steetz in Peters Mosamb. Bot.* 346. *V. cuspidata*, *Buck in Index Candoll.* ii. 5. *Conyza volkameriæfolia* and *punduana*, *Wall. Cat.* 3001, 3035.

SIKKIM HIMALAYA, KHASIA and JAINTIA Mts.; alt. 2-5000 ft. MISHMI HILLS, *Griffith*. *BIRMA*, *Kurz*.

A small tree; branches robust, terete. Leaves 5-12 by $1\frac{1}{2}$ -4 in., rather thin, narrowed into very short petioles. Heads very numerous, $\frac{1}{2}$ - $\frac{3}{4}$ in diam.; peduncles short or long, stout, with small bracts at the base; invol. bracts $\frac{1}{4}$ in.; corolla glabrous. Achenes $\frac{1}{3}$ in., with a few scattered short hairs; pappus $\frac{1}{3}$ in., very persistent, outer hairs few short.

40. **V. travancorica**, *Hook. f.*; a tree, branchlets and inflorescence hoary-pubescent, leaves shortly petioled obovate obtuse sinuate towards the tip, glabrous on both surfaces, heads 5-6-flowered in terminal leafless panicles, invol. bracts few short oblong obtuse silky, achenes 10-ribbed glandular, pappus white deciduous. *V. volkameriæfolia*, *Beddome, Fl. Sylv.* t. 225 (not of *DC.*).

TRAVANCORE, *Beddome*.

Closely allied to *V. volkameriæfolia*, but differing from it and from *V. arborea* in the silky invol. bracts, and very deciduous quite white pappus.—I have seen but one specimen; it exactly accords with *Beddome's* figure.

41. **V. talaumifolia**, *Hook. f. & T. Herb. Ind. Or.*; a tree, branches very thick, leaves beneath and inflorescence puberulous or nearly glabrous, leaves very large shortly petioled obovate or oblanceolate subacute entire or sinuate-toothed, heads 8-20-flowered in very large irregularly branched terminal panicles, invol. bracts ovate obtuse, achenes deeply 10-ribbed glabrous, pappus red, outer hairs slender. *Clarke Comp. Ind.* 25.

SIKKIM HIMALAYA; alt. 1-4000 ft., *J. D. H. & T. T. BHOTAN*, *Clarke*. ASSAM, *Masters*. MISHMI HILLS, *Griffith*.

Much the largest Indian species. Branches as thick as the little finger. Leaves 16 by 6 in. and under, very coriaceous, glabrous, shining and reticulated on both surfaces, or pubescent on the nerves beneath; petiole $\frac{1}{4}$ in. Heads $\frac{3}{4}$ in. diam., sessile on the long dichotomous divaricating branches of the panicle; invol. bracts $\frac{1}{3}$ in., glabrate; corolla glabrous. Achenes $\frac{1}{3}$ in.; pappus nearly $\frac{1}{2}$ in.

42. **V. Parishii**, *Hook. f.*; branches robust and inflorescence finely tomentose, leaves large shortly petioled oblanceolate subacute obscurely toothed reticulate minutely pubescent above more so beneath, midrib closely pubescent

on both surfaces, heads corymbose in a large panicle, invol. bracts oblong herbaceous obtuse or acute, achenes glandular, pappus white.

MOULMEIN; hills on the Attran, *Parish*.

A good deal resembling *V. Lobtii*, but the leaves are much more pubescent beneath, the heads form a large terminal branched panicle, nearly a foot long; the invol. bracts are herbaceous and very different in shape, and the achenes are not tomentose.

43. **V. scandens**, *DC. Prodr.* v. 32; climbing, branches slender and inflorescence glabrous or pubescent, leaves petioled ovate elliptic or lanceolate acuminate quite entire glabrous or pubescent beneath, heads 5-10-flowered in long leafy terminal panicles all pedicelled, invol. bracts ovate or linear-lanceolate acute or obtuse, achenes compressed glabrous deeply 10-ribbed, pappus red outer hairs few short slender. *Clarke Comp. Ind.* 26; *Kurz For. Fl.* ii. 81. *Conyza scandens*, *Wall. Cat.* 3060. *V. vagans*, *DC. l. c.*; *Clarke l. c.* *Gymnanthemum scandens and vagans*, *Steetz in Peter's Mosamb. Bot.* 338.

SIKKIM HIMALAYA and the KHASIA Mts.; ascending to 4000 ft. ASSAM, SILHET, and BIRMA.

A rambling climber, branches woody. Leaves $2\frac{1}{2}$ -4 by 1- $2\frac{1}{2}$ in., rather thin; petiole slender. Heads $\frac{1}{3}$ - $\frac{1}{2}$ in. diam.; pedicels slender; invol. bracts very variable in breadth, puberulous, inner $\frac{1}{2}$ in. long; corolla glabrous. Achenes $\frac{1}{8}$ - $\frac{1}{5}$ in. long; pappus between $\frac{1}{4}$ - $\frac{1}{2}$ in. long.—I cannot distinguish between *V. scandens* and *V. vagans*, which in their extreme forms differ, the former in the broader blunter invol. bracts, and I think longer achenes, but I find achenes of $\frac{1}{8}$ and $\frac{1}{5}$ in. in the same specimen.

44. **V. blanda**, *DC. Prodr.* v. 32; a rambling shrub, slender branches and leaves glabrous, panicles puberulous, leaves petioled elliptic acuminate at both ends quite entire, heads 10-25-flowered in elongate branched terminal panicles, invol. bracts linear-oblong acute puberulous, receptacle glabrous, achenes pubescent 10-ribbed, pappus red outer hairs few. *Clarke Comp. Ind.* 25; *Kurz in Journ. As. Soc.* 1877, ii. 202. *excl. syn.*; *For. Fl.* ii. 81. *V. blandula*, *Clarke l. c.* 26. *Conyza blanda*, *Wall. Cat.* 3033.

MARTABAN and TENASSERIM; on the Saluen river, *Wallich*. PEGU, *Scott*.

Very similar to *V. scandens*, but with pubescent achenes.

45. **V. Andersoni**, *Clarke Comp. Ind.* 27; scandent, branches leaves beneath and inflorescence pubescent or tomentose, leaves petioled ovate acute or acuminate quite entire finely reticulated, heads 5-15-flowered in axillary and terminal loose panicles, invol. bracts small ovate obtuse, receptacle hairy, achenes deeply 10-ribbed flattened puberulous, pappus red outer hairs 0. *V. Cumingiana*, *Benth. Fl. Hongk.* 170 (not of *Kew Journ. Bot.* iv. 333).

UPPER ASSAM; Naga hills, *Masters*. BIRMA, *Griffith*. TENASSERIM, *Helper*.—DISTRIB. Hongkong.

Very similar to large-leaved states of *V. scandens* with obtuse invol. bracts, but the leaves are thinly leathery, the nerves beautifully reticulated, the achenes puberulous, and the receptacle covered with deciduous fulvous hairs. Invol. bracts $\frac{1}{10}$ in. narrowly oblong, very obtuse, nearly glabrous. Achenes (in Hongkong specimen) $\frac{1}{8}$ in. long; pappus upwards of $\frac{1}{2}$ in.—Bentham is mistaken in referring the Hongkong plant to his *V. Cumingiana* of the Philippines, which has a naked receptacle and far more numerous flowers in a head; as is Kurz (*Journ. As. Soc.* 1877, ii. 202) in referring *V. Andersoni* to *blanca*.

DOUBTFUL AND IMPRELECTLY KNOWN SPECIES.

? *V. (EUPATORIUM PECTINATUM, Wall. Cat.* 3172.) from the Nilgherry Mts.; there is no specimen of this in the Wallichian Herbarium.

V. (DECANEURON LILACINUM, Dalz. & Gibs. Bomb. Fl. 314); there is no specimen of this in Dalzell's Herbarium, and I fail to identify it by the description.

6. **ELEPHANTOPUS**, Linn.

Rigid herbs. *Leaves* alternate. *Heads* homogamous of 2-5 flowers collected into a head-like cluster. *Involucre* compressed; bracts about 8, dry, stiff, alternately flat and conduplicate; receptacle naked. *Flowers* all equally 4-lobed and cleft on one side and with the lobes spreading somewhat palmately. *Anther-bases* obtuse. *Style-arms* subulate. *Achenes* truncate, 10-ribbed; pappus bristles rigid, shining, slender and dilated below or chaff-like.—DISTRIB. Species 10-12, chiefly tropical American, with one cosmopolitan.

1. **E. scaber**, Linn.; *DC. Prodr.* v. 86; dichotomously branched, 1-2 ft. high, strigose scabrid and villous, radical leaves obovate-oblong crenate cauline few sessile, heads clusters of 1 in. diam. surrounded by cordate leafy bracts, invol. bracts pungent, achenes hairy, pappus of 4-5 rigid bristles dilated at the base. *Wall. Cat.* 2979; *Wight Ic.* t. 1086; *Roxb. Fl. Ind.* iii. 445; *Don Prodr.* 169; *Dalz. & Gibs. Bomb. Fl.* 122; *Clarke Comp. Ind.* 28.—*Rheede Hort. Mal.* x. t. 7.

Throughout INDIA, from the Punjab ? to CEYLON and SINGAPORE.—DISTRIB. Tropical Asia, Australia and America.

The embryo not unfrequently germinates in the head.

TRIBE II. **EUPATORIÆ.**7. **ADENOSTEMMA**, Forst.

Glabrous or glandular-pubescent herbs. *Leaves* mostly opposite. *Heads* corymbose, homogamous. *Involucre* campanulate; bracts many, sub-2-seriate, narrow, herbaceous, sometimes connate; receptacle flat, naked. *Corollas* all equal, tubular, regular; tube short; limb campanulate, 5-toothed. *Anthers* truncate with a glandular tip, base obtuse. *Style-arms* elongate, dilated above. *Achenes* obtuse, 5-ribbed, glandular; pappus hairs 3-5, short, rigid, often clavate, inserted in a short ring.—DISTRIB. Species 5 or 6 American, 1 cosmopolitan.

1. **A. viscosum**, Forst; *DC. Prodr.* v. iii.; *Clarke Comp. Ind.* 28.

Throughout INDIA; ascending to 5000 ft. on the Himalaya and other ranges, and to 6000 in Ceylon.—DISTRIB. All tropical countries.

An erect rarely decumbent annual, glabrous pubescent or viscidly pubescent, slender or robust. *Leaves* sessile or petioled, opposite or the upper alternate, from linear to broadly ovate, serrate. *Heads* few or many, in lax or dense panicles or corymbs; invol. bracts oblong, obtuse or acute, glabrous glandular or scabrid.—Of this most variable plant there is but one species. Clarke distinguishes the following marked Indian forms.

VAR. 1. typica; leaves oblong-lanceolate subacute crenate glabrescent, achenes sparingly warted. *DC. l. c.* A. leiocarpum, *DC. in Wight. Contrib.* 9; *Prodr. l. c.* A. Roylei, *DC. l. c.* 112. A. rivale, *Dalz. in Hook. Kew Journ.* iii. 231; *Dalz. & Gibs. Bomb. Fl.* 122. A. angustifolium, *Arn. Pugill.* 29; *DC. l. c.* vii. 266. *Lavenia alba*, *Wall. Cat.* 3220. *Ageratum aquaticum*, *Roxb. Hort. Beng.* 61; *Fl. Ind.* iii. 415.

VAR. 2. elata; leaves broadly ovate or cordate nearly glabrous, achenes and invol. bracts as in Var. 1. A. elatum, *DC. l. c.* 112; ? *Don Prodr.* 181. A. aquaticum, *Don l. c.* A. microcephalum, *DC. l. c.* *Lavenia erecta and carnosa*, *Wall. Cat.* 3218 in part, 3219. *Ageratum strictum*, *Bot. Mag.* t. 2410.

VAR. 3. latifolia; leaves broadly ovate or cordate nearly glabrous sometimes very large, achenes densely warted. A. latifolium, *DC. l. c.* 112; *Don Prodr.* 181. *Lavenia erecta*, *Wall. Cat.* 3218 C.—one of the best marked varieties.

VAR. 4. parviflora; leaves elliptic glabrous membranous, branches of panicle slender, achenes small densely warted. A. macrophyllum and parviflorum, *DC. l. c.* iii. 113. *Lavenia macrophylla and parviflora*, *Blume Bijdr.* 905, 906. *Lavenia viscida*, *Wall. Cat.* 3222 A.

VAR. 5. *fastigiata* (not of *Clarke Comp. Ind.* 29), leaves ovate-lanceolate glabrous, panicles fastigiata, achenes scabrid and warted. *A. fastigiatum*, *DC. l. c.* 111. *Lavenia fastigiata*, *Blume l. c.* 905.

VAR. 6. *rugosa*; leaves ovate coriaceous rugose, achenes densely warted. *A. rugosum*, *DC. in Wight Contrib.* 8; *Prodr. l. c.* 112; *Deless. Ic. Sel.* iv. t. 10. *A. latifolium*, *Wt. Ic. t.* 1087. *A. fastigiatum*, *Schultz-Bip. in Herb. Hohenack.* n. 612 (not of *DC.*). *Lavenia rugosa*, *Wight in Wall. Cat.* 3221.—Nilgherry, &c. Mts. only.

VAR. 7. *reticulata*; leaves ovate sometimes a span broad often reticulate, achenes smooth or sparsely warted often elongate. *A. reticulatum*, *DC. in Wight Contrib.* 8; *Prodr. v.* 113; *Wt. Ic. t.* 1088. *A. viscosum*, madurensis and leiocarpum, *DC. in Wight Contrib.* 9; *Prodr. v.* 113. *A. erectum*, *DC. l. c.* *Verbesina Lavenia*, *Linn. Fl. Zeyl.* 145.—*Burm. Thes. Zeyl. t.* 42.—South India and Ceylon.

8. *AGERATUM*, *Linn.*

Erect herbs or shrubs. *Leaves* opposite or the upper alternate. *Heads* corymbose or paniced, homogamous. *Involucre* campanulate; bracts 2-3-seriate, linear, subequal; receptacle flat or nearly so, naked or with caducous scales. *Corollas* all tubular, equal, regular, limb 5-cleft. *Anthers* appendaged, base obtuse. *Style-arms* elongate, obtuse. *Achenes* 5-angled; pappus of 5 short free or connate scales, or of 10-20 narrow unequal scales.—*DISTRIB.* Species about 16, probably all American, but now distributed throughout the tropics.

1. *A. conyzoides*, *Linn.*; *DC. Prodr. v.* 108; annual, 1-2 ft., hispidly hairy, leaves petioled ovate crenate, heads small in dense terminal corymbs, bracts striate acute, ray-fl. many pale blue or white, achenes black, pappus scales 5 awned often serrate below. *Clarke Comp. Ind.* 30; *Wall. Cat.* 3176. *A. cordifolium*, *Rorb. Fl. Ind.* iii. 415; *Wall. Cat.* 3177.

Throughout INDIA; ascending the Himalayas to 5000 ft.—*DISTRIB.* All hot countries.

9. *EUPATORIUM*, *L.*

Herbs shrubs or undershrubs. *Leaves* opposite or alternate. *Heads* corymbose, homogamous. *Involucre* long or short; bracts few- or many-seriate, subequal or outer shorter; receptacle naked. *Corollas* all equal, regular, tubular; tube slender; limb 5-lobed or toothed. *Anthers* appendaged, base obtuse. *Style-arms* long, obtuse. *Achenes* truncate, 5-angled or -ribbed; pappus-hairs 1-seriate, many, rigid, scabrid.—*DISTRIB.* About 400 species, chiefly American.

1. *E. Reevesii*, *Wall. Cat.* 3168; *DC. Prodr. v.* 179; hoary-pubescent, leaves simple ovate or lanceolate acuminate entire or coarsely serrate, corymbs very many rounded, heads $\frac{1}{4}$ in. long, invol. bracts very obtuse. *Clarke Comp. Ind.* 32. *E. longicaule*, *Wall.*; *Clarke l. c.* 32, not of *DC.* *E. squamosum*, *Don Prodr.* 170. *Conyza longicaulis*, *Wall. Cat.* 3073. *Mikania clematidea*, *Wall. in DC. l. c.* 191; *Cat.* 3173.

SUBTROPICAL HIMALAYA; from Simla to Bhotan alt. 2-6000 ft. exclusive of Sikkim.—*DISTRIB.* China, Japan.

Tall, erect or scandent, slender, much branched above. *Leaves* 1-2 in., puberulous above, 3-ply-nerved; petiole short. *Heads* pale, fastigiata; invol. bracts 5-8, obtuse, hoary; flowers 5-8.—This is usually called *E. longicaule*, of De Candolle, whose description does not agree with my Indian specimens and is probably made up of more than one Wallichian plant.

2. *E. cannabinum*, *Linn.*; *DC. Prodr. v.* 180; pubescent or puberulous, leaves simple or trisect lanceolate coarsely serrate, corymbs many rounded, heads $\frac{1}{4}$ in. long, inner invol. bracts subacute. *Clarke Comp. Ind.* 34. *E. Wallichii* and *heterophyllum*, *DC. l. c.* 179, 180. *E. punduanum*, *Wall. in DC. Prodr. l. c.* 179; *Cat.* 3170; *Clarke l. c.* 33. *E. nodiflorum*, *Wall. Cat.* 3166;

DC. l. c. 179; Clarke l. c. 33. E. Lambertianum and viscosum, Wall. Cat. 3287, 3288. E. dicline, Edgew. in Trans. Linn. Soc. xx. 63. E. Simonsii, Clarke l. c. 32.

TEMPERATE HIMALAYA; abundant from 3–11,000 ft. KHASIA Mts.; alt. 3–6000 ft. BURMA.—DISTRIB. Europe and Temp. Asia.

A taller usually coarser plant than *E. longicaule*, with larger heads—To this species many described ones are referable. Of *E. Lambertianum*, there is only one specimen in Wallich's Herbarium, but there are many in Mr. Clarke's, all from the Khasia; it differs in the more rigid strongly triply-nerved leaves, that are also strongly reticulated beneath, but passes into the commoner Khasian form of *E. cannabinum*.

EXCLUDED AND SUPPRESSED SPECIES.

E. AYAPANA, Vent. Hort. Malm. t. 3; DC. Prodr. v. 169. Cyanopsis? erigeroides, DC. in Wight Contrib. 7 (not. V. erigeroides, DC.) is an American plant, introduced into the Calcutta and other gardens.

E. BIRMANICUM, DC. Prodr. v. 179; Clarke Comp. Ind. 34, is a Japan plant, not different from *E. cannabinum*.

E. FINLAYSONIANUM, Wall. Cat. 7133; DC. Prodr. v. 179; Clarke Comp. Ind. 34, from Finlayson's Herbarium, is *E. cannabinum*.

E. LONGICAULE, DC. Prodr. v. 178; it is impossible to say what this is. De Candolle's description does not agree with that of the plant cited under it (*Conyza longicaulis, Wall.; Milkania? longicaulis, Wall.*).

E. ODORATUM, Linn.; DC. Prodr. v. 143; Clarke Comp. Ind. 30, is a West Indian species, cultivated, but very rarely, in India.

E. POLYANTHUM, Wall. Cat. 3171; from Herb. Wight. There is no specimen of this in the Wallichian Herbarium, and it is impossible to say what it may have been.

E. SUAVEOLENS, Wall. Cat. 3290, from the banks of the Irawaddy at Seguen; there is no specimen of this in the Wallichian Herbarium.

10. MIKANIA, Willd.

Shrubs, or erect or twining herbs. *Leaves* opposite. *Heads* small, spiked racemed or paniced, homogamous, usually 4-flowered. *Involucre* oblong; bracts 4, narrow, with often a smaller outer one; receptacle narrow, naked. *Corollas* all equal, regular, tubular, tube slender; limb campanulate, 5-fid. *Anthers* appendiculate, base obtuse. *Style-arms* long, acute. *Achenes* truncate, 5-angled; pappus-hairs numerous, 1–2-seriate, scabrid, often connate at the base.—DISTRIB. About 60 species, all American, one of them cosmopolitan.

1. *M. scandens, Willd.; DC. Prodr. v. 199;* climbing, glabrous or puberulous, leaves long-petioled ovate acute or acuminate base rounded cordate or truncate crenate or angled, sometimes villous beneath, heads 4-flowered corymbose terminating lateral branches, achenes glabrous glandular, pappus reddish. *Clarke Comp. Ind. 34. M. volubilis and M. chenopodifolia, Willd.; DC. l. c. 199 and 201. Eupatorium scandens, Linn.; Jacq. Ic. t. 169.*

EASTERN ASSAM, *Clarke;* Daphla hills, *Nuttall.* BURMA and MALAY PENINSULA from Tenasserim to Singapore.—DISTRIB. Siam, Malayan and Philippine Islands.

TRIBE III.—ASTEROIDEÆ.

11. SOLIDAGO, Linn.

Perennial herbs. *Leaves* alternate. *Heads* small, often in scorpioid cymes, heterogamous, rayed, yellow; ray-fl. few, 1-seriate, ♀, ligulate; disk-fl. tubular, 5-fid. *Involucre* oblong or campanulate; bracts many-seriate, coriaceous; receptacle small, usually pitted. *Anther-bases* obtuse. *Style-arms* of ♀

flattened, tips lanceolate. *Achenes* subterete or angled, 8-12-ribbed; pappus hairs 1-2-seriate, slender, scabrid.—**DISTRIB.** Species about 80, chiefly N. American, one of them cosmopolitan in the N. temp. regions.

1. **S. Virga-aurea**, *Linn.*; *DC. Prodr.* v. 338; glabrous or pubescent, stems erect stout subsimple 6-24 in., lower leaves petioled ovate or oblong subserrate, upper smaller narrower entire, heads 1-4 on short axillary peduncles collected in a long leafy panicle, invol. bracts narrow acute, ray-fl. about 8, achenes glabrous or puberulous. *Clarke Comp. Ind.* 35.

TEMPERATE HIMALAYA; from Kashmir eastwards, alt. 5-9000 ft. KHASIA Mts., alt. 4-6000 ft.—**DISTRIB.** Europe, Temp. Asia and America, Hongkong.

VAR. 1. *leiocarpa*, *Benth.* Fl. Hongk. 179; var. *glabriuscula*, *Clarke l. c.*, glabrous or nearly so, achenes glabrous.—Kashmir to Nepal.—*Amphiraphis leiocarpa*, *Benth. in Hook. Lond. Journ. Bot.* i. 488.

VAR. 2. *pubescens*, *Clarke l. c.*; pubescent, achenes puberulous, at least when young. *S. pubescens*, *Wall. Cat.* 3226. *S. nepalensis*, *Don Prodr.* 177. *Amphiraphis pubescens*, *DC. Prodr.* v. 343.—Nipal to Khasia Mts.

12. DICHROCEPHALA, DC.

Annuals. *Leaves* alternate, toothed, lyrate or pinnatifid. *Heads* very small, paniced, heterogamous, globose or hemispheric, not rayed; outer fl. α -seriate, ♀, fertile, slender, rigid, 2-3-toothed or cleft; disk-fl. ♂, fertile, narrow, 4-5-toothed. *Anther-bases* truncate. *Style-arms* of ♂ short, flattened, tips lanceolate. *Achenes* compressed; pappus 0, or in ♀ of 2 minute bristles.—**DISTRIB.** Species 5, Asiatic and African.

* *Receptacle much elevated.*

1. **D. latifolia**, *DC. in Wight Contrib.* 11; *Prodr.* v. 372; annual, erect or spreading, glabrous pubescent or villous, leaves petioled ovate or lanceolate entire pinnatifid or lyrate, terminal lobe broadly ovate coarsely toothed, heads $\frac{1}{2}$ in. diam. globose, ray-fl. filiform curved obscurely toothed. *Dalz. & Gibs. Bomb. Fl.* 124; *Wight Ic.* t. 1096; *Clarke Comp. Ind.* 36. *D. gracilis* and *sonchifolia*, *DC. l. c.* 371, 372. *D. nilagirensis*, *Schultz-Bip. in Pl. Hohenack.* n. 1035. *Cotula sinapifolia*, *Roxb. Hort. Beng.* 63; *Fl. Ind.* iii. 437; *Wall. Cat.* 3237 excl. *D. C. bicolor*, *Roth Cat. Bot.* ii. 116. *C. latifolia*, *Pers. Syn.* ii. 464. *Grangea latifolia*, *Lamk. Ill.* t. 699. *Hippia bicolor*, *Smith in Rees Cyclop.* xviii. *Ethulia integrifolia*, *Don Prodr.* 182.

TROPICAL and SUBTROPICAL HIMALAYA; from Simla, alt. 9000 ft. to Sikkim, ascending to 8000 ft. KHASIA Mts., CACHAR, BIRMA and the MALAY PENINSULA. WESTERN PENINSULA; on the Ghats from Bombay southwards.—**DISTRIB.** Tropical and subtropical Asia and Africa.

A weed 12-24 in. high. *Leaves* very variable. *Heads* on slender divaricating peduncles, yellow or purplish. *Corolla* of the ♀ very slender, sometimes green and persistent. *Achenes* $\frac{1}{24}$ in., smooth.

2. **D. chrysanthemifolia**, *DC. in Wight Contrib.* 11; *Prodr.* v. 372; erect, stiff, pubescent or hispid, branches divaricate, leaves oblong or obovate coarsely serrate or pinnatifid, heads long-peduncled $\frac{1}{4}$ - $\frac{1}{3}$ in. diam. globose or oblong, ray-fl. short 4-fid. *Wight Ic.* t. 1095; *Clarke Comp. Ind.* 36. *D. oblongata*, *Bth. in Gen. Pl.* ii. 260. *D. tanacetoides*, *Schultz Bip. in Miq. Fl. Ind. Bat.* ii. 38. *D. grangeæfolia*, *DC. l. c.* 372.

WESTERN HIMALAYA, *Royle*; Simla, alt. 6-7000 ft., *Edgeworth, Thomson.* NILGHERY Mts., alt. 7000 ft., *Wight, &c.*—**DISTRIB.** Java, Trop. Africa.

Different in habit from *D. latifolia*, being very rigid, often hoary, with smaller leaves and larger heads on peduncles often 2 in. long. *Heads* purple. *Corolla* of ray-fl. shortly funnel-shaped, deeply 3-5-cleft.

3. **D. Hamiltoni**, *Hook. f.*; robust, sparsely pubescent, leaves sessile $\frac{1}{2}$ -amplexicaul obovate coarsely toothed, heads globose paniced shortly peduncled, corolla of ♀ fl. short, inflated mouth minute entire, ♀ very few funnel-shaped 4-fid, achenes cuneiform flattened, margins thickened. *Cotula sinapifolia*, *Roxb. Hort. Beng.* 62; *Wall. Cat.* 3237 D?. *C. dichrocephala*, *Clarke Comp. Ind.* 160.

ASSAM; at Metabo, *Hamilton*; Brahmaputra plains, *Herb. Calcutta*.

Annual, stem 6–10 in., much stouter than in any of the other species. *Leaves* 1–2 in., sparsely pubescent on both surfaces. *Heads* $\frac{1}{2}$ in. diam.; invol. bracts very short, obtuse, hidden under the ripe achenes; receptacle convex.

** *Receptacle slightly convex.*

4. **D. Benthamii**, *Clarke Comp. Ind.* 36; suberect with ascending branches pubescent, leaves obovate sinuately lobed or spatulate, heads $\frac{1}{2}$ in. diam. hemispheric.

KHASIA MTS.; alt. 3–5000 ft., *J. D. H. & T. T., Clarke*.

Habit of *D. latifolia*, but with so different a head and receptacle as almost to suggest generic separation. *Corolla* of ♀ fl. elongate, ovoid or suburceolate, minutely-toothed. —Clarke has erroneously described the ♀ as 3-fid. to the base, and stated that Bentham had confounded this with *D. chrysanthemifolia*.

13. CYATHOCLINE, *Cass.*

Erect, annual, odorous herbs. *Leaves* alternate, pinnatisect. *Heads* small, paniced, heterogamous, not rayed; outer fl. ∞ -seriate; ♀ fertile, filiform, 2-toothed; disk-fl. ♀, usually sterile, regular, 5-cleft. *Involucre* hemispheric; bracts sub-2-seriate, lanceolate, acute, margins scarious; receptacle with a contracted base, elevated, top concave, naked. *Anther-bases* truncate. *Style* exserted, of ♀ simple or cleft. *Achenes* minute, oblong, smooth; pappus 0. — *DISTRIB.* Species all Indian.

1. **C. lyrata**, *Cass.*; *DC. Prodr.* v. 374; sparsely hairy, branched, lower leaves obovate, upper or all pinnatifid, heads in small rounded paniced corymbs rose-purple. *Wight Ic. t.* 1098; *Clarke Comp. Ind.* 37. *C. stricta*, *DC. l. c.* 374. *C. Lawii*, *Wight in Calc. Journ. Nat. Hist.* 1846 pt. ii. 159, not of *Dalz.* *Tanacetum viscosum*, *Wall. Cat.* 3232. *T. purpureum*, *Don Prodr.* 181. *Artemisia hirsuta*, *Rottl.*; *Spreng Syst.* iii. 490, *fid. DC.*

WESTERN HIMALAYA; from Kashmir, alt. 1–4000 ft., and Kumaon, alt. 4–5000 ft., to Nipal, *Wallich*, and Bhotan, *Griffith*. OUDE, BEHAR, CHOTA NAGPORE, BENGAL, ASSAM, MUNNYPORE, GHITTAGONG, RANGOON, BURMA, and the WESTERN PENINSULA.

Stem 1–2 ft., soft. *Leaves* 1–5 in., segments toothed. *Heads* $\frac{1}{2}$ in. diam., yellow. —*C. Lawii* is merely a very slender form.

2. **C. lutea**, *Law mss.*; *Wight in Calc. Journ. Nat. Hist.* 1846, pt. ii. 158, t. 2, f. 1.; *Ic. t.* 1150; pubescent, stems many from the root slender 3–8 in., radical leaves linear bipinnatifid revolute cauline alternate, segments minute, heads few in subscorpioid cymes yellow. *Clarke Comp. Ind.* 37 (*C. flava* by error). *C. Lawii*, *Dalz. & Gibs. Bomb. Fl.* 124, not of *Wight*.

The CONCAN; on the Ghats, alt. 2–4000 ft., *Law, &c.*

A curious and very beautiful little plant, with stellately spreading radical leaves, 1–2 by $\frac{1}{2}$ in., and very numerous slender flexuous scape-like stems branched above, the branches bearing a few, small, yellow heads.

14. GRANGEA, *Forsk.*

Suberect or prostrate villous herbs. *Leaves* alternate, pinnatifid. *Heads* terminal or leaf-opposed, subglobose, not rayed, yellow; outer fl. 1– ∞ -seriate,

♀, fertile, filiform, outermost 2-fid., inner 2-4-fid.; disk-fl. ♂, fertile, tube very slender; limb campanulate, 4-5-cleft. *Involucre* broadly campanulate; bracts few-seriate, outer herbaceous; receptacle convex or conic, naked. *Anther-bases* obtuse. *Style-arms* of ♀ flattened, cuneate, obtuse or with triangular points. *Achenes* flattened or subterete; pappus cupular.—**DISTRIB.** Species 3 or 4 tropical Asia and Africa.

1. **G. maderaspatana**, Poir; *DC. Prodr.* v. 373; pubescent or villous, stems spreading from the root prostrate, leaves sinuately pinnatifid, heads solitary rarely 2-nate leaf-opposed shortly peduncled, pappus hairs connate into a cylindric fimbriate tube. *Wight Ic.* t. 1097; *Dalz. & Gibs. Bomb. Fl.* 124; *Clarke Comp. Ind.* 37. *Artemisia maderaspatana*, Roxb. *Hort. Beng.* 61.; *Fl. Ind.* iii. 412. *Cotula maderaspatana*, Willd. *C. sphæranthus*, Link *Enum.* ii. 344. *Grangea sphæranthus*, Koch in *Bot. Zeit.*, i. 41.

Throughout INDIA, from the Punjab eastwards and southwards.—**DISTRIB.** Tropical and subtropical Asia and Africa.

A common weed, growing flat on the ground, forming patches 6-12 in. broad, and more.

15. MYRIACTIS, Less.

Erect annuals. *Leaves* alternate, toothed. *Heads* loosely paniced or solitary, homogamous, white with a yellow disk, rayed; ray-fl. 2-∞-seriate, ♀, fertile, small, ligulate, ligules spreading or revolute; disk-fl. ♂, fertile, tubular, 5-fid. *Involucre* hemispheric; bracts few-seriate, narrow, margins scarious; receptacle broad, convex, naked. *Anther-bases* obtuse. *Style-arms* of ♀ narrow, flattened, tips lanceolate. *Achenes* compressed, margined; pappus 0.—**DISTRIB.** Species 1, or more, Asiatic and African.

1. **M. Wightii**, DC. in *Wight Contrib.* 10; *Prodr.* v. 308; pubescent or villous, leaves ovate or lyrate distantly serrate, upper lanceolate sessile, heads long-peduncled, invol. bracts acute villous, achenes shortly beaked. *Wight Ic.* t. 1091; *Clarke Comp. Ind.* 38. *M. javanica*, DC. l. c.; *Clarke l. c.*

NILGHERY MTS.; alt. 8000 ft. CEYLON; central province, alt. 5-8000 ft.

A weed 2-3 ft. high; stem rigid, branches divaricating. *Leaves* 1-4 in., petiole winged, upper auricled. *Heads* $\frac{1}{2}$ in. diam., on long strict peduncles.

VAR. bellidioides; hirsute, 4-6 in. high, leaves radical rosulate obovate-spathulate quite entire obtuse, heads solitary on a scape-like stem.—Nilgherry Mts., *Wight*.

2. **M. nepalensis**, Less.; *DC. Prodr.* v. 308; glabrous villous or hispid, leaves ovate or lanceolate coarsely serrate, heads subpaniculate, invol. bracts acute at length reflexed, achenes mucronate at the top not beaked. *Clarke Comp. Ind.* 38. *M. Gmelini*, DC. l. c. 309. *M. oleosa* and *M. gracilis*, *Edgew. in Trans. Linn. Soc.* xx. 65 and 66. *M. carnosa*, Wall. *Cat.* 3219. *Botryadenia Gmelini*, Fisch. & Mey. *Ind. Sem.* ii. 30; *Regel Sert. Petrop.* t. 23. *Lavenia dentata*, Wall. *Cat.* 3216 A.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 5-10,000 ft. KHASIA MTS., alt. 4-6000 ft.—**DISTRIB.** Central Asia.

A most variable weedy plant, of which I am quite unable to make satisfactory varieties; indeed, as Bentham suggests, it may be only a form of *Wightii*.

3. **M. Wallichii**, Less.; *DC. l. c.* 309; very slender, sparsely hairy, leaves elliptic-lanceolate unequally serrate, heads very small on slender pedicels. *Lavenia dentata*, Wall. *Cat.* 3216 B.

TEMPERATE HIMALAYA; Simla, Thomson. NIPAL, Wallich. SIKKIM, alt. 9-12,000 ft. J. D. H.

I can scarcely think this more than a slender small-headed form of *M. nepalensis*, but if more than one species is to be kept, this must be one of them.

16. **RHYNCHOSPERMUM**, Reinw.

A slender puberulous herb with long spreading branches. *Leaves* alternate. *Heads* small, axillary and in spreading leafy panicles, heterogamous, rayed; ray-fl. ♀, 2-3-seriate, fertile, shortly ligulate, white; disk-fl. ♂, fertile, tube short, limb campanulate 4-5-cleft. *Involucre* short; bracts in few series, lanceolate, margins scarious; receptacle flat, naked. *Anther-bases* obtuse or 2-lobed. *Style-arms* of ♀ flattened; tips short, broad, obtuse. *Achenes* compressed, beaked, beak short in the disk, longer in the ray; pappus of 3-5 caducous bristles or 0.

1. **R. verticillatum**, Reinw. mss.; *Blume Bijd.* 902; *Clarke Comp. Ind.* 39. *Leptocoma racemosa*, Less. in *DC. Prodr.* v. 280. *Lavenia rigida*, Wall. Cat. 3215. *Carpesium racemosum*, Wall. Cat. 3201, in part. *Zollingeria scandens*, Schultz-Bip. in *Flora*, 1854, 275.

TEMPERATE HIMALAYA; from Kashmir, alt. 5000 ft., to Sikkim, alt. 6000 and Bhotan. KHASIA MTS., alt. 5000 ft. BURMA.—DISTRIB. Malay Isld., Japan.

Stems 2-3 ft., branches very slender. *Leaves* 1-3 in., membranous, petioled, lanceolate, acuminate entire or coarsely toothed, narrowed into a very slender petiole. *Heads* $\frac{1}{2}$ in. diam., on short, rigid, stout, axillary often bracteate peduncles, often one in every axil along the branches.

17. **LAGENOPHORA**, Cass.

Scapigerous herbs. *Heads* small, solitary, heterogamous, rayed; ray-fl. ♀, 1-3-seriate, fertile; ligule white, long or short; disk-fl. ♂, often sterile, tubular, limb 5-cleft. *Involucre* short; bracts sub-2-seriate; receptacle convex, naked. *Anther-bases* obtuse, entire. *Style-arms* of ♂ narrow, flattened, tips triangular or lanceolate. *Achenes* of ray compressed, beaked, margins thickened; of disk similar, often narrower and sterile; pappus 0.—DISTRIB. Species 11-12 Australian, 1 Asiatic, 1 S. American, 1 Sandwich Isld.

1. **L. Billardieri**, Cass.; *DC. Prodr.* v. 307; pubescent, leaves radical or subradical oblong or obovate sinuate-toothed pubescent, scape slender. *Clarke Comp. Ind.* 173. *L. sundana*, Miq. *Fl. Ind. Bat.* ii. 32. *L. Harveyi*, *Thwaites Enum.* 162.

KHASIA MTS., alt. 5-6000 ft. CEYLON, central province, alt. 4-6000 ft.—DISTRIB. Malay Islds. China. Australia.

Rootstock with thick fibres. *Leaves* 1-2 in. *Scape* 3-4 in., slender. *Heads* $\frac{1}{2}$ in. diam.; invol. bracts linear; ligules white, short. *Achenes* obovoid oblong, beak glandular.—I follow Bentham and Clarke in reducing the Indian species to the Australian, though differing greatly in the size of the head.

18. **BRACHYCOME**, Cass.

Branched or scapigerous herbs, with the character of *Lagenophora*, except that the ray-flowers are 1-seriate, and that there is sometimes a scanty paleaceous pappus.—DISTRIB. About 40 species, Australian and New Zealand, with one S. African.

1. **B? assamica**, *Clarke Comp. Ind.* 40; glabrous, almost shrubby, branches sharply angled, leaves alternate sessile linear dilated upwards, heads small terminal solitary, invol. bracts elliptic or ovate margins scarious. achenes terete striate narrowed above and beaked, pappus 0. ? *Synanthera*, Wall. Cat. 7134. ? *Epaltes linearifolia*, *DC. Prodr.* v. 461. *Ethulia divaricata*, Wall. Cat. 98, ex *DC.*

UPPER ASSAM; in the Dihong river, on stones,

I know nothing of this plant, which exists only in the Calcutta Herbarium, where Clarke described it. The shape of the achenes differs altogether from that of *Brachycome*. Wallich's 7134 is a plant of Finlayson's, no doubt from Siam; it is a mere scrap, the ray-fl. are in one row, and the achenes are truncate and glandular at the tip. *Ethulia linearifolia* is a Prome species of which there is no specimen in Wallich's Herbarium; it is probably the Prome plant marked "C. Prome" in Wallich's Catalogue, where the No. 98, placed under 2988, is the numbering of the *Compositæ*.

19. **BOLTONIA**, *L'Her.*

Perennial erect herbs. *Leaves* alternate. *Heads* heterogamous, rayed; ray-fl. ♀, 1-2-seriate, ligule white; disk-fl. ♀, fertile, tubular; limb elongate, 5-cleft. *Involucre* hemispheric; bracts few-seriate, lanceolate, outer smaller; receptacle conic or convex. *Anther-bases* obtuse, entire. *Style-arms* of ♀ flattened; tips short, lanceolate. *Achenes* compressed, margins thickened or winged, faces plane or 3-ribbed or -winged; pappus very short subpaleaceous with sometimes 2-∞ hairs added.—Species 12, N. American and N. subtropical Asiatic.

1. **B. indica**, *Benth. Fl. Hongk.* 174; scaberulous, leaves small oblong-lanceolate entire or subserrate, heads terminal on leafy branches small, invol. bracts 2-3-seriate, pappus scales minute connate below awned. *Kurz in Journ. As. Soc.* 1877, ii. 193; *Clarke Comp. Ind.* 40. *Asteromæa indica*, *Blume Bijd.* 901; *DC. Prodr.* v. 303. *Calimeris integrifolia*, *Turcz. in DC. l. c.* v. 259. *Hisutsua cantoniensis*, *DC. l. c.* vi. 44. *Chrysanthemum cuneatum*, *Roxb. Fl. Ind.* iii. 436. *Calistemon indicum*, *Don in Loud. Hort. Brit.* 348. *Aster indicus*, *Linn.*

UPPER BIRMA, Khakyen hills, *J. Anderson* (cult. ?).—DISTRIB. China, Malay Isld.

Clarke doubts this being a native of the habitat assigned above, which is further beyond the limits of this Flora; it is, however, so likely to occur in India proper, that it is best to retain it.

20. **ASTER**, *Linn.*

Herbs or shrubs. *Leaves* alternate. *Heads* solitary corymbose or panicled, heterogamous, rayed (rarely discoid); ray-fl. ♀, 1-2-seriate, fertile; ligule elongate, white blue or purple; disk-fl. ♀, fertile, tubular, yellow, 5-cleft. *Involucre* campanulate or hemispheric; bracts few- or many-seriate, outer smaller or larger; receptacle flat or convex. *Anther-bases* obtuse, entire. *Style-arms* of ♀ flattened, tips lanceolate long or short. *Achenes* compressed, faces with 1-3 ribs or 0; pappus-hairs few or copious, scabrid, outer sometimes shorter rigid and paleaceous.—DISTRIB. Species about 200, chiefly of N. temperate regions.

Aster Amellus, L., is cultivated in Indian gardens, as is the China Aster *Callistephus chinensis*, *Nees* (*Clarke Comp. Ind.* 41). There are no natural limits between the sections of this genus, and some of the Indian species of *Erigeron* may be referable to it, there being no good distinguishing characters for the latter genus.

SECT. I. *Invol. bracts* in few series; outer large green obtuse.—Heads corymbose; stems leafy; leaves sessile.

1. **A. Pseudamellus**, *Hook. f.*; scaberulous, stems simple below slender leafy, leaves sessile oblong acute or obtuse entire or toothed nerves indistinct, branches of corymb slender usually with many elliptic leaves, heads $1\frac{3}{4}$ in. diam., outermost invol. bracts oblong green larger than the inner.

WESTERN HIMALAYA, *Jacquemont*; Kumaon, alt. 8-9000 ft., *Thomson*. Lahul, *Jaeschke*.

Stems 8–18 in., many, stiff, ascending from a woody perennial stock. *Leaves* 1–2½ by ½–¾ in., green, uniform on the stem, with very obscure nerves on both surfaces. *Ligules* 12–16, ½–¾ in., narrow. *Achenes* ⅙ in., pubescent; pappus rather longer, hairs few, slender, white.—Very like *A. Amellus*, L., but differing in the large outer invol. bracts.

SECT. II. *Invol. bracts* in few series herbaceous.—Heads large, solitary, rarely 2–3 on a stem.

2. ***A. himalaicus***, *Clarke Comp. Ind.* 43; laxly villous, stems leafy ascending, radical leaves persistent petioled obovate-spathulate entire or toothed, cauline oblong ½-amplexicaul, heads solitary, outer invol. bracts broadly lanceolate leafy recurved, ligules 40–50 very narrow, achenes silky, pappus single white. *Diplopappus elegans*, *Herb. Ind. Or. Hf. & T. in part.*

SIKKIM HIMALAYA, alt. 13–15,000 ft., *J. D. H.*; *Clarke*.

A small robust species when alpine, 12–18 in. in lower localities, with a single head, a very leafy involucre and numerous ligules. *Leaves* 1–2 in.; petiole of radical sometimes very long. *Heads* 1½ in. diam. *Achenes* ⅙ in.; pappus rather longer.

3. ***A. tricephalus***, *Clarke Comp. Ind.* 43; puberulous, stems erect leafy, radical leaves deciduous petioled obovate-spathulate, cauline oblong ½-amplexicaul, heads 1–3, outer invol. bracts numerous narrow longer than the inner, ligules 40–50 very narrow. Achenes pubescent, pappus simple reddish. *Diplopappus elegans*, *Herb. Ind. Or. Hf. & T. in part.*

SIKKIM HIMALAYA, alt. 10–14,000 ft., *J. D. H.*; *Clarke*.

Clarke suggests the possibility of this being a more developed form of *A. himalaicus*, and this I supposed it to be when I found it in Sikkim; but besides being taller, the invol. bracts are narrower, and the pappus hairs red and much stouter.

4. ***A. Stracheyi***, *Hook. f.*; dwarf, stoloniferous, pubescent or villous, radical leaves obovate-spathulate with few distant teeth, scapes ascending one- or few-leaved, heads solitary, invol. bracts few linear-oblong membranous acuminate, ligules 30–40, achenes pubescent or silky, pappus simple reddish. *Heterochæta* sp., *Herb. Str. & Wint.*

WESTERN ALPINE HIMALAYA; Kumaon, *Wallich*; Pindari, alt. 12,000 ft., *Str. & Wint.*, *Stewart*.

A remarkable little species, with a rambling often branching rootstock, and short ascending scape or stem. *Leaves* 1–2 in., coarsely serrate or lacinate. *Heads* ¾ in. diam.; ligules about ½ in. *Achenes* and pappus much as in the preceding, but more silky.

5. ***A. Heterochæta***, *Benth. in Gen. Pl.* ii. 272; tomentose or woolly, stemless or stem erect leafy, radical leaves obovate or oblanceolate entire acute, cauline 1–2 oblong ½-amplexicaul, heads solitary very large, outer invol. bracts linear-lanceolate acuminate, ligules 50–60, achenes ½ in. glabrate, pappus white or reddish double, outer very short paleaceous. *Clarke Comp. Ind.* 44. *A. alpinus*, *Thoms. in Herb. Ind. Or. Hf. & T.* *Heterochæta asteroides*, *DC. Prodr.* v. 282.

ALPINE HIMALAYA and WESTERN TIBET, alt. 14–18,000 ft.—DISTRIB. Altai Mts.

A variable plant (annual?) closely resembling the European *A. alpinus*, but differing from it and from the preceding species in the double pappus.—There has been great confusion in the distribution of the single-flowered Himalayan *Asters* and *Erigerons* collected by Dr. Thomson and myself, and which have in various herbaria been named *Aster alpinus*, *himalaius*, and *elegans*, *Diplopappus elegans* and *Erigeron multiradiatus*. The true *A. alpinus*, though Siberian and Central Asiatic, is not known to be Himalayan; and I fail to recognise Clarke's "*A. elegans*, Hf. & T.," described by him at Calcutta as from Sikkim. I find no species having biseriata pappus together with very silky achenes except *A. diplostephioides*.

6. **A. tibeticus**, *Hook. f.*; pubescent or slightly villous, slender, erect, sparingly leafy, radical leaves petioled lanceolate or oblanceolate obtuse or acute quite entire, cauline sessile linear-oblong obtuse, heads solitary rarely 2-3, outer invol. bracts linear acute pubescent or villous, achenes glabrescent, pappus double white, outer hairs very few short subulate.

WESTERN HIMALAYA and TIBET, *Jacquemont*; Piti, Hanli Plains and Pangong Lake, alt. 15-16,000 ft., in salt grassy plains, *Thomson, H. Strachey*; Laptal (N. of Kumaon), alt. 15,000 ft., *Str. & Wint.* (Diplopappus, No. 2.); Karakoram, alt. 14-15,000 ft., *Clarke*.

Perennial, 4-12 in. high. *Leaves* small, radical 1-2 in. including the petiole. *Heads* 1-2 in. diam.; *ligules* very many, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, bright blue. *Achenes* very small, flat, $\frac{1}{12}$ in.; *pappus* $\frac{1}{2}$ in., hairs few slender.

7. **A. diplostephioides**, *Benth. in Gen. Pl. ii.* 272; erect, robust, villous, stem simple leafy, leaves sessile erect lanceolate or oblong-lanceolate acute quite entire, lower narrowed at the base, heads solitary 3 in. diam., invol. bracts lanceolate leafy, outer often very long, ligules very long and narrow, achenes silky, pappus reddish, outer very short white. *Clarke Comp. Ind.* 45. *Heterochaeta diplostephioides*, *DC. Prodr. v.* 282. *Diplopappus diplostephioides*, *Herb. Ind. Or. Hf. & T. in part.*

ALPINE HIMALAYA; Kashmir, alt. 8600-11,500 ft., *Falconer, &c.*; Wurdwan, *Lance*; Kunawur, alt. 14,000 ft., *Thomson*; Kumaon, alt. 13,000 ft., *Str. & Wint.* (*Stenactis* sp. 3); Sikkim, alt. 16,000 ft., *J. D. H.*

A very handsome species, 12-18 in. high. *Leaves* 2-3 in. *Invol. bracts* sometimes 1 in.; *ligules* very many. *Achenes* $\frac{1}{8}$ in., and pappus no longer than in the preceding.—*Thomson's* Kumaon specimens have broader leaves than the others; *Falconer's* Kashmir ones are more leafy. *Aitchison* says the roots are used by the Kashmiris for washing clothes.

SECT. III. *Invol. bracts* in few or many series, narrow, dry or scarious, rarely herbaceous.—*Heads* small, corymbose or solitary.

8. **A. molliusculus**, *Wall. Cat.* 2972; pubescent or sparsely villous, stems many erect or ascending from a woody rootstock leafy, leaves subsessile linear elliptic or obovate-oblong entire or toothed, heads long-peduncled solitary, invol. bracts linear-lanceolate acuminate, ligules very many short slender, achenes silky, pappus reddish, outer very short white. *Clarke Comp. Ind.* 45. ? *A. scaposus*, *Klatt in Sitz. Münch. Akad.* 1878, 84 *Diplopappus molliusculus*, *Lindl. in DC. Prodr. v.* 277. *Hersilia simplex*, *Klotzsch in Pr. Wald. Reis. Bot.* 75, t. 73.

WESTERN HIMALAYA; from Kumaon to Kashmir, alt. 5-8000 ft. TIBET (N. of Kumaon), alt. 15,000, *Str. & Wint.* (Diplopappus, No. 3), and of Sikkim, *J. D. H.*

Stems sometimes branched, 4-12 in., slender, rigid. *Leaves* $\frac{1}{2}$ -1 in., acute or obtuse, glabrous or scaberulous. *Heads* rarely 2-3, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; *ligules* 20-30, revolute when dry. *Achenes* $\frac{1}{8}$ in.; *pappus* rather longer.—*Tibetan* specimens are short, prostrate, with linear leaves and larger flowers. It is difficult (if possible) to distinguish this from *Erigeron multiradiatus*.

9. **A. altaicus**, *Willd. Enum. Hort. Berol.* 881; rigid, scaberulous, stem grooved much branched leafy, leaves sessile linear or oblong obtuse quite entire, heads solitary subcorymbose, invol. bracts linear-lanceolate acuminate, achenes silky, pappus single reddish. *Clarke Comp. Ind.* 46; *Boiss. Fl. Orient.* iii. 158. *A. angustifolius*, *Lindl. in Royle Ill.* 251, t. 58, f. 1. *A. spartioides*, *Clarke l. c.* *Callimeris altaica* and *canescens*, *Nees Aster.* 228, 229; *DC. Prodr. v.* 258, 259. *Hersilia ramosa*, *Klotzsch in Pr. Wald. Reis. Bot.* 75, t. 73. *Galatella juncea*, *Lindl. in Royle Ill.* 251, t. 58.

WESTERN HIMALAYA; Lahul and Kashmir, alt. 9-13,000 ft., *Jaeschke, &c.*;

KUMAON and WESTERN TIBET, alt. 11-14,000 ft., *Falconer, &c.*—DISTRIB. Affghan and Beluchistan, Central Asia, Altai Mts., China.

Stem 2-3 ft. and branches slender, green. *Leaves* $\frac{1}{2}$ -2 in., sometimes contracted at the base, nerves very obscure. *Heads* $\frac{1}{4}$ - $\frac{2}{3}$ in. diam., peduncled or sessile; invol. bracts $\frac{1}{4}$ in.; ligules 20-30, short, blue, revolute when dry, sometimes 9. *Achenes* $\frac{1}{8}$ in.; pappus rather longer.—Lindley's *Galatella juncea* is founded on a cultivated specimen of this from the Saharunpore Bot. Gardens, which is glabrous with linear leaves and rounded branches; the achenes are immature, and I do not recognise the difference from those of *altaicus* pointed out by Clarke. A young specimen of *A. altaicus* from Beloochistan presents the same characters.

10. **A. trinervius**, *Roxb. Hort. Beng.* 61; *Fl. Ind.* iii. 433; glabrous or scaberulous, slender, leafy, leaves sessile or petioled lanceolate obtuse acute or acuminate coarsely serrate, heads corymbose, invol. bracts linear obtuse or acute, ligules 12-15 short, achenes hairy, pappus reddish with a few short slender outer hairs. *Don Prodr.* 177. *A. scabridus*, *Hook. f. & Thoms. Herb. Ind. Or.; Clarke Comp. Ind.* 47. *A. Benthami*, *Steetz in Seemann Bot. Herald.* 385. *A. asperimus*, *Wall. Cat.* 2970. *Diplopappus asperimus*, *DC. Prodr.* v. 277 (*excl. syn. Roxb.*). *Galatella asperima*, *Nees Aster.* 173. *Diplopappus laxus*, *Benth. in Hook. Lond. Journ. Bot.* i. 487.

CENTRAL AND WESTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 5-7000 ft. MISHMI Mts. *Griffith.* KHASIA Mts., alt. 3-6000 ft.—DISTRIB. Japan, N. China.

Stem 2-3 ft., rarely almost glabrous, grooved, sometimes almost hispid. *Leaves* 1-4 in., very variable, rarely oblong and obtuse, base rounded or acute, usually scabrid on both surfaces. *Heads* $\frac{1}{2}$ - $\frac{1}{2}$ in. diam.; ligules 10-12, white, narrow. *Achenes* $\frac{1}{10}$ in.; pappus $\frac{1}{2}$ in.

11. **A. sikkimensis**, *Hook. f. & Thoms. in Bot. Mag.* t. 4557; erect, leafy, glabrous or puberulous, branches terete flexuous, leaves large sessile or short-petioled lanceolate acuminate entire or subserrate membranous, heads many small corymbose, invol. bracts linear acuminate, achenes hispid 4-ribbed, pappus single white or reddish. *Clarke Comp. Ind.* 42.

EASTERN NIPAL AND SIKKIM, alt. 6-12,000 ft., *J. D. H.*

Stems 3-4 ft., much branched, soft. *Leaves* 3-7 by $\frac{3}{8}$ -2 in., narrowed into the broad short $\frac{1}{2}$ -amplexicaul petiole, membranous. *Heads* $\frac{3}{4}$ in. diam., very numerous, on glabrous or very pubescent branches; peduncles slender or stout; ligules very many, blue. *Achenes* $\frac{1}{12}$ in.; pappus $\frac{1}{2}$ in.

SECT. IV. *Invol. bracts* narrow or broad.—Tall herbs with large leaves, corymbosely branched stems above, the branches bearing single, rarely corymbose very large heads.

12. **A. Thomsoni**, *Clarke Comp. Ind.* 48; laxly villous, erect, branched, leaves subsessile broadly ovate acuminate coarsely serrate, heads few large long-peduncled, invol. bracts linear-lanceolate acuminate, achenes hairy, pappus single much shorter than the corolla reddish, hairs subulate. *Callimeris flexuosus*, *Royle in DC. Prodr.* v. 258; *Royle Ill.* 251, t. 58, f. 2.

WESTERN HIMALAYA; from Nipal to Kashmir, alt. 7-10,000 ft.

An erect laxly branched herb, with flaccid hairs; branches slender, flexuous. *Leaves* 2-4 by 1-2 $\frac{1}{2}$ in., membranous, base contracted and $\frac{1}{2}$ -amplexicaul. *Heads* solitary, 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in. diam.; invol. bracts herbaceous; ligules 20-30, $\frac{1}{2}$ - $\frac{3}{4}$ in. long. *Achenes* $\frac{1}{8}$ - $\frac{1}{6}$, much longer than the pappus.

13. **A. asperulus**, *Nees Aster.* 281; laxly hairy or glabrate, erect, branched, leaves petioled ovate or lanceolate acuminate coarsely serrate, heads few large on slender peduncles, invol. bracts linear or lanceolate acuminate often long and leafy, achenes hairy, pappus hairs white or reddish equalling the corolla with a few short ones, *Wall. Cat.* 2968. *A. peduncularis*, *Wall. Cat.*

2967; *Clarke Comp. Ind.* 48. *Diplopappus asperulus* and *Amphiraphis peduncularis*, *DC. Prodr.* v. 277, 344.

WESTERN HIMALAYA, alt. 4–9000 ft.. from Chumba to Kumaon.

Very similar in habit and hairiness to *A. Thomsoni*, but readily distinguished by the (usually winged) petioles and pappus. The heads vary greatly in size, from $\frac{2}{3}$ –1 $\frac{1}{2}$ in., and the invol. bracts from short narrowly linear with scarious edges, to nearly 1 by $\frac{1}{4}$ in., green and leafy, and the pappus from white to red.

14. **A. Laka**, *Clarke Comp. Ind.* 49; stems short stout simple from a woody tomentose rootstock, leaves with broad sheath-like petioles, ovate or cordate acute coarsely toothed, heads large solitary on stout peduncles, invol. bracts very large ovate obtuse leafy, achenes hairy, pappus hairs white or reddish equalling the corolla.

WESTERN HIMALAYA; at Laka, near Dhurmsala, alt. 10–11,000 ft., *Edgeworth; Clarke*.

A remarkable species, evidently allied to *A. peduncularis*, of which it has the flowers, achenes and pappus, but only 6–8 in. high, with simple stout ascending stems, broader leaves with sheath-like petioles, and very broad obtuse invol. bracts.

EXCLUDED SPECIES.

A. NITIDULUS, *DC. in Wight Contrib.* 9; *Prodr.* 247; is founded on an American cultivated plant, probably *A. laevis*, Willd.

A. AUREUS, *Don Prodr.* 178, with a yellow ray, cannot belong to the genus.

21. **BRACHYACTIS**, *Led.*

Annual or perennial herbs. *Leaves* alternate. *Heads* solitary, axillary or few in leafy panicles, heterogamous, rayed; ray-fl. ♀, 1–∞-seriate, fertile; ligule minute, bluish or rosy; disk-fl. ♂, fertile, tubular, limb 5-cleft. *Invol. bracts* half as long as the flowers, 2–3-seriate, narrow, outer often leafy; receptacle flat, naked or pitted. *Anther-bases* obtuse, entire. *Style-arms* of ♀ narrow, flattened, tips narrowly lanceolate. *Achenes* narrowly obovate, quite flat; pappus-hairs sub-2-seriate, outer shorter.—*DISTRIB.* Species 6, N. American, Central Asian, Siberian, and the Himalayan.

1. **B. menthadora**, *Benth. in Hook. Ic. Pl.* xii. t. 1106; tall, erect, glandular-pubescent, root perennial, leaves oblong-lanceolate or ovate serrate upper sessile $\frac{1}{2}$ -amplexicaul, lower long-petioled, recept. not pitted, ligules longer than their styles. *B. indica*, *Clarke Comp. Ind.* 49. *Erigeron anomalum*, *DC. Prodr.* v. 293.

ALPINE HIMALAYA; Kashmir, Sind valley, alt. 12,000 ft., *Clarke*; Sikkim, alt. 10–13,000 ft., *J. D. H.*, &c.

Stem stiff, 1–2 ft.; branches short, erect. *Leaves* 1–2 in., cauline decurrent. *Heads* $\frac{1}{2}$ – $\frac{2}{3}$ in. diam., chiefly towards the tips of the stem or branches; invol. bracts few, linear, pubescent, 1–2 outer often much larger and leafy; fl. pale blue. *Achenes* $\frac{1}{10}$ in., nearly glabrous, margins thickened; pappus $\frac{1}{8}$ in. reddish.—Whole plant smells like mint, but more sweetly.

2. **B. umbrosa**, *Benth. in Hook. Ic. Pl.* under t. 1106; small, annual, glandular and villous, leafy, branched from the base, leaves obovate lobulate or cuneate narrowed into the petiole, ligules minute. *B. wangtuensis*, *Clarke Comp. Ind.* 61. *Conyza umbrosa*, *Karel & Kiril. in Led. Fl. Ross.* ii. 498. *O. Roylei*, *DC. Prodr.* v. 381. *Vernonacea*, *Griff. Itin. Notes*, 322, n. 1259.

WESTERN HIMALAYA and TIBET; from Kashmir to the Karakoram, alt. 8–12,000 ft.; Lahul, *Jaeschke*.—*DISTRIB.* Alatau Mountains. Afghanistan.

Branches 4–8 in., rarely more, ascending, leafy. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in. *Heads* many, $\frac{1}{2}$ in. diam., often one in every leaf-axil, sessile or long-peduncled. *Achenes* $\frac{1}{11}$ in.,

sparingly silky; pappus scanty, $\frac{1}{8}$ in. long, reddish.—In luxuriant specimens the leaves are 2–3 by $1-1\frac{1}{2}$ in. and very membranous.

3. **B. robusta**, *Benth. in Hook. Ic. Pl. under t. 1106*; stout, annual, glandular-pubescent, erect, branched, leaves obovate toothed narrowed into a short petiole, receptacle broad. *Conyza pubescens*, *DC. Prodr. v. 381*.

WESTERN HIMALAYA, alt. 4–14,000 ft., from Kashmir to Kumaon and Gurwhal, *Falconer, Edgeworth, &c.* WESTERN TIBET, alt. 12–14,000 ft., *Thomson, &c.*

Possibly only a large form of *B. umbrosa*, the heads are $\frac{1}{2}$ in. diam., but the achenes and pappus are no longer.

22. ERIGERON, *Linn.*

Characters of *ASTER*, but ray-flowers usually in several rows with very slender short or long ligules, and the achenes narrower. *Pappus* often double, the outer of a few short hairs or bristles.—*DISTRIB.* Species about 100, chiefly natives of N. Temp. regions, extremely variable and difficult to discriminate from one another, and certain of them from species of *Aster*.

E. linifolius, *Willd. (Boiss. Fl. Orient. iii. 169)*, is found as an escape, or a garden weed, in the Punjab and elsewhere. It is a stout erect hirsute herb, with leafy stem and branches, the leaves are close-set, $2-2\frac{1}{2}$ by $\frac{1}{8}-\frac{1}{2}$ in., serrated here and there, the numerous peduncled heads are subpaniculate and $\frac{3}{8}-\frac{1}{2}$ in. in diam. It is the *Conyza angustifolia* of Thwaites *Herb. (C. P. 3928)* but not of Hamilton.

1. *Species of the tropical region.*

1. **E. canadensis**, *Linn.; Boiss. Fl. Orient. iii. 163*; annual, very slender, much branched above, pubescent hirsute or nearly glabrous, leafy, leaves narrow linear or linear-lanceolate entire or toothed, heads $\frac{1}{8}-\frac{1}{4}$ in. diam. peduncled in elongated branched panicles, invol. bracts narrow glabrate, ligules erect pink, pappus dirty white.

WESTERN HIMALAYA and the PUNJAB, ascending to 3000 ft. *ROHILKUND, Thomson.*—*DISTRIB.* All warm countries, assumed to be a native of N. America.

Stem 6 in.–3 ft. and branches erect, more slender than in any other Indian species, and the heads smaller. *Invol. bracts* acuminate; ligules pale rosy or purplish, scarcely exceeding the pappus. *Achenes* $\frac{1}{8}$ in. narrow, flat, nearly glabrous; pappus $\frac{1}{8}$ in.

2. **E. asteroides**, *Roxb. Fl. Ind. iii. 432*; pubescent or villous, branched, radical leaves obovate petioled cauline obovate or oblong $\frac{1}{2}$ -amplexicaul all toothed or lobulate, heads $\frac{1}{4}-\frac{1}{2}$ in. peduncled solitary or subcorymbose, ligules capillary blue rather longer than the reddish or dirty white pappus. *Wall. Cat. 3052 A. E. hispidum, DC. in Wight Contrib. 9; Prodr. v. 292; Clarke Comp. Ind. 54. E. sublyratum, Roxb. in DC. l. l. c. c.; Clarke l. c. 55, 301. E. hirsutum, Wall. Cat. 2976. E. ægyptiacum, Kurz in Journ. As. Soc. 1877, ii. 193. Conyza graveolens, Wall. Cat. 3106. C. ægyptiaca, Herb. Ind. Or. Hf. & T., not of Ait. C. Jerdoni, Clarke Comp. Ind. 62.*

TROPICAL HIMALAYA; Nipal, *Wallich*; Sikkim, ascending to 4000 ft., *J. D. H. BENGAL and the WESTERN PENINSULA.*

A coarse annual, 1–2 ft. high, erect, or in a dwarf state decumbent, closely resembling *Conyza ægyptiaca*. *Cauline-leaves* $\frac{1}{2}$ –1 in., numerous. *Invol. bracts* 1–2-seriate, very narrow with hair points, much shorter than the pappus. *Achenes* very minute, $\frac{1}{30}$ in., nearly glabrous, flat, pale.—*Blumea pubiflora*, under which Roxburgh's *E. asteroides* is quoted by DC. as a synonym, appears from the description to be a true *Blumea*, but of *Wallich's 2975 Erigeron asteroides, Roxb.* also quoted under the same

plant, there is no specimen in the Wallichian Herbarium, nor is there of *Conyza graveolens* (Wall. Cat. 3106, Herb. Madr.), which is referred by DC. to *E. hispidum*.

2. *Species of the temperate and Alpine regions.*

3. *E. andryaloides*, Benth. in Herb. Kew; perennial, densely softly tomentose or woolly, leaves petioled spatulate entire or lobulate, heads $\frac{2}{3}$ in. diam. on a very naked scape-like stem, invol. bracts linear acute, ligules short broad revolute, pappus white then reddish. Clarke Comp. Ind. 52. *Conyza andryaloides*, DC. Prodr. v. 377.

WESTERN HIMALAYA; Lahul and Kunawur, Royle, &c. WESTERN TIBET, alt. 9-18,000 ft., Falconer, &c.

Rootstock woody, very stout. Leaves 1-2 in., densely crowded. Scapes $\frac{1}{2}$ in., with one or two small linear leaves or 0. Invol. bracts woolly or pubescent. Achenes $\frac{1}{2}$ in. flat narrow silky; pappus rather longer, 1-seriate.

4. *E. monticolus*, DC. Prodr. v. 286; perennial, glabrous or sparsely hairy, leaves petioled, radical rosulate obovate-lanceolate acute subentire, heads solitary or few on a slender scape-like stem, ligules many twice as long as the pappus. Wall. Cat. 2977.

TEMPERATE AND ALPINE HIMALAYA; Nipal, Wallich; Kumaon, Strach. & Winterb.

In its usual form a scapigerous plant, but sometimes branching, and then apparently passing into *E. bellidioides*.

5. *E. alpinus*, Linn; Boiss. Fl. Orient. iii. 165; biennial or perennial, hispidly hairy or glabrate, radical leaves petioled spreading obovate or oblong-obovate, cauline usually sessile obovate or oblong, heads solitary or corymbose $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., invol. bracts pubescent tomentose or woolly, ligules rarely exceeding the length of the reddish pappus, achenes sub-silky. E. acre, Clarke Comp. Ind. 52; Herb. Ind. Or. Hook. f. & T.

Throughout the TEMPERATE and ALPINE WESTERN HIMALAYA, the KHASIA and NILGHERY MTS.—DISTRIB. Mountains of the N. temp. zone.

I have in vain tried to draw any distinction between this common Himalayan *Erigeron* and *E. alpinus*, which is itself in my opinion only a form of *E. acris*; nor does the difficulty end here, for I find it almost as difficult to separate *E. bellidioides* and *multiradiatus* by any definite characters, whilst *E. monticolus* seems to pass into the *bellidioides* on one hand, and on the other, into *E. andryaloides*. The following varieties are not strictly definable, they represent prevalent forms.

VAR. 1. *alpinus proper*; hispid heads subsolitary $\frac{3}{4}$ in. diam., invol. bracts subulate-lanceolate, ligules longer than the pappus.

VAR. 2. *multicaulis*; more glabrous, stem much branched from the base, branches slender, heads rather small usually long-peduncled corymbose, pappus hairs scanty shorter ones very few. *E. multicaulis*, Wall. Cat. 3286; DC. Prodr. v. 292. Temperate and Alpine Himalaya, from Nipal westward and Western Tibet.

VAR. 3. *semibarbata*; more robust and hairy or hispid, leaves often 3-nerved, cauline $\frac{1}{2}$ -amplexicaul or narrowed at the base, heads 2-3 in. diam. few larger, peduncles often thickened at the top, the lateral often spreading, tube of ray-fl. with long hairs, ligules twice as long as the pappus. *E. semibarbatus* and ? *Roylei*, DC. Prodr. v. 292. Western Himalaya, abundant.

VAR. 4. *khassiana*; erect, hairy, stem usually unbranched below, radical leaves very crowded obovate-lanceolate, cauline sessile, heads few peduncled, ligules twice as long as the red rather copious pappus the shorter hairs of which are rather numerous. *E. bellidioides*, var. *khassiana*, Clarke Comp. Ind. 55. Khasia Mts., alt. 3-6000 ft., Bhotan, Griffith.

VAR. 5. *Wightii*; stout, hispid, stem usually unbranched below, radical leaves many oblong-lanceolate, cauline narrowed at the base, heads 2-3 in. diam. few long-peduncled, ligules as long as the copious pappus, shorter hairs rather numerous. E.

Wightii, *DC. Prodr.* v. 286; *Wight. Ic.* t. 1090. *E. multicaulis*, var. *madurensis* and *E. Leschenaultii*, *DC. l. c.* 292. Neilgherry Mts., alt. 7500 ft. Wight describes the achenes as glabrous, but figures them hispid.

VAR. 6. *uniflora*; subscapigerous, hirsute, radical leaves obovate-lanceolate, cauline linear-oblong, heads subsolitary, involucre woolly, bracts sometimes herbaceous and recurved, achenes about as long as the pappus. *E. acris*, var. *θ. erigeroides*, *Clarke Comp. Ind.* 54. *Heterochaeta erigeroides*, *DC. Prodr.* v. 282.—Alpine Western Himalaya and Tibet, alt. 10–17,000 ft.

6. *E. bellidioides*, *Benth. in Gen. Pl.* ii. 280; perennial, glabrous or nearly so, stem very slender grooved sparingly branched, radical leaves lanceolate acutely serrate, cauline sessile oblong or linear-oblong entire or crenate, heads $\frac{1}{2}$ in. diam. few long-peduncled, ligules thrice as long as the red pappus, shorter hairs few, achenes sub-silky. *Clarke Comp. Ind.* 55. *Aster bellidioides*, *Ham. in Don Prodr.* 177; *Wall. Pl. As. Rar.* ii. t. 101; *Cat.* 2978. *Stenactis bellidioides*, *Nees Aster.* 274.

CENTRAL and WESTERN HIMALAYA, from Kashmir to Nipal, alt. 5–10,000 ft.

This passes into slender forms of *A. alpinus*, var. *multicaulis*, but is usually distinct, and perhaps into *E. monticolus*.

7. *E. multiradiatus*, *Benth. in Gen. Pl.* ii. 280; hirsute or pubescent, erect, stem stout or slender simple or branched sparingly above, leaves all cauline obovate or lanceolate obtuse or acute entire or 1–2-toothed, heads 2–3 in. diam. solitary or few long-peduncled, ligules 2–3 times longer than the red pappus very numerous, short pappus hairs few, achenes $\frac{1}{2}$ in. nearly glabrous. *Clarke Comp. Ind.* 56. *Aster multiradiatus*, *Wall. Cat.* 2969. *A. inuloides*, *Don Prodr.* 178. *Stenactis multiradiata*, *Lindl. in DC. l. c.* 299. ? *Diplopappus* *Roylei*, *DC. Prodr.* v. 276.

TEMPERATE and ALPINE HIMALAYA, from Kashmir and Kumaon, alt. 7–9000 ft., and to Sikkim, alt. 9–12,000 ft.

The smaller states of this are difficult to distinguish from *E. alpinus*, var. *semi-barbata*, but the heads are larger, the ligules are very numerous, often $\frac{3}{4}$ in. long, and the involucre are broad and villous. The achenes resemble those of *E. alpinus*. In respect of the double pappus and habit this comes very near some Sikkim asters, especially *A. molliusculus*.

DOUBTFUL SPECIES.

E. AUGUSTISSIMUS, *Lindl. in DC. Prodr.* v. 286, is a doubtful plant. The Afghan plant of Griffith, doubtfully referred to by *Clarke Comp. Ind.* 51., is certainly not *Lindley's E. augustissimus*.

ERIGERON, sp.; hispid and glandular-pubescent, leaves 2–3 in. sessile obovate- or oblong-lanceolate acute entire or toothed, heads $\frac{3}{4}$ in. diam. crowded subglobose, invol. bracts linear, ligules rather longer than the yellowish pappus very numerous and narrow, achenes small unripe.—Mountains near Peshawur, *Stewart* (Afghanistan, Safed Koh, alt. 9000 ft., *Collett*).

23. MICROGLOSSA, DC.

Slender shrubs, sometimes climbing. *Leaves* alternate, quite entire. *Heads* small, corymbose or paniced, heterogamous; ray-fl. ♀, 1–∞-seriate, fertile, ligule minute, white; disk-fl. few or many, ♀, fertile, tubular; limb dilated, 3–4-fid. *Involucre* campanulate; bracts ∞-seriate, narrow, outer shorter; receptacle flat, naked or nearly so. *Anther-bases* obtuse, entire. *Style-arms* of ♂ flattened, tips long lanceolate. *Achenes* angled; pappus-hairs copious, slender, 1–2-seriate, rather unequal.—**DISTRIB.** About 6 Asiatic and African species.

1. **M. volubilis**, DC. *Prodr.* v. 320; subsucculent, branches grooved, leaves petioled ovate-lanceolate obscurely-toothed glabrous or pubescent beneath, heads $\frac{1}{2}$ in. diam. peduncled clustered on the branches of rounded corymbs, achenes compressed 4-angled puberulous, pappus $\frac{1}{2}$ in. red much longer than the minute achenes. *Clarke Comp. Ind.* 57; *Kurz For. Fl.* ii. 82. *Conyza volubilis*, Wall. *Cat.* 3057. *Erigeron pyrifolius*, Benth. *Fl. Hongk.* 176.

KHASIA MTS., ASSAM, NAGA HILLS, CACHAR, BURMA, and from PEGU to PENANG. —
DISTRIB. Malay Islds., China.

A rambling shrub. *Leaves* $1\frac{1}{2}$ – $2\frac{1}{2}$ in.; petiole very slender. *Heads* numerous, invol. bracts lanceolate; ligules very minute.

2. **M. albescens**, *Clarke Comp. Ind.* 59; erect, branches faintly grooved, leaves shortly petioled lanceolate acuminate quite entire or subserrate hoary beneath, heads $\frac{1}{2}$ in. diam. peduncled loosely clustered on the branches of a spreading corymb, achenes puberulous obscurely 5-angled, pappus red not longer than the achenes. *M. cabulica* and *M. Griffithii*, *Clarke Comp. Ind.* 57, 58. *Aster cabulicus*, Lindl. in *Bot. Reg.* 1843; *Misc.* 62; *Boiss. Fl. Orient.* iii. 158. *A. albescens*, Wall. *Cat.* 2974. *A. ferrugineus*, Edgew. in *Trans. Linn. Soc.* xx. 64. *Amphiraphis albescens*, DC. *Prodr.* v. 343. *Conyza conspicua*, Wall. *Cat.* 3066. *Homostylium cabulicum*, Nees in *Linnaea*, xviii. 513.

TEMPERATE HIMALAYA; from Kishtwar, alt. 7–9000 ft., to Sikkim, alt. 9–12,000 ft., and Bhotan.

A stouter plant than *M. volubilis*; leaves 2–3 in., narrowed into the short petiole; corymbs often 8 in. diam., with lilac conspicuous ligules.—The name *cabulicus*, founded on the mistaken supposition that the plant is a native of Afghanistan, must be abandoned.

3. **M. zeylanica**, Benth. in *Gen. Pl.* ii. 282; branches grooved and leaves beneath hoary, leaves narrowly lanceolate acuminate serrulate or entire, heads $\frac{3}{8}$ in. shortly peduncled crowded on the branches of a spreading corymb, ligules short suberect, pappus $\frac{1}{10}$ in. red twice as long as the hairy angled achenes. *Clarke Comp. Ind.* 58. *Amphiraphis zeylanica*, DC. *Prodr.* vii. 279. *Solidago zeylanicus*, Arn. *Pugill.* 9.

TRAVANCORE; Pulney Mts., Wight. CEYLON, abundant throughout the island, ascending to 6000 ft.

An erect shrub. *Leaves* 3–4 in., narrowed into a petiole of $\frac{1}{4}$ – $\frac{1}{2}$ in. *Heads* very numerous, small and crowded; invol. bracts very small, broadly linear, obtuse.

24. CONYZA, Less.

Herbs. *Leaves* alternate, entire, toothed or cut. *Heads* corymbose or paniced, rarely solitary, heterogamous, disciform; outer fl. \varnothing , 2– ∞ -seriate, filiform, rarely ligulate, 2–3-toothed, fertile, pale-cold; inner \varnothing , all or mostly fertile, yellow, tubular, limb 5-toothed. *Involute* campanulate; bracts 2– ∞ -seriate, narrow (except *C. rufa*), outer smaller; receptacle flat or convex, naked or pitted and fimbriate. *Anther-bases* obtuse, entire. *Style-arms* of \varnothing flattened, tips long or short. *Achenes* minute, compressed; pappus slender, 1-seriate.—
DISTRIB. Species 50, chiefly tropical and subtropical.

1. **C. semipinnatifida**, Wall. *Cat.* 3058; erect, villous or hirsute, leaves obovate-spathulate or oblanceolate acutely or obtusely lobed or cut, heads crowded $\frac{1}{4}$ in. diam. globose yellow, invol. bracts slender, achenes $\frac{1}{30}$ in. long glandular, pappus $\frac{1}{12}$ in. white. DC. *Prodr.* v. 382; *Clarke Comp. Ind.* 62.

SOONDERBUNDS, at Burisal, Clarke. BURMA, from Prome and Martaban southwards, on the banks of large rivers, Wallich, Kurz. UPPER ASSAM; Mishmi, Griffith.

Annual, 1–2 ft., stem stout. The Mishmi species is much less hairy than the Birma ones, with leaves more sharply toothed.

2. ***C. japonica*, Less.**; *DC. Prodr.* v. 383; erect, villous or woolly, rarely glabrate, leaves sessile obovate spatulate oblong or lanceolate serrate or crenate, heads $\frac{1}{2}$ in. diam. globose, invol. bracts lanceolate with scarious edges, achenes $\frac{1}{4}$ in. nearly glabrous, pappus $\frac{1}{2}$ in. reddish. *C. veronicaefolia*, *Wall. Cat.* 3005; *DC. l. c.* 382; *Clarke Comp. Ind.* 62. *C. stricta*, *Wall. Cat.* 3044; *C. multicaulis*, *DC. l. c.* 383. ? *C. petiolaris*, *DC. l. c.*; *Wall. Cat.* 3282 (no specimen in *Herb. Wall.*).

TROPICAL HIMALAYA; from Simla eastwards, and the KHASIA Mts., ascending to 5000 ft. PEGU and MARTABAN, ascending to 7000 ft., *Kurz.*—DISTRIB. Afghanistan, China and Japan.

Annual, 6–12 in., rarely more; stem often simple with well developed radical leaves. The Sikkim specimens are more slender and glabrous than any others.

3. ***C. ægyptiaca*, Ait.**; *DC. Prodr.* v. 382; erect, hirsute, leaves lanceolate or obovate-lanceolate unequally pinnatifidly lobed, lobes ascending, heads $\frac{1}{2}$ in. diam. crowded, invol. bracts lanceolate edges scarious, achenes $\frac{1}{30}$ in. sparingly hairy, pappus $\frac{1}{2}$ in. reddish. *Conyza hirsuta* and *asteroides*, *Wall. Cat.* 3007 B. partly and 3052 B. partly. ? *A. Jerdoni*, *Clarke l. c.* 62.

TROPICAL WESTERN HIMALAYA; Garwhal, *Falconer*; Kumaon, *Thomson.*—DISTRIB. Africa, China, Japan, Australia.

The more deeply cut leaves and larger heads, distinguish this from *C. japonica*. There are no materials for determining *C. Jerdoni*, which Mr. Clarke thinks is *ægyptiaca*.

4. ***C. viscidula*, Wall. Cat.** 3006; pubescent and glandular, stem tall corymbosely branched, leaves lanceolate narrowed at both ends entire or serrate, heads $\frac{1}{2}$ in. peduncled in loose corymbs, invol. bracts lanceolate edges scarious, achenes $\frac{1}{10}$ in. obovoid glabrous, pappus $\frac{1}{2}$ – $\frac{1}{4}$ in. reddish. *DC. Prodr.* v. 383; *Clarke Comp. Ind.* 63. *C. disticha*, *striata* and *travancorensis*, *Wall. Cat.* 3024, 3065, 3067; *DC. l. c.* 383, 384. *C. serrulata*, *Wall. Cat. sub.* 3024 B. *U. Wallichii*, *DC. l. c.* 384. *C. polycephala*, *Edgew. in Trans. Linn. Soc. xx.* 66.

SUBTROPICAL HIMALAYA, from Simla eastwards, ascending 4000 ft., and southwards to TRAVANCORE, CEYLON, and BIRMA.—DISTR. Philippine Islds., Java, New Caledonia, Australia.

Much the tallest and most branched of the Indian species, with very uniform leaves 2–4 in. long, and usually loosely cymose heads.

5. ***C. angustifolia*, Roxb. Hort. Beng.** 61; *Fl. Ind.* iii. 429; woody below, scaberulous, branches slender, leaves sessile long narrowly linear serrate, heads $\frac{1}{4}$ – $\frac{1}{2}$ in. in slender open peduncled cymes, invol. bracts lanceolate margins broad scarious, achenes minute sparsely silky, pappus $\frac{1}{10}$ in. reddish very caducous as a whole. *DC. Prodr.* v. 383; *Clarke Comp. Ind.* 63; *Ham. in Wall. Cat.* 3071.

SIKKIM HIMALAYA, alt. 2–4000 ft., *J. D. H.*, &c.

Roxburgh, who describes this from Calcutta Garden specimens, says it is annual 4–8 ft. high, with a simple erect stem; he did not know its native country, and probably procured it from Hamilton, whose specimens in Wallich's herbarium are called *angustifolia*. The Sikkim specimens are much smaller, 2–3 ft. Hamilton no doubt procured it from the foot of the Sikkim hills. A specimen of a very similar plant is in Griffith's Afghan Herbarium (n. 918), but it is too young for determination.

6. ***C. stricta*, Willd.**; *DC. Prodr.* v. 389; hoary or scaberulously pubescent, excessively corymbosely branched and leafy, leaves from narrowly linear to spatulate-obovate entire or toothed rarely pinnatifid, heads $\frac{1}{2}$ in. diam. extremely numerous peduncled corymbose, invol. bracts narrowly lanceolate,

achenes about $\frac{1}{40}$ in. puberulous, pappus $\frac{1}{16}$ in. reddish. *O. absinthifolia*, DC. in *Wight Contrib.* 16; *Prodr. l. c.* 383; *Clarke Comp. Ind.* 64; *Dalz. & Gibs. Bomb. Fl.* 124. *O. pinnatifida*, Roxb. *Hort. Beng.* 61; *Fl. Ind.* iv. 430. *Erigeron trisulcum* and *pinnatifidum*, Don *Prodr.* 171, 172. *Blumea trisulca*, DC. *l. c.* 440. *Baccharis trifurcata*, Trev. in *Nov. Act. Nat. Cur.* xiii. 201, t. 13.

SUBTROPICAL HIMALAYA; from Kashmir eastwards, ascending to 5000 ft. KHASIA MTS., alt. 2-6000 ft. BEHAR and the WESTERN GHATS to TRAVANCORE, PEGU and BURMA.—DISTRIB. Eastern Africa.

The excessively fastigiate branched and leafy habit of this species, and its minute heads, distinguish it from all others.

7. ***C. adenocarpa***, Dalz. & Gibs. *Bomb. Fl.* 125; pubescent and scabrous, stem rather woody below, leaves linear or oblong $\frac{1}{2}$ -amplexicaul entire or distantly toothed, heads $\frac{1}{2}$ in. diam. in terminal few-fl. corymbs, invol. bracts lanceolate acute, achenes $\frac{1}{40}$ in. glandular and puberulous, pappus $\frac{1}{10}$ in. reddish.

THE WESTERN DECCAN and the CONCAN, Dalzell; highest hills east of Bombay, Ritchie.

Apparently shrubby below, branches 6-10 in. high. Leaves 1-2 in., usually rounded at the apex, broad and 2-lobed at the base. Heads like those of *C. stricta*.

8. ***C. rufa***, Wall. *Cat.* 3079; tomentose or villous, branched from the base, branches spreading or prostrate, leaves sessile obovate or oblong-obovate or linear-oblong coarsely toothed, heads subglobose $\frac{1}{2}$ in. diam., invol. bracts broad ovate acute green with membranous margins, achenes $\frac{1}{36}$ in. pubescent with curled hairs, pappus $\frac{1}{2}$ in. reddish shining very caducous as a whole. DC. *Prodr.* v. 384; *Clarke Comp. Ind.* 65. *C. marginata*, Edgew. in *Trans. Linn. Soc.* xx. 67. *C. hirsuta*, Wall. *Cat.* 3007 B. partly.

Annual, corymbosely branched, branches 4-8 in. long. Leaves 1-2 in.—The broad invol. bracts with defined membranous margins distinguish this from all other Indian species.

EXCLUDED SPECIES.

C. SEERULATA, Wall. of *Clarke Comp. Ind.* 64, is not the plant of Wallich, and is altogether doubtful.

C. PATULA, Ait. *Hort. Kew* iii. 184; *Miller Icon.* t. 247; referred to as *Cyanopsis pubescens*, in DC. *Prodr.* v. 69, is probably a *Vernonia*. See *Eupatorium glabrum*, Wall. *Cat.* 3283, ex *Herb. Heyne* (*Decaneuron glabrum*, DC. *l. c.* 67), of which there is no specimen in Wallich's Herbarium.

25. **THESPIIS**, DC.

A branched glabrous annual. Leaves alternate, toothed. Heads minute, globose, sessile in globose clusters on the branches of dichotomous cymes, heterogamous, disciform, yellow; outer fl. ♀, many-seriate, often without corolla, fertile; disk-fl. ♂, few, regular, sterile, tube very short, limb narrowly campanulate 4-fid. *Involucre* hemispheric; bracts broad, obtuse, herbaceous, sub-2-seriate; receptacle flat or convex, naked. *Anther-bases* obtuse, entire or 2-fid. *Style-arms* short, flattened, subacute. *Achenes* of ♀ small, hardly ribbed; pappus-hairs about 10, short, dilated.

1. ***T. divaricata***, DC. *Prodr.* v. 375; *Deless. Ic. Sel.* iv. t. 20; *T. erecta*, DC. *l. c.*; *Clarke Comp. Ind.* 65. *Cotula sinapifolia*, Roxb. in Wall. *Cat.* 3237, G.

TRIPUR HIMALAYA; Nipal and Sikkim, Wallich, &c. EASTERN BENGAL, ASSAM, SILHET, CACHAR, BURMA and TENASSERIM.

A variable weed from 3 in. to 2 ft. high, robust with spreading branches. Leaves sessile or narrowed into a petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in., obovate, toothed. Heads $\frac{1}{2}$ in. diam.

TRIBE IV.—**INULOIDEÆ.**26. **BLUMEA**, DC.

Annual or perennial, glandular pubescent or woolly herbs. *Leaves* alternate, usually toothed or lobed. *Heads* corymbose paniced or fascicled, rarely racemed, heterogamous, disciform, purple rosy or yellow; outer fl. ∞ -seriate, ♀, fertile, filiform, 2-3-toothed; disk-fl. ♂, few, fertile, tubular, slender, limb 5-toothed. *Involucre* ovoid or campanulate; bracts ∞ -seriate, narrow, acute, soft or herbaceous, outer smaller; receptacle flat, naked. *Anther-bases* sagittate, tails small, slender. *Style-arms* of ♀ flattened or almost filiform, rarely connate with the adjoining anthers. *Achenes* small, subterete or angled, ribbed or not; pappus 1-seriate, slender, often caducous.—**DISTRIB.** Species about 60, tropical and subtropical Asiatic, African and Australian.

This genus is eminently characteristic of India, and the species may be called the Groundsels of that country. There is no more unsatisfactory genus than this; it is distinguished from *Laggera* only by the tailed anther-cells, and this is not a very constant character, the anthers of some states of *B. virens* having no tails, whilst forms of *Laggera* have them; Kurz, indeed, suggests (with much probability) that some *Laggers* are sexual forms of *Blumeas*. Clarke finds generally in *Blumea*, that functionally ♀ heads occur, the disk-flowers, though ♂ in form, having only rudimentary stamens, and that in the case of the common *B. oxyodonta* he has never found perfect ♂ flowers, nor has Kurz. The divisions of the Genus here proposed are most unsatisfactory, and I fear that the specific diagnoses are not much better. The glabrous or pubescent receptacle is very difficult to see; the size of the head is tolerably constant; the form and number of the invol. bracts are difficult to describe; the very minute achenes are tolerably uniform; the foliage is sportive to an extraordinary degree, as is the pubescence; gland-hairs are common to most species, but the amount varies with the dryness of the locality. I have not been able to follow Clarke's disposition of the species at all closely, they want a careful study *in situ*, and under cultivation.

SECT. 1. *Heads* few, small, $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., solitary or 2 and peduncled at the ends of the branches.—Small, annual herbs, erect or prostrate; flowers yellow.

1. ***B. amplexens*, DC. in Wight Contrib. 13; Prodr. v. 433;** sparsely softly hairy or glabrous, divaricate branches spreading from the base, leaves $\frac{1}{2}$ – $1\frac{1}{2}$ in. $\frac{1}{2}$ -amplexicaul oblong or obovate obtuse or acute coarsely toothed, heads solitary on the branchlets peduncled $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., invol. bracts very slender inner hair-pointed, recept. glabrous, corolla yellow, lobes of ♂ hairy, achenes oblong, pappus reddish. *Clarke Comp. Ind.* 71; *Dalz. & Gibs. Bomb. Fl.* 125; *Thwaites Enum.* 163 partly (*C. P.* 1730). *Conyza amplexens*, *Wall. Cat.* 3096. *C. obliqua*, *Willd. Sp. Pl.* iii. 1930. *C. amplexicaulis*, *Lamk. Dict.* ii. 84. *Erigeron obliquum*, *Linn. Mant.*

CENTRAL INDIA AND WESTERN PENINSULA; abundant in **BENGAL**, chiefly near the coast and **CEYLON**.

The following varieties are according to Clarke, they are with difficulty limitable.

VAR. 1. typica; softly hairy or glabrate, leaves oblong toothed.

VAR. 2. arenaria, leaves obovate-oblong sparingly toothed usually more villous beneath. *B. arenaria*, *DC. in Wight. Cont. ib.* 13; *Prodr.* v. 433. *Conyza villosa*, *Wall. Cat.* 3105.

VAR. 3. pubiflora, leaves toothed, peduncles stout, heads large $\frac{1}{2}$ in. *B. pubiflora*, *DC. Prodr.* v. 434. *Erigeron asteroides*, *Wall. Cat.* 2975, *B.*—Extends to Bundelkund and N.W. India.

VAR. 4. maritima; bushy, glabrous, glandular, leaves small, heads large.—Near the sea, Andaman Islds., Pegu, Soonderbunds and round the coast to Scinde.

VAR. 5. tenella; almost glabrous.

2. **B. bifoliata**, DC. in *Wight Contrib.* 14; *Prodr.* v. 434; often prostrate with ascending branches, pubescent villous or glabrate, branched from the base, leaves 1-3 in. sessile obovate or oblong serrate obtuse or acute 2 uppermost on the branches sub-opposite, heads $\frac{1}{4}$ - $\frac{1}{2}$ in. solitary on the branchlets peduncled, inner invol. bracts acuminate, receptacle glabrous, corolla yellow, lobes of σ hairy, achenes narrowly oblong with 4-5 hairy angles, pappus white. *Dalz. & Gibs. Bomb. Fl.* 145; *Kurz in Journ. As. Soc.* 1877, ii. 186; *Clarke Comp. Ind.* 72. *B. amplexens*, *Thwaites Enum.* 163 in part (C.P. 3523). *B. oligocephala*, DC. in *Wight Contrib.* 13; *Prodr.* v. 434. *B. anagallidifolia*, DC. *Prodr.* v. 434. *Conyza bifoliata*, Willd.; *Roxb. Fl. Ind.* iii. 431. *C. foliolosa*, *anagallidifolia* and *amplexicaulis*, *Wall. Cat.* 3092, 3098, 3104.

BENGAL, the WESTERN PENINSULA, BIRMA, the MALAY PENINSULA and CEYLON.

Best distinguished from *B. amplexens* by the serrate (not dentate) leaves, the two upper of which on each branch are usually opposite, and by the tips of the invol. bracts not being hair-pointed. *B. anagallidifolia* is a very small leaved state.

SECT. II. *Heads* many, villous, small, $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. ($\frac{1}{2}$ - $\frac{2}{3}$ in *B. hieracifolia*), more or less clustered and forming dense oblong spikes or contracted panicles at the top of the stem, exceptionally arranged in loose open corymbs.—Erect or ascending stout or slender herbs, usually very villous silky or woolly, often glandular, rarely 2 ft. high. Leaves toothed or serrate, seldom deeply gashed. Pappus white. (Corymbs often loose in *B. barbata*, and sometimes in all the others. Branches prostrate in *B. nodiflora* See *B. Belangeriana* in Sect. IV.)

3. **B. Wightiana**, DC. in *Wight Contrib.* 14; *Prodr.* v. 435; villous silky hairy or woolly, sometimes glandular, stem erect subsimple very leafy, leaves petioled obovate irregularly toothed or serrate, heads $\frac{1}{4}$ in. collected into terminal spiciform dense (rarely open) cymes or panicles, invol. bracts narrow acuminate, receptacle glabrous, corolla purple, lobes of σ glandular, achenes terete or 4-5-angled not ribbed sparsely hairy. *Clarke Comp. Ind.* 74; *Kurz in Journ. As. Soc.* 1877, ii. 186 (*excl. syn. hymenophylla*). *B. trichophora*, *parvifolia* and *phyllostachya*, DC. *Prodr.* 436, 437, 438. *Conyza lactucæfolia*, *paniculata*, *bifoliata* and *Wightiana*, *Wall. Cat.* 3088, in part, 3090 A., 3091, 3093. *Erigeron molle*, *Don Prodr.* 172.

Throughout the plains of INDIA from the outer Himalaya and the Punjab eastwards and southwards; and in CEYLON, BIRMA and the MALAYAN PENINSULA.—DISTRIB. Malay Islds., China, Australia, Tropical Africa.

Similar to *B. lacera*, but easily distinguished by the small heads, purplish flowers, and hairy achenes. A very glabrous variety with large membranous long-petioled leaves, 4 by $1\frac{1}{2}$ in. from Rangoon may be the "*B. hymenophylla*, DC.," quoted by Kurz as a synonym of *Wightiana*, but which is not DC.'s plant of that name.

4. **B. nilgherrensis**, Hook. f.; densely softly villous and silky, stem simple stout erect or ascending, leaves 3-4 in. obovate or oblong-obovate sessile or narrowed into a petiole regularly sharply gland-toothed, heads $\frac{1}{2}$ in. diam. very numerous in axillary clusters forming an oblong or rounded terminal spike or panicle, invol. bracts almost filiform softly silky, recept. glabrous, corolla purple, lobes of σ glabrous, achenes glabrous angled, pappus $\frac{1}{2}$ in. white.

NILGHERRY and PULNEY HILLS, *Wight, Gardner.*

This is a mountain plant, near *Wightiana* in its purple flowers, but has a denser inflorescence, larger head, glabrous achenes, and very regularly toothed leaves. As in all Blumeas, the villosity or hairiness is a very inconstant character; this plant is sometimes as silky as *B. Belangeriana*.

5. **B. subcapitata**, DC. *Prodr.* v. 439; pubescent, sparsely villous upwards, stem slender simple, leaves denticulate radical long-petioled membranous obovate or elongate-obovate entire or serrately or subpinnatifidly lobed

below the middle, cauline smaller petioled, heads $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. solitary or 2–3-nate in the distant upper leaf-axils and forming a crowded oblong short terminal or cylindric contracted panicle, invol. bracts very slender glabrescent, receptacle glabrous, corolla yellow, lobes of \varnothing glabrous, achenes nearly glabrous angled, pappus $\frac{1}{2}$ in. white. *Conyza subcapitata*, Wall. Cat. 3056.

CENTRAL and EASTERN HIMALAYA; Nipal, Wallich; Sikkim, alt. 1–5000 ft., J. D. H.

I retain this species contrary to Mr. Clarke's opinion (who referred it to *B. lacera*) with diffidence, my Sikkim specimens precisely accord with Wallich's Nipal ones, and I find none of the forms of *lacera* at all like it.

6. **B. barbata**, DC. in *Wight Contrib.* 14; *Prodr.* v. 434; stem erect subsimple with very long hairs, leaves obovate or oblanceolate coarsely toothed or serrate silky beneath, heads $\frac{1}{4}$ in. peduncled in short loose axillary and terminal cymes forming an elongate inflorescence, invol. bracts narrowly linear acuminate hairy, recept. glabrous, corolla yellow, lobes of \varnothing glandular, achenes most minute 5–6-ribbed striate hairy above, pappus white. *Kurz in Journ. As. Soc.* 1877, ii. 188, excl. var. β ; *Clarke Comp. Ind.* 73. *Conyza barbata*, Wall. Cat. 3099.

TRAVANCORE; Pulney Mts., Wight. CEYLON, Central Province, alt. 3–5000 ft., Thwaites.

Stem 4–10 in., stout or slender. Leaves 1–2 $\frac{1}{2}$ in. often narrowed into a petiole, membranous, hairy and subglandular above. Heads on slender peduncles.

7. **B. sericans**, Hook. f.; tall, robust, stem simple erect, and leaves beneath densely silvery villous, leaves 2–3 in. lower petioled upper elongate-oblanceolate or linear acuminate minutely toothed, heads $\frac{1}{4}$ in. sessile in crowded axillary and terminal clusters, recept. glabrous, corolla yellow lobes of \varnothing hairy, achenes silky, pappus white. *B. barbata*, var. β *sericans*, *Kurz in Journ. As. Soc.* 1877, ii. 188.

CHITTAGONG; on hills, alt. 500–1500 ft., Clarke. BIRMA and MARTABAN, Falconer, Kurz.

This is quite unlike any other species in its long leaves, silvery silky pubescence and inflorescence.

8. **B. glomerata**, DC. in *Wight Contrib.* 15; *Prodr. l. c.* 443; pubescent or villous, stem erect usually slender, lower leaves petioled obovate serrate or lyrate-pinnatifid upper oblong incised, heads purple $\frac{1}{4}$ in. diam. in small sessile axillary clusters all along the branches, invol. bracts subulate-lanceolate villous, corolla yellow, lobes of \varnothing and recept. pubescent, achenes 8–10-ribbed glabrous or hairy. *Dalz. & Gibs. Bomb. Fl.* 125. *B. fasciculata*, DC. *Prodr.* v. 442; *Clarke Comp. Ind.* 81. *B. fistulosa*, *Kurz in Journ. As. Soc.* 1877, ii. 187. *B. holosericea*, racemosa, spinellosa, gracilis, purpurea and leptoclada, DC. l. c. 442, 443. *B. holosericea* and leptoclada, *Dalz. & Gibs. Bomb. Fl.* 125, 126. *Conyza fistulosa*, Roxb. *Fl. Ind.* iii. 429. *C. racemosa*, sericea, glomerata, gracilis, purpurea and holosericea, Wall. Cat. 3002, 3021, 3055, 3064, 3076, 3103.

TROPICAL HIMALAYA; from Kumaon to Sikkim ascending to 5000 ft., and throughout the plains to ASSAM, BIRMA, TENASSERIM and the DECCAN (not in Ceylon).—DISTRIB. China, Java, Philippine Islds.

Very distinct in its normal state from the slender erect branches with rounded axillary clusters of purple sessile heads, which become spiciform. *Conyza sericea*, Wall., has leaves very silky, especially beneath, and *C. holosericea* resembles it, but differs from the typical inflorescence of the species in the clusters of flowers being borne on axillary peduncles. See also *B. membranacea*, var. *gracilis*.

9. **B. nodiflora**, Hook. f.; stem branched from the base, branches 2–4 in. long very slender dichotomously forked, leaves $\frac{1}{2}$ –1 in. subsessile obovate

more or less toothed glabrous, heads $\frac{1}{4}$ in. in dense axillary globose clusters round the branches at the leaf axils and terminal, invol. bracts linear acute white woolly, recept. and unripe achenes puberulous.

PEGU; Prome, *McClelland*. TENASSERIM and MERGUT, *Griffith, Helfer*.
The clusters of heads resemble those of *Attenanthera nodiflora*.

10. **B. lacera**, *DC. Prodr.* v. 436; hairy villous or glandular, rarely glabrescent, stem erect simple or branched very leafy, leaves petioled obovate toothed or serrate rarely lobulate, heads $\frac{1}{2}$ in. in short axillary cymes and collected into terminal spiciform panicles rarely corymbose, invol. bracts narrow acuminate hairy, recept. glabrous, corolla yellow, lobes of σ nearly glabrous, achenes sub-4-gonous not ribbed glabrate. *Clarke Comp. Ind.* 76. B. Musra, *DC. l. c.* 435; *Deless. Ic. Sel.* iv. t. 23. B. leptoclada, *Dalz. & Gibs. Bomb. Fl.* 125, not of *DC.* B. villosa, *Schultz-Bip. in Pl. Hohenack.* n. 2a. Conyza lacera, *Roxb. Fl. Ind.* iii, 428; *Wall. Cat.* 3082. C. thyrsiflora, villosa and Musra, *Ham.*; *Wall. Cat. sub* 3082, 3083, 3095. C. lactucæfolia, *DC. l. c.* 435; *Wall. Cat.* 3088 in part; *Burm. Fl. Ind.* 180, t. 59, f. 1.

Throughout the plains of INDIA, from the N.W. ascending to 2000 ft. in the Himalaya, to Travancore and Singapore, and in CEYLON.—DISTRIB. Malay Islds., China, Tropical Africa.

It is very difficult to separate this in the Herbarium from *B. Wightiana* (which see), it is even more variable; when living, the yellow flowers at once distinguish it. The smell and glabrous receptacle should distinguish it from *laciniata*, but the latter character is very difficult to see in the last-named plant. Smells strongly of turpentine (Roxburgh).

VAR. glandulosa; whole plant more or less glandular. B. glandulosa, *DC. in Wight Contrib.* 14; *Prodr.* 438. B. Heyneana, *DC. l. c.* 15 and 441. B. trigona, *DC. l. c.* 437. Conyza Heyneana, *Wall. Cat.* 3089. ? B. napifolia, *DC. l. c.* 440. Conyza napifolia, *Wall. Cat.* 3075 (heads small). This passes into *C. membranacea*, *VAR. major*.

VAR. cinerascens; hoary or clothed with soft white pubescence, leaves obovate often simple petioled and toothed as in *B. lacera*, corymbs often effuse, receptacle puberulous. B. cinerascens, *DC. Prodr.* v. 438. B. runcinata, *Wall. Cat.* 3087 B.—Hot valleys of the Himalaya from Nipal to Bhotan.

11. **B. hieracifolia**, *DC. in Wight Contrib.* 15; *Prodr.* v. 442; tomentose villous or copiously woolly or silky, stem usually robust and simple sometimes scape-like, lower leaves elliptic or oblong petioled serrate or toothed upper sessile often entire, heads $\frac{1}{2}$ — $\frac{3}{4}$ in. diam. more or less fasciated or spiked forming elongate panicles rarely corymbose, invol. bracts lanceolate acuminate, receptacle glabrous, corolla yellow lobes of σ glabrate, achenes hairy. *Wight. Ic.* t. 1099; *Clarke Comp. Ind.* 82; *Kurz in Journ. As. Soc.* 1877, ii. 188. Erigeron hieracifolia, *Don Prodr.* 172. Conyza hieracifolia, *Spreng. Syst.* iii. 524.

Throughout the hilly parts of INDIA, from the outer Himalaya in Kumaon eastwards and southwards to the NILGHERRY MTS. and MARTABAN.—DISTRIB. Java.

The robust habit of the larger form, and scapigerous habit of the smaller, are amongst the best characters of this most variable plant. A form (*Conyza natans*, *Herb. Ham.*) floats on tanks in Bengal.—See also 23. *B. crinita* and 25. *flexuosa*.

VAR. 1. typica; simple or sparingly branched, often scapigerous, leaves oblong crenulate or with small teeth silkily villous beneath, heads in a dense terminal cluster or spike.

VAR. 2. macrostachya; tall, robust, paniculately branched above, leaves with spreading hairs beneath, heads in large clusters at the ends of the branches. *Var. evolutior*, *Clarke l. c.* B. macrostachya and B. cernua, *DC. l. c.* 442 and 436. Conyza macrostachya and nutans, *Wall. Cat.* 3053, 3080.

VAR. 3. Hamiltoni; small, often clothed with close buff or white cottony tomentum,

branches solitary or several from the base, leaves chiefly radical often almost entirely villously silky beneath, heads in spiked fascicles. *B. Hamiltoni*, DC. l. c. 439. *Gnaphalium Hamiltoni*, Wall. Cat. 2938. Habit often that of *Antennaria hyperborea*.—See *B. crinita*, Arn., and *Belangeriana*, DC., which may be southern forms of this.

12. *B. angustifolia*, *Thwaites Enum.* 165; glabrous or puberulous, stem erect slender subsimple, leaves 1-3 in. all linear-oblong or lanceolate subobtusely narrowed at the base quite entire or obscurely toothed, heads few all peduncled crowded or corymbose, peduncles tomentose or glabrous, invol. bracts linear-lanceolate pubescent or sparingly villous, recept. glabrous, achenes nearly glabrous. *Clarke Comp. Ind.* 81.

CEYLON; central province, alt. 1-3000 ft., *Moon, Thwaites*.

Stem 1 ft., procumbent, branched and rooting below. I have seen but few specimens.

SECT. III. *Heads* many, small, $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., peduncled in open corymbs or panicles with often divaricate branches, rarely clustered.—Tall, erect, green herbs; stem simple below, paniculately or corymbosely branched above, glabrous or glandular, rarely villous densely woolly or silky; leaves, the lower especially, gashed or laciniate; pappus white.

13. *B. laciniata*, DC. *Prodr.* v. 436; erect, usually stout, pubescent or laxly tomentose, stem branched, leaves usually large membranous runcinate lyrate or subpinnatifid and toothed, heads $\frac{1}{2}$ in. diam. usually in broad open corymbs, invol. bracts lanceolate acuminate villous, recept. pubescent, corolla yellow, lobes of ♀ hairy, achenes ribbed silky. *Clarke Comp. Ind.* 78; *Kurz in Journ. As. Soc.* 1877, ii. 187. *B. runcinata* and *sonchifolia*, DC. l. c. 438. *Conyza sonchifolia* and *runcinata*, Wall. Cat. 3085, 3087 A. C. *laciniata*, Roxb. *Fl. Ind.* iii. 427; Wall. Cat. 3100, 3084 B.

TROPICAL HIMALAYA; from Kumaon eastwards, ascending to 4000 ft, in Sikkim. ASSAM, CACHAR and the KHASIA Mts., BEHAR and BENGAL; rare in the CONCAN, SOUTHERN INDIA and the MALAY PENINSULA.—DISTRIB. Malay Islds., China, Philippines.

Usually a taller plant than *B. lacera*, from which it is difficult to distinguish specimens with leaves more entire than usual, but it is usually more glabrous, and should have a pubescent receptacle; this latter character is, however, very variable, evanescent in age, and at all times requires a high power to detect. Roxburgh says that this differs from *B. lacera* in having all the leaves laciniate, to which I suppose may be added its being scentless. The four following species are possibly all reducible to *laciniata*.

14. *B. virens*, DC. in *Wight Contrib.* 14; *Prodr.* v. 439; quite glabrous, tall, slender, much branched, bright green, leaves membranous irregularly or sinuate-toothed lower petioled obovate lyrate or runcinate upper oblong small very numerous, heads $\frac{1}{4}$ in. glabrous on capillary peduncles all in large open much branched panicles with small leaves on the ascending branches, invol. bracts slender ciliolate, recept. very narrow glabrous, corolla yellow, lobes of ♀ glandular, achenes 8-10-ribbed with spreading hairs. *Clarke Comp. Ind.* 79 in part. *B. lapsanoides*, DC. l. c. 440. *Conyza virens*, Wall. Cat. 3037 A. B. C.

UPPER ASSAM, *Griffith*; BIRMA, *Wallich*; the CONCAN, CANARA, and NILGHERY Mts., *Wight*, &c.

The perfectly glabrous habit distinguishes this from all other species; it sometimes grows 4 ft. high with a stem as thick as the finger, but is generally smaller. The stem is grooved and green with a few more or less conspicuous yellow slender ribs.

VAR. *minor*; 6-12 in., stem simple slender, leaves long-petioled elliptic ovate or lanceolate toothed or serrulate very membranous. Travancore at Courtallam, *Wight*. Closely resembles *B. membranacea*, but the glabrous panicle distinguishes it.

15. **B. membranacea**, DC. *Prodr.* v. 440; pubescent, tall, slender, much branched, leaves and heads and flowers as in *B. virens* but more or less softly pubescent, and the branches of the panicle glandular and with spreading hairs. *B. hymenophylla*, DC. l. c. 440. *Conyza membranacea* and *hymenophylla*, Wall. *Cat.* 3019, 3038. *C. virens*, Wall. *Cat.* 3037 D. *C. diffusa*, Roxb. *Fl. Ind.* iii. 429.

Common throughout INDIA.—DISTRIB. Malay Islds.

This may be a pubescent and glandular form of *B. virens*. The prevalent forms may be approximately limited as follows.

VAR. 1. *typica*; tall, pubescent, much branched, leaves large membranous, heads many paniced.

VAR. 2. *muralis*; glandular-hairy, stem usually simple slender, leaves elliptic-ovate or lanceolate toothed or serrulate very membranous, invol. bracts rigid coloured like those of a *Vernonia*. *B. muralis*, DC. *Prodr.* v. 440; Dalz. & Gibs. *Bomb. Fl.* 125. *Conyza muralis*, Ham. in Wall. *Cat.* 3077.—Though in extreme forms the heads of this look so different from those of *membranacea*, they are connected by numerous intermediates.

VAR. 3. *gracilis*; heads subsolitary or racemose on the long slender branches. *B. gracilis*, DC. *Prodr.* v. 443. *Conyza gracilis*, Herb. Heyne in Wall. *Cat.* 3064. Taong-Dong in Ava, Wallich. Madras, Herb. G. Thomson.—This approaches *B. glomerata* in habit, and may be referable to it, but the receptacle is glabrous.

VAR. 4. *Gardneri*; glabrous or puberulous, erect, bright green, corymbosely or paniculately branched and glandular, lower leaves 2-4 in. lyrate or runcinate-toothed, upper lanceolate sinuate-toothed, heads $\frac{1}{2}$ in. diam. on slender peduncles, invol. bracts puberulous. *B. hymenophylla*, Herb. Wt. (*Kew Distrib.* 1577). *B. glandulosa*, Thwaites *Enum.*—Nilgherry Mts., Wight, Gardner; Ceylon, Walker, &c.

VAR. 5. *viscosula*, covered with lax spreading long simple and glandular hairs, heads few at the ends of the few long branches of the panicle. *B. viscosula*, DC. *Prodr.* v. 441. *B. lactucæfolia*, var. *nudipes*, Kurz in *Journ. As. Soc.* 1877, ii. 187.—Prome, Wallich; Pegu, Gomez, Kurz; Rangoon, Maclelland.

VAR. 6. *subsimplex*; anther-cells without tails, their bases connate with the filaments. *B. paucifolia* and *subsimplex*, DC. *Prodr.* v. 441. *Conyza subsimplex*, Wall. *Cat.* 3003. *C. spiridens*, Mig. *Fl. Ind. Bat.* ii. 44, *excl. syn.*—This is technically a *Laggera*, but I agree with Kurz in regarding it as a sexual form of *membranacea*, from which it differs solely by the anthers; it represents closely both the larger and smaller forms of *membranacea*, and is widely distributed.

16. **B. Kingii**, Clarke *ms.*; pubescent and glandular above, stem strict erect simple glabrate below, leaves 3-5 in. lower petioled runcinate or lyrate and unequally toothed rather membranous, heads $\frac{1}{2}$ in. all peduncled in open panicles with many divaricate bracteate branches, invol. bracts linear rigid green puberulous, recept. glabrous deeply pitted, achenes 10-ribbed puberulous.

MARWAR; Mt. Aboo, King.

This again is closely allied to *B. virens*, and has similar habit and foliage, but the panicle is more robust and branched, and the invol. bracts are rigid like those of a *Vernonia*.

17. **B. Jacquemontii**, Hook. f.; villous with spreading soft hairs, stem stout erect simple below, leaves 3-5 in. lower petioled obovate-lanceolate coarsely irregularly serrate upper sessile toothed or lacerate, heads $\frac{1}{2}$ in. all peduncled in open panicles with divaricating branches and pedicels, invol. bracts numerous subulate-lanceolate rigid coloured puberulous, recept. pubescent, achenes 8-10-ribbed finely silky. *B. obovata*? Clarke *Comp. Ind.* 72 (*not of DC.*)

BEHAR, on Parusnath, alt. 4000 ft., J. D. H., &c. CENTRAL INDIA, Jacquemont (n. 1054). NILGHERY MTS., Clarke (*Comp. Ind.* 77); Hort. Bot. Calc., Herb. Griffith.

A large coarse species, with the paniculate inflorescence sometimes 18 in. across, yellow flowers and coloured invol. scales like those of a *Vernonia*.

SECT. IV. *Heads* few, rarely many, small, $\frac{1}{4}$ – $\frac{1}{2}$ in., usually peduncled and forming loose axillary and terminal corymbs but often clustered.—Prostrate or decumbent rarely ascending or erect herbs, woolly villous or silky, branches usually dichotomously forked; leaves acutely irregularly toothed, the teeth often subsppinescent; pappus white.

18. **B. oxyodonta**, DC. in *Wight Contrib.* 15; *Prodr.* v. 444; prostrate, pubescent villous or tomentose, branches spreading from the root leafy slender dichotomously forked or simple, leaves spinulose-toothed lower $\frac{1}{2}$ –3 in. petioled obovate membranous, upper obovate or oblong sessile, heads $\frac{1}{4}$ in. diam. on slender peduncles solitary or few corymbose, invol. woolly or glabrate, recept. glabrous, corolla yellow lobes of σ glabrous, achenes sparingly silky. *Clarke Comp. Ind.* 85. *Conyza tenera*, Wall. *Cat.* 3023.

WESTERN TROPICAL HIMALAYA, from Kumaon to Nipal, and southwards to CANARA, BEHAR, BENGAL, PEGU and BIRMA.—DISTRIB. China, Philippine Islds.

Smaller than most species and easily recognised by its decumbent habit. Clarke observes that in all the specimens he has examined those anther-cells which are tailless are empty of pollen, and Kurz suspects it is a hybrid, or a polygamous form of some other species.

19. **B. eriantha**, DC. in *Wight Contrib.* 15; *Prodr.* v. 444; pubescent or tomentose or clothed with scattered long hairs, rarely silkily villous, stems 1 ft. slender dichotomously branched from the base, leaves 1–3 in. acutely irregularly toothed lower petioled obovate obtuse, upper sessile obovate or oblong acute, heads small $\frac{1}{4}$ – $\frac{1}{2}$ in. mostly on the long slender peduncles of dichotomous cymes rarely fascicled, peduncles and invol. clothed with long silky hairs, recept. glabrous, achenes very minute, angles obtuse sparingly silky.

The CONCAN, *Law*. BANDA, *Edgeworth*.

Usually very slender, with divaricate dichotomous branches, and heads with long slender peduncles; but some specimens are nearly as robust as *B. Malcolmii*, and almost as silvery-villous; the heads are, however, not half the size, and the achenes are smaller, and it is perhaps a var. of *oxyodonta*.

20. **B. Malcolmii**, *Hook. f.*; densely clothed with soft white silky wool, stems leafy ascending stout forked rarely decumbent from the root, leaves 1–4 in. sessile leathery obovate very obtuse acutely closely jaggedly toothed, heads $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. fascicled towards the ends of the branches or remote and peduncled villous with long white silky hairs, recept. glabrous, achenes obscurely angled silky. *Pluchea lanuginosa*, *Clarke Comp. Ind.* 95.

The CONCAN; hills above 2000 ft., *Law*; Belgaum and Velloor on the Fort walls (heads smaller), *Ritchie*.

The stout habit, dense silvery woolly clothing, and sparse often peduncled heads of this species are its most prominent characters. The buds at the crown of the root form globose woolly bodies, often clustered together; the jagging of the leaf-margin is very close and irregular. I have not seen specimens of the *Pluchea lanuginosa*, described by Clarke, who tells me that this is the same plant.

21. **B. Belangeriana**, DC. *Prodr.* v. 444; silkily woolly especially the leaves beneath, branches dichotomously forked strict leafy, lower leaves 2–3 in. petioled obovate finely toothed, upper sessile oblong coarsely toothed, heads $\frac{1}{2}$ in. diam. sessile axillary solitary or clustered, invol. bracts woolly, recept. glabrous, corolla lobes of σ hispid, achenes (unripe) glabrous. *B. Metziana*, *Schultz-Bip. Pl. Hohenack.* n. 777.

The CONCAN, CANARA and MALABAR, *Law*, *Ritchie*, &c.

Usually much branched, the branches a foot long, stiff, and often red-brown.

SECT. V. *Heads* large, $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., usually clustered and axillary, or dis-

posed in elongated spikes racemes or contracted panicles.—Herbs with long simple or sparingly branched grooved erect or flexuous stems; leaves 1-3 in., sessile or shortly petioled, glabrous beneath or silky or tomentose, sparingly toothed; pappus white.—Some forms of *B. hieracifolia* belong here, perhaps also *B. chinensis*.

22. *B. malabarica*, Hook. f.; pubescent, branches slender elongate flexuous, leaves subsessile membranous linear-oblong acute distantly serrate slightly hairy beneath, heads $\frac{1}{2}$ in. diam. pubescent in small axillary sessile or peduncled clusters, recept. broad pubescent, achenes strongly ribbed nearly glabrous.

CANARA and MALABAR, *Ritchie*; Bababoodan Hills, *Law*.

This appears a very distinct species, the leaves are membranous, and have a distinct short slender petiole, quite unlike that formed by the narrowed bases of the leaves; it is possibly a scandent species.

23. *B. crinita*, Arn. *Pugill.* 30; *DC. Prodr.* vii. 283; pubescent hirsute or villous, stem elongate slender or stout flexuous, leaves scabrid rigid sessile obovate-oblong acute sharply finely or coarsely toothed scabrid above glabrate or tomentose beneath, heads $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. woolly or villous sessile in small sessile or long peduncled clusters usually forming an elongate sparse panicle, receptacle and corolla lobes of σ glabrous, achenes ribbed glabrous, pappus white. *Clarke Comp. Ind.* 84.

CEYLON; central province, Adam's Peak and Neuera Ellia, *Walker*, &c.

The long brown often flexuous stems, and hard uniform toothed sessile leaves, usually rounded at the base, and the glabrous achenes distinguish this from *B. hieracifolia*, to which it is closely allied.

24. *B. Clarkei*, Hook. f.; stem simple elongate flexuous pubescent or tomentose, leaves shortly petioled 2-3 in. obovate or oblanceolate acuminate toothed pubescent or villous beneath, heads $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. sessile and axillary or peduncled in axillary clusters forming very narrow elongate panicles, invol. bracts slender, receptacle broad pubescent, corolla yellow, lobes of σ glandular, achenes obscurely silky, pappus white. *B. hieracifolia*, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 1-3000 ft., *J. D. H.*, *Clarke*. CACHAR, *Keenan*. MERGUI, *Griffith*.

This has quite simple stems, and is intermediate in habit between the larger forms of *hieracifolia* and *malabarica*. It agrees in many points with De Candolle's *B. elongata* (*Prodr.* v. 445), founded on Wallich's *Conyza elongata*, Cat. 3078, of which there is no specimen in Wallich's Herbarium, but the receptacle of that plant is described as glabrous, and it is a native of Penang.

25. *B. flexuosa*, *Clarke Comp. Ind.* 86; tall, robust, stem much branched leafy clothed with soft spreading hairs, leaves 3-5 in. petioled elliptic-lanceolate acuminate and pungent clothed beneath with long soft silky or spreading hairs or glabrate acutely irregularly toothed, heads $\frac{3}{4}$ in. in large paniced clusters rarely separately peduncled and cymose, invol. bracts broad pubescent, receptacle nearly pitted, corolla yellow, lobes of σ hairy, pappus white. *B. hieracifolia*, var. *Thwaites Enum.* 163.

NILGHERY MTS.; Sisparah, *Wight*. CEYLON; Neuera Ellia, *Gardner*.

I separate this from the larger forms of *B. hieracifolia* with great reluctance, especially as Thwaites united the Ceylon specimens with that plant. Both forms have heads sometimes all pedicelled, and forming a loose open cyme, as in the following section. The receptacle is indistinctly pubescent.

VAR. *zeylanica*; leaves from glabrate to densely silkily villous beneath, heads smaller.

VAR. *peninsularis*; leaves softly loosely hairy beneath.

SECT. VI. *Heads* very numerous, large or small, forming narrow or broad terminal branched corymbs or panicles.—Shrubs or small trees (except *B. chinensis* and *obovata*, sometimes climbing); leaves very large, 8–18 in. long; pappus white or red.

* *Pappus white*.

26. ***B. chinensis***, DC. *Prodr.* v. 444; scandent, quite glabrous, leaves shortly petioled elliptic-lanceolate acuminate glandularly subserrate coriaceous, heads $\frac{1}{2}$ in. clustered on the short distant branches of a long terminal pubescent panicle, invol. bracts puberulous outer short obtuse, recept. densely hirsute, ♀ corolla-lobes hairy, achenes strongly 10-ribbed hairy. *B. riparia*, DC. *l.c.*; *Clarke Comp. Ind.* 85. *Conyza chinensis*, Linn.; *Blume Bijdr.* 898. *C. riparia*, Blume, *l.c.* 899. *C. longispina*, Zoll. & Morr. *Syst. Verg.* 121. *C. serici-vestita*, Wall. *Cat.* 2996 *B. Baccharis nitida*, Wall. *Cat.* 3043.

EASTERN HIMALAYA; Sikkim and Bhotan, alt. 2–4000 ft. ASSAM, and KHASIA Mts., J. D. H. & T. T. PENANG, Wallich, &c.—DISTRIB. JAVA, S. China.

Branches terete, grooved, flexuous. *Leaves* green; petiole slender, $\frac{1}{8}$ – $\frac{1}{4}$ in. *Involucre* quite unlike any other species; the outer bracts very short, coriaceous and obtuse; inner long and thin. *Pappus* white.

27. ***B. obovata***, DC. *Prodr.* v. 446; herbaceous, stem and panicle softly densely villous, leaves narrowed into a short petiole obovate-lanceolate acute or acuminate faintly or coarsely toothed membranous glabrous above tomentose beneath, heads very few $\frac{3}{4}$ in. diam. on simple or branched peduncles at the end of a very long almost naked branch, invol. bracts villous very many slender and shining, recept. with a very few hairs, ♀ corolla lobes glandular, achenes unripe. *Conyza obovata*, Wall. *Cat.* 3022.

NIPAL, Wallich.

Known only from Wallich's specimens. Its herbaceous character would bring it under the first division of the genus, but the large head habit and foliage are that of this; pappus quite white.

28. ***B. sikkimensis***, Hook. f.; branches stout glabrous, leaves 8–12 in. elliptic-lanceolate narrowed into a petiole acuminate obtusely subserrate glabrous membranous, heads $\frac{3}{4}$ in. on slender peduncles loosely clustered at the ends of the slender branches of a large pubescent panicle, invol. bracts puberulous very narrow revolute in age, recept. broad glabrous, ♀ corolla lobes pubescent, achenes ribbed silky, pappus dirty white.

SIKKIM HIMALAYA; alt. 5000 ft., J. D. H.

Probably climbing, branches grooved as in *B. chinensis*.

29. ***B. procera***, DC. *Prodr.* v. 445; villous above or tomentose, branches long stout, leaves 5–8 in. sessile obovate-oblong or -lanceolate acuminate coarsely irregularly toothed glabrous or hirsute beneath base cordate, heads $\frac{1}{2}$ in. in dense (rarely loose) compound clusters on the woolly branches of an elongate panicle, invol. bracts silky outer short acute coriaceous, recept. narrow glabrous, lobes of ♀ corolla very hairy, achenes ribbed shortly silky, pappus very white. *Clarke Comp. Ind.* 86. *B. semivestita*, DC. *l.c.* *Conyza procera* and *semivestita*, Wall. *Cat.* 3050, 2996 A. *C. repanda*, Roxb. *Fl. Ind.* iii. 431.

TROPICAL HIMALAYA; from Nipal eastwards, ascending in Sikkim and the KHASIA Mts. to 5000 ft. ASSAM, PEGU, TENASSERIM, MARTABAN, BIUMA.

The cordate narrowed base of the large leaves is a good character of this species, which grows to 6 ft. high. I have not quoted Kurz, who (*As. Soc. Journ.* 1877, ii. 189) considers *procera* to be a var. of *macrophylla*. Clarke believes that Kurz's *macrophylla* has red pappus, and that his *procera* is Blume's *confusa*.

** *Pappus* red. Receptacle more or less villous or pubescent (except in *B. spectabilis*, var. *longifolia*).

30. **B. Hookeri**, *Clarke mss.*; erect, puberulous, leaves 8-18 in. membranous oblong-lanceolate pinnatifid acuminate narrowed into a winged petiole lobes upcurved acuminate denticulate or lacerate, heads very many $\frac{1}{4}$ in. diam. peduncled in a very large branched pubescent panicle, invol. bracts narrow rigid puberulous, corolla lobes hispid, recept. narrow pubescent, achenes unripe.

SIKKIM HIMALAYA, alt. 1-4000 ft., *J. D. H. KHASIA Mts., Simons.*

Stem stout, green, herbaceous. *Leaves* sometimes 7 in. broad, very membranous and glabrous, quite unlike those of any other species.

31. **B. myriocephala**, *DC. Prodr.* v. 445; shrubby, branches very stout glabrous or puberulous, leaves 6-10 in. glabrous oblanceolate acuminate narrowed into an often appendaged petiole serrulate many-nerved coriaceous, heads $\frac{1}{4}$ - $\frac{1}{2}$ in. subsessile or clustered on the ascending branches of a narrowly pyramidal elongate tomentose erect panicle, invol. bracts tomentose squarrosely recurved in age, recept. villous or glabrate, σ corolla-lobes glabrous or glandular, achenes 10-ribbed hairy. *B. sessilifolia*, *Kurz in Journ. As. Soc.* 1877, ii. 189. *Conyza squarrosa*, *Wall. Cat.* 3025. *C. lanceolaria*, *Korb. Fl. Ind.* iii. 432.

SIKKIM HIMALAYA, alt. 2000 ft., *J. D. H. SILHET, de Silva.* ASSAM and BIRMA, *Griffith.* CHITTAGONG, *Clarke.*

Stem as thick as the forefinger. The very numerous nerves and recurved (when dry) margins of the leaves and their small regular teeth, are unlike any other species of this shrubby section, except the following. The name *Conyza lanceolaria*, *Roxb.* is attached to a Calcutta Bot. Garden very narrow-leaved form of this plant in Griffith's Herbarium.

32. **B. spectabilis**, *DC. Prodr.* v. 445; shrubby, branches very stout glabrous below pubescent above, leaves 4-10 in. glabrous oblanceolate or elliptic acuminate subserrate narrowed into a long winged often appendaged petiole, heads $\frac{1}{2}$ in. peduncled free or clustered along the branches of a broad bracteate pyramidal panicle, invol. bracts slender pubescent, σ corolla-lobes glandular, achenes (unripe) silky, pappus red. *B. myriocephala*, *Thwaites Enum.* 163, excl. syn. *Conyza longifolia*, *Herb. Heyne in Walp. Cat.* 3026.

MYSORE, *Heyne.* TRAVANCORE, *Wight, &c.* CEYLON, central province, alt. 4000 ft.

VAR. *longifolia*; heads smaller $\frac{1}{4}$ in. diam. sessile on the branches of a narrow panicle. *B. longifolia*, *DC. Prodr.* v. 446; *Dalz. & Gibs. Bomb. Fl.* 125. Tullawaree and Purdana, in Canara, *Stocks, Ritchie.*—Perhaps a different species, the heads not half the size of the type, densely crowded on the branches of a much more contracted panicle, and the receptacle is quite glabrous, but the leaves are identical and very characteristic.

33. **B. densiflora**, *DC. Prodr.* v. 446; stem stout, panicle and leaves beneath densely tomentose or clothed with thick white felted wool, leaves 8-18 in. broadly elliptic or elliptic-lanceolate narrowed into a long winged sometimes appendaged petiole puberulous above serrate-toothed or pinnatifid, heads $\frac{1}{4}$ in. diam. sessile in rounded clusters on a large branched panicle, invol. bracts narrow rather rigid, recept. narrow glabrous, corolla-lobes of σ hairy, achenes 10-ribbed pubescent, pappus red. *Clarke Comp. Ind.* 88. *B. excisa* and *grandis*, *DC. l. c.* 446, 447. *B. Milnei*, *Seem. Fl. Viti* 141, t. 27. *Conyza densiflora*, *excisa* and *grandis*, *Wall. Cat.* 2997, 3011, 3051. *C. falcigera*, *Wall. Cat.* 2048; *ex DC. l. c.* *C. dasycoma*, *Miq. Fl. Ind. Bat.* ii. 56.

TROPICAL HIMALAYA; Sikkim. ASSAM; Mishmi and Naga hills, *Griffith.* KHASIA Mts., alt. 2-4000 ft. Tavoy, *Wallich.*—DISTRIB. Malay and Fiji Islands.

The very woolly white undersurface of the leaves is a striking character of this species, which however Kurz unites with *balsamifera*, perhaps, as Clarke thinks, rightly, but the corolla lobes in this are hairy, and very glandular in *balsamifera*.

34. **B. aromatica**, DC. *Prodr.* v. 88; glandular, stem stout and leaves beneath glabrous pubescent or loosely villous, leaves 6-12 in. membranous obovate-oblong or lanceolate serrate toothed or lobulate and jagged membranous lower narrowed into a broadly winged often appendaged petiole upper sessile, heads $\frac{1}{2}$ - $\frac{1}{3}$ in. sessile or peduncled in clusters on the branches of a large spreading panicle, invol. bracts slender puberulous, recept. glabrous, corolla-lobes glandular, achenes 10-ribbed hairy, pappus red. *Clarke Comp. Ind.* 88. *Conyza aromatica*, Wall. *Cat.* 3054.

TROPICAL HIMALAYA; from Kumaon, alt. 1000 ft. eastwards, ascending to 5000 ft. in Sikkim. ASSAM and KHASIA Mts., alt. 3000 ft. TENASSERIM, Kurz.

A very aromatic shrubby herb, chiefly distinguished from *B. balsamifera* by the membranous foliage.

36. **B. balsamifera**, DC. *Prodr.* v. 466; tomentose or villous or silky woolly, stem tall corymbosely branched above, leaves 4-8 in. coriaceous elliptic or oblong-lanceolate usually silky above serrate sometimes pinnatifid narrowed into a usually auricled short petiole, heads $\frac{1}{4}$ - $\frac{1}{3}$ in. sessile or peduncled in rounded clusters on the stout branches of a large spreading or pyramidal panicle, invol. bracts tomentose, recept. glabrous, achenes 10-ribbed silky, pappus red. *Clarke Comp. Ind.* 89; Kurz in *Journ. As. Soc.* 1877, ii. 189, *excl. some syn.*; *For. Fl.* ii. 82; *Conyza balsamifera*, Linn.; Wall. *Cat.* 2998; Roxb. *Fl. Ind.* iii. 427; *C. vestita*, Wall. *Cat.* 2998. *C. appendiculata*, Blume *Bijl.* 895, *not Lamk.*

TROPICAL HIMALAYA; Nipal and Sikkim, alt. 1-4000 ft. ASSAM, KHASIA Mts., CHITTAGONG, PEGU, BURMA and the EASTERN PENINSULA, to Singapore and Penang.—DISTRIB. Java.

The most arboreous of all the species, smelling strongly of camphor.

DOUBTFUL SPECIES.

B. *ELONGATA*, DC. *Prodr.* v. 445 (*Conyza elongata*, Wall. *Cat.* 3078); see under *B. Clarkei*.

B.? *LEUCANTHEMA*, DC. *Prodr.* v. 436 (*Erigeron leucanthum*, Don *Prodr.* 171). It is impossible to identify this by the meagre description of Don.

B. *PUBIFLORA*, DC. *Prodr.* v. 434; from Madras (*Erigeron asteroides*, Roxb. in Wall. *Cat.* 2975), is probably the Roxburghian plant referred to (see p. 254), but there are no specimens of Wallich's plant in his herbarium.

27. **LAGGERA**, Sch. Bip.

Annual or perennial herbs. Leaves alternate, often rigid and decurrent. Heads panicled or axillary, yellow (always?), heterogamous, disciform; outer fl. ♀, ∞-seriate, fertile, filiform, mouth minutely toothed; disk-fl. ♂, ∞-seriate, fertile, tubular, limb 5-fid. Involucre campanulate; bracts ∞-seriate, narrow, often rigid, outer shorter; receptacle flat, naked. Anther-bases 2-lobed or sagittate; auricles obtuse or acute, often unequal, not tailed nor connate with the adjoining anthers. Style-arms of ♀ and pappus as in *Blumea*.—DISTRIB. Species 10, tropical African and Indian.

See remarks under *Blumea* and under *B. membranacea*, var. 6.

1. **L. flava**, Benth. in *Gen. Pl.* ii. 290; quite glabrous or puberulous, very slender, leaves sharply toothed or incised lower petioled cauline oblong-cordate $\frac{1}{2}$ -amplexicaul, heads $\frac{1}{4}$ in. diam. few cymose, fl. golden yellow. *Clarke Comp. Ind.* 90. *Blumea flava*, DC. *Prodr.* v. 439. *Erigeron falcatum*, Don *Prodr.* 172; Kurz in *Journ. As. Soc.* 1877, ii. 191; *excl. syn.* *Conyza fasciculata*, Wall. *Cat.* 3019 (not 3094).

Throughout NORTHERN INDIA; from the HIMALAYA in Kumaon eastwards, ascending to 6000 ft. in SIKKIM and BHOTAN; southwards to BEHAR and the GOLCONDAH HILLS, *Beddome* in the west, and to CHITTAGONG, PEGU, TAVOY and PENANG in the east.

Stem 6 in. to 3 ft., simple or corymbosely branched above, grooved. Leaves 1-3 in., sometimes scaberrulous, membranous. Heads on capillary peduncles; recept. glabrous; corolla yellow, lobes of $\frac{5}{8}$ glabrous; anthers sagittate. Achenes most minute, glabrous. Pappus white.

2. **L. alata**, *Schultz-Bip. in Herb. Hohenack.* n. 1340; robust, much branched, pubescent or tomentose, stem with entire wings, leaves oblong toothed sessile decurrent, heads $\frac{2}{3}$ in. diam. racemed on short axillary winged branches drooping in fruit, fl. purplish. *Clarke Comp. Ind.* 91. *L. divaricata*, *Oliv. Fl. Trop. Afr.* iii. 525. *Blumea alata*, *DC. Prodr.* v. 448; *Dalz. & Gibs. Bomb. Fl.* 125; *Wight Ic. t.* 1101. *B. vernonioides*, *DC. l. c.* 447. *Conyza alata*, *Roxb. Hort. Beng.* 61; *Fl. Ind.* iii. 430. *C. nutans*, *Blume Bijl.* 896. *C. cernua*, *Wall. Cat.* 3012. *Erigeron alatum*, *Don Prodr.* 171. *Vernonia Wightiana*, *Wall. Cat.* 2923 (not of *Arnott*).

TROPICAL HIMALAYA, alt. 1-5000 ft., from Simla eastwards to SIKKIM, and southwards in hilly districts ascending to 6000 ft. in the NILGHERY Mts., and to 7000 ft. in CEYLON. Not found south of the Khasia Mts. and Birma in the east.—DISTRIB. Java, China, Philippine Islds., Trop. Africa.

A stout, leafy herb. Leaves 1-4 in., sometimes almost entire. Invol. bracts many, outer short herbaceous often recurved, inner long straight. Achenes hairy; pappus white.

3. **L. pterodonta**, *Benth. in Gen. Pl.* ii. 290; much branched, glabrous or puberulous, stem with deeply toothed lobed or interrupted wings, leaves sessile oblanceolate toothed or pinnatifid at the base, heads $\frac{2}{3}$ in. diam. on (usually) slender peduncles at the ends of the branches, fl. purple. *Clarke Comp. Ind.* 92. *Blumea pterodonta*, *DC. in Wight Contrib.* 16; *Prodr.* v. 448; *Wight Ic. t.* 1100. *Conyza cernua*, *Wall. Cat.* 3012. *B. serratula polygona*, *A. Rich. Fl. Abyss.* i. 437, t. 62.

TROPICAL HIMALAYA; from Simla, alt. 4000 ft. eastwards. ASSAM, BIRMA, NILGHERY and PULNEY Mts.—DISTRIB. Trop. Africa.

A more slender and glabrous plant than *L. alata*, well distinguished by the remarkable wings of the stem, which are sometimes represented by a series of membranous vertical laminae $\frac{1}{8}$ - $\frac{1}{2}$ in. broad. Invol. bracts glabrous, rigid.

4. **L. aurita**, *Schultz-Bip. in Herb. Hohenack.*; rather slender, viscidly hirsute pubescent or villous, stem not winged, leaves small sessile or petioled oblanceolate toothed lobed cut or $\frac{1}{2}$ -pinnatifid, heads $\frac{1}{2}$ - $\frac{1}{2}$ in. diam. in small lateral or terminal corymbs, flowers pink. *Clarke Comp. Ind.* 92. *Blumea aurita*, *DC. Prodr.* v. 449. *B. guineensis*, *DC. l. c.* *Conyza aurita*, *Linn. f.*; *Roxb. Fl. Ind.* iii. 428; *Wall. Cat.* 3069? and 3086; *Boiss. Fl. Orient.* iii. 216.

Plains of India from the PUNJAB and SCIND, eastwards and southwards to CHITTAGONG, BIRMA and TRAVANCORE.—DISTRIB. Tropical Africa.

A well-marked species. The leaves are decurrent, but very shortly only. Invol. bracts slender, soft, villous.—The whole plant has an odour of turpentine.

28. PLUCHEA, Cass.

Shrubs rarely herbs, tomentose or glutinous. Leaves alternate. Heads small, in terminal leafless corymbs or large and subsolitary, heterogamous, disciform, white, yellow or lilac; outer fl. $\frac{5}{8}$, ∞ -seriate, fertile, filiform; disk-fl. $\frac{5}{8}$, few, sterile, tubular, limb 5-fid. Involucre ovoid or campanulate; bracts

ovate, usually broad, dry, rigid; receptacle flat, naked. *Anther-bases* sagittate; cells tailed. *Style-arms* of ♀ filiform, entire or 2-fid. *Achenes* small, 4-5-angled; pappus hairs slender, 1-seriate, rigid, free or many and connate in the sterile achenes.—DISTRIB. About 30 species, tropical and subtropical.

1. **P. indica**, Less.; *DC. Prodr.* v. 451; shrubby, glabrous or nearly so, leaves obovate or oblanceolate subserrate narrowed into the short petiole, heads in compound terminal corymbs, outer invol. bracts broad tips rounded. *Wight Ill.* t. 131 (*colour of fl. wrong*); *Clarke Comp. Ind.* 93. *P. foliolosa*, *DC. Prodr.* v. 451. *Conyza corymbosa*, *Roxb. Fl. Ind.* iii. 426; *Wall. Cat.* 3009. *C. indica*, *Miq. El. Ind. Bat.* ii. 58. *Baccharis indica*, *Linn.*

Salt marshes, &c., from the SUNDERBUNDS to MALACCA and PENANG.—DISTRIB. Malay Islds., China.

A low shrub. *Leaves* 1-2 in., obtuse acute or apiculate, often gland-dotted. *Corymbs* pubescent; heads $\frac{1}{4}$ in. diam.; flowers of disk ♂ 3; of ray ♀, numerous. *Achenes* minute, ribbed, nearly glabrous; pappus scanty, white, spreading.

2. **P. ovalis**, *DC. Prodr.* v. 450; shrubby, pubescent, branches winged, leaves sessile oblong or obovate-oblong coarsely toothed, heads in compound terminal corymbs, outer invol. bracts acute. *Oliv. Fl. Trop. Afr.* iii. 328. *Baccharis ovalis*, *Pers. Synops.* ii. 424.

PUNJAB; in the Salt Range, *Aitchison*.—DISTRIB. N. Africa.

A large shrub. *Branches* with broad green toothed and sinuate wings like *Laggetia pterodonta*. *Leaves* 2-2 $\frac{1}{2}$ by $\frac{3}{4}$ -1 in., tips rounded. *Corymbs* scaberulous; heads $\frac{1}{4}$ in. diam. *Achenes* (young) glabrous.—The wing may be an inconstant character. The specimens are poor, and it may prove a form of *P. tomentosa*.

3. **P. tomentosa**, *DC. in Wight Contrib.* 16; *Prodr.* v. 457; shrubby or tomentose, pubescent, branches not winged, leaves sessile broadly obovate base auricled coarsely toothed, heads in compound terminal corymbs, outer invol. bracts acute. *Clarke Comp. Ind.* 94. *Conyza tomentosa*, *Wall. Cat.* 3031.

UPPER BENGAL, on the Ganges from Futtihpore to Cawnpore. CENTRAL INDIA, SCIND and the DECCAN to TRAVANCORE.

A more or less glandular shrub, 5 ft. high (*Dalzell*). *Leaves* 1 $\frac{1}{2}$ -2 in., often as broad, acute or obtuse. *Corymbs* and heads as in *P. ovalis*. *Pappus* reddish.

4. **P. Wallichiana**, *DC. Prodr.* v. 451; shrubby, glandular-pubescent and scabrid, branches not winged, leaves sessile obovate-oblong faintly toothed, heads in compound corymbs, outer invol. bracts tomentose subacute. *Dalz. & Gibs. Bomb. Fl.* 126; *Clarke Comp. Ind.* 94. *Conyza sessilifolia*, *Wall. Cat.* 3029. *C. Candolleana*, *Boiss. Fl. Orient.* iii. 217.

The PUNJAB, *Falconer, Stewart*. SCIND, *Stocks*. GUZERAT ("only one specimen seen in the whole country, perhaps not indigenous," *Dalzell*).—DISTRIB. Beluchistan.

A tall shrub. *Leaves* 1-2 in., variable in breadth, rigid, nerves raised on both surfaces. *Heads* very similar to those of *tomentosa*.—Wallich gives Srinuggur in Kamrup, as the habitat, but I suspect the specimen is one of Hamilton's and probably western.

5. **P. lanceolata**, *Oliv. Fl. Trop. Afr.* iii. 329; shrubby, hoary-pubescent, leaves sessile very coriaceous oblong or oblanceolate pungent quite entire strongly nerved, heads in compound corymbs, invol. bracts short rounded obtuse. *Berthelotia lanceolata*, *DC. Prodr.* v. 376; *Deless. Ic. Sel.* iv. t. 21; *Boiss. Fl. Orient.* iii. 218. *Conyza lanceolata*, *Wall. Cat.* 2991.

UPPER BENGAL, at Cawnpore, OUDH, and westward to the PUNJAB and SCIND.—DISTRIB. Afghanistan, Beluchistan, N. Africa.

Branches rather slender. *Leaves* 1-2 in., pale when dry, with strong very oblique

nerves on both surfaces. *Heads* longer than broad; invol. contracted at the mouth, outer bracts hoary.

6. ***P. arguta***, Boiss. *Diagn. Ser.* ii. 3, p. 5; shrubby, glandular-pubescent, leaves sessile oblanceolate or obovate pungent coarsely serrate or lobulate base auricled or not, heads peduncled solitary or few not or hardly corymbose, invol. bracts subulate-lanceolate rigid. *P. frutescens*, Benth. in Hook. *Ic. Pl.* xii. t. 1157. *Conyza odontophylla*, Boiss. *Fl. Orient.* iii. 217. *Laggera arida*, Clarke *Comp. Ind.* 92.

SCIND, *Stocks*; Boogta hills, Vicary. PUNJAB, Aitchison.—DISTRIB. Beluchistan.

A stout branched shrub, succulent when near the sea. *Leaves* 1–1½ in., very variable in breadth, from ½–¾ in. *Heads* ¾–1 in. diam., quite different from those of the preceding species, both as to structure and arrangement.

7. ***P. linearifolia***, Clarke *Comp. Ind.* 95; annual, scaberulous, leaves sessile very long linear rigid coriaceous margins recurved toothed, heads clustered at the ends of the long branches of the corymb, outer invol. bracts rounded.

ASSAM, Masters. MISHMI at Jingsha, on the Karam in sandy places, banks of the Lohit below the Dihong (and ? KHASIA Mts.), Griffith.

Stem apparently 2–3 ft., simple below, slender or stout, sometimes as thick as the little finger, corymbosely branched above. *Leaves* 5–8 by ¼–½ in., sessile by a broad base, midrib very stout, nerves very obscure. *Corymb* very scabrid, branches naked, stiff, erecto-patent. *Heads* ¼ in. diam.; invol. bracts scaberulous. *Achenes* not seen; pappus snow-white.—This is a very curious plant, clearly annual, and differing wholly in habit from the preceding but agreeing in the heads and flowers. A ticket with “Khasia” on it is amongst Griffith’s specimens, but no other collector has found it there, and the ticket is probably misplaced.

EXCLUDED SPECIES.

P. EUPATORIODES, Kurz *For. Fl.* ii. 575; *Journ. As. Soc.* 1877, ii. 191; has not been found hitherto within the British border, it is a viscid Siamese shrub, with petioled linear coarsely toothed leaves and corymbs of small heads with broad ovate-lanceolate invol. bracts.

29. **NANOTHAMNUS**, Thoms.

A small rigid woolly herb. *Leaves* alternate, acutely serrate. *Heads* small, subsessile, subterminal and axillary, heterogamous, disciform; outer fl. 1–4, ♀, (rarely 0), filiform, 2–3-toothed, fertile; disk-fl. ♂, few, fertile, tube slender, limb campanulate sub-2-lipped, outer lip 4-lobed, inner free to the base. *Involucre* ovoid; bracts ∞-seriate, lanceolate, dry, inner sub-scarious, outer shorter hispid; receptacle flat, naked. *Anther-bases* sagittate, auricles mucronate or shortly tailed. *Style-arms* of ♂ filiform. *Achenes* obovoid, tip rounded, ribs 5–8 slender; pappus 0 or a minutely 5-toothed crown.

N. sericeus, Thoms. in *Journ. Linn. Soc.* ix. 342, t. 3; Clarke *Comp. Ind.* 96.

The CONCAN, on dry hills, Dalzell, &c.

Root stout, fusiform, woody, annual? *Stems* very many from the root, decumbent or suberect and ascending, 6–8 in. long, pale, rigid. *Leaves* ½–2 in., lanceolate, sessile or contracted into a petiole, rigid, pungent and with irregular pungent teeth, strongly nerved and reticulate. *Heads* ¼ in., in dense clusters.—This curious plant bears some resemblance to a *Blumea* of the *oxydonta* group in habit and foliage.

30. **EPALTES**, *Cass.*

Herbs. *Leaves* alternate, usually decurrent. *Heads* small, solitary or corymbose, heterogamous, disciform; outer fl. ∞ -seriate, ♀, fertile, corolla much shorter than the style, filiform, 2-3-toothed; disk-fl. ♀, usually sterile, tubular, limb 3-5-fid. *Involucre* broad; bracts ∞ -seriate, dry, rigid; receptacle flat or convex or raised, naked. *Anther-bases* sagittate, auricles minute, connate; tails small. *Style* of ♀ subulate, entire or 2-fid. *Achenes* of ♀ subterete, 5-10-ribbed, pappus 0; of ♂ usually abortive, pappus-hairs 2-3, caducous or 0.—**DISTRIB.** Species 9, Tropical Asiatic, African, and American.

1. ***E. divaricata***, *Cass.*; *DC. in Wight Contrib.* 16; *Prodr.* v. 461; heads $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. subsolitary globose, invol. bracts finely acuminate inner longer than the flowers. *Dalz. & Gibs. Bomb. Fl.* 126; *Clarke Comp. Ind.* 96 (*excl. syn. E. pygmæa*); *Wall. Cat.* 2988. *E. linearifolia*, *DC. l. c.* *Ethulia divaricata*, *Linn.*; *Burm. Fl. Ind.* 170, t. 58, f. 1.

WESTERN PENINSULA; watery places from the Concan southwards. **BIIRMA**, at Promé, *Wallich*. **CEYLON**, abundant.—**DISTRIB.** Java, China.

Glabrous, annual, 4-8 in. high, branched from the base; branches divaricate, winged. *Leaves* 1-2½ in., linear, linear-oblong or lanceolate, narrowed at the base, toothed or entire, decurrent. *Heads* on winged peduncles, when ripe dull purplish, with the invol. bracts almost pungent. *Achenes* $\frac{1}{30}$ in., pale, obovate-oblong.

2. ***E. pygmæa***, *DC. Prodr.* v. 461; heads $\frac{1}{6}$ in. diam., invol. bracts broad obtuse or acute shorter than the flowers.

The **CARNATIC**, *Belanger, Wight*.

This occurs in Wight's Herbarium mixed with *E. divaricata*, from which it widely differs in the smaller size, the shape and size of the heads of the invol. bracts, and more still in the achenes, which are not half the size (about $\frac{1}{60}$ in.), more oblong, black and obscurely ribbed. There is a fragment of this in Wallich's Herbarium, collected by Rottler, and mixed with *E. divaricata*.

31. **SPHÆRANTHUS**, *Linn.*

Low annuals with spreading branches. *Leaves* alternate, toothed, decurrent. *Heads* small, in terminal solitary globose clusters, which are usually involucrate by a few empty bracts, sessile on a common receptacle and bracteate or not, heterogamous, disciform; outer fl. ♀, few or many, fertile, slender, minutely 2-3-toothed; disk-fl. ♀, solitary or few, fertile or sterile, tube thickened, limb 4-5-toothed. *Involucre* narrow; bracts narrow, acute, dry, unequal; receptacle small, naked. *Anther-bases* sagittate, auricles acute or tailed. *Style-arms* of ♀ filiform or connate. *Achenes* oblong, subcompressed; pappus 0.—**DISTRIB.** Species 8, Tropical Asiatic, African and Australian.

1. ***S. amaranthoides***, *Burm.*; *DC. Prodr.* v. 370; erect, glabrous, branches not winged, leaves linear-oblong narrowed at the base decurrent obtuse serrulate, clusters of heads subsessile ovoid glabrous, bracts imbricating spinescent. *Clarke Comp. Ind.* 96. *S. zeylanicus*, *Heyne in Wall. Cat.* 3180 A.B. *Oligolepis amaranthoides*, *Wight in Calc. Journ. Nat. Hist.* vii. 161; *l.c.* 1149.

SOUTHERN MYSORE and **TRAVANCORE**; in rice fields, *Wight*. **CEYLON**, not uncommon.

Stem sometimes as thick as the little finger, but short, branches 8-12 in. *Leaves* 2-4 in. *Heads* $\frac{1}{2}$ -1 in.

2. **S. peguensis**, Kurz in Journ. As. Soc. 1877, ii. 283; erect or decumbent, glandular-pubescent, branches winged, leaves strap-shaped or linear-oblong narrowed at the base and decurrent obtuse coarsely serrate, clusters of heads broadly ovoid hirsute, bracts imbricating spinescent. Clarke Comp. Ind. 97. *S. zeylanicus*, Wall. Cat. 3180 C.

BIRMA; banks of the Irawaddi, Wallich. PEGU, Kurz.

Less robust than *S. amaranthoides*, and with the decurrent bases of the leaves continued throughout the nodes, and toothed; clusters of heads shorter and hairy all over.

3. **S. africanus**, Linn. Sp. Pl. 1314; glabrous or pubescent, branches ascending winged, leaves obovate narrowed and decurrent at the bases finely toothed, clusters of heads small globose on winged peduncles glabrous, bracts rounded not imbricating. *S. africanus* and *microcephalus*, Willd. Sp. Pl. iii. 2395. *S. microcephalus*, DC. Prodr. v. 369; Clarke Comp. Ind. 97. *S. indicus*, Kurz in Journ. As. Soc. 1877, ii. 183; Roxb. Hort. Beng. 62; Fl. Ind. iii. 446. *S. africanus*, Wall. Cat. 3179, in part.

Plains of BENGAL and SILHET, and southwards to CEYLON and MALACCA, common in swamps.—DISTRIB. Persia. Africa. Malay Islds. China, Philippines and Australia.

Branches stout or slender, curved, ascending, wing entire. Leaves 1–3 in. Clusters of heads $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., very different from those of the former species, the bracts very small not imbricating nor spinulose, do not conceal the heads. Whole plant fragrant.

4. **S. indicus**, Linn. Sp. Pl. 1314; tomentose or villous, branches ascending with toothed wings, leaves obovate-oblong toothed or serrate, base narrowed and decurrent, clusters of heads on winged peduncles globose or shortly oblong, bracts short slender acuminate. Burm. Fl. Zeyl. t. 94, f. 3. *S. indicus*, Willd. Sp. Pl. iii. 2394. *S. hirtus*, Willd. l. c. 2395; DC. Prodr. v. 369; Kurz in Journ. As. Soc. 1877, ii. 183; Clarke Comp. Ind. 97; Wall. Cat. 3178; Wight Ic. t. 1094. *S. africanus*, Wall. Cat. 3179, in part. *S. mollis*, Roxb. Hort. Beng. 62; Fl. Ind. iii. 446; DC. l. c.; Dalz. & Gibs. Bomb. Fl. 123.—Rheede Hort. Mal. x. t. 43.

TROPICAL HIMALAYA, ascending to 5000 ft., from KUMAON to Sikkim. ASSAM, SILHET, and southwards to CEYLON and SINGAPORE; common in rice fields.—DISTRIB. Africa, Malay Islds., Australia.

32. **PTEROCAULON**, Elliott.

Tomentose herbs. Leaves alternate, decurrent. Heads small, collected in globose, terminal or scattered or spicate clusters, heterogamous, disciform, yellow; outer fl. ♀, many-seriate, fertile, filiform, truncate or 2–3-toothed; disk-fl. ♂, few or solitary, usually sterile, tubular, slender, 5-toothed. Involucre ovoid or campanulate; bracts narrow, few-seriate, inner deciduous with the flowers, outer shorter; receptacle small, naked, hirsute or with deciduous bristles. Anther-bases sagittate; auricles connate, tailed. Style-arms of ♀ filiform, subobtusate. Achenes small, 4–5-ribbed; pappus slender, 1–2-seriate.—DISTRIB. Species 13, all tropical.

P. cylindrostachyum, Clarke Comp. Ind. 98; erect, densely woolly, leaves obovate or oblong obtuse serrate rugose decurrent, clusters of heads sessile globose. P. Billardieri, F. Muell. Descr. Papuan Pl. iii. 43; Kurz in Journ. As. Soc. 1877, ii. 182. Monenteles spicatus, Labill. Sert. Nov. Caled. 43, t. 43. Gnaphalium cylindrostachyum, Wall. Cat. 3931.

BIRMA and the EASTERN PENINSULA, from PEGU southwards.—DISTRIB. Philippine Islds. New Caledonia. Australia.

Robust, 1–2 ft. high; branches erect. *Leaves* 1–1½ in., white beneath. *Heads* ½ in., sessile, horizontal; invol. bracts shining; disk-fl. solitary. *Achenes* sparingly hairy.

33. BLEPHARISPERMUM, Wight.

Glabrous shrubs. *Leaves* alternate. *Heads* small, compressed, in solitary or crowded globose clusters which are sessile on an oblong or cylindric terminal receptacle, heterogamous, discoid; outer fl. ♀, few, fertile, very slender, 3–4-toothed; disk-fl. 2–8, ♂, fertile or not, tubular, 5-fid. *Invol. bracts* 1–2, like the pales, but shorter; receptacle minute or cylindric, with broad rigid pales enclosing the flowers. *Anther-bases* sagittate, auricles subcaudate. *Style-arms* of ♂ linear, stout, obtuse. *Achenes* obcompressed, black, outer on both faces with a ciliate rib, margins ciliate; pappus pales or bristles very unequal, or with 2–3 stronger ones at the angles, or 0 in the sterile achenes.—DISTRIB. 2 Tropical Indian and an African species.

1. **B. petiolare**, DC. in *Wight Contrib.* 12; *Prodr.* v. 268; leaves petioled ovate membranous acuminate, clusters of heads long-peduncled corymbose. *Clarke Comp. Ind.* 98; *Arnott in Mag. Zool. & Bot.* ii. 421; *Wight Ic.* t. 1092; *Deless. Ic. Sel.* iv. t. 19, f. 1.

TRAVANCORE; at Courtallam, Wight.

A glabrous shrub, branches slender. *Leaves* 3–7 in., acuminate; petiole ¼–¾ in. Clusters of *heads* ½–1½ in. diam.; basal bracts broad; heads 4-fid.; ♀ fl. 2, pappus of a few bristles; achenes compressed, margins ciliate; fl. ♂ 2; pappus 0; achenes small, empty.

2. **B. subsessile**, DC. in *Wight Contrib.* 12; *Prodr.* v. 368; leaves subsessile ovate or elliptic obtuse coriaceous finely reticulate, heads solitary shortly peduncled. *Clarke Comp. Ind.* 98; *Wight Ic.* t. 1093; *Deless. Ic. Sel.* iv. t. 19, f. 2. *Leucoblepharis subsessilis*, Arn. in *Mag. Zool. & Bot.* ii. 422; *Dalz. & Gibs. Bomb. Fl.* 123; *Wall. Cat.* 7524 (DC.).

The CONCAN, CANARA and MYSORE; on the Ghats.

A glabrous undershrub, with a woody rootstock. *Leaves* 1½–5 by ¾–2½ in., shining on both surfaces, narrowed into the petiole. Clusters of *heads* globose, 1–1½ in. diam., with leafy bracts at the base, 5–10-fid.; fl. ♀ 2, pappus of a few hairs, achenes compressed almost villous with long hairs; fl. ♂ 3–8, pappus like the ♀ and achenes smaller.

34. ATHROISMA, DC.

A viscid glabrous or pubescent annual. *Leaves* alternate, petioled, pinnatifid. *Heads* small, in globose or ovoid terminal peduncled clusters which are sessile on a common cylindrical receptacle, heterogamous, disciform; outer fl. ♀, very few, filiform, 2–3-toothed, fertile; disk-fl. ♂, fertile, tubular, limb campanulate shortly 4-fid. *Invol. bracts* 1–2, like the pales, but shorter; receptacle cylindric, with broad dry pales enclosing the flowers. *Anther-bases* sagittate; auricles connate, acute. *Style-arms* of ♀ short, flattened, very obtuse. *Achenes* black, inner face flat, outer convex, margin ciliate; pappus a short stellately spreading fimbriate corona.

A. laciniatum, DC. *Prodr.* v. 369; *Clarke Comp. Ind.* 98. *Sphaeranthus laciniatus*, Wall. *Cat.* 3184 (DC.).

BENGAL, from the Hoogly at Rajmahal, eastwards to ASSAM, and southwards to BIRMA and TENASSERIM.—DISTRIB. Java.

Simple or branched from the base; branches ascending 6-18 in., soft. *Leaves* few, 1-2 in.; segments oblong, toothed. Clusters of heads $\frac{1}{2}$ -1 $\frac{1}{2}$ in. long.

35. **FILAGO**, Linn.

Small woolly herbs. *Leaves* alternate. *Heads* small, sessile in crowded terminal and axillary clusters which are often enclosed by floral leaves, heterogamous, disciform; outer fl. ♀, ∞-seriate, fertile, filiform, 2-3-toothed; disk-fl. ♂, few, fertile or not; limb scarcely dilated, 4-5-toothed. *Invol. bracts* 2-∞-seriate, scarious, inner gradually passing into the pales, but shorter than these; receptacle cylindric, obconic or flat and constricted at the base; pales at the base of the outer of all the flowers, hyaline, concave. *Anther-bases* sagittate; auricles small, tails short slender. *Style-arms* of ♂ oblong or linear, obtuse. *Achenes* minute, subterete or compressed, tip rounded, not ribbed; pappus of inner ♀ and ♂ 1-2-seriate, slender, scabrid; of outer ♀ 0 or scanty. —**DISTRIB.** Species about 8, natives of the old world.

1. **F. germanica**, Linn.; *DC. Prodr.* vi. 247; woolly all over, branched from the base, branches dichotomous divaricating, leaves obovate-oblong apiculate, clusters of heads surrounded by leafy bracts longer than themselves, invol. bracts erect in fruit acuminate outer awned. *Clarke Comp. Ind.* 99. *Gnaphalium hurdwaricum*, Wall. *Cat.* 2951; *DC. l. c.* 231.

Plains and Mts. of NORTH-WESTERN INDIA, from Cawnpore in the plains and Kumaon in the Himalaya westward to Afghanistan, ascending to 8000 ft. in TIBET. —**DISTRIB.** Westwards to the Canaries.

An erect or prostrate slender annual. *Stems* or branches 2-6 in., flexuous. *Clusters* terminal in the forks of the branches, $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., shorter than the leafy bracts; heads 6-20, $\frac{1}{8}$ in. long, glistening, yellowish.—The Indian specimens appear mostly to belong to the prostrate form, *F. spatulata*, Presl (*Boiss. Fl. Orient.* iii. 246), including *F. prostrata*, Parlature, with the leafy bracts longer than the clusters.

2. **F. arvensis**, Linn.; *Boiss. Fl. Orient.* iii. 247; woolly all over, branched from the base, branches erect with erect divisions, leaves linear-lanceolate erect, clusters of heads axillary and terminal surrounded by leafy bracts shorter than themselves, invol. bracts spreading in fruit obtuse, outer with scarious tips. *Clarke Comp. Ind.* 99, *excl. syn.*

NORTH WEST INDIA, Falconer. WESTERN TIBET; Iskardo and Dras, alt. 7-9000 ft., Clarke.—**DISTRIB.** Westward to the Canaries.

There are two forms, one tall and stout, the other more slender and decumbent, like *F. germanica*. It is not a common North Western plant, as supposed by Clarke, who has confounded it with *F. germanica* in his "Compositæ Indicæ."

36. **IFLOGA**, Cass.

Herbs or small shrubs. *Leaves* alternate, small or slender, often clustered. *Heads* small, solitary or clustered, sessile, forming leafy spikes, heterogamous, disciform; outer fl. ♀, 1-∞-seriate, fertile, very slender, obscurely toothed; disk-fl. ♂, sterile, limb 5-toothed. *Invol. bracts* few; receptacle cylindric below or slightly elevated, top flat naked, with an outer ring of scarious pales as long as the bracts. *Anther-bases* sagittate, tails very slender. *Achenes* glabrous, of ♀ fl. small, oblong, pappus 0; of ♂ pappus hairs few, 1-seriate, feathery.—**DISTRIB.** Species 8, one Indian, the rest N. African.

1. **Fontanesii**, Cass. in *Dict. Sc. Nat.* xxiii. 14; annual, branched from the base, branches ascending densely leafy, leaves narrowly linear spreading

acute, heads 2-3-nate nestling amongst the leaves throughout the length of the branches reddish, invol. bracts scarious aristate. *I. cauliflora*, *Clarke Comp. Ind.* 99. *I. spicata*, *Schultz-Bip.*; *Boiss. Fl. Orient.* iii. 248. *Trichogyne cauliflora*, *DC. Prodr.* vi. 266. *Gnaphalium spicatum*, *Vahl.* *G. anemophilum*, *Wall. Cat.* 2943.

UPPER GANGETIC PLAINS, from Saharunpore westwards to the frontier.—DISTRIB. Westward to the Canaries.

Woolly or glabrate. *Branches* 4-6 in. high, 1 in. diam. across the leaves, densely clothed with leaves and heads. *Heads* $\frac{1}{2}$ in. long, glistening, glabrous; invol. bracts and pappus red.

37. **ANTENNARIA**, Gaertn.

Tufted perennial herbs, woolly or tomentose. *Leaves* spathulate, quite entire, radical, often rosulate. *Heads* solitary or in terminal corymbs, disciform, dioecious; fl. ♀ all fertile, filiform, truncate or minutely toothed; ♂ sterile, tubular, limb campanulate 5- rarely 4-fid. *Involucre* ovoid or campanulate; bracts ∞-seriate, scarious, innermost woolly; recept. convex or nearly flat, pitted, naked. *Anther-bases* sagittate, auricles connate caudate. *Styles* of ♂ undivided or 2-fid., tips obtuse or truncate. *Achenes* of ♀ small, oblong, terete or sub-compressed, not ribbed; pappus-hairs of ♀ copious, slender, connate at the base; of fl. ♂ fewer, crisped.—DISTRIB. Species about 10, mountain plants of various countries.

The dioecious flowers are the only character that distinguishes this genus from *Anaphalis*.

1. **A. nana**, *Hook. f. & Thoms.*; *Clarke Comp. Ind.* 100; stemless, leaves spreading $\frac{1}{2}$ -1 in., heads sessile solitary, invol. bracts linear-lanceolate acute upper half and margins hyaline.

WESTERN TIBET; Nubra and Shayuk valleys, &c., alt. 12-14,000 ft., *Thomson*.

A densely tufted woolly herb, 1-3 in. high. *Leaves* linear spathulate or oblanceolate, woolly on both surfaces. *Heads* small, sessile amongst the leaves or shortly peduncled, $\frac{1}{2}$ in. diam., dioecious. *Pappus* copious, white, hairs slender, tips not dilated or bearded.—An anomalous *Antennaria*, the pappus of the ♀ not being bearded or dilated at the tip.

2. **A. muscoides**, *Hook. f. & Thoms.*; *Clarke Comp. Ind.* 100; leaves minute densely imbricate, heads solitary sessile, invol. bracts linear-oblong subacute almost wholly hyaline.

SIKKIM HIMALAYA in the interior ranges; alt. 16-18,000 ft., *J. D. H.*

There are two forms of this, one is quite moss-like, very compactly tufted, forming great white cushions on the bare ground; its leaves are about $\frac{1}{18}$ in. long, closely imbricated with the rounded blade spreading starlike on the surface of the mass; the other grows more loosely, with spathulate spreading leaves $\frac{1}{2}$ in. long. Pappus hairs connate at the base, as are those of *A. nana*.

38. **LEONTOPODIUM**, Br.

Perennial tufted woolly herbs, with simple leafy flowering stems. *Leaves* quite entire. *Heads* small, sessile in involucre clusters, disciform, unisexual or 2-sexual with the ♀ flowers outermost; fl. ♀ fertile, filiform, truncate or minutely toothed; fl. ♂ tubular, sterile, limb campanulate 5-fid. *Involucre* campanulate, bracts ∞-seriate, scarious, inner acute or with a spreading petaloid limb, outer smaller, outermost woolly; recept. convex, naked. *Anther-bases* sagittate, auricles with slender tails. *Styles* of ♂ usually entire, obtuse or truncate. *Achenes* of ♀ small, oblong, subterete, not ribbed; pappus hairs slender,

1-seriate, shortly bearded, bases sub connate.—DISTRIB. Species 5, on the mountains of Europe and Asia.

L. alpinum, Cass.; *DC. Prodr.* vi. 275; *Reichb. Ic. Fl. Germ.* t. 947; *Clarke Comp. Ind.* 100. *L. himalayanum*, *DC. l.c.* *L. monocephalum*, *Edgew. in Trans. Linn. Soc.* xx. 73. *Gnaphalium pulchellum*, *Wall. Cat.* 2945.

ALPINE HIMALAYA and TIBET, ascending from 10,000 to nearly 18,000 ft.—DISTRIB. Alps of Europe and Central Asia.

This, the Edel-Weiss of the European Alps, is very variable in habit and in the length of foliage, amount of woolliness and size of the involucriform leaves; the rosulate lower leaves vary from obovate-oblong and $\frac{1}{4}$ in. long, to linear and $1-1\frac{1}{2}$ in. long, equally woolly on both surfaces or less so or almost glabrate above; flowering stem 1-8 in., erect or ascending, slender or stout, sparingly or densely leafy or woolly; cauline leaves sessile or $\frac{1}{2}$ -amplexicaul, linear or linear-oblong, rarely obovate, obtuse or acute; involucriform leaves $\frac{3}{4}$ -1 in. long, linear or dilated upwards, spreading or recurved, almost always densely clothed with yellowish wool, always longer than the cluster of heads. *Heads* monœcious, $\frac{1}{4}$ in. long; invol. bracts erect, scarious, oblong-lanceolate, acuminate, tipped with purple. *Achenes* papillose if fertile, smooth if sterile; pappus hairs of ♀ filiform, of ♂ thickened towards the tips.

VAR. *Stracheyi*; stem 12 in. filiform nearly glabrous, radical leaves 0, cauline lanceolate acuminate base auricled cobwebby above, snow-white and woolly beneath.—Kumaon at Tola, alt. 11,500 ft., *Str. & Winterb.* Nipal, *J. Scully*. This appears to me to be a state of *L. alpina*, drawn up amongst rocks, but it is a very peculiar one.

39. **ANAPHALIS**, *DC.*

Perennial, rarely annual, erect, cottony or woolly, rarely pubescent or glabrate herbs. *Leaves* alternate. *Heads* small, corymbose, heterogamous with the ♀ fl. outermost, or unisexual or subdiœcious, disciform; fl. ♀ numerous, filiform, fertile, 2-4-toothed; fl. ♂ usually sterile, tubular, limb subcampanulate 5-fid. *Involucre* campanulate turbinate or sub-globose; bracts ∞-seriate, scarious, inner with a petaloid limb, outer shorter, outermost woolly; receptacle naked. *Anther-bases* sagittate; auricles connate, tailed. *Style* of ♂ filiform, obtuse, subcapitate or 2-cleft. *Achenes* very small, oblong; pappus hairs of ♀ 1-seriate, slender, scabrid, quite free and caducous, of ♂ often thickened at the tips.—DISTRIB. Species about 25, chiefly temperate and mountain plants of Asia and America.

It is difficult to conceive a more troublesome assemblage of plants to discriminate and describe than this genus presents. The following arrangement of the Indian species is quite artificial. I have vainly sought good characters in the number of the flowers and of ♂ and ♀ flowers in a head; these vary much in the same plant, and in different plants of the same species, and I suspect that the size of head which differs in very similar plants and which is relied on as a specific character in often only a sexual one. In some (as *A. oblonga*) the disk-flowers are all fertile, thus breaking down the character between this genus and *Gnaphalium*; in fact the differences between these genera and *Helichrysum*, *Antennaria* and *Leontopodium* are artificial and hardly sufficient for practical purposes.

SERIES I. *Heads* large, $\frac{1}{2}$ - $\frac{2}{3}$ in. diam. (except in *A. xylorhiza* and *Royleana*), more or less stellately spreading, acute or acuminate, white.—All Himalayan and mostly Alpine.

1. **A. nubigena**, *DC. Prodr.* vi. 272; dwarf, softly woolly or cottony, stems simple tufted 1-8 in., leaves elliptic or lanceolate or lowest obovate-spathulate 1-nerved acute or with a naked point or awn, base contracted, heads 1 or few $\frac{1}{2}$ -1 in. diam., invol. bracts lanceolate obtuse or subacute $\frac{1}{4}$ to more than $\frac{1}{2}$ in. long.

ALPINE HIMALAYA and TIBET, alt. 12–16,000 ft. The following forms have very unstable characters.

VAR. 1. *nubigena proper*; stems 3–8 in. slender, leaves narrow and scattered usually $\frac{1}{4}$ – $\frac{1}{2}$ in., heads solitary rarely 2–3 $\frac{2}{3}$ –1 in. diam. *A. nubigena*, *monocephala* and *mucronata*, DC. l. c. *A. nubigena* and *mucronata*, Clarke Comp. Ind. 105, 106. *Gnaphalium nubigenum*, Wall. Cat. 2935.

VAR. 2. *intermedia*; slender, 3–8 in., leaves longer $\frac{1}{4}$ – $\frac{3}{4}$ in. as in var. 1., heads 1–5 corymbose smaller often crowded. *A. nubigena* β . *polylephala*, Clarke Comp. Ind. 106. *Antennaria triplinervis* γ . *intermedia*, DC. l. c. 270. *Gnaphalium intermedium*, Wall. Cat. 2936, *in part.*—This passes insensibly into *A. cuneifolia*. There is a great mixture of this and Var. 1 in Wallich's Herbarium, and from the description I suspect that De Candolle had specimens of the following under his eye when describing *A. triplinervis*, var. *intermedia*.

2. ***A. cuneifolia***, Hook. f.; softly woolly or cottony, stems several ascending slender 6–12 in. often stoloniferous, leaves 1–2 in. linear-oblong or obovate-oblong or the lower spatulate $\frac{1}{2}$ -amplexicaul acute and aristate, heads $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. corymbose, invol. bracts $\frac{1}{2}$ in. lanceolate acute or obtuse white. *Gnaphalium cuneifolium*, Wall. Cat. 2934, *except left-hand specimen*. *Antennaria triplinervis* var. *cuneifolia*, DC. Prodr. vi. 270. *Helichrysum stoloniferum* and ? *elegans*, Don Prodr. 176. *Elichrysum nepalense*, Spreng. Syst. Veg. iii. 485.

TEMPERATE and ALPINE HIMALAYA; from 8–12,000 ft. in Kashmir, and from 9–13,000 ft. in Sikkim, abundant.

It is impossible to distinguish small states of this from large ones of *nubigena*, var. *intermedia*, though on the whole this retains its characters throughout the length of the Himalaya.

3. ***A. Royleana***, DC. Prodr. 272; stems many from the root 4–6 in. woody below leafy, leaves $\frac{3}{4}$ –1 $\frac{1}{4}$ in. sessile linear or linear-oblong obtuse or acute woolly beneath or on both surfaces 1-nerved flat or margins recurved, heads $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. in rounded corymbs, invol. bracts $\frac{1}{2}$ – $\frac{1}{4}$ in. ovate obtuse or acute white.

ALPINE HIMALAYA, alt. 9–15,000 ft.; Kunawar, Royle, &c.

VAR. 1. *Royleana proper*; leaves puberulous or scaberulous above. *A. Royleana* and *polylepis*, DC. l. c. *A. polylepis*, Clarke Comp. Ind. 104. Pangi and Werang Pass, alt. 10–13,000 ft.—Royle's specimens do not show the woody base of the stem, which is the only described difference between this and *A. polylepis*, DC., except the size of the heads, which vary much, being sometimes as small as in *A. contorta*. The invol. bracts vary in length and acuteness, and the outer have a broad thickened coloured claw as in *A. xylorhiza*. *A. Royleana* of Clarke (Comp. Ind. 104) is *A. Griffithii*.

VAR. 2, *concolor*; leaves uniformly clothed on both surfaces with soft white or grey tomentum rarely apiculate. *A. chionantha*, Herb. Ind. Or. H. F. & T. *Gnaphalium canum*, Wall. Cat. 2942, *in part.*—Alpine Himalaya, alt. 9–13,000 ft. Kunawar, Jacquemont, &c. Mana, Edgeworth. Sikkim, alt. 13–15,000 ft., J. D. H.

VAR. 3. *cana*; stems very numerous and slender, leaves 1–1 $\frac{1}{2}$ in. more or less woolly or cottony on both surfaces very narrow margins often revolute. *Antennaria chionantha*, var. *cana*, DC. l. c. *Gnaphalium canum*, Wall. Cat. 2942, *in part.*—Specimens with broader leaves not revolute at the margin are with difficulty distinguished from forms of *A. cuneifolia*.

4. ***A. Griffithii***, Hook. f.; stems 12–18 in. erect or ascending slender leafy, leaves beneath densely clothed with white or sub-cinnamomeous wool, leaves 1–1 $\frac{1}{2}$ in. linear acute or apiculate $\frac{1}{2}$ -amplexicaul above white or grey woolly or cobwebby 1-nerved margins flat or revolute, heads many $\frac{1}{2}$ -in. diam. in usually open corymbs, invol. bracts $\frac{1}{2}$ in. ovate or elliptic-ovate subacute white. *A. Royleana*, ? Herb. Ind. Or. H. F. & T.; Clarke Comp. Ind. 104.

EAST NIPAL; Tambur river, alt. 6-8000 ft., *J. D. H.* KHASIA MTS., *Griffith* (Kew Dist. 3231), at Pomrang, alt. 5000 ft., *J. D. H. & T. T.*

I advance this species with great hesitation; it is intermediate between *Royleana* and *cinnamomea*, but is much larger than the former in all its parts and more robust, and it differs from the latter species in its smaller foliage and larger heads with more spreading bracts. This is certainly not *A. Royleana*, DC., of which I have seen authentic specimens since the distribution of the Indian Herbarium.

5. ***A. triplinervis***, *Clarke Comp. Ind.* 105; stems rather stout often flexuous leafy and leaves beneath densely clothed with white wool, leaves 3-8 in. obovate or elliptic-oblong acute amplexicaul 3-5-nerved cobwebby above, heads $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. in open or close corymbs, invol. bracts $\frac{1}{2}$ in. long ovate-lanceolate acute or subacute white. *Antennaria triplinervis*, *Sims Bot. Mag.* t. 2468; *DC. Prodr.* vi. 270, excl. var. β and γ ; *Don Prodr.* 174. *Gnaphalium perfoliatum*, *Wall. Cat.* 2937. *G. cynoglossoides*, *Trevir. in Nov. Act. Nat. Cur.* xiii. i. 200.

TEMPERATE HIMALAYA; alt. 6-10,000 ft., from Kashmir to Bhotan.

A very much larger more robust plant than *A. nubigena*, var. *intermedia*, with the leaves sometimes 3 in. diam. and strongly amplexicaul or even auricled at the base; but small specimens come very close to large ones of that plant.

6. ***A. subumbellata***, *Clarke Comp. Ind.* 108; pubescent and glandular, greenish brown when dry, stem 12-16 in. erect rather slender leafy, leaves 1-2 in. linear-oblong acute or apiculate $\frac{1}{2}$ -amplexicaul obscurely 3-nerved green above and beneath lowest spatulate, margins flat, heads many $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. in rounded or subumbellate corymbs, invol. bracts nearly $\frac{1}{2}$ in. lanceolate acute white.

SIKKIM HIMALAYA; Lachoong valley, alt. 10-12,000 ft., *J. D. H.*

A very distinct species, rather viscid, with sweet-smelling foliage when fresh, as in *A. Hookeri*, which it a good deal resembles except in the larger heads.

7. ***A. xylorhiza***, *Schultz-Bip. mss.*; clothed with soft spreading brown wool, root very stout woody twisted, crown divided into many densely tufted very short stout branches clothed with membranous leaf bases and tufted linear-spathulate leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. long, flowering stems 1-3 in. scape-like with linear-oblong sessile leaves, heads many $\frac{1}{2}$ in. diam. clustered, invol. bracts about $\frac{1}{2}$ in. long ovate subacute with a broad brown claw $\frac{1}{2}$ the length of the blade.

SIKKIM HIMALAYA; Tibetan region, alt. 10-17,000 feet., *J. D. H.* Bagdwar in Kumaon, alt. 8000 ft., *Strach. & Winterb.*

A very distinct species, gathered late, and I am hence uncertain whether the invol. bracts always spread in a flowering state, their form is more that of the next section. The plant in Herb. Strach. & Wint. has rather larger heads and more lanceolate invol. bracts, but is, I think, the same species.

SERIES II. Heads $\frac{1}{6}$ - $\frac{1}{2}$ in. diam.; invol. bracts erect incurved or somewhat recurved, stellately spreading only after flowering.

*. *Leaves flat, margins rarely recurved, 3-7-nerved.*—Usually tall, stout, leafy species. (See *A. triplinervis* in Series I., *A. oblonga* and *zeylanica* in **).

8. ***A. cinnamomea***, *Clarke Comp. Ind.* 104; stems 1-2 ft. usually simple rather robust leafy and leaves beneath densely clothed with white grey or cinnamomeous wool, leaves 2-4 in. spreading or horizontal tapering from the middle to a $\frac{1}{2}$ -amplexicaul simple or auricled base and to the acute point glabrous or woolly above 3-5-nerved, heads very many subglobose $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., invol. bracts $\frac{1}{2}$ in. elliptic-ovate obtuse erect or incurved white opaque. *Antennaria cinnamomea*, *DC. Prodr.* vi. 270. *A. Timmia*, *Don Prodr.* 174. *Gnaphalium cinnamomeum*, *Wall. Cat.* 2944. *G. Wightianum*, *Thwaites Enum.* 166, in part (*C. P.* 568).

TEMPERATE HIMALAYA; from Kashmir, alt. 4-9000 ft. to Sikkim and Bhotan, alt. 5-10,000 ft. KHASIA MTS., alt. 4-6000 ft. CEYLON; central province, alt. 5-8000 ft., *Thwaites*.—DISTRIB. Upper Birma, N. China and Japan.

Very similar to the American, *A. margaritacea*, but the leaves are 3-nerved and usually cinnamomeous beneath; they vary from $\frac{1}{8}$ - $\frac{3}{8}$ in broad, and when very narrow are only 1-nerved, margins generally flat. Corymbs usually much branched.

9. **A. Hookeri**, *Clarke mss.*; stem 1-2 ft. simple or corymbosely branched glandular-pubescent leafy, leaves 2-4 in. spreading narrowly lanceolate tapering from the auricled $\frac{1}{2}$ -amplexicaul base to the acuminate point 3-nerved sparsely cobwebby or cottony and subglandular both surfaces greenish-brown when dry margins flat, heads very small $\frac{1}{8}$ in. diam. globose in broad much-branched corymbs, invol. bracts $\frac{1}{10}$ in. long broadly ovate obtuse white opaque.

SIKKIM HIMALAYA; Lachen and Lachoong valleys, alt. 9-11,000 ft., *J. D. H.*

A very distinct looking species, but allied to *A. subumbellata* in its glandular pubescence and habit.

10. **A. adnata**, *DC. Prodr.* vi. 274; stem simple stout leafy 2-4 ft. densely clothed with white silky or cottony wool, leaves 2-5 in. suberect obovate oblong sub-spathulate or lanceolate acute or obtuse leathery 1-3-nerved narrowed to the $\frac{1}{2}$ -amplexicaul base, heads numerous $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. subglobose in dense rounded clusters on the stout branches of a large corymb or in a simple terminal cluster, invol. bracts $\frac{1}{2}$ in. long rounded-ovate obtuse white opaque. *Clarke Comp. Ind.* 108. *Gnaphalium adnatum*, *Wall. Cat.* 2948.

TEMPERATE HIMALAYA, alt. 6-8000 ft., from Simla eastwards to Bhotan. KHASIA MTS., alt. 4-6000 ft. MARTABAN, alt. 5-7000 ft.

In its fullest development much the largest, stoutest, and largest-leaved Indian species, with stem as thick as the middle-finger, and obovate-spathulate 3-nerved leaves attaining $1\frac{1}{2}$ in. diam.; it, however, grows more slender with leaves $\frac{1}{2}$ in. diam. and 1-nerved. The white woolly clothing is very uniform; the root appears annual.

11. **A. fruticosa**, *Hook. f.*; shrubby, branches stout terete woody covered below with persistent leaf-bases produced beyond the leaves into a long slender cottony flowering branch, leaves 1-2 in. crowded spreading oblanceolate obtuse narrowed from beyond the middle 3-nerved coriaceous margins flat glabrous above beneath clothed with appressed cinnamomeous wool, heads many $\frac{1}{2}$ in. diam. campanulate in a large branched open corymb, longer invol. bracts $\frac{1}{4}$ in. narrowly obovate-oblong obtuse recurved white shining. *Gnaphalium Wightianum*, *Thwaites Enum.* 166 (C.P. 132).

CEYLON; Adam's Peak, *Thwaites*.

Apparently a very distinct species, but I have seen only one specimen; it differs wholly from *Wightiana* in habit, form and colour of foliage, and in the campanulate heads. The woody terete branch is nearly as thick as a goose-quill, the leaves are widest beyond the middle and coloured underneath like *A. cinnamomea*, which differs in the globose heads with broader shorter bracts. It is most like a very large form of *A. marcescens*, but the large heads and bracts are quite different.

12. **A. Beddomei**, *Hook. f.*; clothed with appressed grey cottony wool, stem stout 1-2 ft. leafy simple, leaves 2-3 in. elliptic-lanceolate from a sessile $\frac{1}{2}$ -amplexicaul narrowed base strongly 5- (upper 3-) nerved, heads $\frac{1}{8}$ in. diam. sessile subglobose in dense rounded corymbous clusters, invol. bracts $\frac{1}{2}$ in. elliptic-oblong obtuse white glistening.

WESTERN PENINSULA, *Beddome*.

A beautiful species, just received from Colonel Beddome without locality, easily recognised by the elliptic lanceolate 5-ribbed leaves. There are about as many ♀ as hermaphrodite flowers, and it may be referable to *Gnaphalium*.

** Leaves 1- (very rarely 3-) nerved, $\frac{1}{2}$ -4 in.: margins usually flat, or slightly recurved when dry, but strongly recurved in many forms, more rarely in *araneosa*. (See also *A. contorta* and *zeylanica* in ***)

13. **A. araneosa**, DC. *Prodr.* vi. 109: stem 1-3 ft. erect usually much branched more or less winged by the decurrent leaf-bases pubescent and glandular or cottony or woolly leafy, leaves suberect or spreading 1-4 in. tapering from a narrow or broad $\frac{1}{2}$ -amplexicaul often auricled and sometimes decurrent base to an acuminate point, margins generally recurved at the base only puberulous or cottony beneath or on both surfaces 1-nerved, heads $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. subglobose in subglobose clusters or in large open much branched corymbs, invol. bracts $\frac{1}{12}$ - $\frac{1}{10}$ in. elliptic obtuse white opaque. *Clarke Comp. Ind.* 109. *Gnaphalium* Busua, *Ham. in Don Prodr.* 173. G. semidecurrens, *Wall. Cat.* 2947 A. G. ? decurrens, *Ham. in Wall. Cat.* 2939. ? G. villosissima, *Don Prodr.* 175.

TEMPERATE HIMALAYA; from Maffi and Simla. alt. 5-8000 ft., to Sikkim, alt. 6-10,000 ft. KHASIA Mts., alt. 4-7000 ft.

I find it impossible to limit the varieties of this in respect of glabrousness or woolliness. Royle's specimens have a very little cottony wool, but are otherwise puberulous or glandular only, and the same form occurs in the Khasia; Wallich's *semidecurrens* has leaves white and cottony beneath, and others are cottony and white all over. A Khasian form connects it with *A. contorta*. The glandular forms are sweet-scented like *A. subumbellata*, which has never so broadly branched a corymb.

14. **A. oblonga**, DC. *Prodr.* vi. 174; softly cottony and white, stems usually many ascending from the root 4-18 in. slender or stout leafy, leaves $\frac{3}{4}$ -1 $\frac{1}{2}$ in. erect and spreading oblong or obovate or linear-oblong acute from a broad $\frac{1}{2}$ -amplexicaul base rarely narrowly linear cottony on both surfaces, margins flat, nerves 1 rarely 3 very obscure, heads turbinate $\frac{1}{2}$ in. diam. sessile densely crowded in rounded corymbose clusters, invol. bracts $\frac{1}{6}$ in. linear-oblong white or pink glistening. *Clarke Comp. Ind.* 112. *Gnaphalium indicum*, *Thwaites Enum.* 166. G. subdecurrens, DC. in *Wight Contrib.* 21. G. semidecurrens, *Wall. Cat.* 2947 B.

WESTERN GHATS, from the BABABOODEN to the PULNEY Mts., alt. 6-8000 ft., *Heyne, &c.* CEYLON; central Province, ascending to 7000 ft.

The uniform white cottony clothing and usually short broad leaves with flat margins and indistinct midrib beneath, small heads, and acuminate bracts, distinguish this at once from the others. It is exceedingly variable in habit. *Gnaphalium subdecurrens*, DC., is no doubt, as Wight states, a state of *A. oblonga* with perfect disk flowers, the styles of which are 2-fid (as indeed they are in most of the Indian species); it unites *Gnaphalium* with *Anaphalis*. I find the same character in Ceylon specimens, whence Thwaites technically referred the plant to *Gnaphalium*, though it is not Linnaeus's *G. indicum*. The globose clusters of heads are sometimes disposed in forked cymes.

VAR. *elliptica*; stem stouter more leafy upwards, leaves broader sometimes 1 in. diam. obscurely 3-5-nerved. A. ? elliptica, DC. *Prodr.* vi. 274; *Wight Ic. t.* 1118 (bad); *Clarke Comp. Ind.* 112.—Neilgherry Mts., *Wight, &c.*—I do not see how this is distinguished, except by habit, from *A. oblonga*. Clarke describes the invol. bracts as yellow, but they are as often white or pink. Styles of the ♂ fl. deeply cleft.

VAR. *Lawii*; stout, erect, very cottony and leafy, leaves 1-3 in. linear obtuse or acute, invol. bracts white or pale straw coloured.—Bababooden hills, *Law*; Mercara, *Hohenacker*.

15. **A. Stoliczkaei**, *Clarke Comp. Ind.* 108; grey with thin cottony pubescence, stem much corymbosely branched leafy, leaves 1-1 $\frac{1}{2}$ in. linear-oblong or ovate from a broad base acute 1-nerved, margins flat, heads $\frac{1}{4}$ in. diam., peduncles subcampanulate forming small corymbs terminating the branches,

invol. bracts few $\frac{1}{2}$ in. linear-oblong obtuse somewhat recurved lower half hard green upper white opaque.

WESTERN TIBET, alt. 5-10,000 ft., *Stoliczka, Jaeschke*.

The only specimen I have seen is the top, 10 in. long, of a stem, which is flexuous and gives off many slender branches terminated by the corymb. Clarke states that its discoverer found it in many places in Tibet. Its nearest ally is *A. virgata*, which differs in the narrow leaves with revolute margins and the less hardened invol. bracts; but I suspect it to be a state of that plant.

16. **A. Thwaitesii**, *Clarke Comp. Ind.* 110; thickly clothed except sometimes the leaves above with dense white or buff cottony wool, stem short stout very woody much branched below, branches 6-10 in. stout below and densely leafy, above slender and sparsely leafy, leaves $\frac{3}{4}$ -1 in. spreading obovate-oblong or spathulate thick obtuse nerveless, margins flat, upper smaller, heads $\frac{1}{2}$ in. diam. turbinate peduncled, invol. bracts $\frac{1}{4}$ in. elliptic-lanceolate acute white rather spreading. *Gnaphalium Wightii*, *Thwaites Enum.* 165, in part (C.P. 528, 2048).

CEYLON; Central Province, alt. 7-8000 ft., *Walker, &c.*

A handsome and very distinct species, with large white heads approaching those of Series I.

17. **A. Notoniana**, *DC. Prodr.* vi. 273; thickly clothed with soft tawny wool, subcorymbosely branched from the base, branches 4-8 in. stout uniformly leafy throughout corymbosely branched at the top, leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. often imbricate erect and recurved oblong from a broad $\frac{1}{2}$ -amplexicaul base very obtuse equally woolly above and beneath 1-nerved, heads $\frac{1}{2}$ in. diam. campanulate or crowded in branched corymbs, invol. bracts $\frac{1}{6}$ in. erect and densely imbricate in many series oblong obtuse scarious wrinkled yellow or pinkish glistening. *Wight Ic.* t. 1116; *Clarke Comp. Ind.* 109. *Helichrysum Notonianum*, *DC. in Wight Contrib.* 20. *Gnaphalium Notonianum*, *Wall. Cat.* 2952. *G. Sp.*, *Wall. Cat.* 2933 (according to *De Candolle*).

NILGHERY Mts., alt. 8000 ft., *Noton, &c.*; at Ootacamund and Cochin, *Wight*.

A remarkable species; the invol. bracts are quite unlike those of any other. The single nerve of the leaf is seen only after removal of the thick wool; the leaf-margins seem never to be recurved except at the very base.

18. ? **A. cutchica**, *Clarke Comp. Ind.* 111; thinly clothed with grey cottony wool, branches 6-10 in. from a woody stock leafy below very slender and nearly leafless above, leaves 1-2 in. slender gradually dilated upwards from a narrow base acute 1-nerved, heads $\frac{1}{6}$ in. long few subcorymbosely oblong, invol. bracts $\frac{1}{6}$ in. few erect linear-oblong obtuse hard yellow shining.

CUTCH, *Dr. Stoliczka*.

Very distinct from any foregoing species, but possibly not an *Anaphalis*, which the involucre is very unlike; the specimens are insufficient to determine this point.

*** Leaves $\frac{1}{2}$ -4 in., 1-nerved; margins usually strongly recurved, but often flat in *A. contorta* and *zeylanica*. (See also under ** *A. araneosa* and *oblonga*.)

19. **A. contorta**, *Hook. f.*; stems 4-24 in. stout or slender, branches prostrate or ascending leafy and leaves beneath or on both surfaces cottony, leaves $\frac{1}{2}$ -1 in. sessile $\frac{1}{2}$ -amplexicaul often very crowded spreading and twisted narrowly linear or oblong from usually a broad or auricled base acute or obtuse 1-nerved, margins often revolute, heads $\frac{1}{2}$ in. diam. subglobose in dense simple or lobed contracted corymbosely clusters, invol. bracts $\frac{1}{10}$ in. broadly ovate or oblong obtuse white or yellowish, outer often purplish with broad coloured glistening

bases. *A. tenella*, DC. *Prodr.* vi. 273, excl. *Syn. of Don*; *Clarke Comp. Ind.* 107. *A. Falconeri*, *Clarke, l. c.* 107. *Antennaria contorta*, *Don in Bot. Reg.* t. 605; *Prodr.* 175; DC. *Prodr.* vi. 271. *Gnaphalium tenellum* and *simplicicaule*, *Wall. Cat.* 2941, 2946. *G. contortum*, *Ham.*; *Spreng. Syst. Veg.* iii. 479.

TEMPERATE and SUBALPINE HIMALAYA, common, from 9–11,000 ft. in Kashmir to 7–13,000 ft. in Sikkim. MISHMI HILLS, *Griffith*. KHASIA MTS., alt. 4–7000 ft.

Very variable; branches usually woody below, even when slender above, with sometimes many very short arrested leafy shoots. *Leaves* quite linear or narrowed downwards, or oblong.—De Candolle's *A. tenella* is founded on small young specimens of Wallich's, with linear leaves hardly auricled at the base, and coloured outer invol. bracts; but the usual forms of *A. contorta* have long strict branches clothed with almost narrow leaves that taper from a broad cordate base; some Kunawur specimens have oblong obtuse leaves with crisped recurved margins, quite unlike the normal state of the plant. A very large form from Bhotan and Mishmi approaches *A. cinnamomea*, but has small heads. Some Khasian specimens have leaves somewhat decurrent, and appear to pass into a form of *araneosa*; others have quite the habit of *A. brevifolia*; still others from the higher Himalaya resemble small-headed specimens of *A. Royleana*; and a few forms are with difficulty distinguished from *A. virgata*, except by the sessile heads. The name *tenella* is quite inapplicable to this plant in any of its forms, and as De Candolle, who first described it under that name, confounded it with Don's *Helichrysum stoloniferum*, his name had better be suppressed for the very applicable and generally known one of *contorta*, under which it is well described by Don and De Candolle, and figured in the Botanical Register.

20. *A. virgata*, *Thoms. in Clarke Comp. Ind.* 107; wholly clothed with softly cottony wool, stems many 8–16 in. slender strict erect rigid from a woody stock simple or corymbosely branched above, leaves 1–1½ in. spreading narrowly linear from a broad or narrow base apiculate, margins flat or recurved, heads ½–¾ in. diam. campanulate very numerous peduncled in open branched corymbs, invol. bracts ⅓ in. long linear-oblong obtuse lower half rigid upper white or yellowish.

KUNAWUR, LAHUL, and WESTERN TIBET, alt. 8–13,000 ft., *Jacquemont, Thomson, &c.*

A very distinct species; the leaves have usually narrow bases, and vary from ⅓–½ in. diam., in the latter case they are flat and elliptic-lanceolate; the individual heads are usually peduncled. *A. Stoliczkaei* may be a form of this.

21. *A. leptophylla*, DC. *Prodr.* vi. 273; clothed with white cottony wool, stems 6–18 in. very slender sparingly branched leafy, leaves 1–1½ in. sessile linear slender apiculate cottony on both surfaces, margins strongly recurved, heads few ½ in. diam. peduncled, invol. bracts ⅓ in. linear-lanceolate acute or acuminate rather spreading white, flowers numerous. *Clarke Comp. Ind.* 111. *Helichrysum leptophyllum*, DC. in *Wight Contrib.* 20.

NILGHERY MTS., alt. 6–8000 ft., *Wight, &c.*

The cottony white clothing, together with its very slender habit, narrow leaves, and usually peduncled heads with spreading invol. bracts (as in Series I.), distinguish this from all but *A. brevifolia*, which has shorter closer leaves.

22. *A. aristata*, DC. *Prodr.* vi. 274; stem woody below, branches 12–24 in. stout pubescent or tomentose woolly above leafy, leaves 2–4 in. spreading and recurved narrow gradually tapering from a broad auricled ½–amplexicaul base to a very slender recurved point puberulous or hoary above cottony or woolly beneath, midrib strong beneath, margins recurved, heads ⅓ in. diam. turbinate in densely corymbose globose clusters, invol. bract linear-oblong obtuse erect white yellowish or pink glistening. *Wight Ic.* t. 1119; *Clarke Comp. Ind.* 112.

NILGHERY MTS., *Wight, &c.*

The leaves are described by both De Candolle and Wight as shortly decurrent, but

they are not so in the very numerous specimens examined. In habit, pubescence, foliage, colour, and inflorescence this very much resembles *A. Wightiana*, but the heads are quite minute turbinate and few-flowered, and the leaves usually taper to a very fine point.

23. ***A. Wightiana*, DC. Prodr. vi. 273**; stems woody and branched below, branches stout ascending leafy loosely cottony and woolly, leaves $\frac{3}{4}$ – $1\frac{1}{2}$ in. erect and recurved broadly linear from a $\frac{1}{2}$ -amplexicaul base obtuse scabrid above loosely cottony and whitish beneath, midrib strong beneath, margins strongly recurved, heads $\frac{1}{4}$ in. diam. sessile turbinate densely packed in rounded corymbose clusters, invol. bracts $\frac{1}{2}$ in. long linear-oblong subacute white glistening. *Wight Ic. t. 1117*; *Clarke Comp. Ind. 111*. *Gnaphalium Wightianum*, *DC. in Wight Contrib. 21*; *Wall. Cat. 2940 B*.

NILGHERRY MTS., alt. 6–7000 ft., *Wight, &c.*

A good deal like *A. aristata*, but the heads are much larger, with numerous flowers, and the invol. bracts are acute. Leaves usually rounded at the tip, but with sometimes a recurved awn.

24. ***A. zeylanica*, Clarke mss.**; stem 6–18 in. ascending puberulous or glabrate below cottony above, leaves 1– $1\frac{1}{2}$ in. linear-oblong from a broad $\frac{1}{2}$ -amplexicaul base obtuse or apiculate 1–3-nerved, glabrous on both surfaces or cottony beneath rarely above, margins recurved often decurrent, heads turbinate $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. sessile or peduncled, invol. bracts $\frac{1}{2}$ in. spreading oblong subacute or obtuse white opaque with a slender dark claw. *A. Wightiana*, *Thwaites Enum. 166* (C.P. 1763 and 568).

CEYLON; Central Province, alt. 5–6000 ft., in rocky places, *Walker, Thwaites, &c.*

A very variable plant; the colour and habit is that of *A. aristata*, but the large usually peduncled heads are quite different, and resemble more those of *A. brevifolia*. Thwaites himself is puzzled by it, and sends it under three forms—1, from Newera Ellia, with usually glabrous leaves; 2, from Pedrolatagala, with the young leaves woolly on both surfaces, and broader more obtuse invol. bracts; 3, a form from Newera Ellia, referred to *G. semidecurrens*, with very narrow acuminate leaves 2 in. long, cottony beneath, and invol. bracts as in 2. This last Clarke inclines to regard as a form of *A. marcescens*, in which the bracts are usually scarious and undulated, and the leaves broader beyond the middle and cinnamomeous beneath; it may be a hybrid.

25. ***A. marcescens*, Clarke Comp. Ind. 110**; stems slender woody much branched leafy and leaves beneath densely clothed with fulvous cottony wool, leaves 1– $1\frac{1}{2}$ in. spreading recurved or reflexed very narrow linear from a narrow base or slightly dilated upwards glabrous above 1-nerved, margins strongly recurved, heads $\frac{1}{4}$ in. diam. turbinate sessile or peduncled in very dense rounded subcorymbose clusters, invol. bracts $\frac{1}{2}$ – $\frac{1}{3}$ in. obovate-oblong, outer with rounded tips very membranous transversely waved glistening, inner spreading with a short white subacute or obtuse limb. *A. linearis*, *DC.?*; *Schultz-Bip. mss. in Herb. Hohen.*, n. 649. *Gnaphalium marcescens*, *Wight Ic. t. 1115*. *G. cinnamomeum*, *Schultz-Bip. l. c.*, n. 134.

NILGHERRY MTS., *Wight, &c.* CEYLON; Central Province, alt. 7–8000 ft., *Walker, &c.*

The slender, woody, much branched, twiggy habit, coriaceous narrow leaves, glabrous above, with revolute margins, and close, usually fulvous-brown cottony tomentum, well distinguish this species. The heads of the Ceylon specimens are rather larger than the continental. *A. fruticosa* may be a very large state of this.

**** Leaves $\frac{1}{6}$ – $\frac{1}{3}$ in. long, very narrow, margins revolute.

26. ***A. brevifolia*, DC. Prodr. vi. 273**; clothed with white cottony wool, stem much branched below, branches very slender erect densely leafy, leaves

very many $\frac{1}{4}$ – $\frac{1}{2}$ in. 1-nerved and cottony on both surfaces, lower spreading linear-oblong obtuse with recurved margins, upper erect often imbricate narrower, heads $\frac{1}{2}$ in. diam. peduncled, invol. bracts $\frac{1}{2}$ in. oblong-lanceolate obtuse rather spreading and incurved white opaque. *Clarke Comp. Ind.* 110. *Gnaphalium brevifolium*, *Thwaites Enum.* 166, *excl. syn.*

WESTERN PENINSULA; Anamallay hills, *Wight*. CEYLON; central province, alt. 6–7000 ft., *Macrae*, &c.

A very distinct plant, if not a slender very elongate var. of *A. neelgerriana* (some specimens have similar flowerless, short, leafy branches), it appears, however, to be an annual, or at most a biennial, and has usually much larger heads than the last named. A Khasian form of *A. contorta* resembles this a good deal.

27. **A. neelgerriana**, *DC. Prodr.* vi. 272; wholly clothed with cottony wool, branches very many crowded on a stout perennial woody stock, some very short densely leafy flowerless, others 4–10 in. long and flower-bearing, leaves $\frac{1}{2}$ – $\frac{1}{2}$ in. narrowly linear those on the flowerless branches and base of the flowering most dense spreading and reflexed, on the upper part of the flowering branches erect, all acute with recurved margins, heads $\frac{1}{2}$ – $\frac{1}{4}$ in. diam. sessile most densely crowded or solitary or in corymbose clusters, invol. bracts $\frac{1}{2}$ in. long elliptic-oblong or lanceolate obtuse or acute white opaque. *Wight Ic.* t. 478; *Clarke Comp. Ind.* 110. *Gnaphalium neelgerrianum*, *DC. in Wight Contrib.* 21. *G. nilagiricum*, *Schultz-Bip. in Herb. Hohenack*, n. 1038.

NILGHERRY MTS.; alt. 7–8000 ft., *Wight*, &c.

Under *A. brevifolia*, its only near ally, I have indicated the differences between that plant and this, but they are far from satisfactory.

40. **LASIOPOGON**, *Cass.*

Minute, much branched, densely woolly annuals. *Leaves* alternate, quite entire. *Heads* in crowded clusters, heterogamous, disciform; fl. all fertile, outer ♀, 2-seriate, filiform, toothed; disk-fl. ♂, few or many, slender, limb dilated 3-toothed. *Involucre* campanulate; bracts few-seriate, inner subhyaline, outer woolly; receptacle small, naked. *Anther-bases* sagittate, tails slender. *Style-arms* of ♀ slender, truncate. *Achenes* subfusiform; pappus-hairs 1-seriate, separately caducous, feathery.—*DISTRIB.* Species 2, oriental and African.

L. lanatum, *Cass. in Dict. Sc. Nat.* xxv. 302; branches many from the root filiform prostrate, leaves linear-oblong or spatulate, heads in globose villous clusters subtended by floral leaves of their own length, invol. bracts linear obtuse scarious. *L. muscoides*, *DC. Prodr.* vi. 246; *Boiss. Fl. Orient.* iii. 224. *Gnaphalium muscoides*, *Desfont. Fl. Atlant.* ii. 267, t. 231

THE PUNJAB; Peshawur, *Vicary*, *Aitchison*.—*DISTRIB.* Westwards to Algeria and Spain. South Africa.

Whole plant 1–2 in. diam., looking like a cluster of cottony balls on the ground, both leaves and flowers being hidden by the woolly clothing; the leaves are $\frac{1}{10}$ – $\frac{1}{4}$ in. long, and the heads about $\frac{1}{2}$ in. long.

41. **PHAGNALON**, *Cass.*

Shrubs, cottony or woolly, rarely perennial glabrous herbs. *Leaves* alternate, entire or sinuate-toothed. *Heads* solitary or fascicled, yellow, heterogamous, disciform, flowers all fertile; outer fl. ♀, ∞-seriate, filiform, minutely 2–3-toothed; ♂ slender, tubular, limb hardly dilated 5-fid. *Involucre* campanulate or ovoid; bracts ∞-seriate, dry, subulate or ovate-lanceolate, tips scarious, outer smaller; receptacle flat, naked or pitted. *Anther-bases* entire or sagittate,

sometimes minutely tailed. *Style-arms* of ♀ slender, obtuse, truncate or sub-capitate. *Achenes* small, not ribbed; pappus hairs 1-seriate, slender, rigid, persistent.—**DISTRIB.** About 14 species, Mediterranean and W. Asiatic.

P. niveum, *Edgew. in Trans. Linn. Soc. xx.* 68; branches and leaves beneath snow-white with dense cottony wool, leaves from obovate to elliptic-oblong or linear-oblong entire or sinuate-toothed, heads axillary.—*P. denticulatum*, *Clarke Comp. Ind.* 113, and *Herb. Ind. Or. H. f. & T.*, not of *Dene*.

WESTERN HIMALAYA and WESTERN TIBET; from Garwhal to Kashmir, alt. 6-8000 ft.

Branches 4-10 in., short and leafy or slender with scattered foliage. *Leaves* 1-1½ in., sometimes spatulate and much narrowed into the sessile base, glabrous or cottony above. *Heads* ½-¾ in. diam.; peduncles 1-3 in., slender; invol. bracts subulate, straight, gradually narrowed to an acicular point, purplish, cottony and hoary.—Elongated branches a good deal resemble *P. acuminatum*, Boiss. of Beluchistan, but the invol. bracts are different.

42. GNAPHALIUM, Linn.

Hoary or woolly herbs. *Leaves* alternate, quite entire. *Heads* small, in terminal or axillary corymbs or fascicles, heterogamous, disciform; flowers all fertile, outer ♀, 2-∞-seriate, filiform, 3-4-toothed; disk-fl. ♂, fewer, slender, limb dilated 5-toothed. *Involucre* ovoid or campanulate; bracts ∞-seriate, all scarious or with a white yellow or brown more or less scarious blade; receptacle naked or pitted. *Anther-bases* sagittate, cells with slender tails. *Style-arms* of ♀ truncate or capitate. *Achenes* oblong or obovoid, not ribbed; pappus-hairs 1-seriate, slender or thickened at the tip, caducous, connate at the base or not.—**DISTRIB.** Cosmopolitan. About 100 species.

This genus is hardly distinguishable from *Helichrysum* and from *Anaphalis*, of which *G. luteo-album* and *hypoleucum* have entirely the habit.

* *Heads in corymbose leafless clusters.*

1. **G. luteo-album**, Linn.; Boiss. *Fl. Orient.* iii. 224; woolly, stem corymbosely branched above, leaves woolly on both surfaces oblong-spatulate obtuse upper lanceolate acute ½-amplexicaul, heads whitish yellow or brown shining, invol. bracts oblong obtuse, achenes tubercled or with minute curved bristles. *Clarke Comp. Ind.* 114. *G. orixense* and *G. albo-luteum*, *Roxb. Fl. Ind.* iii. 425.—Synanthera, *Wall. Cat.* 7415.

Throughout INDIA; from Kashmir to Birma and southwards to Martaban, ascending to 10,000 ft. in Sikkin.—**DISTRIB.** Most hot and warm temperate counties.

A very variable annual 4-12 in. high, with leaves 1-2 in. long, rarely more than ½ in. broad, and leafless, dense corymbose clusters of glistening heads. The European form with very pale heads does not occur east of Afghanistan; the two following extend eastwards to Japan.

VAR. 1. multiceps; stems usually many from the root, heads golden-yellow.—*G. multiceps*, *Wall. Cat.* 2949; *DC. Prodr.* vi. 222. *G. ramigerum* and *confusum*, *DC. l. c.* *G. affine*, *Don Prodr.* 173. *G. martabanicum*, *Wall. Cat.* 2950.—The Himalaya and Khasia Mts., near the foot of the hills, rarer on the plains. Martaban, *Wallich. Mt. Aboo, King.*

VAR. 2. pallidum; heads pale brown.—*G. pallidum*, *Ham. in Wall. Cat.* 2953. Very common.

2. **G. hypoleucum**, *DC. in Wight Contrib.* 21; *Prodr.* vi. 222; stem above and leaves beneath woolly, leaves sessile linear acuminate puberulous or scaberulous above, base dilated ½-amplexicaul, heads many in corymbose dense

clusters, invol. bracts oblong obtuse yellowish or golden glistening, achenes papillose. *Clarke Comp. Ind.* 114; *Wight Ic.* t. 1114.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 3-7000 ft. KHASIA MTS., alt. 3-5000 ft. MARWAR, Mt. Aboo, *Herb. Dalzell, King.* NILGHERRY MTS., alt. 5-7000 ft.—DISTRIB. China, Japan, Abyssinia.

A usually taller and often stouter annual than *G. luteo-album*, easily distinguished by the longer very acuminate leaves woolly beneath only, with often broadly auricled bases. The Nilgherry specimens have paler heads.

** *Heads in leafy spikes.*

3. ***G. indicum***, Linn; *DC. in Wight Contrib.* 22; *Prodr.* vi. 231; softly cottony, stems many from the root ascending leafy, leaves linear-obovate or spatulate apiculate, heads $\frac{1}{2}$ in. diam. in simple or branched leafy spikes or racemose clusters, invol. bracts linear-oblong acute pale reddish-brown or yellowish, achenes minutely papillose, pappus-hairs not coherent at the base. *Wall. Cat.* 2954; *Boiss. Fl. Orient.* iii. 225; *Clarke Comp. Ind.* 114; *Dalz. & Gibs. Bomb. Fl.* 130; *G. strictum* and *multicaule*, *Roxb. Fl. Ind.* iii. 424, 425. *G. nilaicum*, *Raddi*; *DC. l. c.* *G. spatulatum*, *Del. Fl. Egypt.* 122, t. 44, f. 2, not of Lamk.

Throughout INDIA on the plains, from the Punjab eastwards to Birma and Martaban, ascending 1000 ft. in the Himalaya.—DISTRIB. Westwards to Senegal and eastwards to China, Japan and Australia.

Branches slender, 4-6 in. Leaves $\frac{1}{2}$ -1 $\frac{1}{2}$ in. Heads $\frac{1}{2}$ in. diam., sometimes crowded and forming ovoid clusters.

G. PURPUREUM, Linn.; *DC. Prodr.* vi. 182; annual, sparsely cottony, stems many from the root stout ascending, leaves spatulate tip broadly rounded, heads $\frac{1}{4}$ in. diam. in spicate globose clusters, invol. bracts linear subacute shining, achenes minutely papillose, pappus-hairs cohering at the base.

UPPER GANGETIC plain, *Falconer*. Jugulliri, *Edgeworth*. Meerut, Moradabad and Bignore, *Thomson*, no doubt introduced.—DISTRIB. N. & S. America.

This closely resembles *G. indicum*, but is a very much larger stouter plant, with stems 12-18 in. high, and leaves attaining 4 inches; the heads, too, are twice as large. Amongst a very large suite of specimens of *indicum*, from all parts of India I find none approaching this. The cohesion of the pappus hairs by their very base is a very marked character.

4. ***G. Stewartii***, *Clarke mss.*; cottony, stem short leafy, leaves linear erect or recurved acute radical rosulate, heads $\frac{1}{4}$ in. diam. in lax or dense leafy racemes, invol. bracts linear-oblong acute and obtuse chestnut-brown, achenes subsilky or scabrid, pappus-hairs not cohering.

WESTERN HIMALAYA, *Stewart*. KASHMIR, alt. 10,000 ft., *Aitchison*. WESTERN TIBET; Karakoram, alt. 13,000 ft., *Clarke*.

Perennial? Stems tufted, 2-4 in., elongating in fruit. Leaves $\frac{1}{2}$ -1 in., very narrow. Heads usually peduncled; invol. bracts a dark rich brown. Flowers few.

*** *Heads in rounded leafy axillary or terminal clusters.*

5. ***G. pulvinatum***, *Delile Fl. Egypt.* 122, t. 44, f. 1; woolly, stems very many spreading from the root short prostrate, leaves small spatulate, heads minute $\frac{1}{12}$ in. hidden amongst the bases of the crowded spreading terminal leaves and immersed in wool, invol. bracts slender linear recurved green with acute hyaline tips, achenes slender minutely papillose. *DC. Prodr.* vi. 231; *Boiss. Fl. Orient.* iii. 225. *G. crispatum*, *Clarke Comp. Ind.* 115. *G. depressum*, *Roxb. Hort. Beng.* 61; *Fl. Ind.* iii. 425. *G. prostratum*, *Roxb. in Wall. Cat.* 2955. Filago prostrata, *DC. in Wight Contrib.* 22; *Prodr.* vi. 249. *Evax indica*, *Ham. in Wall. Cat.*

Throughout the plains of INDIA, from the Punjab and Scind to Pegu, Ava and the Deccan.—DISTRIB. Egypt.

This closely resembles the *G. crispatum*, Del., also a Nile Valley plant, but is distinguished by the narrow acute invol. bracts.

6. *G. Thomsoni*, Hook. f.; softly cottony, stems rather stout erect simple or many from the root erect leafy, leaves linear acute, heads $\frac{1}{2}$ in. diam. in sessile globose terminal clusters subtended by slender leaves, invol. bracts linear-oblong obtuse scarious brown shining with a strong green central nerve half way down, achenes minutely papillose, pappus-hairs not coherent at the base. *G. uliginosum*, Clarke Comp. Ind. 115, not of Linn.

WESTERN HIMALAYA; Kashmir, alt. 5-7000 ft., Thomson, Stewart, Brandis.

A very distinct annual? species. Stem 4-6 in. Leaves 1-1 $\frac{1}{2}$ in. Heads in pale globose clusters an inch in diameter, subtended by spreading leaves; flowers numerous.

7. *G. flaccidum*, Kurz in Clarke Comp. Ind. 115; Journ. As. Soc. 1877, ii. 182; sparingly cottony, stem simple or branching from the root erect flexuous, leaves obovate-spathulate flaccid, tips rounded, heads minute $\frac{1}{10}$ in. crowded into a terminal peduncled globose cluster subtended by leaves shorter than itself, invol. bracts hyaline outer broadly oblong or obovate obtuse, inner narrower yellow glistening.

BENGAL; Purwal, near Maldah, Clarke. PEGU, Kurz.

A flaccid green annual, 4-6 in. high. Leaves 1-2 in. long, very flaccid. Clusters of heads quite globose, 1-1 $\frac{1}{2}$ in. diam. pale yellow. Achenes immature.

43. *HELICHRYSUM*, Gærtn.

Herbs or shrubs, often woolly or tomentose. Leaves alternate (the lower rarely opposite), quite entire. Heads solitary or corymbose, few or many fld., homogamous (or heterogamous with few outer ♀ fld.); flowers all fertile, or rarely the central sterile; ♀ filiform, minutely toothed; ♂ tubular, limb 4-5-toothed. Involucre of various forms; bracts ∞-seriate, scarious, appressed or loose, or with a spreading yellow red white or brown long or short scarious limb; receptacle various, naked or pitted or with the margins of the pits with bristles or pales. Anther-bases sagittate, tails simple or branched. Style-arms of ♀ truncate or subcapitate. Achenes small, terete, 5-angled or subcompressed; pappus-hairs 1- rarely ∞-seriate, free or connate below, dilated and bearded or feathery above.—DISTRIB. About 260, species chiefly of temperate and sub-tropical regions.

The Indian species are not distinguishable by habit from *Anaphalis*. *Gnaphalium macranthum*, Schultz-Bip. in Herb. Hohenack. n. 1023 and *G. chrysanthum*, Schultz-Bip. l.c. 1020 are both S. African *Helichrysa* and garden escapes. *Anaphalis Beddomei* may be a species of *Helichrysum*.

1. *H. buddleioides*, DC. in Wight Contrib. 20; Prodr. vi. 201; shrubby, stem robust leaves beneath and corymbs densely cottony, leaves large sessile elliptic-lanceolate acuminate 3-9-nerved, heads subcampanulate yellow in many globose corymbose clusters, invol. bracts oblong, inner with a short rounded scarious blade, achenes scabrid.

WESTERN PENINSULA; on the Ghats from Bombay to Cochin. CEYLON, alt. 7-8000 ft.

Stems 4-6 ft. high and branches as thick as a goose- or swan's-quill, tomentose, white grey or cinnamon-brown. Leaves 2-5 by $\frac{1}{2}$ -1 $\frac{1}{2}$ in., nerves parallel, grooved above. Corymbs 4-8 in. diam., the globose clusters $\frac{1}{4}$ -1 in. diam.; heads campanu-

late, $\frac{1}{2}$ in. diam. *Achenes* distinctly scabrid as figured by Wight (not glabrous as described both by DC. and Wight).

VAR. 1. *buddleioides* proper; leaves larger, nerves 5-9 very prominent beneath, heads yellow. *H. buddleioides*, DC. l.c.; *Wight Ic. t.* 1113; *Clarke Comp. Ind.* 116. *Gnaphalium cynoglossoides*, *Schultz-Bip. in Herb. Hohen.* n. 1043, not of Trev. G. sp., *Wall. Cat.* 2932.—Western Peninsula only.

VAR. 2. *Hookeriana*; smaller, leaves $1\frac{1}{2}$ -2 $\frac{1}{2}$ in. 3-5-nerved more densely cottony beneath obscuring the nerves, heads paler. *H. Hookerianum*, DC. *Prodr.* vi. 201; *Clarke Comp. Ind.* 116. *Gnaphalium Hookerianum* and *G. Wightianum* in part, *Thwaites Enum.* 126.—Travancor, at Courtallam, *Wight*. Ceylon; central province, alt. 6-7000 ft., *Walker, &c.* I can find no specific character for this plant, the comentum varies, as in the type from white to cinnamon brown.

2. H. Wightii, *Clarke mss.*; shrubby, branched, all parts with thick appressed wool, leaves sessile on the flowerless branches linear-lanceolate thick with 5-7 thick close-set parallel nerves tips recurved, those on the flowering branches smaller linear recurved, heads in subglobose corymbose clusters, invol. bracts oblong acute or subacute scarious.

NILGHERY HILLS; Sisparah Ghat, *Wight*.

I have seen but one specimen in Wight's Herbarium, it differs from *H. buddleioides*, in the short leafy branches, the narrower leaves, woolly on both surfaces, the smaller heads and very different invol. bracts.

44. **CÆSULIA**, *Roxb.*

A glabrous marsh-herb. *Leaves* alternate, serrulate. *Heads* in sessile, axillary, involucre balls, each sessile on a broad convex common receptacle, 1-fl.; fl. tubular, limb narrowly campanulate, deeply 5-fid. *Involucral bracts* 2, opposite, keeled or winged, and at length adnate to and including the achene. *Anther-bases* sagittate, tails branched. *Style-arms* short, linear-cuneate, subtruncate. *Achenes* included in the laterally compressed bracts; pappus 0.

C. axillaris, *Roxb. Hort. Beng.* 62; *Fl. Ind.* v. 482; *Cav. Ic.* i. 64, t. 93; *DC. in Wight Contrib.* 11; *Prodr.* v. 482; *Dalz. & Gibs. Bomb. Fl.* 126; *Wight Ic. t.* 1102; *Wall. Cat.* 3183; *Clarke Comp. Ind.* 116. *Meyera orientalis*, *Don Prodr.* 180.

Throughout NORTHERN INDIA; common in rice fields, ascending to 3000 ft., from the Punjab to Chittagong and the Deccan; (absent in Ceylon and the Eastern Peninsula).

Stems stout, prostrate or suberect, 6-12 in. *Leaves* 2-4 in., sessile, acuminate at both ends, nerves very numerous, base dilated subauricled. *Heads* $\frac{3}{4}$ in. diam. and under.

45. **INULA**, *Linn.*

Herbs, rarely shrubs. *Leaves* radical and alternate. *Heads* solitary, corymbose or paniced, heterogamous, radiate, rarely disciform; ray-fl. ♀, 1-∞-seriate, fertile, ligule long short or minute, yellow or white, 3-toothed; disk-fl. ♀, fertile, tubular, yellow, limb elongate 5-toothed. *Involucre* broad or rather narrow; bracts ∞-seriate, inner usually rigid and narrow, outer herbaceous, outermost often foliaceous; receptacle flat or tumid, pitted or areolate. *Anther-bases* sagittate, tails long simple or branched. *Style-arms* of ♀ linear, broader upwards, obtuse. *Achenes* subterete, usually ribbed; pappus hairs rather short, 1-2-seriate, few or many, smooth scabrid or bearded.—DISTRIB. Species about 56, European, African and Asiatic.

SECT. I. **Corvisartia**. Tall stout herbs. *Heads* large, solitary or race-

mose, broadly hemispheric; outer invol. bracts broad, herbaceous, outermost usually foliaceous.

1. **I. racemosa**, *Hook. f.*; stem and leaves above scabrid, leaves densely tomentose beneath crenate, radical long-petioled elliptic-lanceolate, cauline oblong $\frac{1}{2}$ -amplexicaul, heads very large $1\frac{1}{2}$ -2 in. diam. racemed, inner invol. bracts linear acute. I. Royleana, *Clarke Comp. Ind.* 118, not of DC. I. Helenium, *Herb. Ind. Or. H. f. & T.*, not of Linn.

WESTERN HIMALAYA; on the borders of fields, &c.; Kashmir, alt. 5-7000 ft., *Falconer*, &c.; Piti, alt. 9-10,000 ft., *Thomson*.

A tall stout herb, 1-5 ft., stem grooved. *Leaves* coriaceous, radical 8-18 by 5-8 in., narrowed into a petiole as long; cauline often deeply lobed at the base. *Heads* many; outer invol. bracts broad, with recurved triangular tips; ligules slender, $\frac{1}{2}$ in. *Achenes* $\frac{1}{2}$ in., glabrous, slender; pappus $\frac{1}{3}$ in., reddish.

2. **I. Royleana**, *DC. Prodr.* v. 464; stem and leaves above pubescent or villous and glandular, leaves denticulate woolly beneath, radical ovate or oblong with a long winged petiole, cauline lyrate base auricled, heads 3-4 in. diam. solitary, inner invol. bracts slender acuminate. I. Stoliczkai, *Clarke Comp. Ind.* 118. ? I. macrocephala, *Kotschy in Boiss. Flor. Orient.* iii. 186.

WESTERN HIMALAYA; Kashmir, alt. 7-11,000 ft., *Royle*, *Thomson*, *Aitchison*, &c.

A stout herb; stem 1-2 ft., grooved. *Leaves* rather membranous, obtuse, glabrate pubescent or villous above, sometimes thickly woolly beneath, radical 6-10 by 4-6 in. exclusive of the winged petiole, cauline variable. *Heads* very handsome, on a stout erect woolly or hirsute peduncle; invol. much broader than in *I. racemosa*, achenes similar; pappus-hairs paler.—The root is, from its similarity to that of the Kut (*Saussurea Lappa*), used to adulterate that article (*Aitchison*).

SECT. II. **Subonium**. Herbs. *Heads* small, corymbose or solitary, hemispheric, campanulate or turbinate; outer invol. bracts narrow, dry, rigid, or with herbaceous or squarrose tips, or outermost narrow and foliaceous.

* *Heads* turbinate, terminating numerous slender branches. *Achenes* hairy, contracted into a small cup at the tip.

3. **I. graveolens**, *Desfont. Fl. Atlant.* ii. 275; slender, much branched, pubescent and viscid, leaves small sessile linear acute 1-nerved quite entire, heads $\frac{1}{2}$ in. diam. terminating slender axillary branchlets, invol. bracts few linear acute or acuminate erect, outer green pubescent and glandular, ligules very short, achenes hairy and viscid. *Boiss. Fl. Orient.* iii. 199, *Clarke Comp. Ind.* 120. *Erigeron graveolens*, *Linn.*; *Sibth. Fl. Græc.* t. 866. ? I. brahuica, *Boiss. Fl. Orient.* iii. 199.

N.W. INDIA; Peshawur, in waste ground, *Stewart*.—DISTRIB. Westwards to Spain.

Annual, 1-2 ft. high, stem and branches slender, often flexuous. *Leaves* 1-1 $\frac{1}{2}$ by $\frac{1}{10}$ - $\frac{1}{8}$ in., spreading, midrib strong beneath. *Heads* rather obconic. *Achenes* $\frac{1}{4}$ in. long, contracted at the apex with a cup-shaped tip; pappus-hairs rather coarse, inserted on the edge of the cup, but not united at the base.

** *Heads* terminal, solitary or corymbose. *Achenes* silky or hairy.

4. **I. macrosperma**, *Hook. f.*; stout, herbaceous, stem winged glabrous or pubescent, leaves amplexicaul decurrent oblong-ovate acuminate puberulous, heads $1\frac{1}{2}$ -2 in. diam. subcorymbose on stout erect peduncles, invol. bracts few lanceolate subacute pubescent, achenes very large narrowly obovate-oblong compressed strongly ribbed hispid above the middle much longer than the red stout scabrid pappus.

Alpine region of the SIKKIM HIMALAYA, *J. D. H.*

I have only a fragment of this remarkable species, the smooth soft stem is as thick as a goose-quill, smooth and shining, wings narrow membranous. *Leaves*, upper alone seen, 3-4 by 1 in. long. *Invol. bracts* herbaceous, $\frac{3}{4}$ in. long, spreading in fruit; receptacle hemispheric; ligules $\frac{1}{2}$ in., deeply 3-fid. *Achenes* $\frac{1}{4}$ in. long; pappus $\frac{1}{10}$ in.

5. *I. polygonata*, DC. Prodr. vi. 465; stem stout winged and leaves beneath and corymb very densely woolly, leaves sessile oblong or oblong-lanceolate obtuse denticulate, heads $\frac{1}{2}$ in. diam. in small corymbs immersed in thick wool, invol. bracts thick, outer oblong, inner narrow pungent, ray-fl. short tubular. *Clarke Comp. Ind.* 119. *Conyza polygonata*, *Wall. Cat.* 3010.

PEGU and BIRMA, on dry hills, *Wallich, Maclelland, Kurz.*

Stems 1-2 ft., simple or branched above, very robust, leafy. *Leaves* 3-4 by $\frac{3}{4}$ -1 $\frac{1}{4}$ in., very coriaceous, glabrous or rough above, sessile but not auricled at the base. *Heads* hemispheric; invol. bracts $\frac{1}{4}$ in., outer obtuse rigid, inner quite pungent. *Achenes* $\frac{1}{12}$ in., silky; pappus-hairs $\frac{1}{8}$ in., white, rather flattened.

6. *I. nervosa*, Wall. Cat. 2960; DC. Prodr. v. 471; perennial, pubescent hirsute or villous and glandular, stem simple or branched erect flexuous, leaves sessile or subsessile elliptic or elliptic-lanceolate acute at both ends subdentate scaberrulous or scabrid above, nerves subparallel with the margin, heads $\frac{1}{2}$ -1 in. solitary or corymbose peduncled, ligules white, invol. bracts linear-lanceolate acute hirsute erect or recurved, outermost foliaceous or not, achenes silky. *Clarke Comp. Ind. excl. syn. Roxb.* *I. asperima* and *nitida*, *Edgew. in Journ. Linn. Soc.* xx. 68, 69. *I. verrucosa*, *Klatt in Sitzungsber. Münch. Akad.* 1875, 86.

TEMPERATE HIMALAYA; alt. 4-7000 ft., from Garwhal to Bhotan. KHASIA MTS.; alt. 3-5000 ft., *Griffith, &c.*

Stem 1-3 ft., strict or flexuous. *Leaves* 2-4 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., usually membranous, teeth remote. *Heads* very variable in size, and especially in the invol. bracts, which are green and either appressed or squarrose, the outermost are narrow recurved and usually leafy; ligules rather broad, shorter than the breadth of the head. *Achenes* $\frac{1}{10}$ in.; pappus dirty-white.

VAR. purpurascens; invol. bracts narrow linear-lanceolate finely acuminate straight purple glabrescent.—Khasia Mts., *Lobb, Clarke*. The bracts differ much from the Khasian specimens gathered by Griffith, or from the Himalayan, but they are always very variable in this species and its allies.

7. *I. Simonsii*, Clarke Comp. Ind. 121; hirsute with yellow glandular hairs, leaves subsessile oblong acute base rounded denticulate rigid hirsute on both surfaces, heads long-peduncled, invol. bracts lanceolate outer shorter hirsute, ligules long white, achenes narrowly oblong silky, pappus white.

ASSAM (Bhotan?), *Dr. Simons*. BHOTAN, *Nuttall*.

I have seen no specimens of this species, which its author describes as being very near *I. nervosa*, but differing in the larger heads and leaves rounded at the base.

8. *I. obtusifolia*, Kerner Nov. Sp. Pl. Jaeschke, 18; stems many from a woody stock short erect rigid and leaves beneath scabrid or hairy, leaves sessile oblong or ovate-oblong obtuse or acute base rounded, heads 1 or few $\frac{1}{2}$ -1 $\frac{1}{2}$ in. diam., inner invol. bracts linear or linear-lanceolate acute rigid pubescent outermost leafy, achenes slender silky. *I. oculus Christi*, var. and *I. Thomsoni*, *Clarke Comp. Ind.* 120.

WESTERN TIBET and KUMAON; alt. 10-14000 ft., *Thomson, Jaeschke*.—DISTRIB. Kashgar.

Stems 6-12 in., often rigidly flexuous, leafy to the top. *Leaves* 1 $\frac{1}{2}$ -2 in., rigid, often scaberrulous above, obscurely denticulate, nerves reticulated beneath. *Heads* very variable in size, hemispheric, outer leafy; invol. bracts 1-2, small or large, inner

erect, acuminate; ligules shorter than the diam. of the head. *Achenes* $\frac{1}{10}$ in.; pappus pale reddish.

VAR. *Clarkei*; stems and leaves beneath shortly tomentose, heads larger, invol. bracts more villous greener very pubescent, outer larger longer more herbaceous.—Mustag Pass, Kashmir, 11,500 ft., *Clarke*; Lahul, *Jaeschke*. This may be a different species, but I think it is only a very luxuriant state of *I. obtusifolia*.

*** *Heads terminal, solitary or corymbose; achenes nearly glabrous.*

9. *I. Hookeri*, *Clarke Comp. Ind.* 122; perennial, stem simple or branched villous above, leaves sessile or sub-petioled elliptic-lanceolate acute at both ends gland-toothed membranous hairy on both surfaces, heads $1\frac{1}{2}$ –2 in. diam. solitary or 2–3, invol. hemispheric villous, bracts all very slender squarrosely recurved, achenes very small glabrous. *Bot. Mag. t.* 6411.

SIKKIM HIMALAYA; alt. 7–10,000 ft., *J. D. H.*

Stem 1–2 ft., usually very shaggy above, but sometimes glabrescent. *Leaves* 3–5 by $1\frac{1}{2}$ in., lower narrowed almost into a petiole, upper sessile, base auricled; nerves slender, diverging. *Heads* very broad, shaggy with very long hairs; invol. bracts $\frac{3}{4}$ –1 in., almost filiform; ligules many, slender, as long as the disk is broad. *Achenes* $\frac{1}{4}$ in., angled; pappus $\frac{1}{8}$ in., dirty-white.

10. *I. grandiflora*, *Willd.*; *Boiss. Fl. Or.* iii. 186; perennial, stem simple hirsute or hairy above leafy throughout, leaves sessile oblong or elliptic-lanceolate acuminate gland-serrate glabrescent or sparingly hairy and ciliate, outermost often foliaceous, achenes very small nearly glabrous.

WESTERN HIMALAYA; from Kashmir, alt. 6–7000 ft., to Kumaon and Nipal, alt. 8–12,000 ft.—**DISTRIB.** Westwards to the Caucasus.

A shorter stouter species than *I. Hookeri*, and with shorter leaves broader at the base, and more oblique nerves and single heads. *Involucre* not shaggy in the Himalayan examples (as they are in the Caucasian); bracts pubescent, rather rigid; ligules longer than the disk is broad. *Achenes* with a very few short hairs or 0, and pappus as in *I. Hookeri*.—*Clarke* states that his was found by *Stoliczka* at 14–17,000 ft. elevation.

11. *I. acuminata*, *DC. Prodr.* v. 471; annual, stem strict glabrous or pubescent above, leaves small suberect elongate hastate acuminate from a dilated sessile cordate base obscurely toothed glabrous, heads $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. few subcorymbose, invol. bracts narrow linear acuminate erect green puberulous, achenes minute nearly glabrous. *I. salicina*, *Clarke Comp. Ind.* 132, not of *Linn.*

WESTERN HIMALAYA, *Royle, Falconer*; Kashmir, *Stoliczka*; on calcareous rocks, alt. 8000 ft., *Clarke*.

Usually quite glabrous, with the habit and foliage of a *Lactuca*. *Stem* shining, 10–14 in., sometimes branched. *Leaves* 1–4 in., gradually tapering from the broad base to the very acuminate point; ligules short, recurved. *Achenes* $\frac{1}{4}$ in. long, with a few short, erect hairs; pappus $\frac{1}{8}$ in., pale reddish.

12. *I. Falconeri*, *Hook. f.*; annual, glabrous, sparsely hairy or tomentose, stem corymbosely branched rarely simple, lower leaves long linear or oblong or linear-oblong gradually contracted above the amplexicaul auricled base, cauline oblong, heads $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. corymbose, invol. bracts linear acute pubescent or tomentose erect or recurved green, achenes minute sparsely pubescent.

WESTERN TIBET, *Falconer*; Iskardo, alt. 7–8000 ft., *Clarke*.

A very variable weedy annual; stems slender, glabrous simple and 12–18 in. high, or stout branched and tomentose. *Leaves*, lower sometimes 3 by $\frac{1}{4}$ in. and contracted below, at others $\frac{1}{2}$ –1 in. oblong with auricled bases, nerves very obscure. *Achenes* and pappus as in *I. acuminata*.

13. **I. Kalapani**, *Clarke Comp. Ind.* 123; pubescent or hirsute, stem simple or sparingly forked, radical leaves petioled elliptic-ovate or lanceolate obtuse or acute subdentate, cauline oblong or ovate-oblong from an amplexicaul dilated base, heads $\frac{2}{3}$ –1 in. diam. few corymbose, invol. bracts few linear acute hirsute green, achenes minute glabrous.

KHASIA Mts.; Kalapani river, alt. 4–5000 ft., *J. D. H. & T. T., Clarke.*

Habit of an *Aster*, 12–18 in. high. *Leaves*, radical 2–3 in. long, narrowed into the petiole, cauline 1–1 $\frac{1}{2}$ in., erect or spreading. *Invol. bracts* spreading or recurved, outer subfoliaceous; ligules short, about $\frac{1}{2}$ in. *Achenes* $\frac{1}{20}$ in. long; pappus scanty, very short, $\frac{1}{8}$ in., reddish.

SECT. III. **Ægophthalmus**. Stemless. *Heads* sessile amongst the rosulate leaves.

14. **I. rhizocephaloides**, *Clarke Comp. Ind.* 124; leaves all radical rosulate obovate-spathulate obtuse ciliate, heads $\frac{2}{3}$ –1 in. diam. crowded sessile, invol. bracts linear acute erect or tips recurved, achenes glabrous ribbed.

WESTERN TIBET, *Falconer*; Dras, alt. 7–9000 ft., *Thomson*; Ladak, alt. 12–14,000 ft., *Stoliczka*.

Whole plant 2–5 in. diam. *Leaves* horizontal, appressed to the ground, narrowed into a broad petiole. *Invol. bracts* all similar; ray-fls. very few with minute ligules or tubular or 0. *Achenes* $\frac{1}{15}$ in.; pappus $\frac{1}{2}$ in., red.—This resembles closely the *I. rhizocephala*, *Schrank*, but the invol. bracts are narrower, less rigid, and purple, and the rays are very different.

SECT. IV. **Cappa**. Shrubs. *Heads* small, corymbose or racemose; invol. bracts linear or subulate, outer gradually smaller.

15. **I. Cappa**, *DC. Prodr.* v. 469; shrubby, branches leaves beneath and corymbs densely silkily villous or woolly, leaves sessile or shortly petioled oblong or oblong-lanceolate acute toothed pubescent or glabrescent above, heads very many $\frac{1}{2}$ in. diam., invol. bracts linear rigid acuminate pubescent, achenes silky. *Clarke Comp. Ind.* 124. *I. Pseudo-cappa* and *eriophora*, *DC. l. c.* 469, 470. *I. salviodora*, *Schultz-Bip. in Miq. Fl. Ind. Bat.* ii. 62. *Conyza lanuginosa*, *eriophora* and *argentea*, *Wall. Cat.* 2922, 3013, 3014. *O. Cappa*, *Ham. in Don Prodr.* 176. *Duhaldea chinensis*, *DC. l. c.* 366.

TEMPERATE HIMALAYA; from Kumaon to Bhotan, alt. 4–6000 ft. (ascending to 10,000 in Kumaon, *Str. & Wint.*). KHASIA Mts., alt. 4–5000 ft. PEGU and BIRMA.—DISTRIB. Java, China.

Shrub 4–8 ft. high; branches very stout. *Leaves* 3–6 by 1–2 $\frac{1}{2}$ in., coriaceous, acute or obtuse, base rounded or acute (in Sikkim leaves 9 by 2 $\frac{1}{2}$ in., gradually acuminate at both ends), toothing variable. *Heads* very numerous; invol. bracts very variable in length, number and breadth, always narrow and linear or subulate; ligules few, very short or 0. *Achenes* $\frac{1}{20}$ in.; pappus $\frac{1}{2}$ in., dirty-white, hairs thickened at the ends.

16. **I. eupatorioides**, *DC. Prodr.* v. 469; shrubby, branches stout and leaves beneath and corymbs pubescent or subtomentose, leaves shortly petioled elliptic-oblong or lanceolate acuminate coriaceous irregularly toothed scaberulous above, heads numerous $\frac{1}{2}$ in. diam. in terminal corymbs shortly peduncled, invol. bracts subulate tomentose, achenes silky. *Clarke Comp. Ind.* 125. *Conyza eupatorioides*, *Wall. Cat.* 2993. *Amphiraphis heterotricha*, *DC. l. c.* 343. *Conyza* and *Solidago heterotricha*, *Wall. Cat.* 3225.

EASTERN HIMALAYA; Sikkim, *J. D. H.* Bhotan, *Griffith*. KHASIA Mts., alt. 4–6000 ft. BIRMA, *Griffith*. MOULMEIN, *Lobb*.

Very closely allied to *I. cuspidata*, but differing in the much stouter habit, shorter stouter-petioled more rigid leaves with much-reticulated nervation beneath, narrower

ligules; achenes and pappus the same.—The Moulmein specimen has very short elliptic leaves 3 by $1\frac{1}{2}$ in., coriaceous, and scabrid above.

17. ***I. cuspidata***, *Clarke Comp. Ind.* 125; shrubby, branches glabrous or young pubescent, leaves petioled elliptic-lanceolate acuminate serrulate membranous glabrous or scaberulous above, heads numerous in terminal corymbs $\frac{1}{3}$ in. diam. on slender peduncles, invol. bracts linear acute pale rigid, outer subulate, achenes silky. *I. polycephala*, *Klatt in Sitzungsber. Münch. Akad.* 1878, 85. *Amphiraphis cuspidata*, *DC. Prodr.* v. 343. *Solidago cuspidata*, *Wall. Cat.* 3244.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 4-7000 ft.

A nearly glabrous shrub, with rather slender branches. *Leaves* 3-5 in., always acute at both ends, young softly pubescent; petiole slender; ligules broad revolute. *Achenes* $\frac{1}{18}$ in.; pappus $\frac{1}{8}$ in., yellowish, hairs thickened at the tip.—A Simla specimen from Major Madden has the leaves finely tomentose beneath.

SECT. V. ***Limbarda***. *Heads* paniced or racemed (solitary in *I. grantioides*).

18. ***I. rubricaulis***, *Clarke Comp. Ind.* 126; shrubby, branches and leaves glabrous, leaves sessile elliptic-lanceolate acuminate serrate membranous, heads $\frac{2}{3}$ in. diam. 3-5 together in very short axillary racemes with tomentose peduncles and slender pedicels, invol. bracts subulate-lanceolate acuminate or aristate straight, achenes silky. *Amphiraphis rubricaulis*, *DC. Prodr.* v. 343. *Solidago rubricaulis*, *Wall. Cat.* 3223.

SUBTROPICAL HIMALAYA; alt. 3-6000 ft., from Kumaon to Sikkim.

Shrub 3-6 ft.; branches long, slender, flexuous. *Leaves* 4-6 by $1-1\frac{1}{2}$ in., nerves almost parallel with the margin. *Corymbs* not $\frac{1}{2}$ the length of the leaves, sometimes racemed towards the ends of the branches; invol. bracts green or purplish; ligules short, broad, revolute. *Achenes* $\frac{1}{8}$ in., slender; pappus $\frac{1}{4}$ in., white, hairs not thickened at the tip.

19. ***I. Griffithii***, *Clarke Comp. Ind.* 126; shrubby, branches woody and leaves scabrid on both surfaces, leaves very large sessile obliquely oblanceolate acuminate denticulate, heads $\frac{1}{2}$ in. diam. few in a small terminal spreading slender sessile pubescent panicle half the length of the leaves, invol. bracts few linear with a subulate point straight rigid, achenes glabrous.

BHUTAN; rocks near Dairang, *Griffith*.

Branches as thick as a goose-quill. *Leaves* 1 foot., membranous, curved, abruptly acuminate, narrowed to the very base, green, nerves slender spreading. *Panicle* as broad as long, compound, with curved lanceolate leafy bracts at the axils; peduncles very slender; ligules 0?; anther-tails very long, lacerate. *Achenes* unripe, $\frac{1}{20}$ in.; pappus $\frac{1}{2}$ in., hairs thickened a little at the tips.

20. ***I. grantioides***, *Boiss. Fl. Orient.* iii. 195; shrubby, papillose glandular and hairy, branches very stout short, leaves fleshy lower long-petioled cuneate 3-fid. upper linear entire or 3-toothed, heads 1 in. diam. solitary, invol. bracts pubescent and viscid, outer short green obtuse, inner narrower long acute, achenes large strongly ribbed hispid above constricted below the tip. *I. cutchica*, *Clarke Comp. Ind.* 126.

SCIND; at Kutch, Kurachee, &c. WUZURISTAN, *Stewart*.

A low, stout, woody shrub, with fleshy leaves and a balsamic odour. *Leaves* 1-2 in. long, lobing variable. *Ligules* few, short, yellow; lobes of disk-fl. very acuminate. *Achenes* $\frac{1}{10}$ in., narrowly oblong, ribbed as in *I. macrosperma*; pappus twice as long, reddish, scabrid.—Bentham (*Gen. Pl.* ii. 322) refers this to *Grantia Aucheri*, Boiss., to which it bears a most deceptive similarity, differing almost solely in the pappus-hairs being filiform to the base; it invalidates the genus *Grantia*. Stock's specimens were not gathered in Beluchistan as Boissier supposed.

46. **VICOA**, Cass.

Annual or perennial, glabrous or hairy herbs. *Leaves* alternate, entire or toothed, upper amplexicaul. *Heads* terminal, solitary or on leaf-opposed peduncles, woolly, radiate and heterogamous or disciform and homogamous; ray fl. ♀, 1-2-seriate, fertile, ligule narrow, 2-3-toothed; disk-fl. ♂, fertile, slender, limb hardly dilated 5-toothed. *Involucre* campanulate; bracts ∞-seriate, narrow, inner scarious, outer shorter margins scarious; receptacle flat or subconvex, naked. *Anther-bases* sagittate, tails slender. *Style-arms* of ♂ flattened, broader upwards, obtuse or truncate. *Achenes* small, hardly ribbed, tip rounded. *Pappus-hairs* 5-∞, 1-seriate, smooth scabrid or bearded.—**DISTRIB.** Species 6; Tropical and Western Asia and Africa.

This genus had best be united to *Inula*.

1. **V. auriculata**, Cass.; *DC. Prodr.* v. 474; annual, slender, pubescent and viscid or glabrate, leaves sessile lanceolate or oblong-lanceolate from a broad auricled base acuminate entire or serrulate often scabrid above, invol. bracts scarcely recurved, *V. indica*, *DC. in Wight Contrib.* 10; *Prodr. l.c.*; *Wight Ic.* t. 1148; *Clarke Comp. Ind.* 127; *Dalz. & Gibs. Bomb. Fl.* 126. *V. aurita*, *DC. l.c.* 474. *V. appendiculata*, *DC. l.c.*; *Clarke l.c.* *Inula indica*, *Linn.*; *Burm. Fl. Zeyl.* 124, t. 55, f. 2; *Wall. Cat.* 2964. *I. auriculata* and *appendiculata*, *Wall. Cat.* 2965, 2966. *Doronicum calcaratum*, *Roxb. Hort. Beng.* 61; *Fl. Ind.* iii. 434.

Throughout the drier parts of INDIA, from the Punjab to Birma and southwards, ascending the Western Himalaya to 4000 ft. and to 5000 in CEYLON (not found in the Eastern Peninsula).

A usually much branched slender rigid leafy herb, 1-3 ft., with spreading branches. *Leaves* in largest specimens 7 by $1\frac{1}{4}$ in., more commonly 1-2 in.; base always rounded; auricles rounded or hastate, sometimes gashed. *Heads* $\frac{1}{4}$ - $\frac{3}{4}$ in., on long slender spreading peduncles; invol. bracts very slender; ligules revolute, as long as the involucre. *Achenes* $\frac{1}{30}$ in., pale, terete, sparsely hairy; pappus hairs few, slender, free at the base.

2. **V. cernua**, *Dalz. in Dalz. & Gibs. Bomb. Fl.* 126; annual, slender, sparsely pubescent, lower leaves shortly petioled elliptic acuminate serrate, upper sessile contracted to a small auricled base, invol. bracts squarrose tips filiform recurved.

Hills of the CONCAN and WESTERN DECCAN; Belgaum, &c., *Law, Stocks, &c.*

Very similar in habit to *V. auriculata*, but differing in the leaves and invol. bracts. The achenes and pappus are very much alike, and I do not find the difference in the pappus of the ray flowers which Dalzell describes.

3. **V. vestita**, *Benth. in Gen. Pl.* ii. 335; woolly and softly hairy, leaves oblong or linear-oblong obtuse or subacute from a broad auricled base serrate, invol. bracts squarrose tips filiform recurved, achenes silky. *Inula vestita*, *Wall. Cat.* 2962; *DC. Prodr.* v. 470; *Boiss. Fl. Orient.* iii. 199; *Clarke Comp. Ind.* 119. *Pentanema radiatum*, *Boiss. Diagn. ser.* 2. iii. 14.

Drier parts of India from MARRI, *Fleming*, and the PUNJAB, to SCIND, PATNA, BEHAR, and the CONCAN; SIKKIM, *Treutler*; WESTERN TIBET, at Iskardo, *Thomson*.—**DISTRIB.** Afghanistan.

A shorter stouter plant than the two preceding species, with more numerous narrower ligules, but similar achenes and pappus.

47. **PULICARIA**, Gaertn.

Annual or perennial, usually woolly or villous herbs. *Leaves* alternate, sessile, often amplexicaul. *Heads* solitary, radiate and heterogamous, or disci-

form and homogamous, yellow; ray fl. ♀, 1-2-seriate, ligules narrow, or minute or 0; disk fl. ♂, fertile, slender; limb elongate, shortly 5-fid. *Involucre* hemispheric or obconic; bracts in few series, narrow, acuminate or awned; receptacle flat or subconvex, pitted. *Anther-bases* sagittate; tails capillary, simple or branched. *Style-arms* of ♀ linear, obtuse. *Achenes* terete or ribbed; pappus double, outer of short jagged teeth, inner of smooth scabrid or bearded filiform or flattened hairs.—**DISTRIB.** Species about 24, European, Asiatic, and African.

SECT. I. *Eupulicaria*. *Invol. bracts* slender. *Pappus* double; outer of a crown of short scales, inner of slender hairs.

1. ***P. vulgaris***, Gaertn.; Boiss. *Fl. Orient.* iii. 204; annual, pubescent or softly tomentose, leaves sessile oblong-lanceolate from a $\frac{1}{2}$ -amplexicaul base, lower petioled, heads on short stout peduncles, invol. bracts subulate, ligules erect very short, pappus dirty white twice as long as the silky achenes, outer scales lanceolate serrate free. *DC. Prodr.* v. 478; *Clarke Comp. Ind.* 128. *Inula Pulicaria*, Linn.

KASHMIR, alt. 5-6000 ft., Falconer, Thomson; Peshawur, Jacquemont, Stewart.—**DISTRIB.** Central and N. Asia, Persia, and westwards to Algeria and Britain.

Erect, 6-18 in. high, copiously dichotomously subcorymbosely branched above. *Leaves* $\frac{1}{2}$ -1 in. *Heads* $\frac{1}{2}$ - $\frac{1}{2}$ in. diam.; peduncles divaricate; invol. bracts very woolly in the Kashmir plant, erect or with subrecurved tips; ligules hardly exceeding the bracts. *Achenes* very minute; pappus $\frac{1}{10}$ in. long.

2. ***P. dysinterica***, Gaertn.; Boiss. *Fl. Orient.* iii. 201; perennial, woolly or cottony, leaves $\frac{1}{2}$ -amplexicaul oblong-cordate waved and toothed, heads densely woolly, invol. bracts setaceous, ligules many long, pappus dirty white four or five times as long as the silky achenes, outer scales lanceolate free. *Inula dysinterica*, Linn.

KASHMIR, alt. 5-6000 ft., Falconer, Thomson.—**DISTRIB.** Westwards to Algeria and Britain.

A more robust plant than *P. vulgaris*, with ligules much exceeding the invol. bracts, and much longer and more copious pappus.

3. ***P. foliolosa***, DC. *Prodr.* v. 480; annual, pubescent or tomentose above, leaves sessile linear-oblong or -oblanceolate from a broad or contracted $\frac{1}{2}$ -amplexicaul base quite entire, tips apiculate recurved, heads woolly and glandular, invol. bracts almost setaceous, peduncles very slender, ligules 0, pappus hairs very few white twice as long as the minute hairy achenes, scales connate below. *Clarke Comp. Ind.* 128. *Blumea senecionidea*, Edgew. *Fl. Banda*, 16. *Conyza foliolosa*, Ham. in Wall. Cat. 3281.

Upper and Lower GANGETIC PLAINS; Oude, Sikkim, Terai, Maldah, and banks of the Ganges. CENTRAL INDIA; Sangur and Jubbulpore. BANDA, Edgeworth. The CONCAN, Law, &c.

Stem 1-2 ft., copiously branched. *Leaves* 1-6 in., lower dilated from the base upwards, almost glabrous. *Heads* scattered, smaller than in *P. vulgaris* or *dysinterica*; ray fl. tubular, 3-toothed.

SECT. II. *Poloa*. *Invol. bracts* herbaceous or leafy. *Pappus* of sect. *Eupulicaria*.

4. ***P. Wightiana***, Clarke *Comp. Ind.* 118; annual, puberulous above, leaves sessile linear-oblong from a sub-auricled base obtuse entire or serrulate, heads solitary, peduncles stout strict, invol. bracts herbaceous lanceolate acute, ligules equalling the bracts, pappus at length reddish twice as long as the glabrate achenes, outer scales united in a cup. *P. hyderabadensis*, DC. l. c. 480.

Callistephus Wightianus, *DC. l. c.* 275; *Wight Ic.* t. 1089; *Dalz. & Gibs. Bomb. Fl.* 123. C. Heyneanus, *DC. l. c.* Poloa Wightiana, *DC. in Wight Contrib.* 10. Erigeron Wightianus, *Wall. Cat.* 3284. Aster indicus, *Heyne*; and A. hyderabadensis, *Wall. Cat.* 2971, 2972.

Hilly country of the DECCAN and MAISOR, common from the Concan southwards.

A tall, stout, much branched, leafy herb, 12–18 in. high; branches often angled, erect. Leaves 1–2 in., erect. Heads $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., peduncles swollen upwards. Achenes $\frac{1}{16}$ in., brown, shining, as are the highly coloured pappus hairs.

5. **P. angustifolia**, *DC. Prodr.* v. 479; annual, softly pubescent, branches erect or ascending, leaves sessile linear-oblong or obovate, base narrow entire or serrulate, tips obtuse or apiculate and recurved, heads small, invol. bracts herbaceous lanceolate acuminate, ligules equalling or exceeding the bracts, pappus white or reddish twice as long as the glabrate achenes, outer scales lacinate. *Clarke Comp. Ind.* 129. P. indica, *Jaub. & Spach. Ill. Pl. Orient.* t. 343. P. Stocksii, *Boiss. Fl. Orient.* iii. 206. P. saxicola, *Edgew. in Journ. Linn. Soc.* ix. 323. Callistephus concolor, *Dalz. in Hook. Journ. Bot.* ii. 344; *Dalz. & Gibs. Bomb. Fl.* 123.

NORTH-WESTERN INDIA, *Royle*; Delhi, *Jacquemont*. BANDA, *Edgeworth*. SCIND, *Stocks*. The CONCAN, *Law, &c.*—DISTRIB. Beluchistan.

A very variable annual, with sometimes a woody stock, much smaller than *P. Wightiana*, with shorter leaves, narrower at the base, more slender peduncles, and smaller heads. The ligules are very deciduous, if indeed they are always present, which is perhaps doubtful.

SECT. III. **Francœuria**. *Invol. bracts* slender or subherbaceous. *Pappus hairs* bearded, thickened at the tips; outer scales connate with the hairs and deciduous with them.

6. **P. crispa**, *Benth. in Gen. Pl.* ii. 336; perennial, shrubby below, branches and leaves beneath densely cottony, leaves sessile linear-oblong or subspathulate, margins recurved toothed and crisped lower $\frac{1}{2}$ -amplexicaul, involucre pubescent, bracts very slender setaceous, ligules shorter than the bracts, pappus white three times as long as the glabrate achenes. *Clarke Comp. Ind.* 129. *Francœuria crispa*, *Cass.*; *DC. Prodr.* v. 475; *Boiss. Fl. Orient.* iii. 206. *Inula quadrifida*, *Ham. in Wall. Cat.* 2963. *Duchesnia crispa*, *Cass. in Dict. Sc. Nat.* xiii. 546.

The PUNJAB, *Royle, &c.* UPPER GANGETIC PLAIN and eastwards to BEHAR.—DISTRIB. Westwards to Arabia, Africa, the Canary and Cape de Verd Islands.

Stout, shrubby, 1–2 ft. high, very leafy; branches ascending. Leaves $\frac{1}{2}$ –1½ in., lowest in young plants sometimes 4 in., obovate-spathulate, with flat margins; upper very small. Heads $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. (ligules sometimes 0, *Boissier*).

7. **P. gnaphalodes**, *Boiss. Fl. Orient.* iii. 203; annual, softly woolly below, leaves sessile obovate-spathulate obtuse waved and crisped, heads very small, invol. bracts few pubescent short oblong-lanceolate, ligules few very short, pappus white or reddish hairs twice as long as the silky achenes. *Inula gnaphalodes*, *Vent. Hort. Cels.* t. 75. *Strabonia gnaphalodes*, *DC. Prodr.* v. 481.

WESTERN TIBET; *Iskardo, Thomson*.—DISTRIB. Afghanistan, Persia.

Habit of *P. crispa*, but not cottony, usually more slender, with larger heads and very different involucre. Thomson's specimens are very old, and have neither flowers nor achenes; but I do not doubt their belonging to this species.

SECT. IV. **Platycheæte**. *Invol. bracts* elliptic or linear-lanceolate, acute. *Pappus* double; outer a short jagged crown, inner of flattened shining rigid

scabrid hairs. *Achenes* short, terete, pericarp crustaceous.—A very distinct group in respect of both pappus and achenes.

8. **P. glaucescens**, *Jaub. & Spach. Ill. Pl. Orient.* t. 349; dwarf, shrubby, glabrous or sparsely hairy above, leaves fleshy elongate linear or dilated upwards, margins flat or involute quite entire, heads $\frac{1}{2}$ in. diam. shortly peduncled, invol. bracts glabrous lanceolate acute rigid, ligules 0, pappus white or yellowish much longer than the short oblong silky achenes. *Clarke Comp. Ind.* 130. *Platychnæ glaucescens*, *Boiss.*; *Fl. Orient.* iii. 209.

The PUNJAB, SALT RANGE and MARRI, *Fleming*. WUZURISTAN, *Stewart*.—DISTRIB. Beluchistan, Persia.

A small saline succulent-leaved shrub, with pale woody stem and branches. *Leaves* 1–2½ in., tips usually recurved. *Heads* shining from the copious pale straw-coloured pappus. The outer pappus is continuous with the pubescence of the very short achenes.

9. **P. Boissieri**, *Hook. f.*; dwarf, shrubby, villous with long white hairs, leaves fleshy spatulate or elongate-spatulate quite entire or sparsely toothed flat or complicate, heads $\frac{1}{2}$ in. diam. shortly peduncled, invol. bracts lanceolate acute rigid puberulous, ligules 0, pappus white or yellowish much longer than the short oblong silky achenes. *Platychnæ villosa*, *Boiss.*; *Fl. Orient.* iii. 208.

SCIND, *Stocks*.

Habit and heads of *P. glaucescens*, but softly villous, and the leaves are not more than $\frac{1}{2}$ –1 in. long. *Boissier* describes the invol. bracts as very obtuse, but they are quite acute in our specimens.

10. **P. Stocksii**, *Hook. f.*; dwarf, shrubby, pubescent, leaves short spatulate very fleshy quite entire flat or concave above, heads subsessile $\frac{1}{4}$ in. diam., invol. bracts rigid lanceolate puberulous outer obtuse inner acute, ligules 0, pappus white much longer than the short oblong silky achenes.

SCIND, *Stocks*.

A much shorter and more robust plant than *P. Boissieri* or *glaucescens*, blackish when dry, with leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. long, not recurved at the tips.

DOUBTFUL SPECIES.

P. SAKKIANA, *Klatt. Compos. Schlagintw.* 87. The description of this answers to any of the above described species of *Platychnæ*.

48. **CARPESIMUM**, *Linn.*

Erect branched herbs. *Leaves* alternate. *Heads* terminal or axillary, sessile or peduncled, usually drooping, heterogamous, disciform, yellow; outer fl. ♀, ∞-seriate, fertile, slender, 3–5-toothed; disk-fl. ♂, fertile, slender, limb slightly dilated 5-toothed. *Involucre* hemispheric or subglobose; bracts in few series, inner broad obtuse dry, outer with herbaceous or foliaceous tips; receptacle flat, naked. *Anther-bases* sagittate, tails slender. *Style-arms* linear, obtuse, connivent till late. *Achenes* elongate, striate with an (often glandular) beak surmounted by a corona; pappus 0.—DISTRIB. Species 4–5, S. European and temperate and subtropical Asiatic.

1. **C. cernuum**, *Linn.*; pubescent, leaves shortly petioled elliptic-lanceolate obtuse sinuate-toothed, heads terminal drooping with broad leafy bracts, outer invol. bracts leafy spreading. *Clarke Comp. Ind.* 130.

TEMPERATE HIMALAYA and the KHASIA and NILGHERY MTS.—DISTRIB. From the Caucasus to France, Java, Japan.

One of the commonest and most variable Himalayan plants, and often a pest to the traveller from the glandular achenes adhering to the clothes; it grows 1-3 ft. high. The following often very distinct-looking varieties graduate into one another in the most perplexing way, and render it very doubtful if *C. trachelioides* should be kept distinct.

VAR. 1. *cernuum proper*; stem and branches pubescent often more or less cottony, leaves subsessile elliptic, heads $\frac{1}{2}$ - $\frac{1}{2}$ in. rarely 1 in. diam. with large leafy bracts at the base. *C. cernuum*, *DC. Prodr.* vi. 281; *Boiss. Fl. Orient.* iii. 214; *Lamk. Ill.* t. 696, f. 1. *C. nepalense*, *Less. in Linnaea*, vi. 234; *DC. l.c.* *C. pubescens*, *Wall. Cat.* 3199; *DC. l.c.*—Himalaya and Khasia Mts.

VAR. 2. *glandulosa*, *Herb. Ind. Or. H. f. & T.*; *Clarke Comp. Ind.* 130; usually hirsute or villous, lower and often cauline leaves also long petioled and ovate or cordate, heads as in var. 1.—Himalaya and Khasia Mts., ascending to 13,000 ft. in Sikkim.—There is every gradation between specimens with long petioled cordate-ovate leaves and those of var. 1.

VAR. 3. *nilagiricum*, *Clarke Comp. Ind.* 131; hirsute or villous, leaves subsessile elliptic or ovate-lanceolate, heads $\frac{1}{4}$ -1 in. diam., involucre villous. *C. nepalense*, *Wight Ic.* t. 1120. *Oiospermum*? *Wightianum*, *DC. Prodr.* vi. 11; *Deless. Ic. Sel.* iv. t. 1.—Nilgerry Mts., alt. 7-8000 ft.

VAR. 4. *lanata*, *Herb. Ind. Or. H. f. & T.*; robust, stem branches and leaves densely woolly or cottony with white hairs, heads 1 in. diam., involucre villous. *Clarke Comp. Ind.* 1304, *excl. syn.*—Sikkim, alt. 4-5000 ft.; Khasia Mts.

VAR. 5. *pedunculosa*, *Clarke l.c.*; glabrous or sparsely hairy, leaves large ovate with winged petioles, heads $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. on very long stiff naked peduncles, invol. bracts glabrate. *C. pedunculolum*, *Wall. Cat.* 3200; *DC. Prodr.* vi. 281.—Kumaon, *Blinkworth*; Simla, alt. 6-8000 ft., *Thomson*.

VAR. 6. *ciliatum*; stem and branches very slender pubescent, leaves very small $\frac{3}{4}$ -1 in. shortly petioled elliptic-ovate or lanceolate sparsely hairy above pubescent beneath, heads $\frac{1}{2}$ in. diam. *C. ciliatum*, *Wall. Cat.* 3214.—Travancere, *Herb. Rottl.*

VAR. 7. *Griffithii*; stem and branches tomentose, leaves petioled linear 2 by $\frac{1}{2}$ in. quite entire hirsute on both surfaces, heads $\frac{1}{4}$ in. with narrow subtending leaves, invol. bracts few inner glabrous.—Mishmi hills, *Griffith* (a fragment only).

2. ***C. trachelifolium***, *Less. in Linnaea*, vi. 233; slender, pubescent hirsute or glabrate, lower leaves long-petioled ovate-cordate sinuate-toothed or lobulate, upper floral subsessile ovate or elliptic-lanceolate serrate or entire, heads very small $\frac{1}{4}$ - $\frac{1}{4}$ in. rarely more sometimes subracemose, invol. bracts very few glabrous. *DC. Prodr.* vi. 282. *C. cernuum*, var. *trachelifolium*, *Clarke Comp. Ind.* 131.

TEMPERATE HIMALAYA; from Kashmir, alt. 5-7000 ft., to Sikkim, alt. 7-10,000 ft.

This has the leaves of *C. cernuum*, var. *glandulosum*, but has very small heads, and is in its common state different in habit, sometimes approaching *C. abrotanoides*. It holds its characters so much more constantly than do any of the varieties of *cernuum*, and covers so great an area, that I keep it distinct.

3. ***C. abrotanoides***, *Linn.*; *Boiss. Fl. Orient.* iii. 215; branches long slender, leaves subsessile lanceolate acuminate quite entire or serrate, heads $\frac{1}{4}$ in. diam. subsessile racemosely secund along the leafy branches horizontal or nodding, invol. bracts broadly oblong obtuse. *DC. Prodr.* vi. 282; *Lamk. Ill.* t. 696; *Clarke Comp. Ind.* 131. *C. racemosum*, *Wall. Cat.* 3201, *in part*; *DC. l.c.* *Amphiraphis Wightiana*, *Wall. Cat.* 2958. *Compos.*, *Wall. Cat.* 7522.

TEMPERATE HIMALAYA; from Kashmir, alt. 5-10,000 ft., to Sikkim, alt. 8-10,000 ft.—DISTRIB. N. Persia, to Austria. Japan, and China.

A stout herb, 2-4 ft. high, pubescent or glabrate; branches leafy to the tips. Leaves 3-5 in., never truly petioled. Heads inserted along the whole length of the branches, in or above the leafy axils, or in short axillary racemes, yellow.—Used to dye silk in Kashmir (*Stewart*).

TRIBE V. **HELIANTHOIDEÆ.**48*. **LAGASCEA**, Cav.

Rigid villous scabrid or subglabrous herbs. *Leaves* opposite or the upper alternate. *Heads* in leafy balls, which are solitary terminal and peduncled or in corymbose panicles, 1-fld.; fl. ♀, fertile, tubular, white red or yellow, tube short, limb elongate cylindric or dilated 5-fld. *Involucre* tubular, of 5 connate bracts; receptacle minute. *Anther-bases* sagittate, auricles obtuse. *Style-arms* elongate, acute, hairy. *Achenes* cuneate, compressed or 3-angled, tip rounded; pappus a toothed or fimbriate cup or ring, with sometimes bristles at the angles of the achene.—**DISTRIB.** Species 7, tropical American.

L. mollis, Cav.; DC. *Prodr.* v. 91; annual, stem and branches scabrid, leaves petioled ovate acuminate subrenate silkily tomentose beneath, clusters of heads solitary terminating in slender naked peduncles, flowers white, pappus very obscure. *Clarke Comp. Ind.* 131. *Nocca mollis*, Jacq. *Fragment.* t. 13.

A weed in cultivated places, in various parts of India.—**DISTRIB.** Indigenous in Central America; introduced in various warm countries.

Much branched, slender, young bracts villous with white hairs. *Leaves* 1-1½ in. *Heads* in clusters (resembling simple heads) ¾-1 in. diam., involucre by elliptic leaves, very silky.

49. **ADENOCAULON**, Hook.

Erect annual or perennial herbs. *Leaves* alternate, lower long-petioled, white beneath. *Heads* small in glandular panicles, heterogamous, disciform; flowers all tubular; outer 4-7, ♀, fertile, rarely with imperfect achenes, limb 4-5-fld; disk fl. 4-5, ♂, sterile. *Involucre* campanulate; bracts 5, subequal, herbaceous; receptacle flat. *Anther-bases* entire or minutely 2-toothed. *Style-arms* of ♀ short, broad; of ♂ connate. *Achenes* obovoid, obscurely ribbed, covered with stalked glands; pappus 0.—**DISTRIB.** Species 5, Japan, Himalaya, N. America, and Chili.

A. bicolor, Hook. *Bot. Misc.* i. 19, t. 15; DC. *Prodr.* vii. 207; stem simple below, panicle and leaves beneath grey with appressed cottony tomentum, leaves orbicular subreniform or subhastate angled and toothed, petiole long winged or not. *A. himalaicum*, Edgew. in *Trans. Linn. Soc.* xx. 64; *Clarke Comp. Ind.* 132. *A. adhærescens*, Maxim. *Prim. Fl. Amur.* 152.

TEMPERATE HIMALAYA, from Simla, alt. 6-9000 ft., to Sikkim, alt. 7-12,000 ft.—**DISTRIB.** Manchuria, Japan, N. W. America.

Root of thick fibres, perennial. *Leaves* 3-4 in. diam., membranous, nerves slender reticulated; petiole with sometimes a toothed wing. *Panicle* with very slender spreading branches and viscid peduncles; heads ¼ in. *Achenes* much longer than the involucre, clothed densely, like the peduncle, with large stalked glands.—I find no material difference between the Himalayan, N. Asiatic, and N. American specimens.

50. **CHRYSOGONUM**, Linn.

Herbs or under-shrubs. *Leaves* opposite, entire toothed or pinnate. *Heads* solitary or corymbose, heterogamous, radiate, yellow; ray fl. ♀, 1-seriate, fertile, ligule entire or 2-3-toothed; disk fl. ♂, sterile, tubular, limb elongate 5-fld. *Involucre* ovoid or campanulate; bracts few, rigid; receptacle flat, with concave pales at the ♂ fl. *Anther-bases* entire or subsagittate. *Style* of ♀ undivided, hairy. *Achenes* of ray dorsally compressed, inner face often keeled or 2-3-ribbed,

margins acute or winged; pappus very short, obscure or 0.—DISTRIB. Species 6, 1 American, 2 Indian, and 3 Australian.

1. **C. heterophyllum**, *Benth. in Gen. Pl.* ii. 350; leaves simple ovate serrate or 3-lobed or pinnatifid or pinnate, segments ovate-lanceolate acutely serrate or gashed, heads $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., ligules few small, achenes, obtuse or 2–3-horned at the tip. *Clarke Comp. Ind.* 182. *Moonia heterophylla*, *Arnott Pugill.* 31; *DC. Prodr.* vii. 289.

NILGHERRY and PULNEY Mts., *Wight*. CEYLON; central province, alt. 6–7000 ft., *Moon*, &c.

Annual, glabrous or sparsely hairy, 1–3 ft. high, branched. *Leaves* usually glabrous beneath, when simple $\frac{3}{4}$ –3 $\frac{1}{2}$ in., narrowed into the slender petiole, when compound usually smaller.

2. **C. Arnottianum**, *Benth. in Gen. Pl.* ii. 350; leaves 3-pinnatisect or pinnatifid, segments or lobes lanceolate serrate, heads 1–1 $\frac{1}{2}$ in. diam., ligules many large. *Clarke Comp. Ind.* 132. *Moonia Arnottiana*, *Wight Ic.* t. 1105.

NILGHERRY Mts., *Wight*.

Thwaites, regarding this as a form of *heterophyllum*, refers the compound leaved Ceylon specimens of that plant to it; but I find no specimen of *heterophyllum* with such large heads, or with so many rays as *Arnottianum* has. Still the two are very closely allied; Clarke thinks them varieties, and I dare say they will prove so.

51. **XANTHIUM**, *Linn.*

Annual, coarse rough herbs, unarmed or with 3-fid spines. *Leaves* alternate, toothed or lobed. *Heads* monœcious (♀ and ♂), axillary; ♂ in the upper axils, globose, many-fld., sterile, tubular, 5-toothed; ♀ 2-fld., fertile, apetalous. *Involucre* of ♂ head short; bracts few, 1–2-seriate, narrow; receptacle cylindric, with hyaline pales enclosing the flowers; invol. of ♀ heads with the bracts united into an ovoid 2-beaked herbaceous utricle with 2 1-fld. cells, clothed with hooked bristles and with sometimes a few small free outer bracts. *Filaments* monadelphous, anthers free, bases obtuse, tips mucronate inflexed. *Style* of ♀ slender, undivided; of ♀ arms free, exerted from the involucre. *Achenes* enclosed in the hardened involucre cells, obovoid, thick; pappus 0.—DISTRIB. Species about 4, probably all of American origin.

X. strumarium, *Linn.*; *Boiss. Fl. Orient.* iii. 251; unarmed, leaves petioled scabrid triangular-cordate or orbicular lobed and toothed, base cuneate, heads in terminal and axillary racemes, fruiting involucre ovoid or oblong, beaks erect or diverging. *Clarke Comp. Ind.* 132. *X. indicum*, *DC. in Wight Contrib.* 17; *Wall. Cat.* 3181; *Dalz. & Gibs. Bomb. Fl.* 127; *Roxb. Fl. Ind.* iii. 601. *X. Roxburghii*, discolor, and *brevirostre*, *Wallroth*; *Walp. Rep.* vi. 151. *X. orientale*, *Blume Bijl.* 915.

Throughout the hotter parts of INDIA and CEYLON, usually near houses; ascending the Western Himalaya to 5000 ft.

52. **SIEGESBECKIA**, *Linn.*

Glandular-pubescent herbs. *Leaves* opposite, toothed. *Heads* in leafy panicles, heterogamous, subradiate, yellow or white; ray fl. ♀, 1-seriate, fertile, tube short, limb 2–3-fid; disk fl. ♂, fertile, or the inner sterile, tubular, limb campanulate and 5-fid, or narrow and 3–4-toothed. *Involucre* campanulate or hemispheric; bracts few, herbaceous, glandular, outer spatulate spreading, inner enclosing the ray fl.; receptacle small; pales membranous, concave, often enclosing the flowers. *Anther-bases* entire. *Style*—arms of ♂ short, flattened,

subacute. *Achenes* obovoid-oblong, not compressed, often incurved, obtuse; pappus 0.—**DISTRIB.** Species 2, a cosmopolitan tropical and subtropical and a Peruvian one.

S. orientalis, Linn.; Boiss. *Fl. Orient.* iii. 250; erect, pubescent with crisped hairs, leaves triangular-ovate toothed or crenate, base incised truncate or cuneate, outer invol. bracts equalling or exceeding the inner, outer achenes rough. *DC. Prodr.* v. 495; *Wight Ic.* t. 1103; *Wall. Cat.* 3182; *Dalz. & Gibs. Bomb. Fl.* 127. *S. glutinosa*, *Wall. Cat.* 3182. *S. brachiata* and *orientalis*? *Roxb. Fl. Ind.* iii. 432. *Minyranthes heterophylla*, Turcz. in *Bull. Soc. Imp. Nat. Misc.* 1851, i. 181.

Throughout INDIA, ascending to 5000 ft. in the Himalaya and other mountains.—**DISTRIB.**—Cosmopolitan in warm climates.

An annual, 1–3 ft., with spreading opposite lower branches. *Leaves* 1–4 in. long and broad, long-petioled.

53. **ENHYDRA**, Lour.

Glabrous or scaberulous marsh-herbs. *Leaves* opposite, sessile. *Heads* axillary, subsessile, unilateral or in alternate axils, heterogamous, subradiate; ray fl. ♀, ∞-seriate, fertile, ligule minute broad 3–4-toothed; disk fl. ♂, fertile, or the inner sterile, tubular, limb campanulate 5-fid. *Invol. bracts* 4, foliaceous, in opposite pairs, 2 outer larger; receptacle convex or conic, pales enclosing the flowers tipped with glandular hairs. *Anther-bases* obtuse, entire. *Style-arms* of ♀ obtuse, tips hispid. *Achenes* oblong, enclosed in the rigid pales, outer dorsally, inner sometimes laterally compressed; pappus 0.—**DISTRIB.** Species about 6, tropical and subtropical.

E. fluctuans, Lour. *Fl. Coch.* 511; pubescent or glabrous, glandular, leaves sessile linear-oblong acute or obtuse entire or subcrenate, heads axillary and terminal sessile. *DC. Prodr.* v. 637. *E. Heloncha*, *DC. l. c.* *Hingtsa repens*, *Roxb. Hort. Beng.* 62; *Fl. Ind.* iii. 448. *Megera Helongcha*, *Ham. in Wall. Cat.* 3195. *Tetractis paludosa*, *Blume Bijl.* 892.

EASTERN BENGAL, ASSAM, and SILHET.—**DISTRIB.** Sumatra, Malay, China.

Usually quite glabrous; stems 1–2 ft, elongate, simple or divaricatingly branched, rooting at the nodes. *Leaves* 1–3 in., variable in breadth, base narrowed or truncate. *Heads* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.

54. **ECLIPTA**, Linn.

Strigose or hirsute annuals. *Leaves* opposite. *Heads* small, axillary or terminal, peduncled, heterogamous, rayed; ray-fl. ♀, sub-2-seriate, fertile or sterile; ligule small, entire or 2-toothed, white rarely yellow; disk-fl. ♂, fertile, tubular, limb 4–5-fid. *Involucre* broadly campanulate; bracts sub-2-seriate, herbaceous, outer large and broad; receptacle flat, or nearly so, pales enclosing several flowers, inner narrow or 0. *Anther-bases* obtuse, subentire. *Style-arms* flattened, with short or triangular obtuse appendages. *Achenes* of ray narrow, triquetrous, often empty; of the disk stouter, laterally subcompressed; top entire, toothed or 2-aristate.—**DISTRIB.** Species 3 or 4, an Australian, a S. American and a cosmopolitan tropical weed.

1. **E. alba**, Hassk.; *Clarke Comp. Ind.* 134; hirsute or strigillose, leaves sessile linear or oblong-lanceolate subentire narrowed at both ends, peduncles 1–2 axillary short or long and slender, invol.-bracts ovate obtuse or acute about equalling or exceeding the flowers. *E. erecta*, *Lamk. Ill.* t. 687. *E. erecta* and *alba*, *Dalz. & Gibs. Bomb. Fl.* 117. *E. alba* and *marginata*, *Boiss. Fl. Orient.* iii. 249. *E. erecta* and *prostrata*, *Linn. Mant.* 266. *Verbesina alba* and pro-

strata, *Linn.* E. prostrata, *Rorb. Fl. Ind.* iii. 438. E. prostrata, undulata and parviflora, *Wall. Cat.* 3209, 3210, 3213.

Throughout INDIA; ascending to 6000 ft. in the Himalaya and other mountains. DISTRIB. Cosmopolitan in warm climates.

An erect or diffuse branched, slender weed. *Leaves* 1-4 in. long, very variable in form and width. *Heads* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.

55. SCLEROCARPUS, Jacq.

Strigose or villous herbs. *Leaves* alternate or opposite. *Heads* terminal or in the forks, or leaf-opposed; heterogamous, rayed, yellow; ray-fl. neuter, 1-seriate, ligule spreading; disk-fl. \varnothing , fertile, tubular, limb 3-5-fid. *Involucre* campanulate; bracts few, 2-seriate, all or the tips herbaceous, outer spreading; receptacle convex or conic; pales enfolding the base of the \varnothing fl. and finally hardening round the achenes. *Anther-bases* subentire. *Style-arms* of \varnothing elongate, acute obtuse or subclavate. *Achenes* obovoid, subcompressed, glabrous, narrowed below, enclosed in the rugose often beaked pales; pappus 0 or a ring.—DISTRIB. Species about 11, tropical American, Asiatic and African.

1. **S. africanus**, *Jacq. Ic. Pl. Rar.* 17, t. 176; annual, erect, hispidly hairy, leaves opposite petioled ovate acute serrate 3-5-nerved, heads peduncled or sessile, achenes glabrous. *DC. Prodr.* v. 566; *Dalz. & Gibs. Bomb. Fl.* 129; *Clarke Comp. Ind.* 134.

WESTERN HIMALAYA; from Simla to Kumaon, *Roule*, &c., ascending to 5500 ft. in fields. PUNJAB, *Aitchison*. BANDA, *Edgeworth*. The CONCAN; Joneer and highest hills east of Bombay, *Dalzell*, &c. The CIRCARS, *Gibson*.—DISTRIB. Tropical E. & W. Africa.

An erect herb, 1-2 ft.; branches stiff, terete, opposite. *Leaves* $1\frac{1}{2}$ -3 in., narrowed into the petiole. *Heads* $\frac{1}{3}$ - $\frac{1}{2}$ in. diam. *Pales* enclosing the curved, gibbous, ribbed achenes.

56. BLAINVILLEA, Cass.

Scabrid or villous herbs. *Leaves* opposite, or the upper alternate, petioled, toothed. *Heads* small, subsessile or peduncled, terminal or axillary, heterogamous, radiate or subdisciform, yellow; ray-fl. \varnothing , 1-2-seriate, fertile; ligules small 2-3-toothed or 0; disk-fl. \varnothing , fertile, tubular, limb dilated 5-fid. *Involucre* broadly ovoid or subglobose; bracts few, outer herbaceous, inner passing into the rigidly membranous concave or folded scales of the small convex receptacle. *Anther-bases* obtuse, entire. *Style-arms* of \varnothing narrow, flattened, with acute or subobtuse appendages. *Achenes* truncate, of ray 3-quetrous or dorsally compressed, of the disk 3-4-angled or laterally compressed; pappus of 2-5 unequal bristles, connate at the base.—DISTRIB. Species about 10, all tropical.

1. **B. latifolia**, *DC. in Wight Contrib.* 17; *Prodr.* v. 492; annual, hispidly hairy, leaves opposite or upper alternate petioled ovate crenate-serrate 3-nerved, heads peduncled, invol. bracts oblong obtuse rigid, achenes of the ray cuneiform triquetrous curved. *Dalz. & Gibs. Bomb. Fl.* 127; *Clarke Comp. Ind.* 135. *B. rhomboidea*, *Cass.*; *DC. l. c.* *B. alba* and *hispida*, *Edgew. in Trans. Linn. Soc.* xx. 70. *Eclipta latifolia*, *Linn. f.* *Verbesina dichotoma*, *Wall. Cat.* 3204, A. in part, B. C. D. E. *V. Lavenia*, *Rorb. Fl. Ind.* iii. 442.

WESTERN INDIA; from the upper Gangetic plain westwards, ascending to 5000 ft. in Kumaon in fields. BANDA, *Edgeworth*. The DECCAN and CEYLON.—DISTRIB. Tropical Asia, Africa, America and Australia.

A weed, 1-2 ft., rigid; branches terete, lower opposite, upper alternate. *Leaves* 2-4 in. long, base cuneate. *Heads* $\frac{1}{2}$ - $\frac{1}{3}$ in. diam.; ligules yellow or whitish.

57. **WEDELIA**, Jacq.

Scabrid pubescent or hirsute herbs or undershrubs. *Leaves* opposite. *Heads* axillary or terminal, heterogamous, radiate, yellow; ray-fl. ♀, fertile, ligule spreading entire or 2-toothed; disk-fl. ♂, fertile or the central sterile, tubular, limb elongate 5-toothed. *Invol.* bracts sub-2-seriate, outer 3-5 usually herbaceous or foliaceous, inner dry; receptacle flat or convex, pales enclosing the flowers. *Anther-bases* entire or subsagittate. *Style-arms* of ♂ with acute hairy tips. *Achenes* cuneate-oblong or obovoid, thick, smooth or tubercled, laterally compressed or the outer triquetrous, tip rounded, margins obtuse or thickened; pappus 0, or a toothed cup or ring, or of short scales, with sometimes a few bristles.—**DISTRIB.** Species about 45, tropical and sub-tropical.

1. **W. calendulacea**, Less.; *DC. in Wight Contrib.* 17; *Prodr.* v. 539; procumbent, strigillose or glabrate, leaves subsessile linear-oblong or oblanceolate acute or obtuse entire or sub-crenate scaberulous above 1- rarely 3-nerved, heads solitary on long slender axillary peduncles, outer invol. bracts large oblong obtuse herbaceous much longer than the disk-fl., achenes of the ray 3-quetrous tip truncate. *Wight Ic.* t. 1107; *Arn. in Hook. Comp. Bot. Mag.* i. 81, t. 5; *Clarke Comp. Ind.* 136; *Dalz. & Gibs. Bomb. Fl.* 129. *W. bengalensis*?, *Rich. in Pers. Synops.* ii. 490. *Verbesina calendulacea*, *Linn.*; *Roxb. Fl. Ind.* iii. 440; *Wall. Cat.* 3205. *Joegeria calendulacea*, *Spreng. Syst.* iii. 590.—*Burm. Fl. Zeyl.* 52, t. 22; f. 1.

In wet places, BENGAL, ASSAM, SILHET, the EASTERN and WESTERN PENINSULAS and CEYLON.—**DISTRIB.** Malay Islds., China, Japan.

Stem 6-18 in., rooting at the lower nodes, glabrous or scabrid. *Leaves* 1-3 in., variable in breadth, hairs on both surfaces scattered, appressed, rigid, white. *Heads* 1-1½ in. diam; peduncles 1-6 in., swollen below the turbinate involucre.

2. **W. urticæfolia**, *DC. in Wight Contrib.* 18; *Prodr.* v. 539 var. *β* only; erect, slender, hispid or scabrid, leaves petioled ovate acuminate serrate 3-nerved, heads 1-3 peduncled, invol. bracts ovate-lanceolate acuminate exceeding the disk-fl., achenes elongate-cuneate 3-quetrous tip broad truncate. *Wight Ic.* t. 1106. *Woollastonia biflora*, *Dalz. & Gibs. Bomb. Fl.* 128, excl. syn. *Verbesina biflora*, *Wall. Cat.* 3207 B., in part.

WESTERN PENINSULA; on the Ghats from the Concan southwards.

Stem and *branches* weak, pale, grooved. *Leaves* 3-5 in., petiole short or long, slender. *Heads* ¾-1 in. diam.; invol. bracts scabrid. *Pappus* usually 0, rarely of 1-2 bristles.

3. **W. biflora**, *DC. in Wight Contrib.* 18; climbing, glabrous or scaberulous, leaves petioled ovate acuminate serrate, heads 1-3 peduncled, invol. bracts oblong or ovate-lanceolate often recurved equalling or exceeding the disk, achenes shortly cuneate 3-4-angled rough tip broad truncate. *W. scandens*, *Clarke Comp. Ind.* 136, excl. syn. ? *W. biflora*, *Kurz in Journ. As. Soc.* 1877; ii. 176. *Woollastonia biflora* and *scabriuscula*, *DC. Prodr.* v. 546, 547. *W. biflora*, *Wt. Ic.* t. 1108. *Verbesina biflora*, *Linn.*; *Wall. Cat.* 3207 A., in part, *F. V. dichotoma*, *Wall. Cat.* 3024 A., partly *F. H. Eclipta scabriuscula*, *Wall. Cat.* 3212, chiefly. *Acemella biflora*, *Spreng. Syst.* iii. 591.—*Rheede Hort. Mal.* x. t. 40.

Near the sea from BENGAL and BOMBAY to CEYLON and SINGAPORE.—**DISTRIB.** Tropical shores of Eastern Asia.

Very like *W. urticæfolia*, but less hispid, climbing, and with much shorter broader achenes.

4. **W. Wallichii**, Less. in *Linnaea*, vi. 162; suberect, hispid or scabrid, leaves petioled ovate acuminate serrate 3-nerved sometimes softly pubescent beneath, outer invol. bracts oblong obtuse or acute equalling or exceeding the disk-fl., achenes obovoid compressed or obtusely 3-angled, tip contracted. *W. urticæfolia*, var. α and γ , DC. *Prodr.* v. 540. *W. scaberrima*, Wall. *Cat.* 3208. *W. biflora*, Clarke *Comp. Ind.* 137. ? *Verbesina biflora*, Roxb. *Fl. Ind.* iii. 440. *V. biflora*, Wall. *Cat.* 3204 E., 3207 E. *Eclipta scabriuscula*, Wall. *Cat.* 3212, partly. *Ecliptaceae*, Wall. *Cat.* 3208.

TROPICAL HIMALAYA; alt. 0-5000 ft., from Kumaon, *Edgeworth*, to Bhotan and the Mishmi Mts., *Griffith*. KHASIA MTS. and BIRMA.—DISTRIB. JAVA.

58. **SPILANTHES**, Linn.

Annual herbs. *Leaves* opposite. *Heads* usually long-peduncled, axillary or terminal, heterogamous and radiate or homogamous and disciform, ray-fl. ♀, 1-seriate, fertile, ligule white or yellow; disk-fl. ♂, fertile, tubular, limb 4-5-fid. *Involucre* ovoid or campanulate, bracts sub-2-seriate; receptacle convex, elongate, pales enclosing the flowers often connate with the ovary into a stalk. *Anther-bases* truncate, entire or 2-toothed. *Style-arms* of ♂ truncate. *Achenes* of ray triquetrous or dorsally compressed, margins and angles usually ciliate; pappus 0, or of 2-3 bristles.—DISTRIB. Species about 20, chiefly tropical American.

1. **S. Acmeila**, Linn.; erect or ascending, leaves petioled ovate-lanceolate crenate-serrate or entire 3-nerved, heads ovoid solitary or paniced, ligules minute. *Dalz. & Gibs. Bomb. Fl.* 129; *Clarke Comp. Ind.* 138; *Kurz in Journ. As. Soc.* 1877, ii. 176. *Verbesina Acmeila* and *Pseuda-acmeila*, Linn. *Acmeila* *Linnaea*, Cass.

Throughout INDIA; ascending the Himalaya and other mountains to 5000 ft.—DISTRIB. All warm countries.

VAR. 1. *Acmeila proper*, Clarke l.c.; peduncles subsolitary, achenes margined scabrid, pappus usually of 1-2 bristles. *S. Acmeila*, DC. *Prodr.* v. 623; Wall. *Cat.* 3285. *S. calva*, Wight *l.c.* t. 1169.—Throughout India.

VAR. 2. *calva*, Clarke l.c.; peduncles subsolitary, achenes smother, pappus usually obsolete. *S. calva*, DC. *Prodr.* v. 625. *S. Pseudo-acmeila*, Linn.; DC l.c. and in *Wight Contrib.* 19; Wall. *Cat.* 3185. *Cotula conica*, Wall. *Cat.* 3185.—Throughout India.

VAR. 3. *oleracea*, Clarke l.c.; more robust and succulent, heads and leaves larger, peduncles subsolitary, achenes as in var. 1. *S. oleracea*, Jacq. *Hort. Vind.* ii. t. 135; *Roxb. Fl. Ind.* iii. 410; DC. *Prodr.* v. 624. *Bidens fervida* and *fixa*, Lamk. *Dict.* i. 415. 416.—Cultivated in gardens.

VAR. 4. *paniculata*, Clarke l.c.; taller, more branched, heads numerous paniced, achenes strongly margined sparsely scabrid, pappus bristles 1-2. *S. paniculata*, DC. l.c. 625; Wall. *Cat.* 3186.—Birina, Wallich, &c.; Sikkim, J. D. H.; Banda, *Edgeworth*; Madras Coll., G. Thomson. I suspect this to be a cultivated form.

58*. **GUIZOTIA**, Cass.

Annual herbs. *Leaves* opposite, or the upper alternate. *Heads* peduncled, axillary and terminal, heterogamous, rayed; ray-fl. ♀, 1-seriate, fertile; ligule 2-3-toothed, yellow; disk-fl. ♂, fertile, limb campanulate 5-fid.; tube of both short, woolly, embracing the top of the achene. *Involucre* campanulate; bracts sub-2-seriate, outer subfoliaceous, inner like the pales; receptacle convex or conic; pales flat, scarious. *Anther-bases* truncate, entire. *Style-arms* of ♂, with subulate hairy tips. *Achenes* glabrous, dorsally compressed, tip rounded; pappus 0.—DISTRIB. Species 3, tropical African.

G. abyssynica, *Cuss. in Dict. Sc. Nat.* 59, 248; pubescent upwards, leaves sessile $\frac{1}{2}$ -amplexicaul ovate-lanceolate or subcordate serrate, invol. bracts 5. *G. oleifera*, *DC. in Mem. Soc. Hist. Nat. Genev.* v. 7, cum *lc.*; *Prodr.* v. 551; *Dalz. & Gibs. Bomb. Fl.* 128; *Wight. Ill.* t. 132; *Clarke Comp. Ind.* 139. *Helianthus oleifera*, *Wall. Cat.* 3194, and *Bidens Ramtilla*, 3191. *Ramtilla oleifera*, *DC. in Wight. Contrib.* 18. *Heliopsis platyglossa*, *Cuss. l.c.* 24, 332. *Verbesina sativa*, *Bot. Mag.* t. 1017; *Roxb. Fl. Ind.* iii. 441. *Polymnia abyssynica*, *Linn. f. Suppl.* 383.

Cultivated in various parts of INDIA. A native of tropical Africa.

A stout, erect, smooth or scabrid, leafy herb, 1-3 ft. high, stem often as thick as the little finger. *Leaves* 3-5 in., sessile, $\frac{1}{2}$ -amplexicaul, linear or lanceolate-oblong, obtuse, serrate, *Heads* $\frac{1}{2}$ -1 in. diam.; peduncles naked, 1-2 in.; outer invol. bracts broadly elliptic or ovate, obtuse, green; ligules few, broad.

58*. **SYNEDRELLA**, *Gärtn.*

Annual, branched, pubescent or villous herbs. *Leaves* opposite, petioled, toothed. *Heads* small, heterogamous, radiate; ray-fl. 1-2-seriate, fertile, ligule short broad 2-3-toothed yellow; disk-fl. ♀, fertile, tubular, limb 4-toothed. *Involucre* ovoid or oblong; bracts few, 1-2 outer usually foliaceous, inner like the pales; receptacle small, pales scarious flat. *Anther-bases* subentire. *Style-arms* of ♀ with long acute tips. *Achenes* of ray dorsally compressed, 2-winged, smooth, wings lacerate, of the disk few narrower compressed or triquetrous often muricate, the angles of both terminating in spines.—**DISTRIB.** Species 2, tropical American, one also African and Asiatic.

S. nodiflora, *Gärtn. Fruct.* ii. 456, t. 171, f. 7; *Hook. Exot. Fl.* t. 60; *Clarke Comp. Ind.* 139. *Verbesina nodiflora*, *Linn. Amoen. Acad.* iv. 290.

The cultivated places, ASSAM, *Jenkins*; MARTABAN, *Stoliczka*; ANDAMAN ISLDS., *Kurz*.—**DISTRIB.** Tropical America.

An erect dichotomously branched herb; stem and branches terete, glabrous. *Leaves* ovate-lanceolate, shortly petioled, serrate, scaberulous, 3-nerved. *Heads* sessile, axillary and terminal; inner invol. bracts linear-lanceolate, shining. *Achenes* slender, black; spines 2-3 times as long, erect, very stout.

59. **GLOSSOCARDIA**, *Cass.*

A branched, annual, glabrous herb. *Leaves* alternate, slender, 1-2-pinnatisect. *Heads* small, terminal and axillary, heterogamous, rayed, yellow; ray-fl. ♀, usually solitary, fertile, ligule 2-fid; disk-fl. ♀, few, fertile, tubular, limb 4-fid. *Involucre* oblong; bracts few, inner oblong with broad membranous margins, outer 1-3 slender; receptacle small, flat; pales few, flat. *Anther-bases* obtuse, entire. *Style-arms* of ♀ with linear, acute, hispid tips. *Achenes* narrowly oblong, dorsally much compressed, faces bearded; pappus of 2 smooth stiff awns.

1. **G. linearifolia**, *Cass. in Dict. Sc. Nat.* xix. 62. *G. Bosvallia*, *DC. in Wight Contrib.* 19; *Prodr.* v. 631; *Wt. Ic.* t. 1110; *Dalz. & Gibs. Bomb. Fl.* 129; *Clarke Comp. Ind.* 139. *Verbesina Bosvallia*, *Linn. f. Suppl.* 379. *V. Boswellia*, *Roxb. Fl. Ind.* iii. 443. *Pectis meifolia*, *Wall. Cat.* 3198.

ROHILKEND; at Delhi, *Clarke*. BANDA, *Edgeworth*. CENTRAL INDIA and the DECCAN.

Prostrate or erect, diffusely branched from the base; branches 3-10 in. long, strict or flexuous. *Leaves* $\frac{1}{2}$ -2 in., 2-pinnatisect, petiole long slender, blade broadly ovate in outline, segments filiform. *Heads* $\frac{1}{2}$ in. long, shortly peduncled; inner invol. bracts large, obtuse, with a striated disk and pale margins. *Achenes* $\frac{1}{4}$ in. long.—Odour of fennel.

60. **BIDENS**, Linn.

Annual or perennial, sometimes climbing herbs. *Leaves* opposite, entire toothed gashed or 1-2-pinnate. *Heads* corymbosely paniced or subsolitary, heterogamous and rayed or homogamous and disciform; ray-fl., if present, ♀ or neuter, 1-seriate, ligule spreading yellow or white; disk-fl. ♂, fertile, tubular, limb cylindric 5-fid. *Involucre* campanulate or hemispheric; bracts sub-2-seriate, bases connate, outer herbaceous short or leafy, inner membranous; receptacle flat or convex, pales narrow nearly flat. *Anther-cells* entire or subsagittate. *Style-arms* of ♀ hairy above, tips short acute or long and subulate. *Achenes* 4-gonous or dorsally compressed, linear or cuneiform, often narrowed but not beaked above; pappus of 2-4 rigid, retorsely hispid bristles or 0.—
DISTRIB. Species about 50, chiefly American.

Achenes cuneiform, tip truncate.

1. **B. cernua**, Linn.; Boiss. *Fl. Orient.* iii. 250; leaves undivided serrate bases subconnate, heads drooping, outer invol. bracts leafy, inner ovate, achenes with 1-4 short awns or 0. Clarke *Comp. Ind.* 140.

WESTERN HIMALAYA; Kashmir and Chumba, alt. 5-6000 ft., rare, Thomson.—
DISTRIB. N. Asia, N. and mid. Europe, N. America.

Annual, stout, erect, glabrous. *Leaves* 3-5 in., base sometimes auricled. *Heads* $\frac{3}{4}$ -1 in. diam.; inner invol. bracts broad, membranous, pale brown; ligules 0 in Indian specimens. *Achenes* very variable, cuneate, compressed, margins sometimes thickened and armed with short recurved spines.

2. **B. tripartita**, Linn.; Boiss. *Fl. Orient.* iii. 251; leaves 3-lobed 3-partite or pinnatifid, segments lanceolate toothed, heads erect solitary discoid, outer invol. bracts herbaceous, inner oblong with scarious margins, achenes with 2-3 short awns. Clarke *Comp. Ind.* 140. B. repens, Don *Prodr.* 180; DC. *Prodr.* v. 596; Wall. *Cat.* 3187, A.; Clarke *Comp. Ind.* 140. B. trifida, Roxb. *Fl. Ind.* iii. 411. B. frondosa, Herb. Ham.

CENTRAL AND WESTERN HIMALAYA. in marshes, alt. 3-5000 ft., from Nipal to Kashmir. WESTERN TIBET; Iskardo, Thomson.—DISTRIB. N. Asia, Japan, and westwards to N. Africa, W. Europe and N. America.

Stout, annual, erect, 1-3 ft. high, glabrous. *Leaves* 3-5 in. *Heads* $\frac{3}{4}$ in. diam., peduncles long or short; outer invol. bracts exceeding the inner. *Achenes* $\frac{1}{4}$ in., glabrous; awns very short.

** *Achenes long, slender, narrowed from the middle to the top.*

3. **B. pilosa**, Linn.; glabrous or hairy, leaves 3-fid 3-foliolate or 1-2-pinnatifid, achenes $\frac{1}{2}$ - $\frac{3}{4}$ in.

Throughout India, ascending the Himalaya and other mountains to 6000 ft.—
DISTRIB. All warm countries.

A very variable, erect, glabrous pilose or pubescent herb, 6-24 in high, a well-known pest from the adhesion of its barbed achenes to the garments and body. *Leaves* excessively variable. *Heads* on long stout peduncles, very variable in length, with or without white or yellow rays; invol. bracts with broad scarious margins. *Achenes* black, much exceeding the involucre, very slender, with 2-4 short, stout, spinescent awns covered with recurved hooks.

VAR. 1. *pilosa proper*; leaves 3-fid or 3-sect., segments broadly or narrowly ovate or lanceolate serrate. B. pilosa, Linn.; DC. *Prodr.* v. 597; Clarke *Comp. Ind.* 140. B. leucantha, Willd. B. chinensis, Willd.; Wall. *Cat.* 3189, A. B. C. B. tripartita and B. bipinnata, Wall. *Cat.* 3187, B. C. D.

VAR. 2. *bipinnata*; leaves bipinnatifid compound, segments ovate lanceolate or linear entire lobed or toothed. B. bipinnata, Linn.; Roxb. *Fl. Ind.* iii. 411. B.

chinensis, *Wall. Cat.* 3189, D. E. F. B. Wallichii, *DC. Prodr.* v. 598; *Dalz. & Gibs. Bomb. Fl.* 129.

VAR. 3. *decomposita*; leaves decompositely pinnatifid, segments linear slender. *B. decomposita*, *Wall. in DC. Prodr.* v. 602; *Cat.* 3188; *Clarke Comp. Ind.* 141, excl. var. β .

EXCLUDED SPECIES.

B. DECOMPOSITA, var. β *hirsutior*, *Clarke (Comp. Ind.* 141), from 7500 ft. in the Nilgherry Mts. I have seen no specimen of this, which *Clarke* informs me he now supposes to be some cultivated plant.

B. CALVA, *Clarke l. c. (Adenolepis calva, Schultz-Bip. in Herb. Hohenack. n. 344)* is *Cosmos sulphureus*, *Cav.*, a cultivated plant.

61. GLOSSOGYNE,

Perennial glabrous herbs, with almost naked stems and branches. *Leaves* radical, crowded, pinnatifid or cuneate and 3-toothed, cauline alternate or the lower opposite, or 0. *Heads* small, few, corymbose, heterogamous and rayed, or homogamous and disciform; ray-fl. \varnothing , fertile, ligules spreading yellow (or white?); disk-fl. \varnothing , fertile, tubular, limb 5-fid. *Involucre* small; bracts 2-3-seriate, narrow, bases connate; receptacle flat; pales scarious, flat or concave. *Anther-bases* obtuse. *Style-arms* of \varnothing with long hairy tips. *Achenes* dorsally compressed, linear, ovoid or almost winged, glabrous, truncate; pappus of 2 retrorsely scabrid bristles.—**DISTRIB.** Species 5, tropical Asiatic and Australian.

1. **G. pinnatifida**, *DC. in Wight Contrib.* 19; *Prodr.* v. 632; branches slender forked, leaves mostly radical pinnatifid triangular in outline, segments linear acute. *Dalz. & Gibs. Bomb. Fl.* 129; *Clarke Comp. Ind.* 141. *B. rigida*, *Hort. Calc.* *Zinnia Bidens*, *Retz Obs.* v. 28; *Roxb. Fl. Ind.* iii. 435. *Bidens pinnatifida*, *Heyne in Wall. Cat.* 3190.

Plains of WESTERN INDIA; from Jamu and Garwhal to Western Bengal and Behar, and southwards to Madras.

Root fusiform, woody. *Leaves* with the petiole 1-2 in.; segments few, often recurved, acute, coriaceous. *Flowering* branches 6-12 in., strict, stiff, grooved, nearly leafless. *Heads* in flower $\frac{1}{2}$ in. diam.; invol. bracts linear, obtuse, $\frac{1}{6}$ in. long. *Achenes* $\frac{1}{4}$ - $\frac{1}{3}$ in., deeply grooved, black.

62. CHRYSANTHELLUM, Rich.

Annual glabrous herbs. *Leaves* alternate, pinnatifid, or radical toothed. *Heads* small, peduncled, terminal and axillary, heterogamous, rayed; ray-fl. \varnothing , 1-seriate, fertile, ligule spreading entire or 2-toothed yellow; disk-fl. \varnothing , fertile, tube short, limb campanulate 5-fid. *Involucre* hemispheric; bracts 1-2-seriate; receptacle flat; pales narrow, flat, scarious. *Anther-bases* obtuse, entire. *Style-arms* of \varnothing slender, tips long subulate. *Achenes* linear-oblong, dorsally compressed, smooth, or the outer tubercled externally, outer thick with obtuse margins, inner flat 2-winged; pappus a minute corona.—**DISTRIB.** Species 2 or 3, tropical Asia, Africa and America.

1. **C. indicum**, *DC. Prodr.* v. 631; achenes all cuneate-oblong obcompressed grooved smooth margins very thick not winged. *Deless. Ic. Sel.* iv. t. 39; *Clarke Comp. Ind.* 142, excl. syn. *Bidens*? *Bandanna*, *Wall. Cat.* 3291. *Hinterpubera Kotschy*, *Schultz-Bip. in Herb. Schimper*, t. 1630.

UPPER GANGETIC plains, *Royle, Thomson*. KUMAON and GARWHAL, at Hawalbagh and Nynee-tal, alt. 4000 ft., *Madden*, &c. NAGPORE, *Munro*.—**DISTRIB.** Madagascar, Tropical Africa.

Branches spreading from the root, procumbent, diffuse, leafy. *Leaves* succulent, 1-3 in. long, deltoid in outline, 2-pinnatifid; segments oblong or cuneiform, obtusely

lobed or cut. *Heads* $\frac{1}{4}$ in. diam. in flower, $\frac{1}{2}$ in. in fruit. *Achenes* $\frac{1}{6}$ in. long, equaling the invol. bracts.—This has been united with the American and Senegal species by Bentham, Clarke and others; but the achenes are smaller and never broadly winged as in the American species.

62*. **GALINSOGA**, Ruiz et Pav.

Annual herbs. *Leaves* opposite, entire or toothed. *Heads* small, peduncled, subterminal and axillary, heterogamous, rayed; ray-fl. few, ♀, 1-seriate, fertile, ligule yellow spreading; disk-fl. ♂, fertile, tubular, limb 5-fid. *Involucre* hemispheric; bracts few, 1-2-seriate, ovate, obtuse, striate; receptacle conic or elongate; pales slender, serrate. *Anther-bases* subentire. *Style-arms* of ♀ acute or with an acute short tip. *Achenes* angled or the outer dorsally compressed; pappus of a few scarious, entire awned or fimbriate scales, of the ray often 0.—DISTRIB. Species 5, tropical American.

G. parviflora, Cav. *Ic.* iii. 41, t. 281; *DC. Prodr.* v. 677; *Clarke Comp. Ind.* 112.

A weed in cultivated and waste places in the HIMALAYA, alt. 4-8000 ft., introduced from America.

A weak, erect, hispid or glabrous herb, 6-12 in. high. *Leaves* petioled, 1-2 in., membranous, ovate, obtusely acuminate, 3-nerved, subserrate. *Heads* $\frac{1}{4}$ in. diam.; peduncles very slender; invol. bracts broad, green.

62*. **TRIDAX**, Linn.

Perennial herbs. *Leaves* opposite, pinnatisect; segments few, narrow. *Heads* very long-peduncled, heterogamous, rayed; ray-fl. ♀, fertile, ligulate or 2-lipped, with the outer lip large 3-fid or 3-partite, the inner small 2-lobed or -parted or 0; disk-fl. ♂, fertile, tubular, limb elongate 5-fid. *Invol. bracts* few-seriate, outer short, broad, herbaceous; receptacle flat or convex; pales membranous. *Anther-bases* with short, acute auricles. *Style-arms* of ♂ hairy above, tips subulate. *Achenes* turbinate or oblong, silky; pappus of short or long aristate, feathery bristles.—DISTRIB. Species 7, tropical American, of which one is introduced into India.

T. procumbens, Linn.; *DC. Prodr.* v. 679; procumbent, hirsute, leaves ovate or lanceolate deeply irregularly serrate, peduncles 2-3 times as long as the stem. *Wall. Cat.* 3197; *Clarke Comp. Ind.* 142.

Abundant in various parts of INDIA, introduced from S. America.

A weak straggling herb, 1-2 ft. long, with few leaves 1-2 in. long, and very long slender solitary peduncles a foot long and more. *Heads* $\frac{3}{4}$ in. diam. *Achenes* brown; pappus $\frac{1}{2}$ in. long, shining.

TRIBE VI.—**ANTHEMOIDÆ.**

63. **ACHILLEA**, Linn.

Perennial pubescent or villous herbs. *Leaves* alternate, narrow, serrulate or pinnatisect. *Heads* small, corymbose, heterogamous and rayed or homogamous and disciform; ray-fl. few, ♀, rarely neuter, ligule short white pink or yellow; disk-fl. ♂, fertile, tube terete or compressed and 2-winged, base often produced over the top of the achene, limb 5-fid. *Invol. bracts* in few series, appressed, margins often scarious and black, outer shorter; receptacle flat or elevated, pales membranous. *Anther-bases* obtuse. *Style-arms* of ♀ with truncate and penicillate tips. *Achenes* oblong or obovoid, dorsally compressed, glabrous, with 2 cartilaginous wings; pappus 0.—DISTRIB. About 50, of temp. N. regions.

A. millefolium, Linn.; Boiss. *Fl. Orient.* iii. 255; glabrous or pubescent, leaves narrowly oblong-lanceolate 3-pinnatisect, heads corymbose ovoid shortly peduncled. *DC. Prodr.* vi. 24; *Reich. Ic. Fl. Germ.* t. 1826; *Clarke Comp. Ind.* 143. *A. cuspidata*, *DC. l. c.* 30; *Wall. Cat.* 3230.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 6-9000 ft.—DISTRIB. N. Asia, Europe, N. America.

Root stoloniferous. *Stem* $\frac{1}{2}$ -1 $\frac{1}{2}$ ft., furrowed, leafy. *Leaves* 2-6 in., radical petioled, segments close-set acute. *Heads* many, $\frac{1}{4}$ in. diam.; invol. bracts oblong, obtuse rigid; ligules many, orbicular, white pink or purple, reflexed. *Achenes* shining.

EXCLUDED SPECIES.

A. squarrosa, Ait.; *DC. Prodr.* vi. 33; *Clarke Comp. Ind.* 143; said to have been introduced into the Calcutta gardens, or Assam, is not a native of India.

64. **ANTHEMIS**, Linn.

Annual or perennial herbs. *Leaves* alternate, deeply toothed or pinnatisect. *Heads* terminal, peduncled, rarely corymbose, heterogamous and radiate (very rarely disciform), ray-fl. ♀, fertile sterile or neuter, 1-seriate, tube terete or 2-winged, ligule spreading; disk-fl. ♂, fertile, tube compressed or 2-winged, base usually 1-2-gibbous, limb 5-fid. *Involucre* hemispheric; bracts ∞-seriate, appressed, rigid, margins scarious, outer shorter; receptacle convex or elongate; pales broad or narrow, rigid or hyaline, sometimes embracing the flowers. *Anther-bases* obtuse. *Style-arms* of ♂ with truncate penicillate tips. *Achenes* oblong, glabrous, 4-5-angled, 8-10-ribbed or many-striate, truncate; pappus 0 or very short, paleaceous or of a membranous large or small auricle.—DISTRIB. Species about 70, European, N. & W. Asian and N. African.

1. **A. Cotula**, Linn.; Boiss. *Fl. Orient.* iii. 315; annual, erect, pales of receptacle linear or setaceous, ray-fl. usually neuter white, disk-fl. winged dilated below, achenes caducous top naked. *Reich. Ic. Fl. Germ.* t. 1000; *Clarke Comp. Ind.* 143. *Maranta Cotula*, *DC. Prodr.* vi. 13.

SCIND, *Stocks*, ex. C. B. Clarke (probably Beluchistan).—DISTRIB. N. Asia, and westwards to Britain and the Canary Islands.

A glabrous or hairy fetid herb, 8-18 in. high, corymbosely branched. *Leaves* gland-dotted, segments very narrow. *Heads* 1-1 $\frac{1}{2}$ in. diam.; peduncle slender, not thickened upwards; invol. bracts oblong, obtuse, margins scarious; receptacle conic. *Achenes* turbinate, tubercled, tip crenulate.—I have seen no Scind specimen of this, but have Beluchistan ones collected by Stocks.

2. **A. odontostephana**, Boiss. *Fl. Orient.* iii. 319; dwarf, hoary-pubescent, leaves ovate pinnatisect, segments entire or 3-5-lobed, ray-fl. ♀, pales of receptacle subulate, achenes crowned with blunt short teeth.

The PUNJAB, at Peshawur, *Vicary, Stewart*; SCIND.—DISTRIB. Afghanistan, Beluchistan, and Persia.

Stems many from the root. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in. long. *Heads* $\frac{1}{2}$ in. diam., few-flowered; peduncle thickened upwards; invol. bracts hairy, oblong, obtuse; ligules oblong; receptacle conic. *Achenes* cylindric, ribbed, tubercled; tip of outer toothed, of inner with a short auricle.—Stated by Clarke to being found in Scind by Stocks, but probably from Beluchistan. It appears to me to be identical with *A. scaposa*, Gay.

65. **ALLARDIA**, Dcne.

Perennial, diffuse or tufted alpine herbs. *Leaves* alternate, cuneate, 3-5-toothed, or 2-3-pinnatisect. *Heads* often large, terminal, sessile or peduncled, heterogamous, rayed; ray-fl. neuter, 1-seriate, ligule spreading entire white

roxy or lilac; disk-fl. ♂, fertile, tubular, limb 5-fid. *Involucre* hemispheric; bracts ∞ -seriate; margins scarious, lacerate, often black; receptacle flat, naked. *Anther-bases* truncate or with short connate auricles. *Style-arms* of ♀ broad, with truncate penicillate tips. *Achenes* of ♂ 5-angled, glabrous or glandular, of ♀ empty; pappus of rigid brown or reddish wavy flattened bristles, sometimes dilated at the tips and with split margins.—DISTRIB. Species 4 or 5, Himalayan and Central Asiatic.

1. **A. glabra**, *Dcne. in Jacq. Voy. Bot.* 88, t. 96; glabrous or sparsely woolly, leaves cuneiform 3-fid, lobes entire or toothed, heads sessile, outer invol. bracts woolly herbaceous with purple scarious margins, achenes glandular, pappus of the ray-fl. scanty of the disk copious brown, bristles slender not dilated upwards. *Clarke Comp. Ind.* 145, excl. syn. *Roylei*. *A. tridactylites*, *Hook. f. & Thoms.*; *Clarke Comp. Ind.* 144. *A. glabra*, tridactylites, and *Hugelii*, *Schultz-Bip. in Pollichia*, xx. 442. *Waldheimia tridactylites*, *Kar. & Kir. in Bull. Soc. Imp. Mosc.* 1842, 126.

EASTERN and WESTERN TIBET, alt. 15–18,000 ft., from Ladak eastwards to the Sikkim frontier.—DISTRIB. Alatau Mts.

Densely tufted, strongly scented. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, lobes linear subacute. *Heads* 1–1 $\frac{1}{2}$ in. diam., sessile; ligules broadly elliptic, $\frac{1}{4}$ in. long, purple. *Achenes* $\frac{1}{8}$ in. long; pappus $\frac{1}{2}$ in. long; bristles unequal, flat, rigid, shining, margins here and there split, tips acute.

2. **A. vestita**, *Hook. f. & Thoms.*; *Clarke Comp. Ind.* 145; densely thickly clothed with buff or whitish wool, leaves cuneiform 3–5-fid, lobes short obtuse, heads shortly peduncled, invol. bracts membranous with broad pale brown deeply fimbriate margins, achenes glandular, pappus hairs with dilated tips yellowish.

WESTERN TIBET; Takli pass, Zanskar, alt. 15–16,000 ft., *Thomson*.

Habit and foliage of *A. glabra*, but distinguished by the dense woolly clothing, peduncled heads, which are $\frac{3}{4}$ –1 in. diam., membranous invol. bracts, and the short yellowish pappus, which is not $\frac{1}{4}$ in. long.

3. **A. nivea**, *Hook. f. & Thoms.*; *Clarke Comp. Ind.* 148; densely clothed with white appressed wool, leaves cuneiform 3-lobed or -toothed, lobes short obtuse, heads small sessile, invol. bracts woolly with narrow brown scarious margins, achenes glandular, pappus hairs with slightly dilated tips yellowish.

WESTERN TIBET, *Falconer*; Nubra, *Thomson*.

Smaller than any of the other Indian species. *Leaves* densely crowded, $\frac{1}{4}$ – $\frac{1}{2}$ in. long. *Heads* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; ligules few, 8–10, broadly elliptic, $\frac{1}{4}$ in. long. *Pappus* $\frac{1}{8}$ in. long, very copious.

4. **A. tomentosa**, *Dcne. in Jacq. Voy. Bot.* 87, t. 95; clothed with soft white wool, leaves oblong or linear-oblong 1–2-pinnatifid, segments various, heads peduncled, invol. bracts woolly, achenes glabrous, pappus bristles flattened with purplish often dilated tips whitish or yellowish. *Schultz-Bip. in Pollichia*, xx. 441; *Clarke Comp. Ind.* 144.

WESTERN TIBET and Tibetan passes of the WESTERN HIMALAYA, from Kashmir to Kumaon, alt. 13–16,000 ft., *Falconer*, &c.

Loosely tufted; branches elongate, ascending, 4–8 in. high, naked upwards. *Leaves* 1 $\frac{1}{2}$ –3 in. long, variable in breadth and amount of division. *Heads* 2–3 in. diam.; ligules very many, linear, 1 in. long, entire. *Achenes* grooved and wrinkled, pale; pappus $\frac{1}{8}$ – $\frac{1}{4}$ in. long.

5. **A. Stoliczkae**, *Clarke Comp. Ind.* 145; glabrous, leaves 2-pinnatisect, segments narrow, heads peduncled, invol. bracts glabrous with black scarious margins, pappus hairs connate below yellowish.

WESTERN TIBET; Ladak, *Stoliczka*; Lahul, *Jaeschke*, *Stewart*.

Habit of *A. tomentosa*, and probably a state of that plant, but quite glabrous; the heads are too young to describe.

DOUBTFUL SPECIES.

A. INCANA, *Klatt in Sitzunb. Münch. Akad.* 1878, 88, with trilobate cano-tomentose leaves, is possibly *A. vestita* or *nivea*, but the description is insufficient to identify it.

66. **CHRYSANTHEMUM**, *Linn.*

Perennial or annual herbs, rarely shrubs. *Leaves* alternate, entire toothed lobed or pinnatifid. *Heads* large, terminal, long-peduncled, or smaller and corymbose, heterogamous, rayed (very rarely disciform); ray-fl. ♀, 1-seriate, fertile, ligule spreading white yellow or rosy; disk-fl. ♂, fertile, tube terete or 2-winged, limb 4-5-fid. *Involucre* hemispheric or broader; bracts α -seriate, broad, appressed, inner with scarious tips, outer shorter often with scarious coloured margins; receptacle various, naked. *Anther-bases* obtuse, entire. *Style-arms* of ♀ with truncate penicillate tips. *Achenes* subterete or angled, variously ribbed or winged; pappus 0 or short, or a cup or auricle.—**DISTRIB.** Species about 80, of N. temperate regions.

Two species of *Chrysanthemum* are cultivated in Indian gardens, and indeed all over the world. One, the common garden chrysanthemum, *C. indicum*, *Linn. (Wall. Cat.* 3227; *Roxb. Fl. Ind.* iii. 436; *Clarke Comp. Ind.* 146. *Pyrethrum indicum*, *DC. Prodr.* vi. 62), is a plant only known in a garden state. The other, *C. coronarium*, *Linn. (DC. Prodr.* vi. 64; *Clarke Comp. Ind.* 147. *C. Roxburghii*, *Desf.; DC. l.c.* *Pyrethrum indicum*, *Roxb. Fl. Ind.* iii. 436. *Matricaria oleracea*, *Ham. in Wall. Cat.* 3229), is also only known in India in a garden state, but is a native of the Mediterranean region.

1. ***C. tibeticum***, *Hook. f. & T.; Clarke Comp. Ind.* 147; shrubby, puberulous and viscid, branches many slender, leaves $\frac{1}{4}$ – $\frac{1}{2}$ in $\frac{1}{2}$ -pinnatifid or 2-pinnatifid, segments linear narrow acute or obtuse, heads long-peduncled, invol. bracts pubescent and viscid, margins scarious and purple, outer lanceolate acute, inner oblong obtuse, achenes subterete, pappus obscure or 0. ? *Pyrethrum Roylei*, *DC. Prodr.* vi. 56.

WESTERN TIBET, alt. 9–13,000 ft.; Shayuk valley, and Indus valley at Kalatza, *Thomson*.

Viscid and aromatic, 6–8 in. high; stems branching from the base; branches woody below, stiff, leafy upwards, terminating in solitary heads $\frac{1}{2}$ – $1\frac{1}{2}$ in. diam.; receptacle small, convex; ligules large, numerous, white or rosy, spreading, linear-oblong, tips entire; achenes immature.—*Royle's specimens of Pyrethrum Roylei* are very poor; they are more glabrous, the leaves are more deeply pinnatifid than *Thomson's*, and the heads many sessile, but I cannot separate it satisfactorily as a species.

2. ***C. Stoliczka***, *Clarke Comp. Ind.* 147; shrubby, branched from the base, pubescent and viscid, leaves $\frac{1}{2}$ –1 in., radical petioled, cauline sessile linear 1–2-pinnatifid, segments slender linear acute, heads long-peduncled, invol. bracts pubescent and viscid, margins scarious purple, outer lanceolate, inner oblong obtuse, achenes narrow strongly 5-ribbed, pappus a large membranous dimidate or lobed sheath.

WESTERN TIBET; Dras, alt. 9000 ft., *Thomson*; Kargil, *Stoliczka*.

Habit of *C. tibeticum*, but the branches are longer, more slender, and less divided, the leaves more divided, the receptacle broader, the outer acute invol. bracts more numerous, and the pappus quite different, half as long as the achene. The ligules are numerous, large, spreading, and white.—*C. Griffithii*, *Clarke*, of Afghanistan, is very closely allied to this, and has the same pappus (which *Clarke* has overlooked in *C. Stoliczka*).

3. **C. Richteria**, *Benth. in Gen. Pl.* ii. 426; dwarf, laxly villous or woolly, stock short woody much divided with many short tufted leafy branches or stems and few 1-headed slender flowering ones naked above, radical leaves petioled linear-oblong 2-3-pinnatisect, pinnæ short rounded, segments minute, cauline few sessile, invol. bracts ovate-oblong obtuse, margins scarious purple, achenes subterete, pappus a coriaceous cup lobed nearly to the base. *Clarke Comp. Ind.* 148. ? *C. artemisiæfolium*, *Klatt in Sitzungsber. Münch. Akad.* 1878, 88. *Richteria pyrethroides*, *Karel. & Kiril. in Bull. Soc. Imp. Nat. Misc.* 1842, 120. *Tanacetum pyrethroides*, *Schultz-Bip. in Polichia*, xx. 441.

WESTERN TIBET; Ladak and Nubra, alt. 13-17,000 ft., *Falconer, Thomson, &c.*—DISTRIB. Soongaria.

Whole plant 6-12 in., very variable in pubescence. *Leaves* 1-3 in. long. *Heads* 1-1½ in. diam.; peduncles slender; ligules apparently white. *Achenes* many-ribbed.

4. **C. Atkinsoni**, *Clarke Comp. Ind.* 147; herbaceous, laxly woolly upwards, root tuberous, leaves oblong or linear-oblong 2-3-pinnatisect, segments very slender linear acute divaricate, heads solitary 1-1½ in. diam., invol. bracts very many linear-oblong obtuse, disk narrow green, margins scarious purple, ligules short recurved purple, achenes angular with 5 strong ribs, pappus 0.

SIKKIM HIMALAYA; Yakla and Jongri, alt. 13-16,500 ft., *Atkinson, Clarke*.

A strongly scented herb. *Root* as thick as the thumb, short, fusiform, apparently fleshy within. *Stem* 6-12 in., solitary, rarely 2 from the root, stout, erect, leafy, terminating in a single head. *Leaves* radical, 4-6 in. long, petioled, the primary segments rather distant, ovate or round, alternate acute, cauline sessile. *Heads* on the thickened woolly top of the stem; ligules not longer than the involucre; receptacle convex. *Achenes* ½ in. long, narrowly obconic, pale, top crenulate, pericarp lax.—This plant very closely resembles specimens of *Tanacetum longifolium* with solitary large heads, but is distinguished by the root, the absence of shining radical petioles, and by the presence of the ray.

EXCLUDED SPECIES.

C. GRIFFITHII, *Clarke Comp. Ind.* 148, is an Afghan plant. It is very near *C. Stolczkai*, and may be a form of that species.

67. **MATRICARIA**, Linn.

Annual or perennial herbs. *Leaves* alternate, 1-2-pinnatisect. *Heads* terminal, peduncled, solitary or corymbose, heterogamous, rayed (rarely disciform); ray-fl. ♀, fertile or sterile, ligule white elongate rarely short; disk-fl. ♂, fertile, tube terete or 2-edged, limb 4-5-fid. *Involucre* hemispheric; bracts in few series, appressed, margins usually scarious and brown, outer shorter; receptacle naked. *Anther-bases* obtuse, entire. *Style-arms* of ♀ with truncate and penicillate tips. *Achenes* oblong, often incurved, faces glandular or rugulose, truncate, dorsally convex and ribbed or not, ventrally 3-5-ribbed; pappus very short, coroniform, dimidiate or 0.—DISTRIB. About 20 species, European, N. and S. African, Asiatic, and American.

1. **M. Chamomilla**, Linn.; *Boiss. Fl. Orient.* iii. 323; aromatic, leaves 2-pinnatifid, segments very narrow, invol. bracts with white margins, receptacle conic, achenes ribbed ventrally only, pappus 0. *M. suaveolens*, Linn.; *DC. Prodr.* vi. 51; *Roxb. Fl. Ind.* iii. 437; *Lamk. Ill.* t. 678; *Wall. Cat.* 3228; *Clarke Comp. Ind.* 149.

UPPER GANGETIC PLAIN and the PUNJAB, *Royle, Thomson*.—DISTRIB. N. Asia and westwards to the Atlantic.

Much branched. *Heads* ½-¾ in. diam., corymbose; ligules reflexed after flowering or 0, receptacle elongating during fruiting. *Achenes* small, grey; ribs slender, white.

2. **M. præcox**, DC. *Prodr.* vi. 52; annual, glabrous or pubescent, leaves pinnatisect, segments short subulate, heads radiate peduncled, invol. bracts with reddish scarious margins, receptacle conic, ligules white, achenes ribbed on both faces crowned with a lobed cup. *Clarke Comp. Ind.* 149. *Pyrethrum præcox*, Bieb. *Flor. Taur. Cauc.* ii. 324. *Chamæmalium præcox*, Visiani; Boiss. *Fl. Orient.* iii. 326. *Gastrosolum præcox*, Schultz-Bip. *Tanac.* 30. *Anthemis pygmaea*, Bertoloni *Misc.* ii. 237.

NORTH-WEST INDIA; Peshawar, Viceroy, Stewart.—DISTRIB. Persia, Asia Minor, and the Caucasus.

So similar when dried to *Anthemis ca'ontostephana* as to have caused them to be mixed in the herbarium.

68. **COTULA**, Linn.

Perennial or annual, often creeping, small herbs. *Leaves* alternate, pinnatifid or pinnatisect, rarely entire or toothed. *Heads* small, peduncled, yellow, heterogamous (rarely homogamous), disciform; outer fl. ♀, 1-2-seriate, fertile, corolla conic or 0; disk-fl. ♂, fertile, tube slender or stout and 2-winged, limb 4-fid. *Involucre* hemispheric or campanulate; bracts sub-2-seriate, herbaceous or membranous, margins often scarious; receptacle naked. *Anther-bases* obtuse, entire. *Style-arms* of ♂ truncate or obtuse, styles of sterile fl. sometimes entire. *Achenes* of the ray or all stipitate, compressed, nerveless or 2-4-nerved, sometimes sheathed at the top by the base of the corolla, at others with a short ear-shaped pappus.—DISTRIB. About 40 species, tropical and temperate.

Nearly allied to *Cotula* is *Cenia*, Juss., a S. African genus, of which one specimen of one species, *C. turbinata*, Pers., was found at Hoshiapore, in the Punjab, by Dr. Aitchison, no doubt an escape: it is a weak villous small annual, with pinnate leaves, and branches ending in a long slender peduncle with a curious top-shaped summit.

1. **C. anthemoides**, Linn.; Boiss. *Fl. Orient.* iii. 359; annual, hairy or glabrate, erect or diffuse, leaves 2-pinnatifid or 2-pinnatisect, segments decurrent lobed, lobes triangular-lanceolate, peduncles filiform naked, achenes of the ray broad flat. DC. *Prodr.* vi. 78; *Clarke Comp. Ind.* 149 (excluding various habitats). *C. dichrocephala*, Schultz-Bip. in A. Rich. *Fl. Abyss.* i. 419. *Pleio-gyne cardiosperma*, Edgew. in *Trans. Linn. Soc.* xx. 71. *Artemisia nilotica*, Linn.

GANGETIC PLAIN, from Rajmahal and Sikkim westwards to the Punjab.—DISTRIB. N. & S. Africa, China.

A weak diffuse weed; branches 3-9 in., spreading. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., petiole $\frac{1}{2}$ -amplexicaul. *Heads* $\frac{1}{8}$ - $\frac{1}{2}$ in. diam., solitary, terminal; fl. ♀ many; invol. bracts with scarious margins; receptacle nearly flat, tubercled. *Achenes* ovate, with thick narrow wings.

2. **C. hemisphærica**, Wall. *Cat.* 3236; annual, erect, glabrous or villous above, leaves pinnatisect, segments very numerous linear mucronate, heads solitary peduncled, ♀ fl. minute, corolla 2-toothed or 0, achenes of the ray minute not winged. *Clarke Comp. Ind.* 150, excl. remarks. *Maruta hemisphærica*, DC. *Prodr.* vi. 140; Deless. *Ic. Sel.* iv. t. 50. *Artemisia hemisphærica*, Roxb. *Fl. Ind.* iii. 422.

Common in dry rice fields in BENGAL, ASSAM. the lower and upper GANGETIC PLAINS, and the PUNJAB; ascending to 2500 ft. in Garwhal.—DISTRIB. China.

Stem 6-8 in., branched above. *Leaves* with gashed segments, uppermost simple. *Heads* $\frac{1}{2}$ in. diam., erect in flower, inclined or drooping in fruit. *Achenes* angled.—The mucronate leaf-segments distinguish this at once from *C. anthemoides*.

3. **C. aurea**, Linn.; DC. *Prodr.* vi. 78; annual, prostrate, nearly glabrous, leaves 1-2-pinnatifid, segments setaceous entire or divided, heads peduncled

axillary and terminal, fl. ♀ with a flattened 3-4-toothed corolla lobed at the base, achenes of the ray hardly winged. *Clarke Comp. Ind.* 150. *Matricaria aurea*, *Boiss. Fl. Orient.* iii. 324. *Anacyclus aureus*, *Lamk. Ill.* t. 700.

The PUNJAB; Peshawar, *Stewart*.—DISTRIB. Persia, Syria, Malta, Algeria, Spain.

Habit of a *Cotula* rather than of *Matricaria*, and the achenes are decidedly flattened. *Stems* 2-4 in., decumbent from the root. *Leaves* 1-3 in., segments very slender. *Heads* $\frac{1}{2}$ - $\frac{1}{4}$ in. diam., subhemispheric; invol. bracts broadly oblong. *Corolla* lobed at the base, walls very thick below, mouth shortly 4-lobed. *Achenes* oblong, flattened, striated; pericarp mucose when moistened; pappus 0 in Indian species (a large auricle in European).

69. CENTIPEDA, *Lour.*

Annual or perennial herbs. *Leaves* alternate, entire or toothed. *Heads* small, sessile on the branches or racemose, heterogamous, disciform, yellow; outer fl. ♀, ∞-seriate, fertile, corolla minute obscurely lobed; disk-fl. ♂, few, fertile, tube short, limb campanulate 4-fid. *Involucre* hemispheric; bracts 2-seriate, spreading in fruit; receptacle naked. *Anther-bases* obtuse, entire. *Style-arms* of ♀ short, truncate. *Achenes* 4-angled, tip obtuse, angles hairy, hairs sometimes hooked; pappus 0.—DISTRIB. Species 3, Asiatic, Australian, and 1 tropical South American.

1. *C. orbicularis*, *Lour. Fl. Coch.*; annual, prostrate, glabrous or sparsely woolly, leaves obovate-oblong, heads globose solitary axillary subsessile, corolla of ♀ fl. a very minute cylindric tube, hairs of achenes simple. *C. minuta*, *Benth. in Gen. Pl.* ii. 230; *Clarke Comp. Ind.* 151. *Myriogyne minuta*, *Less.*; *DC. Prodr.* vi. 139. *Cotula sternutatoria*, *Wall. Cat.* 3259. *C. minima*, *Willd. Sp. Pl.* iii. 2170. *Dichrocephala Schmidii*, *Wight Ic.* t. 1610. *Artemisia sternutatoria*, *Roxb. Fl. Ind.* iii. 423. *A. minima*, *Linn.* *Sphæromorphæa centipeda*, *DC. Prodr.* vi. 140.—*Burm. Fl. Ind.* t. 58, f. 3.

Throughout the plains of INDIA and CEYLON in moist places.—DISTRIB. Afghanistan, Eastern tropical Asia, Australia, and the Pacific Islands.

Stems excessively numerous, spreading from the root, 4-8 in. long, slender, leafy. *Leaves* $\frac{1}{2}$ - $\frac{1}{3}$ in. long; teeth few. *Heads* $\frac{1}{10}$ - $\frac{1}{8}$ in. diam.—I see no reason for doubting that Lessing's *Myriogyne minuta* and De Candolle's *Sphæromorphæa centipeda* should be referred to Loureiro's *Centipeda orbicularis*. The genus should be placed next to *Dichrocephala*.

70. SPHEROMORPHEA, *DC.*

A small perennial, pubescent with crisped hairs, with woody root and prostrate rather woody branches. *Leaves* alternate, sessile, obovate. *Heads* axillary, subsolitary, shortly peduncled, heterogamous, disciform, yellow; outer fl. ♀, multiseriate, fertile, corolla elongate slender tubular inflated below; disk fl. ♂, fewer, fertile, tubular, 4-cleft. *Involucre* hemispheric; bracts many-seriate, oblong, obtuse, coriaceous, incurved in fruit; receptacle naked. *Anther-bases* obtuse, entire. *Style-arms* of ♂ and ♀ 2-fid. *Achenes* subcylindric, slender, broadly ribbed, hairy at the base only; pappus 0.

1. *S. Russelliana*, *DC. Prodr.* vi. 140; *Deless. Ic. Sel.* iv. t. 49. *Centipeda orbicularis*, *Clarke Comp. Ind.* 151; *Kurz in Journ. As. Soc.* 1877, ii. 179, not of Loureiro. *Cotula Russelliana*, *Wall. Cat.* 3240.

WESTERN PENINSULA; the Circars, *Russel*.—DISTRIB. Siam.

Root stout, woody, 6-10 in. long. *Stem* much branched from the woody stock; branches straggling, 6-8 in. long, flexuous, woody below. *Leaves* $\frac{1}{2}$ - $\frac{1}{3}$ in., contracted into a petiole, obtuse, irregularly toothed. *Heads* globose, $\frac{1}{8}$ - $\frac{1}{4}$ in. diam.; invol. bracts very coriaceous, obscurely pubescent.—This is a very rare plant; I have seen no speci-

men but Wallich's. Kurz is the authority for the Siam habitat. Bentham had not seen it, or would never have confounded it with *Centipeda orbicularis* (*C. minuta*, Benth., *Myriogyne minuta*, Less.), even generically. It is, however, generically allied to that plant and to *Dichrocephala*, near which I think that both should be placed.

71. **TANACETUM**, Linn.

Annual or perennial herbs. *Leaves* usually pinnatisect. *Heads* corymbose (rarely large, long-peduncled, and solitary), heterogamous or homogamous, disciform, yellow; outer fl. 0 or ♀, 1-seriate, fertile, terete or compressed, 2-3-fid; disk-fl. ♂, fertile, tube stout cylindric, limb 5-fid. *Involucre* usually broad and short; bracts ∞-seriate, appressed, margins often scarious and brown, outer smaller. *Receptacle* flat or convex, naked. *Anther-bases* obtuse, entire. *Style-arms* of ♂ with truncate penicillate tips. *Achenes* compressed, 5-angled or -ribbed, or of the ray triquetrous, truncate; pappus annular or coroniform or 0, rarely a dimidiata auricle.—**DISTRIB.** Species about 30, north temperate regions.

* *Leaves all cauline and pinnatisect, stems or branches all flowering.*

1. **T. fruticosum**, Ledeb. *Fl. Alt.* iv. 58; *Ic. t.* 38; hoary or woolly, stems very many from the woody root 10-14 in. strict erect leafy upwards, leaves $\frac{1}{4}$ - $\frac{1}{2}$ in. 1-2-pinnatisect, segments spreading linear obtuse, heads many peduncled or sessile $\frac{1}{4}$ in. diam., invol. bracts broadly oblong nearly glabrous all scarious and pale or margins faintly coloured, receptacle conic. *DC. Prodr.* vi. 129. *Pyrethrum Athanasia*, Bess.; *Boiss. Fl. Orient.* iii. 353.

WESTERN TIBET, alt. 12-15,000 ft., Thomson, &c.—**DISTRIB.** Altai Mts., Afghanistan.

Root as thick as the thumb and less; stems rather slender. *Heads* numerous. *Achenes*, ripe not seen.—The species is easily confounded with *Artemisia fasciculata*; it differs from *T. artemisioides* in the narrower leaf-segments and glabrous involucre, from *A. gracile* in habit and the much larger heads.

2. **T. artemisioides**, Schultz-Bip. in *Herb. Hook.*; hoary-pubescent, stem 1-2 ft. slender naked below sparsely leafy ribbed simple or corymbosely branched above, leaves $\frac{1}{2}$ -1 in. subpalmately 1-2-pinnatisect, segments short broad obtuse, heads $\frac{1}{4}$ in. in small corymbs terminating very long slender branches, invol. bracts broadly oblong concave coriaceous pubescent wholly pale, receptacle conical. *Artemisia fasciculata*, *Herb. Ind. Or. H. f. & T.*; *Clarke Comp. Ind.* 162, not of *M. Bieb.*

WESTERN TIBET; Balti, alt. 8-9000 ft., Thomson.

Stems sometimes simple, at others copiously branched from the base; the branches all long, slender, and sparsely leafy, both angled and ribbed, greenish grey. *Heads* sessile in a cluster, or peduncled and forming a small flat-topped or rounded corymb rarely 1 in. diam.; flowers about 20; receptacle conic. *Achenes*, ripe not seen.

3. **T. gracile**, Hook. f. & Thoms.; hoary-pubescent, stems many from a woody stock very slender 1-2 ft. corymbosely branched above, branches slender spreading, leaves $\frac{1}{2}$ -1 in. few scattered palmately 2-pinnatisect, segments very slender, heads $\frac{1}{4}$ in. diam. in small corymbs terminating the long slender branches, invol. bracts broadly oblong scarious glabrous pale, receptacle conical, achenes obovoid with a terminal cupula. *T. fruticosum*, *Clarke Comp. Ind.* 153.

WESTERN TIBET, Falconer; Ladak, alt. 11-12,000 ft., Thomson; Sutlej river, N. of Kumaon, alt. 13,500 ft., Strach. & Winterb.

This is very near *T. artemisioides*, but is much more slender, with slender leaf-segments and much smaller heads, with glabrous invol. bracts.

4. **T. nubigenum**, Wall. in *DC. Prodr.* vi. 130; hoary or woolly, stems

many from the woody root elongate densely leafy upwards, leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. 2–3-pinnatisect, segments short linear subacute, heads many peduncled or sessile $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., invol. bracts broadly oblong disk herbaceous woolly margins broad scarious purple-brown, receptacle hemispheric, achenes ovoid-oblong brown 5-ribbed tip rounded. *Clarke Comp. Ind.* 153. *T. fruticulosum*, var. *bracteata*, *Clarke in Gard. Chron.* 1877, 584. *Artemisia nubigena*, *Wall. Cat.* 3233.

ALPINE HIMALAYA; from Kumaon, alt. 10–12,000 ft., to Sikkim, alt. 14–16,000 ft.

Very closely allied to *T. fruticulosum*, but the root is less woody, the stems fewer and more robust, the leaves more dissected, the heads rather larger, and the invol. bracts have coloured margins and herbaceous disks. *Flowers*, including the achenes, about $\frac{1}{2}$ in. long.—*Clarke's* var. *bracteata* of *T. fruticulosum* is only the weak cultivated state of this plant grown from Sikkim seeds.

5. ***T. tibeticum***, *Hook. f. & Thoms.*; *Clarke Comp. Ind.* 164; dwarf, tomentose, stems very many 1–4 in. crowded on a stout stock leafy upwards, leaves $\frac{1}{2}$ in. crowded palmately pinnatisect, segments short linear obtuse, heads $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. capitate or corymbose, invol. bracts orbicular pubescent with broad coloured or pale scarious margins, receptacle convex or hemispheric, achenes 5-ribbed with a minute terminal cup.

WESTERN TIBET; Parang and Lanak passes, alt. 15–17,000 ft., *Thomson*.

Very near to *T. nubigenum*, and perhaps a dry country form of that plant; but the habit is different, the heads often much larger, and the receptacle never conical; the corollas seem to be always glandular, and the whole plant is probably strongly scented when fresh. *Flowers*, including the achenes, $\frac{1}{2}$ in. long. Specimens collected by Thomson in the Parang valley have solitary heads $\frac{3}{8}$ in. diam.

6. ***T. tenuifolium***, *Jacquem. in DC. Prodr.* vi. 129; dwarf, silkily tomentose, stems many short 2–4 in. densely leafy, leaves 2-pinnatisect, segments linear obtuse, heads $\frac{1}{8}$ – $\frac{1}{4}$ in. corymbose, invol. bracts linear-oblong hoary margins scarious brown, receptacle convex, achenes obovoid acutely angled. *Artemisia tenuiflora*, *Jacquem. Cat.* 2053; *Bess. Suppl. ad Tent. Abrot.* 62.

WESTERN TIBET; Keyrie Pass, *Jacquemont*; Kumaon, alt. 14,000 ft., *Thomson*.

Very near indeed to *T. tibeticum*, and probably a variety of that plant, differing chiefly in the narrow lobes of the more silkily pubescent foliage. *Flowers*, including the achenes, $\frac{1}{10}$ in. long.

** *Leaves radical and cauline; stems many from the root, elongating and flowering, the rest short and flowerless, or stem subsolitary with both radical and cauline leaves.*

7. ***T. senecionis***, *Gay in DC. Prodr.* vi. 129; tomentose or woolly, stems few or many stout long or short from a stout woody root, radical leaves petioled 1–3 in. palmately pinnatisect, segments short or long linear obtuse, flowering stems 3–10 in. distantly leafy, heads $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. capitate or in woolly corymbs, invol. bracts broadly ovate with a woolly disk and broad scarious brown margins, receptacle convex or hemispheric, achenes obovoid tip rounded without a cupule. *T. tomentosum*, *DC. l. c.* 130.

WESTERN HIMALAYA; Lahul, Kunawur, and Garwhal, alt. 11–14,000 ft., *Royle, Jacquemont, &c.*

Very variable, 4–10 in. high. In *Jacquemont's* specimen the leaves are 3 in. long and the flowering stem 8 in., but at great elevations the plant becomes dwarf and only 3–5 in. high. I have seen no quite ripe achenes, but the ripest appear to be between obovoid and cuneate, rather compressed, angled, with rounded shoulders and no trace of a terminal cupule (as in *T. nubigenum*); pericarp lax. I find no difference whatever between some of *Jacquemont's* specimens of *T. senecionis*, so named by Gay, and *Royle's* of *tomentosum*. The heads vary in wooliness, the invol. bracts being some-

times almost hidden (as in the following species), and their brown scarious edges concealed. The flowers (with the achenes) rarely exceed $\frac{1}{2}$ in. long.

8. **T. robustum**, *H. f. & T.*; *Clarke Comp. Ind.* 154; very stout, softly tomentose, stem subsolitary from a stout woody stock robust angled, radical leaves long-petioled 3-4 in. oblong in outline 2-pinnatisect, segments linear-obovoid obtuse, cauline few, heads $\frac{1}{2}$ in. diam. in branched corymbs with very stout woolly and leafy branches and peduncles, invol. bracts densely woolly oblong with very narrow scarious pale margins, receptacle convex, flowers numerous.

WESTERN HIMALAYA; Kunawur, below the Werang Pass, *Thomson*.

I doubt this being anything but a very large robust form of *T. senecionis*, with very stout stem and branches of the corymbs, larger heads, and woolly bracts. *Root* woody, with a prostrate, branched crown. *Leaves* long-petioled, $\frac{3}{4}$ -1 in. diam. *Achenes* unripe, but apparently as in *T. senecionis*, with the corolla $\frac{1}{2}$ in. long.

9. **T. Falconeri**, *Hook. f.*; rather silkily tomentose or hoary, stem 1-2 ft. robust grooved, radical leaves 2-4 in. linear-oblong in outline 2-pinnatisect, segments linear narrow acute, heads $\frac{1}{2}$ in. diam. peduncled in branched corymbs with linear or divided leaves, invol. bracts densely pubescent linear-oblong margins narrowly scarious pale, receptacle convex, flowers about 20.

WESTERN TIBET (or Kashmir), *Falconer*; KASHMIR, *Bellev*.

A very robust tall species, differing from *T. robustum* in the larger size, the longer leaves more oblong in outline, with slender lobes. *Achenes* pale, linear-oblong, rather dilated upwards, pericarp loose, tip truncate and lobed, with the corolla about $\frac{1}{4}$ in. long. In *Bellev's* specimen the corymb is 6 in. diam., with long stout ascending branches, the lower 7-8 in. long; the heads are longer peduncled, and the leaves on the corymb simple, slender, undivided, and 1 in. long. In *Falconer's* the corymbs are much smaller and denser, with divided leaves.

10. **T. longifolium**, *Wall. Cat.* 3231; laxly villous, stem single from the root stout 6-18 in., radical leaves 5-10 in. slender linear in outline 2-pinnatisect, segments subuliform, heads $\frac{1}{3}$ - $\frac{1}{2}$ in. diam. in a close woolly corymb or rounded cluster (rarely solitary and 1 in. broad), invol. bracts narrowly oblong with a pubescent disk and broad scarious purple margins, receptacle hemispheric, flowers 50-60. *DC. Prodr.* vi. 130, *excl. syn.*; *Clarke Comp. Ind.* 154.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 10-13,500 ft.

A very distinct species in foliage, though offering no characters of importance in the head and flowers. *Root* as thick as the thumb, woody, crowned with the shining base of the old petioles. *Stem* stout, erect, striated, not angled. *Leaves* very long and finely cut. *Heads* sometimes reduced to one, then 1 in. diam., with very many invol. bracts; flowers with the achenes, $\frac{1}{4}$ in. long. *Achenes* narrowly obovoid, with 5 strong ribs; pappus 0.—The form with a large solitary head is rather an abnormal development than a normal variety, and, except in the absence of ligules and presence of the shining remains of the petioles, it resembles most closely *Chrysanthemum Atkinsoni*.

11. **T. nanum**, *Clarke Comp. Ind.* 155; hoary, rootstock excessively stout branched, radical leaves $\frac{1}{2}$ -1 in. ovate 2-pinnatisect, segments minute short acute incurved, flowering stem 3 in. sparingly leafy simple, heads capitate $\frac{1}{4}$ in. diam., invol. bracts with a woolly disk and broad brown scarious margins, receptacle convex.

WESTERN TIBET; Nubra Valley, alt. 16,000 ft., *Thomson*.

This differs from all the other Indian species in the minute incurved segments of the leaves, which are quite acute; the heads resemble those of *T. nubigenum*, but the habit is very different. The woody root is almost as thick as the thumb, the achenes are immature.

*** *Leaves cuneiform, 3-fid.*

12. **T. gossypinum**, Hook. f. & T.; Clarke *Comp. Ind.* 154; dwarf, densely tufted, softly woolly, leafy shoots short densely compacted clothed with short quadrate silky most densely imbricating leaves $\frac{1}{2}$ in. long, flowering stems 1-2 in. stout simple densely leafy with cuneiform 3-fid leaves $\frac{1}{4}$ - $\frac{1}{2}$ in., heads $\frac{1}{4}$ in. diam. in rounded terminal woolly dense clusters, invol. bracts linear-oblong, margins scarious purple, receptacle hemispheric.

SIKKIM HIMALAYA, on the Tibetan frontier, alt. 16-18,000 ft., J. D. H.

A very singular species, forming dense cushions, at the highest elevation reached by flowering plants in Sikkim, resembling one of the moss-like *Eritrichiums* in habit. The short flowerless shoots have often silvery white silky pubescence, which contrasts with the tawny wool of the flowering branches, which are club-shaped, the dense inflorescence forming the broad end of the club. The achenes are narrowly obovoid, with a lax pericarp and small cupular tip, and with the corollas are $\frac{1}{6}$ in. long.

72. **ARTEMISIA**, Linn.

Herbs or shrubs, usually strong-scented. *Leaves* alternate, entire serrate or 1-3-pinnatisect. *Heads* small, solitary or fascicled, racemose or paniced, never corymbose, heterogamous or homogamous, disciform; outer fl. ♀, 1-seriate, fertile, very slender, 2-3-toothed; disk fl. ♂, fertile or sterile, limb 5-fid. *Involucre* ovoid, subglobose or hemispheric; bracts few-seriate, outer shorter, margins scarious; receptacle flat or raised, naked or hirsute. *Anther-bases* obtuse, entire. *Style-arms* of ♂ with truncate usually penicillate tips, often connate in the sterile fl. *Achenes* very minute, ellipsoid oblong or subobovoid, faintly striate; pappus 0.—DISTRIB. Species about 150, in the N. temperate regions, and a few S. American ones.

SECT. I. **Dracunculus**. *Heads* heterogamous; outer fl. ♀; disk fl. ♂, sterile; receptacle naked. *Leaves* glabrous or villous, never appressedly tomentose.

* *Perennials*.

1. **A. salsoloides**, Willd.; Boiss. *Fl. Orient.* iii. 262; perennial, glabrous or sparsely villous, stems many strict angled pale shining, leaves glaucous 2-3-pinnatisect, segments slender obtuse or acute, upper quite entire, racemes simple or paniculately branched, heads $\frac{1}{8}$ - $\frac{1}{2}$ in. long subsessile or pedicelled broadly ovoid or subglobose, invol. bracts glabrous ovate or obovate-oblong obtuse pale with broad scarious margins, achenes glabrous. DC. *Prodr.* vi. 94.; Ledeb. *Fl. Ross.* ii. 560; Clarke *Comp. Ind.* 157.

WESTERN TIBET, alt. 12-14,000 ft., from Rupchu (N. of Kumaon) westwards.—DISTRIB. Mongolia, Siberia, Caucasus.

Root very stout, long and woody, sometimes 12 in. *Leaves* 1-2 in., radical many or 0. *Racemes* copious. *Heads* shining; flowers very few. *Achenes* 2-3, narrowly ellipsoid, $\frac{1}{20}$ in. long, delicately ribbed.—Clarke describes this species as biennial, but the root appears to be perennial.

VAR. 1. *salsoloides proper*; stems very numerous from the crown, racemes subsimple.

VAR. 2. *paniculata*; taller, stem stout branched above the root, racemes paniced. A. Halimodendron, Ledeb.; Herb. Ind. Or. H. f. & T. (not of Turczaninow, which has much larger more ovoid heads $\frac{1}{2}$ in. long, with longer hard invol. bracts, and achenes twice as large).

2. **A. Dracunculus**, Linn.; DC. *Prodr.* vi. 97; herbaceous, perennial, glabrous, radical leaves 3-fid or 0, cauline sessile linear or linear-oblong acute entire or toothed, racemes paniced, heads subglobose $\frac{1}{2}$ in. diam. sessile or pedi-

celled pale shining, invol. bracts broadly oblong with very broad scarious margins and a very narrow green disk. *Clarke Comp. Ind.* 157; *Ledeb. Fl. Ross.* ii. 563.

WESTERN TIBET, alt. 14-16,000 ft., *Thomson*; Lahul, *Jaeschke*.—DISTRIB. Affghanistan, W. Asia, S. and Mid Russia.

A green erect herb 1-2 ft. high; stems grooved and ribbed. *Leaves* 1-1½ in., quite entire in Indian specimens. *Heads* sometimes clustered in threes, horizontal or nodding; flowers rather numerous. *Achenes*, ripe not seen in Indian specimens.—Though described as an annual, the roots seem to be perennial. The Affghan specimens have rather smaller heads, and are probably Boissier's *A. campestris*, var. *inodora*.

3. *A. glauca*, *Pall.*; *DC. Prodr.* vi. 97; herbaceous, perennial, pubescent, radical leaves 3-fid or 0, lobes acute, cauline sessile linear or linear-lanceolate rarely lobed, heads subglobose ½ in. diam. in very slender lax short racemes with capillary pedicels, invol. bracts glabrous oblong obtuse scarious with a narrow green disk. *Ledeb. Fl. Ross.* ii. 563. *A. dubia*, *Wall.*? *Herb. Ind. Or. H. f. & T.*

WESTERN HIMALAYA; KUNAWUR and JAMU, alt. 7-9000 ft., *Thomson*.—DISTRIB. Siberia, Mongolia.

Very similar to *A. Dracunculus*, and distinguished by the pubescence only.

4. *A. desertorum*, *Spreng. Syst.* iii. 490; herbaceous, perennial, glabrous, leaves 1-2 in. sessile entire and linear or 2-3-partite or pinnatifid with linear acute segments, heads usually pedicelled subglobose ½ in. diam. sessile or peduncled, solitary and distant or in clusters of 2-3 short forming paniced racemes, invol. bracts orbicular or oblong, outer herbaceous or with narrow scarious margins. *DC. Prodr.* vi. 97; *Ledeb. Fl. Ross.* ii. 564; *Clarke Comp. Ind.* 158. *A. foetida*, *Jacquem. in DC. Prodr.* vi. 98. *A. Jacquemontiana*, *Besser*; *DC. l. c.* 97.

WESTERN TIBET and KUNAWUR, alt. 10-16,000 ft., *Falconer, Jacquemont, Thomson*.—DISTRIB. Eastern Turkestan, alt. 17-18,000 ft. (*Henderson*); Siberia.

A suberect foetid herb; branches grooved and ribbed. *Leaves* green, acute. *Heads* dark green; outer invol. bracts often wholly herbaceous; flowers rather numerous. *Achenes* as in *A. salsoloides*.—In *A. Jacquemontiana* the invol. bracts are more scarious, and present a transition to *A. Dracunculus*, of which this is probably a variety; it is referred by Maximovicz (*Dec. xi.* 526) to *parviflora*, *Roxb.*, but I think erroneously.

5. *A. parviflora*, *Roxb. Hort. Beng.* 61; *Fl. Ind.* vi. 420; perennial, herbaceous, villous, hoary or glabrous, stems erect or ascending stout paniculately branched grooved, leaves sessile linear-cuneate, tip entire or acutely 2-8-fid or flabellately lobulate rarely pinnatifid, upper linear entire acute, heads ¾-1 in. diam. globose secund in elongate strict paniced racemes, invol. bracts broadly oblong with broad scarious edges. *Don Prodr.* 181; *DC. in Wight Contrib.* 20; *Prodr.* vi. 100; *Dalz. & Gibs. Bomb. Fl.* 314; *Wall. Cat.* 3298; *Clarke Comp. Ind.* 159. *A. glabrata*, *DC. in Wight Contrib.* 20; *Prodr.* vi. 100; *Wight Ic.* t. 1111. *A. cuneifolia*, *DC. l. c.* 126.

TEMPERATE HIMALAYA; from Kashmir, alt. 7-9000 ft., to Sikkim, alt. 7-11,000 ft. KHASIA MTS., AVA, and MARTABAN, alt. 5-7000 ft. BEHAR; on Parusnath, alt. 4000 ft. WESTERN GHATS; from the Concan southwards to the Pulney Mts. (absent in Ceylon).

A shrubby inodorous herb 1-3 ft. high, glabrous or laxly villous. *Leaves* very variable, 1-2 in. long, the lowest sometimes nearly 1 in. diam., with palmately spreading 3-5-fid lobes, the upper middle sometimes 1-2-pinnatifid with narrow lobes, but usually the lower and middle cauline are simply narrowly cuneate and acutely 3-5-fid at the broad end; all have generally a pair of stipule-like narrow lobes at the base. *Heads* almost always pedicelled, greenish; flowers 6-10. *Achenes* about ¼ in. long, ellipsoid, smooth, brown.—The stems are so robust as to suggest that this is often

shrubby, though described as herbaceous by Roxburgh. The corolla of the ray is not pubescent, as represented in Wight's *Icones*.

**** Annuals, rarely perennials.**

6. ***A. scoparia***, *Waldst. & Kit. Pl. Rar. Hung.* i. 66, t. 65; annual, or rootstock perennial, glabrous below, hoary or villous, radical leaves petioled broadly ovate 1-3-pinnatisect, segments linear, cauline filiform, heads minute $\frac{1}{12}$ – $\frac{1}{10}$ in. secund in slender paniced racemes, invol. bracts glistening oblong obtuse scarious with narrow green disks. *Boiss. Fl. Orient.* iii. 364; *Ledeb. Fl. Ross.* ii. 569; *Clarke Comp. Ind.* 158. *A. elegans*, *Roxb. Fl. Ind.* iii. 421; *Wall. Cat.* 4300. *A. trichophylla*, *Wall. Cat.* 3305; *DC. l. c.* vi. 100; *Clarke l. c.*

UPPER GANGETIC PLAIN, and westwards to SCIND and the PUNJAB. WESTERN HIMALAYA; from Kashmir to Lahul, alt. 5-7000 ft. WESTERN TIBET, alt. 7-12,000 ft., *Thomson*.—DISTRIB. Japan, Afghanistan to Central Europe.

A faintly scented very slender branched annual, 1-2 ft. high; branchlets often almost capillary. *Leaves*, radical 1-3 in., long-petioled, the segments distant spreading; cauline setaceous. *Heads* sessile or on short capillary pedicels. *Achenes* $\frac{1}{20}$ in. long (perhaps one of the most minute fruits of any flowering plant).—Though usually annual and described as such, some specimens, both from the plains of India and Tibet, have very woody stocks.

7. ***A. stricta***, *Edgew. in Trans. Linn. Soc.* xx. 73; annual, laxly villous or glabrate, erect or branches diffusely prostrate, radical leaves petioled 1-3-pinnatisect, segments linear or lanceolate, cauline sessile less divided or entire, heads $\frac{1}{10}$ – $\frac{1}{8}$ in. diam. subglobose sessile in spiked clusters or solitary suberect, invol. bracts oblong obtuse pubescent, outer greenish with narrow scarious margins glabrous and shining in age. *Clarke Comp. Ind.* 158.

Tibetan Passes of the HIMALAYA; Kumaon, alt. 10-11,500 ft., *Edgeworth, Strach. & Winterb.* SIKKIM, alt. 15,000 ft., *J. D. H.* WESTERN TIBET, alt. 10-13,000 ft., *Thomson*.

Very variable; from a diffuse herb with spreading prostrate branches 2-6 in. long, to a tall branching one 2 ft. high, readily distinguished from *A. scoparia* by the smaller less divided radical leaves, the shorter pinnatisect cauline ones, and the usually pubescent larger heads being sessile, erect or suberect, and forming very short spikes, and being not at all secund. The achenes are also larger than in that plant.

8. ***A. annua***, *Linn.*; *Boiss. Fl. Orient.* iii. 371; annual, erect, very slender, glabrous, branches deeply grooved, leaves broad 3-pinnatisect or decompound, segments serrate or lobulate, heads $\frac{1}{12}$ – $\frac{1}{10}$ in. diam. subglobose secund in very slender paniced racemes pedicelled pendulous, invol. bracts glabrous, inner orbicular green with scarious margins at length all scarious and shining. *A. Stewartii*, *Clarke Comp. Ind.* 163. *A. Wadei*, *Edgew. in Trans. Linn. Soc.* xx. 72.

The PUNJAB; Peshawur to Wuzuristan, alt. 5500 ft., *Stewart*.—DISTRIB. Siberia, Afghanistan, and westwards to Hungary.

A very strong scented species. It has 4-pinnatifid lower leaves, 3 in. broad, and as long, with stipuliform pinnatifid auricles at the base of the petiole, and with puberulous nerves beneath. *Stewart's* specimens are tall, strict, copiously paniculately branched, with fully developed leaves deltoid-ovate in outline, identical with *Edgeworth's*, and both with Siberian and Caucasian specimens of *A. annua*. Though usually placed in the section *Abrotanum*, I find the ray flowers to be always fertile and the disk flowers sterile.

SECT. II. **Seriphidium.** *Heads* homogamous; flowers all fertile, receptacle naked.

9. ***A. maritima***, *Linn.*; *Ledeb. Fl. Ross.* ii. 570; hoary or tomentose,

shrubby below, stems erect or ascending much branched from the bases, leaves ovate 2-pinnatisect, segments small spreading linear obtuse, upper simple linear, heads 3-8-fl. ovoid or oblong suberect in spicate fascicles, invol. bracts linear-oblong, outer herbaceous tomentose, inner scarious acute glabrous. *DC. Prodr.* vi. 102; *Clarke Comp. Ind.* 159. *A. brevifolia*, *Wall. Cat.* 3306; *DC. Prodr.* vi. 103. *A. fragrans*, *Willd.*; *Boiss. Fl. Orient.* iii. 366. *A. acetica*, *Jacq. in Bess. Monog. Dracunc. Suppl.* 86; *DC. l. c.* 105.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 7-9000 ft. WESTERN TIBET; in salt plains, alt. 9-14,000 ft., abundant.—DISTRIB. Coasts of Europe and saline tracts of N. Asia.

Rootstock woody, branched; stems 6-18 in., strict, woody or wiry. *Leaves* $\frac{1}{2}$ -2 in., often quite white, with very many segments; petiole slender. *Heads* often reddish, crowded and bracteolate by a small linear or almost setaceous leaf.—The heads are erect in most of the Indian specimens, which refers them to the form called *fragrans* of Willdenow, but Clarke mentions a variety with nodding heads which he (in mss.) refers to *A. nutans*, Willd.; and he has a var. *Thomsoniana* for a form with very woolly leaves and suberect heads (*A. Lehmaniana*, Bge.). Wallich's *A. brevifolia* in no way differs from *A. maritima*.

SECT. III. **Abrotanum**. *Heads* heterogamous; ray-fl. ♀, disk-fl. ♂, all fertile; receptacle naked (or puberulous in *A. persica*).

* *Annuals or biennials*.

10. ***A. caruifolia***, *Ham. in Roxb. Hort. Beng.* 61; *Fl. Ind.* iii. 162 (by error *carnifolia*); annual, quite glabrous, stem branched above densely leafy, leaves sessile capillaceo-multifid, heads $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. hemispheric pedicelled secund drooping in axillary leafy racemes, invol. bracts glabrous broadly oblong, outer herbaceous with narrow scarious margins, inner scarious. *Wall. Cat.* 3299; *DC. Prodr.* vi. 119; *Clarke Comp. Ind.* 162. *A. riparia*, *Herb. Ham.*

EASTERN BENGAL, ASSAM, NIPAL and BIRMA.—DISTRIB. China.

Stem 2-4 ft., stout, but soft and herbaceous. *Leaves* deep green, segments very narrow and weak. *Heads* green, many-fl.; receptacle hemispheric.

11. ***A. Tournefortiana***, *Reichb. Ic. Exot.* i. 6, t. 5; annual, stout, erect quite glabrous simple or thyrsoïdly branched, leaves linear-oblong or ovate pinnatisect, rachis lobulate, segments distant oblong toothed lacinate or pinnatifid, cauline and floral sessile elongate, heads ovoid $\frac{1}{2}$ in. long erect in very dense axillary erect sessile compound thyrsoïd panicles, invol. bracts glabrous erect after flowering obovate-oblong acute scarious with a narrow green disk, receptacle very small. *DC. Prodr.* vi. 119; *Boiss. Fl. Orient.* iii. 372; *Clarke Comp. Ind.* 163.

WESTERN HIMALAYA and WESTERN TIBET; alt. 8-12,000 ft; Kashmir, *Falconer*; Kunawur and Piti, *Jacquemont*, *Thomson*.—DISTRIB. Affgharistan and westward to Armenia.

Very stout, 2-4 ft.; stem green or purplish. *Leaves* green, 3-5 in. long, soft, petiole and rachis slender. *Heads* clustered like the inflorescence of an *Amaranthus*. *Achenes* larger than usual in the genus, about $\frac{1}{10}$ in. long.—The Sikkim plant referred to this by Clarke (l. c.) is *A. biennis*, which differs widely in the size, form and colour of the heads, and in the broad receptacle.

12. ***A. biennis***. *Willd.*; *Ledeb. Fl. Ross.* iii. 593; green and rather succulent, glabrous or pilose, leaves 2-pinnatifid, segments pinnatifid or toothed, heads many-fl. $\frac{1}{5}$ - $\frac{1}{3}$ in. diam. broadly cupular suberect in short leafy paniced racemes, invol. bracts pubescent broad green with rather narrow and brown scarious margins, *DC. Prodr.* vi. 120.

WESTERN TIBET; Milam (N. of Kumaon), alt. 11,500 ft., and Topidunga, alt.

15,000-ft., *Strach. & Wint.*; Potopa, alt. 11,500–12,000 ft., *Heyde.* SIKKIM; on the Tibet frontier, alt. 15,000 ft., *J. D. H.*—DISTRIB. N. Asia, N. America.

A subsucculent herb, of which the specimens are not very good. *Stem* 6–12 in., very stout and soft. *Leaves* radical, numerous, green, petioled, cauline subsessile. 1–2 in., linear-oblong in outline. *Heads* much larger than those in any of the foregoing species.—Ledebour describes the root, which I have not seen, as creeping jointed and scaly, the brown scarious margins of the invol. bracts are peculiar.

**** Perennials with usually small heads in often spreading paniced spikes or racemes.**

13. ***A. amygdalina*, Dcne. in Jacq. Voy. Bot. 92, t. 100;** stem stout erect leafy, leaves subsessile lanceolate acuminate serrate teeth incurved gland-tipped hoary beneath, heads $\frac{1}{10}$ in. ovoid few-fl. subsecund in dense short axillary racemes, invol. bracts oblong obtuse scarious glabrous, outer with a green disk.

KASHMIR; Pir Punjal, *Jacquemont, Stewart.*

Stem deeply grooved and many-ribbed, glabrous. *Leaves* quite simple, 4–6 by $\frac{1}{2}$ – $\frac{1}{4}$ in., rather membranous, glabrous above; nerves many and midrib slender; base narrowed into a very short petiole with minute setaceous auricles.—I have seen but one specimen of this very remarkable species, the leaves are like those of a willow. It is perhaps nearest *A. vulgaris*; the only other species at all like it is *A. anomala*, Hance, of China, which has shorter, broader leaves.

14. ***A. vulgaris*, Linn.; Boiss. Fl. Orient. iii. 371;** tall, shrubby below, hoary pubescent or tomentose, stems leafy paniculately branched, leaves large ovate lobed lacinate or 1–2-pinnatifid white-tomentose beneath rarely hoary or green on both surfaces, lobes acute irregularly serrate or lobulate lower petioled upper sessile or petioled with stipule-like basal lobes, uppermost linear-lanceolate entire, heads $\frac{1}{2}$ – $\frac{1}{3}$ in. long ovoid or subglobose clustered or seriate subsecund in short or long suberect or horizontal paniced racemes, invol. bracts woolly or glabrate, outer small herbaceous, inner almost wholly scarious, corollas glabrous. *DC. Prodr. v. 112; Clarke Comp. Ind. 161; Roxb. Fl. Ind. iii. 420; Kurz in Journ. As. Soc. 1877, ii. 178. A. indica, Willd.; DC. l. c. 114; Roxb. l. c. 419; Dalz. & Gibs. Bomb. Fl. 129; Wight Ic. t. 112; Wall. Cat. 3293. A. dubia, Wall. Cat. 3307; DC. l. c. 110. A. myriantha, Wall. Cat. 3297; DC. l. c. 112. A. paniculata, Roxb. l. c. 418. A. leptostachya, DC. l. c. 113. A. grata, Wall. Cat. 3294 in part; DC. l. c. 114. A. lavandulæfolia, DC. l. c. 110. A. affinis, Hassk. Hort. Bogor. 102. A. parviflora, Wight Cat. 1460, not of Roxb.; Rheede Hort. Mal. x. t. 45.*

Throughout the mountainous districts of INDIA, at elevation of 5–12,000 ft., in the Western Himalaya; and 5–8000 ft. in Sikkim, the Khasia, Ava, and Martaban Mts. Mt. Aboon, in MARWAR. The WESTERN GHATS, from the Concan, southwards to CEYLON.—DISTRIB. Temperate Europe and Asia, Siam, Java.

A tall aromatic shrub-like herb, often forming thickets 6–8 ft. high in Sikkim, with branches as thick as the thumb, and leaves 7 in. long, and broad; the leaves normally vary from very lobulate, like those of the garden chrysanthemum, to pinnatifidly 2–3-sect, and from green or hoary on both surfaces to thickly clothed with white or buff, tomentose beneath or on both surfaces; the heads, too, vary greatly in number, disposition, size and form, from globose to ovoid, and from sessile to pedicelled.—I have failed to separate the following forms into varieties recognisable by description or by locality. *A. indica* was originally distinguished by its leaves ashy beneath; *A. dubia* by the more entire leaves; *A. myriantha* by its floribund branches; *A. paniculata* (a Calcutta garden plant) has no distinctive characters, *A. leptostachya* should have leafless racemes, as is often the case with other forms; *A. grata* of Wallich consists of a broad leaved state of *vulgaris* from the Western Peninsula, and of the same with *A. Roxburghiana* from the Calcutta Garden. The

synonym of *parvifolia*, Wight, is probably due to a misplaced ticket. Wight (Icones, under t. 1112) states that he cannot recollect having seen this plant (in the Nilgherry Mts.) except about habitations; and the only habitat Thwaites gives for it in Ceylon is "in or near native gardens." It is, however, abundant in the Ghats, and the heads are sold in the Bombay Bazaar.

15. **A. Roxburghiana**, *Besser Abrot. Suppl.* 57; rootstock creeping, stem 1-2 ft. simple below ascending leafy, leaves ovate or oblong 2-3-pinnatifid, rachis winged, segments linear or oblong acute entire or cut tomentose or glabrate beneath margins flat or recurved, heads $\frac{1}{2}$ - $\frac{1}{3}$ in. ovoid or hemispheric 6-10-fl. in compound pannicled racemes or spikes, invol. bracts pubescent or tomentose, receptacle very small flat. *DC. Prodr.* vi. 114. *A. Wallichiana*, *Besser Abrot.* 69.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 5-10,000 ft.

Very similar in some states, in foliage and inflorescence, to *A. vulgaris*, but at once distinguished by its rootstock, small size, and herbaceous habit; the leaves, too, are much smaller and more finely cut, the flowers are usually, if not always, purple. The heads vary much in size and in form, from hemispheric to ovoid. A form with large racemose heads appears to pass into *A. Moorcroftiana*.

VAR. 1. *grata*; leaf segments broad white tomentose beneath, margins flat or recurved. *A. grata*, *Wall. Cat.* 3294, *A. A. hypoleuca*, *Edgew. in Trans. Linn. Soc.* xx. 71; *Clarke Comp. Ind.* 164. The stem is often purple.

VAR. 2. *purpurascens*; leaves more finely cut, segments very narrow acute, margins recurved glabrate on both surfaces. *A. purpurascens*, *Jacquem. mss. Besser l. c.* 60. *A. revoluta*, *Edgew. l. c.* 72.

16. **A. vestita**, *Wall. in DC. Prodr.* vi. 106; *Cat.* 3301; shrubby below, erect, hoary, paniculately branched, leaves ovate pinnatisect segments pectinately pinnatifid green above white-tomentose beneath, rachis simple or pectinately winged, heads 6-10-fl. hemispheric $\frac{1}{2}$ - $\frac{1}{3}$ in. subsecund long-pedicelled nodding in short or long compound hoary racemes, invol. bracts obovate-oblong scarious, outer with a green disk. *Clarke Comp. Ind.* 160.

WESTERN HIMALAYA, and the SALT RANGE, alt. 7-10,000 ft., from Peshawur and Kashmir to Kumaon.—*DISTRIB.* N. China.

Stem 1-4 ft., hoary, grooved. *Leaves* 1-3 in., petiole slender or 0, with or without simple or pinnatifid basal auricles. *Achenes* ellipsoid, smooth, shining, brown.—The very finely divided leaves, like those of a fern, distinguish this from *A. Roxburghiana*, to which it is most closely allied.

17. **A. laciniata**, *Willd.*; *DC. Prodr.* vi. 110; erect, hoary, herbaceous, leaves broadly ovate decompoundly pinnatisect, segments pectinately pinnatifid puberulous on both surfaces, rachis simple, heads 15-20-fl. broadly hemispheric nodding subsecund distant in slender paniced racemes, invol. bracts hoary with a green disk and broad scarious margins. *Ledeb. Fl. Ross.* ii. 581; *Clarke Comp. Ind.* 161.

WESTERN TIBET and KUMAON, alt. 8-12,000 ft., *Royle, &c.* KASHMIR, alt. 9500 ft., *Clarke*.—*DISTRIB.* Siberia and Dahuria.

This is probably only a more compound leaved state of *A. sacrorum*; the heads are identical.

18. **A. sacrorum**, *Ledeb. Fl. Alt.* iv. 72; *Fl. Ross.* ii. 578; erect, hoary, shrubby below, leaves long-petioled ovate pinnatisect, segments pectinately pinnatifid hoary or green or white-pubescent on both surfaces, rachis simple or pectinately winged, heads 15-20-fl. broadly hemispheric nodding subsecund distant in slender paniced racemes, invol. bracts hoary, outer with a green disk and broad scarious margins. *Reichb. Ic. Fl. Germ.* t. 310; *Clarke Comp.*

Ind. 160. *A. Messerschmidiana*, *Besser Monog.*; *Abrot.* 27; *DC. Prodr.* vi. 107.

WESTERN TIBET, KUNAWUR, and the Tibetan region of KUMAON, alt. 9–17,000 ft. —DISTRIB. Mid. and S. Russia, Siberia, Dahuria.

Habit of *A. vestita*, but the leaves are smaller and alike on both surfaces, the heads are twice as large, and the flowers far more numerous. The outer invol. bracts in both are sometimes linear and green.

19. ***A. Campbellii***, *Hook. f. & T.*; *Clarke Comp. Ind.* 164 (*excl. locality of W. Tibet*); dwarf, clothed with buff tomentum, stems simple, ascending from a creeping woody branched stock, leaves ovate pinnatisect segments 2–3-lobed, lobes lanceolate acute tomentose on both surfaces, petiole stout, heads $\frac{1}{2}$ in. diam. hemispheric sessile clustered clusters in interrupted simple or racemose spikes, invol. bracts densely woolly oblong, outer with narrow scarious margins, inner scarious.

SIKKIM HIMALAYA; on the Tibetan passes and north of them, alt. 16–18,000 ft., *J. D. H.*

A strong scented, tufted, stout herb, less than a foot high, softly, often subsilicily tomentose all over; rootstock stout, with stout woody descending fibres. *Radical leaves* 1–1 $\frac{1}{2}$ in. long; petiole stout, with a sheathing base; cauline sessile, with auricled bases, segments with revolute margins. *Heads* brown, in woolly clusters; receptacle very small; flowers not numerous.—Through some accident Clarke has referred to this species a Western Tibetan plant of Falconer's, &c., and a portion of Wallich's N. 3302 (*A. vestita*), from Kashmir.

*** *Perennials with rather large heads in simple or sparingly branched erect axillary and terminal racemes.*

(The species 20, 21, 22 are very closely allied and closely resemble states of 16, 17 and 18, all may prove forms of one or two species.)

20. ***A. Moorcroftiana***, *Wall. Cat.* 3296; *DC. Prodr.* vi. 117; hoary or tomentose, rootstock creeping, stem simple below, leaves ovate or oblong 2-pinnatifid white-tomentose beneath, rachis pinnatifid, segments spreading ovate or lanceolate acute, heads large $\frac{1}{2}$ – $\frac{1}{4}$ in. diam. broadly hemispheric 15–20-fld. sessile solitary or in clusters along the long racemes, invol. bracts obovate tomentose broadly scarious, receptacle broad hemispheric.—*A. hypoleuca?* *Herb. Ind. Orient. H. f. & T.*

KASHMIR; Baltal, alt. 9–13,000 ft., and WESTERN TIBET, alt. 13–14,000 ft., *Thomson*. KUNAWUR, at Spiti, *Jaeschke*.

This resembles closely states of *A. Roxburghiana*, var. *grata*, in foliage, and it has a similar root, but the inflorescence is very peculiar, the large heads forming interrupted elongated spikes or racemes, with spaces of $\frac{1}{4}$ – $\frac{3}{4}$ in. between the solitary heads or clusters of 2–3 heads. The flowers are purple, very numerous, the receptacle totally different, and the achenes twice as large ($\frac{1}{2}$ in. long).

21. ***A. persica***, *Boiss. Fl. Orient.* iii. 373; tall, erect, perennial?, hoary with white tomentum, paniculately branched above, leafy, leaves small ovate or flabellate decompoundly pinnatisect, segments minute linear or obovate obtuse spreading, rachis simple or lobulate, heads $\frac{1}{2}$ in. diam. subglobose rather remote pedicelled secund nodding in short or long axillary strict erect racemes, invol. bracts tomentose outer linear green, inner orbicular broadly scarious, receptacle small convex obscurely pubescent. *Clarke Comp. Ind.* 165.

WESTERN TIBET, alt. 9–14,000 ft., *Thomson*.—DISTRIB. Afghanistan, S. Persia, Kurdistan.

Described by Boissier as a perennial, but the Tibetan examples are rather like biennials and very strongly scented. *Stem* 3–4 ft., grooved and ribbed, branches long

suberect. *Leaves* very finely cut, sessile or petioled. *Heads* numerous, yellow, usually rather distant; receptacle very obscurely pubescent; corolla of ♂ very short, almost cupular, glabrous or pubescent.—Placed in the section *Absinthium* by Boissier and Clarke, but it is most closely allied to *A. Falconeri*, and the pubescence of the receptacle is totally different from the long hairs of the *Absinthium* section.

22. **A. Falconeri**, *Clarke mss.*; hoary tomentose, stem woody and branched below, branches slender strict erect simple, leaves small broad short lower 2-pinnatisect floral and upper pinnatifid equally tomentose on both surfaces, segments small subacute pointing upwards, heads $\frac{1}{2}$ in. diam. hemispheric pedicelled nodding forming a simple terminal secund leafy raceme, invol. bracts tomentose, outer linear green, inner oblong obtuse tomentose green, innermost scarious, receptacle small convex.

WESTERN TIBET; *Falconer*.

A foot high, branches very slender but stiff, not grooved. *Leaves* $\frac{1}{2}$ – $\frac{1}{2}$ in. long, and as broad, radical and lower cauline with slender petioles; upper cauline, sessile; segments linear or narrowly lanceolate. *Heads* in perfectly simple secund strict erect racemes terminating the erect branches.—I have seen no specimens but 3 of *Falconer's*, and I have hence no idea how much this species may vary; its very slender, simple, erect branches and racemes are unlike any other, but it may be a contracted form of *A. Moorcroftiana*.

23. **A. Stracheyi**, *Hook f. & T.*; *Clarke Comp. Ind.* 164; dwarf, softly villously tomentose, branches annual simple strict erect very stout from a very large woody branched many-headed rootstock, leaves 3–6 in. linear-oblong 2-pinnatisect subsilkily villous on both surfaces, segments close-set short linear or lanceolate subacute, heads $\frac{1}{2}$ in. diam. broadly hemispheric shortly pedicelled nodding forming a simple terminal secund stout leafless raceme, invol. bracts numerous obovate tomentose with broad brown scarious margins, receptacle broad, corolla densely villous.

WESTERN TIBET; Manasarowar Lake, alt. 15,000 ft., *Strach. & Winterb.*; Lanak Pass and Valley above Pughu, alt. 15–17,000 ft., *Thomson*; Rupchu, *Heyde*.

A very remarkable species, with the heads of a *Tanacetum*, but racemed like the Abrotanoid *Absinthia*. *Root* woody, a foot long; rootstock of numerous short branches as thick as the finger, clothed with sheathing bases of old petioles. *Achenes* $\frac{1}{2}$ in. long, cuneiform, compressed, unlike those of most *Artemisia*.

SECT. IV. **Absinthium**. *Heads* heterogamous; ray-fl. ♀, disk-fl. ♂, both fertile; receptacle covered with long hairs.

Perennials.

24. **A. Absinthium**, *Linn.*; *Boiss. Fl. Orient.* iii. 373; perennial, hoary-pubescent, stems erect angular and ribbed, leaves ovate or obovate unequally 2–3-pinnatifidly cut into spreading linear or lanceolate obtuse segments hoary on both surfaces, radical and lower cauline narrowed into winged petioles, heads $\frac{1}{4}$ – $\frac{1}{4}$ in. diam. pedicelled hemispheric in drooping secund racemes terminating the branches, outer invol. bracts oblong hoary narrowly scarious, inner orbicular broadly scarious, receptacular hairs long straight. *DC. Prodr.* vi. 125. *Clarke Comp. Ind.* 104; *Reichb. Ic. Fl. Germ.* t. 1029. *Absinthium vulgare*, *Gærtn. Fruct.* ii. t. 164.

KASHMIR; alt. 5–7000 ft., *Thomson, Falconer, &c.*—DISTRIB. N. Asia, Afghanistan and westward to the Atlantic.

Very aromatic, almost silkily hoary, stem 1–3 ft. *Leaves* 1–2 in. *Heads* numerous, but hardly crowded; fl. yellow; ray-corolla dilated below; anthers acuminate (not aristate). *Achenes* elliptic-oblong or somewhat obovoid, $\frac{1}{24}$ in. long.

25. **A. minor**, *Jacquem. in DC. Prodr.* vi. 124; dwarf, silkily tomentose, densely tufted, stems very many short stout ascending from a stout woody root-stock sheathed with scarious dry petiole-bases below and clothed with imbricating leaves above, a few elongating simple and flowering, leaves small densely imbricate and sessile on the flowerless stems flabellately 2-pinnatifid sessile or petioled on the flowering stem uppermost pinnatifid, heads $\frac{1}{2}$ in. diam. bracteate hemispheric subsessile subsecund solitary or spicate, invol. bracts tomentose with broad coloured scarious margins, receptacular hairs long. *A. tibetica*, *Herb. Ind. Or. H. f. & T.* *A. Sieversiana*, *var. tibetica*, *Clarke Comp. Ind.* 165.

WESTERN TIBET, alt. 15–18,000 ft., *Jacquemont, Thomson.* EASTERN TIBET, N. of Sikim, alt. 18,000 ft., *J. D. H.*

A strongly scented, densely tufted, dwarf species of the loftiest and driest regions, with a woody root of probably great age giving off many tufts of short leafy branches, of which few elongate and flower. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., grey; petiole when present, rather stout. *Heads* rarely more than 6, subtended by a leaf or bract that is linear or ovate, entire or lobed, or sometimes reduced to one of the involucre series; corollas with pubescent lobes; anthers acuminate.

** *Annuals or biennials.*

26. **A. Sieversiana**, *Willd.; Ledeb. Fl. Ross.* ii. 599; annual or biennial, hoary-pubescent, stem erect angled and ribbed simple or paniculately branched above, leaves mostly petioled broadly ovate 2-pinnatisect segments obtuse and obscurely lobed hoary on both surfaces, heads $\frac{1}{4}$ to nearly $\frac{1}{2}$ in. diam. broadly hemispheric pedicelled secund nodding distant in lax long racemes terminating the branches, outer invol. bracts green hoary, inner broadly scarious, receptacular hairs long straight. *Clarke Comp. Ind.* 165; *excl. var. β* ; *DC. Prodr.* vi. 126.

WESTERN HIMALAYA; from Kashmir to Lahul, alt. 8–10,000 ft. WESTERN TIBET, alt. 12–14,000 ft., *Falconer, &c.*—DISTRIB. From China, westward to S. Russia.

Very similar in many respects to *A. Absinthium*, but annual (in the Indian specimens) with much larger heads, distant on the long lax racemes, and the anthers are aristate.—Ledebour describes the receptacle as sometimes nearly glabrous, in which case the *A. pallida* could be hardly distinguished from it.

27. **A. macrocephala**, *Jacquem.*; *DC. Prodr.* vi. 125; annual, dwarf, hoary-tomentose, branches many ascending from the root simple or sparingly divided, leaves ovate 2-pinnatisect, segments linear obtuse or subacute hoary on both surfaces, lower stoutly petioled, heads $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. broadly hemispheric shortly pedicelled secund nodding distantly racemed at the end of the branches, outer invol. bracts green linear tomentose, inner oblong broadly scarious, receptacular hairs long straight. *A. Griffithiana*, *Boiss. Fl. Orient.* iii. 376.

KUNAWUR and WESTERN TIBET; alt. 12–16,000 ft., *Jacquemont, Thomson.* Manasarowar Lake, alt. 15,500 ft., *Strach. & Winterb.*—DISTRIB. Afghanistan, Central Asia.

Stem rather stout for the size of the plant, 4–8 in. long, often decumbent at the base; branches spreading in a circle from the root, simple, rarely suberect and again branched. *Leaves* about $\frac{1}{2}$ in. long, mostly sessile. *Heads* yellow; invol. bracts numerous; corollas often with hairy lobes; anthers acuminate.

DOUBTFUL SPECIES.

A. (Abrotanum) ROYLEANA, *DC. Prodr.* vi. 115; “herbaceous, strict, wholly glabrous, cauline leaves pinnatifid from the base, pinnae pairs 7 or 9, lobes broadly linear acute entire, branches of the panicle erect, heads racemed secund subglobose subcarnuous, invol. bracts ovate subrotund margins scarious.—A most distinct species, leaf-lobes 10 by $1\frac{1}{2}$ lines.”—N.W. India, *Royle*. I cannot identify this.

A. (Abrotanum) PALLENS, *Wall. Cat.* 3302; a very obscure plant, procured from the Madras missionaries by Wallich, and called *A. absinthii*, by Heyne; it resembles

A. Absinthium, but the root is clearly annual and the receptacle is glabrous; the specimens are very poor and also resemble *A. Sieversiana*; it is properly a garden plant.

A. LEPTOPHYLLA, *Don Prodr.* 182; *DC. Prodr.* vi. 126; "silky, leaves bipinnate linear-subulate acute rarely divided, stem ascending simple leafy, flowers unknown."—"Alpine region of Nipal, Wallich; very near *A. pontica*."—It is impossible to recognise this by the description.

A. Gmelini, var. δ , *Jacquemontiana*, and var. ξ , *Cashmyrica*, Bess. Monog. Abrot. Suppl. 40 & 41; *DC. Prodr.* vi. 107, may be forms of *vulgaris*, *vestita*, or *Roxburghiana*.

A. MOLLISSIMA, *Don Prodr.* 182; *DC. Prodr.* vi. 125; "wholly clothed with white wool, stem erect simple a span high angled, leaves 2 in. spreading elegantly sub-3-pinnate leaflets linear-lanceolate flat quite entire mucronate, heads axillary sessile woolly, invol. bracts linear mucronate.—*Sirinagur*."—This is undeterminable.

A. KOHATICA, *Klatt in Sitzung. Münch. Akad.* 1878, 91. The meagre description does not even state to what section of the genus this plant belongs.

TRIBE VII.—SENECIONIDÆ.

73. TUSSILAGO, L.

A white, woolly, scapigerous herb, with a perennial stoloniferous root-stock. *Leaves* all radical, coming after the flowers, orbicular-cordate, toothed. *Heads* solitary, heterogamous, radiate, yellow; ray-fl. \varnothing ∞ -seriate, fertile, ligule narrow spreading; disk-fl. \varnothing , sterile, tubular, limb elongate 5-fid. *Involucre* campanulate or cylindric; bracts 1-seriate, equal, with a few very small outer ones; receptacle flat, naked. *Anther-bases* entire or subauricled. *Style-arms* of \varnothing entire, obtuse. *Achenes* of \varnothing linear, 5-10-ribbed, with slender rough pappus-hairs; of \varnothing slender, empty, pappus scanty.

1. **T. Farfara**, *Linn.*; *Boiss. Fl. Orient.* iii. 377; *DC. Prodr.* vi. 208; *Clarke Comp. Ind.* 166. *T. rupestris*, *Wall. Cat.* 2990.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 6-11,000 ft., *Blinkworth*, &c.—*DISTRIB.* N. & W. Asia, N. Africa, Europe.

Leaves long petioled, 3-10 in. broad, cobwebby above, white-tomentose beneath. *Scapes* 1 or more, 4-10 in., tomentose, scaly. *Head* 1-1½ in. diam., bright yellow, drooping in bud. *Pappus* soft, snow-white.

74. CREMANTHODIUM, Benth.

Perennial scapigerous herbs. *Leaves* chiefly radical, cordate or reniform, toothed, rarely pinnatifid. *Heads* solitary on a leafless or 1-2-leaved or bracteate scape, always nodding or deflexed, heterogamous, radiate, yellow or pale pink; ray-fl. \varnothing , 1-seriate, fertile, ligule large spreading 2-4-toothed; disk-fl. \varnothing , fertile, tubular, limb cylindric 5-fid. *Involucre* campanulate or hemispheric, bracts 1-seriate, membranous; receptacle flat, naked, pitted. *Anther-bases* subentire. *Style-arms* short or long, flattened, obtuse or acute. *Achenes* angled, 5-10-striate, glabrous; pappus-hairs copious, white or reddish, slender, rough or barbellate.—*DISTRIB.* Species 8, all Himalayan.

This genus is hardly distinguishable from *Senecio*, § *Ligularia*. The species are probably unduly multiplied, but more specimens are required to determine their limits; the involucre bracts vary much in most, in number, length, breadth, and in being glabrous or pubescent; all the species are nearly glabrous with black or brown pubescence at the top of the scape and base of the involucre. The style-arms differ much in the various species. The bracts are as in *Senecio*, § *Ligularia*, 1-seriate, but overlap in two series; the heads are ecalyculate in all.

* *Nerves of leaf radiating from the petiole.*

1. **C. reniforme**, *Benth. in Hook. Ic. Pl.* t. 1141; nearly glabrous, 12-18 in. high, leaves long-petioled reniform or orbicular sinuate-toothed

glabrous palmately nerved, head 3 in. diam., invol. bracts oblong-lanceolate acuminate, ligules broad entire or minutely toothed yellow, achenes cuneate, pappus white. *Clarke Comp. Ind.* 167; *Ligularia reniformis*, *DC. Prodr.* vi. 315. *Senecio reniformis*, *Wall. Cat.* 3141.

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich*, Sikkim, alt. 10–15,000 ft., *J. D. H.*

Slender. *Radical leaves* few; petiole 6–12 in., very slender; blade 2–4 in. diam., sometimes pubescent beneath, sinus broad and rounded or narrow and acute, cauline solitary; petiole with an inflated amplexicaul sheath. *Scape* sparsely hairy with black hairs towards the tip. *Invol. bracts* 1 in. long, sparingly hairy; ligules sometimes 1 in. long and $\frac{1}{2}$ broad, tip entire or toothed, disk brown. *Style-arms* long, flexuous, slender, acuminate. *Achenes* $\frac{1}{2}$ in. long; pappus-hairs minutely scabrid.

2. **C. Decaisnei**, *Clarke Comp. Ind.* 168; more or less pubescent, 6–10 in. high, leaves chiefly radical reniform coriaceous crenate glabrous or with white appressed tomentum beneath, petiole stout, heads $1\frac{1}{2}$ –2 $\frac{1}{2}$ in. diam., ligules broad 3-toothed yellow, achenes slender, pappus white. *Ligularia*, n. 7, *Herb. Ind. Or. H. f. & T.*

ALPINE HIMALAYA; from Kashmir, alt. 11,000 ft., *Falconer, Jacquemont*; and Kumaon, alt. 15,000 ft., *Strach. & Winterb.*; to Sikkim, alt. 14–16,000 ft., *J. D. H.*

A shorter and more robust plant than *C. reniforme*, with smaller leaves, shorter stouter petioles, much broader oblong invol. bracts, and very narrow achenes. *Style-arms* linear, $\frac{1}{2}$ -cylindric, slightly dilated at the obtuse tip.

3. **C. Thomsoni**, *Clarke Comp. Ind.* 169; nearly glabrous, 6–8 in. high, leaves all subradical reniform broadly crenate, head 1–1 $\frac{1}{2}$ in. diam., invol. bracts acuminate, ligules broad deeply 3-fid. yellow, achenes linear-oblong, pappus reddish-brown. *Ligularia*, n. 14, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Kankola valley, alt. 13–14,000 ft., *J. D. H.*

A much smaller plant than *C. reniforme*; leaves 1–1 $\frac{1}{2}$ in. diam., more crenate than toothed; invol. bracts $\frac{1}{2}$ in., oblong-lanceolate; ligules $\frac{3}{4}$ –1 in.; style-arms linear, $\frac{1}{2}$ -cylindric, long, subacute; achenes $\frac{1}{2}$ – $\frac{3}{8}$ in.

4. **C. Hookeri**, *Clarke Comp. Ind.* 169; nearly glabrous, 6–8 in. high, leaves chiefly cauline reniform denticulate, petiole short with long narrow sheaths, heads 1 in. diam., involucre campanulate, ligules very slender yellow, achenes narrowly oblong, pappus reddish. *Ligularia*, n. 16, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Yeumtong, alt. 13–15,000 ft., *J. D. H.*

This differs from *C. Thomsoni* in the cauline leaves with shorter petioles and minute teeth, the smaller heads more campanulate; involucre with linear bracts, and 1 very slender ligules. *Style-arms* linear, $\frac{1}{2}$ -cylindric, rather long, subacute.

5. **C. palmatum**, *Benth. in Hook. Ic. Pl.* t. 1142; slender, hairy, 4–7 in. high, leaves reniform acutely palmately 5–10-lobed to near the middle, heads $1\frac{1}{2}$ –2 $\frac{1}{2}$ in. diam., ligules very broad pink 2–4-fid, achenes short, pappus white. *Clarke Comp. Ind.* 168. *Ligularia palmata*, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Kankola valley, alt. 12–14,000 ft., *J. D. H., Elwes.*

An elegant species, with very large heads for the size of the plant, and broad pale pink rays that do not stand horizontally, but are erecto-patent, giving the head, which is sharply deflexed with a narrow base to the involucre, a triangular profile. *Style*, hispid far below the arms, which are linear, $\frac{1}{2}$ -cylindric, with rounded tips. The achenes are too young to ascertain their form and size.

** *Nerves of leaf pinnate.*

6. **C. oblongatum**, *Clarke Comp. Ind.* 168, excl. var. β ; glabrous, 4–8 in. high, leaves chiefly radical orbicular or orbicular-oblong, base rounded or

reniform toothed coriaceous pinnately nerved, heads $1\frac{1}{2}$ in. diam., ligules broad 3-toothed or 5-fid, yellow, achenes slender, pappus white. *Ligularia arnicoides*, *Wall. Cat.* 3138, *in part*; *DC. Prodr.* vi. 314, *in part*.

NIPAL, *Wallich*. SIKKIM HIMALAYA, near the Tibetan frontier, alt. 12–16,000 ft., *J. D. H.*

Usually a robust species. *Leaves* 2–2 $\frac{1}{2}$ in. diam., pale beneath, with coarsely reticulated nerves; petiole stout, 1–2 in. long, not inflated at the base. *Scape* with often many oblong bracteal leaves. *Invol.* bracts glabrous or pubescent, oblong or linear-oblong; ligules $\frac{1}{2}$ – $\frac{3}{4}$ in. long. *Style-arms* very short, with dilated acute tips. *Achenes* $\frac{1}{8}$ in. long.—The alternate nerves of the leaf distinguish this from all others but *C. pinnatifidum*.

7. ***C. pinnatifidum***, *Benth. in Hook. Ic. Pl.* t. 1142; 4–6 in. high, leaves chiefly radical oblong pinnatifid, lobes oblong acute 1-toothed on the lower margin or entire, petiole short, scape naked or with 1 sheath, head $1\frac{1}{2}$ –2 in. diam., ligules broad 2–4-toothed yellow, achenes small, pappus white. *Clarke Comp. Ind.* 167. *Ligularia pinnatifida*, *Herb. Ind. Or. Hook. f. & T.*

SIKKIM HIMALAYA; Kankola valley, Lachoong, and Yeumtong, alt. 13–15,000 ft., *J. D. H., Elwes*.

A very elegant species, remarkable for the pinnatifid leaves, almost naked scape, and large deflexed head with the ligules suberect as in *C. palmatum*. The invol. bracts vary greatly in number, length, and breadth. *Style-arms* rather short, semi-cylindric, subacute.

75. **DORONICUM**, *Linn.*

Perennial herbs. *Leaves* alternate, radical long-petioled; cauline distant, often amplexicaul. *Heads* large, long-peduncled, heterogamous, radiate, yellow; ray-fl. ♀, 1-seriate, fertile, ligule elongate entire or 2–3-toothed; disk-fl. ♂, fertile, tubular, limb 5-fid. *Involucre* broadly campanulate or hemispheric; bracts 2-seriate, subequal, herbaceous, acuminate; receptacle hemispheric, naked. *Anther-bases* entire or subauricled. *Style-arms* of ♀ linear, tip rounded or truncate and penicillate. *Achenes* of ♀ oblong-turbinate, 10–∞-ribbed; pappus hairs copious, short or long, rigid; of ♀ (rarely of all) often 0.—*DISTRIB.* Species about 10, temperate Europe and Asia.

1. ***D. Roylei***, *DC. Prodr.* vi. 321; corymbosely branched above, sparsely hairy or villous, leaves broadly ovate sinuate-toothed, radical long-petioled, upper cauline amplexicaul, heads many glandular-pubescent base turbinate, achenes of the ray epappose, of the disk pappose. *Clarke Comp. Ind.* 169. *Fullaronia kumaonensis*, *DC. l. c.* v. 281.

WESTERN HIMALAYA; from Kashmir, *Royle*, *Falconer*, to Garwhal, alt. 10,000 ft., *Strach. & Winterb.*

Herbaceous, erect, 2–4 ft. high. *Leaves* 4–5 in. long, base acute rounded or cordate; petiole 4–6 in. *Heads* few or numerous, 1–2 in. diam., on slender peduncles that swell at the tip, forming a turbinate base to the head; invol. bracts $\frac{1}{2}$ – $\frac{3}{4}$ in. long, finely acuminate; ligules nearly as long. *Achenes* deeply grooved, all glabrous, or the outer sparsely hairy; pappus short, reddish.—Very closely allied to *D. Pardalianches*, *L.*, of Europe.

VAR. epapposa; heads smaller, pappus 0.—Kashmir, *Falconer*. Possibly a distinct species, but the specimens are very imperfect, the achenes are rather more cylindric, and the ribs more regular.

2. ***D. Hookeri***, *Clarke mss.*; stem subsimple sparsely softly villous, leaves all narrowed into short $\frac{1}{2}$ -amplexicaul petioles oblong or elliptic-lanceolate obtuse or acute entire or irregularly toothed, heads 1–2 glandular-pubescent base truncate, achenes all pappose. *D. scorpioides*, *Clarke Comp. Ind.* 169, *in part*.

SIKKIM HIMALAYA; Lachen and Tungu, alt. 12-14,000 ft., *J. D. H.*

A robust herb, 1-2 ft. high; radical leaves 0 or soon withering; cauline 4-6 by 1-2 in., often unequal-sided. *Heads* $2\frac{1}{2}$ in. diam.; invol. bracts ovate-lanceolate, acuminate; ligules about as long. *Achenes* (ripe not seen); pappus short, reddish.

3. **D. Falconeri**, *Clarke mss.*; stem simple puberulous or glabrate, leaves all petioled obovate or spatulate obscurely toothed, heads 1-2 glandular-villous base turbinate, achenes of the ray epappose, of the disk pappose. *D. scorpioides*, *Clarke Comp. Ind.* 169, in part.

KASHMIR, alt. 13,000 ft., *Falconer, Clarke*. WESTERN TIBET; Karakoram, alt. 14,000 ft., *Clarke*.

A stout herb, 1-1½ ft. high, stem nearly naked above. *Leaves*, including the petiole, 5-6 in. long, variable in breadth. *Heads* 2-3 in. diam.; invol. bracts linear-lanceolate; ligules very numerous, longer than the bracts. *Achenes* very immature; pappus short.

76. **GYŃURA**, *Cass.*

Succulent herbs, rarely undershrubs, glabrous or hispid. *Leaves* alternate, entire toothed or pinnatisect. *Heads* solitary or corymbose, bracteolate at the base, homogamous, disciform, yellow or purplish; fl. all ♀, fertile, tubular, with rarely a few more slender outer ♀ ones, limb 5-toothed. *Involucre* cylindric or subcampanulate; bracts 10-12, 1-seriate, narrow, equal, margins scarious; receptacle flat, pitted or shortly fimbriate. *Anther-bases* entire or subauricled. *Style-arms* slender; tips long, subulate, hispid. *Achenes* narrow, many-ribbed; pappus hairs copious, ∞-seriate, slender, white.—DISTRIB. Species about 20, warm regions of Asia, Africa, and Australia.

The species of this genus are much confused in De Candolle's *Prodromus*, and there are probably fewer in India than are here described.

* *Stem erect.*

1. **G. nitida**, *DC. in Wight Contrib.* 24; *Prodr.* vi. 299; glabrous except the puberulous pedicels, stem robust branched below, branches simple, leaves crowded towards the bases of the branches obovate or oblanceolate acute or obtuse succulent remotely serrate, base narrowed auricled or not, uppermost sessile, heads with fleshy turbinate pubescent bases, invol. bracts glabrous, achenes hispid. *Wight Ic.* t. 1121; *Clarke Comp. Ind.* 171. *G. simplex*, *Dalz. & Gibs. Bomb. Fl.* 130. *Cacalia incana*, *Heyne in Wall. Cat.* 3158.

NILGHERRY and PULNEY Mts., *Wight, &c.*

There are two forms of this in Wight's Herbarium, one a very robust plant from the Nilgherry mountains, with a long stout stem and broadly oblong auricled upper cauline leaves (as figured in Wight's *Icones*); the other has short branches, with narrow, more petioled leaves; both have hispid achenes. The former of these closely resembles in habit *G. angulosa*, and the latter *G. pseudo-china*.

2. **G. nepalensis**, *DC. Prodr.* vi. 300; tall, shrubby below and corymbosely branched above, hoarily pubescent or subtomentose, leafy, leaves obovate oblong or lanceolate the lower narrowed into a petiole entire sinuate-toothed or base subpinnatifid, heads many, invol. bracts hoary-villous, achenes glabrous or sparsely pubescent. *Clarke Comp. Ind.* 171. *G. foetens*, *DC. l. c.* *Cacalia aurantiaca* and *foetens*, *Wall. Cat.* 3146, 3156. *C. flava*, *Herb. Ham.*

TEMPERATE HIMALAYA; from Kumaon to Bhotan, alt. 2-5000 ft. MARTABAN; mountains near Moulmein, alt. 4-5000 ft., *Parish*. AYA, *Wallich*.—DISTRIB. JAVA?

A tall handsome species; stem below as thick as the little finger. *Leaves* 3-7 in., acuminate, usually irregularly coarsely toothed, hoary-pubescent on both surfaces. *Corymbs* often large and broad; heads $\frac{3}{4}$ -1 in. long.—The Javanese *G. aurantiaca* hardly differs from this, but its hairs are not white.

3. *G. lycopersicifolia*, *DC. Prodr.* vi. 300; glabrous or hoary-pubescent, stem simple erect, leaves irregularly deeply laciniately pinnatifid or lyrate, base auricled, lobes or segments very various obtuse or acute entire or toothed, invol. bracts glabrous, achenes deeply furrowed hispid. *Clarke Comp. Ind.* 172. *Cacalia laciniata*, *Wall. Cat.* 3153. *C. pinnatifida*, *Pers.*; *Herb. Wight*.

SOUTHERN MAISOR; Dindygul hills and Courtallam, *Heyne, Wight*. CEYLON, abundant up to 5000 ft., *Walker, Thwaites*, &c.

Stem 6 in. to 2 ft., erect. *Leaves* 3–5 in.; terminal lobe ovate-oblong or subcordate, or narrow and lobed; lateral spreading, sometimes reduced to auricles on the rachis or petiole, at others 1–2 in. long and spreading, sometimes hoary with white hispid pubescence; basal auricles large, small or 0. *Heads* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, usually rather numerous and panicle, —I have seen no specimen of *Clarke's* var. β *Andersoni* from Upper Birma, which is beyond British India.

4. *G. angulosa*, *DC. Prodr.* vi. 298; robust, quite glabrous, corymbosely branched; leaves large sessile obovate oblanceolate or oblong acuminate irregularly toothed, base contracted simple or auricled, upper oblong sessile with broad auricled bases, heads many large, peduncles invol. bracts and achenes quite glabrous or papillose between the ribs. *Clarke Comp. Ind.* 170. *G. simplex*, *Dalz. & Gibs. Bomb. Fl.* 130. *Cacalia angulosa*, *Wall. Cat.* 3152. *C. Cusimbua*, *Don Prodr.* 179. *Kleinia Cusimbua*, *Less. in Linnæa*, 1831, 133. *Porophyllum Cusimbua*, *DC. l. c. v.* 650.

TEMPERATE HIMALAYA; from Garwhal to Mishmi, alt. 4–7000 ft. KHASIA Mts., alt. 4–6000 ft. Hills of the CONCAN and DECCAN; Jooner and Belgaum jungles, *Stocks, Ritchie*. MARTABAN; hills near Moulmein, *Parish*.

Stem 3–10 ft. and upwards, as thick as the little finger below. *Leaves* 6–12 in., the basal sometimes 2 ft. long. *Heads* $\frac{3}{4}$ –1 in. long.—Don describes the leaves as pubescent beneath. Lessing as glabrous, which they are in all specimens I have seen except in a young and a doubtful specimen from Mishmi (Griffith), in which they are puberulous on both surfaces; but as Griffith notes his plant to be subsucculent, it may be a different species. The Sikkim people have a native name for this plant much resembling that which Don gives it of *Cusimbua*, and I have no hesitation in referring his plant to *angulosa*. In the Bombay Flora *G. simplex* is described as having a tall erect unbranched stem, but the specimens from the Concan are branched corymbosely above, as in the Nipal state.

VAR. *petiolata*; leaves elliptic-lanceolate less toothed distinctly petioled.—Sikkim and Khasia Mts.

5. *G. Pseudo-china*, *DC. Prodr.* vi. 299; glabrous or pubescent, stem very short, leaves all subradical obovate narrowed into the petiole sinuate- or subpinnatifidly lobed, scapes long nearly leafless, heads few, invol. bracts and achenes glabrous or sparsely villous. *G. sinuata*, *DC. l. c.* 301; *Clarke Comp. Ind.* 173; *Kurz in Journ. As. Soc.* 1877, ii. 194. *G. nudicaulis*, *Arn. Pugill.* 33; *DC. l. c.* 301. *Cacalia bicolor* β , *Wall. Cat.* 3148. *O. sagittaria*, *Heyne in Wall. Cat.* 3159. *C. bulbosa*, *Lour. Fl. Coch.* 485.—*Dill. Hort. Elth.* 345, t. 258.

MADRAS PRESIDENCY (Dillenius); Courtallam, *Wight*. SIKKIM HIMALAYA, alt. 2–4000 ft., *J. D. H., Clarke*. PEGU and MARTABAN, *Kurz*. CEYLON; at Galagama, alt. 3000 ft., *Thwaites*.—DISTRIB. Java, China?

Root tuberous; stem very short. *Leaves* 2–7 in. long, very variable in form. *Heads* $\frac{1}{2}$ – $\frac{3}{4}$ in. long.—This I think must be the “*Pseudo-china*” of Dillenius, of which that author gives an excellent figure from a plant cultivated in his garden at Eltham. and which he states was a native of the Madras Presidency. It may well be doubted if this is anything more than a state of a common Eastern plant represented by *G. angulosa* in the Himalaya, and *nitida* in the Deccan. *Kurz* remarks of it that when young it looks scapigerous and has smaller and simpler leaves, but that as the tuberous roots enlarge it grows more robust and large, and branches from the base, with leaves

7 in. long. *G. nudicaulis* is a very small state of the plant. For remarks on the *Pseudo-china* of authors, see end of the genus under *G. hieracioides*.

VAR. *hispida*, Thwaites Enum. 166; hispidly pubescent, stem simple or sparingly branched leafy below, leaves obovate-lanceolate sinuate-toothed lower narrowed into a petiole, invol. bracts sparsely villous or glabrate, achenes glabrous. *G. hispida*, Thwaites Enum. 166; Clarke Comp. Ind. 172.—Ceylon; central province, on damp rocks, alt. 5-7000 ft., Thwaites. Stem 1-3 ft. Leaves 2-6 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in.; heads 3-6, long-peduncled; bracteoles many; flowers orange-yellow.—The only specimen I have seen is very poor, and adds nothing to the character given by Thwaites, who observes that it is very closely allied to *G. aurantiaca*, and that it is perhaps a form of *G. sinuata* (that is, of *Pseudo-china*).

6. *G. bicolor*, DC. Prodr. vi. 299; glabrous, erect, stem branched, leaves obovate or oblanceolate narrowed into a winged petiole toothed or runcinately pinnatifid, lobes or teeth acute, cauline sessile deeply auricled, heads many, base very narrow, peduncles with scattered filiform bracteoles, invol. bracts quite glabrous, achenes (immature) glabrous. *Cacalia bicolor*, Roxb. Fl. Ind. iii. 412; Salisb. Hort. Parad. t. 25; Bot. Reg. t. 110.

MALACCA, Griffith.—DISTRIB. Moluccas.

Apparently shrubby at the base, 1-2 ft. high, rather slender, with a few scattered hairs at the base of the leaves and stem. Leaves 2-4 in. long, bases not auricled, teeth or lobes always recurved, entire or sparingly toothed. Heads $\frac{3}{4}$ in. long; base of involucre very narrow.—I have seen no authentic specimen of *G. bicolor*.

** *Stem climbing*.

7. *G. sarmentosa*, DC. Prodr. vi. 298; glabrous except the puberulous peduncles, climbing, leaves petioled or the uppermost sessile ovate elliptic or lanceolate acute or acuminate subentire or sinuate-toothed, heads narrow, invol. bracts glabrous, achenes glabrous. *G. Finlaysoniana*, DC. l. c. 299; Deless. Ic. Sel. iv. t. 55. *Cacalia cylindriflora*, reclinata and Finlaysoniana, Wall. Cat. 3150, 3151, 3152. *Sonchus volubilis*, Rumph. Herb. Amb. v. t. 103, f. 2.

MALACCA and PENANG, Wallich, &c.—DISTRIB. Siam, Java, Philippine Islands.

Stem and branches loosely twining, petioles and pedicels slender. Leaves 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in.; nerves obscure. Heads paniced; bracteoles few, small; invol. bracts $\frac{1}{2}$ in. and under. Achenes $\frac{1}{2}$ in., ribs very close and slender.

DOUBTFUL AND EXCLUDED SPECIES.

G. AURICULATA, Cass. Opusc. Phyt. iii. 100; DC. Prodr. vi. 300. (*Cacalia hieracioides*) Roxb. Hort. Beng. 61; Wall. Cat. 3154. *Gynura Pseudo-china*, Benth. Fl. Hongk. 299, not of DC., nor of Benth. Fl. Austral. *G. auriculata* and *glabrata*, Clarke Comp. Ind. 172).—This is a Chinese plant, cultivated in Calcutta and the Mauritius Bot. Gardens, distinguishable (at once in the glabrous forms and after maceration in the pubescent ones) from all Indian species by the fine elongated reticulation of the nerves of the leaf. Whether it is Willdenow's *Cacalia hieracioides* is doubtful. Of Clarke's *G. auriculata*, β *puberula*, and γ *villosa* I know nothing.

G. PURPURASCENS, DC. Prodr. vi. 299; Deless. Ic. Sel. iv. t. 56 (*Cacalia purpurascens*, Wall. Cat. 3157); this is founded on a plant cultivated in the Calcutta Gardens, and said to have been introduced from Nipal; it is not, however, in Wallich's Herbarium, and is, judging from the description, probably *G. bicolor*.

77. EMILIA. Cass.

Annual or perennial herbs, often glaucous, glabrous or hairy. Leaves, radical crowded, petioled, entire toothed or lyrate-pinnatifid; cauline few, stem-clasping. Heads long-peduncled, solitary or loosely corymbose, without bracteoles at the base, homogamous, discoid, yellow or red; fl. all ♀, fertile, tubular, limb elongate 5-toothed. Involucre cylindric; bracts 1-seriate, equal, free or cohering

striate; receptacle flat, naked. *Style-arms* subterete, tip short obtuse or long and acute. *Achenes* subterete or angled and 5-ribbed; pappus hairs copious, white, soft, slender.—**DISTRIB.** Species 4 or 5, Indian and tropical African.

1. ***E. sonchifolia*, DC. in Wight Contrib. 24; Prodr. vi. 302;** glabrous, scabrid or puberulous, erect or diffuse, invol. bracts about equalling the purple flowers, achenes 5-ribbed scabrid, style-arms $\frac{1}{2}$ -cylindric tip conic.

Common throughout INDIA from the Punjab to Tenasserim and CEYLON, ascending to 4000 ft. in the hills (no specimen seen from the Malay Peninsula).—**DISTRIB.** Asia, Africa (America, introduced?).

A very variable weed, 4–10 in. high.

VAR. 1. *sonchifolia proper*; lower leaves lyrate-pinnatifid or sinuate-toothed puberulous or glabrous, flowering branches leafy. *E. sonchifolia*, DC. in Wight Contrib. 24; Prodr. vi. 302. *E. sonchifolia*, vars. α and β , Clarke Comp. Ind. 174. *Cacalia sonchifolia*, Linn.; Roxb. Fl. Ind. iii. 413; Don Prodr. 180; Wall. Cat. 3144. *C. glabra*, Heyne in Wall. Cat. 3145. *Gynura ecalyculata*, DC. l.c. 298. *Prenanthes sarmatosa*, Wall. Cat. 3262, E.; Rheed. Hort. Mal. x. t. 68.—Common in most parts of India, ascending to 4000 ft. in the hills.

VAR. 2. *scabra*; leaves all radical scaberulous, flowering stems naked. *E. scabra*, DC. Prodr. vi. 303; Wight Ic. t. 1123.—The Deccan and Khasia Mts.

VAR. 3. *mucronata*, Clarke Comp. Ind. 175; lower leaves elliptic acute at both ends upper sessile, base auricled. *E. mucronata*, Wall. Cat. 316.

2. ***E. flammea*, Cass. in Dict. Sc. Nat. xiv. 406, t. 5; Opusc. Phyt. 1, t. 5;** erect, glabrous or scabrid, lower leaves petioled obovate or subspathulate entire or toothed, upper large oblong or ovate-oblong deeply sagittately auricled, invol. bracts much shorter than the scarlet flowers, achenes 5-ribbed scabrid, style-arms $\frac{1}{2}$ -cylindric tip conic. *E. sagittata*, DC. Prodr. vi. 302; Dalz. & Gibs. Bomb. Fl. Suppl. 46. *E. sonchifolia*, var. *sagittata*, Clarke Comp. Ind. 175 (*excl. habitat*). *Cacalia sagittata*, Vahl Symb. iii. 91. *Cacalia mucronata*, Heyne in Wall. Cat. 3161. *C. coccinea*, Bot. Mag. t. 564.

The CONCAN, *Stocks* (indigenous?).—**DISTRIB.** Philippine Islands (DC.).

This approaches the larger form of *E. sonchifolia*, but the lower leaves seem to be always entire, and the scarlet heads are broader. The Concan specimens are very glaucous. I suspect that this very commonly cultivated plant is not a native of India.

3. ***E. prenanthoidea*, DC. Prodr. vi. 303;** erect, glabrous, rarely scabrid, slender, lowest leaves small ovate petioled or 0, all or upper sessile linear-oblong obtuse or acute nearly entire deeply sagittately or broadly auricled at the base, invol. bracts shorter than the scarlet flowers, style-arms dilated at the tip, achenes glabrous. Clarke Comp. Ind. 176. *E. angustifolia*, DC. l.c. *Cacalia angustifolia and teres*, Wall. Cat. 3163, 3164.

SIKKIM HIMALAYA, alt. 2000 ft., J. D. H. KHASIA MTS., alt. 2–4000 ft.; common.—**DISTRIB.** Upper Birma.

A very slender species, 1–3 ft. high, with much the habit of *E. flammea*, but with few or 0 radical leaves, and with glabrous achenes. I have seen but two specimens of the scabrid form; they were found by Dr. Thomson and myself near the Ongot river in Khasia.

4. ***E. zeylanica*, Clarke Comp. Ind. 175;** erect, glabrous or leaves pubescent, slender, lowest leaves small petioled or 0, cauline sessile narrowly linear-oblong obtuse or acute entire base deeply sagittately or broadly auricled, invol. bracts shorter than the flowers, style-arms slender tips conic, achenes scabrid. *E. prenanthoidea*, Thwaites Enum. 167, in part.

CEYLON; Central Province, alt. 6–8000 ft., Thwaites.

This very closely resembles *E. prenanthoidea* in all but the achenes and style-arms.

Thwaites describes the flowers as purple, but as he does not distinguish the following, I have not taken that character into account.

5. **E. Walkeri**, *Hook. f.*; erect, robust, quite glabrous, cauline leaves many large upper half deltoid or ovate suddenly contracted into a broad linear oblong lower half entire or sinuate-toothed, base deeply broadly auricled, heads broad, invol. bracts shorter than the flowers, style-arms dilated towards the short conic tips, achenes scabrid. *E. prenanthoidea*, *Thwaites Enum.* 167, in *part.*

CEYLON; Central Province, Ramboddie and Newera Ellia, *Walker, Thwaites, &c.*

This is a much larger plant than any of the preceding, with a stout polished often flexuous leafy stem, and branches 2-3 ft. high, leathery leaves, and the heads and invol. bracts broader; the achenes too are much larger than in *E. zeylanica*.

78. NOTONIA, DC.

Fleshy glabrous undershrubs. *Leaves* alternate, obovate or lanceolate, quite entire or crenulate. *Heads* large, long-peduncled, corymbose, bracteolate or not, homogamous, discoid, yellow; flowers ♀, all fertile, slender, limb elongate 5-fid. *Involucre* cylindric; bracts 1-seriate, equal; receptacle flat, naked. *Anther-bases* entire. *Style-arms* elongate; tips short, ovate, thick, papillose or hispid. *Achenes* long, subterete, 10-striate; pappus hairs copious, slender.—*DISTRIB.* Species 4 or 5, all Indian.

1. **N. grandiflora**, *DC. in Wight Contrib.* 24; *Prodr.* vi. 442; branches short very stout, leaves obovate elliptic-lanceolate or suborbicular quite entire very fleshy, heads $\frac{3}{4}$ -1 in. long, achenes glabrous, pappus hairs very slender terete. *Deless. Ic. Sel.* iv. t. 61; *Dalz. & Gibs. Bomb. Fl.* 132; *Clarke Comp. Ind.* 176. *N. corymbosa*, *DC. l. c.*; *Wight Ic.* t. 484. *N. crassissima*, *Schultz-Bip. in Pl. Hohenack.* n. 1027, not of *DC.* *Cacalia grandiflora*, *Wall. Cat.* 3147; *C. Kleinia*, *Herb. Madras.*

Hilly districts of the WESTERN PENINSULA; from the Concan southwards. CEYLON; in the Batticaloa district.

A small shrub, 2-3 ft. high, very fleshy. *Leaves* 3-5 by 1-3 in., subsessile or petioled. *Flowering peduncles* 6-12 in. long, stout, strict, naked; corymb of few or many heads, which are $\frac{3}{4}$ -1 in. long. *Achenes* $\frac{1}{4}$ in. long.—I cannot distinguish *N. corymbosa* from *grandiflora* by any characters.

2. **N. balsamica**, *Dalz. & Gibs. Bomb. Fl.* 133; branches short very stout, leaves oblong ovate-oblong or oblanceolate quite entire, heads $\frac{3}{4}$ -1 in. long, achenes glabrous, pappus hairs stiff flattened. *Cacalia Kleinia*, *Grah. Cat. Bomb. Pl.* 98, not of *Sprengel*.

The CONCAN and DECCAN; in the inland ghats rare, *Graham, Dalzell, &c.*

Very similar to *N. grandiflora*, but at once distinguishable by the pappus. *Dalzell*, in the Bombay Flora, refers *Graham's Cacalia Kleinia* to *N. grandiflora*, but in *Wight's Herbarium* there is a specimen of *balsamica* from *Graham* with the name attached to it by himself.

3. **N. Walkeri**, *Clarke Comp. Ind.* 176; branches long, leaves long-petioled elliptic-lanceolate acuminate quite entire or crenulate or gland-serrulate, heads $\frac{1}{2}$ in. long in very large compound corymbs, achenes sparsely hairy, pappus hairs very slender terete. *Gynura Walkeri*, *Wight Ic.* t. 1122. *Senecio Walkeri*, *Thwaites Enum.* 167. *S. nilagereensis*, *Schultz-Bip. Pl. Hohenack.* n. 1353.

NILGHERRY MTS.; in woods, alt. 7-8000 ft., *Wight*. CEYLON; Central Province, alt. 7-8000 ft., *Walker, &c.*

Shrubby, 6-7 ft.; stems naked below, often 1 in. diam. *Leaves* 4-7 by 1-1 $\frac{1}{2}$ in., not so fleshy as in the preceding species; petiole 1-2 in. *Pedicels* with usually many

small bracts.—This has more the habit of a *Senecio* than of a *Notonia*, but the styles are characteristic of the latter genus. Thwaites describes the flowers as pale yellow in Ceylon, and Wight as white in the Nilgherries.

DOUBTFUL SPECIES.

N. CRASSISSIMA, DC. *Prodr.* vi. 442; *Kurz in Journ. As. Soc.* 1877, ii. 194 (*Cacalia crassissima*, Wall. *Cat.* 3155); Wallich's specimen of this (from the Segaeen hills, Ava) has no flowers, and the branches and leaves do not differ from those of *N. grandiflora*. Kurz, who keeps it up, gives Wallich's habitat, and quotes Griffith's *Ic. Pl. Asiat.* t. 470, as the same plant; but that figure is utterly unlike any known plant. So many Deccan plants are Avan, that this is probably *N. grandiflora*.

79. *SENECIO*, Linn.

Herbs, undershrubs or shrubs. *Leaves* radical or alternate, entire or variously divided. *Heads* solitary corymbose or racemose, heterogamous (rarely homogamous) usually yellow; ray-fl. ♀, fertile, ligulate (or 0); disk-fl. ♀, fertile, tubular, 5-fid. *Involucre* various, bracts 1 or sub-2-seriate, equal, erect, free or connate at the base, with few or many very short outer ones (heads bracteolate); receptacle flat or convex, naked, pitted or fimbriate. *Anther-bases* obtuse, or auricled, or minutely tailed. *Style-arms* of ♀ recurved, tips truncate and penicillate, rarely rounded or with a short narrow point. *Achenes* subterete or outer dorsally compressed, 5–10-ribbed; pappus-hairs copious or sparse, soft, white, smooth, scabrid or barbellate.—*DISTRIB.* About 900 species, chiefly in temperate climates and mountains of the tropics.

I have refrained from regarding various Indian species of the section *Jacobæa* as forms or varieties of North Asiatic and European, the limits of these being so badly defined that a study of the whole genus would be necessary to do so with confidence; of the other sections the species are certainly almost all South Asiatic. Amongst the Indian anomalous species are those of the group of *Madaractis*, hitherto referred to *Doronicum*, whose pappus is usually red and rigid; amongst these the most remarkable are *S. Grahami* with paleaceous pappus, and *S. belgaumensis* with none at all. The many-seriate, imbricating, involucre bracts of *S. lavandulæfolius* in its ordinary state are altogether unlike those of the genus, and the species is referable to *Senecio* only on the (tenable) hypothesis of the bracteoles being very numerous and appressed to the involucre bracts.

SERIES A. Anther-cells obtuse at the base, not produced downwards into tails.

SECT. I. *Jacobæa*. Erect herbs. *Heads* usually campanulate; invol. bracts 1-seriate, subequal; ligules usually conspicuous, rarely minute, 0 in 15. *dubius*. *Achenes* all pappose (except forms of 2. *chrysanthemoideis* and 5. *diversifolius*); pappus longer than the achenes, of soft white (rarely red) equal hairs.

* *Annuals* or *biennials*. *Disk-fl.* with a funnel-shaped or campanulate limb. *Leaves* broad or narrow, entire toothed or lyrate-pinnatifid.

1. ***S. graciliflorus***, DC. *Prodr.* vi. 365; glabrous, erect, stem flexuous terete or nearly so, leaves large petioled pinnatifid, lobes 6–8 pair ovate- or oblong-lanceolate acuminate coarsely unequally serrate, petiole not auricled, heads $\frac{1}{2}$ in. many narrow bracteolate 5–8-fid. in much branched corymbs or panicles, invol. bracts 5–7 linear obtuse glabrous, ligules 3–5, achenes ribbed glabrous all pappose. *Clarke Comp. Ind.* 189. *S. Royleanus*, DC. *l. c.* 367. *S. tanacetoides*, Kunth & Bouché *Ind. Sem. Hort. Berol.* 1845, 12. *Cacalia graciliflora*, Wall. *Cat.* 3149.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 8–13,000 ft.

Stem 2–6 ft., sometimes angled and grooved. *Leaves* 4–6 by 2–4 in., membranous,

petiole not auricled. *Corymb* with filiform bracts; heads erect or drooping. *Involucre* cylindric. *Achenes* ribbed, $\frac{1}{10}$ in.; pappus white.—The var. *Hookeri*, Clarke l. c., differs only in the rather broader heads with more developed ligules; var. *pubescens*, from Chumba, has hairs on the leaf-nerves beneath.

2. *S. chrysanthemoides*, DC. Prodr. vi. 365; glabrous below, pubescent above, stem erect usually much corymbosely branched, leaves glabrous rarely hoary beneath, lower lyrate-pinnatifid with an auricled petiole and large gashed terminal lobe, upper sessile broadly amplexicaul pinnatifid, the lobes often very large, auricle gashed and toothed, heads $\frac{1}{2}$ in. diam. numerous bracteolate corymbose many-fl., invol. bracts 10–12 oblong acute, ligules 8–12, achenes glabrous or puberulous all with white pappus or the ray without pappus.

TEMPERATE HIMALAYA; from KASHMIR to Sikkim, alt. 8–13,000 ft. KHASIA Mts., alt. 4–5000 ft.

The commonest *Senecio* of the Himalaya, simulating the European *S. chrysanthemifolius*, but with glabrous achenes. *Stem* 2–6 ft., robust, striate. *Leaves*, lower sometimes reduced to an ovate or oblong crenate blade, at others lyrate with a large terminal and few or many small lateral lobes, always less acutely cut than the upper, and narrowed into a long or short winged petiole; upper leaves 1–9 by $\frac{1}{2}$ –4 in., with always broadly auricled toothed bases; rarely all the leaves are lyrate-pinnatifid; terminal lobes ovate, oblong or deltoid. *Corymb* in ordinary states much branched with auricled forks and stout peduncles with filiform bracts; invol. bracts $\frac{1}{6}$ – $\frac{1}{4}$ in., thickened at the bases. *Achenes* $\frac{1}{10}$ in., strongly ribbed.

VAR. 1. *chrysanthemoides proper*; lower leaves glabrous lyrate-pinnatifid, upper sessile amplexicaul, heads many glabrescent, achenes glabrous all pappose. *S. chrysanthemoides*, DC. l. c. *S. laciniatus* and *stipulatus*, Wall. Cat. 3124, 3126. *S. lætus*, Edgew. in Trans. Linn. Soc. xx. 74. *S. Jacobæa*, Don Prodr. 179.—Common.

VAR. 2. *sisymbriiformis*; puberulous, all the leaves lyrate with a large terminal ovate toothed lobe, heads pubescent, achenes all pappose. *S. sisymbriiformis*, DC. Prodr. vi. 366; Clarke Comp. Ind. 190.—N.W. India, Royle; Kashmir, Falconer; Marri, Fleming.

VAR. 3. *spectabilis*; foliage, &c., of var. 1, but ray flowers without pappus. *S. spectabilis*, Wall. Cat. 3127, a. c.; DC. l. c.

VAR. 4. *khasiana*; foliage and heads of var. 1, but achenes puberulous, pappus of ray-fl. scanty or 0, of the disk white or reddish. *S. spectabilis*, Wall. Cat. 3127 B; Clarke Comp. Ind. 190, in part. *S. pallens*, var. *khasianus*, Clarke l. c. 192.—Khasia Mts., alt. 4–5000 ft. This unites *S. diversifolius* with *chrysanthemoides*.

VAR. 5. *analogus*; leaves smaller cobwebby beneath all lyrate-pinnatifid, heads usually smaller glabrescent or hoary, achenes all pappose.—*S. analogus*, DC. l. c. N.W. India, Royle; Kashmir, Falconer, Thomson; Marri, Fleming.

3. *S. bracteolatus*, Hook. f.; dwarf, simple, 4–6 in. high, stem above and leaves beneath tomentose, radical-leaves long petioled elliptic obtuse toothed or lobulate, cauline sessile with shorter petioles pinnatifidly lobed, heads 1–3 $\frac{3}{4}$ in. diam. many-fl., bracteoles many subulate-lanceolate half as long as and appressed to the similar purplish invol. bracts, ligules 10–12 longer than the involucre 4-nerved, achenes glabrous, pappus white. *S. alpinus*, Clarke Comp. Ind. 190, not of Scopoli.

SIKKIM HIMALAYA; alt. 15–16,000 ft., J. D. H.

I at first supposed this to be an alpine dwarf form of *S. chrysanthemoides*, but the many long bracteoles of the involucre are very different from what any form of that plant presents. I found it but once, at an early season for the lofty elevation it inhabits, and the ticket was lost with many of my specimens from that region. It is a high Alpine form, and hence specimens from other localities would show much variation from those described. It differs from *S. alpinus* notably in the bracteolate heads.

4. ***S. tibeticus***, *Hook. f.*; dwarf, simple, 4-7 in. high, stem petioles and young leaves beneath white cottony, leaves hoary, radical long-petioled oblan- ceolate lyrate-pinnatifid, terminal lobe ovate-lanceolate erose, lower lobes short variously cut, cauline leaves elongate narrow irregularly subpinnatifid base auricled, heads few $\frac{3}{4}$ in. diam. campanulate many-fl. bracteolate on long stout peduncles with scattered subulate bracts, invol. bracts linear-lanceolate acuminate cottony, ligules 16-20 revolute 4-nerved longer than the involucre, achenes (young) glabrous, pappus white.

WESTERN TIBET; Karakoram, near Ashkoley, alt. 10,700 ft., *Clarke*.

This differs from any form of *S. chrysanthemoides* in the few and much larger more campanulate heads, as well as in the habit and few long peduncles.

5. ***S. diversifolius***, *Wall. Cat.* 3127; very robust, glabrous, leaves pinnatifid or lyrate-pinnatifid with broad auricled bases and oblong gashed lobes, heads many $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. broadly campanulate or hemispheric bracteolate many-fl., invol. bracts 10-16 oblong acute, ligules 10-16, achenes glabrous, pappus of the ray-fl. 0, of the disk red. *DC. Prodr.* vi. 366; *Clarke Comp. Ind.* 191. *S. raphanifolius*, *Wall. Cat.* 3125; *DC. l. c.*

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 10-14000 ft., *J. D. H.*

Usually much stouter than *S. chrysanthemoides*, with broader heads and more flexuous, and at once distinguished by the red pappus at all ages, from all forms of that plant but var. 4.

6. ***S. nudicaulis***, *Ham. in Don Prodr.* 179; glabrous or sparsely pubescent, radical leaves often rosulate sessile or narrowed into a petiole obovate or linear- or obovate-oblong or spatulate obtuse obtusely crenate, cauline sessile linear-oblong or obovate irregularly crenate lobulate or toothed base contracted or dilated and auricled, heads many $\frac{1}{2}$ in. diam. bracteolate broadly campanulate many-fl., invol. bracts 10-14 oblong acute 3-nerved, achenes puberulous all with whitish pappus. *S. pallens*, *Wall. Cat.* 3132; *DC. Prodr.* vi. 367; *Clarke Comp. Ind.* 191, excl. var. γ . *S. violaceus and truncatus*, *Wall. Cat.* 3134, 3137; *DC. l. c.* *S. denudatus*, *Don Prodr.* 179.

TEMPERATE HIMALAYA; alt. 5-10,000 ft., from Wuzuristan, *Stewart*; to Sikkim, *J. D. H.*

The prevalent scapigerous habit and obovate more entire leaves and the 3-nerved invol. bracts distinguish this from all forms of *S. chrysanthemoides* and *diversifolius*, but it is very variable in height, from 6 in. to 3 ft., and the cauline leaves especially vary from 2-3 in. and oblong contracted at the base to 6-7 in. with very dilated auricled bases. Limb of disk-fl. campanulate.

7. ***S. obtusatus***, *Wall. Cat.* 3183; glabrous, stem or scape very slender almost naked, radical-leaves few elliptic or elliptic-lanceolate acute denticulate, cauline similar or the uppermost linear-oblong, heads few or many $\frac{1}{4}$ - $\frac{1}{2}$ in. long 20-30-fl. campanulate bracteolate in lax corymbis with long slender branches and peduncles, invol. bracts oblong acute obscurely 3-nerved, ligules 8-10, achenes papillose all with white pappus. *DC. Prodr.* vi. 367; *Clarke Comp. Ind.* 192.

KHASIA and JYNTEA Mts; alt. 4-6000 ft., *De Silva*, &c.—DISTRIB. Khakyen hills, east of Bhamo, in Birma.

A very distinct species, allied to *S. pallens*, but differing in the foliage, very slender habit, and small heads; limb of disk-fl. campanulate.

8. ***S. zeylanicus***, *DC. Prodr.* vi. 365; very slender, puberulous, leaves very long narrow linear or dilated upwards acute or obtuse margins recurved entire or obscurely toothed, cauline few distant linear, heads very few often $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. many fl. bracteolate campanulate very long peduncled in very

loose open corymbs, invol. bracts 16-20 linear-oblong 1-3-nerved suddenly ending in long points, ligules 16-20, achenes strongly ribbed glabrous all with white pappus. *S. gracilis*, *Arn. Pugill.* 31.

TRAVANCORE; Pulney Mts., *Wight*. CEYLON; elevated districts amongst high grass, alt. 7000 ft.

Root woody. *Stem* 1-2 ft., terete. *Leaves* lower 4-6 by $\frac{1}{2}$ - $\frac{1}{2}$ in., rather thick, 1-nerved. *Peduncles* of heads erect, very slender, with setaceous bracts; limb of disk-fl. campanulate. *Achenes* slender, almost black, most minutely scabrid.

9. *S. nilgheryanus*, *DC. in Wight Contrib.* 23; *Prodr.* vi. 368; glabrous pubescent or sparsely cottony, stem strongly ribbed and angled leafy, lower leaves oblanceolate obtuse or 0, cauline sessile linear-oblong from a narrow or dilated auricled base margins flat or recurved toothed or sinuately-pinnatifid 1-nerved, heads not numerous $\frac{1}{2}$ - $\frac{1}{2}$ in. diam. 30-40-fld. bracteolate campanulate very long peduncled in very loose open corymbs, invol. bracts 30-40 oblong subacute, ligules 10-15, achenes most minutely scabrid all with white pappus. *Wight Ic. t.* 1132; *Clarke Comp. Ind.* 198. *S. Arnottianus*, *DC. l.c.* 357.

NILGHERY Mts.; alt. 7-8000 ft., *Wight*, &c.

Green or white with cottony pubescence. *Stem* 12-18 in., stout or slender. *Leaves* 3-5 in., very variable in width and in depth of cutting, sometimes rigid, scaberulous above.—Specimens from “about Avalanche” (McIvor), have densely crowded leaves, grey above and quite white beneath, as are the stems and corymbs, but not the involucre, limb of disk-fl. campanulate. *Achenes* as in *zeylanicus*.

** *Perennials*, with a woody rootstock or branches. *Disk-fl.* with campanulate or funnel-shaped limb. *Leaves* narrow.

10. *S. Griffithii*, *Hook. f. & Thoms.*; glabrous or pubescent, stem slender woody erect simple densely leafy below, leaves elongate crowded very narrow linear acute margins revolute upper shorter, heads 1-3 long peduncled $\frac{1}{2}$ -1 in. diam. many-fld. bracteolate, invol. bracts 12-18 linear-oblong acute 1-nerved, ligules 8-14, achenes papillose or scabrid all with white or yellowish pappus. *Clarke Comp. Ind.* 194.

KHASIA Mts.; alt. 5-7000 ft., *Griffith*, &c.

Stem 6-12 in erect, or ascending from a woody stock, rarely forked. *Leaves* 1-2 $\frac{1}{2}$ by $\frac{1}{10}$ - $\frac{1}{8}$ in., rarely dilated a little upwards, glabrous above, margins almost meeting beneath at the prominent midrib. *Peduncles* continuations of the stem, with scattered, small, erect, subulate leaves; ligules longer than the invol. bracts, bright yellow; disk-fl. with a narrow funnel-shaped limb.

11. *S. Kurzii*, *Clarke mss.*; dwarf, pubescent, rootstock and numerous stout short leafy branches woody, leaves crowded spreading and recurved linear obtuse or apiculate scaberulous, margins recurved, heads $\frac{1}{2}$ in. diam. solitary terminal many-fld. with 15-20 long linear-oblong acute nearly glabrous bracteoles, ligules 15-20, achenes scabrid all with white pappus. *S. Griffithii*, *var. Kurzii*, *Clarke Comp. Ind.* 194.

MARTABAN; granite rocks on the top of Moolee, *Parish*; and of Thoung-gyun, *Lobb*.

A singular little almost shrubby rigid species, 2-5 in. high. *Leaves* $\frac{1}{4}$ -1 $\frac{1}{2}$ in. long. *Bracteoles* half as long as the involucre and more, very slender.

*** *Annuals*. *Disk-fl.* very slender. *Leaves* pinnatifid in all or entire in *S. dubius*.

12. *S. coronopifolius*, *Desf.*; *Boiss. Fl. Oriem.* iii. 390; annual, glabrous, slender, often much branched, leaves all cauline rather small and fleshy narrow pinnatifid, lower petioled, upper amplexicaul and auricled, heads few $\frac{1}{2}$ in. diam. many fld. long peduncled minutely bracteolate in lax corymbs, invol. bracts 15-20 narrow acute, ligules 8-12 revolute, disk corollas very slender,

achenes scabrid, pappus white. *DC. Prodr.* vi. 344; *Clarke Comp. Ind.* 194. *S. subdentatus*, *Ledeb. Ic. Fl. Ross.* t. 493, f. 2. *S. chrysanthemifolius*, *DC. Prodr.* vi. 345.

WESTERN HIMALAYA; Northern Kashmir and Kunawer, alt. 8–17,000 ft., *Thomson*. &c.—DISTRIB. Afghanistan and westwards to Spain.

Rather slender, stems often very many from the root, 6–18 in., branches erect or divaricating, leaves scattered, 1–2 in., rarely more.

13. *S. ramosus*, *Wall. Cat.* 3129 A.; annual, glabrous, stem simple or branched angled and grooved, leaves all cauline sessile linear-oblong pinnatifid, lobes obtuse bases simple or $\frac{1}{2}$ amplexicaul and dilated, heads many $\frac{1}{2}$ – $\frac{1}{4}$ in. diam. campanulate many-fld. subbracteolate long-peduncled in loose terminal corymbs, invol. bracts 12–15 slender acuminate margins scarious, ligules 6–8 minute, achenes slender hairy. *DC. Prodr.* vi. 365; *Clarke Comp. Ind.* 195.

SIKKIM TERAI, ASSAM, SILHET and MISHMI; *Roxburgh*, &c.

Stem 10–24 in. Leaves 1–3 in. Heads very small.—Clarke suggests that this may be a tropical form of *S. vulgaris*, but the small heads and the invol. bracts and achenes are very different. It is not described in *Roxburgh*, but there is in the Benthonian Herbarium a specimen communicated by that botanist to Dr. Forsyth. —*S. vulgaris* in Wight's Herbarium from the Nilgherry Mts. is no doubt an escape, and Thomson has garden specimens from Moradabad.

14. *S. pedunculatus*, *Edgew. in Trans. Linn. Soc.* xxi. 74; annual, dwarf, glabrous, stem and branches slender terete, leaves all cauline pinnatifid lobes linear divaricate base simple or dilated and $\frac{1}{2}$ -amplexicaul, heads $\frac{1}{2}$ in. diam. many-fld. narrowly campanulate subbracteolate long peduncled in loose irregular corymbs, invol. bracts 10–16 linear acuminate, ligules very short, achenes slender glabrous or nearly so, pappus white. *Clarke Comp. Ind.* 195. *S. pedunculatus* and *dubius*, *Herb. Ind. Or. H. f. & T*

WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 9–12,000 ft., *Jacquemont*, &c. WESTERN TIBET; alt. 9–13,000 ft., *Thomson*, &c.

Usually 6–18 in. high, slender and very much branched from the base, with slender spreading leaf-lobes and small laxly corymbose heads. The roughness of the achenes requires a very high power to render it visible. Clarke suggests (l.c. 196) that *S. pedunculatus* and *dubius* may perhaps be referable to *coronopifolius*, but they appear to me to differ no less in the heads than in the habit and foliage.

15. *S. dubius*, *Ledeb. Fl. Alt.* iv. 112; annual, dwarf, glabrous, branched from the base, leaves sessile or the upper auricled linear entire or sparingly pinnatifidly lobed, heads $\frac{1}{4}$ in. diam. many-fld. subcampanulate bracteolate subcorymbose, invol. bracts 12–16 linear-oblong green with acute purple tips and white margins, ligules 0, achenes hoary, pappus white. *DC. Prodr.* vi. 341; *Clarke Comp. Ind.* 195.

WESTERN HIMALAYA; northern Kashmir, alt. 9–13,000 ft., *Stoliczka*. WESTERN TIBET; Parang Pass, alt. 15–17,000 ft., *Thomson*. Rakas Thal, alt. 16,000 ft. *H. Strachey*.

Two to six inches high, with leaves often half the length of the plant.

16. *S. tetrandus*, *Ham. in Wall. Cat.* 3129 B.; annual, slender, glabrous, stem sub-angular or terete sometimes winged, leaves narrowly oblong from an auricled sometimes decurrent base irregularly pinnatifidly lobed, lobes subacute irregularly sparingly toothed, heads $\frac{1}{4}$ in. diam. many-fld. subcampanulate bracteolate subcorymbose, invol. bracts linear-lanceolate acuminate green with white margins glabrous, ligules overtopping the involucre, achenes scabrid, pappus white. *DC. Prodr.* vi. 365.

SIKKIM; plains at the foot of the hills, *Hamilton, Clarke*.

A weak usually straggling weed 4–8 in. high, flexuous, simple or branched, very

like *S. vulgaris*, but the heads are erect, and are not conical by the inflexion of the invol. bracts after flowering. It is very near *S. ramosus*, but the heads are rather larger and ligules longer. Perhaps both these are vars. of *S. ægyptius*, L.

SECT. II. **Pseudo-jacobæa**. Heads radiate, bracteolate; invol. bracts many-seriate, imbricate; fl. all pappose; anther-cells not tailed.—The habit and involucre of the species are peculiar; the flowers are those of *S. Jacobæa*.

17. **S. lavandulæfolius**, DC. in *Wight Contrib.* 23; *Prodr.* vi. 368; woolly, stems stout woody erect densely leafy unbranched, leaves 1 in. densely imbricate linear-oblong from a broad subauricled base obtuse, margins strongly recurved entire rarely toothed or 3-fid, heads $\frac{1}{2}$ in. diam. campanulate in dense or open corymbs, invol. bracts 20–40 many-seriate closely imbricate, outer subulate or lanceolate acuminate, ligules 10–16 short, achenes slender glabrous shorter than the soft white pappus. *Wight. Ic.* t. 1133; *Clarke Comp. Ind.* 193.

NILGHERRY Mts.; in pastures, alt. 6–8000 ft., *Wight*, &c.

Stems from a woody stock, 6–12 in., very strict. Leaves thickly woolly, especially beneath, uniformly smaller upwards. Corymbs with stout erect branches and peduncles; heads glabrate or woolly.—This is a very anomalous plant, on account of the numerous many-seriate invol. bracts, in some heads about 20, all narrowly lanceolate, glabrate; in others up to 40 and tomentose, the inner broadly oblong; between these states there are all intermediates. One of Wight's specimens had been injured by an insect, and the leaves on the lower part of its stem are flat and irregularly cut, or even deeply trifid with acute spreading lobes; the uppermost are, however, as in all the numerous other specimens from 7 collectors, linear-oblong, quite entire, with strongly recurved margins, and are densely imbricate.

SECT. III. **Madaractis**. Heads turbinate or obconic, all radiate, usually bracteolate; invol. bracts 1-seriate; ligules broad and long, usually 4-nerved; anther-cells not tailed; ray-fl. (all in *S. belgaumensis*) epappose; pappus often shorter than the achenes, rigid, scabrid, often reddish, unequal, sometimes sub-biseriate, the outer hairs very short (pappus paleaceous below in *S. Grahami*). (See also *S. chrysanthemifolius*, var. *spectabilis* and *S. diversifolius*, both with epappose ray-fl.).

* Leaves not white and cottony beneath, rarely pinnatifid.

18. **S. linifolius**, *Clarke Comp. Ind.* 202; glabrous, stem herbaceous erect or ascending fastigiately leafy, leaves sessile elongate-linear subacute entire or distantly serrate base contracted not auricled 1-nerved, heads few bracteolate long-peduncled in lax corymbs, invol. bracts 15–20 $\frac{1}{8}$ in. long linear-oblong acuminate, achenes slender glabrous equalling the red pappus. *Doronicum linifolium*, DC. *Prodr.* vi. 322. *Aster odontophyllus* and *linifolius*, *Wall. Cat.* 3285, 3287. *Synanthera*, *Wall. Cat.* 7132.

KHASIA Mts.; on rocky banks of streams, alt. 4–7000 ft.

Root perennial. Stems 8–18 in., often branched from the base, very smooth. Leaves 3–6 by $\frac{1}{8}$ – $\frac{1}{4}$ in., green when dry, suberect and spreading, usually numerous and close set, having a fastigiate appearance, occasionally pinnatifidly lobed. Ligules 10–12, elliptic-oblong, longer than the invol. bracts. Achenes $\frac{1}{8}$ in.; pappus not much longer, hairs slender, subequal, not cohering at the base.

19. **S. Gardneri**, *Thwaites Enum.* 167; glabrous, stem herbaceous erect or ascending subsimple, leaves sessile elongate-linear distantly serrate base contracted not auricled 1-nerved, heads few bracteolate long peduncled in lax-corymbs, invol. bracts 10–15 $\frac{1}{10}$ in. long linear-oblong acuminate glabrous, ligules 8–10 narrow, achenes short linear pubescent equalling the whitish or yellowish pappus. *Doronicum Gardneri*, *Clarke Comp. Ind.* 202.

CEYLON; Ambagamowa district, alt. 3-5000 ft., *Macrae, Thwaites.*

The habit, foliage and inflorescence of this are entirely that of *S. linifolius* and the pappus is the same, but the achenes are very much smaller and pubescent.

20. **S. saxatilis**, *Wall. Cat.* 3131; slender, pubescent, hirsute or glabrate, leaves sessile base auricled linear linear-oblong or elliptic-oblong acute or acuminate 1-nerved serrate, heads few ebracteolate long peduncled subcorymbose, invol. bracts 15-20 $\frac{1}{2}$ in. long oblong lanceolate acuminate, ligules 8-12, achenes linear slender glabrous longer than the whitish or reddish pappus. *DC. Prodr.* vi. 367. *S. Rabani* and *pilosiusculus*, *Clarke Comp. Ind.* 202, 203. *S. Wightii*, *Benth. in Gen. Pl.* ii. 248; *Clarke Comp. Ind.* 197. *Doronicum Wightii*, *DC. in Wight Contrib.* 23; *Prodr.* vi. 322; *Wight Ic.* t. 1124. *Madaractis glabra*, *DC. Prodr.* vi. 440. *M. Metziana*, *Schultz-Bip. in Herb. Hohenack.* n. 1011.

KHASIA MTS.; alt. 4 7000 ft. NILGHERRY MTS.; in moist pastures; *Wight, &c.*

A much more variable plant than *S. linifolius*, both as to foliage and hairiness, but always distinguishable from it by the auricled upper leaf-bases. Of the Khasian specimens, one form from river banks closely resembles *linifolius* in all other respects; another growing in drier places is very hispid and has broader leaves, both these have linear leaves 4-7 in. long and $\frac{1}{8}$ - $\frac{1}{2}$ in. broad; a third very slender hispid form has short elliptic-lanceolate acute leaves, the lower only $1\frac{1}{2}$ in. long contracted into an auricled petiole. The whole plant smells of sweetbriar when bruised. Of the Nilgherry specimens the two most divergent forms are a tall stout coarse glabrous one 2-3 ft. high, much corymbosely branched above, with petioled toothed elliptic-lanceolate lower leaves and coarsely-toothed cauline leaves with broad auricled bases; and a more slender simpler one, with all the leaves smaller and regularly crenate-toothed and elliptic-lanceolate. Between these there are all intermediates. and each has subsidiary varieties which imitate the Khasian ones in greater or less degree. The pappus-hairs are all long and rather slender in this species.

P 21. **S. Mishmi**, *Clarke Comp. Ind.* 203; stem glabrous angular, leaves sessile with broad amplexicaul bases produced backwards broadly oblong acute glandular-pubescent on both surfaces denticulate or subentire, heads large almost glabrous in long angular bracteolate peduncles, invol. bracts 10-14 narrowly oblong acute margins white, ligules long flat, achenes narrowly oblong 5-angled glabrous much shorter than the slender white pappus.

UPPER ASSAM; Mishmi hills, *Griffith.*

I have seen no specimens of this, which is described from a fragment a foot long in the Calcutta Herbarium, and Mr. Clarke has no further information to give respecting it; its tailless anther-cells and epappose ray-fl. place it in this section.

22. **S. polycephalus**, *Clarke Comp. Ind.* 197; herbaceous, pubescent hispid or scabrid, leaves all sessile obovate-oblong or linear or lanceolate regularly crenately serrate, lower 3-5-nerved upper with dilated auricled bases, heads few or many bracteolate long-peduncled corymbose, invol. bracts 10-15 $\frac{1}{2}$ in. long linear-oblong acuminate glabrous or pubescent, ligules 8-10, achenes linear glabrous or scabrid nearly equalling the red pappus. *Madaractis polycephala*, *DC. Prodr.* vi. 440. *Doronicum Arnottii*, *DC. in Wight Contrib.* 23; *Prodr.* l. c. 322; *Wight Ic.* t. 1125.

NILGHERRY MTS.; alt. 6-7500 ft., on the northern slopes, *Wight, &c.*

A coarse herb 10-18 in., often branched corymbosely from the very base, with stout branches and thickish leaves, very brown when dry, leaves 1-3 in., usually regularly crenate-toothed with rather thickened margins. Ligules very broadly oblong, equalling the invol. bracts. Achenes slender, often $\frac{1}{2}$ in. long, from quite glabrous to very scabrid, as in Wight's figure.

23. **S. Lessingianus**, *Clarke Comp. Ind.* 198; herbaceous, hispidly pubescent, leaves all sessile and auricled linear-oblong deeply acutely serrate or

toothed, heads $\frac{3}{4}$ –1 in. diam. many-flid. turbinate long-peduncled bracteolate, invol. bracts 10–15 $\frac{1}{2}$ in. long linear-oblong acuminate hispid, ligules 8–10 very broad, achenes linear scabrid equalling the red pappus. *Doronicum Lessingiarum*, *Wight & Arn. in Arn. Pugill.* 106; *DC. Prodr.* vi. 322; *Wight Ic.* t. 1126. *Madaractis scabra*, *DC. l. c.* 439.

NILGHERRY MTS.; alt. 6–8000 ft., *Wight*, &c.

Closely allied to *S. polycephalus* and as coarse, always hispid, with more numerous more reniform leaves which are very deeply toothed.

** *Leaves not white and cottony beneath, pinnatifid.*

24. **S. ludens**, *Clarke Comp. Ind.* 199; herbaceous, hirsute puberulous scaberulous or glabrate, stem strict or slender, leaves polymorphous simple or more often lyrate-pinnatifid with broadly auricled bases or petioles, terminal lobe ovate or orbicular-ovate or -cordate lobulate and toothed lateral small gashed or 0, heads ecalyculate irregularly corymbose on stout or slender peduncles, invol. bracts 12–16 $\frac{1}{2}$ in. long linear-oblong acuminate usually glabrous, ligules 8–10 broadly oblong, achenes quite or nearly glabrous or hispid slender equalling the dirty-white pappus. *Doronicum Walkeri*, *Arn. Pugill.* 32; *DC. Prodr.* vi. 322; *Thwaites Enum.* 167.

The CONCAN; Bababoodan and Wattikely hills, alt. 5000 ft., *Law*, &c. CEYLON; central province, alt. 5–7000 ft., *Walker*, &c.

A most sportive plant; some of the Concan specimens are very stout, a foot high with a much branched stem as thick below as the little finger and leaves with the terminal lobe $2\frac{1}{2}$ in. diam.; others have flexuous leafy unbranched stems with long petioled leaves reduced to the terminal lobe, others have oblong leaves 4–5 by 1 in., uniformly pinnatifid with oblong ascending toothed lobes. The Ceylon forms are often as stout, but more often slender, less branched and less leafy than the Concan ones, with sometimes a very few small elliptic petioled toothed leaves $\frac{1}{2}$ –1 in. long, without auricled bases, and the stem produced into a very slender forked scape bearing 2–4 subcorymbose heads, on filiform peduncles. A very singular small apparently prostrate Ceylon form, probably growing in water, has slender stems emitting long roots, and rather recurved rhomboid petioled toothed leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. long, and single or but few heads. The achenes are rarely as described by Clarke villously hairy; I can sometimes detect only minute hairs, at others short spreading ones, and at others none at all; they are about $\frac{1}{10}$ in. long and contracted below the top. Clarke's name is a very applicable one, but that of *Walkeri* should have been retained.

25. **S. Hohenackeri**, *Hook. f.*; glabrous puberulous or scabrid, stem woody very stout and much branched below, branches short ascending herbaceous above leafy, petiole not auricled, leaves small deeply pinnatifid segments few short acute toothed or lobed margins recurved, heads long-peduncled bracteolate, invol. bracts 10–15 $\frac{1}{2}$ in. long lanceolate acuminate rigid glabrous or scabrid, ligules 6–10, achenes slender more or less scabrid nearly equalling the red pappus. *S. pinnatifidus*, *Clarke Comp. Ind.* 198. *Madaractis pinnatifida*, *DC. Prodr.* vi. 439. *Doronicum Candolleianum*, *Wight & Arn. in Arn. Pugill.* 108; *DC. Prodr.* vi. 322; *Wight Ic.* t. 1127. *D. rupestre*, *Wight Ic.* t. 1128.

NILGHERRY and SHEVAGHERRY MTS.; alt. 7–8000 ft., *Wight*, &c., in pastures.

Root and stout branched stock as thick as the little finger; branches rather slender very many 3–6 in. *Leaves* $\frac{1}{2}$ –1 in.; petiole short, slender or 0. *Achenes* $\frac{1}{10}$ in.; pappus hairs all long or with a few short ones.

26. **S. tenuifolius**, *Burm. Fl. Ind.* t. 60, f. 4; annual, slender, herbaceous, glabrous, much branched, leaves sessile pinnatifid or sub-2-pinnatifid, lobes very slender spreading obtuse, heads few long-peduncled ebracteolate in divaricating corymbs, invol. bracts 10–12 $\frac{1}{2}$ in. long obovate-oblong acute membranous glabrous, ligules 6–10, achenes broader upwards scabrid equalling the

reddish or yellowish pappus. *S. multifidus*, Willd. *Sp. Pl.* iii. 1986; *DC. Prodr.* vi. 365; *Wall. Cat.* 3135; *Clarke Comp. Ind.* 198. *S. laciniosus*, Arn. *Pugill.* *Doronicum tenuifolium*, *Wight Ic.* t. 1129.

WESTERN PENINSULA; on the dry hills of the Western Ghats, from the Concan southwards.—DISTRIB. JAVÀ.

A slender much branched annual, or like most annuals reduced to a single weedy stem. *Achenes* $\frac{1}{10}$ in.—This has more of the habit of sect. *Jacobæa* than the others of this section. *Wight* suspects that this and *S. Hohenackeri* are varieties of one species, but the achenes and invol. bracts are quite different, besides this being an annual.

27. *S. hewrensis*, *Hook. f.*; annual, dwarf, puberulous or scaberulous, leafy, leaves sessile or shortly petioled base auricled lanceolate or oblong-lanceolate obtuse obtusely coarsely irregularly toothed or subpinnatifid membranous, heads ebracteolate on capillary axillary and subcorymbose peduncles, invol. bracts 8–10 $\frac{1}{2}$ in. long narrowly oblong rather dilated upwards acuminate glabrous, ligules 3, achenes broader upwards scabrid equalling the dirty-white pappus. *Doronicum hewrense*. *Dalz. in Dalz. & Gibs. Bomb. Fl.* 130.

The CONCAN; rocky places near Jooneer, common, *Dalzell*.

A remarkable little species, differing in habit from its allies, the heads with capillary peduncles being as often axillary and solitary as corymbose, the invol. bracts very few, and ligules (constantly according to *Dalzell*) only 3. *Achenes*, as in *S. tenuifolius*, $\frac{1}{10}$ in. long, slender; pappus hairs all long and slender.

*** *Leaves more or less white with cottony tomentum beneath.*

28. *S. Edgeworthii*, *Hook. f.*; herbaceous, stem leaves beneath and corymbs white with dense cottony pubescence, leaves petioled cordate or rhomboid or ovate-lanceolate obtuse or acute irregularly toothed lobulate or crenate many-nerved glabrous or scabrid above margins more or less recurved, petiole auricled, heads on short or long naked peduncles turbinate bracteolate corymbose, invol. bracts $\frac{1}{2}$ – $\frac{3}{5}$ in. oblanceolate acuminate cottony, ligules 10–14, achenes elongate turbinate scabrid about equalling the white pappus. *S. tomentosus*, *Clarke Comp. Ind.* 200. *Madaractis lanuginosa*, *Edgew. in Trans. Linn. Soc.* xx. 75. *Doronicum tomentosum*, *Wight in Calc. Journ. Nat. Hist.* vii. 155; *Ic.* t. 1151.

CENTRAL INDIA, *Jacquemont*; rocks at Mandu on the Vindhya range, *Edgeworth*. CANARA; Bababoodén hills, *Law, Dalzell, &c.* NILGHERY MTS.; on the N.W. slopes, *Wight*.

The Canara and Nilgherry specimens are stout erect leafy with stiff grooved stems from a stout woody perennial stock, and have shortly petioled angular stiff coriaceous leaves 1–1 $\frac{1}{2}$ in. long, with scabrid upper surface and prominent nerves beneath; the heads are very many-fl., and the cottony bracts are dilated upwards with very broad membranous margins. *Edgeworth's* specimens, which are very imperfect, are very slender, with naked shining stems, much more membranous leaves with longer more slender petioles and smaller heads with much narrower invol. bracts. *Jacquemont's* specimens have the habit of the Concan ones, but the narrow invol. bracts of *Edgeworth's*, and the deeply cordate leaves are unlike either of the others. The achenes in all are about $\frac{1}{2}$ in., ribbed and scabrid; pappus-hairs slender, most of them subequal and long with a few intermixed much shorter ones.

29. *S. Dalzellii*, *Clarke Comp. Ind.* 201; herbaceous, erect, much branched, branches and leaves beneath more or less cottony, leaves sessile linear or lanceolate apiculate base contracted or dilated and auricled coriaceous 1-nerved margins recurved entire or rarely denticulate, heads bracteolate long-peduncled in dichotomous corymbs, invol. bracts 10–12 $\frac{1}{2}$ in. long oblanceolate

acuminate scabrid without white margins, ligules 10–15 narrow, achenes small scabrid about equalling the white rigid subbiseriate pappus.

The CONCAN; Bababooden hills, *Law, Dalzell*.

Stem 1–2 ft., rigid, angled and grooved, branches erect. *Leaves* 2–3½ in., the broadest ½ in. diam., narrowed to both ends, auricles rounded or 0, very leathery, smooth or scabrid above. *Heads* numerous; peduncles with a few minute bracts. *Achenes* (immature) ¼ in., turbinate; pappus-hairs very rigid, scabrid, some very short.

30. **S. Lawii**, *Clarke Comp. Ind.* 201; very slender, excessively branched, stem branches and leaves beneath more or less white and cottony, leaves lower or most petioled lanceolate irregularly coarsely toothed with the petiole not auricled, upper or most sessile linear entire or obscurely toothed with an auricled base, heads bracteolate turbinate or capillary axillary and solitary or terminal and subcorymbose peduncles, invol. bracts 12–15 ⅓ in. long obovate acuminate puberulous, ligules 8–10, achenes small scabrid equalling the white subbiseriate pappus.

Hills of the CONCAN (or MYSORE?); Severndroog talooka, *Dalzell, &c.*

Very closely allied to *S. Dalzellii*, but much more slender, with capillary peduncles to the smaller heads. I suspect, however, that these characters will not prove constant, the achenes and pappus being identical. The only “Severndroog talooka” I can find is in Mysore (W. of Hyderabad), where I doubt Dalzell having ever been.

31. **S. Grahmi**, *Hook. f.*; erect, much branched, slender, branches glabrous or scaberulous, leaves rhombic-ovate narrowed suddenly into a short simple or lobulate petiole irregularly coarsely toothed white and cottony beneath with broad green veins, heads solitary and axillary or subcorymbose on very slender peduncles bracteolate, invol. bracts 12–18 ⅓ in. long obovate-oblong acuminate pubescent, ligules 10–12 elongate, achenes obconic scabrid equalling the double white pappus of long paleaceous and short setaceous hairs. *S. reticulatus*, *Clarke Comp. Ind.* 199. *Doronicum reticulatum*, *Wight in Calc. Journ. Nat. Hist.* vii. 156; *l.c.* t. 1151, B. *Madaractis arachnoidea*, *Herb. Calc.*

BOMBAY; Tanna district; *Graham, Law, &c.*

Herbaceous, 2–3 ft. *Leaves* 1–2½ in. long, 5-nerved at the base; petiole of lower often as long, slender, exauricled, of the upper shorter, often broadly winged, auricled, *Peduncles* with setaceous bracts. *Ligules* ½ in., linear. *Invol. bracts* without white margins. *Achenes* of the ray curved, linear, compressed, smooth, of the disk ⅓ in. long, turbinate, angled, ribbed and strigose, much longer than the pappus, the long rigid hairs of which are flattened and taper from a broad base.—Nothing can be more foreign to the character of *Senecio* than the pappus of this plant, which is however clearly related closely to *S. Lawii* and *S. belgaumensis*, &c.

32. **S. Gibsoni**, *Hook. f.*; erect, much branched, branches slender scaberulous, leaves ovate-lanceolate or subrhomboid apiculate sessile or narrowed into a broadly winged auricled petiole sinuate-toothed glabrous or scaberulous above grey beneath with appressed cottony down nerves slender, heads ecalyculate on very slender peduncles in lax dichotomously branched corymbs, invol. bracts 15–18 ½ in. long obovate-oblong acuminate puberulous, ligules 8–10 long narrow, achenes obconic glabrous longer than the scanty whitish pappus of rigid scabrid long and short hairs.

The CONCAN and CANARA; Bababooden hills, *Law, Dalzell*.

This very much resembles *S. Grahmi*, but the leaves are narrower, more membranous, with much shorter petioles and are not white beneath, the heads are much smaller and the achenes though of the same form and length are glabrous, and the pappus-hairs are not at all paleaceous.

33. **S. belgaumensis**, *Clarke Comp. Ind.* 200; erect, much branched, branches slender glabrous or pubescent, leaves rhombic-ovate narrowed into a broad auricled petiole acute coarsely toothed or gashed white and cottony beneath except the nerves, heads ecalyculate on long capillary loosely irregularly corymbose peduncles, invol. bracts $12-18 \frac{1}{10}$ in. long obovate-oblong acuminate pubescent, ligules 8-10, achenes turbinate ribbed scabrid epappose. *Madacarpus belgaumensis*, *Wight in Calc. Journ. Nat. Hist.* vii. 157; *Id.* t. 1152; *Dalz. & Gibs. Bomb. Fl.* 130. ? *Doronicum reticulatum*, *Dalz. & Gibs. l. c.*

The DECCAN; Belgaum, *Law, Dalzell*, colouring the walls of the fort (at Jilwan?) yellow, *Ritchie*.

So similar to *S. Grahani* in habit and foliage that *Clarke (Comp. Ind.)* suggests its being an epappose state of that plant, which suggestion, he informs me, he withdraws in favour of its nearer affinity to *S. Edgeworthii*. From *Grahani*, it differs chiefly in the much smaller involucre bracts, only $\frac{1}{10}$ in. long, and more capillary peduncles, as well as the absence of pappus, and from the Concan and Nilgherry form of *S. Edgeworthii* it differs in being apparently annual, in its slender habit, in the shape texture and clothing of the undersurface of the leaves, in the much smaller invol. bracts without broad membranous margins, and in the shorter more turbinate achenes; but it approaches more *Edgeworth's* very imperfect specimen from Mandu. Some of *Dalzell's* specimens of *S. belgaumensis* with a tall erect stem 4-6 ft. high, furnished throughout with short spreading branches bearing lax corymbose heads, differ wholly in habit from the genus. In *Dalzell* and *Gibson's Flora Doronicum reticulatum* (*S. Grahani*, nob.), is described as having no pappus, which obliges me to quote it under this species, but I suspect this is a blunder, specimens from the habitat ascribed to their *D. reticulatum*, "Island of Caranjah" (in Bombay harbour) would clear up this point.

SECT. IV. **Ligularia**. Perennial herbs with long petioled very broad orbicular reniform or palmate radical leaves, and cauline leaves with large sheaths. *Heads* large, nodding or deflexed, racemose or corymbose; invol. bracts 1-seriate in insertion, of two forms, the narrower outer overlapping both margins of the broader inner. *Achenes* glabrous, usually equalling or exceeding the pappus, all pappose. The Indian species are all Himalayan with one Khasian (see also genus *Cremanthodium*).

* *Leaves not palmately lobed; heads many, corymbose or in corymbose racemes.*

34. **S. amplexicaulis**, *Wall. Cat.* 3139; very robust, nearly glabrous, leaves orbicular-reniform cordate or subhastate toothed, petiole of lower long simple or interruptedly winged, of upper with a broad sheathing wing, heads many-fl. corymbose or in corymbose racemes base broad, invol. bracts about 8 connate below oblong acute glabrous, ligules 5-6 very long, achenes narrow shorter than the rufous pappus. *Clarke Comp. Ind.* 204. *S. Yakla*, *Clarke l. c.* *Ligularia amplexicaulis* and *corymbosa*, *DC. Prodr.* vi. 314.

WESTERN HIMALAYA; alt. 9-13,000 ft., from Kashmir to Garwhal. SIKKIM; at *Yakla*, alt. 16,000 ft., *Clarke*.

Stem 2-4 ft., as thick as the thumb below. *Leaves* 1 ft. diam. and less, teeth regular and alternately smaller. *Heads* drooping, campanulate, corymbose in flower, racemed after flowering, branches of corymb pubescent; invol. bracts $\frac{1}{4}-\frac{1}{3}$ in.; ligules $\frac{1}{2}-\frac{3}{4}$ in., slender; disk-fl. with slender tube longer than the short campanulate limb. *Achenes* $\frac{1}{2}$ in. long, glabrous.—The Sikkim specimens are smaller than the N. Western and the disk corollas have a much shorter tube in proportion to the limb.

35. **S. Thomsoni**, *Clarke Comp. Ind.* 205; robust, glabrous below, above glabrous or cottony, leaves orbicular hastate or cordate toothed, petiole of lower not winged slender, heads 5-6-fl. corymbose or in subpanicked corymbs

base narrow, invol. bracts 5-6 linear-oblong free acute glabrous, ligules 1-2 very long, achenes narrow equalling the white pappus.

WESTERN HIMALAYA; Kashmir, alt. 7-10,000 ft., Thomson, Watt.

Stem 3-4 ft., more slender than in *S. amplexicaulis*. Leaves 10 in. diam. and under, orbicular and deeply cordate with rounded lobes, or more often hastate with decurved or spreading lobes. Corymbs very variable, axils with long linear bracts. Heads suberect and drooping; bracteoles linear or filiform; invol. bracts $\frac{1}{2}$ in. long; ligules $\frac{3}{4}$ in. Achenes $\frac{1}{4}$ in. long, glabrous.

36. **S. pachycarpus**, Clarke mss.; stout, erect, nearly glabrous, pubescent above, leaves ovate-cordate toothed, petiole of radical long winged wing toothed, cauline with a dilated sheath, heads many-fld. drooping base broad, invol. bracts 10-12 oblong connate at the base, ligules very long, achenes short broad equalling the reddish pappus. *S. corymbosus*, Clarke Comp. Ind. 205, not of DC.

SIKKIM HIMALAYA; alt. 10-14,000 ft., Clarke.

The only specimen I have seen is very mutilated; its heads are smaller than in *S. amplexicaulis*, which is apparently its nearest ally, and from which it is best distinguished by its small heads and small broadly obovate-oblong achenes $\frac{1}{6}$ - $\frac{1}{3}$ in. long, and short pappus.

** Leaves palmately lobed, heads corymbose.

37. **S. macranthus**, Clarke Comp. Ind. 205; very robust, nearly glabrous, leaves palmately or subpedately 7-9-lobed to near the base, lobes oblong gashed and toothed, petiole of radical long not winged, of cauline with a basal sheath, heads very few and large corymbose on long naked peduncles many-fld., base broad ebracteolate, invol. bracts 6-10 very unequal and irregularly connate, ligules very long narrow, achenes narrow glabrous nearly equalling the red pappus.

KHASIA Mts.; alt. 5-7000 ft., J. D. H. & T. T.

Stem 3-5 ft., as thick as the thumb below. Leaves reniform in outline, 12-18 in. diam. Heads campanulate, ebracteolate; invol. bracts $\frac{3}{4}$ -1 in., some lanceolate acuminate, others broadly ovate obtuse or acute, with membranous overlapped margins; ligules 2 in. long; disk-fl. with a long slender tube and short limb. Achenes $\frac{1}{3}$ in.

38. **S. Mortonii**, Clarke Comp. Ind. 208; stem above and corymb puberulous, leaves palmately 5-11-lobed lobes gashed and toothed, petiole of the radical long not winged, of the cauline with a basal sheath, heads many large narrow 5-6-fld. bracteolate base very narrow, invol. bracts 3-5 linear-oblong acute or obtuse free to the base, ligules 0, achenes narrow glabrous equalling or exceeding the red pappus.

EASTERN HIMALAYA; E. Nipal, Sikkim and W. Bhotan, alt. 9-12,000 ft., J. D. H., Clarke.

Stem 3-4 ft. Leaves reniform in outline, 18 in. diam. and under. Corymbs much branched, very broad; heads erect, fascicled; bracteoles linear, revolute; invol. bracts $\frac{1}{2}$ in. long, 2-seriate, outer narrower, inner broader with wide membranous borders; tubes of disk-corollas about equalling the campanulate limb. Achenes $\frac{1}{2}$ - $\frac{3}{4}$ in., smooth.—The campanulate limb of the disk-corolla is not, as Clarke describes, much shorter than the tube, nor are the achenes $\frac{1}{2}$ in. long. It is named after a grandson of the illustrious Roxburgh, Depy Comm. of Sikkim in 1870.

*** Leaves not lobed. Heads in simple or rarely branched racemes or solitary.

39. **S. Ligularia**, Hook. f.; glabrous, or cottony above, stout, erect, leaves cordate-sagittate or subdeltoid or reniform obtuse or acute coarsely toothed, petiole of the lower long simple, of the upper winged and sheathing.

heads many-fl. subsecund in a solitary terminal simple raceme pendulous, base narrow, invol. bracts oblong acute free to the base, ligules several very long, achenes narrow longer than the reddish pappus. *S. sibiricus*, *Ledeb. Fl. Ross. vi.* 238; *Clarke Comp. Ind.* 206, not of *Lin.* *S. racemosus*, *Wall. Cat.* 3140. *Ligularia sibirica*, *Cass. in DC. Prodr.* vi. 315. *L. racemosa*, *DC. l.c.* 314.

TEMPERATE AND SUBALPINE HIMALAYA; from Kashmir to Sikkim, alt 9–12,000 ft. —DISTRIB. Siberia, Dahuria, Japan.

Very variable; stem sometimes as thick as the thumb, usually less. *Leaves* 1 ft. diam. and under, lateral lobes produced outwards and subtriangular or rounded off, basal sinus shallow or deep. *Heads* numerous, bracteolate or not; bracts at the bases of the peduncles small or large and leafy; invol. bracts 8–10, outer narrow-acute, inner broad with broad overlapped membranous margins; ligules $\frac{1}{2}$ – $\frac{3}{4}$ in., tube of disk-fl. equalling the campanulate limb. *Achenes* $\frac{1}{4}$ in. long.—Described by Ledebour as very variable, the heads being sometimes small with very few flowers in Siberian specimens. I have adopted the subgeneric name for this species, it being the most widely distributed of the old genus *Ligularia*.

VAR. *Atkinsoni*; heads smaller, bracts at the base of the peduncles filiform, ligules very short, pappus dirty-white. *S. Atkinsoni*, *Clarke Comp. Ind.* 207. —Sikkim, at Yakla, alt. 12,000 ft., *Clarke*. The specimen of this is a very poor one.

40. ***S. Jacquemontianus***, *Benth. in Gen. Pl.* ii. 449; glabrous, robust, leaves broadly ovate-cordate or subhastate obtuse toothed sinus open, petiole of lower stout winged, of cauline sheathing, heads numerous peduncled in a conical raceme broadly campanulate, invol. bracts 8–12 oblong acute bases subconnate, ligules many long and broad, achenes linear-oblong, pappus very short coroniform. *Clarke Comp. Ind.* 208. *Senecillis Jacquemontiana*, *Dcne. in Jacq. Voy. Bot.* 90, t. 98.

WESTERN HIMALAYA; Kashmir, alt. 10–13,000 ft., *Falconer, Jacquemont*.

Stem stout, 3–5 ft. *Leaves* 1 ft. broad and under, tip acute or rounded; petiole 5–15 in., wing narrow or broad and gashed or toothed. *Racemes* 4–8 in., elongating in fruit; heads not secund; peduncles curved, 1–2½ in., lower with oblong leafy bracts at the base; bracteoles under the heads few, filiform; heads 1½–2 in. across the ligules; invol. bracts ½ in. glabrous; ligules 12–15, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, 5–9-nerved, tip entire or toothed; tube of disk-corollas shorter than the limb. *Achenes* $\frac{1}{2}$ in. long, deeply grooved; pappus-hairs $\frac{1}{16}$ in., unequal, united at the base.

41. ***S. retusus***, *Wall. Cat.* 3142; stem short glabrous puberulous above, leaves reniform or nearly orbicular toothed, petiole of lower stout not winged, middle cauline with a broad sheath uppermost cauline small oblong-lanceolate sessile, heads solitary or 2–8 in a simple terminal raceme many-fl. nodding base broad usually ebracteolate, invol. bracts 10–12 oblong acute or obtuse, ligules many short broad 3-toothed, achenes linear smooth shorter than the whitish pappus. *Clarke Comp. Ind.* 206. *Ligularia retusa*, *DC. Prodr.* vi. 314.

CENTRAL AND EASTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 12–15,000 ft., *J. D. H., &c.*

Stem 12–18 in., stout or slender. *Leaves* 8 in. diam. and under, tip rounded or retuse, sinus deep or shallow, middle cauline sometimes ovate-cordate. *Heads* broad and short, 1½ in. diam.; tube of corolla of disk-fl. very short. *Achenes* $\frac{1}{4}$ in.; pappus rather scanty, fugaceous.

42. ***S. calthæfolius***, *Hook. f.*; slender, glabrous, leaves reniform or broadly ovate-cordate toothed, sinus deep, petiole of lower very slender not winged of middle cauline with a narrow sheath, uppermost cauline small sessile oblong-lanceolate, heads solitary or 2–5 in simple terminal racemes many-fl. base broad, invol. bracts 8–10 oblong obtuse bases connate, ligules many slender, achenes unripe smooth shorter than the reddish pappus.

SIKKIM HIMALAYA; at Kongra-Lama, alt. 14-15,000 ft., *J. D. H.*

A very slender species, 10-18 in. high; root with copious long erect fastigiate fibrous remains of old leaves 2-3 in. long. *Leaves* 3 in. diam. and less; petiole of lower often as long as the stem, very slender. *Heads* with 1-2 linear bracteoles; invol. bracts $\frac{1}{2}$ - $\frac{1}{2}$ in., rather membranous when dry; ligules $\frac{3}{4}$ in. long, tip entire or minutely toothed; tube of disk-corolla equalling the limb. *Achenes* unripe, $\frac{1}{2}$ in.—A very distinct species, but looks as if drawn up amongst grass, &c.

43. **S. arnicoides**, *Wall. Cat.* 3138, *in part*; stout, erect, glabrous or sparingly cottony above, leaves oblong ovate or elliptic obtuse toothed, lower narrowed into the stout petiole which is winged above, cauline sessile amplexicaul or with a sheathing petiole, heads solitary or 2 or more in simple or branched racemes large broad many-fld. drooping base very broad, invol. bracts 14-16 oblong acute bases connate, ligules many short broad, achenes shorter than the whitish pappus. *Clarke Comp. Ind.* 207. *Ligularia arnicoides*, *DC. Prodr.* vi. 314; *Royle Ill.* t. 60, f. 2.

CENTRAL AND WESTERN HIMALAYA, alt. 12-14,000 ft.; Nipal, *Wallich*; Garwhal, *Falconer*, &c.; Kunawer and Lahul? *Thomson*.

Stem stout, 12-18 in. *Leaves* variable, largest 8 by 5 in., coriaceous. *Heads* sometimes $2\frac{1}{2}$ in. diam., broadly campanulate; invol. bracts $\frac{3}{4}$ in. long, 12-14; ligules 15-30, $\frac{3}{4}$ in. long, 7-11-nerved, tips entire or minutely toothed; tube of disk-corolla shorter than the narrow limb. *Achenes* $\frac{1}{4}$ in., broader upwards; pappus rather scanty.—Specimens with single head approach *Werneria Ellisii* very much, in which, however, the heads are erect and the bracts connate to above the middle.

VAR. frigida; dwarf, 6-10 in., very stout, leaves chiefly radical very coriaceous, heads solitary, invol. bracts glabrous or tomentose. *Ligularia frigida*, *Schultz-Bip. in Herb. Hook.*—Kunawer and Western Tibet; Nubra, Ladak, &c., alt. 15-17,000 ft.

SERIES B. Anther-cells tailed; tails contiguous or connate.

SECT. V. **Synotis**. *Heads* few or many-fld; flowers all pappose; invol. bracts 1-seriate.

* *Climbing, leafy shrubs or undershrubs.*

44. **S. araneosus**, *DC. Prodr.* vi. 364; climbing, glabrous or sparsely cottony, leaves petioled cordate acuminate entire or sub-3-lobed toothed or sinuate-toothed 5-7-nerved, petiole not auricled, heads $\frac{1}{2}$ - $\frac{1}{2}$ in. long bracteolate in open axillary and terminal rounded corymbs, invol. bracts 8, ligules 0, achenes glabrous striate. *Clarke Comp. Ind.* 181, *excl. some syns.* *S. arachnoideus*, *Wall. Cat.* 3163. *S. Walkeri*, *Arn. Pugill.* n. 103; *DC. l.c.*; *Wight Ic.* t. 1131. *S. corymbosus*, *var. β*, *Thwaites Enum.* 167. *Cissampelopsis volubilis*, *Miq. Fl. Ind. Bat.* ii. 103. *Cacalia*? *volubilis*, *Blume, DC. l.c.* 331.

WESTERN HIMALAYA; from Sikkim to Mishmi, alt. 5-7000 ft. KHASIA MTS., alt. 2-5000 ft. NILGHERY MTS., *Wight*. CEYLON; Central Province, alt. 7-8000 ft. *Walker*, &c.—DISTRIB. JAVA.

An extensive climber; branches grooved. *Leaves* 3-7 by 2-5 in., coriaceous or membranous, finely reticulated. *Invol. bracts* linear-oblong, subacute, with a thickened mesial band and pale margins. *Pappus* white.—Very variable in foliage. I find no difference between the South Indian and some Sikkim specimens; the Khasian have often much larger more lobed leaves.

45. **S. corymbosus**, *Wall. Cat.* 3121; climbing, leaves petioled orbicular or ovate-cordate acute denticulate 5-7-nerved glabrous above densely cinnamomeous-tomentose beneath, petiole not auricled, heads $\frac{1}{2}$ - $\frac{1}{2}$ in. long in dense axillary and terminal rounded corymbs, invol. bracts 8, ligules 0, achenes glabrous striate. *DC in Wight Contrib.* 22; *Prodr.* 364; *Wight Ic.* t. 1130.

NILGHERY MTS., *Noton*, *Wight*, &c. CEYLON; Central Province, alt. 7-8000 ft., *Walker*, &c.

Both Thwaites and Clarke consider this and *S. araneosus* to be co-specific, but I find no intermediate states; the leaves of this are smaller, more rounded and coriaceous, less acuminate, and thickly tomentose beneath; the heads are dense, and anther-tails usually shorter.

46. ***S. Buimalia***, *Ham. in Don Prodr.* 178; climbing, branches leaves beneath and inflorescence cottony, leaves petioled ovate-cordate acuminate sinuate-toothed or entire 3-5-nerved, petiole not auricled, heads $\frac{1}{2}$ - $\frac{2}{3}$ in. long bracteolate few in axillary rounded corymbs, invol. bracts about 8 linear-oblong, ligules few, achenes glabrous. *DC. Prodr.* vi. 369; *Clarke Comp. Ind.* 182. *S. scandens*, *Wall. Cat.* 3120. *Cacalia volubilis*, *Herb. Ham.*

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 5-6000 ft., *J. D. H.*

Branches grooved. *Leaves* 3-5 by 2-3 in., glabrous above. *Invol. bracts* linear-oblong, with a thickened tomentose mesial band, and thin glabrous borders. *Ligules* short, yellow. *Achenes* $\frac{1}{2}$ in., slender, angled; pappus $\frac{1}{2}$ in., white.

47. ***S. scandens***, *Don Prodr.* 178; climbing, glabrous or branches and leaves beneath slightly pubescent, leaves hastate or ovate-hastate acuminate entire crenate or toothed, petiole short auricled, heads $\frac{1}{2}$ in. long in lax divaricate rounded corymbs, invol. bracts 10-12 linear-oblong acute, ligules few or many. *S. campyloides*, *DC. Prodr.* vi. 370; *Wall. Cat.* 3170; *Clarke Comp. Ind.* 183. *S. stipulatus* and *Wightianus*, *DC. l. c.*; *Wight Ic. t.* 1136. *S. intermedius*, *Wight Ic. t.* 1135. *S. flexicaulis*, *Edgew. in Trans. Linn. Soc.* xx. 74. *S. flexuosus*, *Wall. Cat.* 3110. *S. chinensis*, *DC. l. c.* 363. *S. Hindsei*, *Benth. in Hook. Journ. Bot.* i. 488. *Cineraria repanda*, *Lour. Fl. Coch.* 501. *C. chinensis*, *Spreng. Syst. Veg.* iii. 549.

TEMPERATE HIMALAYA; Kumaon, alt. 6-7000 ft., *Edgeworth*; Nipal, *Wallich*. Sikkim, alt. 6-10,000 ft., *J. D. H.* KHASIA MTS., alt. 5-6000 ft. PULNEY and NILGHERY MTS., alt. 7500 ft., *Wight*, &c. CEYLON; Central Province, *Walker*, &c.—DISTRIB. Yunnan, China.

Branches zig-zag, grooved or ribbed. *Leaves* 3-4 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., usually membranous, sometimes pinnate below in Ceylon specimens; auricles of petiole very variable. *Invol. bracts* with thin margins. *Achenes* $\frac{1}{10}$ in., slender, 4-angled or -ribbed; ribs hairy or glabrous, outer compressed curved.

48. ***S. candicans***, *DC. in Wight Contrib.* 22; *Prodr.* vi. 369; branches angled and leaves beneath densely white-tomentose, leaves ovate-cordate or -hastate acuminate toothed glabrous or cottony above, petiole short auricled, heads $\frac{1}{2}$ in. long bracteolate in axillary and terminal rounded corymbs or lax panicles, invol. bracts linear acute tomentose, ligules few, achenes pubescent. *Wight Ic. t.* 1134; *Wall. Cat.* 3123. *S. campyloides*, var. *candicans*, *Clarke Comp. Ind.* 184. *Cacalia sarmentosa*, *Lesch. mss.*

NILGHERY MTS., alt. 4-7000 ft., *Wight*, &c.

Very near *S. scandens*, and united with it by Clarke; but, besides the woolly covering, the branches are more uniformly angled and ribbed, the leaves more coriaceous, and the achenes smaller and more pubescent. I have seen no intermediates.

49. ***S. tetranthus***, *DC. Prodr.* vi. 370; climbing, nearly glabrous, leaves ovate-cordate or -lanceolate acuminate serrate membranous, petiole pubescent not auricled, heads $\frac{1}{2}$ - $\frac{1}{4}$ in. long in bracteolate axillary and terminal thyrsiform panicles 4-fld., invol. bracts 5-6 short oblong obtuse glabrous, ligules 2, achenes glabrous. *Clarke Comp. Ind.* 185. *S. cordatus*, *Wall. Cat.* 3109.

TEMPERATE HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 7-8000 ft., *J. D. H.*

Branches terete. *Leaves* 5-7 by 1 $\frac{1}{2}$ -3 in., often caudate-acuminate, sometimes orbicular-cordate and 4 in. diam. *Heads* shortly peduncled. *Achenes* $\frac{1}{12}$ in.; pappus white or reddish, much shorter than the tubular corollas.

**** Herbs or undershrubs with large radical or subradical or cauline leaves, flexuous scapes or stems, and paniced racemose or thyrsoid (not corymbose) inflorescence.**

50. **S. Wallichii**, DC. *Prodr.* vi. 364; sparsely pubescent, leaves radical long-petioled broadly ovate-cordate acuminate sinuate-toothed membranous, scape almost leafless pubescent or woolly above, heads $\frac{1}{2}$ in. long bracteolate narrow 5-fld., invol. bracts 5 oblong obtuse, ligules 2, achenes glabrous. *Clarke Comp. Ind.* 184. *S. dentatus*, Wall. *Cat.* 3112.

CENTRAL and EASTERN HIMALAYA; Nipal, Wallich; Sikkim, alt. 7-10,000 ft., J. D. H., &c.

Stem 2-3 in., woody, slender. Leaves 8-10, 3-7 by 2-4 in.; petiole slender, 4-6 in. Scape 12-24 in., with a few small leaves near the base or 0, flowering at the top only. Heads in thyrsoid corymbs, shortly pedicelled. Achenes slender, $\frac{1}{10}$ in. long; pappus white, much shorter than the tubular corollas.

51. **S. alatus**, Wall. *Cat.* 3114; glabrous pubescent or cottony, stem short or long simple stout, leaves ovate-cordate or lanceolate acuminate serrate membranous, petiole long with broad toothed wings, stem beyond the leaves elongate simple or branched, heads $\frac{1}{2}$ in. long ebracteolate about 6-fld. in very large branched thyrsoid panicles, invol. bracts 4-7 linear obtuse pubescent, ligules 2, achenes glabrous or puberulous. DC. *Prodr.* vi. 368; *Clarke Comp. Ind.* 185.

TEMPERATE HIMALAYA; from Simla, alt. 6-9000 ft., to Sikkim, alt. 7-13,000 ft.

Whole plant 1-2 ft. or more; stem below sometimes as thick as a swan's quill and shaggy, either very short with subradical leaves, or elongate with alternate leaves, rarely branched, ending in a pubescent or cottony erect often widely branching flower-scape. Leaves 5-12 by 4-6 in.; petiole short or long, its wing dilated in the middle or sometimes at the base, where it is broadly auricled. Heads shortly pedicelled. Achenes $\frac{1}{10}$ in., slender, and pappus much as in *S. Wallichii*.

52. **S. Candolleanus**, Wall. *Cat.* 3119; stem slender flexuous glandular-pubescent simple or branched, leaves long-petioled ovate acute coarsely toothed white-tomentose beneath, heads $\frac{1}{4}$ in. long 6-7-fld. narrow ebracteolate in terminal peduncled panicles, invol. bracts 5 linear-oblong membranous glabrous, ligules 0, achenes pubescent. DC. *Prodr.* vi. 364; *Clarke Comp. Ind.* 187.

WESTERN HIMALAYA; Kumaon, Blinkworth; Pindari, alt. 11,500 ft., Strach. & Winterb.

Stem 12-18 in., or branches terminating in a peduncled panicle, flexuous, and red. Leaves 1-2 by $\frac{1}{2}$ -1 in., glabrous above; petiole slender. Achenes (ripe not seen); pappus much shorter than the tubular corollas.—This species has the inflorescence and flowers of *S. Levingii* and *alatus*, with the leafy stem and foliage of *S. Kunthianus*.

53. **S. Levingii**, Clarke *Comp. Ind.* 301; glabrous, tall, leafy, leaves deltoid angles acuminate toothed membranous suddenly contracted into a broad short cuneate petiole, heads $\frac{1}{2}$ in. bracteolate 5-fld. in long peduncled axillary or terminal secund paniced racemes, invol. bracts 5 narrow-linear acute glabrous, ligules 0, achenes glabrous.

WESTERN HIMALAYA; Kashmir, alt. 8-10,000 ft., Falconer, Thomson, Levinge.

A very handsome species, 2-3 ft. high. Leaves 4-7 in. across the angles, very membranous. Heads sessile or peduncled and drooping, flowers three times as long as the involucre; anthers far exerted. Achenes sometimes as long as the involucre; pappus much shorter than the corollas, white.—Habit of section *Ligularia*, and near the Siberian *S. hastatus* (*Cacalia hastata*, L.), which has long-tailed anthers.

54. **S. quinquelobus**, Hook. f. & T.; herbaceous, glabrous or sparsely pubescent, stem simple long slender erect flexuous, leaves petioled membranous

cordate or subreniform and 3-7-angled or palmately lobed, angles or lobes coarsely sinuate-toothed and teeth acute and apiculate, petiole slender not auricled, heads narrow 5-6-fld. bracteolate long-peduncled drooping in simple or branched long slender racemes, invol. bracts 5-6 linear membranous, ligules 0, achenes slender glabrous shorter than the scanty white pappus. *Clarke Comp. Ind.* 209. *Prenanthes* ? quinqueloba, *Wall. Cat.* 3261; *DC. Prodr.* vi. 195.

TEMPERATE HIMALAYA; from Garwhal to Bhotan, alt. 10-12,000 ft.

Root perennial; stem grooved, 2-3 ft., naked below. *Leaves* 2-4 in., sometimes as broad as long or even broader, rather glaucous beneath, uppermost not cordate. *Racemes* a foot long and less, very slender, sometimes quite simple with second bracteate peduncles bearing solitary terminal heads and bulb-like leaf-buds in the axils; or the peduncle becomes an elongated branch bearing many bulbils. *Invol. bracts* obtuse or acute, green; corolla large, tube shorter than the campanulate limb; anthers exserted, with very short tails. *Achenes* $\frac{1}{16}$ in., tip dilated.

55. **S. chenopodifolius**, *DC. Prodr.* vi. 364; herbaceous, finely pubescent above, stem branched naked below, leaves membranous triangular-cordate or obscurely 3-lobed acuminate irregularly sinuate-toothed angles and teeth apiculate, petiole slender base broadly auricled, heads small numerous subsecund 3-fld. fascicled on the slender branches of paniced racemes, invol. bracts 3-5 minute, ligules 0, achenes glabrous shorter than the copious brown pappus. *Clarke Comp. Ind.* 209. *Mikania chenopodioides*, *Wall. Cat.* 3175.

CENTRAL AND WESTERN HIMALAYA; from Kashmir, alt. 7000 ft., *Falconer, Stewart*, to Nipal, *Wallich*.

Stem 2-4 ft., rather stout, but soft, terete, often flexuous. *Leaves* 3-5 in. long and often as broad, base truncate or cordate, subglaucous beneath. *Racemes* very slender, paniced; heads $\frac{1}{4}$ in. long, very shortly peduncled, drooping; invol. bracts $\frac{1}{10}$ in., oblong, pubescent, much smaller than the corollas, the slender tube of which equals in length the inflated limb; anthers hardly exserted. *Achenes* turbinate, unripe $\frac{1}{16}$ in. long.

*** *Erect herbs with leafy stems or branches and terminal broad corymbs.*

56. **S. Kunthianus**, *Wall. Cat.* 3118; stem erect glabrous or puberulous leafy simple or corymbosely branched above, leaves short-petioled ovate- or elliptic-lanceolate acute coarsely toothed white-tomentose beneath, heads $\frac{1}{2}$ in. long many-fld. bracteolate campanulate in broad terminal corymbs, invol. bracts 5-8 narrow acute glabrescent, ligules 5-7, achenes pubescent. *DC. Prodr.* vi. 369; *Clarke Comp. Ind.* 186.

TEMPERATE HIMALAYA; from Kashmir, alt. 10-14,000 ft., to Sikkim, alt. 12,000 ft.

Stem stout, often glandular, red when dry. *Leaves* $1\frac{1}{2}$ -3 by $\frac{1}{2}$ -1 in., smooth and glabrous above, snowy-white beneath. *Heads* peduncled. *Achenes* $\frac{1}{2}$ in.; pappus copious, white, as long as the tubular corollas.

57. **S. acuminatus**, *Wall. Cat.* 3107; pubescent above, stem corymbosely branched, leaves shortly petioled elongate-lanceolate caulate-acuminate finely serrate glabrous on both surfaces, nerves reticulate, heads $\frac{1}{2}$ in. long 2-3-fld. bracteolate narrow in terminal and axillary long-peduncled corymbs, invol. bracts 3-5 linear-oblong obtuse glabrous, ligule solitary minute, achenes glabrous. *DC. Prodr.* vi. 368; *Clarke Comp. Ind.* 187.

CENTRAL AND EASTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 8-10,000 ft., *J. D. H.*

An erect herb, 2-3 ft.; stem rather flexuous, obtusely angled. *Leaves* 5-7 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., rather thin, base acute. *Heads* very numerous; flowers twice as long as the involucre. *Pappus* reddish, equalling the tubular corollas.

**** *Shrubby, heads in axillary and terminal corymbs.*

58. **S. densiflorus**, *Wall. in DC. Prodr.* vi. 369; shrubby, branches leaves beneath and corymbs clothed with appressed white rarely grey cottony wool, leaves large petioled narrowly or broadly elliptic- or obovate-lanceolate acuminate toothed, heads $\frac{1}{4}$ in. long many-fld. bracteolate in axillary peduncled and terminal branched subpanicked corymbs, invol. bracts 8-12 linear acute tomentose, ligules 8-10, achenes glabrous. *Clarke Comp. Ind.* 185. *S. uncinnellus*, *densiflorus*, and *angulosus*, *DC. l. c.* 368, 369. *S. aureus* and *angulosus*, *Wall. Cat.* 3113, 3117. *Solidago densiflorus*, *Wall. Cat.* 1821.

CENTRAL AND WESTERN HIMALAYA; from Nipal to Bhotan, alt. 5-7000 ft. KHASIA Mts., alt. 4-6000 ft. BIRMA, *Parish*.

Branches stout. *Leaves* 5-9 by 1-3 $\frac{1}{2}$ in., glabrous or cottony above, teeth often hooked; petiole $\frac{1}{4}$ -1 in., with often small broad toothed auricles. *Heads* campanulate, shortly peduncled; invol. bracts white, opaque; receptacle pitted and bristly; ligules very short. *Achenes* $\frac{1}{14}$ in.; pappus equalling or shorter than the tubular corollas, white.

VAR. Parishii; corymbs paniced on a stout prolongation of the branch none axillary.—Birma, Nat Toungin, *Parish*.

VAR. ? Lobbi; nerves of leaves beneath with red-brown tomentum (as in *S. rufinervis*), heads paniced as in *var. Parishii* but larger with longer ligules.—Martaban, Thoug Gyne, alt. 5000 ft., *Lobb*.

VAR. ? mishmiensis; softly cottony, branches angled, leaves as in the type, heads fewer broader on longer peduncles, invol. bracts longer.—Mishmi hills, *Griffith*.—Specimens very imperfect.

59. **S. rufinervis**, *DC. Prodr.* vi. 369; shrubby, branches leaves beneath and corymbs clothed with appressed white cottony wool, leaves petioled oblong-ovate or elliptic acute or acuminate sharply toothed, base rounded cordate or acute, nerves beneath with red tomentum, heads $\frac{1}{2}$ in. long many bracteolate 8-10-fld. in lax branched paniced corymbs, invol. bracts 5-8 oblong acute very much shorter than the flowers, ligules 4-5 short, achenes glabrous.

WESTERN HIMALAYA; from Simla to Kumaon, alt. 6-8000 ft.

Habit of *S. densiflorus*, and foliage as large, but nerves red beneath, base often rounded or even cordate, petiole usually much longer, heads much narrower, with very few flowers and very short glabrous or pubescent broader invol. bracts that are not $\frac{1}{3}$ the length of the expanded corolla, and receptacle very narrow.

60. **S. Bhot**, *Clarke Comp. Ind.* 187; shrubby, stem strongly ribbed and angled, branches and corymbs loosely cottony, leaves sessile lanceolate acuminate sharply toothed or serrate nearly glabrous, heads $\frac{1}{2}$ in. diam. many-fld. in axillary and terminal subsessile corymbs with stout angled and ribbed divaricate branches, invol. bracts 8-10 linear-oblong acute green glabrous, ligules 9-14, achenes large ribbed glabrous.

BHOTAN, *Griffith*.

Branches with very prominent angles and ribs. *Leaves* (upper alone seen) 3-6 by 1-1 $\frac{1}{2}$ in., rather membranous, base narrowed rounded. *Corymbs* with singularly stout ribbed divaricate branches and peduncles; invol. bracts rigid, with a few basal green rather large and broad bracteoles; receptacle smooth, convex; ligules very short. *Achenes* $\frac{1}{16}$ in. and upwards; pappus white.—A very singular species; the specimens are past flower, and the exact number of ligules is not ascertainable.

61. **S. vagans**, *Wall. Cat.* 3108; quite glabrous, stem and branches long slender, leaves petioled ovate- or elliptic-lanceolate more or less toothed, heads $\frac{1}{3}$ in. very narrow ebracteolate in very loose axillary and terminal few-flowered corymbs with long filiform branches and peduncles, invol. bracts about 8 linear-

oblong acute or obtuse glabrous, ligules 3-5, achenes glabrous. *DC. Prodr.* vi. 368. *S. vagans*, var. β . *Clarke Comp. Ind.* 188.

NIPALESE HIMALAYA; central region, *Wallich*; eastern region, Tambur river, alt. 6-8000 ft., *J. D. H.*

One of the few perfectly glabrous Indian species of the section. *Branches* below terete, above often ribbed or angled. *Leaves* 3-5 by 1-2 in., thin, with slender nerves, base narrowed into the short petiole. *Heads* on almost capillary peduncles, drooping; bracts at the forks of the corymbs setaceous; invol. bracts much shorter than the flowers. *Achenes* $\frac{1}{8}$ in., very slender.

62. ***S. triligulatus***, *Ham. in Don Prodr.* 178; glabrous except sometimes the corymbs, stem and branches long and slender, leaves petioled ovate-lanceolate caudate-acuminate more or less serrate membranous, heads $\frac{1}{4}$ in. long few-fl. ebracteolate in rounded axillary and terminal much branched corymbs with short slender branches and peduncles, invol. bracts 8 short linear-oblong obtuse, ligules 3-4, achenes glabrous. *DC. Prodr.* vi. 368. *S. vagans*, var. α , *Clarke Comp. Ind.* 188. *Solidago floribundus*, *Wall. Cat.* 3111.

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 5-7000 ft., *J. D. H.*, &c.; Bhotan and Mishmi, *Griffith*.—DISTRIB. Birma.

Habit of *S. vagans*, but corymbs very different, rounded with shorter branches and peduncles, and heads much shorter, leaves with longer points.

63. ***S. Simonsii***, *Clarke Comp. Ind.* 188; glabrous, branches flexuous terete, leaves shortly petioled broadly elliptic acute toothed glabrous shining beautifully reticulated, heads small ebracteolate 8-16-fl. in axillary corymbs and a terminal leafy panicle, invol. bracts 7-10 oblong subacute glabrous, ligules 0, achenes 5-angled glabrous, pappus white.

ASSAM, *Simons*.

I have seen no specimen; *Clarke* describes it as a very handsome plant with leaves 4-5 in. long.

DOUBTFUL AND EXCLUDED SPECIES.

S. ? PEGUANUS, *DC. Prodr.* vi. 365; an altogether doubtful plant, which cannot be determined without a reference to the Candolleian Herbarium.

S. ANDERSONI, *Clarke Comp. Ind.* 104, does not occur near the limits of British India.

80. **OTHONNOPSIS**, *Jaub. & Spach.*

Glabrous leafy undershrubs. *Leaves* alternate, sessile, fleshy. *Heads* peduncled, solitary or paniced on the shortened leafy branches, heterogamous, radiate or disciform, yellow; outer fl. \varnothing , 1-seriate, fertile, ligule entire or 3-toothed or 0; disk-fl. \varnothing , sterile, tubular, limb 5-fl. *Involucre* ovoid or campanulate; bracts 1-seriate, oblong, bases subconnate; receptacle flat, naked. *Anther-bases* entire. *Style-arms* of \varnothing linear, tip truncate penicillate. *Achenes* of \varnothing oblong, obscurely 5-10-ribbed, pubescent or villous; of \varnothing slender, empty, glabrous; pappus hairs of \varnothing copious, ∞ -seriate, slender, white; of \varnothing scanty.—DISTRIB. Species 8, N. and S. Africa, and S. W. Asia.

1. ***O. intermedia***, *Boiss. Fl. Orient.* iii. 414; branches strict erect, leaves oblong elliptic or linear-oblong rarely subspathulate obtuse or acute quite entire, heads subsolitary long-peduncled, invol. bracts elliptic or lanceolate shorter than the ligules, achenes pubescent. *Clarke Comp. Ind.* 210.

WUZARISTAN, alt. 6-7000 ft., *Stewart*.—DISTRIB. Westward to Persia.

A shrub, 1-3 ft. high, with woody erect leafy branches and white bark. *Leaves* 1-2 $\frac{1}{2}$ in., obscurely 3-nerved, coriaceous when dry. *Heads* numerous, $\frac{3}{4}$ -1 in. diam.; peduncles 1-3 in., stout, terminal and sublateral, erect, naked, a little swollen below

the subturbinate base of the involucre; bracts variable in width; ligules yellow.—This is not a native of Scind, as stated in the Genera Plantarum, Stock's specimens being collected in Beluchistan.

81. WERNERIA, H. B. & K.

Characters of *Senecio*, but heads (of the Indian species) without outer basal bracts, and the invol. bracts connate below into a cup.—DISTRIB. Species about 17 Andean, and 1 Abyssinian.

1. **W. nana**, *Benth. in Gen. Pl.* 451; leaves small elliptic-ovate or orbicular obtuse quite entire, ligules not much exceeding the densely woolly involucre. *Ligularia nana*, *Dcne in Jacq. Voy. Bot.* 91, t. 99; *Clarke Comp. Ind.* 210.

WESTERN TIBET; Kiobrung Ghat, *Jacquemont*; Rajhote (N. of Kumaon), alt. 16,000 ft., *Strach. & Wint.*

Stem simple, stout, 4–6 in. high from a creeping rootstock, base with a membranous sheath. *Radical leaves* $\frac{1}{2}$ –1 in., broadly oblong or suborbicular, on long stout petioles, thick, quite entire, nerves very obscure; cauline 2–3, $\frac{1}{2}$ -amplexicaul, concave and sheathing below. *Head* solitary, erect, 1–1 $\frac{1}{4}$ in. diam., subhemispheric; peduncle stout; involucre very densely woolly; bracts about 16, united halfway up, obtuse, glabrous and veined within; ligules yellow, 3-nerved; style-arms linear, $\frac{1}{2}$ -cylindric, obtuse. *Achenes* glabrous; pappus rather scanty, $\frac{1}{4}$ in. long, white.

2. **W. Ellisii**, *Hook. f.*; leaves large elliptic obtuse toothed, ligules twice as long as the woolly and hairy involucre.

WESTERN HIMALAYA; Chumba, *R. Ellis*.

Root tuberous with very thick fibres. *Leaves* very coriaceous, 3–5 by 2–2 $\frac{1}{2}$ in., quite glabrous; nerves numerous, spreading; base narrowed into the very stout flexuous petiole 2–3 in. long. *Scape* with 2–3 shorter-petioled smaller leaves, tomentose, and, like the broad involucre, densely villous with black cellular curly hairs; head 2 $\frac{1}{2}$ in. diam.; invol. bracts about 16, connate to above the middle, ovate-lanceolate, acute; ligules 1 in. *Style-arms* with broad conical tips. *Achenes* glabrous; pappus copious, $\frac{1}{4}$ in., white, reddish at the base.—In the connate invol. bracts this and *W. nana* technically accord with the genus *Werneria*, but in many respects they seem to approach both to *Senecio*, sect. *Ligularia*, and to *Cremanthodium*, differing from the former in foliage, and from the latter in the erect heads.

TRIBE VIII. CALENDULACEÆ.

82. CALENDULA, Linn.

Annual or perennial herbs. *Leaves* alternate, entire or sinuate-toothed. *Heads* terminal, peduncled, heterogamous, rayed, yellow or orange; ray-fl. ♀, 1–2-seriate, fertile, ligules entire or 3-toothed; disk-fl. ♂, sterile, tubular, limb dilated shortly 5-fid. *Involucre* broad; bracts 1–2-seriate, linear, acuminate, subequal, margin often scarious; receptacle flat, naked. *Anther-bases* sagittate, auricles acuminate or tailed. *Style-arms* of ♂ undivided. *Achenes* glabrous, of the ray incurved, 2–3-seriate, heteromorphous, outermost often empty, the next broader often winged, inner shorter; of the disk slender, empty; pappus 0.—DISTRIB. Species about 10, S. Europe, N. Africa, and W. Asia.

1. **C. officinalis**, *Linn.*; *DC. Prodr.* vi. 451; annual, erect, hispidly pubescent, lower leaves spatulate quite entire, upper lanceolate base cordate-amplexicaul toothed or subentire, achenes all curved boat-shaped dorsally mucronate not beaked, outer larger ventrally crested scarcely beaked. *Clarke Comp. Ind.* 210; *Bot. Mag.* t. 3204.

Fields in the PUNJAB and SCIND, scarcely indigenous; Peshawur, *Aitchison*.—DISTRIB. Afghanistan, and westward to S. Europe.

Stem 12-18 in., corymbosely branched above. *Leaves* 1-3 in., acute, often hispid on both surfaces. *Heads* terminal, 2 in. diam. and under; invol. bracts $\frac{1}{2}$ in., incurved and appressed to the ripe achenes; ligules many, bright orange yellow, 3-toothed, tube hairy. *Achenes* longer than the involucre.

2. **C. arvensis**, Linn.; Boiss. *Fl. Orient.* iii. 418; annual, pubescent, radical leaves subspathulate entire, cauline lanceolate cordate-amplexicaul subentire or toothed, achenes all curved marginal dorsally echinate beaked, inner dorsally muricate. *DC. Prodr.* vi. 452; *Sibth. Fl. Græc.* t. 920.

KASHMIR, *Stoliczka*.—DISTRIB. S. Europe, W. Asia.

Habit of *C. officinalis*, but differing in the sulphur-coloured ligules and beaked achenes.—A doubtful native of India.

TRIBE IX, CYNAROIDEÆ.

83. ECHINOPS, Linn.

Thistle-like herbs, with white tomentum. *Leaves* alternate, pinnatifid, spinous. *Heads* in globose involucrate balls, blue or white, sessile or shortly stipitate on a common receptacle, 1-flid.; fl. ♂, all fertile, tube slender, limb with 5 slender segments. *Involucre* oblong; bracts ∞ -seriate, rigid, pungent or some spinescent, outer shorter, inner spathulate, innermost linear or lanceolate, sometimes all connate into a tube with one long rigid spine on the outer side; receptacle minute. *Filaments* glabrous; anther-bases sagittate, auricles connate, tails short entire or fimbriate. *Style-arms* thick, and with a thick basal ring, at length spreading. *Achenes* elongate, usually villous; pappus crown of many short free or connate bristles.—DISTRIB. Species about 70, S. Europe, tropical and N. Africa, and Asia to Japan.

1. **E. echinatus**, DC. in *Wight Contrib.* 24; *Prodr.* vi. 526: stem branched from the base, branches wide-spreading and leaves beneath white with cottony wool, leaves sessile oblong pinnatifid, lobes triangular or oblong sinuate and spinescent, involucre surrounded by strong white bristles glabrous scaberulous villous or cobwebby above, balls 1-1 $\frac{1}{2}$ in. diam. with many stout spines, outer invol. bracts 6-8 oblanceolate glabrous pungent one often spinescent, inner $\frac{1}{2}$ in. long connate tips ciliate, achenes $\frac{1}{2}$ in. long. *Roxb. Fl. Ind.* iii. 647; *Wall. Cat.* 2985; *Dalz. & Gibs. Bomb. Fl.* 131; *Clarke Comp. Ind.* 211. ? *E. Grifithianus*, Boiss. *Diagn.* 3, ii. 39; *Fl. Orient.* iii. 434.

UPPER GANGETIC PLAIN, NORTH WESTERN HIMALAYA, and the PUNJAB, from Benares westward, ascending to 5000 ft. in Sirmore. BEHAR, SCIND, and the DECCAN.—DISTRIB. Afghanistan.

A much branched spreading rigid annual, 1-2 ft. high, branched from the base. *Leaves* 3-5 in. long; spines often 1 $\frac{1}{2}$ in. *Balls* of heads white. *Involucre* $\frac{1}{2}$ in. long, inner hardening around the obconic silkily villous achene.

2. **E. cornigerus**, DC. *Prodr.* vi. 525; stem erect simple, branches stout and leaves beneath densely cottony, leaves ovate-oblong or oblong pinnatifid or pinnate cobwebby above, segments deeply lobulate, lobules spinescent, balls 2 $\frac{1}{2}$ -3 in. diam. with or without projecting spines, outer invol. bracts narrowly oblanceolate glabrous surrounded by bristles 1 in. long, inner connate when ripe $\frac{3}{4}$ in. long, achenes villous narrowly obconic $\frac{1}{2}$ in. long. *Clarke Comp. Ind.* 211. *E. coriarius*, *Clarke l. c.* 212.

WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 6-9000 ft., *Royle*, &c. WESTERN TIBET, alt. 9-13,000 ft., *Falconer*, *Thomson*.

Stem very leafy. *Leaves* 4-8 in. *Balls* stoutly peduncled, often without spines.—

The erect habit and very large balls and involucre distinguish this at once from *E. echinatus*.

3. ***E. niveus***, Wall. Cat. 2986; stem erect simple, branches and leaves beneath densely cottony, leaves bipinnatifid, segments narrow with long spines and revolute spinulose margins, balls 3 in. diam. spines usually included, outer invol. bracts oblanceolate spinescent, inner connate when ripe nearly 1 in. long. DC. Prodr. vi. 526; Royle Ill. t. 56, f. 1; Clarke Comp. Ind. 212.

NORTH WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 4-8000 ft.

The numerous very narrow much divided leaves, which are often recurved, best distinguish this from *E. cornigerus*.

84. **ARCTIUM**, Linn.

Tall coarse erect branched herbs. *Leaves* alternate or radical, broad, undivided. *Heads* terminal, sessile, solitary or fascicled, homogamous; fl. all similar, ♂, fertile, tubular, purplish, limb cylindric 5-fid. *Involucre* subglobose; bracts ∞-seriate, appressed, tips subulate spreading glochidiate; receptacle flat, densely bristly. *Filaments* glabrous; anther-bases sagittate; auricles small, tails setaceous. *Style-arms* linear with a basal pencil of hairs, or style pubescent below the arms. *Achenes* oblong, sub-3-quetrous, ∞-ribbed, glabrous, shining, truncate, base subequal; pappus hairs short, copious, serrulate, deciduous separately.—DISTRIB. Species 3 or 4, in temperate Asia and Europe.

1. ***A. Lappa***, Linn.; leaves petioled ovate-cordate margins sinuate beneath hoary or glabrate, heads subcorymbose glabrous or cottony, invol. bracts subulate hooked, achenes angled and ribbed grey mottled with black. Wall. Cat. 2928; Clarke Comp. Ind. 212. *Lappa* major, Gaertn., and minor, Schkuhr; Boiss. Fl. Orient. iii. 457. *L. tomentosa*, Lamk.

WESTERN HIMALAYA; Kashmir to Simla, alt. 6-8000 ft., Falconer, &c. WESTERN TIBET, alt. 11-13,000 ft., Thomson, &c.—DISTRIB. Westwards to the Atlantic.

A tall coarse herb, 2-4 ft. *Leaves* often 1 ft., usually cottony beneath. *Heads* $\frac{3}{4}$ -1½ in. diam., stoutly peduncled; invol. bracts slender, rigid, angled, spreading; corolla and stamens purple, styles white.

85. **COUSINIA**, Cass.

Thistle-like herbs. *Leaves* alternate, toothed lobed or pinnatisect, spinescent. *Heads* solitary or crowded, rarely corymbose, homogamous; flowers all similar, ♂ (outer rarely neuter), tubular, yellowish white or purple; limb cylindric, slender, usually unequal, 5-fid. *Involucre* globose ovoid or oblong; bracts ∞-seriate, appressed with long erect spreading or recurved spinous tips, inner erect slender scarious; receptacle flat, densely bristly. *Filaments* glabrous; anther-bases sagittate, auricles connate, tails branched or villous. *Style-arms* narrow, short or long. *Achenes* glabrous, obovate oblong or obpyramidal, 5-∞-ribbed, compressed, basal areole straight; pappus hairs 1-seriate, slender or flattened, simple, free, caducous, rarely 0.—DISTRIB. Species about 120, Central and Western Asiatic.

* *Bristles of the receptacle quite smooth.*

1. ***C. minuta***, Boiss. Fl. Orient. iii. 489; dwarf, annual, branches spreading usually decumbent, leaves sessile membranous hoary and cobwebby oblong or lanceolate sinuate-pinnatifid sparingly spinescent, heads small terminal and in the forks globose, receptacular bristles smooth, invol. bracts 15-20 triangular-lanceolate stout spreading and recurved, flowers yellow, achenes obovoid compressed 5-7-angled truncate with a crenulate ring, angles subcrenate. O.

calciotrapiformis, *Jaub. & Spach. Ill. Pl. Or.* ii. 157, t. 158; *Clarke Comp. Ind.* 213. *C. avalensis*, *Bunge Pl. Lehm.* 352.

THE PUNJAB, at Hazara, *Stewart, &c.*—DISTRIB. Afghanistan, Beluchistan, and Persia.

A small rigid herb, with spreading branches. *Leaves* cobwebby on both surfaces. *Heads* small, numerous; invol. bracts stellately spreading. *Pappus* very deciduous, hairs scabrid.

**** Bristles of the receptacle more or less rough.**

2. ***C. Thomsoni***, *Clarke Comp. Ind.* 213; tall, stout, erect, cottony, stem not winged, branched, radical leaves petioled linear deeply interruptedly pinnatifid cobwebby above densely white-tomentose beneath, segments horizontal triangular with a stout nerve and rigid long spine, cauline ovate-lanceolate sessile or auricled, heads $1\frac{1}{2}$ –2 in. diam. terminal peduncled, invol. bracts woolly numerous $\frac{1}{2}$ – $1\frac{1}{2}$ in. long triangular-lanceolate ending in a stiff spreading or recurved spine, inner linear scarious shining aristate, tip woolly, recept. hairs scabrid above, pappus scabrid. *C. Brandisii*, *Clarke l. c.* 215.

WESTERN HIMALAYA; from Lahul to Kumaon, alt. 10–14,000 ft., *Falconer, &c.*

Probably biennial; stem cottony all over, not shining. *Radical leaves* 5–10 by $\frac{3}{4}$ – $1\frac{1}{4}$ in.; segments sometimes forked or 3-sect at the base, with the lobes divaricating; midrib very stout and glossy. *Heads* suberect or nodding; invol. bracts variable in length and stoutness, very rigid; receptacular bristles $\frac{3}{4}$ in.; corolla glabrous, $\frac{1}{2}$ – $\frac{3}{4}$ in. long (1 in. *Clarke*). *Achenes* obovoid, glabrous.

3. ***C. Falconeri***, *Hook. f.*; stout, erect, cottony, stem not winged branched, radical leaves petioled pinnatifid or $\frac{1}{2}$ -pinnatifid cobwebby above densely white-tomentose beneath, segments horizontal triangular or lanceolate simple or lobulate, tip and lobes spinescent, heads $\frac{1}{2}$ – $2\frac{1}{2}$ in. diam. sessile or subsessile solitary or fascicled, invol. bracts numerous woolly 1 – $1\frac{1}{2}$ in. long subulate-lanceolate ending in a stiff erect or spreading spine, inner linear aristate scarious shining, recept. hairs scabrid above. *Cirsium*, sp. 15, *Herb. Ind. Or. H. f. & T.*

WESTERN TIBET, *Falconer*. KISHTWAR, alt. 11,000 ft. *Thomson*.

This is very near *C. Thomsoni*, but differs in the fascicled heads with straight invol. bracts, and in the broader usually less pinnatifid leaves with longer lobed segments.

4. ***C. auriculata***, *Boiss. Fl. Orient.* iii. 502; cottony, stem corymbosely branched not winged, leaves glabrous or cobwebby above densely cottony beneath, radical oblong-ovate obtuse serrulate, cauline ovate or ovate-lanceolate sinuate or pinnatifid, tip and lobes strongly spinescent, heads 1–2 in. solitary peduncled, invol. bracts $\frac{3}{4}$ – $1\frac{1}{2}$ in. base very small concave, spines very long stout spreading and recurved keeled deeply channelled above, inner scarious erect shining narrowly oblanceolate aristate margin above serrulate, receptacular bristles slender scabrid above twisted below.

TRANS-INDUS PLAINS, alt. 6000 ft., and KASHMIR valley (scarce), *Stewart*.—DISTRIB. Afghanistan.

The specimens are very imperfect, as are Griffith's, from which Boissier's description is taken. The pappus is, I think, very short or 0.

5. ***C. microcarpa***, *Boiss. Fl. Orient.* iii. 496; biennial, sparsely cottony, stem rather slender dichotomously corymbosely branched and branches spinuously winged, leaves glabrate above cottony beneath, radical lyrate runcinate-pinnatifid segments toothed, cauline sessile linear-oblong irregularly pinnatifid and toothed, lobes and teeth spinescent, heads 1 in. diam. peduncled globose,

invol. bracts cobwebby triangular-lanceolate $\frac{1}{2}$ in. long ending in very stout spreading flat keeled spines, innermost narrowly spathulate scarious shining apiculate serrate above, receptacular bristles scabrid, pappus 0. *C.?* *Hystrix*, *Clarke Comp. Ind.* 214, not of *C. A. Meyer*.

KASHMIR, alt. 5-6000 ft., *Falconer, Thomson*.—DISTRIB. Afghanistan, Persia.

A slender species, well characterised by the runcinate radical leaves, winged stems and absence of pappus.

86. *CARDUUS*, Linn.

Erect thistles. *Leaves* alternate, often decurrent, serrate-toothed or pinnatifid, spinescent. *Heads* solitary and long-peduncled or subsessile, scattered or crowded, homogamous; fl. all ♂ and fertile (rarely dioecious), white yellow or red, tube slender, limb equal or oblique 5-fid. *Involucre* ovoid hemispheric or globose; bracts ∞ -seriate, appressed, erect spreading or recurved and spinescent or with a spinescent appendage; receptacle flat or convex, densely bristly. *Filaments* hairy or glabrous. *Anthems* sagittate, auricles connate, tails slender. *Style-arms* short, rarely filiform, obtuse. *Achenes* glabrous, obovoid, obtusely 4-angled, smooth or 5-10-ribbed, truncate or the top umbonate, basal areole nearly straight; pappus copious, hairs ∞ -seriate, rigid, simple or barbelate, deciduous with a basal ring.—DISTRIB. Species about 30: temp. Europe, N. Africa and Asia.

1. *C. nutans*, L.; *Boiss. Fl. Orient.* iii. 515; biennial, cobwebby, tall, stem interruptedly winged, wings spinulose, leaves entire 1-2-pinnatifid waved spinous, heads $\frac{3}{4}$ -1 $\frac{1}{2}$ in. diam. solitary or fascicled hemispheric or subcampanulate inclined or drooping, invol. bracts subulate-lanceolate outer or all terminating in a spreading erect or reflexed spine, flowers crimson. *DC. Prodr.* vi. 621; *Reich. Ic. Fl. Germ.* 146; *Clarke Comp. Ind.* 215. *C. lucidus*, *Wall. Cat.* 2895.

WESTERN HIMALAYA; from Kashmir to Simla, alt. 6-12,000 ft.; and Hazara, in the PUNJAB. WESTERN TIBET; Nubra, alt. 13,000 ft., *Thomson*.—DISTRIB. N. Asia, and westward to N. Africa and W. Europe.

A tall stout thistle; stem 1-3 ft., usually simple, grooved, wing sinuous. *Leaves* 6-12 in., variable. *Achenes* pale brown, glabrous, granulate.—*Thomson*, as quoted by *Clarke*, remarks that the Himalayan plant is intermediate between *C. nutans* and *C. crispus*, L. (*C. acanthoides*, Sm.), which has smaller more erect fascicled heads: the fact is that the Indian specimens show every transition between the large stout form of *C. nutans* with subsolitary heads 1 $\frac{1}{2}$ in. diam., which is its typical European state, and a more slender form with fascicled or solitary or subracemose or paniced heads $\frac{3}{4}$ -1 in. diam. The invol. bracts are erect or recurved, though not so strongly as in most Western forms. A specimen collected by *Jaeschke* in Labul has fascicled globose heads $\frac{1}{2}$ in. diam., with the invol. bracts all short and very strongly recurved. Most of the Indian specimens exactly accord with a supposed hybrid between *C. nutans* and *crispus* found near Munich, and called *C. acanthoides-nutans*.

2. *C. Thomsoni*, *Hook. f.*; short, very robust, cottony or cobwebby above, leaves linear-oblong or lanceolate from a broadly auricled sessile base subpinnatifidly lobed strongly spinous very coriaceous shining, heads 2-3 in. diam. few fascicled or s. corymbose inclined densely woolly, invol. bracts short with a long strong spreading or recurved spine. *Carduus?*, *Clarke Comp. Ind.* 215.

WESTERN TIBET; Ladak, alt. 12-13,000 ft., *Thomson*.

Annual; 12-18 in. high, leafy; stem simple, strongly ribbed. *Leaves* 6-8 in., lowest narrowed at the base, upper dilated, spines very strong horizontal. *Invol. bracts* 1 in. long, outer with spinulose margins; recept. bristles very dense. $\frac{1}{2}$ in. long; corolla very slender, glabrous, 1 $\frac{1}{2}$ in.; filaments quite glabrous; anther-bracts very long, lacinate. *Achenes* nearly $\frac{1}{2}$ in., glabrous; pappus hairs stiff, very unequal, longest 1 $\frac{1}{2}$ in.

87. **CNICUS**, Linn.

Characters of *Carduus*, but outer invol. bracts foliaceous and pappus hairs feathery (unequal with the longer clavellate in all the Indian species).—DISTRIB. Species about 150, all N. temperate regions.

SECT. I. *Heads* dicæcious. *Corolla-limb* 5-partite. *Achenes* linear-oblong, compressed.

1. **C. arvensis**, Hoffm.; stem not winged cobwebby tomentose above, leaves sessile sinuate or pinnatifid, lobes divergent and tips spinescent tomentose beneath, heads solitary fascicled or corymbose, invol. bracts glabrate or cobwebby outermost short ovate or triangular-ovate ending in a short spine, inner gradually longer with undulate often recurved tips, innermost narrow linear-lanceolate scarious. *Clarke Comp. Ind.* 216. *C. candicans*, Wall. *Cat.* 2893, B. E. F. *Cirsium arvense*, Scop.; *DC. Prodr.* vi. 643; *Boiss. Fl. Orient.* iii. 552. *C. Stocksii*, Boiss. *Diagn.* 2, iii. 40. *Carduus lanatus*, Roxb. *Fl. Ind.* iii. 408. *Aplotaxis cirsoides* and *A. ? pungens*, *DC. l.c.* 540, 539.

BENGAL and GANGETIC PLAINS, from the Sonderbunds north-westward to the PUNJAB. WESTERN HIMALAYA, from Kashmir to Kumaon. WESTERN TIBET, alt. 11–13,000 ft.—DISTRIB. N. Asia and westward to the Atlantic.

Erect; stems many from the perennial creeping roots, usually simple, leafy, 2–3 ft., the sexes forming separate tufts. *Leaves* 3–5 in., more or less woolly beneath. *Heads* variable or shortly peduncled, ♂ globose, $\frac{1}{2}$ –1 in. diam., ♀ much longer, more campanulate, with more lax invol. bracts; corolla dingy purple. *Achenes* smooth, shining; pappus brownish white.—A pest in English fields.

SECT. II. *Heads* bisexual. *Corolla-limb* 5-lobed. *Achenes* shortly oblong, compressed.

* *Invol. bracts all spinulose, inner not dilated at the tip.*

2. **C. involucratus**, *DC. Prodr.* vi. 639 (*Cirsium*), *excl. syn.*; tall, stout, erect, leaves setulose above white-tomentose beneath teeth and lobes spinescent, radical petioled pinnate, segments lanceolate sinuate-lobed or -toothed, cauline broader cordate-amplexicaul ovate or lanceolate pinnatifid, heads $1\frac{1}{2}$ –2 $\frac{1}{2}$ in. diam. solitary or fascicled involucrate, invol. bracts glabrate all ending in slender erect or subrecurved spines or a few innermost linear acuminate, corolla 1 in. long. *C. Eriophorus*, *var. involucratus*, *Clarke Comp. Ind.* 217.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 8–12,000 ft.

Stem as thick below as the little finger, 2–6 ft. high, branched above. *Leaves*, radical a foot long, pinnatifid to the middle or deeper, or to the base with distant lobes. *Heads* inclined; corolla glabrous. *Achenes* $\frac{1}{2}$ in. long, obovoid-oblong, margins obtuse; pappus $\frac{3}{4}$ in., brown.—Western specimens of this have more rigid leaves, spinescent above, and longer stronger invol. spines than the Sikkim ones have. De Candolle describes the corollas as purple, which they appear to be when dry, but they are pale yellow-white when fresh. I have gathered in E. Nipal withered specimens of a plant like this, but with the leaves quite glabrous above and many rows of inner invol. bracts with soft reflexed flat wrinkled tips. I have also seen in Sikkim and the Khasia leaves supposed to belong to this species that are quite glabrous above.

VAR. horrida; more rigid, leaves more densely setulose above and spines much stronger.—Khasia Mts., alt. 5–7000 ft.; Kumaon, alt. 9000 ft., *Strach. & Winter*.

3. **C. argyracanthus**, *DC. Prodr.* 640 (*Cirsium*); stem cottony, leaves glabrous above cottony or glabrate beneath lobes and teeth strongly spinescent, radical petioled pinnatifid lobes rounded, cauline broader cordate-amplexicaul, heads $\frac{3}{4}$ –1 in. diam. sessile densely fascicled involucrate, invol. bracts with woolly margins and long strong erect or spreading spines, innermost

linear acuminate, corolla $\frac{1}{2}$ in. white. *Clarke Comp. Ind.* 218, excl. var. β . *C. vertus*, *Don Prodr.* 167? *Carduus argyranthus*, *Wall. Cat.* 2903.

TEMPERATE HIMALAYA, alt. 6-9000 ft., from Murree to Bhotan (excl. Sikkim).

A more slender plant than *C. involucratus*, with the leaves always glabrous above, and much more numerous smaller and densely fascicled heads. *Achenes* $\frac{1}{8}$ in. long; *pappus* $\frac{1}{2}$ in., nearly white.

4. **C. Falconeri**, *Hook. f.*; tall, very robust, stem villous, leaves membranous setose and spinescent above appressed cottony beneath teeth and lobes spinescent, cauline large broad ovate or ovate-lanceolate sinuate-lobed or sub-pinnatifid, head $2\frac{1}{2}$ -3 in. diam. subsolitary globose drooping densely woolly, invol. bracts very many lanceolate all ending in a long slender flexuous spine, corolla 1 in. *O. horridus*, *Clarke Comp. Ind.* 220, not of *Bieb.*

WESTERN HIMALAYA; from Kashmir, *Falconer*, to Kunawar, *Jacquemont*.

A very fine species, of which I have seen no radical leaves. The heads resemble those of *C. Eriophorus*, but the weak spines of the invol. bracts at once distinguish it.

5. **C. eriophoroides**, *Hook. f.*; tall, stout, stem sparsely villous or cottony, leaves membranous glabrous cobwebby or setulose above cottony or glabrate beneath, lobes and teeth spinescent, radical petioled pinnatifid lobes broad lobulate, cauline large broad ovate or ovate-lanceolate sinuate-lobed, heads 2-3 in. diam. solitary or clustered densely woolly, invol. bracts lanceolate ending in soft long spines inner numerous linear acuminate, corolla $2\frac{1}{2}$ in. *C. Eriophorus*, *Herb. Ind. Or. H. f. & T.*; *Clarke Comp. Ind.* 217.

SIKKIM HIMALAYA; alt. 10-14,000 ft., *J. D. H.*

Very similar to *C. Falconeri*, but the heads are less globose, the invol. bracts fewer and many of the inner are soft linear and not spinescent, the corollas are longer. *Achenes* and *pappus* as in *C. involucratus*.

6. **C. Griffithii**, *Hook. f.*; robust, stem cottony, cauline leaves sessile or base auricled pinnatifid, lobes lanceolate acute spinescent setulose above white appressed-tomentose beneath, heads 2 in. diam. crowded glabrous, outermost invol. bracts short with acicular points, the rest linear wavy aristate or acuminate, corolla $1\frac{1}{4}$ in. long.

UPPER ASSAM; Mishmi hills, *Griffith*.

This differs from all the previous described species in the long soft invol. bracts, which are extremely numerous, quite glabrous, none really spinescent, the points of the outermost being merely needle-like. The *pappus* is longer, fully 1 in. long. The *achenes* are as in *C. involucratus*.

** *Inner invol. bracts with dilated tips.*

7. **C. Wallichii**, *DC. Prodr.* vi. 643 (*Cirsium*); stem pubescent leafy, leaves sessile sinuate-pinnatifid lobes spinescent lobulate spines very long and strong glabrous above and beneath or cottony or tomentose beneath, heads $\frac{3}{4}$ - $1\frac{1}{2}$ in. solitary and on naked peduncles or sessile fascicled and involucrate, outer invol. bracts lanceolate ending in appressed erect or recurved spines, inner with spreading or recurved more or less dilated, lanceolate or ovate spreading or recurved scarious serrulate acute or spinescent tips, corolla $\frac{3}{4}$ in. long. *C. carlinoides*, *Cass. var. \beta*, *Herb. Ind. Or. H. f. & T.*

TEMPERATE HIMALAYA; from Marri to Bhotan, alt. 6-12,000 ft. NILGHERY Mts., alt. 6000 ft.

An extremely variable plant, 4-10 ft. high, with spreading branches, which passes into *C. argyranthus* through var. *Wightiana* in the Eastern Himalayas and the Nilgherries. The following varieties pass into one another in the most perplexing way. Corolla white, yellow or red (according to Clarke).

VAR. 1. *nepalensis*; leaves white-tomentose beneath, heads peduncled, inner invol. bracts with broadly dilated scarious reflexed tips in many series more numerous than the outer spiniferous ones, sometimes occupying two thirds of the head. *Cnicus arachnoides*, Wall. Cat. 2891. *C. Wallichii*, Clarke Comp. Ind. 219. *Cirsium nepalense*, DC. Prodr. vi. 642.

VAR. 2. *cernua*; more slender, leaves white-tomentose beneath, heads peduncled, inner invol. bracts in few series with narrowly dilated erect or reflexed tips, much fewer than the outer spiniferous ones and occupying nearly the whole head. *C. argyranthus*, var. β , Clarke Comp. Ind. 218. *C. cernuus*, Wall. Cat. 2892. *Cirsium Wallichii*, DC. Prodr. vi. 643.

VAR. 3. *glabrata*; usually larger with more membranous leaves which are quite or nearly glabrous beneath, heads large fascicled or peduncled, inner invol. bracts numerous with long lanceolate or ovate spinescent tips.

VAR. 4. *fasciculata*; very spinous, leaves white-tomentose or cottony beneath, heads fascicled, inner invol. bracts with long lanceolate dilated spinescent tips.

VAR. 5. *platylepis*; very spinous, leaves sessile tomentose or glabrous beneath, heads usually fascicled, invol. bracts almost all short with broadly ovate spinescent tips.—Kashmir and Dras.

VAR. 6. *Wightii*; tall, much branched, leaves glabrous or nearly so beneath, heads large usually fascicled, inner row of bracts with dilated or hardly dilated lanceolate recurved tips. *Cirsium argyranthus*, Wight Ic. t. 1137-8. *C. macracanthum*, Schultz-Bip. in Herb. Hohenack. No. 1019.—From Simla to Sikkim, alt. 8-10,000 ft., and Bhotan. This passes into *C. argyranthus*. One Sikkim specimen has no obvious dilatation to the inner invol. bracts.

*** Outer invol. bracts spinulose, inner linear with inflexed acute (not dilated) tips.

8. ***C. sinensis***, Gard. et Champ. in Hook. Kew Journ. 1323 (*Cirsium*); stem slender strict fastigiately branched above, branches slender erect, leaves narrow sessile linear-oblong or -lanceolate ciliate and spinescent smooth or scaberulous above white-tomentose beneath, heads solitary long-peduncled erect 1 in diam. glabrous or cottony, outer invol. bracts appressed oblong obtuse or tips spinulose inner linear with inflexed acute tips, corolla $\frac{3}{4}$ in. purple. Clarke Comp. Ind. 219.

KHASIA Mts.; in marshy places, alt. 4-6000 ft., Griffith, &c.—DISTRIB. Upper Birma, China.

Stem 3-6 ft., stiff, glabrous or slightly pubescent. Leaves numerous, 2-5 in., the larger and longer sinuate-lobed, the lobes bearing 2-3 spines, the sinus spinulose, margins of the smaller leaves recurved, upper very small. Invol. bracts very numerous and appressed, imbricate in many series. Achenes $\frac{1}{2}$ in.; pappus $\frac{1}{2}$ in.

88. **SILYBUM**, Gaertn.

An erect glabrous thistle. Leaves alternate, sinuate-lobed, spinescent, marbled with white. Heads large, solitary, terminal, nodding, homogamous; flowers all σ , similar and fertile, purple, tube slender, limb dilated below 5-fid. Involucre subglobose; bracts ∞ -seriate, broad and fimbriated with spines below above terminating in a spreading rigid spine, inner lanceolate erect pungent; receptacle flat, densely bristly. Filaments glabrous, united in a sheath below; anther-bases sagittate, auricles connate mucronate or shortly tailed. Style subentire, ring below the hairs not prominent. Achenes glabrous, obovoid-oblong, compressed, basal areole straight; pappus-hairs ∞ -seriate, unequal, subpaleaceous, united at the base in a deciduous ring.

S. Marianum, Gaertn.; Boiss. Fl. Orient. iii. 556; DC. Prodr. vi. 616; Clarke Comp. Ind. 220; Reichb. Ic. Fl. Germ. t. 151. *Carduus Marianus*, Linn.

PUNJAB and N. W. HIMALAYA; Peshawur, Hazara, and from Kashmir to Jamu, alt. 6-8000 ft.—DISTRIB. Westwards to N. Africa and Europe.

Annual or biennial; shining; stem 1-4 ft., grooved, not winged. *Leaves* large, with strong spines. *Heads* 1-2 in. diam., base intruded; invol. bracts coriaceous, with a spine $\frac{1}{2}$ - $\frac{3}{4}$ in. long, outermost mucronate; receptacle fleshy, flowers rose-purple. *Achenes* $\frac{1}{4}$ in., transversely wrinkled, black or gray; pappus white.

89. SAUSSUREA, DC.

Annual, biennial or perennial, glabrous or tomentose herbs of various habit. *Leaves* unarmed, alternate, entire toothed pinnatifid or pinnatisect. *Heads* narrow or broad, sometimes crowded on the dilated top of a simple stem, peduncled or sessile, solitary corymbose or panicle, homogamous; flowers purple or blueish, all ♂ and similar, tube slender, limb narrow 5-fid. *Involucre* ovoid oblong globose or hemispheric; bracts ∞ -seriate, appressed, not spinescent, inner longer narrower; receptacle flat or convex, densely bristly, rarely naked. *Filaments* free, glabrous; anther-bases sagittate, auricles connate, tails usually long entire ciliate or woolly. *Style-arms* linear. *Achenes* glabrous, oblong, 4-ribbed, smooth or rugose; top truncate and cupular, or crowned with a thickened disk and the persistent base of the style; basal areole straight; pappus-hairs 1-2-seriate, inner feathery, base thickened and connate into a deciduous ring, outer usually of rigid scabrid bristles rarely feathery or 0.—DISTRIB. Species about 60, northern temp. and mountain plant.

Saussurea finds its maximum development in the Himalaya, and is protean in habit, foliage, inflorescence, and all its organs. It presents two very distinct groups, of which that designated *Eriocoryne* is as well deserving of generic recognition as any in the Order. For the subordinate divisions I have been compelled to have recourse to characters of habit and foliage. Little dependence can be placed on the size of the head, nor on the number, form and texture of the invol. bracts (of which *S. deltoidea* is a most conspicuous example); nor on the absolute length of the recept. bristles, though their relative length is a fair guide. The achenes often vary extremely in the same species, in length, amount of compression, smoothness or roughness, and in the form of the top; and the outer pappus, which is always, when present, caducous, is sometimes absent or present in the same species.

SUBGEN. I. Eusaussurea. Glabrous, woolly or cottony, rarely villous herbs. *Stem* 0 or simple or branched above. *Heads* sessile or peduncled. *Achenes* truncate or crowned with a rim or cup on which the outer pappus, if present, is inserted.

SECT. 1. *Stem* simple, leafy. *Heads* more or less enclosed in the inflated bladdery, membranous, veined uppermost leaves. (See also *S. glandulifera*.)

1. ***S. obvallata*, Wall. Cat. (under 2906);** stem stout simple pubescent or glabrate, leaves 4-8 in. glabrous obtuse toothed lower petioled elongate-ovate, cauline sessile $\frac{1}{2}$ -amplexicaul oblong concave, floral cymbiform membranous enclosing 2-6 sessile or shortly peduncled glabrous heads, invol. bracts lanceolate, pappus brown, outer bristles scabrid or 0. *Clarke Comp. Ind.* 223. *Carduus obvallatus* and *C. tectus*, *Wall. Cat.* 2095, 2906. *Aplotaxis obvallata*, *DC. Prodr.* vi. 541; *Deless. Ic. Sel.* iv. t. 69; *Ledeb. Fl. Ross.* ii. 673 (*Haplotaxis*).

WESTERN HIMALAYA; from Kashmir to Sikkim, alt. 10-15,000 ft., *Blinkworth* &c.—DISTRIB. Altai Mts.

Root very thick, crowned with blackened remains of petioles, &c. *Stem* 6-18 in., as thick as a little finger or less, terminated by the incurved bladdery veined translucent leaves which form a pale head 3-6 in. diam. *Heads* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., hemispheric; invol. bracts tipped and often margined with black; corolla $\frac{1}{4}$ in.; anther-tails very

short, laciniate. *Achenes* obovoid, flattened, glabrous, ribbed; pappus $\frac{1}{2}$ in., pale brown with sometimes a few outer rough bristles.—There is no specimen of *C. tectus* in Wallich's Herbarium, and I follow DC. in citing it as a synonym.

2. ***S. uniflora*, Wall. Cat. 2916**; stem simple laxly villous, leaves 4–8 in. glabrous obtuse toothed, lower long-petioled linear-oblong or -obovate, cauline sessile $\frac{1}{2}$ -amplexicaul often acuminate, floral usually cymbiform membranous often enclosing the large usually solitary subsilky head, peduncle stout silkily woolly, invol. bracts ovate-lanceolate, pappus brown outer bristles scabrid.

CENTRAL AND EASTERN HIMALAYA; Nipal, *Wallich*. Sikkim, alt. 10–15,000 ft., *J. D. H., &c.*

Stem 1–2 ft., more slender than in *S. obvallata*. *Radical leaves* with the blade 4–7 in., and the petiole as long; involucrum leaves purple, quite entire, sometimes small and enclosing only the very young head, at others reduced, elliptic, acuminate, silkily villous on both surfaces. *Head* very variable in size, rarely two, 1–2 in. diam., campanulate; invol. bracts with long narrow tips; corolla $\frac{1}{2}$ in. long; anther-tails laciniate. *Achenes* $\frac{1}{2}$ in., glabrous; pappus as in *S. obvallata*, but longer, $\frac{1}{2}$ in.

VAR. *conica*; heads many. *S. conica*, *Clarke Comp. Ind. 224*.—Sikkim, Singalelah, alt. 10,000 ft., *Clarke*. I find no character whatever, except the number of heads, to separate this from *S. uniflora*, which is an unfortunate name.

3. ***S. Schultzii*, Hook. f.**; glabrous or puberulous, stem stout simple, leaves toothed radical narrowed into a very stout petiole linear-oblong acute midrib very thick, cauline $\frac{1}{2}$ -amplexicaul acuminate, floral short cymbiform membranous partially enclosing the numerous crowded silkily villous heads, invol. bracts blackish lanceolate acuminate, pappus brown outer bristles scabrid.

WESTERN TIBET; from N. Kashmir to the Karakoram Mts., alt. 14–17,000 ft., *Thomson, &c.*

Root very stout; crown clothed with the stout recurved remains of the old petioles; stem 6–16 in., often coloured. *Leaves* 3–5 by $\frac{1}{2}$ –1 $\frac{1}{2}$ in., leathery, coarsely toothed; floral 1–2 in. long, often as broad and rosy. *Heads* $\frac{1}{2}$ –1 in. diam.; peduncles short, stout, densely woolly; invol. bracts with very slender tips, corolla $\frac{1}{2}$ in.; anther-tails short woolly. *Achenes* glabrous, ripe not seen; pappus whiter than in *S. obvallata*.—The late Prof. Schultz proposed (in mss.) the name of *setifolia* for this, but I cannot see how it applies in any sense. It may be only a large form of the following.

4. ***S. bracteata*, Dcne. in Jacq. Voy. Bot. 94, t. 102**; dwarf, scaberulous or puberulous, stem 3–6 in. very stout, leaves linear-lanceolate or narrowly elliptic acute coarsely toothed, lower narrowed into a very short petiole, upper sessile, floral short cymbiform membranous coloured partly enclosing the solitary large sessile subsilky head, invol. bracts blackish lanceolate acuminate, pappus white, outer bristles scabrid. *Clarke Comp. Ind. 224*. ? *S. Schlagintweitii*, *Klatt in Sitzung. Münch. Akad. 1878, 94*.

WESTERN TIBET; from Ladak and Nubra eastwards to the Balch Pass (N. of Kumaon), alt. 14–18,000 ft., *Jacquemont, &c.*

This much resembles a diminutive form of *S. Schultzii* with one or two stems from the root, shorter petioles, and much larger heads in proportion, varying from 1–1 $\frac{1}{2}$ in. diam.; the achenes are similar, and the pappus is white $\frac{1}{2}$ in. long.

SECT. 2. ***Acaules***. *Stem* very short or obsolete (or elongate in *S. Sugho*). *Heads* solitary or few, sessile or subsessile amongst the leaves. (See also sessile-headed forms of species in sect. 3.)

* *Pappus* double, hairs of both feathery. *Densely tufted dwarf herb, leaves not pinnatifid*.

5. ***S. Thomsoni*, Clarke Comp. Ind. 227**; dwarf, stemless, glabrous,

leaves small $\frac{1}{2}$ – $1\frac{1}{2}$ in. sessile or narrowed into a short thick petiole obovate or oblong obtuse quite entire or obtusely toothed densely coriaceous nerveless, uppermost orbicular sheathing the involucre, heads one or more sessile crowded subglobose, invol. bracts obovate-oblong obtuse glabrous, receptacle fimbriate, pappus double both feathery. *S. acaulis*, *Klatt in Sitzung. Münch. Akad.* 1878, 91.

WESTERN TIBET; Nubra, alt. 17–18,000 ft., *Thomson*; *Schlagintweit*.

Root fusiform, crown very short. Leaves variable, always thickly coriaceous, in a flowerless specimen $2\frac{1}{2}$ in. long and narrowly spatulate, in most others spreading obovate, midrib very indistinct. Heads $\frac{1}{2}$ in. diam., densely clustered, sheathed by rounded floral leaves which are much shorter than the involucre; invol. bracts purplish; corolla $\frac{1}{4}$ in. long.; anther-tails short, entire. Achenes $\frac{1}{2}$ in., glabrous, ripe not seen; pappus $\frac{1}{4}$ in., brown, all the hairs softly feathery.

6. *S. werneroides*, *Schultz-Bip. in Herb. Hook.*; dwarf, densely tufted, leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. narrowed into densely imbricating sheathing petioles lanceolate coriaceous glabrous above densely tomentose beneath, tip subulate, margins toothed revolute often to the midrib, heads solitary sessile amongst the leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., invol. bracts lanceolate acuminate rigid or broad and concave, receptacle bristly, pappus double both feathery. *S. subulata*, *Clarke Comp. Ind.* 226, *in part*.

SIKKIM HIMALAYA; on the Tibetan frontier, alt. 16–18,000 ft., *J. D. H.*

Root a foot long; crown dividing into numerous densely tufted branches $\frac{1}{2}$ –1 in. long, together forming cushions. Leaves erect or spreading, very coriaceous, rather glossy above. Invol. bracts very variable, often purple, glabrous or sparsely woolly, sometimes lanceolate acuminate, at others apparently replaced by the short concave, coriaceous sheaths of the uppermost leaves; recept. bristles (overlooked in *Clarke's* description) rigid, scabrous; corolla $\frac{1}{4}$ in.; anther-tails long, woolly. Achenes very small (not ripe).

** Outer pappus of scabrid bristles or 0; leaves entire or pinnatifid.

7. *S. subulata*, *Clarke Comp. Ind.* 226, *in part*; dwarf, densely tufted, below densely clothed with imbricating sheathing petioles, leaves $\frac{1}{2}$ – $1\frac{1}{2}$ in. very laxly hairy or glabrate sparsely woolly towards the base linear-lanceolate or subulate narrowed into the sheathing petiole, tip subulate, margin quite entire revolute to the midrib, heads $\frac{1}{2}$ –1 in. diam. solitary sessile amongst the leaves, invol. bracts oblong-lanceolate acuminate rigid, receptacle fimbriate, outer pappus bristles scabrid. *S. setifolia*, *Klatt in Sitzung. Münch. Akad.* 1878, 95.

WESTERN TIBET; Nubra, alt. 15–18,000 ft., *Thomson*.—DISTRIB. Yarkand.

Habit of *S. werneroides*, but the leaf bases are woolly, the leaves much narrower, not at all toothed, and less coriaceous, the heads are larger, the receptacle fimbriiferous, and the few outer pappus bristles are scabrid. It may be a dwarf high alpine form of *S. glandulifera*; the anther-tails are short and bearded.

8. *S. Atkinsoni*, *Clarke Comp. Ind.* 224; stemless, glabrous or midrib and nerves of leaves beneath pubescent, leaves 3–5 petioled or sessile spreading from the root broadly obovate or elliptic membranous toothed reticulate, head sessile solitary, inner invol. bracts linear oblong scarious, receptacle naked or entire, outer pappus bristles few scabrid.

WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 10–13,000 ft., *Falconer, &c.*

Root-stock undivided. Leaves $2\frac{1}{2}$ –4 by $1\frac{1}{2}$ –3 in., spreading flat on the ground. Head $\frac{3}{4}$ –1 in. long; outer invol. bracts very variable, ovate-lanceolate, erect or recurved, glabrous or margins pubescent; corolla upwards of $\frac{1}{2}$ in.; anther-cells shortly fimbriate. Achenes glabrous; pappus $\frac{1}{2}$ in., brown.—See remarks under *S. Clarkei* in reference to this species.

9. **S. Stoliczkai**, *Clarke Comp. Ind.* 225; dwarf, densely tufted, white with cottony wool, leaves obovate-oblong or oblanceolate lyrate or sinuate-pinnatifid cottony beneath or on both surfaces, lobes acute or obtuse short very irregular terminal ovate, head $\frac{1}{2}$ –1 in. diam. sessile, invol. bracts linear-lanceolate outer with broad bases inner narrower membranous with dark tips. receptacle densely bristly, outer pappus bristles few scabrid.

WESTERN TIBET and KUNAWUR; alt. 13–16,000 ft., *Thomson, Stoliczka*.

Root stout; branches of stock often as thick as the little finger, crown divided into very stout short 1-headed branches clothed with brown scarious leaf-sheaths. *Leaves* 1–2 in., usually snow white, lobes sometimes a little recurved, obtuse or acute. *Invol. bracts* $\frac{2}{3}$ in. long, sheathed by the bases of the uppermost leaves; corolla upwards of $\frac{1}{2}$ in.; anther-tails short woolly. *Achenes* glabrous, $\frac{1}{8}$ in. long; pappus $\frac{1}{2}$ in. brown.

10. **S. Sugho**, *Clarke Comp. Ind.* 225; dwarf, stem 0 or 4–6 in., leaves oblong-obovate or oblanceolate acute very coriaceous narrowed into the petiole coarsely toothed or runcinately pinnatifid with the teeth and lobes apiculate scaberulous above white-tomentose beneath, heads $\frac{1}{2}$ in. diam. solitary sessile or 2–3 shortly peduncled glabrous or puberulous, outer invol. bracts lanceolate from an ovate base coriaceous inner linear acuminate scarious, receptacle bristly, outer pappus-bristles scabrid or 0.

SIKKIM HIMALAYA; towards the Tibetan frontier, alt. 12–16,000 ft., *J. D. H., T. Anderson*.

Very variable, smaller specimens have a divided root-stock $\frac{1}{2}$ –1 in. long and one sessile head, larger have an undivided stock and an elongating leafy stem 6 in. high with 2 or more peduncled heads. *Leaves* coriaceous in the larger specimens, 3 in. long with a slender petiole 1–1 $\frac{1}{2}$ in., in smaller the leaves are shorter petioled or subsessile, upper surface reticulated. *Invol. bracts* above margined and tipped with dark purple; corolla more than $\frac{1}{2}$ in.; anther-tails short, woolly. *Achenes* muricate and sparsely villous; pappus $\frac{1}{2}$ in. pale brown.

11. **S. Yakla**, *Clarke Comp. Ind.* 227; dwarf, stemless, leaves sessile or petioled spreading large short or long linear-oblong pinnate or pinnatifid membranous puberulous above white-tomentose beneath, lobes or segments broadly ovate or subtriangular sinuate-toothed tips and teeth mucronate, heads 1–3 very large 1–3 in. diam. sessile pubescent or glabrate, invol. bracts narrowly lanceolate acuminate rather membranous pale, recept. bristles long, anther-tails lacinate, achenes 4-gonous muricate, outer pappus-hairs 0

SIKKIM HIMALAYA; Yeumtong and Chola, alt. 11–12,000 ft., *J. D. H. Yakla*, alt. 16,000 ft., *Clarke*.

Root-stock woody, undivided. *Leaves* very flaccid in specimens from 11–12,000 ft., 10–15 by 2–2 $\frac{1}{2}$ in., in those from 16,000 ft. 3–4 in. by 2–3 in. *Heads* very variable; invol. bracts erect; corolla nearly 1 in. long. *Achenes* $\frac{1}{8}$ in., angled; angles muricate, crown strongly cupped; pappus $\frac{3}{4}$ in., brown.—Habit of a *Dolomiaea* (*Jurinea*).

SECT. 3. **Caulescentes**. *Heads* solitary, rarely 2–3 on an erect elongate quite simple stem or leafy peduncle 1–6 in. high. *Leaves* both radical and cauline. (Heads sometimes sessile, see also forms of species in sect. 2.)

* *Leaves pinnatifid or pinnate, white beneath.*

12. **S. taraxicifolia**, *Wall. Cat.* 2914; stem 0 or 1–6 in. glabrous or cottony, leaves petioled spreading linear elongate runcinate-pinnatifid glabrous or nearly so above white-tomentose beneath, lobes numerous oblong or obtusely triangular rarely toothed or lobulate, tips and teeth mucronate, head solitary 1–1 $\frac{1}{2}$ in. diam. glabrous or sparsely cottony, invol. bracts lanceolate, receptacle

densely bristly, anther-tails short woolly, achenes glabrous, outer pappus-hairs few scabrid. *DC. Prodr.* vi. 532; *Clarke Comp. Ind.* 228. *S. caespitosa*, *Wall. Cat.* 2913; *Clarke l. c.* *Aplotaxis caespitosa*, *DC. l. c.* 539. *Cyathidium taraxicifolium*, *Lindl. in Royle Ill.* 251, t. 56, f. 2.

ALPINE HIMALAYA; from Kunawur to Sikkim, alt. 12-15,000 ft. WESTERN TIBET; Rupchu, alt. 16,000 ft., *Heyde*.

Very variable; stock stout, clothed with the black remains of withered petioles, simple or divided; stem rarely 6 in., rather slender. *Heads* very variable in breadth and shape, and the bracts in breadth, outer sometimes with recurved tips; corolla upwards of $\frac{1}{2}$ in. *Pappus* pale brown, $\frac{1}{2}$ in.

VAR. depressa; dwarf, stemless, leaves 2-3 in. more regularly and closely pinnatifid with recurved short lobes.—Garwhal to Sikkim, alt. 12-15,000 ft.

13. ***S. Kunthiana***, *Clarke Comp. Ind.* 225; dwarf, stemless, leaves petioled spreading linear-elongate pinnatifid or runcinate glabrous or pubescent above white-tomentose beneath, lobes quadrate semi-circular or oblong entire or lobulate and toothed, tip teeth and lobes apiculate or mucronate, head solitary sessile 1-1 $\frac{1}{2}$ in. diam., invol. bracts lanceolate inner often with subsquarrose tips, anther-tails short woolly, receptacle bristly, achenes muricate, outer pappus-hairs few scabrid. *Leontodon* ? *Kunthianum*, *Wall. Cat.* 3292. *Aplotaxis leontodontoides*, *DC. Prodr.* vi. 539.

ALPINE HIMALAYA; from Kashmir to Sikkim, and WESTERN TIBET, alt. 14-16,000 ft.

Very similar indeed to *var. depressa* of *S. taraxicifolia*, from which the muricate achenes at once distinguish it, the lobes of the leaf are $\frac{1}{4}$ - $\frac{1}{2}$ in. long, usually broader, more square and lobulate, and their upper surface is never glabrous.

VAR. major; larger in all its parts, leaves sometimes pinnatisect, lobes $\frac{1}{2}$ - $\frac{1}{2}$ in. less recurved broadly oblong or ovate sinuate or subpinnatifid scabrid above, invol. bracts glabrous more coriaceous, anther tails more conspicuously woolly.—Sikkim, interior ranges, alt. 13-16,000 ft.

VAR. filicifolia; leaves pinnatifid nearly to the midrib, lobes regular oblong or linear-oblong entire or auricled at the base of the upper margin obtuse or apiculate.—Sikkim, Jongri and Yakla, alt. 13,000 ft., *Clarke*. Habit of a small *Polypodium*.

14. ***S. polystichoides***, *Hook. f.*; dwarf, stemless, leaves petioled spreading linear-elongate pinnatisect glabrous above white-tomentose beneath, segments rounded ovate or subquadrate spinulous-toothed, heads $\frac{1}{2}$ -1 in. sessile or peduncled glabrous, invol. bracts lanceolate acuminate erect or subsquarrosely recurved, anther-tails short woolly, receptacle naked, achenes muricate, outer pappus-hairs few scabrid.

SIKKIM HIMALAYA; alt. 13-16,000 ft., *J. D. H., Elwes, Clarke*.

Very closely allied indeed to *S. Kunthiana*, but the leaves are pinnate and the receptacle without bristles; the leaf segments are horizontal and slightly recurved.

15. ***S. Falconeri***, *Hook. f.*; stem very stout short or long cottony or woolly, leaves petioled linear-elongate cottony above and more so beneath irregularly sinuate-pinnatifid or toothed, lobes or teeth distant spreading or recurved broadly triangular acute, heads 1-2 in. diam., invol. bracts linear-lanceolate cottony, recept. bristles shorter than the smooth achenes, anther-tails short woolly, pappus double or single.

WESTERN TIBET; Karakoram, alt. 14,500 ft., *Falconer, Clarke*. KASHMIR, alt. 13,000 ft. *Clarke*.

Very similar to *S. taraxicifolia*, but distinguished by the woolly habit and very stout stem or peduncle. *Stock* stout or slender, sometimes very thickly clothed with the black shining remains of the old petioles. *Stem* 1-6 in., nearly $\frac{1}{4}$ in. diam., sparingly leafy. *Leaves* 3-6 by $\frac{1}{4}$ - $\frac{1}{2}$ in. *Invol. bracts* pale, erect, corolla $1\frac{1}{4}$ in.

Pappus more than $\frac{1}{2}$ in., pale brown.—I can find no difference whatever between the two following forms except that of the pappus.

VAR. 1. Outer pappus of plumose bristles.—Kashmir.

VAR. 2. Outer pappus of scabrid bristles or 0.—Western Tibet and Kashmir.

** *Leaves pinnatifid, glabrous on both surfaces.*

16. **S. Andersoni**, *Clarke Comp. Ind.* 226; perfectly glabrous, stem 0 or 3-6 in., leaves spreading linear-elongate sessile or petioled membranous pale beneath runcinate-pinnatifid, lobes distant small short ovate and acute or subulate, heads solitary $\frac{1}{2}$ -1 in., invol.-bracts ovate or ovate-lanceolate with dark borders, recept. bristles few, anther-tails woolly, achenes muricate, pappus dark brown outer 0.

SIKKIM HIMALAYA; Lachen, alt. 10-12,000 ft., *J. D. H.*; Jongri, alt. 13,000 ft., *Clarke*.

This much resembles *S. taraxicifolia*, but is perfectly glabrous, with very short distant leaf-lobes or -teeth. between which the rachis is linear. the invol. bracts are much broader and highly coloured, the achenes and pappus are very different.

17. **S. eriostemon**, *Wall. Cat.* 2912; nearly glabrous, stem stout elongate 6-12 in. 1-leaved, leaves membranous almost all radical linear pinnatifidly lobed and toothed, lobes and teeth short broad acute and aristate, head solitary 1-1 $\frac{1}{2}$ in. diam., invol. bracts lanceolate subsquarrose, recept. bristles long, anther-tails fimbriate, achenes smooth 4-angled, outer pappus 0. *Clarke Comp. Ind.* 229. *Aplotaxis nepalensis*, *Spreng. Syst. Veg.* iii. 380; *Deless. Ic. Sel.* iv. t. 67; *DC. Prodr.* vi. 529. *Centaurea taraxicifolia*, *Don Prodr.* 167; *Less. in. Linnæa*, vi. 88. *Eriostemon taraxicifolium*, *Less. Synops.* 12.

NIPAI, *Wallich*.

The foliage of this resembles strongly that of *S. Andersoni*, but the achenes are very different.

*** *Leaves entire or nearly so, tomentose villous or woolly beneath, or on both surfaces, glandular-pubescent in S. glanduligera.*

18. **S. Roylei**, *Clarke Comp. Ind.* 229, *excl. syn.*; stem stout 6-18 in. glabrate or cottony; radical leaves 3-10 in. petioled erect elongate-lanceolate acuminate quite entire or sinuate or pinnatifid towards the base only, cauline few sessile $\frac{1}{2}$ -amplexicaul, heads large 1 $\frac{1}{2}$ -2 in. usually bracteate tomentose, invol. bracts lanceolate, recept. bristles equalling the long smooth achenes, anther-tails woolly, outer pappus bristles scabrid. *S. uniflora*, *Clarke l. c.* 229, *not of Wallich*. *Aplotaxis Roylei*, *DC. Prodr.* vi. 589.

WESTERN HIMALAYA; from Kashmir to Kunawur, alt. 11-14,000 ft., *Falconer, &c.*

Root-stock stout, usually simple, clothed with the remains of broad petiolar sheaths. *Stem* usually very stout and thickened under the head. *Leaves* very variable in length and breadth, much narrowed at both ends, sometimes runcinate or lyrate-pinnatifid, sometimes snow-white beneath, nearly glabrous in a specimen from Munro, nearly 2 in. broad in some of Thomson's from the Werang Pass. *Invol. bracts* long, straight; corolla short for the size of the head, about $\frac{1}{2}$ in. long. *Achenes* $\frac{1}{4}$ in. and upwards, narrow, angled and delicately ribbed; pappus $\frac{1}{2}$ in., pale brown, outer bristles numerous, sometimes unilateral.

19. **S. graminifolia**, *Wall. Cat.* 2911; stem 6-10 in. very stout much thickened upwards leafy densely silkily woolly and shining, rarely glabrate, leaves very slender narrowly linear from a dilated shining scarious base flexuous tomentose beneath, margins quite entire recurved, head solitary 1-1 $\frac{1}{2}$ in. diam. densely silkily woolly bracteate by many spreading or reflexed or linear leaves,

invol. bracts narrow lanceolate, recept. bristles short, achenes (unripe) short smooth, outer pappus bristles many short scabrid.

WESTERN HIMALAYA; Kumaon, *Blinkworth*, alt. 12,000 ft., *Edgeworth*. WESTERN TIBET; Salt Marshes, Ladak and below the Ladak Pass, alt. 15-16,000 ft., *Thomson*. Barji Kang, alt. 13,500 ft., *Strach.* & *Wint.*

Root long, stout; crown divided. *Leaves* 2-5 by $\frac{1}{10}$ - $\frac{1}{8}$ in.; sheathing petioles membranous, 1 in., glabrous except at the margins, contrasting with the silky wool of the stem, which is $\frac{1}{2}$ in. thick round the base of the head. *Invol. bracts* membranous; corolla not $\frac{1}{2}$ in. long; anther-tails fimbriate. *Achenes* (unripe) small, $\frac{1}{10}$ in. long; pappus pale brown.—A very distinct species.

VAR. glabrata; sparsely woolly, more slender, leaves more erect, invol. bracts shorter and straighter not hidden below in silky wool, achenes longer pale shining 4-angled.—Western Tibet. Though differing so much in the involucre and in wooliness from the type, I can hardly doubt this being a form of *S. graminifolia*.

20. **S. Hookeri**, *Clarke Comp. Ind.* 230; stem 4-6 in. stout much thickened (and hollow) upwards silkily woolly, leaves slender narrowly linear from a dilated scarious base curved tomentose beneath margins quite entire recurved, head solitary 1-1 $\frac{1}{2}$ in. bracteate by broad obtuse short appressed leaves, invol. bracts broadly lanceolate or ovate, recept. bristles long dense, achenes short, outer pappus bristles short scabrid.

ALPINE HIMALAYA; Tibetan frontier of Kumaon, Balch Pass, alt. 16,000 ft., *Strach.* & *Wint.*; and of Sikkim, alt. 17,000 ft., *J. D. H., Elwes*.

Rootstock stout, simple or divided, clothed with black scarious dried petiolar sheaths; stem shorter stouter and more leafy than in *S. graminifolia*; leaves rather broader, more coriaceous, floral usually short and broad, but very variable; corolla nearly $\frac{1}{2}$ in.; achenes unripe very small, pappus very pale $\frac{1}{2}$ in.

21. **S. hieracioides**, *Hook. f.*; softly villous, stem 4-8 in. slender, radical leaves petioled elliptic acute villous on both surfaces quite entire or obscurely toothed nerves spreading, cauline few linear-oblong, heads 1-1 $\frac{1}{2}$ in. diam. solitary woolly at the base, invol. bracts ovate-lanceolate erect coloured, recept. bristles short, achenes very short smooth, outer pappus bristles scabrid.

SIKKIM HIMALAYA; Tangu, near the Tibetan frontier, alt. 12-14,000 ft., *J. D. H.*

Habit of *Hieracium alpinum*, uniformly villous with soft spreading hairs. *Stock* short, stout, simple, clothed with scarious dark petiolar remains. *Leaves* few, radical 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ by $\frac{3}{4}$ -1 $\frac{1}{4}$ in., green; petiole variable, slender. *Invol. bracts* wholly or margined with purple, inner glabrous; corolla 1 $\frac{1}{4}$ in.; anther-tails short, very woolly. *Achenes* (unripe) $\frac{1}{10}$ in., very broad; pappus $\frac{1}{2}$ in. pale.

22. **S. glanduligera**, *Schultz-Bip. in Herb. Hook.*; stem 4-8 in. and leaves on both surfaces glandular-pubescent or -puberulous, leaves narrowly linear-lanceolate irregularly sinuate toothed, petiole dilated into a narrow glabrous sheath with often woolly base and margins, cauline subsimilar, heads solitary 1-1 $\frac{1}{2}$ in. usually bracteate by linear leaves, invol. bracts lanceolate green erect pubescent or woolly, recept. bristles long, achenes 4-angled scaberulous, outer pappus bristles short scabrid.

WESTERN TIBET; Ladak, alt. 14-16,000 ft., *Thomson, Heyde*; Lahoul, *Hay*.

Root very stout; stock branched. *Leaves* 2-4 in. (larger in var. *major*), pale green; petiolar sheaths of radical, very conspicuous pale chestnut brown, ribbed, with soft white silky wool at the bases of the younger. *Invol. bracts* pale, not numerous; corolla nearly $\frac{1}{2}$ in.; anther-tails short woolly. *Achenes* $\frac{1}{2}$ in. long, pale, much cupped at the top; pappus-hairs $\frac{1}{2}$ in., pale brown or blueish.

VAR. major; taller, leaves large and broader 8-10 by $\frac{3}{4}$ -2 in. puberulous only, heads 1-3, corolla $\frac{3}{4}$ in.—Piti, alt. 14-17,000, *Thomson*. Tibet north of Kumaon, alt. 16,000 ft., *Strach.* & *Wint.* This approaches *S. bracteata*.

SECT. IV. **Corymbiferae**. Stem 1-3 ft., simple, leafy. *Leaves* not pinnatifid or lobed, radical 0, cauline large sessile or petioled. *Heads* rather small, $\frac{1}{2}$ - $\frac{2}{3}$ in., in terminal dense corymbs; receptacle small. *Achenes* smooth, angled; outer pappus bristles few or many, scabrid. .

23. **S. Candolleana**, *Wall. Cat.* 3289; stem 1-3 ft. more or less winged by the decurrent petioles or leaf bases, leaves oblong or ovate-lanceolate acute or acuminate denticulate glabrous above cobwebby or cottony beneath, base rounded or abruptly or gradually narrowed decurrent, heads $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. or in dense terminal corymbs, invol. bracts ovate obtuse or acute glabrous or silky, receptacle small bristles longer than the narrow smooth 4-5-angled achenes, outer pappus bristles short scabrid. *S. pterocaulon*, *Dcne. in Jacq. Voy. Bot.* 95, t. 103. *Aplotaxis Candolleana*, *DC. Prodr.* vi. 541. *Jurinea adenocarpa*, *Ledeb. Fl. Ross.* ii. 765; *Schrenk. Enum. Pl. Nov.* i. 46.

TEMPERATE HIMALAYA; from Kashmir, alt. 8-10,000 ft., *Falconer*, &c., to Sikkim, alt. 11-13,000 ft., *J. D. H.*—DISTRIB. Soongaria.

Stem stout, deeply grooved. *Leaves* 3-6 by 1-3 $\frac{1}{2}$ in., oblong and sessile but nerveless, abruptly narrowed below the middle, membranous, rarely quite glabrous beneath. *Heads* shortly peduncled; corolla $\frac{1}{4}$ - $\frac{1}{3}$ in.; anther-tails fimbriate. *Achenes* $\frac{1}{2}$ in., long, narrow, shining; pappus $\frac{1}{2}$ in. long, pale brown.

24. **S. piptathera**, *Edgew. in Trans. Linn. Soc.* xx. 76; stem 1-3 ft. not winged, leaves oblong or ovate-oblong with a contracted or dilated $\frac{1}{2}$ -amplexicaul auricled base sharply toothed glabrous above cottony rarely glabrate beneath, heads $\frac{1}{2}$ in. in a crowded dense corymb, invol. bracts glabrate or silky outer ovate obtuse, inner lanceolate acute, recept. bristles longer than the achenes, outer pappus bristles short scabrid. *Aplotaxis discolor*, *DC. Prodr.* vi. 541.

WESTERN HIMALAYA; from Chumba to Kumaon, alt. 9-12,000 ft., *Royle*, &c.

Very similar to *S. Candolleana* in the head, flowers, achenes, &c., but at once distinguished by the stem not being winged, and by the leaf-base. Specimens from Herb. Falconer (without locality) have the leaves quite glabrous on both surfaces.

25. **S. Clarkel**, *Hook. f.*; stem 4-6 in. stout pubescent, leaves 4-5 in. obovate acute sessile or contracted into a winged petiole sharply toothed membranous puberulous above cottony or glabrate beneath, heads $\frac{1}{2}$ in. diam. in a dense terminal cluster, invol. bracts glabrous or cottony outer ovate acute inner lanceolate acuminate, recept. bristles longer than the achenes. *S. Candolleana*, *Clarke Comp. Ind.* 230, not of *Wallich*.

KASHMIR, *Falconer*; Tilail, alt. 13-14,000 ft., *Clarke*.

This is in habit intermediate between *S. pterocaulon* and *S. Atkinsoni*, agreeing with the former in the heads, flowers, &c., but differing in the small size, peculiar habit and leaf-base; and from the latter (which it resembles in the foliage) in the stout stem, small crowded heads, and recept. bristles. *Pappus* brown.

26. **S. elliptica**, *Clarke mss.*; stem 4-6 in. slender cottony, leaves 3-4 in. long-petioled elliptic-oblong or -lanceolate acute irregularly toothed thinly cottony on both surfaces, heads $\frac{1}{2}$ in. diam. in a small rather lax terminal corymb, invol. bracts lanceolate acuminate subsilkily villous, receptacle naked, outer pappus bristles numerous scabrid.

WESTERN TIBET; Karakoram, alt. 14,000 ft., *Clarke*.

I have seen only three specimens of this very distinct species. Grey-green when dry; stem ascending from a slender simple or divided stock, curved. *Leaves* flaccid, narrowed into a very slender cottony petiole. *Corolla* nearly $\frac{1}{2}$ in.; anther-tails laciniate, hardly woolly. *Achenes* immature; pappus white, except towards the base. —Closely allied to *S. ovata*, Benth. (in "Henderson's Yarkand," p. 325), from Eastern Turkistan, but differing in the form of the leaves.

SECT. V. **Elatæ.** Stems tall, leafy, simple below, corymbosely branched above. *Leaves* all cauline or radical and cauline. *Heads* erect or suberect numerous in branched corymbs all peduncled; invol. bracts rigid, anther-tails fimbriate or subentire. *Pappus* very slender, outer bristles 0.

* *Leaves* lyrate-pinnatifid, cottony beneath; *heads* broad erect or suberect.

27. **S. affinis**, Spreng. mss. in DC. Prodr. vi. 540; stem 2-8 ft. simple below and inflorescence glabrous, leaves lyrate-pinnatifid cottony beneath radical petioled cauline sessile uppermost sinuate-lobed or entire, heads long-peduncled in large open paniced corymbs, invol. bracts glabrate outer ovate obtuse or acute inner lanceolate acuminate, recept. bristles long, achenes smooth 10-ribbed, outer pappus 0. *Clarke Comp. Ind.* 232. *Aplotaxis multicaulis*, DC. in Deless. Ic. Sel. iv. t. 68; Prodr. vi. 540. *A. carthamoides*, Ham. in DC. l. c. *A. Bungei*, DC. l. c. 539. *Hemistepha lyrata*, Bunge in Fisch. et Mey. Ind. Sem. ii. 1835, 38. *Serratula multicaulis*, Wall. Cat. 2897. *S. carthamoides*, Roxb. Hort. Beng. 60; Fl. Ind. iii. 407. *Cnicus carthamoides*, Wall. Cat. 2896. *Cirsium lyratum*, Bunge Enum. Pl. Chin. 36.

BENGAL; from Silhet to the foot of the Nipal Hills. BURMA; Saluen River, Wallich.—DISTRIB. China, Japan.

Annual, stem sometimes as thick as the little finger, and peduncles grooved. *Leaves*, radical 4-8 in., membranous, glabrous or puberulous above. *Heads* 1 in. diam. or less; invol. bracts pale, rarely a little cottony; corolla $\frac{1}{2}$ in. long, very slender, pale red; anther-tails short, fimbriate. *Achenes* $\frac{1}{12}$ in., obovoid, tip contracted; pappus hairs $\frac{1}{2}$ in., very slender, white.

28. **S. candicans**, Clarke Comp. Ind. 232; stem 2-5 ft. simple below and inflorescence cottony, leaves oblong or obovate-oblong entire or sinuate-toothed or lobulate at the base or lyrate-pinnatifid glabrous or pubescent above cottony or white tomentose rarely glabrous beneath, heads long-peduncled in large open paniced corymbs, invol. bracts cottony or pubescent lanceolate acuminate, recept. bristles long, achenes 5-angled muricate, outer pappus 0. *S. brahuica*, Boiss. Fl. Orient. iii. 566. *Aplotaxis candicans*, DC. Prodr. vi. 540. *A. scapoza*, Edgew. in Trans. Linn. Soc. xx. 76. *Cnicus candicans*, Wall. Cat. 2893 A. C. D. *Cirsium heteromallum*, Spreng. Syst. iii. 372. *Carduus heteromallus*, Don Prodr. 166, excl. syn. Roxb.

SUBTROPICAL and TEMPERATE WESTERN INDIA and the HIMALAYA; from the Salt Range, Hazara and Kashmir to Bhotan, alt. 2-7000 ft.—DISTRIB. Afghanistan.

A more robust plant than *S. affinis*, with less divided leaves, larger heads, and very different achenes. *Leaves* sometimes 18 by 5 in. *Heads* 1-1 $\frac{1}{2}$ in. diam.; corolla upwards of $\frac{1}{2}$ in. long; anther-tails lacerate. *Achenes* $\frac{1}{2}$ in., top cucular, very variable as to rugosity; pappus-hairs very slender, white, equalling the corolla.—Small specimens are *scapoza* and even 1-headed.

29. **S. foliosa**, Edgew. in Trans. Linn. Soc. xx. 77 (*Aplotaxis*); stem 1-2 ft. copiously branched leafy and inflorescence pubescent, leaves 3-4 in. lyrate-pinnatifid puberulous above cottony beneath lobes rounded, heads small $\frac{1}{2}$ in. on slender long axillary and terminal peduncles, invol. bracts very slender with acicular points, recept. bristles long, achenes obtusely 4-angled smooth or somewhat tubercled, outer pappus 0.

WESTERN HIMALAYA; Garwhal and Kumaon, alt. 7-8000 ft., Edgeworth, Strach. & Winterb.

Referred by Clarke to *S. candicans*, but I think quite distinct in habit, and especially in the small heads with almost subulate bracts, the very small corollas, and short pappus, neither of which exceed $\frac{1}{4}$ in.

** *Leaves entire or subpinnatifid, cottony or tomentose beneath; heads narrow, erect.*

30. **S. albescens**, Hook. f. & T. in Clarke Comp. Ind. 233; stem 6-10 ft. simple below and leaves beneath densely or laxly cottony or tomentose, leaves 4-12 in. acute or acuminate entire or sinuate-lobed or subpinnatifid glabrous scabrid or cobwebby above with slender branching nerves, lower narrowly oblong petioled, upper sessile ovate or linear or oblong-ovate, heads narrow $\frac{1}{2}$ - $\frac{3}{4}$ in. long in copious long peduncled terminal and axillary flat-topped corymbs, invol. bracts erect glabrous rarely cottony rigid purplish outer ovate acute, inner lanceolate, recept. bristles long, achenes narrow 4-angled muricate above, outer pappus 0. ? *S. chenopodifolia*, Klatt in Sitzungsber. Münch. Akad. 1878, 92. *Serratula albescens*, Wall. Cat. 2918. *Aplotaxis albescens*, DC. Prodr. vi. 540.

WESTERN and CENTRAL HIMALAYA; from Murree to Nipal, alt. 6-10,000 ft.

Stem strict, erect, slender for the height of the plant. *Leaves* very variable in length and breadth, tip and teeth apiculate. *Heads* peduncled, erect; receptacle very narrow, bristles longer than the achenes; corolla $\frac{1}{2}$ in.; anther-cells fimbriate. *Achenes* $\frac{1}{4}$ - $\frac{1}{2}$ in. long, top much cupped; pappus white, $\frac{1}{2}$ - $\frac{1}{2}$ in.

VAR. brachycephala; leaves very scabrid above, heads $\frac{1}{2}$ in. long fewer on shorter branches more rounded at the base, invol. bracts shorter inner more ovate, corolla and pappus-hairs $\frac{1}{2}$ in.—Kashmir, Stewart; Mozufferabad, at the foot of the Kashmir hills. Falconer. The few short broad flat heads of this look different from those of *S. albescens*, but there are many intermediate forms. I have seen no achenes.

*** *Leaves lyrate-pinnatifid, cottony or tomentose beneath; heads inclined nodding; recept. bristles very long.*

31. **S. hypoleuca**, Spreng. mss. in DC. Prodr. vi. 541; stem simple or branched above leafy, leaves lyrate or lyrate-pinnatifid sinuate-toothed glabrous above cottony or white beneath membranous terminal lobe large deltoid acute lateral generally one pair triangular acute, heads $1\frac{1}{2}$ -2 in. diam. globose nodding. invol. very broad and open bracts lanceolate acuminate ciliate, recept. bristles exceeding the clavellate pappus, achenes short 4-angled tubercled, pappus single. Clarke Comp. Ind. 234. *Carduus auriculatus*, Wall. Cat. 2899. *Aplotaxis auriculata*, DC. l. c.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 7-13,000.

Stem rather slender, 2-5 ft., glabrous or puberulous. *Leaves* 3-8 in., variable in breadth, petioled or sessile, petiole auricled at the base or not, terminal lobe sometimes 5 in. diam. *Heads* long-peduncled, inclined or nodding, very many-fl., base often intruded; invol. bracts often recurved; corolla $\frac{1}{2}$ in., limb as long as the tube; anther-tails long, subulate, quite entire or split near the tip. *Achenes* $\frac{1}{2}$ in. long, almost cubical, with obtuse angles, black, strongly tubercled, tip contracted with a terminal toothed cup; pappus $\frac{1}{2}$ in. brown.—This and the following are quite unlike any other Indian species, and are the only ones with decidedly nodding heads.

32. **S. deltoidea**, Clarke Comp. Ind. 235, var. α and β ; stem tall simple below branched above, leaves petioled membranous sinuate-toothed above glabrous or scabrous beneath white-tomentose or cottony, lower lyrate-pinnatifid terminal lobe very large deltoid lateral variable, upper triangular ovate or deltoid, heads $\frac{1}{2}$ - $1\frac{1}{2}$ in. very broad nodding paniced or racemose on the branches of a terminal leafy panicle, invol. bracts hoary short ovate obtuse or long and lanceolate tips and margins purple, recept. bristles shorter than the pappus, achenes short 4-5-angled smooth tubercled or scaly, pappus single. Kurz in Journ. As. Soc. 1877, ii. 204. *Aplotaxis deltoidea*, DC. Prodr. vi. 541.

CENTRAL and EASTERN HIMALAYA; from Garwhal to Bhotan, alt. 6-11,500 ft. MARTABAN, or the Nattoung hills, F. Mason.

Stem 4–8 ft., sometimes as thick as the thumb below, grooved, glabrous pubescent or cottony. *Leaves* 2–18 in. long, white or buff beneath, terminal lobe sometimes 10 in. broad. *Heads* extremely variable, sessile or peduncled, scattered or fascicled; invol. bracts glabrous or cottony, all narrow or the outer broad and obtuse, erect or recurved, often tipped and margined with purple; corolla $\frac{1}{2}$ – $\frac{3}{4}$ in., tube rather longer than the limb; anther-tails subulate, nearly entire. *Achenes* $\frac{3}{8}$ – $\frac{1}{2}$ in., very variable in breadth, always 4–5, 4-angled with a terminal entire or toothed cup, black, perfectly smooth or tubercled on the angles or all over, or covered with broad adnate scales; pappus equalling the corolla, white.

VAR. *nivea*; heads smaller subglobose clustered subsessile or shortly peduncled, invol. bracts shortly ovate obtuse hoary, corolla and pappus $\frac{1}{4}$ in., achenes variable as in the type. *S. deltoidea*, var. *polycephala*, *Clarke Comp. Ind.* 236. *Apotaxis nivea*, *DC. Prodr.* vi. 541. *Cnicus niveus*, *Wall. Cat.* 2898. *Synanthera*, *Wall. Cat.* 7135.—Nipal, Sikkim, and the Khasia mts., alt. 4–6000 ft.; Martaban, alt. 6–7000 ft., *Kurz.*—It is difficult to believe that this is all the variety of *S. deltoidea*, but the intermediate forms are too numerous to render it doubtful. No other Indian species is so variable in the involucre and achenes.

? **VAR. *peguensis*;** leaves pubescent or cobwebby above, heads shortly pedicelled subracemose, invol. bracts linear-lanceolate acute erect outer woolly inner villous, achenes oblong cylindric striate smooth. *S. peguensis*, *Clarke Comp. Ind.* 235.—Karen hills, Birma, *Riley*.—I know nothing of this plant, which Clarke says is perhaps a variety of the Khasian form (var. *nivea*) of *S. deltoidea*. If the description of the achenes is correct, it must be different, for in all the varieties in *S. deltoidea* the 4–5-angled shape of the achene is constant.

33. *S. Jacea*, *Clarke Comp. Ind.* 223; stem 1–4 ft. simple below branched above, leaves uniform, sessile $\frac{1}{2}$ -amplexicaul ovate or oblong obtuse or acute quite entire scaberulous on both surfaces, heads $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. solitary and terminating the branches or in terminal corymbs, invol. bracts few rigid broad outer ovate obtuse or acute inner lanceolate, receptacle narrow bristles flattened exceeding the involucre, achenes unripe narrow smooth, pappus double hairs all feathery. *Apotaxis Jacea*, *Klotzsch in Reise Pr. Wald. Bot.* 79, t. 79.

KASHMIR, KUNAWUR, and WESTERN TIBET, alt. 9–15,000 ft., *Falconer, Thomson*.

Stem rigid, puberulous, terete, not grooved, and branches very leafy. *Leaves* 3–4 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., rigid, base usually rounded. *Heads* on strict rather slender peduncles, invol. bracts appressed, hard, margins purple; receptacle very narrow; bristles curved, gradually narrowed from the flattened base, rigid; corolla $\frac{2}{3}$ in.; anther-tails subulate, entire. *Achenes* (unripe) $\frac{1}{4}$ in. long, smooth, shining, ribs slender, top truncate; pappus more than $\frac{1}{4}$ in., brown.

34. *S. denticulata*, *Wall. Cat.* 2917; stem simple below erect stout leafy, leaves uniform sessile oblong or oblong-lanceolate acute or acuminate finely toothed cottony or glabrous beneath, heads broad solitary and terminal or terminating branches on long peduncles, invol. bracts glabrous rigid obtuse outer ovate inner linear-oblong margins scarious lacerate purple, receptacular bristles flattened exceeding the involucre, achenes compressed smooth many-ribbed, pappus double, hairs all feathery. *Clarke Comp. Ind.* 234. *Apotaxis denticulata*, *DC. Prodr.* vi. 539. *A. fastuosa*, *Dene in Jacquem. Voy. Bot.* 97, t. 105.

CENTRAL and EASTERN HIMALAYA; from Garwhal to Sikkim, alt. 7–11,000 ft.

Stem 1–3 ft., glabrous or cottony, simple and 1-headed or branched above, each branch with a head. *Leaves* 3–9 by 1 – $2\frac{1}{2}$ in., thinly coriaceous, nerves very numerous and slender. *Heads* usually subtended by a small leaf; peduncle sometimes 6 in., very stout and stiff; receptacle broader than in *S. Jacea*; bristles similar; corolla $\frac{1}{2}$ in.; anther-tails short, subulate, perfectly entire. *Achenes* $\frac{1}{2}$ in., narrowly obovoid, strongly many-ribbed, pale, shining, tip oblique rather contracted; pappus $\frac{1}{2}$ in., pale brown.—The inner invol. bracts are almost appendaged by the broad scarious margins; the quite entire short anther-tails are peculiar.

SECT. VI. **Lappa**. Tall, very stout herbs; stem 4–10 ft., simple below. *Heads* corymbose or fascicled or solitary and terminal or axillary; outer invol. bracts broad, rigid; recept. bristles very long, sometimes exceeding the involucre. *Pappus* double, outer hairs feathery.

35. **S. Lappa**, *Clarke Comp. Ind.* 233; stem tall very robust simple pubescent above, leaves membranous scaberulous above glabrate beneath irregularly toothed, radical very large triangular with a long lobately-winged petiole, cauline shorter petioled or sessile with an auricled $\frac{1}{2}$ -amplexicaul base, heads subglobose 1–1 $\frac{1}{2}$ in. diam. sessile axillary or in a terminal cluster of 2–5, invol. bracts very many ovate-lanceolate acuminate rigid squarrosely recurved glabrous, recept. bristles very long, achenes compressed tip narrowed, pappus double hairs all feathery. *Apotaxis Lappa*, *DCne in Jacq. Voy. Bot.* 96, t. 104. *Aucklandia Costus*, *Falconer in Trans. Linn. Soc.* xix. 23.

KASHMIR, alt. 8–12,000 ft., *Falconer*, &c.

Stem 6–7 ft., as thick as the little finger below. *Radical leaves* with the petiole 2–3 ft. long, terminal lobe often a foot in diameter; cauline 6–12 in. long with the petiole. *Heads* very hard; invol. bracts numerous, purple, young pubescent; recept. bristles $\frac{3}{4}$ in.; corolla dark purple, $\frac{3}{4}$ in. long; anther-tails fimbriate. *Achenes* upwards of $\frac{1}{2}$ in., curved, compressed, with thickened margins and one rib on each face, top contracted and cupped; pappus hairs $\frac{3}{4}$ in., brown.—Supposed to be the *Costus* of the ancients, and used largely as a medicine in India, but its properties have never been investigated.

SUBGEN. II. **Eriocoryne**. Densely woolly herbs. *Stems* simple, clavate. *Heads* very numerous, sessile and densely crowded on the flat usually hollow dilated top of the stem, often concealed by woolly floral leaves. *Achenes* crowned by the hardened disk and base of the style.

36. **S. gossypiphora**, *Don Prodr.* 168; densely clothed with long white or yellowish matted wool, stem 6–12 in. simple clavate leafy, leaves sessile linear remotely toothed or runcinate-pinnatifid usually glabrous above glabrous or woolly beneath, heads concealed, invol. bracts linear-oblong shining, achenes $\frac{1}{8}$ in. narrow 4–5-angled and compressed, outer pappus hairs few scabrid numerous or 0. *Wall. Cat.* 2920 A. *S. gossypina*, *Wall. Pl. As. Rar.* ii. 32, t. 138; *Clarke Comp. Ind.* 228 (*excl. syn.*). *Apotaxis gossypina*, *DC. Prodr.* vi. 541. *Eriocoryne nidularis*, *Wall. mss.*

ALPINE HIMALAYA; from Garwhal to Sikkim, alt. 14–17,000 ft.

Root perennial (or biennial?), spongy, fusiform, simple or forked. *Stem* hollow throughout, often 4 in. broad at the truncate top, base clothed with membranous black shining remains of leaf-bases, leafy throughout and covered often 1 in. thick with wool. *Leaves* 1–6 by $\frac{1}{4}$ – $\frac{3}{8}$ in., sometimes 2-pinnatifid; lobes or teeth distant. *Heads* very many, $\frac{1}{2}$ –1 in. long, cylindric; invol. bracts short, erect, pubescent or woolly above or glabrous and shining throughout; receptacle pitted, bristles about equalling the achenes; corolla $\frac{1}{2}$ – $\frac{3}{4}$ in., straight, limb equalling the tube, lobes short; anthers half included, filis slender, nearly entire. *Achenes* $\frac{1}{8}$ in. long, narrowly obovoid, compressed, brown, crowned with a tumid hardened disk and beaked by the style-base.—One of the most singular Himalayan plants, with the habit of *Crepis glomerata*. Wallich (in *Plant. Asiat.*) changed Don's clumsy name for the more euphonious *gossypina*, but having adopted the former in his catalogue, I feel obliged to retain it.

37. **S. sacra**, *Edgew. in Trans. Linn. Soc.* xx. 76; densely woolly, stem 4–6 in. simple clavate, leaves sessile linear pinnatifid, heads exposed, invol. bracts lanceolate, achenes $\frac{1}{10}$ – $\frac{1}{8}$ in. 4–5-angled smooth or warted, outer pappus hairs scabrid few numerous or 0. *S. gossypiphora*, *Wall. Cat.* 2910 B.

ALPINE HIMALAYA; from Garwhal to Sikkim, alt. 14–18,000 ft.

I greatly doubt this being specifically distinct from *G. gossypiphora*, with which

Wallich (doubtfully) and Clarke have united it; it is, however, a much smaller plant, with exposed heads, narrower involucre bracts, inner pappus hairs united higher up and only $\frac{1}{4}$ in. long; and the small achenes are more obconic, $\frac{1}{10}$ in. long, and often warted or wrinkled. The wool is pink in Sikkim specimens.

38. **S. tridactyla**, *Schultz-Bip. in Herb. Hook.*; densely clothed with matted wool, stem 3-6 in. simple clavate leafy, leaves linear or linear-obovate or spatulate obtuse entire or obtusely 3-6-lobed at the apex densely woolly on both surfaces, heads partially exposed, invol. bracts linear-oblong acute shining, achenes narrow 5-angled, outer pappus 0 or of a very few scabrid bristles.

SIKKIM HIMALAYA; on the Tibetan frontier, alt. 16-18,000 ft., *J. D. H.*

A much more woody-rooted plant than *S. gossypiphora*, with a woody stock, more densely leafy, and the leaves, which are covered with the same long matted wool as the stem, are quite entire or lobulate only towards the apex. The heads and flowers resemble closely those of *S. gossypiphora*, but the pappus, which is pale brown, is almost invariably single.

39. **S. sorocephala**, *Hook. f. & T. in Clarke Comp. Ind.* 226; dwarf, densely tufted, stem 0 or very short thickly woolly or cottony, leaves $\frac{1}{2}$ -1 in. obovate-lanceolate or oblong-obovate subacute entire or obscurely toothed, heads exposed, invol. bracts lanceolate silky, achenes narrow 5-angled, outer pappus hairs scabrid many few or 0. *Apilotaxis gnaphalodes*, *Royle Ill.* 259, t. 59; *DC. Prodr.* vi. 542. *A. andryaloides*, *DC. l. c.* *Apilotaxis sorocephala*, *Schrenk Enum. Pl. Nov. i.* 43; *Ledeb. Fl. Ross.* ii. 673.

WESTERN TIBET, KUNAWUR, and LAHUL, alt. 14-18,000 ft.; from Nubra to the north of Kumaon, *Falconer, &c.*—DISTRIB. Altai Mts.

A much smaller plant than any of the foregoing species of *Eriocoryne*, of tufted habit, the rootstock branching repeatedly; the leaves vary greatly in length and form; the flowering stem, when produced, is hollow at the top which is much dilated under the heads, as in its allies; the heads do not differ materially from those of *S. gossypiphora*, but the bracts are very membranous and glabrous, or silky at the tips; the pappus is pale brown or dull blue; achenes not ripe.

VAR. ? *glabrata*; stem 1-2 in., leaves longer narrower toothed, cauline glabrous, floral woolly, outer pappus hairs 0 or deflexed on the achene.—Western Tibet, alt. 15-18,000 ft., *H. Strachey*; *Sassar, Thomson.*

90. **GONIOCAULON**, *Cass.*

An erect glabrous branched annual; stem acutely 4-8-angled. *Leaves* narrow, alternate, toothed. *Heads* narrow, fascicled and corymbose, homogamous: flowers few, all ♂, fertile and similar, tube slender; limb longer, cylindric, 5-fid to the middle or lower. *Involucre* oblong, base very narrow; bracts ∞ -seriate, pale, very narrow, rigid, acute, erect, not spinescent, outer gradually shorter; receptacle very narrow, paleaceous. *Filaments* hairy; anther-bases sagittate, connate, tails short. *Style-arms* filiform. *Achenes* glabrous, oblong, subcylindric, about 20-ribbed, basal areole straight; pappus scales ∞ -seriate, very unequal.

1. **G. glabrum**, *Cass. in Bull. Soc. Phil.* 1818, and in *Dict. Sc. Nat.* xix. 201. *G. indicum*, *Clarke Comp. Ind.* 236. *Amberboa indica*, *DC. Prodr.* vi. 558; *Wight Ic.* t. 479; *Dalz. & Gibs. Bomb. Fl.* 131. *A. Goniocaulon*, *DC. l. c.* *Athanasia indica*, *Roxb. Fl. Ind.* iii. 417; *Wall. Cat.* 2919. *Serratula indica*, *Wall. Cat.* 2919.

CENTRAL INDIA and the DECCAN; from Banda and Indore, *Edgeworth*, southwards, especially in high lands lately under cultivation, *Roxburgh.*

Stem 1-3 ft., strict, erect, ribbed on and between the angles, with a straight tap

root, branched or simple below, corymbose above. *Leaves* 2-4 in., sessile, $\frac{1}{2}$ -amplexicaul, linear-obovate or subspathulate, toothed, base narrowed. *Heads* $\frac{1}{2}$ - $\frac{2}{3}$ in., narrow, pedicelled, fascicled in compound corymbs, erect, pale; corollas about 5, rose-purple.—Roxburgh observes that it is not uncommon to see fields of this as thick as if the plants were sown by a careful farmer.

91. *JURINEA*. Cass.

Annual or perennial herbs. *Leaves* entire toothed or pinnatifid, rarely armed, more or less tomentose. *Heads* homogamous; flowers all ♂, similar, purple; tube slender, limb elongate 5-fid to the middle or lower. *Invol. bracts* ∞ -seriate, imbricate, innermost narrow erect, outer shorter; receptacle flat, densely bristly. *Filaments* free, glabrous; anther-bases sagittate, auricles usually connate, tails elongate. *Style-arms* short. *Achenes* glabrous, 4-5-angled, rarely compressed, smooth or 1-3-ribbed between the angles, basal areole nearly straight; pappus hairs ∞ -seriate, very unequal, rigid, simple barbellate or feathery, persistent or deciduous.—DISTRIB. About 40 species, Europe, and W and Central Asia.

1. *J. ceratocarpa*, Benth. in *Gen. Plant.* ii. 474; scaberulous, stemless or stem erect much branched, leaves linear-oblong or lanceolate entire or pinnatifid green on both surfaces or white-tomentose beneath, heads sessile or terminating the branches 1- $1\frac{1}{2}$ in. diam. bracteate by linear leaves, invol. bracts lanceolate acuminate, recept. bristles longer than the achenes, anther-tails long lacinate, achenes 4-5-angled, angles thickened ending in erect spines. *Clarke Comp. Ind.* 236. *Saussurea ceratocarpa*, Dcne. in *Jacquem. Voy. Bot.* 93, t. 101. ? *S. stemmaphora*, Klatt in *Sitzungsb. Münch. Akad.* 1878, 93.

KASHMIR, alt. 9-15,000 ft., Falconer, &c.

Stem 0-2 ft., or plant branched from the base in the larger forms, branches very stout leafy. *Leaves* 2-5 in., radical and lower cauline usually runcinate, petioled; upper sessile, base auricled. *Heads* stoutly pedicelled; outer invol. bracts linear, green; inner very slender, erect or recurved; corolla $\frac{1}{2}$ in. *Achenes* $\frac{1}{2}$ in., rough, brown; outer pappus bristles few scabrid, inner very slender, $\frac{1}{2}$ in., white.

VAR. *depressa*, Clarke mss.; stemless or nearly so. *Saussurea acanthocarpa*, *Schultz-Bip. mss.*—Western Tibet and Kashmir, alt. 13-15,000 ft., abundant; Garwhal, at Gothering, alt. 13,500 ft., *Strach. & Winterb.*

2. *J. macrocephala*, Benth. in *Gen. Pl.* ii. 474; stemless, leaves oblong-lanceolate pinnate or pinnatifid lobes broad lobulate or pinnatifid denticulate cobwebby or cottony above thickly white-tomentose beneath, heads many $\frac{2}{3}$ -1 in. diam. sessile or shortly peduncled, outer invol. bracts ovate-lanceolate inner elliptic-lanceolate long-acuminate, recept. bristles united into lacinate cups, anther-tails lacerate, achenes large cuneate-obovate angled tubercled. *Clarke Comp. Ind.* 237. *Dolomæa macrocephala*, DC. in *Guill. Arch. Bot.* ii. 330; *Prodr.* vi. 542; *Deless. Ic. Sel.* iv. t. 70; *Royle Ill.* 251, t. 57. *Serratula macrocephala*, *Wall. Cat.* 2904.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 11-14,000 ft.

Root woody, perennial. *Leaves* spreading, 6-18 by $1\frac{1}{2}$ -7 in., long- or short-petioled, lobes or segments contiguous broad sometimes crisped, teeth acute or mucronate. *Heads* 3-30; peduncles stout, tomentose often cottony at the base; invol. bracts $\frac{2}{3}$ -1 $\frac{1}{2}$ in., scabrid or smooth, erect, scarious; recept. bristles very rigid, much shorter than the achenes; corolla 1- $1\frac{1}{2}$ in. *Achenes* $\frac{1}{2}$ - $\frac{3}{4}$ in., curved, compressed, unequally 4-5-angled, truncate, ashy grey; pappus copious, 1 in., brown, hairs cohering at the base. "The roots, called Dhup, are collected and used by Hindoos as incense." *Aitchison*.

3. *J. modesta*, Boiss. *Fl. Orient.* iii. 584; annual, cobwebby, stem branched from the base, branches short ascending ending in very long leafless

slender 1-headed cottony peduncles, leaves sessile decurrent lanceolate acute quite entire or sinuate-toothed, heads 1 in. diam., invol. bracts appressed, outer ovate acuminate lanceolate green with scarious margins, inner elongate, recept. bristles half as long as the involucre, anther-tails subentire, achenes obconic compressed angles thickened pale smooth shining, pappus hairs many-seriate very unequal rough persistent.

WESTERN PUNJAB; Peshawur, *Vicary*.—DISTRIB. Afghanistan.

Whole plant 6–12 in. high. *Leaves* 2–3 in. *Heads* pale; invol. bracts sparsely cottony, inner sometimes red; corolla $\frac{1}{2}$ in.; tube very slender, limb inclined. *Achenes* $\frac{1}{5}$ in., crowned with the stout thickened base of the style; pappus $\frac{1}{2}$ in., white, shining, innermost hairs very stiff, two much longer than the others and flattened.—Boissier's description is drawn up from very imperfect materials. The basal areole of the achene refers this plant to *Jurinea*, but it is a *Serratula* in habit.

DOUBTFUL SPECIES.

J. ROSULATA, *Klatt in Sitzungsber. Münch. Akad.* 1878, 96; from the Punjab and Kashmir.—The few words of description does not enable me to say whether this is a *Jurinea* or not; the appendaged invol. bracts produced into a long spine are unlike those of any Indian species.

J. GNAPHALIOIDES, *Klatt l. c.*; also from the Punjab.—This also is undeterminable from the meagre description.

92. *SERRATULA*, Linn.

Perennial herbs. *Leaves* alternate, toothed or pinnatifid. *Heads* corymbose, subsolitary, homogamous; flowers all ♀, similar, purple violet or white, all sub-oblique or regular, tube slender, limb elongate 5-fid. *Involucre* ovoid or globose; bracts ∞-seriate, inner narrow elongate, outer shorter broader acute or awned not spinescent rarely obtuse or with a lanceolate appendage; receptacle bristly. *Filaments* glabrous; anther-bases sagittate; auricles connate, shortly mucronate or tailed. *Style* hairy or with a hairy ring below the slender arms. *Achenes* glabrous, oblong, subterete or obtusely angled, basal areole very oblique; pappus bristles ∞-seriate, rigid, serrulate, unequal, outer often very short.—DISTRIB. About 30 species, Europe, N. Africa, West Central and Alpine Asia.

1. *S. pallida*, *DC. Prodr.* vi. 670; glabrous or scaberulous, stem simple or divided below, branches ending in long leafless 1-headed peduncles, leaves polymorphous from broadly ovate or oblong and toothed to linear and deeply runcinate pinnatifid, heads 1–1½ in. diam., invol. bracts appressed, outer ovate acute, inner linear-oblong with scarious obtuse tips, recept. bristles longer than the obovate obcompressed smooth pale achenes. *Clarke Comp. Ind.* 237. *Centaurea pallida*, *Wall. Cat.* 2983.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 6–8000 ft.

Stem 1–3 ft., simple or sparingly branched from the tomentose base, stout or slender, usually scaberulous or puberulous. *Leaves* glabrous or young pubescent, radical with long slender petioles, in the largest forms 8–12 by 5–6 in., acute or obtuse, sharply toothed, base entire cordate rounded acute or cut into short lobes; in more ordinary forms 4–6 by 1–2½ in., deeply pinnatifid or runcinate, with a toothed terminal and oblong or triangular acute entire or toothed lateral lobes; in smallest forms ½–1 in. long. *Heads* broad; peduncle stout or slender, often 18 in.; invol. bracts glabrous; corolla $\frac{2}{3}$ in.; anther-tails short, entire. *Achenes* $\frac{1}{2}$ in., obovoid-oblong, broad, flattened, pale, quite smooth, obscurely ribbed; pappus hairs rigid, $\frac{1}{2}$ in., brown.

93. *TRICHOLEPIS*, DC.

Annual or perennial branched unarmed herbs. *Leaves* entire toothed or the lower pinnatifid, often with raised dots on the surfaces. *Heads* terminal, soli-

tary, peduncled, homogamous; flowers all ♀, similar, fertile, yellow red or purple, regular or suboblique, tube slender, limb 5-cleft to the middle. *Involucre* ovoid or broader; bracts ∞-seriate, very narrow, usually with long recurved hair-points or mucronate, the outer shorter; receptacle densely bristly. *Filaments* papillose; anther-bases sagittate, auricles connate, tails slender lacerate. *Style-arms* slender. *Achenes* glabrous, oblong or obovoid, smooth, ribbed, basal areole lateral, terminal areole small or broad; pappus bristles ∞-seriate and very unequal, serrulate barbellate or feathery, long and slender or short and paleaceous, or 0.—**DISTRIB.** Species 7, all Indian or Affghan.

* *Pappus hairs scabrid, connate, not or slightly flattened below; corolla yellow.*

1. **T. Karensium**, Kurz in *Journ. As. Soc.* 1872, ii. 318, 1877, ii. 202; tall, erect, woody, villous above with 1-3 heads, upper leaves 3-4 in. lanceolate entire or denticulate puberulous or cottony beneath, heads $2\frac{1}{2}$ in. diam. very large bracteate by the upper leaves, invol. bracts innumerable elongate-subulate spreading and incurved rigid white, recept. bristles linear equalling the feathery pappus, achenes oblong 4-5-ribbed smooth, pappus hairs barbellate connate at the base, outer short. *Clarke Comp. Ind.* 238 (*T. Karensis*)

BIRMA; Karen hills, O'Riley & Mason.

Much the largest Indian species. I have seen only a very imperfect specimen, and have taken the characters chiefly from Clarke: the invol. bracts are quite acicular, in very many series, the inner gradually longer, innermost $1\frac{1}{2}$ in., outermost $\frac{1}{8}$ in., all rigid but not pungent, densely ciliate with spreading hairs.

2. **T. furcata**, DC. *Prodr.* vi. 563; glabrous or puberulous, branched from the base, branches elongate ending in a long-peduncled head, leaves shortly petioled elliptic or lanceolate acute or acuminate denticulate covered with raised points or scaberulous above and beneath or pubescent beneath, heads $1\frac{1}{2}$ in. nodding ebracteate, invol. bracts acicular or filiform from a lanceolate base recurved ciliate tips black, recept. bristles shorter than the narrowly oblong ribbed smooth achenes, pappus hairs scabrid connate at the base, outer shorter. *Clarke Comp. Ind.* 238. *T. nigrescens*, Edgew. in *Trans. Linn. Soc.* xx. 77. *Carduus trichocephalus*, Wall. *Cat.* 2901.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 5-10,000 ft.

Stem 2-6 ft., slender. *Leaves* 2-6 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., smooth or scaberulous above. *Invol. bracts* very spreading in fruit; corolla $\frac{3}{4}$ -1 in., nearly straight, yellow; anther-tails subentire. *Achenes* $\frac{1}{2}$ in., pale, compressed; pappus hairs very slender, soft, inner 1 in., white.—I can detect no character whereby to separate *T. nigrescens*; the amount of ciliation of the bracts varies greatly.

3. **T. Stewarti**, Clarke mss.; branches rigid leafy, leaves sessile lanceolate acuminate minutely toothed quite glabrous veins indistinct, heads shortly peduncled 1 in. diam., invol. bracts acicular from an ovate woolly base pale, recept. bristles longer than the achenes, pappus rigid.

PUNJAB; in the Jhelum valley, Stewart.

Apparently a very distinct species, of which I have seen only tips of branches with imperfect flowers. *Leaves* $1\frac{1}{2}$ in., rather coriaceous. *Invol. bracts* yellowish when dry, inner $\frac{2}{3}$ in. long. *Pappus* $\frac{1}{3}$ in. long, pale, brown.

4. **T. elongata**, DC. *Prodr.* vi. 563; pubescent or scaberulous, stem and branches strict, leaves sessile linear oblong-lanceolate elliptic or obovate acute or obtuse toothed serrate or distantly runcinate, heads $\frac{1}{2}$ -1 in. diam., invol. bracts acicular from an ovate base ciliate tips black or not, recept. bristles longer than the 5-angled smooth pale achenes, pappus hairs in many rows short, inner flattened below. *Clarke Comp. Ind.* 239. *Carduus elongatus*, Wall. *Cat.* 2900, 2909. *T. lanuginosa*, Klotzsch in *Reise Pr. Wald. Bot.* 79, t. 81.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 4-8000 ft.

Stem 2-5 ft., sparingly branched. *Leaves* very variable, surface covered with raised points or scaberulous or pubescent, in the largest specimens 4 by $1\frac{1}{4}$ in., toothed and pinnatifid at the base as in the largest leaved form of *Saussurea pallida*; in others 2 by $\frac{3}{4}$ in., oblanceolate and regularly coarsely serrate; in others linear and pinnatifid or serrate above and pinnatifid towards the base. *Heads* erect or suberect, like those of *T. furcata*; corolla $\frac{1}{2}$ - $\frac{3}{4}$ in., yellow. *Achenes* $\frac{1}{2}$ in., acutely angled, narrowly oblong, slightly broader upwards, truncate; pappus $\frac{1}{4}$ in., copious, pale brown, shining.

** *Pappus-hairs scabrid, not connate at the base, flattened below, or scanty or 0; corolla red or lilac.*

5. **T. radicans**, DC. *Prodr.* vi. 584; slender, glabrous, smooth or scaberulous, much branched from the base, branches decumbent or erect, leaves covered with raised points sessile $\frac{1}{2}$ -amplexicaul linear obovate oblong or spatulate remotely irregularly toothed or pinnatifid, heads $\frac{1}{2}$ - $\frac{3}{4}$ in. on slender naked glabrous peduncles, outer invol. bracts acicular from an ovate base recurved, inner more lanceolate, recept. bristles longer than the oblong compressed smooth achenes which are longer than the very short flattened pappus-hairs. *Clarke Comp. Ind.* 239; *Dalz. & Gibs. Bomb. Fl.* 131. *Carduus radicans*, Roxb. *Fl. Ind.* iii. 408; *Wall. Cat.* 2907.

WESTERN PENINSULA; from the Circars and Bombay southwards.

Annual, 6-18 in. high, branches angular, rarely erect and stout. *Leaves* 1-3 in., membranous, teeth mucronate or bristle-pointed. *Heads* on very slender peduncles, erect; corolla $\frac{1}{2}$ in., lilac. *Achenes* $\frac{1}{2}$ in., obovoid or oblong, compressed, truncate, sides rounded, faces with very many slender ribs, pale, shining, almost twice as long as the scabrid flattened hairs of the pale brown pappus.

6. **T. amplexicaulis**, *Clarke Comp. Ind.* 240; quite glabrous, erect, rigid, stem stout and branches angled and ribbed quite smooth, leaves linear-oblong from a dilated auricled toothed $\frac{1}{2}$ -amplexicaul base finely toothed or ciliate covered with raised points, heads $\frac{3}{4}$ -1 in. on short stout angular peduncles glabrous or puberulous bracteate by linear leaves, invol. bracts acicular from a linear base recurved, recept. scales much longer than the broadly oblong smooth achenes, pappus 0 or of a few bristles.

WESTERN PENINSULA; Canara and Mysore, *Dalzell, Law.*

Annual, very stout, 3-5 ft.; stem and branches shining. *Leaves* 3-5 by $\frac{1}{2}$ -1 $\frac{1}{2}$ in., rigid, quite glabrous, pale when dry. *Invol. bracts* often tipped with black; corolla $\frac{1}{2}$ - $\frac{3}{4}$ in. *Achenes* $\frac{1}{2}$ in. long, compressed, perfectly smooth, glossy, pale brown, sides rounded, top rounded with a very small apical areole, basal areole broad, very oblique.

VAR. β , leaves 2-1 $\frac{1}{2}$ in., elliptic, obovate acute denticulate teeth mucronate.—Concan, *Dalzell*.

7. **T. glaberrima**, DC. *Prodr.* vi. 564; quite glabrous, erect, rigid, stem slender and branches angled and ribbed quite smooth, leaves sessile linear-oblong or -lanceolate acute entire or serrate scaberulous and covered with raised points base simple or auricled, heads small $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., invol. bracts subulate from a lanceolate base erect, recept. bristles exceeding the pappus, achenes oblong faintly ribbed, twice as long as the pappus. *Clarke Comp. Ind.* 240; *Dalz. & Gibs. Bomb. Fl.* 131; *Dene. in Jacq. Voy. Bot.* 98, t. 106. ? *Serratula indica*, *Willd. Sp. Pl.* iii. 1642.

CENTRAL INDIA; Indore, *Edgeworth*. MARWAR; Mt. Aboo, *King*. The CONCAN and DECCAN, common, *Dalzell, &c.*

Habit of *T. amplexicaulis*, but more slender, with much smaller heads, straight

more subulate shorter invol. bracts, distantly ribbed achenes, and conspicuous though short pappus; the leaves also are more entire and have stronger nerves.

8. ***T. angustifolia*, DC. Prodr. vi. 564, excl. syn.**; quite glabrous, very slender, branches spreading angled quite smooth, leaves sessile but not amplexicaul lower obovate upper linear-oblong all entire or subserrate covered with raised points, heads small $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. ovoid on slender peduncles, invol. bract acicular from a lanceolate base recurved glabrous, recept. bristles longer than the oblong smooth faintly ribbed achenes, pappus 0. *Clarke Comp. Ind.* 240.

WESTERN PENINSULA; Travancore, *Klein*; Mangalore, *Hohenacker*; Canara *Thomson*.

A very slender species, at times resembling in habit *T. radicans*, at others more erect with longer straighter branches, small heads, and achenes like those of *T. amplexicaulis*, but only $\frac{1}{3}$ in. long.

9. ***T. tibetica*, Hook. f. & T. in Clarke Comp. Ind.** 241; woody below, quite glabrous, branches erect cylindric quite smooth, leaves small sessile coriaceous scattered without raised points, lower distantly pinnatifid upper ovate linear entire base simple, heads $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. scaberulous, outer invol. bracts ovate-subulate inner subulate-lanceolate rigid suberect, recept. bristles longer than the linear-oblong silvery truncate achenes, pappus a brush of compressed bristles twice as long as the achenes.

WESTERN TIBET and NORTHERN KASHMIR; alt. 8–12,000 ft., *Falconer*, &c.—*DISTRIB.* Affghanistan.

A corymbosely branched undershrub, about a foot high, naked below; branches slender, virgate, terminating in a strict peduncle with a small erect head. *Leaves* 1–3 in. long, very narrow, obtuse, lobes of the pinnatifid ones few spreading or recurved triangular or oblong acute, upper $\frac{1}{2}$ –1 in., $\frac{1}{10}$ – $\frac{1}{8}$ in. diam., subacute. *Invol. bracts* appressed, minutely scabrid, inner $\frac{1}{2}$ in. long; corolla red, more than $\frac{1}{2}$ in. long. *Achenes* (unripe) $\frac{1}{8}$ in., obscurely ribbed, top with a distinct broad rim to which the pappus is attached, basal areole very oblique; pappus-hairs $\frac{1}{2}$ in. long, nearly white, one or two of the innermost often much longer than the rest, and flattened as in *Jurinea modesta* and *Volutarella divaricata*.—This has the habit, truncate achene, and pappus of *Jurinea chatolepis*, Boiss., from Affghanistan (*Tricholepis spartoides*, *Clarke Comp. Ind.* 241), which has the involucre of a *Tricholepis*, and the oblique basal areole of the achene, and is rightly referred to the latter genus by Clarke.

*** *Pappus-hairs feathery.*

10. ***T. stictophyllum*, Clarke Comp. Ind.** 241; quite glabrous, stem 0 or 6–12 in. sparingly branched from the base, branches angular grooved leafy below, leaves sessile $\frac{1}{2}$ -amplexicaul linear or ligulate quite entire or obscurely toothed acute covered with obscure raised points, nerves parallel to the midrib, heads 1–1 $\frac{1}{2}$ in. diam. at the naked ends of the branches glabrous, invol. bracts appressed glabrous outer ovate acuminate inner linear-lanceolate with erect flexuous tips, recept. bristles longer than the linear-oblong compressed many-ribbed truncate achenes, pappus copious of slender feathery hairs. *Stictophyllum glabrum*. *Edgew. in Trans Linn. Soc. xx.* 78. *Cnicus angustifolius*, *Wall. Cat.* 2915.

WESTERN HIMALAYA; Garwhal at Kanstow Ghat, *Falconer*; Subsiwalik hills, in grassy places, *Edgeworth*. CENTRAL INDIA (probably Saugur), *Jerdon*.

Root perennial?; habit subscapigerous. *Leaves* 3–5 by $\frac{1}{4}$ – $\frac{1}{2}$ in., flat, quite smooth; midrib slender. *Heads* rarely 2 together; invol. bracts $\frac{1}{4}$ – $\frac{2}{3}$ in.; corolla $\frac{2}{3}$ in., straight. *Achenes* $\frac{1}{2}$ in. long, pale, margins rounded, basal areole very oblique, top rather dilated, as in *T. tibetica*; pappus $\frac{1}{2}$ in. long, soft, silvery brown, hairs slightly united at the base.—An anomalous plant, with the habit and involucre of *Serratula*, and the pappus of *Jurinea*; the achene is, however, quite that of *Tricholepis tibetica*, and

different from that of other species of the genus, with which, however, it agrees in the leaves having raised points (whence the name *Stictophyllum*, Edgeworth). Wallich's specimen, from Herb. Hamilton, has no habitat.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

T. MONTANA, Dalz. & Gibs. *Bomb. Fl.* 131; "a coarser species (than *T. glaberrima*), leaves obovate-oblong very coarsely toothed or sometimes pinnatifid; differs from *T. angustifolia* also in having long slender stigmas."—The Ghats. I know nothing of this species.

T. ROYLEI, Hook. f.; shrubby, branches petioles and leaves beneath densely clothed with cottony tomentum, leaves 3 by $1\frac{1}{2}$ in. elliptic or ovate subacute toothed glabrate above with raised points, petiole $\frac{1}{2}$ in., head solitary terminal large erect 2 in. diam., peduncle stout, invol. broadly campanulate cottony, bracts very numerous outer appressed small ovate with appressed spinous points, innermost linear-lanceolate 1 in. long with softer subrecurved points, filaments papillose, anther-tails toothed, achenes?, pappus $\frac{1}{2}$ in. scabrid pale yellow red. *Jurinea?* *Tricholepis*, DC. *Prodr.* vi. 678.—N.W. India, Royle. I have seen very imperfect specimens of this very distinct species. which though referred by De Candolle doubtfully to *Jurinea* is, as far as can be judged in the absence of achenes, clearly a *Tricholepis*.

94. **VOLUTARELLA**, Cass.

Annuals. *Leaves* alternate. *Heads* heterogamous, purple violet or blue; outer fl. 1-seriate, neuter; disk-fl. ♂, fertile, tube slender short, limb cylindric 5-fid. *Involucre* ovoid or globose; bracts ∞-seriate, innermost narrow acute; outer shorter, acute, awned or spinescent; receptacle flat, densely bristly. *Filaments* glabrous or hairy; anther-bases sagittate, auricles connate shortly tailed. *Style* filiform, arms free or connate. *Achenes* obovoid or oblong, subulate or angled, 5-15-ribbed, often striate and pitted between the ribs; basal areole oblique or lateral; pappus bristles ∞-seriate, outermost gradually shorter, innermost 2-4 dilated and flattened.—DISTRIB. Species 4 or 5, S. Europe, N. Africa, W. Asia and India.

V. divaricata, Benth. in *Gen. Pl.* ii. 476, *excl. some syns.*; dichotomously branched, spreading, leaves oblong or obovate entire toothed or pinnatifid, lobes mucronate often undulate or crisped, heads $\frac{1}{2}$ -in. diam., invol. bracts ovate with a long spreading or recurved spinescent awn, achenes 4-5-angled striate and punctate. *Clarke Comp. Ind.* 242; *excl. syns.* *Tricholepis procumbens*, Wight *Ic.* t. 1139; Dalz. & Gibs. *Bomb. Fl.* 131. *T. Candolleana*, Wight in Hook. *Comp. Bot. Mag.* i. 81, t. 4. *Microlonchus divaricatus*, DC. *Prodr.* vi. 562. *Centaurea divaricata*, Wall. *Cat.* 2984. *Carduus ramosus*, Roxb. *Fl. Ind.* iii. 407.

CENTRAL, WESTERN and SOUTHERN INDIA; from Behar and the upper Gangetic plains to Lahore; and from Seind to Mysore and the Deccan; ascending to 3000 ft. in the N.W. Himalaya.—DISTRIB. Afghanistan, Beluchistan.

An annual straggling stiff weed, troublesome from its hard head with spiny invol. bracts; branches 1-2 ft. long, angled, smooth or scabrid. *Leaves* very variable 1-2 by $\frac{1}{4}$ - $\frac{3}{4}$ in., rarely 6 by 3 in., sessile, base simple, lobes rounded. *Invol. bracts* glabrate reddish, spines $\frac{1}{4}$ - $\frac{1}{2}$ in. smooth; receptacular bristles short; corolla $\frac{1}{2}$ in., straight, pale purple. *Achenes* $\frac{1}{2}$ in., narrow, acutely angled, grooved and punctate between the angles, base narrow; areole small lateral deeply excavated, top broad truncate; pappus spiny of many unequal scaberulous hairs $\frac{1}{2}$ in. long, silvery brown, 3 or 4 innermost flattened and long.—In the Genera *Plantarum*, *Centaurea patula*, DC., and *Serratula divaricata*, Fisch. & Mey., are erroneously (as Boissier has pointed out, *Fl. Orient.* iii. 605, 701) referred to this.

94*. **ZOEGIA**, Linn.

Slender erect branched annuals. *Leaves*, radical pinnatifid, cauline entire. *Heads* long-peduncled, heterogamous; flowers purple, outer 1-seriate, neuter; disk-fl. ♂, fertile, tube slender, limb 5-fid to or below the middle. *Involucre* ovoid or globose; bracts membranous, ∞-seriate, outer shorter pectinately ciliate, inner entire tips ciliate violet; receptacle densely bristly. *Filaments* glabrous; anther-bases sagittate, auricles minute connate. *Style* entire or emarginate. *Achenes* obovoid, compressed, shining, obscurely ribbed, basal areole lateral, top truncate crowned with 1-4 concentric ridges; pappus double or triple, outermost, if present, of short chaffy scales, middle one of long smooth bristles, inner of short bristles.—DISTRIB 2-4, Mediterranean and Oriental.

1. **Z. purpurea**, Fresen.; Boiss. *Fl. Orient.* iii. 698; 8-12 in., glabrous or puberulous, very slender, invol. bracts deeply pectinately ciliate, inner with long hair points, outer pappus of oblong chaffy scales, middle white longer than the glabrous achene, inner short subulate. *Z. aristata*, DC. *Prodr.* vi. 562.

NORTH WEST INDIA; between Kashmir and Wuzuristan, Stewart.—DISTRIB. Westward to Persia, Arabia and Egypt.

The specimens are small and withered, but I think referable to *Z. purpurea*. The outer chaffy pappus of this species is nowhere described. A very elegant plant, with bright purple tips to the invol. bracts.

95. **CENTAUREA**, Linn.

Herbs, often rigid. *Leaves* radical and alternate, entire toothed or pinnatifid. *Heads* solitary corymbose or paniced, heterogamous (rarely homogamous), purple, violet, blue, white or yellow; outer-fl. 1-seriate, neuter; disk-fl. ♀, fertile, tube slender, limb straight or oblique 5-fid to the middle or lower, of neuter fl. often larger with a spreading limb. *Involucre* ovoid or globose; bracts ∞-seriate, imbricate, appressed, margins scarious or coriaceous, or ending in a simple or palmately divided spine or a pectinate appendage; receptacle flat, densely bristly. *Anther-bases* sagittate; auricles connate, tails long or short entire or lacerate. *Style-arms* with a thickened hairy basal ring, erect and connate or shortly spreading. *Achenes* oblong or obovoid, compressed or obtusely 4-angled, often shining, basal areole oblique or lateral; pappus very various, bristles rigid or paleaceous, ∞-seriate, entire serrulate bearded or feathery, rarely 0.—DISTRIB. Species about 320, European and W. Asiatic, with a few N. & S. American and one Australian.

The *Centaureas* are immigrants from the west into India. and except perhaps *C. iberica* and *C. phyllocephala*, are visitors rather than even denizens.

1. **C. Cyanus**, Linn.; Boiss. *Fl. Orient.* iii. 634; annual or biennial, erect, slender, cottony, leaves narrow radical entire or lyrate-pinnatifid cauline linear, heads ovoid, invol. bracts oblong obtuse cottony, tip broad with brown scarious toothed margins which are decurrent on the sides of the bract teeth triangular, ray-flowers large spreading blue, achenes grey silky longer than the middle row of pappus-hairs. DC. *Prodr.* vi. 578; Clarke *Comp. Ind.* 242. *C. lanata*, Roxb. *Fl. Ind.* iii. 644.

In corn fields and cultivated places of N.W. INDIA; sporadic.—DISTRIB. The Caucasus and westward to the Atlantic.

The common corn-cockle of England.

* The genus *Zoegia* is omitted in the conspectus of genera, p. 225, where its diagnostic character would be *achenes* with concentric ridges below the top. It is doubtful whether it was found within the British border.

2. **C. depressa**, *M. Bieb.*; *Boiss. Fl. Orient.* iii. 635; annual, appressed-tomentose or hoary, stem simple or branched, lower leaves petioled entire or pinnatifid, cauline linear-lanceolate, heads ovoid, invol. bracts glabrous margins scarious white or brown toothed, teeth lanceolate white, ray-flowers large spreading blue, achenes shining puberulous equalling or shorter than the middle row of pappus-hairs, basal areole bearded. *DC. Prodr.* vi. 578; *Clarke Comp. Ind.* 243.

NORTH WEST INDIA, *Royle*. WESTERN TIBET,; Ladak, *Stoliczka*, sporadic.—*DISTRIB.* Afghanistan and westward to Asia Minor.

Heads larger than *C. Cyanus*, and leaves broader.

3. **C. melitensis**, *Linn.*; *Boiss. Fl. Orient.* iii. 686; pubescent tomentose or glabrate, erect, branches strict rigid narrowly winged, radical leaves lyrate-pinnatifid cauline linear decurrent, heads small ovoid, invol. bracts ending in a spreading and recurved spine margins spinulose, flowers yellow, achenes minute puberulous produced below the basal areole. *DC. Prodr.* vi. 593; *Clarke Comp. Ind.* 243.

NILGHERY MTS.; alt. 6-7000 ft., sporadic.—*DISTRIB.* Westwards to the Atlantic.

4. **C. Calcitrapa**, *Linn.*; *Boiss. Fl. Orient.* iii. 689; branches angular spreading from the base, leaves spreading pubescent radical pinnatifid or pinnate, lobes linear toothed cauline sessile uppermost entire, heads ovoid lateral and terminal sessile or peduncled, invol. bracts with narrow membranous margins terminating in a long strong spreading spine with short lateral ones at its base, flowers purple, achenes small white, pappus 0. *DC. Prodr.* vi. 597; *Clarke Comp. Ind.* 243.

NORTH WESTERN INDIA; the Punjab and Kashmir, ascending to 3500 ft. *Mysore*; sporadic.—*DISTRIB.* Western Asia and Europe, introduced in most parts of the world.

Cottony or glabrous, rigid. Branches 1-2 ft. long. Heads $\frac{1}{2}$ - $\frac{2}{3}$ in. diam. exclusive of the yellow spines. Achenes mottled.

5. **C. iberica**, *Stev.*; *Boiss. Fl. Orient.* iii. 690; characters of *C. Calcitrapa*, but heads smaller, flowers paler and achenes with a very short pappus.

KASHMIR, alt. 5-6000 ft., *Thomson*.—*DISTRIB.* Westward to the Atlantic.

6. **C. phyllocephala**, *Boiss. Fl. Orient.* iii. 684; glabrous or hispid, branches wide-spreading cylindric white, leaves small sessile lower lanceolate entire or pinnatifid margins spinulose-toothed and scabrid, cauline with amplexicaul cordate bases, heads small terminal, outer invol. bracts ending in oblong pectinately ciliate leaves, inner entire white ending in a long strong spine, innermost acuminate, achenes minute longer than the paleaceous pappus. *Clarke Comp. Ind.* 244. *Tetramorphæa Bruguieriana* and *Belangeriana*, *DC. Prodr.* vi. 609.

The PUNJAB, *Falconer*; Peshawur, *Stewart*.—*DISTRIB.* Westwards to Asia Minor.

A very pretty species, easily recognised by the white terete branches and green outer invol. bracts.

96. **CARTHAMUS**, *Linn.*

Thistle-like herbs. Leaves alternate, rigid, spinescent. Heads usually homogamous; fl. all ♂, fertile (rarely a few marginal ♀ or neuter) and similar, yellow white or purplish, tube slender; limb oblong, dilated at the base, 5-cleft (or 0 in ♀ fl.). Involucre ovoid or subglobose; bracts ∞-seriate, inner dry entire or with a short fimbriate appendage, outer with a foliaceous toothed or spinescent appendage (sometimes absent in cultivated specimens); receptacle flat, densely bristly. Filaments usually hairy in the middle; anther-bases sagit-

tate, auricles connate, tails short fimbriate. *Style-arms* short or long. *Achenes* glabrous, obovoid, 4-angled or compressed, basal areole oblique or lateral, all or the outer only without pappus, or all or the inner only with paleaceous ∞ -seriate pappus.—**DISTRIB.** Species about 20, of the Mediterranean region extending into Asia.

1. *C. tinctorius*, Linn.; Boiss. *Fl. Orient.* iii. 709; glabrous or pubescent, leaves entire and unarmed or spinulose-serrate, outer invol. bracts ovate-oblong constricted above the base green spinous or not, inner ovate-oblong acute, flowers orange-red, achenes (often deformed) obovoid 4-angled truncate at the top with 4 bosses, pappus 0. DC. *Prodr.* vi. 612; Reichb. *Ic. Fl. Germ.* t. 746; Roxb. *Fl. Ind.* iii. 409; Wall. *Cat.* 2959; Clarke *Comp. Ind.* 244.

Cultivated throughout INDIA.—The Safflower.

2. *C. oxyacantha*, Bieb.; Boiss. *Fl. Orient.* iii. 709; puberulous, stem and branches white, leaves oblong or oblong-lanceolate lower shortly spinulose-toothed upper $\frac{1}{2}$ -amplexicaul very spinous, outer invol. bracts exceeding the head white below the contracted portion green above it with yellow spines, flowers orange-yellow, achenes obovoid 4-angled smooth shining truncate at the top with 4 bosses, pappus 0. DC. *Prodr.* vi. 612; Clarke *Comp. Ind.* 244.

The PUNJAB; from Lahore westward, Royle, &c.—**DISTRIB.** Westward to the Caucasus.

Perhaps the wild form of the Safflower, *C. tinctorius* (Clarke).

3. *C. lanatus*, Linn.; Boiss. *Fl. Orient.* iii. 706; very rigid, cobwebby cottony or glabrate, stem strict erect, leaves hispid or scaberulous, radical lyrate-pinnatifid, cauline ovate $\frac{1}{2}$ -amplexicaul with an auricled toothed base strongly 3-nerved spinescent, heads large, outer invol. bracts large far exceeding the flowers lanceolate leafy spinescent on the sides, inner entire, flowers pale yellow, achenes thick very broad turbinate obtusely 4-angled smooth pitted above, pappus longer than the achenes of narrow linear acute shining elastic pales. Bot. *Mag.* t. 2142; Clarke *Comp. Ind.* 707. *Kentrophyllum lanatum*, DC. *Prodr.* vi. 610. *Carduncellus lanatus*, Reichb. *Ic. Fl. Germ.* t. 746.

KASHMIR, alt. 5-6000 ft., Falconer, &c.—**DISTRIB.** Westward to the Atlantic.

Stem 6-18 in. terete. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., spreading, hard, green. *Heads* 1-1 $\frac{1}{2}$ in. diam.; outer bracts 1-2 in., spreading; lower linear, scariously coriaceous, brown, tip spinescent; recept. bristles very long. *Achenes* $\frac{1}{4}$ in., pale yellowish or grey, pericarp crustaceous; pappus pales narrowly sword-shaped, unequal, very beautiful, silvery or rich bronze-coloured.

TRIBE X. MUTISIACEÆ.

97. LEUCOMERIS, Don.

Shrubs or small trees. *Leaves* alternate, broad, quite entire. *Heads* corymbose, homogamous, discoid, 4-8-fld., white; fl. all σ , similar and fertile, tubular, segments 5 narrow revolute. *Involucre* much shorter than the flowers, ovoid; bracts ∞ -seriate, ovate or lanceolate, coriaceous or dry, outer smaller; receptacle flat, naked. *Anther-bases* sagittate, auricles connate, tails ciliate. *Style* filiform, obtuse, 2-fid. *Achenes* oblong, subterete, 5-ribbed, silky; pappus copious, hairs very slender, scabrid, outer shorter.—**DISTRIB.** 2 Indian species.

1. *L. spectabilis*, Don *Prodr.* 170; leaves elliptic or elliptic-lanceolate densely velvety-tomentose beneath, invol. bracts few linear-oblong obtuse or acute glabrous, pappus pale. Wall. *Pl. As. Rav.* ii. 8, t. 3; DC. *Prodr.* vii. 25; Deless. *Ic. Sel.* iv. t. 78; Clarke *Comp. Ind.* 245. *L. macrophylla*, DC. l. c. *Eupatorium candicans*, Wall. *Cat.* 2999. *E. spectabile*, Spreng. *Syst.* iii. 410.

Gochnatia spectabilis, Less. in *Linnæa*, v. 26. *Conyza candicans*, Wall. Cat. 2999.

WESTERN HIMALAYA; Garwhal to Nipal, alt. 2-5000 ft.

Branches stout, grooved. *Leaves* 4-14 by $1\frac{1}{2}$ -4 in., narrowed at both ends, coriaceous, glabrous above; petiole very short. *Corymbs* 4-8 in. diam., rounded, sessile; peduncles densely tomentose, bracteolate. *Heads* $\frac{3}{4}$ -1 in.; invol. bracts about 10, nearly flat; corolla $\frac{1}{2}$ in. *Achenes* $\frac{1}{8}$ - $\frac{1}{4}$ in., slender, densely silky; pappus $\frac{1}{2}$ in., hairs often contracted at the base.

2. ***L. decora***, Kurz in *Journ. As. Soc.* 1872, ii. 317; 1877, ii. 204: *For. Fl.* ii. 78; leaves elliptic or elliptic-lanceolate glabrous on both surfaces, invol. bracts very many woolly, outer very short-imbricating along the whole peduncle, pappus reddish. *Clarke Comp. Ind.* 245.

PEGU; dry forests of Prome, Kurz.

A small tree, leafless in the hot season; shoots tomentose. *Leaves* 5-7 in., base unequal; petiole $\frac{1}{2}$ -1 in. *Corymbs* rounded, almost capitate, the heads very nearly sessile from the invol. bracts passing into the bracteoles of the peduncle; inner bracts as in *L. spectabilis*, but woolly at the base; corolla nearly 1 in., fragrant. *Achenes* $\frac{1}{2}$ in. (Kurz), pappus as long.

98. **DICOMA**, Cass.

Herbs or low shrubs. *Leaves* alternate. *Heads* subsessile on the branches, rarely corymbose, white or purple, homogamous, discoid; fl. all ♂, or heterogamous with the outer fl. ♀ and all fertile, or the innermost sterile, tubular, limb 5-partite, segments erect or revolute, ♀ if present slender with a short ligule. *Invol. bracts* ∞ -seriate, ovate-lanceolate or linear, acuminate or spinescent, outer shorter; receptacle flat, naked, often pitted. *Anther-bases* sagittate, tails long, bearded. *Style-arms* short, erect, obtuse. *Achenes* turbinate, densely silkily villous, 5-10-ribbed; pappus hairs ∞ -seriate, inner or all flat, scabrid bearded or feathery; outer shorter, paleaceous or of slender bristles.—**DISTRIB.** Species 13, tropical and S. African and Indian.

1. ***D. tomentosa***, Cass.; *DC. Prodr.* vii. 36; erect, branched, clothed with white cottony wool, leaves sessile linear or linear-obovate obtuse or acute quite entire, heads subaxillary, invol. bracts $\frac{1}{2}$ - $\frac{3}{4}$ in. subulate spinescent straight glabrous shining, outer pappus bristles slender, inner narrowly subulate-lanceolate strongly ribbed, margins undulate. *Clarke Comp. Ind.* 245. *D. lanuginosa*, *DC. in Wight Contrib.* 26; *Prodr.* vii. 36; *Wight Ic.* t. 1140; *Dalz. & Gibs. Bomb. Fl.* 132. *Xeropappus lanuginosus*, Wall. Cat. 2980. *Acilepis lanata*, *Spreng. mss.* *Onopordon lanatum*, *Herb. Madr.*

NORTH WEST INDIA, Royle; Dhaulpoor, Jameson. AYA, Wallich. SCIND, Stocks. WESTERN PENINSULA; from the Concan southwards, in gravelly places.—**DISTRIB.** Tropical Africa.

Annual, 10-18 in. high, much branched; branches terete. *Leaves* 1-3 in., usually narrow, glabrate or cottony above, nerves obscure. *Heads* glabrous; spines of invol. bracts yellowish, shining; corolla $\frac{1}{2}$ in. *Achenes* broad and short, $\frac{1}{2}$ in. long, turbinate, densely silky; pappus shining, elastic; inner membranous and hyaline with a rigid midrib, pale brown, $\frac{1}{4}$ in. long.

99. **HOCHSTETTERIA**, DC.

A rigid branched perennial herb. *Leaves* alternate. *Heads* solitary, terminal, homogamous, discoid, yellow; fl. all ♂, similar and fertile, tubular, limb elongate 5-partite, segments revolute. *Involucre* subhemispheric; bracts ∞ -seriate; subulate, outermost few foliaceous; receptacle convex, pitted, margins

of pits often shortly paleaceous. *Anther-bases* sagittate, tails long, lanceolate. *Style-arms* linear, obtuse. *Achenes* turbinate, villous; pappus of 10 stellately spreading slender pales, margins below hyaline, above slender and barbellate.

1. **H. Schimperi**, *DC. Coll. Mem.* ix. t. 6; *Prodr.* vii. 287; *Boiss. Fl. Orient.* iii. 219; *Clarke Comp. Ind.* 246.

SCIND, *Dalzell*.—DISTRIB. Arabia, Nubia.

Nearly glabrous, 1-2 ft.; branches slender, erect or ascending, nearly smooth, furrowed. *Leaves* shortly petioled, ovate or elliptic, acute, serrulate; nerves very slender. *Heads* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., involucre by 1-2 small leaves; invol. bracts straight, very rigid, 1-nerved; corolla $\frac{1}{4}$ in. *Achenes* $\frac{1}{10}$ in., turbinate, covered with long brown silky hairs; pappus pales narrowly subulate-lanceolate, incurved, membranous, hyaline, undulate with a strong midrib.

100. **AINSLIEA**, DC.

Subscapigerous, erect, perennial, simple or branched herbs. *Leaves* alternate, chiefly radical. *Heads* small, sessile or peduncled, solitary fascicled racemed paniced or spicate, on a single strict slender flowering stem, often pendulous, homogamous, discoid, white or purplish, 1-4-fld.; fl. ♂, all fertile, slender; limb not dilated, unequally 5-partite. *Involucre* narrow; bracts ∞ -seriate, laxly imbricate, rigid, inner elongate, outer shorter. *Anther-bases* sagittate; tails long, bearded. *Style-arms* narrowly cuneate, tips spreading rounded. *Achenes* ob-lanceolate, subcompressed, ribs 0 or 5-10, hairy; pappus bristles 1-seriate, feathery.—DISTRIB. Species 10, Himalayan, Chinese, and Japanese.

1. **A. pteropoda**, *DC. Prodr.* vii. 14; more or less tomentose cottony or hairy, leaves ovate or cordate acute or acuminate suddenly narrowed into a broadly winged petiole, heads in tall strict spikes or lax elongate paniced racemes, achenes 10-ribbed. *Clarke Comp. Ind.* 246. *A. silhetensis*, *Clarke in Journ. Linn. Soc.* xiv. 411; *Kurz in Journ. As. Soc.* 1871. ii. 205. *Vernonia lobelioides*, *Wall. Cat.* 2927. *Liatris lobelioides*, *Wall. mss.* *Perdicium triflorum*, *Ham. mss.* *Prenanthes*? *Candolleana*, *Wall. Cat.* 3280, *in part*.

TEMPERATE HIMALAYA; from Simla to Bhotan and the Mishmi hills, alt. 5-8000 ft. KHASIA MTS., alt. 5-7000 ft. MARTABAN and TENASSERIM, *Kurz*; top of Moolee, alt. 7000 ft., *Parish*.

Leaves 2-5 by $1\frac{1}{2}$ -3 in., membranous or rather thick, sparsely hairy glabrate or white-tomentose beneath, obscurely crenate; petiole as long as the blade. *Flowering stem* 1-3 ft., with few small lanceolate leaves, cobwebby cottony or glabrous, rarely branched or forked at the base; heads $\frac{1}{2}$ in. long, solitary or fascicled on the stem or on alternate short spreading lateral branches, 3-fld.; invol. bracts lanceolate. *Achenes* $\frac{1}{5}$ in., oblanceolate, softly silky; pappus $\frac{1}{3}$ in., pale brown.

2. **A. angustifolia**, *Hook. f. & Thoms. mss.*; sparsely hairy, leaves oblanceolate acute narrowed into a long petiole obscurely toothed, cauline sessile, heads racemed on the short branches of a long slender panicle, achenes obscurely ribbed. *Clarke in Journ. Linn. Soc.* xiv. 412; *Comp. Ind.* 247. *A. glumacea*, *Klatt in Sitzungsber. Münch. Akad.* 1873, 97. *Prenanthes*? *Candolleana*, *Wall. Cat.* 3280, *in part*.

KHASIA MTS., alt. 3-5000 ft., *De Silva*, &c.

A smaller and more delicate plant than *A. pteropoda*, with narrower leaves, never abruptly narrowed nor tomentose beneath; heads much smaller, $\frac{1}{4}$ – $\frac{1}{2}$ in. long; peduncles and pedicels very slender; achenes $\frac{1}{6}$ in., silky; pappus as long, brown.

3. **A. aptera**, *DC. Prodr.* vii. 14; villous pubescent or glabrate, leaves long-petioled triangular- or orbicular-cordate acute sinuate-lobed or -toothed,

heads in interrupted spikes or spreading branched panicles, achenes obscurely ribbed. *Clarke Comp. Ind.* 247.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 5-8000 ft., ascending to 10,000 in Sikkim. KHASIA MTS., alt. 4-5000 ft., *J. D. H. & T. T.*

Usually a more robust plant than either of the preceding. *Leaves* sometimes 7 in. long and broad, glabrous villous or densely silkily villous; petiole 3-7 in., glabrous or villous. *Flowering stem* 1-3 ft., generally stout and red-brown. *Heads* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, subsessile or on strict stiff slender peduncles, usually glabrous; bracts sometimes numerous, the outer small and imbricating along the peduncle; corolla $\frac{1}{2}$ in. *Achenes* $\frac{1}{2}$ in., like those of *A. pteropoda*, but less distinctly ribbed; pappus as long, brown.—Very variable in the number, length and breadth of the invol. bracts.

4. **A. Brandisiana**, *Kurz in Journ. As. Soc.* 1872, ii. 318; 1877, ii. 205; more or less hirsute, leaves petioled oblong acute quite entire base cordate margins villously fringed, heads in open branched panicles. *Clarke Comp. Ind.* 247.

LOWER BIRMA; Karen hills, alt. 2-4000 ft., *Kurz*.

Leaves $2\frac{1}{2}$ -4 $\frac{1}{2}$ by 1-2 in., sparsely pubescent or glabrous above, sparsely hirsute beneath, densely so along the margins with curled hairs, base shortly cordate with rounded lobes and a very close sinus; petiole 1-2 in., stout, hirsute. *Flowering stems* 12-18 in., pubescent or scabrid; heads long-peduncled, $\frac{1}{2}$ - $\frac{3}{4}$ in. long; corolla $\frac{1}{2}$ in. *Achenes* unripe, silky.

101. CATAMIXIS, Thoms.

An erect undershrub. *Leaves* alternate, petioled, obovate or oblong, obtusely serrate. *Heads* small, narrow, in a broad terminal corymb, yellow?, homogamous, few-flid.; fl. all ♂, similar, ligulate and fertile. *Involucre* oblong; bracts few, ∞ -seriate, lanceolate, acute, outer shorter; receptacle small, naked. *Anther-bases* sagittate, tails elongate barbellate. *Style* filiform, obtuse; arms very short, erect. *Achenes* narrowly turbinate, silkily villous; pappus hairs sub-2-seriate, slender, scabrid, outer shorter.

1. **C. baccharoides**, *Thoms. in Journ. Linn. Soc.* ix. 343, t. 4; *Clarke Comp. Ind.* 248.

WESTERN HIMALAYA; Garwhal, on the Sewalik hills, *Royle*.

Branches subsilkily pubescent. *Leaves* 2-3 by 1-1 $\frac{1}{2}$ in., coriaceous, narrowed into the short petiole, $\frac{1}{2}$ -amplexicaul, glabrous; nerves prominent on both surfaces when dry. *Corymbs* dichotomously branched; branches slender, puberulous, suberect; heads $\frac{1}{2}$ in. long; ligules spreading; involucre much shorter than the flowers; corolla $\frac{1}{2}$ in. *Achenes* $\frac{1}{12}$ in. long; pappus $\frac{1}{2}$ in., white.

102. GERBERA, Gronov.

Scapigerous herbs. *Leaves* radical. *Scape* naked or scaly. *Heads* solitary, heterogamous, radiate, rarely homogamous and discoid, yellow pink or white; ray-fl., if present, 1-2-seriate, ♀ and fertile; disk-fl. ♂, fertile; both 2-lipped, outer lip of ray-fl. with a 3-toothed ligule, inner 2-partite; tips of disk-fl. more equal, outer 3-4-fid, inner entire or 2-partite. *Involucre* turbinate or broadly campanulate; bracts 2- ∞ -seriate, narrow, acute, outer shorter; receptacle flat. *Anther-bases* sagittate, tails long. *Style-arms* of ♀ linear, obtuse. *Achenes* compressed, 5-ribbed, papillose, tip contracted or beaked; pappus copious, hairs slender, smooth or scabrid.—DISTRIB. About 20 species, African and Asiatic, temperate or mountain.

* *Heads rayed*.

1. **G. piloselloides**, *Cass.; DC. Prodr.* vii. 16; leaves shortly petioled elliptic or obovate-oblong obtuse quite entire villously hirsute beneath, scape

villous ebracteate, heads rayed, invol. bracts cottony, achenes long with a long slender beak scaly, pappus red. *Oreoseris ovalifolia*, *Wall. Cat.* 2930. *G. ovalifolia*, *DC. l. c.* 17; *Clarke Comp. Ind.* 249. *Arnica piloselloides*, *Linn. Amœn. Acad.* vi. 103.

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 7000 ft., *J. D. H. KHASIA MTS.*, alt. 5000 ft., *Griffith, &c.* LOWER BURMA; Karen hills, *Mason*.—DISTRICT. China, S. Africa.

Crown and young leaves densely woolly. *Leaves* 2-5 by 1-2 in., narrowed into the stout short petiole, glabrous or sparsely hairy above, usually white beneath. *Scape* 12-20 in., stout. *Head* 1-1½ in. diam.; invol. bracts linear-lanceolate, suberect; ligules ½ in. long. *Achenes* ½ in., very slender; pappus about as long.

2. *G. lanuginosa*, *Benth. in Gen. Pl.* ii. 497; leaves obovate or oblanceolate acute or acuminate lobulate towards the base or lyrate-pinnatifid or petiole auricled rarely entire glabrous and shining above densely cottony beneath, scape cottony ebracteate, heads rayed, invol. bracts cottony, achenes slender hardly beaked subpapillose, pappus white. *Clarke Comp. Ind.* 249, *excl. syn. O. pusilla*. *Oreoseris lanuginosa*, *DC. Prodr.* vii. 17; *Deless. Ic. Sel.* iv. t. 76. *Oreoseris lanuginosa*, *Wall. Cat.* 2929 A. C. *Chaptalia gossypina*, *Royle Ill.* 251, t. 59, f. 2.

WESTERN HIMALAYA; from Murree, *Fleming*, to Kumaon, alt. 4-8000 ft.

Crown and young leaves silkily woolly. *Leaves* 2-5 by ¾-1½ in. (exceptionally 7-10 by 3-3½ in.), petiole long or short, usually sinuately-pinnatifid at the base only, lobes rounded, rarely entire or pinnatifidly lobed throughout. *Scape* 4-12 in., cottony, slender. *Head* 1-2½ in., cottony; outer invol. bracts ovate; inner linear-lanceolate, acuminate, suberect; ligules ½ in. long. *Achenes* ¼ in., ribbed; pappus ¾ in.

VAR. *pusilla*; leaves ½-1 in., terminal lobe rounded or ovate obtuse or acute, scape ½-6 in., heads ½ in. diam. *Oreoseris pusilla*, *DC. Prodr.* vii. 17. *O. lanuginosa*, *Wall. Cat.* 2929 B.—Nipal, *Wallich*, Kumaon and Garwhal, *Jamieson, Thomson*. This has all the appearance of being a starved state of *G. lanuginosa*.

3. *G. nivea*, *Benth. in Gen. Pl.* ii. 497; leaves obovate or obovate-spathulate tip rounded pinnatifidly lobed throughout their length, lobes rounded obscurely toothed, sinus acute or obtuse glabrous above densely cottony beneath, scape cottony ebracteate, invol. bracts ovate-lanceolate long-acuminate cottony, inner large and broad, achenes not seen. *Oreoseris ? nivea*, *DC. Prodr.* vii. 17. *Senecio niveus*, *Wall. Cat.* 3143. *Arnica nivea*, *Wall. l. c.*

NIPAL, *Wallich*.

Leaves petioled, 2-3½ by 1-1½, gradually narrowed from the rounded tip downwards to the short petiole, coriaceous, glabrous above. *Scape* very slender, cottony, longer than the leaves. *Heads* drooping, 1¼ in. diam.; invol. bracts with long points, glabrate. *Flowers* too young for examination.

4. *G. Kunzeana*, *Braun & Aschers. in App. Plant. nov. ad Cat. Sem. Hort. Berol.* 1871, 3; dioecious, leaves oblong or ovate acute or mucronate subentire or margins lobulate or lyrate-pinnatifid or petiole winged glabrous above densely cottony beneath, lobes apiculate, scape glabrous or cottony above with scattered filiform bracts, invol. bracts glabrous membranous outer ovate, inner broadly lanceolate acuminate, achenes slender hardly beaked scabrid ribbed, pappus chestnut-brown. *G. nivea*, *Clarke Comp. Ind.* 249. *Cleistanthium nepalense*, *Kunze in Bot. Zeit.* 1851, 350.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 7-12,000 ft.

Similar in habit and foliage to *G. lanuginosa*, but with different invol. bracts and pappus, and at once distinguished from it and all others of the genus by the filiform bracts on the scape. It is most closely allied to the Chinese *G. anandria*, *Schultz-Bip. mss. (Anandria Bellidiastrum, DC.)*, which differs in the cottony obtuse invol.

bracts, quite glabrous achenes, and pale pappus. Clarke observes that the female plant produces strictly cleistanthous heads with minute filiform corollas on shorter later peduncles. Not distinguished by Bentham (*Gen. Pl.* ii. 498) from Wallich's *Arnica nivea*, which is *G. nivea*, Benth.

** *Ligules* 0.

5. *G. macrophylla*, Benth. in *Gen. Plant.* ii. 497; leaves large long-petioled sagittate abruptly acuminate denticulate appressedly cottony (rarely glabrous) beneath sometimes pinnatifid at the base, scape cottony ebracteate, invol. bracts acute glabrous, outer ovate, inner linear-lanceolate, achenes slender beaked almost glabrous, pappus white. *Clarke Comp. Ind.* 250. *Chaptalia maxima*, *Don Prodr.* 166. *Bernieria nepalensis*, *DC. Prodr.* vii. 18; *Deless. Ic. Sel.* iv. t. 77. *Tussilago macrophylla*, *Wall. Cat.* 2989. *Perdicium semiflosculare*, *Ham. mss. in Don Prodr.*

TEMPERATE HIMALAYA; from Garwhal to Bhotan, alt. 6-7000 ft. (to 10,000, Clarke). KHASIA MTS.; alt. 4-6000 ft.

Crown of rootstock and young leaves woolly. *Leaves* 5-12 by $2\frac{1}{2}$ -7 in.; base truncate or cordate, angles acute obtuse or rounded, when pinnatifid lobes irregular, rarely more than 1 or 2 pairs, oblong, reaching as far as the margin of the terminal lobe, horizontal or deflexed, sometimes remote from the blade; petiole 3-12 in., cottony. *Scape* 6-18 in. *Heads* 1-1 $\frac{1}{2}$ in. diam.; invol. bracts pale or coloured; corolla $\frac{1}{2}$ - $\frac{2}{3}$ in. long. *Achenes* $\frac{1}{2}$ - $\frac{1}{3}$ in., obscurely puberulous, strongly ribbed; pappus dirty-white or reddish, nearly $\frac{1}{2}$ in. long.

VAR. *glabrata*; leaves glabrous beneath.—Sikkim and Khasia.

TRIBE XI.—CICHORIACEÆ.

103. CICHORIUM, Linn.

Erect, glabrous or hispid herbs with divaricate sometimes spinescent branches. *Leaves*, upper subentire, lower pinnatifid. *Heads* sessile on the branches or on thickened peduncles, homogamous, blue; fl. all ligulate. *Invol. bracts*, inner 1-seriate, at length concave at the base with the outer flowers in the concavity, outer few shorter; receptacle flat, naked or subfimbriate. *Achenes* glabrous, sub-5-angled, or the outer subcompressed and ∞ -ribbed or striate, base contracted, tip truncate or the margin slightly produced; pappus pales short, 2-3-seriate.—DISTRIB. Species 3; temperate regions of the old world.

1. *C. Intybus*, Linn.; *Boiss. Fl. Orient.* iii. 715; perennial, stem and leaf-nerves beneath hispid, leaves runcinate, heads solitary and terminal and axillary clustered, invol. bracts glandular-hispid much shorter than the corolla, pappus pale obtuse very short. *DC. Prodr.* vii. 84; *Clarke Comp. Ind.* 250. *C. Cosnia*, *Ham in Wall. Cat.* 3241.

NORTH WESTERN INDIA; Kumaon (cult. or an escape?).—DISTRIB. Westward to the Atlantic.

Root fleshy, tapering. *Stem* 1-3 ft., angled and grooved; branches rigid, spreading. *Leaves* oblong-lanceolate, upper cordate-amplexicaul. *Heads* 1-1 $\frac{1}{2}$ in. diam., peduncle thickened in the middle; invol. bracts herbaceous; ligules bright blue, rarely white or pink, truncate, 5-toothed. *Achenes* angled, pale, mottled.—The specimens are very indifferent and include some of the cultivated variety *C. Endivia* (the garden Endive), which is more glabrous.

104. LAPSANA, Linn.

Erect herbs. *Leaves* alternate, toothed or the lower pinnatifid. *Heads* small, loosely corymbose or paniced, yellow, homogamous; fl. all ligulate.

Involucre cylindric-campanulate; inner bracts subequal, herbaceous, fruiting harder and more convex or keeled, erect, outer few small; receptacle flat, naked. *Achenes* oblanceolate, curved subterete, 20-30-ribbed, ribs slender, base narrowed, top rounded; pappus 0.—**DISTRIB.** Species 3-4, European and Asiatic.

1. **L. communis**, Linn.; Boiss. *Fl. Orient.* iii. 720; annual, glabrous or hispid below, stem paniculately branched leafy, lower leaves petioled lyrate, cauline ovate uppermost linear entire, heads corymbose $\frac{1}{2}$ in. long glabrous, DC. *Prodr.* vii. 76; Reichb. *Ic. Fl. Germ.* xix. t. 1352; Clarke *Comp. Ind.* 250.

KASHMIR; alt. 5-6000 ft.—**DISTRIB.** N. & W. Asia, Europe, N. Africa.

Stem 1-2 ft. *Leaves* membranous, terminal lobe of radical sinuate-toothed, lateral small. *Heads* many; peduncle short, slender, naked; invol. bracts 8-10, linear, rigid, keeled, obtuse, glabrous or glandular. *Achenes* $\frac{1}{2}$ in., pale, shining.

105. **KÆLPINIA**, Pall.

A glabrous or puberulous weak annual. *Leaves* chiefly radical, linear, quite entire. *Heads* small, peduncled, yellow, homogamous; fl. all ligulate. *Involucre* cylindric; bracts 5-7, narrow, subequal, thin, base at length keeled, outer very few, small; receptacle naked. *Achenes* very long, much exceeding the bracts, spreading and incurved, narrowly linear, ribbed, dorsal ribs with rows of glochidiate spines.

1. **K. linearis**, Pall.; Boiss. *Fl. Orient.* iii. 721; DC. *Prodr.* vii. 78; Jaub. & Spach. *Ill. Pl. Orient.* t. 286; Clarke *Comp. Ind.* 721. Rhagadiolus Kœlpinia, Willd. Lapsana Kœlpinia, Linn.

The PUNJAB, KASHMIR and WESTERN TIBET; alt. 2-14,000 ft., Jacquemont, &c.—**DISTRIB.** Central and Western Asia, N. Africa, S. Russia.

Root slender. *Stem* 6-12 in., erect or decumbent, simple or branched, leafy. *Leaves* 2-6 by $\frac{1}{10}$ - $\frac{1}{4}$ in., gradually narrowed at both ends. *Heads* $\frac{1}{4}$ - $\frac{1}{2}$ in. *Achenes* $\frac{1}{3}$ - $\frac{2}{3}$ in., incurved like birds' claws, puberulous, terminal spines stellate.—In some Afghan specimens the dorsal spines are almost suppressed.

106. **RHAGADIOLUS**, Juss.

Annual. *Leaves* toothed or pinnatifid. *Heads* small, axillary in the forks or terminal, yellow, homogamous, fl. all ligulate. *Involucre* subcampanulate; bracts 1-seriate, at length keeled and embracing the outer achenes; receptacle naked. *Achenes* very long, much exceeding the bracts, incurved, narrow, smooth, beaked, outer with a short pappus, inner with a paleaceous pappus.—**DISTRIB.** Species 5, Mediterranean and Oriental.

1. **R. Hedypnois**, Fisch & Mey. *Ind. iv. Sem. Hort. Petrop.* 48; glabrous or sparsely hispid, diffuse, leaves obovate-oblong, stem and peduncles thickened in fruit, achenes glabrous. DC. *Prodr.* vii. 78. Gastradiolus Hedypnois and angulosus, Jaub. & Spach *Ill. Pl. Orient.* iii. t. 264, 265; Boiss. *Fl. Orient.* iii. 723.

KASHMIR, Falconer.—**DISTRIB.** Westwards to Asia Minor.

Branches 2-8 in., all spreading from the root. *Leaves* 1-3 in., narrowed into the petiole. *Heads* $\frac{1}{4}$ - $\frac{1}{2}$ in.; invol. bracts small, subspinulose or smooth in fruit. *Achenes* $\frac{1}{4}$ - $\frac{1}{2}$ in., narrowed from the base to the incurved tip, terete, smooth.

107. **PICRIS**, Linn.

Erect, branched, hispid herbs. *Leaves* alternate or radical, entire toothed or pinnatifid. *Heads* terminal, long-peduncled, homogamous, yellow; fl. all ligu-

late. *Involucre* suburceolate or campanulate; inner bracts 1-seriate, subequal; outer ∞ -seriate, herbaceous, narrow, or the outermost broad and foliaceous; receptacle flat. *Anther-bases* sagittate, acute or shortly setaceous. *Style-arms* slender. *Achenes* narrow, incurved, subterete compressed or angled, glabrous, 5-10-ribbed, ribs transversely rugose, beak short or long, all similar or the outer with a shorter beak and no pappus; pappus copious, of 1 series of soft feathery hairs, or of fewer rigid hairs dilated at the base, with sometimes a few outer short hairs.—**DISTRIB.** Species about 24, Europe, N. Africa, N. Asia and one cosmopolitan.

P. hieracioides, Linn.; Boiss. *Fl. Orient.* iii. 734; tall, corymbosely branched, radical leaves sinuate-toothed, cauline cordate $\frac{1}{2}$ -amplexicaul, peduncles not thickened in fruit, achenes narrowly ellipsoid shortly beaked compressed, all with feathery deciduous pappus. *DC. Prodr.* vii. 128; *Clarke Comp. Ind.* 251. *P. hieracioides*, var. *indica*, *Wight Ic.* t. 1143. *P. hamulosa*, *Wall. Cat.* 3255; *DC. l. c.* 129. *P. strigosa*, *Wall. Cat.* 3256.

TEMPERATE HIMALAYA; from Murree to Bhotan, alt. 6-8000 ft., ascending to 10,000 ft. in Sikkim. KHASIA MTS.; alt. 4-6000 ft. NILGERRY MTS.; alt. 5-8000 ft.—**DISTRIB.** N. Asia to Japan, W. Asia, Europe, N. Africa.

A coarse herb, 1-4 ft.; hairs straight or hooked. *Leaves* 2-5 in. *Heads* $\frac{1}{2}$ - $\frac{2}{3}$ in. long; invol. bracts glabrous or hispid. *Achenes* $\frac{1}{2}$ in., narrowed at both ends, slightly curved, brown; pappus very white, $\frac{1}{4}$ in.

108. CREPIS, Linn.

Annual or perennial glabrous or hairy herbs, hairs never stellate. *Leaves* radical or alternate, cauline often stem-clasping, entire toothed or pinnatifid. *Heads* peduncled, solitary fascicled or corymbose, yellow or red, homogamous; fl. all ligulate. *Involucre* cylindric or campanulate; invol. bracts either ∞ -seriate and regularly imbricate, or the outer small or very much shorter than the linear 1-seriate inner; base or midrib thickened after flowering or not; receptacle flat, rarely concave, naked or shortly fimbriate. *Achenes* more or less fusiform or oblong, rarely short and cylindric, often slender, glabrous or scaberulous, 10-20-ribbed, tip narrowed or beaked; pappus short or long, usually copious, hairs usually silvery, simple and soft, rarely brownish and stiff or brittle.—**DISTRIB.** Species 130, chiefly in N. temp. region of the old world, none in S. temperate.

It is impossible to draw a line between this genus and *Lactuca*, *Hieracium*, *Launæa* or even *Prenanthes*. As a rule the Indian species here included have terete or only slightly compressed achenes, narrowed from above the middle to the tip in all but the last section; and they are truly beaked in section *Barkhausia* alone.

SECT. I. Barkhausia. Inner or all the *achenes* with long slender beaks; pappus soft.

1. **C. foetida**, Linn.; Boiss. *Fl. Orient.* iii. 851; hispid, lower leaves lyrate-pinnatifid or sinuate-toothed, cauline cordate base $\frac{1}{2}$ -amplexicaul, heads drooping in bud, invol. bracts hispid and glandular, outer hardened and keeled at the base, outer achenes shorter than the bracts acute, inner long-beaked scabrid striate. *Clarke Comp. Ind.* 252. *C. Kotschyana*, *Clarke l. c.* not of Boissier. *Barkhausia foetida*, *DC. Prodr.* vii. 158.

The PUNJAB and WESTERN HIMALAYA; from Kashmir to Kumaon, in fields, alt. 6-8000 ft.—**DISTRIB.** Westward to the Atlantic.

Annual; branches suberect or spreading from the root, 6-18 in., stout, corymbosely branched. *Leaves* 2-6 in. *Heads*, flowering $\frac{1}{2}$ in., fruiting $\frac{3}{4}$ in., and as broad; invol. bracts hispid. *Outer achenes* $\frac{1}{4}$ in., curved, pale, dorsally thickened; inner $\frac{1}{2}$ - $\frac{1}{3}$ in.;

straight, many-ribbed, red-brown, beak very slender as long as the body; pappus $\frac{1}{2}$ in., dirty-white.

SECT. II. **Soyeria**. Perennials. *Heads* large, broad, usually hirsute; invol. bracts imbricating, all long or outer broad or narrow, gradually passing into the inner. *Achenes* long, narrowed gradually upwards or to both ends; pappus soft, white.

2. **C. sibirica**, *Linn.*; *Ledeb. Fl. Ross.* ii. 828; stout, erect, more or less hispid, radical and lower leaves oblanceolate acuminate sinuate-toothed or lyrate-pinnatifid, lobes rounded denticulate, cauline cordate $\frac{1}{2}$ -amplexicaul, heads 1 in. diam. few subcorymbose peduncled, invol. bracts obtuse ciliate and pubescent, outer broadly ovate, inner linear, achenes $\frac{1}{2}$ in. slender ribbed smooth gradually narrowed upwards, pappus short. *DC. Prodr.* vii. 167; *Reichb. Ic. Fl. Germ.* t. 1458. *Clarke Comp Ind.* 252. *Hieracium sibiricum*, *Gmel.* *Soyeria sibirica*, *Monnier Hieracium*, 177.

WESTERN HIMALAYA; from Kashmir to Kumaon, *Falconer, &c.*, alt. 6-10,000.—*DISTRIB.* Siberia, S. Europe to Austria.

Root fusiform, very stout. *Stem* 6-18 in., simple or sparingly branched. *Leaves* 6-12 in., lowest petioled, scaberulous or glabrate above. *Achenes* pale brown, quite smooth; pappus $\frac{1}{2}$ in., rather scanty, hairs singly deciduous.—I have not quoted Boissier who (iii. 833) describes the achenes as 20-30-ribbed, the ribs transversely rugulose and scaberulous.

3. **C. blattarioides**, *Vill.*; *DC. Prodr.* vii. 167; hispid, villous and glandular above, stem simple subcorymbosely branched above, leaves entire or sinuate-toothed radical obovate-oblong petioled, cauline few large sessile, heads 1 in. diam. few erect, peduncles long strict naked, invol. bracts 2-3-seriate all long lanceolate acute villous, achenes $\frac{1}{2}$ in. slender narrowed at both ends ribbed smooth longer than the white shining pappus. *Reichb. Ic. Fl. Germ.* t. 1461. *C. austriaca*, *Jacq. Fl. Aust.* v. t. 441. *Hieracium blattarioides*, *Linn.* *Soyeria blattarioides*, *Monnier Tarax.* 76.

KASHMIR; Sonamurg, alt. 11,500 ft., *Clarke*.—*DISTRIB.* Mid. & West Europe.

Stem 1-2 ft., rather stout. *Leaves*, radical, 2-4 by 1-2 in., cauline as broad or broader. *Heads* 4-8, rarely more; peduncle swollen at the base; invol. bracts 20-30, $\frac{1}{2}$ in. long, blackish when dry, acuminate, with rarely a slender shorter basal one. *Achenes* red-brown, outer curved, ribs strong; pappus $\frac{1}{4}$ in. long, rather persistent.

SECT. III. **Youngia**. *Heads* small, narrow; outer invol. bracts very short, inner linear 1-seriate. *Achenes* small, narrowed at both ends, slightly flattened, ribbed, hardly beaked; pappus soft white or grey.

* *Stems or flowering branches much dichotomously branched, slender, virgate.*

4. **C. glauca**, *Benth. in Gen. Pl.* ii. 515; annual, quite glabrous, stems very numerous from the root dichotomously divaricatingly excessively branched, radical leaves long-petioled obovate-spathulate sinuate-toothed pinnatifid or pinnate, lobes variously acutely cut, cauline sessile linear entire, heads $\frac{1}{4}$ - $\frac{1}{2}$ in. narrow, outer invol. bracts minute inner 6-8 linear glabrous, achenes very slender ribbed to the tip longer than the white pappus. *C. flexuosa*, *Clarke Comp. Ind.* 254 (not of *Ledeb.*). *Barkhausia flexuosa*, *DC. Prodr.* vii. 155. *Youngia glauca*, *Edgew. in Trans. Linn. Soc.* xx. 79.

WESTERN TIBET, and the Tibetan regions of Lahul and Kumaon, alt. 8-17,000 ft., *Falconer, &c.*

A most densely corymbosely branched herb, forming an obconical mass 6-12 in. high, and as broad at the truncate top, of forking spreading rigid slender branches

terminated by small yellow heads. *Leaves* few, radical soon disappearing. *Heads* terminal and sublateral, few fld.; peduncles naked, slender. *Achenes* $\frac{1}{2}$ in. long, very slender, pale, obscurely scabrid, hardly beaked; pappus white.—Bentham suggests that this and *Youngia flexuosa* of the Altai are varieties; Clarke also points out they are altogether similar, except in that the Altai plant has a distinct beak to the achenes.

5. *C. tenuifolia*, Willd. Sp. Pl. iii. 1605; perennial, quite glabrous, stems very many from the root-stock stout much branched stiff, radical leaves long-petioled pinnatifid, lobes distant spreading very unequal slender acuminate sparingly toothed or entire, rachis winged, heads corymbose $\frac{1}{2}$ in. long, invol. bracts hoary outer very small inner linear subacute, tips often clawed, achenes narrowly fusiform shortly beaked compressed ribbed minutely scabrid about equalling the soft silvery pappus. *Clarke Comp. Ind.* 254. *Barkhausia tenuifolia*, *DC. Prodr.* vii. 155. *Youngia diversifolia*, *Ledeb. Fl. Ross.* ii. 837. *Prenanthes diversifolia*, *Ledeb. Ic. Fl. Alt.* t. 152. *Lagoseris tenuifolia*, *Reichb. Ic. Crit.* i. t. x.

NORTHERN KASHMIR and WESTERN TIBET; alt. 12–15,000 ft., *Falconer, &c.*—*DISTRIB.* Dahuria, Siberia, Mongolia.

Root woody. *Stem* often branching from the base, 6–18 in. high, stiff. *Leaves* 4–8 in., narrow, radical rarely linear, and entire, cauline usually so. *Heads* numerous; peduncles bracteate, sometimes sparsely pubescent. *Achenes* $\frac{1}{2}$ in., red-brown, slightly compressed; pappus-hairs rather deciduous.

6. *C. japonica*, Benth. Fl. Hongk. 194; annual, glabrous or puberulous, radical leaves obovate sinuate-toothed or runcinate-pinnatifid, flowering-stems slender erect nearly naked, heads $\frac{1}{2}$ – $\frac{1}{4}$ in. on slender bracteolate peduncles, invol. bracts 6–8 narrowly oblong glabrous fruiting with a strong basal midrib, achenes narrowly fusiform hardly beaked compressed ribbed equalling or shorter than the white soft pappus. *O. lyrata*, *Clarke Comp. Ind.* 253. *Youngia lyrata*, *Cass.; Thw. Enum.* 168. *Y. Thunbergiana*, *runcinata*, *napifolia*, *Poosia*, *ambigua*, *fastigiata* and *striata*, *DC. Prodr.* vii. 192, 193. *Y. napifolia*, *Wight Ic.* t. 1147. *Lactuca napifolia*, *DC. in Wight Contrib.* 27. *Chondrilla runcinata*, *Wall. Cat.* 3272. *Prenanthes Poosia* and *napifolia*, *Wall. Cat.* 3265, 3277. *P. japonica*, *Linn. Mant.* 107. *P. striata*, *Bl. Bijdr.* 885.

Throughout INDIA and CEYLON; ascending to 10,000 ft., in the Himalaya.—*DISTRIB.* Malay Peninsula, China, Japan, Afghanistan, Mauritius.

Leaves rosulate, 2–6 in., membranous. *Flowering stems* 1 or many from the root, 6–18 in., soft, strict, corymbosely branched at the top; branches slender, spreading. *Invol. bracts* with hyaline margins, erect green. *Achenes* $\frac{1}{2}$ in., distinctly contracted but not beaked at the top, many-ribbed, ribs smooth, red-brown.—Wight suggests that this should be placed in the *Brachyramphus* section of *Lactuca*, and Clarke says that the subgenus *Youngia* would be better placed under *Lactuca*. The fact is that it will go with either *Crepis* or *Lactuca*, but has rather the habit of the former according to Bentham's and my view of the limitation of these very artificial genera.

7. *C. fuscipappa*, Benth. in Gen. Pl. ii. 574; annual, glabrous or nearly so, stem erect slender simple or sparingly forked, radical leaves petioled elongate obovate or oblanceolate obtuse acute or acuminate sinuate-lobed or pinnatifid, cauline linear or lanceolate base narrow, heads few corymbose $\frac{1}{2}$ in. long, peduncles slender naked, outer invol. bracts very small, inner linear subacute glabrous fruiting not ribbed at the base, achenes narrowly fusiform hardly beaked compressed ribbed minutely scabrid about equalling the soft grey pappus. *Clarke Comp. Ind.* 254. *C. gracilis*, *Hook. f. & T. mss.; Clarke Comp. Ind.* 254. *O. primulifolia*, *Herb. Ind. Or. H. f. & T.* *Youngia fuscipappa*, *Thwaites Enum.* 168.

SIKKIM HIMALAYA; Lachen, alt. 9-10,000 ft., *J. D. H.* KHASIA Mts.; alt. 4-5000 ft., *Wallich*, &c. CEYLON; central province, alt. 5000 ft., *Walker*, &c.

Radical leaves 5-10 by $\frac{1}{2}$ -1 $\frac{1}{2}$ in., cauline in Khasian and Sikkim specimens 2-3 in., petioled or narrowed at the base. *Stem* 1-3 ft., very slender, rarely divided. *Heads* few and small for the size of the plant. *Achenes* $\frac{1}{2}$ in., red-brown.—I find no material difference between the achenes of this and *L. japonica* which would warrant separating them generically; the name *fuscipappa* is hardly merited, the pappus being not at all brown, but of an inky grey or nearly white.

8. **C. acaulis**, *Hook. f.*; perennial, dwarf, quite glabrous, radical leaves very narrowly obovate-spathulate linear or lanceolate obtuse or acute quite entire or sinuate-toothed or subpinnatifid, flowering stem shorter or longer than the leaves, heads few 1 in. long 10-12-fld., peduncle bracteolate, outer invol. bracts very small, inner linear, achenes ellipsoid narrowed at both ends subcompressed strongly ribbed shorter than the soft silvery pappus. *Microrhynchus glabra*, *Wight Ic. t.* 1145. *M. acaulis*, *Kurz in Journ. As. Soc.* 1877, ii. 208. *Lactuca glabra*, *DC. in Wight Contrib.* 26; *Prodr.* 135; *Clarke Comp. Ind.* 272. *L. rigida*, *DC. l. c.* *Youngia acaulis*, *DC. Prodr.* vii. 193. *Prenanthes acaulis*, *Roxb. Fl. Ind.* iii. 403. *P. glabra*, *Heyne*, and *P. rigida*, *Ham. in Wall. Cat.* 3264, 3263. *Prenanthes* sp. *Griff. Notul.* iv. 251; *Ic. Pl. Asiat.* t. 469. *Sonchus Metzianus*, *Schultz-Bip. in Plant. Hohenack.* n. 522 and 1359.

SUBTROPICAL HIMALAYA; from Jamu to Bhotan. LOWER GANGETIC PLAIN; Maldah, Dinagapore, &c., CENTRAL INDIA. WESTERN PENINSULA; CANARA and Nilgherry Mts.; common, *Hohenacker*. BURMA, common, *Kurz*.

Root woody, straight, cylindric, sometimes a foot or more long and $\frac{1}{2}$ in. diam. *Leaves* chiefly radical, 2-12 by $\frac{1}{2}$ -1 in., nerves faint spreading. *Flowering-stems* 3-10 in., sometimes very numerous, simple or dichotomously branched. *Achenes* $\frac{1}{2}$ in., hardly beaked, with about 6 very thick smooth ribs and more slender intermediate ones.

9. **C. Stoliczka**, *Clarke Comp. Ind.* 255; perennial?, stemless, hirsutely pubescent, leaves all radical long-petioled narrowly obovate-spathulate sinuate-toothed or lyrate-pinnatifid, flowering stem erect naked sparingly corymbosely branched and glandular above, heads $\frac{1}{2}$ in. long cylindric puberulous, outer invol. bracts minute, inner linear obtuse not thickened in fruit, achenes very narrowly fusiform not beaked finely ribbed rather longer than the soft white pappus.

WESTERN HIMALAYA; Kashmir, Tilail, alt. 12,000 ft., *Clarke*; Lahul, alt. 9500-13,000 ft., *Stoliczka*. WESTERN TIBET; Karakoram, alt. 14,000 ft., *Clarke*.

Leaves very few and narrow, 2-5 in. long, obtuse, pubescent on both surfaces. *Flowering stems* 6-12 in., rather stout but soft, often copiously glandular above; peduncles usually short, naked, with a subulate bract at the base; invol. bracts 8-10, green, with fainter margins. *Achenes* $\frac{1}{2}$ in., very slender, distinctly narrowed upwards from the middle, red-brown; pappus persistent but easily removed.—*Clarke* compares this with *C. premorsa*, *Froel.*, and *C. multicaulis*, *Ledeb.*; and he further suggests that it may be *Barkhausia Roylei*, *DC. (Prodr.* vii. 157), but it has not the beaked achenes of that genus, nor are the leaves sessile.

*** *Flowering stem* 0, or very short; heads few, subsessile amongst the leaves.

10. **C. gracilipes**, *Hook. f.*; perennial, dwarf, glabrous, leaves all radical elongate obovate or spathulate sinuate-lobed or pinnatifid lobes obtuse entire, heads $\frac{1}{2}$ in. long solitary on short slender 1-bracteate scapes, outer invol. bracts very small, inner linear subacute, achenes (unripe) much shorter than the soft silvery pappus. *Lactuca*, *Sect. Chorisma*, sp. inéd., *Benth. in Gen. Pl.* ii. 526.

SIKKIM HIMALAYA; alpine region, *J. D. H.*

Root-stock long, creeping, sometimes divided. *Leaves* $\frac{1}{2}$ – $1\frac{1}{2}$ in., rather succulent, tip broad rounded or acute. *Scapes* or *peduncles* shorter than the leaves, pubescent or glabrate. *Heads* quite glabrous, 20–30-fl.; inner invol. bracts 10–12, green, or the overlapped edges pale. Closely allied to *C. depressa*.

11. **C. depressa**, Hook. f. & Thoms.; perennial, stemless, puberulous, leaves rosulate very stoutly petioled ovate or rounded obscurely toothed or sinuate-toothed 5-nerved from near the base, heads crowded amongst the radical leaves $\frac{1}{2}$ in. long-peduncled bracteolate, invol. bracts strap-shaped obtuse or subacute nearly glabrous, achenes very slender fusiform beaked ribbed quite smooth shorter than the white smooth pappus. *C. glomerata*, Clarke Comp. Ind. 255, excl. syn.

SIKKIM HIMALAYA; near the Tibetan frontier, alt. 15–17,000 ft., J. D. H.

Root as thick as the little finger and crown woody. *Leaves* 1–2 in. long, rather fleshy, base rounded; petiole as long or shorter, very thick. *Heads* very numerous, invol. bracts green, inner with scarious margins, base rather thickened in fruit, glabrous or with a few hispid hairs. *Achenes* $\frac{1}{4}$ in., dark brown with a pale beak; pappus $\frac{1}{3}$ – $\frac{1}{2}$ in.

SECT. IV. **Hieracioides**. *Heads* rather broad, panicled or racemose; outer invol. bracts very short, inner linear 1-seriate. *Achenes* small, slender, narrowed at both ends; pappus hairs brownish, rigid, brittle.

12. **C. silhetensis**, Hook. f.; quite glabrous, radical leaves persistent linear-lanceolate finely acuminate narrowed into a short petiole quite entire or obscurely toothed, flowering stem sparingly dichotomously branched, branches slender erect, heads numerous panicled $\frac{1}{3}$ in. diam., peduncles slender, outer invol. bracts very small, inner linear subacute, achenes slender glabrous narrowed upwards ribbed about equalling the brown rigid pappus. *Hieracium silhetense*, DC. Prodr. vii. 218; Clarke Comp. Ind. in Journ. Linn. Soc. xiv. 411, 257. *Prenanthes*? Candolleana, Wall. Cat. 3280, in part. *Conyza foliolosa*, Wall. Cat. 3281, in part.

KHASIA Mts., alt. 4–6000 ft., common. BURMA and TENASSERIM, Kurz.

Perennial; rootstock stout, woody. *Leaves* 6–12 by $\frac{1}{4}$ – $1\frac{1}{4}$ in., very much narrowed at both ends. *Flowering stems* often twice as long as the leaves, slender, with small leaves at the forks. *Heads* yellow, panicled, peduncles with usually a small bract. *Achenes* $\frac{1}{10}$ in., pale brown; pappus rather scanty.—A very anomalous plant, with the habit, absence of stellate hairs, and the achenes of *Crepis*, but with the brittle brown pappus of *Hieracium*.

13. **C. racemifera**, Hook. f.; perennial, glabrous or puberulous above, stem strict simple or branches erect, leaves scattered petioled ovate or ovate-lanceolate sinuate-toothed, petiole winged, heads in unilateral racemes, achenes much shorter than the pappus. *Crepis*, No. 6, Herb. Ind. Or. H. f. & T.

SIKKIM HIMALAYA; towards the Tibetan frontier, alt. 8–14,000 ft., J. D. H.

Stem 6–18 in., very slender, from a small perennial rootstock. *Leaves* few, 1–2½ in., acute, membranous, lower and middle cauline long-petioled, petiole not auricled at the base, upper sessile. *Racemes* strict, nearly leafless, with minute bracts at the base of the peduncles, which are erect, curved at the top, and usually 1–2-bracteolate; heads campanulate, $\frac{1}{3}$ – $\frac{1}{2}$ in. diam., horizontal or drooping; outer invol. bracts very small, inner 6–10 linear acute glabrous, all green, blackish when dry; ligules yellow. *Achenes* quite immature, apparently short and not beaked; pappus not exceeding the involucre, pale brown, brittle.—A very remarkable species, whose affinity is doubtful, but I think very near *H. silhetensis*, though differing in habit and inflorescence.

SECT. V. **Glomeratæ**. *Heads* very numerous and densely crowded, sessile or shortly peduncled on the dilated top of a simple villous club-shaped stem.

14. **C. glomerata**, *Denc. in Jacq. Voy. Bot.* 99, t. 107 (*Prenanthes*), *not of Clarke*; pubescent or villous, stem short soft simple clavate leafy, leaves obovate or linear-oblong entire sinuate-toothed or pinnatifid, heads cylindric, outer invol. bracts 0 or 1-2 filiform, inner 3-6 linear- or broadly oblong obtuse, achenes cylindric-oblong obscurely constricted below the shining white reddish or blue-grey rigid pappus. O. Hookeriana, *Clarke Comp. Ind.* 255.

WESTERN TIBET, *Jacquemont*; Lahul, *Captain Hay*; Barji-kang (N. of Kumaon), alt. 14,000 ft., *Strach. & Winterb.* SIKKIM; common near the Tibetan passes, alt. 13-17,000 ft., *J. D. H.*

Stem 1-6 in., densely or laxly villous, tapering into a fusiform root a foot long, soft, often $1\frac{1}{2}$ -2 in. diam. at the truncate top. *Leaves* very variable, 1-5 by $\frac{1}{4}$ - $\frac{1}{2}$ in., flaccid. *Heads* 50-100, forming a dense hemispheric mass mixed with filiform bracts which arise from the base of the very short peduncle, few-fld.; invol. bracts $\frac{1}{4}$ - $\frac{1}{2}$ in., variable in breadth, glabrous or villous, margins membranous; ligules yellow. *Achenes* $\frac{1}{2}$ in., many-ribbed, shining, brown; pappus $\frac{1}{2}$ in. long, deciduous, hairs very variable in colour.—This is a very singular plant, the analogue of *Saussurea gossypiphora*, which it entirely resembles in habit.

DOUBTFUL SPECIES.

CREPIS PORRIFOLIA, *Don Prodr.* 164; *Barkhausia porrifolia*, *DC. Prodr.* vii. 157; and *BARKHAUSIA ROYLEI*, *DC. l. c.*, are very doubtful plants (see under *Pterotheca Falconeri* and *Crepis Stoliczkaei*).

109. **PHÆCASIUM**, *Cass.*

Annual or perennial erect hispid herbs. *Radical leaves* lyrate. *Heads* small, yellow, homogamous; fl. all ligulate. *Involucre* cylindric, calyculate, bracts 1-seriate, fruiting with the midrib thickened below; receptacle flat, naked. *Achenes* terete with a broad base, finely striate, narrowed at the tip or beaked; pappus copious, deciduous, or of the outer achenes scanty.—*DISTRIB.* Species 2 or 3, European and Oriental.

1. **P. lampsanoides**, *Cass. in Dict. Sc. Nat.* xxxix. 387; annual, hispid or glabrate, leaves rosulate runcinate-pinnatifid, cauline few, base simple or sagittate, flowering stem corymbosely or paniculately branched, heads $\frac{1}{2}$ in. long, invol. bracts narrowly lanceolate glabrous fruiting rigid, achenes very slender curved subterete pale smooth rather larger than the very soft white pappus. *P. pulchrum*, *Reichb. Ic. Fl. Germ.* t. 1431. *Crepis pulchra*, *Linn.*; *DC. Prodr.* vii. 160; *Boiss. Fl. Orient.* iii. 846. *C. youngiformis*, *Koch in Linnæa*, xxiii. 690. *Chondrilla pulchra*, *Lamk. Encycl.* ii. 77. *Youngia Kochiana*, *Ledeb. Fl. Ross.* ii. 837.

WESTERN HIMALAYA; Kashmir to Lahul, alt. 7-8000 ft., *Clarke, Watt.*—*DISTRIB.* Westwards to the Atlantic.

Stem 1 or many from the root, 12-18 in. high. *Leaves* very variable. *Heads* on slender divaricating peduncles; fruiting invol. bracts pale, incurved. *Achenes* $\frac{1}{2}$ in. long.—This genus would be better reunited with *Crepis* as a section.

110. **PTEROTHECA**, *Cass.*

Annual subscapigerous hispid or glabrous herbs. *Leaves* all radical, toothed or sinuate-pinnatifid. *Heads* subcorymbose, homogamous, yellow or red, all ligulate. *Involucre* tubular-campanulate; inner bracts 1-2-seriate, equal, narrow, herbaceous, at length concave with the keel thickened, outer few small; receptacle with long hairs or bristles. *Anther-bases* sagittate, auricles acute or setaceous. *Style-arms* slender. *Achenes* slender, all subterete or the outer compressed, 8-10-ribbed, narrowed at both ends, glabrous, strongly 3-ribbed or

winged on the inner face; pappus short, hairs very slender, simple, white, subconnate, deciduous or persistent.—DISTRIB. Species 4 or 5, Mediterranean and W. Asiatic.

1. **P. Falconeri**, *Hook. f.*; hispid or glandular above or glabrate, radical leaves subsessile obovate or elongate-spathulate sinuate-toothed or pinnatifid, flowering stems leafless subcorymbosely branched above, heads $\frac{1}{2}$ in. long broadly cylindric hispid or glabrate, outer invol. bracts very small ovate, inner 8–10 linear acute midrib thickened in fruit, achenes very slender straight all terete narrowed above 8–10-ribbed, outer scaberulous, inner smooth longer than the very soft white pappus. *P. bifida*, *Clarke Comp. Ind.*, 256, not of *F. & M.*

WESTERN HIMALAYA; from Kashmir, alt. 3–9000 ft. to Kunawur, *Falconer, &c.*—DISTRIB. Afghanistan.

Annual. *Radical leaves* 2–8 in., very variable. *Flowering stem* 6–18 in., slender or stout, corymbosely or paniculately branched above, with minute bracts at the forks or 0; branches spreading, usually with hispid gland-tipped hairs; peduncles naked; recept. hairs very slender, flexuous. *Achenes* $\frac{1}{2}$ in., outer sometimes imperfect white and flattened, perfect terete many-ribbed red-brown; pappus $\frac{1}{10}$ in., hairs all rather persistent.—I advance this species with much hesitation, for though differing in the achenes being all terete and uniformly ribbed from *P. bifida*, I find so much variety in the outer achenes of that plant that I suspect this may prove to be a form of it. *Clarke* refers *De Candolle's Barkhausia porrifolia* and *Roylei* to this, but besides the achenes being in no sense beaked, *B. porrifolia* is founded by *Don* on a plant of *Wallich's* from Nipal (where *P. Falconeri* does not occur) which is quite glabrous and glaucous; and with regard to *P. Roylei* the description is not sufficient to identify it; *P. Falconeri* does not occur in *Royle's* Herbarium. The genus should be merged in *Crepis*.

111. **HIERACIUM**, *Linn.*

Perennial, leafy, erect or scapigerous herbs, with simple and stellate hairs. *Leaves* entire or toothed, very rarely pinnatifid. *Heads* often with black glandular hairs, solitary and long-peduncled or narrowly paniced or corymbose, homogamous, yellow, rarely orange or red; fl. all ligulate. *Involucre* tubular-campanulate or broad; bracts narrow, herbaceous, inner subequal or not, outer usually smaller, unchanged after flowering; receptacle flat, naked or shortly fimbriate. *Achenes* oblong-cylindric, 10–15 ribbed, terete or angled, base shortly contracted, top truncate; pappus copious, hairs 1–2-seriate, simple, rigid, fragile, persistent, usually dirty white or brown.—DISTRIB. Species about 150, chiefly Western European, a few Asiatic, N. American, Andean, and S. African.

The Indian *Hieracia* have been referred by *Mr. Baker* to European species, and I have followed his identifications, but described them from the Indian examples. The species seem as variable and difficult to define in the East as in the West, and there are several forms from the Himalaya which do not appear referable to any of the following, but are too imperfect for description. The genus wants careful study in the Himalaya.

1. **H. vulgatum**, *Koch; Boiss. Fl. Orient.* iii. 871; hirsute or glabrate, radical leaves persistent petioled narrowed at both ends coarsely toothed, lower cauline petioled upper sessile, heads many, peduncles straight glandular, invol. cylindric in bud floccose and with gland-tipped hairs, bracts equal alternate subacute. *Reichb. Ic. Fl. Germ.* xix. t. 1526. *H. sylvaticum*, *Lamk.* *H. murorum*, *Clarke Comp. Ind.* 256.

WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 6–10,000 ft.—DISTRIB. N. Asia, Europe, Arctic America.

Stolons 0. *Leaves* 3–5 in., often spotted with black in Europe. *Stem* 1–2 ft.,

stout or slender, paniculately or corymbosely branched. *Heads* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. *Achenes* $\frac{1}{10}$ in., black; pappus as long.

2. ***H. crocatum***, *Fries.*; glabrous or hirsute, stem leafy simple or branched above, radical leaves 0, cauline sessile elliptic linear-oblong or lanceolate glaucous beneath base rounded truncate or cordate entire or toothed, heads few or many and erect, peduncles downy glabrous or hirsute, invol. bracts glabrous appressed obtuse, outer often slender and recurved.

WESTERN HIMALAYA; Kashmir to Dalhousie, alt. 6–8000 ft., *Thomson, Clarke* WESTERN TIBET, *Falconer, Heyde.*—DISTRIB. Middle and N. Europe.

Stem 1–2 ft., strict. *Leaves* 1–5 in., very variable in shape. *Heads* $\frac{3}{4}$ in. diam. *Achenes* $\frac{1}{8}$ in., cylindric, faintly ribbed, black, shining.

3. ***H. prenanthoides***, *Villars, Boiss. Fl. Orient.* iii. 878; glabrous or hirsute, glandular above, stem leafy with spreading branches, radical leaves 0, cauline oblong or ovate or linear-oblong entire or denticulate glaucous beneath, uppermost cordate, heads in branched leafy paniced corymbs floccose and with gland-tipped hairs, invol. bracts pubescent. *Reichb. Ic. Fl. Germ.* xix. t. 1512.

NORTHERN KASHMIR, alt. 8–10,000 ft., *Clarke.*—DISTRIB. N. Asia, the Caucasus, and N. and Mid. Europe.

Stolons 0. *Stem* 2–3 ft. *Leaves* 1–3 in., rather membranous, ciliate. *Heads* 1 in. diam. *Achenes* nearly $\frac{1}{8}$ in., strongly ribbed, red-brown.

4. ***H. umbellatum***, *Linn.; Boiss. Fl. Orient.* iii. 877; glabrous or hirsute below, eglandular, stem leafy, radical leaves 0, cauline sessile linear or linear-oblong narrowed at the base toothed, heads glabrous or with the bracteolate peduncles stellately downy, invol. bracts many outer small recurved. *Clarke Comp. Ind.* 257, excl. syn. and var. γ ; *Reichb. Ic. Fl. Germ.* t. 1531.

WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 5–10,000 ft.—DISTRIB. N. Asia to Japan, N. Persia, the Caucasus, N. and Mid. Europe, N. America.

Stolons 0. *Stem* 1–2 ft., wiry. *Leaves* 1–3 in., usually narrow and contracted at the base. *Achenes* as in *H. crocatum*, from which it appears to me very difficult to distinguish this in the Himalaya.

VAR. *lanceolata*; smaller, more slender, heads 1–3. *H. lanceolatum*, *Royle mss.*—Kashmir, alt. 7–8000 ft., *Clarke.* Baker regards this as a starved state of *H. umbellatum*; it is very like *H. lanceolatum* of Villars.

5. ***H. virosum***, *Pall.; Ledeb. Fl. Ross.* ii. 856; glabrous or very sparsely hirsute, glaucous, stem stout leafy, leaves sessile short coriaceous oblong-ovate base cordate toothed glaucous beneath, heads numerous in short terminal bracteate umbellate corymbs, peduncles short stout bracteolate, invol. bracts glabrous outermost small spreading. *Reichb. Ic. Fl. Germ.* xix. t. 1536. *H. umbellatum*, var. γ *rigidum*, *Clarke Comp. Ind.* 258. *H. corymbosum*, *Pers. Synops.* ii. 374.

KASHMIR, *Falconer*; Srinuggur, alt. 7–8000 ft., *Clarke.*—DISTRIB. N. Asia from Dauria westwards to Mid. Europe.

Stolons 0. *Stem* very stout, stiff. *Leaves* 1–3 in., crowded, gradually diminishing upwards, glabrous above, sparsely ciliate on the margins and beneath. *Corymbs* with ascending short stiff branches. *Heads* $\frac{3}{8}$ in. diam. *Achenes* $\frac{1}{10}$ in., red-brown.

111.* **HYPOCHÆRIS**, *Linn.*

Perennial, rarely annual, scapigerous herbs. *Leaves* rosulate, entire toothed or pinnatifid. *Heads* long-peduncled, solitary, yellow, homogamous: fl. all ligulate. *Involucre* cylindric-oblong or campanulate; bracts ∞ -seriate, ap-

pressed, unchanged after flowering, outer smaller; receptacle flat, pales narrow, usually hyaline. *Achenes* linear or oblong, terete or compressed, 10-ribbed, ribs scabrous or ciliate, beaked or not; pappus of 1 series of feathery hairs with a few shorter simple outer or alternating ones.—**DISTRIB.** Species about 3, temperate and mountain plants of Northern regions, 2 widely diffused through cultivation.

II. *GLABRA*, Linn.; Boiss. *Fl. Orient.* iii. 783; annual, radical leaves sessile obovate or elongate spathulate sinuate-toothed glabrous or scabrous, flowering stems many stout simple or branched grooved, peduncles bracteolate thickened at the top, heads $\frac{2}{3}$ in. long, invol. bracts equalling the ligules erect obtuse or acute, outer achenes truncate inner with a long slender beak. *DC. Prodr.* vii. 90; *Reichb. Ic. Fl. Germ.* t. 47; *Clarke Comp. Ind.* 258.

NILGHERRY MTS., alt. 7-8000 ft., introduced.—**DISTRIB.** Europe.

Leaves 2-4 in., rarely pinnatifid. *Flowering stems* 6-12 in., naked or 1-2-bracteolate; invol. bracts few, unequal. *Achenes*, outer $\frac{1}{2}$ in., shorter than the pappus; inner $\frac{3}{4}$ in., beak longer than the body, very slender; pappus as long, scanty

112. **TARAXACUM**, Hall.

Scapigerous milky herbs. *Leaves* radical, entire sinuate- or runcinate-pinnatifid. *Heads* solitary on leafless scapes, yellow, homogamous; fl. all ligulate. *Involucre* campanulate or oblong; bracts herbaceous, innermost 1-seriate, erect, subequal, sometimes connate below, unchanged after flowering: outer shorter, ∞ -seriate, often recurved; receptacle flat, naked. *Achenes* oblong obovoid or narrow, 4-5-angled, or the outer dorsally compressed, beaked, glabrous, 10-ribbed, ribs often muricate or echinate above, beak often very long and slender; pappus copious, hairs simple, slender, unequal.—**DISTRIB.** Species about 6, temperate and cold regions.

1. **T. officinale**, Wigg.; Boiss. *Fl. Orient.* iii. 787; glabrous, on crown and scape woolly root vertical, leaves sessile oblanceolate or linear entire toothed pinnatifid or runcinate, lobes acute more or less denticulate, heads solitary, inner invol. bracts linear often thickened or clawed at the tip, outer ovate or linear appressed or the outer reflexed, achenes narrowly obovoid ribbed, ribs muricate or echinate above the middle suddenly contracted into a very slender beak equaling or exceeding the body. *Clarke Comp. Ind.* 258.

Throughout the HIMALAYA and WESTERN TIBET, from 1-18,000 ft. MISHMI Mts., Griffith.—**DISTRIB.** Temperate and cold regions of the N. and S. hemisphere.

One of the most variable of the order. The following are the principal Himalayan forms; I am unable to distinguish them in all their states. It is remarkable that this common Himalayan plant should not be found in the Khasia or Nilgherry mountains, even as a garden escape.

VAR. typica; leaves deeply runcinate, outer invol. bracts reflexed. *Reichb. Ic. Fl. Germ.* t. 1404.—Ascends to 12,000 ft.

VAR. glaucescens; leaves glaucous runcinate, outer invol. bracts reflexed. T. Wallichii, DC. *Prodr.* vii. 147. *Leontodon glaucescens*, M. Bieb.; Wall. *Cat.* 3246.

VAR. eriopoda; crown densely woolly at the bases of the scape and leaves, leaves runcinate, outer invol. bracts usually reflexed. T. eriopodum, DC. *Prodr.* vii. 147. *Leontodon eriopodum*, Don in *Mem. Wern. Soc.* iii. 413; *Prodr.* 163; Wall. *Cat.* 3245. L. eriopus, Spreng. *Syst.* iii. 658.

VAR. parvula; dwarf, leaves narrow runcinate or entire sometimes linear, invol. bracts with broad or narrow white membranous margins, beak sometimes shorter than the body of the achene. *Leontodon parvulum*, Wall. *Cat.* 3247.—Throughout the Himalaya from 10-18,000 ft.—This includes the forms *lividum*, *salinum*, and *leptocepalum* figured in Reichb. *Ic. Fl. Germ.* t. 1406.

2. **T. Wattii**, Hook. f.; crown woolly, leaves runcinate-pinnatifid glabrous, scapes numerous pubescent above, heads broadly campanulate glabrous, outer invol. bracts few suberect or recurved, achenes white compressed acutely ribbed, ribs sparingly echinate, beak stout shorter than the body, base conical.

WESTERN HIMALAYA; Pangt, at Silundi, alt. 13,000 ft., *Watt.*

Habit of a large specimen of *T. officinale*. Heads broad, 1 in. diam. without the ligules. Invol. bracts black when dry, inner $\frac{2}{3}$ in. long, hardly clawed at the tip. Achenes not quite ripe, $\frac{1}{4}$ in. long, silvery white; pappus $\frac{1}{4}$ in.—I have seen but one specimen of this remarkable species.

113. **CHONDRILLA**, Linn.

Perennial herbs. Stem usually branched from the base; branches slender, cylindric, rigid or virgate. Leaves, radical pinnatifid, cauline often entire. Heads terminal, homogamous; fl. all ligulate, yellow. Involucre cylindric; bracts ∞ -seriate, outer usually very small, inner linear; receptacle flat, naked. Achenes oblong, subterete, many-ribbed, toothed, or with a toothed ring below the beak, beak long and slender or short and stout; pappus hairs very slender, white, many-seriate, persistent or deciduous separately.—DISTRIB. Species about 15, European and Oriental.

1. **C. graminea**, M. Bieb.; Ledeb. Fl. Ross. ii. 809; Ic. t. 177; quite glabrous, branches many from the base very slender, cauline leaves filiform, heads $\frac{1}{2}$ in. about 8-fld. hoary, invol. cylindric, outer bracts minute, inner narrow with white membranous margins, achenes slender obscurely toothed or quite smooth below the very slender beak which about equals the body. DC. Prodr. vii. 142.

WESTERN TIBET; Karakoram mts., alt. 8–11,000 ft., *Clarke*.—DISTRIB. Siberia.

Stems 2–3 ft. from a woody stock, dichotomously branched. Leaves, radical not seen, cauline 2–3 by $\frac{1}{16}$ in., flexuous, quite entire. Heads subcorymbose, peduncled. Achenes $\frac{1}{2}$ in. long, ribbed, sometimes quite smooth where contracted into the beak; pappus as long as the achenes, persistent, silvery.

VAR. *kashmiriana*; leaves rather broader.—S. Kashmir at Ramoo, alt. 6000 ft., *Clarke*.

2. **C. setulosa**, *Clarke mss.*; quite glabrous, much branched from the base, branches very slender, cauline leaves linear very narrow, margins naked with here and there a minute spine, heads $\frac{1}{2}$ in. about 8-fld. hoary, involucre cylindric, outer bracts minute, inner narrow with a stout spinulose midrib thickening in fruit, achenes slender strongly toothed below the very slender beak which about equals the body.

BALTISTAN; at Shigar, alt. 8000 ft., *Clarke*.

Habit of *C. graminea*, differing in the spinules on the midrib of the invol. bracts, and the mucronate and toothed achenes.

DOUBTFUL SPECIES.

C. sp.?; much dichotomously branched, branches stout, leaves 1–2 in. linear-oblong obtuse obscurely denticulate, heads $\frac{1}{2}$ in. base corky in fruit, invol. bracts with a thickened midrib which is here and there spinous.—Western Tibet, Shayuk valley, alt. 8–10,000 ft., *Thomson*. This may be a var. of *C. setulosa*, but there are no ripe achenes; it also closely resembles *C. juncea*, L.

114. **LACTUCA**, Linn.

Glabrous or hispid milky herbs. Leaves radical and alternate, entire toothed pinnatifid or pinnate, cauline often stem-clasping and auricled. Heads sessile or peduncled, paniced corymbose racemose or subspicate, homogamous, yellow purple or blue; fl. all ligulate. Involucre usually narrow; bracts few- (rarely many-) seriate, thinly herbaceous, margins often membranous, fruiting unchanged

(except in Sect. I.) inner slender subequal, outer often very short; receptacle flat, naked. *Achenes* compressed or flattened, ovoid oblong or narrow, beaked, faces 3- ∞ -ribbed; ribs slender or strong, smooth or rugose, the middle one often strongest; beak slender or short and cylindric, dilated into an entire or toothed pappiferous disk; pappus copious, hairs very slender, simple, usually soft and white, but very variable, persistent or separately deciduous, sometimes with a minute outer ring.—DISTRIB. Species about 60, N. temperate regions.

The species here brought together under *Lactuca* differ greatly in habit, some approaching in this respect to species of *Launæa*, others to *Prenanthes*, and others again to *Crepis*. I have found it impossible to group them by the achenes or pappus, and I have had recourse to characters of habit.

SECT. I. Herbs (habit of *Launæa*) with radical leaves and spicate or racemose heads on long strict flowering branches. *Heads* erect or spreading, narrow, cylindric, peduncles bracteolate; invol. bracts with broad membranous margins, outer very small; ligules yellow. *Achenes* with muricate ribs; pappus silky, persistent. (BRACHYRAMPHUS, DC.)

1. **L. Heyneana**, DC. *Prodr.* vii. 140; tall, glabrous, leaves runcinate-pinnatifid finely spinulose or ciliate-toothed membranous radical narrowed at the base, cauline $\frac{1}{2}$ -amplexicaul auricled, flowering stems slender, branches erect, heads $\frac{1}{2}$ in. long solitary or fascicled, fascicles distant spiked or racemose, achenes shortly beaked muricate black half the length of the flexuous silvery persistent pappus. *Clarke Comp. Ind.* 261, excl. some syns. *L. runcinata*, DC. in *Wight Contrib.* 26. *Brachyramphus Heyneana*, *Wight Ic.* t. 1146; *Dalz. & Gibs. Bomb. Fl.* 132. *B. sonchifolius*, *Thwaites Enum.* 168, not of DC. *B. taraxacoides*, DC. l. c. 177; *Wall. Cat.* 3279. *Prenanthes racemosa*, *Roxb. Fl. Ind.* iii. 405. *P. sonchifolia*, *Heyne in Wall. Cat.* 3266. *P. patens*, *Wall. Cat.* 3258, in part. *Microrhynchus patens*, DC. l. c. 181. *Chondrilla racemosa*, *Poir. Encycl. Suppl.* ii. 330, in part. *Sonchus calyculatus*, *Roxb. mss.*

NORTH WESTERN INDIA; *Royle, Stewart*. BANDA; *Edgeworth*. WESTERN PENINSULA; common in fields. CEYLON; *Galle, Gardner*.

Annual or biennial, 1-4 ft. high; stem hollow below, often very stout and much branched. *Radical leaves* 6-12 in., very irregularly pinnatifid, teeth more cartilaginous. *Heads* rarely peduncled, bracteolate; inner invol. bracts with thickened ribs in fruit. *Achenes* $\frac{1}{10}$ in., oblanceolate, then suddenly contracted.—I have seen no Ceylon specimens, nor any of Wallich's *Prenanthes taraxacoides*, which is not in his Herbarium.

2. **L. remotiflora**, DC. in *Wight Contrib.* 26; glabrous, radical leaves obovate or obovate-spathulate or orbicular finely spinulose or ciliate-toothed membranous, radical narrowed at the base, cauline $\frac{1}{2}$ -amplexicaul and auricled, flowering-stems very slender, branches erect, heads $\frac{1}{2}$ in. long few racemose long-peduncled, achenes shortly beaked muricate black nearly as long as the soft silvery persistent pappus. *L. Schimper*, *Jaub. & Spach. Ill. Pl. Orient.* t. 281. *Brachyramphus sonchifolius*, DC. *Prodr.* vii. 177; *Dalz. & Gibs. Bomb. Fl.* 132. *Cacalia sonchifolia*, *Wall. Cat.* 3144 D.

BANDA; *Edgeworth*. SCIND; *Stocks*.—DISTRIB. Arabia.

A smaller and more delicate plant than *L. Heyneana*, with nearly entire (rarely sinuate-pinnatifid) smaller leaves, less branched flowering stems, heads solitary with peduncles as long as themselves, and achenes $\frac{1}{2}$ in. long.

SECT. II. Herbs with intricate dichotomous stiff sometimes spinescent branches and small cauline leaves. *Heads* sessile, in spiked fascicles or solitary, erect, narrowly cylindric; invol. bracts with broad membranous margins; ligules yellow. *Achenes* indistinctly beaked, smooth; pappus silvery. (PHENIXOPUS, Cass.)

3. ***L. orientalis***, Boiss. *Fl. Orient.* iii. 819; perennial, glabrous, branches white with green wings, leaves small decurrent, lower pinnatifid with spreading or incurved triangular acute entire or toothed lobes, upper linear entire elliptic or oblanceolate, heads $\frac{1}{2}$ in. long in spiked fascicles sessile, achenes narrow equalling the silvery deciduous pappus. *L. viminea*, Clarke *Comp. Ind.* 262, not of *Schultz-Bip.* *Phenopus orientalis*, Boiss. *Voy. en Esp.* 390, in note.

WESTERN TIBET; alt. 10–14,000 ft., Falconer, &c.—DISTRIB. Westward to Syria and Armenia.

A much intricately branched shrubby herb, the branches often spinescent, conspicuous from the silvery white branches being winged by the decurrent bases of the leaves, the blades of most of which are undeveloped. *Leaves* 1–2 in., bright green. *Heads* solitary or in fascicles of 2–5. *Achenes* $\frac{1}{2}$ in., narrowed to both ends from the middle or a little above it, pale.—Afghan specimens have smaller heads and achenes than the Tibetan. The habit is that of *L. ramosissima*, Gren. & Godr. (*Reichb. Ic. Fl. Germ.* 1419), but the achene is very different.

SECT. III. Herbs with radical leaves and erect rarely spreading (*L. Clarkei*) leafy flowering-stems. *Heads* paniced, erect, rarely fascicled or drooping; peduncle bracteate; outer invol. bracts gradually passing into the inner; ligules yellow blue or purple. *Achenes* beaked; pappus silvery. (SCARIOLA.)

* *Beak of achene capillary, white.*

4. ***L. Scariola***, Linn.; Boiss. *Fl. Orient.* iii. 809; annual or biennial, glabrous, tall, erect, very leafy, corymbosely or paniculately branched above, leaves suberect sessile runcinate-pinnatifid spinulose-toothed midrib prickly beneath, cauline $\frac{1}{2}$ -amplexicaul sagittate, heads $\frac{1}{2}$ in. long erect cylindric few-flid. paniced glabrous, outer invol. bracts triangular inner linear, achenes oblanceolate many-ribbed ribs scabrid beak capillary about equalling the body. *DC. Prodr.* vii. 137; *Reichb. Ic. Fl. Germ.* t. 1421.

WESTERN HIMALAYA; from Marri to Kunawur, alt. 6–11 000 ft. WESTERN TIBET; alt. 9–12,000 ft.—DISTRIB. Siberia and westwards to the British Isles and Canaries.

Stem 2–5 ft., somewhat prickly. *Leaves* 5–7 in., smooth except the midrib and nerves beneath. *Inflorescence* variable, sometimes 12 in. diam., with incurved ascending corymbose branches, at others laxly paniculate; branches and peduncles white, with many appressed green cordate bracts. *Invol. bracts* ovate, inner linear; ligules yellow or dull-reddish outside. *Achenes* $\frac{1}{2}$ in., including the very slender beak, ribbed, pale; pappus $\frac{1}{2}$ in.—Not a Nipal plant, as stated by Clarke. I have seen no specimen from east of the Sutlej.

VAR. *sativa*; more succulent, quite smooth, leaves spreading pinnatifid or entire, branches of panicle shorter with more numerous bracts, achenes black. *Clarke Comp. Ind.* 263. *L. sativa* Linn.; *DC. Prodr.* vii. 138; *Roxb. Fl. Ind.* iii. 403; *Reichb. Ic. Fl. Germ.* t. 1421. *L. bracteata* and *sativa*, Wall. *Cat.* 3243, 3244 B.—The garden lettuce, cultivated throughout India.

5. ***L. undulata***, Ledeb. *Fl. Alt.* iv. 156; *Ic. Fl. Ross.* t. 129; annual, glabrous or glaucous, stem short dichotomously branched from the base leafy, radical leaves sessile pinnatifid lobes entire or sparingly toothed, cauline $\frac{1}{2}$ -amplexicaul base dilated or auricled, heads 1 in. long narrow erect peduncled cylindric few-flid., outermost invol. bracts small inner unequal very slender obtuse, achenes oblanceolate transversely rugose margins scabrid, beak capillary 3–4 times as long as the body. Boiss. *Fl. Orient.* iii. 813; *DC. Prodr.* vii. 135; *Clarke Comp. Ind.* 263.

WESTERN TIBET; alt. 9–12,000 ft., Thomson. SALT RANGE; Fleming.—DISTRIB. Siberia, Soongaria, and westwards to Arabia.

Habit of a *Senecio* of the *Jacobæa* section, 6–10 in. high, succulent. *Leaves* 2–3 in., dark green. *Heads* subcorymbose or terminal on the branches; ligules white pink or blueish. *Achenes* including the capillary beak $\frac{1}{2}$ – $\frac{2}{3}$ in. long, much compressed

pale, margins thickened scabrid, tip cleft embracing the base of the beak; pappus $\frac{1}{2}$ in. long, quite white.

6. ***L. dissecta***, *Don Prodr.* 164; annual, glabrous or sparsely pubescent, stem dichotomously branched from the base, branches slender leafy, leaves entire or lyrate or runcinate-pinnatifid lobes entire or sparingly toothed lower petioled cauline $\frac{1}{2}$ -amplexicaul base auricled or sagittate, uppermost linear, heads $\frac{1}{4}$ - $\frac{1}{2}$ in. erect narrow cylindric few-fl., outermost invol. bracts minute ovate innermost narrowly linear, achenes oblanceolate transversely rugose faces 3-ribbed, beak capillary twice as long as the body. *DC. Prodr.* vii. 135; *Boiss. Fl. Orient.* iii. 814; *Clarke Comp. Ind.* 264. *L. Stocksii*, *Boiss. Diagn. Ser.* 2, iii. 96. *L. arvensis*, *Edgew. in Trans. Linn. Soc.* xx. 79. *Chondrilla auriculata*, *Wall. Cat.* 3269.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 4-8000 ft. WESTERN TIBET; Iskardo, alt. 8000 ft., *Clarke*. SALT RANGE; *Aitchison*.—DISTRIB. Affghanistan and Beluchistan.

This, like *L. undulata*, is senecionoid in habit and very variable. *Stem* 3-18 in. high, sometimes simple and leafless below, branching upwards; at others numerous corymbosely branched flowering stems start from the crown which bears a profusion of rosulate leaves. *Leaves* 1-4 in., very variable indeed in lobation, sometimes almost bipinnatifid. *Heads* corymbose, on very slender peduncles, erect; ligules blue. *Achenes* including the capillary beak $\frac{1}{4}$ in. long, much compressed, dull, margins most minutely scabrid, tip cleft as in *L. undulata*; pappus $\frac{1}{2}$ in. long, white.

7. ***L. longifolia***, *DC. Prodr.* vii. 135; annual or biennial, glabrous, tall, erect, paniculately branched above, sometimes hispid at the base, leaves sessile very long lanceolate or linear-lanceolate acuminate entire or sparingly $\frac{1}{2}$ -pinnatifid lobes very few distant acute base sagittate, heads $\frac{1}{2}$ in. long erect peduncled 12-20-fl., outer invol. bracts few ovate, inner linear-oblong, achenes elliptic or oblanceolate nearly smooth faces 3-5-nerved, beak capillary equalling or shorter than the body. *Clarke Comp. Ind.* 264. *Chondrilla longifolia*, *Wall. Cat.* 3273. *Mulgedium sagittatum*, *Royle Ill.* 252, t. 61, f. 2 (*achene bad*); *DC. l. c.* 250.

WESTERN and CENTRAL HIMALAYA; from Kashmir to Nipal, alt. 4-9000 ft., *Wallich*, &c.

Stem 3-6 ft., strict, always simple below. *Leaves* 3-6 by $\frac{1}{4}$ - $\frac{1}{2}$ in. or more across the lobes when $\frac{1}{2}$ -pinnatifid, in which case the lobes are very few, membranous, almost nerveless; auricles deflexed, acute, appressed to the stem. *Heads* in broad or narrow panicles, erect; peduncles slender with few bracts; invol. bracts pale green, unequal; ligules blue. *Achenes* $\frac{1}{2}$ in. including the beak, dark brown, much compressed, young with thickened margins, faces obscurely rough and most minutely scabrous; pappus $\frac{1}{4}$ in., white.

8. ***L. brevirostris***, *Champ. in Hook. Kew Journ.* iv. 237; annual, glabrous, stem tall erect paniculately branched above, leaves very long linear or linear-lanceolate acuminate quite entire or toothed base simple or shortly auricled, heads $\frac{1}{2}$ in. long erect peduncled 12-20-fl., outer invol. bracts few ovate inner linear-oblong, achenes ellipsoid much compressed smooth black beak capillary shorter than the body. *Clarke Comp. Ind.* 265. *L. bialata*, *Griff. Notul.* iv. 247; *Kurz in Journ. As. Soc.* 1877, ii. 206. *L. squarrosa*, *Miquel Prod. Fl. Jap.* 121, 362. *L. amurensis*, *Regel. Ind. Sem. Hort. Petrop.* 1859, 42. *Prenanthes squarrosa*, *Thunb. Fl. Jap.* 303.

SIKKIM HIMALAYA; Rungeet valley, *Anderson, Clarke*. KHASIA MTS.; all. 4-6000 ft., *J. D. H. & T. T.* ASSAM, *Jenkins*; Suddya, *Griffith*.—DISTRIB. Japan China, Philippine Islds.

Habit of *L. longifolia* and as tall, but the leaves are never pinnatifid and want the sagittate base; the achenes are quite different, very flat, black, $\frac{1}{4}$ in. long, including the beak, with one strong median rib on each face and 4 more slender lateral ones

on each side of the dorsal face; the base of the beak is black in this (white in *longifolia*); the pappus is dirty-white or yellowish. Ligules pale yellow within, purplish outside in Assam (Griffith), sulphur yellow in China (Hance in litt.).

**** Beak rather stout, coloured.**

9. ***L. Clarkei*, Hook. f.**; annual, glabrous, stem erect with lateral wide spreading branches from the base and upwards, leaves coriaceous radical linear runcinate-pinnatifid terminal lobe long-acuminate lateral triangular acute denticulate or quite entire, cauline lanceolate entire or sinuate-toothed finely acuminate sessile base simple or $\frac{1}{2}$ -amplexicaul not auricled, heads $\frac{1}{2}$ in. long suberect numerous in peduncled clusters along the branches, peduncles bracteolate, outer invol. bracts all green ovate or oblong-ovate, inner 5-6 linear-oblong with narrow pale margins, achenes slender fusiform gradually narrowed into a cylindric beak strongly ribbed smooth black, pappus twice as long as the achenes silvery.

WESTERN TIBET; Iskardo, alt. 8000 ft., *Clarke*.

Habit of Sect. I., but evidently most closely to *L. tatarica* in the foliage heads and achenes. Stem 6-12 in., flexuous, and branches rather rigid. Radical leaves 2-4 in., sparingly toothed or lobed, stiff when dry and dull dark green, the points of the lobes and the tip being almost pungent. Heads neither corymbose nor paniced but clustered on short branches; invol. bracts quite smooth, acute, pale green; ligules blue. Achenes $\frac{1}{2}$ in., beak pale at the tip; pappus $\frac{1}{2}$ in., deciduous, white.

10. ***L. tatarica*, C. A. Meyer, Enum. Pl. Cauc. 56**; var. *tibetica* (achene shortly beaked); perennial? glabrous, stem stout erect leafy paniculately branched above, leaves coriaceous radical and lower sinuate-toothed or runcinate-pinnatifid and sharply toothed, cauline similar or less lobed base simple or auricled, heads erect $\frac{3}{4}$ in. paniced peduncled solitary or clustered, peduncles bracteolate, outer invol. bracts all green ovate or oblong-ovate, inner 5-6 linear-oblong, achenes narrowly oblong strongly ribbed quite smooth suddenly contracted beneath the pappus into a very short cylindric beak, pappus twice as long as the achenes silvery. *Clarke Comp. Ind. 267*.

WESTERN TIBET; Nubra, Hanli, &c., alt. 12-16,000 ft., *Thomson, Stoliczka*.—DISTRIB. of *L. tatarica*, Central Asia and Siberia.

This so strongly resembles *L. tatarica*, a native of Affghanistan, that, except for the achenes, I do not see how it can be separated; these are however of a different form, and not very like those of any other *Lactuca*; they are narrowly linear $\frac{1}{2}$ in. long, with a very inconspicuous beak, remarkably strong ribs, of which the median ventral one is the most prominent. The tips of the leaves and their lobes are almost pungent.

SECT. IV. Perennial usually tall leafy herbs (habit of *Prenanthes*), with large tuberous or fusiform roots, and more or less pinnatifid or pinnate and sharply toothed leaves. Heads very numerous, drooping or pendulous, in large terminal panicles or paniculate racemes; outer invol. bracts usually very short, inner few long narrow often with dilated tips; ligules blue violet or purple. Achenes smooth; pappus deciduous.

11. ***L. graciliflora*, DC. Prodr. vii. 139**; glabrous or leaves puberulous, tall, leafy, paniculately branched above, lower leaves petioled pinnate or pinnatifid terminal lobe large deltoid or triangular-ovate acute irregularly toothed, pinules 1-pair, middle upper leaves like the terminal lobe of the lower, uppermost sessile ovate or lanceolate, heads very many narrow $\frac{1}{4}$ - $\frac{1}{2}$ in. long 3-4-fld. in large open panicles glabrous drooping, peduncles slender, outer invol. bracts minute inner 5-6 very narrow with dilated tips, achenes narrowly oblong or oblanceolate smooth, margins thickened constricted at the top into a short thick beak, pappus dirty white. *L. Brunoniana*, *Clarke Comp. Ind. 226*, mainly, not of *Wall*. *Prenanthes graciliflora*, *Wall. Cat. 3260*. *P. rostrata*, *Bl. Bijl. 836*: *DC. l. c.* *Mulgedium rostratum*, *Schultz-Bip. in Mig. Fl. Ind. Bat. ii. 115*.

CENTRAL AND EASTERN HIMALAYA; Nipal, *Wallich*. Sikkim; alt. 6-12,000 ft., *J. D. H.*, &c.—DISTRIB. Java, Sumatra.

Stem 2-6 ft., sometimes very stout at the base. *Leaves* 3-4 in., membranous, terminal lobe of the lower 2-4 by 2-2½ in., base truncate hastate cordate or suddenly narrowed into the very slender petiole, not auricled; leaves of young specimens sometimes pinnatifid throughout. *Panicles* often very large, 1-2 ft. long and almost as broad; inner invol. bracts with often spathulate tips, outer very short. *Achenes* ½ in., brown, ribs often obscure; pappus ¼ in., deciduous, outer very obscure.—The absence of this in the Khasia Mts. is remarkable, if, as I suppose, it is identical with the Malay Isld. plant.

12. ***L. rapunculoides***, *Clarke Comp. Ind.* 268; glabrous or sparsely setose above, erect, simple or paniculately branched above, leafy, lower leaves long-petioled hastate cordate or deltoid with margins incurved entire or variously toothed, upper middle with broadly winged petioles sagittately auricled at the base, uppermost subsessile often lanceolate, heads very narrow ½-¾ in. 6-8-fld. drooping, outer invol. bracts very small, inner few very narrow with dilated tips, achenes very slender elongate-fusiform slightly compressed smooth striate narrowed into a brown beak. *Mulgedium rapunculoides*, *DC. Prodr.* vii. 249.

WESTERN HIMALAYA; alt. 9-12,000 ft., Kashmir and Lahul, *Thomson*, *Clarke*; Kumaon, *Strach. & Winterb.*; Nipal, *Wallich*.

A smaller plant (2-3 ft.) than *L. graciliflora*, with longer and sometimes sparsely hispid heads of the same shape which have also like it often spathulate tips, but differing in the leaves, which are never pinnate or pinnatifid, but often hastate, with wide spreading lateral and a produced mid-lobe, and very different achenes, ¼ in. long, very narrow, slightly compressed, with rounded sides and faces, all equally striated, ribs slender; pappus very caducous, dirty white, rather shorter than the achenes.—This has the achenes of a *Prenanthes*, but is too closely allied to *L. graciliflora* to be dissociated from it.

13. ***L. decipiens***, *Clarke Comp. Ind.* 266; glabrous, stem tall paniculately branched above, lower leaves (rarely entire) runcinate-pinnatifid with a broad hastate terminal lobe coarsely toothed, cauline with long winged petioles dilated and auricled at the base, uppermost lanceolate, heads ¾ in. long 6-8-fld. cylindric peduncled glabrous drooping, outer invol. bracts oblong-ovate obtuse half the length of the 5-6 linear-oblong inner which are glabrous or dorsally setose, achenes oblanceolate narrowed into a short dark beak smooth faces ribbed. *Mulgedium decipiens*, *Herb. Ind. Or. II. f. & T.*

WESTERN HIMALAYA; Kashmir and Dras, alt. 8-10,000 ft., *Thomson*, *Clarke*.

Very similar to *L. rapunculoides*, but the heads are larger, and the outer invol. bracts much longer, the lower leaves are not hastate nor the upper sagittately auricled; and the achenes are very different. *Ligules* blue. *Achenes* ¼ to nearly ½ in. long, compressed, rather suddenly contracted into the beak, which is ¼ the length of the body, dorsal face with many equal ribs, ventral with a strong midrib and lateral fainter ones; pappus ¼ in., dirty white.

VAR. *multifida*; stem 1-1½ ft., leaves crowded at the base of the stem all pinnatifid with narrow coarsely toothed and cut lobes, heads larger, achenes nearly ½ in. with rather longer beaks, the upper half of which is white.—Kashmir, *Thomson*, *Clarke*.

14. ***L. hastata***, *DC. Prodr.* vii. 139; glabrous pubescent or hispidly hairy above, tall, erect, often very robust, paniculately branched above, leaves large polymorphous usually pinnatifid or pinnate with a hastate deltoid or ovate coarsely toothed acuminate terminal lobe, pinnules or lobes few or many, petiole slender and simple or dilated at the base or winged lobulate and auricled, heads ¾ in. long subcampanulate 10-30-fld., peduncles nodding, outer invol. bracts oblong-ovate half as long as the 8-10 linear-oblong glabrous or setose inner, achenes obovate or elliptic flat, beak slender pale equalling the body. *Clarke*

Comp. Ind. 267. *Chondrilla hastata*, *Wall. Cat.* 3217. *Sonchus robustus and hastatus*, *Wall. Cat.* 3249, 3250. *S. Cyanus*, *Don Prodr.* 164. *Mulgedium cyaneum and robustum*, *DC. l. c.* 249, 250. *M. nilgherryense*, *Wight Ic. t.* 1144. *Melanoseris paniculata*, *Edgew. in Trans. Linn. Soc. xx.* 80.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 4-12,000 ft. KHASIA Mts.; alt. 5-6000 ft. NILGHERRY Mts.

One of the tallest and most robust species, 4-7 ft. high, but occurring in dwarf and slender forms, from perfectly glabrous to glandular-hispid all over, the latter in western specimens. *Leaves* sometimes a foot long and 4-6 in. broad, of various shapes, rarely large and runcinate-pinnatifid, petiole sometimes a foot long. *Inflorescence* very various; the heads usually subracemose or the branches of contracted or spreading panicles, sometimes as narrow as in *L. graciliflora*, but this is rare; ligules blue purple or dark red. *Achenes* very uniform, $\frac{1}{4}$ in. long including the beak, quite flat, irregularly ribbed, dark brown, suddenly contracted into a brown cleft tip in which the white beak is seated; pappus $\frac{1}{4}$ in., very deciduous, dirty-white, outer ring of bristles distinct.

SECT. V. Perennial tuberous rooted herbs, with soft ascending stems and branches and very membranous pinnate or pinnatifid leaves that are scarcely, if at all, toothed. *Heads* terminating the branches, pendulous, narrow; peduncles ebracteate; invol. bracts few, outer gradually longer; ligules blue or purple. *Achenes* smooth; pappus deciduous.

15. ***L. macrorhiza***, *Hook. f.*; glabrous or sparsely villous, branches many from the root ascending long or short (sometimes reduced to a 1-headed scape) soft terete leafy irregularly divided above, leaves membranous linear or elongate obovate pinnatifid or pinnate upper sometimes entire, pinnules or lobes usually numerous oblong-orbicular quite entire, petiole quite simple or dilated or winged with a very broad orbicular entire or toothed auricle, heads $\frac{1}{2}$ - $\frac{2}{3}$ in. long terminating the branches peduncled drooping or inclined 6-16-fl., outer invol. bracts lanceolate very much shorter than the 6-10 linear-oblong inner, achenes flat elliptic-lanceolate smooth narrowed into a white beak $\frac{2}{3}$ the length of the body, pappus silky white. *L. lævigata*, *Clarke Comp. Ind.* 269. *L. Hoffmeisteri*, *Klotzsch in Reise Pr. Waldem. Bot.* 81, t. 80. *Mulgedium lævigatum*, *DC. Prodr.* vii. 249. *M. macrorhizum*, *Royle Ill.* 251, t. 61; *DC. Prodr.* vii. 251. *Prenanthes lævigata*, *Wall. Cat.* 3259. *Melanoseris saxatilis*, *Edgew. in Trans. Linn. Soc. xx.* 72.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 6-16,000 ft.

From 3 in. to 3 ft. high, in some Alpine forms reduced to a few leaves 2-3 in. long and one or more 1- or few-headed scapes; in its largest state the stems are as thick as a goose quill. *Leaves* excessively variable, usually narrow and pinnate with a slender rachis, sometimes reduced to a single orbicular oblong ovate cordate or hastate lobe, upper sessile with auricled bases, lower petioled; petiole simple and slender or winged, the wing sheathing at the base or dilated into a large orbicular toothed lobe clasping the stem. *Heads* from glabrous to densely villous, irrespective of the altitude at which the plant grows or its other characters; ligules blue or purple, large for the size of the head. *Achenes* $\frac{1}{6}$ - $\frac{1}{4}$ in. including the slender beak, about 5-ribbed on either face, almost black; pappus equalling the achene, deciduous, outer inconspicuous.

16. ***L. Lessertiana***, *Clarke Comp. Ind.* 270; perennial, glabrous or laxly villous, stem short stout (or 0) leafy simple or branched from the base, leaves very variable elongate oblanceolate and entire or shorter sinuate-toothed or pinnatifid acute, margins and lobes subentire, petiole 0 or simple at the base, heads $\frac{3}{4}$ in. long subcylindric or campanulate 12-24-fl. terminating the branches or subpaniculate erect or drooping black glabrous or villous, outer invol. bracts few linear or 0, inner linear-oblong obtuse, achenes flattened elliptic or oblanceolate suddenly narrowed into a stout pale beak, pappus shorter than the achene.

Mulgedium ? Lessertianum, *DC. Prodr.* vii. 251. Hieracium Lessertianum, *Wall. Cat.* 3254. Melanoseris lyrata, *Decne. in Bot. Jacq. Voy.* 101, t. 109.

TEMPERATE and ALPINE HIMALAYA; from Kashmir, alt. 8–13,000 ft., to Sikkim, alt. 9–16,000 ft.

Stem 0–12 in., sometimes stout with many erect lateral flowering branches, at others slender and nearly simple. *Leaves* always membranous, with nearly entire margins, in one extreme form 6–8 by 1 in., very narrowly oblanceolate, quite entire, obtuse, narrowed into a long petiole; in another as long but broader, pinnatifidly lobed; in others 1–2 in., entire or runcinate. *Heads* on long or short flaccid peduncles; blackish, sometimes densely villous with long hairs; ligules blue. *Achenes* $\frac{1}{4}$ in. including the stout beak, black, strongly ribbed; pappus white or yellowish, very deciduous.—This is nearly related to *L. macrorhiza*, though differing a good deal in habit and in the achene.

SECT. VI. Perennial tall branched leafy herbs. *Heads* loosely paniced, large, nodding or pendulous; peduncle ebracteolate; invol. bracts broad, many-seriate, outer gradually larger, all regularly imbricate; ligules blue. *Achenes* long, narrow; pappus white or yellowish, brittle.

17. *L. macrantha*, *Clarke Comp. Ind.* 267; glabrous or pubescent above, tall, stout, branched above, leafy, leaves large glabrous sessile oblong pinnatifid acutely irregularly toothed base with broad-toothed auricles, heads few 1–1 $\frac{1}{2}$ in. diam. campanulate peduncled terminating the branches inclined or nodding, invol. bracts broadly ovate regularly imbricate ciliate inner oblong subacute, achenes equalling the brown fugacious pappus flattened oblanceolate or narrowly elliptic ribbed smooth narrowed into a stout paler beak much shorter than the body. *Mulgedium macranthum*, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 10–14,000 ft., *J. D. H., Clarke.*

Stem 1–2 ft., usually very stout, smooth. *Leaves* 3–9 by 1–3 in., glaucous beneath, terminal lobe usually triangular-ovate. *Heads* blackish when dry; peduncles, curved, usually pubescent; ligules blue. *Achenes* $\frac{3}{4}$ – $\frac{1}{2}$ in.; pappus rigid, brittle.

18. *L. bracteata*, *Hook. f. & T. in Clarke Comp. Ind.* 270; hispid, tall, simple or paniculately branched above, leafy, leaves sessile ovate or oblong-ovate acute acutely toothed abruptly cordate or contracted into a cordate auricled $\frac{1}{2}$ -amplexicaul base, heads $\frac{1}{2}$ –1 in. broad many-fl. campanulate in open leafy panicles with long slender branches and peduncles or in leafy racemes inclined or drooping, invol. bracts membranous broadly ovate subacute imbricate inner oblong obtuse, achenes oblanceolate or narrowly elliptic smooth ribbed flattened gradually narrowed into a slender white beak as long as the body longer than the white pappus. *Melanoseris bracteata*, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Lachoong Valley, alt. 8–10,000 ft., *J. D. H.*

Stem slender, 1–3 ft. *Leaves* tolerably uniform, 3–6 by 1 $\frac{1}{4}$ –2 $\frac{1}{2}$ in., membranous; those in the inflorescence lanceolate, acuminate. *Heads* rather numerous; invol. bracts without white margins, reticulated, speckled with red; ligules blue. *Achenes* $\frac{1}{2}$ in. including the very slender beak; pappus brittle.—This is somewhat intermediate between this section and Sect. IV.

SECT. VII. A perennial robust simple or sparingly branched leafy hispid herb. *Heads* loosely paniced, large, nodding, clothed with black glandular hairs; peduncle ebracteolate; outer invol. bracts few, narrow; ligules yellow. *Achenes* long, narrow; pappus white, persistent. (*DUBYÆA*, *DC.*)

19. *L. DUBYÆA*, *Clarke Comp. Ind.* 271; leaves simple or the lower lobed at the base or pinnatifid, radical 0 or petioled, cauline ovate hastate or oblong-ovate sinuate-toothed, petiole winged, base $\frac{1}{2}$ -amplexicaul, upper sessile oblong or cordate base broadly auricled, heads 1 in. diam. few peduncled nodding

or drooping many-fld. and peduncles hispid with black glandular hairs, outer invol. bracts few linear or subulate, inner 12-15 linear-oblong acute, achenes slender slightly compressed rather longer than the white pappus narrowed gradually into pale slender beak. *Dubyæa hispida*, *DC. Prodr.* vii. 247; *Wall. Cat.* 3253. *Hieracium heteranthum*, *Wall. Cat.* 3253. *H. hispidum*, *Don Prodr.* 165.

CENTRAL HIMALAYA; from Kumaon, alt. 9000 ft., to Sikkim, alt. 11-14,000 ft.

Root fusiform. *Stem* 6-18 in. *Leaves* 3-6 by 1-2 in., more or less hispid on both surfaces. *Heads* broadly campanulate, black when dry; peduncles curved, stout. *Achenes* $\frac{1}{2}$ in. long, nearly black except the pale beak, ribbed; pappus more persistent than in the two preceding sections.

SECT. VIII. Herbs with radical long-petioled leaves, and one or more corymbosely branched erect flowering stems. *Heads* small, numerous, erect; peduncles slender, ebracteate; outer invol. bracts minute, inner all equal, linear, green; ligules yellow. *Achenes* small, smooth; pappus silvery or yellowish. (*IXERIS*, *Cass.*)

20. ***L. sagittarioides***, *Clarke Comp. Ind.* 265; biennial?, glabrous, leaves all radical long-petioled sagittate acute or obtuse entire or denticulate, flowering stems erect naked corymbosely branched above, heads $\frac{1}{2}$ in. long, achenes as long as the white pappus elliptic-lanceolate gradually narrowed into the slender white beak. *L. sagittata*, *Herb. Ind. Or. H. f. & T.* *Chondrilla sagittata*, *Wall. Cat.* 3270.

WESTERN AND CENTRAL HIMALAYA; from Dharmasala to Nipal, alt. 5-6000 ft.—
DISTRIB. Upper Birma.

Leaves 2-3 in. long and as broad, lateral lobes horizontal or depressed, sometimes obsolete when the leaf is lanceolate, more rarely in pairs on each side; petiole 6-10 in., with a coriaceous entire wing that narrows downwards. *Flowering stems* 6-18 in., slender, sometimes sparsely hairy above, bracts at the forks minute. *Heads* erect; outer invol. bracts very small, inner 6-10, linear-oblong; ligules yellow. *Achenes* $\frac{1}{10}$ in. including the beak, which is much shorter than the body.

21. ***L. polycephala***, *Benth. in Gen. Pl.* ii. 526; annual, glabrous, slender, radical leaves petioled very long narrow linear or lanceolate flaccid entire sinuate-toothed or pinnatifid base narrowed, cauline sessile oblong or lanceolate base sagittate auricles acute, flowering stems simple or branched, heads $\frac{1}{2}$ - $\frac{1}{4}$ in. diam. many-fld. in dichotomous or subumbellate corymbs or panicles, achenes as long as the silvery pappus elliptic-lanceolate strongly ribbed narrowed into a short slender brown beak. *Clarke Comp. Ind.* 272. *Ixeris polycephala*, *Cass.*; and *I. fontinalis*, *DC. Prodr.* vii. 151. *Chondrilla fontinalis*, *Wall. Cat.* 3268. *C. tenuis*, *Ham.*, and *longifolia*, *Ham. in Wall. Cat.* 3274.

NORTHERN INDIA; in wet places from Kashmir and the Gangetic plain to Sikkim, the Khasia mts., Bengal, Assam, and Birma, ascending the Himalaya to 6000 ft.—
DISTRIB. Afghanistan.

A flaccid annual, 6-18 in., with long membranous leaves 3-10 by $\frac{1}{4}$ - $\frac{3}{8}$, rarely pinnatifid, when the lobes are usually few, slender and horizontal; cauline often broader than the radical, finely acuminate, with sometimes forked auricles. *Heads* 10-20-fld., erect; outer invol. bracts minute; inner 6-10, linear-oblong, green; ligules yellow. *Achenes* $\frac{1}{2}$ in., red-brown, hardly compressed, smooth, with about 10 very strong smooth ribs.—The subumbellate character of the inflorescence is very exceptional in the genus.

22. ***L. gracilis***, *DC. Prodr.* vii. 140; glabrous, slender, radical leaves very long linear or linear-lanceolate acuminate quite entire rarely toothed or ciliate, cauline sessile base often ciliate not auricled, flowering stems slender simple or forked, heads $\frac{1}{2}$ - $\frac{1}{4}$ in. long few-fld. narrow in open often excessively branched corymbs, achenes about equalling the dirty white pappus compressed

narrowly elliptic-lanceolate narrowed into a brown beak $\frac{1}{2}$ – $\frac{1}{4}$ as long as the body. *Clarke Comp. Ind.* 271. *Chondrilla* (*Crepis*?) *gracilis*, *Wall. Cat.* 3267.

NIPAL, *Wallich*. KHASIA Mts., alt. 3–5000 ft., *De Silva*, &c. BHOTAN, *Griffith*.

A flaccid annual? *Leaves* 4–6 by $\frac{1}{2}$ – $\frac{1}{4}$ in., erect, usually quite entire. *Flowering stems* 6–18 in., few solitary or many from the root. *Heads* 3–8-fl., erect; outer invol. bracts minute, inner 4–8 linear; ligules yellow. *Achenes* $\frac{1}{12}$ in. including the slender beak, pale red, much compressed, many-ribbed; pappus deciduous, more scanty, brittle, and coarser than in *L. sagittarioides* and *polycephala*.—The small heads, pappus, and cauline leaves simple at the base, at once distinguish this from *L. polycephala*, than which this has usually far more heads. It appears closely allied to a Java plant of Horsfield's named by Miquel *Aracium lævigatum*, which is the *Prenanthes lævigata* of Blume (not of Wallich), and *Lactuca lævigata*, DC.

VAR. *khasiana*, *Clarke mss.*; heads $\frac{1}{3}$ in. long, achenes $\frac{1}{6}$ in. beak shorter.—Khasia mts., alt. 3–5000 ft., *J. D. H. & T. T.*

DOUBTFUL SPECIES.

L. BENTHAMII, *Clarke Comp. Ind.* 273, from Kashmir (Kavang and Karnag, alt. 12–15,000 ft., *Stoliczka*) is unknown to me. *Clarke* describes it as a glaucous herb, with dichotomous scapes 4–6 in. high, spathulate oblong entire or obscurely toothed 3-nerved leaves, cylindric heads with many purple flowers, 8 equal oblong inner invol. bracts, small outer, and a 1-seriate dirty-white pappus.—It is not Bentham's new species of *Chorisma*, which is *Crepis gracilipes* (p. 396).

115. PRENANTHES, Linn.

Glabrous or hispid milky herbs, often tall and slender, sometimes subscandent. *Leaves* alternate, usually petioled, sagittate or cordate, pinnatifid or lyrate, membranous, petiole often winged, upper narrow sessile or stem-clasping. *Heads* small (slender pendulous and few-fl. in the Indian species), loosely paniced or racemed, of various colours, homogamous; fl. all ligulate. *Involucre* cylindric; inner bracts long and narrow, 1–2-seriate, equal, thinly herbaceous, unchanged after flowering, outer few small; receptacle flat, naked. *Achenes* narrowly oblong or contracted at both ends, slightly compressed or 3–5-angled, usually ribbed, tip with a pappiferous disk; pappus hairs 2–3-seriate, simple, slender or rigid, separately deciduous.—DISTRIB. Species about 16, N. temperate regions.

The Indian species referred here to *Prenanthes* by Bentham (in *Gen. Plant.*) and *Clarke* (*Comp. Ind.*) are identical in habit with Section V. of *Lactuca*, from which they are distinguishable only by the achene less suddenly contracted at the tip, and less flattened. *L. rapunculoides* (p. 407) is perhaps a *Prenanthes*.

1. **P. Khasiana**, *Clarke Comp. Ind.* 273; slender, erect, glabrous or sparsely hairy, leaves long-peduncled, radical deltoid base cordate lower pinnate, lateral pinnules petioled terminal simple or 3-lobed, panicle elongate branches very slender, heads narrow pendulous cylindric glabrous, flowers 1–4 blueish purple, achenes contracted slightly above and below, pappus brown brittle.

KHASIA Mts., alt. 5–6000 ft., *Griffith*, &c.

Stem 1–4 ft. *Leaves* membranous, ciliate-toothed, lower 8–10 by 3–4 in.; pinnules 2–3 pair, alternate, oblong or ovate-cordate, base equal or very oblique, acute and apiculate; terminal lobe ovate or deltoid, base cordate or hastate; upper pinnatifid; petiole of the radical leaves very slender, 4–8 in., of cauline shorter. *Panicles* 1–2 ft., strict; branches erect, ultimate and peduncles filiform with few small bracts. *Heads* $\frac{1}{2}$ – $\frac{3}{4}$ in. long; outer invol. bracts minute, inner 3–4 linear obtuse. *Achenes* very narrow, $\frac{1}{2}$ in., compressed, truncate, brown, ribbed, equalling the scanty pappus.—Habit of *Lactuca graciliflora*.

2. **P. Brunoniana**, *Wall. Cat.* 3278; erect, subhispid or glabrous, leaves polymorphous simple lobed pinnatifid or pinnate ovate or cordate or deltoid or

oblong toothed or serrate, petiole winged or not, panicle erect elongate branches stout or slender, heads fasciated narrow glabrous, flowers 3-5 rose-purple, achenes narrowed downwards, pappus nearly white. *P. hispidula*, *DC. Prodr.* vii. 195; *Clarke Comp. Ind.* 273. *P. Brunoniana alliarifolia and raphanifolia*, *DC. l.c.*

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 6-9000 ft.

Stem 1-4 ft., from glabrous to hispid with long spreading hairs, simple or branched. *Leaves* so variable that it is difficult to arrange their forms under any system; 1 (*alliarifolia*), leaves entire, cordate or ovate or oblong, with the base truncate or cordate obtuse or acute, petiole simple slender auricled at the base; 2 (*raphanifolia*), leaves more or less pinnatifid with a terminal ovate lanceolate or deltoid acute terminal lobe to which the leaf is sometimes reduced, petiole broadly winged dilated or not at the base; 3, leaves orbicular or broadly oblong, palmately 3-lobed, lobes cut and toothed, petiole simple or toothed (when the leaf becomes pinnatifid). *Heads* $\frac{1}{4}$ - $\frac{2}{3}$ in.; outer invol. bracts $\frac{1}{2}$ - $\frac{1}{3}$ the length of the inner. *Achenes* $\frac{1}{2}$ - $\frac{1}{3}$ in., narrow, compressed, slightly contracted at the tip; pappus scanty, brittle, white or pale brownish.

3. ***P. violæfolia***, *Dene. in Bot. Jacq. Voy.* 100, t. 108; stem very slender simple quite glabrous or with soft hairs at the top of the petiole, leaves long-petioled ovate-cordate deltoid or hastate tip and auricles obtuse or acute entire or obscurely sinuate-toothed glaucous beneath, petiole simple or winged or dilated at the base, heads racemose or subpaniculate narrow pendulous long-peduncled 5-8-fld., achenes ellipsoid shorter than the white pappus. *Lactuca violæfolia*, *Clarke Comp. Ind.* 269.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 9-12,000 ft.

A small very slender species, a foot high, simple or sparingly branched. *Leaves* 1-2 in. long and broad; petiole of the lower 3-8 in., simple or dilated at the base, sometimes into a foliaceous orbicular toothed auricle, rarely with a pair of oblong pinnules below the blade, nerves radiating from the tip of the petiole. *Heads* few, subsolitary, pendulous; invol. bracts $\frac{1}{2}$ in., outer very small, inner linear obtuse. *Achenes* $\frac{1}{2}$ in., contracted at both ends, but not beaked.

4. ***P. Hookeri***, *Clarke mss.*; stem simple or branched, glabrous except the petiole and leaf-nerves beneath which are often setose, leaves hastate or cordate obtuse quite entire rarely sinuate uppermost ovate or oblong, petiole not longer than the blade with a broad $\frac{1}{2}$ -amplexicaul wing dilated downwards and auricled at the base, heads 3-6-fld. racemose or panicled narrow pendulous, peduncle long, achenes narrowly elliptic compressed contracted towards both ends about equalling the white pappus. *P. alata*, *Herb. Hook. f. & T.*; *Clarke Comp. Ind.* 274; *Kurz in Journ. As. Soc.* 1877, ii. 207.

KHASIA Mts.; in marshy places, alt. 4-6000 ft. MARTABAN Mts.; dry hills, alt. 5-6000 ft., *Kurz*.

Stem 1-3 ft., quite glabrous, simple and slender or stout and much branched. *Leaves* 1-2 in. long and broad, basal lobes spreading or deflexed; petiole with flexuous hairs underneath and towards the top only, wing gradually narrowed to the insertion of the leaf-blade or below it. *Flowers* blue purple. *Achenes* $\frac{1}{2}$ in., broader and darker than in *P. violæfolia*, from which this differs conspicuously in the short petioles.—Clarke suggests the alteration of the name from *alata*, which should be retained for the *P. (Nabalus) alata*, Hook. f., N. America. Clarke describes the achenes as cylindric, but I find all to be flattened. I have seen no Martaban specimens.

5. ***P. sikkimensis***, *Hook. f.*; quite glabrous, stem elongate very slender flexuous branched, leaves very membranous quite entire with slender petioles winged towards the base simple (not auricled) deltoid with rounded tip and lobes or with a pair of pinnules on the petiole, heads panicled solitary long-peduncled pendulous 5-6-fld., achenes large fusiform compressed equalling the white pappus.

SIKKIM HIMALAYA; Lachen valley, alt. 9000 ft., J. D. H.

A very slender branched species, 3-4 ft. high, with membranous leaves 1-1½ in. diam., very glaucous beneath, and heads as in the other species, but achenes ¼ in. long, narrowed towards both ends.

6. *P. scandens*, Hook. f. & T.; Clarke Comp. Ind. 274; scandent, glabrous puberulous or pubescent, branched, flexuous, leaves ovate or triangular-ovate acuminate ciliate base truncate cordate or hastate, petiole shorter than the blade quite simple, heads in axillary and terminal panicles with divaricating branches shortly peduncled pendulous glabrous, achenes very slender almost beaked shorter than the whitish pappus.

SIKKIM HIMALAYA, alt. 4-9000 ft., common. UPPER ASSAM; Mishmi Mts., Griffith.

A tall flaccid rambling climber, with zig-zag stem and branches. Leaves nearly glabrous in Sikkim, pubescent with crisped hairs in Mishmi. Leaves 3-5 by 2-3 in., glaucous beneath, margins with strong projecting remote cilia; petiole ¼-1½ in. Heads ½ in. long; ligules rose-purple. Achenes ½ in., much more slender than in any of the preceding species and more nearly beaked, being much attenuated from above the middle; pappus nearly white.

116. *PICRIDIMUM*, Desf.

Perennial or annual glabrous milky herbs. Leaves radical or alternate, toothed or pinnatifid, lobes often crisped and toothed or spinulose. Heads campanulate, yellow, homogamous; fl. all ligulate. Involucre campanulate; bracts ∞-seriate, thinly herbaceous, innermost subequal lanceolate unchanged in fruit, outer shorter broader with scarious margins; receptacle flat, naked. Achenes oblong, truncate at both ends, constricted at the tip; ribs 4-5, thick, transversely rugose; pappus hairs ∞-seriate, slender, simple, soft, white, connate at the base into a deciduous ring.—DISTRIB. Species 5 or 6, Europe, N. Africa, W. Asia.

P. tingitanum, Desf., Boiss. Fl. Orient. iii. 827; annual, stem stout, radical leaves elongate-obovate or spatulate obtuse sinuate-toothed or pinnatifid denticulate, cauline ½-amplexicaul auricled, peduncle thickened under the head, invol. bracts cordate with very broad membranous margins and thickened tips, inner oblong, achenes 4-angled or of 4 moniliform ribs. DC. Prodr. vii. 182; Clarke Comp. Ind. 275. *P. orientale*, DC. l.c. *Scorzonera tingitana* and *orientalis*, Linn.

The PUNJAB, Jacquemont; Futtehgurh, Edgeworth; Tilla rocks and Byree, common. Aitchison.—DISTRIB. Affghan and Beluchistan, Persia, Arabia, and N. Africa to the Canaries, S. Europe.

Stem 6-18 in., glabrous. Leaves 1-5 in., variable in breadth. Heads 1½ in. diam. Achenes ⅙ in. long, pale, corky; pappus ½ in., very soft and white.

VAR. *subintegra*, Boiss. l.c. 828; tall, robust, cauline leaves 3-4 in. linear oblong quite entire or obscurely denticulate.—Ajmir, Jacquemont. This looks a very different plant, except in the head, from *P. tingitanum*, being tall, with the stem as thick as a goose-quill and quite entire oblong leaves; it is probably a state growing in rich soil.

117. *SONCHUS*, Linn.

Annual or perennial milky herbs. Leaves radical or alternate, cauline often stem-clasping, entire toothed or pinnatifid, segments often spinulose-toothed. Heads terminal, irregularly subcorymbose umbellate or paniced, yellow, homogamous; fl. all ligulate. Involucre ovoid campanulate or cylindric, often dilated thickened and conic at the base; bracts ∞-seriate, herbaceous, outer smaller; receptacle flat, naked. Achenes ovoid obovoid or ellipsoid, compressed, not beaked, ribbed, ribs smooth or transversely rugose; pappus copious, hairs ∞-seriate, very slender, simple, usually white and united at the base into a deciduous

ring.—DISTRIB. Species about 24, N. temp. regions and Central Asia, a few spread over the world with cultivation.

1. ***S. asper***, Vill.; Boiss. *Fl. Orient.* iii. 796; annual, glabrous or sparsely glandular above, subumbellately branched, leaves lanceolate $\frac{1}{2}$ -amplexicaul with rounded auricles entire or pinnatifidly toothed, heads crowded, achenes compressed, faces 3-ribbed obscurely muricate between the ribs. Reichb. *Ic. Fl. Germ.* t. 1410; Clarke *Comp. Ind.* 275. *S. ferox*, Wall. *Cat.* 3248. *S. oleraceus*, Wall. *Cat.* 3252 F.

Throughout INDIA; in fields and cultivated places, ascending to 12,000 ft. in the Himalaya.—DISTRIB. All temperate and many tropical countries, wild or introduced.

By many considered a subspecies of *S. oleraceus*. Clarke remarks that in India this flowers from December to April, and *S. oleraceus* from April to May.

2. ***S. oleraceus***, Linn.; Boiss. *Fl. Orient.* iii. 795; annual, glabrous or sparsely glandular-hispid, subumbellately branched above, leaves lanceolate $\frac{1}{2}$ -amplexicaul with acute auricles entire or pinnatifid, heads crowded, achenes compressed, faces 3-ribbed and muricate between the ribs. Reichb. *Ic. Fl. Germ.* t. 1410, f. 1; Clarke *Comp. Ind.* 275. *S. ciliatus*, Lamk.; Wight *Ic.* t. 1141. *S. Royleanus*, Wall. *Cat.* 3252; DC. *Prodr.* vii. 184.

Throughout INDIA; in fields and cultivated places, ascending to 8000 ft. in the Himalaya.—DISTRIB. of *S. asper*.

3. ***S. arvensis***, Linn.; Boiss. *Fl. Orient.* iii. 798; rootstock creeping, stem glabrous tall umbellately branched above, leaves runcinate-pinnatifid spinous-toothed cauline $\frac{1}{2}$ -amplexicaul with appressed rounded auricles uppermost linear, heads and peduncles glandular-hispid, achenes narrow subcompressed with thick regular ribs on each face. Reichb. *Ic. Fl. Germ.* t. 1412; Clarke *Comp. Ind.* 276. *S. Wightianus*, DC. *Prodr.* vii. 187; Wight *Ic.* t. 1142. *S. orixensis*, Roxb. *Fl. Ind.* iii. 402. *S. Wallichiana*, DC. *l. c.* 185. *S. longifolius*, Wall. *Cat.* 3251.

Throughout INDIA; wild and in cultivated places, scarce in the plains, common in the Khasia and Himalaya, ascending to 8000 ft.—DISTRIB. of *S. asper*.

4. ***S. maritimus***, Linn.; Boiss. *Fl. Orient.* iii. 797; perennial, glabrous, glaucous, rootstock creeping, stem sparingly branched above, leaves linear-oblong quite entire or sparingly sinuate-toothed, cauline $\frac{1}{2}$ -amplexicaul with acute auricles, heads few peduncled glabrous, achenes ellipsoid subcompressed margins thickened faces with a thick middle rib and 2 more slender lateral ones. Reichb. *Ic. Fl. Germ.* t. 1413? *S. arvensis*, β , Clarke *Comp. Ind.* 276.

THE PUNJAB; Peshawur, Stewart.—DISTRIB. Westwards to the Atlantic.

118. **LAUNÆA**, Cass.

(MICRORHYNCHUS, Less.)

Perennial glabrous herbs, with yellow (always?) juice. *Leaves* chiefly radical, sinuate-lobed or pinnatifid, margins often spinulose-toothed. *Heads* peduncled or lateral and sessile on the branches, racemose or paniculate, or solitary or fascicled, yellow, homogamous; fl. all ligulate. *Involute* campanulate or cylindric; bracts ∞ -seriate, herbaceous, margins often membranous, inner subequal, outer various, keel often thickened in fruit; receptacle flat, naked. *Anther-bases* sagittate, auricles setaceous. *Style-arms* slender. *Achenes* narrow, subterete angled or slightly flattened, rarely winged, truncate at both ends or rarely emarginate; ribs 4-5 very stout, close-set, smooth papillose or narrowly winged or 2-grooved, truncate at each end; pappus copious, hairs ∞ -seriate

simple, very slender, white, a few inner sometimes longer and stronger, all connate at the base into a deciduous ring.—DISTRIB. About 20 species, European, African and W. Asian.

* Achenes not winged.

† *Heads terminal on the paniculately branched flowering stems.*

1. ***L. asplenifolia*, DC. Prodr. vii. 181** (*Microhynchus*); biennial or perennial, glabrous, radical leaves sinuate-lobed or pinnatifid, cauline few, flowering stems many from the root, branches dichotomous divaricating, heads $\frac{1}{2}$ in. terminal paniculate peduncles bracteate, outer invol. bracts small inner linear margins membranous, achenes minute columnar angled and ribbed, ribs rough much shorter than the very soft straight white pappus. *Microhynchus asplenifolius*, DC.; *Clarke Comp. Ind.* 276. *Prenanthes dichotoma*, Wall. Cat. 3275. *P. asplenifolia*, Willd. ?; *Roxb. Fl. Ind.* iii. 404.

Plains of INDIA; from the Punjab to Assam and southwards to the Soonderbunds, Circars, Andamans, Birma and Tenasserim.

Leaves 3–6 in., sessile or shortly petioled, narrowly obovate, lobes minutely toothed. *Flowering stems* ascending, almost naked, 6–18 in. long; peduncles with usually one or two subulate bracts; invol. bracts quite glabrous. *Achenes* $\frac{1}{2}$ in., pale, very narrow; pappus $\frac{1}{2}$ in., deciduous, hairs of about equal length, with no stronger inner ones.—De Candolle quotes *Hieracium dichotomum* of Roxb. Fl. Ind. under this, but no such name is published by Roxburgh, though he gave it in mss. Roxburgh describes this as perennial or biennial and stoloniferous, which latter I have never seen it to be.

2. ***L. chondrilloides*, DC. Prodr. vii. 183** (*Zollikoferia*); perennial, glabrous, erect, radical leaves rosulate runcinate-pinnatifid lobes numerous very unequal much irregularly acutely toothed, cauline sessile auricled irregularly toothed or pinnatifid, flowering stems few or many stout dichotomously branched, heads terminal $\frac{1}{2}$ –1 in. long, peduncles bracteate, invol. bracts glabrous outer ovate-lanceolate intermediate equalling the oblong-lanceolate inner, achenes slender columnar strongly ribbed, ribs scaberulous rather shorter than the soft white pappus. *Microhynchus chondrilloides*, *Clarke Comp. Ind.* 277. *Sonchus Candolleanus*, *Jaub. & Spach Ill. Pl. Orient.* iii. t. 279. *Zollikoferia mucronata*, *Boiss. Fl. Orient.* iii. 822.

The PUNJAB; Mooltan, *Edgeworth*, low hills at Rawul Pindee, *Aitchison*. SCIND, *Stocks, Dalzell, &c.*—DISTRIB. Afghanistan, Persia, Arabia, Egypt.

Leaves 3–5 in., narrow, subsessile. *Flowering branches* 6–18 in., often stout, leafy at the axils; peduncles stout, thin, bracteoles ovate toothed; invol. bracts without membranous white edges, bases at length thickened. *Achenes* $\frac{1}{2}$ in. pale; outer pappus hairs numerous, excessively slender, very soft, inner few much longer nearly $\frac{1}{2}$ in. rigid much stouter but quite smooth.

3. ***L. microcephala*, Hook. f.**; annual, small and very slender, sparsely villous, radical leaves obovate-spathulate entire or sinuate-lobed, flowering stems filiform dichotomously branched, heads $\frac{1}{4}$ in. long cylindric, peduncles capillary ebracteolate, invol. bracts glabrous or puberulous outer minute inner linear midrib thickened in fruit, achenes slender linear truncate at both ends, striate, much longer than the scanty white pappus. *Crepis microcephala*, *Clarke mss.*

WESTERN TIBET; Iskardo, alt. 9000 ft., *Clarke*.

Root very slender. *Radical leaves* $\frac{1}{2}$ –1 in., petioled, sparsely pubescent with spreading hairs. *Flowering stems* several, erect 2–7 in., pubescent below, with sessile oblong leaves at the lower forks, the upper naked; invol. bracts 6–8 with narrow white margins, hardened in fruit. *Achenes* $\frac{1}{2}$ in., dark brown when ripe, outer slightly curved; pappus $\frac{1}{12}$ in. very soft, white, persistent,—I refer this to *Launæa*

(with some hesitation, and against Mr. Clarke's opinion), because the achenes are not at all contracted at either end, and appear to me to differ from those of any Indian *Crepis*. The habit is very close to that of small forms of *Crepis japonica*, but the achenes are entirely different.

†† *Heads more or less racemose on the flowering stem, or its branches.*

4. **L. secunda**, *Clarke Comp. Ind.* 27 (Microrhynchus), *excl. syn.*; glabrous or sparsely hispid, radical leaves sessile runcinate- or lyrate-pinnatifid lobes rounded irregularly lobulate and sharply toothed, cauline 0 or very few, flowering stems subsolitary tall strict simple or sparingly forked, heads $\frac{1}{2}$ in. long narrow in subsessile racemed subsecund clusters, invol. bracts with white membranous margins, outer small ovate inner linear midrib much thickened in fruit, achenes columnar angled and strongly ribbed as long as the very soft white pappus. *Chondrilla secunda*, *Royle mss.*

WESTERN HIMALAYA; from Hazara to Kumaon, alt. 4-8000 ft., *Royle, &c.*

Annual? *Radical leaves* 4-8 by 1-2 in. obovate or elongate-obovate, with many lobes, coriaceous. *Flowering stems* 1-3 ft., terete, strict; branches erect, racemose, 1 foot and under, quite erect. *Invol. bracts* with scarious white edges, hard and connivent in fruit with soft green tips overtopping the pappus, midrib much thickened. *Achenes* $\frac{1}{3}$ in., pale, smooth, many ribbed, slightly thicker in the middle; pappus excessively soft, with a few rigid rather longer hairs.

5. **L. nudicaulis**, *Less. Synops.* 139 (Microrhynchus); glabrous, leaves sinuate-lobed pinnatifid or runcinate lobes irregularly lobulate and sharply toothed teeth often white and cartilaginous, flowering stems decumbent or spreading irregularly branched, heads $\frac{1}{2}$ - $\frac{3}{4}$ in. long narrow sessile solitary or clustered subracemose and terminal, invol. bracts with white membranous margins, outer very short ovate, inner long linear midrib thickened in fruit, achenes columnar very thickly ribbed outer compressed, much shorter than the soft straight white pappus. *Microrhynchus nudicaulis*, *Less.*; *DC. Prodr.* vii. 180. *M. fallax*, *Jaub. & Spach Ill. Pl. Orient.* t. 276. *Zollikoferia nudicaulis*, *Boiss. Fl. Orient.* iii. 824. *Chondrilla nudicaulis*, *Linn. Mant.* 273. *Lactuca nudicaulis*, *Murray*. *L. obtusa*, *Clarke Comp. Ind.* 261. *Prenanthes patens* and *P. dichotoma*, *Wall. Cat.* 3258, 3275, *F. P. obtusa*, *Ham. in Wall. Cat.* 3276. *P. procumbens*, *Roxb. Fl. Ind.* iii. 405. *Brachyramphus obtusus*, *DC. Prodr.* vii. 177; *Deless. Ic. Sel.* iv. t. 96.

Plains of INDIA; from Bengal and Behar to the Punjab, ascending the WESTERN HIMALAYA to 8000 ft. in Kumaon. SCINDE and the DECCAN.—DISTRIB. Afghanistan and westwards to the Atlantic.

Root perennial? with yellow juice. *Leaves* 2-10 by 1-3 in., usually sessile. *Flowering stems* usually very numerous, 6-24 in. long, spreading on all sides, stout or slender, simple or branched. *Heads* sometimes 6-10 in a cluster; invol. bracts overtopping the pappus. *Achenes* $\frac{1}{2}$ in., very pale, polymorphous, inner sometimes as if composed of 4 thick ribs, outer slightly curved and flattened with a thick ventral and several thick dorsal ribs, all smooth or obscurely uneven; pappus $\frac{1}{3}$ - $\frac{1}{2}$ in., very deciduous, hairs very straight soft and of nearly equal length.

††† *Heads solitary or fascicled at the nodes of the flagelliform rooting flowering stem.*

6. **L. pinnatifida**, *Cass. in Ann. Sc. Nat.* xxiii. 85; glabrous, leaves runcinate-pinnatifid or sinuate-toothed or lobed, flowering stems procumbent long flagelliform rooting and leafing at the nodes, heads at the nodes solitary or clustered $\frac{1}{2}$ in. long usually with bracteate peduncles, invol. bracts with white membranous margins, outer short, intermediate longer, inner linear midrib at the base hardening in fruit, achenes columnar very thickly ribbed much shorter than the soft straight white pappus. *Microrhynchus sarmentosus*, *DC. Prodr.*

vii. 181; *Wight. Ill.* t. 133; *Clarke Comp. Ind.* 277. *Prenanthes sarmentosa*, *Willd. Sp. Pl.* iii. 1540; *Wall. Cat.* 3262, A. B. C. *Lactuca sarmentosa*, *DC. in Wight Contrib.* 27.

Sandy coasts of INDIA; from Bengal to Ceylon. Penang, Madras and Malabar.—**DISTRIB.** Mauritius, Egypt, E. African coast.

Leaves 1-3 in., rarely more, teeth rarely white and cartilaginous (as in *L. nudicaulis*). *Flowering stems* slender, 1-3 ft. long, arching from node to node. *Invol. bracts* almost 3-seriate, as in *L. nudicaulis*. *Achenes* $\frac{1}{12}$ in., pale, thick with few very thick rounded ribs, usually obtusely 4-gonous; pappus $\frac{1}{4}$ in., deciduous, hairs very slender, white and of nearly equal length.

** Achenes winged; invol. bracts 3-seriate, outer very broad, all with broad membranous margins. (*LOMATOLEPIS*, *Cass.*)

7. **L. glomerata**, *Cassini in Dict. Sc. Nat.* xlviii. 422 (*Lomatolepis*); glabrous, leaves sessile sinuate-lobed pinnatifid or runcinate, lobes usually short rounded toothed, teeth cartilaginous white, flowering-branches spreading sparingly dichotomously branched, heads $\frac{1}{2}$ – $\frac{2}{3}$ in. campanulate clustered at the ends of the branches, invol. bracts with very broad membranous margins outer large broadly ovate, inner oblong, base hardened in fruit, achenes corky thickly ribbed outer 2-winged inner columnar shorter than the soft straight white pappus. *Lomatolepis glomerata*, *Cass.*; *DC. Prodr.* vii. 180. *Microhynchus glomeratus*, *Jaub. & Spach Ill. Pl. Orient.* iii. t. 275. *Zollikoferia glomerata*, *Boiss. Fl. Orient.* iii. 826. *Sonchus capitatus*, *Spr. Syst. Voy.* iii. 650.

THE PUNJAB; *Stewart*. SCINDE; *Stocks*.—**DISTRIB.** Persia, Arabia, Egypt, Algiers.

Perennial? *Leaves* 3-5 by 1-1 $\frac{1}{2}$ in., lobes or pinnules numerous, close set. *Flowering branches* stout, strict, usually not exceeding the leaves, naked. *Heads* broader than in other Indian species, with broader 3-seriate more obtuse invol. bracts, and more numerous flowers; peduncles short, bracteolate. *Achenes* $\frac{1}{2}$ in., pale yellow; outer slightly curved, linear-oblong, emarginate at both ends, wings each as broad or broader than the nucleus, which is ventrally and dorsally 5-6-ribbed, wings and ribs minutely crenulate; inner achenes often narrower and imperfect; pappus $\frac{1}{2}$ in. long, deciduous, hairs subequal with no inner stronger ones.

119. **TRAGOPOGON**, *Linn.*

Biennial or perennial milky-juiced herbs. *Leaves* alternate, stem-clasping, narrow, quite entire. *Heads* terminal; long-peduncled, large, homogamous, yellow blue or purple; fl. all ligulate. *Involucre* cylindric or narrowly campanulate; bracts 1-seriate longer or shorter than the flowers, herbaceous, acuminate, bases sometimes connate, outer 0; receptacle flat or convex, pitted, margins of the pits often cartilaginous. *Achenes* slender, terete, 5-angled, 5-10-ribbed, ribs smooth or muricate, basal areole broad concave, inner usually with a slender beak; pappus hairs numerous, 1-seriate, feathery, connate into a basal ring, 5-10 longer than the rest with simple (not feathery) tips, those of the outer achenes often fewer, subpaleaceous, free at the base, simple or feathery below.—**DISTRIB.** Species about 20, Europe, N. Africa, temp. and subtrop. Asia.

1. **T. gracile**, *Don in Mem. Wern. Soc.* iii. 407; *Prodr.* 162; quite glabrous, leaves very narrow linear keeled flexuous, radical often equalling the scape, invol. bracts 5-8 shorter than the yellow ligules, achenes $\frac{1}{2}$ in. smooth beak not conspicuous. *T. junceum*, *Wall. Cat.* 3257; *DC. Prodr.* vii. 115; *Clarke Comp. Ind.* 278.

CENTRAL and WESTERN HIMALAYA; from Hazara to Nipal, alt. 6-10,000 ft., ascending to 13,000 ft. in Piti and Kunawur.

Leaves 3-10 by $\frac{1}{2}$ -1 in., base dilated. *Scape* 1-rarely 2-3-fld, not thickened under the head. *Invol. bracts* $\frac{1}{2}$ -1 $\frac{1}{2}$ in. long. *Achenes* beak not long nor slender.

2. ***T. pratense*, Linn.; Boiss. Fl. Orient. iii. 747**; glabrous, stem usually branched and leafy, leaves gradually narrowed from a broad sheathing base, peduncle hardly thickened under the head, invol. bracts about 8 equalling or exceeding the yellow ligules, achenes long-beaked muricate. *DC. Prodr. vii. 113.*

WESTERN HIMALAYA and WESTERN TIBET; alt. 12-14,000 ft., Thomson, &c.—*DISTRIB.* Westward to the Atlantic.

Stem 6-24 in., leafy, often stout. *Leaves* $\frac{1}{6}$ - $\frac{1}{2}$ in. diam. about the middle. *Invol. bracts* $\frac{1}{2}$ -3 in. long. *Achenes* $\frac{3}{4}$ to nearly 1 in., beak equalling or shorter than the body, very slender.

3. ***T. porrifolium*, Linn.; Boiss. Fl. Orient. iii. 745**; glabrous or cottony, stem usually branched and leafy, leaves gradually narrowed from a very broad sheathing base, peduncle much inflated under the head, invol. bracts about 8 exceeding the purple ligules, achenes long-beaked muricate. *DC. Prodr. vii. 113.*

WESTERN TIBET; *Falconer*. SIMLA; in cultivated places, Thomson.—*DISTRIB.* Westwards to the Mediterranean.

Habit of *T. pratense*, distinguished by the swollen peduncle and purple ligules; the achenes are 1 in. long in Tibetan specimens and much muricated.

120. **SCORZONERA**, Linn.

Perennial, rarely annual herbs. *Leaves* alternate or radical, entire lobed or pinnatisect. *Heads* large, long-peduncled, yellow, homogamous; fl. all ligulate. *Involucre* cylindric or campanulate; bracts ∞ -seriate, thinly herbaceous, acute or the inner acuminate, outer gradually (rarely suddenly) smaller; receptacle naked or pitted, rarely villous. *Achenes* linear, subterete or the outer angled, ∞ -ribbed, rarely 2-3-winged, basal areole broad, hollowed; pappus hairs ∞ -seriate, unequal, serrulate or feathery, 5-10 usually longer and with simple (not feathery) tips.—*DISTRIB.* Species about 100, Europe, N. Africa, W. and Centr. Asia.

SECT. I. ***Eu Scorzonera***. *Achenes* terete or angled, not winged.

1. ***S. divaricata*, Turcz.; DC. Prodr. vii. 125**; glabrous, stem slender simple or branched, leaves slender curved, heads cylindric, invol. bracts 4-8 3-4-seriate glabrous or pubescent, ligules yellow, achenes $\frac{3}{4}$ in. very slender longer than the pappus smooth. *Clarke Comp. Ind. 278. S. virgata, DC. l. c. ? S. Roylei, DC. l. c.*

WESTERN HIMALAYA; from Kashmir to Kunawur; and WESTERN TIBET; alt. 9-15,000 ft., *Falconer*, &c.—*DISTRIB.* Mongolia.

Root woody. *Stem* branched from the base or above only, rarely simple, grooved, branches divaricate. *Leaves* 2-6 by $\frac{1}{16}$ - $\frac{1}{2}$ in., margins incurved. *Heads* 1-1 $\frac{1}{2}$ in.; 5-8-fld.; outer invol. bracts short, broad, inner long linear. *Achenes* pale, smooth, striate; pappus hairs feathery below.

2. ***S. purpurea*, Linn.; Boiss. Fl. Orient. iii. 768**; glabrous or sparsely woolly, stem slender, leaves narrowly linear shorter than the stem, heads few large cylindric, invol. bracts imbricate pubescent outermost ovate inner lanceolate shorter than the purple ligules, achenes angled shorter than the pappus, ribs rugose.

KASHMIR; Banahal, alt. 8000 ft., Thomson.—*DISTRIB.* Asia Minor.

I have seen only 2 specimens, from Kashmir, which want the tufts of fibres at the

crown, and have unripe achenes; they however entirely resemble Caucasian ones of *S. purpurea*.

SECT. II. **Pterachænia**, *Benth. in Gen. Plant.* ii. 532. *Achenes* 2-3-winged.

3. **S. Stewartii**, *Hook. f.*; stemless, scapigerous, leaves linear or slightly dilated beyond the middle woolly or glabrate below, scapes usually shorter than the leaves naked, heads solitary tomentose or glabrate, outer invol. bracts ovate acute inner oblong-lanceolate, achenes linear-oblong with 2 broad or 3 narrower whitè wings, ribs echinate.

The PUNJAB; Peshawur, *Stewart*; low hills at Hurroo, *Aitchison*.

Annual. *Leaves* 3-8 by $\frac{1}{10}$ - $\frac{1}{8}$ in., grassy, 3-nerved, subacute. *Scapes* stout, erect or decumbent, ribbed. *Heads* $\frac{1}{2}$ -1 in. long; invol. bracts variable in length and breadth, shorter than the yellow ligules. *Achenes* linear or linear-oblong, $\frac{1}{2}$ in. long, wings entire or toothed equalling or broader than the very narrow strongly ribbed dark body of the achenes; ribs with an irregular row of horizontal spinules; pappus reddish, as long as the achenes.

DOUBTFUL SPECIES.

S. BUPLEUROIDES, *Don Prodr.* 162; "root fusiform, stem simple erect 1-fl. nearly 1 foot high terete glabrous, leaves linear-lanceolate acute flat glabrous villous at the base shorter than the stem, invol. bracts longer than the yellow striate ligules, pappus unequal scabrid."—Alps of Nipal, *Wallich*.—I have no idea what this can be.

121. **EPILASIA**, *Bunge*.

Annual low herbs. *Leaves* chiefly radical, quite entire. *Peduncles* usually thickened and hollow. *Heads* terminal, homogamous; fl. all ligulate. *Involucre* campanulate or ovoid; bracts few, inner sub-2-seriate, outer 3-6, leafy erect or spreading; receptacle flat, naked. *Achenes* short, cylindric or subturbinatè, 10-20-ribbed, glabrous, base not contracted, areole hollowed, tip truncate and raised and dome-shaped within the pappus; pappus dark brown, most densely many-seriate, silky, hairs feathery a few longer the others with simple (not feathery) tips.—DISTRIB. Species 5, Western and Central Asia.

E. ammophila, *Bge. in Reliq. Lehm.* 202; annual, glabrous, leaves very narrowly linear or dilated about the middle 3-nerved quite entire or obscurely serrulate, outer invol. bracts leafy spreading often much longer than the ligules inner ovate-lanceolate obtuse, achenes closely ribbed. *E. Bungei*, *Clarke Comp. Ind.* 279.

The PUNJAB; Peshawur, *Vicary, Stewart*. Salt Range, *Fleming*; low hills at Rawul Pindee, *Aitchison*.—DISTRIB. Beluchistan, Affghanistan, Turkistan.

Stemless or with a rather stout leafy stem 6 in. high. *Leaves* 1-4 by $\frac{1}{2}$ - $\frac{1}{3}$ in., tip obtuse cartilaginous. *Scapes* 1 or more, 2-6 in., stout, naked. *Heads* solitary $\frac{1}{2}$ - $\frac{1}{3}$ in., campanulate; outer invol. bracts very variable in length and breadth, sometimes $2\frac{1}{2}$ in. long and slender, at others short and broad, 3-nerved with cartilaginous tips; ligules blueish. *Achenes* $\frac{1}{2}$ in. long, sometimes nearly as broad and then connate in pairs, about 20-ribbed, ribs obscurely crenulate.—Bunge describes the achene as retrorsely scabrid, which is hardly the case in the Indian specimens.

ORDER LXXVIII.* **STYLIDIÆ**. (By C. B. Clarke.)

Herbs, rarely undershrubs. *Leaves* alternate or falsely whorled, entire. *Flowers* in racemose cymes, panicles or corymbs; hermaphrodite or unisexual. *Calyx* adnate to the ovary; limb 2-lipped, upper lip 3-, lower 2-lobed. *Corolla*

* The numbering of the five preceding Orders, pp. 1, 17, 210, 215, 219, should be respectively 73, 74, 75, 76, 77.

gamopetalous, rarely regular. *Stamens* 2; filaments connate with the style into a column; anther-cells ultimately subconfluent. *Ovary* inferior, 2-celled. *Stigma* at the apex of the column. *Ovules* in each cell ∞ , on the middle of the dissepiment. *Capsule* 1-2-celled, 2-valved, the two valves cohering at the base, or at the base and top. *Seeds* numerous, minute, albuminous; embryo minute, next the hilum.—Species 100, Australian, with a few in S. E. Asia, N. Zealand, and Antarctic America.

1. **STYLIDIUM**, Swartz.

Corolla irregularly 5-lobed; lobes 4, suberect in pairs, and 1 smaller recurved. *Column* of stamens elongate, apex at first deflexed, elastically reflexed when irritated.—Species 85 Australian, and 3 Indian.

1. **S. Kunthii**, Wall. *Cat.* 3759; stems short stout usually pubescent when young, leaves terminal subrosulate obovate-orbicular, peduncles 1 or more leafless dichotomous, corolla white. *DC. Prodr.* vii. 335; *H. f. & T. in Journ. Linn. Soc.* ii. 8. *S. Brunonis*, Griff. *Notul.* iv. 275. *S. uliginosum*, Kurz in *Flora*, 1872, 303, and in *Journ. As. Soc.* 1877, pt. ii. 212.

Throughout EASTERN BENGAL and BRITISH BIRMA; in grassy flats, from the Sikkim and Khasia Terai to Chittagong, *H. f. & T.*, and Mergui, Griffith.

Height 1-8 in. Rosulate leaves $\frac{1}{2}$ - $\frac{3}{4}$ in., often petioled, with scattered smaller ones below them. *Bracts* usually 2, opposite at the forks of the peduncle, $\frac{1}{2}$ - $\frac{1}{4}$ in., linear-oblong. *Flowers* sessile at the forks, minute. *Capsule* $\frac{3}{4}$ - $\frac{1}{2}$ in., linear; valves dehiscing from the top, recurved.

2. **S. uliginosum**, Swartz in *Gesellsch. Nat. Berlin Mag.* 1807, 52, t. 2, fig. 4; stem hardly any, leaves subrosulate obovate-orbicular, peduncles 1 or more leafless dichotomous, corolla white. *DC. Prodr.* vii. 336; *H. f. & T. in Journ. Linn. Soc.* ii. 8. *S. sinicum*, Hance in *Walp. Ann.* ii. 1030.

CEYLON; in moist places, Walker; near Colombo, Champion, Thwaites. MALACCA, *vide H. f. & T.*—DISTRIB. South China, North Australia.

Glabrous, 1-8 in.—Closely resembling *S. Kunthii*, and united therewith by Kurz.

3. **S. tenellum**, Swartz in *Gesellsch. Nat. Berlin Mag.* 1807, 51, t. 2, fig. 3, not of Br.; stem simple erect leafy, leaves scattered oblong or oblong-obovate gradually smaller upwards, corolla rosy or purplish. *H. f. & T. in Journ. Linn. Soc.* ii. 8; Kurz in *Flora*, 1872, 304. *S. roseum*, Kurz in *Journ. As. Soc.* 1876, pt. ii. 137; 1877, pt. ii. 212.

Dacca; in swamps, Clarke. CHITTAGONG, Kurz. MERGUI, Griffith (Kew Distrib. n. 3450). MALACCA, *vide Swartz*.

Stem glabrous, 4-8 in., dichotomous. *Lower leaves* $\frac{1}{2}$ in., narrowed to the base; upper passing gradually into bracts. *Bracts* $\frac{1}{2}$ in., linear, mostly solitary at each fork of the cyme. *Flowers* sessile. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in., linear; valves united at the top and base.

VAR. *minima*; stems 1 2 in., 1-4-flowered.—Chota Nagpore, at Hazaribagh, alt. 2000 ft., C. B. Clarke.

ORDER LXXIX. **GOODENOVIÆ.** (By U. B. Clarke.)

Shrubs or herbs; juice not milky. *Leaves* alternate or radical, very rarely opposite; stipules 0. *Flowers* axillary or terminal, racemose or paniced, irregular or regular. *Calyx-tube* adnate to the ovary; limb 5-fid or nearly obsolete. *Corolla-lobes* 5, valvate in bud. *Stamens* 5, inserted at the base of the corolla, alternate with its lobes; anthers free or connate in a ring round the style. *Ovary* 1-2-celled. *Style* simple, with a cup-shaped indusium including the

stigma. *Ovules* in each cell 1 or many, on the dissepiment. *Fruit* a drupe or capsule. *Seeds* albuminous; embryo next the hilum.—Species 200, Australian; a few in temp. America, New Zealand, and S. E. Asia.

1. *SCÆVOLA*, Linn.

Leaves entire or toothed. *Flowers* axillary, in short cymes or solitary. *Corolla* oblique, split to the base behind. *Anthers* free. *Ovary* 2-1-celled, with 2 erect ovules. *Fruit* a drupe.—Species 60, 50 Australian, 8 Polynesian, 2 Asiatic.

1. **S. Koenigii**, Vahl *Symb.* iii. 36; leaves petioled obovate-oblong obtuse herbaceous, calyx-lobes linear-lanceolate enlarged in fruit. *Lamk. Ill.* t. 124, fig. 2; *DC. Prodr.* vii. 505; *H. f. & T. in Journ. Linn. Soc.* ii. 8; *Kurz in Journ. As. Soc.* 1877, pt. ii. 212. *S. sericea*, Forst.; *DC. l. c.* 506. *S. Taccada*, Roxb. *Hort. Beng.* 15, and *Fl. Ind.* i. 527; *Ham. in Trans. Linn. Soc.* xvii. 250; *Wall. Cat.* 1314; *Wight Ill.* t. 137; *DC. l. c.* 505; *Dalz. & Gibs. Bomb. Fl.* 134. *S. Lobelia*, Ham. in *Trans. Linn. Soc.* xvii. 250; *De Vriese Goodenov.* 20-26, and in *Ned. Kruidk. Arch.* ii. 20, not of Linn. *S. Plumieri*, Blume *Bijd.* 730, not of Vahl. *S. montana*, Lab. *Sert. Austr. Caled.* 41, t. 42. *S. velutina*, Presl. in *Rel. Hænk.* ii. 57. *S. Bela-Modagam*, Roem. & Sch. *Syst.* v. 163; *DC. l. c.* 505. *S. Leschenaultiana*, *DC. l. c.* 506. *S. macrocalyx*, *De Vriese Goodenov.* 26, t. 3, fig. 1-4. *S. chlorantha* and *Lambertiana*, *De Vriese l. c.* 27, 28. *S. lativaga*, Hance in *Walp. Ann.* ii. 1054. *Lobelia frutescens*, Linn. *Fl. Zeyl.* 148. *L. Taccada*, Gaertn. *Fruct.* i. 119, t. 25. *L. Plumieri*, *Burm. Fl. Ind.* 186, not of Linn. *Cerbera salutaris*, Lour. *Fl. Cochinch.* 136.—*Rumph. Herb. Amb.* iv. t. 54; *Rheede Hort. Mal.* iv. t. 59.

Sea shores of INDIA; from Scinde to Ceylon, and from Birma to Malacca.—DISTRIB. Tropical E. Asia, Australia, and Polynesia.

A shrub; stem and branches stout. *Leaves* 3-5 in., alternate, entire or rarely obscurely crenate, silky or glabrescent, tufted in the axils. *Cymes* axillary, much shorter than the leaves; bracts small. *Calyx-lobes* $\frac{1}{8}$ - $\frac{1}{4}$ in.; fruiting often much longer and obtuse. *Corolla-tube* $\frac{3}{4}$ in., narrow, pubescent; lobes $\frac{1}{4}$ - $\frac{1}{2}$ in., lanceolate. *Indusium* of the stigma ciliate. *Drupe* $\frac{1}{2}$ - $\frac{1}{4}$ in., subspherical, very succulent; endocarp bony.

2. **S. Lobelia**, Linn.; *Oliver Fl. Trop. Afr.* iii. 462; leaves petioled elliptic obtuse fleshy, calyx-lobes very short obtuse or subobsolete. *S. Plumieri*, Vahl *Symb.* ii. 36; *Lamk. Ill.* t. 124, fig. 1; *DC. Prodr.* vii. 506; *H. f. & T. in Journ. Linn. Soc.* ii. 8. *S. senegalensis*, Presl *Rel. Hænk.* ii. 59; *DC. l. c.* 507. *S. uvifera*, Stocks; *Wight Ic.* t. 1613. *S. Thunbergi*, Eckl. & Zeyh.; *DC. l. c.* *S. Macraei* and *Sieberi*, *De Vriese Goodenov.* 31, 33. *Lobelia Plumieri*, Linn. *Sp. Pl.* 1317; *Jacq. Amer.* 219, t. 179, fig. 88, not of *Burm.*—*Plum. Pl. Amer.* t. 165, fig. 1.

Seashores of CEYLON and the SOUTH DECCAN; SCIND.—DISTRIB. Warm shores of both hemispheres.

Closely resembles *S. Koenigii*, except in the points stated; the leaves are smaller, 2-3 in. long.

ORDER LXXX. *CAMPANULACEÆ*. (By C. B. Clarke.)

Herbs or undershrubs, sometimes twining, often with milky juice. *Leaves* alternate or opposite, entire toothed or rarely lobed; stipules 0. *Inflorescence* axillary or terminal, solitary subpaniculate or racemose; uppermost leaves reduced to small bracts; bracteoles 0 (except in *Sphenoclea*). *Calyx* inferior or superior; limb 4-6-partite, usually persistent. *Corolla* always superior, regular

or irregular, tubular, rotate or campanulate; lobes valvate in bud. *Stamens* 4-6, alternating with the corolla-lobes, inserted with the corolla on the margin of the epigynous disk (in *Sphenoclea* on the corolla-tube); anthers free or united in a tube. *Ovary* 2-5-celled; placentas in the inner angle of the cell, many-ovuled. *Style* cylindric; stigma-lobes as many as ovary-cells. *Fruit* capsular, baccate or dry (in *Sphenoclea* spuriously circumsciss). *Seeds* very many, small, ellipsoid, albuminous; embryo erect, radicle next the hilum.—Species 1000, scattered throughout the globe.

TRIBE I. Lobeliæ. *Corolla* 2-lipped, cleft dorsally to the base. *Anthers* connate.

Berry indehiscent 1. PRATIA.
Capsule 2-valved at the crown 2. LOBELIA.

TRIBE II. Campanulæ. *Corolla* regular. *Anthers* free or imperfectly connate.

* *Capsule loculicidal within the calyx-teeth.*

Small herbs; corolla very small stellately 5-partite; capsule $\frac{1}{10}$
in. diam. 3. CEPHALOSTIGMA.
Corolla campanulate; capsule altogether inferior, $\frac{1}{2}$ – $\frac{1}{3}$ in. 4. WAHLENBERGIA.
Corolla tubular inflated upwards; capsule with a conical superior
beak. 5. LEPTOCODON.
Corolla campanulate; capsule with a conical superior beak 6. CODONOPSIS.
Capsule consisting of the conical beak, enclosed in the calyx-tube 7. CYANANTHUS.

** *Fruit indehiscent or membranous, breaking up irregularly.*

Berry fleshy, crowned by a flat disk 8. CAMPANULÆA.
Slender prostrate herb; flowers very small; fruit small inferior,
membranous 9. PERACARPA.
Leaves large succulent; flowers 2-ranked in a dense scorpioid
spike 10. PENTAPHRAGMA.
Flowers in a dense cylindric spike, capsule circumsciss. 11. SPHENOCLEA.

*** *Capsule dehiscent at the base or sides below the calyx-teeth.*

Corolla rotate, ovary 2-celled 12. PHYTEUMA.
Corolla campanulate rarely rotate, ovary 3-5-celled 13. CAMPANULA.

1. PRATIA, Gaud.

Herbs. *Leaves* alternate, toothed. *Peduncles* axillary, 1-flowered. *Calyx* inferior, limb 5-partite. *Corolla* oblique, 2-lipped; upper lip 2-partite, lower 3-lobed. *Staminal tube* free or nearly so; 2 lower anthers with 1 or more terminal bristles, 3 upper naked. *Ovary* inferior, 2-celled; placentæ hemispheric; stigma 2-lobed or emarginate. *Berry* ellipsoid, crowned with the calyx-teeth. *Seeds* very many, minute.—Species 15, S. E. Asia, Australia, N. Zealand, and S. America.

1. *P. begonifolia*, Lindl. in Bot. Reg. t. 1873; small, creeping, rooting, pubescent, leaves petioled cordate-ovate. *P. zeylanica*, Hassk. Cat. Bogor. 106. *P. Nummularia*, Kurz in Journ. As. Soc. 1877, pt. ii. 210. *Lobelia Nummularia*, Lamk. Dict. iii. 589. *L. begonifolia*, Wall. Cat. 1806; in As. Res. xiii. 377; in Roxb. Fl. Ind. ed. Carey & Wall. ii. 115. *L. Horsfieldiana*, Miq. Fl. Ind. Bat. ii. 577. *Piddingtonia Nummularia*, DC. Prodr. vii. 341; *H. f. & T. in Journ. Linn. Soc.* ii. 26. *Rapuntium Nummularium*, Presl Prodr. Lob. 30.

NIPAL, SIKKIM, BHOTAN, ASSAM, KHASIA Mts., and PEGU, alt. 2-7000 ft., frequent.—DISTRIB. Malaya, S. China.

Leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., denticulate. *Peduncles* $\frac{1}{2}$ – $1\frac{1}{2}$ in., distant, none from the upper axils. *Calyx-teeth* $\frac{1}{2}$ in., linear. *Corolla* green with pink marks. *Anthers* 5, nearly black; 2 surmounted by 1 bristle each, 3 puberulous. *Berry* $\frac{1}{2}$ in., shortly ellipsoid, finally smooth, black. *Seeds* compressed, ellipsoid, smooth.

2. **P. montana**, Hassk. *Cat. Bogor.* 106; glabrous, branches long, leaves petioled lanceolate tapering at both ends. *Lobelia montana*, Reinw.; *Blume Bijdr.* 728; *DC. Prodr.* vii. 386. *Speirema montanum*, H. f. & T. in *Journ. Linn. Soc.* ii. 27. *Piddingtonia patens and montana*, Miq. *Fl. Ind. Bat.* ii. 573.

TEMPERATE HIMALAYA, alt. 4–8000 ft.; from Nipal to Mishmi, common. UPPER ASSAM; Patkoy Mts., Griffith.—DISTRIB. Java.

A tall, rambling herb. *Leaves* $4\frac{1}{2}$ by $1\frac{1}{4}$ in., finely serrate. *Peduncles* 1–2 in., often 1 from every axil, nearly to the ends of the branches. *Calyx-teeth* $\frac{1}{2}$ – $\frac{1}{4}$ in., linear. *Corolla* green with purple marks, hairy within. *Anthers* 5, yellow; 2 surmounted by several bristles, 3 puberulous. *Berry* $\frac{1}{2}$ – $\frac{1}{4}$ in., globose, black-purple. *Seeds* compressed, ellipsoid, smooth.

2. LOBELIA, Linn.

Herbs, often tall, or (non-Indian species) shrubs. *Leaves* alternate, toothed, rarely subentire. *Peduncles* axillary, 1-flowered, sometimes subracemose. *Calyx* superior, limb 5-partite. *Corolla* oblique, 2-lipped; upper lip 2-partite, lower 3-lobed. *Staminal tube* free or nearly so; anthers tipped with bristles, 3 upper naked. *Ovary* inferior, 2-celled; placentæ hemispheric; ovules numerous; stigma shortly bifid. *Capsule* loculicidally 2-valved within the calyx-teeth. *Seeds* very many, minute, ellipsoid, compressed or trigonous.—Species 200, rare in Europe and W. Asia.

L. chenopodifolia, Wall. *Cat.* 1312 (*L. Cliffortiana*, Linn. *Hort. Cliff.* t. 2^a; *DC. Prodr.* vii. 372), cultivated from Roxburgh's time in the Calcutta Botanic Garden, is not indigenous in India.

SECT. I. **Holopogon**, Benth. in *Gen. Pl.* ii. 552 (char. narrowed to the Indian species). Small herbs. *Leaves* $\frac{1}{4}$ – $1\frac{1}{2}$ in. *Corolla* small; lobes unequal. *Anthers* all barbate on the apex nearly equally.

† *Seeds distinctly trigonous.*

1. **L. trigona**, Roxb. *Fl. Ind.* i. 506; glabrous, leaves ovate subsessile, pedicels mostly longer than the leaves. *A. DC. Prodr.* vii. 359; *Wight Ic.* t. 1170; *H. f. & T. in Journ. Linn. Soc.* ii. 27, partly; *Dalz. & Gibs. Bomb. Fl.* 133, excl. syn. *L. triangulata*, Roxb. *Hort. Beng.* 16. *L. stipularis*, Roth *Nov. Sp.* 144; *Wall. Cat.* 1309. *L. gratioloides*, Roxb.; *A. DC. l. c.* 387. *Lobelia* sp., Griffith. *Notul.* iv. 281.

THE DECCAN AND CEYLON, alt. 0–6000 ft., common. ASSAM, Simons. BENGAL; Dacca, Clarke. MERGUi, Griffith, n. 429. PEGU, M'Lelland.

Annual; branches 6–12 in., ascending, rooting only near the base, more or less 3-angled. *Leaves* $\frac{1}{4}$ – $\frac{3}{4}$ in. diam., denticulate. *Corolla* $\frac{1}{2}$ – $\frac{1}{4}$ in. *Capsule* $\frac{1}{2}$ by $\frac{1}{2}$ in., ellipsoid, not tapering acutely to the pedicel. *Seeds* ellipsoid, narrowed at both ends, distinctly trigonous.—Roth says that his *L. stipularis* was Heyne's *L. zeylanica*, of which the authentic examples, both at Kew and the British Museum, are *L. trigona*; and Wallich (*Cat.* 1309) agrees. But Roth's description of *L. stipularis* fits the Ceylon plant called below *L. zeylanica*, var. *Walkeri*; and it is quite possible that Heyne may have sent this to Roth. Benth. (*Fl. Hongk.* 196) unites with *L. trigona* (doubtfully) *L. chinensis*, Lour., which is its nearest ally, but has narrower leaves and more divaricate branches.

2. ***L. affinis***, Wall. Cat. 1311; prostrate, often rooting, leaves petioled ovate minutely pilose on the nerves beneath, pedicels mostly longer than the leaves, calyx-teeth pilose. *A. DC. Prodr.* vii. 360; *Hook. f. & T. in Journ. Linn. Soc.* ii. 27. *L. zeylanica*, Wall. in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 113; *Kurz in Journ. As. Soc.* 1877, ii. 211, not of Linn. *L. subcuneata*, Miq. *Fl. Ind. Bat.* ii. 574.

From SIKKIM, BENGAL and ASSAM to MALACCA and CEYLON; alt. 0-4000 ft., common.—DISTRIB. Malaya, S. China.

Stems 6-24 in., much branched, pubescent or glabrate, more or less 3-angled. *Leaves* $\frac{1}{4}$ - $\frac{3}{4}$ in. diam., denticulate. *Corolla* $\frac{1}{2}$ - $\frac{1}{4}$ in. *Capsule* $\frac{1}{8}$ - $\frac{1}{4}$ by $\frac{1}{8}$ - $\frac{1}{6}$ in., not tapering to the pedicel. *Seeds* ellipsoid, narrowed at both ends, distinctly trigonous.—The Ceylon examples are *L. hirta*, Wight mss., and agree closely with the Javan; they are mixed by collectors with *L. zeylanica*, var. *Walkeri*, which they somewhat resemble; but the leaves are distinctly pubescent and seeds different.

VAR. *Lobbiana* (sp.), H. f. & T. in *Journ. Linn. Soc.* ii. 28; leaves 2 in., corolla $\frac{1}{3}$ in.—Khasia Mts., Lobb. The fragment on which this species is founded has the leaf hardly longer than in some examples of *L. affinis*, but the corolla is much larger, and may indicate a distinct species.

3. ***L. terminalis***, Clarke; pubescent, ascending, leaves short-petioled ovate upper narrower sharply toothed almost bracteiform, pedicels very long slender.

NORTH BENGAL; near the foot of the hills; Bhyadanga in Mymensingh, Clarke.

A slender, suberect, annual, 6-10 in., branching, not rooting. *Leaves* $\frac{1}{4}$ - $\frac{3}{4}$ in. diam., denticulate; upper oblong, incised. *Pedicels*, mostly from the upper axils, 3-5 times as long as the bractiform leaves, so that the inflorescence appears as a lax terminal corymb. *Corolla* $\frac{1}{2}$ in. *Capsule* $\frac{1}{8}$ by $\frac{1}{8}$ in., not tapering to the pedicel. *Seeds* subspherical, distinctly trigonous.

VAR. *minuta*; 1-2 in. high, leaves and flowers smaller.—Sikkim Terai; Phansidowa, Clarke. Both *L. terminalis* and its var. *minuta* have probably been passed by collectors for *Cephalostigma*, which they simulate closely.

4. ***L. Griffithii***, H. f. & T. in *Journ. Linn. Soc.* ii. 28, glabrous, erect, leaves few small oblong sessile, pedicels longer than the leaves. *Kurz in Journ. As. Soc.* 1877, ii. 211. *L. dopatrioides*, *Kurz in Flora*, 1872, 302; in *Journ. As. Soc.* 1870, 77, excl. syn. *Griff.*

BIRMA; Mergui, *Griffith*; Tavoy, *Parish*; Martaban, *Brandis*; Arracan, *Kurz*.

Stems annual, 3-12 in., weak, thickened below, divided upwards, sparingly leafy or nearly naked. *Leaves* $\frac{1}{2}$ by $\frac{1}{6}$ in., entire or sparingly toothed. *Corolla* $\frac{1}{4}$ - $\frac{1}{2}$ in. *Capsule* $\frac{1}{8}$ - $\frac{1}{6}$ in., nearly orbicular. *Seeds* ellipsoid, distinctly trigonous.—Kurz's notes on this plant are misleading. He assumes from its locality that it must have been *Griffith's* n. 429 (Notul. iv. 281), and hence tries to make his diagnosis square with *Griffith's* description which refers to *L. trigona*, Roxb.

5. ***L. microcarpa***, Clarke; glabrous, erect, leaves elliptic-oblong sub-orbicular sessile lower ovate upper linear, pedicels longer than the leaves, capsule small, calyx-teeth filiform.

TENASSERIM or ANDAMANS; *Helper* (Kew Distrib. n. 3447). MOULMEIN; *Lobb*. DISTRIB. Java.

Annual, 3-5 in. high, branching. Lower leaves $\frac{1}{3}$ - $\frac{1}{2}$ in. diam., crenate-dentate; upper leaves $\frac{1}{6}$ in., linear, bracteiform. *Pedicels* $\frac{1}{4}$ - $\frac{3}{4}$ in. *Corolla* less than $\frac{1}{6}$ in. *Capsule* $\frac{1}{10}$ in., subspherical. *Seeds* subspherical, distinctly trigonous.—Near *L. chinensis*, Lour., which has a longer capsule with broader calyx-teeth, and the upper leaves much less reduced.

†† *Seeds ellipsoid, more or less compressed.*

6. ***L. trialata***, *Hann. in Don Prodr.* 157; glabrous, stem suberect branched, leaves subsessile ovate or elliptic, pedicels mostly equalling the leaves, seeds obtuse compressed. *A. DC. Prodr.* vii. 360. *L. micrantha*, *Hook. Exot. Fl.* i. t. 44, *not of Kunth*. *L. subincisa*, *Wall. Cat.* 1310; *A. DC. l.c.* 367. *L. arenarioides*, *A. DC. l.c.* *L. subracemosa*, *Miq. Fl. Ind. Bat.* ii. 576. *L. trigona*, *H. f. & T. in Journ. Linn. Soc.* ii. 27, *partly*; *Kurz in Journ. As. Soc.* 1877, pt. ii. 211, *not of Roxb.* *L. umbrosa*, *Hochst.*; *Hemsl. in Oliv. Fl. Tro. Afr.* iii. 463. *Rapuntium trialatum* and *arenarioides*, *Presl Prodr. Lobel.* 13, 17.

NORTHERN INDIA; from Chumba and Bombay to Bhotan and Pegu, alt. 0-5000 ft., very common.—DISTRIB. Mts. of Ara, Java, Abyssinia.

Stems 6-15 in., trigonous, often trialate. *Leaves* $\frac{1}{4}$ -1 in., subrhomboidal, narrowed at the base, the lower sometimes petioled, crenate or denticulate. *Corolla* $\frac{1}{2}$ in. *Capsule* $\frac{1}{2}$ - $\frac{1}{3}$ in., much narrowed into the pedicel.—This has been much confused with *L. trigona*, *Roxb.*, from which it essentially differs in the seeds; it can be generally recognised by the capsules being lanceolate-triangular (not ovate) at the base.

VAR. *lamifolia*; leaves incise-dentate somewhat petioled.—Deccan, *Wight*.—This was marked *L. trialata* by *Wight*, and it appears to be a Deccan form of that species; but from the deeply incised leaves it looks very different and resembles the allied Tropical African species.

7. ***L. zeylanica***, *Linn. Sp. Pl.* 1323, *not of Wall.*; stems elongate, leaves oblong or narrowly rhomboid narrowed at the base sessile subdecurent, pedicels about as long as the leaves, seeds obtuse scarcely compressed. *L. decurrens*, *Roth Nov. Sp.* 145. *L. Heyniana*, *Roem. & Sch. Syst.* v. 50. *L. dichotoma*, *Miq. Fl. Ind. Bat.* ii. 576. *L. trigona*, *Thwaites Enum.* 169, *chiefly*. *L. alata*, *Heyne in Herb. Rottler.* *L. Sebae*, *A. DC. Prodr.* viii. 386.

MALABAR; from Bombay to Travancore, CEYLON, apparently common.

Stems weak, usually elongate, 9-15 in., little branched, bialate or somewhat trigonous. *Leaves* $1\frac{1}{4}$ by $\frac{1}{2}$ in., denticulate or crenate. *Corolla* $\frac{1}{4}$ - $\frac{1}{2}$ in. *Capsule* $\frac{1}{2}$ by $\frac{1}{2}$ in., base not acute.—*Linnæus'* excellent specimen of this species is named *L. zeylanica* by his own hand; but the name has been altered (erroneously) by Sir J. E. Smith to *L. anceps*, an Australian species. The stems, leaves and calyx-teeth are glabrous or obscurely ciliate; but in a fine specimen collected by *Beddome* in Travancore, the leaves glisten with needle-like hairs beneath. *A. DC.* says that his *L. Sebae*, from Ceylon, is not *L. zeylanica*, *Linn.*; but the picture (*Seba Thes.* t. 22, fig. 12), which is the only authority for the species, suits some of the examples of *L. zeylanica* as well as can be expected.

VAR. *Walkerii*; leaves petioled ovate glabrous.—Ceylon, *Walker, Wight*.—This looks distinct from *L. zeylanica*, but the flowers and seeds are exactly similar.

SECT. II. ***Isolobus***. Small herbs. *Corolla* 2-lipped, lobes nearly equal in length. *Anthers* 5, 2 lower bearded on the apex, 3 upper naked.

8. ***L. radicans***, *Thunb. in Trans. Linn. Soc.* ii. 330; procumbent, glabrous, leaves linear- or oblong-lanceolate remotely toothed or subentire, pedicels equalling or longer than the leaves. *Roxb. Hort. Beng.* 16, and *Fl. Ind.* i. 507; *Wall. Cat.* 1308. *L. campanuloides*, *Thunb. in Trans. Linn. Soc.* ii. 331. *L. caespitosa*, *Blume Bijdr.* 729; *A. DC. Prodr.* vii. 366. *Rapuntium caespitosum*, *radicans* and *campanuloides*, *Presl Prodr. Lobel.* 13, 14. *Isolobus campanuloides* and *radicans*, *A. DC. l.c.* 353. *L. Roxburghianus*, *A. DC. l.c.* 353; *H. f. & T. in Journ. Linn. Soc.* ii. 27. *Pratia radicans* and *Thunbergii*, *G. Don Gen. Syst.* iii. 700.

KHASIA MTS; alt. 3-5000 ft.—DISTRIB. Java, S. China, Japan.

Leaves $\frac{1}{2}$ -1 by $\frac{1}{10}$ - $\frac{1}{4}$ in., sessile, often bifarious. *Corolla* $\frac{1}{2}$ - $\frac{1}{2}$ in., tube glabrous or

obscurely pubescent, green with pink marks, a green gland on each side the central lobe at its base. Two lower filaments hairy. Capsule $\frac{1}{4}$ by $\frac{1}{10}$ in., base acute. Seeds ellipsoid, slightly compressed.—The lobes of the corolla are subequal, but its structure differs in no wise from that of the section *Holopogon*, in which Benth. (in Gen. Pl. ii. 553) appears to include this species.

SECT. III. **Rhyncopetalum**. Tall, sometimes very tall, herbs. Leaves 2–12 in. Flowers in terminal racemes, the upper leaves reduced bracteiform. Anthers 5, 2 lower usually bearded, 3 upper usually naked.

* *Species of North India.*

9. **L. colorata**, Wall. Pl. As. Rar. ii. 42, not of Sweet; stem simple above or with a few long ascending branches, raceme lax rhachis subglabrous, cauline leaves linear-lanceolate glabrous beneath. A. DC. Prodr. vii. 380; H. f. & T. in Journ. Linn. Soc. ii. 28. L. purpurascens, Wall. Cat. 1807, not of R. Br. L. Wallichii, Steud. Rapuntium coloratum, Presl Prodr. Lobel. 24.

KHASIA Mts.; alt. 3–5500 ft., common.

Erect, 1–3 ft., nearly glabrous. Radical leaves elliptic, petioled, pilose above at least when young; cauline 4–5 by $\frac{1}{2}$ in., narrowed at base, gland-crenulate, glabrous or nearly so. Peduncles $\frac{1}{4}$ in., nearly glabrous. Calyx-teeth sublinear, minutely gland-toothed, sometimes $\frac{3}{5}$ in., sometimes even shorter than in the next species. Corolla $\frac{3}{4}$ in., purple, sometimes white. Anthers sparsely pilose on the backs, 2 lower bearded at the tips. Capsule $\frac{1}{4}$ in., subglobose, glabrous. Seeds ellipsoid, compressed, not margined.

10. **L. erecta**, H. f. & T. in Journ. Linn. Soc. ii. 28; stem simple above, leaves elliptic or oblong narrowed at both ends pubescent beneath on the nerves, raceme somewhat rigid, rhachis with many deflexed white hairs.

ALPINE SIKKIM; alt. 10–12,000 ft., J. D. H., C. B. Clarke.

Stem 1–3 ft., always simple, somewhat rigid. Leaves 4 by $1\frac{1}{2}$ in., subpetioled, obscurely crenate-toothed. Peduncles $\frac{1}{2}$ in., hairy. Calyx-teeth $\frac{1}{2}$ in., linear-lanceolate, minutely gland-toothed. Corolla $\frac{1}{2}$ – $\frac{3}{4}$ in., purple. Anthers obscurely pilose on the backs, 2 lower bearded at the tips. Capsule $\frac{1}{2}$ in., subglobose, pilose or finally glabrescent. Seeds ellipsoid, compressed, not margined.—Closely allied to *L. colorata*.

11. **L. mishmica**, Clarke; stem much branched upwards, upper leaves elliptic subpetioled pilose on both surfaces, racemes elongate leafy pilose. *Lobelia* sp., Griff. Journ. 39.

MISHMI Mts.; at Premsong s, Griffith (Kew Distrib. n. 3446).

Inflorescence (the only part seen) 15 in., much paniculately branched, branches long-racemed with capsules. Leaves (of inflorescence alone seen) 1 by $\frac{1}{2}$ – $\frac{3}{4}$ in., obscurely crenate-dentate (the lower were doubtless much larger). Peduncles $\frac{1}{4}$ in., hairy. Calyx-teeth $\frac{1}{4}$ – $\frac{1}{2}$ in., linear-lanceolate, minutely gland-toothed. Corolla purple-red (Griffith). Capsule $\frac{1}{4}$ in., subglobose, hairy. Seeds ellipsoid, somewhat compressed, minute, not margined.—The material is imperfect, but evidently represents a new species.

12. **L. pyramidalis**, Wall. in As. Research. xiii. 376; stem widely branched upwards glabrous, leaves linear-lanceolate finely serrulate glabrous above, racemes many-flowered dense upwards. Wall. Cat. 1802, and in Roxb. Fl. Ind. ed. Carey & Wall. ii. 113; Don Prodr. 157; Bot. Mag. t. 2387; A. DC. Prodr. vii. 381; H. f. & T. in Journ. Linn. Soc. ii. 29. L. Wallichiana, H. f. & T. in Journ. Linn. Soc. ii. 29; Kurz in Journ. As. Soc. 1877, pt. ii. 211. Rapuntium pyramidale and Wallichianum, Presl Prodr. Lobel. 23, 24.

HIMALAYA; common from Gurwhal, eastward, alt. 3–9000 ft.; KHASIA Mts. and PEGU.—DISTRIB. N. Birmā, S. China.

Stem 2-7 ft. *Leaves* 6 by $1\frac{1}{2}$ in., upper sessile, beneath glabrous or pubescent on the nerves. *Peduncles* $\frac{1}{2}$ - $\frac{3}{4}$ in., glabrous or shortly pubescent. *Calyx-teeth* $\frac{1}{2}$ - $\frac{3}{4}$ in., linear, glabrous or pubescent. *Corolla* $\frac{3}{4}$ -1 in., purple-rose, sometimes nearly white. *Anthers* pilose on the back, rarely nearly glabrous, 2 lower usually with 1 or more bristles on the tips. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., subglobose, glabrous or pubescent. *Seeds* ellipsoid, compressed, margined on one side.

13. **L. rosea**, Wall. *Pl. As. Rar.* ii. 42, t. 152; stem with horizontal branches upwards softly pilose, leaves narrowly lanceolate velvety above, peduncles crowded racemose scarcely longer than the capsules. Wall. *Cat.* 1303, and in Roxb. *Fl. Ind. ed.* Carey & Wall. ii. 115; A. DC. *Prodr.* vii. 381; H. f. & T. in *Journ. Linn. Soc.* ii. 29, excl. syn.; Kurz in *Journ. As. Soc.* 1877, ii. 212.

SUBTROPICAL HIMALAYA; from Kumaon to Bhotan and the KHASIA MTS., alt. 0-4000 ft., abundant in the Terai of North Bengal and Assam. MARTABAN, Kurz.—DISTRIB. AVA.

Stem 4-12 ft., suberect, branches short, horizontal with drooping tips; flowers crowded. *Leaves* 6 by 1 in., narrowed at both ends, subsessile, minutely toothed. *Peduncles* $\frac{1}{4}$ in., rarely $\frac{1}{2}$ in., softly pilose, often recurved. *Calyx-tube* pilose, teeth linear minutely toothed. *Corolla* $\frac{3}{4}$ in., rose or white. *Anthers* usually very hairy on the backs, tips of 2 lower bearded. *Capsule* $\frac{1}{2}$ in. diam., subglobose. *Seeds* ellipsoid, compressed, not (or most obscurely) margined.—The Deccan plants formerly referred here have the leaves glabrous above, the peduncles 2-4 times as long as the capsules.

** *Species of the Deccan Peninsula and Ceylon.*

14. **L. nicotianæfolia**, Heyne in Roth *Nov. Sp.* 143; stem tall usually branched upwards somewhat pubescent or glabrate, leaves lanceolate sparingly pilose or glabrescent, anthers glabrous on the back rarely a little hairy. Wall. *Cat.* 1304, and in Roxb. *Fl. Ind. ed.* Carey & Wall. ii. 110; A. DC. *Prodr.* vii. 381; Wight *Ill.* t. 135; Dalz. & Gibs. *Bomb. Fl.* 133; H. f. & T. in *Journ. Linn. Soc.* ii. 29. *Rapuntium nicotianæfolium*, Presl *Prodr. Lobel.* 24.

MALABAR; on the Ghats, alt. 3-7000 ft., from Bombay to Travancore, frequent, and in Ceylon.

Stem 5-12 ft., erect, thick, hollow below, usually branched at the top or the inflorescence compound, glabrescent below, more or less pilose upwards. *Leaves* narrowly obovate-lanceolate, lower often 12 by 2 in., upper gradually smaller, subsessile, serrulate, herbaceous, glabrous or nearly so above, pilose or glabrous beneath. *Racemes* dense, more or less pubescent; peduncles $\frac{1}{2}$ -1 in. and upwards. *Calyx-tube* glabrous or pubescent; teeth $\frac{1}{2}$ in., linear, gland-denticulate. *Corolla* $\frac{3}{4}$ -1 $\frac{1}{4}$ in., glabrous or pubescent. *Capsule* $\frac{1}{2}$ in. diam., subglobose. *Seeds* ellipsoid, compressed, not margined.

VAR. *trichandra*; anthers with many white hairs spreading from their backs. L. *trichandra*, Wight *Ic.* t. 1171.—Nilgherry Mts., Wight.—Usually more slender, more glabrous, and with thinner racemes than *L. nicotianæfolia*; but Wight could not distinguish it, still less can Thwaites, who (Enum. Pl. Zeyl. 170) further unites *L. excelsa*.

15. **L. excelsa**, Leschen.; Wall. in Roxb. *Fl. Ind. ed.* Carey & Wall. ii. 114, not of Bonpl.; stem tall usually simple softly villous upwards, leaves lanceolate villous rugose, spike dense, anthers usually glabrous on the back. Wall. *Cat.* 1305, and Pl. As. Rar. ii. 42; A. DC. *Prodr.* vii. 381; Wight *Ic.* tt. 1173-4; H. f. & T. in *Journ. Linn. Soc.* ii. 29. *L. aromatica*, Moon *Cat. Pl. Ceyl.* 14; Wight. *Ic.* t. 1172; H. f. & T. in *Journ. Linn. Soc.* ii. 29. *Rapuntium Leschenaultianum*, Presl *Prodr. Lobel.* 24.

Mts. of SOUTHERN INDIA and CEYLON; alt. 3-8000 ft., common.

Very near *L. nicotianæfolia*, and regarded as a form of it by Thwaites. From the biennial dense tuft of radical leaves a foot long rises the stout coarse flowering stem,

often 15 ft. long, ending in a dense hairy spike, usually simple, though sometimes divided. The leaves are thicker, more villous than those of *L. nicotianæfolia*, the corolla often very hairy without. The milk of both species is intensely acrid.

DOUBTFUL SPECIES.

16. *L. ? PUMILA*, *A. DC. Prodr.* vii. 360; founded entirely on *Burm. Fl. Ind.* 186, t. 60, fig. 3, a small *Lobelia*-like plant, from Coromandel, but with opposite lanceolate leaves.

3 **CEPHALOSTIGMA**, *A. DC.*

Small, erect, branched herbs, sparsely patently hairy. *Leaves* alternate, subsessile, margin thickened entire waved or crisped. *Flowers* small, racemed or panicked; upper bracts often very small and pedicels filiform. *Calyx* superior; limb 5-partite. *Corolla* deeply 5-fid; segments linear-lanceolate, spreading stellately, blue or whitish. *Ovary* subglobose, 2-3-celled. *Style* cylindric; stigma shortly obtusely 3-lobed. *Capsule* loculicidally 2-3-valved within the persistent calyx-teeth. *Seeds* very many, small, ellipsoid, compressed or trigonous.—Species 9, 5 Indian, 3 Tropical African, 1 Brazilian.

* *Seeds oblong-ellipsoid, compressed, not trigonous.*

1. **C. Schimperl**, *Hochst.*; *A. Rich. Fl. Abyss.* ii. 2; stem erect with numerous horizontal branches above, leaves oblong and elliptic acute margins undulate crisped recurved. *C. hirsutum*, *H. f. & T. in Journ. Linn. Soc.* ii. 9, partly; *Dalz. & Gibs. Bomb. Fl.* 133; *Vatke in Linnæa*, xxxviii. (1874), 699; *Hemsl. in Oliver Fl. Trop. Afr.* iii. 472, not of *Edgew.* *Wahlenbergia perotifolia*, *W. & A. Prodr.* 405; *A. DC. Prodr.* vii. 434; *Wight Ic.* t. 842. *Dentella erecta*, *Roth Nov. Sp.* 140.

Throughout the DECCAN; from Ceylon to Rajpootana and Chota Nagpore; common. KHASIA and JAINTEA; alt. 2-5000 ft., common. CEYLON.—DISTRIB. E. Africa.

Erect 4-15 in., patently pilose, the main stem simple nearly to the top of the plant. *Leaves* $\frac{3}{4}$ by $\frac{1}{4}$ - $\frac{3}{8}$ in., narrowed at both ends, subsessile, sparsely patently pilose or glabrescent. *Pedicels* $\frac{1}{4}$ - $\frac{3}{8}$ in., rarely longer. *Calyx-tube* patently pilose, lobes $\frac{1}{12}$ in., linear-lanceolate, nearly glabrous. *Corolla* $\frac{1}{8}$ in., bluish. *Capsule* $\frac{1}{10}$ in. diam., subglobose or obovoid. *Seeds* much longer than broad.

2. **C. flexuosum**, *H. f. & T. in Journ. Linn. Soc.* ii. 9; stem erect flexuose repeatedly dichotomous with ascending branches, leaves sessile ovate and elliptic narrowed at both ends subobtuse thin. *Dalz. & Gibs. Bomb. Fl.* 133.

MALABAR; CONCAN, *Dalzell, Stocks*. Bababoodun hills, *Law*.

Very closely allied to *C. Schimperl*, but instead of the rigid crisped habit, it is flexuose with thin leaves and much longer capillary pedicels, as though it were *C. Schimperl* growing in a moist shady place; calyx-teeth larger, $\frac{1}{8}$ - $\frac{1}{6}$ in.

** *Seeds trigonous.*

3. **C. paniculatum**, *A. DC. Prodr.* vii. 421; stem repeatedly dividing upwards, leaves oblong narrowed at both ends, panicles loose, pedicels capillary, calyx glabrous, teeth linear. *H. f. & T. in Journ. Linn. Soc.* ii. 9; *Kurz in Journ. As. Soc.* 1877, pt. ii. 210. *Campanula paniculata*, *Wall. Cat.* 1295 A. B.

BIRMA; Prome, *Wallich*.

Stem 15 in., sparsely pubescent. *Leaves* 2 by $\frac{2}{3}$ in., sessile, obscurely crenate, nearly glabrous. *Panicle* nearly naked; upper bracts linear, minute. *Calyx-teeth* $\frac{1}{8}$ in. *Corolla* $\frac{1}{6}$ - $\frac{1}{4}$ in., bright blue. *Capsule* $\frac{1}{8}$ in., shortly obconic, valves forming a cone as long as the inferior portion of the capsule. *Seeds* lanceolate-ellipsoid, distinctly trigonous.

4. **C. hirsutum**, *Edgew. in Trans. Linn. Soc. xx. 81*; stem erect divided upwards, leaves elliptic narrowed at both ends, calyx patently pilose, teeth lanceolate-linear. *H. f. & T. in Journ. Linn. Soc. ii. 9, in part, excl. all syn.* *C. anagalloides*, *Royle Ill. 253, name only.* *C. paniculata*, *Wall. Cat. 1295 C.*

WESTERN HIMALAYA; alt. 2-5000 ft., from Kashmir to Kumaon, frequent, *Falconer, Edgeworth, &c.* BEHAR; Parasnath, alt. 4000 ft., *J. D. H., Kurz.*

Stem 1-5 in., somewhat rigid, patently pilose, the branches ascending. *Leaves* $\frac{1}{2}$ -1 by $\frac{1}{2}$ - $\frac{3}{4}$ in., margin crisped waved or subcrenulate, patently pilose. *Panicle* small; upper bracts very small; pedicels $\frac{1}{2}$ - $\frac{1}{2}$ in. *Calyx-teeth* $\frac{1}{10}$ in., pilose. *Corolla* $\frac{1}{4}$ in., blue. *Capsule* $\frac{1}{10}$ in. diam., subglobose. *Seeds* shortly ellipsoid, trigonous.—A much smaller, more rigid and hairy plant than *C. paniculatum*, with smaller flowers; but perhaps not specifically distinct. It is readily separated from *C. Schimper* by the seeds, which *Kurz* could not have compared when he suggested (*Journ. As. Soc. 1877, pt. ii. 210*) that *H. f. & T.* were in error. *Wallich's n. 1295 C.* was not collected in Birma with the rest of *n. 1295*, but came from *Herb. Wight*.

5. **C. Hookeri**, *Clarke*; stem erect dichotomously branched upwards, leaves elliptic narrowed at both ends, calyx-teeth shortly triangular glabrous. *Cephalostigma* nov. sp., *Herb. Ind. Or. H. f. & T.*

BEHAR; Parasnath, alt. 4000 ft., *J. D. H., Clarke, Watt.* KHASIA Mts.; from the Garos to the Nagas, alt. 4000 ft., very common.

Stem 3-8 in., patently pilose. *Leaves* $\frac{3}{4}$ - $\frac{1}{2}$ in., hardly acute, often minutely crenate, sometimes subpetioled, sparsely pilose. *Panicles* terminal, often nearly naked; bracts most minute, linear. *Calyx* nearly glabrous; teeth $\frac{1}{16}$ in. long. *Corolla* $\frac{1}{10}$ in., blue. *Capsule* $\frac{1}{10}$ in. diam., subglobose. *Seeds* shortly ellipsoid.—The Parasnath examples have the stem erect, simple, with some larger leaves clustered almost in a whorl at the base of the panicle. The Khasian examples have the stem stouter, flexuose, more hairy, branched from the base, and the leaves have no tendency to a whorl.

4. **WAHLENBERGIA**, *Schrad.*

Annual or perennial herbs. *Leaves* alternate or opposite. *Peduncles* terminal or leaf-opposed, paniced. *Calyx* superior, limb 5-partite. *Corolla* campanulate, 5-lobed, sometimes to the base. *Stamens* free from the corolla; filaments often dilated near the base; anthers oblong, free. *Ovary* turbinate, 2-3-celled. *Style* cylindric; stigma (in the Indian species) of 3 narrow lobes. *Capsule* erect, 2-3-celled, loculicidally 2-3 valved within the persistent calyx-teeth. *Seeds* very many, small.—DISTRIB. Species 80, chiefly in the southern hemisphere, a few tropical, 1 European.

1. **W. gracilis**, *DC. Prodr. vii. 433, not of E. Meyer*; leaves from linear to obovate-oblong more or less toothed, peduncles terminal subpaniced, calyx-teeth short linear erect in fruit. *Kurz in Journ. As. Soc. 1877, pt. ii. 209.* *W. agrestis*, *A. DC. Prodr. vii. 434*; *Wight Ic. t. 1175*; *H. f. & T. in Journ. Linn. Soc. ii. 21*; *Dalz. & Gibs. Bomb. Fl. 134.* *W. indica*, *A. DC. l. c.*; *Wight Ic. t. 1176.* *W. dehiscens*, *Sieberi*, marginata, *lavandulæfolia* and *quadrifida*, *A. DC. Prodr. vii. 433, 434.* *Campanula agrestis*, *Wall. Cat. 1292*, and in *Roxb. Fl. Ind. ed. Carey & Wall. ii. 97.* *C. dehiscens*, *Roxb. Hort. Beng. 85*, and *Fl. Ind. i. 504*; *Wall. Cat. 1294*, and in *As. Research. xii. 571*, with fig. *C. marginata*, *Thunb. Fl. Jap. 89*, and *Pl. Jap. Dec. iii. Ic. 4.* *C. lavandulæfolia*, *Reinw. in Blume Bijdr. 725.* *Lightfootia gracilis*, *Miq. Fl. Ind. Bat. ii. 567.*

Throughout INDIA; alt. 0-7000 ft., a common weed.—DISTRIB. E. Asia, Australia, New Zealand, S. Africa.

Erect or decumbent, simple or divaricately, branched from the base, 4-24 in. high, glabrous or hairy, or more hairy below, glabrous above. *Leaves* $\frac{1}{2}$ -2 $\frac{1}{2}$ by $\frac{1}{2}$ - $\frac{1}{2}$ in., margin often thickened or undulate. *Peduncles* 1-8 in., glabrous or nearly so; upper bracts linear, small. *Calyx-teeth* $\frac{1}{12}$ - $\frac{1}{6}$ in., linear from a triangular base, glabrous.

Corolla $\frac{1}{2}$ – $\frac{3}{4}$ in., campanulate, deeply divided into broad oblong lobes, blue. *Capsule* $\frac{1}{4}$ in., tapering into the peduncle. *Seeds* ellipsoid, compressed, sublenticular, smooth.—*W. agrestis* is nearly glabrous with linear leaves; *W. indica* has even the uppermost leaves very hairy; *W. dehiscens* is a weak small annual with broad obovate petioled thin leaves; *W. marginata* has the leaves with white thickened margins and a rigid habit. Some examples (in flower) are of the first year; other examples have a very woody base whence spring numerous annual shoots.

2. ***W. peduncularis***, *H. f. & T. in Journ. Linn. Soc.* ii. 22; glabrous, leaves elliptic subentire, peduncles solitary axillary leaf-opposed, calyx-teeth oblong herbaceous lax in fruit. *Campanula*? *peduncularis*, *Wall. Cat.* 7139; *A. DC. Prodr.* vii. 483.

KUMAON; *Blinkworth*; Chaur, alt. 6700 ft., *Strachey & Winterbottom*.

Stems 3–8 in., weak, little divided. *Leaves* opposite or (especially the upper) alternate, $\frac{1}{2}$ – $\frac{1}{2}$ by $\frac{1}{4}$ in., shortly petioled. *Peduncles* $\frac{1}{2}$ –2 in. *Corolla* $\frac{1}{2}$ in., divided nearly to the base into narrow oblong segments. *Filaments* dilated, pilose below. *Stigmas* 3, linear-oblong. *Capsule* $\frac{1}{2}$ in., tapering into the peduncle. *Calyx-teeth* $\frac{1}{2}$ – $\frac{1}{2}$ in., oblong from a triangular base. *Seeds* ellipsoid, slightly compressed, smooth.—The leaves beneath and the calyx-tube are somewhat glaucous.

3. ***W. ? dicentrifolia***, *Clarke*; glabrous, leaves ovate subentire, peduncles terminal, calyx-teeth linear erect on the fruit.

SIKKIM; Phullot, alt. 11,000 ft., *Clarke*.

Erect, 1 ft., much and patently branched. *Leaves* $\frac{1}{2}$ – $\frac{1}{2}$ in. diam., glaucous beneath; petiole $\frac{1}{8}$ in. *Peduncles* 1 in., thickened upwards in fruit. *Calyx-teeth* $\frac{1}{4}$ – $\frac{1}{4}$ by $\frac{1}{10}$ in. *Stamens* 5, free; filaments dilated at the base. *Capsule* $\frac{1}{2}$ by $\frac{1}{2}$ in., horizontal or cernuous, elongate-obconic, tapering into the peduncle, 3-celled, prominently 10-ribbed; conical superior beak $\frac{1}{4}$ in., loculicidally 3-valved. *Seeds* oblong-ellipsoid much compressed, without a trace of the reticulation of the testa seen in *Codonopsis*.—The examples are good, but in late fruit; the corolla appears to have been lobed nearly to the base. The species is exceedingly like *Codonopsis thalictrifolia*, *Wall.*, and the long superior conical beak of the capsule also is very like *Codonopsis*, but the elongate obconic capsule and the seeds are very different.

5. **LEPTOCODON**, *H. f. & T. (not of Sond.)*.

A slender, glabrous twiner. *Leaves* alternate and opposite, long-petioled, ovate, membranous. *Peduncles* terminal and leaf-opposed, slender, 1-flowered. *Calyx* $\frac{1}{2}$ -inferior; limb 5-lobed to the base. *Corolla* tubular, curved, inflated upwards, truncate, shortly 5-lobed, blue. *Stamens* 5, free from the corolla, alternate with 5 clavate epigynous glands; filaments dilated at the base; anthers oblong, free. *Ovary* $\frac{1}{2}$ -inferior, obconic, 3-celled, conical upwards. *Style* long, cylindric; stigma ovate, hairy, of 3 suberect oblong lobes. *Capsule* a double cone; the upper free cone elongate, loculicidally 3-valved. *Seeds* few, oblong-ellipsoid, somewhat compressed, smooth, shining black.

1. ***L. gracilis***, *H. f. & T. in Journ. Linn. Soc.* ii. 17. *Codonopsis gracilis*, *Hook. f. Ill. Him. Pl.* t. 16, fig. A.

SIKKIM; Lachen and Lachoong, alt. 6–9000 ft., *J. D. H.*

Leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., undulate-crenate; petiole $\frac{1}{2}$ –1 in. *Calyx-lobes* $\frac{1}{2}$ in., linear-oblong, herbaceous. *Corolla* 1– $1\frac{1}{2}$ in., mouth $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. *Capsule* $\frac{3}{4}$ by $\frac{1}{4}$ in.; the superior portion longer than the inferior.

6. **CODONOPSIS**, *Wall.*

Perennial herbs; twiners from a tuberous root, or suberect from a fibrous root. *Leaves* alternate or subopposite, petioled. *Peduncles* axillary or terminal, 1-flowered. *Flowers* conspicuous, green, blue, yellowish or lurid, often purple-

veined, 5- rarely 4-6-merous. *Calyx* superior; lobes 5, long, foliaceous. *Corolla* campanulate, shortly 5-lobed. *Stamens* 5, free, inserted on the margin of an epigynous disc; filaments somewhat dilated at the base; anthers oblong, free. *Ovary* at first inferior, turbinate, with a short conic superior vertex, 3-celled; style cylindric, stigma of 3 ovate or oblong lobes. *Capsule* somewhat fleshy, ultimately dry; beak elongated in fruit, loculicidally 3-valved. *Seeds* very many, small, ellipsoid, slightly compressed, smooth, brown.—Species 12, in the Himalaya, Yunnan, Mantschuria, and Japan.

In the Genera Plantarum the ovary and stigma-lobes are described as sometimes 5-4, of which no instances have been found in the Indian species.

1. **C. viridis**, Wall. Cat. 1298, and in Roxb. Fl. Ind. ed. Carey & Wall. ii. 103; stem twining, leaves elliptic-oblong from a rhomboidal or truncate base densely pilose beneath, peduncles axillary minutely puberous, calyx-teeth distant linear, corolla in bud densely pilose. H. f. & T. in Journ. Linn. Soc. ii. 12. Wahlenbergia viridis, A. DC. Prodr. vii. 424. Campanula viridis, Spreng. Cura post. 78.

NIPAL and KUMAON, alt. 7000 ft., Wallich, &c.

Leaves 2-3 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., opposite and alternate, base obtuse or slightly rounded but not cordate, subentire, minutely pilose above, at least when young; petiole $\frac{1}{2}$ in. Peduncles 2 in. Calyx-teeth $\frac{1}{2}$ - $\frac{3}{4}$ by $\frac{1}{8}$ in., not (or very obscurely) widened upwards, pilose on both surfaces. Corolla 1 by $\frac{3}{4}$ in., lurid yellow. Capsule hemispheric, $\frac{1}{2}$ - $\frac{3}{4}$ in. broad; beak $\frac{1}{2}$ in. long. Testa with very small and obscure reticulations, even under the microscope, so that the seed does not "glisten" under an ordinary pocket-lens.

2. **C. Griffithii**, Clarke; stem twining, leaves elliptic-oblong from a rhomboidal or truncate base densely pilose beneath, calyx-teeth distant linear broader upwards, peduncles axillary patently pubescent, corolla in bud glaucous Codonopsis sp. 3, Griff. Notul. iv. 281, Ic. Pl. Asiat. t. 482.

KHASIA MTS., alt. 4-5000 ft., Griffith, &c.

Altogether resembling *C. viridis*, under which it is included by H. f. & T., and of which it may be a geographic variety. The leaves are more hairy, the petioles have crisped or patent hairs, while the young corolla without is glabrous or with a few long white hairs near the top; the testa is much more coarsely and prominently reticulate, so that the seeds glisten under a pocket-lens.

3. **C. affinis**, H. f. & T. in Journ. Linn. Soc. ii. 12; stem twining, leaves ovate-oblong from a deeply cordate base villous beneath, peduncles axillary and terminal, calyx-teeth distant narrowly oblong.

SIKKIM HIMALAYA, alt. 11,000 ft., J. D. H., Clarke.

Leaves 2-4 by 1-2 $\frac{1}{2}$ in., opposite and alternate, subentire, sparsely pilose above, at least when young; petiole $\frac{1}{2}$ -2 in. Peduncles 1-5 in., often dichotomous with a bractiform leaf, so that the inflorescence appears of few-flowered racemes. Calyx-teeth $\frac{1}{2}$ by $\frac{1}{8}$ in., narrower upwards, pilose on both surfaces. Corolla $\frac{3}{4}$ in. long and broad, green with purple marks. Capsule hemispheric, $\frac{1}{2}$ in. broad; beak $\frac{1}{2}$ in. long. Seeds not glistening under the lens, i.e. the reticulations of the testa are very small, not prominent.

VAR. *birmanica*; leaves sparsely pilose beneath, calyx-lobes elliptic-acute.—Birma Griffith (Kew Distrib. n. 34399.—An imperfect fruiting example, referred by H. f. & T. doubtfully to *C. affinis*, which the calyx-lobes hardly admit. It is probably a new species.

4. **C. purpurea**, Wall. Cat. 1299, and in Roxb. Fl. Ind. ed. Carey & Wall ii. 105; glabrous, stem diffuse, leaves opposite elliptic-oblong subentire base rhomboid or truncate, peduncles axillary and terminal, calyx-teeth approximate

triangular ovate. *H. f. & T. in Journ. Linn. Soc.* ii. 12. *Wahlenbergia purpurea*, *A. DC. Prodr.* vii. 425. *Campanula purpurea*, *Spreng. Cura post.* 78.

NIPAL; Gossain-than, *Wallich*. KUMAON; Lohulhat, alt. 6000 ft., *Strachey & Winterbottom*.

Rambling or subscandent, not twining. *Leaves* $2\frac{1}{2}$ by $1-1\frac{1}{2}$ in., all opposite or peduncle-opposed, sometimes obscurely rounded at the base, never cordate, glaucous beneath; petiole $\frac{1}{4}$ in. *Peduncles* $\frac{1}{2}-2$ in. *Calyx-teeth* $\frac{1}{2}$ by $\frac{1}{3}$ in, subacute, glaucous. *Corolla* 1 by $\frac{3}{4}$ in., purple. *Capsule* obconic or subhemispheric, $\frac{1}{2}$ in. broad; beak $\frac{1}{4}$ in. long. *Seeds* not glistening, i.e. testa very minutely reticulated.

5. **C. rotundifolia**, *Benth. in Royle Ill.* 254, t. 62; stem twining, leaves ovate from a rounded base crenate glabrous or sparsely pilose, calyx-teeth approximate elliptic, corolla widely campanulate, seeds $\frac{1}{16}$ in. oblong-ellipsoid. *Bot. Mag.* tt. 4942, 5018; *H. f. & T. in Journ. Linn. Soc.* ii. 14. *Wahlenbergia rotundifolia*, *A. DC. Prodr.* vii. 425.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 7-11,000 ft., common.

Leaves alternate, often 2 by $\frac{1}{4}$ in., very variable in size; petiole $\frac{3}{4}$ in. *Peduncles* 1-6 in., axillary and terminal. *Calyx-lobes* $\frac{3}{4}$ by $\frac{1}{4}-\frac{1}{2}$ in., often crenate or toothed. *Corolla* $\frac{3}{4}-1\frac{1}{4}$ by $\frac{3}{4}$ in., purple or lurid grey-blue. *Capsule* hemispheric, $\frac{1}{2}-\frac{3}{4}$ in. broad; beak $\frac{1}{4}$ in. *Seeds* minutely reticulate, not glistening, more than twice as large as those of *C. Benthami* and its allies.

6. **C. Benthami**, *H. f. & T. in Journ. Linn. Soc.* ii. 14; rambling or subscandent, leaves rhomboid-elliptic crenate pilose on both surfaces, calyx-teeth approximate ovate acute, corolla narrowly campanulate somewhat constricted in the middle, seeds short ellipsoid scarcely $\frac{1}{30}$ in. long.

SIKKIM HIMALAYA; Lachen, alt. 9000-11,000 ft., *J. D. H.*; Yakla, alt. 11,000 ft., *Clarke*.

Not twining. *Leaves* nearly as of *C. rotundifolia*, but less rounded at the base. *Corolla* $\frac{3}{4}-1$ by $\frac{1}{2}$ in., lurid purple-yellow. *Capsule* hemispheric, $\frac{1}{2}-\frac{1}{2}$ in. broad; beak nearly $\frac{1}{4}$ in. long. *Seeds* not glistening.—Separable from *C. rotundifolia* by the more woody, rambling, but not twining, stem, and by the seeds, which are less than $\frac{1}{6}$ th the volume.

7. **C. subsimplex**, *H. f. & T. in Journ. Linn. Soc.* ii. 16; suberect, leaves ovate from a rounded base crenate sparsely pilose, calyx-lobes approximate ovate, corolla broadly campanulate, seeds $\frac{1}{24}$ in. ellipsoid.

ALPINE SIKKIM; Lachen and Yeumtung, alt. 12-13,000 ft., *J. D. H.*; ridge between Sikkim and Nipal, alt. 11,000 ft., *Clarke*.

Stem 1-2 ft., branched. *Leaves* $1\frac{1}{4}-2$ by $\frac{3}{4}-1$ in., alternate and opposite, closely resembling those of *C. rotundifolia*; petiole $\frac{1}{2}$ in. *Peduncles* 1-4 in., terminal. *Calyx-lobes* $\frac{1}{2}$ by $\frac{1}{4}-\frac{1}{2}$ in., entire or slightly toothed. *Corolla* $\frac{3}{4}$ in. long and nearly as broad, lurid pale-blue. *Capsule* hemispheric, $\frac{1}{4}$ in. broad; beak $\frac{1}{2}-\frac{1}{4}$ in. long. *Seeds* not glistening, about $\frac{3}{4}$ the volume of those of *C. rotundifolia*, twice as large as those of *C. Benthami*.—This differs from *C. Benthami* chiefly by the shorter much broader corolla.

8. **C. thalictrifolia**, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 106; leaves small ovate or reniform pilose, peduncles long, calyx-lobes oblong, corolla narrow tubular with a widened mouth. *Benth. in Royle Ill.* 253; *H. f. & T. in Journ. Linn. Soc.* ii. 16. *Glossocomia thalictrifolia*, *Wall. Cat.* 1297. *G. tenera*, *Don Prodr.* 158. *Wahlenbergia thalictrifolia*, *DC. Prodr.* vii. 425. *Campanula thalictrifolia*, *Spreng. Cura post.* 77.

NIPAL; Gossain Than, *Wallich*.

Stems flexuose. *Leaves* $\frac{1}{6}-\frac{1}{4}$ in. diam., alternate and opposite, subentire, pilose on both surfaces; petiole $\frac{1}{2}$ in. *Peduncles* 2-6 in., terminal, laxly pubescent or glabrous.

Calyx-lobes $\frac{1}{2}$ by $\frac{1}{10}$ in., somewhat distant, minutely pubescent. *Corolla* 1 in. long, tube $\frac{1}{2}$ in. diam., mouth $\frac{1}{2}$ in. diam. *Capsule* subhemispheric.—This should perhaps be removed to *Leptocodon*.

9. **C. foetens**, H. f. & T. in *Journ. Linn. Soc.* ii. 16; leaves small ovate or reniform pilose, peduncles long, calyx-lobes elliptic-oblong, corolla globose-campanulate.

ALPINE SIKKIM; Samdong, Lachen, and Kangra Lama, alt. 14–16,000 ft., *J. D. H.*

Closely resembling *C. thalictrifolia* except as to the corolla. *Stems* 6 in., flexuose. *Leaves* $\frac{1}{4}$ – $\frac{1}{3}$ in. diam. *Peduncles* 3–6 in., terminal. *Calyx-lobes* $\frac{1}{3}$ by $\frac{1}{6}$ in., approximate at base, minutely pilose. *Corolla* 1 by $\frac{3}{4}$ in. *Capsule* depressed obconic, $\frac{1}{2}$ in. broad; beak nearly $\frac{1}{2}$ in. long, more than double the length of the portion of the capsule below it. *Seeds* ellipsoid, not glistening.—Separated doubtfully from *C. thalictrifolia* by H. f. & T., but the corolla is very different, and the calyx-teeth much broader at the base. It scarcely differs from *C. ovata* by the smaller leaves, more globose corolla (which from the dried example seems to have been lurid purple, not sky-blue), and smaller seeds.

10. **C. ovata**, Benth. in *Royle Ill.* 253, t. 69, fig. 3; leaves ovate hairy on both surfaces, peduncles long, calyx-lobes elliptic-oblong, corolla broadly campanulate, seeds narrowly ellipsoid $\frac{1}{8}$ in. long. *Lindl. in Gard. Chron.* 1856, 468, with fig.; H. f. & T. in *Journ. Linn. Soc.* ii. 15. *Wahlenbergia Roylei*, DC. *Prodr.* vii. 425.

WESTERN HIMALAYA; from Kashmir to Gurwhal, alt. 8–12,000 ft., common.

Root woody, fusiform, large. *Stem* 6–12 in., decumbent, then erect. *Leaves* $\frac{1}{4}$ – $\frac{3}{8}$ by $\frac{1}{8}$ – $\frac{1}{2}$ in., alternate and opposite, obtuse or acute; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in. *Peduncles* 3–6 in., terminal. *Calyx-lobes* $\frac{1}{3}$ by $\frac{1}{6}$ in., approximate at base, minutely pilose. *Corolla* 1–1 $\frac{1}{4}$ by $\frac{1}{3}$ – $\frac{2}{3}$ in., widened upwards, sky-blue. *Capsule* depressed obconic, $\frac{1}{2}$ – $\frac{1}{2}$ in. broad; beak $\frac{1}{2}$ in. long. *Seeds* much larger than those of *C. foetens*, not glistening.—*C. clematidea*, Schrenck (*Glossocomia clematidea*, Fisch. in *Regel Gartenfl.* 1856, 226, t. 167, fig. 2), has larger, subglabrous leaves, but is probably only a form of *C. ovata*.

7. **CYANANTHUS**, Wall.

Annual or perennial herbs. *Leaves* alternate, entire or lobed. *Flowers* terminal, blue, peduncled or sessile. *Calyx* nearly inferior, usually shaggy when young; tube ovate or cylindric; lobes 5, lanceolate or triangular. *Corolla* tubular or funnel-shaped; lobes 5, induplicate-valvate. *Stamens* free from the corolla; anthers ovate, adpressed round the base of the style, free or coherent. *Ovary* nearly superior, conoid, tapering upwards, 3–5-celled; style cylindric from a conic base, stigma 3–5-lobed lobes short, soon recurved. *Capsule* nearly or quite included in the persistent calyx-tube, ovoid-conoid, loculicidally 5–4 (rarely 3-) valved from the apex. *Seeds* minute, narrowly oblong-ellipsoid or shortly ellipsoid, smooth, brown; testa not (or most obscurely) reticulated.—Species 7, all Himalayan.

* *Root* perennial; *stems* subsimple, 1-flowered, the lateral branches few, weak, not flowering.

1. **C. lobatus**, Wall. *Cat.* 1473; leaves subpetioled obovate-oblong lobed often 3-fingered sparingly pilose, peduncles solitary and calyx with black spreading hairs. Benth. in *Royle Ill.* 309, t. 69, fig. 1; *Bot. Reg.* 1847, t. 6; *Regel Gartenfl.* 1877, t. 888; H. f. & T. in *Journ. Linn. Soc.* ii. 19; *Bot. Mag. t.* 6485.

ALPINE HIMALAYA; from Gurwhal to Sikkim, alt. 11–14,000 ft., common.

Stems 4–16 in., somewhat stout, glabrous below, hirsute upwards, simple or with

a few short weak branches near the base. *Leaves* $\frac{3}{4}$ –1 by $\frac{1}{2}$ in., laxly pilose, ultimately nearly glabrous. *Calyx* $\frac{3}{4}$ – $\frac{3}{2}$ in., ovate, lobed subacutely $\frac{1}{2}$ its length. *Corolla* sometimes $1\frac{1}{2}$ by 1 in. diam. at the mouth (usually much smaller), tubular-funnel-shaped; lobes ovate, somewhat spreading, hairy at least in the throat. *Capsule* $\frac{1}{2}$ in., ovoid-conoid, superior for $\frac{5}{8}$ its length; calyx in fruit unaltered, densely black hirsute. *Seeds* $\frac{1}{12}$ in., narrowly oblong-ellipsoid.

2. ***C. integer*, Wall. Cat. 1472**; leaves subsessile entire or crenate-toothed broadly or narrowly oblong shortly closely scabrid-pilose on both surfaces, flowers subsessile, calyx black-hirsute unaltered in fruit. *Benth. in Royle Ill.* 309, t. 69, fig. 2; *H. f. & T. in Journ. Linn. Soc.* ii. 19. *C. barbatus*, *Edgew. in Trans. Linn. Soc.* xx. 82.

KUMAON, *Wallich*; alt. 11,000 ft., *Strachey & Winterbottom*. GURWHAL, *Falconer, Edgeworth*. SIRMORE, *Vicary*.

Stems 4–12 in., many or few from the root, simple, hairy or finally nearly glabrous. *Leaves* 1 by $\frac{1}{2}$ in. in *Wallich's* type, crenate-dentate; often much smaller, narrower, subentire; in *Falconer's* examples larger, broad-elliptic, subpetiolate. *Calyx* $\frac{1}{2}$ – $\frac{3}{4}$ in., ovoid, lobed subacutely $\frac{1}{2}$ its length. *Corolla* 1 by $\frac{1}{2}$ in., tubular-funnel-shaped; lobes ovate, somewhat spreading, hairy at least in the throat within. *Capsule* $\frac{1}{2}$ in., ovoid-conic, superior for $\frac{5}{8}$ its length. *Seeds* $\frac{1}{16}$ in., narrowly oblong-ellipsoid.

3. ***C. linifolius*, Wall. Cat. 3722**; leaves sessile small oblong entire glabrous above closely scabrid-pilose beneath, flowers subsessile, calyx black-hirsute unaltered in fruit. *H. f. & T. in Journ. Linn. Soc.* ii. 20, in part. *C. microphyllus*, *Edgew. in Trans. Linn. Soc.* xx. 81.

KUMAON; *Blinkworth*; Mana, *Edgeworth*; Ralam River, alt. 11,000 ft., *Strachey & Winterbottom*. GURWHAL; *Falconer*.

Stems 3–10 in., very many from the root, simple, hairy or nearly glabrous. *Leaves* $\frac{1}{2}$ – $\frac{1}{2}$ by $\frac{1}{8}$ – $\frac{1}{6}$ in., usually narrowly oblong, sometimes ovate, margins often recurved. *Calyx* $\frac{1}{2}$ in., cylindric, lobed acutely about $\frac{1}{2}$ its length. *Corolla* $\frac{3}{4}$ by $\frac{1}{4}$ in., densely hairy in the throat within. *Capsule* and seeds nearly as in *C. integer*.—Hardly separable from *C. integer*; the stems are usually more hairy, the leaves smaller and narrower, glabrous on the upper surface, the calyx is rather shorter and more deeply divided, and the flowers somewhat smaller.

4. ***C. pedunculatus*, Clarke**; leaves sessile oblong entire scabrid-pilose on both surfaces, peduncles $\frac{1}{2}$ – $1\frac{1}{2}$ in. patently black-hirsute as is the calyx. *C. linifolius*, *H. f. & T. in Journ. Linn. Soc.* ii. 20, in part.

ALPINE SIKKIM; Lachoong and Samdong, alt. 12–16,000 ft., *J. D. H., Elwes*. Yakla, alt. 14–16,000 ft., *Clarke*.

Stem 3–8 in., simple or with weak barren branches near the base, glabrescent below, hairy upwards. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in., cylindric, lobed acutely to the middle, unaltered in fruit. *Corolla* 1 by $\frac{1}{2}$ in., tubular-funnel-shaped, glabrous in the throat or very nearly so. *Capsule* and seeds nearly as in *C. integer*.—This was included by *H. f. & T.* under *C. linifolius*, from which it differs in the pilose upper surface of the leaves, the peduncled flowers and the glabrous corolla-throat.

5. ***C. incanus*, H. f. & T. in Journ. Linn. Soc. ii. 20**; leaves oblong hispid-pilose on both surfaces, flowers subsessile, calyx fivous hirsute in fruit subinflated reticulately veined finally glabrescent.

ALPINE SIKKIM; Lachen, Tungu and Yeumtong, alt. 12–16,000 ft., *J. D. H., Elwes*.

Stem 3–4 in., many from one root, wiry, simple, patently hispid. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ by $\frac{1}{8}$ – $\frac{1}{4}$ in., nearly entire, subsessile. *Calyx* $\frac{1}{2}$ in., broadly cylindric, acutely lobed half its length, when young more or less hairy or glabrous. *Corolla* $\frac{3}{4}$ –1 in., oblong-funnel-shaped, throat densely hairy, lobes somewhat spreading. *Capsule* $\frac{1}{4}$ in., ovoid-conic, superior for $\frac{5}{8}$ its length, loose within the much enlarged inflated calyx. *Seeds*

scarcely $\frac{1}{80}$ in., ellipsoid.—This species by its inflated fruiting-calyx and minute seeds differs considerably from all the preceding species, and approaches the next section.

**** Root annual ; stems branched, lateral branches often flowering.**

6. **C. inflatus**, *H. f. & T. in Journ. Linn. Soc.* ii. 21 ; stem procumbent loosely branched, leaves petioled round, flowers sessile, calyx in fruit globose-conic.

ALPINE SIKKIM ; alt. 11–16,000 ft., general. BHOTAN ; *Griffith* (*Kew Distrib. n.* 3434).

Stems 6–30 in., with long branches, patently pilose or at length glabrate. *Leaves* $\frac{1}{4}$ in. diam., margin more or less sinuate, hairy on both surfaces or nearly glabrous ; petiole $\frac{1}{8}$ – $\frac{1}{6}$ in. *Calyx* $\frac{1}{2}$ in., ovate, lobed less than $\frac{1}{4}$ its length, hairy ; in fruit much widened at the base, membranous, often conspicuously nerved, ultimately nearly glabrous. *Corolla* $\frac{1}{2}$ in., tubular, hardly widened at the mouth. *Capsule* $\frac{1}{2}$ – $\frac{2}{3}$ in., oblong-conic ; valves often far exceeding the narrow calyx-mouth. *Seeds* scarcely $\frac{1}{30}$ in., ellipsoid.

7. **C. Hookeri**, *Clarke* ; stems ascending rigid with short lateral flowering branches, leaves petioled ovate, calyx in fruit ellipsoid closely embracing the capsule. *Cyananthus* sp. n. 6, *H. f. & T. in Journ. Linn. Soc.* ii. 21.

EAST NIPAL ; Wallanchoon, alt. 13,000 ft., *J. D. H.*

Stems 3–8 in. (or more), many from one root, wiry, ultimately glabrescent ; lateral branches $\frac{1}{2}$ –1 in. *Leaves* $\frac{1}{8}$ – $\frac{1}{4}$ in., hirsute ; petiole $\frac{1}{8}$ – $\frac{1}{6}$ in. *Calyx* in fruit $\frac{1}{2}$ – $\frac{1}{4}$ by $\frac{1}{2}$ in., patently fulvous-hirsute, lobed acutely half its length. *Capsule* $\frac{1}{2}$ by $\frac{1}{2}$ in., ellipsoid, 3–5 (mostly 4-) valved, included in the calyx. *Seeds* $\frac{1}{30}$ in., ellipsoid.—The specimens are in ripe fruit only, but the species is evidently distinct from all the others ; the calyx and capsule are very much smaller.

8. CAMPANUMÆA, Blume.

Perennial herbs ; root tuberous ; stem twining or rambling with long straight branches. *Leaves* opposite or alternate, short- or long-petioled, entire crenate or serrate. *Flowers* peduncled, solitary, lateral or terminal. *Calyx* inferior or superior ; lobes 4–6, long, broad or narrow, persistent. *Corolla* epigynous, campanulate, white with a short tube, or lurid large with a long tube ; lobes 4–6. *Stamens* 4–6, inserted round the base of the corolla-tube. *Ovary* 4–6-celled ; style cylindric, stigma of 4–6 short lobes. *Fruit* indehiscent, truncate. *Seeds* very many, small, ellipsoid.—Species 5–6, Himalaya, Malaya, S. China, Japan.

SECT. I. **Eucampanumæa**. *Stem* twining ; inflorescence lateral. *Calyx-lobes* broad, herbaceous. *Corolla* campanulate, large, lurid purple. *Seeds* ellipsoid, prominently reticulated.—Differs from *Codonopsis* only in the baccate truncate fruit.

1. **C. javanica**, *Blume Bijdr.* 727 ; leaves ovate-cordate glabrous, calyx nearly free from the hemispheric berry. *DC. Prodr.* vii. 423 ; *Fl. des Serres*, t. 1264 ; *H. f. & T. in Journ. Linn. Soc.* ii. 9 ; *Kurz in Journ. As. Soc.* 1877, pt. ii. 209. *C. javanica*, *Hook. f. Ill. Him. Pl.* t. 16, B. *C. cordata*, *Bot. Mag.* t. 5372, not of *Hassk.* *Codonopsis*, sp. 2, *Griff. Notul.* iv. 280.

SIKKIM, BHOTAN and KHASIA Mts., alt. 3–7000 ft., frequent. *BIIRMA* ; *Karen Hills*, *Kurz*.—*DISTRIB.* JAV.

Leaves opposite or nearly all alternate, 2 by 1 in., acute, deeply cordate, entire or crenate-serrate, glaucous beneath ; petiole $\frac{1}{2}$ –1 in. *Peduncles* solitary, axillary or leaf-opposed, as long as the petioles. *Calyx-tube* very short, adnate to the base of the

ovary; lobes $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{4}$ in., ovate-lanceolate, approximate, glabrous. *Corolla* $\frac{3}{4}$ – $1\frac{1}{4}$ by $\frac{1}{2}$ – 1 in., lurid yellow with purple veins. *Ovary* 5–4 (rarely 3-) celled. *Berry* $\frac{1}{2}$ – 1 in. diam., hemispheric, broader than long, glaucous, black-purple, the persistent somewhat enlarged calyx-lobes spreading from near its base.—*Codonopsis cordata* (Hassk. in Retzia, i. 9) may be only a var. of this, as Kurz states; but Hasskarl's examples differ in the leaves being sparsely hairy above with much spreading hairs on the nerves beneath, a state unknown in India.

2. **C. inflata**, Clarke; leaves ovate-cordate nearly glabrous, calyx adnate nearly to the summit of the ellipsoid berry. *Codonopsis inflata*, Hook. f. *Ill. Him. Pl. t. 16, C.*; *H. f. & T. in Journ. Linn. Soc. ii. 13.*

SIKKIM and BHOTAN; alt. 5–8000 ft., common.

Leaves alternate sometimes opposite, 3 by $1\frac{3}{4}$ in., acute, deeply cordate, entire or crenate-dentate, glaucous beneath, glabrous or sparsely pilose above; petiole $\frac{1}{2}$ – 2 in. *Peduncles* mostly leaf-opposed, as long as the petioles. *Calyx-lobes* $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{4}$ in., ovate-lanceolate, approximate, glabrous or nearly so. *Corolla* $1\frac{1}{4}$ by $\frac{3}{4}$ in., lurid yellow with purple veins. *Ovary* 3-celled. *Berry* $\frac{3}{4}$ – 1 in., cylindric from a hemispheric base, usually at least as long as broad, glaucous, black-purple, crowned by a flat pentagonal disc.

SECT. II. **Cyclocodon** (Gen. Griffith). Perennial, erect herbs, with long spreading branches. *Leaves* opposite. *Inflorescence* terminal. *Calyx-lobes* narrow. *Corolla* small, with a very short tube, white. *Seeds* ovoid, testa not reticulated.

3. **C. celebica**, Blume *Bijd. 727*; leaves short-petioled lanceolate serrate, calyx-tube adnate to the 5-celled ovary. *C. truncata*, Endl. *Gen. Plant. i. 515.* *Codonopsis truncata*, Wall. *Cat. 1501*; *DC. Prodr. vii. 423.* *C. celebica* and *leucocarpa*, Miq. *Fl. Ind. Bat. ii. 565, 566.* *C. albiflora*, Griff. *Notul. iv. 279.* *Cyclocodon lancifolium*, Kurz in *Flora*, 1872, 303, and in *Journ. As. Soc. 1877, ii. 210, partly.* *C. truncatum*, H. f. & T. in *Journ. Linn. Soc. ii. 18.* *C. adnatus*, Griff.; *Benth. in Gen. Pl. ii. 558.* *Campanula lancifolia*, Roxb. *Fl. Ind. i. 505*; *A. DC. Prodr. vii. 485.*

SIKKIM HIMALAYA; alt. 4–6000 ft., frequent. CHITTAGONG and BURMA; alt. 0–3000 ft., frequent.—DISTRIB. Malaya, Ava, S. China.

Erect, 3–4 ft. high with horizontal long and drooping branches. *Leaves* 3 by 1 in., base cuneate or rounded, teeth sometimes obscure, glabrous or with scattered hairs, often glaucous beneath; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Flowers* solitary, terminal, and in the forks of a dichotomous cyme; peduncle $\frac{1}{2}$ in. *Calyx* in bud very shortly adnate to the ovary, in fruit adnate shortly or half way up, sometimes nearly to the base of the corolla; teeth $\frac{1}{2}$ – $\frac{1}{2}$ in., linear-lanceolate, usually serrate. *Corolla* $\frac{1}{2}$ – $\frac{1}{2}$ by $\frac{1}{4}$ in., epigynous, very shortly campanulate, white, fading somewhat into yellow, but not at all lurid glaucous as in sect. *Eucampanumæa*. *Ovary* 5–6-celled. *Berry* $\frac{1}{2}$ in. diam., globose, white, little succulent, ultimately dry and breaking up irregularly.—The Amoy species admitted by Benth (Gen. Pl. ii. 558) as having a 6-merous corolla, does not differ from the 6-merous *Pegu plant*.

4. **C. parviflora**, Benth. in *Gen. Pl. ii. 558*; leaves shortly petioled lanceolate caudate-serrate, calyx free from the 4-celled ovary. *Codonopsis parviflora*, Wall. *Cat. 1300*; *DC. Prodr. vii. 423.* *Cyclocodon distans*, Griff. *Notul. iv. 277*; *Ic. Pl. Asiat. t. 481.* *C. parviflorum*, H. f. & T. in *Journ. Linn. Soc. ii. 18 (exclud. syn. Campanumæa celebica).* *C. lancifolium*, Kurz in *Journ. As. Soc. 1877, ii. 210, partly.*

SIKKIM, BHOTAN and KHASIA Mts.; alt. 1–5000 ft., common.

Closely resembling *C. celebica*, and united with it by Kurz, but the calyx is entirely free, and $\frac{1}{2}$ – $\frac{1}{2}$ in. below the fruit. This degree of adherence of the calyx is, however, so very variable in *C. celebica*, that Kurz does not distinguish this species by

it. The flowers in *C. parviflora* are not always smaller than in *C. celebica*, but they seem always 4-merous, while the flowers of *C. celebica* appear invariably 5-6-merous; a character of little weight in *Campanulaceæ*.

PERACARPA, *H. f. & T.*

A slender prostrate herb. *Leaves* alternate and opposite, petioled, ovate. *Pedicels* axillary, 1-flowered, clustered or solitary. *Flowers* small, purple or white. *Calyx* superior; teeth 5, oblong-linear, persistent. *Corolla* campanulate, 5-lobed. *Stamens* 5, free from the corolla. *Ovary* inferior, 2-celled. *Fruit* dry, indehiscent, white, membranous, 3- (or 2-1-) celled, 6-30-seeded. *Seeds* fusiform-ellipsoid, dark brown, smooth.

1. ***P. carnosa***, *H. f. & T. in Journ. Linn. Soc.* ii. 26. *Campanula carnosa*, *Wall. Cat.* 1282, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 102; *DC. Prodr.* vii. 474.

KUMAON TO BHOTAN; alt. 5-11,000 ft., in wet places frequent. KHASIA Mts.; alt. 5-6000 ft., *H. f. & T.*

A very weak, succulent herb, 3-8 in., branching. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., obtuse or acute, entire or crenate, glabrous or scabrid; petiole $\frac{1}{8}$ - $\frac{1}{2}$ in. *Pedicels* sometimes 1 in. solitary, sometimes clustered and less than $\frac{1}{20}$ in. *Calyx-teeth* $\frac{1}{10}$ in. *Corolla* $\frac{1}{2}$ - $\frac{1}{3}$ in. *Fruit* $\frac{1}{2}$ - $\frac{1}{4}$ by $\frac{1}{10}$ - $\frac{1}{8}$ in., sack-like, often unsymmetric by the suppression of one cell.

10. PENTAPHRAGMA, *Wall.*

Perennial herbs; stem short, sparingly branched. *Leaves* alternate, large, often very unequal at the base. *Spikes* dense, scorpioid, shortly peduncled; flowers in two ranks; bracts membranous, short. *Calyx* superior; lobes 5, long, obtuse, persistent. *Corolla* campanulate, 5-lobed, white. *Stamens* 5, epigynous, free; anthers ovate. *Ovary* inferior, 3-5-celled; style short, cylindrical, stigma peltate obscurely 3-5-lobed. *Berry* inferior. *Seeds* very many, small, testa prominently reticulated.—Species 3, Malayan.

1. ***P. begoniæfolium***, *Wall. Cat.* 1313; leaves ovate serrate, calyx-teeth $\frac{1}{2}$ in. subquadrate-oblong obtuse, fruit $\frac{1}{4}$ - $\frac{1}{2}$ in. turbinate ellipsoid, *A. DC. Prodr.* vii. 496; *H. f. & T. in Journ. Linn. Soc.* ii. 26; *Kurz in Journ. As. Soc.* 1877, ii. 201. *Phyteuma begonifolium*, *Roxb. Hort. Beng.* 85; *Fl. Ind.* i. 505; *Jack in Hook. Bot. Misc.* i. 276, t. 57.

MERGUI, *Griffith.* PENANG and SINGAPORE, *Roxburgh, &c.*

Stem 6-12 in., succulent, scabrous-villous. *Leaves* 6-8 by 4-5 in. ovate with the base excised on one side, cordate and auricled on the other; or oblong base equal and cuneate; scabrous-pilose on the nerves beneath, otherwise nearly glabrous; petiole $\frac{1}{4}$ -1 in. *Peduncle* $\frac{1}{4}$ -1 in., lateral near the summit of the stem, carrying 1-3 ovate alternate sessile bracts $\frac{1}{2}$ in. diam. *Spike* 1-4 in.; bracts 2-ranked, obovate or elliptic, $\frac{1}{4}$ in. long; bracts ovary and calyx weakly villous. *Corolla* $\frac{1}{2}$ - $\frac{1}{4}$ in. long and broad, lobes deep, broad, obtuse.—This genus is unlike other *Campanulaceæ* in habit; and *P. begoniæfolium* so simulates *Epithema* (*Cyrtandraceæ*) in leaves and inflorescence, that these plants are mixed under *Wall. Cat.* 1313.

11. SPHENOCLEA, *Gaertn.*

An annual, erect herb. *Leaves* alternate, lanceolate, entire. *Spikes* lateral and terminal, peduncled, cylindrical, dense-fld., apex conical. *Flowers* small, sessile; bracteate and 2-bracteolate. *Calyx* $\frac{1}{2}$ -inferior; limb 5-fld, segments ovate. *Corolla* campanulate, epigynous, 5-lobed. *Stamens* 5, on the corolla,

alternate with its segments, filaments short linear; anthers ovate. *Ovary* at first inferior, 2-celled; ovules very many on stalked placentas; style short, stigma obscurely 2-lobed. *Capsule* $\frac{1}{2}$ -inferior, membranous below; crown superior, depressed, conical, circumsciss, hard. *Seeds* very many, narrowly oblong; testa somewhat lax.

1. **S. zeylanica**, Gaertn. *Fruct.* i. 113, t. 24, fig. 5; *Roxb. Fl. Ind.* i. 507; *Wall. Cat.* 1516; *Kurz in Journ. As. Soc.* 1877, ii. 209. *S. Pongatium*, A. DC. *Prodr.* vii. 548; *Wight Ill.* t. 138; *Boiss. Fl. Orient.* iii. 963. *Pongatium indicum*, Lamk. *Ill.* ii. 444. Gaertnera Pongati, Retz *Obs.* vi. 24. *Rapinia herbacea*, Lour. *Fl. Cochinch.* (ed. Willd.) i. 157. *Sphenoclea*, Griff. *Notul.* iv. 276.—*Rheede Hort. Mal.* xi. t. 24.

Throughout INDIA; in swamps.—DISTRIB. In both hemispheres in warm regions.

Stem 12–24 in. *Leaves* 2–3 by $\frac{1}{4}$ –1 in., narrowed at both ends, sometimes shortly petioled. *Peduncles* $\frac{1}{2}$ –1 in.; spikes $\frac{1}{2}$ –1 $\frac{1}{2}$ in., dense both in flower and fruit. *Calyx-lobes* $\frac{1}{8}$ in.; in fruit somewhat enlarged, $\frac{1}{10}$ in., triangular, closely inflexed over the disc. *Corolla* $\frac{1}{12}$ in., lobes short, valvate in bud (Griffith says imbricate). *Fruit* $\frac{1}{2}$ in. diam. *Seeds* minute, scabrous from microscopic papillæ or scales.

12. PHYTEUMA, Linn.

Perennial herbs. Radical leaves petioled, cauline alternate. *Flowers* capitate, spicate, or (in all the Indian species) panicled. *Calyx-tube* adnate, obconic; limb 5-partite. *Corolla* rotate, 5-lobed nearly to the base, segments 5 narrow. *Stamens* free from the corolla, filaments widely dilated at the base; anthers free. *Ovary* 2-celled (in the Indian species); ovules very many in each cell. *Style* cylindric; stigma 2-fid. *Capsule* dehiscing by small valves on the sides. *Seeds* minute, ellipsoid.—Species 50, Europe, N. Africa and Temp. Asia.

The Indian species belongs to the sub-genus *Podanthus*, G. Don, referred by Boissier on account of the lax inflorescence to *Campanula*: retained by Bentham in *Phyteuma* on account of the shape of the corolla.

P. Thomsoni, Clarke; nearly glabrous, erect, cauline leaves petioled ovate-lanceolate, flowers numerous laxly panicled, corolla segments linear-oblong, ovary 2-celled, stigma 2-lobed. *Campanula Thomsoni*, H. f. & T. in *Journ. Linn. Soc.* ii. 25. *Symphandra stylosa*, Royle *Ill.* 253.

NORTH-WEST HIMALAYA; alt. 6–8000 ft., Thomson. KASHMIR, Jacquemont, Henderson, Aitchieson.

Root long, woody. *Stems* $\frac{1}{2}$ –4 ft. *Cauline leaves* 3 by 1 $\frac{1}{2}$ in., obscurely crenate; lower leaves suborbicular, petioled. *Panicle* with many branches 6–12 in., naked, weak, flowering at the tops; sometimes reduced to a simple terminal cluster. *Pedicels* $\frac{1}{8}$ – $\frac{1}{4}$ in. *Calyx-teeth* $\frac{1}{4}$ in., subulate. *Corolla-lobes* $\frac{1}{4}$ – $\frac{1}{3}$ by $\frac{1}{10}$ – $\frac{1}{8}$ in., blue. *Filaments* very short, pubescent, connivent; anthers large, oblong, at first forming a cylinder round the style, but quite free. *Fruit* unknown.—The deeply partite corolla and 2-celled ovary refer this plant to *Phyteuma*, though the lax inflorescence is campanula-like.

13. CAMPANULA, Linn.

Perennial or annual herbs, erect or decumbent. *Leaves* alternate, or the radical subrosulate, from ovate to linear. *Flowers* peduncled or subsessile, axillary or terminal, panicled spicate or subcapitate, purple or white. *Calyx-tube* adnate to the ovary, turbinate; limb deeply 5-lobed, persistent. *Corolla* campanulate, 5-fid (in *C. fulgens* 5-partite). *Stamens* 5, free, filaments dilated at the base; anthers free. *Ovary* inferior, 3- (rarely 4–5-) celled; ovules very

many in each cell; style cylindric, stigma shortly 3-5-lobed. *Capsule* obovoid or elongate, truncate, dehiscent by small valves at the base or on the sides outside the calyx-lobes. *Seeds* very many, minute, ellipsoid or small compressed margined.—Species 230, natives chiefly of the north temperate hemisphere.

SECT. I. *Capsule* dehiscent by valves at the base.

* *Tall erect herbs; cauline leaves broadly lanceolate or ovate; seeds (large for Campanula) much compressed, margined.*

1. **C. latifolia**, Linn.; DC. *Prodr.* vii. 469; cauline leaves ovate or broadly lanceolate somewhat pubescent, flowers suberect large, calyx-teeth lanceolate subentire. *Bot. Mag.* t. 2553; *H. f. & T. in Journ. Linn. Soc.* ii. 22; *Boiss. Fl. Orient.* iii. 921. C. Brunonis, Wall. *Cat.* 1285. C. macrantha, *Bot. Mag.* t. 3347. C. eriocarpa, *Bieb. Fl. Taur. Cauc.* i. 149.

WESTERN HIMALAYA; alt. 8-11,000 ft., from Kashmir to Kumaon, frequent.—DISTRIB. N. & W. Asia, Europe.

Erect, 2-6 ft., corymbose upwards, branches ascending. *Upper leaves* 3 by 1-2 in., subsessile, cuneate or rounded at the base, crenate-serrate, herbaceous. *Pedicels* $\frac{1}{4}$ - $\frac{1}{2}$ in., recurved in fruit. *Calyx-teeth* $\frac{1}{2}$ in., minutely pilose. *Corolla* $1\frac{1}{2}$ by 1 in., purple. *Capsule* $\frac{1}{2}$ by $\frac{1}{4}$ - $\frac{1}{2}$ in., glabrous or very nearly so. *Seeds* $\frac{1}{12}$ in.

2. **C. khasiana**, *H. f. & T. in Journ. Linn. Soc.* ii. 25; cauline leaves ovate or broadly lanceolate hispid, flowers nodding, calyx-teeth narrowly lanceolate sharply serrate.

KHASIA MTS.; alt. 4-6000 ft., plentiful.

Erect, 1-4 ft., sparingly corymbose upwards, branches ascending. *Upper leaves* $1\frac{1}{2}$ -2 by $\frac{1}{2}$ - $\frac{3}{4}$ in., sessile, base obtuse, crenate-serrate, rigid, nerves beneath elevated. *Pedicels* $\frac{3}{8}$ - $\frac{1}{2}$ in., lower apparently often elongated, 2-3 in., with small bracts near the summit whence may rise flowers. *Calyx-teeth* $\frac{1}{2}$ in., glabrous or nearly so, serratures few very sharp. *Corolla* $\frac{1}{2}$ - $\frac{3}{4}$ in., and nearly as wide at the mouth, funnel-shaped rather than campanulate, purple. *Stigma* 3-lobed. *Capsule* $\frac{1}{2}$ by $\frac{1}{4}$ in., ellipsoid, narrowed upwards, glabrous. *Seeds* $\frac{1}{16}$ - $\frac{1}{12}$ in.

** *Erect herbs, with slender straight stems; seeds minute, ellipsoid, little compressed.*

3. **C. sylvatica**, Wall. *Cat.* 1293, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 97; leaves linear pilose, calyx-teeth linear-lanceolate $\frac{1}{4}$ - $\frac{1}{2}$ in. A. DC. *Prodr.* vii. 471; *H. f. & T. in Journ. Linn. Soc.* ii. 22. C. stricta, Wall. in *As. Research.* xiii. 374, not of Linn. C. integerrima, *Don Prodr.* 155. C. caperionoides, *Klotzsch in Reis. Pr. Waldem. Bot.* 73, t. 78, fig. 1.

TEMPERATE HIMALAYA; Gurwhal to Nipal, alt. 5-9000 ft., Wallich, Thomson, Edgeworth, Strach. & Winterb.; Bhotan, Griffith.

Stems 8-12 in., pilose, *Leaves* 2 by $\frac{1}{10}$ in., in Griffith's Bhotan example 2 by $\frac{1}{2}$ in. *Panicle* lax, few-flowered, *pedicels* $\frac{1}{2}$ - $\frac{3}{4}$ in., puberulous. *Corolla* $\frac{1}{2}$ - $\frac{1}{2}$ by $\frac{1}{2}$ in., shortly 5-lobed. *Capsule* $\frac{1}{2}$ in. long and broad, obconic, finally glabrous, crowned by the somewhat elongated calyx-teeth.

4. **C. canescens**, Wall. *Cat.* 1289; hairy, leaves oblong or lanceolate crenate, calyx-teeth linear-lanceolate $\frac{1}{10}$ - $\frac{1}{5}$ in. A. DC. *Prodr.* vii. 473; *H. f. & T. in Journ. Linn. Soc.* ii. 23; *Kurz in Journ. As. Soc.* 1877, pt. ii. 209; *Boiss. Fl. Orient.* iii. 934. C. Bentharii, Wall. *Cat.* 1290. Cephalostigma spathulatum, *Thwaites Enum.* 422.

Throughout NORTHERN INDIA; alt. 0-5000 ft., from the Himalaya to Central India and Pegu, very common. CEYLON, Thwaites.

Stems 6-24 in. *Leaves* 1 by $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* numerous, clustered in panicles,

dimorphic (both forms frequently on one stem); one form complete, the other very much smaller without corolla or stamens. *Calyx-teeth* $\frac{1}{2}$ in. in the perfect flower, often scarcely $\frac{1}{2}$ in. in the imperfect. *Corolla* $\frac{1}{2}$ by $\frac{1}{2}$ in., broadly campanulate, shortly lobed, grey-purple. *Ovary* 3-celled, or in large hill examples 5-celled. *Capsule* $\frac{1}{2}$ - $\frac{1}{4}$ in. in diam.; or in the imperfect flowers often scarcely $\frac{1}{10}$ in., producing perfect seeds. *Seeds* very minute.

*** *Herbs, much branched or with flexuose stems; seeds minute, ellipsoid, little compressed.* (The species are closely allied and hardly separable.)

5. ***C. colorata***, Wall. Cat. 1287, and in Roxb. Fl. Ind. ed. Carey & Wall. ii. 101; stem terete patently hairy, leaves subremote lanceolate repand-dentate softly pilose on both surfaces, calyx-teeth lanceolate, corolla $\frac{1}{2}$ by $\frac{1}{2}$ in. laxly pilose without. A. DC. Prodr. vii. 473; H. f. & T. in Journ. Linn. Soc. ii. 23. C. Moorcroftiana, Wall. Cat. 1288. C. ramulosa, Wall. Cat. 1286, and in Roxb. Fl. Ind. ed. Carey & Wall. ii. 100; A. DC. l. c.; Wight Ic. t. 1178; Boiss. Fl. Orient. iii. 934. C. nervosa, Royle Ill. 253. C. pallida, Wall. in As. Research. xiii. 375, and in Roxb. Fl. Ind. ed. Carey & Wall. ii. 100; Don Prodr. 156; A. DC. l. c. C. Hoffmeisteri and himalayensis, Klotzsch in Reis. Pr. Waldem. Bot. 73, 74, t. 77, and t. 78, fig. 2.

TEMPERATE HIMALAYA, alt. 3-10,000 ft.; from Kashmir to Khasia, very common. WESTERN GHATS, alt. 5-7000 ft.—DISTRIB. Cabul.

Stem 6-24 in., suberect, flexuose or very much branched. *Leaves* 1 by $\frac{1}{4}$ - $\frac{1}{2}$ in., often spatulate or subpetioled. *Pedicels* sometimes 1-2 in., slender, sometimes short rigid. *Calyx-teeth* $\frac{1}{2}$ - $\frac{1}{4}$ in., lanceolate or triangular-lanceolate, entire or toothed. *Corolla* purple or grey-purple, lobed from $\frac{1}{2}$ - $\frac{1}{3}$ its length; as in *C. canescens*, flowers without corolla or stamens occur, in which the calyx and the fruit are much smaller. *Capsule* $\frac{1}{2}$ - $\frac{1}{4}$ in. long and broad, obconic, cernuous, obviously inferior. *Seeds* ellipsoid, very small.

VAR. *tibetica*, H. f. & T. in Journ. Linn. Soc. ii. 23; calyx-teeth wide overlapping at the base, lower portion of the capsule shortened so that it appears only half-inferior. —North Kashmir and West Tibet, alt. 8-12,000 ft., frequent.—This is considered a var. by H. f. & T., but it seems as remarkable a form of *C. colorata* as some others admitted by them as species. The var. *anomala*, H. f. & T. l. c., is the extreme form of var. *tibetica*, having the calyx-lobes (in fruit) nearly $\frac{1}{2}$ by $\frac{1}{4}$ in., almost cordate at the base, the calyx-tube only shortly adnate.

6. ***C. Alphonssi***, Wall. Cat. 1296; stems wiry angular densely leafy, leaves small oblong repand-dentate pilose on both surfaces and somewhat tomentose beneath, calyx-teeth broadly lanceolate entire or slightly toothed, corolla $\frac{1}{2}$ by $\frac{1}{2}$ in. laxly pilose without. A. DC. Prodr. vii. 473; Wight Spic. Neilgh. ii. 22, t. 125; Ic. t. 1177; H. f. & T. in Journ. Linn. Soc. ii. 24.

NILGHERY MTS., alt. 6-8000 ft., frequent.

Leaves (in the typical form) $\frac{1}{2}$ by $\frac{1}{2}$ in., very closely placed on the stem; but in Dalzell's example (? from the Concan) the leaves are larger, more scattered, and the plant approaches *C. colorata*. H. f. & T. suggest that *T. Alphonssi* may be a var. of *C. cana*.

7. ***C. cana***, Wall. Cat. 1284; stems patently hispid, leaves oblong toothed scabrous-pilose above somewhat tomentose beneath, calyx-tube hirsute, teeth broadly lanceolate coarsely toothed, corolla $\frac{1}{2}$ by $\frac{1}{2}$ in. hairy without. Wall. in Roxb. Fl. Ind. ed. Carey & Wall. ii. 101; A. DC. Prodr. vii. 472; H. f. & T. in Journ. Linn. Soc. ii. 22, var. β only.

WESTERN HIMALAYA; from Kumaon, alt. 7500 ft., to Nipal, Wallich. MISHMI HILLS, Griffith (Kow Distrib. n. 3431, 3432).

Leaves $\frac{1}{2}$ by $\frac{1}{2}$ in. in Wallich's plant; twice as large in Edgeworth's, in which also

the corolla is $\frac{1}{2}$ by $\frac{1}{4}$ in.—Wallich's *cana* is here described; his description (and A. DC.'s taken therefrom) probably includes *C. alsinoides* (and *C. argyrotricha*?). These species ought perhaps to be included under *cana*. But the fine large blue *Campanula* described as *C. cana* by H. f. & T. is a Kashmir and West Tibet plant, which it is not likely that Wallich ever saw.

8. **C. alsinoides**, H. f. & T. in *Journ. Linn. Soc.* ii. 24; stems slender patently hairy, leaves oblong-ovate subpetioled obscurely toothed pilose on both surfaces, capsule small subglobose, calyx-teeth small narrowly lanceolate.

NORTH-WEST HIMALAYA, alt. 8–10,000 ft.; Piti, Kunawur, Tarkiti, and Kishtwar, Thomson; Gurwhal, Falconer.

Several times collected, but always in fruit. Stems 4–8 in., exceedingly numerous from a woody root. Leaves $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in., thin, herbaceous. Peduncles $\frac{1}{4}$ –1 in., slender. Flowers unknown. Calyx-teeth (on the fruit) $\frac{1}{6}$ – $\frac{1}{8}$ in., entire or somewhat toothed. Capsule $\frac{1}{8}$ in. diam., rounded at the base.—H. f. & T. suggest that this may be an apetalous form of *C. colorata* (or of a closely allied plant), but the shape of the capsule, and the small weak calyx-teeth differ from all these; it may be more nearly allied to *C. argyrotricha*.

9. **C. argyrotricha**, Wall. Cat. 7138; softly pilose and with spreading white needle-like hairs on the stems and leaves, leaves ovate entire or toothed, calyx-teeth elliptic-oblong, corolla $\frac{1}{2}$ by $\frac{1}{3}$ in. sparingly pilose without. A. DC. Prodr. vii. 473; H. f. & T. in *Journ. Linn. Soc.* ii. 24.

NORTH-WEST HIMALAYA, alt. 8–11,500 ft.; from East Kashmir to Kumaon, Wallich, Jacquemont, Falconer, &c.

Stems numerous, 4–8 in., weak, curved, procumbent. Leaves $\frac{1}{2}$ by $\frac{1}{4}$ in., often subpetioled, thin, herbaceous. Pedicels $\frac{1}{4}$ –1½ in. Calyx-teeth $\frac{1}{8}$ – $\frac{1}{4}$ in., entire, rarely with few teeth. Capsule $\frac{1}{8}$ in. diam., base rounded.

10. **C. cashmiriana**, Royle Ill. i. 254, t. 62, fig. 1; stem terete villous, leaves oblong closely villous or hoary tomentose on both surfaces, calyx-teeth ovate-lanceolate subentire, corolla $\frac{3}{4}$ –1 by $\frac{1}{2}$ – $\frac{3}{4}$ in. broadly campanulate bright-blue. A. DC. Prodr. vii. 473; H. f. & T. in *Journ. Linn. Soc.* ii. 24. *C. cana*, H. f. & T. in *Journ. Linn. Soc.* ii. 22, var. *a* only.

WEST TIBET and KASHMIR, alt. 6–11,000 ft., common.

In the large form, stems rigid, zigzag, hoary villous or tomentose. Leaves 1 by $\frac{1}{2}$ – $\frac{1}{3}$ in., thick, entire or sparingly crenate, woolly and often nerved beneath. Calyx-teeth $\frac{1}{4}$ – $\frac{1}{2}$ in., hoary or closely villous, wide, sometimes overlapping at base. Capsule $\frac{1}{2}$ in., broader than long, half- (or more than half-) superior.—The fully developed form of this species, with zigzag stems and very large brilliant flowers, is *C. cana*, H. f. & T., var. *a*; the middle form, with flexuose stems and medium flowers, is *C. cashmiriana*, Royle type; the weak form, with smaller flowers, $\frac{1}{2}$ by $\frac{1}{2}$ in., less hairy without, is *C. evolvulacea*, Royle.

VAR. *evolvulacea*; leaves smaller, calyx-teeth lanceolate not greatly widened at the base, capsule inferior or less than half inferior. *C. evolvulacea*, Royle Ill. 253; A. DC. Prodr. vii. 473.—Western Himalaya, from Kashmir to Kumaon, alt. 6–10,000 ft., common.—Griffith's n. 2208 from Mishmi, referred by H. f. & T. to *C. cashmiriana*, has patently hispid stems and hispid calyx-teeth, and is hence referred by me to *C. cana*.

SECT. II. Capsule dehiscing by valves on the sides or towards the top.

11. **C. aristata**, Wall. Cat. 1291, and in Roxb. Fl. Ind. ed. Carey & Wall. ii. 98; glabrous, cauline leaves linear, calyx-teeth $\frac{1}{2}$ in. linear, capsule $\frac{3}{4}$ by $\frac{1}{2}$ in. dehiscing close to the summit. A. DC. Prodr. vii. 483; H. f. & T. in *Journ. Linn. Soc.* ii. 24.

ALPINE HIMALAYA, alt. 11–16,000 ft.; from Kashmir to Sikkim, frequent.

Stems 8-24 in., erect, simple. *Radical leaves* elliptic, long-petioled, subentire; *cauline leaves* $1\frac{1}{2}$ by $\frac{1}{10}$ - $\frac{1}{4}$ in. *Flowers* solitary; *peduncle* $\frac{1}{2}$ -10 in. *Corolla* $\frac{1}{2}$ in. long and broad, conic, lobed half-way down, deep blue. *Capsule* narrowly oblong or sub-linear, contracted near the summit. *Seeds* very small, ellipsoid.

12. **C. modesta**, *H. f. & T. in Journ. Linn. Soc.* ii. 24; glabrous, cauline leaves linear-oblong, calyx-teeth $\frac{1}{6}$ in. linear, capsule $\frac{3}{4}$ by $\frac{1}{4}$ in. dehiscing near the summit.

ALPINE SIKKIM, alt. 12-14,000 ft., *J. D. H.*

Stems 2-7 in., erect, simple. *Radical leaves* long-petioled, ovate, subentire; *cauline* $\frac{1}{2}$ by $\frac{1}{8}$ in., sessile, sparingly toothed. *Flowers* solitary; *peduncle* $\frac{1}{4}$ -1 $\frac{1}{2}$ in. *Corolla* $\frac{1}{3}$ in. long and broad, conic, lobed half-way down, deep blue. *Capsule* obovoid, long attenuate at the base, contracted near the summit. *Seeds* very small, ellipsoid.—This is evidently an ally of *C. aristata*, but distinct specifically by the widely turbinate-clavate capsule.

13. **C. fulgens**, *Wall. Cat.* 1283, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 99; leaves lanceolate pilose or glabrous, flowers subsessile in an interrupted spike or subcapitate, calyx-teeth linear. *A. DC. Prodr.* vii. 477; *Wight Ic.* t. 1179; *Ill. t.* 136; *H. f. & T. in Journ. Linn. Soc.* ii. 24.

NIPAL, SIKKIM, and KHASIA MTS., alt. 3-7000 ft., frequent. MALABAR and CEYLON, alt. 4-8000 ft., frequent.

Stems 8-30 in., suberect, sparingly branched. *Radical leaves* petioled, 2 by $\frac{3}{4}$ in., narrowed at both ends, crenate; *cauline* similar but sessile, or wider at the base, or (in the Malabar examples) 0. *Calyx-teeth* $\frac{1}{4}$ - $\frac{1}{3}$ in. *Corolla* deeply divided with lanceolate segments in the Deccan examples, almost to the base with very narrow segments in the North Indian. *Ovary* 3-celled. *Capsule* from ellipsoid $\frac{1}{4}$ in. to narrow turbinate $\frac{1}{2}$ in.—This *Campanula*, having spicate inflorescence with a deeply-lobed corolla, might be removed to *Phyteuma*, and some of the Indian examples are indeed difficult to distinguish specifically from *Phyteuma campanuloides*, *Bieb. (Bot. Mag. t. 1015)*.

ORDER LXXXI. VACCINIACEÆ. (By C. B. Clarke.)

Shrubs or small trees; sometimes epiphytes with the stems greatly thickened at the base. *Leaves* alternate or falsely whorled, entire or serrate; stipules 0. *Flowers* racemose or axillary and solitary; pedicels 1-bracteate and often 2-bracteolate, often thickened and articulate beneath the ovary. *Calyx-tube* ovoid, adnate to the ovary; limb 5-fid, usually persistent. *Corolla* tubular and 5-toothed, or shortly campanulate with 5 long segments, deciduous. *Stamens* 10, epigynous, free; anthers opening by apical pores, often produced upwards into 2 tubes opening by slits from the apex. *Ovary* inferior, 5-celled, or falsely 10-celled; style cylindric, stigma simple; ovules many (rarely few) at the inner angle of each cell. *Fruit* a berry, rarely dry, 5- or falsely 10-celled. *Seeds* many or several (rarely 1) in each cell, small, compressed, albuminous; radicle next the hilum.—Species 320, natives chiefly of cold and temperate regions.

TRIBE I. **Thibaudieæ**. *Corolla* long and tubular, or shortly campanulate with very long segments.

Calyx-tube terete. Seed with a loose outer coat 1. AGAPETES.

Calyx-tube 5-winged or 5-ribbed 2. PENTAPTERYGUM.

TRIBE II. **Euvaccinieæ**. *Corolla* small, campanulate or ovoid, with short teeth.

Racemes axillary. *Testa* of the seed close 3. VACCINIUM.

Pedicels corymbose on axillary short peduncles 4. CORALLOBOTRYS.

1. **AGAPETES**, *D. Don*.

Shrubs, often epiphytic; stems often greatly thickened at the base. *Leaves* alternate, sometimes falsely whorled, from linear to elliptic, entire or toothed, sessile or shortly petioled, often with glands at the apex of the petiole, usually coriaceous. *Flowers* axillary, corymbose fascicled or solitary; pedicel often thickened or articulate under the ovary; bracts small. *Calyx-tube* globose; limb 5-fid or 5-partite, persistent. *Corolla* tubular or campanulate, shortly or deeply 5-lobed, red, often with transverse marks, or the lobes greenish-white. *Stamens* 10, filaments usually short; anthers elliptic, produced upwards in 2 long beaks opening by apical pores or slits, often spurred behind. *Ovary* 5-celled, or spuriously 10-celled; style cylindric, stigma capitate; ovules very many. *Berry* globose, succulent or nearly dry, 5-celled or spuriously 10-celled, often opening by 10 pores round the disk within the calyx-teeth. *Seeds* very many, ellipsoid, outer coat very lax.—Species 30, from Nipal and Bhotan to Borneo; 1 in Fiji.

SECT. I. *Corolla* elongate, lobed less than half its length, curved at the apex. *Anthers* not spurred on the back. *Corymbs* peduncled.

1. **A. setigera**, *D. Don*; *G. Don Gen. Syst.* iii. 862; leaves oblong or obovate-lanceolate narrowed suddenly into the very short petiole, pedicels and calyx more or less hirsute, filaments $\frac{1}{2}$ in. *DC. Prodr.* vii. 554. *A. variegata*, *DC. Prodr.* vii. 554, *as to descr. only, not of D. Don*. *A. hirsuta*, *Klotzsch in Linnæa*, xxiv. 38. *Thibaudia setigera* *Wall. Cat.* 752. *Vaccinium hirsutum*, *Wight Ic.* t. 1182. *V. verticillatum*, *Wight Ic.* t. 1181; *Kurz in Journ. As. Soc.* 1873, ii. 83, and 1877, ii. 213 (*exclud. var. β and γ*); *For. Fl.* ii. 87, *var.* 1.

KHASIA MTS., alt. 5000 ft., common; extending thence to TAVOY.

Branches round, glabrous or patently hirsute. *Leaves* $4\frac{1}{2}$ by $1\frac{3}{4}$ in., often falsely whorled, coriaceous, entire or slightly toothed, glabrous, outer nerve nearly marginal or obscure. *Peduncles* $\frac{3}{4}$ in., arising mostly from the nodes with the whorls of leaves; pedicels $\frac{1}{2}$ –1 in., widely dilated at the apex in fruit; bracts scarcely $\frac{1}{2}$ in.; calyx-teeth $\frac{1}{2}$ in. long, lanceolate. *Corolla* $\frac{3}{4}$ by $\frac{1}{4}$ in., hirsute or pubescent, without rarely glabrous, deep red, the transverse V-shaped bars on the tube obscure. *Filaments* pilose or glabrous; anther-cells granular-scabrid. *Fruit* $\frac{1}{2}$ in., subglobose, ultimately nearly dry, usually hirsute even when ripe, seeds escaping by 10 pores round the disc; calyx-teeth in fruit enlarged, half as long as the fruit or longer.

VAR. verticillata; leaves narrowed sometimes attenuated into the petiole. *A. verticillata*, *D. Don*; *G. Don Gen. Syst.* iii. 862; *DC. Prodr.* vii. 544. *A. Wallichiana*, *Klotzsch in Linnæa*, xxiv. 38. *Thibaudia verticillata*, *Wall. Cat.* 753. *T. obliqua*, *Griff. Ic. Pl. Asiat.* t. 515. *Vaccinium Wallichianum*, *Wight Ic.* t. 1180.—Khasia Mts., alt. 4000 ft.

VAR. Roylei; leaves suddenly narrowed into the petiole, pedicels and calyx glabrous. *Vaccinium Roylei*, *Kurz in Journ. As. Soc.* 1877, ii. 214. *V. variegatum*, β parviflorum, *Kurz in Journ. As. Soc.* 1873, ii. 84. *Thibaudia variegata*, *Royle Ill.* 257, t. 79, fig. 1, *exclud. all syn.* *Agapetes variegata*, *Hook. f. in Gen. Pl.* ii. 571, *not of Don*.—Khasia Mts., alt. 4000 ft., extending to lower Birma.—The type example of Wallich's *Thibaudia variegata*, n. 751, is the true *Ceratostemma variegatum* of Roxb.; but some of Wallich's duplicates issued as n. 751 are *Agapetes setigera*, whence has arisen some confusion in the names adopted by Sir J. D. Hooker and by Kurz.

2. **A. macrostemon**, *Clarke*; leaves oblong subsessile rounded at the base, pedicels and calyx glabrous, filaments $\frac{1}{2}$ – $\frac{3}{4}$ in. *Vaccinium macrostemon*, *Kurz in Journ. As. Soc.* 1873, ii. 85; 1877, ii. 213; *For. Fl.* ii. 87.

BRITISH BIRMA; Martaban, alt. 4–6,000 ft., *Kurz*.

An epiphytic shrub, 2–4 ft. *Branches* thick, angular upwards. *Leaves* 6 by 2 in.,

entire, coriaceous, glabrous, often falsely whorled, marginal nerve obscure. *Corymbs* 3 in., with 12-15 flowers; peduncle $\frac{3}{4}$ in., pedicels $\frac{1}{2}$ in.; bracts $\frac{1}{4}$ in., narrowly lanceolate. *Calyx-limb* 5-fid about half its length; teeth $\frac{1}{8}$ - $\frac{1}{6}$ in., lanceolate, subobtus. *Corolla* $1\frac{1}{4}$ by $\frac{1}{4}$ in., distinctly curved at the apex, deep red, the transverse V-shaped bars on the tube obscure. *Filaments* glabrous; anther-cells granular-scabrous, somewhat connate into a tube. *Berry* fusiform-ovoid, narrowed at the apex and crowned with the cup-shaped limb of the calyx (*Kurz*).

SECT. II. *Corolla* tubular, elongate, lobed less than half its length, straight at the apex. *Flowers* in corymbs.

* *Corymbs* distinctly peduncled; *anthers* granular, not spurred. (See also *A. loranthiflora*, n. 12.)

3. ***A. auriculata***, *Hook. f. in Gen. Pl.* ii. 571; leaves large sessile oblong-lanceolate from a rounded base, corymbs glabrescent, calyx-teeth $\frac{1}{2}$ in. narrowly lanceolate, corolla $\frac{3}{4}$ in. *Vaccinium auriculatum*, *Kurz in Journ. As. Soc.* 1877, ii. 214; *For. Fl.* ii. 89. *Thibaudia auriculata*, *Griff. Ic. Pl. Asiat.* t. 508.

EASTERN HIMALAYA; Sikkim, *J. D. H.*; and Bhotan, *Griffith*. KHASIA Mts., alt. 3-5000 ft., *Griffith*. MARTABAN, alt. 4000 ft., *Brandis (fide Kurz)*.

Branches stout, glabrous, often angular upwards. *Leaves* 7 by $2\frac{1}{4}$ in., glabrous, nearly entire, coriaceous, often falsely whorled, marginal nerve distinctly continuous. *Peduncles* $\frac{1}{4}$ - $1\frac{1}{2}$ in., stout, mostly proceeding from the whorls of leaves; pedicels 1 in., stout, much dilated and cup-shaped at apex; bracts $\frac{1}{12}$ in. *Corolla-tube* narrowing upwards, pubescent without at least when young, bright red, transverse V-shaped bars obscure; teeth $\frac{1}{2}$ - $\frac{1}{3}$ in. *Fruit* $\frac{1}{4}$ in., ovoid, nearly dry, bright red; calyx-teeth $\frac{1}{4}$ in., broad-lanceolate, striate, connivent, forming a cone as long as the fruit.

4. ***A. glabra***, *Clarke*; leaves sessile oblong-lanceolate from a rounded base, corymbs pubescent or cinereous almost tomentose, calyx-teeth $\frac{1}{2}$ in. triangular-lanceolate, corolla $\frac{3}{4}$ in. *Thibaudia glabra*, *Griff. Ic. Pl. Asiat.* t. 514.

BHOTAN and KHASIA, alt. 3-5000 ft., *Griffith, J. D. H.*, &c., not infrequent.

Branches round, glabrous. *Leaves* 5 by $1\frac{1}{2}$ in., sometimes elliptic or ovate, glabrous, obscurely crenate, often whorled, marginal nerve obscure. *Peduncles* $\frac{1}{4}$ - $1\frac{1}{2}$ in., mostly proceeding from the leaf-whorls, often many-flowered; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in., slightly dilated upwards; bracts $\frac{1}{12}$ in. *Corolla-tube* narrowed upwards, pubescent, green upwards, below white with rose-coloured V-shaped transverse bars or nearly colourless; teeth $\frac{1}{2}$ - $\frac{1}{3}$ in. *Fruit* nearly $\frac{1}{4}$ in., globose, ultimately nearly dry, seeds escaping by 10 pores round the disk; calyx-teeth very much shorter than the fruit, distant.—In *Griffith's* figure several of the leaves are shown hairy, but the leaves in *Griffith's* own n. 1218 are quite glabrous, as they are in all the other numerous examples.

5. ***A. saligna***, *Hook. f. in Gen. Pl.* ii. 571; leaves shortly petioled lanceolate acuminate from a cuneate base, corymbs glabrous, calyx-teeth $\frac{1}{2}$ - $\frac{1}{3}$ in. lanceolate acute, corolla 1 in. *Vaccinium salignum*, *Hook. f. Ill. Him. Pl.* t. 15, fig. A.

EASTERN HIMALAYA; Sikkim and Bhotan, alt. 7000 ft., frequent, *Griffith* (*Kew Distrib.* n. 3467), *J. D. H.*, &c. MOULMEIN; Thong-gyun, alt. 5000 ft., *Lobb*.

Branches not thick, scarcely angular. *Leaves* 3 by $\frac{3}{4}$ -1 in., scattered, entire, glabrous, coriaceous, marginal nerve obscure. *Peduncles* $\frac{1}{4}$ - $\frac{1}{2}$ in.; pedicels 1 in., gradually thickened upwards especially in fruit, cup at the apex hardly wider than the pedicel; bracts $\frac{1}{12}$ in. *Corolla-tube* somewhat widened upwards, glabrous, bright-red with obscure transverse V-shaped bars; lobes $\frac{1}{4}$ - $\frac{1}{3}$ in. *Fruit* $\frac{1}{4}$ in., subglobose, scarlet (as are the fruiting pedicels), subbaccate; calyx-teeth scarcely altered, much shorter than the fruit.—Stems sometimes greatly thickened at the very base.

VAR. cordifolia; leaves rounded at the base nearly sessile.—Duphla Hills, Lister.

6. **A. salicifolia**, *Clarke*; leaves sessile narrowly lanceolate attenuate at both ends, corymbs glabrous, calyx-teeth $\frac{1}{2}$ in. oblong acute, corolla $\frac{2}{3}$ in.

MISHMI Mts.; Koond Rocks, *Griffith* (Kew Distrib. n. 3477).

Branches scarcely angular, glabrous. *Leaves* 4 by $\frac{1}{2}$ – $\frac{3}{4}$ in., entire, coriaceous, often clustered, imperfectly whorled. *Peduncle* $\frac{1}{4}$ in.; *pedicels* $\frac{1}{8}$ – $\frac{1}{4}$ in.; *bracts* $\frac{1}{16}$ in. *Calyces*, with the peduncles, vermilion (*Griffith*). *Corolla* scarcely widened in the middle, vermilion with green lobes (*Griffith*); lobes scarcely $\frac{1}{10}$ in., triangular. *Fruit* not seen.

7. **A. miniata**, *Hook. f. in Gen. Pl.* ii. 571; leaves subsessile elliptic-lanceolate serrate, corymbs glabrous, calyx-teeth $\frac{1}{5}$ in. narrow-lanceolate, corolla $1\frac{1}{4}$ in. *Ceratostemma miniatum*, *Griff. Notul.* iv. 302; *Ic. Pl. Asiat.* t. 504. *Vaccinium miniatum*, *Kurz in Journ. As. Soc.* 1873, ii. 85; 1877, ii. 214; *For. Fl.* ii. 88.

Patkoy Mts., south-east of ASSAM, *Griffith* (Kew Distrib. n. 3475). KHASIA Mts., alt. 4000 ft.; Monai, *Clarke*.

Branches round, stout, smooth. *Leaves* 6 by $2\frac{1}{2}$ in., acute, falsely whorled, remotely shallowly serrate, base cuneate or rounded; petiole 0– $\frac{1}{2}$ in. *Peduncle* $\frac{1}{8}$ – $\frac{1}{2}$ in., densely covered with bracts; *pedicels* $\frac{1}{4}$ –1 in.; *bracts* $\frac{1}{2}$ in., lanceolate. *Corolla* slightly wider in the middle, vermilion (*Griffith*), no transverse bars visible in the dried plants nor suggested in *Griffith's* picture; lobes $\frac{1}{2}$ in., triangular. *Fruit* not seen.

8. **A. macrophylla**, *Clarke*; leaves petioled broadly lanceolate, corymbs glabrous, calyx-teeth $\frac{1}{2}$ in. narrowly lanceolate, corolla $1\frac{1}{4}$ in.

KHASIA Mts., *Griffith* (Kew Distrib. n. 3476).

Branches thick, rounded, smooth. *Leaves* 11 by $3\frac{1}{2}$ in., acuminate, cuneate or rounded at the base, remotely obscurely crenate-toothed, coriaceous; petiole $\frac{1}{2}$ in., exceedingly thick. *Peduncle* $\frac{1}{2}$ –2 in.; *pedicels* $\frac{1}{2}$ – $1\frac{1}{2}$ in.; *bracts* $\frac{1}{4}$ in., lanceolate-linear. *Corolla* tubular, 5-angled, red, with transverse V-shaped bars; lobes $\frac{1}{2}$ – $\frac{3}{8}$ in.; triangular. *Fruit* not seen.—This seems closely allied to *A. miniata*, but the petioles, peduncles and calyx-teeth are much longer.

9. **A. Nuttallii**, *Clarke*; glabrous, leaves petioled obovate shortly acuminate entire, calyx-teeth $\frac{1}{2}$ in. triangular-lanceolate, corolla 1 in.

BHOTAN; *Nuttall*.

Branches round, stout. *Leaves* $5\frac{1}{2}$ by 3 in., suddenly narrowed at the apex into a short point, narrowed into the petiole, very coriaceous, nerves coarse deeply impressed on the upper surface; petiole $\frac{1}{4}$ in. *Peduncle* from below the leaves $1\frac{1}{2}$ in.; *pedicels* 1 in.; apex conspicuously cupped; *bracts* $\frac{1}{10}$ in.; corymb erect, lax, whole height 4 in. *Corolla* narrowly tubular, straight; lobes $\frac{1}{4}$ in., linear-lanceolate (appears in the dried state to have been red without transverse bars). *Fruit* not seen.

10. **A. Parishii**, *Clarke*; leaves petioled narrowly lanceolate, corymbs glabrous, calyx-teeth $\frac{1}{8}$ – $\frac{1}{2}$ in. triangular-lanceolate, corolla $\frac{3}{4}$ –1 in.

BIRMA; Nat-toung expedition, *Parish*; Thoung-gyen, alt. 5000 ft., *Lobb*.

Branches not thick, round or scarcely angular. *Leaves* 5 by $1\frac{1}{2}$ in., narrowed at both ends, entire, coriaceous, glabrous, marginal nerve well defined; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in. *Peduncle* $\frac{1}{8}$ – $\frac{1}{2}$ in.; *pedicels* $\frac{1}{2}$ – $\frac{3}{4}$ in., thickened upwards, cup little broader than the pedicel; *bracts* $\frac{1}{16}$ in. *Corolla* cylindric, slightly campanulate upwards, bright red, transverse bars very obscure in the dried examples; teeth $\frac{1}{8}$ – $\frac{1}{4}$ in., triangular. *Fruit* not seen.—Near *A. salicifolia* (n. 6), but the leaves are distinctly petioled and wider, the pedicels longer, the flowers larger.

** *Corymbs subsessile or the pedicels fascicled or solitary; anthers granular, spurred on the beak (except in A. macrantha).*

11. **A. variegata**, D. Don; *G. Don Gen. Syst.* iii. 862, not of DC. nor of Hook. f.; leaves shortly petioled lanceolate narrowed at both ends, calyx-teeth $\frac{1}{2}$ – $\frac{1}{3}$ in. triangular-lanceolate glabrous, corolla $\frac{3}{4}$ –1 in. *A. pulcherrima* and *odontocera*, Hook. f. in *Gen. Pl.* ii. 571. *Thibaudia variegata*, Wall. Cat. 751. *T. pulcherrima*, Hook. in *Bot. Mag.* t. 4303. *Vaccinium odontocera*, Wight Ic. t. 1187. *V. variegatum*, Kurz in *Journ. As. Soc.* 1873, ii. 84 (as to spec. descr. only); Kurz in *Journ. As. Soc.* 1877, ii. 214; *For. Fl.* ii. 89. *Caligula pulcherrima* and *odontocera*, Klotzsch in *Linnaea*, xxiv. 28.

KHASIA Mts.; alt. 3–5000 ft., common. CACHAR, Keenan. CHITTAGONG HILLS. BRITISH BURMA.

Branches thick, round, often covered with flowers for a great space below the leaves. *Leaves* towards the end of the branches, alternate, usually without flowers among them, 4–7 by 1–2 in., entire or toothed, glabrous, somewhat coriaceous; petiole 0– $\frac{1}{4}$ in. (on the same branch). *Pedicels* $\frac{3}{4}$ in., usually densely fascicled on very short spurs, thickened upwards in fruit, terminal cup scarcely wider than the pedicel. *Corolla* rose-purple, with very strongly marked V-shaped transverse bands; lobes $\frac{1}{4}$ in., lanceolate, green. *Anthers* with spurs on their beaks. *Fruit* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., very succulent, red to purple-black.

12. **A. macrantha**, Hook. f. in *Gen. Pl.* ii. 571; leaves shortly petioled lanceolate narrowed at both ends, calyx-teeth $\frac{1}{2}$ – $\frac{1}{3}$ in. broadly lanceolate glabrous, corolla $1\frac{3}{4}$ in. *Ceratostema variegatum*, Roxb. *Fl. Ind.* ii. 413, not of Griff. *Vaccinium variegatum*, Kurz in *Journ. As. Soc.* 1873, ii. 84, var. *macrantha* only. *Thibaudia macrantha*, Hook. in *Bot. Mag.* t. 4566.

KHASIA AND CHITTAGONG HILLS; Roxburgh. MOULMEIN; Kola Mts., Lobb.

Resembling the common *A. variegata*, and, according to Kurz l c., only a var. thereof, but with much larger flowers, the corolla $1\frac{3}{4}$ by $\frac{1}{2}$ – $\frac{3}{4}$ in. in Lobb's example, and 2 in. long in Roxburgh's description and (unpublished) drawings. The anthers have no spurs on the beak (as noticed by Hooker); these are always present in *A. variegata* and in *A. grandiflora*.

13. **A. loranthiflora**, D. Don; *G. Don Gen. Syst.* iii. 862; leaves nearly sessile very narrowly obovate-oblong, calyx-teeth $\frac{1}{2}$ – $\frac{1}{3}$ in. lanceolate hispid, corolla $1\frac{1}{4}$ in. *Thibaudia loranthiflora*, Wall. Cat. 754. *Vaccinium loranthiflorum*, DC. *Prodr.* vii. 554. *V. verticillatum*, β elegans, Kurz in *Journ. As. Soc.* 1877, ii. 214.

TAVOY; Wallich. PEGU; Yomah, alt. 3200 ft., Kurz. PROME HILLS; Maingay, n. 703.

Branches round, smooth. *Leaves* 5 by $\frac{1}{2}$ in., entire, approximate towards the ends of the branches; petiole 0– $\frac{1}{4}$ in. *Pedicels* $\frac{3}{4}$ in., hispid, rising among the terminal leaves, solitary or few and fascicled or very shortly corymbose. *Corolla* tubular, deep-red; teeth $\frac{1}{2}$ in., lanceolate, greenish. *Anthers* with spurs on the beak. *Fruit* $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., subglobose, hirsute; calyx-teeth ultimately wide-triangular.

VAR. *glabrata*; pedicels and calyx-teeth nearly or quite glabrous.—Tenasserim, Helfer (Kew Distrib. n. 3477); Moulmein, Lobb.

14. **A. grandiflora**, Hook. f. in *Gen. Pl.* ii. 571; leaves subsessile oblong-lanceolate suddenly narrowed at the base, calyx-teeth $\frac{1}{2}$ in. triangular glabrous, corolla 2–2 $\frac{1}{2}$ in. *Ceratostema variegatum*, Griff. *Notul.* iv. 302; *Ic. Pl. Asiat.* t. 502 (not good).

MISHMI Mts. and NAGA HILLS (south-east of Assam), Griffith.

Branches stout, round, smooth, leafy at the ends, flowering below the leaves. *Leaves* nearly sessile, 7 by 2 in., entire, glabrous, marginal nerve subprominent; base rounded.

Pedicels 1 in., stout, thickened upwards, cupped top prominent, in fascicles of 1-4 on the thick part of the branches. *Corolla* tubular, little widened upwards, red with transverse bars; teeth $\frac{1}{2}$ in., long-lanceolate. *Anthers* with spurs on the beak. *Fruit* not seen.—Kurz in Journ. As. Soc. 1877, ii. 214 unites this with *A. macrantha* (n. 11). Griffith's figure, though apparently taken from a specimen now at Kew, is not accurate as regards the leaf-base and petiole.

15. ***A. angulata***, *Hook. f. in Gen. Pl.* ii. 571; leaves lanceolate acuminate narrowed to a short petiole, calyx-teeth $\frac{1}{12}$ in. shortly triangular glabrous, corolla 1 in. *Ceratostema angulatum*, *Griff. Notul.* iv. 302; *Ic. Pl. Asiat.* t. 503. *Vaccinium odontocermum*, *Kurz in Journ. As. Soc.* 1877, ii. 214, not of *Wight*.

ПАТКОУ Mts., south-east of Assam, *Griffith* (Kew Distrib. n. 3471).

Very closely allied to *A. variegata*; the branches are more quadrangular; the leaves inflorescence and corolla undistinguishable; but the calyx-teeth are much shorter and more obtuse than in any of the examples of *A. variegata*.

SECT. III. *Corolla* tubular, lobed less than half its length, straight. *Peduncles* axillary, solitary, 1- (or 2-) flowered. *Leaves* small.

16. ***A. obovata***, *Hook. f. in Gen. Pl.* ii. 572; leaves less than $\frac{1}{2}$ in. obovate obtuse entire, peduncles 1-flowered, corolla $\frac{1}{2}$ in. *Vaccinium Sprengelii*, *Wall. Cat.* 6296. *V. obovatum*, *Wight. Ic.* t. 1193. *Vaccinii* sp., *Griff. Notul.* iv. 300; *Ic. Pl. Asiat.* t. 517. *Epigynium obovatum*, *Klotzsch in Linnæa*, xxiv. 51.

KHASIA Mts.; alt. 3-5000 ft., frequent, *Griffith, H. f. & T.*, &c.

A small dense shrub. *Branches* rigid, terete, glabrous or patent hispid, densely leafy. *Leaves* glabrous, coriaceous, margins recurved. *Peduncles* $\frac{1}{2}$ - $\frac{3}{4}$ in., scattered among the leaves, scarcely dilated at the apex. *Calyx-teeth* $\frac{1}{16}$ in., triangular-lanceolate, glabrous. *Corolla* acutely conical in the bud, deep-red, ultimately wide tubular, lobed nearly half its length. *Anther-beaks* spurred. *Capsule* $\frac{1}{8}$ in. diam., globose, ultimately dry. *Seeds* with the outer coat lax.—Resembling in habit and leaves the small-leaved *Vacciniums*; but the corolla (and the seeds) are of *Agapetes*.

17. ***A. buxifolia***, *Nutt.*; *Hook. f. in Bot. Mag.* t. 5012; leaves 1 in. elliptic crenate, peduncles 1-flowered, corolla $\frac{3}{4}$ in.

BHOTAN; Duple hills, *Nuttall*; Yeorsi, alt. 4500 ft., *Lister*.

A shrub, 3-4 ft. *Branches* virgate, round, pilose. *Leaves* obtuse, narrowed at the base, glabrous. *Peduncles* $\frac{1}{2}$ in., scattered among the leaves, pilose, little dilated at the apex. *Calyx-teeth* $\frac{1}{8}$ - $\frac{1}{6}$ in., lanceolate, softly pilose. *Corolla* tubular, little widened upwards, bright-red; lobes $\frac{1}{2}$ in., lanceolate, paler or greenish. *Anthers* without spurs; filaments longer than usual in *Agapetes*. *Fruit* not seen.

18. ***A. mitrarioides***, *Hook. f. ms.*; leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. ovate toothed shining, peduncles 2-flowered, corolla $\frac{3}{4}$ -1 in.

MISHMI Mts., *Griffith* (Kew Distrib. n. 3466).

A small, much branched epiphyte. *Branches* rigid but slender, flexuous, round, hispid-pilose. *Leaves* hard, shining on both surfaces, acute, narrowed at the base, subpetioled; teeth rigid but few, shallow. *Peduncles* $\frac{3}{4}$ in., axillary, scattered, few, lax, pendent, minutely pilose or glabrous, bifurcate into 2 pedicels $\frac{1}{2}$ in. each; bracts inconspicuous. *Calyx-teeth* $\frac{1}{2}$ in., lanceolate, glabrous or most minutely pilose. *Corolla* tubular, hardly at all widened upwards, bright-red; lobes $\frac{1}{2}$ - $\frac{1}{4}$ in., triangular. *Anthers* not spurred.—A species remote in habit from all others of the genus.

SECT. IV. *Corolla* straight, divided half way down or lower. *Flowers* corymbose or subfscicled.

19. **A. nana**, *Hook. f. in Gen. Pl.* ii. 571; leaves shortly petioled narrowly lanceolate, entire, cup at the apex of the pedicel deeply lobed, corolla $\frac{1}{4}$ – $\frac{1}{2}$ in. lobed nearly to the base. *Ceratostema nanum*, *Griff. Notul.* iv. 303; *Is. Pl. Asiat.* t. 105.

NAGA HILLS; *Griffith* (Kew Distrib. n. 3473).

Branches thick, round, glabrous. *Leaves* $3\frac{1}{2}$ by 1 in., narrowed at both ends, glabrous, very coriaceous; petiole $0\frac{1}{2}$ in. *Peduncle* $\frac{1}{6}$ – $\frac{3}{8}$ in.; pedicels, $\frac{1}{4}$ – $\frac{1}{2}$ in., glabrous, cup at their apex irregularly 8–12-toothed; bracts minute. *Calyx-teeth* $\frac{1}{8}$ in., lanceolate, glabrous.—The enlarged base of the stem, shewn in Griffith's drawing, occurs in many of the species of Sects. I., II.

20. **A. Lobbii**, *Clarke*; leaves petioled lanceolate caudate-acuminate, corymbs 4 in. glabrous, corolla $\frac{3}{4}$ –1 in. lobed much more than half-way down.

MOULMEIN; Thoung-gyun, alt. 5000 ft., *Lobb*.

Branches round, glabrous, leafy. *Leaves* $3\frac{1}{2}$ by 1 in., narrowed at the base, entire, coriaceous; petiole $\frac{1}{6}$ – $\frac{1}{4}$ in. *Corymbs* from the axils of the leaves, numerous, large, lax, glabrous; peduncle $\frac{1}{4}$ – $\frac{1}{2}$ in.; pedicels $\frac{1}{4}$ – $\frac{3}{8}$ in., cup at the apex entire not large; bracts $\frac{1}{10}$ in. *Calyx-teeth* $\frac{1}{2}$ in., lanceolate-subulate, glabrous. *Corolla* narrowly-tubular in bud, crimson with a white top (*Lobb*), lobes $\frac{1}{2}$ – $\frac{3}{4}$ in., linear. *Anthers* not spurred. *Fruit* not seen.—Much resembling *A. saligna* (n. 5) in the leaves and corymbs; the deeply divided corolla entirely differing.

21. **A. pilifera**, *Hook. f. ms.*; leaves short-petioled elliptic caudate-acuminate, pedicels subfascicled hairy, corolla $\frac{1}{4}$ in.

KHASIA Mts.; Pomrang, alt. 4000 ft., *H. f. & T.* MISHMI Mts., alt. 4000 ft., *Griffith* (Kew Distrib. n. 3455).

Branches round, slender, sparsely hairy. *Leaves* 3 by $1\frac{1}{2}$ in., suddenly narrowed into the caudate point, base rounded, entire, membranous, glabrous or with scattered hairs; petiole $\frac{1}{2}$ in., hairy. *Pedicels* 1–4 fascicled in the axils, 1 in., hairy, scarcely thickened upwards. *Calyx* of 5 ovate short acute lobes. *Corolla* tubular, lobes oblong acute. *Anthers* spurred on the beak. *Fruit* not seen.

22. **A. bracteata**, *Hook. f. ms.*; leaves shortly petioled elliptic caudate-acuminate, corymbs lax, pedicel with leaf-like bracts $\frac{1}{4}$ – $\frac{1}{2}$ in., corolla $\frac{1}{2}$ – $\frac{1}{2}$ in.

MOULMEIN; Thoung-gyun, alt. 5000 ft., *Lobb, Parish*.

Branches slender, round or somewhat angular, glabrous, pilose towards the tips. *Leaves* 2 by $\frac{3}{4}$ in., broadly cuneate or almost rounded at the base, entire, coriaceous, glabrous; petiole $\frac{1}{6}$ in., hairy. *Corymb* 2 in., peduncle $\frac{1}{4}$ in.; pedicels $\frac{1}{4}$ – $\frac{1}{2}$, hairy, scarcely thickened upwards; bracts broadly lanceolate, usually longer than the pedicels. *Calyx-teeth* $\frac{1}{8}$ in., lanceolate, glabrous or nearly so. *Corolla* narrowly tubular-conic in bud, white and purple (*Lobb*), lobed more than half way down; lobes recurved, apparently linear. *Anthers* spurred on their beaks. *Fruit* not seen.

23. **A. discolor**, *Clarke*; glabrous, leaves subpetioled oblong narrowed at both ends toothed white beneath, calyx-limb campanulate, lobes $\frac{1}{5}$ in. ovate-lanceolate, corolla scarcely $\frac{1}{2}$ in. divided nearly to the base.

SIKKIM HIMALAYA; Teniv Lampa, alt. 3500 ft., *King*. PATKOY Mts.; *Griffith* (Kew Distrib. n. 3463). BHUTAN; Dughla Hills, *Nuttall*.

Branches round, somewhat slender, uniformly leafy. *Leaves* $1\frac{3}{4}$ by $\frac{1}{2}$ – $\frac{3}{8}$ in., acute, tapering at the base, coriaceous. *Peduncles* $\frac{1}{4}$ in., axillary; pedicels $\frac{3}{8}$ in., thickened upwards, top cupped. *Calyx-tube* at base very much wider than the corolla (at flowering time). *Corolla* exceedingly narrowed upwards, the reflexed lobes linear. *Anthers* not spurred. *Fruit* $\frac{1}{2}$ in. diam., globose, narrower upwards; the long calyx-teeth erect.

SECT. V. *Corolla* widely campanulate, straight, lobed much less than half its length. *Corymbs* shortly peduncled.

24. **A. campanulata**, *Clarke*; leaves subsessile elliptic narrowed at both ends, calyx-limb shallowly 5-lobed, corolla $\frac{3}{4}$ by $\frac{1}{2}$ in. *Vaccinium campanulatum*, *Kurz in Journ. As. Soc.* 1873, ii. 85, 1877, ii. 214, and *For. Fl.* ii. 89.

MARTABAN; Nattoung, alt. 7000 ft., *Kurz*. MOULMEIN; *Parish*.

Branches thick, round, glabrous, tips leafy. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{4}$ – $1\frac{1}{2}$ in., acute not acuminate, entire, glabrous, coriaceous. *Corymbs* from the naked branches, glabrous; peduncles $\frac{1}{4}$ in.; pedicels $\frac{1}{2}$ in., thickened upwards; bracts $\frac{1}{2}$ in. *Calyx-limb* lobed hardly half way down. *Corolla* gradually widened upwards from a campanulate base, deep scarlet; lobes $\frac{1}{6}$ – $\frac{1}{4}$ in., broadly triangular, acute. *Anthers* spurred on their beaks. *Fruit* not seen.

SPECIES IMPERFECTLY KNOWN.

25. **A. LINEARIFOLIA**, *Clarke*; glabrous, leaves long linear entire petioled, corymbs peduncled, calyx-teeth $\frac{1}{6}$ in. lanceolate.

MISHMI; Thumath summit, *Griffith* (Kew Distrib. n. 3480).

Griffith's fragments are without flowers. *Branches* round, uniformly leafy. *Leaves* 6 by $\frac{1}{4}$ – $\frac{1}{3}$ in., entire, coriaceous; petiole $\frac{1}{8}$ – $\frac{1}{6}$ in. *Peduncles* $\frac{1}{4}$ – $\frac{1}{2}$ in.; pedicels 4–8 or more, $\frac{1}{2}$ in., thickened upwards, top cupped.—*Peduncles*, pedicels and calyces fleshy, rose-coloured (*Griffith*).

26. **A. GRIFFITHII**, *Clarke*; glabrous, leaves petioled oblong suddenly caudate acuminate entire, peduncles long axillary, calyx-teeth $\frac{1}{8}$ in. ovate acute.

MISHMI or PATKOTE Mts., *Griffith*.

Griffith's example is in young bud. *Branches* round, uniformly leafy. *Leaves* $5\frac{1}{2}$ by $1\frac{3}{4}$ in., with parallel sides, suddenly narrowed into a short tail at the apex, base cuneate, coriaceous; petiole $\frac{1}{5}$ in. *Peduncle* 1 in., axillary; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., thickened upwards, articulate under the flowers; bracts $\frac{1}{12}$ in.

2. **PENTAPTERYGIIUM**, *Klotzsch*.

Shrubs often epiphytic, stems often greatly thickened at the base. *Leaves* alternate, ovate or lanceolate, toothed or subentire, coriaceous, often with glands at the apex of the petiole. *Flowers* axillary, corymbose, fascicled or solitary; pedicels thickened upwards, cupped and articulate under the ovary; bracts small. *Calyx-tube* 5-angled or -winged; lobes 5, enlarged in fruit. *Corolla* tubular, shortly 5-lobed, rose or red with transverse marks, or yellow. *Stamens* 10, epigynous, filaments short; anthers elliptic, produced upwards in 2 long beaks opening by terminal pores or slits, beaks often 2-spurred behind. *Ovary* 5-celled or spuriously 10-celled; style cylindric, stigma subcapitate; ovules very many. *Berry* 5-winged, or distinctly 5-ribbed, 5-celled or spuriously 10-celled. *Seeds* very many, ellipsoid, outer coat very lax.—Species 5, of the Eastern Himalaya and Khasia.

* *Leaves* less than $\frac{3}{4}$ in., pedicels subsolitary, anthers without spurs on their beaks.

1. **P. serpens**, *Klotzsch in Linnæa*, xxiv. 47; leaves elliptic-oblong subentire. *Vaccinium serpens*, *Wight Ill.* t. 141, D, fig. 2 and *Ic.* t. 1183; *Hook. f. Ill. Him. Pl.* t. 15, B. *Thibaudia myrtifolia*, *Griff. Notul.* iv. 301, and *Ic. Pl. Asiat.* t. 510.

SIKKIM and BHOTAN; alt. 3–8000 ft., *Griffith, J. D. H., &c.*

Branches pendulous, hispid, densely leafy. *Leaves* subsessile, bifarious, $\frac{3}{4}$ by $\frac{1}{2}$ in., acute, rounded at the base, coriaceous, glabrous, margins recurved. *Pedicels* $\frac{1}{2}$ –1 in.,

with patent glandular hairs. *Calyx-teeth* $\frac{1}{2}$ in., lanceolate, subobtus, glandular-hairy, enlarged in fruit. *Corolla* $\frac{3}{4}$ by $\frac{1}{2}$ in., tubular, shortly lobed, hairy without, bright-red with transverse V-shaped marks. *Fruit* $\frac{1}{2}$ in. diam, turbinate-globose, conspicuously 5-winged.

** *Leaves* 2-5 in., *pedicels fascicled or corymbose*. *Anthers spurred on their beaks*.

2. ***P. rugosum***, *Hook. f. in Bot. Mag.* t. 5198; leaves lanceolate serrate glabrous, corymbs short-peduncled few-flowered, corolla rose-red transversely marked. *Gaylussaccia* sp., *Griff. Itin. Notes*, 84, n. 1217. *G. incurvata*, *Griff. Ic. Pl. Asiat.* t. 503. *G. serrata*, *Griff. Itin. Notes*, 37, and n. 604 in *Herb.*, not *G. serrata*, *Griff. Ic. Pl. Asiat.* t. 507.

BHOTAN and KHASIA Mts.; alt. 3-7000 ft., *Griffith, H. f. & T.*, &c.

Branches stout, hirsute towards the extremities. *Leaves* subsessile, 4 by $1\frac{1}{4}$ in., acute, base obtuse or rounded, coriaceous, rugose with impressed nerves, margins often recurved. *Peduncle* $\frac{1}{4}$ in.; *pedicels* $\frac{3}{4}$ - $1\frac{1}{2}$ in., hairy or glabrescent; *bracts* $\frac{1}{2}$ in. *Calyx-lobes* in early flower $\frac{1}{2}$ in., lanceolate or scarcely triangular; in early fruit enlarged, elliptic or ovate, foliaceous, overlapping at the margins, appearing decurrent down the young fruit and produced beneath it; in ripe fruit again less prominent, triangular, scarcely overlapping. *Corolla* $\frac{3}{4}$ by $\frac{1}{2}$ in., tubular, shortly lobed, glabrous, white or rose, with red transverse V-shaped marks. *Berry* $\frac{1}{2}$ in. and more, widely hemispheric, 5-ribbed, hardly 5-gonal.

3. ***P. Listeri***, *King ms.*; leaves elliptic-oblong acute subentire glabrous not rugose beneath, corymbs small very short-peduncled, corolla small rose-red.

BHOTAN; Duple Hills, alt. 7000 ft., *Lister*.

Branches stout, angular towards the extremities. *Leaves* subsessile $3\frac{1}{2}$ by $1\frac{1}{4}$ in., obtuse, shortly cordate at the base, nerves (primary and secondary) elevated on the upper surface. *Peduncles* from beneath the leaves, $\frac{1}{2}$ - $\frac{1}{2}$ in.; *pedicels* 2-3, $\frac{1}{2}$ in.; *bracts* $\frac{1}{8}$ in. *Calyx-lobes* $\frac{1}{2}$ in., broadly elliptic, obtuse in bud. *Corolla* (in bud) $\frac{1}{2}$ - $\frac{1}{2}$ in. long.—Closely allied to *P. rugosum* and as though a starved form of it with depauperated corymbs and small flowers; but the texture and nervation of the leaves give it a widely different appearance.

4. ***P. flavum***, *Hook. f. in Bot. Mag.* t. 4910; leaves elliptic acute subentire or slightly crenate glabrous or silky on the midrib beneath, pedicels densely fascicled hardly corymbose, corolla yellow.

BHOTAN; Duple Hills, *Nuttall*.

Branches round, pubescent towards the extremity. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{4}$ in., rounded at the base, coriaceous, rugose, obscurely crenate; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in. *Pedicels* $\frac{3}{4}$ in., pilose, thickened upwards, densely fascicled on very short spurs; *bracts* $\frac{1}{2}$ in., lanceolate; *pedicels* and *calyx-tube* corolloid, yellowish (in the Kew picture). *Calyx-lobes* in flower $\frac{1}{2}$ in., elliptic-lanceolate, striate, pilose. *Corolla* $\frac{2}{3}$ by $\frac{1}{2}$ in., tubular, inflated in the middle, shortly lobed, pubescent without, yellow. *Berry* $\frac{1}{2}$ in. diam. and upwards, crowned by the spreading narrowly lanceolate acute calyx-teeth.

5. ***P. Hookeri***, *Clarke*; leaves elliptic acute crenate or serrate glabrous or hairy on the midrib beneath, pedicels fascicled or hardly corymbose, corolla yellow.

SIKKIM; alt. 5-8000 ft., *J. D. H., Treutler, &c.*, frequent. BHOTAN; *Nuttall*.

Intermediate between *P. rugosum* and *P. flavum*; the dried examples are (from the serrated leaves) always arranged under *P. rugosum*, but the corolla is a clear yellow or (when young) a greenish-yellow. The calyx-lobes in the buds are larger and more obtuse than in any flowering or fruiting example of *P. rugosum*; the pedicels are subsfascicled; nevertheless, it appears really more allied to *P. rugosum* than to *P. flavum*.

3. **VACCINIUM**, Linn.

Shrubs, sometimes epiphytic. *Leaves* alternate, from lanceolate to ovate, entire or serrate, sometimes falsely whorled. *Flowers* usually small, axillary or terminal, racemed fascicled or corymbose rarely solitary, usually bracteate and 2-bracteolate. *Calyx-tube* globose; teeth 5, small. *Corolla* tubular or ovoid, 5-lobed, white, rose or yellow-green. *Stamens* 10, epigynous, free; anthers oblong, produced at the apex into 2 cylindric tubes with terminal slits or spurs (tubes very short in *V. bancanum*). *Ovary* 5-celled, or falsely 10-celled; style cylindric, stigma simple; ovules few or several in each cell. *Berry* globose, crowned by the calyx-teeth; 5- (apparently 10-) celled. *Seeds* 1 or more in each cell, ellipsoid, compressed; testa firm, smooth.—Species 100, natives of the N. hemisphere and tropical mountains.

The Indian species all belong to the subgenus *Epigynium* (genus Klotzsch), and the foregoing generic character does not include some non-Indian subgenera.

* Leaves small, $1\frac{1}{2}$ in. or less (see also *V. Griffithianum*, n. 15).

1. **V. Nummularia**, H. f. & T. ms.; leaves $\frac{1}{2}$ in. broadly elliptic obtuse subentire, racemes often clustered, calyx-teeth very short obtusely triangular.

SIKKIM and BHOTAN; alt. 8–10,000 ft., Griffith, J. D. H., &c.

A small, rigid epiphyte; branches pendent, densely hirsute, almost bristly. *Leaves* subsessile, coriaceous, glabrous, margins recurved. *Racemes* 1–2 in., rose-coloured; rachis hairy; pedicels $\frac{1}{2}$ in., glabrous; bracts $\frac{1}{2}$ in., elliptic, caducous. *Corolla* $\frac{1}{2}$ by $\frac{1}{12}$ in., tubular, shortly lobed, glabrous, rosy. *Filaments* with long hairs; anthers dehiscing by slits below the apex, dorsal spurs very large. *Fruit* $\frac{1}{2}$ in. diam., subglobose, crowned by the obscurely toothed calyx-limb.

2. **V. retusum**, Hook. f. ms.; leaves 1 in. obovate-oblong obtuse entire, racemes solitary or clustered, calyx-teeth very short obtusely triangular. *Thibaudia retusa*, Griff. Notul. iv. 300, and Ic. Pl. Asiat. t. 509.

SIKKIM and BHOTAN; alt. 7–9000 ft., Griffith, J. D. H., &c.

A small epiphyte; branches pendent, pubescent upwards. *Leaves* often obtuse or emarginate, base attenuate, scarcely petioled, coriaceous, glabrous, margins recurved. *Racemes* white, 1–2 in., glabrous or the rachis pilose; pedicels $\frac{1}{2}$ – $\frac{1}{3}$ in.; bracts $\frac{1}{2}$ – $\frac{1}{3}$ in., elliptic, caducous. *Corolla* $\frac{1}{2}$ by $\frac{1}{8}$ – $\frac{1}{10}$ in., ovoid-tubular, shortly lobed, glabrous, white with 5 red stripes. *Filaments* with long hairs; anthers dehiscing by slits below the apex, dorsal spurs very large. *Fruit* $\frac{1}{2}$ in. diam., subglobose, crowned by the obscurely-toothed calyx-limb.

3. **V. sikkimense**, Clarke; leaves 1 in. obovate-oblong acute serrulate, racemes short solitary or clustered, calyx-teeth very short obtuse nearly glabrous.

SIKKIM HIMALAYA; Lachen, alt. 13,000 ft., J. D. H.

A rigid, small shrub; branches pubescent upwards. *Leaves* subsessile, coriaceous, glabrous, margins recurved. *Racemes* only seen in bud; bracts $\frac{1}{2}$ in. elliptic, caducous. *Corolla* $\frac{1}{2}$ in., lobed deeply. *Filaments* hairy; anthers dehiscing by long slits below the apex, not spurred. *Fruit* not seen.

4. **V. pumilum**, Kurz in Journ. As. Soc. 1873, ii. 85; leaves $\frac{3}{4}$ –1 in. elliptic narrowed at both ends obtuse, racemes solitary pubescent, calyx-teeth lanceolate pubescent. Kurz in Journ. As. Soc. 1877, ii. 214, and For. Fl. ii. 90.

BIRMA; Martaban Hills, alt. 4–6000 ft., Kurz, Brandis.

A small, much-branched epiphyte; branches pubescent upwards. *Leaves* subsessile, obscurely crenate-serrate, coriaceous, glabrous, margins recurved. *Racemes* 1–2

in., pubescent-pilose; pedicels $\frac{1}{8}$ – $\frac{1}{6}$ in.; bracts elliptic, white, caducous. *Calyx-tube* pilose, teeth $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ in., oblong-urceolate, shortly lobed, glabrous without, rose-coloured. *Filaments* pilose; anthers spurred. *Berries* small, purple.

** Leaves $1\frac{1}{2}$ –8 in.

† *Racemes* axillary, solitary or subumbellate from whorls of leaves.

5. **V. serratum**, *Wight Ic. t. 1184*; branchlets glabrous, leaves lanceolate serrate often whorled, peduncles mostly terminal umbelled not clothed with broad bracts at their bases, corolla glabrous without. *Thibaudia serrata*, *Wall. Cat. 6299*. *Ceratostemma vacciniaceum*, *Roxb. Fl. Ind. ii. 412*. *Gaylussaccia serrata*, *Lindl. in Royle Ill. 257, t. 79, fig. 2*; *DC. Prodr. vii. 558*. *Agapetes serrata*, *G. Don Gen. Syst. iii. 882*. *Epigynium serratum*, *Klotzsch in Linnæa*, xxiv. 50.

SIKKIM, BHOTAN and KHASIA Mts.; alt. 3–7000 ft., frequent.

A stout epiphyte; branches often greatly thickened at their base. *Leaves* subsessile, $2\frac{1}{2}$ by $\frac{3}{4}$ in., acute, remotely crenate-serrate nearly to the base, glabrous. *Racemes* 2 in., often 3–4 springing umbellately from the terminal whorl of leaves, glabrous or nearly so; bracts $\frac{1}{10}$ in., lanceolate, serrate, those at the base of the peduncles hardly larger. *Calyx-tube* smooth; teeth minute, triangular. *Corolla* $\frac{1}{4}$ by $\frac{1}{8}$ in., tubular, very shortly lobed, yellow-green. *Filaments* glabrous; anthers not spurred, dehiscing by long slits from below the apex. *Berry* $\frac{1}{8}$ in. diam., globose, glistening, white or yellowish.

VAR. leucobotrys; leaves elliptic acute from a broad or almost rounded base. *Epigynium leucobotrys*, *Nutt.*; *Bot. Mag. t. 5103*.—BHOTAN; Duphla Hills, *Nuttall*.

VAR. Nuttallii; leaves 7 by $2\frac{1}{4}$ in. crenate (not serrate) rugose with nerves impressed on the upper surface.—Bhotan, *Nuttall*.—This may be specifically distinct, the leaves differing very much both in size and texture.

6. **V. venosum**, *Wight Ic. t. 1185*; branchlets glabrous, leaves lanceolate crenate-serrate, peduncles mostly terminal umbelled clothed with numerous imbricated elliptic bracts at their bases, corolla puberulous without. *Epigynium venosum*, *Klotzsch in Linnæa*, xxiv. 50.

MISHMEE; Thuratha summit, *Griffith* (Kew Distrib. n. 3461). KHASIA Mts.; *Griffith*.

A stout, glabrous epiphyte; branches round. *Leaves* $3\frac{1}{2}$ by $\frac{3}{4}$ –1 in., acute, suddenly narrowed to the very short petiole, remotely crenate-serrate nearly to the base, coriaceous. *Racemes* 2–3 in.; pedicels $\frac{1}{8}$ – $\frac{1}{4}$ in.; bracts as long as the pedicels, elliptic, caducous, the lowest persistent. *Calyx-tube* rough with circular glands; teeth small, acute. *Corolla* $\frac{1}{2}$ by $\frac{1}{10}$ in., ovoid-conic. *Filaments* glabrous; anthers without spurs, dehiscing by long slits below the subentire apex. *Fruit* not seen.

VAR. hispida; branchlets hispid-pilose upwards, leaves often smaller. *Gaylussaccia serrata*, *Griff. Ic. Pl. Asiat. t. 507, not of Lindl.*—Sikkim and Bhotan, alt. 4–7000 ft., frequent, *Griffith, J. D. H., &c.*, frequent.—Leaves varying much in size and texture, in the Alpine examples only $1\frac{1}{2}$ in. long, in *Nuttall's* examples herbaceous, little coriaceous. In *Griffith's* examples greatly resembling those of *V. serratum*. *Berries* $\frac{1}{8}$ in. diam., globose.

7. **V. ardisioides**, *Hook. f. ms.*; glabrous, leaves sessile elliptic acuminate entire, peduncles umbelled in the terminal whorl of leaves without imbricated bracts at their base, corolla glabrous without.

MOULMEIN; Thoun-gyun, alt. 6000 ft., *T. Lobb*; Nattoung expedition, *Parish*.

Branches 2 ft., naked, with terminal whorls of leaves. *Leaves* closely sessile, $4\frac{1}{2}$ by $1\frac{1}{2}$ in., rounded at the base, coriaceous. *Racemes* coloured, 2–3 in.; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., thickened upwards; bracts $\frac{1}{2}$ in., linear-lanceolate. *Calyx* glabrous, limb shortly campanulate, obscurely 5-pointed. *Corolla* $\frac{1}{4}$ by $\frac{1}{8}$ in., ovoid-conic, deeply lobed. *Filaments* glabrous; anthers spurred, opening by long slits from the subentire apex. *Fruit* not seen.

8. **V. Dunalianum**, *Wight Ic. t. 1194*; glabrous, leaves subpetioled oblong-lanceolate caudate-acuminate entire, racemes axillary solitary, corolla glabrous without. Epigynium *Dunalianum*, *Klotzsch in Linnæa*, xxiv. 31. *Thibaudia revoluta*, *Griff. Ic. Pl. Asiat. t. 513*.—*Thibaudiaceæ*, *Griff. Itin. Notes 152*, n. 752.

SIKKIM, BHOTAN and KHASIA Mts., alt. 5–8000 ft., frequent.

A large, erect shrub; branches angular, uniformly leafy. *Leaves* 4 by 1–1½ in., the linear point often nearly 1 in., base cuneate, coriaceous, margins recurved. *Racemes* 1–3 in.; pedicels $\frac{1}{6}$ – $\frac{1}{4}$ in.; bracts round-ovate, margins scarious, densely imbricate, a few persistent at flowering-time, usually deciduous before fruiting. *Calyx-teeth* small, triangular. *Corolla* $\frac{1}{2}$ in., ovoid-conic. *Filaments* glabrous; anthers spurred, dehiscing by slits at their subentire apex. *Berry* $\frac{1}{2}$ in. diam., globose.

9. **V. gualtheriæfolium**, *Hook. f. ms.*; glabrous, leaves large shortly petioled elliptic acute remotely crenate-serrate, racemes axillary solitary. *Thibaudia gualtheriæfolia*, *Griff. Ic. Pl. Asiat. t. 512*.—*Thibaudiaceæ*, *Griff. Itin. Notes, 136*, n. 590.

BHOTAN; banks of the Koollong, *Griffith* (Kew Distrib. n. 3468/1). SIKKIM; Catzuperri Lake, alt. 7000 ft., *J. D. H.*

A shrub, 8 ft. high; branches compressed. *Leaves* 4½ by 2 in., rhomboid or rounded at the base, coriaceous, nerves impressed above, glaucous-white beneath; petiole $\frac{3}{8}$ – $\frac{1}{2}$ in. *Racemes* 2–3 in.; pedicels $\frac{1}{2}$ in. *Berries* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., globose, blue-black.—*Griffith's* examples are in advanced fruit, showing no trace of bracts; corolla unknown.

10. **V. glauco-album**, *Hook. f. ms.*; glabrous, leaves obovate-oblong acute closely mucronate-serrate, racemes axillary dense with large white subpersistent bracts and bracteoles.—*Thibaudia*, *Griff. Itin. Notes, 154*, n. 762.

SIKKIM HIMALAYA; Lachen and Lachoong, alt. 9–10,000 ft., *J. D. H.* BHOTAN; Tongsa, alt. 7500 ft., *Griffith* (Kew Distrib. n. 3478).

A shrub; branches angular. *Leaves* 2½ by 1–1½ in., not acuminate, base cuneate, coriaceous, nerves impressed above, white beneath; petiole 0–½ in. *Racemes* 2–3 in.; pedicels $\frac{1}{8}$ – $\frac{1}{4}$ in.; bracts $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{8}$ – $\frac{1}{3}$ in., extending to the top of the raceme, and often persistent till the fruit is ripe; bracteoles 2–1 on each pedicel, $\frac{3}{8}$ – $\frac{1}{2}$ in., linear-lanceolate, resembling the bracts. *Calyx-teeth* minute, triangular. *Corolla* $\frac{1}{4}$ – $\frac{1}{2}$ in., ovoid-conic, white tinged pink (*J. D. H.*). *Filaments* densely hairy; anthers long-spurred, dehiscing by long slits from the subentire apex. *Berry* $\frac{1}{2}$ in. diam., globose.

11. **V. arbutoides**, *Clarke*; leaves large ovate acuminate entire glabrous, racemes axillary solitary pilose, calyx-teeth $\frac{1}{2}$ in. lanceolate pilose.

SOUTH-EAST ASSAM; PATKOY Mts.; *Griffith* (Kew Distrib. n. 3469).

A stout shrub; branches glabrous. *Leaves* 5 by 2½ in., suddenly acuminate, base rhomboid or rounded, very coriaceous; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in., very stout. *Racemes* 2½ in.; pedicels $\frac{1}{2}$ in.; bracts caducous. *Calyx-tube* subglobose, densely pilose; teeth erect, somewhat striate.—Neither corolla nor fruit seen; unmistakable as a species, and (almost without doubt) of this genus.

†† *Racemes* alternate, corymbose or subcorymbose towards the ends of the branchlets.

12. **V. Donianum**, *Wight Ic. t. 1191*; glabrous, leaves lanceolate or oblong acuminate, bracts linear or very narrowly lanceolate caducous, pedicels and calyx glabrous, anthers spurred. *Kurz in Journ. As. Soc. 1877*, pt. ii. 215 (exclud. var. β) and *For. Fl. ii. 91*. *V. affine*, *Wight Ic. t. 1190*. *Thibaudia Sprengelii*, *Wall. Cat. 6298*. *Agapetes Sprengelii*, *G. Don Gen. Syst. iii. 862*; *DC. Prodr. vii. 555*. Epigynium *Donianum*, *Sprengelii* and affine, *Klotzsch in Linnæa*, xxiv. 51, 50.

KHASIA Mts.; alt. 3-5000 ft., common. PEGU; alt. 3-6000 ft., frequent.

An erect shrub; branches round, not thick. *Leaves* $2\frac{1}{2}$ by $\frac{1}{2}$ -1 in., subsessile, narrowed at both ends, minutely crenate-serrate, nerves distinct beneath. *Racemes* 1-4 in.; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in.; bracts $\frac{1}{2}$ by $\frac{1}{4}$ in. (or narrower), usually caducous; bracteoles linear, caducous. *Calyx-teeth* small, triangular. *Corolla* $\frac{1}{2}$ by $\frac{1}{2}$ in., tubular, glabrous without. *Filaments* hairy; anthers opening by short slits from the crenulated apex. *Berry* $\frac{1}{2}$ in. diam., globose or broader than long.

13. **V. malaccense**, *Wight Ic.* t. 1186; leaves shortly petioled lanceolate or elliptic narrowed at both ends, bracts linear or lanceolate caducous, pedicels and calyx pubescent, anther-spurs most minute. *Miq. Fl. Ind. Bat. Suppl.* 587. *Epigynium malaccense*, *Klotzsch in Linnæa*, xxiv. 50.

MALACCA; *Griffith, Lobb, Maingay*. SINGAPORE; *Schomburgk*.—DISTRIB. JAVA, BANGKA.

An erect shrub; branchlets glabrous, angular, not thick. *Leaves* $2\frac{1}{2}$ by $\frac{3}{4}$ -1 in., minutely crenate-serrate, nerves distinct beneath. *Racemes* 2-3 in., pubescent; pedicels $\frac{1}{2}$ - $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ - $\frac{3}{4}$ by $\frac{1}{2}$ - $\frac{3}{4}$ in., caducous. *Calyx-teeth* minute, triangular. *Corolla* $\frac{1}{2}$ by $\frac{1}{2}$ in., ovoid-tubular, pubescent without. *Filaments* longer than in preceding species, glabrous in Wight's figure, with lax hairs in our examples; anthers with terminal crenate-serrate pores; spurs most minute in Wight's examples, wanting in some others. *Berry* $\frac{1}{2}$ in. diam., globose.

VAR. *Lobbii*; racemes calyx and corolla glabrous, corolla rather larger. V. *Donianum*, var. β , *Kurz in Journ. As. Soc.* 1877, ii. 215.—Moulmein; Thong-gyun, alt. 6000 ft., *Lobb*.

14. **V. bancanum**, *Miq. Fl. Ind. Bat. Suppl.* 587; leaves elliptic narrowed at both ends entire, racemes glabrous or minutely pubescent, anther-beaks very short or 0. V. *exaristatum*, *Kurz in Journ. As. Soc.* 1873, pt. ii. 86, 1877, pt. ii. 215, and *For. Fl.* ii. 91.

MARTABAN; *Kurz*. MALACCA; Mt. Ophir, *Maingay* (n. 699).—DISTRIB. BANGKA.

An erect shrub; branches glabrous or minutely pubescent upwards. *Leaves* 2 by 1 in., obtusely acuminate, base cuneate almost petioled, coriaceous, glabrous, nerves beneath obscure. *Racemes* 1-3 in.; pedicels $\frac{1}{2}$ in.; bracts narrow, caducous, *Calyx-tube* (in the Mt. Ophir plant) densely pilose; teeth minute, obtuse. *Corolla* $\frac{1}{2}$ by $\frac{1}{2}$ in., glabrous without or nearly so; style much exserted. *Filaments* rather long, and (with the disk) very hairy; anther-cells oblong, opening by apical pores, hardly beaked. *Fruit* not seen.—The Bangka plant has the calyx-tube glabrescent. Some of the Mt. Ophir examples have much smaller and narrower leaves, $1\frac{1}{4}$ by $\frac{1}{2}$ in. only.

15. **V. Griffithianum**, *Wight Ic.* t. 1192; leaves small oblong acute at both ends serrulate glabrous, racemes minutely pubescent, bracts leaf-like subsistent, calyx sparsely minutely pilose teeth ovate acute dentate, corolla glabrous without. *Epigynium Griffithianum*, *Klotzsch in Linnæa*, xxiv. 51. *Thibaudia camelifolia*, *Griff. Notul.* iv. 301, and *Ic. Pl. Asiat.* t. 516.

KHASIA Mts.; alt. 3-5500 ft., frequent.—DISTRIB. South China.

An erect shrub, 6 ft. high; branches glabrous, pubescent towards the extremities. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ - $\frac{3}{4}$ in., minutely acutely serrulate; petiole very short, often pubescent. *Pedicels* $\frac{1}{2}$ - $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ - $\frac{1}{2}$ in., some of the upper often persistent in fruit. *Calyx-teeth* $\frac{1}{16}$ in., often glandular-denticulate. *Corolla* $\frac{1}{2}$ by $\frac{1}{10}$ in. *Filaments* hairy; anthers dehiscing by short apical slits, beaks spurred. *Berry* $\frac{1}{2}$ in. diam., globose.

VAR. *glabrata*, H. f. & T.; innovations raceme and calyx glabrous or nearly so.—Khasia Mts.—This is, of all the Indian forms, that most like *V. bracteatum*, Thunb., with which Mr. Benthham has suggested (*Fl. Hongk.* 200) that perhaps *V. Donianum*, *Griffithianum* and *nilgherrense* might all be united.

16. **V. nilgherrense**, *Wight Ic.* t. 1189; leaves lanceolate acute at both ends crenate glabrous, bracts leaf-like subsistent, calyx closely cinereous-

pubescent, teeth triangular acute entire, corolla pubescent without. Epigynium *neilgherrense*, *Klotzsch in Linnæa*, xxiv. 50.

NILGHERRY MTS.; alt. 4-8000 ft., frequent.

Closely resembling *V. Griffithianum*, differing in the points stated and in the larger leaves, $2\frac{1}{2}$ -3 by $\frac{1}{2}$ - $\frac{2}{3}$ in. *V. chinense*, Champ. in Hook. Kew Journ. iv. 297, does not appear to differ except by the wider ovate or oblong leaves.

17. **V. Leschenaultii**, *Wight Ic.* t. 1188; leaves ovate or oblong acute or obtuse minutely toothed glabrous, racemes pubescent, bracts caducous, anthers spurred. *Bedd. Fl. Sylv.* t. 277. *Andromeda symplocifolia*, *Wull. Cat.* 1522. *Agapetes symplocifolia*, *G. Don Gen. Syst.* iii. 862; *DC. Prodr.* vii. 555. A. ? arborea, *DC. Prodr.* vii. 555. Epigynium *Leschenaultii*, *Klotzsch in Linnæa*, xxiv. 50.

MTS. of SOUTHERN INDIA and CEYLON; alt. 4-8000 ft., common.

The typical form of this species hardly differs from *V. Donianum*, n. 12, but by the pubescent innovations and racemes, the flowers and berries are rather larger. The leaves are 2-3 in. long, elliptic-lanceolate. The following varieties differ however considerably in general aspect.

VAR. *arborea*, *Leschenault*; arboreous, branchlets and racemes very stout nearly glabrous, pedicels $\frac{1}{2}$ in., berries $\frac{1}{2}$ in. diam. and upwards.

VAR. *rotundifolia*; leaves 1-1 $\frac{1}{2}$ in. diam. orbicular obtuse sometimes retuse. *V. rotundifolia*, *Wight Ill.* t. 139; *Bedd. For. Man.* p. 136.—Ceylon.

VAR. *zeylanica*; bracts large leaf-like and as persistent as the leaves, so that the pedicels are axillary solitary.—Ceylon, *Thwaites*, &c. This remarkable plant appears to be a form of the var. *arborea*; the bracts (in *Thwaites*, n. 270) attain 1 $\frac{1}{2}$ by $\frac{2}{3}$ in. and are coriaceous; pedicels $\frac{1}{2}$ in., stout, recurved in fruit; berries large. It is connected with *V. Leschenaultii* by intermediate forms having large but membranous subcaducous bracts.

4. CORALLOBOTRYS, *Hook. f.*

An epiphytic shrub; branches round. Leaves alternate, petioled, lanceolate, acuminate, obtusely serrate, coriaceous, base 2-glandular. Peduncles axillary, from below the leaves; flowers corymbose; pedicels thickened upwards, articulated and cup-shaped under the ovary; bracts very small. Calyx-tube hemispheric; lobes 5, small, triangular, persistent. Corolla small, globose-campanulate, red; teeth 5, small, recurved. Stamens 10, epigynous, free; anthers oblong, produced into 2 short tubes upwards, dehiscing by short terminal slits. Ovary 5-celled; style cylindric, somewhat thickened in the middle, stigma capitate; ovules numerous in each cell. Fruit unknown.

C. acuminata, *Hook. f. in Gen. Pl.* ii. 575. *Thibaudia acuminata*, *Wall. Cat.* 6297. *Agapetes acuminata*, *G. Don Gen. Syst.* iii. 862; *DC. Prodr.* vii. 554. Epigynium *acuminatum*, *Klotzsch in Linnæa*, xxiv. 51; *Bot. Mag.* t. 5010. *Vaccinium acuminatum*, *Kurz in Journ. As. Soc.* 1877, pt. ii. 214, and *For. Fl.* ii. 90.

KHASIA MTS.; alt. 3-4000 ft., *Wallich*, *Griffith*, *H. f. & T.*, &c. BHOTAN, *Nuttall*. ? PEGU, *Griffith*.

A shrub, 2-4 ft.; branches thick. Leaves 5 by 1 $\frac{1}{2}$ in., sometimes 10 by 2 $\frac{1}{2}$ in.; base cuneate, glabrous; petiole $\frac{1}{8}$ - $\frac{2}{5}$ in. Corymbs red; peduncle $\frac{1}{8}$ - $\frac{1}{2}$ in.; pedicels $\frac{1}{2}$ in.; bracts $\frac{1}{16}$ in. Calyx-tube cinereous pubescent or glabrous; teeth $\frac{1}{16}$ in. Corolla $\frac{1}{2}$ by $\frac{1}{8}$ in., glabrous or glandular-puberulous without. Filaments short, sparsely pilose; anther-cells glandular-scabrid.

ORDER LXXXII. **ERICACEÆ.** (By C. B. Clarke.)

Shrubs, trees or perennial herbs. *Leaves* alternate or apparently whorled, entire or serrate; stipules 0. *Flowers* racemed, clustered or solitary; pedicels bracteate and often 2-bracteolate. *Flowers* regular, or in *Rhododendron* sometimes irregular, sometimes dimorphic. *Calyx* free (or in *Diplycosia* sometimes much adnate to the ovary), 5- (rarely 4-6-)fid or 5-partite. *Corolla* hypogynous, often campanulate or urceolate, sometimes deeply lobed or (in *Pyrola*) petals free; lobes 5-20. *Stamens* 10, vary 5, 8 or 20, hypogynous or slightly attached to the base of the corolla (in *Diplycosia* sometimes epigynous); filaments free; anthers oblong, opening by pores or slits at the apex (in *Diplarche* by longitudinal slits), the cells often produced upwards into tubes, sometimes dorsally spurred. *Ovary* 5- (or 4-16-)celled; style cylindric; stigma simple or shortly lobed; ovules many in the inner angles of the cells, or placenta often pendulous from the upper angle. *Fruit* capsular, loculicidally or septicidally 5-valved; in *Gaultheria* and *Diplycosia* enclosed by the enlarged succulent calyx, appearing baccate. *Seeds* many (rarely few) in each cell, albuminous; testa close or loose or produced.—Species 1000, in all parts of the globe.

TRIBE I. **Andromedææ.** *Corolla* gamopetalous. *Capsule* loculicidally 5-valved.

* *Calyx* in fruit succulent, surrounding the capsule.

Anthers with 2 horns on their back 1. GAULTHERIA.
Anthers without horns on their back 2. DIPLYCOSIA.

* *Calyx* in fruit unaltered.

† *Flowers* fascicled or solitary.

Leaves very small, densely imbricated, adpressed to the stem . . . 3. CASSIOPE.
Leaves petioled, clustered at the ends of the branches 6. ENKIANTHUS.

† *Flowers* racemed.

Seeds linear-oblong, not margined 5. PIERIS.
Seeds orbicular-compressed margined 4. LEUCOTHOE.

TRIBE II. **Rhodoreæ.** *Corolla* gamopetalous. *Capsule* septicidal:

Anthers opening by longitudinal slits 7. DIPLARCHE.
Anthers opening by terminal pores 8. RHODODENDRON.

TRIBE III. **Pyroleæ.** *Corolla* polypetalous. Herbs.

Flowers racemose. *Capsule* loculicidal, dehiscing from the base. 9. PYROLA.

1. **GAULTHERIA**, Linn.

Shrubs, erect or procumbent. *Leaves* persistent, alternate, serrulate. *Flowers* small, sometimes dimorphic; racemose or axillary and solitary; bracteate and 2-bracteolate. *Calyx* ovoid, 5-fid, in fruit enlarged coloured succulent and enclosing the capsule. *Corolla* ovoid-tubular, greenish-white or reddish; teeth small, recurved. *Stamens* 10; filaments more or less dilated, pilose; anther-cells more or less produced upwards, dorsally 1-2-horned; in the dimorphic flowers the stamens are small with simple anthers. *Ovary* 5-celled; style cylindric, stigma simple; ovules many in each cell. *Capsule* 5-celled, loculicidally 5-valved from the apex. *Seeds* many, minute, subglobose, obtusely angled.—Species 90, mostly American, a few in New Zealand, Australia, Malaya and Eastern Asia.

Small, procumbent, leaves less than $\frac{3}{4}$ in. long, flowers axillary solitary.

1. **G. nummularioides**, *Don Prodr.* 150; stem prostrate hirsute, leaves ovate from a rounded base, anther-cells shortly produced 2-horned at the apex. *Wall. Cat.* 1524; *Royle Ill.* 260, t. 63, fig. 2. *G. repens*, *Blume Bijl.* 857; *DC. Prodr.* vii. 593. *G. Nummulariæ*, *DC. Prodr.* vii. 592. *Gaultheria* sp., *Griff. Ic. Pl. Asiat.* t. 518, fig. 2. *Pernettya repens*, *Zoll.; Miq. Fl. Ind. Bat.* ii. 1054.

Throughout the HIMALAYA; alt. 5-9000 ft.; and KHASIA Mts., alt. 4-6000 ft. frequent.—DISTRIB. Java.

Covering banks closely with its much-branched, densely leafy stems. *Leaves* $\frac{1}{2}$ by $\frac{1}{2}$ in., acute, minutely petioled, subentire, glabrous above, setulose beneath and frequently on the margin. *Pedicels* $\frac{1}{10}$ in., densely clothed with coriaceous glabrous ovate-oblong bracts $\frac{1}{2}$ in. long. *Calyx-teeth* $\frac{1}{10}$ in., lanceolate. *Corolla* $\frac{1}{2}$ by $\frac{1}{2}$ in., wide, tubular, reddish or nearly white, lobes minute. *Capsule* $\frac{1}{2}$ in. diam., succulent; calyx blue-black.

2. **G. trichophylla**, *Royle Ill.* 260, t. 63, fig. 3; stems prostrate more or less hirsute upwards, leaves oblong from a cuneate base, anther-cells not produced upwards, with a spreading spur below the pore. *DC. Prodr.* vii. 592.

ALPINE HIMALAYA; alt. 10-13,000 ft.; from LAHUL, *Jaeschke.* to SIKKIM, *J. D. H.*

Stems wiry, much branched, 6-12 in. *Leaves* $\frac{1}{4}$ by $\frac{1}{2}$ in., subsessile, entire or obscurely crenulate, glabrous on both surfaces, margins usually long-ciliate. *Pedicels* $\frac{1}{10}$ in., densely clothed by ovate bracts $\frac{1}{5}$ in. long. *Calyx-teeth* $\frac{1}{10}$ in., ovate-oblong. *Corolla* $\frac{1}{2}$ in. long and broad, wide campanulate, red or nearly white. *Capsule* $\frac{1}{2}$ in. diam.; succulent calyx blue-black.

** *Erect shrubs, leaves large (except G. pyrolæfolia), flowers racemed.*

3. **G. pyrolæfolia**, *Hook. f. ms.*; glabrous or the pedicels minutely pilose, leaves elliptic-obovate obtuse, anther-cells 2-horned at the apex.

SIKKIM; alt. 13,000 ft.; Lachen, *J. D. H.*; Mon Lepcha and Jongri, *J. D. H., Clarke.*

Stems woody, suberect, 4-8 in. high. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$ -1 in., narrowed at the base, crenate, glabrous or with few minute bristles. *Racemes* $1\frac{1}{2}$ in., 2-5-flowered; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in., lowest much the longest; bracts $\frac{1}{2}$ in. elliptic; bracteoles $\frac{1}{2}$ in., lanceolate, about the middle of the pedicel. *Calyx-teeth* very small, triangular. *Corolla* $\frac{1}{2}$ by $\frac{1}{2}$ in., ovoid. *Fruit* $\frac{1}{2}$ in. diam.; succulent calyx blue-black.

4. **G. fragrantissima**, *Wall. in As. Research.* xiii. 397, with fig.; branches glabrous, leaves lanceolate to ovate not acuminate, racemes more or less pubescent, bracteoles on the upper part of the pedicel, calyx-teeth ovate-lanceolate subacute. *DC. Prodr.* vii. 593; *Wall. Cat.* 765; *Wight Ic.* t. 1196; *Bot. Mag.* t. 5984; *Bedd. Fl. Sylv. Anal. Pl.* xix. fig. 1. *G. fragrans*, *Don Prodr.* 151. *G. punctata*, *Blume Bijl.* 856; *DC. l. c.* 593; *Kurz in Journ. As. Soc.* 1877, ii. 215 and *For. Fl.* ii. 92. *G. ovalifolia*, *Wall. Cat.* 1523. *G. Leschenaultii*, *DC. l. c.* 593; *Wight Ill.* t. 141, C. and *Ic.* t. 1195. *Andromeda flexuosa*, *Moon Cat. Pl. Ceyl.* 35. *A. katagherensis*, *Hook. Ic. Pl.* t. 246. *Leucothoe* ? *katagherensis*, *DC. l. c.* 606.

From NIPAL to BHOTAN; alt. 6-8000 ft., frequent. KHASIA Mts.; Mts. of BRITISH BIRMA, SOUTH INDIA and CEYLON, common.—DISTRIB. Malay Ind.

A stout shrub; branches more or less trigonous. *Leaves* 3 by 1-1 $\frac{1}{2}$ in., shortly acute or subobtuse, base rhomboid, crenate-serrate, coriaceous, glabrous or sparingly hirsute from the punctations of the under surface; petiole $\frac{1}{16}$ - $\frac{1}{8}$ in. *Racemes* 1-3 in.;

pedicels 0- $\frac{1}{4}$ in.; bracts $\frac{1}{2}$ in., and bracteoles $\frac{1}{2}$ in., ovate-lanceolate, the latter close to the ovary or more distant in the lower longer pedicels. *Calyx-teeth* $\frac{1}{12}$ in., usually acute in fruit. *Corolla* $\frac{1}{2}$ by $\frac{1}{2}$ in., widely tubular, nearly glabrous without, green, green-yellow or whitish. *Anther-cells* each with 2 terminal bristles. *Fruit* $\frac{1}{2}$ in. diam., brown hairy, surrounded by the deep-blue enlarged calyx.—Dimorphic flowers occur, with short stamens and anthers not produced upwards nor horned; see Wight's figures quoted above.

VAR. *racemosa*, Hook. f.; leaves lanceolate narrowed at both ends, racemes numerous 4-5 in. flexuose.—Sikkim, *J. D. H.*—Leaves $4\frac{1}{2}$ by $\frac{1}{4}$ in., racemes very narrow, the uppermost pedicels $\frac{1}{4}$ in. with the bracteoles hardly above the middle.

VAR. *hirsuta*, Gardner ms. (sp.); branches bristly, leaves elliptic obtuse or rounded at both ends often bristly beneath.—Ceylon, alt. 6-7000 ft.; *Gardner, Thwaites, &c.*

5. *G. Hookeri*, Clarke; branches hispid, leaves elliptic not acuminate, racemes pubescent, bracts large, calyx-teeth ovate not acute.

SIKKIM; alt. 8-11,000 ft., Lachen and Choorgtam, *J. D. H.*

A shrub, 6 ft. *Leaves* 2 by 1 in., suddenly or shortly acute, base usually rounded, serrate, punctate and usually bristly beneath; petiole 0- $\frac{1}{8}$ in. *Racemes* 1-2 in.; pedicels $\frac{1}{8}$ in.; bracts often $\frac{1}{4}$ in., elliptic; bracteoles $\frac{1}{2}$ in., elliptic, usually about the middle of the pedicel. *Calyx* nearly or quite glabrous. *Corolla* and *fruit* as in *G. fragrantissima* (Hooker, however, denotes the flowers as "pink and white").—This may be an alpine form of *G. fragrantissima*, analogous to var. *hirsuta*, of that species; but the bracteate racemes give it a different aspect.

VAR. *angustifolia*; leaves lanceolate $2\frac{1}{4}$ by $\frac{2}{3}$ in. narrowed at both ends.—Sikkim; Yakla, alt. 9-10,000 ft., *C. B. Clarke*.

6. *G. Griffithiana*, Wight Ic. t. 1197; branches glabrous, leaves oblong and elliptic caudate-acuminate closely serrulate, racemes pubescent, bracteoles often remote from the ovary, calyx-teeth ovate-oblong not acute on the fruit.

SIKKIM and BHOTAN; alt. 6-9000 ft. **KHASIA Mts.;** alt. 5-6000 ft., *Griffith, J. D. H., &c.*

A stout shrub, branches round. *Leaves* 5 by $1\frac{1}{2}$ in., base rhomboid, coriaceous, glabrous rarely sparsely hirsute from the punctations of the under surface; petiole $\frac{1}{4}$ in. *Racemes* 2-3 in.; pedicels $\frac{1}{4}$ in.; bracts $\frac{1}{2}$ - $\frac{1}{3}$ in., ovate; bracteoles $\frac{1}{2}$ in., ovate, often below the middle of the pedicels. *Calyx-teeth* usually obtuse, always less acute than in *G. fragrantissima*. *Corolla, stamens and fruit* as in *G. fragrantissima*.

2. **DIPLYCOSIA**, Blume.

Anther-cells without apical horns. Otherwise as *Gaultheria*.—**DISTRIB.** Species 10, Malayan.

The calyx is sometimes adnate more or less to the ovary; and in *D. semi-infera* (provisionally attached to the genus here) is at least semi-adnate in the young flower.

1. *D. microphylla*, Beccari Malesia, 212; leaves $\frac{1}{2}$ - $\frac{2}{3}$ in. ovate subentire, pedicels axillary solitary 1-flowered. *Vaccinium microphyllum*, *Blume Bijdr.* 851.

MALACCA; *Griffith, Lobb;* Mt. Ophir, *Maingay*.—**DISTRIB.** Malay Ids., Borneo, Philippines.

Habit of *Gaultheria nummularioides*. *Branches* hirsute. *Leaves* obtuse, base cuneate or round, coriaceous, sometimes 3-nerved, glabrous or sparsely hirsute beneath; petiole $\frac{1}{16}$ in. *Pedicels* $\frac{1}{8}$ - $\frac{1}{4}$ in., glabrous; bracteoles connate under the ovary. *Calyx* free, widely campanulate; lobes wide-triangular, subobtuse. *Corolla* $\frac{1}{4}$ by $\frac{1}{8}$ - $\frac{1}{3}$ in., broadly tubular, red. *Anther-cells* produced upwards into tubes. *Fruit* not seen.

2. **D. discolor**, *Clarke*; branchlets scabrid-pilose, leaves ovate or elliptic narrowed at both ends serrate very white beneath, racemes pubescent, calyx-teeth ovate acute. *Gaultheria discolor*, *Nutt. in Bot. Mag.* t. 5034; *Belg. Hort.* viii. (1858) 193, t. 52, fig. 2.

BHOTAN; Duphla Hills, *Nuttall*. MOULMEIN; Nattoung expedition, *Parish*.

Habit of *Gaultheria fragrantissima*. *Leaves* 2 by $\frac{3}{4}$ -1 $\frac{1}{4}$ in., glabrous, often 3-nerved to near the apex; petiole $\frac{1}{2}$ in. *Racemes* 2 in.; pedicels $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ in., ovate-lanceolate, caducous; bracteoles $\frac{1}{2}$ in., lanceolate, usually close to the ovary, caducous. *Corolla* $\frac{1}{8}$ by $\frac{1}{8}$ in., ovoid, white, mouth red within. *Anther-cells* oblong, not produced at the apex, mucicous or with 1 or 2 most minute points. *Fruit* nearly as of *G. fragrantissima* but rather smaller; calyx sometimes enlarged, blue-black, with ovate lobes; sometimes (in the same branch with ripe seeds) hardly altered, of 5 ovate spreading lobes, below and much shorter than the fruit.

3. **D. ? semi-infera**, *Clarke*; branches scabrid, leaves oblong or ovate not acuminate, racemes pubescent, ovary half-inferior, calyx succulent closed over the fruit with erect linear teeth from the centre.—*Vaccinioid*. *Griff. Itin. Notes*, 127, nn. 484, 485.

BHOTAN; alt. 7-9000 ft, *Griffith* (Kew Distrib. n. 3482).

A stout shrub. *Leaves* 1 $\frac{1}{2}$ by $\frac{1}{2}$ - $\frac{3}{4}$ in., base cuneate or rounded, crenate-serrate, coriaceous, glabrous, punctate beneath; petiole 0- $\frac{1}{2}$ in. *Racemes* 1-2 in., sometimes dense; pedicels $\frac{1}{16}$ - $\frac{1}{8}$ in.; bracteoles small, usually close under the ovary. *Corolla* $\frac{5}{16}$ in., ovoid-conic. *Stamens* (in 2 of the few available flowers examined) small, irregular, imperfect, apparently corresponding to the stamens of the dimorphic flowers of *Gaultheria fragrantissima*. *Ovary* in the bud fully half-inferior; upper half conoidal, 5-ribbed, densely adpressed-pilose, containing the ovules. *Berry* $\frac{1}{8}$ - $\frac{1}{6}$ in. diam., globose, almost inferior; the depressed conical vertex opening by 5 hairy valves loculicidally. *Seeds* angular, as of *Gaultheria*.—This berry is quite unlike the fruit of *Gaultheria* and *Diplycosia* and probably indicates a new genus, which cannot be founded without better flowers for examination.

3. **CASSIOPE**, *D. Don*.

Small, fastigate shrubs. *Leaves* small, rigid, densely imbricate, adpressed to the branches, entire or ciliate. *Pedicels* axillary, bracteate at the base only, curved in flower, erect in fruit. *Sepals* 5, free, thickened at the base, imbricate in bud; spreading and unaltered in fruit. *Corolla* campanulate, white or pink; lobes 5, short, recurved. *Stamens* 10 (or 8-12), slightly attached to the base of the corolla, filaments linear; anthers ovoid, truncate, with 1-2 horns divaricate from beneath the summit of each cell. *Ovary* 5-celled; style cylindric, stigma simple; ovules many in each cell. *Capsule* globose, apex depressed, loculicidally 5-valved. *Seeds* minute, long-ellipsoid, somewhat curved; outer coat of long, somewhat loose cells.—Species 10, in the frigid regions of the N. hemisphere.

1. **C. fastigiata**, *D. Don in Edinb. Phil. Journ.* xvii. (1834) 158; leaves $\frac{1}{2}$ in. ovate-oblong, pedicels 0- $\frac{1}{2}$ in. woolly. *DC. Prodr.* vii. 611; *Bot. Mag.* t. 4796. *Andromeda fastigiata*, *Wall. Cat.* 764, and in *Asiat. Research.* xiii. 394 and *Pl. As. Rar.* 51, t. 284; *Royle Ill.* 260, t. 63, fig. 1. *A. cupressiformis*, *Wall.*; *D. Don in Mem. Wern. Soc.* iii. 411, and *Prodr.* 150.

ALPINE HIMALAYA; alt. 10-14,000 ft., common from Kashmir to Bhotan.

Forming dense tufts 6-12 in. high. *Leaves* somewhat 4-fariously imbricate, thickened on the back, ciliate. *Pedicels* 2-4-nate or solitary. *Sepals* $\frac{1}{2}$ - $\frac{1}{4}$ in., elliptic, acute, nearly glabrous; margins scarious, often toothed. *Corolla* $\frac{1}{4}$ - $\frac{1}{2}$ in., widely campanulate, white. *Filaments* glabrous or sparingly pilose; anthers truncate, each cell 1-horned.—“Heather” (of English travellers).

2. **C. selaginoides**, *H. f. & T. in Hook. Kew Journ.* vii. (1855) 126, t. 4; leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. elliptic-oblong, pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. woolly.

ALPINE SIKKIM: alt. 10–13,000 ft.; Lachen, *J. D. H.*; Jongri, *C. B. Clarke*.

Closely allied to *C. fastigiata* and hardly to be diagnosed by any technical character; but readily distinguishable by its much more slender stems and more elongate pedicels.

4. **LEUCOTHOE**, *D. Don*.

Glabrous shrubs. *Leaves* alternate, petioled, oblong or lanceolate. *Racemes* axillary and solitary or terminal and corymbose; pedicels bracteate and 1–2-bracteolate. *Calyx* 5-fid or -partite; segments open or imbricate in bud. *Corolla* urceolate, 5-fid, white. *Stamens* 10; anthers oblong, not horned on the back, sometimes aristate at the apex. *Ovary* 5-celled; style cylindric, stigma simple; ovules many. *Capsule* depressed-globose, loculicidally 5-valved. *Seeds* many, compressed, narrowly winged; testa laxly reticulate.—Species 7, North American, with 1 Japanese, 1 Himalayan.

L. Griffithiana, *Clarke*; leaves lanceolate acuminate at both ends subentire coriaceous, calyx-teeth triangular. *Gaultheria* sp., *Griff. Itin. Notes*, 138, n. 606 *Pieris Griffithiana*, *Hook. f. in Herb*.

BHUTAN; towards Sanah, alt. 6800 ft., *Griffith* (*Kew Distrib.* n. 3485).

A shrub; with lax, flexuose, pendent branches, and black-green leaves (*Griffith*). *Griffith's* examples (in late fruit) are altogether glabrous. *Leaves* $5\frac{1}{2}$ by $1\frac{1}{2}$ in., sometimes almost caudate-acuminate, entire or minutely acutely serrulate upwards, punctate beneath; petiole $\frac{1}{2}$ in. *Racemes* 3–5 in., axillary and corymbose at the ends of the branches, dense; pedicels $\frac{1}{2}$ in. *Calyx-teeth* $\frac{1}{16}$ – $\frac{1}{12}$ in., subobtusely, united at the base. *Fruit* $\frac{1}{2}$ in. diam., depressed-globose, glabrous. *Seeds* $\frac{1}{50}$ in. diam., orbicular, much compressed, outer coat white, margined by closely-placed long glistening scale-like papillæ.—Though the flowers are unknown, this plant (from the capsule and seeds) can belong to no known genus except *Leucothoe*.

5. **PIERIS**, *D. Don*.

Trees or shrubs; branches terete. *Leaves* alternate, petioled, persistent, entire or serrulate. *Racemes* axillary or panicked at the ends of the branches; pedicels bracteate and 1–2-bracteolate. *Calyx* 5-fid or -partite; segments open or valvate in the bud. *Corolla* ovoid; lobes 5, short, recurved. *Stamens* 10; filament with 2 horns divaricate from its apex (0 in *P. villosa*); anther-cells ovoid, truncate. *Ovary* globose, 5-celled; style cylindric, stigma capitate; ovules very many in each cell. *Capsule* globose, loculicidally 5-valved. *Seeds* many, linear-oblong, falcate, not winged; testa loose.—Species 10; Himalaya, Birma, Japan and N.E. America.

1. **P. ovalifolia**, *D. Don in Edinb. Phil. Journ.* xvii. (1834) 159; leaves ovate or elliptic acute entire, calyx-teeth triangular-lanceolate, corolla pubescent without, filament 2-horned at the apex. *DC. Prodr.* vii. 599; *Loud. Arb. Brit.* 570, fig. 1070. *Andromeda ovalifolia*, *Wall. Cat.* 763 and in *Asiat. Research.* xiii. 391, with fig.; *Don Prodr.* 148; *Wight Ic.* t. 1199; *Cleghorn in Agri-Hort. Soc. Calc. Journ.* xvi. 260, with fig.; *Brand. For. Fl.* 280; *Kurz in Journ. As. Soc.* 1877, pt. ii. 216 and *For. Fl.* ii. 92. *A. elliptica*, *Sieb. & Zucc. Fl. Jap. Fam. Nat.* ii. 126.—*Thibaudia*, *Griff. Ic. Pl. Asiat.* t. 514.

TEMPERATE HIMALAYA; alt. 3–8000 ft., from Kashmir to Bhutan, common. KHASIA MTS.; alt. 3–5000 ft., common. BRITISH BIRMA.—DISTRIB. Japan.

A tree, 20–40 ft., or shrub. *Leaves* 3–7 by 1–4 in., rounded at the base, glabrous or pilose beneath; petiole $\frac{1}{8}$ – $\frac{1}{2}$ in. *Racemes* 4–10 in., simple, rarely (by the suppression of leaves towards the ends of the branches) appearing panicked, more or less pubes-

cent; pedicels $\frac{1}{8}$ – $\frac{1}{3}$ in.; bracts $\frac{1}{5}$ in., lanceolate or linear. *Calyx-teeth* $\frac{1}{10}$ – $\frac{1}{8}$ in., connate at the base. *Corolla* $\frac{1}{4}$ – $\frac{1}{2}$ in., elongate-ovoid, white. *Capsule* $\frac{1}{8}$ in. diam., globose, glabrous. *Seeds* small, linear-oblong.

VAR. lanceolata; leaves narrower cuneate or sometimes almost acuminate at the base. *P. lanceolata*, *D. Don in Edinb. Phil. Journ.* xvii. (1834) 159; *DC. Prodr.* vii. 599. *Andromeda lanceolata*, *Wall. in Asiat. Research.* xiii. 390, with fig.; *Wight Ic.* t. 1198. *A. squamulosa*, *D. Don. Prodr.* 149.—Himalaya and Khasia.

2. P. villosa, *Hook. f. ms.*; leaves elliptic subobtusely entire villous beneath, calyx-teeth narrowly lanceolate, corolla pubescent without, filaments without horns at the apex. *Andromeda villosa*, *Wall. Cat.* 762.

ALPINE HIMALAYA; GURWAL; alt. 10,000 ft., near Rogila, *Strach. & Winterb. NIPAL*; *Wallich. SIKKIM*; alt. 10–13,000 ft., Lachen and Tonglo, *J. D. H.*; Yakla, *C. B. Clarke.*

A small tree, closely resembling *P. ovalifolia* in leaves, flowers and fruit. The leaves are hardly more villous beneath than in some forms of *P. ovalifolia*; the calyx-teeth are very narrow downwards, only shortly connate; the corolla is rather wider; but it is definitely separated by the absence of horns at the apex of the filament.

3. P. formosa, *D. Don in Edinb. Phil. Journ.* xvii. (1834) 159; leaves lanceolate serrate glabrous, racemes panicle, calyx-teeth broadly lanceolate, corolla scarcely pubescent without. *DC. Prodr.* vii. 599. *Andromeda formosa*, *Wall. Cat.* 761 and in *Asiat. Research.* xiii. 395; *Don Prodr.* 149; *Wight Ic.* t. 1200; *Brand. For. Fl.* 280.—*Gaultheria* sp., *Griff. Itin. Notes*, 125 (n. 430), and *Ic. Pl. Asiat.* t. 517.

EASTERN HIMALAYA from NIPAL to BHOTAN; alt. 6–10,000 ft., *Wallich, Griffith, J. D. H., &c.* ASSAM; Ghombunda Hills, *Simons.*

An evergreen, small, glabrous tree, 12 ft. *Leaves* 4 by 1–1 $\frac{1}{4}$ in., acuminate, attenuated at base; petiole $\frac{1}{4}$ in. *Racemes* 2–4 in.; pedicels $\frac{3}{8}$ – $\frac{1}{4}$ in.; bracts $\frac{1}{8}$ in., linear-oblong, caducous. *Calyx-teeth* $\frac{1}{8}$ – $\frac{1}{6}$ in., acute, very coriaceous, valvate in bud. *Corolla* $\frac{1}{4}$ by $\frac{1}{6}$ in. ovoid, white. *Filaments* with 2 horns at the apex. *Capsule* $\frac{1}{4}$ in. diam., ovoid-globose, glabrous. *Seeds* many, linear-fusiform, subtriquetrous, testa very lax.

6. ENKIANTHUS, Lour.

Shrubs or small trees. *Leaves* petioled, entire or serrulate. *Flowers* terminal, umbelled or subcorymbose, pendulous or cernuous. *Calyx* free, 5-lobed. *Corolla* broadly campanulate; lobes 5, short, imbricated in bud, entire or lacinate. *Stamens* 10; anthers oblong, cells aristate on the back, dehiscing by very short slits in front. *Ovary* ovoid, 5-celled; style columnar, stigma simple; placentas pendent from the upper inner angles of the cells, many-ovuled. *Capsule* ovoid or oblong, woody or coriaceous, 5-celled, loculicidally 5-valved. *Seeds* few perfect (and often many imperfect) in each cell; testa crisped, membranous.—Species 5; E. Himalaya, China, Japan.

E. himalaicus, *H. f. & T. in Hook Kew Journ.* vii. (1855) 126, t. 3; leaves ovate or elliptic serrulate, pedicels umbelled, corolla widely campanulate lobes entire, capsules cernuous. *Bot. Mag. t.* 6460.—*Rhodoraceæ*, *Griff. Itin. Notes*, 148, n. 717. *Rhodora deflexa*, *Griff. Itin. Notes*, 187, n. 969.

EAST NIPAL, SIKKIM and BHOTAN, alt. 8–11,000 ft., *Griffith, J. D. H., &c.*

A small tree, sometimes 20 ft., or a bush. *Leaves* mostly in terminal clusters, 1 $\frac{3}{4}$ by $\frac{3}{4}$ –1 in., narrowed at both ends, acute or obtuse, pubescent beneath, at least when young; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in. *Peduncles* about 10, 1–2 in., 1- (rarely 2-) flowered, hairy. *Calyx-teeth* $\frac{1}{8}$ – $\frac{1}{6}$ in., lanceolate, scarcely pubescent. *Corolla* $\frac{1}{2}$ by $\frac{1}{4}$ in., base not gibbous, red-orange. *Anther-cells* oblong, each awned. *Capsule* $\frac{1}{4}$ in. diam., globose, somewhat pentagonal, glabrous. *Seeds* large, $\frac{1}{2}$ in., ellipsoid, subtrigonal; testa very lax crisped and honeycombed.

7. **DIPLARCHE**, *H. f. & T.*

Small low shrubs. *Leaves* small, sessile, crowded, linear-oblong, coriaceous, serrate or long-ciliate, subacute or ending in a gland. *Flowers* small, rose-coloured, subcapitate, terminal; bract ciliate, ovate; bracteoles lateral, linear, shorter than the sepals. *Sepals* 5, coriaceous, ciliate. *Corolla* deciduous; tube cylindric; lobes 5, obovate, patent. *Stamens* 10, included; 5 inserted high on the corolla, alternate with its lobes; 5 alternate basal or hypogynous; anthers elliptic, dehiscent longitudinally. *Ovary* 5-celled; style short, stigma capitate 5-lobed; ovules numerous in each cell. *Capsule* globose, enclosed by the calyx, 5-celled, septicidally 5-valved; the wall of the cells splitting into two layers, the outer of which breaks up in appearance loculicidally. *Seeds* very many, obovate-cuneate, compressed; testa of lax tissue.—Species 2, Himalayan.

1. ***D. multiflora***, *H. f. & T. in Hook. Kew Journ.* vi. (1854) 383, t. 11, fig. A; branches glandular-pubescent, flowers many densely capitate, sepals linear-oblong subacute, lower 5 stamens attached to the corolla.

SIKKIM HIMALAYA; Lachen, alt 11,000 ft., *J. D. H.*

Leaves $\frac{1}{4}$ by $\frac{1}{10}$ in. *Flowers* 8–20 forming a globose head $\frac{1}{2}$ in. diam. *Peduncle* in fruit elongate, pubescent; capsules $\frac{1}{8}$ in. diam., spicate.

2. ***D. pauciflora***, *H. f. & T. in Hook. Kew Journ.* vi. (1854) 383, t. 11, fig. B; branches glabrous or nearly so, flowers terminal few, sepals ovate-oblong obtuse, lower 5 stamens free from the corolla.

SIKKIM HIMALAYA; Kankola, alt. 15,000, *J. D. H.*

Closely resembling *D. multiflora*, but smaller in all its parts. *Leaves* $\frac{1}{8}$ – $\frac{1}{5}$ in. *Flowers* 2–6 at the apex of the branch. *Stamens* of the lower series often left surrounding the capsule after the corolla has fallen.

8. **RHODODENDRON**, *Linn.*

Trees or shrubs, sometimes very small; often scaly or aromatic. *Leaves* alternate, often clustered towards the ends of the branches, rarely subopposite or falsely whorled, entire, coriaceous. *Flowers* fascicled or subcorymbose, terminal, rarely solitary or axillary; bracts broad, generally caducous; bracteoles linear. *Calyx* 5-lobed, sometimes small or obsolete, rarely saucer-shaped, persistent. *Corolla* campanulate, widely funnel-shaped or cylindric, tube long or short, lobes 5–10. *Stamens* 5–18, usually 10; anthers oblong, dehiscent by terminal pores. *Ovary* 5–20-celled; style long or short, stigma capitate; ovules very many in each cell. *Capsule* short woody, or elongate thinner, 4–20-celled, septicidally 4–20-valved from the apex, valves breaking away from the placentas. *Seeds* very many, ellipsoid, albuminous; testa close or loose, often shortly crested, or tailed at one or both ends.—Species 130, in the Mts. of Europe, Asia, Malaya and N. America.

SUBGENUS I. ***Vireya*** (*Gen. Blume Bijdr.* 854). *Capsule* elongate, acute; valves twisting after dehiscence, not woody; placentæ separating (leaving a slender central axis) as five filiform ribs, attached at the apex. *Seeds* very long-tailed at both ends, the tails many times longer than the seed.—Malayan large shrubs; leaves subopposite or almost whorled; flowers in sessile terminal umbels; bracts caducous; exocarp often separating from the endocarp, dehiscent irregularly or somewhat loculicidally.

* *Leaves sprinkled beneath with sessile round glandular scales.*

1. ***R. malayanum***, *Jack in Mal. Misc.* ii. n. 7, 17; leaves lanceolate acute glabrous glandular-scaly beneath, corolla red, tube cylindric twice as long

as the round patent lobes. *Hook. Journ. Bot.* i. 369; *DC. Prodr.* vii. 725; *Bot. Mag.* t. 6045; *Becc. Malesia*, i. 205. *R. tubiflorum* and *celebicum*, *DC. Prodr.* vii. 725; *Miq. in Ann. Mus. Lugd. Bat.* i. 44, t. 2, A, B. *R. lampongum*, *Miq. Fl. Ind. Bat. Suppl.* 585. *Vireya tubiflora* and *celebica*, *Blume Bijl.* 855, 854.

MALACCA; Mt. Ophir, alt. 4000 ft., *Griffith, &c.*—DISTRIB. Sumatra, Java, Celebes.

A large shrub, all parts more or less glandular and scaly. *Leaves* $3\frac{1}{2}$ by $\frac{1}{2}$ in., base cuneate; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Umbels* terminal, 2-6-flowered; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. *Calyx* very small. *Corolla-tube* $\frac{2}{3}$ by $\frac{1}{4}$ in. *Stamens* 10; filaments glabrous. *Ovary* 5-celled; stigma clavate not peltate. *Capsule* $1-1\frac{1}{4}$ by $\frac{1}{8}$ – $\frac{1}{5}$ in., acute; valves recurved to the base, twisted.

2. ***R. jasminiflorum***, *Hook. Bot. Mag.* t. 4524; leaves elliptic obtuse very coriaceous glabrous glandular-scaly beneath, corolla white tube cylindric thrice as long as the obovate patent lobes. *Lemaire Jard. Fleur.* t. 41; *Illustr. Hort.* (1859) t. 203.

MALACCA; Mt. Ophir, *Griffith, Maingay.*—DISTRIB. JAVA.

A small shrub. *Leaves* $2\frac{1}{2}$ by $1-1\frac{1}{2}$ in., obtuse, base rounded or cordate; petiole $\frac{1}{8}$ in. *Umbels* 3-8-flowered; pedicels $\frac{1}{2}$ in., pubescent. *Calyx-lobes* hardly any. *Corolla-tube* $1\frac{1}{2}$ by $\frac{1}{8}$ in., sparsely glandular-scaly or glabrous without. *Stamens* 10; filaments minutely pilose. *Ovary* 5-celled, glandular scaly; style glandular, stigma subclavate. *Capsule* 1 by $\frac{1}{2}$ in., acute, glandular-scabrous; valves recurved to the base, twisted.

** *Leaves eglandular beneath.*

3. ***R. javanicum***, *Benn. Pl. Jav. Rar.* 85, t. 19; leaves lanceolate narrowed at both ends glabrous eglandular, corymbs many-flowered, corolla large orange-red wide-funnel-shaped from a tubular base. *DC. Prodr.* vii. 721; *Bot. Mag.* t. 4336; *Fl. des Serres* (1847), t. 293; *Miq. in Ann. Mus. Lugd. Bat.* i. 42, t. 1, B. *Vireya javanica*, *Blume Bijl.* ii. 854.

MALAY PENINSULA; *Lobb.*—DISTRIB. Sumatra, Java Celebes.

A large shrub. *Leaves* 6 by $1\frac{1}{2}$ in., primary nerves either oblique to or at right angles with the midrib, sometimes obscurely punctate beneath; petiole $\frac{1}{4}$ in. *Umbels* solitary; pedicels 3-12, 1-2 in., nearly glabrous; bracts $1\frac{1}{2}$ in., linear-oblong. *Calyx* obsolete. *Corolla* 2 in. long, and as much in diam., rose orange or brick-red, glabrous without; lobes 5, round. *Stamens* 10; filaments glabrous. *Ovary* glabrous or glandular-scaly; style usually glabrous; stigma large, peltate. *Capsule* 1 by $\frac{1}{2}$ in., acute.

4. ***R. moulmainense***, *Hook. Bot. Mag.* t. 4904; leaves lanceolate acute at both ends glabrous eglandular, pedicels 3-4 clustered on short axillary spurs close below the terminal bud, corolla rose-red, lobes elliptic acute much longer than the cylindric tube. *Kurz in Journ. As. Soc.* 1877, ii. 216, and *For. Fl.* ii. 94.

MOULMEIN; Thoung-gyrai, alt. 5000 ft., *Lobb*; Nattoung Expedition, *Parish*.

A stout shrub. *Leaves* 4 by $1\frac{1}{2}$ in.; petiole $\frac{1}{2}$ in. *Umbels* 1-4 together, so that the inflorescence appears a 2-10-flowered lateral or pseudo-terminal umbel; pedicels 1 in., glabrous; bracts 1 in., elliptic, acute, glabrous; bracteoles $\frac{1}{2}$ in., linear, hairy. *Calyx-lobes* minute. *Corolla-tube* $\frac{1}{2}$ in., slightly wider upwards; lobes 5, $\frac{3}{4}$ –1 by $\frac{1}{2}$ in., subacute, erect-patent. *Stamens* 10, glabrous. *Ovary* 5-celled, glabrous; stigma peltate. *Capsule* narrow, acute (not ripe).—*Kurz* failed to distinguish this from *R. javanicum*; but the inflorescence is so totally different that according to *Maximowicz's* views its affinity is with *R. Keysii*.

5. ***R. Teysmanni***, *Miq. Fl. Ind. Bat. Suppl.* 585; leaves oblong-lanceolate acute eglandular often whorled, umbels terminal many-flowered, corolla

yellow tube cylindric below widely funnel-shaped upwards. *Miq. in Ann. Mus. Lugd. Bat.* i. 42, t. 1, A.

PENANG; *Maingay*, n. 1099.—DISTRIB. Sumatra.

A large shrub. *Leaves* 7 by $2\frac{1}{2}$ in., shortly acute at both ends; petiole $\frac{1}{2}$ in. *Pedicels* 2-7, 1 in., pubescent. *Calyx-lobes* obsolete. *Corolla* $1\frac{3}{4}$ in. long, and broad; lobes 5, large, round, erecto-patent. *Stamens* 10; filaments densely hairy downwards. *Ovary* 5-celled, densely hairy; style glabrous, stigma small, clavate. *Capsule* $1\frac{1}{2}$ by $\frac{1}{4}$ in., acute, closely pubescent; exocarp separating half-way down; endocarp dehiscing loculicidally, about $\frac{1}{3}$ its length twisting up.—Closely allied to *R. javanicum*, and perhaps not really separable by the colour of the corolla; but larger in all its parts and having a densely hairy ovary.

SUBGENUS II. **Pseudovireya**. Characters of *Vireya*, but valves of the capsule recurved, not twisting after dehiscence.

6. **R. vaccinioides**, *Hook. f. Rhod. Sikkim Himal.* pt. ii. p. 3; leaves scattered small obovate-oblong obtuse glabrous glandular-scaly beneath, flowers solitary, corolla white or pinkish tube short broadly cylindric lobes wide-spreading. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 81, 96.

SIKKIM HIMALAYA; alt. 6-8000 ft.; Lachen and Darjeeling, *J. D. H., Gamble, &c.*

A shrub, 1-3 ft., sometimes epiphytic; branches scabrous. *Leaves* $\frac{2}{3}$ by $\frac{1}{4}$ in.; base attenuate, scarcely petioled. *Pedicels* $\frac{1}{2}$ in., glandular; bracts $\frac{1}{6}$ in., closely sheathing their base even in fruit. *Calyx-lobes* $\frac{1}{16}$ in., ovate-oblong. *Corolla-tube* $\frac{1}{8}$ - $\frac{1}{2}$ in.; lobes 5, $\frac{1}{4}$ - $\frac{1}{2}$ in., round or obovate, entire. *Stamens* 10, filaments densely hairy. *Ovary* 5-celled, scaly, not hairy; stigma clavate. *Capsule* 1 by $\frac{1}{2}$ in., acute; valves recurved to their base.

SUBGENUS III. **Eurhododendron**. *Capsule* ovoid cylindric or oblong; valves woody; placentæ remaining attached to the central axis. *Seeds* without tails, or tail shorter than the seed.—*Inflorescence* terminal, or pedicels clustered, axillary or pseudo-terminal.

SERIES A. *Leaves* beneath glabrous or tomentose without glandular scales. *Corolla* widely funnel-shaped or campanulate.—Large shrubs or trees.

* *Corymbs* many-flowered. *Calyx-lobes* small or obsolete.

† *Corolla-lobes* more than 5, *stamens* 12-18.

7. **R. grande**, *Wight Ic.* t. 1202; leaves long-petioled oblong-lanceolate glabrous silvery beneath, corolla white. *R. argenteum*, *Hook. f. Rhod. Sikkim Himal.* t. 9 and in *Journ. Hort. Soc. Lond.* vii. 76, 91; *Fl. des Serres*, v. (1849) t. 473-476; *Bot. Mag.* 5054. *Rhododendron*, *Griff. Itin. Notes*, 139, n. 618. *R. longifolium*, *Nutt. in Hook. Kew Journ.* v. (1853) 365. *R. Windsorii*, var. γ , *Nutt. l. c.* 357, 358. *Waldemaria argentea*, *Klotzsch in Reis. Pr. Waldem. Bot.* 99, t. 53-4.

SIKKIM HIMALAYA; alt. 7-11,000 ft., frequent, *J. D. H., &c.* BHOTAN; alt. 7000 ft.; *Griffith, Booth*.

A tree, 30 ft. *Leaves* 9 by 3 in., tapering at the base, primary nerves prominent and parallel; petiole $\frac{3}{4}$ -1 $\frac{1}{2}$ in. *Heads* many-flowered, dense; outermost empty bracts glabrescent; flower-bracts 1 by $\frac{1}{2}$ - $\frac{3}{4}$ in., densely hairy. *Calyx* very short, lobes obscure. *Corolla* 2-3 by 2-2 $\frac{1}{2}$ in. (in Griffith's examples much smaller), 5-8-lobed, sometimes pinkish when young. *Stamens* 10-16; filaments pilose or glabrous. *Ovary* glandular, scarcely pubescent, 10-16-celled; stigma very large. *Capsule* $1\frac{1}{4}$ by $\frac{1}{2}$ in., more or less tomentose, curved. *Seeds* ellipsoid, compressed, margined.

8. **R. Hodgsoni**, *Hook. f. Rhod. Sikkim Himal.* t. 15; leaves long-petioled narrowly obovate-oblong cinnamoneous or whitish subtomentose beneath, corolla bright-rose or purplish. *Hook. f. in Journ. Hort. Soc. Lond.* vii.

76, 97; *Bot. Mag.* t. 5552; *Rev. Hort.* 1855, 421, t. 22.—*Rhododendron*, *Griff. Notul.* iv. 303 and *Ic. Pl. Asiat.* t. 521.

EASTERN HIMALAYA; from Nipal to Bhotan, alt. 10–12,000, abundant, *Griffith, J. D. H., &c.*

A broad, round shrub, 10–20 ft. *Leaves* 10 by 4 in., obtuse, cuneate or rounded at the base; petiole $\frac{3}{4}$ – $1\frac{1}{2}$ in. *Heads* many-flowered, dense; bracts $1\frac{1}{2}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in., silky; pedicels 1–2 in., hairy. *Calyx* subobsolete. *Corolla* $1\frac{1}{2}$ by 1 in., 6–10-lobed. *Stamens* 14–18; filaments glabrous or nearly so. *Ovary* glandular, scarcely pubescent, 10–12-celled. *Capsule* $1\frac{1}{2}$ by $\frac{1}{2}$ in., narrowly cylindric, curved, furfuraceous or subtomentose. *Seeds* narrowly oblong; testa hardly lax or produced except at the end.

9. **R. Falconeri**, *Hook. f. Rhod. Sikkim. Himal.* t. 10; leaves large long-petioled elliptic obtuse ferruginous-tomentose beneath, very coriaceous, corolla white or yellowish with purple spots at the base within. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 76, 97; *Fl. des Serres*, v. (1849) t. 477–80; xi, t. 1166–7; *Regel Gartenfl.* t. 658. *R. eximium* and *venosum*, *Nutt. in Hook. Kew Journ.* v. 364, 365.—*Rhododendron*, *Griff. Itin. Notes*, 140, n. 654.

From East NIPAL to BHOTAN; alt. 9–13,000 ft., abundant, *Griffith, J. D. H., &c.*

A tree, 30 ft.; or frequently a large gregarious shrub. *Leaves* 9 by 3–4 in., base obtuse or subcordate, rugose by impressed nerves above; petiole $\frac{3}{4}$ – $1\frac{1}{2}$ in. *Heads* many-flowered, dense; bracts large, densely hairy; pedicels 1–2 in., ferruginous-tomentose. *Calyx* subobsolete. *Corolla* 1–2 by $\frac{3}{4}$ – $1\frac{1}{2}$ in., 7–10-lobed, usually white, sometimes yellow even when young. *Stamens* 12–16; filaments slightly hairy below. *Ovary* densely ferruginous-woolly, 10–16-celled; style glabrous; stigma very large. *Capsule* 1–2 by $\frac{1}{2}$ –1 in., more or less tomentose and curved. *Seeds* ellipsoid, compressed margined.

†† *Corolla*-lobes 5, entire or emarginate, *stamens* 10.

(a) *Corolla* purple, rose or white.

10. **R. arboreum**, *Sm. Exot. Bot.* t. 6; leaves lanceolate or oblong narrowed at both ends rugose-veined on both surfaces silvery or with rusty tomentum beneath, corolla campanulate red pink or nearly white. *Hook. Exot. Fl.* t. 163; *Bot. Reg.* t. 890, 1240, 1982; *Wall. Cat.* 755, and *Pl. As. Rar.* ii. 23, t. 123; *DC. Prodr.* vii. 720; *Hook. f. in Journ. Hort. Soc. Lond.* vii. 78, 92; *Bot. Mag.* t. 5311; *Bedd. Fl. Sylv.* t. 228; *Brand For. Fl.* 281; *Kurtz For. Fl.* ii. 93; *in Journ. As. Soc.* 1877, pt. ii. 216. *R. puniceum*, *Roxb. Hort. Beng.* 33, and *Fl. Ind.* ii. 409. *R. cinnamomeum*, *Wall. Cat.* 760; *G. Don Gen. Syst.* iii. 844. *R. album*, *Sweet Brit. Fl. Gard.* v. (1838) t. 148. *R. Campbellii*, *Hook. f. Rhod. Sikkim Himal.* t. 6. *R. Windsorii*, *Nutt. in Hook. Kew Journ.* v. 1853, 357, var. β included (not var. γ).—*Boorans*, *Hardwicke in Asiut. Research.* vi. 359.

TEMPERATE HIMALAYA; alt. 5–10,000 ft., from Kashmir to Bhotan, very common. KHASIA MTS.; alt. 4–6000 ft., common. BIRMA; Karen Hills, *Kurz.*

A tree, 25 ft. *Leaves* 5 by $1\frac{1}{4}$ in., acute, rarely shortly so, base cuneate, tomentum beneath usually hard white, sometimes cinnamomeous or more woolly; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Heads* many-flowered, dense; pedicels $0\frac{1}{2}$ –1 in., hairy; bracts densely hairy. *Calyx*-lobes sometimes $\frac{1}{2}$ in., widely ovate, sometimes very obscure. *Corolla* 1– $1\frac{1}{2}$ by $\frac{3}{4}$ –1 in., 5-lobed, usually red, sometimes pink nearly white as depicted by Wallich. *Stamens* 10; filaments glabrous or nearly so. *Ovary* mealy or ferruginous-woolly, usually 7–9-celled. *Capsule* 1 by $\frac{1}{2}$ in., cylindric, curved, furfuraceous. *Seeds* ellipsoid, testa scarcely lax except produced at the end.—In *R. Campbellii* the leaves are 9 by $2\frac{1}{2}$ in., with petiole $\frac{3}{4}$ in. In *R. Windsorii*, in all the numerous examples collected by Booth, the calyx is, as Nuttall describes, minute; but, in the cultivated plant (*Bot. Mag.* t. 5008), they are ovate-lanceolate acuminate.

VAR. *nilagirica*; leaves elliptic or oblong subobtusate, the base rhomboid or often rounded. *R. nilagirica*, *Zenk. Pl. Ind.* t. 15. *R. arboreum*, var. *Wight Ill.* t. 140, and *lc.* t. 1201. *R. nobile*, *Wall. Cat.* 1521, B.—Mts. of South India and Ceylon, alt. 5–8000 ft., very common.—The whole of the Deccan material at Kew is very homogeneous, and unlike the Himalayan; Beddome's figure (*Fl. Sylv.* t. 228) from fresh Nilgherry specimens exhibits however nearly the Himalayan form.

11. ***R. niveum***, *Hook. f. Rhod. Sikkim Himal., Conspect.* p. 4; leaves lanceolate narrowed at both ends mealy-tomentose beneath not rugose, corolla campanulate lilac. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 78, 93; *Bot. Mag.* t. 4730; *Lemaire Jard. Fleur.* iv. t. 421. *Rhododendron* sp., *Griff. Itin. Notes*, 185, n. 947. *R. Blumei*, *Nutt. in Hook. Kew Journ.* v. (1853) 366 p.

SIKKIM HIMALAYA; alt. 10–12,000 ft., frequent, *J. D. H., Clarke*.

Closely allied to *R. arboreum*, but distinct. The leaves do not exhibit the nerves impressed on the upper surface nor is the under surface so softly and opaquely tomentose; and lilac flowers are unknown in *R. arboreum*. The seeds of *R. niveum* are narrow, oblong with a very lax testa, much produced at both ends, and appearing as a margin on both sides, differing from the seeds of *R. arboreum*. The pedicels are longer, often $\frac{3}{4}$ in. The capsule, which has been supposed different from that of *R. arboreum*, is nearly the same, usually a little smaller.

12. ***R. campanulatum***, *Don in Mem. Wern. Soc.* iii. 410; leaves elliptic subobtusate at both ends with a close cinnamoneous tomentum concealing the nervation beneath, corolla campanulate purple, ovary and capsule glabrous or nearly so. *Wall. Cat.* 756; *Don Prodr.* 153; *Lodd. Bot. Cab.* t. 1944; *Sweet Brit. Fl. Gard.* vi. (1838) t. 241; *DC. Prodr.* vii. 721; *Loud. Arb. Brit.* 589, t. 1114; *Bot. Mag.* t. 3759; *Hook. f. in Journ. Hort. Soc. Lond.* vii. 78, 100; *Brand. For. Fl.* 281. *R. æruginosum*, *Hook. f. Rhod. Sikkim Himal.* t. 22. *R. nobile*, *Wall. Cat.* 1521, A, chiefly. *R. Edgarii*, *Gamble Darjeeling List.* 52.

ALPINE HIMALAYA; alt. 9–14,000 ft., from Kashmir to Bhotan, plentiful.

A large shrub, 6–16 ft. *Leaves* 5 by $2\frac{1}{4}$ in., often mucronate, glabrous, very closely minutely reticulated above; tomentum beneath sometimes more lax woolly, sometimes flocculose and deciduous; petiole $\frac{3}{4}$ –1 in. *Pedicels* $\frac{3}{4}$ – $1\frac{1}{4}$ in., glabrous; bracts 1 in., broad-oblong, silky. *Calyx-teeth* scarcely $\frac{1}{12}$ in., broadly triangular. *Corolla* $1\frac{1}{2}$ by $\frac{3}{4}$ –1 in., 5-lobed. *Stamens* 10; filaments glabrous. *Ovary* 5–9-celled. *Capsule* $\frac{3}{4}$ – $1\frac{1}{4}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in. cylindric, more or less curved. *Seeds* linear-oblong, compressed; testa scarcely produced except at the end.

VAR. *Wallichii*, *Hook. f.*; leaves elliptic or oblong tomentum beneath lax often caducous, petiole densely woolly. *R. Wallichii*, *Rhod. Sikkim Himal.* t. 5. *R. planifolium*, *Nutt. in Hook. Kew Journ.* v. (1853) 365. *R. Batemani*, *Hook. Bot. Mag.* t. 5387.—Sikkim; alt. 10–12,000 ft., *J. D. H., &c.* **BHOTAN**; *Booth. Leaves* sometimes 5 by 2 in.

13. ***R. fulgens***, *Hook. f. Rhod. Sikkim Himal.* t. 25; leaves elliptic base rounded cinnamoneous tomentose beneath, heads dense, calyx-teeth subobsolete, corolla campanulate scarlet, ovary and capsule glabrous. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 79, 100; *Fl. des Serres*, viii. (1852–3) t. 789. *R. nobile*, *Wall. Cat.* 1521, in part.

NIPAL; *Wallich.* **SIKKIM**; alt. 10–14,000 ft., *J. D. H., &c.*

Similar to *R. campanulatum*, except as to the points mentioned in the diagnosis; the leaves are often subcordate at the base. In flower it is at once recognised by its unequalled brilliant colour.

14. ***R. Kendrickii***, *Nutt. in Mag. Nat. Hist.* 2, xii. (1853) 10; leaves very narrowly lanceolate acuminate glabrous, heads dense many-flowered, calyx minutely lobed, corolla campanulate bright-red, ovary strigose. *Nutt. in Hook.*

Kew Journ. v. 1853, 358; *Bot. Mag.* t. 5129.—*Rhododendron* sp., *Griff. Itin. Notes*, 141, n. 656.

BHUTAN; Duphla Hills, alt. 7000 ft., *Griffith, Booth*.

A large shrub. *Leaves* $6\frac{1}{2}$ by $1-1\frac{1}{2}$ in.; base cuneate or obtuse; petiole $\frac{1}{2}$ in. *Heads* closely packed; rachis brown-villous; pedicels $\frac{1}{4}$ in., nearly glabrous; bracts $\frac{3}{4}$ in., broadly oblong, villous. *Corolla* $1\frac{1}{2}$ in., 5-lobed. *Stamens* 10. *Capsule* 1 by $\frac{1}{8}$ in., curved, nearly glabrous. *Seeds* oblong, compressed; testa somewhat lax, produced at both ends.—This seems allied to *R. arboreum* as Nuttall suggests, differing by the very narrow capsule. The leaves are described above from the Bhotan examples; in *Bot. Mag.* t. 5129, taken from a plant grown in England, and called var. *latifolia*, the leaves are not narrower than in the North Indian *R. arboreum*.

15. **R. Shepherdii**, *Nutt. in Hook. Kew Journ.* v. (1853) 360; leaves linear-oblong acute glabrous, heads dense many-flowered, calyx small 5-lobed, corolla campanulate bright-red, ovary glabrous. *Bot. Mag.* t. 5125.

BHUTAN; Oola Mts., *Booth*.

Nothing is known of this at Kew except the drawing of Mr. Holden, communicated and figured in *Bot. Mag.* t. 5125. It differs from *R. Kendrickii*, var. *latifolia*, in the glabrous ovary, the more developed more distinctly lobed calyx. On the faith of the larger calyx it has been (by Hook. f. in *Gen. Pl.* ii. 600) removed to the next section and placed next *R. Thomsoni*.

(b) *Corolla yellow*,

16. **R. Wightii**, *Hook. f. Rhod. Sikkim Himal.* t. 27; leaves narrowly obovate-oblong rhomboid at the base closely cinnamoneous tomentose beneath, heads many-flowered somewhat lax, corolla campanulate yellow, ovary ferruginous woolly. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 79, 99.; *Fl. des Serres*, viii. (1852-3) t. 792-3.

EAST NIPAL AND SIKKIM; alt. 11-14,000 ft., *J. D. H., &c.*

A shrub, 6-14 ft. *Leaves* 7 by $2\frac{1}{2}$ in., mucronate, hardly acute, above glabrous, minutely closely reticulate, beneath adpressed-tomentose; petiole $\frac{1}{2}$ in., more or less tomentose, not hirsute. *Pedicels* 10-20, $\frac{1}{2}-1\frac{1}{2}$ in., hairy, sometimes glandular or ferruginous; bracts $1\frac{1}{2}$ in., spatulate-oblong, silky. *Calyx-lobes* subobsolete. *Corolla* $1\frac{1}{2}$ by 1 in., 5-lobed. *Stamens* 10; filaments scaly-woolly at the base. *Ovary* 10-celled. *Capsule* $1\frac{3}{4}$ by $\frac{1}{2}$ in., cylindric, curved, ultimately glabrescent. *Seeds* linear-oblong, large for *Rhododendron*, compressed; testa close, produced at one end.

17. **R. lanatum**, *Hook. f. Rhod. Sikkim Himal.* t. 16; leaves narrowly obovate-elliptic cuneate at the base cinnamoneous and woolly beneath, heads few-flowered lax, corolla campanulate yellow, fruit ferruginous-lanate. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 79, 100; *Fl. des Serres*, vii. (1851-2) t. 684; *Rev. Hortie.* 1855, t. 9.

SIKKIM HIMALAYA; Jongri, alt. 12-13,000 ft., *J. D. H., &c.*

Branchlets upwards densely woolly. *Leaves* 4 by $1\frac{3}{4}$ in., subobtuse, more or less lanate or ultimately glabrescent above except the midrib; petiole densely woolly, not hirsute. *Flowers* 5-7 in a head, nodding. *Capsule* $\frac{1}{2}-\frac{3}{4}$ by $\frac{1}{8}-\frac{1}{4}$ in. *Seeds* smaller than those of *R. Wightii*, which this species resembles except in the points mentioned.

18. **R. campylocarpum**, *Hook. f. Rhod. Sikkim Himal.* t. 30; leaves elliptic obtuse at the base glabrous on both surfaces, heads somewhat lax, corolla campanulate yellow, ovary sparsely covered with stalked glands. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 79, 101; *Bot. Mag.* t. 4963.

EAST NIPAL AND SIKKIM; alt. 11-14,000 ft., *J. D. H., &c.*

A shrub, 4-8 ft. *Leaves* $2\frac{1}{2}-3$ by $1\frac{1}{2}$ in., obtuse, base rounded sometimes subcordate, rarely rhomboid, minutely reticulated on both surfaces; petiole $\frac{1}{4}-\frac{3}{8}$ in., with

scattered stalked glands or glabrescent. *Flowers* few or many in the head; pedicels 1-1½ in., very glandular upwards; bracts 1 in., spatulate-oblong, hairy. *Corolla* 1½ by 1 in. *Stamens* 10; filaments glabrous. *Ovary* 5-celled. *Capsule* ¾ by ½ in., subcylindric, much curved, with scattered stalked glands or ultimately nearly glabrous and shining. *Seeds* oblong, compressed; testa close, produced at one end.

** *Calyx* deeply-lobed or dilated.

† *Branchlets* not woolly.

19. **R. Griffithianum**, *Wight Ic.* t. 1203; leaves oblong subacute glabrous, calyx widely saucers shaped margin subentire, corolla white. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 76, 93; *Bot. Mag.* t. 5065. *R. Aucklandii*, *Hook. f. Rhod. Sikkim Himal.* t. 11; *Rev. Hort.* 1855, t. 5; *Regel Gartenfl.* (1866) t. 517. *R. oblongum*, *Griff. Ic. Pl. Asiat.* t. 523.—*Rhododendron* sp., *Griff. Itin. Notes.* 192, n. 1045.

SIKKIM and BHOTAN, alt. 7-9000 ft., *Griffith, J. D. H.*, &c.

A tree, 40 ft.; also (as most of the other *Rhododendron* trees) not rarely flowering as a shrub 4-8 ft. *Leaves* 7 by 2 in., exactly oblong with subparallel sides, rounded or cuneate at the base; petiole 1 in. *Pedicels* 2-5, 1-2 in., with large flowers, or numerous subpanicked with smaller flowers; bracts 1½ in., linear-oblong villose. *Calyx* in flower ½ in. diam., patent; in fruit often enlarged, unequal, or torn. *Corolla* 1½-2½ in., widely funnel shaped, often spotted pink. *Stamens* 12-18; filaments glabrous or nearly so. *Ovary* 12-celled, glandular-pubescent. *Capsule* 1½ by ¾ in., short-cylindric, very woody, at length glabrous. *Seeds* ellipsoid, compressed; testa lax, appearing as a margin completely (or nearly) surrounding the seed.

20. **R. Thomsoni**, *Hook. f. Rhod. Sikkim Himal.* t. 12; leaves broadly elliptic obtuse at both ends, calyx cup-shaped obscurely unequally lobed, corolla deep crimson. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 77. 99; *Bot. Mag.* t. 4997; *Fl. des Serres*, viii. (1851-2) t. 688-90; *Morr. Belg. Hort.* viii. 33, t. 10; *Rev. Hort.* 1855, t. 7.

EAST NIPAL and SIKKIM; alt. 11-13,000 ft., common, *J. D. H.*, &c.

A large shrub, 6-15 ft. *Leaves* 3 by 1½ in., often cordate at the base, glaucous beneath, finely reticulated; petiole ½-¾ in. *Pedicels* ¼-1 in., glabrous or nearly so; bracts 1-1½ in., spatulate oblong, hairy. *Calyx* in flower ½ in., in fruit enlarged, often very unequal on one side, more or less lobed or lacerate, glaucous, glabrous. *Corolla* 1-1½ in., wide-funnel shaped. *Stamens* 10. *Ovary* glabrous, 6-10-celled. *Capsule* ¾ by ½ in., glaucous purple. *Seeds* linear-oblong compressed; testa produced at each end, otherwise scarcely lax.

VAR. Candelabrum, *Hook. f.*; calyx shorter and with the ovary sparingly stalked-glandular. *R. Candelabra*, *Hook. f. Rhod. Sikkim Himal.* t. 29.—*Sikkim, J. D. H.*

VAR. flocculosa; leaves beneath cinnamoneous flocculose or furfuraceous.—*Sikkim, Clarke.*

21. **R. Hookeri**, *Nutt. in Hook. Kew Journ.* v. (1853); leaves oblong obtuse at both ends squamulose on the nerves beneath, calyx cup shaped obscurely unequally lobed glabrous. *Hook. Bot. Mag.* t. 4926.

BHOTAN; Oola Mts., alt. 7-8000 ft., *Booth.*

Leaves 4-5 by 1½-2 in.; petiole 1 in., otherwise as *R. Thomsoni*, of which it may be a var. The leaves are not so furfuraceous beneath as in *R. Thomsoni*, var. *flocculosa*, but they are much longer than in any of the numerous examples of *R. Thomsoni* itself.

22. **R. barbatum**, *Wall. Cat.* 757; leaves oblong acute glabrous the midrib beneath and petiole often coarsely bristly, heads many-flowered dense, calyx-lobes large elliptic, corolla campanulate deep red. *G. Don Gen. Syst.* iii. 844; *DC. Prodr.* vii. 721; *Hook. f. Rhod. Sikkim Himal.* t. 3 and in *Journ. Hort. Soc. Lond.* vii. 77, 91; *Fl. des Serres*, v. (1849) t. 469-72; *Morr. Belg. Hort.*

ix. 186, t. 17. *R. nobile*, Wall. Cat. 1521, partly. *R. lancifolium*, Hook. f. *Rhod. Sikkim Himal.* t. 4.

TEMPERATE HIMALAYA; alt. 8–12,000 ft.; from KUMAON to BHOTAN; common in Sikkim.

A tree, 30–40 ft. *Leaves* 6 by $1\frac{1}{2}$ –2 in., base rounded, reticulated beneath; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., with bristles $\frac{1}{8}$ – $\frac{1}{4}$ in. long, or (on the same branch) smooth. *Pedicels* $\frac{1}{4}$ – $\frac{1}{2}$ in., glabrous; bracts $\frac{3}{4}$ in., oblong, hairy. *Calyx-lobes* $\frac{1}{4}$ by $\frac{1}{8}$ in., glabrous. *Corolla* 1– $1\frac{1}{2}$ in. wide-funnelshaped. *Stamens* 10. *Ovary* 5 9-celled, hairy. *Capsule* $\frac{2}{3}$ by $\frac{1}{4}$ in., hirsute. *Seeds* oblong, compressed; testa lax, produced at both ends, and often appearing as a margin round the seed.—The type form of this plant from Nipal and West Sikkim has the leaves generally glabrous; they are sometimes setose beneath and closely ciliate on the margin.

VAR. *Smithii*; leaves furfuraceous subtomentose beneath. *R. Smithii*, Nutt. ms.; Bot. Mag. t. 5120. *Rhododendron* sp., Griff. Itin. Notes, 145, n. 693 and 159, n. 813 a.—East Sikkim and Bhotan, alt. 8–12,000 ft., frequent.

†† *Branchlets densely woolly.*

23. **R. Edgeworthii**, Hook. f. *Rhod. Sikkim Himal.* t. 21; leaves elliptic subacute strongly rugose-veined above, corolla very large broadly funnel-shaped. Hook. f. in Journ. Hort. Soc. Lond. vii. 77, 94; Bot. Mag. t. 4936; Regel. Gartenfl. v. t. 170; Fl. des Serres, viii. (1852–3) t. 797–8.—Ericinea, Griff. Itin. Notes, 155, n. 770.

SIKKIM HIMALAYA; alt. 7–9000 ft., J. D. H., &c. BHOTAN; Griffith, Booth.

A shrub, 4–6 ft., terrestrial and erect or epiphytic. *Leaves* 4 by $1\frac{1}{2}$ in., base rhomboid, densely ferruginous, woolly beneath; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Pedicels* $\frac{1}{4}$ –1 in., densely woolly. *Calyx-lobes* $\frac{1}{2}$ by $\frac{1}{2}$ in., obtuse, unequal. *Corolla* 2–3 in., 5-lobed about half-way down. *Ovary* and style below woolly. *Capsule* $\frac{3}{4}$ by $\frac{1}{2}$ in., densely ferruginous-woolly. *Seeds* linear; testa shortly tailed at each end.—There are round glandular scales beneath the wool of the leaves; the species might be arranged in Series B.

24. **R. pendulum**, Hook. f. *Rhod. Sikkim Himal.* t. 13; leaves elliptic-oblong glabrous or thinly floccose above, corolla small shortly broadly funnel-shaped. Hook. f. in Hort. Soc. Lond. vii. 80, 103; Fl. des Serres, vii. (1851–2) t. 662.

SIKKIM HIMALAYA; alt. 9–11,000 ft.; Lachen, J. D. H.; Jongri and Dikchoo, Clarke.

Epiphytic; branches pendulous, 2–4 ft. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$ in., obtusely rhomboid at both ends, rusty-woolly beneath; petiole $\frac{1}{8}$ – $\frac{1}{6}$ in. *Pedicels* $\frac{1}{4}$ in., rusty-woolly. *Calyx-lobes* $\frac{1}{2}$ by $\frac{1}{4}$ in., obtuse, rose-coloured. *Corolla* $\frac{2}{3}$ in., 5-lobed about half-way down, glandular without. *Capsule* $\frac{1}{2}$ by $\frac{1}{3}$ in., hirsute. *Seeds* linear-oblong; testa shortly tailed at each end.

SERIES B. *Leaves* sprinkled beneath with sessile round glandular scales (which in *R. Anthopogon* coalesce, forming apparently a tomentum). Large or small shrubs.

* *Calyx prominently lobed, lobes longer than broad.*

25. **R. Dalhousiæ**, Hook. f. *Rhod. Sikkim Himal.* tt. 1, 2; leaves obovate-oblong cuneate at the base glabrous, pedicels 2–5 clustered, calyx-lobes elliptic obtuse, corolla very large campanulate white. Hook. in Journ. Hort. Soc. Lond. vii. 77, 93; Bot. Mag. t. 4718; Fl. des Serres, v. (1849) t. 460–8. *R. macrocarpos*, Griff. Itin. Notes, 138.

SIKKIM HIMALAYA; alt. 6–9000 ft., frequent, J. D. H., &c. BHOTAN; alt. 6800 ft., Griffith, Booth.

A laxly branched shrub, often epiphytic. *Leaves* 4–5 by $1\frac{1}{2}$ –2 in., obtuse or sub-

acute, sometimes ciliate; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., sometimes pilose. *Pedicels* $\frac{1}{4}$ – $\frac{3}{4}$ in., pubescent or pilose; bracts 2 in., oblong, hairy. *Calyx-lobes* $\frac{1}{2}$ by $\frac{1}{2}$ in., glabrous, usually pilose at the base, frequently ciliate on the margin. *Corolla* $2\frac{1}{2}$ –4 in., often tinged yellow, green or pink, fragrant; lobes 5, subentire. *Stamens* 10. *Ovary* 5-celled, scaly-glandular. *Capsule* $1\frac{1}{2}$ by $\frac{1}{2}$ – $\frac{2}{3}$ in., straight, glabrescent. *Seeds* linear-oblong, compressed, margined and shortly tailed; testa close.

26. **R. Nuttallii**, *Booth*; *Nutt. in Hook. Kew Journ.* v. (1853) 355; leaves elliptic base rounded glabrous, pedicels 2–5 clustered calyx-lobes oblong-oval obtuse, corolla very large white. *Hook. Bot. Mag.* t. 5146; *Fl. des Serres*, xiii. (1858) t. 1326; *Illustr. Hort.* (1859) t. 208.

BHOTAN; Duple Hills, alt. 4–5000 ft., *Booth*.

A tree, 30 feet; or a straggling epiphyte. *Leaves* 8 by 4 in., obtuse, coriaceous, rugose by impressed nerves above; petiole $\frac{3}{4}$ in. *Pedicels* 1–2 in., exceedingly thick in fruit. *Calyx-lobes* $\frac{3}{4}$ by $\frac{1}{2}$ in., glabrous or slightly ciliated, rose-coloured. *Corolla* 4–5 in., campanulate, tinged yellow at the base, pink at the mouth, fragrant; lobes 5, subentire. *Stamens* 10; filaments hairy below. *Ovary* 5-celled, scaly-glandular. *Capsule* $1\frac{1}{2}$ by $\frac{3}{4}$ in., straight, glabrescent. *Seeds* oblong, compressed, widely margined; testa close.—Nuttall says that the calyx, capsule and seeds in this species are wholly different from those of *R. Dalhousiæ*; but there appears little difference except in size.

27. **R. Boothii**, *Nutt. in Hook. Kew Journ. Bot.* v. (1853) 356; leaves rhomboid-elliptic acuminate ciliate and villose on the margin, corymbs dense many-flowered, calyx-lobes elliptic obtuse, corolla campanulate yellow. *Illustr. Hort.* (1858) t. 174.

BHOTAN; Gascherong Hills, *Booth*.

A straggling epiphyte, 5–6 ft. *Leaves* 4–5 by $2\frac{1}{4}$ in., shortly acuminate, base rhomboid, young sprinkled with long lax ferruginous hairs, adult glabrous except the margins; petiole $\frac{1}{4}$ in., woolly. *Pedicels* $\frac{3}{4}$ in., slightly hairy. *Calyx-lobes* $\frac{1}{4}$ by $\frac{1}{2}$ in., glabrous veined in fruit. *Corolla* $1\frac{1}{2}$ in., 5-lobed; stamens 10, with hairy filaments (*vide Illustr. Hort.*). *Capsule* $\frac{2}{3}$ by $\frac{1}{2}$ in., rugose, furfuraceous. *Seeds* linear, compressed, tailed at both ends; testa close.

28. **R. ciliatum**, *Hook. f. Rhod. Sikkim Himal.* t. 24; branchlets leaves and pedicels with scattered bristles, leaves elliptic acute, pedicels 2–6-nate, calyx-lobes elliptic obtuse, corolla broadly funnel-shaped white or pale-rosy. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 77, 95; *Hook. Bot. Mag.* t. 4648; *Lindl. & Paxt. Fl. Gard.* t. 83; *Lemaire Jard. Fleur.* iii. t. 312; *Fl. des Serres*, viii. (1852–3) t. 766; *Regel Gartenfl.* t. 563.

SIKKIM HIMALAYA; Lachen, alt. 9000 ft., *J. D. H.*; Chola and Dikchoo, alt. 9–10,000 ft., *Clarke*.

A shrub, 2–4 ft., often spread over rocks. *Leaves* $2\frac{3}{4}$ by $1\frac{1}{4}$ in., base obtuse or rounded, glabrous beneath or midrib bristly; petiole $\frac{1}{2}$ in. *Pedicels* $\frac{1}{4}$ – $\frac{1}{2}$ in.; bracts ovate, glabrous. *Calyx-lobes* $\frac{1}{4}$ by $\frac{1}{2}$ in., glabrous, ciliate. *Corolla* $1\frac{1}{2}$ in.; lobes 5, emarginate. *Stamens* 10. *Ovary* 5-celled, scaly-glandular. *Capsule* $\frac{1}{2}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in., scaly. *Seeds* linear; testa close, crested at one end.—The wild plant has the flowers white, slightly tinged with rose, fading a deeper rose. Sir J. D. Hooker sketched his species in Sikkim (*Rhod. Sikkim*, t. 24) from a plant “past flower;” hence with too purple a corolla.

29. **R. camellæiflorum**, *Hook. f. Rhod. Sikkim Himal.* t. 28; leaves oblong or elliptic glabrous densely ferruginous scaly beneath, pedicels 1–4-nate, calyx-lobes elliptic obtuse, corolla white tube cylindric lobes widely spreading. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 80, 103; *Hook. Bot. Mag.* t. 4932; *Regel. Gartenfl.* (1865) t. 460, fig. 1–3. *R. sparsiflorum*, *Nutt. in Hook. Kew Journ.* v. (1853) 363.

EASTERN HIMALAYA; from E. Nipal to Bhotan, alt. 9–13,000 ft., *J. D. H.*, &c.

A shrub, 2–6 ft. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{4}$ in., or $2\frac{1}{2}$ by $1\frac{1}{2}$ in., obtuse or acute, base obtuse or rhomboid; petiole $\frac{1}{2}$ – $\frac{1}{4}$ in. *Pedicels* $\frac{1}{4}$ in., scaly, rugose. *Calyx-lobes* $\frac{1}{2}$ by $\frac{1}{2}$ in., glabrous or nearly so. *Corolla-tube* $\frac{1}{2}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in., lobes $\frac{1}{2}$ – $\frac{1}{2}$ in. diam., orbicular, entire. *Stamens* 12–16. *Ovary* 10-celled. *Capsule* $\frac{1}{2}$ by $\frac{1}{2}$ in., ellipsoid or sometimes ovoid, rough with scales. *Seeds* linear-lanceolate, produced acutely at both ends; testa close.

30. **R. leptocarpum**, *Nutt. ms.*; leaves elliptic-oblong base narrowed glabrous, corymbs many-flowered, calyx-lobes broadly elliptic obtuse, capsule narrow curved. *R. pumilum*, *Nutt. in Hook. Kew Journ.* v. (1853) 354, not of *Hook. f.*

BHOTAN; Oola Mts., alt. 7–8000 ft., *Booth.*

A slender, alpine, branching shrub, $1\frac{1}{2}$ –2 ft. *Leaves* 3 by $1-1\frac{1}{4}$ in., subobtuse, mucronate, finely reticulated above; petiole $\frac{1}{2}$ in., rusty-scaly. *Corymbs* 7–10-flowered; pedicels (in fruit) $1-1\frac{3}{4}$ in., slender, glabrous, scaly. *Calyx-lobes* (in fruit) $\frac{1}{2}$ in. long and broad, glabrous. *Corolla* not seen. *Capsule* $\frac{2}{3}$ by $\frac{1}{2}$ in., rough with scales. *Seeds* linear-lanceolate; testa close, produced acutely at both ends.—The calyx and leaves are exceedingly like those of *R. camelliaeflorum*, but the scales beneath are not so close, and the narrow capsule is very different.

31. **R. glaucum**, *Hook. f. Rhod. Sikkim Himal.* t. 17; leaves oblong glabrous glaucous beneath scaly above, corymbs 4–10-flowered, calyx-lobes ovate subacute scaly, corolla campanulate dull rose. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 78, 102; *Hook. Bot. Mag.* t. 4721; *Fl. des Serres* (1851–2) t. 672; *Rev. Hort.* (1855) t. 11.—*Rhododendron* sp., *Griff. Itin Notes*, 144, n. 691.

SIKKIM and BHOTAN; alt. 10–12,000 ft., *Griffith, J. D. H.*, &c.

A small shrub, 2 ft. *Leaves* 3 by $1\frac{1}{4}$ in. (those on barren shoots often much larger), subobtuse, mucronate, base rhomboid, lower surface with scattered glandular scales; petiole $\frac{1}{2}$ – $\frac{1}{4}$ in. *Pedicels* $\frac{1}{2}$ –1 in., scaly; bracts $\frac{1}{2}$ in., ovate, scaly, caducous. *Calyx-lobes* $\frac{1}{4}$ – $\frac{1}{2}$ by $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ – $\frac{2}{3}$ in.; lobes 5, emarginate. *Stamens* 10, filaments woolly below. *Ovary* 5-celled, scaly. *Capsule* $\frac{1}{4}$ by $\frac{1}{4}$ in., shortly ellipsoid. *Seeds* minute, lanceolate; testa closely, shortly produced at one end.

32. **R. pumilum**, *Hook. f. Rhod. Sikkim Himal.* t. 14, not of *Nutt.*; leaves small elliptic obtuse glabrous, pedicels 1–3 together long, calyx-lobes ovate-oblong obtuse, corolla widely funnel-shaped tube longer than the lobes rose-coloured hairy without. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 78, 102; *Fl. des Serres*, vii. (1851–2) t. 667.

SIKKIM HIMALAYA; Lachen, alt. 12–14,000 ft., *J. D. H.*

A shrub, 3–8 in. *Leaves* $\frac{1}{2}$ by $\frac{1}{2}$ in., often mucronate, rhomboid at the base, above glabrous and naked, beneath with scattered scales; petiole hardly any. *Pedicels* $1-2\frac{1}{2}$ in., glandular, erect. *Calyx-lobes* $\frac{1}{10}$ – $\frac{1}{8}$ in., in fruit $\frac{1}{2}$ in., sometimes glandular-scaly. *Corolla* $\frac{2}{3}$ in., shortly 5-lobed. *Stamens* 10; filaments hairy below. *Ovary* 5-celled, scaly. *Capsule* $\frac{1}{4}$ by $\frac{1}{5}$ – $\frac{1}{6}$ in., ovate-oblong, erect on the erect pedicel.

33. **R. lepidotum**, *Wall. Cat.* 758; leaves from obovate to lanceolate glabrous not setose, pedicels 1–3 together long, calyx-lobes elliptic obtuse, corolla yellow or dull purple tube short globose, lobes round wide spreading. *Royle Ill.* 260, t. 64, fig. 1; *DC. Prodr.* vii. 724; *Bot. Mag.* tt. 4657, 4802, 6450; *Lemaire Jard. Fleur.* iv. 343; *Hook. in Journ. Hort. Soc. Lond.* vii. 81, 104; *Brand. For. Fl.* 282. *R. salignum* and *elæagnoides*, *Hook. f. Rhod. Sikkim Himal.* t. 23, A, B. *R. obovatum*, *Hook. f. Rhod. Sikkim Himal. Consp.* p. 6.

TEMPERATE and ALPINE HIMALAYA; alt. 8–15,000 ft.; from Kashmir to Bhotan, common.

A shrub, more or less scaly-glandular throughout, 1-6 ft.; branchlets very scabrid glandular. *Leaves* $\frac{1}{4}$ - $1\frac{1}{2}$ in., obovate and obtuse or lanceolate and subacute, base narrowed; petiole scarcely any. *Pedicels* $\frac{1}{2}$ - $1\frac{1}{2}$ in., very scabrous. *Calyx-lobes* $\frac{1}{10}$ in. *Corolla-tube* $\frac{1}{2}$ in.; lobes $\frac{1}{4}$ in. *Stamens* 8, very rarely 10; filaments hairy below. *Ovary* 5-celled. *Capsule* $\frac{1}{4}$ - $\frac{3}{4}$ by $\frac{1}{8}$ - $\frac{1}{4}$ in., erect. *Seeds* oblong, acute; testa close, hardly produced at the ends.

34. **R. setosum**, *D. Don in Trans. Wern. Soc.* iii. 408, *Prodr.* 152; branchlets bristly, leaves elliptic-obovate obtuse scaly on both surfaces and often bristly beneath, pedicels 3-8 clustered short, calyx lobes elliptic, corolla red tube very short, lobes oblong spreading. *DC. Prodr.* vii. 724; *Hook. f. Rhod. Sikkim Himal.* t. 20, and in *Journ. Hort. Soc. Lond.* vii. 81, 105. *R. Anthopogon*, *Wall. Cat.* 759, partly.

NIPAL; *Wallich*. SIKKIM; alt. 13-16,000 ft., *J. D. H.*, &c.

A small shrub, 1 foot. *Leaves* $\frac{1}{2}$ by $\frac{1}{4}$ in.; petiole very short, usually bristly. *Pedicels* $\frac{1}{4}$ in., glandular-scaly. *Calyx-lobes* $\frac{1}{4}$ - $\frac{1}{2}$ by $\frac{1}{8}$ - $\frac{1}{4}$ in., obtuse, glandular-scaly. *Corolla-tube* $\frac{1}{2}$ in.; lobes $\frac{1}{2}$ by $\frac{1}{4}$ in. *Stamens* 3, sometimes 10; filaments hairy below. *Ovary* 5-celled, glandular-scaly. *Capsule* $\frac{1}{4}$ by $\frac{1}{2}$ in., ovoid, hardly larger than the calyx-lobes. *Seeds* ellipsoid, subacute at the ends; testa close, not produced.

35. **R. nivale**, *Hook. f. Rhod. Sikkim Himal.* t. 26; prostrate, leaves small elliptic, flowers solitary subsessile, corolla rose-red, tube short, lobes obovate-elliptic spreading. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 81, 105.

SIKKIM; alt. 13-16,000 ft., Phullong and Kinchinjhow, *J. D. H.*

A dense, small bush; hardly rising 2 in. from the ground. *Leaves* $\frac{1}{2}$ - $\frac{1}{4}$ in., obtuse, glabrous, scaly on both surfaces. *Calyx-lobes* $\frac{1}{12}$ in., elliptic, obtuse, unequal. *Corolla-tube* $\frac{1}{2}$ in.; lobes $\frac{1}{4}$ in., round-obovate; hairy in the throat. *Stamens* 3 or 10; filaments hairy below. *Ovary* 5-celled, scaly. *Capsule* $\frac{1}{2}$ in. long, ovoid. *Seeds* ellipsoid, compressed, subacute; testa close, not produced.

36. **R. Anthopogon**, *D. Don in Mem. Wern. Soc.* iii. 409, and *Prodr.* 153; leaves petioled elliptic subobtuse at both ends glabrous above densely scaly beneath, pedicels short numerous fascicled terminal, corolla yellow, tube cylindric, lobes wide-spreading, *Wall. Cat.* 759, chiefly; *Royle Ill.* 260, t. 64, fig. 2; *Loud. Arb. Brit.* 590, t. 1115; *DC. Prodr.* vii. 725; *Hook. f. Rhod. Sikkim Himal. Consp.* 7, and in *Journ. Hort. Soc. Lond.* vii. 82; *Hook. Bot. Mag.* t. 3947; *Brandis For. Fl.* 282. *R. aromaticum*, *Wall. Cat.* 1520 (*vide Hook. f., wanting in Herb. Wall.* *R. palustre*, *Turcz.*; *DC. Prodr.* vii. 715. *R. parvifolium*, *Adams in Mem. Soc. Mosc.* ix. 237. *R. parviflorum*, *F. Schmidt Reis. in Amurl.* 158 (*vide Maxim.*). *R. fragrans and micranthum*, *Maxim. Rhod. As. Orient.* 16, 18, t. 4, fig. 1-10. *Azalea fragrans*, *Adams*; *Roem. et Sch. Syst.* iv. 379. *A. lapponica*, *Pall. Fl. Ross.* ii. 52, t. 70, fig. 1, A, B. *Osmothamnus fragrans and pallidus*, *DC. Prodr.* vii. 715.

ALPINE HIMALAYA; alt. 11-16,000 ft., from Kashmir to Bhotan, common.—DISTRIBUTION. Central and Northern Asia.

A small shrub, 1 ft.; branchlets scabrous and densely scaly. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$ in., cinnamonaceous beneath and as it were tomentose from the layer of glands; petiole $\frac{1}{2}$ - $\frac{1}{3}$ in. *Pedicels* 4-12, $\frac{1}{2}$ - $\frac{1}{4}$ in., glabrous; bracts $\frac{1}{4}$ in., ovate, hairy. *Calyx-lobes* $\frac{1}{8}$ - $\frac{1}{6}$ in., elliptic, obtuse, margin villous. *Corolla-tube* $\frac{1}{2}$ in., throat hairy; lobes $\frac{1}{4}$ in., elliptic-obovate, obtuse, entire. *Stamens* 6-8, included. *Ovary* 5-4-celled, scaly; style $\frac{1}{12}$ - $\frac{1}{8}$ in.; 4-5 stigmatic points rising above the widened truncate summit of the style. *Capsule* $\frac{1}{2}$ in., ovoid. *Seeds* oblong, subacute; testa lax, not produced even at the ends.

** *Calyx very shortly, or obsoletely lobed.*

37. **R. Maddenii**, *Hook. f. Rhod. Sikkim Himal.* t. 18; leaves oblong or elliptic acute glabrous densely scaly beneath, corymbs 4-12-flowered, calyx-

teeth oblong, corolla very large white, mouth widely funnel-shaped. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 79, 95; *Hook. Bot. Mag.* t. 4805; *Fl. des Serres* (1853-4), t. 912; *Rev. Hort.* (1855) t. 16; *Illustr. Hort.* (1857) t. 140. *R. Jenkinsii*, *Nutt. in Hook. Kew Journ.* v. (1853) 361; *Regel Gartenfl.* ix. 277.

SIKKIM and BHOTAN; alt. 6000 ft., *J. D. H., Booth.*

A shrub, 6-8 ft. *Leaves* 5-6 by $1\frac{1}{4}$ - $2\frac{1}{4}$ in., base rhomboid or rounded; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in. *Pedicels* $\frac{1}{4}$ - $\frac{1}{2}$ in., scaly. *Calyx-lobes* $\frac{1}{5}$ in., in fruit nearly $\frac{1}{2}$ in., triangular-oblong, glabrous, membranous. *Corolla* 3-4 in.; lobes 5, rounded. *Stamens* 18; filaments glabrous. *Ovary* 10-celled, scaly. *Capsule* 1 by $\frac{1}{2}$ in., ellipsoid. *Seeds* linear-lanceolate, caudate, large for the genus; testa close, produced at the ends.

VAR. calophylla; calyx-lobes shorter sometimes ovate obtuse, capsule much smaller. *R. calophylla*, *Nutt. in Hook. Kew Journ.* v. 362; *Bot. Mag.* t. 5002; *Fl. des Serres*, t. 2340; *Regel Gartenfl.* t. 460, fig. 4, 5; t. 577. *R. macranthum*, *Griff. Ic. Pl. Asiat.* t. 520, not *R. macranthum*, *Griff. Itin. Notes*, 144, n. 690. *Rhododendron* sp., *Griff. Itin. Notes*, 198, n. 1134.—Bhotan, alt. 4000 ft., *Griffith, Booth.*—The capsules in Griffith's and Booth's (numerous) examples hardly average one half the size of those of *R. Maddeni*; the largest capsule in *R. calophylla* is hardly $\frac{3}{4}$ by $\frac{1}{2}$ in., and its calyx-lobes are not at all enlarged in fruit. The leaves in the two varieties (or species?) are exactly alike.

38. ***R. formosum***, *Wall. Pl. As. Rar.* iii. 3, t. 207; leaves obovate-lanceolate acute glabrous or setose-ciliate, corymbs 2-5-flowered, calyx-teeth small, corolla large white widely funnel-shaped. *DC. Prodr.* vii. 721; *Bot. Mag.* t. 4457; *Kurz in Journ. As. Soc.* 1877, pt. ii. 216, and *For. Fl.* ii. 94. *R. Gibsonii*, *Paxt. Mag. Bot.* viii. t. 217; *Fl. des Serres*, i. t. 18.

BHOTAN; *Griffith, Booth.* KHASIA Mts.; alt. 3-5000 ft., common. MARTAPAN; Nattoung, alt. 7200 ft., *Kurz.*

A shrub, 8 ft.; branchlets glabrous, rarely ferruginous-bristly. *Leaves* 1-2½ in., variable in size, usually broadest above the middle, shortly acute, long attenuate to the base, glands beneath numerous (but not approximate as in *R. Maddeni*); petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Pedicels* $\frac{1}{4}$ in., glandular-scaly; bracts $\frac{1}{2}$ in., ovate, glabrous, ciliate. *Calyx-lobes* obtuse, hirsute or glabrous. *Corolla* $1\frac{1}{2}$ -2 in. long and broad; lobes about as long as the tube, round, entire or slightly crenate, sometimes with pink marks. *Stamens* 10; filaments sparsely pilose. *Ovary* 5-celled, scaly. *Capsule* $\frac{3}{4}$ by $\frac{1}{2}$ in., erect, symmetric. *Seeds* elliptic, acute; testa close, hardly produced at the ends.

VAR. salicifolia; leaves very narrowly lanceolate, sometimes 3 by less than $\frac{1}{2}$ in.—Khasia, frequent.

VAR. inæqualis; capsule $\frac{3}{4}$ by $\frac{1}{2}$ in., ovoid, unsymmetric from a very unequal base.—Khasia; Kollong rock, alt. 5000 ft., *H. f. & T.*—This has been considered a distinct species, and may be so, but the flowers are unknown. Branches often hirsute-setose; leaves entirely without the setose ciliæ common (but sometimes wanting) in *R. formosum*. *Capsules* (of which there are numerous examples) more unsymmetric than in any other Indian *Rhododendron*.

39. ***R. Veitchianum***, *Hook. Bot. Mag.* t. 4992; leaves obovate-lanceolate acute glabrous glandular-scaly beneath, corolla large white or pink wide-funnel-shaped. *Fl. des Serres*, xiv. t. 1416, xv. t. 1519-20. *R. formosum*, var. β , *Kurz in Journ. As. Soc.* 1877, pt. ii. 216.

MOULMEIN; alt. 7000 ft., Moolee, *Parish, Kurz.*

A shrub, 8 ft.; sometimes epiphytic; branchlets glabrous or (in Kurz's example) hirsute. *Leaves* $3\frac{1}{2}$ by $1-1\frac{1}{2}$ in., base cuneate; petiole $\frac{1}{4}$ in., sometimes hirsute. *Umbels* terminal, 3-8-flowered; pedicels $\frac{1}{4}$ in., glandular-scaly; bracts 1 by $\frac{1}{4}$ in., acute, villous below. *Calyx-lobes* small, unequal, sometimes hirsute. *Corolla* 2-2½ in. long and broad, glandular-scaly without or nearly glabrous; lobes 5, round, crisped-crenulate. *Stamens* 12-14; filaments hairy below. *Ovary* and base of the style densely glandular-scaly; stigma large, peltate. *Capsule* not seen.—This hardly

differs from some large-flowered glabrous examples of *R. formosum*, except by the crisped-crenulate margin of the corolla.

40. ***R. cinnabarinum***, *Hook. f. Rhod. Sikkim Himal.* t. 8; leaves oblong or elliptic glabrous, pedicels terminal clustered, calyx-lobes small unequal or obsolete, corolla-tube long narrow campanulate, lobes ovate, flowers orange rose or brick-red. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 80, 101; *Hook. Bot. Mag.* t. 4788. *R. Raylei*, *Hook. f. Rhod. Sikkim Himal.* t. 7. *R. blandfordiæflorum*, *Hook. Bot. Mag.* t. 4930; *Fl. des Serres* (1856), t. 1173; *Gard. Chron.* 1856, 548, with fig.; 1871, 236, t. 53; *Illustr. Hort.* ser. iii. t. 112.—*Rhododendron* sp., *Griff. Itin. Notes*, 194, n. 1072.

SIKKIM; alt. 10–12,000 ft., *J. D. H.*, &c. BHOTAN; alt. 10,000 ft., *Griffith*.

A shrub, 4–8 ft. *Leaves* 2–3 by 1–1½ in., acute or obtuse, beneath mealy white or cinnamomeous with scattered glandular scales; petioles ½ in. *Pedicels* ¼–½ in., squamose or glabrous; bracts glabrous with ciliate margins. *Corolla* 1½ by ¾ in., pendulous. *Stamens* 10; filaments pilose at the base. *Ovary* 5-celled, glandular-scaly. *Capsule* ½–½ by ¼ in. *Seeds* ovoid or trigonous; testa close, hardly produced at all.—A most variable plant.

41. ***R. Keysii***, *Nutt. in Hook. Kew Journ.* v. (1853) 353; leaves lanceolate narrowed at both ends glabrous, pedicels pseudo-terminal clustered on short axillary spurs, calyx-lobes minute, corolla-tube long cylindric lobes ovate, flowers pale brick-red whiter at the mouth. *Hook. Bot. Mag.* t. 4875; *Fl. des Serres* (1856), t. 1110; *Regel Gartenfl.* (1863) t. 415.—*Rhododendron* sp., *Griff. Itin. Notes*, 141, n. 655 and 190, n. 1010 and *Ic. Pl. Asiat.* t. 618.

BHOTAN; alt. 8–10,000 ft., *Griffith, Booth*.

A shrub, 2–6 ft. *Leaves* 3½ by 1 in., acute, base cuneate, beneath cinnamomeous with scattered glandular scales; petiole ⅙–⅓ in. *Pedicels* ¼ in., scaly; bracts ¾ in., hairy. *Corolla* ¾ by ¼ in., pendulous; lobes hardly spreading. *Stamens* 10; filaments woolly below. *Ovary* 5-celled, glandular-scaly. *Seeds* oblong; testa close, produced as a crest at one end.

42. ***R. triflorum***, *Hook. f. Rhod. Sikkim Himal.* t. 19; leaves elliptic acute glabrous closely minutely scaly beneath, pedicels 1–5 fascicled terminal, corolla yellow, tube short campanulate, lobes ovate obtuse erect-patent. *Fl. des Serres*, vii. t. 673. *R. virgatum* var., *Hook. f. in Journ. Hort. Soc. Lond.* vii. 96. *R. deflexum*, *Griff. Ic. Pl. Asiat.* t. 519.—*Rhodora* sp., *Griff. Itin. Notes*, 192, n. 1046.

SIKKIM and BHOTAN; alt. 7–8000 ft., *Griffith, J. D. H.*, &c.

A shrub, 4–8 ft. *Leaves* 2½ by 1 in., obtuse at the base; petiole ¼ in. *Pedicels* ½–½ in., scaly; bracts ½–¾ in., obovate, scaly, ciliate; bracteoles ½ in., linear. *Calyx-lobes* subobsolete. *Corolla-tube* ⅓ in., lobes ⅓ in., often scaly without. *Stamens* 10 or 8; filaments densely woolly near the base. *Ovary* 5-celled, scaly; style glabrous. *Capsule* ½ by ½ in. *Seeds* oblong, acute; testa close.

SUBGENUS IV. ***Rhodorastrum*** (Sect. *Maxim. Rhod. As. Orient.* 15). As *Eurhododendron*; but pedicels axillary, solitary, each sheathed at the base by several large caducous bracts.

43. ***R. virgatum***, *Hook. f. Rhod. Sikkim Himal.* t. 26, A; leaves narrowly oblong acute glabrous glandular-scaly beneath, calyx-lobes small ovate obtuse, corolla purple, lobes 5 ovate entire spreading as long as the campanulate tube. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 81, 95 (excl. syn. *R. triflorum*); *Hook. Bot. Mag.* t. 5060.—*Azalea*, *Griff. Itin. Notes*, 155, n. 776.

SIKKIM; Choongtam, alt. 7–9000 ft., *J. D. H.* BHOTAN; alt. 7000 ft., *Griffith*.

A shrub, 4 ft., branchlets scaly. *Leaves* $2\frac{1}{4}$ by $\frac{3}{4}$ in., base broadly rhomboid, obscurely glandular-punctate above; petiole $\frac{1}{8}$ in. *Pedicels* $\frac{1}{4}$ – $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ in., ovate, pubescent. *Corolla-tube* $\frac{1}{2}$ in. *Stamens* 10 or 8; filaments sparsely pilose. *Ovary* 5-celled, scaly as is the lower portion of the style. *Capsule* $\frac{1}{2}$ by $\frac{1}{4}$ in. *Seeds* oblong; testa produced into a tail at each end shorter than the seed.

SPECIES IMPERFECTLY KNOWN.

44. *R. BHOTANICUM*, Clarke; leaves oblong or elliptic obtuse with a mucro or acute glabrous sparsely scaly beneath, flowers and fruit unknown.

BHOTAN; *Booth*.

Leaves 5 by $1\frac{1}{2}$ in., base cuneate or rhomboid, much resembling those of *R. Maddeni* but the glands beneath are sparsely scattered. *Flower-scales* in large terminal cones, very much larger than those of *R. cinnabarinum* or *R. Keysii*, broadly obovate, glabrous, scarcely scarious towards the margin, but fringed densely with brilliantly white soft hairs; in *R. Maddeni* the flower-scales have the margins scarious not fringed.—These shoots represent possibly the species referred to by Nuttall (in Hook. Kew Journ. v. (1853) 363) as a second variety of *R. camelliaeflorum* “with foliage almost as robust as *R. Jenkinsii*.”

45. *R. PARISHII*, Clarke; leaves elliptic narrowed at the base glabrous finely reticulated beneath without glands, petioles with loose ferruginous wool sometimes continued up the midrib beneath.

MOULMEIN; Moolee, alt. 6000 ft., *Parish*, n. 1021.

Branchlet stout with some ferruginous wool towards the extremity. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., subobtuse with a very short point, of a rich brown colour; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Flowers* and capsules unknown.

46. *R. LUCIDUM*, Nutt. in Hook. Kew Journ. v. (1853) 363; shrubby, leaves short-petioled oblong-lanceolate acute shining base cuneate glaucous and scaly beneath, flowers subsolitary, calyx-lobes somewhat large oblong-ovate obtuse glabrous, capsules ovate acute 5–8-celled.

Mts. of BHOTAN; beyond the Bhorelli, *Booth*.

Hardly distinguishable from *R. Jenkinsii* by the leaves, though very distinct in the inflorescence, which approaches nearer that of *R. camelliaeflorum*. *Flowers* not seen (Nuttall).

9. **PYROLA**, Linn.

Perennial, glabrous herbs, with short leafy stems and erect annual simple scapes. *Leaves* alternate, long-petioled, persistent, entire or nearly so. *Flowers* in simple racemes, cernuous, white or rose; pedicels 1-bracteate. *Calyx* deeply 5-lobed, persistent. *Petals* 5; concave, sessile, deciduous. *Stamens* 10, hypogynous; filaments subulate, glabrous; anthers incompletely 4-celled, dehiscing by 2 terminal pores. *Ovary* subglobose, 5-celled; style straight declinate or curved, linear or thickened upwards, top truncate with a 5-lobed stigma; ovules very many in each cell. *Capsule* subglobose, depressed, pentagonal, 5-celled, loculicidally 5-valved from the base, crowned by the persistent style. *Seeds* minute; testa lax, produced at both ends.—Species 15, in temperate northern regions.

P. rotundifolia, Linn.; leaves orbicular or broadly-ovate or -obovate or elliptic, petiole about equalling the blade, calyx-segments broadly ovate or ovate-lanceolate, style equalling or longer than the petals declinate, stigmatic lobes erect or spreading.

NORTH-WESTERN and EASTERN HIMALAYA, and the Khasia Mts.—DISTRIB. Europe, N. Asia and N. America.

Glabrous. *Leaves* 1–2 in. diam., narrowed into the petiole, quite or nearly entire, coriaceous, obtuse or subacute. *Scape* 6–8 in.; raceme many-fl'd. *Stamens* ascending,

shorter than the styles. *Flowers* drooping about $\frac{1}{2}$ in. diam., bracts $\frac{1}{2}$ in., lanceolate, amplexicaul; floral lanceolate, about equalling the pedicels. *Petals* $\frac{1}{4}$ -in. long, orbicular or obovate, white and pink. *Anther-bases* obtuse or mucronate. *Capsule* $\frac{1}{3}$ - $\frac{1}{2}$ in. diam.

VAR. *rotundifolia* proper; calyx-segments ovate- or oblong-lanceolate. *P. rotundifolia*, DC. *Prodr.* vii. 772.—Kashmir, alt. 9–10,000 ft., Falconer, Thomson, Clarke.

VAR. *asarifolia*; calyx-segments triangular-ovate, leaves usually more obovate. *P. asarifolia*, Mich.; DC. *Prodr.* vii. 773. *Chimaphila* sp. Griff. *Itin. Notes*. 134, n. 560.—Sikkim Himalaya, alt. 9–11,000 ft., J. D. H., Anderson. Bhotan, alt. 6800 ft., Griffith. Khasia Mts., alt. 5–6500 ft., H. f. & T., Lobb.—A Japanese and American form.

ORDER LXXXIII. MONOTROPEÆ. (By C. B. Clarke.)

Parasitic, brown or yellowish leafless herbs. *Stem* erect, with leafy scales. *Flowers* solitary or racemose, regular. *Sepals* (sometimes like the scales) 2–6, deciduous, imbricate. *Petals* 3–6 (in the Indian species). *Stamens* 6–12, hypogynous; filaments linear. *Ovary* free, globose or fusiform, 1–6-celled; style cylindric, stigma peltate; ovules very numerous on axile or parietal placentæ. *Capsule* loculicidally 4–6-valved. *Seeds* very many, minute; testa often loose, produced, saccate; embryo minute, undivided.—Species 10–12, in the forests of the N. hemisphere.

* *Anthers peltate, ovary ovoid, placentas axile.*

Flowers solitary. Petals hardly saccate at base 1. MONOTROPA.
Flowers racemose. Petals saccate at base 2. HYPOPITHYS.

** *Anthers oblong, ovary fusiform, placentas parietal.*

Scape 1–3-flowered. Petals 3, narrow 3. CHEILOTHECA.

1. MONOTROPA, Linn.

Stem 1-flowered. *Sepals* 4, resembling scales. *Petals* 5–6, obovate-oblong, scarcely saccate at base, at length deciduous. *Stamens* 10–12; anthers peltate, horizontal, dehiscing by transverse slits. *Ovary* 5-celled; ovules very many on axile placentæ. *Capsule* 5-celled, 5-valved.—Species 1 or 2, American and Himalayan.

M. uniflora, Linn.; DC. *Prodr.* vii. 781; Lamk. *Ill.* t. 362, fig. 1; Don *Prodr.* 151; Hook. *Exot. Fl.* t. 85; Maxim. *Mel. Biol. Dec.* xii. 626. M. Morisoniana, Michx. *Fl. Bor. Am.* i. 266; DC. l.c.; Don *Prodr.* 152. *Monotropa*, Griff. *Ic. Pl. Asiat.* t. 523.

TEMPERATE HIMALAYA; alt. 6–8000 ft. KHASIA Mts.; alt. 4–6000 ft., frequent. DISTRIB. Corea, Japan, N. America.

Glabrous, 6–15 in. Scales $\frac{3}{4}$ in., ovate-lanceolate. *Flower* nodding. *Petals* $\frac{3}{4}$ in.; stamens and stigma nearly level with their summits. *Ovary* and capsule globose. *Style* at first short, in fruit often $\frac{1}{2}$ in. *Filaments* pilose below. *Fruit* erect.

2. HYPOPITHYS, Scop.

Flowers in a terminal raceme; bracts scaly. *Sepals* 4–5, obovate-lanceolate, hyaline, deciduous. *Petals* 4–5, obovate-oblong, saccate at the base, deciduous. *Stamens* 8–10; anthers peltate, horizontal, dehiscing by transverse slits. *Ovary* 5-celled; ovules on axile placentæ. *Capsule* 4–5-celled, loculicidally 4–5-valved.—Species 2 (or 1); throughout the N. hemisphere.

H. lanuginosa, Nutt. *Gen. Am.* i. 271; stem raceme and flowers pubescent, petals densely hairy within. DC. *Prodr.* vii. 781.

KASHMIR; alt. 8500 ft., *Aitchison, C. B. Clarke.* KHASIA MTS.; alt. 4-5000 ft., *H. f. & T., &c.*—DISTRIB. Amurland, Japan, N. America.

Scapes 6-18 in. *Scales* $\frac{3}{4}$ in., ovate-oblong. *Pedicels* $\frac{1}{4}$ - $1\frac{1}{2}$ in. *Petals* $\frac{1}{2}$ in., yellow or white; stamens and stigma nearly level with their summits. *Ovary* and capsule globose.—This only differs from the European species (*Monotropa Hypopitys, Linn.*) by its hairiness; and is considered a variety thereof by Maximowicz.

3. CHEILOTHECA, Hook. f.

Stem erect, simple or forked; branches 1-flowered. *Sepals* 3-4, oblong-lanceolate. *Petals* 3, erect, linear-oblong, obtuse, base not saccate. *Stamens* 6; anthers linear-oblong, erect, dehiscent on the sides by longitudinal slits. *Ovary* fusiform, 1-celled, narrowed into the short cylindric style; stigma globose-conical; placenta 6, parietal, bifid, the long branches covered on all sides by numerous ovules. *Fruit* unknown.

C. khasiana, Hook. f. in Gen. Pl. ii. 608.

KHASIA MTS.; Musbai, near River Oongkot, alt. 3500 ft., *H. f. & T.*

Stem 4-6 in. *Scales* 1 by $\frac{1}{4}$ in., lanceolate, acute, densely imbricate. *Petals* 1 in., yellow-red. *Stamens* as long as the petals, brown. *Pistil* $\frac{3}{4}$ by $\frac{1}{2}$ in., glabrous.

ORDER LXXXIV. EPACRIDÆ. (By C. B. Clarke.)

Shrubs or small trees. *Leaves* alternate, articulated with the branch, coriaceous, entire, longitudinally nerved. *Flowers* solitary or racemose, axillary or terminal, usually bracteolate. *Calyx* 5-4-partite; segments coriaceous, striate, imbricate, persistent. *Corolla* 5-4-lobed. *Stamens* 5-4, usually on the corolla-tube; anthers oblong, 1-celled (spuriously 2-celled), dehiscent along their whole length by a single slit. *Ovary* globose, 1-10-celled: style terminal, cylindric, stigma subcapitate; ovules in each cell 1 or many. *Fruit* drupaceous with 2-5 1-seeded pyrenes, or a many-seeded capsule. *Seeds* small, albuminous.—Species 320, nearly all Australian, a few Polynesian, 1 Fœgian, a few Malayan.

1. LEUCOPOGON, R. Br.

Shrubs. *Flowers* small, white, in axillary or terminal spikes or racemes; rachis terminating in an abortive flower; bracteoles 2-3 under the calyx. *Corolla* campanulate, lobes 5, hairy within, valvate in bud. *Ovary* 2-5-celled; style terminal; ovule solitary in each cell, pendulous. *Drupe* scarcely fleshy, 1-5-celled.—Species 130, 118 Australian, the others Polynesian and Malayan.

L. malayanus, Jack in Mal. Misc. i. v. 20, and in Hook. Bot. Misc. ii. 74; leaves narrowly lanceolate glabrous shining, racemes 3-7-flowered much shorter than the leaves, rachis villous. *Wall. Cat.* 3720, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 301; *DC. Prodr.* vii. 744; *Kurz in Journ. As. Soc.* 1877, ii. 217, and *For. Fl.* ii. 95. *Styphelia malayica, Spreng. Syst. cur. post.* 67.

MALACCA and SINGAPORE; *Jack, &c.*—DISTRIB. Malay Isles and Borneo.

A shrub, 3-6 ft.; branches densely leafy. *Leaves* 2 by $\frac{1}{2}$ in., acute, mucronate. *Racemes* $\frac{1}{2}$ in.; calyx enveloped by the ovate bracteoles; segments $\frac{1}{2}$ - $\frac{1}{3}$ in., elliptic-oblong. *Corolla-tube* $\frac{1}{2}$ in.; lobes $\frac{1}{2}$ in., spreading. Hypogynous scales 5, free. *Style* hairy or perfectly glabrous. *Drupe* $\frac{1}{8}$ - $\frac{1}{4}$ in. diam.

VAR. *moluccana, Kurz in Journ. As. Soc.* 1877, pt. ii. 217, and *For. Fl.* ii. 96; leaves $\frac{1}{2}$ -1 in. subulate-pointed. *L. moluccanum, Scheff. Obs. Phyt.* iii. 97 (sp.).—TENASSERIM, *Helfer*; Keddah Peak, *Low.*—*L. moluccanum, Scheff.* has the peduncles 1-2-flowered; in *Helfer's* Tenasserim plant, the racemes are (sometimes at least) 3-5-flowered.

ORDER LXXXV **DIAPENSIACEÆ.** (By C. B. Clarke.)

Very small, prostrate shrubs. *Leaves* alternate or crowded, entire or toothed. *Flowers* solitary or racemose. *Calyx* 5-partite, persistent; segments imbricate. *Corolla* hypogynous; lobes 5, imbricate. *Stamens* 5, on the throat of the corolla, alternate with its lobes; anthers dehiscing by slits. *Disc* 0. *Ovary* free, globose, 3-celled; style cylindric, stigma shortly 3-lobed; ovules few or many in the inner angles of the cells. *Capsule* coriaceous, 3-celled, loculicidally 3-valved. *Seeds* many, minute, aluminous.—Species 8, in N. America, Europe, Japan, and the Eastern Himalaya.

1. **DIAPENSIA**, Linn.

Very small, glabrous shrubs. *Leaves* crowded, obovate-oblong, entire, coriaceous. *Flowers* at the ends of the branches, solitary, peduncled, white or rose-red. *Calyx* 2–3-bracteate; sepals broadly ovate, obtuse. *Corolla* campanulate, persistent; lobes spreading, round. *Anthers* subsessile, cells oblique; staminodes 0. *Seeds* very many, minute, subcubic; testa lax.

D. himalaica, *H. f. & T. in Hook. Kew Journ.* ix. 372, t. 12; leaves subacute, flowers subsessile, tube of the corolla twice as long as the calyx, fruiting peduncle 1–3 in.

SIKKIM HIMALAYA; alt. 10–14,000 ft., Lachen and Chola Pass, *J. D. H.*, &c.

Densely tufted. *Leaves* $\frac{1}{8}$ in. *Sepals* in flower-time $\frac{3}{8}$ – $\frac{1}{2}$ in., ovate; in fruit nearly $\frac{1}{4}$ in., obovate-oblong. *Corolla-tube* $\frac{1}{8}$ in., lobes $\frac{1}{4}$ in. *Capsule* $\frac{1}{8}$ – $\frac{1}{6}$ in. diam.

ORDER LXXXVI. **PLUMBAGINEÆ.** (By C. B. Clarke.)

Herbs or undershrubs. *Flowers* in terminal scapes or peduncles, capitate, racemed or paniced; bracts often scarious on the margins, usually sheathing the flower; bracteoles 2. *Calyx* inferior, tubular, 5–10-ribbed, often hyaline between the ribs, mouth frequently funnel-shaped, scarious. *Petals* 5, free or connate at the base into a very short tube with the filaments, rarely united into a linear tube, spreading. *Stamens* 5, opposite the petals; filaments nearly free or adnate below to the corolla; anthers oblong. Hypogynous *disc* 0. *Ovary* superior, 1-celled, 5-angular above; styles 5, distinct from the base or connate below, stigmas subcapitate; ovule 1, pendulous from a basal ascending funicle, anatropal. *Capsule* membranous or the apex hardened, included in the calyx (in *Ægialitis* linear, long-exsert), circumsciss or rupturing near the thin base, the hardened apex often 5-valved. *Seeds* cylindric (in *Ægialitis* elongate), pendulous; albumen various or 0; radicle superior.—Species 200, throughout the world, mostly in maritime or saline places.

TRIBE I. **Staticeæ.** *Styles* 5, distinct; stigmas subcapitate. *Stamens* very shortly united at the base into a tube with the corolla.

Large shrub, with broad petioled leaves	1. <i>ÆGIALITIS</i> .
Herbs or small shrubs, with linear prickly leaves	2. <i>ACANTHOLIMON</i> .
Herbs or small shrubs, with obovate leaves	3. <i>STATICE</i> .

TRIBE II. **Plumbagææ.** *Style* 1, filiform, divided into 5 stigmatose branches.

<i>Calyx</i> glandular, stamens free, flowers spicate	4. <i>PLUMBAGO</i> .
<i>Calyx</i> eglandular, stamens adnate to the middle of the corolla-tube, flowers capitate	5. <i>CERATOSTIGMA</i> .
<i>Calyx</i> eglandular, 5-winged, stamens free, flowers spicate	6. <i>VOGELIA</i> .

1. **ÆGIALITIS**, R. Br.

A glabrous shrub. *Leaves* alternate, broad, coriaceous; petiole dilated at base, amplexicaul. *Racemes* paniced; bract sheathing the pedicel and including the 2 bracteoles. *Calyx* tubular, tough, 5-ribbed; teeth 5, short. *Petals* linear, white, connate at base with the filaments into a persistent tube, deciduous above the tube. *Anthers* oblong. *Styles* distinct, from the angles of the ovary; stigmas capitate. *Fruit* (in *Æ. annulata*) linear, long-exserted from the calyx, slightly pentagonal, dehiscing finally along the angles. *Seed* elongate, albumen 0.—Species 2, littoral, an Australian and a Malayan.

Æ. rotundifolia, Roxb. *Fl. Ind.* ii. 111; leaves orbicular base mostly rounded, calyx $\frac{1}{2}$ in., young capsule ovoid pentagonal. *Wall. Cat.* 7240; *Griff. Notul.* iv. 207. *Æ. annulata*, *Kurz in Journ. As. Soc.* ii. 217, and *For. Fl.* ii. 96, not of R. Br. *Ægianilites rotundifolia*, *Presl Bot. Bermerk.* 103.

Mangrove swamps; BENGAL; abundant. *MERGUI*; *Griffith.* ANDAMANS; *Kurz.* MALACCA; *Griffith.*

Height 3–8 ft. *Leaves* $2\frac{1}{2}$ –3 in.; petiole $2\frac{1}{2}$ in. *Bract* $\frac{1}{2}$ in.; pedicels stout. *Young capsule* $\frac{1}{4}$ by $\frac{3}{8}$ – $\frac{1}{2}$ in., shining, horny; endocarp very tough, spongy. *Seed* narrowly oblong.—This plant has been united with the Australian *Æ. annulata*, R. Br. (*DC. Prodr.* xii. 621); in which the calyx hardly exceeds $\frac{1}{4}$ in. The ripe fruit of the Indian species is unknown; but the young capsules are much broader than in the fruit of *Æ. annulata* at any stage. *Corolla-tube* $\frac{1}{2}$ in. long, in *Æ. annulata* a mere ring.

2. **ACANTHOLIMON**, Boiss.

Small, prickly shrubs. *Leaves* crowded, linear, spinescent. *Scapes* many-flowered; rachis brittle, simple or dichotomous; bracts usually 3. *Calyx-tube* cylindric, 10-ribbed; limb widely funnel-shaped, scarious, subentire, with 5 sometimes excurrent nerves. *Petals* oblong or obovate, united shortly at the base into a tube with the stamens, rose or white, contorted in bud. *Filaments* linear; anthers oblong. *Styles* distinct, at the angles of the ovary; stigmas capitate. *Utricle* included within the calyx, oblong or pentagonal, membranous; seed more or less albuminous.—Species 80, Greece to Kashmir, most numerous in Persia.

A. lycopodioides, Boiss. in *DC. Prodr.* xii. 632; leaves linear-lanceolate, spikes dichotomous short, bracts coriaceous with hyaline margins, ribs of the wide-spreading calyx-limb glabrous. *Bunge Acanthol.* 20. *A. tibeticum*, *Herb. Ind. Or. H. f. & T.* *Statice lycopodioides*, *Girard in Ann. Sc. Nat.* 3, ii. 330, excl. *syn. Willd.*

NORTH KASHMIR; alt. 11–14,000 ft, frequent, *Thomson, &c.*—DISTRIB. Kashgar.

Densely tufted. *Leaves* 1 by $\frac{1}{2}$ in., needle-pointed. *Scapes* 1–2 in., minutely scabrous. *Bracts* $\frac{1}{2}$ by $\frac{1}{6}$ in., inner wholly scarious except the midrib. *Calyx-tube* $\frac{1}{6}$ – $\frac{1}{2}$ in., pilose without; limb white, subtruncate. *Petals* $\frac{1}{4}$ in., rose-red.

3. **STATICE**, Linn.

Herbs or small shrubs. *Leaves* alternate, radical often rosulate, entire (in the Indian species), not spinescent. *Scapes* branched, many-flowered; bracts small, amplexicaul, margins scarious. *Calyx* tubular or funnel-shaped ribbed; limb scarious, spreading, 5-nerved, sometimes lacinate or plumose. *Petals* spatulate-oblong, entire or bipartite, united at base into a short tube with the stamens. *Styles* distinct, at the angles of the ovary; stigmas subcapitate. *Utricle* included within the calyx, oblong fusiform, membranous; seed more or less albuminous.—Species 100, cosmopolitan, especially in saline places.

SECT. I. **Limonium**. *Petals* entire or emarginate.

1. **S. Stocksii**, Boiss. in DC. Prodr. xii. 664; leaves spathulate-oblong glabrous fleshy, calyx pilose without limb subtruncate. *Wight Ill.* ii. 225, t. 178; *Hook. Ic. Pl.* t. 837; *Boiss. Fl. Orient.* iv. 868.

SCINDE; *Stocks*, Dalzell.—DISTRIB. Beloochistan.

Height 6-10 in.; branches woody, leafy. *Leaves* $\frac{3}{4}$ by $\frac{1}{2}$ in., obtuse, tapering much at the base; petiole hardly any. *Scapes* dividing into a second panicle; bracts $\frac{1}{2}$ in., elliptic, herbaceous, reddish. *Calyx* $\frac{1}{2}$ in., ribs long-ciliate. *Petals* longer than the calyx, entire or emarginate, rose-pink. *Anthers* long-exsert.

2. **S. cabulica**, Boiss. in DC. Prodr. xii. 666; leaves all radical rosulate spathulate-oblong obtuse mucronate, panicle large dichotomous, branches long, calyx minutely pilose without, limb at first subtruncate ultimately with linear recurved divisions. *Boiss. Fl. Orient.* iv. 871.

PUNJAB; Jhelum valley and lower hills west of the Indus, alt. 2-4000 ft., *Stewart*.—DISTRIB. Afghanistan.

Annual. *Leaves* $1\frac{1}{2}$ by $\frac{2}{3}$ in., densely rosulate. *Scape* 1-3 ft., solitary, erect, glabrous; flowers subsessile, scattered along the branches; bracts $\frac{1}{2}$ in., ovate or oblong, obtuse, mucronate, coriaceous, scarious margin narrow. *Calyx-tube* $\frac{1}{2}$ - $\frac{1}{4}$ in., very narrow; limb at first funnel-shaped, subtruncate, scarious, with 5 ribs; in fruit the membranous portion breaks up and almost entirely disappears, the 5 ribs are recurved.

SECT. II. **Schizopetalum**. *Petals* bifid half-way down.

3. **S. macrorrhabdos**, Boiss. Diagn. 2, iv. 67, and *Fl. Orient.* iv. 869; var. *Thomsoni*, Clarke; leaves all radical rosulate spathulate-orbicular obtuse or emarginate rarely minutely mucronate, calyx with tufts of small spreading hairs. *Statice*, sect. *Schizopetali* sp. altera, *Hook. f. in Gen. Pl.* ii. 626.

WEST TIBET; *Falconer*; Ladak, T. Thomson. Baltisthan, alt. 9000 ft., *Clarke*.

Annual. *Leaves* 2 by $1\frac{1}{2}$ -2 in. *Scapes* 1-3 ft., glabrous; flowers in clusters of 2-4, sessile along the branches; bracts $\frac{1}{2}$ in., ovate, mucronate, coriaceous with scarious margin. *Calyx-tube* $\frac{1}{2}$ in., limb funnel-shaped, truncate, scarious, 5-ribbed. *Petals* divided to the base of the lamina into two lanceolate-linear divisions.—This was considered specifically distinct from *S. macrorrhabdos* (a native of Afghanistan and Beloochistan) by Sir J. D. H., and would be so according to Boissier's views.

4. **PLUMBAGO**, Linn.

Herbs or undershrubs; branches diffuse. *Leaves* alternate, entire. *Flowers* spiked; bracts and bracteoles shorter than the calyx. *Calyx* tubular, covered with stalked glands; limb 5-fid. *Corolla-tube* long, slender; lobes 5, round, patent. *Stamens* free; filaments linear, dilated at base; anthers oblong. *Ovary* narrowed at the apex; style slender, with 5 terminal branches stigmatose nearly throughout their length. *Capsule* membranous, circumsciss near the base.—Species 10, warmer regions of both hemispheres.

1. **P. zeylanica**, Linn.; DC. Prodr. xii. 692; leaves ovate suddenly narrowed into the petiole, rachis of the spike pubescent or glandular, corolla white, base of style glabrous. *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 462; *Wall. Cat.* 7241; *Wight Ill.* t. 179; *Dalz. & Gibs. Bomb. Fl.* 220; *Kurz in Journ. As. Soc.* 1877, ii. 217; *Boiss. Fl. Orient.* iv. 875. *P. auriculata*, *Blume Bijl.* 736. *Thela alba*, *Lour. Fl. Cochinch.* 119.—*Rheede Hort. Mal.* x. t. 8.

Throughout INDIA, much cultivated and readily spreading; wild in the south. *Kurz* thinks not wild in Birma; *Watt* thinks wild in Bengal.—DISTRIB. Throughout the tropics of the Old World.

Rambling several feet. *Leaves* 3 by $1\frac{1}{2}$ in., acute, glabrous, or puberulous; petiole $\frac{3}{4}$ in., base dilated, amplexicaul. *Spikes* 4–12 in., often branched; bracts $\frac{1}{2}$ in., ovate, acute. *Calyx* $\frac{1}{8}$ – $\frac{1}{2}$ by $\frac{1}{10}$ in.; teeth very short. *Corolla-tube* $\frac{3}{4}$ in.; lobes $\frac{1}{2}$ in.

2. **P. rosea**, Linn.; Roxb. *Fl. Ind.* i. 462; leaves elliptic tapering to the short petiole, rachis of the spike glabrous, corolla red, base of style hairy. Wall. *Cat.* 7242; Bot. *Mag.* tt. 230, 5363; Kurz in *Journ. As. Soc.* 1877, pt. ii. 218. *P. coccinea*, Boiss. in *DC. Prodr.* xii. 693. *Thela coccinea*, Lour. *Fl. Cochinch.* 119.—Rumph. *Herb. Amb.* v. t. 168. Rheede *Hort. Mal.* x. t. 9.

Valleys in SIKKIM and KHASIA, wild (?). India, often cultivated; Thwaites thinks not wild in Ceylon; Kurz thinks not wild in Birma.—DISTRIB. South-east Asia, cultivated.

Altogether resembling *P. zeylanica*, and perhaps only a cultivated variety of it.

5. CERATOSTIGMA, Bunge.

Herbs or shrubs. *Leaves* alternate, obovate or lanceolate, bristle-ciliate. *Flowers* capitate; bracts and bracteoles sheathing. *Calyx* tubular, without glands, deeply 5-fid; segments narrow, 3-striate. *Corolla-tube* elongate, slender; lobes round, patent. *Stamens* adnate to the middle of the corolla-tube, filaments linear; anthers oblong. *Ovary* pentagonal; tip conical; style filiform, with 5 stigmatose branches. *Capsule* included in the calyx, circumsciss close to the base, sub-5-valved.—Species 3–4; Chinese, Bhotanese and Abyssinian.

C. Griffithii, Clarke; shrubby, ferruginous-hirsute, leaves spatulate obovate, calyx-segments linear. Plumbago?, Griff. *Itin. Notes*, 189, n. 1007.

BHUTAN; between Woollookka and Lamnoo very common, Griffith (alt. 8000 ft.?), (Kew Distrib. n. 4181).

A low densely branched shrub; leaves red-margined, calyces and bracts brown-ciliate; flowers a fine blue (Griffith).—Griffith's specimen has been badly preserved; the leaves on it are $\frac{3}{4}$ by $\frac{1}{2}$ in.; but it had probably much larger leaves.

6. VOGELIA, Lamk.

Small shrubs, branches long. *Leaves* alternate, entire. *Spikes* terminal, paniced; bracts and bracteoles small. *Calyx* deeply 5-fid, with 5 broad transversely undulate wings between the ribs. *Corolla-tube* cylindric; lobes 5, round, patent. *Stamens* free; filaments linear, base dilated; anthers oblong. *Ovary* oblong-fusiform, somewhat pentagonal; style filiform, branches 5, stigmatose throughout. *Capsule* included in the calyx, circumsciss at the very base.—Species 2, a S. African and an Indo-Arabian.

V. indica, Gibs. ms.; Wight in *Calc. Journ. Nat. Hist.* vii. 17, and *Id.* 1075; leaves perfoliate elliptic obtuse or orbicular. *DC. Prodr.* xii. 696; Boiss. *Fl. Orient.* iv. 876. *V. arabica*, Boiss. in *DC. Prodr.* xii. 696; Dalz. & Gibs. *Bomb. Fl.* 220.

WESTERN INDIA; Canara, Gibson, &c.; Mt. Aboo, Stocks, Brandis.—DISTRIB. Arabia.

Puberulous or glabrescent. *Leaves* $2\frac{1}{4}$ by $1\frac{3}{4}$ in. (sometimes twice as large), deeply cordate, more or less perfoliate. *Spikes* dense. *Calyx* $\frac{1}{3}$ by $\frac{1}{8}$ in. *Corolla-tube* $\frac{2}{3}$ in.; lobes $\frac{1}{2}$ in. *Style* hairy at the base

ORDER LXXXVII. **PRIMULACEÆ.** (By J. D. Hooker.)

Perennial, rarely annual herbs. *Leaves* all radical, or if cauline opposite alternate or whorled, exstipulate. *Flowers* hermaphrodite, regular. *Calyx* inferior (except *Samolus*), 5- rarely 4-9-cleft. *Corolla* hypogynous (except *Samolus*, 0 in *Glaux*), rotate bell- or funnel-shaped 5- rarely 4-9-cleft. *Stamens* on the corolla-tube, opposite its lobes (hypogynous in *Glaux*), with sometimes alternating staminodes, filaments usually short; anthers 2-celled, dehiscent longitudinally. *Ovary* 1-celled; style short or long, stigma undivided; ovules many, usually amphitropous on a free central placenta. *Capsule* dehiscent transversely or by valves, few or many-seeded. *Seeds* minute, usually angular, often sunk in the placenta, albumen fleshy or horny; embryo transverse.—Species about 80, chiefly N. temperate and alpine.

TRIBE I. **Primulææ.** *Corolla-lobes* imbricate. *Ovary* superior.

* *Capsule dehiscent by valves.*

- | | |
|--|----------------|
| Corolla salver- or funnel-shaped, tube long. Stamens on the corolla-tube, anthers obtuse | 1. PRIMULA. |
| Corolla salver-shaped or almost rotate, tube very short. Stamens on the corolla-tube, anthers obtuse | 2. ANDROSACE. |
| Corolla funnel-shaped. Stamens at the base of the corolla, anthers acuminate | 3. CORTUSA. |
| ** <i>Capsule circumsciss at the top.</i> | |
| Corolla 7-lobed | 4. BRYOCARPUM. |

TRIBE II. **Lysimachiææ.** *Corolla-lobes* contorted. *Ovary* superior.

* *Capsule dehiscent by valves.*

- | | |
|---|-----------------|
| Corolla 5-6-cleft | 5. LYSIMACHIA. |
| Corolla 0 | 6. GLAUX. |
| ** <i>Capsule circumsciss.</i> | |
| Corolla 5-partite, exceeding the calyx | 7. ANAGALLIS. |
| Corolla 4-5-lobed, shorter than the calyx | 8. CENTUNCULUS. |

TRIBE III. **Samolææ.** *Corolla-lobes* imbricate. *Ovary* $\frac{1}{2}$ -inferior.

- | | |
|-----------------------------------|-------------|
| Herbs, leaves alternate | 9. SAMOLUS. |
|-----------------------------------|-------------|

1. **PRIMULA**, Linn.

Perennial scapigerous herbs. *Flowers* umbelled or whorled, rarely solitary, often dimorphic, one form having the stamens low and stigma high in the corolla-tube, the other having the stamens high and stigma low. *Calyx* 5-cleft. *Corolla* funnel- or salver-shaped, throat naked or with folds opposite the lobes (annulate); lobes 5, spreading or incurved. *Stamens* 5, included; anthers obtuse. *Ovary* ovoid, obovoid or globose. *Capsule* globose, oblong or cylindric, 5-valved; valves simple or 2-fid. *Seeds* angular or subglobose, peltately attached.—Species about 80; distribution of the order.

The natural classification of *Primula* is a difficult task, owing to the great variability of all the organs. I quite believe that various of the Himalayan species are but highly developed states of European and N. Asiatic ones, but to demonstrate this it would be necessary to compare living specimens. Of the two natural divisions of

the genus—those with the margins of the leaves revolute, and those with them described as involute in veneration—the first embraces all the Indian species but *P. floribunda*, of which the veneration is very obscure and conduplicate. Under the first (A) of the two primary divisions here proposed (these are purely artificial, and proposed for convenience sake), all the species allied to *P. sinensis* (namely, 1, 2, 5, 7, 8) will be found; of the others, *P. pulchra* is closely allied to *P. Kingii*, *P. reticulata* to *P. sikkimensis*, and *P. Clarkei* to *P. petiolaris*. The sections established under the second division (B) are, I think, for the most part natural, and follow one another in a fairly good sequence. The form of the top of the ovary, of the stigma, and of the seeds, afford good characters; but I have not been able to apply them sectionally.

A. Leaves on long slender unwinged petioles, orbicular oblong or cordate, margins revolute in veneration. (See *P. petiolaris*, *sibirica*, *involucrata*, and *tibetica* in B).

* Quite or nearly glabrous, mealy or not.

1. **P. rotundifolia**, Wall. in Roxb. *Fl. Ind. ed. Carey & Wall.* ii. 18; *Cat.* 605; more or less mealy, leaves 1–4½ in. diam. orbicular-cordate toothed crenate or erose, umbels often superposed many-fl'd., bracts many subulate, corolla purple, mouth annulate, limb flat, capsule oblong exserted. *Duby in DC. Prodr.* viii. 41; *Don Prodr.* 79. *P. odontophylla*, Wall. *Cat.* 7016.

TEMPERATE HIMALAYA; from Kashmir, alt. 11,000 ft., to Sikkim, alt. 12–13,000 ft.

Buds densely clothed with sulphurous meal. *Leaves* membranous, sometimes lobulate; petiole 6–12 in. *Scape* as tall and inflorescence puberulous and mealy; bracts many. *Corolla-tube* twice as long as the calyx; limb flat, ½–¾ in. diam.; lobes obovate or obcordate. *Ovary* with a thickened lobulate crown; stigma cuneate. *Capsule* ¼–½ in. *Seeds* pale, ⅓ in., irregularly ellipsoid, coarsely papillose.

2. **P. Gambeliana**, Watt in *Journ. Linn. Soc. Bot. ined.*; buds mealy, leaves ¼–1 in. diam. orbicular-cordate toothed, umbels few-fl'd., bracts 1–3 subulate, corolla purple, mouth annulate, lobes orbicular emarginate.

SIKKIM HIMALAYA; Jongri, alt. 14,000 ft., Watt.

A smaller plant, with much fewer and larger flowers, than *P. rotundifolia*, but I have seen only four specimens from the one known locality. *Leaves* membranous; petiole not sheathed at the base as in *P. pulchra*, which this a good deal resembles. *Scape* and inflorescence quite glabrous. *Corolla* limb concave, 1–1½ in. diam. *Ovary* and *stigma* as in *P. rotundifolia*. *Fruit* unknown.

3. **P. pulchra**, Watt in *Journ. Linn. Soc. Bot. ined.*; glabrous, not mealy, basal sheaths long membranous, leaves oblong or ovate-oblong, glaucous beneath, base rounded or cordate, tip rounded, margin wavy, scape short, bracts filiform or subulate membranous, flowers 2–10 loosely umbelled, corolla purple, tube funnel-shaped, mouth obscurely annulate, lobes broad obcordate.

SIKKIM HIMALAYA; Lachen, alt. 12–14,000 ft., J. D. H.; Jongri. Watt.

Sheaths 1–1½ in. long, embracing the petioles. *Leaves* few, blade 1–1½ in., midrib stout, nerves few; petiole 1–1½ in. *Scape* about equalling the petiole; bracts much shorter and more slender than the very unequal pedicels. *Calyx* ¼–½ in., terete. *Corolla* very large for the size of the plant, ¾–1 in. diam. *Ovary* globose, subacute; stigma globose. *Fruit* unknown.

4. **P. reticulata**, Wall. in Roxb. *Fl. Ind. ed. Carey & Wall.* ii. 21; *Cat.* 608; glabrous, slightly mealy or not, leaves very long-petioled oblong-cordate obtuse crenate or doubly crenate reticulate glaucous beneath, scape very tall, bracts large linear-oblong or lanceolate, base not produced, calyx-lobes short acute recurved, corolla yellow, tube funnel-shaped slender much exserted,

mouth not annulate, ovary obovoid. *Duby in DC. Prodr.* viii. 41. *P. altissima* and *P. speciosa*, *Don Prodr.* 78.

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 11–15,000 ft., *J. D. H., Elwes*.

Rootstock very small. *Leaf-blade* 2–3 in.; petiole 4–6 in., very slender. *Scape* 12–16 in., very slender; inflorescence sometimes mealy; flowers nodding, slightly fragrant; bracts regularly placed, but unequal in size, broad, sometimes toothed. *Calyx* $\frac{1}{2}$ – $\frac{1}{3}$ in., campanulate, quite tere or 5-ribbed. *Corolla-tube* nearly $\frac{1}{2}$ in.; lobes erecto-patent, small, rounded, or notched. *Fruit* not seen.—*Wallich* describes the leaves as slightly pubescent beneath, which I do not observe. A close ally of *P. sikkimensis*.

5. *P. vaginata*, *Watt in Journ. Linn. Soc. Bot. ined.*; puberulous or glabrescent, not mealy, leaves $\frac{1}{2}$ in. diam. orbicular deeply cordate 7-lobed one third way, lobes 3-fid, petiole with a broad basal sheath, scape 2–4 in., umbel 3–6-fid., pedicels very unequal, bracts linear, calyx-lobes short, corolla lilac, tube funnel-shaped, mouth annulate, lobes 2–4-fid.

SIKKIM HIMALAYA; Laghep, alt. 10,000 ft., *Clarke*.

Rootstock small, woody. *Leaves* puberulous or glabrous; petiole equalling the blade, abruptly dilated at the very base into a broad membranous sheath. *Scape* glabrous; pedicels $\frac{1}{2}$ – $\frac{1}{3}$ in. *Calyx* campanulate, lobes ovate acute. *Corolla-tube* not twice the length of the calyx; limb $\frac{1}{2}$ in. diam. *Ovary* globose, acute. *Fruit* unknown.

6. *P. Clarkei*, *Watt in Journ. Linn. Soc. Bot. ined.*; quite glabrous, leaves 1–1 $\frac{1}{2}$ in. orbicular- or elliptic-cordate sharply toothed or crenate, tip rounded, scape 0, pedicels equalling or shorter than the petioles, calyx broadly campanulate, lobes short, corolla-tube slender, mouth not annulate, limb flat, lobes 2-fid, capsule globose included.

KASHMIR; at Poosiana, alt. 7000 ft., *Clarke*.

Habit of a *Viola*. *Rootstock* slender, woody. *Leaves* membranous, nerves very slender; petiole 2–4 in., very slender, base narrowly sheathing. *Pedicels* 2–3, slender. *Corolla-tube* $\frac{1}{2}$ in., lobes narrow. *Ovary* globose, acute, stigma capitate. *Seeds* black, subglobose, minutely papillose, $\frac{1}{40}$ in. diam.

** *Pubescent or tomentose with flaccid jointed hairs.*

7. *P. mollis*, *Hook. Bot. Mag. t.* 4798; softly pubescent or tomentose, not mealy, leaves 3–5 in. diam. orbicular deeply cordate obtusely lobulate and erose, petiole stout, scape long, flowers in 2–5 loose superposed whorls, bracts linear-lanceolate, corolla rosy, mouth annulate, limb flat, lobes obovate or obcordate.

EASTERN HIMALAYA; Bhotan, *Booth*.

A near ally of *P. cortusoides*, and of the common garden *P. sinensis*. *Crown* without sheathing scales. *Leaves* rather thick, pubescent on both surfaces; petiole 3–5 in., base shortly sheathing. *Scape* and inflorescence 12–18 in.; whorls distant, 3–6-fid., pedicels 1–1 $\frac{1}{2}$ in. *Calyx* membranous, broadly campanulate, loose, lobes acuminate. *Corolla* $\frac{3}{4}$ in. diam. *Ovary* globose, acute, upper half thickened; stigma globose. *Fruit* unknown.

8. *P. geraniifolia*, *Hook. f.*; very slender, softly pubescent, not mealy, leaves 2–3 in. diam. orbicular deeply cordate acutely lobulate all round lobules toothed, petiole very long, scape very slender, flowers in simple or superimposed whorls, bracts few linear, corolla lilac, mouth annulate, lobes obcordate.

E. TIBET; Chumbi valley (between Sikkim and Bhotan), alt. about 10,000 ft. *King*.

Rootstock horizontal. *Leaves* few, lobes 10–12, pubescent on both surfaces; petiole 2–5 in. *Scape* twice as long as the leaves; bracts small; pedicels slender. *Calyx* glabrous, campanulate, cleft half way, teeth acute. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., tube twice as long as the calyx, funnel-shaped.—A near ally of the European and Siberian *P. cortusoides*, and of the Turkestan *P. Kauffmanniana*, Regel, but the acute lobing of the broader leaf is very different.

9. ***P. filipes***, *Watt in Journ. Linn. Soc. Bot. ined.*; sparsely pubescent, not mealy, leaves 1–1½ in. orbicular ovate or oblong cordate entire lobulate or toothed, petiole as long as the blade very slender, scape shorter than the leaves 6–8-fld., calyx-lobes short very broad, corolla flesh-coloured, mouth not annulate, limb flat, capsule globose included, seeds very minute smooth. *Primula*, *Griff. Itin. Notes*, 123, n. 396; *Notul.* iv. 299; *Ic. Pl. Asiat.* t. 485, f. 1.

BHUTAN; rocks near Chuka, alt. 6500 ft., *Griffith.*

Rootstock elongate, woody. *Leaves* membranous. *Scape* about equalling the petiole, slender in flower, thickened in fruit; bracts small, subulate. *Calyx* broadly campanulate. *Corolla-tube* $\frac{1}{3}$ in., three times as long as the calyx, funnel-shaped; limb as much broad; lobes obovate, 2-lobed. *Seeds* $\frac{1}{80}$ in., dark brown, obtusely-angled.—Allied to the Chinese *P. obconica*. Hance (*P. poculiformis*, *Bot. Mag.* t. 6582), but much smaller and more delicate, and the corolla-tube is longer.

10. ***P. Listeri***, *King ms.*; pubescent, not mealy, rootstock woody, leaves 1–1½ in. orbicular-cordate sinuate-lobed entire or denticulate very membranous, petiole equalling the blade or longer very slender, scapes shorter than the petiole few-fld., bracts few linear, calyx campanulate, lobes broad short, corolla rose-pink, tube funnel-shaped, mouth not annulate.

SIKKIM HIMALAYA; Tonglo and the Singalelah ranges, in bamboo jungles, alt. 9–10,000 ft.

I retain this species as distinct from *P. filipes* with great doubt, having very imperfect specimens of this last; it differs chiefly in the more orbicular lobulate leaves, broader calyx and much shorter more funnel-shaped corolla-tube. Petiole with a very short small sheath. *Corolla-tube* outside, and mouth pubescent. Whole plant smelling like *Geranium Robertianum* (Watt).

B. *Leaves* sessile or base narrowed into a broad winged petiole, margins revolute in veneration (petiole sometimes long and slender in *P. sibirica*, *involucrata*, *tibetica*, and *petiolaris*).

* *Scape* normally much longer than the leaves. *Flowers* very numerous in dense heads, or umbellate with very short pedicels, purple. *Bracts* small, short, usually hidden by the flowers, bases not gibbous or produced. *Corolla-tube* usually much exceeding the calyx.

11. ***P. denticulata***, *Smith Exot. Bot.* ii. 109, t. 114; sparingly mealy, leaves not fully developed till after flowering surrounded at the base by thick fleshy leafy scales, leaves obovate-spathulate obtuse sharply minutely toothed or subentire, flowers capitate, heads depressed, corolla-tube usually twice as long as the long or short obtuse or acute calyx-teeth, corolla mouth obscurely annulate, lobes obcordate. *Duby in DC. Prodr.* viii. 44; *Roxb. Fl. Ind. ed.* Carey & Wall. ii. 17; *Wall. Cat.* 607; *Bot. Reg.* 1842, t. 47; *Bot. Mag.* t. 3959. *P. Hoffmeisteri*, *Klotzsch in Bot. Reise Pr. Wald.* t. 56.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 7–13,000 ft. KHASIA Mts., alt. 5000 ft.—DISTRICT. Afghanistan.

Rootstock stout, short, thick. *Leaves* erect or spreading, midrib broad, never reticulate. *Scape* stout or slender, 4–18 in.; bracts short, unequal, sometimes connate. *Calyx* long or short, base acute or truncate, lobes obtuse or acute. *Corolla*

pale purple, salver-shaped, $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; lobes broad or narrow, mouth obscurely annulate. *Ovary* obovoid or globose, tip rounded. *Capsule* usually oblong, exceeding the calyx, sometimes globose and sunk in it. *Seeds* coarsely granulate.—The commonest Himalayan *Primula*, and very variable.

VAR. *cacheniriana*; leaves produced almost with the flowers, more mealy. P. cacheniriana, Munro in Garden, 1879, 535.—Western Himalaya.

VAR. *paucifolia*; leaves fewer longer-petioled, heads fewer-flid., calyx-teeth long narrower nearly equalling the corolla-tube, capsule globose sunk in the calyx (ripening very few seeds).—Kashmir, at Poosiana, alt. 9000 ft., Clarke.

12. **P. capitata**, Hook. Bot. Mag. t. 4550; usually very mealy, leaves appearing with the flowers obovate-spathulate or oblanceolate obtuse or acute finely toothed usually copiously mealy beneath, fleshy leafy scales few or 0, heads very dense-flid. with the outer flowers deflexed and inner in bud forming a conical crown, flowers deep purple, tube long often wrinkled, limb flat or concave.—*Fl. des Serres*, vi. t. 618. P. globifera, Griff. Itin. Notes, 148.

SIKKIM and BHOTAN HIMALAYA, alt. 12–15,000 ft., Griffith, J. D. H.

I retain this species as distinct from *P. denticulata* with great hesitation, though it differs much in habit and general appearance, and retains its characters in cultivation.

13. **P. erosa**, Wall. Cat. 611; glabrous or puberulous, leaves not mealy fully developed with the flowers membranous obovate-spathulate or oblanceolate toothed or erose reticulate fleshy leafy scales few or 0, flowers umbelled purple mealy, pedicels very short, calyx-lobes long or short, tube twice as long as the calyx, limb flat, mouth hardly annulate. Regel in Bot. Zeit. 1853, 833; Gartenfl. ii. t. 51. P. denticulata, var. erosa, Duby in DC. Prodr. viii. 45.

TEMPERATE HIMALAYA; from Kumaon to Bhotan, alt. 4500–9500 ft. (not seen in Sikkim).

I suspect Duby to be right in reducing this to a variety of *P. denticulata*, but it differs in habit, and seems to be always recognised as distinct by Himalayan collectors and by cultivators in Europe. The leaves are sometimes 18 inches long.

14. **P. bellidifolia**, King in Herb. Calc.; puberulous, fleshy scales few or 0, leaves membranous flaccid elongate oblanceolate or spathulate coarsely shallowly toothed, scape long, bracts minute concealed, flowers small densely capitate, corolla-tube four times longer than the short obtusely lobed mealy calyx, lobes small spreading obcordate.

SIKKIM HIMALAYA; alt. 13,000 ft., King.

Rootstock small. Leaves 2–4 in., obtuse, tapering into the petiole, pubescent on both surfaces, not wrinkled, nerves faint, teeth irregular. Scape 4–8 in., erect, glabrous. Heads nearly 1 in. diam.; flowers bluish-purple, quite sessile. Corolla glabrous; tube cylindric, $\frac{1}{4}$ – $\frac{1}{2}$ in. long; limb not so broad; mouth contracted, annulate. Stigma peltate. Capsule small, globose.—A very distinct species, with leaves like *Bellis sylvestris*, but quite thin and flaccid; in this respect and in toothing very different from any form of *P. erosa*, *denticulata*, or *capitata*.

** Scape normally much longer than the leaves (except *P. tibetica*). Flowers umbelled, rarely capitate, white pink or purple. Bracts forming a 1-seriate involucre, gibbous or produced downwards at the base (obscurely in *P. concinna*).

† Capsule oblong or cylindric, usually longer than the narrow fruiting calyx.

15. **P. farinosa**, Linn.; Duby in DC. Prodr. viii. 44; stolons 0, more or less mealy, leaves $\frac{1}{2}$ –1 in., sessile or subsessile obovate-spathulate obtuse

entire crenulate or toothed above the middle, bracts small base gibbous, flowers numerous subsessile, corolla-tube exceeding calyx, the limb flat, calyx-lobes 2-fid. *Fl. Danica* i. t. 125; *Sweet Brit. Fl. Gard.* ser. 2, t. 65.

WESTERN TIBET, alt. 12–17,000 ft.. *Thomson, &c.*—DISTRIB. Europe, N. and Central Asia, Arctic America.

Rootstock stout. *Leaves* densely rosulate. *Scape* tall and stout for the size of the plant; bracts few, base gibbous; pedicels shorter than the calyx. *Calyx* 5-ribbed, cleft $\frac{1}{2}$ – $\frac{1}{3}$ way down; lobes lanceolate, acute, often purple. *Corolla* pale purple, $\frac{1}{2}$ – $\frac{1}{3}$ in. diam.; mouth annulate; lobes rather narrow, deeply cleft. *Capsule* oblong. *Seeds* $\frac{1}{50}$ in., angular, pale, minutely papillose.—The Fuegian plant (*P. magellanica*), referred to *P. farinosa* by myself and others, differs in the large granulate seeds.

16. **P. Heydei**, *Watt in Journ. Linn. Soc. Bot. ined.*; stoloniferous, leaves $\frac{1}{2}$ – $\frac{1}{3}$ in. sessile lanceolate acuminate coarsely toothed mealy beneath, scape stout, flowers 5– ∞ sessile, bracts short base saccate, corolla-tube exceeding the calyx, limb flat.

WESTERN TIBET, alt. 12–14,000 ft., *Thomson*; Taglang, *Heyde*.

A very distinct little species, densely tufted. *Stolons* short, leafy. *Leaves* rosulate, on the stolons subsecund. *Scape* 1–3 in.; inflorescence mealy; bracts gibbous at the base. *Calyx* campanulate, cleft to the middle. *Corolla* pale lilac, $\frac{1}{2}$ in. diam. *Capsule* included. *Seeds* as in *P. farinosa*.

17. **P. concinna**, *Watt in Journ. Linn. Soc. Bot. ined.*; densely tufted, very small, leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. oblanceolate acute or obtuse quite entire or subcrenulate mealy beneath, scape short 2–3-fld., pedicels elongated in fruit, calyx deeply cleft equalling the short corolla-tube, corolla-mouth contracted, limb flat, lobes obcordate.

SIKKIM HIMALAYA; on the Tibetan passes, alt. 15–17,000 ft., *J. D. H., Watt*.

Somewhat resembling a reduced state of *P. farinosa* with longer capsules, from which the short corolla-tube and the seeds at once distinguish it. *Tufts* $\frac{1}{2}$ in. high. *Leaves* sometimes narrowed into a short petiole, margins revolute. *Scape* rarely longer than the leaves; bracts gibbous at the base; pedicels sometimes two to four times longer than the scape. *Corolla* $\frac{1}{4}$ in. diam., white or pink. *Capsule* $\frac{1}{2}$ in. long, cylindric-oblong. *Seeds* nearly orbicular, $\frac{1}{50}$ in. diam., a little flattened on one side, quite smooth, pale brown.

18. **P. glabra**, *Klatt in Linnæa* xxxvii. 500; not mealy except the inflorescence, leaves $\frac{1}{2}$ –1 in. obovate-spathulate acute or obtuse erose or toothed, scape very slender loosely 3– ∞ -fld., flowers sessile or shortly pedicelled, bracts short, calyx campanulate, lobes short obtuse equalling the corolla-tube, corolla mouth contracted, limb flat, lobes short 2-fid. *Watt in Journ. Linn. Soc. ined.*

SIKKIM HIMALAYA; alt. 13–15,000 ft.. *J. D. H., Clarke, Watt*.

A very distinct species. Tufted. *Leaves* rather thin, rigid when dry, often narrowed into a slender or broad petiole; teeth horizontal or recurved. *Scape* 1–5 in.; bracts subulate, $\frac{1}{12}$ in., base gibbous. *Corolla* blue-purple, $\frac{1}{4}$ in. diam. *Capsule* oblong, included. *Seeds* obtusely-angled, $\frac{1}{40}$ in. diam., coarsely papillose.—In foliage and habit this closely resembles *P. pusilla*, but the bracts are very different, and the mouth of the corolla is not bearded.

19. **P. sibirica**, *Jacq. Misc. Austr.* i. 161; not mealy, leaves coriaceous $\frac{1}{2}$ –1 in. shortly petioled elliptic ovate or spatulate obtuse entire or crenulate, scape slender 3–6-fld., bracts linear base shortly produced, calyx tubular 5-ribbed, corolla pink, tube shortly exerted, mouth not annulate, limb flat, lobes narrow deeply cleft. *Duby in DC. Prodr.* viii. 43; *Lehm. Monog. Primul.* t. 5; *Bot. Mag.* t. 3167, 3445, 6403.

WESTERN TIBET, ZANSKAR and LAHUL, alt. 13–15,000 ft., *Falconer*, &c.—DISTRIB. Europe, N. America, Arctic America.

Leaves coriaceous, rosulate or suberect and crowded, midrib obscure. *Scape* 3–6 in., bracts erect equalling the pedicels or shorter. *Calyx* $\frac{1}{2}$ in.; lobes short, ovate. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. *Ovary* globose, top rounded, thickened; stigma capitate. *Capsule* cylindric, exserted. *Seeds* $\frac{1}{10}$ in., angular, smooth, pale.

20. ***P. involucrata***, *Wall. Cat.* 7107; not mealy, leaves 1–3 in. coriaceous elliptic ovate oblong cordate or orbicular narrowed into a long or short petiole obtuse entire or obscurely crenulate, scape long slender loosely 3–6-fld., bracts linear base much produced often 2-fld., calyx tubular 5-ribbed, corolla white, tube much exserted, mouth annulate, limb flat, lobes broad emarginate. *Duby in DC. Prodr.* viii. 42; *Bot. Reg.* 1846, t. 31; *Regel. Gartenfl.*, 1863, t. 394. *P. Munroi*, *Lindl. Bot. Reg.* 1833, t. 15.

ALPINE HIMAYLAYA, from Kashmir to Sikkim and Western Tibet, alt. 12–15,000 ft.—DISTRIB. Europe, N. Asia, Arctic America.

Closely allied to *P. sibirica*, but distinguished by the much larger size, broader longer petioled leaves, stouter longer scape, larger white flowers, annulate mouth of the corolla, shorter capsule, and large elliptic or subcuneate seeds acute at one or both ends, $\frac{1}{10}$ in. long. *Ovary* and stigma as in *P. sibirica*.

21. ***P. tibetica***, *Watt in Journ. Linn. Soc. Bot. ined.*; dwarf, tufted, not mealy, leaves petioled $\frac{1}{2}$ – $\frac{1}{2}$ in. coriaceous elliptic obtuse or acute quite entire, scape very short 1–5-fld., bracts linear base gibbous, pedicels very long in fruit, calyx tubular, corolla-tube not exserted, mouth annulate, limb flat, lobes deeply cleft.

WESTERN TIBET, north of Kumaon, alt. 15,500 ft., *Strach. & Winterb.* EASTERN TIBET, on the Sikkim frontier, alt. 16–17,000 ft., *J. D. H.*

This closely resembles a dwarf state of *P. sibirica*, to which it stands in the same relation as *P. concinna* does to *P. farinosa*. The capsule is cylindric, much exserted; seeds not seen.

†† *Capsule* globose, included in the hemispheric calyx (not seen in *P. elliptica*).

22. ***P. elliptica***, *Royle Ill.* 311, t. 76, f. 2; not mealy, leaves $\frac{1}{2}$ –1 in. elliptic ovate or ovate-oblong narrowed into the broad petiole sharply toothed, scape long loosely 3–10-fld., bracts linear base shortly produced, calyx campanulate deeply cleft, corolla purple, tube exserted, mouth not annulate, limb flat, lobes broad deeply cleft. *Duby in DC. Prodr.* viii. 44; *P. denticulata*, *Wight Ic.* t. 2000. *P. spathulacea*, *Jacquem. mss.*

WESTERN HIMALAYA; Kashmir and Lahul, alt. 8–12,000 ft., *Falconer*, &c. WESTERN TIBET; Ladak, *Watt*.

Leaves suberect, thinly coriaceous, closely serrated down to the dilated top of the petiole, midrib slender, nerves obscure. *Scape* much exceeding the leaves; bracts equalling or exceeding the short pedicels; flowers nodding. *Calyx* $\frac{1}{2}$ – $\frac{1}{2}$ in. *Corolla-tube* variable; lobes usually acute, sometimes toothed. *Ripe fruit* not seen.—A distinct and beautiful plant. The figure in Royle's work is very bad indeed, and but for his specimens the species could not be identified.

23. ***P. rosea***, *Royle Ill.* 311, t. 75 f. 1; quite glabrous, not mealy, leaves dense subsessile obovate-oblong or -spathulate or oblanceolate obtuse or acute crenulate or toothed, scape short stout 5– ∞ -fld., bracts linear-lanceolate or subulate base shortly produced, pedicels short, calyx-lobes ovate acute, corolla rose-red, tube exserted, mouth not annulate, limb flat, lobes bifid. *Duby in DC. Prodr.* viii. 41; *Bot. Mag.* t. 6437; *Regel Gartenfl.* t. 994.

WESTERN HIMALAYA; from Kulu to Kashmir, alt. 10-12,000 ft., *Falconer, &c.*
—DISTRIB. Afghanistan.

Often forming large tufts. *Leaves* numerous, variable in length and breadth; margins revolute or flat when flowering, not umbelled, midrib broad, nerves inconspicuous. *Scape* equalling or exceeding the leaves, robust; bracts $\frac{1}{4}$ – $\frac{1}{2}$ in.; pedicel very variable. *Calyx* cleft to the middle, tube angular. *Corolla-tube* glabrous within and without, one half to twice as long as the calyx, disk of limb puberulous; lobes variable in width, sometimes toothed. *Seeds* $\frac{1}{25}$ in. long, sharply angled, pale.

VAR. elegans; corolla smaller, tube longer, lobes narrower.—*P. elegans*, *Duby l. c.* 42; *Mem. Prim. t. i. f. 1.* Kashmir, *Jacquemont*; Afghanistan.

*** *Scape* longer than the leaves. *Flowers* many (few in *P. elongata*), umbelled or in superposed whorls. *Bracts* irregular, ovate or subulate, or lanceolate from a broad not gibbous base. (See also *P. petiolaris*, var. 7 *scapigera*.)

† *Ovary* globose, top acute not thickened. *Capsule* globose, included in the calyx.

24. ***P. prolifera***, *Wall. in As. Research.* xiii. 372, t. 3, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 18; tall, not mealy, leaves 8-16 in. oblanceolate or elongate obovate-spathulate obtuse quite entire or toothed glabrous or puberulous beneath, scape very tall, flowers in superposed whorls, bracts shorter than the pedicels, calyx short, lobes subulate, corolla yellow tube very long, mouth annulate, limb flat, lobes obcordate crenulate, capsule globose included. *Duby in DC. Prodr.* viii. 34; *Don Prodr.* 81. *P. imperialis*, *Jungh.*; *Miquel Fl. Ind. Bat.* ii. 1001. *Cankrienia chrysanthia*, *de Vriese in Jahrb. der Maatsch. van Tuinb.* 1850, 30.

KHASIA MTS., alt. 4-6000 ft., *Wallich, &c.*—DISTRIB. JAVA.

Leaves thin, nerves reticulate, petiole broad. *Scape* 12-18 in., stout, quite erect; flowers in 2-4 distant whorls, pedicels subequal; lower bracts sometimes foliaceous. *Calyx* $\frac{1}{2}$ in. long, 5-ribbed. *Corolla-tube* $\frac{1}{2}$ in. *Capsule* quite glabrous, $\frac{1}{2}$ in. diam., not exerted. *Seeds* rather large, $\frac{1}{25}$ in. diam., coarsely papillose.—I can see no difference between the Khasian and Javan plants. The Japanese *P. japonica*, *A. Gray*, differs chiefly in the purple flowers. I have not found any specimens of this in *Wallich's Herbarium*.

25. ***P. obtusifolia***, *Royle Ill.* 311, t. 77, f. 1; mealy or not, leaves 2-6 in. membranous elliptic spathulate obovate or ovate acute or obtuse entire crenulate erose or coarsely toothed, base narrowed rounded or cordate, petiole winged, scape stout few- or many-fld., bracts ovate or subulate much shorter than the pedicels often connate below, corolla purple, tube twice as long as the calyx, mouth annulate, limb flat, lobes obcordate. *Duby in DC. Prodr.* viii. 42. (*Herb. Ind. Or. H. f. & T. Prim.* 10.)

EASTERN AND WESTERN HIMALAYA; *Kunawar, Royle*; *Kumaon, Herb. Calcutta*; *Sikkim*, alt. 11-12,000 ft., *J. D. H., Watt*; *Bhotan, Griffith*.

Rootstock stout, clothed with fleshy broad sheathing scales. *Leaves* excessively variable, naked or with yellow meal beneath. *Scape* stout, 6-10 in.; bracts $\frac{1}{4}$ – $\frac{1}{2}$ in.; pedicels $\frac{1}{2}$ – $1\frac{1}{2}$ in., stout in fruit. *Calyx* usually mealy, cupular or broadly campanulate in fruit; lobes triangular and ovate or linear, acute or obtuse. *Corolla* large, bright blue-purple; limb $\frac{3}{4}$ –1 in. diam., often puberulous. *Seeds* large, subglobose, $\frac{1}{20}$ in. diam., coarsely papillose.—This resembles states of *P. Stuartii*, but is distinguished by the thin texture of the leaves, acute ovary, and globose capsule sunk in the calyx. The forms with broadly ovate-cordate deeply toothed leaves differ widely in aspect from those with obovate-spathulate ones.

VAR. 1. Roylei; leaves obovate-spathulate subentire or erose mealy beneath, tip rounded, umbels few- or many-fld.—*Kunawar and Sikkim*.

VAR. 2. Griffithii, *Watt in Journ. Linn. Soc. ined.*; leaves ovate-cordate acute deeply toothed.—*Bhotan and Sikkim*.

26. *P. elongata*, *Watt. in Journ. Linn. Soc. Bot. ined.*; leaves long-petioled 3-5 in. membranous obovate or oblanceolate obtuse crenulate narrowed into a usually long petiole mealy or not beneath, scape tall, flowers few subsessile, bracts short subulate, calyx narrow cleft to the middle, teeth lanceolate, corolla yellow glabrous, tube very long, throat funnel-shaped not annulate, lobes rounded obovate toothed. (*Herb. Ind. Or. H. f. & T. Prim.* 14.)

SIKKIM HIMALAYA; Zemu valley, alt. 12-13,000 ft., *J. D. H.*

A rather slender species, with few yellow flowers remarkable chiefly for the length of the corolla-tube, with rounded toothed lobes, short bracts, and globose ovary with a subacute tip like *P. obtusifolia*, of which it is possibly a form. *Corolla-tube* $\frac{3}{4}$ of an inch long (including the throat), three times as long as the calyx. *Fruit* not seen.

†† *Ovary rounded and usually thickened at the top. Capsule oblong or cylindric, exceeding the calyx.*

27. *P. Stuartii*, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 20; mealy or not, quite glabrous, leaves 4-10 in. coriaceous suberect, broadly or narrowly oblanceolate or obovate-spathulate acute or obtuse quite entire crenulate or finely toothed, midrib very broad, petiole broadly membranous below, flowers loosely umbelled, bracts elongate, calyx terete, lobes usually long narrow acute rarely obtuse, corolla yellow or purple, mouth contracted, tube equalling the calyx-throat or long as the tube, limb various, seeds coarsely granulate.

Throughout the SUBALPINE and ALPINE HIMALAYA and TIBET; alt. 12-16,000 ft.—*DISTRIB.* Afghanistan.

After long study I am unable to draw any specific characters between the many forms of purple and yellow (rarely white) *Primulas* included under the above character. If there are species amongst them they hybridise so as to defy recognition by description. Each of the following varieties may have its small and great form with narrower or broader, entire and serrated, mealy and green leaves, many or few sessile or pedicelled flowers, more or less deeply-cut calyx, mealy on the outer only, or inner only, or on both surfaces, and a longer or shorter corolla-tube, with very variously formed lobes. The habit of the forms may be seen to depend on dryness or wetness of soil, or the length of herbage amongst which the plant grows, and elevation on the mountains, and many of the forms are no doubt constant and reproduced with much constancy by seed.

VAR. 1. Stuartii proper; leaves 5-10 in. narrowly oblanceolate or short and spathulate acute closely sharply toothed rarely entire yellow-mealy beneath, inflorescence more mealy, calyx-teeth linear or lanceolate acute or obtuse, corolla-lobes orbicular and emarginate or broadly obovate entire or toothed. *P. Stuartii*, *Wall. l. c.*; *Tent. Fl. Nep.* t. 34; *Cat.* 606 in part; *Don Prodr.* 80; *Duby in DC. Prodr.* viii. 41; *Bot. Mag.* t. 4356.—From Sikkim to Kashmir and Tibet

VAR. 2. purpurea; leaves as in *var. 1* but seldom toothed and oftener broader white- or yellow-mealy beneath, flowers sometimes in two whorls, calyx as in *var. 1* but sometimes nearly an inch long linear-oblong and round at the tip, corolla pale or deep purple, lobes obovate or 2-fid entire, capsule sometimes 1 in. *P. purpurea*, *Royle Ill.* 311, t. 77, f. 2; *Duby l. c.* 40; *Wall. Cat.* 606 (the Kumaon specimens). *P. macrophylla*, *Don Prodr.* 80. *P. Jäschkiana*, *Kerner in Bericht des Naturwiss. Vereins Innsbruck, Jahrg. i. Heft 2*, 97.

VAR. 3. Moorcroftiana; not or very slightly mealy, leaves 2-4 in. oblanceolate acute usually quite entire, scape shorter fewer-flowered, calyx-lobes narrow acuminate corolla as in *var. 1* purple. *P. Moorcroftiana*, *Wall. Cat.* 4988.—Western Tibet.

Wallich's specimens are miserable, but no doubt referable to the common Western Tibetan form described above; the flowers are sessile in his specimens, as they often are in high alpine forms. Strachey and Winterbottom's *P. Moorcroftiana*, from 16,800 ft. on the Niti Pass, Kumaon, is very dwarf, with leaves white-mealy beneath and sessile flowers.

VAR. 4. *macrocarpa*; leaves mealy beneath 2-5 in. oblanceolate obtuse or acute, calyx very large $\frac{1}{2}$ - $\frac{3}{4}$ in. long divided nearly to the base into linear-oblong obtuse leathery lobes, capsule 1 in.—Sikkim, alt. 15-17,000 ft., *J. D. H.*

VAR. 5. *lineariloba*; lobes of corolla narrow deeply divided into two spreading linear lobes.—Tibet N. of Sikkim, *J. D. H.* I have seen flowers only, procured by my collectors. Considering the range of variation in the corolla-lobes of this and other species, I do not doubt this being an alpine state of *Stuartii* allied to var. *purpurea*.

28. **P. sikkimensis**, *Hook. f. in Bot. Mag. t. 4597*; glabrous, leaves 6-14 in. membranous not mealy oblong-obovate or -spathulate obtuse, margins sharply toothed decurrent on a long broadly winged and often toothed petiole, scape very tall, bracts very short subulate, flowers very many yellow, pedicels slender, calyx strongly 5-angled and 5-ribbed, teeth subulate, corolla funnel-shaped, tube not annulate longer than the calyx, limb concave, lobes rounded emarginate.

SIKKIM HIMALAYA; in wet places, alt. 11-15,000 ft., *J. D. H.*, &c.

Rootstock as thick as the thumb, very short. *Leaves* often 2 in. diam., midrib not broad, nerves many slender. *Scape* often 2 ft. and as thick as a goose-quill, inflorescence sometimes mealy; bracts $\frac{1}{10}$ - $\frac{1}{2}$ in.; flowers 6-30, nodding; pedicels slender, $\frac{1}{2}$ -4 in. *Calyx* $\frac{1}{2}$ - $\frac{3}{4}$ in., teeth recurved. *Corolla* $\frac{2}{3}$ in. long and $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, blue-green when dry, quite glabrous within and without. *Ovary* globose, crown rounded not thickened. *Capsule* oblong-cylindric, rather longer than the calyx, teeth short. *Seeds* coarsely granulate.—The tallest described *Primula*, more resembling the Cowslip than any other Indian one; odour faint, sweet.

**** *Scape* much longer than the leaves. *Flowers* 1-5. *Bracts* very few, slender or 0, base not gibbous or produced.

† *Tube of corolla cylindric or narrowly funnel-shaped, mouth glabrous or puberulous.*

29. **P. Kingii**, *Watt mss* glabrous, not mealy, leaves crowded 2-3 in. elliptic-lanceolate acute quite entire or obscurely crenulate, midrib stout, base sheathing broadly membranous, scape tall 4-5-fld., bracts subulate from a broad base, pedicels short puberulous, calyx narrowly subcampanulate 5-cleft above or to the middle, corolla red-purple broadly funnel-shaped puberulous very shortly 5-lobed, limb concave. lobes retuse glabrous within.

SIKKIM HIMALAYA; at Na-tong (*Herb. Calcutta*).

A very distinct species, with the habit of *P. Dickieana*, and the funnel-shaped shortly lobed corolla of *sikkimensis*. *Leaves* rather thick in texture, spreading, pale when dry. *Scape* 6-10 in., slender; bracts very unequal. *Calyx* $\frac{1}{2}$ in., obtusely angled. *Corolla* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., claret-coloured, glabrous within. *Ovary* with a rounded 5-lobed crown. *Fruit* not seen.

30. **P. Dickieana**, *Watt in Journ. Linn. Soc. Bot. ined.*; quite glabrous, not mealy, leaves elliptic-obovate or oblanceolate acute quite entire or serrate sessile or petiole elongate and narrowly membranous below, flowers 2-6 large yellow sessile or shortly pedicelled, bracts linear or subulate, calyx campanulate 5-cleft, lobes ovate oblong or lanceolate obtuse or acute, corolla yellow, tube twice as long as the calyx hairy within, mouth not annulate, lobes obcordate, tube and disk of flat limb pubescent, ovary with a thickened obtuse tip. (*Herb. Ind. Or. H. f. & T. Prim.* 13.)

SIKKIM HIMALAYA; Lachen, on open banks, alt. 10-13,000 ft., *J. D. H.*

This, though in many respects approaching small states of *P. Stuartii*, seems quite distinct, in the total absence of scent, small leaves, few flowers, and hairy tube, and pubescent disk of the corolla. The leaves too are, if not quite entire, distantly and distinctly serrate, not toothed or crenate. It is a beautiful plant. *Fruit* not seen.

31. **P. Elwesiana**, *King in Herb. Calc.*; not mealy, leaves 2-3 in. oblanceolate subacute quite entire glabrescent coriaceous, nerves obscure, scape and solitary inclined very large purple flower softly pubescent, bract 0, calyx short 5-partite, segments ovate-lanceolate, corolla-tube funnel-shaped $\frac{3}{4}$ in. long, lobes obovate-oblong crenate spreading and recurved.

SIKKIM HIMALAYA; alt. about 12,000 ft., *King*.

Rootstock very stout, with broad fleshy leafy scales. *Leaves* narrowed into a broadly winged puberulous petiole. *Scape* 6-7 in., stout. *Flower* 1 in. long and wide, dark purple. *Calyx* $\frac{1}{2}$ in. long. *Corolla* pubescent all over. *Stamens* linear, on the mouth of the tube. *Ovary* very small, conical, acute; style filiform, stigma minute truncate.—A very remarkable and beautiful species.

32. **P. tenella**, *King in Herb. Calc.*; leaves small ($\frac{1}{2}$ in.) petioled obovate or trapeziform toothed above the middle mealy, scape filiform and large solitary erect bluish-white flower glabrous, bract very small, calyx 5-cleft to the middle, lobes obtuse, corolla-tube long slender, throat broadly funnel-shaped, lobes 5 very broadly and deeply obcordate.

E. TIBET; Chumbi valley, between Sikkim and Bhotan, at Phari, alt. about 13,000 ft., *King*.

Whole plant 2-2 $\frac{1}{2}$ in. high, glabrous. *Rootstock* stout. *Leaves* many, mealy all over, especially beneath, subacute, cuneate and entire below the middle. *Scape* very slender; bract close to and shorter than the calyx. *Corolla-tube* $\frac{1}{2}$ in., limb $\frac{3}{4}$ in. diam. *Stamens* near the base of the tube. *Stigma* included, large, peltately capitate.

†† *Mouth of saucer-shaped corolla densely woolly.*

33. **P. pusilla**, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall. ii. 22; Cat. 609; Tent. Fl. Nep. t. 32*; densely tufted, hoary, leaves $\frac{1}{2}$ -1 in. spatulate or oblanceolate pinnatifidly toothed, scape very slender 1-4-fld., bracts few lanceolate, flowers sessile, calyx hoary, tube short terete, lobes oblong obtuse or acute equalling the funnel-shaped corolla-tube, corolla-lobes longer than the tube, lobules spreading, capsule included. *Duby in DC. Prodr. viii. 42; Mem. Prim. t. 1, f. 2. P. humilis, Steudel Nomencl. ed. ii. 395. Androsace primuloides, Don Prodr. 81. A. primulina, Spreng. Syst. Veg. Cur. Post. 56.*

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 13-16,000 ft., *J. D. H., &c.*

Leaves in dense rosettes, 1-2 in. diam., petioled, margins and teeth recurved, hoary above; bracts sometimes leafy and toothed, glandular as is the calyx and corolla-tube. *Scape* 2-3 in. *Corolla* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.; lobules oblong, spreading.

††† *Corolla broadly funnel-shaped or subcampanulate, mouth glabrous.*

34. **P. sapphirina**, *Hook. f. & T. Herb. Ind. Or. Prim. 32*; very small, glabrous or hoary, leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. obovate-spatulate obtuse pinnatifidly toothed, scape filiform 1-4-fld., bracts ovate-oblong, flowers sessile nodding, calyx-tube short terete equalling the obtuse lobes, corolla hoary, lobes very short 2-fld, capsule included.

SIKKIM HIMALAYA, alt. 13-15,000 ft., *J. D. H., &c.*

Rosettes $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. *Leaves* with scattered white hairs above. *Scape* 1-2 in. *Corolla* $\frac{1}{4}$ in. diam., bright or pale blue.

35. **P. uniflora**, *Klatt in Linnæa xxxvii. 500*; not-mealy, leaves petioled $\frac{1}{2}$ in. orbicular or broadly ovate pinnatifidly crenate, scape very slender 1-2-fld., bracts very minute, flowers sessile very large nodding, calyx 5-partite segments quadrate, corolla broadly funnel-shaped, lobes shallow coarsely toothed.

SIKKIM HIMALAYA; Kankola Pass, alt. 15,000 ft., J. D. H.

This and the following are very singular species, the corolla being larger than the whole rosette of leaves, and calyx quite peculiar.—*Leaves* few, petiole puberulous, equalling or exceeding the blade. *Scapes* 1–3, 2–5 in. *Flower* 1 in. diam., with occasionally a very imperfect apetalous one. *Calyx* puberulous; segments nearly $\frac{1}{2}$ in. long, truncate, tip entire or toothed. *Corolla* pale lilac, tube $\frac{1}{2}$ in., limb $\frac{2}{3}$ in. long and broader, lobes very shallow and unequally toothed. *Stamens* near the bottom of the tube. *Ovary* globose.

36. **P. soldanelloides**, Watt in Journ. Linn. Soc. Bot. ined.; quite glabrous, not mealy, leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. long-petioled ovate runcinate-pinnatifid half-way to the midrib, scape capillary 1-fld, bract 0, flower large nodding, calyx cleft half-way, lobes oblong ovate or obtuse, corolla broadly funnel-shaped, lobes shallow coarsely toothed.

SIKKIM HIMALAYA; Kankola Pass, J. D. H.; Patangla (Herb. Calcutta).

A smaller plant than *P. uniflora*, quite glabrous, with a very different calyx, but similar corolla, which is white. *Calyx-lobes* entire or obscurely toothed. *Ovary* globose.

***** Minute species (except *P. petiolaris*). *Scape* 0, or much shorter than the leaves (sometimes elongate in *P. petiolaris*). *Bracts* subulate, at the bases of the leaves or on the very short scape. (See also *P. concinna* and *P. tibetica*.)

37. **P. petiolaris**, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. ii. 22; Tent. Fl. Nep. t. 31; Cat. 603; glabrous or puberulous, mealy or not, leaves 2–10 in. rugose densely rosulate membranous erose jagged toothed or crenulate of two forms in the same or different plants, some broadly or narrowly obovate-spathulate sessile or narrowed into a broadly winged petiole, others elliptic ovate or cordate on long slender petioles, pedicels long or short, calyx-teeth acute, corolla pale purple or white or pink, tube funnel-shaped above much longer than the calyx, mouth not annulate, limb flat, lobes rounded entire emarginate 2-fid or sharply toothed, ovary globose, tip acute, stigma capitate, capsule globose sunk in the broad calyx-tube, seeds large subglobose black papillose. *Duby* in DC. Prodr. viii. 37. *P. tridentata*, Don Prodr. 77. *P. sessilis*, Royle mss.

TEMPERATE HIMALAYA; from Simla to Bhotan, alt. 4–12,000, abundant. Fl. autumn and winter.

A most variable plant. The following forms pass into one another in all ways:—

VAR. 1. *petiolaris proper*; not mealy, leaves mostly elliptic, blade 1–3 in., petiole 2–6 in., scape 0, corolla large, lobes broad 2-fid or many-toothed.

VAR. 2. *nana*; slightly mealy or not, leaves all or mostly obovate-spathulate sessile or shortly petioled, corolla smaller, lobes obcordate entire or toothed. *P. nana*, Wall. l. c. 23; Cat. 612; Griff. Ic. Pl. Asiat. t. 485, f. 2 (*Primula*).

VAR. 3. *Stracheyi*; not mealy, leaves all obovate-spathulate erose, flowers very numerous, scape 0, calyx small, corolla $\frac{3}{4}$ in. diam., tube long, lobes narrower obcordate entire.—Kumaon, at Namil, alt. 8000 ft., Strach. & Winterb. (Prim. 12).

VAR. 4. *sulphurea*; leaves 2 in. sessile obovate clothed with yellow meal beneath finely toothed, corolla small $\frac{1}{2}$ in. diam., tube not twice the length of the small calyx, lobes entire or lacerate.—Kumaon, at Suring, alt. 4500 ft., Strach. & Winterb. (Prim. 10).

VAR. 5. *pulverulenta*; covered all but the corolla with yellow meal, leaves all obovate-spathulate and irregularly toothed, flowers very numerous and large, corolla 1–1 $\frac{1}{2}$ in. broad, tube twice as long as the calyx-lobes coarsely toothed.—Kumaon, at Pindaree, alt. 10–12,000 ft.; Edgeworth, &c. (Strach. & Winterb. Prim. 9).

VAR. 6. *Edgeworthii*; buds only mealy, leaves very large 3–4 in. without the petiole which is often as long ovate or elliptic base truncate acute or cordate, margin irregularly coarsely toothed or lobulate with toothed lobules, pedicels stout, calyx

cupular with broad short lobes.—Garwhal, at Tungnath, alt. 8-900 ft., *Edgeworth*; Simla, alt. 7-10,000 ft., *Thomson*; Kumaon, at the Madhari Pass, alt. 8000 ft., *Strach.* & *Winterb.* (*Prim.* 8).

VAR. 7. *scapigera*; leaves as in var. 1, scape very stout equalling or exceeding the leaves, bracts short subulate from a broad base, pedicels 1-2 in. stout with sometimes a few small leaves intermixed.—Bhotan, *Griffith*; Sikkim, alt. 8-12,000 ft., *J. D. H.*

38. **P. minutissima**, *Jacquem. mss. in DC. Prodr.* viii. 42; very small, densely tufted, stoloniferous, leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. spathulate lanceolate or oblanceolate acuminate acute or obtuse toothed above glabrous or puberulous mealy beneath, scape sunk amongst the leaves 1-3-fld., flowers sessile 1-2-bracteate, calyx cleft to the middle, tube terete, lobes oblong or lanceolate much shorter than the long corolla-tube, corolla very large for the plant, lobes obcordate. *Duby Mem. Prim.* t. 1, f. 3. *P. Saundersiana*, *Herb. Royle*. *P. Stracheyi*, *Hook. f.*; *Munro in Garden*, 1879, 535.

ALPINE HIMALAYA, alt. 12-16,000 ft.; from Kashmir to Kumaon, alt. 12-15,000 ft.

Forming large patches of rosettes each $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. Leaves densely crowded, dark green, teeth not recurved. Calyx glabrous, lobes very variable. Corolla bright purple, $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., tube glabrous, lobes bifid, lobules rounded. Ovary globose, tip subacute; stigma capitate.—This may be a reduced form of *P. Heydei*.

VAR. *spathulata*; leaves larger spathulate-obovate crenate, tip rounded. Corolla $\frac{3}{4}$ in. diam. Sikkim, alt. 13,000 ft., *J. D. H.*

39. **P. reptans**, *Hook. f.*; minute, not mealy, tufted, minutely puberulous, stem creeping, leaves $\frac{1}{6}$ – $\frac{1}{4}$ in. long including the petiole orbicular cleft one-third way down into lobules with recurved margins, flowers solitary shortly pedicelled erect much larger than the foliage, calyx small terete cleft to the middle, lobes oblong obtuse one-fourth the length of the corolla-tube which is long with a narrowly funnel-shaped mouth and spreading deeply 2-fid lobes.

WESTERN HIMALAYA; *Falconer*; Kashmir, Burjila, alt. 14,500 ft., *Clarke*.

The creeping stem, minute rounded leaves $\frac{1}{16}$ – $\frac{1}{8}$ in. diam., suddenly contracted into the slender petiole, palmately lobulate except at the very base, and the large flowers, well characterise this little species. Corolla pale purple, $\frac{1}{2}$ in. diam., tube $\frac{1}{2}$ in. long. Ovary globose, tip acute; stigma globose.

40. **P. Hookeri**, *Watt in Journ. Linn. Soc. Bot. ined.*; tufted, glabrous, not mealy, leaves $\frac{1}{2}$ –1 in. usually sessile narrowly obovate-oblong or -spathulate tip rounded margin sharply toothed and recurved, midrib very broad, outer reduced to large sheaths, scape 0 or very short, flowers 1-3 very shortly pedicelled, calyx cupular or campanulate glandular with 5 very short broad acute teeth, corolla-tube wide cylindric twice as long as the calyx, lobes short 2-fid rounded. *Herb. Ind. Or. H. f. & T. Prim.* 25.

SIKKIM HIMALAYA; Lachen, alt. 12,000 ft., *J. D. H.*

A very distinct species, differing in the calyx from any of the group.—Roots stout, fleshy. Leaves dark green, rather fleshy, rarely produced into a petiole, teeth often recurved, outer reduced to oblong fleshy scales toothed at the tip. Corolla white, mouth without a thickened ring; lobes about as long as the tube. Ovary globose, tip acute; stigma globose.

41. **P. muscoides**, *Hook. f.*; minute, glabrous, not mealy, densely tufted, leaves $\frac{1}{16}$ – $\frac{1}{10}$ in. sessile obovate-oblong or subspathulate dilated at the base margins recurved coarsely toothed or oblong and toothed at the tip only, midrib very broad, flowers solitary subsessile with 2 broad ovate bracts, calyx short

cleft nearly to the base, lobes oblong-lanceolate, corolla-tube twice as long as the calyx cylindric, lobes short. *Herb. Ind. Or. H. f. & T. Prim.* 23; *Watt in Journ. Linn. Soc. ined.*

SIKKIM HIMALAYA; Kankola Pass, alt. 15,000 ft., *J. D. H.*

Much the smallest species of the genus, forming moss-like tufts interlaced with the roots and stems of other small plants. It is most allied to *P. Hookeri*. Ovary globose, tip acute, stigma capitate.

VAR. ? *tenuiloba*; leaves with short petioles, corolla-tube narrower slightly hairy, lobes very narrow deeply cleft with narrow lobules.—Sikkim Himalaya; Yeumtong, alt. 14,000 ft., *J. D. H.*; (*Herb. Ind. Or. H. f. & T. Prim.* 22). I have very few specimens of this, which may prove a distinct species.

42. ***P. Stirtoniana***, *Watt in Journ. Linn. Soc. Bot. ined.*; not mealy, glandularly puberulous, tufted, leaves $\frac{1}{2}$ in. obovate-spathulate tip rounded margins flat sharply closely toothed, midrib slender, scape 0, flowers solitary on slender pedicels sunk amongst the leaves, calyx cleft to the middle, teeth lanceolate acute entire or toothed, corolla-tube twice as long as the calyx, mouth funnel-shaped, lobes deeply cleft entire or crenate.

SIKKIM HIMALAYA; Kanglanamo Pass, alt. 14–16,000 ft., *Watt.*

In size this much resembles *P. Hookeri*, but it differs entirely in the shape of the leaves, calyx, and corolla tube. Bracts 0 or 1–2 very slender ones on the pedicel. Corolla bright purple, $\frac{1}{2}$ – $\frac{2}{3}$ in. diam., glabrous. Ovary obovoid, tip thickened retuse; stigma capitate.

C. Leaves narrowed into a broad winged petiole, complicate in vernation. Scapes many, longer than the leaves. Flowers in superimposed whorls. Bracts few, leafy, toothed.

43. ***P. floribunda***, *Wall. Tent. Fl. Nep.* t. 33; *Cat.* 1825; glandular-pubescent, leaves elliptic acute or obtuse narrowed into a broad winged petiole coarsely irregularly toothed, whorls 2–8, pedicels very unequal, bracts ovate or elliptic, acuminate toothed, calyx campanulate, lobes acute, corolla yellow, tube long, limb small, lobes obcordate. *Duby in DC. Prodr.* viii. 35. *P. obovata*, *Wall. Cat.* 610. *Androsace obovata*, *Wall. mss.*

WESTERN HIMALAYA; from Kumaon to Kashmir, alt. 2500–6500 ft.—DISTRIB. Afghanistan.

Leaves 2–4 in. Scapes numerous, stout, 4–8 in.; pedicels $\frac{1}{2}$ –1 in.; bracts shorter. Calyx glandular, hemispheric in fruit, cleft to the middle; lobes ovate, acute. Corolla-tube $\frac{1}{4}$ – $\frac{1}{2}$ in., pubescent, throat more or less dilated, mouth annulate; limb $\frac{1}{2}$ – $\frac{1}{2}$ in. diam. Ovary globose, top rounded; stigma globose. Capsule globose, included in the hemispheric calyx. Seeds $\frac{1}{50}$ in., black, angled, minutely papillose.—Closely allied to the Arabian and Abyssinian *P. verticillata* and *P. simensis*.

2. **ANDROSACE**, *Linn.*

Perennial rarely annual low herbs. Leaves various, rosulate or imbricate on the branches. Flowers small, white or red. Calyx 5-lobed or -partite. Corolla salver-shaped with a very short tube, or funnel-shaped, limb 5-lobed, mouth annulate or with folds opposite the lobes. Stamens 5, anthers subsessile, included in the tube, obtuse. Ovary globose, style short. Capsule ovoid or globose, 5-valved. Seeds 2, rarely more, angular or subglobose, embryo transverse.—Species about 40, chiefly mountain plants, all of N. temperate or Arctic regions.

* Scapes numerous. Leaves all radical Stolons 0, except in *A. geraniifolia*.

† Leaves long-petioled, rounded-cordate, lobulate and crenate.

1. *A. saxifragæfolia*, Bunge Enum. Pl. Chin. Bor. 53; annual, glandular-pubescent, leaves rounded-cordate crenate-toothed, blade about as long as the petiole, calyx deeply 5-cleft, segments elliptic-acuminate stellately spreading in fruit. *Duby in DC. Prodr.* viii. 53. *A. rotundifolia*, Wall. Cat. 613; *Smith Exot. Bot.* t. 113; *DC. l.c.* 54 (not of Hardwicke). *A. patens*, *Wright in Mem. Amer. Acad. Sc. ser. 2.* vi. 401. ? *A. carnosula*, *Duby in DC. l.c.* 54.

GANGETIC PLAIN, from Calcutta to the Punjab, and ascending the Himalayas to 4000 ft.—DISTRIB. N. E. China, Japan, Loochoo Islands.

The only annual Indian species. Leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. Scapes many, twice as long as the leaves; invol. bracts. $\frac{1}{2}$ in.; pedicels $\frac{1}{4}$ – $1\frac{1}{2}$ in., very unequal. Calyx fruiting $\frac{1}{2}$ – $\frac{1}{3}$ in. diam. Corolla narrower or broader than the calyx. Seeds minute, subglobose, deeply pitted.—A plant confused with Hardwicke's *A. rotundifolia* by Wallich, Smith and others, and with a third species by Roemer and Schultes (see Obs. in Roxb. Fl. Ind. ed. Wail. & Carey, ii. 1.).

2. *A. rotundifolia*, Hardwicke in As. Research. vi. 350; perennial, glandular-pubescent or villous, leaves rounded-cordate lobulate the lobules usually 3-crenate, blade usually shorter than the petiole, bracts lanceolate or obovate crenate sessile or petioled entire or sharply toothed, calyx cleft to the middle, segments ovate recurved in fruit. Wall. in Roxb. Fl. Ind. ed. Wail. & Carey, ii. 14, excl. Obs. *A. incisa*, Wall. l. c. 16; Cat. 616; *Duby in DC. Prodr.* viii. 54. *A. parviflora*, Jacquem. mss. in DC. l. c. 54; *Mem. Prim.* t. 3, f. 4. *A. elegans*, Jacquem. mss. l. c. 55.

TEMPERATE HIMALAYA, alt. 5–11,000 ft., from Kashmir to Kumaon, and in WESTERN TIBET.

Very variable. Leaves $\frac{1}{2}$ – $1\frac{1}{2}$ in. diam., petiole 1–4 in.; lobes very shallow, sometimes the sinus is not deeper than that of the crenatures. Scapes few or many, 1–6 in.; invol. bracts short or long, broad or narrow, sometimes $\frac{3}{4}$ in. long and deeply 5-cleft at the broad end. Calyx, fruiting $\frac{1}{2}$ – $\frac{1}{3}$ in. diam., sometimes much enlarged, nearly 1 in. diam. and acutely toothed or 3-fid at the tip. Corolla usually much larger than the calyx, but when the latter is enlarged it becomes very small and even minute. Capsule much smaller than the calyx. Seeds minute, rounded, granulate.—I cannot doubt this being Hardwicke's *A. rotundifolia*, found by him on “the most elevated mountains of Shreenugur,” and described as having toothed invol. leaves. Wallich referred *A. saxifragæfolia* to Hardwicke's *rotundifolia*, and re-describes the latter as *A. incisa*.

VAR. 1. *rotundifolia proper*; softly pubescent or villous, 3–5 in. high, lobules of leaf rounded entire or crenate rarely acutely toothed, corolla rarely exceeding the entire calyx-lobes.—Kumaon to Kashmir, alt. 3–9000 ft.

VAR. 2. *macrocalyx*, Watt in Journ. Linn. Soc. ined.; habit, pubescence and leaves of var. 1, but calyx-lobes much larger acutely toothed.—Kashmir, alt. 5–9500 ft.

VAR. 3. *glandulosa*; usually 5–12 in. high, glandular pubescent, petioles and scapes more slender, lobules of leaves rounded entire truncate or crenate rarely acutely toothed, corolla usually much larger than the entire calyx-lobes.—Drier ranges of Lahul and Kashmir; abundant in Western Tibet, alt. 7–12,000 ft.—A form affecting high dry regions.

VAR. 4. *Stracheyi*, Watt l. c.; glandular-pubescent or glabrescent, 4–6 in. high, scapes and petioles slender, lobules of leaf entire or crenate, calyx in flower large campanulate, lobes quite entire much exceeding the calyx.—Garwhal, at Bampa, alt. 11,000 ft., *Str. & Winterb.* Kunawur, alt. 8–11,000 ft., *Munro, Thomson, Brandis*.

VAR. 5. *Thomsoni*, Watt l. c.; much smaller, glandular-puberulous, leaves small, lobules acutely toothed, petioles filiform, flowers small, corolla exceeding the entire calyx lobes.—Western Tibet; Dras river, *Thomson*; Iskardo, alt. 9000 ft., and Barji la, alt. 11,000 ft., *Clarke*.

3. **A. geraniifolia**, *Watt in Journ. Linn. Soc. ined.*; perennial, stoloniferous, laxly villous with soft spreading hairs, leaves rounded-cordate 7-lobed to the middle, lobes 3-lobulate, petiole much longer than the blade, bracts very small lanceolate acuminate quite entire, calyx campanulate 5-cleft above the middle, corolla exceeding the calyx.

KUMAON; at Dwali, alt. 8200 ft., *Strach. & Winterb.* SIKKIM in damp woods at Lachen, alt. 9–10,000 ft., *J. D. H.*

Stolons a foot long, very slender. *Leaves* 1–2 in. broad, petiole 2–6 in. *Scapes* much longer than the leaves; invol. bracts $\frac{1}{2}$ in. *Calyx* small, broadly campanulate, $\frac{1}{10}$ – $\frac{1}{8}$ in. diam.; lobes broad or narrow, recurved.

†† *Leaves lanceolate elliptic or spatulate, densely rosulate.*

4. **A. septentrionalis**, *Linn.*; *Boiss. Fl. Orient.* iii. 17; glabrous, leaves small densely rosulate sessile oblanceolate acute or obtuse, scapes rigid, invol. bracts minute subulate, calyx turbinate 5-toothed, corolla very small. *Duby in DC. Prodr.* viii. 52; *Lamk. Ill.* t. 98, f. 2; *Fl. Dan.* t. 7; *Bot. Mag.* t. 2021; *Nees Ic. Gen. Fl. Germ.* v. t. 6; *Reichb. Ic. Fl. Germ.* xvii. t. 1110.

WESTERN TIBET; *Falconer*; Karakoram and Deosar, alt. 12–14,000 ft., *Clarke*.—DISTRIB. Mid-Europe, Caucasus, N. Asia, Arctic America.

Leaves in Tibetan specimens $\frac{1}{4}$ – $\frac{1}{2}$ in., coriaceous, densely packed, quite entire or obscurely toothed. *Scapes* many, 4–6 in., one usually much stouter than the rest and rather longer; invol. bracts $\frac{1}{10}$ – $\frac{1}{8}$ in.; pedicels 1–2 in., very unequal. *Flowering calyx* $\frac{1}{12}$ – $\frac{1}{10}$ in. diam., fruiting about $\frac{1}{8}$ in., teeth acute. *Corolla* very small. *Seeds* small, angular, granulate.

5. **A. Aizoon**, *Duby in DC. Prodr.* viii. 50; perennial, inflorescence glandular-pubescent, leaves densely rosulate sessile cartilaginous spatulate cuspidate ciliolate, scapes very long, invol. bracts small lanceolate, calyx between hemispheric and turbinate cleft to the middle, corolla small. *Dene in Jacquem. Voy. Bot.* 141, t. 145.

KASHMIR and WESTERN TIBET; alt. 8–11,000 ft., *Jacquemont, Falconer, &c.*

Leaves $\frac{1}{4}$ –1 in., very numerous and most densely rosulate, margins thickened when dry. *Scapes* $\frac{1}{2}$ –2 ft.; invol. bracts $\frac{1}{10}$ in., ovate; pedicels $\frac{1}{4}$ – $\frac{3}{4}$ in., very unequal. *Calyx* turbinate; lobes oblong, obtuse. *Corolla-lobes* 2-fid with 2-fid appendages. *Capsule* with 2-fid valves. *Seeds* large, angular, rough.

** *Scapes* solitary; flowers umbelled, except in 1-flowered varieties of *A. villosa*.

† *Leaves* minute, cartilaginous, glabrous except the strongly ciliate margins.

6. **A. sempervivoides**, *Jacquem. in DC. Prodr.* viii. 50; small, stoloniferous, leaves densely rosulate obovate-spatulate apiculate ciliate cartilaginous, scape solitary, umbels glandular-pubescent, pedicels short; calyx cleft to the middle, lobes obtuse, corolla-lobes obovate, tips rounded. *Duby Mem. Prim.* t. 3, f. 2.

WESTERN TIBET; *Jacquemont, Falconer.* Sind Valley, KASHMIR alt. 11,000 ft., *Clarke*.—DISTRIB. Afghanistan (a form with longer narrow leaves).

Rosettes $\frac{1}{2}$ in. diam., subglobose. *Stolons* short, 1–1½ in., stout, naked. *Leaves* glabrous on both surfaces, $\frac{1}{4}$ – $\frac{1}{3}$ in., margins translucent when dry. *Scape* 1–3 in.,

stout; bracts linear-oblong; pedicels short, stout. *Calyx* broadly turbinate, lobes erect in fruit. *Capsule* 1-2-seeded. *Seeds* large, oblong, plano-convex.

7. ***A. microphylla***, Hook. f.; densely tufted, stolons 0 or obscure, leaves minute densely imbricate on the short crowded branches sessile obovate concave incurved cartilaginous ciliate, scapes very short and small, umbels glandular-pubescent, calyx cleft to the middle; lobes obtuse, corolla-lobes obovate tips rounded mouth annulate. *A. globifera*, Klatt in *Linnaea*, xxxii. 292 (not of Duby). *A. villosa*, Herb. Ind. Or. H. f. & T., not of Linn.

KASHMIR; inner ranges; Brazil and Tilail, alt. 12-13,000 ft., Thomson, Clarke. WESTERN TIBET, Falconer.

Stems 1-6 in., sometimes rigid, with subremote rosettes. *Leaves* $\frac{1}{12}$ - $\frac{1}{8}$ in., obtuse or mucronate or cuspidate. *Scapes* $\frac{1}{4}$ -1 in., 3-6-fld. *Flowers* and seeds as in *A. sempervivoides*, but ring at mouth of corolla not produced. *Seeds* 2, oblong, angular.

†† *Leaves large or small, pubescent villous or silky.*

8. ***A. sarmentosa***, Wall. in Roxb. Fl. Ind. ed. Wall. & Carey, ii. 14; Pl. As. Rar. iii. t. 206; Cat. 614, and 615 in part; pubescent villous or silky, stolons leafless except at the nodes, leaves sessile or petioled elliptic-lanceolate or oblanceolate subacute, bracts various entire silky, umbels lax or dense, calyx cleft half-way, lobes obtuse, corolla-throat obscurely annulate. Duby in DC. Prodr. viii. 49; Bot. Mag. t. 6210.

TEMPERATE and SUB-ALPINE HIMALAYA, from Sikkim to Kashmir.

A very variable plant, in size, habit, clothing, length, and shape of invol. leaves, and number, length, and stoutness of pedicels.—*Calyx* hemispheric. *Corolla* twice as broad, pale rose-purple with a yellowish eye, lobes broadly obovate, tips rounded; throat with a raised ring. *Capsule* broadly oblong, valves entire. *Seeds* few or many, oblong or subglobose, granulate. The following varieties have no precise limits.

VAR. 1. *Watkinsi*; laxly hairy or silky, scapes and stolons stout, leaves $\frac{1}{2}$ -1 in., lanceolate or oblanceolate subsessile or sessile, pedicels $\frac{1}{2}$ -1 $\frac{1}{2}$ in. much longer than the invol. bracts.—Nipal.

VAR. 2. *grandifolia*; pubescent or laxly hairy, stolons 0, scape stout, leaves very large sometimes 1 in. diam. elliptic or lanceolate narrowed into the long or short petiole, bracts very small. *A. foliosa*, Klatt in *Linnaea* xxxii. 293, not of Duby.—Sikkim, at Tungu, alt. 13-14,000 ft., J. D. H.

VAR. 3. *primuloides*; silkily villous, leaves as in var. 1 but often narrowed into a petiole, and stolons (often absent) and scapes more slender. *A. primuloides*, Duby l. c. 30; Mem. Prim. t. 3, f. 3—Kumaon, alt. 12,000 ft., Edgeworth. Kashmir, Zanskar, and Lahul, al. 8-10,000 ft.

VAR. 4. *foliosa*; leaves long petioled elliptic 1 in. diam., stolons 0?, scape slender, bracts small linear. *A. foliosa*, Duby in Jacquem. Voy. Bot. 142, t. 146; DC. l. c. 49; Banehal, Jacquemont.

9. ***A. lanuginosa***, Wall. in Roxb. Fl. Ind. ed. Wall. & Carey, ii. 15; Cat. n. 615 and 614 in part; pubescent or silkily villous, stolon-like branches long leafy throughout and with scattered rosettes, leaves lanceolate acute or acuminate, scape solitary, invol. bracts various entire silky, umbels lax or dense, calyx cleft half-way, lobes obtuse, corolla-throat obscurely annulate. Bot. Mag. t. 4005.

WESTERN HIMALAYA; alt. 7-10,000 ft., from Kumaon to Kashmir.

Very similar in calyx and corolla to *A. sarmentosa*, and as variable in stature and clothing, but in habit entirely different, the ascending branches 1-10 in. long only resemble stolons, and never root, the leaves are smaller, always sessile and much more densely silky in the ordinary state of the plant, the flowers are smaller. *Capsule* 4-6-

seeded. *Seeds* angular, granulate.—In Wallich's Herbarium the ticket of this has been inadvertently attached to a sheet of *A. sarmentosa*.

VAR. 1. *typica*, densely clothed with white silky hairs, stems and branches elongate, umbels dense-fld., pedicels short.—Throughout the Western Himalaya.

VAR. 2. *glabrior*, Wall.; more slender, sparingly villous or silky, umbels loose, pedicels $\frac{1}{2}$ –1 in. slender.—Kumaon to Sirmore.

10. *A. villosa*, Linn.; Boiss. Fl. Orient. iii. 13; stoloniferous, densely villous, leaves in small globose rosettes sessile lanceolate or spatulate, scapes solitary, invol. leaves usually equalling the pedicels, calyx cleft half-way, lobes obtuse, corolla-lobes obovate, tips rounded, mouth with a conical erect tubular swelling. *Duby in DC. Prodr.* viii. 50; *Jacq. Coll.* i. t. 12; *Reichb. Ic. Crit.* iii. t. 248, vi. t. 580; *Ic. Fl. Germ.* xvii. t. 1112. *A. Jacquemontii*, *Duby l. c.* 50; *Mem. Prim.* t. 3, f. 1.

WESTERN HIMALAYA; in the drier regions from Kumaon to Kashmir and WESTERN TIBET, alt. 12–17,000 ft.—**DISTRIB.** Afghanistan, Caucasus, Alps, Asia Minor, Central and N. Asia.

Prostrate, in tufted masses of short naked stems and stolons bearing at close intervals villous rosettes $\frac{1}{2}$ –1 in. diam.; much resembling a very small state of *A. sarmentosa* or *lanuginosa*, but the corolla has a prominent conical ring at the mouth. The scapes are sometimes shortened, and the umbels sessile. Boissier identifies *A. Jacquemontii* with *A. villosa*, I think rightly. I distinguish it from states of *A. Chamæjasme* with great difficulty.

11. *A. Hookeriana*, Klatt in Linnaea xxxii. 293, t. iii. f. 1; sparingly pubescent, loosely tufted, stolons and branches rigid divaricate, rosettes of few unequal small petioled obovate or elliptic obtuse flat leaves, scapes solitary slender few-fld., bracts linear, calyx-lobes obtuse, corolla-lobes obovate, tips refuse, mouth annulate.

SIKKIM HIMALAYA; Lachen, alt. 12–14,000 ft., *J. D. H.*

Branches divaricating. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., narrowed into petioles of sometimes the length of the blade. *Scapes* $\frac{1}{4}$ –3 in. *Corolla* much larger than the calyx, pink. *Capsule* 2-seeded.

12. *A. Chamæjasme*, Host; Boiss. Fl. Orient. iv. 14; laxly villous with jointed hairs, loosely tufted, stolons and branches slender, rosettes of many densely tufted sessile small obovate ovate-oblong or lanceolate spreading or imbricating leaves, scape solitary hairy few-fld., bracts linear-oblong or spatulate equalling the pedicels, calyx-lobes obtuse, corolla-lobes longer obovate, tips rounded, mouth annulate. *Duby in DC. Prodr.* viii. 51; *Reichb. Ic. Crit.* vi. t. 580; *Ic. Fl. Germ.* xvii. t. 1112; *Lodd. Bot. Cab.* t. 232. *A. villosa*, *Jacq. Fl. Austr.* t. 352.

WESTERN TIBET, *Henderson*; Barjila and Karakoram, alt. 12–15,000 ft., *Clarke*. —**DISTRIB.** Alps, Arctic Russia, Central and N. Asia, Arctic America.

VAR. *coronata*; leaves densely tufted imbricate shorter and narrower, mouth of corolla with the ring prominent.—Western Tibet, alt. 16–17,000 ft., *H. Strachey*, *Henderson*.

VAR. *uniflora*; leaves densely imbricate, scape very short 1–2-fld.—Western Tibet; Ralam, N. of Kumaon, *Strach. & Winterb.*, No. 8.

Apparently identical with the European, &c., plant, and like it variable in the size of the whole plant and of the leaves. *Rosettes* $\frac{1}{3}$ – $\frac{1}{2}$ in. diam. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., obtuse or subacute. *Flowers* and *capsules* as in *A. Hookeriana*.

*** *Scapes* solitary, 1–2-fld., or *peduncle* 1-fld.

13. *A. muscoidea*, Duby in DC. Prodr. viii. 48; villous, stems elongate forming dense broad patches, leaves densely imbricated in close-set globose

balls the size of a pea sessile linear or oblong obtuse incurved, scape very short 1-fl. ebracteate, calyx cleft one-third way down, lobes subacute, corolla-lobes obovate, tips rounded.

KASHMIR; *Jacquemont, Falconer.*

Patches 6-10 in. diam., of crowded branches and stolons 2-6 in. long, naked below or covered almost throughout their length with the little balls of leaves. *Flowers* numerous, $\frac{1}{10}$ in. diam.; pedicels $\frac{1}{18}$ - $\frac{1}{16}$ in. *Calyx* between turbinate and hemispheric. —I can hardly doubt this being the plant described by Dury, though the calyx is not 5-partite, nor its lobes lanceolate.

14. **A. globifera**, *Duby in DC. Prodr.* viii. 48; pubescent, stems very short forming small patches, leaves densely imbricate in subsolitary globose balls the size of a pea sessile broadly obovate obtuse or subacute incurved with pubescent surfaces and long silkily ciliate margins, the older glabrate, scape very short 1-fl. ebracteate, calyx cleft one-third way down, lobes obtuse, corolla-lobes obovate, tips rounded.

KUMAON, *Jacquemont*; Barjikang Pass and Rogila, alt. 12-15,000 ft., *Madden, Strack. & Winterb.*, &c.

This may be a high alpine state of *A. Chamajasma*, with short much broader and sessile leaves, and solitary flowers. The floral bract, though apparently absent, is in this species and its allies at the base of the pedicel amongst the leaves.

15. **A. Selago**, *Hook. f. & Thoms. mss.*; *Klatt in Linnæa*, xxxii. 292; silkily shortly villous forming spherical tufts, branches densely packed radiating from the root interruptedly or uniformly clothed with compactly imbricating minute leaves hence cylindric and obtuse, leaves sessile linear- or cuneate-obovate obtuse membranous and glabrous below the middle coriaceous and silkily ciliate above it, uppermost elliptic subacute incurved, scape 1-2-fl. and bract villous, calyx cleft below the middle, lobes oblong obtuse, corolla-lobes obovate-oblong obtuse.

SIKKIM HIMALAYA, and North of it, in the Tibetan region, alt. 15-18,000 ft., *J. D. H.*

Root woody; branches with the leaves $\frac{1}{8}$ - $\frac{1}{6}$ in. diam., extremities silvery. *Leaves* $\frac{1}{4}$ - $\frac{1}{2}$ in. long. *Scape* slender, $\frac{1}{10}$ in.; bracts silky, equalling the flower, which is $\frac{1}{12}$ in. diam. *Calyx* hemispheric, $\frac{1}{3}$ in. diam., enclosing the capsule. *Seeds* 2, minute, irregularly oblong or ellipsoid.—A singular and beautiful plant.

16. **A. Lehmanni**, *Wall. Cat.* 617; densely tufted, glabrous except the minute woolly scales sunk in the rosettes and the inflorescence, leaves in continuous or interrupted subsquarrose whorl-like rosettes subulate or oblong-lanceolate acuminate sessile spreading and recurved from a broad imbricating membranous base, scape 1-fl. very short ebracteate and flower glandular-pubescent, calyx turbinate, lobes short obtuse, corolla-lobes orbicular. *Duby in DC. Prodr.* viii. 48.

NIPAL; *Wallich*. SIKKIM, at Jongri, alt. 12-14,000 ft.; *J. D. H., T. Anderson.*

A very singular species, of a dark chestnut colour when dry, and squarrose habit. *Stems* 1-4 in., with the leaves $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. *Leaves* $\frac{1}{8}$ - $\frac{1}{4}$ in. long, rather rigid, their dark colour contrasting with the snow-white clusters of minute lanceolate scales that nestle in the centre of the rosettes. *Pedicels* $\frac{1}{16}$ - $\frac{1}{10}$ in. long. *Calyx* $\frac{1}{12}$ in. diam.

UNDETERMINABLE SPECIES.

A. CORDIFOLIA, *Wall. in As. Research.* xiii. 371, and in *Roxb. Fl. Ind.* ii. 17; villous, leaves ovate-cordate obtuse sinuate crenulate, scapes almost equalling the petioles, umbels 5-fl., bracts setaceous, calyx campanulate shorter than the corolla, enlarging over the fruit.—Forests of Nipal.

3. **CORTUSA**, Linn.

Scapigerous perennial pubescent herbs. *Leaves* long-petioled, rounded-cordate, 7-9-lobed. *Scape* slender. *Flowers* umbelled, purple. *Calyx* campanulate, 5-lobed. *Corolla* between funnel- and bell-shaped, tube short; throat naked; lobes 5, oblong, obtuse. *Anthers* 5, subsessile at the base of the corolla, sagittate, connivent, acute. *Style* filiform, exserted. *Capsule* ovoid, 5-valved, many-seeded.—**DISTRIB.** Species 1 or 2; natives of Mid-Europe, N. Asia and the N.W. Himalaya.

C. Matthioli, Linn.; *DC. Prodr.* viii. 55; *Reichb. Ic. Fl. Germ.* t. 1081; *Bot. Mag.* t. 987.

KASHMIR and **LAHUL**, alt. 7-9000 ft., *Jacquemont, Falconer, &c.*—**DISTRIB.** Affghanistan, Alps of Europe, N. Asia.

Leaves membranous, 1-4 in. diam.; lobes shallow, crenate-toothed; petiole 4-6 in. *Scapes* much taller than the petioles. *Umbels* 6-10-fl.; pedicels slender, very unequal; invol. bracts $\frac{1}{2}$ - $\frac{1}{4}$ in., lanceolate. *Calyx* small, lobes ovate. *Corolla* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., cleft to the middle.

4. **BRYOCARPUM**, Hook. f. & Thoms.

A scapigerous glabrous herb. *Leaves* ovate or ovate-cordate, obtuse, subcrenate, with scattered orbicular scales beneath; petiole winged. *Scapes* slender, 1-fl. *Flower* nodding, yellow. *Calyx* of 7 subulate-lanceolate divisions. *Corolla* between funnel- and bell-shaped, 7-lobed to the middle, throat naked, lobes 2-fl. *Stamens* 7, filaments short; anthers oblong, acuminate. *Ovary* narrowly oblong, scaly; style slender; placenta columnar. *Capsule* elongate-cylindric, many-seeded, the top with the style falling away.

B. himalaicum, Hook. f. & Thoms. in *Kew Journ. Bot.* ix. 199, t. 5.

SIKKIM HIMALAYA; in pine woods at Lachen, alt. 8-10,000, *J. D. H.*

Rootstock stout. *Leaves* $\frac{1}{2}$ -3 in. long, coriaceous; petiole about as long. *Scapes* 1-3, much longer than the leaves, very slender. *Corolla* $\frac{3}{4}$ in. long, twice as long as the calyx. *Capsule* 2-2 $\frac{1}{2}$ in. long, erect, very membranous. *Seeds* (young) orbicular.

5. **LYSIMACHIA**, Linn.

Erect procumbent or creeping herbs. *Leaves* quite entire, opposite alternate or whorled. *Flowers* solitary racemed or spicate. *Calyx* 5-6-partite. *Corolla* rotate or funnel-shaped, 5-6-partite. *Stamens* inserted on the base of the corolla-lobes. *Ovary* subglobose; style filiform, persistent, ovules many. *Capsule* globose or subglobose, 5-valved or bursting irregularly, many-seeded. *Seeds* trigonous or plano-convex.—Species about 60; chiefly N. temperate.

A. Flowers white or pale pink. *Corolla* funnel-shaped; segments obovate-spathulate. *Filaments* quite free from one another at the base. *Leaves* alternate, rarely opposite.

* *Flowers* in elongate terminal racemes; pedicels longer than the linear or subulate bracts.

† *Stamens* longer than the corolla.

1. **L. Leschenaultii**, Duby in *DC. Prodr.* viii. 61; *Mem. Prim.* t. 4;

erect, leaves elliptic-lanceolate acute closely gland-dotted, racemes dense-fl., pedicels $\frac{1}{2}$ in., fruiting 1 in., bracts filiform, petals exceeding the calyx. *Wight Ic.* t. 1204; *Fl. des Serres*, x. t. 982. *Klatt, die Gatt. Lysim.* t. 7. *L. Clementsoniana*, *Wall. Cat.* 1485. *L. Notoniana*, *Wall. mss.*

NILGHERRY and PULNEY MTS., *Leschenault*, &c.

Glabrous. *Stem* 6-8 ft., robust, branched. *Leaves* 2-4 in., acute or acuminate, sessile or petioled, margin smooth or crisp. *Racemes* 3-9 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., leafless except at the base. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. long. *Sepals* lanceolate, acuminate, margins membranous, disk with oblong glands. *Corolla-lobes* obovate-spathulate. *Filaments* eglandular; anthers oblong, exserted. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.

2. *L. lobelioides*, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 29; *Cat.* 1484; suberect or ascending, leaves elliptic-ovate or lanceolate, margin only gland-dotted, racemes long lax-fl., pedicels $\frac{1}{2}$ in., fruiting $\frac{3}{4}$ in., bracts subulate, petals exceeding the calyx. *Duby in DC. Prodr.* viii. 61; *Bot. Reg.* 1842, t. 6; *Klatt, die Gatt. Lysimach.* t. 2. *L. secunda*, *Ham. in. Don Prodr.* 84.

WESTERN and CENTRAL HIMALAYA, alt. 4-7000 ft.; from Nipal to Kashmir.—
DISTRIB. JAVA.

Glabrous, annual, 1-2 ft. *Stem* branched from the base. *Leaves* 1-1 $\frac{1}{2}$ in., acute, narrowed into a short petiole. *Racemes* 6-8 in. in flower, to 18 in. in fruit; pedicels spreading and decurved in fruit. *Flowers* $\frac{1}{4}$ - $\frac{1}{2}$ in. long, white or pale purplish, sweet-scented. *Sepals* lanceolate, margins white, disk with very long glands. *Corolla-lobes* obovate. *Filaments* eglandular; anthers oblong, exserted. *Capsule* $\frac{1}{2}$ in. diam.—*Lindley* (in *Bot. Reg.*) describes the capsule as bursting irregularly at the base. This I have not seen. The dehiscence is irregular, but usually by valves.

3. *L. javanica*, *Bl. Bijl.* 736; erect, leaves elliptic-ovate or lanceolate more or less gland-dotted and margined, racemes long lax-fl., pedicels $\frac{1}{2}$ in., fruiting $\frac{1}{2}$ in., bracts subulate, petals hardly exceeding the sepals. *Klatt, die Gatt. Lysimach.* t. 5. *L. multiflora*, *Wall. Cat.* 1487; *Duby in DC. Prodr.* viii. 63; *Klatt l. c.* t. 4. *L. acroadenia*, *Maxim. Diagn. Pl. Jap. Dec.* iv. and v. 272. *L. consobrina*, *Hance mss.* *L. decurrens*, *Herb. Hance.*

EASTERN HIMALAYA; Sikkim and Bhotan, alt. 4-6000 ft. ASSAM and SIHET.—
DISTRIB. JAVA, China, Japan, Isle of Pines, New Caledonia.

Very similar to *L. lobelioides*, but a much more robust and erect plant, with shorter pedicels and smaller petals, and glandular filaments. The capsules burst very irregularly. The amount of glandular dots on the leaves varies exceedingly; they are sometimes confined to the margin.

†† *Stamens shorter than the corolla.*

4. *L. obovata*, *Herb. Ham.*; *Wall. Cat.* 1488; erect, slender, simple or sparingly branched, leaves obovate spathulate or oblanceolate minutely gland-dotted, racemes long lax-fl., pedicels fruiting and flowering $\frac{1}{2}$ - $\frac{3}{4}$ in., bracts subulate, corolla-lobes obovate nearly twice as long as the sepals. *L. glaucescens*, *Wall. mss.*

HINDOSTAN and MAINPUR, *Herb. Wallich.* BIRMA, *Griffith.*—DISTRIB. JAVA.

Smaller than any of the preceding species, more or less glaucous. *Stem* 6-18 in., sometimes branched from the base. *Leaves* $\frac{1}{2}$ -3 in., acute or obtuse, usually petioled. *Racemes* 2-8 in.; bracts about half as long as the pedicels. *Corolla-segments* obovate. *Filaments* short; anthers apiculate. *Capsule* $\frac{1}{2}$ in. diam., bursting irregularly.—*L. candida*, *Lindl.*, differs only in the longer stamens, if at all.

** *Flowers in elongate terminal racemes; bracts leafy, longer than the pedicels. Stamens shorter than the corolla.*

5. ***L. pyramidalis***, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall. ii. 28; Cat. 1486*; erect, much branched, leaves linear-lanceolate minutely gland-dotted and margined, racemes long lax-flid., pedicels $\frac{1}{4}$ in., fruiting $\frac{1}{2}$ in., bracts linear, corolla-segments obovate longer than the sepals. *Duby in DC. Prodr. viii. 62; Klatt, die Gatt. Lysimach. t. 16. L. heterophylla, Don Prodr. 84. Anagallis multangularis, Ham. (ex Don).*

CENTRAL AND WESTERN HIMALAYA; from Simla to Central Nipal, alt. 5-8000 ft., Hawulbagh, *Jamieson*.

Glabrous. *Stem* 10-24 in., branches erect. *Leaves* 1-2 $\frac{1}{2}$ in., rarely ovate-lanceolate. *Racemes* 6-10 in.; lower bracts 1 in. *Sepals* narrowly lanceolate, with slender membranous margins. *Corolla* $\frac{1}{4}$ in. long, white, lobes crenulate or toothed. *Filaments* short, glabrous; anthers apiculate. *Capsule* as in the previous species, bursting irregularly.

6. ***L. chenopodioides***, *Watt in Journ. Linn. Soc. ined.*; erect or decumbent, branched, leaves petioled elliptic ovate or rhomboid acute or acuminate gland-dotted and margined, flowers sessile and subsessile in the leaf axils, sepals linear about equalling the obovate-oblong corolla-segments. *L. glandulosa, Klatt, die Gattung Lysimachia, t. 17 (not of Edgeworth).*

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 6-9000 ft. (not found in Nipal or Sikkim).

Very variable in habit, 12-18 in. high, glabrous, usually much branched. *Leaves* $\frac{1}{2}$ -1 in.; petiole often as long as the blade. *Flowers* $\frac{1}{2}$ in. long, sometimes subracemose, with narrower recurved floral leaves. *Sepals* with several series of large long glands down the centre. *Filaments* very short; anthers obtuse. *Capsule* $\frac{1}{2}$ in. diam., bursting irregularly.

7. ***L. prolifera***, *Klatt, die Gatt. Lysim. 30, t. 16*; small, erect creeping or ascending, leaves petioled subacute ovate or the lowest spatulate obtuse gland-dotted but not margined, flowers in small terminal corymbs, pedicels very short, sepals linear obtuse or acute, filaments equalling or shorter than the linear-obovate corolla-segments.

TEMPERATE HIMALAYA; Garwhal at Dordotoole, alt. 10,000 ft., *Madden*; Kumaon, Madhari Pass, alt. 9000 ft., *Strach. & Winterb.*; Sikkim, alt. 8-10,000 ft., *J. D. H., &c.*

Perennial, 4-6 in. high, glabrous or puberulous towards the ends of the branches, simple or branched from the base. *Leaves* opposite and alternate, 1-1 $\frac{1}{2}$ in., including the petiole, which often equals the blade. *Flowers* in small terminal corymbs amongst the uppermost leaves; pedicels equalling the calyx, or longer. *Corolla* funnel-shaped, $\frac{1}{4}$ in., pale flesh-coloured or white. *Filaments* glabrous, very variable in length; anthers obtuse, often exerted from the expansion of the corolla. *Fruit* not seen.

B. *Flowers* yellow. *Corolla* rotate; segments broad, oblong or obovate. *Filaments* connected at the base by a membrane or ridge.

* *Leaves* alternate.

8. ***L. ramosa***, *Wall. Cat. 1490*; erect, branches winged, leaves lanceolate faintly gland-dotted, pedicels capillary usually equalling or exceeding the subtending leaves, sepals ovate acuminate, anthers subsagittate apiculate. *Duby in DC. Prodr. viii. 65; Klatt, die Gatt. Lysimach. t. 17.*

EASTERN HIMALAYA; Sikkim, alt. 5-8000 ft. KHASIA Mts., alt. 4-6000 ft. BIRMA, at the serpentine mines, *Griffith.*—DISTRIB. JAVA.

Quite glabrous, annual (?). *Stem* 2-4 ft.; branches long, slender, erecto-patent.

Leaves alternate, 2-4 in., thin, acuminate, narrowed into the short petiole. *Peduncles* all axillary, 1-5 in., spreading. *Flowers* $\frac{1}{2}$ in. diam., yellow. *Sepals* sub-glandular, $\frac{1}{2}$ - $\frac{3}{4}$ in. long. *Corolla-segments* elliptic-oblong. *Filaments* very short, connected at the base, with sometimes an obscure staminode between them. *Capsule* $\frac{1}{2}$ in. diam., bursting irregularly.—Java specimens have larger sepals, approaching var. *zeylanica*.

VAR. *zeylanica*; leaves larger 3-5 in., sepals larger $\frac{1}{2}$ - $\frac{3}{4}$ in. longer pointed, capsule larger 5-valved. *L. alata*, Gard. mss.—Ceylon, Central Province, alt. 6-8,000 ft.

9. ***L. peduncularis***, Wall. Cat. 1489; slender, erect, branches winged, leaves lanceolate faintly gland-dotted, peduncles capillary much exceeding the subtending leaves, sepals narrow-lanceolate.

BIRMA; Taongdong Mts. and Prome Hills, Wallich.

A much smaller plant than *L. ramosa* with the peduncles longer and with more slender and narrow sepals. *Flowers* not seen. *Fruit* capsular.

10. ***L. linearifolia***, Griff. mss.; stem strict terete, leaves subsessile linear-lanceolate acuminate, peduncles capillary exceeding the leaves, sepals narrow-lanceolate.

BIRMA; at the serpentine mines, Griffith.

Annual. *Stem* 12-18 in., slender or sparingly branched, puberulous above. *Leaves* rather crowded, uniform in size and shape all along the stem, $1\frac{1}{2}$ by $\frac{1}{2}$ - $\frac{1}{4}$ in., acute at both ends, opaque, dark-brown when dry, midrib strong. *Peduncles* decurved in fruit.—Of this singular plant I have seen no remains of flower except the sepals, nor of the fruit except the persistent placenta. The leaves are from their colour very different looking from those of any other species.

11. ***L. evalvis***, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. ii. 27; Cat. 1483; stem subterete flexuous erect or ascending, leaves petioled elliptic or ovate acuminate sparingly gland-dotted, peduncles few equalling or shorter than the leaves decurved, sepals ovate-cordate acuminate. *Duby* in DC. Prodr. viii. 66; Klatt, die Gatt. *Lysimach.* t. 22.

CENTRAL and EASTERN HIMALAYA; Nipal, Wallich; Sikkim, alt. 4-6000 ft. KHASIA Mts., alt. 3-5000 ft.—DISTRIB. China (?).

Quite glabrous. *Stem* 10-18 in., obscurely angled. *Leaves* rather distant, $1\frac{1}{2}$ -3 in., finely acuminate, petiole long or short. *Peduncles* very variable, sometimes only $\frac{1}{2}$ in. long, rather stout, decurved; flower $\frac{1}{2}$ - $\frac{2}{3}$ in. diam. *Sepals* $\frac{1}{2}$ - $\frac{3}{4}$ in., reflexed in fruit. *Corolla* yellow, segments longer than the sepals, oblong, obtuse. *Filaments* very short; anthers linear-oblong, obtuse. *Capsule* $\frac{1}{2}$ in. diam., very membranous, whitish, dehiscing irregularly.—This is apparently identical with the Chinese *L. Fœnum-græcum*, Hance mss., which is used by Chinese ladies as a scent for hair oil, but has no scent.

12. ***L. alternifolia***, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. ii. 26; Cat. 1481; glabrous or puberulous, branches ridged prostrate or ascending, leaves sessile or petioled elliptic-lanceolate or ovate acute, peduncles axillary capillary shorter or longer than the leaves, sepals lanceolate longer than the corolla gland-dotted. *Duby* in DC. Prodr. viii. 66; Klatt, die Gatt. *Lysimach.* t. 21. *L. tetragona*, Don Prodr. 83 (excl. syn. *L. evalvis*). *L. quinquangularis*, Ham. mss. (ex Don). *L. glandulosa*, Edgew. in Trans. Linn. Soc. xx. 83; Klatt, l. c. t. 22 (excl. fig. c.).

TEMPERATE and SUBTROPICAL HIMALAYA, from Garwhal to Bhotan, alt. 2-6000 ft. KHASIA Mts., Shillong, alt. 4000 ft.; Clarke.

Branched from the base; branches 2-8 in., leafy throughout. *Leaves* $1\frac{1}{2}$ in. *Flowers* numerous, $\frac{1}{2}$ in. diam. *Corolla* yellow, segments oblong, obtuse, sparingly gland-dotted. *Filaments* short, united by a very short basal ridge. *Ovary* glabrous. *Capsule* bursting by valves, shorter than the calyx.

* * *Leaves opposite, rarely 3-nate or alternate. Capsule bursting by valves.*

13. **L. japonica**, *Thunb. Fl. Jap.* 83; *Icones*, t. 16; prostrate, pubescent or villous, leaves ovate acute gland-dotted, peduncles solitary or 2-nate very short, sepals lanceolate villous longer than the corolla reflexed in fruit, filaments united at the base by a broad membrane, ovary hirsute. *Duby in DC. Prodr.* viii. 67; *Klatt, die Gatt. Lysim.* t. 19. *L. debilis*, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 25; *Cat.* 1482; *Duby l. c.* 66; *Klatt, l. c. t.* 20. *L. ferruginea*, *Edgew. in Trans. Linn. Soc.* xx. 84.

TEMPERATE HIMALAYA, from Kashmir to Rhotan, alt. 4-8000 ft. KHASIA MTS., alt. 3-5000 ft.—DISTRIB. China, Japan.

Branches 6-10 in. terete, weak. *Leaves* 1-1½ in., usually petioled. *Peduncles* very variable in length, spreading decurved or upcurved. *Corolla* yellow, ¼-½ in. diam.; segments oblong, gland-dotted. *Filaments* long, but shorter than the corolla, glabrous. *Capsule* much shorter than the sepals.—A specimen apparently of this plant procured in Sikkim by Griffith's collectors has the leaves alternate, very short peduncles, longer filaments with a shorter connecting membrane and hairy ovary; it a good deal resembles Klatt's figure of *L. ferruginea*, *Edgew.*, and is intermediate between *alternifolia* and *japonica*.

14. **L. deltoides**, *Wight Ill.* ii. 137, t. 144; hirsute, procumbent, branches ascending, leaves ovate or broadly oblong obtuse or acute, peduncles solitary or 2-nate about as long as the leaves, sepals lanceolate villous shorter than the corolla, filaments united at the base by a very narrow membrane, ovary glabrous. *Klatt, die Gatt. Lysim.* t. 19. *L. Metziana*, *Hohen. Pl. Exsicc. Ind. Or. No.* 1443, 1444.

NILGHERRY and PULNEY Mts., *Wight, &c.*

Much branched from the base; branches rooting below, terete. *Leaves* often 3-nate, ¾-1½ in., more or less hairy on both surfaces. *Peduncles* usually decurved in fruit. *Corolla* yellow, ⅔ in. diam., segments obovate, gland-dotted. *Capsule* bursting by valves, shorter than the corolla.

VAR. *cordifolia*; leaves cordate or truncate at the base. *L. umbrosa*, *Gardn. mss.* *L. japonica*, *Thwaites Enum.* 172.—Ceylon, alt. 6-7000 ft.

6. GLAUX, Tournef.

A succulent glabrous creeping stoloniferous herb. *Leaves* decussate. *Flowers* small, axillary, sessile, white or pink. *Calyx* 5-partite, coloured. *Corolla* 0. *Stamens* 5, hypogynous, alternate with the calyx-segments. *Ovary* subglobose; style filiform; ovules few. *Capsule* globose, 5-valved, few-seeded. *Seeds* peltate, terete, rough.

G. maritima, *Linn.; Boiss. Fl. Orient.* iv. 7.

WESTERN TIBET; alt. 12-15,000 ft., *Falconer, &c.*—DISTRIB. N. temperate and Arctic regions.

Stem 6-10 in., procumbent or with suberect branches. *Leaves* ¼-¾ in., linear- or obovate- or ovate-oblong. *Calyx* ½-¾ in. long, campanulate, lobes obtuse, margins scarious. *Anthems* subexserted. *Capsule* small, cuspidate.

7. ANAGALLIS, Tournef.

Slender annual or perennial herbs. *Leaves* opposite, quite entire. *Flowers* axillary, solitary, peduncled, ebracteate, red or blue, rarely white. *Calyx* 5-partite. *Corolla* rotate, 5-partite. *Stamens* 5, filaments villous. *Ovary* globose;

style filiform; ovules many, amphitropous. *Capsule* globose, circumsciss. *Seeds* many, peltate, plano-convex.—N. temperate regions, and temperate S. America.

A. arvensis, *Linn.*; *Boiss. Fl. Orient.* iv. 6, annual, erect or procumbent, leaves sessile ovate cordate or lanceolate acute dotted, sepals almost equalling the blue or red corolla. *Wall. in Roxb. Fl. Ind.* ii. 24; *Cat.* 1492.

BENGAL, NORTH-WESTERN INDIA, and the HIMALAYA from Nipal westwards ascending to 5000 ft. CENTRAL INDIA, the NILGHERY HILLS, and CEYLON (perhaps introduced).—DISTRIB. Europe, West Asia. and introduced into most temperate regions.

Glabrous, gland-dotted, branched from the base; branches 4-angled, ascending. *Leaves* $\frac{1}{2}$ – $1\frac{1}{2}$ in., rarely whorled. *Peduncles* 1–2 in., erect in flower, decurved in fruit. *Sepals* narrow, lanceolate, acuminate. *Corolla* $\frac{1}{3}$ – $\frac{1}{2}$ in. diam., closing in dull weather, segments often ciliate. *Capsule* size of a small pea. *Seeds* 3-gonous.—Both the blue and red-fl. vars. are found in Western India; the blue (*A. cærulea*, Lam.) being the common one eastward.

8. CENTUNCULUS, *Linn.*

Small annual herbs. *Leaves* subopposite or alternate. *Flowers* minute, solitary, axillary, ebracteate, white or pink. *Calyx* 4–5-partite. *Corolla* short, urceolate. *Stamens* 4–5, on the corolla-throat, filaments flattened; anthers exserted. *Ovary* subglobose; style filiform; ovules many. *Capsule* globose, circumsciss. *Seeds* many, peltate. Species 3 or 4; Europe, Asia, America.

C. tenellus, *Duby in DC. Prodr.* viii. 72; erect, leaves alternate subsessile ovate orbicular or obovate obtuse or acute, flowers 4–5-merous, sepals lanceolate, tube of corolla subglobose, lobes ovate-lanceolate. *Wight Ic.* t. 2000. *Lysimachia tenella*, *Wall. Cat.* 1491. *Micropyxis pumila*, *Duby l. c.* M. *tenella*, *Wight l. c.* t. 1585.

CENTRAL and WESTERN HIMALAYA; Nipal, Kumaon, Dalhousie, alt. 4000 ft. CENTRAL INDIA; Chota Nagpore and Parasnath, *Clarke*. NILGHERY and PULNEY Mts.—DISTRIB. Tropical America and Australia.

9. SAMOLUS, *Tournef.*

Annual or perennial herbs. *Leaves* radical and alternate. *Flowers* in terminal racemes or corymbs, white; pedicels bracteate. *Calyx* $\frac{1}{2}$ -superior, 5-fid. *Corolla* perigynous, subcampanulate, 5-partite. *Stamens* 5, alternating with staminodes, filaments very short. *Ovary* subglobose; style short; ovules many, anatropous. *Capsule* $\frac{1}{2}$ -inferior, ovoid, crown 5-valved. *Seeds* many, angular, hilum basilar.—Species about 8; temperate regions.

S. Valerandi, *Linn.*; *Boiss. Fl. Orient.* iv. 5; leaves obovate or spatulate obtuse or apiculate *Wall. Cat.* 1508.

WESTERN HIMALAYA; from Sirmore, alt. 3–4000 ft., westwards.—DISTRIB. Most temperate regions.

Glabrous. *Rootstock* short. *Stem* $\frac{1}{2}$ –2 ft., erect, decumbent or ascending, often rooting at the base. *Leaves* 1–4 in., quite entire, radical rosulate, cauline alternate. *Racemes* $\frac{1}{2}$ –6 in., erect; pedicels ascending with the adnate bract above their middle. *Calyx-tube* hemispheric, lobes triangular. *Corolla* $\frac{1}{2}$ in. diam.; lobes short, obtuse. *Capsule* $\frac{1}{4}$ in. diam. *Seeds* rugose.

ORDER LXXXVIII. **MYRSINÆE.** (By C. B. Clarke.)

Shrubs or small trees. *Leaves* alternate, undivided, generally gland-dotted; stipules 0. *Flowers* regular, hermaphrodite or polygamo-dioecious. *Calyx* inferior (in *Mæsa* more or less adnate to the ovary); limb 4-6- (usually 5-) lobed, persistent, often somewhat enlarged on the fruit. *Corolla-tube* short or 0; segments 3-7 (usually 5), contorted or imbricate (rarely valvate). *Stamens* 3-7, opposite the corolla-lobes, free or adnate to the tube, in *Reptonia* alternating with staminodes; anthers usually oblong, acute, dehiscence longitudinal, very rarely by terminal pores; free or united by their margins. *Ovary* globose or oblong, free (in *Mæsa* semi-inferior), 1-celled, narrowed into the style; style filiform or columnar, stigma simple rarely shortly lobed; ovules few or many, inserted on a free central placenta. *Fruit* commonly small, globose (in *Ægiceras* linear, acute), often sub-baccate and coloured, 1- (or several-) seeded, indehiscent (except in *Ægiceras*). *Seeds* mostly globose, excavate at the base, albumen pitted or ruminant; embryo transverse.—Species 500; all Tropical or Subtropical.

TRIBE I. **Mæsæe.** *Calyx* nearly enclosing the many-seeded berry.

Calyx 2-bracteolate. *Flowers* racemed 1. *MÆSA*.

TRIBE II. **Eumyrsinæe.** *Calyx* free. *Staminodes* 0. *Fruit* 1-seeded.

* *Corolla-lobes imbricate or induplicate-valvate (rarely contorted) in bud.*

Flowers in axillary fascicles. *Corolla* imbricate 2. *MYRSINÆE*.

Flowers racemed or panicled. *Corolla* imbricate or contorted 3. *EMBELIA*.

Flowers spicate-paniculate. *Corolla*-segments induplicate-valvate 4. *LABISIA*.

** *Corolla-lobes contorted in the bud (see also 3. Embelia).*

† *Anthers free.*

Corolla-segments twisted to the right; *calyx* glabrous 5. *ARDIA*.

Corolla-segments twisted to the right; *calyx* pubescent 6. *PIMELANDRA*.

Corolla-segments twisted to the left 7. *ANTISTROPHEE*.

†† *Anthers united.*

Corolla middle-sized, segments acute 8. *HYMENANDRA*.

Corolla very small, segments emarginate 9. *AMBYLANTHUS*.

Anomalous genus with long filaments, and septate anthers.

Fruit cylindric, curved, acute 10. *ÆGICERAS*.

TRIBE III. **Theophrastæe.** *Calyx* free. *Staminodes* 5. *Fruit* 1-2-seeded.

Flowers small, in axillary fascicles 11. *REPTONIA*.

1. **MÆSA**, Forsk.

Trees or shrubs. *Leaves* entire or serrate. *Racemes* axillary or terminal; pedicels bracteate at the base. *Flowers* small, 2-bracteolate, 1-2-sexual, 4-5-merous. *Calyx* half-inferior or nearly free, in fruit $\frac{1}{2}$ -adnate; teeth small, persistent. *Corolla* gamopetalous, campanulate; lobes round, much imbricate, sometimes unequal. *Stamens* 5, inserted on the corolla-tube; filaments short; anthers ellipsoid; staminodes 0. *Ovary* partially adnate to the calyx; style

short, stigma capitate or shortly 3-5-lobed; ovules numerous, placenta globose. *Berry* globose (in *M. mollis* hirsute), of the size of a peppercorn. *Seeds* numerous, subtrapezoid.—Species 35, in the tropics of the Old World.

The inflorescence is often monstrosous, the flowers being replaced by densely imbricating bracteoles.

* *Leaves glabrous, sometimes scaly or furfuraceous when young.*

† *Leaves entire or obscurely denticulate.*

1. ***M. ramentacea***, A. DC. *Prodr.* viii. 77; leaves coriaceous elliptic-lanceolate acuminate entire, base rounded or wide-rhomboid, secondary nervation obscure, racemes compound usually much longer than the petioles and often than the leaves. *Scheff. Myrsin.* 15; *Kurz in Journ. As. Soc.* 1877, pt. ii. 220, and *For. Fl.* ii. 99. *M. lanceolata*, *Don Prodr.* 148 (not of Forsk.). *M. acuminata*, *missionis* and *glabra*, A. DC. l. c. 77, 78, 82. *M. sumatrana*, *Scheff. l. c.* *Bæobotrys ramentacea*, *Roxb. Hort. Beng.* 16, and *Fl. Ind.* i. 558; *Wall. Cat.* 2322. *B. glabra*, *Roxb. l. c.* 560. *B. fragrans*, *Wall. Cat.* 2323. *B. acuminata*, *Spreng. Syst. Index*, v. 89. *B. ? missionis*. *Wall. Cat.* 6523.

EASTERN BENGAL and the EASTERN PENINSULA, alt. 0-3000 ft., common from Bhotan to Singapore.—DISTRIB. Malaya to Borneo.

An erect tree, 30 ft., with straight stem and lanceolate outline; or more commonly a gregarious bush on the low dry hills; branches rarely verrucose. *Leaves* 4-5 by $1\frac{1}{2}$ in., margin slightly thickened; primary nerves conspicuous beneath, distant, about 8 on each side; petiole $\frac{1}{2}$ in. *Racemes* usually equalling the leaf, from half as long to twice as long, glabrous.—*Bæobotrys* (v. *Mæsa*) *acuminata*, *Wall. Cat.* 2321, is *Gymnosporia acuminata*, Hook. f.

VAR. *ovata*, A. DC. in *Trans. Linn. Soc.* xvii. 133, t. 4 (sp.); leaves larger ovate or ovate-cordate. *Scheff. Myrsin.* 14. *Bæobotrys ovata*, *Wall. Cat.* 2324.—Penang; *Wallich*. South Malay Peninsula; frequent. Nicobars; *Kurz*.—Distrib. Malaya,—Leaves 6 by 3 in. in the extreme forms from the south, smaller in the Burmese examples, panicle sometimes very large in both. The figure of A. DC. does not show (as Scheffer has observed) the extreme form of *M. ovata*, but one near the type. *Wallich's* typical plant has cordate-ovate leaves, and nerves deeply impressed in the upper surface.

2. ***M. andamanica***, *Kurz For. Fl.* ii. 575, and in *Journ. As. Soc.* 1877, pt. ii. 220; leaves coriaceous elliptic acuminate rounded at the base obscurely denticulate secondary nervation obscure, racemes as long or twice as long as the leaves. *M. verrucosa*, *Kurz For. Fl.* ii. 98, not of *Scheff.*

SOUTH ANDAMAN ISLAND; in forests, *Kurz*.

An evergreen, small tree; all parts glabrous; branches verrucose. *Leaves* 3 by $1\frac{1}{4}$ in., primary nerves 6-8 on each side; petiole $\frac{1}{4}$ in. *Racemes*, in *Kurz's* example in young flower, sometimes more than twice the petiole, not shorter than in some examples of *M. ramentacea*, from which it scarcely differs but by the minute denticulation of the leaves.

3. ***M. rugosa***, *Clarke*. leaves coriaceous narrowly lanceolate caudate cuneate at the base obscurely denticulate rugose, racemes longer than the petioles scarcely one-third the length of the leaves. *M. montana*, var. *coriacea*, *Herb. Ind. Or. H. f. & T.*, not *M. coriacea*, *Champ.*

SIKKIM, alt. 5-7000 ft.; in the upper valleys of the Teesta and Rātong, frequent; *J. D. H.*, &c.

A stout shrub, probably becoming a tree; branchlets very sparingly warted. *Leaves* $7\frac{1}{2}$ by $1\frac{1}{4}$ in., scaly or furfuraceous when young, glabrous or glandular-puberulous when old; primary nerves 12-15 on each side, much raised beneath, secondary uniting them at right angles, often subprominent, ultimate reticulating very obscure; petiole $\frac{2}{3}$ in. *Racemes* 1-2 in., paniced, glandular-puberulous or glabrous.

VAR. *Griffithii*; leaves ovate-lanceolate from a rounded base.—Bhotau, alt. 5–7000 ft.; *Griffith* (Kew Distrib. n. 3554), &c. Assam; *Simons*. Leaves $7\frac{1}{2}$ by $3\frac{1}{2}$ in, in *Griffith's* example from Chuki in East Bhotan; but in the West Bhotan examples, intermediate between this and the type.

†† *Leaves, or some of them, distinctly toothed*

4. **M. Chisia**, *Don Prodr.* 148; leaves lanceolate or elliptic acuminate base cuneate, primary nerves approximate secondary distinctly reticulated, racemes axillary about half the length of the leaves. *M. dioica*, *A. DC. Prodr.* viii. 79. *M. montana*, *A. DC. l. c. for the most part*. *Bæobotrys indica*, *Wall. Cat.* 2318, A and B only.

From NIPAL to BHOTAN, alt. 2–6000 ft., common. KHASIA Mts., alt. 3–5000 ft.; common.

A tree 30 feet, or more often a shrub. *Leaves* $4\frac{1}{2}$ by $1\frac{1}{2}$ in., primary nerves about 12 on each side at right angles to the midrib; teeth 1–2 to each primary nerve, often obscure; petiole $\frac{1}{2}$ in. *Racemes* compound, $1\frac{1}{2}$ –3 in.

5. **M. indica**, *Wall. note in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 230; leaves coriaceous lanceolate or elliptic shortly acute or acuminate base rhomboid secondary nervation obscure, racemes axillary shorter than the leaves. *A. DC. Prodr.* viii. 80; *Scheff. Myrsin.* 22; *Dalz. & Gibs. Bomb. Fl.* 136; *Brand. For. Fl.* 283; *Kurz in Journ. As. Soc.* 1877, pt. ii. 220, and *For. Fl.* ii. 99; *M. montana*, *A. DC. l. c. partly*. *Bæobotrys indica*, *Roxb. Hort. Beng.* 16, and *Fl. Ind.* i. 557; *Wight l. c.* t. 1206; *Bot. Mag.* t. 2052; *Wall. Cat.* 2318, except A, B. *B. nemoralis*, *Roxb. Fl. Ind.* i. 559; *Wall. Cat.* 2319; *Mart. Pfanz. Gart. Münchens* 9, t. 6 (not of *Vahl.*).

Throughout INDIA, alt. 0–6000 ft.; from the HIMALAYA, eastward from the Ganges (*Brandis*), to CEYLON and SINGAPORE, in and near the hills, very common.—DISTRIB. Malaya, S. China, ? Madagascar, ? Africa.

An erect tree, 30 feet; or a shrub on lands gone out of cultivation. *Leaves* 5 by $1\frac{3}{4}$ in., primary nerves about 7 on each side the midrib, oblique thereto; teeth 1–3 to each primary nerve; petiole $\frac{1}{2}$ in. *Racemes* compound, $1\frac{1}{2}$ –4 in.—The leaves in *B. indica* of Roxburgh, from Chittagong, are large, broadly elliptic, coriaceous, subentire; in *B. nemoralis*, *Roxb.*, smaller, distinctly toothed; in *M. indica*, var. *angustifolia*, *H. f. & T.*, very narrowly lanceolate. *M. indica*, var. *latifolia*, *H. f. & T.* (from Khasia), has ovate, subentire leaves, and short racemes; it is *M. pyrifolia*, *Miq.* (*Fl. Ind. Bat.* ii. 1008), and hardly differs from *M. latifolia* (*A. DC. l. c.* 78) unless by its compound racemes. *M. indica*, var. *Wightiana* (South Indian and Ceylon) has more membranous leaves, the reticulated nervation somewhat prominent; this form, abundant in Malaya, is *M. virgata* (*A. DC. l. c.* 78). There are other forms described as species by Javan botanists.

VAR. *Perottetiana*, *A. DC. l. c.* 80 (sp.); leaves 5 by $2\frac{1}{2}$ in. cinereous regularly acutely serrate.—Nilgherries, alt. 7000 ft., common.

VAR. *maxima*; leaves 7 by $5\frac{1}{2}$ in. subcordate orbicular, panicles dense, primary branches again panicled.—Assam, *Simons*.—Panicles $3\frac{1}{2}$ by 3 in.

6. **M. paniculata**, *A. DC. in Trans. Linn. Soc.* xvii. 133, and *Prodr.* viii. 78; leaves membranous elliptic acute base rounded or rhomboid secondary nervation obscure, racemes axillary and terminal lax compound much longer than the leaves. *Kurz in Journ. As. Soc.* 1877, pt. ii. 220, and *For. Fl.* ii. 99. *Bæobotrys paniculata*, *Wall. Cat.* 2320.

SILHET; Pundua, alt. 250 ft., *H. F. & T. TAVOY, Wallich*. TENASSERIM, *Griffith, Helfer* (Kew Distrib. n. 3559).

A shrub, or probably sometimes a tree; branches verrucose. *Leaves* $8\frac{1}{2}$ by 4 in. (in *Wallich's* plant, not 2 in. in other examples), slightly toothed, primary nerves about 7 on each side, the ultimate reticulations obscure beneath; petiole $\frac{3}{4}$ in. *Panicle* (even a single axillary) 15 in. long in the examples of *H. f. & T.* (which have,

however, been referred to *M. indica*). Except in the very long, lax, narrow panicles this does not differ from *M. indica*.

** *Leaves hairy, when old sometimes glabrescent.*

7. ***M. dubia***, Wall. in Roxb. *Fl. Ind. ed. Carey and Wall.* ii. 235; leaves elliptic acute, racemes compound about half as long as the leaves, fruit $\frac{1}{2}$ in. broad. *A. DC. Prodr.* viii. 81. *M. canarana*, Miq. in *Pl. Hohenack.* n. 429. *M. indica*, var., *Bedd. For. Man.* 137, t. xviii. 4, fig. 1 only. *Bæobotrys dubia*, Wall. Cat. 2317, right-hand fragment only.

MALABAR MTS.; Canara, Ritchie, Hohenacker; Concan and Mysore, Stocks, Law.

A shrub, more or less hairy; branches villous, at least at the tips. *Leaves* 7 by $3\frac{1}{2}$ in., or only half as large, toothed, base rounded or cuneate, villous on both surfaces, or sparingly so beneath when young, ultimately glabrescent, primary nerves about 10 on each side. *Racemes* rusty-villous or pubescent, or sparingly pilose.—The left-hand example in the type sheet of Wall. Cat. 2317 is *M. indica*, var. *Perottetiana*, but it comes from the same locality as *M. dubia*; and, except that it is perfectly glabrous, it is hard to say how it differs.

8. ***M. argentea***, Wall. in Roxb. *Fl. Ind. ed. Carey & Wall.* ii. 233; leaves large ovate-lanceolate more or less hairy when young often white beneath, racemes short sparsely pilose or glabrescent, fruits $\frac{1}{8}$ – $\frac{1}{6}$ in. broad. *A. DC. in Ann. Sc. Nat.* 2, xvi. t. 5 B, and *Prodr.* viii. 81; *Brand. For. Fl.* 283. *Bæobotrys argentea*, Wall. Cat. 2316.

WESTERN and CENTRAL HIMALAYA; Gurwhal, alt. 4000 ft., Stewart. KUMAON, alt. 5000 ft., Strach. & Winterb., Madden. NIPAL, Wallich. EAST NEPAL, alt. 3–7000 ft., J. D. H.

A large shrub; branches hairy, at least at the tips. *Leaves* 8 by 4 in., narrowed at both ends, more or less hairy above, and at least on the midrib beneath, primary nerves about 11 on each side, reticulated nerves obscure. *Racemes* 1–1 $\frac{1}{2}$ in. in fruit, usually once branched.—This species is easily distinguished by the fruits being larger than in the other Indian species.

9. ***M. macrophylla***, Wall. in Roxb. *Fl. Ind. ed. Carey & Wall.* ii. 234; leaves large elliptic or orbicular softly hairy on both surfaces base cordate, racemes paniced often as long as the leaves shortly pubescent. *A. DC. Prodr.* viii. 81. *M. tomentosa*, Don *Prodr.* 148. *Bæobotrys macrophylla*, Wall. Cat. 2325.

From NIPAL to BHOTAN, alt. 3–5000 ft., frequent, Wallich, Griffith, J. D. H., &c.

A large shrub, 6–14 ft.; branches closely pubescent. *Leaves* 8 by $5\frac{1}{2}$ in., obtuse, regularly serrate; petiole 1 in. *Panicles* 5–10 in., axillary and sometimes terminal, compound. *Fruit* $\frac{1}{2}$ in. diam., nearly as of *M. indica*.

10. ***M. mollis***, *A. DC. in Trans. Linn. Soc.* xvii. 134, and *Prodr.* viii. 82; leaves lanceolate acuminate toothed ferruginous hairy on the nerves beneath base cuneate, racemes very small hirsute, flowers 5-merous, fruits hirsute. *Scheff. Myrsin.* 26. *M. mollissima*, *Kurz For. Fl.* ii. 100, and in *Journ. As. Soc.* 1877, pt. ii. 220 (not of *A. DC.*). *M. permollis*, *Kurz in Journ. As. Soc.* 1871, pt. ii. 66. *M. fulvinervis*, *A. DC. in Ann. Sc. Nat.* 2, xvi. 80, and *Prodr. l. c.* 82. *Bæobotrys mollis*, *Blume Bijl.* 865.

PEGU; *Kurz*, n. 3002. TENASSERIM; *Brandis*.—DISTRIB. JAVA.

A shrub, 6 ft. (*Kurz*). *Leaves* $7\frac{1}{2}$ by 2 in., primary nerves 9 on each side, oblique; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., fulvous-hairy. *Racemes* hardly as long as the petioles, little divided, densely fulvous-hirsute; bracts and bracteoles minute. *Fruits*, when nearly ripe, fulvous-hirsute. Described from *Kurz's* n. 3002 (named by him *M. mollissima*, Wall., a name not found in Wallich's Herbarium), which agrees closely with authentic Javan specimens of *M. mollis*, but the leaves are rather larger. *Kurz's* description of *M. mollissima*, Wall. (*For. Fl.* ii. 100), does not exactly suit his own example (n.

3002), but applies chiefly to the var. following. Wallich's *M. mollissima* is a very different plant.

VAR. *latifolia*?, Kurz; leaves $6\frac{1}{2}$ by $4\frac{1}{2}$ in. more hairy, racemes very compound.—Namyoon, in the Patkoye district S.E. of Assam; Griffith (Kew Distrib. n. 3555).—Leaves roundly elliptic ciliate cuspidate sprinkled with fulvous long hairs on both surfaces, base rounded or rhomboid, primary nerves 12 on each side, ending in a strong tooth. Racemes densely paniced, subsessile, hardly longer than the petioles. Possibly a distinct species, the locality being remote from Pegu; but, from Kurz's descriptions, *M. mollis* is a very variable species.

11. *M. muscosa*, Kurz in Journ. As. Soc. Beng. 1873, pt. ii. 87; 1877, pt. ii. 220, and For. Fl. ii. 100; leaves large obovate, nerves sparingly pilose beneath, racemes rusty-hirsute short densely paniced, bracts prominent.

SOUTH-EAST ASSAM; Nemphean, in the Patkoye Mts., Griffith (Kew Distrib. n. 3556).

Branches stout, glabrous. Leaves $9\frac{1}{2}$ by 5 in., subobtuse, cuspidate, narrowed to the petiole, glabrescent, nerves 11 on each side, slightly denticulate; petiole 1 in. Panicles $1\frac{1}{2}$ –2 in., exceedingly dense; bracts $\frac{1}{2}$ in., linear, persistent; pedicels very short. Flowers very numerous, resembling closely those of *M. mollis*. Fruit not seen.

EXCLUDED SPECIES.

M. (Bæobotrys) acuminata, Wall. Cat. 2321, is *Gymnospora acuminata*, Hook. f.

2. MYRSINÆ, Linn.

Trees or shrubs. Leaves entire or serrate. Flowers polygamous or often dioecious, fascicled, axillary or on exceedingly short branches; pedicels short, bracts at their base densely imbricate. Calyx small, 4–5-fid, persistent. Corolla 4–5-partite, white, segments imbricate or valvate (not contorted) in the bud, recurved. Stamens 4–5, filaments short; anthers ovate. Ovary free, globose; style cylindric; stigmas 2–5 small, or subcombined, or patent spathulate; ovules several or many. Fruit small, globose, dry or fleshy, red or purple. Seed solitary, albumen more or less pitted, scarcely ruminant; embryo often curved, horizontal.—Species 80, chiefly tropical.

* Style 2–4-fid, branches spreading flat spathulate-ovate.

1. *M. africana*, Linn.; A. DC. Prodr. viii. 93; branchlets pubescent, leaves subsessile oblong narrowed to the base serrate glabrous, flowers and fruits subsessile. Lamk. Ill. t. 122; Brand. For. Fl. 286; Boiss. Fl. Orient. iv. 31. M. glabra and M. scabra, Gaertn. Fruct. i. 282, t. 59, fig. 1. M. retusa, Ait.; Vent. Hort. Cels. t. 86; Jacq. Hort. Schænb. iv. t. 424. M. rotundifolia, Lamk. Dict. iv. 194. M. bifaria, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. ii. 296, and Cat. 2294. M. Potama, Don Prodr. 146.

HIMALAYA: from Kashmir and the Salt Range to Nipal, alt. 1–8500 ft., frequent.—DISTRIB. Afghanistan. Africa to the Cape and the Azores.

A shrub or small tree; sometimes 20 ft. Leaves (at most) $1\frac{1}{2}$ by $\frac{1}{2}$ in. Flowers in clusters of 3–8, 4- (or 5-) merous, less than $\frac{1}{12}$ in. diam. Style branches 2–4 spathulate. Berry $\frac{1}{8}$ – $\frac{1}{6}$ in. diam.

2. *M. semiserrata*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. ii. 293; Tent. Fl. Nep. t. 24, and Cat. 2295; glabrous, leaves petioled lanceolate acute sparingly denticulate or entire, pedicels shorter than the fruits. A. DC. Prodr. viii. 93; Brand. For. Fl. 285; Kurz in Journ. As. Soc. ii. 221, and For. Fl. ii. 105. M. acuminata, Royle Ill. 265; Madden in Journ. As. Soc. xvii. pt. i. 368. M. sessilis, Don Prodr. 146; A. DC. l. c. 104.

NIPAL; Wallich. KHASIA, alt. 3–5000 ft., common. BIRMA, Kurz.

A shrub or small tree. Leaves $3\frac{1}{2}$ by $\frac{3}{4}$ in., narrowed at both ends, coriaceous;

petiole $\frac{1}{5}$ in. Pedicels $\frac{1}{4}$ in., often longer, glabrous. Flowers 4- (rarely 5-) merous, $\frac{1}{10}$ in. diam. Style with 2-4 spatulate flat branches. Berry $\frac{1}{8}$ - $\frac{1}{5}$ in. diam.

VAR. *subspinosa*, Don Prodr. 147 (sp.); branches pubescent at the tips, leaves serrate sometimes subspinescent, pedicels glandular-pubescent often when young ferruginous shorter than the fruits.—Gurwhal to Bhotan, alt. 3-9000 ft.; very common, Khasia, H. f. & T.—Branches often angular. Leaves much less coriaceous than in the shining eastern *M. semiserrata*; petiole often pubescent.—This is the common Himalayan *M. semiserrata* of Wallich, though not the plant figured by him (in Tent. Fl. Nep. t. 24). Kurz (who, in his own herbarium, named it *M. bifaria*, Wall. ?) nevertheless proposes to call this *M. semiserrata*, and to make a new species (*M. khasiana*, Kurz) of the type which is probably distinct. Kurz "is not sure" about Wallich's figure; it would appear probable that Wallich collected *M. subspinosa* in Nipal and *M. semiserrata* in Khasia, and, regarding them as one species, his figure represents either or both.

** Style-branches oblong, not spreading.

3. *M. capitellata*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. ii. 295; Tent. Fl. Nep. t. 25, and Cat. 2296; leaves elliptic-lanceolate narrowed at both ends entire primary veins distinct, flowers subsessile, fruits smooth. Bot. Mag. t. 3222; A. DC. Prodr. viii. 95; Brand. For. Fl. 286; Kurz in Journ. As. Soc. 1877, pt. ii. 221. *M. excelsa*, Don Prodr. 147; A. DC. l. c. 94. *M. lucida*, Wall. Cat. 2298; A. DC. l. c.

NIPAL, Wallich; alt. 4000 ft., J. D. H. BHOTAN, Griffith. ASSAM, Hamilton. KHASIA MTS., H. f. & T.—DISTRIB. Ava.

A shrub, or a tree 30 ft. Leaves 7 by $2\frac{1}{2}$ in., subacute; petiole $\frac{1}{2}$ in. Flowers $\frac{1}{8}$ in. across, 5-merous. Style cylindric, hardly wider upwards.—Bentham (in Fl. Hongk. 205-6) includes (under *M. capitellata*, Wall.) *M. philippensis*, A. DC., and *M. nerifolia*, Sieb. & Zucc.; thus extending the area of the species throughout Eastern Asia to the Philippines and Japan.

VAR. *lanceolata*, Wall. Cat. 2297 (sp.); leaves smaller more coriaceous subobtus. *M. Wightiana*, Wall. Cat. 2300; A. DC. l. c. 94; Wight Ic. t. 1211; Bedd. Fl. Sylv. t. 234.—Khasia Mts., common. Mts. of South India and Ceylon, common.—There are a number of Malay forms hardly distinguishable, and some of Griffith's examples, collected at Malacca, have the leaves distinctly veined, and cannot be distinguished from var. *lanceolata*.

VAR. *lepidocarpum*, Wight in Herb. (sp.); fruits rough with scales.—Indian Peninsula, Wight, n. 1781.—Otherwise as var. *lanceolata*.

VAR. *avenis*, A. DC. in Trans. Linn. Soc. xvii. 107, and in DC. Prodr. viii. 96 (sp.); leaves very coriaceous primary nerves obscure, pedicels rather longer sometimes $\frac{1}{3}$ - $\frac{1}{2}$ in. Scheff. Myrsin. 47; Kurz in Journ. As. Soc. 1877, pt. ii. 221, and For. Fl. ii. 105. *M. Porteriana*, Wall. Cat. 6525; A. DC. l. c. 95. *M. umbellulata*, A. DC., l. c.

Ardisia avenis, Blume Bijdr. 691. *Embelia umbellulata*, Wall. Cat. 2312.—Birma to Malacca, frequent.—DISTRIB. Sumatra, Java, Banca.—Kurz endeavours to distinguish this specifically by the "stigmas sessile, pedicels thick."

EXCLUDED SPECIES.

M. theaeifolia, Wall. Cat. 6391, is *Ilex theaeifolia*, Hook. f.

3. EMBELIA, Burm.

Shrubs mostly climbing, or small trees. Leaves entire or toothed; petiole often margined or glandular. Racemes axillary or terminal, simple or compound, or flowers subsessile; bracts small (except in *E. amentacea*); bracteoles 0. Flowers small, polygamous, mostly dioecious, white or greenish yellow. Calyx free, 5-4-lobed, persistent. Petals 5-4, free or slightly coherent at the base, elliptic, imbricate in bud (in subgenus *Rhynchostylis* contorted). Stamens 5-4; filaments more or less adnate to the petal; anthers ovate-oblong. Ovary ovoid or globose

(in subgenus *Rhynchosstylis* conical-beaked); style cylindric, stigma capitellate; ovules few. *Fruit* small, globose, 1- (rarely 2-) seeded. *Seed* globose, base hollowed, albumen pitted subruminate; embryo curved, transverse.—Species 60; in the tropics of the old world.

In the "Genera Plantarum" (ii. 664) and some other works, the name *Samara*, proposed by Linné in the "Mantissa," is adopted from being assumed to be prior to Burmann's *Embelia*, published in 1768. This was due to the erroneous supposition that *Samara* was proposed in the first part of the "Mantissa," which appeared in 1767; whereas it was proposed in the second, which appeared in 1771. (At p. 1240 of "Genera Plantarum" the error is corrected.

SUBGENUS I. Euembelia. *Petals* imbricate in bud. *Ovary* globose or ovoid, not tapering upwards into a beak.

SECT. I. CALISPERMUM, Lour. *Flowers* in general 5-merous.

* *Inflorescence both terminal and axillary.* (Leaves entire in the Indian species).

1. ***E. Ribes***, *Burm. Fl. Ind.* 62 t. 23; leaves elliptic narrowed at both ends entire glabrous, panicles grey-pubescent, pedicels longer than the flowers and fruits. *Retz. Obs.* iv. 24; *Lamk. Ill.* t. 133; *Roxb. Fl. Ind.* i. 586; *Wall. Cat.* 2304; *A. DC. Prodr.* viii. 85; *Scheff. Myrsin.* 38; *Dalz. & Gibs. Bomb. Fl.* 137; *Brand. For. Fl.* 284; *Kurz For. Fl.* ii. 101. *E. garciniaefolia*, *Wall.*; *Miq. Pl. Jungh.* 187; *Scheff. l. c.* 40. *E. glandulifera*, *Wight Ic.* t. 1207; *Dalz. & Gibs. Bomb. Fl.* 137. *Calispermum scandens*, *Lour. Fl. Cochinc.* 156. *Samara Ribes* and *S. floribunda*, in part, *Kurz in Journ. As. Soc.* 1877, pt. ii. 222.

Throughout INDIA from the Central HIMALAYA to CEYLON and SINGAPORE, alt. 0-5000 ft.; common in the lower hills.—**DISTRIB.** Malaya and South China.

A scandent shrub. *Leaves* 3 by $1\frac{1}{2}$ in., obtusely acuminate, base cuneate or rhomboid, nerves slender; petiole $\frac{1}{2}$ in. *Panicle-branches* often 3-4 in.; pedicels $\frac{1}{2}$ in. *Flowers* scarcely $\frac{1}{2}$ in. long, white. *Ovary* ovoid, not conic upwards.

2. ***E. sessiliflora***, *Kurz in Journ. As. Soc.* 1871, pt. ii. 66, and *For. Fl.* ii. 102; leaves ovate entire glabrous base rounded, panicles grey-pubescent, flowers sessile. *Samara sessiliflora*, *Kurz in Journ. As. Soc.* 1877, pt. ii. 222.

BIRMA, "probably Martaban or the Karen Hills," *Kurz*.—**DISTRIB.** Pongeshee, Upper Birma.

Only differs from *E. Ribes* in the points stated, and is perhaps a variety of it (*vide* *Kurz*).

3. ***E. microcalyx***, *Kurz in Trimen Journ. Bot.* 1875, 328; leaves elliptic obtuse at both ends entire rusty-villous beneath, panicles villous, pedicels about as long as the flowers. *Samara microcalyx*, *Kurz. in Journ. As. Soc.* 1877, pt. ii. 221.

NICOBAR ISLANDS; *Kurz*.

A scandent shrub; branches brown-villous. *Leaves* 3 by $1\frac{1}{2}$ in., nearly glabrous above, nerves slender; petiole $\frac{1}{4}$ in. *Panicle-branches* 1 in., dense-flowered. *Flowers* nearly as in *E. Ribes*, but more pubescent.—Differs from *E. canescens*, Jack., by the very obtuse leaves, and elongate compound panicle.

4. ***E. coriacea***, *A. DC. in Trans. Linn. Soc.* xvii. 135, and *Prodr.* viii. 87; leaves oblong-lanceolate entire glabrous base obtuse, panicles very compound grey-pubescent, pedicels scarcely so long as the flowers. *Wall. Cat.* 2314. *E. oblongata*, *Miq. Fl. Ind. Bat. Suppl.* 573. *E. macrophylla*, *Scheff. Myrsin.* 36.

PENANG; *Wallich*. **MALACCA**; *Maingay*.—**DISTRIB.** Java, Sumatra.

A scandent shrub. *Leaves* 8 by $1\frac{1}{2}$ in. (in *Wallich's* example, larger in *Maingay's*),

acute, very coriaceous, nerves slender; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., very stout. *Panicles* often a foot long and broad; bracts at the divisions $\frac{1}{2}$ in., elliptic, sometimes subpersistent. *Flowers* very nearly as in *E. Ribes*.—This has been taken for *E. garciniaefolia*, Wall., which is a somewhat shining Malayan form of *E. Ribes*.

5. *E. adnata*, *Bedd. ms.*; leaves broadly oblong entire glabrous base obtuse, panicle compound branches and pedicels very stout pubescent, pedicels scarcely so long as the flowers. *Embelia*, sp. 4, *Bedd. For. Man.* 138.

DECCAN PENINSULA; Bolamputti Hills, alt. 5000 ft., *Beddome*.

A large, scandent, epiphytic shrub (*Beddome*); branches stout, rugose, angular, warted, pubescent towards the tips. *Leaves* 5–6 by 2– $2\frac{1}{4}$ in., obtuse, acute or slightly acuminate, coriaceous, red when young, nerves slender or obscure; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in. *Panicle* 8 in. diam., reddish-brown; branches rugose, thinly pubescent. *Flowers* nearly as of *E. Ribes*, the calyx-teeth rather more acute. *Ovary* globose, not conic upwards.—Neither *E. coriacea*, Wall., nor any of the allied Malayan species, has such stout panicle-branches and pedicels.

6. *E. canescens*, *Jack.*; *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 292, and *Cat.* 2311; leaves ovate or obovate-oblong narrowed at the apex rounded on the petiole entire, midrib beneath rusty-villous, panicle thin rusty-villous, pedicels as long as the flowers and fruits. *A. DC. Prodr.* viii. 84; *Scheff. Myrsin.* 42.

PENANG; *Jack.* MALACCA; *Maingay*.

A scandent shrub; branches cinnamomeous-tomentose. *Leaves* 3 by $1\frac{1}{4}$ in., shortly obtusely acuminate, pubescent on both surfaces when young, nearly glabrous except the midrib beneath when old, membranous, nerves prominent; petiole $\frac{1}{4}$ in., glandular. *Panicles* 2–4 in.; pedicels longer than the flowers in Wallich's examples; but *Scheffer* (*Myrsin.* 31) diagnoses the species as having pedicels shorter than the flowers and fruits. *Flowers* as in *E. Ribes*, but fulvous-villous; petals hairy on both surfaces. *Fruit* $\frac{1}{2}$ in. long, rather larger than in *E. Ribes*.

7. *E. Limpani*, *Scheff. Myrsin.* 37; leaves oblong subobtuse rusty-villous beneath, panicle rusty-villous, pedicels shorter than the flowers, bracts linear minute. *E. villosa*, *Wall. Cat.* 2313 chiefly, not of *A. DC.*

MALACCA; *Maingay*.—DISTRIB. Sumatra.

A scandent shrub; branches villous. *Leaves* $2\frac{1}{4}$ by $\frac{3}{4}$ in., exactly oblong with parallel sides, or slightly wider upwards and obscurely obovate, coriaceous, base rounded; petiole $\frac{1}{2}$ in. *Panicles* compound, 2–5 in. diam., branches 1–4 in.; pedicels $0\frac{1}{6}$ in. *Calyx* rusty-pubescent. *Corolla* $\frac{1}{10}$ in. long, puberulous hardly pubescent within and without.—This is probably what Wallich originally meant to be his *E. villosa*, but he described under that name the very different plant mixed with it, which is only a pubescent form probably of *E. robusta*, *Roxb.*

8. *E. amentacea*, *Clarke*; leaves oblong subobtuse rusty-villous beneath, panicle rusty-villous, pedicels shorter than the flowers, bracts $\frac{1}{4}$ in. ovate-oblong.

* MALACCA; *Griffith* (*Kew Distrib.* n. 3548).

Griffith's examples (marked by him *Samara*?) are young males; the branches of the panicle resembling catkins from the close imbrication of the bracts on all sides. Except as to these bracts, the plant is so exactly like *E. Limpani* that it may prove to be an abnormal form of that species. The flowers, however (males), appear perfectly developed and normal.

** *Inflorescence axillary.*

9. *E. floribunda*, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 291, and *Cat.* 2305; leaves long-lanceolate acuminate entire glabrous base obtuse or rounded, racemes panicle glabrous. *A. DC. Prodr.* viii. 85; *Kurz For. Fl.* ii. 102, in

part. *E. esculenta*, Don *Prodr.* 147. *Samara floribunda*, Kurz in *Journ. As. Soc.* 1877, pt. ii. 222 (*syn. excl.*).

From NIPAL to BHOTAN and TENASSERIM, alt. 2-6000 ft.; frequent.—DISTRIB. Java.

A large, scandent shrub. *Leaves* $8\frac{1}{2}$ by $1-1\frac{1}{4}$ in., or (above the racemes) sometimes $1\frac{1}{2}$ by $\frac{1}{4}$ in., much acuminate often caudate, shining, nerves numerous; petiole $\frac{1}{4}-\frac{1}{2}$ in. *Racemes* all axillary, usually much divided, often 8 in. *Flowers*, pedicels and fruits much as in *E. Ribes*, but glabrous or very obscurely puberulous.—This has been confounded by Kurz and others, with *E. Ribes*; it has more acuminate leaves much more rounded at the base, and glabrous panicles never terminal.

10. ***E. robusta***, Roxb. *Hort. Beng.* 16, and *Fl. Ind.* i. 587; leaves obovate-oblong elliptic or obovate suddenly shortly acuminate undulate or obscurely serrulate rusty-pubescent or rarely glabrous beneath reticulated, racemes scarcely divided often fasciated more or less rusty-pubescent. *Wall. Cat.* 2308; *A. DC. Prodr.* viii. 86; *Bedd. For. Man.* 137, and *Anal. Pl.* xix. fig. 2; *Brand. For. Fl.* 284; *Kurz For. Fl.* ii. 102. *E.* ? reticulata, *Wall. Cat.* 6521. *E. villosa*, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 289, and *Cat.* 2313 in *part.*; *A. DC. l. c.* 85. *E.* ? Tsjeriam-Cottam, *A. DC. in Trans. Linn. Soc.* xvii. 131, and *Prodr. l. c.* 87; *Wight Ic. t.* 1209. *E.* ? Basaal, *A. DC. in Trans. Linn. Soc. l. c.* 1, and *Prodr. l. c.* 87; *Dalz. & Gibs. Bomb. Fl.* 136. *E. picta*, *A. DC. Prodr.* viii. 86. *Samara* ? picta, *Wall. Cat.* 2302. *S. robusta*, Kurz in *Journ. As. Soc.* 1877, and pt. ii. 222. *Ardisia* ? Basaal and Tsjeriam-Cottam, *Roem. & Sch. Syst.* iv. 517, 518.—*Rheede Hort. Mal.* tt. 11, 12.

Throughout INDIA, alt. 0-5000 ft.; from the HIMALAYA (westward to the Jumna, *Brandis*) to CEYLON and TENASSERIM, very common.

A large, rambling shrub, or small tree; branches glabrous. *Leaves* $3\frac{1}{2}$ by 2 in., sometimes 7 by $3\frac{1}{4}$ in., base cuneate, margin usually undulate subentire (in a form of East Bengal and Birma regularly somewhat closely toothed), more or less pubescent beneath, or when mature quite glabrous (the type of Roxburgh's plant, much the less common form; see Wallich's note in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 288); petiole $\frac{1}{2}-\frac{1}{4}$ in. *Racemes* 1-2 in.; bracts $\frac{1}{10}$ in., linear; pedicels shorter than the flowers and fruits. *Corolla* $\frac{1}{2}$ in. diam., puberulous within and without. *Berry* $\frac{1}{8}-\frac{1}{6}$ in. diam., red, nearly dry.

VAR. *ferruginea*, *Wall. Cat.* 2310 (sp.); branches rusty-tomentose, leaves beneath and racemes rusty-villous or subtomentose. *A. DC. Prodr.* viii. 86.—Pegu and Tenasserim; *Wallich, &c.*—Very different in appearance from Roxburgh's original smooth *E. robusta*, but (as Kurz states) it appears impossible to separate *E. villosa* on the one side from *E. robusta*, on the other from *E. ferruginea*.

11. ***E. parviflora***, *Wall. Cat.* 2307; leaves small elliptic or ovate entire rusty-pubescent beneath base rounded, racemes shortened almost to umbels rusty-pubescent. *A. DC. Prodr.* viii. 86; *Scheff. Myrsin.* 44; *Kurz For. Fl.* ii. 104.—*Samara parviflora*, Kurz in *Journ. As. Soc.* 1877, pt. ii. 223.—*Celastrinea*, *Griff. Itin. Notes*, 85, n. 1226.

KHASIA Mts., alt. 0-4000 ft.; *Wallich, Griffith, &c.*—DISTRIB. Upper Birma, Sumatra.

A scandent shrub; branches rusty-pubescent. *Leaves* $\frac{1}{2}-1$ by $\frac{1}{4}-\frac{1}{2}$ in., acute or obtuse; petiole scarcely $\frac{1}{12}$ in. *Pedicels* $\frac{1}{2}$ in., rusty-pubescent, subumbellated on a peduncle $\frac{1}{8}$ in. *Petals* $\frac{1}{12}$ in., oblong, imbricate. *Filaments* slender, three times as long as the anthers. *Berry* $\frac{1}{2}$ in. diam.—Kurz is mistaken in saying that Griffith collected this plant (Kew Distrib. n. 3545) at Ava; Griffith has ticketed it "Lakhat," which is in Khasia nearly due north from Sylhet Station.

SECT. II. SAMARA, *Linn.* *Flowers* in general 4-merous. *Racemes* axillary. *Leaves* entire, or very nearly so. (*Choripetalum*, *A. DC.*).

12. **E. Myrtillus**, *Kurz in Journ. As. Soc.* 1871, pt. ii. 67, and *For. Fl.* ii. 104; leaves small broadly-elliptic glabrous obtuse base entire, racemes shortened almost to umbels rusty-pubescent. *Myrsine Myrtillus*, *Hook. Ic. Pl.* t. 825. *Samara Myrtillus*, *Kurz in Journ. As. Soc.* 1877, pt. ii. 223.

BIRMA; Taondong summit, *Griffith*. MALACCA; Mt. Ophir, *Griffith, Lobb.*—DISTRIB. Philippines.

Exceedingly like *E. parviflora*, except that the leaves are glabrous and prominently dotted beneath, the flowers 4-merous. *Kurz* guesses it to be a prostrate shrub, but the habit is that of *E. parviflora*, and it is perhaps scandent. The branches are rusty-pubescent, and the inflorescence exactly as that of *E. parviflora*, with which it must be congeneric.

13. **E. Gamblei**, *Kurz ms.*; leaves obovate-oblong or elliptic acute or subobtuse entire glabrous reticulated on both surfaces, fruits $\frac{1}{2}$ in. diam. globose. *Samara* (Choripetalum) frondosa, *King*; *Gamble Darjeeling list* 52.

SIKKIM; alt. 6-9000 ft., frequent; *Griffith* (*Kew Distrib. n.* 3544), *J. D. H.*, &c.

A large climber; branches glabrous, or tips rusty-tomentose. *Leaves* $5\frac{1}{2}$ by $2\frac{1}{2}$ in., base rounded or cuneate, midrib beneath glabrous or rarely tomentose; petiole $\frac{2}{3}$ in. *Racemes* 1- $1\frac{1}{2}$ in., simple, numerous, usually from the portion of the branches bare of leaves, minutely pubescent or nearly glabrous; pedicels $\frac{1}{8}$ in. *Petals* $\frac{1}{2}$ in., elliptic, obscurely pubescent, imbricate in bud. *Stamens* 4; anthers oblong; not overtopping the petals.—Leaves eaten by the hill-men (*J. D. H.*, *J. S. Gamble*).

14. **E. Nagushia**, *Don. Prodr.* 147; leaves lanceolate or obovate-lanceolate entire glabrous membranous base narrowed, fruits $\frac{1}{4}$ - $\frac{1}{2}$ in. broad depressed-globose. *Myrsine* ? undulata, *Wall. Cat.* 2301. *Choripetalum undulatum*, *A. DC. Prodr.* viii. 88.

NIPAL; *Wallich*. SIKKIM, alt. 5-10,000 ft.; *J. D. H.*, *Gamble*, &c. KHASIA Mts., *Masters*.

A large climber (*Gamble*), or a tree 60 ft. high (*J. D. H.*), or a large erect shrub (*Clarke*); branches glabrous. *Leaves* 3-6 by 1-2 in., suddenly shortly acuminate or subobtuse; petiole $\frac{1}{3}$ - $\frac{2}{3}$ in. *Racemes* 1 in., simple, usually from the portion of the branches bare of leaves, and appearing with the very young leaves, minutely pubescent or nearly glabrous; pedicels 0- $\frac{1}{2}$ in. *Petals* $\frac{1}{10}$ in., elliptic. *Filaments* 4, not so long as the petals.—Flowers often hermaphrodite. *Drupe* edible (*Don*). Acid leaves eaten by the hill-men (*J. D. H.*).

VAR. *subcoriacea*; leaves subcoriaceous, racemes 2-3 in.—Khasia Mts., *Griffith* (*Kew Distrib. n.* 3545); Cherra and Surureem, alt. 5-6000 ft., *H. f. & T.*—A lofty climber. *Leaves* 5 by 2 in., obovate-lanceolate, suddenly acuminate or subobtuse, base cuneate or sometimes broadly rhomboid almost rounded. *Fruits* $\frac{1}{2}$ in. broad, depressed-globose, resembling those of *E. Nagushia*. This may be a distinct species.

15. **E. viridiflora**, *Scheff. Myrsin.* 45; leaves coriaceous obovate or oblong entire glabrous base narrowed, fruits $\frac{1}{4}$ in. subglobose rather longer than broad. *Choripetalum viridiflorum*, *A. DC. Prodr.* viii. 88. *C. aurantiacum*, *A. DC. l.c.*; *Wight Ic.* t. 1210. *Samara Rheedii*, *Wight Ic.* t. 1591. *S. viridiflora*, *Thwaites Enum. Pl. Zeyl.* 173.—*Rheede Hort. Mal.* vii. t. 42.

DECCAN PENINSULA AND CEYLON, alt. 2-5000 ft., frequent.—DISTRIB. Malaya.

A large, scandent shrub. *Leaves* 4-6 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in. (or smaller oblong), narrowed cuneate at both ends or subobtuse; petiole $\frac{1}{2}$ in. *Racemes* $\frac{1}{2}$ -1 in., minutely pubescent or nearly glabrous. *Petals* $\frac{3}{10}$ in., elliptic.—Hardly distinguishable without the fruit from the coriaceous form of *E. Nagushia*.

SUBGENUS II. **Rhynchostylis**. *Petals* twisted in the bud: *Ovary* tapering upwards into a beak. (*Racemes* axillary).

16. **E. vestita**, Roxb. *Fl. Ind. ed. Carey & Wall.* ii. 288; leaves oblong or ovate narrowed at both ends serrate glabrous, racemes short simple rusty pubescent, petals twisted in the bud. *Wall. Cat.* 2306; *Deless. Ic. Sel.* v. t. 30; *A. DC. Prodr.* viii. 86; *Kurz For. Fl.* ii. 103 partly. Samara vestita, *Kurz in Journ. As. Soc.* 1877, pt. ii. 223 partly.—Choripetali sp., *Griff. Itin. Notes* 168, n. 162.

NIPAL; *Wallich*. BHOTAN; *Griffith* (Kew Distrib. n. 3547, 3549). ASSAM; Nowgong, *Simons*. KHASIA MTS.; *Griffith*; alt. 4-5000 ft., frequent, *H. f. & T., Clarke*.

A scandent shrub; branches glabrous. Leaves 3 by $1\frac{1}{4}$ in., shining base, cuneate or rhomboid, denticulations shallow but sharp, mostly in the upper part of the leaf, nerves conspicuous; petiole $\frac{1}{2}$ – $\frac{1}{4}$ in., glabrous. Racemes $\frac{1}{2}$ –1 in. Petals $\frac{1}{10}$ in., oblong, dotted. Ovary $\frac{1}{12}$ in., ovoid-conic, beaked. Berry globose, $\frac{1}{2}$ in. diam.

17. **E. nutans**, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 291, and *Cat.* 2303; leaves oblong subobtusely acuminate pubescent or rusty puberulous on the midrib beneath entire or obscurely bluntly crenulate, base rounded, racemes short simple rusty-pubescent, petals twisted in bud. *A. DC. Prodr.* viii. 87. *E. vestita*, *Kurz For. Fl.* ii. 103 partly. Samara vestita, *Kurz in Journ. As. Soc.* 1877, pt. ii. 223 partly.

SILHET; *Wallich, H. f. & T.* KHASIA MTS., alt. 0-5000 ft.; *H. f. & T.* ASSAM; *Griffith, Masters*. PEGU; *Kurz*.

Branches rusty-pubescent, at least towards the tips. Petioles rusty-pilose, or pubescent, or ultimately glabrescent. Racemes flowers and fruits as in *E. vestita*, with which it is united by *Kurz*; but there is no difficulty in distinguishing it.

18. **E. Gardneriana**, *Wight Ic.* t. 1208; leaves ovate-lanceolate crenate-serrate beautifully reticulated, racemes shortened almost to fascicles rusty-hairy.

NILGHERY MTS.; *Sisparah, Gardner, &c.*

A large climber; branchlets rusty-hairy. Leaves $2\frac{1}{2}$ by $\frac{3}{4}$ – $1\frac{1}{4}$ in., from ovate to lanceolate, base rounded, rusty-pilose on the midrib beneath or altogether glabrous, shining, coriaceous, nerves much raised on the upper surface; petiole $\frac{1}{4}$ in. Pedicels $\frac{1}{8}$ – $\frac{1}{4}$ in., subumbellulate from imbricated small bracts. Petals $\frac{1}{10}$ in., oblong, dotted. Ovary $\frac{1}{10}$ in., ovoid-conic, long beaked. Berry $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., globose.—No buds seen, but from the conically beaked ovary it may be inferred that the petals were twisted in bud, and that the species is a near ally of *E. vestita*.

IMPERFECTLY KNOWN SPECIES.

E. ? LUCIDA, *Wall. Cat.* 2315; leaves 3 by $1\frac{1}{4}$ in, broadly oblong suddenly narrowed at both ends entire glabrous coriaceous, racemes 1 in. axillary simple solitary or paired rusty-villous. *A. DC. Prodr.* viii. 87.—SINGAPORE, *Wallich*.—Certainly of this genus.

EMBELIA, sp., *Griff. Notul.* iv. 223; leaves ovate-lanceolate glabrous in age sub-spinosely toothed, panicles axillary and terminal, corolla rotate 5-partite. MOULMEIN; plentiful, *Griffith*.—*Kurz in Journ. As. Soc.* 1877, pt. ii. 223, proposes doubtfully to reduce this to *E. Ribes*; but the subspinosely toothed leaves will not allow this.

CHORIPETALUM, *Griff. Io. Pl. Asiat.* t. 499; branches pubescent, leaves lanceolate acute at both ends entire pubescent, panicles axillary longer than the leaves.—PATKOYE MTS., south-east of Assam; *Griffith*.—Assuming that the branches and leaves are glabrous, this might be *E. floribunda*.

CHORIPETALUM sp., *Griff. Ic. Pl. Asiat.* t. 500; leaves lanceolate acuminate serrate, base cuneate or rhomboid, panicles axillary shorter than the leaves, flowers 4-merous, several 5-merous.—MISHMEE; *Griffith*.

4. **LABISIA**, *Lindl.*

Small shrubs, with a creeping rhizome and short simple stem. *Leaves* lanceolate, acuminate, primary nerves nearly at right angles to the midrib; petiole dilated at the base. *Flowers* small, white, in axillary panicked spikes; bracts very small. *Calyx* 5-toothed. *Corolla* 5-partite; segments ovate, induplicate-valvate in bud. *Stamens* 5, filaments short; anthers oblong-linear. *Ovary* superior, globose; style cylindric, stigma small; ovules few. *Fruit* small, globose, 1-seeded. *Seed* globose, base hollowed, albumen smooth; embryo transverse.—Species 2, Malayan.

1. ***L. pothoina***, *Lindl. in Bot. Reg.* 31, t. 48; leaves glabrous or puberulous beneath entire or nearly so, flowers very shortly pedicelled clustered on the rachis of the linear rusty-pubescent panicle. *Ardisia pumila*, *Blume Bijdr.* 688; *A. DC. in Trans. Linn. Soc.* xvii. 135, and *Prodr.* viii. 137; *Scheff. Myrsin.* 92. *A. ? spicata*, *Wall. Cat.* 2273.

MALACCA and SINGAPORE; *Wallich, &c.*—DISTRIB. Sumatra to Borneo.

Stem 6 in. *Leaves* 8 by $2\frac{1}{2}$ in., primary nerves horizontal, very numerous, close; petiole 1–3 in., more or less winged its whole length. *Peduncles* 1–2 in., from 1–3 penultimate axils; spikes 1–4 in. *Petals* $\frac{1}{10}$ in., dotted. *Berry* $\frac{1}{8}$ – $\frac{1}{6}$ in. diam.

VAR. pothoina proper; petiole winged throughout its length.

VAR. lanceolata, *Scheff. Myrsin.* 93; petiole 2–4 in. not winged, base of leaf narrowed or rounded, pedicels $\frac{1}{8}$ – $\frac{1}{6}$ in.—Singapore, *Lobb.* DISTRIB. Sumatra, Borneo.

5. **ARDISIA**, *Swartz.*

Shrubs or small trees. *Leaves* petioled. *Flowers* hermaphrodite, in axillary or terminal, simple or compound umbels or racemes; bracts small, deciduous (except in *A. involucrata*). *Calyx* 5- (rarely 4-) lobed, (sometimes 3-lobed in *A. porosa*), persistent, often somewhat enlarged in fruit. *Corolla* red, white, or spotted, 5-partite; segments acute (in *A. membranacea* emarginate), twisted to the right in bud. *Stamens* 5; filaments very short (except in *A. membranacea*); anthers free, ovate-lanceolate, acute (in *A. membranacea* small, round), (in *A. porosa* opening by terminal pores). *Ovary* globose, narrowed upwards (in *A. membranacea* obovate-oblong); style cylindric, often much longer than the corolla-lobes, stigma punctiform; ovules few. *Fruit* globose or subglobose. *Seed* solitary, globose, albumen pitted or ruminated; embryo horizontal.—Species 200, all tropical.

The Indian species are very uniform in floral structure, except *A. involucrata membranacea* and *porosa*, which differ possibly generically from all the rest—as much perhaps as do *Pimelandra* and *Amblyanthus*.

* *Panicle* terminal, 1–2-divided, branches ending in corymbs often contracted almost to umbels, bracts not leaf-like.

† *Panicle* stout, compound.

1. ***A. crassa***, *Clarke*; leaves narrow-oblong acute at both ends, panicle rusty-pubescent, branches and pedicels exceedingly thick, corolla broad short.

MALACCA; *Maingay.*—DISTRIB. Borneo.

Branches round, stout, ending in a much-flattened panicle. *Leaves* $8\frac{1}{2}$ by 2 in., parallel-sided, subentire, coriaceous, glabrous, primary nerves nearly at right angles to the midrib; petiole $\frac{1}{2}$ in. *Panicle* 5 in. (including the peduncle); branches remote, flattened, again divided; pedicels $\frac{1}{8}$ – $\frac{1}{6}$ in., umbelled, thickened upwards; bracteoles

$\frac{1}{8}$ in., elliptic, persistent. *Buds* $\frac{1}{2}$ in. long, and as much broad. *Sepals* $\frac{1}{2}$ in., elliptic; in fruit $\frac{1}{2}$ in., orbicular. *Anthers* ovate, acute. *Berry* $\frac{1}{4}$ in. wide, depressed-globose, not striated.—This is perhaps *A. eximia*, Miq. (Pl. Jungh. i. 196) which has subsessile flowers and very large leaves; or the allied *A. jambosoides*, Miq. (not seen).

2. ***A. lanceolata***, Roxb. *Fl. Ind. ed. Carey & Wall.* ii. 275; leaves narrowly obovate-lanceolate, panicle glabrescent once divided into laxly corymbose branches, corolla large. *Wall. Cat.* 2292; *A. DC. Prodr.* viii. 126. *A. speciosa*, *Blume Bijl.* 684; *A. DC. l. c.* 133; *Miq. Pl. Jungh.* i. 197, and *Fl. Ind. Bat.* ii. 1022; *Scheff. Myrsin.* 88. *A. purpurea*, Reinw.; *Blume Bijl.* 684; *A. DC. l. c.* 129; *Miq. in Pl. Jungh.* i. 197; *Scheff. l. c.* 88. *A. mucronata*, *Blume l. c.* 685; *A. DC. l. c.* 126; *Scheff. l. c.* 83. *A. Leschenaultii*, *A. DC. l. c.* 137; *Miq. Pl. Jungh.* i. 197, and *Fl. Ind. Bat.* ii. 1022; *Scheff. l. c.* 89. *A. Boissieri*, *A. DC. l. c.* 129. *A. Hasseltii*, *Blume*; *Scheff. l. c.* 86.

PENANG; Roxburgh. MALACCA; Griffith (Kew Distrib. n. 3569, 3579). SINGAPORE; McNair.—DISTRIB. Throughout Malaya to the Philippines.

A large shrub, glabrous or nearly so; branches cylindric. *Leaves* $8\frac{1}{2}$ by $2\frac{1}{2}$ in., shortly acuminate, subentire, coriaceous, primary nerves oblique; petiole $\frac{1}{2}$ in. *Panicle* 4–5 in., broadly ovate, terminal (rarely axillary compound large and bractless); branches 2–4 in., rarely again divided; pedicels $\frac{3}{4}$ – $1\frac{1}{2}$ in., scattered corymbosely on the branches; bracteoles small, obtuse, caducous. *Buds* $\frac{1}{2}$ – $\frac{1}{4}$ by $\frac{1}{4}$ in., rose-red. *Sepals* $\frac{1}{2}$ in., orbicular, glabrous or nearly so; margins more or less scarious and fimbriate subpubescent; in fruit enlarged, more or less patent in the dried examples. *Berry* $\frac{1}{4}$ in. wide, globose, slightly depressed, not striated.

3. ***A. rigida***, Kurz in *Journ. As. Soc. Beng.* 1873, pt. ii. 87, and *For. Fl.* ii. 107; leaves elliptic acute at both ends, panicle glabrescent 1–2-divided, pedicels short, flowers rather small.

TENASSERIM; seashore of the Peninsula, Helfer (Kew Distrib. n. 3563).

Branches moderately stout, cylindric. *Leaves* 6 by $2\frac{1}{2}$ in., subentire, glabrous, coriaceous, primary nerves oblique; petiole $\frac{1}{2}$ in. *Panicle* 4 in.; branches minutely rusty-puberulous; pedicels $\frac{1}{2}$ in., umbelled or clustered; bracteoles minute, caducous. *Calyx-teeth* scarcely $\frac{1}{16}$ in., triangular-ovate, minutely rusty. *Buds* $\frac{1}{2}$ by $\frac{1}{12}$ in. *Berry* very small, but not ripe; calyx not enlarged on the young fruit.

4. ***A. paniculata***, Roxb. *Hort. Beng.* 16, and *Fl. Ind. ed. Carey & Wall.* ii. 270; glabrous, leaves obovate-lanceolate, panicle large compound, pedicels $\frac{1}{4}$ in. densely umbelled, calyx-lobes small round. *Wall. Cat.* 2268; *Bot. Reg.* t. 638; *Bot. Mag.* t. 2364; *A. DC. Prodr.* viii. 126; Kurz in *Journ. As. Soc.* 1877, pt. ii. 224, and *For. Fl.* ii. 107 (syn. excl.).

KHASIA Mts.; Griffith (Kew Distrib. n. 3573). DACCA; frequent, C. B. Clarke. CHITTAGONG HILLS; Roxburgh, Clarke.

A large shrub; branches more or less compressed. *Leaves* 9 by 3 in., shortly acute, tapering nearly to the base, subentire, coriaceous, primary nerves manifest, oblique; petiole very short and thick. *Panicle* 6–10 in.; branches more or less flattened, again divided; bracts often $\frac{1}{2}$ in., linear-oblong. *Buds* $\frac{1}{2}$ by $\frac{1}{2}$ in., rose-red. *Berry* $\frac{1}{2}$ in., globose, vertically striate.

VAR. *Hookeri*; leaves large, panicle lax compound, pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. *Ardisia* sp., n. 21, *Herb. Ind. Or. H. f. & T.*—Khasia Mts., alt. 1–3000 ft.; Chela, Nowgong, Luckhipoor, H. f. & T. Assam; Masters.—*Leaves* 14 by 5 in. (in some examples 20 in.). *Panicle* 13 in.; pedicels 2–4-fascicled and also scattered corymbosely.

5. ***A. missionis***, Wall. *Cat.* 6524; glabrous, leaves narrowly oblong obtuse narrowed at both ends, panicle large compound, pedicels $\frac{1}{4}$ – $\frac{3}{4}$ in. *A. DC. Prodr.* viii. 130.

CEYLON; common.

Leaves 5 by 1 in., very coriaceous, primary nerves obscure.—Very close to *A.*

paniculata, Roxb. and treated as a form of it in *Thwaites Enum. Pl. Zeyl.* 173. The numerous Ceylon specimens are, however, all alike, and all differ similarly from *A. paniculata*.

6. ***A. courtallensis***, *Wight Ic.* t. 1215; glabrous, leaves obovate-lanceolate, panicle compound lax, pedicels 1 in.

SOUTH DECCAN PENINSULA; Coimbatore and Courtallum, *Wight*.

This again is considered a form of *A. paniculata* by Thwaites (*Enum. Pl. Zeyl.* 173), and by Beddome (*For. Man.* 138), but the exceedingly long pedicels differ considerably. *A. paniculata*, *missionis* and *courtallensis* are strictly localised forms, whether they be considered species or varieties.

7. ***A. colorata***, *Roxb. Hort. Beng.* 16, and *Fl. Ind. ed. Carey & Wall.* ii. 271; leaves petioled narrowly ohlong acute at both ends, primary nerves nearly at right angles to the midrib, panicle compound glabrous or obscurely rusty, buds $\frac{1}{2}$ in. long. *A. pyramidalis*, *Roth Nov. Sp.* 123 (not of Cav.). *A. anceps*, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 280, and *Cat.* 2261; *A. DC. Prodr.* viii. 126; *Kurz in Journ. As. Soc.* 1877, pt. ii. 224, and *For. Fl.* ii. 107. *A. polycarpa*, *Wall. Cat.* 2285. *A. grandiflora*, *Wall. Cat.* 2272. *A. Rothii*, *A. DC. l.c.* 126. *A. Blumii*, *A. DC. in Trans. Linn. Soc.* xvii. 117, and *Prodr.* viii. 128, *sic* *Scheff. Myrsin.* 77. *A. ovata*, *Thunb.*; *Roem. & Sch. Syst.* iv. 517 (P).

From ASSAM and CACHAR to MALACCA, frequent; *Wallich*, &c. **DISTRIB.** Malaya, Birma.

A shrub, or tree attaining 25 ft.; branches round, becoming flattened only close under the panicle. *Leaves* 9 by $2\frac{1}{4}$ in., parallel-sided, glabrous, coriaceous; base cuneate; petiole $\frac{1}{2}$ in. *Panicle* 6-12 in., divided 2 or 3 times; branches flattened; pedicels $\frac{1}{2}$ - $\frac{1}{4}$ in., densely umbelled, glabrous or minutely puberulous. *Calyx-teeth* $\frac{1}{16}$ in., elliptic-oblong. *Style* $\frac{1}{4}$ in., longer than the corolla. *Berry* $\frac{1}{2}$ in., globose, smooth, deep-red to black.

VAR. *polyneura*, *Miq. in Pl. Jungh.* i. 198 (sp.); leaves wider, panicle subtriangular wide at the base. *Scheff. Myrsin.* 81.—Malacca, *Griffith*.—**DISTRIB.** Java.—*Leaves* $10\frac{1}{2}$ by 4 in., elliptic or somewhat obovate.—*Griffith's* example in *Herb. Wight* is identical with the Javan *A. polyneura*, but there are other Malacca examples intermediate between this form and *A. colorata* type. Blume placed these under his *A. sanguinolenta*.

VAR. *complanata*, *Wall. Cat.* 2277 (sp.); panicles smaller rusty, flowers rather smaller. *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 280; *A. DC. Prodr.* viii. 126; *Scheff. Myrsin.* 78. *A. sanguinolenta*, *Blume Bijl.* 685, *not of Wall.* *A. Zollingeri*, *A. DC. l.c.* 670.—Chittagong; *H. f. & T. Penang*; *Wallich*.—**DISTRIB.** Malaya.—Panicle branches often much flattened, densely scaly, hardly pubescent.—*Kurz* says the berry of his small-flowered *anceps* is white when fully ripe.

†† Panicle not stout, primary branches often bearing the racemes or umboels.

§ Leaves distinctly toothed.

8. ***A. zeylanica***, *Clarke*; leaves broad-lanceolate acute at both ends closely toothed, panicle simple or very sparingly compound, pedicels umbelled minutely rusty. *A. divergens* var. β *crispa*, *Thwaites Enum. Pl. Zeyl.* 174.

CEYLON; *Gardner, Wight*.

Leaves $4\frac{1}{2}$ by $1\frac{1}{2}$ in., glabrous, membranous, drying black primary nerves arching at some distance from the margin, the interspaces and margin with several rows of large dots; petiole $\frac{1}{2}$ - $\frac{1}{4}$ in. *Panicles* 3 by 2 in., primary branches bearing an umbel each, the lowermost sometimes 2; bracts at the forks not rarely leaf-like, 1 in; pedicels $\frac{1}{4}$ in. *Calyx-lobes* $\frac{1}{2}$ in., ovate-oblong. *Buds* $\frac{1}{2}$ by $\frac{1}{2}$ in. *Berry* $\frac{1}{2}$ in., globose, obscurely striated vertically.

§§ *Leaves entire or obscurely crenulate.*

9. **A. amplexicaulis**, *Bedd. Ic. Pl. Ind. Or.* t. 170, and *Fl. Sylv. Anal. Pl.* t. 18, fig. 3; leaves short-petioled oblong acuminate base rounded, panicle simple or sparingly compound, pedicels umbelled minutely rusty.

WYNAAD; Tirrihoot Hills, alt. 4000 ft., and TRAVANCORE; *Beddome*.

A shrub. *Leaves* 5 by $1\frac{1}{2}$ in., broadest above the middle, acuminate, glabrous, membranous, primary nerves inarching at a distance from the margin, prominently dotted near the margin; petiole $\frac{1}{16}$ – $\frac{1}{8}$ in. *Panicle* flowers and fruits as in *A. zeylanica*.—Though *A. zeylanica* has strongly toothed leaves narrowed to the petiole, it is, perhaps, only a form of *A. amplexicaulis*.

10. **A. divergens**, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 275; leaves elliptic or oblong, drying red-brown rhomboid or almost round at the base, panicle subsimple minutely rusty. *Wall. Cat.* 2269; *A. DC. Prodr.* viii. 130. *A. punctata*, *Jack*; *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 275 (not of *Lindl.*). *A. punctulosa*, *Dietr. Syn. Pl.* i. 615.

PENANG; *Jack, Maingay*.—DISTRIB. Moluccas.

A small tree, 20 ft.; branchlets slender, cylindric, much divided. *Leaves* $4\frac{1}{2}$ by $1\frac{1}{2}$ in., subobtusely acuminate, glabrous, primary nerves arched, prominently dotted especially near the margin; petiole $\frac{1}{2}$ in. *Panicles* 3 by 2 in.; bracts small or deciduous; pedicels $\frac{1}{8}$ – $\frac{1}{2}$ in., subumbelled. *Buds* $\frac{1}{2}$ in., and as much broad. *Calyxlobes* $\frac{1}{26}$ in., round.—*A. javanica* (*A. DC. Prodr.* viii. 130) only differs by having the branchlets upwards and panicle more rusty-pubescent.

11. **A. Gardneri**, *Clarke*; leaves elliptic or obovate-lanceolate narrowed at both ends drying black, panicle minutely-rusty, pedicels umbelled. *A. divergens*, *Thwaites Enum. Pl. Zeyl.* 174; *A. DC. Prodr.* viii. 130 *partly*.

CEYLON, frequent; *Gardner, Thwaites, &c.*

Very near *A. divergens* and perhaps the Ceylon form of it. *Leaves* acute at the base. *Calyx-teeth* ovate, subacute, rather larger than in *A. divergens*. *Flowers* altogether as those of *A. zeylanica* (of which Thwaites reckons it a variety), and of *A. amplexicaulis*.

12. **A. andamanica**, *Kurz For. Fl.* ii. 108, and in *Journ. As. Soc.* 1877, pt. ii. 225; glabrous, leaves narrowly lanceolate base cuneate or rhomboid, panicles thin subsimple, pedicels racemed. *A. neriifolia*, *A. DC. Prodr.* viii. 127 *partly* (not of *Wall.*).

MALAY PENINSULA, from Mergui to Malacca, frequent; ANDAMAN ISLANDS; *Griffith, Kurz, &c.*

A shrub, 2–4 feet (*Kurz*). *Leaves* 5 by $1-1\frac{1}{2}$ in., acute, primary nerves not prominent, arching near the margin or not at all, sparsely dotted; petiole $\frac{1}{2}$ in. *Panicles* 4 in., often divaricate or depauperated; bracts 0 or deciduous; pedicels $\frac{1}{2}$ – $\frac{1}{2}$ in. *Calyxlobes* $\frac{1}{16}$ in., round, glabrous. *Corolla* $\frac{1}{2}$ by $\frac{1}{2}$ in.—This is not near *A. oblonga*, *A. DC.* (as *Kurz* supposed), but is that form of *A. neriifolia*, *A. DC.*, which is said to have terminal inflorescence, and which in fact specifically differs from the North Bengal *A. neriifolia* of Wallich. *A. DC.*'s figure (*Trans. Linn. Soc.* xvii. t. 8) represents *A. andamanica*, while most of the description ("panicles lateral peduncles and pedicels somewhat velvety") can apply only to *neriifolia*.

VAR. *effusa*; leaves elliptic acuminate, panicle straggling, pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., buds $\frac{1}{2}$ by $\frac{1}{2}$ in.—Andamans; Port Mouat, *Kurz*.—*Kurz* has issued this unnamed, as though he supposed it specifically different from his *A. andamanica*.

13. **A. tuberculata**, *Wall. Cat.* 2274; leaves coriaceous elliptic narrowed to both ends, panicles compound glabrous or rusty-scaly, flowers numerous small. *A. DC. in Trans. Linn. Soc.* xvii. 119, and *Prodr.* viii. 130. *A. chrysophylloides*, *Miq. Fl. Ind. Bat. Suppl.* 574.

MALACCA; *Griffith* (Kew Distrib. n. 3564), *Maingay*. SINGAPORE, *Wallich*, *Maingay*.

Leaves 5 by $1\frac{1}{2}$ in., primary nerves obscure or numerous, thin; petiole $\frac{1}{4}$ in., often rusty-scaly. *Panicle* 3-6 in.; pedicels $\frac{1}{16}$ - $\frac{1}{8}$ in., crowded, *Calyx-lobes* very small, ovate, subglabrous. *Buds* $\frac{1}{12}$ - $\frac{1}{8}$ in.

VAR. *ophirensis*; nerves of the leaves beneath prominent somewhat thickened, calyx-lobes elliptic, flowers a little larger.—Mt. Ophir, Malacca.

14. **A. porosa**, *Clarke*; glabrous, leaves oblong narrowed at both ends, panicle of 1-3 elongate lax racemes, anthers opening by terminal pores.

MALACCA; *Griffith* (Kew Distrib. n. 3578); *Maingay*.—DISTRIB. JAVA.

Branchlets flexuose, almost zigzag, compressed or winged. *Leaves* 5 by $1\frac{1}{2}$ in., cuneate, subacute at both ends, hardly acuminate; primary nerves distinct, ramifying (rather than arching) near the margin; dots 0 or obscure; petiole $\frac{1}{8}$ in. *Panicle* 2-4 in., branches wiry, flexuose, compressed; pedicels $\frac{1}{4}$ - $\frac{3}{8}$ in., scattered in racemes 1-3 in. long; bracts and bracteoles 0, or small, caducous. *Flowers* 5-4- rarely 3-merous. *Buds* $\frac{1}{4}$ by $\frac{1}{8}$ in. *Calyx-lobes* $\frac{1}{20}$ in., ovate. *Stamens* 5-4, free; anthers as of *Ardisia* but with round (scarcely elongate) pores at the apex. *Berry* $\frac{1}{8}$ in., globose, dark-purple (*Maingay*), altogether of *Ardisia*.—The Java plant has broader leaves and a still more reduced panicle.

** *Panicle in appearance terminal, the axis of the branch ending in a reduced leaf or leaves, below which rise one or more peduncles. (The panicle is perhaps truly terminal in some of these species.)*

15. **A. depressa**, *Clarke*; glabrous, leaves oblong acute at both ends, panicles slender compound not rising above the leaves, flowers small. *A. neriifolia*, *Kurz For. Fl.* ii. 108, and in *Journ As. Soc.* 1877, pt. ii. 225 (not of *Wall.*).

SIKKIM, alt. 4-6000 ft., *J. D. H. KHASIA MTS.*, *Griffith*, *Wallich*. ASSAM PLAINS, *Herb. Roxburgh*. BURMA, *Griffith* (Kew Distrib. n. 3581).

A large bush. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{4}$ in., acuminate, primary nerves close fine, dots most minute; petiole $\frac{1}{8}$ in. *Panicles* 2-3 in.; peduncles bearing as it were small compound umbels; bracts and bracteoles 0 or caducous. *Buds* $\frac{1}{8}$ in. long, and as much broad. *Flowers* rose-coloured (*Griffith*). *Calyx-teeth* $\frac{1}{16}$ in., lanceolate, acute. *Berry* $\frac{1}{8}$ in., globose, not striate.—This is *A. pedunculata* in *Herb. Roxburgh*, and was mixed with *A. pedunculosa* in *Herb. Wallich*; and (perhaps from the small flowers) has been called *A. pauciflora*, *Hayne*?

16. **A. neriifolia**, *Wall. Cat.* 2278; leaves elongate narrow obovate-lanceolate acute entire, panicles minutely-rusty, berry globose-pentagonal scarcely depressed. *A. DC. in Trans. Linn. Soc.* xvii. 118 partly (as to description only), (not of *Kurz*). *A. floribunda*, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 272, and *Cat.* 2263; *A. DC. Prodr.* viii. 127; *Brand. For. Fl.* 287. *A. thyrseiflora*, *Don Prodr.* 148; *A. DC. l. c.* 138.

SUBTROPICAL HIMALAYA, alt. 5000 ft.; from Kumaon to Bhotan, frequent. KHASIA MTS., alt. 4000 ft., frequent.

A large shrub, common by rivers, with erect branches topped by the pink flowers, and reminding altogether of *Oleander*. *Leaves* 7 by $1\frac{1}{4}$ in., attenuate at the base, nerves obscure; petiole $\frac{1}{4}$ in. *Peduncles* 3-5 in., ascending, springing above the leaves below the terminal reduced tuft, each supporting often a compound panicle; bracts 0 or caducous; pedicels $\frac{1}{2}$ in., umbelled. *Buds* $\frac{1}{2}$ by $\frac{1}{8}$ in. *Calyx-lobes* $\frac{1}{10}$ in., elliptic, obtuse, minutely rusty. *Berry* $\frac{1}{8}$ in. diam., distinctly pentagonal at least when dry, deep-red.

17. **A. quinquangularis**, *A. DC. in Trans. Linn. Soc.* 2. xvi. 95, and *Prodr.* viii. 127; leaves elongate obovate-lanceolate acute entire, panicles compound rusty-pubescent, berry small pentagonal greatly depressed.

ASSAM.

Leaves and *inflorescence* exceedingly like those of *A. neriifolia*. *Calyx* pubescent. *Berry* $\frac{1}{10}$ by $\frac{1}{8}$ in., markedly pentagonal, strongly depressed.—The plant here identified (from description only) with *A. quinqueangularis*, A. DC., may be a var. of *A. neriifolia*, but the small depressed berry is unlike any of the fruiting examples of that plant. A. DC.'s plant was "obtained by the Ganges or cultivated in the Botanic Garden, Calcutta."

18. *A. pedunculosa*, Wall. in Roxb. *Fl. Ind. ed. Carey & Wall.* ii. 279, and *Cat.* 2271 partly; glabrous, leaves elongate lanceolate acute, umbels placed racemously on the peduncles, pedicels long, flowers rather large, *A. DC. Prodr.* viii. 128.

KHASIA MTS., alt. 2–5000 ft., frequent; Wallich.

A straggling shrub, with pendent inflorescence. *Leaves* 7 by $1\frac{1}{2}$ in., entire or obscurely toothed, dotted, base cuneate, nerves slender; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Peduncles* 1–4 in., divaricate, sometimes crowded close to the end of the branches, appearing to form a large compound panicle, sometimes axillary or extra-axillary far below the terminal leaves; bracts $\frac{1}{2}$ in., leaf-like, rarely persistent; pedicels $\frac{1}{2}$ in., minutely rusty sometimes when young. *Buds* $\frac{1}{4}$ by $\frac{1}{8}$ in., very acute. *Flowers* rose-red. *Sepals* $\frac{1}{2}$ in., ovate-lanceolate, acute. *Berries* $\frac{1}{8}$ by $\frac{1}{4}$ in., globose, slightly depressed, vertically striate.

19. *A. Griffithii*, Clarke; leaves large obovate-oblong acute entire, panicle rusty, pedicels $\frac{1}{4}$ in. umbelled. *Ardisia* sp. n. 22, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS.; Griffith (Kew Distrib. n. 3576); Nunklow, alt. 3–5000 ft., *H. f. & T.*

Habit and inflorescence of *A. neriifolia*, but much stouter, with broad leaves.—*Leaves* 10 by 3 in., narrowed at the base, glabrous, nerves slender; petiole $\frac{3}{4}$ in. *Bracts* (at the base of the umbels) $\frac{1}{2}$ in., elliptic-oblong, unusually persistent. *Sepals* $\frac{1}{2}$ in., elliptic-oblong. *Berries* $\frac{1}{2}$ by $\frac{1}{8}$ in., globose slightly depressed, vertically striated.

20. *A. Icara*, Ham. in Wall. *Cat.* 2264; leaves elongate lanceolate acute crenulate-toothed, panicles rusty, sepals lanceolate acute. *A. DC. in Trans. Linn. Soc.* xvii. 125, t. 7, and *Prodr.* viii. 136. *A. serrulata*, Kurz in *Journ. As. Soc.* 1873 pt. ii. 87, 1877 pt. ii. 225, and *For. Fl.* ii. 108 (not of Swartz).

NORTH-EAST BENGAL; Mudhopoor and Bholagunje, Hamilton. ASSAM; Suddiya, Griffith (Kew Distrib. n. 3577). BURMA AND TENASSERIM; Griffith and Helfer (Kew Distrib. n. 3562).

Habit and inflorescence of *A. neriifolia*; from which it only differs by the narrow acute sepals and distinctly crenulate leaves; the berries are hardly pentagonal.

21. *A. Moonii*, Clarke; leaves elliptic or obovate coriaceous entire, peduncles few crowded very near the end of the stem long bearing simple panicles, pedicels minutely rusty umbelled. *A. Wallichii*, Thwaites *Enum. Pl. Zeyl.* 174 (not of A. DC.). *Anguillaria zeylanica*, Gaertn. *Fruct.* i. 173, t. 77, fig. 1.—*Burm. Thes. Zeyl.* t. 103.

CEYLON; Moon, &c.

An undershrub $\frac{1}{2}$ –2 ft.; young parts obscurely rusty. *Leaves* $6\frac{1}{2}$ by $3\frac{1}{2}$ in., obtuse with a short acumination, base cuneate, dotted, primary nerves distinct beneath; petiole $\frac{1}{4}$ in. *Peduncles* 2–3 in., forming a terminal quasi-umbel; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. *Buds* $\frac{1}{2}$ by $\frac{1}{8}$ in., pyramidal. *Flowers* rose (Thwaites). *Sepals* $\frac{1}{2}$ in., ovate, subacute. *Berry* $\frac{1}{2}$ in., subglobose, smooth (red, Thwaites).—Easily distinguished from *A. Wallichii* by the entire leaves and quasi-terminal peduncles.

VAR. *subsessilis*; panicles subsessile solitary or several umbelled subterminal,

A. humilis, var., *Thwaites Enum. Pl. Zeyl.* 174.—Ceylon, *Gardner, Thwaites*, n. 2829.—This is, perhaps, distinct from *A. Moonii*, but it can hardly be *A. humilis*; not only is the inflorescence widely different, but the sepals are quite small, not concave with membranous margins on the fruit.

22. *A. macrocarpa*, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 277, and *Cat.* 2267; leaves narrowly lanceolate crenulate, umbels subterminal sometimes also from the upper axils and then peduncled, pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. *A. DC. Prodr.* viii. 134.

NIPAL; *Wallich.* SIKKIM and BHOTAN; alt. 3–7000 ft., frequent, *J. D. H.*, &c.

A shrub, 1–4 ft. *Leaves* 4–5 by $\frac{1}{4}$ in., acute at both ends, glabrous, membranous, crisped-crenulate with a marginal row of dots; petiole very short or obscured by the long-attenuated base of the leaf. *Peduncles* subterminal and short, or lateral 1–4 in. without leaves or leaf-like bracts at their apex; pedicels minutely rusty. *Calyx-lobes* $\frac{1}{2}$ – $\frac{3}{4}$ in., in fruit sometimes $\frac{1}{2}$ in., narrowly oblong. *Petals* exceeding $\frac{1}{2}$ in., lanceolate acute. *Berries* $\frac{1}{2}$ – $\frac{3}{4}$ in. wide, globose depressed, bright red, dotted, not vertically striated.—Both *A. DC.* and *Kurz* supposed this near *A. crispa*, which has smaller berries and quite different inflorescence, the lateral umbels being sessile, i.e. supported by large leaves.

23. *A. virens*, *Kurz For. Fl.* ii. 575, and in *Journ. As. Soc.* 1877, pt. ii. 226; leaves broadly lanceolate acuminate margins crisped-crenulate, peduncles subterminal exceedingly long, pedicels 1 in. *Ardisia* sp. n. 37, *Herb. Ind. Or. H. f. & T.*

MISHMEB, *Griffith* (Kew Distrib. n. 3561). ASSAM; *Griffith.* KHASIA Mts., alt. 4000 ft., *H. f. & T.*, &c. CACHAR; Doorbund Pass, *Keenan.*—DISTRIB. YULAN.

A small shrub, resembling much *A. macrocarpa*. *Leaves* 7 by 2 in., more acuminate than those of *A. macrocarpa*, and without the marginal row of glands. *Peduncles* 1–2 in., carrying simple or compound glabrous umbels with numerous flowers. *Calyx-lobes* $\frac{1}{2}$ in., elliptic-oblong. *Corolla-lobes* $\frac{1}{2}$ in., ovate, acute, white (*Kurz*). *Berry* $\frac{1}{2}$ – $\frac{3}{4}$ in., globose, smooth, dotted not vertically striated, yellow.

*** *Umbels sessile, simple or compound, terminal, mostly on divaricate branches springing laterally below the end of the main branches.*

24. *A. undulata*, *Clarke*; glabrous, leaves lanceolate acute crenulate, calyx-lobes in fruit narrowly-oblong, berries large. *Ardisia* sp. n. 41, *Herb. Ind. Or. H. f. & T.* *Ardisia* sp., n. 953, *Griff. Ilin. Notes* 62.

KHASIA Mts.; alt. 250–5000 ft., frequent; *Griffith, H. f. & T.*, &c.

Leaves $5\frac{1}{2}$ by $1\frac{1}{2}$ in., acute at both ends. undulate-crenate, membranous, with prominent glands scattered distantly over the whole surface. *Umbels* simple and compound; pedicels $\frac{1}{2}$ –1 in. in fruit. *Buds* $\frac{1}{2}$ in., acute. *Calyx-lobes* $\frac{1}{8}$ in., ovate; in fruit $\frac{1}{2}$ in., oblong. *Berry* $\frac{1}{2}$ – $\frac{3}{4}$ in., globose, gland-dotted, not vertically striated, altogether as of *A. macrocarpa*.—This is perhaps only a northern form of *A. crenata*, differing by the long acute leaves, and large berry; and was the plant which (under the mistaken name of *A. macrocarpa*) *Kurz* proposes to merge in *A. crenata*.

25. *A. crenata*, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 276; glabrous, leaves elliptic acute or subobtusely crisped-crenate, berries $\frac{1}{2}$ in. diam. globose obscurely vertically striate not dotted. *Wall. Cat.* 2262; *Bot. Mag.* t. 1950. A glandulosa, *Blume Bijdr.* 690, not of *Roxb.* *A. crenulata*, *Lodd. Bot. Cab. t.* 2, not of *Vent.* *A. crispa*, *A. DC. in Trans. Linn. Soc.* xvii. 124, and *Prodr.* viii. 134 (excl. syn. *A. lentiginosa* and *elegans*); *Kurz For. Fl.* ii. 113, and in *Journ. As. Soc.* 1877, pt. ii. 226. *A. densa* and *polysticta*, *Miq. Fl. Ind. Bat. Suppl.* 575, 576. *Bladhia crispa*, *Thunb. Fl. Jap.* 97; *Kaempfer. Ic. Pl. Jap.* t. 7.

PENANG, MALACCA, and SINGAPORE, frequent.—DISTRIB. Malaya, China, Japan.

Leaves $3\frac{1}{2}$ by $1\frac{1}{2}$ in., membranous; primary nerves very close together, slender but conspicuous beneath. *Umbels* simple, sometimes proliferous, i.e. compound with 1,

rarely 2, lateral secondary umbels, always supported by a leaf (Roxburgh). *Buds* $\frac{1}{2}$ in., ovate, acute. *Flowers* rose or white, often spotted. *Calyx-lobes* (in fruit) $\frac{1}{2}$ in., ovate.

VAR. *angusta*; leaves narrowly lanceolate, flowering pedicels 1 in. divaricate. buds very obtuse, corolla-segments broad.—Malacca; *Griffith* (Kew Distrib. n. 3584).—Leaves 3 by $\frac{1}{2}$ in., tapering at both ends, primary nerves carried almost undivided to the obscure crenatures, whole surface gland-dotted. *Buds* $\frac{1}{2}$ in.

26. *A. Kurzii*, Clarke; glabrous, leaves obovate-lanceolate entire reticulated beneath, calyx-segments small obtuse. *A. polycephala*, var. *acuminata*, *Kurz For. Fl.* ii. 110, and in *Journ. As. Soc.* 1877, pt. ii. 225.

PEGU and MARTABAN; in the tropical forests, *Kurz*.

Leaves 8 by $2\frac{1}{4}$ in., shortly acuminate, cuneate at the base; primary nerves beneath prominently inarching at some distance from the margin, secondary nerves distinctly reticulated; petioles $\frac{2}{3}$ in. *Umbel* (very young) compounded of 3 umbellules; bracts $\frac{1}{2}$ in., elliptic, deciduous.—*Kurz* has observed that this is perhaps distinct from *A. polycephala*.

27. *A. villosa*, Roxb. Fl. Ind. ed. Carey & Wall. ii. 274; innovations rusty-villous, leaves lanceolate, umbels rusty-villous, calyx-segments $\frac{1}{2}$ in. linear-lanceolate. *Wall. Cat.* 2280; *A. DC. Prodr.* viii. 136; *Scheff. Myrsin.* 90; *Kurz For. Fl.* ii. 113, and in *Journ. As. Soc.* 1877, pt. ii. 227. *A. vestita*, *Wall. in Roxb. l. c.* in note; *A. DC. l. c.* *A. mollis*, *Blume Bijdr.* 689. *A. glabrata*, *Blume Bijdr.* 692; *A. DC. l. c.* *A. Tavoyana*, *A. DC. in Trans. Linn. Soc.* xvii. 125.

From MERGUI to MALACCA and PENANG, frequent.—DISTRIB. Malaya.

A small shrub. *Leaves* 6–8 by $\frac{3}{4}$ – $2\frac{1}{4}$ in., narrowed at both ends, sparingly crenate or nearly entire, more or less rusty-villous on the lower or on both surfaces; petiole $\frac{1}{2}$ in. *Umbels* simple, or several together, very shortly peduncled; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., elliptic; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., patently villous. *Calyx* subcorolloid, whitish; segments villous without, within glabrous or (in the very hairy forms) hairy. *Corolla* small, hardly so long as the calyx. *Berries* $\frac{1}{2}$ in., globose, shorter than the sepals.—A somewhat variable, though easily recognised species; leaves very broadly lanceolate in some of Griffith's Mergui specimens, linear-lanceolate in Maingay's Malacca ones; often nearly glabrous (in age) except the midrib beneath; more frequently villous beneath; in the form *vestita*, clothed with long fulvous hairs also above.

VAR. ? *obtusa*; leaves obovate-oblong subobtuse, umbels in short shortly-peduncled corymbs.—Shevagherry Hills, South Deccan Peninsula, *Wight*.—Lateral branches divaricate below the summit of the main branch, leafy upwards; terminated by the corymb. Peduncle $\frac{1}{2}$ in.; corymb repeatedly dichotomous; rusty-pubescent; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. Calyx-segments $\frac{1}{2}$ in., ovate-lanceolate.—Perhaps a distinct species, but the solitary example in Herb. Wight is without flowers; it is very like *Hymenandra Wallichii*, but the calyx-teeth are too large for that.

**** *Umbels peduncled or panicled, axillary, the lower (at least) always peduncled without leaves or leaf-like bracts at the apex of the peduncles.*

† *Plant not wholly glabrous, branchlets at least hairy or pubescent.*

‡ *Leaves serrate or crenate.*

28. *A. odontophylla*, Wall. Cat. 2279 (not of Lindl.); branchlets upwards rusty-villous, leaves long-petioled elliptic sharply finely serrate villous at least on the midrib beneath, peduncles (some of them) remote from the apex of the branch ascending. *A. DC. in Trans. Linn. Soc.* xvii. 125, t. 6, and *Prodr.* viii. 135.

KHASIA and JAINTIA MTS., alt. 1–4000 ft., frequent; *Wallich, H. f. & T., &c.* PATKOYE MTS., S.E. of ASSAM; *Griffith* (Kew Distrib. n. 3666). CACHAR; *Keenan*.

A weak shrub, 2-6 ft. *Leaves* 6 by 3 in., acute at both ends, usually glabrous or most minutely pubescent except the nerves beneath; petiole 1 in. *Racemes* 1-4 in., simple or compound, lax, few-flowered; bracts small, linear; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in., minutely puberulous. *Buds* $\frac{1}{2}$ by $\frac{1}{2}$ in. *Calyx-lobes* $\frac{1}{12}$ in., ovate, obtuse. *Berry* $\frac{1}{4}$ in. diam. (and upwards), globose, not striated, scarlet.

VAR. *Maingayi*; branchlets glabrous, leaves in age glaucous or sparsely pilose on the midrib beneath.—Malacca; *Maingay*.

VAR. *Lobbii*; leaves obovate-lanceolate, base much attenuated, nerves beneath densely villous, peduncles weak pendulous all from near the summit of the branchlets. —Singapore; *Lobb*. n. 316.—Branchlets densely fulvous villous. Peduncles 1-2 in. Buds broader than in *A. odontophylla* type.

29. *A. Brandisiana*, *Kurz in Journ. As. Soc.* 1871, pt. ii. 67, and *For. Fl.* ii. 112; leaves elliptic acute at both ends slightly crenate, peduncles axillary long bearing simple umbels, pedicels $\frac{1}{2}$ in. thickened upwards minutely rusty-pubescent.

MARTABAN; *Brandis*. **MOULMEIN**; Thoun-gyuan, alt. 4500 ft., *Lobb*.

Branchlets thick, rusty and scaly (hardly pubescent) upwards. *Leaves* $5\frac{1}{2}$ by $2\frac{1}{4}$ in., subcoriaceous, nerves distinct; petiole 1 in. *Peduncles* 3-4 in., ascending, minutely rusty; bracteoles very small. *Calyx-lobes* $\frac{1}{2}$ - $\frac{3}{4}$ in., ovate, subacute. *Corolla-lobes* $\frac{1}{4}$ - $\frac{1}{2}$ in., broad, acutely acuminate. *Berry* not seen.

++ *Leaves entire, or very nearly so.*

30. *A. grandifolia*, *A. DC. in Trans. Linn. Soc.* xvii. 122, and *Prodr.* vii. 132; leaves large obovate-oblong acute at both ends glabrous above villous at least on the midrib beneath, peduncles divaricate from near the apex of the branches, calyx-segments $\frac{1}{2}$ in. lanceolate. *Kurz in Journ. As. Soc.* 1877, pt. ii. 225, and *For. Fl.* ii. 111. *A. macrophylla*, *Wall. Cat.* 2290 (not of *Blume*).

TAVOI; *Wallich*.

Branches rusty-villous. *Leaves* 8 by $2\frac{1}{2}$ in.; primary nerves close together, slender, distinct; petiole $\frac{1}{2}$ in., villous. *Peduncles* 1-2 in., patently pilose, bearing simple umbels; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in., very many. *Buds* $\frac{1}{2}$ by $\frac{1}{2}$ in.

VAR. *Parishii*; calyx-segments scarcely $\frac{1}{10}$ in., round.—Moulmein, *Parish*; *Mergui, Griffith* (Kew Distrib. n. 3590).—This may be a distinct species; but the length of the calyx-lobes is very variable in some of the species of *Ardisia*, and the calyx-lobes in *Griffith's* example are longer than in *Parish's*.

31. *A. Keenani*, *Clarke*; leaves oblong narrowed at both ends glabrous above rusty-villous beneath, peduncles short bearing simple elongate racemes, calyx-segments very short round glabrous.

CACHAR; *Keenan*. **MUNEEPOOR**; *Clarke*.

Branches densely brown-villous. *Leaves* 7 by 2 in., primary nerves distinct beneath, somewhat distant, inarching; petiole $\frac{1}{2}$ in. *Peduncles* 1-2 in., patently pilose, on one branchlet divaricate from near its apex, on the other ascending from a lower axil; pedicels $\frac{1}{2}$ -1 in., laxly racemose rather than umbelled. *Buds* $\frac{1}{2}$ by $\frac{1}{2}$ in.—This resembles so strongly *A. grandifolia* var. *Parishii*, that it might be added to it as a variety, but the nervation of the leaves differs. The Muneypoor example has much smaller leaves, all the peduncles ascending from lower axils, the racemes more villous, but the calyx-segments glabrous or very nearly so.

32. *A. Helferiana*, *Kurz in Journ. As. Soc.* 1873, pt. ii. 86, and *For. Fl.* ii. 113; densely rusty-villous or woolly, leaves obovate-oblong acute at both ends softly hairy above, peduncles axillary long bearing simple subumbellate racemes.

MERGUI, MOULMEIN, and TENASSERIM; *Griffith, Helfer* (Kew Distrib. n. 3589).

Branches densely rusty-woolly. *Leaves* $6\frac{1}{2}$ by $2\frac{1}{2}$ in., primary nerves strong

petiole $\frac{1}{8}$ – $\frac{1}{2}$ in. *Peduncles* 3–4 in.; pedicels $\frac{1}{4}$ – $\frac{3}{4}$ in.; bracteoles $\frac{1}{4}$ in., linear. *Buds* $\frac{1}{8}$ by $\frac{1}{6}$ in., glabrous. *Calyx* densely villous; segments $\frac{1}{8}$ in., ovate. *Berry* not seen.

33. **A. reflexa**, Wall. Cat. 2282; branchlets fulvous-pubescent, leaves narrowly obovate-lanceolate acute at both ends sparingly pilose beneath or glabrescent, peduncles short bearing simple dense minutely fulvous-pubescent racemes. *A. DC. Prodr.* viii. 132. *A. Amherstiana*, *A. DC. in Trans. Linn. Soc.* xvii. 120, and *DC. l. c.* 131; *Kurz For. Fl.* ii. 111, and in *Journ. As. Soc.* 1877, pt. ii. 225.

PEGU and TENASSERIM; Wallich, &c.

Branchlets, corymbs, and innovations with numerous spreading exceedingly short tawny hairs. *Leaves* membranous, 8 by 2½ in. (often smaller), acuminate, base cuneate or rarely suddenly narrowed; primary nerves numerous, slender, thinly pilose beneath, especially near the midrib, or ultimately glabrescent; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Peduncles* 1–2 in., axillary from near the ends of the branches; pedicels $\frac{1}{4}$ – $\frac{3}{4}$ in.; bracteoles caducous. *Buds* $\frac{1}{8}$ by $\frac{1}{6}$ in., scarcely acute. *Calyx-segments* $\frac{1}{10}$ in., round. *Berry* $\frac{1}{2}$ in., globose, vertically striate.—In Wallich's Herbarium the type sheet has the leaves pilose beneath, the second sheet has them glabrous; *A. DC.* made two species of these.

34. **A. khasiana**, Clarke; branchlets fulvous-woolly, leaves linear-obovate glabrous, peduncles numerous axillary bearing simple lax few-flowered glabrous umbels. *Ardisia* sp.; n. 27, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 500–3000 ft., frequent; Griffith (Kew Distrib. n. 3572), *H. f. & T.*, &c.

Erect, 1–4 ft.; branches very leafy upwards. *Leaves* 4 by $\frac{1}{2}$ – $\frac{3}{4}$ in., broadest above the middle, tapering at both ends, primary nerves conspicuous beneath, acutely oblique to the midrib, inarching; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in., often woolly. *Peduncles* 1 in., often one from each of the crowded upper axils; pedicels 1 in., usually 2–5 in each umbel. *Buds* $\frac{1}{4}$ – $\frac{1}{2}$ by $\frac{1}{8}$ in. *Calyx-segments* $\frac{1}{6}$ in., elliptic; in fruit, orbicular, concave, margins membranous. *Berry* $\frac{1}{4}$ in., or more, depressed-globose, scarcely striate.—The flowers, berries, and habit are similar to those of *A. humilis*.

VAR. Thomsoni; leaves obovate-lanceolate. *Ardisia* sp. n. 30, *Herb. Ind. Or. H. f. & T.*—Chittagong; *H. f. & T.* Khasia Mts., alt. 3–4000 ft.; Mousto and Nong Klao, Clarke.—*Leaves* 5 by 1¾ in. in the Chittagong examples, but connected with *A. khasiana* type by intermediate forms.

†† *Plant wholly glabrous, the young parts sometimes puberulous or scaly.*

‡ *Leaves crenate or denticulate.*

35. **A. membranacea**, Wall. Cat. 2288; leaves broadly lanceolate crenate membranous, peduncles axillary slender bearing simple small umbels, corolla-segments obtuse or emarginate, filaments much longer than the small round anthers. *A. DC. Prodr.* viii. 134 (not of *Kurz in Journ. As. Soc.* 1877, pt. ii. 224). *Ardisia* sp. n. 36, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 2000 ft.; Wallich, *H. f. & T.*, &c. CACHAR; Shapoor, Keenan.

Erect, 1–4 ft., subsimple, succulent. *Leaves* 7 by 2½ in., acute at both ends, nerves prominent, gland-dotted all over; petiole $\frac{3}{4}$ in. *Peduncles* 1–2 in.; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in.; bracteoles 0. *Calyx-segments* $\frac{1}{20}$ in., obtuse. *Buds* $\frac{1}{2}$ in., obtuse. *Stamens* inserted close to the base of the corolla-segments, free from each other; filaments linear, flattened, slightly wider upwards; anthers small, round, opening by a longitudinal slit. *Ovary* obovate-oblong, substipitate; style cylindric, short. *Berry* $\frac{1}{4}$ in. diam. and upwards, globose, black, not vertically striate. *Seed* large, very hard at least when dry, altogether of *Ardisia*.—This is the type of a new genus nearly allied to *Amblyanthus*, with which the habit, leaves, inflorescence, and corolla closely agree; the free stamens with long filaments, and the pistil are unlike *Amblyanthus*, and indeed all other Indian *Ardisiads*.

36. **A. bhotanica**, Clarke; leaves large lanceolate crenate, peduncles axillary short rigid bearing umbels arranged in simple panicles, corolla and stamens of *Ardisia*.

BHOTAN; Griffith (Kew Distrib. n. 3587).

Leaves 9 by $2\frac{1}{2}$ in., acuminate, prominently nerved, gland-dotted, base cuneate; petiole $\frac{1}{2}$ in. Peduncles $\frac{1}{2}$ –1 in.; panicles $1\frac{1}{2}$ in. diam.; pedicels $\frac{1}{2}$ in. Buds $\frac{1}{4}$ – $\frac{1}{2}$ by $\frac{1}{2}$ in., hardly acute. Calyx-teeth $\frac{1}{10}$ in., ovate-lanceolate. Corolla-segments subacute. Stamens free; filaments very short; anthers oblong-lanceolate. Berry not seen.

37. **A. Wallichii**, A. DC. in Trans. Linn. Soc. xvii. 123, and Prodr. viii. 137; leaves obovate-elliptic minutely toothed, peduncles axillary bearing many-flowered subsimple racemes. Kurz For. Fl. ii. 122, and in Journ. As. Soc. 1877, pt. ii. 226, in part. *Ardisia sanguinolenta*, Wall. Cat. 2287 (not of Blume). *Ardisia* sp. n. 31, Herb. Ind. Or. H. f. & T.

PROME and RANGOON; McLelland. BIRMA; Griffith (Kew Distrib. n. 3594).—DISTRIB. AVA.

Closely resembling *A. humilis*, Vahl, from which it differs in the minutely denticulate (not subentire) leaves; and should perhaps be reckoned a Birmese form of that species.—Kurz makes two varieties, whereof 1. *Wallichii proper* has the young shoots and inflorescence with rusty-brown floccose hairs, and 2. *glabriuscula* with the young shoots glabrous, and the pedicels indistinctly puberulous. Kurz's "*Wallichii proper*" is probably therefore the plant above called *A. khasiana* var. *Thomsoni*, and his var. *glabriuscula* will be Wallich's *A. sanguinolenta*.

†† Leaves entire or subentire.

38. **A. involucrata**, Kurz in Journ. As. Soc. 1871, pt. ii. 68; leaves obovate-oblong acute at both ends, peduncles lateral and subterminal carrying simple umbels, bracteoles $\frac{1}{2}$ in. ovate concave subsistent, sepals in fruit $\frac{1}{2}$ – $\frac{1}{2}$ in. *Ardisia* sp. n. 26, Herb. Ind. Or. H. f. & T.

SIKKIM; alt. 2–5000 ft., Griffith (Kew Distrib. n. 3560), J. D. H., Kurz, &c., not rare.

A shrub, 3–6 ft. Leaves $5\frac{1}{2}$ by $2\frac{1}{2}$ in., shortly acuminate, base attenuate; petiole hardly any. Peduncles 1–3 in., stout; pedicels 1 in., usually about 5, bracteoles as many. Sepals $\frac{1}{2}$ in. (in flower), orbicular, concave, waxy corolloid, pink. Corolla $\frac{1}{2}$ in. long, segments scarcely acute. Filaments short; anthers oblong-lanceolate. Berry $\frac{1}{2}$ in., globose, scarcely striate; sepals in fruit spreading at the base, elongate, connivent over the summit of the berry.—This is a very striking species, that has been marked as generically distinct; but it is very nearly allied to *A. humilis*.

39. **A. oxyphylla**, Wall. Cat. 2291; leaves elliptic narrowed at both ends, peduncles axillary carrying lax few-flowered racemes, pedicels $\frac{3}{4}$ in. A. DC. Prodr. viii. 130.

PENANG; Wallich. TENASSERIM (or Andamans); Helfer (Kew Distrib. n. 3571, 3585).

Leaves 7 by $2\frac{1}{2}$ in. (or much smaller), widest at the middle or a little above it, subcoriaceous, nerves numerous distinct; petiole $\frac{3}{4}$ in. Peduncles 1–3 in., near the apex of the branches or distant therefrom, slender; racemes often shortened, subumbelliform; pedicels 2–6. Buds $\frac{1}{2}$ by $\frac{1}{2}$ in. Calyx-segments $\frac{1}{10}$ in., ovate, obtuse. Berry $\frac{1}{2}$ in., globose, hardly striate.

VAR. *attenuata*, Wall. Cat. 2286 (sp.); peduncles still more slender. A. DC. in Trans. Linn. Soc. xvii. 119, and Prodr. viii. 131; Kurz For. Fl. ii. 109. A. alternata, A. DC. in Ann. Soc. Nat. 2, ii. 296. A. oblonga, A. DC. in Trans. Linn. Soc. xvii. 121, and Prodr. l. c. 131; Kurz l. c. 109, and in Journ. As. Soc. 1877, pt. ii. 226.—Pegu, Tenasserim, Andamans. The type sheet of Wall. Cat. 2286 is nearly identical with *A. oxyphylla*, but exhibits neither flower nor berry; the second sheet has smaller leaves, one oblong berry, and is *A. oblonga*, A. DC.

40. **A. polycephala**, *Wall. Cat.* 2293; leaves elliptic or oblong narrowed at both ends, peduncles axillary short stout compressed carrying dense racemes. *A. DC. in Trqns. Linn. Soc.* xvii. 118, and *Prodr.* viii. 131; *Kurz For. Fl.* ii. 109, and in *Journ. As. Soc.* 1877, pt. ii. 225 (*excl. var. acuminata*).

PEGU and TENASSERIM; *Wallich, Griffith, Helfer* (Kew Distrib. n. 3565, 3586).

Leaves 7-9 by $2\frac{1}{2}$ in., nerves numerous, distinct; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., often from near the apex of the branches, very much compressed, often recurved or divaricate; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in., numerous, sometimes subumbelled, sometimes in a raceme 2-4 in. long. *Flowers* nearly as in *A. attenuata*, to which this species is very closely allied; the two differ from their ally *A. humilis* in the elongate leaves and the smaller calyx-segments.

41. **A. rhynchophylla**, *Clarke*; leaves obovate-lanceolate caudate-acuminate, peduncles short bearing simple few-flowered racemes of rather large flowers. *Ardisia* sp. n. 28, *Herb. Ind. Or. H. f. & T.*

KHASIA Mts., alt. 3-4000 ft.; Mahadeo and Cherra, *H. f. & T.*

A small, branched shrub. *Leaves* $4\frac{1}{2}$ by $1\frac{1}{2}$ in., base cuneate, primary nerves prominent beneath, inarching; petiole $\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ - $\frac{3}{4}$ in.; pedicels 1 in., laxly racemed, much thickened upwards. *Buds* $\frac{1}{2}$ - $\frac{3}{4}$ by $\frac{1}{2}$ in. *Calyx-segments* $\frac{1}{2}$ - $\frac{1}{2}$ in., elliptic, concave. *Flowers* white (J. D. H.). *Berry* $\frac{1}{4}$ in., globose, smooth, gland-dotted, not vertically striate.—Allied to *A. humilis*, differing in the long-acuminate, smaller leaves.

42. **A. Lobbiana**, *Clarke*; leaves small elliptic narrowed at both ends, peduncles axillary bearing umbels in simple panicles.

"INDIA"; *Lobb* (probably Singapore).

Leaves coriaceous, $2\frac{1}{2}$ by $1\frac{1}{2}$ in., shortly acuminate, base cuneate; petioles $\frac{1}{2}$ - $\frac{1}{2}$ in. *Peduncles* 1 in., distant from the apex of the branches, compressed; panicles 2-3 in. diam., somewhat lax; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in., 3-6 in each umbel. *Buds* $\frac{1}{4}$ by $\frac{1}{2}$ in. *Calyx-segments* $\frac{1}{2}$ in., ovate, obtuse. *Berry* not seen.—The leaves resemble those of *A. rhynchophylla*, but are shortly acuminate, not caudate.

43. **A. pauciflora**, *Heyne; Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 279, and *Cat.* 2270; leaves long-lanceolate narrowed at both ends, peduncles short weak axillary bearing 1-5-flowered simple weak racemes. *A. DC. Prodr.* viii. 127 (*excl. var. cymosa*); *Wight Ic.* t. 1214; *Bedd. For. Man.* 138.

Mts. of SOUTH INDIA and CEYLON; common.

Branchlets rusty-scaly, hardly pubescent. *Leaves* 4 by 1 in., or sometimes 9 by $1\frac{1}{2}$ in., coriaceous, nerves obscure; petiole $\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ in., scattered; pedicels $\frac{1}{4}$ in., thin. *Buds* $\frac{1}{2}$ in. long, and as much broad. *Calyx-segments* $\frac{1}{2}$ in., triangular, subacute. *Berry* $\frac{1}{2}$ in. diam., globose, not striate.—The Malay *A. cymosa*, Blume, has been reduced to this by A. DC. and Scheffer; but the examples of *A. cymosa* from Java differ considerably, having many-flowered racemes often in panicles, and larger flowers. The peculiarity of *A. pauciflora* is that even stout large-leaved examples have exceedingly small depauperated racemes.

44. **A. rhomboidea**, *Wight Ic.* t. 1213; leaves spathulate-rhomboid obtusely acuminate, peduncles short bearing 1-5-flowered small racemes. *Bedd. For. Man.* 138.

SOUTH DECCAN PENINSULA; Shovagerry Hills, *Wight*.

This is perhaps a form of *A. pauciflora* with abnormal leaves; the branchlets, habit, inflorescence, and berries are as in *A. pauciflora*; the leaves are spathulate with a narrowly winged petiole.

45. **A. humilis**, *Vahl Symb.* iii. 40 (*excl. syn. Burn., not of Blume*); leaves obovate-oblong or elliptic shortly acuminate or subobtuse base cuneate,

peduncles axillary patent or suberect, pedicels stout, calyx-lobes in fruit rounded concave with membranous margins. *A. DC. Prodr.* viii. 129; *Scheff. Myrsin.* 73; *Wight Ic.* t. 1212; *Dalz. & Gibs. Bomb. Fl.* 137; *Brand. For. Fl.* 287; *Kurz For. Fl.* ii. 110, and in *Journ. As. Soc.* 1877, pt. ii. 226. *A. solanacea*, *Roxb. Cor. Pl.* 27, t. 27, and *Fl. Ind.* i. 580; *Bot. Mag.* t. 1677; *Wall. Cat.* 2283. *A. umbellata*, *Roth Nov. Sp.* 123; *Roxb. Fl. Ind.* i. 582, and *ed. Carey & Wall.* ii. 273; *Lodd. Bot. Cab.* t. 531. *A. litoralis*, *Andr. Bot. Rep.* x. 630; *Kurz For. Fl.* ii. 110, and in *Journ. As. Soc.* 1877, pt. ii. 226. *A. Wightiana*, *Wall. Cat.* 2380. *A. polycephala*, *Wight Ill.* t. 145 (not of *Wall.*). *A. obovata*, *Blume Bijl.* 688; *A. DC. Prodr.* viii. 132. *A. salicifolia*, *A. DC. l. c.* 129. *A. elliptica*, *Bedd. For. Man.* 138, ? of *Thunb.* *A. rostrata*, *Hassk. in Flora* 1868, p. 26?. *Climacandra obovata* and *multiflora*, *Miq. Pl. Jungh.* i. 199, 200. *C. littoralis*, *Kurz in Journ. As. Soc.* 1871, pt. ii. 68.—*Rheede Hort. Mal.* v. t. 28.

Throughout INDIA, alt. 0–5000 ft.; from the HIMALAYA to CEYLON and SINGAPORE (not in Western and Desert India).—DISTRIB. Malaya, China.

An erect, branched shrub. *Leaves* 6 by 2–2½ in., coriaceous, nerves slender; petiole ½ in. *Peduncles* 1–2 in., near the apex of the branches or subremote therefrom, divaricate or ascending, sometimes recurved, stout, more or less compressed; umbels simple, sometimes compound, rarely lengthened into racemes; pedicels ½–1 in. *Buds* ½ by ⅓ in. *Flowers* pink. *Calyx-lobes* ⅓–½ in., elliptic, obtuse; in fruit enlarged, orbicular, closely pressed to the berry. *Berry* ¼–½ in. wide, globose, slightly depressed, hardly striate.—Beddome proposes to take up Thunberg's name, *A. elliptica*, for this plant as being the oldest; but the description of *A. elliptica* (see *DC. Prodr.* viii. 138) is so curt that there can be no certainty that it is *A. humilis*.

VAR. arborescens, *Wall. Cat.* 2289 (sp.); arborescent, leaves large, peduncles long very stout, inflorescence often compound. *A. DC. Prodr.* viii. 131.—*Ava*; *Wallich*. *Wallich's* type specimen, however, in no wise differs from some Bengal *A. humilis*, which sometimes attains 25 feet, and has longer leaves and peduncles than in the common shrubby state.

6. *PIMELANDRA*, *A. DC.*

Flowers in small scattered axillary rusty sessile umbels, racemes or corymbs, otherwise as *Ardisia*.—Species 10; extending from Khasia to Java.

The last section of *Ardisia* only differs from *Pimelandra* in having the lateral inflorescence peduncled. *A. DC.* depended on the berry being oblong (not globose) as the main character of *Pimelandra*; this character *A. DC.* took from *Wallich*. Such obovate-oblong one-sided fruits, with the style-base lateral, are found not rarely both in *P. Wallichii* and *eugeniæfolia*, but are all seedless, and probably due to some insect injury. The perfect fruit in these and all species of *Pimelandra* is globose, exactly as in *Ardisia*.

1. *P. eugeniæfolia*, *Hook. f. in Gen. Pl.* ii. 647; leaves lanceolate-oblong caudate-acuminate crenate nearly glabrous prominently gland-dotted beneath, calyx-lobes minute in fruit. *Ardisia eugeniæfolia*, *Wall. Cat.* 2276; *A. DC. Prodr.* viii. 130.

KHASIA Mts., alt. 2–4000 ft., frequent; *Wallich, H. f. & T.*, &c.

A shrub, 3–6 ft.; stem erect; branches horizontal, tips rusty-pubescent, with complanate foliage. *Leaves* 10 by 2½ in. in Hooker's examples (usually one-third smaller), base cuneate or rhomboid, glabrous or scarcely villous on the midrib beneath, primary nerves prominent, inarching; petiole ½ in., often rusty-pubescent. *Inflorescence* scarcely 1 in. long, usually corymbose, sometimes sub simply racemose, rusty-pubescent; bracts inconspicuous or caducous. *Buds* ⅓ in. *Flowers* altogether of *Ardisia*, but very small. *Calyx-lobes* ⅓ in. at fruit-time, ovate, subacute, finally deflexed. *Berry* ½ in. diam., globose, red, altogether (as is the seed) that of *Ardisia*.—Some of Hooker's specimens bear as many as 45 fruits on each branch, everyone being obovate-oblong

and 1-sided and all seedless, this is also the case in Wallich's type specimens. Clarke's specimens, collected on various occasions, have fruits in abundance, all globose with perfect seeds.

2. **P. Griffithii**, *Clarke*; leaves broadly lanceolate acuminate subentire rusty-villous on the midrib beneath not gland-dotted, calyx-lobes minute. *Ardisia eugeniaefolia*, *Kurz For. Fl.* ii. 111, and in *Journ. As. Soc.* 1877, pt. ii. 225, not of *Wallich*.

PATKOYE Mts., south-east of Assam, alt. 4000 ft.; *Griffith* (*Kew Distrib.* n. 3598).

An erect shrub, 4-5 ft.; branches ascending obliquely, rusty-villous at the tips. *Leaves* $6\frac{1}{2}$ by 2 in., base cuneate or rhomboid, primary nerves prominent scarcely inarching, gland-dots most minute; petiole $\frac{1}{4}$ in. *Inflorescence* less than $\frac{3}{4}$ in., densely corymbose, rusty-pubescent; flowers as of *P. eugeniaefolia*, but still smaller. *Berry* $\frac{1}{2}$ in. diam., globose, red.—Perhaps a var. of *P. eugeniaefolia*; but the erect habit of growth is unlike the marked uniform horizontal branches of that species, and the leaves are without the large glandular dots which are always present in *P. eugeniaefolia*.

3. **P. ?erecta**, *Clarke*; leaves elliptic-oblong narrowed at both ends subentire nearly glabrous, pedicels $\frac{1}{2}$ in. in axillary rusty fascicles, calyx-lobes $\frac{1}{2}$ in. elliptic-oblong adpressed to the berry.

KHASIA Mts.; Umwai, alt. 3000 ft.; *Clarke*.

A small, erect shrub; branches erect, rusty-villous towards the ends. *Leaves* 4 by $1\frac{1}{4}$ in., acuminate, base cuneate, primary nerves not prominent, gland-dots scattered not prominent; petiole $\frac{1}{6}$ in. *Pedicels* fascicled on shortened lateral spurs, rising from tufts of small bracteoles. *Corolla* small; lobes rounded. *Berry* $\frac{1}{2}$ in. diam., globose, smooth.—This is perhaps a new genus; but the examples being in fruit, the stamens have not been observed. The inflorescence resembles that of *Myrsine*, but the fruit is that of *Ardisia*.

4. **P. Wallichii**, *A. DC.* in *Ann. Sc. Nat.* 2, xvi. 88, and in *DC. Prodr.* viii. 106; leaves large oblong acute at both ends entire rusty-villous at least on the midrib beneath rarely glabrous, pedicels $\frac{1}{2}$ in. in sessile umbels or corymbs, ovary villous, berry $\frac{1}{4}$ - $\frac{1}{2}$ in. globose glabrous. *Deless. Ic. Sel.* v. t. 31; *Scheff. Myrsin.* 94. *Myrsine pachysandra*, *Wall. in Roxb. Fl. Ind.* ed. *Carey & Wall.* ii. 297, and *Cat.* 2284; *A. DC.* in *Trans. Linn. Soc.* xvii. 111.

PENANG, MALACCA and SINGAPORE; *Wallich, Griffith, Mainyay*.—*DISTRIB.* Malaya.

A large shrub or small tree; branches rusty-villous at the ends. *Leaves* $9\frac{1}{2}$ by $2\frac{3}{4}$ in., base cuneate, primary nerves distinct beneath scarcely inarching, dots small or obscure; petioles $\frac{1}{4}$ in., rusty-villous. *Inflorescence* 1- $1\frac{1}{2}$ in., somewhat lax. *Buds* $\frac{1}{6}$ by $\frac{1}{8}$ in. *Calyx-lobes* $\frac{1}{12}$ in., ovate.

VAR. Teysmanniana, *Hook. f.* in *Gen. Pl.* ii. 647 (sp.); leaves very large more villous beneath, pedicels very stout. *Ardisia Teysmanniana*, *Scheff. Obs. Phyt.* ii. 56.

Malacca; *Mainyay*. *DISTRIB.* Bangka.—A. Korthalsiana, *Scheff. Myrsin.* 57, appears the same thing, but is said to differ by the berry (not seen) being hairy.

7. **ANTISTROPHE**, *A. DC.*

Slender shrubs. *Leaves* alternate, petioled, lanceolate, acuminate. *Flowers* hermaphrodite, rose-coloured; umbels subsessile, axillary; pedicels slender; bracts small. *Calyx* small; lobes 5, lanceolate, persistent. *Corolla* deeply 5-fid, lobes twisted to the left in the bud. *Stamens* 5, in the throat of the corolla, filaments short; anthers free, elliptic-oblong, opening by longitudinal slits, connective produced upwards as a membranous wing. *Ovary* ovoid, narrowed into a slender style, stigma punctiform; ovules several, immersed in a globose free placenta. *Berry* globose, smooth; endocarp chartaceous. *Seed*

solitary, stony when dry, globose, albumen ruminated; embryo transverse.—Species 2; Indian.

1. **A. oxyantha**, *A. DC. in Ann. Sc. Nat.* 2, xvi. 84, and *Prodr.* viii. 92; leaves entire glabrous beneath strongly gland-dotted, buds ovate rostrate-acuminate. *Ardisia oxyantha*, *Wall. Cat.* 2275; *A. DC. in Trans. Linn. Soc.* xvii. 121.

KHASIA, alt. 3–4000 ft.; *Wallich, H. f. & T., &c.*

Shrub 6 ft. high; branches horizontal, nearly glabrous. *Leaves* 6 by $1\frac{1}{2}$ in., caudate-acuminate, base cuneate, nerves prominent beneath inarching; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Pedicels* $\frac{1}{2}$ in., several or few together, fascicled on exceedingly short lateral spurs. *Buds* $\frac{1}{2}$ by $\frac{1}{2}$ in., somewhat suddenly narrowed into a beak, which encloses the membranous tip of the connectives. *Calyx-teeth* $\frac{1}{12}$ in., puberulous, whitened on the margins. *Berries* $\frac{1}{2}$ in. and upwards, globose, smooth, thinly obscurely vertically striate.

2. **A. serratifolia**, *Hook. f. in Gen. Pl.* ii. 647; leaves regularly closely serrate rusty-villous on the nerves beneath, buds conical acute. *Ardisia serratifolia*, *Bedd. Ic. Pl. Ind. Or.* t. 113.

ANAMALLAY and COIMBATORE HILLS, ascending to 3000 feet, in moist woods; *Beddome*.

An erect shrub; branches towards their ends (and all the innovations) rusty-villous. *Leaves* $6\frac{1}{2}$ by $1\frac{3}{4}$ in., acute at both ends; nerves prominent beneath, curving much upwards, inarching; gland-dots small or obscure; petiole $\frac{1}{2}$ in. *Pedicels* $\frac{1}{2}$ in., several or few together, minutely rusty-pubescent, fascicled on exceedingly short lateral spurs. *Buds* $\frac{1}{2}$ by $\frac{1}{2}$ in. *Calyx-teeth* $\frac{1}{16}$ in., pubescent, whitened on the margins. *Corolla-segments* lanceolate-acuminate, gland-dotted. *Berry* not seen.

8. **HYMENANDRA**, *A. DC.*

A robust, low shrub. *Leaves* large, obovate-oblong, crenate-dentate. *Umbels* compound, subsessile, terminal on short lateral branches from near the summit of the stem. *Calyx-lobes* 5, ovate, subacute. *Corolla-lobes* 5, long-lanceolate, strongly twisted to the right in bud. *Stamens* 5, attached at the throat of the corolla, filaments very short; anthers ovoid, connectives dilated above the anther and united into a membranous 5-toothed tube. *Ovary* globose, narrowed into a filiform style, stigma punctiform; ovules several, on a globose sessile placenta. *Berry* globose. *Seed* 1, globose, albumen wrinkled; embryo transverse.

H. Wallichii, *A. DC. in Ann. Sc. Nat.* 2, xvi. 83, t. 5, and *Prodr.* viii. 91. *Ardisia hymenandra*, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 282, and *Pl. As. Rav.* ii. 57, t. 175, and *Cat.* 2266.

KHASIA Mts.; *Wallich*; Mahadeo, alt. 3000 ft., *Griffith*. UPPER ASSAM; *Griffith* (Kew Distrib. n. 3596). CACHAR; Gopal Teela, *Keenan*.

Stem 2–4 ft., erect, stout, usually simple. *Leaves* 10 by 4 in. (or in *Griffith's* example 24 by 10 in.), acute, scarcely acuminate, base attenuate, sometimes rounded or cordate, glabrous or nearly so, primary nerves slender nearly at right angles to the midrib, gland-dots more or less prominent; petiole scarcely $\frac{1}{2}$ in. Lateral floral branches (peduncles) 1–3 in., stout, flattened; bracts $4\frac{1}{2}$ by $\frac{1}{2}$ in., altogether leaf-like, usually 3. *Umbel* usually compound of one subcentral sessile and two lateral peduncled umbellules; pedicels $\frac{3}{4}$ in., very many, rusty-pubescent or ultimately nearly glabrous. *Buds* $\frac{1}{2}$ by $\frac{1}{10}$ in. *Calyx-lobes* $\frac{1}{2}$ in., ovate. *Corolla* red. *Berries* $\frac{1}{2}$ in. diam., globose, scarcely striated.

9. **AMBLYANTHUS**, *A. DC.*

A small, glabrous shrub. *Leaves* petioled, narrowly lanceolate, slightly crenate-serrate. *Umbels* compound, sessile, terminal on lateral branches leafy at their summits. *Flowers* small; buds obtuse. *Calyx-tube* obconic; lobes 5. *Corolla-lobes* 5, obovate, emarginate, twisted to the right in bud. *Stamens* 5, inserted at the throat of the corolla, filaments short; anthers ovate, united by their margins, dehiscing by slits inwards. *Ovary* oblong, narrowed into a short cylindric style; stigma small, discoid; ovules few, immersed in a globose placenta. *Fruit* not known.

A. glandulosus, *A. DC.* in *Ann. Sc. Nat.* 2, xvi. 83, t. 6, and in *DC. Prodr.* viii. 91. *Ardisia glandulosa*, *Roxb. Hort. Beng.* 16, *Fl. Ind. ed. Carey & Wall.* ii. 276; *Wall. Cat.* 2265 (not of *Blume*). *A. Roxburghiana*, *Dietr. Syn. Pl.* i. 617.

SYLHET; Wallich. KHASIA, Mts., alt. 2000 ft.; below Cherra, *H. f. & T.*; *Bor Pani*, below Nunklow, *J. D. H., Simons.*

Leaves 7 by $1\frac{1}{2}$ in., acuminate, denticulate or entire, base cuneate, primary nerves slender, oblique; petiole $\frac{1}{4}$ in. Flowering branches rising obliquely from near the summit of the stem, naked below, peduncle-like, usually with 3-4 leaves near their summit. *Peduncles* 2-3 in., subumbelled, slender, curving; pedicels $\frac{1}{8}$ - $\frac{1}{4}$ in., numerous, subumbelluled; bracteoles 0 or caducous. *Calyx-lobes* $\frac{1}{16}$ in., ovate. *Corolla-lobes* $\frac{1}{16}$ in., but slightly overlapping in the bud, recurved in flower.

10. **ÆGICERAS**, *Gaertn.*

A small, glabrous tree; branches cylindric. *Leaves* scattered, petioled, obovate, entire, coriaceous, 1-nerved. *Umbels* sessile, axillary, terminal or leaf-opposed; bracts 0; pedicels filiform. *Flowers* hermaphrodite, white. *Calyx-lobes* 5, imbricate. *Corolla-tube* short; segments 5, acute, twisted to the right in bud. *Stamens* 5, on the corolla-tube; filaments linear, hairy at the base; anthers cordate-lanceolate, dehiscing longitudinally, cells transversely septate. *Ovary* oblong, narrowed into a filiform style, stigma small; ovules many, immersed in a central globose placenta. *Fruit* cylindric, curved, acute, coriaceous, striated, 1-seeded, at length dehiscing longitudinally. *Seed* conform to the fruit, exalbuminous, germinating within the pericarp; radicle inferior, long, enlarged at the base; cotyledons very short.

Æ. majus, *Gaertn. Fruct.* i. 216, t. 46, fig. 1; *Roxb. Fl. Ind.* iii. 130; *A. DC. in Ann. Sc. Nat.* 2, xvi. t. 9 A, and in *DC. Prodr.* viii. 142; *Wight Ill.* t. 146; *Scheff. Myrsin.* 97; *Dalz. & Gibs. Bomb. Fl.* 137; *Bedd. Fl. Sylv. Anal. Pl.* xix. fig. 3. *Æ. fragrans*, *Koen. Ann. Bot.* i. 129, t. 3; *Wall. Cat.* 2326; *Wight in Hook. Bot. Misc.* iii. 84, t. 21; *Grab. Cat. Bomb. Pl.* 104; *Griff. Notul.* iv. 294. *Æ. obovatum and ferreum*, *Blume Bijl.* 693. *Æ. floridum*, *Roem. & Sch. Syst.* iv. 512; *A. DC. in DC. l. c.* 143; *Scheff. l. c.* 99. *A. nigricans*, *A. Rich. in Voy. Astral.* ii. 57, t. 21; *A. DC. l. c.* *Æ. minus*, *A. DC. l. c.* (not of *Gaertn.*). *Æ. Malaspinaea*, *A. DC. l. c.* *Æ. corniculata*, *Blanco Fl. Filip.* 79; *Kurz For. Fl.* ii. 114, and in *Journ. As. Soc.* 1879, pt. ii. 227. *Rhizophora corniculata*, *Linn. Sp. Pl.* 635. *R. Ægiceras*, *Linn. Syst. Nat. ed. Gmel.* vii. 747. *Malaspinaea laurifolia*, *Presl. Rel. Haenk.* ii. 68, t. 61.—*Rheede Hort. Mal.* vi. t. 36.

Sea-coasts, from SCINDE to SINGAPORE, especially in the mangrove swamps.—**DISTRIB.** Tropical shores nearly of the whole world.

A shrub, or tree 15-20 ft. *Leaves* 3 by $1\frac{1}{2}$ in., obtuse, base cuneate; petiole $\frac{1}{2}$ in. *Pedicels* $\frac{1}{2}$ in., numerous. *Calyx-lobes* $\frac{1}{2}$ in., broad, much imbricate, persistent, closely embracing the base of the fruit. *Corolla-lobes* $\frac{1}{4}$ in., almost horny. *Anthers* exserted, versatile. *Fruits* 1- $1\frac{1}{2}$ by $\frac{1}{8}$ in., tapering to an acute apex.

11. **REPTONIA**, *A. DC.*

A small tree, spinous or unarmed; branches hoary. *Leaves* short-petioled, obovate, entire, coriaceous. *Flowers* small, hermaphrodite, axillary, sessile in tufts; bracteoles small. *Calyx-lobes* 5, round, imbricate. *Corolla-tube* short: lobes 5, oblong, obtuse, contorted or imbricate. *Stamens* 5, alternating with 5 lanceolate-subulate staminodes, filaments linear; anthers oblong. *Ovary* hairy, ovoid, narrowed into a cylindric style, stigma small: ovules 5-7, basal, erect, anatropous. *Fruit* globose, fleshy, crowned by the style-base, 1- (rarely 2-) seeded. *Seed* globose, hollowed at the base, albumen ruminated; embryo axile, elongate, curved, cotyledons long, radicle short next the hilum.

***R. buxifolia*, A. DC. Prodr. viii. 153; Boiss. Fl. Orient. iv. 32; Brand. For. Fl. 287, t. 34. Edgeworthia buxifolia, Falconer in Proc. Linn. Soc. i. 129, and in Trans. Linn. Soc. xix. 99, t. 9. Edgeworthia sp., Griff. Notul. iv. 295, and Ic. Pl. Asiat. t. 498. Monotheca muscatensis, A. DC. l. c.: Deless. Ic. Sel. v. t. 35.**

PESHAWUR; *Falconer, Stewart*.—DISTRIB. Afghanistan, Muscat.

Leaves $1\frac{1}{2}$ by $\frac{3}{4}$ in., obtuse, base cuneate, margin recurved, glabrous above glaucous beneath; petiole hardly $\frac{1}{8}$ in. *Calyx-lobes* less than $\frac{1}{30}$ in., acute, rusty-puberulous. *Corolla* scarcely $\frac{1}{16}$ in., greenish-yellow. *Berry* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.

ORDER LXXXIX. **SAPOTACEÆ.** (By C. B. Clarke.)

Trees or shrubs; young parts often rusty-tomentose. *Leaves* alternate (sub-opposite in *Sarcosperma*), coriaceous, entire, petioled; stipules 0 or very caducous. *Flowers* hermaphrodite, small or medium-sized, axillary; pedicels clustered, rarely solitary (in *Sarcosperma* flowers paniced); bracts and bracteoles 0, or minute. *Calyx-lobes* 4-8, much imbricated, or 2-seriate with the outer series valvate, persistent. *Corolla-tube* shorter than the calyx, lobes as many, or 2-4 times as many as the calyx-lobes. *Stamens* upon the corolla-tube, as many as the corolla-lobes and opposite to them, or 2-3 times as many, 1-3-seriate; filaments usually short; anthers oblong-lanceolate, connective often produced; staminodes, when present, alternating with the stamens. *Ovary* superior, sessile, 2-8-celled; style linear, stigma a point; ovules solitary in each cell, usually attached to the inner angle. *Berry* indehiscent, 1-8-seeded. *Seeds* ellipsoid; or, if more than one, often compressed, hilum long, testa usually crustaceous; embryo straight, exalbuminous with large fleshy cotyledons, or albuminous with flat cotyledons; radicle inferior, usually small.—DISTRIB. Species 320, in the tropics of the whole world.

ACHRAS SAPOTA, *Linn.* (= *Mimusops Manilkara*, *Don*) is cultivated in India for its fruit.

Fruiting branchlets have been communicated by Mr. Cantley, from Perak, of a tree 80-100 ft. high, which yields gutta plentifully: the 4-merous calyx, fruits, and leaves are as in *Isonandra*, but the single fragment of a flower indicates a funnel-shaped corolla $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; it is attached, and appears to have the remains of many stamens and scales in the corolla-tube. The fragments (not the flowers) are figured by Beauvisage (*Gutta-percha*, t. 2); and the tree is identified by him with *Keratephorus Leerii*, Hassk., erroneously, for in this the corolla is very small. Without fuller material this tree cannot be safely referred to any genus; the pedicels of the fruits are $1\frac{1}{2}$ in. long, scattered towards the ends of the branchlets, not well agreeing with *Isonandra* or *Dichopsis*.

* *Calyx-lobes 1-seriate, imbricated* (see also *Bassia butyracea*), *stamens 5-6*.

Staminodes 0	1. CHRYSOPHYLLUM.
Staminodes present, flowers sessile or paniced	2. SARCOSPERMA.
Staminodes present, pedicels axillary clustered :	3. SIDEROXYLON.

** *Calyx-lobes 2-seriate, outer series valvate*.

† *Calyx-segments 4*.

Stamens 8 (in <i>I. diplostemon</i> 16)	4. ISONANDRA.
Stamens 12-40, corolla lobed half way down	6. BASSIA.
Stamens 12-24, corolla deeply lobed	7. PATENA.

†† *Calyx-segments 6-8*.

Staminodes 0	5. DICHOPSIS.
Staminodes present	8. MIMUSOPS.

1. **CHRYSOPHYLLUM**, Linn.

Trees. *Leaves* coriaceous, exstipulate. *Flowers* small, in axillary fascicles. *Calyx-lobes* 5-6, subequal, imbricated. *Corolla-lobes* 5-6, entire, imbricate. *Stamens* 5-6, attached at the base of the corolla-lobes; filaments short, linear; anthers ovate; staminodes 0. *Ovary* 5-6- (rarely 7-10-) celled, villous; style cylindric. *Berry* fleshy, globose. *Seeds* 5-6 (or fewer), testa coriaceous, hilum elongate, albumen copious or scanty.—Species 60; tropical, mostly American; a few in Africa, Asia and Australia.

C. Roxburghii, G. Don *Gen. Syst.* iv. 33; leaves oblong-lanceolate acuminate glabrous, base cuneate, pedicels $\frac{1}{2}$ in., filaments and style short. *A. DC. Prodr.* viii. 162; *Dalz. & Gibs. Bomb. Fl.* 139; *Bedd. Fl. Sylv.* t. 236; *Kurz For. Fl.* ii. 118, and in *Journ. As. Soc.* 1877, pt. ii. 228. *C. acuminatum*, *Roxb. Fl. Ind.* i. 599; *Wall. Cat.* 4160, not of Lamk.

ASSAM; Goalpara, Hamilton. KHASIA; Mariau, alt. 3000 ft., Clarke. SILHET; Wallich. PEGU; Kurz. MALACCA; Griffith, Maingay.

Attains 40-60 ft. *Leaves* 5 by $1\frac{1}{2}$ in., parallel-sided, the acumination often sudden into a short obtuse tail, shining, primary nerves very numerous and close, nearly horizontal, uniting within the margin; petiole $\frac{1}{2}$ in. *Corolla-lobes* $\frac{1}{12}$ in., obtuse, minutely rusty-pilose. *Corolla-tube* $\frac{1}{16}$ in., filled with rusty hairs; lobes $\frac{1}{16}$ in. *Anthers* included, slits introrse or sublateral. *Style* cylindric, as long as the corolla, obscurely lobed. *Fruit* $1\frac{1}{4}$ in., globose, pulpy, yellow, eaten by the Khasis, when dried strongly 5-6-angled. *Seeds* 5-6, $\frac{1}{2}$ by $\frac{1}{4}$ in., compressed, very hard.

VAR. sumatrana, Miq. *Fl. Ind. Bat. Suppl.* 579 (sp.); leaves rusty-villous on the midrib beneath.—From the Concan southwards and Ceylon, up to 4000 ft. alt.; *Dalzell, Thwaites, &c.*—DISTRIB. Sumatra.

2. **SARCOSPERMA**, Hook. f.

Trees. *Leaves* subopposite, oblong, acuminate, coriaceous; stipules caducous. *Flowers* small, fascicled on the branches of a simple or compound panicle, minutely bracteoid. *Calyx-segments* 5, round, subequal, strongly imbricated. *Corolla-tube* short; lobes 5, round, imbricated. *Stamens* 5, on the corolla-tube; filaments short; anthers oblong, obtuse; staminodes 5, small, oblong-linear. *Ovary* glabrous, 2-1-celled; style cylindric; ovules ascending. *Berry* ellipsoid, large, 2-1-celled, 2-1-seeded. *Testa* crustaceous, hilum nearly basal, albumen 0; embryo fleshy.—Species 3; in North-east India, Birma, Hongkong.

1. S. arboreum, Benth. in *Gen. Pl.* ii. 655; leaves large with pits in the axils of the primary nerves beneath, panicle and calyx pubescent-

villous. *Kurz in Journ. As. Soc.* 1877, pt. ii. 229. *Sideroxylon arboreum*, *Herb. Ham.*—*Celastrinea*, *Wall. Cat.* 9011. *Sapotea*, *Griff. Notul.* iv. 291, and *l.c. Pl. Asiat.* t. 501.

SIKKIM and KHASIA, alt. 0-4000 ft.; *Hamilton, &c.* PATKOYE Mts. (in South-east Assam); *Griffith* (Kew Distrib. n. 3603).

A large, bushy tree. *Leaves* 9 by 2 in., parallel-sided, rarely somewhat obovate, suddenly shortly acuminate, base rhomboid, secondary nerves very prominent beneath; petiole $\frac{1}{2}$ in. *Spikes* in panicles 2-8 in.; flowers densely fascicled. *Calyx* $\frac{1}{10}$ - $\frac{1}{8}$ in. *Corolla-tube* scarcely $\frac{1}{12}$ in., without hairs within; lobes $\frac{1}{12}$ - $\frac{1}{10}$ in. *Fruit* 1 by $\frac{3}{4}$ in., and $\frac{1}{2}$ in. thick; 1-seeded fruits only $\frac{1}{2}$ in. broad, obtuse; calyx-lobes persistent, deflexed.—*Leaves* sometimes somewhat obovate, but never so broad as in *Griff. l.c. Pl. Asiat.* t. 501, which may represent a different species; for *Griffith's* Patkoye example (from which this t. 501 is supposed to be taken) has leaves 9 by 2 in., exactly parallel-sided.

2. **S. Griffithii**, *Benth. in Cn. Pl.* ii. 655; leaves lanceolate coriaceous, panicle and calyx glabrous. *Sideroxylon* sp. 10, *Herb. Ind. Or. H. f. & T.*

KHASIA and JAINTEA Mts., alt. 3-5000 ft.; *Griffith* (Kew Distrib. n. 3602); *H. f. & T.*, &c.

A large tree. *Leaves* 5 by $1\frac{1}{2}$ in., secondary nerves not prominent, no pits in the axils of the leaves beneath. *Inflorescence* nearly as in *S. arboreum*. *Fruit* unknown.—Nearly allied to *S. arboreum*; the leaves are smaller.

3. **SIDEROXYLON**, *Linn.*

Trees. *Leaves* alternate, lanceolate elliptic or obovate, exstipulate. *Flowers* small, in axillary fascicles, subsessile or shortly pedicelled; pedicels pubescent villous or tomentose. *Calyx-segments* 5, much imbricated, subequal. *Corolla-tube* campanulate; lobes 5, imbricated. *Stamens* 5 (perfect), attached to the base of the corolla-lobes, filaments short or linear; anthers ovate or lanceolate; staminodes 5, lanceolate. *Ovary* villous, rarely nearly glabrous, 5- (more rarely 4-2-) celled; style cylindric, short or long. *Berry* ovoid or globose, 5-4- (or 3-1-) seeded. *Seeds* albuminous, usually oblong, much compressed, testa hard, hilum long.—Species 60, tropical, and a few subtropical.

* *Calyx-lobes* not acute. *Buds* obtuse.

1. **S. grandifolium**, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 348, and *Cat.* 4155; branchlets glabrous, leaves obovate-oblong glabrous, pedicels 0- $\frac{1}{2}$ in. minutely pubescent, calyx nearly glabrous. *A. DC. Prodr.* viii. 178; *Kurz For. Fl.* ii. 117, and in *Journ. As. Soc.* 1877, pt. ii. 228. *S. regium*, *Wall. Cat.* 4156, A.

SILHET; *Wallich*. KHASIA; alt. 3000 ft., below Cherra, *H. f. & T.* PEGU; *Wallich*. MARTABAN; *Kurz*.

A large tree. *Leaves* 10 by $3\frac{1}{2}$ in., acute, tapering at the base, primary nerves strong beneath; petiole 1 in. *Pedicels* densely clustered along the branches below the leaves crowded at their extremities, upon very short spurs. *Calyx-lobes* $\frac{1}{2}$ in., much imbricated, inner pubescent. *Corolla* whitish, hardly longer than the calyx. *Staminodes* lanceolate-linear. *Berry* (*vide* *Kurz*) globular, size of an apple, smooth, yellow then brown, 5-10-seeded.

2. **S. Maingayi**, *Clarke*; branchlets rusty-pubescent, leaves obovate-oblong shortly acute base tapering nearly glabrous, pedicels 0- $\frac{1}{2}$ in. and calyx closely rusty-pubescent.

MALACCA; *Maingay* (n. 993).

A tree; leaves crowded towards the end of the branches. *Leaves* 6 by $2\frac{1}{2}$ in.,

rusty-pubescent when young, ultimately glabrous or slightly rusty along the midrib beneath, primary nerves 8 each side, prominent; petiole 1 in. *Inflorescence* densely fasciculate, subsessile along the naked part of the branches below the terminal leaves. *Calyx-lobes* $\frac{1}{6}$ in., rounded. *Corolla* little exceeding the calyx. *Staminodes* lanceolate-linear. *Berry* $1\frac{1}{2}$ in. diam., globular, ultimately smooth. *Seeds* $\frac{1}{4}$, $\frac{2}{3}$ by $\frac{1}{4}$ in., compressed, testa hard shining, hilum long.

3. **S. malaccense**, Clarke; branchlets rusty subtomentose, leaves broadly obovate obtuse at both ends nearly glabrous, pedicels $0\frac{1}{2}$ in. and calyx rusty-villous.

MALACCA; Maingay (n. 994).

Leaves crowded towards the ends of the thick branchlets, 7 by $4\frac{1}{4}$ in., very coriaceous, ultimately glabrous, or rusty-tomentose along the midrib beneath; primary nerves 10–11 each side, prominent; petiole $1\frac{1}{2}$ –2 in. *Inflorescence* fasciculate, along the naked part of the branches below the terminal leaves. *Calyx-lobes* $\frac{1}{2}$ in., rounded. *Corolla* nearly $\frac{1}{2}$ in. *Staminodes* lanceolate-linear. *Fruit* not seen.—Allied to *S. Maingayi*, differing in the larger flowers and more obtuse leaves.

4. **S. ferrugineum**, Hook. & Arn. Bot. Beech. Voy. 266, t. 55; branchlets rusty, leaves oblong-elliptic base attenuate ultimately nearly glabrous, secondary nerves prominent, pedicels $\frac{1}{2}$ in. rusty-pubescent, calyx-lobes scarious-margined nearly glabrous. A. DC. Prodr. viii. 178. *S. attenuatum*, A. DC. l. c.; Wight Ic. t. 1590; Kurz For. Fl. ii. 117, and in Journ. As. Soc. 1877, pt. ii. 229. *Mimusops*? attenuata, Wall. Cat. 4150.

MALAY PENINSULA; from Mergui to Singapore, and the ANDAMANS; Wallich, Griffith, &c. NICOBARS; Kurz.—DISTRIB. Malay Archipelago to the Philippines and S. China.

A small tree. Leaves 3 by $1\frac{1}{4}$ in., obtuse or scarcely acute, ferruginous-silky (when young) beneath, coriaceous, shining above; primary nerves 10 on each side, often scarcely more prominent than the secondary; petiole $\frac{1}{2}$ in. *Inflorescence* fascicled in the axils of both persistent and fallen leaves. *Calyx-lobes* $\frac{1}{2}$ in., round. *Corolla-tube* campanulate, sparingly hairy at the base within. *Stamens* (fertile) exserted; filaments linear, longer than the round anthers. *Staminodes* oblong, acute, undulate. *Berry* $\frac{1}{3}$ – $\frac{1}{2}$ in., shining, smooth, 1–2-seeded; when 1-seeded obliquely ellipsoid.

5. **S. Hookeri**, Clarke; leaves large oblong-lanceolate acuminate, mature glabrous, pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. rusty-villous, calyx-lobes ovate hardly acute. *Sideroxylon* sp. n. 4, Herb. Ind. Or. H. f. & T.

SIKKIM; alt. 6000 ft., J. D. H. BHOTAN; alt. 2800 ft., Griffith (Kew Distrib. n. 3601).

Branchlets glabrous, tips rusty-villous. Leaves $7\frac{1}{2}$ by $2\text{--}2\frac{1}{4}$ in., long-acuminate, base cuneate, young rusty-villous, soon glabrescent; primary nerves 12–15 on each side, prominent; petiole $\frac{3}{4}$ in. *Calyx-lobes* nearly $\frac{1}{2}$ in., villous. *Corolla* $\frac{1}{2}$ in. long and upwards, segments scarcely pubescent without. *Anthers* oblong, acute, exserted. *Staminodes* linear-lanceolate. *Ovary* densely villous. *Fruit* not seen.—This may be a form of the next species which the leaves closely resemble; but the calyx-lobes are blunter, the buds not lanceolate upwards.

** *Calyx-lobes acute. Buds narrow, tips conical.*

6. **S. assamicum**, Clarke; leaves broadly lanceolate or elliptic acuminate membranous when mature glabrous or with deciduous sparse floccose tomentum beneath, pedicels $\frac{1}{4}$ in. and calyx densely rusty-villous. *S. tomentosum*, Wall. Cat. 4153 partly, not of Roxb.

ASSAM; Jenkins, Masters. CACHAR; Keenan.

A tree with grey bark (Keenan); branchlets villous. Leaves 6 by $2\text{--}2\frac{1}{4}$ in., dark

green, acute, shortly-acuminate, rhomboid at the base, primary nerves 12-15 on each side; petiole $\frac{1}{4}$ in. *Calyx-lobes* $\frac{1}{2}$ in., oblong-lanceolate, villous. *Corolla* $\frac{1}{4}$ in. and upwards, segments acute, nearly glabrous. *Stamens* and staminodes as in *S. tomentosum*. *Fruit* (unripe) 1 by $\frac{1}{3}$ in., acute upwards, glabrescent.—This has been supposed a var. of *S. tomentosum*, but the leaves are always acute; none of the numerous examples are spinescent.

7. *S. tomentosum*, *Roxb. Cor. Pl.* 28, t. 28, and *Fl. Ind.* i. 602; leaves elliptic or obovate not acute coriaceous, mature glabrous or tomentose beneath, pedicels $\frac{1}{4}$ in. and calyx densely fulvous-woolly. *Wall. Cat.* 4153, chiefly; *Grah. Cat. Bomb. Pl.* 1057; *Kurz For. Fl.* ii. 116, and in *Journ. As. Soc.* 1877, pt. ii. 228. *S. armatum*, *Roth Nov. Sp.* 138; *Kurz in Journ. As. Soc.* 1877, pt. ii. 228. *Sapota tomentosa*, *A. DC. Prodr.* viii. 175; *Dalz. & Gibs. Bomb. Fl.* 139. *S. armata*, *A. DC. l. c.* 176. *S. elengoides*, *A. DC. l. c.* 177; *Wight Ic.* t. 1218. *Achras tomentosa*, *Bedd. For. Man.* 142. *A. elengoides*, *Bedd. Fl. Sylv.* t. 235.

MTS. of MALABAR and CEYLON; from the Concan southwards; common. PEGU and MARTABAN (*vide* Kurz).

A small or moderate-sized tree; branchlets woolly. *Leaves* $1\frac{1}{2}$ - $4\frac{1}{2}$ by $\frac{3}{4}$ -2 in.; tips obtuse or triangular, base cuneate, primary nerves 10-12 on each side; petiole $\frac{1}{2}$ in. *Calyx-lobes* $\frac{1}{2}$ in., oblong-lanceolate, woolly. *Corolla* $\frac{1}{4}$ in. and upwards, segments acute, nearly glabrous. *Anthers* oblong-lanceolate, exserted; staminodes linear-lanceolate. *Berry* $\frac{3}{4}$ -1 by $\frac{1}{2}$ - $\frac{3}{4}$ in., ultimately smooth, yellow, 5-4- (or 3-1-) seeded.

IMPERFECTLY KNOWN SPECIES.

8. *S. ? GAMBLEI*, *Clarke*; leaves elliptic acute, fruit $1\frac{1}{2}$ by $\frac{2}{3}$ in. ellipsoid narrowed upwards 1-seeded. *Chrysophyllum* sp., *Gamble ms.*

SIKKIM; Rungbee, alt. 5000 ft., *Gamble*.

A tree; shoots minutely rusty-villous. *Leaves* $7\frac{1}{2}$ by $2\frac{3}{4}$ in., acuminate, base rhomboid or broadly cuneate, mature glabrous, glossy beneath; primary nerves 10-12 on each side, much raised beneath, secondary obscure; petiole 1 in. *Pedicels* axillary, fascicled, in fruit $\frac{1}{2}$ in. *Calyx-lobes* 5, (in fruit) $\frac{1}{2}$ in., ovate, obtuse, minutely villous, deflexed. *Corolla* not seen. *Fruit* smooth, symmetric; exocarp fleshy, small; endocarp, firm, rather thick, sinuously grooved without. *Seed* conform to the fruit, albumen fleshy, a deep black-blue; embryo small.—Almost certainly belonging to this order; but the genus (while flowers are unknown) is doubtful.

4. *ISONANDRA*, *Wight*.

Trees. *Leaves* alternate, petioled, coriaceous, glabrous, primary nerves distinct. *Flowers* small, rusty or villous, in axillary clusters, subsessile or shortly pedicelled. *Calyx-segments* 4, subequal, imbricated. *Corolla* deeply 4-lobed, somewhat longer than the calyx. *Stamens* 8, all perfect, attached near the base of the corolla, filaments short; anthers oblong-lanceolate, base sagittate; staminodes 0. *Ovary* villous, 4-celled; style linear. *Berry* ellipsoid, usually 1-seeded, flattened, smooth; pericarp crustaceous. *Testa* hard shining, hilum lateral, albumen fleshy; embryo large, cotyledons elliptic flat.—Species 6, in South India and Ceylon; 1 in the Sandwich Islands.

In the opinion of Thwaites and Beddome, who are well acquainted with this genus in the field, all the Indian species of Wight and A. DC. are varieties of one.

1. *I. villosa*, *Wight Ic.* t. 360; leaves broadly elliptic rounded at both ends glabrous, secondary nerves closely reticulated, flowers sessile on very short thick lateral spurs. *A. DC. Prodr.* viii. 188.

SOUTH DECCAN; Quilon, *Wight*.

Branches thick, obscurely rusty, scarcely pubescent at the tips. *Leaves* $2\frac{3}{4}$ by $1\frac{3}{4}$ in., young glabrous, primary nerves $\frac{1}{2}$ in. apart; petiole $\frac{1}{10}$ in., minutely rusty.

Inflorescence in sessile clusters at the summits of thickly scarred naked spurs 0- $\frac{1}{4}$ in. long. *Calyx-lobes* $\frac{1}{10}$ in., ovate, rounded, minutely sparsely silky or glabrescent upwards. *Berry* $\frac{1}{2}$ by $\frac{1}{5}$ in.—The most glabrous species of the genus. In Wight's specimen (figured in Ic. t. 360) the young leaves and shoots are as described above, and no part of the plant is villous. The species seems well distinct by the short petiole, the very rounded leaf-base, the very fine reticulation of the secondary nervation.

2. **I. Candolliana**, *Wight Ic. t. 1220*; leaves elliptic obtuse or scarcely acute, secondary nerves distinct of close subparallel lines, flowers subsessile in the axils of leaves, anther-tips villous. *Dalz. & Gibs. Bomb. Fl. 139*. I. Perottetiana, *A. DC. Prodr. viii. 188, partly*.

NILGHERRY MTS.; *Wight, Gardner*.

Shoots minutely rusty-silky. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., not acuminate, base cuneate, margins little recurved when dry, primary nerves $\frac{1}{4}$ - $\frac{1}{3}$ in. apart; petiole $\frac{1}{4}$ in. *Flowers* nearly as in *I. villosa*. *Berry* $\frac{3}{4}$ by $\frac{1}{4}$ in.—Only distinguishable from the next by the hairy anther-tips and more membranous leaves. *A. DC.* says his *I. Perottetiana* had the anthers pilose at the tips, but Wight split this species into two, whereof his *I. Candolliana* has the anther-tips pilose, his *I. Perottetiana* has them glabrous.

3. **I. Perottetiana**, *Wight Ic. t. 1219*; leaves elliptic obtuse or subacute, secondary nerves obscure of close subparallel lines, flowers subsessile axillary, anther-tips glabrous. *A. DC. Prodr. viii. 188, partly*.

NILGHERRY MTS.; *Wight, Gardner, Sir F. Adam*.

4. **I. Stocksii**, *Clarke*; leaves elliptic-obovate obtuse, secondary nerves somewhat laxly reticulated, flowers sessile on very short thick lateral spurs.

CONCAN; *Stocks*.

Branchlets thick. *Leaves* $4\frac{1}{2}$ by $2\frac{1}{2}$ in., base cuneate, primary nerves $\frac{1}{2}$ - $\frac{3}{4}$ in. apart; petiole $\frac{1}{5}$ in. *Flowers* as in *I. villosa*.—This, by the leaves clustered at the summits of the branches, and by the inflorescence, approaches *I. villosa*, but the primary and secondary nervation of the leaves is different.

5. **I. lanceolata**, *Wight Ic. t. 359, not of Thwaites*; leaves lanceolate obtusely acuminate, secondary nerves distinct subparallel, flowers nearly sessile in the axils of persistent leaves. *A. DC. Prodr. viii. 187*. *Sideroxylon Wightianum, Wall. Cat. 4154*.

SOUTH DECCAN PENINSULA; Coimbatore and Quilon, *Wight*; Nilgherry Mts., *G. Thomson*; Anamallays, *Beddome*. CEYLON; *Dr. Kelaart*.

Branches not thick. *Shoots* minutely rusty-silky. *Leaves* 5 by $1\frac{3}{4}$ in. (in Wight's type specimen), usually smaller, base cuneate, primary nerves $\frac{1}{4}$ - $\frac{1}{2}$ in. apart, secondary prominent, slightly waved; petiole $\frac{1}{4}$ in. *Calyx-lobes* $\frac{1}{8}$ in., ovate, obtuse. *Berry* $\frac{2}{3}$ by $\frac{1}{2}$ in.

VAR. aufractuosa; leaves obovate-elliptic abruptly shortly acuminate, secondary nerves conspicuous strongly curved so as to cross each primary at right angles, calyx-segments lanceolate subobtuse.—Cochin; Valla Candoo, *Wight*.—Buds longer than in *I. lanceolata*, of which this appears a fine variety.

6. **I. Wightiana**, *A. DC. Prodr. viii. 187*; leaves elliptic sub-obtuse, primary nerves distant secondary laxly reticulated obscurely subparallel, flowers nearly sessile in the axils of persistent leaves. *Thwaites Enum. Pl. Zeyl. 177*. *S. tomentosum, Wall. Cat. 4153*. *Bassia Wightiana, Bedd. For. Man. 141*.

CEYLON; common, *Wight, Gardner, Thwaites, &c.*

Perhaps not separable from *I. lanceolata*. *Leaves* commonly $3\frac{1}{2}$ by $1\frac{1}{2}$ in., but very variable. The following varieties have been noticed:—

VAR. major; leaves 9 by $1\frac{3}{4}$ in., acuminate, green, primary nerves 1- $1\frac{1}{4}$ in. apart,

secondary nerves subparallel.—*Thwaites* n. 45.—This approaches *I. lanceolata* in the acuminate leaves, but otherwise is not like it. A smaller form of this has the leaves $5\frac{1}{2}$ by $\frac{3}{4}$ in., rostrate.

VAR. *angustata*; leaves $3\frac{1}{2}$ by $\frac{1}{2}$ in. obtuse.—*Thwaites* nn. 179, 191.

VAR. *acuminata*, Gardn. ms.; leaves broadly obovate-oblong abruptly obtusely acuminate.—This is perhaps near *I. lanceolata* var. *anfractuosa*.

VAR. *montana*, *Thwaites* Enum. 177; leaves elliptic-obovate obtuse coriaceous, secondary nerves reticulated not subparallel.—*Thwaites* n. 3092.—Hardly differs from *I. Wightiana* type.

VAR. *compta*, *Thwaites* ms.; mature leaves densely silky beneath with rich brown hair.—*Thwaites* n. 3912.

ANOMALOUS SPECIES.

7. *I. DIPLOSTEMON*, *Clarke*; leaves elliptic-obovate obtuse glabrous, stamens 15–18. —*Diospyros* obovata, *Wight* Ic. t. 1226.

DECCAN PENINSULA; *Wight*.

Leaves 5 by $2\frac{3}{4}$ in., base obtuse or rounded; petiole $\frac{1}{2}$ in. Flowers small, minutely rusty-villose, in axillary fascicles. Calyx-lobes 4, $\frac{1}{10}$ in., imbricate. Corolla-lobes 5–6. Stamens 15–18, 1-seriate, filaments short hairy; anthers lanceolate, acuminate. —*Wight's* examples are good, but have buds only: these so closely resemble those of *Isonandra* that *Beddome* (in *For. Man.* 238) considers this species as merely an anomalous state of *Isonandra Wightiana*. The figure of *Wight* accurately shows the style; there is hardly any trace of a cavity in the ovary, far less of an embryo; but in this respect it agrees with the neighbouring species of *Sapotaceæ* at the same early stage of development: there is no ground for supposing these buds male.

5. *DICHOPSIS*, *Thwaites*.

Trees; shoots rusty-tomentose. Leaves obovate or oblong, petioled, coriaceous. Flowers fascicled, axillary, or on the naked branchlets below a terminal tuft of leaves. Calyx-lobes 6, 2-seriate, outer 3 valvate, inner 3 imbricate. Corolla-lobes 6, imbricated or contorted. Stamens 12–18 (usually 12), attached near the base of the corolla, 1-seriate or the alternate a little higher up, filaments short or long; anthers lanceolate, dehiscence extrorse or lateral, connective produced acute or bifid; staminodes 0. Ovary villous, 6-celled or (*vide Thwaites*) rarely 4–3-celled; style linear. Berry fleshy, ellipsoid or ovoid, 2–1-seeded. Seed exalbuminous, testa crustaceous; cotyledons large, fleshy. —Species 30, in S. India, the Malay peninsula and islands; 1 in Samoa.

* *Species of Ceylon.*

1. *D. petiolaris*, *Thwaites* Enum. 176; leaves long-petioled elliptic cuneate at both ends, pedicels 1 in. rusty-tomentose. *Bassia petiolaris*, *Bedd. For. Man.* 140, and *Fl. Sylv.* t. 254.

CEYLON; Ambagamowa district, Hinidoon and Reigam Corles, *Thwaites*.

A large tree. Leaves 4 by 1–3 in., broadly or narrowly elliptic, glabrous, coriaceous, primary nerves distinct oblique, secondary laxly irregularly reticulated, not prominent; petiole $\frac{3}{4}$ – $1\frac{1}{4}$ in. Pedicels 2–5 together, clustered near the end of the branches. Calyx-lobes $\frac{1}{4}$ – $\frac{1}{2}$ in., ovate, subacute, rusty-tomentose. Corolla $\frac{2}{3}$ in., white, tube hairy within. Stamens 12; filaments short; anthers minutely 2-horned at the apex, 6 opposite the corolla-lobes subextrorse, 6 alternate subintrorse. Ovary 6-celled. Fruit $1\frac{1}{4}$ in. diam., on erect much thickened pedicels, subspherical, 1-seeded.

2. *D. grandis*, *Benth.* in *Gen. Pl.* ii. 658; leaves obovate obtuse or abruptly shortly acuminate, pedicels $\frac{1}{2}$ –1 in. rusty-tomentose. *Isonandra grandis*, *Thwaites* Enum. *Pl. Zeyl.* 176. *Bassia grandis*, *Bedd. Fl. Sylv.* t. 254.

CEYLON; alt. 6000 feet, *Walker*, &c.

A huge tree. Leaves 10 by $4\frac{1}{4}$ in., base cuneate, glabrous; petiole $\frac{3}{4}$ in. Pedicels

densely clustered, sometimes near the end of the branches, more often distant therefrom. *Calyx-lobes* $\frac{1}{4}$ – $\frac{1}{3}$ in., ovate, subacute, rusty-tomentose. *Corolla* $\frac{3}{4}$ in., white. *Stamens* 12, filaments as long as the anthers; anthers apiculate, extrorse. *Ovary* 6-celled. *Berry* 1– $1\frac{1}{2}$ in., ovoid, black. *Seeds* used for oil.

VAR. parvifolia; leaves 2 by 1 in., pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in.—There are numerous examples intermediate between this and *D. grandis* type.

3. ***D. rubiginosa***, *Benth. in Gen. Pl.* ii. 658; leaves obovate-oblong obtuse rusty-tomentose beneath, pedicels $\frac{3}{4}$ –1 in. rusty-tomentose. *Isonandra rubiginosa*, *Thwaites Enum.* 177. *Bassia rubiginosa*, *Bedd. For. Man.* 141.

CEYLON; up to 4000 ft., Saffragam district and Hinidoon Corle, *Thwaites*.

A huge tree. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ – $1\frac{3}{4}$ in., base cuneate, very coriaceous, ultimately nearly glabrous; petiole $\frac{1}{2}$ in. *Pedicels* 6–10 together, stout, subterminal or lateral. *Calyx-lobes* $\frac{1}{2}$ in. and upwards, ovate, subacute. *Stamens* 12; filaments shorter than the apiculate anthers. *Ovary* 6-celled. *Berry* ovoid.—Flowers rather larger than in the two foregoing species.

4. ***D. canaliculata***, *Benth. in Gen. Pl.* ii. 658; leaves oblong shortly cuneate at both ends, pedicels 1 in. hardly crowded sparingly fulvous-tomentose. *Isonandra canaliculata*, *Thwaites Enum.* 177. *Bassia canaliculata*, *Bedd. For. Man.* 141.

CEYLON; Caltura district, *Thwaites*, *Gen. Walker*.

A medium-sized tree. *Leaves* 10 by $4\frac{1}{4}$ in. to $2\frac{1}{2}$ by $1\frac{1}{4}$ in., glabrous, midrib channelled above or nearly plane; petiole $\frac{3}{4}$ –2 in. *Pedicels* 2–4 together, lateral or terminal, less crowded than in the three foregoing species. *Calyx-lobes* $\frac{1}{2}$ in., broad-triangular. *Ovary* 6-celled. *Berry* ellipsoid.—The channelling of the midrib of the leaf above, characteristic of *Thwaites*' large specimens, entirely disappears in some of the small examples.

5. ***D. pauciflora***, *Benth. in Gen. Pl.* ii. 658; leaves narrowly elliptic obtusely acuminate, pedicels 0– $\frac{1}{2}$ in. rusty-tomentose. *Isonandra pauciflora*, *Thwaites Enum. Pl. Zeyl.* 177. *Bassia pauciflora*, *Bedd. For. Man.* 141.

CEYLON; near Ratnapoora, at no great elevation, *Thwaites*.

A medium-sized tree. *Leaves* 7 by $2\frac{1}{4}$ in., base cuneate, glabrous, primary nerves distinctly inarching; petiole $\frac{3}{4}$ in. *Calyx-lobes* $\frac{3}{8}$ – $\frac{1}{2}$ in., elliptic, rusty-tomentose. *Corolla* $\frac{1}{2}$ in. *Ovary* 3–4-celled. *Berry* oblong.

6. ***D. lævifolia***, *Benth. in Gen. Pl.* ii. 658; leaves narrowly obovate-oblong obtuse or subacute, pedicels $\frac{3}{4}$ in. closely pilose. *Isonandra lævifolia*, *Thwaites Enum.* 177. *Bassia lævifolia*, *Bedd. For. Man.* 141.

CEYLON; Saffragam district and Reigam Corle, at no great elevation, *Thwaites*.

A medium-sized tree; branchlets adpressedly pilose. *Leaves* $4\frac{3}{4}$ by $1\frac{1}{2}$ in., base cuneate, glabrous, very smooth beneath from the primary nerves not being elevated, secondary nerves slender but very distinct; petiole $\frac{1}{2}$ in. *Fascicles* 4–6-fld.; axillary or 1–2 near the ends of the branches. *Calyx-lobes* $\frac{1}{2}$ in., ovate, acute, closely pilose. *Anther-tips* pilose (*Thwaites*). *Ovary* 6-celled. *Berries* oblong, acute.

7. ***D. lanceolata***, *Benth. in Gen. Pl.* ii. 658; young leaves and shoots rusty-tomentose, leaves lanceolate narrowed at both ends tip very obtuse, pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. obscurely tomentose. *Isonandra lanceolata*, *Thwaites Enum.* 442, not of *Wight*. *Bassia lanceolata*, *Bedd. For. Man.* 141.

CEYLON; Caltura, *Thwaites*.

A middle-sized tree. *Leaves* $4\frac{1}{4}$ by $1\frac{1}{4}$ in., coriaceous, densely closely silky-tomentose beneath when young, glabrescent when mature, nerves obscure; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Pedicels* 3–6 together. *Calyx-lobes* $\frac{1}{4}$ in. or rather more, ovate, subacute, obscurely tomentose.

** *Species of Malabar.*

8. **D. elliptica**, *Benth. in Gen. Pl.* ii. 658; leaves elliptic or somewhat obovate subobtusely glabrous, pedicels $1\frac{1}{2}$ in. minutely tomentose, stamens 12–18 (usually 14–17). *Bassia elliptica*, *Dalz. in Hook. Kew Journ.* iii. 36; *Dalz. & Gibs. Bomb. Fl.* 139; *Bedd. Fl. Sylv.* t. 43. *Bassia* sp., *Miq. Pl. Hohenack.* n. 397. *Isonandra acuminata*, *Drury Useful Pl. Ind.* 260, not of *Gardner*.

BOMBAY and CANARA; *Dalzell*. MANGALORE; *Hohenacker*. CANARA; *Stocks*. WESTERN GHATS, up to 4000 ft.; common, *Beddome*.

A tree, 100 ft., trunk often straight, unbranched to a great height; branchlets and shoots minutely adpressedly pilose. *Leaves* 4 by 2 in., obtuse or with a short obtuse triangular point, base cuneate; petiole $\frac{3}{4}$ in. *Pedicels* 4–8 together, axillary or terminal. *Calyx-lobes* $\frac{1}{2}$ in., ovate, subacute, minutely adpressed-pilose. *Corolla* $\frac{1}{2}$ in., segments fulvous-silky on the back. *Filaments* short, hairy; anthers narrow-lanceolate, acute, sometimes tips hairy. *Ovary* 6-celled. *Berry* $1\frac{1}{2}$ in., ellipsoid.—Indian Gutta-percha.

*** *Species of East Bengal and the Malay Peninsula.*

9. **D. polyantha**, *Benth. in Gen. Pl.* ii. 658; leaves obovate-oblong subobtusely closely silky-tomentose beneath or mature nearly glabrous, pedicels $1\frac{1}{2}$ in., filaments hairy hardly as long as the anthers. *Bassia polyantha*, *Wall. Cat.* 4166; *A. DC. Prodr.* viii. 198. *Sideroxylon regium*, *Wall. Cat.* 4156, partly. *Isonandra polyantha*, *Kurz For. Fl.* ii. 119, and in *Journ. As. Soc.* 1877, pt. ii. 230.

SILHET; *Wallich, H. f. & T.* CACHAR; *Keenan*. CHITTAGONG; *H. f. & T.* PEGU; *Wallich*. ARRACAN; *Kurz*.

A tree, 30–40 ft. *Leaves* $5\frac{1}{2}$ by $2\frac{1}{4}$ in., base cuneate, silvery or rich brown glossy beneath; petiole $\frac{1}{2}$ – $1\frac{1}{4}$ in. *Pedicels* in lax clusters towards the ends of the branches, tomentose. *Calyx-lobes* $\frac{1}{2}$ – $\frac{1}{3}$ in., ovate, hardly acute. *Corolla* nearly $\frac{1}{2}$ in., cream-coloured. *Stamens* 12, sometimes more. *Berry* $1\frac{1}{2}$ in., obovoid, scaly brown, 1-seeded.—Yields good gutta-percha in large quantity (*Kurz*). Flowers eaten (*Keenan*).

10. **D. obovata**, *Clarke*; leaves obovate-oblong glaucescent glabrous beneath secondary nerves obscure, pedicels $\frac{1}{2}$ in. densely clustered, filaments glabrous at least as long as the anthers. *Isonandra obovata*, *Griff. Notul.* iv. 293; *Kurz For. Fl.* ii. 120, and in *Journ. As. Soc.* ii. 230. *Bassia*? *hypoleuca*, *Miq. Fl. Ind. Bat. Suppl.* 582 (*vide Kurz*).

MALACCA; *Griffith* (*Kew Distrib.* n. 3606), *Maingay* (n. 985, 996). SINGAPORE; *T. Anderson*.

A tree; branches thick, leaves clustered towards their extremities; shoots rusty-tomentose. *Leaves* $8\frac{1}{2}$ by 3–4 in., obtuse or very shortly acute, base cuneate, primary nerves 12 on each side, much raised beneath; petiole $\frac{3}{4}$ in. *Clusters* densely covering the branches below the terminal leaves. *Calyx-lobes* $\frac{1}{2}$ – $\frac{1}{3}$ in., ovate, subobtusely. *Corolla* $\frac{1}{2}$ in., nearly glabrous without, segments narrow acute. *Stamens* 12. *Berries* $\frac{3}{4}$ in. diam., globose.—*Kurz* says that there is another species collected in Martaban by *Falconer* closely allied to this. The imperfect specimen collected by *Falconer* at Moulmein appears identical.

11. **D. Helferi**, *Clarke*; leaves obovate-lanceolate obtuse glabrous secondary nerves distinct, pedicels $\frac{3}{4}$ in. densely clustered.

TENASSERIM; *Helfer* (*Kew Distrib.* n. 3616). TAVOY; *Packman*.

Closely allied to *D. obovata*; and is perhaps *Helfer's* *Tenasserim* plant referred to *D. obovata* by *Kurz*; but the nervation of the leaves is different. *Leaves* $8\frac{1}{2}$ by 3 in., base cuneate, primary nerves 8–9 on each side, $\frac{3}{4}$ –1 in. apart, inarching not conspicuously parallel.—Corolla not seen.

12. **D. Maingayi**, Clarke; leaves large obovate pilose beneath, pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. densely clustered rusty hirsute, filaments glabrous.

MALACCA; *Maingay* (n. 996–2).

Branchlets thick, rusty-villous. *Leaves* $9\frac{1}{2}$ by 6 in., obtuse, base cuneate, primary nerves 13 on each side, carried parallel almost to the margin, secondary distinct; petiole nearly 2 in. *Pedicels* densely clustered along the branches below the terminal leaves. *Calyx-lobes* $\frac{1}{2}$ in., ovate, obtuse, rusty hirsute. *Corolla* $\frac{1}{4}$ – $\frac{1}{2}$ in., nearly glabrous without, lobes ovate acute. *Stamens* 12; filaments about as long as the anthers. *Fruit* not seen.—Nearly allied to *D. obovata*, but the corolla is much shorter with wider lobes, and the indumentum is more spreading.

13. **D. hexandra**, Clarke; leaves elliptic-oblong suddenly narrowed at both ends glabrous, pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. clustered axillary, filaments pilose hardly so long as the anthers. *Isonandra hexandra*, Griff. *Notul.* iv. 292. *Payena Griffithii*, Kurz *For. Fl.* ii. 121, and in *Journ. As. Soc.* 1877, pt. ii. 230?.

MALACCA; *Griffith* (Kew Distrib. n. 3609), *Maingay* (n. 984).

Shoots closely rusty-tomentose. *Leaves* 6 by $2\frac{1}{2}$ in. (generally much smaller), very shortly obtusely acuminate or subobtusely, much less cuneate at the base than in the 3 foregoing species, primary nerves 9–10 on each side, secondary not prominent; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in. *Calyx-lobes* $\frac{1}{2}$ in., ovate, minutely closely tomentose. *Corolla* $\frac{1}{5}$ – $\frac{1}{4}$ in.; lobes elliptic, acute, nearly glabrous without. *Berry* $\frac{1}{2}$ in. diam., globose, 1-seeded. *Seed* exalbuminous.—Kurz says his *Payena Griffithii* was *Hexameria*, Griff., a name unpublished either as a genus or section by Griffith. Kurz's diagnosis is so short that placing his plant here is a mere guess.

14. **D. rubens**, Clarke; leaves obovate-oblong obtuse glabrous, pedicels $\frac{1}{4}$ in. axillary minutely tomentose, filaments and corolla-tube within glabrous.

MALACCA; *Maingay* (n. 995).

Shoots minutely closely rusty-tomentose. *Leaves* 4 by $1\frac{1}{2}$ in., base cuneate, drying red, primary nerves not prominent; petiole $\frac{1}{2}$ in. *Calyx-lobes* $\frac{1}{2}$ in., ovate, subacute, minutely closely tomentose. *Corolla* $\frac{1}{2}$ in. or more, lobes 6, oblong, obtuse. *Stamens* 12; filaments all short, subequal; anthers oblong, acute, mucronate. *Berry* not ripe, promises to be $\frac{1}{2}$ in. diam.—Not very closely allied to any of the preceding species.

15. **D. Gutta**, Benth. in *Gen. Pl.* ii. 658. leaves obovate-oblong very shortly obtusely acuminate coriaceous, pedicels $\frac{1}{2}$ in. in axillary clusters, filaments glabrous longer than the anthers. *Isonandra Gutta*, Hook. *Lond. Journ. Bot.* vi. 464, t. 16; *Miq. Fl. Ind. Bat.* ii. 1038, t. 36; *Benth. & Trim. Med. Pl.* t. 167.

MALACCA AND SINGAPORE; *Lobb*, *Maingay*.—DISTRIB. Sumatra.

A tree, 40 ft.; shoots minutely rusty-tomentose. *Leaves* $4\frac{1}{2}$ by 2 in. (sometimes much longer), base cuneate, densely closely rusty-tomentose beneath, ultimately glabrescent, primary nerves 24–30 on each side, not prominent; petiole $1\frac{1}{2}$ in. *Calyx-lobes* $\frac{1}{2}$ in., ovate, obtuse, rusty-tomentose. *Corolla* $\frac{1}{2}$ in.; lobes 6, elliptic obtuse. *Stamens* 12. *Ovary* 6-celled. *Berry* $\frac{2}{3}$ in., ovoid, 2–1-seeded.—Easily distinguished from all the preceding species by the numerous primary nerves of the leaf.—*Gutta-percha*.

6. **BASSIA**, Linn.

Trees. *Leaves* petioled, coriaceous, silky or tomentose beneath when young; stipules caducous. *Pedicels* axillary, fascicled, among the subterminal tufts of leaves, or in the axils of fallen leaves. *Calyx-segments* 4, 2-seriate, 2 outer valvate enclosing the inner (except in *B. butyracea*). *Corolla-tube* campanulate; lobes 6–12 (usually 8–10), contorted in bud. *Stamens* at least twice as many as the corolla-lobes, 12–40 (usually 16–20); anthers lanceolate, acute, connective often mucronate or excurrent. *Ovary* villous, 4–12-

(usually 6-8-) celled; style linear. *Berry* globose or oblong-ellipsoid, 1-3- (rarely 4-5-) seeded. *Seeds* ellipsoid, hilum long, sometimes large; albumen 0; radicle very small; cotyledons hemi-ellipsoid, fleshy.—*DISTRIB.* Species 30; in India, Malaya and Polynesia.

* Calyx-lobes 4, the 2 outer subvalvate including the others.

† *Species of the Deccan Peninsula and Ceylon* (*B. latifolia*, extending northwards to Kumaon).

1. *B. latifolia*, *Roxb. Cor. Pl.* 20, t. 19, and *Fl. Ind.* ii. 526; leaves elliptic or oblong-elliptic shortly acuminate, calyx rusty-tomentose, anthers 20-30 3-seriate subsessile. *Wall. Cat.* 4163; *A. DC. Prodr.* viii. 198; *Dalz. & Gibs. Bomb. Fl.* 139; *Bedd. Fl. Sylv.* t. 41; *Brand For. Fl.* 289. *B. villosa*, *Wall. Cat.* 4165.—Mahwah or Madhuca, *C. Hamilton in As. Research.* i. 300-308, with fig.

Throughout CENTRAL INDIA; alt. 1-4000 ft., abundant; from West Bengal to the Western Ghats; also wild in the KUMAON Terai.—*DISTRIB.* Ava.

A tree, 50 ft., with a large head, the leaves clustered at the ends of the branches; all the young parts densely rusty-woolly. *Leaves* 5 by 3 in., varying in size, and from round-obovate to broad-lanceolate, acute, base cuneate, densely woolly beneath when young, in age glabrescent, primary nerves 12 on each side, subparallel, $\frac{1}{4}$ - $\frac{1}{2}$ in. apart, secondary very prominent, glabrous or obscurely pubescent; petiole 1-1 $\frac{1}{2}$ in.; stipules linear, caducous. *Pedicels* 1-1 $\frac{1}{2}$ in., woolly, in dense clusters near the ends of the branches. *Calyx-lobes* $\frac{1}{2}$ - $\frac{1}{2}$ in., ovate, subacute, densely rusty-tomentose; nearly always 4, rarely 5; the two outer segments always subvalvate and enclosing the others. *Corolla* $\frac{3}{4}$ in., yellowish white, tube fleshy; lobes 7-14 (usually 8-9), short, erect. *Stamens* usually 24-26; anthers hairy, acuminate. *Berry* 1-2 in., ovoid, 1-4-seeded.—The corollas, collected and dried, form an important article of food both for men and animals in Central India, and yield by distillation a coarse spirit. The seeds yield an inferior oil, largely eaten by the tribes. Moa-tree, of the English denizens.

2. *B. longifolia*, *Linn. Mant.* 563; leaves lanceolate narrowed at both ends glabrous distinctly nerved, anthers 16 2-seriate subsessile tips 3-toothed, young fruit globose densely hirsute. *Gaertn. Fruct.* t. 104; *Lamk. Ill.* t. 398; *Wall. Cat.* 4162; *Roxb. Fl. Ind.* ii. 523; *A. DC. Prodr.* viii. 197; *Wight Ill.* t. 147; *Dalz. & Gibs. Bomb. Fl.* 139; *Thwaites Enum.* 175; *Bedd. Fl. Sylv.* t. 42.

MALABAR; from Canara southwards, and CEYLON; common.

A tree, 50 ft.; leaves clustered towards the ends of the branches; all the young parts rusty-tomentose. *Leaves* 4-5 by 1 $\frac{1}{2}$ in., mature glabrescent, primary nerves 12 on each side, distinct, secondary distinct; petiole 1-1 $\frac{1}{2}$ in.; stipules linear. *Pedicels* 1-2 in., tomentose, in dense clusters near the ends of the branches. *Calyx-lobes* $\frac{1}{2}$ - $\frac{1}{2}$ in., ovate, subacute. *Corolla* $\frac{3}{4}$ in.; lobes usually 6, scarcely one-third the length of the tube. *Filaments* hairy; anthers 3-toothed at the apex (A. DC.), the short mucronation of the connective between the tips of the two cells giving this appearance more strongly than is indicated in any of the figures. *Berry* 1-1 $\frac{1}{2}$ in. diam., globose, ultimately nearly glabrous, 1-2-seeded or (*vide* Roxburgh) sometimes 3-4-seeded.—The figure of Gaertner shows the fruit 5-seeded, which may be an error; A. DC. doubts this figure, while he expresses no doubt about Lamarck's (*Ill.* t. 398) which is copied from it. This species has been much confounded with the next, but the young fruit is widely different.

3. *B. malabarica*, *Bedd. For. Man.* 140; branchlets glabrous, leaves lanceolate or oblong obtuse or scarcely acute glabrescent distinctly nerved, stamens 16 in 2 series subsessile connective excurrent lanceolate-linear, young fruit oblong-lanceolate glabrous.

SOUTH CANARA, MALABAR, and the ANAMALLAYS; up to 4000 ft., abundant, *Beddome*.

A middle-sized tree. *Leaves* scattered, 10 by $2\frac{1}{2}$ in., tapering at both ends, or 3 by $1\frac{1}{2}$ in., subobtusate at both ends, primary nerves 15–25 on each side, secondary distinct; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Flowers* in axillary clusters near to or distant from the ends of the branches, closely resembling those of *B. longifolia*. *Filaments* short, hairy; connective much produced. *Berry* 1 by $\frac{1}{2}$ in., often oblique, scarcely obtuse when ripe; 1-seeded in all the examples.—The leaves vary greatly in size and shape if there be not two species here included; perhaps it should be united with *B. neriifolia* and *Moonii*.

4. *B. Moonii*, *Bedd. For. Man.* 140; branchlets rusty-villous, leaves oblong-lanceolate obtusely acuminate glabrescent distinctly nerved. *Dasyaulus Moonii*, *Thwaites Enum.* 176.

CEYLON; Caltura, *Moon*; Ratnapoora, *Thwaites*.

Does not appear to differ from *B. malabarica*, except by rusty villous shoots.—*Seeds* sparingly albuminous (*Thwaites*).

5. *B. neriifolia*, *Moon. Cat. Pl. Ceyl.* 36; branchlets glabrous, leaves very narrowly oblong coriaceous nerves obscure, anthers 16 2-seriate subsessile connective excurrent lanceolate-linear, young fruit oblong-lanceolate glabrous. *Bedd. For. Man.* 140, and *Fl. Sylv.* t. 254. *Dasyaulus neriifolius*, *Thwaites Enum.* 175.

CEYLON; common, *Thwaites*.

Leaves $4\frac{1}{2}$ by $\frac{3}{4}$ in. in *Thwaites*' typical example, broader and obtuser in others. Except by the texture of the leaves this seems undistinguishable from *B. malabarica*. *Beddome's* analysis does not show the anthers acute enough.

6. *B. fulva*, *Bedd. For. Man.* 140; leaves elliptic or obovate subobtusate at both ends densely rusty-woolly on the nerves beneath when mature, inflorescence and calyx of *B. malabarica*. *Dasyaulus fulvus*, *Thwaites Enum.* 176.

CEYLON; Pasdoon Corle, *Thwaites*.

A medium-sized tree. *Leaves* 6 by $3\frac{3}{4}$ in., coriaceous, somewhat rugose, primary nerves 10–12 on each side, strongly elevated; petiole $\frac{1}{2}$ in., densely rusty-woolly. Inner 2 calyx-segments densely rusty-woolly. *Corolla* not seen. *Ovary* 6-celled (*Thwaites*). *Fruit* not seen.

7. *B. microphylla*, *Hook. Ic. Pl.* t. 74; leaves small obovate or oblong obtuse glabrous, fascicles axillary few-fld., anthers 12 2-seriate subsessile acuminate. *Bedd. For. Man.* 140. *B. parvifolia*, *A. DC. Prodr.* viii. 198. *Dasyaulus microphyllus*, *Thwaites Enum.* 175.

CEYLON; *Gen. Walker*; near Galle, *Gardner*.

Branchlets glabrous; shoots rusty-villous. *Leaves* 1– $1\frac{1}{2}$ by $\frac{3}{4}$ in., coriaceous, nerves slender; petiole $\frac{1}{2}$ in. *Pedicels* $\frac{1}{2}$ in., nearly glabrous, solitary or few together. *Calyx-lobes* $\frac{1}{2}$ in., ovate, subobtusate: 2 entirely within, villous. *Corolla* $\frac{1}{2}$ in., cleft to the middle; lobes 6 (rarely 5) obtuse. *Filaments* hairy.

†† *Species of the Malay Peninsula and Andamans.*

8. *B. argentea*, *De Vriese Pl. Reinw.* 62; leaves elliptic rhomboid at both ends silky beneath, fascicles axillary many-fld., flowers small. *Miq. Fl. Ind. Bat.* ii. 1041.

MALACCA; *Maingay*.—DISTRIB. Malayan Archipelago?

A large tree. *Leaves* 7 by $2\frac{3}{4}$ in., primary nerves 16 on each side, parallel, strongly raised beneath, secondary obscured by close shining silk; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Pedicels* as long as the petioles, 4–10 together in the axils of persistent leaves. *Calyx-segments* $\frac{1}{2}$ in., ovate, obtuse, closely tomentose. *Anthers* acute, hairy on all sides.—*Maingay's* specimens named *argentea* are too imperfect for analysis; they agree with *De Vriese's*

diagnosis. In the absence of fruit it is uncertain whether either may not be a *Payena*.

9. **B. Lobbii**, *Clarke*; leaves elliptic acutely cuneate at both ends glabrous distinctly reticulated, pedicels $1\frac{1}{4}$ in. with the calyx-lobes closely cinereous-tomentose.

MOULMEIN; banks of the Attran, *Lobb*.

Shoots grey-tomentose. Leaves $2\frac{1}{2}$ by $1\frac{1}{4}$ in., submembranous, primary and secondary nerves distinct; petiole $\frac{1}{2}$ in. Pedicels from the terminal tufts of leaves. Calyx-lobes $\frac{1}{4}$ in., elliptic-oblong. Corolla 10-12-lobed. Stamens about 18; filaments short; anthers lanceolate, mucronate. Ovary 8-celled.—Possibly a *Payena*, but the long calyx-lobes and habit suggest *Bassia*.

10. **B. Mottleyana**, *De Vriese in Miq. Journ.* 1861, 257; leaves long-petioled broadly elliptic abruptly shortly acuminate at both ends glabrous, fascicles very numerous axillary-dense-fld.

MALACCA; *Griffith* (Kew Distrib. n. 3608).—DISTRIB. Borneo.

Leaves 5 by $2\frac{3}{4}$ in., coriaceous, primary nerves numerous not prominent nor very oblique; petiole $\frac{3}{4}$ – $1\frac{1}{2}$ in. Pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in.; fascicles in the axils of persistent leaves and clothing the branches below the leaves. Calyx-lobes $\frac{1}{2}$ – $\frac{1}{3}$ in., ovate, scarcely acute, sparingly tomentose, Corolla 8-10-lobed. Stamens 16-18; anthers subsessile, lanceolate, acute. Ovary 6-8-celled. Fruit not seen.

11. **B. cuneata**, *Blume Bijl.* 675; leaves obovate obtuse or emarginate coriaceous glabrous, seeds exalbuminous. *Miq. Fl. Ind. Bat.* ii. 1041.

MALACCA; *Maingay*.—DISTRIB. Java.

Leaves $4\frac{1}{2}$ by $2\frac{3}{4}$ in., attenuated at the base, primary nerves slender, not very oblique; petiole $\frac{3}{4}$ in. Flowers not seen. Berry $\frac{3}{4}$ –1 in. diam., globose, 1-3-seeded. Seeds $\frac{1}{2}$ – $\frac{3}{4}$ in., ovoid, shining-chestnut; hilum elliptic, oblique, covering one-third the surface; radicle exceedingly small, cotyledons hemi-ellipsoidal fleshy.—Maingay's examples (in ripe fruit) are here referred to Blume's *B. cuneata* merely from his short description of that plant in flower. Whether *B. obovata*, Forst., from Tanna, differs is doubtful. Maingay's cuneate-emarginate leaved plant has been supposed to be the fruiting state of *B. Mottleyana*; the two appear closely allied.

12. **B. caloneura**, *Kurz Andaman Rep.* 141; leaves large elliptic-oblong base rounded or obtuse, fruit $1\frac{1}{4}$ by 1 in. rusty 2-seeded. *Isonandra*? *caloneura*, *Kurz For. Fl.* ii. 119, and in *Journ. As. Soc.* 1877, pt. ii. 229. *I. calophylla*, *Kurz in Journ. As. Soc.* 1871 pt. 69, and 1873 pt. ii. 88, not of *Teyssm. & Binn.* *Dichopsis*? *caloneura*, *Hook. f. in Gen. Pl.* ii. 658.

SOUTH ANDAMAN; frequent, *Kurz*.

A tree, 60 ft.; shoots minutely rusty-silky. Leaves $8\frac{1}{2}$ by $2\frac{3}{4}$ in., acute, mature glabrous; petiole $\frac{1}{2}$ in. A very obscure plant. *Kurz* describes the calyx (*Journ. As. Soc.* 1873, and *For. Flor.*) as 6-lobed, and the seed (*Journ. As. Soc.* 1877) as exalbuminous; but he never saw the flower. He elsewhere describes the calyx as 4-lobed, and he has finally put the plant into an albuminous genus.—Our specimen has no flower, and the solitary fruit has no calyx and is unfit for analysis; as, however, it altogether resembles that of a *Bassia*, and is quite unlike that of an *Isonandra*, we retain the plant in the former genus.

** Calyx-lobes 5, much imbricated, not or obscurely 2-seriate.

13. **B. butyracea**, *Roxb. in As. Research.* viii. 499-502, with fig., and *Fl. Ind.* ii. 527; leaves obovate or obovate-oblong, stamens 30-40, filaments glabrous as long as the anthers. *Wall. Cat.* 4164; *Don Prodr.* 146; *A. DC. Prodr.* viii. 198?; *Brand. For. Fl.* 290, t. 35.

SUBTROPICAL HIMALAYA; alt. 1-5000 ft.; from Kumaon to Bhotan, frequent.

A tree, attaining 70 ft. Leaves 13 by 6 in. (or smaller), crowded near the ends of

the branches, subobtuse, base rhomboid, tomentose when young, mature glabrous or flocculose beneath, primary nerves 16 on each side; petiole $1\frac{1}{4}$ in.; stipules $\frac{1}{2}$ in., ovate-lanceolate, caducous. *Pedicels* 1 in., very many, crowded among the subterminal leaves, tomentose. *Calyx-lobes* $\frac{1}{2}$ - $\frac{1}{3}$ in., ovate, subsimilar, rusty-villous. *Corolla* $\frac{3}{4}$ in.; lobes 8-10, spreading. *Anthers* exserted, linear-lanceolate. *Ovary* 7-9-celled. *Berry* 1 by $\frac{2}{3}$ in., 1-3-seeded.—A. DC. says the calyx is 4-lobed, whence it must be very doubtful whether he had the true plant.

7. *PAYENA*, A. DC.

As *Bassia*, but the seeds albuminous. *Corolla* deeply lobed, and flowers in the axils of scattered leaves.—DISTRIB. Species 8-10?, in the Malay Peninsula and islands.

As the fruit is only known in the first described species, the four others may prove to be *Bassias*.

1. *P. Maingayi*, Clarke; leaves large oblong acuminate, flowers large, filaments and anthers glabrous, connective produced narrow-lanceolate. *Ceratophorus* sp., *Maingay* ms. *Chrysophyllum*? molle, Wall. Cat. 4161?.

MALACCA; *Maingay*. ? Penang; Wallich.

Branchlets rusty-tomentose. *Leaves* 9 by $2\frac{1}{2}$ in., parallel-sided, abruptly acuminate, base cuneate, shining brown-silky beneath, ultimately glabrescent, primary nerves 24 on each side, not prominent nor very oblique; petiole 1 in. *Pedicels* $\frac{2}{3}$ in., 2-6 together, clothing the branches and in the axils of persistent leaves, minutely silky. *Calyx-lobes* $\frac{1}{2}$ in., ovate, subacute, closely silky. *Corolla* $\frac{1}{2}$ in., divided nearly to the base; segments 10, lanceolate, distinctly 2-seriate. *Stamens* 16-20. *Ovary* 6-8-celled. *Berry* $1\frac{1}{2}$ by $\frac{3}{4}$ in., 1-seeded. *Seed* brown, shining, albuminous; hilum very large.—Wallich's *C. molle* consists of a branchlet with leaves only, from Penang.—Abounds in gutta-percha (*Maingay*).

2. *P. malaccensis*, Clarke; leaves large obovate or obovate-oblong conspicuously nerved, filaments and anthers with long fulvous hairs, connective produced linear-cuspidate. *Keratophorus* Wightii, *Maingay* mss., not of Hassk.

MALACCA; Griffith (Kew Distrib. n. 3610), *Maingay*.

Branchlets nearly glabrous. *Leaves* 12 by $6\frac{1}{2}$ in., subobtuse, base cuneate, ultimately glabrous, primary nerves 15-20 on each side, curving upwards; petiole $1\frac{1}{2}$ in. *Pedicels* $\frac{2}{3}$ in., closely silky; in numerous axillary fascicles. *Calyx-lobes* 2 outer $\frac{1}{2}$ in., subquadrate, obscurely silky, much overlapping, 2 inner longer, subacute, densely villous. *Corolla* $\frac{1}{2}$ in., divided nearly to the base; lobes 10, narrow-lanceolate, sub-2-seriate. *Stamens* 16-20; filaments short. *Fruit* not seen.

3. *P. lucida*, A. DC. *Prodr.* viii. 197; leaves elliptic acuminate primary nerves somewhat oblique to the midrib, filaments and anthers glabrous, connective excurrent tip glabrous. *Kurz For. Fl.* ii. 121, and in *Journ. As. Soc.* 1877, pt. ii. 230. *Mimusops lucida*, Wall. Cat. 4147; *G. Don Gen. Syst.* iv. 35 (*wrongly described, not of Poir.*).

PENANG; Wallich. SINGAPORE; Lobb.

Branchlets and shoots rusty-tomentose. *Leaves* $3\frac{3}{4}$ by $1\frac{1}{2}$ in., tapering at both ends, glabrous and somewhat shiny beneath, nerves not prominent; petiole $\frac{1}{4}$ in. *Pedicels* clustered in the axils of persistent leaves, $\frac{1}{2}$ -1 in., slender, minutely silky. *Calyx-lobes* $\frac{1}{2}$ in., obtuse, obscurely silky. *Corolla* $\frac{1}{4}$ - $\frac{1}{2}$ in., deeply divided; lobes 8, oblong, obtuse. *Stamens* 16; filaments short. *Ovary* 8-celled.—*Bassia sericea* (Blume Bijl. 674) is perhaps the same species, but has the primary nerves closer, the pedicels rather shorter. Miquel admits *Bassia sericea*, Blume, as a species, and also *Payena*?

sericea, Miq., which, from the authentic example, is seen to be quite different, though probably a true *Bassia*.

VAR. *Wightii*; leaves larger very coriaceous gradually or abruptly shorter acuminate, pedicels stouter, sepals larger rusty-tomentose. *Isonandra polyandra*, *Wight Ic.* t. 1589. *Keratophorus Wightii*, *Hassk. in Retz.* 101.—Malacca; *Griffith* (*Kew Distrib.* n. 3605), *Maingay*.—This is perhaps specifically distinct from *P. lucida*; and of this there are two forms having the flowers alike but leaves somewhat differing, viz. (1) *Wight Ic.* t. 1589, leaves $6\frac{1}{2}$ by $2\frac{3}{4}$ in. obovate-oblong suddenly shortly acuminate; (2) *Griffith n.* 3605, leaves 5 by $1\frac{1}{2}$ in. oblong-lanceolate long-acuminate. *Griffith* and *Maingay* have each collected both forms, and have each kept them apart as being distinct species.

4. *P. paralleloneura*, *Kurz in Journ. As. Soc.* 1871, pt. ii. 70, and *For. Fl.* ii. 121; leaves narrowly elliptic-acuminate, primary nerves nearly horizontal, filaments and anthers glabrous, connective excurrent tipped with fulvous hairs.

MERGUI; *Helper* (*Kew Distrib.* n. 3611).

Leaves $3\frac{1}{2}$ by $1\frac{1}{2}$ in., base broadly rhomboid, primary nerves very slender; petiole $\frac{1}{2}$ in. Pedicels $\frac{1}{2}$ – $\frac{1}{2}$ in.—This seems exceedingly near *P. lucida* and *Bassia sericea*, *Blume*.

8. MIMUSOPS, Linn.

Trees. Leaves elliptic or obovate, coriaceous; primary nerves numerous, spreading, slender or obscure. Pedicels clustered or solitary, axillary. Calyx-segments 6–8, 2-seriate, outer series valvate in bud, including the inner imbricated series. Corolla-tube short, lobes 18–24, 2–8-seriate. Stamens 6–8 (in *M. littoralis* 12–16), inserted near the base of the corolla, opposite its interior series of lobes; filaments short; anthers lanceolate, connective excurrent; staminodes as many as the stamens, entire serrate or lobed. Ovary hairy, 6–8-celled. Fruit globose, 6–1-seeded; endocarp crustaceous. Seeds compressed, ellipsoid; albumen fleshy; cotyledons flat, often nearly as wide as the seed.—DISTRIB. Species 30; in the tropics of both hemispheres.

1. *M. Elengi*, Linn.; *Roxb. Cor. Pl.* i. 15, t. 14, and *Fl. Ind.* ii. 236; leaves elliptic shortly acuminate, stamens 8, berry 1-seeded. *Gaertn. Fruct.* i. 198, t. 42; *Lamk. Il.* t. 300; *Wall. Cat.* 4146; *A. DC. Prodr.* viii. 202; *Grah. Cat. Bomb. Pl.* 106; *Dalz. & Gibs. Bomb. Fl.* 140; *Wight Ic.* t. 1586; *Bedd. Fl. Sylv.* t. 40; *Kurz in Journ. As. Soc.* 1877, pt. ii. 231, and *For. Fl.* 123.—*Rheede Hort. Mal.* i. t. 20. *Rumph. Herb. Amb.* ii. t. 63.

DECCAN AND MALAY PENINSULAS; common. In North India frequently cultivated. DISTRIB. Cultivated in the Tropics.

A tree, 50 ft. Leaves $3\frac{1}{2}$ by $1\frac{1}{2}$ in., base rhomboid, glabrous, nerves slender numerous nearly horizontal; petiole $\frac{3}{4}$ in. Pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., rusty-tomentose. Calyx-lobes 8, $\frac{1}{2}$ in., elliptic, acute, rusty-tomentose. Corolla-lobes 16–20, narrow-lanceolate, white. Staminodes 8, pilose, acute, serrate or subentire. Berry $\frac{3}{4}$ –1 in., ovoid, 1- (rarely 2-) seeded, yellow.

2. *M. Roxburghiana*, *Wight Ic.* t. 1588; leaves broadly elliptic very obtuse at both ends, stamens 6 (rarely 7), berry 6–3-seeded. *Bedd. For. Man.* 143; *Brand. For. Fl.* 293.

SHEVAOHERRY and AYAMALLAY HILLS; *Wight*.

A large tree. Leaves 3 by $1\frac{1}{2}$ in., coriaceous, glabrous, nerves very slender; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. Pedicels 2–4 together, 1 in., nearly glabrous, near the ends of the branches. Calyx-lobes 6, $\frac{1}{2}$ in., triangular-lanceolate, mealy-tomentose. Corolla nearly as of *M. Elengi*, but segments rather fewer. Staminodes 6 (rarely 7), lanceolate serrate. Berry $\frac{1}{2}$ in. diam., depressed-globose, shining.—Flowers as large as, and like those of *M. Elengi*; but the calyx is only 6-lobed. There are no specimens at

Kew except the very complete set collected by Wight; but Col. Beddome says the tree is common in the Nilgherry and Anamallay forests.

3. *M. hexandra*, Roxb. *Cor. Pl.* i. 16, t. 15, and *Fl. Ind.* ii. 298; leaves elliptic-obovate obtuse or emarginate, stamens 6 (occasionally 7-8), berry 1- (sometimes 2-) seeded. *Wall. Cat.* 4148, A, B; *A. DC. Prodr.* viii. 204; *Grah. Cat. Bomb. Pl.* 106; *Dalz. & Gibs. Bomb. Fl.* 140; *Bedd. For. Man.* 142. *M. indica*, *A. DC. l. c.* 205; *Wight Ic.* t. 1587; *Brand. For. Fl.* 291. *M. Kauki*, *Wall. Cat.* 4149, A, C, not of Linn.

DECCAN PENINSULA and CEYLON, common; extending north to Gujerat, Banda and the Circars. Cultivated in North-west India.

A large tree. *Leaves* 3-4 by $1\frac{1}{2}$ -2 in., base cuneate or rhomboid, coriaceous, nerves obscure; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Pedicels* $\frac{1}{2}$ - $\frac{3}{4}$ in., 2-5 together, nearly glabrous; clusters subterminal, and along the branches, often dense. *Calyx-lobes* 6, $\frac{1}{2}$ - $\frac{3}{4}$ in., elliptic, subacute, obscurely tomentose or nearly glabrous. *Corolla* $\frac{1}{2}$ in. long, white. *Staminodes* 6-8, serrate or lobed. *Berry* $\frac{1}{2}$ by $\frac{1}{4}$ in., wider when 2-seeded.—The staminodes are rather more lobed in the well-developed examples.

4. *M. Kauki*, Linn. *Sp. Pl.* 497; leaves long-petioled obovate-elliptic silky-white beneath, stamens 6-8, berry usually 4-3-seeded. *Wall. Cat.* 4149, E, upper half; *A. DC. Prodr.* viii. 203; *Miq. Fl. Ind. Bat.* ii. 1042; *Grah. Cat. Bomb. Pl.* 106. *M. balota*, *Blume Bijl.* 673. *M. dissecta*, *Br. Prodr.* 531, in obs.; *Hook. Bot. Mag.* t. 3157; *A. DC. l. c.* 204. *M. Hookeri*, *A. DC. l. c.* *M. Browniana*, *Benth. Fl. Austral.* iv. 285.—*Rumph. Herb. Amb.* iii. t. 8.

BIRMA, at Amherst; *Wallich. MALACCA*; *Griffith.*—DISTRIB. Malaya, Tropical Australia.

A large tree. *Leaves* 4 by 2 in., obtuse or scarcely acute, base cuneate, nerves obscure; petiole 1- $1\frac{1}{2}$ in. *Pedicels* 1 in., densely clustered near the ends of the branches, cinnamomeous-tomentose. *Calyx-lobes* 6, $\frac{1}{2}$ in., ovate, subacute, brown-tomentose. *Corolla* $\frac{1}{2}$ in. long, lobes narrow, acute. *Staminodes* 6-8, serrate or lobed. *Berry* $\frac{3}{4}$ -1 in. diam., globose, smooth.—Among the secondary sheets of *Wall. Cat.* 4148 are *Achras Sapota* and *Sideroxylon ferrugineum*. The great difficulty that has been raised over *M. Kauki*, Linn., has been due to two causes: (1) Wallich identified his Amherst plant, the true *M. Kauki*, with Roxburgh's Deccan *M. hexandra*; (2) botanists, not looking to the fruit, and perhaps not having it always to look at, have betaken themselves to the degree of notching of the staminodes for diagnostic characters.

ANOMALOUS SPECIES.

5. *M. LITTORALIS*, *Kurz For. Fl.* ii. 123, and in *Journ. As. Soc.* 1876, pt. ii. 138; leaves large elliptic or obovate glabrous beneath, fruit 1- $1\frac{1}{2}$ in. diam. 6-5-seeded. *M. indica*, *Kurz Andaman Rep.* 42, and in *Journ. As. Soc.* 1871, pt. ii. 70, not of *A. DC.*

ANDAMAN ISLDS.; *Kurz, Helfer* (Kew Distrib. n. 3613). NICOBARS; *Kurz.*

A tree, 50-80 ft.; all parts quite glabrous. *Leaves* $7\frac{1}{2}$ by $3\frac{3}{4}$ in., not acute, base cuneate, coriaceous; petiole $\frac{3}{4}$ in. *Pedicels* 1 in., clustered towards the ends of the branches, 1 in each axil.—The Kew specimens have no flowers, but represent a large species allied to *M. Kauki*. *Kurz* describes the calyx as 6-8-lobed, and the fertile stamens as 12-16, with as many staminodes; indicative perhaps of a new genus.—Andaman Bullet-wood.

ORDER XC. EBENACEÆ. (By C. B. Clarke.)

Trees or shrubs. *Leaves* alternate, rarely subopposite, exstipulate, entire, usually coriaceous. *Flowers* usually dioecious, regular, axillary, subsessile or in short cymes, usually bracteate: pedicels articulated under the flower. *Calyx*

inferior, gamosepalous, in fruit often accrescent. *Corolla* gamopetalous, often hairy without. *Stamens* as many or 2-3 times as many as the corolla-lobes, hypogynous, free or filaments paired or variously united; anthers narrow, dehiscent longitudinally; staminodes in the female flower resembling stamens or 0. *Ovary* superior, sessile; styles 2-8; cells as many or twice as many as the styles, imperfectly septate; ovules twice as many as the styles, attached to the interior angle of the cells, pendulous, anatropous. *Fruit* coriaceous or fleshy, indehiscent, several- or few-seeded. *Seeds* pendulous, usually oblong, longitudinally 2-3-furrowed, testa thin, albumen copious equable or ruminated; embryo axile, radicle superior.—Species 250, in the tropics of the whole world; a few species in South Africa and North America.

Flowers often 3-merous. Ovary 3- or 6-celled 1. MABA.

Flowers mostly 4-5-merous. Ovary 4-5- or 8-10-celled 2. DIOSPYROS.

1. MABA, J. R. & G. Forst.

Trees or shrubs. *Leaves* alternate, entire. *Flowers* diœcious (monœcious in *M. Maingayi*), axillary, short-pedicelled or in small dense cymes; usually 3-merous, rarely 4-5-merous. *Calyx* 3-5-partite or 3-5-fid, rarely subtruncate, often cupuliform and enlarged in fruit. *Corolla-tube* usually longer than the calyx, lobes 3, twisted to the right-hand. *Male flowers*: stamens 3-22; filaments distinct, paired or otherwise united; anthers oblong; ovary rudimentary. *Female flowers*: staminodes 0-12; ovary 3-celled, or 6-celled, or 3-celled with imperfect dissepiments between the ovules; 6-ovulate. *Fruit* ellipsoid or globose, glabrous or hairy, 1-6-celled, 1-6-seeded. *Albumen* not ruminated (where known) in any of the Indian species except *M. Maingayi*.—DISTRIB. Species 60, in the tropics of both hemispheres and frequent in Australia and Polynesia.

SECT. I. **Ferreola** (Hiern in Trans. Camb. Phil. Soc. xii. 107). *Calyx-lobes* not much imbricated. *Ovary* densely hairy.

* *Fruiting calyx* small, 3-partite, patent or reflexed.

1. **M. acuminata**, Hiern in Trans. Camb. Phil. Soc. xii. 112; leaves elliptic much acuminate, stamens 4-5, fruit $\frac{1}{2}$ in. diam. tomentose. *Macreightia acuminata*, Thwaites Enum. 424; Bedd. For. Man. 147.

Ceylon; Hinidoon Pattoo, Thwaites.

A medium-sized tree; branchlets fulvo-sericeous, soon glabrescent. *Leaves* 3 by 1-1 $\frac{1}{2}$ in., thinly coriaceous, soon glabrescent; base rhomboid or almost rounded; petiole $\frac{1}{8}$ in. *Male fl.*: calyx $\frac{1}{8}$ in.; corolla-tube $\frac{1}{4}$ in.; rudiment of ovary oblong, acute, pilose.

2. **M. oblongifolia**, Hiern in Trans. Camb. Phil. Soc. xii. 112; leaves oblong or elliptic acuminate, stamens about 12, fruit $\frac{3}{4}$ -1 in. diam. brown tomentose almost hirsute. *Macreightia oblongifolia*, Thwaites Enum. 183; Bedd. Fl. Sylv. (Anal. Gen.) t. 21, fig. 1, and For. Man. 147, not of Kurz.

Ceylon; Galle and Ratnapoora, Thwaites.

A small tree; branchlets patently fulvous-hairy, at length glabrescent. *Leaves* 6 by 2 $\frac{1}{2}$ in., base rounded, subcoriaceous, patently fulvous hairy on the nerves beneath, ultimately glabrous; petiole $\frac{1}{8}$ - $\frac{1}{2}$ in. *Male fl.* crowded, sessile; calyx $\frac{1}{4}$ in., shortly 3-lobed; corolla-tube $\frac{1}{2}$ in., limb 3-fid; stamens glabrous; rudiment of ovary minute, pilose. *Female fl.* solitary, subsessile; calyx $\frac{1}{2}$ in., divided nearly to the base; corolla-limb 3-fid; stamens 0; ovary 3-celled, style divided into 3 glabrous stigmas. *Fruit* 2-6-seeded. *Seeds* $\frac{1}{2}$ by $\frac{1}{3}$ in., black, albumen equable.

3. **M. ovalifolia**, *Hiern in Trans. Camb. Phil. Soc.* xii. 113; leaves elliptic or subovate narrowed to a scarcely-acute apex, stamens 13-16. *Macreightia ovalifolia*, *Thwaites Enum.* 424; *Bedd. For. Man.* 147.

CEYLON; Hinidoon Pattoo, *Thwaites*.

A medium-sized tree; branchlets patently fulvous-hairy soon glabrescent. *Leaves* 3 by $1\frac{1}{2}$ in., base rhomboid or nearly rounded, subcoriaceous, fulvous-hairy beneath when young, soon glabrescent; petiole $\frac{1}{3}$ - $\frac{1}{2}$ in. *Male fl.* crowded, sessile; calyx $\frac{1}{8}$ in., shortly acutely 3-lobed; corolla-tube $\frac{1}{2}$ in.; limb 4-fid (in one example at least); stamens glabrous; ovary-rudiment minute. *Female* not known.

** *Fruiting calyx cupuliform at the base, often enlarged.*

4. **M. nigrescens**, *Dalz. in Dulz. & Gibs. Bomb. Fl.* 142; branchlets patently fulvous-hairy, leaves lanceolate scarcely acute, male fl. subsessile in short cymes, fruits ellipsoid when young with fulvous hairs upwards. *Hiern in Trans. Camb. Phil. Soc.* xii. 115.

WESTERN GHATS, from the Concan to Mysore; *Dalzell, Ritchie, &c.*

A tree, 15 to 35 ft. (Ritchie); young branches almost shaggy. *Leaves* 2 by $\frac{3}{4}$ in., narrowed at both ends, fulvous-hairy on the midrib beneath and margins, soon glabrescent; primary nerves indistinct, secondary prominently finely reticulated; petiole $\frac{1}{8}$ in. *Male fl.* 1-5 together, 3-4-merous; calyx $\frac{1}{8}$ in., lobes short triangular; corolla $\frac{1}{2}$ in., tube campanulate; stamens 9 or (in 4-merous flowers) 6-4, glabrous; rudiment of the ovary hairy. *Female fl.* 1-2 together, 3-merous; stamens 0; ovary 3-celled. *Fruit* $\frac{1}{3}$ by $\frac{1}{4}$ in.; calyx (in fruit) $\frac{1}{3}$ in. diam., shortly cupuliform.

5. **M. buxifolia**, *Pers. Syn.* ii. 606; branchlets soon glabrous, leaves elliptic or obovate obtuse, flowers 1-3 together subsessile in very short cymes, fruits globose or ellipsoid soon glabrous. *Wight Ic.* t. 763; *A. DC. Prodr.* viii. 240; *Thwaites Enum.* 183; *Hiern in Trans. Camb. Phil. Soc.* xii. 116; *Bedd. Fl. Sylv. (Anal. Gen.)* t. 19, fig. 4, and *For. Man.* 148, partly; *Kurz in Journ. As. Soc.* 1877, pt. ii. 232, and *For. Fl.* ii. 139. *M. littorea*, *Br. Prodr.* 527. *M. Cumingiana*, *madagascariensis*, *guineensis* and *Smeathmanni*, *A. DC. l.c.* 241. *M. neilgherrensis*, *Wight Ill.* t. 148, *bis* E. *M. Ebenus*, *Wight Ic.* tt. 1228-9, *not of Spreng.* *Maba?*, *Wall. Cat.* 7461. *Ferreola buxifolia*, *Roxb. Cor. Pl.* i. 35, t. 45, and *Fl. Ind.* iii. 790.

SOUTH DECCAN PENINSULA with CEYLON, common. MALAY PENINSULA; from PEGU to MALACCA, frequent.—DISTRIB. Malay Islds. to N. Australia and the Philippines. Tropical Africa with Madagascar.

A bush, or in the hills a small tree. *Leaves* (very variable) $\frac{1}{4}$ -1 in., narrowed at the base, soon glabrescent; primary nerves indistinct, secondary finely reticulated; petiole $\frac{1}{12}$ in. *Flowers* 3-merous; calyx $\frac{1}{10}$ in., campanulate, lobes short triangular; corolla campanulate, lobes oblong. *Male fl.*: stamens 6-12, glabrous; ovary-rudiment hairy. *Female fl.*: stamens 0; ovary 3-celled; style 3-lobed at the apex. *Fruit* $\frac{1}{3}$ in., 1-seeded; calyx in fruit cupuliform (often very shortly); albumen equable.

VAR. *Ebenus*, *Thwaites l.c.*; leaves $2\frac{1}{2}$ by $1\frac{1}{2}$ in. elliptic rounded at both ends.—*M. Ebenus*, *sp. Wight*, comes about half-way between this and the next var.

VAR. *angustifolia*, *Thwaites l.c.*; leaves 3 by $\frac{3}{4}$ in. narrowly cuneate at both ends.—Except in the glabrate branches this is nearly the same as *M. nigrescens*.

6. **M. andamanica**, *Kurz in Journ. As. Soc.* 1876, pt. ii. 138, and *For. Fl.* ii. 140; leaves large oblong patently hairy on the midrib beneath, female fl. axillary solitary subsessile, berry ellipsoid more than an inch long. *Macreightia oblongifolia*, *Kurz Andam. Rep.* 11, *not of Thwaites*. *M. andamanica*, *Kurz Andam. Rep.* ed. ii. 42.—See *Hiern in Trans. Camb. Phil. Soc.* xii. 124.

ANDAMAN ISLANDS; in the upper forests frequent, *Kurz*. NICOBARS; *Kurz*.

A shrub, 3-5 ft.; branchlets hairy. *Leaves* 8 by $2\frac{3}{4}$ in., abruptly subobtusely

acuminate, narrowed towards the subcordate base, soon glabrescent; petiole $\frac{1}{8}$ – $\frac{1}{6}$ in. *Male fl.*: in short-peduncled small cymes; calyx $\frac{1}{2}$ in., lobes 3, acute; corolla fulvous-hairy without; stamens 8, glabrous. *Female fl.* on pedicels $\frac{1}{10}$ in.; bracts minute; calyx $\frac{1}{4}$ in., campanulate, deeply 3-lobed; corolla-tube somewhat widened, constricted under the limb, lobes oblong acute (*Kurz*); ovary 3-celled. *Berries* rather dry, mucronate, smooth, usually 3-seeded. *Seeds* (*Kurz*) $\frac{2}{3}$ by $\frac{1}{4}$ in., albumen equable.

SECT. II. **Holochilus**, gen. Dalz. in Hook. Kew Journ. iv. 290 (character widened to include *Rhipidostigma* (gen.), Hassk. Retz. 103). *Calyx-lobes* not much imbricated. *Ovary* glabrous.

7. **M. micrantha**, *Hiern in Trans. Camb. Phil. Soc.* xii. 133; leaves elliptic-oblong glabrous, female fl. axillary solitary sessile, calyx truncate subentire. *Holochilus micranthus*, *Dalz. in Hook. Kew Journ.* iv. 291; *Dalz. & Gibs. Bomb. Fl.* 142; *Bedd. For. Man.* 147.

BOMBAY; Syhadree Hill, *Dalzell*.

A middle-sized tree; branchlets glabrous. *Leaves* $4\frac{1}{2}$ by $1\frac{1}{2}$ in., narrowed at both ends, widest towards the base, coriaceous; petiole $\frac{1}{4}$ – $\frac{1}{3}$ in., obscurely rusty-puberulous. *Male fl.* unknown. *Female fl.*: calyx $\frac{1}{2}$ in., tubular; corolla $\frac{1}{4}$ in., tubular, 3-lobed nearly half-way down; staminodes 6, distinct; ovary 6-celled; styles 3, erect, rather thick, tip obtuse. *Fruit* 1 by $\frac{1}{2}$ in., 6-celled, 6-seeded; calyx in fruit $\frac{1}{4}$ in. long and as much broad, funnel-shaped.

8. **M. merguensis**, *Hiern in Trans. Camb. Phil. Soc.* xii. 134; leaves ovate or oblong glabrous, female fl. in dense small axillary cymes, calyx lobed half-way down. *Kurz in Journ. As. Soc.* 1877, pt. ii. 232, and *For. Fl.* ii. 139.

MERGUI; *Griffith, Helfer*.—DISTRIB. Sumatra, Java, Borneo.

A small tree; nearly glabrous. *Leaves* 6 by $2\frac{3}{4}$ in., subobtusely acuminate, base obtusely rhomboid or almost rounded; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Male fl.* in compound dense minutely pubescent cymes 1– $1\frac{1}{2}$ in. diam.; calyx $\frac{1}{8}$ in., 4- (rarely 3-) merous, lobes triangular or obtuse; corolla $\frac{1}{10}$ in., shortly 4–3-lobed; stamens 14–16, glabrous; ovary rudimentary. *Female fl.*: calyx $\frac{1}{2}$ in., 4- (rarely 3-) merous, lobed half-way down; corolla $\frac{1}{4}$ in., 4–3-merous; staminodes 3 or 6; ovary-cells 6, 1-ovulate; styles 3, distant, glabrous. *Fruit* $\frac{1}{2}$ by $\frac{1}{2}$ in.; calyx in fruit $\frac{2}{3}$ in. diam., lobes ovate spreading. *Albumen* equable.—*Kurz* l.c. proposes to remove this species to *Diospyros*, to which in its glabrousness, its usually 4-merous flowers, and the large spreading lobes of the calyx in fruit, it shows much affinity.

SECT. III. **Barberia** (*Hiern in Trans. Camb. Phil. Soc.* xii. 107). *Calyx-lobes* rounded, much imbricated.

9. **M. Maingayi**, *Hiern in Trans. Camb. Phil. Soc.* xii. 138; leaves elliptic or somewhat obovate finally glabrous, fascicles of female fl. 3–5-fld. axillary, flowers 4- (sometimes 5-) merous, flowers and fruits large.

MALACCA; *Maingay*.—DISTRIB. Borneo.

A monoecious tree (*Maingay*); branchlets furfuraceous or subtomentose, soon glabrous. *Leaves* 4 by $2\frac{1}{2}$ in., obtuse, base cuneate, coriaceous; petiole $\frac{1}{2}$ in. *Male fl.*: calyx 4-partite; corolla-limb 4-partite, stamens 22 (*Maingay*). *Female fl.*: pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., densely rusty-woolly; calyx $\frac{1}{2}$ in., wide-campanulate, rusty-woolly, lobes short; corolla tube $\frac{1}{2}$ in., glabrous below suddenly dilated upwards, lobes $\frac{1}{2}$ in., narrow; style short, tip 3-lobed; ovary narrowly-oblong, glabrous, cells 3, 2-ovulate. *Fruits* $1\frac{1}{2}$ –2 by 1 in., ellipsoid, 3–1-celled, cells 1–0-seeded; calyx-tube in fruit solid, cylindric, $\frac{1}{2}$ by $\frac{1}{4}$ in.; lobes in fruit horizontal, $\frac{1}{2}$ in. diam., round, imbricate. *Seed* 1 by $\frac{1}{2}$ in., cylindric; albumen strongly ruminated.—The flowers are not in a good state for examination, and the ovaries may perhaps not prove always 3-celled; but *Hiern's* dissections show conclusively that each cell contains two oblong erect ovules.

2. **DIOSPYROS**, Linn.

Trees or (rarely) shrubs. *Leaves* alternate, or (in Sect. *Meloniā*) sometimes subopposite, entire. *Flowers* dioecious, very rarely polygamous, axillary and short-pedicelled or in small cymes, sometimes (the females often) solitary; 4-5-merous, very rarely 3-merous. *Calyx* lobed, often deeply (in Sect. *Ebenus* truncate), in the female often larger than in the male, often accrescent and plicate or auriculate in fruit. *Corolla* tubular, salvershaped or campanulate, shortly or deeply lobed, lobes twisted to the right. *Male flowers*: stamens 4-64, often 16; filaments distinct, paired or otherwise united; anthers linear, rarely short; ovary rudimentary. *Female flowers*: staminodes 0-16; ovary 4-5-celled, or 8-10-celled, or 4-5-celled with imperfect dissepiments between the ovules; cells 1- (rarely 2-) ovuled; styles (or stigmas) 1-4. *Fruit* globose, ellipsoid, or ovoid-conic, often supported by the much enlarged, sometimes woody, calyx; flesh often pulpose or viscid. *Seeds* oblong, usually compressed, albumen equable or (in Sect. *Melonia*) ruminated.—Species 153, in the tropics of the whole world; a few in South Africa and North America.

SECT. I. **Gunisanthus** (Genus *A. DC. Prodr.* viii. 219). *Leaves* alternate, (adult) fulvous-pilose at least on the nerves beneath. *Inflorescence* male in loose or short racemose few-flowered cymes, females subsolitary axillary. *Flowers* 4- (rarely 4-5-) merous. *Calyx* divided nearly to the base, nearly similar in the male and female flowers, little accrescent (where known) in fruit. *Corolla* narrowly tubular in the bud, cinereous-pilose or glabrate without when expanded; lobes elliptic. *Stamens* glabrous, 12-16 (or ex Hiern sometimes in *D. apiculata* 6-7 only). *Ovary* (where known) 4-celled; cells 1-ovuled. *Albumen* (only known in *D. apiculata*) equable.

1. ***D. pruriens***, Dalz. in Hook. *Kew Journ.* iv. 110; leaves elliptic base obtuse or cordate, male fl. long-pedicelled in small cymes, corolla fulvous-tomentose without. Dalz. & Gibs. *Bomb. Fl.* 141; Bedd. *Ic. Pl. Ind. Or.* t. 129, and *For. Man.* 144; Hiern in *Trans. Camb. Phil. Soc.* xii. 185, not of Thwaites.

BOMBAY; Dalzell, Ritchie. BABABOODUN HILLS; Law.

Shoots fulvous-pilose; branchlets persistently villous. *Leaves* 3 by $1\frac{1}{4}$ in., tip cuneate obtuse, base abruptly narrowed often cordate, fulvous-pilose especially on the nerves beneath, ultimately glabrescent above, chartaceous scarcely coriaceous; primary nerves oblique, secondary not prominent; petiole $\frac{1}{8}$ – $\frac{1}{6}$ in. *Male fl.*: peduncles $0\frac{1}{2}$ in., 1-5-flowered; bracts small ovate, glabrous within, caducous; pedicels $0\frac{1}{4}$ in.; calyx nearly 4-partite, lobes $\frac{1}{4}$ in., oblong, hairy; corolla $\frac{1}{2}$ – $\frac{3}{4}$ in., salvershaped, tube rather longer than the calyx, lobes $\frac{1}{4}$ – $\frac{1}{2}$ in. oblong; stamens 13-14, glabrous. *Female fl.* solitary; peduncles $\frac{1}{2}$ in.; calyx and corolla nearly as in the males; ovary 4-celled, 4-ovuled. *Fruit* $\frac{3}{4}$ –1 in., ovoid-conical, densely clothed with fulvous stinging hairs; fruiting calyx scarcely enlarged.

2. ***D. apiculata***, Hiern in *Trans. Camb. Phil. Soc.* xii. 186; leaves elliptic acuminate base obtuse or cordate, male fl. in short cymes, corolla glabrous without.

PENANG; Government Hill, Maingay.

A tree, with slender stem 4 ft. high (*Maingay*); shoots fulvous-hirsute; branchlets persistently villous. *Leaves* $5\frac{1}{2}$ by $2\frac{1}{2}$ in., base abruptly narrowed mostly cordate, fulvous-hirsute especially on the nerves beneath, ultimately glabrescent above, chartaceous scarcely coriaceous; primary nerves very oblique, much elevated beneath, secondary not prominent; petiole $\frac{1}{16}$ – $\frac{1}{8}$ in. *Male fl.*: peduncles $0\frac{1}{2}$ in., 1-4-flowered; bracts small, ovate, glabrous within, caducous; pedicels $0\frac{1}{6}$ in.; calyx $\frac{1}{8}$ in., nearly 4-partite, lobes lanceolate glabrous within downwards; corolla $\frac{1}{2}$ – $\frac{1}{2}$ in., salvershaped,

tube rather shorter than the calyx, lobes $\frac{1}{2}$ in. elliptic; stamens 12 (sometimes 6-7 *ex Hiern*), glabrous. *Female fl.* 1-3 together, subsessile. *Fruit* 1 by $\frac{1}{2}$ in., ovoid-conic, acute, with scattered fulvous hairs, ultimately nearly glabrous, calyx scarcely accrescent. *Albumen* equable.

3. *D. pilosula*, *Wall. Cat.* 4132; leaves narrowly obovate-lanceolate acuminate cuneate or rhomboid at the base, male flowers long-pedicelled in lax cymes, corolla closely silky without. *Hiern in Trans. Camb. Phil. Soc.* xii. 188. *Gunisanthus pilosulus*, *A. DC. Prodr.* viii. 220; *Kurz in Journ. As. Soc.* 1877, pt. ii. 232, and *For. Fl.* ii. 125.

KHASIA MTS.; *Wallich. PEGU; Brandis. ANDAMAN ISLDS., Kurz.*

A small tree, attaining 25 ft. (*Kurz*); branchlets adpressedly fulvous-pilose, at length glabrescent. *Leaves* 4 by $1\frac{1}{2}$ in., base cuneate or scarcely obtuse, hairy principally on the nerves beneath, ultimately nearly glabrous except the midrib beneath, chartaceous somewhat coriaceous; primary nerves oblique, secondary not conspicuous; petiole $\frac{1}{2}$ in. *Male fl.* in lax depauperated subracemose cymes, 4-merous; bracts $\frac{1}{2}$ in., ovate, deciduous; pedicels $\frac{1}{2}$ in.; calyx-lobes $\frac{1}{2}$ in., lanceolate; corolla-tube $\frac{1}{2}$ - $\frac{3}{4}$ in., slender, pilose without; lobes $\frac{1}{2}$ - $\frac{3}{4}$ in.; stamens 12, glabrous. *Female fl.* solitary, calyx and corolla nearly as in the male; ovary 4-celled, cells 1-ovuled; young fruit densely rufous hirsute.

4. *D. martabanica*, *Clarke*; leaves narrowly oblong acuminate obtuse or rounded at the base, male flowers long-pedicelled in lax racemose cymes, corolla fulvous-villous without. *Gunisanthus mollis*, *Kurz in Journ. As. Soc.* 1873, pt. ii. 88, 1877, pt. ii. 232, and *For. Fl.* ii. 126.

MARTABAN; east of Tounghoo not infrequent, *Kurz.*

A tree, attaining 30 ft.; branchlets hirsute, persistently villous. *Leaves* 6 by $\frac{1}{2}$ in., when young glabrous above, hirsute beneath with fulvous hair $\frac{1}{2}$ in. long, when mature pilose beneath, chartaceous somewhat coriaceous; primary nerves oblique, secondary not conspicuous; petiole $\frac{1}{2}$ in. *Male fl.* in lax depauperated subracemose cymes, 4-merous; bracts $\frac{1}{2}$ in., ovate, deciduous; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in., calyx-lobes $\frac{1}{2}$ in., narrowly lanceolate; corolla-tube $\frac{1}{2}$ in., slender, lobes $\frac{1}{2}$ in., narrow-oblong; stamens 12-14, glabrous, anthers short-oblong, connective hardly produced. *Female fl.* unknown.—Very nearly allied to *D. pilosula* (*Kurz*).

VAR. *pellucido-punctata*; leaves 2 in. long. *D. vaccinioides*, var., *Hiern in Trans. Camb. Phil. Soc.* xii. 231.—Andamans; *Kurz*.—The example exhibits no flowers, one detached imperfect fruit.

5. *D. dasphylla*, *Kurz in Journ. As. Soc.* 1871, pt. ii. 71; leaves cordate-oblong acute, male flowers in short ferruginous-villous cymes, corolla-tube densely villous without, stamens about 16. *Hiern in Trans. Camb. Phil. Soc.* xii. 203; *Kurz in Journ. As. Soc.* 1877, pt. ii. 237, and *For. Fl.* ii. 138.

MARTABAN HILLS, alt. 4000 ft., *Brandis.*

Branchlets persistently fulvous-villous. *Leaves* $5\frac{1}{2}$ by $2\frac{1}{2}$ in., fulvous-pilose on the nerves beneath, chartaceous somewhat coriaceous; primary nerves oblique, secondary not conspicuous; petiole $\frac{1}{2}$ in. *Male fl.*: cymes $\frac{1}{2}$ in., 2-4-flowered; bracts $\frac{1}{2}$ in., orbicular; calyx $\frac{1}{2}$ - $\frac{3}{4}$ in., deeply 4-lobed, lobes round-elliptic, ciliate-pilose; corolla-tube $\frac{1}{2}$ in., lobes $\frac{1}{2}$ in., elliptic; stamens glabrous; anther-cells narrowly oblong, connective shortly produced above them. *Female fl.* unknown.

SECT. II. *Embryopteris*. *Leaves* alternate, adult glabrous or (in *D. Kaki* and *D. montana*, var.) pubescent. *Flowers* 4- (rarely 4-5-) merous; males in small cymes or clustered subsessile (in *D. foliolosa* in rather larger more numerous-flowered cymes); females subsolitary. *Calyx* cleft to the base or half-way down (in *D. Embryopteris* and *D. Toposia* irregularly, less deeply). *Corolla* narrowly tubular in bud; glabrate or nearly so without when expanded (except in *D. Kaki*), urceolate or salvershaped. *Stamens* about 16 (in *D. Embryopteris*, *D. Kaki* and *D. assimilis* numerous), glabrous or in a

few species somewhat hairy. *Fruit* ellipsoid or subglobose. *Seeds* (where known) with equable albumen.

6. **D. montana**, *Roxb. Cor. Pl.* i. 37, t. 48 and *Fl. Ind.* ii. 538; leaves ovate or oblong pubescent or glabrous base cuneate or obtuse, male fl. in small cymes, calyx small deeply lobed, corolla urceolate glabrous without, stamens 16 glabrous. *Wall. Cat.* 4115, upper part of type sheet; *Wight Ic.* t. 1225; *A. DC. Prodr.* viii. 230; *Grah. Cat. Bomb. Pl.* 107; *Dalz. & Gibs. Bomb. Fl.* 142; *Bedd. For. Man.* 143; *Hiern in Trans. Camb. Phil. Soc.* xii. 220; *Kurz in Journ. As. Soc.* 1877, pt. ii. 235; *Brand. For. Fl.* 296. *D. cordifolia*, *Roxb. Cor. Pl.* i. 38, t. 50, and *Fl. Ind.* ii. 538; *Wall. Cat.* 4116; *A. DC. Prodr.* viii. 230; *Wight Ill.* t. 148; *Thwaites Enum.* 178; *Kurz For. Fl.* ii. 130; *Bedd. For. Man.* 143. *D. rugosula*, *Br. Prodr.* 526; *A. DC. Prodr.* viii. 229. *D. bracteata*, *Roxb. Fl. Ind.* ii. 539; *A. DC. l. c.* 239. *D. heterophylla*, *Wall. Cat.* 4138; *A. DC. l. c.* viii. 230. *D. sylvatica*, *Wall. Cat.* 4117, not of *Roxb.*; of *A. DC. Prodr.* viii. 231, as to var. β only. *D. punctata*, *Decne in Nouv. Ann. Mus. d'Hist. Nat.* iii. 467; *A. DC. l. c.* 230. *D. Goindu*, *Dalz. in Hook. Kew Journ.* iv. 111; *Dalz. & Gibs. Bomb. Fl.* 141. *D. Waldemarii*, *Klotzsch in Reis. Pr. Waldem.* 101, t. 55.

From the HIMALAYA (from the Ravi eastward, *Brandis*) to CRYLON and TENASSERIM; common.—DISTRIB. Birma, Malay Archipelago, Trop. Australia.

A tree. often spinous; branchlets soon glabrous. *Leaves* $2\frac{1}{2}$ by 1 in., base cuneate or cordate on the same branch, thin, nerves not elevated, though both primary and reticulating nerves often distinct; petiole $\frac{1}{2}$ in. *Male fl.*: cymes $\frac{1}{4}$ – $\frac{3}{4}$ in., pubescent or glabrescent; peduncles $0\frac{1}{2}$ – $\frac{1}{2}$ in.; bracts $\frac{1}{20}$ in.; calyx $\frac{1}{8}$ – $\frac{1}{10}$ in., lobes ovate; corolla $\frac{1}{4}$ in., shortly lobed. *Female flowers* solitary; peduncles $\frac{1}{2}$ – $\frac{1}{2}$ in.; calyx $\frac{1}{8}$ – $\frac{1}{2}$ in., deeply 4-fid; corolla nearly as of the male; stamindes 4–12; ovary 8-celled, cells 1-ovuled. *Fruit* $\frac{1}{2}$ – $1\frac{1}{2}$ in. diam., globose, glabrous; lobes of fruiting calyx $\frac{1}{4}$ – $\frac{1}{2}$ in., ovate, obtuse, foliaceous. *Seeds* 2–8; albumen not ruminated (*Kurz* says ruminated in the Pegu tree).—*D. cordifolia* has the female peduncles $\frac{1}{4}$ – $\frac{3}{4}$ in., the leaves and calyx subsersistently pubescent; *D. montana* has them glabrescent; *Beddome* maintains the two to be distinct species.

7. **D. Lotus**, *Linn*; *A. DC. Prodr.* viii. 228; leaves elliptic narrowed upwards membranous at first pubescent beneath, male fl. 2–3 together subsessile, calyx small lobed half-way down, corolla urceolate glabrous without, stamens 16 connective pilose. *Lamk. Ill.* t. 858; *Reich. Ic. Fl. Germ.* t. 1079; *Hiern in Trans. Camb. Phil. Soc.* xii. 223; *Brand. For. Fl.* 297, t. 36; *Boiss. Fl. Orient.* iv. 33.

WEST PUNJAB; Hazara, alt. 3–6000 ft., *Stewart*. WEST KASHMIR and North of PESHAWUR; not uncommon, *Brandis*.—DISTRIB. West Asia. Cultivated in the Mediterranean Region, also (?) in Japan and China.

Resembling *D. montana*; the leaves are larger ($6\frac{1}{2}$ by 2 in. in *Stewart's* example).—"Fruit much prized by the Affghan tribes" (*Brandis*); hence it may be questioned how far the tree is indigenous in India.

8. **D. Kaki**, *Linn. f. Suppl.* 439; leaves ovate obtuse or narrowed at both ends pubescent reticulated beneath, male flowers in small cymes, calyx lobed deeply, corolla urceolate tube short glabrate lobes tomentose without, stamens 16 pilose. *Roxb. Fl. Ind.* ii. 527; *Grah. Cat. Bomb. Pl.* 107; *Wight Ic.* t. 415; *A. DC. Prodr.* viii. 229, excl. var. γ , glabra; *Hiern in Trans. Camb. Phil. Soc.* xii. 227–230, with fig.; *Ill. Hort.* 1871, 176, t. 78; *Kurz in Journ. As. Soc.* 1877, pt. ii. 233. *D. chinensis*, *Blume Bijl.* 670. *D. Schi-Tse*, *Bunge Enum. Pl. Chin. Bor.* 42. *D. costata*, *Rev. Hort.* 1870, fig. at p. 133. *D. Roxburghii*, *Rev. Hort.* 1872, tt. 28–29. *Embryopteris Kaki*, *G. Don. Gen. Syst.* iv. 41.

KHASIA Mts.; Moosmai, Bor Pani, Nunklao, Nurtiung, *H. f. & T.*—DISTRIB. Eastern India, China and Japan, cultivated.

A small tree; branchlets subsperisistently villous. *Leaves* $4\frac{1}{2}$ by 2 in., chartaceous scarcely coriaceous; primary nerves oblique, conspicuous beneath; petiole $\frac{1}{4}$ in. *Male fl.*: cymes $\frac{1}{4}$ in., about 3-flowered, pubescent; peduncles $0\frac{1}{2}$ in.; bracts $0\frac{1}{2}$ in., lanceolate linear; pedicels hardly any; calyx $\frac{1}{4}$ in., deeply 4-lobed; corolla $\frac{1}{4}$ in. *Female fl.* solitary; peduncles $\frac{1}{2}$ in.; calyx-lobes $\frac{1}{2}$ in., ovate; corolla $\frac{1}{2}$ by $\frac{1}{4}$ in.; staminodes 8; ovary usually 8-celled; style hairy, 4-fid. *Fruit* 1-3 in. diam., globose, edible, very variable in the cultivated plant.

9. **D. Embryopteris**, *Pers. Syn.* ii. 624; leaves oblong obtuse at the base glabrous, male flowers in short cymes, corolla urceolate nearly glabrous without, stamens 24-64 pilose. *Wall. Cat.* 4123; *Bot. Reg.* t. 499; *A. DC. Prodr.* viii. 235; *Griff. Notul.* iv. 289; *Thwaites Enum.* 178; *Bedd. Fl. Sylb.* t. 69; *Hiern in Trans. Camb. Phil. Soc.* xii. 258; *Kurz in Journ. As. Soc.* 1877, pt. ii. 234, and *For. Fl.* ii. 128; *Brand. For. Fl.* 298. *D. glutinosa*, *Koen.*; *Roxb. Fl. Ind.* ii. 533; *Grah. Cat. Bomb. Pl.* 107. *Embryopteris peregrina*, *Gaertn. Fruct.* i. 145, t. 29, fig. 2. *E. glutenifera*, *Roxb. Cor. Pl.* i. 49, t. 70; *Wight Ic.* tt. 843, 844. *E. gelatinifera*, *G. Don Gen. Syst.* iv. 41. *Garcinia malabarica*, *Desrouss.*; *Lamk. Dict.* iii. 701.—*Rheede Hort. Mal.* iii. t. 41.

INDIA from the HIMALAYA (from the Jumna eastward, *Brandis*) to CEYLON and TENASSERIM, very common; abundant in Bengal.—DISTRIB. Siam, Malayan Archipelago.

A dense tree; branchlets glabrous. *Leaves* $5\frac{1}{2}$ by 2 in., obtuse or subacuminate, coriaceous; primary nerves oblique, reticulating nerves distinct, slightly elevated above; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Male fl.*: cymes $\frac{1}{4}$ – $\frac{3}{4}$ in., few- or many-flowered, puberulous or subtomtense; calyx $\frac{1}{4}$ in. long and broad, adpressedly cinereous silky, or in the more southern examples black silky or almost hirsute, lobes $\frac{1}{2}$ – $\frac{1}{4}$ in., triangular; corolla $\frac{1}{2}$ by $\frac{1}{2}$ in.; tubular-campanulate, lobes $\frac{1}{10}$ in.; filaments short hairy, anthers linear more or less hairy. *Female fl.* 1-5 together, subsessile or cymose; resembling the male, but larger, calyx-lobes wider, subauriculate at the base; staminodes 1-12; ovary 8-celled, glabrous; styles 4, lobed at the tips. *Fruit* usually solitary, 1-2 in. diam., subglobose; glandular or rusty, usually 4-8-seeded; fruiting-calyx much accrescent, lobes $\frac{3}{4}$ in., ovate, auriculate, base cordate, nearly glabrous.

10. **D. Toposia**, *Ham. in Trans. Linn. Soc.* xv. 115; leaves oblong acuminate coriaceous glabrous, male flowers in small cymes, calyx spathaceo-valvate irregularly lobed, corolla urceolate nearly glabrous without, stamens about 32 glabrous. *A. DC. Prodr.* viii. 237; *Bedd. Ic. Pl. Ind. Or.* t. 122; *Hiern in Trans. Camb. Phil. Soc.* xii. 263; *Kurz in Journ. As. Soc.* 1877, pt. ii. 234, and *For. Fl.* ii. 128; *Bedd. For. Man.* 144. *D. racemosa*, *Roxb. Hort. Beng.* 40, and *Fl. Ind.* ii. 536; *Wight Ic.* t. 416. *D. lanceolata*, *Wall. Cat.* 4122. *Embryopteris lanceolata*, *G. Don Gen. Syst.* iv. 41.

SILHET; *Roxburgh*. CACHAR; *Keenan*. CHITTAGONG; *Kurz*. CEYLON; *Gardner*, *Thwaites*.

A large or middle-sized tree; branchlets glabrous. *Leaves* $6\frac{1}{2}$ by $2\frac{1}{4}$ in., base obtuse or almost rounded, primary nerves not so oblique as in *D. Embryopteris*, reticulated nerves very close distinct; petiole $\frac{1}{4}$ in. *Male fl.*: peduncles $\frac{1}{2}$ – $\frac{2}{3}$ in., nearly glabrous; cymes $\frac{1}{4}$ –1 in., often 3-flowered; calyx $\frac{1}{2}$ in., lobes irregular, ovate, acute; corolla $\frac{1}{4}$ in., tubular-campanulate, shortly 4-lobed. *Female fl.* short-peduncled; calyx and corolla as in the male; staminodes 12-16; ovary 4- (rarely 6-) celled; style 0, stigmas 4. *Fruit* $\frac{2}{3}$ –1 in., ellipsoid or subglobose, villous finally glabrate, 1-4-seeded; fruiting calyx $\frac{2}{3}$ in. across; lobes patent, villous within. *Albumen* equable.

11. **D. foliolosa**, *Wall. Cat.* 4143; leaves oblong acuminate glabrous, male cymes lax, corolla urceolate glabrous without, calyx-lobes of the female

cordate ovate accrescent soon glabrous. *A. DC. Prodr.* viii. 234; *Hiern in Trans. Camb. Phil. Soc.* xii. 188. *D. calycina*, *Bedd. Fl. Sylv.* t. 68, and *Ic. Pl. Ind. Or.* t. 123.

SHEVAGHERRY HILLS and COURTALLUM; *Wight*. TINNEVELLY HILLS; *Beddome*.

A middle-sized tree; branchlets soon glabrous. *Leaves* 4 by $\frac{3}{4}$ – $1\frac{1}{4}$ in., base cuneate or obtusely rhomboid, shining, coriaceous; primary nerves oblique, indistinct, reticulating nerves prominent on both surfaces; petiole $\frac{1}{8}$ – $\frac{1}{6}$ in. *Male fl.*: cymes 2 in., lax, soon glabrescent, pedicels $\frac{1}{8}$ – $\frac{1}{10}$ in.; calyx $\frac{1}{10}$ in., lobed half-way down; corolla $\frac{1}{4}$ in., shortly 4-lobed; stamens 12–16, somewhat hairy. *Female fl.* solitary, peduncles $\frac{1}{2}$ –1 in.; corolla nearly as in the male; ovary 4-celled, cells 1-ovuled. *Fruit* $\frac{3}{8}$ in. diam., globose, squamose, glabrescent; fruiting calyx foliaceous, lobes $\frac{3}{4}$ in. long and broad, cordate-ovate acute.

12. ***D. ovalifolia***, *Wight Ic.* t. 1227; leaves elliptic or oblong cuneate or subobtusate at both ends glabrous, flowers sessile clustered, corolla urceolate glabrous without. *Thwaites Enum.* 181; *Hiern in Trans. Camb. Phil. Soc.* xii. 237; *Bedd. For. Man.* 143.

SOUTH DECCAN PENINSULA; Coimbatore and Nilgherries, *Wight*; Anamallays and Tinnevely Hills, *Beddome*. CEYLON, alt. 2–4000 ft., *Moon*, *Thwaites*.

A middle-sized tree; branchlets glabrous. *Leaves* 5 by $2\frac{1}{4}$ in., coriaceous, nerves ultimately distinct; petiole $\frac{1}{4}$ in. *Male fl.* 3–6 together, clusters minutely pilose; calyx $\frac{1}{10}$ in., wide-campanulate, lobes $\frac{1}{16}$ in., deltoid, hairy on both sides; corolla $\frac{1}{5}$ – $\frac{1}{4}$ in., tubular-campanulate, lobes 4–5 less than half the length of the corolla, ovate; stamens 13–20, glabrous. *Female fl.* 2–6 together, resembling the males but rather broader; staminodes 0–7; ovary hairy 4–6 celled (2-celled, fide *Wight*); style 2–3-lobed. *Fruits* 1–3 together, $\frac{2}{3}$ in. diam., subsessile, globose, glabrate, usually 1-seeded; lobes of the fruiting calyx $\frac{1}{5}$ by $\frac{1}{2}$ in., reflexed, thick, ferruginous-tomentose on both sides. *Albumen* equable.

13. ***D. nigricans***, *Wall. Cat.* 6351; leaves elliptic-lanceolate acuminate glabrous, male flowers subsessile, calyx-lobes small ovate, corolla tubular nearly glabrous without. *A. DC. Prodr.* viii. 239; *Hiern in Trans. Camb. Phil. Soc.* xii. 207; *Bedd. For. Man.* 144.

KHASIA MTS.; *H. f. & T. SILHET*; *Wallich*.

A tree, attaining 50 ft.; branchlets subpersistently grey-pubescent. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{4}$ in., base broad-cuneate, often turning black in drying, chartaceous hardly coriaceous; primary nerves slender, indistinct, oblique, reticulating nerves distinct; petiole $\frac{1}{6}$ in. *Male fl.* 3–6 together; calyx-tube very short, lobes 4, $\frac{1}{8}$ in., sparsely pilose; corolla $\frac{1}{4}$ in., deeply lobed. *Female fl.* unknown. *Fruit* solitary, subsessile $\frac{2}{3}$ by $\frac{1}{2}$ in., ellipsoid, glabrous, 4-celled; fruiting calyx divided nearly to the base, blackish; lobes $\frac{1}{4}$ by $\frac{3}{4}$ in., ovate or elliptic, foliaceous, nearly flat and glabrous.

14. ***D. variegata***, *Kurz in Journ. As. Soc.* 1871, pt. ii. 73; leaves large broadly oblong acute glabrous, male flowers in very short sparingly pubescent cymes, corolla salver-shaped nearly glabrous without. *Hiern in Trans. Camb. Phil. Soc.* xii. 203; *Kurz in Journ. As. Soc.* 1877, pt. ii. 236, and *For. Fl.* ii. 137.

ASSAM; *Jenkins*. PEGU and MARTABAN; alt. 0–1000 ft., not infrequent, *Kurz*.

A tree, attaining 70 ft. (*Kurz*); glabrous. *Leaves* $7\frac{1}{2}$ by $2\frac{1}{2}$ – $3\frac{1}{2}$ in., base cuneate or subobtusate, coriaceous; primary nerves oblique strong, reticulating nerves distinct; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Male fl.*: cymes 3–8-flowered, crowded; calyx $\frac{1}{2}$ in., 4-lobed more than half-way down, lobes elliptic minutely pubescent; corolla-tube $\frac{1}{4}$ in., narrowed upwards, lobes $\frac{1}{4}$ in., ovate, subacute, patent; stamens about 16, anthers glabrous.—In an Assam fruiting example (n. 275 *Herb. Kew*); peduncle $\frac{1}{2}$ in.; fruit solitary $\frac{3}{4}$ in. diam., globose, ferruginous-villous; calyx-lobes 4, $\frac{3}{4}$ by $\frac{1}{2}$ in., auriculate, ferruginous-pubescent within. This was matched with *Kurz*'s male examples of *D. variegata* by the leaves, apparently correctly by *Hiern*, who nevertheless hesitated to

describe the fruit of *D. variegata* from it.—Griffith's Assam examples, referred to by *Hiern l. c.* 223, were finally referred to *D. variegata*, with which the leaves exactly agree; the examples exhibit only leaves and dense panicles 4-6 in. diam. of abortive buds: these are doubtful.

15. **D. Ebenum**, Koenig; *A. DC. Prodr.* viii. 234; leaves elliptic obtuse or obtusely cuneate at both ends coriaceous reticulating nervation hexagonal prominent, male fl. in short-peduncled cymes, corolla tubular glabrous without not clavate in the bud, stamens about 18. *Roxb. Hort. Beng.* 40, and *Fl. Ind.* ii. 529; *Wall. Cat.* 4120; *Wight Ic.* t. 188; *Grah. Cat. Bomb. Pl.* 108; *Bedd. Fl. Sylv.* t. 65; *Hiern in Trans. Camb. Phil. Soc.* xii. 208, partly. *D. Ebenaster*, *Roxb. Fl. Ind.* ii. 529, not of Retz.

SOUTH DECCAN PENINSULA; fide *Beddome*. ASSAM; *Griffith* (an culta?). CEYLON; alt. 2-5000 ft., frequent.—DISTRIB. Malaya (*Hiern*).

A large tree; branchlets glabrous. *Leaves* 4 by $1\frac{3}{4}$ in., coriaceous; primary nerves oblique; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in. *Male fl.* 3-12 together, almost fascicled on peduncles $0-\frac{1}{4}$ in.; calyx $\frac{1}{8}$ in., funnel-shaped, nearly glabrous, lobes 4, not reaching half-way down, rounded, glabrous or ciliate-pubescent on the margins; corolla-buds $\frac{1}{2}$ in., narrower upwards, lobed half-way down; filaments minutely pilose, anthers linear glabrous, connective long produced. *Female fl.* solitary, very shortly peduncled; calyx larger than in the male; style 1, stigmas 4; ovary 8-celled. *Fruit* $\frac{3}{4}$ in diam., globose, glabrous or adpressedly pubescent; fruiting calyx a subhemispheric wooden cup fitting the base of the fruit; below its margin without spread the 4 ovate calyx-lobes.—No specimens seen from Bengal except cultivated. Thwaites sends a variety in which the primary nerves of the leaves are more distant and very oblique.

16. **D. assimilis**, *Bedd. in Madras For. Rep.* 1866-7, 20, t. 1; leaves broadly oblong acuminate glabrous thin reticulating nervation rhomboidal conspicuous, male fl. in short-peduncled cymes, calyx pubescent, corolla tubular glabrous without not clavate in bud, stamens 24-32. *D. nigricans*, *Dalz. in Hook. Kew Journ.* iv. 110; *Dalz. & Gibs. Bomb. Fl.* 141, not of *Wall.* nor of *Bedd.* *D. Ebenum*, *Hiern in Trans. Camb. Phil. Soc.* xii. 208, partly.

MALABAR; Concan and Canara, *Dalzell*; South Canara, *Beddome*.

Leaves more parallel-sided than in *D. Ebenum*, much thinner in texture, drying black. *Calyx* more pubescent, lobed more than half-way down. *Filaments* glabrous, anthers linear, connective hardly produced. The examples are all male, but the tree seems closely allied to *D. Ebenum* (*Beddome*), with which *Hiern* unites it.

17. **D. clavigera**, *Clarke*; leaves elliptic obtusely rhomboid at both ends glabrous coriaceous reticulated nervation obscure, male fl. in small dense cymes, corolla tubular glabrous without clavate in the bud, stamens about 16 glabrous. *D. Ebenum*, *Hiern in Trans. Camb. Phil. Soc.* xii. 208, partly.

MALACCA; *Griffith* (*Kew Distrib.* n. 3635), *Maingay* (n. 971).

Whole plant glabrous, except the minutely ciliate-pilose margin of the calyx. *Leaves* $2\frac{3}{4}$ by $1\frac{1}{4}$ in. (much larger occur), drying red; petiole $\frac{1}{4}$ in. *Male fl.* 3-16 together in very small subsessile cymes; calyx $\frac{1}{8}$ in., divided deeply; lobes 4, obtuse; corolla (in the bud) $\frac{1}{2}$ in., glabrous, the upper portion containing the lobes much thicker than the tube; anthers oblong, connective very shortly produced. *Female fl.* and fruit unknown.

SECT. III. **Brachyanthos**. *Leaves* alternate. *Flowers* small, 4- (rarely 3- or 5-) merous; males in very small cymes (or in *D. microphylla* almost fascicled), females solitary or (in *D. Kurzii*) in very small cymes. *Calyx* nearly 4-partite, larger in the female, accrescent in fruit. *Corolla* subglobose in the male bud, when expanded urceolate small, glabrate (in *D. Kurzii* cinereous-tomentose). *Stamens* 12-24, glabrous or slightly hairy; anther dehiscing at

first by short slits laterally near the apex of the cells. *Albumen* ruminated or equable.

18. *D. sylvatica*, *Rarb. Cor. Pl.* i. 37, t. 47, and *Fl. Ind.* ii. 537; leaves elliptic or oblong narrowed at both ends nearly glabrous secondary nervation indistinct, male fl. in small cymes, corolla short urceolate glabrate without, female solitary. *A. DC. Prodr.* viii. 231, excl. var. β ; *Thwaites Enum.* 178; *Bedd. Ic. Pl. Ind. Or.* t. 121, and *For. Man.* 143; *Hiern in Trans. Camb. Phil. Soc.* xii. 161, not of *Wall.*

DECCAN PENINSULA from the CIRCARS and BOMBAY to CEYLON.

A medium-sized tree. *Leaves* $4\frac{1}{2}$ by 2 in., minutely pubescent beneath or glabrous, drying black; petiole $\frac{1}{2}$ in. *Male fl.* in cymes $\frac{1}{2}$ in. long; calyx-lobes $\frac{1}{8}$ in., rounded, minutely hairy; corolla $\frac{1}{10}$ in., lobed half way down; stamens 13-22, glabrous or sparsely pilose; anthers ovate, dehiscing by a short slit near their apex, connective produced lanceolate. *Female fl.* on peduncles $\frac{1}{2}$ in., 4-3-merous; calyx-lobes $\frac{1}{2}$ in., ovate-oblong; corolla $\frac{1}{2}$ in.; staminodes 4; ovary 6-8-celled; styles 3, bifid. *Fruit* $\frac{1}{2}$ in. diam., globose, nearly glabrous; fruiting calyx accrescent, lobes spreading, foliaceous, glabrous, nearly flat, striate. *Seeds* 2-8, albumen ruminated.

19. *D. ehretioides*, *Wall. Cat.* 4187; leaves large elliptic base obtuse nearly glabrous reticulating nervation prominent, male fl. in small cymes, corolla urceolate glabrate without, females solitary. *A. DC. Prodr.* viii. 231; *Hiern in Trans. Camb. Phil. Soc.* xii. 162; *Kurz in Journ. As. Soc.* 1877, pt. ii. 234, and *For. Fl.* ii. 129.

Throughout BRITISH BIRMA, frequent.—DISTRIB. AVA.

A tree, attaining 70 ft. *Leaves* attaining 11 by $6\frac{1}{2}$ in., base rounded or rarely rhomboidal, nearly glabrous when very young, pale (brown when dried) beneath; petiole $\frac{3}{4}$ in. *Flowers* nearly as in *D. sylvatica*, the males rather larger; anthers ovate-lanceolate, similar to those of *D. sylvatica*, and similarly dehiscing by a lateral slit from the apex of the cell, which is in this species produced more than half-way down the cell. *Fruit* $1-1\frac{1}{2}$ in. diam., globose, smooth.

20. *D. Kurzii*, *Hiern in Trans. Camb. Phil. Soc.* xii. 162; leaves elliptic shortly acuminate glabrous, primary nerves slender distinct very close, female fl. 2-8 together in short-peduncled cymes, corolla-lobes cinereous-tomentose on both sides. *Kurz in Journ. As. Soc.* 1877, pt. ii. 235, and *For. Fl.* ii. 231.

ANDAMAN ISLDS.; frequent, *Kurz.* NICOBARS; Kamorta, *Kurz.*

A tree, attaining 60 ft. (*Kurz*); branchlets pubescent. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., base cuneate, drying black, midrib depressed above; petiole $\frac{1}{2}$ in. *Male fl.* unknown. *Female fl.* 4-merous; peduncles $\frac{1}{2}$ in., pubescent, bracts small, linear, deciduous; calyx $\frac{1}{8}$ in., lobes deep, elliptic glabrous or nearly so; corolla $\frac{1}{2}$ in., short-campanulate, lobes deep, oblong-ovate; staminodes 4 glabrous; ovary glabrous except at the apex, 4-celled, cells 1-ovuled; styles 2, erect, slender, hairy, long, base connate. *Berries* globular, size of a small cherry, smooth, 4-celled, 4-seeded; albumen equable. *Kurz* says that the style is simple thick.

21. *D. microphylla*, *Bedd. Ic. Pl. Ind. Or.* t. 218, and *For. Man.* 145; leaves small ovate-oblong cuneate at both ends glabrescent except the midrib beneath, flowers axillary subsessile, calyx-lobes ovate. *D. buxifolia*, *Hiern in Trans. Camb. Phil. Soc.* xii. 118. *D. vaccinioides*, *Wall. Cat.* 4180, as to *Penang and Singapore examples*; *Hiern l. c.* 230, as to all the *Malay examples*, not of *Lindl.* *Leucosylum buxifolium*, *Blume Bijdr.* 1169; *Choisy Mém. Ternstr.* p. 43, t. 2.

CANARA, MYSORE, BABABOODUN and ANAMALLAY HILLS; *Gibson, Beddome, &c.* MALACCA; *Maingay*, n. 966, *Griffith* (Kew Distrib. n. 3643), *Walker, &c.* PENANG and SINGAPORE, *Wallich*.—DISTRIB. JAVA, BORNEO.

A large tree; branchlets in the Malay glabrescent, in the Malabar subpersistently hirsute. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ in., glabrous above, coriaceous, nerves obscure; petiole $\frac{1}{8}$

in. *Male fl.* 1-3 together in a most minute cyme; calyx $\frac{1}{16}$ in., 4-lobed; lobed half-way down, tube glabrate without lobes densely fulvous-pilose near their margins; stamens 16 (in the Indian examples). *Female fl.* solitary; calyx and corolla nearly as of the male; ovary 4-celled, pubescent, cells 1-ovuled; style short, bipartite. *Fruit* $\frac{1}{3}$ - $\frac{2}{3}$ by $\frac{1}{6}$ - $\frac{1}{3}$ in., short-cylindric, glabrous 1- (rarely 2-) seeded. *Seeds* with albumen not ruminated.—The anthers are exceedingly short, dehiscing at first by a lozenge-shaped opening from the summit, but even at that time a groove is produced from this opening nearly to the base of the cell. *D. vaccinioides* differs in its very narrow calyx-segments.

22. **D. Chloroxylon**, *Roxb. Cor. Pl.* i. 38, t. 49, and *Fl. Ind.* ii. 538; leaves elliptic or obovate-oblong hairy beneath, male fl. subsessile fascicled, calyx small, lobes 4 deep ovate, corolla small urceolate nearly glabrous without. *Wall. Cat.* 4118; *A. DC. Prodr.* viii. 230; *Dalz. & Gibs. Bomb. Fl.* 140; *Hiern in Trans. Camb. Phil. Soc.* xii. 233; *Brand. For. Fl.* 297. *D. tomentosa*, *Lamk. Encyc.* v. 436, not of *Roxb.* *D. capitulata*, *Wight Ic.* tt. 1224, 1588 bis.

DECAN PENINSULA from SURAT and ORISSA southwards; frequent.

A middle-sized tree; branches sometimes spinous. *Leaves* $1\frac{3}{4}$ by 1 in., usually narrowed upwards or acute, base cuneate or obtuse, nerves not prominent; petiole $\frac{1}{8}$ in. *Male fl.* 4-10 together, 4-merous; calyx $\frac{1}{10}$ in., lobes ovate, glabrous within; corolla $\frac{1}{8}$ in.; stamens 16, glabrous; anthers opening by small subapical slits, subsequently extending nearly to their base. *Female fl.* solitary, sessile; calyx and corolla as in the male but rather larger; staminodes 7-9; ovary glabrous, styles 4 glabrous. *Fruit* $\frac{1}{2}$ in. diam., globose, glabrous, 2-3-seeded; fruiting calyx $\frac{1}{2}$ in. diam., nearly flat.—Wight says that his *D. capitulata* differed by having the produced connective bipartite, but this does not appear to be so in Wight's own Herbarium specimens. As to *D. glauca*, Rottler (*A. DC. Prodr.* viii. 238), reduced here doubtfully by Hiern, it is so imperfectly characterised that it may have been *D. montana* or some totally remote species.

SECT. IV. **Ebenus** (Hiern in *Trans. Camb. Phil. Soc.* xii. 146). *Leaves* alternate, adult glabrous. *Flowers* mostly 4-merous; males in very small cymes or fascicled; females 1-3, sessile. *Calyx* obscurely lobed or nearly entire. *Corolla* narrowly tubular in the bud, fulvous-tomentose without. *Stamens* glabrous. *Albumen* equable.

23. **D. oocarpa**, *Thwaites Enum.* 180; leaves ovate obtusely acuminate glabrous primary nerves oblique secondary little elevated, male fl. fascicled, corolla tubular tomentose without, female calyx subtruncate. *Hiern in Trans. Camb. Phil. Soc.* xii. 171.

MALABAR HILLS; *Law. CONCAN*; *Dalzell. CEYLON*; *Thwaites*.

A middle-sized tree. *Leaves* 4 by $1\frac{1}{2}$ in., base broadly rhomboid; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Male fl.*: cymes small, 3-7-flowered; calyx $\frac{1}{8}$ in., cylindric, silky; corolla $\frac{1}{2}$ in., 3-4-lobed; stamens 9-12, glabrous. *Female fl.* 1-3 together, subsessile, similar to and scarcely larger than the male; ovary 6-8-celled. *Fruit* 1 by $\frac{3}{4}$ in., ellipsoid, young narrowly cylindric; fruiting-calyx short funnel-shaped, mouth $\frac{1}{4}$ in. (or more) wide, entire.—Hiern follows Thwaites in reducing here *D. Arnotiana*, Miq.; but Miquel's authentic specimen at Kew is *D. Candolleana*.

24. **D. quæsitæ**, *Thwaites Enum.* 179; leaves elliptic abruptly acuminate glabrous primary nerves numerous nearly horizontal reticulating nerves conspicuous, male cymes small, corolla tubular minutely closely hairy without. *Bedd. Ic. Pl. Ind. Or.* t. 128 (*nerivation* bad), and *For. Man.* 145; *Hiern in Trans. Camb. Phil. Soc.* xii. 174.

CEYLON; Saffragam, and between Ratnapoora and Galle, *Thwaites*.

A huge tree. *Leaves* 7 by $3\frac{1}{4}$ in., base broadly rhomboid; petiole $\frac{1}{2}$ in. *Male fl.*: cymes small, 3-9-flowered, pilose; calyx $\frac{1}{4}$ in., tubular, pubescent, obscurely 4-5-lobed;

corolla $\frac{1}{2}$ in., 4-5-lobed; stamens about 16. *Female fl.* solitary, short-peduncled; corolla shortly 5-lobed. *Fruit* 2 in. diam., globose, glabrous; fruiting calyx $1\frac{1}{2}$ in. wide, lobes large cordate, reflexed at the sides and base.—Beddome's figure as to the outline of the larger leaves agrees with Thwaites' specimens, but the venation shown in the smaller leaves is particularly unlike them.

SECT. V. **Noltia** (Hiern in Trans. Camb. Phil. Soc. xii. 146, character much widened). *Leaves* alternate, adult glabrous (in *D. stricta* and *D. flavicans* somewhat pubescent). *Flowers* 4- or 5-merous; male fascicled, female sessile or shortly peduncled, solitary or fascicled. *Calyx* distinctly lobed. *Corolla* ovoid-tubular in the bud, densely fulvous- or rufous-tomentose without. *Albumen* (where known) equable.

* *Stamens* 4-5, *fruit* ovoid-conic.

25. **D. attenuata**, *Thwaites Enum.* 182; leaves oblong acuminate base cuneate glabrous nervation conspicuous above, male fl. sessile clustered, corolla tubular ferruginous-tomentose without, stamens 4-5, fruit ovoid acuminate glabrous. *Bedd. Ic. Pl. Ind. Or.* t. 139, and *For. Man.* 146; *Hiern in Trans. Camb. Phil. Soc.* xii. 182.

CEYLON; Pasdoon Corle, *Thwaites*.

A middle-sized tree. *Leaves* $3\frac{3}{4}$ by 1 in., coriaceous; primary nerves indistinct, distant, nearly horizontal, secondary fine; petiole $\frac{1}{8}$ in. *Male fl.* 3-10 together; calyx $\frac{1}{10}$ in., deeply lobed, hairy on both sides; corolla $1\frac{1}{2}$ in., slender; anthers glabrous. *Female fl.* solitary, subsessile; calyx $\frac{1}{4}$ – $\frac{1}{3}$ in., nearly 4-5-partite; stamens 4-5; ovary 4-celled, cells 1-ovulea. *Fruit* $1\frac{1}{4}$ by $\frac{1}{2}$ in., very sharply acuminate, 2-3-seeded; calyx-segments in fruit narrow-oblong, foliaceous, $\frac{1}{4}$ in. long.

26. **D. acuta**, *Thwaites Enum.* 182; leaves oblong-lanceolate acuminate base obtuse or almost rounded glabrous reticulation obscure above, male fl. sessile clustered, corolla tubular densely fulvous-villous without, stamens 4-5, fruit ovoid acuminate. *Hiern in Trans. Camb. Phil. Soc.* xii. 182; *Bedd. For. Man.* 146.

CEYLON; Pasdoon Corle, *Thwaites*.

A middle-sized tree. *Leaves* 9 by $2\frac{1}{2}$ in., broadest near the base, very thick coriaceous; primary nerves nearly horizontal, reticulation usually altogether obscure, sometimes subconspicuous beneath; petiole $\frac{2}{3}$ in. *Male fl.* 5-20 together; calyx $\frac{1}{8}$ in., lobed more than half-way down, very hairy; corolla $\frac{1}{2}$ in.; stamens glabrous. *Female fl.* sessile, 1-4 together; calyx $\frac{1}{3}$ in. or more, lobed nearly to the base, lobes lanceolate, margins little reflexed; ovary 4-6-celled. *Fruit* $1\frac{1}{2}$ in. long, 2-3-seeded.

** *Stamens* 12-20, *fruit* ellipsoid obtuse.

27. **D. Gardneri**, *Thwaites Enum.* 181; leaves elliptic-lanceolate glabrous. nerves not prominent, male fl. sessile clustered, corolla salvershaped fulvous-tomentose without, calyx-lobes in the female flower very short. *Bedd. Ic. Pl. Ind. Or.* t. 132, and *For. Man.* 146; *Hiern in Trans. Camb. Phil. Soc.* xii. 214. *Patonia Walkerii*, *Wight Ill.* i. p. 19.

CEYLON; alt. 2000 ft., *Walker, Gardner, &c.*

A middle-sized tree; young shoots soon glabrous. *Leaves* $6\frac{1}{2}$ by $2\frac{1}{2}$ in., base rhomboid or obtuse, shining above, midrib strongly elevated beneath; petiole $\frac{1}{4}$ in. *Male fl.*: calyx $\frac{1}{4}$ in., lobed half-way down, silky; corolla-tube $\frac{1}{4}$ in., narrowed upwards, lobes $\frac{1}{8}$ in. elliptic acute; stamens 12-16, filaments short, anthers lanceolate linear, connective pilose on the back, hardly produced. *Female fl.* solitary, subsessile; calyx-tube $\frac{1}{2}$ in., campanulate, lobes broad-triangular, hardly $\frac{1}{16}$ in. long. *Fruit* nearly 1 in. diam., depressed globose, glabrate; fruiting-calyx cupuliform, thickened, $1\frac{1}{4}$ in. diam., lobes very short triangular.

28. ***D. lanceæfolia***, *Roxb. Cat. Pl. Fl. Ind.* (1813), and *Fl. Ind.* ii. 537; leaves oblong or lanceolate acuminate glabrous coriaceous, male fl. sessile clustered, corolla salvershaped fulvous-tomentose without, calyx-lobes in the female flower ovate with reflexed margins. *A. DC. Prodr.* viii. 232; *Hiern. in Trans. Camb. Phil. Soc.* xii. 213; *Kurz in Journ. As. Soc.* 1877, pt. ii. 236, and *For. Fl.* ii. 136. *D. multiflora*, *Wall. Cat.* 4144; *A. DC. l. c.* 231. *D. amœna*, *Wall. Cat.* 4139; *A. DC. l. c.* 231.

SILHET; *Roxburgh. KHASIA Mts.*; Terrya Ghat, *H. f. & T.*; Mahadeo, *Griffith. CACHAR; H. f. & T., Keenan. MOULMEIN; Falconer (fide Kurz).*

A pretty large tree; branchlets soon glabrous. *Leaves* $6\frac{1}{2}$ by 2 in., base rhomboid or subobtus, coriaceous; midrib deeply impressed from above, much elevated below; primary nerves oblique, secondary not prominent. *Male fl.*: calyx $\frac{1}{2}$ in., lobes 4, ovate, ferruginous sericeous; corolla in *D. lanceæfolia* $\frac{1}{2}$ in., in *D. multiflora* $\frac{1}{2}$ in., narrowed upwards, lobes $\frac{1}{2}$ in.; stamens about 16, filaments minutely pilose; anthers linear, glabrous or slightly pilose at the base. *Female fl.* solitary, subsessile; calyx $\frac{1}{2}$ — $\frac{3}{4}$ by $\frac{1}{2}$ — $\frac{3}{4}$ in., lobes cordate-ovate densely fulvous tomentose, margins recurved even before the corolla is expanded; corolla nearly as of the male; ovary 8-celled, hairy. *Fruit* 1 by $\frac{3}{4}$ in., ovoid or subglobose ferruginous-villous; fruiting calyx 1 in. diam., with thickened tube and spreading lobes.

VAR. amœna, *Wall. Cat.* 4139 (sp.); leaves oblong-lanceolate widest very near the base, calyx-lobes in the female smaller without recurved margins. *A. DC. Prodr.* viii. 231.—*Khasia; Wallich.*—Referred here by *Hiern*, but the material is very scanty not showing either the male inflorescence or fruit; and the leaves and female calyx appear more like those of *D. undulata*, *Wall. var. macrophylla*.

29. ***D. sapotoides***, *Kurz; Hiern in Trans. Camb. Phil. Soc.* xii. 206; leaves large obovate-oblong shortly acuminate glabrate, male fl. sessile clustered, calyx-lobes broad reflex-margined, corolla salvershaped, tube fulvous-pilose without, lobes glabrate. *Kurz in Journ. As. Soc.* 1877, pt. ii. 236; *For. Fl.* ii. 136.

BRITISH BIRMA; eastern slopes of the Pegu Yomah, frequent, *Kurz*.

A tree, attaining 50 ft. (*Kurz*); branchlets soon glabrous. *Leaves* 11 by $3\frac{1}{2}$ in., base cuneate or subobtus, coriaceous, midrib beneath obscurely silky otherwise ultimately glabrous; primary nerves oblique, secondary not conspicuous; petiole $\frac{1}{2}$ in. *Male fl.* densely clustered, bracts $\frac{1}{2}$ in., ovate; calyx $\frac{1}{2}$ in., openly campanulate, deeply lobed, fulvous-silky; corolla-buds $\frac{1}{2}$ in., tube densely fulvous-silky at least on the 4 angles; stamens 15–16, glabrous. *Female fl.* (from *Kurz's* description) nearly as of the male; staminodes 12; ovary glabrous, style tolerably long, 4-cleft.—Resembles *D. flavicans* but has much larger leaves; the specimens do not exhibit the long bracts conspicuous in *D. flavicans*, nor does *Kurz* notice that such ever occur.

30. ***D. flavicans***, *Hiern in Trans. Camb. Phil. Soc.* xii. 205; leaves elliptic acuminate to an obtuse apex glabrescent, male fl. clustered subsessile, calyx-lobes broad reflex-margined, corolla salvershaped fulvous-pilose without, sometimes glabrate towards the apex, female flowers 1–3 together on $\frac{1}{2}$ — $\frac{3}{4}$ in. ferruginous-villous pedicels. *Kurz in Journ. As. Soc.* 1877, pt. ii. 236, and *For. Fl.* ii. 135. *Guatteria? flavicans*, *Wall. Cat.* 7295.—*Ebenacea* sp. 2, *Griff. Notul.* iv. 291.

MERGUI and TAVOY; *Griffith. TENASSERIM; Helfer. MALACCA; Griffith (Main-gay, n. 972, male specimens only).*

A small tree; branches soon glabrescent. *Leaves* $5\frac{1}{2}$ by 2 in., base rhomboid or subobtus, midrib beneath obscurely pubescent, otherwise at length glabrous, coriaceous, when dried yellowish-green above, cinnamoneous-brown beneath; primary nerves distant, oblique, secondary obscure; petiole $\frac{1}{2}$ — $\frac{3}{4}$ in. *Male fl.*; pedicels $\frac{1}{10}$ in.; bracts $\frac{1}{2}$ in., oblong; calyx $\frac{1}{2}$ in. long and broad, lobes ovate acute ferruginous-pubescent auriculate; corolla nearly $\frac{1}{2}$ in., slender, lobed half-way down; stamens 14–20, glabrous. *Female fl.*: bracts as of the male; calyx as of the male, slightly

larger, $\frac{1}{2}$ in. long and broad, with a distinct tube; corolla as of the male. *Fruit* $\frac{3}{4}$ by $\frac{1}{2}$ in., oblong cylindric, glabrescent; fruiting calyx very slightly enlarged.—Female flowers and fruit here are described from Griffith's examples; but by Hiern from Maingay's n. 972 female (see next species).

31. *D. decipiens*, Clarke; leaves elliptic acuminate glabrous, female flowers sessile solitary, calyx 4-partite, lobes foliaceous margins hardly reflexed little hairy, corolla salvershaped tube 4-gonal densely fulvous-silky. *D. flavicans*, *Hiern in Trans. Camb. Phil. Soc.* xii. 205, as to the female plant partly.

MALACCA; *Maingay* (n. 972, female only).

Closely resembling *D. flavicans* female, and taken as part of it by Hiern. *Female calyx* (shortly after flowering); lobes $\frac{1}{2}$ in. and upwards, ovate acute, with scattered fulvous hairs or nearly glabrous, tube 0 or obscure. *Fruit* 1 in., cylindric, glabrous; fruiting calyx unchanged.—This does not show the bracts conspicuous in every example of *D. flavicans*. Helfer's n. 3640, from Tenasserim, a very poor specimen with young male buds, might be the male of *D. decipiens*, or *D. flavicans* as proposed doubtfully by Hiern. Helfer's n. 423, doubtfully referred here by Hiern i. e., has totally different leaves and is quite distinct, may be *D. lucida*, Wall.

32. *D. stricta*, Roxb. Hort. Beng. 40, and *Fl. Ind.* ii. 539; leaves elliptic-lanceolate acuminate sparsely pilose beneath, male fl. subsessile in small clusters, corolla salvershaped tomentose without, fruit ellipsoid glabrous narrowed at the base. *Wall. Cat.* 4121; *A. DC. Prodr.* viii. 232; *Hiern in Trans. Camb. Phil. Soc.* xii. 201; *Kurz in Journ. As. Soc.* 1877, pt. ii. 236, and *For. Fl.* ii. 137, as to *descript. only*.

EAST BENGAL; Silhet and Comilla, *Roxburgh* (Hort. Calc.); (*Griffith*, Kew Distrib. n. 3624).

A tall slender conical tree with straight trunk (*Roxburgh*); branchlets soon glabrous. *Leaves* 3 by $1\frac{1}{4}$ in., base obtuse, ultimately glabrous above except the midrib, coriaceous; primary nerves oblique not prominent, secondary obscure; petiole $\frac{1}{2}$ in. *Male fl.* 3-6 together; bracts $\frac{1}{16}$ in., numerous, ovate; calyx $\frac{1}{10}$ in., deeply lobed, lobes ovate apiculate; corolla-tube $\frac{1}{2}$ in., narrowed upwards, lobes 4, $\frac{1}{2}$ in., ovate; stamens 14-16, glabrous. *Female fl.* unknown. *Fruit* $1\frac{1}{4}$ by $\frac{3}{4}$ -1 in., solitary; peduncle $\frac{1}{4}$ in.; fruiting-calyx small, lobes $\frac{1}{2}$ in. long and broad, ovate.

SECT. VI. **Melonia** (Hiern in *Trans. Camb. Phil. Soc.* xii. 146, in chief part). *Leaves* alternate or subopposite. *Flowers* 4-5-merous; male cymose or fascicled, female solitary or fascicled. *Calyx* deeply lobed or tubular-campanulate, often much larger dissimilar in the female. *Corolla* in the bud ovoid-tubular, densely fulvous- or rufous-sericeous without *Albumen* ruminated (where known).

* *Leaves when mature more or less hairy beneath, male flowers distinctly cymose with tubular-campanulate calyx.*

33. *D. Tupru*, Buch-Ham. Journ. i. 183, and in *Trans. Linn. Soc.* xv. 112, not of *Hiern*; leaves (not large) elliptic obtuse at both ends reticulating nerves raised on the upper surface, male fl. cymose, calyx short-cylindric, corolla yellow-woolly without, female solitary short-peduncled with 4-5-gonal calyx. *D. rubiginosa*, *Roth Nov. Sp.* 385; *A. DC. Prodr.* viii. 239. *D. exsculpta*, *Dalz. & Gibs. Bomb. Fl.* 142, syn. excl. not of *Ham.* *D. melanoxylon*, *Hiern in Trans. Camb. Phil. Soc.* xii. 159, in great part.

WEST DECCAN PENINSULA; from the Concan to Mysore, *Hamilton, &c.* JUBBULPORE; *Griffith*.

A small tree; branchlets woolly. *Leaves* $3\frac{1}{2}$ by 2 in. (rarely so large even when mature), alternate and subopposite, base mostly rounded or subcordate, or if obtusely

cuneate not decurrent on the petiole; fulvous woolly when young, ultimately glabrescent above, coriaceous; secondary nerves slender; petiole $\frac{1}{4}$ in. *Male fl.*: cymes $\frac{1}{2}$ – $1\frac{1}{2}$ in., fulvous-hairy; calyx-tube $\frac{1}{4}$ in., terete; teeth $\frac{1}{12}$ in., triangular; corolla $\frac{3}{8}$ in., very woolly without; stamens 12; filaments and anther-cells glabrous, connective fulvous-pilose behind, scarcely produced. *Female fl.*: pedicels $\frac{1}{10}$ in.; calyx (at flower time) $\frac{1}{8}$ by $\frac{1}{4}$ in., lobed nearly to the base; lobes broad ovate with recurved margin; corolla $\frac{1}{2}$ in.; styles 2–3, bifid at the apex. *Berry* $\frac{3}{4}$ in. diam., globose, smooth; often 4-seeded.—Hamilton says that the calyx of the male (in *D. Tupru*) is like that of the female; but this must have been a slip, as his authentic specimen in the British Museum shows.

34. ***D. tomentosa***, Roxb. *Hort. Beng.* 40, and *Fl. Ind.* ii. 532; leaves large ovate from a rounded base reticulated nerves impressed on the upper surface, male fl. cymose, calyx funnel-shaped, corolla ferruginous-lanate without, female solitary short-peduncled with 4–5-gonal calyx. *Wight Ic.* tt. 182, 183, *not of Poir.* *D. exsculpta*, Ham. in *Trans. Linn. Soc.* xv. 110; *A. DC. Prodr.* viii. 223, *not of Dalz. nor of Bedd.* *D. insculpta*, Ham. l.c. 112; *A. DC. l.c.* D. Roylei, *A. DC. l.c.* 239.

BENGAL; Roxburgh, Hamilton. BEHAR; H. f. & T. CHOTA NAGPORE; Clarke. BUNDELCUND; Edgeworth. OUDH; R. Thompson.

A small, crooked tree. *Leaves* alternate and opposite, 8 by 5 in., sometimes 13 in., commonly broad-ovate, rarely ovate acute, young very hairy, mature glabrous above hairy beneath, base cordate or rounded (rarely obtusely cuneate), ultimately glabrescent on both surfaces, very coriaceous; secondary nerves impressed as broad furrows, giving the leaf a wrinkled and thickened aspect; petiole $\frac{1}{4}$ in. *Flowers* nearly as in *D. Tupru*, but rather larger; calyx of the male widened at the mouth, teeth ovate often $\frac{1}{10}$ – $\frac{1}{8}$ in.; stamens about 16, filaments glabrous, connective fulvous-pilose on the back, shortly produced. *Berry* as of *D. Tupru*, but rather larger.

35 ***D. melanoxyton***, Roxb. *Cor. Pl.* 36, t. 46, and *Fl. Ind.* iii. 530; leaves elliptic narrowed at both ends reticulating nerves raised on the upper surface, male fl. cymose, calyx short cylindric, corolla yellow-lanate without, female solitary short-peduncled with 4–5-gonal calyx. *A. DC. Prodr.* viii. 224; *Hiern in Trans. Camb. Phil. Soc.* xii. 159, *partly*; *Brand. For. Fl.* 294, *partly*, *not of Blume.* *D. Wightiana*, Wall. *Cat.* 4406; *A. DC. l.c.* 223; *Bedd. Fl. Sylv.* t. 67. *D. dubia*, Wall. *Cat.* 4407; *A. DC. l.c.* 223; *Wight Ic.* t. 1223.

DECCAN PENINSULA AND CEYLON; frequent.

A tree, attaining sometimes 60–80 ft., or a shrub. *Leaves* 4 by $1\frac{3}{4}$ in., alternate or rarely subopposite, base nearly always narrowed, or if broad yet with a narrow decurrence on the petiole. Otherwise as *D. tomentosa*.

Var. Beddomei; calyx of the female (as of the male) tubular terete with small teeth. *D. exsculpta*, *Bedd. Fl. Sylv.* t. 66, *not of Ham.*—Not seen. If the figure of the female calyx is incorrect, this tree will be *D. menaloxyton*, Roxb. type (not *D. tomentosa* as Hiern doubtfully suggests).

36. ***D. Packmanni***, Clarke; all young parts ferruginous-woolly, leaves elliptic-oblong acute, male fl. pedicelled by threes on short peduncles 5-merous, stamens 16 paired, anthers oblong-lanceolate fulvous-pilose, connective not produced.

TAOY; Packmann (from Herb. Wight).

Branchlets slender, densely ferruginous-woolly, finally glabrate. *Leaves* $2\frac{1}{4}$ by $\frac{3}{4}$ in., alternate, base obtuse, ferruginous-woolly on both surfaces, ultimately nearly glabrous except the midrib beneath; primary nerves slender, reticulating nerves close distinct; petiole $\frac{1}{8}$ in. *Male fl.*: peduncles $\frac{1}{4}$ in., pedicels $\frac{1}{10}$ – $\frac{1}{8}$ in.; calyx $\frac{1}{8}$ by $\frac{1}{8}$ in., shortly campanulate, lobed half-way down; lobes ovate, ferruginous-villous on both sides; corolla $\frac{1}{4}$ in. shortly campanulate, deeply lobed, densely ferruginous-villous without; filaments glabrous below, fulvous-pilose upwards, anther-cells and connec-

tive with fulvous hairs. *Female fl.* not seen.—Not taken up by Hiern, who has merely noted on the sheet “*cfr. D. melanoxylon*, Roxb.,” it is near *D. Tupru*, Ham the leaves more acute, more finely reticulated.

37. *D. burmanica*, Kurz in Journ. As. Soc. 1873, pt. ii. 73; leaves oblong obtusely cuneate at both ends mature reticulated above by the impressed nerves, male fl. in small peduncled cymes, corolla fulvous-tomentose without, stamens 12-16 glabrous. *Hiern in Trans. Camb. Phil. Soc.* xii. 166; *Kurz in Journ. As. Soc.* 1877, pt. ii. 235, and *For. Fl.* ii. 133.

PROME, PEGU AND MARTABAN; *McLelland, Kurz.*—DISTRIB. Ava.

A tree, attaining 60 ft. (Kurz); all the young parts fulvous-pubescent. *Leaves* 3½ by 1½ in., alternate, hairy on both sides, ultimately nearly glabrous except near the midrib beneath, coriaceous; primary nerves oblique, indistinct; petiole ½-⅔ in. *Male fl.*: peduncle ⅔-¾ in., cymes 3-8-flowered; calyx ⅓-½ in., lobed less than half-way down; corolla ¼-⅓ in.; anthers linear. *Female fl.*: solitary, peduncles ⅓-¼ in.; calyx nearly ¼ in., lobes broadly cordate-ovate with recurved margins; staminodes 8. *Fruit* 1-1½ in. diam., globose, glabrous, 2-4-seeded. *Albumen* ruminated.

**** Leaves when mature glabrescent beneath, drying reddish or brownish, male flowers fascicled with deeply-lobed calyx.**

38. *D. insignis*, Thwaites Enum. 180; leaves often subopposite large ovate or oblong glabrous, male fl. clustered subsessile, corolla-buds narrower upwards, stamens 14-20. *Bedd. Ic. Pl. Ind. Or.* t. 130, and *For. Man.* 145; *Hiern in Trans. Camb. Phil. Soc.* xii. 157.

ANAMALLAYS; alt. 2-3000 ft., *Beddome*. CEYLON; alt. 2000 ft., *Thwaites*.

A very large tree. *Leaves* subopposite and alternate, 13 by 6 in., or 8 by 3½ in., acuminate, base rounded or cuneate, coriaceous; secondary nerves strong, tertiary manifest; petiole ¼ in. *Male fl.* 4-merous; calyx ⅓-½ in., campanulate, shortly 4-fid, minutely pubescent; corolla ⅓ in., tubular, tomentose, silky without, lobes short; filaments and anthers glabrous or with very few scattered hairs, unequal. *Female fl.* 1-3 together, axillary, subsessile; ovary 8-celled. *Fruit* 1½ in. diam., globose, smooth; calyx accrescent, tube forming a woody shallow cup 1½ in. wide. *Seeds* ¾ by ½-½ in.; albumen ruminated.

39. *D. oppositifolia*, Thwaites Enum. 181; leaves often subopposite elliptic shortly obtusely acuminate glabrous, male flowers subsessile few together, corolla-buds broader upwards, stamens about 8. *Bedd. Ic. Pl. Ind. Or.* t. 131, and *For. Man.* 146; *Hiern in Trans. Camb. Phil. Soc.* xii. 157.

CEYLON; Hinidoon Corle, alt. 1000 ft., *Thwaites*.

A middle-sized tree. *Leaves* 4 by 2 in., broadly rhomboid or almost rounded, coriaceous; secondary nerves obscure, tertiary indistinguishable; petiole ⅓-⅔ in. *Male fl.*: calyx ⅓ in., nearly glabrous, acutely 4-lobed half-way down; corolla ¼ in., ferruginous-villous without, lobed one-third the way down; filaments very unequal. *Female fl.* (and fruit) unknown.

40. *D. hirsuta*, Linn. f. Suppl. 440; leaves elliptic or oblong abruptly acuminate coriaceous young hirsute beneath with short basifixed hairs, male fl. densely fascicled, corolla tubular ferruginous-tomentose without, stamens 5 glabrous, fruit rufous-tomentose 6-10-seeded. *A. DC. Prodr.* viii. 223; *Thwaites Enum.* 181; *Bedd. Ic. Pl. Ind. Or.* t. 137, and *For. Man.* 146; *Hiern in Trans. Camb. Phil. Soc.* xii. 163, partly, *excl. syn. D. lucida*.

CEYLON; Saffragam and Galle, *Thwaites*.

A middle-sized tree; branchlets and inflorescence ferruginous-tomentose. *Leaves* 4½ by 1½-2 in., alternate, base broadly rhomboid or almost rounded, ultimately nearly glabrous, coriaceous; nervation very obscure; petiole ½ in. *Male fl.*: calyx ⅓ in., terete, 5-fid half-way down; corolla ¼ in. *Female fl.* 1-3 together, subsessile; calyx

$\frac{1}{4}$ in., broad, deeply 5-lobed; corolla $\frac{1}{4}$ – $\frac{1}{2}$ in.; staminodes 5; ovary usually 10-celled. *Fruit* 1 by $\frac{3}{4}$ in., ellipsoid; calyx densely ferruginous-silky within.

41. **D. Candolleana**, *Wight Ic. tt.* 1221–2; leaves oblong shortly cuneate at both ends coriaceous glabrescent, male fl. densely fascicled, corolla tubular yellow-tomentose without, stamens 10 glabrous, fruit glabrous usually 5–4-seeded. *Dalz. & Gibs. Bomb. Fl.* 142; *Bedd. For. Man.* 144, *not of Thwaites*. *D. hirsuta*, *Hiern in Trans. Camb. Phil. Soc.* xii. 164, *partly*. *D. Arnottiana*, *Miq. in Pl. Hohenack.* n. 562. *D. canarica*, *Bedd. Ic. Pl. Ind. Or.* t. 134, and *For. Man.* 145. *D. oligandra*, *Bedd. Rep. Forests Madras*, 1867, 68.

DECCAN PENINSULA; from the Concan to Quilon and Courtallum, common.

Closely resembling *D. hirsuta*. *Leaves* 4–7 in., young with closely adpressed fulvous hairs adfixed by their middle beneath, usually early glabrescent, without the acuminate apex of *D. hirsuta*. *Male fl.* rather larger; calyx $\frac{1}{2}$ in.; corolla $\frac{1}{2}$ in.; stamens in 5 pairs, filaments of each pair attached one in front of the other at the base. *Female fl.* rather larger than in *D. hirsuta*, 1–3 together or sometimes 6–10; staminodes 5, or 10 in the form *D. canarica*, *Bedd.*

42. **D. nilagirica**, *Bedd. Ic. Pl. Ind. Or.* t. 136, and *For. Man.* 144; leaves oblong narrowed at both ends, young densely rufous-tomentose beneath, male fl. densely fascicled, corolla tubular tomentose without, stamens 16, filaments hairy.

NILGHERRIES; Sispara Ghat, *Beddome*.

Female fl. 1–2 together; staminodes 8 in one series; ovary 8-celled; fruit globose, depressed, size of a small greengage.—Not seen; appears allied to *D. Candolleana* as *Beddome* states, rather than to *D. lucida* as suggested by *Hiern*.

43. **D. Moonii**, *Thwaites Enum.* 182; leaves large oblong coriaceous glabrescent, male fl. densely fascicled, corolla tubular densely rufous-villous without, stamens 5–8 glabrous, female calyx wide-tubular, fruit glabrate 6–10-seeded. *Bedd. Ic. Pl. Ind. Or.* t. 138, and *For. Man.* 146. *D. hirsuta*, *Hiern in Trans. Camb. Phil. Soc.* xii. 164, *partly*.

CEYLON; Caltura, *Moon*; Pasdoon Corle, *Thwaites*.

Leaves 11 by $3\frac{1}{4}$ in., base broad or rounded, primary nerves numerous sub-horizontal obscure. *Male fl.* nearly as of *D. hirsuta*. *Female fl.*: calyx-tube at flower time $\frac{1}{2}$ in. long and broad, slightly wider upwards, lobes hardly so long as the tube. *Fruit* $1\frac{1}{4}$ in. diam., globose.—Closely allied to *D. hirsuta*, the young leaves being similarly hairy beneath. The female calyx however differs strikingly.

44. **D. Thwaitesii**, *Bedd. Ic. Pl. Ind. Or.* t. 135, and *For. Man.* 144; leaves lanceolate acuminate coriaceous glabrescent, flowers fascicled, corolla intensely rufous-tomentose without, stamens 10–12 connective fulvous-pilose its whole length, fruit rufous-tomentose usually 4-seeded. *D. Candolleana*, *Thwaites Enum.* 181, *not of Wight*. *D. hirsuta*, *Hiern in Trans. Camb. Phil. Soc.* xii. 164, *partly*.

CEYLON; Saffragam and Hinidoon Corle, *Thwaites*.

Resembling *D. hirsuta* in the shape and texture of the leaves and in the fruit. Young leaves intensely red-tomentose, soon glabrescent. *Male fl.*: calyx $\frac{1}{5}$ in., lobes $\frac{1}{2}$ in., triangular; hairs on the connective numerous, short, extending to the shortly-produced apex (the two long ciliæ depicted by *Beddome* are not found in *Thwaites'* authentic examples). *Fruit* $\frac{3}{8}$ in. diam., subglobose.

*** *Leaves* alternate, early glabrous, drying blackish, male flowers distinctly cymose with shortly-lobed calyx, fruiting calyx strongly plicate.

45. **D. affinis**, *Thwaites Enum.* 179; leaves oblong narrowed at both ends early glabrescent reticulatating nerves prominent, male cymes peduncled, calyx

with hairs fixed by their middle soon glabrescent, corolla tubular fulvous-tomentose without, stamens 8-9. *Bedd. Ic. Pl. Ind. Or. t. 127, and For. Man. 145; Hiern in Trans. Camb. Phil. Soc. xii. 169, partly.*

TINNEVELLY HILLS; *Beddome*. CEYLON; between Kandy and Badulla, *Thwaites*.

A middle-sized tree; branchlets glabrous except the tips. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., apex obtuse, when very young with scattered hairs fixed by their middle; petiole $\frac{1}{2}$ in. *Male fl.*: peduncles $\frac{1}{2}$ in., 5-10-flowered, soon glabrate; calyx $\frac{1}{2}$ in., campanulate-tubular, distinctly veined, teeth minute; stamens nearly glabrous, anthers linear, connective fulvous-pilose below on the back, apex shortly produced. *Female fl.* solitary on peduncles $\frac{1}{2}$ in.; calyx $\frac{1}{2}$ by $\frac{1}{2}$ in., early glabrescent; corolla $\frac{1}{2}$ in., tubular, narrowed at the mouth, lobes broad ovate mucronate, nearly glabrous within. *Fruit* 1 in. diam., globose, glabrous, usually 4-seeded. *Albumen* ruminated (*Thwaites*).

46. *D. crumenata*, *Thwaites Enum. 179*; leaves elliptic obtuse at both ends early glabrous reticulating nerves prominent, male cymes small, calyx subtomentose with basifixed hairs, corolla tubular fulvous-hirsute without, stamens about 12. *Bedd. Ic. Pl. Ind. Or. t. 126, and For. Man. 145; Hiern in Trans. Camb. Phil. Soc. xii. 169.*

CEYLON; Central Province, alt. 2-4000 ft., *Thwaites*.

A large tree. *Leaves* $2\frac{1}{2}$ by $1\frac{1}{2}$ in.; but in another example 3 by $\frac{3}{4}$ in. resembling those of *D. affinis*; this example is in ripe fruit and may be *D. affinis* mixed in the mounting perhaps. *Female fl.*: peduncles and calyces somewhat persistently subtomentose with basifixed hairs; corolla-tube $\frac{1}{2}$ in., lobes broad, rounded, plicate, auriculate, densely tomentose within. Otherwise in all respects as *D. affinis*, of which further material may prove this a variety.

47. *D. opaca*, *Clarke*; leaves elliptic cuneate at both ends primary nerves thin oblique secondary obscure, male cymes very small, calyx densely sericeous with basifixed hairs, corolla short-tubular tomentose without, stamens about 16. *D. affinis*, *Hiern in Trans. Camb. Phil. Soc. xii. 169, partly, not of Thwaites*.

CEYLON; *Thwaites*.

Branchlets terete; bark very smooth. *Leaves* 3 by 1 in., subobtusely, very opaque, minutely pilose with basifixed hairs, when young soon glabrous; petiole $\frac{1}{2}$ in. *Male fl.*: cymes almost reduced to fascicles; calyx $\frac{1}{10}$ in., teeth small; corolla $\frac{1}{2}$ in., very deeply lobed; stamens glabrous, anthers lanceolate.—*Hiern* has widened the diagnosis of *D. affinis*, so as to include in it this solitary male example of *Thwaites*, which differs in too many points; the texture nervation and indumentum of the leaves, the very deeply-lobed male corolla and number of stamens. It may not belong to this section of the genus.

SECT. VII. *Argophyllum*. *Leaves* alternate, usually large, glabrous above, shining, coriaceous. *Flowers* 4-5-merous; males in small cymes, females solitary or few together, scarcely pedicellate. *Calyx* deeply lobed, often dissimilar in the female. *Corolla* in the bud ovoid-tubular, densely fulvous- or rufous-sericeous without. *Stamens* usually 16 (12-20). *Albumen* (where known) equable.

48. *D. oleifolia*, *Wall. Cat. 4128*; leaves oblong obtusely acuminate, nerves above obscure, male cymes small few-fl., calyx glabrous without densely fulvo-tomentose within, corolla widely tubular fulvous-tomentose without. *A. DC. Prodr. viii. 239; Kurz in Journ. As. Soc. 1871, pt. ii. 72, 1877, pt. ii. 235, and For. Fl. ii. 132; Hiern in Trans. Camb. Phil. Soc. xii. 204.*

AMHERST; *Wallich*. PEGU; *Brandis*. MARTABAN and TENASSERIM; frequent, *Kurz*.—DISTRIB. JAVA.

A tree, attaining 60 ft. (*Kurz*); branchlets soon glabrous. *Leaves* $6\frac{1}{2}$ by 2 in., opaque, coriaceous, nerves beneath very closely but obscurely reticulate; petiole $\frac{1}{2}$ in.

Male fl. about 3 together, in very small cymes, 4-merous; calyx $\frac{1}{4}$ in., lobes wide acute; corolla-tube $\frac{1}{4}$ in. and upwards, lobes short round; stamens 20. *Female fl.* solitary, on very short peduncles (*Kurz*). *Fruit* $\frac{2}{3}$ in. diam., globose, fulvous-pubescent; fruiting-calyx $\frac{1}{4}$ in., 4-fid, in one case 3-fid, tomentose within; lobes ovate-deltoid.

49. ***D. undulata*, Wall. Cat. 4136**; leaves broadly oblong cuneate at the base glabrous, nerves strongly elevated beneath, male flowers in very short densely ferruginous cymes, corolla tubular densely ferruginous without, stamens about 16 nearly glabrous except the connective. *A. DC. Prodr.* viii. 233; *Hiern in Trans. Camb. Phil. Soc.* xii. 216, partly; *Kurz in Journ. As. Soc.* 1877, pt. ii. 23, and *For. Fl.* ii. 135, partly.

AMHERST; *Wallich*. MERGUI; *Griffith*. MALACCA; *Griffith* (Kew Distrib. n. 3636).

A large tree (*Kurz*); branchlets soon glabrous. *Leaves* 8 by $2\frac{1}{2}$ – $3\frac{1}{2}$ in., shortly acuminate or acute, coriaceous, nerves somewhat impressed above; petiole $\frac{1}{3}$ in. *Male fl.*: cymes less than $\frac{1}{4}$ in.; bracts $\frac{1}{10}$ in., triangular; calyx nearly $\frac{1}{8}$ in. long and broad, lobes 4, short, broad-triangular; corolla $\frac{1}{2}$ in., lobed half-way down; filaments nearly glabrous, anthers linear, connective villous with fulvous ascending hairs, hardly produced above the anther. *Female fl.* solitary, shortly peduncled; calyx soon obpyramidal enlarged, teeth broadly triangular, incurved over the young fruit, margins of the lobes not reflexed. *Fruit* 1– $1\frac{1}{4}$ by $\frac{3}{4}$ –1 in., apex remarkably truncate, fulvous-villous; fruiting calyx much thickened, woody, not plicate nor reflexed.—Much of the material referred to this species by Hiern is *D. lucida*, Wall.

VAR. *macrophylla*, Wall. Cat. 4141 (sp.), not of Blume; leaves 14 by $4\frac{3}{4}$ in. much acuminate, nerves of the upper surface not impressed.—Tavoy; *Wallich*, *Packman*. Merqui; *Griffith* (Kew Distrib. n. 3629)—Fruit not seen; *fide* Hiern larger than that of *D. undulata*, typ.; but it may be feared than Hiern attributed to *D. undulata* the much smaller globose fruit of *D. lucida* (marked by him *D. undulata*), and supposed the large truncate fruits to belong to *D. macrophylla*.

50. ***D. pachyphylla*, Clarke**; leaves elliptic or oblong coriaceous glabrous base rounded, male fl. in small ferruginous-villous cymes, corolla tubular rusty-tomentose beneath, stamens about 12 nearly glabrous except the connective. *D. undulata*, var. *macrophylla*, *Hiern in Trans. Camb. Phil. Soc.* xii. 215 (*neither D. undulata nor D. macrophylla*, Wall.).

MALACCA; *Maingay* (n. 974).

Branchlets thick, soon glabrous. *Leaves* 7 by $2\frac{1}{2}$ in., acute, midrib much elevated beneath, other nerves inconspicuous, very smooth shining above; petiole $\frac{1}{4}$ in. *Male fl.*: cymes $\frac{1}{4}$ –1 in., often compound; bracts $\frac{1}{10}$ in. ovate; calyx $\frac{1}{8}$ – $\frac{1}{6}$ by $\frac{1}{8}$ in., lobed half-way down, lobes 4 oblong; corolla $\frac{1}{2}$ in., tube narrowed upwards, lobes hardly $\frac{1}{8}$ in., small oblong; stamens nearly as of *D. undulata*. *Female fl.* not seen.—Allied no doubt to *D. undulata*, but the corolla differs much, neither do the leaves agree.

51. ***D. lucida*, Wall. Cat. 4127**; leaves oblong narrowed at both ends coriaceous glabrous, male fl. sessile fascicled, corolla tubular yellow-tomentose without, stamens 12–14, anthers and connectives glabrous filaments densely pilose. *A. DC. Prodr.* viii. 233. *D. undulata*, *Hiern in Trans. Camb. Phil. Soc.* xii. 215, partly, not of Wall. *Diospyros* sp., *Griff. Notul.* iv. 288.

SINGAPORE; *Wallich*. MALACCA; *Griffith* (Kew Distrib. n. 3637, n. 3619, not Helfer under same Distrib. n.); *Maingay* (nn. 970, 973, 977).

Leaves 4 by $1\frac{1}{2}$ in., soon glabrescent, primary nerves not numerous nor prominent, reticulating nerves beneath little elevated; petiole $\frac{1}{6}$ – $\frac{1}{5}$ in. *Male fl.*: calyx $\frac{1}{8}$ in. lobed half-way down; corolla nearly $\frac{1}{2}$ in., lobed scarcely half-way down, buds narrower upwards. *Female fl.* 1–2 together, subsessile; calyx $\frac{1}{8}$ by $\frac{1}{4}$ in., divided nearly to the base, lobes broad-ovate with recurved margins; corolla nearly $\frac{1}{2}$ in. *Fruit* $\frac{2}{3}$ in. diam., globose, umbonate at the apex, hairy nearly till ripe, 4–6-seeded. *Albumen* equable.

52. **D. Helferi**, *Clarke*; leaves oblong obtuse apiculate base acute glabrescent reticulating nerves prominent, female fl. 1-3 together sessile, calyx-lobes deep with reflexed margins, corolla rufous-hirsute without. *D. Moonii*?, *Hiern in Trans. Camb. Phil. Soc.* xii. 164.

TENASSERIM (or Andamans); *Helfer*, n. 3632.—DISTRIB. Cambodia.

Branchlets rufous-tomentose. *Leaves* 6 by $2\frac{1}{2}$ in., broadly oblong, parallel-sided, tip shortly cuneate, base broad, shortly suddenly attenuate, narrowed into the petiole, ferruginous-pilose beneath when young; primary nerves numerous, subhorizontal, much reticulated; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in. *Male fl.* unknown. *Female fl.* usually 3 together sessile on thick peduncles scarcely $\frac{1}{20}$ in. long; calyx nearly $\frac{1}{2}$ in., almost 5-partite, lobes ovate-oblong; corolla nearly $\frac{1}{2}$ in. *Fruit* (imperfectly ripe) $\frac{3}{4}$ by $\frac{1}{2}$ in., ellipsoid, glabrous; fruiting calyx much enlarged, plicate, with much-reflexed margins auriculated at the sinus.—Affinity doubtful, but cannot be *D. Moonii*; the prominently reticulated nerves of the leaves and the female calyx differ.

53. **D. argentea**, *Griff.* *Notul.* iv. 288; leaves large oblong acute glistering silky beneath, male fl. in stout dense cymes, stamens hairy, fruit solitary hairy. *Hiern in Trans. Camb. Phil. Soc.* xii. 262.

MALACCA; *Griffith* (Kew Distrib. n. 3625), *Maingay* (n. 968).

Branchlets stout, with subsistent yellowish hair. *Leaves* 10 by $2\frac{1}{2}$ -3 in., base rounded, glabrous above, densely villous with fulvous or white soft hairs beneath, at length glabrate; nerves obscure, midrib impressed above; petiole $\frac{1}{2}$ in. *Male fl.*: cymes $\frac{1}{2}$ in., 3-10-flowered; bracts $\frac{1}{2}$ in., ovate; calyx $\frac{1}{4}$ in., deeply 4-lobed, villous; corolla $\frac{1}{4}$ in., tubular, lobed half-way down, very villous without; stamens 22-24. *Female fl.* solitary, peduncles $\frac{1}{2}$ in.; calyx $\frac{1}{2}$ in., campanulate, lobes ovate; corolla $\frac{2}{3}$ in.; staminodes 4-5; ovary 4-celled, 8-ovuled, densely hairy; styles 4, hairy, erect. *Fruit* $2\frac{1}{2}$ by $1\frac{3}{4}$ in., ellipsoid, 8-celled; fruiting calyx greatly enlarged, lobes $1\frac{1}{2}$ in., oblong, densely softly villous. *Seeds* 6-8, $1\frac{1}{2}$ by $\frac{1}{2}$ in., albumen horny.—*D. discolor*, Willd. (A. DC. Prodr. viii. 235), a Philippine species, greatly resembles *D. argentea*, but has glabrous stamens; it is in the collections of Wallich and Maingay, but is supposed only cultivated in India.

SECT. VIII. **Horsfieldia**: as Sect. VII., except that the female flowers are distinctly (though often shortly) cymose.

54. **D. oblonga**, *Wall. Cat.* 4124; leaves large oblong acuminate glabrous, female flowers crowded in very short cymes 5-merous tomentose with black hairs intermixed. *A. DC. Prodr.* viii. 243; *Hiern in Trans. Camb. Phil. Soc.* xii. 243.

PENANG; *Wallich*. SINGAPORE; *Maingay* (n. 967).

Branchlets stout, glabrous. *Leaves* $7\frac{1}{2}$ by $2\frac{3}{4}$ in., base obtuse or almost rounded, coriaceous; primary nerves numerous, nearly horizontal, reticulating nerves inconspicuous; petiole $\frac{1}{4}$ in. *Male fl.* not known. *Female fl.* 1-5 together; calyx $\frac{1}{4}$ - $\frac{1}{2}$ in., deeply lobed, lobes ovate-oblong, auriculate, subplicate; corolla $\frac{1}{2}$ in., densely hairy without, deeply lobed; staminodes 5; ovary 10-celled, ferruginous-hairy. *Fruit* $\frac{2}{3}$ in. diam., globose, glabrate; calyx $\frac{3}{4}$ in. across, lobes auriculate. *Albumen* horny, not ruminated.

55. **D. ramiflora**, *Roxb. Hort. Beng.* 40, and *Fl. Ind.* ii. 535; leaves large broadly oblong acute glabrous, male fl. in short cymes, female in many-flowered compound much larger cymes. *Wall. Cat.* 4119; *Wight Ic.* t. 189; *A. DC. Prodr.* viii. 233.

EAST BENGAL; Tipperah, *Roxburgh*; Khasia Mts., *Wallich*.

A large tree; branchlets glabrous. *Leaves* $7\frac{1}{2}$ by 3- $3\frac{1}{2}$ in., base cuneate or obtuse, nerves not prominent; petiole $\frac{1}{2}$ in. *Male fl.* subfasciculate in $\frac{1}{4}$ in. rusty cymes; calyx $\frac{1}{2}$ by $\frac{1}{2}$ in., sub tubular, campanulate, lobed nearly halfway down; lobes 5, oblong, subobtuse; corolla $\frac{1}{2}$ in., tubular, lobed less than halfway down, densely villous without; stamens 16, glabrous, anthers linear, connective hardly produced. *Female*

fl.: cymes $\frac{1}{2}$ –2 in., often on the old branches; calyx $\frac{1}{4}$ – $\frac{1}{2}$ by $\frac{1}{4}$ in.; corolla $\frac{1}{2}$ by $\frac{1}{2}$ in., as of the male, but larger; staminodes 8–12; ovary hairy, 8–12-celled, stigmas 4–6. *Fruit* 2–3 in. diam., globular, nearly glabrous; fruiting calyx $\frac{1}{2}$ in. across.

56. **D. densiflora**, *Wall. Cat.* 4140; leaves large elliptic or oblong obtuse or scarcely acuminate glabrous, male *fl.* numerous in somewhat large cymes, calyx 4-lobed nearly to the base lobes with reflexed margins, corolla tubular fulvous-tomentose without, stamens 15–16 glabrous. *A. DC. Prodr.* viii. 233; *Hiern in Trans. Camb. Phil. Soc.* xii. 171; *Kurz in Journ. As. Soc.* 1877, pt. ii. 236, and *For. Fl.* ii. 134.

MOULMEIN and AMHERST; *Wallich*. ARRACAN, MARTABAN and TENASSERIM; rare, *Kurz*.

Leaves $7\frac{1}{2}$ by $2\frac{1}{2}$ – $3\frac{1}{4}$ in., base obtusely cuneate; primary nerves wide apart, much arched, slightly elevated above, reticulated nervation distinct on both surfaces; petiole $\frac{1}{2}$ in. *Male fl.*: cymes 1–2 in. diam., minutely rusty-pubescent; bracts $\frac{1}{2}$ in., ovate; pedicels $0\frac{1}{2}$ in.; calyx-lobes $\frac{1}{2}$ by $\frac{1}{2}$ in.; corolla $\frac{1}{2}$ in., narrowly cylindric; anthers and connective glabrous. *Female fl.*: cymes $\frac{3}{4}$ – $1\frac{1}{2}$ in., 12–20-flowered; calyx-lobes $\frac{1}{2}$ by $\frac{1}{2}$ in. *Fruit* $\frac{3}{4}$ in. diam., globose, ultimately glabrescent; pedicels in fruit $\frac{1}{2}$ – $\frac{3}{4}$ in. *Albumen* ruminated (*Hiern*), but the affinity of this species seems to be with *D. undulata*.

57. **D. Horsfieldii**, *Hiern in Trans. Camb. Phil. Soc.* xii. 193; leaves large ovate-oblong or elliptic-oblong glabrous strongly reticulate beneath, male *fl.* in compound cymes, calyx-lobes ovate with reflexed margins, corolla urceolate ferruginous-hispid without, female *fl.* in large cymes. *D. frutescens*, *Hassk. Pl. Jav. Rar.* 467, not of *Blume*.

MALACCA; *Griffith* (*Kew Distrib.* n. 3620).—DISTRIB. JAVA.

Branchlets soon glabrous. *Leaves* $9\frac{1}{2}$ by $2\frac{3}{4}$ – $4\frac{1}{4}$ in., shortly acuminate, base rounded or obtuse, nerves (primary and secondary) impressed above very strongly raised beneath; petiole $\frac{1}{2}$ in. *Male flowers*: cymes about 1 in., few-flowered; calyx $\frac{1}{2}$ in., deeply 4-lobed, fuliginous-hispid; corolla $\frac{1}{2}$ in., urceolate, fuliginous-hispid without, lobes 4 ovate; stamens 14–16, filaments hairy, anthers glabrous. *Female fl.*: cymes 1–4 in.; bracts $\frac{1}{2}$ in., elliptic; calyx nearly as in the male; corolla $\frac{1}{2}$ in., very deeply 4–5-lobed; staminodes 12; ovary 8-celled, cells 1-ovuled. *Fruit* $\frac{3}{4}$ in. diam., globose, fuliginous hairy, ultimately glabrescent; lobes of the fruiting calyx $\frac{1}{2}$ in., margins strongly reflexed, auriculate.

58. **D. paniculata**, *Dalz. in Hook. Kew Journ.* iv. 109; leaves broad-oblong obtusely cuneate at both ends glabrous, male *fl.* paniced, calyx-lobes foliaceous ovate, corolla tubular black-velvety without, female flowers solitary or few together. *Dalz. & Gibs. Bomb. Fl.* 141; *Bedd. Ic. Pl. Ind. Or.* t. 125, and *For. Man.* 144; *Hiern in Trans. Camb. Phil. Soc.* xii. 190.

DECCAN PENINSULA; in the Ghauts, *Wight*; Concan, *Dalzell*; Canara, *Ritchie*; Anamallays, *Beddome*.

A large tree; nearly glabrous except the flowers. *Leaves* $6\frac{1}{2}$ by 2 in., mature strongly closely reticulate on both surfaces; petiole $\frac{1}{2}$ in. *Male fl.*: cymes 1– $1\frac{1}{2}$ in., sparingly pilose, pedicels $0\frac{1}{2}$ in., bracts ovate caducous; calyx 5-lobed nearly to the base, lobes $\frac{2}{3}$ – $\frac{1}{2}$ in., pubescent without and within; corolla $\frac{1}{2}$ in. (or rather more) lobed half-way down; stamens 20, glabrous. *Female fl.* solitary or in 2–5-flowered cymes, peduncled; bracts ovate, caducous; ovary 4-celled, cells 1-ovuled. *Fruit* 1 by $\frac{3}{4}$ in., ellipsoid, ferruginous-hirsute; fruit-calyx 5-lobed, enlarged, nearly glabrous; lobes $\frac{1}{2}$ – $\frac{3}{4}$ in. long and broad, plicate, auricled.

59. **D. Brandisiana**, *Kurz in Journ. As. Soc.* 1871, pt. ii. 72; leaves lanceolate or oblong acuminate base cuneate or subobtuse sparsely pilose or ultimately nearly glabrous, male *fl.* in very short cymes, corolla tubular minutely closely pilose, stamens about 16, female *fl.* in many-flowered cymes. *Hiern in*

Trans. Camb. Phil. Soc. xii. 184; *Kurz in Journ. As. Soc.* 1877, pt. ii. 236, and *For. Fl.* ii. 138.

UPPER TENASSERIM; *Brandis*.—DISTRIB. Upper Birma.

A tree; branchlets pubescent. *Leaves* $8\frac{1}{2}$ by $2\frac{1}{2}$ in., or wider (*Kurz*); primary nerves much raised beneath, oblique, secondary conspicuous, undulate; petiole $\frac{1}{4}$ in. *Male fl.*: cymes $0\frac{1}{2}$ in., densely fascicled, on the old wood or in the axils of the leaves; calyx $\frac{1}{2}$ in., divided more than half-way down, rusty villous; corolla $\frac{1}{2}$ in., narrowly tubular, lobes short obtuse; filaments densely pilose, anthers and connective glabrous. *Female fl.*: cymes 1 in., rusty pubescent; bracts $\frac{5}{8}$ in., lanceolate; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in.; calyx and corolla nearly as in the male but rather larger; staminodes 5–8; ovary ovoid-conic, hairy, style hairy, stigmas 6–8 glabrous; cells 6–10, 1-ovuled, septa at flowering time complete.

VERY IMPERFECTLY KNOWN SPECIES.

D. CHARTACEA, *Wall. Cat.* 4135, partly; glabrous, leaves ovate-lanceolate or narrowly lanceolate acuminate, male fl. sessile in small clusters 4-merous, calyx elongate cylindric lobes ovate ciliate, corolla short lobes obtuse, stamens 16–20 in pairs, anthers hairy. *A. DC. Prodr.* viii. 232; *Hiern in Trans. Camb. Phil. Soc.* xii. 230; *Kurz in Journ. As. Soc.* 1877, pt. ii. 234, and *For. Fl.* ii. 129.—Martaban and Upper Tenasserim; not uncommon, *Kurz*.—DISTRIB. Birma.

Wallich has two sheets of this; the type is a male in very young bud with small narrow leaves; the duplicate sheet is a male with medium large young flowers and broad—almost ovate-lanceolate leaves. It is very doubtful whether the two belong to the same species. *Hiern* has described the flowers from the duplicate sheet, while he says the leaves are 2–9 by $\frac{1}{2}$ – $\frac{3}{4}$ in. elongate lanceolate, which seems intended to cover both sheets of Wallich. *Kurz* finds *Hiern's* plant “not uncommon” in British Birma, but says the leaves are 4–5 in. long, ovate-oblong to oblong and oblong-lanceolate; so that his plant can hardly be referred to the species of Wallich's type sheet in which the leaves are uniformly small and narrow, running from $2\frac{1}{2}$ by $\frac{1}{2}$ in. to $3\frac{1}{2}$ by $\frac{3}{4}$ in.

D. ELEGANS, *Clarke*; leaves oblong acutely caudate fulvous-pilose on the nerves beneath, male cymes small on $\frac{1}{4}$ in. peduncles, corolla with a few scattered hairs without or glabrate, calyx 3-partite.

KHASIA MTS.; Nunklow, alt. 3500 ft., *Clarke*.

A small tree; branches persistently fulvous-hirsute. *Leaves* $5\frac{1}{2}$ by $1\frac{1}{2}$ in., obtuse at the base; primary nerves oblique; petiole $\frac{1}{2}$ in. *Male fl.* (exceedingly young) about 12 short-pedicelled in each cyme; cyme sometimes $1\frac{1}{2}$ in. compound; female unknown.—Supposed allied to *D. microphylla*, but may be a *Maba*.

VAR. *Hookeri*; shrubby, leaves less finely acuminate. *D. stricta*, *Hiern in Trans. Camb. Phil. Soc.* xii. 201, partly, not of *Roxburgh*.—Chittagong, Seetakoond; *H. f. & T.*—This differs from *D. stricta* in the hirsute branches and peduncled male cymes.

D. GRATA, *Wall. Cat.* 4142; leaves alternate oblong narrowed at both ends obtuse glabrous, female flowers solitary subsessile, ovary fulvous-hispid, fruit globose subglabrous, fruiting calyx 5-fid pentagonal pubescent on both sides. *A. DC. Prodr.* viii. 232; *Hiern in Trans. Camb. Phil. Soc.* xii. 264.—Nipal; *Wallich*.

Hiern thinks *Wallich's* fragmentary example may be *D. lanceifolia*, *Roxb.*

D. ORIXENSIS, *Wight*; *Hiern in Trans. Camb. Phil. Soc.* xii. 264; leaves alternate elliptic shortly obtusely acuminate base obtuse hairy at least on the midrib beneath, fruits solitary axillary subglobose, fruiting calyx deeply 4-fid hairy without.—*Courtallum*; *Wight*.—This looks like the female of *D. stricta*, *Roxb.* Why *Wight* named a *Courtallum* species *orixensis* does not appear. *Hiern* says that *D. orixensis* of *Klein* and *Willd.* (*A. DC.* viii. 230) is probably *D. montana*, *Roxb.*, with which also *Beddome* agrees (*For. Man.* 143); but the short description of *Willd.* appears to fit *Wight's* examples of *D. orixensis* very well.

D. PYREBHOCARPA, *Miq. Fl. Ind. Bat. Suppl.* 250, 583; shoots pubescent soon glabrescent, leaves elliptic-oblong shortly acuminate coriaceous densely reticulated, flowers solitary short-peduncled rufous-tomentose, berries size of a cherry depressed-globose rufous-orange-tomentose. *Hiern in Trans. Camb. Phil. Soc.* xii. 266; *Kurz in Journ. As. Soc.* 1877, pt. ii. 236, and *For. Fl.* ii. 136.—West Sumatra.

VAR. *andamanica*, Kurz; leaves oblong to narrow-oblong, lateral nerves faint and numerous, reticulation more lax.—Andamans; Kurz.—Not seen, and for the present exceedingly obscure; for Kurz l. c. adds “the Andaman tree, I have little doubt, is a different species” (i.e. from the Sumatran), “but the material is too incomplete for description.”

D. ROYLEI, Wall. Cat. 4134; A. DC. Prodr. viii. 239.—There is no specimen of this in Wallich's herbarium.

D. VENOSA, Wall. Cat. 4126; leaves alternate elliptic shortly acuminate glabrous, female flowers in subsessile clusters 1-3 together, bracts $\frac{1}{2}$ in. ovate. Anonaceæ?, Hiern in Trans. Camb. Phil. Soc. xii. 271.—Penang; Wallich.

The single fruiting calyx (not perhaps the normal form) on Wallich's specimen is 3-lobed, but the young fruit in it is globose, undivided, and can hardly be Anonaceous. The specimen might be *D. undulata* or some closely allied species.

ORDER XCI. STYRACÆ. (By C. B. Clarke.)

Trees or shrubs. *Leaves* alternate, exstipulate. *Flowers* hermaphrodite (in the Indian species), in axillary and terminal simple or compound racemes or spikes, sometimes solitary, white, rarely rose; bracts small. *Calyx* campanulate, superior or inferior, limb 5-4-toothed or truncate, persistent. *Petals* 5-4, free or united into a short (rarely long) tube, imbricated (in the Indian species). *Stamens* adnate to the petals, 8-10 or very many; filaments free or connate; anthers round or linear, dehiscing laterally. *Ovary* inferior or superior, 2-5-celled, or (by the early separation of the septa) 1-celled; style filiform; stigma small or capitate; ovules 1 or few on the inner angle of each cell, pendulous or erect. *Fruit* drupaceous, 1-seeded, less often 2-3-seeded. *Seeds* albuminous; embryo straight or curved.—Species 220, in the warmer regions of Asia, Australia and America; not known in Africa.

Stamens many, in several series 1. SYMPLOCOS.
Stamens 10, in 1 series 2. STYRAX.

1. SYMPLOCOS, Linn.

Trees or shrubs; often drying yellow. *Leaves* alternate, toothed or entire. *Racemes* or *spikes* axillary, simple or compound, sometimes reduced to a single flower; bracts usually solitary at the base of each pedicel, caducous; bracteoles 3-1, small, at the base of the flower. *Flowers* white (in *S. rosea*, rose), hermaphrodite (in the Indian species). *Calyx-tube* adnate; lobes 5, small, imbricate. *Petals* (in the Indian species) 5, imbricate, free or obscurely connate, more rarely connate into a tube. *Stamens* numerous, in several series, adnate to the corolla-tube, usually throughout its length, and in a few species in a tube beyond it; anthers shortly-oblong, dehiscing longitudinally. *Ovary* inferior (in the Indian species), 3-, rarely 2- or 4-celled; style filiform, stigma small capitate sub-3-lobed; ovules 2, pendulous from the inner angle of each cell. *Drupe* ellipsoid, endocarp usually woody, 1-3-seeded. *Seeds* oblong, straight or less often curved; embryo terete, axile, straight or curved.—DISTRIB. Species 160, in the tropics of Asia, Australia and America.

SUBGENUS I. *Hopea* (Species 1 to 59). *Petals* free or connate only at the very base, spreading; buds subglobose. *Filaments* slender, more or less united to the corolla, not forming a tube distinct from the corolla. *Embryo* straight, or curved.—The curvembryose species constitute the section *Palura*, not adopted here, the embryo being unknown in many species.

SECT. 1. Racemes or spikes (at least some of them) compound. (See also 12. *S. racemosa* var., and 51. *S. angustata*). Species 1 to 11.

* *Embryo curved (in several not known).*

1. ***S. cratægoides***, *Ham. ms.*; *Don Prodr.* 145; leaves broadly elliptic closely sharply serrulate towards the acuminate apex, cyme elongate compound subpanicled, disc glabrous. *A. DC. Prodr.* viii. 258; *Brand. For. Fl.* 299; *Kurz For. Fl.* ii. 147, and in *Journ. As. Soc.* 1877, pt. ii. 239. *S. paniculata*, *Wall. Cat.* 4429. *Lhodra cratægoides*, *Dcne in Jacq. Voy. Bot.* 103, t. 110.—*Griff. Flin. Notes* 163, n. 839.

HIMALAYA; alt. 2-8000 ft.; from Kashmir to Bhotan; common. KHASIA; alt. 3-5000 ft.; common. MARTABAN; Nattoung Hills (*Kurz*).—DISTRIB. Japan.

A tree, 40 ft., or shrub. *Leaves* $2\frac{1}{2}$ by $1-1\frac{1}{2}$ in., varying from lanceolate acuminate to broadly obovate-elliptic subobtusate, teeth sometimes nearly obsolete, usually softly pilose beneath, at least on the midrib, sometimes glabrous; reticulating nerves prominent beneath; petiole $\frac{1}{2}$ in. *Panicles* 1-5 in., hairy, glabrescent or glabrous; lateral branches distinct, cymosely many-flowered, or with few longer-pedicelled flowers; bracts small, linear, caducous. *Calyx-tube* obconic, glabrous, or sparsely pilose or densely hirsute; teeth small obtuse, or lanceolate subacute, glabrous ciliate or pilose. *Corolla* $\frac{1}{2}-\frac{1}{3}$ in. *Stamens* 20-60. *Fruit* $\frac{1}{4}-\frac{1}{2}$ in., obliquely ovoid or obovoid, calyx-rim small, very much narrower than the fruit.—Most variable: the typical North-west form (described by Brandis) has a glabrous calyx-tube with short obtuse teeth; while Griffith's n. 306 (from Khasia) has densely hairy calyx-tube and long calyx-teeth. The fruits vary so greatly in form and size that Thomson (erroneously) regarded some as insect-injured.

2. ***S. spicata***, *Roxb. Hort. Beng.* 40, and *Fl. Ind.* ii. 541; leaves broadly lanceolate acute serrulate glabrous, flowers sessile in long-branched spikes, disc glabrous. *Wall. Cat.* 4417; *Brand. For. Fl.* 300; *Kurz For. Fl.* ii. 148, and in *Journ. As. Soc.* 1877, pt. ii. 239. *S. polycarpa*, *Wall. Cat.* 4423; *A. DC. Prodr.* viii. 255; *Kurz ll.c.* *S. Loha*, *Don Prodr.* 144; *A. DC. l.c.* *S. racemosa*, *Wall. Cat.* 4418, *in part, not of Roxb.*

NORTH and EAST INDIA; near the base of the hills, alt. 0-4000 ft.; from Kumaon to Bhotan, Assam and Martaban; common.—DISTRIB. China, Japan, Australia?

A small tree. *Leaves* 5 by 2 in., base cuneate; nerves distant, not prominent beneath, parallel; petiole $\frac{1}{2}$ in. *Spikes* 2-4 in., often tripartite below, sometimes panicled, glabrous or obscurely rusty-pubescent; flowers all closely sessile, the depressed ovary and short calyx-tube embraced by the 3 persistent small ovate obtuse bracteoles. *Calyx-lobes* $\frac{1}{20}$ in., round, glabrous or slightly pubescent. *Petals* $\frac{1}{8}$ in. *Stamens* about 40. *Fruit* $\frac{1}{2}$ in. diam., subsymmetric, ribbed (or smooth), globose, surmounted by a very short cylindric tube; calyx-rim as wide as the tube.—Wallich's *S. polycarpa* only differs in the larger leaves; *Kurz* separates it by the smooth, not ribbed fruit; but the fruit is distinctly ribbed in Wallich's *polycarpa*. The whole of this series of *S. spicata* type is readily distinguished by the long branches of the spike, with small distant flowers and very depressed ovaries.

VAR. laurina, *Wall. Cat.* 4416 (sp.); spikes shorter fulvous subtomentose or hirsute, flowers rather larger densely crowded, ovary less depressed. *S. spicata*, *A. DC. Prodr.* viii. 254; *Wight Ill.* t. 150; *Thwaites Enum.* 154; *Bedd. For. Man.* 149. *S. flavida* and *S. Loha*, *Miq. in Pl. Hohenack.* p. 1053, 1054. *Myrtus laurina*, *Retz Obs.* iv. 26. *Eugenia laurina*, *Willd. Sp. Pl.* ii. 967. *Bobua laurina*, *DC. Prodr.* iii. 24. *Hopea spicata*, *Dalz. & Gibs. Bomb. Fl.* 140.—W. side of the Deccan Peninsula and Ceylon; alt. 2-7000 ft., very common.—(*Burm. Thes. Zeyl.* t. 62.)

VAR. attenuata, *Wall. Cat.* 4426 (sp.); leaves long-attenuate at the base, spikes shorter tripartite or simple, fruits smaller often only $\frac{1}{2}$ in. *A. DC. Prodr.* viii. 256.—Khasia; alt. 3-6000 ft., common, Hills of British Birma, *Kurz*.

VAR. malassica; leaves less coriaceous, secondary nerves prominent, flowers less closely sessile, ovary not depressed, calyx-lobes oblong prominent above the bracteoles.—Malay Peninsula, common; *Maingay*, n. 957, &c.—This is not exactly *S. Stawellii*, *F. Muell. Fragm. Phyt. Austr.* v. 60, which has the flowers more distinctly pedicelled, and is more like the Ceylon *S. laurina*.

3. *S. oxyphylla*, Wall. Cat. 4430; leaves oblong-lanceolate acuminate serrulate glabrous, racemes compound, flowers small mostly pedicelled. *A. DC. Prodr.* viii. 256. *S. pedicellata*, Kurz in *Journ. As. Soc.* 1873, pt. ii. 80, and *For. Fl.* ii. 147.

KHASIA; Wallich; Cherra, alt. 4000 ft., *H. f. & T. ASSAM*; Masters. PEGU; rather rare, Kurz.

A small tree; branchlets glabrous. Leaves 5 by $1\frac{1}{2}$ in., subcaudate, base attenuate; nerves distant, not prominent beneath, parallel; petiole $\frac{1}{4}$ in. Panicles $1\frac{1}{2}$ –2 in. diam., many-fld., puberulous, finally glabrous; bracts small, caducous. Calyx nearly glabrous; teeth $\frac{1}{8}$ in., round. Corolla $\frac{1}{2}$ in. Fruit $\frac{1}{4}$ – $\frac{1}{2}$ in., ovoid, narrowed upwards into a cylindric beak, often 3-seeded, scarcely ribbed; fruiting calyx as wide as the beak.—*S. xanthophylla*, Jungh. & De Vriese; *Miq. Fl. Ind. Bat.* i. pt. ii. 468, has pedicelled flowers, but the fruits are small, and it resembles *S. spicata* var. *attenuata* rather than *S. oxyphylla*.

4. *S. fasciculata*, Zoll. Syst. Verz. 136; leaves oblong-lanceolate minutely pilose on the midrib beneath or glabrous very short-petioled, cymes compound very small, flowers small mostly pedicelled. *Miq. Fl. Ind. Bat.* i. pt. ii. 467. *Dicalyx tinctorius*, Blume Bijdr. 1116.

MALACCA; Griffith (Kew Distrib. n. 3665), Maingay (n. 958). SINGAPORE; Murton.—DISTRIB. Java, Borneo.

A large tree (Maingay); branchlets ashy-pubescent. Leaves $3\frac{1}{2}$ by $1\frac{1}{4}$ in., obtusely acuminate, base obtusely rhomboid, entire or obscurely crenate-serrate; thinly chartaceous, nerves distant, not prominent beneath, parallel; petiole $\frac{1}{2}$ in. Cymes scarcely $\frac{2}{3}$ in. diam., ashy-pubescent; bracts minute. Calyx-teeth $\frac{1}{10}$ in., ovate-oblong, grey-pubescent. Corolla $\frac{1}{2}$ in. Stamens 25. Disc glabrous; style glabrous (in the Malacca examples), sparsely villous in the Javan. Fruit $\frac{1}{4}$ in., obliquely ovoid, narrowed to a cylindric beak; embryo not seen (fruit imperfectly ripe), probably curved.

5. *S. oligandra*, Bedd. Ic. Pl. Ind. Or. t. 272; leaves oblong cuneate at both ends subentire glabrous, cymes scarcely $\frac{1}{2}$ in. compound minutely hairy, disc closely shortly hairy.

TRAVANCORE GHATS; Beddome.

A tree (Beddome); branchlets glabrous. Leaves $1\frac{1}{2}$ by $\frac{2}{3}$ in., coriaceous; nerves 9–10 on each side, very slightly impressed; petiole $\frac{1}{8}$ – $\frac{1}{2}$ in. Cymes 3–6-fld.; bracts minute, deciduous. Calyx-tube $\frac{1}{4}$ in., glabrous; teeth $\frac{1}{4}$ in., closely adpressedly pilose. Petals $\frac{1}{10}$ in. Stamens 12–14, in pairs. Ovary 3-celled. Fruit unknown.

6. *S. ferruginea*, Roxb. Hort. Beng. 40, and *Fl. Ind.* ii. 542; leaves broad-lanceolate rusty-villous on the nerves beneath, nerves numerous strong parallel, spikes compound rusty-villous. Wall. Cat. 4412; *A. DC. Prodr.* viii. 257. *S. mollis*, Wall. Cat. 4433; *G. Don Gen. Syst.* iv. 3. *S. Verhuelli*, Jungh. & De Vriese; *Miq. Fl. Ind. Bat.* i. pt. ii. 467. *S. polystachya*, Zoll. & Mor. Verz. 43, not of Wall. *S. lachnobotrya* and *Horsfieldiana*, *Miq. Fl. Ind. Bat. Suppl.* 475. *S. javanica*, Kurz in *Journ. As. Soc.* 1877, pt. ii. 239 (syn. *S. rubiginosa* excl.), and *For. Fl.* ii. 145. *Dicalyx javanicus*, Blume Bijdr. 1117.

KHASIA; Wallich; Mikir Hills, Simons. MALAY PENINSULA; from Mergui to Malacca, common.—DISTRIB. Malay Archipelago.

A small tree; branchlets subsuperficially rusty-villous. Leaves $6\frac{1}{2}$ by $2\frac{1}{4}$ in., acuminate, base cuneate, often broader above the middle, serrulate or subentire, mature villous beneath or glabrescent, coriaceous, shining, smooth with scarcely impressed nerves above; nerves 10–15 on each side, strongly raised beneath, quite parallel, carried $\frac{2}{3}$ (or more) the way to the margin before inarching; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. Panicles 2–5 in., very compound and villous, branches long; flowers sessile, bracteoles concealing the short calyx-tube. Calyx-teeth $\frac{1}{12}$ in., ovate, villous. Corolla $\frac{1}{2}$ – $\frac{3}{4}$ in. Stamens 40. Ovary depressed, disc glabrous. Fruit $\frac{1}{2}$ in., depressed-globose, ribbed; beak hardly any besides the enlarged glabrescent calyx-teeth.

VAR. *polystachya*, Wall. Cat. 4428 (sp.); leaves beneath glabrous or adpressedly pilose on the midrib only. *A. DC. Prodr.* viii. 254.—Gurwhal, alt. 5500 ft., *Strachey & Winterbottom*. Kumaon; alt. 4,500 ft., *Madden*. Darjeeling; alt. 5,000 ft., *Gamble*. Khasia; alt. 3-4000 ft., *Wallich, Clarke*.—This may be specifically separable, for when the midrib beneath is hairy, the indumentum is widely different from that of *S. ferruginea*. *Brandis* thinks (*For. Fl.* 300) this species too near *S. spicata*; the nervation of the leaves differs widely.

** *Embryo straight* (in several not known).

7. ***S. adenophylla***, Wall. Cat. 4427; leaves narrowly lanceolate or broadly elliptic obtusely acuminate subentire glabrous, racemes compound minutely rusty-pubescent, disc glabrous. *A. DC. Prodr.* viii. 257. *S. iteophylla*, *Miq. Fl. Ind. Bat. Suppl.* 476.

PENANG; *Wallich*. SINGAPORE and MALACCA; *Wallich, Griffith, Maingay*.—DISTRIB. JAVA, BORNEO.

Branchlets glabrous. *Leaves* 3 by $\frac{3}{4}$ in., or $3\frac{1}{2}$ by $1\frac{1}{2}$ in., base cuneate or attenuate, coriaceous; nerves distant, not prominent; petiole $\frac{1}{2}$ in. *Racemes* 1-2 in., tripartite, lax; pedicels $0-\frac{1}{2}$ in.; bracteoles minute, subobsolete. *Calyx-tube* glabrous or minutely rusty; teeth $\frac{1}{10}$ in., oblong. *Corolla-lobes* $\frac{1}{2}$ in. *Stamens* 40. *Fruit* $\frac{1}{2}$ by $\frac{1}{2}$ in., terete, ellipsoid, smooth, tip obtuse; calyx-teeth closely incurved, inconspicuous.—*Wallich* doubted whether his broad-leaved examples from Singapore (var. *virgata*, Wall.) might not be specifically distinct from his narrow-leaved ones from Penang; but two extreme forms of leaf occur on one branch.

8. ***S. celastrifolia***, *Griff. ms.*; leaves elliptic-oblong cuneate at both ends crenate glabrous, racemes laxly paniced minutely rusty-villous, disc glabrous.

MALACCA; *Griffith* (Kew Distrib. n. 3651).—DISTRIB. BORNEO.

Branchlets glabrous. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}-1\frac{3}{4}$ in., very shortly obtusely acuminate, base cuneate or subobtuse, strongly crenate, thickly chartaceous, when dried dull-green above, pale-yellow beneath; nerves not prominent; petiole $\frac{1}{2}$ in. *Racemes* 2-3 in., branches long lax; pedicels $\frac{1}{10}$ in.; bracteoles subobsolete. *Calyx-tube* nearly glabrous, teeth $\frac{1}{10}$ in., elliptic, glabrous. *Corolla* $\frac{1}{2}-\frac{3}{4}$ in. *Stamens* 40. *Fruit* more than $\frac{1}{4}$ in., ovoid-ellipsoid, smooth; calyx-rim as wide as the upper part of the fruit, teeth erect. *Embryo* straight.

9. ***S. phyllocalyx***, *Clarke*; leaves oblong acuminate serrulate glabrous, spikes very short sparingly compound minutely pilose, calyx-teeth green round, disc glabrous. *Symplocos* sp. n. 812, *Griff. Itin. Notes*, 158. *Symplocos* sp. n. 54, *Herb. Ind. Or. H. f. & T.* *Symplocos* sp. (*Ohandan*), *Gamble Darjeeling List*, 54. *Laurinea* ? n. 660, *Griff. Itin. Notes*, 141.

SIKKIM; alt. 8-12,000 ft., *J. D. H., &c.*, frequent. BHOTAN; *Griffith*.

A small tree or shrub, almost wholly glabrous. *Leaves* 4 by $1\frac{1}{2}$ in., base cuneate or attenuate, coriaceous, shining; midrib elevated above, broad; nerves numerous, often 14 on each side, slender but distinct above; petiole $\frac{1}{2}$ in. *Spikes* often shorter than the petioles, bracts glabrous when young; bracteoles $\frac{1}{2}$ in., ovate. *Calyx-teeth* $\frac{1}{2}$ in., glabrous or microscopically ciliate on the margins. *Corolla* $\frac{1}{2}$ in. *Stamens* 40-50. *Disc* shortly hairy; style often sparsely hairy. *Fruit* nearly $\frac{1}{2}$ by $\frac{1}{2}$ in., ellipsoid, crowned by the unaltered calyx-teeth. *Embryo* straight.—Furnishes a dye exported into Tibet (*Hook. Himal. Journ.* ii. 41).

10. ***S. theaeifolia***, *Ham. ms.*; *Don Prodr.* 145; leaves oblong acuminate obscurely serrulate glabrous, spikes very short compound minutely pubescent, disc densely hairy. *S. lucida*, Wall. Cat. 4414; *A. DC. Prodr.* viii. 255; *Kurz in Journ. As. Soc.* 1877, pt. ii. 238, and *For. Fl.* ii. 143, not of *Sieb. & Zucc.* *S. racemosa*, Wall. Cat. 4418; *A. DC. l.c.*, partly; *Brand. For. Fl.* 300, not of *Roxb.*

HIMALAYA; from Nipal to Bhotan, alt. 5–8000 ft., very common. KHASIA; alt. 4–6000 ft., common. MARTABAN; alt. 5–7000 ft., not unfrequent, Kurz.

An erect tree, often 50 ft.; branchlets glabrous. *Leaves* $4\frac{1}{2}$ by $1\frac{3}{8}$ in., base cuneate or obtuse, coriaceous; nerves numerous, indistinct, not parallel; petiole $\frac{1}{4}$ in. *Panicles* $\frac{1}{2}$ –1 in., dense, often tripartite from the base, branches stout; bracts $\frac{1}{10}$ in. broad, obtuse; bracteoles $\frac{1}{18}$ in., broad, obtuse. *Calyx-tube* nearly glabrous, teeth $\frac{1}{16}$ in., broad, obtuse, glabrous, minutely ciliate. *Corolla* $\frac{1}{8}$ – $\frac{1}{2}$ in. *Stamens* 20–25. *Disc* densely covered with long white hairs. *Fruit* $\frac{1}{2}$ by $\frac{1}{2}$ in., ellipsoid, smooth, tip obtuse, calyx-teeth incurved inconspicuous. *Embryo* straight.—There has been much confusion respecting this very distinct species. Wallich has, under No. 4418, three plants named *S. racemosa*, Roxb., none of which are right, except letter C, upon which De Candolle (in whose Herbarium the specimen is) founded his *S. nervosa*.

11. ***S. kurgensis***, Clarke; leaves oblong acuminate scabrous-villous beneath, panicles rufous-hirsute, flowers subsessile, calyx-tube glabrous, teeth closely silky. *Symplocos*, n. 31, *Herb. Ind. Or. Hk. f. & T. S.*, *spicata* affinis, *Bedd. For. Man.* 152.

Mts. of KURG, common, G. Thomson; *Beddome*.

Branchlets thick, soon glabrescent except the tips. *Leaves* $5\frac{1}{2}$ by 2 in., base rounded or subcordate when mature, sub-denticulate, villous and glandular-scabrid beneath, coriaceous; nerves 10 on each side, thick, much elevated beneath; petiole $\frac{1}{2}$ in., rusty-villous. *Panicles* 2–3 in.; bracts $\frac{1}{4}$ in., ovate, densely hairy. *Calyx-lobes* $\frac{1}{10}$ in., ovate. *Petals* $\frac{1}{2}$ in. *Stamens* 50. *Disc* and style glabrous. *Fruit* nearly $\frac{1}{2}$ by $\frac{1}{4}$ in., cylindric, smooth; calyx-rim as broad as the fruit, teeth patent. *Embryo* straight.—This differs from *S. Hohenackeri*, n. 37, in the rounded base of the leaves, which are glandular-scabrous beneath, and in the compound spikes.

SECT. 2. Racemes or spikes undivided (in *S. racemosa* var. divided). *Embryo* straight. Species 12 to 59.

* *Species of the Himalaya and Khasia Mts.*

12. ***S. racemosa***, Roxb. *Hort. Beng.* 40, and *Fl. Ind.* ii. 539; leaves oblong cuneate at both ends obscurely crenate, midrib glabrous or pilose beneath, racemes hairy half as long as the leaves, disc glabrous. Kurz in *Journ. As. Soc.* 1877, pt. ii. 238, and *For. Fl.* ii. 144, not of Wall. nor of A. DC. *S. Hamiltoniana*, Wall. *Cat.* 4420; *A. DC. Prodr.* viii. 254; *Brand. For. Fl.* 301. *S. rigida*, Wall. *Cat.* 4422, type sheet. *S. nervosa*, *A. DC. l.c.* 256, not of Wight. *S. propinqua*, Hance in *Seem. Journ. Bot.* 1868, 329.—*Symplocos* n. 52, *Herb. Ind. Or. H. f. & T.*

Throughout NORTH-EAST INDIA, alt. 0–2500 ft., common from the Terai of Kumaon to Assam and Pegu; common throughout Chota Nagpore.—DISTRIB. Birma, China.

A small tree, or more frequently a shrub; branchlets soon glabrous. *Leaves* 5 by $1\frac{1}{2}$ in. (sometimes almost orbicular leaves) obtuse, coriaceous; nerves distant, not conspicuous; petiole $\frac{1}{2}$ in. *Racemes* 2–4 in.; bracts $\frac{1}{2}$ in., ovate, hairy, deciduous; lower pedicels often distant, $\frac{1}{20}$ – $\frac{1}{4}$ in.; bracteoles $\frac{1}{12}$ in., ovate. *Calyx-tube* usually glabrous, lobes $\frac{1}{10}$ in., ovate, minutely pubescent. *Corolla* $\frac{1}{2}$ in. *Stamens* sometimes 115. *Fruit* nearly $\frac{1}{2}$ by $\frac{1}{4}$ in., subcylindric, smooth; calyx-rim nearly as wide as the fruit, with erect teeth. *Embryo* straight.—*S. rigida*, Wall. type, differs by some of the racemes terminating in a leafy branch, so that the pedicels appear solitary from the old wood bearing the fruits.—Kurz must be mistaken in thinking that this was *S. racemosa* of A. DC., who describes his plant as having racemes about as long as the petioles and the ovary pilose at the summit. A. DC.'s plant was therefore, as he states, *S. racemosa*, Wall. = *S. theaeifolia*, Don. Kurz also refers the Kew Distrib. n. 3660 to *S. spicata*, whereas that number is *S. racemosa*, Roxb.

VAR. *khasiana*; flowers sessile in dense clusters on the spike. *Symplocos*, n. 1275, *Griff. Itin. Notes*, 87.—Khasia; Nongkreem (alt. 4500 ft., perhaps), *Griffith*.

VAR. *composita*, Kurz in Journ. As. Soc. 1877, pt. ii. 238; flowers clustered in small cymes subterminal on the elongate branches, stamens about 40. *S. rigida*, Wall. Cat. 4422 partly.—Moulmein; Wallich. Darjeeling Terai; frequent, C. B. Clarke.

13. **S. glomerata**, King; Gamble, *Darjeeling List* 54; leaves elongate-lanceolate acuminate gland-serrate glabrous, petioles glandular, flowers and fruits fascicled axillary, disc glabrous. *Symplocos*, n. 900, Griff. *Itin. Notes*, 177. *Symplocos*, n. 55, *Herb. Ind. Or. Hk. f. & T. Incerta*, n. 448, Griff. *Itin. Notes*, 125.

SIKKIM and BHOTAN, alt. 1-8000 ft., frequent; Griffith, J. D. H., &c. KHASIA, alt. 2-5500 ft.; H. f. & T., Simons.

A shrub; or a tree 10 ft. high (J. D. H.); nearly wholly glabrous. *Leaves* 6 by $1\frac{1}{2}$ in., base cuneate, coriaceous; midrib impressed above, nerves distant, conspicuous beneath; petiole $\frac{1}{4}$ in. *Bracts* and *bracteoles* ovate, somewhat woolly, but obscured by the densely fascicled flowers. *Calyx-tube* nearly glabrous; lobes $\frac{2}{30}$ in., broad, rounded. *Corolla* nearly $\frac{1}{8}$ in. *Stamens* 25. *Fruit* $\frac{1}{4}$ - $\frac{1}{3}$ by $\frac{1}{8}$ - $\frac{1}{2}$ in., subcylindric, smooth; calyx-rim nearly as wide as the fruit, teeth erect. *Embryo* straight.

14. **S. ramosissima**, Wall. Cat. 4425; leaves oblong lanceolate acuminate membranous serrulate glabrous, racemes numerous scattered few-flowered minutely pubescent longer than the petioles, disc glabrous. A. DC. *Prodr.* viii. 257; Brand. *For. Fl.* 299.

TEMPERATE HIMALAYA, alt. 4-8000 ft.; from Gurwhal to Bhotan, common KHASIA; alt. 4000 ft., H. f. & T.

A shrub, or tree 30-40 ft.; branchlets glabrous. *Leaves* 4 by $1\frac{1}{2}$ in. (occasionally much larger), base cuneate; nerves somewhat distant, slender, distinct beneath; petiole $\frac{1}{4}$ in. *Racemes* $\frac{1}{2}$ -1 in., 1-6-flowered, often from lower leafless axils; bracts deciduous; pedicels $0-\frac{1}{8}$ in.; bracteoles $\frac{1}{16}$ in., ovate, pubescent, adpressed to the calyx-tube. *Calyx-teeth* $\frac{1}{20}$ in., ovate. *Corolla* $\frac{1}{8}$ - $\frac{1}{4}$ in. *Stamens* 20. *Fruit* more than $\frac{1}{4}$ in. long, ellipsoid (accompanying subglobose fruits are probably insect-punctured); calyx-rim narrower than the fruits. *Embryo* straight.—In Kew Distrib. n. 3667 (Panukka, in Bhotan, Griffith) many of the branches have the racemes reduced to solitary flowers.

15. **S. caudata**, Wall. Cat. 4113; leaves lanceolate caudate subentire glabrous, racemes lax hairy much longer than the petioles, calyx-tube obconic glabrous, disc glabrous. A. DC. *Prodr.* viii. 256. *S. prunifolia*, Sieb. & Zucc. *Pl. Jap. Fam. Nat.* ii. 9; Miq. in *Ann. Mus. Lugd. Bat.* iii. 101. *S. Swinhoeana*, Hance in *Ann. Sc. Nat. Ser. 4*, xv. 226.

SIKKIM; Darjeeling, Gamble. KHASIA (alt. 3000 ft.); Wallich, &c. CHITTAGONG; Seetakoond, H. f. & T.—DISTRIB. China, Japan.

Attains sometimes 15 ft., usually a shrub. *Leaves* 3 by $\frac{3}{4}$ in., base cuneate, stoutly chartaceous; nerves distinct, distant, not easily separable from the secondary; petiole $\frac{1}{5}$ in. *Racemes* 1- $1\frac{1}{2}$ in., sparingly pilose or fulvous-subhirsute; bracts and bracteoles inconspicuous; pedicels $0-\frac{1}{2}$ in. *Calyx-tube* $\frac{1}{10}$ in., teeth nearly as long, ovate, subacute. *Corolla* $\frac{1}{8}$ in. *Stamens* 25. *Fruit* (unripe) $\frac{1}{2}$ in., ovoid-cylindric, shining, smooth, crowned by the patent somewhat-enlarged calyx-teeth.—From the form of the unripe fruit, the embryo is presumed to be curved.

16. **S. lancifolia**, Sieb. & Zucc. *Fl. Jap. Fam. Nat.* ii. 9; leaves lanceolate acuminate crenate-serrulate glabrous, spikes slender fulvous-pubescent, disc glabrous. Miq. in *Ann. Mus. Lugd. Bat.* iii. 101. *S. leptostachya*, Sieb. & Zucc. l. c. *S. microcarpa*, Bth. in *Hook. Kew Journ.* iv. 303.

ASSAM; Patkoye Mts., alt. 2500 ft., Griffith (Kew Distrib. n. 3659).—Japan. Hongkong.

A shrub or small tree; branchlets nearly glabrous. *Leaves* $3\frac{1}{4}$ by 1 in., base

cuneate or rhomboid, subcoriaceous; nerves distant, not conspicuous; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. Spikes $\frac{1}{2}$ – $1\frac{1}{2}$ in., subracemose; flowers small, the minute pedicels and calyx-tube enveloped by persistent fulvous-villous imbricated bracteoles. *Calyx-segments* $\frac{1}{10}$ in., ovate. *Corolla* $\frac{1}{10}$ in. *Stamens* 15–25. *Ovary* 3-celled. *Fruit* $\frac{1}{2}$ in. diam., cuboid-globose; calyx-rim less than one quarter the width of the fruit. *Embryo* curved.—The simple spikes are in one example sometimes changed into dense panicles of abortive flowers with numerous bracteoles.

Var. fulvipes; midrib of the leaves beneath fulvous-pilose, spikes villous. *S. microcarpa*, var.?, *Bth. Fl. Hongk.* 212. *Symplocos*, n. 657, *Griff. Itin. Notes*, 41. *Symplocos*, n. 50, *Herb. Ind. Or. Hk. f. & T.*—Khasia; Cherra, *Griffith* (Kew Distrib. n. 3648); Borpani, *H. f. & T.* Assam; *Masters*.

17. **S. Hookeri**, *Clarke*; leaves large obovate-oblong acute minutely toothed glabrous, nerves parallel much elevated beneath, racemes stout minutely rusty. *Symplocos*, n. 49, *Herb. Ind. Or. Hk. f. & T.*

KHASIA; Nunklow, *H. f. & T.*

Branches thick, glabrous. *Leaves* 12 by $4\frac{1}{2}$ in., base cuneate, thickly chartaceous; midrib and nerves impressed on the upper surface; petiole $1\frac{1}{2}$ in. *Flowers* not seen. *Racemes* (in fruit) from thick branchlets, 2–3 in., simple; pedicels $\frac{1}{2}$ in., distant. *Fruit* $\frac{1}{2}$ by $\frac{1}{2}$ in., elongate ellipsoid, smooth. *Embryo* straight.—From the leaves this appears allied to *S. rubiginosa*, Wall., which has much smaller fruits.

18. **S. macrophylla**, *Wall. Cat.* 4431; leaves large elliptic acute from a rounded base minutely toothed hirsute beneath, spikes 2 in. stout densely rusty-villous.

KHASIA Mts.; *De Silva*.

Branchlet stout, rusty-hirsute. *Leaves* 8 by $3\frac{1}{2}$ in., base obtuse or subcordate, thickly coriaceous, rugose from the deeply impressed nerves; nerves 11 on each side, strongly elevated beneath, secondary distinct; petiole $\frac{3}{4}$ in., densely hirsute. *Bracts* and bracteoles subsimilar, $\frac{1}{2}$ in., ovate, very hairy. *Calyx-tube* $\frac{1}{8}$ in., glabrescent; teeth $\frac{1}{10}$ in., ovate, closely hairy. *Petals* $\frac{1}{2}$ in., elliptic. *Fruit* not seen.

19. **S. dryophila**, *Clarke*; leaves narrowly obovate-lanceolate shortly cuspidate subentire glabrous, racemes long lax sparsely fulvous-hirsute, disc glabrous. *Symplocos*, n. 53, *Herb. Ind. Or. Hk. f. & T.*

EASTERN NIPAL AND SIKKIM, alt. 8–10,000 ft.; in oak forests, *J. D. H.*; Simonbong, alt. 9000 ft., *Gamble*.

A tree (*Gamble*); branchlets glabrous. *Leaves* 6 by $1\frac{3}{4}$ in., base cuneate, densely villous beneath when young, soon glabrous, coriaceous; nerves many, slender, midrib impressed above; petiole $\frac{1}{2}$ in. *Racemes* $3\frac{1}{2}$ in.; bracts caducous, outermost orbicular glabrous, inner oblong villous; pedicels $\frac{1}{2}$ in., bracteoles obsolete. *Calyx-tube* $\frac{1}{12}$ in., nearly glabrous; teeth $\frac{1}{10}$ in., ovate. *Corolla* $\frac{1}{2}$ in. *Fruit* $\frac{1}{2}$ in. diam., subglobose, smooth; calyx-rim much narrower than the fruit. *Embryo* curved.

20. **S. grandiflora**, *Wall. Cat.* 4421; leaves lanceolate subentire glabrous, nerves much elevated beneath, racemes elongate lax nearly glabrous, disc glabrous. *A. DC. Prodr.* viii. 257.

KHASIA Mts.; *De Silva*, *Griffith*. ASSAM; *Griffith*.

Branchlets glabrous. *Leaves* 5 by $1\frac{1}{2}$ in., base cuneate or subobtuse, thickly chartaceous; midrib impressed, nerves subparallel, secondary distinct beneath; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Racemes* 2– $3\frac{1}{2}$ in.; bracts caducous; pedicels many, $0\frac{1}{2}$ in., glabrous or nearly so; bracteoles $\frac{1}{4}$ in., lanceolate, subciliate. *Calyx-tube* $\frac{1}{12}$ in., obconic, glabrous; teeth $\frac{1}{10}$ in., ovate. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in. *Stamens* 80. *Fruit* $\frac{1}{2}$ by $\frac{1}{2}$ in., subcylindric, smooth; calyx-rim little narrower than the fruit. *Embryo* probably straight.

21. **S. Sumuntia**, *Ham. ms.*; *Don Prodr.* 144; leaves oblong-lanceolate acuminate crenulate glabrous coriaceous, racemes $1\frac{1}{2}$ in. hirsute, calyx-teeth

nearly glabrous, fruit ovoid-cylindric. *S. racemosa*, Wall. Cat. 4418, B and lower half A. *Symplocos*, n. 888, Griff. Itin. Notes, 178.

HIMALAYA, alt. 3-7000 ft.; from Nipal to Bhotan, frequent; *Hamilton*, &c KHASIA; Borpani, *Simons*.

A small tree; branchlets glabrous. *Leaves* $4\frac{1}{2}$ by $1\frac{1}{2}$ in., base cuneate; midrib impressed, nerves 11 pairs, sub-parallel, impressed slightly above; petiole $\frac{1}{4}$ in. *Bracts* and bracteoles villous, caducous; pedicels $0-\frac{1}{2}$ in., hirsute. *Calyx-tube* glabrous or nearly so. *Petals* $\frac{1}{2}-\frac{3}{4}$ in. *Stamens* 35-40, 5-adelphous. *Disc* glabrous. *Fruit* $\frac{1}{2}$ by $\frac{1}{2}$ in., smooth, calyx-rim as wide as the upper part of the fruit. *Embryo* straight.—Described from *Hamilton's* type: the fruit from Sikkim examples of J. D. H.—A narrow-leaved var. ? of *S. decora*, Hance (in Trimen Journ. Bot. 1874, 368), from Ningpo, hardly differs but by the slightly longer flowers.

VAR. *floribunda*, Wall. Cat. 4419 (sp.); flowers spiked, i.e. pedicels 0 or most obscure. *S. Sumuntia*, A. DC. Prodr. viii. 255. *Symplocinea*, n. 739, Griff. Itin. Notes. 150.—Nipal to Bhotan, Assam and Khasia.—*Hamilton* also collected this, and did not suppose it identical with his *S. Sumuntia*.

22. *S. pyrifolia*, Wall. Cat. 4415; leaves elliptic-lanceolate acuminate minutely toothed glabrous rigid, racemes $1\frac{1}{2}$ in. glabrous or sparsely hairy, calyx-teeth densely silky, fruit cylindric-ellipsoid. A. DC. Prodr. viii. 256.

NIPAL; *Wallich*. SIKKIM; alt. 7000 ft., J. D. H. BHOTAN; *Griffith*. KHASIA; alt. 2-5000 ft., very common.

Closely resembling *S. Sumuntia*: the leaves are stiff and crisp rather than coriaceous, the petioles rather longer. *Hamilton* named this *S. salicifolia* or *Loth* of the Bengalees, considering it a var. of *S. racemosa*, Roxb. Don hence took the specific name *S. Loha*, his description of which refers to *S. spicata*.

** *Species of the Malay Peninsula* (see also 12. *S. racemosa*).

23. *S. ophirensis*, Clarke; leaves elliptic-cuneate obtuse subentire glabrous, petiole very short, racemes very short closely silky. *Symplocos*, 42, *Herb. Ind. Or. H. f. & T*.

MALACCA; Mt. Ophir summit, *Griffith* (Kew Distrib. n. 3650), *Lobb*.

Branches glabrous. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., base cuneate, stiffly chartaceous; nerves distant, reticulations close, prominent beneath; petiole $\frac{1}{10}-\frac{1}{8}$ in. *Racemes* $\frac{1}{2}$ in., dense; bracts and bracteoles inconspicuous; pedicels $0-\frac{1}{12}$ in. *Calyx-tube* $\frac{1}{8}$ in. closely fulvous-silky, teeth $\frac{3}{8}$ in., ovate, fulvous-pilose. *Petals* $\frac{1}{2}$ in. *Stamens* 40. *Disc* nearly glabrous. *Fruit* $\frac{1}{2}$ by $\frac{1}{2}$ in., ovoid-cylindric, smooth; calyx-rim as wide as the upper part of the fruit. *Embryo* straight.

24. *S. leucantha*, *Kurz in Journ. As. Soc.* 1873, pt. ii. 89, and *For. Fl.* ii. 148; leaves oblong or ovate acute crenate glabrous, racemes hardly 1 in. hirsute, calyx nearly glabrous, teeth prominent.

PEGU; Irrawaddi swamp-forests, *Kurz*; Moulmein, *Parish*.

A tree 20-25 ft. (*Kurz*); branchlets glabrous. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in. (in *Kurz's* examples), much wider in those of *Parish*, base cuneate or obtuse, thinly chartaceous with slender conspicuous nerves; primary nerves distant, only 1 or 2 pairs from the upper half of the midrib. *Pedicels* $0-\frac{1}{2}$ in., hairy; bracteoles $\frac{1}{2}$ in., elliptic, hairy, deciduous. *Calyx-tube* $\frac{1}{8}$ in., teeth $\frac{1}{2}$ in., ovate, nearly glabrous. *Corolla* $\frac{1}{2}$ in. *Stamens* 40. *Disc* glabrous. *Fruit* unknown.

25. *S. sulcata*, *Kurz in Journ. As. Soc.* 1871, pt. ii. 65, and *For. Fl.* ii. 145; leaves oblong acuminate subentire coriaceous glabrous, racemes 1 in. rusty-tomentose, fruit ellipsoid longitudinally furrowed.

MARTABAN and UPPER TENASSERIM, alt. 3-6000 ft.; in the drier hill-forests, frequent, *Kurz*. MOULMEIN; *Lobb*.

A tree 20-25 ft. (*Kurz*); branches glabrous. *Leaves* $4\frac{1}{2}$ by $1\frac{1}{2}$ in., base cuneate or

rhomboid, often unequal sided; midrib and nerves strongly raised beneath, nerves 13 pairs sub-parallel; petiole $\frac{1}{2}$ in. *Pedicels* $0\text{--}\frac{1}{12}$ in.; bracts and bracteoles sub-similar, $\frac{1}{12}$ in., obovate-oblong, pubescent. *Calyx-tube* nearly glabrous; lobes $\frac{1}{12}$ in., ovate-lanceolate, subobtusely, pubescent. *Petals* $\frac{1}{8}$ in. *Stamens* numerous. *Fruit* $\frac{1}{2}$ by $\frac{1}{6}$ in., rusty, calyx-rim much narrower than the fruit, teeth accrescent. *Embryo* straight.

26. ***S. leiostachya***, *Kurz in Journ. As. Soc.* 1873, pt. ii. 89; leaves oblong acuminate serrulate fulvous-pilose on the midrib and primary nerves beneath, racemes numerous 2–4 in. very narrow nearly glabrous many-flowered. *S. leiostachya*, *Kurz in Journ. As. Soc.* 1877, pt. ii. 239, and *For. Fl.* ii. 144 (as to flowers only).

TENASSERIM; *Helper* (Kew Distrib. n. 3656).

A large tree (*Helper*). *Leaves* $4\frac{1}{4}$ by 1 in., base obtuse or rounded, coriaceous; midrib and nerves impressed above, prominent beneath; petiole $\frac{1}{2}$ in. *Racemes* axillary, and 10–15 crowded at the ends of the branchlets, 20–40-flowered, when young densely spicate; pedicels later sometimes attaining $\frac{1}{2}$ in.; bracteoles $\frac{1}{12}$ in., ovate, glabrous. *Calyx-tube* $\frac{1}{24}$ in., teeth $\frac{1}{16}$ in., ovate, glabrous. *Petals* $\frac{1}{8}$ in. *Stamens* 40. small. *Fruit* not known.—Kurz mistook the fruit of a Nicobar *Symplocos* (*S. Nicobarica*) for that of this species.

27. ***S. nicobarica***, *Clarke*; leaves broadly oblong shortly acuminate serrulate coriaceous nearly glabrous, fruiting racemes 2–3 in. nearly glabrous, fruits ovoid-conic. *S. leiostachya*, *Kurz For. Fl.* ii. 144, partly.

NICOBARS; Kamorta, *Kurz*.

Young branchlets fulvous-hirsute. *Leaves* 5 by $1\frac{1}{2}$ in., base rhomboid, obscurely fulvous-pilose on the midrib beneath; nerves prominently raised beneath, not quite parallel; petiole $\frac{1}{2}$ – $\frac{2}{3}$ in. *Racemes* stout; lower pedicels $\frac{1}{4}$ in. *Fruit* $\frac{1}{2}$ by $\frac{1}{4}$ in., smooth; calyx-rim as wide as the upper part of the fruit, teeth erect. *Embryo* straight.—Flowers not known. From the fruit this appears to be allied to *S. racemosa*, Roxb.

28. ***S. cerasifolia***, *Wall. Cat.* 4434; leaves oblong acute at both ends crenate pilose on the midrib beneath, spikes $1\frac{1}{2}$ in. villous, calyx-teeth large, fruit ellipsoid large. *A. DC. Prodr.* viii. 257.

PENANG; *Wallich. MALACCA*; *Maingay* (Kew Distrib. n. 962).

Branchlets glabrescent. *Leaves* $5\frac{1}{2}$ by $1\frac{1}{2}$ in., coriaceous; nerves very oblique, distant, obscure above, elevated beneath; petiole $\frac{1}{2}$ in. *Spikes* solitary, axillary and crowded, subterminal; bracts $\frac{1}{4}$ in., ovate, very hairy; pedicels 0; bracteoles caducous. *Calyx-tube* $\frac{1}{16}$ in., subglabrous; teeth $\frac{1}{10}$ in., ovate, subacute, pilose. *Petals* $\frac{1}{8}$ in. *Stamens* 30. *Disc* and lower part of style with a few hairs. *Fruit* 1 by $\frac{1}{2}$ in., smooth; calyx-rim $\frac{1}{2}$ in. broad. *Embryo* straight.

29. ***S. rubiginosa***, *Wall. Cat.* 4432; leaves large obovate-oblong acute, nerves parallel much raised beneath, spikes 2 in. silky-villous, fruit ellipsoid small. *A. DC. Prodr.* viii. 257.

PENANG; *Wallich. MALAY PENINSULA*: *Griffith* (Kew Distrib. n. 3652). *MALACCA*; *Maingay* (Kew Distrib. n. 955).

Branchlets rusty-hirsute. *Leaves* $10\frac{1}{2}$ by $4\frac{1}{4}$ in., cuneate at the base, minutely toothed, rubiginous-villous on the nerves beneath, or ultimately glabrous, coriaceous; secondary nerves transverse, subparallel, not strongly reticulated; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Spikes* axillary, subremote; bracts and bracteoles subsimilar, $\frac{1}{2}$ – $\frac{1}{4}$ in., ovate, densely villous. *Calyx* sessile, closely silky-villous, tube $\frac{1}{16}$ in.; lobes $\frac{1}{16}$ in., elliptic, subacute. *Petals* $\frac{1}{2}$ – $\frac{1}{4}$ in. *Stamens* 30. *Disc* and style glabrous. *Fruit* $\frac{1}{3}$ by $\frac{1}{4}$ in., smooth; calyx-rim $\frac{1}{2}$ in. wide, teeth erect. *Embryo* straight.

30. ***S. crassipes***, *Clarke*; leaves large elliptic-lanceolate subtentire glabrous short-petioled, racemes $\frac{1}{2}$ in. rusty-villous.

MALACCA; Mount Ophir, *Maingay* (Kew Distrib. n. 960).

Branchlet glabrous. *Leaves* $6\frac{1}{2}$ by 3 in., base rounded subcordate or obtusely rhomboid, stoutly chartaceous; nerves distinct, distant, irregular, not at all parallel; petiole $\frac{1}{8}$ – $\frac{1}{6}$ in., very thick. *Raceme* 4-flowered, axillary; pedicels hardly $\frac{1}{2}$ in.; bracteoles 3, $\frac{1}{10}$ in., ovate, rufous-villous. *Calyx* rufous-villous, tube $\frac{1}{16}$ in.; teeth $\frac{1}{12}$ in., ovate. *Petals* $\frac{1}{8}$ in. *Stamens* 30. *Ovary* 3-celled; disc minutely fulvous-pilose. *Fruit* unknown.

31. **S. rigida**, *Clarke* (not of *Wall.*); leaves large lanceolate narrowed at both ends subentire coriaceous glabrous, spikes 2 in. pubescent. *Doxomma rigidum*, *Miers* in *Trans. Linn. Soc. ser. ii. Bot. i. 104*. *Barringtonia rigida*, *Clarke* in *Hook. f. Fl. Brit. Ind. ii. 510*.

MALACCA; *Maingay* (Kew Distrib. n. 767, 965).

A large tree (*Maingay*); branchlets glabrous. *Leaves* 12 by $3\frac{1}{2}$ in., early glabrate; nerves 13 pairs, much elevated beneath, subparallel; petiole $1\frac{1}{2}$ in. *Spikes* approximated among the penultimate leaves of the branch, erect, ultimately thick rigid; bracts and bracteoles similar, $\frac{1}{4}$ in., ovate, densely grey hairy without. *Calyx-tube* $\frac{1}{15}$ in., glabrescent; teeth $\frac{1}{10}$ in., ovate, densely grey hairy. *Petals* $\frac{1}{8}$ in. *Stamens* 60. *Disc* glabrous. *Fruit* (imperfectly ripe) nearly 1 by $\frac{1}{2}$ in., oblong-ellipsoid; calyx-rim $\frac{1}{6}$ in. wide, teeth erect.—There may still be a doubt whether *Doxomma rigidum* (*Maingay*, n. 767) is the fruiting state of *Symlocos* sp. (*Maingay*, n. 965) in good flower; the petioles are longer, the fruiting spike extraordinarily thickened; but it is the fruit either of *Maingay*, n. 965, or some closely allied species.

*** *Species of the Deccan Peninsula* (see also 12. *S. racemosa*).

32. **S. monantha**, *Wight* *Ic. t. 1236*; leaves lanceolate acute or acuminate at both ends glabrous, flowers solitary axillary sessile or very shortly pedicelled. *Bedd. For. Man. 150*.

SHEVAGHERRY HILLS; *Wight*. TINNEVELLY Mts.; *Beddome*.

A leafy, very ramous shrub (*Wight*); branchlets soon glabrate. *Leaves* $1\frac{3}{4}$ by $\frac{2}{3}$ in., base cuneate or subobtusely, subentire or minutely toothed, nerves inconspicuous; petiole $\frac{1}{6}$ in. *Peduncles* $0\frac{1}{10}$ in.; bracteoles small, sometimes numerous. *Calyx-tube* $\frac{1}{20}$ in., minutely tomentose, teeth $\frac{1}{20}$ in., elliptic. *Petals* $\frac{1}{3}$ in., or more. *Stamens* 40. *Disc* minutely hairy. *Fruit* not seen.

33. **S. anamallayana**, *Bedd. Ic. Pl. Ind. Or. t. 116*, and *For. Man. 150*; leaves broadly elliptic subobtusely glabrous, flowers solitary peduncled. *S. uniflora*, *Bedd. in Trans. Linn. Soc. xxv. 219*, not of *Benth.*

ANAMALLAYS, alt. 5–6000 ft.; *Beddome*.

A small tree (*Beddome*); glabrous or the margins of the calyx-lobes minutely pubescent. *Leaves* $1\frac{3}{4}$ by 1 in., base obtuse or rounded, serrulate, rigidly chartaceous; nerves distant, secondary distinctly reticulated; petiole $\frac{1}{8}$ – $\frac{1}{6}$ in. *Peduncles* $\frac{1}{4}$ – $\frac{1}{2}$ in., slender, solitary (or, ex *Beddome*, sometimes 2–3 together) in axils; bracts 0; bracteoles $\frac{1}{8}$ in., lanceolate, caducous, at the base of the calyx-tube. *Calyx-tube* $\frac{1}{16}$ in.; teeth $\frac{1}{24}$ in., triangular. *Petals* $\frac{1}{6}$ in. *Stamens* 40. *Disc* glabrous. *Fruit* not seen.

34. **S. microphylla**, *Wight* *Ic. t. 1232*; leaves elliptic obtuse or scarcely acute serrulate almost glabrous, spikes very short dense fulvous-villous, disc and style pilose. *Bedd. For. Man. 150*.

NILGHERRIES; *Gardner*; *Avalanche*, *Wight*.

A ramous bush, 6 ft. high (*Wight*); branchlets rufous-villous. *Leaves* attaining $2\frac{1}{2}$ by $1\frac{1}{2}$ in. (in *Wight*'s examples), obtuse at the base, rigidly coriaceous, adpressedly fulvous pilose on the midrib beneath or glabrate; primary nerves 8 pairs, strong, reticulations distinct; petiole $\frac{1}{4}$ in. *Spikes* $\frac{1}{4}$ – $\frac{3}{4}$ in.; bracts $\frac{1}{4}$ in., ovate, fulvous-villous. *Calyx* nearly glabrous, tube $\frac{1}{16}$ in., lobes $\frac{1}{12}$ in., ovate. *Petals* $\frac{1}{8}$ – $\frac{1}{2}$ in. *Stamens* 50. *Style* sparsely fulvous-pilose; disc shortly closely pilose. *Fruit* not known.

35. **S. macrocarpa**, *Wight ms.*; leaves oblong narrowed at both ends glabrous, spikes short dense rusty-pubescent, calyx-tube pubescent, fruit large long-ellipsoid.

SOUTH DECCAN PENINSULA; Courtallum, *Wight, herb*, nn. 467, 469.

Branchlets stout, rusty. *Leaves* attaining 8 by $2\frac{1}{2}$ in., slightly crenulate, chartaceous; primary nerves 9 pairs, conspicuous but not thick, secondary nerves distinct beneath; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Spikes* $\frac{1}{2}$ – $1\frac{1}{2}$ in., stout; bracts $\frac{1}{2}$ in., spatulate obovate, rusty-pubescent; flowers crowded. *Calyx-tube* $\frac{1}{10}$ in., teeth more than $\frac{1}{2}$ in., lanceolate. *Petals* $\frac{1}{2}$ in. *Stamens* 40. *Disc* and style glabrous or nearly so. *Fruit* $1\frac{1}{4}$ by $\frac{3}{4}$ in., smooth, round; calyx-rim $\frac{1}{2}$ in., broad, teeth patent.—Examples in young fruit may be distinguished from *S. Beddomei* by the short stout spikes, and the shorter petioles.

36. **S. Gardneriana**, *Wight Ic. t.* 1231; leaves elliptic cuneate at both ends villous beneath, nerves numerous strong subparallel, calyx-tube densely hairy, fruits hairy. *Bedd. Fl. Sylv. t.* 237.

SOUTH MALABAR MTS., alt. 4–7500 ft.; Nilgherries, Travancore, Anamallays, &c., frequent.

A small tree; branchlets thick, villous. *Leaves* $4\frac{1}{2}$ by 2 in., slightly crenulate, coriaceous; nerves 10 pairs; petiole $\frac{1}{2}$ in., stout, rusty-villous. *Spikes* 2 in., stout fulvous-villous; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., ovate, densely villous, caducous; flowers sessile or the lower pedicels attaining $\frac{1}{2}$ in. *Calyx-tube* $\frac{1}{12}$ in., teeth $\frac{1}{2}$ in., oblong, densely silky. *Petals* $\frac{3}{8}$ – $\frac{1}{2}$ in., round. *Stamens* 60. *Disc* shortly densely villous. *Fruit* $\frac{1}{2}$ – $\frac{3}{4}$ in., cylindric, densely villous; calyx-rim $\frac{1}{2}$ in. wide, teeth patent.—Easily distinguished by the very hairy fruit. *Beddome's* figure represents the fruit of *Gardneriana*, but the leaves of a plant since sent to Kew as a new species. This latter has leaves more rounded at the base and more acute bracts than *S. Gardneriana*.

37. **S. Hohenackeri**, *Clarke*; leaves elliptic cuneate at both ends villous beneath, nerves numerous strong subparallel, calyx-tube glabrous. *Eriobotryæ* vel *Photiniæ* affinis, *Miq. in Pl. Hohenack.* n. 456.

MERCARA in CANARA, *Hohenacker*.

Hohenacker's example (in flower) resembles *S. Gardneriana* in every point but the conspicuously glabrous calyx-tube, the calyx-teeth being densely silky. It has hence been supposed a simple-spiked var. of *S. kurgensis*, n. 11; but it so closely resembles *S. Gardneriana* that further material may show it a mere variety thereof.

38. **S. Beddomei**, *Clarke*; leaves elliptic or oblong narrowed at both ends gland-serrulate glabrous, spikes long fulvous-villous, calyx-tube glabrous teeth sparsely pilose, fruit ovoid. *S. reticulata*, *Grah. Cat. Bomb. Pl.* 104. *Symplocos* sp., *Herb. Wight*, n. 62. *Hopea racemosa*, *Dalz. & Gibs. Bomb. Fl.* 140.

WESTERN GHATS; from the Concan to Kurg, frequent.

Perhaps only a variety of *S. racemosa*; but the leaves are less coriaceous, the nerves more numerous (9 pairs), more distinct, the crenatures stronger, the inflorescence spicate, scarcely racemose; but the greatest difference is in the fruit, which is ovoid, $\frac{1}{2}$ by $\frac{1}{2}$ in. (that of *S. racemosa* is much narrower, not wider towards the base).

VAR. *glabrata*; flowering spikes nearly glabrous, fruit subcylindric. *Symplocos*, n. 32, *Herb. Ind. Or. Hk. f. & T.*—Kurg; *G. Thomson*.—Leaves glabrous from the bud; calyx-teeth glabrous; lower pedicels in fruit attaining $\frac{1}{2}$ in.; fruits $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{2}$ in.

VAR. *flagellaris*; spikes in young fruit $5\frac{1}{2}$ in. long slender wavy, otherwise as var. *glabrata*.—Bombay Presidency; *Dalzell*.

39. **S. foliosa**, *Wight Ic. t.* 1234; leaves elliptic or oblong serrulate from the base glabrous, spikes fulvous-villous, calyx-tube glabrous. *S. nervosa*, *Wight Ic. t.* 1235; *Bedd. For. Man.* 149, not of *A. DC.*

NILGHERRIES, alt. 5-7500 ft.; *Wight, Gardner, Hohenacker* common about Ootacamund, *Beddome*.

A large tree (*Beddome*); branchlets soon glabrate. *Leaves* $8\frac{1}{2}$ by $1\frac{1}{2}$ - $1\frac{1}{2}$ in., acuminate or shortly acute, base cuneate or obtuse; serratures regular, close; nerves 9 pairs, prominent beneath; petiole $\frac{1}{2}$ in. *Spikes* $1-1\frac{1}{2}$ in.; bracts caducous. *Calyx-tube* $\frac{1}{10}$ in., teeth $\frac{1}{10}$ in., oblong, glabrous or sparsely pilose. *Petals* $\frac{1}{2}$ in. *Stamens* 40. *Disc* and style glabrous. *Fruit* $\frac{1}{2}$ by $\frac{1}{2}$ in., broadly cylindric, smooth; calyx-rim scarcely $\frac{1}{2}$ in. wide.—Distinguished from all other Indian species by the leaves being serrulate from the very base. The examples marked by *Wight* *S. nervosa* are identical with those marked by him *S. foliosa*, as *Beddome* divined; but *Wight's S. nervosa* is not *DeCandolle's* (as *Beddome* presumed), and the name *S. nervosa* has been so misapplied that the undisputed one of *S. foliosa* is adopted here for this well-marked species.

40. *S. rosea*, *Bedd. in Trans. Linn. Soc.* xxv. 219; leaves elliptic-oblong sharply acuminate serrate glabrous, racemes 1-3 in. very hairy as is the calyx, flowers rose-coloured, fruit puberulous. *Bedd. Ic. Pl. Ind. Or.* t. 115, and *For. Man.* 150.

ANAMALLAYS, alt. 2-4000 ft., *Beddome*.

A large shrub; young branches petioles and inflorescence hairy. *Leaves* 5-8 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in.; petiole $\frac{1}{2}$ in. *Bracts* deciduous. *Calyx-lobes* acute, half as long as the corolla. *Fruit* $\frac{1}{2}$ in., oblong.—Description copied from *Beddome*.

VAR. *glabrior*; calyx-tube glabrous, fruit glabrous. *S. racemosa*, *Herb. Wight, not of Roxb.*—Courtallum and Cochin; *Wight*.—*Leaves* obovate-lanceolate, chartaceous; nerves 6-7 pairs, slender, distinct not parallel. *Pedicels* (in fruit) $\frac{1}{2}$ in. *Calyx-rim* (in fruit) nearly $\frac{1}{2}$ in., wide (as wide as the summit of the fruit). *Wight's* examples fit *Beddome's* picture so well, that this is probably not even a variety.

41. *S. acuminata*, *Bedd. Ic. Pl. Ind. Or.* t. 117, and *For. Man.* 150; leaves obovate-lanceolate acuminate glabrous, racemes slender few-flowered slightly hairy, calyx glabrous, flowers $\frac{1}{2}$ in. diam.

MALABAR; Wynaad, very common on the Brumagherries, alt. 6000 ft., and on the Tirriroot Peak, *Beddome*.

A small tree, or large shrub; young shoots, peduncles and bracts minutely hairy, otherwise quite glabrous. *Leaves* 4 by $1\frac{1}{2}$ - $1\frac{3}{4}$ in., base attenuated, subentire. *Racemes* 1-2 in.; pedicels $0-\frac{1}{10}$ in. *Calyx-lobes* rounded or subacute, half as long as the corolla.—Not seen; description taken from *Beddome*.

42. *S. pulchra*, *Wight Ic.* t. 1230 (*not good*); leaves oblong acuminate brown-hirsute on both surfaces, racemes 1-2 in., flowers 1-4 large. *Bedd. For. Man.* 149.

NILGHERRIES; Sispara Ghat, alt. 3-4000 ft., *Gardner, Wight, Beddome*.

A shrub; branches densely fulvous-hirsute. *Leaves* $4\frac{1}{2}$ by $1\frac{3}{8}$ in., base rounded, denticulate, chartaceous; nerves 7 pairs, distinct, very oblique; petiole $\frac{1}{2}$ - $\frac{1}{4}$ in. *Peduncles* patently rufous-hirsute; pedicels $0-\frac{1}{2}$ in.; bracteoles $\frac{1}{2}$ - $\frac{1}{2}$ in., linear, hirsute. *Calyx-tube* $\frac{1}{10}$ in., sparsely pilose; teeth $\frac{1}{8}$ in., ovate, glabrescent. *Petals* $\frac{1}{2}$ - $\frac{1}{2}$ in., elliptic. *Stamens* 50-60. *Disc* densely pilose.—*Wight's* figure omits the thick, long, spreading brown hairs of the branches, leaves, and peduncles; it is hence very likely to mislead.

43. *S. obtusa*, *Wall. Cat.* 4424; glabrous, leaves obovate-elliptic obtuse subentire coriaceous, spikes 1-4 in., flowers large. *A. DC. Prodr.* viii. 255; *Wight Ic.* t. 1233, and *Ill.* t. 151 b.; *Thwaites Enum.* 185; *Bedd. For. Man.* 149.

SOUTH MALABAR; Nilgherries and Anamallays, alt. 5-8000 ft., common. CEYLON; alt. 5-8000 ft., frequent.

A tree. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$ in., or larger (attaining 7 by $3\frac{1}{2}$ in. in some Ceylon varieties),

base attenuated, margin often reflexed; nerves distant, irregular, distinct beneath; petiole long, often $\frac{1}{2}$ in. in the small-leaved varieties. *Bracts* caducous; pedicels 0, or (rarely) $\frac{1}{10}$ in. *Calyx-tube* $\frac{1}{10}$ in., teeth $\frac{1}{12}$ in., round, prominent. *Petals* $\frac{1}{2}$ in. *Stamens* 50–60. *Disc* glabrous. *Fruit* $\frac{1}{2}$ by $\frac{1}{4}$ in., ovoid-cylindric, smooth; calyx-rim $\frac{1}{5}$ in., broad, teeth prominent.—The varieties enumerated by Thwaites do not differ much from the type, but vary greatly as to the size of the leaves.

**** *Species of Ceylon* (see also n. 43. *S. obtusa*).

44. ***S. læta***, Thwaites Enum. 184; glabrous, leaves elliptic-lanceolate acute at both ends, spikes 1–2 $\frac{1}{2}$ in. *Bedd. For. Man.* 151.

CEYLON; elevated parts of the Central Province, Thwaites.

A tree. *Leaves* 2 by $\frac{3}{4}$ in., minutely toothed. *Spikes* often peduncled; bracts small, caducous; bracteoles 0; lower pedicels 0, rarely 0– $\frac{1}{10}$ in. *Calyx-lobes* $\frac{1}{16}$ in., round. *Petals* $\frac{1}{4}$ – $\frac{1}{5}$ in. *Stamens* 30. *Fruit* more than $\frac{1}{4}$ in., ellipsoid.—Otherwise resembling *S. obtusa*, from which it differs in its acute leaves and smaller flowers.

VAR. *pedicellata*; pedicels longer, attaining sometimes $\frac{1}{3}$ in.—Ceylon; Thwaites, n. 165.

45. ***S. bractealis***, Thwaites Enum. 185; glabrous, leaves elliptic-oblong scarcely acute, spikes 1–2 in., bracts ovate glabrous ciliate, bracteoles large persistent. *Bedd. For. Man.* 151.

CEYLON; elevated parts of the Central Province, Walker, Thwaites.

A tree. *Leaves* 2 by 1 in., base obtuse or subacute, closely minutely serrulate, coriaceous; nerves 6 pairs, prominent beneath, secondary distinct; petiole $\frac{1}{2}$ in. Rhachis of the *spike* glabrous or sparingly fulvous-pilose. *Bracts* $\frac{1}{4}$ in. and upwards; bracteoles $\frac{1}{6}$ in., sometimes persistent under the ripe fruit. *Calyx-tube* $\frac{1}{16}$ in., lobes $\frac{1}{12}$ in., round. *Petals* $\frac{1}{2}$ in., obovate. *Stamens* 60. *Disc* glabrous. *Fruit* $\frac{1}{2}$ by $\frac{1}{2}$ in., ellipsoid, narrowed at both ends.

VAR. *revoluta*, Wight & Gardner; leaves exceedingly coriaceous, margins revolute.—Ceylon.

46. ***S. versicolor***, Clarke; glabrous, leaves oblong acuminate at both ends subentire chartaceous, spikes 1–2 in., bracts and bracteoles small glabrous ciliate. *S. rufescens*, Thwaites Enum. 184; *Bedd. For. Man.* 150, not of H. B. K.

CEYLON; Ambagamowa District, Thwaites.

Branchlets when young glabrous; reddish when dried. *Leaves* 4 by 1 $\frac{1}{2}$ in., drying with red blotches; nerves distant, indistinct; petiole $\frac{1}{2}$ in. *Spikes* glabrous; bracts $\frac{1}{2}$ in., ovate, deciduous; bracteoles $\frac{1}{16}$ in., oblong, more ciliate, subsistent. *Calyx-tube* $\frac{1}{16}$ in., glabrous, teeth $\frac{1}{16}$ in., scarcely ciliate on the margin. *Petals* $\frac{1}{2}$ in. *Fruit* unknown. Probably allied to the two preceding rather than to *S. spicata* as Thwaites supposed.

47. ***S. acuta***, Thwaites Enum. 186; leaves elliptic-lanceolate acuminate subentire glabrescent except the nerves beneath, racemes small villous, calyx glabrous with rounded lobes. *Bedd. For. Man.* 151.

CEYLON; Saffragam District, alt. 2000 ft., Thwaites (C.P. 2681, partly).

A tree; young branches fulvous-villous at the tips. *Leaves* 3 $\frac{1}{2}$ by 1 $\frac{1}{2}$ in., base cuneate or subobtusate, adpressedly fulvous-pilose on the nerves beneath, coriaceous; nerves 8 pairs, obscure above, strongly raised beneath; petiole $\frac{1}{2}$ in. *Racemes* $\frac{1}{4}$ –1 in.; bracts $\frac{1}{2}$ in., ovate, fulvous-pilose, deciduous; pedicels $\frac{1}{10}$ in.; bracteoles $\frac{1}{12}$ in., lanceolate, ciliate. *Calyx-tube* $\frac{1}{24}$ in., teeth $\frac{1}{10}$ in., scarcely pubescent on the margins. *Petals* $\frac{1}{2}$ in. *Fruit* unknown; that described by Thwaites belongs to *S. cuneata* (mixed with C.P. 2681)

48. ***S. cuneata***, Thwaites Enum. 186; leaves elongate-lanceolate at-

tenuate at both ends subentire glabrous except the nerves beneath, racemes small villous, calyx densely silky with oblong lobes.

CEYLON; *Moon*; Pasdoon Corle at no great elevation, *Thwaites* (C.P. 2920 and part 2681).

A tree; branchlets fulvous-villous. *Leaves* $5\frac{1}{2}$ by $1\frac{1}{4}$ in., adpressedly fulvous-pilose on the nerves beneath, coriaceous; nerves 8 pairs, obscure above, strongly raised beneath; petiole $\frac{1}{4}$ in. *Racemes* 1 in.; bracts $\frac{1}{2}$ in., ovate, deciduous; pedicels $\frac{1}{12}$ in.; bracteoles $\frac{1}{12}$ in., ovate. *Calyx-tube* $\frac{1}{10}$ in., teeth $\frac{1}{8}$ in. *Corolla* not seen. *Disc* and style glabrous. *Fruit* $\frac{1}{2}$ by $\frac{1}{8}$ in., long-cylindric, softly villous; calyx-rim as wide as the upper part of the fruit; teeth enlarged, $\frac{3}{8}$ – $\frac{1}{2}$ in. long, lanceolate.

49. ***S. hispidula***, *Thwaites Enum.* 186; leaves oblong-elliptic acuminate hispid beneath, racemes 1–4 in., bracts ovate hispid, calyx-tube and fruit softly hairy. *Bedd. For. Man.* 151. *S. subcordata*, *Wight ms.*

CEYLON; alt. 3–5000 ft., *Wight, Walker, Thwaites.*

A tree; branchlets with patent, fulvous, bristly hairs. *Leaves* $3\frac{1}{2}$ by 2 in., from cuneate-oblong acuminate to cordate-orbicular shortly acute, obscurely crenate, fulvous-hirsute or glabrate above, patently hispid at least on the nerves beneath; nerves 7 pairs; petiole $\frac{1}{10}$ – $\frac{1}{4}$ in., usually short. *Racemes* lax, irregular; bracts $\frac{1}{2}$ in., hispid; pedicels 0– $\frac{1}{8}$ (rarely $\frac{1}{4}$) in.; bracteoles $\frac{1}{2}$ in., subacute, hispid. *Calyx-tube* $\frac{1}{10}$ in., lobes $\frac{1}{10}$ in., ovate, obtuse, glabrescent upwards. *Petals* $\frac{1}{2}$ in., round. *Stamens* 50. *Disc* hairy. *Fruit* $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{8}$ in., cylindric; calyx-rim as wide as the fruit, teeth enlarged, lanceolate, suberect.—Readily separated from the neighbouring Ceylon species by the hairy fruit; but may be only a form of *S. pulchra*.

50. ***S. jucunda***, *Thwaites Enum.* 186; leaves cordate-oblong attenuate subentire rufous-hirsute beneath, racemes $1\frac{1}{2}$ in. rufous-hirsute, bracts linear rufous-hirsute, calyx-tube and fruit pilose. *Bedd. For. Man.* 151.

CEYLON; Deltotte and Saffragam, alt. 3–4000 ft., *Thwaites.*

A tree; branchlets densely patently rufous-hirsute. *Leaves* $3\frac{1}{4}$ by $1\frac{1}{4}$ in., tapering from near the base, chartaceous, glabrous above; primary nerves 9 on each side the midrib, springing nearly at right angles therefrom; petiole $\frac{1}{8}$ – $\frac{1}{6}$ in. *Fruit* $\frac{1}{2}$ in., cylindric (*Thwaites*).—Nearly allied to *S. hispidula*, *Thwaites*, but differs in the nervation of the leaves and the linear bracts.

51. ***S. angustata***, *Clarke*; leaves small oblong-lanceolate acuminate entire adpressedly fulvous-pilose on the nerves beneath, racemes 1–2 $\frac{1}{2}$ in. fulvous-pilose very slender, calyx glabrous. *S. elegans* var. *angustata*, *Thwaites Enum.* 186, partly.

CEYLON; Newera Ellia, *Macrae*; Jatagama, *Thwaites* (C.P. 78).

Branchlets adpressedly shortly rufous-pilose. *Leaves* 2 by $\frac{2}{3}$ in., acute, base obtuse or rounded, glabrous except the nerves beneath, coriaceous; nervation irregular, not prominent; petiole $\frac{1}{8}$ – $\frac{1}{6}$ in. *Racemes* sometimes slightly compound; bracts $\frac{1}{16}$ in.; pedicels 0– $\frac{1}{8}$ in.; bracteoles $\frac{1}{16}$ in., hairy, persistent. *Calyx-tube* $\frac{1}{16}$ in., teeth $\frac{1}{16}$ in., round. *Petals* $\frac{1}{8}$ in. *Fruit* $\frac{1}{3}$ by $\frac{1}{8}$ in., ovoid-cylindric smooth; calyx-rim nearly as wide as the upper part of the fruit, teeth somewhat enlarged, suberect.

52. ***S. latiflora***, *Clarke*; leaves oblong acuminate serrulate hispid on the nerves beneath, racemes $\frac{1}{2}$ – $1\frac{1}{2}$ in. villous bracteate, calyx-tube glabrous, flowers large. *S. hirsuta*, *Wight & Gardn. in Thwaites Enum.* 185, excl. var. β ; not of *A. DC.*

CEYLON; alt. 5–8000 ft., *Walker, Gardner, Thwaites.*

A tree; branchlets fulvous-hispid. *Leaves* $3\frac{1}{4}$ by 1 in., base obtuse or rounded, serrulate nearly to the base, chartaceous; nerves 7 pairs, irregular; petiole $\frac{1}{4}$ in. *Bracts* $\frac{1}{2}$ in., ovate, villous; pedicels 0– $\frac{1}{10}$ in.; bracteoles $\frac{1}{10}$ in., ovate, villous. *Calyx-tube* $\frac{1}{12}$ in., teeth $\frac{1}{10}$ in., round. *Petals* $\frac{1}{2}$ in., round. *Stamens* 80–100. *Disc* and

style glabrous. *Fruit* $\frac{1}{4}$ by $\frac{1}{8}$ – $\frac{1}{5}$ in., ellipsoid, smooth; calyx-rim scarcely $\frac{1}{10}$ in., broad; lobes $\frac{1}{2}$ in., patent.

53. **S. minor**, *Clarke*; leaves small elliptic subobtusely serrulate hispid on the nerves beneath, racemes $\frac{1}{2}$ – $1\frac{1}{2}$ in. patently fulvous-hirsute, calyx-tube glabrous. *S. hirsuta*, *Thwaites Enum.* 185, var. β minor, mostly. *S. elegans*, *Thwaites l. c.*, var. β , partly.

CEYLON; *Macrae*, *Walker*, *Gardner*, *Thwaites* (C.P. 273, 155).

Leaves $1\frac{1}{4}$ by $\frac{3}{4}$ in., obtuse or very suddenly acute, base rounded, coriaceous, margin recurved, nervation strong beneath. *Bracts* caducous. *Fruit* $\frac{1}{2}$ by $\frac{1}{5}$ in., cylindric smooth; calyx-rim as wide as the top of the fruit.—Allied to *S. latiflora*, and treated as a variety of it by *Thwaites*, but there are no examples intermediate between the two forms.

VAR. *eugenioides*, *Champ. ms.*; branchlets adpressedly fulvous-pilose at the tips only, leaves very small glabrous or nearly so, racemes scarcely $\frac{1}{2}$ in. long 1–2- (rarely 4-) flowered nearly glabrous.—Ceylon, *Walker*; Horton Plains, *Champion*.

VAR. *glabrescens*, *Thwaites ms.*; branchlets early glabrous, leaves coriaceous, racemes short few-flowered densely fulvous-villous.—Ceylon; Central Provinces, alt. 6000 ft., *Thwaites*.—Resembles *S. microphylla*. Placed with *S. minor* by *Thwaites*, but differs in the glabrousness of the leaves, and dense fulvous hairy spikes.

54. **S. elegans**, *Thwaites Enum.* 185, var. *a only*; leaves broadly elliptic acutely acuminate adpressed rufous-hirsute on the midrib beneath, racemes $\frac{1}{2}$ – $1\frac{1}{2}$ in. slender rufous-hairy, calyx glabrous. *Bedd. For. Man.* 151.

CEYLON; alt. 5–7000 ft., *Champion*, *Thwaites*.

Possibly a var. of *S. latiflora*, *Clarke*. *Leaves* 2 by 1 in., base rounded, slightly crenate-serrate. *Racemes* more slender, bracts narrower, flowers smaller than in *S. latiflora*.

55. **S. hebantha**, *Thwaites ms.*; leaves elliptic acuminate subentire glabrescent, spikes 1–3 in. densely villous, calyx-tube glabrous teeth silky.

CEYLON; Songalla, *Thwaites* (C.P. 3918).

Branchlets villous. *Leaves* $3\frac{1}{2}$ by 2 in., base rounded, coriaceous, sparsely pilose on the nerves beneath; nerves 7 pairs, conspicuous beneath, sub-parallel; petiole $\frac{2}{3}$ in. *Spikes* stout, dense; bracts more than $\frac{1}{4}$ in., ovate, densely hairy.—This may be a Ceylon form of *S. Beddomei*; but differs in the leaves rounded at the base, less crenate.

56. **S. cordifolia**, *Thwaites Enum.* 187; leaves large cordate elliptic nearly sessile glabrous, spikes stout densely villous crowded near the ends of the branches, calyx-tube glabrous teeth villous. *Bedd. For. Man.* 151.

CEYLON; alt. 6–7000 ft., *Macrae*, &c.

A tree; branchlets thick. *Leaves* 6 by $2\frac{1}{2}$ in. (sometimes much larger), scarcely acute, rounded or attenuate at the base but always cordate at the petiole, minutely denticulate, coriaceous; nerves 13 pairs, distinct beneath; petiole $0\frac{1}{2}$ in. *Spikes* 2–4 in., often 8–12 quasi-fasciculate at the ends of the branches; bracts $\frac{1}{4}$ – $\frac{1}{3}$ in., ovate, villous. *Calyx-tube* $\frac{1}{10}$ in., teeth $\frac{1}{2}$ in. *Petals* $\frac{1}{4}$ in., elliptic. *Stamens* 60. *Disc* hairy. *Fruit* $\frac{1}{2}$ by $\frac{1}{4}$ in., cylindric; calyx-teeth enlarged, triangular, densely hairy.

57. **S. apicalis**, *Thwaites Enum.* 187; leaves large obovate-lanceolate acuminate glabrous, spikes 1–2 in. hirsute, calyx-tube hairy. *Bedd. For. Man.* 151.

CEYLON; *Moon*; Reigam Corle and between Ratnapoora and Galle at no great elevation, *Thwaites*.

Subarboreous (*Thwaites*); branchlets hairy, afterwards nearly glabrous. *Leaves* clustered at the end of the branchlets or the lower sometimes whorled, 13 by 5 in.,

base attenuated, sometimes very shortly cordate at the petiole, nearly entire, stoutly chartaceous; nerves 13 pairs, prominent beneath; petiole $\frac{1}{10}$ – $\frac{1}{2}$ in. Bracts $\frac{1}{2}$ in., ovate, black-hirsute, subpersistent. Fruit more than $\frac{1}{2}$ by $\frac{1}{5}$ in., cylindric, villous finally glabrescent; calyx-rim as wide as the fruit, teeth $\frac{1}{2}$ in., triangular, acute, suberect, villous.

58. **S. marginalis**, *Thwaites Enum.* 187; leaves elliptic acute coriaceous densely ferruginous-hirsute on the nerves beneath, spikes 3–6 in. densely ferruginous-hirsute, calyx-tube and young fruit densely ferruginous-hirsute. *Bedd. For. Man.* 151.

CEYLON; Ambagamowa District, *Thwaites*.

A tree; branchlets stout, densely ferruginous-hirsute. Leaves 6 by 3 in., base obtuse or rounded, subentire, rugose, glabrous above; nerves 13 pairs, very prominent and thick beneath; petioles $\frac{1}{4}$ – $\frac{1}{2}$ in. Spikes very stout; bracts deciduous. Disc villous. Fruits (half-ripe) $\frac{1}{2}$ by $\frac{1}{4}$ in., ellipsoid; calyx-teeth $\frac{1}{5}$ in., elliptic.

59. **S. coronata**, *Thwaites Enum.* 187; leaves large oblong or elliptic narrowed at both ends serrulate fulvous-villous on the nerves beneath, spikes 1–3 in. fulvous-villous, calyx-tube and young fruit softly villous. *Bedd. For. Man.* 152.

CEYLON; alt. 2–4000 ft., *Macrae*, &c.

A tree. Leaves attaining 12 by $3\frac{1}{2}$ in., attenuate downwards but shortly cordate at the petiole, closely but minutely serrulate, coriaceous; nerves 13 pairs, much elevated beneath, reticulations very prominent beneath; petiole $\frac{1}{2}$ – $\frac{1}{4}$ in. Spikes dense with flowers nearly to their base; bracts $\frac{1}{2}$ in., ovate, villous, subpersistent. Calyx-tube $\frac{1}{16}$ in.; teeth $\frac{1}{10}$ in., oblong, densely silky. Petals $\frac{1}{5}$ in., appear to have been red or purple. Stamens 50. Fruit (half-ripe) $\frac{1}{2}$ by $\frac{1}{4}$ in., ovoid, hairy; calyx-teeth $\frac{1}{2}$ in., suberect.

VAR. *obovata*; leaf 7 by $4\frac{3}{4}$ in. broadly obovate.—Ceylon.

SUBGENUS II. **Ciponima** (including **CORDYLOBLASTE**). Petals distinctly connate, tube often elongate; flower-buds obovate-oblong or clavate. Filaments adnate to the corolla throughout the tube, and often produced as a free tube. Calyx-tube produced much above the ovary, free, with short lobes.

60. **S. pendula**, *Wight Ic. t.* 1237; glabrous, leaves elliptic subentire, peduncles $\frac{1}{2}$ – $\frac{1}{3}$ in. 1-flowered pendulous in bud, corolla-tube $\frac{1}{2}$ in. *Bedd. For. Man.* 152.

MALABAR and TRAVANCORE MTS.; alt. 4–6000 ft., common, *Wight*, *Beddome*.

A tree. Leaves $2\frac{1}{2}$ by 1 in., obtuse, base cuneate, coriaceous; nerves irregular, distinct beneath; petiole $\frac{1}{5}$ in. Peduncles solitary or 1–3 together; bracteoles $\frac{1}{4}$ in., minutely ciliate. Calyx-tube $\frac{1}{2}$ in., lobes scarcely $\frac{1}{24}$ in. Corolla in bud $\frac{1}{3}$ in. Stamens 40–60; no free staminal tube. Disc and style glabrous. Fruit not seen.

61. **S. pauciflora**, *Wight ms.*; nearly glabrous, leaves elliptic subentire, peduncles $\frac{1}{4}$ – $\frac{3}{4}$ in. 1-flowered always erect, corolla-tube $\frac{1}{2}$ in. *S. pendula*, *Thwaites Enum.* 184.

CEYLON; *Wight*, &c.; alt. 5–8000 ft., abundant, *Thwaites*.

Perhaps only a Ceylon form of *S. pendula* as *Thwaites* supposes, but the peduncles are always much longer and slenderer, at no time pendulous, often several-flowered with very long pedicels, not rarely rusty-pubescent. Fruit (unripe) $\frac{1}{2}$ by $\frac{1}{2}$ in., cylindric, curved.

62. **S. sessilis**, *Clarke*; glabrous, leaves obovate-oblong obtuse subentire, flowers solitary sessile or subsessile erect, corolla-tube $\frac{1}{2}$ in.

TRAVANCORE MTS., *Beddome*.

Differs from *S. pendula* in the erect, smaller flowers; from *S. pauciflora* in the

want of peduncles; considered a var. of *S. pendula* by Beddome (*For. Man.* 152), but ranked as a species by Benth. (*Gen. Pl.* ii. 669).

63. **S. Henscheli**, *Benth. in Gen. Pl.* ii. 669; leaves elliptic-oblong narrowed at both ends subentire ultimately nearly glabrous, racemes small ashy silky, corolla-tube $\frac{1}{8}$ – $\frac{1}{4}$ in. subglabrous. *Cordyloblaste Henscheli, Moritzi in Bot. Zeit.* 1848, 606.

MALACCA; Mt. Ophir, *Griffith* (Kew Distrib. n. 3644), *Lobb.*

Branchlets sparsely pilose. *Leaves* 4 by $1\frac{3}{4}$ in., sometimes obscurely pubescent beneath, coriaceous; nerves irregular, indistinct; petiole $\frac{1}{4}$ in. *Racemes* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., 1–5-flowered; bracts minute; pedicels 0– $\frac{1}{8}$ in. *Calyx-tube* $\frac{1}{8}$ in., grey-silky, lobes scarcely $\frac{1}{24}$ in. *Corolla* in bud $\frac{1}{8}$ by $\frac{1}{8}$ in. *Stamens* 40–60; staminal tube $\frac{1}{10}$ in., free. *Disc* villous; style $\frac{1}{3}$ – $\frac{1}{2}$ in., glabrous, stigma large capitate. *Fruit* not seen.

VAR. *hirtistylis*; flowers rather larger, style hirsute.—Mt. Ophir; *Maingay* (n. 2586, herb. prop.).

64. **S. Maingayi**, *Benth. in Gen. Pl.* ii. 669; leaves elliptic narrowed at both ends sparsely pubescent beneath, racemes dense ferruginous hairy, corolla-tube 1 in. silkily white-tomentose without.

MALACCA; *Maingay* (Kew Distrib. n. 961).

Branchlets stout, rusty-hirsute. *Leaves* $4\frac{1}{2}$ by 2 in., subentire, coriaceous; nerves irregular, indistinct; petiole $\frac{1}{4}$ in. *Racemes* 1 in., stout; bracts $\frac{1}{2}$ in., ovate, ferruginous-hairy; pedicels 0– $\frac{1}{2}$ in.; bracteoles minute. *Calyx-tube* $\frac{1}{2}$ in., hairy, teeth $\frac{1}{10}$ in. *Corolla-tube* narrow, glabrous within; lobes $\frac{1}{2}$ in., elliptic. *Stamens* 40–60, staminal tube $\frac{1}{2}$ in., free, dividing into 20 ligulate lobes. *Disc* and style hairy. *Ovary* 3–5-celled with 1 pendulous ovule in each cell (*Maingay*). *Fruit* $1\frac{3}{4}$ by $1\frac{1}{4}$ in., obovoid, obtuse, glabrescent; endocarp very thick, woody; calyx-rim $\frac{1}{2}$ in. wide, less than one-tenth the width of the upper part of the fruit.

2. STYRAX, Linn.

Trees and shrubs. *Leaves* elliptic-lanceolate. *Flowers* in lax little-divided axillary and terminal racemes, or subsolitary axillary; bracts inconspicuous. *Calyx* campanulate, free or slightly adnate to the base of the ovary, truncate or 5-toothed. *Corolla-tube* short, lobes 5, elliptic-oblong, imbricate (in the Indian species). *Stamens* 10, 1-seriate at the summit of the corolla-tube, filaments short; anthers large, linear. *Ovary* nearly free, at first 3-celled, later often 1-celled; style subulate, stigma capitate; ovules few in each cell. *Fruit* globose or ellipsoid, seated on the cupuliform or patelliform calyx, toughly chartaceous (in the Indian species), breaking up irregularly. *Seeds* rarely 2 (many in *S. polysperma*), erect, testa chartaceous or indurated, albumen plentiful fleshy; embryo straight, cotyledons broad.—Species 60, in the warmer regions of Eastern Asia and America.

S. Finlaysonianum, Wall. Cat. 4403, A. DC. Prodr. viii. 261, with subentire nearly glabrous leaves (*S. odoratissimum*, Champ. in Hook. Kew. Journ. iv. 304) was collected probably in Cambodia, and is not known as an Indian plant.

1. **S. serrulatum**, Roxb. Fl. Ind. ii. 415; leaves elliptic acuminate serrulate glabrous or with scattered stellate hairs beneath, pedicels and calyx closely white-tomentose, corolla $\frac{1}{2}$ in., style glabrous. Wall. Cat. 4402; A. DC. Prodr. viii. 267; Hk. f. in Bot. Mag. t. 5950, syn. excl.; Kurz in Journ. As. Soc. 1877, pt. ii. 237, and For. Fl. ii. 142. *S. Porterianum*, Wall. Cat. 4401; A. DC. l.c. *S. floribundum*, Griff. Notul. iv. 287.

EASTERN INDIA; alt. 3–7000 ft., frequent; from Nipal and Bhotan to Pegu and Penang.

A tree, sometimes 40 ft. high, or more often a shrub; young branches stellately pubescent. *Leaves* 3 by $1\frac{1}{2}$ in., often widest at or above the middle, base acute or rounded on the same branch, glabrous, rarely setulose above, stellately pubescent and soon glabrate beneath, chartaceous, prominently reticulate; petiole $\frac{1}{2}$ in. *Peduncles* axillary solitary, 2-3-fasciculate, or in small racemes, or (by the suppression of the leaves) subpaniculately racemed 3-5 in. long at the ends of the branchlets; pedicels $\frac{1}{2}$ in. *Calyx* (at flower time) $\frac{1}{2}$ in. broad, minutely 5-toothed or truncate. *Corolla*-lobes elliptic, subacute, tomentose without, white. *Filaments* hairy, attached $\frac{1}{2}$ in. above the corolla-base. *Fruit* $\frac{1}{2}$ by $\frac{1}{3}$ in., ellipsoid, white- or fulvous-tomentose; splitting up irregularly, calyx in fruit enlarged cupuliform $\frac{1}{4}$ in. wide embracing the lower quarter of the fruit.

VAR. agrestis; calyx-tube brown-hirsute with spreading hairs. *Cyrta agrestis*, *Ham. in Wall. Cat.* 4402.—Sikkim, Bhotan and Assam.

VAR. virgatum; leaves tapering acuminate usually widest below the middle, flowering-calyx $\frac{1}{2}$ - $\frac{1}{4}$ in. wide, corolla $\frac{1}{3}$ - $\frac{2}{3}$ in., segments wider. *S. virgatum*, *Wall. Cat.* 4400; *A. DC. Prodr.* viii. 267; *Kurz in Journ. As. Soc.* 1877, pt. ii. 237, and *For. Fl.* ii. 142. *S. grandiflorum*, *Griff. Notul.* iv. 267, and *lc. Pl. Asiat.* t. 423.—From Sikkim and Bhotan to Pegu. Distrib. South China, Japan.—*S. japonicum*, *Sieb. & Zucc. Fl. Jap.* i. 53, t. 23, united with this in *Bot. Mag.* t. 5950, somewhat differs in the glabrescent calyx and pinkish flowers.

2. **S. Hookeri**, *Clarke*; leaves elliptic acuminate serrulate setulose on the nerves above with scattered stellate hairs beneath, pedicels and calyx loosely fulvous-tomentose, corolla $\frac{1}{2}$ - $\frac{3}{4}$ in., style densely stellate-pubescent. *Styrax* sp., *Gamble Darjeeling List*, 54.

SIKKIM and BHOTAN; alt. 6-7000 ft., frequent, *Hook. f.*, &c.

Perhaps only an extreme form of *S. serrulatum*, var. *virgatum*, but the flowers are much larger sometimes 1 in. long; the calyx at flower-time is more than $\frac{1}{4}$ in. broad, lax. *Fruit* as of *S. serrulatum*.

3. **S. ? crotonoides**, *Clarke*; leaves broad-oblong shortly acuminate at both ends subentire coriaceous stellately pubescent beneath, fruit $\frac{3}{4}$ by $\frac{2}{3}$ ellipsoid indehiscent supported by a woody cupuliform calyx. *Crotoni affinis* sp., *Wall Cat.* 7848.

SINGAPORE; *Wallich*.

Branches rusty-stellate-pubescent. *Leaves* 5 by $2\frac{1}{4}$ in., glabrous above, almost tomentose, with very close rusty-stellate hairs beneath; nerves 9 pairs, prominent beneath; petiole $\frac{1}{2}$ in. *Fruits* with hard white tomentum (ripe but broken up and the seeds gone).—This agrees, as to leaves and fruit, closely with *S. suberifolium* (*Hk. & Arn. Bot. Beechey Voy.* 196, t. 40), but has much larger leaves and fruits.

4. **S. Benzoin**, *Dryand. in Phil. Trans.* 1787, 308, t. 12; leaves elliptic acuminate subentire closely stellately tomentose beneath, pedicels and calyx closely white-tomentose, corolla $\frac{1}{2}$ in., style glabrous. *Blume Bijl.* 671; *Roeb. Fl. Ind.* ii. 416; *A. DC. Prodr.* viii. 261; *Bentl. & Trim. Med. Pl.* iii. t. 169.

MALACCA; *Griffith, Maingay*.—DISTRIB. Malaya.

A small tree, resembling *S. serrulatum* in the inflorescence and flowers. *Fruit* $\frac{1}{2}$ in. diam., globose, densely white tomentose.

5. **S. rugosum**, *Kurz in Journ. As. Soc.* 1871, pt. ii. 51, and *For. Fl.* ii. 141; leaves elliptic acuminate serrulate densely stellately white-tomentose beneath, pedicels and calyx roughly tomentose, corolla $\frac{1}{2}$ in., style stellately tomentose at base.

MARTABAN; alt. 4-6000 ft., *Brandis*.

A tree; branchlets floccosely rusty-tomentose. *Leaves* 3 by $1\frac{1}{4}$ in., base obtuse, stellately pubescent or finally glabrous above, coriaceous, reticulate beneath; petiole $\frac{1}{2}$ in. *Flowers* axillary, and quasi-racemed towards the ends of the branches, pen-

dulous; peduncle $\frac{1}{10}$ in.; bracteoles linear, sometimes $\frac{1}{2}$ in. *Calyx* rusty floccose-tomentose, subspathaceous, irregularly lobed and often serrate. *Corolla* closely tomentose without. *Filaments* villous. *Fruit* not seen.

6. **S. polysperma**, Clarke; leaves broadly oblong acute obscurely crenate glabrous, corymbs many-flowered scabrous, corolla $\frac{1}{4}$ – $\frac{1}{2}$ in., fruit 5–8-seeded.

KHASIA MTS.; Griffith; Mahadeo, alt. 3000 ft., H. f. ♂ T.

Branches glabrous. *Leaves* 6 by $2\frac{1}{2}$ in., base cuneate or rhomboid; petiole $\frac{1}{2}$ in. *Corymbs* subterminal, repeatedly dichotomous, flowers nearly sessile. *Corolla* densely tomentose without. *Style* obscurely 3-lobed. *Fruit* $\frac{1}{2}$ by $\frac{1}{4}$ in., ellipsoid, subacute, imperfectly 3-celled; cells 2–1-seeded; testa stoutly chartaceous.—A most remarkable plant; the glabrous leaves and compound dichotomous inflorescence have caused fruiting examples to be referred to *Cordia*. The fruit is altogether unlike that of any other *Styrax*, and may indicate a new genus.

ORDER XCII. OLEACEÆ. (By C. B. Clarke.)

Trees, or scandent or erect shrubs, unarmed. *Leaves* opposite (in a few *Jasminums* alternate), simple 3-foliolate or pinnate, entire or toothed; stipules 0. *Inflorescence* mostly in trichotomous cymes or panicles, terminal or axillary, rarely fascicled or racemose. *Flowers* hermaphrodite often dimorphous, sometimes polygamous or dioecious, regular. *Calyx* small, truncate or 4- (sometimes 5–9-) lobed, rarely 0. *Corolla* monopetalous, rarely 4–9-petalous or 0, tube long or short, imbricate or valvate in bud. *Stamens* 2 (in Indian species), inserted on the corolla, or (in the polypetalous or apetalous genera) hypogynous, filaments usually short; anthers dehiscing usually on the margin or subextrorsely. *Ovary* free, 2-celled; style short or long, stigma simple or 2-lobed; ovules 1–2 (rarely 3–4) in each cell, attached to the inner angle near the apex or base. *Fruit* a loculicidal capsule, or indehiscent, or a berry or drupe. *Seeds* solitary (or 2) in each cell, erect or pendulous; testa thin or bony, albumen fleshy horny or 0; embryo straight, radicle superior or inferior.—DISTRIB. Species 280, in the tropical and temperate regions.

A shrub, collected by Helfer in Tenasserim or the Andamans (Kew Distrib. n. 3694) is supposed to belong to this Order; the imperfect specimens are here described.

Branches round; wood loose, soft; bark white, smooth. *Leaves* opposite, 10 by $3\frac{1}{2}$ in., cuneate at both ends, entire, softly hairy on the nerves beneath, coriaceous, whitened beneath, primary nerves 12 on each side the midrib, prominently inarching; petiole $\frac{1}{4}$ in., hairy, very turgid. *Panicles* 1 in., axillary, reduced almost to racemes, minutely pubescent; bracts 0 or minute; pedicels hardly any. *Ovary* (in young fruit) superior, 2-celled; cells 2-ovuled?.

TRIBE I. **Jasmineæ**. *Corolla-lobes* much imbricate. *Seeds* erect; albumen 0; radicle inferior.

Scandent shrubs; fruit baccate 1. JASMINUM.
Erect small tree; capsule bipartite 2. NYCTANTHES.

TRIBE II. **Syringææ**. *Fruit* dry, loculicidal. *Seeds* pendulous, winged, radicle superior.

Corolla-lobes imbricate; fruit woody, pyriform 3. SCHREBERA.
Corolla-lobes valvate; fruit small, cylindric 4. SYRINGA.

TRIBE III. **Fraxinææ**. *Fruit* samaroid. *Petals* valvate or 0.

Trees; leaves pinnate 5. FRAXINUS.

TRIBE IV. **Oleineæ**. *Fruit* a drupe or berry. *Corolla* small. *Radicle* superior (except *Myxopyrum*).

* *Corolla-lobes imbricate*; *seeds albuminous*.

Flowers fascicled or in very short racemes 6. OSMANTHUS.

** *Corolla-lobes valvate or petals distinct in pairs or 0*.

Petals in pairs or distinct or very shortly united into a tube, inflorescence axillary 7. LINOCIERA.

Corolla tubular or 0, inflorescence axillary except in *O. glandulifera* 8. OLEA.

Panicles terminal 9. LIGUSTRUM.

Large scandent shrubs, leaves 3-nerved 10. MYXOPYRUM.

1. JASMINUM, Linn.

Shrubs, scandent or erect. *Leaves* opposite or alternate, simple 3-foliolate or unequally pinnate; petiole nearly always articulated. *Cymes* 3- or 2-chotomous, simple or flowers rarely solitary; bracts linear and small, or ovate, sometimes petaloid. *Calyx* 4-9-fid, tube funnel-shaped rarely subcylindric, teeth linear long or short or 0. *Corolla* salver-shaped, white pink or yellow, tube narrow, lobes 4-10, patent, imbricate in bud. *Stamens* 2, included in the corolla-tube, filaments very short; anther oblong, connective usually shortly produced and triangular. *Ovary* 2-celled; style cylindric, stigmas 2 linear, long or short or subcombined; ovules 2 in each cell, near the base. *Berry* didymous, or often, by suppression, simple; carpels globose ellipsoid or elongate. *Seed* in each carpel 1, rarely 2, erect, exalbuminous; radicle inferior.—**DISTRIB.** Species 90, in the tropics or warm temperate parts of the Old World.

* *Leaves all simple*.

† *Calyx pubescent*. (The series proceeds from the species with long to those with short calyx-teeth.)

The species are generally dimorphic, having a long- and a short-styled form: Wight founded two species on this solitary character out of *J. auriculatum*. It has not been found practicable to use characters drawn from the style and stigma in the discrimination of the species.

1. **J. Sambac**, Ait. *Hort. Kew.* i. 8; leaves short-petioled ovate nearly glabrous, cymes lax few-flowered, bracts small, calyx-teeth subulate. *Bot. Reg.* t. 1; *Bot. Mag.* t. 1785; *Wall. Cat.* 2868; *DC. Prodr.* viii. 301; *Wight Ic.* t. 704; *Dalz. & Gibs. Bomb. Fl.* 137; *Brand. For. Fl.* 311; *Kurz For. Fl.* ii. 153, in *Journ. As. Soc.* 1877, pt. ii. 242. *J. fragrans*, *Salisb. Prodr.* 12. *J. undulatum*, *Willd. Sp. Pl.* i. 36, not of *Ker.* *J. Zambac*, *Roxb. Hort. Beng.* 2, *Fl. Ind.* ed. *Carey & Wall.* i. 87. *J. quinqueflorum*, *Heyne; Wall. Cat.* 2878; *DC. l. c.* 302. *J. pubescens*, *Wall. Cat.* 2880, not of *Willd.* *Nyctanthes Sambac* and *undulatum*, *Linn. Sp. Pl.* 8. *Mogorium Sambac*, *Lamk. Dict.* iv. 210, *Il.* t. 6, fig. 1. *M. undulatum*, *Lamk. Dict.* iv. 212.—*Rheede Hort. Mal.* vi. tt. 50, 51, 55. *Burm. Thes. Zeyl.* t. 58, fig. 2. *Mallica*, *Asphota* and *Sup-tula*, *Jones in As. Research.* iv. 245.

BENGAL to CEYLON and BIRMA; alt. 0-2000 ft., common.—**DISTRIB.** Much cultivated throughout India, and in the tropics of both hemispheres.

Scandent; branchlets pubescent. *Leaves* opposite or sometimes ternate, thinly membranous, varying from 1 to 5 in., sometimes on the same bush, acute or obtuse, base cuneate or rounded, nerves beneath pubescent or glabrous, primary often tufted in the axils beneath, secondary nerves distinct; petiole $\frac{1}{2}$ in. *Cymes* about 3-flowered

(or many-flowered in cultivation), pubescent; pedicels $0\frac{1}{4}$ in., usually distinct; bracts $0\frac{1}{4}$ in., linear; flowers white, fragrant. *Calyx-teeth* $\frac{1}{2}$ in., pubescent (in cultivation often nearly glabrous). *Corolla-tube* $\frac{1}{2}$ in.; lobes $\frac{1}{2}$ in., oblong, acute or obtuse, or in cultivation orbicular. *Ripe carpels* 1-2, globose, $\frac{1}{4}$ in. diam., black, surrounded by the suberect subulate calyx-teeth.

VAR. 1. *Sambac proper*; corolla-tube not twice the length of the calyx.

VAR. 2. *Heyneana*, Wall. Cat. 2871 (sp.); leaves small, corolla-tube 2-5 times as long as the calyx-teeth.—Deccan Peninsula; Heyne.—*Leaves* $1\frac{1}{2}$ in. *Calyx-teeth* $\frac{1}{16}$ – $\frac{1}{8}$ in. *Corolla-tube* $\frac{1}{2}$ in. *Style* sometimes as long as corolla-tube (unlike any in *J. Sambac* type, but in this polymorphic genus, little reliance can be placed on this character). Forms of *J. Sambac* approaching this var. are in cultivation in Bengal; it appears from Rottler's herb. to have been (as Wallich records under Wall. Cat. 2871) the typical *J. undulatum*, Heyne, and therefore of Linnæus, Willd., and the older authors. It is probably a cultivated var. of *J. Sambac* as none of the examples appear to be native ones.

2. ***J. undulatum***, Ker in Bot. Reg. t. 436, not of Willd.; leaves short-petioled ovate-lanceolate pubescent on the nerves beneath, cymes dense often hardly exceeding the uppermost leaves, calyx-teeth $\frac{1}{2}$ – $\frac{1}{2}$ in. subulate pubescent. DC. Prodr. viii. 302, syn. excl. *J. amplexicaule* and *J. aristatum*, Wall. Cat. 2853 and 2875; DC. Prodr. l. c. 306, 314. *J. scandens*, Griff. Itin. Notes, 102, not of Vahl.—*Jasminum* sp. n. 597, Griff. Itin. Notes, 36. *Jasminum* sp. n. 33, Herb. Ind. Or. H. f. & T.

SIKKIM, BHOTAN and KHASIA, alt. 1-5000 ft., common; Griffith, H. f. & T., &c.—DISTRIB. South China to Hongkong.

Scandent; branchlets hairy. *Leaves* $2\frac{1}{2}$ by 1 in., acute, base rounded often cordate, obscurely hairy or usually glabrescent except the nerves beneath; secondary nervation obscure; petiole $\frac{1}{2}$ in. *Cymes* capitate, often on short lateral branches; pedicels $0\frac{1}{16}$ in., pilose or nearly glabrous; bracts 0, or 1-3 ovate-lanceolate among the flowers, the two subtending leaves green, often 1 in. long. *Flowers* white, somewhat fragrant. *Corolla-tube* $\frac{3}{4}$ in., lobes $\frac{1}{4}$ in., oblong, acute. *Carpels* 1-2, globose, $\frac{1}{4}$ in. diam., black, surrounded by the suberect subulate calyx-teeth.

3. ***J. pubescens***, Willd. Sp. Pl. i. 37; hairy, leaves ovate acute, cymes dense often hardly exceeding the uppermost leaves, calyx-teeth $\frac{1}{5}$ – $\frac{2}{3}$ in. subulate densely villous. Roxb. Hort. Beng. 3, and Fl. Ind. ed. Carey & Wall. i. 90; Don Prodr. 105; DC. Prodr. viii. 302; Dalz. & Gibs. Bomb. Fl. 138. *J. hirsutum*, Willd. l. c. 36; Smith Exot. Bot. ii. 117, t. 118; Bot. Reg. t. 15; Bot. Mag. t. 1991; Wall. Cat. 2852; Wight Ic. t. 702; Brand. For. Fl. 312; Kurz For. Fl. ii. 164, and in Journ. As. Soc. 1877, pt. ii. 242. *J. multiflorum*, Roth Nov. Sp. 6 (?); Andr. Bot. Rep. t. 496; DC. l. c. 303. *J. congestum*, Wall. Cat. 2874; DC. l. c. 314. *J. bracteatum* (by error *fractiatum*), Wight Ic. t. 1248; Dalz. & Gibs. Bomb. Fl. 138. *Nyctanthes pubescens*, Retz Obs. v. 9. *N. multiflora*, Burm. Fl. Ind. 5, t. 3, fig. 1. *Mogorium pubescens*, Lamk. Dict. iv. 213.

INDIA, from the HIMALAYA to CEYLON and TENASSERIM, alt. 0-3000 ft., common.—DISTRIB. Birma, China.

Scandent; branchlets, pedicels and calyx densely fulvous-villous. *Calyx-teeth* with patent yellow hairs erect or curved in fruit. Otherwise as in *J. undulatum*, Ker, which has more acuminate, less hairy leaves.—*Nyctanthes hirsuta*, Linn. Sp. Pl. 8 is generally taken for this and the name *hirsutum* preferred, but Linnæus founded his plant on Rheede Hort. Mal. vi. t. 48, which is not *J. pubescens*. Rheede Hort. Mal. vi. t. 54 is usually quoted for *J. pubescens*, but from the shape of the leaves it seems more likely to be *J. Rottlerianum* or *J. Thwaitesii*. The name *J. multiflorum*, Roth, has been much disputed: Roth says he took it from Heyne, but Heyne's original plant with the ticket descriptive of *J. multiflorum*, in his handwriting, is preserved in Herb. Wight, and is *J. Rottlerianum*. This however could not have been

the plant described by Roth, as he says the bracts were linear. The example of *J. multiflorum* in Herb. Roxb. is *J. pubescens*.

VAR. *bracteata*, Roxb. Hort. Beng. 3, Fl. Ind. ed. Carey & Wall. i. 92 (sp.); leaves somewhat bifarious, bracts linear small, calyx-teeth $\frac{1}{2}$ – $\frac{3}{4}$ in., corolla-tube $\frac{1}{4}$ – $\frac{3}{4}$ in. Wall. Cat. 2867; DC. Prodr. viii. 305.—Penang; Wallich.—DISTRIB. Sumatra.—This was supposed allied to or a var. of *J. bifarium*, from which it does not much differ but by the longer calyx-teeth. The corolla-tube, which is figured as very short in Roxburgh's drawing, is $\frac{3}{4}$ in. in some of Wallich's specimens.

4. *J. coarctatum*, Roxb. Hort. Beng. 3, and Fl. Ind. ed. Carey & Wall. i. 91; leaves elliptic acute nearly glabrous, petioles jointed, flower-heads solitary or subpaniculate, bracts prominent white ovate-lanceolate, calyx-teeth linear hairy. DC. Prodr. viii. 308; Kurz For. Fl. ii. 153, and in Journ. As. Soc. 1877, pt. ii. 242. *J. reticulatum*, Wall. Cat. 2869; DC. l. c. 303.—Jasminum, n. 34, Herb. Ind. Or. Hk. f. & T.

FROM ASSAM TO PEGU, alt. 0–3000 ft., frequent; Wallich, Griffith, &c.

Scandent; branchlets hairy. Leaves $4\frac{1}{2}$ by 2 in., usually acuminate, base obtuse or rounded, midrib above pilose or glabrous, often tufted in the axils of the nerves beneath, membranous, secondary nervation somewhat prominent; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. Cymes dense, many-flowered, rusty-pubescent; bracts $\frac{1}{2}$ –1 in., petaloid, acuminate, often ciliate or pilose. Flowers white. Calyx-teeth $\frac{1}{2}$ – $\frac{3}{4}$ in. Corolla-tube 1–1 $\frac{1}{4}$ in.; lobes $\frac{1}{2}$ – $\frac{3}{4}$ in., oblong, acute. Carpels $\frac{1}{2}$ by $\frac{1}{2}$ in., and upwards.

5. *J. Rottlerianum*, Wall. Cat. 2865; leaves elliptic acute softly hairy on both surfaces or glabrate, petioles jointed, flower-heads solitary or subpaniculate, bracts prominent white ovate-lanceolate, calyx-teeth linear hairy. DC. Prodr. viii. 305; Wight Ic. t. 1249; Dalz. & Gibs. Bomb. Fl. 138. *J. hirsutum*, Wall. Cat. 2852, C. *J. bracteatum*, Heyne in Herb. not of Roth. *J. pubescens* and *hirsutum*, Mig. in Herb. Hohenack. not of Willd.

MTS. OF THE DECCAN PENINSULA; from the Concan to Travancore, alt. 2–5000 ft., frequent; Heyne, &c.

Scandent; branchlets, inflorescence and bracts villous. Leaves often subcordate at the base, adult very villous. Corolla-tube 1 in., and more in Wight's examples. Fruit-carpels $\frac{1}{2}$ by $\frac{1}{2}$ in.—This type form looks, from its hairiness, very distinct from *J. coarctatum*.

VAR. *glabrior*; adult leaves glabrous or nearly so, inflorescence shortly pubescent, corolla-tube $\frac{3}{4}$ in. slender.—Travancore; Wight.—This is referred by Wallich to *J. Rottlerianum*, and there are examples intermediate in hairiness; but it is very difficult to say how it differs from *J. coarctatum*, except that the flowers are rather smaller. Kurz (For. Fl. ii. 153, and in Journ. As. Soc. 1877, pt. ii. 242) has a *J. Rottlerianum* from Pegu, with adult leaves nearly glabrous, and the corolla-tube only $\frac{1}{2}$ in. long; this plant cannot therefore resemble very closely the typical *J. Rottlerianum*, which has a tube 1–1 $\frac{1}{4}$ in.; but possibly *J. coarctatum* and *Rottlerianum* should be united.

VAR. *Thwaitesii*; leaves oblong acuminate nearly glabrous, corolla-tube 1–1 $\frac{1}{4}$ in., carpels $\frac{1}{4}$ in. diam. globose. *J. rigidum*, Thwaites Enum. 190, not of Zenk.—Ceylon; Thwaites, C. P. n. 1809. Nilgherries, alt. 4–7000 ft., frequent, Clarke.—Branchlets terete, pubescent. Leaves sometimes cordate at the base. Bracts several, ovate-lanceolate, whitish. Calyx-teeth $\frac{1}{2}$ – $\frac{3}{4}$ in., linear.—This is a very difficult plant as may be guessed from Thwaites referring his specimen (though much twining) to *J. rigidum*. It does not differ much from *J. Rottlerianum*, var. *glabrior* (of which the fruit has not been seen): its small fruit is very unlike that of *J. coarctatum*.

6. *J. Griffithii*, Clarke; leaves large oblong-elliptic acuminate pilose beneath, heads dense many-flowered, bracts linear small or the uppermost leaves whitened, calyx-teeth long subulate patently fulvous-pilose.

MALACCA; Griffith (Kew Distrib. n. 3704) and Maingay (n. 998).

Scandent; branchlets patently fulvous-villous. Leaves $6\frac{1}{2}$ by $2\frac{3}{4}$ in., base obtuse or

cordate, coriaceous; nerves impressed above, much raised and fulvous-villous beneath, strongly tufted in their axils, prominently inarching, secondary obscure; petiole $\frac{1}{4}$ in. *Inflorescence* fulvous-pilose, subbracteate, but the upper leaves (even $3\frac{1}{2}$ in. long) whitened. *Calyx-teeth* $\frac{1}{2}$ in. *Corolla-tube* $\frac{3}{4}$ in., slender; lobes $\frac{1}{4}$ in., elliptic, acute. *Fruit* not seen.

7. **J. Maingayi**, *Clarke*; leaves long-petioled elliptic-lanceolate glabrous, flower-heads dense pubescent, bracts small linear or 1-2 ovate-lanceolate, calyx-teeth long linear pubescent.

PENANG; *Maingay* (Kew Distrib. n. 1000).

Scandent; branchlets pilose. *Leaves* 5 by 2 in., acute, base obtusely rhomboid, coriaceous; nerves 6-8 pairs, conspicuous, very oblique, not inarched, secondary obscure; petiole $\frac{1}{3}$ - $\frac{1}{2}$ in. *Cymes* paniced, sometimes more compound and lax; pedicels $\frac{1}{16}$ - $\frac{1}{6}$ in.; bracts mostly linear, $\frac{1}{16}$ - $\frac{1}{8}$ in., a few foliaceous bracts $\frac{3}{4}$ in. long occur. *Calyx-tube* $\frac{1}{2}$ in., campanulate; teeth $\frac{1}{4}$ - $\frac{1}{2}$ in. *Corolla-tube* $\frac{3}{4}$ in.; lobes $\frac{1}{2}$ in., elliptic, acute. *Carpels* $\frac{3}{8}$ by $\frac{1}{4}$ in., ellipsoid.

8. **J. malabaricum**, *Wight* *Ic. t.* 1250; leaves subcordate ovate suddenly acuminate nearly glabrous, cymes compound hairy, calyx-teeth long linear hairy, corolla-tube elongate. *J. glabellum*, *Wall. Cat.* 2857, partly.

DECCAN PENINSULA; on the Ghats, from the Concan southwards, common, *Wight*, &c.

Scandent; branchlets pubescent. *Leaves* $4\frac{1}{4}$ by 3 in., broadest near the base, membranous; nerves 9 pairs, distinct beneath, lower patent; petiole often 1 in. *Cymes* compound, trichotomous, not dense, many- (often 40-50-) flowered, branches ascending; bracts $\frac{1}{4}$ - $\frac{1}{2}$ in., subulate; pedicels $\frac{1}{4}$ in. *Calyx-teeth* $\frac{1}{4}$ in., subulate, acute. *Corolla-tube* $\frac{1}{2}$ - $\frac{2}{3}$ in.; lobes $\frac{1}{2}$ in., oblong, very acute. *Fruit* not seen.—*Wight* first named this plant *J. cuspidatum*, but abandoned the name on finding that Roth had applied it to a very different species. *Wight's* figure does not show the very acute petals, which are conspicuous in his examples.

VAR. *Lawii*; leaves ovate-lanceolate gradually acuminate, corolla-lobes nearly 1 in. long very narrow.—Concan; *Law*?.—These specimens have been referred to *J. erectiflorum* which has glabrous cymes and calyx-teeth, and a less compound inflorescence.

9. **J. arborescens**, *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 94; arborescent, leaves subcordate or ovate acute, finally glabrous, cymes trichotomous hairy, calyx-teeth short linear subclavate pubescent divaricate, basal sinus wide, corolla-lobes not much shorter (often longer) than the tube. *Wall. Cat.* 2856; *Wight Ic. t.* 699; *DC. Prodr.* viii. 303; *Brand. For. Fl.* 311. *J. montanum*, *Roth Nov. Sp.* 5; *DC. l. c.* 308. *J. arboreum*, *Roem. et Sch. Mant.* i. 90.

TROPICAL NORTH-WEST HIMALAYA; Terai of Oudh and Kumaon; frequent. DECCAN PENINSULA, from Rajmahal to Ceylon; in the hot lower hills, alt. 500-3000 ft., common.

A large shrub or scrubby tree; branchlets hairy. *Leaves* 4 by $2\frac{1}{2}$ in., shortly acuminate, widest near the base, subcordate or the upper ovate or elliptic, young hairy and often tomentose on both surfaces; nerves distinct beneath, lower divaricate; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Cymes* usually 12-20-flowered, not dense; bracts $\frac{1}{2}$ in., linear; pedicels $\frac{1}{4}$ in. *Calyx-teeth* $\frac{1}{10}$ - $\frac{1}{6}$ in., their narrowest part one-third of the way up. *Corolla-tube* $\frac{1}{2}$ in.; lobes $\frac{3}{4}$ in., lanceolate, acute. *Carpels* (generally solitary) $\frac{1}{2}$ by $\frac{1}{4}$ - $\frac{1}{2}$ in., unsymmetric, ellipsoid, black.

VAR. *latifolia*, *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 93 (sp.); scandent. *Wall. Cat.* 2855; *DC. Prodr.* viii. 308; *Wight Ic. t.* 703; *Dalz & Gibs. Bomb. Fl.* 138; *Brand. For. Fl.* 311.—Base of the Himalaya, from Kumaon to Bengal.

VAR. *montana*, *Roth Nov. Sp.* 5 (sp.); leaves elliptic cuneate scarcely rounded at

the base, calyx minutely pubescent. *DC. Prodr.* viii. 308. *J. punctatum*, *Wall. Cat.* 2877; *DC. l. c.* 303.—*J. glabellum*, *Wall. Cat.* 2857, partly.—Deccan Peninsula; Patna.

10. ***J. Roxburghianum***, *Wall. Cat.* 2870; leaves elliptic-oblong softly hairy, cymes trichotomous very hairy, calyx-teeth minute narrowly triangular villous, corolla-lobes usually as long as the tube. *DC. Prodr.* viii. 314.

MALABAR GHATS, *Ritchie*; Bababoodun Hills, *Law*.

Perhaps a var. of *J. arborescens*, but much more hairy, and with shorter calyx-teeth. *Leaves* not acuminate, sometimes obtuse, base broadly cuneate or scarcely rounded, mature softly hairy on both surfaces. *Cyme* somewhat lax, many-flowered. *Calyx* densely fulvous-villous teeth $\frac{1}{20}$ – $\frac{1}{10}$ in. *Corolla* and fruit as in *J. arborescens*.

11. ***J. syringæfolium***, *Wall. Cat.* 2861; leaves ovate-lanceolate acuminate glabrous, cymes lax trichotomous minutely pubescent, calyx-teeth short linear erect pubescent, corolla-lobes shorter than the tube. *DC. Prodr.* viii. 306.

TENASSERIM, Amherst and Tavoy; *Wallich, Packman*. ASSAM; *Griffith*.

Scandent; branchlets glabrescent. *Leaves* 4 by $1\frac{1}{2}$ in., broadly cuneate or the lower leaves rounded at the base, coriaceous; nerves 3–5 pairs, prominent beneath; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., mostly pubescent. *Cymes* terminal and axillary, 12–20-flowered; bracts $\frac{1}{4}$ in., linear; pedicels $\frac{1}{8}$ – $\frac{1}{6}$ in. *Calyx-teeth* $\frac{1}{16}$ – $\frac{1}{12}$ in. *Corolla-tube* $\frac{2}{3}$ in.; lobes scarcely $\frac{1}{2}$ in., narrow, acute. *Fruit-carpels* $\frac{2}{3}$ by $\frac{1}{2}$ in., unsymmetric, ellipsoid.—Kurz (*Journ. As. Soc.* 1877, pt. ii. 242) refers this species to *J. scandens*, which has the cymes much denser, the calyx-teeth divaricate, the corolla-tube shorter.

12. ***J. bifarium***, *Wall. Cat.* 2866; leaves oblong acuminate minutely pubescent or glabrous, cymes subcapitate, calyx-teeth short linear erect pubescent, corolla-tube longer than its lobes. *DC. Prodr.* viii. 306. *J. bracteatum*, *Wall. Cat.* 2867. *J. nummularoides*, *Blume Mus. Lugd. Bat.* i. 275.

PENANG; *Wallich, Maingay*.—DISTRIB. Malaya to Borneo.

Scandent; branchlets hairy or nearly glabrous. *Leaves* 2 by $\frac{3}{4}$ in. (sometimes much larger), bifarious, base truncate; nerves 5 pairs, often pubescent, secondary obscure; petiole $\frac{1}{2}$ in. *Cymes* 6–12-flowered, usually subsessile between the two uppermost leaves; bracts $\frac{1}{2}$ in., linear; pedicels $0\frac{1}{8}$ in. *Calyx-teeth* $\frac{1}{16}$ – $\frac{1}{10}$ in. *Corolla-tube* $\frac{3}{4}$ in.; lobes scarcely $\frac{1}{2}$ in., elliptic, acute. *Carpels* $\frac{1}{2}$ by $\frac{1}{4}$ in., ellipsoid.

VAR. *glabra*; leaves larger elliptic rhomboid or rounded at the base glabrous often drying reddish not bifarious, calyx-teeth $\frac{1}{8}$ – $\frac{1}{6}$ in. *J. Lessertianum*, *DC. Prodr.* viii. 304 *ex descr.*—Malacca and Singapore, frequent; *Wallich, Walker, &c.*—DISTRIB. Malaya.—This is one of Horsfield's plants, and believed to be *J. glabrum*, *Horsf.*; *Blume Bijl.* 679: but whether *J. glabrum*, *Willd.*, is doubtful.

13. ***J. scandens***, *Vahl Symb.* iii. 2; leaves ovate-lanceolate glabrous or nearly so, cymes subcapitate pubescent, calyx-teeth short linear pubescent divaricate or recurved in flower, corolla-tube scarcely $\frac{1}{2}$ in. *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 88; *Wall. Cat.* 2850; *DC. Prodr.* viii. 306; *Kurz For. Fl.* ii. 155, and in *Journ. As. Soc.* 1877, pt. ii. 242, *syn. excl.* *J. lætum*, *Wall. Cat.* 2859; *DC. l. c.* 306. *Nyctanthes scandens*, *Retz Obs.* v. 9.

BENGAL and PEGU, in the plains, common; and in the adjacent lower hills of SIKKIM, ASSAM, KHASIA, CACHAR and CHITTAGONG.

Scandent; branchlets pubescent. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., acuminate, base rounded, pubescent on the nerves beneath or glabrous, coriaceous; nerves few, remote; petiole $\frac{1}{4}$ in. *Cymes* dense, often on short axillary branches; bracts $\frac{1}{2}$ in., linear, but the cyme frequently subsessile between the two uppermost leaves; pedicels $0\frac{1}{10}$ in. *Flowers* white, often tinged pink, very fragrant. *Calyx-teeth* $\frac{1}{12}$ – $\frac{1}{8}$ in. *Corolla-tube* shorter than in the preceding species and somewhat broader; teeth $\frac{1}{4}$ – $\frac{1}{2}$ in., oblong, acute. *Carpels* $\frac{1}{2}$ by $\frac{1}{4}$ in., ellipsoid.

14. ***J. decussatum***, Wall. Cat. 2860; leaves ovate-lanceolate hairy, flowers in clusters upon compound trichotomous villous cymes, calyx-teeth short linear recurved villous, corolla-tube about $\frac{1}{4}$ in. DC. Prodr. viii. 306; Kurz For. Fl. ii. 151, and in Journ. As. Soc. 1877, pt. ii. 241.

PEGU and TENASSERIM, frequent; Wallich, Griffith, &c.

Scandent; branchlets villous. Leaves 4 by $1\frac{1}{2}$ in., acuminate, base obtuse, mature hairy at least beneath, coriaceous; nerves few, remote; petiole $\frac{1}{2}$ in. Cymes terminal compound, and on short-lateral branches; bracts $\frac{1}{2}$ in., linear; pedicels 0 or $0-\frac{1}{2}$ in. Calyx-teeth $\frac{1}{10}$ in. Corolla smaller than in any of the preceding species; lobes $\frac{1}{4}$ in., narrowly lanceolate. Carpel $\frac{1}{3}$ by $\frac{1}{4}$ in., ellipsoid.

†† *Calyx glabrous* (the series proceeds from the species with long to those with short calyx-teeth).

15. ***J. cordifolium***, Wall. Cat. 2858; leaves cordate-lanceolate acuminate glabrous, cymes crowded many-flowered, calyx-teeth subulate, corolla-tube nearly 1 in. G. Don Gen. Syst. iv. 60; DC. Prodr. viii. 304. *J. erectiflorum*, DC. Prodr. viii. 308; Wight Ic. t. 1251.

NILGHERRIES; Gardner, Wight; Canoor, alt. 6000 ft., Clarke.

Scandent, glabrous. Leaves 4 by $1\frac{1}{2}$ in., coriaceous; nerves 7 pairs, the lowest divaricate, secondary obscure; petiole $\frac{1}{2}-\frac{3}{4}$ in. Cymes often 20-flowered, shortly repeatedly trichotomous; bracts $\frac{1}{2}$ in., linear; pedicels $\frac{1}{2}$ in. Calyx-teeth $\frac{1}{6}-\frac{1}{2}$ in. Corolla-lobes $\frac{3}{4}$ in., elliptic, acute. Carpels nearly $\frac{1}{2}$ by $\frac{1}{2}$ in., ellipsoid.—G. Don says the leaves are 3-nerved, the cymes pubescent, which will not apply to the present (nor to any Nilgherry) species; Wight has noted in his Herb. that *J. erectiflorum*, A. DC., is *J. cordifolium*, Wall.

16. ***J. anastomosans***, Wall. Cat. 2863; leaves elliptic-lanceolate acuminate glabrous imperfectly 3-nerved, cymes 1-5-flowered axillary, calyx-teeth long linear, corolla-lobes very long narrow. DC. Prodr. viii. 305; Kurz For. Fl. ii. 152, and in Journ. As. Soc. 1877, pt. ii. 242. *J. stenopetalum*, Lindl. in Bot. Reg. t. 918, in adnot.; DC. l.c. 304; Blume Mus. Bot. i. 272. *J. trinerve*, Roxb. Hort. Beng. 3, and Ic. Ined. in Herb. Kew., and Fl. Ind. ed. Carey & Wall. i. 91; Wall. Cat. 2848 A, chiefly, not of Vahl. *J. laurifolium*, Wall. Cat. 2847 A, chiefly, not of Roxb.—*Jasminum* sp. n. 32, Herb. Ind. Or. H. f. & T.

BHOTAN; Dalimkote, Gamble. KHASIA; Griffith. CACHAR; Keenan. SILHET; Chattuck, H. f. & T. PEGU; Wallich, &c., frequent.

Scandent, glabrous. Leaves 4 by $1\frac{1}{2}$ in., very acute, base obtuse sometimes cordate, membranous; lowest pair of nerves strong, carried along the margin, upper slender, distinct, resembling the secondary; petiole $\frac{1}{4}$ in. Cymes slender, on short lateral branches sometimes leafy, but more frequently altogether axillary; bracts $\frac{1}{4}$ in., linear; pedicels $\frac{1}{2}$ in. Calyx-teeth $\frac{1}{2}-\frac{3}{4}$ in. Corolla-tube $\frac{2}{3}$ in., lobes 7-10, often 1 in. Carpels $\frac{1}{2}$ by $\frac{1}{2}$ in., ellipsoid; calyx-teeth in fruit often thickened, divaricate, stellate.

VAB. *silhetsensis*, Blume Mus. Bot. i. 271 (sp.); corolla-lobes a little shorter than the tube. *J. trinerve*, Wall. Cat. 2848, chiefly.—*J. trinerve*, Vahl, is defined as having the corolla-lobes only half as long as the tube; but, after all the labours of Blume, it may be a question whether the Indian plant is other than a form of it, as Roxburgh considered.

17. ***J. subtriplinerve***, Blume Mus. Bot. i. 272; leaves elliptic-lanceolate acuminate glabrous 3-nerved, cymes 1-7-flowered axillary and terminal, calyx-teeth linear, corolla-lobes oblong acute shorter than the tube. *J. trinerve*, Wall. Cat. 2848, partly.

SIKKIM, ASSAM, KHASIA, SILHET, CACHAR, alt. 0-4000 ft., frequent; Wallich, Griffith, H. f. & T., &c.

Closely allied to *J. anastomosans*. Leaves coriaceous, distinctly 3-nerved, the basal primary pair of nerves often carried near the margin nearly to the tip of the

leaf, other nerves obscure. *Flowers* usually 3, sometimes all solitary and terminal. sometimes in compound many-flowered cymes; pedicels not exceeding $\frac{1}{2}$ in., by which the species is known from all forms of *J. laurifolium*. *Calyx-teeth* $\frac{1}{4}$ in., shorter than in *J. anastomosans*, glabrous in the Sikkim examples, minutely scabrid-pubescent in the Khasian. *Corolla-tube* $\frac{3}{4}$ in., lobes $\frac{2}{3}$ by $\frac{1}{4}$ in.

18. **J. nobile**, *Clarke*; leaves ovate-lanceolate acuminate, cymes few-flowered lax, corolla very large, calyx-teeth linear acute.—*Jasminum*, n. 26, *Herb. Ind. Or. H. f. & T.*

MOULMEIN; Thoungyeen, alt. 5000 ft., *Lobb*; Donnatoung, alt. 4000 ft., *Parish*.

Scandent, glabrous. *Leaves* $3\frac{1}{4}$ by $1\frac{1}{4}$ in., base obtuse or almost rounded, coriaceous, obscurely 3-nerved; petiole $\frac{1}{2}$ in. *Cymes* terminal and on shortened axillary branches, peduncled or sub-sessile, 3-5-flowered; bracts $\frac{1}{2}$ in., linear; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., thickened. *Calyx-teeth* $\frac{1}{4}$ in. *Corolla-tube* 1 in., lobes $1\frac{1}{4}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in., oblong acute. *Fruit* not seen.

19. **J. laurifolium**, *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 91; leaves oblong or narrow-elliptic acuminate 3-nerved, cymes few-flowered lax, calyx-teeth linear long, corolla-lobes long narrow. *Wall. Cat.* 2847, partly; *DC. Prodr.* viii. 303; *Kurz For. Fl.* ii. 152, and in *Journ. As. Soc.* 1877, pt. ii. 241. *J. angustifolium*, *Ker in Bot. Reg.* t. 521, not of *Vahl*.

KHASIA MTS., *De Silva, H. f. & T.* (cultivated in Ceylon, Kumaon, Mauritius, &c.).

Scandent, glabrous. *Leaves* $2\frac{1}{2}$ by $\frac{3}{4}$ in., base obtuse or rounded, coriaceous, definitely 3-nerved in the cultivated examples, more membranous and anastomosing nerves more distinct in the native; petiole $\frac{1}{2}$ in. in the wild, $\frac{1}{4}$ in. in the cultivated plant. *Cymes* 3-5-flowered, terminal or long-peduncled and axillary; bracts $\frac{1}{2}$ in., linear; pedicels $\frac{1}{3}$ – $\frac{1}{2}$ in., not much thickened. *Calyx-teeth* $\frac{1}{4}$ in. *Corolla-tube* $\frac{3}{4}$ in., lobes $\frac{2}{3}$ by $\frac{1}{2}$ in. *Fruit* not seen.—*Ker*, whose figure of this species is excellent, nevertheless says he could not distinguish it from *J. angustifolium* (by which *Ker* meant *J. sessiliflorum*); it has 3-nerved leaves, the corolla-lobes much longer.

VAR. brachyloba, *Kurz* l. c.; calyx-teeth $\frac{1}{10}$ – $\frac{1}{8}$ in.—*Birma*; *Griffith* (*Kew Distrib.* n. 3712); Martaban and Tenasserim Hills, frequent (*Kurz*).

VAR. sublinearis; leaves 5 by $\frac{1}{2}$ in., calyx-teeth $\frac{1}{8}$ in.—*Tavoy*; *Helper* (*Kew Distrib.* n. 3710).

20. **J. adenophyllum**, *Wall. Cat.* 2876; leaves elliptic-oblong acuminate penninerved, cymes lax few-flowered, calyx-teeth very long linear. *DC. Prodr.* viii. 314.

KHASIA MTS.; *De Silva*.

Scandent, glabrous. *Leaves* 5 by $1\frac{1}{4}$ in., base cuneate; primary nerves 8 pairs, subequally distant, the lowest short; petiole $\frac{1}{2}$ in., not (or very obscurely) jointed. *Peduncles* 1-flowered (in the scanty examples); bracts obsolete; pedicels 1 in. *Calyx-teeth* $\frac{1}{2}$ in., and upwards. *Corolla* and fruit not seen.—The imperfect examples represent a species, apparently closely allied to *J. laurifolium*, but the nervation of the leaves is altogether different.

21. **J. sessiliflorum**, *Vahl Enum.* i. 29; leaves small ovate, cymes few-flowered, pedicels short, calyx-teeth linear long, corolla medium-sized tube hardly so long as the narrow lobes. *DC. Prodr.* viii. 307. *J. angustifolium*, *Wall. Cat.* 2873, partly, not of *Vahl*.

MADRAS; Nundidroog, Chingleput, *Rottler*, &c. CEYLON; *Thwaites*.

Scandent, ramous; branchlets often minutely pubescent. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ in. (those of the shortened flowering lateral branchlets hardly half so large), shortly acute or subobtuse, base obtuse or almost rounded, glabrous; nerves few, obscure; petiole $\frac{3}{8}$ – $\frac{1}{2}$ in. *Cymes* usually 3- or 1-flowered, sessile; pedicels 0– $\frac{1}{2}$ in. *Calyx-teeth* $\frac{1}{4}$ in., glabrous or obscurely scabrid-pubescent. *Corolla-tube* $\frac{1}{2}$ in., lobes $\frac{1}{2}$ – $\frac{1}{2}$ by $\frac{1}{10}$ in., acute. *Fruit* not seen.

22. **J. angustifolium**, *Vahl Enum. i.* 29; leaves small ovate, cymes few-flowered, pedicels long, calyx-teeth linear short, corolla largeish lobes lanceolate. *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall. i.* 95; *Wall. Cat.* 2873, partly; *Wight Ic.* t. 698; *DC. Prodr.* viii. 303. *J. vimineum*, *Willd. Sp. Pl. i.* 36. *J. triflorum*, *Pers. Syn. i.* 7. *Nyctanthes angustifolia*, *Linn. Sp. Pl.* 8. *N. viminea*, *Retz Obs.* v. 9. *N. triflora*, *Burm. Fl. Ind.* 4, t. 2. *Mogorium vimineum*, *Lamk. Dict.* iv. 213. *M. triflorum*, *Lamk. Ill.* 23, t. 6, fig. 2.—*Rheede, Hort. Mal.* vi. t. 53.

DECCAN PENINSULA and CEYLON; in the lower hills, frequent.

Scandent, ramous; branchlets minutely pubescent or almost villous. *Leaves* $1\frac{1}{4}$ by $\frac{1}{2}$ in. (those of the lateral branchlets half as large), acute, base obtuse or almost rounded, glabrous; nerves few, obscure; petiole $\frac{1}{8}$ in. *Cymes* usually 3-1-flowered; pedicels $\frac{1}{4}$ – $\frac{3}{4}$ in. *Calyx-teeth* $\frac{1}{8}$, rarely $\frac{1}{6}$ in., glabrous or very nearly so. *Corolla-tube* $\frac{1}{2}$ – $\frac{3}{4}$ in.; lobes $\frac{2}{3}$ by $\frac{1}{3}$ in. *Carpels* $\frac{1}{2}$ by $\frac{1}{4}$ in., unsymmetric, ellipsoid.—In the habit and leaves this species closely resembles *J. sessiliflorum*, with which it has been mixed from the days of Rottler.

23. **J. Ritchiei**, *Clarke*; leaves ovate or elliptic shortly acuminate glabrous, cymes few-flowered lax, pedicels long, calyx-teeth linear short, fruit-carpels large globose.

WESTERN GHATS and CEYLON, in the hills frequently collected; Nilgherries, *Wight, Gardner*; Bababoodun Hills, *Law*; Belgaum, *Ritchie, &c.*

Scandent, ramous, glabrous or nearly so. *Leaves* attaining $4\frac{1}{2}$ by $1\frac{3}{4}$ in., base broadly cuneate; nerves 5-6 pairs, prominent, often tufted in the axils; petiole $\frac{1}{8}$ in. *Cymes* very lax, often subpaniculate, 3-9-flowered; bracts $\frac{1}{2}$ in., linear; pedicels $\frac{1}{4}$ –1 in. *Calyx-tube* campanulate, often somewhat ribbed; teeth $\frac{1}{8}$ in. and upwards, linear or shortly oblong, sometimes minutely ciliate-scabrid. *Corolla-tube* $\frac{3}{4}$ in., lobes $\frac{2}{3}$ in., narrow. *Carpels* $\frac{1}{2}$ in., very accurately spherical.—Named *J. angustifolium* by Wight and Ritchie, from which in flower it does not differ much but by the larger leaves; the fruits are unusual.

VAR. purpurea, *Heyne* in *Herb. Rottler* (sp.); leaves more obtuse sometimes roundish.—Bababoodun Hills, *Rottler*. Ceylon, *Wight*.

24. **J. Wightii**, *Clarke*; glabrous, leaves oblong-lanceolate long-acuminate, cymes trichotomously compound lax, calyx-teeth shortly linear, corolla-tube $\frac{1}{2}$ in. lobes $\frac{2}{3}$ in.

Bolimputty near COIMBATORE; *Wight*, n. 1762.

Branches flexuose. *Leaves* $3\frac{1}{2}$ by $\frac{3}{4}$ in., or some more ovate, attenuate into the petiole, penninerved; nerves obscure; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in. *Cymes* terminal; bracts $\frac{1}{2}$ in., linear; pedicels $\frac{1}{6}$ – $\frac{1}{3}$ in. *Calyx-teeth* $\frac{1}{8}$ in. *Corolla-lobes* $\frac{1}{8}$ – $\frac{1}{6}$ in. wide, acute. *Fruit* not seen.—The leaves are punctate beneath, the cyme somewhat divaricated, the calyx-teeth separated by a very wide sinus. It may be allied to *J. arborescens* var. *montana*, but it is very glabrous.

25. **J. rigidum**, *Zenker Pl. Ind.* 5, t. 6; glabrous, leaves ovate or elliptic shining, cymes few-flowered dense sessile, calyx-teeth linear rigid erect, corolla-tube elongate longer than the lobes. *DC. Prodr.* viii. 305; *Wight Ic.* t. 1247; *Thwaites Enum.* 190, in part. *J. myrtophyllum*, *Zenker Pl. Ind.* 6, t. 7; *DC. l. c.* 304. *J. ligustrifolium*, *Wall.*; *Bojer Hort. Maurit.* 204; *DC. l. c.* 305, not of *Lamk.* *J. cuspidatum*, *Rottler*; *Spreng. Syst.* i. 30; *Wall. Cat.* 2872. *J. Perrottetianum*, *DC. l. c.* 304, ex descr. *J. triflorum*, *Heyne* in *Herb. Rottler*, not of *Pers.*

DECCAN PENINSULA and CEYLON, alt. C-5000 ft.; common.

A rigid, dense, shrub, hardly scandent. *Leaves* 2 by $\frac{3}{4}$ in., upper acute at both ends, not acuminate, lower ovate, coriaceous; nerves reticulating, slender but often subprominent on the upper surface; petiole $\frac{1}{6}$ in. *Cymes* 3-1-flowered; pedicels 0– $\frac{1}{8}$

in. *Calyx-teeth* $\frac{1}{8}$ in. *Corolla-tube* 1 in.; lobes $\frac{2}{3}$ by $\frac{1}{8}$ in., oblong, acute. *Fruit* not seen.

VAR. *tetraphis*, Wight & Gardn. in Calc. Journ. Nat. Hist. vi. 55 (sp.); subsucculent, leaves larger, cymes with more flowers.—Nilgherries; *Gardner, &c.*—Leaves puberulo-punctate beneath. May this be *J. Perottetianum*, *A. DC. Prodr.* viii. 304?

26. *J. trichotomum*, Heyne; *Roth. Nov. Sp.* 6; leaves ovate-lanceolate glabrous or minutely rusty-pubescent beneath, cymes trichotomous compound lax glabrous or nearly so, calyx-teeth minute triangular-subulate, corolla smallish. *Wall. Cat.* 2879; *DC. Prodr.* viii. 308. *J. intermedium* and *J. Gardnerianum*, *Wight in Herb.*

MADRAS; Rayacottah, Heyne; Nilgherries, Gardner, Wight.

Scandent, ramous; branchlets glabrous. *Leaves* $2\frac{1}{4}$ by 1 in., not acuminate, base broadly cuneate or almost rounded; nerves 7 pairs, secondary obscure; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Cymes* terminal, often paniculate, divaricate; bracts $\frac{1}{20}$ in., lanceolate; pedicels $\frac{1}{8}$ – $\frac{1}{2}$ in. *Calyx* glabrous, teeth in Heyne's type example 0– $\frac{1}{25}$ in., rarely attaining $\frac{1}{15}$ in. *Corolla-tube* $\frac{1}{4}$ in.; lobes $\frac{1}{2}$ in., narrow acute. *Carpels* $\frac{1}{4}$ in., ellipsoid, black. —Allied to *J. arborescens* (var. *montana*), as noted by Heyne on the original plant of Rottler. Roth's description does not agree well with this type, and has puzzled all authors.

27. *J. latipetalum*, Clarke; glabrous, leaves narrow-lanceolate coriaceous, cymes few-flowered lax, calyx-teeth minute lanceolate, corolla large lobes $\frac{1}{2}$ – $\frac{1}{2}$ in. broad.

MOULMEIN; Thoung-gyeen, alt. 5000 ft., Lobb.

Scandent. *Leaves* 5 by $\frac{3}{4}$ in., elongate, acuminate, base obtuse, almost rounded, very thick; nerves 20 pairs, horizontal, obscure; petiole $\frac{1}{4}$ – $\frac{1}{3}$ in., not (or very obscurely) jointed. *Cymes* 1–5-flowered, terminal; bracts $\frac{1}{8}$ in., lanceolate; pedicels $\frac{1}{2}$ in. *Calyx-teeth* $\frac{1}{20}$ in. *Corolla-tube* 1– $1\frac{1}{4}$ in., slender; lobes $\frac{3}{4}$ in., obovate-oblong, obtuse. *Fruit* not seen.

28. *J. attenuatum*, Roxb. *Hort. Beng.* 3; glabrous, leaves oblong acuminate, cymes lax slender, calyx subhemispheric teeth minute, corolla-tube $\frac{2}{3}$ – $\frac{3}{4}$ in. *Wall. Cat.* 2864; *DC. Prodr.* viii. 309; *Kurz For. Fl.* ii. 151, and in *Journ. As. Soc.* 1877, pt. ii. 241.

KHASIA Mts. and adjacent part of ASSAM, alt. 500–4000 ft., frequent; Wallich, Griffith, H. f. & T., &c. MARTABAN, alt. 5–7000 ft. (Kurz).

Scandent. *Leaves* $6\frac{1}{2}$ by 2 in., base cuneate or subobtuse, membranous; nerves 12 pairs, obscure; petiole $\frac{1}{2}$ in. *Cymes* axillary and terminal, slender; bracts $\frac{1}{2}$ in., lanceolate; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., slender. *Calyx-teeth* $\frac{1}{20}$ in. *Corolla* bright-red, pink or white; lobes $\frac{1}{2}$ in., lanceolate, acute. *Fruit-carpels* $\frac{1}{2}$ by $\frac{1}{2}$ in., ellipsoid.

29. *J. glandulosum*, Wall. *Cat.* 2849; glabrous, leaves elliptic acuminate, cymes slender lax few-flowered, calyx-tube cylindric-campanulate teeth minute, corolla-tube 1– $1\frac{1}{4}$ in. slender lobes $\frac{3}{4}$ –1 in. linear. *DC. Prodr.* viii. 304; *Royle Ill.* 268; *Brand For. Fl.* 312. *J. nepalense*, Spreng. *cura post.* 12; *DC. l. c.* 308. *J. dichotomum*, Don *Prodr.* 105, not of Vahl. *J. Hamiltonii*, G. Don *Gen. Syst.* iv. 67. *J. laurifolium*, Gamble *Darjeeling List*, 55, not of Roxb.

SUBTROPICAL HIMALAYA, alt. 2–6000 ft., from Kumaon to Bhotan; frequent. KHASIA Mts., alt. 2–4000 ft., frequent.

Scandent. *Leaves* 3 by $1\frac{1}{2}$ in., base obtuse or rounded; nerves 7 pairs, distinct, often tufted in the axils beneath, inarching; petiole $\frac{1}{2}$ in. *Cymes* axillary and terminal, 1–3-flowered; bracts $\frac{1}{10}$ in., linear; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., slender. *Calyx-tube* $\frac{1}{2}$ by $\frac{1}{10}$ in., lobes $\frac{1}{20}$ in. *Corolla* white, scarcely yellow while fading; lobes $\frac{1}{2}$ – $\frac{1}{2}$ in. broad. *Carpels* $\frac{3}{4}$ by $\frac{1}{2}$ in., elongate ellipsoid.—This has been confounded with the Australian *J. simplicifolium* (Benth. *Fl. Austral.* iv. 296), which has a much shorter calyx-tube,

a less slender corolla, and fruit carpels not half as long; and is only known in cultivation in India.

30. **J. subglandulosum**, Kurz in *Trimen Journ. Bot.* 1875, p. 329, and *For. Fl.* ii. 151; glabrous, leaves large obovate-oblong shortly acuminate, racemes axillary very lax, calyx broad teeth very short, corolla-tube $\frac{1}{2}$ – $\frac{2}{3}$ in., lobes half as long obovate-oblong blunt.

SOUTH ANDAMAN; Kurz. PEGU and TENASSERIM, in the tropical forests not infrequent (Kurz).

Scandent. Leaves 7 by $2\frac{3}{4}$ in., base obtusely cuneate, membranous; nerves 10 pairs, secondary distinct. Flowers white; bracts minute, subulate. Carpels $\frac{1}{2}$ by $\frac{1}{4}$ in., ellipsoid.—Description chiefly from Kurz, as his example is very imperfect; the inflorescence appears strictly cymose, as in the two preceding species; there is nothing in the material or description to show that it differs from *J. attenuatum* but in the somewhat larger leaves.

31. **J. smilacifolium**, Griff. ms.; glabrous, leaves large ovate acute coriaceous 3-nerved, cymes axillary and terminal stout compound, calyx-teeth short thick triangular, flowers and fruits large.

MALACCA; Griffith (Kew Distrib. n. 3698), Maingay.

A large climber. Leaves 7 by $3\frac{3}{4}$ in., base obtuse or almost cordate, very thick, secondary nerves thin distinct; petiole $\frac{3}{4}$ in. Cymes 5–20-flowered, not lax; bracts $\frac{1}{10}$ in., lanceolate; pedicels $\frac{1}{8}$ – $\frac{1}{4}$ in. Calyx-teeth $\frac{1}{16}$ in. Corolla white tinged with pink, tube $\frac{3}{4}$ –1 in., lobes $\frac{3}{4}$ by $\frac{1}{2}$ in., acute. Carpels 1 by $\frac{1}{2}$ – $\frac{2}{3}$ in.; pedicels often greatly enlarged, $\frac{1}{2}$ in. diam. below the fruit.—This has been supposed a var. merely of *J. crassifolium*, Blume, which however has smaller obscurely 3-nerved leaves, and the cymes much slenderer, with pedicels often $\frac{3}{4}$ in.

** Leaves (some of them) compound: in *J. auriculatum* and *brevilobum* often in appearance simple, the lateral leaflets being only occasionally present and then exceedingly small. (The series proceeds from the less- to the more-compound-leaved species.)

32. **J. auriculatum**, Vahl *Symb.* iii. 1; leaves mostly simple ovate some 3-foliate the lateral leaflets mere auricles, cymes compound many-flowered, corolla-tube $\frac{1}{4}$ – $\frac{1}{2}$ in. Roxb. *Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 96; Wall. *Cat.* 2854; Bot. *Reg.* t. 264; DC. *Prodr.* viii. 309, *syn. excl.*; Wight *Ic.* t. 700. *J. affine* and *ovalifolium*, Wight *Ic.* tt. 1255, 1256.

DECCAN PENINSULA and CEYLON, common (cultivated in Scinde, North-west India, Bengal, Siam and Mauritius).

Scandent; pubescent or villous, sometimes nearly glabrous. Leaves (when simple and the terminal leaflets) 1 by $\frac{3}{4}$ in., shortly acute or hardly acuminate, base obtuse or rounded, ashy-pubescent sometimes glabrescent; nerves few, lowest oblique; lateral leaflets when present rarely exceeding $\frac{1}{6}$ in. diam. Cymes terminal, paniculate, grey-pubescent; bracts $\frac{1}{6}$ in., linear; pedicels 0 – $\frac{1}{5}$ in. Calyx-teeth minute, narrowly oblong. Corolla-lobes $\frac{1}{4}$ in., elliptic. Carpels $\frac{1}{2}$ in. diam., globose, black.—The *J. mauritianum*, Bojer, reduced to *J. auriculatum* by Baker (*Fl. Maurit.* 220) has the leaves subequally 3-foliate, the corolla-tube nearly 1 in. *J. affine*, Wight, with the style half as long as corolla-tube, and *J. ovalifolium*, Wight, with the stigmas exerted, are dimorphic forms.

33. **J. brevilobum**, A. DC. *Prodr.* viii. 307; leaves mostly simple ovate, some 3-foliate the lateral leaflets mere auricles, cymes sessile subcapitate, corolla-tube $\frac{2}{3}$ –1 in. *J. nilagiricum*, Pl. *Hohenack.* n. 1007.

MTS. of the DECCAN PENINSULA; Nilgherries, Pulneys, &c., alt. 3–6000 ft., frequent; Gardner, Wight, &c.

Resembling *J. auriculatum*; usually villous or subtomentose, sometimes only

sparingly pubescent. Terminal *leaflets* often cordate; the lowest primary nerves divaricate. *Cymes* terminal, 3-10-flowered, dense. *Flowers* altogether larger than in *J. auriculatum*; lobes often $\frac{1}{2}$ by $\frac{1}{8}$ in. *Carpels* larger, $\frac{1}{4}$ in. diam. and upwards.

34. **J. flexile**, *Vahl Symb.* iii. 1; glabrous, leaves opposite nearly all 3-foliolate, leaflets elliptic or ovate acute coriaceous distinctly nerved, cymes lax axillary and terminal upper elongate paniculate longer than the leaves, corolla-tube $\frac{2}{3}$ -1 in. *Wall. Cat.* 2881; *DC. Prodr.* viii. 310; *Wight Ic.* t. 1253.—*Burm. Thes. Zeyl.* t. 58, fig. 1.

DECCAN PENINSULA and CEYLON, in the lower hills, frequent.

Scandent. Terminal *leaflet* $4\frac{1}{2}$ by $1\frac{1}{2}$ -2 in., base rounded or obtuse; primary nerves 6 pairs, inarching. *Panicles* 4-8 in. long, or the lower short few-flowered, branches opposite alternate or whorled; bracts $\frac{1}{2}$ in., linear; pedicels $\frac{1}{8}$ - $\frac{1}{4}$ in. *Calyx-teeth* minute. *Corolla* white, lobes $\frac{1}{2}$ by $\frac{1}{2}$ in., acute or obtuse. *Carpels* $\frac{1}{4}$ by $\frac{1}{4}$ in., ellipsoid.—Heyne named three examples of this in *Herb. Rottler*: *J. acuminatum*, *J. azoricum* and *J. travancorense*. The Timor *J. parviflorum*, Decne., is said to have much smaller flowers, but it must be very nearly allied.

VAR. *ovata*, *Wall. Cat.* 2882 (sp.), chiefly; leaflets obtusely cuneate at the base, axillary cymes short few-flowered, pedicels $\frac{1}{8}$ in. *J. attenuatum*, *Wall. Cat.* 2864, B, not of *Roxb.*—Khasia; *Wallich.*—This is possibly a var. of *J. lanceolaria*, *Roxb.*; it has leaves distinctly nerved, the flowers rather smaller.

VAR. *Hookeriana*; terminal leaflet 4 by $2\frac{1}{2}$ in. membranous, corolla large with broad lobes.—*Jasminum* n. 41, *Herb. Ind. Or. H. f. & T.*—Khasia; *Hook. f. & T.*—This seems exactly half-way between *J. flexile* and *J. caudatum*, having the broad leaflets of the former, the membranous texture and flowers of the latter.

35. **J. caudatum**, *Wall. Cat.* 2884; glabrous, leaves opposite nearly all 3-foliolate, leaflets lanceolate or ovate-lanceolate caudate-acuminate membranous distinctly nerved, cymes lax, corolla-tube $\frac{3}{4}$ -1 $\frac{1}{4}$ in. *Lindl. in Bot. Reg.* 1842, t. 26; *DC. Prodr.* viii. 310. *J. ovatum*, *Wall. Cat.* 2882, in part.

KHASIA, alt. 0-4000 ft., frequent; *Wallich, H. f. & T., &c.* MISHMEE; *Griffith.*

Only distinguishable from *J. flexile*, var. *Hookeriana*, by the narrower more caudate leaves. The cyme is usually slenderer, the corolla longer, the tube attaining $1\frac{1}{4}$ in., the lobes $\frac{3}{4}$ by $\frac{1}{3}$ in.

36. **J. lanceolaria**, *Roxb. Fl. Ind. ed. Carey & Wall.* i. 97; glabrous, leaves opposite nearly all trifoliolate, leaflets elliptic shortly acuminate very thick, nerves obscure, cymes compound rigid thick-branched, corolla-tube 1 in. *DC. Prodr.* viii. 310. *J. lanceifolium*, *Roxb. Hort. Beng.* 3?

KHASIA and JAINTIA MTS., alt. 3-5000 ft., frequent; *Griffith, H. f. & T., &c.*

A large climber. *Leaflets* 4 by $1\frac{1}{2}$ in., acute, base obtusely cuneate. *Cymes* compound, trichotomous; bracts $\frac{1}{2}$ in., linear; pedicels $0\frac{1}{2}$ in., thick, still thicker in fruit. *Calyx-teeth* minute. *Corolla* large, white; lobes attaining $\frac{3}{4}$ by $\frac{1}{2}$ in. *Carpels* $\frac{1}{2}$ - $\frac{1}{2}$ in. diam., subglobose.—Easily recognised by the very thick leaflets and stout cymes. This has been identified by Benth. (*Fl. Hongk.* 216) with *J. paniculatum*, *Roxb.*, a Chinese plant, which has the corolla far smaller (tube $\frac{1}{2}$ in., lobes $\frac{1}{4}$ in.), the cyme less stout, the leaflets obtuse.

37. **J. heterophyllum**, *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 99; leaves alternate simple and 3-foliolate, leaflets ovate-lanceolate glabrous, cymes very compound minutely pilose, corolla yellow tube $\frac{1}{2}$ - $\frac{1}{2}$ in. *Wall. Cat.* 2883; *Don Prodr.* 106; *Wall. Pl. As. Rar.* iii. 47, t. 275; *DC. Prodr.* viii. 312; *Loud. Arb.* 655, t. 1274.

NIPAL; *Wallich, Scully.* MISHMEE; *Griffith.*

Scandent. *Leaves* 5 by $2\frac{1}{4}$ in. (lateral leaflets, when present, smaller), base rounded or cordate, somewhat coriaceous, nerves irregular but distinct beneath. *Cymes* mostly terminal, 10-90-flowered, branches alternate; bracts $\frac{1}{2}$ in., linear; pedicels $0\frac{1}{2}$ in.

Calyx small, minutely pubescent, teeth minute. *Corolla-lobes* $\frac{1}{4}$ in., elliptic, acute. *Carpels* $\frac{1}{3}$ by $\frac{1}{4}$ in., ellipsoid.

38. **J. calophyllum**, Wall. Cat. 2889; leaves opposite and alternate subequally 3-foliolate, leaflets broadly ovate glabrous, cymes compound trichotomous minutely pubescent, corolla-tube $\frac{3}{4}$ in. DC. Prodr. viii. 310; J. courtallense, Wight Ic. t. 1252.

SOUTH DECCAN PENINSULA; Nilgherries, Wight, Foulkes; Courtallum, Wight.

Scandent. Leaflets 2 by $1\frac{1}{2}$ in., obtuse or shortly acute, base rounded truncate or subcordate, membranous, shining, nerves slender. Cymes 10–50-flowered, branches alternate and opposite; bracts minute; pedicels 0– $\frac{1}{2}$ in. *Calyx* nearly glabrous, subtruncate. *Corolla-lobes* $\frac{1}{4}$ – $\frac{1}{2}$ in., elliptic, obtuse. *Carpels* $\frac{1}{2}$ in., ellipsoid.

39. **J. dispernum**, Wall. Cat. 2886, and in Roxb. Fl. Ind. ed. Carey & Wall. i. 99, and Pl. As. Rar. iii. 46, t. 274; leaves opposite 3–5-foliolate, leaflets cordate-lanceolate glabrous sub-3-nerved, cymes somewhat dense puberulous or pubescent running into terminal panicles, corolla-tube $\frac{1}{2}$ in. Don Prodr. 106; DC. Prodr. viii. 310; Brand. For. Fl. 312.

TEMPERATE HIMALAYA; alt. 2–8000 ft., from Kashmir to Bhotan, common. KHASIA Mts., alt. 3–6500 ft., common.

Scandent. Terminal leaflet $3\frac{1}{2}$ by $1\frac{1}{2}$ in., acuminate, coriaceous; lateral leaflets 1 or often 2 pairs, smaller. Cymes when axillary 10–20-flowered; upper leaves often gradually reduced to bracts $\frac{1}{5}$ in. long, whence arises a terminal elongate panicle 60–100-flowered; proper bracts $\frac{1}{10}$ in.; pedicels 0– $\frac{1}{2}$ in. *Calyx* glabrous or minutely puberulous, teeth $\frac{1}{25}$ in., short-triangular. *Corolla* white; lobes $\frac{1}{4}$ – $\frac{1}{3}$ in., broadly elliptic. *Carpels* $\frac{1}{2}$ by $\frac{1}{4}$ in., ellipsoid.

40. **J. humile**, Linn.; DC. Prodr. viii. 313; glabrous or puberulous, leaves alternate 3-foliolate or pinnate, leaflets rhomboid oblong coriaceous, cymes somewhat dense, calyx-teeth very short, corolla yellow tube $\frac{1}{2}$ – $\frac{2}{3}$ in. Bot. Reg. t. 350. J. chrysanthemum, Roxb. Hort. Beng. 3, and Fl. Ind. ed. Carey & Wall. i. 98. J. revolutum, Sims in Bot. Mag. t. 1731; Bot. Reg. t. 178; Don Prodr. 106; Wall. Cat. 2887; Lodd. Bot. Cab. t. 966; DC. l. c. 312; Wight Ic. t. 1258; Loud. Arb. 655, t. 1275; Brand. For. Fl. 313; Boiss. Fl. Orient. iv. 42. J. bignoniaceum, Wall. Cat. 2888; DC. l. c. 313. J. Wallichianum, Lindl. in Bot. Reg. t. 1409. J. inodorum, Jacquem.; Dcne. in Jacq. Voy. Bot. 139, t. 143; DC. l. c. 312.—*Jasminum*, n. 3, Hardwicke in As. Research. vi. 349.

SUBTROPICAL HIMALAYA, alt. 2–5000 ft., from Kashmir to Nipal, common. BHOTAN; Griffith. SOUTH INDIA AND CEYLON, alt. 2–6000 ft., common.—DISTRIB. Cabul (cultivated widely).

An erect rigid, ramous shrub. Leaflets 2 by $\frac{3}{4}$ –1 in., or $\frac{1}{2}$ by $\frac{1}{4}$ in., very variable in size, usually smaller when more numerous, acute or obtuse at both ends; nerves inconspicuous. Cymes 10–20-flowered; bracts minute; pedicels $\frac{1}{8}$ – $\frac{3}{4}$ in. *Calyx* glabrous or nearly so; teeth $\frac{1}{16}$ in., triangular-oblong. *Corolla-lobes* $\frac{1}{3}$ by $\frac{1}{5}$ in. *Carpels* $\frac{1}{2}$ by $\frac{1}{4}$ in., ellipsoid.

41. **J. pubigerum**, Don Prodr. 106; softly densely villous, leaves alternate 3–7-foliolate, leaflets ovate or oblong, cymes dense, calyx-teeth $\frac{1}{20}$ – $\frac{1}{10}$ in. densely villous, corolla-tube $\frac{3}{4}$ in. DC. Prodr. viii. 312, excl. var. β .

NORTH-WEST INDIA; Royle.

An erect shrub, in habit closely resembling *J. humile* and perhaps a var. thereof, but there are no examples intermediate in hairiness. Branches dense, villous. Leaflets $1\frac{1}{2}$ –2 in., from suborbicular to oblong, closely villous on both surfaces. Cyme nearly sessile, 15-flowered, very villous. *Calyx-teeth* linear, short but much longer than in *J. humile*.—Perhaps a garden plant.

42. **J. officinale**, Linn.; *DC. Prodr.* viii. 313; glabrous or nearly so, leaves opposite pinnate, leaflets rhomboid oblong acute, calyx-teeth linear long, corolla white tube $\frac{2}{3}$ in. *Bot. Mag.* t. 31; *Brand. For. Fl.* 313; *Boiss. Fl. Orient.* iv. 43.

KASHMIR; alt. 3-9000 ft., frequent.—DISTRIB. Cabul, Persia (often cultivated in India, China, Europe, &c.).

* *Branches* very long, weak, requiring support, hardly scandent. *Cymes* terminal, 1-10-flowered, often leafy; bracts $\frac{1}{2}$ in., linear; pedicels 0- $\frac{2}{3}$ in. *Calyx-teeth* $\frac{1}{2}$ - $\frac{2}{3}$ in., sometimes as long as the corolla-tube, sometimes (in the same plant) not half so long. *Corolla-lobes* $\frac{1}{2}$ by $\frac{1}{4}$ in. *Carpels* $\frac{1}{2}$ by $\frac{1}{4}$ in., ellipsoid.

43. **J. grandiflorum**, Linn.; *DC. Prodr.* viii. 313; glabrous or nearly so, leaves opposite pinnate, leaflets rhomboid-oblong, calyx-teeth linear long, corolla white tube $\frac{2}{3}$ in. *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 98; *Bot. Reg.* t. 91; *Wall. Cat.* 2885; *Wight Ic.* t. 1257; *Brand. For. Fl.* 313; *Kurz For. Fl.* ii. 150, and in *Journ. As. Soc.* 1877, pt. ii. 242. *J. aureum*, *Don Prodr.* 106; *DC. l. c.* 314?—*Rheede Hort. Mal.* vi. t. 52.

SUBTROPICAL NORTH-WEST HIMALAYA, alt. 2-5000 ft.; frequent, wild (fide *Brandis*; elsewhere in India often cultivated).

Branches subpendent, angular, hardly requiring support. *Calyx-teeth* about $\frac{1}{4}$ in., rarely half as long as the corolla-tube. *Corolla-lobes* attaining $\frac{1}{2}$ in.—Otherwise hardly distinguishable from *J. officinale*.

EXCLUDED SPECIES (not British Indian).

J. EXTENSUM, *Wall. Cat.* 2862; *DC. Prodr.* viii. 308; *Kurz For. Fl.* ii. 150.—Birma.

J. LIGUSTRIFOLIUM, *Wall. ms.*; *Bejer Hort. Maurit.* 204, *DC. Prodr.* viii. 305.—Birma, beyond the British frontier.

J. TUBIFLORUM, *Roxb. Cat. Pl.* (1813), *Fl. Ind. ed. Carey & Wall.* i. 96.—This is supposed to be the origin of *J. SOLENANTHUM*, *DC. Prodr.* viii. 306, founded on a specimen cultivated in the Mauritius. Malay Islds.

J. ORLONGUM, *Burm. Fl. Ind.* 6, t. 3, fig. 2; *DC. Prodr.* viii. 312.—Java.

2. NYCTANTHES, Linn. in part.

A small tree. *Leaves* opposite, ovate. *Flowers* in small, sessile, bracteate heads disposed in terminal trichotomous cymes. *Calyx* ovoid-cylindric, subtruncate, finally split or deciduous. *Corolla* salvershaped; tube cylindric, yellow; lobes 4-8, imbricated in bud, patent, white. *Anthers* 2, subsessile near the top of the corolla-tube. *Ovary* 2-celled; style cylindric, very shortly bifid; ovule 1 in each cell, erect, basal. *Capsule* orbicular, compressed parallel to the partition, ripe separating into 2 subdiscoid carpels. *Seed* erect, orbicular, flattened, testa thin, albumen 0; cotyledons flat, radicle inferior.

N. Arbor-tristis, Linn.; *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 85; *Wall. Cat.* 2846; *Bot. Reg.* t. 399; *Lamk. Ill.* t. 6; *DC. Prodr.* viii. 314; *Bot. Mag.* t. 4900; *Bedd. Fl. Sylv.* t. 240; *Eichler in Mart. Bras.* vi. pt. i. 317, t. 84, fig. 3; *Brand. For. Fl.* 314; *Kurz For. Fl.* ii. 155, and in *Journ. As. Soc.* 1877, pt. ii. 240. *Parilium Arbor-tristis*, *Gaertn. Fruct.* i. 234, t. 51. *Scabrita scabra*, Linn.; *Vahl Symb.* ii. 28; *Gaertn. Fruct.* ii. 265, t. 138. *S. triflora*, Linn. *Mant.* i. 37.—*Rheede Hort. Mal.* i. t. 21. *Sephalica*, *Jones in As. Research.* iv. 244.

CENTRAL INDIA, alt. 1-3000 ft., common, to Bundelkund and Burdwan; reappearing in the Oudh and North-west Terai (cultivated throughout India, and in both hemispheres).

Erect, 30 ft., but often forming coppice, scabrid-pilose. *Leaves* $4\frac{1}{2}$ by $2\frac{1}{2}$ in., acute, base rounded or cuneate; petiole $\frac{1}{2}$ in., not articulated. *Flowers* 3-7 in each head, sweet-scented; bracts $\frac{1}{4}$ - $\frac{1}{2}$ in., elliptic. *Calyx* $\frac{1}{5}$ in. *Corolla-tube* $\frac{1}{4}$ - $\frac{1}{3}$ in.; lobes $\frac{1}{5}$ - $\frac{1}{4}$ in., elliptic. *Capsule* $\frac{3}{4}$ in. long and broad by $\frac{1}{8}$ - $\frac{1}{6}$ in. thick.

3. SCHREBERA, Roxb.

A tree. *Leaves* opposite, unequally pinnate. *Flowers* in terminal 2-3-chotomous compound cymes; bracts small. *Calyx* tubular-campanulate, irregularly 4-7-lobed. *Corolla* salvershaped; tube cylindric; lobes imbricate in the bud, 4-7, patent. *Stamens* 2, near the top of the corolla-tube; filaments short. *Ovary* 2-celled; style cylindric, shortly 2-lobed; ovules 3-4 in each cell, pendulous from its apex. *Capsule* obovoid, 2-celled, loculicidally 2-valved, woody. *Seeds* pendulous, winged, albumen 0; cotyledons plano-convex or contorted, radicle superior.—DISTRIB. Species 4; 1 Indian, 3 African.

S. swietenoides, Roxb. *Cor. Pl.* ii. t. 101, and *Fl. Ind. ed. Carey & Wall.* i. 109; minutely pubescent or glabrous, leaves 5-7-foliolate, cymes many-flowered, capsule 2 in. pearshaped. *Wight Ill.* t. 162; *Trattin. Arch.* i. 29, with plate; *DC. Prodr.* viii. 675; *Bedd. Fl. Sylv.* t. 248; *Brand. For. Fl.* 305; *Kurz For. Fl.* ii. 156, and in *Journ. As. Soc.* 1877, pt. ii. 243.

TROPICAL HIMALAYA; Kumaon Terai. DECCAN PENINSULA, alt. 1-4000 ft. PEGU; widely diffused, but not abundant.

A tree, 40-50 ft. *Leaflets* 4 by 2 in., ovate, acute, mature glabrous; petiolules $\frac{1}{2}$ in. *Cyme* often 100-flowered; bracts $\frac{1}{2}$ in., linear, or obsolete; pedicels 0- $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in., irregularly 5-lobed, somewhat 2-lipped or subtruncate, minutely pilose or glabrescent. *Corolla* white with brown marks; tube $\frac{1}{4}$ - $\frac{1}{2}$ in.; lobes $\frac{1}{5}$ - $\frac{1}{4}$ in., elliptic. *Anthers* subexserted. *Capsule* 2 by $1\frac{1}{2}$ in., obovoid, obtuse, very woody. *Seeds* usually 3-4 in each cell; cotyledons contorted.

VAR. *pubescens*, Kurz in *Flora*, 1872, p. 398 (sp.); leaves pubescent, cyme villous. —Jubbulpore; Kurz.—A variety of *S. swietenoides* according to Kurz himself in *Journ. As. Soc.* 1877, pt. ii. 243, who says that the capsules are much smaller.

4. SYRINGA, Linn.

Shrubs. *Leaves* opposite, simple or (in cultivation) pinnate. *Panicles* terminal; bracts small or 0. *Calyx* small, campanulate, irregularly toothed or subtruncate, persistent. *Corolla* salvershaped; tube narrow-cylindric; lobes 4, patent, elliptic, induplicate-valvate in bud. *Stamens* 2, near the top of the corolla-tube; filaments short; anthers oblong, laterally dehiscent. *Ovary* 2-celled; style cylindric, included, 2-partite or subsimple; ovules 2 in each cell, pendulous from its apex. *Capsule* oblong, subterete, loculicidally 2-valved. *Seeds* pendulous, compressed, winged, albuminous; cotyledons flat, radicle superior.—DISTRIB. Species 6 (or 11 ex Dcne.), from Eastern Europe to Japan.

1. **S. persica**, Linn.; *DC. Prodr.* viii. 283; leaves 1 in. ovate-lanceolate or lanceolate glabrous, flowers numerous scarcely fascicled. *Bot. Mag.* t. 486; *Wall. Cat.* 2832; *Brand. For. Fl.* 306; *Rev. Hort.* 1878, p. 571-2, with fig.; *Dcne. in Nouv. Arch. Mus.* 2, ii. 42; *Boiss. Fl. Orient.* iv. 38.

WEST KASHMIR; alt. 8000 ft., possibly wild; frequently cultivated in India.—DISTRIB. Persia.

A glabrous shrub. *Leaves* acute, rarely obtuse, sometimes pinnatifid or sub-pinnate, base cuneate; petiole $\frac{1}{2}$ in. *Panicles* compound, glabrous; bracts from $\frac{1}{2}$ in. lanceolate to $\frac{1}{2}$ in. linear, usually inconspicuous; pedicels $\frac{1}{12}$ - $\frac{1}{5}$ in. *Calyx* $\frac{1}{2}$ in., teeth short, triangular. *Corolla* lilac or white; tube $\frac{1}{4}$ in., lobes $\frac{1}{5}$ in. *Capsule* $\frac{1}{2}$ - $\frac{1}{2}$ by $\frac{1}{8}$ in., terete, 4-ribbed.—Persian Lilac.

2. **S. Emodi**, *Wall. Cat.* 2831; leaves 2-5 in. elliptic or ovate glabrous whitened beneath, panicles dense, flowers often fascicled. *Royle Ill.* 267, t. 65, fig. 2; *DC. Prodr.* viii. 283; *Bot. Reg.* 31 (1845), t. 6; *Brand. For. Fl.* 306; *Decne. in Nouv. Arch. Mus.* 2, ii. 40.

SUBALPINE HIMALAYA, alt. 9-12,000 ft., from Kashmir to Kumaon, frequent; *Wallich, Falconer, &c.*

A large shrub. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., acute at both ends, secondary nerves prominently reticulating beneath; petiole $\frac{1}{2}$ - $\frac{2}{3}$ in. *Panicles* dense-flowered; bracts lanceolate, deciduous, usually inconspicuous; pedicels often 0, sometimes $\frac{1}{8}$ in. *Calyx* $\frac{1}{2}$ in., subtruncate, minutely pubescent or nearly glabrous. *Corolla* purplish or white; tube $\frac{1}{4}$ in.; lobes $\frac{1}{2}$ in. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in., terete, 2-grooved, acute.

5. **FRAXINUS**, *Linn.*

Trees. *Leaves* opposite, unequally pinnate. *Inflorescence* terminal or on shortened axillary buds falsely axillary. *Flowers* small, polygamous or dioecious, paniced, racemose or subfascicled; bracts caducous. *Calyx* small, 4-toothed, or 0. *Petals* 0, or 2-4, free or connate in pairs at the base, narrow-oblong, induplicate-valvate in bud. *Stamens* 2, attached near the base of the petals or subhypogynous, filaments short or long. *Ovary* 2-celled; style short or long, bifid; ovules in each cell 2, pendulous from its apex. *Capsule* samaroid, compressed contrary to the partition, produced into a wing, 1-seeded, indehiscent. *Seed* pendulous, oblong; albumen fleshy; cotyledons flat, radicle superior.—**DISTRIB.** Species 30, in the north temperate regions of both hemispheres.

SECT. I. Ornus. *Petals* 2-4. *Flowers* paniced, mostly hermaphrodite.

1. **F. floribunda**, *Wall. Cat.* 2836, and in *Roxb. Fl. Ind. ed. Carey & Wall.* i. 150, and *Pl. As. Rar.* iii. 47, t. 277; leaflets elliptic-lanceolate serrate membranous, secondary nerves reticulated, samaras 1-1 $\frac{1}{2}$ in. very narrow obtuse or emarginate. *Don Prodr.* 106; *DC. Prodr.* viii. 275; *Brand. For. Fl.* 302, t. 37. *F. urophylla*, *Wall. Cat.* 2835; *DC. l. c.* *Ornus floribunda*, *Dietr. Sp. Pl.* i. 249; *Loud. Arb.* 653, t. 1270. *O. urophylla*, *G. Don Gen. Syst.* iv. 57.

TEMPERATE AND SUBALPINE HIMALAYA, alt. 5-11,000 ft., from Kashmir to Bhotan; *Wallich, Griffith, &c.* KHASIA MTS., alt. 4-5000 ft.; *De Silva, H. f. & T.*

A large tree. *Leaflets* 3-4 pairs, 4 by $1\frac{1}{4}$ in., acutely acuminate, serratures close shallow (in the Khasian *F. urophylla* more distant and coarse), glabrous, when young pilose on the nerves beneath; petiolules $\frac{1}{4}$ in. *Pedicels* $\frac{1}{2}$ in., in tufts on the branches of the panicle. *Calyx* $\frac{1}{16}$ - $\frac{1}{24}$ in.; teeth acutely triangular in the typical Kumaon plant, hardly any in the East Himalayan. *Corolla-lobes* $\frac{1}{2}$ - $\frac{1}{2}$ in., linear-oblong. *Filaments* $\frac{1}{12}$ in. *Style* short; stigma long, deciduous. *Samara* $\frac{1}{8}$ in. wide upwards, narrowed to the width of the seed at base.—*F. retusa*, *Champ.* (according to *Benth. Fl. Hongk.* 214), differs in the retuse samara and the subtruncate calyx; but, if these characteristics are specific, the East Himalayan and Khasian examples must be referred to *F. retusa*. The Hongkong *retusa* differs however in the smaller samara, which when fully ripe is less than 1 in. The flowers appear to grow larger westward; in *Wallich's* type example of *F. floribunda* the petals are fully $\frac{1}{2}$ in.

2. **F. Griffithii**, *Clarke*; leaflets elliptic obtusely acuminate entire coriaceous, secondary nerves obscure, samaras 1 in. very narrow obtuse or emarginate.

MISHMEE; "summit of a high mountain," *Griffith* (*Kew Distrib.* n. 3677).

Griffith's example is in ripe fruit, and is perhaps a var. of *F. floribunda*, but differs more from it and from *F. retusa* than these do from each other. The leaflets are very thick, acuminate, rostrate, rounded and sometimes widened at the tip.

SECT. II. **Fraxinaster**. *Petals* 0. *Flowers* polygamous or dioecious. *Pedicels* in fruit racemed or subfascicled.

3. **F. excelsior**, *Linn.*; *DC. Prodr.* viii. 276; leaflets 2-5 pairs all sessile or nearly so, calyx in all the flowers obsolete, pedicels in fruit racemed. *Engl. Bot.* t. 1692; *Lamk. Ill.* t. 858, fig. 1; *Brand. For. Fl.* 303; *Boiss. Fl. Orient.* iv. 39. *F. heterophylla*, *Vahl Enum.* i. 53 (and several others). *F. Moorcroftiana*, *Wall. Cat.* 2834; *DC. l. c.* 275, not of *Brandis*. *Ornus Moorcroftiana*, *G. Don Gen. Syst.* iv. 57.

TEMPERATE WEST HIMALAYA and WESTERN TIBET, alt. 4-9000 ft.; Ladak; *Moorcroft*; from Kashmir, frequent; *Jacquemont*; *Jamu* and *Kishtwar*, *T. Thomson*.—DISTRIB. From the Caucasus westwards to Britain.

A large tree. *Leaflets* 4 by $1\frac{3}{4}$ in., elliptic, acuminate, serrate sessile or very nearly so, midrib beneath glabrous or minutely pubescent. *Flowers* in short racemes, fascicled near the tips of the branches, appearing before the leaves; male and hermaphrodite alike without perianth. *Filaments* very short. *Racemes* in fruit 1-6 in., pendulous; pedicels $\frac{1}{4}$ in.; samaras $1\frac{2}{3}$ by $\frac{1}{4}-\frac{1}{3}$ in., narrowed gradually to both the obtuse ends.—In the absence of flowers *Brandis* hesitates about identifying this with *F. excelsior*, but the tree is plentiful in Kashmir hills and exactly like the common Ash.

4. **F. xanthoxylodes**, *Wall. Cat.* 2833; leaflets 3-5 pairs lowest petiolulate, calyx 0 in the male flowers small in the hermaphrodite, pedicels in fruit in very short racemes or subfascicled. *DC. Prodr.* viii. 275; *Brand. For. Fl.* 304; *Boiss. Fl. Orient.* iv. 41. *F. Moorcroftiana*, *Brand. For. Fl.* 304, not of *Wall.* *Ornus xanthoxylodes*, *G. Don Gen. Syst.* iv. 57.

TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 3-9000 ft., abundant in places (*Brandis*).—DISTRIB. Cabul and Beloochistan.

A tree 25 ft., or more often a shrub. *Leaflets* 2 by $\frac{3}{4}$ in., hardly acuminate, crenulate-serrate, glabrous, or often slightly hairy near the base of the midrib beneath; lowest petiolules usually $\frac{1}{8}$ in., distinct, sometimes subobsolete. *Flowers* appearing before the leaves in dense heads, brown from the woolly bracts. *Filaments* short; anthers oblong. *Racemes* in fruit $\frac{1}{2}$ in., or the pedicels $\frac{1}{4}$ in., appearing fascicled. *Calyx* in fruit often $\frac{1}{10}$ in., obtuse, striated lengthwise or not. *Fruit* $1\frac{1}{2}$ by $1\frac{1}{4}$ in.—The Cabul examples of *Griffith* have the samara $\frac{1}{2}$ (sometimes very nearly $\frac{1}{3}$) in. broad. *F. dimorpha*, *Coss & Dur.*, from Algiers, does not appear to differ except in all the leaflets being sessile or very nearly so.

6. **OSMANTHUS**, *Lour.*

Evergreen shrubs or trees, glabrous. *Leaves* opposite, entire or serrate. *Flowers* axillary and terminal, fascicled or in very short racemes; hermaphrodite or polygamous. *Calyx* 4-toothed or -lobed. *Corolla-tube* short or long; lobes 4, elliptic, obtuse, imbricated. *Stamens* 2, subsessile on the corolla-tube. *Ovary* 2-celled; style short or cylindric, 2-lobed or subentire; ovules 2 in each cell, pendulous from its apex. *Drupe* ovoid or globose; endocarp bony or crustaceous. *Seeds* pendulous, usually solitary, albumen fleshy; radicle superior.—DISTRIB. Species 8, extending from the N.W. Himalaya through China and Japan to Western N. America.

The character of this genus is here considerably widened from that of *Gen. Pl.* (ii. 677), to include *O. suavis*, *King*.

1. **O. fragrans**, *Lour. Fl. Cochinch.* i. 29; leaves lanceolate acuminate, calyx minute, corolla less than $\frac{1}{8}$ in. tube very short. *DC. Prodr.* viii. 291. *Olea fragrans*, *Thunb. Fl. Jap.* 18, t. 2; *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed.*

Carey & Wall. i. 104; *Wall. Cat.* 2810; *Bot. Mag.* t. 1552; *Blume Mus. Bot.* i. 316; *Brand. For. Fl.* 309. *O. acuminata*, *Wall. Cat.* 2809; *DC. l.c.* 285.

TEMPERATE HIMALAYA, alt. 4-7000 ft., from Gurwhal to Sikkim; *Wallich, H. f. & T.*, &c. KHASIA MTS.; *Griffith, Lobb.* (According to Brandis only planted in Gurwhal and Kumaon).—DISTRIB. China, Japan, cultivated.

A small tree or a shrub. *Leaves* 7 by 2 in., entire in the wild plants, often serrated in the cultivated, coriaceous; petiole $\frac{2}{3}$ in. *Pedicels* $\frac{1}{4}$ – $\frac{3}{4}$ in., densely fascicled, often in the upper axils, rarely terminal. *Calyx* less than $\frac{1}{10}$ in., 4-toothed. *Corolla* divided nearly to the base; lobes oblong. *Drupe* $\frac{3}{4}$ by $\frac{1}{2}$ in., ellipsoid.—The fruit is only known from the Kumaon tree (a cultivated plant, ex *Brandis*). The cultivated *O. fragrans* is not known to produce fruit elsewhere.

2. *O. suavis*, *King in Herb. Calc.*; leaves lanceolate acute, calyx $\frac{1}{8}$ – $\frac{1}{6}$ in. deeply 4-lobed, corolla-tube $\frac{1}{8}$ – $\frac{1}{4}$ in. *Olea* sp., *Griff. Itin. Notes*, 156, n. 785.

SUBALPINE HIMALAYA; Sikkim and East Nipal, alt. 9-10,000 ft., Tonglo and Kalapookree, *J. D. H., King*; Bhotan *Griffith*.

A bush, 12 ft., or a small tree (*King*). *Leaves* $3\frac{1}{2}$ by 1 in., acute, base cuneate, minutely crenate-serrate, coriaceous; petiole $\frac{1}{2}$ in. *Pedicels* 0– $\frac{1}{4}$ in., in dense axillary and terminal fascicles. *Flowers* polygamous. *Calyx-lobes* oblong, obtuse, microscopically pubescent. *Corolla-tube* $\frac{1}{4}$ in. and upwards (both in the male and hermaphrodite flowers) in *King's* specimens; in *Griffith's* varying from $\frac{1}{10}$ to $\frac{1}{5}$ in. (in flowers male or nearly male); corolla-lobes $\frac{1}{2}$ in., strongly imbricated in the bud. *Anthers* subsessile near the top of the tube, elliptic, acute. *Style* $\frac{1}{8}$ in., tip bifid. *Drupe* $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in., ellipsoid; endocarp thin, crustaceous. *Albumen* copious, fleshy.—*Griffith* made a long MS. note on this species: it does not agree well with *Osmanthus* to which *King* refers it, but there appears no other place for it unless a new genus.

7. LINOCIERA, Swartz.

Shrubs or trees. *Leaves* opposite, entire. *Flowers* in axillary (rarely terminal) panicles or cymes, often in small terminal fascicles; bracts at the divisions small. *Calyx* small, 4-fid. *Petals* 4, long or short, nearly free, or cohering by pairs, or very shortly connate, induplicate-valvate in bud. *Stamens* 2; filaments short; anthers elliptic, dehiscing on the margin. *Ovary* 2-celled; style short, stigma obscurely bifid or entire; ovules 2 in each cell, pendulous from its apex. *Drupe* ellipsoid (rarely globose); endocarp bony or crustaceous. *Seed* usually solitary, pendulous, testa thin, albumen fleshy plentiful or 0; radicle superior.—DISTRIB. Species 40, in the tropics of both hemispheres.

Olea only differs by having the corolla more distinctly tubular. Many authors place the albuminous species in *Olea*, and the exalbuminous in *Linociera*; but the albumen is unknown in so many species that this arrangement is inconvenient, while it throws into different genera the very long-petaled species closely allied in every point except the albumen.

SECT. I. **Eulinociera.** *Seeds* albuminous (*Petals* elongate).

1. *L. malabarica*, *Wall. Cat.* 2828; leaves broadly oblong hardly acuminate, flowers in small clusters, calyx-lobes grey-pilose, petal $\frac{1}{4}$ in. linear-lanceolate connected in pairs, ovary pilose. *DC. Prodr.* viii. 297; *Wight Ic.* t. 1246; *Dalz. & Gibs. Bomb. Fl.* 179. *Chionanthus malabarica*, *Bedd. For. Man.* 154, and *Fl. Sylv.* t. 239, fig. in corner.

DECCAN PENINSULA; from the Concan, *Dalzell*, to Courtallum, *Wight*; frequent.

A small tree. *Leaves* 4 by $1\frac{3}{4}$ in., subobtusely or very suddenly narrowed to an obtuse apex, base cuneate, glabrous, coriaceous, nerves obscure; petiole $\frac{1}{4}$ in. *Peduncles* short, axillary, fascicled, numerous, grey-pilose, sparingly panicked; bracts $\frac{1}{30}$ in., ovate, grey-pilose. *Calyx-lobes* $\frac{1}{24}$ in., ovate, grey-pilose on the back.

Petals white. *Style* shortly bifid. *Drupe* $\frac{1}{3}$ – $\frac{1}{2}$ by $\frac{1}{4}$ – $\frac{1}{3}$ in., ellipsoid; endocarp thin, crustaceous. *Testa* thin, albumen plentiful.

2. ***L. Wightii***, *Clarke*; leaves elliptic acuminate or rostrate, flowers in small clusters, calyx-lobes glabrous on the back ciliate, petals $\frac{1}{2}$ in. linear-lanceolate connected in pairs often for one-third their length, ovary glabrous. *Olea linocieroides*, *Wight Ic. t.* 1241; *Bedd. For. Man.* 152.

DECCAN PENINSULA; Courtallum; *Wight*. Tinnevely Ghauts, alt. 1–3000 ft., *Beddome*.

A small tree. *Leaves* 4 by $1\frac{1}{2}$ in., base obtusely cuneate, coriaceous, nerves obscure or somewhat plainly inarching; petiole $\frac{1}{2}$ in. *Peduncles* short, axillary, clustered, glabrous, sparingly panicle; bracts $\frac{1}{30}$ in., ovate, glabrous. *Calyx-lobes* $\frac{1}{4}$ in., ovate. *Drupe* $\frac{1}{3}$ – $\frac{1}{2}$ by $\frac{1}{4}$ – $\frac{1}{3}$ in., ellipsoid; endocarp thin, crustaceous. *Testa* thin, albumen plentiful.—Hardly differs from *L. malabarica*, but by the points specified in the diagnosis. *Wight's Herbarium* contains the ripe fruit, which is as depicted by him.

SECT. II. ***Ceranthus***. *Seeds* exalbuminous. (Several species, in which the seed is not known may prove to be *Oleas*.)

3. ***L. purpurea***, *Vahl Enum. i.* 47; leaves obovate-oblong obtuse coriaceous, panicles very small closely pubescent, petals 4 subequal $\frac{1}{10}$ in., drupe $\frac{1}{2}$ – $\frac{3}{4}$ in. ellipsoid. *Wall. Cat.* 2829; *DC. Prodr. viii.* 297. *Chionanthus zeylanica*, *Linn.*; *Thwaites Enum.* 188; *Roxb. Fl. Ind. ed. Carey & Wall. i.* 107; *Bedd. For. Man.* 154. *Thouinia nutans*, *Linn. f. Suppl.* 89.

CEYLON; common in the hotter parts of the island.

A small tree; branchlets minutely pubescent. *Leaves* $2\frac{1}{2}$ by 1 in., tip very obtuse or rounded, base attenuate, nerves slightly impressed beneath distinctly inarching; petiole $\frac{1}{2}$ in. *Panicle* $\frac{1}{2}$ –1 in., somewhat dense, grey-pubescent; lower bracts $\frac{1}{2}$ in., lanceolate, upper $\frac{1}{30}$ in., ovate. *Calyx* very small. *Ovary* glabrous.

VAR. *dichotoma*, *Wall. Cat.* 2825 (sp.); leaves elliptic or oblong subacute at both ends very coriaceous nerves less distinct, panicles 1–4 in. lax nearly glabrous, petals $\frac{1}{2}$ – $\frac{3}{4}$ in. *DC. Prodr. viii.* 297.—Ceylon.

4. ***L. albidiflora***, *Thwaites Enum.* 189; leaves elliptic shortly suddenly rostrate coriaceous, panicles small nearly glabrous, petals 4 subequal $\frac{1}{6}$ – $\frac{1}{4}$ in. and upwards, drupe $\frac{1}{2}$ – $\frac{3}{4}$ in. *Chionanthus axillaris*, *R. Br. Prodr.* 523 ?.

CEYLON; alt. 1–3000 ft., abundant, *Thwaites*.—DISTRIB. Australia.

A small tree; nearly glabrous. *Leaves* $2\frac{1}{2}$ by $1\frac{1}{2}$ in.; nerves beneath slightly impressed, distinctly inarching. *Panicles* $\frac{1}{2}$ –1 in.; bracts $\frac{1}{30}$ in., ovate, minutely ciliate-pubescent. *Calyx* $\frac{1}{20}$ in., glabrous; lobes minutely ciliate-pubescent. *Petals* pale yellow (*Thwaites*). *Ovary* glabrous.—This seems hardly specifically distinct from *L. purpurea* if in that species we include the larger flowered *L. dichotoma*. *Beddome (For. Man. 154)* reduces it with confidence to *L. malabarica*; but (apart from the presence of albumen) *L. malabarica* has the flowers in small capitate clusters at the extremities of peduncles much longer than the heads themselves. The example communicated from Australia by F. Mueller appears identical with the Ceylon specimens; F. Mueller is very probably right in supposing it to have been *Chionanthus axillaris*, R. Br., but the diagnosis of Brown is very short.

VAR. *rostrata*, *Thwaites Enum. Pl. Zeyl.* 189 (sp.); fruit 1 by $\frac{1}{2}$ in.—Ceylon; Hinidoon Corle, *Thwaites*.—Except in the somewhat larger fruit, *Thwaites' examples* of this appear identical with his *L. albidiflora*.

5. ***L. leprocarpa***, *Thwaites Enum.* 189; leaves oblong acuminate coriaceous, panicles small minutely glandulose-pilose, drupe ovoid large. *Chionanthus leprocarpa*, *Bedd. For. Man.* 154.

CEYLON; Central Province, alt. 3–4000 ft., rather rare, *Thwaites*.

Appears closely allied to *L. purpurea*. *Leaves* $5\frac{1}{2}$ by $1\frac{1}{2}$ in., base narrowly cuneate,

very thick; nerves beneath somewhat obscure, inarching. *Fruit* 1 by $\frac{2}{3}$ in., rough, blotched, fide *Thwaites*, but when dry does not differ in this respect from the neighbouring species.—*Thwaites's* example is not in flower; nor does *Thwaites* explicitly state that the seed is exalbuminous.

VAR. *courtallensis*; leaves elliptic-oblong subacute hardly acuminate drying reddish. *Chionanthus courtallensis*, *Bedd. For. Man.* 154.—*Courtallum*, *Wight*. Tinnevely Ghats; *Beddome*.—A good-sized tree (*Beddome*), glabrous. *Leaves* $7\frac{1}{2}$ by $2\frac{1}{2}$ in., nerves beneath subobscurely inarched. *Panicles* $\frac{1}{2}$ –1 in., usually reduced to 3–5 subsimple racemes fascicled in each axil, glabrous. *Petals* scarcely $\frac{1}{8}$ in. *Drupe* unknown.—The flowers of this have been in the Herbarium matched with the fruit of *L. leprocarpa*; the identification must be uncertain until further material is received.

6. *L. intermedia*, *Wight Ic. t.* 1245; glabrous, leaves elliptic-oblong acute at both ends secondary nerves prominent, panicles compound somewhat dense, petals $\frac{1}{8}$ in. narrowly oblong, drupe $\frac{2}{3}$ by $\frac{1}{2}$ in. *Chionanthus intermedia*, *Bedd. Fl. Sylv. t.* 239.

NILGHERRIES, alt. 1–6000 ft.; *Wight, Hohenacker, &c.* **ANAMALLAYS**; alt. 5000 ft., *Beddome*.

A large tree, *Beddome*, more often small. *Leaves* $6\frac{1}{2}$ by $2\frac{1}{2}$ in., chartaceous; nerves 10 pairs, reticulations many prominent; petiole $\frac{1}{2}$ –1 in. *Panicle* 2–5 in.; branches compressed; bracts $\frac{3}{10}$ in., ovate; pedicels often hardly any. *Calyx* $\frac{1}{10}$ in., lobes ovate glabrous. *Petals* 4, shortly united at the base, obscurely disposed in pairs. *Ovary* glabrous.—*Chionanthus picrophloia*, *F. Muell. Fragm. iii.* 139, t. 24, does not appear to differ; the inflorescence in the picture is subcapitate, but in the specimens is densely paniculate, as in *L. intermedia*.

VAR. *Roxburghii*; panicles smaller, drupes scarcely $\frac{1}{2}$ in., seed exalbuminous. *Olea paniculata*, *Roxb. Catal. Pl.* (1813), and in *Fl. Ind. ed. Carey & Wall.* i. 104. *O. Roxburghii*, *Spreng. Syst. i.* 34; *Wight Ic. t.* 735, not of Wall. *O. Roxburghiana*, *Roem. et Sch. Mant. i.* 77; *DC. Prodr. viii.* 286; *Dalz. & Gibs. Bomb. Fl.* 159; *Bedd. For. Man.* 153.—Orissa and Circars, *Roxburgh*. Chota Nagpore, alt. 2–5000 ft.; *J. D. H., &c.* Western Ghats; *Dalzell, Beddome, &c.*—Sumbulpore; *Griffith*. Siwaliks; *Edgeworth*. At 4500 ft. alt. this is a gnarled tree 25 ft. high. The examples of *Griffith* and *Edgeworth* have narrower (obovate-lanceolate) leaves. *Linociera*? oblonga, *Wall. Cat.* 2843, from Ava, appears the same, but the example consists of very young fruits and leaves only.

7. *L. pauciflora*, *Clarke*; glabrous, leaves large elliptic-oblong somewhat acuminate coriaceous, panicles very small. *Olea pauciflora*, *Wall. Cat.* 2812, letter a only; *DC. Prodr. viii.* 288, partly.

PENANG; *Wallich*.

Leaves $7\frac{1}{2}$ by $2\frac{1}{2}$ in., shortly obtusely acuminate, base cuneate; nerves 11 pairs, subprominent beneath, secondary nerves obscure; petiole $\frac{1}{4}$ in. *Panicles* reduced to subsimple erect spikes 1 in. *Flowers* in bud, seem likely to be small. *Drupe* not seen.—This could hardly be distinguished from *L. leprocarpa*, var. *courtallensis*, but by the subsolitary racemes. If, however, as *Wallich* supposed, the next variety is really its young fruit, it must be altogether different.

VAR. *evolutior*; nerves more distinct, petioles 1– $1\frac{1}{2}$ in., panicles in young fruit 2–6 in. compound lax, branches stout angular, pedicels thickened. *L. pauciflora*, *Wall. Cat.* 2812, b only.—Penang; *Wallich*. Tenasserim or Andamans, *Helfer*.—The seeds are immature but probably exalbuminous.

VAR. *palembanica*; leaves as of *L. pauciflora*, *Wall. a*, panicles 2–5 in. compound, petals $\frac{1}{10}$ in. elliptic-oblong, fruits not seen. *Chionanthus palembanica*, *Miq. Fl. Ind. Bat. Suppl.* 558; *Kurz For. Fl. ii.* 159, and in *Journ. As. Soc.* 1877, pt. ii. 243.—Andamans; *Kurz, Helfer*.—*Kurz* says the drupe is 1– $1\frac{1}{2}$ in., ovoid to oblong. In one branch of *Helfer's* the petioles vary from $\frac{1}{4}$ to $\frac{3}{4}$ in. The upper bracts are sometimes $\frac{1}{2}$ in., subfoliaceous, both in *Miquel's* and *Helfer's* examples.

8. ***L. terniflora***, Wall. Cat. 2845; leaves oblong acuminate coriaceous, nerves inarching distinct on both surfaces, flowers in small heads in small pubescent panicles, petals $\frac{1}{2}$ – $\frac{1}{6}$ in. united in pairs, ovary pilose. *DC. Prodr.* viii. 297. *Olea terniflora*, Kurz For. Fl. ii. 157, and in *Journ. As. Soc.* 1877, pt. ii. 244.

BIRMA; on the Saluen, Wallich; Pegu—Yomah, Kurz.

Innovations fulvous-pilose. Leaves $6\frac{1}{2}$ by 2 in., sometimes more elliptic, glaucous-green, narrowed at both ends, apex obtuse; nerves 3 pairs, impressed above; petiole $\frac{1}{2}$ in. Panicles 1–3 in., divaricate with few heads, grey-pubescent; heads often 3-flowered. Calyx $\frac{1}{5}$ in.; lobes broad, patent, thin, ciliate-pubescent. Petals united about one-third their length. Ovary minutely pilose; style twice as long as the ovary, pilose below. Drupe $\frac{1}{2}$ by $\frac{1}{4}$ in.; seed exalbuminous in Kurz's own example, who nevertheless removes the species to *Olea*.—Setting aside the albumen, the species appears closely allied to *Linociera malabarica*.

VAR. *acuminata*, Wall. Cat. 2844 (sp.); primary nerves obscure somewhat impressed beneath not prominently inarched, petals united in pairs for half their length, ovary densely pilose, style much shorter than the ovary. *DC. Prodr.* viii. 298. *Linociera* sp. n. 6, *Herb. Ind. Or. H. f. & T.*—Birma; on the Saluen, Wallich; Moulemein; Griffith (Kew Distrib. n. 3689); Chittagong; *H. f. & T.*

9. ***L. insignis***, Clarke; leaves large obovate-lanceolate, panicles compound pubescent, petals 4 nearly free oblong-linear. *Chionanthus insignis*. *Miq. Fl. Ind. Bat. Suppl.* 559. *Ch. montanus*, Kurz For. Fl. ii. 159, and in *Journ. As. Soc.* 1877, pt. ii. 243, not of Blume.

TENASSERIM, Helfer (Kew Distrib. n. 3688); Martaban, alt. 1–2000 ft., rather rare, Kurz.—DISTRIB. Sumatra.

A small tree (Kurz); innovations ashy-pubescent. Leaves $9\frac{1}{2}$ by $2\frac{3}{4}$ in., shortly acuminate, base attenuated, glabrous; nerves 12 pairs, prominent beneath, secondary obscure; petiole $1\frac{1}{4}$ in. Panicles 2–4 in., ashy-pubescent; bracts $\frac{1}{2}$ in., linear, some $\frac{3}{4}$ in., subfoliaceous, often added; pedicels often hardly any. Calyx $\frac{1}{5}$ in., pubescent; lobes deep, almost acute. Petals $\frac{1}{2}$ – $\frac{1}{6}$ in., oblong, margins much incurved. Ovary microscopically pilose; style as long as the ovary, terminated by 2 short lobes. Drupe 1 in. (Kurz); the fruit in the examples seen is very imperfectly ripe, but seems likely to be larger.—*Chionanthus macrocarpa*, Blume (Mus. Bot. i. 319), has drupes $1\frac{1}{2}$ by $\frac{3}{4}$ in. and obtuse petals, but the leaves and inflorescence are exceedingly like the present plant. Kurz supposes the Tenasserim plant to be *Chionanthus montana*, Blume (altered to *Ch. monticola* in Mus. Bot. i. 317), but the plentiful examples communicated show this to be a totally different species with much smaller leaves and very small glabrous panicles.

10. ***L. minutiflora***, Clarke; leaves obovate-oblong subacute, panicles compound, calyx nearly glabrous, petals $\frac{1}{2}$ in. free narrowly oblong. *Chionanthus minutiflora*, Kurz For. Fl. ii. 159, and in *Journ. As. Soc.* 1877, pt. ii. 243.

MARTABAN HILLS; east of Tounghoo, Brandis.

Leaves $4\frac{1}{2}$ by $1\frac{1}{2}$ in., base cuneate, coriaceous; nerves few, slender, prominent beneath, secondary obscure; petiole $\frac{1}{4}$ in. Panicles 3–4 in., minutely ashy-pubescent, branches in flower long slender; bracts $\frac{1}{16}$ in., linear; pedicels hardly any. Calyx $\frac{1}{16}$ in.; lobes ovate, glabrous or puberulous. Ovary glabrous; style very short. Drupe not seen.—The examples from Kurz's herbarium are very imperfect; they appear closely allied to *L. laxiflora*, Blume (common in Malaya), which has, however, a very pubescent calyx.

11. ***L. macrophylla***, Wall. Cat. 2826; leaves large long-petioled oblong acute distinctly nerved, panicles compound dense less than one-third as long as the leaves glabrous, pedicels 0– $\frac{1}{2}$ in., petals $\frac{1}{2}$ in. nearly free oblong, drupe $\frac{3}{4}$ by $\frac{1}{2}$ in. *DC. Prodr.* viii. 297. *Chionanthus macrophylla*, Kurz For. Fl. ii. 159, and in *Journ. As. Soc.* 1877, pt. ii. 243.

SILHET; *Wallich*. ASSAM; *Griffith, Jenkins*. KHASIA; *Griffith*.

A small tree; glabrous or nearly so. *Leaves* 8 by $2\frac{1}{4}$ in. (sometimes $9\frac{1}{2}$ by 4 in.), acute at both ends, chartaceous, often punctate on the upper surface; nerves 10–13 pairs, secondary distinct; petiole 1– $1\frac{1}{4}$ in. *Panicles* 1– $1\frac{1}{2}$ in. in the type specimens, 1–4 in. in cultivated ones; bracts minute. *Calyx* glabrous. *Petals* obtuse, margins little incurved. *Ovary* glabrous; style short. *Fruit* elongate ellipsoid, on greatly thickened pedicels; endocarp crustaceous; testa thin; albumen 0.

VAR. attenuata; panicle more lax, in fruit slenderer with pedicels less thickened. *L. tenuiflora*, *Wall. Cat.* 2827; *DC. Prodr.* viii. 298. *Olea attenuata*, *Wall. Cat.* 2839; *DC. l. c.* 286. *Chionanthus ramiflora*, *Roxb. Hort. Beng.* 3, and *Fl. Ind. Carey & Wall.* i. 106; *Benth. Fl. Austral.* iv. 301. *Phillyrea ramiflora*, *Roxb. Ic. Ined.*—Pegu and Tenasserim; *Wallich, Griffith*. Andamans; *Kurz*.—DISTRIB. Ava, Malaya, Tropical Australia.—This has been placed as a variety of *L. intermedia*, Wight, and it does not greatly differ but by the smaller flowers and the much slenderer panicle.—*L. ramiflora*, *Wall. Cat.* 2824 (*DC. l. c.* 297), cultivated specimen, is remarkable for the intricately divaricately ramous panicle, the pedicels being nearly all $\frac{1}{2}$ to $\frac{1}{4}$ in. The whole series only differs in the development of the panicle, and (slightly) in the size of the flowers; and perhaps *L. intermedia*, *macrophylla* and *ramiflora* (with their varieties) form but one species, extending over Southern and Eastern India, Malaya and Australia.

SPECIES NOT SEEN.

L. COTINIFOLIA, *Vahl*; *DC. Prodr.* viii. 297; is founded on *Pluk. Alm.* t. 241, fig. 4, which represents a Ceylon shrub with leaves very villous beneath and 5-merous flowers, and is therefore not of the genus.

L. ? LORANTHIFOLIA, *Wall. Cat.* 2842, from Amherst, has only twigs and a few leaves which resemble those of *Salvadora persica*.

L. MUELLERI, *Van Heurck Pl. Nov.* 124, collected by Griffith near Malacca, is perhaps *Bouea microphylla*, *Griff.*; *J. D. Hook. Fl. Brit. Ind.* ii. 21. (It has 4 stamens).

CHIONANTHUS ? GHIERI, *Gaertn.*; *DC. Prodr.* viii. 295; from Ceylon, of which the leaves and flowers are unknown, remains obscure.

NOTELEA POSUA, *Don Prodr.* 107; leaves opposite elliptic-oblong acuminate, peduncles axillary drooping clustered 1-flowered, calyx-teeth equal, stigma capitate.

NIPAL; Narainhetty, *Hamilton* (fide *Don*). Probably a *Linociera*.

Leaves 4–5 by $1\frac{1}{2}$ –2 in. *Petals* 4, ovate united at the base in pairs by the filaments. *Drupe* with subchartaceous endocarp.—Copied from *Don*.

8. *OLEA*, *Linn.*

Trees or shrubs. *Leaves* opposite, entire or toothed. *Flowers* small, hermaphrodite diceious or polygamous, in axillary or terminal panicles; bracts minute. *Calyx* small, 4-toothed or 4-lobed. *Corolla-tube* short; lobes 4, induplicate-valvate, or 0. *Stamens* 2, on the corolla-tube or subhypogynous, filaments short; anthers oblong. *Ovary* 2-celled; style short, stigma ovate or shortly 2-lobed; ovules 2 in each cell, subpendulous or attached laterally to the septum. *Drupe* ellipsoid or subglobose, endocarp bony or crustaceous, usually 1-seeded. *Seed* pendulous, albumen fleshy; radicle superior.—DISTRIB. Species 35 in the Old World, from the North Temperate Zone to South Africa and New Zealand.

1. *O. cuspidata*, *Wall. Cat.* 2817; leaves oblong, nerves beneath entirely obscured by felted ferruginous scales, panicles short axillary, flowers bisexual corolloid, ovary glabrous, drupe $\frac{1}{2}$ in. ellipsoid. *DC. Prodr.* viii. 285; *Brand. For. Fl.* 307, t. 38; *Boiss. Fl. Orient.* iv. 36. *O. ferruginea*, *Royle Ill.* 257, t. 65, fig. 1.

NORTH WEST HIMALAYA and KASHMIR, alt. 2–6000 ft., frequent. DISTRIB. Cabul, Beloochistan.

A tree, 30 ft., glabrous, not spinous. *Leaves* $2\frac{1}{4}$ by $\frac{3}{4}$ in., narrowed at both ends, usually obtuse or subacute, sometimes cuspidate, very coriaceous; midrib prominent beneath, scales of the lower surface circular peltate closely toothed; petiole $\frac{1}{2}$ – $\frac{1}{3}$ in. *Panicles* 1–2 in., minutely scaly; flowers perfect, but many with reduced ovary are functionally male. *Calyx* $\frac{1}{10}$ in., subtruncate, glabrous. *Corolla* deeply divided; lobes $\frac{1}{10}$ in., elliptic, obtuse. *Endocarp* bony.—This was supposed a var. of the Wild Olive by Dr. Stewart; Brandis says it differs by the more lax inflorescence, the upper surface of the leaves glossy, not dull grey, the lower surface reddish instead of white, smaller fruit, the absence of spines, and a more distinctly marked heartwood. The cuspidation of the leaves, distinct in Wallich's specimen, and relied on by Boissier as a diagnostic mark, proves variable in the Indian plant.

2. *O. glandulifera*, Wall. *Cat.* 2811; leaves rhomboid-lanceolate entire, nerve-axils glandular, secondary nerves distinctly reticulating, panicles mostly terminal glabrous or nearly so, flowers bisexual corolloid, ovary glabrous or nearly so, drupe $\frac{1}{2}$ in. ovoid. *DC. Prodr.* viii. 285; *Wight Ic.* t. 1238; *Bedd. Fl. Sylv.* t. 238; *Brand. For. Fl.* 309, excl. syn.

NORTH-WEST HIMALAYA, alt. 2–6000 ft., from Kashmir to Nipal. Mts. of SOUTH INDIA; *Wight, Beddome, &c.*

A tree, 20–60 ft.; glabrous or nearly so. *Leaves* 4 by 2 in., acuminate, base cuneate, margin undulate; petiole $\frac{2}{3}$ in. *Panicles* nearly always terminal, some smaller in the penultimate axils sometimes added, 2–5 in. diam., broad, compound; pedicels $0\frac{1}{2}$ in. *Calyx* minute, 4-lobed, glabrous or obscurely pubescent on the margin. *Corolla* deeply divided, lobes $\frac{1}{2}$ in., elliptic, obtuse. *Anthers* broad, large. *Ovary* glabrous or (fide *Wight*) minutely hairy. *Endocarp* bony.

3. *O. dioica*, Roxb. *Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 105; leaves elliptic-lanceolate toothed or entire coriaceous, secondary nerves obscure, panicles axillary glabrous, flowers dioecious males with corolla females without, ovary glabrous or with hard tomentum, drupe $\frac{1}{2}$ – $\frac{2}{3}$ in. ellipsoid often subacute. *Wall. Cat.* 2814; *Wight Ill.* t. 151; *DC. Prodr.* viii. 286; *Dalz. & Gibs. Bomb. Fl.* 159; *Bedd. For. Man.* 154; *Kurz For. Fl.* ii. 157, and in *Journ. As. Soc.* 1877, pt. ii. 244. *O. Wightiana*, Wall. *Cat.* 2815. *O. Heyneana*, Wall. *Cat.* 2823; *DC. Prodr.* viii. 288.

In the lower hills, from ASSAM and BENGAL throughout the DECCAN PENINSULA; common. CHITTAGONG HILLS; *Roxburgh*.

A tree 30–60 ft.; glabrous. *Leaves* $5\frac{1}{2}$ by $2\frac{1}{2}$ in., base cuneate; nerves 10 pairs, elevated beneath; petiole $\frac{1}{2}$ in. *Panicles* 2–6 in., very compound, shining (female usually smaller); pedicels $0\frac{1}{2}$ in. *Calyx* minute; lobes ovate, glabrous or margin obscurely pubescent. *Corolla* of the males deeply lobed; lobes $\frac{1}{10}$ in., elliptic, obtuse; of the females wanting in the examples seen (*Kurz* says present). *Endocarp* crustaceous.—*O. Wightiana*, Wall., is a form from Assam with large leaves but shorter subglobose drupes; in the typical *O. dioica* the drupes are often subacute.

4. *O. maritima*, Wall. *Cat.* 2813; branchlets hairy, leaves elliptic-lanceolate entire or toothed coriaceous, secondary nerves obscure, panicles axillary hairy, flowers dioecious, drupe $\frac{1}{2}$ in. globose. *G. Don Gen. Syst.* iv. 49; *DC. Prodr.* viii. 288. *Pachyderma javanicum*, Blume *Byd.* 682. *Stereoderma javanicum*, Blume; *DC. l. c.* 290. *Tetrapilus brachiatus*, Lour. *Fl. Cochinch.* 611. *Notelæa Zollingeriana*, Teijs. & Binn. *Cat. Hort. Bog.* 122.

MALACCA and SINGAPORE; Wallich, Griffith, &c., frequent.—DISTRIB. Malaya, Cochinchina.

A small tree. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., base cuneate, glabrous; petiole $\frac{1}{2}$ in. *Panicles* 1–4 in., compound; bracts minute or a few $\frac{1}{2}$ – $\frac{3}{4}$ in. narrow lanceolate, caducous; pedicels $0\frac{1}{2}$ in. *Calyx* minute; lobes ovate, pubescent. *Corolla* (in the males) $\frac{1}{12}$ – $\frac{1}{10}$ in., divided deeply; lobes elliptic, obtuse; of females not seen. *Endocarp* somewhat bony.—Without fruit, this greatly resembles *Olea dioica*, but the branchlets

and panicles have many minute soft spreading hairs. Wight supposed it to be *Olea microcarpa*, Vahl (i.e. *Phillyrea indica*, Lour. *Fl. Cochinch.* 19), but Loureiro says his plant had terminal inflorescence, so that it should more probably be one of the globose-fruited *Ligustrums* allied to (or identical with) a Khasia or Chinese species.

5. *O. dentata*, Wall. Cat. 2840; branchlets hairy, leaves oblong-lanceolate toothed or entire coriaceous, secondary nerves obscure, panicles axillary large hairy, flowers dioecious, corolla in both sexes campanulate shortly 4-fid. DC. *Prodr.* viii. 286; Kurz *For. Fl.* ii. 157, and in *Journ. As. Soc.* 1877, pt. ii. 245.

BRITISH BIRMA; Griffith and Helfer (Kew Distrib. n. 3690), Parish, &c.; Martaban and Tenasserim, alt. 2–3000 ft., frequent (Kurz).

A tree, 40–60 ft. (Kurz). Leaves 5 by $1\frac{1}{4}$ in., base cuneate or subobtusate, glabrous or sometimes hairy beneath; nerves slender, often subimpressed beneath; petiole $\frac{1}{4}$ in. Panicles (both male and female) 3–6 in., brachiate; bracts small, linear or $\frac{1}{2}$ – $\frac{3}{4}$ in., very narrow, hairy; pedicels $0\text{--}\frac{1}{16}$ in., with flowers in threes. Calyx minute; lobes ovate, pubescent. Corolla $\frac{1}{4}$ – $\frac{1}{2}$ in., almost tubular-campanulate, subequally 4-lobed. Ovary glabrous; style 0; stigma subtruncate. Drupe not seen.—This plant has been mixed with *O. maritima*, from which it hardly differs but by the campanulate shortly-divided corolla, and with *Linociera ternifolia*, in which the corolla is nearly divided into 2 bifid petals and the panicle much smaller.

VAR. *salicifolia*, Wall. Cat. 2821 (sp.); panicles much less hairy, pedicels $\frac{1}{8}$ – $\frac{1}{6}$ in. subumbelled, corolla $\frac{1}{8}$ in., drupes $\frac{1}{2}$ by $\frac{1}{4}$ in. narrow ellipsoid, endocarp bony, seed albuminous. DC. *Prodr.* viii. 286.—Khasia; Wallich, Griffith; at the Bor-pani, H. f. & T.—This is placed with *O. dentata* by Kurz, the leaves are remarkably similar, and one of Griffith's Mergui examples in flower seems nearer the Khasia *O. salicifolia* than the Birma *O. dentata*; but the seeds of *O. dentata* remain unknown, and may prove to be exalbuminous, when the species will stand near *Linociera terniflora*.

6. *O. Gamblei*, Clarke; leaves oblong acuminate entire coriaceous, panicles axillary obscurely pubescent, flowers dioecious both males and females without corolla, drupes $\frac{3}{4}$ by $\frac{1}{2}$ in.

TROPICAL SIKKIM HIMALAYA; J. D. H.; near Punkabari, Gamble.

Nearly glabrous. Leaves $4\frac{1}{2}$ by $\frac{1}{2}$ in., parallel-sided, long acuminate, base cuneate; nerves obscure; petiole $\frac{1}{4}$ in. Panicles $2\frac{1}{2}$ in., brachiate; bracts minute; pedicels $0\text{--}\frac{1}{8}$ in. Calyx less than $\frac{1}{30}$ in., subtruncate. ciliate. Anthers subsessile, oblong, large. Ovary glabrous; style short, stigma short bifid. Fruit sometimes nearly 1 by $\frac{1}{2}$ in.; endocarp bony. Seed albuminous.—One or two hermaphrodite flowers (without corolla) are seen at the base of the female panicles. The New Zealand *O. apetalæ* has broader less acuminate leaves and shorter, far less compound, subracemose panicles.

7. *O. polygama*, Wight Ic. tt. 1239, 1240; glabrous, leaves broadly elliptic suddenly shortly acuminate coriaceous, secondary nerves obscure, panicles axillary, flowers male and hermaphrodite all petaline. Bedd. *For. Man.* 154. O. Gardneri, Thwaites Enum. 188; Bedd. *For. Man.* 154.

NILGHERRIES; Sispara, Gardn.; Wight. CEYLON; alt. 7000 ft., Walker, Thwaites.

A small tree. Leaves $2\frac{1}{2}$ by $1\frac{1}{4}$ in., obtuse, mucronate, base cuneate; nerves 8 pairs, subimpressed beneath; petiole $\frac{1}{2}$ in. Panicles 1– $2\frac{1}{2}$ in.; male on one tree, female-hermaphrodite on another; bracts inconspicuous; pedicels $\frac{1}{10}$ – $\frac{1}{8}$ in., subumbelled. Flowers as of *O. dioica*. Drupe not seen.—This differs from *O. dioica* slightly; the leaves dry reddish with subincurred margins, the nerves are not elevated beneath the panicles are smaller; it looks like a high-level, somewhat stunted *O. dioica*.

9. **LIGUSTRUM**, Linn.

Shrubs or trees; branchlets often lenticellate. *Leaves* opposite, entire, glabrous when mature, except in *L. nepalense*, var. *vestita*. *Panicles* terminal, sometimes with foliaceous bracts in the lower part, flowers white or nearly so. *Calyx* small, truncate or shortly 4-toothed. *Corolla* funnelshaped, tube long or short; lobes 4, induplicate-valvate. *Stamens* 2, on the corolla-tube, filaments short; anthers oblong or rounded. *Ovary* 2-celled; style longish, stigma subclavate oblong hardly 2-fid. *Drupe* 1-3-seeded; endocarp chartaceous or thin. *Albumen* fleshy; radicle superior.—**DISTRIB.** Species 25, from Europe throughout Asia to Australia.

* *Drupe longer than broad.*

1. ***L. robustum***, Blume *Mus. Bot.* i. 313; branches very lenticellate, leaves elliptic narrowed at both ends, nerves slender irregular, panicle large hairy, corolla-tube as long as the calyx, drupe $\frac{1}{2}$ by $\frac{1}{3}$ in. *Dcne. in Nouv. Arch. Mus.* 2, ii. 29, not of Brand. or Bedd. *L. pubescens*, Wall. *Cat.* 2841; *Pl. As. Rar.* iii. 44; *DC. Prodr.* viii. 294. *L. punctatum*, Griff. *Notul.* iv. 741. *Phillyrea robusta*, Roxb. *Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 101. *Olea robusta*, Wall. *Cat.* 2822; *Kurz For. Fl.* ii. 158, and in *Journ. As. Soc.* 1877, pt. ii. 244. *Visiania robusta*, DC. l. c. 289; *Deless. Ic. Sel.* v. t. 44. *V. sumatrana*, Mig. *Fl. Ind. Bat.* ii. 549.

EAST BENGAL PLAIN; Silhet, Dacca, Chittagong, &c.; abundant near the base of the hills. **PEGU**; *Kurz*.—**DISTRIB.** Birma, Malaya.

A tree, attaining 60 ft.; usually a large shrub. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., membranous; nerves somewhat distant, difficult to count from their irregularities and interposed scarcely less distinct other nerves; petiole $\frac{1}{2}$ in. *Panicles* often 12 by 10 in., pubescent or almost villous; bracts 0; bracteoles $\frac{1}{30}$ in., linear; pedicels (in flower) $0-\frac{1}{8}$ in., the flowers all scattered not clustered. *Corolla* small, white. *Style* long, or (fide Griffith) hardly any (is the species dimorphic?). *Drupe* cylindric, often curved and more or less glaucous.—Many of the species that follow are difficult to separate from this; and, when it is said that this East Bengal plains plant is not *L. robustum* of Brandis, all that is intended is that the long-fruited Silhet species (Roxburgh's type) has not been sent from the North-west Himalaya. Dr. Brandis may very probably be right in thinking plants he has seen there to be not specifically distinct.

VAR. khasiana; panicle smaller denser, pedicels in flower 0, drupe $\frac{1}{4}-\frac{1}{3}$ by $\frac{1}{8}-\frac{1}{6}$ in. very glaucous. *Ligustrum* sp. n. 5, *Herb. Ind. Or. H. f. & T.* *Olea*, n. 445, *Griff. Notul.* iv. 29.—Khasia, alt. 4000 ft.; *Griffith, H. f. & T.*, &c.—A stunted small tree, perhaps a high-level form of the plains' *L. robustum*, but appears more distinct than species admitted by authors. In Griffith's examples the fruiting panicle in *L. robustum* type is diffuse with scattered fruit, in var. *khasiana* it is close erect rigid with erect fruits and 4-angled lenticellate branches; the fruits are scarcely more than half the size of those of *L. robustum*. But the series *Ligustrum*, n. 5, *H. f. & T.*, includes an example gathered at Chela (alt. 1000 ft.) which is intermediate in character.

2. ***L. Walkeri***, *Dcne. in Nouv. Arch. Mus.* 2, ii. 27; branches lenticellate, leaves elliptic acuminate, nerves slender irregular, panicle large compound minutely pubescent, corolla-tube hardly as long as the calyx, drupe $\frac{1}{4}$ by $\frac{1}{6}$ in. *L. ceylanicum*, *Dcne. in Nouv. Arch. Mus.* 2, ii. 30. *L. robustum*, *Thwaites Enum.* 188.

Ceylon; ascending to 5000 ft., frequent; *Walker, Thwaites* (n. 475, 494, &c.). **NILGHERRIES**; *Herb. Ind. Or. H. f. & T.*, n. 5, partly.

Very near *L. robustum*, and perhaps only the Ceylon form of it as Thwaites considered; the drupes, however, are very much shorter, broader, and somewhat obovoid, the panicle is more obscurely pubescent, the leaves rather more coriaceous. *Decaisne*

refers the Nilgherry portion of *Ligustrum*, n. 5, *H. f. & T.*, to his *L. confusum*, which is certainly erroneous; it is either *L. Walkeri* or closely allied thereto.

VAR. *tubiflora*; corolla-tube twice as long as the calyx. *Olea Roxburghii*, *Wall. Cat.* 2816 B only.—Deccan Peninsula; Belgaum, *Dr. Ritchie*; Herb. Heyne, *Wallich*.—Corolla-tube much slenderer than in *L. neilgherrense*, *Wight*; anthers exsert.—These are very doubtful plants; *Ritchie*'s has a bracteate panicle, and subovate leaves, but the drupe is as of *L. Walkeri*.

3. *L. Roxburghii*, Clarke; branches lenticellate, leaves ovate-lanceolate acuminate coriaceous, panicle stout pubescent, flowers clustered, corolla-tube broad as long as the calyx, drupe $\frac{1}{2}$ by $\frac{1}{2}$ in. *L. Candolleum*, *Blume Mus. Bot.* i. 315, not of *Dene*. *L. robustum*, *Bedd. For. Man.* 154, not of *Blume*. *L. compactum*, *Dene. in Nouv. Arch. Mus.* 2, ii. 23, not of *H. f. & T.* *Olea Roxburghii*, *Wall. Cat.* 2816, not of *Spreng.* nor of *Wight*. *Visiania robusta*, *Wight Ic. t.* 1242. *Phillyrea terminalis*, *Herb. Roxb.*

MTS. of the DECCAN PENINSULA, alt. 4-7000 ft., very common.

A small tree. *Leaves* $3\frac{1}{2}$ by $\frac{1}{2}$ in., base obtuse; nerves 8 pairs, slender but well-defined and somewhat regular; petiole $\frac{1}{2}$ in. *Panicles* often 8 by 6 in., brachiate; bracts lanceolate, foliaceous or 0; pedicels hardly any, clusters of flowers often somewhat whorled. *Corolla* $\frac{1}{2}$ in., much larger than in *L. robustum*; tube sometimes considerably exceeding the calyx.—*Blume* founds his species on *Wall. Cat.* 2816 E, which he (by error) supposes to have come from Nipal. *Dcaisne* has not included *Wight*'s icon, t. 1242, in his monograph; but he has named the specimens belonging to that picture, *L. compactum*, perhaps because of the distinct regular nervation of the leaves, which is similar. This species has been known as "the stout Nilgherry form of *L. robustum*," but it differs as much from *L. robustum* of *Silhet* as does any Indian *Ligustrum*. The confusion which has enveloped this species arises from its having been named by *Wight Phillyrea paniculata*, *Roxb.*, which is = *Ligustrum lucidum*, *Aiton* = *Olea clavata*, *Don* = *O. Roxburghii*, *Spreng.* (*Wight Ic. t.* 735), a Chinese plant, cultivated both at Calcutta and in Europe, closely allied to *L. Roxburghii*, but having the panicle glabrous.

4. *L. neilgherrense*, Wight Ic. t. 1243, not of *Dene*.; leaves ovate acute coriaceous, panicle dense, branches glabrous lenticellate, corolla-tube twice as long as the calyx, drupe $\frac{1}{2}$ by $\frac{1}{2}$ in. *L. Candolleum*, *Dene. in Nouv. Arch. Mus.* 2, ii. 28, not of *Blume*. *Olea Roxburghii*, *Wall. Cat.* 2816, E only.

MTS. of the DECCAN PENINSULA, frequent; Dindygul, Nilgherries, Bababoodun Hills, &c.

United (very probably correctly) with *L. Roxburghii* by *Beddome*; it differs in the larger flowers (corolla-tube $\frac{1}{2}$ in.) and in the glabrous panicle, the branches of which are quadrangular lenticellate in fruit, instead of round and hairy as in *L. Roxburghii*. The leaves also are not acuminate, often subobtus, sometimes orbicular ($2\frac{1}{2}$ by 2 in.).—*Dcaisne* has marked a typical example of this from Herb. *Wight* (flower and fruit) *L. compactum*; the Kumaon *L. compactum* has a shorter corolla-tube with reflexed lobes more closely-nerved acuter leaves, and a very different-looking less rigid fruit-panicle with compressed flexuose branches.

VAR. *obovata*, Dene. in Nouv. Arch. Mus. 2, ii. '22; leaves subobtus, corolla rather shorter.—MTS. of the DECCAN PENINSULA**.—Cannot be satisfactorily distinguished from *L. neilgherrense*.**

5. *L. Perrottetii*, A. DC. in DC. Prodr. viii. 294; branches rarely lenticellate, leaves smallish elliptic acute at both ends, panicles thyrsoid minutely pubescent, corolla-tube nearly twice the calyx, drupe $\frac{1}{2}$ by $\frac{1}{2}$ in. *Wight Ic. t.* 1244; *Bedd. For. Man.* 153, and *Anal. Gen.* t. 19, fig. 5; *Dene. in Nouv. Arch. Mus.* 2, ii. 32.

MTS. of the DECCAN PENINSULA, frequent; Nilgherries, Pulneys, *Wight*, *Gardner*, &c.

Leaves 2 by $\frac{3}{4}$ in., coriaceous; *nerves* 7 pairs, oblique to the midrib, slender or obscure. *Panicles* 3 by $1\frac{1}{2}$ in., rigid; branches in fruit 4-angled, stout.—This differs little from *L. Roxburghii* but by the non-lenticellate branches and smaller leaves, and is placed under *L. Roxburghii* by Beddome.

6. **L. Decaisnei**, *Clarke*; branches lenticellate, leaves small elliptic acute at both ends, panicles small obscurely pubescent, corolla small tube scarcely as long as the calyx. *L. neilgherrense*, *Dcne. in Nouv. Arch. Mus.* 2, ii. 32, *not of Wight*. *Ligustrum* sp. n. 3, *Herb. Ind. Or. H. f. & T.*

NILGHERRIES.

Leaves $1\frac{1}{2}$ by $\frac{2}{3}$ in. *Panicles* 2 by $1\frac{1}{2}$ in.—This appears as though a form of *L. Walkeri* with smaller leaves and panicles, but is founded on a plant once collected, the fruit unknown.

VAR. microphylla, *Wight in Herb. (sp.)*; leaves $2\frac{1}{4}$ by $\frac{2}{3}$ in. lanceolate, panicles glabrous, berry $\frac{1}{4}$ by $\frac{1}{8}$ in.—South Deccan; Shevagherry Hills and Courtallum, *Wight*.—*L. microphyllum*, *Bedd. For. Man.* 154, from Coorg, is described with small leaves and pubescent panicle-branches, and is therefore perhaps nearer *L. Decaisnei* type. *L. Walkeri* only differs in its large diffuse panicles.

7. **L. compactum**, *H. f. & T.*; *Brand. For. Fl.* 310; glabrous, leaves elliptic-lanceolate, nerves 12–20 pairs subdistinct, panicle pyramidal compound, corolla-tube as long as the calyx, fruit nearly $\frac{1}{2}$ by $\frac{1}{5}$ in. *Dcne. in Nouv. Arch. Mus.* 2, ii. 23 (*as to the Kumaon examples*). *Olea compacta*, *Wall. Cat.* 2819. *DC. Prodr.* viii. 287.

TEMPERATE HIMALAYA, alt. 5000 ft.; Kumaon, *Wallich, Thomson, Strachey & Winterbottom*.

Branches sparingly (or not) lenticellate. *Leaves* 4 by $1\frac{1}{2}$ in., acute, base cuneate or rounded, coriaceous; petiole $\frac{1}{4}$ in. *Panicles* 4 in. long and broad; bracts 0; bracteoles minute; flowers clustered, subsessile. *Corolla-tube* very short; lobes reflexed, or sometimes corolla-tube considerably exceeding the calyx. *Panicle* dense with fruit; branches compressed, flexuose. *Drupe* often curved.

8. **L. Massalongianum**, *Vis. Pl. Nov. Orto Padova*, 27, t. 4; leaves linear-lanceolate, panicles small dense very hairy, corolla-tube narrow twice as long as the calyx, drupe $\frac{1}{4}$ by $\frac{1}{8}$ in. *Dcne. in Nouv. Arch. Mus.* 2, ii. 19. *Olea robusta*, *γ. angustifolia*, *Wall. Cat.* 2822. *Ligustrum* n. 8, *Herb. Ind. Or. H. f. & T.*

KHASIA; alt. 3–5000 ft., *Wallich, H. f. & T., &c.*

A small shrub; branchlets lenticellate, densely leafy. *Leaves* 3 by $\frac{1}{2}$ in., tapering at each end, coriaceous; nerves few, distant; petiole $\frac{1}{2}$ in. *Panicles* 1–2 in.; bracts $\frac{1}{2}$ in., linear, caducous; bracteoles inconspicuous; flowers clustered, subsessile, small. *Berry* glaucous, exceedingly like that of *L. robustum*, var. *khasiana*, of which this may be a narrow-leaved form.

VAR. Lindleyi; leaves 1 in. lanceolate, corolla-tube hardly longer than the calyx, style short, drupe $\frac{1}{2}$ in. broad. *L. robustum*, *Wall. Cat.* 2822, *γ only*. *Olea Lindleyi*, *Wall. Cat.* 6305; *DC. Prodr.* viii. 288. *Ligustrum* sp., n. 1175, *Griff. Itin. Notes*, 81.—Khasia, alt. 3–4000 ft.; *Griffith, H. f. & T., &c.*—Perrottet's Nilgherry plant referred here by Decaisne was perhaps *L. Decaisnei*, var. *microphylla*.

** *Drupe* globose.

9. **L. confusum**, *Dcne. in Nouv. Arch. Mus.* 2, ii. 24; branches lenticellate, leaves elliptic-lanceolate, panicles pubescent bractless, flowers clustered subsessile, corolla-tube as long as the calyx, berry $\frac{1}{2}$ in. diam. *L. robustum*, *Wall. Cat.* 2822, *β only*. *Ligustrum* sp., nn. 1247, 408, 1247, *Griff. Itin. Notes*, pp. 86, 123, 157. *Ligustrum* n. 9, *Herb. Ind. Or. H. f. & T.*

SIKKIM; Lachen and Lachoong, *J. D. H.*; Kulhait, alt. 5000 ft., *Clarke*. BHOTAN; alt. 5500 ft., *Griffith*. KHASIA, alt. 3-5000 ft., common, *Griffith, H. f. & T.*, &c.

A small tree; sometimes 40 ft. in Sikkim. *Leaves* $3\frac{1}{2}$ by $\frac{3}{4}$ in., usually obtuse or rounded at the base, coriaceous; nerves slender or distinct; petiole $\frac{1}{8}$ in. *Panicles* 1-5 in.; bracts 0 or linear, caducous; bracteoles minute. *Corolla* $\frac{1}{4}$ in., wider than in *L. robustum*.—This previous to Decaisne's memoir, was confounded with *L. robustum* which (except as to the fruit) it greatly resembles. In flower it differs from the Bengal typical *L. robustum* in the more obtusely-based leaves, the sessile crowded flowers, and the broader corolla. It only differs from *L. spicatum* in the absence of persistent leaflike bracts in the panicle. Simons' specimen is named *L. compactum* by Decaisne, but it has a pubescent panicle, and the leaves do not show the prominent numerous nerves characteristic of *L. compactum*.

VAR. *macrocarpa*; berry $\frac{1}{2}$ in. diam. and upwards. Khasia; Nunklao, alt. 4000 ft., *Clarke*.

10. ***L. nepalense***, *Wall. Cat.* 2830, and in *Roxb. Fl. Ind. ed. Carey & Wall.* i. 150, and *Pl. As. Rar.* iii. 44, t. 270; branches lenticellate, leaves elliptic-lanceolate, panicles large pubescent, bracts leaflike coriaceous persistent, flowers clustered sessile, corolla-tube as long as the calyx, drupe $\frac{1}{6}$ in. diam. *DC. Prodr.* viii. 294, excl. var. β ; *Dene. in Nouv. Arch. Mus.* 2, ii. 26. *L. spicatum*, *Ham.*; *Don Prodr.* 107; *Loud. Arb. Brit.* 630, t. 1220. *L. bracteolatum*, *Don Prodr.* 107; *DC. l. c.*; *Brand. For. Fl.* 310; *Dene. l. c.* 34. *L. Wallichii*, *Blume Mus. Bot.* i. 315; *Dene. l. c.* 29. *L. parviflorum*, *Visiani: Dene. in Nouv. Arch. Mus.* 2, ii. 26. *L. kumaonense*, *Dene. l. c.* 28. *Olea grandiflora*, *Wall. Cat.* 2820. *Visiania grandiflora*, *DC. l. c.* 289.

TEMPERATE HIMALAYA, alt. 4-7000 ft.; Gurwhal to Nipal, frequent.

Only separable from *L. confusum* by the bracts interspersed among the panicle branches being petiolate, often $1\frac{1}{2}$ by $\frac{1}{2}$ in., coriaceous, persistent. The type examples of *L. nepalense* and *grandiflorum* in herb. Wallich, and of *L. kumaonense* in herb. Strach. & Winterb. all exhibit these bracts, which are not seen in the Khasian *L. confusum*.—*L. nepalense*, β var. *glabra* (*Bot. Mag. t.* 2921), is *L. lucidum*, and received from the Calcutta garden, it is not an Indian plant.

VAR. *vestita*, *Wall. Cat.* 6304 (sp.); leaves villous beneath. *DC. Prodr.* viii. 294. --Nipal.

11. ***L. Myrsinites***, *Dene. in Nouv. Arch. Mus.* 2, ii. 33; leaves small elliptic, racemes small few-flowered nearly glabrous, drupe scarcely $\frac{1}{8}$ in. diam. *L. Uva-ursi*, *Dene. l. c.* 34. *Ligustrum* n. 10, *Herb. Ind. Or. H. f. & T.*

KHASIA, alt. 4-5000 ft.; Mairung, *Griffith* (*Kew Distrib. n.* 3683); Moflong, Moleem and Upper Kalapani, *J. D. H.*, *Simons*.

A small ramous shrub; branchlets hairy. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ by $\frac{1}{4}$ - $\frac{1}{2}$ in., glabrous, coriaceous; nerves obscure; petiole $\frac{1}{8}$ in. *Panicles* (nearly always reduced to racemes) 3-10-flowered, less than $\frac{1}{2}$ in. diam. in flower; rhachis verrucose hardly hairy; flowers sessile; in the penultimate axils are often added solitary short-pediceled flowers (or raceme with foliaceous bracts in its lower part). *Corolla* $\frac{1}{8}$ in., tube a little longer than the calyx.

10. MYXOPYRUM, *Blume*.

Large scandent shrubs; branches 4-angular. *Leaves* opposite, large, coriaceous, 3-nerved, entire or toothed. *Flowers* small, yellowish, numerous in axillary and terminal trichotomous panicles; bracts minute or 0. *Calyx* acutely 4-lobed. *Corolla-tube* longer than the calyx; lobes 4, concave, oblong or spatulate, induplicate-valvate in bud. *Stamens* 2, on the corolla-tube, filaments short; anthers ovate. *Ovary* 2-celled; style hardly any, stigma 2-lobed; ovules 1-2 in each cell, attached near the base at the inner angle (anatropal, *sic*

Blume). *Fruit* 1-seeded globose, or sometimes 2-seeded obovoid; pericarp crustaceous. *Testa* thin, albumen horny; radicle inferior.—**DISTRIB.** Species 3, East Himalaya to South Madras and Malaya.

1. ***M. smilacifolium***, *Blume Mus. Bot.* i. 320; leaves ovate or oblong acute entire or toothed, fruit $\frac{1}{2}$ in. diam. *Kurz For. Fl.* ii. 160, and in *Journ. As. Soc.* 1877, pt. ii. 245. *Ligustrum laurifolium*, *Roxb. Hort. Beng.* 3. *Chionanthus* ? *smilacifolia*, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* i. 108. *Chondrospermum smilacifolium*, *Wall. Cat.* 2837; *Wight Ill.* t. 151, b. D; *DC. Prodr.* viii. 301. *Ch. coriaceum*, *Wall. Cat.* 2838; *DC. l.c.*

SIKKIM TERA; J. D. H. ASSAM, SILHET, CACHAR, CHITTAGONG, PEGU, PENANG. SOUTH DECCAN PENINSULA; Anamallay Mts., *Beddome*.—**DISTRIB.** Malaya, Admiralty Islands.

Nearly glabrous. *Leaves* 6–9 in., from narrow-oblong to cordate-ovate, acuminate, base cuneate or rounded, entire slightly toothed or closely serrate on the same branch; petiole $\frac{1}{2}$ in. *Panicles* 4–8 in., peduncled; branches somewhat lax in fruit. *Corolla* $\frac{1}{2}$ in.

2. ***M. nervosum***, *Blume Bijl.* 683; *Mus. Bot.* i. 320, t. 51; leaves oblong or elliptic acute entire or toothed, berries $\frac{2}{3}$ in. diam. *DC. Prodr.* viii. 290.

MALACCA; Maingay.—**DISTRIB.** Sumatra, Java.

Leaves 8 by $3\frac{1}{2}$ in., base cuneate or rounded, very coriaceous. *Panicles* minutely pubescent in flower, very rigid, brachiate in fruit.—Maingay's plant here described differs from *M. smilacifolium*, only in its very stout habit and large berries. Whether it is Blume's *M. nervosum* is uncertain, as that has no ripe fruit.

ORDER XCIII. SALVADORACEÆ. (By C. B. Clarke.)

Trees or shrubs, nearly glabrous, olive-grey, unarmed or spinous. *Leaves* opposite, entire. *Flowers* clustered or paniced, small, dioecious or polygamodimorphic. *Calyx* free, campanulate or ovoid, 3–5-fid. *Corolla* shortly campanulate or petals free, 4-merous, imbricate in bud. *Stamens* 4, on the corolla-tube or hypogynous, alternate with the corolla-segments; filaments free or connate into a tube. *Ovary* free, 1-2-, or imperfectly 4-celled; style short, stigma 2-fid or subentire; ovules 1–2 in each cell, erect from its base, anatropous. *Berry* or *drupe* mostly 1-seeded. *Seed* erect, globose, exalbuminous.—**DISTRIB.** Species 8–9, in tropical and subtropical Asia, Africa, Madagascar and Malaya.

Distinguished from the Indian species of *Oleaceæ* by their 4 stamens.

Petals free. Stamens monadelphous. Ovary 1-celled, 1-ovuled . . .	1. DOBERA.
Corolla gamopetalous. Stamens on corolla-tube. Ovary 1-celled,	
1-ovuled	2. SALVADORA.
Petals free. Stamens free. Ovary 2- (or falsely 4-) celled . . .	3. AZIMA.

1. DOBERA, Juss.

A glabrous tree. *Leaves* opposite, entire. *Flowers* small, polygamo-dioecious, clustered on the branches of an axillary inflorescence, trichotomous in the males, subsimple in the females. *Calyx* ovoid, irregularly valvate, 3–5-toothed. *Petals* 4 (or 5), narrowly-oblong, free, imbricate. *Stamens* 4 (or 5), filaments connate into a tube; anthers lanceolate, dehiscing laterally or subextrorsely. *Scales* 4–5 outside the staminal tube, alternate with the stamens. *Ovary* 1-celled (*Bth.* &

Hk.), 4-5-celled (*Hochst.*), 2-celled (*Forsk.*); style short, stigma obtuse undivided (*Bth. & Hk.*), 2-fid (*Forsk.*); ovule solitary, erect (*Bth. & Hk.*). Fruit subglobose. Seed erect, globose, exalbuminous.

The true place of this disputed genus cannot be settled until material is received which shall decide the structure of the young ovary. The younger flowers at Kew appear all male (or functionally male); in these the imperfect style is obscurely 2-lobed, and the ovary seems 2-celled as *Forsk.* states. From *Hochstetter's* description it seems probable that he had very young fruit containing one 1-seeded cell and traces of other abortive cells. As he tried to make the order of the tree *Meliaceæ*, he may have over-counted the abortive cell.

D. Roxburghii, *Planch. in Ann. Sc. Nat.* 3, x, 101. *D. coriacea* and *glabra*, *A. DC. Prodr.* xvii, 31. *Tomex glabra*, *Forsk. Fl. Egypt-Arab.* 32. *Schizocalyx coriaceus*, *Hochst. in Flora*, 1844, Beil. 2. *Blackburnia oppositifolia* (error for *B. monadelpha*), *Roxb. Fl. Ind. ed. Carey & Wall.* i. 435, *vide Planch. l.c.*

BOMBAY; *Capt. Geburne*.—DISTRIB. Arabia, Abyssinia.

A fine tree (*Hochst.*). Leaves $3\frac{1}{2}$ by $1\frac{1}{2}$ in., elliptic, acute, mucronate or obovate-obtuse (on the same branch in the Indian specimen), coriaceous; petiole $\frac{1}{8}$ – $\frac{1}{6}$ in. Panicles $1\frac{1}{2}$ –3 in.; bracts 0; bracteoles $\frac{1}{30}$ in., ovate, close to the calyx. Calyx $\frac{1}{10}$ in., ovate-cylindric, subspathaceous; teeth usually 5, one much broader. Petals $\frac{1}{5}$ in., white, free, 4 in the Indian plant, but placed slightly unsymmetrically, sometimes 5 in the African (*Hochst.*). Stamens 4 in the Indian specimen (sometimes 5 in the African), filaments united for two-thirds their length into a subquadrangular tube Berry $\frac{1}{4}$ in. diam.; endocarp crustaceous.—There is no *Blackburnia oppositifolia*, *Roxb.* Planchon no doubt meant *B. monadelpha*, *Roxb.*, with which the description fairly agrees.

2. SALVADORA, Linn.

Shrubs or trees. Leaves opposite, entire. Flowers small, hermaphrodite or (mostly) functionally unisexual, racemose or spicate on the branches of terminal or axillary panicles; bracts minute. Calyx campanulate; lobes 4, imbricate. Corolla campanulate; tube with 4 small teeth (sometimes subobsolete) between the bases of the filaments; lobes 4, imbricate. Stamens 4, on the corolla, alternate with its lobes. Ovary 1-celled; style 0, stigma truncate; ovule 1, erect basal. Drupe globose, supported by the slightly enlarged calyx, and subpersistent corolla; endocarp crustaceous. Seed erect, globose, exalbuminous.—DISTRIB. Species 2; Eastern Africa, Arabia and India.

1. **S. persica**, Linn.; *A. DC. Prodr.* xvii, 28; glabrous, leaves ovate or oblong obtuse, panicles axillary or terminal compound, flowers pedicelled, drupes scattered. *Vahl Symb.* i. 12, t. 4; *Lamk. Ill.* t. 81; *Roxb. Cor. Pl.* i. 26, t. 26, and *Fl. Ind. ed. Carey & Wall.* i. 404; *Wall. Cat.* 1042; *Lemaout & Dene. Traité Bot.* 453, with fig.; *Dalz. & Gibs. Bomb. Fl.* 312; *Baill. in Adans.* ix. 289, t. 10, fig. 4–8; *Brand. For. Fl.* 315; *Boiss. Fl. Orient.* iv. 43. *S. Wightiana*, *Planch.*; *Thwaites Enum.* 190; *Bedd. Fl. Sylv.* t. 247. *S. indica*, *Wight Ill.* ii. 229, t. 181. *Cissus arborea*, *Forsk. Fl. Egypt-Arab.* 32. *Embelia Grossularia*, *Retz Obs.* iv. 24.

INDIA, alt. 0–1500 ft., in the drier climates; from the Punjab and Scinde to Patna; and in the Circars and North Ceylon; often planted elsewhere.—DISTRIB. Arabia, Syria, E. Africa.

A small, glaucous tree Leaves $1\frac{3}{4}$ by $\frac{3}{4}$ in., somewhat fleshy; petiole $\frac{1}{2}$ in. Panicles 2–5 in., often very compound, numerous in the upper axils; flowers scattered. Calyx $\frac{1}{20}$ in., lobes ovate. Corolla $\frac{1}{10}$ in., almost 5-partite. Filaments short, anthers ovate. Drupe $\frac{1}{2}$ in. diam.

2. ***S. oleoides***, *Dene. in Jacquem. Voy. Bot.* 140, t. 144; glabrous, leaves narrowly lanceolate acute, panicles mostly reduced to axillary fascicles of short spikes, drupes clustered. *A. DC. Prodr.* xvii. 28; *Brand. For. Fl.* 316, t. 39. *S. Stocksii*, *Wight Ill.* ii. 229, and *IC. t.* 1621. *S. indica*, *Royle Ill.* 319. *S. persica*, *T. And. in Journ. Linn. Soc. v. Suppl.* i. 29.

PUNJAB and SCINDE, in the plains; frequent.—DISTRIB. Aden.

Leaves 2 by $\frac{1}{2}$ in.; petiole $\frac{1}{8}$ in. *Panicles* many, axillary, mostly of sessile clustered spikes 1–1 $\frac{1}{2}$ in.; rhachises after the flowers have dropped rough from the crowded scars. *Drupes* $\frac{1}{8}$ in., subsessile, often touching each other.—Closely allied to the preceding species, but well distinguished by Brandis. Wight's *S. Stocksii* is figured from a flowering example which has the panicles rather more compound than usual.

EXCLUDED SPECIES.

SALVADORA, *Wall. Cat.* 7530, is *Olar nana*, but there is a loose sheet without locality, date or name numbered also 7530, which is *Salvadora oleoides*.

3. **AZIMA**, *Lamk.*

Rambling shrubs, with axillary spines. *Leaves* opposite, entire *Flowers* small, dioecious, axillary, sessile, or on a little-branched panicle in clusters or umbels; bracts 0 or leaflike; bracteoles linear, small. *Calyx* campanulate, 4-fid or irregularly 2–4-lobed. *Petals* 4, oblong, imbricate in bud. *Stamens* 4, alternate with the petals, hypogynous, filaments linear; anthers ovate. *Ovary* 2-celled; stigma subsessile, large, 2-fid; ovules 2–1 in each cell, erect, basal. *Berry* globose, 2–1-seeded, endocarp membranous. *Seed* globose, exalbuminous.—DISTRIB. Species 3–4, in Trop. and S. Africa and Asia.

1. ***A. tetracantha***, *Lamk. Dict.* i. 343, and *Ill.* t. 807; rigid, leaves elliptic acute, flowers axillary clustered, calyx minutely hairy, berries sessile. *Wight & Gardn. in Calc. Journ. Nat. Hist.* vi. 49–55, t. 1; *Wight Ill.* ii. t. 152; *Dalz. & Gibs. Bomb. Fl.* 143. *Monetia barlerioides*, *L'Hérit. Stirp. Nov.* i. t. 1; *Gaertn. Fruct.* t. 225; *Roxb. Fl. Ind.* iii. 765; *Wall. Cat.* 7492. *Fagonia montana*, *Miq. in Pl. Hohenack.* n. 761.

DECCAN PENINSULA and CEYLON; “one of the commonest shrubs of Coromandel, growing in all situations;” *Roxburgh, &c.*—DISTRIB. S. and Subtrop. Africa and Madagascar.

Glabrous, or branchlets hairy. *Leaves* 1 $\frac{1}{2}$ by $\frac{3}{4}$ in., mucronate or spinescent, base cuneate, glabrous, rigid; petiole $\frac{1}{8}$ in.; spines $\frac{1}{4}$ – $\frac{3}{4}$ in., 1–2 in each axil. *Flowers* in axillary clusters scarcely $\frac{1}{2}$ in. diam.; upper leaves often reduced or obsolete, so that the branches end in naked spikes on which the flowers are whorled. *Calyx* $\frac{1}{10}$ in. *Petals* $\frac{1}{2}$ in. *Ovary* 2-celled; cells 2-ovulate, or (ex Wight & Gardner) more often 1-ovulate. *Berry* $\frac{1}{4}$ in. diam., usually 1-seeded.

2. ***A. sarmentosa***, *Benth. in Gen. Pl.* ii. 681; rambling, leaves ovate obtuse mucronate, flowers paniced, calyx glabrous, berries pedicelled. *Actegeton sarmentosa*, *Blume Bijl.* 1143; *A. DC. Prodr.* xvii. 30. *Monetia Brunoniana*, *Wall. Cat.* 7493. *M. laxa*, *Planch. in Ann. Sc. Nat.* 3, x. 191. *M. sarmentosa*, *Baill. in Adans.* ix. 289, t. 10, fig. 1–3. *Salvadora Madurensis*, *Dene. in Jacquem Voy. Bot.* 140.

PROME; *Kurz* (n. 3036).—DISTRIB. Birma, Malaya, Philippines.

Branchlets glabrous. *Leaves* 2 $\frac{1}{2}$ by 1 $\frac{1}{2}$ in., broadly ovate, base obtuse, rigid, glabrous; petiole $\frac{1}{8}$ in.; axillary spines $\frac{1}{4}$ in., 2 in each axil. *Panicles* axillary, in fruit 1–3 in.; bracts minute; pedicels in fruit 0– $\frac{1}{3}$ in. *Flowers* as of *A. tetracantha*. *Ovary* imperfectly 4-celled, 4-ovuled. *Berry* $\frac{1}{4}$ in. diam.

ORDER XCIV. **APOCYNACEÆ.** (By J. D. Hooker.)

Erect or twining shrubs, rarely herbs or trees. *Leaves* opposite or whorled (scattered in *Cerbera* and *Plumeria*), quite entire, exstipulate. *Flowers* in terminal or axillary cymes, hermaphrodite, regular. *Calyx* inferior; lobes 5, rarely 4, imbricate, often glandular within at the base. *Corolla* rotate or salver-shaped; lobes 5, rarely 4, spreading, contorted and often twisted in bud, very rarely valvate. *Stamens* 5, rarely 4, on the tube throat or mouth of the corolla. filaments usually short; anthers oblong linear or sagittate, conniving, connective sometimes adhering to the stigma; cells 2, dehiscing lengthwise, sometimes produced downwards into an empty spur; pollen granular. *Disk* annular, cupular or lobed, or of glands, or 0, sometimes concealing the ovary. *Ovary* 1-celled with 2-parietal placentas, or 2-celled with axile placentas, or of 2 distinct or partially connate carpels; style simple or divided at the base only; top thickened; stigma 2-fid, acute or obtuse. *Ovules* in each cell 2, or few or many and 2- ∞ -seriate, rarely solitary. *Fruit* a dry or fleshy drupe, berry, or samara, or of 2 drupes, berries or follicles. *Seeds* various, often winged, or with a terminal pencil of long silky hairs (*Coma*); albumen hard fleshy, or scanty or 0; embryo straight, cotyledons flat, concave, convolute or contorted, radicle usually superior.—**DISTRIB.** Species about 900, chiefly tropical.

TRIBE I. *Carisseæ.* *Anthers* included, free from the stigma; cells rounded at the base. *Ovary* of 2 wholly combined carpels, 1-2-celled. *Fruit* large, usually fleshy or pulpy within. *Seeds* without wing or pencil of hairs. *Corolla-lobes* overlapping to the left in all.

* *Ovary* 1-celled, with parietal ovules.

Fruit indehiscent. Albumen 0	1. WILLOUGHBEIA.
Fruit 2-valved. Albumen horny	2. CHILOCARPUS.

** *Ovary* 2-celled, with axile ovules.

Flowers 4-merous. Erect shrubs. Seeds exalbuminous	3. LEUCONOTIS.
Climbing shrubs. Corolla-mouth with lobed scales	4. MELODINUS.
Climbing slender unarmed shrub. Corolla-mouth naked	5. WINCHIA.
Erect or stout climbing armed shrubs	6. CARISSA.

TRIBE II. *Plumeriæ.* *Anthers* included, free from the stigma, cells rounded at the base. *Ovary* of 2 distinct carpels united by the style. *Fruit* various. *Seeds* peltate. *Corolla-lobes* overlapping to the left except in *Ochrosia*.

SUBTRIBE 1. *Rauwolfiæ.* *Calyx* eglandular within. *Carpels* 1-2, rarely 4-6-ovuled. *Fruit* of 2 1-seeded drupes or berries, rarely moniliform (of superposed drupes).

Leaves usually whorled. Disc present. Albumen even	7. RAUWOLFIA.
Leaves usually whorled. Disc 0. Albumen ruminate	8. AXYLIA.
Leaves opposite. Disc 0. Albumen smooth	9. HUNTERIA.

SUBTRIBE 2. *Cerberæ.* *Calyx* glandular within. *Carpels* 2-, rarely 4-ovuled; ovules on opposite sides of a thick placenta. *Drupe*s or berries 1-seeded, or 2-seeded, the seeds separated by the enlarged placenta.

Leaves scattered, alternate. Corolla funnel-shaped	10. CERBERA.
Leaves opposite. Corolla salver-shaped, lobes overlapping to the right	11. OCHROSIA.
Leaves opposite. Corolla salver-shaped	12. KOPSIA.

SUBTRIBE 3. **Euplumeriæ**. *Calyx* glandular within. *Carpels* 6-∞-ovuled. *Fruit* (in the Indian genera) of 2 follicles.

* *Ovules* 2-seriate.

Disc annular or obscure. Seeds winged. Leafless shrub . . . 13. RHAZYA.
Disc of 2 scales. Seeds truncate at both ends . . . 14. VINCA.

** *Ovules* ∞-seriate.

Erect trees. Leaves scattered, alternate. Seeds winged . . . 14*. PLUMERIA.
A climber. Leaves opposite or whorled. Seeds winged . . . 15. ELLERTONIA.
Erect trees or shrubs. Leaves whorled. Seeds comose.
Style distinct . . . 16. ALSTONIA.
Erect trees. Leaves whorled. Seeds winged. Style 0 . . . 17. DYERA.
Erect trees. Leaves opposite. Seeds comose. Style short . . . 18. HOLARRHENA.

SUBTRIBE 4. **Tabernæmontanæ**. *Calyx* glandular within. *Carpels* ∞-ovuled. *Fruit* fleshy or coriaceous, dehiscent or not.

Erect trees or shrubs . . . 19. TABERNÆMONTANA.

TRIBE III. **Echitidæ**. *Anthers* included or exserted, conniving in a cone around the top of the style and adherent to it by a point on the connective; cells produced downwards into a subulate empty spur. *Ovary* of 2 distinct carpels united by the style. *Fruit* of 2 follicles. *Seeds* comose at one or both ends.—Exceptions, see *Parsonsia*.

SUBTRIBE 1. **Parsonsiæ**. *Corolla* rotate or salver-shaped, throat naked, except *Wrightia*. *Anthers* more or less exserted.

Corolla-lobes valvate. *Carpels connate in flower* . . . 20. PARSONSIA.
Corolla rotate, mouth naked. Connective thickened at the back . . . 21. VALLARIS.
Corolla salver-shaped, mouth naked . . . 22. POTTSIA.
Corolla rotate or salver-shaped, mouth with scales . . . 23. WRIGHTIA.

SUBTRIBE 2. **Neriæ**. *Corolla-throat* broad, with 5-10 scales. *Anthers* included.

Shrubby, erect. Leaves whorled. Corolla-lobes short. Follicles erect . . . 24. NERIUM.
Shrubby or twining. Leaves opposite. Corolla-lobes long or tailed. Follicles spreading . . . 25. STROPHANTHUS.
Herbaceous. Leaves opposite. Corolla-lobes short. Follicles slender . . . 26. APOCYNUM.

SUBTRIBE 3. **Euechitidæ**. *Corolla* various, mouth naked. *Anthers* included.

* *Corolla-lobes* valvate, overlapping to the left.

Flowers small or minute. Corolla urceolate, lobes valvate . . . 27. URCEOLA.
Flowers small. Corolla subcampanulate, lobes overlapping . . . 28. PARAMERIA.

** *Corolla-lobes* overlapping to the right.

a. *Corolla* very large.

Immense climbers, corolla bell- or funnel-shaped . . . 29. BEAUMONTIA.
Lofty climbers. Corolla salver-shaped . . . 30. CHONEMORPHA.

β. *Corolla* minute, urceolate, lobes very short.

Ovary exserted from the disc. Seeds beaked . . . 31. ECDYSANTHERA.

γ. *Corolla small or medium-sized, salver-shaped, lobes nearly straight or slightly twisted to the left in bud.*

- Ovary hidden in the disc. Seeds slender 32. *BALISSEA*.
 Ovary hidden or not in the disc. Seeds ovate or oblong 33. *AGANOSMA*.

δ. *Corolla small, salver-shaped, lobes sharply twisted to the left in bud, tips not deflected.*

- Ovary hidden in the disc. Seeds slender 34. *EPIGYNUM*.
 Ovary exerted from the disc. Seeds beaked 35. *RYNCHODIA*.
 Ovary exerted from the disc. Seeds not beaked 36. *TRACHELOSPERMUM*.
 Ovary hidden in the disc. Seeds ovate, beaked 37. *ANODENDRON*.

ε. *Corolla small, salver-shaped, lobes sharply twisted to the left in bud, with the tips deflected.*

- Seeds ovate, beaked 38. *ICHNOCARPUS*.
 Seeds ovate, not beaked 39. *MICRECHITES*.

TRIBE I. **CARISSEÆ.**

1. **WILLOUGHBEIA**, Roxb.

Glabrous shrubs, often climbing by the peduncles becoming tendrils. *Leaves* opposite, petiole short. *Flowers* in axillary cymes. *Calyx* short, 5-lobed. *Corolla* salver-shaped, tube nearly glabrous within, mouth naked or with fleshy glands alternating with the lobes; lobes overlapping to the left, nearly straight in bud. *Stamens* included in the tube, and filaments very short; anthers ovate or lanceolate, cells rounded at the base. *Disc* 0. *Ovary* 1-celled; style short, top obconic or urceolate, stigma curved or columnar; ovules many, ∞-seriate on 2 parietal placentas. *Berry* large, globose or ovoid, many-seeded, pericarp hard. *Seeds* imbedded in pulp, ellipsoid, albumen 0; cotyledon thick, plano-convex.—*DISTRIB.* Species 8-10, Malayan and East Asiatic.—All supposed to yield Caoutchouc.

The species with glands on the corolla-mouth may form a different genus. I have seen no tendrils on these.

* *Mouth of corolla naked.*

1. **W. coriacea**, Wall. *Cat.* 1620, and *Pl. As. Rar.* iii. 45; glabrous, leaves elliptic or elliptic-lanceolate subacute or obtusely acuminate thickly coriaceous very shining above, base acute, nerves 8-14 pairs strong arched interspaces not reticulated, corolla-lobes linear-oblong longer than the globose tube. *A. DC. Prodr.* viii. 321.

SINGAPORE; *Wallich, Lobb. MALACCA; Griffith, Maingay* (Kew Distrib. 1048).

Branches stout, bark black; tendrils slender, branched. *Leaves* 4-5 by 1-2½ in., drying greenish above and red beneath, very smooth, secondary nerves very faint; petiole stout, ¼-½ in. *Flowers* densely crowded, sessile in sessile cymes, ½ in. long; bracts persistent. *Calyx* very thick, subhemispheric; lobes short, rounded, ciliate. *Corolla* thickly coriaceous, lobes twice as long as the tube. *Ovary* broad, acute; style short, top obovoid, stigma conical. *Seeds* ¾ in. long.

2. **W. edulis**, Roxb. *Cor. Pl.* iii. t. 280, and *Fl. Ind.* ii. 57; glabrous, leaves oblong or obovate-oblong obtusely acuminate or caudate thinly coriaceous, base acute, nerves many pairs nearly straight ascending interspaces reticulated, corolla-lobes linear-oblong longer than the subcylindric tube. *Wall. Cat.* 1618,

and *Pl. As. Rar.* iii. 45; *A. DC. Prodr.* viii. 321; *Kurz For. Fl.* ii. 165. *W. martabanica*, *Wall. Cat.* 1619, and *Pl. As. Rar.* iii. 45, t. 272; *A. DC. l.c.*; *Kurz l.c.* *Hunteria?*, *Wall. Cat.* 9066. *Pacourea Gudara*, *Herb. Ham.*; *Wall. Cat.* 4465.

ASSAM; at Gualpara, *Hamilton*. SILHET; *De Silva*. CACHAR; *Keenan*. CHITTAGONG; *Roxburgh*, &c. PEGU; *McClelland*. MARTABAN; *Wallich*. MALACCA; *Griffith*.—DISTRIB. BORNEO.

"An immense climber; tendrils long, branched; bark $\frac{1}{2}$ in. thick" (*Roxburgh*). *Leaves* 4-7 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., greenish or brown when dry and polished above, paler beneath, margins waved; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Cymes* shortly stoutly peduncled, few-fl.; bracts rounded, deciduous; pedicels very short. *Calyx* thick, subglobose; lobes short, rounded, ciliolate. *Corolla-tube* $\frac{1}{2}$ in., inflated in the middle, lobes three times as long. *Anthers* subsagittate; filaments short. *Ovary* ovoid, acute; style very short, stigma conical. *Berry* "size of a lemon, subovoid, rind thick smooth friable. *Seeds* many in soft pulp mixed with cottony fibres, size of a garden bean; outer coat fleshy, inner thin friable," *Roxb.*—Yields much caoutchouc. Fruit edible. *Kurz*, who keeps *W. edulis* distinct from *W. martabanica*, gives no other characters than "berry ovate smooth" in the former, and "berry globular wrinkled in the latter."—Assuming the usual variety in the size and form of such fruits in *Apocynaceæ*, and attributing the wrinkles to age, nothing is left whereby to distinguish these plants, of which the specimens in *Wallich's Herbarium* are identical.

3. *W. ceylanica*, *Thwaites Enum.* 191; glabrous, leaves elliptic obtusely acuminate base acute margins waved nerves very many pairs horizontal interspaces reticulated, cymes sessile or peduncled, corolla-lobes linear-oblong much longer than the tube. *Beddome For. Fl., Anal. Gen.* xx. fig. 4. *Chilocarpus ceylanicus*, *Wight Ic.* t. 1288. *Winchia cirrhifera*, *Gardner ms.*

CEYLON; in forests ascending to 4000 ft., *Gardner*, &c.

A climbing shrub with long branched tendrils, bark of branches black. *Leaves* 3-4 by $1\frac{1}{2}$ -2 in., very coriaceous, when dry very dark brown and polished above, light red-brown beneath; nerves straight, with a recurrent one from the intramarginal between every pair of primaries; petiole $\frac{1}{2}$ in. *Cymes* usually peduncled, few or many-fl.; bracts ovate, obtuse; pedicels short. *Calyx* small, lobes short rounded, ciliolate. *Corolla-tube* very short, lobes three times as long. *Anthers* lanceolate, filaments nearly as long, very broad and fleshy at the base. *Ovary* very broad, depressed-flagon-shaped; style rather slender, stigma elongate, obpyriform. *Fruit* "4-5 in. diam., spherical or subpyriform, fleshy, yellow-red. *Seeds* $\frac{3}{4}$ by $\frac{1}{2}$ in., oblong, compressed, testa membranous, cotyledons fleshy, reddish," *Thwaites*.

4. *W. firma*, *Blume Mus. Bot.* i. 154; glabrous, leaves elliptic or elliptic-lanceolate very coriaceous shining above obtusely acuminate base acute, nerves 10-15 pairs nearly straight interspaces hardly reticulated, cymes sessile dense-flowered, corolla-lobes linear-oblong longer than the inflated tube, berry pyriform. *Miquel Fl. Ind. Bat.* ii. 390. *W. Burbidgei*, *Dyer in Kew Gard. Rep.* 1880, 44, 46.

SINGAPORE; jungles near the Botanical Gardens, *H. Murton*.—DISTRIB. Sumatra, Borneo.

A large climber; branches stout, obtusely angled, bark smooth. *Leaves* very variable, 3-6 by 1-3 in., very coriaceous, usually dark brown and polished above, or on both surfaces when dry; midrib very stout beneath; nerves slender but prominent, reticulations very indistinct. *Flowers* about $\frac{1}{2}$ in. long. *Calyx-lobes* ovate, obtuse, obscurely ciliate. *Corolla-tube* inflated in the middle; lobes narrow. *Anthers* ovate, acute, filaments short. *Ovary* ovoid, acute; style short. *Fruit* in Bornean specimens as large and of the form of a good sized pear, 4 inches long, orange-yellow, pericarp thick. *Seeds* 1 in. long.—There may be more than one species under this name. The Javan specimens referred to it by *Miquel* have much fewer nerves in the

leaf. Burbidge has made in Borneo excellent drawings of the whole plant in flower and fruit. In both Singapore and Borneo it is said to yield the "Gutta Singarip."

5. **W. grandiflora**, *Dyer in Herb. Kew.*; quite glabrous, leaves elliptic or orbicular tip and base rounded very thickly coriaceous pale, nerves 4-7 pairs very strong arching interspaces with distant reticulations, cymes densely many-fl., corolla-lobes very large oblong much longer than the slender tube.

MALACCA; *Maingay* (Kew Distrib. 1047).—DISTRIB. Borneo.

A very stout climber, with woody tendrils, branches as thick as a goose-quill. Leaves 3-5 by 3-3½ in., very pale yellowish-red and rather shining above when dry, beneath cinnamon coloured and soft to the touch, with midrib and nerves very distinct but not prominent; petiole stout, ½-1 in. Cymes very dense-fl.; flowers shortly and stoutly pedicelled. Calyx broad, lobes rounded. Corolla nearly 1 in. long before expansion, tube ½ in., very slender, swollen towards the base, lobes ¾-1 in. long, tip rounded. Anthers lanceolate, base cordate, filaments slender. Ovary minute, broadly conical; style very short, base conical, top urn-shaped; stigma slender, as long as the style.

6. **W. tenuiflora**, *Dyer in Herb. Kew.*; shoots and cymes pubescent, leaves elliptic-oblong or oblanceolate obtusely acuminate base acute, nerves 20-30 pairs very slender nearly horizontal interspaces nerveless, petiole slender.

MALACCA; *Maingay* (Kew Distrib. 1049).

Branches with black bark. Leaves 3-4 by 1-1½ in., thinly coriaceous, dark brown and hardly shining above when dry, pale brighter brown beneath but without reticulations between the nerves, margins flat; petiole ½-¾ in. Cymes numerous, rusty puberulous, subsessile, dense-flowered; bracts small, rounded. Calyx-lobes rounded. Corolla-tube ½ in. long, slender, hairy within, globose near the base just above the calyx; lobes narrowly linear-oblong, obtuse. Anthers cordate-lanceolate, filaments short slender. Ovary hemispheric, top almost truncate; style very short, stigma large, elongate conic. Fruit 4 in. long, "pyriform, abounding in caoutchouc; pericarp thick, leathery. Seeds many, naked, cotyledons pink fleshy" (*Maingay*).

** Mouth of the corolla with tubercles or scales. (Tendrils not seen.)

7. **W. oblonga**, *Dyer in Herb. Kew.*; branches very stout, leaves elliptic obtuse or suddenly obtusely contracted at the tip opaque above, base acute, nerves 10-15 pairs arched interspaces reticulated, cymes sessile dense-fl.. corolla-lobes linear-oblong longer than the rather long tube, berry oblong.

MALACCA; *Maingay* (Kew Distrib. 1089).

A long flexuose shrub (*Maingay*). Branches woody, obtusely angled, rough, with close-set small lenticels, bark pale. Leaves 3-6 by 1½-3 in., base usually rounded, thickly coriaceous; when dry dark brown and opaque on both surfaces; petiole stout. ¼ in. Cymes very small, sessile, pedicels very short. Calyx-lobes short, oblong, strongly ciliate. Corolla-tube ⅝ in., rather slender, inflated in the middle, lobes twice as long, with glands or tubercles at the sinus. Berry many-seeded, pericarp leathery. Seeds 2-seriate, imbedded in firm pulp; cotyledons large, fleshy (*Maingay*).—Abounds in tenacious milky juice.

8. **W. flavescens**, *Dyer in Herb. Kew.*; quite glabrous, leaves elliptic obtusely acuminate base subacute or rounded, nerves numerous nearly horizontal very slender interspaces reticulated, cymes sessile many-fl., corolla-tube very short, tubercles at the mouth small lobulate. Chilcarpus flavescens, *Kew Gard. Report*, 1880, 47.

SINGAPORE; in jungles near the Botanic Gardens, *H. Murton*. "A large climber; stem 8 in. diam." (*Murton*).

Branches stout, smooth, divaricate, somewhat compressed, nodes swollen, bark brown. Leaves 3-4 by 1½-2¼ in., thickly coriaceous, dirty brown and opaque above when dry, brighter and paler yellowish-brown beneath, nerves very distinct though slender;

petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., stout. *Cymes* numerous, 1 in. diam., branches divaricate; bracts very minute; flowers pedicelled, 4–5-merous. *Calyx* small, lobes broadly ovate. *Corolla-tube* inflated, quite glabrous within; lobes slightly falcate, forming an oblong bud narrower than the tube, which they nearly equal in length. *Anthers* shortly ovate, twice as long as the filaments. *Ovary* distinctly 1-celled with parietal many-ovuled placentas. *Fruit* unknown.

DOUBTFUL SPECIES.

9. *W. RUFESCENS*, *Dyer in Herb. Kew.*; leaves elliptic or elliptic-oblong or -lanceolate, obtuse, very coriaceous, shining above, red-brown when dry beneath, nerves 16–20 pairs very slender, slightly arched, interspaces reticulated.

MALACCA, *Maingay* (Kew Distrib. 1092).

Branches divaricate, thickened at the nodes, bark black; tendrils not seen. *Leaves* $2\frac{1}{2}$ –3 by 1–1 $\frac{1}{4}$ in., dirty brown above, bright-brown beneath; petiole $\frac{1}{4}$ in. *Fruit* (unripe) globose, nearly 2 in. diam.

2. **CHILOCARPUS**, *Blume.*

Milky sarmentose shrubs. *Leaves* opposite, nerves horizontal close. *Flowers* small, in axillary cymes. *Calyx* short, 5-lobed, eglandular. *Corolla-tube* cylindrical, throat naked; lobes 5, broad, overlapping to the left, twisted to the right. *Stamens* at or below the middle of the tube; anthers lanceolate, acute, cells rounded at the base. *Disc* 0. *Ovary* 1-celled, placentas 2 parietal; style short, stigma ovoid or conical, tip obscurely 2-toothed; ovules many, 2-seriate on each placenta. *Berry* fleshy, at length 2-valved. *Seeds* imbedded in pulp, or in a granular substance, compressed or thick, grooved or excavated at the hilum, albumen copious, horny, equable or ruminant; cotyledons flat, radicle elongate. —DISTRIB. Species 8, Malayan and Australian.

* *Pedicels bracteate at the base only; flowers very small, in lax panicked cymes; tube of corolla inflated in the middle* (fruit unknown).

1. **C. atro-viridis**, *Blume Mus. Bot. i.* 153; glabrous, leaves oblong obtusely caudate, nerves very numerous nearly horizontal straight slender. *Miquel Fl. Ind. Bat. ii.* 393. *C. malabaricus*, *Beddome Ic. Pl. Ind. Or. t.* 175. *Hunteria? atro-viridis*, *Wall. Cat.* 1614; *A. DC. Prodr. viii.* 351. *Winchia atro-viridis*, *Kurz For. Fl. ii.* 170.

MALAYAN PENINSULA; Tavoy, *Gomez*; Mergui, *Griffith*, *Parish*. MALABAR; *Beddome*.

Branches slender; bark smooth, sparsely lenticellate. *Leaves* $3\frac{1}{2}$ –6 by $1\frac{1}{2}$ –2 in., thinly coriaceous, base acute, green and opaque when dry above, paler green beneath, minutely dotted and with a recurrent nerve from the marginal one between every pair of primaries; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., slender. *Cymes* 2–4 in., on slender pedicels; branches trichotomous, spreading, slender; flowers pedicelled, 3-nate or subumbellate; bracts minute. *Calyx-lobes* rounded, with white margins. *Corolla* $\frac{1}{2}$ in. long, tube inflated in the middle, glabrous externally, pubescent at the mouth and base of the stamens within; lobes short, falcate, broadly notched on one side, inflexed and forming a globose bud. *Anthers* subsessile, oblong. *Ovary* acute. *Fruit* unknown. —The *C. denudatus*, *Blume*, of Java, may prove to be the same as this.

** *Pedicels with many imbricate bracts; flowers very small; fruits capsular.*

2. **C. enervis**, *Hook. f.*; leaves oblong or elliptic-lanceolate obtuse or obtusely apiculate narrowed into a slender petiole nerveless, fruit 4 in. ellipsoid narrowed to an obtuse point base contracted into a short stipes, pericarp very thick.

MALACCA; *Maingay* (Kew Distrib. 1044).

Scandent; branches stout, smooth, swollen at the nodes. *Leaves* 3 by 1–1 $\frac{1}{2}$ in.,

very thickly coriaceous, brown and opaque above when dry, brighter brown beneath, midrib stout; petiole $\frac{1}{2}$ in. *Flowers* unknown. *Fruit* on a very stout woody pedicel with remains of minute persistent bracts in spiral series, bright orange coloured; pericarp very thick, dehiscent, pulp coarsely granular. *Seeds* very numerous, irregularly broadly oblong, ends rounded, hilum excavated, testa smooth, albumen solid horny.

3. **C. decipiens**, *Hook. f.*; glabrous, leaves elliptic-oblong or -ovate obtusely acuminate, base acute, nerves very numerous slender nearly horizontal, fruit linear-oblong cylindric rounded at both ends, pericarp woody.

MALACCA; *Maingay* (Kew Distrib. 1060 and 1043, *C. atro-viridis*).

Leaves 3–3½ by 1–1½, hardly shining above and greenish when dry, beneath pale brown minutely dotted; nerves very slender but prominent on both surfaces; petiole $\frac{1}{2}$ in. *Cymes* rather slender, dichotomously branched; flowers not seen. *Fruit* 1½–2½ by $\frac{1}{2}$ – $\frac{2}{3}$ in., on a stout pedicel bearing numerous minute bracts in spirals. *Seeds* large, “albumen horny, dull white, cotyledons blood-red, fleshy, convolute” (*Main-gay*).—The foliage resembles *C. atro-viridis*, but there are no recurrent nerves between the primaries.

*** *Pedicels bracteate at the base only; flowers long; tube of corolla inflated towards the base.*

4. **C. Maingayi**, *Dyer in Herb. Kew.*; glabrous, leaves elliptic-oblong obtuse base acute, nerves numerous slightly arched strong beneath, cymes long very stout, pedicels subverticillately branched.

MALACCA; *Maingay* (Kew Distrib. 1046).

A climber; branches stout, smooth, shining, swollen at the nodes. *Leaves* 3–4 by 1–2 in., coriaceous, opaque, dull yellowish green when dry on both surfaces; nerves 20–30 pairs, with a recurrent one from the intramarginal between each pair; petiole $\frac{1}{2}$ in., very stout. *Cymes* elongate, erect; peduncles very stout, 1–3 in., bearing superposed pairs of very short branches, the crowded flowers of which give them a somewhat whorled appearance; flowers $\frac{3}{4}$ in. long, sessile or stoutly pedicelled. *Calyx-lobes* rounded, short. *Corolla-tube* very slender, with a ring of hairs below the anthers within; lobes inflexed and forming an ovoid bud much broader than the tube, when expanded $\frac{1}{2}$ in. long, ovate-lanceolate, narrowed into long points. *Anthers* small, ovate, longer than the slender filament. *Ovary* acute, “1-celled with 4 parietal placentas,” *Maingay*. *Fruit* “spherical and obtusely conoid, coriaceous, fleshy, capsular, orange-yellow. *Seeds* very many, immersed in angular bright yellow masses (pulp), mixed with delicate arachnoid fibres, subquadrate, curved on one surface, deeply channelled on the other; testa cartilaginous, bright brown; albumen horny; embryo axile; cotyledons semi-oval, flat, white” (*Maingay*).

3. **LEUCONOTIS**, *Jack.*

Erect milky evergreen shrubs. *Leaves* opposite, nerves distant. *Flowers* in peduncled axillary cymes, 4-merous. *Calyx* 4-lobed or -partite, eglandular or minutely glandular within. *Corolla* salver-shaped, tube dilated in the middle, throat naked; lobes 4, short, overlapping to the left. *Stamens* 4, in the middle of the tube, included, anthers linear, cells rounded at the base. *Disc* 0. *Ovary* 2-celled; style short, top thickened, stigma 2-toothed; ovules 2, laterally affixed in each cell. *Berry* ovoid or globose. *Seeds* 1–3, imbedded in pulp, ovoid-oblong, testa membranous, albumen 0; cotyledons thick, fleshy, inner faces irregular, radicle short superior.—DISTRIB. Species 6, Malayan (not Javan).

* *Calyx 4-partite, segments long linear.*

1. **L. eugenifolius**, *A. DC. Prodr.* iii. 3: 1; shoots petioles and nerves

beneath rusty-puberulous, leaves opaque above oblong obtusely caudate base obtuse, nerves 8-10 pairs united by a strong intramarginal one, cymes few-flid. *Miquel Fl. Ind. Bat.* ii. 398. *L. cuspidatus*, *Blume Mus. Bot.* i. 112: *Miquel l. c.* 398. *Melodinus*? *eugenifolius*, *Wall. Cat.* 1616.

PENANG; *Wallich*.—DISTRIB. Sumatra, Borneo.

Branches strict, obscurely angled, bark smooth. *Leaves* 3-4 by $1\frac{1}{4}$ - $1\frac{1}{2}$ in., tip $\frac{1}{2}$ in. long, very narrow, pale or dark greenish-brown when dry above, beneath much paler yellow-brown and minutely dotted and with strong horizontal nerves; petiole slender, $\frac{1}{3}$ - $\frac{1}{2}$ in. *Cymes* erect; peduncle 1 in.; bracts linear; pedicels short; flowers erect, nearly $\frac{1}{2}$ in. long. *Sepals* very narrow, erect, deciduous in fruit. *Corolla* coriaceous, tube as long or half as long again as the calyx, pubescent within; lobes short, puberulous on both surfaces. *Anthers* sessile, elongate-lanceolate. *Ovary* deeply grooved, narrowed into the grooved style, stigma oblong, 2-fid. *Fruit* "the size of a gooseberry," *Don*.

** *Calyx* 4-lobed, lobes short rounded.

2. **L. Griffithii**, *Hook. f.*; glabrous, leaves elliptic obtusely acuminate shining above base rounded or subacute, nerves 5-7 pairs very faint, cymes shortly stoutly peduncled glabrous, flowers densely crowded sessile or shortly pedicelled.

MALACCA; *Griffith, Maingay* (Kew Distrib. 1051, *L. anceps*?). ? SINGAPORE; *T. Anderson*.

Branches obscurely angled, lenticellate. *Leaves* 3-5 by $1\frac{1}{2}$ -2 in., thickly coriaceous, pale brown when dry, beneath paler still and very opaque chocolate-brown, and minutely dotted or not, intramarginal nerve very faint; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Cymes* erect, peduncle shorter and stouter than the petiole; branches very short, thick and crowded; bracts small, broad; flowers $\frac{1}{2}$ in. long. *Calyx* small, lobes rounded. *Corolla* thickly coriaceous, tube cylindric, glabrous within and without; lobes short, rounded forming an ovoid bud broader than the tube. *Anthers* sessile, narrowly lanceolate, acuminate. *Fruit* $1\frac{1}{2}$ in. long, broadly ellipsoid. *Seeds* $\frac{1}{2}$ in. long, oblong, compressed, smooth.—Very near *L. anceps*, *Jack.*, but which has long-peduncled puberulous cymes with long-pedicelled flowers. *Anderson's* Singapore specimens have the leaves opaque above, and broader, but the flowers appear to be identical.

3. **L. Maingayi**, *Dyer in Herb. Kew.*; quite glabrous, leaves oblong abruptly obtusely acuminate shining above, nerves 6-10 pairs slender arched, base acute or rounded, cymes very shortly and very stoutly peduncled glabrous few-flowered, flowers sessile or stoutly pedicelled.

SINGAPORE; *Maingay* (Kew Distrib. 935).

Characters very much those of *L. Griffithii*, but a much stouter plant; leaves coriaceous but very dark brown, with stronger nerves beneath and longer petioles, 1- $1\frac{1}{4}$ in. long; peduncle of cymes $\frac{1}{4}$ - $\frac{1}{2}$ in., and $\frac{1}{8}$ - $\frac{1}{4}$ in. diam.; calyx much larger, as broad as the peduncle of the cyme; bracts triangular, thickly coriaceous.

4. **MELODINUS**, *Forst.*

Evergreen, erect or climbing shrubs. *Leaves* opposite. *Cymes* terminal and axillary, flowers rarely 4-merous, white or pale pink. *Calyx* 5-partite, eglandular within. *Corolla* salver-shaped, mouth with thick cleft or lobed scales; lobes overlapping to the left. *Anthers* included, subsessile, lanceolate, cells rounded at the base. *Disc* 0. *Ovary* 2-celled, acute; style short, stigma thick 2-fid; ovules many in each cell. *Berry* globose, pericarp coriaceous or hard. *Seeds* many, imbedded in pulp, albumen fleshy; cotyledons thin, radicle short.—DISTRIB. About 15 species, East Asiatic, Malayan, Australian and Pacific.

* *Flowers in terminal paniced cymes. Corolla-lobes oblong or rounded, quite entire.*

1. **M. monogynus**, *Roxb. Fl. Ind.* ii. 56; leaves oblong or oblong-lanceolate acute or obtuse base acute or rounded, corolla-tube $\frac{1}{2}$ – $\frac{3}{4}$ in., lobes as long oblong. *A. DC. Prodr.* viii. 329; *Wall. Cat.* 1603; *Wight Ic.* t. 394; *Bot. Reg.* t. 834; *Bot. Mag.* t. 2527. *Echaltium piscidium*, *Wight Ic.* t. 242, excl. fig. of fruit. *Nerium piscidium*, *Roxb. Fl. Ind.* ii. 7, excl. descr. of fruit.

SIKKIM HIMALAYA; at Bartning, alt. 4500 ft. (leaves only), *Clarke*. ASSAM, SILHET and the KHASIA Mts., common, ascending to 4000 ft. PENANG; *Maingay*.

A tall milky climber, branches smooth. *Leaves* 5–6 by $1\frac{1}{2}$ –2 in., pale brown when dry and shining above, nerves many but not close, very slender, arching; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Panicles* puberulous, sometimes 12 in. long, brachiate, drooping; flowers usually 3-nate, nearly white, fragrant; pedicels long or short; bracts caducous. *Calyx-segments* $\frac{1}{6}$ in., broad, ciliolate. *Corolla-tube* villous or bearded within, lobes obtuse. *Fruit* globose, obscurely 4-angled, size and colour of an orange; pericarp coriaceous. *Seeds* numerous. Roxburgh erred in describing the scales of the corolla as being undivided.

2. **M. khasianus**, *Hook. f.*; leaves linear-lanceolate acuminate at both ends membranous, cymes short few-fl., corolla-tube $\frac{1}{6}$ in., lobes rounded.

KHASIA Mts.; Moflong wood, &c., alt. 5–7000 ft., *Griffith, J. D. H. & T. T.*

A smaller plant in all its parts than *M. monogynus*, with leaves $2\frac{1}{2}$ –5 by $1\frac{1}{2}$ –1 in., and more membranous, very much smaller flowers with a short corolla-tube and rounded lobes, and with the fruit only $\frac{1}{2}$ in. diam.

** *Flowers small in axillary cymes or fascicles. Corolla-lobes very obliquely 2-lobed or 2-fid at the tip.*

3. **M. orientalis**, *Blume Bijl.* 1026, and *Mus. Bot.* i. 155, fig. 411; quite glabrous, leaves oblong or elliptic-oblong obtusely acuminate base acute, nerves very numerous nearly horizontal very slender, cymes shortly peduncled few-fl., corolla $\frac{1}{2}$ in. lobes short obliquely ovate bicuspidate, scales closing the mouth very thick fleshy lobulate. *Miquel Fl. Ind. Bat.* ii. 395, t. 34; *A. DC. Prodr.* viii. 330; *Kurz in Journ. As. Soc.* 1877, ii. 250, in note. *Hunteria?* cuspidata, *Wall. Cat.* 1609; *A. DC. l.c.* 350. *Alyxia?* cuspidata, *Wall. Herb. Chilocarpus cuspidatus*, *Benth. in Gen. Pl.* ii. 698 (under *Hunteria*).

PENANG; *Wallich, Phillips, Maingay* (Kew Distrib. 1043/2, *Chilocarpus suaveolens*).—DISTRIB. Java, Sumatra.

Branches smooth, rather slender, bark very dark. *Leaves* 4–5 by $1\frac{1}{2}$ –2 in., thinly coriaceous, greenish brown and shining above when dry, pale yellow green beneath, margins a little undulate; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Cymes* with very short stout peduncles; flowers crowded; bracts rounded, persistent. *Calyx* small, lobes rounded. *Corolla* very thickly coriaceous, tube swollen in the middle, lobes forming a globose bud; lobes shorter than the tube. *Fruit* “large, yellow” (*Maingay*).

4. **M.? micranthus**, *Hook. f.*; quite glabrous, leaves elliptic-lanceolate obtusely acuminate base acute nerves remote very slender, cymes subsessile many-flowered, corolla $\frac{1}{2}$ – $\frac{3}{4}$ in. long, lobes short unequally obtusely 2-lobed, scales closing the mouth 2-lobed.

MALACCA; *Maingay* (Kew Distrib. 1090).

Branches smooth rather slender; bark black. *Leaves* 3–6 by $1\frac{1}{2}$ –2 in., coriaceous, dark brown and shining when dry above, paler bright brown beneath, margins somewhat undulate; petiole $\frac{1}{2}$ in. *Fascicles* of flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; bracts broad, short, deciduous. *Calyx* very small, lobes rounded. *Corolla* coriaceous, tube much swollen in the middle; lobes short, forming a globose bud, obliquely 2-fid, sinus broad,

longer lobule ciliate or toothed at the tip. *Anthers* narrowly lanceolate, acuminate. *Fruit* unknown.—Maingay observes that this resembles a *Melodinus*.

5. **WINCHIA**, A. DC.

A slender twining evergreen shrub. *Leaves* 3 in a whorl. *Flowers* small, in terminal paniculate cymes. *Calyx* small, 5-lobed, eglandular within. *Corolla* salver-shaped, tube nearly cylindric; lobes rounded, velvety, overlapping to the left; throat villous. *Anthers* above the middle of the tube, included, subsessile, cells rounded at the base, dehiscing almost throughout their length. *Disc* 0. *Ovary* short, 2-celled, top rounded glabrous; style short, stigma with a calyp-triform base; ovules in several series, placentas on the septum. *Fruit* not seen.

W. calophylla, A. DC. *Prodr.* viii. 326; *Kurz For. Fl.* ii. 170; *Deless- Ic. Sel.* v. t. 46. *Alyxia*? *calophylla*, Wall. *Cat.* 1607. *A. glaucescens*, G. *Don Gen. Syst.* iv. 97 (descript. incorrect).

MARTABAN; Wallich.

Leaves 2-4 in., oblong-lanceolate, obtusely caudate, acuminate, base acute, very shining above and dark olive brown when dry, pale beneath, margins waved, coriaceous; nerves very numerous, close and horizontal; petiole slender, $\frac{1}{2}$ - $\frac{3}{4}$ in. *Cymes* glabrous, rounded, shortly peduncled, 1-2 in. diam.; bracts minute; pedicels short. *Calyx* campanulate, lobes rounded, ciliolate. *Corolla-tube* $\frac{1}{2}$ - $\frac{1}{4}$ in., four times longer than the calyx, inflated below the top; lobes short, white with velvety hairs.

6. **CARISSA**, Linn.

Spinous, densely branched, usually erect shrubs. *Leaves* opposite, small, coriaceous. *Flowers* in terminal and axillary peduncled 3-chotomous cymes. *Calyx* 5-partite, glandular within or not, segments acute. *Corolla-tube* cylindric, throat naked, lobes overlapping to the right (in the Indian species). *Stamens* at the top of the tube, included; anthers lanceolate, cells rounded at the base. *Disc* 0. *Ovary* 2-celled; style filiform, stigma fusiform or columnar, minutely 2-fid; ovules 1-4 in each cell, rarely more. *Berry* ellipsoid or globose, 2- (or by abortion 1-) celled. *Seeds* usually 2, peltately attached to the septum, albumen fleshy; cotyledons ovate.—DISTRIB. Species about 20, African, Asiatic and Australian.

The Indian species of this genus are very difficult of definition, and are probably reducible to one or two very variable plants. The tickets of Wallich's specimens in Herb. Linn. Soc. have been, I fear, much misplaced.

* *Spines straight.*

1. **C. Carandas**, Linn.; A. DC. *Prodr.* viii. 332; shrubby or arborescent, quite glabrous except the puberulous cymes, leaves $1\frac{1}{2}$ -3 in. oblong rounded broadly ovate or obovate shining above, tip rounded or obtuse, nerves numerous, corolla $\frac{3}{4}$ -1 in. long, ovary 4- or 8-ovuled, berry $\frac{1}{2}$ -1 in. ellipsoid 4- or more-seeded. Wall. *Cat.* 1677, partly; Roxb. *Cor. Pl.* i. 55, t. 77, and *Fl. Ind.* i. 687, and ed. Wall. & Carey ii. 523; Wight *Ic.* t. 426, and in Hook. *Comp. Bot. Mag.* i. 276, t. 12; Lamk. *Ill.* t. 118, fig. 1; Lodd. *Bot. Cab.* t. 663; Brand. *For. Fl.* 320; Gibs. *Cat. Bomb. Pl.* 116; Dalz. & Gibs. *Bomb. Fl.* 143; Kurz *For. Fl.* ii. 169; Beddome *Fl. Sylv.* 156, t. 19, fig. 6. *C. congesta*, Wight *Ic.* t. 1289.

Throughout the drier sandy or rocky soils of INDIA, native or cultivated; from the Punjab to Ceylon, Birma and Malacca.—DISTRIB. Java, Timor.

A large shrub or small gnarled tree with many dichotomous, rigid, spreading

branches; axils and nodes with 2 simple or forked thorns, sometimes 1-2 in. long. *Leaves* subsessile, $1\frac{1}{2}$ -3 by $1-1\frac{1}{2}$ in., rather thinly coriaceous, base rounded or retuse, tip rarely mucronate. *Cymes* terminal, peduncle stout, $\frac{1}{4}$ -1 in.; bracts minute; flowers crowded, white or pale rose-coloured, odorous. *Calyx-segments* subulate-lanceolate, acute, puberulous and ciliate. *Corolla-tube* $\frac{3}{4}$ in., glabrous or puberulous with swollen throat and lobes pubescent, lobes lanceolate, acute, about half as long as the tube. *Ovary-cells* 4-ovuled. *Drupe* $\frac{1}{4}$ -1 in. long, ellipsoid, red then black, polished, 4- or more-seeded.

Var. congesta, Beddome Fl. Sylv. Anal. Gen. 156; ovarian cells 2-ovuled. *Kurz in Journ. As. Soc.* 1877, ii. 250. *C. congesta*, *Wight Ic.* t. 1289.—Mt. Aboo, *Stocks*; Kurg, the Wynaad and Birma.

2. ***C. spinarum***, *A. DC. Prodr.* viii. 332; suberect, shrubby, glabrous or branches cymes and leaves beneath finely puberulous, leaves $\frac{1}{2}$ -1 $\frac{1}{2}$ in. elliptic ovate or rounded acute mucronate or apiculate rarely obtuse many or few-nerved shining above, corolla $\frac{1}{2}$ in. long, ovary 4-ovuled, berry $\frac{1}{4}$ in. subglobose. *C. diffusa*, *Roxb. Fl. Ind.* i. 689, and *ed. Wall. & Carey*, ii. 524; *A. DC. l. c.*; *Wight Ic.* t. 427; *Wall. Cat.* 1678, partly; *Brand. For. Fl.* 321; *Kurz For. Fl.* ii. 169; *Beddome Fl. Sylv.* t. 157.

Drier parts of INDIA; from the Punjab Himalaya, which it ascends to 6000 ft. in Murree, to Ceylon and Birma.

Probably a state of *C. Carandas* as suggested by Brandis, than which it is a smaller plant with shorter and more slender spines, more acute leaves and a smaller berry.

Var. hirsuta; more pubescent. *C. hirsuta*, *Roth Nov. Sp.* 128; *A. DC. Prodr.* viii. 333; *Kurz For. Fl.* ii. 169; *Dalz. & Gibs. Bomb. Fl.* 143. *C. villosa*, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 525; *Grah. Cat. Bomb. Pl.* 116. *Wight Ic.* t. 437. Not uncommon.

3. ***C. paucinervia***, *A. DC. Prodr.* viii. 333; suberect, shrubby, glabrous except the puberulous petioles and cymes, leaves $1-1\frac{1}{2}$ in., elliptic-oblong or lanceolate acute at both ends very coriaceous not shining, nerves 2-3 pairs very oblique, corolla $\frac{1}{2}$ - $\frac{3}{4}$ in., berry $\frac{1}{2}$ in. ellipsoid. *Wight Ic.* t. 1290. *C. diffusa*, *Wall. Cat.* 1678, in part. *C. Carandas*, var. *paucinervia*, *Beddome Fl. Sylv. Anal. Gen.* 156; *Kurz in Journ. As. Soc.* 1877, ii. 250.

LOWER BENGAL; Monghir, *Hamilton in Herb. Wall.* NILGHERRY Mts.; at the Kaitia Falls, *Wight*, &c. ? *C. salicina*, *Lamk.*; *A. DC. l. c.*

A small ramous shrub, with the habit of *C. diffusa*, and probably, as Beddome conjectures, a variety of that species, but very distinct in appearance, more densely leafy, the leaves less shining than in its congeners and yellower when dry. *Peduncles* very short, 3-5-fld. *Corolla-lobes* very narrow.—I suspect a mistake as to the Monghir locality and that Wallich's specimens are mislabelled.

** *Spines decurved.*

4. ***C. macrophylla***, *Wall. Cat.* 1679; shrubby, erect; quite glabrous except the puberulous cymes, leaves 2-4 in. ovate or elliptic-ovate acute or acuminate many-nerved, cymes sessile, corolla 1 in., berry $\frac{3}{4}$ -1 in. ellipsoid. *A. DC. Prodr.* viii. 332. *C. inermis*, *Vahl Symb.* iii. 43; *A. DC. l. c.* 335. *C. lanceolata*, *Dalz. in Dalz. & Gibs. Bomb. Fl.* 143. *C. Dalzellii*, *Beddome For. Fl. Anal. Gen.* 157. *C. mitis*, *Heyne mss.*

DECCAN PENINSULA; Kurg, *Heyne*; the Concan, at Ramghat, *Dalzell*; Courtallum, *Roth*, *Wight*.

A large shrub, thorns very strong, curved, $1-1\frac{1}{2}$ in., and branches dark brown. *Leaves* shortly petioled, drying dark brown. *Flowers* as in *C. Carandas*, but lobes of corolla longer and narrower. *Calyx-lobes* longer and more slender, almost filiform in the Courtallum specimens, which have smaller leaves.—I cannot doubt this being

Vahl's *C. inermis*, described by him from a spineless branch, which justifies the abandonment of his name *inermis*.

5. *C. suavissima*, *Beddome mss.*; climbing, quite glabrous, leaves 2–3 in. broadly ovate acute or acuminate many-nerved, cymes sessile, corolla 1 in. long, berry 2 in. long.

DECCAN PENINSULA; mountains of the Madura district, *Beddome*.

This closely resembles *C. macrophylla*; but differs in the slender climbing habit, very small spines, broader paler leaves, the perfectly glabrous flowers and large berries. Col. *Beddome* describes it as a lofty climber with milky and most delicious fruit.

TRIBE II. PLUMERIEÆ.

7. *RAUWOLFIA*, *Linn.*

Glabrous (the Indian) shrubs. *Leaves* 3–4-nately whorled, rarely opposite; nerves slender, remotely arched, axils glandular. *Peduncles* alternating with the terminal leaves, becoming lateral. *Calyx* 5-fid or -partite, eglandular within. *Corolla* salver-shaped, tube cylindric, mouth constricted, throat usually hairy within; lobes broad, overlapping to the left. *Stamens* included at or above the middle of the tube; anthers small, acute, cells rounded at the base. *Disc* large, cup-shaped or annular. *Carpels* 2, distinct or connate; style filiform, stigma broad calyptriform at the base, tip 2-fid; ovules 2, collateral in each carpel. *Ripe carpels* drupaceous, distinct or connate, usually 1-seeded. *Seeds* ovoid, albumen fleshy; cotyledons flat.—*DISTRIB.* Species about 40, chiefly tropical American.

* *Corolla-tube* slender, inflated a little above the middle.

1. *R. serpentina*, *Benth. in Gen. Pl.* ii. 697; leaves elliptic-lanceolate or obovate acute or acuminate, nerves 8–12 pairs, cymes long-peduncled rounded rarely racemose fruiting erect, sepals short lanceolate, corolla-tube long slender shortly globosely inflated above the middle, drupes $\frac{1}{4}$ in. broadly obliquely ovoid. *Kurz For. Fl.* ii. 17. *Ophioxylon serpentinum*, *Linn.*; *A. DC. Prodr.* viii. 342; *Bot. Mag. t.* 784; *Jones in As. Research.* iv. 308; *Roxb. Fl. Ind. i.* 694, and *ed. Carey & Wall.* ii. 530; *Wight Ic. t.* 849; *Grah. Cat. Bomb. Pl.* 116; *Dalz. & Gibb. Bomb. Fl.* 144; *Bedd. For. Fl. Anal. Gen.* 156; *Miq. Fl. Ind. Bat.* ii. 404. *O. trifoliatum*, *Gaertn. Fruct.* ii. 129, t. 109, fig. 2; *Miquel l.c.* *O. obversum*, *Miquel l.c.* 405. *Tabernæmontana cylindracea*, *Wall. Cat.* 4451.—*Rheede Hort. Mal. t.* 47; *Burm. Fl. Zeyl. t.* 64.

TROPICAL HIMALAYA and plains near the foot of the hills from Sirkind, *Edgeworth*, and Moradabad, *Thomson*, to Sikkim. The KHASIA Mts., ascending to 4000 ft.; ASSAM, PEGU, TENASSERIM, and in the DECCAN PENINSULA, along the Ghats to TRAVANCORE and CEYLON.—*DISTRIB.* JAVA.

A small shrub, 6–18 in., rarely 2–3 ft. high, bark white, rarely lenticellate. *Leaves* 3–7 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., green when dry, very pale beneath, narrowed into a short petiole. *Cymes* 1–2 in. diam., many-flowered; peduncle 2–5 in., stout, branches and pedicels red; bracts obsolete; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in.; flowers white or pinkish, nearly 1 in. long. *Calyx* small. *Corolla-tube* often curved; lobes not one-quarter the length of the tube, margins undulate; throat hairy. *Drupes* black, endocarp slightly rugose.

2. *R. peguana*, *Hook. f.*; leaves oblong or oblong-lanceolate acuminate, cymes sessile branched from the base branches divaricate, calyx-lobes ovate acute, corolla-tube slender inflated in the middle.

PEGU; *Kurz*.

Branches rather slender, not lenticellate. *Leaves* opposite and three in a whorl,

3-5 by $1\frac{1}{2}$ - $1\frac{3}{4}$ in., very membranous; nerves 7-10 pairs, very faint. *Cymes* with the main branches an inch long widely divaricating from the base, some decurved; flowers pedicelled, $\frac{1}{2}$ - $\frac{2}{3}$ in. long. *Calyx* very small, many times shorter than the corolla-tube. *Corolla-lobes* very small. *Fruit* not seen.—This is closely allied to *R. serpentina*, differing in the inflorescence, smaller flowers, and calyx.

** *Corolla-tube broad, inflated at the top.*

3. *R. densiflora*, Benth. in *Gen. Pl.* ii. 697; leaves obovate or oblanceolate acuminate, nerves 8-16 pairs, cymes short- or long-peduncled or corymbose erect or spreading in fruit, sepals elongate subulate-lanceolate half the length of the broadly tubular corolla-tube which is inflated at the top, drupes $\frac{1}{2}$ - $\frac{1}{3}$ in. obliquely ellipsoid. *Ophioxylon neilgherrense*, *Wight Ic.* t. 1292; *Dalz. & Gibs. Bomb. Fl.* 144. *O. ceylanicum*, *Wight Ic.* t. 1291. *O. macrocarpum*, *Wight l. c.* iv. part 2, 1. *O. densiflorum*, *Thwaites Enum.* 191; *Beddome For. Fl. Anal. Gen.* 156, t. 20, fig. 2. *Tabernæmontana densiflora*, *Wall. in Bot. Reg.* t. 1273; *A. DC. Prodr.* viii. 373. *T. parviflora*, *Herb. Heyne in Wall. Cat.* 4453.

KHASIA MTS.; alt. 1-4000 ft.. *J. D. H. & T. T.* DECCAN PENINSULA, on the Western Ghats; from the Concan southwards, alt. about 6000 ft. CEYLON, ascending to 6000 ft.

A larger shrub than *R. serpentina*; branches copiously lenticellate. *Leaves* often 4 in a whorl, very variable in size, 4-10 by 2-3 in., and number and stoutness of nerves. *Cymes* often numerous, dichotomously branched, branches and pedicels erect; flowers rose-red or white, $\frac{1}{2}$ in. long. *Calyx-lobes* $\frac{1}{6}$ - $\frac{1}{4}$ in. *Corolla-lobes* rounded, nearly as long as the tube. *Drupe*s very rugose.

VAR. ? *macrophylla*; leaves broader 8-10 by $2\frac{1}{2}$ - $3\frac{1}{2}$ in. very membranous, cymes very short branched from the base, flowers not seen, fruit as in the type. *Tabernæmontana subcapitata?*, *Herb. Ind. Or. H. f. & T.*—Khasia Mts., alt. 2000 ft., at Nowgong.

4. *R. microcarpa*, *Hook. f.*; leaves small oblanceolate acuminate, nerves 8-10 pairs, cymes short branched from the base, drupes ovoid $\frac{1}{4}$ in. long. *Tabernæmontana microcarpa*, *Wall. Cat.* 1581.

BIRMA; Taongdong (road to Ween-dow), *Wallich*.

The specimens are most wretched, consisting of two fragments of branches with 3 or 4 broken leaves and a fruiting cyme from which the solitary drupe (much eaten by insects) is detached.

5. *R. decurva*, *Hook. f.*; leaves small oblanceolate acuminate, cymes shortly peduncled decurved few-flowered, calyx-lobes lanceolate half as long as the broad corolla-tube which is inflated at the top, drupes $\frac{1}{4}$ in.

DECCAN PENINSULA; Canara and the Concan, Poonah, *Stocks*; Mundeel, *Ritchie*.

A shrub, 6 ft.; branches stout, dichotomous, lenticellate, leafy at the tips only. *Leaves* 4 in a whorl, in crowded whorls, $1-1\frac{1}{2}$ by $\frac{1}{2}$ - $\frac{2}{3}$ in., drying brownish-green. *Cymes* short, peduncle $\frac{1}{2}$ -1 in., 2-6-flowered, sometimes branched from the base; flowers $\frac{1}{2}$ in. long, white to pink. *Calyx-lobes* lanceolate, half the length of the corolla-tube. *Corolla-lobes* rounded, almost as long as the tube.—This may be a state of *R. densiflora*, but if so it is a very singular one, easily distinguished by the small leaves crowded at the tips of the woody branches, the decurved peduncles, and small flowers.

6. *R. micrantha*, *Hook. f.*; leaves elliptic-lanceolate or oblanceolate acuminate, cymes with long slender erect peduncles few-flid., calyx-lobes triangular-ovate, corolla very small tube slightly swollen at the top, lobes small, drupes $\frac{1}{2}$ in. obliquely ovate acute. *Ophioxylon micranthum*, *Wight mss.*

MALABAR; *Wight*.

Branches rather slender, with minute lenticels. *Leaves* opposite and 3 in a whorl,

3-5 by 1-2 in., very membranous, drying yellowish green, narrowed into an often slender petiole; nerves 10-12 pairs, very slender. *Peduncle* $1\frac{1}{2}$ -2 in., branches few, slender, short, divaricate; bracts minute, subulate; flowers $\frac{1}{2}$ in. *Calyx-lobes* about one-quarter the length of the corolla-tube. *Corolla* membranous, tube broad, lobes (unexpanded) very small. *Drupes* connate to the middle.

7. **R. Beddomei**, *Hook. f.*; leaves oblanceolate acuminate, cymes with very long slender horizontal peduncles, branches few divaricate, flowers racemed, calyx-lobes triangular-ovate, corolla small, tube slightly swollen at the top, lobes small, drupe $\frac{1}{2}$ in. gibbously ovate acuminate. *Tabernæmontana verticillata*; *Beddome For. Fl. Anal. Gen. xx. fig. 3.*

TRAVANCORE; *Beddome*.

Branches very slender; bark ciliate, minutely lenticellate. *Leaves* 3-6 by $1\frac{1}{2}$ - $1\frac{3}{4}$ in., very membranous; nerves 15-20 pairs, very slender, spreading, nearly straight. *Peduncle* 3-5 in.; horizontal or decurved; branches 1-2 in., divaricate, very slender, forked, the long arms bearing racemes of flowers $\frac{1}{2}$ in. long, like those of *R. micrantha*. *Drupe* solitary, much flattened.—Allied to *R. micrantha*, differing in the leaves with more numerous straighter nerves, the very long peduncles and racemose flowers and large drupes.

DOUBTFUL SPECIES.

OPHIOXYLON BELGAUMENSE, *Wight Ic. iv. part ii. 2* (under *O. neilgherrense*); shrubby, erect, leaves elliptic-oblong obtuse or acuminate, corymbs long-peduncled compact many-fld., flowers on rather long pedicels, calyx 5-cleft, lobes dilated broad imbricating somewhat truncate, corolla-tube long slender, lobes forming a round capiculum in bud, stamens about the middle of the tube.—Belgaum, *Lav.* I find no specimen of this in Wight's Herbarium; but for the calyx it seems identical with *R. serpentina*.

R. PULAPARIA, *Roxb.*; *Smith in Rees's Cyclop. xxix.*; *A. DC. Prodr. viii. 341*; leaves 3 in a whorl, 3-4 by $1-1\frac{1}{2}$ in. elliptic-lanceolate subacute, nerves very numerous nearly horizontal, cymes terminal, peduncle curved stout $\frac{1}{2}$ in., pedicels and bracts downy, calyx-lobes small ovate acute downy, corolla-tube many times longer than the calyx swollen at the top glabrous, lobes short rounded.—A Calcutta garden plant, probably the W. Indian *R. nitida*, L. I have made up the description from Roxburgh's coloured figure and Smith's description, having no specimen.

8. **ALYXIA**, *Br.*

Shrubs. *Leaves* 3-4-nately whorled, rarely opposite, nerves faint. *Flowers* small, in axillary or subterminal cymes. *Calyx* short, 5-partite, eglandular within. *Corolla* salver-shaped, tube cylindric, throat naked; lobes overlapping to the left. *Stamens* at or above the middle of the tube; anthers lanceolate, base of cells rounded. *Disc* 0, or obscure. *Carpels* of ovary 2, distinct; style filiform, top oblong, urceolate or capitate, tip pointed or shortly 2-fid; ovules 2-6, 2-seriate in each carpel. *Fruit* of 1-2 drupes or berries, 1-seeded or with 2-4 1-seeded joints. *Seeds* ovoid or oblong, grooved or excavated ventrally, albumen horny, ruminant; cotyledons thin, radicle superior.—*DISTRIB.* Species about 30, tropical Asiatic, Malayan, Australian and Polynesian.

1. **A. gracilis**, *Benth. in Gen. Pl. ii. 697*; glabrous, twining, leaves opposite and 3 in a whorl elliptic oblong or lanceolate obtusely caudate, nerves very many faint horizontal, flowers small in long peduncled very slender branched panicles. *Hunteria*? *gracilis*, *Wall. Cat. 1613*; *A. DC. Prodr. viii. 350*.

SIKKIM HIMALAYA; in the Terai, alt. 1-2000 ft., *J. D. H. KHASIA Mts.*, alt. 2-4000 ft., *De Silva, H. f. & T.*

Branches slender; bark pale, often warted. *Leaves* 3-6 by $1-1\frac{1}{2}$ in., shining above, green when dry, paler beneath, base acute; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Cymes* 2-4 in., branches spreading, very slender; bracts small, ovate, acute. *Calyx-lobes* $\frac{1}{16}$ in.,

ovate, acute. *Corolla-tube* about twice as long as the calyx; lobes oblong, obtuse, as long as the tube. *Ripe carpels* $\frac{3}{4}$ in. long, stoutly stipitate, ellipsoid, obtuse, smooth.—*Habit* of a *Chilocarpus*.

2. **A. coriacea**, Wall. in Roxb. *Fl. Ind. ed. Wall. & Carey*, ii. 541, and *Cat.* 9065; bark red-brown, leaves opposite very coriaceous obovate obtuse shining above nerves ascending, cymes very short and shortly peduncled, bracts and calyx-lobes obtuse. *Hunteria*? *coriacea*, Wall. *Cat.* 1610.

PENANG; Wallich, Porter.

Branches very stout. *Leaves* 2-4 by 1-1 $\frac{1}{2}$ in., narrowed into the petiole, yellow-brown when dry, nerves raised in the upper surface, beneath opaque dull yellow with the nerves very faint; petiole $\frac{1}{2}$ - $\frac{2}{3}$ in. *Cymes* $\frac{1}{2}$ in., few fld., bracts very small. *Flowers* $\frac{1}{8}$ in. long. *Calyx* very coriaceous, lobes $\frac{1}{16}$ in., acute, ciliate. *Corolla-tube* inflated in the middle, constricted at the mouth, with 5 2-lobed glands, lobes small, oblong falcate. *Fruit* not seen.

3. **A. lucida**, Wall. in Roxb. *Fl. Ind. ed. Wall. & Carey*, ii. 540; bark red-brown, cymes and shoots pubescent, leaves opposite or 3-4 in a whorl obovate obtuse or acute very pubescent shining above and almost so beneath, nerves nearly horizontal, cymes very short and shortly peduncled, corolla $\frac{1}{2}$ in. long. *A. Gynopogon*, Wall. *Cat.* 1605.

SINGAPORE; Wallich. MALACCA (cultivated); Maingay.

Branches very stout, young 4-angled. *Leaves* 3-4 by 1-1 $\frac{1}{2}$ in., pale, hard and thick when dry, narrowed into a very short petiole; nerves hardly raised on either surface. *Cymes* $\frac{1}{2}$ in. long, on thick peduncles, rarely longer than the petioles; bracts oblong, pubescent; flowers yellow, fragrant. *Calyx* deeply 5-cleft, segments acute. *Corolla-tube* $\frac{1}{2}$ in., pubescent within; lobes as long, oblong. *Ovary* villous. *Ripe carpels* $\frac{1}{2}$ in. long, broadly elliptic, smooth, stipitate.

4. **A. pilosa**, Miquel *Fl. Ind. Bat.* ii. 408; branches leaves beneath and cymes softly pubescent or tomentose, leaves 3-4 in a whorl elliptic-lanceolate very coriaceous shining above, nerves very many horizontal, cymes shortly peduncled, flowers villous.

MALACCA; Mt. Ophir (*Herb. Hook.*).—DISTRIB. Sumatra, Borneo.

Branches stout; bark pale. *Leaves* 3-5 by 1-1 $\frac{1}{2}$ in., drying green, narrowed into short stout petioles $\frac{1}{4}$ in., midrib stout beneath; nerves very close, faint on both surfaces. *Peduncle* equalling or shortly exceeding the petiole, very stout, bracts small; flowers subsessile, crowded, $\frac{1}{2}$ in. long. *Calyx-segments* ovate-lanceolate, obtuse, erect, one-fourth shorter than the corolla. *Corolla-tube* coriaceous, narrowly campanulate above, hairy within and without, lobes very short, rounded, glabrous within. *Fruit* not seen.—I am a little doubtful about the Malacca locality of this plant, that given above is in Sir W. Hooker's handwriting on the sheet; that on a specimen, evidently of the same collecting, in Bentham's Herbarium, is marked "Penang, Hooker, 1857."

5. **A. pumila**, Hook. f.; dwarf, glabrous, leaves opposite or 3 in a whorl elliptic-lanceolate obtusely acuminate very coriaceous shining above, nerves very many horizontal, cymes subsessile few-fld.

MALACCA; Mt. Ophir, Lobb, Maingay (Kew Distrib. 1053).

A small slender shrub (apparently scandent, Maingay); branches slender, young 4-angled with granulate red bark. *Leaves* 1-2 by $\frac{1}{2}$ - $\frac{1}{2}$ in., drying greenish, narrowed into slender petioles, $\frac{1}{4}$ in., midrib prominent beneath, nerves very close and faint on both surfaces. *Cymes* 3-6-fld.; peduncle very short; bracts minute; flowers shortly pedicelled, quite glabrous, $\frac{1}{4}$ in. long. *Calyx-segments* small, ovate-lanceolate, thick, subacute. *Corolla-tube* inflated below the constricted mouth, throat villous within; lobes small, rounded. *Fruit* $\frac{1}{4}$ in. long, between globose and ellipsoid, apiculate, pedicel slender.

6. **A. odorata**, *Wall. Cat.* 1606; bark red, leaves opposite and 3 in a whorl, elliptic or obovate obtuse or obtusely acuminate shining above with numerous raised nearly horizontal nerves, ripe carpels fleshy. *A. DC. Prodr.* viii. 347; *Miquel Fl. Ind. Bat.* ii. 408.

TENASSERIM; between Chappedong and Amherst, *Wallich*.

Leaves 3-5 by $1\frac{1}{2}$ -2 in., narrowed into the very short petiole, yellow when dry; nerves almost imperceptible beneath. *Flowers* not seen. *Ripe carpels* $\frac{3}{4}$ in. long, stipitate, ellipsoid.—This differs from *A. stellata* in the coriaceous foliage and larger carpels. A piece of the old wood in Wallich's Herbarium is covered with smooth scaling very dark-brown bark. *Kurz (in Journ. As. Soc.* 1877, ii. 251) refers this to *A. stellata*, but the fruit is very much larger than that of his own description of the latter species.

7. **A. stellata**, *Roem. & Sch. Syst.* iv. 439; quite glabrous, bark very white quite glabrous, leaves 3-4 in a whorl elliptic-lanceolate or oblong or obovate obtuse or obtusely acuminate shining above, nerves numerous very slender nearly horizontal, cymes shortly peduncled nodding paniced, corolla-tube $\frac{1}{2}$ in. long. *Roxb. Fl. Ind.* i. 699, and *ed. Wall. & Carey*, ii. 539. *A. DC. Prodr.* viii. 346; *Wall. Cat.* 1604. *Gynopogon stellatum*, *Labill. Ser. Austr.-Caled.* 30, t. 34; *Kurz For. Fl.* ii. 176.

TENASSERIM and the ANDAMAN ISLANDS.; *Kurz*. PENANG; *Wallich*.—DISTRIB. Malay Archipelago, Pacific Islds.

A shrub; branches slender, smooth. *Leaves* 2-5 by $1-1\frac{1}{2}$ in., thinly coriaceous, green when dry, pale beneath, narrowed into a petiole $\frac{1}{4}$ in. long. *Cymes* short but effuse; bracts short, ovate; flowers very shortly pedicelled, pure white. *Calyx* deeply 5-lobed, lobes acute. *Corolla-tube* cylindric, slender, lobes short, rounded. *Ripe carpels* ellipsoid, stipitate, "size of a cherry," *Roxb.*, or "of a small pea," *Kurz*, yellowish, sometimes with a second superposed.—I am not convinced of the identity of this with the original species of New Caledonia, which has more obovate leaves.

8. **A. fascicularis**, *Benth. in Gen. Pl.* ii. 698 (under *Hunteria*); bark pale warted, leaves opposite or 3 in a whorl elliptic-oblong or lanceolate obtusely caudate shining above with numerous parallel very slender raised nerves, cymes very shortly peduncled decurved dense-fld. glabrous or puberulous, corolla-tube $\frac{1}{2}$ in. long. *Hunteria*? *fascicularis*, *Wall. Cat.* 1612; *A. DC. Prodr.* viii. 350.

KHASIA MTS.; *De Silva*; Churra, alt. 4000 ft., *H. f. & T.*

A woody climber, branches slender or stout. *Leaves* 3 $3\frac{1}{2}$ by $1-1\frac{1}{2}$ in., coriaceous, green or pale brown when dry; nerves very faint beneath; petiole distinct, $\frac{1}{4}$ in. *Cymes* $\frac{3}{4}$ -1 in. long, dense-fld.; flowers racemose, very shortly peduncled; bracts acute. *Calyx-lobes* ovate, acute. *Corolla-lobes* small, rounded. *Fruit* not seen.—The short corolla at once distinguishes this from *A. stellata*.

9. **A. ceylanica**, *Wight Ic.* t. 1293; glabrous, branches slender, leaves opposite or 3 in a whorl broadly elliptic obtusely caudate membranous not shining, nerves distant arched, flowers solitary or 2-3-nate long pedicelled, carpels often moniliform. *Thwaites Enum.* 191; *Beddome For. Fl.* 158, t. 20, fig. 5.

CEYLON; Ambagamowa district, alt. 1-2000 ft., *Walker, &c.*

Shrubby, erect?; branches dichotomous, 4-angled. *Leaves* 2-3 by $1-1\frac{1}{2}$ in., drying green, base narrowed into a short slender petiole, midrib slender; nerves 8-10 pairs, extremely faint and slender. *Pedicels* $\frac{1}{2}$ in., straight, slender. *Calyx-lobes* lanceolate, acute, many times shorter than the corolla. *Corolla* yellowish, tube $\frac{1}{2}$ in., very slender, funnel-shaped above, glabrous without, villous within; lobes lanceolate, acuminate, half the length of the tube. *Carpels* fleshy, scarlet, sometimes of one dimidiate-oblong compressed pedicelled 1-seeded segment, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, some-

times of 2-4 similar superimposed ones.—Very dissimilar from the other species, if indeed congeneric.

DOUBTFUL SPECIES.

GYNPOGON BREVIFLORUM, Kurz *For. Fl.* ii. 177; glabrous throughout, scandent. leaves 2-3 in. opposite or in whorls of 3 oblong lanceolate to lanceolate obtusely caudate base acuminate thinly coriaceous, nerves parallel obsolete, petiole 2-3 in. (? lines), cymes axillary and terminal short sessile, trichotomous, pedicels glabrous; very short, flowers small; calyx-lobes lanceolate acuminate, corolla-tube $\frac{1}{2}$ in., lobes shorter, drupes ellipsoid pointed glabrous, pedicel slender.—Upper Tenasserim and Martaban, in tropical forest, alt. 2000 ft.—The above description is condensed from Kurz's. I have seen no specimens.

9. **HUNTERIA**, Roxb.

Glabrous trees. *Leaves* opposite, coriaceous, shining, nerves very slender. *Flowers* small in terminal axillary or subterminal cymes. *Calyx* small, 5-lobed, eglandular. *Corolla* salver-shaped, tube cylindric, throat annulate, lobes overlapping to the left. *Stamens* above the middle of the tube; anthers oblong-lanceolate, cells rounded at the base. *Disc* 0. *Carpels* 2, distinct; style filiform, top thickened, stigma shortly 2-fid; ovules 2-4 in each carpel. *Fruit* of 2 ovoid or oblong, oblique or recurved fleshy berries, 1-seeded or 2-celled by the intruded placenta, and 2-seeded, not pulpy within. *Seeds* ovoid or oblong, albumen fleshy; cotyledons thin, radicle straight.—*DISTRIB.* 3 Indian species.

H. corymbosa, Roxb. *Fl. Ind.* i. 695, and *ed. Carey & Wall.* ii. 53; leaves lanceolate or oblong-lanceolate obtuse or obtusely caudate shining above, cymes short terminal and axillary. *A. DC. Prodr.* viii. 350; *Wight Ic.* t. 428. II. zeylanica, *Gard. Thwaites Enum.* 191; *Bedd. For. Fl.* ii. t. 265. II. ? lanceolata, *Wall. Cat.* 1611; *A. DC. l. c.* A. Roxburghiana, *Wight Ic.* t. 1294; *Thwaites Enum.* 192; *Bedd. l. c. Anal. Gen.* 158. *Cameraria zeylanica*, *Retz Obs.* iv. 24; *A. DC. l. c.* 389. *Gynopogon lanceolatum*, Kurz *For. Fl.* ii. 177. *Tabernæmontana salicifolia*, *Wall. Cat.* 1580. *T. parviflora*, *Herb. Heyne*.

DECCAN PENINSULA; Coromandel coast, Roxburgh, &c.; Tinnevely Ghats, *Beddome*; Courtallum, *Heyne*, &c. TAVOY; *Wallich*, Roxburgh. PENANG; *Wallich*, *Phillips*. CEYLON; *König*, &c.

A tree; branches slender, smooth. *Leaves* very variable, 4-6 by $\frac{3}{4}$ -2 in., very coriaceous, narrowed into the petiole, pale yellow-brown when dry; nerves very numerous, slender, spreading, with close intermediate reticulations; tip sometimes $\frac{1}{2}$ in. long; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in. *Cymes* shortly peduncled, shortly corymbosely branched; bracts minute: flowers pedicelled, white. *Calyx-lobes* ovate, acute. *Corolla-tube* $\frac{1}{4}$ in., limb about $\frac{1}{3}$ in. diam.; lobes short, obliquely ovate-oblong. *Ripe carpels* size of a cherry, globose, pedicelled, pulpy, orange-coloured, 2-seeded.—Some Deccan specimens, figured by Wight as *H. Roxburghiana*, and which includes *Wallich's Tabernæmontana salicifolia*, have very narrow leaves.

10. **CERBERA**, Linn.

Small glabrous trees. *Leaves* alternate, long, nerves slender horizontal and parallel. *Flowers* large, white or red, in terminal cymes. *Calyx* 5-partite, eglandular, segments long. *Corolla* funnel-shaped, tube short, throat ribbed or with pubescent scales; lobes broad, overlapping to the left. *Stamens* included; anthers lanceolate, apiculate, cells rounded at the base. *Disc* 0. *Carpels* 2, distinct; style filiform, top dilated, stigma 2-lobed; ovules 4 in each carpel, on the faces of a thick placenta. *Fruit* of 1 (rarely 2) globose ovoid or ellipsoid 1-2-seeded carpels; pericarp very thick, fibrous and woody. *Seeds*

broad, compressed, peltately attached to the placenta, albumen 0; cotyledon thin, radicle very short.—**DISTRIB.** 4 maritime species, Madagascar, tropical Asia, and the Pacific.

C. Odollam, *Gaertn. Fruct.* ii. 193, t. 124; leaves lanceolate or oblanceolate or linear-obovate acute or abruptly acuminate narrowed into the stout petiole. *A. DC. Prodr.* viii. 353; *Wight Ic.* t. 441; *Roxb. Fl. Ind.* i. 692, and in *ed. Carey & Wall.* ii. 527; *Grah. Cat. Bomb. Pl.* 116; *Brand. For. Fl.* 322; *Kurz For. Fl.* ii. 171; *Bedd. For. Fl. Anal. Gen.* 157. *C. Manghu*, *Linn. partly*; *Wall. Cat.* 1582, in *Roxb. Fl. Ind. ed. Wall. & Carey*, ii. 529; *Bot. Mag.* t. 1845. *C. lactaria*, *Ham.*; *A. DC. l. c.* *C. laurifolia*, *Lodd. Bot. Cab.* t. 989, *Tanghinia Odollam, lactaria and laurifolia*, *G. Don Gen. Syst.* iv. 98.—*Rheede Hort. Mal.* i. t. 39.

Salt swamps, or on the coasts of INDIA and CEYLON.—**DISTRIB.** Malay Archipelago, China, Australia, Pacific Islds.

A small tree or large shrub, branches very thick. *Leaves* 3–8 by 1–2 in., leathery, black when dry, shining above, nerves very slender; petiole stout, $\frac{1}{2}$ –1 $\frac{1}{2}$ in. *Cymes* large; peduncle 2–6 in., stout, branches corymbose; bracts ovate, deciduous; flowers white, shortly pedicelled. *Calyx-lobes* $\frac{1}{2}$ –1 in., lanceolate, acuminate, revolute. *Corolla-tube* $\frac{1}{2}$ in., mouth red, limb 1–3 in. diam., lobes falcately triangular-obovate, acute. *Ripe carpel* ovoid, 2–4 in. long.—Omitted in Dalzell & Gibs. *Bomb. Flora*, but stated by Graham to be native of the South Concan.

11. OCHROSIA, Juss.

Trees. *Leaves* whorled, rarely opposite or scattered; nerves very numerous, slender, spreading. *Cymes* terminal, at length lateral, peduncled. *Calyx* 5-partite, eglandular, segments obtuse. *Corolla* salver-shaped, tube cylindric, throat naked, lobes overlapping to the right. *Stamens* above the middle of the tube, included; anthers lanceolate, cells rounded at the base. *Disc* 0, or obscure. *Carpels* 2, distinct; style filiform, top oblong, stigma 2-fid; ovules 2–6, 2-seriate in each carpel on each side of a prominent placenta. *Fruit* of 2 (rarely 1) spreading drupes; endocarp hard, thick, usually dorsally compressed and ventrally grooved. *Seeds* solitary, or 2 separated by the placenta, flattened, albumen 0 (or fleshy?); cotyledons large, flat; radicle short, superior.—**DISTRIB.** Species 12, Mascarene Islands, Malay Archipelago, Australia and the Pacific.

O. borbonica, *Gmel.*; *A. DC. Prodr.* viii. 356; glabrous, leaves in whorls of 3–4 obovate narrowed into the petiole polished above, tip rounded. *Thwaites Enum.* 192. *O. salubris*, *Blume Mus. Bot.* i. 158; *Kurz For. Fl.* ii. 172. *Cerbera parviflora*, *Wall. Cat.* 1584. *C. salutaris*, *Lour.*; *Blume Bijl.* 1033.

Tidal forests of the ANDAMAN ISLDS., *Kurz*, of SINGAPORE, *Wallich*, and CEYLON.—**DISTRIB.** Java, Seychelle and Mascarene Islds.

An evergreen tree, 20 ft. high, branches very stout. *Leaves* 6–16 by 2–6 in., coriaceous, yellow when dry, nerves nearly straight; petiole $\frac{1}{2}$ –2 in. *Cymes* stoutly peduncled, branches short, thick, corymbose; lower bracts sometimes leafy; flowers white, shortly thickly pedicelled. *Calyx-lobes* very coriaceous, ovate. *Corolla-tube* $\frac{1}{2}$ in., limb $\frac{1}{2}$ in. diam. *Ripe carpels* “ellipsoid-oblong, about 2 in. long” (*Kurz*).—I have seen no fruit, and have refrained from quoting synonyms, the specimens of the genus, being difficult to procure, are insufficient for complete identification; but I suspect that this species extends under various names from the Mauritius to Australia and the Fiji Islands.

12. **KOPSIA**, Blume.

Glabrous trees or shrubs. *Leaves* opposite, narrowed into very short petioles. *Flowers* in terminal cymes. *Calyx* small, 5-partite, segments with glandular tips, eglandular within. *Corolla* salver-shaped, tube very slender, throat hairy, lobes overlapping to the right. *Stamens* near the top of the tube, included; anthers acute, cells rounded at the base. *Disc* of 2 glands alternating with the carpels. *Carpels* 2, distinct; style filiform, thickened at the top, stigma short; ovules 2 on each carpel, 1 on either side of a thick placenta. *Fruit* of 2 obovoid or obliquely quadrate coriaceous or rather fleshy carpels, each 1-celled and -seeded or 2-celled by the intruded placenta and 2-seeded. *Seeds* oblong, albumen 0; cotyledons not thick.—**DISTRIB.** Species 4, Malayan.

1. **K. fruticosa**, A. DC. *Prodr.* viii. 352; leaves elliptic or elliptic-lanceolate obtusely caudate shining above, nerves 10–13 pairs, cymes subsessile, bracts ovate acute, corolla-tube inflated at the top. *Bot. Mag.* t. 4220. *Calpicarpium Roxburghii*, G. Don *Gen. Syst.* iv. 100; *Wight Ic.* t. 431; *Kurz For. Fl.* ii. 178. *Cerbera fruticosa*, Ker, *Bot. Reg.* t. 391; *Roxb. Fl. Ind.* i. 691, and *ed. Wall. & Carey*, ii. 526; *Wall. Cat.* 1583.

PEGU, MARTABAN and TENASSERIM; Wallich, &c., often planted.—**DISTRIB.** Java, Borneo.

A large evergreen shrub. *Leaves* 4–8 by $1\frac{1}{2}$ –3 in., thinly coriaceous, green when dry, shining above, paler beneath; nerves slightly arched, reticulations distinct. *Cymes* short, nearly flat-topped; peduncle very short, stout; branches short, thick; bracts $\frac{1}{12}$ in. *Calyx-segments* $\frac{1}{12}$ in., ovate. *Corolla* pink, tube $1\frac{1}{2}$ in., limb $1\frac{1}{2}$ –2 in. diam., mouth red. *Ovary* villous. *Ripe carpels* usually solitary, 1-seeded, urn-shaped, $\frac{1}{2}$ –1 in. long, obliquely truncate, pubescent, veined; pericarp thin, greenish purple.

2. **K. macrophylla**, Hook. f.; leaves oblong obovate or elliptic-oblong obtusely caudate opaque above, nerves 18–20 pairs, cymes subsessile, bracts imbricate boat-shaped obtuse, corolla-tube inflated in the middle.

SINGAPORE; Lobb.

Leaves 5–9 by 2–3 in., thinly coriaceous, green above, paler beneath; nerves as in *K. fruticosa*; petiole hardly any. *Cyme* with a short stout peduncle and a few thick branches 1 in. long, clothed with small broad bracts. *Calyx-lobes* rounded. *Corolla-tube* 1 in., very slender, limb $1\frac{1}{2}$ in. diam., lobes obovate. *Fruit* not seen.—This resembles *K. fruticosa*, but differs conspicuously in the long opaque leaves, shorter petioles, imbricate bracts, and corolla-tube with the stamens in the middle.—I have seen only one specimen.

3. **K. pauciflora**, Hook. f.; leaves elliptic or elliptic-lanceolate obtusely caudate shining above, nerves 6–8 pairs, cymes sessile reduced to a very short simple rachis, bracts ovate obtuse, corolla-tube inflated at the top.

MALACCA; Mt. Ophir, Maingay (Kew Distrib. 1056).

Leaves yellow-green when dry, 4–6 by $1\frac{1}{2}$ –2 $\frac{1}{2}$ in., firmly but thinly coriaceous, yellow beneath; petiole $\frac{1}{4}$ in. *Cyme-rachis* $\frac{1}{4}$ – $\frac{1}{2}$ in. long, quite sessile, loosely clothed with bracts. *Calyx-lobes* broad, obtuse. *Corolla-tube* $1\frac{1}{2}$ –2 in., very slender; lobes 1 in., linear-oblong, longer and narrower than in the two preceding species. *Fruit* not seen.—This is referred by Maingay (mss.) to Blume's *K. flavida* of New Guinea, which is described as having intensely green leaves and cymose flowers.

13. **RHAZYA**, Dcne

Glabrous erect shrubs. *Leaves* alternate, thick, nerves obscure. *Flowers* in dense terminal cymes, corymbs or thyrsi. *Calyx* short, 5-partite, eglandular.

Corolla salver-shaped, tube cylindric, with reflexed hairs beneath the stamens within, throat constricted hairy; lobes 5, short, broad, overlapping to the left. *Stamens* above the middle of the tube, included; anthers lanceolate, cells rounded at the base. *Disc* annular or obscure. *Carpels* 2, distinct; style filiform, top broad thickened, stigma sometimes furnished with a reflexed membrane, top 2-globose; ovules many, 2-seriate in each carpel. *Follicles* 2, erect, slender. *Seeds* many, subterete or angled and compressed, truncate or winged above and below, albumen fleshy ruminant; cotyledons oblong, thick, radicle superior.—**DISTRIB.** 2 species, Arabian and Indian.

R. stricta, *Decaisne* in *Ann. Nat. Sc. ser. 2*, iv. 81, and in *Jacquem. Voy. Bot.* t. 111; leaves elliptic-lanceolate acute coriaceous, corolla-lobes ovate mucronate. *A. DC. Prodr.* viii. 386; *Brandis For. Fl.* 322; *Boiss. Fl. Orient.* iv. 47.—*Apocyn. Wall. Cat.* 7478.

SCINDE; *Stocks*; in the Trans-Indian territory, common; Salt-range, *Fleming*; Peshawur, *Stewart*.—**DISTRIB.** Afghanistan, Beluchistan, Arabia.

A small glabrous very stout erect sparingly branched leafy shrub. *Leaves* 3-4 by $\frac{1}{2}$ - $\frac{3}{4}$ in., yellowish and leathery when dry, sessile. *Flowers* in short axillary, stoutly branched cymes, shortly and stoutly pedicelled; bracts subulate, persistent. *Corolla-lobes* acute. *Corolla* white, tube $\frac{1}{4}$ in., upper half inflated. *Follicles* erect, parallel, 2-3 by $\frac{1}{4}$ in., slightly compressed, thinly coriaceous. *Seeds* $\frac{1}{2}$ in. long, angularly compressed, shortly winged.—There is no specimen of this on the sheet in Wallich's Herbarium to which his ticket, No. 7478, is attached, but the note on that ticket is "*Apocyn. (ex Royleo in cujus Herbar. ad sunt specim. et icon. pict.) viminea, subaphylla, Doab Hindostania, 1825,*" leaves no doubt as to the plant meant; added to which the icon alluded to, made by Royle's artists, is in the Kew collection of drawings.

14. **VINCA**, *Linn.*

Erect or procumbent herbs or shrubs. *Leaves* opposite. *Flowers* solitary, axillary. *Calyx* 5-partite, eglandular, segments narrow. *Corolla* salver-shaped; tube cylindric, with usually reflexed hairs below the stamens; throat constricted, hairy or thickened; lobes broad, overlapping to the left. *Stamens* above the middle of the tube, included; anthers various. *Disc* of 2 large glands. *Carpels* 2, distinct; style filiform, top thick, stigma annulate viscid sometimes with a reflected membrane, tip minute penicillate; ovules 6 or more, 2-seriate in each carpel. *Follicles* 2, slender, erect or spreading. *Seeds* subcylindric, truncate at both ends, hilum lateral, albumen fleshy; cotyledons ovate, radicle long superior.—**DISTRIB.** About 10 species, European, Indian, American, and Madagascarian.

V. ROSEA, *Linn.* (*V. Gulielmi Waldemarii*, *Klotzsch* in *Reise Pr. Waldem. Bot.* t. 70); a West Indian plant, is much cultivated about pagodas, &c.; it has obovate leaves and rosy flowers $1\frac{1}{2}$ -2 in. diam.

V. pusilla, *Murr.* in *Act. Goett.* 1772, 66, t. 2, fig. 1; annual, erect, glabrous, branched from the base, leaves lanceolate acuminate, flowers very small subsessile, sepals filiform. *A. DC. Prodr.* viii. 382; *Dalz. & Gibs. Bomb. Fl.* 144. *V. parviflora*, *Retz Obs.* ii. n. 33; *Roxb. Fl. Ind.* ii. 1. *Catharanthus roseus*, *G. Don Gen. Syst.* iv. 95.—*Rheede Hort. Mal.* ix. t. 33.

WESTERN HIMALAYA; Garwhal, alt. 2000 ft., *Str. & Winterb.*; **UPPER GANGETIC PLAIN**, *Royle*, &c. Throughout the **DECCAN**, common.

An erect, pale-green annual, 1-2 ft. high; stem and branches acutely 4-angled. *Leaves* $1\frac{1}{2}$ -2 $\frac{1}{2}$ by $\frac{1}{3}$ - $\frac{3}{4}$ in., membranous, acuminate, margins minutely scabrid, stipular glands subulate; petiole $\frac{1}{4}$ in. or less, slender. *Flowers* $\frac{1}{4}$ in. long, on short pedicels, white. *Corolla* mouth narrow, hairy; throat glabrous, thickened. *Follicles* 2-3 in., very slender, diverging, straight, membranous. *Seeds* $\frac{1}{10}$ in., linear-oblong, cylindric, rounded at both ends; testa black, many-ribbed, ribs rough.

14*. **PLUMERIA**, Linn.

Erect trees; branches very thick. *Leaves* scattered, elongate, nerves numerous, horizontal. *Flowers* large, in terminal 2-3-chotomous cymes; bracts many, broad, deciduous. *Calyx* small, 5-fid, eglandular within; lobes broad, obtuse. *Corolla* salver-shaped, throat naked, lobes overlapping to the left, rarely to the right. *Stamens* near the base of the tube; anthers obtuse, cells rounded at the base. *Disc* 0, or lining the calyx-tube. *Carpels* 2, distinct; style short, stigma 2-lobed; ovules ∞ -seriate in each cell. *Follicles* linear-oblong or ellipsoid. *Seeds* oblong or lanceolate, plano-convex, winged, albumen fleshy, thin; cotyledons oblong or ovate-cordate.—**DISTRIB.** About 40 species, all natives of tropical America.

P. acutifolia, *Poiret*; leaves oblong acute at both ends. *A. DC. Prodr.* viii. 392; *Wall. Cat.* 1636; *Wight Ic. t.* 471; *Brand. For. Fl.* 323; *Kurz For. Fl.* ii. 179; *P. acuminata*, *Roxb. Fl. Ind.* ii. 20; *Bot. Reg. t.* 114; *Bot. Mag. t.* 3952.

Cultivated and naturalised in many parts of INDIA.

A small tree with crooked trunk and rough bark; branches swollen and leafy at the tips. *Leaves* 8-12 in.; petiole 1-1½ in., 1-glandular at the top. *Flowers* many, fragrant, pink externally, white within. *Follicles* about 5 in. long, cylindric.

15. **ELLERTONIA**, *Wight*.

Glabrous climbing shrubs. *Leaves* opposite or 3-4-nately whorled, coriaceous. *Flowers* slender, in subterminal cymes. *Calyx* small, deeply 5-fid, eglandular. *Corolla* salver-shaped, tube cylindric; throat constricted, naked; lobes 5, narrow, overlapping to the left. *Stamens* in the middle of the tube, filaments ciliate; anthers lanceolate, cells obtuse at the base. *Disc* 0. *Carpels* 2, distinct; style filiform, top ovoid or oblong, sigma linear, 2-fid; ovules many in each carpel, 2- ∞ -seriate. *Follicles* 2, linear or narrowly linear-oblong, terete, spreading. *Seeds* 2-seriate, oblong, flattened, peltately attached, winged above and below, albumen scanty; cotyledons thin, radicle superior. Species 2, an Indian and ? a Madagascarian.

E. Rheedii, *Wight Ic. t.* 1295.—*Rheede Hort. Mal.* ix. t. 14.

MALABAR and the **CONCAN**; at Quilon, *Wight*; Warree country, *Stocks, Gibson*.

Branches twining, slender, terete, *Leaves* 3-5 by 1-2 in., elliptic or oblong, obtusely acuminate, of a peculiar blue-gray hue beneath when dry, coriaceous; nerves 10-12 pairs, very slender, spreading; petiole ¼ in. *Cymes* clustered, few-fid., 1-2 in. long, 2-3-chotomously branched; bracts subulate, persistent; pedicels short. *Sepals* ovate, acuminate. *Corolla-tube* ½ in., very slender, inflated in the middle; lobes lanceolate, acuminate. *Ovary* elongate; style slender, stigmas long. *Follicles* 2-4 by ½ in., horizontally divaricate, sessile, straight or slightly curved, acute, coriaceous, inner coat separable. *Seeds* 1½ in., disc elliptic, wings quite straight, tips rounded.

16. **ALSTONIA**, Br.

Trees or erect shrubs. *Leaves* 3-4-nately whorled, rarely opposite. *Flowers* in subterminal corymbose cymes. *Calyx* short, 5-lobed or -partite. *Corolla* salver-shaped, tube cylindric; throat naked, annulate or with reflexed hairs; lobes overlapping to the right or left. *Stamens* near the top of the tube, included; anthers subacute. *Disc* annular, lobed or truncate or 0. *Carpels* 2 distinct; style filiform, top ovoid or oblong, stigma minute or 2-toothed; ovules many, ∞ -seriate in each carpel. *Follicles* 2, linear, slender. *Seeds* oblong or linear, flattened, peltately attached, often ciliate, albumen scanty; cotyledons oblong, flat, radicle superior.—**DISTRIB.** Species about 30, tropical Asiatic, Malayan, Australian, and Polynesian.

SECT. I. **Pala.** *Leaves* with close parallel nervation, usually obtuse. *Corolla-lobes* overlapping to the left.

1. **A. scholaris**, *Brown in Mem. Wern. Soc. i. 75*; leaves 4-7 in a whorl obovate or elliptic-oblong white beneath, base acute, tip obtuse rounded or obtusely acuminate, cymes peduncled or sessile capitate, flowers pubescent, follicles very long and slender. *A. DC. Prodr. viii. 408*; *Wight Ic. t. 422*; *Gräh. Cat. Bomb. Pl. 115*; *Dalz. & Gibs. Bomb. Fl. 145*; *Brand. For. Fl. 325*; *Kurz For. Fl. ii. 183*; *Beddome For. Fl. 325, t. 242*; *Wall. Cat. 1644*. *Echites scholaris*, *Linn. Mant. 55*. *E. Pala*, *Ham. ex Spreng. Syst. i. 633*; *A. DC. l. c. 477*.—*Rheede Hort. Mal. i. t. 45*.

Drier forests of INDIA; in the tropical region of the WESTERN HIMALAYA from the JUMNA eastwards to ASSAM, and southwards to CEYLON, SINGAPORE and PENANG.—DISTRIB. Malay Archipelago, tropical Australia and Africa.

An evergreen tree 40-60 ft., "at times 80-90" (*Brandis*); trunk tall, base often buttressed; branches whorled; juice milky bitter. *Leaves* 4-8 by 1-2½ in., very coriaceous, whitish beneath; nerves 30-60 pairs, horizontal, joining an intramarginal one; petiole stout, ¼-½ in. *Cymes* umbellately branched; peduncle 1-3 in., rarely 0, very stout; branches numerous, stout; flowers subcapitate, greenish-white. *Corolla* ⅓-½ in. diam., throat villous, lobes rounded. *Disc* 0. *Ovary* hirsute. *Follicles* 1-2 ft., pendulous in clusters, only ½ in. diam., terete. *Seeds* ½ in. long, slender.

2. **A. spathulata**, *Blume Bijl. 1037*; quite glabrous, leaves 3-5 in a whorl obovate-cuneate tip rounded concolorous beneath, cymes peduncled and pedicelled flowers quite glabrous.—*A. DC. Prodr. viii. 410*; *Miquel Fl. Ind. Bat. ii. 437*. *A. cuneata*, *Wall. Cat. 1645 (habitat wrong)*.

MALACCA; in marshes, *Griffith, Maingay* (Kew Distrib. 1068).—DISTRIB. Java, Borneo.

Leaves 1½-4 in., very coriaceous, brown on both surfaces when dry, shining above, opaque beneath; nerves 20-30 pairs, horizontal; petiole very short. *Cymes* small, umbellately branched; bracts short. *Calyx-lobes* orbicular. *Corolla-tube* ¼ in., lobes elliptic, throat villous. *Disc* small. *Ovary* glabrous. *Follicles* 5-7 in. long, slender.

SECT. II. **Blaberopus.** *Leaves* with close parallel nerves, membranous, acute or acuminate. *Corolla-lobes* overlapping to the left. *Disc* of 2 ligulate glands alternating with the carpels. *Follicles* 3-6 in., broadest in the middle.

3. **A. venenatus**, *Brown in Mem. Wern. Soc. i. 75*; quite glabrous, leaves 4-6 in a whorl narrowly lanceolate finely acuminate, follicles stipitate and long-beaked. *Wall. Cat. 1647*; *Lodd. Bot. Cab. t. 186*; *Wight Ic. t. 436*; *Dalz. & Gibs. Bomb. Fl. Suppl. 52*; *Beddome For. Fl. Anal. Gen. 160*. *Blaberopus venenatus*, *A. DC. Prodr. viii. 411*. *Echites venenata*, *Roxb. Ic.*

DECCAN PENINSULA, NILGHERY HILLS; alt. 3-4500 ft., Courtallum, Dindygul on high hills.

A shrub 6-8 ft. *Leaves* 4-8 by ½-1¼ in., narrowed into a slender short petiole, midrib stout, nerves very slender and close. *Cymes* subumbellate, the flowers often racemose on the branches. *Calyx* very small, lobes triangular-ovate, acute. *Corolla-tube* 1 in., very slender, swollen at the top, limb ⅔-1 in. diam.; lobes oblong, obtuse. *Ovary* ovoid; style slender, top barrel-shaped, stigma 2-fid. *Follicles* 4-5 by ½ in., sword-shaped, coriaceous, smooth, narrowed into a stalk ½-1 in. long, and into a straight beak as long. *Seeds* more than ½ in. long, linear-oblong, flat, hairs short.—Fig. 6 of Wight's plate represents the pod of *A. neriifolia*.

4. **A. neriifolia**, *Don Prodr. 131*; branchlets and leaves beneath pubescent, leaves opposite or 3-4 in a whorl narrowly lanceolate finely acuminate, follicles sessile beaked. *Wall. Cat. 1646*. *Blaberopus neriifolius*, *A. DC. Prodr. viii. 411*. *B. Sebusii*, *Van Huerck & Muell. Arg. in Plant. Nov. Herb. Van Heurck, fasc. ii. 188*.

TROPICAL HIMALAYA; Nipal, Wallich, near the Sikkim frontier, on dry rocks, J. D. H. BHOTAN; Griffith.

Very similar to *A. venenata*, but the leaves are more coriaceous, always more or less pubescent beneath, and much fewer in a whorl, with usually long (sometimes $\frac{1}{2}$ in.) subulate interpetiolar glands; the foliicles are longer (4-7 in.), more slender, straighter, and sessile; the seeds are smaller and narrower.—*B. Sebusii*, Van H. & Muell. Argan., is founded on Griffith's Bhotan specimen, in which the leaves and flowers are those of *A. nerifolia*, but the pods, which are separate, belong to *A. venenata*.

SECT. III. **Dissuraspermum.** Leaves with distant nerves. Corolla-lobes overlapping to the right. Disc annular. Follicles long, slender, cylindric.

5. ***A. macrophylla***, Wall. Cat. 1648; leaves 6-12 in. oblanceolate or elliptic-lanceolate obtusely acuminate pubescent or glabrous beneath, nerves 16-20 pairs, cymes numerous large terminal sessile or peduncled with slender spreading many-flowered branches, corolla-tube glabrous throat villous. *A. DC. Prodr.* viii. 409. *A. costata*, Wall. Cat. 1649, not of Br.

PENANG; Wallich, Maingay (Kew Distrib. 1066/2, 1070/2).—DISTRIB. JAVA, Timor. Philippine Islds.

Leaves thinly coriaceous, $2\frac{1}{2}$ -3 in. broad, shining above, rather paler beneath; nerves spreading, about $\frac{1}{2}$ in. apart; base narrowed into a stout petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. long. Cymes copious, lax, pubescent; bracts 0; flowers small. Calyx campanulate, lobes short obtuse. Corolla-tube $\frac{1}{8}$ in., mouth contracted; lobes rounded, pubescent, thick. Disc annular. Ovary ovoid, acute, glabrous. Follicles very numerous, slender, pendulous, 12-18 by $\frac{1}{4}$ in., terete, membranous. Seeds slender, $\frac{1}{4}$ in. long.

6. ***A. angustifolia***, Wall. Cat. 1650; leaves glabrous obovate or oblanceolate obtusely acuminate or obtuse, nerves 10-15 pairs, cymes numerous branched densely pubescent many-flowered, peduncle and branches stout, calyx urceolate lobes very short, corolla-tube densely pubescent throat villous. *A. DC. Prodr.* viii. 409.

SINGAPORE; Wallich, T. Anderson. MALACCA and PENANG; Griffith, Maingay (Kew Distrib. 1066, 1067, 1070, 1070/1, 1070/2).

A tall tree (Maingay), leaves much smaller and more coriaceous than *A. macrophylla*, always quite glabrous, with fewer nerves and longer petioles ($\frac{3}{4}$ -1 in.) and with denser more pubescent cymes and flowers. Penang specimens have very broad leaves, 6-7 by 3 in.

SPECIES OF DOUBTFUL POSITION.

7. ***A. Kurzii***, Hook. f.; a tree 80-100 ft., quite glabrous; leaves whorled, 4-7 in. long, oblong to obovate-oblong, tip retuse or rounded, base acute or obtuse, coriaceous, glaucous beneath; nerves parallel, numerous, slender; flowers small, white, densely cymulose; pedicels short and stout; cymelets shortly peduncled, whorled, forming a long peduncled, glabrous axillary panicle; foliicles linear. *A. spectabilis*, Kurz For. Fl. ii. 183, not of Brown.—Forests of the Andaman Islds., Kurz.

This is obviously not Brown's *A. spectabilis*, which is probably closely allied to *A. macrophylla*. In Journ. As. Soc. 1877, ii. 254, Kurz says of this, "hardly specifically distinguishable from *A. scholaris*."

8. ***A. GRANDIFOLIA***, Miquel Fl. Ind. Bat. Suppl. 555; leaves 5-7 in a whorl, unequal, 12-16 by 4-5 in., narrowly obovate or oblanceolate, obtusely apiculate, glaucous beneath, midrib stout, nerves 20 pairs strong; petiole very stout, 2 in.—Singapore, T. Anderson.—Of this I have seen only two leaves, which precisely agree with Miquel's from Sumatra.

17. **DYERA**, Hook. f.

Glabrous trees. Leaves whorled, petioled. Flowers small, in terminal and axillary umbellately branched cymes. Calyx hemispheric, shortly 5-lobed, eglandular within. Corolla salver-shaped, tube short; lobes overlapping to

the left. *Stamens* 5, in the middle of the tube, included, filaments very short; anthers oblong, obtuse, upper half empty fleshy, base obtusely 2-lobed. *Disc* annular, obscure. *Ovary* short, broadly conic, obtuse, top pubescent, 2-celled, cells many-ovuled; style 0, stigma 2-cleft, minute, sessile, pyriform, lobes appressed. *Follicles* very large long thick, straight, cylindric, obtuse, connate at the base, reflexed, furfuraceous. *Seeds* (unripe) flattened, winged.—Species 3, Malayan.

1. **D. costulata**, Hook. f.; leaves rounded at the base, cymes shortly peduncled, corolla-lobes about as long as the tube. *Alstonia* ? *costulata*, Miquel Fl. Ind. Bat. Suppl. 556.

MALACCA; Griffith, Maingay (Kew Distrib. 1097).—DISTRIB. Sumatra.

A tree; branches very stout. *Leaves* 6–8 in a whorl, 2–4 by $1\frac{1}{2}$ –3 in., broadly elliptic or oblong, rounded at both ends, hard and coriaceous, shining above, glaucous beneath; nerves 12–16 pairs, strong, nearly straight, almost horizontal or ascending, reticulations prominent above; petiole $\frac{1}{2}$ –1 in. *Cymes* numerous, twice umbellately branched, glabrous; peduncles 2–3 in.; pedicels short; flowers very small. *Calyx-lobes* rounded, coriaceous. *Corolla-tube* $\frac{1}{10}$ in. long, glabrous, lobes linear-oblong. *Follicles* 9–12 by $1\frac{1}{2}$ in., “covered with minute crenated ferruginous squamulæ” (Maingay).—A most remarkable plant, evidently allied to *Alstonia*, though from the seeds being imperfectly known, its exact affinity cannot be stated. The huge follicles are borne on a woody peduncle nearly $\frac{1}{2}$ in. diam., their bases are entirely connate, and though quite straight they are sharply deflexed, when ripe they gape wide, and the inner shining parchment-like coat becomes irregularly torn, forming a fringe to the coriaceous outer. An allied species from Borneo, collected by Low, Lobbo, and Beccari, has longer leaves (6–9 by 1–2 in.) with the base narrowed into the petiole and numerous (20–30) pairs of nerves.—All the species are said to yield gutta Jelatang.

2. **D. laxiflora**, Hook f.; leaves narrowed to the rounded or subacute base, cymes long peduncled, corolla-lobes four times as long as the tube.

SINGAPORE; Murton, Cantley.

Closely allied to *D. costulata*, but with much larger leaves, sometimes 8 in long, petioles $1\frac{1}{2}$ –2 in. *Peduncles* of cyme very slender, 3–5 in., pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. *Corolla-lobes* linear, $\frac{1}{2}$ in. long.

18. **HOLARRHENA**, Br.

Trees or shrubs. *Leaves* opposite, membranous. *Flowers* white, in terminal or subaxillary many-flowered corymbose cymes. *Calyx* 5-lobed or -partite, usually glandular within, lobes small. *Corolla* salver-shaped, tube slender cylindric, throat contracted naked; lobes oblong, overlapping to the left. *Stamens* near the base of the tube; anthers oblong-lanceolate, mucronate, cells rounded at the base. *Disc* 0. *Carpels* 2, distinct; style short, filiform, stigma oblong-fusiform, top entire or 2-toothed; ovules many in each carpel. *Follicles* 2, elongate, spreading and incurved, terete. *Seeds* linear or oblong, compressed, concave, tipped with a deciduous coma; funicle in the concavity, albumen scanty; cotyledons broad, complicate, radicle short, superior.—DISTRIB. Species 7 or 8, tropical Asiatic and African.

1. **H. antidysenterica**, Wall. Cat. 1672; glabrous pubescent or tomentose, leaves shortly petioled elliptic oblong ovate or ovate-oblong obtusely acuminate. *A. DC. Prodr.* viii. 413; *Brand. For. Fl.* 326, t. 40; *Bedd. Fl. Sylb. Anal. Gen.* xx. fig. 6; *Kurz For. Fl.* ii. 182; *Dalz. & Gibbs. Bomb. Fl.* 145; *Beddome For. Fl. Anal. Gen.* 160, t. 20, fig. 6. *H. Codaga*, *G. Don Gen. Syst.* iv. 78; *A. DC. l. c.*; *Kurz For. Fl.* ii. 183; *Wight Ic.* 1297. *H. pubescens*, Wall. Cat. 1673; *A. DC. l. c.* *H. malaccensis*, *Wight Ic.* t. 1298. *Echites antidysenterica*, Roxb. *Wrightia antidysenterica*, *Grah. Cat. Bomb. Pl.* 114, excl. some syns. *Chonemorpha* ? *antidysenterica*, *G. Don l. c.*; *Wight Ic.* t.

439. ? *H. villosa*, Ait. ex Loud. in Steud. Nomencl.—Rheede Hort. Mal. i. t. 47.

TROPICAL HIMALAYA; ascending to 3500 ft., from the Chenab westwards, and throughout the drier forests of INDIA to TRAVANCORE and MALACCA.

A small deciduous tree, bark pale. *Leaves* 6–12 by $1\frac{1}{2}$ –5 in., base obtuse rounded or acute; nerves 10–14 pairs, strong, arched; petiole 0– $\frac{1}{4}$ in. *Cymes* 3–6 in. diam., corymbose, sessile, terminal; bracts small, ciliate; pedicels slender. *Flowers* inodorous, white, 1–2 in. diam., puberulous. *Sepals* acuminate. *Corolla-tube* very slender, $\frac{1}{4}$ – $\frac{1}{2}$ in.; lobes as long, oblong, tip round. *Follicles* 8–16 by $\frac{1}{2}$ in., very slender, parallel, terete, coriaceous, obscurely torulose, usually with small long white spots. *Seeds* $\frac{1}{2}$ in., narrowly linear-oblong, glabrous, coma 2 in., brown.

2. *H. mitis*, Br. in Mem. Wern. Soc. i. 62; glabrous, leaves lanceolate or linear-lanceolate obtuse. A. DC. Prodr. viii. 413; *Thwaites Enum.* 194; *Beddome For. Fl. Anal. Gen.* 161.

CEYLON; not uncommon up to 1500 ft.

A medium-sized tree (*Thwaites*). *Leaves* 3–5 by $\frac{1}{2}$ –1 in., shining above, paler beneath, nerves about 10 pairs; petiole $\frac{1}{4}$ in. *Cymes* axillary and terminal, many-fld. *Corolla-lobes* narrowly linear. *Follicles* upwards of a foot long.—A specimen of this is in the Wallichian Herbarium without name or number, ticketed as from Herb. Finlayson; probably erroneously, as Finlayson collected only in Siam.

19. **TABERNÆMONTANA**, Linn.

Trees or shrubs. *Leaves* opposite. *Flowers* white in axillary terminal cymes. *Calyx* 5-lobed or -partite, glandular within, rarely eglandular. *Corolla* salver-shaped, tube cylindric, usually slender, inflated in the middle or top; lobes overlapping to the left. *Stamens* at or above the middle of the tube, filaments short or 0; anthers sagittate or base obtuse, acuminate. *Disc* 0. *Carpels* 2, distinct; style short or long, top urceolate ovoid or clavate, stigma short or long 2-lobed; ovules usually many, and ∞ -seriate in each carpel. *Fruit* of 2 ovoid or oblong or reniform, smooth or ribbed 1-many-seeded, dry or fleshy follicles. *Seeds* buried in pulp, ovoid-oblong, subterete or compressed, grooved down one face, smooth striate or rugose, albumen fleshy equable or ruminate; cotyledons ovate, radicle short or long.—**DISTRIB.** About 110 species in all tropical regions.

* *Calyx* 5-lobed to the middle, lobes obtuse, eglandular or with glands on their inner faces at the base. *Corolla-lobes* globose in bud.

† *Branches* stout; *leaves* large coriaceous; *peduncles* and *pedicels* very stout. *Calyx* large. *Corolla-tube* cylindric, stout.

1. **T. dichotoma**, Roxb. Hort. Beng. 20, and Fl. Ind. ii. 21; glabrous, leaves coriaceous oblong or obovate- or linear-oblong tip rounded, base acute, nerves horizontal, petiole stout, cymes long-peduncled few-fld. A. DC. Prodr. viii. 366; *Wight Ic.* t. 433; *Wall. Cat.* 1570; *Thwaites Enum.* 192; *Bot. Reg.* 1841, t. 53. *Cerbera dichotoma*, Lodd. Bot. Cab. t. 1516. C. Manghas, Linn., partly (*Thwaites*). *Tanghinia dichotoma*, G. Don Hort. Brit. ed. 3, 461.—*Burm. Thes. Zeyl.* t. 70, fig. 1.

DECCAN PENINSULA; common in the Western Ghats, *Beddome*. CEYLON; very common in the warmer parts of the island (*Thwaites*).

A small tree; branches very stout, woody, cylindric; buds resinous. *Leaves* 4–8 by 1–2 in., pale yellow-brown when dry, midrib very stout, nerves 16–22 pairs; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in., base semialexicaul. *Peduncle* 2–5 in., bracts 0. *Calyx* hemispheric, very thick, lobes semicircular. *Flowers* scarcely fragrant. *Corolla* white, tube $\frac{3}{4}$ –1 in., yellow, cylindric, swollen at the very base, limb white, 2–3 in. diam., mouth contracted; lobes broadly oblong, falcate, obtuse. *Anthers* half-way down the tube.

Follicles usually solitary, 4-5 by 1-2 in., recurved, oblong, narrowed at both ends, dorsally concave, ventrally 2-ribbed, orange-yellow. *Seeds* many, $\frac{3}{4}$ in. long, buried in scarlet pulp.—Though mentioned by Roxburgh and Beddome as a Malabar plant, I have seen no specimen from continental India. It is remarkable as being the only Ceylon species of this common Indian and tropical genus. The *T. dichotoma*? of Gibson's Catalogue of Bombay Plants is probably *T. Heyneana*.

2. **T. Heyneana**, Wall. in *Bot. Reg. under t.* 1273, and *Cat.* 1573; glabrous, leaves linear-oblong or -lanceolate obtusely acuminate, base acute, nerves 12-16 pairs arched, cymes peduncled many-fl. *A. DC. Prodr.* viii. 376. *T. intercedens*, Van Heurck & Mull. *Arg. Plant. Nov. Herb. Van Heurck*, 166. *T. recurva*, *Herb. Hohenack.* 1847, not of Roxb.

WESTERN GHATS; from the Concan, southwards, common.

Branches very stout, with pale smooth bark, grooved when dry. *Leaves* 3-8 by 1-2½ in., coriaceous, dark brown and shining above when dry, paler beneath, midrib and nerves beneath stout; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in., base dilated. *Peduncle* 1-2 in.; pedicels $\frac{3}{4}$ -1 in.; bracts obsolete. *Calyx* very coriaceous; lobes hardly ovate, obtuse. *Corolla-tube* 1 in., cylindric, stout, swollen at the top, limb 1 in. diam.; lobes globose in bud, falcately oblong, obtuse, crisped. *Ovary* very short; style filiform, top obconic, stigma forked. *Follicles* very variable. $\frac{1}{2}$ -1 in. long, sessile, slightly recurved, shortly sausage-shaped, not keeled or ribbed, beaked or not. *Seeds* 2 or more, $\frac{1}{2}$ in. long.

3. **T. corymbosa**, Roxb. *Fl. Ind.* ii. 25; glabrous, leaves elliptic-oblong or lanceolate or oblanceolate obtuse or obtusely acuminate, nerves 10-16 pairs very spreading, cymes peduncled many-fl. *A. DC. Prodr.* viii. 376; Wall. *Cat.* 1772, and *Bot. Reg. under t.* 1273.

PENANG; Wallich, Phillips. SINGAPORE, Anderson, Murton.—DISTRIB. Java.

Very similar to *T. Heyneana*, but with smaller and more crowded flowers on slenderer pedicels, more obtuse leaves with straighter nerves. *Branches* stout; bark pale, smooth, grooved when dry. *Leaves* 3-7 by 1½-2½ in. (in one specimen of Wallich's 12 by 4 in.), coriaceous, opaque, greenish or brown above when dry, pale beneath; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Cymes* shortly peduncled, much branched; bracts obsolete; pedicels $\frac{1}{2}$ in. *Calyx* very coriaceous, lobes rounded. *Corolla-tube* $\frac{1}{2}$ in., cylindric, swollen at the top; lobes falcately oblong, globose in bud. *Ovary* elongate-conical; style stout, stigma fusiform. *Follicles* not seen.—This is certainly very near *T. javanica*, Miquel, but differs in the longer pedicels, suppression of bracts, and in the corolla-tube being dilated not in the middle, but at the top, as also in the stigma not being 2-fid; the latter character is however a very deceptive one, as the tearing away of the stigma from the anthers often mutilates it. *T. sphaerocarpa* of Java is another close ally.

4. **T. hirta**, Hook. f.; cymes pubescent, leaves elliptic-ovate or -oblong long acuminate, nerves 10-15 pairs arched, cymes peduncled many-fl.

MALACCA; Maingay.

Leaves 4-8 in., coriaceous, almost caudate, base acute; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Cymes* almost hirsute, with short close-set spreading hairs, peduncle branches and pedicels stout. *Calyx* coriaceous, sometimes 7-lobed, lobes semicircular, eglandular. *Corolla* glabrous, tube $\frac{1}{2}$ in., stout, cylindric; lobes short, globose in bud. *Ovary* elongate; style slender, top urn-shaped, stigma small fusiform. *Follicles* strongly recurved, 1-1½ by $\frac{1}{2}$ - $\frac{3}{4}$ in., terete, not ribbed keeled or beaked. *Seeds* $\frac{1}{2}$ in., few or many.—The specimens are very indifferent of this very distinct species.

†† *Branches* rather slender; leaves membranous; calyx small; corolla-tube slender.

5. **T. coronaria**, Br. in *Hort. Kew.* ed. 2, ii. 72; glabrous, leaves in each pair unequal elliptic-oblong obovate or oblanceolate obtusely acuminate or caudate, peduncles solitary or in pairs in the forks of the branches dichotomous 1-8-fl., corolla-tube swollen below the middle, follicles recurved. *A. DC.*

Prodr. viii. 373; *Roxb. Fl. Ind.* ii. 23; *Wall. Cat.* 1568; *Wight Ic.* t. 477; *Brand. For. Fl.* 322; *Dalz. & Gibs. Bomb. Fl.* 144; *Bedd. For. Fl. Anal. Gen.* 159; *Lodd. Bot. Cab.* t. 406. *T. divaricata*, *Blume Bijl.* 1626; *Kurz For. Fl.* ii. 174. *Nerium divaricatum*, *Linn. Sp. Pl.* 306. *N. coronarium*, *Jacq. Coll.* i. 138, t. 52; *Bot. Mag.* t. 1861.—*Jasminum zeylanicum*, &c., *Burm. Fl. Ind.* t. 39.

Cultivated throughout INDIA; from the N.W. Himalaya in Kumaon, eastwards and southwards.—Native country unknown.

A shrub, 6–8 ft., much dichotomously branched, bark pale. *Leaves*, the larger 4–6 by 1–1½ in., glossy, rather coriaceous, green when dry, pale beneath, margins waved, nerves 6–8 pairs, narrowed into a petiole ¼–½ in., axils of petioles glandular. *Peduncles* 1–2 in., pedicels slender; bracts 0 or minute. *Flowers* pure white, often double, fragrant. *Calyx-lobes* broadly ovate, acute. *Corolla-tube* ½–1 in., glabrous, dilated slightly below the middle, limb 1–1½ in. diam.; lobes obliquely ovate, obtuse, margins curled; mouth with 5 glands. *Anthers* inserted below the middle of the tube. *Ovary* glabrous. *Follicles* 1–3 in., spreading and recurved, sessile or contracted into a sort of stalk at the base, turgidly oblong, beaked or not, 3-ribbed. *Seeds* 3–6, oblong, striated; aril red, fleshy.

6. ***T. graciliflora***, *Wall. Cat.* 1576, and in *Bot. Reg.* under t. 1273; glabrous, leaves oblong-lanceolate obtusely acuminate or caudate, nerves 11–16 pairs, cymes very long-peduncled, bracts obsolete, corolla-tube 1 in. very slender, lobes narrow, follicles ½ in. turgid 1–2-seeded. *Kurz For. Fl.* ii. 175. *T. Colignonæ*, *Van Heurck & Muell. Pl. Nov. Van Heurck*, 170.

MARTABAN and MOULMEIN; *Wallich, Griffith.*

Branches with pale bark. *Leaves* 4–7 by 1–2 in., membranous, narrowed into a slender petiole ¼–½ in. *Peduncle* sometimes equalling the leaves; branches of cyme slender, divaricate, pedicels short. *Calyx* very small; lobes rounded, ciliolate. *Corolla-tube* dilated above the middle, twice as long as the lobes. *Ovary* of two very slender carpels; style filiform, tip obconic, stigma forked. *Follicles* turgid, smooth, with a short upcurved beak or 0. *Seeds* ½ in.

7. ***T. subcapitata***, *Wall. Cat.* 1579, and in *Bot. Reg.* under t. 1273; leaves elliptic-oblong or lanceolate obtusely acuminate or caudate, nerves 8–12 pairs, cymes shortly peduncled small many-fld., bracts obsolete, corolla-tube ½ in., lobes small rounded, throat villous. *A. DC. Prodr.* viii. 373.

TAVOY; Gomez. PEGU and TENASSERIM (*Kurz*). MERGUI; *Griffith.*

An evergreen shrub. *Leaves* 4–7 by 1½–3 in., very membranous, midrib and nerves slender; petiole slender, ¼–½ in. *Peduncle* 1–1½ in.; branches crowded, dichotomous, very short. *Calyx* small; lobes broadly ovate, obtuse. *Flowers* white. *Corolla* rather funnel-shaped above, lobes about half as long as the tube. *Ovary* ovoid, acute; style filiform, tip clavate, stigma fusiform. *Follicles* “obliquely oblong, about ¾ in. long, narrowed into a thick long stalk and compressed into a sterile truncate appendage, terminating in a falcate point; glabrous, 1–2 seeded,” *Kurz*.

8. ***T. peduncularis***, *Wall. Cat.* 1575, and in *Bot. Reg.* under t. 1273; glabrous, leaves oblong-lanceolate obtusely caudate-acuminate, nerves 12–20 pairs spreading, peduncles very long and slender, cyme-branches divaricate, pedicels capillary, corolla-tube ½ in. curved limb small, follicles ½ in. stipitate 1-seeded. *A. DC. Prodr.* viii. 376.

PENANG; Porter, Maingay (*Kew Distrib.* 1060/2).

A small shrub. *Leaves* 4–6 by 1½–2½ in., membranous, nerves close, tips usually very long, base acute; petiole slender, ¼–½ in. *Peduncle* 4–5 in., wiry; branches few, filiform, widely divaricate. *Calyx* small, lobes rounded. *Corolla-lobes* very small, mouth glabrous. *Ovary* of two long narrow carpels; style filiform, top clavate, stigma 2-fid. *Follicles* turgid, obtusely beaked, not ribbed.

** *Calyx* 5-partite, segments eglandular or glandular at the base.

+ *Calyx-segments* broad, foliaceous, deciduous.

9. **T. crispa**, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 24; glabrous, leaves elliptic or elliptic-oblong or -obovate obtusely acuminate margins wrinkled, cymes long-peduncled, bracts minute, sepals rounded subacute. *A. DC. Prodr.* viii. 371, excl. syn. *Rheede & Linnæus; Wall. Cat.* 4450; *Wight Ic.* t. 470; *Bedd. For. Fl. Anal. Gen.* 159. *T. alternifolia*, *Roxb. Fl. Ind.* ii. 24; *Kurz For. Fl.* ii. 174, not of *Linnæus*.

ANDAMAN ISLANDS; frequent along the coast, *Kurz*.

Habit and foliage of *T. coronaria*, but leaves often much larger, sometimes 10 by 5 in., with more numerous and more spreading nerves; petiole very short. *Cymes* many-fld.; peduncle 1-4 in.; pedicels long, $\frac{1}{2}$ -1 in. *Sepals* $\frac{1}{2}$ in. diam., obtuse or apiculate, sometimes cordate. *Corolla-tube* very slender, $\frac{1}{2}$ - $\frac{3}{4}$ in., swollen at the top; limb 1 in. diam., lobes obovate, margins crisped, ovoid and acute in bud. *Ovary* ovoid, narrowed into the slender style, which is elongate, urceolate at the top, with a 2-fid stigma. *Follicles* "1 in., sessile, acute, recurved, ventrally 3-keeled, 3-6-seeded" (*Roxburgh*).—This species, which differs from all others in the remarkable calyx, has long been in confusion, and though cultivated in India from a very early period, it was only quite lately that its native country was known. This is the Andaman Islands. *Beddome* indeed says that it is common in the Western Ghats; but I have seen no specimens and suspect some error. *Roxburgh* accurately describes it, but strangely confounded it with *T. alternifolia* of *Linnæus* (*Sp. Pl.* 211). Under the latter plant (*Fl. Ind.* ii. 25) he quotes *Linnæus'* and *Rheede's Curata pala*, and says "the leaves being in this opposite, made me change the Linnæan specific name *alternifolia* for *crispa*, on account of its curled petals." A glance at *Rheede's* figure of *Curata pala*, upon which *Linnæus* founded his *T. alternifolia*, shows that it has nothing to do with this, but is probably *T. coronaria*. *Kurz*, also neglecting to refer to *Rheede*, restores the Linnæan name of *alternifolia*, and does not even refer to *Roxburgh's crispa*, though his description perfectly agrees with that author's. Lastly, *Linnæus* and *Roxburgh* are both wrong in the citation of *Rheede* for *Curata pala*—it is part i. t. 47 (*Linnæus* say 45, and *Roxburgh* 46).

†† *Calyx-segments* narrow, acute or acuminate, persistent.

10. **T. recurva**, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 26; glabrous, leaves elliptic-oblong obtusely acuminate subcaudate, cymes short-peduncled recurved few- or many-fld., bracts subulate persistent, sepals very unequal lanceolate ciliolate, corolla-tube slender swollen above, follicles turgid many-seeded. *A. DC. Prodr.* viii. 371; *Wall. Cat.* 1569, and in *Bot. Reg.* under t. 1273; *Wight Ic.* t. 476; *Kurz For. Fl.* ii. 174. *T. gratissima*, *Lindl. in. Trans. Hort. Soc.* vii. pt. i. 55, and *Bot. Reg.* t. 1084.

CHITTAGONG; *Roxburgh*; Flagstaff Hill, *J. D. H. & T. T.* PEGU and TENASSERIM (*Kurz*).

A small shrub; bark smooth. *Leaves* 2-6 by 1-2 $\frac{1}{2}$ in., membranous; nerves 6-8 pairs, slender, arched; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Cymes* with stout peduncle $\frac{1}{2}$ -1 in., branches stout; bracts rather persistent; flowers drooping, fragrant. *Sepals* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Corolla-tube* $\frac{3}{4}$ in.; limb 1-1 $\frac{1}{2}$ in. diam., lobes falcately obovate, forming an ovoid acute bud. *Ovary* elongate, narrowed into the filiform style with oblong tip and forked stigma. *Follicles* $\frac{1}{2}$ -2 in., sessile, hardly recurved, very turgid, terete, not keeled.

11. **T. rostrata**, *Wall. Cat.* 1578, and in *Bot. Reg.* under t. 1273; glabrous, leaves elliptic-oblong or -lanceolate obtusely acuminate pale beneath, cymes short-peduncled, bracts persistent, sepals ovate acute, corolla-tube swollen in the middle, follicles sessile lanceolate long-beaked acutely keeled few-seeded. *A. DC. Prodr.* viii. 371; *Kurz For. Fl.* ii. 174.

AVA; banks of the Irawaddy, *Wallich*.

Shrubby, bark smooth. *Leaves* 3-6 by 1 $\frac{1}{2}$ -2 in., membranous; nerves 7-10 pairs,

slender. *Cymes* few-fl'd., peduncle $\frac{1}{4}$ –1 in., bracts small, pedicels very short. *Sepals* small, $\frac{1}{10}$ in. *Corolla-tube* 1 in., very slender, lobes falcately linear-oblong. *Filaments* slender. *Ovary* narrowed into a style much shorter than the tube, stigma large, 2-partite. *Follicles* $\frac{1}{2}$ –1 by $\frac{1}{8}$ – $\frac{1}{2}$ in., 2–4-seeded, beak straight or upcurved.

12. **T. calycina**, *Wall. Cat.* 1577, and in *Bot. Reg.* under t. 1273; glabrous, leaves elliptic-lanceolate obtusely acuminate, cymes short-peduncled, bracts subulate persistent, sepals linear-lanceolate acuminate very unequal, corolla-tube swollen above, ovary very short. *Kurz For. Fl.* ii. 173.

TENASSERIM; *Gomez*.

Foliage similar to that of *T. rostrata*, but petioles rather longer; pedicels very short indeed; bracts sometimes linear-oblong and almost leafy in texture; sepals very much longer, one-third as long as the corolla-tube, which is very slender, $\frac{2}{3}$ in. long and swollen at the top; ovary not elongate, but almost hemispheric.—I have seen but one specimen.

13. **T. malaccensis**, *Hook. f.*; glabrous, leaves elliptic-obovate or -lanceolate obtusely acuminate or caudate, cymes sessile or shortly peduncled few-fl'd., pedicels slender, bracts 0, sepals unequal subulate-lanceolate acuminate, corolla-tube slender inflated at the top, lobes narrow, follicles turgid recurved beaked 3-keeled few- or many-seeded.

MALACCA; *Griffith, Maingay* (Kew Distrib. 1061, 1062).

A small shrub. *Branches* slender, very smooth. *Leaves* in flowering specimens 3–4 by 1–1 $\frac{1}{2}$ in., very membranous, in the fruiting specimens shorter and broader in proportion sometimes nearly orbicular; nerves very slender, 6–8 pairs; petiole $\frac{1}{4}$ in. *Cymes* very slender and few- or many-flowered, pedicels $\frac{1}{4}$ –1 in.; flowers small. *Corolla-tube* $\frac{2}{3}$ in., lobes about as long, crumpled. *Ovary* short, top rounded; style long, filiform. *Follicles* $\frac{3}{4}$ –1 $\frac{1}{2}$ in., more or less recurved.

14. **T. membranifolia**, *Kurz For. Fl.* ii. 175; glabrous, leaves elliptic-lanceolate caudate-acuminate very membranous, not paler beneath, cymes subsessile, bracts obsolete, sepals very small subulate, corolla-tube very slender inflated below the middle, lobes linear-lanceolate much shorter than the tube.

MARTABAN; forests east of Tounghoo, *Kurz*.

An evergreen shrub, 3–4 ft. (*Kurz*). *Leaves* 3–5 by 1–1 $\frac{1}{4}$ in., tips very long, curved, nerves 7–8 pairs, very slender. *Cymes* short, many-flowered; pedicels long or short. *Sepals* subequal. *Corolla-tube* $\frac{3}{4}$ in., lobes linear-lanceolate, acute, half as long as the tube or less, forming very long narrow buds. *Ovary* ovoid, acute; style filiform, top elongate-clavate, truncate, stigma slender. *Follicles* not seen.

DOUBTFUL AND EXCLUDED SPECIES.

T. FINLAYSONIANA, *Wall. Cat.* 4452, without flower or fruit, is probably a native of Siam, and is indeterminate.

T. INDICA, *Willd. Herb. in Steudel Nomenclator*, cannot be determined without a reference to Willdenow's herbarium.

T. MACROCARPA, *Jack.*, is a native of Sumatra; and *T. MONOCARPA*, *Steudel Nomenclator*, is obviously a misprint for the same.

T. PERSICARIEFOLIA, *Willd., Roxb. Fl. Ind.* ii. 27, is a Mauritian plant.

T. OPHIORHIZOIDES, *Kurz For. Fl.* ii. 175; a glabrous shrub, 2–4 ft., leaves 3–5 in. obovate-oblong to broadly lanceolate shortly acuminate sessile or tapering into a petiole of 2–3 lines membranous pale beneath, cymes 2–3 rarely more in the forks of the upper branches, subsessile or shortly peduncled few-fl'd., pedicels 1–1 $\frac{1}{2}$ lines, bracts and bractlets minute deciduous, calyx 5-cleft very short, segments hardly 1 line lanceolate acute, corolla-tube about 4 lines rather thick, apex inflated, lobes hardly half as long as the tube.—Hill forests of Martaban, alt. 3–5000 ft. frequent.—I have seen no specimen.

T. WALLICHIANA, *Steudel Nomenclator* (*T. parvifolia*, *Roxb. Fl. Ind.* ii. 25; *Wight Ic.* t. 393, by error pauciflora in letterpress), is a native of Sumatra.

20. **PARSONSIA**, Br.

Twining shrubs. *Leaves* opposite. *Flowers* small, white, in terminal or axillary dichotomous cymes or thyrsi. *Calyx* 5-partite, glandular within or naked, or with 5 scales. *Corolla* salver-shaped, tube short, cylindric or globose, throat naked; lobes overlapping to the right. *Stamens* inserted in the tube, filaments often twisted; anthers half-exserted, acute, conniving over and adhering to the stigma, cells spurred and empty below. *Disc* of 5 lobes or scales. *Ovary* 2-celled; style filiform, top dilated, truncate, stigma columnar or elongate-conical, cells many-ovuled. *Fruit* cylindric, carpels at length separating from the two placentas. *Seeds* linear or oblong, tip narrowed and penicillate, albumen scanty; cotyledons linear-oblong, flat, radicle superior.—**DISTRIB.** 12 species of tropical Asia, Australia and New Zealand.

P. spiralis, Wall. Cat. 1631; quite glabrous, leaves ovate oblong or oblong-lanceolate base acute rarely rounded or cordate, cymes axillary corymbose. *A. DC. Prodr.* viii. 402; *Kurz For. Fl.* ii. 180. *P. oblonga*, Wall. Cat. 1632; *A. DC. l. c.* *P. pauciflora* and *P. acuminata*, Wall. Cat. 1633, 1634. *Helygia javanica*, Blume Bijl. 1043. *Heligme javanica*, *A. DC. l. c.* 425. *H. Rheedei*, Wight Ic. t. 1303; *Dalz. & Gibs. Bomb. Fl.* 146. *H. spiralis*, Thwaites Enum. 193. *Spirostemon spiralis*, Griff. Notul. iv. 80, t. 411, fig. 1. *Aganosma cancanensis*, Hook. Ic. Pl. t. 841.

SILHET; Wallich. PEGU, TENASSERIM, MALACCA, SINGAPORE and PENANG. WESTERN GHATS; from the Concan southwards. CEYLON, ascending to 3000 ft.—**DISTRIB.** Malay Archipelago, China.

An evergreen twiner. *Leaves* 3-7 by $1\frac{1}{2}$ - $3\frac{1}{2}$ in., coriaceous, pale when dry; nerves 6-8 pairs, arched; petiole $\frac{1}{3}$ -1 in. *Cymes* 2-3 in. diam.; peduncle stout, half as long as the leaves; bracts small. *Sepals* ovate, very thick, obtuse, equalling the corolla-tube. *Corolla* $\frac{1}{2}$ in. diam., coriaceous; lobes linear-oblong, obtuse. *Fruits* 7 by $\frac{3}{4}$ in., or shorter, elongate, linear-lanceolate, acuminate, quite cylindric, at length separating into 2 coriaceous follicles. *Seeds* $\frac{3}{4}$ in., slender, glabrous; coma as long.

TRIBE III. **ECHITIDÆ.**21. **VALLARIS**, Burm.

Twining shrubs. *Leaves* opposite, minutely dotted. *Flowers* white, in subaxillary or axillary or supra-axillary dichotomous cymes, or fascicled. *Calyx* 5-partite, glandular or not within, segments narrow. *Corolla* salver-shaped, tube short, throat naked; lobes broad, overlapping to the right. *Stamens* at the top of the tube, filaments very short clavate; anthers exserted, conniving in a cone adherent to the stigma, connective with a large dorsal gland, cells with rigid basal spurs. *Disc* various. *Carpels* 2, at first connate, many-ovuled; style filiform, pubescent, stigma thick obscurely annulate. *Fruit* oblong, acuminate, carpels at length separating. *Seeds* 2-seriate, ovate, acuminate or beaked, compressed, tip comose, albumen scanty; cotyledons flat thin, radicle superior.—**DISTRIB.** Species 5 or 6, tropical Asiatic and Malayan.

* *Flowers* cymose. Twining shrubs.

1. **V. Heynei**, Spreng. Syst. i. 635; leaves elliptic or oblong or linear-oblong acuminate pellucid-dotted, cymes pubescent. *A. DC. Prodr.* viii. 400; *Dalz. & Gibs. Bomb. Fl.* 144. *V. dichotoma*, Wall. Cat. 1621; Griff. Notul. iv. 77; *A. DC. l. c.*; Thwaites Enum. 192; Brand. For. Fl. 327; Kurz For. Fl. ii. 181; Wight Ic. t. 438. *Echites dichotoma*, Roxb. Fl. Ind. ii. 19. *Peltanthera solanacea*, Roth Nov. Sp. 132.

TROPICAL HIMALAYA; Nipal, Wallich; Kumaon, ascending to 5000 ft., Edgeworth. DECCAN PENINSULA; from the Concan southwards. SILHET, BIRMA, CEYLON. (Commonly cultivated in India).

A tall climbing shrub, bark pale; the axils of the petioles glandular. *Leaves* $1\frac{1}{2}$ –4 by $\frac{3}{4}$ – $1\frac{1}{2}$ in., glabrous or pubescent, petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Cymes* 3–10-fl., sessile or peduncled, dichotomous, much shorter than the leaves, sometimes racemose with a twining rachis; peduncles and pedicels slender, the latter often decurved; flowers pure white, $\frac{2}{3}$ in. diam., fragrant. *Sepals* ovate-oblong, obtuse, equalling the short corolla-tube. *Corolla-limb* spreading. *Disc* ciliate. *Filaments* linear, villous; anthers woolly. *Style* pubescent. *Follicles* 6 by 2 in., straight, tapering from a rounded base to a stiff point, "splitting into 4 valves when dry" (Roxb.); pericarp thick, fibrous. *Seeds* 1 in., ovate, beaked, with a tuft of hairs at the hilum; coma very long.—I have seen no seeds; Kurz states that the follicles are always solitary.

2. V. Pergulana, Burm. Fl. Ind. 81; leaves large broadly elliptic or obovate or rounded abruptly shortly acute membranous, cymes glabrous or puberulous.—*A. DC. Prodr.* viii. 399; *Wight Ic.* t. 429; *Hook. Ic. Pl.* t. 153 (*V. Pergularia* by error). *V. ovalis, Miquel Fl. Ind. Bat.* ii. 427. *Pergularia glabra, Linn. Mant.* 53. *Emericia Pergularia, Roem. & Sch. Syst.* iv. 401. *Echites hircosa, Roxb. Fl. Ind.* ii. 18.—*Rumph Amb.* v. 51, t. 29, fig. 2.

BENGAL; scarce, Roxburgh. MALACCA; cultivated, Maingay. CEYLON (*Thwaites*).—DISTRIB. Java, Malay Islands, Timor.

A climbing shrub; bark pale; axils of the petioles glandular. *Leaves* 4–7 by 3–4 in., glabrous or puberulous beneath; petiole $1\frac{1}{2}$ in. *Cymes* much more lax-flowered and glabrous than in *V. Heynei*. *Flowers* with a disagreeable goat-like smell. *Sepals* ovate-lanceolate, acute.—*Thwaites* doubts this being distinct from *P. Heynei*, which makes me doubt his having the true plant in Ceylon. *Miquel's V. ovalis* is undoubtedly the same species, as an examination of *Horsfield's* specimens, on which it was founded, proves. I doubt the species being British Indian. I have seen no native specimens, and Roxburgh's habitat of Bengal is not confirmed.

** *Flowers fascicled. Shrubs not twining.*

3. V. Maingayi, Hook. f.; branches stout, bark black, leaves very coriaceous elliptic-lanceolate obtusely acuminate shining above, nerves 5–6 pairs, corolla $\frac{1}{2}$ in. diam., lobes obliquely ovate obtuse puberulous, mouth contracted puberulous.

MALACCA; Maingay (Kew Distrib. 1084).

A large tree (*Maingay*). *Branches* curving, bark closely ringed with cracks. *Leaves* $3\frac{1}{2}$ – $4\frac{1}{2}$ by $1\frac{1}{2}$ in., tapering at both ends, very dark brown above, pale brown beneath, nerves strong but not prominent, black when dry; petiole very short, black. *Flowers* 4–8 in a small peduncled fascicle; pedicels very unequal, $\frac{1}{6}$ – $\frac{1}{2}$ in., rather stout. *Sepals* broadly ovate, 2 outer eglandular, 3 inner with 5 glands in all (*Maingay*). *Corolla-tube* much longer than the sepals, $\frac{1}{2}$ in. long, swollen in the middle, mouth much contracted, hairy within; lobes not much twisted in bud, but strongly overlapping. *Anthers* half-exserted, with a large subcordate gland at the base behind, villous opposite to it in front. *Disc* of broad rounded glabrous glands. *Ovary* hairy towards the tip; style slender, top slightly dilated. *Fruit* unknown.

4. V. lancifolia, Hook. f.; branches slender, bark pale, leaves narrowly lanceolate acuminate, nerves very numerous close and slender, corolla $\frac{1}{4}$ in. diam., lobes obliquely foliate obtuse, mouth broad villous.

MALACCA; Maingay (Kew Distrib. 1102).

A much branched woody shrub, apparently erect and not twining; branches tubercled with lenticels, twigs smooth. *Leaves* 2–3 by $\frac{1}{4}$ – $\frac{1}{2}$ in., narrowed at both ends, much so to the very slender points, pale brown, rather membranous; petiole slender, $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* 3–5 on a very short axillary peduncle; pedicels very slender, $\frac{1}{4}$ in., with minute bracts at the base. *Sepals* triangular, very small, ciliate, minutely

glandular at the base (*Maingay*). *Corolla-tube* funnel-shaped, $\frac{1}{12}$ in. long, limb $\frac{1}{4}$ in. diam., lobes inflexed at the tip in bud. *Anthers* half-exserted, with a narrow lanceolate gland on the back.

DOUBTFUL SPECIES.

V. ASSAMICA, *Griff. Notul.* iv. 77; this agrees fairly well with the character of *V. Heynei*, but I find no specimens of this species in Griffith's herbarium from Assam. His habitat is woods at Bishenath.

V. ? ANCEPS, *Wall. Cat.* 1622; *A. DC. Prodr.* viii. 400 (*without description*); from Tavoy. This is not a *Vallis*, but is in too imperfect a state for determination. *Kurz* (*Journ. As. Soc.* 1877, ii. 254) says that it seems hardly referable to *Apocynæ*.

22. **POTTSIA**, *Hook. et Arn.*

An evergreen climber. *Leaves* opposite, nerves distant. *Flowers* in lax terminal and axillary panicked cymes. *Calyx* small, 5-partite, glandular within. *Corolla* salver-shaped, tube cylindric; throat constricted, naked; lobes overlapping to the right. *Stamens* at the top of the tube, filaments hairy; anthers exserted, sagittate, conniving over and adhering to the stigma, cells with basal empty spurs. *Disc* deeply 5-fid, lobes lanceolate, much longer than the ovary. *Carpels* 2, distinct, villous, many-ovuled, included in the disc; style slender, thickened in the middle and top, stigma conical. *Follicles* elongate, slender, beaded. *Seeds* linear, elongate, coma deciduous, albumen copious; cotyledons linear, flat, radicle superior.—*DISTRIB.* Species 2 or 3, Eastern Asiatic and Malayan.

P. cantonensis, *Hook. & Arn. Bot. Beech. Voy.* 199, t. 43; *Benth. Fl. Hongk.* 222; *Kurz For. Fl.* ii. 190. *P. Hookeriana*, *Wight Ic.* t. 1306 bis. *P. ovata*, *A. DC. Prodr.* viii. 442. *Parsonsia ovata*, *Wall. Cat.* 1630. *Teysmannia laxiflora* and *Hookeriana*, *Miquel Fl. Ind. Bat.* ii. 455, 456, and *Parapottsia*, *Addenda*, 1080. *Vallis laxiflora*, *Blume Bijl.* 1043. *Euthodon paniculata*, *Griff. Notul.* iv. 84; *Ic. Pl. Asiat.* t. 458, fig. 2.

SILHET; *De Silva*. ASSAM; *Jenkins*. CACHAR; *Keenan*, TENASSERIM; *Kurz*. MALACCA; *Maingay*.—*DISTRIB.* Java, S. China.

Branches slender, smooth, cylindric; twigs puberulous. *Leaves* 3–4 by $1\frac{1}{2}$ –2 in., elliptic-ovate or ovate, acuminate, base rounded or subcordate, nerves 4–6 pairs; petiole slender, 1– $1\frac{1}{2}$ in. *Cymes* drooping, long-peduncled, very many-fld.; branches slender, ultimate with racemose flowers; pedicels slender, $\frac{1}{2}$ in.; bracts minute, ovate. *Sepals* broadly ovate, obtuse. *Corolla* $\frac{1}{4}$ – $\frac{1}{2}$ in., glabrous, rose-coloured, tube broad obtusely angled, lobes short ovate. *Follicles* 1 ft., flexuous, smooth, thinly coriaceous. *Seeds* 1 in., very slender, glabrous, coma as long.—Griffith in his generic character of *Euthodon* describes the throat of the corolla as without scales; in the specific he mentions 5 glands in the sinus of the lobes; these I do not find in his specimens.

23. **WRIGHTIA**, *Br.*

Shrubs or small trees, with often slender cord-like branches. *Leaves* opposite. *Flowers* red, white or yellow, in terminal or subaxillary sessile cymes. *Calyx* short, 5-partite, with glands or scales inside. *Corolla* salver-shaped, tube cylindric, usually short, throat with 1–2 series of usually fimbriate scales; lobes overlapping to the left. *Stamens* at the top of the tube, filaments short dilated; anthers exserted, sagittate, conniving around and adhering to the stigma, cells spurred at the base. *Disc* 0. *Carpels* 2, free or connate, many-ovuled; style filiform, stigma ovoid with usually a toothed basal ring. *Follicles* linear, erect, connate or distinct. *Seeds* linear, compressed, tip narrowed naked, base with a deciduous coma, albumen scanty or 0; cotyledons broad, convolute, radicle

short, superior.—DISTRIB. Species about 12, tropical African, Asiatic and Australian.

W. religiosa, *Benth. in Gen. Pl. ii. 713* (*Echites religiosa*, *Teijsm. & Binnend. Hort. Bogor. 126*); cultivated at Malacca (*Herb. Maingay*), is a native of Siam. It is a small tree with elliptic leaves $\frac{1}{2}$ – $1\frac{1}{2}$ in. long, capillary peduncles and pedicels, and small flowers without coronal scales.

* *Calyx-segments half the length of the short corolla-tube or shorter.*

1. *W. tinctoria*, *Br. in Mem. Wern. Soc. i. 73*; glabrous, leaves elliptic-ovate or -lanceolate or obovate-oblong obtusely acuminate or caudate, coronal scales fimbriate. *A. DC. Prodr. viii. 406*; *Wall. Cat. 1625*; *Wight Ic. t. 444*; *Dalz. & Gibs. Bomb. Fl. 145*; *Brand. For. Fl. 324*; *Grah. Cat. Bomb. Pl. 114*; *Kurz For. Fl. ii. 193*; *Bedd. Fl. Sylv. t. 241*; *Bot. Reg. t. 933*. *Nerium tinctorium*, *Roxb. Hort. Beng. 19*, and *Fl. Ind. ii. 4*.

CENTRAL INDIA and throughout the WESTERN PENINSULA. BIRMA (*Kurz*).—DISTRIB. TIMOR (*Hort. Mus. Paris*).

A small tree, twigs glabrous or puberulous. *Leaves* 3–5 by $1\frac{1}{2}$ in.; nerves 6–12 pairs, faint till the leaves are old, then strong beneath; base acute or rounded; petiole very short. *Cymes* sometimes 5 in. diam., with slender spreading dichotomous branches; bracts minute; flowers white, $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. *Sepals* ovate, obtuse. *Corolla-lobes* linear-oblong, scales linear scattered. *Stamens* large. *Follicles* 6–18 in. or more, cylindric, slender, smooth, tips adhering. *Seeds* $\frac{2}{3}$ in., glabrous except for the coma, linear.—Foliage very variable. I have seen no Birmese specimen. The Timor plant is undoubtedly the same.

VAR. *Rothii*; branches and leaves beneath puberulous. *W. Rothii*, *G. Don Gen. Syst. iv. 86*; *A. DC. Prodr. viii. 406*; *Wight Ic. t. 1319*. *W. tinctoria*, *Roth Nov. Pl. Sp. 121*.—Deccan Peninsula.

2. *W. angustifolia*, *Thwaites Enum. 193*; glabrous, leaves lanceolate obtuse, coronal scales ligulate tips lacerate. *Beddome For. Fl. Anal. Gen. 160*.

CEYLON; Dambool and Trincomalee, *Gardner*.

A small tree; branches slender. *Leaves* $1\frac{1}{2}$ –4 by $\frac{1}{2}$ – $\frac{3}{4}$ in., almost black when dry, nerves 6–12 pairs; petiole very short. *Cymes* and flowers as in *W. tinctoria*, but the coronal scales very different, as long as the anthers, and lacinate at the tip only. *Fruit* unknown.

3. *W. tomentosa*, *Roem. & Schultes Syst. iv. 414*; densely tomentose, leaves elliptic caudate-acuminate, base acute, cymes many-flowered, corolla-lobes linear-oblong, coronal scales short obtuse entire or lobulate. *A. DC. Prodr. viii. 404*; *Wall. Cat. 1628*; *Wight Ic. t. 443*, and *III. ii. t. 154*; *Dalz. & Gibs. Bomb. Fl. 145*; *Brand. For. Fl. 323*; *Grah. Cat. Bomb. Pl. 114*; *Beddome For. Fl. Anal. Gen. 159*. *W. mollissima*, *Wall. Cat. 1627*; *Pl. Rar. ii. t. 126*; *Kurz For. Fl. ii. 192*. *W. Wallichii*, *A. DC. l.c. 405*; *Dalz. & Gibs. l.c.*; *Kurz l.c.*; *Wight Ic. t. 1296*; *Beddome l.c. 160*. *W. Coraia*, *Wall. Cat. under 1615*; *A. DC. Prodr. viii. 407*. *W. Hamiltoniana*, *Wall. Cat. 4461*. *Hunteria eugenifolia*, *Wall. Cat. 1615*. *Nerium tomentosum*, *Roxb. Fl. Ind. ii. 6*. *N. Coraia*, *Hb. Ham. N.?* tinctorium, *Hb. Ham.*—*Rheede Hort. Mal. ix. t. 3, 4*.

TROPICAL INDIA; from the Indus eastwards and southwards to Ceylon, Birma and Penang, ascending to 2000 ft. in the Himalaya, and to 4000 in the Nilgherries.

A small usually crooked deciduous-leaved tree, bark corky. *Leaves* 3–6 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., often tomentose on both surfaces, dark brown when dry, nerves 10–14 pairs; petiole $\frac{1}{4}$ in. *Cymes* peduncled, corymbose, many-flid.; flowers 1 in. diam., yellowish with orange coronal scales. *Sepals* half as long as the corolla-tube, rounded. *Corolla-lobes* linear- or obovate-oblong, coronal scales very variable. *Anthers* white. *Follicles* 6–12 by $\frac{1}{2}$ in., connate into a cylinder, with a deep groove on each side till maturity, rough with tubercles. *Seeds* slender, $\frac{1}{2}$ – $\frac{2}{3}$ in., coma pure white.—There is

some obscurity about the colour of the flower of this species, possibly indicating different species, or a change during life. In Thwaites' figure of the Ceylon plant they are in one pale yellowish-red, in another of the same cyme a deep blue purple. In a drawing of Royle's they are nearly pure white, in another they are all pale rosy; in Wight's Illustrations (of *W. mollissima*) they are a dingy pale reddish. Brandis, who remarks on this subject and on the various accounts of the scent of the flowers, suggests that they may change colour after expansion.

4. *W. coccinea*, Sims, *Bot. Mag. t.* 2696; glabrous or pubescent, leaves elliptic or elliptic-lanceolate obtusely caudate-acuminate base acute, cymes few-fl'd., corolla-lobes rounded, coronal scales large broad rounded undivided. *A. DC. Prodr.* viii. 407; *Wall. Cat.* 1626; *Grah. Cat. Bomb. Pl.* 114; *Kurz For. Fl.* 193; *Lodd. Bot. Cab. t.* 894; *Wight Ic. t.* 442. *Nerium coccineum*, Roxb. *Fl. Ind.* ii. 2.

SILHET; Roxburgh, *De Silva*. CHITTAGONG HILLS (*Kurz*).—DISTRIB. Philippine Islds.

A timber tree; bark of shoots white, shining. *Leaves* 3-5 by 2-2 $\frac{3}{4}$ in.; membranous, dark brown when dry, nerves 6-12 pairs; petiole very short. *Cymes* 3-4 fl'd.; peduncle and pedicels very short; bracts large; flowers 1 in. diam., dark red. *Sepals* rounded, $\frac{1}{4}$ in. diam., almost as long as the corolla-tube. *Corolla* thick, almost fleshy; scales crimson, obscurely crenate. *Anthers* very hairy at the back. *Follicles* "linear, as thick as the little finger, glabrous, corky-lenticellate" (*Kurz*).

5. *W. lævis*, Hook. f.; glabrous, leaves elliptic or oblong caudate-acuminate shining above; cymes few-fl'd., corolla-lobes oblong, coronal scales fimbriate from the base.

MALACCA; Mt. Ophir, Maingay (*Kew Distrib.* 1065).

Branches slender, bark pale. *Leaves* 3-5 by 1-2 in., thin in texture; nerves 4-5 pairs, arched; petiole very short. *Cymes* puberulous, peduncled, pedicels rather stout; flowers about $\frac{1}{2}$ in. diam. *Sepals* rounded, ciliolate. *Corolla* rather fleshy. *Follicles* 7-8 in., very slender. *Seeds* very long, 1 $\frac{1}{2}$ in., slender, glabrous.

** *Calyx-segments much shorter than the corolla-tube*

6. *W. zeylanica*, Br. in *Mem. Wern. Soc.* i. 73; glabrous, leaves elliptic or elliptic-lanceolate ovate or obovate acuminate, cymes axillary and terminal, coronal scales lacinate. *A. DC. Prodr.* viii. 407; *Thwaites Enum.* 193; *Gaertn. Carp.* ii. 172, t. 117; *Wall. Cat.* 4460; *Bedd. For. Fl. Anal. Gen.* 160. *W. antidysenterica*, Br. l. c.; *A. DC. l. c.* *Nerium zeyanicum* and *antidysentericum*, Linn. *N. divaricatum*, Herb. *Madr.*—*Burm. Fl. Zeyl.* 23, t. 12, fig. 2.

CEYLON; "common in the south of the island," Thwaites.

A small tree, branches dichotomous. *Leaves* 3-5 by 1 $\frac{1}{2}$ -2 in.; nerves 6-10 pairs; petiole very short. *Cymes* few-fl'd., shortly peduncled, glabrous. *Sepals* ovate, obtuse. *Corolla-tube* very slender, $\frac{3}{4}$ -1 in., limb 1-1 $\frac{1}{2}$ in. diam., white, puberulous, lobes obovate; coronal scales as long as the stamens. *Follicles* 7 in., pericarp thin. *Seeds* $\frac{3}{4}$ in. long, linear oblong.

24. *NERIUM*, Linn.

Erect glabrous shrubs. *Leaves* 3-4-nately whorled, rarely opposite, narrow, coriaceous; nerves slender, very close. *Flowers* large, in racemose cymes. *Calyx* 5-partite, glandular within, segments narrow. *Corolla* funnel-shaped, tube cylindric, throat campanulate with 5 broad toothed scales; lobes overlapping to the right. *Stamens* at the top of the tube, included, filaments short; anthers sagittate, conniving around and adhering to the stigma, tips filiform, cells with long spurs furnished with twisted hairs, appendages rigid. *Disc* 0. *Carpels* 2, distinct, many-ovuled; style filiform or thickened above the middle, stigma with a basal reflected lobed membrane surmounted by 5 tubercles, tip

subglobose. *Follicles* elongate, cylindric, straight, hard, appressed. *Seeds* oblong, villous, coma terminal caducous, albumen fleshy; cotyledons flat, thickish, radicle superior.—DISTRIB. Species 2 or 3, Mediterranean region, N. Asian and Japanese.

N. odorum, *Soland. in Hort. Kew.* ed. i. v. i. 297; flowers scented, appendages of the corolla cleft into 4-7 linear segments, spurs of anthers linear twice as long as the cells. *Boiss. Fl. Orient.* iv. 48; *A. DC. Prodr.* viii. 420; *Roxb. Fl. Ind.* ii. 2; *Brandis For. Fl.* 328; *Grah. Cat. Bomb. Pl.* 114; *Targ. Tozz. Rap.* 28, 29, t. 3; *Wall. Cat.* 1624; *Bot. Mag.* 1799, 2032; *Bot. Reg.* t. 74 (*fl. double*). *N. odoratum*, *Lamk. Encycl.* iii. 456. *N. latifolium* and *N. indicum*, *Mill l. c. ed.* 8.—*Rheede Hort. Mal.* ix. t. 1, 2.

WESTERN HIMALAYA; from Nipal westwards, ascending to 6500 ft. in Murree.—CENTRAL INDIA. SCIND.—DISTRIB. Afghanistan, Japan.

A large erect stout shrub. *Leaves* 4-6 in., linear-lanceolate, thickly coriaceous, acuminate, midrib very stout; nerves numerous, slender, horizontal; petiole very short. *Flowers* 1½ in. diam., sweet-scented, rose white or yellow. *Sepals* subulate-lanceolate. *Follicles* 6-9 in.—Very similar to and perhaps only a variety of the common *N. Oleander* of the Mediterranean region, which extends eastwards to Persia.

25. STROPHANTHUS, DC.

Small trees or shrubs, often climbing. *Leaves* opposite. *Flowers* usually large, in terminal cymes. *Calyx* 5-partite, glandular within. *Corolla* funnel-shaped, tube short, throat large, campanulate, with 10 free or connate scales; lobes overlapping to the right, produced into long or short tails, rarely ovate acute. *Stamens* at the top of the tube, included, filaments short; anthers sagittate, tips filiform, conniving around and adhering to the stigma, cells spurred at the base. *Disc* 0. *Carpels* 2, distinct, many-ovuled, glabrous; style filiform, rugose, with cellular papillæ, tip dilated, stigma columnar or conical, simple or 2-fid. *Follicles* oblong or elongate, hard, spreading (parallel in *S. Jackianus*). *Seeds* compressed, fusiform, narrowed into a feathery tail, or with a sessile coma, base with a deciduous tuft of hairs.—DISTRIB. Species about 18, tropical Asiatic and African, and 1 S. African.

* *Lobes of the corolla exceeding the throat in length.*

1. **S. dichotomus**, DC. in *Bull. Soc. Phil.* iii. 123; glabrous, leaves elliptic-oblong or obovate obtuse acute or apiculate, cymes few-fl., tails of corolla-lobes 5-7 in. *A. DC. Prodr.* viii. 417; *Miquel Fl. Ind. Bat.* ii. 441. *S. scandens*, *Roem. & Sch. Syst.* iv. 412. *L. longicaudatus* and *Griffithii*, *Wright Ic.* t. 1299, 1300; *Kurz For. Fl.* ii. 191. *S. pentaphyllus*, *Griff. Notul.* iv. 78. *S. caudatus*, *Kurz in Journ. As. Soc.* 1877, ii. 257. *S. Horsfieldianus*, *Miquel Fl. Ind. Bat.* ii. 442. *Echites caudata*, *Burm. Fl. Ind.* 68, t. 26. *Nerium caudatum*, *Lamk. Dict.* *N. scandens*, *Lour. Fl. Coch.* i. 143 (*ex A. DC.*).

TENASSERIM (*Kurz*). MALACCA; *Griffith, Maingay*. SINGAPORE and PENANG (drawings).—DISTRIB. JAVA.

An erect shrub. *Branches* stout; bark dark, dotted with lenticels. *Leaves* 3-5½ by 2-3 in., rather coriaceous, glossy above; nerves 6-8 pairs, spreading, arching and joining far within the margin; petiole ½ in. *Cymes* much shorter than the leaves, dichotomous. *Sepals* subulate from an ovate base. *Corolla-tube* and *throat* ¾-1 in. long, whitish, tails purple; scales cleft to the base. *Anther-tips* very long and slender. *Follicles* not seen (as taken from a drawing, very large, divergent, 8 by 2 in., broadest at the very base where united, tapering to a broad rounded point, terete smooth green).

2. **S. Wallichii**, *A. DC. Prodr.* viii. 418; glabrous, leaves elliptic-oblong or obovate acuminate cuspidate or obtuse, cymes many-fl., tails of corolla-

lobes 2-3 in. *S. dichotomus*, *Wall. Cat.* 1641; *Wight Ic.* t. 599; *Lodd. Bot. Cab.* t. 759; *Grah. in Maund. Bot.* iii. t. 150. *S. dichotomus*, γ *coromandelianus*, *Ker in Bot. Reg.* t. 469 *in obs.* ? *S. caudatus*, *Kurz For. Fl.* ii. 193. *Nerium caudatum*, *Roxb. Fl. Ind.* ii. 9; *Burm. Fl. Ind.* t. 26.

KHASIA MRS., *De Silva*. CHITTAGONG; at Seetakoond, *J. D. H. & T. T. (cult.?)*. CERCARS; on the mountainous parts of the coast, *Roxburgh*. ? TENASSERIM; *Kurz*.

A climber. bark lenticellate. *Leaves* waved, shining, 2-3 by $1\frac{1}{2}$ -2 in., rather thin, nerves 5-6 pairs; petiole $\frac{1}{2}$ in. *Cymes* sometimes 6 in. diam., spreading, loosely dichotomously branched from the base; branches slender; bracts $\frac{1}{2}$ - $\frac{1}{3}$ in., narrowly lanceolate, spreading and recurved. *Sepals* subulate-lanceolate. *Corolla-tube* $\frac{1}{2}$ in., swollen at the base, pink in *Roxburgh's* drawing and *Kurz's* description, yellow with faint reddish stripes in the figures of *Maund* and *Loddiges*. *Anther-tips* very long and slender.

** *Lobes of the corolla not or hardly exceeding the throat.*

3. ***S. Wightianus***, *Wall. Cat.* 4459; quite glabrous, leaves elliptic obtuse, cymes many-fld., tails of corolla-lobes $\frac{1}{4}$ - $\frac{1}{2}$ in. *Wight Ic.* t. 1301. *Cameraria zeylanica*, ?? *Hb. Wight (ex Wall. l. c.)*.

MALABAR and TRAVANCORE; *Rottler*; near Quilon, *Wight*.

A climbing shrub, bark closely warted with lenticels. *Leaves* 2-3 by $1-1\frac{1}{2}$ in., thinly coriaceous, nerves 6-7 pairs; petiole very short. *Cymes* repeatedly dichotomously branched from the base, 2-3 in. high and broad, corymbiform; bracts and sepals ovate, acute. *Corolla-tube* $\frac{1}{2}$ - $\frac{1}{2}$ in. long; inflated at the base; lobes rather longer, gradually narrowing into the linear obtuse tail; scales very prominent. *Anther-tips* very long and slender. *Follicles* (from *Wight's* drawing) 6 by 1 in., of the shape of those of *S. dichotoma*, warted all over. *Seeds* with a long beak ending in a filiform longitudinally plumose bristle.

4. ***S. brevicaudatus***, *Wight Ic.* t. 1302; quite glabrous, leaves elliptic or oblong finely acuminate margins crisped, corolla-lobes broadly ovate acute. *Kurz For. Fl.* ii. 191. *Cercocoma singaporia*, *Wall. Cat.* 1623. *A. DC. Prodr.* viii. 432.

MALACCA; *Griffith, Maingay*. SINGAPORE; *Lobb*. MERGUI (? *Kurz*).—DISTRIB. Borneo.

A straggling shrub, branches minutely warted. *Leaves* 2-4 by $1-1\frac{1}{2}$ in., dark brown when dry, opaque on both surfaces, nerves 6-8 pairs; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Cymes* dichotomously branched from the base; branches stout, short; bracts (often numerous and empty) and sepals broadly ovate acute. *Corolla* almost salver-shaped; tube $\frac{1}{2}$ in. long, limb about as broad. *Filaments* hairy; anthers with very slender points about equalling the cells. *Style* hairy. *Follicles* 8 by $\frac{2}{3}$ in., base broad, middle slightly turgid, then tapering to a long hard point, terete, smooth. *Seeds* not ripe, shortly pilose at the lower end (*Maingay*).—*Kurz* states this species is reputed to grow at Mergui.

5. ***S. Jackianus***, *Wall. Cat.* 1643; leaves linear-oblong obtusely acuminate scaberulously pubescent beneath, cymes axillary very few-fld., corolla-lobes $\frac{1}{2}$ in. linear obtuse about equalling the broad subcylindric throat, seeds very slender. *A. DC. Prodr.* viii. 419.

PENANG; *Jack*.

Branches slender, with dark-brown bark, twigs scaberulous. *Leaves* 3-4 by $1-1\frac{1}{2}$ in., minutely scaberulous above, nerves numerous; petiole very short. *Cymes* very shortly peduncled, 2-3-fld.; pedicels short; flowers nodding. *Sepals* ovate-lanceolate, acuminate. *Corolla* puberulous, tube hardly any, throat more cylindric than campanulate. *Follicles* a foot long, very slender, parallel, cylindric, 2-partite when ripe, the segments opening flat, pericarp thinly coriaceous, polished within. *Seeds* $\frac{1}{2}$ in. long, narrowly fusiform, glabrous, coma white, three times as long.—I have seen

only Wallich's very mutilated flowers, shrivelled leaves, dehiscent pods and seeds, which latter entirely resemble those of a *Wrightia*.

26. *APOCYNUM*, Linn.

Erect herbs or undershrubs. *Leaves* opposite. *Cymes* terminal and lateral; flowers small. *Calyx* 5-fid, eglandular within; lobes acute. *Corolla* campanulate, 5-fid, with 5 processes between the stamens; lobes overlapping to the right. *Stamens* near the base of the corolla, included; anthers sagittate, acute, conniving and adnate to the stigma, cells with basal spurs. *Disc* fleshy, 5-lobed. *Carpels* 2, distinct, many-ovuled, half sunk in the disc, to which they are adnate by the back; style short or 0, stigma subglobose, tip 2-lobed. *Follicles* slender. *Seeds* small, oblong, with a terminal caducous coma, albumen scanty, cotyledons flat.—**DISTRIB.** Species 5, of the north temp. zone.

A. venetum, Linn.; *A. DC. Prodr.* viii. 400; *Boiss. Fl. Orient.* iv. 48.

WESTERN TIBET; Shayuk valley, alt. 8000 ft. (without flower or fruit), *Thomson*. —**DISTRIB.** N. Asia, from the Caucasus to China, Persia, Asia Minor, Greece, Dalmatia.

Stem and branches slender, smooth, cylindric. *Leaves* 2-3 by $\frac{1}{2}$ – $\frac{3}{4}$ in., linear-oblong or oblong-lanceolate, apiculate, entire or crenulate; nerves very slender; petiole very short. *Cymes* small, erect, subcorymbose; bracts subulate. *Flowers* erect, $\frac{1}{2}$ in. diam., purplish, puberulous. *Carpels* with pubescent tips. *Follicles* 4 in. —Though I have seen neither flower nor fruit, I cannot doubt this being the common *A. venetum*.

27. *URCEOLA*, Roxb.

Climbing shrubs. *Leaves* opposite, nerves distant. *Flowers* small, in dense corymbosely paniced cymes. *Calyx* 5-partite, eglandular within. *Corolla* urceolate or subglobose, throat naked; lobes short, valvate. *Stamens* at the base of the corolla; anthers sagittate, conniving over and adhering to the stigma, cells spurred at the base. *Disc* cupular or annular, truncate or 5-lobed. *Carpels* 2, distinct, longer than the disc, truncate, hirsute, many-ovuled; style short, top obconic; stigma subannulate, conoid. *Follicles* spreading, thick and acuminate, or elongate and contracted or not between the seeds. *Seeds* oblong or linear, compressed, villous, tip contracted bearded with long persistent brown hairs, and crowned with a long white deciduous coma, albumen scanty; cotyledons thin, radicle short.—**DISTRIB.** Species 7 or 8, Malayan.

SECT. I. *Urceola* proper. *Follicles* straight, even, horizontally divergent. *Calyx* longer than the corolla, 2 interior segments much smaller than the others.

1. ***U. elastica***, Roxb. in *As. Res.* v. 167, with figure (excl. fruit); branches robust, leaves beneath and inflorescence finely rusty pubescent, leaves elliptic abruptly acuminate thickly coriaceous, nerves 10–12 pairs very strong, cymes very dense-fld., bracts subulate, calyx-segments lanceolate recurved, follicles cylindric. *A. DC. Prodr.* 358; *Wight Ic.* t. 473 (excl. figures and descriptions of fruit). *Tabernæmontana elastica*, Spreng. *Syst. Veg.* i. 639. ? *Vabea gummi-fera*, Poir. *Dict. Suppl.* v. 409.

MALACCA and PENANG; Roxburgh, Wallich, Griffith, Maingay (Kew Distrib. 1058, 1091).—**DISTRIB.** Sumatra.

A stout climber. *Leaves* 4–6 by 2–3 in., red-brown when dry, softly pubescent beneath, glabrous above with impressed nearly horizontal nerves; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Cymes* numerous, paniced at the ends of the branches, long-peduncled; flowers in compound corymbs, very densely packed. *Calyx* $\frac{1}{2}$ in. long, exceeding the ovoid pubescent corolla, which is glabrous within except a tuft of reflexed hairs between

the stamens. *Anthers* acuminate. *Style* obconoid, with a small conoid stigma. *Follicles* 6 by $\frac{1}{2}$ in., quite straight, horizontal, cylindric, acuminate. *Seeds* linear, $\frac{3}{4}$ in., softly villous, coma copious, four times longer.—The fruit figured and described by Roxburgh, A. DC., and Wight as that of *U. elastica* is *Orchipeda fœtida*, Blume, a plant cultivated in India. Wallich's *U. elastica* (Cat. 1617), from Penang, is an Asclepiadaceous plant without flower or fruit.

2. ***U. Maingayi***, Hook. f.; quite glabrous except the inflorescence, leaves elliptic abruptly acuminate thickly coriaceous, pale beneath, nerves 6–10 pairs strong, cymes finely pubescent, calyx-segments oblong obtuse recurved, follicles cylindric.

SINGAPORE, *Maingay* (Kew Distrib. 1083).

Habit and brown colour of *U. elastica*, but the leaves are quite glabrous and apparently glaucous beneath, with fewer more arched nerves not impressed above. The cymes are smaller, fewer and laxer-flowered; the calyx-segments much broader and very obtuse; the anthers and style are the same in both, but the follicles are much more slender in *A. Maingayi*.

3. ***U. lucida***, Benth. in Gen. Pl. ii. 716; quite glabrous except the inflorescence, leaves elliptic abruptly acuminate shining on both surfaces, nerves 8–12 pairs, cymes lax-flid. finely pubescent, bracts subulate, calyx-segments broadly oblong, follicles short gradually acuminate from a broad base. *Chavannesia lucida*, A. DC. Prodr. viii. 444. Echites? *lucida*, Wall. Cat. 1670.

PENANG; Wallich. ? MALACCA; Griffith. RANGOON; McLelland.

Branches slender; bark nearly black, smooth. *Leaves* 3–5 in., rigidly coriaceous, red-brown when dry; nerves arched, strong beneath; petiole slender, $\frac{1}{2}$ –1 in. *Cymes* long-peduncled; peduncle and branches very slender; bracts subulate; flowers very minute, $\frac{1}{10}$ in. long. *Corolla* as in the preceding species. *Anthers* truncate. *Ovary* hairy at the tip only; style elongate with an obconoid top surmounted by subulate stigma. *Follicles* 4 in. long, $\frac{1}{4}$ in. diam. above the narrowed base, rigid, like poignards. *Seeds* $\frac{1}{3}$ – $\frac{1}{2}$ in., linear-oblong, silky, coma 4–5 times longer.—Griffith's plant is in very young flower and may be another species; it has larger leaves with fewer and very slender nerves. The Rangoon specimens have caudate-acuminate leaves, larger bracts and hispidulous flowers. Kurz (in Journ. As. Soc. 1877, ii. 255) refers this to *U. esculenta*.

4. ***U. malaccensis***, Hook. f.; quite glabrous except the inflorescence, leaves elliptic or ovate-oblong obtusely caudate-acuminate coriaceous, nerves 4–6 pairs slender, cymes shortly peduncled dense-flid., bracts puberulous oblong obtuse, calyx-segments linear-oblong obtuse recurved, "follicles elongate filiform."

MALACCA; *Maingay* (Kew Distrib. 1098, ? 1082).

Branches smooth; bark dark brown. *Leaves* 2–4 by 1–1 $\frac{1}{2}$ in., smooth on both surfaces; nerves arched, nervules obscure; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Cymes* chiefly axillary; peduncle glabrous, shorter or longer than the leaves; bracts $\frac{1}{2}$ – $\frac{1}{4}$ in., recurved, much larger than in the foregoing species; flowers hoary rather than pubescent. *Corolla* as in the preceding species. *Anthers* obtuse. *Ovaries* hirsute; style obconic, surmounted with an obpyriform stigma. *Follicles* described by Maingay as "elongate filiform divaricate. *Seeds* oval, compressed, pilose at the apex."

5. ***U. esculenta***, Benth. in Gen. Plant. ii. 715; leaves elliptic caudate-acuminate coriaceous, quite glabrous, nerves 9–11 pairs strong, follicles lanceolate from a contracted peduncle-like base. Kurz For. Fl. ii. 184. *Chavannesia esculenta*, A. DC. Prodr. viii. 444; Strettell, note on *Caoutchouc* (Rangoon, 1874, with figure). Echites? *esculenta*, Wall. Cat. 1671. *E. lucida*, ? Don Gen. Syst. iv. 75.

MARTABAN and TAVOY; Wallich. Common all over PEGU (Kurz).

*Branches and leaves quite glabrous. Leaves 4-6 by 2-2½ in., acute at both ends or obtuse at the base, shining above; nerves red, slightly arched. Flowers "minute, white; corymbs apparently short; long-peduncled, glabrous in the axils of the upper leaves, or terminal" (Kurz). Follicles 5 by ½ in., quite straight, pointed, narrowed into a stout stalk ½ in. long, thickly coriaceous when dry and hard. Seeds elliptic-lanceolate, villous, ½ in. long; coma white, four times as long.—The leaves a good deal resemble those of *U. brachysepala*, but are longer, and the nerves are more numerous. Fruit eatable.*

SECT. II. **Dittormos.** *Follicles flexuous, distantly torulose. Calyx shorter than the corolla; segments erect, subequal.*

6. ***U. torulosa*, Hook. f.**; glabrous except the inflorescence, leaves oblong or oblong-lanceolate acuminate, nerves 6-10 pairs slender, cymes pubescent, follicles very slender swollen over the remote seeds.

MALACCA; *Maingay* (Kew Distrib. 1080, 1086).

*Branches slender, smooth (in flower). Leaves 4-7 by 1½-2 in., red-brown when dry, thinly coriaceous. Cymes long-peduncled; bracts lanceolate; flowers not quite mature, ⅓ in. long. Calyx-segments oblong-lanceolate. Corolla as in the preceding section. Anthers subacute. Ovary hairy; style obconic, with a conoid stigma of the same length. Follicles 2-2½ ft. long, thinly coriaceous, smooth, terete, swellings ¾ in. long, often 1 in. apart, long ellipsoid. Seeds elliptic-lanceolate, villous, top bearded with persistent hairs; coma twice as long.—The follicles resemble those of *Parameria glandulifera*.*

7. ***U. brachysepala*, Hook. f.**; glabrous except the puberulous flowers, leaves elliptic obtusely acuminate, nerves 6-8 pairs strong, cymes long-peduncled, peduncles and branches compressed, bracts subulate, sepals much shorter than the subglobose shortly 5-lobed corolla.

MALACCA; *Maingay* (Kew Distrib. 1079, 1080).

Branches rather stout; bark red-brown. Leaves 4-5 by 1½-2½ in., firmly coriaceous, red-brown when dry, nervules distinct on both surfaces. Peduncles 6-8 in., glabrous, red when dry, branches jointed at the nodes; branches and pedicels slender, glabrous; flowers very small, ⅙-⅓ in. long. Calyx-segments erect, ovate. Corolla pubescent, inflated; lobes obtuse, glabrous within, except a tuft of hairs between the stamens. Anthers subacute. Ovary twice as long as the disc, cylindric, hirsute; style cupular, stigma large obpyriform. Follicles not seen.

DOUBTFUL SPECIES.

URCEOLA?; branches and leaves glabrous; bark black when dry; leaves 2-2½ by ¾-1½ in., elliptic- or ovate-lanceolate obtusely acuminate, narrowed into the petiole, firmly coriaceous, pale brown shining above, nerves 3-4 pairs very slender ascending, follicles horizontal 6-8 by ¼ in. slightly curved cylindric from the base, narrowed at the apex, hard; seeds ½ in., very slender narrowed into a filiform process longer than the body, on which the fine pale brown hairs of the coma are placed. Probably an undescribed genus.—MALACCA; *Maingay* (Kew Distrib. 1069).

28. **PARAMERIA**, Benth.

Evergreen glabrous climbing shrubs. *Leaves opposite, rarely 3-nately whorled. Flowers small, in broad lax terminal panicles. Calyx small, 5-fid or -partite, glandular within. Corolla sub-campanulate, throat broad naked, lobes obliquely obovate or obcuneate, wrinkled, overlapping to the left. Stamens at the base of the corolla, filaments short; anthers sagittate, acute or apiculate, conniving over and adhering to the stigma, cells spurred at the base. Disc of 5 connate scales. Carpels 2, distinct, longer than the disc, many-ovuled; style short, top obconoid, stigma conoid. Follicles long, slender, distantly torulose.*

Seeds linear or oblong, compressed, hairy, crowned with a deciduous pencil and persistent ring of hairs, albumen scanty; cotyledons thin, radicle superior, short.—**DISTRIB.** Species 2–3, Indian and Malayan.

1. ***P. glandulifera*, Benth.** in *Gen. Plant.* ii. 715; glabrous except the cymes, leaves coriaceous elliptic oblong or obovate obtuse acute or acuminate shining above, nerves 5–6 pairs arching very oblique, cymes in terminal and axillary brachiate panicles. *Kurz For. Fl.* ii. 189. *Ecdysanthera glandulifera*, A. DC. *Prodr.* viii. 443; *Wight Ic.* t. 1307 (*E. Griffithii*, in text). *E. barbata*, Mig. *Fl. Ind. Bat.* ii. 451. *Echites glandulifera* and *monilifera*, Wall. *Cat.* 1660, 1659; *G. Don Gen. Syst.* iv. 75. *Parsonsia barbata*, Bl. *Bijd.* 1042.

MARTABAN; Wallich, *Parish*; on the borders of tidal forests, *Kurz*. MALACCA; Griffith, *Maingay* (Kew Distrib. 1077, 1093). SINGAPORE; Lob. ANDAMAN ISLDS.; Kurz.—**DISTRIB.** Java, Borneo, Philippine Islds., Cambodia.

Branches stout or slender. *Leaves* 3–5 by $1\frac{1}{2}$ –2 in., sometimes 3-nately whorled, smooth, nerves very slender; petiole very short, $\frac{1}{8}$ – $\frac{1}{4}$ in. Terminal panicle of *cymus* often 5–6 in. broad, pyramidal, axillary ones short; branches spreading, 3-chotomous, puberulous, pedicels short, or sometimes long and slender when the flowers are collected into globose umbellules; bracts minute; flowers $\frac{1}{4}$ in. diam. *Calyx-segments* small, ovate, one-quarter the length of the broad obtusely angled corolla-tube. *Corolla-lobes* about equalling the tube. *Anthers* acute and apiculate. *Ovary* somewhat hairy; style obconic. *Follicles* 6–12 in., very slender, flexuous, glabrous, pericarp thinly coriaceous; swellings over the seeds sometimes 1 in. apart, elliptic-lanceolate. *Seeds* $\frac{1}{4}$ in. long, oblong-lanceolate, contracted at the tip, pubescent, coma three times as long, white. The follicles resemble those of *Urceola*.—Wight is mistaken in describing and figuring the overlapping of the corolla-lobes as to the right. Blume describes the axils of the nerves of the leaf and corolla-throat as bearded in *Parsonsia barbata*, characters which I do not observe in the Indian specimens.

2. ***P. polyneura*, Hook. f.**; glabrous except the cymes, leaves membranous elliptic-oblong or elliptic obtusely acuminate, nerves 8–10 pairs arching very oblique, cymes in terminal brachiate panicles.

TENASSERIM; Lob. MALACCA; Griffith, *Maingay* (Kew Distrib. 1078).

Habit of *P. glandulifera*, but leaves very membranous with numerous nerves, cymes always terminal and anthers not apiculate. *Follicles* not seen.

29. **BEAUMONTIA**, Wall.

Evergreen climbing trees or shrubs. *Leaves* opposite, membranous; nerves distant, arched. *Flowers* very large, white, in terminal cymes; bracts leafy. *Calyx* 5-partite, glandular or not within. *Corolla-tube* very short, throat large, bell- or funnel-shaped, naked; lobes broad, overlapping to the right. *Stamens* at the top of the tube, included in the throat; filaments thickened at the top; anthers horny, sagittate, conniving over and adhering to the stigma; cells spurred at the base. *Disc* deeply 5-lobed. *Ovary* 2-celled, cells many-ovuled; style filiform, top clavate, stigma fusiform. *Fruit* long, thick, woody, at length dividing into 2 horizontally spreading follicles. *Seeds* compressed, ovoid or oblong, top contracted, crowned with a pencil of hairs; cotyledons thin or thick, radicle short superior.—**DISTRIB.** Species 4, Indian and Malayan.

1. ***B. grandiflora*, Wall.** *Tent. Fl. Nep.* 15, t. 7; *Cat.* 1629; leaves glabrous or tomentose beneath, calyx-lobes 1–2 in. long, corolla between tubular and bell-shaped much shorter than the tube. A. DC. *Prodr.* viii. 404; *Kurz For. Fl.* ii. 179; *Bot. Reg.* t. 911; *Bot. Mag.* t. 3213. ? *B. longiflora*, Lodd. *Bot. Cab.* 183. *Echites grandiflora*, Roxb. *Hort. Beng.* 20, and *Fl. Ind.* ii. 14 (excl. fruit).

EASTERN HIMALAYA; from Nipal (*Wallich*) to Sikkim, ascending to 4000 ft. SILHET and CHITTAGONG.

Stem woody, very stout and climbing high. *Shoots* rusty-pubescent. *Leaves* 7-12 by 3-7 in., glabrous above, rarely tomentose beneath; obovate-oblong, abruptly acuminate; nerves 7-16 pairs, arching; petiole $\frac{1}{2}$ -1 in. *Cymes* few- or many-fl'd., pedicels and calyx tomentose. *Calyx-lobes* very variable, from oblong-lanceolate to obovate or oblanceolate, acuminate. *Corolla* 3-5 in. long, glabrous or pubescent; lobes 1 in. rounded, except the tip. *Anthers* $\frac{3}{4}$ in. long. *Ripe carpels* very variable in length and breadth, turgid, densely fleshy, green, with a thick hard spongy yellowish polished endocarp. *Seeds* $\frac{3}{4}$ in. long, coma twice as long.

2. **B. Jerdoniana**, *Wight Ic. t.* 1314, 5; leaves nearly glabrous beneath, calyx-lobes $\frac{3}{4}$ -1 in. long, corolla between broadly campanulate and funnel-shaped, lobes acuminate, follicles 10 by $1\frac{1}{2}$ in. cylindric.

DECCAN PENINSULA; on the Western Ghats from the Concan southwards, *Wight*, &c. This so closely resembles *B. grandiflora* in all respects but the corolla, the rather smaller size of all its parts, and the form of the follicles, that I suspect it will have to be ranked as a variety.

3. **B. khasiana**, *Hook. f.*; leaves obovate or elliptic acuminate tomentose beneath, calyx-lobes $\frac{1}{2}$ in., corolla broadly campanulate, lobes equalling the tube and throat rounded not acuminate.

KHASIA Mts.; Nungklow, *Lobb*.

The general habit of this is that of *B. grandiflora*, but the old leaves are broader, 8-10 by 4-4 $\frac{1}{2}$ in., more elliptic, the peduncle and pedicels are much longer, and the flowers very short; the corolla-tube and throat are together not 2 in. long, whilst the limb is 4 in. in diameter, with quite rounded lobes. It is very near the Javanese *B. multiflora*, *Teijsm & Binn.*, which is intermediate between this and *B. Jerdoniana* all may be varieties of one, but without the fruit this cannot be determined.

30. CHONEMORPHA, *G. Don*.

Climbing stout shrubs. *Leaves* opposite, broad; nerves distant, arching. *Flowers* large, white, in lax terminal and pseudo-axillary cymes. *Calyx* 5-cleft or -partite, with a ring of glands within. *Corolla* salver-shaped, tube very short; throat long, tubular, naked; lobes broad, obliquely obtusely, overlapping to the right, twisted sharply to the left. *Stamens* at the top of the tube, filaments short, broad, villous; anthers sagittate, elongate, pungent, conniving over and adhering to the stigma, cells shortly spurred below. *Disc* thick, annular or cupular. *Carpels* 2, distinct, many-ovuled; style filiform, base cleft, top globose or hemispheric, stigma conoid or subclavate. *Follicles* long, straight, hard, parallel, 3-gonous. *Seeds* ovoid or oblong, flat, shortly beaked, coma long, albumen thin; cotyledons oblong flat, radicle short.—DISTRIB. Species 2, Indian and Malayan.

1. **C. macrophylla**, *G. Don Gen. Syst. iv.* 76; calyx 5-lobed. *A. DC. Prodr. viii.* 430. *Wight Ic. t.* 432; *Brandis For. Fl.* 328; *Kurz For. Fl. ii.* 187. ? *C. grandiflora*, *G. Don l.c.* *C. mollis*, *Miquel Fl. Ind. Bat. ii.* 444, ex *Kurz in Journ. As. Soc.* 1877, ii. 257. *Echites macrophylla*, *Roxb. Fl. Ind. ii.* 13; *Wall. Cat.* 1657. *E. grandis*, *Wall. Cat.* 1658; *Grah. Cat. Bomb. Pl.* 113; *Dalz. & Gibs. Bomb. Fl.* 147. ? *E. macrantha*, *Spreng. Syst. i.* 632; *A. DC. l.c.* 477. *Epichysianthus macrophyllus*, *Voigt Hort. Suburb. Calc.* 523.—*Rheede Hort. Mal. ix. t.* 5, 6.

Moist forests throughout INDIA; from Kumaon in the HIMALAYA, ascending to 4500 ft., to Travancore, Ceylon, Malacca and the Andaman Islds.—DISTRIB. Java, Sumatra.

Branches glabrous, puberulous, or pubescent, soft, stout. *Leaves* 6–18 by 5–18 in., ovate elliptic obovate or orbicular, acute or cuspidate, base acute rounded or cordate, glabrous pubescent or tomentose beneath; nerves 10–12 pairs; petiole $\frac{1}{2}$ –2 in., stout or slender. *Cymes* on long or short stout pedicels; bracts ovate, acute. *Calyx* $\frac{1}{2}$ – $\frac{1}{2}$ in., coriaceous, terete, base truncate; lobes rounded or subacute. *Corolla* white, 2–3 in. diam., lobes $\frac{1}{3}$ – $\frac{1}{2}$ in. diam.; mouth glabrous, throat with 5 villous bands within. *Stamens* $\frac{1}{2}$ in. *Follicles* 12–18 by $\frac{3}{4}$ –1 in. *Seeds* $\frac{3}{4}$ in.

2. *C. Griffithii*, Hook. f.; calyx 5-partite.

SIKKIM HIMALAYA and KHASIA MTS., alt. 2–4000 ft., Griffith, &c.

Branches often hispid. *Leaves* smaller than in *C. macrophylla*. *Flowers* quite as large, but differing so much in the calyx as to suggest its belonging to a different genus. *Fruit* unknown.

DOUBTFUL SPECIES.

C. MALABARICA, G. Don Gen. Syst. iv. 76 (excl. syn. E. Pala). Echites malabarica, Lamk. Dict. ii. 342; A. DC. Prodr. viii. 477.—Pal. Valer, Rheede Hort. Mal. ix. t. 12.

C. VESTITA, G. Don Gen. Syst. iv. 76. Echites vestita, Roem. & Sch. iv. 394; A. DC. Prodr. viii. 477. E. tomentosa, Roth Nov. Sp. 137, non Vahl.—This is possibly *Wrightia tomentosa*.

31. *ECDYSANThERA*, Hook. et Arn.

Climbing glabrous shrubs. *Leaves* opposite, acuminate, nerves distant. *Flowers* minute, in terminal trichotomous paniced cymes. *Calyx* small, 5-partite, glandular or not within. *Corolla* suburceolate, throat naked, lobes very short, obtuse, overlapping to the right. *Stamens* at the base of the corolla; anthers sagittate, conniving over and adhering to the stigma, cells spurred at the base. *Disc* annular. *Carpels* 2, distinct, longer than the disc, many-ovuled, hairy; style short, top large cupular, stigma obpyriform. *Follicles* spreading, terete, acuminate. *Seeds* few, oblong or linear, compressed, tip narrowed with a long coma and a short persistent ring of hairs, albumen scanty; cotyledons thin, radicle short superior.—DISTRIB. Species 4 or 5, Malayan and Chinese.

E. micrantha, A. DC. Prodr. viii. 442; leaves glabrous ovate-lanceolate obtusely acuminate, nerves 3–5 pairs, cymes long-peduncled glabrous or puberulous. E. brachiata, A. DC. Prodr. viii. 443; Kurz For. Fl. ii. 189. Echites? micrantha and brachiata, Wall. Cat. 1667, 1668.

SIKKIM HIMALAYA (alt. 3–5000 ft.), ASSAM, SILHET, KHASIA MTS. (alt. 2–4000 ft.), CACHAR, AVA HILLS, Kurz.

A very tall climber; branches slender, pendulous, pustular, ultimate sometimes puberulous. *Leaves* 2–7 by 1–2 in., thinly coriaceous; nerves very oblique, slender; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Cymes* brachiata; bracts minute; flowers $\frac{1}{36}$ to $\frac{1}{12}$ in. long; pedicels slender or short. *Calyx* not half the length of the corolla, segments ovate. *Corolla* glabrous within and without, lobes falcate, spreading. *Anthers* obtuse. *Follicles* 3–4 in., $\frac{3}{4}$ in. broad near the base, horizontal, slightly incurved, narrowed from above the base to the point, thickly coriaceous with a shining crustaceous endocarp. *Seeds* $\frac{3}{4}$ in. long, elliptic-lanceolate, compressed, pubescent, bearded at the constricted tip, coma three times as long.

32. *BAISSEA*, A. DC.

Climbing shrubs. *Leaves* opposite; nerves distant, straight. *Flowers* small, in dense or lax axillary or terminal paniced or corymbose cymes. *Calyx* small, 5-partite, glandular or not within; segments obtuse. *Corolla* salver-shaped, lobes overlapping to the right, not twisted (in the Indian species). *Stamens* below the middle of the corolla; anthers sagittate, conniving over the stigma and adhering to it, cells shortly spurred at the base. *Disc* cup-shaped. *Carpels* 2, distinct, sunk in the disc, many-ovuled; style short, top cup-shaped, stigma

columnar. *Follicles* long. *Seeds* long, linear, truncate or narrowed (not beaked) at both ends, glabrous, tipped with a deciduous coma, albumen not thick; cotyledons linear, flat, radicle short.—**DISTRIB.** Species 7, a Cingalese, a Malayan, and 5 African.

1. **B. acuminata**, *Benth. in Gen. Pl.* ii. 719; leaves oblong obtusely caudate-acuminate pale beneath glabrous, cymes terminal and axillary corymbose puberulous shorter or longer than the leaves. *Oleghornia acuminata* and *cymosa*, *Wight Ic.* t. 1310, 1312; *Walp. Ann.* iii. 43; *Thwaites Enum.* 194.

CEYLON; common in the central province, alt. 3000 ft.

A slender climber. *Leaves* 3–4 by 1–1½ in., rather thin; nerves quite horizontal, very slender; petiole $\frac{1}{4}$ – $\frac{1}{3}$ in. *Cymes* trichotomous, peduncle slender; pedicels short. *Flowers* $\frac{1}{2}$ in. long. *Calyx* about half as long as the calyx-tube, glands between the sepals connate in pairs. *Corolla* glabrous or puberulous; lobes oblong or linear obtuse; tube and throat hairy within. *Follicles* 6–10 by $\frac{1}{2}$ in., cylindric, smooth. *Seeds* $\frac{1}{4}$ in., slender, narrowed at both ends.—The corolla-lobes are much too short, and rounded in Wight's figure.

2. **B. malaccensis**, *Hook. f.*; leaves oblong or elliptic obtusely caudate-acuminate pale beneath glabrous, cymes terminal and axillary paniculate glabrous longer than the leaves.

MALACCA; *Maingay* (Kew Distrib. 1094).

Very closely allied to *B. acuminata*, but more slender, leaves smaller, 2 by $\frac{3}{4}$ –1½ in., more membranous, whiter beneath, cymes more panicled than corymbose; the flowers are almost identical, except that the glands are solitary between the sepals according to Maingay's mss. *Fruit* not seen.

33. **AGANOSMA**, *G. Don.*

Stout evergreen climbers. *Leaves* opposite. *Flowers* in terminal tomentose cymes, large or middle-sized. *Sepals* narrowly lanceolate, acuminate, with subulate glands at the base, rarely oblong ovate. *Corolla* salver-shaped, tube very short; throat long, cylindric, with bearded longitudinal bands behind the anthers; lobes lanceolate linear-oblong or broad and rounded, overlapping to the right and nearly straight in bud. *Stamens* at the base of the throat, included; anthers sagittate, rigid, conniving over the stigma and adnate to it, cells spurred at the base. *Disc* 5-lobed, cupular. *Carpels* 2, distinct, tips hirsute, rarely glabrous, many-ovuled; style short, top urn-shaped, truncate, stigma columnar. *Follicles* short or long, terete, straight or curved, linear. *Seeds* ovate or linear-oblong, flattened, glabrous, not beaked, albumen scanty; cotyledons oblong, radicle short.—**DISTRIB.** Species 5, Indian and Malayan.

The very different aestivation of the corolla requires the separation of this genus from *Ichnocarpus*.

SECT. I. **Amphineurion**, *A. DC.* *Sepals* ovate-oblong, acute. *Ovary* glabrous, half sunk in the disc. *Follicles* very long, cylindric.

1. **A. marginata**, *G. Don Gen. Syst.* iv. 77; glabrous or branches and leaves beneath pubescent, leaves oblong acute acuminate or caudate, nerves very strong beneath inarching within the margin, cymes lax, corolla glabrous, tube rather longer than the acute calyx-segments, lobes linear obtuse. *Wight Ic.* t. 425; *A. DC. Prodr.* viii. 433; *Kurz For. Fl.* ii. 186. *A. acuminata*, *G. Don. l. c.*; *Wight Ic.* t. 424; *A. DC. l. c.* 434. *A. macrocarpa*, *A. DC. l. c.* 434. *Echites marginata*, *Roxb. Fl. Ind.* ii. 15; *Wall. Cat.* 1661. *E. acuminata*, *Roxb. l. c.* *E. macrocarpa*, *Wall. Cat.* 1662. *E. reticulata*, *Boj. Hort. Maur.*

211. *E. apoxys*, *Voigt Hort. Sub. Calc.* 522. ? *E. cristata*, *Roth Nov. Pl.* 135. ? *Chonemorpha cristata*, *G. Don l. c.* 76.

From SILHET and CHITTAGONG to MALACCA and SINGAPORE.—DISTRIB. Java, Sumatra, Philippine Islds.

A stout scandent or subscandent shrub. *Leaves* 2-4 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., coriaceous, hard, polished above, dark brown when dry; petiole $\frac{1}{4}$ in. *Cymes* chiefly axillary; peduncle slender, 1-2 in.; bracts deciduous; flowers white. *Corolla-tube* $\frac{1}{4}$ - $\frac{1}{2}$ in., slender; lobes twice as long, mouth glabrous, throat not dilated. *Ovary* glabrous. *Follicles* 6-18 by $\frac{1}{2}$ in., straight or flexuous, cylindric. *Seeds* linear-oblong.

SECT. II. *Meladenia*, *A. D. C.* *Calyx* large; lobes long, ovate or lanceolate. *Ovary* wholly included in the tubular 5-lobed disc.

2. *A. caryophyllata*, *G. Don Gen. Syst.* iv. 77; leaves ovate or elliptic acute obtuse or acuminate glabrous or tomentose beneath, nerves 3 pairs very oblique, cymes lax pubescent, sepals linear-lanceolate glandular within, corolla-lobes obliquely orbicular, ovary hairy at the tip, follicles 3-5 in.—*A. D. C. Prodr.* viii. 432; *Dalz. & Gibs. Bomb. Fl.* 113; *A. Blumei*, *Wight Ic. t.* 1305, not of *A. D. C.* *Echites caryophyllata*, *Wall. Cat.* 1651; *Bot. Mag. t.* 1919. ? *E. Heynei*, *Spreng. Syst.* i. 632. *E. dichotoma*, *Roth Nov. Pl.* 136. *Chonemorpha dichotoma*, *G. Don Gen. Syst.* iv. 76; *A. D. C. l. c.* 477.

LOWER BENGAL; Monghir, *Hamilton*; common on rocks at Risikund, *Wallich*. DECCAN PENINSULA, *Heyne*, &c.

A large climber, stem very stout, shoots pubescent. *Leaves* 4-5 by 2-2 $\frac{1}{2}$ in., coriaceous, base rounded acute or subcordate, nerves strong beneath and all running towards the point; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Cymes* terminal, lax, white-tomentose; pedicels shorter than the calyx-lobes, which are hoary without. *Corolla-tube* and *throat* both cylindric, subequal; limb 1 $\frac{1}{2}$ in. diam. *Ovary* pubescent; style slender, top urceolate, stigma columnar, to the tip of which the anthers are attached. *Follicles* stout, nearly $\frac{1}{2}$ in. diam., pericarp thickly coriaceous. *Seeds* (unripe) ovate-oblong, $\frac{1}{2}$ in. long, flat.—I have retained Roxburgh's specific name for this plant, because it is that of his Herbarium, of Rottler's Herbarium, of the Botanical Magazine, of the Calcutta Botanic Gardens, and of DeCandolle's Prodrum; but it is not the *Echites caryophyllata* of Roxburgh's Flora, which is *A. calycina*, and is described as having subglobular cymes; nor of his drawing, repeated by Wight (*Ic. t.* 440), which agrees with his description and represents the leaves as having many spreading veins and ovate acute corolla-lobes and glabrous ovary. Nor have I quoted Rheede's figure (*vii. t.* 55) which is referred to as *E. caryophyllata* in the Botanical Magazine; nor Rheede's "Kemetti Valli" (*ix. t.* 14, not 135 as quoted by Roxburgh), which Roxburgh cites for his *caryophyllata*, as neither of these is a good representation of this or any other plant, and they both differ totally from Roxburgh's and the Bot. Mag. figure and description. Though evidently a commonly (cultivated?) plant in India, its only presumably native habitat is the Monghir one given above; its few red nerves and rounded corolla-lobes at once distinguish it from its congeners.

3. *A. gracilis*, *Hook. f.*; branches very slender, leaves elliptic oblong acuminate membranous glabrous, nerves 8-10 pairs, very slender arching, cymes terminal corymbose glabrate, peduncles and pedicels long slender, sepals 1 $\frac{1}{2}$ in. hoary eglandular, corolla-tube $\frac{3}{4}$ in., lobes 1 $\frac{1}{2}$ in. obliquely oblanceolate.

SIKKIM HIMALAYA, alt. 2-4000 ft.; *J. D. H.* KHASIA MTS., alt. 1-3000 ft.; *Lobb*

A very beautiful and distinct species, at once distinguishable by the slender stem and branches, membranous leaves, few-flowered spreading glabrous cymes, very long sepals, and long narrow calyx-lobes.

4. *A. calycina*, *A. D. C. Prodr.* viii. 432; branches stout, leaves elliptic or oblong-lanceolate acuminate glabrous, nerves 7-10 pairs arching slender, cymes terminal lax densely rusty-tomentose, peduncle and pedicels stout, sepals

$\frac{3}{4}$ –1 in. eglandular, corolla-tube $\frac{1}{2}$ in., lobes ovate acute, ovary glabrous. *Kurz For. Fl.* ii. 186. *A. Roxburghii*, *G. Don ex Wight Ic.* t. 440. *A. Wallichii*, *G. Don Gen. Syst.* iv. 77. *Echites calycina*, *Wall. Cat.* 1653. *E. caryophyllata*, *Roxburgh Fl. Ind.* ii. 11 (and drawings copied by *Wight*, t. 440).

TAVOY; *Gomez, Kurz.*

Branches pubescent. *Leaves* 3–4 in., coriaceous; petiole $\frac{1}{2}$ in. *Cymes* many-fl., tomentose. *Sepals* very narrow, rusty tomentose. *Corolla-tube* hoary, slender, cylindric, base hardly dilated, narrowed upwards to the mouth, villous within. *Ovary* quite glabrous; style elongate-clavate, truncate, stigma columnar. *Fruit* unknown.—I have under *A. caryophyllata* stated my reasons for retaining that name for the plant of *Roxburgh's Herbarium*, and thus avoiding an involved synonymy and the necessity of giving it a new name.

5. *A. cymosa*, *G. Don Gen. Syst.* iv. 77; glabrous or shoots and leaves beneath softly tomentose, leaves elliptic-oblong or oblong-lanceolate acute or finely acuminate, nerves 5–7 pairs, cymes dense rounded densely tomentose, sepals $\frac{1}{4}$ – $\frac{1}{2}$ in., corolla-tube $\frac{1}{8}$ – $\frac{1}{2}$ in., lobes $\frac{1}{4}$ – $\frac{1}{2}$ in. ovate acuminate, ovary hirsute.

SILHET; *Roxburgh, &c.* DECCAN PENINSULA; common from Bombay to Travancore, *Heyne, &c.*

A stout rambling climber, very variable in size and habit, of which I am unable to distinguish the following forms specifically.

VAR. 1. *cymosa proper*; shoots tawny-tomentose, leaves 4–5 by 2–2 $\frac{1}{2}$ in. elliptic or oblong abruptly acuminate glabrous or sparsely hairy above, pubescent or tomentose beneath, nerves 7–9 pairs, sepals $\frac{1}{2}$ in., corolla-lobes $\frac{1}{4}$ in. long.—*A. cymosa*, *G. Don l.c.*; *A. DC. Prodr.* viii. 433. *Echites cymosa*, *Roxb. Fl. Ind.* ii. 16; *Wight Ic.* t. 395; *Wall. Cat.* 1654, *in part.*—Silhet.

VAR. 2. *lanceolata*; shoots tawny tomentose, leaves 4–5 $\frac{1}{2}$ by 1–1 $\frac{1}{2}$ in. oblong lanceolate finely acuminate margins and midrib beneath sparsely hairy, nerves 7–9 pairs, sepals $\frac{1}{2}$ in., corolla-lobes $\frac{1}{2}$ in. broad, follicles 3 by 3 $\frac{1}{2}$ in. sessile linear-falcate, seeds ovate-lanceolate glabrous.—*Echites cymosa*, *Wall. Cat.* 1654, *in part* (specimens from Calcutta Botanic Gardens).

VAR. 3. *conferta*; shoots puberulous or hoary, leaves 2–3 by 1 $\frac{1}{2}$ –2 in. elliptic-oblong acute obtuse or apiculate rarely acuminate, quite glabrous on both surfaces, nerves 3–4 pairs, flowers as in var. 2. *Echites conferta*, *Wall. Cat.* 1655.—Deccan Peninsula, *Herb. Heyne.*

VAR. 4. *elegans*; shoots puberulous or glabrate, leaves 1 $\frac{1}{2}$ –2 $\frac{1}{2}$ by $\frac{3}{4}$ –1 $\frac{1}{2}$ acute obtuse or acuminate, nerves 3–5 pairs, sepals $\frac{1}{4}$ – $\frac{1}{2}$ in., corolla-lobes $\frac{1}{8}$ – $\frac{1}{4}$ in., “follicles 5–9 by $\frac{1}{2}$ in., terete, hairy at length glabrate, seeds linear-oblong shortly beaked glabrous” (*Thwaites*). *Aganosma elegans*, *G. Don l.c.*; *A. DC. Prodr.* viii. 433; *Wight Ic.* t. 1304; *Thwaites Enum.* 194. *A. Doniana*, *Wight Ic.* t. 1306 (a small-flowered form); *Dalz & Gibs. Bomb. Fl.* 146. *Echites elegans*, *Wall. Cat.* 1656. *E. bracteata*, *Herb. Heyne in Wall. Cat.* under 1656.—Deccan Peninsula and Ceylon.

DOUBTFUL SPECIES.

A. LÆVIGATA, *Grah. Cat. Bomb. Pl.* 113 (*Rheede Hort. Mal.* ix. t. 9); without description. *S. Concan.* Is probably *Parsonsia*.

34. **EPIGYNUM**, *Wight.*

Climbing shrubs. *Leaves* opposite, nerves distant, arching. *Flowers* hoary, in dense subcapitate corymbose or open paniculate cymes. *Calyx* small, 5-fl., lobes acute. *Corolla* salver-shaped, tube long, throat villous; lobes overlapping to the right, twisted to the left, or nearly erect. *Stamens* below the middle of the tube; anthers sagittate, acuminate, conniving around and hardly adhering to the stigma, cells spurred at the base. *Disc* lining the calyx-tube, fleshy, 5-lobed. *Carpels* 2, distinct, many-ovuled, dorsally adnate to the disc and surmounted by its 5 connivent lobes; style long or short, top obovate or cupular,

stigma thick. *Follicles* distinct, long, linear, terete. *Seeds* elongated, compressed (crowned with a wing or pencil of hairs?).—**DISTRIB.** Species 4 or 5, Malayan Peninsula and Borneo.

1. **E. Griffithianum**, *Wight Ic. t.* 1308; leaves elliptic acute at both ends glabrous, cymes rusty-pubescent, flowers $\frac{1}{2}$ in. long, corolla pubescent, lobes in bud slightly twisted. *Kurz For. Fl. ii.* 184. *Legouixia amabilis*, *Muell. Argan. in Van Heurck Pl. Nov.* 146.

MERGUI; *Griffith, Kurz.*

Branches slender, puberulous towards the tips. *Leaves* 2-3 by $\frac{3}{4}$ -1 $\frac{1}{4}$ in., membranous, brown when dry, narrowed into the short petiole. *Cymes* branched from the base or peduncled, 1-1 $\frac{1}{2}$ in. diam.; branches $\frac{1}{2}$ in.; flowers crowded; pedicels very short. *Calyx* $\frac{1}{2}$ the length of the narrow corolla-tube. *Corolla-limb* $\frac{3}{4}$ in. diam.; lobes obovate, glabrous within, throat and tube hairy within. *Fruit* not seen.

2. **E. Maingayi**, *Hook. f.*; leaves elliptic subacute and cymes softly tomentose beneath, flowers 1 in. long, corolla tomentose, lobes in bud nearly straight.

MALACCA; *Maingay* (*Kew Distrib.* 1088).

Branches slender, young tomentose. *Leaves* 3 $\frac{1}{2}$ -4 $\frac{1}{2}$ by 1 $\frac{1}{2}$ -2 in., minutely puberulous above, with yellowish tomentum beneath; petiole $\frac{1}{4}$ in., tomentose. *Cymes* shortly peduncled; flowers very shortly pedicelled, corymbose. *Calyx* $\frac{1}{2}$ the length of the corolla-tube. *Corolla-lobes* rounded, tomentose on one half of the back; tube and throat pubescent within and without. *Follicles* 6-8 by $\frac{1}{4}$ - $\frac{3}{8}$ in., slender, cylindric, flexuous, tomentose. *Seeds* not ripe.

3. ?**E. lævigatum**, *Hook. f.*; leaves elliptic-lanceolate acuminate quite glabrous, flowers $\frac{1}{2}$ in. long, corolla glabrous, lobes strongly twisted in bud. *Echites lævigata*, *Wall. Cat.* 1669.

SILHET; at Pundua? (*Wallich*).

Perfectly glabrous throughout; branches slender, dark brown. *Leaves* 4-5 by 1 $\frac{1}{2}$ in., thinly coriaceous, polished above; petiole $\frac{1}{2}$ in. *Flowers* in peduncled axillary trichotomous paniced cymes, rather crowded towards the ends of the long horizontal branches; bracts ovate. *Calyx-lobes* ovate-lanceolate, with a small glandular tooth in the sinus between each lobe. *Corolla-tube* $\frac{1}{6}$ in., twice as long as the calyx; lobes linear-oblong, twice as long as the tube. *Carpels* sunk in the cupular 5-lobed disc, and attached to it by their backs; style very short, stigma large. *Fruit* not seen.—A fruiting specimen of what may be this species was collected in Cachar by Keenan; the follicles are 3-4 in. by $\frac{1}{4}$ in., horizontal, terete, gradually narrowed from the base to the acute point, exactly as in *Anodendron*, but the seeds are slender and not beaked.

DOUBTFUL SPECIES.

?**E. PARVIFLORUM**, *Hook. f.*; quite glabrous, leaves 5-6 by 1 $\frac{1}{2}$ -2 in., elliptic-lanceolate, acuminate at both ends, nerves 5-6 pairs very oblique, petiole $\frac{1}{2}$ in., flowers in lax brachiate axillary and terminal cymes, peduncle branches and pedicels slender, calyx very small, corolla pale yellow, tube short, limb $\frac{1}{2}$ in. diam., lobes falcately lanceolate acuminate, stamens towards the base of the tube, ovary sunk in the 5-lobed disc, style very short, top cup-shaped, stigma conical. *Echites parviflora*, *Roxb. Fl. Ind. ii.* 20.

NORTHERN CIRCARS; *Roxburgh*.

I have described this from Roxburgh's drawings; it appears closely allied to *E. ? lævigatum*.

35. **RHYNCHODIA**, *Benth.*

A lofty climbing evergreen shrub. *Leaves* opposite, broad, membranous, nerves distant. *Flowers* in lax broad axillary or subterminal paniced cymes.

Calyx 5-partite or -fid, glandular within. *Corolla* salver-shaped, throat contracted, villous; lobes large, broad, obliquely obtuse, overlapping to the right, twisted to the left. *Stamens* in the middle of the tube, filaments broad short: anthers sagittate, conniving round and adhering to the stigma, cells shortly spurred below. *Disc* annular, 5-fid. *Carpels* 2, distinct, glabrous, longer than the disc, many-ovuled; style filiform, top clavate truncate, stigma columnar. *Follicles* elongate, narrow, compressed. *Seeds* ovate or oblong, compressed, beak slender, tipped by a deciduous coma.

R. Wallichii, *Benth. in Gen. Pl.* ii. 720; glabrous, leaves elliptic ovate or oblong cuspidate or caudate-acuminate, cymes dichotomous loose, peduncles and pedicels slender. *Rhynchospermum Wallichii* and *R. ellipticum*, *A. DC. Prodr.* viii. 431. *Echites rhynchosperma*, *Wall. Pl. As. Rar.* i. 43, t. 49; *Cat.* 1665. *E. elliptica*, *Wall. Cat.* 1666. *Echites verticalis*, *Herb. Ham.* Cercomoma *Wallichii*, *Miq. Fl. Ind. Bat.* ii. 445; *Kurz For. Fl.* ii. 187.

SIKKIM HIMALAYA, alt. 2500 ft.; *Treutler. SILHET; De Silva.* ASSAM; *Masters. CACHAR; Keenan.* MARTABAN, TENASSERIM and AVA; *Wallich, Kurz.*

Branches distantly tubercled. *Leaves* 5-9 by 2-4 in., base acute, rounded or rarely cordate; petiole slender, 1 in. *Cymes* 2-4 in. diam.; flowers white, fragrant; peduncle 1-3 in. *Calyx-lobes* ovate-lanceolate, half as long as the corolla-tube. *Corolla* glabrous, except round the mouth; tube $\frac{1}{4}$ in., 5-angled; limb 1 in. diam.; lobes narrowly obovate. *Follicles* 12-18 by $\frac{3}{8}$ - $\frac{3}{4}$ in., smooth. *Seeds* 1 in., beak as long as the body, hairs rather longer, white.—This genus might well form a section of *Trachelospermum*.

36. TRACHELOSPERMUM, Lemaire.

Climbing shrubs. *Leaves* opposite, nerves distant. *Flowers* white or purplish, in lax terminal or pseudo-axillary cymes. *Calyx* small, 5-partite, glandular or scaly within. *Corolla* salver-shaped, mouth constricted; lobes oblique, overlapping to the right, twisted to the left. *Stamens* above the middle of the tube, tips included or exerted, filaments short, broad; anthers conniving over and adhering to the stigma, cells spurred at the base. *Disc* annular or of oblong glands. *Carpels* 2, distinct, many-ovuled; style short, top cupular, stigma columnar. *Follicles* elongate, slender, incurved, terete. *Seeds* linear, not beaked, coma long, albumen copious; cotyledons linear, flat, radicle short.—DISTRIB. Species 8, East Asiatic and Malayan.

* *Cymes in the upper axils, long-peduncled. Corolla-tube slender, much longer than the calyx.*

1. **T. fragrans**, *Hook. f.*; leaves elliptic-lanceolate obtusely acuminate, cymes loosely paniced, peduncles and pedicels slender, sepals ovate or lanceolate, corolla-lobes at base and mouth pubescent, anthers included. *Ichnocarpus fragrans*, *Wall. Cat.* 1675; *A. DC. Prodr.* viii. 435; *Brand. For. Fl.* 327. I. ? inflata, *Herb. Ham. in Wall. l.c.* *Blaberopus lucidus*, *A. DC. l.c.* 411. *Alstonia lucida*, *Don Prodr.* 231.

TEMPERATE and SUBTROPICAL HIMALAYA; from Kumaon, ascending to 5,700 ft. to Bhotan, exclusive of Sikkim. ASSAM; Muku hills, *Simonds.* CACHAR; *Keenan.*

A tall climber, shoots and petioles sometimes pubescent. *Leaves* 3-5 by 1-1 $\frac{1}{2}$ in.; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Peduncles* 1-3 in., very slender, stout, angular, trichotomously branched. *Sepals* $\frac{1}{4}$ - $\frac{1}{2}$ the length of the corolla-tube. *Corolla* white, tube slender, with the throat $\frac{1}{4}$ - $\frac{1}{2}$ in.; lobes obtuse, obliquely truncate. *Disc-glands* quadrate. *Ovary* glabrous, acute. *Follicles* 4-9 by $\frac{1}{4}$ in., incurved and converging, cylindric, acuminate, narrowed at the base; pericarp thinly coriaceous, smooth, pale. *Seeds*

$\frac{3}{4}$ in. long, slender, compressed, obtuse at both ends, pale, smooth, coma as long, white.

2. **T. gracillipes**, *Hook. f.*; glabrous, leaves elliptic acute, cymes loosely paniced, peduncle and pedicels capillary, calyx-segments ovate or lanceolate, corolla-lobes and throat glabrous, anther-tips exserted.

KHASIA and JYNTEA Mts.; *Lobb.* ASSAM; Gowahatty, *Simons*.

Very similar to *T. fragrans*, but differing in the form of the leaf point, in the more slender cymes, and notably in the glabrous corolla and exserted anther-tips.

** *Cymes short-peduncled, in numerous axils. Corolla-tube short.*

3. **T. axillare**, *Hook. f.*; quite glabrous, leaves oblanceolate obovate or elliptic-oblong abruptly caudate-acuminate, cymes very shortly peduncled, sepals rounded, shorter than the glabrous corolla. *Rhynchospermum* 5, *Herb. Ind. Or. Hook. f. & T.*

SIKKIM HIMALAYA; alt. 4-6000 ft., *J. D. H.*

A stout arboreous climber. *Leaves* 3-5 by 1-1 $\frac{1}{2}$ in., rather coriaceous, tip $\frac{1}{2}$ in. long. *Cymes* 1 in. diam.; peduncle $\frac{1}{2}$ in., pedicels rather longer, stout. *Sepals* puberulous, half the length of the corolla-tube. *Corolla* dull purple; tube angular, $\frac{1}{2}$ in. long; lobes linear-oblong, nearly straight, obtuse; mouth and throat glabrous. *Stamens* included. *Glands* glabrous. *Ovary* pubescent; style very short, stout. *Follicles* 6-8 by $\frac{1}{2}$ in., curved, cylindric, tomentose. *Seeds* slender, $\frac{3}{4}$ in. long; coma 2 in., copious, pale brown.—*Buds* more obtuse and lobes less twisted to the left than in the typical species.

37. **ANODENDRON**, *A. DC.*

Climbing glabrous shrubs. *Leaves* opposite, nerves distant arched. *Flowers* in axillary or axillary and terminal slender paniced wide spreading cymes. *Calyx* 5-cleft; segments obtuse, eglandular within. *Corolla* salver-shaped, mouth contracted; lobes narrow, overlapping to the right, twisted to the left. *Stamens* below the middle of the tube; anthers sagittate, conniving round and adherent to the stigma, cells shortly spurred at the base. *Disc* cupular. *Carpels* 2, distinct, sunk in the disc, and attached to it by their backs at the base, many-ovuled; style very short, top cupular, stigma thick conic. *Follicles* diverging, acuminate, hard. *Seeds* ovoid or oblong, compressed, beaked, tipped with a long coma.—*DISTRIB.* Species 7, Asiatic and Malayan.

1. **A. paniculatum**, *A. DC. Prodr.* viii. 444; quite glabrous, leaves large elliptic or oblong obtusely cuspidate thinly coriaceous, nerves 12-15 pairs, calyx-lobes obtuse. *Dalz. & Gibs. Bomb. Fl.* 147; *Thwaites Enum.* 194; *Kurz For. Fl.* ii. 188; *Wight Ic.* t. 1309, *fruit and seeds only*. Echites paniculata, *Roxb. Fl. Ind.* ii. 17; *Wight Ic.* t. 396. E. coriacea, *Wall. Cat.* 1586. E. manubriata and polyantha, *Wall. Cat.* 1663, 1664. *Gymnema nepalense*, ? *Grah. Cat. Bomb. Pl.* 120 (ex *Dalz. & Gibs.*).—*Rheede Hort. Mal.* ix. t. 8.

From SILHET to MARTABAN. DECCAN PENINSULA; on the Western Ghats from the Concan southwards. CEYLON; common up to 2000 ft.—*DISTRIB.* Java, Timor, Philippine Islds.

An immense climber. *Leaves* 4-8 by 1 $\frac{1}{2}$ -3 in.; petiole $\frac{1}{2}$ in. *Cymes* 2-10 in. long and broad, repeatedly 3-chotomously branched; branches brachiate, filiform; flowers 3-nate; pedicels short; bracts ovate. *Calyx-lobes* minute. *Corolla* $\frac{1}{2}$ in. long, yellowish white, lobes twice as long as the tube, narrow, falcate, obtuse, throat villous. *Stigma* subsessile. *Follicles* 5-6 in., straight, narrowed from a base $\frac{3}{4}$ in. diam. to the obtuse point, terete, woody. *Seeds* few, 1 $\frac{1}{4}$ in. long, flat; beak long slender; coma white, 2 in. long.

2. **A. Candolleianum**, *Wight Ic. t.* 1309 (*excl. fruit and seeds*); quite glabrous, leaves elliptic obtusely cuspidate thickly coriaceous, nerves 8-10 pairs, petiole 1 in., calyx-lobes acute. *Miquel Fl. Ind. Bat. ii.* 455. *A. rubescens*, *Teijsm. & Binnend. Cat. Hort. Bogor.*

MALACCA; *Capt. Wight, Maingay* (Kew Distrib. 1087).—DISTRIB. Borneo.

Very similar in inflorescence and flowers to *A. paniculatum*, but petioles longer, leaves very different in texture, sepals acute, corolla-throat nearly glabrous, style distinct, stigma smaller, follicles much thinner-walled, acute, and seeds (unripe) apparently much more slender,

3. **A. rhinosporum**, *Thwaites Enum.* 195; quite glabrous, leaves coriaceous elliptic-oblong or -lanceolate obtuse or obtusely acuminate, nerves very slender, petiole $\frac{1}{2}$ in., flowers $\frac{1}{10}$ in. long.

CEYLON; Ambagamowa and Matuvatte districts, *Thwaites*.

A much smaller and narrower-leaved plant than either of the foregoing, with a smaller panicle. *Leaves* 2-4 by $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; petiole $\frac{1}{3}$ - $\frac{1}{2}$ in. *Follicles* 3-5 in. *Seeds* 1 in.

4. **A. pauciflorum**, *Hook. f.*; quite glabrous, leaves oblong or oblong-lanceolate obtusely acuminate, nerves very slender, cymes small short axillary puberulous few-fl., flower $\frac{1}{2}$ in. long.

PENANG; *Maingay* (Kew Distrib. 1101).

Branches smooth, glabrous. *Leaves* 4-5 by 1 $\frac{1}{2}$ -2 in., red-brown when dry; nerves 8-10 pairs, slightly arched, very slender; petiole $\frac{1}{2}$ in., stout. *Cymes* much shorter than the leaves; peduncle stout, $\frac{1}{2}$ -1 in.; bracts ovate, crowded; pedicels very short. *Calyx-lobes* obtuse. *Corolla* glabrous, lobes acute in bud, strongly twisted: tube about equalling the linear-lanceolate falcate obtuse lobes; throat pubescent. *Style* and stigma together pyriform, seated on the glabrous carpels. *Follicles* 4-5 by $\frac{3}{4}$ -1 in., horizontal, straight, tapering from a rounded base to the subacute points, terete, smooth, pericarp thick. *Seeds* $\frac{2}{3}$ in. long, ovoid, beaked, flat, glabrous; coma three times as long, brown.

38. ICHNOCARPUS, Br.

Climbing shrubs. *Leaves* opposite, nerves distant. *Flowers* small or minute, in long terminal and axillary paniculate cymes. *Calyx* 5-fid, glandular or not within. *Corolla* salver-shaped, throat contracted or villous; lobes narrowed to the obtuse point, overlapping to the right, upper half deflexed in bud. *Stamens* at or below the middle of the tube; anthers sagittate, conniving over and adhering to the stigma, cells spurred at the base. *Disc* free, 5-lobed. *Carpels* 2, distinct, exserted from the disc, many-ovuled, hairy; style short, top obconic, stigma columnar. *Follicles* spreading or divaricate, slender and subterete or rigid and compressed. *Seeds* narrowed at the tip, coma deciduous, albumen copious; cotyledons long, flat, radicle short, superior.—DISTRIB. Species 5 or 6, Indian, Malayan and Australian.

1. **I. frutescens**, Br. in *Hort. Kew. ed. 2, ii.* 69; glabrous or branches and leaves beneath more or less softly tomentose, leaves elliptic oblong or lanceolate acute, cymes pubescent, corolla-tube glabrous, mouth villous. *Benth. Fl. Austral. iv.* 315; *Wight Ic. t.* 430, *Wall. Cat.* 1674; *Brand. For. Fl.* 327; *Grah. Cat. Bomb. Pl.* 113; *Dalz. & Gibs. Bomb. Fl.* 147; *Kurz For. Fl. ii.* 185. *I. radicans*, *Wall. Cat.* 1676. *I. dasycalyx*, *Miquel Fl. Ind. Bat. ii.* 449. *I. leptodictyus*, *F. Muell. Fragmenta*, vi. 118. *Echites frutescens*, *Wall. Cat.* 1674. *Apocynum frutescens*, *Linn.*—*Lyama*, *Roxb. in As. Res. i.* 261.—*Burm. Fl. Zeyl.* 23, t. 12, fig. 1.

WESTERN HIMALAYA; Sirmore to Nepal, alt. 1-2000 ft. UPPER GANGETIC PLAIN; from Delhi to BENGAL, ASSAM, SILHET, CHITTAGONG, BIRMA, the DECCAN PENINSULA and CEYLON.—DISTRIB. Java, Australia.

An extensive climber. *Leaves* very variable, 2-3 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in.; petiole $\frac{1}{2}$ in. *Cymes* 1-3 in., axillary and in terminal panicles, rusty-pubescent; branches short, trichotomously divided or 3-flowered; pedicels longer or shorter than the corolla. *Calyx-lobes* ovate, obtuse or subacute, eglandular. *Corolla* about $\frac{1}{2}$ in. diam., purplish, twice as long as the calyx; lobes twice as long as the tube, falcate, acuminate, mouth and margins sparingly bearded. *Disc-glands* 5, erect, slender, capitate, much longer than the hairy ovary. *Style* very short. *Follicles* 3-6 by $\frac{1}{2}$ in., very slender, cylindrical, curved, acute, "sometimes moniliform as in *Ecdysanthera*," Kurz, divergent at an acute angle; pericarp thinly coriaceous. *Seeds* $\frac{1}{2}$ in., very slender, not beaked; coma as long, scanty, white.—*I. radicans*, Wall., is the young state of the plant.

VAR. parvifolia; leaves 1-1 $\frac{1}{2}$ by $\frac{1}{2}$ in. oblong or linear-oblong, cymes shorter.—Coimbatore, Wight, &c.

2. *I. ovatifolius*, A. DC. Prodr. viii. 435; glabrous or branches and leaves beneath more or less tomentose, leaves orbicular elliptic-oblong or ovate obtuse acute or cuspidate, peduncle and pedicels pubescent, corolla-tube pubescent, mouth puberulous. *I. affinis*, *Herb. Ind. Or. H. f. & T.* Echites affinis, *Roem. & Sch.* *I. latifolia*, *Herb. Ham. in Wall. Cat. 1652.* *Springia indica*, *Muell. & Van Heurck in Plant. Nov. Van Heurck, 143.*

SILHET and KHASIA Mts.; alt. 1-4000 ft. MALACCA; *Griffith, Maingay* (Kew Distrib. 1075, 1103).—DISTRIB. Sumatra, Borneo, Celebes, Philippine Islds.

Very closely allied to *I. frutescens*, and perhaps a variety of that plant, but besides the characters indicated the leaves are much larger and broader, and the disc-glands are not capitate.—The flowers occur in a monstrous state (through insect-puncture), the corolla being enlarged below into a globose form $\frac{1}{2}$ in. diam., crowned with a rigid erect tubular beak. This state occurs in Wallich's Herbarium, under No. 2015, from Tavoy (which number should apply to a *Dendrobium*), and it is Maingay's 1103 (Kew Distrib.) from Malacca.

3. *I. pubiflorus*, Hook. f.; glabrous, with rusty-tomentose cymes, leaves elliptic obtusely acuminate, cymes very shortly peduncled dense-flowered, calyx-segments oblong equalling the glabrous corolla-tube, corolla-throat pubescent, lobes linear-oblong, base gibbous.

KHASIA Mts.; *Griffith* (a solitary specimen).

Branch stout glabrous, bark dark brown. *Leaves* 3 by 1 $\frac{1}{2}$ in., rather coriaceous; petiole $\frac{1}{2}$ in. *Cymes* $\frac{3}{4}$ - $\frac{1}{2}$ in. long and broad, branched from near the base, peduncle pedicels and bracts densely tomentose; flowers $\frac{1}{4}$ in. long, corolla as broad. *Calyx* cleft to the base into linear-oblong segments. *Corolla-tube* short; lobes obliquely ovate, obtuse. *Anthers* acuminate. *Ovary* villous above, glabrous below.

39. MICROCHITES, *Miquel*.

Climbing shrubs. *Leaves* opposite, nerves distant. *Flowers* very small, in axillary and terminal lax thyrsoid or brachiate panicle cymes. *Calyx* small, 5-fid or -partite, glandular within, segments obtuse. *Corolla* campanulate or salver-shaped, tube short; lobes falcate, overlapping to the right, very oblique, upper half deflexed in bud. *Stamens* near the bottom of the tube, filaments short; anthers sagittate, conniving around and adhering to the stigma, cells spurred at the base. *Disc* annular or cupular, entire or lobed. *Carpels* 2, longer than the disc, distinct, many-ovuled, hirsute; style short, top turbinate or globose, stigma clavate. *Follicles* spreading or recurved, hard, subterete. *Seeds* oblong, compressed, not beaked; coma terminal, caducous.—DISTRIB. Species 4, Malayan.

1. *M. polyantha*, *Miq. Fl. Ind. Bat.* ii. 456; leaves elliptic oblong or oblong-lanceolate obtuse or obtusely acuminate glabrous, nerves numerous very slender nearly straight, cymes puberulous short axillary and in terminal racemes. flowers $\frac{1}{2}$ in. long, corolla subcampanulate glabrous. *Tabernæmontana polyantha*, *Blume Bijl.* 1029; *A. DC. Prodr.* viii. 376.

MALACCA; *Maingay* (Kew Distrib. 1081). ANDAMAN ISLDS.; *Kurz.*—DISTRIB. Java.

Branches slender, obscurely angled. *Leaves* 2–3 by 1–1 $\frac{1}{4}$ in., narrowed at both ends; nerves 10–15 pairs, with intermediate still more slender ones, very spreading, but not horizontal; petiole $\frac{1}{2}$ in. *Cymes* very shortly peduncled, about $\frac{1}{2}$ in. diam., few-fld.; bracts minute; pedicels short, stout, and calyx densely pubescent; flowers $\frac{1}{2}$ in. long. *Calyx-lobes* round. *Corolla* glabrous, subcampanulate, lobes about equaling the throat, falcately lanceolate, very oblique, mouth bearded. *Anthers* acute. *Ovary* much longer than the disc, hirsute; style short, stigma conical.

2. *M. elliptica*, *Hook. f.*; leaves elliptic- or oblong-lanceolate obtusely or acutely acuminate, nerves numerous very slender nearly straight, cymes elongate glabrate, flowers $\frac{1}{2}$ in. long, corolla salver-shaped. *Rhynchospermum* 4, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; alt. 4–6000 ft., *J. D. H.* KHASIA MTS.; *Griffith*, alt. 3–4000 ft., *H. f. & T.*

Very similar to *M. polyantha*, but leaves narrower, 4–6 by 1–1 $\frac{3}{4}$ in., more acuminate, cymes usually longer, with distant short branches, flower larger, corolla more salver-shaped, the lobes more obliquely falcate, upper deflexed half narrow obtuse; style longer, its top more globose. *Follicles* (unripe) red, 5–6 by $\frac{1}{2}$ in., horizontal or recurved, subcylindric, broadest at the base, gradually narrowed thence to the point, pericarp hard and fleshy. *Seeds* very immature, $\frac{1}{2}$ in. long, narrowly oblong, glabrous; coma long.—The branches sometimes root copiously.

ADDENDA AND ERRATA, VOL. III., PART III.

P. 5. *Viburnum sambucinum* is a Javanese, not a Japanese plant.

P. 221. Subtribe V. CONYZEÆ. The ray-flowers are white or yellow.

P. 232. Under *D. Roylei*, for *Fullaronia* read *Fullartonia*.

P. 244. Under *E. longicaule*, for *Milkania* read *Mikania*.

P. 256. In generic character of *Microglossa*, for ligule "minute, white" read minute or small, white or lilac.

P. 257. Under *M. albescens*, line 4, after corymb insert "ligule lilac slender."

P. 260. BLUMEA. Since the printing of this genus Mr. Clarke has visited the Candollean Herbarium in Geneva, and communicated to me the following notes on such of the species described in De Candolle's Prodomus as appeared to him (without having the Wallichian Collection to compare) not to accord, wholly or in part, with the descriptions in this Flora. In respect of these discrepancies large allowance must be made for the fact that, in so critical a genus, the specimens sent by Wallich to DeCandolle do often differ considerably from those at the Linnean Society. The numbers are those of the Prodomus, vol. v. p. 433, &c.

3. *B. tenella*. Prodr. p. 433. The Timor plant is quite unlike any Indian one; the Madras one may be referable to *B. bifoliata*.

5. *B. anagallidifolia*, Prodr. p. 433. Is rather *B. amplexans* than *bifoliata*, the leaves being nearly entire.

11. *B. Chamissoniana*, Prodr. p. 434, from Luzon; and 17. *B. Leschenaultiana*, p. 435, are typical *B. Wightiana*.

18. *B. lactucæfolia*, Prodr. p. 435. The Birman plant is *B. lacera*; the Luzon one *B. laciniata*.

20. *B. lacera*, var. *Wallichii*, p. 435, consists of *B. lacera*, *Wightiana*, *glomerata*, and an *Frigeron*.

28. *B. cichoriifolia*, Prodr. p. 437, and *B. crepidifolia* l. c. (*B. laciniata*, *Ham. in Wall. Cat.* 3084), are both *B. laciniata*.

39. *B. senecioides*, Prodr. p. 439 (*Conyza senecioides*, *Ham. in Wall. Cat.* 3102), is a form of *B. membranacea* resembling *B. virens*, but with more viscous bracts; it is the same as *B. hymenophylla*.

47. *B. membranacea*, Prodr. p. 440; and 51. *B. cuneifolia*, p. 441 (*Conyza cuneifolia*, *Wall. Cat.* 3101, from Martaban), are probably *B. lacera*.

48. *B. viscosula*, Prodr. p. 441, and *B. hispidula*, are the same as *B. paucifolia*, as is probably *B. subsimplex*, and all referable to vars. of *membranacea*.

56. *B. holoserica*, Prodr. 442, and *B. gracilis*, 443, are forms of *lacera*.

58. *B. fasciculata*, Prodr. p. 442. The Birman plant is *B. glomerata*, the Timor one quite different.

65. *B. spinellosa*, Prodr. p. 443, is a silky straggling form of *B. hieraciifolia*.

75. *B. elongata*, Prodr. p. 445, consists of *B. Clarkei*, and the large form of *lacera*?

81. *B. longifolia*, Prodr. p. 446, may be *B. myriocephala*.

P. 482. PRIMULA. All the species here for the first time described will be found together with figures of them in a paper by Dr. Watt, shortly to be published in the *Journal of the Linnean Society*, vol. xx. p. 1 (ined.), together with the following, which should follow 35. *P. uniflora*, p. 493.

P. WATTII, *King in Herb. Calcutt.*; glabrous, leaves oblong-lanceolate narrowed into the petiole obtuse lobulate or crenate softly hairy, scape slender 6-8-fld., bracts narrow or rounded, flowers capitate, calyx large lax cupular membranous irregularly incised, corolla violet, limbs broadly infundibular, lobes crenate.

SIKKIM HIMALAYA; Chola, Natong, *Dr. King*.

Rootstock small. *Leaves* 2-4 in., membranous. *Heads* 1-2 in. diam. *Calyx* $\frac{1}{2}$ in., veined. *Corolla-tube* $\frac{1}{2}$ in., glabrous; limb twice as long and broad. *Stamens* at the mouth of the tube. *Ovary* globose, top rounded; style very short, stigma truncate.—A very beautiful plant.

P. 495. ANDROSACE. This genus also has been illustrated by Dr. Watt for the *Journal of the Linnean Society*, l. c. p. 16 (ined.), where the following additional species is described: it should follow 3. *A. geraniifolia*, p. 497.

A. CROFTII, *Watt in Journ. Linn. Soc. ined*; small, perennial, stoloniferous, densely rufous tomentose, leaves petioled reniform-rounded crenate or lobulate lobules 1-3-crenulate, scape stout few-fld. equalling the leaves, flowers umbellate, bracts lanceolate obtuse, pedicels short, calyx-lobes obtuse, corolla small lobes obovate retuse.

SIKKIM HIMALAYA; Singalelah, alt. 12-13,000 ft., *Watt*.

Whole plant clothed with (when dry) rufous hairs. *Rootstock* short, creeping. *Leaves* 1-1 $\frac{1}{2}$ in. long with the petiole; blade $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., hairy on both surfaces. *Flowers* $\frac{1}{2}$ in. diam., apparently purple.

P. 542, line 6, after *acuminata* add *Lindl.*; and for 260 read 268.

P. 546, for *B. Mottleyana*, *De Vriese*, read *B. Motleyana*, *Clarke*; and add at end of specific character, *Isonandra Motleyana*, *De Vriese in Mig. Journ.* 1861, 257.

INDEX OF GENERA, SPECIES AND SYNONYMS.

The Synonyms and Species incidentally mentioned are printed in Italics.

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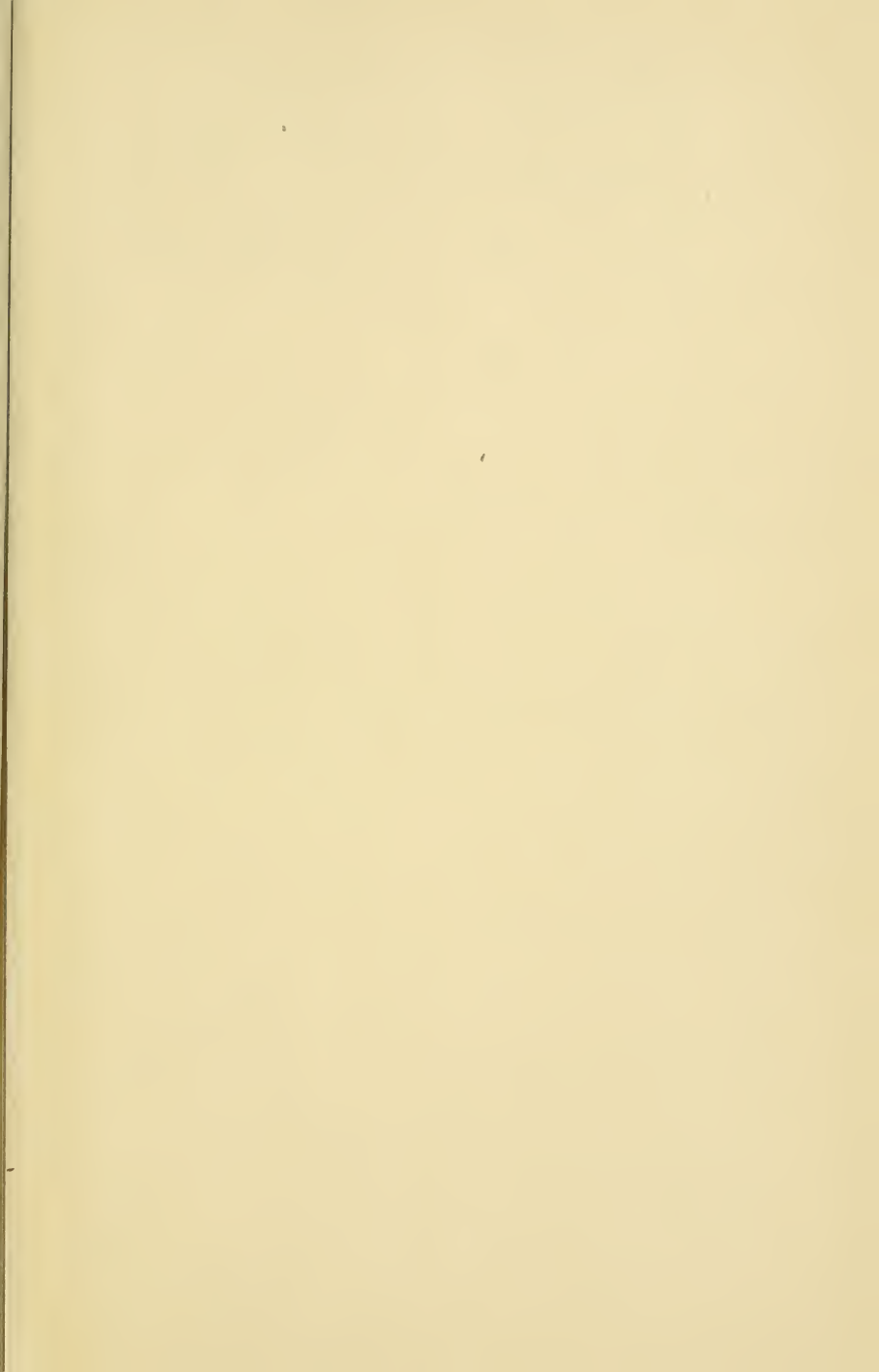
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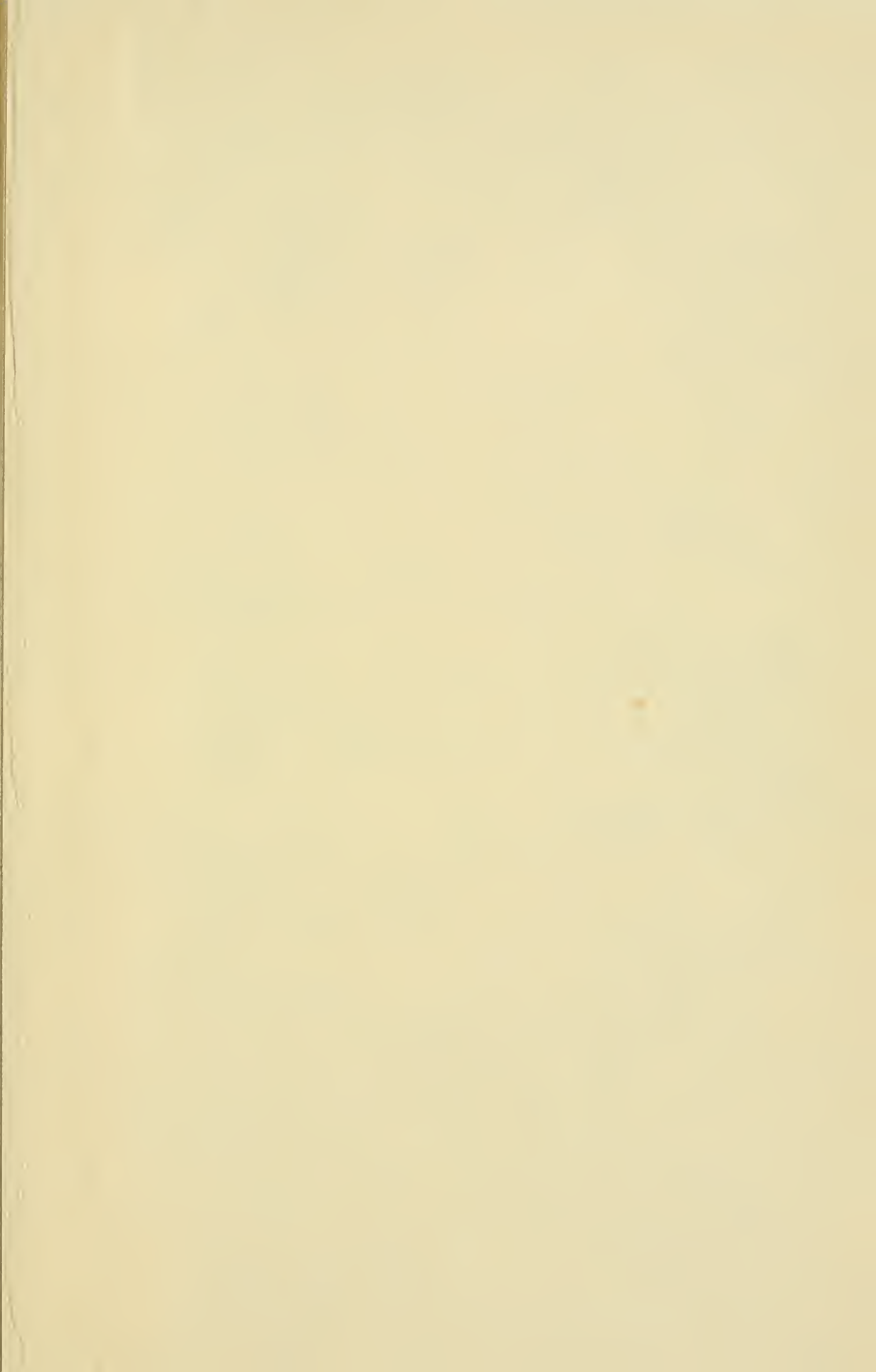
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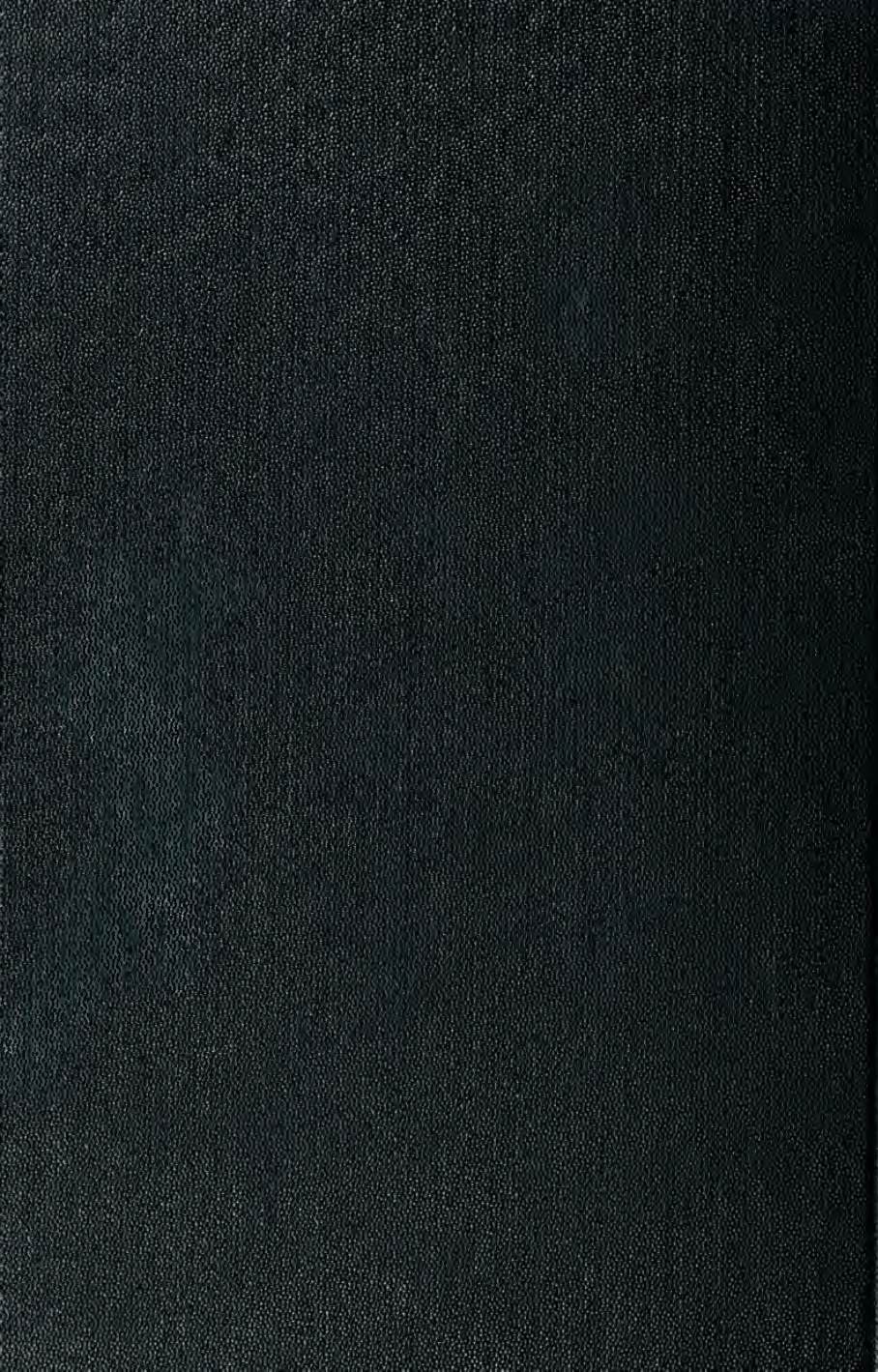
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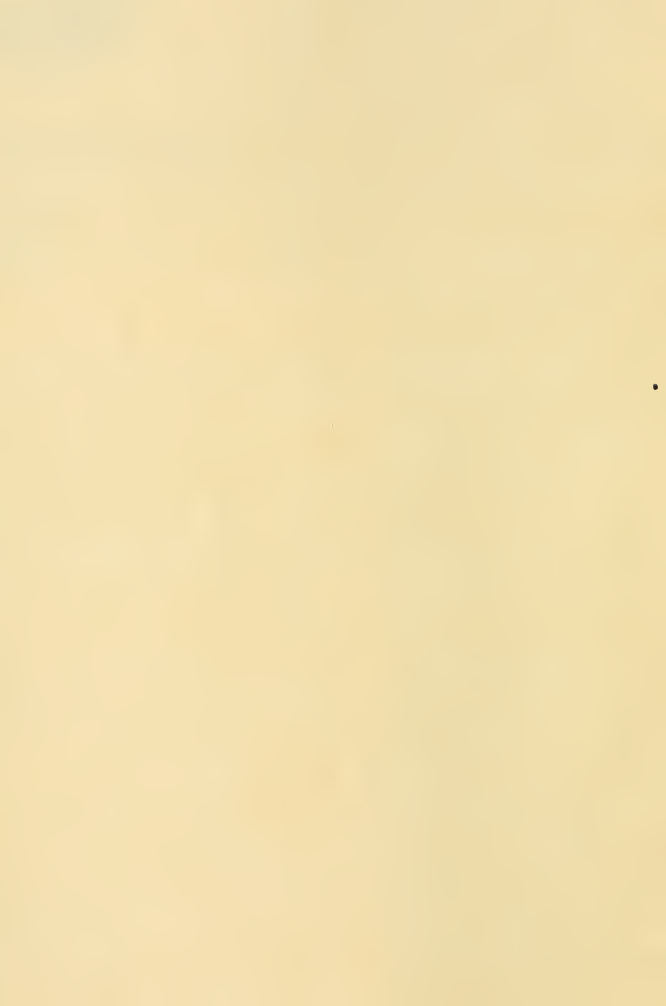
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THE
FLORA OF BRITISH INDIA.

BY

SIR J. D. HOOKER, C.B., K.C.S.I.

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CORRESPONDING MEMBER OF THE INSTITUTE OF FRANCE, AND HON. MEMBER OF THE
ASIATIC SOCIETY OF BENGAL.

ASSISTED BY VARIOUS BOTANISTS.

VOL. IV.

ASCLEPIADEÆ TO AMARANTACEÆ.

PUBLISHED UNDER THE AUTHORITY OF THE SECRETARY OF STATE FOR
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FLORA OF BRITISH INDIA.

ORDER XCV. **ASCLEPIADEÆ.** (By J. D. Hooker.)

Herbs or shrubs, usually twining. *Leaves* opposite or obsolete, very rarely alternate, quite entire, exstipulate. *Inflorescence* various, usually an axillary umbelliform cyme; flowers regular, hermaphrodite, 5-merous. *Calyx* inferior, lobes or segments imbricate. *Corolla lobes* or *segments* valvate or overlapping to the right, very rarely to the left; tube or throat often with a ring of hairs, scales, or processes (the outer or *corolline corona*). *Stamens* at the base of the corolla, filaments free in *Periploceæ* with or without interposed glands; in other tribes, connate into a generally very short fleshy column, which usually bears a simple or compound ring or series of scales or processes (inner or *staminal corona*) that are attached to the filaments or to the back of the anthers, or to both; anthers crowning the column, connate or free, adnate by the connective to the stigma, 2-celled; tip often produced into an inflexed membrane; pollen forming one or two granular or waxy masses in each cell, the masses united in pairs or fours to a gland (*corpuscle*) which lies on the stigma. *Ovary* of two distinct superior carpels, enclosed within the staminal column; styles 2, short, uniting in the stigma, which is 5-angled short and included between the anthers, or is produced beyond them into a long or short simple or 2-fid column; ovules many, rarely few, 2-seriate in each carpel. *Fruit* of 2 follicles. *Seeds* compressed, usually flat ovoid winged and surmounted with a dense long brush of hairs (*coma*) (absent in *Sarcolobus*); albumen copious, dense; embryo large; cotyledons flat, radicle short, inferior.—**DISTRIB.** Species about 1,000, chiefly tropical.

* The analysis of the plants of this order is most difficult, and in dried specimens never satisfactory, from the fleshiness and complexity of the coronal processes and anthers. I have spent many months over the Indian ones, and have kept pretty close to the generic limits adopted in the "Genera Plantarum." I have, however, been obliged to abandon the tribe *Stapelieæ*, to suppress *Vincetoxicum*, and to propose several new genera.

SUBORDER I. Periploceæ. Filaments usually free; anthers acuminate or with a terminal appendage; pollen-masses granular, in pairs in each cell.

TRIBE I. Periploceæ. Characters of the Suborder.

* Coronal scales or processes 0.

Anthers with bearded appendages 1. **PENTANURA.**

** Coronal scales corolline, free, short, thick.

Corolla very small, rotate, lobes valvate 2. **HEMIDESMUS.**

VOL. IV.

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Corolla small, rotate, lobes overlapping 3. *CRYPTOLEPIS*.
 Corolla large, funnel-shaped, lobes overlapping *3. *CRYPTOSTEGIA*.

*** Coronal scales 5, free, close to or adnate to the filaments.

† *Coronal scales short, broad; filaments without interposed glands.*

A pubescent twining shrub; leaves opposite 4. *BRACHYLEPIS*.
 An erect tree; leaves alternate 5. *UTLERIA*.

†† *Coronal scales filiform or subulate.*

a. *Filaments free without interposed glands.*

Cymes stopt, pubescent. Corolla-lobes short, broad . . . 6. *FINLAYSONIA*.
 Cymes slender, glabrous. Corolla-lobes slender, straight . 7. *ATHEROSTEMON*.

β. *Filaments free, with interposed teeth or glands.*

Cymes slender, glabrous. Corolla-lobes short, triangular . 8. *ATHEROLEPIS*.
 Cymes slender, glabrous. Corolla-lobes long, slender. . . 9. *ATHERANDRA*.
 Cymes short, sessile. Corolla-lobes short, ovate . . . 10. *STREPTOCAULON*.
 Cymes loosely paniced. Corolla-lobes lanceolate . . . 11. *MYRIOPTERON*.

††† *Coronal scales short, broad; filaments connate, with interposed glands.*

Cymes peduncled. Corolla-lobes ovate, valvate 12. *DECALEPIS*.

**** Coronal scales connate into a lobed ring; filaments without interposed glands.

Corolla rotate, lobes overlapping 13. *PERIPLOCA*.

SUBORDER II. **Euasclepiadeæ**. Filaments connate; pollen-masses waxy.

TRIBE II. **Secamoneæ**. Anthers with a membranous inflexed tip; pollen-masses in pairs in each cell (20 in all), sessile in fours (2 pairs) on the corpuscle.

Corolla rotate, lobes overlapping to the right 14. *SECAMONE*.
 Corolla rotate, lobes overlapping to the left 15. *TOXOCARPUS*.
 Corolla rotate, lobes valvate 16. *GENIANTHUS*.

TRIBE III. **Cynancheæ**. Anthers with a membranous inflexed tip; pollen-masses solitary in each cell (10 in all), sessile or pedicelled in pairs on the corpuscle, pendulous.

* Corona single, corolline, 5-cleft 17. *GLOSSONEMA*.

** Corona double, corolline and staminal 18. *OXYSTEMMA*.

*** Corona staminal, of 5 processes adnate to the anthers; or 0.

† *Stem erect.*

Corolla valvate. Coronal processes laterally compressed . 19. *CALOTROPIS*.
 Corolla valvate. Coronal processes spatulate *19. *ASCLEPIAS*.
 Corolla-lobes overlapping. Coronal processes short, fleshy . 20. *PENTABOTHRAS*.

†† *Stem twining. Corolla-lobes overlapping.*

Corolla campanulate. Coronal processes ligulate 21. *RAPHISTEMMA*.
 Corolla rotate. Coronal processes laterally compressed . 22. *PENTATROPIS*.
 Corolla funnel-shaped. Coronal processes laterally compressed 23. *DÆMIA*.
 Corolla campanulate. Coronal processes 0 24. *ADELOSTEMMA*.

**** Corona single, staminal, cupular or annular. Corolla rotate.

- Corona of a 10-lobed ring, and 5 horny processes behind the
anthers 25. HOLOSTEMMA.
Corona annular. Leafy erect or twining herbs or shrubs 26. CYNANCHUM.
Corona annular. Leafless straggling shrubs 27. SARCOSTEMMA.

TRIBE IV. **Marsdeniææ**. Anthers with a membranous inflexed tip (absent in *Physostelma* and rarely in *Hoya*); pollen-masses solitary in each cell (10 in all), sessile, or pedicelled in pairs on the corpuscle, erect (rarely horizontal or pendulous in *Tylophora*).

* Corolla-lobes overlapping. Corona 0, or corolline.

- Stem twining. Corolla-lobes short. Corona 0 28. SARCOLOBUS.
Stem pendulous. Corolla-lobes long. Stigma included 29. PENTASACME.
Stem twining. Corolla lobes short. Corona on the corolla-
tube 30. GYMNEMA.

** Corolla-lobes overlapping. Coronal processes on the staminal column, rarely 0.

† *Corolla urceolate companulate or salver-shaped.*

- Corolla urceolate. Coronal processes minute or 0. Stigma
included 31. GONGRONEMA.
Corolla urceolate or salver-shaped. Coronal scales on the
back of the anthers, simple 32. MARSDENIA.
Corolla rotate or salver-shaped. Coronal scales on the back
of the anthers, notched 33. PERGULARIA.
Corolla salver-shaped, coriaceous. Coronal scales 0 (in
Indian species) 34. STEPHANOTIS.
Corolla-lobes long, doubled down inwards in bud 35. LYGISMA.

†† *Corolla rotate.*

- Cymes various. Column minute. Coronal processes fleshy 36. TYLOPHORA.
Cymes umbelliform. Column large; coronal processes simple 37. TREUTLERA.
Cymes racemiform. Column minute, fleshy; coronal pro-
cesses 2-fid 38. COSMOSTIGMA.
Cymes umbelliform, pendulous. Coronal scales spreading,
cuspidate 39. DREGEA.

*** Corolla valvate. Coronal processes adnate to the staminal column.

- Corolla small, rotate. Column short, corona stellate. Fol-
licles slender 40. HETEROSTEMMA.
Corolla large, rotate. Column short, corona stellate. Fol-
licles stout 41. DITTOCERAS.
Corolla urceolate or disciform. Corona cupular, fleshy 42. OIANTHUS.
Corolla minute, urceolate. Coronal scales membranous, erect 43. DISCHIDIA.
Corolla rotate. Corona very large, stellate 44. HOYA.
Corolla cupular. Corona large, stellate 45. PHYSOSTELMA.
Corolla-tube short, lobes long subulate. Ovary sunk in the
calyx-tube 46. PYCNORHACHIS.

TRIBE V. **Ceropegieæ**. Anthers incumbent on the stigma, without a membranous tip; pollen-masses one in each cell (10 in all) sessile in pairs on the corpuscle, erect or horizontal. Corolla-lobes valvate in all.

* Corona double; corolline lining the corolla-tube and forming minute processes in the sinus of its lobes, staminal annular.

Calyx turbinate, 5-lobed. Corolla rotate 47. LEPTADENIA.

Calyx 5-partite. Corolla salver-shaped 48. ORTHANTHERA.

** Corona staminal, simple or compound, annular, 5-10 lobed, with 5 processes from its inner face which overlap the anthers.

† *Leafy herbs with terete stems and branches.*

Corolla rotate, lobes very narrow. Stem very slender, erect

or twining 49. BRACHYSTELMA.

Corolla-tube long. Stem stout or slender, erect or twining . 50. CEROPEGIA.

Corolla rotate. Stem erect and branches short, stout, fleshy . 51. FREREA.

†† *Leafless herbs, with fleshy 4-angled stems and branches.*

Corolla rotate, lobes very narrow. Flowers lateral, subsolitary 52. CARALLUMA.

Corolla rotate, lobes very broad. Flowers terminal, umbelled 53. BOUCEROSIA.

GENUS KNOWN BY NAME ONLY.

ODONTANTHERA, *Wight in Lindl. Veg. Kingd.*, 626.

TRIBE 1. PERIPLOCÆ.

1. PENTANURA, Blume.

Twining glabrous shrubs. *Leaves* opposite, elliptic, strongly nerved. *Flowers* small, fascicled on a short axillary peduncle, purplish. *Calyx* small, 5-glandular within. *Corolla* subcampanulate, fleshy; lobes concave, overlapping to the right. *Coronal scales* 0. *Filaments* free, arched, bases distant; anthers oblong, adherent below to the stigma, tipped with bearded appendages; pollen-masses granular; appendages of the corpuscles stipitate, flabellate. *Stigma* capitate, 5-angled. *Follicles* divaricate, cylindric. *Seeds* comose.—Species 2; a Sumatran and the following.

P. khasiana, *Kurz in Herb. Calcutt.*; glabrous, leaves elliptic-lanceolate acuminate at both ends, petiole slender. *Pentanura* sp., in *regione Yunan* and *Periploca khasiana*, *Benth. in Gen. Pl.* ii. 740 and 746.

KHASIA MTS., alt. 3-4000 ft., J. D. H. & T. T., *Kurz*.—DISTRIB. Yunan.

Branches smooth. *Leaves* 4-5 by $1\frac{1}{4}$ - $1\frac{1}{2}$ in., reddish when dry beneath and finely reticulated, midrib stout; nerves 8-10 pairs, arched; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Peduncle* stout, $\frac{1}{4}$ in. in the Khasian specimen, $\frac{1}{2}$ -1 in. in the Yunan ones. *Corolla* about $\frac{1}{4}$ in. diam.; lobes pubescent within, pink. *Filaments* and back of anther pubescent as in *Phyllanthera* (which is perhaps not generically distinct) in the Yunan specimens, glabrous in the Khasian. *Style* elongate; stigma 2-lobed at the top. *Follicles* (young) in Khasian specimen $\frac{1}{2}$ - $\frac{3}{4}$ in. long, ovoid, incurved, obtuse.—I have not seen the Sumatran species which is the type of the genus.

2. HEMIDESMUS, Br.

Twining shrubs. *Leaves* opposite, hoary or pubescent beneath. *Flowers* small, in opposite crowded subsessile cymes, greenish-purple. *Sepals* glandular within, acuminate. *Corolla* rotate; lobes thick, valvate. *Coronal scales* 5, on the corolla-throat, alternate with its lobes, short, thick. *Filaments* distinct; anther-tips connate, inflexed, membranous; pollen-masses cohering in pairs in

each cell, granular; appendages of the corpuscles dilated or hooded. *Stigma* 5-angled, crown flat. *Follicles* long, slender, divaricate, terete, smooth. *Seeds* comose.

H. indicus, *Br. in Mem. Wern. Soc.* i. 57; leaves from broadly obovate to oblong elliptic linear or linear-lanceolate obtuse or apiculate. *Wall. Cat.* 8243; *Wight Contrib.* 63; *Wight Ic.* t. 594; *Deless. Ic. Sel.* v. t. 55; *Dalz. & Gibs. Bomb. Fl.* 147; *Grah. Cat. Bomb. Pl.* 122; *Dcne. in DC. Prodr.* viii. 494; *Benth. & Trim. Med. Pl.* t. 174. *H. Wallichii*, *Miquel Pl. Hohenack.* No. 359. *Periploca indica*, *Willd. Sp. Pl.* i. 2251. *Asclepias pseudo-sarsa*, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 39, excl. *syn.*—*Burm. Thes. Zeyl.* t. 83, f. 1; *Rheede Hort. Mal.* x. t. 34.

NORTHERN INDIA; from Banda to Oudh and Sikkim, and southwards to Travancore and CEYLON.

Leaves most variable in form, length, and breadth, the shorter and broader 1-1½ by 1-1½ in., the longer 4 by ½ in., the broadest sometimes retuse at the tip, the narrowest finely acuminate, those on the young shoots often white along the midrib; petiole ½ in. *Pedicels* clothed with ovate acute imbricating bracts. *Corolla* ½ in. diam., green without, purple within. *Follicles* 4-5 in. *Seeds* ½ in., ovate-oblong, flattened, black; coma 1 in.

VAR. pubescens; stem and leaves beneath and sometimes above pubescent. *H. pubescens*, *Wight & Arn. Contrib.* 63; *Wight Ic.* t. 1320; *Wall. Cat.* 8244; *Dcne. in DC. Prodr.* viii. 495.—Behar on the Soane river, *J. D. H.*; Deccan Peninsula, *Wight, &c.*

3. **CRYPTOLEPIS**, *Br.*

Twining glabrous shrubs. *Leaves* opposite. *Flowers* in very lax slender dichotomous few-flowered peduncled terminal or axillary cymes. *Calyx* with 5 scales within. *Corolla-tube* short, cylindric or bell-shaped; lobes linear, overlapping and twisted to the right. *Coronal scales* 5, about or above the middle of the tube, linear or clavate, conniving. *Filaments* subconnate by their broad bases; anthers short, adhering by their base to the stigma, tips conniving, acuminate; pollen-masses cohering in pairs in each cell, granular, appendages oblong. *Stigma* broadly conic. *Follicles* divaricate, terete, smooth. *Seeds* comose.—*DISTRIB.* Species 14; Tropical Asiatic and African.

1. **C. Buchanani**, *Roem. & Sch. Syst.* iv. 409; glabrous, leaves oblong or elliptic, glaucous beneath, nerves very many slender nearly horizontal, cymes axillary many-flowered. *Wight Ic.* t. 494, and *Ill.* t. 182, f. 8; *Falc. in Trans. Linn. Soc.* xix. 53, t. 5; *Brandis. For. Fl.* 330; *Dalz. & Gibs. Bomb. Fl.* 148. *C. reticulata*, *Wall. Cat.* 1640; *Royle Ill.* 270. *Nerium reticulatum*, *Roxb. Hort. Beng.* 19, and *Fl. Ind.* ii. 8. *Echites reticulata*, *Roth Nov. Sp.* 134. *E. cuspidata*, *Heyne in Herb. Rottl.*—*Rheede Hort. Mal.* ix. t. 11.

Throughout INDIA, from WESTERN KASHMIR to ASSAM and BURMA, ascending the Himalaya to 4000 ft.; and southwards to TRAVANCORE and CEYLON.

Leaves 3-6 by 1-2½ in., coriaceous, shining above, sometimes obovate, apiculate or acuminate, base acute; petiole ½ in. *Cymes* very shortly peduncled, paniculate; branches short, divaricate. *Sepals* short, acute. *Corolla* yellow, ¾ in. diam.; tube very short, lobes lanceolate. *Coronal scales* clavate. *Follicles* 2-4 in., straight, rigid, gradually narrowed from about the middle where they are ½-¾ in. diam. *Seeds* ¼ in. long, oblong-ovate, contracted below the tip, compressed; coma 1 in.

2. **C. grandiflora**, *Wight Ic.* t. 831, and *Ill.* ii. 169, t. 155 b, f. E; glabrous, leaves obovate oblong or elliptic obtuse or mucronate, pale beneath,

nerves 5-6 pairs arched, cymes axillary and terminal few- or many-flowered. *C. Wightiana*, *Wall. Cat.* 4457. *Echites coriacea*, *Heyne in Herb. Rottler*.

DECCAN PENINSULA; the Mount, Madras, *Heyne*, &c.; Balaghaut Mts., *Wight*.

Leaves 2-4 by 1-2 in., very variable in form, coriaceous, hardly glaucous beneath, base acute; petiole $\frac{1}{2}$ in. *Cymes* sparingly branched, usually long-peduncled; branches stout, prominently distantly scarred by the fallen bracts. *Sepals* large, ovate, acute. *Corolla* 1 in. diam; tube ventricose, lobes falcate lanceolate. *Coronal scales* clavate. *Follicles* 2-4 in., curved and conniving or straight and divaricate. *Seeds* very large, $\frac{3}{4}$ in. long, linear-oblong; coma a little longer.

3. *C. elegans*, *Wall. Cat.* 1639; glabrous, leaves oblong or linear-oblong or lanceolate apiculate, rounded at both ends or acuminate, glaucous beneath, nerves numerous very faint and spreading, cymes axillary and terminal few-flowered. *G. Don Gen. Syst.* iv. 82. *C. pauciflora*, *Wight Ic.* t. 493. *C. laxiflora*, *Blume Mus. Bot.* i. 147. *Aganosma Edithæ*, *Hance in Ann. Sc. Nat. Ser.* 5. v. 227. *Echites pauciflora*, *Herb. Rottl.* *Nerium pauciflorum*, *Roxb. Ic. ined.*

SIKKIM; Terai, *J. D. H. Orissa*, *Heyne*. ASSAM, BENGAL, KHASIA MTS., CHITTAGONG, TENASSERIM AND ANDAMAN ISLDS.—DISTRIB. Java, S. China.

A slender climber. *Leaves* $1\frac{1}{2}$ - $2\frac{1}{2}$ by $\frac{3}{4}$ in., rarely ovate or linear-lanceolate, tip sometimes retuse, base rarely cordate; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., very slender. *Cymes* 2-4 in., peduncles long, branches few and pedicels slender. *Sepals* ovate, obtuse. *Corolla* yellow, $1-1\frac{1}{2}$ in. diam., tube short, lobes lanceolate, tips twisted. *Coronal scales* clavate. *Follicles* 5-8 in., slender, nearly straight. *Seeds* much as in *C. Buchanani*.—The mss. name of *Apocynum orizense*, in Rottler's Herbarium, indicates the Orissa habitat of this plant. *Flower* fragrant.

3*. **CRYPTOSTEGIA**, *Br.*

Lofty climbers. *Leaves* opposite. *Flowers* large, in terminal 3-chotomous cymes. *Sepals* lanceolate. *Corolla* funnel-shaped, tube short, throat campanulate; lobes broad, overlapping and twisted to the right. *Coronal scales* at the base of the throat, subulate, entire or 2-cleft. *Filaments* short; anthers adnate to the stigma, acute; pollen-masses in pairs in each cell, granular, appendages subspathulate. *Stigma* convex. *Follicles* thick, divaricate, hard, 3-winged, furrowed between the wings. *Seeds* comose.—DISTRIB. Madagascar.

C. grandiflora, *Br. in Bot. Reg.* t. 435; glabrous, leaves elliptic obtuse, coronal scales cleft into two filiform segments. *Wall. Cat.* 1635; *Wight & Arn. Contrib.* 36; *Wight Ic.* t. 832, and *Ill.* ii. t. 182, f. 9; *Grah. Cat. Bomb. Pl.* 122; *Dalz. & Gibs. Bomb. Pl. Suppl.* 54; *Dene. in DC. Prodr.* viii. 492; *Miquel Pl. Rar. Jard. Buitenz.* t. 8; *Reichb. Ic. Exot.* t. 132. *Nerium grandiflorum*, *Roxb. Hort. Beng.* 19, and *Fl. Ind.* ii. 100.

Cultivated in various parts of INDIA.

Branches stout. *Leaves* 3-4 by $1\frac{1}{2}$ -2 in., coriaceous, glossy above; nerves many, spreading, arched, faint, base acute; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Cymes* short, spreading, peduncle and branches stout, hoary or glabrous; bracts caducous. *Sepals* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Corolla* pale pinkish purple, tube and throat $1\frac{1}{2}$ in. long, limb often 2 in. diam., lobes acute. *Follicles* 4-5 by $1-1\frac{1}{2}$ in., broadest near the base, straight, woody. *Seeds* $\frac{1}{4}$ in. long, oblong-ovate, compressed, narrowed upwards; coma $1\frac{1}{2}$ in., very fine.—Supposed to be a native of Africa or Madagascar, from which latter country another species is described with leaves pubescent beneath and entire coronal scales, but this is only known from Mauritian garden specimens. Schweinfurth found *C. grandiflora* cultivated at Khartum on the Nile.

4. **BRACHYLEPIS**, Wight & Arn.

A pubescent or tomentose twining shrub. *Leaves* opposite. *Flowers* small, villous, in terminal or axillary dichotomous cymes. *Sepals* ovate, glandular within. *Corolla* rotate, 5-cleft; lobes short, overlapping and twisted to the right. *Coronal scales* 5, broad, membranous, close to the stamens. *Anthers* sessile, cohering in a fleshy ring, tips acute conniving; pollen-masses in pairs in each cell, granular; appendages of the corpuscles orbicular. *Stigma* 5-angled, top flat. *Follicles* divaricate, acuminate, thick, smooth.

B. nervosa, Wight & Arn. *Contrib.* 64; *Wight Ic.* t. 1284; *Dcne. in DC. Prodr.* viii. 495; *Deless. Ic. Sel.* v. t. 56.—*Tylophora* sp., *Miquel in Pl. Hohen.* n. 1389.

NILGHERY MTS., alt. 5-7500 ft., common, Wight, &c.

Leaves 3-4 by 1-2 in., elliptic or ovate, acuminate, base acute or rounded, coriaceous, glabrous and glossy above; nerves 8-10 pairs, spreading and arched; petiole stout, $\frac{1}{2}$ in. *Cymes* villous, peduncles and pedicels short, stout; bracts persistent; bracteoles numerous, imbricate. *Corolla* $\frac{1}{2}$ in. diam., green outside, purple within, lobes ovate. *Follicles* not seen.

5. **UTLERIA**, Beddome.

A glabrous tree. *Leaves* scattered, narrow, subcrenulate. *Flowers* minute, towards the ends of the long branches of terminal peduncled dichotomous cymes. *Sepals* rounded, glandular within. *Corolla* subrotate, 5-cleft, lobes overlapping and twisted to the right. *Coronal scales* 5, small, opposite and close to the stamens. *Filaments* short; anthers ovate, conniving over and adnate to the stigma; pollen-masses in pairs in each cell, granular; appendages of the corpuscles dilated. *Stigma* convex. *Fruit* unknown.

U. salicifolia, Beddome mss.

DECCAN PENINSULA; Anamallay Mts., alt. 3-4000 ft., Beddome.

Branches stout. *Leaves* crowded at the ends of the branches, 7-9 by $\frac{1}{2}$ -1 in., narrowly lanceolate, acuminate, coriaceous, margin thickened waved or crenulate, base very acute; nerves many, very slender, nearly horizontal, reticulations fine; petiole 1-2 in. *Cymes* 4-6 in., sparingly branched; bracts on the terminal branches numerous, imbricate, obtuse; pedicels short. *Corolla* $\frac{1}{10}$ in. diam., lobes ovate, acute.

6 **FINLAYSONIA**, Wall.

A lofty glabrous climber. *Leaves* opposite. *Flowers* in 2-3-chotomous axillary cymes, yellowish and purple. *Sepals* rounded, short. *Corolla* rotate, 5-cleft; lobes ovate, overlapping to the right. *Coronal scales* 5, close to the stamens, filiform. *Stamens* on the throat of the corolla, filaments slender; anthers adnate by the middle to the stigma, beardless, tip membranous inflexed acute. *Pollen-masses* in pairs in each cell, granular; tips of the corpuscles slightly dilated. *Stigma* 5-angled, top flat. *Follicles* divaricate, turgid, narrowed at both ends, 1-3 winged, tip with a revolute beak. *Seeds* margined with soft retrorse hairs.

F. obovata, Wall. *Pl. As. Rar.* ii. 48, t. 162, and *Cat.* 4466; *Wight & Arn. Contrib.* 65; *Wight Ill.* t. 182, f. 5; *Griff. Notul.* iv. 70, and *Ic. Pl. Asiat.* t. 407; *Dcne. in DC. Prodr.* viii. 494. *Gurua obovata*, Ham. in *Voigt Hort. Sub. Calc.* 544.

From the SUNDERBUNDS to TENASSERIM and MALACCA; Wallich, &c.

Branches stout. *Leaves* 3-4 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., obovate-oblong or oblanceolate, obtuse or apiculate, thickly coriaceous, reticulate beneath, base acute; nerves very numerous, horizontal, very slender; petiole $\frac{1}{2}$ -1 in. *Cymes* 2-3 in. long; peduncle and branches very thick; bracts short, persistent; pedicels short, thick. *Corolla* $\frac{1}{2}$ in. diam., lobes bearded within. *Follicles* 3 by 2 in., distantly ribbed between the wings, pericarp thin. *Seeds* $\frac{3}{4}$ in. long, flat, obovate-oblong, hairs brown.—*Flowers* fœtid (Voigt).

7. **ATHEROSTEMON**, Blume.

A very slender glabrous twining shrub. *Leaves* opposite. *Flowers* in axillary and terminal slender peduncled dichotomous cymes. *Calyx* minute, tube turbinate, eglandular within. *Corolla* rotate; lobes long, slender, overlapping to the right, straight and forming an oblong-cylindric bud. *Coronal* processes 5, filiform, at back of the bases of the filaments. *Stamens* at the base of the corolla; filaments very short, distinct, without interposed glands or teeth; anthers conniving over and adnate to the stigma, tips membranous, acute; pollen-masses in pairs in each cell, granular; appendages of the corpuscles dilated. *Stigma* rounded. *Fruit* unknown.

A. javensis, Blume Mus. Bot. i. 126, t. 23.

TENASSERIM; banks of the Gyna, Moulmein, Lobb.—DISTRIB. Java.

Leaves 2-3 $\frac{1}{2}$ by $\frac{3}{4}$ - $1\frac{1}{2}$ in., oblong-elliptic or linear-oblong, apiculate, glaucous beneath, base obtuse or rounded; nerves 6-10 pairs, very slender, arched; petiole slender, $\frac{1}{2}$ - $\frac{3}{4}$ in. *Cymes* much longer than the leaves; peduncle long and slender, branches filiform; bracts minute; flowers very few, distant; pedicels capillary, tip turbinate. *Calyx*-lobes small, rounded, membranous, with sometimes a very obscure scale in the sinits. *Corolla*-lobes long, linear, obtuse, $\frac{3}{4}$ in. long, erect and recurved. *Stamens* very minute.

8. **ATHEROLEPIS**, Hook. f. Nov. Gen.

A pubescent slender climber. *Leaves* opposite, very narrow, membranous. *Flowers* very small, in very short few-flowered axillary pubescent cymes. *Calyx* $\frac{1}{2}$ -superior, tube turbinate; lobes short, eglandular within. *Corolla* rotate; lobes triangular, overlapping to the right. *Coronal* scales 5, subulate, at the back of the stamens. *Stamens* at the base of the corolla; filaments very short, distinct, with interposed rounded glands; anthers oblong, conniving over and adherent to the stigma, tips obtuse, connate; pollen-masses in pairs in each cell, granular; appendages of the corpuscles dilated. *Ovary* half sunk in the calyx-tube and adherent to it; stigma small, tip obtuse. *Fruit* unknown.

A. Wallichii, Hook. f. *Atherandra Wallichii*, Benth. in Gen. Plant. ii. 744. Hemidesmus Wallichii; Wight & Arn. Contrib. 63; Wall. Cat. 8245; Dene. in DC. Prodr. viii. 495.

PEGU, at Promé, Wallich; Rangoon, McClelland.

Branches glabrous below. *Leaves* 3-7 by $\frac{1}{2}$ - $1\frac{1}{2}$ in., narrow, oblong or linear-lanceolate, acute or acuminate, puberulous above, softly pubescent beneath; base acute; nerves rather distant, spreading, slightly arched, very slender; petiole $\frac{1}{2}$ in. *Cymes* shorter than the petioles; bracts minute; pedicels very short, top turbinate. *Corolla* $\frac{1}{10}$ in. diam., shortly conic in bud, lobes glabrous within. *Filaments* alternating with obscure low glands.—The habit, foliage, inflorescence, eglandular calyx, obtuse anthers and short stigma well distinguish this from *Atherandra*.

9. **ATHERANDRA**, *Dcne.*

Slender glabrous twining shrubs. *Leaves* opposite. *Flowers* in axillary and terminal slender peduncled dichotomous cymes. *Calyx-tube* turbinate, lobes with quadrate crenulate glands within. *Corolla* rotate; lobes long, slender, overlapping and sharply twisted to the right, forming a long-beaked bud. *Coronal* processes 5, filiform, at the back of the bases of the filaments. *Stamens* at the base of the corolla; filaments distinct, alternating with large erect glands; anthers sagittate, conniving over and adnate to the stigma, tips elongate, filiform; pollen-masses in pairs in each cell, granular; appendages of the corpuscles dilated. *Ovary* partly sunk in the broad calyx-tube; stigma elongate-conical, 2-fid. *Fruit* unknown.

A. acutifolia, *Dcne. in DC. Prodr.* viii. 497. *A. pubescens*, *Blume Mus. Bot.* i. 147, t. 2. *A. cuspidata*, *Blume l. c.* *Cryptolepis filiformis*, *Wall. Cat.* 4458.

PENANG, *Wallich*.—DISTRIB. *Java*.

Branches and *leaves* beneath glabrous or sparingly pubescent. *Leaves* 1-2 by 1-1½ in., oblong or obovate-oblong, finely abruptly acuminate; nerves 6-8 pairs, strong beneath, arched; petiole ½-¾ in. *Cymes* numerous, quite glabrous, spreading, longer than the leaves; bracts small, deciduous; pedicels thickened towards the turbinate tip. *Calyx-lobes* ovate, acute, erect or reflexed. *Corolla* ½-¾ in. diam., long and slenderly beaked in bud.

10. **STREPTOCAULON**, *Wight & Arn.*

Twining tomentose herbs or shrubs. *Leaves* opposite. *Flowers* small or minute, in lax sessile or peduncled trichotomous paniced cymes. *Calyx* minute, glandular within. *Corolla* rotate; lobes ovate, overlapping to the right; buds shortly conical. *Coronal-scales* 5, filiform, adnate to the back of the filaments. *Stamens* at the base of the corolla; filaments very short, alternating with minute teeth; anthers conniving over and adnate to the stigma, tip with an obtuse triangular process; pollen-masses in pairs in each cell, granular; appendages of the minute corpuscles dilated. *Stigma* convex, 2-lobed. *Follicles* divaricate, terete, smooth, not winged.—DISTRIB. *Species* 6; *Indian* and *Malayan*.

1. **S. Kleinii**, *Wight & Arn. Contrib.* 65; shrubby, climbing, leaves cuneate-obovate base cordate with softly appressed white tomentum beneath, nerves 7-10 pairs, cymes pubescent shorter than the leaves. *Dcne. in DC. Prodr.* viii. 496.

DECCAN PENINSULA; *Klein*.

Leaves 2-3 by 1-1½ in., coriaceous, above puberulous closely reticulated with sunk nerves, beneath pale buff when dry; nerves and reticulation faintly seen through the tomentum; petiole ¼-½ in. *Cymes* with a stout peduncle ½-1½ in., sparingly shortly di-tri-chotomously branched, branchlets very short 1-2-fid; bracts tomentose, persistent. *Sepals* hirsute, ovate, subacute, 1-2-glandular. *Corolla* ½ in. diam.; lobes ovate, subacute, sparingly hirsute externally, glabrous within.

2. **S. Wallichii**, *Wight & Arn. Contrib.* 65; shrubby, climbing, leaves broadly or narrowly elliptic acute at both ends finely acuminate softly brown-tomentose beneath, nerves 6-8 pairs, cymes much branched many-fid. hispidly pubescent, flowers quite glabrous. *Wall. Cat.* 8249; *Dcne. in DC. Prodr.* viii. 496.

PENANG, *Phillips, Maingay* (Kew Distrib. 1100), &c. SINGAPORE, *Wallich*.

Branches stout, young densely shortly pubescent; bark brown, lenticellate. *Leaves* 2-3 by 1-2 in., very variable in breadth, coriaceous, opaque and puberulous above, reticulations minute; nerves faint beneath; petiole $\frac{1}{4}$ - $\frac{1}{3}$ in. *Cymes* spreading, 1-2 in. long and broad; 2-3-chotomously branched; branches divaricate, slender, ultimate with persistent sometimes imbricate minute bracts; pedicels slender, tips turbinate. *Sepals* glabrous, minute, obtuse. *Corolla* $\frac{1}{10}$ in. diam., red, lobes broad acute. *Follicles* 3 by $\frac{1}{2}$ in. divaricate, straight, acuminate, pubescent. *Seeds* $\frac{1}{4}$ in., oblong, narrowed below the tip; coma $1\frac{1}{4}$ in.

3. **S. tomentosum**, *Wight & Arn. Contrib.* 64; shrubby, climbing, leaves cuneate elliptic or oblanceolate acuminate base rounded or truncate, softly fulvous-tomentose beneath, nerves 16-20 pairs, cymes many-flowered densely pubescent, corolla quite glabrous. *Wight Ill.* t. 182 f. 2.; *Wall. Cat.* 8248; *Dcne. in DC. Prodr.* viii. 496.

AYA, at Taongdong and MOULMEIN, *Wallich*. PEGU, *McClelland*. **DISTRIB.** YUNAN. Cochinchina.

Branches smooth, ultimate finely densely pubescent. *Leaves* very variable in breadth, 3-5 by $1\frac{1}{2}$ - $3\frac{1}{2}$ in., usually broadest beyond the middle and truncate at the base, puberulous above; nerves straight, prominent or concealed in the tomentum beneath; petiole $\frac{1}{3}$ - $\frac{2}{3}$ in. *Cymes* short, 1 in. long and broad or less, branches divaricate; bracts persistent. *Sepals* pubescent. *Corolla* $\frac{1}{10}$ in.; lobes broad ovate, acute. *Fruit* unknown.

4. **S. Griffithii**, *Hook. f.*; shrubby, climbing, leaves obovate-oblong or oblanceolate acuminate base cordate, scaberulous above, densely rusty-tomentose beneath, nerves 14-18 pairs, cymes hispidly tomentose, corolla glabrous. *Streptocaulon, Griff. Notul.* iv. 71, & *Ic. Pl. As.* t. 406.

TENASSERIM, *Helper* (Kew Distrib. 3754, under *tomentosum*); Mergui, *Griffith*.

Branches stout, lenticellate, ultimate hispidly tomentose. *Leaves* 3-6 by $1\frac{1}{2}$ -2 in., variable in form, often broadest above the middle, hard and coriaceous, finely impressedly reticulate above; nerves and reticulations, usually prominent beneath. *Cymes* 1-2 in. long and broad, densely hispid, branches rather stout divaricate; bracts persistent; pedicels short. *Calyx* strigose. *Corolla* $\frac{1}{6}$ in. diam.; lobes broad, acute. *Follicles* 3-4 by $\frac{1}{2}$ in., straight, acute, finely pubescent. *Seeds* nearly $\frac{1}{2}$ in., narrowly oblong, coma 1 in.

5. **S. sylvestre**, *Wight Contrib.* 65; herbaceous, prostrate, leaves sessile orbicular or broadly ovate pubescent or tomentose beneath, base rounded or cordate, nerves 6-7 pairs, cymes small few-fld., corolla nearly glabrous. *Wall. Cat.* 8251; *Dcne. in DC. Prodr.* viii. 496.

BENGAL, *Hamilton*; foot of the SIKKIM HIMALAYA, *Clarke*.

Root woody, giving off many slender pubescent flexuous branches, 12-18 in. long with distichous leaves that lie flat on the ground. *Leaves* 1- $1\frac{1}{2}$ in. long and nearly as broad, apiculate, glabrous or puberulous above; nerves arched, prominent beneath. *Cymes* $\frac{1}{2}$ in., pubescent; peduncle slender; branches and pedicels short, not spreading; bracts minute; *Calyx* small, strigose. *Corolla* $\frac{1}{2}$ in. diam., purple, very slightly pubescent, lobes lanceolate acute. *Fruit* unknown.

11. MYRIOPTERON, *Griff.*

A glabrous or pubescent slender twining shrub. *Leaves* opposite, long-petioled. *Flowers* small, in lax paniculate cymes from opposite axils. *Sepals* minutely glandular within. *Corolla* rotate; lobes narrow, overlapping to the right, twisted to the left, broadly conic in bud. *Coronal scales* 5, at the back of the filaments, filiform from a broad base. *Stamens* at the base of the corolla,

filaments connate below into a ring with alternating teeth; anthers conniving over and adherent to the stigma, tips membranous; pollen-masses in pairs in each cell, appendages of the corpuscles 2-fid. *Stigma* convex, 2-fid. *Follicles* short, turgid, straight; with many longitudinal membranous wings. *Seeds* comose.

M. paniculatum, *Griff. in Calc. Journ. Nat. Hist.* iv. 385; & *Notul.* iv. 71. & *Ic. Pl. Asiat.* 408. *Streptocaulon extensum*, *Wight Contrib.* 65, & *Ill.* t. 182. f. 3.; *Dene. in DC. Prodr.* viii. 496. *S. Horsfieldii*, *Miq. Fl. Ind. Bat.* ii. 470. *Vicarya cristata*, and *Jenkinsia cristata*, *Wall. mss. in Voigt Hort. Sub. Calc.* 544.

ASSAM, CHITTAGONG, PEGU, and TENASSERIM. *DISTRIB.* Java.

Branches smooth, herbaceous. *Leaves* $3\frac{1}{2}$ –5 by $2\frac{1}{2}$ in., very variable in length and breadth, rounded oblong or elliptic, acuminate or subcaudate, base rounded or acute, membranous, finely pubescent or glabrate beneath; nerves 5–7 pairs, slender, arched; petiole very slender, $\frac{1}{2}$ – $1\frac{1}{2}$ in. *Cymes* 3–7 in., peduncle and brachiate branches very slender, quite glabrous; bracts few, chiefly at the forks; pedicels capillary, top turbinate. *Sepals* minute, rounded, ovate. *Corolla* $\frac{1}{2}$ in. diam.; lobes lanceolate. *Follicles* 3 by $\frac{3}{4}$ in., straight, narrowed to the obtuse tip, base rounded, pericarp thin. *Seeds* $\frac{1}{2}$ in. long, ovoid, narrowed to the tip, coma 1 in.—*M. Horsfieldii*, agrees with the perfectly glabrous leaved states of the plant from Tenasserim.

12. DECALEPIS, *Wight & Arn.*

A glabrous twining shrub. *Leaves* opposite. *Flowers* small, in axillary peduncled cymes. *Calyx* eglandular within. *Corolla* rotate; lobes valvate, bearded within, ovoid in bud. *Coronal scales* 5, ovate, adnate to the back of the base of the filaments. *Stamens* at the base of the corolla, filaments connate at the base with alternating minute glands; anthers ovate, conniving over and adnate to the stigma, tip acute inflexed; pollen-masses in pairs in each cell, granular; appendages of the corpuscles dilated. *Stigma* convex, 5-grooved. *Fruit* unknown.

D. Hamiltonii, *Wight & Arn. Contrib.* 64; *Wight Ill.* t. 182. f. 6.; & *Ic.* t. 1285; *Dene. in A. DC. Prodr.* viii. 495. *Streptocaulon Hamiltonii*, *Wight mss.* *Apocynum reticulatum*, *Herb. Madr.*; *Wall. Cat.* 8247.

DECCAN PENINSULA; Balaghaut Mts. near Madras; Anamallay hills, *Wight*.

Branches stout, smooth. *Leaves* coriaceous, orbicular or elliptic-obovate, tip rounded, base acute or rounded, finely reticulated; nerves 6–8 pairs, strongly arched; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Cymes* in single axils, glabrous or puberulous; peduncle $\frac{1}{2}$ in.; branches few, short, spreading; bracts persistent, scattered or subimbricate. *Sepals* oblong, obtuse. *Corolla* $\frac{1}{4}$ in. diam., coriaceous; lobes ovate-oblong, subacute, beard dense white.

13. PERIPLOCA, *Linn.*

Erect or twining glabrous sometimes leafless shrubs. *Leaves* opposite. *Flowers* in lax terminal or axillary cymes, greenish externally, purplish within. *Calyx* 5-glandular within. *Corolla* rotate; lobes obtuse, usually bearded within, overlapping to the right. *Coronal scales* connate into a 10-lobed ring often produced behind the stamens into 5 subulate or branched processes. *Stamens* within the corona, filaments broad short flat; anthers bearded on the back, conniving over and adhering to the stigma, tips cohering, with incurved appendages; pollen-masses in pairs in each cell, granular; appendages of the corpuscles dilated. *Stigma* convex. *Follicles* conniving spreading or divaricate, cylindric, smooth. *Seeds* comose. *DISTRIB.* S. Europe, West Asia and Africa, Species 12.

1. ***P. aphylla***, *Dene. in Jacq. Voy. Bot.* 109. t. 116; and in *DC. Prodr.* viii. 499; erect, leafless or nearly so, flowers purple, coronal lobes very long filiform glabrous. *Boiss. Fl. Orient.* iv. 50. *Campelepis viminea*, *Falc. in Trans. Linn. Soc.* xix. 109, in note.

WESTERN PANJAB, in the plains, *Falconer, &c.* SCIND Stocks. DISTRIB. Afghanistan, Persia, Arabia, Nubia.

A shrub; branches as thick as a goose-quill or less, smooth or tips pubescent. *Leaves*, if present, $\frac{1}{4}$ in., oblong, acute, very thick, nerveless. *Cymes* often opposite, $\frac{1}{2}$ –1 in. long and broad, branched from the base or on short thick peduncles, glabrous; branches short, thick; bracts caducous. *Sepals* broad, rounded-ovate. *Corolla* $\frac{1}{2}$ – $\frac{2}{3}$ in. diam., dark purple, glabrous externally, lobes ovate-oblong, densely bearded above the middle within. *Follicles* $\frac{3}{4}$ by $\frac{1}{4}$ in., rigid, woody, terete. *Seeds* $\frac{1}{4}$ in., narrowly oblong; coma 1 in.—“Used for cordage; flowers fragrant, eaten by natives, taste like raisins” (*Stocks*).

2. ***P. hydaspidis***, *Falc. in Ann. & Mag. of Nat. Hist.* viii. 449; twining, leafless or nearly so, flowers yellow, coronal lobes subulate hairy. *Dene. in DC. Prodr.* viii. 498.

WESTERN HIMALAYA; Southern Kashmir and Kishtwar, ascending to 4000 ft., and the adjacent PANJAB, *Falconer, Thomson, &c.* DISTRIB. Afghanistan.

Quite glabrous. *Branches* tortuous, wiry, sometimes fascicled, as thick as a crow-quill, smooth. *Leaves* (if present) $\frac{1}{2}$ – $\frac{1}{4}$ in., linear, subacute, thick, nerveless. *Cymes* $\frac{1}{2}$ –1 in. long and broad, often opposite, very numerous; peduncle stout, erect, branches divaricate; bracts caducous. *Sepals* rounded, quite glabrous. *Corolla* $\frac{1}{2}$ in. diam.; lobes oblong, obtuse, pubescent or villous within, glabrous externally. *Follicles* (old only seen) broader and less woody than in *P. aphylla*.

3. ***P. calophylla***, *Falc. in Ann. & Mag. Sc. Nat.* viii. 449; twining, quite glabrous, leaves narrowly lanceolate caudate-acuminate, nerves very many horizontal, flowers yellow or pinkish, coronal lobes hairy. *Brandis For. Fl.* 330. *Dene. in DC. Prodr.* viii. 498. *Streptocaulon calophyllum*, *Wight Contrib.* 65, and *Ill.* t. 182, f. 1; *Wall. Cat.* 8252.

TEMPERATE and SUBTROPICAL HIMALAYA, alt. 3–5000 ft. from Kumaon to Sikkim, KHASIA Mts. alt. 4000 ft.

A small shrub, branches slender. *Leaves* $1\frac{1}{2}$ –3 by $\frac{1}{4}$ – $\frac{3}{4}$ in., coriaceous, shining on both surfaces, margin undulate; petiole $\frac{1}{4}$ in. *Cymes* numerous, often in opposite axils, sessile, $\frac{1}{2}$ –1 in. long and broad; branches and pedicels slender; bracts caducous. *Sepals* broadly ovate, obtuse. *Corolla* $\frac{1}{2}$ in. diam., lobes ovate-oblong acute. *Follicles* 4–8 by $\frac{1}{4}$ in., quite straight or curved, parallel or divergent, never divaricate, smooth, terete; pericarp thin but firm. *Seeds* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, linear; coma 1–1 $\frac{1}{2}$ in.

TRIBE 2. SECAMONEÆ.

14. SECAMONE, *Br.*

Climbing or straggling shrubs or undershrubs. *Leaves* opposite. *Flowers* small or minute, in sessile or shortly peduncled lax axillary 2–3-chotomous cymes. *Corolla* rotate, 5-cleft; lobes (in Indian species) overlapping to the right. *Coronal scales* 5, adnate to the staminal tube, laterally compressed, tips free. *Filaments* short, connate; anther-tips small, membranous, inflexed; pollen-masses in pairs in each cell, small, globose, waxy, corpuscles minute. *Stigma* beaked, 2-fid, or low and conical. *Follicles* stout or slender, acuminate, smooth, terete or angled. DISTRIB. Species about 24, tropical Asia, Australia, and Mascarene Islands.

S. emetica, Br. in Mem. Wern. Soc. i. 56; slender, glabrous, except the puberulous cymes, climbing, leaves lanceolate, or linear- or elliptic-lanceolate subacute narrowed into the short petiole, cymes much shorter than the leaves, corolla glabrous, coronal-scales broadly subulate incurved much shorter than the column, stigma 2-lobed, follicles slender straight terete narrowed from the base to the tip. *Dene. in DC. Prodr.* viii. 501; *Wight Contrib.* 60; *Ic.* t. 1283, and *Ill.* t. 155. b. *fig. D.*; *Wall. Cat.* 8236. *Periploca emetica*, Retz. Obs. ii. 14.

Mountains of the SOUTH DECCAN PENINSULA and CEYLON.

Leaves $1\frac{1}{2}$ -3 by $\frac{1}{2}$ - $\frac{1}{2}$ in., rather glaucous beneath, nerves very faint. Cymes few- or many-fl.; peduncle $\frac{1}{2}$ - $\frac{1}{2}$ in. Sepals ciliolate. Corolla $\frac{1}{2}$ in. diam., segments oblong, obtuse, bases saccate. Follicles 2-2 $\frac{1}{2}$ in.—*S. Finlaysoni*, Wight; *Wall. Cat.*, a native of Siam, has much broader leaves and longer cymes.

15. TOXOCARPUS, Wight & Arn.

Twining shrubs. Leaves opposite. Flowers small, in axillary dichotomous cymes. Calyx minute; lobes oblong, obtuse. Corolla-tube short; lobes narrow, spreading and recurved, glabrous, overlapping to the left. Coronal scales minute, obtuse or acute, adnate to the column. Filaments connate; anthers small, retuse, often inappendiculate; pollen-masses 2 in each cell, very minute, pendulous, waxy. Stigma produced far beyond the column. Follicles smooth. Seeds comose. **DISTRIB.** Species about 14, tropical Asiatic and African.

I am unable to determine accurately from herbarium specimens the characters of the very minute staminal column and its scales in this genus.

* Cymes rusty-pubescent. Corolla-segments without an adnate scale.

† Corolla-segments villous or hairy at the base only.

1. **T. villosus**, *Dene. in DC. Prodr.* viii. 506; leaves elliptic-oblong subacute or cuspidate rusty-pubescent beneath, cymes lax, coronal scales with subulate tips overtopping the anther-cells, stigma slender quite entire. *Miq. Fl. Ind. Bot.* ii. 475. *Secamone villosa*, *Blume Bijl.* 1050.

TENASSERIM; Mergui, *Griffith*.—**DISTRIB.** JAVA.

Leaves 2-3 $\frac{1}{2}$ by 1-1 $\frac{1}{2}$ in., base acute, glabrous in age; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. Cyme-branches stout and sepals densely villous. Corolla $\frac{1}{2}$ in. diam., segments slightly hairy at the base.

2. **T. Griffithii**, *Dene. in DC. Prodr.* viii. 505; leaves elliptic-oblong or lanceolate cuspidate, young glabrous beneath, cymes short, coronal scales not overtopping the anther-cells, stigma short enlarged upwards, tip notched. *Toxocarpus* sp. *Griff. Notul.* iv. 69, and *Ic. Pl. Asiat.* t. 404 (*Asclepiadæ*).—*Connaracea*, *Wall. Cat.* 8550.

TENASSERIM, *Griffith*, &c. MALACCA, *Maingay* (Kew distrib. 1105). SINGAPORE, *Lobb.* PENANG, *Porter*.

Leaves 2-4 by 1-2 in., base acute or rounded; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. Cymes few-fl. Corolla-segments slightly hairy at the base, the hairs disposed in a triangle like the adnate scale of *T. acuminatus*. Follicles 12 in., very slender, flexuous, cylindric. Seeds 1 in., very slender, not beaked.

3. **T. himalensis**, *Falc. mss.*; leaves elliptic-oblong or lanceolate or orbicular obtusely cuspidate, young pubescent beneath, coronal scales overtopping the anther-cells, stigma slender unequally 2-fl.

WESTERN HIMALAYA; Chaumussoore, *Falconer*. ASSAM and KHASIA MTS., *Jenkins, Griffith, H. f. & T. &c.*

Leaves 3–5 by $1\frac{1}{2}$ –3 in., quite glabrous when old, base acute or rounded, petiole $\frac{1}{2}$ – $\frac{2}{3}$ in. *Corolla* $\frac{1}{2}$ in. diam.; lobes membranous, slender, villous at the base within. *Follicles* 4–6 by $\frac{1}{2}$ – $\frac{2}{3}$ in., young rusty-pubescent. *Seeds* ovate, beaked, $\frac{2}{3}$ in. long.—The only Himalayan specimen is *Falconer's*, and probably from Garwhal.

†† *Corolla-segments glabrous throughout.*

4. **T. Roxburghii**, *W. & A. Contrib.* 61; stem cymes and calyx sparsely hirsute, leaves broadly elliptic cuspidate membranous glabrous base subacute, cymes spreading much shorter than the leaves, flowers few sessile, coronal scales acute hardly overtopping the anther-cells, stigma fusiform. *Wight Ic. t.* 475; *Wall. Cat.* 8239; *Dcne. in DC. Prodr.* viii. 505; *Asclepias longistigma*, *Roxb. Fl. Ind.* ii. 46.

THE CIRCARS, *Heyne; Roxburgh.*

Leaves $2\frac{1}{2}$ –3 by $1\frac{1}{2}$ –2 in., midrib sparsely puberulous beneath; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. and nerves very slender. *Cymes* shortly peduncled; flowers solitary or clustered, $\frac{1}{4}$ in. diam.; bracts very minute.—I am in doubt about this plant, for which *Wight* cites n. 1561 as his catalogue number, for the solitary specimen in his "Herbarium" has no number, locality, or collector's name attached. Good specimens are however in *Rottler's* "Herbarium," sent by *Heyne* as *Echites dichotoma*, *Herb. Heyne* (not the plant published under that name), and in *Wallich's* also from *Heyne*. *Roxburgh* gives no locality for it in his "Flora," but *Wight* gives the Circars on *Roxburgh's* authority. The flowers in his (*Roxburgh's*) drawing are twice as large as in the specimens. *Wight* and *Arnott* and *Decaisne* describe the corolla-throat as hirsute, which is perfectly glabrous in *Roxburgh's* drawing and in the specimens; and the cymes as longer than the leaves, whereas they are much shorter. As a species it is very near *T. Kleinii*, but is a much more slender less villous plant, with very short coronal scales.

5. **T. Kleinii**, *Wight & Arn. Contrib.* 61; leaves from elliptic-ovate or obovate or lanceolate to orbicular acuminate or cuspidate glabrous or pubescent beneath base acute, cymes spreading and calyx densely tomentose, flowers few sessile and pedicelled, coronal scales overtopping the anther-cells, stigma long fusiform tip slender notched. *Wight Ic. t.* 886; *Dcne. in DC. Prodr.* viii. 505.

HILLS of the DECCAN PENINSULA, from the Concan southwards. CEYLON; Matu-ratte district alt. 3000 ft. *Thwaites; Galle, Champion.*

Very near *T. Roxburghii*, but stouter, with more coriaceous leaves, longer more densely tomentose cymes, larger usually pedicelled flowers $\frac{1}{3}$ in. diam., less membranous calyx and corolla, and longer coronal scales. *Follicles* quite glabrous, more or less curved, some 3 by $\frac{1}{3}$ in. and flattened, others 7 by $\frac{1}{3}$ in. and nearly cylindric. *Seeds* $\frac{1}{3}$ in. ovate, hardly beaked.—In some specimens, both Peninsular and Ceylonese, the leaves are narrow, 2 by $\frac{1}{3}$ in., quite glabrous and shining on both surfaces, in others they are $2\frac{1}{2}$ in. long and broad, rusty-pubescent beneath. I do not find the tube of the corolla to be pubescent within as figured by *Wight*.

6. **T. concanensis**, *Hook. f.*; leaves obovate or elliptic cuspidate mottled and glabrous or pubescent beneath, cymes densely tomentose much branched many-fl., coronal scales hardly overtopping the anther-cells, stigma long slender.

CANARA; on the Bababoodan hills, *Law.*

This again closely resembles *T. Kleinii*, but the leaves are much larger, 3–5 by $2\frac{1}{2}$ –3 in., more obovate, with petioles $\frac{1}{2}$ – $\frac{2}{3}$ in. long, and the cymes are more divided, very many-flowered, densely tomentose. The leaves are dark green, minutely mottled between the nerves beneath in a branching reticulated manner, a character I do not

find in its allies, though there are traces of it in *T. Kleinii*. Fragment of a follicle cylindric, glabrous.

7. **T. Kurzii**, *Hook. f.*; leaves large broadly elliptic-ovate broadly cuspidate coriaceous shining, cymes small, flowers few sessile, calyx nearly glabrous, coronal scales obtuse hardly overtopping the anther-cells, stigma long slender.

MIDDLE ANDAMAN ISLAND, *Kurz*.

I have seen but one specimen, which is nearest to *T. Kleinii*, differing in the large (4-5 by $2\frac{1}{2}$ -3 in.) coriaceous leaves, long ($\frac{2}{3}$ in.) petioles and nearly glabrous calyx.

** Corolla lobes with a triangular erose scale adnate to their bases.

8. **T. acuminatus**, *Benth. in Gen. Pl. ii. 747*; leaves elliptic-lanceolate acuminate quite glabrous shining base acute, cymes branching from the base branches and branchlets very long slender few-fl., flowers pedicelled. *Gonio-stemma acuminatum*, *Wight Contrib. 62*; *Wall. Cat. 8242*; *Dcne. in DC. Prodr. viii. 504*.

SILHET, *Wallich*.

Stem glabrous, pustular. *Leaves* 4-5 by $1\frac{1}{4}$ - $1\frac{1}{2}$ in., shining on both surfaces. nerves many, faint, spreading; petiole $\frac{1}{3}$ - $\frac{1}{2}$ in. *Cymes* almost glabrous, nearly equalling the leaves; pedicels very slender; bracts very minute. *Sepals* very small, rounded. *Corolla* $\frac{1}{4}$ in. diam., quite glabrous, lobes lanceolate twice as long as the tube. *Coronal scales* triangular, shorter than the column. *Stigma* long, fusiform.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

T. FRIOCARPUS, *Hook. f.*; leaves elliptic-oblong or oblong-lanceolate acute at both ends quite glabrous, petiole slender, nerves slender very oblique, follicles long curved terete finely pubescent, seeds linear-oblong tip not contracted.

TRAVANCORE; at Courtallan, *Wight*.

Branches glabrous, woody. *Leaves* $2\frac{1}{2}$ -3 by $1-1\frac{1}{2}$ in. firm, pale when dry. petiole $\frac{1}{3}$ - $\frac{1}{2}$ in. *Flowers* not seen. *Follicles* 5-7 by $\frac{1}{3}$ in. woody. *Seeds* $\frac{3}{4}$ in. long.

T. ROXBURGHII, *Griff. Notul. iv. 68*; *Id. Pl. Asiat. t. 386a f. 4, 5, not of W. & A.* from Mergui. This, though referred by Griffith to Roxburgh's *Asclepias longistigma* (*T. Roxburghii*, W. & A.), is certainly not that plant, and is, I suspect, *T. Griffithii*.

? *T. WIGHTIANUS*, *Hook. & Arn. Bot. Beech. Voy. 200*; *Dcne. in DC. Prodr. viii. 506*; stem very slender, young densely rusty-tomentose, leaves small $1-1\frac{1}{2}$ in. elliptic oblong cuspidate glabrous above rusty-pubescent beneath, base rounded, nerves 2-4 pairs, slender oblique, petiole $\frac{1}{2}$ in.—Specimens in leaf only collected by Dr. Thomson and myself at the Bor-panee river, Khasia Mts. alt. 2000 ft., quite resemble the Chinese *T. Wightianus*, which may be known by its very small cymes of flowers, like those of *T. himalensis*, and its short tomentose pods.

16. **GENIANTHUS**, *Hook. f., Gen. Nov.*

Twining shrubs. *Leaves* opposite. *Flowers* small, in axillary subsimple or dichotomously branched cymes. *Calyx* minute, lobes oblong obtuse. *Corolla-tube* short; lobes narrow, spreading and recurved, villous to the tip on the inner face, valvate. *Corona* of 5 scales adnate to the column. *Staminal-column* minute; pollen-masses 2 in each cell, minute, waxy. *Stigma* sessile and capitate, or long and slender.—DISTRIB. Species 3 or 4 tropical Asiatic and Malayan.

This genus is distinguished from *Toxocarpus* by the bearded corolla-lobes and valvate aestivation.

• *Stigma sessile, capitate. Cymes very compound.*

1. **G. laurifolius**, *Hook. f.*; leaves glabrous broadly elliptic obtusely acuminate, base acute, petiole slender, cymes rusty-tomentose much branched many-fld., coronal scales obtuse hardly overtopping the anther-cells. *Toxocarpus laurifolius*, *Wight Contrib.* 61, and *Ic. t.* 598; *Wall. Cat.* 8241; *Dene. in DC. Prodr.* viii. 506. *T. crassifolius*, *Dalz. & Gibs. Bomb. Fl.* 148. *Asclepias laurifolia*, *Roxb. Fl. Ind.* ii. 49.

SIKKIM HIMALAYA, in hot valleys, *J. D. H. & T. T. CHITTAGONG* to *PEGU*, *Roxburgh, Kurz, &c.* *CONCAN* and *CANARA. Stocks, &c.*

Stem glabrous, pustular. *Leaves* 3-4 by 2-3 in. or larger; nerves slender, spreading; petiole $\frac{1}{2}$ - $1\frac{1}{2}$ in. *Cymes* very variable, 1-4 in. long and broad; flowers $\frac{1}{10}$ - $\frac{1}{8}$ in. diam., sessile and pedicelled, of two forms on the same cyme, one small with narrow densely bearded segments, the other much larger with broader oblong nearly glabrous segments. *Follicles* in *Roxburgh's* figure 5 by $\frac{1}{8}$ in., very slender, terete, straight.—*Wight & Arnott* give *Cawnpore*, *Genl. Hardwicke*, as a locality for this, but I suspect some mistake.

** *Stigma* elongate, columnar. *Cymes* subsimple, branches long stout with distant clusters of sessile flowers.

2. **G. crassifolius**, *Hook. f.*; branches cymes and midrib beneath rusty-tomentose, leaves thickly coriaceous broadly elliptic acute or acuminate, coronal scales overtopping the anther-cells. *Toxocarpus crassifolius*, *Wight Contrib.* 61; *Wall. Cat.* 8240; *Dene. in DC. Prodr.* viii. 506.

SILHET, *Wallich*.

Leaves 3-5 by 2-2½ in., base rounded or subacute, margins narrowly recurved, nerves very spreading; petiole stout, $\frac{1}{2}$ - $\frac{2}{3}$ in. *Cymes* simple, or twice or thrice branched, stout, flexuous, as long as the leaves; flowers $\frac{1}{2}$ in. diam. *Stigma* very stout, subclavate.

3. **G. Maingayi**, *Hook. f.*; branches and cymes rusty-pubescent, leaves glabrous oblanceolate obtusely acuminate, coronal scales overtopping the anther-cells.

SINGAPORE, *Maingay* (*Kew Distrib.* n. 1106).

Leaves 2½-3½ by 1½-1½ in., coriaceous, narrowed into the petiole, midrib beneath glabrous or pubescent. nerves ascending; petiole $\frac{1}{4}$ -½ in. *Cymes, flowers, staminal column* and *stigma* as in *G. crassifolius*.

TRIBE 3. CYNANCHÆ.

17. GLOSSONEMA, *Dene.*

Diffuse, hoary undershrubs or herbs, branched from the base. *Leaves* opposite. *Cymes* small 2-6-flowered, sessile or shortly peduncled; flowers small. *Sepals* glandular within. *Corolla* subcampanulate, tube short, lobes overlapping to the right. *Corona* near the base of the tube, 5-cleft; lobes large, broad, hyaline, obtuse acuminate or ligulate. *Staminal column* short; anthers tipped by an inflexed membrane; pollen-masses solitary in each cell, oblong, not compressed, pendulous, waxy. *Stigma* exserted, fleshy, conical clavate or peltate. *Follicles* thick, acuminate, mucicate or spinous. *Seeds* comose.—*DISTRIB.* Species 6; tropical African, Arabian and Scind.

G. varians, *Benth. in Gen. Pl.* ii. 748; leaves fleshy ovate or rounded obtuse or acute, margin crisped or entire, upper narrower, cymes subsessile, pedicels very short, corolla-lobes rounded. *Mastostigma varians*, *Stocks in Hook. Ic. Pl.* t. 843; *Boiss. Fl. Orient.* iv. 51.

SCIND, *Vicary, Frere, Stocks*.—DISTRIB. Beluchistan, Persia.

Annual? *Branches* 4-6 in., stout, erect or decumbent. *Leaves* 1-2 in., often as broad, base acute, nerves obscure; petiole $\frac{1}{2}$ -1 in. *Flowers* yellowish, $\frac{1}{2}$ in. diam. *Follicles* 2-3 in., ovoid, turgid, beaked, fleshy; spines very stout, soft, scattered. *Seeds* $\frac{1}{2}$ in., broadly ovate, flattened, pale yellow-red, margins thin.

18. OXYSTELMA, Br.

Twining glabrous herbs or undershrubs. *Leaves* narrow, opposite. *Flowers* large, in loose racemose or umbelliform cymes or solitary, pedicels filiform. *Calyx* small, 5- ∞ glandular within. *Corolla* broadly urceolate, or campanulate or rotate; lobes ciliate and subvalvate below, tips overlapping to the right. *Corona* double, corolline annular, at the base of the corolla, papillose within, margin membranous, truncate; staminal of 5 scales adnate to the bases of the stamens with cordate or dilated bases, 2-keeled within. *Filaments* short, connate; anther-tips membranous, inflexed; pollen-masses one in each cell, oblong, compressed, pendulous, waxy. *Stigma* depressed, or subconvex. *Follicles* thick, oblique or curved, smooth or narrowly 2-winged. *Seeds* comose.—DISTRIB. Species 4; tropical Asia and Africa.

O. esculentum, Br.; leaves lanceolate linear-lanceolate or linear finely acuminate, base acute rounded or cordate, corolla 1 in. diam. ciliate, follicles oblong lanceolate or ovoid. *Wight Contrib.* 54; *Grah. Cat. Bomb. Pl.* 121; *Dalz. & Gibs. Bomb. Fl.* 150; *Hook. Comp. Bot. Mag.* t. 22; *Griff. Notul.* iv. 61, and *l.c. Pl. Asiat.* t. 399, 400; *Wall. Cat.* 8219; *Miq. Fl. Ind. Bat.* iii. 483; *Dene. in DC. Prodr.* viii. 542. *O. Wallichii*, *Wight Contrib. l.c.*; *Dene. l.c.*; *Wall. Cat.* 8220. *Periploca esculenta*, *Linn. f. Suppl.* 168; *Roxb. Cor. Pl.* i. 13, t. 11. *Asclepias rosea*, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 40, and *As. Research.* iv. 268 (*Dooghdhika*).

Throughout the plains and lower hills of INDIA; from the Punjab to Ceylon, Assam, Pegu and Tenasserim.—DISTRIB. Ava, Java.

A deciduous-leaved very slender climbing perennial. *Leaves* 4-6 by $\frac{1}{2}$ -1 in., membranous, nerves many, uniting far within the margin; petiole $\frac{1}{2}$ in., very slender. *Cymes* few-fl., peduncles and pedicels capillary. *Flowers* white and rose-coloured with purple veins. *Follicles* 2-3 in., rather membranous. *Seeds* very numerous, $\frac{1}{2}$ in., broadly ovate, flat.—*O. Wallichii* of Wight differs only in the more oblong follicles rounded at the end.

19. CALOTROPIS, Br.

Erect, glabrous or hoary shrubs or small trees. *Leaves* opposite, broad, sessile. *Flowers* medium-sized in umbelliform or subracemose cymes. *Sepals* glandular within. *Corolla* broadly campanulate; lobes broad, naked, valvate. *Coronal-scales* 5, fleshy, laterally compressed, radiating from the large staminal column, dorsally spurred. *Anther-tips* membranous, inflexed; pollen-masses one in each cell, pendulous flattened, waxy. *Stigma* depressed, 5-angled or -lobed. *Follicles* short, thick. *Seeds* comose.—DISTRIB. Species 3; tropical Asia and Africa.

1. **C. gigantea**, Br. in *Hort. Kew. Ed.* 2, ii. 78; sub-arboreous, leaves sessile beneath and umbels cottony, corolla-lobes spreading, coronal-scales truncate hairy. *Hamilt. in Trans. Linn. Soc.* xiv. 245; *Wight Contrib.* 53, and *l.c.* t. 155, 156 A.; *Dalz. & Gibs. Bomb. Fl.* 149; *Grah. Cat. Bomb. Pl.* 120; *Brand. For. Fl.* 331; *Griff. Notul.* iv. 68, and *l.c. Pl. Asiat.* t. 397, 398; *Dene. in DC. Prodr.* viii. 535; *Bot. Reg.* t. 58. *Asclepias gigantea*, *Willd.*; *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 30.

Throughout INDIA, ascending to 3000 ft. in the Himalaya from the Punjab to Assam, Ceylon and Singapore.—DISTRIB. Malay Islands, S. China.

Trunk stout, bark pale, shoots woolly. *Leaves* 4–8 by 1–3 in., cuneate-obovate, base cordate, axils bearded, smooth above, cottony beneath, *Umbels* peduncled, simple or compound; bracts oblong. *Corolla* $\frac{1}{2}$ –2 in. diam., pale purple; segments ovate-lanceolate, revolute and twisted in age. *Follicles* recurved, 3–4 in. *Seeds* $\frac{1}{4}$ in., broadly ovate.

2. **C. procera**, Br. in Ait. Hort. Kew. Ed. 2, ii. 78; shrubby, leaves sessile young and umbels cottony old glabrous, corolla-lobes erect, coronal-scales acute glabrous or pubescent. *Hamilt. in Trans. Linn. Soc.* xiv. 246; *Wight Contrib.* 53, and *Ic. t.* 1278; *Dalz. & Gibs. Bomb. Fl.* 149; *Brand. For. Fl.* 331; *Boiss. Fl. Orient.* iv. 57; *Bentl. & Trim. Med. Pl. t.* 176; *Dene. in DC. Prodr.* viii. 585. *C. Hamiltoni*, Wall. Cat. 8215; *Wight l.c.* *C. Wallichii*, *Wight l.c.* 53; *Wall. Cat.* 8216. *C. heterophylla*, Wall. Cat. 8217; *Wight l.c.* 54. *Asclepias procera*, Bot. Reg. t. 1792.

WESTERN and CENTRAL INDIA, ascending to 3500 ft. from Scind and the Punjab to Behar and Bombay.—DISTRIB. Ava, Persia, trop. Africa.

A shrub 6–15 ft. *Leaves* as in *A. gigantea*, but more oblong and acute, sometimes 8–9 by 4 in. *Umbels* long-peduncled, cottony. *Follicles* 4–5 in., recurved. *Seeds* $\frac{1}{4}$ in., ovoid.

3. **C. Acia**, *Hamilt. in Trans. Linn. Soc.* xiv. 247; herbaceous, leaves petioled obovate oblanceolate or oblong glabrous, corolla-lobes erect, coronal-scales 2-lobed. *C. herbacea*, *Wight Contrib.* 54, and *Ic. t.* 492; *Wall. Cat.* 8218; *Dene. in DC. Prodr.* viii. 536. *Asclepias herbacea*, Roxb. Hort. Beng. 21, and *Fl. Ind.* ii. 50.

N. BENGAL and SIKKIM TERAI; from Tirhoot to Mymensing, ascending the Himalaya to 3000 ft.

Stem erect. *Leaves* 6–8 by 3–4 in., very thick, narrowed into the petiole; nerves few, stout; petiole $\frac{1}{4}$ –1 in.—Flowers as in *C. procera*.

19.* **ASCLEPIAS**, Linn.

Perennial erect herbs. *Leaves* opposite, alternate or whorled. *Cymes* umbelliform; flowers medium-sized or small. *Sepals* glandular within. *Corolla* rotate, lobes often reflexed, naked, valvate. *Coronal-scales* 5, erect, adnate to the column, spoon-shaped. *Anther-tips* membranous, inflexed; pollen-masses one in each cell, pendulous, flattened, waxy. *Stigma* depressed, 5-angled. *Follicles* turgid, beaked, smooth. *Seeds* comose.—DISTRIB. Species 60; all American, except 2 African and the following cosmopolitan one.

A. curassavica, Linn.; *Dene. in DC. Prodr.* viii. 566; perennial, leaves opposite lanceolate or oblong-lanceolate acute narrowed into a short petiole glabrous, umbels many-fld. shortly peduncled, corolla orange-red, lobes reflexed, column stipitate. *Roxb. Hort. Beng.* 20; *Dalz. & Gibs. Bomb. Fl. Suppl.* 54; *Gibs. Cat. Bomb. Pl.* 120; *Bot. Reg. t.* 81.

Bengal and various parts of India, a weed introduced from the West Indies throughout the tropics.

20. **PENTABOTHR**A, Hook. f. Gen. Nov.

A dwarf erect glabrous herb. *Leaves* opposite, linear. *Flowers* in axillary umbelliform short-peduncled cymes. *Sepals* oblong, minutely glandular within. *Corolla* campanulate, deeply 5-lobed; lobes oblong-ovate, overlapping to the

right. *Corona* of 5 pouch-like folds at the base of the column alternating with the anthers, and 5 fleshy laterally compressed processes with free obtuse tips adnate longitudinally to the backs of the anthers. *Anthers* large, horny, membranous tips large oblong; pollen-masses one in each cell, elongate, compressed, falcate, with long pedicels, pendulous, waxy. *Stigma*, a depressed 5-angled cone, included.

P. nana, Hook. f. *Ic. Pl.* 1426. *Cynanchum nanum*, Ham. in *Wight Contrib.* 59; *Wall. Cat.* 8230.

NORTHERN CAMRUP (Lower Assam), at Sanyashikata, in grassy hills, *Hamilton*.

Stem 5-6 in., rigid, divided below. *Leaves* 4 by $\frac{1}{4}$ - $\frac{1}{2}$ in., spreading, exactly linear, acute, base cordate, midrib stout, nerves faint; petiole $\frac{1}{10}$ in. *Umbels* clustered, many-fl'd.; pedicels $\frac{1}{4}$ in.; bracts lanceolate. *Sepals* puberulous. *Corolla* $\frac{1}{5}$ - $\frac{1}{4}$ in. diam., purple within, glabrous.—A very remarkable plant, of which the specimen in Wallich's Herbarium (from which fragments were sent to Wight) is the only one known. It is evidently near *Holostemma* and *Asclepias* itself.

21. RAPHISTEMMA, Wall.

Twining glabrous shrubs. *Leaves* opposite, membranous. *Cymes* axillary, umbelliform, long-peduncled; flowers large, white, long-pedicelled. *Calyx* 5-glandular within. *Corolla* campanulate, 5-fid; lobes spreading, twisted in bud and overlapping to the right. *Coronal-scales* 5, membranous, adnate to the column, produced into long slender linear ligules. *Column* large, anthers with an inflexed membranous tip; pollen-masses one in each cell, not compressed, pendulous, waxy. *Stigma* depressed, flat, 2-lobed in the middle. *Follicles* thick, acute, smooth. *Seeds* comose. **DISTRIB.** Species 2; Asiatic.

1. **R. pulchellum**, Wall. *Pl. As. Rar.* ii. 50, t. 163, and *Cat.* 8221 A.; leaves cordate acuminate, flowers 1-1 $\frac{1}{2}$ in. long. *Wight Contrib.* 55. *Dene. in DC. Prodr.* viii. 516. *Pavt. Fl. Gard.* iii. t. 101; *Pavt. Mag.* xiv. 27 with fig.; *Fl. des Serres*, t. 223. *Asclepias pulchella*, Roxb. *Fl. Ind.* ii. 54.

SIKKIM HIMALAYA, alt. 2000 ft., J.D.H. ASSAM, SILHET and CACHAR, *Hamilton*, &c. *PEGU*, Wallich. *MOULMEIN*, *Parish*.

Branches slender, smooth, herbaceous. *Leaves* 3-7 in., sinus at base wide, midrib glandular at the base above; petiole 2-5 in. *Cymes* 4-6 fl'd.; peduncle 4-5 in.; pedicels very slender, 1 $\frac{1}{2}$ -2 in. *Sepals* broad, very variable in size. *Corolla* thick, pure white. *Follicles* (from a drawing) solitary? 6 by 1 $\frac{1}{2}$ in. diam., sharply deflexed from the very base, fusiform, turgid, terete, green, slightly upcurved.—Wallich's 8221 B. from Finlayson seems to be *R. Hooperianum*, a native of Java and Siam.

22. PENTATROPIS, Br.

Twining slender herbs or undershrubs. *Leaves* opposite, small. *Cymes* umbelliform, axillary; pedicels slender. *Flowers* small, purplish. *Calyx* 5-partite. *Corolla* rotate, 5-fid; lobes elongate, overlapping to the right, twisted to the left. *Corona* of 5 laterally compressed scales adnate vertically to the backs of the anthers with free tips and spurred bases. *Column* short; anther-tips inflexed; pollen-masses one in each cell, not compressed, pendulous, waxy. *Stigma* hardly umbonate. *Follicles* smooth. *Seeds* comose. **DISTRIB.** Species 8; tropical Asiatic, African, and Australian.

1. **P. spiralis**, *Dene. in Ann. Sc. Nat.* 1838, 327, t. 11 E. and in *DC. Prodr.* viii. 536; glabrous, leaves ovate lanceolate or oblong base rounded or cordate, corolla-lobes ovate-lanceolate elongate caudate. *Edgew. in Journ. Linn. Soc.* vi. 204, t. 1, f. 9; *Boiss. Fl. Orient.* iv. 58. *P. microphylla*, *Wall. Cat.*

8213 D. *Oxystelma*? *caudatum*, *Herb. Ham.* *Asclepias spiralis*, *Forsk. Fl. Eg. Arab.* 49.

The PANJAB, SCIND, and Eastwards to the Jumna river. *DISTRIB.* Affghanistan and Westwards to the Red Sea and Nubia.

Leaves 1-1½ in., very variable in breadth, obtuse or acute, usually apiculate, coriaceous, nerves obscure; petiole ½-¾ in. *Peduncles* very short or 0; pedicels capillary, top obconic. *Calyx* minute. *Corolla* green, ½ in. diam.; segments narrowed from a triangular base. *Follicles* 2½-3 in., fusiform, narrowed to the base and to the long straight rather slender point. *Seeds* ¼ in. long, ovate, flat, broader end crenate.

2. **P. microphylla**, *Wight & Arn. Contrib.* 52; glabrous, leaves oblong ovate or rounded, base rounded or cordate, corolla-segments triangular-lanceolate obtuse. *Wight Ic.* t. 352; *Wall. Cat.* 8213, excl. D.; *Dalz. & Gibs. Bomb. Fl.* 149; *Grah. Cat. Bomb. Pl.* 120; *Dcne. in DC. Prodr.* viii. 536. *Asclepias microphylla*, *Roxb. Fl. Ind.* ii. 35; *Roth Nov. sp.* 177? *Cynanchum acuminatum*, *Thunb. Obs. in Cynanch.* 5; *Dcne. l.c.* 548. *Eutropis*, gen. nov. *Falconer in Proc. Linn. Soc.* i. 15.

BENGAL, in the Sunderbunds; PEGU; DECCAN PENINSULA, from Bombay southwards. CEYLON, not uncommon.

Habit and general characters of *P. spiralis*, but the flowers are much smaller, and the corolla-lobes have not the long tails.

23. **DÆMIA**, Br.

Twining pubescent or tomentose undershrubs. *Leaves* opposite, cordate. *Cymes* axillary, racemiform or corymbiform, pedicels filiform. *Sepals* glandular within. *Corolla* greenish-white, tube short infundibular; lobes large, broadly ovate, spreading, overlapping to the right. *Corona* of an outer annular 5-10-crenate or -lobed membrane, and 5 laterally compressed scales vertically adnate to the anthers and spurred behind, with free long subulate tips. *Column* large, anther-tips inflexed; pollen-masses one in each cell, subcompressed, pendulous, waxy. *Follicles* echinate. *Seeds* comose.—*DISTRIB.* Species 6; Asiatic and African.

D. extensa, Br. in *Mem. Wern. Soc.* i. 50; subhispidly hairy or glabrate, leaves membranous broadly ovate acuminate deeply cordate pubescent beneath, lobes rounded incurved, peduncles long racemose, corolla ciliate, follicles clothed with long soft spines. *Wight Contrib.* 59, and *Ic.* t. 596; *Wall. Cat.* 8231, excl. F.; *Dalz. & Gibs. Bomb. Fl.* 150; *Grah. Cat. Bomb. Pl.* 122; *Dcne. in DC. Prodr.* viii. 544. *Cynanchum extensum*, *Ait.*; *Jacq. Ic. Rar.* t. 54. *C. cordifolium*, *Retz. Obs.* ii. 15. *C. echinatum*, *Thunb. Obs. in Cynanch.* 8; *Dcne. l.c.* 549. *Asclepias echinata*, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 44. *Raphistemma ciliatum*, *Hook. f. in Bot. Mag.* t. 5704.

Throughout India; from the Salt-range and the N.W. HIMALAYA (ascending to 3000 ft.) to LOWER BENGAL and CEYLON (not seen from the Malay Peninsula, Birma, or Pegu).—*DISTRIB.* Affghanistan.

A fetid climber, hairs on stem spreading. *Leaves* 2-4 in. long and broad; petiole 2-4 in. *Peduncles* 2-6 in.; pedicels capillary, ½-2 in. *Sepals* small, ovate, pubescent. *Corolla* ¾ in. diam., pale yellowish green and red. *Column* large, tips of inner coronal processes often twisted together. *Follicles* 1½-2 in., lanceolate, beaked. *Seeds* ¼ in. long, broadly ovate, pubescent, margin quite entire.

24. **ADELOSTEMMA**, Hook f. *Gen. Nov.*

A slender glabrous twiner. *Leaves* opposite, long-petioled, cordate. *Flowers* small, in axillary peduncled corymbiform cymes. *Sepals* lanceolate. *Corolla*

campanulate, glabrous, shortly 5-lobed; lobes erecto-patent, overlapping to the right. *Corona* 0. *Column* very shortly stipitate, conical, 5-angled; anthers with very long oblong membranous tips; pollen-masses one in each cell, ovoid, pedicelled, waxy, corpuscles large. *Stigma* clavate, tip exserted, obtuse.

1. **A. gracillimum**, *Hook. f. Ic. Pl. t. 1427.* *Cynanchum gracillimum*, *Wall. in Wight Contrib.* 57.

BURMA; at Segaeen, *Wallich.*

Leaves in distant pairs, $1\frac{1}{2}$ – $2\frac{1}{2}$ by 1 – $1\frac{1}{2}$ in., very membranous, acuminate; basal lobes rounded, incurved with a broad sinus; nerves very slender; petiole 1 – $1\frac{1}{2}$ in. filiform. *Cymes* puberulous; peduncles shorter than the petioles, pedicels $\frac{1}{10}$ – $\frac{1}{4}$ in. *Sepals* half as long as the corolla, which is $\frac{1}{2}$ in. long, pale and quite glabrous inside and out.—I find no traces of the 5-fid tubular corona at the base of the stipes of the column described by Wight.

25. **HOLOSTEMMA**, *Br.*

Twining glabrous shrubs. *Leaves* opposite, membranous, cordate. *Cymes* axillary, few-fl'd.; flowers large, purple. *Sepals* eglandular. *Corolla* subrotate; lobes thick, ovate, overlapping to the right. *Corona* low, annular, 10-lobed, fleshy. *Anthers* very large, oblong, horny, shining, cohering in a 10-winged column, tip small inflexed membranous; pollen-masses one in each cell, elongate, falcate, compressed, pendulous, waxy, pedicels long black. *Stigma* included, 5-winged. *Follicles* short, thick, smooth, acute. *Seeds* comose.—DISTRIB. Two Indian species.

H. Rheedel, *Wall. Pl. As. rar. ii. 51*, and *Cat. 4469*; leaves acuminate basal lobes rounded, flowers subglobose red-purple and white. *Wight Contrib.* 55, and *Ic. t. 597*; *Dene. in DC. Prodr. viii. 532.* *H. fragrans*, *Wall. l. c.*; *Dene. l. c.*; *Dalz. & Gibs. Bomb. Fl. 148*; *Grah. Cat. Bomb. Pl. 121.* *H. Brunonianum*, *Royle Ill. 276. t. 66*; *Dene. l. c. 533.* *H. Adakodien*, *Roem. & Sch. Syst. vi. 95.* *Asclepias annularis*, *Roxb. Fl. Ind. ii. 37.* *Sarcostemma annulare*, *Roth Nov. sp. 178.* *Gomphocarpus volubilis*, *Herb. Ham. (in Wight l. c.)*—*Rheede Hort. Mal. ix. t. 7.*

TROPICAL HIMALAYA, from Sirmore to Sikkim, alt. 3–5000 ft. DECCAN PENINSULA, from the Circars and Canara southwards. PEGU and BURMA.

Quite glabrous, or the leaves faintly puberulous. *Leaves* 3–6 in., basal lobes spreading or incurved and meeting; petiole 1–3 in., glandular at the base of the midrib above. *Cymes* umbelliform or in irregular racemes; peduncles 1–2 in.; pedicels as long. *Corolla* 1 – $1\frac{1}{2}$ in. diam.; lobes subacute, incurved, white on the back and margin. *Follicles*, according to Rheede's figure, like those of *Raphistemma*.—Sprengel is given as the authority for the name *H. Rheedei*, on the supposition that it is his *H. Rheedianum*, which being described as erect with oblong cuspidate strongly nerved leaves must be a very different plant. As Sprengel's other species, *H. Candolleana*, is a *Fischeria*, his genus must be abandoned.

26. **CYNANCHUM**, *Linn.*

Erect or twining herbs or shrubs. *Leaves* opposite, rarely whorled. *Cymes* axillary, umbelliform racemose or subpaniculate; flowers small, greenish or purplish. *Calyx* 5-partite. *Corolla* rotate, 5-partite, lobes overlapping to the right or valvate. *Corona* adnate to the base of the column, 5-partite or cupular or campanulate, variously toothed or lobed, with or without scales or tubercles on the inner face opposite the lobes. *Anthers* sessile or stipitate, tip membranous inflexed; pollen-masses one in each cell, not compressed, pendulous, waxy. *Stigma* flat, umbonate or apiculate. *Follicles* terete or shortly 2-winged, elon-

gate, moderately ventricose, smooth (in *C. corymbosum* densely clothed with soft spines). *Seeds* comose.—**DISTRIB.** Species about 100; tropical and temperate.

I cannot retain *Vincetoxicum* as distinct from *Cynanchum*; the presence or absence of processes or scales within the corona affords no character (see *C. acutum*). The corona itself affords very inconstant characters even for many of the species.

* Stem erect. Corona simple, 5-lobed or -partite, lobes without internal processes.

1. ***C. Vincetoxicum***, *Pers.*; pubescent or glabrate, leaves broadly cordate or ovate acute, cymes sessile or peduncled, flowers corymbose or paniculate, corolla yellow, segments glabrous or nearly so, coronal-lobes triangular oblong or rounded. *C. Kenouriense*, *Wight Contrib.* 58. *Vincetoxicum officinale*, *Moench*; *Boiss. Fl. Orient.* iv. 54; *Dcne. in DC. Prodr.* viii. 524. *V. Kenouriense*, *Dcne. l.c.* 525. *Asclepias Vincetoxicum*, *Linn.*

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 7–11,000 ft.—**DISTRIB.** Westwards to Norway and Spain.

Stem 6–10 in., and leaves beneath usually pubescent, sometimes glabrous; leaves broader, greener, shorter petioled and less coriaceous than in the two following species. The coronal-lobes are very variable indeed.

2. ***C. glaucum***, *Wall. in Wight Contrib.* 58; erect, hoary or puberulous pale or glaucous, leaves ovate oblong lanceolate or cordate, cymes usually sessile, flowers umbelled, corolla yellow segments hirsute or bearded within, coronal-lobes 5 rounded broader than long fleshy. *Wall. Cat.* 8229. *Vincetoxicum canescens*, *Dcne. in DC. Prodr.* viii. 523; *Boiss. Fl. Orient.* iv. 52.

TEMPERATE HIMALAYA, from Nepal Westwards, alt. 5–9000 ft. WESTERN TIBET, alt. 10–12,000 ft.—**DISTRIB.** Afghanistan and westward to the Greek Archipelago.

Stem 6–18 in., erect, flexuous; rootstock with dense fascicles of roots as in *C. Vincetoxicum*. *Leaves* 1–3 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., extremely variable in length and breadth, coriaceous, acute acuminate or apiculate, nerves very oblique; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Cymes* pubescent, few or many-fld.; pedicels short. *Corolla* $\frac{1}{2}$ in. diam., very variable in size, segments subacute. *Coronal-lobes* variable. *Follicles* 2–4 in., slender. *Seeds* $\frac{1}{4}$ – $\frac{1}{2}$ in. long, broadly ovoid, concavo-convex.—Boissier says that *C. glaucum* differs from *canescens* in the narrower leaves, few-fld. cymes, and smaller corolla with ovate segments, but none of these characters hold good. In some Tibetan specimens the coronal-lobes are narrow, and the filaments form a rather long column.

3. ***C. Arnottianum***, *Wight Contrib.* 58; erect, puberulous or hoary, leaves ovate oblong or lanceolate, cymes sessile, corolla dark purple, segments hirsute or bearded within, coronal-lobes 5 fleshy oblong or rounded. *Vincetoxicum Arnottianum*, *Wight Ic.* t. 1614; *Dcne. in DC. Prodr.* viii. 523; *Boiss. Fl. Orient.* iv. 52. *V. montanum*, *Dcne. l.c.* 525. *V. luridum*, *Stocks mss.*

WESTERN HIMALAYA; Kashmir, alt. 6–8000 ft., *Royle, &c.*—**DISTRIB.** Beluchistan.

Habit and foliage of *C. glaucum*, with the leaves sometimes whorled, and smaller dark purple flowers. I suspect that it is only a variety of that plant, and both of *C. Vincetoxicum*.

** Stem twining. Corolla glabrous. Corona without internal processes.

† *Peduncle of cyme* short.

4. ***C. ovalifolium***, *Wight Contrib.* 57; twining, glabrous, leaves elliptic or oblong acuminate base rounded or subacute, peduncles short, flowers racemose or panicled, corona short irregularly toothed, teeth often curved.

Wall. Cat. 8226. *Cynoctonum ovalifolium* and *C. Blumei*, Dcne. in DC. Prodr. viii. 529, 528. *Holostemma læve*, Blume Bijl. 1055.

PENANG, Wallich; MALACCA, Maingay.—DISTRIB. JAVA.

Leaves 3-4 by $1\frac{1}{2}$ in., coriaceous, pale beneath, nerves spreading; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. Sepals ovate. Corolla $\frac{1}{4}$ in. diam.; segments broadly ovate, quite glabrous. Column sessile. Follicles 5 in. long, thickly coriaceous, terete, tapering to a narrow but stout point, tip recurved. Seeds $\frac{1}{2}$ in., very broad and flat.—“Produces an excellent caoutchouc” (Wallich). Making allowance for the variability of the corona in this genus, I am disposed to unite with this the *C. formosanum*, Maxim. (Diagn. Pl. Nov. Asiat. 801), and Cuming’s No. 774 from the Philippines.

5. **C. alatum**, Wight & Arn. Contrib. 56; twining, puberulous or glabrate, leaves linear ovate or oblong acute base contracted cordate pale beneath, umbels shortly peduncled pubescent, corona short cupular plaited irregularly crenate, follicles narrowly 2-winged. *Cynoctonum alatum*, Dcne. in DC. Prodr. viii. 529; Wight Ic. t. 1280.

NILGHERY MTS., Gardner, &c. TRAVANCORE, at Coimbatore, Wight.

Stem slender, sometimes softly pubescent. Leaves $1\frac{1}{2}$ - $2\frac{1}{2}$ in., rarely more, very variable in breadth, glabrous or puberulous above; basal lobes rounded, sinus open or almost closed; petiole $\frac{1}{2}$ - $\frac{2}{3}$ in. Umbels 1 in. diam., peduncle and pedicels pubescent. Calyx lobes ovate. Corolla $\frac{1}{4}$ in. diam., glabrous, segments oblong-ovate. Follicles 2- $2\frac{1}{2}$ in., dorsally compressed.—Wight’s figure represents the whole plant as far too hairy; he gives Coimbatore as the only habitat, but his specimens are marked from the Nilgherries, as are all the others I have seen (Gardner, Hohenacker, Schmidt, G. Thomson). In the “Contributions” he gives Coromandel as the only native country, which is unlikely. The plaited corona has obscure thickenings on some of the folds of the inner face which are rudimentary inner processes.

6. **C. pauciflorum**, Br. in Mem. Wern. Soc. i. 45; twining, nearly glabrous, leaves ovate or ovate-lanceolate acuminate, base broadly cordate, lobes rounded, umbels shortly peduncled and flowers glabrous, corona much longer than the sessile column 5-lobed with 5 intermediate teeth, follicles terete. Wight Contrib. 56; Ic. t. 354; Wall. Cat. 8223; Dalz. & Gibs. Bomb. Fl. 148? *C. inconspicuum*, Griff. Notul. iv. 66, and Ic. Pl. Asiat. t. 401. *Cynoctonum pauciflorum*, Dcne. in DC. Prodr. viii. 528. *Periploca tunicata*, Retz. Obs. ii. 15; Willd. Phytogr. i. 7, t. 5, f. 3. *Asclepias tunicata*, Roxb. Hort. Beng. 20, and Fl. Ind. ii. 35.

DECCAN PENINSULA; from the Concan southwards to Travancore. CEYLON, very common in the Central Province.

Stem slender. Leaves 2- $2\frac{1}{2}$ by $1-1\frac{1}{2}$ in., broadest at the base, rather coriaceous; petiole $\frac{1}{2}$ -1 in., glabrous or puberulous; stipular leaves rounded, $\frac{1}{4}$ in. diam. or less. Peduncle shorter than the petiole. Flowers $\frac{1}{4}$ in. diam. Sepals lanceolate. Corona nearly equalling the corolla, campanulate, plicate, large lobes sometimes 2-fid at the tip. Follicles $2\frac{1}{2}$ in. long, thinly coriaceous, beak slender. Seeds orbicular, flat, $\frac{1}{4}$ in. diam.—This at first sight resembles *C. alatum*, but the leaves broad at the base at once distinguish it. The name *pauciflorum* is not very distinctive.

7. **C. Wallichii**, Wight Contrib. 56; twining, glabrous, leaves ovate or oblong-lanceolate finely acuminate membranous base deeply cordate with rounded decurved or incurved lobes, umbels shortly peduncled and flowers glabrous, corona campanulate plicate shortly 5-6-lobed lobes toothed. Wall. Cat. 8224. *Cynoctonum Wallichii*, Dcne. in DC. Prodr. viii. 528.

KHASIA AND JYNTEA MTS.; at the foot of the hills, Wallich, &c.

Stems slender. Leaves 3-5 by 1-2 in., pale beneath, nerves very oblique, basal sinus rounded, open or almost closed by the incurved lobes; petiole $1-1\frac{1}{2}$ in. Peduncles much shorter than the petioles, pedicels slender. Sepals ovate. Corolla

greenish; segments oblong-lanceolate, longer than the corona, which is membranous and pale. *Filaments* forming a column longer than the anthers.

8. **C. Callialata**, *Ham. in Wight Contrib.* 56; twining, glabrous or very sparsely hairy, leaves coriaceous from rounded or oblong or ovate to linear acuminate glaucous beneath, base contracted cordate, nerves spreading obscure, umbels shortly peduncled nearly glabrous flowers glabrous, corona short cupular irregularly 5-toothed and crenate, follicles 2-winged. *Wall. Cat.* 8225; *Wight Ic.* t. 1279. *C. auriculatum*, *Herb. Ham.* *C. angustifolium*, *Wight & A. l. c.* 57. *Cynoctonum Callialata* and *angustifolium*, *Dcne. in DC. Prodr.* viii. 528, 529. *Periploca tunicata*, *Herb. Madr.*

BEHAR; summit of Parusnath, *J. D. H.*, &c. DECCAN PENINSULA, from the Concan to Travancore. BURMA at Hengadah, *Wallich*.

Stem robust, glabrous or sparingly hairy. *Leaves* .3-5 in., very variable in breadth, basal lobes small rounded, sinus narrow, midrib broad, nerves very slender spreading; petiole $\frac{1}{2}$ -1 in. *Peduncles* shorter than the petioles. *Flowers* $\frac{1}{2}$ in. diam., quite glabrous. *Corona* follicles and seeds as in *C. alatum*.—Very closely allied to *C. alatum*, but quite distinct in the much larger size and glabrous habit.

†† *Peduncles of cyme long, slender.*

9. **C. corymbosum**, *Wight Contrib.* 56; quite glabrous, leaves ovate-or orbicular-cordate cuspidate or acuminate membranous glaucous beneath, basal lobes rounded decurved or incurved, peduncles long equalling the long petioles, corona campanulate plicate with longitudinal thickenings within, mouth irregularly crenate, anthers sessile, follicles large clothed densely with long fleshy spines. *Wall. Cat.* 8222, 8231, *F.* *Cynoctonum corymbosum*, *Dcne. in DC. Prodr.* viii. 528.

SEKKIM HIMALAYA, alt. 2-4000 ft. *Clarke*. KHASIA MTS., SILHET and CACHAR, alt. 1-3000 ft. *Wallich*, &c. PENANG, *Wallich*. NICOBAR ISLDS. *Kur.*

Stem rather stout. *Leaves* 2-6 by 1-3 in., membranous, white beneath; petiole $1\frac{1}{2}$ -3 in. *Peduncle* slender; flowers racemose or corymbose, $\frac{1}{2}$ - $\frac{1}{2}$ in. diam. quite glabrous. *Sepals* ovate, obtuse. *Corolla-segments* obtuse. *Corona* large, much longer than the short column, with internal thickenings as in *C. alatum*. *Seeds* $\frac{1}{2}$ in. long, orbicular-ovoid, with a wrinkled nucleus surrounded by a very broad wing deeply crenate at the lower end.—The large lanceolate almost fleshy follicles, 4-5 by $1-1\frac{1}{2}$ in. diam., densely clothed with soft reversed hooked spines $\frac{1}{2}$ - $\frac{1}{2}$ in. long, are quite peculiar, and recall those of *Damia*. It is remarkable that this species, though collected both in the Nicobar Islands and Penang, should never have been found in Burma or the Malay Peninsula.

10. **C. deltoideum**, *Hook. f.*; twining, glabrous or nearly so, leaves deltoid-cordate acuminate membranous, peduncles slender, flowers small umbelled glabrous, corona 10-lobed to the middle, 5 lobes large ovate obtuse, 5 intermediate very small rounded.

KHASIA MTS.; Kalapanee and Moflong, alt. 5-6000 ft., *J. D. H. & T. T.*

Stem slender. *Leaves* 2-3 in. long and nearly as broad, pale beneath, basal lobes large rounded, sinus broad; petiole $1-1\frac{1}{2}$ in. *Umbels* many-flid.; peduncle longer than the petiole, and pedicels hairy. *Sepals* ovate, glabrous. *Corona* concealing the sessile column, the large lobes elliptic and thickened, smaller membranous.

*** *Stem* twining or suberect. *Corolla* glabrous or pubescent. *Corona* with processes on its inner face (sometimes absent in *C. acutum*).

† *Corolla glabrous within.*

11. **C. acutum**, *Linn.*; *Boiss. Fl. Orient.* iv. 60; twining, glabrous or nearly so, leaves narrowed from a broad 3-lobed or hastately cordate base

linear or lanceolate acuminate, peduncle long or short, flowers umbelled or corymbose, corolla glabrous, corona variable, follicles long flattened, seeds narrowly oblong. *Dcne. in DC. Prodr.* viii. 547. *C. longifolium*, *Martens*; *Dcne. l. c.*

WESTERN TIBET, alt. 11–13000 ft., *Thomson &c.*—DISTRIB. Afghanistan, Central and Western Asia, Mediterranean region to Spain.

Leaves 1–5 in. long, very variable in width and in the size and spread of the basal lobes which are rounded at the tip and sometimes $1\frac{1}{2}$ in. long; petiole $\frac{1}{2}$ – $1\frac{1}{2}$ in. *Peduncle* equalling or exceeding the petiole, pedicels pubescent. *Sepals* ovate, usually pubescent. *Corolla* $\frac{1}{4}$ – $\frac{3}{4}$ in. diam.; segments ovate-oblong. *Corona* sometimes quite simple and cleft deeply into triangular lanceolate erect or spreading simple lobes, sometimes cupular and 5-lobed or with 2–5 subulate lobes, and furnished within with a tongue-shaped process. *Anthers* sessile, or stalked by the column of filaments. *Follicles* quite unlike those of its congeners, 4–6 in. long, $\frac{1}{3}$ – $\frac{1}{2}$ in. diam., thinly coriaceous, straight or slightly curved, somewhat compressed, hardly turgid, narrowed to a slender point. *Seeds* $\frac{1}{4}$ in. long flat.

12. **C. Heydel**, *Hook. f.*; twining, nearly glabrous, leaves lanceolate acuminate deeply cordate the lobes incurved often overlapping, sinus long narrow, peduncle slender, flowers corymbose, corolla glabrous, corona campanulate, mouth with 5 long subulate exerted processes each with a short process at its inner base.

WESTERN TIBET; Ladak, between Saspo and Kala-tse, *Heyde*.

I have seen only Heyde's specimens, which differ entirely from *C. acutum* in the long incurved basal lobes of the leaf and the long teeth of the corona projecting beyond the corolla.

13. **C. Dalhousiæ**, *Wight Contrib.* 55; twining, nearly glabrous, leaves elongate linear-lanceolate acuminate base cordate, lobes rounded, peduncles short, flowers umbelled quite glabrous, corona campanulate 5–10-lobed with a low conical process opposite to each lobe near the base within. *Dcne. in DC. Prodr.* viii. 548.

WESTERN TEMPERATE HIMALAYA, from Sirmore to Kumaon, alt. 5–7000 ft.

Stem slender, with sometimes a line of hairs. *Leaves* 3–7 by $\frac{1}{2}$ –1 in., membranous, basal lobes short rounded pointing backwards, sinus open, nerves very oblique; petiole $\frac{1}{3}$ – $\frac{3}{4}$ in. *Peduncles* shorter than the petioles; pedicels slender, glabrous or puberulous. *Flowers* $\frac{1}{3}$ in. diam., pale green. *Sepals* ovate. *Corona* equalling the corolla.

†† *Corolla pubescent within.*

14. **C. auriculatum**, *Herb. Royle*; *Wight Contrib.* 58; twining, puberulous, leaves broadly ovate to ovate-lanceolate acuminate deeply cordate membranous, basal lobes incurved rounded, peduncles long, flowers corymbose, corolla pubescent within, corona short cupular deeply 5-lobed, lobes oblong obtuse with adnate fleshy processes on their inner faces. *Endotropis auriculata*, *Dcne. in DC. Prodr.* viii. 546.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 6–12000 ft.

Leaves usually large, 4–6 by $2\frac{1}{2}$ – $3\frac{1}{2}$ in., very membranous, basal lobes sometimes meeting or overlapping; petiole 1–2 in. *Peduncles* 2–4 in., often stout; pedicels slender; flowers numerous, yellow, $\frac{1}{3}$ – $\frac{3}{4}$ in. diam. *Sepals* lanceolate. *Corolla-segments* linear-oblong or lanceolate. *Follicles* 4 by $\frac{1}{4}$ in., straight. *Seeds* $\frac{1}{4}$ in. long, flat, flask-shaped with a crenulate broader end.—Nearly allied to *C. Wilfordi*, Maxim. (*E. caudata*, *Miquel*; *Symphyoglossum hastatum*, *Turczan. in Bull. Soc. Imp. Nat. Mosc.* 1848, i. 255), of China and Japan, which has smaller flowers.

15. **C. Roylei**, *Wight Contrib.* 58; suberect, softly pubescent, leaves

small deltoid-ovate or -lanceolate from a broadly cordate base, finely acuminate, sinus open, peduncles very long, flowers corymbose, corolla pubescent, corona short 5-lobed lobes rounded with a tubercle on their inner faces. *Endotropis* Roylei, *Dcne. in DC. Prodr.* viii. 547.

WESTERN HIMALAYA; Kunawur, *Royle, Jacquemont, &c.*

A span to a foot high, branches flexuous. *Leaves* 1-1½ in., pubescent on both surfaces; petiole ¼-½ in. *Peduncles* sometimes twice as long as the leaves, pedicels slender; flowers numerous, ⅓-½ in. diam. *Sepals* lanceolate. *Corolla* pubescent within and without. *Follicles* 2 in. long, fusiform, turgid, puberulous. *Seeds* ¼ in. long, orbicular-obovate, flat.

16. **C. Jacquemontianum**, *Dcne. in Jacquem. Voy. Bot.* 106, t. 112; nearly glabrous, suberect, much branched, leaves small lanceolate from a broadly cordate base finely acuminate, sinus open, peduncles very long, flowers corymbose, corolla pubescent within only, corona equalling the corolla 5-cleft, lobes subulate-lanceolate entire or cleft with a small flat process below them. *C. humile*, *Herb. Falconer*. *Endotropis Jacquemontii*, *Dcne. in DC. Prodr.* viii. 547.

WESTERN HIMALAYA; Kashmir, *Falconer, Jacquemont*.

A span to 2 ft. high. *Branches* slender, spreading, or erect from a woody stock. *Leaves* 1-1½ by ½-⅔ in., sometimes faintly puberulous; petiole ¼-½ in. *Peduncles* sometimes twice as long as the leaves; pedicels slender; flowers numerous, ¼-½ in. diam. *Sepals* ovate.

DOUBTFUL SPECIES.

C. HEYNEANA, *Roem. & Sch. Syst.* vi. 101; *Dcne. in DC. Prodr.* viii. 549. *Periploca reticulata*, *Roth. mss.*—May be *C. Callialata*.

C. PEDUNCULATUM, *Thunb. Obs. in Cynanch.* 5; *Dcne. in DC. Prodr.* viii. 548, from Ceylon is undeterminable.

C. TOMENTOSUM, *Lamk.*, is probably *Tylophora asthmatica*, according to Wight (*Contrib.* 51, in note).

27. **SARCOSTEMMA**, Br.

Trailing leafless jointed shrubs with pendulous branches. *Cymes* terminal or at the nodes, umbelliform; peduncle clavate. *Flowers* small. *Calyx* 5-fid. *Corolla* rotate, 5-fid; lobes broad, overlapping to the right. *Corona* cup-shaped, membranous, adnate to the base of the column, 10-crenate or -lobed, the lobes opposite the stamens bearing large fleshy processes which are adnate to the backs of the anthers. *Column* short; anther-tip inflexed; pollen-masses one in each cell, pendulous, slender, waxy. *Stigma* conical or shortly fusiform. *Follicles* smooth. *Seeds* comose.—*DISTRIB.* Species 5 or 6; Asiatic, African, and Australian.

I am unable to determine the described species of this genus from dried specimens. There are probably differences in the fruit and seeds between the four supposed Indian ones, but I have no sufficient materials to verify this, and those may be reduced to two.

1. **S. brevistigma**, *Wight & Arn. Contrib.* 59; umbels terminal, flowers whitish, column very short, inner processes of the corona almost concealing the anthers, stigma very shortly conical, follicles slightly diverging thinly coriaceous narrowed to the base. *Wight Ic.* t. 595; ? *Wall. Cat.* 8233; *Dalz. & Gibs. Bomb. Fl.* 149; *Dcne. in DC. Prodr.* viii. 538, and in *Jacquem. Voy. Bot.* 107, t. 113. *Asclepias acida*, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 31. *A. aphylla*, *Roxb. mss.*

DECCAN PENINSULA; not uncommon in dry rocky places. BURMA, Wallich.

Stem as thick as a goose-quill, green; joints 4-6 in. long. Umbels sessile, 1-1½ in. diam., many-fld.; pedicels ½ in., puberulous. Sepals small, ovate. Corolla ½ in. diam., pale greenish-white; lobes ovate or oblong, obtuse. Corona and column together rounded, very obtuse. Follicles 4-5 by ½ in., thinly coriaceous, tip fine straight. Seeds flattened, ⅓-¼ in. long, ovate.

2. **S. Brunonianum**, Wight & Arn. *Contrib.* 59; umbels chiefly lateral, flowers yellow, column very short, inner processes of corona almost concealing the anthers, stigma very shortly conical, follicles as in *S. brevistigma*. Wight *Ic. t.* 1282; Dcne. in *DC. Prodr.* viii. 538; *Bot. Mag.* t. 6002.

DECCAN PENINSULA, ascending to 4000 ft. in the Nilgherries. CEYLON.

Apparently more slender than *S. brevistigma*, with smaller, chiefly lateral, umbels of bright yellow flowers.

3. **S. intermedium**, Dcne. in *DC. Prodr.* viii. 538; umbels terminal and axillary, flowers white, column ovoid, inner processes of corona oblong subacute, stigma fusiform simple or 2-fid, follicles broad at the base narrowed to the tip thinly coriaceous. *S. viminalis*, Wight & Arn. *Contrib.* 59; Wight *Ic. t.* 1281; ? Wall. *Cat.* 8232, not of Brown.

DECCAN PENINSULA, in arid jungles.

The elongate column, narrower dorsal processes of the anthers and longer stigma are the characters of this. The follicles when in pairs spread but do not divaricate as in the following.

4. **S. Stocksii**, Hook. *f.*; umbels terminal, column very short, inner processes of corona almost concealing the anthers, stigma very shortly conical, follicles short spreading horizontally poinard-shaped nearly cylindric subacute hard thickly coriaceous. *S. brachystigma* (by error for *brevistigma*), Hook. *Ic. Pl.* t. 861.

SCIND, Stocks.

Apparently a much more robust plant than any of the preceding, with the flowers of *S. brevistigma*, but widely different follicles, which are 2½-3½ in. long, rigid, almost woody, cylindric but tapering very gradually from the base to the straight stout point; peduncle very short and thick; the seeds are nearly ½ in. long, linear-oblong, thicker than in its congeners.

TRIBE 4. MARSDENIÆ.

28. SARCOLOBUS, Br.

Twining glabrous shrubs. Leaves opposite. Flowers small, crowded in axillary corymbiform cymes. Calyx 5-partite. Corolla sub-campanulate; lobes 5, ovate, overlapping to the right. Corona 0. Column very short; anthers broad, tip inflexed; pollen-masses one in each cell, erect, waxy, elongate, with long twisted pedicels. Stigma flat. Follicles thick, fleshy, globose and smooth, or oblong and 2-keeled. Seeds large, coma 0.—DISTRIB. Species 2-3; Malayan and E. Asiatic.

1. **S. globosus**, Wall. in *Asiat. Research.* xii. 568, t. 4, and *Cat.* 4468; leaves 3-4 in. oblong or ovate acuminate or obtuse and apiculate, corolla-lobes pubescent within, fruit large globose. Wight *Contrib.* 47, and *Ic. t.* 1273; Dcne. in *DC. Prodr.* viii. 625. *S. carinatus*, Griff. *Notul.* iv. 53, and in *Ic. Pl. Asiat.* t. 410 (not of Wall.).

SUNDERBUNDS and eastwards to MERGUI, MALACCA and the NICOBAR ISLANDS.

Branches stout. *Leaves* brown when dry, thinly coriaceous, nerves arched, base usually rounded; petiole $\frac{1}{2}$ –1 in., slender. *Peduncles* and *pedicels* very short. *Sepals* oblong, obtuse. *Corolla* $\frac{1}{2}$ – $\frac{1}{2}$ in. diam., pale purple within, lobes obtuse. *Anthers* very broad, shortly stipitate. *Fruit* globose, 4 in. diam.; pericarp very thick, brown. *Seeds* $\frac{2}{3}$ in. long, broadly ovate, flat with a thick raised border, dark brown.

2. ***S. carinatus***, Wall. in *Asiat. Research*. xii. 570, t. 5, and *Cat.* 4467; leaves 1–2 in. elliptic obovate lanceolate or linear-oblong obtuse or acute, corolla nearly glabrous within, fruit small ellipsoid. *Wight Contrib.* 47; *Dcne. in DC. Prodr.* viii. 625. *Sarcolobus* sp., *Griff. Notul.* iv. 55, and *Ic. Pl. Asiat.* t. 405.

SUNDERBUNDS and eastwards to MERGUI and the ANDAMAN ISLANDS.

A much smaller plant than *S. globosus*, more slender, with smaller narrower leaves very rarely 3 in. long, thicker in texture, the nerves very obscure, petiole $\frac{1}{8}$ – $\frac{1}{4}$ in., corolla smaller, yellow, with lines of brown dots; anthers sessile. *Fruit* 3 in., curved, turgid, beaked, with several narrow undulate keels, pale yellow, fleshy. *Seeds* $\frac{1}{2}$ in., like those of *S. globosus*.

29. **PENTASACME**, Wall.

Pendulous tufted glabrous herbs, with simple stems. *Leaves* opposite, subsessile, membranous, narrow. *Flowers* long, yellowish, in sessile axillary umbelliform cymes; pedicels filiform. *Calyx* 5-partite. *Corolla-tube* short, campanulate; lobes long, caudate, twisted, overlapping to the right. *Coronal-scales* 5, on the corolla-tube, entire or toothed. *Column* very short; anther-tips membranous; pollen-masses one in each cell, pedicelled, erect, ovoid, waxy, tips pellucid. *Stigma* included, conical or beaked. *Follicles* very slender, terete, straight, smooth. *Seeds* comose.—**DISTRIB.** Species 3–4; Indian and Chinese.

1. ***P. caudatum***, Wall. *Cat.* 8234; very slender, leaves linear-lanceolate caudate-acuminate, corolla-lobes triangular at the base suddenly ending in long almost filiform tails. *Wight Contrib.* 60; *Dcne. in DC. Prodr.* viii. 627.

KHASIA Mts., alt. 0–3000 ft., common. Patkoi Mts. in UPPER ASSAM, *Griffith*, *Pegu*, *McClelland*, *Kurz*.

Densely tufted, flaccid, stems 12–18 in., rarely forked, leafy throughout their length. *Leaves* 2–3 by $\frac{1}{4}$ – $\frac{2}{3}$ in., thin, bright green, nerves obscure. *Flowers* $\frac{1}{2}$ in. long, longer than the capillary pedicels. *Sepals* subulate. *Corolla-lobes* with obtuse tips; coronal-scales 4-fid. *Anther-tips* obtuse. *Stigma* obtuse. *Follicles* 2 $\frac{1}{2}$ –3 in., with long slender points. *Seeds* $\frac{1}{10}$ in. long, ovate, flat, red-brown.

2. ***P. Wallichii***, *Wight Contrib.* 60; leaves elliptic-lanceolate acuminate base acute, corolla-lobes gradually narrowed to the long obtuse tip. Wall. *Cat.* 8235; *Dcne. in DC. Prodr.* viii. 627; *Deless. Ic. Sel.* v. t. 87.

WESTERN HIMALAYA; Kumaon, alt. 3500 ft., *Madden*, &c. SILHET, *Wallich*. MISHMEE Mts., *Griffith*.

Habit of *P. caudatum*, but stems stouter; leaves 2–3 by $\frac{3}{4}$ –1 $\frac{1}{4}$ in., nerves beneath distinct, setulose; flowers much longer, with broader corolla-lobes; coronal-scales minute; anthers acuminate; stigma shortly beaked; follicles rather stouter; seeds much the same.

30. **GYMNEMA**, Br.

Twining shrubs or undershrubs. *Leaves* opposite. *Flowers* small, in crowded umbelliform cymes. *Calyx* 5-partite. *Corolla* subrotate, campanulate or urceolate; lobes thick, twisted, subvalvate or narrowly overlapping to the right. *Corona* 0, or of 5 fleshy processes adnate to the corolla-throat or tube.

Column short; anther-tips small, membranous; pollen-masses one in each cell; ovoid-oblong, waxy, pedicelled, erect. *Stigma* large, conical, clavate or capitate, exserted. *Follicles* slender or turgid, terete, smooth, acuminate. *Seeds* comose. —DISTRIB. Species 25; Asiatic, African, and Australian.

* Corolla-tube short, with fleshy coronal processes on the throat, the free points of which (except in *rotundatum*) protrude above the sinus, and are produced downwards on the tube as double villous ridges. Bracts obsolete.

1. **G. sylvestre**, Br. in Mem. Wern. Soc. i. 33; branches slender and petioles cymes and sepals finely closely pubescent, leaves 1-2½ in. elliptic or obovate acute rarely cordate glabrous or puberulous beneath, cymes small 2-nate peduncled nearly flat, corolla $\frac{1}{10}$ in. diam. lobes glabrous, follicles slender glabrous, seeds narrow. *Wight Contrib.* 44, and *Ic.* t. 349; *Wall. Cat.* 8184 A; *Dalz. & Gibs. Bomb. Fl.* 151; *Grah. Cat. Bomb. Pl.* 120; *Dcne. in DC. Prodr.* viii. 621. *G. melicida*, *Edgew. Banda Fl.* 50. *Periploca sylvestris*, *Willd. Sp. Pl.* i. 1252. *Asclepias geminata*, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 45.

BANDA, *Edgeworth*. DECCAN PENINSULA; from the Concan to Travancore.—DISTRIB. Trop. Africa.

A stout large woody climber. *Leaves* rarely pubescent above, thinly coriaceous; petiole slender or stout, $\frac{1}{4}$ - $\frac{1}{2}$ in. *Cymes* $\frac{1}{2}$ in. diam., subglobose, pedicels slender. *Corolla-lobes* short. *Follicles* 2-3 by $\frac{1}{2}$ in., terete, rigid. *Seeds* $\frac{1}{2}$ in. long, narrowly ovoid-oblong, flat with a broad thin wing, pale brown.—The leaves in Wight's figure are unusually large.

VAR. *ceylanica*; leaves ovate base cordate softly pubescent on both surfaces. *G. sylvestre*, var. *Decaisneana*, *Thw. Enum.* 197, excl. *syn.*—Ceylon, ascending to 3000 ft.

2. **G. hirsutum**, *Wight & Arn. Contrib.* 44; branches petioles leaves on both surfaces and cymes densely softly pubescent, leaves 1½-2½ in. broadly ovate or cordate acute or acuminate, cymes 2-nate subsessile few- or many-flid., corolla $\frac{1}{4}$ in. diam., lobes thick ciliolate, follicles slender glabrous. *Wight Ic.* t. 1272; *Wall. Cat.* 8185; *Dcne. in DC. Prodr.* viii. 622. *G. Decaisneanum*, *Wight Ic.* t. 1271.

BEHAR; at Rotas, *J. D. H.*; Nilgherry Mts., *Wight, &c.*

Much stouter than *G. sylvestre*, with broader more ovate and cordate leaves softly pubescent on both surfaces with shorter thicker petioles, and much larger flowers, in more sessile cymes with shorter thicker pedicels.—The Behar specimen is in fruit only and may belong to *G. sylvestre*, though the leaves are pubescent on both surfaces. I have seen no ripe seeds of the Nilgherry plants. In Wight's figure of *G. Decaisneana*, the leaves are glabrous above, which is opposed to his description and specimens. The distinctions he indicates between this and *hirsutum* do not exist.

3. **G. molle**, *Wall. in Wight Contrib.* 45, and *Cat.* 8186; branches petioles leaves beneath and cymes finely pubescent, leaves ovate oblong or cordate acute or acuminate, cymes subsessile dense-flid., corolla $\frac{1}{2}$ in. diam. lobes ciliate, follicles woody broad turgid below the middle pubescent, seeds ovate. *Dcne. in DC. Prodr.* viii. 622.

UPPER BURMA; Irawaddi, near the Petroleum wells, and at Taong-dong, *Wallich.*

A stout climber. *Leaves* very variable, some 2-2½ by 1-1½ in., others 3 in. and as broad, deeply cordate, above glabrous or puberulous; petiole slender, $\frac{1}{4}$ - $\frac{1}{2}$ in. *Cymes* small, irregular. *Sepals* hirsute. *Corolla-lobes* thickened, glabrous. *Follicles* 2½-3 in., $\frac{1}{4}$ -1 in. broad at the thickest part. *Seeds* $\frac{1}{2}$ in. long, very different from those of the preceding species.—This is very near the Chinese *G. affine*, *Dcne.* (*G. parviflorum*, *Wall. Tent. Fl. Nep.* 50), which has broad seeds and similar follicles, but the flowers are larger. Though Upper Burma is beyond British India, the species is so likely to be found in the latter that I (as in like instances) introduce it.

4. **G. acuminatum**, *Wall. Tent. Fl. Nep.* 50; *Cat.* 8187; branches stout, petioles leaves beneath cymes and sepals densely tomentose, leaves 3-6 in. coriaceous ovate acuminate, cymes peduncled globose, corolla $\frac{1}{2}$ in. diam. lobes glabrous not ciliate, follicles turgid ovoid beaked woody, seeds large elliptic broadly winged. *Wight Contrib.* 45; *Dene. in DC. Prodr.* viii. 622. *Cynanchum acuminatum*, *Herb. Ham.* *Asclepias acuminata*, *Roxb. Hort. Beng.* 21, and *Fl. Ind.* ii. 55.

EAST BENGAL, *Griffith.* SILHET and TENASSERIM, *Wallich.* CHITTAGONG, *Roxburgh.* MALACCA, *Griffith,* *Maingay.*

A large climbing shrub, bark of old wood spongy and split (*Roxburgh*). *Leaves* coriaceous, rather shining above; petiole $\frac{1}{2}$ -1 in. *Calyx* villous. *Follicles* 3 in. long, base cordate, thickly woody, narrowed into a stout beak, glabrous. *Seeds* $\frac{2}{3}$ in. long, flat, wing broad membranous.

5. **G. latifolium**, *Wall. in Wight. Contrib.* 45, and *Cat.* 8188; branches stout petioles leaf-nerves beneath cymes and sepals finely pubescent, leaves large orbicular acute or cuspidate, cymes 2-nate peduncled very many-fld., globose, pedicels slender, corolla-lobes ciliolate thickened and puberulous, follicles slender punctate, seeds narrow. *Dene. in DC. Prodr.* viii. 623.

SILHET; BURMA, at Troglā and the Saluen river, *Wallich.*

Leaves 4-5 in. long and nearly as broad, base rounded or subacute, glabrous above except the puberulous midrib, pale beneath; nerves spreading; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Cymes* $\frac{1}{2}$ -1 in. diam.; peduncle $\frac{1}{10}$ - $\frac{1}{2}$ in.; pedicels very slender. *Sepals* broadly ovate, obtuse. *Corolla* $\frac{1}{10}$ in. diam. *Follicles* 3 in. long, thinly coriaceous. *Seeds* as in *G. sylvestre*.

6. **G. glabrum**, *Wight Contrib.* 45; branches stout and petioles leaf-nerves beneath and cymes and sepals finely pubescent, leaves large broadly ovate or oblong acuminate, cymes 2-nate peduncled globose many-fld., pedicels slender, corolla very minute, lobes glabrous not ciliate thickened, follicles fusiform. *Wall. Cat.* 8189; *Dene. in DC. Prodr.* viii. 623.

BURMA; at Taong-dong, *Wallich.*

Very similar in foliage to *G. latifolium*, but the leaves are hardly so rounded and the petioles 1-1 $\frac{1}{2}$ in. long; the flowers $\frac{1}{10}$ - $\frac{1}{12}$ in. diam., and the follicles are lanceolate in outline, 4 by 1 in., thinly woody, glabrous, smooth; the seeds broadly ovate $\frac{1}{2}$ in. long, flat.

7. **G. rotundatum**, *Thwaites Enum.* 197; branches petioles leaves beneath cymes and sepals tomentose, leaves long-petioled rounded-ovate obtusely acuminate subpilose above, petiole glandular, cymes 2-nate peduncled densely many-fld., sepals rounded, corolla-lobes not ciliate quite glabrous, coronal processes wholly below the sinus.

CEYLON; central province, alt. 3000 ft., *Thwaites.*

I have seen but one specimen; it differs from *G. latifolium* chiefly in the longer petioles, 1-1 $\frac{1}{2}$ in. and peduncles. The fruit is wanting to tell its affinity. It differs from all others of this section in the coronal processes having no free points between the sinus.

8. **G. lactiferum**, *Br. in Mem. Wern. Soc.* i. 33; branches petioles and nerves beneath glabrous or puberulous, leaves ovate oblong or lanceolate acuminate point often long, cymes peduncled and broadly oblong or rounded, sepals glabrous or sparsely hairy, corolla $\frac{1}{6}$ in. diam. lobes short ciliolate glabrous. *Wight Contrib.* 44; *Dene. in DC. Prodr.* viii. 622.

KHASIA MTS., MALAY PENINSULA, and CEYLON.—DISTRIB. Sumatra, Borneo.

A stout climber. *Leaves* 2-4 by $\frac{3}{4}$ -1 $\frac{3}{4}$ in., coriaceous, brown when dry; nerves

3-4 pairs, very oblique; petiole slender, $\frac{1}{2}$ - $\frac{3}{4}$ in. *Cymes* few or many-fl., peduncle shorter than the petiole, flowers subglobose, $\frac{1}{8}$ in. diam. *Follicles* not seen.

VAR. 1. *lactiferum proper*; branches pubescent, leaves glabrous on both surfaces, sepals nearly glabrous. *G. lactiferum*, Br. l.c. *G. zeylanicum*, Dene. in DC. Prodr. viii. 622. *Asclepias lactifera*, Linn.—Ceylon.

VAR. 2. *nitens*; branches glabrous, leaves glabrous or the midrib and nerves beneath pubescent, sepals glabrous or sparsely hairy. *G. nitens*, Blume Mus. Bot. i. 149, t. 29; *Miquel Fl. Ind. Bat.* ii. 498. *G. malayanum*, Griff. Notul. iv. 56, and *l.c. Pl. Asiat.* t. 394.—Malay Peninsula from Mergui to Malacca, Sumatra, Borneo.

VAR. 3. *hasiana*; branches and nerves of leaf beneath pubescent, leaves often lanceolate.—Khasia Mts. at Churra, J. D. H. & T. T.

VAR. 4. *Thwaitesii*; leaves softly pubescent beneath, sepals membranous pubescent.—Ceylon, *Thwaites* (N. 2549). This resembles *G. sylvestre* and *acuminatum*, but the flowers are larger and the calyx is very different.

VAR. 4? *Walkeri*; branches and leaves quite glabrous, cymes sessile puberulous, sepals puberulous membranous.—Ceylon, *Walker*.

9. **G. Maingayi**, Hook. f.; branches slender petioles leaves beneath cymes and sepals softly finely pubescent, leaves small ovate or ovate-cordate acuminate few-nerved, cymes sub-sessile, flowers few minute, corolla-lobes not ciliate.

MALACCA, *Maingay* (Kew. Distrib. 1111).

Leaves 1-2 in. and branches bright yellow-brown when dry, nerves 2-3 pairs; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in. *Pedicels* slender, $\frac{1}{10}$ - $\frac{1}{8}$ in., bracts most minute. *Sepals* oblong. *Corolla* glabrous, $\frac{1}{8}$ in. diam., lobes rather narrow.—This resembles a good deal *G. affine* of China and *G. sylvestre*, but the cymes are sessile and leaves much smaller.

** Corolla-tube with double villous (rarely glabrous) ridges below the sinuses, not produced into fleshy points (see also *G. rotundatum*). BIDARIA, Dene.

† Corolla-tube short, broad, hardly exceeding the linear-oblong sepals; coronal-processes large.

10. **G. tingens**, Wight & Arn. Contrib. 45; glabrous or nearly so, leaves membranous broadly ovate usually cordate acute acuminate or caudate, petiole 1-1 $\frac{1}{2}$ in., cymes 4-6 in. corymbose at length racemose, peduncle shorter than the petioles, sepals glabrate, corolla-lobes glabrous broadly ovate or oblong. Wall. Cat. 8190. *G. tingens* var. *cordifolia*, Wight *l.c.* t. 593. *Bidaria tingens*, Dene. in DC. Prodr. viii. 623, partly. *Asclepias tingens*, Roxb. Hort. Beng. 21, and *Fl. Ind.* ii. 53.

TROPICAL HIMALAYA, from Kumaon to Sikkim; ASSAM; SILHET; LOWER BENGAL at Monghyr; PEGU and TRAVANCORE; Annamallay hills, alt. 4000 ft. *Beddome*.

An extensive climber; branches soft, not woody. Leaves 4-6 by 2-3 in., bright green; nerves 4-6 pairs. *Cymes* many-fl., elongating into a spiral raceme; bracts oblong; pedicels rather exceeding the peduncles; flowers $\frac{1}{2}$ in. diam., pale yellow. "*Follicles* 4 by 1 in. ovate-lanceolate, spreading, smooth fleshy" (Roxb.).—The western localities for this plant are doubtful, a specimen from Royle's Herb. is labelled by Falconer "Kharia Pass," another from Vicary "Gomulepore." The Annamallay specimen is indistinguishable and suggests the probability of this and *G. montanum* being forms of one species.

11. **G. montanum**, Hook. f.; glabrous or nearly so. Leaves 4-5 in. large coriaceous oblong or ovate-oblong or oblong-lanceolate obtuse acute or acuminate, petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., cymes corymbose at length racemose, peduncle shorter than the petiole, sepals ciliate glabrate, corolla-lobes oblong.—*G. tingens* var. *ovalifolia*, Wight *l.c.* t. 592. *Bidaria tingens*, Dene. in DC. Prodr.

viii. 623, partly. *B. elegans*, Dalz. & Gibs. *Bomb. Fl.* 151. ? *Asclepias montana*, Roxb. *Fl. Ind.* ii. 45.

DECCAN PENINSULA, from the Concan Southwards, on the Ghats.

This may, as Wight suggests, be a variety of *G. tingens*, but I find no intermediate forms; it differs in the shape and coriaceous nature of the leaves, their short petioles, and in the shorter peduncles. I have seen no fruit. There appear to be three forms of it.

VAR. 1. Leaves usually ovate, petiole short, cymes many-fld., corolla glabrous.—The Concan.

VAR. 2. *Beddomei*; leaves more oblong or oblong-lanceolate, petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., cymes few-fld., flowers larger, corolla glabrous.—Annamallay hills, alt. 5000 ft. *Beddome*.

VAR. 3. *pubiflora*; leaves of var 2., cymes few-fld., corolla pubescent externally.—Nilgherry hills at Nedawullum, alt. 7000 ft., *Wight, Clarke*. Clarke's specimens have longer peduncles and petioles and densely pubescent cymes.

12. *G. elegans*, *Wight & Arn. Contrib.* 46; glabrous or shoots and cymes puberulous, leaves 2–4 in. membranous ovate-cordate acute or acuminate, cymes few-fld., peduncles slender shorter than the petioles, sepals ciliate, glabrate, corolla-lobes obovate-oblong. *Wight Ic.* t. 830; *Wall. Cat.* 8191. *Bidaria elegans*, *Dene. in DC. Prodr.* viii. 623.

DECCAN PENINSULA; hills of the South Carnatic from the Nilgherries to Travancore, *Wight, &c.*

Much smaller and more delicate than *G. tingens*, with smaller leaves, more slender petioles and pedicels. *Follicles* $2\frac{1}{2}$ –3 by $\frac{1}{2}$ in., narrowly lanceolate, glabrous, straight. *Seeds* $\frac{1}{2}$ in. long, ovate, with a broad border.—As Wight well remarks, it is difficult to distinguish this from *G. tingens* except by habit, size, and the few-fld. cymes.

†† *Corolla-tube much exceeding the sepals; coronal-processes elongate, nearer to the base than to the lobes, often faint and glabrous.*

13. *G. pergularioides*, *Wight & Gardner mss.*; branches very slender and petioles and cymes puberulous, leaves membranous elliptic- or oblong-lanceolate caudate-acuminate base rounded or acute, peduncles equalling the petioles, pedicels very short, corolla-lobes ovate-lanceolate. *Bidaria pergularioides*, *Thwaites Enum.* 198? *Cynanchum cuspidatum*, *Thunb. Obs. in Cynanch.* 5; *Dene. in DC. Prodr.* viii. 548.

CEYLON, *Walker, Gardner, &c.*

Leaves very variable, 1–6 by $\frac{1}{2}$ –2 in., nerves arching or very oblique; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in., slender. *Cymes* dense-fld.; flowers almost capitate. *Sepals* broadly oblong, not half as long as the corolla-tube, which is $\frac{1}{4}$ in. and as long as the lobes. *Corolla-tube* yellow, tinged with red, $\frac{1}{2}$ in. long. “*Follicles* 5–6 in. long, $\frac{1}{4}$ in. broad, linear-lanceolate, much attenuate, puberulous, at length glabrate,” *Thwaites*.

VAR. *Gardneri*, *Thwaites l.c.*; leaves smaller 1–1 $\frac{1}{2}$ in. elliptic-lanceolate more coriaceous, follicles shorter.

14. *G. stenoloba*, *Hook. f.*; glabrous or nearly so, leaves membranous lanceolate acuminate, cymes few-fld., peduncles equalling the petioles, pedicels short, corolla-lobes linear, stigma bifid.

CEYLON, *Walker*.

Closely allied to *G. pergularioides*, but the cymes are few-fld., the flowers much larger, the corolla-tube $\frac{1}{4}$ in. long, the lobes narrowly linear, the column much longer and more slender and the stigma 2-fld. The follicles answer to the description of those of *G. pergularioides*, but are quite glabrous.

15. *G. ? Thomsoni*, *Hook. f.*; quite glabrous, leaves linear-lanceolate coriaceous, cymes simple or branched long-peduncled, pedicels long, corolla-

lobes linear with reflexed margins, anthers with membranous margins and a membranous ligule behind and below the inflexed tip, stigma broadly turbinate.

SIKKIM HIMALAYA, alt. 5-6000 ft., Thomson.

Stems slender. *Leaves* 3-6 by $\frac{3}{4}$ -3 $\frac{1}{2}$ in., base acute or narrowly rounded; nerves oblique, very faint; petiole stout, $\frac{1}{4}$ - $\frac{3}{4}$ in. *Peduncle* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., rather slender; flowers umbelled, pedicels twice or thrice as long as the corolla-tube. *Sepals* very small, broadly oblong. *Corolla-tube* $\frac{1}{2}$ in.; lobes as long, spreading, thick.—A very remarkable plant, resembling *G. stenoloba*, but differing totally in the texture of the leaves, the reflexed margins of the corolla-lobes and especially in the winged anthers with a membranous ligule behind the tip and parallel to it. It is probably a new genus, but, without the fruit, I do not venture to propose it as such.

DOUBTFUL SPECIES.

BIDARIA INODORA, Dcne. in DC. Prodr. viii. 624. "From sandy places near Pondicherry (*Cynanchum inodorum* v. *Ganosma inodora*, Lour. Fl. Coch. 166). A climber with fistular glabrous stems, leaves rounded-ovate or lanceolate quite glabrous base rounded or cordate, petiole slender, peduncles short, pedicels longer, flowers puberulous, tube hairy within, stigma conical emarginate exceeding the anthers" (Dcne. l.c.). I have no idea what this is; it is probably a very common plant.

31. GONGRONEMA, Dcne.

Glabrous twining shrubs or undershrubs. *Leaves* opposite. *Cymes* various, axillary; flowers small. *Calyx* 5-partite. *Corolla* urceolate subrotate or broadly campanulate, lobes narrowly overlapping to the right. *Column* short; coronal scales adnate to the bases of the anthers or 0. *Anther-tips* inflexed, concealing the stigma; pollen-masses solitary in each cell, ovoid, waxy, erect; stigma convex clavate or conical. *Follicles* acuminate. *Seeds* comose. **DISTRIB.** Species about 10; Asiatic, African, and Australian.

* Corolla nearly rotate, tube short.

1. **G. nepalense**, Dcne. in DC. Prodr. viii. 624; glabrous or cymes puberulous, leaves large oblong or ovate acuminate base rounded or cordate, cymes very long-peduncled bracteate, corolla-tube short open, lobes ovate, coronal process small recurved or obsolete. *Gymnema nepalense*, Wall. Tent. Fl. Nep. 50, t. 38, the left-hand leaf only, and Cat. 8192; Wight Contrib. 46.

SUBTROPICAL HIMALAYA; from Kumaon to Sikkim, alt. 2-4000 ft. KHASIA MTS., alt. 3-5000 ft.

An extensive twiner, shoots and cymes puberulous. *Leaves* 3-6 by 1 $\frac{1}{2}$ -3 $\frac{1}{2}$ in., membranous, nerves arching; petiole 1-2 in. *Peduncle* 2-6 in., generally branching into 3 long divaricate arms, each bearing three many-fld. umbels, pedicels short. *Sepals* ovate. *Corolla* $\frac{1}{2}$ in. diam., yellow. *Follicles* slender, 2 $\frac{1}{2}$ -3 by $\frac{1}{4}$ in.

VAR. sagittatum; leaves linear-oblong base rounded or cordate. *G. sagittatum*, Dcne. l.c. *Gymnema sagittatum*, Wall. Cat. 8194; Wight Contrib. 46. *G. nepalense*, Wall. Tent. Fl. Nep. t. 38 (except the left-hand cordate leaf). *G. columnare*, Wall. Cat. 8193; Wight & Arn. l.c. *Gongronema columnare*, Dcne. l.c.—Silhet, Assam, and Chittagong. Except the narrower leaves and usually shorter peduncles I can find no difference between *G. sagittatum* and *nepalense*. The processes at the base of the column vary very much.

** Corolla-tube inflated, equalling or exceeding the lobes in length.

2. **G. Wallichii**, Dcne. in DC. Prodr. viii. 624; quite glabrous, leaves elliptic-oblong or -lanceolate acute or acuminate, cymes subsessile few-fld., corolla-tube hairy within lobes short ovate. *Gymnema Wallichii*, Wight Contrib. 46; Wall. Cat. 8195 A.

MALACCA (? Finlayson), *Griffith, Maingay* (Kew Distrib. 1113).

Leaves 3-6 by 1-2 in., firmly membranous; nerves 5-6 pairs, arched; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Cymes* small; pedicels very unequal. *Sepals* small, oblong. *Corolla* $\frac{1}{4}$ in. diam., lobes spreading. *Coronal-scales* broad, recurved, apparently confluent with the anther-base. *Anther-tips* large, exserted. *Follicles* 6 by $\frac{1}{2}$ in., gently curved from base to tip, smooth. *Seeds* $\frac{1}{2}$ in. oblong, wing broad recurved.—Finlayson's specimens in Herb. Wallich have no locality given.

3. *G. ventricosum*, *Hook. f.*; quite glabrous, leaves coriaceous ovate or ovate-lanceolate obtusely caudate-acuminate, cymes subsessile few-fl'd., corolla-tube glabrous within, lobes as long linear with recurved margins.

KHASIA MTS. (Herb. Calcutta).

Leaves 3 by 1-1 $\frac{1}{4}$ in.; nerves 2-3 pairs, very prominent beneath, strongly inarching far within the margin; petiole stout, $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* very shortly pedicelled. *Sepals* very small. *Corolla* $\frac{1}{2}$ in. long. *Coronal-scales* broad, recurved. *Pollen-masses* smaller than the corpuscle.—In form of corolla this a good deal resembles *Gymnema Thomsoni*. I have seen only a solitary indifferent specimen of this plant.

G. ? FINLAYSONII, *Dcne. in DC. Prodr.* viii. 625 (*Gymnema Finlaysonii*, *Wight Contrib.* 46; *Wall. Cat.*), is probably, like most of Finlayson's plants, from Siam. It is glabrous with ovate-cordate leaves, and has peduncled cymes of large flowers $\frac{1}{2}$ - $\frac{1}{2}$ in. diam. The pollen-masses have long spiral pedicels.

32. MARS DENIA, Br.

Twining, rarely erect, shrubs or undershrubs. *Leaves* opposite. *Cymes* umbelliform, simple or branched, terminal or axillary; flowers medium-sized or small. *Calyx* 5-partite. *Corolla* campanulate or urceolate or salver-shaped, lobes narrow or broad, overlapping to the right. *Coronal scales* 5, usually subulate flattened (or 0), adnate to the anthers dorsally, erect. *Column* short; anthers with an inflexed tip; pollen-masses pedicelled, oblong or ovoid, waxy, erect. *Stigma* flat convex or beaked, sometimes very long. *Follicles* lanceolate or poniard-shaped. *Seeds* comose.—DISTRIB. Species about 50; chiefly tropical or subtropical, with one S. European.

A heterogeneous assemblage, amongst which perhaps *M. tinctoria*, *eriocarpa*, and *thyrsoidea* should form one natural genus, and the remainder a second. *M. thyrsoidea* is very remarkable in wanting the coronal scales.

SECT. I. *Eumarsdenia*. *Flowers* small. *Corolla* cylindric, shortly 5-cleft, mouth closed with a brush of short hairs. *Column* minute; anther-tips and coronal scales very short. *Stigma* truncate;

1. *M. tinctoria*, *Br. in Mem. Wern. Soc.* i. 30; nearly glabrous, leaves ovate or cordate acuminate or caudate, flowers in dense thyrsoid or rounded panicles, coronal scales subulate longer and narrower than the anther-tip, follicles finely pubescent. *Wight Contrib.* 40, and *Ic. t.* 589; *Wall. Cat.* 8173; *Griff. Notul.* iv. 52, and *Ic. Pl. Asiat.* t. 389; *Grah. Cat. Bomb. Pl.* 119; *Brand. For. Fl.* 332; *Kurz For. Fl.* ii. 201; *Dcne. in DC. Prodr.* viii. 615 excl. syn. of *Rheede*. *M. monostachya*, *Wall. mss.* *Asclepias tinctoria*, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 43. *Pergularia tinctoria*, *Spreng. Syst.* i. 844. *P. parviflora*, *Blume Bijd.* 1056. *Cynanchum tingens*, *Herb. Ham.*

SIKKIM HIMALAYA, alt. 2-3000 ft. ASSAM, SILHET, KHASIA MTS., and BURMA at Prome, *Wallich* (cultivated in the Deccan and elsewhere in India).—DISTRIB. Sumatra, Java, China.

A tall climber; stem stout, smooth, glabrous or finely pubescent, as are the petioles, sometimes the leaves below, and cymes. *Leaves* 3-9 by 1-3 in., nerves spreading, glandular above at the petiole; petiole 1-2 in. *Cymes* short- or long-peduncled, rounded and $\frac{1}{2}$ -1 in. diam. or elongate 3-6 in. long, thyrsoid, formed of interrupted clusters; pedicels short. *Sepals* ovate, pubescent. *Corolla* $\frac{1}{3}$ in. long, yellow, fleshy, glabrous externally; tube with deflexed hairs within. *Follicles* 3 in. long, $\frac{1}{2}$ in. diam., narrowed at the base. *Seeds* narrowly ovoid, $\frac{1}{2}$ - $\frac{3}{4}$ in. long.—In the absence of any description or figure of the follicles, or of authentic specimens in fruit of the Sumatran plant on which the genus was founded, I am in doubt whether this or the following is the true *M. tinctoria*. The flowers are often deformed, very large, and the column is often replaced by rudimentary leaves. Decaisne erroneously quotes Rheedé's Kada Kodi (Hort. Mal. ix. 72, t. 8) for this plant.

2. *M. eriocarpa*, Hook. f.; foliage of *M. tinctoria*, follicles shorter broader turgid at the base softly villous with long spreading hairs, seeds broadly ovate.

SILHET, Herb. Wallich (*Asclep.* 145 A). ASSAM, Masters.

Wallich on the ticket of his specimen (which has no Catalogue number) says of this "Marsdenia, tinctoriæ affinis, sed differt; E. Sylhet, introd. in H.B. Calc. Feb. 1840." Brandis describes the pod of *M. tinctoria* as "covered with long soft hairs," whence he probably has assumed that this is referable to *M. tinctoria*, and, if so, the plant I have described under that name must be named afresh. A reference to Marsden's Sumatran plant can alone solve the difficulty.

SECT. II. MACROCENTRUM. *Flowers* larger. *Corolla* subcampanulate; tube short, globose or subcylindric; lobes large, fleshy, spreading, and throat glabrous or villous. *Staminal column* large, filling the tube; coronal scales usually large, often exceeding the anther-tip.

* *Stigma* not extended beyond the anthers.

3. *M. Roylei*, Wight Contrib. 40; branches petioles leaves beneath and cymes finely pubescent or tomentose, leaves ovate-cordate acuminate, cymes corymbose, corolla-lobes pubescent without villous within, coronal scales slender subulate far exceeding the short anther-tips. *Brand. For. Fl.* 333; *Dene. in DC. Prodr.* viii. 615.

EASTERN and WESTERN HIMALAYA; from Simla to Kumaon, ascending to 5000 ft. SIKKIM, alt. 4000 ft., Clarke.

Leaves 3-6 by 2-4 in., often velvety beneath; petiole $1\frac{1}{2}$ -2 in. *Cymes* 1- $1\frac{1}{2}$ in. diam. *Corolla* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. *Stigma* dome-shaped. *Follicles* turgid, 3 in. long $1\frac{1}{2}$ in. diam., straight, beaked, pericarp thick transversely rugose puberulous. *Seeds* $\frac{1}{2}$ in. long.

4. *M. tenacissima*, Wight & Arn. Contrib. 41; branches petioles leaves beneath and cymes velvety or tomentose, leaves broadly ovate base cordately 2-lobed acuminate, corolla-lobes pubescent without glabrous within, coronal scales coriaceous subulate hardly exceeding the ovate anther-tip. *Wight Ic. t.* 590; *Wall. Cat.* 8176; *Brand. For. Fl.* 333; *Kurz For. Fl.* ii. 201; *Dene. in DC. Prodr.* viii. 616. *Asclepias tenacissima*, Roxb. Cor. Pl. iii. 35, t. 240, and *Fl. Ind.* ii. 31. *A. tomentosa* and *A. echinata*, Herb. Madr. *Gymnema tenacissima*, Spreng. Syst. i. 844.

WESTERN HIMALAYA; Kumaon, ascending to 4500 ft. NORTHERN OUDH, Thomson. BENGAL; Rajmahal hills, Roxburgh. CHITTAGONG, Wallich. AYA, Kurz. CEYLON, hotter parts of the Island, not common, Thwaites.—DISTRIB. TIMOR (Miquel).

Stem very stout. *Leaves* 4-7 by 3-5 in., often velvety above; petiole 2-3 in. *Cymes* much corymbosely branched. *Corolla* $\frac{1}{2}$ in. diam.; lobes oblong, ciliate *Stigma* between conical and dome-shaped. *Follicles* 5-6 in. long by $1\frac{1}{2}$ -2 in. diam.,

lanceolate; pericarp very thick, longitudinally wrinkled, finely pubescent. *Seeds* ovate-oblong, $\frac{1}{2}$ in. long.—*Pergularia crocea*, Zipp. (*Miquel Fl. Ind. Bat.* ii. 497), of Java is very closely allied, but the coronal scales are much laterally compressed, project radially, and are 2-keeled towards the base.

5. **M. Hamiltonii**, *Wight Contrib.* 41; branches petioles nerves beneath and cymes furfuraceously puberulous, leaves oblong or oblong-ovate obtuse or acute base cordate, cymes corymbosely branched, corolla-lobes glabrous without and within, throat densely villous, coronal scales membranous subulate exceeding the anther-tips. *Wall. Cat.* 8174; *Dcne. in DC. Prodr.* viii. 614. *Cynanchum reticulatum*, *Herb. Ham.*

NORTHERN OUDH, *Hamilton*. WESTERN HIMALAYA; Subsewaliks, *Edgeworth*.

Leaves coriaceous, 2-3 by $1\frac{1}{2}$ -2 in., pale; petiole $\frac{1}{2}$ -1 in. *Cymes* corymbosely branched. *Corolla* $\frac{1}{10}$ to $\frac{1}{5}$ in. diam. *Stigma* quite flat with a central cone. *Follicles* not seen.

6. **M. Brunoniana**, *Wight & Arn. Contrib.* 40; glabrous or cymes and petioles puberulous, leaves orbicular-cordate acuminate membranous, cymes short few-fl. corymbiform, corolla-lobes glabrous within and without, anthers with a double flattened obtuse spur (or fold) at the base, coronal scales ovate acute a little longer than the short anther-tip. *Dcne. in DC. Prodr.* viii. 614; *Wight Ic.* t. 356.

COROMANDEL; near Cotermala, *Wight*.

Branches and petioles sometimes puberulous. *Leaves* 4-5 by 3-4 in., base shortly cordate, nerves slender; petiole 1-2 in., slender. *Cymes* $\frac{1}{2}$ -1 in. diam.; peduncle shorter than the petiole. *Corolla* $\frac{1}{2}$ in. diam., lobes broadly oblong. *Stigma* broadly conical, 2-toothed.

7. **M. Jenkinsii**, *Hook. f.*; glabrous or puberulous, very stout, leaves broadly elliptic or orbicular cuspidate thickly coriaceous, corolla-tube globose, lobes glabrous without villous within, coronal scales subulate much exceeding the very short anther-tip.

ASSAM, *Jenkins* (*Herb. Calcutta*).

Branches as thick as the little finger. *Leaves* 7-10 by 5-7 in., pale beneath; nerves 6-8 pairs, diverging, straight or a little arched; petiole 2-4 in. *Cymes* small; peduncle short, very thick; flowers subumbellate, bracteate; pedicels stout, 1 in. *Sepals* $\frac{1}{2}$ in., lanceolate, pubescent. *Corolla* $\frac{3}{4}$ in. diam., lobes rounded fleshy. *Stigma* dome-shaped.

** *Stigma protruded far beyond the anthers.*

8. **M. lucida**, *Edgew. mss.*; branches petioles cymes and leaves beneath finely pubescent, leaves elliptic or ovate acute or obtusely acuminate, cymes corymbiform very shortly peduncled, corolla-lobes ciliate glabrous without sparsely hairy within, coronal scales subulate equalling the anther-tips, style many times longer than the column tip bifid. *Brand. For. Fl.* 333.

WESTERN HIMALAYA; Kumaon, *Strach. & Winterb.*; Nynetal, alt. 5-7000 ft., *Madden*.

Leaves 4-5 by 2-3 in., rather coriaceous, pale beneath; nerves arched; petiole 1-2 in. *Corymbs* many-fl.; peduncle stout, $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ - $\frac{1}{3}$ in. diam. *Follicles* 5 in. long by 1 in. diam., straight, lanceolate; pericarp thickly coriaceous, glabrous. *Seeds* $\frac{3}{8}$ in. long, ovate-lanceolate.

9. **M. Griffithii**, *Hook. f.*; glabrous except the puberulous cymes, leaves elliptic obtusely acuminate coriaceous base rounded or cordate, cymes corymbiform shortly peduncled, corolla-lobes glabrous without sparsely hairy within,

coronal scales small obtuse shorter than the orbicular anther-tips, style as long as the column, tip 2-toothed. *M. lucida*, *Herb. Ind. Or. II. f. & T.*

KHASIA MTS., alt. 4-6000 ft.; at Mungbrea and Myrung, *Griffith, H. f. & T.*

Stem stout. *Leaves* 3-7 by $1\frac{1}{2}$ - $3\frac{1}{2}$ in., pale beneath; nerves slightly arched; petiole $1-1\frac{1}{2}$ in. *Umbels* and *flowers* greenish yellow, very like *M. lucida*. *Follicles* not seen.

SECT. III. **Microcentrum.** *Clarke mss.* *Flowers* small. *Corolla* urceolate or tubular, shortly 5-cleft, glabrous within. *Anthers* spurred at the base behind. *Stigma* exserted, obtuse.

10. **M. Calesiana**, *Wight Contrib.* 41; branches petioles and leaves beneath and cymes densely pubescent, leaves broadly ovate-cordate acuminate membranous, cymes much corymbosely branched, corolla sparsely hairy without lobes narrow, coronal scales subulate shorter than the long anther-tips. *Wall. Cat.* 8175; *Dcne. in DC. Prodr.* viii. 616. *Pergularia Calesiana*, *Herb. Ham.*

CENTRAL AND EASTERN HIMALAYA; Nepal Morung, *Hamilton*. SIKKIM, alt. 2000 ft., *Clarke.*

Stem stout. *Leaves* 4-6 in. long and nearly as broad, pubescent or glabrate above; petiole $1\frac{1}{2}$ -3 in., slender. *Cymes* shortly peduncled, 3 in. diam. *Corolla-tube* cylindric, $\frac{1}{2}$ in. long; lobes spreading and recurved, thick. *Column* nearly filling the tube.

11. **M. thyrsiflora**, *Hook. f.*; nearly glabrous except the puberulous cymes, leaves broadly ovate or oblong- or deltoid-ovate deeply cordate acuminate, cymes elongate of clusters of shortly peduncled flowers on a long rachis, corolla urceolate glabrous without and within, lobes lanceolate, coronal scales short rounded wholly adnate to the long subulate anther-tips. *M. tinctoria*, in part, *Herb. H. f. & T.*

BENGAL; in the Jheels, *Griffith, J. D. H. & T. T.* ASSAM, *Masters.*

Leaves 4-8 by 2-6 in., membranous; petiole 1-3 in. *Cymes* 4-6 in. long; rachis flexuous; pedicels very short. *Sepals* nearly glabrous, obtuse. *Corolla* $\frac{1}{12}$ - $\frac{1}{10}$ in. long; lobes coriaceous. *Anther-tips* longer than the column, basal spurs very small. *Stigma* fusiform. *Follicles* 2 in. long, dagger-shaped, turgid below; pericarp thinly coriaceous, glabrous. *Seeds* ovate, $\frac{1}{2}$ - $\frac{1}{4}$ in. long.—So similar to some forms of *M. tinctoria* in foliage and inflorescence as to be easily mistaken for that plant. The coronal scales may be said to be absent.

DOUBTFUL SPECIES.

M. ROTUNDIFOLIA, *Dcne. in DC. Prodr.* viii. 615; "branches thick glabrous; leaves rounded, obsoletely cordate, glabrous, shortly acuminate; petiole rather long, slender, puberulous; cymes subcontracted, many-fl.; peduncle equalling the petiole; corolla-lobes ovate-oblong, densely bearded within; coronal scales ovate-deltoid, equalling the column."—Communicated from the Calcutta Garden to Paris Herb. by *Griffith*.

33. **PERGULARIA**, *Linn.*

Twining subglabrous undershrubs. *Leaves* opposite, ovate-cordate, membranous. *Cymes* subumbelliform. *Flowers* greenish or yellow, rather large. *Calyx* 5-partite. *Corolla* salver-shaped, tube swollen at the base; lobes oblong or linear, overlapping to the right. *Column* rather large; coronal scales large, membranous, adnate to the back of the anthers, erect, flattened dorsally or laterally, acute, simple or transversely bifid (2-lamellate above the middle), pollen-masses one in each cell, subcylindric clavate or globosely obovoid, waxy, erect. *Stigma* umbonate or capitate, rather longer than the anther-cells.

Follicles lanceolate, terete, rather turgid. *Seeds* ovate, concave.—DISTRIB. Species about 10; Asiatic and African.

The excessively sweet-scented *P. odoratissima*, Smith (Icones Pictæ, t. 15), is stated to be Indian, but the plant so called by Roxburgh, Wight, &c., is *P. minor*. Smith's figure exactly resembles *P. pallida*, which is nearly scentless.

* *Pollen-masses* elongate-clavate or subcylindric.

1. ***P. pallida***, Wight & Arn. *Contrib.* 42; leaves ovate-cordate acuminate, flowers scarcely fragrant, corolla yellowish white, lobes linear much larger than the tube which is glabrous within, coronal scales with broad points not spurred behind. *Wall. Cat.* 8181; *Wight Ic.* t. 585; *Brand. For. Fl.* 334; *Kurz For. Fl.* ii. 203; *Dene. in DC. Prodr.* viii. 619. *P. coromandeliana* and *P. montana*, *Dene. l. c.* *Asclepias pallida*, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 48.

TROPICAL HIMALAYA; from Murree ascending to 5000 ft. eastward to SIKKIM and southward on the plains to BOMBAY and CENTRAL INDIA, BEHAR and BIRMA.

Except by the absence of the sweet scent and pale flowers I do not know how this can be distinguished from Smith's figure and description of *P. odoratissima*. *Follicles* in Roxburgh's figure 6 in. long and 1 broad ($1\frac{1}{2}$ as drawn partially open), lanceolate. *Seeds* $\frac{1}{2}$ in. long, broadly ovate.

** *Pollen-masses* globosely obovoid or obscurely broadly obconic.

2. ***P. minor***, Andr. *Bot. Rep.* t. 184; leaves orbicular or ovate cordately 2-lobed acuminate, flowers very fragrant yellow or green, corolla-lobes oblong about equalling the tube or shorter, tube pubescent above within, coronal scales double inner with a long subulate point. *Bot. Mag.* t. 755. *P. odoratissima*, *Wight Contrib.* 43, and *Ic.* t. 414. *Kurz For. Fl.* ii. 203. *Asclepias odoratissima*, *Roxb. Hort. Beng.* 20; and *Fl. Ind.* ii. 46; *Wall. Cat.* 8182; *Grah. Cat. Boml. Pl.* 120.

Cultivated or native throughout India, and the Eastern Islands, China and Japan; native of the Himalaya (*Brandis*). Tsegai hills in AYA, *Griffith*.

Though confounded with *P. odoratissima*, this appears to be perfectly distinct in the smaller flowers and short broad corolla-lobes. *Follicles* lanceolate, 3 in. long by $\frac{3}{4}$ in. diam.; pericarp thick, glabrous. *Seeds* $\frac{1}{2}$ in. long, broadly ovate.—The coronal scales vary excessively in length acuteness and in the comparative length of the outer and inner divisions.

3. ***P. puberula***, *Miquel Fl. Ind. Bat.* ii. 495; leaves ovate or oblong-ovate acuminate, base rounded or cordate, sepals broadly ovate, corolla pubescent without and within, lobes linear longer than the tube, coronal scales laterally compressed 2-winged dorsally below produced into an inflexed subulate point exceeding the anthers.

PENANG, *Phillips*.—DISTRIB. JAVA.

Habit of *P. pallida*, from which the short sepals, pubescent corolla, and laterally much-flattened scales which project far outwards from the column, and the form of the pollen-masses, at once distinguish it.

34. **STEPHANOTIS**, *Thouars*.

Twining glabrous shrubs. *Leaves* opposite, coriaceous. *Cymes* umbelliform, axillary; flowers large, white. *Calyx* 5-partite, segments large. *Corolla* coriaceous, tubular or salver-shaped, tube cylindric, base swollen; lobes twisted, overlapping to the right. *Coronal scales* 0 in the Indian species (in others adnate to the anthers, erect, dorsally flattened). *Column* very short; anthers with an inflexed tip; pollen-masses one in each cell, erect, waxy, shortly

pedicelled. *Stigma* conical or shortly beaked, hardly or not exerted. *Follicles* very thick, obtuse or acuminate. *Seeds* comose.—**DISTRIB.** Species 14, Madagascar, Malay Islds. and China.

S. Maingayi, *Hook. f.*; quite glabrous, leaves broadly ovate-cordate acuminate, cymes on long stout peduncles, sepals large lanceolate acuminate, corolla-tube 1 in., lobes lanceolate acuminate, anther-tips long, coronal scales 0.

MALACCA; *Maingay* (Kew distrib. 1112).

Branches stout. *Leaves* 4–6 by 2–3 in., basal sinus acute, nerves about 8 pairs; petiole $\frac{1}{2}$ –1 in. *Peduncle* 2–3 in., few-fl'd.; pedicels 1–1 $\frac{1}{2}$ in.; bracts subulate. *Sepals* $\frac{3}{4}$ in., acuminate, coriaceous. *Corolla-tube* with 5 hairy ridges at the base within, lobes about equalling the tube. *Column* $\frac{1}{2}$ the length of the tube. *Anther-tips* as long as the rest of the column, obtuse. *Stigma* capitate.

35. **LYGISMA**, *Hook. f. Gen. Nov.*

A puberulous slender much diffusely branched twining shrub. *Leaves* small, opposite, lanceolate. *Flowers* small, in numerous axillary umbelliform cymes. *Sepals* ovate, eglandular. *Corolla* salver-shaped, tube very short, lobes long, linear, waved, obtuse, the lobes overlapping to the right below the middle, the upper half sharply doubled down inwards (buds hence truncate). *Corona* of minute obtuse appressed teeth at the back of the anthers. *Column* minute, fleshy, low, cylindric; anthers very short, with small rounded membranous tips; pollen-masses cylindric, clavate, waxy, erect, subsessile on the long corpuscle. *Stigma* included.

L. angustifolia, *Hook. f. Ic. Plant. t. 1423.* *Marsdenia angustifolia*, *Night. Contrib. 40*; *Wall. Cat. 8172*; *Dcne. in DC. Prodr. viii. 614.*

BIRMA; hills near Prome, *Wallich.*

Leaves 1–2 by $\frac{1}{4}$ – $\frac{1}{3}$ in., acute, glabrous when mature, base rounded, triple nerved at the base; petiole very short. *Cymes* in all the upper axils, many-fl'd.; peduncle $\frac{1}{3}$ – $\frac{1}{2}$ in., very slender, pedicels $\frac{1}{2}$ in. *Sepals* obtuse, pubescent. *Corolla* glabrous, $\frac{1}{4}$ in. diam.—A very curious plant, the only Indian Asclepiad one known to me with the corolla-lobes doubled down inwards in aestivation, rendering the bud truncate.

36. **TYLOPHORA**, *Br.*

Twining, rarely erect, herbs or undershrubs. *Cymes* umbelliform or racemose; flowers small or minute. *Sepals* ovate or lanceolate. *Corolla* rotate; lobes broad, slightly overlapping to the right. *Coronal processes* fleshy, adnate to the very short column. *Anthers* very small with an inflexed tip; pollen-masses one in each cell, minute, globose or ovoid, waxy, erect or ascending rarely transverse or pendulous from the ascending pedicel. *Stigma* disciform, 5-gonal, included. *Follicles* acuminate, smooth. *Seeds* ovoid, flat, winged, comose.—**DISTRIB.** Species about 40; Asiatic, African, Australian and Oceanic.

The minute anthers (larger in *T. Iphisia*), forming a small ring round the disciform stigma, which is more or less overlapped by the short anther-tips, and the adnate usually gibbous or globose coronal processes are the best characters for this genus. The position of the pollen-masses, ascending, horizontal, or pendulous, cannot be depended upon, and is most difficult to ascertain in dried specimens; as is the exact form of the fleshy coronal processes.

* Stem short, erect or suberect, 1–2 ft. (perhaps longer and twining in *T. Iphisia*), sometimes twining at the tips.

1. **T. Govanii**, *Dcne. in DC. Prodr.* viii. 610; stem simple pubescent, leaves subsessile oblong elliptic or obovate, umbels simple peduncled, sepals linear, corolla-lobes lanceolate, coronal processes gibbous. *Iphia* Govanii, *Wight Contrib.* 52; *Wall. Cat.* 8212. *Vincetoxicum montanum*, *Dcne. l.c.* 525.

WESTERN HIMALAYA; KUNAWUR to Kumaon, alt. 7–8000 ft., *Govan*, &c.

Rootstock slender, creeping. *Stems* 8–16 in., naked below. *Leaves* 1–1½ by ½–1¼ in., rarely linear or almost orbicular, obtuse or apiculate. *Umbels* rarely sessile; pedicels capillary; flowers dark purple, ½ in. diam. *Anthers* large for the size of the column; pollen-masses pendulous. *Stigma* umbonate.

2. **T. Helferi**, *Hook. f.*; softly pubescent, stem simple, leaves sessile ovate or lanceolate acuminate, umbels simple long-peduncled, sepals linear, corolla-lobes elongate-lanceolate, coronal processes gibbous.

TENASSERIM; *Helfer*.

Stem 8–12 in. *Leaves* 1½–2 by ½–1 in., pubescent on both surfaces, base rounded. *Peduncle* strict, equalling the leaves, pedicels capillary. *Corolla* ½ in. diam., purple?, lobes caudate. *Follicles* 1½ in., poniard-shaped, pubescent.—The position of the pollen-masses I could not ascertain, owing to the imperfection of the specimens.

3. **T. fasciculata**, *Ham. in Wight Contrib.* 50; *l.c.* t. 848; stem simple or branched glabrous below finely puberulous above, leaves petioled ovate or lanceolate acute glabrous, cymes peduncled umbelliform simple or compound, sepals lanceolate, corolla-lobes broadly ovate, coronal processes globose, follicles short turgid. *Wall. Cat.* 8204; *Dcne. in DC. Prodr.* viii. 608; *Dalz. & Gibs. Bomb. Fl.* 151.

SOUTH NEPAL; at Sukanagur, *Hamilton*. SOUTH CONCAN; Bababoodan hills, &c.; *Law, Dalzell*, &c.

Stems several from the root, 12–18 in., flexuous or climbing amongst grass. *Leaves* 1–2 by ¾–1½ in., coriaceous; petiole ½–1 in. *Peduncles* slender; pedicels capillary. *Corolla* ½ in. diam., fleshy in the Nepal specimens. *Pollen-masses* horizontal according to *Wight*, but I think erect. *Follicles* 1½–2 by ½–¾ in., ovoid-lanceolate; pericarp very thick, glabrous. *Seeds* ½ in. long, broadly ovoid, quite flat.—*Wight* correctly observes that the corpuscles in this and the following are almost 2-partite.

4. **T. macrantha**, *Hook. f.*; stem simple or branched finely pubescent, leaves petioled ovate acute glabrous, cymes peduncled simple or subcompound, sepals lanceolate, corolla-lobes ovate-lanceolate, coronal processes globose. *T. fasciculata* var. *macrantha*, *Wight Contrib.* 50; *Dcne. in DC. Prodr.* viii. 608.

NILGHERRY MTS., *Wight*, &c. PEGU, *Col. Eyre (in Herb. Calcutt.)*

This has the habit and foliage of *T. fasciculata*, but the flowers are twice as large, and the corolla-lobes ovate-lanceolate. The Pegu specimens seem identical with the Nilgherry ones. *Fruit* unknown.

5. **T. Iphia**, *Dcne. in DC. Prodr.* viii. 610; quite glabrous, stem branched flexuous, leaves petioled ovate or lanceolate acuminate, cymes branched, sepals ovate, corolla subglobose, lobes ovate, coronal processes ovoid wholly adnate to the base of large anthers. *Deless. Ic. Sel.* v. t. 82; *Wight Ill.* t. 155 bis f. e. & *l.c.* t. 1276. *Iphia multiflora*, *Wight & Arn. Contrib.* 52. *T. fasciculata*, *Thwaites Enum.* 197. *T. pauciflora*, *Hohenack. Pl. Ind. Or.* n. 1386.

NILGHERRY MTS., *Wight*, &c. CEYLON; Central province, alt. 4–7000 ft., *Walker*, &c.

Stem rather stout, 2-3 feet long. *Leaves* $1\frac{1}{2}$ -2 $\frac{1}{2}$ by $\frac{1}{2}$ -1 $\frac{1}{2}$ in., dark green, rather coriaceous; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in. *Peduncles* longer than the petiole; pedicels short. *Sepals* quite glabrous. *Corolla* $\frac{1}{2}$ in. diam., yellow or dark purple. *Anthers* large for the size of the column, horny, with broad inflexed tips; pollen-masses horizontal. *Follicles* 3-3 $\frac{1}{2}$ in. long, poniard-shaped, glabrous. *Seeds* $\frac{1}{2}$ in. long, narrowly ovate.—The anthers of this are much larger than in any of its congeners. Hohenacker's is the only Peninsular specimen that I have seen; it is identical with the Ceylon ones. The corpuscles are long, linear with a central groove, quite different from those of *T. fasciculata*.

•• Stems and branches long, twining, and cymes perfectly glabrous; sepals always glabrous (see also *T. Iphisia*); coronal processes without free points (except *T. himalaica*).

6. **T. capparidifolia**, *Wight & Arn. Contrib.* 51; quite glabrous, leaves elliptic or elliptic-oblong obtuse acute or apiculate pale veined coriaceous, cymes shortly peduncled or sessile, pedicels capillary, flowers minute, sepals ovate, corolla subglobose, lobes short ovate, coronal processes globose. *Dene. in DC. Prodr.* viii. 610; *Wall. Cat.* 8208. *Asclepias tenuis*, *Herb. Heyne*.

TRAVANCORE; Courtallam, *Heyne, Wight*.

Branches rigidly flexuous. *Leaves* 2-4 by $\frac{1}{2}$ -1 $\frac{1}{2}$ in., rigid; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in. *Cymes* much shorter than the leaves, pedicels $\frac{1}{2}$ - $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ in. diam. *Follicles* 3 in. long, poniard-shaped.—*Wight* describes the coronal processes as toothed on the inner margin below the tip, a character I fail to verify.

7. **T. globifera**, *Hook. f.*; quite glabrous, leaves short-petioled oblong or ovate acuminate or apiculate, cymes long-peduncled compound few-fl'd. pedicels capillary, sepals ovate-lanceolate, corolla-lobes short ovate, coronal processes very large globose as high as the anthers.

MALACCA, *Griffith*. SOUTH ANDAMAN ISLAND, *Kurz*.

Leaves 1-3 by $\frac{1}{2}$ -1 $\frac{1}{2}$ in., dark brown when dry, base rounded or cordate, nerves few; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Peduncles* 1-1 $\frac{1}{2}$ in., very stout; pedicels $\frac{1}{2}$ -1 in. *Corolla* $\frac{1}{2}$ in. diam. *Staminal column* very short, depressed.

8. **T. pauciflora**, *Wight & Arn. Contrib.* 44; quite glabrous, leaves long-petioled ovate-lanceolate or cordate acuminate, cymes long-peduncled few-fl'd. compound, sepals ovate acute, corolla-lobes short ovate, coronal processes very large globose as high as the anthers. *Wight Ic. t.* 1274; *Dene. in DC. Prodr.* viii. 607. *T. asthmatica* β *glabra*, *Thwaites Enum.* 19. "*Cynanchum flavens* and *bracteatum*, *Thunb.*; *Dene. in DC. l.c.* 549" (*Thwaites*).

DECCAN PENINSULA; from S. Canara to Malabar and Travancore, *Wight, &c.* CEYLON, not uncommon, *Thwaites*.

Branches rather stout. *Leaves* 2-4 by 1-2 in., rather thin, nerves slender; petiole $\frac{1}{2}$ -1 in. *Peduncles* longer than the petioles; pedicels very variable. *Corolla* $\frac{1}{2}$ in. diam. *Column* and *coronal processes* much as in *T. globifera*, from which this differs in the leaves and long petioles.—The North Bengal locality attributed to this in *DC. Prodr.* is doubtless an error. *Thwaites'* specimen of *T. asthmatica* β *glabra* is very imperfect, but I think referable to this.

9. **T. purpurea**, *Wall. in Wight Contrib.* 51, and *Cat.* 8208; quite glabrous, leaves oblong-lanceolate apiculate base cordate, cymes long-peduncled few-fl'd., sepals ovate, corolla-lobes short ovate, coronal processes gibbous. *Dene. in DC. Prodr.* viii. 611.

BIRMA; banks of the Irawaddy, *Wallich*.

Resembles *T. pauciflora*, but the leaves are narrower, more cordate at the base, and the coronal processes less developed. The specimens are very insufficient. *Wight*

describes the processes of the column as toothed on the inner margin below the tip, and the pollen-masses as transverse.

10. **T. longifolia**, *Wight Contrib.* 50; quite glabrous, leaves lanceolate from a broad cordate base acuminate, cymes elongate bearing small distant umbels on the very long slender rachis, sepals ovate, corolla-lobes short ovate obtuse, coronal processes gibbous. *Wall. Cat.* 8205; *Dcne. in DC. Prodr.* viii. 608.

SIKKIM HIMALAYA, alt. 2000 ft., *Clarke*. KHASIA Mts., alt. 4-6000 ft., *Wallich*, &c.

Stem and *branches* slender. *Leaves* 3-6 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., membranous, nerves distant; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in. *Cymes* very slender and few-fld. *Corolla* $\frac{1}{2}$ in. diam., yellow. *Follicles* not seen.

11. **T. himalaica**, *Hook. f.*; quite glabrous, leaves petioled ovate-lanceolate acuminate base acute or rounded, cymes bearing short distant umbels on the very long slender rachis, sepals lanceolate, corolla-lobes oblong-ovate obtuse, coronal processes gibbous.

WESTERN HIMALAYA (Suhunsudhara), *Falconer*. SIKKIM HIMALAYA, alt. 3000 ft., *Thomson, Clarke*. KHASIA Mts., alt. 0-4000 ft., *Griffith*, &c.

Very closely allied to *T. longifolia*, but the leaves are very different; always contracted, generally acute, and never cordate at the base; and the flowers are twice as large, with narrow longer sepals, more membranous longer corolla-lobes, and a much larger column. *Follicles* 4-5 in., narrowly poniard-shaped. *Seeds* $\frac{1}{4}$ in. long, broadly ovate.—I have observed a very few hairs on the sepals.

12. **T. zeylanica**, *Dcne. in DC. Prodr.* viii. 608; quite glabrous, leaves large fleshy ovate elliptic or almost rounded acuminate acute or apiculate, cymes elongate bearing few- or many-fld. umbels or racemes on the divaricate branches, sepals ovate obtuse, corolla lobes oblong-ovate obtuse, coronal processes gibbous. *T. micrantha*, *Thwaites Enum.* 197. *Cynanchum micranthum*, *Thunb. Diss.* 6; *DC. l.c.* 548.

TRAVANCORE, alt. 2000 ft., *Beddome*. CEYLON; Central province, alt. 2-4000 ft.

A tall climber. *Leaves* 4-6 by 2-4 in.; midrib thick with a gland above at the insertion of the petiole; nerves spreading; petiole 1-1 $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in. diam.; pedicels slender. *Follicles* 4-6 in., slender. *Seeds* $\frac{1}{2}$ in. long, linear-oblong.—In one of *Beddome's* specimens the flower-bearing tips of the branches are thickened and covered with spirally placed scars, each subtended by a minute bract at the insertion of the pedicels.

13. **T. tenuis**, *Blume Bijl.* 1062; very slender, quite glabrous, leaves small fleshy ovate elliptic or oblong obtuse acute or apiculate, base acute or rounded, peduncle capillary simple or branched bearing few-fld. sessile umbels, pedicels capillary, sepals ovate acute, corolla-lobes short ovate obtuse, coronal processes gibbous or globose. *Dcne. in DC. Prodr.* viii. 608. *T. carnosa*, *Wall. in Wight Contrib.* 49; *Wall. Cat.* 8200; *Wight. Ic. t.* 351; *Dcne. l.c.* 607; *T. tenuissima*, *Wight & Arn. Contrib.* 47; *Wight Ic. t.* 588; *Dalz. & Gibs. Bomb. Fl.* 150. *Dcne. l.c.* 607. *Asclepias tenuissima*, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 41. *A. dichotoma*, *Rottl. in Wall. Cat.* 8200 B.C. *Ceropegia Decaisneana*, *Miquel Pl. Hohenack.* n. 634.

BENGAL, *Roxburgh*; Salt Lakes near Calcutta and Sunderbunds, *Clarke*. DECCAN PENINSULA, from Canara southwards. BIRMA, *Wallich*. MALACCA, *Griffith*, *Maingay*. CEYLON, hotter parts of the Island, *Walker*, &c.—DISTRIB. Java, Borneo.

Very slender, prostrate or twining. *Leaves* rarely 1 $\frac{1}{2}$ in. long, very variable in form and breadth, base sometimes cordate, nerves few indistinct; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in. *Flowers* rarely $\frac{1}{2}$ in. diam., dark purple; pedicels $\frac{1}{2}$ - $\frac{1}{2}$ in. *Pollen-masses* suberect. *Follicles* 3 in. long, poniard-shaped, pericarp membranous. *Seeds* $\frac{1}{4}$ in., ovate.

•• Stem and branches long, twining, and leaves glabrous or pubescent; sepals always hirsute or pubescent.

† Coronal processes wholly adnate to the column without free points above.

14. **T. Belostemma**, Benth. Gen. Pl. ii. 771; softly hirsute throughout, leaves ovate-cordate acuminate, cymes simple subsessile, flowers few umbelled, coronal processes linear radiating from the base of the column.—*Belostemma hirsutum*, Wall. in *Wight Contrib.* 52, and *Cat.* 8211.

NEPAL, Wallich. KHASIA Mts.; Churra and below it, alt. 2–4000 ft., J. D. H. & T. T.

Hairs reflexed on stem and branches. Leaves $1\frac{1}{2}$ –2 in., pale green when dry, hirsute on both surfaces; petiole $\frac{1}{2}$ – $\frac{2}{3}$ in. Peduncles shorter than the petioles. Sepals lanceolate, hirsute. Corolla $\frac{1}{4}$ in. diam., dull purple; lobes ovate, pubescent within. Staminal column contracted below the anthers. Follicles not seen.

15. **T. hirsuta**, Wight Contrib. 49; stem densely softly tomentose, leaves ovate or ovate-lanceolate acute or acuminate pubescent or tomentose on both surfaces, base rounded obtuse or cordate, peduncles long flexuous bearing distant few-fl. umbels at the flexures, corolla puberulous within lobes short, coronal processes subglobose. Wall. Cat. 8201; Dcne. in DC. Prodr. viii. 607. *T. Jacquemontii*, Dcne. l. c. *Gymnema hirsutum*, Wall. Tent. Fl. Nep. 50.

TROPICAL HIMALAYA, ascending to 5000 ft. in Kumaon, from the Punjab eastwards (Pathankola, Clarke). ASSAM, Jenkins. KHASIA Mts., alt. 2000 ft., J. D. H. & T. T. CACHAR, Keenan.

Stem rather stout; hairs reflexed. Leaves 3–7 by $1\frac{1}{2}$ –4 in., sometimes only faintly hairy; petiole $\frac{3}{4}$ – $1\frac{1}{2}$ in., stout. Peduncle very variable in length, villous or hirsute; pedicels capillary, short or long. Sepals lanceolate, hirsute. Corolla $\frac{1}{2}$ – $\frac{1}{4}$ in. diam. Follicles 2–2 $\frac{1}{2}$ in., poniard-shaped, glabrous. Seeds $\frac{1}{4}$ in. long, narrowly ovate.

VAR. ? *penangensis*; leaves minutely pustular on the upper surface at the bases of the hairs.—Penang, Phillips.—This, of which the specimens are very imperfect, may be *T. villosa*, Blume of Java, which strongly resembles *T. hirsuta*, and also *T. mollissima*, Wall. (Cat. 8202) of China.

16. **T. mollissima**, Wight Contrib. 49; Ic. t. 1275 (not of Wallich), stem densely softly tomentose, leaves oblong or linear-oblong acute or acuminate base rounded tomentose or villous on both surfaces, peduncles flexuous bearing distant few-fl. umbels, sepals lanceolate, corolla glabrous within lobes oblong, coronal processes subglobose hispid. Dcne. in DC. Prodr. viii. 607.

NILGHERY and PULNEY Mts., Wight.

Very similar to *T. hirsuta*, differing in the form of the leaves. Fruit unknown.

17. **T. rotundifolia**, Hamilt. in Wight Contrib. 50; stem pubescent, leaves very shortly petioled orbicular or very broadly ovate obtuse or acute beneath and margins pubescent, base rounded or cordate, cymes many-fl. umbellate sessile or peduncled, pedicels long, sepals lanceolate hispid, corolla lobes ovate, coronal processes globose. Wall. Cat. 8203; Dcne. in DC. Prodr. viii. 608.

ASSAM; Dongtala and Habora Ghat, Hamilton. NORTHERN OUDE, Vicary. THE CONCAN, Law, Stocks. TRAVANCORE; Annamallay hills, Beddome.

Leaves 2–3 $\frac{1}{2}$ in. long and often as broad, coriaceous, glabrous above; petiole $\frac{1}{2}$ – $\frac{1}{4}$ in. Pedicels $\frac{1}{2}$ –1 in. long, nearly glabrous or pubescent. Corolla $\frac{1}{4}$ to nearly $\frac{1}{2}$ in. diam. Follicles not seen.

18. **T. Dalzellii**, Hook. f.; stem and cymes sparsely pubescent, leaves coriaceous or fleshy ovate oblong or cordate acute or acuminate glabrous or

nearly so, cymes sessile or peduncle short, rachis flexuous with umbels or racemes at the flexures, pedicels long capillary, sepals ovate hispid, corolla-lobes short, coronal processes gibbous.—*T. carnosa*, Dalz. & Gibs. *Bomb. Fl.* 150. *Tylophora* n. 23 and *T. pauciflora*? *Herb. Ind. Or. H. f. & T.*

CONCAN and MALABAR, *Stocks, Law, &c.*

Leaves very variable, 2-4 in., quite glabrous or puberulous on the petiole margins and nerves beneath; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Peduncles* nearly half as long as the leaves; rachis often zigzag, sometimes clavate, hispid at the insertion of the pedicels; flowers always numerous, sometimes in a globose mass $1\frac{1}{2}$ in. diam., usually laxer; pedicels $\frac{1}{4}$ –1 in. *Corolla* $\frac{1}{8}$ – $\frac{1}{4}$ in. diam. *Follicles* 3-4 in. poniard-shaped, glabrous. *Seeds* $\frac{1}{3}$ in., broadly ovate.—This is the *T. carnosa* of Dalzell and Gibson, but not of Wight, from whose plant it differs in the pubescence, larger leaves, shorter peduncles, and many-flowered umbels. It differs from *T. rotundifolia* in the much smaller flowers and longer petioles; it also closely resembles *T. asthmatica*, but has shorter sepals and wholly adnate processes.

19. ***T. exilis***, *Coleb. in Trans. Linn. Soc.* xii. 358, t. 16; stem slender and cymes finely sparsely villous, leaves ovate-oblong or -lanceolate acuminate nearly glabrous, peduncles long slender flexuous simple or branched bearing few-fl. sessile umbels, pedicels very short, sepals ovate hispid, corolla-lobes short, coronal processes gibbous. *Wight Contrib.* 50; *Wall. Cat.* 8206; *Dcne. in DC. Prodr.* viii. 608. *Pergularia exilis*, *Spreng. Syst.* i. 844.

ASSAM, *Masters*. SILHET, *Wallich*. CHITTAGONG, *Colebrooke*. MALACCA, *Griffith*.

Very similar to *T. tenuis*, but with larger leaves, hairy branchlets cymes petioles and midrib of the leaf above, and very short pedicels rarely $\frac{1}{4}$ in. long. *Follicles* $3\frac{1}{2}$ in. long, very membranous. *Seeds* $\frac{1}{4}$ in. long, ovate.

†† *Coronal processes adnate below to the column; tips free, reaching as high as the stigma.*

20. ***T. cordifolia***, *Thwaites Enum.* 196; nearly glabrous, leaves small coriaceous ovate-cordate apiculate, peduncles very short 1-2-fl., sepals ovate glabrous, corolla-lobes short, coronal processes strongly laterally compressed, dilated upwards.

CEYLON; common in the central provinces, *Walker, Thwaites*.

Stem slender and petioles puberulous. *Leaves* $\frac{1}{2}$ –1 in., thin, firm, shining; petiole $\frac{1}{10}$ – $\frac{1}{8}$ in. *Peduncle* $\frac{3}{8}$ – $\frac{1}{2}$ in., capillary. *Corolla* $\frac{1}{8}$ in. diam., dark purple, lobes obtuse. "*Follicles* usually solitary, 2 in. long, slender, glabrous" (*Thwaites*).—The column with its processes is obconic (as in some non-Indian species) from the upward dilatation of the processes which radiate from it.

21. ***T. tenerrima***, *Wight Contrib.* 50; nearly glabrous, leaves ligulate or linear-lanceolate obtuse apiculate or acuminate, cymes peduncled 2-4-fl., sepals ovate-lanceolate hispid, corolla-lobes linear-oblong puberulous within, coronal processes gibbous or globose with free incurved cuspidate tips. *Wall. Cat.* 8207; *Dcne. in DC. Prodr.* viii. 610. *Homostyles tenerrima*, *Wall. mss.*

SUBTROPICAL HIMALAYA; alt. 3-6000 ft., from Kumaon, *Royle*, to Sikkim, *J. D. H.*

Stem very slender and much branched. *Leaves* 1-2 by $\frac{1}{10}$ – $\frac{1}{8}$ in., nerveless; petiole very short. *Peduncles* capillary, usually shorter than the leaves; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. *Corolla* $\frac{1}{8}$ in. diam. *Follicles* not seen.

22. ***T. asthmatica***, *Wight & Arn. Contrib.* 51; glabrous pubescent or tomentose, leaves ovate rounded or oblong apiculate acute or acuminate, base usually cordate, peduncles shorter than the leaves bearing 2-3 sessile few- or many-fl. umbels, pedicels long capillary, sepals long lanceolate hispid, corolla large lobes short acute, coronal processes gibbous or globose with free cuspidate

tips. *Wall. Cat.* 8210; *Wight Ic.* t. 1277; *Dalz. & Gibs. Bomb. Fl.* 150; *Thwaites Enum.* 197, excl. var. β ; *Bentl. & Trim. Med. Pl.* t. 177; *Dene. in DC. Prodr.* viii. 611. *T. pubescens*, *Wall. mss.* *Asclepias asthmatica*, *Willd.*; *Roze. Hort. Beng.* 20, and *Fl. Ind.* ii. 33. *A. tunicata*, *Hort. Calc.* *A. vomitoria*, *Koen. mss.* *Cynanchum vomitorium*, *Lamk. Dict.* ii. 235. *C. viridiflorum*, *Sims. Bot. Mag.* t. 1929. "*C. flavum* and *bracteatum*, *Thunb.*;" *Thwaites*; *Dene. in DC. l. c.* 549. *C. Ipecacuanha*, *Willd.* *C. indicum*, *Herb. Burm.* *Hoya planiflora*, *Wall. mss.*

N. & E. BENGAL, ASSAM, CACHAR, CHITTAGONG and BURMA to MALACCA; DECCAN PENINSULA, abundant. CEYLON, common in the hotter districts.—DISTRIB. Siam, Malay Islds., Borneo.

Stem slender. *Leaves* 2–4 in., rather thickly coriaceous, very variable in width, rarely pubescent or tomentose on both surfaces; nerves few, spreading; petiole $\frac{1}{4}$ – $\frac{2}{3}$ in. *Cymes* always more or less pubescent, hispid at the bases of the umbels. *Corolla* $\frac{1}{3}$ in. diam., dull yellow and purple within. *Follicles* very variable, poniard-shaped, divaricate, 3–4 in. and slender in Deccan specimens with a thin pericarp; turgid in the lower half, and only 2 in. long, with a thick pericarp, in some Ceylon specimens. *Seeds* $\frac{1}{2}$ in. long, broadly ovate.

23. **T. Wallichii**, *Hook. f.*; stem stout, cymes and petioles sparsely pubescent or puberulous, leaves fleshy oblong or ovate-oblong acuminate base cordate, peduncles long stout branched bearing few-fl. irregular umbels or clusters, sepals ovate pubescent, corolla subglobose fleshy shortly 5-lobed, coronal processes gibbous with free cuspidate tips (or 0), follicles very large ellipsoid ventricose. *Gymnema Wallichii*, in part, *Wight Contrib.* 46. *G. sagittatum*, *Wall. Cat.* 8194 B.

SINGAPORE, *Wallich.* PENANG, *Maingay.* MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1142).—DISTRIB. Borneo.

Leaves thickly coriaceous, 4–6 by $\frac{1}{2}$ –2 in., narrowed at the cordate base, nerves spreading; petiole $\frac{1}{2}$ – $\frac{2}{3}$ in. *Cymes* often exceeding the leaves, branches divaricate. *Flowers* $\frac{1}{3}$ in. diam.; often fleshy and deformed with the column imperfectly developed cylindric and without coronal processes. *Follicles* very different from those of any congener, 4–5 by 1–1 $\frac{1}{2}$ in., elliptic-lanceolate, narrowed equally to the base and tip, pericarp coriaceous. *Seeds* $\frac{1}{2}$ in. long, broadly ovate.—This very closely resembles in habit when dry *Gongronema Wallichii*.

37. **TREUTLERA**, *Hook. f. Gen. Nov.*

A stout glabrous twiner. *Leaves* opposite, thickly coriaceous. *Flowers* large, in axillary simple stoutly peduncled umbels. *Sepals* very small, ovate, glandular within. *Corolla* rotate, shortly 5-lobed; lobes broadly ovate, ciliate, overlapping to the right. *Coronal* processes adnate to the backs of the anthers and equalling them, ovate, obtuse, fleshy. *Column* prominent; anther-tips inflexed, rounded; pollen-masses one in each cell, subcylindric, pedicelled, waxy, erect. *Stigma* hemispheric, 2-cuspidate, included.

T. insignis, *Hook. f. in Hook. Ic. Pl.* t. 1425.

SIKKIM HIMALAYA, alt. 8–10,000 ft., *J. D. H., Anderson, Treutler.*

Branches terete, smooth. *Leaves* in distant pairs, 3–5 by 1 $\frac{1}{2}$ –3 in., ovate elliptic oblanceolate or elliptic-oblong, apiculate or acuminate, midrib thick; nerves 4–5 pairs, spreading, secondary indistinct; petiole stout, $\frac{1}{2}$ –1 $\frac{1}{2}$ in. *Peduncle* 1–2 in.; *pedicels* 1–1 $\frac{1}{2}$ in., stout; bracts small, lanceolate. *Sepals* ciliate. *Corolla* 1–1 $\frac{1}{2}$ in. diam., coriaceous, glabrous, dark purple. *Fruit* not seen.—This genus is very near *Marsdenia*, from which it differs conspicuously in the large rotate corolla with short rounded lobes. It is named after Dr. Treutler, a native of the province of Sikkim, who presented to Kew in 1875 a very large and valuable collection of its plants, inclusive of the present which is one of the most handsome of the Sikkim Asclepiads.

38. **COSMOSTIGMA**, Br.

A twining glabrous shrub. *Leaves* opposite, ovate or cordate. *Cymes* axillary, racemiform; flowers small, greenish. *Sepals* small. *Corolla* rotate, lobes overlapping to the right. *Coronal scales* adnate to the base of the anthers, and shorter than they are, erect, broad, membranous, truncate or 2-fid. *Column* very short, filaments fleshy; anther-tip broad, rounded, inflexed; pollen-masses obovoid-oblong, waxy, erect, pedicels long flexuous. *Stigma* broad, flat, 5-angled. *Follicles* large, linear-oblong, obtuse, smooth. *Seeds* comose.

C. racemosum, *Wight Contrib.* 42, and *Ic. t.* 591; *Dalz. & Gibs. Bomb. Fl.* 151; *Grah. Cat. Bomb. Pl.* 119; *Dene. in DC. Prodr.* viii. 613. *C. acuminatum*, *Wight Ic. t.* 1270. *Asclepias racemosa*, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 32. *Nerium piscidium*, *Hort. Calc.—Rheede Hort. Mal.* vii. t. 32.

SILHET, CHITTAGONG, and the WESTERN GHATS, from the Concan southwards. CEYLON, common.—DISTRIB. Java.

A tall stout climber. *Leaves* deciduous, 3-5 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., rather coriaceous, rounded or ovate, finely acuminate or tip obtuse, base sometimes cordately 2-lobed, lobes conniving; petiole 1-2 in. *Peduncles* equalling the petioles, stout, straight; pedicels $\frac{1}{2}$ in., stout, spreading, spirally arranged round the rachis; bracts 0. *Corolla* $\frac{1}{2}$ in. diam., fleshy, speckled with brown. *Follicles* 7 in. long by $1\frac{1}{2}$ in. diam., lanceolate or linear-oblong, obtuse, smooth. *Seeds* $\frac{3}{4}$ in. long, broadly ovate.

39. **DREGA**, E. Meyer.

Twining shrubs, glabrous or hoary. *Leaves* opposite, ovate or cordate, acuminate. *Cymes* axillary, umbelliform; flowers green. *Sepals* small. *Corolla* rotate, lobes broad, overlapping to the right. *Coronal scales* 5, hemispheric, fleshy, adnate to the column, spreading, inner angle cuspidate, the tooth incumbent on the anthers. *Column* very short, fleshy; anther-tips short inflexed; pollen-masses one in each cell, cylindric-oblong, shortly pedicelled, waxy, erect. *Stigma* conical or dome-shaped. *Follicles* thick, hard, winged or ribbed. *Seeds* comose.—DISTRIB. Species 6 or 7; Indian, Malayan, and tropical and S. African.

D. volubilis, *Benth. Gen. Pl.* 775; glabrous hoary or mealy, leaves ovate suborbicular or cordate acuminate, peduncles equalling or exceeding the pedicels many-fld., pedicels slender, flowers green, sepals triangular-ovate. *Hoya viridiflora*, Br. in *Mem. Wern. Soc.* i. 27; *Wight Contrib.* 39, and in *Hook. Bot. Misc.* ii. 98, t. 1, and *Ic. t.* 586; *Wall. Cat.* 8168; *Dalz. & Gibs. Bomb. Fl.* 153; *Grah. Cat. Bomb. Pl.* 119; *Griff. Ic. Pl. Asiat.* t. 387, 388. *Asclepias volubilis*, *Linn. f.*; *Roxb. Fl. Ind.* ii. 36. *Apocynum tiliæfolium*, *Lamk. Encycl.* i. 214. *Wattakaka viridiflora*, *Hassk. in Flora*, 1857, 79.—*Rheede Hort. Mal.* ix. t. 15.

BENGAL, ASSAM and the DECCAN PENINSULA, from the Concan, southwards. CEYLON, in the hotter parts of the island.—DISTRIB. Java.

A stout tall climber, branches often pustular. *Leaves* 3-6 by 2-4 in., rather coriaceous, base rounded or cordate; nerves 4-5 pairs; petiole 1-3 in. *Peduncles* 1-3 in., rather slender; umbels drooping, very many-fld., subglobose; pedicels $\frac{1}{2}$ in., slender. *Corolla* $\frac{1}{2}$ in. diam., cupular, lobes triangular. *Stigma* dome-shaped. *Follicles* $\frac{3}{4}$ in. long by $1-1\frac{1}{4}$ in. diam., broadly lanceolate, turgid, glabrous. *Seeds* 2 in. long, broadly ovate, pale, smooth and shining, border thick.

VAR. *Lacuna*, all parts hoary or mealy. *Hoya Lacuna*, *Ham. in Wall. Cat.* 8169; *Wight Contrib.* 39; *Dene. in Jacq. Voy. Bot.* 108, t. 114, and in *DC. Prodr.* viii. 639. —North-West India from Kumaon to Oude and the Bombay Ghats. Bengal. Birma.

VAR. *angustifolia*, suberect, densely mealy or velvety, leaves ovate-lanceolate small.—Malabar and Bombay (a starved form).

40. **HETEROSTEMMA**, W. & A.

Twining nearly glabrous shrubs or undershrubs. *Leaves* opposite, often cordate, base 3-5-nerved. *Flowers* rather small, in shortly peduncled umbelled or racemose-cymes. *Calyx* small, 5-fid or -partite. *Corolla* rotate, lobes broad triangular valvate. *Corona* of 5 large lobes spreading horizontally from the column and lying flat on the corolla. *Column* very small, depressed; anthers very minute, tip very short; pollen-masses one in each cell, minute, broad, compressed, sessile, waxy, erect. *Stigma* included, truncate, 5-angled. *Follicles* slender, straight, terete, pointed, pericarp thin. *Seeds* comose.—DISTRIB. Species about 10; Indian and Malayan.

* *Coronal processes orbicular, sessile.*

1. **H. Wallichii**, *Wight Contrib.* 42; branches hairy chiefly along two lines, leaves ovate broadly oblong or elliptic acuminate, coronal processes sessile orbicular with or without a small conical boss near the base. *Wall. Cat.* 8179; *Dene. in DC. Prodr.* viii. 630. *Heterostemma*, sp. 4, *Herb. H. f. & T.*

NEPAL, *Wallich*. ASSAM, *Jenkins*. KHASIA MTS. at Nowgong, *J. D. H. & T. T.*

Leaves 3-7 by 2-4 in., base rounded or subcordate, bright green, thinly coriaceous; petiole $\frac{1}{2}$ -2 in. *Cymes* small, peduncle stouter than the petiole; flowers $\frac{1}{3}$ - $\frac{1}{2}$ in. diam., greenish. *Fruit* not seen.

2. **H. alatum**, *Wight Contrib.* 42; branches with two lines of hairs, leaves elliptic-ovate oblong or -lanceolate acuminate, nerves beneath winged, coronal processes ovate-lanceolate acuminate with a large ovate acute concave appendage on the surfaces. *Wall. Cat.* 8180; *Dene. in DC. Prodr.* viii. 630.

CENTRAL and EASTERN HIMALAYA; Kumaon, *Royle*; Nepal, *Wallich*; SIKKIM, alt. 2-6000 ft., *J. D. H.* KHASIA MTS., alt. 4-6000 ft., *Lobb, J. D. H. & T. T.*

Leaves 3-6 by $1\frac{1}{2}$ - $3\frac{1}{2}$ in., rather coriaceous, light green, base acute or rounded, rarely cordate, nerves 3-4 pairs; petiole 1-2 in. *Peduncles* very short, stout; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in., flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., yellow. *Follicles* (immature) very slender, straight.

3. **H. stellatum**, *Hook. f.*; branches with very obscurely pubescent lines, leaves lanceolate or oblong-lanceolate acuminate, nerves beneath winged, corona stellately 5-lobed to below the middle, lobes triangular acute without appendages. *Heterostemma*, n. 3, *Herb. H. f. & T.*

KHASIA MTS.; at Myrung, alt. 6000 ft., *J. D. H.*

This resembles *H. alatum*, but the leaves are narrower with a more regular intermarginal nerve, and the corona is very different.

4. **H. tanjorensis**, *Wight & Arn. Contrib.* 42; branches quite glabrous, leaves broadly or narrowly ovate oblong or oblong-lanceolate obtuse or apiculate, base rounded or subcordate, coronal processes orbicular-obovate with a large erect fleshy appendage on the surface. *Wight Ic.* t. 348; *Wall. Cat.* 1178; *Dene. in DC. Prodr.* viii. 630. *Stapelia involucrata*, *Herb. Madr. Glossostelma*, nov. gen., *Wight mss.*

WESTERN PENINSULA; the Carnatic, in sandy places, *Wight*.

Leaves very variable, 3-5 by $1\frac{1}{2}$ -3 in., tip usually rounded and apiculate. *Cymes* usually sessile, flowers $\frac{1}{3}$ in. diam.; coronal processes with an erect acute appendage. *Follicles* very slender, 4 in. long by $\frac{1}{4}$ - $\frac{1}{3}$ in. diam., glabrous. *Seeds* $\frac{1}{2}$ in. long narrowly ovate.

VAR. zeylanicum; leaves acute or acuminate, flowers dark purple, appendages of the coronal processes larger obtuse or acute. *H. tanjorensis*, *Thwaites Enum.* 198.—Ceylon, central province, ascending to 4000 ft.

5. **H. Dalzellii**, *Hook. f.*; branches glabrous or nearly so, leaves broadly or narrowly elliptic or ovate- or oblong-lanceolate acuminate, coronal processes spathulate without an appendage. *H. Wallichii*, *Dalz. & Gibbs. Bomb. Fl.* 152 (not of *Wight*). *Heterostemma*, sp. 2, *Herb. Ind. Or. H. f. & T.*

The CONCAN; at Vingorla, and Malvan, *Dalzell, Stocks*.

Leaves as in *H. tanjorensis*, of which this may be a variety, differing greatly in the corona, the lobes of which have no appendage proper, though there are traces of swellings at the bases in some specimens and at their backs in others, as if in the latter case the process was reduced and its appendage enlarged. In some specimens the apex is obscurely 3-lobed, in others the tip is subquadrate with a simple or bifid tip, and the sides acutely angled. The follicles appear shorter than in *H. tanjorensis*, but they are not quite ripe in either species.

41. **DITTOCERAS**, *Hook. f. Gen. Nov.*

A stout pubescent twining shrub. *Leaves* opposite, long petioled, elliptic-ovate, acute. *Flowers* large, in sessile umbelliform few-fl. cymes. *Sepals* minute, ovate, obtuse, glandular within. *Corolla* rotate; lobes short, triangular, subacute, valvate in bud. *Corona* large, deeply 5-lobed, lying flat on the corolla, lobes orbicular-spathulate, with a minute boss at the base of each. *Column* depressed. *Anthems* minute, tips very short, incurved; pollen-masses very minute, subglobose, sessile on the minute corpuscle, waxy, erect. *Stigma* pentagonal, included. *Follicles* sub-cylindric, obtuse, recurved, pericarp very thick fleshy, endocarp hard shining. *Seeds* very large, narrowly ovoid-oblong, compressed, winged at the rounded base; coma short.

1. **D. Andersoni**, *Hook. f. in Hook. Ic. Pl.* t. 1422. *Heterostemma*, sp. 6, *Herb. Hook. f. & T.*

SIKKIM HIMALAYA, alt. 2-4000 ft.; *J. D. H., T. Anderson, Clarke*.

Branches leaves beneath, petioles and pedicels rusty-pubescent. *Leaves* 4-5 by 2-3 in., sometimes cordate, dark green, sparsely hairy above, nerves 4-5 pairs; petiole $1\frac{1}{2}$ -2 in. *Corolla* $1\frac{1}{2}$ in. diam., sparsely hairy without, dark purple. *Follicles* 4-5 in. long, by $\frac{2}{3}$ in. diam., green when ripe. *Seeds* $1\frac{1}{4}$ in. long, black, coma as long as the rest of the seed, hairs spreading and reflexed.—Closely allied to *Heterostemma*, but widely differing in the large flowers, follicles, and seeds.

42. **OIANTHUS**, *Benth.*

Twining glabrous undershrubs, branches with two lines of pubescence. *Leaves* opposite. *Cymes* small, subsessile, few-fl. *Sepals* small, obtuse or acute. *Corolla* ovoid-urceolate or disciform, mouth contracted; lobes 5, very short, broad, valvate. *Corona* cupular, adnate to the column, spreading, fleshy, lobulate or toothed. *Column* minute, short, depressed; anther-tips short, inflexed; pollen-masses very minute, one in each cell, semi-ovate, compressed, inner margin pellucid, sessile, waxy, ascending. *Stigma* broadly conic, not exceeding the anthers.

I think it possible that the following species are abnormal forms of *Heterostemma*.

1. **O. urceolatus**, *Benth. in Hook. Ic. Pl.* t. 1191; leaves ovate or ovate-lanceolate acuminate base rounded or subcordate, cymes sessile or shortly peduncled, corolla ovoid-urceolate, corona 5-lobed, lobes incurved 3-toothed. *Heterostemma urceolatum*, *Dalz. in Hook. Kew Journ.* iv. 295; *Dalz. & Gibs. Bomb. Fl.* 153.

The CONCAN; Belgaum and hills to the north of it, *Dalzell*.

Stem purple. *Leaves* 2-4 by 1-2 in.; green, nerves 2-3 pair with strong connecting nervules. *Corolla* coriaceous, $\frac{3}{4}$ in. long, red-purple without, dark purple within, sparingly villous at the base within; lobes minute, triangular.

2. **O. disciflorus**, *Hook. f.*; nearly glabrous, leaves elliptic or ovate-oblong subacute or obtuse, petiole 1-1 $\frac{1}{2}$ in., corolla disciform vertically depressed, corona 5-lobed lobes entire margin very thick somewhat incurved.

WESTERN PENINSULA, the Concan? *Herb. Law. and Stocks*.

This in foliage entirely resembles *Heterostemma Dalzellii*, of which it may be a singular form, but the flowers are quite perfect (about $\frac{1}{2}$ in. diam.)

3. **O. Beddomei**, *Hook. f.*; branches and petioles very pubescent, leaves ovate-cordate acuminate reticulately nerved, petiole 2-3 in., sepals lanceolate acuminate, corolla discoid.

MYSORE in the Beigoor forests, Wynaad, *Beddome*.

Described from an excellent drawing, Col. Beddome having lost his specimen.

43. DISCHIDIA, Br.

Herbs or undershrubs, usually rooting and climbing on trees or pendulous. *Leaves* various, fleshy, sometimes forming into pitchers (ascidia). *Flowers* very small or minute, white or red, in axillary fascicles umbels or racemes. *Sepals* 5, ovate, membranous. *Corolla* urceolate, mouth contracted; lobes 5, very short, valvate. *Coronal-scales* 5, membranous, adnate to the back of the column, erect, tips entire notched or 2-fid or with recurved arms. *Column* very short; anther-tip membranous; pollen-masses one in each cell, compressed, waxy. *Stigma* flat or conical. *Follicles* small, slender or thick, smooth, acuminate. *Seeds* minute, coma long.—DISTRIB. Species about 24; tropical Indian, Malayan, and Australian.

The species of *Dischidia* all want a careful study. They cannot be described satisfactorily from dried specimens. The leaves change in form, and it is not ascertained in respect of many species whether they may or may not be converted into pitchers (ascidia).

1. **D. Nummularia**, *Br. Prodr.* 461; glabrous, leaves subsessile $\frac{1}{4}$ - $\frac{3}{4}$ in. orbicular acute obtuse or apiculate, corolla scarlet, throat with a ring of hairs, follicles 1-1 $\frac{1}{2}$ in. curved obliquely ellipsoid below the middle, above it contracted into a long slender beak. *Wall. Cat.* 4204; *Wight Contrib.* 43; *Dene. in DC. Prodr.* viii. 632; *Blume Bijl.* 1059. *D. orbicularis*, *Dene. l.c.* *Collyris minor*, *Vahl. in Act. Soc. Hafn.* vi. 111; ex *Wight Contrib.* 67.—*Rumph. Herb. Amboin.* v. t. 176, f. 1.

CACHAR, Keenan, and MALAY PENINSULA, from Chittagong. *Clarke*, Tenasserim and the Andaman Islands, to Singapore and Malacca, *Wallich*, &c. DISTRIB. Malay Islds., Australia.

A very slender herb, rooting on tree trunks. *Leaves* whitish when dry, with

often recurved margins, nerves 2-3 pairs horizontal reticulating. *Seeds* $\frac{1}{18}$ in. long, slender.

2. **D. hirsuta**, *Dcne. in DC. Prodr.* viii. 632; papillose and more or less pubescent, leaves $\frac{3}{4}$ -1 in. sessile broadly ovate acute lacunose above between the horizontal nerves, corolla red, throat with 2 rows of hairs. *D. fasciculata*, *Dcne. l. c.* *D. Brunoniana*, *Griff. Notul.* iv. 44, and *l. c. Pl. Asiat.* t. 410, A. f. 1. *Leptostemma hirsutum* and *fasciculatum*, *Blume Bijl.* 1058.

TENASSERIM, *Helfer*; at Mergui, *Griffith*. SINGAPORE, *Hb. Wight*. MALACCA, *Maingay* (Kew Distrib. 1120). DISTRIB. Java.

Stem very slender and leaves on both surfaces papillose and sometimes sparsely hairy. *Leaves* pale when dry, the 2 or 3 pairs of nerves very prominent above. *Corolla* $\frac{1}{2}$ in. long "blood red, with a row of ascending shining hairs in the middle of the tube, and a similar row on the throat inserted below a row of 5 adnate fleshy convex scales. *Pollen-masses* linear, connate at the base." *Maingay*.

3. **D. albida**, *Griff. Notul.* iv. 46; glabrous, leaves petioled ovate or rounded-ovate or ovate-cordate acute or acuminate nerveless.

MALACCA; at Toondook. *Griffith*.

Stems very slender, creeping and rooting. *Leaves* fleshy; petiole $\frac{1}{8}$ - $\frac{1}{6}$ in. "*Peduncles* subaxillary equalling the petiole, perennial. *Flowers* umbelled, few, small, white. *Corolla*-throat closed with white hairs. *Pollen-masses* oblong, scarcely compressed, as long as their caudicles. *Follicles* very long-beaked, deeply channelled on the inner face." *Griffith*.

4. **D. khasiana**, *Hook. f.*; glabrous or very sparsely hairy, leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. petioled orbicular tip rounded, nerves very slender, follicles $2\frac{1}{2}$ in. slender throughout straight or curved. *Dischidia*, n. 9, *Herb. H. f. & T*.

KHASIA Mts. at Churra and Nunklow, alt. 3-4000 ft. *J. D. H. & T. T*.

Stem very slender, creeping, papillose. *Leaves* quite orbicular, tip rounded or apiculate, nerves 2-3 pairs horizontal; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in. *Follicles* about $\frac{1}{2}$ in. diam. below the middle, gradually tapering to the obtuse tip and to the base. pale.—This resembles *D. formosana*, Maxim., but the leaves are much larger; the habit and foliage are precisely those of *Hoya Nummularia*.

5. **D. benghalensis**, *Coleb. in Trans. Linn. Soc.* xii. 357, t. 15; glabrous, branches flagelliform pendulous, leaves linear elliptic obovate oblong or lanceolate midrib and nerves obscure or 0, flowers fascicled subsessile. *Wight Contrib.* 43; *Wall. Cat.* 4205; *Dcne. in DC. Prodr.* viii. 631; *Bot. Mag.* t. 2916. *D. cuneifolia*, *Wall. Cat.* 4206; *Dcne. l. c.* *D. spathulata*, *Blume Bijl.* 1069; *Miquel Fl. Ind. Bat.* ii. 513.

EASTERN NEPAL and SIKKIM, *J. D. H.* ASSAM and southwards to MALACCA.—DISTRIB. Java, Borneo.

Stems often matted, pale green, as thick as a goose-quill. *Leaves* in distant pairs, subsessile, 1-2 by $\frac{1}{4}$ - $\frac{3}{4}$ in. obtuse acute or apiculate, very fleshy. *Flowers* minute. *Corolla* $\frac{1}{2}$ in. long, yellowish, tube globose, throat glabrous. *Follicles* $1\frac{1}{2}$ - $2\frac{1}{2}$ in. slender, straight, acuminate, pericarp thin.

6. **D. Rafflesiana**, *Wall. Plant. As. Rar.* ii. 35, t. 142, and *Cat.* 4208; glabrous, climbing and pendulous, leaves orbicular 1 in. diam. subsessile changing into oblong pitchers 2-5 in. long, flowers umbellate on a long or short stout peduncle, sepals pubescent, corolla ovoid, teeth minute pubescent within, throat glabrous. *Griff. Notul.* iv. 47, t. 386, f. 6, and in *Trans. Linn. Soc.* xx. 387 and 396, t. 17, 18; *Dcne. in DC. Prodr.* viii. 632. *Collyris major*, *Vahl.*; *Wight Contrib.* 66.

CACHAR, *J. D. H. & T. T.*; and from TENASSERIM, *Griffith*, to MALACCA.—DISTRIB. Borneo, Australia.

Stem and branches stout. *Leaves* very similar to those of *D. hirsuta* when dry, but not papillose; ascidia irregularly compressed, obtuse, fleshy, base gibbous, the cavity filled with rootlets from the adjoining node. *Flowers* $\frac{1}{2}$ in long. *Sepals* obtuse. *Corolla* fleshy, teeth 3-gonous and throat thickened. *Follicles* 2-3 in. long, curved, $\frac{1}{2}$ in. broad below the middle, tapering thence to both ends, pericarp thin. *Seeds* $\frac{1}{10}$ in. linear oblong.—Griffith's Mergui plant may be different from the Malacca one, which has longer peduncles and more numerous flowers. I find no difference in the corollas.

7. *D. acutifolia*, Maingay mss.; glabrous, stems slender twining, leaves shortly petioled 3-4 in. long ovate-lanceolate acute coriaceous penninerved, peduncles elongate, flowers subsessile, corolla throat hairy.

MALACCA; Maingay (Kew Distrib. 1122).

Leaves shining, nerves 5-7 pair, prominent on both surfaces; petiole $\frac{1}{4}$ in. or less. *Peduncle* $\frac{1}{2}$ -1 in. "*Corolla* very minute, urceolate, pale yellow with the short limb pink, throat closed with a row of fine horizontal or slightly ascending hairs. *Coronal-processes* very minute, closely appressed to the anthers," Maingay. *Follicles* $2\frac{1}{2}$ in. long, very slender, terete, slightly curved, narrowed from the base upwards.

8. *D. Griffithii*, Hook. f.; glabrous, twining, leaves 1-1 $\frac{1}{2}$ in. petioled obovate acute very fleshy nerveless, peduncles very short few-fld. *D. obovata*, Griff. Notul. iv. 51, and Ic. Pl. Asiat. t. 388, A. f. 7.

TENASSERIM; at Mergui, on trees, Griffith.

Branches as thick as a crow-quill. *Leaves* $\frac{3}{4}$ -1 in. diam., base cuneate; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Peduncles* perennial, ovoid, obtuse, as thick as the branch. "Flowers few, small, inconspicuous, white. *Sepals* minute, rounded. *Corolla* urceolate, 5-toothed, throat closed with hairs. *Coronal-processes* white, fleshy, angular, base 2-fld. *Pollen-masses* tumid, obovoid." Griffith.

9. *D. Collyris*, Wall. Cat. 4207; glabrous, leaves sessile orbicular 1-1 $\frac{1}{2}$ in. diam. fleshy convex papillose with the nerves distinct beneath, corolla glabrous within white. Conchophyllum imbricatum, Blume Bijd. 1062; Dcne. in DC. Prodr. viii. 630. *Collyris* major, Vahl.; Wight Contrib. 66; Miq. Fl. Ind. Bat. ii. 513. ? *D. albiflora*, Griff. Notul. iv. 47, and Ic. Pl. Asiat. t. 410, A. f. 8.

MALACCA, Maingay (Kew Distrib. 1114). SINGAPORE, Walker.—DISTRIB. JAVA, BORNEO.

Stems creeping and rooting, the roots protected by the leaves. *Leaves* sometimes pruinose beneath, nerves 2-3 pairs, horizontal. *Flowers* subsessile on the short peduncles. *Corolla* $\frac{1}{16}$ in. long, globose with erect teeth, "white glabrous within, lobes tipped with lilac," Maingay.

10. *D. coccinea*, Griff. Notul. iv. 45, and Ic. Pl. Asiat. t. 409; glabrous, leaves sessile orbicular $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. convex papillose with the nerves distinct beneath, corolla glabrous within scarlet.

MALACCA, Griffith, Maingay (Kew Distrib. 3780).

More slender and smaller than *D. Collyris*, of which Maingay considers it a variety. *Flowers* fascicled on a very short peduncle $\frac{1}{2}$ in. long. *Follicles* 1 in. long, lanceolate, curved, broadest near the base.

11. *D. complex*, Griff. Notul. iv. 50; glabrous, ascidia subreniform compressed lamina inflexed at the orifice, peduncle long, corolla white, throat closed with hairs.

MALACCA, Griffith.

Twining. *Ascidia* large; orifice small, near the petiole, its outer margin inflexed formed into a second pitcher much smaller than the outer one, opening on each side by an oblique aperture, deeply lobed or furrowed on the upper carinate on the lower side; outer cavity crammed with radicles, inner surfaces of both lurid purple.

Peduncles 3 in.; flowers subumbellate (in bud), white. *Corolla* subglobose. *Coronal scales* with very long narrow arms dilated at the tips; pollen-masses subobovate, caudicles much dilated—Description from Griffith.

DOUBTFUL SPECIES.

D. WALLICHII, *Wight Contrib.* 43; *Wall. Cat.* 8183; *Dene. in DC. Prodr.* viii. 633; flowers and fruit unknown; is probably not a *Dischidia*.

D. CLAVATA, *Wall. Cat.* 4209, from Attran, is unknown to me; I have not found it in Wallich's Herbarium at the Linnean Society.

44. HOYA, Br.

Twining pendulous or rambling and rooting, rarely erect shrubs. *Leaves* opposite, thickly fleshy or very coriaceous. *Flowers* in axillary or terminal umbels. *Calyx* small, 5-partite. *Corolla* rotate, fleshy or waxy; lobes 5, often convex and spreading or reflexed; valvate in bud. *Coronal-scales* 5, large, membranous fleshy or horny, adnate to the column, stellately spreading or ascending, turgid or compressed laterally or vertically, often concave on the upper surface, margins usually recurved so as to enclose a hollow space, the inner angle often produced into a tooth or spur which is erect or incumbent on the anther. *Column* short; anthers conniving over the stigma, membranous, tips inflexed or erect, rarely 0; pollen-masses various, solitary in each cell, waxy, pedicelled, erect. *Stigma* included, flat or the centre apiculate. *Follicles* various, usually slender, acuminate, with a thin pericarp; rarely turgid with very thick walls. *Seeds* very small, ovate or linear-oblong; coma long. *DISTRIB.* Species about 60; tropical Asiatic, Malayan, and Australian.

A most difficult genus to describe from dried specimens. I am quite unable to adopt the sections established by Blume on the development of the coronal-processes. The description of the nervation of the leaves applies to herbarium specimens solely. The secondary nerves, and in most the primary, in perhaps all except *H. coriacea*, are invisible in the living plants, and there is no exact line to be drawn between those with 3-5 principal basal nerves, and those with alternate arched or straight, and more or less horizontal nerves. The peduncle is in very many species persistent and perennial, giving off a succession of flowers from tubercles towards its tip; the result is a cylindric thick end to the peduncle: it is not known whether this feature is common to all the species, nor even whether it is constant in any. The incurved or recurved form of the corolla probably affords a good character, but is lost in dried specimens. The coronal-processes are greatly distorted in drying, and the characters I have drawn from them must be accepted with reserve. The pollen-masses present great variations in size, form, and length of pedicels, and probably afford excellent characters. The follicles present wonderful variations, from the most slender and terete with thin pericarp of *H. globulosa*, to the thick cylindric with rounded lobed ends and excessively thick pericarp of *H. coronaria*. The seeds of all are very small for the Order.

SECT. I. **Cryptoceras.** *Corolla* reflexed, lobes longer than broad. *Column* stipitate; coronal-processes very long, erect, with a long spur diverging from the base of each.

1. **H. multiflora**, *Blume Cat. Hort. Buit.* 49, and *Bijd.* 1064. II. coriacea, *Lindl. Bot. Reg.* 1839, t. 18, not of Blume. *Cryptoceras reflexum*, *Benn. Fl. Jav.* 90, t. 21. C. floribundum, *Maund Botanist*, iv. t. 178. *Centrostemma multiflorum*, *Dene. in Ann. Sc. Nat. Ser. ii.* ix. 272, and in *DC. Prodr.* viii. 634; *Blume Mus. Bot. Lugd. Bat.* i. 45; *Bot. Mag.* t. 5173. C. *Lindleyanum*, *Dene. in DC. l. c.*

MALACCA; on Mt. Ophir, *Maingay*. PENANG (*drawing in Herb. Kew*).—*DISTRIB.* Java, Borneo, Philippine Islds.

Quite glabrous. *Stem* stout, climbing. *Leaves* 3-8 by $1\frac{1}{2}$ to 2 in., linear-oblong, acuminate, base acute; petiole $\frac{1}{2}$ in. *Umbels* terminal and axillary, very many-fld., peduncle 1-2 in.; pedicels slender, as long. *Sepals* small, oblong. *Corolla-lobes* $\frac{1}{4}$ - $\frac{1}{2}$ in. long, tube bearded at the base. *Column* $\frac{1}{2}$ in. long. *Fruit* not seen.

SECT. II. **Pterostelma.** *Corolla* reflexed, lobes longer than broad. *Column* sessile, obconic; coronal-processes laterally compressed, semi-cordate, 2-winged, with an erect subulate point in the inner angle. **PLOCOSTEMMA**, *Bl.*

2. **H. acuminata**, *Benth. in Gen. Pl. ii. 777.* *H. Griffithiana*, *Dcne. mss.* *Pterostelma acuminatum*, *Wight Contrib. 39*; *Wall. Cat. 8170*; *Dcne. in DC. Prodr. viii. 633.*

KHASIA MTS.; alt. 2,000 ft., *Wallich, &c.*

Quite glabrous. *Stem* stout, 1-2 ft., subscent and pendulous. *Leaves* 3-4 by $1\frac{1}{2}$ in., elliptic-lanceolate, nerves obscure; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Umbels* terminal and axillary, few-fld.; peduncle $\frac{1}{2}$ in., pedicels 1 in. *Sepals* linear-oblong, obtuse, ciliolate. *Corolla-lobes* 1 in., glabrous, tube puberulous within. *Corona* shining. *Fruit* not seen.

SECT. III. **Ancistrostemma.** *Corolla* reflexed, lobes longer than broad. *Column* sessile; coronal-processes gibbous and 2-lamellate below, produced upwards into long erect points each with a 2-fid incurved hooked tip.

3. **H. Edeni**, *King in Herb. Hort. Calc.* *Centrostemma* sp., *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 3-6000 ft., *Herb. Griffith, J. D. H., &c.*

Stem rather slender, climbing and rooting. *Leaves* 3-4 by $1\frac{1}{2}$ in., elliptic- or obovate-lanceolate, obtusely caudate-acuminate, base acute, thinly coriaceous, puberulous or glabrate beneath; petiole $\frac{1}{10}$ in. pubescent. *Umbels* terminal; peduncles $\frac{1}{4}$ - $\frac{1}{2}$ in., pedicels 1 in. *Sepals* small, ovate, obtuse. *Corolla* pubescent within; lobes $\frac{1}{2}$ in. long, subacute. *Coronal-processes* horny, deeply grooved down the back, much exceeding the anthers. *Follicles* 4 in. long, slender, straight. *Seeds* $\frac{1}{2}$ in. long.

SECT. IV. **Euhoya.** *Corolla-lobes* broader than long, spreading or recurved. *Column* sessile or subsessile; coronal-processes stellately spreading, inner angle acute or produced into an erect or recurved simple spine.

* Inflorescence terminal, or terminal and axillary.

† *Leaves terete.*

4. **H. linearis**, *Wall. in Wight Contrib. 37*, and *Cat. 8155*; ends of branches and umbels hirsute, leaves 1-2 in. cylindric terete acute, umbels terminal sessile many-fld., corolla glabrous or papillose within, coronal-processes horizontal. *Don Prodr. 130*; *Dcne. in DC. Prodr. viii. 637.*

SUBTROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 3-6000 ft., *J. D. H., Treutler.*

Stem pendulous, 1 ft. and more, flaccid. *Leaves* 1-2 by $\frac{1}{4}$ in. diam., straight, midrib glabrous or hirsute; petiole very short. *Pedicels* 1 in., and linear-oblong calyx hirsute. *Corolla* $\frac{1}{2}$ - $\frac{1}{2}$ in. diam., and corona white. *Follicles* $2\frac{1}{2}$ in., slender, straight, pericarp thin glabrous. *Seeds* $\frac{1}{2}$ in. long.—The following varieties are so identical in habit and inflorescence, that I cannot doubt their being conspecific. *Wight's* character is drawn from specimens sent him by *Wallich* consisting of leaves of one plant (*linearis*) and a detached flower of another, of which specimens (also detached) are fastened on *Wallich's* sheet of *linearis*, and which have glabrous pedicels and minute glabrous sepals; these may belong to another species.

VAR. nepalensis; corolla papilloso puberulous within, coronal-lobes ovate flattened above concave beneath.—Nepal.

VAR. sikkimensis; corolla glabrous within, coronal-lobes longer narrower subcylindric. *Bot. Mag. t. 6682.*—Sikkim.

5. *H. teretifolia*, *Griff. mss.*; quite glabrous, stem very slender creeping and rooting, leaves 5-7 in. very slender cylindric quite terete.

UPPER ASSAM; Patkoy hills, alt. 4000 ft., *Griffith*.

A very singular plant, mentioned under the above name by Griffith in his Journal (p. 69). The leaves, which are rather distant, are curved and (as dried) about $\frac{1}{2}$ in. diam. I have seen no flowers.

†† *Leaves flat*.

6. *H. lanceolata*, *Wall. in Wight Contrib.* 33, and *Cat.* 8164 and 8156 b (*H. parviflora*); nearly glabrous, leaves 1-2 in. subsessile lanceolate or ovate-lanceolate fleshy, umbels terminal, peduncles and pedicels stout puberulous, corolla puberulous within. *Don Prodr.* 130; *Dcne. in DC. Prodr.* viii. 637.

TROPICAL HIMALAYA; from Kumaon to Bhotan and KHASIA Mts., alt. 3-4000 ft.

Stem stout, climbing; branches long, pendulous. *Leaves* close set, somewhat elongate-trapezoid, base acute, midrib very obscure. *Umbels* 6-10-fld. *Sepals* oblong-lanceolate, pubescent. *Corolla* $\frac{1}{2}$ in. diam., lobes acute. *Coronal-lobes* ascending, short, thick, obtuse, terete, with a short flat area above, inner angle erect as long as the anther-tip. *Follicles* 5-6 in., very slender.

7. *H. Lobbii*, *Hook. f.*; quite glabrous, branches very stout, leaves 2-3 in. subsessile elliptic or ovate acute or acuminate very fleshy, nerves 6-8 pairs arched spreading, umbels terminal and axillary subsessile, corolla puberulous within, corona very large.

KHASIA Mts.; Nowgong, alt. 1500 ft., *Thos. Lobb*.

Branches as thick as a goose-quill, woody. *Leaves* 1-2 in. diam., base narrowly cordate; midrib rather slender. *Pedicels* 1 in. *Sepals* ovate-lanceolate, glabrous. *Corolla* purple, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., lobes subacute. *Coronal-processes* ascending, thick, terete, obtuse or subacute, inner angle raised acute as long as the anther tip.

8. *H. polyneura*, *Hook. f.*; quite glabrous, branches stout, leaves 3-4 in. subsessile rhombic-ovate or -lanceolate acuminate very fleshy, nerves very many oblique straight parallel, umbels axillary very shortly peduncled, corolla-lobes papillose within. *Hoya*, No. 29. *Herb. Ind. Or., H. f. & T.*

SIKKIM HIMALAYA; *Herb. Griffith*, alt. 3-5000 ft., *J. D. H., Clarke*.

Branches long, flexuous. *Leaves* very variable in breadth, broadest 1-2 $\frac{1}{2}$ in the middle, base narrow but rounded; midrib slender, nerves very close. *Peduncle* at length thickened and scarred; pedicels slender. *Sepals* oblong, obtuse, glabrous. *Corolla* $\frac{1}{2}$ in. diam., white, disc glabrous. *Coronal-lobes* red-purple, very short, orbicular, flat above, inner angle produced upwards in some specimens into a stout, erect beak which equals the long subulate anther-tip, and downwards into 2 auricles; other specimens have a very short inner angle and short anther-tips. *Follicles* 4 in., slender, falcate, smooth. *Seeds* $\frac{1}{10}$ in. long, ovate-lanceolate.

** Flowers in axillary (rarely also terminal) umbels. (Solitary in *H. retusa*.)

† Corolla small, less than $\frac{1}{2}$ in. diam., revolute, villous within. Staminal column conical.

9. *H. parviflora*, *Wight Contrib.* 37; quite glabrous, leaves lanceolate-acuminate very thick and fleshy, peduncles long slender, corolla revolute villous within, column conical. *Wall. Cat.* 8156 A; *Dcne. in DC. Prodr.* viii. 637.

TENASSERIM; Moulmein, *Wallich*.

Stem climbing, slender. *Leaves* 2 $\frac{1}{2}$ -4 by $\frac{1}{2}$ - $\frac{3}{4}$ in.; petiole short, thick. *Peduncles* almost as long as the leaves; pedicels $\frac{1}{2}$ in., very slender. *Sepals* ovate, glabrous. *Corolla* $\frac{1}{2}$ - $\frac{1}{4}$ in. diam. *Coronal-processes* membranous, united into a conical vertically 5-lobed column, each lobe again longitudinally folded and bifid at the spreading tip.

Follicles 4 in. long, very slender.—This approaches an unnamed Javanese species, but the leaves are more fleshy and the column different.

10. **H. revoluta**, *Wight mss.*; quite glabrous, leaves ovate or ovate-lanceolate acuminate very thick and fleshy, margins strongly recurved, peduncles long slender, corolla revolute villous within, column conical. *H. ovalifolia*, *Wall. Cat.* 8160 b.

MALACCA, *Griffith, Maingay* (Kew Distrib. 1127). SINGAPORE, *Wallich*.

Stem climbing. *Leaves* $1\frac{1}{2}$ –3 in., midrib and nerves not visible, base acute; petiole $\frac{1}{8}$ – $\frac{1}{2}$ in., very thick. *Peduncle* equalling the leaves; pedicels very slender. *Sepals* ovate. *Corolla* $\frac{1}{2}$ in. diam., pink. *Coronal-processes* membranous, united into a conical vertically 5-lobed column, each lobed again, longitudinally folded and produced upwards into an acute point.

11. **H. micrantha**, *Hook. f.*; quite glabrous, leaves ovate or elliptic-lanceolate acute very thick and fleshy, margins flat, peduncle long or short, corolla revolute pubescent within, column conical.

TENASSERIM; Mergui, *Griffith*.

Stem rather stout. *Leaves* $2\frac{1}{2}$ –4 by $1\frac{1}{4}$ – $1\frac{1}{2}$ in., midrib and nerves not visible; petiole very short. *Peduncle* shorter than the leaves; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., filiform. *Sepals* ovate, obtuse. *Corolla* $\frac{1}{8}$ – $\frac{1}{4}$ in. diam. *Coronal-lobes* lanceolate, suberect, outer angle 2-fid, back with a boss; anther-tip much longer than the process.

12. **H. lacunosa**, *Blume Bijl.* 1063; quite glabrous, leaves ovate or rounded-ovate acute base rounded margins thickened, nerves horizontal, peduncle stout, pedicels very short. *Miquel Fl. Ind. Bat.* ii. 525; *Dcne. in DC. Prodr.* viii. 638; *Bot. Mag.* t. 4826, 5272. *Otostemma lacunosum*, *Blume Mus. Bot.* i. 59, t. 11.

MALACCA; between Jarsing and Aya Bomboo, *Maingay*.—DISTRIB. Sumatra, Java, Borneo.

Stem slender, twining. *Leaves* 1– $1\frac{1}{2}$ in., very thick, but nerves distinct beneath, 3–5 pairs, base rounded; petiole very short. *Peduncle* longer than the leaves; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. *Sepals* very small, ovate, obtuse. *Corolla* $\frac{1}{2}$ in. diam., pubescent within. *Coronal-lobes* ovate, inner angle produced into an ovate obtuse lobe almost as large as the body, incumbent on the anther (which has no tip?).—This differs from the Javanese *H. lacunosa*, in the much larger inner produced angle of the coronal-processes.

†† *Corolla* $\frac{1}{2}$ in. diam. and upwards, rarely less; lobes usually spreading or incurved. Leaves flat in all.

a. *Leaves* very small, rarely more than 1 in. long.

13. **H. Nummularia**, *Dcne. mss.*; stem slender minutely rough, leaves very small orbicular shining, flowers many in very long-peduncled umbels.

KHASIA Mts.; at Moosmai, *Griffith*.

Stem creeping and rooting, angular (when dry). *Leaves* $\frac{3}{4}$ in. diam., shining and reticulate on both surfaces; petiole $\frac{1}{4}$ in., rather slender. *Peduncle* 2 in.; pedicels $\frac{1}{2}$ – $\frac{2}{3}$ in. *Sepals* ovate-oblong. *Corolla* $\frac{1}{2}$ in. diam., "white, pubescent," *Griffith*. *Coronal-processes* too young for description.—Resembles *Dischidia khasiana*.

14. **H. serpens**, *Hook. f.*; stem very slender minutely rough, leaves very small suborbicular opaque papillose on both surfaces, flowers many on long peduncled umbels, corolla tomentose within, coronal-lobes ellipsoid.

SIKKIM HIMALAYA (*Herb. Griffith*).

Stem creeping and rooting. *Leaves* $\frac{1}{4}$ – $\frac{3}{4}$ in. diam., ovate or very broadly elliptic, base rounded or subcordate, nerves obscure; petiole very short, $\frac{1}{10}$ – $\frac{1}{10}$ in. *Peduncle*

1½ in., stouter than the branch; pedicels 1 in. *Sepals* ovate. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., white, lobes obtuse.—Very similar to *H. Nummularia*, but the leaves are covered with minute papillæ (when dry).

15. *H. obcordata*, Hook. f.; stem very slender minutely rough and here and there hairy, leaves obcordate or obreniform.

SIKKIM HIMALAYA; Chakoong, alt. 4–6000 ft., J. D. H., Yoksun, Clarke.

Stem creeping and rooting. *Leaves* $\frac{1}{2}$ in. long, sometimes broader than long, lobes rounded, sinus acute, base rounded or subacute, rather thin, opaque, nerves obscurely reticulate; petiole $\frac{1}{18}$ – $\frac{1}{10}$ in. *Flowers* in a drawing in Herb. Kew (by Jerdon) in a loose peduncled umbel; pedicels slender. *Corolla* $\frac{1}{2}$ in. diam., white, lobes triangular with villous margins.—Possibly a form of *H. Nummularia* or *serpens*, but if so a very remarkable one.

16. *H. vaccinioides*, Hook. f.; quite glabrous, branches very long slender pendulous, leaves $\frac{1}{2}$ in. elliptic subacute fleshy nerves obsolete.

UPPER ASSAM; Mishmi Mts., by the Thumat river, Griffith,

Follicles 3 in. long, slender, straight, pericarp thin.

17. *H. bella*, Hook. Bot. Mag. t. 4402; stem petioles and peduncles pubescent, leaves 1 in. sub-bifarious ovate acute, peduncles very short, pedicels longer, sepals oblong ciliate. *Part. Magaz.* xv. t. 243; *Fl. des Serres*, iv. t. 399 (copied from Bot. Mag.).

TENASSERIM; Taungkota mountain, Moulmein, T. Lobb.

Leaves deep green, recurved, nerveless when fresh, midrib strong beneath; petiole $\frac{10}{16}$ in. *Peduncle* $\frac{1}{2}$ in.; pedicels $\frac{3}{4}$ in. *Sepals* small. *Corolla* $\frac{3}{4}$ in. diam., pure white, glabrous within; lobes very short, subacute. *Coronal-processes* violet, boat-shaped, concave above, inner angle acute.—I have seen no specimens.

b. Leaves very narrow, lanceolate oblanceolate or linear, rarely 1 in. broad; nerves invisible or very obscure.

18. *H. retusa*, Dalz. in Hook. Kew Journ. Bot. iv. 294; quite glabrous, leaves very narrow gradually dilating from the base to the obcordate broad tip fleshy, flowers subsolitary, corolla puberulous within. *Dalz. & Gibs. Bomb. Fl.* 153.

The CONCAN; on the Ghats, Dalzell, &c.

Stem very slender. *Leaves* 1½–2 in. by $\frac{1}{4}$ – $\frac{1}{3}$ at the broad tip, midrib very strong; petiole $\frac{1}{10}$ – $\frac{1}{6}$ in. *Flowers* 1–3-nate; pedicels slender. *Sepals* minute, ovate. *Corolla* $\frac{3}{4}$ in. diam., white with a pink corona; lobes very broad, acute. *Coronal-lobes* horizontal, ovate, shorter than the corolla-tube, broad end outwards, inner angle acute.

19. *H. pauciflora*, Wight Ic. t. 1269 (*parviflora* in text); quite glabrous, leaves 1–2 in. linear-lanceolate obtuse very thick, peduncles very short few-fl., pedicels long slender, corolla glabrous within. *H. Wightiana*, *Thwaites Enum.* 199.

MALABAR and TRAVANCORE; Cochin and Courtallam, Wight. CEYLON; central province, alt. 3–5000 ft., Walker, &c.

A very slender climber. *Leaves* rarely more than $\frac{1}{4}$ in. broad, margins often recurved; petiole $\frac{1}{10}$ – $\frac{1}{6}$ in. *Peduncle* scarcely exceeding the petiole. *Sepals* small, narrow. *Corolla* $\frac{3}{4}$ in. diam., white. *Coronal-processes* pink, short, ovoid, obtuse, concave above, inner angle produced into a recurved spur.—I see no difference between the Ceylon and Deccan plants.

20. *H. longifolia*, Wall. in Wight. Contrib. 36; Cat. 8154; glabrous, leaves 4–8 in. narrowly oblanceolate acuminate very fleshy, peduncle long or short smooth and pedicels glabrous, corolla glabrous margins pubescent,

coronal-processes horizontal. *Dene. in DC. Prodr.* viii. 627; ? *H. Shepherdii*, *Hook. Bot. Mag.* t. 5269.

TROPICAL HIMALAYA; from Kumaon to Sikkim, alt. 1-3000 ft. KHASIA Mts., alt. 3-4000 ft., *Griffith*, &c.

Stem stout, climbing; branches long, pendulous. *Leaves* very variable in breadth, $\frac{1}{2}$ -1 $\frac{1}{4}$ in., midrib obscure, base narrow acute or rounded; nerves hardly visible, very oblique almost parallel to the midrib; petiole very stout, $\frac{1}{4}$ -1 in. *Peduncle* sometimes 2 in.; pedicels 1-1 $\frac{1}{2}$ in. *Sepals* ovate, acute, glabrous. *Corolla* $\frac{1}{4}$ -1 $\frac{1}{4}$ in. diam., lobes subacute. *Coronal-processes* broadly ovate, flat above with a central boss, convex beneath; inner angle acute, shorter than the broad anther-tips. *Follicles* 4-6 in., slender, straight. *Seeds* $\frac{1}{4}$ in., lanceolate.

21. **H. oblanceolata**, *Hook. f.*; glabrous, leaves 4-6 in. narrowly oblanceolate acuminate very fleshy, peduncles very short and thick and pedicels glabrous, corolla puberulous within, coronal-processes sub-erect.

KHASIA Mts., alt. 3-4000 ft., *J. D. H. & T. T.*

Stem, stout, climbing. *Leaves* as in *H. longifolia*, but smaller. *Peduncles* $\frac{1}{4}$ -1 in., clavate or cylindric, when old $\frac{1}{2}$ - $\frac{1}{4}$ in. diam. and densely scarred; pedicels slender. *Sepals* ovate, acute. *Corolla* $\frac{1}{2}$ in. diam., pale flesh-coloured. *Coronal-lobes* broadly oblong or subspathulate, inner angle produced into a short obtuse lamella which is much shorter than the subulate anther tip.

c. Leaves broad, ovate oblong elliptic or lanceolate, strongly 3-5-nerved from the base to the middle or higher.

22. **H. latifolia**, *G. Don. Gen. Syst.* iv. 127; glabrous, leaves 5-10 in. ovate or oblong-ovate acute or acuminate very thick shining 5-nerved margins recurved, peduncles solitary or fascicled very thick, pedicels very short puberulous, flowers small, coronal-processes shorter than the corolla-tube. *Dene. in DC. Prodr.* viii. 638. *H. macrophylla*, *Wight Contrib.* 38, not of *Blume*. *H. polystachya*, *Blume Mus. Bot.* i. 45, t. 9.

PENANG, *Wallich*. SINGAPORE, *Maingay*.—DISTRIB. JAVA.

Stem very stout. *Leaves* variable in breadth, 3-5 in., base rounded or cordate, petiole very short and thick. *Peduncles* 1-2 in., at length cylindric and covered with raised pitted tubercles. *Sepals* minute, ovate. *Corolla* $\frac{1}{2}$ in. diam., pubescent within. *Coronal-processes* suberect, ovoid, apiculate, upper surface flattened, inner angle acute, under surface deeply grooved.

23. **H. parasitica**, *Wall. in Wight Contrib.* 37, and *Cat.* 8159; glabrous, leaves 3-5 in. ovate elliptic or lanceolate acute or acuminate 3-5-nerved, peduncles solitary or in pairs short or long slender or stout, pedicels slender long glabrous, coronal-processes longer than the corolla-tube. *Wight Ic.* t. 587; *Dene. in DC. Prodr.* viii. 637. *H. Hookeriana*, *Wight Contrib.* 37; *Wall. Cat.* 8153; *Dene. l.c.* 636. *Hoya* sp. *Wall. Cat.* 8153. *H. pallida*, *Lindl. in Bot. Reg.* t. 951; *Paxt. Fl. Gard.* t. 26, copied in *Lemaire Jard. Fleur.* t. 64. *Asclepias parasitica*, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 42.

ASSAM; *Conulla, Clarke*. KHASIA Mts. ascending to 2000 ft. SUNDERBUNDS, and from CHITTAGONG to SINGAPORE, MALACCA and the ANDAMAN ISLS.

A tall climber, stem stout or slender. *Leaves* extremely variable in length and breadth, much the largest in Khasian specimens, nerves obscure; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in., very thick. *Peduncles* 1-3 in., slender or stout and becoming much thickened and scarred; pedicels $\frac{1}{4}$ -1 in. *Sepals* small, ovate. *Corolla* $\frac{1}{2}$ in. diam., pearly white; lobes glabrous within, always inflexed in dried specimens with the coronal-processes projecting between them; these are ascending, ovate, acute, concave with a mesial ridge above, with the narrow end outwards, and the inner angle very short, white, pink at the junctures.—I have seen no fruit. Except in the large leaves, sometimes 9 in. long, I can find no character for *H. Hookeriana*. *H. cinnamomifolia*, *Hook. Bot.*

Mag. t. 4347, has very similar flowers and leaves. Lindley figures the flower of *H. pallida* as nearly white, Paxton both figures and describes them as yellow.

d. Leaves elliptic, oblong, or linear-oblong, penni-nerved, nerves very horizontal (sometimes oblique in H. Griffithii).

24. *H. fusca*, Wall. Pl. As. Rar. i. 68, t. 75, and Cat. 8157; glabrous, leaves 6-9 in. linear-oblong acuminate fleshy midrib very thick, peduncles short and pedicels very stout, corolla pubescent within. *Wight Contrib.* 37; *Dcne. in DC. Prodr.* viii. 639.

NEPAL, *Wallich*; SIKKIM, alt. 1-4000 ft. KHASIA Mts. and PEGU.

A stout climber. *Leaves* $1\frac{1}{2}$ - $2\frac{1}{2}$ in. diam., sides nearly parallel; nerves numerous, quite horizontal; petiole thick, $\frac{1}{2}$ -1 in. *Peduncles* sometimes terminal, $\frac{1}{2}$ -1 in., pedicels as long. *Sepals* broadly ovate, obtuse. *Corolla* $\frac{1}{2}$ in. diam., yellow-brown, lobes spreading. *Coronal-processes* short, very thick, obtuse, concave above, inner angle ending in an erect or recurved spur as long as the anther-tip. *Follicles* 4-5 in. long by $\frac{1}{2}$ in. diam., rather thick-walled, straight. *Seeds* $\frac{1}{2}$ in. long.

25. *H. obtusifolia*, *Wight Contrib.* 38; more or less puberulous, stem very stout, leaves 4-6 in. oblong rounded at both ends or tip acute or apiculate very thick, margins flat, midrib stout, peduncle stout, pedicels and calyx pubescent, corolla coriaceous pubescent without glabrous within. *Wall. Cat.* 8167; *Dcne. in DC. Prodr.* viii. 638; *Bot. Mag.* t. 4969 (excl. syn. *H. velutina*). *H. Teysmanniana*, *Miquel Fl. Ind. Bat.* 522.

TENASSERIM OR ANDAMAN ISLDS., *Helper*. PENANG? *Wallich*.—DISTRIB. Sumatra, Java.

Branches as thick as the little finger or less. *Leaves* $1\frac{1}{2}$ - $2\frac{1}{2}$ in., broad, shining, nerves visible only when dried; petiole very thick, $\frac{3}{4}$ -1 in. *Peduncle* 1-3 in., at length terminating in a cylindric mass of scarred close set tubercles; pedicels $\frac{1}{2}$ -1 in. *Sepals* large for the genus, oblong, obtuse, coriaceous. *Corolla* dull yellow, $1\frac{1}{2}$ in. diam.; lobes erect, acute. *Coronal-processes* short, obtuse, suberect, concave in fruit, inner angle ending in an erect or recurved spine longer than the anther-tip. *Follicles* not seen.

26. *H. coronaria*, *Blume Bijl.* 1063, and *Rumph.* iv. 31, t. 182, f. 2 and t. 104; leaves 3-4 in. elliptic or elliptic-ovate abruptly acuminate very thick pubescent beneath, base rounded, margins recurved, peduncle stout and pedicels large, sepals pubescent, corolla coriaceous pubescent without glabrous within, follicles very thick. *Miquel Fl. Ind. Bat.* ii. 516. *H. velutina*, *Wight Contrib.* 35; *Wall. Cat.* 8150. *Dcne. in DC. Prodr.* viii. 635.

MALACCA, *Griffith*, *Maingay* (Kew Distrib. 1125), PENANG, ? *Wallich*.—DISTRIB. Sumatra, Borneo.

Stem stout, twining; young shoots, petioles, leaves beneath and inflorescence finely tomentose. *Leaves* 1-3 in. diam., nerves very obscure; petiole thick, $\frac{1}{2}$ - $\frac{3}{4}$ in. *Peduncles* $\frac{1}{2}$ -1 in., pedicels as long. *Sepals* rounded, thick. *Corolla* 1- $1\frac{1}{2}$ in. diam., thick, "cream white or yellowish speckled with purple," *Maingay*; lobes erect or incurved. *Coronal-processes* small, waxy, white, nearly hemispherical, very concave above and convex beneath, the inner angle shortly horizontally produced, obtuse. *Follicles* 6-8 in. long by $1\frac{1}{2}$ -2 in. diam., subcylindric, obtuse, base gibbous, walls very thick, endocarp hard. *Seeds* $\frac{1}{2}$ in. long.—The smaller shorter leaves with revolute margins distinguish this at once from *H. obtusifolia*; *Wallich's* habitat of Silhet is probably an error for Penang, from which island there is a drawing of this species in Herb. Kew. Perhaps two species mixed here, a purple- and white-flowered.

27. *H. elliptica*, *Hook. f.*; glabrous, leaves $1\frac{1}{2}$ - $2\frac{1}{2}$ in. elliptic obtuse at both ends thin in texture nerves very prominent, peduncle very short, pedicels long slender, sepals very small, corolla glabrous without puberulous within.

MALACCA, *Maingay* (Kew Distrib. 1137).

Stem rather slender, twining. *Leaves* 1-1½ in. diam., intramarginal nerve very distinct; petiole ½-¾ in. *Peduncles* ½ in., pedicels 1-1½ in. *Sepals* ovate, obtuse, puberulous. "*Corolla* white," *Maingay*; lobes obcordate, apiculate, inflexed (when dry). *Coronal-processes* longer than the corolla-tube, suberect, laterally subcompressed, ovate-oblong, obtuse, upper (inner) surface grooved, inner angle produced into a short subulate erect point.

28. *H. Griffithii*, *Hook. f.*; glabrous, leaves 6-9 in. narrowly oblanceolate or linear-oblong acute or acuminate very thick, nerves nearly horizontal, peduncle long stout, sepals large coriaceous, corolla 1½ in. diam. glabrous within.

KHASIA MTS., *Griffith*; Nowgong, alt. 2-4000 ft. *J. D. H. & T. T.*

A stout climber. *Leaves* distant, 1-2 in. diam., midrib stout, nerves quite obscure in some, in others distinct and forming large areoles; petiole ¾-1 in., very thick. *Peduncle* 2-4 in., as thick as the branch; pedicels 1-1½ in., very stout. *Sepals* ¾-1 in., oblong, obtuse, coriaceous. *Corolla* purple? glabrous within, lobes acute. *Coronal-processes* produced upwards from a suborbicular base into an erect stiff obtuse spur as long as the anther-tip, the orbicular base is 2-lamellate below.—In the large calyx this approaches *H. coronaria*. It has been flowered at Fallowfield (Manchester) by Mr. Swan.

29. *H. imperialis*, *Lindl. in Bot. Reg.* 1846, t. 68 in note, and in *Journ. Hort. Soc.* v. 80, with woodcut; leaves 6-9 in. elliptic or linear-oblong obtuse apiculate very thick puberulous or glabrate beneath, peduncles and pedicels long stout, sepals rounded-ovate, corolla 2½-3 in. diam., follicles stout woody. *Hook. Bot. Mag.* t. 3397, copied in *Fl. des Serres*, iv. t. 393, 394; *Ann. de Gand.* 1848, t. 228. ? *H. speciosa*, *Decne. in DC. Prodr.* viii. 635. ? *Asclepias Susuella*, *Roxb. Fl. Ind.* ii. 31, excl. *syn.*

MALACCA, *Maingay*.—DISTRIB. Borneo, ? Amboyna.

A lofty stout climber. *Leaves* 1½-2½ in. diam., rarely acute, shining, base often narrowed and cordate, midrib very stout, nerves quite horizontal; petiole ¼-½ in. *Peduncles* 3-10 in.; pedicels 2-3, and sepals pubescent. *Corolla* leathery, dull purple, puberulous near the corona, lobes triangular acute. *Coronal-processes* white, laterally compressed, erect, turgid, obtuse, inner angle shortly produced into a subulate point. *Follicles* 9 in. long. by 1½ in. diam., straight, lanceolate, finely acuminate, pubescent; pericarp thickly coriaceous, endocarp hard. *Seeds* ¼ in. long.

30. *H. Wightii*, *Hook. f.*; quite glabrous, leaves 3-4 in. long-petioled elliptic or elliptic-lanceolate rarely orbicular acute at both ends thick, margins recurved, nerves distinct horizontal or nearly so, peduncles much shorter than the pedicels, sepals linear-oblong, follicles slender. *H. pendula*, *Wight & Arn. Contrib.* 36 (excl. *syn.*); *Decne. in DC. Prodr.* viii. 635; *Grah. Cat. Bomb. Fl.* 119. *H. pallida*, *Dalz. & Gibs. Bomb. Fl.* 152.—*Hoya*, n. 27, *Herb. Ind. Or. H. f. & T.*

DECCAN PENINSULA; from the Bombay Ghats to the Nilgherry Mts.

A stout climber. *Leaves* 1½-2 in. broad, margins often revolute, tip obtuse often produced, nerves loosely netted; petiole ½-1 in. *Peduncles* ¾-1 in.; pedicels stout, 1 in. *Sepals* glabrous. *Corolla* ½-¾ in. diam., cream-coloured, glabrous within, margins puberulous. *Coronal-processes* ascending, short, inflated, obtuse, concave above, inner angle produced into a short erect spur. *Follicles* 4 in. long, slender, straight, pericarp thin.—For the distinctions between this and *H. ovalifolia* see the latter plant. The vars. *Rheedei* and *nilgherrensis*, *Wight*, are not distinguishable.

e. Leaves orbicular ovate-oblong or broadly elliptic, rarely lanceolate, penninerved, nerves arching (not prominently 3-5-nerved from the base). See also *H. polyneura* and *H. Lobbii*.

31. ***H. caudata***, *Hook. f.*; glabrous, leaves ovate acuminate very shortly petioled very thick margins corrugate, pedicels short filiform, corolla pubescent within lobes tailed.

MALACCA, *Maingay* (Kew Distrib. 1128).

Stem rather slender but woody. *Leaves* 2-3 in. diam., sparsely papillose on both surfaces, midrib and arching nerves faint; petiole $\frac{1}{2}$ in., so thick as to appear globose. *Peduncle* (one only seen) nearly 2 in., with a thickened scarred tip; pedicels $\frac{1}{2}$ in. *Sepals* linear-lanceolate, glabrous. *Corolla* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., "white, suffused with pink," *Maingay*; lobes triangular, ending in slender tails of their own length. *Coronal-processes* horizontal, elliptic-ovate, broadest end outwards, concave above, inner angle produced into a long subulate spur, which is much shorter than the very long filiform anther-tips.

32. ***H. Arnottiana***, *Wight Contrib.* 36; quite glabrous, leaves 3-8 in. elliptic or lanceolate thick acute or acuminate, nerves distinct, peduncles long or short stout, pedicels long, corolla glabrous within, coronal-processes large exceeding the tube. *Wall. Cat.* 8161; *Dcne. in DC. Prodr.* viii. 638.—*Hoya* n. 38, *Herb. Ind. Or. H. f. & T.*

TROPICAL HIMALAYA; Nepal, *Wallich*. SIKKIM; alt. 1-3000 ft., *J. D. H.* UPPER ASSAM; Suddya, *Griffith*.

A lofty climber. *Leaves* very variable, 2-4 in. diam.; petiole $\frac{1}{2}$ -1 in. *Peduncle* 1-3 in.; pedicels 1 in. *Sepals* broadly ovate, obtuse. *Corolla* $\frac{3}{4}$ in. diam., scarcely papillose within, cream-coloured, lobes spreading, subacute. *Coronal-processes* white, ovate, subacute with the narrower end outwards, concave above, inner angle acute, shorter than the anther-tip.

33. ***H. ovalifolia***, *Wight & Arn. Contrib.* 37; quite glabrous, leaves 2-4 in. elliptic or elliptic-ovate or -oblong or -lanceolate obtuse or acute very thick, nerves distinct, peduncles and pedicels stout, corolla glabrous within, coronal-processes exceeding the tube. *Wight Ic. t.* 847 (not good); *Wall. Cat.* 8160 a; *Dcne. in DC. Prodr.* viii. 638; *Thwaites Enum.* 198; *Paxt. Fl. Gard. t.* 23, copied in *Lemaire Jard. Fleur. t.* 64, f. 2.

NILGHERY MTS. and MANGALORE, *Wight*. CEYLON, in the Ambagamowa district, *Walker, &c.*

Stem slender. *Leaves* often subfascicled, 1-1 $\frac{1}{2}$ in. broad, very variable, acute at both ends; petiole $\frac{1}{2}$ - $\frac{1}{4}$ in. *Peduncle* short; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in. *Sepals* ovate, obtuse, glabrous. *Corolla* $\frac{1}{2}$ - $\frac{1}{3}$ in. diam., pale straw-coloured; lobes broad acute. *Coronal-processes* ovate, obtuse, broader end inwards, concave above, inner angle cuspidate. *Follicles* 5-6 in., very slender, curved, pericarp thin.—The arching nerves, flat leaf-margins and large corona distinguish this from *H. Wightii*.

34. ***H. globulosa***, *Hook. f. in Gard. Chron.* 1882, ii. 732, f. 115; more or less hairy, leaves 5-7 in. long-petioled elliptic or oblong cuspidate or acuminate base rounded midrib very stout, nerves distinct, peduncle long, pedicels villous, corolla nearly glabrous within. *Floral Magazine*, 1860, t. 406.—*Hoya* n. 30 and 33; *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; alt. 1-3000 ft., *J. D. H., Clarke*. ASSAM; Muku hills, *Simmonds*. CACHAR, *Keenan*. CHITTAGONG; at Seetakoond. *J. D. H. & T. T.*

A stout climber, more or less hairy, the hairs long but very deciduous. *Leaves* 2-3 $\frac{1}{2}$ in. diam., much like those of *H. fusca*, but with arching nerves; petiole $\frac{1}{2}$ -1 in. *Peduncle* 3-4 in.; pedicels 1 in. *Sepals* rounded. *Corolla* $\frac{1}{2}$ in. diam., cream-coloured; lobes short, incurved. *Coronal-processes* short, broadly elliptic, pink, concave above, inner angle produced into an erect spur which is shorter than the large broad anther-tips. *Follicles* 12-16 in. long, very slender, cylindric, pericarp thin. *Seeds* $\frac{1}{2}$ in. long, slender.

35. **H. Thomsoni**, *Hook. f.*; petioles and leaves beneath sparsely pilose, leaves 2-3 in. oblong or obovate-oblong acuminate very thick, umbels axillary, peduncle short puberulous tip at length thickened and scarred, corolla-lobes with fringed margins glabrous or pubescent within.—*Hoya*, n. 12, *H. f. & T.*

KHASIA Mts.; Churra, alt. 3-4000 ft., *J. D. H. & T. T.*

Stem slender, rooting. *Leaves* not very fleshy, $\frac{2}{3}$ -1½ in. broad, midrib obscure, base obtuse or rounded, nerves very faint, arched; petiole $\frac{1}{4}$ -½ in. *Peduncle* $\frac{1}{2}$ -1 in., pubescent; pedicels glabrous or sparsely puberulous. *Sepals* glabrous, ovate, acute. *Corolla* $\frac{1}{2}$ in. diam., lobes acute. *Coronal-processes* obovate with the broad end outwards, concave above with a boss, inner angle produced into a short erect spur as long as the anther-tip.—The pubescence of the leaves is very obscure in dried specimens.

36. **H. diversifolia**, *Blume Bijl.* 1064; quite glabrous, leaves 2-3 in. broadly obovate or elliptic obtuse or apiculate very thick margins recurved, nerves indistinct, peduncles and short pedicels stout, corolla puberulous within, follicles very thick. *Miquel Fl. Ind. Bat.* ii. 518; *Dcne. in DC. Prodr.* viii. 637. *H. orbiculata*, *Wall. in Wight Contrib.* 36; *Wall. Cat.* 8151; *Dcne. l. c.*—*Sussuela esculenta*, *Rumph. Herb. Amb.* v. 467, t. 175, f. 2.

BURMA; at Prome, *Wallich.* MALACCA, *Maingay* (Kew Distrib. 1130).—DISTRIB. Java, Amboyna.

A stout climber. *Leaves* 1½-2½ in. diam., base acute or rounded, nerves arched; petiole $\frac{1}{4}$ -½ in. *Peduncle* $\frac{1}{4}$ -½ in., very thick; pedicels about $\frac{1}{2}$ in. *Sepals* small, elliptic, obtuse, glabrous (ciliate, *Maingay*). *Corolla* $\frac{1}{2}$ in. diam., cream-coloured; lobes broad. *Coronal-processes* pale pink, short, thick, ovate, with the broad end outwards concave above, with a boss near the centre, inner angle produced into a short, erect spur shorter than the anther-tip. *Follicles* 6 in. long., $\frac{3}{4}$ in. diam., falcate, sublinear; pericarp thick, apparently $\frac{1}{4}$ in. or more. *Seeds* about $\frac{1}{4}$ in. long.

37. **H. coriacea**, *Blume Bijl.* 1063; *Rumphia*, iv. t. 187; nearly glabrous, leaves 3-5 in. long-petioled elliptic or oblong or obovate-oblong acute or acuminate thinly coriaceous reticulated, base rounded, midrib and slender nerves very distinct, peduncles and pedicels long, sepals linear pubescent, corolla villous within. *Miquel Fl. Ind. Bat.* ii. 521; *Dcne. in DC. Prodr.* viii. 638; *Bot. Mag.* t. 4518, copied in *Fl. des Serres*, t. 578; *Paxt. Fl. Gard.* i. f. 55; *Lemaire Jard. Fleur.* t. 37. *H. Brunoniana*, *Wight Contrib.* 37; *Wall. Cat.* 8163; *Dcne. l. c.* 636.

PENANG, *Wallich.* MALACCA, *Griffith*, *Maingay* (Kew Distrib. 1131, 1134).—DISTRIB. Java, Borneo.

A stout climber. *Leaves* variable, 1½-2½ in. broad, shining above, far more thin than in any Indian congener; petiole $\frac{1}{2}$ -¾ in. *Peduncle* 2-5 in.; pedicels $\frac{3}{4}$ -1 in. *Sepals* as long as the corolla-tube. *Corolla* $\frac{3}{4}$ in. diam., dirty straw-coloured or reddish; lobes incurved when dry. *Coronal-processes* white, ovoid, inflated, subacute, the narrow end outwards, inner angle cuspidate shorter than the anther-tip. "pollen-masses very slender, with trigonous pedicels and minute corpuscles," *Maingay*.—The comparatively membranous leaves with conspicuous reticulate nervation, unlike that of *Hoya*, at once distinguish this species.

38. **H. pendula**, *Wight Ic.* t. 474 (*not of Contrib.*); branchlets and umbels sparsely hairy, leaves 1½-3 in. elliptic-ovate or -lanceolate acute thick nerves distinct, margins recurved, peduncles short, pedicels longer, sepals lanceolate, corolla-lobes silkily villous. *Dalz. & Gibs. Bomb. Fl.* 152. *Asclepias pendula*, *Roxb. Fl. Ind.* ii. 36.

DECCAN PENINSULA; the Circars, *Roxburgh*; Western Ghats, and the Concan, *Nimmo*; Nilgherry hills, *Wight*.

Stem rather slender, hairiness very inconspicuous. *Leaves* 1½-2½ in. diam., like those of *H. ovalifolia*, but margins recurved when dry, base narrow or rounded;

petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. Peduncles $\frac{1}{2}$ – $\frac{3}{4}$ in.; pedicels 1–1 $\frac{1}{2}$ in. Sepals shorter than the corolla-tube. Corolla $\frac{2}{3}$ in. diam., white. Coronal-processes (mutilated) as long as the corolla-tube, apparently ovate, with the inner angle shortly spurred.—The only specimen I have seen is an unnamed one in Wight's Herbarium; the plate in his *Icones* is a copy of Roxburgh's drawing, which represents a much larger leaved plant than the specimen.

39. **H. Maingayi**, *Hook. f.*; quite glabrous, leaves 7–8 in. elliptic-lanceolate or oblanceolate finely acuminate very thick nerves reticulate distinct very oblique, peduncle very short thick, pedicels longer, sepals small obtuse, coronal-processes longer than the villous corolla-tube.

MALACCA, *Maingay* (Kew Distrib. 1136).

Stem stout. *Leaves* 2 $\frac{1}{2}$ –3 $\frac{1}{2}$ in. diam. at or above the middle, reticulate on both surfaces, base narrow; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., very thick. *Peduncle* $\frac{1}{2}$ –1 in., thickened and scarred; pedicels 1 in. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., pale pink, lobes short, obtuse. *Coronal-processes* ovate, acute, narrow end outwards, above concave with a mesial ridge, inner angle apiculate shorter than the anther-tip.

DOUBTFUL AND EXCLUDED SPECIES.

H. CRASSIFOLIA, *Haw. Succ. Pl. Suppl.* 8; *Dcne. in DC. Prodr.* viii. 640. *Scholera crassifolia*, *Jacq. Eclog.* t. 2; *Traill. in Trans. Hort. Soc.* vii. 22; from India; with leaves described as excessively thick, obsoletely spotted, petals truncate or obtuse, is unknown. Wight (*Contrib.* 38) refers it to the Chinese *H. carnosa*, Br., which name it would supersede.

H. FINLAYSONII, *Wight Contrib.* 38; *Wall. Cat.* 8166; *Dcne l.c.*; stem stout, leaves 5–7 by 2 in. ovate-lanceolate obtusely acuminate densely thick penni-nerved, nerves prominent on both surfaces arched, intramarginal very distinct, petiole short stout.—Singapore, *Wallich*; Siam,? *Herb. Finlayson*.

H. GYMNANTHERA, *Wight. Contrib.* 37; *Wallich's* sheet of this consists of a leafless twig of a *Hoya* with buds, and a good specimen of *Parsonsia spiralis*.

H. NICOBARICA, Br. in *Wight Contrib.* 36 (note under *H. pendula*, W. & A.); *Dcne. l.c.*—Nothing is known of this.

H. OPOSITA, *Don Gard. Dict.* iv. 128 (*Sperlingia opposita*, *Vahl*; *Wight Contrib.* 67), is *H. Rumphii*, *Blume*, a Moluccan plant.

H. WALLICHIANA, *Dcne. l.c.* 635; said to be mixed with *Wallich's* n. 8165 (*H. latifolia*), appears from *Decaisne's* description to be *H. coronaria*, Bl.

H. VERTICILLATA, *G. Don Gard. Dict.* iv. (*Sperlingia verticillata*, *Vahl. Skrivt. Naturhist. Selsk. Kiobenh.* vi. 113), said to be a native of India, is unknown to me.

H. sp.? Amongst the drawings in *Herb. Kew* is one of a *Hoya* from Penang, with ovate-lanceolate acuminate 3-ple nerved leaves 6 in. long suffused with purple, red and white flowers $\frac{1}{2}$ in. diam. having long flexuous hairs on the corolla, the corolla-lobes are obtuse and the coronal-processes red.

45. **PHYSOSTELMA**, *Wight*.

A twining glabrous shrub. *Leaves* opposite, coriaceous, shining. *Flowers* large, umbelled. *Sepals* small, narrow. *Corolla* cup-shaped, lobes very short. *Coronal-processes* 5, very large, ovoid-oblong, obtuse, adnate to the anthers, spreading and ascending; margins reflexed. *Column* very small; anthers conniving over the stigma, tips inappendiculate; pollen-masses one in each cell, ovoid-oblong, erect. *Stigma* flat. *Follicles* long, cylindric, smooth. *Seeds* comose.

P. Wallichii, *Wight Contrib.* 40; *Wall. Cat.* 8171; *Dcne. in DC. Prodr.* viii. 633. *P. campanulatum*, *Dcne. l.c.* *Hoya campanulata*, *Blume Bijl.* 1064; *Bot. Reg.* 1847, t. 54; *Bot. Mag.* t. 4545. *Cystidianthus campanulatus*, *Hassk. Cat. Hort. Boj.* 126; *Blume Mus. Bot.* i. 57.

SINGAPORE; *Wallich*.—DISTRIB. Java?

Leaves 3-5 by $1\frac{1}{4}$ - $2\frac{1}{2}$ in., elliptic-oblong, acuminate, coriaceous, nerves reticulate; petiole $\frac{1}{4}$ in. *Cymes* globose, 3-4 in. diam.; peduncle 1-2 in., stout; podicels as long, slender. *Corolla* $1\frac{1}{2}$ in. diam., pale yellow, lobes apiculate. *Column* $\frac{1}{4}$ in. diam., the radiating coronal-processes narrowly oblong, horny and yellow when dry.

46. **PYCNORHACHIS**, *Benth.*

A hairy twining undershrub. *Leaves* opposite, very shortly petioled, membranous, villous. *Flowers* black-purple, in reflexed pairs spirally disposed round the long fleshy branches of an axillary racemiform cyme. *Sepals* subulate. *Corolla-tube* short, thick, throat annulate; lobes elongate, subulate-lanceolate from a broad base, hairy within, valvate in bud. *Coronal-scales* 5, spreading at the base of the column opposite the anthers. *Column* short, adnate to the middle of the corolla-tube; anther-tip long, subulate, hyaline; pollen-masses one in each cell, long, slender, shortly pedicelled, cylindric, waxy, erect. *Ovary* sunk in the calyx-tube; stigma obtusely conical, 5-angled, much shorter than the anther-tips; ovules many. *Follicles* curved, cylindric, obtuse, glabrous. *Seeds* comose.

P. Maingayi, *Hook. f.*

MALACCA; very rare, *Maingay*.

Branches hispidly hairy. *Leaves* 4-6 by $1\frac{1}{2}$ -2 in., oblong-obovate, acuminate, villous on both surfaces, base narrowly cordate or 2-lobed at the insertion of the petiole; nerves 10-12 pair, spreading; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., villous. *Cymes* 3-6 in. long, branches few, $\frac{1}{4}$ in. diam. *Corolla* $\frac{1}{4}$ in. long, dark purple; annules of throat fringed with hairs. *Corpuscle* slender. *Follicles* 5 in. long by $\frac{2}{3}$ in. diam., sickle-shaped.—Description chiefly from that and the drawings of the discoverer of this very curious genus, which resembles no other.

TRIBE V. **CEROPEGIÆ.**

47. **LEPTADENIA**, *Br.*

Erect, rigid, almost leafless, or twining, hoary or glabrous, leafy shrubs. *Leaves* elliptic or ovate-cordate. *Flowers* small, in crowded axillary umbelliform cymes. *Calyx* turbinate, shortly 5-lobed. *Corolla* rotate; lobes pubescent or bearded, margins recurved, valvate in bud. *Corona* double, corolline of 5 scales between the corolla-lobes; staminal of a raised undulate wing at the base of the anthers. *Column* short; anthers inflexed, obtuse, tips appendiculate; pollen-masses one in each cell, globose, sessile, erect, tips pellucid. *Stigma* included, flat, 5-gonal, 2-cuspidate. *Follicles* rigid, acuminate, smooth. *Seeds* comose, flat, winged.—DISTRIB. Species 12; tropical Asia and Africa.

1. **L. reticulata**, *Wight & Arn. Contrib.* 47; twining, leafy, leaves ovate-cordate or elliptic acute glabrous or hoary beneath, cymes peduncled hoary. *Wight Ic. t.* 350; *Wall. Cat.* 8197; *Dcne. in DC. Prodr.* viii. 628. *L. appendiculata*, *Dcne. l.c.* *L. imberbe*, *Wight Contrib.* 48; *Wall. Cat.* 8198. *L. brevipes*, *Wight Cat.* 1536; *Dcne. l.c.* *Cynanchum reticulatum*, *Retz. Obs.* ii. 15. *C. asthmaticum*, *Herb. Ham.* ? *C. ovatum*, *Thunb.*; *Dcne. l.c.* 548. *Secamone canescens*, *Sm. in Rees Cycl. Asclepias tuberosa*, *Rarb. Fl. Ind.* ii. 38. *A. volubilis*, *Herb. Madr.* *Gymnema aurantiaca*, *Wall. mss.*

EASTERN PUNJAB, at Amballah, *Edgeworth*; and from BANDA southwards through the DECCAN PENINSULA. BURMA, *Wallich*. SINGAPORE, *Lobb*. CEYLON, at Amoor-adhapoora, *Gardner*.—DISTRIB. AYA.

Bark corky; young branches, &c., hoary. *Leaves* 1-2 in., coriaceous, pale, both

surfaces alike, nerves very faint; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. Cymes solitary or in pairs, $\frac{1}{2}$ –1 in. diam.; many-fld.; peduncles shorter or longer than the petioles. *Calyx-lobes* obtuse. *Corolla* $\frac{1}{4}$ in. diam., thick, pubescent on both surfaces; tip of lobes keeled and thickened on the face, most so at the tips; tube glabrous, shining from the adnate corona which is continued halfway down the middle of the lobes. *Follicles* $2\frac{1}{2}$ –3 in. long, $\frac{1}{4}$ – $\frac{3}{4}$ in. diam., turgid, straight, smooth, almost woody; beak thick, curved. *Seeds* $\frac{1}{2}$ in., long, narrowly ovoid.—I think this hardly differs from an East African species.

2. **L. Spartium**, *Wight Contrib.* 48; erect, leaves narrowly linear or 0, cymes subsessile few-fld. hoary. *Wall. Cat.* 8199; *Dene. in DC. Prodr.* viii. 629; *Boiss. Fl. Orient.* iv. 63. *L. pyrotechnica*, *Dene. in Ann. Sc. Nat.* 1838. 269, and in *DC. Prodr. l. c.* *L. Jacquemontiana* and *gracilis*, *Dene. ll. cc.* *Cynanchum pyrotechnicum*, *Forsk.*; *Del. Fl. Egypt*, t. 20. *Sarcostemma pyrotechnica*, *Br. Prodr.* 453. *Microlooma pyrotechnica*, *Spreng. Syst.* i. 855. *M. angustifolia*, *Herb. Ham.*

The PUNJAB and SCINDE, eastwards to the Jumna.—DISTRIB. Beluchistan, Arabia, Egypt, Senegambia.

A glabrous shrub 3–4 ft. high, with long erect twiggy branches. *Leaves* when present 3–4 by $\frac{1}{4}$ in., acuminate, shortly petioled, leathery. *Flowers* as in *L. reticulata*, but smaller, $\frac{1}{8}$ in. diam. *Follicles* 5 in. long, $\frac{1}{2}$ in. diam., terete, straight, produced into a very long slender straight beak.

48. **ORTHANTHERA**, *Wight*.

An erect twiggy leafless shrub. *Flowers* small, in dense-fld. peduncled woolly cymes. *Sepals* lanceolate, eglandular. *Corolla* salver-shaped, tube ovoid, equalling the lanceolate valvate lobes. *Corona* double; corolline of minute scales between the corolla-lobes; staminal a raised undulate ring below the anthers. *Column* ovoid, anther-tips inappendiculate; pollen-masses globose, sessile, erect. *Stigma* included, flat, 5-gonal. *Follicles* elongate, cylindric, opening out flat after dehiscence. *Seeds* comose.

O. viminea, *Wight & Arn. Contrib.* 48; *Royle Ill.* t. 66; *Dene. in DC. Prodr.* viii. 626, and in *Jacquem. Voy. Bot.* 109, t. 105. *Apocynaea viminea*, *Wall. Cat.* 7478.

NORTH-WEST INDIA; along the base of the Himalaya, alt. 1–3000 ft. from Peshawur and the Punjab to Oudh.

Branches stout, erect, as thick as a crowquill. *Peduncles* $\frac{1}{4}$ –1 in.; flowers shortly pedicelled, very woolly. *Sepals* equalling the corolla-tube. *Corolla* villous outside, glabrous within; lobes keeled down the centre of the face. *Follicles* erect, 5 in. long.—The long sepals and salver-shaped corolla are such strong generic characters that I do not follow the “*Genera Plantarum*” in uniting this genus with *Leptadenia*.

49. **BRACHYSTELMA**, *Br.*

Erect or twining pubescent or glabrous herbs with tuberous roots. *Leaves* opposite, sometimes very narrow or minute. *Flowers* few, in axillary sessile umbels or solitary, pedicels very slender. *Corolla* (in the Indian species) rotate; lobes 5, elongate, valvate. *Corona* short, adnate to the column, annular, variously 5–10-lobed or -toothed, lobes or teeth erect or incumbent on the anthers. *Column* very short; anthers ovoid, tips inappendiculate, retuse; pollen-masses one in each cell, sessile, globose, erect, one margin pellucid. *Stigma* nearly flat. *Follicles* slender, smooth. *Seeds* comose.—DISTRIB. About 14 African species, and the following.

There are probably in India many species of this singular genus, which owing to their slender habit and inconspicuous flowers may be overlooked. I cannot find any character whereby to distinguish *Eriopetalum*, Wight, from *Brachystelma*. The following descriptions are all very imperfect.

* *Stem erect.*

1. ***B. lævigatum***, *Hook. f.*; leaves minute subulate, umbels sessile, corolla glabrous or puberulous, segments thrice as long as the tube, corona with a broad 2-toothed lobe between the anthers, and as many narrow oblong ones opposite them. *Eriopetalum lævigatum*, *Wight Contrib.* 35; *Wall. Cat.* 8149; *Dcne. in DC. Prodr.* viii. 646. *Gomphocarpus lævigatus*, *Ham.*

NORTHERN OUDE; at Gorkhpore, *Hamilton*.

Root the size of a small potato. *Stem* 12–18 in., pubescent upwards. *Umbels* minutely hispid, as are the subulate sepals. *Flowers* pendulous, $\frac{1}{2}$ in. diam., pale dirty purple, with pale green segments. *Follicles* 3 in. long, erect.—Described partly from a drawing in *Herb. Kew*.

2. ***B. parviflorum***, *Hook. f.*; leaves long slender almost filiform glabrous, flowers solitary very long-pedicelled, corolla villous segments twice as long as the tube, corona shortly irregularly toothed. *Eriopetalum parviflorum*, *Wight Contrib.* 35; *Dcne. in DC. Prodr.* viii. 646.

NORTH-WESTERN INDIA; Doongie, *Royle (Wight)*.

Leaves 4 in. by $\frac{1}{10}$ in., acuminate. *Pedicels* 1–2 in. long, bracteate at the base. *Flowers* $\frac{3}{4}$ in. diam., white with a few spots on the tube and purple hairs on the margins and segments. *Sepals* subulate.—Described from a flower and drawing in *Herb. Wight*.

3. ***B. attenuatum***, *Hook. f.*; segments of corolla filiform 4–5 times as long as the tube villous, corona shortly irregularly toothed. *Eriopetalum attenuatum*, *Wight Contrib.* 35; *Dcne. in DC. Prodr.* viii. 646.

NORTH-WESTERN INDIA; Doongie, *Royle (Wight)*.

Flower $\frac{3}{4}$ in. diameter.—I have seen only a single flower in *Herb. Wight*.

4. ***B. maculatum***, *Hook. f.*; glabrous, leaves long slender almost filiform, umbels sessile, corolla-lobes 2–3 times as long as the spotted tube keeled above down the middle glabrous except a few scattered long cilia, corona with 5 subulate teeth opposite to and much higher than the anthers.

CANARA OR MYSORE, *Law*.

Stem 10–12 in. *Leaves* 3–4 by $\frac{1}{10}$ in. *Flowers* 2–3 together, $\frac{3}{4}$ in. diam. *Sepals* quite glabrous, subulate.

5. ***B. glabrum***, *Hook. f.*; quite glabrous, leaves narrowly linear-lanceolate or strap-shaped acute, umbels sessile, corolla puberulous lobes linear obtuse three-times as long as the tube, corona very short, minutely toothed.

DECCAN PENINSULA, *Beddome*.

Stem 6 in. *Leaves* 1–3 by $\frac{1}{8}$ – $\frac{1}{4}$ in. *Flowers* $\frac{3}{4}$ in. diam.

** *Stem twining.*

6. ***B. volubile***, *Hook. f.*; quite glabrous, leaves long linear slender, umbels peduncled, corolla-lobes many times longer than the tube with very long scattered hairs, margins incurved, column very depressed discoid, corona forming a low broad obtusely 5-angled cup round its base.

THE CARNATIC; on the Cuddapa hills, alt. 2000 ft., *Beddome*.

Stem several feet long. *Leaves* 3–5 by $\frac{1}{10}$ – $\frac{1}{8}$ in., acuminate. *Umbels* 2–3-*Ad.*

Corolla 1 in. diam., purplish, lobes crenulate. *Column* inserted by a very small base.

7. **B. Beddomei**, Hook. f.; glabrous, leaves very slender elongate acuminate, umbels peduncled 3 fld., corolla-lobes many times longer than the tube glabrous cohering by their tips corona with 5 very broad rounded lobes. *Ceropegia brevitybulata*, *Beddome Ic. Pl. Ind. Or. t. 174*.

MYSORE; Vellore hills, alt. 1000 ft., *Beddome*.

Glabrous, except the puberulous cyme. *Leaves* in distant pairs, 3-4 by $\frac{1}{8}$ - $\frac{1}{4}$ in., narrowed to the sessile base. *Peduncle* $\frac{1}{2}$ in.; bracts setaceous; pedicels $\frac{1}{4}$ in. *Sepals* setaceous. *Corolla* quite glabrous, pale without, purple within; segments 1 in. long, very narrow, flat. *Corona* with the processes opposite the anthers so entirely confluent with them as to appear to be absent.—This singular species has the corolla of *Brachystelma* with the segments cohering by their tips as in *Ceropegia*; it unites the characters of these genera.

50. CEROPEGIA, Linn.

Twining, rarely erect herbs, often with a tuberous rootstock. *Leaves* opposite, sometimes minute or 0. *Flowers* in axillary peduncled umbelliform cymes, rarely solitary, often large, white or greenish and purple. *Sepals* narrow. *Corolla-tube* elongate, straight or curved, often swollen at the base, throat dilated or not; lobes very various, broad or narrow, erect or incurved with cohering tips, often at length recurved or reflexed. *Corona* adnate to the column, annular or cupular, 5-10-lobed and with 5 long or short ligulate processes within that are free or adnate to the anthers. *Column* short; anther short, obtuse; pollen-masses one in each cell, short, erect, sessile, with one pellucid margin. *Stigma* depressed or shortly 2-lobed, included. *Follicles* usually slender, terete, smooth. *Seeds* comose.—DISTRIB. Species about 50; tropical Asian, African and South African, with a few Malayan and Australian.

Herbarium materials do not suffice to enable me to discriminate satisfactorily the species of this most difficult genus, and still less to describe them accurately. The classification I here propose is quite artificial.

* Stem erect, rarely flexuous or twining.

1. **C. pusilla**, Wight *Ic. t. 1261*; dwarf, puberulous, leaves linear, corolla straight, lobes linear erect much shorter than the tube, tips puberulous. *Wall. Cat. 8140*; *Dcne. in DC. Prodr. viii. 643*.

DECCAN PENINSULA; Nilgherry and Anamallay Mts., alt. 7-8000 ft., *Wight, &c.*

Tuber $\frac{1}{2}$ -1 in. diam. *Stem* 3-6 in. *Leaves* rather crowded, 1-3 by $\frac{1}{10}$ - $\frac{1}{2}$ in., narrowed at the base. *Flowers* solitary or 2-3-nate, erect. *Sepals* $\frac{1}{8}$ - $\frac{1}{4}$ in. *Corolla* 1 in., tube narrow, base ovoid. *Coronal lobes* 5, triangular, acute, 2-fld, ciliate; processes narrowly linear, three times as long. *Follicles* 2 in., narrowly fusiform.

2. **C. spiralis**, Wight *Ic. t. 1267*; quite glabrous, leaves very narrowly linear, corolla straight, lobes narrowly linear contorted as long as the tube fimbriate at the base.

DECCAN PENINSULA; Balaghat hills, Madras, *Wight*; Cuddapa hills, *Beddome*.

Stem slender, 4-6 in. *Leaves* 4-8 by $\frac{1}{10}$ - $\frac{1}{2}$ in., margins recurved. *Flowers* solitary, shortly peduncled. *Sepals* filiform, $\frac{1}{8}$ - $\frac{1}{2}$ in. *Corolla* 2 in. long, base slightly inflated, mouth hardly dilated. *Coronal lobes* 5, triangular, acute, glabrous; processes slender, three times as long.

3. **C. fimbriifera**, *Beddome in Madras Lit. Soc. Journ. 1861, 53*, and *Ic. Pl. Ind. Or. t. 172*; finely pubescent, leaves narrowly linear, corolla straight,

lobes as long as the tube narrowly linear erect or twisted together, fimbriate at the base with gland-tipped hairs. ? *C. Munroi*, *Wight Ic.* t. 1264.

TRAVANCORE; rocky place on the Anamallay hills, alt. 3-4000 ft., *Beddome*.

Stem 4-9 in., slender, glabrous below. *Leaves* 4-6 by $\frac{1}{4}$ - $\frac{1}{2}$ in., narrowed at the base and gradually from the middle to the tip. *Peduncles* $\frac{1}{2}$ -1 in., 1-4-fld. *Sepals* filiform, $\frac{1}{4}$ in. *Corolla-tube* subcylindric, green outside, purple within; lobes narrowed downwards from above the middle, basal margins reflexed, fimbriate with long slender hairs. *Coronal lobes* 10, triangular, ciliate; processes linear-spathulate, four times as long.—*C. Munroi* is only known from the very insufficient drawing engraved in *Wight's Icones*. *Beddome* has suggested to me its being a twining or flexuous form of this species, which becomes scandent in cultivation.

4. *C. attenuata*, *Hook. Ic. Pl.* t. 867; pubescent, leaves linear or linear-lanceolate, corolla straight lobes linear erect as long as the tube naked. *Dalz. & Gibs. Bomb. Fl.* 154; *C. angustifolia*, *Dalz. in Hook. Kew Journ.* ii. 259; *Dalz. & Gibs. l.c.* *C. spiralis*, *Herb. Ind. Or. H. f. & T.*

THE CONCAN; near Vingorla, and rocky pastures near the sea in Malwan, *Dalzell, Stocks, &c.*

Stem 6-12 in., slender or rather stout. *Leaves* 2-6 by $\frac{1}{8}$ - $\frac{1}{2}$ in., narrowed at the base. *Peduncles* short, axillary, usually 1-fld. *Sepals* filiform, $\frac{1}{4}$ - $\frac{1}{2}$ in. *Corolla* 2-2 $\frac{1}{2}$ in. long, base swollen, mouth dilated, lobes very narrow from a triangular base, the margins of which are not reflected. *Coronal lobes* 5, triangular, entire or 2-fld, ciliate, processes narrow, 4 times as long. *Follicles* 3 in. long, very slender, terete, torulose. *Seeds* $\frac{1}{10}$ in., oblong, compressed, margins very thick, coma $\frac{1}{2}$ in.

5. *C. Lawii*, *H. f.*; pubescent, stout, leaves long-petioled ovate, peduncles many-fld., corolla slightly curved lobes small elliptic naked incurved very much shorter than the very narrow tube. *Ceropegia* n. 25, *Herb. Ind. Or. H. f. & T.*

SOUTH CONCAN, *Law, Stocks*.

Tubers 2-5 in. diam. *Stem* often as thick as a goose-quill, 1-2 ft. high. *Leaves* 2-4 by $1\frac{1}{2}$ -2 in., acute, sometimes rounded; petiole $\frac{1}{2}$ -1 in. *Peduncle* 1-1 $\frac{1}{2}$ in. strict; bracts minute; pedicels short. *Sepals* minute, recurved. *Corolla* 1-1 $\frac{1}{2}$ in. long, base scarcely swollen; lobes $\frac{1}{4}$ - $\frac{1}{2}$ in., incurved, forming a small subglobose head. *Coronal lobes* 10, obtuse, short, ciliate; processes slender, four times as long.

6. *C. Wallichii*, *Wight in Bot. Mag.*, note under t. 3267, and *Contrib.* 32; puberulous, stem very stout, leaves ovate or rounded subsessile, flowers fascicled, corolla straight lobes oblong obtuse densely fimbriate within erect much shorter than the tube. *Wall. Cat.* 8143; *Royle Ill.* t. 66, f. 3; *Dcne. in DC. Prodr.* viii. 644.

CENTRAL and WESTERN HIMALAYA; Nepal, *Wallich*; Kumaon at Nainital, alt. 6500 ft., *Strachey and Winterb.*

Stem 8-12 ft. in., as thick as a goose-quill. *Leaves* 2-2 $\frac{1}{2}$, puberulous or glabrate above, tip obtuse acute or rounded. *Peduncle* very short; pedicels crowded, $\frac{1}{4}$ - $\frac{1}{2}$ in.; bracts setaceous. *Sepals* filiform, $\frac{1}{4}$ in. *Corolla* 1 $\frac{1}{2}$ in., tube narrow, base inflated, mouth funnel-shaped acutely 5-angled; lobes forming a narrow oblong obtuse crown $\frac{1}{2}$ - $\frac{1}{2}$ in. long, ciliate with short fusiform stout hairs. *Coronal-lobes* 10, triangular, ciliate, processes four times as long. *Follicles* 1 foot long.

** Stem twining. *Leaves* fleshy. *Calyx* minute. *Corolla* small, straight (rarely 1 in. long) narrow; mouth slightly dilated; lobes short, narrow, erect, fleshy.

7. *C. bulbosa*, *Roxb. Cor. Pl.* i. 11, t. 7, and *Fl. Ind.* ii. 28; leaves various, corolla-tube slender, lobes linear from a triangular base villous within, corona glabrous lobes minute or obsolete, processes filiform straight.

From WESTERN INDIA; the Punjab and Upper Gangetic plain as far east as Allahabad, southwards to Travancore.

Root tuberous. *Stem* very slender. *Leaves* excessively variable (see the varieties). *Peduncles* $\frac{1}{2}$ –1 in., 3–5-fld.; pedicels short. *Sepals* $\frac{1}{10}$ in. long. *Corolla* rarely 1 in. long, greenish, base moderately inflated mouth obtusely 5-angled; lobes $\frac{1}{2}$ – $\frac{3}{4}$ the length of the tube, purple within. *Follicles* 4 in. long, slender, terete, pericarp thin. *Seeds* $\frac{1}{2}$ in. long, linear-oblong, wing membranous.

VAR. 1. bulbosa proper; leaves petioled 1–2 in. rarely more orbicular oblong elliptic obovate or obovate acute or apiculate, rarely elliptic lanceolate, base acute rounded or cordate. *C. bulbosa*, *Roxb. l.c.*, *Wight Contrib.* 32, and *l.c. t.* 845, and in *Hook Bot. Misc.* ii. 99 and *Suppl. t.* 2; *Wall. Cat.* 8141; *Dalz. & Gibs. Bomb. Fl.* 153; *Grah. Cat. Bomb. Pl.* 117; *Dcne. in DC. Prodr.* viii. 643.

VAR. 2. Lushii; leaves subsessile very narrowly linear 4–8 by $\frac{1}{4}$ – $\frac{1}{2}$ in. *C. Lushii*, *Grah. in Bot. Mag. t.* 3300; *Dalz. & Gibs. Bomb. Fl.* 154; *Grah. Cat. Bomb. Pl.* 117; *Dcne. l.c.* 644. Bombay, in the Kasersaya jungles, *Dr. Lush.*

VAR. 3. esculenta, leaves 4–5 by 1 in. shortly petioled linear-lanceolate. *C. esculenta*, *Edgew. in Journ. Linn. Soc.* v. 204; *Aitchison Cat. Punjab. Pl.* 90. Punjab and Mooltan.

8. *C. Wightii*, *Graham in Bot. Mag. t.* 3267; leaves subsessile or shortly petioled elliptic-lanceolate apiculate or acute, corolla-tube slender, lobes linear from a triangular base, corona glabrous, lobes 5 minute obtuse, processes short broad curved. *Wight Contrib.* 30; *Dcne. in DC. Prodr.* viii. 641.

EAST INDIES, formerly cult. in the Edinburgh Bot. Gardens.

Probably a form of *C. bulbosa*, from Bombay.

*** Stem twining, stout. Leaves very small or 0.

9. *C. juncea*, *Roxb. Cor. Pl.* i. 12, t. 10; quite glabrous, fleshy, leaves if present elliptic-lanceolate acute, calyx small, corolla funnel-shaped above the middle, lobes erect nearly as long as the tube. *Wight Contrib.* 30; *Wall. Cat.* 8134; *Dalz. & Gibs. Bomb. Fl.* 153; *Grah. Cat. Bomb. Pl.* 117; *Dcne. in DC. Prodr.* viii. 641.

DECCAN PENINSULA, from Bombay and the Circars to Tanjore and Mysore.

Root tuberous. *Stem* simple, as thick as a goose-quill. *Leaves* very remote, often suppressed, rarely 1 in. long, subsessile. *Peduncle* stout, $\frac{1}{2}$ –1 in., 3–5-fld.; pedicels short, stout. *Sepals* $\frac{1}{4}$ in., subulate. *Corolla* greenish, speckled and veined with purple, base inflated, lobes linear from a triangular base, tips fimbriate within. *Coronal lobes* 10, short, ovate, obtuse, ciliate; processes filiform with hooked tips. *Follicles* 7 in. long.

**** Stem twining, leafy. Leaves membranous. Flower 1 in. long and upwards, rarely less.

† Corolla-lobes much shorter than the tube, very broad, forming a hemispherical or broadly conical crown over the much-dilated broadly funnel-shaped throat of the tube. Corolla curved, base much inflated in all.

10. *C. elegans*, *Wall. in Bot. Mag. t.* 3015, and *Cat.* 8135; quite glabrous, leaves ovate or ovate-lanceolate, corolla-lobes broadly ovate acute ciliate with very long hairs, coronal lobes 10 subulate or linear glabrous almost as long as the straight linear processes. *Wight Contrib.* 31, and *l.c. t.* 1265; *Dcne. in DC. Prodr.* viii. 642. ? *C. spheananantha*, *Wight & Arn. Contrib.* 31; *Wall. Cat.* 8138; *C. sphenanthera*, *Dcne. l.c.* 643.

MALABAR and TRAVANCORE, on the mountains from the Nilgherries southwards. CEYLON, alt. 3000 ft., *Walker, &c.*

Leaves 2–4 by 1–1 $\frac{1}{2}$ in., acute or acuminate; petiole $\frac{1}{4}$ –1 in., very slender. *Peduncles* $\frac{1}{2}$ –2 in.; flowers subumbellate; pedicels short; bracts subulate. *Sepals* filiform,

glabrous. *Corolla* $1\frac{1}{2}$ – $1\frac{3}{4}$ in., spotted with dark purple, base globose or oblong and gibbous, crown $\frac{1}{2}$ –1 in. diam. *Follicles* 7–9 in., very slender, terete, membranous. *Seeds* nearly $\frac{1}{2}$ in. long, linear, convex on one face, deeply grooved on the opposite one.—I can detect no character, except perhaps the shorter and more obtuse coronal lobes, whereby to distinguish *C. sphenanantha*.

The coronal lobes are described by Wight as hirsute, but they are perfectly glabrous in ten flowers I have examined, and they are so represented in a drawing made in the Calcutta Garden, and in another made from specimens grown at Kew. Wight's specimen is accompanied with a loose sketch of a hairy corona, placed in a cover with a loose flower, in which latter the corona is glabrous.

11. *C. mysorensis*, Wight *Ic. t.* 846; glabrous or petioles and leaf-nerves beneath minutely hairy, leaves ovate acuminate, corolla-lobes ovate naked, coronal lobes long subulate glabrous, processes filiform.

MYSOORE and TRAVANCORE; on the Pulney Mts., Wight.

This very closely resembles *C. elegans* in habit, and the form and size of the flowers, but the latter are of a very pale straw colour or greenish, and the lobes are entirely naked. *Leaves* $1\frac{1}{2}$ –2 in. long. *Sepals* $\frac{1}{2}$ in. subulate. *Corolla* 1– $1\frac{1}{2}$ in.

12. *C. Walkeriæ*, Wight *Ic. t.* 1266; quite glabrous, leaves ovate or ovate-lanceolate acuminate, corolla-lobes ovate naked, coronal lobes 10 linear, glabrous nearly as long as the linear processes.

CEYLON; Walker, Wight.

Very similar to and probably a variety of *C. mysorensis*, but the leaves are 3–4 in. long, the sepals are longer, $\frac{1}{2}$ – $\frac{1}{2}$ in., the corolla much larger, 2– $2\frac{1}{2}$ in. long, blotched with purple, the tube narrower above the globose base, and the coronal lobes different.

13. *C. Gardneri*, Hook. *Bot. Mag. t.* 5306; quite glabrous; leaves lanceolate or ovate-lanceolate acuminate, corolla-lobes ovate-cordate ciliate, coronal lobes 10 linear ciliate, processes rather longer linear. *Thwaites Enum.* 199.

CEYLON; Ramboddy, alt. 4–5000 ft., Gardner, &c.

Except by the ciliate coronal lobes I do not see how dried specimens of this can be distinguished from *C. elegans*. According both to the figure in the Botanical Magazine, and to a sketch made in Ceylon, the leaves are purplish beneath. Thwaites, who joins both *C. mysorensis* and *Walkeriæ* with *C. elegans*, regards *Gardneri* as distinct, but does not say on what grounds. According to drawings sent by him to Sir W. Hooker, the Cingalese plant called by him *C. elegans* has very broad leaves, a greenish corolla spotted pale-purple with a hemispheric crown of green cordate lobes tipped with dark purple and fimbriate at the tips only, whereas *C. Gardneri* has a deep purple black corolla with a depressed crown of much broader lobes ciliated at the base only. The follicles and seeds of Thwaites' specimen of *Gardneri* precisely accord with those of *C. elegans*.

14. *C. longifolia*, Wall. *Pl. As. Rar. i.* 56, t. 73, and *Cat.* 8136; sparsely puberulous, leaves shortly petioled elongate- or linear-lanceolate acuminate, corolla-lobes ovate ciliate, coronal lobes 10 lanceolate ciliate, processes linear twice as long. *Wight Contrib.* 31; *Dcne. in DC. Prodr. viii.* 642. *C. lanceolata*, Wight *l. c.*; *Wall. Cat.* 8139; *Dcne. l. c.* 643.

CENTRAL HIMALAYA, Nepal, Wallich; Kumaon, alt. 4–5000 ft., Edgeworth.

Stem with a line of pubescence. *Leaves* 5–8 by $\frac{1}{2}$ – $1\frac{1}{2}$ in., base acute or rounded; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in. *Peduncle* 1– $1\frac{1}{2}$ in., hairy; pedicels fascicled, $\frac{1}{2}$ – $\frac{1}{2}$ in.; bracts subulate. *Sepals* $\frac{1}{2}$ in., very slender. *Corolla* $1\frac{1}{2}$ in., green spotted dark purple, tube curved; lobes very broadly ovate. *Follicles* 6 in. long, very slender. *Seeds* $\frac{1}{2}$ in., linear-oblong, concavo-convex.—Approaches *C. lucida*, differing in the much broader shorter head of the corolla and longer sepals. Wight describes *C. lanceolata* as glabrous and as having the coronal lobes shorter than the column, thus placing it in a different

section from *C. longifolia*, but there is no difference whatever between the authentically named specimens of these species in either Wight's or Wallich's Herbaria. The foliage closely resembles that of *C. angustifolia*.

†† Corolla-lobes shorter than the tube (nearly as long in *C. pubescens*), oblong obovate linear or elliptic, forming a conical ellipsoid ovoid or beaked crown over the not greatly dilated throat.

a. *Leaves and peduncles perfectly glabrous.*

15. **C. tuberosa**, *Roxb. Cor. Pl.* i. 12, t. 9; quite glabrous, leaves fleshy from orbicular apiculate to lanceolate acuminate, corolla straight, lobes $\frac{1}{2}$ shorter than the tube suddenly contracted from a triangular base into linear cohering appendages that are at first connate throughout their length and villous within. *Wight Contrib.* 33, and *Ic.* t. 353; *Wall. Cat.* 8145, excl. A; *Dalz. & Gibs. Bomb. Fl.* 154; *Grah. Cat. Bomb. Pl.* 117; *Dcne. in DC. Prodr.* viii. 644. *C. acuminata*, *Dalz. & Gibs. l. c. not of Roxb.* *C. mucronata*, *Roth Nov. Sp.* 179. *C. Candelabrum*, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 27, not of *Linnaeus*.

DECCAN PENINSULA; from the Concan southwards, common.

Root tuberous. *Stem* slender. *Leaves* 1-4 in. (fleshy, *Dalzell*), base acute or rounded; petiole $\frac{1}{4}$ - $\frac{2}{3}$ in. *Peduncles* 1-3 together, $\frac{1}{2}$ -3 in.; pedicels fascicled or subpaniculate; bracts minute. *Sepals* subulate, $\frac{1}{2}$ in., recurved. *Corolla* 1-2 in., base somewhat inflated, mouth slightly dilated. *Coronal lobes* ciliate, very short. *Follicles* 4-5 in. long, slender. *Seeds* $\frac{1}{2}$ in. long, linear.

16. **C. Candelabrum**, *Linn. Sp. Pl.* 211; glabrous, leaves oblong acute or apiculate base cordate, peduncles pendulous, flowers whorled erect, corolla-base globose, lobes very short ovate acute united by the tips only. *Dcne. in DC. Prodr.* viii. 643.—*Rheede Hort. Mal.* ix. t. 16.

MALABAR, *Rheede*; at Mangalor, *Perrottet (Dcne.)*.

Stem slender. *Leaves* 2-3 by 1-1 $\frac{1}{2}$ in.; petiole 1 in. *Peduncles* 3 in.; pedicels $\frac{1}{2}$ in.; flowers 10-12 in a whorl. *Sepals* small. *Corolla* 1 $\frac{1}{2}$ in.—I have seen no specimen of this striking species.

17. **C. Elliottii**, *Hook. f.*; quite glabrous, leaves elliptic acute, peduncle pendulous, flowers erect, corolla straight green base somewhat inflated, lobes very short ovate acute united at the tips only, coronal lobes obsolete, processes glabrous linear.

DECCAN PENINSULA; Sinhachalam hills, near Vizagapatam, *Sir W. Elliot*.

Root tuberous. *Stem* rather stout. *Leaves* 4 by 1 $\frac{1}{2}$ -2 in., base subacute; petiole 1 in. *Peduncles* 2 $\frac{1}{2}$ -3 in.; pedicels upcurved, $\frac{1}{2}$ - $\frac{3}{4}$ in. *Corolla* 1 $\frac{1}{4}$ in., rather narrow above the swollen base, striped purple within, lobes pubescent at the tips within. *Follicles* 4 in. long, beaked.—Described from an excellent drawing given by *Sir W. Elliot* to General *Beddome*. It comes far nearer to *C. Candelabrum* than does any other species.

18. **C. acuminata**, *Roxb. Cor. Pl.* i. xii. t. 8, and *Fl. Ind.* li. 29; quite glabrous, leaves short-petioled succulent elongate-lanceolate finely acuminate, peduncles short, corolla small straight, lobes short linear connate by their tips only, coronal lobes 5 minute, processes long filiform. *Wight Contrib.* 32; *Dcne. in DC. Prodr.* viii. 643.

THE CIRCARS; at Samulcottah, *Roxburgh*.

Root tuberous. *Stem* slender. *Leaves* 3-4 by $\frac{1}{2}$ in., base acute, not 3-nerved; petiole $\frac{1}{2}$ in. *Peduncle* $\frac{1}{2}$ in., 4-6-fld.; pedicels $\frac{1}{4}$ in. *Sepals* small. *Corolla* $\frac{3}{4}$ in., white with purple streaks and lobes, base swollen, mouth dilated; lobes $\frac{1}{2}$ in., cohering by the tips only.—Described from *Roxburgh*. *Wight* suggests its being only a variety

of *C. bulbosa*, but the short corolla-lobes are very different. Roxburgh's locality, Samulcottah, has never been explored by a subsequent botanist.

19. *C. intermedia*, *Wight Ic.* t. 1263; quite glabrous, leaves long-petioled ovate or elliptic-lanceolate finely acuminate base 3-nerved, corolla straight, lobes subspathulate villous within connate by their tips only, coronal lobes 5 very short or 0 ciliate or glabrous processes long dilated upwards. *C. tuberosa*, *Wall. Cat.* 8145 A. *C. Candelabrum*, *Thwaites Enum.* 199.

TRAVANCORE; Courtallam and Dindygul, *Wight*; Anamallay hills, alt. 2500 ft., *Beddome*. CEYLON, in the hotter part of the island, *Walker*, *Thwaites*.

Root fibrous (*Beddome*). Stem slender. Leaves 2-3 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., pale yellow-brown when dry; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. Peduncles 1-2 in., 3-6-fld., pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in. Sepals subulate. Corolla 1-1 $\frac{1}{4}$ in., pale purplish, base inflated, lobes much shorter than in *C. tuberosa*.—Wight figures the coronal lobes as obsolete and the processes as hairy at the base; I find 5 minute glabrous lobes. He further figures the lobes of the corolla as linear, but describes them as subspathulate. An excellent drawing from Thwaites of what appears to be this species (his *C. Candelabrum*, C.P. 774) has purple branches. Wallich's 8145 A, from Heyne, appears to be the same.

? VAR. *Wightii*; leaves lanceolate acuminate, corolla-lobes broader glabrous, coronal lobes ciliate.—Courtallam, *Wight*.—Wight calls this *C. acuminata*, but it differs from Roxburgh's drawing in the leaves with slender petioles and strongly 3-nerved at the base.

20. *C. Thwaitesii*, *Hook. Bot. Mag.* t. 4758; quite glabrous, leaves elliptic ovate or ovate-lanceolate acuminate, peduncles 2-3-fld., corolla 2-2 $\frac{1}{2}$ in. base ovoid, throat funnel-shaped, lobes oblong, tip not contracted obtuse erect half the length of the tube, coronal lobes subulate ciliate half as long as the linear straight processes.

TRAVANCORE; at Courtallam, *Wight*; Peermade Ghat, *Beddome*. CEYLON; central province, *Gardner*, &c.

Stem rather stout. Leaves 3-4 by 1 $\frac{1}{2}$ -2 in., petiole $\frac{3}{4}$ -1 $\frac{1}{2}$ in. Peduncles stout, 1-2 in., pedicels $\frac{1}{2}$ -1 in. Corolla curved, green with purple blotches above the middle of the tube, and a purple band across the lobes above the middle. Follicles (in Peninsular specimens) 10 in. long, very slender. Seeds $\frac{1}{2}$ in. long.—The leaves are figured and described in *Bot. Mag.* as ciliolate, but I do not detect this in the only Ceylon example I have seen (a most incomplete one).

β. Leaves and peduncles pubescent or hispid.

21. *C. hirsuta*, *Wight & Arn. Contrib.* 33; hirsute or pubescent, leaves from linear or lanceolate to ovate-cordate acuminate, peduncles hispid, sepals long slender, corolla 1 $\frac{1}{2}$ -2 in. long, base ventricose, lobes suberect oblong obtuse ciliate $\frac{1}{3}$ of the length of the tube, coronal processes hooked.

DECCAN PENINSULA; from the Concan to Travancore.

A coarse climber, more or less clothed with subhispid spreading hairs. Leaves 2-4 in.; petiole $\frac{1}{2}$ -1 in. Peduncles $\frac{1}{2}$ -2 in., very hispid; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in. Sepals $\frac{1}{2}$ in., very slender. Corolla greenish, blotched with purple. Corona very variable, but the processes always broad and curved or hooked at the tip. Follicles 4 in. long, slender. Seeds $\frac{1}{2}$ in., narrowly oblong.—After a very tedious examination of the corona in specimens collected at various places between Bombay and Travancore I conclude that the following are referable to one variable plant, an opinion in which I am confirmed by Colonel Beddome; vars. 1-4 are all mixed in Stock's and Dalzell's Herbaria, and none being authentically named I cannot positively say which answers to the species described in the Bombay Flora.

VAR. 1. *hirsuta proper*; all over hirsute except the corolla, coronal lobes 5 short triangular 2-fld ciliate much shorter than the processes. *C. hirsuta*, *Wight l.c.*; *Dona. in DC. Prodr.* viii. 641.

VAR. 2. *vincifolia*; branches glabrous, leaves less and more softly pubescent ovate-cordate, peduncles hispid, coronal lobes 5 short rounded emarginate ciliate. *C. vincifolia*, *Hook. Bot. Mag.* t. 3740; *Dalz. & Gibs. Bomb. Fl.* 153; *Dene. in DC. Prodr.* viii. 642.—I have seen no authentic specimen of this.

VAR. 3. *ophiocephala*, hirsute all over except the corolla, leaves hispid on both surfaces, lobes of corolla oblong obtuse narrowed and purple at the base yellow in the middle, tips green, coronal lobes 10 obtuse 2-fid connate nearly to the tips yellow bordered with purple. *C. ophiocephala*, *Dalz. in Hook. Kew Journ.* ii. 259; *Dalzell & Gibs. Bomb. Fl.* i. 54.

VAR. 4. *Jacquemontiana*; hirsute all over except the corolla, leaves softly tomentose, "lobes of the corolla broader upwards entirely green," *Dalzell*, coronal lobes united to the middle ciliate. ? *C. Jacquemontiana*, *Dene. in DC. Prodr.* viii. 641; ? *Dalz. & Gibs. Bomb. Fl.* 153.—*Carli, Jacquemont*. I am doubtful if *Dalzell's* plant is *Jacquemont's*. *Decaisne* describes the latter as having the lobes of the corolla nearly as long as the tube, which is not the case with any of the forms I have referred to *hirsuta*.

VAR. 5. *stenophylla*; leaves narrowly linear, margins flat or recurved.—*Pulney Mts.*, *Herb. Wight*; *Anamallays*, alt. 3500-5000 ft., *Beddome*. One of *Wight's* specimens has no coronal lobes, the other and *Beddome's* have 5 rather large 2-toothed ciliate ones. *Beddome* describes the roots as fibrous.

22. *C. oculata*, *Hook. Bot. Mag.* t. 4093; branches glabrous, leaves ovate or ovate-cordate acuminate ciliolate, peduncles hispid, corolla 2-2½ in. long base large much inflated, lobes erect lanceolate half the length of the tube, tips contracted pubescent, coronal lobes short ciliate 2-toothed, processes slender straight erect. *Dalz. & Gibs. Bomb. Fl.* 151.

The *CONCAN*; *Bombay*, *Miss Jones*, *Dalzell*.

Leaves 4-6 by 1½-2½ in., membranous; *petiole* ½-1 in. *Peduncle* 1½-2 in., 4-8-fld. *Sepals* ¼-½ in., slender, nearly glabrous. *Corolla* very pale, spotted with purple below the lobes; lobes green above the middle, pale, each with a large purple blotch below it.—Described chiefly from the *Bot. Mag.*, where the leaves are said to have glands above at the insertion of the petiole, which is not the case with the plants in *Dalzell's* Herbarium which I refer to this species. It no doubt varies greatly from the above characters. But for the erect straight inner coronal processes I should be disposed to refer this to *C. hirsuta* (see also 30, *C. Stocksii*).

23. *C. ciliata*, *Wight Ic.* t. 1262; branches hairy above, leaves linear-to ovate-lanceolate acute or acuminate pubescent above and beneath, peduncles very long hispid very many-fld., corolla ¾ in. gently curved, base slightly swollen, lobes very narrow linear erect one-third the length of the tube, coronal lobes 5 very short 2-toothed ciliate, processes slender hooked.

NIGHERRY and *PULNEY Mts.*, *Wight*, *Beddome*.

Hispidly pubescent nearly all over. *Root* tuberous. *Leaves* 2-3 by ¼-2 in., base acute rounded or cordate, *petiole* ¼-½ in. *Peduncles* 1-5 in., very stout, sometimes shortly branched and 20-fld.; *pedicels* ¼-½ in. *Sepals* slender, hispid, ¼-½ in. *Corolla* greenish, lobes lead-coloured, tips forming an oblong head. *Follicles* 3 in. long.

24. *C. angustifolia*, *Wight Contrib.* 31; branches and peduncles pubescent on one side, leaves narrowly elongate-lanceolate pubescent above ciliolate, peduncles few-fld., corolla 1¼-2 in. nearly straight base slightly inflated, lobes short suberect broadly obovate glabrous one third the length of the tube, coronal lobes 10 lanceolate ciliate, processes straight linear rather longer. *C. longifolia*, *Herb. Ind. Or. H. f. & T.*

KHASIA Mts. alt. 4-6500 ft., *Wallich*, &c.

An extensive slender climber. *Leaves* 2-9 by ½-¾ in., rather coriaceous, minutely pubescent above, finely acuminate, margin often recurved; *petiole* ¼-½ in. *Peduncles*

1-1½ in. 3-6-fld.; pedicels ¼-½ in. *Sepals* glabrous, subulate, ¼ in. *Corolla* pale purple, lobes quite glabrous forming an ovoid crown.—Except in the small sepals, much narrower corolla mouth and form of the lobes and crown, this is almost identical with the Nepalese *C. longifolia*.

25. **C. pubescens**, Wall. *Pl. As. Rar.* ii. 81, 187, and *Cat.* 8144 B.; sparsely pubescent or glabrate, leaves long-petioled ovate acuminate, peduncles glabrous 3-∞-fld., sepals small, corolla 2-2½ in. straight base hardly swollen lobes linear erect from an ovate base cohering from the middle glabrous nearly as long as the tube, coronal lobes minute or obsolete ciliate, processes linear erect. *Dene. in DC. Prodr.* viii. 644.

TEMPERATE HIMALAYA; Nepal, Wallich; Sikkim, alt. 3-8000 ft., J. D. H., Treutler. KHASIA MTS., alt. 4-5000 ft., J. D. H.

Branches slender, nearly glabrous. *Leaves* 3-7 by 1½-3 in., very membranous, base sometimes cordate, sparsely pubescent on both surfaces or glabrous, ciliate; petiole 1-2 in. *Peduncle* ½-2½ in. *Sepals* ½-¾ in., recurved. *Corolla-tube* pale dirty purple, sub-cylindric, mouth hardly dilated; lobes yellow with purplish tips forming a long-beaked crown.—This approaches closely *C. tuberosa*, but is always more or less pubescent and it has much longer corolla-lobes. Amongst Cathcart's drawings (in Herb. Kew.) is one apparently of this species having a green corolla with yellow bases to the lobes. Wallich's 8144 A. (*Herb. Heyne*) is probably *C. tuberosa*, but the specimens are undeterminable.

26. **C. Hookeri**, Clarke *ms.*; minutely pubescent, leaves short-petioled ovate acuminate, peduncles 1-2-fld., sepals minute, corolla 1 in. long straight base swollen, lobes short linear-lanceolate one third the length of the tube, coronal lobes minute or obsolete ciliate, processes slender erect. *Ceropegia*, n. 23, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Lachen, alt. 8-10,000 ft., J. D. H.

Stem very slender and as well as the petioles leaves on both surfaces and peduncles sparsely minutely hairy. *Leaves* 1-2 by ¾-1 in., very membranous; petiole ¼-½ in. *Peduncles* shorter or rather longer than the petioles. *Corolla* short, dark purple, narrow from above the base to the mouth, which is rather contracted, lobes gently curved forming a short ellipsoid crown.

††† Corolla-lobes as long or nearly as long as the tube (or shorter in *C. odorata*).—See also 25, *C. pubescens*.

a. *Corolla-tube* broadly funnel-shaped upwards from above or below the middle.

27. **C. lucida**, Wall. *Pl. As. Rar.* ii. 33, t. 139 and *Cat.* 8133; quite glabrous, leaves ovate or lanceolate, peduncles many-fld., sepals small, corolla 1½-2 in. curved, lobes linear from a lanceolate base tips dilated ciliate, coronal lobes 10 short triangular ciliate, processes linear-spathulate. *Dene. in DC. Prodr.* viii. 641.

SILHET, at Terrya Ghat, Wallich, J. D. H. & T. T. CACHAR, Keenan. BURMA at Prome, Wallich.

An extensive climber; root irregularly tuberous. *Leaves* 4-7 by 1½-3 in., membranous; petiole ½-1½ in. *Peduncles* short, ¼-1 in.; pedicels as long. *Sepals* ¼-½ in. *Corolla* scarcely dilated at the base, green spotted with purple, lobes inflexed from above the base, tips brown connate by all the dilated part.

28. **C. Decaisneana**, Wight *lc.* t. 1259; quite glabrous, leaves short-petioled elongate- or linear-lanceolate acuminate, peduncles 1-3-fld., sepals long filiform, corolla 2½-3 in. curved base very largely inflated, lobes linear from a

lanceolate base, coronal lobes 5 linear forked at the tip villous half as long as the slender linear straight processes.

NILGHERRY Mts.; at Sispara Ghat, *Wight, &c.*

Root tuberous. Stem rather stout. Leaves 4-7 by $\frac{1}{2}$ -1 $\frac{1}{2}$ in., membranous, base acute, margins obscurely ciliate; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. Peduncle slender, 1-5 in.; pedicels 1-3 in. Sepals $\frac{1}{2}$ - $\frac{3}{4}$ in., sometimes puberulous. Corolla large, pale, spotted with pale purple, inflated base sometimes $\frac{3}{4}$ in. diam., lobes sometimes longer than the tube, tips slightly dilated. Coronal lobes rigid, yellow with purple tips.

29. **C. brevicollis**, *Hook. f.*; leaves ovate or lanceolate acuminate puberulous on both surfaces, peduncle sparsely hairy 3-6-fld., sepals filiform, corolla 2 in. long curved, base very broadly inflated, tube with a very short neck and broad funnel-shaped limb, lobes erect linear from an ovate-lanceolate base, tips incurved, coronal lobes obsolete, processes linear erect.

TRAVANCORE; Anamallay hills, alt. 2500 ft., *Beddome*.

Stem slender, glabrous. Leaves very variable, 2 $\frac{1}{2}$ -6 by 1 $\frac{1}{2}$ -2 in., membranous, sometimes linear-oblong; petiole $\frac{3}{4}$ -1 $\frac{1}{2}$ in. Peduncles slender, 1-2 in., glabrous or sparsely hairy; pedicels slender, $\frac{3}{4}$ -1 $\frac{1}{2}$ in. Sepals $\frac{1}{2}$. Corolla-base obliquely inflated, dilating again shortly above the inflation into a broad funnel; lobes longer than the tube, linear for half their length.

30. **C. Stocksii**, *Hook. f.*; leaves ovate or ovate-cordate acuminate puberulous on both surfaces, peduncles 3- ∞ -fld. hispid, sepals filiform; corolla 2 $\frac{1}{2}$ -3 in. straight base slightly inflated, lobes erect linear from a small base, tips incurved, coronal lobes 5 short broad ciliate, processes linear straight.

The CONCAN, *Stocks*.

An extensive climber. Leaves 2-5 by $\frac{1}{2}$ -2 in., membranous; petiole $\frac{1}{2}$ -1 in. Peduncle stout, 1-1 $\frac{1}{2}$ in.; pedicels very short, hispid. Sepals $\frac{1}{4}$ - $\frac{1}{2}$ in. Corolla large. —This closely resembles *C. oculata*, differing in the long linear corolla-lobes. It may be a form of that plant; if so, the corolla affords a most treacherous character.

β . Corolla-tube narrow, subcylindric above.

31. **C. macrantha**, *Wight Contrib. 31*; nearly glabrous, leaves short-petioled elliptic-lanceolate acuminate, peduncles short pubescent many-fld., sepals filiform, corolla curved tube narrow base swollen, lobes slender erect linear glabrous cohering from above the middle, coronal lobes ovate-lanceolate villous, processes straight linear. *Dcne. in DC. Prodr. viii. 642.*

TROPICAL HIMALAYA; Kumaon, alt. 4500 ft., *Royle, &c.*; Sikkim, alt. 2-5000 ft., *J. D. H., Treutler*.

An extensive rather stout climber; branches glabrous. Leaves 4-7 by 1 $\frac{1}{2}$ -3 $\frac{1}{2}$ in., very membranous, glabrous or sparsely puberulous on both surfaces, base acute; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. Peduncles longer and stouter than the petioles; pedicels $\frac{1}{4}$ - $\frac{3}{4}$ in.; bracts many, subulate. Sepals $\frac{1}{2}$ in. Corolla pale, base sometimes globose, lobes with a broad ovate base, above it forming a long straight beak. Follicles 4-5 in. long.

32. **C. Arnottiana**, *Wight Contrib. 32*; nearly glabrous, leaves short-petioled narrowly lanceolate or oblong-lanceolate acuminate, peduncles short few-fld., sepals small, corolla 2 in. narrow straight base hardly inflated, lobes very slender erect longer than the tube, coronal lobes 5 short obtuse notched subciliate, processes linear straight. *Dcne. in DC. Prodr. viii. 644.*

KHASIA Mts., *Lobb*. BURMA at Prome, *Wallich*. TENASSERIM; Moulmein, *Lobb*.

Stem very slender, glabrous. Leaves 3-5 by $\frac{1}{4}$ -1 in., rather firm, glabrous or minutely puberulous above, ciliate; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. Peduncle $\frac{1}{4}$ -1 in. slender;

pedicels very short; bracts setaceous. *Sepals* $\frac{1}{4}$ in. *Corolla* sub-cylindric; lobes lanceolate at the base, tips slightly dilated. *Follicles* 4 in. long, slender. *Seeds* $\frac{1}{16}$ in. long, linear-oblong.

33. **C. odorata**, *Nimmo in Grah. Cat. Bomb. Pl.* 118; nearly glabrous, leaves short-petioled lanceolate acuminate, peduncles short hispid many and dense-fl., corolla 1 in. slender straight base not swollen, lobes very narrow erect, coronal lobes minute glabrous.

The CONCAN; Salsette, *Nimmo, Law.*

Stem slender, glabrous. *Leaves* 3-4 by $\frac{1}{2}$ - $\frac{3}{4}$ in., rather firm, glabrous or minutely puberulous above; petiole $\frac{1}{8}$ - $\frac{1}{2}$ in. *Peduncles* $\frac{1}{4}$ - $\frac{3}{4}$ in., pedicels very short; bracts squarrose. *Sepals* $\frac{1}{4}$ in., recurved. *Corolla* one of the narrowest of the genus, yellow, sweet-scented, lobes variable in length, at first united by the tips, soon free.

34. **C. ensifolia**, *Beddome Ic. Pl. Ind. Or.* 173; stem glabrous, leaves subsessile or short-petioled elongate linear acute or apiculate nerveless finely reticulate, peduncles hispid often very long, sepals small, corolla 1 in. slender straight base inflated, lobes linear erect, coronal lobes 5 short obtuse ciliate, processes long linear erect.

TRAVANCORE; Anamallay hills, alt. 3-3500 ft., *Beddome.*

Root tuberous. *Stem* very slender. *Leaves* 4-7 by $\frac{1}{2}$ - $\frac{1}{2}$ in., firm, glabrous or minutely puberulous above, finely reticulate beneath; petiole 0- $\frac{1}{2}$ in. *Peduncles* 1-5 in., often bearing a succession of fascicles of flowers; pedicels very short. *Sepals* $\frac{1}{2}$ in. *Corolla* greenish-white, lobes as long or longer than the tube. *Follicles* 6-7 in.

35. **C. albiflora**, *Hook. f.*; pubescent, leaves short-petioled ovate- or linear-lanceolate nerves distinct oblique, peduncles hispid often very long, sepals subulate, corolla 1-2 in. slender straight base not inflated, lobes linear erect, coronal lobes 5 very short ciliate processes long linear erect.

TRAVANCORE; near Peermede, alt. 3500-4500 ft., *Beddome.*

Very similar to *C. ensifolia*, in habit, inflorescence, bracts, &c., but, as I am assured by Colonel Beddome, quite distinct, more hispidly pubescent, with much broader distinctly nerved leaves and white flowers. The peduncle is sometimes 8 in. long, and bears 4 or 5 remote sessile fascicles of flowers.

36. **C. Beddomei**, *Hook. f.*; sparsely pubescent, leaves subsessile elongate linear-lanceolate acuminate, nerves very slender, peduncle stout hispid few-fl., sepals filiform, corolla 3 in. long slightly curved, tube slender swollen below funnel-shaped above, lobes slender elongate erect villous within, coronal lobes very short notched ciliate processes broad hooked.

TRAVANCORE; Peermede, alt. 2500 ft., *Beddome.* COCHIN, *Johnston.*

Stem hispid above. *Leaves* 5-6 by $\frac{1}{2}$ - $\frac{1}{2}$ in., rather firm, finely acuminate, narrowed to the base, sparsely puberulous on both surfaces, midrib strong, nerves few and extremely fine. *Peduncle* 1-3 in. stout, pedicels short. *Sepals* $\frac{1}{4}$ - $\frac{1}{2}$ in. *Corolla* dark purple, $\frac{1}{2}$ in. diam. at the mouth, lobes gradually narrowed from the base to the tips. —I have seen but one good specimen of this, Colonel Beddome's; that from Cochin is imperfect, and appears to have straight coronal processes.

DOUBTFUL AND UNDESCRIBED SPECIES.

C. MICANS, *Nimmo*, and **C. ARCTA**, *Nimmo*, from the Concan, and mentioned by name only in *Graham Cat. Bomb. Pl.* 118, are unknown to me.

C. BIFLORA, *Linn. Fl. Zeyl.* 46, and *Sp. Pl.* 211; from Ceylon. The only character given for this, "peduncles 2-flowered," may apply to any Ceylon species. Wight refers it doubtfully to *C. tuberosa*, which is not a Ceylon plant.

51. **FREREA**, Dalz.

A low fleshy quite glabrous erect shrub, branches terete. *Leaves* opposite, oblong. *Flowers* large, solitary or in pairs, axillary. *Sepals* triangular-ovate, acute. *Corolla* rotate, lobes broad, acute, valvate. *Corona* a low broad, 5-angled ring round the column, with 5 broad short truncate or retuse spreading lobes alternating with 5 long narrow processes opposite the anthers and inflexed over them. *Column* very short; anthers retuse, inappendiculate; pollen-masses one in each cell, short, erect, one margin pellucid. *Stigma* flat, included. *Follicles* terete, smooth. *Seeds* comose.

F. indica, Dalz. in Journ. Linn. Soc. viii. 10, t. 3.

The CONCAN; hill foot near Hewra, alt. 3000 ft., Dalzell.

Branches very short, $\frac{1}{2}$ in. diam., nodose. *Leaves* sessile, 1 in., sometimes spatulately obovoid, obtuse or retuse. *Flowers* very shortly dicelled. *Corolla* purple. *Corona* as in *Boucrosia*, from which the genus differs in habit.—Described from Dalzell's figure and characters.

52. **CARALLUMA**, Br.

Fleshy, erect, nearly leafless herbs, with very thick subterete or angular stems and branches. *Leaves* minute and caducous, or 0. *Flowers* solitary, or in pairs at the upper nodes. *Sepals* acute. *Corolla* broadly campanulate; lobes 5, narrow, valvate. *Corona* annular, adnate to the column, 5-lobed, lobes 2-cuspidate, with a ligulate process at the sinus on the inner face which overlaps the anther. *Column* very short; anthers short, retuse, incumbent on or confluent with the stigma, tips inappendiculate; pollen-masses one in each cell, short, erect, one margin pellucid. *Stigma* flat. *Follicles* slender, smooth, terete. *Seeds* comose.—DISTRIB. Species 4; Western India and Arabia.

The corona is that of *Boucrosia*, but the habit and inflorescence are very different, the stem and branches gradually narrowing upwards and becoming very slender. I have had to describe the species for the most part according to drawings in Herb. Kew.

* *Corolla glabrous within.*

1. **C. edulis**, Benth. Gen. Pl. 782; stem and branches subterete 4-grooved, corolla glabrous, tube inflated, lobes ovate-lanceolate. *Boucrosia edulis*, Edgew. in Journ. Linn. Soc. vi. 205, t. 1. *B. ascendens*, Wall. Cat. 8146, in part. *B. Stocksiana*, Boiss. Fl. Orient. iv. 64.

The PUNJAB; at Rawul Pindee, Aitchison; Mooltan, Edgeworth. SCINDE, Stocks. Erect, 6–18 in. high, simple or sparingly branched. *Leaves* $\frac{1}{2}$ in. long, ovoid-lanceolate, acute, fleshy, caducous. *Flowers* $\frac{1}{2}$ in. diam., purple within.

2. **C. adscendens**, Br. in Mem. Wern. Soc. i. 25; stem 4-angled slender terete above, branches glabrous, tube short funnel-shaped, lobes lanceolate acute. *Wight Contrib.* 33; Wall. Cat. 8146, in part; *Dene*. in DC. Prodr. viii. 647. *Stapelia adscendens*, Roxb. Cor. Pl. i. 28, t. 30.

DECCAN PENINSULA; in arid places, Wight.

Stem ascending, 1–2 ft. high; branches slender above. *Flowers* $\frac{1}{2}$ in. diam., dark purple within.

** *Corolla fringed or hairy within.*

3. **C. attendata**, Wight Ic. t. 1268, and Ill. t. 155 b, fig. B.; stem

4-angled, branches slender and terete above, corolla-tube short funnel-shaped, lobes fringed with long hairs.

SOUTH DECCAN Mts.; Nilgherries, Pulneys, &c., *Wight*, &c. COCHIN, *Johnstone*. CEYLON; between Kandy and Badulla.

Habit of *C. ascendens*, but differing according to *Wight's* plate in the larger flowers with deeply fringed petals. The Ceylon plant, according to a drawing from *Thwaites*, is smaller with much smaller flowers borne on the 4-angled stems, not on slender terete branches as in the Peninsular one; it is possibly *C. fimbriata*.

1. *C. fimbriata*, *Wall. Pl. As. Rar.* i. 7, t. 8; stems much diffusely branched 4-angled to the ends of the branches, corolla rotate, segments copiously fimbriate. *Wight Contrib.* 34; *Dalz. & Gibs. Bomb. Fl.* 155.

DECCAN PENINSULA; from the Concan southwards, in arid rocky places.—DISTRIB. Ava.

Wight refers the Peninsular to the Ava plant, remarking that the flowers of the former are much larger (they are 1 in. diam. in *Wallich's* drawing), but finds no other difference. In both the arms of the coronal lobes are long subulate and hooked. —Amongst *Wight's* drawings is one of a plant with the habit of *fimbriata*, that is, bearing the flowers on the curved 4-angled ends of the branches, but with short ovate ciliate corolla-lobes, green, banded with purple, ending in fimbriate linear tips. If this is *Wight's fimbriata*, it differs much from *Wallich's*.

53. *BOUCEROSIA*, *Wight & Arn.*

Fleshy leafless herbs, with thick 4-angled stems, angles toothed. *Flowers* terminal, rather large, solitary or umbelled, more or less purple. *Sepals* narrow. *Corolla* campanulate or rotate; lobes 5, short, broad, valvate. *Corona* annular, adnate to the column, 5-lobed; lobes 2-fid, subulate, erect or spreading with a linear fleshy process on the inner face at the sinus inflexed over the anther. *Column* minute, short; anther-tips inappendiculate; pollen-masses one in each cell, sessile, erect, suborbicular, compressed. *Stigma* low, conical, 5-angled, tip truncate depressed. *Follicles* slender, straight, terete, smooth. *Seeds* flat, winged, comose.—DISTRIB. Species 12; Spain, North Africa, Arabia, Western India.

For the definition of the species of this genus (as of *Caralluma*) I have had to depend mainly upon published and unpublished drawings and definitions.

1. *B. umbellata*, *Wight & Arn. Contrib.* 34; stem very stout, flowers in dense umbels, corolla glabrous. *Wight Ic.* t. 495; *Wall. Cat.* 8147; *Dene. in DC. Prodr.* viii. 648. *Stapelia umbellata*, *Roxb. Cor. Pl.* iii. t. 241. *S. Callamula*, *Ham.*

DECCAN PENINSULA; common in arid localities. CEYLON; rocks near Kornegalle, *Thwaites*.

Stem erect or ascending, simple or sparingly branched, 1-2 ft. high, 1-2 in. across the obtuse thick crenate angles. *Umbels* 2-4 in. diam., globose, dense-fld. *Corolla* 1-1½ in. diam., streaked closely concentrically with purple. *Follicles* 4-7 in. long by ½ in. diam. *Seeds* ½ in. long, oblong.

? VAR. *campanulata*; angles of stem thin, corolla smaller without the purple streaks more tubular. *B. campanulata*, *Wight Ic.* t. 1287.—*Wight* distinguishes this as above, but *Thwaites* unites it with *umbellata*, and in the Herbarium they are indistinguishable, except by the smaller flower and narrower lobes of the corona; its native locality is unknown.

2. *B. crenulata*, *Wight & Arn. Contrib.* 34; stems very stout, flowers in dense umbels, corolla with long scattered hairs over the whole inner surface.

Dcne. in DC. Prodr. viii. 648. *B. lasiantha*, *Wight Ic.* t. 1286. *Caralluma crenulata*, *Wall. Pl. As. Rar.* i. 6, t. 7.

DECCAN PENINSULA; Nuggur hills, near Madras, *Wight*.—DISTRIB. Ava.

Apparently similar in habit to *B. umbellata*, differing chiefly in the hairy inner surface of the corolla.

3. ***B. diffusa***, *Wight Ic.* t. 1599; diffuse, branches very stout, flowers in dense umbels, corolla-lobes fimbriate on the margin only.

TRAVANCORE; arid rocks, alt. 2000 ft., *Wight*.

"The very diffuse habit, a single plant covering many square feet of surface, the minute cauline teeth, small sepals, and distinctly tubular corolla of this plant, combine to mark the species as very distinct from any of its Indian congeners," *Wight l.c.*

4. ***B. Hitchinia***, *Dcne. in DC. Prodr.* viii. 649; stem slender diffusely branched, flowers few in an umbel, corolla hairy within. *Hitchinia indica*, *Wight & Arn. Contrib.* 35; *Wight Ic.* t. 355; *Wall. Cat.* 8148.

The CARNATIC and CIRCARS, *Wight, &c.*

Branches $\frac{1}{2}$ in. diam. Flowers shortly pedicelled. Corolla $\frac{3}{4}$ in. diam. Coronal lobes shorter than in *B. umbellata*, inner process larger in proportion and decurrent.

5. ***B. pauciflora***, *Wight mss.*; *Dcne. in DC. Prodr.* viii. 648; stems slender diffusely branched, teeth or angles recurved, flowers solitary, corolla hairy within.

SOUTH CARNATIC; at Palamcottah, *Wight*.

I have an unpublished lithograph of this plant made for Dr. Wight, and there are specimens in his Herbarium, but not sufficient for full analysis; the stems are as slender as in *B. Hitchinia*, the corolla campanulate, $1\frac{1}{2}$ in. diam. with broad short acute lobes banded closely with purple, and the inflexed process from the corona is short and very broad.

6. ***B. Aucheriana***, *Dcne. in DC. Prodr.* viii. 649; stem short branched, flowers capitate, corolla-lobes lanceolate glabrous pustular above. *Boiss. Fl. Orient.* iv. 63.

Dry hills in the WESTERN PUNJAB; the Saltrange, &c.—DISTRIB. Afghanistan, Beloochistan, Persia, Arabia.

Plant 2-6 in. high; branches $\frac{1}{2}$ - $\frac{1}{2}$ in. diam. Sepals ovate-lanceolate. Corolla $\frac{1}{2}$ in. diam., dark purple, more deeply divided into narrower lobes than in any of the southern species. Follicles 3-4 in., tips capitate.

ORDER XCVI. LOGANIACEÆ. (By C. B. Clarke.)

Trees, shrubs or herbs. *Leaves* opposite (rarely ternate), undivided; stipules various or 0. *Inflorescence* cymose, terminal or axillary, simple or compound; cymes sometimes subcapitate, sometimes reduced to solitary flowers. *Flowers* regular. *Calyx* inferior, small, 4-5-toothed or -lobed. *Corolla* 4-5-lobed or -partite. *Stamens* 4-5, inserted on the corolla-tube, alternate with the lobes; anthers 2-celled. *Ovary* free, 2-celled; style simple, stigma capitate bifid or 2-partite; ovules one or more in each cell, placentæ on the dissepiment or basal in the inner angle. *Fruit* capsular septicidal, or baccate indehiscent, 1-∞-seeded. *Seeds* various, albumen copious; embryo straight, long or short.—Species 350, tropical and subtropical.

TRIBE I. **Euloganieæ.** *Ovary* with many ovules in each cell.

* *Herbs; corolla valvate; capsule compressed, didymous.*

Cymes 2-3-chotomous. *Corolla* 5-lobed 1. MITREOLA.
Pedicels solitary or clustered. *Corolla* 4-lobed 2. MITHASACME.

** *Shrubs or trees.*

Corolla imbricate. *Capsule* 2-valved. 3. BUDDLEIA.
Corolla valvate. *Capsule* 2-valved 5. NORRISIA.
Corolla contorted. *Fruit* indehiscent. 4. FAGRÆA.
Corolla valvate. *Fruit* indehiscent 6. STRYCHNOS.

TRIBE II. **Gaertneriæ.** *Ovary* with 1 ovule in each cell.

Corolla tubular. *Anthers* nearly included in the tube 7. GAERTNERIA.
Corolla subrotate. *Anthers* large, exserted 8. GARDNERIA.

1. MITREOLA, Linn.

Herbs. *Leaves* opposite, membranous; stipules membranous or small. *Cymes* 2-3-chotomous, terminal or peduncled, axillary. *Flowers* small, white, often unilateral on the ultimate cyme-branches. *Sepals* lanceolate. *Corolla* urn-shaped; lobes 5, small, valvate. *Stamens* 5, included. *Ovary* 2-celled; styles 2, short, connate under one small hairy stigma, ultimately divergent; ovules many in each cell, placentas peltate. *Capsule* obovoid, laterally compressed, truncate or 2-horned; carpels dehiscing by separating from each side of the septum from above. *Seeds* very many, minute, globose or elongate, albumen fleshy; embryo linear.—Species 4; 2 American and the following.

1. **M. oldenlandioides**, Wall. Cat. 4350; leaves oblong nearly glabrous, cymes terminal and axillary 2-chotomous, capsule 2-horned, seeds elongate trigonous, A. DC. Prodr. ix. 9; Dalz. & Gibs. Bomb. Fl. 155; Hook. Ic. Pl. t. 827; Benth. in Journ. Linn. Soc. i. 91. M. paniculata, Wall. Cat. 4349; Wight Ic. t. 600 (*flowers of principal figure inaccurate*); A. DC. l. c. (*as to the Asiatic plant*). M. inconspicua, Zoll. et Mor. Verz. (1845-6) 55.

CENTRAL PROVINCES, alt. 0-3000 ft.; extending to Bombay and to Chota Nagpore, frequent. PEGU; J. Anderson. DISTRIB. Burma, Malaya, N. Australia.

Annual, 6-18 in., erect. *Leaves* 2 by $\frac{3}{8}$ in., narrowed at both ends; petiole $\frac{1}{4}$ in. *Cymes* 2-6 in., often numerous; bracts $\frac{1}{16}$ in., lanceolate. *Flowers* subsessile, scarcely $\frac{1}{16}$ in. *Capsules* $\frac{3}{8}$ in., unilateral on the branches. *Seeds* twice as long as broad. The American *M. petiolata* united with this by A. DC. is exceedingly like it, but has globose seeds.

2. **M. pedicellata**, Benth. in Journ. Linn. Soc. i. 91; leaves oblong hairy beneath, cymes on long axillary peduncles 3-chotomous, capsule truncate, seeds globose tuberculate. Parophiorrhiza khasiana, Clarke; Hook. f. Fl. Brit. Ind. iii. 85.

KHASIA MTS., alt. 4200 ft.; Cherra, Limestone Hill, Griffith, J. D. H., Clarke.

Perennial, 2-8 in., decumbent, branching. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{4}$ in., narrowed at both ends; petiole $\frac{1}{3}$ in. *Cymes* 6-12-flowered, lax, irregular, peduncle 1-3 in. *Flowers* nearly as of *M. oldenlandioides*, obscurely unilateral, fruiting pedicels sometimes $\frac{1}{4}$ - $\frac{1}{2}$ in., but not longer than sometimes in *M. oldenlandioides*. *Capsules* $\frac{1}{12}$ in., succulent, little compressed.—The specimens on which the genus *Parophiorrhiza* were founded, were mislaid when the Rubiaceæ were described for this work.

2. MITRASACME, Labill.

Small herbs. *Leaves* opposite, stipules forming a minute sheath. *Flowers* small, white, terminal or axillary, solitary clustered or in irregular umbels.

Calyx campanulate, 4-fid. *Corolla* urn-shaped; lobes 4, valvate. *Stamens* 4, included; anthers ovate. *Ovary* 2-celled; styles 2, connate, separating from the base upwards, usually finally divergent, stigma capitate or 2-lobed; ovules many in each cell, placentæ peltate. *Capsule* subglobose, laterally sub-compressed, truncate or sub-2-horned; carpels dehiscent by separating from each side of the septum from above. *Seeds* very many, minute, subglobose, testa smooth, reticulated.—Species 28; from Bengal to Japan and New Zealand, common in Australia.

1. **M. nudicaulis**, Reinw. in *Blume Bijl.* 849; leaves subradical elliptic minutely hairy, scapes terminated by a lax simple or compound umbel. *A. DC. Prodr.* ix. 12; *Benth. in Journ. Linn. Soc.* i. 92. *M. chinensis*, Griseb. in *Pl. Meyen.* 51; *A. DC. l. c.* 560.

KHASIA and JAITEA MTS., alt. 4000 ft., frequent.—DISTRIB. China, Malaya.

Annual. *Scape* 3–5 in., very slender. *Leaves* $\frac{1}{2}$ in., subsessile, obtuse or acute, minutely hispid-flocculose. *Pedicels* $\frac{1}{2}$ – $1\frac{1}{2}$ in., glabrous; bracts $\frac{1}{10}$ in., lanceolate. *Calyx* $\frac{1}{18}$ in., divided halfway down into acute lobes, glabrous. *Corolla* $\frac{1}{2}$ in., throat hairy. *Capsule* $\frac{1}{2}$ in. diam.

2. **M. alsinoides**, Br. *Prodr.* 453; leaves oblong acute glabrous, pedicels axillary solitary or 2–3 clustered in the upper axils. *A. DC. Prodr.* ix. 11. *M. indica*, Wight *Ic. t.* 1601; *Benth. in Journ. Linn. Soc.* i. 92. *M. pusilla*, Dalz. in Hook. *Kew Journ.* ii. 136; Dalz. & Gibs. *Bomb. Fl.* 155. *M. crystallina*, Griff. *Notul.* iv. 87, and *Ic. Pl. Asiat. t.* 383, fig. 2.

INDIA, alt. 0–2000 ft., widely scattered; ASSAM and BENGAL; CHOTA NAGPORE; DECCAN PENINSULA; PEGU and TENASSERIM. CEYLON.—DISTRIB. Borneo, Philippines, Australia.

Annual; stem 6 in., weak, branched, nearly glabrous. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., sessile, scaberulous. *Pedicels* $\frac{1}{4}$ – $\frac{3}{4}$ in., scaberulous. *Calyx* $\frac{1}{12}$ in., acutely lobed half-way down. *Corolla* $\frac{1}{5}$ in., throat hairy. *Capsule* $\frac{1}{10}$ in. diam.—The Bengal examples are lax straggling, exactly agreeing with the Malay and Australian; the Madras and Ceylon ones are shorter (2–3 in. high), suberect.

3. **M. polymorpha**, Br. *Prodr.* 452; stems patently glandular hairy below, leaves oblong, umbels terminal or from the upper axils, pedicels long unequal glabrous. *A. DC. Prodr.* ix. 10; *Benth. Fl. Austral.* iv. 353 with syn. *M. capillaris*, Wall. in Roxb. *Fl. Ind. ed. Carey & Wall.* i. 420 and *Cat.* 4348; *Don Prodr.* 129; *A. DC. l. c.* 11; *Benth. in Journ. Linn. Soc.* i. 92. *M. trinervis*, Spanoghe in *Linnaea.* xv. 335; *A. DC. l. c.* 560. *M. malaccensis*, Wight *Ic. t.* 1601. *Limnophila campanuloides*, *Benth. in Wall. Cat.* 3908.

NEPAL; in the valleys, Wallich. PEGU to MALACCA, frequent. DECCAN PENINSULA; Mangalore, Hohenacker, n. 590. DISTRIB. China, Japan, Malaya, Australia.

Annual; stem 2–15 in., erect. *Leaves* $\frac{1}{2}$ by $\frac{1}{2}$ in., sessile, glabrous or pubescent. *Umbels* 1–8 in., compound or simple, capillary; pedicels $\frac{1}{4}$ – $1\frac{1}{2}$ in. *Calyx* $\frac{1}{8}$ – $\frac{1}{4}$ in., lobed acutely halfway down, ciliate pubescent or glabrous. *Corolla* $\frac{1}{4}$ in., throat hairy. *Capsule* nearly $\frac{1}{8}$ in.—The Pegu examples of *M. capillaris* are 14 in., and agree altogether with Australian ones named *M. polymorpha* by Benth. The tropical Australian plant has larger capsules and is said to be perennial. The Nepal and Mangalore specimens are 3–4 in. high only, resembling the Japanese.

VAR. *Parishii*; umbels small dense long-peduncled, flowers large.—Tavoy; Parish. DISTRIB. Cochinchina. *Peduncles* 1–3 in., with a terminal umbel, and sometimes a sessile umbel in the middle; pedicels numerous, 0– $\frac{1}{2}$ in.—This is not much like any one of the numerous forms of the Australian *M. polymorpha*, but some of the Malay examples of *M. polymorpha* show a tendency to the Var. *Parishii*.

3. **BUDDLEIA**, Linn.

Trees, shrubs, or herbs. *Leaves* opposite, entire or crenate, united by a stipulary line. *Cymes* dense, globose or corymbiform, axillary or in a thyrsoid terminal panicle. *Calyx* campanulate, 4-merous. *Corolla* urn-shaped; lobes 4, imbricate in the bud. *Stamens* 4, on the corolla-tube; anthers subsessile, ovate or oblong. *Ovary* 2-celled; style linear, clavate; ovules very many in each cell. *Capsule* septicidally 2-valved. *Seeds* very many, oblong or fusiform, testa usually loose or expanded into a wing or tail, albumen fleshy; embryo straight.—Species 70, tropical and subtropical Asia, America, and Africa.

1. **B. Colvillei**, Hook. f. *Ill. Himal. Pl.* t. 18; sub-arboreous, leaves oblong acuminate crenate-dentate, cymes lax in large terminal panicles, flowers 1 in. crimson. *Gamble List Darjeeling Pl.* 56.

SIKKIM; frequent on Tonglo, alt. 9–12,000 ft., *J. D. H.*, &c.

A small tree 15–20 ft., or a large shrub. *Leaves* 6 by $1\frac{1}{2}$ in., attenuate at the base, densely rusty-woolly when young, obscurely pubescent when mature; petiole $0-\frac{1}{4}$ in.; stipules small. *Panicles* 4–8 in., rusty-villous; pedicels $0-\frac{1}{4}$ in. *Calyx* $\frac{1}{4}$ in., shortly toothed, rusty-villous. *Corolla* tubular-campanulate, glabrous without; lobes short, round. *Ovary* hairy. *Capsule* $\frac{2}{3}$ by $\frac{1}{3}$ in. *Seeds* rhomboid-ellipsoid, testa lax little longer than the seed.

2. **B. macrostachya**, Benth. in *Wall. Cat.* 6407, and *Scroph. Ind.* 42, and in *DC. Prodr.* x. 447; shrubby, leaves oblong acuminate crenulate-dentate stipulate, spikes terminal elongate subpanicked, corolla narrow tubular fulvous-woolly without, seeds tailed. *B. Martii*, *T. A. Schmidt in Trimen Journ. Bot.* 1868, 245.

SIKKIM HIMALAYA, alt. 6000–7000 ft., Choongtam and Lachen, *J. D. H.* KHASIA Mts. alt. 3000–5000 ft. frequent.

Shrub 3–8 ft.; branches quadrangular upwards, woolly. *Leaves* 8 by 2 in., attenuate at the base, rusty-woolly beneath or ultimately brown-pubescent, petiole $0-\frac{1}{2}$ in., stipulary line much developed often eared $\frac{1}{2}$ in. broad. *Spikes* 4–10 in., dense-fld., rusty-villous, usually continuous. *Calyx* $\frac{1}{2}$ in., campanulate; teeth lanceolate, acute. *Corolla* $\frac{1}{2}$ by $\frac{1}{2}$ in., white tinged with pink and yellow, throat orange. *Capsule* $\frac{1}{2}-\frac{1}{3}$ in., oblong, acute, villous. *Seeds* elongate, testa lax 3–6 times as long as the nucleus, tailed at both ends.—The Sikkim plant does not essentially differ, but has a grey pubescence, the calyx is smaller, and almost a silvery white. "Flower very sweet, corolla-tube yellowish, limb patent blue, throat deep orange," *J. H. B. Martii* is described as having glabrous branches, which is never the case in our specimens.

VAR. Griffithii; corolla $\frac{1}{4}$ by $\frac{1}{8}$ in., capsule $\frac{1}{2}$ in.—Bhotan; *Griffith* (Kew Distrib. n. 3743). *Mishmee*; *Griffith* (Kew Distrib. nn. 3746, 3747). "Flowers lead-blue, throat orange," *Griffith*.

3. **B. paniculata**, Wall. *Cat.* 6403, and in *Roeb. Fl. Ind. ed. Carey & Wall.* i. 412; shrubby, leaves ovate or oblong sinuate-dentate crenate or subentire, flower-heads in interrupted panicles, corolla narrow-tubular woolly, seeds ellipsoid not tailed. *Don Prodr.* 92; *Benth. Scroph. Ind.* 43, and in *DC. Prodr.* x. 444; *Brand. For. Fl.* 318; *Kurz For. Fl.* ii, 251. *B. crispa*, Benth. in *Wall. Cat.* 6404, and *Scroph. Ind.* 43; *Bot. Mag.* t. 4793; *T. A. Schmidt in Trimen Journ. Bot.* 1868, 245; *Boiss. Fl. Orient.* iv. 1193. *B. nepalensis*, *Colla*; *Benth in DC. l. c.* 447?

HIMALAYA, alt. 4–7000 ft., common westwards, becoming rare in Sikkim and Bhotan.—DISTRIB. Ava, Cabul Beloochistan. [The locality *Silhet* given by Mr. Bentham is believed to be erroneous.]

A shrub or small tree. *Leaves* 5 by 2 in., hastate, sinuate-dentate (on the flowering

branches usually much smaller, lanceolate, narrowed at the base, crenate or subentire), woolly beneath; petiole $0\frac{1}{4}$ in.; stipules usually very narrow or obsolete. *Flower-heads* woolly. *Calyx* $\frac{1}{2}$ – $\frac{3}{4}$ in., urn-shaped, woolly, teeth short. *Corolla-tube* pink, lobes short lavender-blue, throat orange. *Style* short or long. *Capsule* $\frac{1}{4}$ in., ellipsoid, woolly. *Seeds* ellipsoid, testa lax scarcely longer than the nucleus.—*B. paniculata* was founded on the ends of the flowering branches with paniced heads and subentire oblong leaves; *B. crispa* on lower portions of the same branches with large hastate deeply sinuate-dentate leaves and flower-heads subsolitary on short axillary branches.

4. ***B. asiatica***, Lour. *Fl. Cochinch.* 72; shrubby, leaves lanceolate acuminate entire crenate or toothed, spikes terminal and axillary often paniced, corolla $\frac{1}{4}$ – $\frac{1}{2}$ in. tubular white, seeds not tailed. *Benth. in DC. Prodr.* x. 446; *Bot. Mag.* t. 6323; *Dalz. & Gibs. Bomb. Fl.* 180; *Bedd. For. Man.* 163, and *Anal. Gen. t.* 21; *Brand. For. Fl.* 318; *Kurz For. Fl.* ii. 250. *B. Neemda*, *Ham. in Wall. Cat.* 6401; *Roxb. Fl. Ind. ed. Carey & Wall.* i. 411; *Reich Ic. Bot. Exot.* t. 21; *Benth. Scroph. Ind.* 43, and in *DC. l. c.* *B. discolor*, *Roth Nov. Sp.* 83; *Benth. Scroph. Ind.* 42; *Wight Ill.* t. 165, b. v. and *Ic.* t. 894. *B. salicina*, *Lamk. Ill.* i. 291. *B. acuminatissima*, *Blume Bijl.* 743. *B. serrulata*, *Roth l. c.* 82. *B. subserrata*, *Don Prodr.* 92. *B. virgata*, *Blanco Fl. Filip.* 57.

Throughout INDIA, ascending to 6800 ft., very common; not known from Ceylon.—DISTRIB. Malaya, Cochinchina, and China.

A shrub, 3–6 ft., rarely subarborescent 15 ft. *Leaves* 5 by $1\frac{1}{4}$ in., usually narrowed at the base, grey white or fulvous-tomentose or pubescent beneath; petiole $0\frac{1}{4}$ in.; stipules narrow. *Spikes* 2–8 in., dense, usually continuous, fulvous or grey tomentose or pubescent. *Calyx* $\frac{1}{2}$ – $\frac{3}{4}$ in., campanulate, lobes triangular-oblong. *Corolla-tube* hairy without or glabrescent, lobes short. *Capsule* $\frac{1}{4}$ in., ellipsoid. *Seeds* ellipsoid, testa lax little longer than the nucleus.

4. **FAGRÆA**, Thunb.

Trees or shrubs, often epiphytic, sometimes scandent. *Leaves* opposite, entire (crenulate in *F. crenulata*); petioles dilated at base or united by a stipular sheath. *Cymes* collected in corymbs racemes or elongate panicles, terminal or axillary; bracts small. *Flowers* large or small, white, yellowish or rarely pink. *Calyx* deeply 5-fid; lobes thick, broad, much imbricate. *Corolla-tube* long, narrow or funnel-shaped; lobes 5, broad, twisted to the left in the bud. *Stamens* 5, filaments filiform; anthers oblong. *Ovary* 2-celled, or 1-celled above; style filiform, stigma capitate; ovules very many in each cell. *Berry* 1–2-celled. *Seeds* very many, immersed in pulp, testa crustaceous, albumen horny; embryo small, straight.—Species 30; India, China, Japan, Malaya, and Australia, Pacific Islds.

* *Cymes* few-fl. (except *F. crenulata*), corymbose near the ends of the branches, flowers large.

† *Corolla-tube* more than 3 in., linear, dilated only near the top.

1. ***F. carnosa***, Jack in *Mal. Misc.* ii. n. 7, 81; leaves obovate obtuse petioled, flowers solitary subsessile terminal, corolla-tube $5\frac{1}{2}$ in. *DC. Prodr.* ix. 30; *Benth. in Journ. Linn. Soc.* ix. 97; *Kurz For. Fl.* ii. 204.

TENASSERIM; Lobb, *Kurz*.—DISTRIB. Sumatra.

An epiphytic shrub. *Leaves* 3 by 2 in., truncate-obtuse, mucronate, base cuneate; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Calyx* $\frac{2}{3}$ in.; lobes $\frac{1}{3}$ in., ovate, much imbricate. *Corolla-tube* $\frac{1}{2}$ in., mouth wide; lobes $1\frac{1}{4}$ in., obovate, obtuse, mucronate. *Berry* "size of a hen's egg, ovate, rather pointed" (*Kurz*).

2. **F. zeylanica**, *Thunb. Nov. Gen.* ii. 35; leaves obovate-oblong, cymes terminal few-flowered, corolla-tube $3\frac{1}{2}$ in. *Lamk. Ill.* t. 167, fig. 2; *Blume Rumph.* ii. t. 78, fig. 2; *DC. Prodr.* ix. 29; *Bot. Mag.* t. 6080. *Solandra oppositifolia*, *Moon. Cat.* 15.

CEYLON; central province, not common, *Rottler, Gardner, Thwaites*.

A small tree. *Leaves* 7 by 3 in., subobtusely, base much attenuate; petiole $\frac{1}{2}$ in., or obscure. *Cymes* subsessile, 1-6-flowered; bracts $\frac{1}{2}$ in., ovate; pedicels $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ - $\frac{2}{3}$ in.; lobes $\frac{1}{4}$ - $\frac{1}{3}$ in., ovate, obtuse. *Corolla-tube* $\frac{2}{3}$ in., mouth wide; lobes $1\frac{1}{4}$ in., elliptic, obtuse. *Berry* $1\frac{1}{2}$ by 1 in., ovoid, subacute.

VAR. *brevituba*; corolla-tube $1\frac{1}{4}$ in. *Wall. Cat.* 1594.—Deccan Peninsula, *Heyne*.—Differs only in the corolla-tube rather less dilated upwards.

†† *Corolla-tube less than 3 in. funnel-shaped at least in the upper half* (see also *F. zeylanica*, var. *brevituba*).

3. **F. auriculata**, *Jack in Mal. Misc.* ii. n. 7, 82; leaves obovate-oblong, cymes terminal few-fl., corolla-tube $2\frac{1}{2}$ in., lobes $2\frac{1}{2}$ in. *Wall. Cat.* 1596, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 34, and *Pl. As. Rar.* iii. 15, t. 229; *Blume Bijl.* 1020, and *Rumph.* ii. t. 72; *DC. Prodr.* ix. 29. *F. auricularia*, *Benth. in Journ. Linn. Soc.* i. 98; *Kurz For. Fl.* ii. 204. *F. imperialis*, *Miq. in Ann. Mus. Lugd. Bat.* ii. 226, t. 5. *Willughbeia auriculata*, *Spreng. Syst. curæ* post 71.

TENASSERIM, MALACCA, and SINGAPORE; *Griffith, Helfer, &c.*—DISTRIB. Malaya.

A large shrub. *Leaves* 9 by 4 in., subobtusely, base cuneate or attenuate; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in., base auricled. *Cymes* 1-5-flowered, subsessile. *Calyx-lobes* 1 by $\frac{2}{3}$ in. *Corolla-mouth* 2 in. wide; lobes 2 in. broad, obovate-oblong. *Berry* $2\frac{3}{4}$ by $1\frac{1}{4}$ in., oblong.—Griffith's examples have smaller flowers; Lobb's have the flowers nearly as large as in Miquel's picture.

4. **F. crenulata**, *Maingay ms.*; leaves large broadly obovate crenulate, cymes trichotomous rigid many-flowered, corolla-tube 1 in. funnel-shaped.

MALACCA; *Maingay*.

A tree 40 ft. high; trunk slender, unbranched (*Maingay*). *Leaves* $11\frac{1}{2}$ by $8\frac{1}{2}$ in., obtuse, base narrowed; petiole $\frac{1}{2}$ in., very thick. *Cyme* $6\frac{1}{2}$ in. broad, depressed; peduncle 2 in.; bracts $\frac{1}{2}$ in., ovate; pedicels $\frac{1}{6}$ - $\frac{1}{5}$ in. *Calyx-tube* $\frac{1}{2}$ in.; lobes $\frac{1}{2}$ in., obtuse. *Corolla-mouth* $\frac{1}{2}$ - $\frac{2}{3}$ in. broad, wide campanulate for fully half its length; lobes $\frac{1}{2}$ in., ovate-oblong. *Capsule* $\frac{3}{4}$ by $\frac{1}{2}$ in., ellipsoid. *Seeds* very many.

5. **F. obovata**, *Wall. Cat.* 1595, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 33; leaves obovate-oblong or elliptic abruptly acuminate, stipules interpetiolar, cymes few- ∞ -flowered rigid, corolla-tube 1 in. upper half campanulate. *Blume Bijl.* 1021, and *Rumph.* ii. t. 75; *DC. Prodr.* ix. 29; *Bot. Mag.* t. 4205; *Griff. Notul.* iv. 35, and *Ic. Pl. Ind. Or.* t. 382; *Miq. Fl. Ind. Bat.* ii. 369; *Thwaites Enum.* 200; *Bedd. For. Man.* 164; *Kurz For. Fl.* ii. 205. *F. crassifolia*, *Blume Rumph.* ii. t. 78, fig. 1, and *Mus. Bot.* i. 166; *Thwaites Enum.* 200; *DC. l. c.* 30; *Miq. l. c.* 373; ? *F. crassifolia*, *Wall. Cat.* 1602. *F. malabarica* and *obovato-javana*, *Blume Rumph.* ii. 29, and *Mus. Bot.* i. 164; *Wight. Ic.* t. 1317. *F. Blumei*, *Steud.*; *DC. l. c.* 30. *F. coromandeliana*, *Wight Ic.* t. 1316; *Bedd. Fl. Sylb.* ii. t. 224. *F. celebica*, *Blume Mus. Bot.* i. 167. *F. globosa*, *Wall. Cat.* 1598; *DC. l. c.* 29. *Willughbeia obovata*, *Spreng. Syst. curæ* post 71.—*Rheede Hort. Mal.* iv. t. 58.

DECCAN PENINSULA and CEYLON, alt. 0-6000 ft., common. KHASIA MTS., alt. 0-4000 ft., *Wallich, Griffith, H. f. & T.* BHOTAN; *Gamble*. MALAY PENINSULA; from Pegu to Singapore, frequent.—DISTRIB. Malaya.

Trunk stunted in the Deccan, erect 30 ft. in the Malay Peninsula. *Leaves* $6\frac{1}{2}$ by 3 in., base narrowed; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in.; stipules often partly free within the petiole,

embracing the branch. *Cymes* 1-5- (sometimes 12-15-) fld., subsessile; pedicels short. *Calyx* $\frac{2}{3}$ in.; lobes $\frac{1}{2}$ in., ovate, obtuse. *Corolla-throat* $\frac{3}{4}$ -1 $\frac{1}{4}$ in. wide; lobes 1-1 $\frac{1}{2}$ in., broadly elliptic, obtuse. *Berry* 1 $\frac{1}{2}$ by 1 in.—Primary nerves of the leaves distinct in *F. obovata*, Wall., obscure in *F. crassifolia*, Blume. The corolla in Wallich's Silhet example is considerably larger than in his Singapore one. *Fagraea crassifolia*, Wall. Cat. 1602, is not in the Linnean Herbarium.

VAR. *Gardneri*; scandent. *F. Gardneri*, *Thwaites Enum.* 200; *Bedd. For. Man.* 164.—Ceylon; central province, alt. 3-6000 ft., *Thwaites*. *Thwaites* says that this hardly differs from *F. obovata*, except in habit.

6. ***F. khasiana***, *Benth. in Journ. Linn. Soc.* i. 96; leaves oblong-elliptic acuminate, cymes laxly trichotomous few-fld., corolla-tube $\frac{3}{4}$ in. funnel-shaped nearly from the base.

KHASIA MTS., alt. 0-5000 ft., *Griffith, H. f. & T. ASSAM, Griffith, Simons*.

A tree, 30 ft. Leaves as of *F. obovata*. *Cymes* 3-12-fld., branches lax, often nodding; bracts $\frac{1}{2}$ in., elliptic; pedicels 0- $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in.; lobes $\frac{1}{2}$ in., ovate, obtuse. *Corolla-throat* $\frac{2}{3}$ in. wide; lobes $\frac{1}{2}$ in., broad-elliptic, obtuse. *Berry* $\frac{3}{4}$ by $\frac{3}{4}$ in.—Closely allied to *F. obovata*, having smaller flowers and fruits, and a much laxer inflorescence.

** *Cymes* short, few-flowered, in a more or less elongate raceme.

7. ***F. Maingayi***, *Clarke*; leaves large oblong, calyx $\frac{1}{2}$ in. campanulate, corolla-tube $\frac{3}{4}$ in. widely funnel-shaped from the base.

MALAYA; Tamoosoo Kufoo, *Maingay*.

Leaves 11 by 4 $\frac{1}{2}$ in., parallel-sided, shortly acute at both ends; petiole $\frac{2}{3}$ in., very thick. *Peduncle* $\frac{3}{4}$ in.; raceme 2 in., few-fld.; cymes subsessile on the rachis of the raceme; pedicels $\frac{1}{2}$ in., thick, terete. *Calyx* nearly 6-partite; segments round. *Corolla-throat* $\frac{3}{4}$ in. wide; lobes $\frac{1}{2}$ in., subquadrate. *Berry* not seen.—This by its large calyx differs from all the species of this section except *F. crassipes*, *Benth.*, which has a tubular corolla only slightly funnel-shaped upwards.

8. ***F. racemosa***, *Jack*; *Wall. Cat.* 1601, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 35; tree, leaves large oblong or elliptic base cuneate, racemes terminal condensed, calyx $\frac{1}{4}$ in., corolla-tube $\frac{2}{3}$ in. lower half cylindric, upper half campanulate. *DC. Prodr.* ix. 29; *Benth. in Journ. Linn. Soc.* i. 99; *Kurz For. Fl.* ii. p. 205. *F. coarctata*, *Blume Rumph. ii.* 33, and *Mus. Bot.* i. 170. *Willughbeia racemosa*, *Spreng. Syst. curæ post.* 71.

PENANG and MALACCA, *Wallich, Griffith, Maingay*.

Attains 50 ft. Leaves 10 $\frac{1}{2}$ by 3 $\frac{1}{2}$ in., nerves distinct; petiole $\frac{1}{2}$ in. *Peduncle* 1 $\frac{1}{2}$ in.; raceme 1 $\frac{1}{2}$ in.; pedicels $\frac{1}{2}$ in., subfascicled on the rachis. *Calyx* divided more than halfway down; lobes round. *Corolla-throat* $\frac{1}{2}$ in. wide; lobes scarcely $\frac{1}{2}$ in., round. *Berry* " $\frac{1}{2}$ in., ovoid," *Kurz*.

9. ***F. morindæfolia***, *Blume Rumph. ii.* 79, and *Mus. Bot.* i. 169; a rambling shrub, leaves large oblong or elliptic base rounded, racemes terminal elongate, calyx $\frac{1}{4}$ in., corolla-tube $\frac{2}{3}$ in. upper half campanulate or funnel-shaped. *DC. Prodr.* ix. 29. *F. appendiculata*, *cuspidata* and *robusta*, *Blume Mus. Bot.* i. 169, 170. *F. Thwaitesii*, *F. Muell. Fragm. Phyt. Austral.* ii. 137. *Kuhlia morindæfolia*, *Reinw. in Blume Bijdr.* 777. *Kentia morindæfolia*, *Steud. Nomencl. Bot.* 2nd ed. i. 845. *Utania morindæfolia*, *G. Don Gen. Syst.* iv. 663.

ANDAMAN ISLDS., *Kurz*.—**DISTRIB.** Malaya, to the Philippines and Australia.

Panicle usually 8-14 in. long; lateral branches rarely simple.—Very near *F. racemosa*, *Jack*, and reduced to it by *Benth. (Fl. Austral.* iv. 367). As to *F. volubilis*, *Jack (Wall. Cat.* 1610, and in *Roxb. Fl. Ind.* ii. 36), it is a climber; the racemes weak, curved, axillary, sometimes 2 from the same axil, and seems nearer *F. racemosa* than the present species. The whole may be (as *Bentham* considers) one; but the *F.*

racemosa of the Malay Peninsula is well represented in the herbarium and uniformly differs from all the Malay *F. morindæfolia*.

10. **F. ligustrina**, *Blume Rumph. ii. 33*, and *Mus. Bot. i. 171*; leaves elliptic not very large, racemes terminal slender erect short, calyx $\frac{1}{2}$ in., corolla-tube $\frac{1}{4}$ in. narrowly funnel-shaped upwards. *Benth. in Journ. Linn. Soc. i. 100*.

SINGAPORE, *Lobb.*—DISTRIB. Malaya, Philippines.

Arborescent (*Blume*); branches round, slender. Leaves $4\frac{1}{2}$ by 2 in., suddenly acute, base broadly cuneate; petiole $\frac{1}{4}$ in. Peduncle 1 in.; raceme 1 in.; pedicels $\frac{1}{10}$ in., subfascicled on the nodes of the rhachis. Calyx divided halfway down; lobes round. Corolla much slenderer than in the preceding 3 species, $\frac{1}{12}$ in. wide below; throat scarce $\frac{1}{4}$ in. wide; lobes $\frac{1}{4}$ in., round.

*** Flowers small, in compound corymbs.

11. **F. fragrans**, *Roxb. Fl. Ind. ed. Carey & Wall. ii. 32*; leaves elliptic acute, corymbs many-flowered, calyx $\frac{1}{2}$ in., corolla-tube $\frac{1}{4}$ in. upper half narrowly funnel-shaped. *Wall. Cat. 1597*; *Kurz For. Fl. ii. 205*. *F. peregrina*, *Blume Rumph. ii. t. 80*; *Field. & Gardn. Sert. t. 6*. *Cyrtophyllum fragrans*, *DC. Prodr. ix. 31*. *C. peregrinum*, *Reinw.*; *Blume Bijl. 1022*; *DC. l. c.*

From MARTABAN and ANDAMAN ISLDS. to SINGAPORE; frequent.—DISTRIB. Malaya.

A small tree, 25–30 ft. Leaves 4 by $1\frac{1}{4}$ in., shortly acute at both ends; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in.; stipules often connate. Corymbs axillary towards the ends of the branches, often 50–100-flowered, sometimes 6–8-flowered; pedicels $\frac{1}{2}$ in. Calyx deeply divided, lobes round. Corolla subcylindric below; throat $\frac{1}{4}$ in. wide; lobes $\frac{1}{4}$ in., obtuse. Stamens much exserted. Berry " $\frac{1}{4}$ in., subglobose, reddish," *Kurz*.

12. **F. Wallichiana**, *Benth. in Journ. Linn. Soc. i. 98*; leaves lanceolate, corymbs few-fld., calyx $\frac{1}{4}$ in., corolla-tube $\frac{3}{4}$ in. slender widened only towards the apex. *F. lanceolata*, *Wall. Cat. 1599*, not of *Blume*. *Cyrtophyllum lanceolatum*, *DC. Prodr. ix. 31*.

PENANG, *Wallich, Maingay*.

Leaves 4 by $1\frac{1}{2}$ in., acute at both ends; petiole $\frac{1}{2}$ in. Corymbs terminal and axillary, 3-fld. mostly where attached (but the detached flowers are very numerous sent by *Maingay*); pedicels $\frac{3}{4}$ in. Corolla-tube narrowly funnel-shaped from the middle upwards; throat $\frac{1}{4}$ in. wide; lobes $\frac{1}{2}$ in., elliptic, obtuse. Berries $\frac{1}{4}$ in., ellipsoid, subacute.—This seems very near *F. fragrans*, but has a larger calyx, corolla, and berry, while the corymb is more slender.

5. NORRISIA, *Gardn.*

A shrub; young parts pubescent. Leaves opposite; petioles dilated at the base, subconnate. Cymes dense, trichotomous, in terminal corymbs. Flowers small, white? Calyx small, 5-lobed. Corolla-tube narrow, cylindric; lobes 5, small, ovate, valvate. Stamens 5, on the corolla-throat, filaments filiform; anthers ovate. Ovary 2-celled; style filiform, stigma capitate; ovules in each cell very many. Capsule oblong, septicidally 2-valved; carpophore finally free. Seeds very many, testa lax 4–6 times as long as the linear caudate nucleus, albumen fleshy; embryo straight or curved.

1. **N. malaccensis**, *Gardn. in Hook. Kew Journ. i. 327*. *Antonia Griffithii*, *Wight. Ill. ii. 172*, t. 156 b.

MALACCA, *Griffith, Maingay*.—DISTRIB. Borneo.

Branchlets round, fulvous-villous. Leaves 3 by $1\frac{1}{2}$ in., shortly acute at both ends, fulvous-villous beneath or finally glabrescent except the midrib; nerves 7 pairs,

oblique, strong, secondary distinctly reticulate; petiole $\frac{1}{2}$ in. *Cymes* in dense heads $\frac{1}{2}$ – $1\frac{1}{2}$ in. diam., villous or tomentose. *Calyx* $\frac{1}{30}$ in. *Corolla-tube* $\frac{1}{2}$ in., grey or fulvous hairy without; lobes $\frac{1}{12}$ in. *Capsule* $\frac{1}{2}$ by $\frac{1}{12}$ in., fulvous-tomentose, the 2 elliptic valves finally splitting again from their tops. *Seeds* minute.

6. **STRYCHNOS**, Linn.

Scandent shrubs with short tendrils, or trees. *Leaves* opposite, 3–5-nerved (except sometimes *S. potatorum*); scandent species bear short clavate tendrils in some of the axils, the adjacent leaf then often suppressed; in the sub-terminal axils both tendrils often developed, both the leaves and the point of the branch then generally suppressed, in which case the species has been said to produce terminal bifurcate tendrils. *Cymes* terminal or lateral; bracts small; flowers white or yellowish. *Calyx* small, 5–4-lobed. *Corolla* 5–4-fid; tube short or long or hardly any; lobes valvate. *Stamens* 5, on the corolla-tube, filaments short. *Ovary* 2-celled (or 1-celled above); style long or short or hardly any, stigma capitate or small or sub-2-lobed; ovules many in each cell. *Berry* globose or oblong, many- (or 2–1-) seeded. *Seeds* globose, discoid or oblong, albumen horny; embryo small.—Species 60; in the tropics of both hemispheres.

Strychnos grandis, Wall. Cat. 4454, is *Anisophyllea grandifolia*, G. Henslow (vol. ii. p. 442).

Strychnos sp. Wall. Cat. 7500, with subalternate leaves, is not of this Order.

* *Corolla-tube* shorter than the *calyx* or hardly any.

1. ***S. hypogyna***, Clarke; leaves elliptic-lanceolate 3-nerved glabrous, cymes axillary sessile compound pubescent, petals 5 hardly connate, ovary hairy.

TENASSERIM; Mergui, Griffith (Kew Distrib. n. 3830).—DISTRIB. Borneo.

Tendrils 0 on the examples; branchlets glabrous. *Leaves* $4\frac{1}{2}$ by $1\frac{1}{2}$ in., base broadly rhomboid; petiole $\frac{1}{4}$ in. *Cymes* 1–2 in.; pedicels hardly any. *Calyx* pubescent. *Petals* $\frac{1}{20}$ in., villous within. *Stamens* obscurely attached to the petals, sometimes persistent after the petals have gone, filaments sometimes vilvous; anther-cells oblong, glabrous or nearly so. *Ovary* hairy; style hardly any. *Fruit* not seen.

2. ***S. acuminata***, Wall. Cat. 1593 in part; leaves ovate acute 5-nerved glabrous, cymes axillary weak minutely pubescent; petals 5 shortly connate, ovary hairy. Kurz For. Fl. ii. 166, not of A. DC.

TENASSERIM; Wallich. PEGU and SOUTH ANDAMAN ISLANDS., Kurz, Helfer (Kew Distrib. 3728).

A large climber, with tendrils, Kurz. *Leaves* $4\frac{1}{2}$ by $2\frac{1}{2}$ in., base cuneate obtuse rounded or subcordate, marginal nerves distinct; petiole $\frac{1}{8}$ in. *Cymes* 1–2 in., subsessile, lax; pedicels $0\text{--}\frac{1}{12}$ in. *Calyx* minutely pubescent. *Corolla* $\frac{1}{16}$ in.; petals free, glabrous fide Kurz (shortly connate and villous within in Helfer's). *Berry* $\frac{1}{2}$ in. diam., crustaceous, 1–2-seeded. *Seeds* $\frac{1}{2}$ in. diam., discoid.—Kurz's examples are in ripe fruit; Wallich's are leaves only; on his A sheet are two plants, one (*b*) with 5-nerved leaves is that taken up by Kurz.

3. ***S. micrantha***, Thwaites Enum. 425; leaves elliptic acuminate sub-5-nerved glabrous, cymes axillary short dense minutely hairy, corolla-lobes 5 oblong 3–4 times longer than the tube, ovary glabrous.

Ceylon; not uncommon, Thwaites (C. P. 3720, 1866).

Tendrils often in pairs. *Leaves* $2\frac{3}{4}$ by $1\frac{1}{2}$ in., widest often above the middle, base cuneate or obtuse, nerves not impressed above; petiole $\frac{1}{8}$ in. *Cymes* 1–2 in.; pedicels $0\text{--}\frac{1}{12}$ in. *Calyx* minutely pubescent. *Corolla* $\frac{1}{10}$ in.; tube exceedingly short; lobes

villous within. *Anther-cells* oblong, sparingly villous or glabrous. *Style* as long as the ovary. *Berry* $\frac{1}{2}$ in. diam., crustaceous, 1-2-seeded. *Seeds* $\frac{1}{2}$ in. diam., discoid.—Thwaites says the ovary is villous, but it is absolutely glabrous in C. P. n. 3720. This is the only constant character to distinguish it from *S. colubrina*.

4. ***S. colubrina***, Linn. *Sp. Pl.* 271 (not of Wall., Wight or A. DC.); leaves elliptic acute 3-nerved glabrous, cymes axillary small compound puberulous, corolla-lobes 5 oblong 2-3 times as long as the tube, ovary hairy upwards. *Benth. in Journ. Linn. Soc.* i. 101; *Thwaites Enum.* 201; *Dalz. & Gibs. Bomb. Fl.* 155. *S. bicirrhosa*, Lesch.; *Wall. Cat.* 1589, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 267; *A. DC. Prodr.* ix. 16. *S. minor*, *Blume Rumph.* i. 70; *A. DC. l. c.* 14.—*Rheede Hort. Mal.* vii. t. 5.

W. DECCAN PENINSULA, from the Concan to Cochin, frequent.

Tendrils often in pairs. *Leaves* 4 by $1\frac{3}{4}$ in., base cuneate or obtuse; nerves not impressed above, marginal pair obscure; petiole $\frac{1}{4}$ in. *Cymes* 1-2 in.; pedicels $0-\frac{1}{2}$ in. *Calyx* puberulous. *Corolla* $\frac{1}{10}$ in., tube hardly longer than the calyx, lobes villous within. *Anther-cells* oblong, glabrous, or nearly so. *Ovary* glabrous below, fulvous-hairy upward; style as long as the ovary. *Berry* $\frac{3}{4}$ in. diam., crustaceous, 1-2-seeded. *Seeds* $\frac{1}{2}$ in. diam., discoid.—All authors previous to Bentham took *Rheede Hort. Mal.* viii. t. 24 as the type of Linnæus' *S. colubrina*, whereas Linnæus founds his *S. colubrina* on t. 5, which has totally different fruit, and on which Blume founded his *S. minor*. Hence the confusion of synonyms.

VAR. *zeylanica*; leaves rhomboid cuneate at both ends coriaceous 5-nerved, ovary glabrous.—Ceylon; *Thwaites C. P.* 2516, &c. This is taken by Thwaites as *S. colubrina*, Linn.

5. ***S. Dalzellii***, Clarke; leaves ovate acute 3-nerved glabrous, cymes very short dense axillary and terminal puberulous, corolla-lobes 5 oblong 2-3 times as long as the tube, ovary glabrous. *S. axillaris*, *Dalz. & Gibs. Bomb. Fl.* 155, not of Colebr.

W. DECCAN PENINSULA; Concan, Malabar and Bababoodan Hills; *Law, Dalzell, Ritchie*.

Scandent, *Ritchie*, no tendrils on the specimens. *Leaves* 4 by $1\frac{3}{4}$ in., widest near the cuneate or rounded base, coriaceous, nerves often impressed above; petiole $\frac{1}{4}$ in. *Cymes* $\frac{1}{2}-\frac{3}{4}$ in., subcapitate. *Calyx* puberulous. *Corolla* $\frac{1}{10}$ in., tube hardly longer than the calyx-lobes, villous within. *Anther-cells* ovate, hairy. *Style* as long as the ovary. *Berry* $1-1\frac{1}{2}$ in. diam., crustaceous, many-seeded. *Seeds* $\frac{1}{2}$ in. diam., discoid.

6. ***S. Benthami***, Clarke; leaves short-petioled elliptic acute 3-5-nerved glabrous, cymes very short subcapitate axillary pubescent, corolla-lobes 4 ovate longer than the tube, ovary glabrous. *S. minor*, *Benth. in Journ. Linn. Soc.* i. 101; *Thwaites Enum.* 201, not of Blume.

CEYLON, frequent; *Thwaites*, &c.

Tendrils often present. *Leaves* 2 by 1 in., base obtuse or rounded, secondary nerves distinct; petiole scarcely $\frac{1}{2}$ in. *Cymes* $\frac{1}{2}$ in. diam.; pedicels hardly any. *Calyx* glabrous, margin puberulous. *Corolla* $\frac{1}{10}$ in., villous within. *Anther-cells* ovate, hairy. *Style* as long as the ovary. *Berry* $\frac{1}{2}$ in. diam., crustaceous, 1-2-seeded. *Seeds* $\frac{1}{2}$ in. diam., discoid.—The 5-merous species referred to by Bentham is *S. micrantha*, Thwaites. *S. minor*, Blume, is founded on *Rheede Hort. Mal.* viii. t. 24, which has totally different fruit.

VAR. *parvifolia*, Benth. in *Journ. Linn. Soc.* i. 101; leaves $\frac{3}{4}$ by $\frac{1}{2}$ in. coriaceous with recurved margins.—Ceylon, *Gardner*, &c.

7. ***S. Rheedei***, Clarke; leaves short-petioled elliptic acute 3-nerved, cymes small peduncled few-flid. lax, corolla short-tubed 5-merous, berry very

large, many-seeded. *S. colubrina*, *Blume Rumph. i.* 70; *A. DC. Prodr. ix.* 14, not of *Linn. nor Wall.*—*Rheede Hort. Mal. viii.* t. 24.

MALABAR; *Rheede*.

Tendrils present; branches stout. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{4}$ in., base obtuse or rounded; petiole $\frac{1}{2}$ – $\frac{3}{8}$ in. *Peduncles* $\frac{1}{2}$ in., axillary, 3–4-flowered; pedicels $\frac{1}{2}$ – $\frac{1}{3}$ in. *Berry* $2\frac{1}{2}$ in. diam., globose. *Seeds* $\frac{3}{4}$ in. diam., circular, discoid.—Only known from *Rheede's* figure, which may be incorrect as to the flowers. It appears from *Roxb. Fl. Ind. ed.* Carey & Wall. ii. 264, and from *Beddome*, that there probably exists a stout scandent species in Malabar with fruit like *S. Nux-vomica*. (See 16, *S. cinnamomifolia*.)

8. ***S. Maingayi***, *Clarke*; leaves elliptic acute 3-nerved glabrous, cymes large dense very many-fld., corolla-lobes 5 linear-oblong 5 times as long as the tube, ovary hairy upwards.

MALACCA, *Maingay* (*Kew Distrib. nn.* 1041, 1042).

Branches glabrous; tendrils 0 (in the examples). *Leaves* $4\frac{1}{4}$ by 2 in., base obtuse; petiole $\frac{1}{2}$ in. *Cymes* 4 in., divided from the base, nearly glabrous 100–300-flowered. *Calyx* glabrous, margin obscurely pubescent. *Corolla* $\frac{1}{2}$ in., throat villous, tube hardly any. *Filaments* linear; anther-cells ovate, hairy. *Style* twice as long as the ovary. *Berry* not seen.

VAR. ? *fructuosa*; bearing tendrils, berry $2\frac{1}{4}$ in. diam. globose, rind thick, seeds many $\frac{2}{3}$ by $\frac{1}{2}$ in. oblong-ellipsoid, testa silky, albumen horny, embryo small.—*Penang*; *Maingay* (*Kew Distrib. n.* 1038). This may be the fruiting state of *S. Maingayi*, or of some totally different species. The seeds closely resemble those of *S. Ignatii*. *Bergius (Benth. & Trim. Medic. Pl. t.* 179).

** *Corolla-tube longer than the calyx, not much longer than its lobes.*

9. ***S. laurina***, *Wall. Cat.* 1591; leaves lanceolate or ovate-lanceolate 3-nerved glabrous, cymes large compound fulvous-pubescent, ovary hairy upwards, berry 1 in. diam. globose 1–2-seeded. *A. DC. Prodr. ix.* 13; *Benth. in Journ. Linn. Soc. i.* 102; *Kurz For. Fl. ii.* 166. *S. ovatifolia*, *Wall. Cat.* 1592; *A. DC. l. c.*; *Benth. l. c.* 103.

CACHAR; *Keenan*. PEGU and TENASSERIM to SINGAPORE, common; *Wallich, Griffith, &c.*—DISTRIB. Burma, Malaya.

Tendrils often in pairs; branchlets glabrous. *Leaves* 5 by 2 in., lanceolate, or in *S. ovatifolia*, *Wall.* 5 by $2\frac{1}{2}$ in. and ovate-lanceolate, 3- or sub-5-nerved; petiole $\frac{1}{4}$ in. *Cymes* 2–5 in., axillary and terminal, sessile (or in *S. ovatifolia* peduncled); pedicels $0-\frac{1}{16}$ in. *Calyx* glabrous, or margin obscurely pubescent. *Corolla* $\frac{1}{2}$ in., villous within; tube rather longer than the lobes. *Anther-cells* oblong, slightly hairy. *Style* much longer than the ovary, hairy downwards.—There are no tendrils on *Wallich's* example of *S. ovatifolia*, which Mr. *Bentham* considers, though imperfect, to indicate a distinct species.

10. ***S. septemnervis***, *Clarke*; leaves elliptic acute 5–7-nerved glabrous, cymes stout large fulvous-pubescent, ovary hairy, berry 1 in. diam. globose 1-seeded.

MALACCA; *Maingay* (*Kew Distrib. n.* 1036).

Scandent, *Maingay*. *Leaves* 4 by $2\frac{1}{4}$ in.; petiole $\frac{1}{5}$ in. *Cymes* 2–5 in., sessile, very many-fld. *Calyx* puberulous. *Corolla* $\frac{1}{2}$ in., villous within; tube about as long as the lobes. *Anther-cells* oblong, hairy. *Style* longer than the ovary, hairy downwards.—Perhaps only a large-flowered variety of *S. laurina*, but the nervation of the leaves differs considerably.

11. ***S. Beddomei***, *Clarke*; leaves elliptic acute 3-nerved glabrous, cymes small fulvous-pubescent, ovary hairy, berry $\frac{1}{2}$ in. diam. globose 1–2-seeded. *S. laurina*, *Thwaites Enum.* 201. *S. colubrina*, *Wall. Cat.* 4455, second sheet only.

TRAVANCORE; *Beddome*. CEYLON; *Thwaites*.

Tendrils often in pairs; branchlets glabrous. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., base obtuse, rarely obscurely 5-nerved; petiole $\frac{1}{2}$ in. *Cymes* $\frac{1}{2}$ – $1\frac{1}{2}$ in., sessile; pedicels $\frac{1}{10}$ – $\frac{1}{8}$ in. *Calyx* puberulous. *Corolla* $\frac{1}{8}$ in., villous within; tube rather longer than the lobes. *Anther-cells* oblong, glabrous or nearly so. *Style* longer than the ovary, hairy downwards.—This differs from *S. laurina* in the small cymes, pedicelled flowers, and much smaller berry. It seems more closely allied to *S. colubrina*, Linn., from which it only differs by the longer corolla-tube.

VAR. *coriacea*; leaves coriaceous, petiole $\frac{1}{10}$ in. *S. coriacea*, Thwaites Enum. 425. —Ceylon; *Thwaites*.

12. **S. malaccensis**, *Benth. in Journ. Linn. Soc.* i. 101; leaves ovate acute 5-nerved glabrous, cymes small subcapitate shortly peduncled fulvous-pubescent, ovary glabrous. *S. Gautheriana*, *Pierre ms. in Herb. Kew*.

TENASSERIM OR ANDAMANS; *Helfer*. MALACCA; *Griffith*.—DISTRIB. Cambodia.

Tendrils present; branchlets puberulous. *Leaves* $3\frac{1}{2}$ by $1\frac{3}{4}$ in., base obtuse; petiole $\frac{1}{2}$ in. *Peduncles* $\frac{1}{4}$ – $\frac{3}{4}$ in.; cymes $\frac{1}{4}$ – $\frac{3}{4}$ in. diam.; pedicels hardly any. *Calyx* puberulous. *Corolla* $\frac{1}{8}$ in., villous within, tube shorter than the lobes. *Anther-cells* ovate, densely hairy. *Berry* not seen.—Easily distinguished by the perfectly glabrous ovary and style, and densely hairy anthers.

13. **S. axillaris**, *Colebr. in Trans. Linn. Soc.* xii. 356, t. 15; leaves elliptic acuminate 3-nerved glabrous, cymes small subcapitate sessile pubescent, ovary glabrous. *Wall. Cat.* 1587; *A. DC. Prodr.* ix. 13; *Benth. in Journ. Linn. Soc.* i. 101.

KHASIA MTS., alt. 3–4000 ft; *Wallich, Griffith, H. f. & T.*

Tendrils present; branchlets puberulous. *Leaves* $2\frac{1}{2}$ by 1 in., base obtuse; petiole $\frac{1}{2}$ in. *Cymes* $\frac{1}{4}$ – $\frac{3}{4}$ in.; pedicels hardly any. *Corolla* $\frac{1}{8}$ in., villous within, tube shorter than the lobes. *Anther-cells* oblong, somewhat hairy. *Berry* not seen.—Very near *S. malaccensis*; the leaves are smaller more acuminate, the cymes sessile or very nearly so, the anther-cells not acute upwards.

14. **S. pubescens**, *Clarke*; leaves ovate acute 3–5-nerved hairy beneath, cymes small axillary dense, ovary glabrous, berry $\frac{1}{2}$ in. diam. globose 1-seeded.

MALACCA; *Maingay* (*Kew Distrib.* n. 1040).

Tendrils present; branches hairy. *Leaves* 2 by 1 in., base obtuse; petiole $\frac{1}{2}$ in. *Cymes* $\frac{1}{4}$ – $\frac{3}{4}$ in. diam., sessile or nearly so, puberulous, pedicels hardly any. *Corolla* $\frac{1}{8}$ in., 5-merous, tube longer than the lobes, throat with a dense ring of hairs. *Anther-cells* subsessile below the ring of hairs, ovate, acute, apiculate, base only hairy. *Ovary* small, style hardly any. *Pericarp* crustaceous. *Seeds* $\frac{1}{4}$ in. diam., peltate, hemispheric.

15. **S. rufa**, *Clarke*; leaves elliptic acute 3–5-nerved rufous-hairy beneath, cymes dense axillary, berry $1\frac{1}{4}$ diam. globose many-seeded.

MALACCA; *Maingay* (*Kew Distrib.* n. 1034).

Branches patently rufous hairy, without tendrils (in the specimen). *Leaves* 4 by 2 in., base obtuse or subcordate, glabrescent above, harsh, scabrous; petiole $\frac{1}{2}$ in., rufous-hairy. *Cymes* $\frac{3}{4}$ in. diam., axillary, sessile, pubescent. *Flowers* not seen. *Seeds* compressed.

VAR. *Candollei*; leaves nearly glabrous beneath 3-nerved. *S. acuminata*, *Wall. Cat.* 1593 partly; *A. DC. Prodr.* ix. 14.—Amherst, *Wallich*.

*** *Corolla-tube linear, 5–10 times longer than the calyx.*

16. **S. cinnamomifolia**, *Thwaites Enum.* 201; leaves elliptic acute 3–5-nerved glabrous, cymes terminal short-peduncled many-fld., berry $1\frac{1}{2}$ in. diam.

globose many-seeded. *S. colubrina*, Wall. Cat. 1589, and in Roxb. *Fl. Ind. ed. Carey & Wall.* ii. 264; *Wight Ic.* t. 434, not of Linn.

CEYLON; Hantani district, alt. 3000 ft., *Thwaites*.

Tendrils present; branchlets glabrous or nearly so. Leaves 4 by 2 in., base obtuse; petiole $\frac{1}{2}$ in. Peduncles $\frac{1}{2}$ –2 in.; cymes 1–2 in. diam., puberulous; pedicels hardly any. Corolla-tube $\frac{1}{2}$ in., lobes less than $\frac{1}{2}$ in. glabrous, a few hairs lower down the tube. Anther-cells oblong, glabrous. Ovary glabrous; style very long, glabrous; stigma large, capitate.—Altogether resembles *S. Nux-vomica*, but is scandent with tendrils. Though Rheede (*Hort. Mal.* viii. t. 24) represents the peduncles lateral and the buds subglobose, it may be suspected that Wallich and Wight were right in identifying that picture with their *S. colubrina*. If so *S. Rheedei* (n. 7 above) becomes a synonym of the present species.

17. *S. Wallichiana*, Benth. in *Journ. Linn. Soc.* i. 102; leaves oblong suddenly caudate 3-nerved shining, cymes terminal short-peduncled many-flowered. *S. lucida*, Wall. Cat. 1590 partly.

SILHET; Pundua, Wallich. ASSAM; Kufcoo Forest, Griffith (Kew Distrib. n. 3726); Mikir Hills, Simons.

Tendrils often in pairs. Leaves $5\frac{1}{2}$ by $1\frac{3}{4}$ in., parallel-sided, base broadly cuneate, 3 nerves very strong, 2 additional sometimes close to the margin very slender; secondary nerves very prominent, numerous, subparallel, nearly at right angles to the primary; petiole $\frac{1}{2}$ in. Cymes and flowers as in *S. Nux-vomica* or *S. cinnamomifolia*. Corolla very villous in the throat. Anther-cells broadly oblong, obtuse. Style exsert stigma small. Berry unknown.—Wallich's n. 1590 includes this and *S. Nux-vomica*, whence Steudel's name *S. Wallichiana* applies to both; A. DC.'s *S. Wallichiana* (Prodr. ix. 13), from the ovate leaves and naked corolla-throat, seems described from one of Wallich's examples of *S. lucida* which have been since referred by Benthams to *S. Nux-vomica*. The broader shorter leaved specimens of this species, mentioned by Benthams, are those collected by H. f. & T. at the base of the Khasia Hills, without flower or fruit, and in which the lower leaves are ovate; they look like first year's shoots.

18. *S. Nux-vomica*, Linn.; Roxb. Cor. Pl. i. 8, t. 4, and *Fl. Ind. ed. Carey & Wall.* ii. 261; leaves ovate 5-nerved glabrous, cymes terminal short-peduncled many-fl., berry $1\frac{1}{2}$ in. diam. globose many-seeded. Gaertn. Fruct. ii. t. 179, fig. 7; Wall. Cat. 1586; A. DC. Prodr. ix. 15; Benth. in *Journ. Linn. Soc.* i. 103; Griff. Ic. Pl. Ind. Or. t. 411; Dalz. & Gibs. Bomb. Fl. 155; Bedd. Fl. Sylv. t. 243; Brand. For. Fl. 317; Benth. & Trim. Med. Pl. t. 178 (syn. *S. colubrina*, Wall. & Wight, to be excluded from all authors); Kurz For. Fl. ii. 166. *S. lucida*, Wall. Cat. 1590, partly.—Rheede Hort. Mal. i. t. 37.

Throughout tropical INDIA, alt. 0–4000 ft.; rare in Bengal, common in Tenasserim and Madras.

A tree, attaining 40 ft. Leaves $3\frac{1}{2}$ by 2 in., base obtuse; petiole $\frac{1}{2}$ in. Peduncles $\frac{1}{2}$ –2 in.; cymes 1–2 in. diam., puberulous; pedicels hardly any. Corolla-tube $\frac{1}{4}$ – $\frac{1}{2}$ in.; lobes less than $\frac{1}{2}$ in. glabrous, a few hairs lower down the tube. Anther-cells oblong, glabrous. Style long, glabrous, stigma small capitate. Seeds $\frac{1}{2}$ in. diam., discoid.—Benthams also reduces to the present species *S. ligustrina* (Blume Rumph. i. 68, t. 25), which does not differ by any tangible character, but has smaller, somewhat different-looking leaves.

19. *S. potatorum*, Linn. f. Suppl. 148; leaves elliptic subsessile glabrous or nearly so, cymes axillary nearly sessile, berry $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. 1–2-seeded. Roxb. Cor. Pl. i. 9, t. 5, and *Fl. Ind. ed. Carey & Wall.* ii. 263; Wall. Cat. 1585; A. DC. Prodr. ix. 15; Wight Ill. ii. t. 156; Benth. in *Journ. Linn. Soc.* i. 103; Dalz. & Gibs. Bomb. Fl. 156; Bedd. For. Man. 163; Brand. For. Fl. 317; Kurz For. Fl. ii. 167. S. Tettankotta, Retz. Obs. ii. 12; Gaertn. Fruct. i. 477, t. 179.

DECCAN PENINSULA, extending north-west to the Sone river. PROMB; Kurz. CEYLON frequent.

A tree, attaining 40 ft. Leaves $2\frac{1}{2}$ by 1 in., acute at both ends, hardly acuminate, 3-nerved from the base or more often the lateral nerves springing much higher, or (as depicted by Roxburgh) sub-penninerved; petiole $\frac{1}{10}$ in. Peduncles $0-\frac{1}{2}$ in.; cymes 1 in. diam., nearly glabrous; pedicels hardly any. Corolla-tube $\frac{1}{2}-\frac{1}{3}$ in., hardly twice as long as broad, hairy within, nearly glabrous in the throat; lobes $\frac{1}{12}-\frac{1}{10}$ in. Anther-cells oblong, glabrous. Style long, glabrous; stigma small, capitate. Seeds $\frac{1}{4}-\frac{1}{3}$ in. diam., hemispheric, subpelate, hardly discoid—*The clearing-nut*.

7. GAERTNERA, Lamk.

Trees or shrubs. Leaves opposite, rarely ternate, entire, coriaceous, feather-nerved; stipules connate into a cylindric sheath. Cymes terminal (axillary in *G. obesa*) many- (or 3-1-) flowered. Calyx small, funnel-shaped or campanulate. Corolla-tube longer than the calyx or elongate; lobes 5-4, valvate in bud. Stamens upon the corolla-tube; filaments short. Ovary 2-celled; style short or long, stigmas 2 linear or clavate; ovule 1 in each cell, erect. Berry didymous, subglobose, crustaceous. Seeds often compressed, albumen horny or fleshy; embryo small.—SPECIES 25; tropical Asia and Africa.

So closely resembling *Psychotria* (except for the inferior ovary) that it has been confounded therewith, and it has been proposed to append the genus to *Psychotria* as an aberrant section. *Psychotria*, Wall. Cat. 8341, without habitat, is a *Gaertnera*, but probably non-Indian.

1. *G. Koenigii*, Wight Ic. t. 1318; leaves elliptic or obovate-oblong shortly acuminate glabrous, panicles terminal trichotomous, calyx wide-funnel-shaped sub-truncate, corolla 5-merous tube about twice as long as the calyx, stigmas thick. Benth. in Journ. Linn. Soc. i. 112; Thwaites Enum. 202; Bedd. For. Man. 164, and Anal. Gen. t. 21, fig. 3. *G. thyrsoiflora*, Blume Mus. Bot. i. 174; Benth. l. c. 112. *G. acuminata*, Benth. l. c. *G. Junghuhnii*, Miq. Fl. Ind. Bat. ii. 383. *Sykesia Koenigii* and *thyrsoiflora*, Arn. Pug. Pl. Ind. Or. 35; DC. Prodr. ix. 35. *Psychotria vaginans*, DC. Prodr. iv. 520; W. & A. Prodr. 434. —*Psychotria* sp., Wall. Cat. 8342, 8388.

SINGAPORE; Wallich. CEYLON; alt. 0-3000 ft., very abundant, Thwaites, &c.—DISTRIB. Malaya.

A large shrub. Leaves 6 by $2\frac{1}{2}$ in., base narrowed; petiole $\frac{1}{4}-\frac{1}{2}$ in. Panicles 2-6 in., pubescent or nearly glabrous, sometimes with leafy bracts below; pedicels $0-\frac{1}{2}$ in. Calyx $\frac{1}{10}$ in. long and broad. Corolla-tube $\frac{1}{2}$ in., throat very villous. Anther-cells $\frac{1}{10}-\frac{1}{8}$ in., slightly exserted. Berry $\frac{1}{4}-\frac{1}{2}$ in., obovoid or subglobose.—The flowers are, as stated by Beddome, somewhat dimorphic.

VAR. *oxyphylla*; leaves smaller lanceolate acuminate, style short, stigmas small linear. *Psychotria oxyphylla*, Wall. Cat. 8374; Benth. in Journ. Linn. Soc. i. 112. —Singapore, Wallich. United with *G. Koenigii* by Thwaites; the differences in the stigma are probably sexual.

VAR. *divaricata*; panicle lax, pedicels divaricate, flowers rather smaller. *G. divaricata* and *Psittidia divaricata*, Thwaites Enum. 149 and 420.—Ceylon; Thwaites. United with *G. Koenigii* by Beddome, and it does not seem separable from some of the Ceylon *G. thyrsoiflora* which has flowers smaller than usual in lax panicles.

2. *G. viminea*, Hook. f. ms.; leaves lanceolate caudate-acuminate glabrous, panicles terminal trichotomous, calyx very small substellate, corolla 4-merous tube 2-3 times as long as the calyx, stigmas linear. *Psychotria viminea*, Wall. Cat. 8354.

SINGAPORE; Wallich.

Branchlets terete, smooth. Leaves $3\frac{1}{2}$ by $\frac{3}{4}$ in., base cuneate; petiole $\frac{1}{2}-\frac{1}{4}$ in.

Panicles 1-4 in., nearly glabrous; lowest bracts sometimes $\frac{1}{2}$ in., linear; pedicels hardly any. *Calyx* scarcely $\frac{1}{16}$ in. long and broad. *Corolla-tube* $\frac{1}{2}$ in., throat villous. *Berry* $\frac{1}{2}$ in., obovoid-globose.

3. *G. rosea*, *Benth. in. Journ. Linn. Soc. i.* 111; glabrous, leaves elliptic acuminate, flowers 1-3-nate, terminal subsessile, corolla 5-merous tube 3-4 times as long as the calyx glabrous in the throat. *Thwaites Enum.* 201.

CEYLON; *Walker*; ascending to 2000 ft.; *Thwaites*.

A shrub, 8-10 ft. *Leaves* $2\frac{1}{2}$ by 1 in.; base cuneate; petiole $\frac{1}{2}$ in.; stipular sheath crowned by two linear teeth. *Calyx* $\frac{1}{2}$ in., campanulate, subtruncate. *Corolla* rose-purple, tube $\frac{1}{2}$ in., hairy in the middle; lobes $\frac{1}{2}$ in., oblong. *Stamens* on the middle of the tube; anther-cells oblong, obtuse, included. *Berry* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., subspherical, "pale blue," *Thwaites*.

4. *G. Walkeri*, *Wight Ill. ii.* 172, t. 156, b.; glabrous, leaves elliptic acuminate, panicles terminal trichotomous few-fld., calyx widely funnel-shaped, corolla 5-merous tube 2-3 times as long as the calyx glabrous in the throat, style very long, *Benth. in. Journ. Linn. Soc. i.* 111, partly; *Thwaites Enum.* 202; *Bedd. For. Man.* 164. *Sykesia Walkeri*, *Arn. Pug. Pl. Ind. Or.* 36; *A. DC. Prodr.* ix. 35.

CEYLON, alt. 3-6000 ft.; *Walker, &c.*

A shrub, 8-10 ft. *Leaves* $2\frac{1}{2}$ by 1 in., base cuneate; petiole $\frac{1}{4}$ in. *Cymes* 3-12-fld.; bracts $\frac{1}{2}$ in. lanceolate; pedicels $0-\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in. long and broad; teeth small, triangular. *Corolla-tube* $\frac{1}{2}$ in., funnel-shaped upwards. *Stamens* inserted about the middle of the corolla-tube amidst hair. *Berry* spherical, "blue," *Thwaites*.—Resembles the smaller-leaved forms of *G. Koenigii forma thyrsiflora*, and does not much differ but by the stamens (with the ring of hairs) being situated lower down the corolla-tube, a point not properly shown in Wight's figure.

VAR. Gardneri; leaves $1\frac{3}{4}$ by $\frac{1}{2}$ in. linear-lanceolate, cymes 3-1-flowered obscurely pubescent, flowers rather smaller. *G. Gardneri*, *Thwaites Enum.* 202.—Ceylon.

5. *G. ternifolia*, *Thwaites Enum.* 212; leaves small linear often ternate, flowers solitary terminal, calyx-teeth lanceolate, berry $\frac{1}{2}$ in. wide didymous subglobose. *G. Walkeri*, var. *angustifolia*, *Benth. in. Journ. Linn. Soc. i.* 111, partly.

CEYLON; near Adam's Peak, alt. 4-5000 ft.; *Thwaites*.

Branchlets minutely pubescent. *Leaves* $\frac{3}{4}$ by $\frac{1}{10}$ in. *Flowers* as *G. Walkeri* var. *Gardneri*.—*Thwaites* calls this a very beautiful and distinct species, but sends a specimen stated to be "an undoubted hybrid between *G. Gardneri* and *G. ternifolia*;" some of the leaves on his specimens of *G. Gardneri* (C. P. n. 363) are ternately whorled: Mr. Benthham considers all to be merely high-level forms of *G. Walkeri*.

6. *G. obesa*, *Hook. f. ms.*; leaves very large obovate-lanceolate glabrous, panicles dense axillary, calyx widely funnel-shaped, corolla-tube exceeding the calyx, lobes 5.—*Psychotria obesa*, *Wall. Cat.* 8328.

SINGAPORE; *Wallich, Walker, Maingay*.

Leaves 17 by $5\frac{1}{2}$ in., base tapering; petiole $1\frac{1}{2}$ in.; stipules $1\frac{1}{2}$ by $\frac{3}{4}$ in., ovate, acute, connate for half their length. *Panicles* 2-3 in., dense, obscurely pubescent, from the upper axils forming a quasi-thyrse. *Calyx* $\frac{1}{2}$ - $\frac{3}{4}$ in. long and broad. *Corolla-tube* $\frac{1}{2}$ - $\frac{3}{4}$ in., lobes $\frac{1}{2}$ in. *Stamens* near the base of the tube; anther-cells lanceolate-linear below the ring of hairs on the corolla-tube. *Style* short, linear, glabrous; stigmas linear, *Berry* not seen.

7. *G. grisea*, *Hook. f. ms.*; leaves large oblong acute hairy beneath, panicles terminal dense, corolla-tube grey-pubescent longer than the subtruncate calyx. *Psychotria*, *Wall. Cat.* 8389.

SINGAPORE; Wallich.

Branches softly hairy. Leaves $9\frac{1}{2}$ by $2\frac{1}{4}$ in., base cuneate or rounded; petiole $\frac{1}{2}$ in.; stipular sheath silky, $\frac{3}{8}$ in. long, crowned by 2-4 teeth. Panicles 1-3 in. diam. trichotomous, grey-pubescent; lower bracts sometimes leaflike; flowers clustered. Calyx $\frac{1}{2}$ in. long and broad, campanulate, grey-pubescent. Corolla-tube $\frac{1}{2}$ in., lobes $\frac{1}{2}$ - $\frac{3}{4}$ in. Anther-cells narrow oblong, immersed in the dense hair in the upper part of the corolla-tube which hardly extends to the throat.—This and the preceding species are allied to *G. longifolia*, Bojer, and other large Mascarene species.

8. GARDNERIA, Wall.

Large, scandent, glabrous shrubs. Leaves opposite, entire; petioles connected by a stipular line. Peduncles axillary, 1- ∞ -fld. Calyx small, deeply 4-5-lobed. Corolla subrotate; lobes 4-5, thick, valvate in bud. Stamens 4-5, on the corolla-tube; anthers subsessile, cells ovate, connivent or subconnate, erect, exerted. Ovary 2-celled; style cylindric, stigma shortly 2-lobed; ovules 1 in each cell, on the dissepiment. Berry globose, 2-celled. Seed compressed parallel to the septum, albumen fleshy; embryo small.—Species 2-3, Indian and Japanese.

1. *G. ovata*, Wall. Cat. 816, and As. Pl. Rar. iii. 17, t. 231, and in Roxb. Fl. Ind. ed. Carey & Wall. i. 400; leaves elliptic acute, cymes trichotomous, corolla-lobes obtuse, anthers connate. DC. Prodr. ix. 20; Benth. in Journ. Linn. Soc. i. 109. *G. Wallichii*, Wight; Wall. Pl. As. Rar. iii. 49, t. 281; Wight Ic. t. 1313.

KHASIA MTS., Wallich, H. f. & T. NILGHERRY MTS., Wight, &c.

Leaves 3 by $1\frac{1}{2}$ in., base obtuse; petiole $\frac{1}{4}$ in. Cymes usually 1-2 in., 5-1-fld.; in the Nilgherry examples sometimes peduncled, and 12-fld.; in a Silhet one compound, paniced, $5-6\frac{1}{2}$ in., and 90-flowered. Calyx $\frac{1}{2}$ in., lobes rounded. Corolla-tube hardly longer than the calyx; lobes $\frac{1}{2}$ - $\frac{3}{4}$ in., patent, tomentose villous or subglabrate within. Anthers in a cylinder $\frac{1}{2}$ in. long. Berry $\frac{1}{2}$ in. diam., scarlet.—A single specimen in Herb. Hook. is marked "Ceylon, Mrs. Walker," but I suspect some error.

2. *G. angustifolia*, Wall. Cat. 817, and in Roxb. Fl. Ind. ed. Carey & Wall. ii. 318; leaves lanceolate acuminate, peduncles 1 (rarely 2)-fld., corolla-lobes acute, anthers free. DC. Prodr. ix. 20; Benth. in Journ. Linn. Soc. i. 109.

TEMPERATE HIMALAYA, alt. 5-7000 ft.; from Kumaon to Bhotan; Wallich, &c.

Leaves $4\frac{1}{2}$ by 1 in., base acute or rounded; petiole $\frac{1}{4}$ in. Peduncles nodding in flower. Corolla-lobes densely villous or nearly glabrous within. Berry $\frac{1}{2}$ in. diam., scarlet.—Closely allied to *G. ovata*, which Bentham reduces to the present species, with *G. nutans*, Sieb. & Zucc. from Japan, which has elliptic acute leaves and rather larger flowers; and may be a geographic form of *G. angustifolia*.

ORDER XCVII. GENTIANACEÆ. (By C. B. Clarke)

Herbs, rarely minutely hairy. Leaves opposite, rarely alternate, entire, or alternate and 3-foliate in *Menyanthes*. Flowers cymose capitate or umbelled, rarely solitary, rarely bracteate, regular; irregular in *Canscora* and *Hoppea*. Calyx inferior, lobes 5-4 imbricate in bud. Corolla funnel-shaped or rotate, lobes twisted to the right, in *Menyanthes* induplicate-valvate. Stamens on the corolla-tube, as many as its lobes and alternate with them, or unequal or suppressed in *Canscora* and *Hoppea*; filaments linear, sometimes dilated

below; anthers oblong. *Disc* of 5 glands at the base of the ovary or 0. *Ovary* superior, 1-celled, or rarely only the placentæ intruded and meeting; style short or linear, simple, stigmas 2 small; ovules numerous. *Capsule* membranous, rarely fleshy and berried. *Seeds* numerous, small, sometimes winged; albumen copious.—Species 520, throughout the globe, more abundant in mountainous regions.

TRIBE I. **Exacææ**. *Leaves* opposite. *Corolla-lobes* twisted to the right. *Ovary* completely 2-celled. *Style* filiform.

Leafless parasites, anthers dehiscing by terminal pores 1. COTYLANTHERA.
Corolla blue, purplish or white 2. EXACUM.
Corolla yellow, anthers dehiscing by longitudinal slits 3. SEBÆA.

TRIBE II. **Chironiææ**. *Leaves* opposite. *Corolla-lobes* twisted to the right. *Ovary* 1-celled. *Style* filiform.

Flowers regular in axillary clusters 5. ENICOSTEMA.
Flowers regular panicle or terminal subcapitate 6. ERYTHRÆA.
Flower irregular, stigma scarcely divided, minute herbs 4. HOPPEA.
Flower irregular, stigmas 2 7. CANSORA.

TRIBE III. **Swertiææ**. *Leaves* opposite, rarely alternate. *Corolla-lobes* twisted or imbricate. *Ovary* 1-celled. *Style* short, rarely elongate.

* *Corolla without pits or depressions near the base of its lobes* (viscid spots or hairy glands sometimes present).

Twiners, corolla tubular-campanulate 8. CRAWFURDIA.
Corolla tubular-campanulate, stamens attached on the tube 9. GENTIANA.
Corolla tubular-campanulate, stamens attached between its lobes 10. JAESCHKEA.
Corolla rotate, stamens attached at its base 11. PLEUROGYNE.

** *Corolla with 1 or 2 depressions pits or spurs near the base of each of its lobes*.

Depressions or pits of the corolla shallow 12. SWERTIA.
Pits of the corolla prolonged into spurs 13. HALENIA.

TRIBE IV. **Menyanthææ**. Aquatic herbs, leaves radical or alternate. *Corolla-lobes* induplicate-valvate in the bud.

Leaves 3-foliolate 14. MENYANTHES.
Leaves simple, cauline deeply cordate 15. LIMNANTHEMUM.

1. COTYLANTHERA, Blume.

Parasitic, small, glabrous herbs. *Leaves* scale-like, opposite. *Flowers* solitary or few, terminal. *Calyx* deeply 4-lobed. *Corolla* rotate; lobes 4, oblong. *Stamens* 4, on the corolla-tube, filaments linear; anther-cells oblong, slightly curved, dehiscing by 1-2 terminal pores. *Ovary* completely 2-celled; placentæ large; style filiform, stigma small capitate. *Capsule* globose, septically 2-valved. *Seeds* numerous.—Species 3, in the Himalaya, Java, and Ladrone Islands.

1. **C. paucisquama**, Clarke in *Herb. Calcutta*; pairs of scales on the stem 1-2 only.

Sikkim; alt. 6000 ft., King.

Stem 2-4 in., white, fleshy. *Leaves* $\frac{1}{2}$ in., elliptic, white. *Calyx-lobes* $\frac{1}{2}$ in., oblong, white. *Corolla-lobes* $\frac{1}{2}$ in., linear-lanceolate, dark blue. *Filaments* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Anthers*

with two pores, *King. Style* $\frac{1}{4}$ in. *Fruit* not seen.—*Cotylanthera tenuis*, *Blume Bijl.* 708, and *Eophylon Lobbii*, *A. Gray in Journ. Linn. Soc.* xi. 23, differ chiefly by having numerous pairs of leaves on the stem; but all may be one species.

2. *EXACUM*, *Linn.*

Herbs, usually branched. *Leaves* ovate or lanceolate, usually 3-5-nerved. *Cymes* terminal and axillary. *Calyx* deeply 4-5-lobed; lobes keeled, winged, or flat. *Corolla* rotate; tube short, globose; lobes 4-5, ovate or oblong, blue purple-blue or white. *Stamens* 5-4, on the corolla-throat, filaments short; anthers large, oblong, apical pores at length extending usually to the base. *Ovary* more or less completely 2-celled; style long, stigma small subcapitate; placentæ large. *Capsule* globose, septicidally 2-valved. *Seeds* very many, minute, subcuboid, testa granular.—Species 20, mostly Indian; a few Malayan, Chinese, and African.

* Stem 4-angular (except *E. teres*); corolla large, lobes 4, blue.

1. *E. teres*, *Wall. Cat.* 4354, and in *Roxb. Fl. Ind. ed. Carey & Wall.* i. 414; stem terete, leaves lanceolate 3-nerved, calyx subquadrangular hardly winged. *Griseb. Gentian.* 108, and in *DC. Prodr.* ix. 44; *Clarke in Journ. Linn. Soc.* xiv. 424.—*Exacum* sp., *Griff. Itin. Notes*, 71 n. 1098.

TROPICAL HIMALAYA, alt. 0-5000 ft.; from Nepal to Bhotan, frequent. ASSAM and KHASIA Mts., alt. 0-4000 ft., frequent.

Stem 1-4 ft., hardly branched, sometimes with 2-4 obscure lines. *Leaves* $3\frac{1}{2}$ by $\frac{1}{2}$ in., sessile or the lower petioled, acute. *Cymes* from the upper axils forming a lax long panicle. *Calyx-lobes* $\frac{1}{4}$ in. ovate, acute, with thickened green keels. *Corolla-lobes* $\frac{1}{2}$ in., obovate-oblong, acute. *Anthers* $\frac{1}{2}$ in. *Style* $\frac{1}{2}$ in. *Capsule* $\frac{1}{2}$ in., ovoid. —Reduced states occur at the higher levels.

2. *E. tetragonum*, *Roxb. Hort. Beng.* 10, and in *Fl. Ind. ed. Carey & Wall.* i. 413; stem quadrangular, leaves sessile broad-lanceolate 5-nerved, calyx-lobes ovate acuminate keeled scarcely winged, anthers $\frac{1}{4}$ in. straight. *Wall. Cat.* 4356, and *Pl. As. Rar.* iii. 47, t. 276; *Don Prodr.* 128, and in *Trans. Linn. Soc.* xvii. 531; *Arn. in Ann. Sc. Nat.* 2, xi. 175; *Griseb. Gentian.* 107, and in *DC. Prodr.* ix. 44; *Benth. Fl. Hongk.* 233; *Clarke in Journ. Linn. Soc.* xiv. 424. *E. Hamiltonii*, *G. Don Gen. Syst.* iv. 213. *E. bellum*, *Hance in Hook. Lond. Journ. Bot.* vii. 472.

N. INDIA, ascending to 5000 ft., common from Kumaon to Central India, Bhotan, and the Khasia Mts.—DISTRIB. China.

Stem 1-4 ft., little branched below. *Leaves* 5 by $1\frac{1}{2}$ in., acute, or $1\frac{1}{2}$ by $\frac{3}{4}$ in., subobtus. *Panicle* large and compound, or depauperated few-fl. *Buds* nearly straight, and corolla subsymmetric. *Calyx-lobes* $\frac{1}{2}$ - $\frac{3}{4}$ in., sometimes sub-3-winged. *Corolla-lobes* $\frac{3}{4}$ in., broadly elliptic, acute, full azure blue (not violet-purple as depicted by Wallich, nor golden yellow as stated by Don). *Style* $\frac{1}{2}$ in. *Capsule* $\frac{1}{2}$ in., subglobose.

VAR. *stylosa*; leaves narrower, corolla smaller, anthers rather longer more attenuate. *E. stylosa*, *Wall. Cat.* 4355; *Griseb. in DC. Prodr.* ix. 46. *E. chironioides*, *Griseb. Gentian.* 109, and in *DC. Prodr.* ix. 45. *E. Horsfieldianum*, *Miq. Fl. Ind. Bat.* ii. 556. *E. sulcatum*, *Clarke in Journ. Linn. Soc.* xiv. 425, not of *Roxb.*—BURMA; *Prome, Wallich.* TENASSERIM; *Mergui, Griffith* (*Kew Distrib.* n. 6809); *Pegu, McClelland*; *Malacca, Lobb.*—DISTRIB. Malaya to Borneo and the Philippines.—A few flowers on the Pegu example are 5-merous.

3. *E. Perrottetii*, *Griseb. in DC. Prodr.* ix. 45; stem quadrangular, leaves sessile 5-7-nerved, calyx-lobes ovate-lanceolate keeled, anthers $\frac{1}{2}$ - $\frac{1}{2}$ in. straight. *Wight Ic.* t. 1322.

W. DECCAN PENINSULA; from the Concan southwards.

Stem 2-5 ft., subsimple below. *Leaves* 2-5 in., from oblong to subcordate-ovate. *Cymes* dense, forming a narrow interrupted panicle. *Calyx-lobes* $\frac{3}{4}$ -1 in., narrowly (or not) winged. *Corolla-lobes* $1\frac{1}{2}$ in., ovate, acute. *Anthers* $\frac{1}{10}$ - $\frac{1}{8}$ in. wide at the base. *Capsule* $\frac{1}{2}$ in., ovoid.—The finest species of the genus: in its straight buds and subsymmetric flowers it resembles *E. tetragonum* on a large scale.

4. ***E. bicolor***, *Roxb. Catal. Pl.* (1813), and *Fl. Ind. ed. Carey & Wall.* i. 413; stem quadrangular, leaves sessile ovate-lanceolate 5-nerved, calyx-lobes ovate suddenly caudate, keel winged; anthers $\frac{1}{2}$ - $\frac{1}{2}$ in. curved. *Wight Ic. t.* 1321; *Griseb. in DC. Prodr.* ix. 45; *Dalz. & Gibs. Bomb. Fl.* 156 (syn. excl.); *Clarke in Journ. Linn. Soc.* xiv. 425. *E. grandiflorum*, *Wall. Cat.* 4358; *Griseb. in DC. Prodr.* ix. 47. *E. Metzianum*, *Herb. Hohenacker*, n. 857. *E. sulcatum*, *Herb. Wight*, not of *Roxb.* *E. tetragonum*, β . *tricolor*, *Bot. Mag. t.* 4340.

DECCAN PENINSULA, frequent from the Concan and Orissa to Courtallum.

Considered by Mr. Bentham only a form of *E. tetragonum*, but differs from that (and the larger *E. Perrottetii*) in the unsymmetric flowers, the buds distinctly curved at the tips, and the anther-cells curved and tapering upwards. The calyx-lobes do not taper gradually as in *E. Perrottetii*. The flowers are larger than those of *E. tetragonum*, smaller than those of *E. Perrottetii*. The corolla-segments are (very generally) white in the lower half, full azure-blue in the upper.

5. ***E. axillare***, *Thwaites Enum.* 203; stem quadrangular, leaves ovate-lanceolate 3-nerved thin succulent, flowers mostly solitary on axillary peduncles, calyx-lobes with a dorsal cordate-lanceolate reticulated wing, anthers $\frac{1}{2}$ in. straight shortly suddenly beaked.

CEYLON; in the Pasdoon Corle, *Walker, Thwaites*.

Stem 6-18 in., procumbent and branched or erect and simple. *Leaves* $2\frac{1}{2}$ by 1 in, base tapering, lower mostly long-petioled, very thin, dried reticulately nerved. *Peduncles* $\frac{1}{4}$ - $\frac{3}{4}$ in., numerous, often from the lower axils; upper imperfectly corymbose. *Calyx-lobes* $\frac{1}{2}$ in.; wing (in young fruit) $\frac{1}{2}$ in. broad. *Corolla-lobe* $\frac{1}{2}$ in., lanceolate, acute, cyaneous (*Thwaites*). *Capsule* $\frac{1}{3}$ by $\frac{1}{2}$ in.

VAR. pentamera; corolla-lobes 5 broader shorter obtuser than in *E. axillare* type. —Ceylon, *Thwaites*.—A dubious plant, perhaps more nearly allied to *E. Walkeri*, but in the thin succulent leaves and cordate calyx-wings altogether resembling *E. axillare*.

** Corolla large or medium-sized, lobes 5 (all from the Deccan Peninsula or Ceylon).

6. ***E. Walkeri***, *Arn. in Ann. Sc. Nat.* 2, xi. 176; leaves ovate or lanceolate acute 3-nerved, peduncles axillary solitary and terminal subcorymbose, calyx-lobes with an ovate-lanceolate dorsal wing, corolla-lobes $\frac{1}{2}$ in. broadly elliptic, anthers $\frac{1}{5}$ - $\frac{1}{6}$ in. subtruncate. *Griseb. Gentian.* 110, and in *DC. Prodr.* ix. 45; *Wight Ill. t.* 157, b. fig. 1. *E. ovale*, *Griseb. Gentian.* 111, and in *DC. Prodr.* ix. 46; *Clarke in Journ. Linn. Soc.* xi. 426. *E. foliosum*, *Griseb. in DC. Prodr.* ix. 45. *E. zeylanicum*, var. β only, *Thwaites Enum.* 203.

CEYLON; *Walker, &c.*; central province, alt. 5000 ft., *Thwaites* (C.P. n. 38).

Stems 1-3 ft., suberect, often with long branches from near the base, quadrangular or obscurely 4-lineolate. *Leaves* (in the original *E. ovale*) 1 by $\frac{2}{3}$ in. ovate, acute, base rounded, subsessile (in *Thwaites E. zeylanicum*, var. β), $2\frac{1}{2}$ by $\frac{2}{3}$ in., lanceolate, acuminate at both ends. *Calyx-lobes* $\frac{1}{2}$ in., base of wing narrowed or rounded, rarely cordate. *Corolla-lobes* acute, white or pale blue. *Capsule* $\frac{1}{4}$ - $\frac{1}{2}$ by $\frac{1}{2}$ in.—*E. ovale* of *Griseb.* has been reduced by *Thwaites* to *E. macranthum*, but the corolla-lobes are described by *Grisebach* as 8 mill. long, and it was doubtless = *E. Walkeri*, as is *E. ovale* of *Wight's* and *Gardner's Herbarium*. In this species 1-flowered peduncles from the lower axils are frequent.

7. ***E. atropurpureum***, *Bedd. Ic. Pl. Ind. Or.* t. 119; leaves subsessile round-ovate shortly acute 5-nerved, flowers 5-1 terminal, calyx winged, corolla-lobes $\frac{3}{4}$ in., anthers $\frac{1}{4}$ in. *E. Beddomei*, *Clarke in Journ. Linn. Soc.* xiv. 427.

DECCAN PENINSULA; Quilon, *Gen. Cullen*; Pulney Mts., *Beddome*.

Stems erect, terete. Leaves $1\frac{1}{2}$ by 1 in., coriaceous. Peduncles $\frac{1}{2}$ in., solitary from the penultimate axils. Calyx-lobes $\frac{1}{2}$ in. Corolla-lobes obovate-oblong, acute, deep blue. Capsule oblong (*Beddome*).

VAR. *anamallayanum*, *Bedd. Ic. Pl. Ind. Or.* t. 154; leaves larger ovate or oblong acute or obtuse margined, flowers corymbose.—Anaimallays and Pulneys, alt. 6-7000 ft., *Beddome*.

8. ***E. courtallense***, *Arn. in Ann. Sc. Nat.* 2, xi. 176; stem quadrangular much branched, leaves lanceolate 3-1 nerved succulent sessile, corymbs terminal few-fl., corolla-lobes $\frac{1}{2}$ - $\frac{1}{2}$ in., anthers $\frac{1}{5}$ in. shortly attenuate. *Griseb. in DC. Prodr.* ix. 47; *Wight Ic.* t. 1323.

S. DECCAN PENINSULA; Courtallum, *Wight*.

Stem often almost woody below, 3-8 in., densely ramous, or 14 in. with fewer longer branches. Leaves $1\frac{3}{4}$ by $\frac{1}{2}$ in., narrowed below, nerves often obscure. Peduncles 0- $\frac{3}{4}$ in., often 1-flowered in the ramous form, corymbose in the less divided. Calyx-lobes $\frac{1}{2}$ in., wing oblong or lanceolate. Corolla-lobes obovate-oblong acute, blue. Capsule $\frac{1}{2}$ by $\frac{1}{2}$ in., ovoid.

VAR. *travancorica*; peduncles $\frac{1}{2}$ - $1\frac{1}{2}$ in. solitary, flowers and capsule rather larger. *E. travancorica*, *Bedd. Ic. Pl. Ind. Or.* t. 118.—Travancore, alt. 5000 ft., *Beddome*.—The examples are only 2-7-fl. and look like alpine forms of *E. courtallense*, but *Beddome* says that *E. travancoricum* is sometimes 50-fl.

9. ***E. Wightianum***, *Arn. in Ann. Sc. Nat.* 2, xi. 176; leaves elliptic-lanceolate 3-5-nerved, calyx winged, corolla-lobes $\frac{3}{4}$ in., anthers $\frac{1}{5}$ - $\frac{1}{4}$ in. scarcely attenuated upwards. *Griseb. in DC. Prodr.* ix. 45; *Wight Ic.* t. 840. *E. zeylanicum*, *Wall. Cat.* 4357, letter a. *E. foliosum*, *Griseb. l. c.* 45.

NILGHERY MTS., alt. 4-7000 ft., frequent. TRAVANCORE, *Beddome*.

Only differs from *E. zeylanicum* in the much shorter anthers, which have a minute papilla at the summit of the connective behind.

10. ***E. zeylanicum***, *Roxb. Catal. Pl.* (1813), and *Fl. Ind. ed. Carey & Wall.* i. 414; leaves elliptic-lanceolate 3-5-nerved, calyx winged, corolla-lobes $\frac{3}{4}$ in., anthers $\frac{1}{2}$ - $\frac{1}{2}$ in. attenuated upwards. *Wall. Cat.* 4357, letter b; *Arn. in Ann. Sc. Nat.* 2, xi. 176; *Griseb. Gentian.* 110, and in *DC. Prodr.* ix. 45; *Thwaites Enum.* 203 (excl. var. β); *Bot. Mag.* t. 4423. *Chironia trinervis*, *Linn. Sp. Pl.* 272; *Moon. Cat.* 16. *Lisianthus zeylanicus*, *Spreng. Syst.* i. 586. —*Burm. Thes. Zeyl.* t. 67.

CEYLON; common up to 5000 ft., *Thwaites*, &c.

Stem 1-3 ft., quadrangular, erect, little-branched below. Leaves 4 by 1 in., narrowed at the base, subsessile. Corymbs terminal, many-fl., 1-fl. peduncles from the lower axils sometimes added. Calyx-lobes $\frac{2}{3}$ in.; wing lanceolate, in fruit ovate or cordate. Corolla-lobes blue, obovate-oblong, obtuse or subacute. Capsule $\frac{1}{2}$ by $\frac{1}{2}$ in.

VAR. *macrantha*; stem terete, corolla purplish-blue, anthers $\frac{1}{2}$ in. broad. *E. macrantha*, *Arn. in Ann. Sc. Nat.* 2, xi. 176; *Griseb. Gentian.* 111, and in *DC. Prodr.* ix. 46; *Bot. Mag.* t. 4771; *Thwaites Enum.* 203.—Ceylon, frequent. The lobes of the corolla are not always acuter than in many examples of *E. zeylanicum* type.

*** Smaller slenderer plants with small 4-merous flowers.

11. ***E. pedunculatum***, *Linn.*; *Griseb. Gentian.* 112, and in *DC. Prodr.* ix. 46; stem erect much-branched, leaves subsessile elliptic or lanceolate 3-nerved, cymes terminal many-fl., pedicels suberect rigid, corolla blue. *Vahl*

Symb. iii. 15; *Wall. Cat.* 4359; *Thwaites Enum.* 203; *Clarke in Journ. Linn. Soc.* xiv. 427. *E. pedunculare*, *Arn. in Ann. Sc. Nat.* 2, xi. 176; *Wight Ic.* t. 336. *E. sulcatum*, *Roxb. Fl. Ind. ed. Carey & Wall.* i. 415; *Griseb. in DC. Prodr.* ix. 46, *syn. excl.* *E. rivulare*, *Edgew. Catal. Pl. Banda*, 51.

Throughout INDIA, ascending to 3000 ft., from Oudh and Bengal to CEYLON, *Thwaites* (C.P. 1876 in *Herb. Kew*), &c.

Stem 3–12 in., quadrangular. *Leaves* $1\frac{3}{4}$ by $\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ – $\frac{1}{2}$ in. *Calyx-lobes* $\frac{1}{2}$ – $\frac{1}{2}$ in., ovate, acuminate; wing distinct, lanceolate. *Corolla-lobes* $\frac{1}{4}$ – $\frac{1}{2}$ in., elliptic. *Anthers* $\frac{1}{2}$ in., scarcely attenuate upwards, dehiscent finally halfway to the base. *Capsule* $\frac{1}{2}$ in., subglobose.—*Linnaeus'* species is founded on *Pluk. Alm. Mant.* t. 343, fig. 3, and *Grisebach* throws doubt on the identification by saying that *Plukenet's* figure is bad; but it seems unusually good and characteristic.

12. ***E. pumilum***, *Griseb. in DC. Prodr.* ix. 46; stem erect branched upwards, leaves sessile lanceolate 3-nerved, cymes lax, pedicels slender, corolla purple-blue. *Wight Ic.* t. 1324; *Dalz. & Gibs. Bomb. Fl.* 157; *Clarke in Journ. Linn. Soc.* xiv. 427.

The CONCAN; Belgaum, *Graham*, *Dalzell*, &c.

Closely allied to *E. pedunculatum*, but slenderer. *Leaves* usually narrower; lower often 1-nerved. *Flowers* less numerous; pedicels (many of them) $\frac{1}{2}$ –1 in. *Calyx-wings* narrower, lanceolate, sometimes obsolete. *Anthers* dehiscent finally often to the base.

13. ***E. sessile***, *Linn.*; *Griseb. Gentian.* 113, and in *DC. Prodr.* ix. 47; leaves small sessile ovate, pedicels lateral and terminal very short cernuous, calyx-lobes ovate acute not winged, corolla white. *Vahl Symb.* iii. 16; *Wight Ic.* t. 1324. *E. macrantherum*, *Miq. Pl. Hohenack.* n. 582.

DECCAN PENINSULA; Mangalore, *Hohenacker*. CEYLON; common up to 2000 ft., *Macrae*, &c.

Stem 4–8 in., erect, quadrangular, simple or corymbose upwards. *Leaves* $\frac{1}{2}$ by $\frac{1}{4}$ in., obscurely nerved, acute or subobtus. *Peduncles* 0– $\frac{1}{2}$ in., axillary, 1-flowered; terminal peduncle appearing sometimes 1 in., but then bearing a pair of small leaves near the flower. *Calyx-lobes* $\frac{1}{10}$ in., herbaceous. *Corolla-lobes* $\frac{1}{2}$ – $\frac{1}{2}$ in., elliptic. *Anthers* $\frac{1}{16}$ in. *Capsule* $\frac{1}{2}$ in., subglobose.—The examples marked *E. macrantherum*, *Miq.*, are certainly *E. sessile*, *Linn.*, but are mixed with *E. pumilum*, and the locality Mangalore is therefore not certain.

14. ***E. Lawii***, *Clarke*; leaves small sessile ovate, cyme few-fl. lax, pedicels mostly elongate, calyx-lobes ovate strongly nerved not winged, corolla purple-blue. *E. sessile*, *Clarke in Journ. Linn. Soc.* xiv. 427, as to the *Bombay examples*.

The CONCAN and MALABAR; Bababoodan hills, *Law*; Belgaum hills, *Ritchie*.

Stem 3–6 in., erect, slender, quadrangular, simple or slightly branched upwards. *Leaves* $\frac{1}{2}$ in. long and broad. *Peduncles* terminal or subterminal, many of them $\frac{1}{2}$ –2 in. without leaves or bracts. *Calyx-lobes* $\frac{1}{2}$ – $\frac{1}{2}$ in., patent, much-nerved at flower-time. *Corolla-lobes* $\frac{1}{2}$ – $\frac{1}{2}$ in., elliptic or round. *Anthers* $\frac{1}{10}$ in. *Capsule* $\frac{1}{2}$ – $\frac{1}{2}$ in., ovoid.—Named *E. sessile* by all collectors, but the flowers are larger, and the inflorescence altogether different.

15. ***E. petiolare***, *Griseb. in DC. Prodr.* ix. 46; leaves petioled elliptic or ovate mostly 5-nerved, peduncles erect, calyx-wings broad, corolla white or pale blue. *Wight Ic.* t. 1324; *Dalz. & Gibs. Bomb. Fl.* 157; *Clarke in Journ. Linn. Soc.* xiv. 427. *E. carinatum*, *Roxb. Fl. Ind. ed. Carey & Wall.* i. 415? *Sebæa carinata*, *Spreng. Syst.* i. 426?

The CONCAN, *Stocks*, &c. CHOTA NAGPORE, alt. 1–3000 ft., abundant, *Clarke*.

Stem 2–12 in., erect, quadrangular, branched upwards. *Leaves* 3 by $1\frac{1}{2}$ in.,

5-nerved, in small specimens lanceolate and subsessile; petiole $\frac{1}{2}$ in. *Cymes* terminal, erect; pedicels mostly $\frac{1}{4}$ – $\frac{1}{2}$ in.; the 1-flowered peduncle at the bifurcation of the cyme often 1–2 $\frac{1}{2}$ in. *Calyx-lobes* $\frac{1}{2}$ in.; wing in fruit ovate or cordate, nerved. *Corolla-lobes* $\frac{1}{2}$ in. or more (or in small examples $\frac{1}{3}$ in.). *Anthers* $\frac{1}{2}$ in., finally dehiscing nearly to the base. *Capsule* $\frac{1}{2}$ in., subglobose.—Roxburgh's Ic. Ined. of his *E. carinatum* resembles in all respects *E. pedunculatum*, Linn., except that the corolla-lobes are orange-yellow. As a yellow corolla is unknown in *Exacum*, Sprengel placed the species under *Sebea*. Arnott and Grisebach, assuming that Roxburgh had not seen the plant alive, reduce it to *E. pedunculatum*. But as Roxburgh had the plant in cultivation and both figured and described *E. pedunculatum* (under *E. sulcatum*), it is not likely that his *E. carinatum* is the same thing. Roxburgh's description seems almost certainly to refer to *E. petiolare*, Griseb., which has white corolla-lobes with yellow anthers and the marked calyx-wing, &c., described by Roxburgh. It doubtless extends to Ceylon, for Thwaites' *E. petiolare* (Clarke in Journ. Linn. Soc. xiv. 427) were almost surely rightly named, though the number (C.P. 1876) attached to the specimens is wrong.

**** Small plant with small 5-merous flowers.

16. **E. pteranthum**, Wall. Cat. 4360; leaves elliptic acuminate 3-nerved often petioled, calyx-lobes winged. Griseb. in DC. Prodr. ix. 47.

PEGU and TENASSEERIM, Wallich, Lobb, alt. 3–4000 ft., Kurz.

Stem 4–8 in., erect, quadrangular, simple or slightly branched upwards. *Leaves* 1 $\frac{1}{2}$ by $\frac{2}{3}$ in., base narrowed; petiole sometimes $\frac{1}{2}$ in. *Cymes* terminal, few-fl., axillary 1-fl. peduncles sometimes added; pedicels 0– $\frac{1}{4}$ in. *Calyx-lobes* $\frac{1}{2}$ in., ovate, acute; wings broad-lanceolate or ovate. *Corolla-lobes* $\frac{1}{4}$ in., ovate-lanceolate. *Anthers* $\frac{1}{12}$ in., dehiscent finally nearly to the base. *Capsule* $\frac{1}{8}$ in., subglobose.

DOUBTFUL SPECIES.

E. PUNCTATUM, Linn. f. Suppl. 124; leaves very shortly petioled 3-nerved glandulose-punctate, corolla blue, stamens exserted yellow. Griseb. in DC. Prodr. ix. 47.—INDIA, Koenig.

3. **SEBEA**, R. Br.

Erect, annual herbs. *Leaves* small, sessile. *Flowers* small, yellow, in terminal cymes. *Calyx-lobes* 4–5, keeled. *Corolla-tube* cylindric; lobes 4–5 patent. *Stamens* 4–5, on the upper part of the corolla-tube, filaments short linear; anther-cells oblong, opening introrsely by longitudinal slits. *Ovary* completely 2-celled, placentæ large; style short, linear, stigma globose or subspatulate. *Capsule* globose or ellipsoid, septicidally 2-valved. *Seeds* very many, minute, polyhedral, testa coarsely loosely reticulated.—Species 18; in Africa, Madagascar, Australia, and N. Zealand.

S. khasiana, Clarke in Journ. Linn. Soc. xiv. 428; cauline leaves $\frac{1}{2}$ – $\frac{1}{3}$ in. lanceolate-linear, cyme 1–7-flowered, calyx 5-partite. Cicendia microphylla, Edgew. in Trans. Linn. Soc. xx. 83. Erythræa microphylla, Benth. in Gen. Pl. ii. 811.

N. W. HIMALAYA; Gurwhal, alt. 5–6000 feet, Edgeworth; NEPAL; Wallich. KHASIA Mts., Kollong Rock, alt. 5500 ft., Clarke.—DISTRIB. Angola.

Stem 6 in., simple, slender, angular, glabrous. Radical *leaves* 0 at flowering time. *Pedicels* $\frac{1}{12}$ – $\frac{1}{3}$ in., rigid, angular. *Sepals* $\frac{1}{2}$ in., lanceolate, keeled, scarious-margined. *Corolla-tube* $\frac{1}{2}$ in.; lobes $\frac{1}{2}$ in.; elliptic. *Anthers* oblong, scarcely apiculate, without glands at the base, finally straight; stigma a flattened ellipsoid, papillose on the edge.—*S. aurea*, R. Br. (Griseb. in DC. Prodr. ix. 52), has the upper leaves broader, but the plant collected by Welwitsch in Angola is identical with the Indian, except that its anthers are minutely apiculate.

4. **HOPPEA**, Willd.

Small, much branched, glabrous herbs. *Leaves* small, sessile, ovate or elliptic. *Cymes* 2-3-chotomous, flowers sessile or short-pedicelled. *Calyx* campanulate; lobes 4, ovate, acuminate. *Corolla-tube* subglobose or elongate; lobes 4, short or long, more or less unequal. *Stamens* 1 perfect, 3 barren, attached in the corolla-throat, filaments linear short; anthers ovate, dehiscing introrsely by two longitudinal slits; barren anthers similar but much smaller, sometimes 0. *Ovary* 1-celled, placentæ not far intruded; style short, stigma subentire. *Capsule* globose or ellipsoid, carpels separating. *Seeds* very many, minute, nearly black, obscurely reticulated.—Species 2, Indian.

1. **H. dichotoma**, Willd. in *Ges. Nat. Fr. Berl. Neue Schrift*. iii. 435; divaricately densely branched often from near the base, corolla ventricose shorter than the calyx both in flower and fruit, lobes short triangular, capsule subglobose. *Hayne Termin. Bot.* t. 30, fig. 3. *Hoppea dichotoma*, *Vahl Enum.* i. 3. *Pladera pusilla*, *Roxb. Fl. Ind. ed. Carey & Wall.* i. 419; *Griseb. in DC. Prodr.* ix. 63; *Clarke in Journ. Linn. Soc.* xiv. 429. *Canscora pusilla*, *Roem. & Sch. Syst.* iii.; *Mant.* 230 (excl. syn. *Exacum* sessile); *Wall. Cat.* 4366; *D. Don in Trans. Linn. Soc.* xvii. 530. *Cicendia Roxburghii*, *Griseb. Gentian.* 160; *Thoms. & Bacon in Hook. Lond. Journ.* iv. 637, t. 22.

Throughout INDIA, alt. 0-3000 ft.; very common; from the Punjab and Assam to Belgaum and Central India, the Circars, and Chittagong.

Stem 1-5 in., quadrangular. *Leaves* $\frac{1}{4}$ in., ovate. *Cymes* dense or lax. *Calyx* $\frac{1}{12}$ in.; lobes scarious, marginal nerve green. *Corolla* white, tube $\frac{1}{20}$ in., ventricose; in fruit wider upwards with the lobes incurved, overtopped by the acute calyx-teeth. *Stigma* clavate, obscurely 2-fid.

2. **H. fastigiata**, *Clarke*; corymbose upwards with ascending branches, corolla tubular lobes oblong overtopping the calyx both in flower and fruit, capsule ellipsoid. *Cicendia fastigiata*, *Griseb. Gentian.* 158, and in *DC. Prodr.* ix. 62. *Pladera fastigiata*, *Arnott in Herb. Wight*; *Clarke in Journ. Linn. Soc.* xiv. 429. *P. pusilla*, *Thwaites Enum.* 204, not of *Roxb.* *Exacum*? *concinnum*, *Miq. in Pl. Hohenack.* n. 581.

S. DECCAN PENINSULA, Mysore and Courtallum, *Wight*; Mangalore, *Hohenacker*. MOULMEIN; *Lobb.* CEYLON, frequent.

Stem 2-6 in., winged. *Leaves* $\frac{1}{2}$ in., ovate. *Flowers* fastigiate. *Calyx* $\frac{1}{2}$ in.; lobes scarious with a marginal nerve. *Corolla-tube* $\frac{1}{10}$ in. long, oblong, in fruit narrowed in the throat with the lobes erect, much overtopping the calyx-teeth. *Stigma* slightly clavate, subentire. *Seeds* very small, but twice as large as those of *H. dichotoma*.—The type of *Cicendia fastigiata*, *Griseb.* is *Macrae's* Ceylon plant, which *Grisebach (Gentian.* 159) says has 4 perfect stamens, but it has 1 only. The corolla in the present species is totally unlike that of *Hoppea dichotoma*, and the species so far agrees with *Cicendia*.

5. **ENICOSTEMA**, Blume.

A glabrous herb, erect, or decumbent branched. *Leaves* sessile, ovate-lanceolate or linear. *Flowers* small, in sessile axillary clusters. *Calyx* deeply 5-fid; segments not keeled. *Corolla* tubular funnel-shaped; lobes 5, spreading, white or bluish. *Stamens* 5, on the upper part of the corolla-tube, filaments shortly linear with minute scales at their base; anthers oblong, acute, included. *Ovary* 1-celled, placentæ not far intruded; style short, linear, stigma capitate. *Capsule* ellipsoid, carpels separating. *Seeds* many, subglobose, reticulated.

E. littorale, Blume Bijdr. 848; Griseb. *Gentian.* 135 and in DC. *Prodr.* ix. 66. *Gentiana verticillata*, Linn.; Wall. *Cat.* 4396; Roxb. *Fl. Ind.* ii. 71. *G. verticillaris*, Retz Obs. ii. 15. *Exacum hyssopifolium*, Willd. *Sp. Pl.* i. 640; Roxb. *Hort. Beng.* 10. *E. verticillatum*, Willd. *Sp. Pl.* i. 640. *Ericoila verticillata*, Borkh. in Roem. Arch. i. 27. *Hippion hyssopifolium* and *verticillatum*, Spreng. *Syst.* i. 589; Griseb. *Gentian.* 134. *H. orientale*, Daltz. & Gibs. *Bomb. Fl.* 157. *Cicendia hyssopifolia*, W. & A. in Hook. *Comp. Bot. Mag.* ii. 249, t. 28. *Slevogtia verticillata*, D. Don in Trans. Linn. Soc. xvii. 532. *S. orientalis* and *occidentalis*, Griseb. in DC. *Prodr.* ix. 65. *S. maritima*, Daltz. in Hook. *Kew Journ.* ii. 137. *Adenema hyssopifolium*, G. Don *Syst.* iv. 201; *Wight Ic.* t. 600.

Throughout INDIA, alt. 0–1500 ft.; from the Punjab and Gangetic Plain to CEYLON; more frequent near the sea, not known in Bengal.—DISTRIB. Malaya, Tropical Africa, W. Indies.

Stem 4–20 in., terete or quadrangular, internodes short. *Leaves* 2 by $\frac{1}{2}$ in., or small or sublinear. *Calyx* $\frac{1}{10}$ in.; lobes narrowly oblong, obtuse. *Corolla-tube* $\frac{1}{2}$ in.; lobes $\frac{1}{10}$ in., elliptic. *Capsule* $\frac{1}{2}$ – $\frac{1}{3}$ in. *Seeds* small, but much larger than in the preceding genera.

6. ERYTHRÆA, L. C. Rich.

Herbs, annual or perennial, erect, branched. *Leaves* opposite, sessile. *Cymes* dichotomous, dense or corymbose, rarely elongate; flowers rose, white or (in non-Indian species) yellow. *Calyx* tubular; teeth 5, lanceolate or linear, keeled. *Corolla-tube* long or short; lobes 5, spreading. *Stamens* 5, near the summit of the corolla-tube, filaments short linear; anthers narrowly oblong. *Ovary* 1-celled, placenta far intruded; style linear, stigmas semicircular or oblong. *Capsule* oblong, about as long as the calyx, nearly 2-celled, 2-valved, capsules separating. *Seeds* very small, reticulated.—Species 20, throughout the N. Hemisphere, extending to Chili and Australia.

The Indian species have all an elongate corolla-tube, as long or longer than the calyx, and the corolla-lobes elliptic or oblong, small, much shorter than the tube, and would be by some authors all referred as varieties to *E. ramosissima*, Pers.

1. **E. ramosissima**, Pers. *Syn.* i. 283; radical leaves not rosulate cauline oblong or elliptic acute, flowers rose-coloured clustered sessile prominently bracteate, calyx-teeth long linear about equalling the corolla-tube. Griseb. *Gentian.* 137, and in DC. *Prodr.* ix. 57; Boiss. *Fl. Orient.* iv. 67. *E. pulchella*, Hornem. in *Fl. Dan.* t. 1637. *Erythræa* sp. 2, Clarke in *Journ. Linn. Soc.* xiv. 428. *Gentiana Centaurium*, var. β , Linn. *Sp. Pl.* 333.

PUNJAB, alt. 1–2000 ft.; Loodiana, Hooshiapore, Thomson, Edgeworth, &c.—DISTRIB. Cabul and Beloochistan, W. Asia and Egypt.

Stem 3–15 in., very leafy. *Leaves* $1\frac{1}{2}$ by $\frac{2}{3}$ in. *Calyx* $\frac{1}{2}$ in.; teeth prominent, overtopping the buds almost till the moment of opening.—This Punjab plant is not exactly the type of *E. ramosissima*, being often tall, leafy, the flowers in clusters enveloped with bracts, the calyx-teeth substellate; the same form extends through Asia to Egypt.

VAR. caspica; upper leaves oblong-linear, cyme repeatedly dichotomous. *E. caspica*, Griseb. *Gentian.* 145, and in DC. *Prodr.* ix. 59.—Punjab (?), Falconer.—Cabul and the Caspian region.

VAR. pulchella, Griseb. *Gentian.* 137; stem slender, cauline leaves $\frac{1}{2}$ – $\frac{1}{3}$ in. oblong or ovate obtuse, cymes depauperated, calyx-teeth not prominent.—Skardo, alt. 7–8000 ft., Thomson.—Distrib. Central and W. Asia. This is not exactly the same as Fries' *E. pulchella*, but it is included under *E. ramosissima* by Boissier, l. c. *Hk. f. & T.* in Herb. marked it *E. tenuiflora*, Link (*Fl. Port.* i. t. 67), which again is only a var. of *E. latifolia*, Griseb., but the true *E. latifolia*, Smith, differs considerably, having larger flowers and being allied to *E. Centaurium*.

2. **E. Roxburghii**, *G. Don Gen. Syst.* iv. 206; radical leaves numerous persistent obovate or elliptic cauline smaller narrower, cymes repeatedly dichotomous with a long-pedicelled flower in each fork, corolla-tube much longer than the calyx, lobes rose-coloured. *Griseb. Gentian.* 145, and in *DC. Prodr.* ix. 59; *Dalz. & Gibs. Bomb. Fl.* 157. *E. ramosissima*, Var. *a* and *β*, *Clarke in Journ. Linn. Soc.* xiv. 428, *not of Pers.* *Chironia centaurioides*, *Roxb. Fl. Ind.* i. 584; *Wall. Cat.* 4397.

Throughout INDIA ascending to 2000 ft., from the Punjab and Bengal to Travancore; common in Bengal Plain.

Stem 2–8 in. *Radical leaves* 1 by $\frac{1}{2}$ in., usually obtuse. *Cyme* fastigiate or widely dichotomous; pedicels in the forks usually $\frac{1}{4}$ – $\frac{1}{2}$ in.; bracts not prominent. *Calyx* $\frac{1}{2}$ in. *Corolla-tube* exceeding $\frac{1}{2}$ in., lobes very small.

VAR. *saxatilis*; stem taller paniced, leaves narrowly lanceolate basal leaves disappearing, flowers in small terminal clusters.—S. Deccan Peninsula.

3. **E. Meyeri**, *Bunge; Ledeb. Fl. Alt.* i. 220, and *Ic. t.* 159; radical leaves not rosulate cauline oblong, cyme laxly sparingly dichotomous with a long-pedicelled flower in each fork, corolla-tube scarcely longer than the calyx lobes white. *E. ramosissima* and *altaica*, *Griseb. in DC. Prodr.* ix. 57. *E. ramosissima*, var. *albiflora*, *Boiss. Fl. Orient.* iv. 67.

KASHMIR and BALTISTHAN; alt. 5–8000 ft., frequent.—DISTRIB. Cabul, Central Asia to the Altai.

Stem 4–10 in., undivided below; radical leaves 2 or 0 at flowering time. *Leaves* $\frac{1}{2}$ by $\frac{1}{2}$ in., subobtuse. *Pedicels* of the flowers on the forks $\frac{1}{4}$ – $\frac{1}{2}$ in.—It is not clear why *Grisebach* and *Boissier*, while maintaining several *Erythræas* as distinct species, reduce this to *E. ramosissima*, from which it is remote in its undivided stem and long-pedicelled flowers, which are invariably white. It is in fact much nearer *E. Roxburghii*.

4. **E. babylonica**, *Griseb. in DC. Prodr.* ix. 60; stem quadrangular, radical leaves not rosulate, cauline oblong remote, cyme laxly dichotomous, branches erect all the flowers subsessile rose-coloured. *E. spicata*, var. *Boiss. Fl. Orient.* iv. 69; *Clarke in Journ. Linn. Soc.* xiv. 428. *E. ramosissima* and *linarifolia*, *Clarke l. c.*, *not of Persoon*.

PUNJAB; *Falconer*; Lahore, *Brandis*.—DISTRIB. Cabul, Persia.

Stem 6–15 in., simple below, acutely quadrangular. *Radical leaves* 2–0 at flowering time. *Leaves* $\frac{1}{2}$ by $\frac{1}{2}$ in., scarcely acute. *Cyme* symmetrically dichotomous; pedicels of the flowers in the forks scarcely $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in., nearly equalling the corolla-tube.—Considered by *Bentham* and *Boissier* a var. of *E. spicata*, *Pers.*, which differs only by its unilateral cyme-branches. *E. babylonica* has been misunderstood, because *Grisebach* described the flowers as 4-merous, whereas in *Ancher-Eloy's* n. 2432 (*Grisebach's* type) they are 5-merous. The Cabul examples identical with this are called by *Boissier E. caspica*, and it is very difficult to say how they differ except in the strict cymes forming an elongate panicle.

7. **CANSCORA**, *Lamk.*

Annual herbs, dichotomously branched. *Leaves* opposite, sessile, petioled or perfoliate. *Flowers* in terminal or central cymes, or axillary solitary, or densely spiked on scapes. *Calyx* tubular, 4-toothed, terete striate keeled or winged. *Corolla-tube* cylindric, about as long as the calyx; lobes 4, more or less unsymmetric, imbricate in the bud. *Stamens* 4, near the summit of the corolla-tube; 1 or 2 larger with longer filaments and fertile ovate or oblong anthers; 3 or 2 with shorter (often lower-attached) filaments, smaller, barren or sometimes subobsolete. *Ovary* 1-celled, placentæ not far intruded; style

linear, stigmas 2 short hemispheric. *Capsule* 2-valved, separating into its 2 carpels, or often very thin breaking up irregularly. *Seeds* very small, polyhedral, dark brown, reticulated.—Species 14, chiefly Indian; Malaya, Australia, Trop. Africa and its islands.

SURGENUS I. Eucanscora. *Flowers* in terminal dichotomous cymes, or pedicelled in axillary small cymes. *Calyx* keeled or winged. *Corolla* subbilabiate. *Stamens* 4, one larger perfect, three shorter smaller barren or subobsolete.

* Cymes terminal; bracts at its bifurcations not perfoliate.

† *Calyx* striate or keeled, not winged, pedicels not 4-winged.

1. **C. diffusa**, Br. *Prodr.* 451 in *Obs.*; stem quadrangular, lower leaves lanceolate or elliptic, cyme diffuse, bracts (at least of its lower divisions) large ovate acute sessile membranous, pedicels slender flexuose, corolla rose. *Griseb. Gentian.* 162, and in *DC. Prodr.* ix. 64; *Wall. Cat.* 4261; *Dalz. & Gibs. Bomb. Fl.* 158; *Clarke in Journ. Linn. Soc.* xiv. 429; *Benth. Fl. Austral.* iv. 372. *C. foliosa*, G. Don *Gen. Syst.* iv. 199? *C. Lauri*, *Wight Ic.* t. 1327, not of *Clarke*. *Gentiana diffusa*, *Vahl Symb.* iii. 47. *Exacum diffusum*, *Willd. Sp. Pl.* i. 637. *E. erectum*, *Roth Nov. Sp.* 83. *Orthostemon erectum*, Br. *Prodr.* 461; *Griseb. Gentian.* 151, and in *DC. Prodr.* ix. 63. *O. Hugelii*, *Griseb. in DC. Prodr.* ix. 63. *Pladera virgata*, *Roxb. Fl. Ind. ed. Carey & Wall.* i. 417; *Hook. Bot. Misc.* iii. 88, t. 25. *Cobamba dichotoma*, *Blanco Fl. Filip.* (ed. 2) 355.

Throughout INDIA ascending to 4000 ft., common; from Kumaon and Bhotan to Ceylon and Tenasserim.—**DISTRIB.** Malaya, Australia, and E. Tropical Africa.

Annual, erect, 4–20 in., densely branched upwards. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ in., 3-nerved, often petioled; upper passing into the bracts. *Cyme* diffuse, leafy; bracts $\frac{1}{2}$ in. leaflike, a few of the uppermost linear. *Calyx* $\frac{1}{2}$ in.; teeth lanceolate-linear. *Corolla-tube* $\frac{1}{2}$ in., lobes $\frac{1}{2}$ in. *Stamens* one on the corolla-throat, perfect; 3 rather lower down with slightly shorter filaments and smaller anthers, polliniferous or not. *Capsule* oblong, as long as the calyx.

VAR. tenella; bracts ovate herbaceous, many of the upper linear. *C. tenella*, *Wight Ic.* t. 1327; *Wall. Cat.* 4362.—Malabar and Mysore, *Wight*.—This has the bracts nearly as in the next species, but the cyme is diffuse, the pedicels long slender.

2. **C. decurrens**, *Dalz. in Hook. Kew Journ.* ii. 136; stem 4-winged, lower leaves lanceolate or elliptic, cyme erect with ascending branches, bracts in its upper part small or linear, pedicels erect, corolla rose or white. *Dalz. & Gibs. Bomb. Fl.* 157; *Clarke in Journ. Linn. Soc.* xiv. 430. *C. divaricata*, *Miq. in Pl. Hohenack.* n. 670.

W. DECCAN PENINSULA from the Concan southwards, frequent.

Very doubtfully distinct from *C. diffusa*, var. *tenella*. *Leaves* hardly decurrent. *Cyme* subtrichotomous (in *C. diffusa* usually dichotomous).

3. **C. pauciflora**, *Dalz. in Hook. Kew Journ.* ii. 136; stem 4-winged, lower leaves ovate or obovate, cyme laxly dichotomous few-flowered, branches long curved ascending somewhat 4-angled, pedicels often thickened under the calyx. *Dalz. & Gibs. Bomb. Fl.* 157. *C. lancifolia*, *Miq. in Pl. Hohenack.* a. 305. *C. Lauri*, *Clarke in Journ. Linn. Soc.* xiv. 430, not of *Wight*.

W. DECCAN PENINSULA, from Malwan to Quilon; *Dalzell, Wight, &c.*

Lower leaves scarcely $\frac{1}{2}$ in., smaller than the middle cauline. *Bracts* (of the lower part of the cyme) rarely so much as $\frac{1}{4}$ in., oblong or linear.—This seems very near, but separable from, *C. diffusa*; *Wight*, however, in his *Herb.*, referred it to his *C. tenella* (treated above as a var. of *C. diffusa*).

†† *Calyx keeled not winged, cyme-branches distinctly winged.*

4. **C. sessiliflora**, Roem. & Sch. Syst. iii. Mant. 230; leaves ovate, flowers in the forks of the cyme sessile. Wall. Cat. 4367; Griseb. *Gentian.* 153, and in *DC. Prodr.* xiv. 64; Clarke in *Journ. Linn. Soc.* xiv. 430. *Gentiana heteroclita*, Linn. Mant. 560. *Exacum heteroclitum*, Willd. Sp. Pl. i. 639. *Pladera sessiliflora*, Roxb. Fl. Ind. ed. Carey & Wall. i. 416. *Centaurium malabaricum*, Borkh. in Roem. Arch. i. 27.

S. DECCAN PENINSULA; Rottler, Wight, &c. CEYLON, Batticaloa district, not common, Thwaites.

Stem 4–9 in., broadly 4-winged upwards. *Leaves* $\frac{1}{2}$ in., sessile, obtuse or subacute. *Cyme* with ascending branches; bracts $\frac{1}{8}$ – $\frac{1}{4}$ in., narrow; lateral flowers usually bracteate, sometimes pedicelled. *Calyx* $\frac{1}{4}$ in. *Corolla-tube* $\frac{1}{4}$; lobes $\frac{1}{4}$ in., broadly obovate, rose-coloured. *Flowers* and *capsules* nearly as of *C. diffusa*, but slightly larger.

††† *Calyx distinctly winged.*

5. **C. decussata**, Roem. & Sch. iii. Mant. 229; leaves oblong-lanceolate, cyme rigidly erect, branches 4-winged, calyx-wings narrowly lanceolate, flowers white. Wall. Cat. 4364; Griseb. *Gentian.* 153, and in *DC. Prodr.* ix. 430. *Pladera decussata*, Roxb. Fl. Ind. ed. Carey & Wall. i. 418; Bot. Mag. t. 3066.

Throughout INDIA, ascending to 4000 ft.; from the Himalaya to Burma; abundant in Bengal Plain. CEYLON, not uncommon.—DISTRIB. Madagascar, Bourbon, Trop. Africa.

Stem 4–20 in., 4-winged. *Leaves* $1\frac{1}{2}$ by $\frac{3}{8}$ in., sessile, 3-nerved. *Cyme* lax; flowers in the forks pedicelled. *Calyx* $\frac{1}{2}$ – $\frac{1}{3}$ in. *Corolla-tube* as long as the calyx; lobes $\frac{1}{4}$ in., obovate, obtuse. *Stamens* 1 perfect; 3 barren, variously reduced, subsessile or with filaments. *Capsule* and *seeds* considerably larger than in *C. diffusa*.—*Exacum alatum*, Roth, is reduced here by Grisebach, and there are specimens of Rottler and Heyne which do belong; but Roth's description "calyx with broad scarious wings, corolla rose" refers entirely to *Canscora perfoliata*, Lamk.

6. **C. concanensis**, Clarke; leaves ovate, cymes slender branches not winged, calyx-wings elliptic nerved scarious in fruit.

The CONCAN, Law.

A slender annual, 3–5 in.; stem decumbent then erect, obscurely quadrangular. *Leaves* $\frac{3}{4}$ by $\frac{1}{2}$ in., subacute, sessile, 3-nerved. *Cymes* weak, at first dichotomous, branches upwards subunilateral, flowers all pedicelled; pedicels $\frac{1}{8}$ – $\frac{1}{4}$ in., slender; bracts $\frac{1}{8}$ – $\frac{1}{2}$ in., linear. *Calyx* $\frac{1}{2}$ in.; wings $\frac{1}{2}$ in., broad in fruit. *Corolla-tube* as long as the calyx; lobes $\frac{1}{6}$ in., obovate, obtuse, seem to have been rose.—Nearest to *C. macrocalyx*, Miq. Fl. Ind. Bat. ii. 553, which is a rigid erect plant with winged stem and cyme-branches.

** Cymes terminal; bracts at its bifurcations (or some of them) perfoliate.

7. **C. perfoliata**, Lamk. Dict. i. 601, not of Griseb.; leaves elliptic acute, calyx large wings elliptic nervose. *C. alata*, Wall. Cat. 4363 A; Griseb. *Gentian.* 154, and in *DC. Prodr.* ix. 65; Daltz. & Gibbs. *Bomb. Fl.* 158; Clarke in *Journ. Linn. Soc.* xiv. 431. *C. grandiflora*, Wight Ic. t. 1326. *C. macrocalyx*, Miq. in Pl. Hohenacker, n. 810 (not Fl. Ind. Bat. ii. 553). *Pladera perfoliata*, Roxb. Fl. Ind. ed. Carey & Wall. i. 418. *Exacum alatum*, Roth Nov. Sp. 85.—Rheede Hort. Mal. x. 103, t. 52.

The DECCAN PENINSULA; from Bombay to Travancore; Rottler, &c.

Stem 6–18 in., 4-winged. *Leaves* 1 by $\frac{1}{2}$ – $\frac{3}{8}$ in., sessile, 3-nerved. Upper bracts $\frac{1}{2}$ in. diam., suborbicular, 2-mucronate; pedicels very short. *Calyx* $\frac{1}{2}$ – $\frac{3}{8}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in.

Corolla-tube as long as the calyx; lobes $\frac{1}{4}$ – $\frac{1}{2}$ in., obovate, obtuse, rose. *Capsule* $\frac{1}{2}$ in. —Lamarck founded *Canscora* and the species *C. perfoliata* on Rheede l. c.; Grisebach says the calyx is exalate, in direct opposition to Rheede's figure and description; moreover the size of the calyx and corolla and whole habit of the plant in Rheede shows that his figure means the *Pladera perfoliata* of the old collectors.

8. **C. Walltohl**, Clarke; leaves oblong acute, calyx cylindric not winged. *C. perfoliata*, Wall. Cat. 4365; Griseb. *Gentian.* 155, and in *DC. Prodr.* ix. 65 (*syn. excl.*); Wight *Ic. t.* 1327, *middle figure*; Thwaites *Enum.* 204; Clarke in *Journ. Linn. Soc.* xiv. 431, *not of Lamk.*—*Canscora* sp., Wall. Cat. 4363 B *partim*.

THE CARNATIC, MYSORE, and MALABAR, Heyne, &c. CEYLON; north end of the Isld., Gardner, &c.

Stem 8–16 in., 4-winged. *Leaves* and *cyme* very nearly as of *C. perfoliata*; pedicels $\frac{3}{4}$ – $\frac{1}{2}$ in., filiform. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ by $\frac{1}{2}$ in., in fruit scarious with 12 green nerves. *Corolla-tube* as long as the calyx; lobes hardly $\frac{1}{2}$ in., obovate, obtuse, rose.

*** Cymes axillary, weak, few-fl'd.

9. **C. andrographioides**, Griff. mss.; Clarke in *Journ. Linn. Soc.* xiv. 431; leaves elliptic-lanceolate 3-nerved, pedicels filiform, bracts minute, calyx cylindric striate not winged. *Canscora diffusa?*, Wall. Cat. 4361 K. *Pladera?* *virgata*, Griff. *Notul.* iv. 92.

KHASIA MTS.; alt. 1–4000 ft., frequent, Wallich, &c. MOULMEIN; Griffith, Lobb.

Stem paniculately branched from the base; branches 8–20 in., quadrangular, not winged. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ – $\frac{1}{2}$ in., 3–5-nerved; petiole $\frac{1}{12}$ in. *Cymes* 1–2 in., 1–5-flowered. *Calyx* $\frac{1}{2}$ by $\frac{1}{10}$ in. *Corolla-tube* as long as the calyx; lobes $\frac{1}{4}$ in., obovate-oblong, white-purple- or rose-veined. *Stamens*, 1 with a filament and ovate perfect anther, 3 subsessile with oblong small but often polliniferous anthers. *Capsule* and seeds nearly of *C. diffusa*.

SUBGENUS II. **Heterocanscora**. *Flowers* in dense spikes, opposite, each bracteate and with 2 large bracteoles. *Calyx* very thin, not winged. *Corolla*, *stamens*, and *style* of *Eucanscora*.

10. **C. Schultesii**, Wall. Cat. 4368; scapose, radical leaves small elliptic petioled. Griseb. *Gentian.* 155, and in *DC. Prodr.* ix. 65. *Heterocanscora* Schultesii, Clarke in *Journ. Linn. Soc.* xiv. 431.

BURMA; Prome Hills, Wallich; Pegu Yomah, Kurz.

Scapes 3–10, several from one annual root, somewhat 4-winged upwards. *Radical leaves* $\frac{1}{2}$ by $\frac{1}{4}$ in.; cauline few, bractlike, $\frac{1}{4}$ in., linear, acute. *Flower-spikes* 1–3 in., terminal, simple, scarcely interrupted. *Bracts* $\frac{1}{2}$ in., boat-shaped, widely elliptic, shortly caudate; bracteoles similar, rather smaller, unilateral. *Calyx* $\frac{1}{4}$ in. *Corolla-tube* $\frac{1}{2}$ in., lobes $\frac{1}{2}$ in. *Stamens* 1 with a filament, perfect; 3 much smaller, on very short filaments. *Capsule* $\frac{1}{2}$ in., and seeds of *Canscora*.—In general habit, inflorescence, and bracts simulating *Andrographis paniculata*.

SUBGENUS III. **Phyllocyclus**. *Stem* and *branches* terete. *Leaves* all perfoliate orbicular. *Flowers* axillary, solitary. *Calyx* ventricose-tubular. *Stamens* 2 larger, on longer filaments, 2 smaller.

11. **C. Parishii**, Hook. f. in *Bot. Mag.* t. 5429; calyx $\frac{1}{2}$ – $\frac{1}{2}$ in., corolla-tube as long as the calyx, lobes $\frac{1}{2}$ in. ovate white with two yellow spots at the base. *Phyllocyclus* Parishii, Kurz in *Journ. As. Soc.* 1873, pt. ii. 236; Clarke in *Journ. Linn. Soc.* xiv. 432.

MOULMEIN, Griffith, Parish, Lobb.

Stem 8–24 in., divaricately dichotomous. *Leaves* $1\frac{1}{2}$ in. diam., radiately nerved;

uppermost herbaceous. *Pedicles* $0-\frac{1}{8}$ in. *Calyx* $\frac{1}{4}-\frac{1}{2}$ in. broad at the base, slightly narrowed upwards, lobes short triangular. *Capsule* $\frac{1}{4}$ by $\frac{1}{2}$ in., ellipsoid. *Seeds* as of *Eucanscora*.

12. **C. Helferiana**, Wall. mss.; calyx $\frac{1}{4}-\frac{1}{2}$ in., corolla-lobes $\frac{1}{4}$ in. *Phyllocyclus* Helfer, Kurz in Journ. As. Soc. 1873, pt. ii. 236; Clarke in Journ. Linn. Soc. xiv. 432.

MOULMEIN, Griffith; Three-Pagoda Pass into Siam, Helfer (Kew Distrib. n. 5816).

Closely resembling *C. Parishii*, but the calyx, corolla, and capsule rather smaller, and the uppermost (floral) leaves very scarious. It is probably only a var. of *C. Parishii*.

8. **CRAWFURDIA**, Wall.

Twining. *Leaves* opposite, petioled, 3-nerved. *Flowers* showy, axillary, solitary or in small cymes, purple white or greenish-yellow. *Calyx* tubular, lobes 5 (or 4 in a non-Indian species). *Corolla* elongate tubular-campanulate, plicate or subterete; lobes 5, short. *Stamens* 5, on the middle of the corolla-tube, filaments flattened; anthers oblong. *Ovary* stalked, 1-celled; disc small, 5-toothed; style linear, stigmas 2 short linear. *Fruit* globose or oblong, compressed or terete, 2-valved, or indehiscent. *Seeds* many, discoid, broadly winged, or wedge-shaped subtriquetrous narrowly 3-winged.—Species 9–10; in India, Malaya, China, and Japan.

SUBGENUS I. **Dipterospermum**. *Flowers* (or many of them) long-pedicelled. *Calyx* not keeled. *Capsule* dry. *Seeds* compressed, discoid; wing marginal, broad, simple, scarious.

1. **C. speciosa**, Wall. Cat. 4371, and Tent. Fl. Nep. 64, t. 48; leaves elliptic acuminate minutely denticulate glabrous, calyx-limb truncate teeth 5 small lanceolate excurrent below the margin, corolla-limb subtruncate teeth distant small triangular acute. *D. Don* in Trans. Linn. Soc. xvii. 517; Griseb. Gentian. 305, and in DC. Prodr. ix. 120; Clarke in Journ. Linn. Soc. xiv. 442, partly.

CENTRAL and EASTERN HIMALAYA; Nepal and Sikkim, alt. 6–10,000 ft., frequent, Wallich, J. D. H., &c.

Leaves 3 by 1 in., base cuneate or rounded. *Cymes* 1–3 in., 1–5-flowered; pedicels 0–7 in.; bracts $\frac{1}{2}$ in., lanceolate, one pair near the base or summit of the pedicel, often 0. *Calyx* $\frac{1}{2}$ by $\frac{1}{2}$ in., cylindric, base campanulate; teeth $\frac{1}{8}-\frac{1}{5}$ in. *Corolla* $1\frac{1}{2}$ by $\frac{3}{4}$ in., purple, plicate; teeth scarcely $\frac{1}{2}$ in. *Filaments* dilated in the middle, attached in the middle of the corolla, sometimes free at the base. *Stigma* more than $\frac{1}{2}$ in., linear. *Capsule* 1 by $\frac{1}{4}-\frac{1}{2}$ in., subincluded in the corolla, stalk $\frac{1}{2}-\frac{2}{3}$ in.

2. **C. campanulacea**, Wall. & Griff. mss.; leaves elliptic acuminate entire glabrous coriaceous, calyx-lobes ovate-lanceolate terminating the tube, corolla-lobes approximate ovate-lanceolate. *C. speciosa*, Clarke in Journ. Linn. Soc. xiv. 442, partly.

KHASIA Mts., alt. 4–6000 ft., frequent, Wallich, H. f. & T., &c.

Leaves as of *C. speciosa* but more coriaceous, the 3 main nerves broad beneath, others obscure. *Peduncles* 0–4 in., all 1-flowered; bracts $\frac{1}{2}$ in., present or absent, varying in position. *Calyx-tube* $\frac{1}{2}$ by $\frac{1}{2}$ in., cylindric; lobes $\frac{1}{3}-\frac{1}{5}$ in., not keeled. *Corolla* $1\frac{1}{2}$ by $\frac{3}{4}$ in., purple, very obscurely plicate; teeth $\frac{1}{4}-\frac{1}{2}$ in., hardly keeled. *Stamens* as of *C. speciosa*. *Stigmas* $\frac{1}{2}$ in., linear. *Capsule* $\frac{3}{4}$ by $\frac{1}{4}$ in., included in the corolla; stalk $\frac{2}{3}$ in.

3. **C. angustata**, Clarke; leaves elliptic acuminate entire glabrous coriaceous, calyx-tube elongate teeth small approximate lanceolate, corolla-tube elongate narrow lobes lanceolate.

UPPER ASSAM; Mishmee Mts., Griffith (Kew Distrib. n. 5838, 5639).

Calyx-tube $\frac{3}{4}$ by $\frac{1}{2}$ in., narrowed at the mouth; teeth $\frac{1}{10}$ in., terminal. *Corolla* 2 by $\frac{1}{2}$ in.; segments $\frac{1}{2}$ – $\frac{3}{4}$ in., acuminate. *Capsule* not ripe, seems likely to be narrow. —This may be a variety of *C. campanulacea*.

4. **C. puberula**, Clarke in Journ. Linn. Soc. xiv. 442; leaves elliptic acuminate minutely denticulate glandulose-puberulous on the nerves beneath, calyx subtruncate teeth small linear distant, corolla-limb subtruncate teeth small triangular acute.

SIKKIM HIMALAYA; Yakla, alt. 9–10,000 ft., Clarke.

Petioles glandular-pubescent. *Cymes* 1–4 in., 1–5-fl., slender. *Calyx* $\frac{1}{2}$ by $\frac{1}{2}$ in.; teeth $\frac{1}{2}$ in., subterminal. *Corolla* $1\frac{1}{4}$ by $\frac{1}{2}$ in., purple, plicate; lobes $\frac{1}{2}$ in. *Style* long, early exsert. *Capsule* $\frac{3}{4}$ by $\frac{1}{2}$ in., half-exsert from the corolla, stalk $\frac{1}{2}$ –1 in. —Perhaps an alpine var. of *C. speciosa* which grows fully as high up, but the flowers are much smaller.

SUBGENUS II. **Tripterosperrum**. *Flowers* (in the Indian species) fascicled. *Calyx* keeled. *Capsule* 2-valved or succulent, subindehiscent. *Seeds* wedge-shaped, triquetrous, almost winged on the angles, one face much narrower than either of the others.

5. **C. fasciculata**, Wall. Tent. Fl. Nep. 63. t. 47; leaves elliptic acuminate, calyx-teeth distant linear not half so long as the tube, corolla large purple, capsule 2-valved dry oblong short-stalked included in the corolla. *D. Don* in Trans. Linn. Soc. xvii. 518; Griseb. Gentian. 306, and in DC. Prodr. ix. 120; Bot. Mag. t. 4838; Clarke in Journ. Linn. Soc. ix. 442. *C. affinis*, Wall. Cat. 4370, partly.

KHASIA MTS., alt. 3–6000 ft., frequent, Wallich, &c.—DISTRIB. S. China.

Leaves 3 by 1 in. *Flowers* 3–1; sometimes pedicelled, with 2 foliaceous bracts under the flower. *Calyx-tube* $\frac{1}{2}$ by $\frac{1}{4}$ in., 5-keeled to the base, scarious between the keels; teeth $\frac{1}{4}$, linear, subterminal. *Corolla* $1\frac{1}{2}$ by $\frac{2}{8}$ in., plicate; lobes $\frac{1}{2}$ in., ovate, acute. *Capsule* 1 by $\frac{1}{2}$ in., stalk scarcely $\frac{1}{4}$ in. —The typical form here described is well-marked; but the starved forms with small flowers hardly differ from the next species by the shorter calyx-teeth and purple flowers.

6. **C. affinis**, Wall. Cat. 4370, partly; leaves cordate-lanceolate acuminate, calyx-teeth linear as long as the tube, corolla small white or greenish yellow, capsule 2-valved dry oblong short-stalked included in the corolla. *C. fasciculata*, Wall. Cat. 4369 A.

SIKKIM HIMALAYA, alt. 5–6000 ft.; frequent. KHASIA MTS., Wallich.

Closely resembling *C. fasciculata*; leaves rounded at the base. *Calyx-tube* $\frac{1}{2}$ in.; teeth more than $\frac{1}{4}$ in., subterminal. *Corolla* less than 1 by $\frac{1}{4}$ in. (in Wallich's example). *Capsule* $\frac{1}{2}$ by $\frac{1}{2}$ in.; stalk $\frac{1}{2}$ in. —The capsule is certainly dry, 2-valved; nevertheless it is to be feared that the species is merely a form of the next. The Javan *C. Blumei* (*Tripterosperrum trinerve*, Blume; DC. Prodr. ix. 121) differs apparently only in having solitary long-pedicelled flowers.

7. **C. japonica**, Sieb. & Zucc. Fl. Jap. Fam. Nat. ii. 36; leaves cordate-lanceolate, calyx-teeth linear as long as the tube, corolla greenish or yellowish, berry ellipsoid red succulent included or exsert from the corolla. Golowninia japonica, Maxim. in Bull. Acad. St. Petersb. iv. 251, t. 4.

SIKKIM HIMALAYA, alt. 7000 ft., J. D. H., Clarke.—DISTRIB. Japan, China, Formosa.

Leaves 3 by 1 in. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in.; teeth distant, excurrent below the margin, or subterminal. *Corolla* 1 – $1\frac{1}{4}$ by $\frac{1}{4}$ in., subtubular, plicate; lobes $\frac{1}{2}$ in., ovate, acute. *Stamens*, *style*, and *disc*, very nearly as of *C. speciosa*, but rather smaller. *Berry* $\frac{3}{4}$ by

$\frac{1}{2}$ in., ellipsoid, or $\frac{1}{2}$ by $\frac{3}{4}$ in., subglobose; completely exserted from the corolla, or half included (on the same branches); stalk often $1-1\frac{1}{2}$ in.

VAR. *luteo-viridis*; berry 1 by $\frac{3}{4}-1$ in., quite included or $\frac{1}{2}$ exsert oblong red, stalk $\frac{1}{2}-1$ in. *C. luteo-viridis*, *Clarke in Journ. Linn. Soc.* xiv. 443. *C. fasciculata*, *Griff. Itin. Notes*, p. 27, n. 420, and p. 127, n. 470. *Gentiana volubilis*, *Don Prodr.* 126.—Himalaya, alt. 5–8000 ft.; from Kumaon to Bhotan, common. Khasia Mts.; alt. 3–5000 ft., frequent.—This is the common *C. fasciculata* of the Himalaya of collectors; but the stalk of the berry is frequently more elongated, and the berry itself so short, that it appears inseparable from *C. japonica*; when much less succulent it runs into *C. affinis*. Wallich appears not to have distinguished it from *C. fasciculata*, as he gives the Himalaya for the habitat of *C. fasciculata*, which species is confined to Khasia.

VAR. *Championi*; leaves hardly acute long-petioled, corolla smaller narrower, berry $\frac{1}{4}$ in. diam. subglobose red exserted. *C. fasciculata*, *Thwaites Enum.* 204. *Tripterospermum Championi*, *Gardn. ms.*—Ceylon; *Gardner*, *Thwaites*.

9. GENTIANA, Linn.

Herbs, annual or perennial, or (*G. crassa*, Kurz) shrubby. Leaves opposite, bases often connate. Flowers axillary or terminal. Calyx tubular, terete or rarely keeled (spathaceous in *G. decumbens*); lobes 5–4. Corolla tubular, bell- or funnel-shaped; lobes 5–4, often with folds between the lobes. Stamens 5–4, attached in the middle or lower half of the tube, included, filaments linear somewhat flattened downwards; anthers oblong or ovate. Ovary 1-celled, placentæ but little intruded; style short or 0, except in *G. stylophora*, stigmas divergent. Capsule stalked or sessile, ellipsoid or oblong, compressed, separating into its 2 carpels, usually to the base. Seeds very many, small, globose or oblong, often trigonous, testa close or lax sometimes prominently reticulated.—Species 180, chiefly in the mountains of the Old World, with a few in the Andes, New Zealand, and Australia.

SECT. I. *Amarella*. Corolla not more than 1 in. at the time of expansion, without folds. Capsule included, sessile or shortly stalked. Seeds small, yellow-brown, numerous, subglobose; testa close, not reticulated.

* Corolla not fimbriate in the throat.

1. *G. Moorcroftiana*, Wall. Cat. 4390; leaves oblong or elliptic, corolla nearly 1 in. 4–5-merous tubular-funnel-shaped. *Griseb. Gentian.* 243, and in *DC. Prodr.* ix. 96, syn. excl.; *Clarke in Journ. Linn. Soc.* xiv. 433.

WESTERN HIMALAYA; Kashmir, Baltistan and Lahoul, alt. 8–12,000 ft., *Moorcroft*, *Falconer*, &c.

Stem 8–16 in., erect, 4-lineolate, branches ascending. Leaves 1 by $\frac{1}{2}$ in., narrowed below. Cymes in subterminal racemes; pedicels $\frac{1}{2}-1\frac{1}{2}$ in. Calyx-tube $\frac{1}{10}$ in.; lobes $\frac{1}{2}$ in., linear. Corolla (at time of expansion) $\frac{1}{2}-1$ in., up to the moment of expansion often short, blue in fruit enlarged often $1\frac{1}{2}$ in., funnel-shaped not campanulate, mouth $\frac{1}{2}$ in. diam. Capsule $\frac{2}{3}$ in., lanceolate; stalk $\frac{1}{2}$ in.—Measurements here taken from *Moorcroft's* example, the calyx-teeth are often even longer, $\frac{1}{2}$ by $\frac{1}{18}$ in.

VAR. *Falconeri*; flowers often 4-merous, calyx-teeth shorter broader often unequal opposite larger $\frac{1}{4}$ by $\frac{1}{6}$ in. *G. Falconeri*, *Clarke in Journ. Linn. Soc.* xiv. 433.—Kashmir, *Falconer*. The seeds do not differ from those of *G. Moorcroftiana*.

VAR. *Maddeni*; leaves narrowly lanceolate acute, expanded corolla often less than $\frac{1}{2}$ in.—Kumaon, alt. 10–12,000 ft., *Madden*, *Davidson*. Tibet, alt. 15,000 ft. (Piti?), *Strachey* & *Winterbottom*.

2. *G. aurea*, Linn.; Boiss. Fl. Orient. iv. 71; leaves oblong or elliptic, corolla $\frac{1}{4}-\frac{1}{2}$ in. 5-merous, tubular. *Griseb. Gentian.* 254, and in *DC. Prodr.* ix.

100. *G. involucrata*, *Fries in Act. Hafn.* x. 434, t. 1, fig. 2. *G. quinquefolia*, *Fl. Dan.* t. 344. *G. umbellata*, *Bieb. Fl. Taur. Cauc.* iii. 188. *G. azurea*, *Bunge in Nouv. Mém. Soc. Imp. Mosc.* i. 230, t. 10, fig. 3, not of *Griseb.* *G. Stoliczkaei*, *Clarke in Journ. Linn. Soc.* xiv. 433.

WESTERN TIBET; Baltisthan, alt. 10–14,000 ft.; *Thomson, &c.*—DISTRIB. Central Asia, and the whole Subarctic Zone.

Stem 4–18 in., erect, 4-lineolate or 4-angular, branches ascending. *Leaves* 1 by $\frac{1}{2}$ in., narrowed below. *Peduncle* $\frac{1}{2}$ –2 in., 1-flowered, in axillary and terminal fascicles. *Calyx-tube* $\frac{1}{2}$ in., lobes $\frac{1}{2}$ in., linear-spathulate, minutely serrulate in the Indian plant. *Corolla* bluish or yellowish, lobes ovate mucronate shorter than the tube; basal glands obsolete. *Capsule* $\frac{1}{2}$ in., oblong; stalk $\frac{1}{2}$ in.—The Indian plant differs from *G. aurea*, Linn. type, in the absence or obscurity of the glands at the base of the corolla-tube, agreeing thus with *G. umbellata*, Bieb. This character considered by *Grisebach* as of sectional value is probably hardly specific.

VAR. *holosteoides*; height $\frac{1}{2}$ –3 in., umbellate character of the inflorescence obscured. *G. holosteoides*, *Schott & Kotschy in Pl. Kotschy*, n. 285.—N. Kashmir, *Falconer*. Skardo; alt. 9100 ft., *Clarke*. DISTRIB. Taurus. The Skardo plant exactly agrees with *Kotschy's*.

3. ***G. Thomsoni***, *Clarke*; minute, leaves obovate-oblong, corolla $\frac{1}{6}$ – $\frac{1}{5}$ in. 4-merous funnel-shaped. *Gentiana* sp. 6, *Herb. Ind. Or. H. f. & T.*

WESTERN TIBET; Karakorum, Nubra alt. 17,000 ft., *Thomson*.

Stem 1 in.; branches numerous, ascending. *Leaves* $\frac{1}{2}$ – $\frac{1}{3}$ in. *Peduncles* $\frac{1}{4}$ –1 in., erect, 1-flowered, subsolitary. *Calyx-tube* $\frac{1}{16}$ in.; lobes $\frac{1}{16}$ in.; oblong or rhomboid. *Corolla-lobes* oblong, about as long as the tube.

** *Corolla fimbriate in the throat.*

4. ***G. borealis***, *Bunge in Nouv. Mém. Soc. Imp. Mosc.* i. 251, t. 10, fig. 2; erect, leaves oblong, pedicels short, corolla tubular 4-lobed terminal flower often 5-lobed.

WESTERN TIBET, alt. 12–14,000 ft.; *Gen. Munro*; LAHOUL, *Jaeschke*; N. KASHMIR to the Karakorum, common.—DISTRIB. N.W. America.

Stem 3–12 in., 4-lineolate, branches ascending. *Leaves* 1 by $\frac{1}{2}$ in., base hardly narrowed. *Pedicels* 0–1 in., mostly cymose on axillary peduncles. *Calyx-tube* $\frac{1}{20}$ in., lobes $\frac{1}{4}$ by $\frac{1}{16}$ in. *Corolla* pink-purple; tube $\frac{1}{2}$ in.; lobes $\frac{1}{8}$ in., ovate, mucronate. *Capsule* $\frac{1}{2}$ in., narrowly oblong; stalk $\frac{1}{12}$ in.—This has the habit of *G. aurea*.

5. ***G. tenella***, *Fries in Act. Hafn.* x. 436, t. 2, fig. 6; erect, leaves oblong or ovate, pedicels (many of them) long, corolla tubular 5-lobed. *Fl. Dan.* t. 318; *Griseb. Gent.* 248, and in *DC. Prodr.* ix. 98; *Clarke in Journ. Linn. Soc.* xiv. 434. *G. Koenigii*, *Gunn. Fl. Norv.* ii. 102. *G. glacialis*, *Thomas in Vill. Delph.* i. 532. *G. dichotoma*, *Pall. Fl. Ross.* ii. 110; *Gmel. Fl. Sibir.* iv. t. 51, fig. B. *G. tetragona*, *Roth Tent. Fl. Germ.* ii. 290. *G. nana*, *Wulf. in Jacq. Misc.* i. 161, t. 18, fig. 3; *Griseb. Gentian.* 249, and in *DC. Prodr.* ix. 98. *G. tristriata* and *pulmonaria*, *Turcz. in Flora 1834 Beibl.* i. 19. *G. pedunculata*, *Royle*; *G. Don Gen. Syst.* iv. 182. *Hippion longepedunculatum*, *Schmidt in Roem. Arch.* i. 21, t. 3, fig. 5. *Eurythalia pedunculata*, *D. Don in Trans. Linn. Soc.* xvii. 516, and *E. nana* and *glacialis*, *G. Don Gen. Syst.* iv. 188, with others.

KASHMIR and W. HIMALAYA, alt. 10–14,000 ft., common.—DISTRIB. Arctic and Alpine Europe and N. and Central Asia.

Stem 2–10 in., erect or straggling, 4-lineolate, branched. *Leaves* $\frac{1}{2}$ by $\frac{1}{4}$ in., lowest spatulate. *Pedicels* often 1–3 $\frac{1}{2}$ in., terminal, solitary. *Calyx-tube* hardly any; lobes $\frac{1}{2}$ by $\frac{1}{10}$ in., elliptic, often unequal. *Corolla-tube* $\frac{1}{2}$ by $\frac{1}{2}$ – $\frac{1}{3}$ in.; lobes $\frac{1}{2}$ in., elliptic. *Capsule* $\frac{3}{4}$ in., oblong-linear, sessile.—Alpine examples, with flowers only

half the size of the fully-developed plant, are frequent. The type specimen (n. 1024 Griff. Journ.) is altogether an average Himalayan example; *G. minutissima*, Boiss. (Fl. Orient. iv. 71) founded on this number is evidently described from some other plant. Koch says that *G. tenella* in Germany is 4-merous; the Himalayan examples are almost uniformly 5-merous. As to the synonyms, if *G. nana* specifically differs from *G. tenella*, it is found in the Himalaya.

VAR. *falcata*, Turcz.; Griseb. *Gentian.* 249; corolla-tube $\frac{1}{2}$ in. long and nearly as broad.—W. Himalaya. DISTRIB. Caucasus.

VAR. *sikkimensis*; stems weak flexuose, leaves scarcely $\frac{1}{2}$ in., peduncles mostly long terminal 1-flowered, expanded corolla scarcely $\frac{1}{2}$ in.—Sikkim; alt. 12,000 ft.; Yeumtung, J. D. H., *Elwes*.

SECT. 2. **Chondrophyllum** (*char. widened*). Corolla not more than 1 in., 5-lobed, tubular, with folds between the lobes. Capsule often exerted. Seeds small, globose oblong or falcate, usually trigonous, testa close, not (or most obscurely) reticulated. (See also *G. ornata*, var. n. 30.)

6. **G. recurvata**, Clarke; stems weak often branched, leaves remote ovate or oblong, pedicels scattered nodding in fruit, corolla twice as long as the calyx, capsule shortly obovoid compressed. *Gentiana* sp. 13, *Herb. Ind. Or. H. f. & T.*; sp. 6, Clarke in *Journ. Linn. Soc.* xiv. 434.

SIKKIM HIMALAYA; alt. 9–12,000 ft., J. D. H., &c.

Stems 2–6 in. Radical leaves $\frac{1}{2}$ by $\frac{1}{2}$ in., spatulate-ovate; cauline $\frac{3}{8}$ – $\frac{1}{2}$ in., sessile, often connate, flaccid. Pedicels $\frac{1}{4}$ in., nodding in bud, erect in flower, recurved in fruit. Calyx $\frac{1}{4}$ in.; lobes $\frac{1}{2}$ in., lanceolate, acute, entire, glabrous, always erect. Corolla $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{8}$ – $\frac{1}{6}$ in., brilliant blue, folds fimbriate into linear-clavate blue laciniae. Capsule $\frac{1}{5}$ by $\frac{1}{8}$ – $\frac{1}{6}$ in., stalk as long as the corolla (at least in some cases). Seeds twice as long as broad, oblong or subfalcate, trigonous.

7. **G. aquatica**, Linn. *Amœn.* ii. 343; branches radical numerous weak little divided, cauline leaves small ovate or obovate marginate recurved, corolla less than $\frac{1}{2}$ in., capsule short-obovoid compressed. Bunge in *Nouv. Mém. Soc. Imp. Mosc.* i. 236, t. 9, fig. 6; Griseb. *Gentian.* 271, and in *DC. Prodr.* ix. 106; Ledeb. *Fl. Ross.* iii. 62. *G. riparia*, Karel. et Kiril. in *Bull. Soc. Imp. Mosc.* 1841, 706; Griseb. in *DC. Prodr.* ix. 186; Clarke in *Journ. Linn. Soc.* xiv. 434, *syn. excl.* *G. Ledebourii*, Reich. *Fl. Excurs.* 425. *G. prostrata*, Clarke, l.c., not of Haencke. *Hippion aquaticum*, Schmidt in *Roem. Arch.* i. 10. *Ericoila aquatica*, Borkh. in *Roem. Arch.* i. 27. *Ericala* (or *Erycala*) *aquatica*, G. Don *Gen. Syst.* iv. 192.

KASHMIR and WESTERN TIBET, alt. 13–16,000 ft.; Thomson, &c.—DISTRIB. N. Asia.

Branches 1–3 in. Radical leaves $\frac{1}{4}$ – $\frac{1}{2}$ in., ovate; cauline $\frac{1}{2}$ in., remote, usually obtuse, mucronate; margin hyaline, narrow. Pedicels $\frac{3}{8}$ – $\frac{1}{2}$ in., terminal, solitary. Calyx $\frac{1}{4}$ – $\frac{1}{2}$ in.; lobes $\frac{1}{2}$ in., lanceolate, acute, glabrous, entire, always erect. Corolla-tube hardly longer than the calyx, lobes short blue; folds bifid; fimbriae none. Capsule $\frac{1}{5}$ by $\frac{1}{8}$ – $\frac{1}{6}$ in.; stalk long, often $\frac{2}{3}$ in., hence capsule long-exsert. Seeds ellipsoid, trigonous, not much longer than broad.—*S. prostrata*, Haencke (as understood by Ledebour and Boissier, *Fl. Orient.* iv. 72), differs by having the capsule nearly twice as long; it was collected in Cabul (Griff. n. 1049), never in British India.

VAR. *Karelini*; calyx elongate, corolla $\frac{1}{2}$ – $\frac{3}{4}$ in. narrowly tubular. Griseb. in *DC. Prodr.* ix. 106. *G. prostrata*, Karel. & Kiril. in *Bull. Soc. Imp. Mosc.* 1841, 705, not of Haencke (?).—Karakoram, alt. 13–14,000 ft. *G. Karelini*, T. Thomson, &c. DISTRIB. Altai.—Stems 1–2 in. fewer and smaller than those of the type. The Karakoram examples agree closely with Karel. & Kiril's *G. prostrata*; but their description differs in the corolla twice as long as the calyx; whereas, in the Indian plants the calyx is $\frac{1}{2}$ in., as long as the corolla-tube.

8. *G. humilis*, Steven.; Bunge in *Nouv. Mém. Soc. Imp. Mosc.* i. 235; branches radical numerous weak little divided, cauline leaves small oblong or elliptic not recurved nor marginate, corolla less than $\frac{1}{2}$ in., capsule short-obovoid compressed. *Griseb. Gentian.* 272, and in *DC. Prodr.* ix. 106; *Ledeb. Fl. Ross.* iii. 63; *Boiss Fl. Orient.* iv. 72. *G. aquatica*, *Pall. Fl. Ross.* ii. t. 97, fig. 2, not of Linn. *Ericala humilis*; *G. Don Gen. Syst.* iv. 192.

WESTERN TIBET; Kárákorum, alt. 13-16,000 ft.; Thomson, &c.—DISTRIB. CAUCASUS, N. Asia.

Closely resembling *G. aquatica*. Corolla $\frac{1}{2}$ by $\frac{1}{10}$ in., usually white, sometimes blue. Capsule $\frac{3}{8}$ - $\frac{1}{2}$ in.

VAR. *evolutior*; corolla $\frac{1}{2}$ by $\frac{1}{4}$ in. fine blue, capsule $\frac{1}{4}$ in.—Karakorum; Thomson, &c.

9. *G. pygmæa*, Clarke; stem $\frac{1}{4}$ -1 in. simple 1-flowered, leaves minute remote ovate, corolla $\frac{1}{4}$ - $\frac{1}{2}$ in. tubular.

WESTERN TIBET; Karakorum, Nubra, Thomson.

Leaves $\frac{3}{8}$ - $\frac{1}{2}$ in., ovate or obovate, margined. Calyx shorter than the corolla-tube; lobes lanceolate, acute, erect. Corolla blue; folds bifid; fimbriæ 0.—This looks like an excessively reduced form of *G. aquatica*, Linn.

VAR. *acuminata*; leaves imbricate acuminate.—Kashmir; Palgam, alt. 13,500 ft. Clarke.—Some of the examples are only $\frac{1}{2}$ in. high, the expanded corolla $\frac{1}{2}$ in. long.

10. *G. squarrosa*, *Ledeb. Fl. Ross.* iii. 64 and *Ic. Pl. Fl. Ross.* t. 14; branches radical numerous weak little divided, cauline leaves small obovate recurved, corolla less than $\frac{1}{2}$ in., capsule short-obovoid compressed. Bunge in *Nouv. Mém. Soc. Imp. Mosc.* i. 234, t. 9, fig. 3; *Griseb. Gentian.* 273, and in *DC. Prodr.* ix. 107. *Ericala squarrosa*, *G. Don Gen. Syst.* iv. 191.

ALPINE HIMALAYA and WESTERN TIBET, alt. 10-15,000 ft.; Karakorum, Thomson, &c.; Sikkim; J. D. H., &c.—DISTRIB. Dahuria, Siberia.

Closely resembling *G. aquatica*, Linn., and hardly separable except by the calyx-teeth, which are ovate, mucronate, recurved even more strongly than in Ledebour's figure. The leaves are scarcely marginate.

11. *G. infelix*, Clarke; branches radical numerous small woody, leaves very small ovate, calyx-teeth ovate erect, corolla $\frac{1}{2}$ in. tubular, capsule oblong subsessile. *Gentiana*, *Herb. Ind. Or. H. f. & T.* n. 9 and 10. Clarke in *Journ. Linn. Soc.* xiv. 435.

SIKKIM HIMALAYA; Yeumtong and Kankola, alt. 14-15,000 ft.; J. D. H. KUMAON; Barji Kang, alt. 14,700 ft., *Strachy & Winterbottom*.

Perennial; branches 1-1 $\frac{1}{2}$ in., black, leafless, wiry below, leafy upwards, 1-flowered. Leaves $\frac{1}{2}$ - $\frac{1}{2}$ in., herbaceous, approximate, not margined. Flower subsessile. Calyx $\frac{3}{8}$ - $\frac{1}{2}$ in.; lobes $\frac{1}{16}$ - $\frac{1}{12}$ in., obtuse, glabrous. Corolla-lobes shorter than the tube; folds subentire; fimbriæ 0. Capsule $\frac{1}{2}$ by $\frac{1}{2}$ in. Seeds oblong-ellipsoid, trigonous, twice as long as broad; testa close, smooth.

12. *G. quadrifaria*, Blume *Bijd.* 847; radical leaves $\frac{1}{2}$ -1 $\frac{1}{2}$ in. ovate or lanceolate, cauline smaller coriaceous often marginate, calyx-lobes lanceolate acute rigid often subquarrose, corolla $\frac{1}{4}$ - $\frac{1}{2}$ in. *Griseb. Gentian.* 276, and in *DC. Prodr.* ix. 108. *G. pedicellata*, *Wall. Cat.* 4394; *Griseb. Gentian.* 273, and in *DC. Prodr.* ix. 107; *Wight Ic.* t. 1328; Clarke in *Journ. Linn. Soc.* ix. 435. *G. orbiculata*, *Heyne*; *Wall. Cat.* 4395. *G. abscondita*, *Zenk. Pl. Ind.* 11, t. 13. *G. zeylanica*, *Griseb. Gentian.* 274, and in *DC. Prodr.* ix. 108. *G. laxicaulis*, *Zoll.*; *Miq. Fl. Ind. Bat.* ii. 568. *G. pumila*, *Griff. Ic. Pl. As.* t. 384, fig. 2. *Gentiana* sp. n. 749, *Griff. Itin. Notes*, 151. *Ericala pedicellata*, *D. Don in Trans. Linn. Soc.* xvii. 514. *E. quadrifaria*, *procumbens* and *orbiculata*, *G. Don Gen. Syst.* 190, 192, 193.

HIMALAYA, alt. 3–10,000 ft.; from Kashmir to Bhotan, common. KHASIA Mts.; alt. 3–5000 ft., common. Mts. of the DECCAN PENINSULA. CEYLON; common.—DISTRIB. Burma, Java, China.

Biennial or annual; stems usually numerous, 1–4 in., decumbent; sometimes erect, 4–10 in., simple, corymbose upwards. *Radical leaves* often rosulate, persistent; cauline $\frac{1}{4}$ – $\frac{1}{2}$ in., ovate and lanceolate, mucronate, often squarrose. *Cymes* usually 3–5-flowered; pedicels 0– $\frac{1}{2}$ in. *Calyx* shorter than the corolla-tube, glabrous. *Corolla* blue, or yellowish-green; folds small, pale, bifid or emarginate; fimbriæ 0. *Capsule* $\frac{1}{5}$ by $\frac{1}{8}$ – $\frac{1}{6}$ in., ellipsoid or ovoid, usually subexsert, i.e. stalk $\frac{1}{4}$ – $\frac{1}{3}$ in. *Seeds* (in the Southern form) globose or obovoid, trigonous, smooth; in the Himalayan form narrower, ellipsoid.—The Indian and Java forms have very shining cartilaginous leaves; when decumbent they are called *G. abscondita*, Zenk. or *G. zeylanica*, Griseb. or *G. laxicaulis*, Zoll.; when more erect they are *G. quadrifaria*, Blume, or *G. orbiculata*, Wall. The abundant N. Indian plant is more herbaceous with green not shining leaves, and is *G. pedicellata*, Wall. or *Ericala procumbens*, Don. A form (?) with elongate, strict stems, and cauline leaves few, oblong, adpressed, flowers in early spring in Sikkim, and is doubtfully referred to *G. pedicellata* by Sir J. D. Hooker.

VAR. *pilosula*; leaves minutely ciliate-pubescent, calyx pilose.—Sikkim, alt. 6–8000 ft.; J. D. H., &c.

13. *G. decemfida*, Ham.; Don Prodr. 127; radical leaves ovate mucronate cauline silvery marginate, flowers lateral and terminal short-pedicelled, corolla $\frac{1}{3}$ in. little exceeding the calyx, capsule shortly ellipsoid subincluded. Wall. Cat. 4392; Griseb. *Gentian.* 274, and in DC. Prodr. ix. 107. *G. Royleana*, Wall. Cat. 4393. *Ericala decemfida*, D. Don in Trans. Linn. Soc. xvii. 514. *E. Royleana*, G. Don Gen. Syst. iv. 192.

N.W. and CENTRAL HIMALAYA, from the Punjab to Nepal, alt. 1–8000 ft.; Wallich, Madden, &c.

Annual; stems 1–9 in., erect, with ascending branches. *Radical leaves* 1 by $\frac{1}{2}$ in., subsessile; cauline $\frac{1}{4}$ – $\frac{1}{2}$ in., cartilaginous; uppermost lanceolate, minutely ciliate-pubescent on the margin. *Pedicels* 0– $\frac{1}{5}$ in. *Calyx* $\frac{1}{3}$ in.; lobes $\frac{1}{6}$ in., narrow-lanceolate, glistening. *Corolla* (in Wallich's examples) not longer than the calyx, sometimes half as long again; folds bifid; fimbriæ 0. *Capsule* $\frac{1}{5}$ by $\frac{1}{8}$ – $\frac{1}{6}$ in., stalk $\frac{1}{4}$ in. *Seeds* ellipsoid, very small, obscurely trigonous; testa close, smooth, minutely reticulated.

VAR. *aprica*; stems strict, inflorescence subpaniculate, pedicels often $\frac{1}{4}$ in., corolla $\frac{1}{3}$ – $\frac{2}{3}$ in. often twice as long as the calyx. *G. aprica*, Dene. in Jacquem. Voy. Bot. 112, t. 118; Griseb. in DC. Prodr. ix. 107.—Subtropical Punjab—Himalaya, alt. 1–3000 ft.; Siwaliks, Dehra Doon, Hooshiapore; Griffith, Edgeworth, &c. Uppermost leaves usually ciliate-pubescent on the margin; capsule included.

14. *G. argentea*, Royle; Griseb. *Gentian.* 275, and in DC. Prodr. ix. 107; radical leaves lanceolate mucronate cauline silvery marginate, flowers mostly terminal subcapitate, corolla $\frac{1}{3}$ in. equalling or exceeding the calyx, capsule ellipsoid subincluded. *Ericala argentea*, D. Don in Trans. Linn. Soc. xvii. 512.

KASHMIR and N.W. HIMALAYA, alt. 8–12,000 ft.; Royle, Thomson, &c.—DISTRIB. Afghanistan.

Stems 1–4 in., erect, branched. *Radical leaves* 1 by $\frac{1}{2}$ in.; uppermost ovate or oblong, falcate, glabrous, often closely investing the flower-heads. *Capsule* more than $\frac{1}{4}$ by $\frac{1}{8}$ in., stalk $\frac{1}{8}$ in. *Seeds* as of *G. decemfida*, from which this species is hardly distinguishable.

15. *G. micans*, Clarke; stems very numerous short, radical leaves small ovate cauline silvery marginate, corolla $\frac{1}{3}$ in., capsule oblong often exsert. *G. argentea*, var. β , Clarke in Journ. Linn. Soc. xiv. 436. *Gentiana* sp. 19, Herb. Ind. Or. H. f. & T.

SIKKIM HIMALAYA; Phullong, alt. 15,000 ft., J. D. H.

Annual; forming dense tufts 1-2½ in. diam.; branches 10-30 from the root, little divided. Radical leaves ½ in., sessile; cauline leaves ½ in., lanceolate, imbricate, cartilaginous. Flowers terminal, sessile, solitary, blue. Calyx ¼-½ in.; lobes ¼-½ in., narrowly lanceolate, rigid, erect, glabrous. Corolla tubular, folds bifid; fimbriæ 0. Capsule ¼ by ½ in., stalk sometimes ¾ in., sometimes but ¼ in.; seeds as of *G. decemfida*.

16. *G. capitata*, Ham. in *Don Prodr.* 126; stem simple erect naked below, leaves ovate or oblong mucronate marginate, flowers capitate, capsule globose compressed subincluded. *Griseb. Gentian.* 275, and in *DC. Prodr.* ix. 107; *Clarke in Journ. Linn. Soc.* xiv. 436. *G. marginata*, Wall. *Cat.* 4391, not of *Griseb.* *G. cephalodes*, *Edgew. in Trans. Linn. Soc.* xx. 84; *Thoms. & Bacon in Hook. Lond. Journ. Bot.* iv. 637, and *G. Baconi*, t. 20.—*Gentiana* sp., *Griff. Ic. Pl. As.* t. 384, fig. 1.

TEMPERATE HIMALAYA, alt. 4-12,000 ft.; from Kumaon to Bhotan; *Wallich, Griffith, &c.*

Stems 1-4 in., often naked at the time of flowering except the leaves mixed in the flower-head, sometimes leafy in the upper half. Leaves ½ by ¼-½ in., thick, somewhat shining, falcate. Calyx ¼ in.; lobes ½ in., oblong, acute, scarious-margined, glabrous. Corolla ¼-½ in., blue or white, folds emarginate; fimbriæ 0. Capsule ½ in. long and broad; stalk sometimes ½ in. Seeds very small, ellipsoid, nearly twice as long as broad, trigonous, smooth, scarcely reticulated.

VAR. *Andersoni*; stem naked below, upper cauline leaves petioled ovate or elliptic herbaceous not marginate. *G. Andersoni*, *Clarke in Journ. Linn. Soc.* xiv. 436. *Ericala capitata*, *D. Don in Trans. Linn. Soc.* xvii. 512.—From Kumaon to Bhotan, alt. 5-8000 ft.; *J. D. H., T. Anderson, &c. Khasia; Simons, &c.* Probably only the fully developed state of *G. capitata*; having sometimes stout subquadrangular stems, and leaves 1½ by ¾-1 in. *D. Don* seems to have got finer specimens for his description in *Trans. Linn. Soc.* than when he founded the species in *Prodr. Fl. Nepal.*

VAR. *strobiliformis*; stem ¼-1 in., densely clothed with imbricated margined often round leaves, flowers solitary or few. *Gentiana* sp. n. 707, *Griff. Itin. Notes.* 147.—Himalaya, alt. 10-12,000 ft., from Kumaon to Bhotan; *Griffith, &c.*

17. *G. carinata*, *Griseb. Gentian.* 304, and in *DC. Prodr.* ix. 109; stem erect branched, radical leaves persistent oblong-lanceolate acute marginate, calyx-teeth shorter than the tube lanceolate acute erect, corolla ½ by ½ in. fimbriate, seeds small ellipsoid subtrigonous smooth not winged. *G. marginata*, *Clarke in Journ. Linn. Soc.* xiv. 437, not of *Griseb.* nor of *Wall.* *Eurythalia carinata*, *D. Don in Trans. Linn. Soc.* xvii. 516. *Ericala carinata*, *G. Don Gen. Syst.* iv. 189.

KASHMIR and N.W. HIMALAYA, alt. 8-12,000 ft., frequent; *Royle, Falconer, &c.*

Annual; stems 1-6 in. Radical leaves 1¾ by ½ in., sessile, very acute, sub-3-nerved; cauline similar, smaller, not much falcate except those next the flowers. Flowers clustered, lateral and terminal, subsessile. Calyx-tube ¼ in.; lobes ½ in., acuminate. Corolla tubular, narrowly funnel-shaped upwards; folds bifid or subentire. Capsule ½ by ¼ in., ellipsoid, compressed; stalk 0-½ in. Seeds altogether as of *Chondrophyllum*; *Grisebach* puts this in a section with winged seeds, but he does not appear to have seen these.

VAR. *marginata*; leaves more crowded herbaceous falcate less acuminate, calyx-teeth falcate sometimes obovate acute, corolla without fimbriæ. *G. marginata*, *Griseb. Gentian.* 275, and in *DC. Prodr.* ix. 108, not of *Wall.* *Ericala marginata*, *D. Don in Trans. Linn. Soc.* xvii. 513.—Kashmir, alt. 11-14,000 ft.; *Falconer, Thomson, &c.* Distrib. Kashgar.

VAR. *intermedia*; leaves as of *G. carinata* type, corolla without fimbriæ.—Kashmir, *Falconer.* These are finely-developed typical *G. carinata* with very acute straight leaves, and large corollas absolutely without fimbriæ (as often occurs).

18. **G. coronata**, *Royle Ill. t. 68, fig. 1*; stem short with spreading branches, leaves lanceolate acute, cyme terminal subcapitate, calyx-teeth ovate-mucronate erect, corolla $\frac{1}{2}$ by $\frac{1}{4}$ in. fimbriate. *Griseb. Gentian. 304*, and in *DC. Prodr. ix. 109*. *Eurythalia coronata, D. Don in Royle Ill. 278*, and in *Trans. Linn. Soc. xvii. 515*. *Ericala coronata, G. Don Gen. Syst. iv. 193*.

N. W. HIMALAYA; Kedarkanta, *Royle*.

Only known from *Royle's* figure, according to which it differs from *G. carinata* by the wider subcampanulate corolla.

19. **G. Hugelii**, *Griseb. in DC. Prodr. ix. 108?*; stem short-branched leafy many-flowered, leaves elliptic obtuse, calyx-teeth shorter than the tube elliptic obtuse, corolla $\frac{1}{2}$ by $\frac{1}{8}$ in. fimbriate, seeds small ellipsoid subtrigonus smooth not winged.

WESTERN TIBET, *Hugel*; Zanskar, alt. 8-10,000 ft., *Thomson*.

Stem 1-3 in. Leaves $1\frac{1}{4}$ by $\frac{1}{2}$ in., upper cauline smaller obovate obtuse. Otherwise as *G. carinata*.—Identified with *G. Hugelii* from *Grisebach's* description, which agrees very well except as to the testa which he describes as winged, whereas in *Thomson's* plant it is close, as in other species of *chondrophyllum*.

20. **G. nudicaulis**, *Kurz in Journ. As. Soc. 1873, pt. ii. 235*; stem erect leafless downwards when flowering, leaves lanceolate, flowers capitate or closely paniced, corolla $\frac{3}{4}$ in. much exceeding the calyx. *Clarke in Journ. Linn. Soc. xiv. 437*.—*Gentiana* sp. 16, *Herb. Ind. Or. H. f. & T*.

KHASIA MTS., *Griffith* (Kew Distrib. n. 5819), &c. BRITISH BURMA, alt. 4-7000 ft.; Nattoung, *Kurz*; Moolee, *Lobb, Parish*.

Stem 2-10, erect, simple below. Leaves 2 by $\frac{1}{2}$ in., sessile, sub-3-nerved, obscurely margined. Cymes $2\frac{1}{2}$ in. diam. in Khasia examples, dense-fl'd.; much smaller, capitate (in Burmese). Calyx-tube $\frac{1}{2}$ in.; teeth $\frac{1}{4}$ in., lanceolate, acute, erect, scarious-margined. Corolla tubular, often nearly twice as long as the calyx, blue, plicate; fimbriæ 0 in *Kurz's* example at Kew; said to be present by C. B. Clarke *l. c.* Capsule nearly $\frac{1}{2}$ by $\frac{1}{8}$ in., ellipsoid, compressed; stalk $\frac{1}{4}$ - $\frac{1}{2}$ in. Seeds small, ellipsoid, nearly twice as long as broad, trigonous; testa close, smooth.

SECT. III. **Pneumonanthæ**. Corolla 1 in. or more ($\frac{3}{4}$ in. in *G. crassa* and *sikkimensis*), 5-lobed with folds between the lobes; fimbriæ 0. Seeds globose, not winged; testa very lax, reticulated, glistening, white.

* Flowers terminal, capitate; calyx-lobes very unequal.

21. **G. crassa**, *Kurz in Journ. As. Soc. 1873, pt. ii. 235*; shrubby, leafless downwards, leaves broadly lanceolate, corolla $\frac{3}{4}$ by $\frac{1}{5}$ in., tubular. *Clarke in Journ. Linn. Soc. xiv. 440*.

PEGU; Nattoung Summit, *Kurz*. MOULMEIN; *Parish*.

Stem 12-18 in., woody, terete, branched. Leaves 2 by $\frac{1}{3}$ - $\frac{2}{3}$ in., attenuated below, coriaceous, margins drying subcrenulate, connate at base into a short cylindric sheath round the stem. Flowers 4-16, capitate. Calyx-tube $\frac{1}{4}$ in.; lobes $\frac{1}{6}$ - $\frac{1}{5}$ in., linear or ovate, foliaceous, often 3 linear 2 foliaceous. Capsule $\frac{1}{2}$ by $\frac{1}{8}$ in.; stalk $\frac{1}{4}$ - $\frac{1}{2}$ in.

22. **G. sikkimensis**, *Clarke*; stems decumbent, radical leaves orbicular or elliptic obtuse, cauline elliptic or oblong, corolla $\frac{3}{4}$ by $\frac{1}{5}$ in. tubular-funnel-shaped. *Gentiana* sp. n. 32 b., *Herb. Ind. Or. H. f. & T*. *Gentiana* sp. n. 31, *Clarke in Journ. Linn. Soc. xiv. 439, partly*.

SIKKIM, alt. 10-14,000 ft., common; *J. D. H., &c.*

Branches 1-8 in., herbaceous, 1-3 from the same root. Radical leaves $\frac{1}{2}$ in., persistent at flowering time; cauline leaves 1 in., distant, uppermost enclosing the heads. Flowers 2-10, capitate. Calyx-tube $\frac{1}{3}$ in.; lobes $\frac{1}{4}$ in., linear or elliptic, foliaceous.

often 3 linear 2 elliptic. *Corolla* $\frac{3}{4}$ –1 in., not contracted at the mouth. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{2}$ in.; stalk $\frac{1}{4}$ – $\frac{3}{4}$ in.—Heads flowers and capsules exceedingly like those of *G. crassa*.

23. **G. Elwesii**, Clarke; stems erect, radical leaves elliptic subacute, cauline elliptic or oblong, corolla $1\frac{1}{2}$ by $\frac{1}{2}$ – $\frac{3}{4}$ in. inflated. *Gentiana* sp. 32, *Herb. Ind. Or. H. f. & T.* *Gentiana* sp. n. 31, Clarke in *Journ. Linn. Soc.* xiv. 439, partly.

SIKKIM HIMALAYA, alt. 13–15,000 ft.; Yeumtong and Lachoong, J. D. H., Elwes.

Possibly a form of *G. sikkimensis*, but among the abundant material of that species, all have stems curved, heads not erect, basal leaves very obtuse, and corolla funnel-shaped. The corolla in *G. Elwesii* is inflated in the middle, somewhat contracted at the mouth, resembling that of the typical *Pneumonanthea*, and considerably larger than in any example of *G. sikkimensis*.

** Branches 1-flowered or stem simple (1–4-fld. in *G. venusta* and *nubigena*).

24. **G. depressa**, Don *Prodr.* 125; stems very short or 0, leaves widely elliptic subacute, calyx-lobes ovate subacute marginate, intervening sinus very narrow, corolla $1\frac{1}{4}$ by $\frac{3}{4}$ in. tubular-campanulate. *Wall. Cat.* 4387; *Griseb. Gentian.* 269, and in *DC. Prodr.* ix. 109; Clarke in *Journ. Linn. Soc.* xiv. 438, *syn. excl.* *Pneumonanthea depressa*, D. Don in *Trans. Linn. Soc.* xvii. 511. *Ericala depressa*, *G. Don Gen. Syst.* iv. 189.

CENTRAL AND EASTERN HIMALAYA; NEPAL, Wallich; SIKKIM, Elwes.

Branches 0–2 in., several or 1 from one root; barren branches short densely imbricated with leaves, fertile branches 0–2 in., with small leaves or naked below and a terminal tuft of leaves. *Leaves* $\frac{3}{4}$ by $\frac{1}{2}$ in., sessile. *Flowers* solitary, sessile, blue. *Calyx-tube* $\frac{1}{2}$ in., campanulate; lobes $\frac{1}{4}$ in. *Corolla-lobes* $\frac{1}{2}$ in., ovate, acute, erect. *Capsule* $\frac{1}{2}$ by $\frac{1}{2}$ in., stalk 0– $\frac{1}{2}$ in.

25. **G. cachemirica**, Dene. in *Jacquem. Voy. Bot.* iii. t. 117; branches often elongate, leaves elliptic or oblong mucronate, calyx-lobes spatulate-oblong acute, intervening sinus wide, corolla 1– $1\frac{1}{4}$ by $\frac{1}{2}$ in. tubular-campanulate. *Griseb. in DC. Prodr.* ix. 109. *G. stipitata*, Edgew. in *Trans. Linn. Soc.* xx. 84.

WESTERN HIMALAYA, from Kashmir to Kumaon, alt. 9–13,000 ft.; Falconer, Royle, &c.

Branches 0–6 in., leafy, often numerous from the root. *Radical leaves* 1 by $\frac{1}{2}$ in., obovate-oblong, acute; cauline $\frac{1}{2}$ – $\frac{3}{4}$ in. *Flowers* solitary, sessile, blue. *Calyx-tube* $\frac{1}{2}$ in., campanulate; lobes $\frac{1}{4}$ in. *Corolla-lobes* $\frac{1}{2}$ in., ovate, acute, erect. *Capsule* $\frac{1}{2}$ by $\frac{1}{2}$ in.; stalk $\frac{1}{2}$ –1 in.—The capsule-stalk in an apparently ripe example of Edgeworth's is only $\frac{1}{8}$ in.; the length is not a safe specific character in this species or its allies. Numerous examples, stemless or nearly so, can hardly be distinguished from *G. depressa*, except by the wide sinus between the calyx-teeth.

26. **G. amœna**, Clarke; branches numerous short densely leafy, leaves obovate marginate obtuse, calyx-lobes broadly obovate marginate obtuse, corolla $\frac{3}{4}$ –1 by $\frac{1}{2}$ – $\frac{3}{4}$ in. campanulate. *Gentiana* sp. n. 30, *Herb. Ind. Or. H. f. & T.* *Gentiana* sp. 25, Clarke in *Journ. Linn. Soc.* xiv. 438.

SIKKIM HIMALAYA, alt. 14–18,000 ft.; Samdong, Momay, and Donkiab, J. D. H.

Tufted; stems 0–2 in., numerous, branched; barren branches succulent with sub-remote smaller leaves. *Leaves* $\frac{3}{4}$ in., densely imbricated (on the fertile branches), margin glistening. *Calyx* $\frac{1}{4}$ in.; lobes $\frac{1}{8}$ in., truncate or submarginate; margin glistening. *Corolla-lobes* $\frac{1}{2}$ in., ovate, subacute, erect. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{2}$ in.; stalk $\frac{1}{4}$ in.

27. **G. phyllocalyx**, *Clarke*; stems solitary suberect 1-flowered, leaves obovate obtuse not marginate, calyx-lobes large resembling the leaves, corolla $1\frac{1}{4}$ – $1\frac{3}{4}$ by $\frac{1}{2}$ – $\frac{3}{8}$ in. tubular inflated. *Gentiana* sp. n. 26, *Clarke in Journ. Linn. Soc.* xiv. 439.

SIKKIM HIMALAYA, alt. 13–15,000 ft.; Kankola and Lachen, *J. D. H.*

Stems 1–5 in. Radical leaves $\frac{3}{4}$ by $\frac{1}{2}$ in., obovate, obtuse, herbaceous, sub-1-nerved, persistent at fruiting time; cauline similar, rather smaller, remote. Calyx-lobes $\frac{1}{2}$ – $\frac{1}{2}$ in., elliptic, green, not marginate. Corolla blue, somewhat contracted at the mouth. Capsule $\frac{3}{4}$ by $\frac{1}{4}$ in.; stalk often 1 in.—Has larger flowers, and very much larger calyx-lobes, than *G. venusta*.

28. **G. venusta**, *Wall. Cat.* 4389; stemless or nearly so, leaves elliptic or obovate obtuse, calyx-lobes small oblong acute, corolla 1 by $\frac{1}{4}$ – $\frac{1}{2}$ in. tubular. *Griseb. Gentian.* 276, and in *DC. Prodr.* ix. 109; *Clarke in Journ. Linn. Soc.* xiv. 439. *Ericala venusta*, *G. Don Gen. Syst.* iv. 189.

ALPINE WESTERN HIMALAYA, from Kashmir to Kumaon, alt. 11–14,000 ft.; *Blinkworth, Gen. Munro, &c.*

Stems 0, or 3 in., prostrate: flowers 1–3 subsessile on the short, densely leafy, annual shoots. Leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. Calyx-tube $\frac{1}{4}$ in., lobes $\frac{1}{8}$ – $\frac{1}{4}$ in., linear or oblong, sinus intervening wide. Capsule $\frac{1}{2}$ – $\frac{3}{4}$ in. by $\frac{1}{4}$ – $\frac{1}{2}$ in.

29. **G. tubiflora**, *Wall. Cat.* 4388; stemless or nearly so, leaves imbricate ovate or elliptic acute, calyx-teeth ovate-lanceolate acute, corolla 1 by $\frac{1}{4}$ in. tubular. *Griseb. Gentian.* 277, and in *DC. Prodr.* ix. 110. *Ericala tubiflora*, *G. Don Gen. Syst.* iv. 189.

ALPINE HIMALAYA; Nepal, *Wallich*; WESTERN TIBET, *Munro*; Sikkim, alt. 14–16,000 ft., *J. D. H.*

Stems $\frac{1}{4}$ –1 in. Leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. Calyx-tube $\frac{1}{2}$ in.; lobes $\frac{1}{8}$ in. Corolla-lobes $\frac{1}{8}$ – $\frac{1}{2}$ in., triangular, erect. Capsule $\frac{1}{2}$ by $\frac{1}{2}$ in.; stalk 1– $1\frac{3}{4}$ in.—The fruiting examples are very distinct from *G. venusta* by the long-exsert capsule; the flowering are hardly separable by the more acute leaves and calyx-teeth.

30. **G. ornata**, *Wall. Cat.* 4386; branches many from the root elongate leafy 1-flowered, cauline leaves oblong or sublinear acute, calyx-lobes oblong or linear, corolla 1– $1\frac{3}{4}$ in. tubular funnel-shaped. *Griseb. Gentian.* 277, and in *DC. Prodr.* ix. 110; *Bot. Mag.* t. 6514. *Pneumonanthe ornata*, *G. Don Gen. Syst.* iv. 194.

ALPINE CENTRAL and EASTERN HIMALAYA, alt. 11–15,000 ft.; Nepal, *Wallich*; Sikkim, *J. D. H., &c.*, common.

Branches 1–5 in., curved. Radical leaves 0 or inconspicuous at flowering time; cauline $\frac{1}{4}$ – $\frac{3}{4}$ by $\frac{1}{8}$ – $\frac{1}{6}$ in., acute; bases connate into a short tube. Calyx-tube $\frac{1}{2}$ in.; lobes $\frac{1}{4}$ in.; sinus wide. Corolla $\frac{1}{2}$ in. diam. (in *Wallich's* example); lobes $\frac{1}{2}$ in., triangular, acute, erect. Capsule $\frac{1}{2}$ by $\frac{1}{2}$ in.; stalk $\frac{1}{4}$ – $1\frac{1}{2}$ in.—The abundant material shows the capsule (fully ripe) often included, and nearly as often far exserted.

VAR. *metantha*; barren shoots with minute leaves, corolla $\frac{1}{2}$ – $\frac{1}{2}$ in.—Sikkim; *Jongri*, alt. 13,000 ft., *Clarke*.—Leaves of the barren shoots $\frac{1}{2}$ in., imbricate, recurved (as in *G. humilis* or *squarrosa*), of the flowering shoots nearly as in *G. ornata*. Calyx-tube $\frac{1}{2}$ in., lobes $\frac{1}{2}$ in., not so much reduced as the corolla. Capsule $\frac{1}{4}$ in., subincluded in the corolla-tube. Testa white, lax, altogether as of *G. ornata*. A very dubious plant.

31. **G. nubigena**, *Edgew. in Trans. Linn. Soc.* xx. 85; leaves oblong-linear, calyx-lobes oblong much shorter than the tube with wide sinus intervening, corolla $1\frac{1}{2}$ by $\frac{2}{3}$ in. funnel-shaped.

ALPINE HIMALAYA, alt. 16–18,000 ft.; from Kashmir to Sikkim; *Edgeworth, Thomson, J. D. H., &c.*

Stems 0-6 in., suberect, usually 1-2 flowering, and 1-2 barren from the same root. Lower leaves $2\frac{1}{2}$ by $\frac{1}{2}$ in.; cauline shorter, connate at base into a short tube. Flowers often 1-3 on each branch, shortly pedicellate or subspicate. Calyx-tube $\frac{1}{2}$ in., teeth $\frac{1}{2}$ in.; sinus often plicate. Corolla-lobes $\frac{1}{2}$ in. acute. Capsule 1 by $\frac{1}{4}$ in., with the stalk $\frac{1}{4}$ - $\frac{1}{2}$ in., included.

VAR. *parviflora*, Gentiana 1 by $\frac{1}{4}$ in. subtubular. Gentiana sp. n. 39, *Herb. Ind. Or. H. f. & T.*—Sikkim, alt. 17,000 ft.; Kinchinjhow, J. D. H.—This again is a doubtful plant; it appears to have been collected with *G. nubigena*.

SECT. IV. **Kurroo**. Stoutish herbs. Flowers racemose or spicate. Corolla 1 in. or more, 5-lobed with folds between the lobes; fimbriæ 0. Seeds oblong trigonous or falcate, acute or subcaudate, not winged; testa close, not (or minutely obscurely) reticulated.

32. **G. Kurroo**, Royle *Ill. t.* 68, fig. 2; leaves oblong or linear, flowers solitary or few racemose, calyx-lobes subequal linear, corolla 2 by $\frac{3}{4}$ in. Griseb. *Gentian.* 304, and in *DC. Prodr.* ix. 110; Clarke in *Journ. Linn. Soc.* xiv. 440; *Bot. Mag.* t. 6470. *Pneumonanthe Kurroo*, D. Don in Royle *Ill.* p. 278, and in *Trans. Linn. Soc.* xvii. 509.

KASHMIR and N.W. HIMALAYA, alt. 5-11,000 ft., common; Royle, &c.

Rootstock stout, perennial: flowering stems 2-12 in., simple. Radical leaves 3 by $\frac{1}{2}$ in., tufted; cauline 1 in., linear, connate at the base into a tube. Flowers 1-4 on each stem, sometimes truly racemed, more often an uppermost pair of leaves close to the calyx. Calyx-tube $\frac{1}{2}$ - $\frac{1}{2}$ in., not keeled; lobes $\frac{1}{2}$ - $\frac{1}{2}$ in., linear, rarely suboblong. Corolla-lobes $\frac{1}{2}$ in., ovate, acute, sky-blue. Capsule $\frac{3}{4}$ by $\frac{1}{2}$ in.; stalk $\frac{1}{4}$ - $\frac{1}{2}$ in. Seeds twice as long as broad, acute at one end, subcaudate at the other.

33. **G. decumbens**, Linn. f. *Suppl.* 174; leaves oblong, flowers terminal clustered and axillary, calyx very unequal often spathaceous or some of the teeth ovate suddenly linear-pointed, corolla $\frac{3}{4}$ -1 in. Bunge in *Nowv. Mem. Soc. Imp. Mosc.* i. 212; *Bot. Mag.* tt. 705, 723; Griseb. *Gentian.* 279, and in *DC. Prodr.* ix. 110; Ledeb. *Fl. Ross.* iii. 64; Clarke in *Journ. Linn. Soc.* xiv. 440. *G. adscendens*, Pall. *Fl. Ross.* ii. 106, t. 94. *Pneumonanthe adscendens*, Schmidt in *Roem. Arch.* i. 10. *Dasystephana adscendens*, Borkh. in *Roem. Arch.* i. 26.—Gentiana sp., Gmel. *Fl. Sibir.* iv. 103, t. 51, fig. A.

BALTISTHAN and WESTERN TIBET, alt. 11-15,000 ft., eastwards to Lahul, Thomson, &c., common on the Karakorum.—DISTRIB. Dahuria, Siberia.

Rootstock stout; flowering stems 2-10 in., simple. Radical leaves 2 by $\frac{1}{2}$ - $\frac{1}{2}$ in.; cauline 1-1 $\frac{1}{2}$ in., oblong or elliptic, connate at the base into a tube. Flowers 1-2 subsessile in each upper axil, the upper 3-7 approximate, subcapitate, the axillary clusters subremote or wanting. Calyx-tube $\frac{1}{2}$ in., lobes $\frac{1}{2}$ in.; but the tube is often split down one side nearly to the base, the lobes very unequal, 2-4 linear, 1-2 ovate obtuse or obovate with linear teeth. Corolla funnel-shaped, lobes rounded. Capsule $\frac{1}{2}$ by $\frac{1}{2}$ in.; stalk $\frac{1}{4}$ - $\frac{1}{2}$ in. Seeds oblong, trigonous, falcate, twice as long as broad, subobtusate at both ends, testa close.

34. **G. dahurica**, Fisch. in *Act. Soc. Nat. Scr. Mosq.* iii. 63, with fig.; leaves oblong, flowers terminal clustered with axillary often added, calyx-lobes equal oblong-linear, corolla $\frac{3}{4}$ -1 in. Bunge in *Nowv. Mem. Soc. Imp. Mosc.* i. 213. G. Olivieri, Griseb. *Gentian.* 278, and in *DC. Prodr.* ix. 110; Clarke in *Journ. Linn. Soc.* xiv. 440; Boiss. *Fl. Orient.* iv. 76.

W. HIMALAYA; Thomson, Hay.—DISTRIB. Beloochistan, Cabul, Dahuria, Soot-garia.

Only differs from *G. decumbens* by the equal calyx; and it may be questioned whether the figure, Gmel. *Fl. Sibir.* t. 51, fig. A (on which *G. decumbens* is founded) may not rather represent *G. dahurica*.

SECT. V. **Crossopetalum**. Erect, branched herba. *Flowers* scattered, pedicelled. *Corolla* $\frac{3}{4}$ –2 in., 4-lobed; folds between the lobes obscure or 0; fimbriæ 0. *Seeds* ellipsoid or subglobose; testa reticulated, hardly lax, not glistening-white.

35. **G. detonsa**, *Fries in Act. Hafn.* x. 435, t. 1, fig. 3; leaves oblong-linear, calyx-tube terete funnel-shaped, lobes ovate-lanceolate, corolla $\frac{3}{4}$ –1 $\frac{1}{4}$ in., seeds subglobose. *Griseb. Gentian.* 256, and in *DC. Prodr.* ix. 101; *Ledeb. Fl. Ross.* iii. 59; *Clarke in Journ. Linn. Soc.* xiv. 437. *G. ciliata*, *Pall. Fl. Ross.* ii. 101, t. 92, fig. 2; *Bot. Mag.* t. 639. *G. barbata*, *Froel. Gentian.* 114; *Bunge in Nouv. Mem. Soc. Imp. Mosc.* i. 223, t. 9, fig. 1. *G. brachypetala*, *Bunge l. c.* i. 225, t. 11, fig. 3. *Gentianella detonsa and barbata*, *G. Don Gen. Syst.* iv. 179.

N. KASHMIR and WESTERN TIBET, alt. 9–15,000 ft., common in the Karakorum.—DISTRIB. Europe, N. Asia, and N. America.

Stems 8–24 in., much branched (in the Indian plants). *Leaves* 1 $\frac{1}{2}$ by $\frac{1}{4}$ in., distant, scarcely connate at the base. *Peduncles* 1–8 in., mostly very long. *Calyx-tube* $\frac{1}{2}$ in.; lobes $\frac{1}{3}$ in., unequal, 2 opposite ovate-lanceolate, 2 lanceolate. *Corolla-tube* 1 by $\frac{1}{4}$ in., lobes $\frac{3}{8}$ in., fimbriate or serrate at least at the apex; glands near the base of the tube very obscure. *Capsule* $\frac{3}{4}$ by $\frac{1}{4}$ in., stalk $\frac{1}{2}$ in. *Seeds* hardly longer than broad; testa reticulated and minutely scaly.—The numerous Indian examples are uniform; but according to Grisebach (*DC. Prodr.* ix. 110), the 5-merous *G. serrata* is only a var., and, according to Asa Gray (*Man. Bot.* 387), *G. crinita*, Froel., cannot be separated. There is a wide range in size of corolla, length and fimbriation of its lobes, in the extra-Indian examples.

VAR. *Stracheyi*; leaves broader, calyx-tube strongly 4-keeled, corolla $\frac{3}{4}$ –2 $\frac{1}{4}$ in., seeds much larger ellipsoid. *Gentiana* sp., nn. 7 & 8, *Herb. Ind. Or. H. f. & T.*—N. Kashmir and W. Tibet; alt. 8–13,000 ft.; *Strachey & Winterbottom*, &c. Sikkim; Tungu, alt. 12–13,000 ft., *J. D. H.*—So far as the Indian material is concerned this var. looks a distinct species, except that the corolla is very variable in size; but among the American *G. crinita* there are examples with a keeled calyx.

36. **G. contorta**, *Royle Ill.* 278, t. 69, fig. 3; leaves elliptic, flowers subracemose, calyx-lobes ovate acute, corolla 1 in. with 4 large oblong glands near the base within, seeds minute subglobose. *D. Don in Trans. Linn. Soc.* xvii. 508; *Griseb. Gentian.* 304, and in *DC. Prodr.* ix. 94.

N. W. HIMALAYA, alt. 6000 ft., *Thomson, Edgeworth.*

Stem 4–8 in. *Radical leaves* 0 at flowering time; cauline 1 by $\frac{1}{2}$ – $\frac{1}{3}$ in., narrowed but hardly connate at the base. *Stems* 2–7-flowered; pedicels $\frac{1}{4}$ – $\frac{3}{4}$ in. *Calyx-tube* $\frac{1}{4}$ in., terete, funnel-shaped; lobes $\frac{1}{2}$ in., somewhat unequal. *Corolla-tube* $\frac{3}{8}$ in.; lobes $\frac{1}{2}$ in., oblong, subentire; basal glands much larger than in *G. detonsa*, reminding *D. Don l. c.* of barren stamens. *Capsule* $\frac{1}{2}$ by $\frac{1}{2}$ in., stalk $\frac{1}{2}$ in. *Seeds* much smaller than in *G. dentosa* and very obscurely reticulated, but not well ripe.

SECT. VI. **Stylophora**. *Stem* hollow, $\frac{1}{4}$ – $\frac{1}{2}$ in. thick. *Flowers* and capsules large. *Style* $\frac{1}{2}$ – $\frac{3}{4}$ in.

37. **G. stylophora**, *Clarke*; leaves large elliptic lower petioled, peduncles axillary 1–8 in. 1-flowered with 2 bracts below the flower, capsule 2 by 1 in. *Gentiana* sp. 40, *Herb. Ind. Or. H. f. & T.*

SIKKIM, alt. 11–14,000 ft.; Chola and Kankola, *J. D. H.*; Jongri, *Clarke*.

Flowering stem 3–6 ft., simple. Lower leaves 12 by 4 in., strongly 5-nerved, upper 5 by 2 in., sessile, shortly connate at the base. *Calyx* widely funnel-shaped, tube $\frac{1}{2}$ in.; lobes $\frac{3}{4}$ by $\frac{1}{2}$ in., subobtus. *Corolla* (apparently very succulent, badly preserved) widely funnel-shaped, fimbriate in the throat (?). *Stamens* attached half-way up the corolla-tube, filaments linear; anthers $\frac{1}{4}$ in., oblong. *Stigmas* $\frac{1}{8}$ – $\frac{1}{4}$ in., oblong. *Seeds* $\frac{1}{8}$ by $\frac{1}{12}$ in.; testa lax, reticulated, scrobiculate.—This fine plant is remote from *G. lutea* in the inflorescence and the widely funnel-shaped corolla; it

may constitute a new genus when the corolla is fully known. It has the habit of *Frasera* and the large *Swertias*, from which it differs in the gamosepalous calyx and long style.

10. **JAESCHKEA**, Kurz.

Herbs, erect, or small decumbent. *Leaves* opposite, linear-lanceolate or ovate, bases shortly connate. *Flowers* paniculate or terminal pedunculate, blue. *Sepals* lanceolate or orbicular. *Corolla* tubular; lobes 5, short, triangular-lanceolate, valvate in bud. *Stamens* 5, attached at the sinus of the corolla-tube, filaments short, linear; anthers oblong-sagittate, blue or greenish. *Ovary* 1-celled, placentæ little intruded; style short, linear, stigma 2-lobed; ovules much fewer than in *Gentiana*. *Capsule* elliptic, sessile or shortly stalked, separating to the base into its two carpels, splitting the style into halves. *Seeds* ellipsoid; testa close, smooth not reticulated.—Species 3; Alpine W. Himalayan.

1. **J. gentianoides**, Kurz in *Journ. As. Soc.* 1870, pt. ii. 230, t. 13, and in *Flora*, 1871, 275; erect, panicled, leaves narrowly lanceolate, sepals lanceolate, seeds $\frac{1}{20}$ in. Clarke in *Journ. Linn. Soc.* xiv. 441. *Gentiana oligosperma*, Griseb. in *DC. Prodr.* ix. 94. *G. Jaeschkei* (by misprint *Taeschkei*), Kurz in *Trimen Journ. Bot.* 1867, 241.

KASHMIR and WESTERN HIMALAYA, alt. 8–13,000 ft.; abundant, *Jaeschke*, &c.

Stem 8–30 in., rigid, slender, somewhat lineolate. *Leaves* $1\frac{1}{2}$ by $\frac{1}{4}$ in., sessile. *Flowers* panicled, numerous; pedicels $0\frac{1}{2}$ in. *Sepals* $\frac{1}{4}$ by $\frac{1}{20}$ in., acute, sub-3-striate. *Corolla* expanding when only $\frac{1}{8}$ in., but gradually enlarging till in fruit (on the same stem) more than $\frac{1}{2}$ in.; tube subventricose; lobes (in fruit) $\frac{1}{2}$ by $\frac{1}{8}$ in. *Stamens* shorter than the corolla-lobes, blue or green when dry. *Capsule* $\frac{1}{2}$ in., ellipsoid, compressed, very shortly stalked. *Seeds* 10–30, much larger than in *Gentiana*.

2. **J. latisepala**, Clarke in *Journ. Linn. Soc.* xiv. 441; erect, panicled, leaves oblong acuminate, sepals unequal ovate obovate or orbicular, seeds $\frac{1}{20}$ in. *Gentiana canaliculata*, Royle; *D. Don* in *Trans. Linn. Soc.* xvii. 509; *G. Don* *Gen. Syst.* iv. 182. *G. Moorcroftiana*, Griseb. in *DC. Prodr.* ix. 96, partly, not of Wall.

N. KASHMIR and WESTERN TIBET, alt. 9–13,000 ft.; common, *Royle*, &c.

Closely resembling *J. gentianoides*; but rather stouter, with broader leaves. *Sepals* $\frac{1}{2}$ by $\frac{1}{2}$ in., hardly striate; uppermost leaves, when near the flowers and bractiform, ovate. *Capsule* sessile. *Seeds* as of *J. gentianoides*.

3. **J. microsperma**, Clarke; small, diffuse, leaves elliptic, flowers small long-peduncled terminal on the branches, sepals oblong, seeds minute.

ALPINE SIKKIM; Samdong, alt. 11–17,000 ft., *J. D. H.*

Stem $\frac{1}{2}$ – $1\frac{1}{2}$ in. Lower leaves $\frac{1}{3}$ by $\frac{1}{4}$ in., cauline $\frac{1}{8}$ in. *Peduncles* $\frac{1}{4}$ – $\frac{1}{2}$ in. *Sepals* $\frac{1}{2}$ by $\frac{1}{10}$ in., subacute. *Corolla-tube* $\frac{1}{8}$ in.; lobes $\frac{1}{10}$ in. *Anthers* blue or greenish. *Capsule* $\frac{1}{4}$ – $\frac{1}{2}$ in., subsessile. *Seeds* $\frac{1}{20}$ in., suborbicular, but, except in size, closely agreeing with those of *Jaeschkea*.—This small plant has doubtless been passed for *Gentiana tenella*, small examples of which it much resembles.

11. **PLEUROGYNE**, Eschsch.

Annual herbs, decumbent branched or erect. *Leaves* opposite. *Flowers* panicled, or long-peduncled. *Sepals* elliptic or linear, often unequal. *Corolla* rotate, without (or with very obscure) basal pits or depressions; tube very short with or without fimbriæ; lobes elliptic, usually acute. *Stamens* 4–5, attached to the corolla-tube, filaments linear somewhat flattened; anthers ob-

long or ovate. Ovary 1-celled, placentæ little intruded; stigma sessile. Capsule oblong or elliptic, sessile or nearly so, carpels separating. Seeds very many, small, subglobose, smooth, testa close not (or obscurely) reticulate.—Species 7; in the Mts. of Europe, Asia, and N. America.

1. **P. carinthiaca**, Griseb. *Gentian.* 310, and in *DC. Prodr.* ix. 122; branching from the base, cauline leaves ovate or elliptic; pedicels elongate, sepals $\frac{1}{4}$ in. elliptic, corolla 5-merous lobes $\frac{1}{2}$ in. fimbriate near the base. *Reich. Ic. Pl.* t. 1045; *Boiss. Fl. Orient.* iv. 77. *P. Stelleriana*, G. Don *Gen. Syst.* iv. 188. *P. carinata*, Edgew. in *Trans. Linn. Soc.* xx. 85, ex descr. *P. himalayensis*, Klotzsch in *Reis. Pr. Walden. Bot.* 91, t. 68. *Swertia carinthiaca*, Wulf. in *Jacq. Misc.* ii. 53, t. 6. *S. rotata*, Pall. *Fl. Ross.* iv. t. 89, fig. 3. *Gentiana carinthiaca*, Froel. *Gentian.* 103. *G. Stelleriana*, Cham. & Schl. in *Linnæa*, i. 188. *G. rotata*, M. Bieb.; Bunge in *Nouv. Mem. Soc. Imp. Mosc.* i. 254. *Lomatogonium carinthiacum*, Braun in *Flora*, 1830, 221.

W. HIMALAYA and WESTERN TIBET; alt. 10–13,000 ft., from Kashmir and Kumaon to the Karakorum, frequent, Thomson, &c.—DISTRIB. Alps, Caucasus, Cabul, Central Asia, Siberia.

Stems 1–6 in., usually very numerous. Radical leaves 1 by $\frac{1}{2}$ in., obovate, persistent or sometimes disappearing; cauline $\frac{1}{2}$ by $\frac{1}{4}$ in., narrowed at the base. Pedicels $\frac{1}{4}$ –2 in., mostly long. Sepals $\frac{1}{4}$ – $\frac{1}{2}$ by $\frac{1}{8}$ in., subacute or obtuse. Corolla-tube very short; lobes $\frac{1}{2}$ by $\frac{1}{4}$ in., blue, with green nerves, fimbriate near the base. Anthers somewhat large, oblong, often as long as the filaments. Capsule $\frac{1}{2}$ in., oblong, acute, sessile. Seeds numerous, small, ellipsoid.

2. **P. Thomsoni**, Clarke; branching from the base, cauline leaves small elliptic, pedicels elongate, sepals $\frac{1}{2}$ in. elliptic, corolla 5-merous lobes $\frac{1}{2}$ in. naked at the base.—Pleurogyne sp. 2, *Herb. Ind. Or. H. f. & T.*

W. TIBET, alt. 15–18,000 ft.; Thomson, Strachey.

Cauline leaves $\frac{1}{2}$ – $\frac{1}{4}$ in. Corolla-lobes at base naked or with obscure depressions. Anthers large, oblong, often as large as the filaments.—Mr. Bentham doubts whether this should not be removed to *Swertia*, but the depressions at the base of the petals are never well marked, and the habit is so exactly that of *P. carinthiaca* that some examples are hard to distinguish from that, while others are less than 1 in., with very small flowers.

3. **P. brachyanthera**, Clarke; branching from the base, cauline leaves small elliptic, pedicels elongate, corolla 4-merous lobes $\frac{1}{4}$ – $\frac{1}{2}$ in., anthers ovate very small much shorter than the filament.

WESTERN TIBET; Karakorum, alt. 13,000 ft., Clarke.

Cauline leaves $\frac{1}{2}$ – $\frac{1}{4}$ in. Sepals $\frac{1}{2}$ in., elliptic. Corolla-lobes at base slightly fimbriate, —The anthers are unlike any examples of *P. carinthiaca* or *P. Thomsoni*. Resembles a starved state of *P. carinthiaca*.

4. **P. spatulata**, A. Kerner *Nov. Sp.* ii. 8; branching from the base, cauline leaves linear-oblong, pedicels elongate, sepals narrowly oblong about half the length of the corolla.

N. KASHMIR; alt. 13,000 ft., Stoliczka, &c. LAHUL (A. Kerner).

Closely allied to *P. carinthiaca*. Radical leaves $1\frac{1}{2}$ in., linear-spatulate; cauline $\frac{3}{4}$ by $\frac{1}{2}$ in. Corolla-lobes often $\frac{3}{4}$ in., more than twice as long as the sepals. Anthers large, oblong. Capsule and seeds as in *P. carinthiaca*, but rather larger.

5. **P. ? minor**, Benth. in *Gen. Pl.* ii. 816; stem erect, cauline leaves ovate or elliptic, flowers 4-merous panicked pedicels $\frac{1}{2}$ –1 in., corolla $\frac{1}{4}$ – $\frac{1}{2}$ in. *Ophelia minor*, Griseb. in *DC. Prodr.* ix. 126; *Wight Ic.* t. 1332; *Datz. & Gibbs. Bomb. Fl.* 156; Clarke in *Journ. Linn. Soc.* xiv. 446.

W. DECCAN PENINSULA ; in the Ghats, from Bombay southwards ; common in the Nilgherries.

Stem 2-9 in., usually undivided at the base, without radical leaves. *Cauline leaves* $\frac{1}{2}$ by $\frac{1}{4}$ in., sessile. *Sepals* $\frac{1}{2}$ by $\frac{1}{3}$ in. elliptic. *Corolla* white or clear blue, nearly 5-partite ; segments oblong, base naked or minutely glandular, scarcely pitted. *Anthers* small, ovate, much shorter than the filament. *Ovary* sessile, oblong ; stigma sessile, shortly bilobed. *Capsule* $\frac{1}{4}$ in., oblong. *Seeds* minute, subglobose.—Genus doubtful ; in the symmetrical erect habit, 4-merous flowers, corolla without green nerves, it approaches *Swertia* Sect. *Ophelia* (see *Swertia Beddomei*).

12. SWERTIA, Linn.

Annual or perennial herbs. *Leaves* opposite except in *S. alternifolia*. *Flowers* blue, lurid, or whiteish, sometimes with yellow glands ; cymes in thyrsoid or corymbose panicles. *Sepals* 4-5, lanceolate, rarely ovate. *Corolla* rotate ; lobes 4-5, twisted to the right ; on each lobe (or on the short corolla-tube below its base) are 1 or 2 pits depressions or glands, naked or partly covered by a basal scale ; margins of pits fimbriate all round, or at its apex only ; scale naked or tips fimbriate. *Stamens* 4-5, attached near the base of the corolla, free, rarely monadelphous, filaments linear complanate, often more or less dilated downwards ; anthers oblong ovate or hastate, versatile. *Ovary* 1-celled, placentæ little intruded ; style 0 or short rarely linear-cylindric, stigmas 2. *Capsule* sessile, ovate or oblong, separating into its 2 carpels. *Seeds* various, many, rarely few, small or minute, testa close or very lax or winged reticulate.—Species 50 ; in Europe, Asia, and Africa, principally in the mountains.

In the species with one pit at the very base of each corolla-lobe, this pit seems homologous with the spur of *Halenia*. There is a passage from the species with a depressed broad viscous spot, fimbriate on the margins only to those which have 2 small lateral linear vertical glands ; among these *S. cærulea*, with very small depressions, should perhaps be removed to *Pleurogyne*. In *S. bimaculata*, where there are 2 green viscous spots, scarcely depressed, in the middle of the corolla-lobes, the morphology is obscure.

SUBGENUS I. Ophelia. *Stems* annual or once-flowering, erect, panicled, solid, virgate. *Radical leaves* 0 at the time of flowering.

* *Flowers* all (or most of them) 5-merous.

† *Sepals* almost free.

1. ***S. purpurascens*, Wall. Cat. 4379 ;** leaves oblong or lanceolate 3-1-nerved, filaments dilated downwards united into a short tube free from the corolla, style long stigmas sublinear. *Ophelia purpurascens*, *D. Don in Trans. Linn. Soc.* xvii. 526 ; *Griseb. Gentian.* 315, and in *DC. Prodr.* ix. 124 ; *Wight Ill. t.* 157, bis 3, fig. d. *O. Dalhousiana*, *Griseb. Gentian.* 313, and in *DC. Prodr.* ix. 123. *O. ciliata*, *G. Don Gen. Syst.* iv. 178.

TEMPERATE N.W. HIMALAYA, alt. 5-12,000 ft. ; from Kashmir to Kumaon ; abundant near Dalhousie and Dhurmsala.

Stems 8-36 in., terete or 4-lineolate. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ in., base narrowed, lowest subobtuse, uppermost acute, glabrous, *Panicles* divaricate, many-flowered, leafy ; pedicels often clustered. *Sepals* $\frac{1}{2}$ in., oblong, 1-nerved. *Corolla-lobes* $\frac{1}{2}$ in., ovate, acute, purple or dark red, reflexed in flower ; pits solitary near the base of each lobe, horse-shoe shaped, naked. *Stamen-tube* erect, and filaments puberulous ; anthers elliptic-lanceolate, much acuminate. *Seeds* $\frac{1}{60}$ in. diam., globose, smooth, light-yellow when ripe.—Grisebach's type specimens of *S. purpurascens* and *Dalhousiana* are identical. This species is recognised at once by the red-purple much-reflexed corolla-lobes. There is a strong purple band near the base of the corolla-lobe which is

usually interrupted in the middle, hence from behind the corolla-lobe appears biglandulose near the base; the foveola or pit is below this, in the corolla-tube, and is a watch-pocket slit, never more than one to each corolla-segment. *O. ciliata* is founded on some scraps of Royle's with most minutely ciliate petioles, nowise differing from the type. There is a form (? dimorphic) in which the stamens are not half so long as the corolla-lobes, the anthers linear.

2. ***S. paniculata***, Wall. Cat. 4374, and Pl. As. Rar. iii. 3, t. 205; leaves oblong or lanceolate 3-1-nerved, filaments linear separately attached to the corolla-tube, style long stigmas linear. *Ophelia paniculata*, D. Don in Trans. Linn. Soc. xvii. 525; Griseb. Gentian. 314, and in DC. Prodr. ix. 124; Bot. Mag. 5687, fig. 5, 6. *O. Wallichii*, G. Don Gen. Syst. iv. 178.

TEMPERATE W. HIMALAYA, alt. 5-8000 ft.; from Kashmir to Nepal, Wallich, &c.

Close resemblance to *S. purpurascens*, when dried. *Sepals* $\frac{1}{2}$ in., oblong, acute, sub-1-nerved. *Corolla-lobes* $\frac{1}{4}$ in., ovate, acute, white in the upper half, patent not reflexed in flower; pit very near the base of the corolla, 1 to each lobe, naked; near the base of the corolla-lobe are 2 purple or lurid-green subglandular marks, sometimes confluent into one. *Filaments* hardly dilated downwards, not puberulous; anthers oblong, not hastate. *Capsule* $\frac{1}{4}$ in., elliptic-lanceolate, acuminate. *Seeds* as of *S. purpurascens* but rather smaller.—The var. *brachypetala*, Griseb. Gentian., 314, was founded on Wallich's type of *S. paniculata*; but Grisebach subsequently marked examples of *S. dilatata* (n. 4 below) as var. *brachypetala*.

3. ***S. Griffithii***, Clarke; leaves narrowly lanceolate 3-1-nerved, panicles dense, calyx-lobes lanceolate rigid 3-nerved connate below, filaments linear free, style long stigmas linear. *Gentianeae* n. 1006, *Griff. Itin. Notes*, 189.

BHOTAN; Lamnos, alt. 9000 ft., Griffith (Kew Distrib. 5883).

Possibly an eastern var. of *S. paniculata*. Examples are 4-7 in., very rigid, branched, dense with leaves and fruit. *Leaves* 1 by $\frac{1}{2}$ in. *Pedicels* mostly $\frac{1}{2}$ in. *Capsules* rather smaller than in *S. paniculata*.

4. ***S. dilatata***, Clarke; leaves lanceolate 3-1-nerved, filaments much dilated for more than half their length puberulous not connate into a tube at the base, style cylindric stigmas sublinear.

SIKKIM HIMALAYA, alt. 4-12,000 ft., common; J. D. H., &c. NEPAL; Wallich.

Resembling *S. paniculata*, but with larger flowers and capsules; and the stamens more like those of *S. purpurascens*. *Leaves* glabrous, base minutely ciliate. *Sepals* $\frac{1}{2}$ in., elliptic-lanceolate, acuminate, much broader than in *S. paniculata*. *Corolla* usually shorter than the sepals; lobes greenish yellow, a transverse purple continuous band near the base; a pit horse-shoe-shaped on the corolla-tube, one for each lobe. *Filaments* usually more dilated than in *S. purpurascens*, sometimes nearly to the summit, while at the base they are contracted, separate. *Capsule* $\frac{1}{2}$ in.

VAR. *pilosa*; leaves pilose on both surfaces with ciliate margins and nerves, pedicels and sepals ciliate. Nepal; J. Scully.

5. ***S. tetragona***, Clarke; leaves lanceolate 3-1-nerved, filaments linear free, style 0 stigmas of 2 closely approximated hemispheric plates. *Ophelia tetragona*, Edgew. in. Trans. Linn. Soc. xx. 86.

TEMPERATE HIMALAYA, alt. 5-8000 ft.; from Kashmir to Simla, abundant; Edgeworth, Thomson, &c.

Resembling in general appearance *S. paniculata*. *Sepals* $\frac{1}{2}$ in., narrowly lanceolate. *Corolla-lobes* more than $\frac{1}{4}$ in., whitish; near the base on either side of each lobe is an oblong vertical hairy gland; no pit at the base of the corolla-tube but a shining obscure concavity, of which (as in other species) the two oblong glands are the more prominent upper margins. *Anthers* oblong, hastate to the middle. *Capsule*

$\frac{1}{4}$ – $\frac{1}{2}$ in., oblong, obtuse. *Seeds* small, nearly as of *S. paniculata*.—This very abundant plant has been overlooked as *S. paniculata* and as *S. angustifolia*.

6. ***S. cordata***, Wall. Cat. 4378; leaves sessile ovate acute 5–3-nerved, filaments linear free, style cylindric stigmas subhemispheric. *Ophelia cordata*, Griseb. *Gentian.* 315, and in DC. *Prodr.* ix. 124; Clarke in *Journ. Linn. Soc.* xiv. 445, not of Don. *O. nuda*, Klotzsch in *Reis. Pr. Wald. Bot.* 91, t. 67.

TEMPERATE HIMALAYA and WESTERN TIBET, alt. 4–12,000 ft., from Kashmir and the Karakorum to Bhotan; abundant westward. KHASIA Mts., alt. 3–5000 ft., very common.

Stem 8–36 in., 4-lineolate. *Leaves* $1\frac{1}{4}$ by $\frac{1}{2}$ in., obtuse, base often cordate. *Panicles* large, many-flid., branches ascending or patent; pedicels 0– $1\frac{1}{2}$ in., often fascicled, unequal. *Sepals* $\frac{1}{2}$ by $\frac{1}{2}$ in., ovate-lanceolate, acute. *Corolla-lobes* $\frac{1}{2}$ – $\frac{1}{3}$ in., elliptic or oblong, acute or obtuse, white or with purplish nerves; above the base of the lobe is a large orbicular viscous yellowish spot hardly depressed, not fimbriate, traversed obscurely by the central nerve, not bifid; no pits in the corolla-tube. *Filaments* linear, subhypogonous, obscurely connate at the very base; anthers oblong, scarcely hastate. *Capsule* (in Wallich's example) $\frac{1}{2}$ by $\frac{1}{2}$ in., often hardly $\frac{1}{2}$ in. *Seeds* $\frac{1}{16}$ in. diam., subglobose, ornamented with long raised lines of rows of glands.—Described from Wallich's Kumaon example, which is *Ophelia cordata* β *laxa*, Grisebach l. c.; and has large flowers and capsules; the Khasia form is nearly the same. Some Kashmir examples have very small flowers with obtuse lobes, others have very large flowers; all have the ovate sessile leaves, the corolla-lobes with one large spot each, and the peculiarly marked seeds. *Ophelia cordata*, Don, is said by him to have been founded on Wallich's *Swertia Chirata* and *cordata* thrown together; the description refers mainly (as to the petals and glands) to *S. Chirata*. This species, like *S. purpurascens*, has a form with very short filaments and linear anthers. It also occurs (in N. Kashmir) with double flowers.

7. ***S. bimaculata***, H. f. & T.; Clarke in *Journ. Linn. Soc.* xiv. 449; leaves elliptic-lanceolate petioled 3-nerved, corolla-lobes marked half-way up with 2 green spots, filaments linear free, stigmas sessile hemispheric. *Ophelia bimaculata*, Sieb. & Zucc. *Fam. Nat.* 35. *So Mokou*, iv. t. 55.

EASTERN HIMALAYA; Sikkim and Bhotan, alt. 5–8000 ft.; Griffith, J. D. H., &c., abundant about Darjeeling.

Stem 2–6 ft., stout, 4-angular, corymbose upwards. *Leaves* 3 by $1\frac{1}{4}$ in., or upper cauline sometimes $6\frac{1}{2}$ by $2\frac{3}{4}$ in., glabrous, petioled or at least much narrowed at the base. *Flowers* numerous, 4–5 merous; pedicels $\frac{1}{2}$ – $1\frac{1}{2}$ in., mostly long. *Sepals* $\frac{1}{2}$ in., elliptic, mostly obtuse. *Corolla-lobes* $\frac{1}{2}$ – $\frac{1}{3}$ in., broadly elliptic, white or yellowish-green, with black spots in their upper half; the two green spots in the middle viscid, scarcely depressed, no pits in the corolla-tube. *Filaments* attached on the corolla-tube; anthers oblong, not hastate. *Capsule* $\frac{3}{4}$ by $\frac{1}{2}$ in. *Seeds* $\frac{1}{10}$ in., cuboid-globose, smooth, obscurely reticulated.

8. ***S. macrosperma***, Clarke; leaves subsessile oblong or subovate acute, corolla-lobes with 2 small oblong glands near their base, stigmas subsessile, seeds few large smooth. *Ophelia macrosperma*, Clarke in *Journ. Linn. Soc.* xiv. 448.—*Ophelia* sp. n. 15, *Herb. Ind. Or. H. f. & T.*

KHASIA Mts., alt. 4–6000 ft., very common; Griffith, H. f. & T., &c.

Stem 6–48 in., quadrangular, diffusely branched upwards. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ in., or in small plants subovate. *Pedicels* $\frac{1}{2}$ –2 in., mostly long. *Sepals* $\frac{1}{2}$ in., lanceolate. *Corolla-lobes* $\frac{3}{4}$ in., lanceolate, pale lurid blue or nearly white; the two glands vertical, parallel, hardly depressed, naked or hairy. *Filaments* linear, free, on the corolla-tube; anthers hastate. *Capsule* $\frac{1}{2}$ by $\frac{1}{2}$ in. *Seeds* $\frac{1}{16}$ in., ellipsoid.—Of this also double-flowered examples occur wild. The whole habit and seeds of this species show it to be very closely allied to *Halenia*.

†† *Calyx distinctly gamosepalous.*

9. **S. racemosa**, Wall. Cat. 4377; leaves subsessile elliptic-lanceolate 3-nerved, filaments free linear slightly dilated below, style long cylindric, stigmas short oblong. *Ophelia racemosa*, Griseb. *Gentian.* 319, and in *DC. Prodr.* ix. 127; Clarke in *Journ. Linn. Soc.* xiv. 447.

NEPAL; Wallich.

Stems 18 in., 4-lineolate. Leaves $1\frac{3}{4}$ by $\frac{1}{2}$ in. Panicles many-fl., leafy; pedicels $0-\frac{1}{2}$ in., mostly short, fascicled, unequal. *Calyx-tube* $\frac{1}{12}$ in., funnel-shaped; lobes $\frac{1}{2}-\frac{1}{3}$ in., lanceolate, very acute, almost keeled. *Corolla-lobes* $\frac{1}{4}-\frac{1}{2}$ in., oblong, acute; at the very base of each, almost in the corolla-tube, is a pit covered by a scale, teeth of its margin lanceolate-linear black not hairy. Filaments on the corolla-tube; anthers oblong, not hastate. Capsule $\frac{1}{2}$ in. Seeds somewhat large, ellipsoid, smooth.—On Wallich's sheets, some *S. Chirata* is mixed with this, which seems to have troubled D. Don as noticed by Grisebach.

** Flowers all 4-merous.

† Species of North India.

10. **S. Chirata**, Ham.; Wall. Cat. 4372; cauline leaves subsessile elliptic acute 5-nerved, corolla lurid-green-yellow near the base of each lobe 2 glandular depressions each terminated by long hairs. *Gentiana Chirayita*, Roxb.; Fleming in *Asiat. Res.* xi. 167. *G. Chirayta*, Roxb. *Fl. Ind.* ii. 71. *G. Chirata*, Wall. *Pl. As. Rar.* iii. 33, t. 252. ? *G. floribunda*, Don *Prodr.* 127. *Agathotes Chirata*, D. Don in *Trans. Linn. Soc.* xvii. 552. *Ophelia Chirata*, Griseb. *Gentian.* 320, and in *DC. Prodr.* ix. 127; Clarke in *Journ. Linn. Soc.* xiv. 447; Benth. & Trim. *Med. Pl.* iii. t. 183.—*Ophelia* sp., 17, 19, and 20, *Herb. Ind. Or. H. f.*, & T.

TEMPERATE HIMALAYA, alt. 4-10,000 ft. from Kashmir to Bhutan. KHASIA MTS., alt. 4-5000 ft.; frequent.

Stem 2-5 feet, 4-lineolate or subterete. Leaves 2 by $\frac{3}{4}$ in., the lower often much larger sometimes petioled. Panicles large, leafy, many-fl.; pedicels $0-\frac{3}{4}$ in., fascicled, mostly short. *Calyx-lobes* $\frac{1}{2}$ in., lanceolate. *Corolla-lobes* $\frac{1}{4}$ in., ovate, acuminate, more or less purple-nerved; the glandular depressions are green, shallow, often submarginal, rarely close together or subconfluent, with a fringe of long white or pink hairs at the summit. Filaments linear, free; anthers oblong. Style cylindric; stigmas oblong. Capsule $\frac{1}{4}$ in. and upwards, ovate, acute. Seeds $\frac{1}{50}$ in., polyhedral, smooth; testa close, not (or microscopically) reticulated.—D. Don (in *Trans. Linn. Soc.* xvii. 522) has reduced to *S. Chirata* his *Gentiana floribunda*. But there must be some error, for he describes the corolla as 5-fid, tubular, blue, and both it and the leaves as hairy. *Ophelia* sp. 20, H. f. & T., is the Khasia plant which has strongly 3-nerved leaves attenuated at the base, and of which some examples have woody short barren branches with terminal tufts of leaves, others annual erect flowering stems. This species is so exceedingly near the two next, that the quotations of all the older authors are uncertain; Bentley and Trimen's figure is the one to be relied upon. While many of the other *Ophelias* are gregarious and could be collected in great quantity, this occurs scattered (from Khasia to Kashmir); yet all the medicinal *Chiretta* of the Bengal bazaars collected by Dr. Wise proved to be *S. Chirata* true, without any admixture of the closely allied species.

11. **S. lurida**, Royle ms.; cauline leaves subsessile elliptic acute 5-nerved, corolla lurid green-yellow with 2 glandular depressions without hairs near the base of each lobe. *Ophelia lurida*, D. Don in *Trans. Linn. Soc.* xvii. 527; Griseb. in *DC. Prodr.* ix. 124. *O. lucida*, G. Don *Gen. Syst.* iv. 179.

N.W. HIMALAYA, Royle, Falconer; Naini Tal, Col. Davidson.

Corolla-lobes $\frac{1}{10}$ in. Capsule $\frac{1}{2}$ in.—Differs from *S. Chirata* in the smaller flowers and capsules.

12. **S. alata**, *Royle ms.*; cauline subsessile leaves ovate acute 5-nerved, corolla lurid green-yellow near the base of each lobe one round depression. *Agathotes alata*, *D. Don in Trans. Linn. Soc.* xvii. 523. *Ophelia alata*, *Griseb. in DC. Prodr.* ix. 127; *Bot. Mag.* t. 5687, fig. 12.

TEMPERATE W. HIMALAYA, alt. 4-6000 ft.; from Kashmir to Kumaon, common.

Stem 4-angular, often 4-winged. *Calyx-lobes* $\frac{1}{4}$ in. and upwards. *Corolla-lobes* purple-veined, often shorter than the calyx; glandular depression minutely pubescent round the margin or glabrous, covered at the base by a slit-like gland.—Closely resembling *S. Chirata*.

13. **S. nervosa**, *Wall. Cat.* 4383; leaves elliptic-lanceolate 3-nerved narrowed at the base, sepals oblong-linear exceeding the corolla, corolla-lobes greenish-yellow with one orbicular gland near the base of each lobe, stigmas subsessile hemispheric. *Griseb. Gentian.* 317, and in *DC. Prodr.* ix. 125.

TEMPERATE NEPAL and SIKKIM, alt. 6-9000 ft., common; *Wallich, J. D. H., &c.*

Stem 1-3 feet, 4-lineolate or 4-winged. *Leaves* $1\frac{1}{2}$ by $\frac{2}{3}$ in., upper cauline subpetiolate. *Panicles* many-flowered; *pedicels* $\frac{1}{2}$ - $1\frac{1}{2}$ in., very variable. *Sepals* $\frac{2}{3}$ by $\frac{1}{4}$ in., sometimes longer. *Corolla-lobes* $\frac{1}{4}$ - $\frac{1}{2}$ in., ovate, acute, purple-nerved or dotted; gland large, sometimes viscous, little depressed, nearly naked; sometimes a distinct pit covered by a slit-like fold with a hairy margin. *Filaments* linear (in one form short); anthers oblong, scarcely hastate. *Capsule* $\frac{1}{2}$ by $\frac{1}{2}$ in., ovate. *Seeds* $\frac{1}{40}$ in., polyhedral; testa somewhat loose, glistening along the edges.

14. **S. angustifolia**, *Ham. in Don Prodr.* 127; leaves narrowly lanceolate sub-1-nerved narrowed at the base, sepals oblong-linear often longer than the corolla, corolla-lobes white or blueish oblong acute with one large orbicular gland near the base. *Wall. Cat.* 4373, and *Pl. As. Rar.* iii. 2, t. 204. *Ophelia angustifolia*, *D. Don in Trans. Linn. Soc.* xvii. 524; *Griseb. Gentian.* 320, and in *DC. Prodr.* ix. 126; *Bot. Mag.* 5087, fig. 3, 4.

SUBTROPICAL HIMALAYA, alt. 1-6000 ft. from the Chenab to Bhotan, common.

Generally resembling *S. nervosa*, the leaves narrower. *Sepals* equalling the corolla in Wallich's type, often $\frac{1}{2}$ - $\frac{2}{3}$ in. and greatly exceeding it; sometimes considerably shorter than the corolla, when the species must be distinguished from *S. pulchella* by the larger gland. *Corolla-lobes* $\frac{1}{4}$ - $\frac{1}{2}$ in., usually white with blue or black dots, never lurid; the large depression usually minutely pubescent on the margin, and partly closed by a scale. *Stamens*, capsule, and seeds nearly as in *S. nervosa*.

15. **S. pulchella**, *Ham. in Wall. Cat.* 4375; leaves sessile narrowly lanceolate sub-3-nerved, sepals lanceolate much shorter than the corolla, corolla-lobes ovate-lanceolate with one orbicular gland near the base. *Ophelia pulchella*, *D. Don in Trans. Linn. Soc.* xvii. 525; *Griseb. Gentian.* 318, and in *DC. Prodr.* ix. 126. *O. porrigens*, *G. Don Gen. Syst.* iv. 178. *O. pratensis*, *Edgew. in Trans. Linn. Soc.* xx. 85.

SUBTROPICAL HIMALAYA, the Terai, alt. 500-4000 ft., from Kangra to Bhotan, very common. KHASIA MTS., alt. 1-4000 ft., common.

Hardly differing from *S. angustifolia* but by the shorter sepals which are hardly half as long as the corolla in Wallich's type. *Corolla-lobes* pale-blue with deeper-blue nerves and dots, erect and connivent in young fruit; orbicular depression very near the base of the corolla, covered by a small scarcely pubescent scale or naked.

VAR. elegans; sepals exceeding the corolla or much shorter than it (on the same branch), corolla-lobes subpatent in young fruit. *S. elegans*, *Wall. Cat.* 4376, *not of Wight*. *Swertia florida*, *Wall. Cat.* 4382. *Ophelia florida*, *G. Don Gen. Syst.* iv. 178; *Griseb. in DC. Prodr.* ix. 125. Himalaya, Khasia, British Burma, frequent over nearly the whole area of *S. pulchella* type. *Distrib. Ava.*—This variety has

been often referred to *S. angustifolia* which has less acute sepals, larger glands on the corolla-lobes, but it may be doubted whether it is a distinct species.

†† *Species of the Deccan Peninsula and Ceylon*.—(Filaments linear, not or scarcely dilated, free or nearly so; anthers oblong, not or obscurely cordate. Style short cylindric, stigmas oblong. Capsule ovate, acute, about as long as the corolla. Seeds $\frac{1}{16}$ in. polyhedral; testa close, minutely reticulated, so that the seeds appear often glistening).

16. *S. affinis*, Clarke; leaves lanceolate 3-nerved base narrowed, cymes forming an elongate lax panicle, corolla-lobes $\frac{1}{4}$ by $\frac{1}{2}$ in. oblong shortly acute or subobtus. *Ophelia affinis*, Arn. in *Wight Ill.* ii. 175, t. 157, bis fig. 3 b. *O. elegans*, *Wight Ic.* t. 1331.

DECCAN PENINSULA, alt. 2-4000 ft.; from Chota Nagpore to the Pulneys, *Wight*, &c.

Stem 1-3 feet. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ in. *Panicle-branches* sharply quadrangular; pedicels 0-1 in., flowers not clustered. *Sepals* $\frac{1}{2}$ in., narrowly lanceolate. *Corolla-lobes* white or with blue nerves; orbicular gland near the base large, completely covered by a large scale with pubescent margin.—This in its long panicle and smaller flowers differs from the other Deccan species, but is very near *S. pulchella*, var. *elegans*, Wall., of which it may be the South Indian form, as *Wight* supposed.

17. *S. corymbosa*, *Wight ms.*; upper cauline leaves sessile ovate or oblong subacute 3-nerved, cymes forming a level-topped corymb, corolla-lobes $\frac{1}{2}$ by $\frac{1}{2}$ in. broadly oblong shortly acute. *Ophelia corymbosa*, *Griseb. Gentian.* 317, and in *DC. Prodr.* ix. 125; *Wight Ic.* t. 1329; *Bot. Mag.* t. 4489.

MTS. OF THE S. DECCAN PENINSULA, alt. 4-7000 ft.; common.

Stem 8-20 in., quadrangular or 4-winged. Lower cauline leaves $\frac{3}{4}$ by $\frac{1}{2}$ in., spatulate-obovate, obtuse, subpetioled; upper cauline $\frac{1}{2}$ by $\frac{1}{2}$ in., ovate, obtuse, mucronate. *Corymb* wide; pedicels 0- $\frac{1}{2}$ in., clustered. *Sepals* $\frac{1}{2}$ in., narrowly lanceolate. *Corolla-lobes* white with blue-nerves or pale-blue, one gland at the base of each covered by a scale with pubescent margin.—Described from *Wight's* type; *Bot. Mag.* t. 4489, is a much drawn-up garden specimen with the upper leaves spatulate, and the flowers much bluer than common. The following varieties are here described from the type specimens, but numerous intermediates occur which *Wight* was unable to refer to any one variety.

VAR. elatior, *Griseb.* in *DC. Prodr.* ix. 125; upper cauline leaves $2\frac{1}{2}$ in. elliptic lanceolate acute, sepals $\frac{1}{2}$ in. acute, corolla-lobes $\frac{1}{2}$ in. very obtuse.—Nilgherries, Bombay; *Dalzell*.

VAR. Grisebachiana; upper cauline leaves $1\frac{1}{4}$ by $\frac{1}{2}$ in. acute. *Ophelia Grisebachiana*, *Wight Ic.* t. 1330.—Pulneys and Nilgherries; *Wight*. *Stem* terete, obscurely lineolate; lower cauline leaves small, somewhat fleshy, narrowly oblong. This variety approximates to *S. zeylanica*.

VAR. Lawii; lower cauline leaves sessile ovate-lanceolate subobtus 5-3-nerved, upper narrow, corymb lax sometimes few-flowered. *Ophelia Lawii*, Arn. in *Wight Ill.* ii. 175, t. 157, bis fig. 3 c. *O. pauciflora*, *Dalzell* in *Hook. Kew Journ.* iii. 211; *Dalzell & Gibs. Bomb. Fl.* 156.—Bombay Ghats; *Dalzell, Ritchie*.

18. *S. trichotoma*, Wall. *Cat.* 4381; upper cauline leaves elliptic-lanceolate, pedicels umbelled or clustered at the ends of the cyme-branches, corolla-lobes $\frac{1}{2}$ - $\frac{1}{2}$ by $\frac{1}{2}$ in. oblong acuminate often caudate. *Ophelia trichotoma*, W. & A. *ms.*; *Wight Ill.* ii. 175, t. 157, fig. 3 g. *O. umbellata*, *Wight l.c.* fig. 3 a; *Bot. Mag.* t. 5397.

NILGHERRIES, alt. 6-8000 ft.; common.

Only differs from *S. corymbosa* in the inflorescence and very acuminate corolla-lobes. *Pedicels* $\frac{1}{2}$ - $1\frac{1}{2}$ in., numerous, sometimes forming perfect umbels; sometimes much shorter, when the examples have been mistaken for *S. decussata*.

19. **S. decussata**, Nimmo in *Grah. Cat. Pl. Bomb.* 249; leaves sessile ovate obtuse 5-3-nerved, corymbs very dense, corolla-lobes $\frac{1}{2}$ by $\frac{1}{2}$ in. broadly oblong shortly acute. *Ophelia densifolia*, Griseb. in *DC. Prodr.* ix. 125. *O. alba*, Arn. in *Wight Ill.* t. 157, bis fig. 3 f. *O. multiflora*, Dalz. in *Hook. Kew Journ.* ii. 135; Dalz. & Gibs. *Bomb. Fl.* 156.

W. DECCAN PENINSULA, alt. 3-6000 ft.; from the Concan to Travancore, common.

Stem 1-3 ft., terete or 4-winged. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$ in., numerous, approximate, decussate. *Pedicels* $0-\frac{1}{2}$ in., mostly short. *Sepals* $\frac{1}{4}-\frac{1}{2}$ in., narrowly lanceolate. *Corolla-lobes* white with blue nerves, with one round depression at the base of each, covering scale shortly hairy not very large.

20. **S. zeylanica**, Walker ms.; leaves sessile short lanceolate subobtuse fleshy, cymes terminal umbel-like, corolla-lobes $\frac{1}{2}$ in. broadly elliptic shortly acute. *Ophelia zeylanica*, Griseb. *Gentian.* 316, and in *DC. Prodr.* ix. 124.

CEYLON, alt. 5-7000 ft.; common.

Stem 8-20 in. terete or scarcely 4-lineolate. *Cauline leaves* $\frac{1}{2}$ by $\frac{1}{2}$ in., lower leaves similar but subspathulate. *Cymes* many or few-flowered; *pedicels* $\frac{1}{4}-\frac{1}{2}$ in. mostly short. *Corolla* deep blue.—Much resembling *S. corymbosa*, var. *Grisebachiana*, but having flowers considerably smaller.

21. **S. Beddomei**, Clarke; leaves sessile ovate subobtuse 3-nerved, cymes forming terminal flat-topped dense corymbs, corolla-lobes $\frac{1}{2}-\frac{1}{3}$ in. elliptic subacute.

DECCAN PENINSULA; Canara, Beddome; Mysore; Lobb.

Stem 12 in., quadrangular. *Leaves* $\frac{2}{3}$ by $\frac{1}{2}$ in., distant, lower smaller disappearing. *Pedicels* $0-\frac{1}{2}$ in., mostly short. *Sepals* $\frac{1}{2}-\frac{1}{3}$ in., elliptic or oblong, scarcely acute. *Corolla-lobes* elliptic, acute; one orbicular depression at the base of each, covered by an oblong scale fimbriated at the tip. *Capsule* not seen.—Not very nearly allied to any of the foregoing, but very near *Pleurogyne* *β. minor*, Benth., of which it has been supposed to be merely a luxuriant form.

SUBGENUS II. **Euswertia**. *Rootstock* perennial with tufted long-petioled leaves; annual flowering stems erect, often thick, hollow (see also n. 10 *S. Chirata*).

22. **S. Hookeri**, Clarke; cauline leaves elliptic scarcely connate at the base, cymes axillary dense distant, flowers 4-merous, seeds much compressed narrowly winged.—*Gentiana* sp. n. 41, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 12-13,000 ft.; Lachen & Choongtam, J. D. H., King.

Stem $1\frac{1}{2}-4$ ft., hollow, $\frac{1}{4}-\frac{1}{2}$ in. thick. *Radical leaves* 4 by 1 in., spathulate-elliptic; cauline 3 by 1 in., narrowed at both ends, sessile, 5-nerved. *Peduncles* hardly any; *pedicels* $\frac{1}{2}-2$ in., nodding with flowers. *Sepals* $\frac{1}{2}$ by $\frac{1}{2}$ in., ovate, hardly acute. *Corolla-lobes* $\frac{2}{3}$ by $\frac{1}{2}$ in., obtuse, purplish with blue nerves; pit at the base of each deep, naked. *Filaments* linear, little dilated; anthers oblong blue. *Style* $\frac{1}{10}$ in., stigmas very short. *Capsule* $\frac{2}{3}$ by $\frac{1}{2}$ in., shining brown. *Seeds* $\frac{1}{2}$ in. diam., discoid, exceedingly thin, smooth.

23. **S. Rex**, Clarke; cauline leaves elliptic acuminate connate into a tube at the base, cymes forming a narrow panicle, flowers 5-merous, glandular depressions 2 on each corolla-lobe above the base nearly naked, seeds compressed narrowly winged.

SIKKIM HIMALAYA, alt. 11,000 ft.; Singalelah, Clarke.

Stem 3-5 ft., hollow, $\frac{1}{2}$ in. thick. *Cauline leaves* 7 by 3 in., 7-nerved; tube at the base $1\frac{1}{2}$ in., lax. *Cymes* 6 in., erect; *pedicels* 1-4 in. *Sepals* $\frac{1}{2}$ by $\frac{1}{2}$ in., lanceolate, 3-nerved, entire. *Corolla-lobes* $\frac{2}{3}$ by $\frac{1}{2}$ in., ovate, subacute, lurid-blue with green nerves; glandular depressions 2, above the base $\frac{1}{2}$ the way up, lower margin slightly produced minutely hairy so as to form an imperfect scale covering the lower part of

the depression. *Filaments* linear, flattened; anthers ovate, small. *Stigmas* subsessile. *Capsule* $\frac{2}{3}$ - $\frac{3}{4}$ by $\frac{1}{2}$ in. *Seeds* $\frac{1}{8}$ in. diam., smooth.

24. ***S. speciosa***, *Wall. Cat.* 4384; cauline leaves elliptic acuminate bases connate, cymes forming a narrow panicle, flowers 5-merous, glandular depressions 2 on each corolla-lobe close to the base subconfluent prominently fimbriate, seeds compressed narrowly winged. *Griseb. Gentian.* 334, and in *DC. Prodr.* ix. 133.

WESTERN HIMALAYA, Kumaon; *Wallich, Munro*; Gurwhal; Ramni, alt. 10,500 ft., *Strach. & Winterb.*; Kashmir; Sonamurg, alt. 9000 ft., *Levinge*.

Stem $1\frac{1}{2}$ -4 ft., hollow, $\frac{1}{2}$ in. thick. *Radical leaves* long-petioled, cauline 5 by 2 in., narrowed downwards, 7-nerved; tube at the base $\frac{1}{4}$ - $\frac{1}{2}$ in. *Peduncles* short, pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in. *Sepals* $\frac{1}{2}$ by $\frac{1}{2}$ in., ovate, acute, serrate, much overlapping at the base. *Corolla-lobes* $\frac{3}{4}$ by $\frac{1}{2}$ in., spatulate-oblong, shortly acute; fimbriæ $\frac{1}{8}$ in. *Stamens, capsule* and seeds nearly as of *S. Rex*.—Described from Wallich's type, but the var. *perfoliata* is mixed in Wallich's collection. The Kashmir example has the corolla smaller.

VAR. *perfoliata*; sepals narrower subentire, corolla-lobes $\frac{3}{4}$ by $\frac{1}{2}$ in. much acuminate. *G. Don Gen. Syst.* iv. 176. *S. speciosa*, *D. Don in Trans. Linn. Soc.* xvii. 518.—Gurwhal and Punjab Himalaya, alt. 11,000 ft.; *Royle, Edgeworth, &c.*

25. ***S. alternifolia***, *Royle Ill.* 278, t. 67, fig. 2; leaves all alternate, cauline elliptic-lanceolate amplexicaul, cymes forming a narrow panicle, flowers 5-merous, glandular depressions 2 on each corolla-lobe close to the base subconfluent prominently fimbriate. *D. Don in Trans. Linn. Soc.* xvii. 520; *Griseb. in DC. Prodr.* ix. 133.

WESTERN HIMALAYA; Kumaon and Gurwhal, alt. 11-12,000 ft.; Choor and Kedarkanta, *Royle*; Jungle (on the Upper Pabur), *Edgeworth*.

Resembling altogether *S. speciosa*, but all the cauline leaves, including those containing cymes, are alternate. All authors describe the flowers as golden or yellow, but it is probable that they have no authority except Royle's artist, and that the flowers are really lurid blue.

26. ***S. petiolata***, *Royle*; *D. Don in Trans. Linn. Soc.* xvii. 519; lower cauline leaves long-petioled oblong connate into a tube upper often sessile, cymes forming a narrow panicle, flowers 5-merous, glandular depressions 2 much fimbriate, seeds polyhedral scrobiculate not winged. *Griseb. in DC. Prodr.* ix. 133. *S. speciosa*, *G. Don Gen. Syst.* iv. 176, not of *Wall.*

WESTERN HIMALAYA; Kashmir, alt. 9-12,000 ft., frequent; Gulmurg, Tragbol, &c., *Royle, Atkinson, Levinge, &c.*—DISTRIB. Cabul.

Stem 1-3 ft., hollow, $\frac{1}{8}$ - $\frac{1}{6}$ in. thick. *Lower cauline leaves* $3\frac{1}{2}$ by 1 in., 5-nerved, petiole 2-3 in.; tube at the base $\frac{1}{4}$ -1 in.; leaves at the base of the cyme $1\frac{1}{2}$ by $\frac{1}{2}$ in., sessile, hardly connate; upper cauline leaves petioled or sessile. *Peduncles* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., mostly 3-5-flowered; pedicels $\frac{1}{4}$ - $\frac{3}{4}$ in. *Sepals* $\frac{1}{2}$ by $\frac{1}{2}$ in., lanceolate, acute (in Royle's example), sometimes $\frac{1}{2}$ by $\frac{1}{2}$ in. *Corolla-lobes* $\frac{1}{2}$ - $\frac{3}{4}$ by $\frac{1}{2}$ - $\frac{1}{2}$ in., acute subentire (in Royle's example) with orbicular glands; in other examples emarginate or suberose at the tip, with glands elliptic or elongate; corolla lurid grey or nearly white with blue-green nerves, the glands yellow, the tip green. *Style* hardly any, stigmas short. *Capsule* $\frac{1}{2}$ by $\frac{1}{4}$ in. *Seeds* corrugate-cristate (*D. Don*) i.e. testa lax in long series of glandular ridges, approaching in structure those of *S. cordata*, but much larger.

VAR. *lahulensis*; sepals $\frac{2}{3}$ by $\frac{1}{2}$ in., corolla-lobes $\frac{3}{4}$ -1 by $\frac{1}{2}$ in. spatulate-oblong greenish erose at the tips, glands elongate considerably above the base of the corolla-lobes. *S. lahulensis*, *A. Kerner Nov. Sp.* ii. 4.—Lahoul; *Jaesckke*. The glands are fimbriate on the upper edge, and also at their base, not on the sides; and, being $\frac{1}{10}$ in. long, there seem to be 2 small hairy glands some way up the corolla-lobes, and a ring of hairs at the very base about the filaments. But there are examples which come between *A. Kerner's* type and the *S. petiolata* of Royle.

27. **S. Thomsoni**, Clarke; lower cauline leaves long-petioled oblong or elliptic scarcely connate upper often sessile, cymes forming a narrow panicle, flowers 5-merous, glands near the base of the corolla-lobes obscure, seeds smooth narrowly or irregularly winged.

WESTERN HIMALAYA; Kashmir; Sonamurg, alt. 9250 ft., Thomson, Clarke.

Resembling in leaves and habit *S. petiolata*, but with more numerous smaller flowers and capsules. Peduncles often 6 in. Sepals $\frac{1}{4}$ by $\frac{1}{10}$ in., acute. Corolla-lobes $\frac{1}{2}$ by $\frac{1}{2}$ in., subobtusely; glands 2 yellow spots very close to the base of the corolla, altogether obscure in T. Thomson's fine examples, usually naked, rarely minutely hairy. Capsule $\frac{1}{4}$ – $\frac{1}{3}$ in. Seeds $\frac{1}{16}$ – $\frac{1}{20}$ in., globose, somewhat angular, wing very partial and irregular; testa close, smooth, microscopically reticulate (hence glistening).

28. **S. cuneata**, Wall. Cat. 4380; cauline leaves spatulate-oblong or petioled, peduncles long mostly 3-1-flowered, corolla 5-merous, glands linear vertical 2 near the edge of each corolla-lobe, seeds $\frac{1}{25}$ in. angular ellipsoid smooth not winged. D. Don in Trans. Linn. Soc. xvii. 520; Griseb. Gentian. 333, and in DC. Prodr. ix. 133. S. Hugelii, Griseb. in DC. Prodr. ix. 133.

ALPINE HIMALAYA, alt. 11-14,000 ft.; from Simla to Sikkim; Wallich, Royle, J. D. H., &c.

Stem 6-24 in., hollow, $\frac{1}{8}$ in. thick. Leaves 3 by $\frac{3}{4}$ in., usually obtuse. Pedicels $\frac{1}{2}$ –2 in., mostly long. Sepals $\frac{1}{4}$ – $\frac{1}{2}$ in., narrowly oblong, obtuse acute or spatulate and apiculate. Corolla-lobes $\frac{1}{2}$ – $\frac{1}{2}$ by $\frac{1}{8}$ – $\frac{1}{6}$ in., obtuse; the 2 glands fimbriate with hairs $\frac{1}{2}$ in. long or nearly naked. Stigmas of 2 sessile hemispheric plates. Capsule $\frac{1}{2}$ in. Seeds black-brown; testa close, reticulated.

29. **S. cœrulea**, Royle Ill. 278, t. 67, fig. 1; cauline leaves oblong sessile or the lower spatulate, pedicels short, corolla 5-merous, glands oblong small, seeds $\frac{1}{50}$ in. polyhedral smooth. D. Don in Trans. Linn. Soc. xvii. 521; Griseb. in DC. Prodr. ix. 132.

WESTERN HIMALAYA; alt. 5-9000 ft., Royle; Chumba, Clarke.

Stem 6-18 in., $\frac{1}{10}$ in. thick. Leaves nearly as of *S. cuneata*. Cymes forming a linear dense panicle, peduncles short, pedicels rarely longer than the flowers. Sepals $\frac{1}{2}$ – $\frac{1}{2}$ in., narrowly lanceolate. Corolla-lobes $\frac{3}{4}$ by $\frac{1}{2}$ in., ovate, acute, blueish with green nerves, glands with small oblong slightly fimbriate scales. Stigmas sessile, hemispheric. Capsule $\frac{3}{4}$ by $\frac{1}{2}$ in., narrowly oblong. Seeds yellow-brown; testa close, reticulated.—Differs from *S. cuneata* in its corolla and seeds, and is excessively near *Pleurogyne rotata*; the difference is that in *Pleurogyne* the two scales near the base of each corolla-lobe are subconfluent, forming a nearly continuous hairy ring near the base of the corolla, without any definite depressions or viscous marks on the corolla-lobe above them; while in *Swertia cœrulea* there are two oblong minute depressions above the base of each corolla-lobe with an oblong scale fimbriated on its upper edge produced above the base of each depression so as partially to cover it.

VAR. *Wattii*; pedicels 1-2 in., sepals $\frac{3}{4}$ by $\frac{1}{2}$ in., corolla-lobes hardly longer than the sepals, scales at their base more developed.—Pangi, alt. 13,000 ft.; Dr. Watt.—This, except in the large calyx, closely resembles some forms of *S. perennis* (see Engl. Bot. t. 1441), which has seeds totally unlike *S. cœrulea*; but Dr. Watt's example being in young flower is not certainly determinable.

SUBGENUS III. **Poephila**. Perennial herbs with numerous short branches from the rootstock.

30. **S. multicaulis**, Don Prodr. 127; leaves narrowly spatulate-oblong, cymes very compound pedicels long, corolla 5-merous, a small pit at the base of each lobe with marginal fimbriæ. Griseb. in DC. Prodr. ix. 134; Clarke in Journ. Linn. Soc. xiv. 449.

ALPINE NEPAL and SIKKIM, alt. 14-17,000 ft., Wallich, J. D. H., &c.

Branches 2-5 in., much divided. *Leaves* $1\frac{3}{4}$ by $\frac{1}{2}$ in., petiole 0- $1\frac{1}{2}$ in. *Pedicels* 1-3 in., ultimately rigid, thickened upwards. *Sepals* $\frac{1}{4}$ - $\frac{1}{3}$ in., narrowly oblong, acute or subobtus. *Corolla-lobes* $\frac{1}{3}$ - $\frac{1}{2}$ by $\frac{1}{8}$ - $\frac{1}{5}$ in., obtuse; pit less than $\frac{1}{3}$ the breadth of the lobe, deep, without a scale but partially closed by the fimbriæ all round the margin. *Stigmas* sessile. *Capsule* $\frac{1}{2}$ by $\frac{1}{4}$ in. *Seeds* $\frac{1}{24}$ in., ellipsoid, black; testa close, smooth, minutely reticulate.

13. **HALENIA.**

Annual or perennial erect herbs. *Leaves* opposite. *Cymes* axillary and forming a lax terminal panicle. *Calyx* sub-4-partite, segments lanceolate. *Corolla* campanulate, 4-fid more than half-way down, pits at the base of the lobes produced into a long spur (in the Indian species). *Stamens* 4, attached near the base of the corolla, filaments linear complanate; anthers ovate or oblong, versatile. *Ovary* 1-celled, placentæ broad; style short, cylindric, stigmas small oblong or linear. *Capsule* sessile, ovate, carpels separating nearly to the base. *Seeds* ellipsoid (fewer and larger than in most *Ophelias*) smooth, testa close yellow.—Species 25 (probably reducible to 15); Mts. of India, Central Asia and America.

1. **H. elliptica**, *D. Don* in *Trans. Linn. Soc.* xvii. 529; leaves elliptic subobtus 5-nerved, spurs linear nearly as long as the petals. *Griseb. Gentian.* 326, and in *DC. Prodr.* ix. 129. *Swertia centrostemma*, *Wall. Cat.* 4385. *S. peloria*, *Griff. Itin. Notes*, 197.

TEMPERATE HIMALAYA, alt. 6-12,000 ft., from Kashmir to Bhotan, frequent.

Stem 1-24 in. *Cauline leaves* 1 by $\frac{1}{2}$ in. (in Don's type) to $2\frac{1}{2}$ by $\frac{3}{4}$ in. and acute; lower in large examples often petioled. *Sepals* $\frac{1}{2}$ in., usually acute. *Corolla* pale-blue; spurs $\frac{1}{6}$ to $\frac{1}{3}$ in., patent, tip often upcurved. *Style* hardly $\frac{1}{12}$ in. *Capsule* $\frac{1}{2}$ - $\frac{1}{3}$ in. *Seeds* $\frac{1}{16}$ in. and upwards, with a concavity at the hilum.—The western small form with elliptic subobtus leaves was *D. Don's* type; but large Sikkim examples with acute leaves appear to pass into *H. Sibirica* (*Swertia corniculata*, *Linn.*; *Pall. Fl. Ross.* ii. 99, t. 90, fig. 1), and, if this be admitted, the range of the species extends through Dahuria, N. China, and Siberia to N. America.

2. **H. Perrottetii**, *Griseb. in DC. Prodr.* ix. 129; leaves ovate or elliptic acute 5-nerved lower spatulate or petioled, spurs linear-oblong hardly half as long as the petals. *Wight Ill. t.* 157, and *Ic. t.* 1334.

NILGHERRIES, alt. 6-8000 ft.; plentiful.

Closely resembling *H. elliptica*. *Style* rather longer, stigmas sublinear. *Seeds* $\frac{1}{24}$ in., *i.e.* considerably smaller.

14. **MENYANTHES**, *Linn.*

Perennial herbs; rootstock creeping or floating. *Leaves* alternate, long-petioled, 3-foliolate in the Indian species. *Peduncles* long, scape-like; flowers white or blueish, subracemose; pedicels 1-bracteate or naked. *Sepals* 5, oblong-lanceolate. *Corolla* shortly funnel-shaped, 5-fid half way down; lobes fimbriate or crested within, induplicate valvate in bud. *Stamens* 5, on the corolla-tube, filaments linear; anthers sagittate, versatile. *Ovary* 1-celled, placentæ shortly intruded; style long, linear, stigmas 2 small. *Capsule* globose, shortly 2-valved from the apex, carpels splitting down the back. *Seeds* many, lenticular, shining, yellow, smooth.—Species 2, in the N. Temperate and Subarctic zones.

1. **M. trifoliata**, *Linn.*; *Griseb. Gentian.* 340, and in *DC. Prodr.* ix. 137; leaves 3-foliolate, leaflets elliptic or oblong obtuse entire or obscurely wavy. *Lamk. Ill. t.* 100, fig. 1; *Engl. Bot. t.* 495; *Boiss. Fl. Orient.* iv. 64; *Benth. & Trim. Med. Pl. t.* 184.

WESTERN HIMALAYA; Kashmir; *Jacquemont, Falconer*.—DISTRIB. Europe, N. Asia, and N. America, the Caucasus, Amurland and Japan.

Stems covered by lax sheathing of petioles, the lower leafless. *Petioles* 3-8 in.; leaflets subsessile, 2 by 1 in. *Peduncle* 3-6 in.; raceme 1-6 in.; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in. *Sepals* $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ - $\frac{1}{2}$ in. *Style* $\frac{1}{4}$ in. *Capsule* $\frac{1}{4}$ - $\frac{1}{2}$ in., sometimes bifid nearly to the base. *Seeds* $\frac{1}{10}$ in.

15. **LIMNANTHEMUM**, *S. P. Gmel.*

Aquatic herbs. *Leaves* deeply cordate, entire or sinuate, alternate or sub-opposite. *Peduncles* clustered at the nodes; flowers white or yellow. *Sepals* 5-4, oblong. *Corolla* rotate, deeply 5-4-fid; tube often with glands opposite the lobes, sometimes hairy in the throat; lobes valvate in bud, ciliate, fimbriate or with an oblong longitudinal fold down their middle. *Stamens* 5-4, on the corolla-tube, filaments linear short; anthers hastate-oblong, versatile. *Ovary* 1-celled, placentæ not intruded; style short, stigma of 2-3 plates. *Capsule* ovoid or oblong, subindehiscent. *Seeds* numerous, orbicular, compressed, either slightly marginate, or nearly flat discoid; testa close, somewhat spongy finely reticulated, sometimes covered with papillose glands.—Species 14, in fresh water, throughout the Tropical and Temperate Zones.

1. **L. nymphæoides**, *Link Fl. Portug.* i. 344; leaves orbicular deeply cordate, umbels axillary, corolla yellow lobes crenulate-ciliate, capsule 1 in., seeds large discoid. *Griseb. Gentian.* 341, and in *DC. Prodr.* ix. 138; *Boiss. Fl. Orient.* iv. 65. *Menyanthes nymphæoides*, *Linn.*; *Engl. Bot.* t. 217; *Gaertn. Fruct.* ii. 157, t. 114. *Villarsia nymphæoides*, *Vent. Choix.* n. 9.

WESTERN HIMALAYA; Kashmir, alt. 6-9000 ft., *Falconer, &c.*—DISTRIB. From W. and Central Europe to China.

Stems long, floating, rooting at the nodes. *Leaves* subopposite, 1-2 in. diam.; petiole 1-2 in. *Pedicels* 1-4 in. *Calyx-lobes* 5, $\frac{1}{2}$ by $\frac{1}{2}$ in. *Corolla-lobes* $\frac{3}{4}$ -1 in., without any longitudinal fold down the middle, sparingly ciliate. *Capsule* ellipsoid, acute, scarcely dehiscent. *Seeds* $\frac{1}{8}$ in. diam., lenticular, ellipsoid, winged.

2. **L. cristatum**, *Griseb. Gentian.* 342, and in *DC. Prodr.* ix. 139; leaves orbicular deeply cordate, pedicels densely fascicled at the nodes, corolla white yellow towards the base within lobes 5-6 entire with a longitudinal fold down the middle, capsule $\frac{1}{5}$ in., seeds numerous scabrous. *Wight Ill.* t. 157, *bis fig.* 4; *Dalz. & Gibs. Bomb. Fl.* 158; *Thwaites Enum.* 205. *Menyanthes cristata*, *Roxb. Cor. Pl.* ii. 3, t. 105, and *Fl. Ind.* ii. 28. *Villarsia cristata*, *Spreng. Syst.* i. 582; *Wall. Cat.* 4353; *Wight in Hook. Journ. Bot.* i. 65, t. 123; *Griff. Notul.* iv. 88, t. 386 A. V. indica, *Wall. Cat.* 4352 A. a.—*Rheede Hort. Mal.* xi. t. 29.

Throughout INDIA; very common.—DISTRIB. S. China.

Stems long, floating, rooting at the nodes. *Leaves* 1-3 in. diam.; petiole often 0-1 $\frac{1}{2}$ in. *Pedicels* 0-2 in., numerous, unequal. *Calyx-lobes* $\frac{1}{2}$ by $\frac{1}{2}$ in. *Corolla-lobes* $\frac{1}{4}$ - $\frac{1}{2}$ in.; tube with a ring of white hairs round the throat. *Stigma* 2-4- (often 3-) ridged; placental lines 2-3. *Capsule* subglobose, 10-20-seeded. *Seeds* $\frac{1}{18}$ in., circular, very thick, lenticular, margins subacute, scabrous.

3. **L. indicum**, *Thwaites Enum.* 205; leaves orbicular deeply cordate, pedicels densely fascicled at the nodes, corolla white yellow towards the base within, lobes fimbriated densely papillose without a longitudinal fold down the middle, capsule $\frac{1}{4}$ - $\frac{1}{2}$ in., seeds numerous smooth or nearly so. *Dalz. & Gibs. Bomb. Fl.* 158; *Benth. Fl. Austral.* iv. 378, with all syn. (except *Bot. Mag.* t. 658); *Boiss. Fl. Orient.* iv. 65; *Griseb. Gentian.* 343, and in *DC. Prodr.* ix. 139?. *L. Kleinianum*, *Griseb. Gentian.* 344, and in *DC. Prodr.* ix. 139; *Seem.*

Fl. Viti, t. 33. *L. Wightianum*, Griseb. *Gentian.* 344, and in *DC. Prodr.* ix. 139. *L. calycinum*, *Miq. Fl. Ind. Bat.* ii. 564. *Menyanthes indica*, *Linn. Sp. Pl.* 207; *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 31. *Villarsia indica*, *Venten.*; *Wall. Cat.* 4352 A. g.; *Wight in Hook. Bot. Misc. Suppl.* t. 30. *V. macrophylla*, *Wight. in Hook. Bot. Misc.* iii. 96. *V. eglandulosa*, *Griff. Ic. Pl. As. t.* 385.—*Rheede Hort. Mal.* xi. t. 28; *Rumph. Herb. Amb.* vi. t. 72, fig. 3.

Throughout INDIA; very common.—DISTRIB. Cabul, Mascarene Islds., S.E. Asia, Malaya, Australia to Fiji Isles.

Stems long, floating, rooting at the nodes. *Leaves* 2-8 in. diam.; petiole 0 or short. *Pedicels* 0-5 in., numerous, unequal. *Calyx-lobes* $\frac{1}{2}$ – $\frac{1}{3}$ in., narrowly lanceolate. *Corolla-lobes* $\frac{1}{2}$ – $\frac{1}{3}$ in. *Ovary* and stigmas nearly as in *L. cristatum*. *Capsule* $\frac{1}{2}$ – $\frac{1}{3}$ in., subquadrate. *Seeds* $\frac{1}{20}$ in., thickly lenticular, smooth or minutely glandular-puberulous, never scabrous as in *L. cristatum*.—The descriptions of *L. cristatum* and *indicum* by Grisebach are so incorrect, that Bentham quotes Thwaites as the primary authority for this common species. *Bot. Mag.* t. 658, adduced here by Bentham, has yellow flowers, and looks more like *L. nymphæoides*.

4. ***L. aurantiacum***, *Dalz. in Hook. Kew Journ.* ii. 136; leaves orbicular deeply cordate, pedicels few from each node, corolla yellow lobes fimbriated on the margin, capsule $\frac{1}{2}$ in., seeds smooth. *Dalz. & Gibs. Bomb. Fl.* 158. *L. biflorum*, *Thwaites Enum.* 205. *Menyanthes biflora*, *Moon. Cat. Pl. Ceyl.* 13.

W. DECCAN PENINSULA; from Bombay southwards. CEYLON, frequent.

Stems elongate, nodes not rooting. *Leaves* $1\frac{1}{2}$ in. diam.; petiole often 1-3 in. *Pedicels* commonly 2 from each node. *Calyx-lobes* 5, $\frac{1}{2}$ by $\frac{1}{10}$ in. *Corolla-lobes* $\frac{1}{2}$ in., sparingly fimbriate, without a longitudinal fold down the middle. *Capsule* subglobose, 10-15-seeded. *Seeds* $\frac{1}{20}$ in. diam.; nearly as of *L. indicum*; testa close, thick, minutely reticulate, not papillose.

5. ***L. Forbesianum***, *Griseb. Gentian.* 345, and in *DC. Prodr.* ix. 139; leaves small orbicular deeply cordate, peduncles numerous equalling or exceeding the leaf, corolla white lobes 5 hairy within fimbriate on the margin, seeds globose obtusely carinate most minutely punctate not muricate.

CEYLON; *Macrae*.

Stems short; pedicels many fasciculate; corolla white (*Macrae*).—This appears to be a small form of *L. aurantiacum*, but *Macrae* has twice noted the corolla to be white. It is *Menyanthes campestris*, *Macrae* and *Wight* (in *Herb.*) partly; but half of *Wight's* sheet is *L. Moonii*, *Thwaites*.

6. ***L. parvifolium***, *Griseb. in DC. Prodr.* ix. 141; leaves small radical spathulate-orbicular cauline deeply cordate, pedicels numerous fascicled, corolla white lobes 5-4 fimbriate, capsule oblong narrowed below, seeds minutely puberulous. *Dalz. & Gibs. Bomb. Fl.* 158. *Villarsia parvifolia*, *Wall. Cat.* 4351.

W. DECCAN PENINSULA, *Wight*, &c. CHITTAGONG, *H. f. & T. Tavoy*, *Wall. Ceylon*.

Stems apparently rooted on mud at the base, long, floating, not rooting at the nodes. *Radical leaves* 1 in. diam., cuneate at the base on the broad petiole; cauline leaves $\frac{1}{2}$ – $\frac{3}{4}$, subsessile. *Pedicels* 3-10, $\frac{1}{2}$ – $\frac{1}{3}$ in., at each node. *Calyx-lobes* $\frac{1}{10}$ in., oblong. *Corolla-lobes* $\frac{1}{2}$ – $\frac{1}{3}$ in. *Capsule* $\frac{1}{2}$ by $\frac{1}{12}$ in.

VAR. *Moonii*; flowers 4-merous, capsule $\frac{1}{2}$ in. long and broad subglobose, seeds smooth, testa thick closely minutely reticulated. *L. Moonii*, *Thwaites Enum.* 205. *Menyanthes campestris*, *Moon. Cat. Pl. Ceyl.* 13.—Ceylon, *Thwaites*, *Kelaart*. *Moulmein*, *Griffith* (*Kew Distrib.* n. 187).

ORDER XCVIII. **POLEMONIACEÆ.** (By C. B. Clarke.)

Herbs, shrubs, or trees. *Leaves* exstipulate. *Flowers* showy, regular, hermaphrodite, 5-merous. *Calyx* inferior. *Corolla* gamopetalous, lobes twisted to the right. *Stamens* 5, on the corolla-tube, alternate with its lobes. *Ovary* superior, 3-celled; style simple, shortly 3-fid; ovules very many. *Capsule* septicidal, 3-valved. *Seeds* many, albuminous; embryo straight.—Species 150; in America, a very few in N. Asia and Europe.

1. **POLEMONIUM**, Linn.

Perennial herbs. *Leaves* alternate, pinnate. *Cymes* terminal, corymbose. *Flowers* blue. *Calyx* campanulate, lobed half-way down, scarcely ribbed. *Corolla* funnel-shaped, lobes patent obovate. *Stamens* attached near the base of the corolla; filaments declinate, hairy, appendaged at the base. *Ovary* and capsule ovoid. *Seeds* not or obscurely winged; testa, when wetted, becoming mucilaginous and breaking up elastically into spiral threads.—Species 8; from Europe, N. and Central Asia, N. America to Mexico and Chili.

P. cœruleum, Linn.; *Benth. in DC. Prodr.* ix. 317; stem erect leafy, leaflets lanceolate or ovate-lanceolate, flowers many corymbose, calyx-lobes ovate or lanceolate-oblong scarcely acute, corolla 2-3-times longer than the calyx. *Gaertn. Fruct.* i. 299, t. 62; *Lamk. Ill.* t. 106; *Wall. Cat.* 1471; *Syme Engl. Bot.* iii. t. 922; *Boiss. Fl. Orient.* iv. 83.

ALPINE WESTERN HIMALAYA, alt. 9-12,000 ft.; from Kashmir to Kumaon, frequent.—DISTRIB. Europe, N. and Central Asia, N. America.

Stems 1-4 ft., viscous hairy or glabrescent. *Leaves* 5 by 3 in., leaflets $1\frac{1}{4}$ by $\frac{1}{2}$ in. *Flowers* often clustered; corolla 1 in. diam. or more, a fine blue. *Capsule* $\frac{1}{2}$ in., ellipsoid, much overtopped by the persistent calyx. *Seeds* $\frac{1}{10}$ in., oblong-ellipsoid, smooth, not winged (in the Indian plant).—The Himalayan, like the European plant, is tall with narrow leaflets.

ORDER XCIX. **HYDROPHYLLACEÆ.** (By C. B. Clarke.)

Differ from *Gentianaceæ* by the alternate leaves and imbricate corolla-lobes.

The single Indian genus, forming by itself the tribe *Hydroleæ*, is easily known from *Gentianaceæ* by its 2 styles distinct from the base with capitate stigmas.—Species 150, mainly American, 3 or 4 only in the Old World.

1. **HYDROLEA**, Linn.

Herbs. *Leaves* alternate, entire. *Flowers* blue, in short terminal racemes or cymes, regular, 5-merous. *Calyx* divided nearly to the base, segments lanceolate. *Corolla* widely campanulate, subrotate, lobes imbricate. *Stamens* 5, attached to the short corolla-tube, alternate with its lobes, filaments filiform often dilated at the base; anthers sagittate, oblong. *Ovary* completely 2-celled; styles 2, distinct, stigmas capitate; ovules very many. *Capsule* globose or ovoid, septicidal or irregularly 4-valved. *Seeds* minute.

H. zeylanica, Vahl *Symb.* ii. 46; annual, unarmed, leaves lanceolate, flowers racemed on short lateral branches, calyx-lobes lanceolate striate exceeding the capsule. *Lamk. Ill.* t. 184; *Wall. Cat.* 4398; *W. & A. in Hook. C. np.*

Bot. Mag. ii. 193, t. 26; *Wight Ill.* t. 167, and *Ic.* t. 601; *Choisy in DC. Prodr.* x. 180; *Dalz. & Gibs. Bomb. Fl.* 170. *H. javanica*, *Blume Bijl.* 725. *Nama zeylanica*, *Linn.*; *Roxb. Fl. Ind.* ii. 73. *Nama*, *Linn. Fl. Zeyl.* 49, t. 2. —*Rheede Hort. Mal.* x. 28.

Throughout INDIA, ascending to 4000 ft., in wet places; abundant in rice swamps. —DISTRIB. S.E. Asia, Malaya, and Australia; Tropical Africa and America.

Stems 3–18 in., procumbent, branched, with the inflorescence patently viscidly hairy, or (in the Ceylon form) nearly glabrous. *Leaves* 2 by $\frac{1}{2}$ in., narrowed at the base. *Racemes* 1–2 in.; bracts $\frac{1}{4}$ – $\frac{1}{2}$ in., narrow; pedicels $\frac{1}{8}$ – $\frac{1}{4}$ in. *Sepals* $\frac{1}{4}$ in. *Corolla-segments* $\frac{1}{2}$ in. *Filaments* dilated at the base, or nearly filiform. *Capsule* $\frac{1}{2}$ in.

ORDER C. **BORAGINÆ.** (By C. B. Clarke.)

Herbs, shrubs or trees, often hispid or scabrous. *Leaves* alternate, very rarely opposite, exstipulate, mostly entire. *Flowers* usually in dichotomous scorpioid cymes, rarely solitary and axillary. *Calyx* inferior, 5-, rarely 6–8-toothed or lobed, usually persistent in fruit. *Corolla* gamopetalous, often with scales in the throat, rarely 4–6-lobed, imbricate (rarely twisted) in the bud. *Stamens* as many as the corolla-lobes, alternate with them, upon the corolla-tube. *Ovary* superior; cells 2, 2-ovuled, or 4–1-ovuled; style terminal or from between the ovary-lobes, long or short, stigma capitate or 2-lobed, rarely the style twice bifid; ovules suberect from the inner basal angle of the cell. *Fruit* drupaceous or dividing into 2–4 nutlets. *Seeds* erect or oblique, testa membranous, albumen fleshy copious sparing or 0; embryo straight or curved, radicle superior.—Species 1,200; throughout the world.

TRIBE I. **Cordiææ.** Trees or shrubs. *Style* terminal on the entire ovary, twice bipartite. *Drupe* 4–1-seeded; albumen 0; cotyledons plicate longitudinally.

Calyx-teeth very short, irregular 1. **CORDIA.**

TRIBE II. **Ehretieæ.** *Style* terminal on the entire ovary, simple, bipartite, or styles 2. *Drupe* with 2 2-celled, or 4 1-celled pyrenes; or of 4–1 nuts.

Trees or shrubs. *Style* 2-fid 2. **EHRETIA.**

Frostrate herb. *Styles* 2 3. **COLDENIA.**

Virgate shrub. *Style* 1, stigma capitate 4. **RHABDIA.**

TRIBE III. **Heliotropieæ.** *Style* terminal on the entire ovary, depressed-conic at the apex, or with a horizontal ring below the stigmas. *Fruit* as of *Ehretieæ*.

Shrubs, often scandent. *Style* short, shortly 2-lobed 5. **TOURNEFORTIA.**

Herbs. *Style* dilated at the apex or above the base 6. **HELIOTROPIMUM.**

TRIBE IV. **Boragææ.** Herbs. *Style* simple or bifid, rising from between the ovary lobes (except in *Trichodesma*). *Nutlets* 4, rarely 3–1 by suppression (2 in *Rochelia*); albumen 0.

SUBTRIBE I. **CYNOGLOSSEÆ.** *Nutlets* attached to a convex or conical carpophore, scar continued to the apex of the nutlets which are often depressed, produced, or saccate at the base.

* *Fruiting calyx enlarged enclosing the nutlets.*

Anthers conically connivent, lanceolate, subexsert 7. **TRICHODESMA.**

** *Nutlets depressed, their bases produced downwards.*

Stamens included. Nutlets obovoid, scar punctiform . . .	8. ACTINOCARYA.
Stamens included. Margins of nutlets reflexed over their backs . . .	9. OMPHALODES.
Stamens included. Nutlets obovoid, glochidiolate . . .	10. CYNOGLOSSUM.
Stamens exerted; anthers large, linear-oblong . . .	11. LINDELOFIA.
Stamens exerted; anthers small, shortly oblong . . .	12. SOLENANTHUS.

*** *Nutlets connate, forming a pyramidal fruit, margined, hardly produced downwards.*

Racemes ebracteate. Margin of the nutlets glochidiolate, often reflexed . . .	13. PARACARYUM.
Racemes bracteate. Margin of the nutlets glochidiolate, scarcely reflexed . . .	14. ECHINOSPERMUM.

SUBTRIBE II. ERITRICHIEÆ. *Nutlets attached to a convex or conical carpophore, scar in the middle or lower half of the nutlets which are not depressed at the base, but are produced at the apex above the scar, free round the base of the style.*

* *Scar in the basal half of the nutlet.*

Racemes ebracteate. Nutlets 4 . . .	15. ERITRICHIMUM.
Racemes bracteate. Nutlets 2, 1-seeded . . .	16. ROCHELIA.

** *Scar in the middle of the inner face of the nutlets.*† *Scar small, without a prominent thickened incurved margin.*

Flowers axillary, subsessile. Fruiting calyx enlarged . .	17. ASPERUGO.
Almost stemless. Fruiting calyx not enlarged . . .	18. MICROULA.

†† *Scar depressed, with a thickened incurved margin.*

Flowers axillary, pedicelled . . .	19. BOTHRIOSPERMUM.
Flowers axillary, subsessile . . .	20. GASTROCOTYLE.

SUBTRIBE III. ANCHUSEÆ. *Nutlets on a flat or nearly flat receptacle; scar basal, prominent, hollowed out, with a prominent thickened margin.*

* *Corolla-throat closed by 5 scales.*

Corolla-tube straight . . .	21. ANCHUSA.
Corolla-tube curved . . .	22. LYCOPSIS.

** *Corolla-throat naked or hairy within, but without scales.*

Racemes dense. Calyx large . . .	23. NONNHA.
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SUBTRIBE IV. LITHOSPERMEÆ. *Nutlets on a flat or nearly flat receptacle scar basal, but little hollowed out, without a prominent margin.*

* *Racemes ebracteate. Corolla-lobes distinct.*

Corolla-tube cylindric. Anthers included . . .	24. MERTENSIA.
Corolla-tube cylindric. Anthers exerted . . .	25. MOLTZIA.
Corolla-tube short. Nutlets tetrahedral . . .	26. TRIGONOTIS.
Corolla-tube short. Nutlets ovoid-oblong . . .	27. MYOSOTIS.

** *Racemes bracteate. Corolla-lobes distinct.*

Corolla-throat naked or with small scales . . .	28. LITHOSPERMUM.
Corolla-throat densely filled with hairs . . .	29. SERICOSTOMA.

Hispid spreading herbs. Corolla yellow, tube elongate . . . 30. ARNEBIA.
 Suberect herbs. Corolla purple, tube elongate . . . 31. MACROTOMIA.

*** *Corolla-lobes reduced to minute teeth.*

Anthers lanceolate, connivent in a cone . . . 32. ONOSMA.

1. CORDIA, Linn.

Trees or shrubs, sometimes subsucculent. *Leaves* alternate, rarely subopposite, petioled. *Flowers* in dichotomous corymbs or clusters, ebracteate, polygamous, hermaphrodite corymbs much fewer-flowered than the male. *Calyx* tubular or campanulate, teeth very short often irregular, in fruit accrescent. *Corolla* funnel-shaped; lobes 4-8, patent or recurved, white or orange. *Stamens* 4-8, filaments often hairy at the base; anthers shortly exserted. *Ovary* 4-celled, glabrous; style terminal, long, bipartite, branches again bipartite linear or subspathulate; cells 1-ovuled. *Drupe* ovoid or ellipsoid, putamen bony, cells 1-4, usually 1 fertile. *Seeds* exalbuminous.—Species 180, all tropical.

SECT. I. **Myxa.** *Corolla* small, white; tube hardly so long as the calyx. *Stamens* usually 4-5.

* *Adult leaves glabrous or subvillous beneath, not tomentose* (except in *C. obliqua*, Willd. var. *Wallichii*).

† *Leaves 3- (or 3-5-) nerved at the base, lateral primary nerves few.*

1. **C. Myxa**, Linn.; *DC. Prodr.* ix. 479; branchlets glabrous, leaves ovate or oblong sub-3-nerved glabrous above, corymbs lax many-fl., calyx glabrous or minutely pubescent without lobes hairy within, berry $\frac{3}{4}$ in. ovoid subacute 1-seeded. *Delile Fl. Æg.* t. 19, fig. 1; *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 332; *Wall. Cat.* 889; *Wight Ill.* t. 169; *Hayne Arzn. Gewach.* ix. t. 33; *Dalz. & Gibs. Bomb. Fl.* 173; *Benth. Fl. Austral.* iv. 386 (with syn.); *Bedd. For. Man.* 165, and *Fl. Sylv.* t. 245, fig. A; *Brand. For. Fl.* 336, partly; *Kurz For. Fl.* ii. 208; *Boiss. Fl. Orient.* iv. 124. *C. Myxa*, var. β *minor* only, *Thwaites Enum.* 214. *C. indica*, *Lamk. Dict.* vii. 49; *DC. Prodr.* ix. 500. *C. officinalis* and *africana*, *Lamk. Ill.* ii. 420, and *Ill.* t. 96, fig. 3. *C. Sebestena*, *Forsk. Fl. Æg. Arab.* lxiii. *C. paniculata*, *Roth Nov. Sp.* 124; *DC. Prodr.* ix. 482. *Sebestena officinalis*, *Gaertn. Fruct.* i. 364, t. 76. *Ehretia glabra*, *Roth Nov. Sp.* 127; *DC. Prodr.* ix. 510, *ex descr.* *Beurreria glabra*, *G. Don Gen. Syst.* iv. 390.—*Rheede Hort. Mal.* iv. t. 37.

Throughout INDIA and CEYLON, alt. 0-3000 ft.; common wild, and often planted. **DISTRIB.**—From Egypt to Cochinchina and Tropical Australia; but often cultivated.

A crooked tree, 40 ft., or a shrub. *Leaves* alternate, 1-5 in. diam., very variable in form and size, subentire, repand-crenate or sublobate, never acuminate; above glabrous or very obscurely scabrous without white discs or hairs, beneath scabrous often hairy or subvillous when young; petiole $\frac{1}{4}$ -1 $\frac{1}{2}$ in. *Flowers* ♂ and ♀, often on the same tree, mostly 5-merous. *Corymbs* 2-8 in., male larger laxer, terminal and on short lateral branches (*C. reflexa* sp., *Wight mss.*), glabrous or (when young) villous or pubescent. *Calyx* $\frac{1}{8}$ - $\frac{1}{2}$ in. at flower-time, soon much accrescent, tubular-campanulate, lobes very short. *Corolla-lobes* $\frac{1}{10}$ - $\frac{1}{8}$ in., tube hairy within. *Stigmas* with long linear lobes. *Berry* yellow or pinkish, glassy, nearly always 1-seeded; fruiting calyx $\frac{3}{4}$ in. diam., wide-funnel-shaped, glabrescent, more or less distinctly striated longitudinally.—*Sebesten*.

VAR. brunnea, *Kurz For. Fl.* 208; leaves large, young shoots fulvous-pubescent, young calyx pubescent or subtomentose, berry 1 in. ovoid subacute 1-seeded. *C. latifolia*, *Wall. Cat.* 893, not of *Roxb.*—Bengal, Assam, Khasia, Burma, alt. 0-2000

ft.; frequent. Distrib. Ava, Malacca.—Leaves mostly broad-elliptic or obovate-oblong, glabrous above, never tomentose beneath; corymbs (at least of ♂) very dense; corolla exactly as of *C. Myxa*.—This is the plant united by modern authors with the typical glabrous form of *C. obliqua*, Willd., which has a considerably larger corolla.

VAR. *domestica*; innovations fulvous-tomentose, leaves small young minutely pubescent above closely grey tomentose beneath, corymbs small grey tomentose. *C. domestica*, Roth Nov. Sp. 123.—Deccan (?); Herb. Wight.—Leaves $\frac{1}{2}$ –1 $\frac{1}{2}$ in., repand-crenate, mature nearly glabrous. Flowers as of *C. Myxa*. Berries (when nearly ripe) rostrate-acuminate, very unlike those of *C. Myxa*. This may be a distinct species, and possibly more nearly allied to *C. fulvosa*, Wight.

2. ***C. obliqua***, Willd. Sp. Pl. i. 1072; innovations fulvous-villous, leaves ovate or orbicular sub-3-nerved young tomentose beneath adult glabrous, corymbs divaricate dichotomous glabrous, calyx glabrous without or scarcely villous on the margin, berry 1 in. ovoid subacute 1-seeded. DC. Prodr. ix. 479. *C. latifolia*, Roxb. Fl. Ind. ed Carey & Wall. ii. 330; Dalz. & Gibs. Bomb. Fl. 173, not of Wall. *C. Myxa*, Thwaites Enum. 213, not of Linn.; Brand. For. Fl. 336, partly.

WESTERN INDIA, from the Punjab and Hindostan to CEYLON, frequent. NICOBARS.

A tree closely resembling *C. Myxa*. Calyx $\frac{1}{5}$ – $\frac{1}{4}$ in. (at flower-time); tube campanulate; lobes distinct, densely villous within. Corolla-lobes $\frac{1}{5}$ – $\frac{1}{4}$ in.

VAR. *Wallichii*; adult leaves densely stellately fulvous- or white-tomentose beneath, calyx glabrescent without below, teeth densely fulvous-villous. *C. Wallichii*, G. Don Gen. Syst. iv. 379; DC. Prodr. ix. 479; Dalz. & Gibs. Bomb. Fl. 174; Bedd. Fl. Sylv. t. 245. *C. tomentosa*, Wall. in Roxb. Fl. Ind. ed Carey & Wall. ii. 329. *C. obliqua*, Wight Ic. t. 1378. *C. grandis*, Wall. Cat. 892 B.—W. India from Lahore to Kurg.—This is *C. obliqua*, var. β of all the old collectors, who have mixed it with *C. obliqua* type. The two are undoubtedly one; they differ in hairs only, and immediately hairy examples occur.

3. ***C. monoica***, Roxb. Cor. Pl. i. 43, t. 58, and Fl. Ind. ed. Carey & Wall. ii. 334; innovations fulvous-tomentose, leaves ovate 3-nerved scabrous with white discs above mature glabrescent or somewhat villous beneath, corymbs small tomentose, berry $\frac{3}{4}$ in. ovoid scarcely acute. DC. Prodr. ix. 479; Bedd. For. Man. 166. *C. polygama*, Roxb. Fl. Ind. ed. Carey & Wall. ii. 237; Wall. Cat. 891; DC. Prodr. ix. 480; Bedd. For. Man. 166; Kurz For. Fl. ii. 207. *C. diversa*, Thwaites Enum. 214; Bedd. For. Man. 166.—*Cordia* sp. n. 16, Herb. Ind. Or. H. f. & T.

DECCAN PENINSULA from Orissa and the Central Provinces southwards to CEYLON; alt. 2–5000 ft., common.

A small tree. Leaves 1–3 in., obtuse or subacute, subentire or sharply crenate. Corymbs 1–2 in. diam., dense, monoicous or polygamous; ♂ usually 4-androus, ♀ 5-androus. Calyx-tube $\frac{1}{2}$ in., tomentose or pubescent; teeth small, villous. Corolla-lobes $\frac{1}{2}$ in., narrow. Drupe yellow; stone 4-celled, drilled at the apex, 3 cells barren, one 1-seeded.—The authentic specimens of *C. polygama* are identical with *C. monoica*; Wight has called the examples with subentire leaves *C. monoica*, and those with strongly crenate leaves *C. polygama*.

4. ***C. grandis***, Roxb. Fl. Ind. ed. Carey & Wall. ii. 335; leaves large ovate 3–5-nerved scabrous above mature glabrous or scarcely villous beneath, corymbs large dense, flowers small pubescent or scarcely tomentose, berry at most $\frac{1}{2}$ in. ellipsoid very obtuse. Wall. Cat. 892; DC. Prodr. ix. 481; Kurz For. Fl. ii. 208. *C. cordifolia*, Wall. Cat. 894.

ASSAM, *Griffith*, &c. CHITTAGONG; *H. f. & T.*, &c. PEGU; *Kurz*.—DISTRIB. Ava.

A large tree. *Leaves* 3-6 in., acute or obtuse, scabrid with very small rough points, base 3-5-nerved; petiole 1-2½ in. *Corymbs* terminal, female many-flowered, male dense. *Calyx* at flower-time scarcely ⅙ in., tubular-campanulate. *Corolla-lobes* 4, ⅓-⅔ in. *Stamens* 4. *Berry* usually ⅓ by ⅓ in., 1-2-seeded; fruiting-calyx scarcely ⅓ in wide.

†† *Leaves* feather-nerved not (or-obscurely) 3-nerved at the base.

5. **C. Rothii**, *Roem. & Sch. Syst.* iv. 798; leaves subopposite oblong base attenuate feather-nerved mature scabrous glabrescent, cymes small pubescent or subtomentose, berry ⅓ in. ellipsoid acute. *Wight Ic.* t. 1879; *DC. Prodr.* ix. 480; *Dalz. & Gibs. Bomb. Fl.* 174; *Bedd. For. Man.* 166; *Brand. For. Fl.* 338. *C. angustifolia*, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 338, not of *Roem. & Sch.* *C. reticulata*, *Roth Nov. Sp.* 124; *Wall. Cat.* 895; not of *Vahl*. *C. subopposita*, *DC. Prodr.* ix. 480.

W. INDIA, from the Punjab, Hurdwar, and Scinde to Malabar, frequent.—DISTRIB. Arabia, Abyssinia.

A tree, attaining 30 feet. *Leaves* 4 by 1¼ in., usually obtuse, entire or undulate; petiole ¾ in. *Corymbs* 1-3 in. *Calyx* at flower time ⅓ in., minutely pubescent. *Corolla-lobes* usually 4, ⅓ in. *Berry* usually 1-seeded.

6. **C. Perrottetii**, *Wight Ic.* t. 1381, not of *A. DC.*; leaves obovate-oblong feather-nerved scabrous pubescent, corymbs small tomentose, berry ½ in. ellipsoid acuminate. *Bedd. For. Man.* 166 partly?

S. DECCAN PENINSULA; Bellary, Coimbatore, &c., *Wight*.

A small tree. *Leaves* 1-2 in., somewhat clustered, scarcely subopposite, obtuse, entire or crenate; petiole ½ in. *Corymbs* 1-2 in. *Calyx* at flower time ⅓ in., tomentose, tubular-campanulate, soon glabrescent. *Corolla-lobes* mostly 4, ⅓-⅔ in.—*Cordia Perrottetii*, *A. DC. Prodr.* ix. 482 (*Perrottet's* Pondicherry example) is *Premna tomentosa*, *Willd.*; *Beddome's* description l.c. appears compounded of this and *Wight's*.

7. **C. oblongifolia**, *Thwaites Enum.* 214; leaves elliptic acute or lanceolate feather-nerved mature glabrous, corymbs terminal soon glabrous, berry 1 by ¾ in. ellipsoid shortly acute. *Bedd. For. Man.* 166. ? *C. Leschenaultii*, *DC. Prodr.* ix. 482.

CEYLON; Central Province up to 2000 ft., *Thwaites*.

Subscandent, *Thwaites*. *Leaves* alternate, 4 by 2 in. elliptic, or 4 by 1 in. lanceolate, base cuneate or rounded, subentire, secondary nerves conspicuous minutely reticulated; petiole 1 in. *Corymbs* 2-4 in., flowers in close clusters. *Calyx* at flower time ⅓ in., narrowly funnel-shaped, nearly glabrous without. *Corolla-lobes* 5-7, ⅓ in.—Of *C. Leschenaultii* no authentic example has been seen; the old specimen in the British Museum so named is *C. oblongifolia*. These plants only differ from *C. Myxa* in the leaves being obscurely 3-nerved at the base with more numerous lateral nerves.

8. **C. Roxburghii**, *Clarke*; minutely scabrous-pilose, leaves oblong-lanceolate copiously feather-nerved, corymb small, calyx widely funnel-shaped teeth triangular distinct.

CEYLON; *Herb. Roxburgh*.

Branches terete, minutely scabrous-pilose. *Leaves* alternate, 3½ by 1 in., acute at both ends, coriaceous, subentire, nerves 10-15 pair; petiole ¼ in. *Corymb* 1½ in. diam., minutely scabrous-pilose; flowers few, sessile in small clusters. *Calyx* at flower-time ⅓ in., minutely scabrous-pilose; teeth 5 or 6, ⅓ in., minutely scabrous-pilose within. *Corolla* glabrous within, lobes ⅓ in., elliptic. *Style* long, divided into

4 spatulate branches. *Stamens* 5, glabrous; anthers large, oblong.—A very distinct species; but possibly not an indigenous plant of Ceylon.

9. **C. Griffithii**, *Clarke*; leaves alternate lanceolate and ovate-lanceolate glabrous feather-nerved, male corymbs large terminal lax nearly glabrous.

MALACCA; *Griffith*.

Branchlets terete, glabrous, curved; innovations fulvous-tomentose. *Leaves* $3\frac{1}{2}$ by $1\frac{3}{4}$ in., or the uppermost narrow-lanceolate, acuminate to an obtuse apex, cuneate at the base, subentire, texture thin, secondary nerves finely reticulate; petiole $\frac{3}{4}$ in. *Calyx* at flower-time $\frac{1}{4}$ in., funnel-shaped, nearly glabrous. *Corolla-lobes* 5, $\frac{1}{2}$ in., elliptic.—Appears closely allied to *C. oblongifolia*. A male plant collected at Malacca by Maingay (Kew Distrib. n. 1162) is perhaps the same, but has the primary nerves of the leaves more numerous.

** *Adult leaves tomentose beneath*.

10. **C. fragrantissima**, *Kurz For. Fl.* ii. 207; leaves alternate large ovate 3-nerved mature scabrous above grey-tomentose beneath, corymbs large terminal soon glabrescent, berry $\frac{1}{2}$ in. ellipsoid obtuse. *C. rotundifolia*, *Heyne in Herb. Rottler*.

KHASIA MTS.; *Griffith* (Kew Distrib. n. 5999). E. BENGAL, at Mymensing; CHITTAGONG, MARTABAN, and TENASSERIM; *Kurz*.

This closely resembles *C. grandis*, Wall. in its area of distribution, inflorescence, 4-merous flowers, and berries: differing only in the adult leaves being densely stellately villous beneath. *Kurz* says "ovary with a sessile stigma," whence, it is presumed, he had only male flowers.

11. **C. vestita**, *H. f. & T. in Journ. Linn. Soc.* ii. 128; innovations fulvous-woolly, leaves ovate or oblong acuminate sub-3-nerved harshly coriaceous tomentum beneath deciduous, flowers cymose-paniculate, berry $\frac{3}{4}$ in. ellipsoid acute. *Brand. For. Fl.* 338. *C. incana*, *Royle Ill.* p. 306, *name only*. *Gynaion vestitum*, *A. DC. Prodr.* ix. 468.

SUBTROPICAL WESTERN HIMALAYA, alt. 1-4000 ft.; frequent from the Jhelum to Oude, *Edgeworth, &c.*

A tree, attaining 30 feet. *Leaves* 4 in., sometimes ovate from a rounded base, sometimes cuneate-oblong from a narrow base, entire crenate or lobed, densely tomentose beneath at least till nearly mature, at length scabrous above often with white dots; petiole 1 in. *Corymbs* dense, tomentose, and woolly. *Calyx* $\frac{1}{2}$ in. tubular-clavate, prominently ribbed upwards, or, in other examples, much smaller scarcely clavate, hardly ribbed. *Corolla-lobes* $\frac{1}{2}$ in., obovate, or smaller elliptic. *Calyx* in fruit $\frac{3}{4}$ -1 in. diam., saucer-shaped; or, in Aitcheson's Punjab examples, $\frac{3}{4}$ by $\frac{3}{4}$ in., elongate campanulate, strongly ribbed.

12. **C. Macleodii**, *H. f. & T. in Journ. Linn. Soc.* ii. 128; very softly densely tomentose, leaves cordate-ovate obtuse 3-5-nerved permanently tomentose beneath, corymbs short tomentose, berry $\frac{3}{4}$ in. ovoid acute. *Brand. For. Fl.* 337, t. 41. *Hemigymnia Macleodii*, *Griff. in Calc. Journ. Nat. Hist.* iii. 363; *Schauer in DC. Prodr.* xi. 697.

CENTRAL INDIA, CONCAN and BELGAUM; *Stocks, Dalzell, &c.*

A tree, attaining 40 feet. *Leaves* alternate, scarcely subopposite; mature 5 in. diam., impressed rugose above, densely tomentose beneath; petiole 1-2 in. *Calyx* $\frac{1}{2}$ in., tubular-clavate, densely tomentose, ribbed upwards; or much smaller, not (or obscurely) ribbed. *Corolla-lobes* $\frac{1}{2}$ in., oblong, or much shorter. *Fruit* acutely conical till nearly ripe, calyx broadly funnel-shaped or subcampanulate.—The specimen on which Griffith founded the species, is leafy and in flower, the calyx then

about $\frac{1}{4}$ in.; most of the examples are leafless when in flower, often with much larger calyx.

13. **C. fulvosa**, *Wight Ic.* t. 1380; leaves ovate obtuse or acute tomentum beneath hard, corymbs closely tomentose calyx soon glabrescent, berry $\frac{3}{4}$ –1 in. ovoid acute. *Bedd. For. Man.* 166. *C. polygama*, *Wall. Cat.* 892, partly.—*Cordia* sp. n. 13, *Herb. Ind. Or. H. f. & T.*

W. DECCAN PENINSULA; Concan and Belgaum, *Lav, Stocks, Ritchie*.

Leaves with hard, not woolly tomentum, becoming scabrous or subglabrate in age, very variable in size, obtuse or more often acute, crenately lobed or entire, obscurely 3-nerved.—Except in its much less tomentose corymb and leaves, this is undistinguishable from *C. Macleodii*; it may be only a more tomentose form of *C. monoica*, as Wallich esteemed it.

VAR. evolutior; less tomentose, leaves 8 by 4 in., corymb large, calyx at flower-time glabrescent.—Bombay; *Dalzell*.—A very doubtful plant; it forms part of *Cordia* n. 13, *Herb. Ind. Or. H. f. & T.* and appears really to belong here, but it is exceedingly unlike *Wight's* picture of *C. fulvosa*.

SECT. II. **Sebesten.** *Corolla* larger, tube exceeding the calyx. *Stamens* 6–8.

14. **C. octandra**, *A. DC. Prodr.* ix. 477; leaves ovate acuminate crenate-suberrate 3-nerved nearly glabrous, calyx cylindric obscurely tomentose without, corolla white tube slightly longer than the calyx, stamens usually 8. *Bedd. For. Man.* 166. *C. serrata*, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 333; *Wall. Cat.* 890; *Wight Ic.* t. 469, not of *Juss.*

TRAVANCORE; *Roxburgh*.

Arboreous. *Leaves* alternate, 6 by 3 in., rounded or rhomboid at the base; petiole 1–2 in. *Corymbs* lateral, peduncled, 2–4 in., minutely rusty; flowers subsessile in small clusters. *Calyx-tube* $\frac{1}{3}$ in.; lobes $\frac{1}{10}$ in., triangular, hairy within. *Corolla-lobes* 7–9, $\frac{1}{2}$ in. *Filaments* hairy; anthers ovate, small.—Described from the Calcutta Botanic Garden examples; no wild specimen known.

15. **C. subcordata**, *Lamk. Ill.* ii. 421; leaves large ovate acute obscurely 3-nerved nearly glabrous without, corolla large orange or reddish tube exceeding the calyx, stamens 6. *Wall. Cat.* 9063; *DC. Prodr.* ix. 477; *Seem. Fl. Viti*, t. 34; *Benth. Fl. Austral.* iv. 385, with syn.; *Kurz For. Fl.* ii. 209. *C. orientalis*, *Br. Prodr.* 498. *C. campanulata*, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 336. *C. Rumphii*, *Blume Bijl.* 843. *C. hexandra*, *Roem. & Sch. Syst.* iv. 799.—*Rumph. Herb. Amb.* ii. t. 75.

ANDAMANS and S. MALAY PENINSULA. In Bengal and various parts of India often planted.—DISTRIB. S.E. Asia to Australia and the Sandwich Isles. Widely cultivated.

A small tree. *Leaves* 3–6 in., base rounded or subcordate; petiole $\frac{3}{4}$ –1 $\frac{1}{2}$ in. *Corymbs* lateral and few-fl., nearly glabrous; flowers usually 6-merous. *Calyx* $\frac{1}{2}$ in.; teeth short, triangular, villous within. *Corolla-tube* $\frac{3}{4}$ in., lobes $\frac{2}{3}$ in. Branches of the stigmas linear-spathulate. *Fruit* 1 in., ellipsoid, acute, usually 1-seeded. Seed grossly muricated, subspinose.

EXCLUDED SPECIES.

CORDIA FINLAYSONIANA, *Wall. Cat.* 7010; without locality attached, was probably collected in Cochin-China.

CORDIA SP., *Wall. Cat.* 9064, is *Mappia oblonga*, Miers, var. *elliptica* (v. i. p. 589).

II. EHRETIA, Linn.

Shrubs or trees, scabrous or glabrous. *Leaves* alternate. *Corymbs* or panicles axillary or terminal, rarely peduncles axillary 1-flowered; flowers small, white. *Calyx* sub-5-partite. *Corolla-tube* short or cylindric; lobes 5, imbricated in the bud, patent or reflexed. *Stamens* 5, on the corolla-tube; anthers ovate or oblong, exsert, rarely included. *Ovary* 2-celled, cells 2-ovulate; style terminal, cylindric bifid or bipartite, stigmas small capitate. *Drupe* small, subglobose, 4- (or by suppression 3-1-) seeded; pyrene one 4-celled, or two 2-celled, or four 1-celled; 3-1 pyrenes or cells not rarely suppressed. *Seeds* straight, testa thin, albumen scanty.—Species 50, all tropical; principally in the Old World.

SECT. 1. **Euehretia.** *Style* single, bifid.

* *Leaves serrate.*

1. **E. acuminata**, Br. *Prodr.* 497; leaves elliptic-oblong acuminate serrate glabrous beneath, panicles terminal dense compound, calyx-lobes $\frac{1}{2}$ in. obtuse. *DC. Prodr.* ix. 503; *Benth. Fl. Austral.* iv. 387. *E. serrata*, Roxb. *Hort. Beng.* 17, and in *Fl. Ind. ed. Carey & Wall.* ii. 340; *Wall. Cat.* 898; *Bot. Reg.* t. 1097; *Wight Ill.* t. 170; *DC. Prodr.* ix. 503; *Griff. Ic. Pl. As. t.* 459; *Brand. For. Fl.* 339; *Kurz. For. Fl.* ii. 210. *E. pyrifolia*, Don *Prodr.* 102. *E. ovalifolia*, Hassk. *Cat. Hort. Bog.* 137, not of *Wight*. *Cordia thyrsoflora*, Sieb. & Zucc. *Fl. Jap. Fam. Nat.* ii. 26.

SUBTROPICAL HIMALAYA and adjacent plains, ascending to 5000 ft., from Ghurwal to Bhotan, common. KHASIA Mts. to PEGU.—DISTRIB. Ava, Australia, Japan.

A tree, attaining 40 feet. *Leaves* 3-4 in., minutely bristly or glabrous above; petiole $\frac{1}{2}$ in. *Panicles* 2-6 in., minutely bristly or glabrescent, crowded with flowers. *Corolla-tube* very short; lobes $\frac{1}{2}$ in., reflexed. *Anthers* exsert. *Style* bifid for less than half its length, branches linear, stigmas minutely capitate. *Drupe* $\frac{1}{2}$ - $\frac{1}{4}$ in. diam., short-ellipsoid, obtuse, not ribbed nor lobed; pyrenes 2, without any hollow between them, each 2-celled, cells 1-seeded.

2. **E. macrophylla**, Wall. *Cat.* 901, and in Roxb. *Fl. Ind. ed. Carey & Wall.* ii. 343; leaves large broadly elliptic acute serrate bristly above softly hairy beneath, panicle terminal compound bristly, calyx-lobes (in young fruit) $\frac{1}{2}$ in. oblong-lanceolate. *DC. Prodr.* ix. 503.

NEPAL; Chundaghiri, Wallich.

A tree. *Leaves* $7\frac{1}{2}$ by 4 in., rhomboid or rounded at the base; petiole 1 in. *Panicle* 2-3 in., sparsely fulvous hirsute. Young *drupe* $\frac{1}{4}$ in. (but Wallich notes the drupe size of a small gooseberry); pyrenes 2, each 2-celled.—Flowers unknown to Wallich. *E. Dicksoni*, Hance in *Ann. Sc. Nat.* 4, xviii. 224, from the interior of S. China, is probably the same species (the leaves in Hance's examples are broadly elliptic subcordate, not oblong as in the description); calyx softly hairy, tube $\frac{1}{8}$ in., lobes $\frac{1}{2}$ in. oblong; corolla-tube $\frac{1}{4}$ in., pubescent without, lobes $\frac{1}{2}$ in. ovate reflexed; anthers long exsert; style single long sparsely hairy, lobes 2 short oblong glabrous; berry as of *C. macrophylla*, $\frac{3}{8}$ in. diam.

** *Leaves quite entire.*

3. **E. lævis**, Roxb. *Cor. Pl.* 42, t. 55, and *Fl. Ind. ed. Carey & Wall.* ii. 341; leaves ovate shortly acuminate undulate base unequally cuneate glabrous, nerves 5-6 pair irregular tufted in the axils, corymbs mostly subaxillary repeatedly dichotomous branches recurved in fruit, calyx-lobes small pubescent, style shortly 2-branched. *Don Prodr.* 102; *Wall. Cat.* 899; *DC. Prodr.* ix.

505; *Wight Ic.* t. 1382; *Dalz. & Gibs. Bomb. Fl.* 170; *Bedd. Fl. Sylv.* t. 246; *Kurz For. Fl.* ii. 210; *Brand. For. Fl.* 340, t. 42. *E. punctata*, *Roth Nov. Sp.* 126. *E. affinis*, *Wall. Cat.* 900. *E. dichotoma*, *Rottl. in Wall. Cat.* 904, probably of *Blume* also. *Beurreria lævis* and *punctata*, *G. Don Gen. Syst.* iv. 390.

Throughout INDIA in tropical and subtropical regions, common.—DISTRIB. From Persia to China, Australia and Polynesia, the allied Tropical African species are perhaps only geographical forms.

A tree 30–40 feet, or a shrub; branchlets glabrous, or rusty-pubescent, or sparsely laxly hirsute. *Leaves* 5 by $2\frac{1}{2}$ in., unsymmetric, rather thin in texture, young glabrous softly hairy or densely tomentose, mature glabrescent; petiole $\frac{3}{8}$ in. *Corymbs* 3 in. lax, glabrous or usually pubescent or rusty, ultimate branches long recurved with sessile fruits. *Calyx-lobes* $\frac{1}{10}$ in., oblong, in fruit ovate. *Corolla-tube* $\frac{1}{10}$ in., lobes $\frac{1}{8}$ in. spreading. *Anthers* exsert. *Drupe* (when perfecting 4 seeds) $\frac{1}{8}$ in. diam., depressed globose, when dry distinctly 4-ribbed, pyrenes 4 each 1-seeded; on one corymb are usually seen drupes perfecting 1, 2, 3, or 4 seeds.—All authors previous to Brandis have kept this species distinct, describing it as absolutely glabrous; it is however nearly always manifestly hairy, and the indumentum is rusty, pubescent, ciliate, hirsute or tomentose at least in the innovations.

VAR. *floribunda*, *Brand. For. Fl.* 340; innovations hairy or glabrous, corymbs large axillary or collected towards the ends of the branches often forming quipanicles 6 in. diam. *E. floribunda*, *Benth. in Royle Ill.* 306; *DC. Prodr.* ix. 507; *Boiss. Fl. Orient.* iv. 124. *E. Cutranga*, *Ham. in Wall. Cat.* 7012.—Punjab to Behar. Distrib. Cabul.

VAR. *pubescens*; branchlets hairy, mature leaves softly hairy beneath or on both surfaces. *E. pubescens*, *Benth. in Royle Ill.* 306; *DC. Prodr.* ix. 597.—Throughout India.

VAR. *timorensis*; glabrous or the innovations and corymbs rusty-pubescent, leaves broadly oblong or somewhat obovate acuminate, corymbs axillary and terminal. *E. timorensis*, *Decne. in Nouv. Ann. Mus. d'Hist. Nat.* iii. 395; *DC. Prodr.* ix. 505. *E. philippensis*, *A. DC. Prodr.* ix. 504. *E. lævis*, type *Benth. Fl. Austral.* iv. 389.—Malay Peninsula. Distrib. Malaya, Australia.—*Leaves* often 6 in., usually larger and more acuminate than in the Indian *E. lævis*, also drying very black and usually symmetric or nearly so. As to the fruit, in *E. lævis* type it is often sub-2-pyrenous, the pyrenes only separating into 4 ultimately or with difficulty.

VAR. *canarensis*; glabrous or nearly so, leaves broadly oblong symmetric narrowed at both ends, mature glabrous above rugose with impressed nerves scabrous beneath. *E. canarensis*, *Miq. in Pl. Hohenack.* n. 285. *E. Championi*, *Wight & Gardn. ms.*—W. Deccan Peninsula and Ceylon.—The common *Ehretia* of the Nilghiris (alt. 3–6000 feet) and other Deccan Mts. It has been regarded as a distinct species, being readily distinguished by the symmetric strong-nerved leaves.

VAR. *aspera*; leaves small obtuse mature hairy beneath. *E. aspera*, *Roxb. Cor. Pl.* i. 41, t. 55, and in *Fl. Ind. ed. Carey & Wall.* ii. 342; *Wall. Cat.* 902; *DC. Prodr.* ix. 507; *Bedd. For. Man.* 166; *Brand. For. Fl.* 340; *Kurz For. Fl.* ii. 209. *E. tomentosa*, *Roth Nov. Sp.* 126, not of *Lamk.* *E. Heynii*, *Roem. & Sch. Syst.* iv. 532. *Beurreria aspera*, *G. Don Gen. Syst.* iv. 390.—Assam.—Described from Roxburgh's example in *Herb. Wallich* (which agrees with his *Ic. Ined.* in *Herb. Kew*), on which the largest leaves are $1\frac{3}{8}$ by $\frac{3}{8}$ in., scabrous above, persistently hairy beneath. None of the *E. aspera* (except from E. Bengal) agrees with this exactly, the *E. aspera* of *Kurz*, *Dalzell*, &c., having larger leaves and resembling *E. lævis*, var. *pubescens*. *Wight's E. aspera* includes an example absolutely glabrous, the young leaves and calyx shining glabrous; no example of *E. lævis* type is so glabrous. A very hairy obtuse-leaved example collected at Arcot by Griffith has the calyx-lobes narrowly oblong and the style deeply bifid.

4. ***E. obtusifolia***. *Hochst.*; *A. DC. Prodr.* ix. 507; leaves obovate-oblong obtuse mature hairy, flowers as of *E. lævis* but rather larger. *Brand.*

For. Fl. 340; *Boiss. Fl. Orient.* iv. 124. *E. obovata*, *R. Br. in Salt Abyss.* *Append.* iv. 64 (name only).

SCINDE, *Stocks*. PUNJAB; in the Salt range, *Fleming*, &c.—DISTRIB. Beloochistan, Abyssinia.

A shrub. *Leaves* 1–1½ in., much cuneate at the base. *Flowers* pedicelled and sessile. —Differs from *E. laevis* var. *aspera* in the narrowed base of the leaves, the more lax corymb, and the slightly larger flowers.

5. ***E. retusa***, *Wall. Cat.* 903; leaves small obovate mature hairy beneath, corymbs small hairy terminal on lateral spurs, calyx-lobes lanceolate acute, flowers and fruit as in *E. laevis* but rather smaller. *DC. Prodr.* ix. 511. *Beurreria retusa*, *G. Don Gen. Syst.* iv. 390.

BURMA; Pagamew, *Wallich*.

Branches scraggy, as of a tough shrub. *Leaves* 1½ by ¾ in., base cuneate, shortly acute or obtuse not retuse, nerves distant not prominent; petiole ½ in.—This may be a stunted example of *E. laevis* var. *aspera*; but the leaves are much narrowed at the base, the calyx-teeth remarkably narrow and acute. In habit it is remote from *E. obtusifolia* and the flowers are hardly half as large.

6. ***E. ovalifolia***, *Wight Ic.* t. 1383; innovations and corymbs pubescent or tomentose, leaves elliptic subobtuse mature glabrous. *Bedd. For. Man.* 167. —Boraginea, *Wall. Cat.* 7529.

S. MADRAS; Jyamallay, *Wight*. CEYLON; Jaffna, *Dykes*.

Otherwise as *E. laevis*, from which it only differs in the obtuse leaves. No fruit seen.

7. ***E. Wightiana***, *Wall. Cat.* 7013; nearly glabrous, leaves lanceolate and obovate-lanceolate scarcely acute, corymbs mostly terminal dense. *G. Don Gen. Syst.* iv. 388; *Wight Ic.* t. 1384; *Bedd. For. Man.* 167. *E. lanceolata*, *Heyne in Herb. Rottl.*

S. MADRAS; Mysore, Courtallum, &c. *Wight, G. Thomson, &c.*

Leaves 1½ by ½ in. in Wight's type example, but larger and broader, approaching *E. laevis* in others. *Corymbs*, when young, pubescent and subtomtose in Wight's example, soon glabrescent. *Flowers* and *drupes* as of *E. laevis*.

8. ***E. parallela***, *Clarke*; nearly glabrous, leaves elliptic or obovate, nerves 8 pair oblique parallel approximate, inflorescence flowers and fruit as in *E. laevis* but rather smaller.

BURMA; banks of the Irrawaddy, *Griffith (Kew Distrib.* n. 6004).

Branches round, glabrous. *Leaves* 1½ by ¾–1 in., retuse and subacute on the same branch, cuneate at the base, glabrous even when young, prominently striate by the straight primary nerves hardly ½ in. apart; petiole ½ in. *Corymbs* minutely pubescent.—Well-marked by the strong, straight, parallel, closely-placed primary nerves, not much like any other species; the leaves are usually obtuse, sometimes retuse.

9. ***E. Wallichiana***, *H. f. & T.*; *Gamble Darjeeling List*, 57; nearly glabrous, leaves elliptic acuminate, corolla-tube much exceeding the calyx. *Cordia acuminata*, *Wall. Cat.* 896, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 339; *DC. Prodr.* ix. 499.

SIKKIM and BHOTAN, alt. 2–7000 ft., frequent; *J. D. H.*, &c. KHASIA MTS. *Wallich, Griffith*.

A tree, attaining 40 ft., flowering before the leaves. *Leaves* 5 by 2 in., base cuneate nerves 7 pair; petiole ½ in. *Corymbs* 1–3 in. diam., mostly sublateral, dense, minutely pubescent. *Calyx-lobes* ¼ in., oblong. *Corolla-tube* ½ in.; lobes ½ in., white, recurved. *Anthers* exsert. *Ovary* 2-celled, cells 2-ovulate; style bifid much less than half-way down, stigmas small capitate. *Drupe* ¼ in. diam., subglobose, when

dry longitudinally ribbed; pyrenes 4, compressed, lunate, corrugated without, occupying the periphery of the drupe, the centre (in the dried drupe) hollow, occupied by the shrivelled fleshy tissue; pyrenes 1-seeded.—Perhaps a small-flowered form of the Hong-Kong *E. longiflora* (Champ. in Hook. Kew Journ. v. 58), which agrees exactly as to the fruit and leaves, but has the corolla-tube $\frac{1}{3}$ in. long.

SECT. II. **Carmona**. *Styles* 2, undivided (1 sometimes suppressed), or 1 sub-2-partite.

10. ***E. buxifolia***, *Roxb. Cor. Pl.* i. 42, t. 57, and in *Fl. Ind. ed. Carey & Wall.* ii. 343; leaves small fascicled obovate entire or lobed, peduncles axillary 1- (or few-) flowered. *Wall. Cat.* 905; *DC. Prodr.* ix. 509; *Bedd. For. Man.* 167. *E. heterophylla*, *Spreng. Syst.* i. 648; *A. DC. l. c.* *E. microphylla*, *Lamk. Ill.* ii. 425. *Cordia retusa*, *Vahl Symb.* ii. 42. *C. coromandeliana*, *Koenig & Retz ms.* *Carmona heterophylla*, *Cav. Ic.* v. 23, t. 438.

DECCAN PENINSULA; in dry jungles, *Wight, Dalzell, &c.*—DISTRIB. Malaya to Formosa and the Philippines.

A shrub. *Leaves* 1 by $\frac{1}{2}$ in., obtuse, very scabrous, often 3-lobed towards the apex, attenuated at the base, subsessile. *Peduncles* 0– $\frac{3}{4}$ in., hairy. *Calyx-lobes* $\frac{1}{2}$ in., lanceolate-linear. *Corolla* $\frac{1}{2}$ in., white, campanulate; lobes short, ovate. *Filaments* very short. *Drupe* $\frac{1}{2}$ in. diam., globose; pyrene 1, 4-seeded; without any cavities in the drupes examined; with 6–8 cavities (A. DC.).

EXCLUDED SPECIES.

E. mollis, *Wall. Cat.* 7011; *DC. Prodr.* ix. 511, is *Mappia ovata*, *Miers*, v. i. p. 509.

3. **GOLDENIA**, *Linn.*

Prostrate, scabrous herbs. *Leaves* alternate, crisped. *Flowers* axillary, sessile (or nearly so), the upper sometimes in a one-sided leafy spike, white. *Sepals* 4–5, narrow. *Corolla*-tube short, lobes 4–5, imbricate in the bud, patent. *Stamens* 4–5, on the corolla-tube; anthers ovate. *Ovary* 2-celled with 2 ovules in each cell, or sub-4-celled with solitary ovules; style terminal, bifid. *Drupe* (nearly dry) of 4, subconnate, 1-seeded, pyrenes. Testa of the seed thin; albumen 0, or scanty; cotyledons flat.—Species 10 American, and the following.

1. ***G. procumbens***, *Linn.*; *DC. Prodr.* ix. 558; procumbent, scabrous-hairy, leaves elliptic-obovate coarsely serrate or subpinnatifid, pyrenes subconnate into an acute 4-ribbed pyramid. *Gaertn. Fruct.* i. 329, t. 68; *Lamk. Ill.* t. 89; *Roxb. Fl. Ind.* i. 448; *Wall. Cat.* 942; *Dalz. & Gibs. Bomb. Fl.* 171. *Lobophyllum tetrandrum*, *F. Muell. in Hook. Kew Journ.* ix. 21. *Waltheria microphylla*, *Miq. in Pl. Hohenack.* n. 87 b. not of Cav.

Throughout tropical INDIA, a weed.—DISTRIB. Asia, Africa, Australia, America.

Annual, usually quite flat. *Leaves* 1–1 $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in. *Pyrenes* $\frac{1}{2}$ in. *Seeds* albuminous.

4. **RHABDIA**, *Mart.*

A shrub; branches twiggy. *Leaves* small, alternate or clustered, linear-oblong, entire or toothed. *Flowers* small; racemes very small, few-fl., sub-terminal on short lateral branches. *Sepals* 5, lanceolate, acuminate. *Corolla* pink-purple; tube short, campanulate; lobes oblong, imbricate in the bud. *Stamens* 5, on the corolla-tube; anthers oblong or ovate. *Ovary* 2-celled, cells 2-ovuled, or sub-4-celled with cells 1-ovuled; style terminal, stigma capitate

or minutely 2-lobed. *Drupe* with 4 crustaceous 1-seeded pyrenes. *Seeds* oblong, albumen thin.

1. **R. lycioides**, Mart. *Nouv. Gen. & Sp.* ii. 137, t. 195; *DC. Prodr.* ix. 512; *Fresen. in Mart. Fl. Bras. Fasc.* xxii. 58, t. 9, fig. 9. *R. viminea*, Dalz. & *Gibs. Bomb. Fl.* 170; *Hook. Ic. Pl.* t. 823; *Brand. For. Fl.* 341; *Kurz For. Fl.* ii. 211. *R. fluvialis*, *Edgew. Pl. Banda*, 51. *R. crebrifolia*, *Miers Contrib.* ii. 222, t. 84. *Rotula aquatica*, *Lour. Fl. Cochinch.* 121; *DC. Prodr.* ix. 531. *Ehretia viminea*, *Wall. Cat.* 906; *DC. l.c.* 509. *E. cuneata*, *Wight Ic. t.* 1385.—*Careyæ* sp. *Miq. in Pl. Hohenack.* n. 688.

INDIA, alt. 0–2500 ft.; from Kumaon and Assam to CEYLON and Tenasserim, frequent; especially on gravelly banks flooded by rapid streams.—DISTRIB. Tropical S.E. Asia, Africa, and Brazil.

Height 2–6 ft. *Leaves* $\frac{3}{4}$ by $\frac{1}{2}$ in. *Flowers* $\frac{1}{4}$ in. *Drupe* $\frac{1}{8}$ in., yellow or brown-red, nearly dry.

5. **TOURNEFORTIA**, Linn.

Trees or shrubs, often rambling or subscandent. *Leaves* alternate, entire. *Cymes* terminal, rarely lateral or extra-axillary, dichotomous, scorpioid; flowers numerous, dense, sessile or very shortly pedicelled, ebracteate, white or greenish-yellow. *Sepals* 5 or 4, lanceolate or ovate. *Corolla-tube* cylindric (short in *T. argentea*), naked in the throat; lobes 5 or 4, small, patent. *Stamens* 5 or 4, included in the tube, filaments short; anthers oblong. *Ovary* 4-celled; style terminal, short, shortly 2-lobed (in the Indian species); ovules 1 in each cell. *Drupe* small, ovoid, scarcely fleshy, not distinctly separating into 2 or 4 pyrenes; pyrenes two 2-celled 2-seeded (in the Indian species). *Seed* straight or curved, albuminous.—DISTRIB. Species 100; in the tropics of both hemispheres.

SECT. 1. **Mallota**. An erect, densely silky shrub. *Leaves* narrowed at the base. *Corolla* subrotate, tube very short.

1. **T. argentea**, Linn. *f. Suppl.* 133; branches and leaves on both surfaces fulvous-sericeous, leaves obovate-lanceolate, cymes very dense. *Rorb. Fl. Ind. ed. Carey & Wall.* ii. 4; *Blume Bijl.* 844; *DC. Prodr.* ix. 514.—*Rumph. Herb. Amboin.* iv. t. 55.

Seashores of CEYLON and the MALAY PENINSULA. NICOBARS; *Kurz*.—DISTRIB. Malaya, Australia, Mauritius.

Branchlets thick. *Leaves* 6 by 2 in., acute or subobtuse; petiole ill-defined. *Peduncles* terminal, or from an upper axil, 1–5 in.; cymes often forming a panicle 6 in. diam.; flowers sessile. *Sepals* $\frac{1}{10}$ in., ovate, densely woolly, ultimately glabrescent. *Corolla-tube* hardly as long as the sepals; lobes $\frac{1}{10}$ in., ovate, crenulate. *Stigma* subsessile, obscurely 2-lobed. *Drupe* $\frac{1}{4}$ in. diam., subglobose.

SECT. 2. **Pittonia**. Rambling or subscandent shrubs. *Leaves* obtuse at the base, distinctly petioled. *Corolla* 5-merous, narrowly tubular.

* *Drupe*s shortly pedicelled (all from the Deccan).

2. **T. Heyneana**, Wall. *Cat.* 910 (*Heyne's specimen*) not of *DC.*; leaves oblong-lanceolate, corolla-tube $\frac{3}{8}$ – $\frac{1}{2}$ in. *T. cymosa*, *Heyne in Herb. Rottler*, not of Linn.

DECCAN PENINSULA, *Heyne*; Nilgherries (near Nadooputtah), *Wight*.

Branchlets sparsely scabrous-hairy. *Leaves* 5 by $1\frac{1}{2}$ in., acuminate, base cuneate or rhomboid, mature sparsely minutely scabrous-hairy on both surfaces; nerves 7 pair, closely hairy when young; petiole $\frac{1}{2}$ in. *Cymes* terminal and extra-axillary, sparsely scabrous-hairy. *Calyx-teeth* $\frac{1}{12}$ in., lanceolate. *Drupe* $\frac{1}{8}$ in., or pedicels $\frac{1}{8}$ in.—Wallich appears to have received a small quantity of this species, and to have named

it *T. Heyneana*; subsequently to have placed with it a large quantity of a Khasian species, *T. Candollii*, Clarke, which he distributed as *T. Heyneana*.

3. ***T. reticosa***, *Wight Ic. t.* 1386; leaves oblong acuminate glabrescent prominently reticulate beneath, corolla-tube $\frac{1}{3}$ – $\frac{1}{2}$ in.

NILGHERRIES & COORG; *Wight*.

Branchlets softly, sparsely hairy. *Leaves* $5\frac{1}{2}$ by $1\frac{3}{4}$ in., base rhomboid or rounded, mature very sparsely hairy above; nerves 8 pair, tertiary densely anastomosing; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in. *Cymes* terminal; flowers sub-1-serial; pedicels (at flower-time) $\frac{1}{16}$ – $\frac{1}{8}$ in. *Calyx-teeth* $\frac{1}{16}$ – $\frac{1}{12}$ in. *Drupe* not seen.

4. ***T. Wightii***, *Clarke*; leaves subcordate ovate-lanceolate mature hairy beneath, corolla-tube $\frac{1}{4}$ – $\frac{1}{3}$ in.

DECCAN PENINSULA; *Wight*.

More hairy than the preceding species. *Leaves* $3\frac{1}{2}$ by $1\frac{3}{4}$ in.; nerves 8 pair, sub-impressed on the upper surface, tertiary obscure; petiole $\frac{1}{2}$ in. *Cyme* extra-axillary; flowers sub-1-serial; pedicels (at flower-time) 0 – $\frac{1}{16}$ in. *Calyx-teeth* $\frac{1}{8}$ in., lanceolate-linear. *Drupe* not seen.—This differs (inter alia) from *T. reticosa* by the primary nerves being much more approximate.

** *Drupe sessile or nearly so (species of Bengal and the E. Peninsula).*

5. ***T. Roxburghii***, *Clarke*; leaves oblong acuminate shortly densely villous beneath, calyx-teeth lanceolate-linear, corolla-tube $\frac{1}{3}$ in.

CHITTAGONG; Seetakoond, Bindravun, Rungamuttea, *J. D. H.*, &c.

Branches hairy. *Leaves* 4 by $1\frac{1}{2}$ in., sometimes subovate, not rugose above, tertiary nerves obscurely reticulated; petiole $\frac{1}{2}$ in. *Cymes* terminal and supra-axillary; flowers sub-2-seriate. *Calyx-teeth* $\frac{1}{8}$ in. *Drupe* $\frac{3}{8}$ – $\frac{1}{6}$ in., sessile, sub-2-seriate; calyx not glistening white within.—Easily separated from all other species of this subsection by its longer corolla. Roxburgh collected his *Lithospermum viridiflorum* in Chittagong (where this is the only species known, and is frequent, on Roxburgh's collecting ground near Sir W. Jones's country-seat), and his description seems (at least partly) drawn therefrom: but his picture, and the Calcutta Botanic Garden authentic examples, refer to the next species.

6. ***T. viridiflora***, *Wall. Cat.* 907, and in *Fl. Ind. ed. Carey & Wall.* ii. 5; leaves oblong acuminate softly hairy beneath, calyx-teeth lanceolate-linear, corolla-tube $\frac{1}{2}$ in. *DC. Prodr.* ix. 516. *Lithospermum viridiflorum*, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 4. *Heliotropium viridiflorum*, *Lehm. Asperifol.* 30.

ASSAM; *Griffith, Masters.* SILHET; *Wallich*.

Branches hairy. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{4}$ in., sometimes subovate, in age wrinkled above, tertiary nerves obscure; petiole $\frac{1}{2}$ in. *Cymes* terminal, rusty-villous; flowers 2-ranked, very dense. *Calyx-teeth* $\frac{1}{10}$ in. *Corolla-tube* little exceeding the calyx-teeth, not exceeding $\frac{1}{4}$ in. in the large cultivated examples from the Calcutta garden. *Drupe* $\frac{1}{8}$ – $\frac{1}{6}$ in., sessile; calyx-lobes in fruit very narrow, not white glistening within.

VAR. Griffithii; mature leaves nearly glabrous beneath distinctly reticulated.—Khasia & Assam; *Griffith*.

7. ***T. Candollii***, *Clarke*; leaves ovate-lanceolate softly hairy beneath, calyx-teeth lanceolate-linear corolla-tube $\frac{1}{4}$ in. *T. Heyneana*, *DC. Prodr.* ix. 516; *Wall. Cat.* 910, as to the Khasia examples.

BHOTAN, ASSAM, KHASIA, and SILHET, frequent; *Wallich, Griffith*, &c.

Branches hairy. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., sometimes oblong, base obtuse or subcordate; primary nerves soon impressed on the upper surface, tertiary very obscurely reticulated; petiole $\frac{1}{2}$ in. *Calyx-teeth* $\frac{1}{10}$ in., in fruit narrowly lanceolate, not glistening white within. *Drupe* $\frac{1}{6}$ – $\frac{1}{8}$ in., sessile.—This species is remote from *T. Heyneana*: it is nearly intermediate between *T. viridiflora* and *T. ovata*, differing little from *T. viridiflora*, var. *Griffithii*, but in the longer corolla.

8. **T. ovata**, Wall. Cat. 908; leaves ovate and elliptic suddenly shortly acuminate hairy or glabrescent beneath, calyx-teeth ovate-lanceolate in fruit glistening white-setose within, corolla-tube $\frac{1}{4}$ – $\frac{1}{3}$ in. *G. Don Gen. Syst.* iv. 369; *DC. Prodr.* 516.

BRITISH BURMA; Rangoon, Wallich, McClelland. S. ANDAMAN; Kurz.

Scandent, branches hairy. Leaves 3–6 in., rhomboid at the base; tertiary nerves obscure. Calyx-teeth $\frac{1}{12}$ in., about $\frac{1}{4}$ the length of the corolla-tube. Drupes $\frac{1}{8}$ – $\frac{1}{4}$ in., sessile.—In Kurz example, the corolla is permanent, the base greatly enlarged so as to include the fruit; this state appears induced by the attack of an insect.

9. **T. khasiana**, Clarke; leaves ovate acuminate glabrescent base obtuse or subcordate, calyx-teeth ovate acute small, corolla-tube exceeding $\frac{1}{4}$ in.

KHASIA MTS.; Nongpriang, alt. 1500 ft., Clarke.

Branchlets minutely hairy. Leaves $3\frac{1}{2}$ by $1\frac{1}{2}$ in., gradually acuminate, tertiary nerves reticulated not very prominent; petiole $\frac{1}{2}$ in. Cymes rusty-pubescent; branches few, long, densely fld. Calyx-teeth scarcely $\frac{1}{16}$ in. Drupe not seen.

10. **T. Hookeri**, Clarke; leaves ovate or elliptic acute glabrescent prominently reticulated beneath, calyx-teeth lanceolate-linear, corolla-tube $\frac{1}{6}$ – $\frac{1}{5}$ in. hardly exceeding the calyx. *T. viridiflora*, Gamble Darjeeling List, 57, not of Wall.

SIKKIM; alt. 2–5000 ft., frequent; *J. D. H.*, &c.

Large, subscent; branches nearly glabrous. Leaves 4–5 by $1\frac{1}{5}$ – $2\frac{1}{2}$ in., obtuse and unequal at the base; tertiary nerves exceedingly prominent; petiole $\frac{1}{2}$ in. Cymes terminal, diffuse, rusty pubescent; branches long; flowers sub-2-seriate. Calyx-teeth $\frac{1}{6}$ in. Drupes $\frac{1}{2}$ in., ovoid, sessile.

VAR. *subtropica*; corolla-tube more than $\frac{1}{4}$ in. pentagonal with 5 hairy lines without, more than twice as long as the calyx-tube.—Sikkim; by the great Rungait, *J. D. H.*

SECT. 3. **Tetrandra**. Rambling or subscent shrubs. Leaves obtuse at the base, distinctly petioled. Corolla 4-merous, narrowly tubular.

11. **T. Wallichii**, DC. Prodr. ix. 527; leaves ovate acute glabrescent base rounded, corolla-tube scarcely $\frac{1}{4}$ in. twice or thrice as long as the calyx. *T. tetrandra*, Wall. Cat. 911, not of Blume. *Tetrandra Wallichii*, *Miq. Fl. Ind. Bat.* ii. 928.

SINGAPORE & PENANG; Wallich, Maingay. NICOBARS; Kurz.

Branches nearly glabrous. Leaves $3\frac{1}{2}$ by $1\frac{3}{4}$ in., tertiary nerves obscure; petiole $\frac{1}{4}$ in. Cymes terminal, lax. Calyx-teeth $\frac{1}{20}$ in., triangular-lanceolate. Drupes $\frac{1}{8}$ in., sessile.—*Tetrandra glabra*, *Miq. Fl. Ind. Bat.* ii. 929, has oblong leaves narrowed at the base; *T. Zollingeri*, *Miq. l.c.* 928, has flowers $\frac{1}{2}$ in. long; these two make up the old *Tournefortia tetrandra*, *Blume Bijl.* 845, *DC. l.c.* More material may reduce the 4 species of this section to 1.

12. **T. Walkerae**, Clarke; leaves oblong acuminate glabrescent reticulated beneath, corolla-tube $\frac{1}{2}$ in. very narrow. *T. Wallichii*, *Thwaites Enum.* 214.

CEYLON; Walker, Thwaites.

Leaves $3\frac{1}{2}$ by 1 – $1\frac{1}{4}$ in., base rounded; upper surface rugose by the impression of the nerves.—This seems nearer both *Tetrandra glabra* and *Zollingeri* than to *Tournefortia Wallichii*.

DOUBTFUL SPECIES.

T. ARBORESCENS, Lamk. Ill. ii. 417; *DC. Prodr.* ix. 529, is described as a tree from India. No tree belonging to the genus is known in British India.

T. TERNATA, Wall. Cat. 912, from Tavoy; there is no specimen of this in Wallich's Herbarium.

6. **HELIOTROPIUM**, Linn.

Annual or perennial herbs, rarely (non-Indian species) shrubby, villous or scabrous. *Leaves* alternate. *Cymes* terminal, dichotomous; branches often long, scorpioid; flowers small, white or nearly so in the Indian species; bracts small, 0, or leafy (inflorescence axillary). *Calyx* 5-partite or -lobed; segments lanceolate or linear (except in Sect. *Piptoclaina*). *Corolla* tubular, throat not hairy; lobes 5, imbricate or induplicate in the bud, spreading in flower. *Stamens* 5, on the corolla-tube, included, filaments very short; anthers ovate or lanceolate. *Ovary* completely or imperfectly 4-celled, 4-ovulate; style terminal, short or long, ending in a depressed conical or flat disc; stigma above the disc 0 or short or elongate-lanceolate, entire, rarely with 2 linear branches (Sect. *Ditrichostigma*). *Fruit* dry, 2-4-lobed, of 4 more or less free nutlets. *Seeds* straight or curved, albumen small or 0 (rarely plentiful).—Species 100, in the tropical and temperate zones of both hemispheres.

SECT. 1. **Messerschmidia**. *Corolla-lobes* patent, caudate-acuminate. *Style* longer than the stigma.

1. **H. zeylanicum**, Lamk. *Ill.* ii. 393, not of Wall; leaves narrowly lanceolate, spikes elongate ebracteate, stigma short-oblong densely hairy included in the corolla-tube. *Burm. Fl. Ind.* t. 16, fig. 2. *Wight Ic.* t. 892; *H. paniculatum*, Heyne in *Herb. Rottler*, not of Br. nor of Roxb. *Tournefortia subulata*, Hochst.; *A. DC. Prodr.* ix. 528; *Dalz. & Gibs. Bomb. Fl.* 171. *T. Royleana & Edgeworthii*, *DC. Prodr.* ix. 527, 529. *T. zeylanica*, *Wight Ill.* t. 170. *Messerschmidia hispida*, Benth. in *Royle Ill.* 306.

W. INDIA, from the Punjab to the W. Deccan Peninsula; *Royle, Edgeworth, Wight*, &c.—DISTRIB. Tropical Africa.

Annual, erect, 1-3 ft., scabrous-hairy. *Leaves* $1\frac{1}{2}$ by $\frac{1}{4}$ in., narrowed at both ends, subentire, sessile; nerves obscure in the upper surface. *Spikes* 2-6 in. in fruit; flowers sessile, 1-2-ranked. *Sepals* $\frac{1}{16}$ in., ovate, acute. *Corolla-tube* $\frac{1}{8}$ in., wider in the upper half, minutely setose without; lobes $\frac{1}{16}$ in. *Style* glabrous, half as long as the corolla-tube; stigma surrounded by the stamens in the swollen upper half. *Fruit* $\frac{1}{12}$ in., of 2 rugose pitted 2-seeded nutlets.

SECT II. **Catimas**. *Corolla-lobes* with an abruptly inflexed mucro. *Stigma* elongate-conic.

2. **H. dasycarpum**, Ledeb.; *Eichw. Itin. Casp.-Caucas.* ii. t. 5; leaves small elliptic, spikes few-flowered, style short, stigma minutely scabrous included in the corolla-tube. *Bunge in Bull. Soc. Imp. Nat. Mosc.* 1869, 323; *Boiss. Fl. Orient.* iv. 140. *H. Schrenkianum*, Ledeb. *Fl. Ross.* iii. 102, *fide Boiss. l. c.* *H. brahuicum*, *Stocks in Hook. Kew Journ.* iv. 173. *H. luteum*, *Aitchison Cat. Punjab.* 94 (? Poir).

PANJAB; Peshawur, *Stewart*.—DISTRIB. Beloochistan, Cabul, Persia, Turkestan, Soongaria.

Woody, rigid, 6-18 in., suberect, scabrous-hairy. *Leaves* $\frac{3}{4}$ by $\frac{1}{4}$ in., mostly cuneate at both ends, subentire, sessile or lower obscurely petioled; nerves obscure in the upper surface. *Spikes* in flower short, in fruit 2-4 in., lower flowers often an inch apart; flowers mostly sessile, but stray lower flowers have pedicels $\frac{1}{4}$ - $\frac{3}{4}$ in. *Sepals* $\frac{1}{10}$ in., oblong-lanceolate. *Corolla-tube* $\frac{1}{8}$ in., cylindric or slightly narrower upwards, hairy without. *Filaments* rather long; anthers ovate-oblong near the top of the tube. *Style* about $\frac{1}{4}$ the length of the stigma, minutely retrorse setose (in *Stocks'* examples as in *Eichwald's* picture, but *Boissier* says style as long as the stigma). *Fruit* small, glabrous in *Stocks'* example, sometimes silky (*Boiss.*).—Very near *H. luteum*, Poir. (*DC. Prodr.* ix. 532) which has larger flowers and fruits, and more rugose leaves.

SECT. III. **Monimantha**, *Franch.* *Stigma* with 2 linear branches exsert from the corolla.

3. **H. ophioglossum**, *Stocks*; *Aitchison Cat. Punjab*. 94; leaves lanceolate, spikes elongate many-flowered, corolla-lobes round crenate. *Boiss. Fl. Orient.* iv. 145. *H. stylosum*, *Franch. Sert. Somal. in Mission Révoil*. 45, t. 4, not *Philippi*.

SCINDE; Kurrachee, *Stocks*.—DISTRIB. Beloochistan, Somali-land.

Woody, 6–15 in., branched from the base, scabrous-hairy. *Leaves* 1 by $\frac{1}{2}$ in., tip cuneate, base attenuated or subpetioled, subentire, nerves obscure on the upper surface. *Spikes* 2–6 in.; flowers sessile, 1–2-ranked. *Sepals* $\frac{1}{2}$ in., lanceolate. *Corolla-tube* scarcely longer than the sepals, cylindric, minutely scabrous without. *Anthers* linear, occupying the upper half of the corolla-tube. *Style* very short; *stigma* conico-linear, nearly as long as the corolla-tube. *Nutlets* 4, $\frac{1}{16}$ in., glabrous.

SECT. IV. **Piptoclaina**. *Calyx-lobes* short, subvalvate. *Fruit* enclosed by the calyx.

4. **H. supinum**, *Linn.*; *DC. Prodr.* ix. 533; leaves petioled elliptic or ovate subobtusate, spikes short woolly, nut solitary (sometimes 2) large rugose margined. *Sibth. Fl. Græc.* t. 157; *Wight Ic.* t. 1387; *Dalz. & Gibs. Bomb. Fl.* 171; *Bunge in Bull. Soc. Imp. Nat. Mosc.* 1869, 289; *Boiss. Fl. Orient.* iv. 127. *Piptoclaina supina*, *G. Don Gen. Syst.* iv. 364. *Lithospermum heliotropoides*, *Forsk. Fl. Æg. Arab.* 39.

PUNJAB and UPPER GANGETIC PLAIN; *Royle, Edgeworth, &c.*—DISTRIB. W. Asia, S. Europe, N. Central Africa.

Annual, prostrate, 1 ft. diam., much branched, shortly softly villous. *Leaves* $\frac{1}{2}$ –1 $\frac{1}{2}$ in., subentire; nerves often impressed on the upper surface. *Calyx* $\frac{1}{2}$ in., ovate, woolly. *Corolla-tube* $\frac{1}{2}$ in., ovate; lobes very small, round. *Anthers* ovate-oblong, near the top of the tube. *Stigma* conical, hairy, nearly as long as the style, included. *Nutlets* $\frac{1}{2}$ by $\frac{1}{2}$ in., margins broad, smooth; often 2 in the Indian examples.

VAR. *malabarica*; nuts usually 4 smaller in horizontal section triangular without margins. *H. malabarica*, *Retz Obs.* iv. 24; *Roxb. Fl. Ind.* i. 454; *Wall. Cat.* 7014. *Piptoclaina malabarica*, *G. Don Gen. Syst.* iv. 364.—W. Deccan Peninsula, from Central India (*Edgeworth*) to Tinnevely (*Wight*), frequent. *Cutch & Scinde, Stocks, Stoliczka*.—*Bunge* (l. c. 287) excludes from the section *Piptoclaina* all the species with 4 nutlets, and objects to regarding *H. malabaricum* as a var. of *H. supinum*; but there is every gradation between the two forms of fruit in the Indian collections; an example, marked as collected at Darjeeling in *Herb. Griffith*, has 2–3 or 3–4 nuts.

SECT. V. **Euheliotropium**. *Sepals* narrow, not enclosing the fruit. *Corolla-lobes* plicate or crenulate, neither patent cuspidate nor with closely-incurved mucro. *Style* short; *stigma* conic, entire or minutely 2-fid or (in *H. rariflorum* and *mysotoides*) capitate, included in the corolla-tube. *Nutlets* not spreading, forming an ovoid 4-pointed mitre-like fruit, with a small hole at the apex.

* *Leaves* obovate or elliptic, silky scarcely scabrous, subentire; flowers sessile.

5. **H. Eichwaldi**, *Steud*; *DC. Prodr.* ix. 535; leaves obovate lower long-petioled softly closely hairy, spikes dense ebracteate, flowers 2-ranked, calyx deciduous with the fruit, nutlets glabrous minutely verrucose. *Bunge in Bull. Soc. Imp. Nat. Mosc.* 1869, 292; *Boiss. Fl. Orient.* iv. 131. *H. ellipticum*, *Ledeb.*; *Eichw. Itin. Casp.-Caucas.* 10, t. 4, not of *Salt*. *H. strictum*, *Ledeb. Fl. Ross.* iii. 100. *H. macrocarpum*, *Guss. Pl. Inarime*, 214, t. 7, fig. 2, and *g*,

h. *H. europæum*, *Aitchison Cat. Punjab*. 94; *Benth. Fl. Austral.* iv. 394; ?*Linn.*; *DC. l.c.* 534.

PUNJAB and SCINDE; in the plains, frequent. KASHMIR; Srinuggur, alt. 5,200 ft.—DISTRIB. W. and Central Asia. Australia.

Stems woody; branches from the base, 6–12 in., softly closely hairy. *Leaves* $\frac{1}{2}$ – $1\frac{1}{2}$ in., obtuse; nerves not prominent on the upper surface; petiole $\frac{1}{2}$ –1 in. *Spikes* 2 in. *Sepals* $\frac{1}{12}$ in., ovate-lanceolate, hairy. *Corolla-tube* $\frac{1}{8}$ in., narrow, cylindric, hairy without; segments small, round, crenulate. *Stigma* microscopically scabrous. *Nutlets* $\frac{1}{12}$ in.—Differs from *H. europæum*, Linn., in the more softly hairy leaves and spikes; as to the minute differences in the stigma (shown by *Gussone l.c.*) they do not apply satisfactorily to the Indian and Australian materials.

VAR. *lasiocarpum*; nuts hispid-silky sparingly rugose. *H. lasiocarpum*, *Fisch & Mey. Ind. Sem.* iv. 38; *Bunge in Bull. Soc. Imp. Nat. Mosc.* 1869, 292; *Boiss. Fl. Orient.* iv. 131.—N.W. India; ex *Boiss. l.c.*, but all the Indian examples seen suit *H. Eichwaldi* so far as the two differ.

6. **H. calcareum**, *Stocks in Hook. Kew Journ.* iv. 174; leaves obovate lower long-petioled softly closely hairy, spikes elongate ebracteate, flowers 1-ranked, calyx persistent after the setulose nutlets have fallen. *Bunge in Bull. Soc. Imp. Nat. Mosc.* 1869, 303; *Boiss. Fl. Orient.* iv. 128. *H. cinerascens*, *Aitchison Cat. Punjab*. 94, not of *Steud.*

SCINDE; *Stocks*.—DISTRIB. Beloochistan.

Stem and leaves nearly as of *H. Eichwaldi*, but indumentum more ash-coloured. *Spikes* often 6 in. *Sepals* $\frac{1}{10}$ in., lanceolate, hairy. *Corolla-tube* $\frac{1}{8}$ in., cylindric, hairy without; lobes small, round, crenate. *Stigma* conic elongate, minutely bifid at the apex. *Nutlets* $\frac{1}{10}$ in.

7. **H. ovalifolium**, *Forsk. Fl. Æg.-Arab.* 38; leaves elliptic or obovate softly closely hairy lower long-petioled, spikes elongate persistently bracteate. *Roth Nov. Sp.* 103; *Wall. Cat.* 2089. *H. coromandelianum*, *Retz. Obs.* ii. 9; *DC. Prodr.* ix. 541; *Wall. Cat.* 7016; *Wight Ic.* t. 1388; *Dalz. & Gibs. Bomb. Fl.* 171. *H. tomentosum* and *polystachyum*, *Poir. Dict. Suppl.* iii. 23; *DC. l.c.* 549. *H. gracile*, *Br. Prodr.* 493. *H. obovatum*, *Don Prodr.* 101; *DC. l.c.* 548. *H. Kunzei*, *Lehm.*; *DC. l.c.* 541; *Boiss. Fl. Orient.* iv. 130. *H. Syenites*, *Spreng. Syst.* i. 539. *H. Brocchianum*, *Vis. Pl. Æg.-Nub.* 8, t. 2, fig. 1. *H. niloticum*, *A. DC. Prodr.* ix. 541.

BENGAL, DECCAN PENINSULA and SCINDE; frequent.—DISTRIB. Tropical Africa and Australia.

Stems woody; branches 1 ft., ascending, softly hairy. *Leaves* $\frac{3}{4}$ by $\frac{1}{2}$ in., or in the western examples hardly half so large, obtuse with or without a mucro; nerves not prominent. *Spikes* 1–4 in., dense; bracts $\frac{1}{10}$ – $\frac{1}{8}$ in., ovate, acute. *Sepals* $\frac{1}{12}$ in., elliptic, acute. *Corolla-tube* $\frac{1}{10}$ in., cylindric; lobes minute, ovate, patent, subacute. *Stigma* minutely hairy. *Nutlets* $\frac{1}{18}$ in., densely setulose.

** *Leaves lanceolate, bristly, margins crisped-crenulate; flowers sessile, ebracteate.*

8. **H. undulatum**, *Vahl Symb.* i. 13; leaves obscurely petioled, spikes rigid branches short, nutlets small hispid. *Wall. Cat.* 916; *DC. Prodr.* ix. 536; *Boiss. Fl. Orient.* iv. 147. *H. persicum*, *Lamk. Dict.* iii. 94; *Burm. Fl. Ind.* 41, t. 19; *DC. l.c.* 537; *Boiss. Fl. Orient.* iv. 147. *H. crispum*, *Desf. Fl. Atlant.* i. 151, t. 41. *H. eriocarpum*, *Delile*; *Lehm. Asperifol.* 55 (*vide Boiss.*). *H. ramosissimum*, *Sieb.*; *DC. l.c.* 536. *H. affghanum*, *Boiss. Fl. Orient.* iv. 143. *Lithospermum hispidum*, *Forsk. Fl. Æg.-Arab.* 38.

PUNJAB, SCINDE, and UPPER GANGETIC PLAIN, alt. 0–1000 ft., frequent.—DISTRIB. W. Asia and N. Africa.

Suberect, 6–24 in., branched, harsh, scabrous. *Leaves* $\frac{1}{2}$ – $1\frac{1}{4}$ in., often rugose.

Sepals $\frac{1}{16}$ in., oblong, scabrous, rigid, persistent after the nutlets have fallen. *Corolla-tube* $\frac{1}{8}$ in., tubular, scabrous without; lobes very small, ovate. *Nutlets* 4, $\frac{1}{12}$ in., verrucose or bristly.—Boissier says that *H. affghanum* has the corolla hairy within, and thus differs from *H. undulatum*, but the type of *H. affghanum* (viz., Griffith, Kew Distrib. n. 5936) altogether agrees with *H. undulatum*.

VAR. suberosa; fruits depressed-globose $\frac{1}{2}$ in. diam. glabrous dividing into 2 two-seeded nutlets with corky cells on the back. *H. nubicum*, *Bunge in Bull. Soc. Imp. Nat. Mosc.* 1869, 330?—Scinde, *Stocks*. The seeds are as in *H. undulatum*. This was collected by Stocks as part of his n. 473, and is probably a variety of *H. undulatum* affected by an insect-punctures; but it is remarkable that Stocks' example has very numerous flowers and fruits, and that every ovary, without exception, appears to form a corky fruit.

*** *Leaves small or very narrow, subentire, scabrous hairy; flowers mostly bracteate, lower often pedicelled or with leaflike bracts.*

† *Stigma elongate conic.*

9. **H. Rottleri**, *Lehm. Asperifol.* 66; woody, leaves small oblong, racemes long with distant flowers, fruit depressed distinctly 4-lobed completely covered by short grey adpressed hairs with a depressed hollow at the apex whence springs the style. *DC. Prodr.* ix. 549; *Wight Ic. t.* 1392; *Dalz. & Gibs. Bomb. Fl.* 171.

DECCAN PENINSULA; Coimbatore, alt. 1000 ft., *Wight, &c.*

Very harsh, with stiff curved branches. *Leaves* $\frac{1}{2}$ by $\frac{1}{8}$ in., sessile, scattered, margins recurved when dry. *Racemes* 2-4 in., stiff, curved; pedicels solitary, each opposite a bract. *Sepals* $\frac{1}{12}$ in., ovate, acute, similar to the bracts. *Stigma* ovate, shortly acute. *Fruit* $\frac{1}{16}$ in. long by $\frac{1}{12}$ broad.

10. **H. paniculatum**, *Br. Prodr.* 494, not of *Roxb.*; erect, subvirgate, leaves linear, racemes filiform elongate, fruit depressed subdivaricately 4-lobed glabrous or with few scattered minute hairs. *DC. Prodr.* ix. 547; *Benth. Fl. Austral.* iv. 399. *H. glabellum*, *Br. l. c.* 494; *DC. l. c.* 548. *H. linifolium*, *Lehm. Asperifol.* 35; *DC. l. c.* 547; *Wight Ic. t.* 1391. *H. tenue*, *Wall. Cat.* 915; *DC. l. c.* 548, not of *Roem. & Sch.* *H. zeylanicum*, *Heyne in Herb. Rottl.*; *DC.* (under *H. glabellum*) *l. c.* 548. *Cynoglossum zeylanicum*, *Wight in Wall. Cat.* 7018, not *Heliotropium zeylanicum*, *Wall.*

S. DECCAN and CEYLON, *Rottler, Wight. PEOU, Wallich.*—DISTRIB. Siam, Australia.

Branches erect, twiggy. *Leaves* 1 by $\frac{1}{10}$ in. *Racemes* 2-6 in.; pedicels subopposite a small linear bract or often extra-axillary. *Sepals* $\frac{1}{4}$ in., ovate, acute. *Stigma* conical-linear. *Fruit* $\frac{1}{20}$ by $\frac{1}{12}$ in.—*Wight* called a rather stouter form, with leaves $\frac{1}{2}$ in. wide and larger flowers, *H. tenue*, the ordinary form *H. linifolium*; but the difference is slight.

11. **H. strigosum**, *Willd. Sp. Pl.* i. 743; ramous, leaves small linear-lanceolate, spikes mostly elongate, upper flowers sessile not conspicuously bracteate, fruit ovoid not or obscurely 4-lobed with minute grey hairs. *DC. Prodr.* ix. 546; *Boiss. Fl. Orient.* iv. 143.

Throughout INDIA; very common.—DISTRIB. W. Asia, Malaya, Australia.

Usually procumbent, intricately branched. *Leaves* $\frac{2}{3}$ by $\frac{1}{10}$ in. Lower flowers of the spike often pedicelled, with larger bracts. *Sepals* $\frac{1}{12}$ in., ovate-lanceolate. *Stigma* ovate, linear. *Fruit* $\frac{1}{16}$ — $\frac{1}{12}$ in. long and broad, depressed conical at the apex.

VAR. brevifolia; leaves $\frac{1}{4}$ by $\frac{1}{10}$ in. narrowly lanceolate. *H. brevifolium*, *Wall. Cat.* 914, and in *Roxb. Fl. Ind. ed Carey & Wall.* ii. 2; *DC. l. c.* 546. *H. compactum*, *Don Prodr.* 101.—Throughout India, even more abundant than *H. strigosum* type.

12. **H. bracteatum**, *DC. Prodr.* 493; suberect, leaves lanceolate, spikes shortened, flowers crowded among prominent bracts, fruit distinctly 4-lobed

glabrous chestnut-brown below scabrous or minutely hairy near the apex. *DC. Prodr.* ix. 547; *Benth. Fl. Austral.* iv. 397. *H. foliatum*, *Br. l.c.* 493; *DC. l.c.* 548. *H. ramosum*, *Roxb.*; *Wall. Cat.* 7015. *H. cyrtostachyum*, *Miq. Fl. Ind. Bat.* ii. 924.

S. DECCAN PENINSULA AND CEYLON.—DISTRIB. Java, Australia.

Stems 4-8 in., strict or with ascending branches. *Leaves* $\frac{3}{4}$ by $\frac{1}{8}$ - $\frac{1}{6}$ in., not very acute. *Sepals* $\frac{1}{2}$ in., lanceolate, smaller than many of the bracts.

VAR. laxiflora; spikes elongate or (in *H. zeylanicum*, *Wall.*) filiform. *H. laxiflorum*, *DC. l.c.* 548; *Dalz. & Gibs. Bomb. Fl.* 171. *H. zeylanicum*, *Wall. Cat.* 2091, not of *Lamk.*—S. Deccan Peninsula and Ceylon, *Heyne, Wight*.

13. *H. marifolium*, *Retz. Obs.* ii. 8; leaves lanceolate acute scabrous cauline often large, spikes 1-2 in. dichotomous rigid dense curved conspicuously bracteate, fruit 4-lobed chestnut-brown below shortly bristly.

DECCAN PENINSULA; from Chota Nagpore and Rajpootana to Cape Comorin.

Stems rigid, divaricately ramous, not intricate. *Cauline leaves* $1\frac{1}{2}$ by $\frac{1}{4}$ in., harsh. *Flowers and fruits* rather larger than those of *H. bracteatum* from which it is perhaps not distinct.

VAR. Wallichii; stems decumbent intricately ramous, leaves smaller less harsh, spikes elongate, flowers and fruits nearly of *H. bracteatum*. *H. marifolium*, *Wall. Cat.* 2092; *DC. Prodr.* ix. 547; *Wight Ic. t.* 1390; *Dalz. & Gibs. Bomb. Fl.* 171. *Cynoglossum marifolium*, *Roxb. Fl. Ind. i.* 457. *Bothriospermum?* *marifolium*, *A. DC. Prodr.* x. 116.—Throughout India. Distinguished from *H. strigosum* by its broader leaves and 4-lobed fruit. Except in its very ramous habit this does not differ from *H. bracteatum*, var. *laxiflora*. Anthers ovate with linear twisted tips (as in allied species) described by Roxburgh as "scales" between the corolla-lobes which error has misled A. DC.

14. *H. scabrum*, *Retz. Obs.* ii. 8; procumbent, densely, leafy, leaves lanceolate acute, flowers subcapitate among leaflike bracts, fruit 4-lobed chestnut glabrous or minutely hairy near the apex. *Wall. Cat.* 7017; *Wight Ic. t.* 1389.

DECCAN PENINSULA AND CEYLON; frequent.

Forming dense tufts with fasciated leaves. Probably not specifically distinct from *H. marifolium*.

†† *Stigma subcapitate*.

15. *H. rariflorum*, *Stocks in Hook. Kew Journ.* iv. 174; erect, branched, leaves linear, spikes elongate bracteate, fruit 4-lobed bristly. *Boiss. Fl. Orient.* iv. 144. *Lithospermum leucophlæum*, *Schweinf. Herb. Afr. Centr.* n. 696.

SCINDE; Kurrachee, *Stocks*. PUNJAB; Jhelum, *Aitchison*.—DISTRIB. Cabul, Beloochistan, Nubia, Socotra.

Branches 6-12 in. *Leaves* 1 by $\frac{1}{8}$ in. *Spikes* 1-3 in.; flowers all sessile; bracts scattered, leaflike. *Stigma* a very depressed cone. Hairs on the fruit adpressed or thickly bristly.

SECT. VI. *Heliophytum*. Fruit mitriform, subacutely 4-pointed.

16. *H. indicum*, *Linn.*; *Roxb. Fl. Ind. i.* 454; herbaceous, leaves petioled ovate subserrate, spikes elongate dense ebracteate, fruit separating into two 2-seeded 2-pointed pyrenes. *Bot. Mag. t.* 1837. *H. anisophyllum*, *Beauv. Fl. Ow. et Ben.* ii. 62, t. 96. *Tiaridium indicum*, *Lehm. Asperifol.* 14; *Wall. Cat.* 913; *Wight Ill. t.* 171; *Chamisso in Linnæa*, 1829, 452, t. 5, fig. 2; *Dalz. & Gibs. Bomb. Fl.* 172. *T. anisophyllum*, *G. Don Gen. Syst.* iv. 364. *Heliophytum indicum*, *DC. Prodr.* ix. 556; *Fresen. in Mart. Fl. Bras. fasc.* 22, 48, t. 10, fig. 4. *H. velutinum*, *DC. l.c.* 557.

Throughout INDIA; very common in the moister parts.—DISTRIB. Malaya, E. Asia, Tropical Africa and America.

Annual, hirsute. *Stems* 6–18 in. *Leaves* alternate or subopposite, 1–4 in., more or less woolly. *Spikes* 1–8 in., mostly leaf-opposed. *Sepals* $\frac{1}{16}$ – $\frac{1}{12}$ in., linear. *Corolla-tube* $\frac{1}{2}$ in., narrow-cylindric; lobes small, round, crenate. *Stigma* conoid-linear. *Fruit* $\frac{1}{2}$ in., ovoid, ribbed, soon separating into 2 mitrelike pyrenes; each pyrene with 2 cavities in addition to the seed-bearing cells.

DOUBTFUL SPECIES.

H. ROXBURGHII, *Spreng. Syst. curæ post.* 54; erect, ramous, hairy, leaves petioled ovate-oblong, spikes terminal paniced secund, tube of the corolla long and gibbous. *DC. Prodr.* ix. 549. H. paniculatum, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 2, not of R. Br.—CHITTAGONG, *Roxburgh*. Known only from Roxburgh's description. Possibly, as Roxburgh did not live to publish his own mss., this was his first description of *Tournefortia Roxburghii* (afterwards described fully under *Lithospermum*), which he may have preserved for reference. This explanation applies certainly to some duplicate species in Roxburgh's posthumous work. It can hardly be *H. æylanicum*, *Lamk.* (as Rottler supposed) because that species is not known in Chittagong.

7. **TRICHODESMA**, Br.

Coarse, hispid herbs. *Leaves* opposite, upper alternate, entire. *Pedicels* axillary, 1-flowered, going off into terminal racemes by the gradual reduction of the floral leaves. *Calyx* deeply 5-merous; lobes triangular-lanceolate, in fruit enlarged. *Corolla-tube* campanulate-cylindric, throat without scales; lobes 5, twisted to the left, a gland or depression near the base of each. *Stamens* 5, filaments short; anthers elongate, lanceolate, connivent in a cone; connectives more or less hairy on the back, tips excurrent at length twisted. *Ovary* 4-celled; style terminal filiform, stigma small. *Fruit* ellipsoid, sub-4-ridged; nutlets ovoid-oblong, smooth, shining on the back, scabrous, slightly or strongly margined on the inner face, closely adnate by their whole inner face to the carpophore below the style, finally separating.—Species 10; in tropical and warm-temperate Africa, Asia, and Australia.

* *Calyx-lobes* in fruit cordate or hastate at the base.

1. **T. indicum**, Br. *Prodr.* 496; bristly with hairs springing from tubercles and also more or less villous, leaves mostly sessile lanceolate or cordate-lanceolate, calyx-lobes (at least in fruit) cordate or hastate at the base, staminal cone densely closely woolly on the back. *Wall. Cat.* 932; *Wight Ill.* t. 172; *DC. Prodr.* x. 172; *Dalz. & Gibs. Bomb. Fl.* 173; *Boiss. Fl. Orient.* iv. 280. *T. perfoliatum*, *Wall. Cat.* 934. *T. hirsutum*, *Edgew. Pl. Banda*, 51. *Borago indica*, *Linn.*; *Roxb. Fl. Ind.* i. 458. ? *B. spinulosa*, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 11; *DC. Prodr.* x. 35.

Throughout INDIA; common; not in Bengal Plain.—DISTRIB. Cabul, Beloochistan, Persia, Mauritius.

Erect or diffuse. *Leaves* 1–4 in., tuberculate on the upper surface. Lower *pedicels* often distinctly axillary, 1-flowered. *Calyx-lobes* $\frac{1}{2}$ – $\frac{1}{2}$ in., more or less grey- or white-villous. *Corolla-tube* $\frac{1}{2}$ in.; lobes $\frac{1}{2}$ in., ovate, suddenly acuminate. *Nutlets* $\frac{1}{2}$ in., sometimes very rough on the inner face, obscurely margined.—Edgeworth notes that *Borago spinulosa* is *Trichodesma indicum*, probably correctly; no one appears to have seen a specimen or to know what else it can be.

VAR. *subsessilis*; leaves subelliptic narrowed downwards many very shortly petioled. *T. subsessilis*, *Wall. Cat.* 933.—British Burma; Prome, *Wallich*; Pegu, *Kurz*.

2. **T. amplexicaule**, *Roth Nov. Sp.* 104; bristly with hairs springing from tubercles, hardly at all villous, leaves sessile cordate-oblong beneath strigose

on the nerves otherwise glabrous, flowers and fruit nearly as of *T. indicum*. *DC. Prodr.* x. 172; *Dalz. & Gibs. Bomb. Fl.* 173. *T. inaequale*, *Edgew. Pl. Banda*, 51.

Throughout W. INDIA; from Scinde, Rajpootana, and Central India to Malabar; frequent.

Probably a mere form of *T. indicum*. *Corolla-lobes* ovate, suddenly acute, twisted to the left in the bud. *Anthers* exsert, tips of the connective finally twisted.

3. ***T. africanum***, *Br. Prodr.* 496; bristly with hairs springing from tubercles, leaves ovate-oblong lower long-petioled, calyx-lobes in fruit cordate at the base, staminal cone laxly hairy on the back. *DC. Prodr.* x. 173; *Boiss. Fl. Orient.* iv. 280. *Borago africana*, *Linn. Sp. Pl.* 197. *B. verrucosa*, *Forsk. Fl. Æg-Arab.* 41.

PUNJAB and SCINDE; *Aitchison, Stocks, &c.*—DISTRIB. Cabul, Persia, Arabia, Tropical Africa to Senegal.

Stem and leaves as of *T. indicum*, but more harshly hispid. *Racemes* mostly lateral, often bipartite and subbracteate. *Calyx-lobes* $\frac{1}{4}$ in., in fruit $\frac{1}{2}$ – $\frac{3}{4}$ in. *Corolla tube* $\frac{1}{2}$ in.; lobes $\frac{1}{4}$ in., ovate, acute. *Nutlets* $\frac{1}{8}$ in.; margin prominent, glochidiate.

** *Calyx-lobes in fruit ovate or rounded at the base.*

4. ***T. zeylanicum***, *Br. Prodr.* 496; leaves oblong obtuse or acute at the base hairy beneath, racemes lateral and terminal, nutlets $\frac{1}{2}$ in. ovoid-oblong obscurely margined. *Wall. Cat.* 935; *DC. Prodr.* x. 172; *Bot. Mag.* t. 4820; *Benth. Fl. Austral.* iv. 404. *Borago zeylanica*, *Linn. Mant.* 202; *Jacq. Ic. Pl. Rar.* ii. t. 314; *Burm. Fl. Ind.* 41, t. 14, fig. 2. *Leiocarya Kotschyana*, *Hochst. in Flora*, 1844, 30.

DECCAN PENINSULA and CEYLON: common.—DISTRIB. Malaya, Australia, Mascarene Islands.

Habit of *T. indicum*. *Leaves* sessile or subpetiolate, bristly with hairs springing from tubercles on the upper surface. *Racemes* usually denser, more softly villous than in *T. indicum*. *Flowers* and fruit about the same size as in *T. indicum*.

5. ***T. khasianum***, *Clarke*; very large, leaves elliptic narrowed at both ends or petioled sparsely hairy beneath, racemes forming large terminal corymbs, nutlets $\frac{1}{4}$ in. widely margined.

KHASIA; *Griffith* (*Kew Distrib.* n. 5989), &c.

Apparently a stout, sparingly setose, shrub. *Leaves* 7 by $2\frac{1}{2}$ in., mostly opposite, petioled, scabrous tuberculate above, rugose subglabrate beneath. *Corymbs* with 50–100 flowers, nearly ebracteate. *Calyx-lobes* in the bud $\frac{2}{3}$ by $\frac{1}{2}$ in., rusty-pubescent, in fruit 1 by $\frac{2}{3}$ in., papery. *Corolla-tube* $\frac{1}{2}$ in.; lobes $\frac{1}{2}$ in., lanceolate-linear. *Anther-cone* nearly $\frac{1}{2}$ in., patently white-hairy.—Remote in habit from the other Indian species; a still larger species has lately been discovered by Dr. Balfour in Socotra.

8. **ACTINOCARYA**, *Benth.*

A slender, diffuse herb, sparsely strigose or nearly glabrous. *Leaves* alternate, obovate-oblong, entire. *Flowers* minute, solitary on axillary pedicels. *Calyx* deeply 5-lobed, hardly enlarged in fruit. *Corolla-tube* short; scales in the throat 5, very small; lobes 5, obtuse, spreading, imbricate in the bud. *Stamens* 5, filaments short; anthers small, ovate, obtuse. *Ovary* deeply 4-lobed; style short, from the base of the lobes, stigma small. *Nutlets* 4, obovoid-oblong, divaricate, with small spines on all sides, attached to the small carpophore only at their minute lower ends.

A. tibetica; *Benth. in Gen. Pl.* ii. 846.

WESTERN TIBET; Nubra, alt. 13,000 ft.; near Karsar village, *Thomson*.

Stems 4-14 in., prostrate, branched. *Leaves* $\frac{3}{4}$ by $\frac{1}{2}$ in., subobtusely. *Pedicels* $\frac{1}{4}$ - $\frac{1}{2}$ in. *Sepals* $\frac{1}{16}$ in., narrowly oblong. *Corolla-tube* scarcely longer than the sepals; lobes $\frac{1}{30}$ in. *Nutlets* $\frac{1}{16}$ in.

9. **OMPHALODES**, *Moench*.

Weak, decumbent herbs, strigose or subglabrous. Radical *leaves* long-petioled, lanceolate or ovate; cauline few, alternate. *Pedicels* in lax racemes, slender, lower subaxillary solitary from leaf-like bracts. *Flowers* white or blue. *Sepals* 5, spreading, little enlarged in fruit. *Corolla* rotate, throat almost closed by obtuse scales; lobes 5, round, spreading, imbricate in the bud. *Stamens* 5, included; anthers small, obtuse. *Ovary* deeply 4-lobed; style filiform, from the base of the lobes, stigma small or subcapitate. *Nutlets* 4, depressed, forming a pyramid, attached to the small carpophore by their inner faces, their margins broad thin, entire or serrate, reflexed over the back of the nuts so as to form on each a small nearly closed cell opening outwards by a small hole; nuts smooth on the back.—Species 10; from the Mediterranean basin to Central Asia and Japan.

O. Thomsoni, *Clarke*; leaves elliptic or oblong subobtusely strigose on both surfaces, racemes lax subterminal, revolute margins of the nutlets nearly entire. *Omphalodes*, sp. 8, *Herb. Ind. Or. H. f. & T*.

WESTERN TIBET: Nubra, alt. 13,000 ft., *Thomson*.

Rootstock perennial; annual branches 6-10 in., very numerous, slender, strigose. Radical *leaves* 1 by $\frac{1}{4}$ in., spatulate; petiole $\frac{1}{4}$ - $1\frac{1}{2}$ in.; cauline $\frac{3}{4}$ by $\frac{1}{2}$ in., sessile. *Pedicels* $\frac{1}{4}$ - $\frac{3}{4}$ in., recurved in fruit. *Sepals* $\frac{1}{10}$ in., oblong, reflexed in fruit. *Fruit* $\frac{1}{5}$ in. long and broad, exactly pyramidal; nutlets somewhat saccate at base, appearing inflated by the reflexed loose membranous margin.

10. **CYNOGLOSSUM**, *Linn.*

Biennial or perennial herbs, erect, hairy. *Leaves* alternate, radical petioled. *Racemes* elongate, ebracteate; flowers ultimately distant, sessile or lower shortly pedicelled, blueish or purple. *Calyx* deeply 5-lobed, in fruit spreading not (or slightly) enlarged. *Corolla-tube* short, with 5 obtuse or emarginate scales in the throat; lobes 5, obtuse, imbricate in the bud. *Stamens* 5, included beneath the scales; anthers small, ovate, their tips hardly above the mouth of the corolla-tube. *Ovary-lobes* 4; style short or longish from the base of the lobes, stigma small. *Nutlets* 4, forming a much depressed pyramid, apices hardly produced above the hilum, bases rounded produced downwards, outer faces convex or flattened, with or without a margin, glochidiate; carpophore (after the nuts have fallen) linear, shortly conic at the base (elongate-conic in *C. Ritchiei* and sometimes in *C. denticulatum*, var. *zeylanica*).—Species 60; in subtropical and temperate, especially mountain regions.

* *Flowers* very small; style neither in flower nor in fruit exceeding $\frac{1}{2}$ in.

1. **C. furcatum**, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 6, and *Cat.* 919; depressed-strigose, upper cauline leaves oblong sessile entire softly hairy, racemes furcate branches long fulvous towards the tips, lower flowers distinctly pedicelled, outer faces of the nutlets ovate distinctly margined by the confluence of the bases of the marginal glochidia. *Don Prodr.* 100; *DC. Prodr.* x. 149; *Maxim. in Bull. Acad. Petersb.* xvii. 554. *C. ovatum*, *Moon Cat.* 12.

Throughout INDIA and CEYLON; in the mountains, alt. 4-9000 ft., very common; no examples from the Malay Peninsula.—DISTRIB. Cabul.

Erect, 1-3 ft., no patent or lax hairs on the stem. Radical leaves larger, long-petioled, persistent at the time of flowering; cauline 4 by 1 in., acute, frequently subdecurent, glabrous or very minutely but scarcely scabrous on the upper surface, nerves beneath often prominent. Lower pedicels often $\frac{1}{10}$ - $\frac{1}{4}$ in. Calyx-lobes ovate, in fruit often $\frac{1}{2}$ in. broadly oblong. Outer face of the nutlets $\frac{1}{2}$ in., with no distinct medial line, with scattered glochidia often not much shorter than the marginal; carpophore linear, hardly conical at the base.—Generally distinguished correctly from the other closely allied species of this subsection by its almost silky indumentum and tawny young racemes. *C. ovatum*, Moon, is a form common in the Nilgherries with shorter, ovate, thicker, more softly hairy leaves.

VAR. *lanceolata*; leaves thinner margin obscurely crenulate upper surface subscabrous with longer hairs rising from a more tuberculate base. *C. lanceolata*, Heyne; Wall. Cat. 921. *C. Heynei*, G. Don Gen. Syst. iv. 354; DC. Prodr. x. 150.—Nilgherries, Anamallays, and Mts. of Ceylon, frequent.—Stem with subpatent hairs; cauline leaves narrowed at the base, sometimes obscurely petioled, margin minutely scabrous, in these respects approaching *C. micranthum*, but the fruit is altogether as of *C. furcatum*.

2. ***C. micranthum***, Desf. Cat. Hort. Par. 1804, 220, *vide* A. DC. Prodr. x. 149; patently hairy, upper cauline leaves lanceolate acute at both ends crenulate, racemes divaricately forked lower flowers subsessile, calyx-lobes minute ovate obtuse, outer faces of the small nutlets shortly ovate not (or most obscurely) margined glochidiate on all sides. Maxim. in Bull. Acad. Petersb. xvii. 555. *C. canescens*, Willd. Enum. Hort. Berol. 180; Benth. in Royle Ill. 306; Wall. Cat. 918, partly. *C. vesiculosum*, Wall. Cat. 920, partly.

NORTHERN INDIA and the HIMALAYA, alt. 1-8000 ft., from Kashmir to Bhotan and Pegu, common.

Stem 1-4 feet, erect, hirsute. Radical leaves none at the time of flowering; upper cauline 3 by $\frac{1}{2}$ in., uppermost often very narrow, margin ciliate sometimes subdentate, upper surface scabrous with hairs from tuberculate bases. Racemes rigid, often imbricate; flowers very small, sessile in the typical form (lower pedicelled in Wallich's examples). Calyx-lobes $\frac{1}{4}$ in. in fruit, obtuse from the first. Corolla very small, white, the scales in the throat blue-black. Nutlets $\frac{1}{10}$ in., ovoid, in the typical form, sometimes rather larger; carpophore cylindric-linear; style often twice as long as the nutlets.

3. ***C. lanceolatum***, Forsk. Fl. Æg. 41, not of Heyne; hispid, leaves broadly lanceolate strongly nerved beneath, racemes often long with all the flowers pedicelled, nutlets $\frac{1}{2}$ in. diam. shortly ovate not (or most obscurely) margined glochidiate on all sides. DC. Prodr. x. 155. *C. racemosum*, Roxb. Hort. Beng. 13, and Fl. Ind. ed. Carey & Wall. ii. 6. *C. hirsutum*, Jacq. Hort. Schoenb. iv. t. 489, not of Thunb. *C. micranthum*, Dalz. & Gibs. Bomb. Fl. 172.

BENGAL PLAIN, to the sea, common; extending throughout the GANGETIC PLAIN to LAHORE. BOMBAY; Law.—DISTRIB. Arabia.

Raceme-branches in fruit often 6-10 in.; pedicels often $\frac{1}{4}$ in.; calyx-lobes in fruit $\frac{1}{2}$ in., obtuse.—Roxburgh's *C. racemosum* has been united by all authorities with *C. micranthum*, Desf.; the nutlets are larger, the habit coarser; whether species or variety, it is identical with *C. lanceolatum*, Forsk.

4. ***C. glochidiatum***, Wall. Cat. 922; stem hispid with hairs springing from tubercles, cauline leaves lanceolate base attenuate or petioled ciliate or denticulate, lower flowers of the elongate racemes shortly pedicelled, calyx-lobes ovate obtuse sometimes oblong in fruit, outer faces of the nutlets ovate margined glochidiate on all sides. DC. Prodr. x. 150, as to description only. *C. stellulatum*, Wall. Cat. 921. *C. micranthum*, Var. *H. f.* & *T. in Herb.*

KHASIA Mts. and adjacent parts of ASSAM, alt. 2-6000 ft., frequent; Wallich, Griffith, H. f. & T. &c.—DISTRIB. Ava.

Erect, 1-2 feet, branches ascending. Leaves 2 by $\frac{1}{2}$ in., thin, sparsely hispid on both surfaces with hairs often rising from tubercles; radical leaves 0 at the time of flowering. Calyx-lobes $\frac{1}{12}$ in. in fruit. Nutlets $\frac{1}{10}$ in., margined by the confluent bases of the glochidia, but not prominently, glochidia on the faces plentiful and not much shorter; carpophore sublinear.—H. f. & T. appear justified in regarding this plant as allied to *C. micranthum*, rather than to *C. denticulatum*. Both Benth. and DC. say that Wallich's *C. glochidiatum* came from Nepal; but Wallich says he got it at Punduah, i.e. Khasia, where all other collectors get it.

5. *C. denticulatum*, A. DC. Prodr. x. 150; stem softly hairy or strigose, leaves ovate- or oblong-lanceolate some cauline petioled ciliate or denticulate, calyx-lobes ovate, outer faces of the nutlets shortly ovate prominently margined glochidiate sparingly on the faces. G. Don. Gen. Syst. iv. 354. *C. glochidiatum*, Benth. in Royle Ill. 306; Lindl. in Bot. Reg. 1841, t. 15. *C. canescens*, Wall. Cat. 918, partly. *C. vesiculosum*, Wall. Cat. 920, partly.

TROPICAL and TEMPERATE HIMALAYA, alt. 1-9000 ft., from Kashmir to Sikkim; very common. CENTRAL INDIA from Chota Nagpore to Bombay; very common.—DISTRIB. Cabul, Malaya.

Resembling *C. glochidiatum*. Leaves usually closely clothed on the upper surface with hairs rising from tubercles. Carpophore sublinear.—The Central Indian examples have rather larger nutlets than the Himalayan *C. denticulatum*, and are intermediate between that and the Var. *zeylanica*.

VAR. *zeylanica*; nutlets larger their faces sometimes $\frac{1}{2}$ in. diam. very strongly margined, base of the carpophore sometimes elongate conic so that the nutlets are attached obliquely. *C. zeylanicum*, Thunb. *C. glochidiatum*, Dalz. & Gibs. Bomb. Fl. 172. *Echinosperrum zeylanicum*, Lehm. Asperifol. 116; Roem. & Sch. Syst. iv. 780; DC. Prodr. x. 142.—W. Deccan Peninsula, from the Concan southwards in the tropical region. Ceylon (fide Lehmann).

6. *C. Wallichii*, G. Don Gen. Syst. iv. 354; stem hirsute erect, cauline leaves lanceolate to ovate base narrowed or petioled ciliate or denticulate, calyx-lobes oblong in fruit sometimes elongate narrow, nutlets shortly ovate strongly margined glochidiate sparingly on the faces. DC. Prodr. x. 150. *C. calycinum*, Wall. Cat. 923, not of Meyer. *C. vesiculosum*, Wall. Cat. 920, partly. *C. microcarpum*, A. Kerner Nov. Pl. Sp. ii. 13.—Cynoglossum sp. n. 6, Herb. Ind. Or. H. f. & T.

W. TEMPERATE HIMALAYA, alt. 4-11,000 ft., from Kashmir to Kumaon, very common.

Differs from *C. denticulatum* in the narrower calyx-lobes more elongate in fruit; these are ovate-oblong in typical *C. calycinum*, linear-oblong in *C. microcarpum*, A. Kerner; and there is every state between.—Very abundant westward about Dalhousie, when *C. denticulatum* becomes rare; but the two species are very difficult to distinguish, and may not be distinct.

VAR. *alpina*; more hirsute, stems prostrate or decumbent, leaves mostly small more scabrous tuberculate hairy. Cynoglossum sp. n. 7, Herb. Ind. Or. H. f. & T. ? *C. membranaceum*, A. DC. Prodr. x. 150.—W. Subalpine Himalaya; Edgeworth, &c. Lower cauline leaves 1 in., long-petioled, but most of the leaves $\frac{1}{2}$ – $\frac{3}{4}$ in., sessile. No authentic example of *C. membranaceum* seen.

7. *C. ? Ritchiei*, Clarke; cauline leaves lanceolate narrowed at the base, calyx-teeth in fruit elongate oblong, outer faces of the nutlets ovate marginate strongly glochidiate, carpophore $\frac{1}{2}$ in. elongate-conic at base so that the nuts are attached obliquely.

BOMBAY; Belgaum, Ritchie.

This closely resembles *C. denticulatum*, var. *zeylanica*, and may be a form of it.

but the carpophore is much dilated at the base; the calyx-segments in fruit $\frac{1}{8}$ by $\frac{1}{20}$ in. This plant is a species of *Paracaryum* according to the "Genera Plantarum," but it cannot well be removed far from *C. denticulatum*, Var. *zeylanica*.

** Flowers larger $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., style $\frac{1}{8}$ – $\frac{1}{4}$ in.

8. **C. microglochis**, *Benth. in Royle Ill.* 305; cauline leaves numerous subsessile ovate or elliptic acute densely softly hairy beneath, calyx-lobes in fruit $\frac{1}{4}$ in., outer faces of the nutlets $\frac{1}{5}$ in. ovate margined coarsely not densely glochidiate. *DC. Prodr.* x. 151.

TEMPERATE W. HIMALAYA, alt. 7–11,000 ft., from Kashmir to Kumaon frequent; *Royle, Strachey, & Winterbottom, &c.*

Erect $1\frac{1}{2}$ –3 feet, hairy. Leaves 4 by 2 in., in Royle's type, often narrower, entire, lower attenuated at the base. Racemes dense, in fruit 1–4 in.; pedicels short, lower in fruit $\frac{1}{4}$ in. Calyx-lobes in flower $\frac{1}{8}$ by $\frac{1}{10}$ in., elliptic, obtuse, villous. Corolla-tube shorter than the calyx-lobes, segments $\frac{1}{8}$ in. Anther-cells oblong, divaricate at the base, tips shortly emergent above the corolla-throat, covered by the depressed cone of scales. Nutlets with very stout glochidia; carpophore conic, style $\frac{1}{4}$ in.

9. **C. nervosum**, *Benth. ms.*; cauline leaves numerous subsessile elliptic or oblong acute sparsely hirsute on both surfaces, calyx-lobes in fruit $\frac{1}{4}$ in., outer faces of the nutlets $\frac{1}{5}$ in. ovate margined densely glochidiate. *Omphalodes nervosa*, *Edgew. ms.*

WESTERN HIMALAYA; Kulu, Jalauri Pass, *Edgeworth*; Pangee, alt. 12,000 ft., *Dr. Watt.*

Generally resembling *C. microglochis*, but with laxer racemes, larger flowers, and different indumentum. Cauline leaves 4 by $1\frac{1}{4}$ in., hairs on the upper surface from tubercles, on the lower lax; nerves not prominent. Racemes 1–6 in., lax; lower pedicels $\frac{1}{4}$ – $\frac{1}{3}$ in. Corolla $\frac{2}{3}$ in. diam., widely campanulate, tube very short. Nutlets not fully ripe, much more closely glochidiate than in *C. microglochis*; carpophore shortly conical at the base, style $\frac{1}{4}$ in.

10. **C. petiolatum**, *A. DC. Prodr.* x. 149; cauline leaves few ovate acute minutely softly hairy beneath, calyx-lobes in fruit $\frac{1}{8}$ in., outer faces of the nutlets $\frac{1}{6}$ in. ovate margined sparsely glochidiate. *Anchusa petiolata*, *Hook. Bot. Mag.* t. 3858.

ALPINE WESTERN HIMALAYA; Zanskar, near Umasi Pass, *T. Thomson.*

Erect, 2–3 feet, hairy. Lower leaves oblong, long-petioled; petiole of the radical leaves 5 in. Racemes straggling, branched, 4–8 in. in fruit; pedicels very short, lower scarcely $\frac{1}{4}$ in. Calyx-lobes in flower $\frac{1}{8}$ in., elliptic, obtuse, hairy. Corolla $\frac{1}{2}$ in. diam., tube hardly longer than the calyx. Nutlets as of *Cynoglossum*, faces but little glochidiate except on the margins.—Flowers intermediate in size between those of the two last species and those of *C. furcatum*, &c. No authentic example of *C. petiolatum* has been seen; and Thomson's examples are referred to that species, only because *Bot. Mag.* t. 3858, closely resembles them; the leaves in Thomson's plant here described are hairy on both surfaces, in the picture they appear glabrous, ciliate on the margin only.

DOUBTFUL SPECIES.

C. **EDGEWORTHII**, *A. DC. Prodr.* x. 150; stem erect hispid below, leaves ovate-oblong narrowed at both ends adpressedly hairy, calyx-lobes ovate obtuse short, nutlets ovate glochidiate on all sides.

HIMALAYA; alt. 4–6000 ft., *Edgeworth.*

Differs from *C. micranthum* by the flowers twice as large, the corolla longer towards (? in proportion to) the calyx, the leaves seldom subdenticulate.

11. LINDELOFIA, Lehm.

An erect, perennial, hairy herb. Radical leaves petiolate; cauline alternate, from ovate to linear-lanceolate. Racemes dense, elongate, ebracteate. Flowers blue, purple, or nearly black. Sepals in fruit somewhat enlarged, spreading. Corolla-tube cylindric, longer than the calyx, crowned with scales in the throat forming a cone; lobes obtuse, round, spreading, horizontally imbricated in bud. Stamens 5; anthers large, linear-oblong, exserted, but scarcely overtopping the scales. Ovary 4-lobed; style from near the base of the lobes, long, stigma small. Nutlets 4, depressed, rounded at the base, apices hardly produced, glochidiate; carpophore short.

L. spectabilis, Lehm. in *Linnæa*, xxiv. 216; hairy, cauline leaves sessile oblong, corolla-tube 1-3 times as long as the calyx, faces of the nutlets glochidiate on the margin chiefly. *Cynoglossum longiflorum*, Benth. in *Royle Ill.* 305; *Bot. Reg.* 26, t. 50. *C. grandiflorum*, Benth. in *Royle Ill.* 305; *DC. Prodr.* x. 156. *Omphalodes longiflora*, A. DC. *Prodr.* x. 158. *Anchusopsis longiflora*, Bisch. in *Linnæa*, xxxvi. 736.

ALPINE WESTERN HIMALAYA; alt. 10-12,000 ft., from Gurwhal to Kashmir, *Royle*, *Madden*, *Falconer*, &c.

Stem 1-2 ft., patently, sometimes densely hairy. Radical leaves long-petioled, 2-4 in., lanceolate; lower cauline petioled, upper subcordate, amplexicaul, 3 in., hirsute more or less on both surfaces. Racemes dense, even in fruit, or elongate lax. Calyx-lobes in flower $\frac{1}{3}$ in., subacute, in the type example, sometimes obtuse, variable in length, sparingly pilose or woolly. Corolla intense blue, tube $\frac{1}{4}$ in., lobes $\frac{1}{2}$ in. in the type example, excessively variable in size. Outer faces of the nutlets $\frac{1}{8}$ - $\frac{1}{5}$ in., ovate, marginal glochidia connate at the base, the obscure medial line sparingly glochidiate, the rest of the surface nearly smooth; in a word, as of *Cynoglossum*; carpophore sublinear.—Hardly any two examples agree in the size and shape of the corolla and calyx or in their relative sizes.

VAR. *Falconeri*; stems strict, leaves linear-lanceolate, calyx-lobes $\frac{1}{2}$ in. narrowly oblong, corolla-tube $\frac{1}{2}$ - $\frac{2}{3}$ in.—Kashmir, *Falconer*.

VAR. *Levingii*; leaves elliptic and ovate acute, calyx-lobes $\frac{3}{4}$ - $\frac{1}{2}$ in. ovate, corolla-tube $\frac{2}{3}$ by $\frac{1}{4}$ in., segments $\frac{1}{2}$ in. diam. orbicular, style $\frac{3}{4}$ in.—Kashmir; Pir Pingul, alt. 11,500 ft., *Levinge*. This has much larger flowers than any other example.

2. **L. Benthami**, Hook f.; hairy, leaves linear-lanceolate acute, racemes panicled, corolla-tube about equalling the calyx narrow, segments elliptic or oblong suberect. *Solenanthes* sp. 3, *Herb. Ind. Or. H. f. & T.*

KASHMIR and WESTERN TIBET; alt. 11-15,000 ft., *Thomson*, *Strachey & Winterbottom*, &c.

Stems 2-3 ft., erect. Radical leaves long-petioled, narrow-lanceolate, cauline sessile 4 by $\frac{1}{4}$ - $\frac{1}{2}$ in. Panicles repeatedly branched, laxly racemose; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in. and upwards. Calyx-lobes at flower-time nearly $\frac{1}{3}$ by $\frac{1}{2}$ in., narrowly lanceolate, acute. Corolla-tube $\frac{1}{4}$ - $\frac{1}{3}$ by $\frac{1}{2}$ in., cylindric; lobes $\frac{1}{2}$ by $\frac{1}{8}$ in., erect or only half-patent. Filaments as long as the scales; anthers exserted (not from the corolla). Style $\frac{1}{2}$ - $\frac{3}{4}$ in. Nutlets $\frac{1}{4}$ - $\frac{1}{3}$ in., forming a pyramid, densely shortly glochidiate, especially round the margins; carpophore elongate conic.—This may prove to be *S. angustifolius*, *Fisch. & Mey.*; *DC. Prodr.* x. 165; it was placed in *Lindelofia* by Bentham, (to which genus I would refer the *Solenanthes* with long anthers, as *S. lanatus*, A. DC., *S. brachystemon*, F. & M.—*J. D. Hooker*).

12. SOLENANTHUS, Ledeb.

Perennial, hairy herbs. Leaves alternate, radical petioled. Racemes dense or corymbose, ebracteate. Calyx 5-partite, scarcely enlarged in fruit. Corolla

tubular, throat with 5 scales; lobes 5, small, obtuse, erect or scarcely spreading. *Filaments* long; anthers small, shortly oblong, far exserted. *Ovary* 4-lobed; style from the base of the lobes, filiform, stigma small. *Nutlets* 4, attached somewhat obliquely to the conical carpophore, scarcely produced at the apex, rounded at the base, muricate or shortly glochidiate, usually margined.—Species 10, in S. Europe, Central and W. Asia.

1. ***S. circinnatus***, *Ledeb. Fl. Alt. i.* 194, and *Ic. Fl. Ross. t.* 26; radical leaves long-petioled cordate submembranous cauline subamplexicaul oblong-lanceolate, racemes forming a terminal panicle *DC. Prodr. x.* 164; *Boiss. Fl. Orient. iv.* 270.

ALPINE WESTERN HIMALAYA; Zanskar, *Thomson*; Pangee, *Dr. Watt*.—DISTRIB. Afghanistan, Astrabad, Soongaria, Altai.

Stems 3 ft., erect, laxly hairy. *Radical leaves* 6 by $2\frac{3}{4}$ in.; petiole 8 in.; cauline 3 by $1\frac{1}{4}$ in. *Panicle* in fruit 10 by 8 in., branches elongate; flowers approximate; pedicels $0\frac{1}{4}$ in. *Calyx-lobes* $\frac{1}{2}$ by $\frac{1}{12}$ in., oblong. *Corolla-tube* $\frac{1}{4}$ in., lobes $\frac{1}{10}$ in. *Filaments* $\frac{1}{4}$ in. *Style* $\frac{1}{4}$ – $\frac{1}{3}$ in. *Nutlets* forming a pyramid $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., densely shortly glochidiate, especially round the margins; carpophore elongate-conic.

13. **PARACARYUM**, *Boiss.*

Perennial or biennial, hairy herbs. *Leaves* alternate. *Racemes* elongate, bracts few or 0. *Flowers* small, blue. *Calyx* deeply 5-fid, in fruit not much enlarged. *Corolla* funnel-shaped, or cylindric in *P. heliocarpum*, tube closed by 5 scales; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, beneath the scales. *Ovary* 4-lobed; style from the base of the lobes, short or long, stigma small. *Nutlets* 4, depressed, often broadly adnate to the carpophore with rigid persistent style, forming a pyramid, their apices hardly produced, their bases rounded, attached obliquely to the elongate conical carpophore, glochidiate (except in *P. ? Lambertianum*), strongly margined; margin sometimes much reflexed as in *Omphalodes*.—Species 20, in S. Europe, W. and Central Asia.

SECT. I. *Stem* solitary, tall, corymbose upwards. *Leaves* large.—(This section differs from *Cynoglossum microglochis*, *petiolatum*, &c., only in the more elongate conic carpophore, the nutlets being obliquely suberect, rather than much depressed and subdivaricate as in *Cynoglossum*.)

1. ***P. cælestinum***, *Benth. in Gen. Pl. ii.* 850; radical leaves ovate-cordate submembranous cauline ovate base cuneate strigose on the nerves beneath, racemes divaricate furcate, pedicels very short. *Cynoglossum cælestinum*, *Lindl. in Bot. Reg.* 1839, t. 36; *DC. Prodr. x.* 151; *Dalz. & Gibs. Bomb. Fl.* 173. *Echinosperrum cælestinum*, *Wight Ic. t.* 1394.

WESTERN DECCAN PENINSULA; from Mahabeshwur to Mysore, common, *Wight, Dalzell, &c.*

Erect, 3–4 ft., sparsely hairy. *Radical leaves* long-petioled, 7 by 5 in.; cauline $3\frac{1}{2}$ by 2 in., acute, subentire, tubercular-scabrous above, nearly glabrous beneath except on the nerves. *Racemes* strigose; branches 2–4 in.; pedicels $\frac{1}{5}$ in., approximate. *Calyx-lobes* $\frac{1}{10}$ in., elliptic; in fruit $\frac{1}{2}$ in., ovate. *Flowers* $\frac{1}{2}$ in. diam., nearly as of *Cynoglossum*. *Style* scarcely $\frac{1}{4}$ in. Outer faces of the *nutlets* $\frac{1}{2}$ in., ovate, margin prominent reflexed strongly glochidiate, disc nearly smooth shining.

2. ***P. malabaricum***, *Clarke*; radical leaves ovate-cordate tuberculate-hispid, cauline ovate cuneate at the base hirsute, racemes numerous erect

forming a large dense corymb, pedicels very short. *Cynoglossum* sp. 13, *Herb. Ind. Or. H. f. & T.*

WESTERN DECCAN PENINSULA; Canara and Mysore, *Law*.

Resembling the preceding species but stouter, more hairy, with larger flowers and fruits. *Calyx-lobes* $\frac{1}{2}$ in., elliptic; in fruit $\frac{1}{4}$ in., ovate. *Nutlets* more than $\frac{1}{4}$ in. diam., subglobose, disc of their faces glochidiate, style $\frac{1}{4}$ in.

3. ? **P. Lambertianum**, *Clarke*; strigose, cauline leaves sessile ovate acute, racemes long forked, pedicels very short, nutlets large margined not glochidiate.

BOMBAY (*Herb. Lambert*).

The upper portions of 2 fruiting stems of this are very like *P. caelestinum*, but the fruits are totally different. *Calyx* as of *P. caelestinum*. *Corolla* not seen. *Nutlets* $\frac{1}{3}$ in. diam., ovate, much depressed flattened, margin $\frac{1}{12}$ in. broad, entire, not reflexed, disc smooth, shining; carpophore elongate conic, style ultimately $\frac{1}{2}$ in.—The genus of this plant is very doubtful; the nutlets approach those of *Rindera*.

4. **P. hellocarpum**, *A. Kerner Nov. Pl. Sp.* ii. 9; radical leaves spathulate-lanceolate, cauline oblong or lanceolate softly hairy on both surfaces, racemes long lax flowers pedicelled, corolla-tube elongate much exceeding the calyx, margin of the nutlets broad membranous white reflexed with lanceolate glochidia disc slightly muricated. *Cynoglossum anchusoides*, *Lindl. in Bot. Reg.* 1842, t. 14; *DC. Prodr.* x. 151. *Cynoglossum Emodi*, *Schottw. Cat. Hort. Copenhagen*. *Lindelia anchusoides*, *Lehm. in Linnæa*, 1851, 216.

TEMPERATE WESTERN HIMALAYA, alt. 7–9000 ft.; Kashmir, Lahul and Piti, *Thomson*, &c.—DISTRIB. Kashgar.

Erect, 3 ft., softly hairy. *Radical leaves* long-petioled, 6 by 1 in.; cauline $2\frac{1}{2}$ by $\frac{1}{2}$ in., closely hairy on both surfaces. *Racemes* 4–10 in., ebracteate; pedicels in fruit $\frac{1}{4}$ – $\frac{1}{2}$ in., distant. *Calyx-lobes* $\frac{1}{2}$ in., narrowly oblong, silky; in fruit $\frac{1}{4}$ in. or more, widened. *Corolla-tube* $\frac{1}{4}$ – $\frac{1}{3}$ in.; lobes $\frac{1}{2}$ in., suberect. *Anthers* linear, included. *Style* $\frac{1}{2}$ in. in fruit. *Nutlets* $\frac{1}{4}$ – $\frac{1}{3}$ in.; glochidia broadly-lanceolate, thin, membranous.—A plant frequently collected in Cabul by Griffith has been named *P. anchusoides*, but it has very stiffly glochidiate, smaller, less margined nuts; and may be *Cynoglossum macrostylum*, Bunge (cf. Boiss. Fl. Orient. iv. 266).

5. **P. glochidiatum**, *Benth. in Gen. Pl.* ii. 850; radical leaves cordate-ovate, cauline ovate acute hairy on the nerves beneath, racemes elongate furcate lax, margins of the nutlets prominent long-glochidiate. *Rindera glochidiata*, *Wall. Cat.* 926. *Cynoglossum uncinatum*, *Benth. in Royle Ill.* 305. *C. Roylei*, *Wall. Cat.* 917; *DC. Prodr.* x. 155. *C. laxum*, *G. Don Gen. Syst.* iv. 356. *Echinoglossum glochidiatum*, *A. DC. Prodr.* x. 136.

ALPINE HIMALAYA, alt. 9–12,000 ft.; from Kashmir to Sikkim, frequent, *Wallich*, *Royle*, *J. D. H.*, &c.

Stem 3 ft., laxly hairy. *Radical leaves* 2–4 in. diam., petioles often 6 in.; cauline leaves mostly distinctly petioled, orbicular to elliptic-lanceolate, base obtuse. *Racemes* 2–6 in., strigose; pedicels in fruit often $\frac{1}{4}$ – $\frac{1}{2}$ in. distant. *Calyx-lobes* $\frac{1}{2}$ in., oblong, acute; in fruit $\frac{1}{4}$ in., ovate. *Corolla* $\frac{1}{2}$ in. diam., tube short, much as of *Cynoglossum*. *Style* $\frac{1}{2}$ in. *Nutlets* forming a pyramid $\frac{1}{3}$ – $\frac{1}{2}$ in. diam., much adnate to the carpophore; glochidia $\frac{1}{8}$ – $\frac{1}{4}$ in., sublinear.

6. **P. Thomsoni**, *Clarke*; radical leaves ovate-oblong, cauline mostly petioled ovate-lanceolate sparsely hairy, racemes divaricate, pedicels very short, nutlets less than $\frac{1}{2}$ in. glochidiate margined.—*Echinosperrum* sp. 2, *Herb. Ind. Or. H. f. & T.*

ALPINE WESTERN TIBET; Nubra, Baltal, *Thomson*.

Stem 3 ft., sparsely hairy. *Radical leaves* 8 by 4 in., blade decurrent on the 4–10 in.

petiole; cauline leaves 3 by $1\frac{1}{4}$ in., cuneate or rhomboid at the base. *Spikes* dense or lax. *Calyx* and *corolla* nearly as of *P. glochidiatum*. *Nutlets* much smaller, margin shorter, white, membranous, less reflexed, more shortly glochidiate.

SECT. 2. Small hispid plants, with several stems. *Leaves* and *flowers* small.—(This section only differs from *Omphalodes* in the more erect nutlets, not saccate at the base.)

7. ***P. himalayense***, *Clarke*; leaves oblong, flowers subsessile, nutlets $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., margin subpatent glochidiate. *Mattia himalayensis*, *Klotzsch in Reis. Pr. Waldem. Bot.* 94, t. 64.—*Omphalodes* sp. n. 4, *Herb. Ind. Or. H. f. & T.*

ALPINE WESTERN HIMALAYA; Nubra, *Thomson*.

Stems decumbent then ascending, 6–14 in., patently hispid. *Radical leaves* $1\frac{1}{2}$ by $\frac{1}{3}$ in., narrowed at both ends, hispid on both surfaces, petiole 1 in.; cauline similar, smaller, subsessile. *Spikes* in fruit 3–8 in.; pedicels hardly any, distant. *Calyx-lobes* hardly $\frac{1}{20}$ in., oblong; in fruit sometimes $\frac{1}{2}$ in. *Corolla* scarcely $\frac{1}{2}$ in. diam., blue, tube short. *Fruit* pyramidal; margin of nutlets membranous, disc muricate, subglochidiate; style hardly $\frac{1}{8}$ in.

8. ***P. tibeticum***, *Clarke*; leaves oblong, flowers subsessile or lower pedicelled, nutlets $\frac{1}{5}$ – $\frac{1}{4}$ in. diam., margin patent subentire.—*Omphalodes* sp. n. 6, *Herb. Ind. Or. H. f. & T.*

WESTERN TIBET; Ladakh, alt. 9000 ft., *Thomson*.

Much resembling *P. himalayense*. *Stems* more diffuse. *Flowers* very small, mostly subsessile; lower pedicels in fruit occasionally $\frac{1}{4}$ in. *Fruit* pyramidal; margin of nutlets membranous, disc minutely glochidiate, style less than $\frac{1}{10}$ in.

9. ***P. microcarpum***, *Boiss. Diagn.* 2. iii. 139, and *Fl. Orient.* iv. 255; leaves oblong, flowers pedicelled, nuts $\frac{1}{16}$ – $\frac{1}{12}$ in., margin inflexed entire.—*Omphalodes* sp. n. 7, *Herb. Ind. Or. H. f. & T.*

SUBALPINE WESTERN HIMALAYA, alt. 8000 ft.; Kashmir and Pangee, *Thomson*.—DISTRIB. Cabul.

Diffuse, hairy. *Racemes* in fruit 3–8 in.; pedicels $\frac{1}{2}$ – $\frac{1}{4}$ in. *Calyx* and *corolla* rather larger than of the two preceding species. *Fruit* pyramidal, somewhat depressed; margin of nutlets membranous, as though inflated; disc minutely glochidiate.

14. **ECHINOSPERMUM**, *Swark*.

Annual or perennial, hispid herbs. *Leaves* alternate, oblong, lanceolate or narrowly obovate. *Flowers* very small, sessile or pedicelled; racemes bracteate, or bracteate above. *Sepals* 5. *Corolla-tube* short, mouth closed by 5 scales; lobes 5, imbricate in the bud, obtuse, spreading. *Stamens* 5, included. *Anthers* ovate, obtuse. *Ovary* 4-lobed; style between the lobes, short, stigma small capitate. *Nutlets* 4, erect, forming a pyramid, confluent or separable, attached above their base; scar produced to their apex; bases not produced; margins with 1 or 2 rows of strong glochidia; carpophore as long as the nutlets.—Species 20, in the north temperate regions of the old World and in N. America; a few in S. Africa and Australia.

The character in Gen. Pl. (ii. 835) assigned of “apices of the nuts erect, free round the style, more or less prominent,” applies only to the glochidiate species of *Eritrichium* placed by Bentham in *Echinosperrum*, but here enumerated under *Eritrichium*.

1. ***E. minimum***, *Lehm. Asperifol.* 126; patently hispid, leaves linear-oblong, calyx-lobes linear, nutlets elongate-pyramidal confluent. *Myosotis*—

echinophora. Pallas *Voy.* (ed. Gauthier), v. 496, t. 16, fig. 2. *Rochelia echinophora*, Roem. et. Sch. *Syst.* iv. 110, 782. *Heterocaryum minimum*, A. DC. *Prodr.* x. 144.

KASHMIR; temperate region Thomson. PUNJAB; Peshawur, Vicary.—DISTRIB. Cabul, Beloochistan to the Ural Mts. and Altai.

A coarser plant with larger flowers and fruits than the other Indian *Echinosperms*. Stem 6–12 in., erect, rigid. Leaves $1\frac{1}{2}$ by $\frac{1}{2}$ in., numerous, sometimes somewhat obovate, lower spatulate petioled. Racemes in fruit 3–4 in.; pedicels $\frac{1}{2}$ in., distant, rigid, suberect, often thickened; bracts $\frac{3}{4}$ – $\frac{1}{2}$ in., leaflike, often continued to the top of the raceme. Calyx-lobes $\frac{1}{2}$ – $\frac{1}{4}$ in. Corolla-tube $\frac{1}{2}$ in., lobes not much over topping the calyx. Nutlets $\frac{1}{2}$ – $\frac{1}{4}$ in.; margins thickened, with a single row of strong glochidia; backs depressed, smooth or scarcely granular; nutlets inseparably confluent, not rarely 1 or 2 abortive.—Boissier (*Fl. Orient.* iv. 243) doubts whether *Heterocaryum pachypodium*, *rigidum*, and *Szovitzianum* (A. DC. *Prodr.* x. 145), are other than forms of this species.

2. ***E. barbatum***, Lehm. *Asperifol.* 128; patently hispid, leaves oblong, calyx-lobes oblong, nutlets separable tubercular-scabrous on all sides with 2 rows of short stout glochidia round the margin. DC. *Prodr.* x. 137; Boiss. *Fl. Orient.* iv. 250. *Myosotis barbata*, Bieb. *Cent. Pl. Rar.* t. 36. *Rochelia barbata*, Roem. & Sch. *Syst.* iv. 110, 782.

SUBALPINE WESTERN HIMALAYA, alt. 7–12,000 ft.; from Gurwhal to Baltisthan, frequent; Thomson, &c.—DISTRIB. from Beloochistan and Cabul to the Ural and Altai.

Erect, 6–18 in. Leaves $\frac{1}{2}$ –2 in., narrowed at the base, lower petioled. Racemes in fruit 2–12 in.; pedicels $\frac{1}{2}$ – $\frac{1}{3}$ in., erect; bracts $\frac{1}{2}$ in., usually 0 in the upper part of the spike. Calyx-lobes $\frac{1}{10}$ in. Nutlets $\frac{1}{10}$ – $\frac{1}{8}$ in., forming a compact pyramid, but separable.

3. ***E. Redowskii***, Lehm. *Asperifol.* 127; patently hispid, leaves oblong, flowers subsessile, calyx-lobes oblong-linear, nutlets separable scabrous on all sides with one row of strong glochidia round the margin. DC. *Prodr.* x. 137. *E. intermedium*, Ledeb. *Fl. Alt.* i. 199, and *Ic. Fl. Ross.* ii. t. 180. *Rochelia Redowskii*, Roem. & Sch. *Syst.* iv. 782.

WESTERN TIBET, alt. 9–10,000 ft.; Leh, Thomson.—DISTRIB. Central Asia to the Ural and Altai.

Generally resembling *E. barbatum*. Pedicels rarely exceeding $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ in., oblong, often continued (smaller) to the summit of the spike. Calyx-lobes rather longer than of *E. barbatum*, in fruit $\frac{1}{8}$ – $\frac{1}{2}$ in. in Thomson's example. Nutlets nearly as in *E. barbatum* but the glochidia in one row and much longer.—Perhaps *E. patulum*, Lehm. (DC. *Prodr.* 137; Boiss. *Fl. Orient.* iv. 250) is not specifically distinct.

4. ***E. semiglabrum***, Ledeb. *Fl. Alt.* i. 204, and *Ic. Fl. Ross.* i. t. 28; patently hispid, leaves oblong, flowers subsessile, calyx-lobes linear-oblong, nutlets tubercular-scabrous on all sides with one row of glochidia round the margin as long as the nutlet is broad. DC. *Prodr.* x. 138; Boiss. *Fl. Orient.* iv. 251.

WESTERN TIBET and BALTISTHAN, alt. 8–10,000 ft.; Thomson, &c.—DISTRIB. Cabul; Turkestan to the Altai.

Hardly distinguishable from *E. Redowskii*, but by the longer glochidia of the nuts which often exceed $\frac{1}{2}$ in. Spikes denser, more divided, often somewhat closely paniced.

15. **ERITRICHIMUM**, Schrader.

Annual or perennial herbs, strigose or silky-villous. Leaves alternate, narrow. Racemes simple or branched. Flowers small, blue, rarely white. Sepals 5, not or slightly enlarged in fruit. Corolla-tube short, throat with 5

scales; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, included; anthers ovate, obtuse. *Ovary* 4-lobed; style between the lobes, short, stigma small capitate. *Nutlets* 4, erect, much longer than the carpophore, scar small below their middle, nearly basal in *E. basiflorum*, tips free; margins winged by glochidia confluent at the base or rugose or entire.—Species 70; Europe, Temp. Asia, America; in Australia.

* *Glochidia on the margin of the nutlets confluent at their bases.*

1. ***E. strictum***, *Dene. in Jacquem. Voy. Bot.* 125; perennial, silky-white, leaves linear, bracts minute in the upper part of the raceme, sepals in fruit $\frac{1}{16}$ – $\frac{1}{12}$ in. oblong. *A. DC. Prodr.* x. 128. *E. Jacquemontii* and longifolium, *Dene. l. c.* 122, 123, tt. 127, 129; *DC. l. c.* 25. *Echinosperrum canum*, *Benth. in Royle Ill.* 306; *A. DC. l. c.* 141. ? *E. myosotiflorum*, *A. DC. Prodr.* x. 141.

Throughout the WESTERN HIMALAYA, alt. 7–13,000 ft.; common, from Kashmir and Baltistan to the Sutledge.

Rootstock woody; stems 8 in., numerous, strict, undivided. *Leaves* $1\frac{1}{2}$ by $\frac{1}{8}$ in., softly adpressedly silky; lowest similar but larger, attenuate, hardly petioled; radical withered. *Racemes* 1–3 in., branched; pedicels $\frac{1}{8}$ – $\frac{1}{3}$ in., erect in fruit. *Flowers* $\frac{1}{4}$ in. diam., blue. *Nutlets* forming a pyramid $\frac{1}{12}$ – $\frac{1}{10}$ in. high, produced more than half their length above the punctiform scar; margins subreflexed, thin, the weak glochidia produced shortly above their confluence, scabrous, apices of most divided, uncinat; backs scabrous, or muricated with minute prickles.—Decaisne's example here described has narrower leaves than the mass of the material which is half-way between this and var. *Thomsoni*. This is the type of the genus *Echinosperrum* as described in the Gen. Pl., and may be *E. myosotiflorum*, *A. DC. Prodr.* x. 141.

VAR. *Thomsoni*; glistening silky, stems 12–18 in., cauline leaves $\frac{3}{4}$ by $\frac{1}{5}$ in. oblong radical much larger long-petioled, racemes larger with rather larger calyces and fruits, nutlets often pilose.—N. Kashmir, alt. 8000 ft., *Thomson*, &c. A most beautiful plant, perhaps specifically distinct.

VAR. *fruticulosum*; weaker, greener, stems diffuse sometimes with divaricate branches. *E. fruticulosum*, *Klotzsch in Reis. Pr. Wald. Bot.* 96, t. 62. *E. patens*, *Dene. in Jacquem. Voy. Bot.* 125; *DC. Prodr.* x. 128.—W. Himalaya, alt. 8–11,000 ft.; Pangee, Lahoul, Changas; *Thomson*, &c.

2. ***E. spathulatum***, *Clarke*; perennial, villous, leaves oblong, bracts minute in the upper part of the raceme, calyx-lobes in fruit $\frac{1}{8}$ – $\frac{1}{5}$ in. oblong. *Echinosperrum spathulatum*, *Benth. in Royle Ill.* 306; *DC. Prodr.* x. 142.

WESTERN TIBET; Hangarang Pass, *Thomson*; Kijungar Pass, alt. 16,000 ft., Strachey and Winterbottom.

Rootstock woody. *Stems* 2–6 in., numerous, decumbent. *Cauline leaves* $\frac{3}{4}$ by $\frac{1}{4}$ in., sessile; lower numerous, larger, spathulate, petioled. *Nutlets* not ripe, larger than in *E. strictum*, var. *Thomsoni*, hairy on the back.—Perhaps a form of *E. strictum*, but wants the glistening silky indumentum of that species; calyx and nutlets larger.

** *Margins of the nutlets entire or crenulate not glochidiate.*

3. ***E. pustulosum***, *Clarke*; weak, diffuse, strigose, leaves spathulate-oblong, pedicels few subaxillary, nutlets ovoid tubercular and minutely pubescent.—*Eritrichium* sp. n. 14, *Herb. Ind. Or. H. f. & T.*

ALPINE SIKKIM; Lachen, alt. 13–15,000 ft., *J. D. H.*

Rootstock biennial (at least), weak; stems 3–7 in. *Leaves* $\frac{3}{4}$ by $\frac{1}{4}$ in., cauline mostly spathulate, petioled, a few uppermost sessile. *Pedicels* $\frac{1}{4}$ – $\frac{1}{3}$ in. in fruit. *Calyx-lobes* in fruit $\frac{1}{2}$ in., elliptic-oblong. *Flowers* $\frac{1}{2}$ in. diam., pale blue. *Nutlets* $\frac{1}{16}$ – $\frac{1}{12}$ in., not distinctly margined; tubercles appearing as tufts of minute hairs.

4. **E. pygmæum**, *Clarke*; nearly stemless leaves elliptic, pedicels $\frac{1}{4}$ in. appearing umbelled, nutlets ovoid nearly smooth.—*Eritrichium* sp. n. 16, *Herb. Ind. Or. H. f. & T.*

ALPINE SIKKIM; Momay, alt. 16,000 ft., *J. D. H.*

Stems 0– $\frac{3}{4}$ in., annual, erect, densely clothed with spreading leaves, terminated by numerous subfascicled spreading pedicels. *Leaves* $\frac{1}{4}$ in., sessile, subobtusely, patently villous. *Calyx-lobes* $\frac{1}{10}$ in., narrowly oblong. *Corolla* not seen. *Nutlets* $\frac{1}{20}$ in., with free apices, testa minutely reticulate and wrinkled; carpophore very short.

5. **E. Munroi**, *Clarke*; small, suberect, branched, leaves oblong lower spathulate, racemes numerous many-flowered, nutlets ovoid-oblong nearly smooth.—*Eritrichium* sp. n. 13, *Herb. Ind. Or. H. f. & T.*

ALPINE HIMALAYA, alt. 11–13,000 ft.; Kunawur, *Munro*, Kumaon, *Strach. & Winterb.*; Sikkim, Lachen, *J. D. H.*

Stems 1–4 in. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., patently villous. *Racemes* villous, dense in flower; in fruit pedicels sometimes $\frac{1}{2}$ in., upper ebracteate. *Calyx-lobes* in flower minute, in fruit $\frac{1}{2}$ in. or upwards, oblong-linear. *Flowers* hardly $\frac{1}{8}$ in. diam. *Nutlets* $\frac{1}{12}$ in., minutely reticulate and wrinkled; carpophore very short.—The fruit is imperfect, and there may be more than one species mixed here.

6. **E. tibeticum**, *Clarke*; lax, weak, diffuse, leaves elliptic mostly petioled, racemes elongate ebracteate, nutlets ovoid shining glabrous margins entire.—*Eritrichium* sp. n. 17, *Herb. Ind. Or. H. f. & T.*

WESTERN TIBET; Ladakh, alt. 9–10,000 ft., *Thomson.*

Rootstock slender, annual? *Stems* 6–10 in., numerous, slender. *Leaves* $\frac{3}{4}$ by $\frac{1}{2}$ in., obtuse, spathulate, strigose. *Racemes* in fruit 6 in.; pedicels $\frac{1}{3}$ in., a few lower from leaflike bracts. *Calyx-lobes* $\frac{1}{12}$ in., ovate-oblong. *Flowers* $\frac{1}{5}$ in. diam. *Nutlets* $\frac{1}{16}$ in.; margin somewhat prominent.

VAR. minor; less strigose, stems 2–3 in., leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. *Eritrichium* sp. n. 15, *Herb. Ind. Or. H. f. & T.*—Sikkim; Phulloong, alt. 15,000 ft., *J. D. H.*

*** *Nutlets conic-obovoid, margin strong fringed with divided hairs.*

7. **E. basifixum**, *Clarke*; erect, leaves sessile broadly lanceolate softly villous, racemes dense bracteate, nutlets apparently basally attached, carpophore depressed hardly convex. *Echinosperrum sericeum*, *Benth. in Royle Ill.* 306; *DC. Prodr.* x. 142.

ALPINE WESTERN HIMALAYA; from Kashmir to Gurwhal, alt. 13–15,000 ft.; *Royle, Lance, Jaeschke, &c.*

Stems 3–7 in., solitary or few, erect, divided at the apex. *Leaves* $\frac{2}{3}$ by $\frac{1}{2}$ in., acute, lower densely tufted, upper distant. *Racemes* in fruit 1 $\frac{1}{2}$ in.; pedicels 0– $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ in. *Calyx-lobes* in fruit $\frac{1}{2}$ in., narrowly oblong. *Flowers* $\frac{1}{4}$ in. diam. and upwards, blue, purpurecent. *Nutlets* $\frac{1}{12}$ in., membranous, glabrous; circular back within the margin minutely hairy.—Closely allied to *E. villosum*, in which the margins of the nutlets carry broad-based flattened lanceolate ciliate-serrate teeth. In the typical *Eritrichium* the scar of the nutlets is sub-punctiform at the apex of a depressed cone on the inner lower face; in *E. villosum*, *DC. Prodr.* x. 126 (*Myosotis villosa*, *Ledeb. Ic. Fl. Ross.* t. 215), this cone is less depressed; in *E. basifixum* it is elongate still more, so that the nutlets are attached apparently basally, nearly as in *Lithospermea*.

16. **ROCHELIA**, *Reichb.*

Annual or perennial, villous or hispid herbs. *Leaves* alternate. *Racemes* simple or branched, bracteate. *Flowers* small, blue or white. *Sepals* 5 (in non-Indian species 6–7), enlarged in fruit, linear or base auricled and sagittate. *Corolla-tube* cylindric, throat with or without scales; lobes small, spreading.

Stamens 5, included; anthers ovate, obtuse. *Ovary* 2-lobed, 2-celled; style from between the lobes, sublateral, shortly linear, stigma capitate; ovule 1 in each cell. *Nutlets* 2, 1-seeded, erect, ovate-oblong, granular-tubercular (in the Indian species); scar extending from the base to the middle.—Species 8; from India, through W. Asia to N. Africa and S. Europe; 1 in Australia.

1. ***R. stellulata***, *Reichb. Iconogr.* ii. 13; t. 123; villous, subhispid, leaves narrowly oblong subspathulate, sepals in fruit linear incurved with hooked hairs, pedicels not exceeding the sepals. *DC. Prodr.* x. 176; *Boiss. Fl. Orient.* iv. 244. *R. saccharata*, *Reichb. in. Flora*, 1824, 243. *Lithospermum dispersum*, *Linn. Sp. Pl.* 191. *L. retortum*, *Pallas Voy. (ed. Gauthier)* v. 497, t. 16, fig. 3.

WESTERN TIBET; Nubra, *Thomson*.—DISTRIB. From Soongaria and Cabul to Spain and Algeria.

Stems 5–14 in., branched, wiry. *Leaves* 1 by $\frac{1}{2}$ in., lower subpetioled. *Racemes* in fruit 2–12 in.; bracts to nearly all the flowers, leaflike, smaller upwards. *Sepals* in flower scarcely $\frac{1}{10}$ in., in fruit nearly $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ in. long, less than $\frac{1}{10}$ in. diam. *Nutlets* nearly $\frac{1}{6}$ in. long, white-tuberculate; style hardly longer than the nutlets; pedicels in fruit subpatent, not distinctly recurved nor thickened.

2. ***R. stylaris***, *Boiss. Fl. Orient.* iv. 245; adpressedly villous, leaves spathulate-oblong or sublinear, sepals in fruit linear incurved without hooked hairs, pedicels exceeding the sepals. *R. stellulata*, *Aitchison Punjab List*, 67.

KASHMIR, and adjoining PUNJAB PLAINS, frequent; *Thomson, Vicary, &c.*—DISTRIB. Cabul.

Annual, 2–8 in., erect. *Leaves* narrower, *racemes* slenderer than in *R. stellulata*. *Pedicels* in fruit deflexed, scarcely thickened. *Style* considerably exceeding the nutlets.—Closely allied to *R. stellulata*.

3. ***R. rectipes***, *Stocks in Hook. Kew Journ.* iv. 176; villous, subhispid, leaves oblong, sepals in fruit ligulate base keeled with spreading scarcely hooked hairs, pedicels about equalling the sepals.

WESTERN TIBET; Zaskar, *Thomson*.—DISTRIB. Cabul and Beloochistan.

Annual; stems 2–5 in., erect, with ascending branches. *Leaves* $\frac{3}{4}$ by $\frac{1}{2}$ in., lower spathulate or sublinear. *Racemes* in fruit 1–4 in., somewhat dense, bracteate. *Sepals* in fruit $\frac{1}{2}$ by $\frac{1}{24}$ in. wide at the base, hairs soft hardly hooked even when dry. *Corolla* pale-blue, with a white throat (*Stocks*). *Nutlets* scarcely half as long as the sepals; fruiting pedicels suberect, not thickened.—*Boissier (Fl. Orient.* iv. 246) reduces this species to *R. macrocalyx*, Bunge (in *Pl. Lehm.* 419). But Bunge describes the fruiting sepals as bigibbous at the base and very hispid, which does not fit. There is another Cabul plant of Griffith's which (ex descr.) may be *R. macrocalyx*, Bunge, and which may have been sent to Boissier as *R. rectipes*.

4. ***R. cardiosepala***, *Bunge in Pl. Lehm.* 420; strigose, subhispid, leaves oblong, sepals in fruit ovate-lanceolate auriculate-cordate at the base hispid, pedicels in fruit recurved as long as the sepals. *Boiss. Fl. Orient.* iv. 246.

WESTERN TIBET; Nubra, *Thomson*.—DISTRIB. Turkestan.

Annual, erect, 6–8 in., very ramous. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ in., lower spathulate or petioled. *Racemes* lax, 2–5 in.; bracts to nearly all the flowers, leaflike, smaller upwards. *Sepals* in flower, $\frac{1}{2}$ in., white silky, in fruit $\frac{1}{2}$ by $\frac{1}{2}$ – $\frac{1}{8}$ in. *Corolla* $\frac{1}{2}$ by $\frac{1}{2}$ in. *Nutlets* $\frac{1}{2}$ in., rather larger than of *R. stellulata*.

17. **ASPERUGO**, *Linn.*

A procumbent, scabrous-hispid annual. *Leaves* alternate and subopposite, spathulate-oblong or petioled, subentire. *Flowers* small, axillary, subsessile,

solitary or paired. *Calyx* campanulate, 5-fid half-way down; in fruit much enlarged, rigid, compressed, lobes toothed nervose. *Corolla-tube* short, mouth closed with 5 scales; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, included; anthers ovate-oblong, obtuse. *Ovary* deeply 4-lobed; style short, stigma small capitate. *Nutlets* 4, erect, ellipsoid-oblong, laterally compressed, smooth, stony, attached at a small subpunctiform scar above their middle; carpophore conoid.

A. procumbens, Linn.; DC. *Prodr.* x. 146; Lamk. *Ill.* t. 94; Engl. *Bot.* t. 661; Sibth. *Fl. Gr.* t. 177; Reichb. *Fl. Germ.* t. 1327; Boiss. *Fl. Orient.* iv. 275.

PUNJAB and KASHMIR, alt. 1-7000 ft.; extending to 13,000 ft. in WESTERN TIBET and the KARAKORUM; a weed especially near cultivation, Thomson, &c.—DISTRIB. Europe, N. Africa, W. Central and N. Asia.

Spreading, 1-2 ft., branched. *Leaves* 1-2½ in. *Flowers* ½ in. diam., purplish-blue or white; calyx-lobes in flower, ¼ in., oblong. *Nutlets* ⅓-½ in.; calyx in fruit ½ in. diam., reticulately-nerved; lobes large, triangular.

18. **MICROULA**, Benth.

An almost stemless, scabrous-pubescent herb. *Radical leaves* elliptic-spathulate, rosulate. *Cymes* dense, many-fld., subsessile among the leaves, bracteate. *Flowers* small, sessile. *Calyx* campanulate; lobes 5, ciliate. *Corolla-tube* short, throat with 5 scales; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, included; anthers ovate-oblong, obtuse. *Ovary* deeply 4-lobed; style short, stigma small capitate. *Nutlets* 4, or fewer, ovoid-oblong, dorsally compressed, attached by a small scar above their middle.

M. Benthami, Clarke.

WESTERN TIBET, alt. 15-17,000 ft.; Parang Pass, Thomson; Kyoongar Pass, Strachey & Winterbottom.

Root long, vertical, crowned by a tuft of leaves longer than the inflorescence; but one example has a stem of 3 in., with inflorescence as in *Eritrichium*. *Leaves* 3 in. *Flowers* ¼-½ in. diam. *Nutlets* ⅓ in., backs diamond-shaped, scabrous with subsessile glochidia.

19. **BOTHRIOSPERMUM**, Bunge.

Weak herbs, annual or biennial, strigose or hirsute. *Leaves* alternate, ovate or lanceolate. *Flowers* small, blue or white, axillary, pedicelled, the upper going off into a bracteate raceme. *Calyx* 5-partite; lobes narrow, not (or scarcely) enlarged in fruit. *Corolla-tube* short, throat with 5 scales; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, included; anthers ovate, obtuse. *Ovary* deeply 4-lobed; style short, stigma capitate. *Nutlets* 4, ellipsoid, without angles, granular-scabrid; scar near the middle of the inner face, large, hollow, smooth, with an inflexed margin; carpophore oblong.—Species 2 or 3; from N. India to Amurland.

B. tenellum, Fisch. & Mey. *Ind. Sem.* 1835, 24; adpressedly hispid, leaves ovate-lanceolate lower petioled, pedicels axillary as long as the calyx, scar of the nutlets elliptic longitudinal. DC. *Prodr.* x. 116. *B. asperugoides*, Sieb. & Zucc. *Fam. Nat. Jap.* ii. 26. *Anchusa tenella*, Hornem.; Roem. & Sch. *Syst.* iv. 100. *A. zeylanica*, Jacq. *f. Ecl.* i. 47, t. 29. *Cynoglossum diffusum*, Roxb. *Fl. Ind. ed. Carey & Wall.* ii. 7; Wall. *Cat.* 925. *C. prostratum*, Don *Prodr.* 100.

Throughout N. INDIA, alt. 0-4000 ft., from the foot of the N.W. Himalaya and Jubbulpore to BHOTAN and KHASIA; not common.—DISTRIB. Amurland, Japan, China, with neighbouring islands, (Mauritius introduced).

Usually prostrate or diffuse, 1-2 ft. with elongate branches and distant axillary flowers; sometimes suberect 3-6 in. with erect, close racemes. *Leaves* 1 by $\frac{1}{4}$ - $\frac{1}{2}$ in., subacute. *Calyx-lobes* in fruit $\frac{1}{8}$ - $\frac{1}{6}$ in., lanceolate or linear. *Corolla* $\frac{1}{8}$ in. diam., white. *Nutlets* $\frac{1}{20}$ - $\frac{1}{16}$ in.; scar more than half their length.

20. *GASTROCOTYLE*, Bunge.

A hispid, diffuse herb. *Leaves* alternate, oblong, lowest spatulate or petioled. *Flowers* small, axillary, solitary and shortly pedicelled, or in dense small, axillary racemes. *Calyx* 5-partite. *Corolla-tube* short, closed with scales; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, included; anthers ovate, obtuse. *Ovary* 4-lobed; style short, stigma subcapitate. *Nutlets* 4, or fewer, ovoid, erect, incurved; scar on the inner face, near their middle, oblong, longitudinal, elevated, margined; carpophore half as long as the nutlets; apex with 4 ridges.

G. hispida, Bunge *Rel. Lehm.* 405. *Anchusa hispida*, Forsk. *Fl. Æg.-Arab.* 40; *DC. Prodr.* x. 50; *Boiss. F. Orient.* iv. 158.

PUNJAB, alt. 1000 ft.; Thomson, &c.—DISTRIB. From Egypt to Beloochistan, Cabul, and Soongaria.

Leaves 1-2 in. *Calyx-lobes* $\frac{1}{8}$ - $\frac{1}{6}$ in., coarsely hispid. *Corolla* $\frac{1}{2}$ in. diam. *Nutlets* $\frac{1}{8}$ - $\frac{1}{6}$ in., rugose, minutely papillose between the wrinkles, undistinguishable from those of *Lycopsis*.

21. *ANCHUSA*, Linn.

Hispid or bristly herbs. *Leaves* alternate. *Cymes* dichotomous, or racemes unilateral, terminal ultimately elongate. *Calyx* deeply 5-fid, not (or scarcely) enlarged in fruit. *Corolla-tube* straight, long or short, closed with scales; lobes 5, imbricate in bud; obtuse, spreading. *Stamens* 5, included; anthers oblong, obtuse. *Ovary* deeply 4-lobed; style filiform, stigma small. *Nutlets* 4, ovoid, conoid, sessile on a flat receptacle; scar basal, concave, margined.—Species 30; Europe, Africa, and W. Asia.

A. italica, Retz, is said to grow in Kashmir (*DC. Prodr.* x. 47); but it is almost certainly a cultivated plant, and the specimens, which were in Royle's Herbarium, were very probably from the Saharanpur Garden.

A. sikkimensis, Clarke; erect, tall, bristly, leaves petioled elliptic or oblong, cymes short bracteate forming a terminal panicle, corolla-tube shortly exceeding the sepals.

ALPINE SIKKIM, alt. 11-12,000-ft., Lachen and Latong, J. D. H.

Stem 2-3 ft. *Cauline leaves* $2\frac{1}{4}$ by 1 in., subacute; petiole $\frac{1}{3}$ in. *Calyx-lobes* $\frac{1}{10}$ in., narrow. *Corolla* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., blue. *Nutlets* not ripe, dorsally compressed; backs diamond-shaped, scabrous; scar very small.—The nutlets are exceedingly like those of *Microula*, and do not agree well with those of *Anchusa*; but the habit is altogether that of *Anchusa sempervirens*, &c. Mr. Bentham has referred the species to *Anchusa*, and it had better remain here till good fruit is obtained; to remove it to *Microula* would require the characters of that genus to be considerably modified.

22. *LYCOPSIS*, Linn.

Annual, hispid herbs. *Leaves* alternate. *Flowers* small, blue purple or white: racemes bracteate, terminal. *Sepals* 5, linear. *Corolla-tube* curved in

the middle, somewhat longer than the calyx; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, included; anthers ovate, obtuse. *Ovary* 4-lobed; style filiform, stigma capitate. *Nutlets* 4, ovoid, suberect, reticulate-rugose; scar on the inner face, near the middle, oblong, longitudinal, elevated, margined; carpophore conical.—Species 3–4, of the Mediterranean region.

L. arvensis, Linn.; *DC. Prodr.* x. 54; erect, bristly, leaves oblong acute upper amplexicaul lower petioled, corolla-lobes subequal. *Lamk. Ill.* t. 92; *Engl. Bot.* t. 938. *Anchusa arvensis*, *Bieb. Fl. Taur.-Cauc.* i. 123; *Reichb. Ic. Fl. Germ.* t. 1310, fig. 1; *Boiss. Fl. Orient.* iv. 160.

KASHMIR and WESTERN TIBET, alt. 3–8000 ft.; from near Peshawur to Skardo, Royle, Thomson, &c.—**DISTRIB.** Europe, W. & N. Asia.

Stem 1–2 ft. *Leaves* 2 by $\frac{1}{2}$ in. *Racemes* in fruit 3–6 in.; pedicels $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ in., lanceolate, or lower leaflike. *Sepals* in flower $\frac{1}{2}$ in., hispid, oblong-linear, in fruit $\frac{1}{4}$ in. *Corolla-tube* $\frac{1}{4}$ in., narrowly cylindric; lobes $\frac{1}{2}$ in., blue, or in the Indian plant usually white. *Stamens* attached near the base of the corolla-tube. *Nutlets* $\frac{3}{8}$ – $\frac{1}{2}$ in., 12 not papillose-scabrid between the wrinkles.

23. NONNEA, Moench.

Annual or perennial herbs, hispid or villous, usually diffuse. *Leaves* alternate. *Cymes* dense, in fruit elongate, bracteate. *Calyx* 5-fid, shortly or half-way down; in fruit much enlarged, tube enclosing the nutlets. *Corolla-tube* straight, about as long as the calyx, throat naked or hairy (not with scales), small scales sometimes present lower down; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, included or scarcely exsert; anthers oblong, obtuse. *Ovary* deeply 4-lobed; style filiform, stigma shortly or obscurely 2-lobed. *Nutlets* 4, ovoid, reticulate-rugose, on a depressed-conic receptacle; scar large, basal, oblique, concave, with a central appendage and very hard margin.—Species 20; in Europe, N. Africa, W. and Central Asia.

N. pulla, Lamk. et *DC. Fl. Fr.* iii. 626, in note; erect, hairy, leaves oblong acute upper subamplexicaul lower petioled, calyx-lobes acuminate, corolla blackish-purple, stamens included. *DC. Prodr.* x. 32; *Reichb. Ic. Fl. Germ.* t. 1302, fig. 2; *Boiss. Fl. Orient.* iv. 166. *N. taurica*, Ledeb. *Fl. Ross.* iii. 112. *N. Edgeworthii*, A. *DC. Prodr.* x. 30. *Lycopsis pulla*, Linn.; *Jacq. Fl. Austr.* ii. t. 188; *Gaertn. Fruct.* i. 327, t. 67. *Anchusa pulla*, *Bieb. Fl. Taur.-Cauc.* i. 125.—*Boraginearum* sp., *Edgw. in Hook. Journ. Bot.* ii. 284.

PUNJAB PLAIN, Thomson, Edgeworth, &c.—**DISTRIB.** Central and E. Europe, W. Asia.

Much branched, 12–18 in., hispid and villous. *Leaves* 2 by $\frac{1}{2}$ in. *Racemes* 2–5 in., dense; pedicels $\frac{3}{8}$ – $\frac{1}{2}$ in.; bracts 1 in., leaflike. *Calyx* $\frac{1}{4}$ in.; in fruit $\frac{1}{2}$ in., the campanulate base $\frac{1}{4}$ in. diam.; subglobose. *Corolla-tube* $\frac{1}{4}$ in., narrow; lobes $\frac{1}{2}$ in., half-spreading. *Nutlets* $\frac{1}{2}$ in., obliquely curved inwards, slightly wrinkled, puberulous.

24. MERTENSIA, Roth.

Perennial herbs, strigose or softly hairy. *Leaves* alternate. *Racemes* terminal, scorpioid, usually simple, dense or lax; bracts 0. *Flowers* blue or purplish, pedicelled. *Sepals* narrow, somewhat enlarged in fruit. *Corolla-tube* as long as, or much longer than, the calyx; throat with or without scales; lobes 5, imbricate in bud, short, obtuse, spreading or suberect. *Stamens* 5, included or scarcely exserted, filaments short linear; anthers oblong, obtuse. *Ovary-lobes* 4; style filiform, often very long, stigma small. *Nutlets* 4, erect,

ovoid-oblong, obscurely dorsally compressed, smooth, slightly angular; scar small, triangular, at the very base of the inner angle, not strongly margined.—Species 15; in E. Europe, extratropical Asia, and N. America.

Trigonitis differs by its short corolla-tube and shortly trigonous (not oblong) nutlets. *Myosotis* differs by its short corolla-tube and twisted corolla-lobes. The length of the corolla is variable in the species of this genus.

1. ***M. elongata***, *Benth. in Gen. Pl.* ii. 857; adpressedly hairy, leaves oblong lower long-petioled spathulate, raceme many-flowered at length elongate, corolla-tube a little longer than the calyx, scales in the throat very small. *Lithospermum elongatum*, *Dcne. in Jacquem. Voy. Bot.* 121, t. 126. *Eritrichium elongatum*, *A. DC. Prodr.* x. 124.

KASHMIR, alt. 5–8000 ft.; *Jacquemont, Falconer*.

Rootstock somewhat stout, annual stems 8 in. *Radical leaves* 2 by $\frac{1}{2}$ in.; petiole $1\frac{1}{2}$ in.; cauline 2 by $\frac{1}{2}$ in., sessile, acute, hairs adpressed from tubercular bases. *Raceme* in fruit $3\frac{1}{2}$ in., long-peduncled; pedicels $\frac{1}{2}$ in., rigid, suberect. *Calyx-lobes* $\frac{1}{8}$ in., linear, sparingly strigose; in fruit $\frac{1}{6}$ in. *Corolla* $\frac{1}{2}$ in. diam., tube $\frac{1}{2}$ in. long; scales in the throat very small; lobes spreading. *Anthers* subsessile, above the scales. *Style* $\frac{1}{2}$ in. *Nutlets* $\frac{1}{10}$ in., white or pale, shining.—Described from *Jacquemont's* specimen.

2. ***M. moltkoides***, *Clarke*; patently hairy, leaves oblong or elliptic lower long-petioled spathulate, racemes many-flowered, corolla-tube nearly twice as long as the calyx, scales in the throat small. *Anchusa moltkoides*, *Benth. in Royle Ill.* 305, t. 73, fig. 1; *DC. Prodr.* x. 51. *Lithospermum moltkoides*, *Dcne. in Jacquem. Voy. Bot.* 122.

KASHMIR, alt. 8000 ft., *Falconer*; near Islamabad, *Thomson*. PANGEE; *Dr. Watt*.

Very near *M. elongata*; leaves more softly hairy, hairs on the midrib beneath patent or reflexed. *Racemes* shorter peduncled. *Calyx* larger. *Corolla-tube* $\frac{1}{2}$ by $\frac{1}{18}$ in. *Nutlets* brown-black, not more excavate at the base than are those of *M. elongata*.

VAR. *Thomsoni*; radical leaves large elliptic acute, corolla exceeding $\frac{1}{2}$ in. diam. with tube $\frac{1}{2}$ in. long. *Mertensia* sp. n. 3, *Herb. Ind. Or. H. f. & T.*—Kashmir, alt. 11,000 ft.; near Islamabad, *Thomson*. *Radical leaves* 3 by $1\frac{1}{2}$ in., base subobtuse. *Pedicels* in fruit $\frac{1}{4}$ – $\frac{1}{2}$ in. *Sepals* in fruit $\frac{1}{2}$ in. and upwards, narrowly oblong, patently hairy. *Nutlets* exceeding $\frac{1}{2}$ in. brown-black.

3. ***M. echioides***, *Benth. in Gen. Pl.* ii. 857; softly hairy, leaves oblong lower long-petioled spathulate, raceme dense many-fl., corolla-tube one-third longer than the calyx-lobes erect scales in the throat obsolete, anthers exsert from the tube. *Lithospermum echioides*, *Benth. in Royle Ill.* 305; *DC. Prodr.* x. 83. *L. secundiflorum*, *Dcne. in Jacquem. Voy. Bot.* 120, t. 125. *Eritrichium secundiflorum*, *A. DC. Prodr.* x. 124.

KASHMIR and WESTERN TIBET, alt. 5–12,000 ft.; from the Upper Indus to the southern face of the Himalaya, frequent; *Royle, Falconer, &c.*

Stems 6–15 in. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ in., subobtuse. *Peduncles* long; racemes 1–3 in., dense even in fruit; pedicels $\frac{1}{2}$ – $\frac{1}{2}$ in., linear. *Corolla-tube* $\frac{1}{2}$ – $\frac{1}{4}$ in., lobes $\frac{1}{2}$ in. *Filaments* linear, distinct; anthers completely exsert, but not reaching above its lobes. *Style* and *nutlets* as of *M. elongata*.—Easily distinguished from all the other species of *Mertensia* by its erect corolla-lobes.

4. ***M. primuloides***, *Clarke*; strigose, leaves small elliptic lower very shortly petioled, raceme dense not many-flowered, corolla-tube $\frac{1}{4}$ in. twice as long as the calyx, scales in the throat distinct. *Eritrichium primuloides*, *Dcne. in Jacquem. Voy. Bot.* 123, t. 128; *A. DC. Prodr.* x. 125.

ALPINE WESTERN HIMALAYA, *Jacquemont*; Sai and Gilgit, alt. 15,000 ft., *Col. Tanner*.

Stems 3 in., densely leafy below. *Leaves* $\frac{1}{2}$ by $\frac{1}{8}$ in., narrowed at both ends; petiole short or very broad. *Peduncle* 1 in. *Raceme* in flower $\frac{1}{2}$ in.; pedicels $\frac{1}{12}$ in. *Calyx-lobes* $\frac{1}{2}$ in., narrowly oblong. *Corolla* $\frac{1}{4}$ in. diam. *Anthers* subexsert, overtopping the small scales. *Style* $\frac{1}{2}$ in. *Fruit* unknown.

VAR. Tanneri; leaves 2 in. linear-spathulate, calyx-lobes $\frac{1}{5}$ in., corolla violet-purple, tube $\frac{1}{2}$ in. long.—Gilgit and Astor, *Col. Tanner*. This looks like a distinct species, but there is only a fragment (in flower).

5. **M. tibetica**, *Clarke*; hispid, leaves small subradical long-petioled elliptic, peduncles long subscapose, corolla-tube $\frac{3}{4}$ — $\frac{2}{3}$ in. five times as long as the calyx, anthers included, scales in the corolla-throat large.

WESTERN TIBET; Karakorum, alt. 14–16,000 ft., *Clarke*.

Leaves all subradical, $\frac{2}{3}$ by $\frac{1}{4}$ in., petiole 1 in. *Peduncles* 2–4 in.; racemes 1–4 in.; pedicels $\frac{1}{8}$ in. *Sepals* $\frac{1}{2}$ in., narrowly oblong; in fruit $\frac{1}{5}$ in. *Corolla-tube* elongate-funnel-shaped, $\frac{1}{2}$ in. wide in the throat; lobes $\frac{1}{2}$ in. and upwards, subquadrate; scales half as long as the lobes, obtuse, emarginate; anthers entirely below the scales. *Style* $\frac{3}{4}$ in. *Nutlets* as of *M. moltkoides*.

6. **M. racemosa**. *Benth. in Gen. Pl.* ii. 857; minutely hairy, radical leaves long-petioled ovate cauline ovate to lanceolate, racemes lax few-flowered, corolla-tube half as long again as the calyx. *Myosotis racemosa*, *Benth. in Royle III.* 305. *M. longiflora*, *Wall. Cat.* 929; *A. DC. Prodr.* x. 113. *Lithospermum ovalifolium*, *Dene. in Jacquem. Voy. Bot.* 119, t. 124. *Eritrichium nemorosum*, *A. DC. l. c.* 123. *Anchusa racemosa*, *DC. Prodr.* x. 50.

TEMPERATE WESTERN HIMALAYA, alt. 7–10,000 ft.; Gurwhal and Kumaon, frequent near Simla; *Royle, Munro, Madden, &c.*

Stems 3–8 in., weak, nearly glabrous. *Radical leaves* 1–1 $\frac{1}{2}$ in., often suborbicular, obtuse, base sometimes cordate; petiole 1–4 in.; cauline similar, smaller, often nearly all petioled. *Racemes* subsessile, i.e. bracteate at the base; pedicels attaining $\frac{1}{4}$ — $\frac{1}{2}$ in. *Sepals* $\frac{1}{10}$ in., linear; in fruit $\frac{1}{2}$ in., villous. *Corolla* $\frac{1}{2}$ — $\frac{3}{8}$ in. diam.; tube $\frac{1}{2}$ in., scales in the throat prominent; anthers below the scales. *Style* $\frac{1}{4}$ — $\frac{1}{2}$ in. *Nutlets* as of *M. moltkoides*.

25. MOLTZIA, *Lehm.*

Corolla abbreviated with small erect lobes hardly overtopping the calyx. *Anthers* long exsert on filiform filaments. Otherwise as *Mertensia*.

M. parviflora, *Clarke*; minutely hairy, leaves linear-oblong, racemes peduncled dense scorpioid ebracteate. *Craniospermum parviflorum*, *Dene. in Jacquem. Voy. Bot.* 126, t. 130; *A. DC. Prodr.* x. 175.

KASHMIR, alt. 6–8000 ft.; *Thomson, Aitchison*.—DISTRIB. Cabul.

Rootstock woody; annual stems 3–10 in., suberect, with sometimes a long trailing stem added. *Leaves* 2 by $\frac{1}{2}$ in. *Racemes* 1–2 in., dense, sometimes forked; pedicels 0— $\frac{1}{8}$ in. *Calyx-lobes* $\frac{1}{2}$ in., narrowly oblong; in fruit $\frac{1}{5}$ in. rather wider. *Corolla* without scales in the throat. *Filaments* exsert $\frac{1}{2}$ in. *Style* $\frac{1}{4}$ in. *Nutlets* ovoid-oblong, acute, smooth, shining; scar small at the base on the inner side.—All the other species of *Moltzia* have bracteate racemes. *Nutlets* altogether of *Mertensia*, and the plant hardly differs from *M. echinoides* but in the abbreviated corolla and longer filaments. *Craniospermum* has exsert anthers but is remote in habit and in the fruit.

26. TRIGONOTIS, *Steo.*

Perennial herbs, weak or diffuse, more or less hairy. *Leaves* alternate, ovate or lanceolate, mostly petioled. *Racemes* lax, ebracteate, or the lower pedicels bracteate, or many pedicels axillary. *Calyx* 5-fid, or 5-partite, in fruit

not or slightly enlarged. *Corolla* small, blue or white; tube shorter than the calyx, throat with 5 small scales; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, included; anthers oblong, obtuse. *Ovary* deeply 4-lobed; style filiform, not elongate, stigma capitate. *Nutlets* 4, tetrahedral with 4 acute or submarginate edges, hardly longer than broad, shining black; scar small, basal, substipitate.—Species 10; Central and E. Asia.

* *Nutlets glabrous* (three very closely allied species).

1. ***T. microcarpa***, *Benth. in Gen. Pl.* ii. 858; leaves petioled ovate acute minutely strigose on both surfaces, racemes terminal, solitary axillary pedicels added, fruiting sepals oblong acuminate. *Myosotis microcarpa*, *Wall. Cat.* 928. *Eritrichium microcarpum*, *DC. Prodr.* x. 123.

ALPINE NEPAL and SIKKIM, alt. 10,000 ft.; *Wallich, J. D. H.*

Stems 6–20 in., procumbent, divided. *Cauline leaves* 1 by $\frac{1}{2}$ in., mucronate, obtuse or rounded at the base, petiole $\frac{1}{4}$ in.; radical leaves rather larger petioled, $1\frac{1}{2}$ in. *Racemes* in fruit 3–6 in., ebracteate, i.e. lower scattered pedicels in the axils of fully-developed leaves; pedicels $\frac{1}{4}$ in. *Calyx-lobes* $\frac{1}{20}$ in., in fruit $\frac{1}{18}$ – $\frac{1}{12}$ in. *Flowers* $\frac{1}{2}$ in. diam. *Nutlets* $\frac{1}{20}$ in. diam.

2. ***T. rotundifolia***, *Benth. in Gen. Pl.* ii. 858; cauline leaves sessile or petioled elliptic narrowed at both ends minutely strigose, racemes terminal, calyx-lobes elliptic acute. *Myosotis rotundifolia*, *Wall. Cat.* 930. *Eritrichium rotundifolium*, *DC. Prodr.* x. 123.

SUBALPINE HIMALAYA, alt. 6–10,000 ft.; *Royle*; Kumaon, *Wallich*; Sikkim (Lachen), *J. D. H.*

Stems weak, 2–4 in. *Cauline leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in.; radical long-petioled, some orbicular but many spatulate.—Does not differ from *T. microcarpa* except in being smaller, with subsessile leaves more attenuate at the base. *Wallich's* example is not in good fruit.

3. ***T. multicaulis***, *Benth. in Gen. Pl.* ii. 858; cauline leaves sessile or petioled elliptic narrowed at both ends minutely strigose, racemes terminal, calyx-lobes in fruit ovate acute. *Myosotis multicaulis*, *Wall. Cat.* 7020. *Eritrichium multicaule*, *DC. Prodr.* x. 123.

CENTRAL and EASTERN HIMALAYA; NEPAL; *Wallich*. SIKKIM, alt. 10–12,000 ft.; Latong, *J. D. H.*

Stems 10 in. *Leaves* $\frac{3}{4}$ by $\frac{1}{4}$ in., upper sessile. *Pedicels* $\frac{1}{4}$ in.—Described from *Wallich's* examples, which resemble his *T. rotundifolia*, but are larger. The Sikkim ones are much smaller, with fruiting pedicels hardly exceeding $\frac{1}{8}$ in. and the nutlets brown yellow.

** *Nutlets minutely patently hairy on all sides.*

4. ***T. ovalifolia***, *Benth. in Gen. Pl.* ii. 858; leaves petioled ovate minutely strigose on both surfaces, racemes terminal with solitary axillary pedicels added, fruiting sepals elliptic acuminate. *Myosotis ovalifolia*, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 9, and *Cat.* 927. *Eritrichium ovalifolium*, *DC. Prodr.* x. 123.

CENTRAL and EASTERN HIMALAYA; Nepal and Sikkim, alt. 8–12,000 ft., frequent; *Wallich, J. D. H.*, &c.

Stems 8–24 in., mostly prostrate. *Cauline leaves* $\frac{1}{2}$ – $1\frac{1}{4}$ in., from elliptic to orbicular, obtuse, base often cordate, petiole $\frac{1}{3}$ – $\frac{1}{2}$ in. *Pedicels* sometimes all axillary $\frac{1}{4}$ – $\frac{3}{4}$ in.; terminal racemes generally added. *Calyx-lobes* in fruit $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* $\frac{1}{4}$ in. diam. and upwards. *Nutlets* $\frac{1}{16}$ – $\frac{1}{12}$ in. diam.—Had there been as few specimens of this as of the three preceding species, the axillary-flowered examples would indubitably have been reckoned distinct from *Wallich's* terminal-racemed ones.

5. **T. Hookeri**, *Benth. in Gen. Pl.* ii. 853; leaves elliptic acute hispid-villous, racemes lateral and terminal elongate ebracteate, calyx-lobes oblong acuminate hispid villous.

KHASIA MTS., alt. 5-6000 ft.; Moflong, *H. f. & T.*

Stems 2 feet at least, stout, branched, patently hispid villous. *Cauline leaves* 2 by $\frac{1}{2}$ – $\frac{3}{4}$ in., base obtuse; petiole $0\frac{1}{2}$ in. *Racemes* 3-6 in., often peduncled, axillary; pedicels $\frac{1}{4}$ – $\frac{1}{3}$ in. *Calyx-lobes* in fruit $\frac{1}{8}$ – $\frac{1}{6}$ in. *Flowers* $\frac{1}{4}$ – $\frac{1}{3}$ in. diam. *Nutlets* $\frac{1}{12}$ in. diam.—This is an ennobled species of *Trigonotis*, much finer than the others, but the nutlets nearly as of *T. ovalifolia*.

27. **MYOSOTIS**, Linn.

Annual or perennial, *hairy* herbs. *Leaves* alternate or densely crowded. *Racemes* elongate, ebracteate, or flowers subsessile and solitary in the penultimate axils. *Calyx* shortly or deeply 5-fid, hardly altered in fruit. *Corolla* blue, changing to red, or white, tube short, mouth closed with scales; lobes 5, twisted to the right in bud, obtuse, spreading. *Stamens* 5, included; anthers ovate, obtuse. *Ovary* deeply 4-lobed; style filiform, stigma small. *Nutlets* 4, ovoid-oblong, longer than broad, shining, smooth, or hairy upwards; scar basal, small; receptacle flat.—Species 30; temperate regions of the N. hemisphere; in Australia and New Zealand.

SECT. I. **Eumyosotis**, A. DC. Weak herbs. *Leaves* distant. *Racemes* elongate, scorpioid. *Nutlets* glabrous.

1. **M. cæspitosa**, *Schultz Fl. Starb.* ii. 11; hairs of stem adpressed, leaves oblong lowest spatulate, pedicels longer than the calyx, calyx-teeth triangular-lanceolate about as long as the tube adpressedly hairy. *DC. Prodr.* x. 105, with syn.; *Syme Engl. Bot.* t. 1103; *Boiss. Fl. Orient.* iv. 235. *M. palustris*, *Benth. in Royle Ill.* 305, not exactly of *With.* *M. lingulata*, *Lehm. Asperif.* 110, name only.

TEMPERATE and SUBALPINE HIMALAYA, from Kunawur to Kashmir and Baltistan; *Royle, Falconer, Thomson*.—DISTRIB. From Cabul to Siberia, Europe and N. Africa, N. America.

Stems 4-20 in. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ in. *Racemes* 2-8 in.; lower fruiting pedicels $\frac{1}{4}$ in. and upwards. *Calyx* in fruit $\frac{1}{2}$ in., sparsely minutely strigose; teeth scarcely acute. *Corolla* $\frac{1}{2}$ in. diam. *Style* shorter than the calyx.—The name *M. lingulata*, *Lehm.* is one year prior to *M. cæspitosa*, *Schultz*; but Boissier and most authors do not consider the notice of the plant by *Lehmann* to be worthy the rank of a "description."

2. **M. sylvatica**, *Hoffm. Deutsch. Fl.* i. 85; hairs of stem spreading, leaves oblong lowest petioled, pedicels longer than the calyx, calyx villous some of the hairs spreading at base, teeth lanceolate longer than the tube, corolla $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. limb flat. *DC. Prodr.* x. 107 with syn.; *Syme Engl. Bot.* t. 1107; *Boiss. Fl. Orient.* iv. 237. *M. montana*, *Besser*; *Fl. Dan.* t. 583. *M. pallens*, *Wall. Cat.* 7019; *DC. l. c.* 112.

ALPINE WESTERN HIMALAYA, alt. 7-12,000 ft., from Kumaon to Kashmir, frequent; *Wallich, &c.*—DISTRIB. Europe; N. West Asia to the Canaries.

Stems 4-16 in., mostly erect, sparingly villous. *Leaves* $1\frac{1}{2}$ by $\frac{1}{4}$ in., lowest broader. *Racemes* 2-8 in., often divided; lower fruiting pedicels usually $\frac{1}{4}$ in. or more, hardly longer than the calyx in *Wallich's M. pallens*. *Calyx* in fruit $\frac{1}{4}$ – $\frac{1}{2}$ in., with many ascending hairs and some patent from the base; teeth in fruit erect hardly connivent.

3. **M. arvensis**, *Hoffm. Deutsch. Fl.* i. 85; hairs of stem spreading, leaves oblong lowest petioled, pedicels longer than the calyx, calyx villous

some of the hairs spreading at base, teeth lanceolate longer than the tube, corolla $\frac{1}{2}$ – $\frac{1}{4}$ in. diam. limb concave. *Engl. Bot.* t. 2558. *M. intermedia*, *Link. Enum.* i. 164; *DC. Prodr.* x. 108; *Boiss. Fl. Orient.* iv. 239.

SUBALPINE KASHMIR; *Aitchison*.—DISTRIB. Cabul and Siberia to N. Africa and Europe.

Hardly distinguishable from *M. sylvatica* but by the smaller corolla. *Pedicels* in fruit longer. *Calyx-teeth* in fruit connivent over the nutlets.—*Aitchison's* example is as near English *M. arvensis* as may be; there are other Kashmir examples supposed to be *M. arvensis* or *M. intermedia*, but they cannot be distinguished in the herbarium from *M. sylvatica*.

4. ***M. stricta***, *Link. Enum.* i. 164; hairs of stem spreading, leaves oblong lower subsessile, lower pedicels in fruit shorter than the calyx, calyx villous some of the hairs spreading at base, teeth lanceolate longer than the tube erect in fruit. *DC. Prodr.* x. 109; *Boiss. Fl. Orient.* iv. 239.

KASHMIR, *Falconer*; alt. 5–6000 ft., *Thomson*; *Pangee, Dr. Watt*.—DISTRIB. Cabul, W. Asia, N. Africa, Europe.

Stems 3–8 in. erect. *Leaves* $\frac{3}{4}$ by $\frac{1}{5}$ in., narrowed at both ends. *Racemes* 3–5 in., often reduced nearly to a spike, with closely approximated flowers.

SECT. 2. Small, densely tufted herbs. *Leaves* crowded. *Flowers* solitary, sub-sessile. *Nutlets* hairy upwards.

5. ***M. Hookeri***, *Clarke*; leaves obovate-spathulate villous.

ALPINE SIKKIM, alt. 15–17,000 ft.; *Kinchinjaw*, *Lama Kangra*, and *Phulloong*, *J. D. H.*

Appearing like a small tufted Alpine *Cerastium*, but with bright blue flowers. *Stems* 1–3 in., repeatedly dichotomous, most densely clothed with leaves in appearance whorled, lower withering or scale-like. *Leaves* $\frac{1}{2}$ – $\frac{1}{3}$ in., very obtuse, with much soft straight long white hair. *Flowers* just emergent from the tufts, nearly as of *Myosotis arvensis* and *sylvatica*. *Nutlets* nearly as of *M. arvensis*, but with some erect hairs in the upper half.

IMPERFECTLY KNOWN SPECIES.

M. ROBUSTA, *Don Prodr.* 101; *DC. Prodr.* x. 112; roots perennial fusiform; stem $1\frac{1}{2}$ feet, ascending, simple, hairy; leaves 3 by $\frac{3}{8}$ in. sessile, elliptic oblong, acute, hairy on both surfaces; racemes paired, short, ebracteate; calyx-segments ovate obtuse, larger than the corolla-tube.—*Nepal*, *Gossainthan*, *Wallich*.—Known only by *Don's* description, which does not accord with any of the described species.

28. **LITHOSPERMUM**, *Linn.*

Herbs or undershrubs, hispid or rough. *Leaves* alternate. *Flowers* white blue or yellow, axillary solitary or in terminal bracteate racemes. *Sepals* 5, linear. *Corolla* tubular-funnel-shaped, throat naked or with 5 small scales; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, included; anthers oblong, obtuse or apiculate. *Ovary* deeply 4-lobed; style filiform or cylindric, stigma usually 2-fid. *Nutlets* 4, erect, ovoid, stony, smooth or rough; scar flat, basal; receptacle nearly flat.—Species 40, in the temperate N. hemispheres, Africa, and S. America.

1. ***L. arvense***, *Linn.*; *DC. Prodr.* x. 74; strigose, leaves lanceolate lower petioled obovate-oblong, corolla white rarely blue tube not longer than the calyx, nutlets ovoid-oblong tuberculate. *Engl. Bot.* t. 123; *Boiss. Fl. Orient.* iv. 216. *Margarospermum arvense*, *Dene. in Jacquem. Voy. Bot.* 122.

KASHMIR; Peshawur, *Vicary*. WESTERN TIBET, *Thomson*.—DISTRIB. From Cabul, Siberia to N. Africa, Europe.

Annual. *Stems* 12–24 in., erect. *Cauline leaves* 1 by $\frac{1}{4}$ in., strigose, hairs often from tuberculate bases. *Racemes* in fruit 4–10 in., pedicels $\frac{1}{10}$ in.; bracts leaflike, smaller upwards. *Corolla* $\frac{1}{4}$ in. long, hairy upwards. *Nutlets* $\frac{1}{8}$ in., gradually narrowed upwards; sepals in fruit $\frac{1}{4}$ – $\frac{1}{3}$ in., hispid.

2. ***L. tenuiflorum***, *Linn. f. Suppl.* 130; strigose, leaves oblong-linear lower spatulate scarcely petioled, corolla blue rarely white tube slightly exceeding the calyx, nutlets ovoid somewhat suddenly acuminate tuberculate. *Jacq. Ic. Rar.* ii. t. 313; *DC. Prodr.* x. 75; *Boiss. Fl. Orient.* iv. 217. *Myosotis tenuiflora*, *Viv. Fl. Lib.* 9, t. 1, fig. 2.

KASHMIR, alt. 5–7000 ft., *Thomson*. PUNJAB, Rawul Pindee, *Aitchison*.—DISTRIB. Cabul, W. Asia to Egypt and Greece.

Very near the preceding species. *Stems* often divided near the base, decumbent, rarely more than 12 in.

3. ***L. officinale***, *Linn.*; *DC. Prodr.* x. 76; hispidly hairy, leaves oblong-lanceolate, corolla white fading yellowish, nutlets ovoid shining white smooth. *Engl. Bot.* t. 134; *Boiss. Fl. Orient.* iv. 218. *Margarospermum officinale*, *Dcne. in Jacquem. Voy. Bot.* 122.

KASHMIR; alt. 5–8000 ft., frequent; *Falconer, Thomson, &c.*

Perennial. *Stems* 2–4 feet, erect, corymbose upwards. *Leaves* 2 by $\frac{1}{2}$ in., rough strigose, nerves subprominent. *Racemes* in fruit 1–4 in.; pedicels $\frac{1}{8}$ in.; bracts leaflike, smaller upwards. *Corolla* $\frac{1}{4}$ in., hairy upwards. *Nutlets* $\frac{1}{8}$ in.; sepals in fruit $\frac{1}{4}$ in.

29. **SERICOSTOMA**, *Stocks*.

Small strigose branched shrubs. *Leaves* alternate. *Flowers* small, axillary, sessile, solitary, or the upper in a bracteate raceme. *Sepals* 5, narrow. *Corolla-tube* short; mouth wide, closed with hair; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5, subincluded; anthers oblong, obtuse. *Ovary* deeply 4-lobed; style short, stigma subcapitate. *Nutlets* 4, ovoid, substipitate; scar basal; receptacle flat.—Species 3 in W. Asia, from India to Arabia.

1. ***S. pauciflorum***, *Stocks in Wight Ic.* t. 1377; roughly strigose, leaves oblong subsessile, corolla white, nuts ovoid acute stony blotched with very flat white tubercles. *Dalz. & Gibs. Bomb. Fl.* 172; *Hook. Ic. Pl.* t. 804.

W. INDIA; Deesa. KATTYWAR (in the sands near the sea). SCINDE; *Stocks, &c.*

Attaining 12–18 in., oftener small, scrubby. *Leaves* $1\frac{1}{4}$ by $\frac{1}{2}$ – $\frac{3}{4}$ in., obtuse with a minute mucro, narrowed at the base, hispid with tubercle-based hairs; in scrubby plants $\frac{1}{4}$ – $\frac{1}{2}$ in. long. *Sepals* $\frac{1}{8}$ in., lanceolate, hispid. *Corolla* $\frac{1}{4}$ in. diam., lobes crisp subserrulate on the margin; tube within and base of the lobes densely hairy. *Nutlets* $\frac{1}{10}$ in., acute.

30. **ARNEBIA**, *Forsk.*

Annual or perennial hispid herbs, diffuse or divided near the base; root often staining red. *Leaves* alternate. *Racemes* terminal, elongate, bracteate; flowers subsessile, yellow or whiteish (in the Indian species). *Sepals* linear, not or slightly enlarged in fruit (in the Indian species). *Corolla-tube* slender, longer than the sepals, throat naked within; lobes 5, imbricate in bud, obtuse, spreading. *Stamens* 5; much below the mouth of the tube with long style, or in the throat semi-exsert with short style; anthers small, oblong obtuse. *Ovary* deeply 4-lobed; style shortly bipartite, stigmas small capitate, nearly the same in the long- and short-styled flowers. *Nutlets* 4, ovoid-oblong or acute, erect;

scar basal, large, triangular, flat, shortly produced up the inner face.—Species 12; in N. Africa, W. and Central Asia.

1. **A. hispidissima**, *DC. Prodr.* x. 94; very hispid, leaves lanceolate, sepals $\frac{1}{2}$ in., corolla-tube $\frac{1}{2}$ in., nutlets $\frac{1}{20}$ – $\frac{1}{16}$ in. ovoid-conic sharply tuberculate on all sides. *Wight Ic.* t. 1393; *Boiss. Fl. Orient.* iv. 213; *Clarke in Journ. Linn. Soc.* xviii. 524. *Dioclea hispidissima*, *Spreng. Syst.* i. 556. *Lithospermum hispidissimum*, *Lehm. Ic.* t. 39. *L. vestitum*, *Wall. Cat.* 941; *Benth. in Royle III.* 305. *Echiochilon hispidissimum*, *Tausch. in Flora*, 1829, 643. *Strobila hispidissima*, *G. Don Gen. Syst.* iv. 327.

WESTERN INDIA, alt. 500–3000 ft.; from the Upper Gangetic plain and Rajpootana westwards, frequent.—DISTRIB. W. Asia to Egypt and Nubia.

Annual and (at least) biennial, diffuse, 3–15 in.; hairs white, harsh, spreading from tubercular bases. *Leaves* 2 by $\frac{1}{2}$ in. *Spikes* 2–4 in., one-sided; bracts $\frac{1}{4}$ – $\frac{1}{2}$ in., linear. *Corolla* yellow, mouth $\frac{1}{4}$ in. diam.—Dimorphic; the plants with stamens sub-erect about as numerous as those with anthers below the corolla-throat.

2. **A. Griffithii**, *Boiss. Fl. Orient.* iv. 213; patently hispid, leaves lanceolate, sepals $\frac{1}{3}$ – $\frac{1}{2}$ in., corolla-tube $\frac{3}{4}$ –1 in., nutlets $\frac{1}{10}$ in. ovoid suddenly narrowed upwards obtusely tuberculate on all sides. *Bot. Mag.* t. 5266. *A. echiioides*, *Hook. Bot. Mag.* t. 4409, not of l. c.—*Arnebia* sp. n. 5, *Herb. Ind. Or. H. f. & T.*

PUNJAB; Peshawur, *Vicary*. SCINDE; *Col. Thompson*.—DISTRIB. Beloochistan, Cabul.

Annual, diffuse, 3–6 in.; hairs white, spreading, from tubercular bases, less harsh than in *A. hispidissima*. *Leaves* 2 by $\frac{1}{4}$ in. *Spikes* 1–3 in., one-sided. *Corolla* yellow, lobes on expansion with 5 dark brown spots at the sinus, which disappear as the day advances, mouth $\frac{1}{3}$ – $\frac{1}{2}$ in. diam. *Nuts* much larger than those of *A. hispidissima*, more triangular in horizontal section. Dimorphic.

3. **A. Thomsoni**, *Clarke*; shaggy hispid, leaves narrowly oblong, sepals $\frac{1}{2}$ in., corolla-tube $\frac{1}{2}$ in., nutlets $\frac{1}{10}$ in. ovoid-conic without tubercles.—*Arnebia* sp. n. 6, *Herb. Ind. Or. H. f. & T.*

WESTERN TIBET; Piti Valley, *Thomson*; Leh, *Lance*.

Biennial or perennial, diffuse, 3–10 in.; hairs white, long, dense, softer and more numerous than in *A. hispidissima*. *Leaves* $1\frac{1}{2}$ by $\frac{1}{4}$ – $\frac{1}{3}$ in. *Spikes* 1–2 in., dense; bracts oblong, obtuse, overtopping the sepals. *Corolla* nearly as of *A. hispidissima*. *Nutlets* gradually narrowed upwards, trigonous in horizontal section.—Stems and spikes much more villous than those of *A. hispidissima*, and the nutlets larger, smooth. Dimorphic.

4. **A. tibetana**, *Kurz in Journ. As. Soc.* 1874, pt. ii. 189; hispid, leaves narrowly oblong, sepals $\frac{1}{4}$ – $\frac{1}{3}$ in., corolla-tube $\frac{1}{2}$ – $\frac{1}{2}$ in., nutlets $\frac{1}{10}$ in. ovoid-conic scabrous.—*Arnebia* sp. n. 7, *Herb. Ind. Or. H. f. & T.*

NORTH KASHMIR and WESTERN TIBET, alt. 7–12,000 ft., frequent; *Thomson*, *Jaeschke*, *Aitchison*, &c.—DISTRIB. Kashgar, Yarkand.

Rootstock perennial, staining red.—Closely resembling *A. Thomsoni*; but more hispid, less villous; the spikes often elongate, the sepals somewhat widened in fruit, the nutlets minutely tuberculate. Dimorphic.

31. **MACROTOMIA**, *DC.*

Erect, hispid, perennial herbs. *Leaves* alternate, oblong or linear. *Spikes* dense, or in fruit elongate. *Sepals* 5, linear, long, more or less accrescent in fruit. *Corolla* (in the Indian species); tube narrow, long; throat naked; lobes 5, imbricate in bud, round, spreading. *Stamens* 5; anthers oblong, obtuse, in

the throat of the corolla, with the stigma in the middle of the tube; or anthers in the middle of the corolla-tube with the stigma at the mouth. *Ovary* deeply 4-lobed; style filiform, 2-fid with 2 capitate stigmas, or entire with a 2-lobed stigma. *Nutlets* 4, ovoid, rugose, trigonous; scar basal, large flat.—Species 6; Himalaya, Siberia, the Caucasus.

The character of the stigma, by which Benthams mainly separated *Arnebia* from *Macrotomia* is largely sexual; there is, however, no difficulty in separating the Indian species, the *Arnebias* having yellow flowers, the *Macrotomias* purple.

1. **M. Benthami**, DC. *Prodr.* x. 26; erect, tall, simple, hispid, leaves narrow-lanceolate, spike terminal solitary, sepals 1-1½ in. linear. *Clarke in Journ. Linn. Soc.* xviii. 524. *Echium Benthami*, Wall. *Cat.* 931; *G. Don Gen. Syst.* iv. 333. *Leptanthe macrostachya*, Klotzsch in *Reis. Pr. Waldem. Bot.* 95, t. 63.

WESTERN HIMALAYA, from Kumaon to Kashmir, alt. 10-13,000 ft., frequent; Wallich, Falconer, &c.—DISTRIB. Cabul.

Stem 1-3 ft. *Radical leaves* 11 by ½ in., cauline 3 by ½ in., acute. *Spike* 12 by 2-3 in., usually very dense. *Corolla-tube* ⅔ in.; mouth in diam. ¼-½ in. *Style* shortly bifid, stigmas 2 capitate. *Nutlets* ½ in., ovoid, suddenly acute, nearly as broad as long.

2. **M. perennis**, Boiss. *Fl. Orient.* iv. 212, note; stems solitary or several undivided hirsute, leaves oblong, cymes compound, spikes short many-flowered or subcapitate, sepals ½-¾ in. lanceolate-linear. *Clarke in Journ. Linn. Soc.* xviii. 525. *M. endochroma*, H. f. & T. ms.; *Henderson Yarkand*, 328; *Aitchison in Journ. Linn. Soc.* xviii. 81, name only. *M. onosmoides*, Regel & Smirnow in *Reg. Descr. Pl.* vi. 50. *Stenosolenium perenne*, Schrenk; *Fisch. & Mey. Enum. Fl. Schrenk*, 34. *Lithospermum euchromon*, Royle III. 305; DC. *Prodr.* x. 82. *Arnebia perennis*, A. DC. *Prodr.* x. 95.

ALPINE WESTERN HIMALAYA and WESTERN TIBET, alt. 10-14,000 ft., from the Karakorum and Kashmir to Kumaon, frequent; Royle, Thomson, &c.—DISTRIB. Cabul, Kashgar, Yarkand, Alatau Mts.

Root perennial; stems 8-20 in. *Radical leaves* 5 by ½ in., striated; cauline 1-2 in., sessile. *Cymes* 3-4 in. diam., many-flowered, pedicels 0-½ in. in *M. endochroma*, H. f. & T.; or condensed capitate few-flowered in Royle's examples on which *Lithospermum euchromon*, Royle, was founded. *Sepals* ½-½ in. in flower, patently hirsute, in fruit sometimes nearly 1 in. and sublanceolate. *Corolla-tube* as long as the sepals in flower or exceeding them by ⅓-½ in.; lobes ½ in., varying in breadth. *Flowers* dimorphic, one form having ½ exserted anthers, and short 2-lobed stigmas, the other with included anthers between the capitate stigma. (See *Fisch. & Mey. l.c.*) *Nutlets* nearly as in *M. Benthami*, but larger.—There is difficulty about the specific name of this species; *M. endochroma*, H. f. & T. is a name published without a description, and it is not known whether it was an error for *M. euchroma* or whether it was intended to imply a species closely allied to *Lithospermum euchromum*. *M. cyanochoera*, Benth. (= *Munbya cyanochoera*, Boiss. *Fl. Orient.* iv. 212. *Arnebia tingens*, A. DC. *Prodr.* x. 96), does not differ from *M. perennis*, but by being more coarsely hispid; it is frequent in Cabul and Persia.

32. **ONOSMA**, Linn.

Hispid herbs or undershrubs. *Leaves* alternate. *Racemes* simple or cymose, one-sided, bracteate. *Flowers* yellow or purple, sessile or shortly pedicelled. *Calyx* 5-partite or 5-fid; segments acute, in fruit sometimes enlarged. *Corolla* tubular or ventricose, throat dilated or contracted; lobes 5, very short. *Stamens* 5, filaments attached near the middle of the corolla-tube linear short or long or greatly dilated at the base; anthers lanceolate, acuminate, free, conically

connivent, included or half-exserted. *Ovary* deeply 4-lobed; style filiform, stigma capitate or obscurely 2-lobed. *Nutlets* 4, ovoid, acute, erect or somewhat incurved, smooth or tuberculate; scar basal, large, flat.—Species 70, of the Mediterranean region and Central Asia.

SECT. 1. **Eunosma**. *Calyx lobes* in fruit much longer than the tube. *Corolla* tubular or somewhat widened upwards. *Filaments* not dilated at the base.

1. **O. echioides**, Linn.; DC. *Prodr.* x. 61; patently hispid, leaves oblong, racemes elongate often forked, calyx-lobes $\frac{1}{3}$ in. narrowly oblong, corolla $\frac{3}{4}$ in. cylindric slightly dilated upwards yellow, nutlets shining smooth. *Lamk. Ill.* t. 93; *Sibth. Fl. Græc.* t. 172; *Jacq. Fl. Austr.* t. 295; *Boiss. Fl. Orient.* iv. 181. O. hispida, Wall. *Cat.* 938; DC. *Prodr.* x. 66. O. arenarium, Walldst. & Kit. *Pl. Hung.* iii. t. 279. O. Gmelini, Ledeb. *Fl. Alt.* i. 184, and *Ice. Fl. Ross.* iii. t. 280.

KASHMIR, alt. 5-9000 ft., frequent, Thomson, &c. KUMAON; Royle.—DISTRIB. From Siberia and Cabul to France.

Biennial; stems 8-20 in. *Cauline leaves* $2\frac{1}{2}$ by $\frac{1}{2}$ in. *Racemes* in fruit 1-6 in.; bracts $\frac{1}{2}$ -1 in., leaflike; pedicels $0-\frac{1}{2}$ in. *Calyx-lobes* in fruit attaining sometimes 1 in. *Corolla* $\frac{1}{4}$ in. diam. at top, glabrous without. *Filaments* linear, anthers included or shortly exserted. *Style* overtopping the anthers. *Nuts* $\frac{1}{2}-\frac{1}{4}$ in. long, stony, white, often speckled.

2. **O. Hookeri**, Clarke; hirsute, leaves oblong, racemes subcapitate, calyx-lobes $\frac{1}{3}$ in. linear silky, corolla $\frac{3}{4}$ in. cylindric dilated upwards, nutlets muricated on the sides.—*Onosma*, sp. n. 2, *Herb. Ind. Or. H. f. & T.*

ALPINE SIKKIM, alt. 12-14,000 ft.; Kongra Lama and Tungu, J. D. H.

Rootstock perennial; stems 3-7 in. *Radical leaves* 3 by $\frac{1}{2}$ in.; *cauline* 1-2 by $\frac{1}{4}$ in., somewhat distant. *Flowers* in a single terminal villous head. *Calyx-lobes* in fruit $\frac{3}{4}$ in., very silky. *Corolla* silky without, apparently purple; upper half $\frac{1}{2}$ in. diam., nearly twice as wide as the lower. *Stamens* and *style* nearly as of *O. echioides*. *Nutlets* scarcely $\frac{1}{2}$ in., ovoid, suddenly narrowed, somewhat incurved, shining, and nearly smooth on the back.—Affords the best Lepcha red dye.

3. **O. Thomsoni**, Clarke; hirsute, leaves linear white woolly beneath, racemes small divided calyx-lobes $\frac{1}{3}$ in. linear, corolla $\frac{1}{2}-\frac{1}{3}$ in. cylindric slightly dilated upwards, nutlets shining glabrous.—*Onosma* sp. n. 3, *Herb. Ind. Or. H. f. & T.*

KASHMIR, alt. 6000 ft.; Banahal, Thomson.

Perennial; stems 1-2 ft., patently hairy. *Cauline leaves* $1\frac{1}{2}$ by $\frac{1}{8}-\frac{1}{6}$ in., hispid above with tubercular-based hairs. *Racemes* 1-3 in., capitate or in fruit lax; bracts $\frac{1}{2}$ in., linear; pedicels $0-\frac{1}{4}$ in. *Calyx-lobes* scarcely enlarged in fruit. *Corolla* minutely hairy, mouth $\frac{1}{8}-\frac{1}{6}$ wide. *Anthers* more than half their length exsert; style overtopping the stamens. *Nutlets* $\frac{1}{2}$ in., ovoid, very acute, somewhat incurved, sides obscurely angular.

4. **O. bracteatum**, Wall. in Roxb. *Fl. Ind. ed.* Carey & Wall. ii. 13; and *Cat.* 936; hirsute, leaves lanceolate upper ovate-lanceolate silky white beneath, racemes capitate, calyx-lobes in fruit 1 in. linear silky, corolla-tube $\frac{1}{2}$ in. slightly dilated upwards, nutlets ovoid rough. DC. *Prodr.* x. 66. O. macrocephala, Don *Prodr.* 99.

WESTERN HIMALAYA; Kashmir, Royle. Kumaon, alt. 11,500 ft.; Pindari, Strachey & Winterbottom.

Stems 15 in., erect, stout, patently hispid. *Radical leaves* 6 by 1 in., petioled; *cauline* 2 by $\frac{2}{3}$ in., acuminate, upper surface hispid with tubercular-based hairs. *Flowers* in dense silky heads 2-3 in. diam. *Corolla* $\frac{1}{2}$ in. diam. at the mouth, hairy

without, a ring of hairs at the base within, purple (?). *Anthers* included, filaments linear. *Nutlets* $\frac{1}{8}$ in., acute.

5. **O. bicolor**, *Wall. Cat.* 939; hispid, cauline leaves spathulate-oblong uppermost elliptic sessile, racemes small divided, calyx-lobes $\frac{1}{5}$ in. lanceolate, corolla $\frac{1}{2}$ in. tubular purple, nutlets obscurely minutely rough. *Maharanga bicolor*, *A. DC. Prodr.* x. 71.

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim at Lachen, alt. 10,000 ft.; *J. D. H.*

Stems 12–18 in., suberect, patently hispid. *Cauline leaves* $2\frac{1}{2}$ by $\frac{1}{2}$ in., subobtusate, much narrowed at the base, hispid with tubercle-based hairs above, whiter more silky beneath. *Cymes* 1–2 in.; bracts $\frac{1}{4}$ in., linear; pedicels $\frac{1}{2}$ in. *Calyx-tube* $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., hairy without, purple. *Anthers* included; filaments linear not dilated downwards. *Nutlets* $\frac{1}{10}$ in., ovoid, scarcely acute.

SECT. 2. **Maharanga**. *Calyx-tube* distinct, widened in fruit. *Corolla* ventricose, distinctly narrowed at the mouth. *Filaments* very much dilated downwards.

6. **O. Emodi**, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 11, not *Wall. Cat.*; hispid, leaves oblanceolate, calyx-lobes a little shorter than the corolla-tube, in fruit spreading broad-lanceolate. *O. vestitum*, *Wall. Cat.* 937. *Maharanga Emodi*, *A. DC. Prodr.* x. 71.

ALPINE HIMALAYA, alt. 10–13,000 ft.; Gurwhal, *Strachey & Winterbottom*; Nepal, *Wallich*; Sikkim, frequent.

Stems 6–18 in., suberect, patently hairy. *Cauline leaves* attaining 6 by $\frac{3}{4}$ in., subobtusate, hispid on both surfaces; uppermost 2 in., elliptic, sessile. *Flowers* capitate or in fruit cymose; bracts $\frac{1}{3}$ in., narrowly lanceolate; pedicels 0– $\frac{1}{4}$ in. *Calyx* $\frac{1}{2}$ in. diam. in fruit, lobes hardly twice as long as the tube, with long white hairs within. *Corolla* $\frac{1}{2}$ in., minutely hairy, purple. *Anthers* included. *Style* exsert. *Nutlets* $\frac{1}{3}$ in., muricate, tubercular.

7. **O. Wallichianum**, *Benth in Gen. Pl.* ii. 864; hispid, leaves spathulate lanceolate, calyx less than half the length of the corolla, lobes in fruit acutely lanceolate from a triangular base. *O. Emodi*, *Wall. Cat.* 940. *Maharanga Wallichiana*, *A. DC. Prodr.* x. 71.

NEPAL; *Wallich*.

This is perhaps as *Wallich* estimated it, a mere form of *O. Emodi*, which is a very variable plant. *Corolla*, *stamens*, *filaments* and *nutlets* are the same.

ORDER CI. CONVOLVULACEÆ. (By C. B. Clarke.)

Herbs or shrubs, often twining, very rarely trees. *Leaves* alternate, exstipulate, in *Cuscuta* 0. *Cymes* 1- or more-flowered; bracteate. *Flowers* regular, hermaphrodite, often showy, 5- (rarely 4-) merous. *Calyx* deeply 5-lobed, persistent, sometimes much enlarged in fruit. *Corolla* campanulate or funnel-shaped, rarely subrotate; limb shortly or deeply lobed, often 5-plaited in the bud. *Stamens* 5, on the corolla-tube; anthers oblong, dehiscing longitudinally. *Ovary* superior, often surrounded by an annular disc, of 2 carpels, 2-celled or by false dissepiments 4-celled; style 1 rarely 2, stigma capitate 2-lobed, or 2-branched; ovules 2 in each carpel, sessile, erect, anatropous. *Fruit* indehiscent, or 2–4-valved or circumsciss or breaking up irregularly, 4–2 rarely 1-seeded. *Seeds* erect, albumen 0 or scanty; cotyledons generally plaited, rarely flat; radicle next the hilum.—Species 800, more abundant in warm regions.

The following genera are expected to occur in British Burma.

Dichondra repens, *Forst.*, found in Mts. beyond Ava by Wallich, belongs to a small group of *Convolvulaceæ*, with a deeply 2-4-lobed ovary with basilar style, and a fruit of 2-4 utricles; it is a small creeping herb with cordate or reniform leaves, and small solitary axillary flowers. It is a native of warm countries in the old and new worlds.

Blinkworthia lycopodioides, *Choisy* (DC. Prodr. ix. 334), a very imperfectly known genus from near Ava. An erect villous shrub, with linear leaves glabrous above and subsilky beneath, short 1-fl. peduncles, 3 involucriform bracts, 5 sepals, a small urceolate corolla, 2-lobed stigma and 1-seeded berry.

TRIBUS 1. **Convolvulææ.** *Corolla-limb* plaited or induplicate in bud.

* *Fruit indehiscent.*

Stigma large, globose, subsessile	1. ERYCIBE.
Stigma 2, linear-oblong	2. RIVEA.
Ovary 4-celled; style long, stigmas 2	3. ARGYREIA.
Ovary 2-celled; style long, stigmas 2	4. LETTSOMIA.

** *Capsule 2-4-valved, or fragile and breaking up.*

Stigmas 2-globose. Filaments linear or dilated near the base.	5. IPOMÆA.
Stigmas 2-globose. Filaments with an oblong process near the base	6. LEPISTEMON.
Ovary 1-celled. Stigmas short-oblong. Bracts shorter than the calyx	7. HEWITTIA.
Ovary 1-celled. Stigmas short-oblong. Bracts enclosing the calyx	8. CALYSTEGIA.
Ovary 2-celled. Style 1. Stigmas short-oblong	9. CONVULVULUS.
Ovary 2-celled. Styles 2, each with 2 linear stigmas	10. EVOLVULUS.
Sepals in fruit enlarged, scarious. Capsule 1-seeded.	11. PORANA.
Styles 2, or 1 deeply 2-partite; stigmas capitate	12. BREWERIA.
Styles 2. Bract in fruit large, orbicular flat, reticulated	13. NEUROPELTIS.

TRIBUS 2. **Cresseæ.** *Corolla-lobes* imbricate in bud.

Leaves small, sessile. Sepals distinct. Styles 2	14. CRESSA.
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TRIBUS 3. **Cuscutææ.** Leafless, yellow, twining parasites.

Corolla small, campanulate or ovoid	15. CUSCUTA.
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1. **ERYCIBE**, *Roxb.*

Scandent or diffuse shrubs, or erect trees; shoots rusty-tomentose. *Leaves* from ovate to narrow-oblong, acuminate, entire, coriaceous. *Cymes* short, axillary or in terminal racemes or panicles; bracts usually inconspicuous. *Sepals* subequal, orbicular, coriaceous, adpressed to the base of the fruit. *Corolla* white or yellowish; tube shortly campanulate, densely hairy; limb plaited in bud, glabrous, lobes subbilobed, entire or serrate. *Stamens* on the corolla throat, filaments short; anthers ovate-lanceolate. *Ovary* globose, 1-celled, 4-ovuled; style 0, stigma large subglobose 2-lobed or -partite. *Berry* fleshy, ovoid or ellipsoid, 1-seeded. *Albumen* scanty, irregularly intruded between the plicate fleshy cotyledons; radicle inferior.—Species 20; from India to Australia.

* *Cymes in terminal racemes or panicles, sometimes also axillary.*

1. **E. paniculata**, *Roxb.* *Cor. Pl.* ii. 31, t. 159, and *Fl. Ind.* i. 585, and *ed. Carey & Wall.* ii. 284; branchlets angular, leaves obovate or obovate-oblong abruptly acuminate base attenuate, cymes in narrow terminal panicles, berry $\frac{1}{2}$ in. ellipsoid. *Wall. Cat.* 1330; *Wight Ill.* t. 180; *Chois. in Ann. Sc. Nat.* 2,

i. 222; *DC. Prodr.* ix. 464, *exclud. var.*; *Dalz. & Gibs. Bomb. Fl.* 169; *Brand. For. Fl.* 344; *Miq. Fl. Ind. Bat.* ii. 1032; *Benth. Fl. Austral.* iv. 411; *Kurz For. Fl.* ii. 214. *E. Rheedii*, *Blume Bijl.* 1047. *Erimatalia Rheedii*, *Roem. & Sch. Syst.* v. 331. *Catonia glauca*, *Vahl in Skrift Kiøbenh.* vi. 99.—*Rheede Hort. Mal.* vii. t. 39.

THROUGHOUT INDIA, from Oudh eastward and southward to Ceylon, Tenasserim and the Nicobars; ascending the Himalaya to 4000 ft.—*DISTRIB.* Malaya, Australia.

A diffuse or subscandent shrub, or an erect tree 40 ft. *Leaves* 5 by 2 in., glabrescent; nerves 5-7 pairs, distinct above; petiole $\frac{1}{3}$ in. *Panicles* 7 by $1\frac{1}{2}$ in.; bracts inconspicuous; pedicels $\frac{1}{8}$ – $\frac{1}{6}$ in. *Sepals* $\frac{1}{10}$ in. *Corolla* $\frac{1}{3}$ – $\frac{1}{2}$ in., yellowish.—Roxburgh's plant was a diffuse or subscandent shrub, with rusty shoots; the Central Indian is an erect tree with pendent branchlets and racemes, and grey pubescence.

VAR. Wightiana, leaves elliptic cuneately acuminate at both ends or lanceolate coriaceous, primary nerves obscure above, secondary prominent much reticulated beneath, axillary cymes often 3-5 in. elongate raceme-like or terminal panicle broad, flowers white sweet-scented. *E. Wightiana*, *Grah. Cat. Bomb. Pl.* 137; *Dalz. & Gibs. Bomb. Fl.* 170; *Brand. For. Fl.* 344. *Catonia elliptica*, *Vahl in Skrift Kiøbenh.* vi. 101.—*W. Deccan Peninsula*, from Bombay to Cochin; common.

VAR. peguensis; leaves elliptic cuneately acuminate at both ends, secondary nerves not prominently reticulate beneath, panicles terminal large, branches long or short, flowers white.—Chittagong; *J. D. H. Moulmein*; *Griffith, Falconer, Parish*.

2. ***E. expansa***, *Wall. Cat.* 1331; branchlets angular rusty-tomentose, leaves elliptic acuminate base rounded or subcordate, cymes in terminal racemes or panicles often prominently bracteate. *G. Don Gen. Syst.* iv. 392. *E. ferruginosa*, *Griff. Notul.* iv. 283. *E. paniculata*, var. β *expansa*, *Chois. in Ann. Sc. Nat.* 2, i. 222; *DC. Prodr.* ix. 464.

PEGU and TENASSERIM; *Wallich*.

Panicles mostly large, broad (whence the name *E. expansa*); bracts $\frac{1}{2}$ –1 by $\frac{1}{4}$ in., foliaceous. *Berry* not seen.—Perhaps a form of *E. paniculata*, but the base of the leaf is always rounded or subcordate, which it never is in *E. paniculata*.

3. ***E. subspicata***, *Wall. Cat.* 1332; branchlets angular rusty-tomentose, leaves elliptic or lanceolate acuminate, cymes peduncled subspicate, berry $\frac{1}{2}$ – $\frac{2}{3}$ in. elliptic-oblong. *G. Don Gen. Syst.* iv. 392.

SILHET, *Wallich*. KHASIA MTS., *Griffith, J. D. H.*—*DISTRIB.* Ava.

Leaves 4 by $1\frac{3}{4}$ in., less abruptly acuminate than in *E. paniculata*, not at all obovate, rhomboid or rounded at the base, coriaceous, nerves obscure above.—Perhaps only a variety of *E. paniculata*; but the specimens are very uniform.

4. ***E. glaucescens***, *Wall. Cat.* 1334; nearly glabrous except the corolla, leaves elliptic acuminate base cuneate, cymes axillary often half as long as the leaves and in elongate terminal panicles. *Chois. in Ann. Sc. Nat.* 2, i. 223; *DC. Prodr.* ix. 464; *Kurz For. Fl.* ii. 214. *E. lævigata*, *Wall. Cat.* 1333 b; *Chois. in Ann. Sc. Nat.* 2, i. 223, partly; *DC. l. c.* partly.

SILHET and MOULMEIN, *Wallich*. CACHAR; *Keenan*.

Differs from *E. paniculata*, var. *peguensis*, only by the branchlets and young panicles being very nearly glabrous. *E. glaucescens* of *DC.*, with the racemes sparingly rufous-silky, and *E. glaucescens*, *Kurz*, with the young shoots rusty-pilose, may include, wholly or partially, *E. lævigata*. *Keenan* refers to his plant as "a tall erect tree with white scented flowers."

5. ***E. lævigata***, *Wall. Cat.* 1333, *a only*; branchlets angular slightly pubescent, leaves elliptic or oblong acuminate base cuneate, cymes short axillary towards the end of the branches and terminal scarcely paniced, berry $\frac{2}{3}$ in.

globose, *Chois. in Ann. Sc. Nat.* 2, i. 223, partly; *DC. Prodr.* ix. 464, partly. —*Erycibe*, n. 8, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 5-6000 ft., *Herb. Griffith, King, &c.* KHASIA Mts., alt. 4000 ft., *Wallich, Griffith, J. D. H.*

A rambling, stout shrub; branchlets thick. *Leaves* 5 by $1\frac{1}{2}$ in., coriaceous; nerves 8-20 pair; petiole $\frac{1}{2}$ in. or longer. *Cymes* hardly half so long as the leaves, rusty-tomentose, terminal hardly larger than the axillary. *Flowers* yellowish-white, as of *E. paniculata*, but larger.—This is distinguished from the four preceding by its thick branchlets, larger flowers and fruits, the nerves appear very variable in number, but always more numerous than in *E. paniculata*.

** *Cymes axillary short, terminal (if any) scarcely larger than the axillary.*

6. ***E. malaccensis***, *Clarke*; leaves elliptic or obovate-oblong acuminate coriaceous base cuneate or rounded, nerves distinctly reticulated raised beneath, cymes and sepals uniformly closely fulvous tomentose, berry $\frac{2}{3}$ in. subquadrate ellipsoid.—*Erycibe* n. 7, *Herb. Ind. Or. H. f. & T.*

MOULMEIN, *Lobb.* MALACCA, *Griffith, Maingay.*

A large scandent shrub; innovations fulvous-pubescent; branchlets obscurely angular. *Leaves* 3 by $1\frac{1}{4}$ in.; petiole $\frac{1}{2}$ in. *Cymes* $\frac{1}{2}$ -2 in. *Sepals* not glabrescent upwards. *Flowers* nearly as of *E. paniculata*.

7. ***E. Princei***, *Wall. Cat.* 1335; innovations rusty-pubescent, leaves short-petioled obovate-oblong abruptly acuminate base obtuse, cymes subcapitate axillary and terminal subspicate or racemose, berry $\frac{1}{2}$ in. ellipsoid. *Chois. in Ann. Sc. Nat.* 2, i. 224; *DC. Prodr.* ix. 464. *E. camptobotrya*, *Miq. Fl. Ind. Bat. Suppl.* 578.

PENANG, *Wallich.* MALACCA, *Griffith, Maingay.*—DISTRIB. Java, Banca, Borneo.

A powerful scandent, sometimes twining, shrub; branchlets scarcely angular, obscurely rusty-pubescent. *Leaves* 4 by $1\frac{3}{4}$ in., coriaceous, suddenly narrowed at the base, sometimes subcordate; nerves 5-7 pairs, nerves obscure; petiole $\frac{1}{2}$ in. *Cymes* scarcely 1 in. diam., subsessile, rusty-villous; bracts $\frac{1}{10}$ in., oblong. *Flowers* nearly as of *E. paniculata*. *Sepals* villous or glabrate, coriaceous.

8. ***E. Griffithii***, *Clarke*; branchlets round glabrous, leaves large obovate-oblong abruptly acuminate base cuneate, cymes sessile small axillary lax few-fl. rufous-villous, berries 1 in. ellipsoid.

MERGUI, *Griffith* (*Kew Distrib.* n. 5880). MALACCA, *Maingay.*

A large, scandent shrub. *Leaves* $5\frac{1}{2}$ by 2 in., coriaceous, nerves 6 pairs, secondary not prominent; petiole $\frac{1}{4}$ in. *Cymes* $\frac{1}{2}$ - $\frac{3}{4}$ in., densely clothed with dark-red hair. *Berry* coriaceous, rough.

9. ***E. Maingayi***, *Clarke*; innovations minutely hairy, leaves long-petioled elliptic acuminate to an obtuse apex base cuneate, cymes axillary small lax minutely rufous-pubescent.

MALACCA; *Maingay.*

A large, scandent shrub; branches round, glabrous or nearly so. *Leaves* $2\frac{1}{2}$ by $1\frac{1}{4}$ in., nerves 6 pairs, secondary obscure; petiole $\frac{1}{2}$ in. *Cymes* $\frac{1}{2}$ in., deep red, appearing glabrous, but minutely adpressedly pilose under a lens.—This appears allied to *E. Princei*; but, besides the differences in indumentum, the long petioles give it a habit of its own.

10. ***E. coriacea***, *Wall. Cat.* 1337; branchlets round glabrous or nearly so, leaves large elliptic acuminate very coriaceous, nerves obscure on both surfaces, cymes $\frac{1}{2}$ -2 in. minutely rusty-pubescent dense-fl. *Chois. in Ann. Sc. Nat.* 2, i. 224; *DC. Prodr.* ix. 465; *Kurz For. Fl.* ii. 213.

CHITTAGONG, Wallich.

Leaves $6\frac{1}{2}$ by $2\frac{1}{2}$ in., cuneate at the base, verrucose beneath; midrib strong, much raised beneath; petiole $\frac{3}{8}$ in. Berry not seen.—There is no specimen of this in Wallich's Herbarium, nor have I seen any.

VAR. *fragrans*; leaves $5\frac{1}{2}$ by $3\frac{1}{4}$ in. ovate-elliptic acuminate, cymes rather less dense than in *E. coriacea*. G. Don Gen. Syst. iv. 392. *E. fragrans*, Wall. Cat. 1336.—Amherst, Wallich.

11. **E. glomerata**, Wall. Cat. 1338 (? of Blume); innovations villous, leaves large elliptic acuminate nerves impressed above much raised beneath secondary obscure, cymes axillary sessile capitate. Chois. in Ann. Sc. Nat. 2, i. 224; DC. Prodr. ix. 465; Kurz For. Fl. ii. 213. *E. citriniflora*, Griff. Notul. iv. 284.—Ebenacea, Wall. Cat. 9061.

MOULMEIN, Wallich. MERGUI, Griffith.

A powerful scandent shrub; branchlets round, stout, soon glabrescent. Leaves 7 by $2\frac{1}{2}$ in., narrowed downwards, but often shortly suddenly rounded at the very base, coriaceous, often rugose above from the strongly impressed nerves; petiole scarcely $\frac{1}{4}$ in. Cymes $\frac{1}{2}$ in. diam., minutely closely rusty-tomentose. Berry not seen.—There is no specimen of this in Wallich's Herbarium. Miquel (Fl. Ind. Bat. ii. 1033) says that this plant is not *E. glomerata*, Blume Bijd. 1047; but from Blume's description it is either the same or very near it.

2. RIVEA, Chois.

Twining shrubs. Leaves ovate-cordate, silky or hirsute beneath, at least while young; petiole long. Peduncles axillary, 1-3-fld.; bracts 2-3, narrow. Sepals ovate or oblong, subequal. Corolla large, white, tube long, cylindric; limb wide-funnel-shaped, plaited. Stamens attached near the middle of the tube, included; anthers narrowly-oblong, obtuse, not finally twisting. Ovary 4-celled, 4-ovuled; disc annular; style filiform, stigmas linear-oblong. Fruit indehiscent or irregularly breaking up, subglobose, shining, nearly dry. Seeds 1-4, glabrous, in mealy pulp.—Species 2, Indian.

1. **R. ornata**, Chois. Convolv. Or. 27, t. 3, and in DC. Prodr. ix. 326; leaves orbicular-cordate white-tomentose beneath, peduncles short mostly 3-fld., sepals $\frac{1}{2}$ - $\frac{3}{4}$ in. elliptic-oblong acute or subacute, corolla-limb white silky without. Wight in Calc. Journ. Nat. Hist. viii. 179, t. 5, fig. 1, and Ill. t. 168, bis fig. 1, and Ic. t. 1356; Dalz. & Gibs. Bomb. Fl. 168. Lettisia ornata, Roxb. Hort. Beng. 13, and Fl. Ind. i. 496, and ed. Carey & Wall. ii. 85. Convolvulus candidans, Roth Nov. Sp. 106; Roem. & Sch. Syst. iv. 273, 790, not of Sol. C. ornatus, Wall. Cat. 1369. C. Tarita, Ham.; Wall. Cat. 2253. Argyreia ornata, Sweet Hort. Brit. ed. 2, 373; Brand. For. Fl. 343.

DECCAN PENINSULA; common in dry jungles, &c. CEYLON; in the hotter parts of the Island.

Branchlets stout, white-tomentose. Leaves 3-5 in. in diam., often broader than long, glabrous above and, sometimes, at length beneath; petiole 1-2 in. Peduncles $\frac{1}{2}$ in or less; pedicels hardly any; bracts $\frac{1}{2}$ in., narrowly oblong, deciduous. Corolla-tube 2 in., limb 2 in. diam. Stigmas $\frac{1}{10}$ by $\frac{1}{40}$ in. Fruit $\frac{2}{3}$ in. diam., globose, mucronate by the style base, yellow-brown, nearly dry.—Roxburgh says he obtained seeds of this from Cawnpore (possibly from a garden?); no examples have been seen but from the South Deccan.

VAR. *Griffithii*; leaves less silky beneath, peduncles 1-4 $\frac{1}{2}$ in., sepals $\frac{1}{2}$ - $\frac{3}{4}$ in. elliptic-oblong acute, corolla-limb glabrous without even in the bud.—BENGAL, Griffith, Falconer.—Possibly a cultivated form. One of Griffith's examples is from the Calcutta Botanic Garden, the other from Sikkim; Falconer's example is without locality.

2. **R. hypocrateriformis**, *Chois. Convolv. Or.* 26, and in *DC. Prodr.* ix. 326; leaves orbicular-cordate adpressedly silky beneath when young, sepals $\frac{1}{2}$ in. ovate-elliptic obtuse, corolla-limb glabrous or puberulous without. *Dalz. & Gibs. Bomb. Fl.* 168; *Miq. Fl. Ind. Bat.* ii. 584, *only copied*. *R. bona-nox*, *Roxb. Hort. Beng.* 13; *Chois. Convolv. Or.* 27, and in *DC. Prodr.* ix. 326; *Dalz. & Gibs. Bomb. Fl.* 168. *R. fragrans*, *Ninmo in Grah. Cat. Pl. Bomb.* 127. *R. ornata*, *Aitch. Cat. Punjab Pl.* 100, *not of Chois.* *Convolvulus hypocrateriformis*, *Lamk. Enc.* iii. 561. *C. candicans*, *Wall. Cat.* 1368; *Roem. & Sch. Syst.* iv. 302, *not of Roth.* *Lettsomia uniflora*, *Roxb. Cat. Pl.* (1813) and *Fl. Ind.* i. 495, and *ed. Carey & Wall.* ii. 85. *L. bona-nox*, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 494. *Argyreia uniflora* and *bona-nox*, *Sweet Hort. Brit. ed.* 2, 373; *Brand. For. Fl.* 343.

WESTERN INDIA; in dry forests, from Lahore and Behar to Mysore, common.—ASSAM, *Griffith*.

Generally resembling *R. ornata*, but the hair on the stems beneath the leaves and on the sepals is less copious, and much less white. The essential distinction lies in the sepals which are smaller and more obtuse.—Roxburgh's *Lettsomia bona-nox*, a native of Midnapore jungles, is referred to here with little doubt, though no specimens of it are known to exist; the only difference his characters afford between his *L. bona-nox* and his *L. uniflora* (*Rivea hypocrateriformis*) are, that the former has deliciously clove-scented flowers and three of them together, the latter solitary flowers; whether scented or no is not stated. Roxburgh's figure is excellent.

3. ARGYREIA, *Lour.*

Scandent, rarely suberect, shrubs. *Leaves* from cordate-ovate to narrow-lanceolate, silky hirsute or pubescent. *Cymes* sessile or peduncled, capitate or corymbose. *Flowers* showy, purple or rose, rarely white. *Sepals* from orbicular to lanceolate, subequal, or the inner smaller, adpressed to the fruit, often somewhat enlarged. *Corolla* funnel-shaped; limb plaited, very shortly lobed. *Stamens* included; anthers oblong, never twisting. *Ovary* completely 4-celled, 4-ovuled; disc annular, often prominent, as long as the ovary; style filiform, stigmas 2 sessile globose. *Fruit* indehiscent, baccate or nearly dry, hard or papery, 4-1-seeded.—Species 30, Indian, Malayan, and S. Chinese, one African.

SECT. I. **Pomifera**. *Sepals* orbicular, ultimately enlarged, completely enveloping the fruit, strongly imbricate, glabrous, mucilaginous.

1. **A. tiliaefolia**, *Wight Ic.* t. 1358; leaves ovate-cordate shortly acuminate or obtuse hoary beneath or glabrescent, peduncles 1-3-fld. shorter than the petioles, corolla-plaits glabrous without or nearly so. *Kurz For. Fl.* ii. 215. *Convolvulus tiliaefolius*, *Lamk. Enc.* iii. 544. *C. gangeticus*, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 467, and *ed. Carey & Wall.* ii. 46; *Wall. Cat.* 1340. *C. melanostictus*, *Schldl. in Linnæa*, 1831, 737. *Ipomæa tiliaefolia*, *Roem. & Sch. Syst.* iv. 229. *I. gangetica*, *Sweet Hort. Brit. ed.* 2, 371. *I. melanosticta*, *G. Don Gen. Syst.* iv. 271. *Rivea tiliaefolia*, *Chois. Convolv. Or.* 25, and in *DC. Prodr.* ix. 325; *Hassk. Retzia*, i. 68.

INDIA, alt. 0-1000 ft., except in the western dry portion, very common in Beugal and near the sea.—DISTRIB. Malaya to the Philippines; elsewhere often cultivated.

Scandent or twining, often forming low, dense masses with apple-like fruits. *Leaves* 1-4 in. diam.; petiole long. *Peduncles* $\frac{1}{2}$ -3 in.; bracts inconspicuous, caducous. *Corolla* 2-3 in., widely-funnel-shaped, rose-purple. *Fruit* $\frac{3}{4}$ -1 $\frac{1}{2}$ in. diam., including the sepals; capsule thin. *Seeds* $\frac{1}{2}$ in., minutely rusty-villous, hilum hirsute.—Miquel (*Fl. Ind. Bat.* ii. 587) says *Ipomæa ilacina* (*Blume Bijl.* 716) is this plant, but the description does not agree ("sepals acute," &c.).

SECT. II. **Euaryrea.** *Sepals* from ovate to narrow-oblong, more or less hairy, ultimately dry. *Seeds* glabrous or very closely tomentose.

* *Stems* twining, often extensively scandent.

2. **A. speciosa**, *Sweet Hort. Brit. ed. 2*, 373; leaves large ovate-cordate acute glabrous above persistently white-tomentose beneath, peduncles long, flowers subcapitate, bracts large ovate-lanceolate acute thin softly woolly deciduous, corolla-tube woolly, fruit brown-yellow stout nearly dry. *Chois. Convolv. Or. 29*, and in *DC. Prodr. ix. 328*; *Wight Ic. t. 851*; *Hassk. Retzia*, i. 68; *Dalz. & Gibs. Bomb. Fl. 168*; *Brand. For. Fl. 343*. *Convolvulus speciosus*, *Linn. f. Suppl. 137*; *Smith Ic. Pict. t. 17*; *Wall. Cat. 1363*. *C. nervosus*, *Burm. Fl. Ind. 48*, t. 20, fig. 1. *Lettsomia speciosa*, *Roxb. Hort. Beng. 13*. *L. nervosa*, *Roxb. Hort. Beng. 13*, and *Fl. Ind. i. 488*, and ed. *Carey & Wall. ii. 78* (not of *Hort. Bot. Calc.*). *Ipomæa speciosa*, *Blume Bijl. 717: Bot. Mag. 2446*.

INDIA, alt. 0-1000 ft.; from Assam to Belgaum and Mysore; frequent in Bengal plain.—DISTRIB. Java; also from China, Mauritius, &c., cultivated.

Extensively climbing. *Stems* stout, white-tomentose. *Leaves* 3-12 in. diam., glabrous above even before unfolding; petiole long. *Peduncles* usually 3-6 in., stout, white-tomentose; outer bracts $1\frac{1}{2}$ in. *Corolla* 2-3 in., tubular-funnel-shaped, rosy. *Fruit* $\frac{3}{4}$ in. diam., globose, apiculate; sepals ultimately $\frac{3}{8}$ in. diam., ovate, coriaceous, woolly.

3. **A. argentea**, *Chois. Convolv. Or. 36*, and in *DC. Prodr. ix. 330*; leaves ovate-cordate acute hairy above persistently white-silky beneath, corymbs peduncled dense or subcapitate, bracts narrow mostly inconspicuous, corolla hairy without, berry nearly black, fruiting sepals thin lanceolate subpatent. *Lettsomia argentea*, *Roxb. Hort. Beng. 13*, and *Fl. Ind. i. 489*, and ed. *Carey & Wall. ii. 79*. *Convolvulus argenteus*, *Wall. Cat. 1364*.

BENGAL PLAIN; frequent, extending to Assam and Chittagong. KHASIA MTS., alt. 4000 ft., *H. f. & T.*

A large climber. *Leaves* 3-6 in., closely pilose above ultimately subglabrous, silky subtomentose beneath; petiole long. *Peduncles* 2-5 in.; corymbs small, or large; bracts $\frac{1}{2}$ by $\frac{1}{4}$ in., in the Khasia plant larger subsistent. *Corolla* 2 in., tubular-funnel-shaped, with many spreading simple lax hairs without, rose-purple. *Berry* $\frac{3}{8}$ in. diam., globose; sepals ultimately $\frac{1}{2}$ by $\frac{1}{8}$ in., subpatent, or in one example ovate subobtusely coriaceous.

VAR. *venusta*; indumentum less silvery ultimately thin. *A. venusta*, *Chois. Convolv. Or. 36*, and in *DC. Prodr. ix. 330*. *Convolvulus festivus*, *Wall. Cat. 1414*, not *Argyrea festiva*, *Wall. Pl. As. Rar. Argyrea* sp., n. 27, *Herb. Ind. Or. H. f. & T.* —PEGU, *Wallich, McLelland, &c.* BENGAL; Furidpore, *Clarke*.—DISTRIB. AVA.

4. **A. Roxburghii**, *Chois. Convolv. Or. 37*, and in *DC. Prodr. ix. 330*, most *syns. excl.*; leaves ovate-cordate acute softly patently villous on both surfaces, peduncles equalling the petioles, corymbs dense, bracts narrow, sepals $\frac{1}{2}$ - $\frac{3}{4}$ in. elliptic-lanceolate. *Convolvulus Roxburghii*, *Wall. Cat. 1415*.

NEPAL, *Wallich*; SIKKIM TERAI, *Clarke*. ASSAM, *Jenkins*.

Leaves hardly shining. *Peduncles* 2 in., shorter than in *A. argentea*, which it very closely resembles.

VAR. *ampla*; innovations white silky, leaves large ultimately sparsely hairy, cymes lax irregularly compound, one or more of the outer bracts often leaflike petioled. *Argyrea ampla*, *Chois. Convolv. Or. 38*, and in *DC. Prodr. ix. Convolvulus amplus*, *Wall. Cat. 1420*.—The common form.

5. **A. Hookeri**, *Clarke*; leaves large cordate-ovate acute glabrescent or somewhat hairy beneath, peduncles very long, cymes dichotomous few-flowered,

bracts caducous, sepals ovate- or oblong-lanceolate, berry dusky succulent completely 4-celled. *A. populifolia*, *Chois. in DC. Prodr.* ix. 329; and *C. malabaricus*, *Wall. Cat.* 1414 B; the Goalpara plant only.

ASSAM, *Hamilton*. SIKKIM HIMALAYA, alt. 1-4000 ft., frequent, *J. D. H.*, &c. BHOTAN, alt. 3000 ft., *Clarke*.

A large climber, ultimately glabrescent; innovations villous or sometimes shining, subsericeous. *Leaves* 4-9 in., larger deeply cordate; petiole long. *Peduncles* 3½-2 in.; bracts ½ in., narrow, caducous. *Sepals* ½ in.; in fruit larger, acute. *Corolla* 2-2½ in., tubular-funnel-shaped, sparsely hairy without, rose-coloured. *Berry* ¾ in. diam., globose.—*Convolvulus peduncularis*, *Wall. Cat.* 1417, from Ava, is exceedingly like *A. Hookeri*; but in it the fruiting sepals are ½ in., orbicular and coriaceous.

6. ***A. splendens***, *Sweet Hort. Brit. ed.* 2, 373; leaves elliptic acuminate base rhomboid or rounded glabrous above silky-white beneath, corymbs peduncled, bracts caducous, corolla-plaits hairy without, capsule papery scarlet. *Lettsomia splendens*, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 487, and *ed. Carey & Wall.* ii. 75; *Wall. Cat.* 1361. *Ipomæa splendens*, *Bot. Mag.* t. 2628.

KHASIA MTS.; *Griffith*. CHITTAGONG; *Roxburgh*; at Seetakoond, *H. f. & T.*

A large climber. *Leaves* 7 by 4 in., never cordate; petiole 3 in. *Peduncles* 1-4 in., few- or many-flowered. *Sepals* ½ in., ovate, obtuse, closely tomentose. *Corolla* 1½ in., tubular-campanulate, rose-coloured. *Fruit* (with the sepals) as of *A. Wallichii*.—*Convolvulus Finlaysonianus*, *Wall. Cat.* 6607, from Cochin-China, is closely allied, but the leaves are elliptic and ovate subcordate. *A. acuta*, *Lour.* (*Chois. in DC. Prodr.* xix. 333) is exceedingly near, but has the corymbs slenderer, smaller flowers, and sepals elliptic-oblong with adpressed silvery hairs.

7. ***A. oblecta***, *Clarke*; leaves elliptic or oblong acute at both ends pilose above silky-strigose beneath, peduncles short, bracts caducous, sepals short ovate obtuse, corolla hirsute without, capsule papery red. *Convolvulus oblectus*, *Wall. Cat.* 1416. *Rivea? oblecta*, *Chois. Convolv. Or.* 28, and *in DC. Prodr.* ix. 326.

MALAY PENINSULA; Tavoy and Amherst, *Wallich*; Mergui, *Griffith*; Tenasserim, *Helper*.

A large climber. *Leaves* 5 by 2½ in., beneath tawny or whiteish; petiole ¾ in. *Peduncles* ½-1½ in. *Flower* and *fruit* nearly as in *A. splendens*, but sepals and corolla more hirsute. *Ovary* 4-celled, 4-ovuled.—Known from *A. splendens* by the short petioles, from *A. lanceolata* by the peduncled corymbs.

VAR. *obtusifolia*; leaves obtuse almost emarginate. Tavoy; *Griffith*.—An example in *Herb. Wight*, named by him *Convolvulus laurifolius*. This may be *A. obtusifolia*, *Lour.* (*Chois. in DC. Prodr.* ix. 333), of which the fragments at the British Museum consist of branchlets, fruits, and a fragment of one leaf.

8. ***A. lanceolata***, *Chois. Convolv. Or.* 39, and *in DC. Prodr.* ix. 331; leaves lanceolate or linear-lanceolate pilose above shining silky beneath, flowers axillary subsessile 1-3 together, bracts inconspicuous, sepals elongate-oblong, corolla hairy without. *Convolvulus argyrophyllus*, *Wall. Cat.* 1395.

MALAY PENINSULA; Martaban and Tavoy, *Wallich*; Moulmein, *Parish*; Tenasserim or Andamans, *Helper*.

Stems twining, slender. *Leaves* 5 by ¾ in., or shorter and broader, base cuneate or rounded; petiole ¾ in. *Sepals* ¾ by ½ in., oblong or lanceolate. *Corolla* 1½ in., tubular-campanulate. *Capsule* ¼ in., globose, thin, not red (but unripe).—The foliage and corymbs are sometimes like those of *A. oblecta*, from which it is distinguished by the elongate sepals.

9. **A. Wallichii**, *Chois. Convolv. Or.* 39, and in *DC. Prodr.* ix. 331; leaves large ovate-cordate acute glabrous wrinkled above persistently tomentose beneath, peduncles very short, flowers capitate, bracts large persistent outer thinner often nerved. *Convolvulus erythrocarpus*, *Wall. Cat.* 1413. *Lettsomia nervosa*, *Hort. Bot. Calc. and Herb. Wight*, not of *Roxb.*

SIKKIM TERAI; *Clarke*.—DISTRIB. AVA.

A large climber. *Leaves* 4–10 in., upper surface wrinkled by the impressed secondary nerves; *petiole* 2–4 in. *Peduncles* 0–1 in.; *heads* 1–3 in. diam., dense, many-fl.; *outer bracts* 1 in. and upwards, ovate-oblong. *Sepals* 2–3 in., elliptic-oblong. *Corolla* $1\frac{1}{2}$ in., tubular-infundibuliform, hirsute, white tinged rose. *Capsule* $\frac{1}{2}$ in., depressed globose, becoming (together with the interior of the sepals) red, or (in the Sikkim example) a glistening white.

VAR. coriacea; leaves more leathery, sepals more leathery densely hairy not nerved, capsule red.—Sikkim, alt. 2–5000 feet, common; *J. D. H., Treutler, &c.* Upper Assam; *Jenkins*.

10. **A. populifolia**, *Chois. Convolv. Or.* 32, and in *DC. Prodr.* ix. 329; leaves ovate acuminate base shallowly cordate or rounded glabrous or sparingly hairy beneath, peduncles shorter than the leaves, flowers subcapitate, bracts prominent linear-lanceolate persistent, sepals small subequal ovate obtuse. *Ipomœa zeylanica*, *Gaertn. Fruct.* ii. 482, t. 178, fig. 1; *Moon Cat. Pl. Ceyl.* 14, not *Argyreia zeylanica*, *Kurz.* *Convolvulus festivus*, *Wall. Cat.* 1414, the Ceylon material only. *Rivea zeylanica* var. *a* only, *Thwaites Enum.* 209, many syn. excl.

CEYLON; common; *Walker, &c.*

A large twiner, sparingly grey pilose or glabrate. *Leaves* 2–5 in. diam., long-petioled. *Peduncles* 1–7 in., usually exceeding the petioles; *bracts* numerous $\frac{1}{2}$ –1 in., sparingly grey-pilose or glabrate. *Sepals* $\frac{1}{2}$ in., hardly larger in fruit. *Corolla* 2 in., funnel-shaped, rose-purple, hairy on the plaits without, ultimately nearly glabrescent. *Berry* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., dusky, pulpy.

VAR. Thwaitesii; leaves elliptic acute base rounded sparsely hirsute beneath, bracts elliptic oblong.—Ceylon; Colombo, *Thwaites* (C. P. n. 1943.)

VAR. fastigiata; corymbs many-fl., close not capitate. *Convolvulus fastigiatus*, *Wall. Cat.* 2258, not of *Roxb.* *Ipomœa fastigiata*, *Chois. in DC. Prodr.* ix. 380, the Bengal plant, not of *Sweet*.—Bengal (*Choisy*). The type (in Wallich's Herbarium), is a plant from the Calcutta Botanic Garden, and looks altogether like *A. populifolia* cultivated. A powerful twiner; stems sparsely hairy. *Leaves* 4 in., shallowly cordate, ovate, subacute, glabrous above, sparingly hairy beneath; *petiole* 2 in. *Peduncles* 3–8 in., strigose; corymbs 2–4 in. diam.; *bracts* 1 by $\frac{1}{2}$ in., lanceolate, persistent, a few outer sometimes leaflike and petioled. *Sepals* $\frac{1}{2}$ in. ovate, obtuse, adpressed villous. *Corolla* $2\frac{1}{2}$ in. and upwards, tubular-funnel-shaped, hairy without, rose-purple. *Fruit* not seen.

11. **A. involucrata**, *Clarke*; leaves ovate acuminate sparingly hairy or glabrescent, peduncles shorter than the leaves, flowers subcapitate, bracts large oblong persistent, sepals subequal ovate-lanceolate acuminate.—*Argyreia* n. 23, *Herb. Ind. Or. H. f. & T.*

WESTERN DECCAN PENINSULA; Concan and Bababoodan Hills, *Law*; Bombay, *Dalzell*.

A large twiner. *Leaves* $7\frac{1}{2}$ by $4\frac{1}{2}$ in., usually more elongate than *A. populifolia*, base rounded or shallowly cordate. *Peduncles* 2–6 in.; *bracts* 1 by $\frac{1}{2}$ in., sparingly hairy, flat. *Sepals* $\frac{1}{2}$ in., often caudate, margins scarious. *Corolla* and fruit nearly as of *A. populifolia*.—*Leaves* in one example of *Dalzell's* narrower, 5 by $1\frac{1}{2}$ in., base subrhomboid.

VAR. inæqualis; bracts large some attaining 2 by $\frac{3}{4}$ in., two outer sepals much longer than the inner, corolla exceeding $3\frac{1}{2}$ in.—The Concan, *Stocks*. Distrib.

Tropical Africa (if *A. populifolia*, var. *africana* (Oliver in Trans. Linn. Soc. **xxix**. 114) can be identified with any Indian plant).

12. *A. bracteata*, *Chois. Convolv. Or.* 39, and in *DC. Prodr.* ix. 328; leaves ovate base rounded glabrate above fulvous densely silky beneath, peduncles mostly short, flowers subcapitate, bracts prominent oblong or elliptic silkily villous persistent, sepals $\frac{1}{2}$ in. ovate subacute. *Wight in Hook. Comp. Bot. Mag.* i. 38, t. 3. *Convolvulus pomaceus*, *Wall. Cat.* 1419, type sheet partly. *Ipomœa Kleiniana*, *Roem. & Sch. Syst.* iv. 789.

DECCAN PENINSULA; *Rottler*; Madras, *Shuter*; Coimbatore, *Wight*.

Scandent. *Leaves* 2–3½ in., obtuse or scarcely acuminate, base sometimes slightly cordate; petiole 1 in. *Peduncles* $\frac{1}{2}$ –2 in., bracts $\frac{3}{4}$ in. *Sepals* with scarious margins. *Corolla* 2 in. and upwards, tubular-campanulate, hirsute without. *Berry* $\frac{2}{3}$ in., yellowish-brown, pulpy.—Easily distinguished by its leaves being glabrous above shining silky beneath; hence often confounded with *A. argentea*.

13. *A. pomacea*, *Chois. Convolv. Or.* 31, and in *DC. Prodr.* ix. 329; leaves elliptic-ovate obtuse closely softly hairy on both surfaces, peduncles short, corymbs small lax, bracts narrowly oblong caducous, sepals $\frac{1}{4}$ in. round-ovate. *Wight Ill.* 168 bis fig. 2. *Lettsomia pomacea*, *Roxb. Hort. Beng.* 18, and *Fl. Ind.* i. 493, and ed. *Carey & Wall.* ii. 83. *Rivea pomacea*, *Wight Ic.* t. 888. *Convolvulus pomaceus*, *Wall. Cat.* 1419, part of second sheet.

SOUTH DECCAN; Mysore, *Roxburgh*; Coimbatore, *Wight*; Nilgherries, *G. Thomson*, &c.

Large, scandent. *Leaves* 1–3 in., sometimes emarginate, often undulate, base rhomboid or rounded; petiole $\frac{3}{4}$ in. *Peduncles* 0– $\frac{3}{4}$ in.; bracts $\frac{1}{4}$ – $\frac{3}{4}$ in. *Corolla* 2 in., tubular-campanulate, hirsute without. *Berry* $\frac{2}{3}$ in. diam., yellow-brown, pulpy.

VAR. *triflora*; leaves narrowly elliptic rhomboid at the base glabrate above sparsely strigose beneath, peduncles $\frac{1}{3}$ – $\frac{2}{3}$ in. 1–3-flowered, bracts $\frac{1}{3}$ – $\frac{1}{2}$ in. narrowly oblong obtuse glabrous, sepals glabrous. *A. Leschenaultii*, *Thwaites Enum.* 209, not of *Chois.* *Ipomœa* n. 43, *Herb. Ind. Or. H. f. & T.*—Ceylon; *Thwaites* (C. P. n. 1932).

14. *A. sericea*, *Dalz. & Gibs. Bomb. Fl.* 169; leaves ovate-cordate acute hispid or strigose above densely silky beneath, peduncles as long as the petioles, flowers capitate, bracts prominent persistent oblong or elliptic nerved silky, sepals elliptic-lanceolate often unequal. *Ipomœa bracteata*, *Graham Cat. Bomb. Pl.* 131, not of *G. Don*.

MALABAR GHATS and CONCAN, frequent; *Stocks*, *Law*, &c.; Belgaum, *Ritchie*.

A powerful, silky twiner. *Leaves* 3–5 in., base of lower deeply cordate; petiole 1–3 in. *Peduncles* 1–4 in.; bracts attaining 1½ in. *Sepals* $\frac{1}{2}$ in., two outer often much longer. *Corolla* 2½ in., tubular-funnel-shaped, pink, hirsute, without. *Berry* $\frac{1}{2}$ in. diam., orange-coloured, pulpy.—Perhaps, as *Dalzell* suggests, nearest to *A. argentea*, but is usually referred to *A. bracteata*, *Choisy*, to which it is not very near.

15. *A. Leschenaultii*, *Chois. Convolv. Or.* 31, and in *DC. Prodr.* ix. 329, not of *Thwaites*; innovations white-tomentose, leaves subcordate ovate acuminate softly hairy on both surfaces, peduncles short, bracts linear, sepals $\frac{1}{4}$ – $\frac{1}{2}$ in. ovate obtuse. *Convolvulus Choisyanus*, *Wall. Cat.* 2259, type sheet only (*Choisy*).

NILGHERRIES, alt. 1–6000 ft.; *Wight*, &c.

A powerful climber. *Leaves* 6 by 5 in., suddenly shortly acuminate, closely villous subtomentose beneath becoming less so in age; petiole 2 in. *Peduncles* $\frac{1}{2}$ –2 in., softly villous; bracts $\frac{3}{4}$ by $\frac{1}{2}$ in., subsistent. *Corolla* 2 in., hirsute without.

Berry $\frac{3}{4}$ in. diam., pulpy.—*Convolvulus Choisyanus* (Wall. Cat. 2259) is not now in Wallich's herbarium; Choisy says it is *Argyreia Leschenaultii* but it may have been *A. Choisyana*, Wight.

16. **A. nellygherya**, Chois. *Convolv. Or.* 82, and in *DC. Prodr.* ix. 329; leaves subcordate elliptic subacute softly hairy above densely villous beneath, peduncles shorter than the leaves, cymes few-fl. subcapitate, bracts oblong persistent, sepals $\frac{1}{2}$ in. ovate obtuse. *Convolvulus pomaceus*, Wall. Cat. 1419, partly.

NILGHERRIES, alt. 6000 ft.; Wight, &c.

Differs little from *A. Leschenaultii* except that the leaves are only half as wide (2–2½ in.) and much more shaggy, often rufescent somewhat shining beneath. It is also very near *A. pomacea*, but has larger sepals and peduncles often 2–3 in.

17. **A. malabarica**, Chois. *Convolv. Or.* 38, and in *DC. Prodr.* ix. 331; stem pubescent, leaves ovate-cordate acute sparsely hispid on both surfaces ultimately nearly glabrous, peduncles 2–5 in., bracts elliptic or oblong, sepals in fruit $\frac{1}{2}$ – $\frac{3}{4}$ in. elliptic-lanceolate. *Dalz. & Gibs. Bomb. Fl.* 169. *Convolvulus malabaricus*, Linn.; *Blume Bijd.* 715, not of Roxb. C. Rottleri, Spreng. *Syst. cur. post.* 61? *Ipomœa malabarica*, Roem. & Sch. iv. 235.—*Rheede Hort. Mal.* xi. t. 51.

MALABAR and COROMANDEL (Choisy).—DISTRIB. Java, Cochin China (Choisy.)

Founded on Rheede's plate, no authentic example being seen by any author, with which, however, Wight's Herb. n. 2353 (named *A. Leschenaultii*) very closely agrees. —Wight had a ms. species, *A. courtallensis*, in his Herb., the plant on which Choisy founded his *A. Leschenaultii*. Hence, Wight having the name *A. Leschenaultii* in excess, applied it to his n. 2353; but the three species are so near that they might be made one.

18. **A. hirsuta**, Arn. *Pugill. Pl. Ind. Or.* 38; leaves ovate-cordate acute villous above shaggy beneath, peduncles very long patently hispid, bracts prominent linear or oblong outer often petioled leaflike, sepals $\frac{1}{2}$ in. ovate obtuse. Chois. in *DC. Prodr.* ix. 330; *Bot. Mag.* t. 4946. *Rivea hirsuta*, Wight *Ic.* t. 891.

NILGHERRY MTS., common; Wight, &c.

Probably, as Arnott suggests, a large form of *A. nellygherya*, which the sepals, corolla, and fruit resemble. The peduncles are often 4–8 in., and the outer petioled bract makes the cymes pseudo-sessile. The needle-like hairs on the stems and peduncles also give the plant a different aspect.

VAR. *coacta*; leaves cordate triangular-ovate acute closely shortly silky beneath, peduncles very long, bracts large elliptic-oblong flat sparsely hairy. *Rivea zeylanica*, var. β *hirsuta*, Thwaites *Enum.* 209.—Ceylon, alt. 4000 feet, Thwaites, &c. This in its indumentum and the more triangular leaves does not agree at all closely with *A. hirsuta*, Arn.

19. **A. pilosa**, Arn. *Pugill. Pl. Ind. Or.* 38; leaves ovate subcordate acute hairy on both surfaces, peduncles shorter than the leaves, flowers capitate, bracts linear persistent, sepals elliptic-lanceolate acute often bristly upwards. Chois. in *DC. Prodr.* ix. 330.—*Argyreia*, n. 22 and 24, *Herb. Ind. Or. H.* f. & T.

WESTERN DECCAN PENINSULA, the CONCAN, CANARA, and MYSORE; Law, Ritchie, &c.

A powerful twiner. Leaves 2–6 in., base rounded or slightly cordate, fulvous-strigose beneath or sometimes green less hairy; petiole long. Peduncles $\frac{1}{2}$ –4 in., variable in length, stout; bracts $\frac{3}{4}$ by $\frac{1}{8}$ in., bristly. Sepals $\frac{1}{2}$ – $\frac{1}{2}$ in. Corolla 2 in., tubular-funnel-shaped, hirsute without. *Berry* $\frac{3}{4}$ in. diam.—The specimens of *H. f.*

♂ *T. n.* 22 have the leaves densely hairy, almost shaggy, fulvous beneath; while here those of *n.* 24 are strigose green beneath; both have very acute sepals.

20. **A. Lawii**, *Clarke*; leaves elliptic acute base rhomboid or rounded softly strigose on both surfaces, peduncles elongated, cymes small dense, bracts narrowly oblong, sepals $\frac{1}{4}$ in. ovate obtuse.—*Argyrea n.* 28, *Herb. Ind. Or. H. f. & T.*

THE CONCAN AND MALABAR, Bababoodan Hills, *Law*, &c.

Scandent, subsericeous. *Leaves* 4 by 2 in., whiter beneath; petiole 1-2 in. *Peduncles* 2-5 in., silky, white, slenderer than in the foregoing species; bracts $\frac{2}{3}$ by $\frac{1}{2}$ in. *Cyme* dichotomous 3-9-fl., with one in the fork; flowers subsessile. *Corolla* 2 in. and upwards, tubular-campanulate, hairy without. *Fruit* not seen.—Appears closely allied to *A. Choisyana*, but the sepals differ widely.

21. **A. Choisyana**, *Wight ms.*; leaves subcordate elliptic-oblong hairy on both surfaces, peduncles 1-3-fl. shorter than the leaves, bracts narrowly oblong, sepals $\frac{1}{2}$ - $\frac{1}{2}$ in. elliptic-lanceolate acuminate. *Batatas Choisyana*, *Wight Ic. t.* 491.

MADRAS; Balaghaut Hills, *Wight*.

A twiner, patently hirsute. *Leaves* 2 by 1 in., subobtusely, densely strigose above, silky somewhat shining beneath; petiole $\frac{1}{2}$ - $\frac{2}{3}$ in. *Peduncles* 1-2 in., hirsute, often with 1 or 2 silky shining subfoliaceous bracts remote from the flowers; proper bracts $\frac{3}{4}$ by $\frac{1}{2}$ in. *Corolla* nearly 2 in., tubular-funnel-shaped, hirsute without. *Ovary* 4-celled. *Fruit* not seen.—Neither the leaves, flowers, ovary or bracts of this species resemble those of *Ipomœa atropurpurea* to which Choisy (in *DC. Prodr.* ix. 366) has reduced it.

VAR. ? *Wightii*; leaves rhomboid at the base glabrous above sparsely strigose beneath, sepals strigose margins scarious, corolla $2\frac{1}{2}$ in. and upwards.—Madras; Condauputy and other hills, *Wight*. This may be a new species, but it is only a fragment in flower.

22. **A. Daltoni**, *Clarke*; leaves large elliptic or oblong acute glabrate above fulvous-strigose beneath, peduncles elongate, corymbs lax, bracts narrowly oblong persistent, sepals $\frac{1}{2}$ - $\frac{3}{4}$ in. ovate-oblong.

CHOTA NAGPORE; Bundgao in Singhboom, alt. 2000 ft., *Clarke*.

A large climber. *Leaves* attaining 9 by 4 in., base usually unequal cuneate, sometimes rounded, primary nerves very oblique; petiole 1-3 in. *Peduncles* 2-4 in., rigid, fulvous-silky; bracts $\frac{3}{4}$ in., often narrowly subspathulate. *Corolla* 2 in., shaggy without. *Sepals* fulvous-strigose in fruit, coriaceous, concave, two inner shorter glabrate on the margins. *Berry* $\frac{2}{3}$ in. diam., pulpose.—Named after Gen. Dalton, Commissioner of Chota Nagpore.

23. **A. cymosa**, *Sweet Hort. Brit. ed.* 2, 373; grey pruinose-pubescent, leaves ovate-cordate shortly acuminate, peduncles long, corymbs often branched, flowers densely capitate at the ends of the branches, bracts orbicular persistent, sepals ovate obtuse. *Chois. Convolv. Or.* 46, and in *DC. Prodr.* ix. 333; *Wight Ic. t.* 839. *Lettomia cymosa*, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 492, and *ed. Carey & Wall.* ii. 82. *Convolvulus glomeratus*, *Wall. Cat.* 2257.

DECCAN PENINSULA, frequent; *Rottler, Wight, &c.*—DISTRIB. Philippines.

Scandent. *Leaves* 2-4 in. diam.; petiole 1-3 in. *Peduncles* 1-4 in.; corymbs 1-4 in. diam., sometimes reduced to single heads; bracts $\frac{1}{2}$ in. diam. *Sepals* $\frac{1}{2}$ - $\frac{1}{3}$ in., somewhat enlarged in fruit. *Corolla* 2 in., tubular-funnel-shaped, hairy without. *Stamens* not exserted. *Berry* $\frac{3}{4}$ in. diam., pulpose.—This is the *Convolvulus malabaricus* of Heyne in *Herb. Rottler*; and, as it is frequent in the Peninsula, it is probably *Convolvulus malabaricus*, Linn., though Linnæus founds his *C. malabaricus* on a plate of Rheedé's, which is *A. malabarica*, Choisy.

** *Stems suberect.*

24. **A. cuneata**, *Ker in Bot. Reg.* t. 661; leaves short-petioled elliptic or obovate villous beneath, peduncles numerous short few-fl'd., corolla bright-purple. *Chois. Convolv. Or.* 34, and in *DC. Prodr.* ix. 330; *Dalz. & Gibs. Bomb. Fl.* 169; *Brand. For. Fl.* 344. *Lettsomia cuneata*, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 491, and *ed. Carey & Wall.* ii. 81. *Convolvulus cuneatus*, *Willd. Sp. Pl.* i. 873; *Wall. Cat.* 1366. *Rivea cuneata*, *Wight in Hook. Journ. Bot.* iii. 199; *Chois. in DC. Prodr.* ix. 327; *Wight Ic.* t. 890. *Ipomœa atrosanguinea*, *Bot. Mag.* t. 2170, not of *Chois.*

DECCAN PENINSULA, common.

Shrubby; 2-5 feet; branches often almost virgate, sometimes somewhat twining. *Leaves* 2-4 in., obtuse mucronate or emarginate, glabrate above; petiole $\frac{1}{4}$ - $\frac{1}{3}$ in. *Peduncles* 0-1 $\frac{1}{2}$ in., often 3-flowered; bracts deciduous. *Sepals* $\frac{1}{2}$ in., ovate, subobtuse, *Corolla* 2 in., tubular-funnel-shaped, hairy without. *Ovary* 4-celled; *Fruit* $\frac{2}{3}$ in., ovoid, shining, yellow-brown, nearly dry.

25. **A. fulgens**, *Chois. Convolv. Or.* 33, and in *DC. Prodr.* ix. 329; leaves long-petioled elliptic acute densely silky shining beneath, peduncles numerous short few-fl'd. *Wight in Calc. Journ. Nat. Hist.* viii. 179, t. 5, fig. 3, and *Ic.* t. 1357. *Convolvulus fulgens*, *Wall. Cat.* 1394.

S. DECCAN PENINSULA; *Heyne*; *Courtallum*, *Wight*.

Branches straight, silky white. *Leaves* 4 by 1 $\frac{3}{4}$ in., acuminate, base rounded or rhomboid, glabrate above; petiole 1-2 in. *Peduncles* 1 in., 3-7-fl'd.; bracts deciduous. *Sepals* $\frac{1}{2}$ in., elliptic, subobtuse. *Corolla* 2 in. and upwards, tubular-campanulate, glabrous without, or when young strigose near the tip, appears to have been very dark in colour. *Ovary* 4-celled. *Fruit* not seen.—In habit closely allied to *A. cuneata*.

4. **LETTSOMIA**, *Roxb.*

Scandent more or less hairy shrubs. *Leaves* alternate, undivided, base often rounded or cordate. *Cymes* axillary, peduncled, densely corymbose or capitate, bracteate. *Sepals* orbicular elliptic or oblong, in fruit often somewhat thickened or enlarged. *Corolla* tubular-funnel-shaped; limb plicate, lobes usually shallow. *Stamens* included or exerted; anthers oblong or linear, never twisting. *Ovary* 2-celled, 4-ovuled; disc annular, usually prominent; style filiform, stigmas 2 subsessile globose. *Fruit* indehiscent. *Seeds* 4-1.—Species 32, East Asiatic and Tropical Africa.

SUBGENUS I. **Eulettsonia**. Fruit 4-1-seeded, 1-seeded capsules occurring as the rule of no one species.

* *Corolla less than 1 in., limb lobed; anthers distinctly exerted.*

1. **L. aggregata**, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 488, and *ed. Carey & Wall.* ii. 76; leaves ovate cordate subacute glabrous above white-woolly beneath, peduncles grooved when dry shorter than the leaves, flowers capitate, bracts orbicular closely woolly subpersistent, sepals nearly as long as the bracts ovate white-tomentose. *Wight in Calc. Journ. Nat. Hist.* viii. 179, t. 5, fig. 4, and *Ic.* t. 1359; *Kurz For. Fl.* ii. 216. *Convolvulus orixensis*, *Rottl.*; *Wall. Cat.* 1362. *C. imbricatus*, *Spreng. Syst.* i. 613. *Ipomœa imbricata*, *Roth Nov. Sp.* 112. *Argyreia aggregata*, *Chois. Convolv. Or.* 45, and in *DC. Prodr.* ix. 333; *Dalz. & Gibs. Bomb. Fl.* 169.

DECCAN PENINSULA, frequent; *Wight*, *Dalzell*, &c.

A scandent shrub; branches closely white-tomentose. *Leaves* 1-4 in., somewhat wrinkled above; petiole 1 in. *Peduncles* 0-2 in.; bracts $\frac{1}{3}$ - $\frac{1}{2}$ in. *Corolla* $\frac{2}{3}$ in.,

tubular-campanulate, rose-coloured, hirsute without. *Capsule* $\frac{1}{2}$ in., red, as are the fruiting sepals within.

VAR. osyrensis; leaves softly hairy above white-tomentose or somewhat fuscous, villous beneath. *Ipomæa osyrensis*, *Roth Nov. Sp.* 117. *Argyreia osyrensis*, *Chois. in DC. Prodr.* ix. 334.—Deccan Peninsula, frequent. Tenasserim, *Helfer*. Ceylon, abundant.—*DISTRIB.* Ava.

2. *L. mysorensis*, *Clarke*; leaves elliptic cordate mucronate glabrous above white-tomentose beneath, peduncles long grooved when dry, corymbs small, bracts shorter than the sepals deciduous, outer sepals ovate inner much smaller narrow.—*Argyreia* n. 29, *Herb. Ind. Or. H. f. & T.*

MYSOORE; *G. Thomson*.

Scandent; branches closely white-tomentose. *Leaves* 5 by 3 in., subobtus with a mucro; petiole 3 in. *Peduncles* 3-5 in.; outer bracts $\frac{1}{4}$ in., obovate, white-tomentose, caducous, inner $\frac{1}{4}$ in., oblong; outer sepals $\frac{1}{2}$ in. white-tomentose, inner $\frac{1}{4}$ in. oblong. *Corolla* as of *L. aggregata*. *Anthers* exserted. *Fruit* not seen.—Closely allied to *L. aggregata*.

3. *L. bella*, *Clarke*; leaves ovate-cordate acute glabrous or softly hairy above white-tomentose beneath, peduncles terete shorter than the leaves, flowers capitate, bracts small spatulate or oblong, outer sepals elliptic densely white hirsute.

CHOTA NAGPORE, alt. 2000 ft., frequent; *Clarke*.

Scandent; branches white-woolly. *Leaves* 4 in.; petiole 3 in. *Peduncles* $\frac{1}{2}$ -3 in., rarely exceeding the petioles; bracts $\frac{1}{4}$ - $\frac{1}{2}$ in. Outer sepals $\frac{1}{2}$ - $\frac{1}{2}$ in., elliptic-lanceolate, in fruit enlarged, subovate, coriaceous; inner sepals gradually smaller; sepals all densely patently white-hirsute. *Corolla* as of *L. aggregata*, more hirsute. *Anthers* exsert. *Capsule* $\frac{1}{4}$ in., red.—*Convolvulus vestitus*, *Wall. Cat.* 1411, from the Nepal Terai, appears to be this plant; but, if so, Wallich's flowers which are $1\frac{1}{2}$ in. long, cannot belong to it.

4. *L. bracteosa*, *Clarke*; leaves elliptic acute glabrescent above sparingly fuscous-villous beneath, peduncles short, flowers capitate, bracts $\frac{3}{4}$ in. orbicular tomentose persistent, sepals $\frac{1}{2}$ in. orbicular in fruit.

PEGU; *McLelland, &c.*

Scandent; branches glabrescent. *Leaves* 3 by $1\frac{1}{4}$ in.; petiole 1 in. *Peduncles* $\frac{1}{2}$ in., woolly; heads dense, softly hirsute. *Flowers* not seen. *Capsule* red.—Resembles *Convolvulus multibracteatus*, *Wall. Cat.* 1408 (= *Argyreia tomentosa*, *Chois. in DC. Prodr.* ix. 333), from Ava, in which the bracts are ovate shortly acute, the sepals linear-lanceolate.

** *Corolla more than 1 in. long, anthers included.*

5. *L. elliptica*, *Wight, note to Ic. t.* 1356; leaves elliptic subacute glabrescent above sparsely strigose beneath, corymbs loose, bracts caducous, sepals $\frac{1}{2}$ in. ovate, corolla $1\frac{1}{4}$ in. nearly glabrous without. *C. ellipticus*, *Spreng. Syst.* i. 613; *Wall. Cat.* 1380. *C. laurifolius*, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 470, and *ed. Carey & Wall.* ii. 50, 573. *Ipomæa elliptica*, *Roth Nov. Sp.* 113. *I. laurifolia*, *Sweet Hort. Brit. ed.* 2. 372. *Argyreia elliptica*, *Chois. Convolv. Or.* 35, and in *DC. Prodr.* ix. 330 (*excl. syn. Wall. Cat.* 1381, 1417); *Dalz. & Gibs. Bomb. Fl.* 169.

DECCAN PENINSULA, *Wight, &c.* *CEYLON*; central province, not uncommon.

Scandent; innovations villous, soon glabrous or sparingly grey-pubescent. *Leaves* 4 by 2 in., base rhomboid or rounded; petiole $1\frac{1}{2}$ in. *Peduncles* 2-5 in., or short, or leafy, 0 when the corymbs have an outer bract; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in. *Sepals* obtuse, in fruit orbicular, coriaceous, patent. *Corolla* pale purple. *Berry* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., depressed-globose, orange-brown.

6. **L. Thomsoni**, *Clarke*; leaves ovate-lanceolate cordate sparsely strigose on both surfaces, peduncles scattered mostly as long as the petioles, flowers capitate, bracts $\frac{1}{3}$ – $\frac{1}{2}$ in. spatulate-oblong sparsely villous caducous, sepals $\frac{1}{2}$ – $\frac{3}{4}$ in. ovate acute densely patently hirsute. *Argyreia capitata*, *Brand.* *For. Fl.* 343, not of *Chois.*

SUBTROPICAL HIMALAYA, alt. 0–4000 ft., from Gurwhal to Sikkim, common; *Royle, Thomson, J. D. H., &c.*

Scandent; stems sparsely villous. *Leaves* 5 by $2\frac{1}{4}$ in., acuminate; petiole 2 in. *Peduncles* 2–5 in.; bracts shorter than, and much less hirsute than the sepals, sometimes subsistent. *Sepals* with soft fulvous hairs $\frac{1}{2}$ – $\frac{3}{4}$ in. long, in fruit coriaceous slightly enlarged. *Corolla* nearly 2 in., rose-purple, hirsute without. *Capsule* usually 4–2-seeded.

7. **L. hirsutissima**, *Clarke*; leaves ovate-cordate acute softly dusky villous on both surfaces, peduncles short collected towards the ends of the branches, flowers capitate, bracts $\frac{1}{3}$ in. oblong villous deciduous, sepals $\frac{1}{2}$ – $\frac{3}{4}$ in. elliptic acute densely patently hirsute. *Convolvulus hirsutissimus*, *Wall. Cat.* 1400. *Argyreia capitata* β conferta, *Chois. in DC. Prodr.* ix. 332.

SIKKIM HIMALAYA, alt. 5000 ft.; *Tendong, Clarke.*—DISTRIB. Ava.

Perhaps only a villous mountain form of *L. Thomsoni*. *Leaves* villous or almost silky. *Peduncles* $\frac{1}{2}$ –2 in., rigid, forming as it were a narrow terminal dense panicle.

8. **L. strigosa**, *Roxb. Hort. Beng.* 13, and *Fl. Ind. ed. Carey & Wall.* ii. 80; leaves cordate suborbicular suddenly short acuminate sparsely hispid on both surfaces, peduncles long, flowers capitate, bracts 1 in. elliptic-oblong sparsely hispid persistent, sepals unequal smaller than the bracts densely bristle-hispid. *L. capitata*, *Miq. Fl. Ind. Bat.* ii. 591. *Convolvulus strigosus*, *Wall. Cat.* 1365, type-sheet. *C. capitatus*, *Vahl Symb.* iii. 28. *C. capitiformis*, *Poir. Enc. Suppl.* iii. 469. *Ipomæa capitata*, *Roem. & Sch. Syst.* iv. 238, not of *Chois.* *Argyreia capitata*, *Chois. Convolv. Or.* 41, and in *DC. Prodr.* ix. 332, in part.

BENGAL PLAIN, and ASSAM, common; extending into subtropical valleys of the adjacent mountains.—DISTRIB. Java.

A powerful climber; branches hispid. *Leaves* 5 by $4\frac{1}{4}$ in., usually very obtuse, covered with needle-like fulvous long straight patent hairs, as is nearly the whole plant; petiole 2 in. *Peduncles* 2–4 in.; bracts much less copiously bristly than the sepals. *Sepals* $\frac{1}{2}$ – $\frac{3}{4}$ in.; outermost elliptic, inner almost linear, coriaceous in fruit. *Corolla* 2 in. purple, hispid without. *Capsule* $\frac{1}{4}$ in., papery, usually 4–2-seeded.

9. **L. peguensis**, *Clarke*; leaves ovate-lanceolate cordate densely softly hairy on both surfaces, peduncles long, flowers capitate, bracts 1 in. elliptic-oblong softly densely hairy subsistent, sepals unequal smaller than the bracts densely hispid. *Argyreia capitata*, *Kurz For. Fl.* ii. 216; *Choisy in DC. Prodr.* ix. 332, chiefly. *Convolvulus strigosus*, *Wall. Cat.* 1365, partly.

BRITISH BURMA, common; *Griffith, Parish, &c.* TAVOY; *Wallich.* ANDAMANS, *Helper, &c.*

Perhaps only a marked local variety of *L. strigosa*, as *Choisy* and *Kurz* have esteemed it; is very constant in its characters and general aspect. *Stem* villous or woolly, without the needle-like hairs of *L. strigosa*. *Leaves* gradually narrowed upwards. *Corolla* softly sparsely hairy without.

10. **L. barbiger**, *Clarke*; leaves ovate-lanceolate cordate sparsely hirsute on both surfaces, peduncles long, flowers capitate, bracts $\frac{1}{3}$ – $\frac{1}{2}$ in. ovate obtuse persistent, sepals ovate and elliptic longer than the bracts densely subpatently hirsute. *Convolvulus barbiger*, *Wall. Cat.* 1404. *Pharbitis barbiger*,

G. Don. Gen. Syst. iv. 262. *Argyreia barbigera*, *Chois. Convolv. Or.* 42, and in *DC. Prodr.* ix. 332; *Brand. For. Fl.* 343.

ASSAM; *Jenkins*. BRITISH BURMA; *Promé, Wallich*.

Probably a var. of *L. setosa*; it differs in the capitate inflorescence and spreading almost hispid backs of the sepals.

11. *L. setosa*, *Roxb. Hort. Beng.* 13, and in *Fl. Ind.* i. 490, and *ed. Carey & Wall.* ii. 80; leaves ovate-cordate acute or subobtuse sparsely hirsute on both surfaces, peduncles long, corymbs dense, bracts $\frac{1}{2}$ – $\frac{1}{3}$ in. ovate obtuse adpressedly strigose persistent, sepals ovate or elliptic longer than the bracts densely adpressedly strigose. *Wight Ic.* t. 1360. *Convolvulus setosus*, *Wall. Cat.* 1412. *C. strigosus*, *Spreng. Syst.* i. 600. *Ipomœa strigosa*, *Roth Nov. Sp.* 113. *Argyreia setosa*, *Chois. Convolv. Or.* 43, and in *DC. Prodr.* ix. 332; *Dalz. & Gibs. Bomb. Fl.* 168; *Brand. For. Fl.* 343.

Throughout tropical and subtropical INDIA, from Oudh, Mt. Aboo and Bombay, to Pegu. CEYLON.

A large climber; branches adpressedly strigose. *Leaves* 3–5 in., in age sometimes nearly glabrous; petiole 1–3 in. *Peduncles* 2–8 in., stout, adpressedly strigose; bracts coriaceous, very obtuse, at length deciduous; corymbs 1–4 in. diam., dense, but not capitate, branches thick. *Sepals* ovate, inner elliptic, very coriaceous, somewhat enlarged in fruit. *Corolla* $1\frac{1}{2}$ –2 in., densely setose without, rose-coloured. *Stamens* included. *Berry* much more succulent than in *L. strigosa*, ovoid, subacute, red, usually 4–2-seeded.

VAR. *minor*; leaves 1–2 in., peduncles 1 in., flowers capitate.—*Argyreia* n. 21, *Herb. Ind. Or. H. f. & T.*—Deccan Peninsula, *Wight*; S. Concan and Bababoodan Hills, *Lav.*

VAR. *obovata*; leaves large 6 by 5 in. obovate obtuse or emarginate, fruit of *L. setosa*. *Convolvulus obovatus*, *Wall. Cat.* 1381.—Nepal; *Wallich*.—Reduced to *L. elliptica* by *Choisy (DC. Prodr.* ix. 330, under *Argyreia*), from which it is certain that the true *Convolvulus obovatus*, now in the Wallichian herbarium, was not detected by *Choisy* among *Wallich's* collections, which were placed loose in his hands. Several species not found by *Choisy* appear to have been afterwards identified correctly by *Kippist*, the Librarian of the Linnæan Society, in arranging the herbarium.

12. *L. atropurpurea*, *Clarke*; leaves elliptic-lanceolate cordate sparsely hirsute on both surfaces, heads dense subsessile, bracts large oblong-lanceolate persistent. *Convolvulus atropurpureus*, *Wall. Cat.* 1345, and *Fl. Ind. ed. Carey & Wall.* ii. 54, and *Pl. As. Rar.* i. 38, t. 43. *Ipomœa atropurpurea*, *Chois. Convolv. Or.* 75, and in *DC. Prodr.* ix. 366 (syn. partly excl.). *I. sphærocephala*, *Don. Prodr.* 98, syn. excl.

NEPAL; *Wallich*. SIKKIM TERAI; *J. D. H., &c.*

A large climber. *Leaves* 6 by 2½ in., base deeply cordate; petiole 1½ in. *Peduncles* 0–½ in., fulvous-hirsute; bracts 1½ in., acuminate, softly hirsute. *Sepals* $\frac{3}{4}$ in., oblong-lanceolate, herbaceous, softly hairy, lax in fruit. *Corolla* 1½ in., tubular-campanulate, hirsute without, dark-purple, or in a Sikkim example, white. *Fruit* $\frac{1}{2}$ in. diam., globose, coriaceous, indehiscent, usually 4–2-seeded.

13. *L. sikkimensis*, *Clarke*; leaves large elliptic shortly acuminate at both ends or subobtuse sparsely hairy beneath, peduncles long, corymbs small few-fl'd., bracts linear-oblong, sepals $\frac{1}{4}$ in. round nearly glabrous.—*Argyreia* n. 12, *Herb. Ind. Or. H. f. & T.*

SIKKIM; Pomong, alt. 3000 ft., *Clarke*. KHASIA Mts., SILHET and CACHAR, *H. f. & T., Keenan*.

A large twiner; stems closely strigose. *Leaves* 5½ by 3 in., base usually shortly cuneate, sometimes rounded; petiole 2–5 in. *Peduncles* 3–8 in., somewhat slender; bracts $\frac{1}{2}$ –1 in., inconspicuous, deciduous, or one of the outer sometimes leaflike

petioled. *Calyx* very small for the flower. *Corolla* $2\frac{1}{3}$ –3 in., widely tubular-funnel-shaped, nearly glabrous without, purple. *Stamens* included; anthers not twisted. *Ovary* 2-celled; stigmas 2, sessile, globose.—*Fruit* not seen, hence this may be an *Ipomœa*; but the large long-petioled leaves and large wide-tubed corollas indicate rather *Lettsomia*. This resembles *L. elliptica*, Wight, which has smaller flowers, more numerous in the corymbs.

14. ***L. rubens*, Clarke**; leaves ovate-cordate shortly acuminate sparingly hairy beneath, peduncles long 1–5-fld., bracts caducous, sepals widely elliptic obtuse sparsely softly hairy. *Convolvulus rubens*, Wall. Cat. 1421. *Ipomœa rubens*, Choisy. *Convolv. Or.* 81, and in *DC. Prodr.* ix. 371, var. *a*.

ASSAM; Goalpara, Wallich. BENGAL; Silhet, Wallich, H. f. & T.; Cachar, Keenan.

Scandent; stems sparsely softly hairy. *Leaves* 4 by 3 in., somewhat deeply cordate; petiole 2–3 in. *Peduncles* 2–4½ in.; bracts deciduous before the flowers expand; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. *Sepals* $\frac{1}{4}$ – $\frac{1}{2}$ in. *Corolla* 1½–2 in., widely tubular-funnel-shaped, softly silky without on the plaits, at least when young, rose-purple. *Ovary* 2-celled; stigmas 2, sessile, globose. *Fruit* not seen.—From the habit and few-flowered peduncles, this has been supposed a *Rivea*; but the ovary is 2-celled. The var. *lanata*, Choisy, is founded on *Convolvulus glandulosus*, Ham. in Wall. Cat. 2252, collected in Lower Assam. This plant is not now in Wallich's herbarium, but from the description it may have been *Argyreia Roxburghii*, Choisy.

15. ***L. barbata*, Clarke**; leaves oblong acuminate or elongate-lanceolate shining fulvous-silky beneath, heads few-fld. subsessile, bracts 1 in. filiform persistent. *Convolvulus barbatus*, Wall. Cat. 1391, and *Pl. As. Rar.* ii. 45, t. 155. *Ipomœa barbata*, Choisy. *Convolv. Or.* 76, and in *DC. Prodr.* ix. 366, not of Roth.

PEGU; Wallich. TENASSERIM; Helfer; Mergui, Griffith.

Scandent, stems with bright long fulvous hairs; innovations densely silky. *Leaves* in Wallich's type oblong or subelliptic acute (in numerous other examples very narrow, $7\frac{1}{2}$ by $1\frac{1}{2}$ in.), sparsely or densely fulvous-hairy beneath, sparingly hairy above; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Peduncle* 0–½ in.; bracts numerous, scarcely $\frac{1}{12}$ in. broad, fulvous-hirsute. *Sepals* $\frac{1}{3}$ in., elliptic-lanceolate, in fruit ovate. *Corolla* $1\frac{1}{4}$ in., widely tubular-campanulate, pale rose-coloured, glabrous without. *Berry* $\frac{1}{3}$ in. diam.; depressed-globose, reddish, usually 4–2-seeded.

SUBGENUS 2. ***Moorcroftia***. *Fruit* 1- rarely 2-seeded.

16. ***L. rubicunda*, Clarke**; leaves large elliptic shortly acute fuscous-villous beneath, peduncles long, bracts deciduous, corymbs compound open, sepals round obtuse fuscous-woolly. *Convolvulus rubicundus*, Wall. Cat. 1409. *Argyreia rubicunda*, Choisy. *Convolv. Or.* 44, and in *DC. Prodr.* ix. 333.—*Argyreia* n. 26, *Herb. Ind. Or. H. f. & T.*

MALACCA; Griffith, Maingay.—DISTRIB. Ava.

A powerful climber; stems fulvous-villous. *Leaves* $6\frac{1}{2}$ by 4 in., base rounded, in age glabrate above, thick; petiole 1–2 in. *Peduncles* 3–7 in., fulvous-lanate; corymbs 2–6 in. diam., many-fld.; bracts caducous before the flowers expand. *Sepals* $\frac{1}{2}$ in., in fruit $\frac{1}{3}$ in., inner somewhat smaller. *Corolla* $\frac{3}{4}$ in., densely fulvous-hirsute without. *Fruit* $\frac{3}{4}$ by $\frac{1}{2}$ – $\frac{1}{3}$ in., ellipsoid, obtuse, smooth, nearly dry, lower half closely embraced by the calyx.

17. ***L. Maingayi*, Clarke**; leaves large elliptic acute glabrescent, heads large subsessile, bracts large ovate-lanceolate persistent, sepals linear-lanceolate.

MALAY PENINSULA, Griffith; Malacca, Maingay.

A large climber; branches stout, sparsely patently hairy. *Leaves* $6\frac{1}{2}$ by $3\frac{1}{2}$ in.,

base rhomboid or rounded, adult glabrous or with scattered fulvous hairs on the nerves beneath, coriaceous; petiole $\frac{1}{2}$ -1 in. *Peduncles* 0- $\frac{1}{2}$ in., fulvous-hirsute; heads 2-3 in. diam., very dense; bracts nearly 2 by 1 in., sparsely hairy. *Sepals* 1 in. and upwards; flower-buds densely hairy without. *Berry* $\frac{3}{4}$ by $\frac{1}{2}$ in., ellipsoid, very succulent, 1-seeded. Expanded flowers not seen.

18. ***L. hancorniaefolia***, *Clarke*; leaves elliptic acuminate glabrous, peduncles short 1-fld., sepals ovate subobtusely ashy pubescent. *Argyreia hancorniaefolia*, *Gardn.*; *Thwaites Enum.* 210.

CEYLON; ascending to 5000 ft., *Walker*, &c.

Scandent; branches ashy-pubescent, afterwards glabrate. *Leaves* 3 by $\frac{1}{2}$ in., base rounded; nerves at right angles to the midrib, very fine and close; petiole $1\frac{1}{2}$ in. *Peduncles* $\frac{1}{4}$ - $\frac{3}{4}$ in., ashy-pubescent; bracts near the middle, $\frac{3}{4}$ in., linear, caducous. *Sepals* $\frac{1}{4}$ in. *Corolla* $1\frac{1}{2}$ in., tubular-funnel-shaped, glabrous without, purple. *Ovary* 2-celled; stigmas 2, globose. *Berry* 1 by $\frac{2}{3}$ in., ellipsoid, very succulent, 1-seeded.

19. ***L. adpressa***, *Miq. Fl. Ind. Bat.* ii. 591; leaves elliptic acute hairy on both surfaces, peduncles very short, cymes small, bracts small lanceolate hairy. *Convolvulus adpressus*, *Wall. Cat.* 1424. *Moorcroftia adpressa*, *Chois.* *Convolv. Or.* 49, and in *DC. Prodr.* ix. 334.

PENANG; *Wallich*, *Maingay*, &c.

Shrubby (? scandent); branches hairy. *Leaves* $4\frac{1}{2}$ by 2 in., base obtuse or cuneate; petiole $1\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ - $1\frac{1}{2}$ in., hirsute; bracts $\frac{1}{4}$ by $\frac{1}{2}$ in., a leaflike bract sometimes added; pedicels 0- $\frac{1}{2}$ in. *Sepals* $\frac{1}{2}$ - $\frac{1}{2}$ in., narrowly lanceolate, sparsely hirsute. *Corolla* $1\frac{1}{2}$ in., hirsute without. *Berry* $\frac{1}{2}$ in., ellipsoid.

20. ***L. penangiana***, *Miq. Fl. Ind. Bat.* ii. 592; leaves elliptic-oblong adult glabrous or midrib beneath sparsely hairy, peduncles elongate slender glabrate, cymes lax, bracts inconspicuous. *Convolvulus penangianus*, *Wall. Cat.* 1425. *Moorcroftia penangiana*, *Chois. Convolv. Or.* 50, t. 4, and in *DC. Prodr.* ix. 335.

PENANG; *Wallich*.

Scandent; innovations thinly fulvous-hirsute. *Leaves* 6 by $2\frac{1}{2}$ in., base obtuse or cuneate, coriaceous; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Peduncles* 2-4 in.; pedicels (many of them) $\frac{1}{4}$ - $\frac{1}{2}$ in. *Sepals* $\frac{1}{2}$ in., ovate, obtuse, sparsely hirsute. *Corolla* (only seen in *Choisy's* picture) $1\frac{3}{4}$ in., tubular-funnel-shaped, hirsute without. *Berry* $\frac{2}{3}$ by $\frac{1}{2}$ in., ovoid.—Nearly allied to *L. adpressa*, but only one specimen seen.

21. ***L. ? Kurzii***, *Clarke*; leaves ovate subcordate very sparingly hairy beneath, peduncles long, cymes few-flowered, bracts $\frac{1}{2}$ in. linear, sepals $\frac{1}{2}$ in. linear-oblong, capsule berry-like yellow size of a pea usually 1-seeded. *Argyreia zeylanica*, *Kurz For. Fl.* ii. 215, *syn. excl.*

PEGU, not rare in the upper forests (*Kurz*).

An extensive twiner; young shoots sparingly adpressed-hairy. *Leaves* 3-5 in., sometimes a foot long and broad. *Peduncle* 5-8 in. *Corolla* large, funnel-bell-shaped, pink; tube $1\frac{1}{2}$ in., lobes of the limb triangular blunt.—Not seen; the foregoing copied from *Kurz*, who supposed this plant to be *Ipomœa zeylanica*, *Gaertn.*, which does not grow in Burma; nor will *Kurz's* description of the fruit suit, which, if correctly described as a 1-seeded berry no bigger than a pea; it may possibly be a *Porana*.

5. **IPOMÆA**, *Linn.*

Herbs, rarely shrubs, twining or prostrate, less often suberect. *Leaves* alternate, entire, lobed or divided. *Cymes* axillary, 1- many-flid.; bracts various. *Flowers* purple, white or yellow, usually showy. *Sepals* ovate or linear, equal or unequal, in fruit erect or rarely patent. *Corolla* campanulate

or funnel-shaped, tube long or short; limb 5-plaited, margin very shortly lobed. *Stamens* unequal, included or exserted; filaments filiform or dilated at base, often hairy, not with processes subconnivent over the ovary; anthers oblong, ultimately twisted or straight. *Ovary* 2-celled, 4-ovuled, rarely 4-celled and 4-ovuled (subgenus *Quamoclit*), or 3-celled and 6-ovuled (subgenus *Pharbitis*); disc annular; style filiform, stigma entire or 2-globose. *Capsule* globose or ovoid, 4-3- (rarely sub-2-) valved. *Seeds* as many as the ovules, or fewer.—Species 300, in the warmer regions of both hemispheres.

SUBGENUS I. **Calonyction**, *Chois. in DC. Prodr.* ix. 345 (genus). *Corolla-tube* elongate, 2-6 in., many-times longer than the sepals. *Stamens* about as long as the corolla-tube. *Ovary* 2-celled.

1. **I. bona-nox**, *Linn. Sp. Pl.* 228, as to the American plant only, not of *Gaertn.*; stem smooth or muricate, leaves cordate ovate acute glabrous entire or angular or lobed, peduncles long 1-5-flowered, flowering sepals ovate mucronate or shortly acute rarely obtuse, corolla white tube linear, capsule 1 in. ovoid-oblong, seeds glabrous. *Cav. Ic.* iii. 52, t. 300; *Bot. Mag.* t. 752; *Jacq. Hort. Schoenb.* i. 13, t. 36; *Benth. in Hook. Fl. Nigrit.* 465; *Meissn. in Mart. Brasil.* vii. 215. *Calonyction speciosum*, *Chois. Convolv. Or.* 59, t. 1, fig. 4, and in *DC. Prodr.* ix. 345, as to the American plant and synonyms only.

Cultivated throughout INDIA, native of tropical America.

VAR. grandiflora; leaves cordate ovate acute not lobed. *I. grandiflora*, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 497, and *ed. Carey & Wall.* ii. 87. *I. noctiluca*, *Herb. in Bot. Reg.* note to t. 917. *I. bona-nox*, *Blume Bijl.* 712; *Kurz For. Fl.* ii. 217, not of *Linn. even in part.* *I. aculeata*, *Blume Bijl.* 715, *vide Hassk.* *I. Roxburghii*, *Steud. Nomencl. not of Sweet.* *I. noctiflora*, *Griff. Notul.* iv. 286. *Convolvulus grandiflorus*, *Wall. Cat.* 1370. *Quamoclit longiflora*, *G. Don Gen. Syst.* iv. 259. *Calonyction speciosum*, *Chois. Convolv. Or.* 59, and in *DC. Prodr.* ix. 345, var. *a* and *β* (but most of the Indian synonyms quoted belong to *C. asperum*, *Chois.*); *Wight Ic.* t. 1361; *Dalz. & Gibs. Bomb. Fl.* 164; *Hassk. Pl. Jav. Rar.* 522. *C. Roxburghii*, *G. Don Gen. Syst.* iv. 263, wholly or in part.

TROPICAL INDIA, in most climates common; from Assam and Bengal to Tenasserim, and Malabar.—DISTRIB. E. Asia, Tropical Africa.

Extensively scandent; stems smooth, or not rarely muricate. *Leaves* 3-8 in., glabrate, secondary nervation much less prominent than in *I. glaberrima*; petiole 3-6 in. *Peduncles* 2-6 in.; bracts caducous. *Sepals* $\frac{1}{2}$ in., usually ovate, obtuse, mucronate, in fruit unaltered or slightly enlarged. *Corolla-tube* 3 by $\frac{1}{2}$ in., limb 3-5 in. diam., pure white or with plaits greenish, never with at all purple. *Anthers* shortly exserted or subincluded. *Capsule* narrowed upwards; peduncle at length somewhat thickened.—Moon-flower of the English; the flower expands at night, closes to wither about one hour after sunrise; see Sir W. Jones in *Asiat. Research.* iv. 257. It does not appear that Linnæus ever saw *I. grandiflora*, *Roxb.*, which is perhaps specifically distinguishable from the American *I. bona-nox*; there are many specimens of the typical *I. bona-nox* supplied from Asia; but American seeds of this were grown in India in Roxburgh's day, if not before. It is consequently now very difficult to decide whether *I. bona-nox* and *I. grandiflora* should be regarded as distinct.

2. **I. muricata**, *Jacq. Hort. Schoenb.* iii. 40, t. 323, not of *Cav.*; stem usually muricate, leaves cordate-ovate acute glabrous entire, peduncles 1-5-fld. somewhat shorter than the petioles, flowering sepals elliptic-lanceolate, corolla rose-purple tube linear, capsule $\frac{1}{2}$ - $\frac{3}{4}$ in. globose apiculate, seeds glabrous. *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 499, and *ed. Carey & Wall.* ii. 89; *Benth. in Hook. Fl. Nigrit.* 465; *Miq. Fl. Ind. Bat.* ii. 608. *I. bona-nox*, β purpurascens, *Bot. Reg.* iv. t. 290. *Convolvulus muricatus*, *Linn. Mant.* 44; *Wall. Cat.*

2249. *Calonyction muricatum*, *G. Don Gen. Syst.* iv. 264. *C. bona-nox*, var. *muricata*, *Chois. in DC. Prodr.* ix. 345, partly, not of Baker.

HIMALAYA, alt. 1-5000 ft., frequent from Kangra to Sikkim. DECCAN HILLS, *Rottler, Wight, &c.*, cultivated elsewhere.—DISTRIB. Japan.

A much weaker plant than *I. bona-nox*; leaves 2-4 in.; sepals in flower more lanceolate, in fruit nearly as of *I. bona-nox*; corolla-tube 1-2 by $\frac{1}{2}$ in., hairy within; peduncle usually greatly thickened under the fruit.—Clearly distinct from *I. bona-nox*.

3. *I. grandiflora*, Lamk. Ill. i. 467; stem usually muricate, leaves cordate-ovate acute entire glabrous, peduncles 1-3-flowered short, flowering sepals large elliptic, corolla white tube linear, capsule nearly 1 in. diam. globose, seeds softly shortly villous margins shaggy. *I. longiflora*, *Br. Prodr.* 484; *Benth. Fl. Austral.* iv. 418. *I. macrantha*, *Roem. & Sch. Syst.* iv. 251. *I. glaberrima*, *Bojer*; *Hook. Journ. Bot.* i. 357. *I. Tuba*, *G. Don Gen. Syst.* iv. 270; *Meissn. in Mart. Brasil.* vii. 216. *I. jucunda*, *Thwaites Enum.* 211, 426. *Convolvulus grandiflorus*, *Linn. f. Suppl.* 136, not of Wall. *C. asper*, *Wall. Cat.* 1388. *C. Tuba*, *Schlecht. in Linnæa*, 1831, 735. *Calonyction asperum* and *grandiflorum*, *Chois. Convolv. Or.* 60, and in *DC. Prodr.* ix. 346, some syn. excl. *C. comorensis*, *Bojer Hort. Maurit.* 228. *C. comospermum*, *Bojer Hort. Maurit.* 228; *Chois. in DC. Prodr.* ix. 346. *C. muticum*, *Dcne. in Nouv. Ann. Mus.* iii. 390; *Chois. in DC. Prodr.* ix. 345. *C. pseudomuricatum*, *G. Don Gen. Syst.* iv. 264. *C. longiflorum*, *Hassk. Pl. Jav. Rar.* 523.—*Rheede Hort. Mal.* xi. t. 50.

W. DECCAN PENINSULA; common. CEYLON; Dolosbage district, rare, *Thwaites*. DISTRIB. Timor, New Caledonia, Australia, and Polynesia, Mascarene Islands with E. Tropical Africa. Tropical America, cultivated.

A large twiner; stem often softly muricate. Leaves 3-6 in. diam., often deeply cordate, secondary nerves prominent; petiole 2-5 in. Peduncles usually 1-2 in.; flowers 1-3; bracts caducous. Sepals in flower $\frac{3}{4}$ -1 in., obtuse or very shortly acute; in fruit enlarged, orbicular, often $1\frac{1}{2}$ in. diam., embracing the capsule. Corolla-tube $2\frac{1}{2}$ by $\frac{1}{2}$ in., sometimes much longer, limb 3 in. diam. Capsule obtuse; peduncles in fruit somewhat thickened.—The length of the peduncle is very variable, almost 0, in others, as in the *Convolvulus asper* and in *Thwaites's Calonyction comospermum*, more than 4 in. Brown describes his *I. longiflora* as with obtuse sepals, and *Bentham's I. longiflora* is identical with the Ceylon *I. grandiflora*; but F. Mueller has lately supplied specimens with much-acuminated sepals, which prove either that the sepals in *I. grandiflora* are eminently variable or that there is another species of *Calonyction* in Australia.

4. *I. trichosperma*, Blume Bijl. 710; stem often muricate, leaves ovate-cordate acute glabrous sometimes lobed, peduncles very short 1-fl., flowering sepals large elliptic, corolla very large tube much wider than in *I. grandiflora*, capsule nearly 1 in. diam. subglobose, seeds softly villous margins shaggy. *I. Yomæ*, *Kurz For. Fl.* ii. 218. *Calonyction trichospermum*, *Chois. Convolv. Or.* 60, and in *DC. Prodr.* ix. 346. *C. diversifolium*, *Hassk. Pl. Jav. Rar.* 523, not of *Fl. des Serres*, t. 1328.

SILHET; *H. f. & T.*, &c. PEGU; *Kurz*. MOULMEIN; *Parish*.—DISTRIB. Java.

Very near *I. grandiflora*, but some of the leaves are lobed, and the flower is very large; in *Parish's* example more than 6 in. long, with the tube 1 in. diam.—The Khasian examples are in fruit, and have the leaves very slightly lobed; some Javan specimens have subdigitate leaves.

SUBGENUS II. **Quamoclit**, *Chois. in DC. Prodr.* ix. 335 (genus). Corolla crimson (in cultivated varieties orange yellow or white), middle-sized, tube narrow long, mouth rather small. Anthers exsert. Ovary 4-celled, 4-ovuled. Capsule 4-celled.

5. **I. coccinea**, Linn.; *Bot. Mag.* t. 221; leaves ovate-cordate acute glabrous, sepals elliptic suddenly acuminate, seeds densely furred. *Roxb. Hort. Beng.* 14; *Andr. Bot. Rep.* t. 499; *Meissn. in Mart. Brasil.* viii. 217, with syn. *I. luteola*, Jacq. *Ic. Rar.* i. t. 35; *Blume Bijl.* 711. *I. phœnicea*, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 502, and ed. *Carey & Wall.* ii. 92. *Convolvulus coccineus* and *luteolus*, *Spreng. Syst.* i. 599. *C. phœniceus*, *Spreng. Syst.* i. 596; *Wall. Cat.* 1372. *Quamoclit coccinea*, *Moench Hort. Marb.* 453; *Chois. in DC. Prodr.* ix. 335, with syn. *Q. phœnicea*, *Chois. Convolv. Or.* 51, t. 1, fig. 1, and in *DC. Prodr.* ix. 336.

Cultivated and quasi-wild throughout INDIA, erroneously supposed by Roxburgh to be a native of Coromandel.—Introduced from tropical America.

Stems subscandent, weak. *Leaves* 2–4 in. diam., entire or lobed; petiole 2–4 in. *Peduncles* 2–6 in., slender; cyme lax, few or many-flowered; bracts inconspicuous. *Sepals* $\frac{1}{4}$ in., unaltered in fruit. *Corolla* crimson, in garden varieties orange or yellow; tube 1 in., mouth $\frac{3}{4}$ in. diam. *Ovary* completely 4-celled. *Capsule* $\frac{1}{4}$ in. or rather more, ovoid, smooth, completely 4-celled; dissepiments thin, membranous, persistent.

6. **I. Quamoclit**, Linn.; *Bot. Mag.* t. 244; leaves pinnate segments numerous linear, sepals elliptic, seeds nearly glabrous. *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 502, and ed. *Carey & Wall.* ii. 93; *Blume Bijl.* 708; *Meissn. in Mart. Brasil.* vii. 217, with syn. *Convolvulus pennatus*, *Lamk. Enc.* iii. 567. *C. Quamoclit*, *Spreng. Syst.* i. 591; *Wall. Cat.* 1375. *Quamoclit vulgaris*, *Chois. Convolv. Or.* 52, and in *DC. Prodr.* ix. 336.—*Rumph. Herb. Amb.* v. t. 155, fig. 2.; *Rheede Hort. Mal.* xi. t. 60.

Common throughout INDIA, in gardens and as a denizen; native of tropical America.

A slender, glabrous twiner. *Leaves* 3–5 by 2–3 in., segments distant. *Peduncles* few-flowered. *Corolla* crimson or white. *Flowers* and capsules nearly as of *I. coccinea*.

SUBGENUS III. **Pharbitis**, *Chois. in DC. Prodr.* ix. 341 (genus). *Corolla*-tube narrow. *Anthers* included. *Ovary* 3-celled, 6-ovuled. *Capsule* 3-celled, 6–4-seeded.

7. **I. hederacea**, Jacq. *Collect.* i. 124, and *Ic. Rar.* i. t. 36; hairy, leaves ovate-cordate 3-lobed lobes ovate acuminate, peduncles 1–5-fld. mostly shorter than the petioles, sepals elliptic elongate-linear patently hirsute near the base, seeds glabrous. *Bot. Reg.* t. 85; *Blume Bijl.* 710; *Meissn. in Mart. Brasil.* vii. 228. *I. cœrulea*, *Koen.*; *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 501; ed. *Carey & Wall.* ii. 91; *Bot. Reg.* t. 276. *I. punctata*, *Pers. Syn.* i. 184. *I. nil* and *barbata*, *Roth Cat. Bot.* i. 36, 37. *I. Dillenii*, *Roem. & Sch. Syst.* iv. 227. *Convolvulus nil*, Linn.; *Bot. Mag.* t. 188. *C. hederaceus*, Linn.; *Wall. Cat.* 1373. *C. Dillenii*, *Lamk. Enc.* iii. 544. *C. cœruleus*, *Spreng. Syst.* i. 593. *Convolvuloides triloba*, *Moench Hort. Marb.* 452. *Pharbitis hederacea* and *nil*, *Chois. Convolv. Or.* 57, 58, and in *DC. Prodr.* ix. 343, 344. *P. diversifolia*, *Lindl. in Bot. Reg.* t. 1988. *P. variifolia*, *Dcne. in Nouv. Ann. Mus.* iii. 390. *P. Purshii*, *punctata* and *barbata*, *G. Don Gen. Syst.* iv. 263, with many other syn.

INDIA; both cultivated and apparently wild, common.—DISTRIB. Tropical and subtropical regions of both hemispheres.

Stem twining, sparsely retrorsely hirsute. *Leaves* 2–5 in. diam.; petiole 1–4 in. *Peduncles* rarely longer than the petioles; pedicels usually $\frac{1}{4}$ in.; bracts 2, $\frac{1}{2}$ in., linear, close to the calyx. *Sepals* $\frac{1}{2}$ –1 in., subequal, narrowly linear upwards, very hirsute, or nearly glabrous near the base. *Corolla* $1\frac{1}{2}$ –2 in., tubular-funnel-shaped, rose-coloured, blue, or somewhat orange below. *Anthers* never twisted. *Capsule*

$\frac{1}{2}$ in., ovoid, subglobose, smooth.—Probably an American plant, naturalised in the Old World. *I. scabra*, Forsk., is adduced as a syn. by Choisy (DC. Prodr. ix. 344), which, if this is correct, is the oldest name; but Forskahl says his plant had 5-lobed leaves, hence the name of Linnæus and Meissner has been here retained.

VAR. *integrifolia*, Choisy.; leaves ovate-cordate acute entire, peduncles about as long as the petioles, sepals elliptic much elongate. *I. cœrulescens*, Roxb. Hort. Beng. 14, and *Fl. Ind.* i. 500, and *ed. Carey & Wall.* ii. 90.—Cultivated and apparently wild. Intermediate states connect this with *I. hederacea*. It is often called *I. hispida*, but it differs from that in the elongate ligulate termination to the sepals.

VAR. *himalaica*; leaves and flowers larger, sepals in fruit attaining $1\frac{1}{2}$ in., seeds densely closely villous.—Himalaya, alt. 4–5000 ft., from Kashmir to Sikkim, in the inner valleys at some distance from the plains.

8. *I. purpurea*, Lamk. *Ill.* i. 466; hairy, leaves ovate-cordate acute entire, peduncles few-fld., sepals elliptic-oblong acute patently hirsute near the base, seeds glabrous. *Meissn. in Mart. Brasil.* vii. 223. *Convolvulus purpureus*, Linn.; *Bot. Mag.* tt. 113, 1005, 1682.

INDIA; ascending to 3–7000 ft. in Kashmir, Sikkim, the Khasia Mts. and W. Deccan Peninsula, probably not a native.—DISTRIB. Tropical America; extensively cultivated in all warm countries.

Resembles the entire-leaved var. of *I. hederacea*; but the leaves are smaller; peduncles often longer and slenderer; pedicels $\frac{1}{2}$ in., umbelled, deflexed in fruit; sepals $\frac{1}{2}$ – $\frac{3}{4}$ in., unequal, without the ligulate termination characteristic of *I. hederacea*. Inhabits very remote parts of the mountains; and has about as good a claim to be regarded as Indian as has *I. hederacea*.

9. *I. laciniata*, Clarke; glabrous, leaves 5–7-partite segments serrate or pinnatifid, peduncles 1–3-fld. shorter than the leaves, corolla-tube long linear. *Pharbitis laciniata*, Dalz. in *Hook. Kew Journ.* iii. 178; *Dalz. & Gibs. Bomb. Fl.* 167.—*Ipomœa* n. 40, *Herb. Ind. Or. H. f. & T.*

WEST DECCAN PENINSULA; Bababoodan Hills, Law; Bombay and Malwar, Dalzell; Belgaum, Ritchie.

Stem slender, creeping or twining. *Leaves* 1–2 in. diam., subdigitate, lobes elliptic or almost linear; petiole $\frac{1}{2}$ –1 in. *Peduncles* mostly 1-fld., thickened upwards in fruit; bracts $\frac{1}{2}$ in., linear. *Sepals* $\frac{1}{2}$ – $\frac{3}{4}$ in., elliptic, somewhat wider in fruit. *Corolla* white, tube 2 by $\frac{1}{2}$ in., purple within, limb $1\frac{1}{2}$ –2 in. diam. *Anthers* scarcely exserted. *Ovary* 3-celled. *Capsule* $\frac{1}{2}$ in., ovoid, subglobose, glabrous. *Seeds* closely, densely furred.

10. *I. dissecta*, Willd. *Phyt.* 5, t. 2, fig. 3; glabrous, leaves digitate, lobes linear-cuneate toothed or pinnatifid, peduncles sub-1-flowered shorter than the leaves, corolla very small. *Benth. Fl. Austral.* iv. 416; *Choisy in DC. Prodr.* ix. 363, partly. *I. coptica*, Roth Nov. Sp. 110; *Choisy. Convolv. Or.* 89, and in *DC. Prodr.* ix. 384; *Dalz. & Gibs. Bomb. Fl.* 166. *Convolvulus copticus*, Linn. *Mant.* 559; *Roxb. Fl. Ind.* i. 477, and *ed. Carey & Wall.* ii. 62; *Wall. Cat.* 1351. *C. stipulatus*, Lamk. *Enc.* iii. 546. *C. Thonningii*, Schum. *Pl. Guin.* 98.

W. INDIA and the DECCAN, not common, Heyne, Shuter, Wight. CEYLON; north of the Island, Gardner.—DISTRIB. Tropical Africa and Australia.

Stems 1–3 ft., prostrate, hardly twining. *Leaves* 1–1 $\frac{1}{2}$ in. diam.; petiole $\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ –1 $\frac{1}{2}$ in.: bracts near the flower, minute; or flowers subsessile amongst the digitate leaflike bracts. *Sepals* $\frac{1}{2}$ in., oblong; in fruit widened, rigid, back often muricate. *Corolla* $\frac{3}{4}$ in., tubular-funnel-shaped, white. *Capsule* $\frac{1}{2}$ in. diam., glabrous, 6-valved, normally 6-seeded. *Seeds* glabrous or very nearly so.

SUBGENUS IV. **Aniseia**, Choisy. in *DC. Prodr.* ix. 429 (genus). Two outer sepals (at least in fruit) much longer than the inner, cordate or sub-

hastate. *Stamens* included. *Ovary* 2-celled, 4-seeded.—Not well distinguishable from *Eupomœa*, in which the outer sepals are usually somewhat larger.

11. **I. uniflora**, *Roem. & Sch. Syst.* iv. 247, *not of Blume*; glabrescent, leaves petioled oblong obtuse, peduncles 1-flowered, sepals ultimately enlarged decurrent, corolla 1 in. campanulate. *I. lanceolata*, *G. Don Gen. Syst.* iv. 282. *Convolvulus uniflorus*, *Lamk. Enc.* iii. 544; *Burm. Fl. Ind.* 47, t. 21, fig. 2. *C. emarginatus*, *Vahl Symb.* iii. 23. *C. Rheedii*, *Wall. Cat.* 1358, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 70; *Wight in Hook. Bot. Miscell.* ii. 106, t. 8. *Aniseia uniflora*, *Chois. Convolv. Or.* 101, t. 2, fig. 9, and in *DC. Prodr.* ix. 431; *Wight Ic.* t. 850; *Dalz. & Gibs. Bomb. Fl.* 163.—*Rheede Hort. Mal.* xi. t. 54.

Throughout INDIA, from Nepal, *Wallich*, and Khasia, *J. D. H.*, to CEYLON, (*Thwaites*) and Malacca (*Griffith, Maingay*); not common, more frequent in the Deccan Peninsula.—DISTRIB. Malaya to Fiji Islands; Tropical Africa.

Creeping in wet places, twining. *Leaves* 3 by 1 in., often emarginate with a mucro, base cuneate; petiole $\frac{3}{4}$ in. *Peduncles* $1\frac{1}{2}$ in.; bracts minute, persistent. *Sepals* in flower $\frac{1}{2}$ – $\frac{1}{2}$ in., outer elliptic, acute; in fruit $\frac{3}{4}$ –1 in., 2 outer subcordate ovate scarious nervose, inner lanceolate. *Corolla* hairy without. *Capsule* $\frac{1}{2}$ in., ovoid, glabrous. *Seeds* glabrous, margins minutely strigose.

12. **I. calycina**, *Benth. in Gen. Pl.* ii. 872; leaves ovate-cordate acute entire, peduncles short few-fl'd., sepals ultimately cordate or sagittate, corolla scarcely 1 in. tubular. *I. sagittata*, *Roxb. Ic. ined. not of Desf.* *I. cariosepala*, *Klotz. in Nub. Pl.* *Convolvulus calycinus*, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 471, and *ed. Carey & Wall.* ii. 51; *Wall. Cat.* 2255. *O. Hardwickii*, *Spreng. Syst. curae post.* 60. *Aniseia calycina*, *Chois. Convolv. Or.* 100, and in *DC. Prodr.* ix. 429; *Wight Ill.* t. 168 b, fig. 5, and *Ic.* t. 833; *Dalz. & Gibs. Bomb. Fl.* 163.

DECCAN PENINSULA; frequent; extending to Banda (*Edgeworth*) and the W. Himalaya (*Royle*).—DISTRIB. Tropical Africa.

Stems much twining, villous. *Leaves* 2–3 in., deeply cordate, sparsely hairy or glabrate; petiole $1\frac{1}{2}$ in. *Peduncles* $\frac{3}{4}$ in.; pedicels $\frac{3}{4}$ in.; bracts $\frac{1}{4}$ in., linear. *Sepals* in flower $\frac{1}{2}$ in., unequal, ciliate; outer in fruit $\frac{1}{2}$ by $\frac{1}{4}$ in., lanceolate, hastate. *Corolla* rose or white; mouth funnel-shaped, narrow. *Capsule* $\frac{1}{4}$ in., ovoid, glabrous. *Seeds* villous, margins with long silky hairs.

13. **I. barlerioides**, *Benth. in Gen. Pl.* ii. 872; hirsute, leaves ovate-oblong scarcely acute, peduncles longer or shorter than the petioles 1-fl'd., corolla 2–3½ in. funnel-shaped. *Convolvulus barlerioides*, *Wall. Cat.* 2256. *C. oblongus*, *Wall. Cat.* 1382. *Aniseia barlerioides*, *Chois. Convolv. Or.* 102, and in *DC. Prodr.* ix. 432.

N. W. INDIA, *Royle*; Subsiwaliks, *Edgeworth*; KUMAON, alt. 4000 feet, *Strachey & Winterbottom*. OUDH; *R. Thompson*. CHOTA NAGPORE; *Clarke*. W. DECCAN PENINSULA southward to Courtallam; *Wight, Dalzell, Ritchie, &c.*

Twining. *Leaves* 2–3 in., base obtuse or subcordate; petiole 0–1½, very variable on the same stem. *Peduncles* 1–4 in.; longer than the petioles in the N. Indian plant (*Choisy's* type), hardly any in other S. Indian examples; bracts $\frac{1}{2}$ in., linear. *Sepals* in flower $\frac{3}{4}$ in., lanceolate; in fruit much widened, 2 outer ovate. *Corolla* purple or purplish-white, glabrous or sparsely hairy without; tube very narrow at the base; mouth $2\frac{1}{2}$ in. diam. *Capsule* $\frac{1}{2}$ in., ovoid, glabrous. *Seeds* oblong, villous or pubescent, margins sometimes hirsute.

SUBGENUS V. **Batatas**, *Chois. in DC. Prodr.* ix. 337 (genus). *Corolla* widely tubular-funnel-shaped. *Stamens* included. *Ovary* 4-celled, 4-ovuled.

14. **I. digitata**, Linn.; Meissn. in Mart. Brasil. vii. 278, with all syn.; glabrous, leaves large palmately 5-7-lobed, peduncles many-fld. longer than the petioles, sepals elliptic shortly acute glabrous, seeds woolly with hairs $\frac{1}{4}$ in. long. Chois. in DC. Prodr. ix. 389, char. emend. I. paniculata, Br. Prodr. 486; Blume Bijl. 709; Bot. Reg. t. 62, not of Burm. I. mauritiana, Jacq. Hort. Schoenb. ii. 39, t. 200. I. gossypifolia, Willd. Enum. Hort. Berol. 208. I. eriosperma, Beauv. Fl. Ovar. et Ben. ii. 73, t. 105. I. insignis, Andr. Bot. Rep. t. 635; Bot. Reg. t. 75; Bot. Mag. t. 1790. I. tuberosa, G. F. W. Mey. Esseq. 102. I. plantensis, Bot. Reg. t. 333; Bot. Mag. t. 3685; Chois. in DC. Prodr. ix. 387. Convolvulus paniculatus, Linn. Sp. Pl. 223; Roxb. Fl. Ind. i. 478, and ed. Carey & Wall. ii. 63; Wall. Cat. 1350. C. digitatus, platensis, and insignis, Spreng. Syst. i. 591, 592. C. roseus, Kunth. in Humb. & Bonpl. iii. 108, not of Mill. Batatas paniculata, Chois. Convolv. Or. 54, t. 1, fig. 2, and in DC. Prodr. ix. 339; Wight in Madras Journ. v. 4, t. 11; Dalz. & Gibs. Bomb. Fl. 167. B. edulis, Chois. in DC. Prodr. ix. 339, var. γ only.

TROPICAL INDIA; common, from Bengal and Assam to Ceylon; not in the drier western portion.—DISTRIB. Tropical Asia, Africa, America and Australia, in moist climates.

A large, scandent perennial. Leaves 3-7 in. diam., often lobed nearly to the base; lobes lanceolate or elliptic, often spathulate; petiole 2-5 in. Peduncles often 6 in.; bracts deciduous; flowers not capitate. Sepals $\frac{1}{4}$ - $\frac{1}{2}$ in., wider concave in fruit. Corolla $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., widely campanulate, glabrous, pink-purple. Anthers never twisted. Ovary completely 4-celled, unless perhaps near the top. Capsule $\frac{1}{2}$ in., ovoid, completely 4-celled to the apex, 4-valved, the long wool from the seeds exsert from the fissures.

15. **I. pentaphylla**, Jacq. Ic. Rar. t. 319, not of Cav.; thinly hirsute, leaves digitate, leaflets broad-lanceolate subsessile, peduncles long laxly dichotomous, sepals large elliptic outer patently hirsute, seeds glabrous. Meissn. in Mart. Brasil. vii. 287, with all syn. I. pilosa, Cav. Ic. iv. 11, t. 323, not of Sweet. Convolvulus pentaphyllus, Linn. Sp. Pl. 223. C. hirsutus, Roxb. Hort. Beng. 14, and Fl. Ind. i. 479, and ed. Carey & Wall. ii. 65. C. munitus, Wall. Cat. 1354; Wight in Hook. Bot. Miscell. ii. 104, t. 7. C. nemorosus, Roem. & Sch. Syst. iv. 303. Batatas pentaphylla, Chois. Convolv. Or. 54, and in DC. Prodr. ix. 339; Wight Ic. t. 834; Dalz. & Gibs. Bomb. Fl. 167. Spiranthera pentaphylla, Bojer Hort. Mauriti. 226.

W. INDIA; Hindoostan, Gujerat, W. Deccan Peninsula, frequent.—DISTRIB. Africa, Polynesia, Tropical America; often cultivated.

A twining annual. Leaflets 2-4 in.; petiole 2 in. Peduncles 1-4 in.; bracts $\frac{1}{2}$ in., linear; pedicels $\frac{1}{2}$ -2 in., fulvous-hirsute. Sepals $\frac{1}{2}$ in., obtuse or subacute; in fruit enlarged, sometimes nearly 1 in. Corolla $1\frac{1}{2}$ in., wide-funnel-shaped, glabrous, white or ochroleucous. Ovary completely 4-celled. Capsule $\frac{1}{4}$ - $\frac{1}{2}$ in., ovoid, papery, completely 4-celled; endocarp separating, with a hole opposite the back of each seed.

16. **I. Batatas**, Lamk. Enc. vi. 14; glabrous or sparingly hairy, leaves ovate-cordate acute angular or more or less lobed, peduncles long many fld., sepals elliptic shortly acute glabrous, seeds glabrous. Meissn. in Mart. Brasil. vii. 282. I. Catesbæi, G. F. W. Mey. Esseq. 103. Convolvulus Batatas, Linn.; Roxb. Fl. Ind. i. 483, and ed. Carey & Wall. ii. 69; Blume Bijl. 712; Wall. Cat. 1356. C. indicus, Moris. Hist. ii. sect. 1, t. 3, fig. 4. C. edulis, Thunb. Fl. Jap. 84. C. esculentus, Salisb. Prod. 123. Batatas edulis, Chois. Convolv. Or. 53, and in DC. Prodr. ix. 338. B. xanthorhiza, Bojer Hort. Mauriti. 225.—Rumph. Herb. Amb. v. t. 130. Rheede Hort. Mal. vii. t. 50.

Cultivated in INDIA, but not extensively.—Native of America.

Tubers red, white or rarely yellow. Stem usually hairy. Flowers 2 in. and

upwards, purple. *Ovary* 4-celled. *Capsule* 4-celled, or by suppression 3-1-celled.—*The Sweet Potato*; though that term is given to yams in Bengal. Said to fruit rarely.

SUBGENUS 6. *Eulpomæa*. *Sepals* subequal, or the outer somewhat larger, especially in fruit. *Corolla* funnel-shaped or campanulate, glabrous without or very nearly so. *Stamens* included. *Ovary* 2-celled, 4-ovuled, rarely imperfectly 4-celled near the base. *Capsule* 2-celled, 4-2-seeded, rarely 1-celled and 1-seeded.—This subgenus is designed to include all the species of *Ipomæa* not distinctly referable to any one of the 5 preceding subgenera.

* *Flowers capitate*; *bracts persistent*.

17. ***I. pileata***, Roxb. *Fl. Ind.* i. 504, and *ed. Carey & Wall.* ii. 94; sparsely hairy, leaves ovate-cordate acute entire, heads many-fl'd. enclosed by a large boat-shaped bract, corolla tubular-funnel-shaped pink. *Chois. Convolv. Or.* 74, and in *DC. Prodr.* ix. 365; *Wight in Calc. Journ. Nat. Hist.* viii. 179, t. 5, fig. 5, and *Ic. t.* 1363; *Dalz. & Gibs. Bomb. Fl.* 166. *Convolvulus pileatus*, *Spreng. Syst. curae post.* 61; *Wall. Cat.* 1376.

ASSAM, BENGAL to TENASSERIM; ascending to 4000 feet. DECCAN PENINSULA and CEYLON; frequent.

Stems annual, twining, patently hairy. *Leaves* 2-3 in. diam., deeply cordate, mostly long-petioled. *Peduncles* 1-4 in.; outer bracts 1-2½ in., entire, produced or almost auriculate at each end; inner ovate or subspathulate. *Sepals* elliptic, acute, inner narrower, very hairy. *Corolla-tube* ¾ by ⅓ in., linear-cylindric; mouth 1¼ in., suddenly widened. *Capsule* ¼ in., subglobose, papery. *Seeds* smooth.—Easily known by its boat-shaped outer bract. *I. involucrata*, Beauv. *Fl. Owar. et Ben.* ii. 52, t. 89, of W. Africa has a similar bract, and Choisy (in *DC. Prodr.* ix. 365) doubts if this can be kept distinct. It differs, however, *inter alia*, by the corolla-tube ¼ in. wide.

18. ***I. Wightii***, *Chois. Convolv. Or.* 88, and in *DC. Prodr.* ix. 364; leaves ovate-cordate acute entire angular or sublobate softly villous above white-woolly beneath, heads long-peduncled, outer bracts lanceolate acuminate, corolla middle-sized pink-purple, capsule minutely pubescent. *Wight Ic. t.* 1364. *Convolvulus Wightii*, *Wall. Pl. As. Rar.* ii. 55, t. 171; *Wall. Cat.* 1406. *C. gossypinus*, *Wall. Cat.* 1407.

MTS. of the DECCAN PENINSULA; Nilgherries, Pulneys, Bababoodan Hills, *Wight, &c.* CEYLON; Central Provinces, alt. 2-3000 ft.

Stems twining, fulvous-villous. *Leaves* 3-4 in. diam., sinuate-denticulate, rarely obscurely 3-lobed; petiole 2 in. *Peduncles* 2-5 in.; heads 1-2 in. diam., dense, fulvous-hirsute; outer bracts 1 in., inner shorter linear. *Sepals* ½-¾ in., linear-lanceolate, subequal, fulvous-hirsute, scarcely altered in fruit. *Corolla* 1¼ in., sparsely hairy without. *Capsule* ¼ in. diam., subglobose, papery. *Seeds* puberulous.—*I. pilosa* has the leaves especially whitened beneath, but the flowers are not capitate, and the capsule not pubescent.

19. ***I. bracteata***, *Wight Ic. t.* 1374; hairy, leaves ovate-cordate acute entire, heads peduncled, outer bracts ovate-cordate, corolla small narrow-campanulate purple-pink.

S. DECCAN PENINSULA; Quilon, *Wight*.

Stems weak, twining, patently hairy. *Leaves* 1-2 in. diam., softly thinly hairy on both surfaces; petiole 1½ in. *Peduncles* ½-2½ in.; outer bracts ¾ in., deeply cordate; inner smaller, ovate or elliptic, obtuse. *Sepals* ½ in., spathulate-oblong, inner smaller, linear-lanceolate. *Corolla* ¾ in., nearly glabrous without. *Capsule* not seen.—The sepals are much more unequal (even at flower-time) than in *Wight's* picture; it might be placed in subgenus *Aniseia*. When dry it greatly resembles *Hewittia bicolor*.

VAR. lobata; leaves 3-7-lobed sometimes nearly to the base, lobes narrowed near their bases, capsule $\frac{1}{2}$ in. diam. papery glabrous, seeds ellipsoid minutely adpressedly fulvous-silky with braid-like markings.—S. Deccan Peninsula; *Wight, Stocks, Law*. Wight has named this *I. hepaticifolia*, Burm., from which it recedes in the distinctly-cordate ovate bracts.

20. I. pes-tigridis, Linn.; *Roxb. Fl. Ind., ed. Carey & Wall.* ii. 93; hairy, leaves deeply 5-9-lobed, heads peduncled, outer bracts ovate or elliptic oblong not cordate, corolla medium-sized funnel-shaped pink. *Blume Bijl.* 709; *Wight Ic.* t. 836; *Chois. Convolv. Or.* 73, and in *DC. Prodr.* ix. 363; *Dalz. & Gibs. Bomb. Fl.* 165. *Convolvulus pes-tigridis*, *Spreng. Syst.* i. 592; *Wall. Cat.* 1374. *C. bryoniaefolius*, *Salisb. Prod.* 125. *Convolvuloidea palmata*, *Moench. Meth.* 452.—*Rheede Hort. Mal.* xi. t. 59.

Throughout INDIA from the Punjab to Malacca and Ceylon, frequent in the drier low hills.—**DISTRIB.** Malaya, China, Polynesia, Tropical Africa.

Stems twining, patently hirsute. *Leaves* 1-5 in. diam., hirsute on both surfaces; lobes elliptic, acuminate, narrowed at the base; petiole 1-2 in. *Peduncles* $\frac{1}{2}$ -3 in.; heads dense, fulvous-hirsute, outer bracts 1 in., inner smaller narrower acute. *Sepals* $\frac{1}{2}$ - $\frac{1}{2}$ in., lanceolate, acute, hirsute, hardly enlarged in fruit. *Corolla* $1\frac{1}{2}$ in., tube narrow, mouth suddenly widened, sparsely hairy without. *Capsule* $\frac{1}{4}$ in., ovoid, papery, glabrous. *Seeds* minutely velvety or nearly glabrous.

VAR. hepaticifolia; leaves 3-lobed or angular. *I. hepaticifolia*, Linn. *Sp. Pl.* 230; *Burm. Fl. Ind.* 50, t. 20, fig. 2; *Chois. Convolv. Or.* 74, and in *DC. Prodr.* ix. 363. *Convolvulus hepaticifolius*, *Spreng. Syst.* i. 594.—S. Deccan Peninsula and Ceylon; frequent.

VAR. capitellata; leaves ovate-cordate acute entire. *I. capitellata*, *Chois. Convolv. Or.* 75, and in *DC. Prodr.* ix. 363. *I. tamnifolia*, *Burm. Fl. Ind.* 50, partly (as to the Indian plant) not of Linn. *Convolvulus capitellatus*, *Wall. Cat.* 2250.—Throughout the Deccan extending north to Behar and Hindoostan; not rare.—A complete series connects the *I. pes-tigridis* with its 3-lobate-leaved form, and another connects it with the entire-leaved form. The entire-leaved form has been supposed to be Wight's *I. bracteata*; while on the other hand Wight supposed his *I. bracteata* with lobed leaves to be *I. hepaticifolia*. The two species are easily separable, *I. bracteata* having bracts obtuse outer distinctly cordate: *I. pes-tigridis* bracts acute outer not at all cordate.

21. I. eriocarpa, *Br. Prodr.* 484; hairy, leaves oblong-cordate acute, heads sessile, bracts ovate-linear, corolla small campanulate pink, capsule patently hairy. *Chois. in DC. Prodr.* ix. 369; *Benth. Fl. Austral.* iv. 426. *I. sessiliflora*, *Roth Nov. Sp.* 116; *Wight Ic.* t. 169; *Chois. Convolv. Or.* 76, and in *DC. Prodr.* ix. 366; *Dalz. & Gibs. Bomb. Fl.* 166. *I. hispida*, *Roem. & Sch. Syst.* iv. 238. *I. ligulata*, *Bojer Hort. Maur.* 229. *I. sphærocephala*, *Sweet Hort. Brit. ed. 2*, 372. *I. Horsfieldiana*, *Miq. Fl. Ind. Bat.* ii. 611. *Convolvulus eriocarpus* and *sessiliflorus*, *Spreng. Syst.* i. 598, 599. *C. sphærocephalus*, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 472, and *ed. Carey & Wall.* ii. 53; *Wall. Cat.* 1344. *C. hispidus*, *Vahl Symb.* 329. *C. Rampania*, *Wall. Cat.* 225 (not now in Wallich's Herbarium).

Throughout INDIA, alt. 0-4000 ft.; common. CEYLON; ascending to 4000 ft.—**DISTRIB.** Afghanistan and Tropics of the Old World.

Stems twining, patently villous. *Leaves* $2\frac{1}{2}$ by 1 in., sparsely hairy on both surfaces; petiole 1 in. *Peduncles* 0, or (in one Hindoostan example of Thomson's) $\frac{1}{2}$ - $2\frac{1}{2}$ in.; heads sometimes few-fl., rarely reduced to one subsessile flower; bracts $\frac{1}{2}$ in., hirsute; sepals similar to the bracts but smaller, unaltered in fruit. *Corolla* $\frac{1}{2}$ in. *Capsule* $\frac{1}{4}$ in., globose. *Seeds* puberulous.

22. I. Stocksii, *Clarke*; hairy, leaves elliptic subacute, heads sessile, bracts lanceolate inconspicuous, corolla small, capsule glabrous.

DECCAN PENINSULA; *Stocks*.

Stems prostrate, twining, patently hairy. *Leaves* 2 in., rhomboid, base obtuse or subcordate; petiole $\frac{1}{4}$ – $1\frac{1}{4}$ in. *Bracts* $\frac{1}{4}$ in., hispid. *Sepals* $\frac{1}{2}$ – $\frac{1}{2}$ in., elliptic-lanceolate, patently hispidulous. *Capsule* $\frac{1}{4}$ – $\frac{1}{2}$ in., ovoid, 2-celled, 4-seeded. *Seeds* furred, margins villous.—Near *I. eriocarpa*.

** *Flowers* pedicelled, cymose, subracemose or solitary.

† *Leaves* undivided or angular or somewhat lobed, rarely deeply.

23. ***I. angustifolia***, Jacq. *Ic. Rar. t. 317, not of Chois.*; glabrous, leaves sessile hastate-oblong or -linear acute, peduncles long 1–3-fld., sepals ovate acuminate, corolla small yellow. *Benth. Fl. Austral. iv. 425. I. denticulata, Br. Prodr. 485; Bot. Reg. t. 317, not of Chois. I. filicaulis, Blume Bijl. 721; Chois. Convolv. Or. 66, and in DC. Prodr. ix. 353; Dalz. & Gibs. Bomb. Fl. 165; Bot. Mag. t. 5426. Convolvulus hastatus and angustifolius, Lamk. Enc. iii. 542, 547. C. filicaulis, Vahl Symb. iii. 24. C. simplex, Pers. Syn. i. 178. C. denticulatus, Spreng. Syst. i. 603. C. linifolius, Wall. Cat. 1389. C. medium, Roxb. Fl. Ind. i. 474, and ed. Carey & Wall. 256; Wall. Cat. 1346, not of Linn. C. Blumii, Dietr. Syn. Pl. i. 675.—Rheede Hort. Mal. xi. t. 55.*

Hills of the DECCAN PENINSULA and CEYLON; extending north to Bundelcund, Edgeworth. KHASIA Mts., alt. 0–3000 ft.; common, and thence to Malacca.—DISTRIB. S. E. Asia, Malaya, Australia, Tropical Africa.

Diffuse, biennial, twining. *Leaves* $1\frac{1}{2}$ –3 in., more or less toothed. *Peduncles* often longer than the leaves; bracts minute, persistent; pedicels long. *Sepals* $\frac{1}{4}$ – $\frac{1}{2}$ in. *Corolla* $\frac{2}{3}$ in., funnel-shaped, eye purple. *Capsule* $\frac{1}{4}$ in., ovoid, papery, glabrous, 2-celled. *Seeds* glabrous.

24. ***I. tridentata***, Roth, *Cat. Bot. ii. 19*; glabrous, leaves sessile hastate-oblong or subquadrate obtuse truncate or 3-toothed, peduncles often as long as the leaves 1–3-fld., sepals ovate acuminate, corolla small yellow. *Chois. Convolv. Or. 65, and in DC. Prodr. ix. 353; Dalz. & Gibs. Bomb. Fl. 165. Evolvulus tridentatus, Linn. Sp. Pl. 392; Burm. Fl. Ind. 77, t. 16, fig. 3. Convolvulus tridentatus, Linn. Sp. Pl. 157; Roxb. Fl. Ind. i. 475, and ed. Carey & Wall. ii. 56; Wall. Cat. 1347.—Rheede Hort. Mal. xi. t. 65.*

DECCAN PENINSULA and CEYLON; frequent; extending north to Chota Nagpore.—DISTRIB. Ava, Banca.

Rootstock woody, giving off numerous, closely-prostrate, elongate stems. *Leaves* usually less than 1 in., sometimes submarginate, mucronate. *Flowers*, capsules and seeds, nearly as of *I. angustifolia*, with which Thwaites (*Enum.* 211) unites it; but it is a smaller plant with smaller flowers, never twining.

25. ***I. linifolia***, Blume *Bijl. 721*; sparsely hairy or glabrate, leaves petioled narrowly oblong lower often subcordate ovate-oblong, peduncles few or many-fld., sepals elliptic obtuse glabrous, corolla small yellow, capsule 1-celled 4-seeded. *Chois. in DC. Prodr. ix. 369; Benth. Fl. Austral. iv. 423. I. setulosa, Zoll. Verz. by Moritz. 51. Convolvulus cæspitosus, Roxb. Hort. Beng. 14, and Fl. Ind. i. 483, and ed. Carey & Wall. ii. 70; Wall. Cat. 1357. C. Bentharii, Wall. Cat. 1393. Hewittia cæspitosa, Steud. Nom. Bot. Skinneria cæspitosa, Chois. Convolv. Or. 105, t. 6, and in DC. Prodr. ix. 435.*

SUBTROPICAL SIKKIM, J. D. H., &c. ASSAM and SILHET, frequent; Wallich, Masters, &c., and thence to MALACCA.—DISTRIB. Malay Archipelago, Australia.

Annual or biennial. *Stems* slender, much twining (creeping, Roxburgh). *Leaves* $1\frac{1}{2}$ –2 $\frac{1}{2}$ in., oblong, narrowed suddenly at both ends; lower often subcordate, sometimes ovate; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Peduncles* 1–3 in., slender; bracts minute, persistent.

Sepals $\frac{1}{4}$ in.; margins, when dry, inflexed above, but hardly acute. *Corolla* $\frac{3}{4}$ in., subcampanulate, glabrous without. *Ovary* 2-celled. *Capsule* $\frac{1}{4}$ in., ovoid, papery, with hardly any trace of the dissepiment near its base. *Seeds* glabrous.

26. **I. chryseides**, *Ker in Bot. Reg. t.* 270; leaves ovate-cordate acute glabrous entire toothed or 3-lobed, peduncles many-fl., sepals elliptic glabrous, corolla small yellow. *Wight Ic. t.* 157; *Dene. in Nouv. Ann. Mus.* iii. 393; *Chois. Convolv. Or.* 87, and in *DC. Prodr.* ix. 382; *Dalz. & Gibs. Bomb. Fl.* 166. *I. dentata*, *Willd.*; *Roem. & Sch. Syst.* iv. 789. *I. subtriflora*, *Zoll. Verz. by Moritz*, 51. *Convolvulus chryseides*, *Spreng. Syst.* i. 598. *C. dentatus*, *Vahl Symb.* iii. 25; *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 62; *Wall. Cat.* 1349. *Lepistemon muricatum*, *Spanoghe in Linnœa* 1841, 339.

Throughout INDIA, alt. 0-4000 ft. and CEYLON, frequent.—DISTRIB. Malaya, S. China, Australia, Tropical Africa.

Stems much twining, glabrous, often muriculate, sometimes in places hairy. *Leaves* 1-2 in.; petiole $\frac{1}{2}$ -2 in. *Peduncles* $\frac{1}{2}$ -3 in.; bracts small, caducous; cymes dense. *Sepals* $\frac{1}{5}$ in., ultimately spreading. *Corolla* $\frac{1}{2}$ - $\frac{3}{4}$ in., funnel-shaped, glabrous without, uniform yellow. *Capsule* $\frac{1}{4}$ in. and upwards, ovoid, somewhat angular, top acute or depressed, 2-celled; wall thicker than in the preceding species. *Seeds* puberulous.

27. **I. polyantha**, *Miq. Fl. Ind. Bat.* ii. 613; sparingly pubescent, leaves ovate-cordate acute entire, cymes peduncled laxly dichotomous many-flowered, sepals broad-elliptic obtuse nearly glabrous, corolla smallish yellow. *Convolvulus polyanthus*, *Wall. Cat.* 1378.

E. BENGAL; Soorma bank, *J. D. H.*; Soonderbund; *Clarke*.—DISTRIB. JAVĀ.

Stems twining, pubescent in places. *Leaves* 2-3 in., deeply cordate, pubescent on the nerves beneath or nearly glabrous; petiole 1-2 in. *Peduncles* 1-4 in.; bracts small, caducous; cymes 2-5 in. diam., minutely pubescent. *Sepals* $\frac{1}{4}$ in. *Corolla* $\frac{3}{4}$ -1 in., subcampanulate, clear yellow or ochroleucous.

VAR. *affinis*; less diffuse, more pubescent, cymes 3-7-fl., sepals pubescent or almost villous. *Convolvulus affinis*, *Wall. Cat.* 1385.—Assam, E. Bengal, Soonderbund; *Wallich, H. f. & T., &c.*, frequent. Distrib. Burma.—Referred by Choisy (in *DC. Prodr.* ix. 380) to *I. gemella*, Roth., with which it can have no near affinity; it is very near *I. chryseides*, but has a larger wider corolla, and much longer pedicels.

28. **I. reniformis**, *Chois. Convolv. Or.* 64, and in *DC. Prodr.* ix. 351, *syn. Linn. excl.*; glabrous or sparingly pubescent, leaves small reniform or ovate-cordate toothed, peduncles 0 or very short few-fl., sepals ovate obtuse glabrescent ciliate, corolla small yellow. *Dalz. & Gibs. Bomb. Fl.* 164. *I. cymbalaria*, *Fenzl in Flora* 1844, 312. *Convolvulus reniformis*, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 481, and *ed. Carey & Wall.* ii. 67; *Wall. Cat.* 1398. *Evolvulus emarginatus*, *Burm. Fl. Ind.* 77, t. 30, fig. 1; *Linn. ms. in Herb. Prop.*

DECCAN PENINSULA and CEYLON, alt. 0-3000 ft., common; extending northwards to Rajputana and Behar.—DISTRIB. S. E. Asia, Tropical Africa.

Closely creeping, much branched, often rooting from nearly every node. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., often small, broader than long, obtuse, sometimes ovate, occasionally 3-lobed; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in. *Peduncles* usually subobsolete, 1-3-flowered; bracts inconspicuous. *Sepals* $\frac{1}{8}$ in., glabrescent on the back, ciliate, even in fruit. *Corolla* $\frac{1}{2}$ - $\frac{3}{4}$ in., campanulate. *Capsule* $\frac{1}{4}$ in., subglobose, 2-celled; cells often 1-seeded. *Seeds* glabrous, dark chestnut-coloured.—Choisy says this species was *Convolvulus gangeticus*, Linn. *Amen. Acad.* iv. 306 (*Evolvulus*, Linn. *Sp. Pl.* 391), to which species Linnæus assigns "leaves and flowers very hirsute, peduncles capillary."

29. **I. rumicifolia**, *Chois. Convolv. Or.* 65, and in *DC. Prodr.* ix. 351; stems sparsely hirsute, leaves ovate-oblong cordate or subhastate sinuate irregularly angular or sublobate, peduncles short laxly few-fl., sepals elliptic-lanceolate patentely hirsute, corolla very small. *Convolvulus lasiospermus*, *Vis. Pl. Egypt. Nub.* 13, t. 1, fig. 2. *C. hirtus*, *Wall. Cat.* 2254.

MTS. of the S. DECCAN; TRAVANCORE and Nilgherries, *Rottler, Wight, &c.*—DISTRIB. E. Tropical Africa.

Stems annual, twining. *Leaves* 1-2 in., scabrous or sparsely hirsute; petiole $1\frac{1}{2}$ in. *Peduncles* 0- $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ in., linear, subpersistent; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in. *Sepals* $\frac{1}{4}$ in., acute, widened in fruit. *Corolla* $\frac{1}{2}$ - $\frac{1}{3}$ in., campanulate, white when dry, *Vistani*, probably yellow when fresh. *Capsule* $\frac{1}{4}$ in. and upwards, ovoid, glabrous, usually 4-seeded. *Seeds* velvety.

30. **I. obscura**, *Ker in Bot. Reg. t.* 239; leaves ovate-cordate acute entire nearly glabrous, peduncles long laxly 1-3-fl., sepals ovate subacute nearly glabrous, corolla middle-sized ochroleucous with a purple base, seeds velvety. *Chois. Convolv. Or.* 82, and in *DC. Prodr.* ix. 370, some *syn. excl.*; *Wight in Madras Journ. v.* 6, t. 12; *Dalz. & Gibs. Bomb. Fl.* 166. *I. insuavis*, *Blume Bijl.* 716. *I. ocularis*, *Bartl. in Linnæa*, 1840; *Suppl.* 126. *I. ochroleuca*, *Spanoghe in Linnæa*, 1841, 340. *Convolvulus obscurus*, *Linn.*; *Burm. Fl. Ind.* 44; *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 52, not of *Hassk.*

Throughout INDIA and CEYLON, alt. 0-3000 ft.; common.—DISTRIB. Malaya, Mascarene Islands, E. Africa.

Stems twining, hairy or nearly glabrous. *Leaves* 1-2 $\frac{1}{2}$ in.; petiole 1-2 in. *Peduncles* 1-3 in., often 1-flowered, rarely with so many as 3-flowers; bracts $\frac{1}{2}$ in., lanceolate, subpersistent; pedicels $\frac{1}{4}$ - $1\frac{1}{2}$ in. *Sepals* $\frac{1}{2}$ in.; ultimately broader, obtuse, reflexed. *Corolla* $\frac{3}{4}$ -1 in., tube narrow, mouth wide, glabrous, yellow or white with the plaits yellowish, always with the purple spot at the base. *Anthers* never twisted. *Capsule* $\frac{1}{4}$ - $\frac{1}{2}$ in., ovoid, subacute, glabrous, 2-valved, 2-seeded, normally 4-seeded. *Seeds* densely softly brown-velvety; therefore the Indian species is not the *I. obscura* elaborately described by *Hasskari (Pl. Jav. Rar.* 519).

VAR. gemella; adult leaves closely hairy on both surfaces. *Convolvulus gemellus*, *Wall. Cat.* 1383 *type sheet, not of Vahl.*—BENGAL; *Wallich, &c.*, frequent.—*Ipomæa gemella*, *Chois. Convolv. Or.* 87, and in *DC. Prodr.* ix. 380, consists of *Convolvulus gemellus*, *Burm. Fl. Ind.* 46, t. 21, fig. 1 (a Javan plant) and the totally different *C. affinis*, *Wall.*, from E. Bengal and Burma; so far as any Malabar examples are supposed to be *I. gemella*, they are perhaps *I. obscura*.

31. **I. Stocksii**, *Clarke*; leaves ovate-lanceolate cordate subcaudate shortly hairy on both surfaces, peduncles long laxly 1-3 fl., sepals lanceolate acuminate, corolla somewhat large, seeds glabrous.

MALABAR and CONCAN; *Stocks, Law, &c.*

Resembling generally (when dry) *I. obscura*. *Leaves* 3 $\frac{1}{2}$ in., deeply cordate, finely acuminate. *Pedicels* often $1\frac{1}{2}$ in. *Sepals* $\frac{1}{2}$ in., in flower sublinear, in fruit lanceolate, sparsely hairy. *Corolla* (very much withered) exceeding 1 in. *Capsule* nearly $\frac{1}{2}$ in., ovoid-oblong, glabrous, 4-valved, 4-seeded.—Referred in *Herb. Ind. Or. H. f. & T.* possibly to a var. of *I. obscura*, which the large flowers and glabrous seeds will not admit. From the unusually narrow sepals it may be the Malabar plant which *Willdenow* (and *Choisy*) have placed with *Burmanni's Convolvulus gemellus*.

32. **I. sibirica**, *Pers. Syn. i.* 183; nearly glabrous, leaves triangular-lanceolate cordate entire or undulate, peduncles shorter than the petioles 1-4-fl., sepals ovate mucronate, corolla small white, seeds glabrous. *Chois. in DC. Prodr.* ix. 377. *Convolvulus sibiricus*, *Linn. Mant.* 203. *C. rupestris*, *Pallas Voy. (ed. Gauthier)* iv. 369, t. 17.

WESTERN HIMALAYA: Kumaon; Naini Tal, alt. 6000 ft., *Strachey & Winterbottom.*—DISTRIB. Siberia, N. China (near *Pekin, Maximowicz*).

Annual, twining. *Leaves* 3 by 2 in.; petiole 2 in. *Peduncles* $\frac{1}{2}$ – $1\frac{1}{3}$ in.; bracts linear, deciduous; pedicels $\frac{1}{2}$ –1 in., racemose or subumbellate. *Sepals* $\frac{1}{2}$ in., glabrous. *Corolla* $\frac{2}{3}$ in., campanulate, glabrous, often yellowish near the base. *Anthers* never twisted. *Capsule* $\frac{1}{4}$ – $\frac{1}{2}$ in., ovoid, glabrous, 2-celled, 2-valved, 4–2-seeded. *Seeds* ellipsoid, glabrous.—The Indian specimen is rather more developed, both in leaf and cyme, than the original Linnæan type, but is identical with the specimens collected by Pallas.

33. *I. poranoides*, Clarke; glabrous, leaves ovate-lanceolate cordate caudate entire, cymes peduncled many-flowered lax, bracts ovate mucronate persistent, sepals ovate obtuse unequal, corolla small white.

SIKKIM and BRITISH BHOTAN; alt. 3–5000 ft., frequent, *Clarke*.

Scandent, twining. *Leaves* 3 by 2 in.; petiole $1\frac{1}{2}$ in. *Peduncles* 1–3 in.; bracts $\frac{1}{4}$ – $\frac{3}{4}$ in., at the divisions of the divaricate cyme. *Sepals* $\frac{1}{4}$ – $\frac{1}{2}$ in., glabrous. *Corolla* $\frac{1}{4}$ in., subcampanulate, glabrous, white, often yellowish near the base. *Anthers* never twisted. *Capsule* $\frac{1}{2}$ in., subglobose, smooth, 2-celled, 2–4-valved, normally 4-seeded. *Seeds* glabrous.—By the prominent persistent bracts, this species is not likely to be confounded with any other *Ipomœa*; but it has probably been passed for *Porana racemosa*, which it somewhat resembles in its scandent habit and numerous white flowers in lax cymes.

34. *I. cynanchifolia*, Clarke; hairy, leaves ovate-lanceolate cordate acuminate entire, peduncles 0, pedicels racemose or subfasciculate, bracts caducous, sepals lanceolate elongate, corolla small rose, capsule glabrous. *Convolvulus cynanchifolius*, *Wall. Cat.* 1399.

SIKKIM and BHOTAN; alt. 2–5000 ft., frequent, *Clarke*.—DISTRIB. Burma.

Scandent, twining. *Leaves* 3 by $1\frac{1}{2}$ in., more or less hairy; petiole 1–2. *Pedicels* $\frac{1}{4}$ in., rigid, fascicled, or forming a raceme 1–2 in., recurved in fruit. *Sepals* $\frac{1}{2}$ – $\frac{1}{2}$ in., hirsute, blackish green, widening in fruit. *Corolla* $\frac{1}{2}$ – $\frac{2}{3}$ in., campanulate, glabrous, with a dark spot at the base. *Anthers* never twisted. *Ovary* 2-celled, 4-ovuled; stigma small, of 2 subsessile globes. *Capsule* $\frac{1}{4}$ – $\frac{1}{2}$ in., subglobose, 2-celled, usually 4-seeded. *Seeds* glabrous.—Regarded by Choisy (in *DC. Prodr.* ix. 366) as identical with *I. eriocarpa*, from his never having seen Wallich's specimens. *I. cynanchifolia* is very near *I. calcinea*, Benth, but the sepals (even in fruit) are not cordate.

35. *I. Glenieii*, Thwaites in litt.; glabrous, leaves subcordate elongate-oblong entire, peduncles 1-flid. ebracteate, sepals ovate subacute, corolla middle-sized subcampanulate.

CEYLON; *Thwaites*.

Creeping, hardly twining. *Leaves* 2 by $\frac{1}{2}$ in., shallowly cordate, gradually narrowed from the very base to the apex, not acuminate, undulate; petiole 1 in. *Peduncles* $\frac{1}{4}$ – $\frac{1}{2}$ in. *Sepals* $\frac{1}{4}$ – $\frac{1}{2}$ in., obscurely mucicate. *Corolla* $\frac{3}{4}$ in., tube $\frac{1}{2}$ – $\frac{1}{2}$ in. broad.—Described from a fragment which flowered at Kew in 1871; it appears very distinct.

36. *I. denticulata*, Choisy in DC. Prodr. ix. 379, not of R. Br.; glabrous, leaves ovate-cordate acute entire denticulate angular or somewhat lobed, peduncles short 1–3-flid., pedicels long, sepals elliptic suddenly acute, corolla $1\frac{1}{2}$ in. purple. *Benth. Fl. Austral.* iv. 421. *I. subdentata*, *Miq. Fl. Ind. Bat.* ii. 614. *I. littoralis*, *Thwaites Enum.* 211, not of *Blume*. *I. cymosa*, *Baker Fl. Maurit.* 208, not of *Roem. & Sch.* *I. nicobarica*, *Kurz in Journ. As. Soc.* 1876. pt. 2, 141. *Convolvulus denticulatus*, *Lamk. Enc.* iii. 540.—*Ipomœa*, n. 42, *Herb. Ind. Or. H. f. & T.*

MALAY PENINSULA; from Mergui (*Griffith*) southwards. CEYLON; near the sea at Galle. *Thwaites*. NICOBARS; *Kurz*.—DISTRIB. Malaya, Australia, Polynesia, Seychelles.

Stems trailing, somewhat twining. *Leaves* 1–2 $\frac{1}{2}$ in., deeply cordate, not fleshy;

petiole $1\frac{1}{2}$ in. Peduncles 0– $1\frac{1}{2}$ in., often 1-fl.; bracts $\frac{1}{2}$ in., linear; pedicels often 1 in. or longer. Sepals nearly $\frac{1}{2}$ in., somewhat scariosus. Corolla widely tubular-funnel-shaped. Ovary 2-celled, not at all 4-celled. Capsule globose, glabrous. Seeds smooth.

37. **I. fastigiata**, Sweet Hort. Brit. ed. 2, 372; minutely puberulo-scabrous or glabrate, leaves ovate-cordate acute entire or lower lobed, peduncles long many-fl., pedicels short, sepals elliptic suddenly acute, corolla $1\frac{1}{2}$ –2 in. purple. Chois. Convolv. Or. 84, and in DC. Prodr. ix. 380; Meissn. in Mart. Brasil. vii. 267, with syn. Convolvulus fastigiatus, Roxb. Hort. Beng. 13, and Fl. Ind. i. 468, and ed. Carey & Wall. ii. 48, not of Wall.

BENGAL, Roxburgh. Introduced from America.

Extensively scandent, twining. Leaves 3–4 in., mostly entire (in the Indian plant), those on the runners often lobed; petiole often 3–5 in. Peduncles 1–4 in.; bracts caducous; cymes dense, pedicels rarely exceeding $\frac{1}{2}$ in. Flower and fruit very nearly as of *I. denticulata*, from which it differs little except in its numerous shorter pedicels.—A common American species, introduced in S. E. Asia. Miquel (Fl. Ind. Bat. ii. 616). Roxburgh describes it as a native of the interior of Bengal, and in flower most part of the year, but no one has met with the plant wild.

38. **I. sepiaria**, Koen.; Roxb. Hort. Beng. 14, and Fl. Ind. i. 500, and ed. Carey & Wall. ii. 90; leaves ovate-cordate acute entire glabrous or somewhat pubescent, peduncles long, pedicels short subumbelled clavate in fruit, sepals ovate subobtusely, corolla largeish pale-purple or white with a dark eye, seeds furred. Chois. Convolv. Or. 82, and in DC. Prodr. ix. 370; Wight Ic. t. 838; Dalz. & Gibs. Bomb. Fl. 166, not of Benth. *I. striata*, Roth Nov. Sp. 111. *I. Heynii*, Wall. Cat. 1387 (Choisy, no specimen now in Herb. Wall.). Convolvulus maximus and striatus, Vahl Symb. iii. 26, 28. *C. marginatus*, Lamk. Enc. iii. 558. *C. sepiarius* and *incrassatus*, Wall. Cat. 1384, 1386.—Rheede Hort. Mal. xi. t. 53.

Throughout INDIA; from Hindostan to Malacca, frequent. CEYLON, common.—DISTRIB. Malaya.

Perennial, twining, glabrous or in places pubescent or hirsute. Leaves 1–2½ in., entire or sinuate, rarely lobed, basal lobes usually rounded; petiole 1–2 in. Peduncles $\frac{1}{2}$ –7 in., usually long; bracts small, lanceolate, caducous; pedicels 0–½ in. Sepals $\frac{1}{2}$ in., obscurely pubescent. Corolla often 1½ in. and upwards; tube cylindric, dark purple within; mouth suddenly widened. Capsule $\frac{1}{4}$ –½ in., ovoid, 4–2-seeded.—Convolvulus triflorus, Vahl Symb. iii. 30 (Ipomæa triantha, Roem. & Sch. Syst. iv. 243; Chois. Convolv. Or. 83, and in DC. Prodr. ix. 370), is only known by Vahl's description. Choisy does not see how it differs from *I. sepiaria*; but Vahl states that the pedicels are about as long as the peduncles, which is not the case in *I. sepiaria*. It may have been *Ipomæa denticulata*.

VAR. *stipulacea*; leaves more elongate often angular or lobed sometimes hastate with basal lobes acute, stipules obscure minute, sepals rather larger, corolla shorter, than in *I. sepiaria* type. *I. stipulacea*, Sweet Hort. Brit. ed. 2, 372; Chois. Convolv. Or. 84, and in DC. Prodr. ix. 379. *I. subtrilobans*, Miq. Fl. Ind. Bat. ii. 615. Convolvulus stipulaceus, Roxb. Hort. Beng. 14, and Fl. Ind. i. 484, and ed. Carey & Wall. ii. 71.—Bengal Plain and Chittagong; Roxburgh, &c., not rare.—Miquel's *I. subtrilobans* is intermediate between *I. sepiaria* and this.

39. **I. Beladamboe**, Roem. & Sch. Syst. iv. 233; glabrous or nearly so, leaves ovate-cordate entire, peduncles short or long stout many-fl., sepals ovate obtuse, corolla large purplish or white, seeds glabrous. *I. rugosa*, Chois. Convolv. Or. 64, and in DC. Prodr. ix. 350; Wight Ic. t. 887. *I. repens*, Lamk. Enc. vi. 18, not of Roth. Convolvulus rugosus, Rottl.; Willd. in Act. Berol. iv. 196. *C. flagelliformis*, Roxb. Hort. Beng. 14, and Fl. Ind. i. 481, and

ed. Carey & Wall. ii. 68; *Wall. Cat.* 1397. *C. Beladambu*, *Spreng. Syst.* i. 608, and *curæ post.* 62.—*Rheede Hort. Mal.* xi. t. 58.

S. DECCAN PENINSULA; *Wight, &c.* CEYLON, abundant in damp fields.

Extensively trailing. *Leaves* 3–4 in. diam., subobtusely; petiole 1–2½ in. *Peduncles* ¼–½ in.; bracts ¼ in., lanceolate, deciduous; pedicels ½ in., stout, somewhat thickened upwards in fruit. *Sepals* ½–¾ in., unequal, outer often shorter, glabrous, wrinkled when young. *Corolla* ½–2 in., purple in the dried examples, pure white in Roxburgh's figure. *Capsule* ½ in., globose, glabrous, 4-seeded.

40. ***I. aquatica***, *Forsk. Fl. Æg. Arab.* 44; glabrous or nearly so, leaves elliptic-oblong cordate or hastate or elongate entire or angular sublobed, peduncles long few-fl., pedicels long, sepals ovate obtuse, corolla large purple, seeds minutely closely silky. *I. reptans*, *Poir. Enc. Suppl.* iii. 460; *Blume Bijl.* 714; *Chois. Convolv. Or.* 62, and in *DC. Prodr.* ix. 349; *Dalz. & Gibs. Bomb. Fl.* 164. *I. repens*, *Roth Nov. Sp.* 110. *I. subdentata*, *Miq. Fl. Ind. Bat.* ii. 614. *Convolvulus reptans*, *Linn.*; *Roxb. Hort. Beng.* 14. *C. repens*, *Vahl Symb.* i. 17; *Roxb. Fl. Ind.* i. 432, and *ed. Carey & Wall.* ii. 68; *Blume Bijl.* 713; *Wall. Cat.* 1355, not of *Linn.* *C. Adansonii*, *Lamk. Enc.* iii. 560.—*Rumph. Herb. Ambo.* v. t. 155, fig. i. *Rheede Hort. Mal.* xi. t. 52.

Throughout INDIA, common; abundant in Bengal Plain. CEYLON; borders of tombs, and cult. as a vegetable, *Thwaites*.—DISTRIB. Tropical Asia, Australia, Africa.

Annual; stems trailing on mud, and floating, sometimes to a great length, hollow. *Leaves* 3–6 in.; petiole 1–6 in., usually very long. *Peduncles* 2–7 in., 1–5-flowered; bracts inconspicuous; pedicels often 1–2 in. *Sepals* ½ in., glabrous or nearly so. *Corolla* 2 in., usually pale purple, glabrous. *Capsule* ½ in., ovoid, glabrous, 4–2-seeded. *Seeds* most minutely hairy, or very nearly glabrous.

41. ***I. salicifolia***, *Roxb. Fl. Ind.* i. 498, and *ed. Carey & Wall.* ii. 88; glabrous, leaves short-petioled linear-lanceolate base rhomboid or rounded, peduncles very short 1–3-fl., sepals broadly elliptic subobtusely, corolla large white. *Chois. in DC. Prodr.* ix. 367. *I. Buchananii*, *Chois. Convolv. Or.* 92.

BENGAL; Rungpore, *Hamilton*.

Only known from Roxburgh's description and his *Ic. Ined.* at Kew. Biennial stem twining. *Leaves* 7 by 1 in., acuminate; petiole ½ in. *Peduncles* 0–¼ in.; bracts ½ in., linear-lanceolate; pedicels ½–¾ in. *Sepals* ¾ by ½ in. *Corolla-tube* 1¾ by ½ in., cylindric; mouth 2½ in. diam. *Capsule* nearly ½ in. diam., globose, glabrous. *Seeds* ¼ in., oblong, black, apparently (from the figure) minutely hairy.—Roxburgh describes the capsule as 2-celled, with 3 seeds in each cell, which is hard to believe; in his picture, the stigma is distinctly 2-lobed, while the capsule seems 3-valved.

42. ***I. staphylina***, *Roem. & Sch. Syst.* iv. 249; glabrous, leaves ovate subcordate, peduncles short many-fl., laxly racemose-paniculate, sepals ovate obtuse, corolla middle-sized purplish white, seeds with silky hairs ¼ in. long. *Chois. Convolv. Or.* 78. *I. racemosa*, *Roth Nov. Sp.* 115, not of *Poir.*; *Chois. in DC. Prodr.* ix. 371; *Wight Ill.* t. 168. *Convolvulus malabaricus*, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 469, and *ed. Carey & Wall.* ii. 49, all *syn. excl.*; *Wall. Cat.* 1341. *C. racemosus*, *Roem. & Sch. Syst.* iv. 302. *C. Kleinii*, *Spreng. Syst.* i. 606, and *curæ post.* 61. *C. polyanthus*, *Wall. Cat.* 1378. *C. gangeticus*, *Wall. Cat.* 1340, by admixture.

S. DECCAN PENINSULA; common. ASSAM; *Jenkins*. PENANG; *Wallich*.

Shrubby, subsucculent. *Leaves* 4 by 2½ in., subacute, not acuminate, prominently nerved; petiole 1–2 in. *Peduncles* ½–2 in., usually shorter than the petioles, numerous, often paniced towards the end of the branches; bracts small, caducous; pedicels 0–¼ in., mostly short. *Sepals* ½ in., glabrous. *Corolla* 1 in., purplish in the tube, mouth nearly white. *Capsule* ½ in., ovoid, subacute, 4-seeded.

43. **I. campanulata**, Linn.; Chois. *Convolv. Or.* 69, and in *DC. Prodr.* ix. 359; leaves cordate-ovate acute entire glabrous or very nearly so, corymbs compound stout, sepals $\frac{1}{4}$ – $\frac{1}{2}$ in. ovate obtuse puberulous, corolla $1\frac{1}{2}$ –3 in. campanulate purple lobes triangular-lanceolate, seeds with very long silky hair. *Dene. in Nouv. Ann. Mus.* iii. 392; *Wight Ic.* t. 1375; *Dalz. & Gibs. Bomb. Fl.* 165; *Kurz For. Fl.* ii. 218. *Convolvulus campanulatus*, Spreng. *Syst.* i. 608. *O. platypeltis*, Spanoghe in *Linnœa*, 1841, 338.—*Rheede Hort. Mal.* xi. t. 56.

DECCAN PENINSULA; frequent. MALAY PENINSULA; from Prome southwards.—CEYLON; in the warmer parts of the Island.—DISTRIB. Malay Archipelago.

A large twiner; nearly glabrous, young parts hoary. *Leaves* 3–4 in., nerves prominent; petiole 2–3 in. *Peduncles* 1–4 in., stout; bracts early deciduous; corymbs 2–5 in. diam., 10–40-flowered. *Sepals* hoary, in fruit somewhat enlarged $\frac{1}{2}$ in. diam. glabrate. *Corolla* very variable in size, always prominently lobed, glabrous or nearly so. *Capsule* $\frac{1}{2}$ in. diam., globose. *Seeds* with hairs often more than $\frac{1}{2}$ in. long.—Resembles *Rivea tiliaefolia* (Thwaites).

VAR. *illustris*; leaves ovate or oblong cordate or hastate, corymbs often few-flowered, sepals nearly glabrous, corolla often 4 in. shallowly or deeply lobate.—MALAY PENINSULA, from Moulmein southwards.—DISTRIB. Malay Islands.—The size and lobation of the corolla vary so greatly that there may be two species here; a Moulmein example collected by Parish has the corolla $4\frac{1}{4}$ in., very shallowly lobed, the calyx glabrate, and is very different from the Malabar ones with corolla only $1\frac{1}{2}$ in. long. Miquel must be mistaken in saying (*Fl. Ind. Bat.* ii. 606) that Spanoghe's *I. campanulata* cannot be Linnæus' *I. campanulata* because the seeds are woolly; for Linnæus' species is founded on Rheede's picture (*Hort. Mal.* xi. t. 46), which (and the description) attributes silky seeds to the species.

44. **I. Gomezii**, Clarke; leaves ovate-cordate acute entire glabrous, corymbs peduncled few-fl'd., sepals 1– $1\frac{1}{2}$ in. elliptic glabrous, corolla very large.

TAVOY; Gomez. ANDAMANS; Kurz.

A large climber, resembling *I. campanulata*, var. *illustris*, but with a much larger calyx. *Leaves* 3–6 in., sinus wide, nerves prominent; petiole 2 in. *Peduncles* 1–3 in., stout; bracts caducous. *Sepals* in young fruit erect, much imbricate. *Corolla* 4 by 3 in., campanulate.—The Malay *I. peltata*, Choisy, resembles this, but has a smaller calyx and peltate leaves.

45. **I. cymosa**, Roem. & Sch. *Syst.* iv. 241; softly hairy or glabrous, leaves cordate or hastate elliptic or oblong obtuse or shortly acute entire or angular or toothed, peduncles shorter than the leaves, cymes compact, sepals $\frac{1}{4}$ – $\frac{1}{2}$ in. elliptic, corolla middle-sized pure white or tinged yellow, seeds patentely hirsute. *Blume Cat. Gewass. Java*, 50; Chois. *Convolv. Or.* 79, and in *DC. Prodr.* ix. 371; *Bot. Reg.* 1843, t. 24. *I. bifida*, Roth *Nov. Sp.* 118. *I. Heynei* and *Rothii*, Roem. & Sch. *Syst.* iv. 237, 241. *I. Olanda*, Sweet *Hort. Brit.* (2 ed.) 372. *I. caliginosa*, Chois. *Convolv. Or.* 79, and in *DC. Prodr.* ix. 370. *Convolvulus cymosus*, Lamk. *Enc.* iii. 556. *C. blandus*, Roxb. *Hort. Beng.* 13, and *Fl. Ind.* i. 470, and ed. Carey & Wall. ii. 50, 70; *Wall. Cat.* 1342. *C. pentagonus*, Roxb. *Hort. Beng.* 14, and *Fl. Ind.* i. 485, and ed. Carey & Wall. ii. 72; *Wall. Cat.* 1343. *C. Rothii*, Spreng. *Syst.* i. 600. *C. umbellatus*, *Wall. Cat.* 2329.—*Rumph. Herb. Amb.* v. t. 158.

Abundant throughout INDIA (except the N.W. dry area), alt. 0–4000 ft. CEYLON; very common.—DISTRIB. Malaya, Australia, Tropical Africa.

Scandent, twining. *Leaves* $1\frac{1}{2}$ –4 in., nerves prominent subparallel; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., mostly short. *Peduncles* $\frac{1}{2}$ –2 in.; bracts caducous; pedicels $\frac{1}{2}$ –1 in. *Sepals* obtuse or mucronate, hairy or glabrous. *Corolla* 1– $1\frac{1}{2}$ in., tubular-funnel-shaped; in buds hirsute at the tip. *Capsule* $\frac{1}{2}$ in. diam., globose, glabrous. *Seeds* with blacker, stiffer, more patent hairs than in the allied species.

VAR. *macra*; larger in all parts, peduncles sometimes 4-6 in., sepals $\frac{2}{3}$ in., corolla 2 in.—Sikkim, Assam and Khasia Mts., alt. 0-4000 ft., *Griffith, J. D. H.*, &c.—Leaves 5 by 3 in.; petiole 3-4 in. *Seeds* exactly as of *I. cymosa*, but considered as a variety by *Bentham (Fl. Austral. iv. 423)*.

46. *I. petaloidea*, *Chois. Convolv. Or. 69*, and in *DC. Prodr. ix. 360*; glabrous, leaves ovate acute many of the upper lanceolate, peduncles short, bracts caducous, flowers subracemose, corolla large yellow shaggy without. *Dene. in Nouv. Ann. Mus. iii. 392*. *I. xanthantha, Kurz For. Fl. ii. 219*. *Convolvulus crispatus, Wall. Cat. 1403*.

N. OUDH; *R. Thomson*. All over **PROME** and **PEGU**; *Kurz*.—**DISTRIB.** **TIMOR**.

Large, scandent. *Leaves* 5 by $3\frac{1}{2}$ in., base rounded or subcordate; upper $3\frac{1}{2}$ by $\frac{2}{3}$ in., base obtuse; petiole $1\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ -1 in.; pedicels often 1 in. *Sepals* $\frac{2}{3}$ in., elliptic-ovate, obtuse or subacute, glabrous, hardly altered in fruit. *Corolla* $1\frac{1}{2}$ in., wide-tubed. *Stamens* inserted low down the tube; anthers ultimately twisted. *Capsule* $\frac{1}{2}$ in., ovoid. *Seeds* minutely velvety, margins subvillous.

VAR. *pauciflora*; leaves smaller all oblong-lanceolate, peduncles 1-fl. rarely 2-fl. *Ipomœa*, n. 44, *Herb. Ind. Or. H. f. & T.*—**KUMAON**; *Thomson*.—Though *Dr. Thomson* collected lower parts of the stem, there are no ovate leaves.

47. *I. Turpethum*, *Br. Prodr. 485*; softly pubescent or glabrate, leaves ovate or oblong not acuminate, cymes few-fl., sepals ovate in fruit much enlarged, corolla largeish white, seeds smooth. *Bot. Reg. t. 279*; *Chois. Convolv. Or. 68*, and in *DC. Prodr. ix. 360*; *Dalz. & Gibs. Bomb. Fl. 165*; *Kurz For. Fl. ii. 218*. *I. anceps, Roem. & Sch. Syst. iv. 231*; *Blume Bijl. 714*; *Chois. Convolv. Or. 68*, and in *DC. Prodr. ix. 360*. *I. triquetra, Roem. & Sch. Syst. iv. 231*. *Convolvulus Turpethum, Linn.; Roxb. Hort. Beng. 14*, and *Fl. Ind. i. 476*, and ed. *Carey & Wall. ii. 57*; *Wall. Cat. 1371*; *Bot. Mag. t. 2093*; *Wight in Hook. Bot. Misc. iii. 297, suppl. t. 38*; *Hassk. Pl. Jav. Rar. 518*. *C. anceps, Linn. Mant. 43*. *C. triqueter, Vahl Symb. iii. 30*. *Spiranthera Turpethum, Bojer Hort. Maurit. 226*. *Operculina Turpethum, Manso Brasil. 16, 49*. *Argyreia alulata, Miq. Fl. Ind. Bat. ii. 587*.

Throughout **INDIA**, alt. 0-3000 ft., and **CEYLON**, common.—**DISTRIB.** **S.E. Asia**, **Malaya**, **Australia**, **Polynesia**, **Seychelles**, **Mauritius**.

Stems stout, twining, quadrangular, winged, compressed, or nearly round. *Leaves* 2-5 in., base cordate or obtuse; petiole 1 in. *Peduncles* 1-4 in.; bracts 1 in., oblong, caducous, often pinkish; pedicels $\frac{1}{4}$ -1 in. *Sepals* $\frac{1}{2}$ in., usually softly pubescent; in fruit 1 in., orbicular, concave, scarious or subsucculent. *Corolla* $1\frac{1}{2}$ in., tubular-campanulate. *Anthers* soon twisting. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., globose, normally 4-seeded.

48. *I. biloba*, *Forsk. Fl. Æg.-Arab. 44*; glabrous, leaves orbicular obtuse emarginate or 2-lobed, peduncles 1-3-fl., sepals ovate obtuse, corolla large purple, seeds villous. *I. maritima, Br. Prodr. 486*; *Blume Bijl. 720*; *Bot. Reg. t. 319*. *I. Pes-Capræ, Roth Nov. Sp. 109*; *Chois. Convolv. Or. 63*, and in *DC. Prodr. ix. 349*; *Dalz. & Gibs. Bomb. Fl. 164*; *Meissn. in Mart. Brasil. vii. 256, with syn.* *Convolvulus Pes-Capræ, Linn.; Roxb. Hort. Beng. 14*, and *Fl. Ind. i. 486*, and ed. *Carey & Wall. ii. 74*; *Wall. Cat. 1360*. *C. maritimus, Lamk. Enc. iii. 550*. *C. bilobatus, Roxb. Hort. Beng. 14*, and *Fl. Ind. i. 485*, and ed. *Carey & Wall. ii. 73*; *Wall. Cat. 1359*. *Batatas maritima, Bojer Hort. Maurit. 225*.—*Rumph. Herb. Amb. v. t. 169, fig. i.* *Rheede Hort. Mal. xi. t. 57*.

Throughout **INDIA** and **CEYLON**; near the sea, abundant.—**DISTRIB.** Seashore of both hemispheres throughout the tropics.

Extensively creeping and twining. *Leaves* 1-4 in., often broader than long, fleshy, prominently nerved; petiole 1-4 in. *Peduncle* 1-4 in.; bracts $\frac{1}{2}$ in., lanceolate,

caducous; pedicels often more than 1 in. *Sepals* $\frac{1}{2}$ – $\frac{2}{3}$ in.; in fruit widened. *Corolla* 2 in., tubular-funnel-shaped, glabrous, margin scarcely lobed. *Ovary* 2-celled, not imperfectly 4-celled. *Capsule* $\frac{1}{2}$ in., ovoid, glabrous.

49. **I. carnosæ**, *Br. Prodr.* 485; glabrous or nearly so, leaves lobed or oblong emarginate, peduncles 1–3-fld., sepals ovate obtuse, corolla largeish ochroleucous, seeds villous. *Benth. Fl. Austral.* iv. 419. *I. acetosæfolia*, *Roem. & Sch. Syst.* iv. 246; *Meissn. in Mart. Fl. Brasil.* vii. 255, t. 94. *I. longifolia*, *Benth. Pl. Hartw.* 16; *Bot. Reg.* 1840, t. 21. *I. littoralis*, *Boiss. Fl. Orient.* iv. 112. *Convolvulus littoralis*, *Linn. Sp. Pl.* 227. *C. acetosæfolius*, *Vahl Ecl.* i. 18. *C. arenarius*, *Vahl Symb.* i. 18. *O. carnosus*, *Spreng. Syst.* i. 609. *O. stoloniferus*, *Cyr. Pl. Rar.* i. t. 5. *Batatas littoralis* and *acetosæfolia*, *Chois. Convolv. Or.* 124, and in *DC. Prodr.* ix. 337, 338.

MALACCA; Griffith.—DISTRIB. Tropical seashores of both hemispheres.

Very near *I. biloba*. Leaves often deeply lobed, sometimes subentire emarginate, but then much more elongate than those of *I. biloba*, oblong or linear, or often fiddle-shaped; nerves much more obscure. *Ovary* completely 2-celled, imperfectly 4-celled. *Capsule* and seeds exactly as of *I. biloba*.

50. **I. vitifolia**, *Sweet Hort. Brit. ed.* 2, 372; hairy, leaves cordate palmately 5-lobed, peduncles 1–7-fld., sepals ovate-acute hirsute, corolla middle-sized sulphur-coloured, seeds glabrous. *Blume Bijl.* 709; *Chois. Convolv. Or.* 72, and in *DC. Prodr.* ix. 361; *Dalz. & Gibs. Bomb. Fl.* 165; *Kurz For. Fl.* ii. 219. *I. angularis*, *Chois. Convolv. Or.* 72. *Convolvulus vitifolius*, *Linn. Mant.* 203; *Burm. Fl. Ind.* 45, t. 18, fig. 1; *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 476, and *ed. Carey & Wall.* ii. 61; *Wall. Cat.* 1348. *C. angularis*, *Linn. Mant.* 203; *Burm. Fl. Ind.* 46, t. 19, fig. 2; *Hassk. Pl. Jav. Rar.* 519.

Throughout INDIA (except the dry N.W.); from Sikkim, Assam, Chittagong and Burma, southwards to Ceylon and Malacca.—DISTRIB. Malay Islds.

A large climber. Leaves 2–6 in. diam.; lobes triangular, acute, often toothed or acutely lobed; petiole $\frac{1}{2}$ –2 in. Peduncles 1–4 in. Sepals $\frac{1}{2}$ in., often $\frac{3}{4}$ in. in fruit. Corolla $1\frac{1}{2}$ in., campanulate. Capsule $\frac{1}{2}$ in. diam., depressed globose, membranous, 2-celled, normally 4-seeded.

51. **I. pilosa**, *Sweet Hort. Brit. ed.* 2, 372; hairy, leaves ovate-cordate acute often deeply 3-lobed white woolly beneath, cymes peduncled persistently bracteate, corolla small purple, seeds pubescent margins silky. *Chois. Convolv. Or.* 86, and in *DC. Prodr.* ix. 363; *Wight Ic.* t. 837; *Dalz. & Gibs. Bomb. Fl.* 166. *I. dichroa*, *Chois. in DC. Prodr.* ix. 364. *Convolvulus pilosus*, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 473, and *ed. Carey & Wall.* ii. 55. *O. albicans*, *Wall. Cat.* 1401. *O. dichrous*, *Roem. & Sch. Syst.* iv. 263.

W, HIMALAYA, alt. 1–3000 ft., PUNJAB and SCINDE; frequent. BENGAL; *Wallicé*. —DISTRIB. Tropical Africa.

Annual, twining, patently hirsute. Leaves 2–4 in., lobes acuminate, often narrower below; petiole 2 in. Peduncles 1–3 in.; bracts $\frac{1}{4}$ in., linear-lanceolate; pedicels usually $\frac{1}{4}$ – $\frac{1}{2}$ in. Sepals $\frac{1}{2}$ in. and upwards, narrow-lanceolate, acuminate. Corolla $\frac{3}{4}$ in., narrowly funnel-shaped, with scattered long hairs without. Capsule $\frac{1}{4}$ – $\frac{1}{2}$ in., ovoid-globose, glabrous, 4-valved, normally 4-seeded.

†† Leaves divided, or very deeply lobed.

52. **I. kentrocaulos**, *Clarke*; glabrous, leaves deeply palmate segments elliptic-lanceolate acuminate entire, peduncles many-fld., sepals 1 in. elliptic-oblong, corolla large, seeds $\frac{1}{2}$ in. glabrous. *I. tuberosa*, *A. Rich. Fl. Abyss.* ii. 67; *Chois. in DC. Prodr.* ix. 362, the old-world plant, not of *Linn.* *O. panicu-*

latus, *Wall. Cat.* 1350, Heyne's *Ipomœa tuberosa* only. *Convolvulus kentrocaulos*, *Steud. in Pl. Schimp.* n. 800. *C. formosus*, *Roeb. Ic. Ined.*

N.W. INDIA; *Royle*. DECCAN PENINSULA; *Rottler, Wight, &c.* CEYLON.—DISTRIB. Malaya, Tropical Africa.

Stem stout, twining, muricate or smooth. *Leaves* 3–5 in. diam.; petiole 2–5 in. *Peduncles* 2–6 in.; bracts deciduous; pedicels $\frac{1}{4}$ –1 in. *Sepals* narrow; in fruit $1\frac{1}{4}$ by $\frac{1}{2}$ in., subpatent, hardly imbricated. *Corolla* 2 in., tubular-campanulate. *Capsule* $\frac{1}{4}$ – $\frac{1}{2}$ in., globose.—In *I. tuberosa*, Linn., the fruiting-sepals are 1–1 $\frac{1}{2}$ in. broad, concave, much imbricate, seeds $\frac{2}{3}$ in., furred; see *Trans. Hort. Soc. Lond.* i. 184, t. 11.

53. ***I. sinuata***, *Ortega Dec.* 84; leaves palmate glabrous or nearly so, leaflets narrowly lanceolate toothed or pinnatifid, peduncles 1–2-fld., sepals nearly 1 in. elliptic-oblong glabrous, corolla middle-sized, seeds glabrous or nearly so. *Chois. in DC. Prodr.* ix. 362. *I. dissecta*, *Chois. l.c.* 363, as to the Indian material, not of *Willd.* *Convolvulus dissectus*, Linn. *Mant.* 204; *Jacq. Hort. Vindob.* ii. 74, t. 159. *C. Kleinii*, *Wall. Cat.* 1377.

Introduced from tropical AMERICA; N.W. India; *Royle*. Hindostan; *Thomson*. Bengal; *Jenkins, Rottler, Wight, &c.*—Native of tropical America, widely spread in the Old World.

Stems twining, hirsute or glabrous. *Leaves* 2–4 in. diam., sometimes hirsute on the midrib. *Corolla* 1 $\frac{1}{4}$ in., campanulate, white, throat purple. *Capsule* $\frac{1}{3}$ – $\frac{1}{2}$ in. diam., glabrous, 2-celled, normally 4-seeded. *Seeds* $\frac{1}{4}$ in.

54. ***I. rhyncorhiza***, *Dalz. in Hook. Kew Journ.* iii. 179; leaves deeply palmate sparsely hispidulous segments oblong lobed or pinnatifid, peduncles 1–2-fld., sepals $\frac{1}{2}$ in. elliptic-lanceolate unequal glabrous, corolla middle-sized yellow. *Dalz. & Gibs. Bomb. Fl.* 167.

The CONCAN; Syhadree Mts. (Bombay), Tulkut Ghat, *Dalzell*; Concan, *Stocks*.

Root tuberous; stems filiform, twining, glabrous. *Leaves* 3 in. diam.; lobes obtuse or mucronate; petiole 1 in. *Peduncles* 2–4 in.; bracts $\frac{1}{2}$ in., linear. *Corolla* 1 $\frac{1}{4}$ in. by 2 in. diam. *Fruit* not known.

55. ***I. quinata***, *Br. Prodr.* 486; leaves palmate, leaflets lanceolate entire, peduncles 1–2-fld., sepals $\frac{1}{2}$ in. elliptic glabrous or nearly so, corolla rather large, seeds glabrous shining apex crested. *Chois. in DC. Prodr.* ix. 385; *Benth. Fl. Austral.* iv. 415. *I. hirsuta*, *Br. Prodr.* 486. *I. pentadactylis*, *Chois. l.c.* *Convolvulus tenuifolius*, *Vahl Symb.* iii. 33. *C. quinatus* and *Brownii*, *Spreng. Syst.* i. 590. *C. pentadactylis*, *Wall. Cat.* 1367. *C. munitus*, *Wall. Cat.* 1354, as to *Hamilton's Convolvulus tenuifolius* only.

CHOTA NAGPORE; frequent, *Clarke*.—DISTRIB. Burma; S. China, N. Australia.

Stems prostrate, hardly twining, patently fulvous-hirsute or glabrous. *Leaves* 3–4 in. diam., glabrous or with patent fulvous hairs; leaflets obtuse or subacute, not acuminate; petiole 1 $\frac{1}{2}$ in., mostly hairy. *Peduncles* shorter than the petioles; bracts $\frac{1}{2}$ in., linear, persistent. *Corolla* 1 $\frac{1}{2}$ in. and upwards, white or purplish. *Capsule* $\frac{1}{2}$ in., ovoid, subacute, glabrous, 2-celled, 4-valved, normally 4-seeded. *Seeds* $\frac{1}{4}$ by $\frac{1}{8}$ in. —Easily distinguished from all other *Ipomœas* by the crest of the seed.

56. ***I. palmata***, *Forsk. Fl. Æg.-Arab.* 43; glabrous, leaves digitate nearly or quite to the base, lobes elliptic or lanceolate subentire, peduncles 3–1-fld., sepals ovate obtuse, corolla large purplish, seeds villous margins woolly. *Chois. Convolv. Or.* ix. 386; *Benth. Fl. Austral.* iv. 415; *Boiss. Fl. Orient.* i. 464. *I. senegalensis*, *Lamk. Ill.* i. 464. *I. stipulacea*, *Jacq. Hort. Schoenb.* ii. 39, t. 199. *I. pendula*, *Br. Prodr.* 486; *Andr. Bot. Rep.* t. 613; *Bot. Reg.* t. 632; *Chois. in DC. Prodr.* ix. 387 (syn. *I. Horsfalliæ* excl.). *I. pulchella*, *Roth Nov. Sp.* 115; *Wight Ic.* t. 156; *Chois. in DC. Prodr.* ix. 386. *I. tuberculata*, *Roem. & Sch. Syst.* iv. 208; *Chois. Convolv. Or.* 91, and in *DC. Prodr*

ix. 386. *Convolvulus cairicus*, Linn.; *Bot. Mag.* t. 699. *C. tuberculatus*, Lamk. *Enc.* iii. 545. *C. bellus*, Spreng. *Syst.* i. 590. *C. digitatus*, Roxb. *Hort. Beng.* 14, and *Fl. Ind.* i. 479, and ed. Carey & Wall. ii. 65. *C. heptaphyllus*, Rottl.; Roxb. *Hort. Beng.* 14, and *Fl. Ind.* ed. Carey & Wall. ii. 66; Wall. *Cat.* 1353. *C. lupulifolius*, Griff. *Notul.* iv. 284.

DECCAN PENINSULA with CEYLON; Rottler, Wight, &c. MALACCA; Maingay.—
DISTRIB. Tropical Asia, Africa, Australia, and America.

Perennial, twining, in age often tubercled. Leaves 1–3 in. diam.; petiole 1–2 in. Peduncles often as long as the petioles, often 3-fld.; bracts minute. Sepals $\frac{1}{4}$ in. Corolla $1\frac{1}{2}$ in., and upwards. Capsule nearly $\frac{1}{2}$ in. ovoid, glabrous, 2-celled, 2–4-valved, normally 4-seeded.

57. **I. dasysperma**, Jacq. *Ecl.* i. 132, t. 89; glabrous, leaves pedate lobes 5–7 unequal elliptic or lanceolate subentire, peduncles mostly 1-fld., sepals ovate obtuse, corolla large yellow with a purplish eye, seeds villous margins woolly. Chois. *Convolv. Or.* 90, and in *DC. Prodr.* ix. 386; Hassk. *Retzia*, i. 70. *I. tuberculata*, Ker in *Bot. Reg.* t. 86, not of Roem. & Sch.? *Convolvulus dasyspermus*, Spreng. *Syst.* i. 591. *C. pedatus*, Roxb. *Hort. Beng.* 14, and *Fl. Ind.* ed. Carey & Wall. ii. 63. Wall. *Cat.* 1352 (specimen not in Herb. Wall.).

SIMLA, Lady Balhousie. ROHILCUND; Edgeworth. DECCAN PENINSULA; Rottler, Wight.

Probably a cultivated form of *I. palmata*. Roxburgh only knew it in cultivation. Pedate leaves occur, and 1-fld. peduncles are not rare in *I. palmata*. The only remaining differential character is the colour of the corolla; but this is by no means a pure yellow in *I. dasysperma*; the tube is purplish and there are often purplish streaks on the limb.

IMPERFECTLY KNOWN AND EXCLUDED SPECIES.

1. *I. ? BIPEDUNCULATA*, Clarke; large glabrous twiner, leaves ovate cordate acute, peduncles 2 in. paired in each axil, cymes dichotomous many-fld.—N.W. HIMALAYA; Sirmore, alt. 3–5000 ft., Edgeworth. Leaves 4 in., entire; petiole $2\frac{1}{2}$ in. Peduncles in pairs from each of the 4 axils on the branch, subquadangular; cymes 6–10-fld. bracts 0 in young fruit; pedicels $\frac{1}{4}$ – $\frac{3}{4}$ in. Sepals $\frac{1}{2}$ in., broad-elliptic, shortly acute, striated, glabrous. Corolla not seen. Fruit (imperfectly ripe), much exceeding the sepals, ovoid, glabrous, possibly indehiscent. Seeds 4, glabrous.—The example is imperfect, but can be matched with no other Indian plant.

2. *I. COMPRESSA*, Gussone; Chois. in *DC. Prodr.* ix. 388; wholly villous-hairy, stem twining compressed, leaves ovate-cordate entire, peduncles 1-fld. shorter than the leaves.—Raised from Indian seeds, in Hort. Becon. 1825.

3. *I. CUSPIDATA*, Don. *Prodr.* 98; Chois. in *DC. Prodr.* ix. 388; leaves cordate cuspidate entire pubescent with rounded lobes, peduncles axillary solitary longer than the leaves many-fld., sepals linear acute hairy, style exceedingly short. NEPAL; Hamilton. Flores rose, a little larger than in *I. coccinea*. No Nepal plant with a very short style and linear sepals will answer to this.

4. *I. MULTIFLORA*, Roxb. *Fl. Ind.* ed. Carey & Wall. ii. 89, and *Ic. Ined. in Herb. Kew*; stems woody twining, leaves broad-cordate downy, peduncles as long as the leaves umbelliferous. Common, native in hedges and forests, Roxburgh. Stem woody, twining up and over trees. Leaves 3–4 in. diam., short acuminate; petiole 2–3 in. Peduncles 7–8 in. (in Roxburgh's picture); cyme close, compound; bracts 0; pedicels $\frac{1}{4}$ in. Corolla $2\frac{1}{2}$ in., pale rose. Fruit not described nor depicted.—Roxburgh's picture might do for *Argyreia Hookeri*; but it is not probable that Roxburgh ever obtained that species, and it is hardly possible he would say it was "common in hedges." It is not Wallich's *C. Roxburghii* (Cat. n. 1415), which is the type of *Argyreia Roxburghii*, Chois.

5. *I. OVALIFOLIA*, *Chois. in DC. Prodr.* ix. 357; said to be a native of India. There is no example thence; it is not = *I. microphylla*, Roth Nov. sp. 112, as *Choisy* supposed.

6. *I. SIDÆFOLIA*, *Chois. in DC. Prodr.* ix. 372; is native in America, not in India. It is *Convolvulus zeylanicus*, *Moon; Wall. Cat.* 1379.

7. *I. TRIANTHA*, *Roem. & Sch.* is perhaps *I. sepiaria*, *Koen.* (which see).

6. **LEPISTEMON**, *Blume.*

Character of *Ipomœa* subgenus *Euipomœa*, but filaments dilated at the base into 5 concave scales which arch over the ovary.—Species 4 (1 African, 3 Asiatic).

1. ***L. Wallichii***, *Chois. Convolv. Or.* 61, and in *DC. Prodr.* ix. 348; hairy, leaves ovate-cordate acute entire or 3-lobed, cymes dense many-fl'd. short-peduncled, sepals elliptic-lanceolate acuminate, corolla $\frac{3}{4}$ in. tubular narrower in the middle. *L. flavescens*, *Wight Ic.* t. 1362, not in *Calc. Journ. Nat. Hist.* t. 5, fig. 6, nor of *Blume*. *Convolvulus cephalanthus*, *Wall. Cat.* 1402. *C. binectariferus*, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 47. *Vallis conroversa*, *Spreng. Syst. curæ post.* 65. *Ipomœa Wallichii*, *Steud. Nomencl. Bot.* *Nemodon* sp., *Griff. Notul.* iv. 286.

ASSAM, KHASIA MTS., SILHET, and CACHAR; ascending to 3000 ft.; *Wallich, H. f. & T., &c. Mergui; Griffith.*

Stems stout, scandent, fulvous-villous. *Leaves* 3-5 in., fulvous-hirsute on both surfaces; petiole 1-2 in. *Peduncles* 0- $\frac{1}{2}$ in.; cymes 10-30-fl'd.; bracts $\frac{1}{2}$ in., linear-lanceolate, deciduous; pedicels many attaining $\frac{1}{2}$ in. *Sepals* $\frac{1}{2}$ in., patently fulvous-hirsute, acuminate. *Corolla* slightly dilated, glassy at base; tube hairy without; mouth shortly widely funnel-shaped, yellowish, white, or dull grey. *Filaments* short, glabrous above; basal process papillose; anthers not twisted. *Ovary* 2-celled, 4-ovuled; style very short, and stamens in the lower part of the corolla-tube, stigmas 2 subglobose. *Capsule* $\frac{1}{4}$ in., ovoid, glabrous, 4-valved, 2-celled, normally 4-seeded. *Seeds* glabrous.—*L. flavescens*, *Blume*, a Javan species, has the sepals ovate subacute (not acuminate), the corolla rather shorter and wider at the base than in *L. Wallichii*. A *Lepistemon* from Borneo and the Philippines has the cymes almost capitate, densely grey strigose; but these 3 Asiatic species might perhaps be considered vars. of one.

7. **HEWITTIA**, *W. & A.*

A pubescent, twining herb. *Leaves* cordate, entire angular or lobed. *Peduncles* axillary; flowers few subcapitate or solitary; bracts linear-lanceolate. *Sepals* acute, outer larger, enlarged in fruit. *Corolla* campanulate, yellowish with a purple eye; limb 5-plaited. *Stamens* included; filaments linear, bases dilated. *Ovary* hirsute, 1- (or imperfectly 2-), celled, 4-ovuled; style filiform, stigmatic lobes 2 ovate-oblong. *Capsule* globose, 4-valved, 1-celled, normally 4-seeded. *Seeds* glabrous.

1. ***H. bicolor***, *Wight Ic.* t. 835 (by misprint Heivetia), and *Ill.* t. 168, bis fig. 6 (Hewetia). *Convolvulus bicolor*, *Vahl Symb.* iii. 25; *Bot. Mag.* t. 2205; *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 475, and *ed. Carey & Wall.* ii. 57; *Wall. Cat.* 1410. *C. bracteatus*, *Vahl Symb.* iii. 25. *C. involucratu*, *Ker in Bot. Reg.* t. 318, not of *Spreng.* *Ipomœa bicolor*, *Sweet Hort. Brit.* ed. 2, 372. *I. timorensis*, *Blume Bijl.* 711. *I. bracteata*, *Blume Bijl.* 711, not of *Willd.* nor of *Wight*. *I. Weinmanni*, *Roem. & Sch. Syst.* iv. 243. *Calystegia Keriana*, *Sweet Hort. Brit.* ed. 2, 370. *Palmia bicolor*, *Endl.; Dalz. & Gibs.*

Bomb. Fl. 163. *Shuteria bicolor*, *Chois. Convolv. Or.* 104, and in *DC. Prodr.* ix. 435; *Fl. des Serres*, t. 421. *Ariseia Afzelii*, *G. Don. Gen. Syst.* iv. 295. *A. bracteata*, *Hassk. Pl. Jav. Rar.* 516.

S.E. INDIA from Assam and Bombay to the Carnatic and Malacca; frequent.—**DISTRIB.** Malaya, Tropical Africa.

Perennial, pubescent or nearly glabrous. *Stems* twining. *Leaves* 2–4 in., some angular or lobed; petiole $\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ –5 in., 1- or oftener few-flid.; bracts $\frac{1}{2}$ – $\frac{1}{2}$ in., narrowly lanceolate, a little below the calyx. *Sepals* $\frac{1}{2}$ – $\frac{1}{2}$ in., ovate, inner lanceolate, pubescent; in fruit enlarged, subscariose, reticulate. *Corolla* 1 in., somewhat widely campanulate, or shortly 5-lobed, hairy without. *Capsule* $\frac{1}{2}$ in., subglobose, hairy.

8. CALYSTEGIA, R. Br.

Prostrate or twining herbs, glabrous or nearly so. *Leaves* entire or lobed. *Peduncles* 1-flid.; bracts 2, large, enclosing the calyx, persistent. *Sepals* ovate or oblong, inner rather smaller. *Corolla* funnel-shaped or campanulate; limb 5-plaited, subentire. *Stamens* included. *Ovary* 1- (or imperfectly 2-) celled, 4-ovuled; style filiform, stigmatic lobes 2, shortly oblong. *Capsule* globose, 1-celled, normally 4-seeded. *Seeds* glabrous.—Species 7–8, in the warm and temperate regions of both hemispheres.

1. *C. hederacea*, *Wall. Cat.* 1828, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 94; leaves cordate or sagittate entire or lobed, corolla 1 in. subcampanulate pink-purple. *Chois. Convolv. Or.* 103, and in *DC. Prodr.* ix. 434. *C. acetosæfolia*, *Turcz. Fl. Baic.-Dahur.* 2, ii. 289, in note. *Convolvulus Wallichianus*, *Spreng. Syst. curæ post.* 61. *C. acetosæfolius*, *Turcz. in Bull. Mosc.* 1840, 73.

NORTH INDIA from the Punjab and Nepal to Penang, exclusive of the Deccan and Ceylon; abundant in the plains of Bengal.—**DISTRIB.** China, Amurland, Cabul.

Prostrate as a weed of cultivation and climbing 6 ft. in bushes. *Leaves* 1–3 in., very irregular in form; petiole 1 in. *Peduncles* 2 in.; bracts $\frac{1}{2}$ in. ovate. *Sepals* $\frac{1}{2}$ in., oblong, obtuse, glabrous. *Capsule* $\frac{1}{2}$ in., ovoid, subacute, glabrous.

9. CONVOLVULUS, Linn.

Herbs or undershrubs, erect prostrate or twining, sometimes spinous. *Leaves* entire, toothed or lobed. *Peduncles* axillary, 1-many-flid.; bracts narrow, rarely wide prominent. *Sepals* subequal, or the outer wider. *Corolla* campanulate, limb 5-plaited, nearly entire. *Stamens* included. *Ovary* 2-celled, 4-ovuled; style filiform; stigmas 2, distinct, oblong or linear. *Capsule* globose, 2-celled, 4-valved, or breaking irregularly, normally 4-seeded. *Seeds* glabrous, usually smooth.—Species 150, tropical and temperate.

* *Erect or diffuse, not twining* (except sometimes *C. glomeratus*), *stigmas filiform, nearly as long as, or longer than the style.*

1. *C. scindicus*, *Stocks in Hook. Kew Journ.* iv. 173, not of *Boiss. Diagn.*; a tomentose, small, rigid, branched undershrub, leaves small spatulate or elliptic plicate, flowers capitate bracteate, sepals lanceolate densely rufous-hirsute, ovary glabrous. *Boiss. Fl. Orient.* iv. 90. *C. brachyphyllus*, *Boiss. Diagn.* 2, iii. 122.

SCINDE; on rocks, *Stocks*.

Height 1–2-ft.; branches fulvous-tomentose, tips in age subspinescent. *Leaves* $\frac{1}{2}$ –1 in., subentire, very thick, nerves impressed; petiole 0– $\frac{1}{2}$ in. *Heads mostly sessile*

on shortened branches; outer bracts $\frac{1}{2}$ in., elliptic or ovate, not plicate, densely rusty-tomentose. *Sepals* $\frac{1}{4}$ in. *Corolla* $\frac{1}{2}$ – $\frac{2}{3}$ in., widely funnel-shaped, hairy on the folds without. *Fruit* not seen.

2. **C. Aitchisoni**, *Clarke*; patently fulvous-hirsute, leaves fascicled linear lower oblong, flowers capitate bracteate, sepals linear-lanceolate very hirsute. *C. lanuginosus*, *Aitch. Cat. Punjab. Pl.* 98; ? of *Lamk.*

PUNJAB; Jhelum and Salt Range, *Aitchison*.—DISTRIB. Afghanistan.

Rootstock woody, forming tufts; annual flowering stems $\frac{1}{2}$ –4 in. *Radical leaves* $1\frac{1}{2}$ in., linear, or in small examples $\frac{1}{2}$ in. oblong, densely patently hirsute on both sides. *Bracts* $\frac{2}{3}$ in., narrowly lanceolate. *Sepals* $\frac{1}{2}$ in. *Corolla* 1 in., wide-funnel-shaped, hairy on the plaits without. *Ovary* glabrous. *Fruit* not seen.—This cannot be *C. lanuginosus*, *Lamk.* (*Chois. in DC. Prodr.* ix. 401), unless *C. Calverti*, *Boiss.* (*Fl. Orient.* iv. 94), and several other intermediate species be united with it; it is not silky, but abundantly hirsute with hairs $\frac{1}{2}$ in. long. It is undoubtedly closely allied to *C. lanuginosus*, *Lamk.* See *Cav. Ic.* ii. t. 189.

3. **C. microphyllus**, *Sieb.*; *Vis. Pl. Æg.-Nub.* 12; fulvous-villous, leaves linear-oblong or upper elliptic, flowers axillary or on short lateral branches sessile 1–4 together, sepals $\frac{1}{4}$ in. lanceolate densely hirsute, corolla scarcely $\frac{1}{2}$ in. hairy without. *Chois. in DC. Prodr.* ix. 402 (*syn. C. deserti excl.*); *Wight Ic.* t. 1367; *Dalz. & Gibs. Bomb. Fl.* 164; *Boiss. Fl. Orient.* iv. 103.

SCINDE; *Stocks*. GOOJERAT; *Dalzell*.—DISTRIB. Beloochistan to Egypt and Nubia.

Rootstock woody; stems 6–24 in., little divided, patently villous, often floriferous from near the base. *Leaves* $\frac{1}{2}$ –1 in., silky and villous in Sieber's example, subsessile. *Bracts* lanceolate, rufous-hirsute, shorter than the sepals. *Corolla* wide-funnel-shaped, rose-yellow. *Capsule* scarcely $\frac{1}{2}$ in., ovoid. *Seeds* glabrous.

VAR. *Boissieri*; stems and leaves adpressedly rusty-silky, flowers mostly solitary axillary. *C. scindicus*, *Boiss. Diagn.* 2, iii. 123, not of *Stocks*.—Scinde; *Stocks*, *Dalzell*.

4. **C. pluricaulis**, *Chois. Convolv. Or.* 95, and in *DC. Prodr.* ix. 403 (the Plains plant); thinly fulvous-hairy, leaves small linear, flowers 1–3 together axillary pedicelled, sepals $\frac{1}{2}$ in. narrowly linear-lanceolate sparsely hairy, corolla $\frac{1}{4}$ – $\frac{1}{2}$ in. hairy without. *Evolvulus ferrugineus*, *Wall. Cat.* 1316, the *Behar example only*. ? *Ipomæa microphylla*, *Roth Nov. Sp.* 112.

Plains of HINDOSTAN and BEHAR; *Wallich, H. f. & T., &c.*, frequent.

Rootstock woody; stems 3–6 in., slender, wiry, very thinly hairy. *Leaves* $\frac{1}{2}$ by $\frac{1}{2}$ in., subsessile; radical more spatulate, subpetioled. *Pedicels* 0– $\frac{1}{2}$ in.; bracts linear, small. *Sepals* with a linear elongation, so thinly hairy as to appear glabrous to the naked eye. *Corolla* wide-funnel-shaped, pale rose. *Ovary* glabrous.

VAR. *macra*; larger, more densely hairy, leaves oblong, sepals $\frac{1}{2}$ in. elliptic-lanceolate rufous-hirsute, corolla $\frac{2}{3}$ – $\frac{3}{4}$ in., seeds puberulous. *Evolvulus pilosus*, *Roxb. Fl. Ind.* ii. 106. *E. ferrugineus*, *Wall. Cat.* 1316.—PUNJAB, common; from 3000 ft. alt. in Kashmir to Delhi; *Wallich, Royle, Edgeworth, &c.*—Easily separable from *C. pluricaulis*, but except in the larger corolla not distinguishable from *C. microphyllus*.

5. **C. rhynchospermus**, *Hochst*; *Chois. in DC. Prodr.* ix. 405; leaves subsessile oblong sparsely hairy, flowers clustered axillary, sepals lanceolate subobtusely hirsute, corolla $\frac{2}{3}$ in. tubular, mouth narrow funnel-shaped. *Wight Ic.* t. 1308.

SCINDE; *Stocks*, *Dalzell*.—DISTRIB. Cordofan.

Annual; stems 3–10 in., little divided, often flowering nearly their whole length. *Leaves* $\frac{1}{2}$ –1 in. *Flowers* rarely solitary, peduncle 0– $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ – $\frac{1}{2}$ in., and sepals $\frac{1}{2}$ in., not acuminate. *Corolla* hairy without. *Ovary* glabrous. *Capsule* $\frac{1}{2}$ in., ovoid.

Seeds minutely papillose.—There is hardly any difference between the seeds of *C. pluricaulis*, *rhyniospermus*, and *conglomeratus*; the papillæ on the seeds of *C. rhyniospermus* are thicker, or somewhat scale-like.

6. ***C. glomeratus***, *Chois. in DC. Prodr.* ix. 401; leaves subsessile oblong sparsely hairy, heads peduncled bracteate, sepals lanceolate hirsute, corolla $\frac{1}{2}$ in. tubular mouth narrow funnel-shaped. *Wight Ic.* t. 1366; *Boiss. Fl. Orient.* iv. 102.

The PUNJAB, *Vicary*; Scinde, *Stocks*, &c.—DISTRIB. Cabul, Beloochistan to W. Tropical Africa.

Rootstock biennial or perennial; stems 2–3 ft., diffuse, branched, sparsely hairy. *Leaves* $\frac{1}{2}$ –1 $\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ –3 in.; bracts $\frac{1}{2}$ –1 in., leaflike; or the heads sessile on short axillary branches. *Sepals* $\frac{1}{2}$ in., lanceolate, acute. *Seeds* puberulous.—Closely allied to *C. rhyniospermus*, but the flowers more numerous (often 6–10) in the head, the habit much more diffuse, running into the following variety.

VAR. *volubilis*; stems distinctly twining, leaves and heads larger, petiole $\frac{1}{2}$ in.—Punjab; *Vicary*. Scinde; *Dalzell*.

7. ***C. Bottlerianus***, *Chois. Convolv. Or.* 95, and in *DC. Prodr.* ix. 403; silky-villous. leaves sessile linear, peduncles 1–3-fld., sepals ovate suddenly acuminate silky-villous, corolla scarcely $\frac{1}{2}$ in. subcampanulate. *Wight in Madras Journ.* v. 7, t. 13; *Dalz. & Gibs. Bomb. Fl.* 164. *Retzia pilosa*, *Heyne*; *Wall. Cat.* 6669 (not *Evolvulus pilosus*, *Roxb.*)

W. DECCAN PENINSULA, from Bombay to Madura; *Rotiler*, &c.—DISTRIB. Affghanistan.

An erect, branched perennial. *Leaves* 1–2 in. *Peduncles* many, 1 $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ in., linear-lanceolate; pedicel (above the bracts) 0– $\frac{1}{2}$ in. *Sepals* $\frac{1}{2}$ in. *Capsule* $\frac{1}{2}$ in. ovoid, glabrous. *Seeds* puberulous.

VAR. *tenella*, *Stocks in Hook. Kew Journ.* iv. 172; sparingly silky not villous, stems strict more slender.—SCINDE; *Stocks*.

** *Stems twining* (see also *C. glomeratus*); *stigmas narrowly oblong or linear, shorter than the style*.

8. ***C. arvensis***, *Linn.; Engl. Bot.* t. 312; glabrous or somewhat pubescent, leaves ovate-cordate, auriculate or hastate, peduncles 1–3-fld., bracts small, sepals elliptic obtuse glabrous or nearly so, corolla middle-sized purplish. *Roxb. Hort. Beng.* 14; *Chois. Convolv. Or.* 97, and in *DC. Prodr.* ix. 406; *Dalz. & Gibs. Bomb. Fl.* 163; *Boiss. Fl. Orient.* iv. 108. *C. Malcolmii*, *Roxb. Hort. Beng.* 14, and *Fl. Ind.* i. 474, and ed. *Carey & Wall.* ii. 55. *C. divaricatus*, *Wall. Cat.* 1422. *C. chinensis*, *Ker in Bot. Reg.* t. 322.

WESTERN INDIA, from Kashmir to the Deccan; a weed of cultivation.—DISTRIB. Nearly all temperate and subtropical regions.

Leaves 1–3 in., lower often lobed; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in. *Peduncles* 1–2 in.; bracts $\frac{1}{2}$ in., linear; pedicels $\frac{1}{2}$ –1 in. *Sepals* $\frac{1}{2}$ in., with or without a mucro. *Corolla* wide-funnel-shaped, glabrous. *Capsule* $\frac{1}{4}$ – $\frac{1}{2}$ in., glabrous.

9. ***C. flavus***, *Willd. Sp. Pl.* i. 852; innovations rusty-pubescent, leaves hastately ovate-oblong angular toothed or lobed, peduncles 1–3-fld., bracts small, sepals elliptic-lanceolate pubescent, corolla small yellowish. *Chois. in DC. Prodr.* ix. 415. *C. rufescens*, *Chois. Convolv. Or.* 97, and in *DC. Prodr.* ix. 408; *Wight Ic.* t. 1365. *Evolvulus hederaceus*, *Burm. Fl. Ind.* 77, t. 30, fig. 2.—*Rheede Hort. Mal.* viii. t. 27.

Hills of S. DECCAN PENINSULA, alt. 3–6000 ft., frequent; *Wight*, &c.

Leaves 1–3 in., in age nearly glabrous; petiole 1 in. *Peduncles* 1 in., not rarely paired in the same axil, pubescent; bracts scarcely $\frac{1}{2}$ in. *Sepals* $\frac{1}{4}$ – $\frac{1}{2}$ in.; wider in

fruit. *Corolla* $\frac{1}{2}$ in., hairy at the tip in the bud. *Ovary* and filaments glabrous. *Capsule* $\frac{1}{2}$ in., ovoid, 2-celled, irregularly breaking up. *Seeds* glabrous.

10. ***C. parviflorus***, *Vahl Symb.* iii. 29; pubescent or nearly glabrous, leaves ovate-cordate acute entire, cymes small dense many-fld. peduncled, corolla $\frac{1}{2}$ in. tubular narrow-mouthed pink or white. *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 51; *Chois. Convolv. Or.* 98, and in *DC. Prodr.* ix. 413; *Dalz. & Gibs. Bomb. Fl.* 163; *Benth. Fl. Austral.* iv. 430. *C. asclepiadeus*, *Wall. Cat.* 1396. *Ipomæa paniculata*, *Burm. Fl. Ind.* 50, t. 21, fig. 3. *I. parviflora*, *Pers. Syn.* i. 183, not of *Vahl*.

ASSAM; *Jenkins*. DECCAN PENINSULA and CEYLON; frequent.—DISTRIB. S.E. Asia, Malaya, Australia, Tropical Africa.

Stems slender. *Leaves* $1\frac{1}{2}$ –3 in., shallowly cordate; petiole $\frac{1}{2}$ –1 in. *Peduncles* mostly longer than the petioles; cymes subcapitate; bracts inconspicuous. *Sepals* $\frac{1}{2}$ in., ovate-caudate, pubescent. *Corolla-lobes* short, acute. *Stigmas* short, linear. *Capsule* $\frac{1}{2}$ in., globose, glabrous. *Seeds* glabrous.—Much resembling *Jacquemontia cœrulea* (cultivated often in India), which has a wider mouthed bright-blue corolla and shorter elliptic-oblong stigmas.

11. ***C. microcalyx***, *Clarke*; leaves ovate-cordate acute stellately fulvous-tomentose beneath, cymes compound subsessile, sepals $\frac{1}{2}$ in. elliptic obtuse, corolla $\frac{1}{2}$ in.

Cultivated (in the Calcutta gardens?) from Assam?

Stems slender, elongate, villous, twining. *Leaves* 1–1 $\frac{1}{2}$ in., shallowly cordate, pubescent above; petiole $\frac{1}{2}$ in. *Peduncles* very short, or 0, i.e., peduncles several from each axil, fulvous-tomentose; bracts inconspicuous. *Sepals* subscarious, nearly glabrous. *Corolla* of *C. parviflorus*, glabrous. *Ovary* glabrous; style long, stigmas filiform slightly clavate. *Fruit* not seen.—The examples are noted as cultivated; but, if the plant was not brought in from the Assam jungles, it is not known whence it came.

C. glandulosus, *Wall. Cat.* 2252, and *C. Tarita*, *Wall. Cat.* 2253, are absent from Wallich's Herbarium.

10. **EVOLVULUS**, *Linn.*

Small, hairy herbs, or undershrubs. *Leaves* small, entire. *Flowers* small, 1–3 together, peduncled. *Sepals* subequal, unaltered in fruit. *Corolla* funnel-shaped; limb 5-plaited, subentire. *Stamens* included or exserted, filaments filiform. *Ovary* 2–1-celled, 4-ovuled; styles 2, separate from the base, each cleft into 2 linear or subclavate stigmas. *Capsule* globose, 4–2-valved, normally 4-seeded. *Seeds* glabrous; cotyledons doubly folded radicle incumbent.—Species 70, in all hotter climates, more numerous in America.

1. ***E. alsinoides***, *Linn.*; *Benth. Fl. Austral.* iv. 437, with all *syn. except E. pilosus*, *Roxb.*; sparsely or densely silky-hairy white fulvous or almost rufous, leaves linear oblong or wide-elliptic, sepals $\frac{1}{2}$ – $\frac{1}{3}$ in. lanceolate hairy, corolla $\frac{1}{4}$ – $\frac{1}{2}$ in. blue or white. *Burm. fl. Zeyl.* 9, t. 6, fig. 1; *Wall. Cat.* 1317; *Roxb. Cat. Pl.* (1813), and *Fl. Ind.* ii. 105; *Chois. in DC. Prodr.* ix. 447; *Wight Ill.* t. 168 bis, fig. 10; *Boiss. Fl. Orient.* iv. 113. *E. linifolius*, *Linn.*; *Chois. l. c.* 449. *E. angustifolius*, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 107. *E. hirsutus*, *Lamk. Enc.* iii. 538, and *Ill.* t. 216, fig. 2; *Chois. l. c.* 447 (*syn. Roxb. excl.*); *Dalz. & Gibs. Bomb. Fl.* 162. *E. sericeus*, *Wall. Cat.* 1316. *Convolvulus valerianoides*, *Blanco. Fl. Filip.* 90.—*Rheede Hort. Mal.* xi. t. 64.

Throughout INDIA and CEYLON, very common; rare in very damp regions.—
DISTRIB. The tropical and subtropical area of the globe.

Perennial; annual branches numerous, wiry, often prostrate. Leaves $\frac{1}{4}$ –1 in., rarely $1\frac{1}{2}$ by $\frac{1}{2}$ in., very variable; petiole 0– $\frac{1}{2}$ in. Peduncles $\frac{1}{8}$ – $1\frac{1}{2}$ in.; bracts small, linear, hairy, persistent; pedicels 0– $\frac{1}{2}$ in. Capsule $\frac{1}{8}$ – $\frac{1}{2}$ in., globose, 4-valved.—The commonest Indian form is the type with leaves $\frac{1}{4}$ – $\frac{1}{2}$ in., oblong or elliptic, moderately silky with white or fulvous hairs. *E. linifolius* (*E. angustifolius*, Roxb.), has linear leaves often 1 in. long. *E. hirsutus*, has thick leaves and is more or less densely hirsute with fulvous or rufescent hairs.

11. PORANA, Burm.

Large climbers. Leaves petioled, ovate, entire. Cymes often in large panicles; flowers purple steel-blue or white; bracts persistent. Sepals in flower small, narrow; in fruit all or 3 much enlarged, scarious, nerved. Corolla campanulate or funnel-shaped, wide- or narrow-mouthed; limb 5-plaited, subentire or lobed. Stamens subincluded, filaments filiform or shortly linear. Ovary 2-celled, 4-ovuled; style long or short, entire with a simple or 2-lobed stigma, or 2-fid with capitate stigmas. Capsule globose oblong or obconic, membranous, indehiscent or 2-valved, 1-seeded. Seed glabrous; cotyledons plaited.—Species 9, from India to N. Australia.

* Flowers large, about an inch long.

1. **P. grandiflora**, Wall. Cat. 1324, and in Roxb. Fl. Ind. ed. Carey & Wall. ii. 41; shoots minutely pubescent, leaves ovate deeply cordate acuminate, racemes minutely bracted, sepals all much enlarged in fruit, 3 more than the others $1\frac{1}{2}$ by nearly $\frac{1}{2}$ in. obtuse. Chois. Convolv. Or. 108, and in DC. Prodr. ix. 436; Kurz in Trimen Journ. Bot. 1873, 138.

TEMPERATE NEPAL and SIKKIM, alt. 5–8000 ft.; Wallich, Griffith, J. D. H., &c.

An extensive, rather slender, glabrous or pubescent climber. Leaves 5 by $2\frac{3}{4}$ in., young villous beneath, old glabrous or puberulous on both surfaces; petiole 3 in. Peduncles 3–4 in.; racemes 2–3 in., 4–12-fid.; bracts $\frac{1}{4}$ in., linear; pedicels $\frac{1}{2}$ in. Sepals $\frac{1}{2}$ in., linear-oblong, puberulous. Corolla mauve; tube $\frac{3}{4}$ –1 in., linear; limb funnel-shaped, subentire, $1\frac{3}{4}$ in. diam., glabrous. Stamens and pistil $\frac{1}{4}$ – $\frac{1}{2}$ in., included in the small swollen base of the corolla-tube. Style linear, stigma subglobose. Capsule $\frac{1}{2}$ in., subglobose, rather longer than broad; 3 larger fruiting sepals subpalately 7–9-nerved; 2 smaller, 1 by $\frac{1}{2}$ in.

2. **P. stenoloba**, Kurz in Trimen Journ. Bot. 1873, 136; nearly glabrous, leaves ovate slightly cordate caudate-acuminate, racemes long-bracted, sepals all much enlarged in fruit, 3 more than the others 1 by $\frac{1}{2}$ in.

TEMPERATE SIKKIM, alt. 5–6000 ft.; on rocks by the Darjeeling road, not unfrequent, Kurz.

Nearly allied to *P. grandiflora*. Leaves very shallowly cordate, caudate, glabrous or minutely hairy above. Bracts 1– $1\frac{1}{2}$ in., ovate-lanceolate, or lanceolate caudate, often petioled; bracteoles 2, minute. Corolla (dry) nearly as of *P. grandiflora*, but "steel-blue," Kurz & King. Capsule not ripe; 3 larger sepals in fruit membranous, 5-nerved; 2 smaller similar, but $\frac{2}{3}$ less.—This differs from *P. grandiflora* in the shallowly cordate leaves, the remarkable bracts, the colour of the flowers and the exceedingly narrow fruit-sepals; but in Gen. Pl. ii. 876 it is considered conspecific.

3. **P. spectabilis**, Kurz in Trimen Journ. Bot. 1873, 136, and For. Fl. ii. 221; fulvous-tomentose, leaves subcordate ovate-oblong, racemes sub-bracteate, 3 sepals greatly enlarged in fruit $1\frac{1}{2}$ by $\frac{1}{2}$ in. 2 altogether suppressed. P. speciosa, Benth. in Gen. Pl. ii. 876.

BRITISH BURMA; Martaban, in tropical forests not unfrequent, *Kurz*.

Branches fulvous-tomentose. *Leaves* 4 by $1\frac{3}{4}$ in., base rounded or scarcely cordate, acute or subobtusely not acuminate, puberulous, woolly beneath; petiole $\frac{3}{4}$ in. *Racemes* terminal, subsessile (lowest bract altogether leaflike); pedicels $\frac{1}{4}$ in. *Sepals* in flower $\frac{1}{5}$ in., linear-oblong, fulvous-tomentose. *Corolla* white, hairy without; tube $\frac{2}{5}$ in., narrowly campanulate; mouth funnel-shaped, subentire, $1\frac{1}{4}$ in. diam. *Style* as long as corolla-tube, stigma subcapitate. *Capsule* $\frac{1}{5}$ in. diam. subglobose; fruiting-sepals oblong, subobtusely, scarious, puberulous, subpalmately 7-9-nerved.

** *Flowers* small, $\frac{1}{4}$ - $\frac{1}{2}$ in. long.

4. ***P. paniculata***, *Roxb. Cor. Pl.* iii. 31, t. 235, and *Fl. Ind.* i. 466, and *ed. Carey & Wall.* ii. 39; densely subtomentose, leaves ovate-cordate acute, cymes subebracteate panicled, 3 sepals greatly enlarged in fruit, the others nearly unchanged. *Don Prodr.* 99; *Wall. Cat.* 1325; *Chois. Convolv. Or.* 107, and in *DC. Prodr.* ix. 436; *Brand. For. Fl.* 342; *Kurz in Trimen Journ. Bot.* 1873, 137, and *For. Fl.* ii. 220. *Dinetus paniculatus*, *Sweet Hort. Brit.* ed. 2, 373.

Throughout INDIA, in jungles alt. 0-3000 ft. from the W. Himalaya and Assam to CEYLON and Tenasserim; less common in the S. Deccan.—DISTRIB. Ava, Java.

A powerful climber, often 30 ft. high. *Leaves* 5 by 3 in., pubescent above; petiole $1\frac{1}{2}$ in. *Panicles* terminating every branchlet with innumerable flowers. *Sepals* in flower $\frac{1}{12}$ in., linear-oblong. *Corolla* $\frac{1}{4}$ - $\frac{1}{3}$ in., campanulate, glabrous, white; limb very shortly lobed. *Filaments* short. *Style* very short, stigma obscurely 2-lobed. *Capsule* $\frac{1}{5}$ in. diam., globose, hairy; 3 enlarged sepals $\frac{3}{4}$ by $\frac{1}{4}$ in. obtuse, pubescent, with one longitudinal and several inarched lateral nerves; 2 others $\frac{1}{4}$ in., linear.—A monstrous form, collected in Sikkim by Sir J. D. H., has fascicled numerous branchlets with very small leaves.

5. ***P. volubilis***, *Burm. Fl. Ind.* 51, t. 21, fig. 1; glabrous except the shoots, leaves ovate subcordate shortly acuminate, cymes subebracteate panicled, sepals in fruit all equal $\frac{1}{2}$ in. subspathulate. *Lank. Ill.* t. 186; *Roxb. Fl. Ind.* i. 465, and *ed. Carey & Wall.* ii. 40; *Blume Bijl.* 723; *Wall. Cat.* 1327; *Don Prodr.* 99; *Wight Ill.* 168 bis, fig. 8, and *Id. t.* 347; *Chois. Convolv. Or.* 106, and in *DC. Prodr.* ix. 436; *Kurz in Trimen Journ. Bot.* 1873, 137, and *For. Fl.* ii. 220.

MALAY PENINSULA from Pegu to Malacca.—DISTRIB. Burma, Siam, Malaya.

A very large climber; branches glabrous, warted. *Leaves* $2\frac{1}{2}$ by $1\frac{1}{2}$ in., base rounded or cordate; petiole $\frac{2}{3}$ in. *Panicles* very large, minutely fulvous-pubescent; pedicels 0- $\frac{1}{4}$ in. *Sepals* in flower $\frac{1}{5}$ in., oblong. *Corolla* $\frac{1}{5}$ in., white; limb distinctly lobed. *Style* bipartite; stigmas small, capitate. *Capsule* $\frac{1}{8}$ in., globose; fruit-sepals with 5-7 longitudinal, not very prominent nerves.—*Kurz* says this extends to Khasia, and Roxburgh, that it grows in various parts of India; but the only examples seen are Malayan or cultivated.

6. ***P. racemosa***, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 466, and *ed. Carey & Wall.* ii. 41; puberulous or nearly glabrous, leaves ovate deeply cordate acute, racemes compound dichotomous, bracts at the forks large cordate persistent, capsule $\frac{1}{5}$ in. ellipsoid longer than broad, fruiting-sepals equal $\frac{1}{2}$ - $\frac{1}{3}$ by $\frac{1}{2}$ in. *Jacq. f. Ecl. ii.* t. 165; *Wall. Cat.* 1326; *Don Prodr.* 98; *Wight Ill.* t. 168 bis, fig. 9, and *Id. t.* 1376; *Chois. Convolv. Or.* 107, and in *DC. Prodr.* ix. 436; *Dalz. & Gibs. Bomb. Fl.* 162?; *Kurz in Trimen Journ. Bot.* 1873, 137. *Dinetus racemosus*, *Sweet Brit. Fl. Gard.* t. 127.

SUBTROPICAL HIMALAYA alt. 2-6000 ft., common; from the North-west (*Royle*) to BHOTAN. KHASIA to MARTABAN; alt. 2-6000 ft., common. DECCAN PENINSULA?

Forming dense, not lofty, masses. *Leaves* 2-3 by $1\frac{1}{2}$ in.; petiole $\frac{3}{4}$ in. *Racemes* lax; bracts at the forks leafy, sessile, scarious in fruit; those at the pedicels $\frac{1}{8}$ in.,

linear. *Sepals* in flower $\frac{1}{8}$ in., linear-oblong, puberulous. *Corolla* $\frac{1}{3}$ – $\frac{1}{2}$ in., lobed nearly half-way, white. *Style* linear; stigmas 2, short, oblong. *Capsule* apiculate, glabrous; fruiting sepals oblong-spathulate, with 3–5 strong longitudinal nerves.—The “Snow-creeper” of the English, one of the most beautiful of Indian plants, the masses of dazzling white flowers resembling snow-patches in the jungle. It is doubtful whether this plant is found wild in the Deccan; Wight’s figure represents it, but the fruit in his herbarium was sent him from N. India. There is no example from the Deccan, all Dalzell’s belong to the next species.

7. **P. malabarica**, Clarke; nearly glabrous, leaves ovate deeply cordate acute, racemes compound dichotomous, bracts at the forks large cordate persistent, capsule $\frac{1}{4}$ in. obovoid, fruit-sepals equal attaining 1 by $\frac{1}{2}$ in. elliptic. *P. racemosa*, Dalz. & Gibs. *Bomb. Fl.* 162.—Porana n. 3, *Herb. Ind. Or. H. F.* & T.

WEST DECCAN PENINSULA; Bombay, Dalzell; Malabar and Concan, Stocks, Law; Canara and Mysore, Law, &c.

Closely allied to *P. racemosa*. *Fruiting-sepals* sometimes only $\frac{2}{3}$ by $\frac{1}{3}$ in., but always differing widely from the much smaller narrow one of *P. racemosa*.

8. **P. truncata**, Kurz in *Trimen Journ. Bot.* 1873, 136; nearly glabrous, leaves ovate deeply cordate acute, racemes compound dichotomous, bracts at the forks large cordate persistent, capsule $\frac{1}{4}$ in. obconoid truncate, fruiting sepals equal $\frac{2}{3}$ by $\frac{1}{3}$ in.

KHASIA Mts., Numklow and Mairung, alt. 4–5000 ft., Griffith (Kew Distrib. n. 5876), &c.

Resembles *P. racemosa*; but is stouter and is intermediate between that species and *T. malabarica*. Kurz attempted to distinguish this by the “depressed-concave” summit of the capsule; but the fact is that the fresh capsule usually has a greatly depressed-conical apiculate summit, which in dried specimens often becomes concave. Possibly *P. racemosa*, *P. malabarica*, and *P. truncata*, are varieties of one; but the characters of the capsule and fruit-sepals seem well-marked, and the material is sufficient.

12. **BREWERIA**, R. Br.

Herbs or undershrubs, large and twining, or small and erect. *Leaves* undivided. *Flowers* in axillary peduncled heads or terminal close panicles, or 1–3 together, sessile and axillary; bracts small. *Sepals* equal or unequal, in fruit scarcely altered (in non-Indian species much enlarged). *Corolla* campanulate or funnel-shaped, limb 5-plaited. *Stamens* included; filaments filiform, bases often dilated. *Ovary* 2-celled, 4-ovuled; styles 2, nearly distinct from the base or united half their length, stigmas capitate. *Capsule* globose or ovoid, normally 4-seeded.—Species 23, in the tropics of both hemispheres, Australia and N. America.

* *Twining*; flowers medium-large yellowish in peduncled cymes; styles united about half their length.

1. **B. cordata**, Blume *Bijd.* 722; rusty-villous, leaves ovate-cordate acute. *Chois. in DC. Prodr.* ix. 438. *B. Roxburghii*, *Chois. Convolv. Or.* 111, and in *DC. Prodr.* ix. 438; *Wight Ic.* t. 1370; *Dalz. & Gibs. Bomb. Fl.* 162. *Convolvulus semidigynus*, *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 468, and *ed. Carey & Wall.* ii. 47; *Wall. Cat.* 1405.

WEST DECCAN PENINSULA; from the Concan Ghauts southwards; EAST BENGAL, and the MALAY PENINSULA, from Silhet to Malacca, frequent. CHYLOM, frequent. DISTRIB. Malaya.

A powerful twiner; branches villous. *Leaves* 4 by $2\frac{1}{2}$ in., those on the flowering branchlets ovate-cordate; petiole $1\frac{1}{2}$ in. *Peduncles* about as long as the petioles, 2-5-fld.; bracts $\frac{1}{4}$ in., oblong; cymes subcapitate, rusty-villous. *Sepals* $\frac{1}{3}$ - $\frac{1}{2}$ in., ovate-oblong, subacute, subequal. *Corolla* $1\frac{1}{2}$ in., wide-funnel-shaped, hairy without; limb subentire. *Style* $\frac{2}{3}$ in., united for $\frac{1}{3}$ in. *Capsule* $\frac{1}{2}$ in., subglobose, glabrous, splitting into numerous vertical segments; sepals in fruit somewhat enlarged, ovate, hardly so long as the capsule. *Seeds* about as broad as long, nearly glabrous.

2. **B. elegans**, *Chois. Convolv. Or.* 112, and in *DC. Prodr.* ix. 439; fulvous-villous, leaves elliptic those of the flowering branches oblong or sub-linear none cordate. *Convolvulus elegans*, *Wall. Cat.* 1392.

BRITISH BURMA; *Prome, Wallich.*

Very near *B. cordata*, differing chiefly in the leaves. *Leaves* of the flowering shoots (for 18 in. near their tops) $1\frac{1}{2}$ by $\frac{1}{3}$ in., narrow-oblong, mucronate; lower leaves 3 by $1\frac{1}{4}$ in., obtuse, almost rounded at both ends. *Pedicels* $\frac{1}{4}$ - $\frac{1}{3}$ in., rather longer than in *B. Roxburghii*. *Corolla* as of *B. Roxburghii* but the tube appears more cylindric, less funnel-shaped. *Capsule* not seen.—Material rather scanty for the support of so critical a species.

** *Small, erect; leaves small; flowers small, axillary, 1-3 together white or pinkish; styles distinct very nearly to the base.*

3. **B. evolvuloides**, *Chois. Convolv. Or.* 112, and in *DC. Prodr.* ix. 439; leaves $\frac{1}{3}$ - $\frac{1}{2}$ in. oblong or elliptic nearly glabrous, pedicels $\frac{1}{2}$ - $\frac{1}{3}$ in., capsule $\frac{1}{10}$ - $\frac{1}{8}$ in. *Seddera evolvuloides*, *Wight Ic. t.* 1369. *Evolvulus alsinoides*, *Wall. Cat.* 1317, *by admixture.*

DECCAN PENINSULA; *Heyne*; near Tuticorin, *Wight.*

A very branched, rigid, harsh, small shrub; with a few scattered strigose hairs. *Sepals* $\frac{1}{3}$ in., oblong, nearly glabrous, suberect both in flower and fruit. *Corolla* $\frac{1}{4}$ in. *Capsule* subglobose, shortly pointed, glabrous tipped with a tuft of hairs 4-valved. *Seeds* glabrous.

4. **B. latifolia**, *Benth. in Gen. Pl.* ii. 877; leaves $\frac{1}{4}$ - $\frac{3}{4}$ in. elliptic densely silky, flowers sessile, capsule $\frac{1}{2}$ in. *Seddera latifolia*, *Hochst. & Steud. in Flora*, 1844, *Beibl.* 8, t. 5, fig. B.C.; *Chois. in DC. Prodr.* ix. 440; *Boiss. Fl. Orient.* iv. 114. *Cressa latifolia*, *T. And. in Journ. Linn. Soc. v. Suppl.* 25, *excluding the Deccan synonyms.*

PUNJAB AND SCINDE; *Vicary, Stocks, &c.*—DISTRIB. W. Tropical Asia, E. Tropical Africa.

Dr. T. Anderson thought this plant not specifically separated from the Deccan *B. evolvuloides* by its hairiness and sessile flowers; but the capsule is twice as large, ovoid, and the seeds ovoid-oblong, twice as long as broad. *Sepals* acuminate, densely silky.

13. **NEUROPELTIS**, *Wall.*

A large scandent shrub; shoots rufous-villous or tomentose. *Leaves* alternate, petioled, coriaceous, ovate or oblong. *Racemes* axillary, or subpanicled towards the ends of the branches; flowers numerous, small, pedicelled; bract under the calyx inconspicuous in flower, in fruit enlarged 1 in. or more diam. *Sepals* suborbicular, in fruit hardly enlarged. *Corolla* wide-campanulate, deeply lobed, lobes induplicate-valvate in bud. *Stamens* exserted or included, filaments filiform. *Ovary* imperfectly 2-celled, 4-ovuled; styles 2, separate from the base, shortly linear, stigmas subcapitate or obscurely 2-lobed. *Capsule* globose, 4-valved, 1-seeded, sessile in the middle of the flat bract, *Seed* globose, glabrous, albuminous; cotyledons plaited.—Species 2, the following and an African.

1. **N. racemosa**, Wall. Cat. 1322, and in Roxb. Fl. Ind. ed. Carey & Wall. ii. 44; leaves elliptic or oblong acute or shortly acuminate, racemes 1-6 in. rusty-villous or tomentose dense. Deless. Ic. Sel. v. t. 96; Chois. Convolv. Or. 109, t. 2, fig. 12, and in DC. Prodr. ix. 437; Bedd. Ic. Pl. Ind. Or. t. 291; Kurz For. Fl. ii. 222. N. ovata, Wall. Cat. 1323; Chois. Convolv. Or. 110, t. 2, fig. 13, and in DC. Prodr. ix. 437. N. bracteata and intermedia, Griff. Notul. iv. 285.

MALAY PENINSULA, from Mergui southwards; Wallich, Griffith, Mainqay, &c. MALABAR PLAINS, near Tambacherry Ghat, Beddome.—DISTRIB. Borneo.

Leaves 5 by $2\frac{1}{2}$ in., base obtuse or rhomboid, when young more or less rusty-villous, sometimes on both surfaces, adult glabrous or nearly so, feather-nerved; petiole $\frac{1}{2}$ -1 in. Racemes subsessile, i.e. flowerbearing nearly to the base; pedicels in flower $\frac{1}{2}$ in.; bract minute. Sepals $\frac{1}{8}$ in. Corolla $\frac{1}{4}$ - $\frac{1}{3}$ in., widely campanulate, rufous-villous without. Ovary hairy. Bract in fruit 1- $1\frac{3}{4}$ in. diam., orbicular, base rounded or cordate, scarious, nerved. Capsule $\frac{1}{4}$ in., ovoid, glabrescent.

14. CRESSA.

A very small shrub, erect or diffuse, grey-pubescent. Leaves small, sessile, elliptic, acute. Flowers small, sessile in the upper axils, often in terminal clusters or spikes. Sepals equal, not enlarged in fruit. Corolla small, funnel-shaped, white or rose; lobes 5, subimbricated (not plaited) in bud. Stamens exserted, filaments filiform. Ovary sub-2-celled, 4-ovuled; styles 2, distinct, linear, stigmas capitate. Capsule 2-4-valved, usually 1-seeded. Seed glabrous; cotyledons linear, plicate.

1. **C. cretica**, Linn.; Lamk. Ill. t. 183; Sibth. Fl. Græc. t. 256; Chois. in DC. Prodr. ix. 440; Dalz. & Gibs. Bomb. Fl. 162; Boiss. Fl. Orient. iv. 114. C. indica, Retz. Obs. iv. 24; Roxb. Cat. Pl. (1813), and Fl. Ind. ed. Carey & Wall. ii. 72; Wall. Cat. 2260; Chois. Convolv. Or. 113. C. australis, Br. Prodr. 490.

Throughout INDIA from the Punjab and Calcutta to CEYLON, not common.—DISTRIB. All warm regions.

Stem 6-18 in. Leaves $\frac{1}{4}$ - $\frac{1}{3}$ in. Sepals $\frac{1}{8}$ in. Corolla $\frac{1}{2}$ in.; lobes reflexed. Capsule $\frac{1}{8}$ in.—The Indian plant differs from the common form of *C. cretica* in having 4 (not 1) seeds, according to Retz and Roxburgh.

15. CUSCUTA, Linn.

Leafless twining parasites, yellow or reddish not green. Flowers small, white or rose, fascicled, sessile or shortly pedicelled; bracts 0 or small. Sepals 5-4, subequal, distinct or shortly connate. Corolla ovoid or campanulate; lobes 5-4, short, imbricate in bud. Stamens 5-4, inserted near the throat of the corolla-tube, filaments short linear; anthers oblong, shortly exsert; scales near the base of the filaments or at the base of the corolla, often fimbriate, rarely 0. Ovary completely or incompletely 2-celled, 4-ovuled; styles 1 or 2, stigmas 2. Capsule globose or ovoid, dry or succulent, circumsciss or irregularly breaking up, 4-2-seeded. Seeds glabrous, albumen fleshy; embryo slender, twisted, cotyledons 0 or obscure.—Species 80, in warm and temperate regions.

SUBGENUS 1. **Monogynella**. Ovary, and young fruit, narrowed upwards into a single short style with 2 long stigmas.

1. **C. reflexa**, Roxb. Cor. Pl. ii. 3, t. 104, and Fl. Ind. i. 446, and ed. Carey & Wall. i. 466; flowers subracemose, bracts small fleshy subquadrate,

corolla campanulate deciduous, scales remote from the filaments, style very short, stigmas lanceolate, capsule $\frac{1}{4}$ – $\frac{1}{2}$ in. fleshy circumsciss near the base 4-seeded. *Wall. Cat.* 1319; *Hook. Exot. Fl.* t. 150; *Chois. Convolv. Or.* 116, and in *DC. Prodr.* ix. 454; *Engelm. Cusc.* 68. *C. grandiflora*, *Wall. Cat.* 1318. *Chois. Convolv. Or.* 116. *C. verrucosa*, *Sweet Brit. Fl. Gard.* t. 6. *C. Hookeri*, *Sweet Hort. Brit.* ed. 2, 373. *C. macrantha*, *G. Don Gen. Syst.* iv. 305; *Chois. in DC. Prodr.* ix. 455. *C. elatior*, *Chois. Convolv. Or.* 177.

Throughout INDIA, alt. 0–8000 ft., common; Bengal Plain, abundant. CEYLON; Newera Ellia, *Gardener*.—DISTRIB. Malaya.

Branches stout, fleshy, forming dense yellow masses on low trees and shrubs. *Flowers* 5-merous, in lax racemes 1–4 in. long, also clustered or subspicatæ; pedicels 0– $\frac{1}{4}$ in., often verrucose; bracts $\frac{1}{20}$ in. *Sepals* $\frac{1}{10}$ in., nearly distinct, ovate, obtuse. *Corolla* $\frac{1}{4}$ – $\frac{1}{2}$ by $\frac{1}{2}$ in., subcylindric; lobes short-triangular, reflexed; scales prominent, emarginate, fimbriate. *Stigmas* wide apart. *Capsule* (unripe) acute (corolla early deciduous), ultimately subquadrate obtuse tough fleshy. *Seeds* large, black.

VAR. *anguina*, corolla about half the usual size. *C. anguina*, *Edgew. in Trans. Linn. Soc.* xx. 87.—W. Himalaya; *Edgeworth*. The corolla varies a good deal in size from Wallich's *C. grandiflora* down to *C. anguina*, *Edgw.*; the chain of intermediates is nearly complete.

2. ***C. gigantea***, *Griff. Notul.* i. 243; spikes short subracemose, corolla cylindric deciduous, scales near its base remote from the filaments, style short, stigmas lingulate, capsule $\frac{1}{2}$ – $\frac{1}{5}$ in. membranous circumsciss near the base 2-seeded. *Engelm. Cuscut.* 66; *Boiss. Fl. Orient.* iv. 122.

WESTERN TIBET; *Falconer*.—DISTRIB. Cabul.

Much slenderer than *C. reflexa*. *Flowers* irregularly fascicled or shortly pedicelled, not capitate; bracts $\frac{1}{24}$ in., ovate. *Sepals* $\frac{1}{18}$ in., ovate, obtuse. *Corolla* $\frac{1}{2}$ – $\frac{1}{3}$ in., tube subcylindric; lobes 5, subacute, erect or reflexed; scales elliptic, shortly fimbriate. *Pistil* nearly as of *C. reflexa* but smaller. *Capsule* ultimately subquadrate, obtuse. *Seeds* broadly rhombiform, black.—Founded on n. 683 of *Griff. Herb. Propr.* from Cabul; but the *Kew Distrib.* n. 5899, which also bears Griffith's ticket n. 683, is a *Eucuscuta* with subglobose corolla and two styles, &c.

SUBGENUS 2. ***Eucuscuta***. *Ovary* and young fruit obtuse. *Styles* 2, their bases approximate but separated by a narrow depression which in the fruit becomes a pit.

* *Styles* elongate, stigmas capitate.

3. ***C. hyalina***, *Roth Nov. Sp.* 100, not of *Wight*; cymes or racemes dense, calyx acutely lobed $\frac{2}{3}$ down, corolla-lobes lanceolate acuminate, scales 0. *Engelm. Cuscut.* 40; *Boiss. Fl. Orient.* iv. 121. *C. sulcata*, *Wall. Cat.* 1320 (as to Heyne's examples marked *C. hyalina*). *C. arabica*, *Wight Ic.* 1371, not of *Fresen.* *C. oxypetala*, *Boiss. Diagn.* 2. iii. 130. *C. Boissieri*, *Stocks in Hook. Kew Journ.* iv. 173.

SCINDE; *Stocks*. DECCAN PENINSULA, *Rottler*; Palamcottah, *Wight*.—DISTRIB. Beloochistan; Abyssinia.

Pedicels 0– $\frac{1}{2}$ in.; bracts $\frac{1}{24}$ in., ovate. *Calyx* $\frac{1}{8}$ in. *Corolla-tube* $\frac{1}{12}$ – $\frac{1}{10}$ in.; lobes 5, $\frac{1}{8}$ in., acuminate and even caudate. *Capsule* $\frac{1}{10}$ in., fragile, irregularly breaking up from the base, normally 4-seeded.—A strongly marked plant, certainly *C. hyalina* of *Rottler*, *Engelmann* and *Boissier*; but the description of *Roth*, copied by *Choisy* (in *DC. Prodr.* ix. 460), is greatly at variance with the characters of the plant.

4. ***C. chinensis***, *Lamk. Enc.* ii. 229; cymes or racemes dense, sepals triangular-ovate subobtuse, corolla-lobes ovate obtuse or shortly acute, scales shortly fimbriate. *Chois. in DC. Prodr.* ix. 457; *Wight. Ic.* t. 1373; *Engelm.*

Cuscut. 29; *Boiss. Fl. Orient.* iv. 120. *C. carinata*, *Br. Prodr.* 491; *Chois. l.c.* 460. *C. sulcata*, *Roxb. Fl. Ind.* i. 447; *Wall. Cat.* 1320, *type sheet.* *C. capillaris*, *Wall. Cat.* 1321; *Chois. Convolv. Or.* 117. *C. hyalina*, *Wight Ic. t.* 1372, *not of Roth.* *C. ciliaris*, *Hohenack*; *Boiss. Diagn.* 2. iii. 129. *Grammica aphylla*, *Lour. Fl. Cochinch.* 171.

KASHMIR and CHUMBA; alt. 5–7000 ft., *Clarke.* E. BENGAL; *Wallich.* DECCAN PENINSULA; common. CEYLON; at Colombo.—DISTRIB. Eastwards to Australia and Westwards to Persia.

Resembling *C. hyalina*, but with much less elongate acute corolla-lobes. *Sepals* nearly free, in large examples keeled (*C. sulcata*, *Roxb.* or *C. carinata*, *R. Br.*); in small examples flat.

VAR. *minor*, *Chois.* 3rd Mem. *Convolv. t.* 3, fig. 4; calyx and corolla hardly half so large as in the type. *C. sulcata*, *Wall. Cat.* 1320, n. 3.—Martaban; *Wallich.*—Stems exceedingly slender. Referred in MS. by Engelm. to *C. obtusiflora*, H.B.K. Var. *breviflora*; but the Martaban plant has the calyx divided to the base, and seems merely a weak example of *C. chinensis*, as Wallich regarded it. Engelm. (*Cuscut.* 43) also refers as a Var. of *C. obtusiflora*, H. B. K., a plant collected in Kashmir by Jacquemont n. 876, which is no doubt this.

** *Stigmas elongate or linear often as long as the styles.*

5. ***C. capitata***, *Roxb. Fl. Ind.* i. 448; flowers capitate, corolla ovoid covered with minute papillæ without. *Engelm. Cuscut.* 23.

TEMPERATE W. HIMALAYA, alt. 6–12,000 ft., from Kashmir to Simla; *Jacquemont, Thomson, &c.*—DISTRIB. Cabul.

A slender rose-coloured species. *Sepals* $\frac{1}{20}$ – $\frac{1}{18}$ in., ovate. *Corolla* scarcely $\frac{1}{8}$ in., mouth contracted; lobes 5, small, triangular, suberect; scales small, low in the corolla, slightly fimbriate. *Styles* linear-lanceolate, as long as the short-linear stigmas. *Capsule* $\frac{1}{12}$ in., exceedingly thin and fragile, enclosed by the unchanged corolla, irregularly breaking up from the base. *Seeds* 4, ellipsoid, brown.—An unmistakable species; and, as Engelm. noticed, agrees well with Roxburgh's figure and description: the puzzle is whence Roxburgh got it; he says it grew abundantly on *Crotalaria juncea*, a plant cultivated at or near the sea-level.

6. ***C. europæa***, *Linn.*; *Syme Engl. Bot. t.* 927; flowers in sessile globose heads, calyx-tube shortly obconic lobes 5–4 ovate-triangular, styles shorter than the linear stigmas, capsule circumsciss near the base along a thickened rim. *Engelm. Cuscut.* 18, 19, *with syn.*; *Boiss. Fl. Orient.* iv. 117. *C. major*, *C. Bauh.*; *Chois. in DC. Prodr.* ix. 452. *C. aggregata*, *Roxb. Fl. Ind.* i. 447. *C. capillaris*, *Edgew. in Trans. Linn. Soc.* xx. 86.

TEMPERATE HIMALAYA, alt. 5–12,000 ft., from Kashmir to Sikkim; *Thomson Edgeworth, J. D. H., &c.*—DISTRIB. Europe, Western and Central Asia.

Calyx $\frac{1}{12}$ in. *Corolla-tube* $\frac{1}{12}$ in., ovoid; lobes 5–4, ovate or triangular; scales near the base of the filaments, obtuse or emarginate, crenulate or subentire. *Capsule* $\frac{1}{12}$ in., fragile. *Seeds* usually 4, ellipsoid, brown.

7. ***C. planiflora***, *Tenore*; *Engelm. Cuscut.* 14 *with syn.*; flowers in sessile globose heads, sepals ovate-oblong, corolla-tube longer than the calyx, styles shorter than the linear stigmas, capsule circumsciss near the base along a thickened rim. *Boiss. Fl. Orient.* iv. 116. *C. minor*, *C. Bauh.*; *Chois. in DC. Prodr.* ix. 453. *C. brevistyla*, *A. Rich. Fl. Abyss.* ii. 79; *Engelm. Cuscut.* 17; *Boiss. Fl. Orient.* iv. 117.

SUBTROPICAL W. HIMALAYA, alt. 1–6000 ft.; frequent, descending to the Punjab Plain.—DISTRIB. Mediterranean Region, Central Asia.

Closely resembling *C. europæa*. *Calyx* and *corolla* often glistening from their large lax tissue; whence the Indian examples have been regarded as papillose, and placed wrongly with *C. capitata*. *Corolla-tube* usually much longer than the calyx.

Seeds more fimbriate than in *C. europæa*. *Styles* (in Engelmänn's named examples of *C. planiflora*) short, less than half as long as the stigmas. *C. brevistyla* is not merely "too near" *C. planiflora* as both Engelmänn and Boissier suggest; it is the same thing.

ORDER CII. SOLANACEÆ. (By C. B. Clarke.)

Herbs or shrubs. *Leaves* alternate, often in unequal pairs, rarely clustered, never opposite; entire, lobed or pinnate; stipules 0. *Cymes* lateral, or terminal, axillary or extra-axillary, or pedicels solitary or clustered; bracts and bracteoles 0. *Flowers* regular, hermaphrodite (in *Withania coagulans* dioecious). *Calyx* inferior, 5-, rarely 3-7-merous, in *Nicandra* 5-partite; in fruit usually persistent, often much enlarged. *Corolla* funnel-shaped campanulate, or rotate, often plaited; lobes 5 (in *Datura* sometimes 10), or limb subentire. *Stamens* 5, on the corolla-tube; anthers ovate or oblong, dehiscing by apical pores or longitudinally. *Ovary* 2-celled, or imperfectly 1- or 4-celled, in *Nicandra* 3-5-celled; style linear, stigma capitate or very shortly lobed; ovules very many, on prominent peltate placentas. *Fruit* baccate or capsular, indehiscent circumsciss or valvular, usually 2-celled, many-seeded. *Seeds* compressed, discoid or subreniform, embryo peripheric; or (in *Nicotiana*) seeds scarcely compressed, embryo straight.—Species 1250 in the warmer parts of the whole world.

SUBORDER I. Solanææ. *Corolla-limb* plaited or the lobes valvate. *Fruit* a berry. *Seeds* much compressed, subdiscoid; embryo peripheric.

* *Anthers opening by 2 pores at the apex.*

Leaves entire, lobed or pinnatifid	1.	SOLANUM.
Leaves pinnate	1*.	LYCOPERSICUM.

** *Anthers oblong, dehiscing longitudinally.*

† *Calyx in fruit small.*

Flowers small. Pedicels solitary or paired	2*.	CAPSICUM.
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†† *Calyx in fruit enlarged, overtopping the berry.*

Pedicels solitary. Calyx shortly lobed	2.	PHYSALIS.
Flowers clustered, sessile or nearly so	3.	WITHANIA.
Pedicels solitary. Calyx 5-partite	3*.	NICANDRA.

SUBORDER II. Atropææ. *Corolla-lobes* more or less imbricate. *Fruit* a berry. *Seeds* compressed; embryo peripheric.

Pedicels solitary or few together. Calyx and corolla small	4.	LYCIUM.
Pedicels solitary. Calyx foliaceous	5.	ATROPA.
Pedicels clustered, subradical	6.	MANDRAGORA.

SUBORDER III. Hyoscyamææ. *Corolla-lobes* plaited or imbricate. *Fruit* capsular. *Seeds* somewhat compressed; embryo peripheric.

* *Capsule 4-celled, 4-valved, or subindehiscent.*

Flowers solitary. Calyx circumsciss	7.	DATURA.
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** *Capsule circumsciss.*

Pedicels solitary, distant	8.	SCOPOLIA.
Corymb terminal, peduncled	9.	PHYSOCHLAINA.
Flowers unilateral, upper racemose	10.	HYOSCYAMUS.

SUBORDER IV. **Cestrineæ.** *Corolla-lobes* induplicate-valvate. *Fruit* capsular. *Seeds* scarcely compressed; embryo straight.

Flowers paniced 10*. NICOTIANA.

1. SOLANUM, Linn.

Shrubs herbs or small trees, spinous or unarmed. *Leaves* alternate or subopposite in equal pairs, entire lobed or pinnatifid. *Cymes* dichotomous or racemose, lateral or terminal. *Calyx* 5- or 10-lobed, rarely 4-lobed, or subentire, unaltered or enlarged in fruit. *Corolla-tube* short, rotate, rarely campanulate; limb 5- (rarely 4-6-) lobed, plaited in bud. *Stamens* 5 (rarely 4-6) in the corolla-throat, filaments short; anthers oblong, narrowed upwards, connivent into a cone, opening by terminal pores or short slits. *Ovary* 2-celled, rarely (in cultivated forms) 3-4-celled; style columnar, stigma small. *Berry* small or large, globose or elongate. *Seeds* very many, discoid; embryo peripheric.—Species 700, chiefly in the hotter parts of the globe, most numerous in America.

S. tuberosum, Linn. (the Potato) is extensively cultivated in India, from the sea-level up to nearly 8000 feet.

* Unarmed. Sepals not overtopping the berry.

† *Cymes* or *racemes* peduncled; *calyx-teeth* 5 (rarely 4 or 6).

1. **S. nigrum**, Linn.; glabrous or sparingly pubescent, leaves ovate or oblong sinuate toothed or lobed, peduncles extra-axillary, pedicels subumbelled, calyx-teeth small obtuse, corolla white. *Blume Bijl.* 694; *Wall. Cat.* 2615; *Dunal in DC. Prodr.* xiii. 150; *Benth. Fl. Austral.* iv. 446 with syn.; *Kurz For. Fl.* ii. 224. *S. rubrum*, Miller; *Roxb. Fl. Ind.* i. 565; *Nees in Trans. Linn. Soc.* xvii. 39; *Dunal l. c.* 57. *S. triangulare*, Lamk. *Ill.* ii. 18; *Dunal l. c.* 53. *S. villosum*, Lamk. *Ill.* ii. 18; *Dunal l. c.* 58; *Boiss. Fl. Orient.* iv. 284. *S. incertum*, *Dunal Sol.* 155, and in *DC. l. c.* 57; *Nees l. c.* 38. *S. nodiflorum*, Jacq. *Ic. Rar.* ii. t. 326; *Dunal in DC. l. c.* 46. *S. uliginosum* and *rhinocerotis*, *Blume Bijl.* 695; *Dunal in DC. l. c.* 50. *S. Roxburghii*, *Dunal l. c.* 57; *Wight Ic. t.* 344. *S. fistulosum*, Rich.; *Nees l. c.* 37; *Dunal l. c.* 49. *S. miniatum*, Bernh.; *Dunal l. c.* 56; *Boiss. l. c.* *S. paludosum*, *pterocaulon*, *suffruticosum*, Rumphii and *erythræum*, *Dunal l. c.* 57, 52, 53, 57 and 371, with many others.—*Rheede Hort. Mal.* x. t. 73; *Rumph. Herb. Amb.* vi. t. 26, fig. 2.

Throughout INDIA and CEYLON, alt. 0-7000 ft.; common.—DISTRIB. All temperate and tropical parts of the world.

Herbaceous or suffrutescent. *Leaves* $3\frac{1}{2}$ by 2 in., narrowed at both ends; petiole $\frac{3}{4}$ in. *Peduncles* $\frac{1}{4}$ – $\frac{3}{4}$ in.; *pedicels* 5-8, $\frac{1}{2}$ in. *Sepals* $\frac{1}{20}$ in., ovate-oblong; in fruit often obscure, the calyx saucer-shaped. *Corolla* $\frac{1}{2}$ in. diam., nearly glabrous. *Ovary* glabrous, style-base hairy. *Berry* $\frac{1}{4}$ in. diam., globose, red or black, sometimes yellow. *Seeds* $\frac{1}{20}$ in. diam., smooth or nearly so.

2. **S. dulcamara**, Linn.; *Boiss. Fl. Orient.* iv. 285; glabrous or sparingly pubescent, leaves ovate or oblong subentire lobed or lyrate, peduncles extra-axillary, cymes laxly paniced, calyx-teeth small obtuse, corolla purple. *Dunal in DC. Prodr.* xiii. pt. i. 78; *Benth. & Trim. Med. Pl.* 190. *S. lyratum*, Thunb. *Fl. Jap.* 92; *Dunal l. c.* 79. *S. persicum*, Willd. *ms.*; *Dunal l. c.* 79. *S. laxum*, Royle *Ill.* 279 (name only).

TEMPERATE W. HIMALAYA, alt. 4-8000 ft., from Kashmir to Gurwhal, frequent. SIKKIM, Choongtam, J. D. H.—DISTRIB. Europe, W. and Central Asia, China, Japan.

A shrub. *Leaves* 3-5 in., in the Indian examples often cordate-oblong, acute, entire lobed or almost pinnate; petiole 1 in. *Peduncles* $\frac{1}{4}$ -4 in.; cymes 2-5 in. diam.; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in. *Calyx* in fruit almost saucer-shaped, lobes in flower $\frac{1}{20}$ in., ovate-oblong. *Corolla* $\frac{3}{8}$ in. diam. *Style* glabrous. *Berry* $\frac{1}{4}$ in. diam., globose. *Seeds* $\frac{1}{8}$ in. diam., smooth.—*S. laxum*, Royle, is a starved state with the panicle almost capillary and flowers about $\frac{1}{8}$ in. diam.

3. ***S. spirale***, Roxb. *Hort. Beng.* 16, and *Fl. Ind.* i. 566; glabrous, leaves elliptic entire acute at both ends, peduncles extra-axillary, pedicels long densely spirally racemed, calyx-teeth minute, corolla white. *Wall. Cat.* 2619; *Nees in Trans. Linn. Soc.* xvii. 40; *Dunal in DC. Prodr.* xiii. pt. i. 146; *Kurz For. Fl.* ii. 227.

ASSAM, KHASIA MTS. and EAST BENGAL; alt. 0-3500 ft., in and near the hills, common.—DISTRIB. Ava.

A herb or undershrub 4-12 feet, resembling a large *S. nigrum*. *Leaves* attaining 8 by 3 in., attenuate at the base, glabrous or scarcely puberulous; petiole $\frac{3}{8}$ in. *Pedicels* numerous, $\frac{1}{2}$ -1 in.; racemes sometimes divided. *Calyx* $\frac{1}{8}$ in., cup-shaped; in fruit saucer-shaped, not enlarged. *Corolla* $\frac{3}{8}$ in. diam., deeply lobed. *Anthers* oblong, scarcely narrowed upwards. *Berry* $\frac{1}{2}$ in. diam., globose, smooth. *Seeds* $\frac{1}{8}$ in. diam., smooth.

4. ***S. vagum***, Heyne in *Wall. Cat.* 2624; leaves elliptic acute at both ends sinuate glabrescent, peduncles extra-axillary, pedicels long sub-racemed, calyx-teeth linear-lanceolate. *Nees in Trans. Linn. Soc.* xvii. 48; *Dunal in DC. Prodr.* xiii. pt. i. 116.

DECCAN PENINSULA; Heyne.

A glabrescent shrub, shoots stellately white-pubescent. *Leaves* 6 by 2 $\frac{1}{4}$ in., very shallowly lobed; petiole 1 $\frac{1}{2}$ in. *Peduncles* $\frac{3}{4}$ in.; racemes dense, sometimes divided; pedicels $\frac{1}{4}$ -1 in., spirally placed. *Calyx-teeth* in flower $\frac{1}{8}$ in.; in fruit $\frac{1}{5}$ in. *Corolla* $\frac{3}{8}$ in. diam., deeply lobed, sparingly pubescent without. *Berry* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., globose, smooth.—Very closely allied to *S. spirale*.

5. ***S. verbascifolium***, Linn.; *Dunal in DC. Prodr.* xiii. pt. i. 114; stellately woolly, leaves elliptic acuminate entire, corymbs peduncled sub-terminal compound dense, calyx-teeth triangular, corolla white. *Jacq. Hort. Vind.* i. t. 13; *Lour. Fl. Cochinch.* 128; *Wall. Cat.* 2616; *Nees in Trans. Linn. Soc.* xvii. 46; *Wight Ic.* t. 1398; *Dalz. & Gibs. Bomb. Fl.* 175; *Kurz For. Fl.* ii. 225. *S. pubescens*, Roxb. *Fl. Ind. ed. Carey & Wall.* ii. 244; *Blume Bijdr.* 698, not of Willd. *S. erianthum*, Don *Prodr.* 96.

Throughout INDIA, in the Tropical and Subtropical zone; common.—DISTRIB. S.E. Asia, Malaya, N. Australia, Tropical America.

A shrub, or subarborescent, 20 feet high. *Leaves* 7 by 3 in. attenuate at both ends or base subrhomboid; petiole 1-2 in. *Peduncles* stout, 1-4 in.; cymes dichotomously compound, very woolly. *Calyx-lobes* in flower $\frac{1}{12}$ in., thrice as large in fruit, but much shorter than the berry. *Corolla* $\frac{3}{8}$ in. diam., woolly without. *Ovary* hairy, style glabrous. *Berry* $\frac{1}{2}$ in. diam., globose, yellow. *Seeds* $\frac{1}{8}$ in. diam., nearly smooth.

6. ***S. pubescens***, Willd. *Phyt.* 5, t. 3; leaves ovate entire sinuate thinly stellately hairy, racemes lateral and terminal 3-10-flowered, calyx-teeth lanceolate, corolla purple. *Wall. Cat.* 2629; *Nees in Trans. Linn. Soc.* xvii. 60; *Dunal in DC. Prodr.* xiii. pt. i. 127; *Wight Ic.* t. 1402. *S. calycinum*, *Nees l. c.* *S. conanthum*, *Dunal l. c.*

DECCAN PENINSULA and Ceylon; *Wight, Thwaites, &c.*

A shrub or subarborescent; young branches densely stellately woolly, older usually perfectly glabrous. *Leaves* 2-4 in., irregularly obscurely lobed, base rhomboid or shallowly cordate shortly decurrent, young stellately subwoolly, mature thinly hairy

or glabrescent. *Racemes* densely woolly, or villous; pedicels $\frac{1}{2}$ – $1\frac{1}{2}$ in. *Calyx-lobes* $\frac{1}{8}$ – $\frac{1}{5}$ in. in flower, in fruit $\frac{1}{4}$ in. *Corolla* $\frac{3}{4}$ – $1\frac{1}{4}$ in. diam., closely tomentose without. *Anther* of the lowest stamen produced upwards, longer than the others. *Berry* $\frac{1}{3}$ in. diam., globose, smooth. *Seeds* $\frac{1}{8}$ in. diam. and upwards.

VAR. ? *lobata*; leaves lobed very tomentose beneath, flowers smaller.—Khasia Hills.—This example (from Herb. Calcutta, named *S. pubescens* by Kurz) has no fruit, nor prickles. It resembles the unarmed form of *S. Melongena*, but the flowers are too small.

†† *Pedicels* axillary, clustered or solitary, or in a subsessile umbel; calyx-teeth 5–10 or obsolete; corolla glabrous without or nearly so.

7. ***S. subtruncatum***, Wall. Cat. 2620; leaves lanceolate acuminate at both ends entire glabrous or nearly so, flowering calyx cup-shaped entire or obscurely toothed fruiting saucer-shaped entire, corolla $\frac{1}{2}$ in. long. Dunal in DC. Prodr. xiii. pt. i. 180. *S. denticulatum*, Nees in Trans. Linn. Soc. xvii. 41, not of Blume. *S. Neesianum*, Wall.; Nees l. c. 42, not of Wight nor of Dalz.

KHASIA Mts. alt. 3–5000 ft., common; Wallich, Griffith, &c. ASSAM; Jenkins.

A shrub, nearly glabrous. Leaves $6\frac{1}{2}$ by $1\frac{3}{4}$ in., minutely setulose above, afterwards glabrous; petiole $\frac{1}{2}$ in. Pedicels $\frac{2}{3}$ in., 1–7 together. Calyx in flower $\frac{1}{10}$ in. long and broad; teeth 5 or 10, very obscure. Berry $\frac{1}{4}$ in. diam., globose, smooth. Seeds $\frac{1}{18}$ in. diam., subtriangular, smooth.—Perhaps not distinct from *S. Blumei*, Nees (Blume Bijl. 696), which has broader leaves.

8. ***S. bigeminatum***, Nees in Trans. Linn. Soc. xvii. 42; leaves elliptic acuminate at both ends entire glabrous or nearly so, flowering calyx cup-shaped entire or obscurely toothed fruiting saucer-shaped subentire, corolla $\frac{1}{2}$ in. long. Dunal in DC. Prodr. xiii. pt. i. 175. *S. Neesianum*, Dalz. & Gibs. Bomb. Fl. 175, and of Wight Herb., not of Wall. & Nees. *S. cupulatum*, Miq. in Pl. Hohenack. n. 1415. *S. angulosum* and *flexuosum*, Heyne in Herb. Madras.

Mts. of the S. DECCAN; Nilgherries, Travancore; Heyne, Wight, &c. Malabar Ghauts, Ritchie.

Very nearly allied to *S. subtruncatum*. Leaves $6\frac{1}{2}$ by 3 in., membranous, sparsely setulose above, margins minutely ciliate; petiole $\frac{1}{2}$ –1 in. Pedicels 1–6 together, $\frac{3}{4}$ in. Berry $\frac{1}{3}$ in. diam. Seeds $\frac{1}{8}$ in. diam.; testa lax, subsquamose.

VAR. *zeylanica*; leaves smaller less membranous, pedicels shorter rusty-puberulous. *S. membranaceum*, Thwaites Enum. 216, not of Wall.—Ceylon, Gardner, Wight, Thwaites.

9. ***S. laeve***, Dunal Solan. Synop. 22; leaves elliptic-lanceolate acuminate at both ends entire glabrous or nearly so, flowering calyx with 5 linear teeth $\frac{1}{8}$ in., fruiting prominently toothed, corolla $\frac{1}{4}$ in. Nees in Trans. Linn. Soc. xvii. 41. *S. membranaceum*, Wall. Cat. 2625; Nees l. c.; Dunal in DC. Prodr. xiii. pt. i. 143.

NILGHERRIES, Wight; alt. 6000 ft., Clarke.

A nearly glabrous shrub. Leaves $6\frac{1}{2}$ by $2\frac{1}{2}$ in., green, membranous, minutely sparsely setulose above, soon glabrous; petiole $\frac{2}{3}$ in. Pedicels 1–5 together, $\frac{3}{8}$ in. Berry and seeds nearly as of *S. bigeminatum*, from which it hardly differs but by the distinct calyx-teeth.

10. ***S. denticulatum***, Blume Bijl. 697; leaves elliptic-lanceolate acuminate at both ends subentire setulose often pubescent, calyx-teeth usually 7–8 small divaricate, corolla $\frac{1}{2}$ – $\frac{3}{4}$ in. long. Nees in Trans. Linn. Soc. xvii. 41, excl. syn. Wallich; Wight Ic. t. 1397; Dunal in DC. Prodr. xiii. pt. i. 181. *S. membranaceum* and *crassipetalum*, Herb. Wight not of Wall.

Mts. of the DECCAN PENINSULA, alt. 4-8000 ft., and CEYLON, frequent.—DISTRIB. Malay Islands.

A woody, somewhat rigid shrub. *Leaves* 3 by $1\frac{1}{2}$ in., young almost villous, mature setulose above, pubescent often rusty on the nerves beneath; petiole $\frac{1}{2}$ in. *Pedicels* 1-4 together, $\frac{2}{3}$ in. *Calyx-teeth* lanceolate, minute; in fruit $\frac{1}{2}$ in. or 0 on the same shrub. *Berry* $\frac{1}{4}$ - $\frac{1}{3}$ in. *Seeds* $\frac{1}{8}$ in. diam. and upwards, smooth or nearly so.

VAR. *Gouakai*; leaves angular and sometimes with acute lobes $\frac{1}{2}$ in. long. *S. Gouakai*, Dunal in DC. l. c. 177.—Pulney Mts.; Wight. Ceylon; Walker.

11. ***S. biflorum***, Lour. *Fl. Cochinch.* 129, not of *D. Don*; leaves elliptic or oblong acuminate at both ends entire glabrous setulose or pubescent, calyx-teeth 10 in flower $\frac{1}{12}$ in. narrow-lanceolate, corolla $\frac{1}{4}$ - $\frac{1}{3}$ in. Dunal in DC. Prodr. xiii. pt. i. 178; Kurz For. Fl. 224. *S. decemdentatum*, Roxb. Hort. Beng. 16, and *Fl. Ind.* i. 565; Wall. Cat. 2614; Dunal l. c. 179. *S. mollissimum*, Blume Bijl. 698; Nees in Trans. Linn. Soc. xvii. 45; Dunal l. c. 178. *S. decemfidum*, Nees l. c. 43. *S. Zollingeri*, Calleryanum and Osbeckii, Dunal l. c. 176, 178, 179.

SINGAPORE; Wallich. MERGUI and MALACCA; Griffith.—DISTRIB. Malaya and East Ava.

A shrub; shoots flocculose-setose or nearly glabrous. *Leaves* 5 by $1\frac{1}{2}$ in.; petiole $\frac{2}{3}$ in. *Pedicels* 1-6, $\frac{2}{3}$ in. *Flower and fruit* nearly as in *S. denticulatum*, from which it only differs in the longer calyx-teeth.—Very variable in indumentum; Roxburgh describes the leaves as villous, the calyx as pubescent; his Ic. Ined. preserved at Kew represents a glabrous form.

12. ***S. macrodon***, Wall. Cat. 2621; erect, shrubby, leaves elliptic-lanceolate acuminate at both ends entire setulose above, pedicels 1-8 together, calyx-teeth in flower $\frac{1}{2}$ in. linear hispidulous, corolla $\frac{1}{2}$ - $\frac{1}{2}$ in. Nees in Trans. Linn. Soc. xvii. 43; Dunal in DC. Prodr. xiii. pt. i. 180. *S. biflorum*, Don Prodr. 96, excl. syn., not of Lour.

TEMPERATE HIMALAYA, alt. 4-8000 ft., from Nepal to Bhotan, common. KHASIA Mts., alt. 3-5000 ft., common.

A small shrub setulose with jointed, submoniliform, glistening hairs. *Leaves* 6 in. in large examples, or 2 in. in high level forms; petiole $\frac{1}{3}$ - $\frac{2}{3}$ in. *Pedicels* $\frac{1}{2}$ -1 in., mostly 2-6 together, sometimes solitary. *Calyx-teeth* (in flower) terminal, alternate sometimes shorter. *Corolla-lobes* oblong, acute, purple rose or nearly white, with 2 green glandular spots near the base. *Berry* $\frac{1}{4}$ in. diam., globose. *Seeds* $\frac{1}{8}$ in. diam., subtriangular, smooth.

VAR. *lysimachioides*; stems slender procumbent often rooting at the nodes, pedicels solitary. Wall. Cat. 2609, and in Roxb. Fl. Ind. ed. Carey & Wall. ii. 257; Nees in Trans. Linn. Soc. xvii. 44; Dunal in DC. Prodr. xiii. 181.—Temperate Himalaya, from Kumaon (Strachey & Winterbottom) to Bhotan. Khasia Mts. alt. 3-5000 feet.

13. ***S. crassipetalum***, Wall. Cat. 2618, and in Roxb. Fl. Ind. ed. Carey & Wall. ii. 256; erect, shrubby, leaves elliptic-lanceolate acuminate at both ends entire glabrous or sparsely setulose, pedicels 1-8 together, calyx-teeth in flower $\frac{1}{24}$ - $\frac{1}{12}$ in. triangular glabrous or pubescent from a compressed base below the calyx-rim, corolla $\frac{1}{3}$ - $\frac{1}{2}$ in. Nees in Trans. Linn. Soc. xvii. 42. Bassovia? Wallichii, Dunal in DC. Prodr. xiii. 409.

TEMPERATE HIMALAYA, alt. 3-8000 ft.; from Nepal to Bhotan, very common.

A shrub, 2-9 feet. *Leaves* 6 by 2½ in. (sometimes 9-10 in.); usually nearly glabrous, sometimes abundantly flocculose-setulose; petiole $\frac{2}{3}$ in. *Calyx-teeth* in flower below the limb, bases compressed decurrent on the tube, points linear-obtuse divaricate horizontally. *Corolla and berry* nearly as of *S. macrodon*.—The thickening of the petals observed in the few examples of Wallich frequently occurs in this species, but in abnormal flowers with imperfect stamens, and is perhaps due to some

insect. At all events, normal unthickened flowers abound.—Leaves cooked and eaten in Sikkim (*J. D. H.*).

** Prickly, some varieties of *S. Melongena* rarely unarmed.

14. ***S. giganteum***, *Jacq. Coll.* iv. 125, and *Ik. Rar.* ii. t. 328; subarborescent, spinous, leaves oblong cuneate at both ends, and cymes stellately white woolly beneath, cymes terminal dense many-fl'd. stellately white woolly, berry $\frac{1}{2}$ in. diam. glabrous. *Dunal Sol.* 202, and in *DC. Prodr.* xiii. pt. i. 258; *Nees in Trans. Linn. Soc.* xvii. 47; *Bot. Mag.* t. 1921; *Wight & Arn. in Ann. Nat. Hist.* i. 395, t. 13; *Wight Ik.* t. 893; *Dalz. & Gibs. Bomb. Fl.* 175. *S. niveum*, *Vahl Symb.* ii. 41. *S. farinosum*, *Wall. Cat.* 2610, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 255. *S. argenteum*, *Heyne in Herb. Rottler.*

Mrs. of S. DECCAN and CEYLON, alt. 3-7000 ft., frequent; *Wight, Thwaites, &c.*

Often 10-25 feet high; but in cultivation flowers at 4 feet high; stem thick, soft, prickly, stellately white-woolly. Leaves 8 by 3 in., entire, undulate; nerves impressed on the upper surface; petiole 2 in. Pedicels very short, in fruit $\frac{1}{4}$ - $\frac{1}{2}$ in. Calyx-lobes $\frac{1}{20}$ in., triangular, in fruit twice as large. Corolla $\frac{1}{2}$ in. diam., blue; tube nearly as long as the lobes. Ovary puberulous. Seeds $\frac{1}{8}$ in. diam., glabrous.

15. ***S. ferox***, *Linn.*; *Dunal Sol.* 223, and in *DC. Prodr.* xiii. pt. i. 255; densely stellately woolly, leaves ovate with short triangular lobes, racemes lateral dense, corolla white, berry 1-1 $\frac{1}{2}$ in. diam. globose hirsute with needle-like hairs greatly exceeding the ovate-triangular calyx-lobes. *Nees in Trans. Linn. Soc.* xvii. 52 (excl. syn. *S. involucratum*, Blume); *Wight Ik.* t. 1399 (excl. var. *minus*); *Kurz For. Fl.* ii. 226, partly, and excl. var. β). *S. lasiocarpum*, *Blume Bijl.* 701; *Wall. Cat.* 2623; *Dunal Sol.* 222, and in *DC. Prodr.* xiii. pt. i. 252. *S. hirsutum*, *Roxb. Hort. Beng.* 17, and *Fl. Ind. ed. Carey & Wall.* ii. 253. *S. stramonifolium*, *Dunal Sol.* 222, and *DC. Prodr.* xiii. pt. i. 252, not of *Jacq.* nor of *Wall.*—*Rhesde Hort. Mal.* ii. 35.

EASTERN and SOUTHERN INDIA, in the tropical zone, frequent; from Assam to Ceylon and to Tenasserim.—DISTRIB. Hongkong.

Stem herbaceous, stout, 2-4 feet, sub-erect, prickly. Leaves 8 by 6 in., closely villous above, stellately fulvous-woolly beneath, lobes 1 in. deep, prickly especially on the nerves; petiole 2 $\frac{1}{2}$ in. Peduncles usually close below the leaves, short; racemes densely stellately woolly and with needle-like hairs, not prickly. Calyx shortly funnel-shaped; lobes $\frac{1}{4}$ in., ovate-triangular not acuminate. Corolla densely woolly without, lobes $\frac{3}{4}$ -1 in., oblong, acute. Ovary hirsute. Berry yellow, needle-like hairs $\frac{1}{8}$ - $\frac{1}{2}$ in., fulvous, spreading; fruit-pedicels $\frac{1}{2}$ -1 in.; calyx-lobes in fruit unaltered, hardly $\frac{1}{4}$ the length of the berry. Seeds $\frac{1}{8}$ in. diam., nearly smooth.—*S. involucratum* (Blume *Bijl.* 701), the Malay species reduced to *S. ferox* by *Nees*, has the calyx-lobes produced, in fruit 1 in., ovate-linear, with slender prickles, enclosing the berry.

16. ***S. barbisetum***, *Nees in Trans. Linn. Soc.* xvii. 51; hirsute, leaves ovate with short triangular lobes, racemes lateral elongate many-flowered, corolla blue lobes lanceolate acuminate, berry $\frac{1}{2}$ in. diam. globose glabrous enclosed by the prickly calyx. *Dunal in DC. Prodr.* xiii. pt. i. 250. *S. erio-phorum*, *Dunal l.c.* 249. *S. involucratum*, *Kurz For. Fl.* ii. 224, not of *Blume*.

From N. BENGAL and ASSAM to TENASSERIM, in the subtropical region, alt. 1-5000 ft., frequent, *Wallich, Griffith, H. f. & T.*, &c.

In general appearance, and in the leaves, resembling *S. ferox*, but with close clustered fine hairs, scarcely woolly. Racemes 2-6 in.; pedicels very many, $\frac{1}{4}$ -1 in., deflexed after flower. Calyx-lobes $\frac{1}{4}$ - $\frac{1}{2}$ in., oblong-lanceolate. Corolla-lobes very narrow, acute. Calyx in fruit enlarged, tube subglobose with deflexed prickles, teeth closed over the berry. Seeds more than $\frac{1}{8}$ in. diam., minutely villous.

17. **S. khasianum**, Clarke; hirsute, leaves ovate lobed, racemes lateral 1-4-flowered, corolla small lobes lanceolate acuminate, berry 1 in. diam. globose glabrous much longer than the unarmed calyx. *Solanum* n. 14, *Herb. Ind. Or. H. f. & T.*

KHASIA Mts.; Nunklow, *H. f. & T.*

A stout species, in indumentum and leaves resembling *S. barbisetum*. Stem densely yellow-hirsute, and with straight patent prickles $\frac{2}{3}$ in. Leaves 7 by 5 in., deeply lobed, hirsute; prickles $\frac{2}{3}$ in. straight, on both surfaces; petiole 1-2 in. Peduncles hardly any; pedicels $\frac{3}{4}$ in. Sepals in flower $\frac{1}{2}$ in., lanceolate, hirsute, not prickly. Corolla $\frac{2}{3}$ in. diam., nearly glabrous without. Stamens equal. Berries 1-3 on each peduncle; fruit-sepals $\frac{1}{2}$ in., ovate-lanceolate, hirsute, not prickly. Seeds $\frac{1}{8}$ in. diam., smooth.

18. **S. Wightii**, Nees in *Trans. Linn. Soc.* xvii. 51; leaves ovate toothed or lobed hirsute, cymes lateral laxly 1-3-flowered, corolla large tube longer than the lobes, berry glabrous overtopped by the ovate-lanceolate sepals. *Dunal in DC. Prodr.* xiii. pt. i. 1334; *Wight Ic.* t. 841. *S. Hohenackeri*, Van Heurck & Muell. in *Van Heurck Pl.* Nov. 87.

NILGHERY Mts., alt. 4-6000 ft.; Canoor Ghat, *Wight, Gardner, &c.*

Herbaceous; shoots tomentose. Leaves 4 by $1\frac{1}{4}$ in., villous above, more densely beneath, prickles few; petiole 1 in. Peduncles axillary or extra-axillary, short; pedicels $\frac{1}{2}$ -2 in. Calyx-lobes (in flower) $\frac{1}{2}$ in., oblong-lanceolate. Corolla 2 in. diam., blue, woolly without; lobes ovate, shortly acuminate. Style minutely sparsely pubescent. Berry $\frac{1}{2}$ in. diam., globose; sepals in fruit $\frac{3}{4}$ in., without prickles. Seeds $\frac{1}{8}$ in. diam., brown, smooth, without tubercles; the dried testa reticulated by the drying and sinking in of the cells leaving the cell-walls prominent.

19. **S. torvum**, Swartz *Prodr.* 47; stem prickly, leaves ovate sinuate or lobed stellately tomentose beneath without prickles, racemes lateral dense, flowers white, berry $\frac{1}{4}$ - $\frac{1}{3}$ in. diam. globose smooth much exceeding the triangular-oblong unarmed calyx-lobes. *Dunal Sol.* 263, t. 23, and in *DC. Prodr.* xiii. pt. i. 260 (excl. var. γ); *Nees in Trans. Linn. Soc.* xvii. 53 a; *Wight Ic.* t. 345; *Dalz. & Gibs. Bomb. Fl.* 175; *Sendtn. in Mart. Fl. Bras.* x. 94, t. 7, fig. 1-8 with syn.; *Kurz For. Fl.* ii. 225. *S. stramonifolium*, Roxb. *Fl. Ind.* i. 572; *Wall. Cat.* 2627; perhaps of Lamk. in part, not of Jacq. *S. ferrugineum*, Jacq. *Hort. Schoenb.* iii. 46, t. 334; *Dunal Sol.* 36, and in *DC. l. c.* 266. *S. pseudosaponaceum*, Blume *Bijl.* 702; *Dunal in DC. l. c.* 274. *S. Wightii*, Miquel *Pl. Hohenack.* n. 36, not of Nees.

Throughout INDIA in the tropical region, except the western desert area; very common in Bengal.—DISTRIB. Malaya, China, Philippines, Tropical America.

A shrub, 8-12 feet high, or flowering as a herb. Leaves 6 by 4 in., lobes shallow rarely deep, softly hairy above, never prickly; petiole 1 in. Peduncles usually extra-axillary, short; racemes many-fl., often dichotomous; pedicels often $\frac{1}{4}$ - $\frac{1}{2}$ in. Calyx-lobes in flower $\frac{1}{2}$ in., lanceolate, sparingly hairy. Corolla $1\frac{1}{4}$ in. diam.; lobes $\frac{1}{2}$ in., triangular, pubescent without. Ovary and style glabrous. Berry yellow; calyx-lobes patent, not half as long as the berry. Seeds scarcely $\frac{1}{10}$ in. diam., smooth.—This, when dried, has been much confused with the blue-flowered *S. indicum* and *S. Melongena*; the former may be distinguished by the prickly leaves, the latter by the few-flowered cymes with a much larger berry and fruiting-calyx.

20. **S. indicum**, Linn. partly; *Nees in Trans. Linn. Soc.* xvii. 55; leaves ovate sinuate or lobed stellately woolly beneath nerves prickly, racemes lateral many-fl., flowers blue, berry $\frac{1}{2}$ in. diam. globose smooth much exceeding the triangular-oblong calyx-lobes. *Lour. Fl. Cochinch.* 131; *Roxb. Fl. Ind.* i. 570; *Wall. Cat.* 2626; *Wight Ic.* t. 346; *Dunal in DC. Prodr.* xiii. pt. i. 309; *Dalz. & Gibs. Bomb. Fl.* 174; *Kurz For. Fl.* 226. *S. violaceum*, Jacq. *Fragm.*

82, t. 133, fig. 1, *not of Br.* *S. cuneatum*, Moench *Hort. Marb.* 476. *S. canescens*, Blume *Bijd.* 701. *S. pinnatifidum* and *agreste*, Roth *Nov. Sp.* 129, 130. *S. Heynei*, Roem. & Sch. *Syst.* iv. 669. *S. Anguivi*, Bojer; Hook. *Exot. Fl.* t. 199. *S. himalense*, Dunal l. c. 300. *S. Junghuhnii*, Miq. *Fl. Ind. Bat.* ii. 649.—*Burm. Thes. Zeyl.* 220, t. 102; *Rheede Hort. Mal.* ii. t. 36.

Throughout tropical INDIA; very common, ascending to 5000 ft.—DISTRIB. Malaya, China to the Philippines.

An undershrub, 1-6 ft., much branched, very prickly; prickles compressed, stout, often recurved. *Leaves* 3-6 by 1-4 in., subentire or pinnatifid; petiole 1 in. *Peduncles* short, often extra-axillary; pedicels $\frac{1}{2}$ - $\frac{1}{3}$ in., stellately woolly. *Calyx-lobes* in flower $\frac{1}{2}$ in., triangular, acute, very woolly, unarmed or with slender straight spines. *Corolla* $\frac{3}{4}$ -1 in. diam., blue; lobes broadly triangular, tomentose without. *Ovary* usually glabrous; style stellately pubescent. *Berry* yellow; calyx-lobes patent, woolly, prickles often strengthened in fruit. *Seeds* $\frac{1}{2}$ in. diam. and upwards, smooth or very nearly so.—A Nilgherry form is less prickly, has smaller less lobed leaves, and small corymbs of larger flowers. A plant from the Concan is sparsely prickly and has the leaves very sparsely stellate tomentose. A Punjab example of Thomson has branches with very numerous small thin leaves, a monstrosity that occurs in other Indian species of *Solanum*.

VAR. *multiflora*, Wight; rather stronger, more hairy, racemes stouter longer, stellate pubescence of the style extending over the ovary continued on the fruit or deciduous. *S. multiflorum*, Roth *Nov. Sp.* 130; Roem. & Sch. *Syst.* iv. 669. *S. ferox*, var. minus, Wight l. c. t. 1400. *S. torvum*, var. β *inermis*, Nees in *Trans. Linn. Soc.* xvii. 54; var. γ *inermis*, Dunal in *DC. Prodr.* xiii. pt. i. 261. *S. erosum*, Van Heurck & Muell. in Van Heurck *Nov. Pl.* 83.

21. **S. Melongena**, Linn.; Nees in *Trans. Linn. Soc.* xvii. 49; leaves ovate sinuate or lobed stellately woolly beneath prickly rarely all unarmed, cymes lateral few-fl., calyx-lobes lanceolate, flowers blue, berry glabrous exceeding the calyx-lobes in cultivation often large ellipsoid or elongate white yellow or dark-purple. *Lour. Fl. Cochinch.* 130; *Roxb. Fl. Ind.* i. 566; *Wall. Cat.* 2628; *Wight Ill.* t. 166; *Dalz. & Gibs. Bomb. Fl. Suppl.* 61; *Sendtn. in Mart. Brasil. Sol.* 77. *S. incanum*, Linn.; Dunal in *DC. Prodr.* xiii. pt. i. 368. *S. insanum*, Linn. *Mant.* 46; *Roxb. Fl. Ind.* i. 568. *S. zeilanicum*, Scop. *Delic.* t. 1. *S. undatum*, Lamk. *Dict.* iv. 301; Blume *Bijd.* 700; Dunal l. c. 359. *S. Trongum*, Lamk. *Dict.* iv. 308. *S. longum*, Roxb. *Hort. Beng.* 16, and *Fl. Ind.* i. 567. *S. pseudo-undatum*, Blume *Bijd.* 699. *S. ovigerum*, Blume *Bijd.* 698; Dunal l. c. 357. *S. esculentum*, Dunal *Sol.* 208, t. 3, and in *DC. l. c.* 355. *S. heteracanthum*, Dunal; Nees l. c. 51; Dunal l. c. 365. *S. melanocarpum*, sativum, pressum and Cumingii, Dunal l. c. 355, 360, 362 and 363. *S. torvum*, var. *inermis*, Dalz. & Gibs. *Bomb. Fl.* 175. *S. ferox*, var. β , Kurz *For. Fl.* ii. 226, *not of Linn.*—*Rumph' Herb. Amb.* v. t. 85, and t. 86, fig. 1; *Rheede Hort. Mal.* ii. t. 37, and x. t. 74.

INDIA; generally cultivated.—DISTRIB. Cultivated in the warmer regions of the globe.

Herbaceous, 2-8 ft.; prickly, or sometimes nearly unarmed. *Leaves* 3-6 by 2-4 in.; petiole 1 in. *Peduncles* mostly extra-axillary, often paired, one bearing a perfect flower, the other a short raceme of male flowers; or the raceme may be considered sessile with the lowest flower only perfect. *Calyx-lobes* in flower $\frac{1}{2}$ - $\frac{1}{3}$ in., elliptic or oblong-linear. *Corolla* 1-1 $\frac{1}{4}$ in. diam., shortly lobed, hairy on the plaits without. *Style* stellately pubescent, or glabrous. *Berry* 1-9 in., very variable in cultivation; calyx-lobes enlarged, usually much shorter than the fruit, often prickly.—Not known wild in India, according to Dalzell and Kurz l. c.; A. DC. says it is a native of Asia, not America, and Sendtner l. c. fixes its origin in Arabia; all this appears uncertain. As an escape from cultivation it becomes often intensely prickly, and the peduncle carries 1-5 fruits.—The egg-plant, or Brinjal.

22. **S. coagulans**, *Forsk. Fl. Æg.-Arab.* 47; leaves ovate sinuate or lobed stellately woolly beneath prickly, cymes lateral few-fl., calyx-lobes triangular, flowers blue, berry globose glabrous yellow exceeding the prickly calyx-lobes. *Delile Fl. Æg.* t. 23, fig. 1; *Dunal in DC. Prodr.* xiii. pt. i. 369; *Boiss. Fl. Orient.* iv. 286. *S. sanctum*, *Linn. Sp. Pl.* 269.

W. INDIA; Punjab and Scinde, *Jacquemont*, *Aitchison*, &c.—DISTRIB. S.W. Asia, Arabia, Egypt.

Very near *S. Melongena*, more rigid and tomentose. *Peduncles* paired, one bearing a single perfect flower, the other a raceme of males. *Calyx-tube* campanulate, often in flower-time strongly spinous. *Corolla* as of *S. Melongena*, more woolly without, lobes rather deeper. *Berry* 1 in. diam.

23. **S. sarmentosum**, *Nees in Trans. Linn. Soc.* xvii. 58; sparsely hairy, leaves broadly elliptic subpinnatifid prickly, peduncles extra-axillary 1-2-fl., berry $\frac{1}{2}$ in. diam. globose glabrous overtopped by the enlarged ovate acuminate-caudate sepals. *Dunal in DC. Prodr.* xiii. pt. i. 357. *S. Melongena*, *Wall. Cat.* 2628, letter F only. *S. Jacquini*, *Miq. Fl. Ind. Bat.* ii. 651, excl. *syn.*, not of *Willd.*

PENANG; *Wallich*. MALACCA; *Griffith* (*Kew Distrib.* n. 5914).—DISTRIB. Java, Borneo.

Stem procumbent, somewhat zigzag, not twining; prickles long, straight. *Leaves* 4 by 2 in., obtusely lobed, young sparsely stellately pubescent beneath, mature sparsely hairy or glabrate on both surfaces; petiole $\frac{2}{3}$ in. *Sepals* in flower $\frac{1}{2}$ in., in fruit $\frac{3}{4}$ by $\frac{1}{2}$ in., erect, sparsely hairy, usually prickly. *Corolla* $\frac{3}{4}$ in. diam., stellately pubescent without. *Seeds* $\frac{1}{8}$ in. diam., flocculose-scaly.

24. **S. xanthocarpum**, *Schrad. & Wendl. Sert. Hanov.* i. 8, t. 2; leaves ovate or elliptic sinuate or subpinnatifid glabrescent very prickly, cymes lateral few-fl., corolla blue, berry $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. globose glabrous much exceeding the calyx-lobes. *Dunal Sol.* 231, and in *DC. Prodr.* xiii. pt. i. 302; *Kurz For. Fl.* 224. *S. Jacquini*, *Willd. Sp. Pl.* i. 1041; *Roxb. Fl. Ind.* i. 569; *Wall. Cat.* 2612; *Dunal Sol.* 231; *Nees in Trans. Linn. Soc.* xvii. 56; *Wight Ic.* t. 1401; *Dalz. & Gibs. Bomb. Fl.* 175. *S. diffusum*, *Roxb. Hort. Beng.* 17, and *Fl. Ind.* i. 568; *Wall. Cat.* 2613. *S. virginianum*, *Jacq. Ic. Rar.* ii. 332, not of *Linn.* *S. armatum*, *Br. Prodr.* 446; *Benth. Fl. Austral.* iv. 458, with *syn.*

Throughout INDIA; from the Punjab and Assam to Ceylon and Malacca; common.—DISTRIB. S.E. Asia, Malaya, Trop. Australia and Polynesia.

A very prickly, diffuse herb, 1-4 ft. diam., bright green, mature nearly glabrous. *Leaves* 4-5 by 2-3 in.; spines $\frac{1}{2}$ in., straight; petiole 1 in. *Peduncles* short, mostly extra-axillary; flowers few, all perfect; pedicels and calyx stellately pubescent, or at length glabrous. *Calyx* in flower $\frac{1}{2}$ in.; lobes ovate-oblong, usually prickly, hardly enlarged in fruit. *Corolla* 1 in. diam., pubescent without; lobes shallow. *Berry* yellow, or whitish and green-blotted. *Seeds* $\frac{1}{12}$ in. diam., glabrous.—Has been supposed to extend to Tropical Africa (see *Schweinf. Pl. Nilot.* 25, t. 9); but in the African plant the flowers are larger, the fruit very much larger, the habit different.

25. **S. trilobatum**, *Linn.*; *Burm. Fl. Ind.* 57, t. 22; shoots stellately pubescent, leaves ovate or elliptic irregularly sinuate or lobed prickly soon glabrate, cymes lateral 2-8-fl., corolla blue, berry $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. globose much exceeding the calyx-lobes. *Roxb. Fl. Ind.* i. 571; *Wall. Cat.* 2622; *Dunal Sol.* 225, and in *DC. Prodr.* xiii. pt. i. 287; *Wight Ic.* t. 854; *Dalz. & Gibs. Bomb. Fl.* 175; *Kurz For. Fl.* 224. *S. acetosæfolium*, *Lamk. Dict.* iv. 306; *Dunal Sol.* 226. *S. canaranum*, *Miq. in Pl. Hohenack.* n. 740.

W. DECCAN PENINSULA; from the Concan, southward, &c., frequent. MALAY

PENINSULA; from Arracan to Malacca, in the tidal swamps, frequent. CEYLON; drier parts of the island.

A scandent undershrub, 6–12 ft., nearly glabrous; prickles short, stout, compressed, recurved. *Leaves* 3 by $1\frac{1}{2}$ in., irregularly obtusely sinuate or lobed, base not cordate; petiole $\frac{1}{2}$ – $1\frac{1}{3}$ in. *Peduncles* short, mostly extra-axillary; pedicels $\frac{1}{2}$ – $1\frac{1}{2}$ in., with short, strong, recurved prickles. *Calyx-lobes* $\frac{1}{5}$ in., ovate-oblong, minutely stellately pubescent or glabrate, rarely prickly, hardly enlarged in fruit. *Corolla* $1\frac{1}{4}$ in. diam., pubescent without; lobes triangular-lanceolate, as long as the tube. *Seeds* $\frac{1}{8}$ in., smooth, or very nearly so.

VAR. ? *Griffithii*; leaves $2\frac{1}{2}$ by $\frac{1}{2}$ in. linear.—Malay Peninsula, *Griffith* (Kew Distrib. n. 5915).

26. **S. gracilipes**, *Dcne. in Jacquem. Voy. Bot.* 113, t. 119; minutely stellately pubescent, stem prickly, leaves ovate or orbicular sinuate often subcordate not prickly, peduncles axillary short 1–3-fld. or pedicels subterminal 1–3 together on very short lateral spurs, berry $\frac{1}{4}$ in. diam. globose glabrous exceeding the sublinear sepals. *Dunal in DC. Prodr.* xiii. pt. i. 286; *Boiss. Fl. Orient.* iv. 286. *S. Jacquemonti*, *Dunal l. c.* 287.

WESTERN INDIA; Punjab and Scinde, *Jacquemont*, *Stocks*, *Dalzell*.—DISTRIB. Beloochistan.

An undershrub; prickles short, conical, subrecurved. *Leaves* $1\frac{1}{2}$ in. diam., obtuse, rarely lobed, usually shallowly cordate; petiole $\frac{3}{4}$ in. *Peduncles* very short or 0; pedicels $\frac{1}{2}$ – $1\frac{1}{2}$ in., slender. *Calyx-lobes* $\frac{1}{2}$ in., linear, in fruit $\frac{1}{2}$ in. *Corolla* $\frac{2}{3}$ in. diam., deeply lobed. *Seeds* $\frac{1}{8}$ in. diam., smooth.—This is believed to be *S. cordatum*, *Forsk. Fl. Æg.-Arab.* 47 (*Dunal Sol.* 239, and in *DC. Prodr.* xiii. 373), an Arabian species of which no authentic example can be seen.

27. **S. aculeatissimum**, *Jacq. Coll.* i. 100, and *Ic. Rar.* i. t. 41; prickles very many long straight slender, leaves ovate lobed sparsely hairy, peduncles 1–7-fld. mostly 1-fruited, berry $1\frac{1}{4}$ in. diam. globose smooth, fruiting-calyx small prickly. *Dunal in DC. Prodr.* xiii. pt. i. 244.

SINGAPORE; *G. Thomson*.—DISTRIB. Malaya, Tropical America?

The example of *G. Thomson* (in fruit) is identical with *Zollinger*, n. 529, which is the type of *S. aculeatissimum*, var. *denudatum*. *Dunal l. c.* *Stems* glabrous (in the var. *denudatum*) or minutely puberulous upwards. *Leaves* 3–5 in. *Peduncles* in fruit $\frac{3}{4}$ in. *Calyx* in fruit scarcely $\frac{1}{4}$ in., but very prickly. *Seeds* $\frac{1}{8}$ in. diam., extremely compressed, almost winged.

1*. LYCOPERSICUM, *Miller*.

Tall, pubescent herbs. *Leaves* pinnate; pinnæ toothed or lyrate. *Cymes* peduncled, few-fld. *Sepals* 5–6, narrow, unaltered in fruit. *Corolla* rotate, tube very short; limb 5–6-fld, plaited in bud. *Stamens* 5–6, on the corolla-tube; anthers connivent in an elongate cone, dehiscing by slits. *Ovary* 2–3-celled; style cylindric, stigma small capitate. *Seeds* many, compressed, papillose; embryo peripheric.—Species 3–4, American.

L. esculentum, *Miller*; *Dunal Sol.* 113, t. 3, fig. C., and in *DC. Prodr.* xiii. 26; *Nees in Trans. Linn. Soc.* xvii. 61. *L. cerasiforme*, *Dunal Sol.* 113, t. 3, fig. B., and in *DC. Prodr.* xiii. 26; *Nees l. c.* 62, with several other species of *Dunal*. *Solanum Lycopersicum*, *Linn.*; *Roxb. Fl. Ind.* i. 565; *Wall. Cat.* 2611. *S. Humboldtii*, *Willd. Hort. Berol.* i. 27, t. 27. *S. pseudolycopersicum*, *Jacq. Hort. Vind.* i. t. 11.

Cultivated, and as an escape, in INDIA.—DISTRIB. Native of Tropical America.

Flowers $\frac{2}{3}$ in. diam., yellow; in cultivation 2–6-merous, or “double.” *Berry* $\frac{1}{2}$ in. diam., globose red; or, in cultivation, enlarged, pyriform or depressed globose, very variable.—The Tomato.

2. **PHYSALIS**, *Linn.*

Annual or perennial herbs. *Leaves* alternate, entire sinuate or shortly lobed. *Pedicels* axillary, solitary. *Calyx* campanulate, 5-fid half-way down; in fruit greatly enlarged, loosely enclosing the fruit; teeth small, connivent. *Corolla* campanulate, lurid-yellow, sometimes with purple spots below. *Stamens* 5, attached near the base of the corolla; anthers oblong, shorter than the filaments, dehiscing longitudinally. *Ovary* 2-celled; style linear, stigma obscurely 2-lobed. *Berry* globose. *Seeds* many or few, smooth or tuberculate-rugose, compressed; embryo peripheric.—Species 30, mostly of Tropical America, several introduced in the Old World.

1. ***P. minima***, *Linn.*; *Nees in Trans. Linn. Soc.* xvii. 69; leaves ovate sinuate angular or scarcely lobed, corolla $\frac{1}{4}$ in., fruit-calyx $\frac{1}{2}$ –1 in. ovoid or subglobose. *Roxb. Fl. Ind.* i. 563; *Wall. Cat.* 2633; *Dunal in DC. Prodr.* xiii. pt. i. 445. *P. parviflora*, *Br. Prodr.* 447; *Dunal l. c.* 444. *P. divaricata*, *Don Prodr.* 97; *Dunal l. c.* 444. *P. villosa*, *Roth Nov. Sp.* 122. *P. Rothiana*, *Roem. & Sch. Syst.* iv. 677. *P. Hermannii*, *Dunal. l. c.* 444. *P. pubescens*, *Wight Ill.* t. 166 b. fig. 6, not of *Linn.*—*Rheede Hort. Mal.* x. t. 71.

Throughout INDIA, in the tropical region; common.—DISTRIB. Tropical Asia, Africa and Australia.

An herbaceous, pubescent annual. *Leaves* 2 in.; petiole 1 in. *Pedicels* $\frac{1}{4}$ – $\frac{1}{2}$ in. *Calyx* at flower-time $\frac{1}{4}$ – $\frac{1}{2}$ in.; lobes lanceolate, half the length of the calyx, often hirsute, sometimes glabrescent. *Corolla* clear yellow; or, in the less common form (*P. Hermannii*), spotted within at the base. *Berry* $\frac{1}{2}$ in. diam.; fruit-calyx globose, 5- or 10-ribbed. *Seeds* very many, $\frac{1}{12}$ in. diam., discoid, reticulated, scarcely scabrous.—Roxburgh says that his *S. pubescens* was the same as *P. peruviana*. The sheet of Rottler's marked *S. pubescens* by Heyne is *P. minima* with one piece of *S. peruviana* mixed.

VAR. *indica*; glabrescent, fruiting calyx 5-angular. *Lamk. Dict.* ii. 102; *Nees in Trans. Linn. Soc.* xvii. 70; *Dunal in DC. Prodr.* xiii. pt. i. 443. *P. pseudo-angulata*, *Blume Bijl.* 706; *Dunal l. c.* 444. *P. angulata*, *Wall. mss.*; *Griff. Notul.* iv. 96. *Nicandra indica*, *Roem. & Sch.* iv. 682.—*Rheede Hort. Mal.* x. t. 70.—Throughout INDIA. The true *P. angulata*, *Linn.*, occurs only cultivated in India.

2. ***P. peruviana***, *Linn.*; *Nees in Trans. Linn. Soc.* xvii. 67; leaves ovate sinuate angular or scarcely lobed, corolla $\frac{1}{2}$ in., fruit-calyx 1–1 $\frac{1}{2}$ in. ovoid conic. *Roxb. Fl. Ind.* i. 562; *Wall. Cat.* 2634; *Dunal in DC. Prodr.* xiii. pt. i. 440; *Dalz. & Gibs. Bomb. Fl. Append.* 61. *P. edulis*, *Sims Bot. Mag.* t. 1068. *P. pubescens*, *Don Prodr.* 97.

Throughout INDIA, cultivated.—DISTRIB. Indigenous in Tropical America; extensively cultivated in the Old World.

Resembling *P. minima*, but stouter, flowers and fruit-calyx larger, usually villous or pubescent. *Corolla* with 5 large purple spots near the base within.—Cape Gooseberry of the English denizens.

2*. **CAPSICUM**, *Linn.*

Annual or perennial herbs, glabrous or nearly so. *Leaves* entire or repand. *Pedicels* axillary or 2–3 together. *Calyx* campanulate, subentire or minutely 5-toothed, much shorter than the fruit. *Corolla* rotate; lobes 5, valvate in bud. *Stamens* 5, attached near the base of the corolla; anthers not longer than the filaments, dehiscing longitudinally. *Ovary* 2- rarely 3-celled; style linear, stigma subcapitate. *Berry* very variable in form and size, many-

seeded. *Seeds* discoid, smooth or subscabrous; embryo peripheric.—**DISTRIB.** Species 20, native in America, some cultivated in all warm countries.

1. **C. frutescens**, *Linn.*; *Nees in Trans. Linn. Soc.* xvii. 63; pedicels solitary, berry pendent elongate-oblong often curved red orange or yellow. *Lamk. Ill.* t. 116, fig. 1; *Roxb. Fl. Ind.* i. 574; *Blume Bijl.* 704; *Wall. Cat.* 2642; *Fingerh. Caps.* 17, t. 4, fig. e; *Dunal in DC. Prodr.* xiii. pt. i. 413.—*Rheede Hort. Mal.* ii. t. 56.

Throughout INDIA, universally cultivated.—**DISTRIB.** Cultivated in all the warmer parts of the globe; native place uncertain.—Chilliee of the English denizens.

Fruit often 3 by 1 in., tapering at the end.

2. **C. minimum**, *Roxb. Hort. Beng.* 17, and *Fl. Ind.* i. 574, and *ed. Carey & Wall.* ii. 261; pedicels mostly 2-3 together, berry small suberect elongate oblong. *Wall. Cat.* 2641. *C. fastigiatum*, *Blume Bijl.* 705; *Nees in Trans. Linn. Soc.* xvii. 64; *Dunal in DC. Prodr.* xiii. pt. i. 416; *Wight. Ic.* t. 1617; *Bentl. & Trim. Med. Pl.* t. 188. *C. baccatum*, *Wall. Cat.* 2644.

Throughout INDIA, extensively cultivated.—**DISTRIB.** Malaya cultivated; native place uncertain.

Berries often $1\frac{1}{2}$ by $\frac{1}{2}$ in., red.—Bird's-eye Chilliee of the English denizen.

3. **C. grossum**, *Willd. Sp. Pl.* i. 1051; pedicels solitary nodding in fruit, berry ovoid. *Roxb. Fl. Ind.* i. 574; *Wall. Cat.* 2643; *Fingerh. Caps.* 21, t. 5, fig. c, d, and t. 6, fig. a; *Nees in Trans. Linn. Soc.* xvii. 62; *Dunal in DC. Prodr.* xiii. pt. i. 422.

In INDIA cultivated.—**DISTRIB.** Native place uncertain.

Berry often 3 by 2 in., red.

VAR. *cerasiformis*; berry $\frac{3}{4}$ in. diam., globose. *C. cerasiformis*, *Lumk. Dict.* v. 325; *Roxb. Fl. Ind.* i. 575. *C. chamæcerasus*, *Nees in Trans. Linn. Soc.* xvii. 65; *Dunal in DC. Prodr.* xiii. pt. i. 429.—In India, rarely cultivated.

3. WITHANIA, Pauq.

Unarmed shrubs. *Leaves* entire. *Flowers* axillary, sessile or shortly pedicelled, fascicled or solitary, sometimes diœcious. *Calyx* campanulate, 5-6-toothed, enlarged in fruit, subglobose. *Corolla* campanulate; lobes 3-6, short, valvate in bud. *Stamens* attached near the base of the corolla; anthers oblong, dehiscing longitudinally. *Ovary* 2-celled; style linear, stigma shortly 2-fid. *Berry* globose. *Seeds* very many, discoid; embryo peripheric.—Species 4; the Mediterranean region to the Cape of Good Hope and Bengal.

1. **W. somnifera**, *Dunal in DC. Prodr.* xiii. pt. i. 453; thinly woolly, leaves ovate, calyx-teeth short very acute, flowers hermaphrodite, fruit-calyx inflated papery larger than the berry. *Boiss. Fl. Orient.* iv. 287. *Physalis somnifera*, *Link & Gaertn. Fruct.* ii. 239, t. 131; *Jacq. Ecl.* t. 22; *Sibth. Fl. Græc.* t. 233; *Cav. Ic.* t. 103; *Nees in Trans. Linn. Soc.* xiii. 66; *Wight Ic.* t. 853; *Dalz. & Gibs. Bomb. Fl.* 175. *P. flexuosa*, *Linn.*; *Jacq. Ecl.* t. 23; *Roxb. Fl. Ind.* i. 561; *Wall. Cat.* 2635. *P. arborescens* and *tomentosa*, *Thunb. Fl. Cap.* (ed. *Schultes*) 190, 191.—*Rheede Hort. Mal.* iv. t. 55.

Throughout drier, subtropical INDIA; frequent in the west and Hindostan. rare in Lower Bengal.—**DISTRIB.** Mediterranean region, with the Canaries; Cape of Good Hope.

Erect, 1-5 ft.; branches round. *Leaves* 2-4 in., subacute; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Pedicels* $C-\frac{1}{2}$ in. *Calyx* in flower $\frac{1}{2}$ in., in fruit $\frac{3}{4}$ in. *Corolla* $\frac{1}{4}$ - $\frac{1}{2}$ in., greenish or

lurid yellow. *Filaments* linear; anthers level with the stigma. *Berry* $\frac{1}{4}$ – $\frac{1}{3}$ in. diam. *Seeds* $\frac{1}{12}$ in. diam., smooth.

2. **W. coagulans**, *Dunal in DC. Prodr.* xiii. pt. i. 685; stellately puberulous, leaves oblong obtuse, calyx-teeth triangular, flowers polygamodioecious, fruit-calyx leathery closely surrounding the berry. *Boiss. Fl. Orient.* iv. 288. *Puneeria coagulans*, *Stocks in Hook. Ic. t.* 801; *Wight Ic. t.* 1616.

PUNJAB and SCINDE; frequent. SUTLEDGE VALLEY; alt. 3300 ft., *Thomson*.—DISTRIB. Cabul and Beloochistan.

A somewhat rigid, grey undershrub. *Leaves* 1–2 in., attenuate at the base; petiole indistinct or $\frac{1}{4}$ in. *Pedicels* 0– $\frac{1}{4}$ in. *Calyx* in flower $\frac{1}{2}$ in.; in fruit $\frac{3}{4}$ in., stellately mealy. *Corolla* $\frac{1}{2}$ in., lurid yellow, stellately mealy without. *Male fl.* filaments linear; anthers subexsert; ovary ellipsoid; style 0. *Hermaphrodite fl.*; anthers subsessile, perfect, near the base of the corolla-tube; ovary globose; style linear, stigma level with the mouth of the tube. *Berry* and *seeds* nearly as in *W. somnifera*.—This plant has been found in the act of passing from dimorphism to diceism.—“The Cheesemaker.”

3*. **NICANDRA**, *Adans.*

An annual, glabrous herb. *Leaves* petioled, ovate-lanceolate, toothed or lobed. *Pedicels* axillary, solitary. *Calyx* sub-5-partite; sepals in fruit much enlarged, cordate-ovate, acute, reticulate. *Corolla* campanulate, blue; limb 5-plaited. *Stamens* attached near the base of the corolla, filaments linear; anthers oblong, dehiscing longitudinally. *Ovary* 3–5-celled; style linear, stigma obscurely 3–5-lobed; ovules very many. *Berry* globose, 3–5-celled. *Seeds* very many, compressed, subdiscoid; embryo peripheric.

N. physaloides, *Gaertn. Fruct.* ii. 237, t. 141; *Bot. Mag.* t. 2458; *Dunal in DC. Prodr.* xiii. pt. i. 434. *Atropa physaloides*, *Lin.*; *Jacq. Obs.* iv. t. 98. *Physalis daturæfolia*, *Lamk. Dict.* ii. 102.

SUBTEMPERATE HIMALAYA; alt. 3–6000 ft., from Kashmir to Sikkim, introduced. Mts. of W. DECCAN PENINSULA, introduced.—DISTRIB. Native of Peru; widely cultivated.

Leaves 4–7 in. *Pedicels* 1 in. *Corolla* 1 in. diam. *Sepals* in fruit 1 by $\frac{2}{3}$ in., deeply cordate at the base, overlapping so as to simulate a 5-angular calyx.

4. **LYCIUM**, *Linn.*

Spinous shrubs, glabrous or puberulous. *Leaves* small, alternate or often fascicled at the nodes, entire, linear or oblong. *Pedicels* solitary or fascicled at the nodes; flowers small. *Calyx* campanulate, at first 5-merous, then irregularly 3–5-lobed or 2-lipped; in fruit not enlarged. *Corolla* funnel-shaped; lobes 5–4, imbricate in bud. *Stamens* 5–4, on the corolla-tube; anthers oblong, exsert or included, dehiscing longitudinally. *Ovary* 2-celled; style filiform, stigma subcapitate; ovules few or many. *Berry* small, globose or oblong. *Seeds* several, few or 1, compressed; embryo peripheric.—Species 40; all temperate and subtropical regions, especially S. Africa and S. America.

1. **L. europæum**, *Linn.*; *Sibth. Fl. Græc.* t. 236; leaves linear-oblong, pedicels short, calyx 5-lobed irregularly, corolla-lobes not half so long as the tube, filaments glabrous at their base. *Miers Ill. S. Amer. Pl.* ii. 95, t. 64, fig. B; *Brand. For. Fl.* 345; *Boiss. Fl. Orient.* iv. 288. *L. indicum*, *Wight Ic.* t. 1403; *Miers l. c.* 97, t. 64, fig. E, not of *Retz.* *L. mediterraneum*, *Dunal in DC. Prodr.* xiii. pt. i. 523. *L. sævum*, orientale, and persicum, *Miers l. c.* 95.

99, 100, t. 64, fig. A, B. *L. intricatum*, Boiss.; Dunal in DC. Prodr. xiii. pt. i. 525; Miers l. c. 98, t. 64, fig. E. *L. arabicum*, Schweinf.; Boiss. Fl. Orient. iv. 289.

W. INDIA; alt. 0–5000 ft., frequent.—DISTRIB. Mediterranean region, W. Asia.

A spinous, nearly glabrous shrub. Leaves $\frac{1}{2}$ –1 in. Pedicels shorter or equalling the calyx, rarely longer. Calyx $\frac{1}{2}$ in., often sub-bilabiate; teeth rarely less than 5. Corolla $\frac{1}{2}$ in., from purple to nearly white. Stamens exsert or subincluded. Berry $\frac{1}{2}$ in. diam., subglobose, many-seeded.

2. *L. barbarum*, Linn.; Boiss. Fl. Orient. iv. 289; leaves linear-oblong, pedicels short, calyx 5-lobed irregularly, corolla-lobes more than half as long as the tube, filaments glabrous at their base. Brand. For. Fl. 345; Miers Ill. S. Amer. Pl. ii. 117, t. 69, fig. D. *L. Edgeworthii*, Dunal in DC. Prodr. xiii. pt. i. 525; Miers l. c. 118, t. 69, fig. F. *L. depressum and foliosum*, Stocks in Hook. Kew. Journ. iv. 179.

PUNJAB and SCINDE; alt. 0–3000 ft., Edgeworth, Stocks.—DISTRIB. W. Asia.

This is not *L. barbarum*, Linn., as understood by Dunal (in DC. Prodr. xiii. pt. i. 511); but it is doubtful whether either of these two ought to be separated specifically from *L. europæum*.

3. *L. ruthenicum*, Murray; Dunal in DC. Prodr. xiii. pt. i. 514; leaves linear, calyx lobed irregularly often 3–4-toothed, filaments hairy at their base. Brand. For. Fl. 346; Miers Ill. S. Amer. Pl. ii. 119, t. 70, fig. A; Boiss. Fl. Orient. iv. 290. *L. tataricum*, Pall. Fl. Ross. i. 78, t. 49; Miers l. c. 122, t. 70, fig. A. *L. armatum*, Griff. Ic. Pl. Asiat. t. 415. *L. glaucum*, Miers l. c. 104, t. 66, fig. D.

N. KASHMIR and BALTISTHAN; alt. 6–9000 ft., frequent, Thomson, &c.—DISTRIB. Cabul, Persia, Central Asia.

Thomson regarded this as a var. of *L. europæum*.—*L. turcomanicum*, Turcz. (Boissier Fl. Orient. iv. 290) is said to differ by having a red (not black) berry.

5. *ATROPA*, Linn.

A coarse, lurid, glabrous herb. Leaves entire, elliptic-lanceolate. Pedicels axillary, solitary, nodding. Flowers somewhat large, dirty-purple or lurid yellow. Calyx large, deeply 5-lobed, scarcely larger in fruit. Corolla widely tubular-campanulate; lobes 5, triangular, imbricate in bud. Stamens attached near the base of the corolla, filaments linear; anthers oblong, dehiscing longitudinally. Ovary 2-celled; style linear, stigma obscurely 2-lobed. Berry globose. Seeds many, compressed; embryo peripheric.

A. Belladonna, Linn.; Dunal in DC. Prodr. xiii. pt. i. 464, 690; Syme Eng. Bot. t. 934; Boiss. Fl. Orient. iv. 291; Benth. & Trim. Med. Pl. t. 193. *A. acuminata*, Royle Ill. 279; Miers Ill. S. Amer. Pl. ii. Append. 5, t. 76. *A. lutescens*, Jacquem. ms.

WESTERN HIMALAYA, alt. 6–11,000 ft.; from Kashmir to Simla, Royle, Gen. Munro, &c.—DISTRIB. Europe to the Caucasus and N. Persia.

Leaves 6 in.; petiole $\frac{1}{2}$ in. Pedicels $\frac{1}{2}$ –1 $\frac{1}{2}$ in. Calyx in flower $\frac{1}{2}$ – $\frac{2}{3}$ in. Corolla 1 in.—Leaves are little more acuminate in the Himalayan than in the European plant.

6. *MANDRAGORA*, Juss.

Perennial herbs, stemless except the Himalayan species. Leaves large, petioled, toothed or subentire. Pedicels fascicled, subradical. Flowers large, pale purple, reticulate. Calyx 5-fid half-way down. Corolla campanulate;

lobes broad, imbricate in bud, sinuses induplicate-valvate. *Stamens* 5, filaments linear; anthers oblong, dehiscent longitudinally. *Ovary* 2-celled; style elongate, stigma much dilated. *Berry* globose, juicy. *Seeds* very many, compressed; embryo peripheric.—Species 3 or 4 of the Mediterranean region, and the following.

M. caulescens, *Clarke*; branches 4-8 in., leaves narrowly obovate-oblong sinuate, calyx-lobes triangular ovate. *Anisodus humilis*, *Hook. f. ms.*

ALPINE SIKKIM, alt. 12-13,000 ft.; Lachen and Tangu, *J. D. H.*

Pubescent or nearly glabrous. *Leaves* 11 by 2 in., obtuse, base much tapering. *Pedicels* 1-3 in.; many-fasciated at the apex of the caudex. *Calyx-lobes* in fruit $\frac{2}{3}$ in., subobtus. *Berry* $\frac{2}{3}$ in. diam. *Seeds* $\frac{1}{2}$ in. diam.—The examples are in fruit; and appear closely allied to *M. officinarum*, *Linn.*

7. **DATURA**, *Linn.*

Coarse, rank-scented herbs (the Indian species), glabrous or minutely pubescent. *Leaves* large, entire sinuate or deeply toothed. *Pedicels* solitary; flowers very large, purple or white. *Calyx* long-tubular, herbaceous, 5-toothed at the apex; in fruit circumsciss above the base. *Corolla* long tubular-funnel-shaped, mouth wide; limb plaited, entire or shortly lobed. *Stamens* attached near the base of the tube, filaments filiform; anthers included, linear, longitudinally dehiscent. *Ovary* 2- or spuriously 4-celled; style filiform, stigma 2-lobed. *Capsule* ellipsoid, 4-celled, spinous (in the Indian species, except in *D. fastuosa*, var. *dubia*), 4-valved or irregularly breaking up near the apex. *Seeds* very many, compressed, rugose; embryo peripheric.—Species 10; temperate and tropical regions.

SECT. I. **Stramonium**. *Capsule* deeply 4-valved, often nearly to the base.

1. **D. Stramonium**, *Linn.*; *Bernh. in Linnæa*, 1833, *Litt.* 139; glabrous or farinose puberulous, leaves ovate toothed or sinuate, corolla white teeth 5 linear, capsule equally spinous on all sides. *Wall. Cat.* 2637, and in *Rorb. Fl. Ind. ed. Carey & Wall.* ii. 239; *Dunal in DC. Prodr.* xiii. pt. i. 540; *Syme Eng. Bot.* t. 935; *Boiss. Fl. Orient.* iv. 292; *Bentl. & Trim. Med. Pl.* t. 192. *D. ferox*, *Nees in Trans. Linn. Soc.* xvii. 75, not of *Linn.* *D. Wallichii*, *Dunal l. c.* 539. *Stramonium vulgatum*, *Gaertn. Fruct.* ii. 243, t. 132, fig. 4.

TEMPERATE HIMALAYA; from Kashmir, *Thomson*, to Sikkim, *J. D. H.*—DISTRIB. Nearly throughout the globe, in temperate and warm climates.

A coarse annual, 2-6 ft. *Leaves* 7 by 4 in.; petiole 1 in. *Pedicels* 0- $\frac{1}{4}$ in. *Calyx* 1-1 $\frac{3}{4}$ by $\frac{1}{4}$ - $\frac{1}{2}$ in.; lobes $\frac{1}{4}$ in., ovate-lanceolate. *Corolla* 3-6 in., mouth 1-3 in. diam.; lobes $\frac{1}{4}$ in. *Capsule* 1 $\frac{1}{2}$ by 1 in.; spines $\frac{1}{5}$ in., subulate; calyx-base $\frac{1}{2}$ in., persistent.

VAR. *Tatula*; flowers purple without and within. *D. Tatula*, *Willd. Sp. Pl.* i. 1008; *Sweet Brit. Fl. Gard.* t. 83; *Wall. Cat.* 2640; *Bernh. in Linnæa*, 1833, *Litt.* 140.—Throughout India.—DISTRIB. Nearly as of *D. Stramonium*, from which it is not easily separable.

SECT. II. **Dutra**. *Capsule* subindehiscent, or irregularly dehiscent near the apex.

2. **D. fastuosa**, *Linn.*; *Wight Ic.* t. 1396; leaves ovate entire or deeply toothed glabrous, corolla purple limb shortly 5-6-toothed. capsule nodding or suberect. *Rorb. Fl. Ind.* i. 561; *Wall. Cat.* 2639; *Nees in Trans. Linn. Soc.* xvii. 74; *Dunal in DC. Prodr.* xiii. pt. i. 542. *D. Hummatu*, *Bernh. in*

Linnæa, 1833, *Litt.* 141; *Dalz. & Gibs. Bomb. Fl.* 174.—*Rheede Hort. Mal.* 2, t. 28; *Rumph. Herb. Amb.* v. t. 87, fig. 2.

Throughout INDIA; in waste places, a weed.—DISTRIB. Malaya, Tropical Africa. In America said to be not a native.

Generally resembling *D. Stramonium*; but the flowers are usually larger. *Calyx* attaining 3 in. *Corolla* 7 in. and 5 in. diam. across the mouth. *Capsule* $1\frac{1}{4}$ in. diam., subglobose, equally spinous on all sides.

VAR. *alba*; flowers white or nearly so. *D. alba*, *Nees in Trans. Linn. Soc.* xvii. 73; *Wight Ic.* t. 852; *Dunal in DC. Prodr.* xiii. pt. i. 542; *Dalz. & Gibs. Bomb. Fl.* 174. *D. Metel*, *Roxb. Fl. Ind.* i. 561; *Wall. Cat.* 2639, not of *Linn.*—*Rumph. Herb. Amb.* v. t. 87, fig. 1.—Throughout India.—Distrib. of *D. fastuosa*.

VAR. ? *dubia*; fruit without spines. *D. dubia*, *G. Don Gen. Syst.* iv. 474. *D. Hummatu*, var. *a dubia*, *Bernh. in Linnæa*, 1833, *Litt.* 141. *D. Nilhummatu*, *Dunal in DC. Prodr.* xiii. pt. i. 542.—*Rheede Hort. Mal.* ii. tt. 29, 33.—W. Deccan Peninsula?—This species is founded on the figures of *Rheede*, which represent possibly one of the foreign smooth-fruited species, none of which are wild in India; hence *Bernhard* appended *Rheede's* plant as a var. of a species which is always spinous so far as known.

3. **D. Metel**, *Linn.*; *Bernh. in Linn.* 1833, *Litt.* 143; leaves ovate entire or deeply toothed pubescent, corolla whitish purple downwards limb 10-toothed, capsule nodding. *Bot. Mag.* t. 1440; *Dunal in DC. Prodr.* xiii. pt. i. 543.—*Rumph. Herb. Amb.* v. t. 243.

W. HIMALAYA and Mts. of W. DECCAN PENINSULA; introduced?—DISTRIB. Tropical America; widely naturalised in the Old World.

8. SCOPOLIA, Jacq.

Erect, glabrescent herbs. *Leaves* entire. *Pedicels* axillary, solitary. *Flowers* lurid, nodding. *Calyx* large, campanulate, subtruncate or shortly lobed; in fruit enlarged, overtopping the capsule. *Corolla* widely campanulate, plaited; lobes short, scarcely imbricate. *Stamens* 5, attached near the base of the corolla; filaments filiform, somewhat dilated near the base; anthers ovate, dehiscing longitudinally. *Ovary* sub-2-celled; style linear, stigma thick dilated. *Capsule* globose, circumsciss above the middle. *Seeds* many, reniform, granulate; embryo peripheric.—Species 3; 1 European, 1 Japanese, 1 Himalayan.

S. lurida, *Dunal in DC. Prodr.* xiii. pt. i. 555; leaves large petioled ovate-lanceolate, corolla wide distinctly lobed, fruit-calyx large reticulated limb very shortly lobed. *Physalis stramonifolia*, *Wall. Cat.* 2632, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 242. *Nicandra anomala*, *Link. & Otto Ic. Sel.* 77, t. 35. *Anisodus luridans*, *Link & Otto in note, l. c.*; *Nees in Trans. Linn. Soc.* xvii. 72; *Miers Ill. S. Amer. Pl.* ii., *App.* 18, t. 78. *A. stramonifolius*, *G. Don in Loud. Hort. Brit.* 61. *Whitleya stramonifolia*, *Sweet Brit. Fl. Gard.* t. 125.

CENTRAL HIMALAYA; Nepal, *Wallich*; Sikkim, near Ging, alt. 5000 ft., *Dr. Treutler*.

Branches 3-6 ft., sparingly divided; rusty-tomentose when young, later puberulous or glabrate. *Leaves* 8 by 3 in., acute at both ends, ultimately glabrate; petiole $\frac{1}{2}$ in. *Peduncles* 1 in. *Calyx* in flower $\frac{3}{4}$ in., in fruit attaining 2 by $1\frac{1}{4}$ in.; lobes short, irregular. *Corolla* $1\frac{1}{4}$ by $\frac{3}{4}$ in., lurid yellow or greenish purple. *Ovary* 2-celled, near the top 1-celled. *Capsule* $\frac{3}{4}$ in., lid 1-celled, remainder 2-celled. *Seeds* $\frac{1}{12}$ in.

9. **PHYSOCHLAINA**, *G. Don.*

Erect, nearly glabrous herbs. *Leaves* petioled, subentire. *Corymb* terminal. *Calyx* campanulate, lobes 5 short; in fruit elongated, overtopping the capsule. *Corolla* elongate; lobes 5, short, imbricate in bud. *Stamens* attached at the middle of the tube, filaments filiform; anthers ovate, longitudinally dehiscent. *Ovary* 2-celled; style linear, stigma obscurely 2-lobed. *Capsule* 2-celled; circumsciss above the middle. *Seeds* very many, compressed; embryo peripheric.—Species 4; Central Asiatic.

P. præalta, *Hook. f. Bot. Mag. t. 4600, in note*; leaves ovate-oblong sinuate, corymb compound lax viscid-pubescent, corolla $\frac{3}{4}$ – $1\frac{1}{4}$ in., stamens and style equalling the corolla or $\frac{1}{3}$ in. longer. *Miers Ill. S. Amer. Pl. ii. App. 15.* *P. grandiflora*, *Hook. f. Bot. Mag. t. 4600.* *Belenia præalta*, *Dene. in Jacquem. Voy. Bot. 144, t. 120.* *Hyoscyamus præaltus*, *Walp. Rep. iii. 21.* *Scopolia præalta*, *Dunal in DC. Prodr. xiii. pt. i. 554.*

N. KASHMIR and WESTERN TIBET, alt. 12–15,500 ft., *Munro, Thomson, Strachey & Winterbottom, &c.*—DISTRIB. Kashgar and Yarkand.

Stems 2–4 ft., corymbose upwards. *Leaves* 4–6 by 3 in., irregular, base cuneate or cordate on the same branch; petiole 1–4 in. *Corymb* 2–8 in. diam.; flowers all pedicelled; pedicels $\frac{1}{4}$ – $1\frac{1}{2}$ in. *Calyx* in flower $\frac{1}{3}$ in.; lobes $\frac{1}{8}$ in., lanceolate; in fruit $1\frac{1}{2}$ by $\frac{1}{2}$ in., striate. *Corolla* $1\frac{1}{4}$ by $\frac{1}{2}$ in., tubular-funnel-shaped, in the majority of the wild examples, sometimes shorter, funnel-shaped; in some cultivated examples wider, subcampanulate. *Stamens* and *style* distinctly exserted in nearly all the wild examples. *Capsule* $\frac{1}{2}$ in. diam. *Seeds* $\frac{1}{12}$ in. diam., scrobiculate-reticulate.

10. **HYOSCYAMUS**, *Linn.*

Erect, coarse herbs. *Leaves* sinuate, toothed, or subpinnatifid. *Flowers* unilateral, sessile or pedicelled, lower axillary solitary, upper forming a dense racemose or subscorpioid cyme, upper leaves bract-like. *Corolla* lurid, yellow or greenish purple. *Calyx* urn-shaped, shortly 5-lobed; in fruit enlarged, overtopping the capsule. *Corolla* funnel-shaped; limb oblique, 5-fid, lobes more or less unequal, imbricate in bud. *Stamens* attached about the middle of the corolla-tube, filaments filiform; anthers exserted or subincluded, oblong, dehiscing longitudinally. *Ovary* 2-celled; style filiform, stigma subcapitate. *Capsule* completely 2-celled, or nearly so, circumsciss near the apex. *Seeds* very many, compressed, scrobiculate; embryo peripheric.—Species 9; European, and extending to Central Asia.

1. **H. niger**, *Linn.; Boiss. Fl. Orient. iv. 295*; cauline leaves sessile ovate or oblong sinuate or lobed, flowers subsessile, calyx softly hairy teeth mucronate, corolla 1 in. lurid reticulate-nerved. *Wall. Cat. 2636*, and in *Roxb. Fl. Ind. ed. Carey & Wall. ii. 237*; *Nees in Trans. Linn. Soc. xvii. 77*; *Bot. Mag. t. 2394*; *Dunal in DC. Prodr. xiii. pt. i. 546*; *Bentl. & Trimen Med. Pl. t. 196.* *H. agrestis*, *Kitaibel*; *Sweet Fl. Gard. t. 27.* *H. persicus*, *Buhse Reise Transkauk. 158.*

TEMPERATE WESTERN HIMALAYA, alt. 8–11,000 ft., from Kashmir to Gurwhal; frequent.—DISTRIB. Europe, W. & N. Asia.

Pubescent and more or less hairy. *Leaves* 5 by 2 in. Lower *pedicels* in fruit scarcely $\frac{1}{2}$ in. *Calyx* in flower $\frac{2}{3}$ in., teeth short, triangular; in fruit 1 by $\frac{1}{2}$ in., subcontracted in the middle, teeth somewhat rigid. *Corolla* purple in the base, limb lurid green, purple-veined. *Capsule* $\frac{1}{3}$ in. diam. *Seeds* $\frac{1}{24}$ in. diam.

2. **H. pusillus**, Linn.; Boiss. *Fl. Orient.* iv. 294; cauline leaves petioled ovate or oblong sinuate or lobed, flowers subsessile, calyx striate glabrescent teeth lanceolate mucronate, corolla $\frac{1}{2}$ – $\frac{3}{4}$ in. not reticulate. Dunal in DC. *Prodr.* xiii. pt. i. 550; Jaub. & Spach *Ill.* v. t. 414.

WESTERN TIBET; Ladak; alt. 10,000 ft., Thomson.—DISTRIB. From Egypt to Persia and the Altai.

About a foot high, pubescent, somewhat viscid. Leaves 3–5 by 1–2 in., very irregularly lobed or subentire; petiole $\frac{1}{4}$ – $1\frac{1}{2}$ in. Lower pedicels in fruit sometimes nearly $\frac{1}{4}$ in., usually very short. Calyx $\frac{1}{3}$ in.; in fruit $\frac{3}{4}$ –1 in., funnel-shaped, ribbed, somewhat reticulated, glabrous or sparsely viscid pubescent, teeth $\frac{1}{4}$ in., almost prickly, patent. Corolla yellow, purple in the base. Capsule $\frac{1}{4}$ in. Seeds even smaller than in *H. niger*.

3. **H. muticus**, Linn. *Mant.* 45; cauline leaves petioled ovate or oblong entire or toothed, lower flowers pedicelled, calyx striate pubescent teeth short triangular not acute in fruit, corolla 1– $1\frac{1}{2}$ in. lurid yellow or nearly white. Jaub. & Spach *Ill.* v. t. 415; Boiss. *Fl. Orient.* iv. 293. H. Datora, Forsk. *Fl. Æg.-Arab.* 45. H. betæfolius, Lamk. *Dict.* iii. 329. H. insanus, Stocks in Hook. *Kew Journ.* iv. 178. H. angulatus, Griff. *Ic. Pl. Asiat.* t. 412. Scopolia mutica, Datora and Bovenia, Dunal in DC. *Prodr.* xiii. pt. i. 552, 553.

WEST PUNJAB; Thomson. SCINDE; Stocks.—DISTRIB. Cabul, westwards to Egypt.

Stem 1–3 ft. Leaves 4–7 in., pubescent or somewhat woolly; petiole $\frac{1}{4}$ –3 in. Lower pedicels in fruit $\frac{1}{4}$ –1 in. Calyx $\frac{2}{3}$ in.; in fruit 1 by $\frac{1}{2}$ in., funnel-shaped, ribbed, somewhat reticulate, villous or ultimately glabrous; teeth short-triangular, not spreading. Capsule $\frac{1}{4}$ in. diam. Seeds $\frac{1}{24}$ in. diam.

10*. NICOTIANA, Linn.

Erect, viscidly-pubescent, herbs, shrubs, or trees. Leaves entire or sinuate. Panicles terminal, or racemes compound, subterminal. Calyx ovoid or tubular, 5-fid. Corolla funnel-shaped; lobes 5, induplicate in bud. Stamens attached in the lower part of the corolla-tube, filaments filiform; anthers ovate, dehiscing longitudinally. Ovary 2-celled; style filiform, stigma shortly 2-fid. Capsule 2-, rarely sub-4-, celled, 2-valved to the middle, valves often again splitting. Seeds very many, small, scarcely compressed; embryo nearly straight.—Species 35; American, Australian, and Polynesian.

1. **N. Tabacum**, Linn.; Gaertn. *Fruct.* i. 264, t. 55; leaves large oblong or elliptic base cuneate, corymb compound ultimate branches short, calyx-teeth triangular-lanceolate, corolla linear-funnel-shaped, capsule $\frac{3}{4}$ in. Lamk *Ill.* t. 113; Wall. *Cat.* 2645; Nees in *Trans. Linn. Soc.* xvii. 76; Wight *Ill.* t. 166 bis; Dunal in DC. *Prodr.* xiii. pt. i. 557; Benth. & Trimen *Med. Pl.* t. 191.

Throughout INDIA, cultivated.—DISTRIB. Native in America; cultivated in all warm countries.

Tobacco, though cultivated in nearly every village in Bengal, shows little tendency to spread as a weed. In Cochin China and the Moluccas, Louveirs and Rumphius say it has been known from a remote period.

2. **N. rustica**, Linn.; Dunal in DC. *Prodr.* xiii. pt. i. 563; leaves ovate base obtuse or cordate, panicle close, calyx-teeth triangular subobtuse, corolla cylindric campanulate, berry $\frac{1}{2}$ in. Reich *Ic. Fl. Germ.* t. 1626, fig. 1.

W. PUNJAB; cultivated, Falconer.—DISTRIB. Native of Mexico; cultivated in Europe, Asia, Africa, and America.

3. ***N. plumbaginifolia***, Viv.; *Dunal in DC. Prodr.* xiii. pt. i. 569; leaves oblong or elliptic base narrowed, corymb-branches elongated forming very lax racemes, calyx-teeth triangular-lanceolate acuminate, corolla narrow-linear, capsule $\frac{1}{4}$ in. *N. crispa*, Pers.; *Jacq. Fragm.* t. 84.

BENGAL, a common introduced weed.—DISTRIB. Native of Mexico and the W. Indies.

The only species of *Nicotiana* that has established itself in India.

ORDER CIII. **SCROPHULARINÆ.** (By J. D. Hooker.)

Herbs or shrubs, rarely trees. *Leaves*, all, or the lower only, opposite, rarely all alternate or whorled; stipules 0. *Inflorescence* centripetal or composite; flowers usually irregular. *Calyx* inferior, usually persistent, 5- rarely 4-merous. *Corolla* hypogynous, 4-5-lobed. *Stamens* usually 4, with a rudimentary 5th, rarely 2 or 5; anthers 1-2-celled, cells distinct, or more or less confluent. *Disc* annular, glandular, or cup-shaped. *Ovary* 2-celled (very rarely 1-celled) (*Lathræa*); style simple; stigma capitate, dilated, 2-lobed, or 2-lamellate; ovules many, rarely 2, in each cell, anatropous or amphitropous. *Fruit* capsular, rarely baccate; placentas on a free central axis, or remaining attached to the margins of the valves. *Seeds* small, various in form, hilum lateral or ventral, albumen fleshy (0 in *Wightia*); embryo straight or curved.—DISTRIB. Species about 2000, native of all regions.

In this Order I have departed from the "Genera Plantarum" in introducing *Lathræa* under the Tribe *Euphrasiæ*, instead of retaining it in *Orobanchæ*. This, its proper position, was pointed out by Solms Laubach, in a dissertation which was overlooked when the *Scrophularinæ* of the "Genera" were elaborated. I have also transferred *Campbellia* to *Christisonia*, which is left in *Orobanchæ* till the living plant shall be studied morphologically.

A few non-Indian garden *Scrophularinæ* are more or less frequent near stations, but none seem truly naturalised to any extent except the American *Calceolaria mexicana*, Benth., which is so about Darjeeling and in the Nilgherries.

SERIES A. *Pseudosolanæ*. *Leaves all alternate. Inflorescence simply centripetal. Corolla with the 2 upper lobes exterior in bud.*

TRIBE I. *Aptosimæ*. *Corolla-tube elongate.*

Stamens 2. Viscid herbs 1. ANTICHARIS.

TRIBE II. *Verbascæ*. *Corolla subrotate.*

Stamens 5 2. VERBASCUM.

Stamens 4 3. CELSIA.

SERIES B. *Antirrhinidæ*. *Leaves, at least the lower, usually opposite. Inflorescence centripetal or composite, partial ones centrifugal. Corolla with the 2 (free or connate) upper lobes exterior in bud. Stamens 2 or 4, very rarely 5 perfect.*

TRIBE III. *Antirrhinæ*. *Corolla tubular, tube saccate or spurred. Capsule opening by pores. Inflorescence uniform, centripetal.*

Corolla spurred. Anther-cells distinct 4. LINARIA.

Corolla small, subsaccate. Anther-cells confluent above . . . 5. SCHWEINFURTHIA.

Corolla large, saccate below. Anther-cells distinct 6. ANTIRRHINUM.

TRIBE IV. **Cheloneæ**. *Corolla* tubular, not saccate nor spurred. *Anther-cells* confluent. *Fruit* capsular or baccate. *Inflorescence* compound.

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| Herbs. Calyx deeply 5-fid. Capsule septicidal | 7. SCROPHULARIA. |
| Shrubs. Calyx 5-toothed. Anthers bearded. Capsule
loculicidal | 8. BRANDISIA. |
| A tree. Calyx 3-4-lobed. Anthers glabrous. Capsule
septicidal | 9. WIGHTIA. |

TRIBE V. **Manuleæ**. *Corolla* tubular, not saccate nor spurred. *Anther-cells* divaricate, confluent. *Fruit* capsular. *Inflorescence* centripetal, uniform. *Viscid* herb. Calyx 5-partite 10. SUTERA.

TRIBE VI. **Gratiolæ**. *Corolla-tube* not saccate nor spurred; lobes flat. *Anther-cells* distinct. *Fruit* capsular, rarely indehiscent. *Inflorescence* uniform.

SUBTRIBE I. **Mimuleæ**. *Calyx* 5-toothed or -fid. *Stamens* included; anther-cells contiguous. *Capsule* loculicidally 2-4-valved, or indehiscent.

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|---|--------------|
| Flowers axillary or the upper racemed. Capsule 2-valved . . . | 11. MIMULUS. |
| Flowers in subsecund racemes. Capsule 2-valved . . . | 12. MAZUS. |
| Flowers few, racemed. Fruit indehiscent, globose . . . | 13. LANCEA. |

SUBTRIBE II. **Stemodieæ**. *Calyx* 5-partite, except *Lindenbergia*. *Stamens* 4, included; anther-cells separate.

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|---|-------------------|
| Calyx campanulate, 5-fid. Capsule 2-valved | 14. LINDENBERGIA. |
| Calyx-segments unequal. Stamens 4, 2 or all with one im-
perfect anther-cell | 15. ADENOSMA. |
| Calyx-segments equal. Stamens all perfect. Seeds terete . . . | 16. STEMODIA. |
| Calyx-segments equal. Stamens all perfect. Seeds angled . . . | 17. LIMNOPHILA. |

SUBTRIBE III. **Herpestidæ**. *Calyx* 5-partite, imbricate. *Stamens* included; anther-cells contiguous. *Capsule* 2-4-valved.

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|---|----------------|
| Calyx-segments unequal. Stamens 4 | 18. HERPESTIS. |
| Stamens 2. Valves of capsule with inflexed margins. | |
| No radical leaves | 19. GRATIOLA. |
| Stamens 2. Valves of capsule not inflexed. Leaves radical . . . | 20. DOPATRIUM. |

SUBTRIBE IV. **Vandellieæ**. *Calyx* usually 5-toothed or -partite. *Stamens* 2 upper, usually in the tube, 2 lower in the throat of the corolla, perfect, or reduced to staminodes; anthers conniving or cohering in pairs.

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|--|-----------------|
| Calyx-segments 5, broad. Stamens 4, all perfect | 21. ARTANEMA. |
| Calyx flat, segments 4, 2 outer very large | 22. CURANGA. |
| Calyx tubular, plaited or winged, obliquely 3-5-toothed or
2-lipped | 23. TORENIA. |
| Calyx-segments 5, free or connate. Stamens 4, all perfect . . . | 24. VANDELLIA. |
| Calyx-segments 5, narrow. Stamens 2, both perfect. Cap-
sule short | 25. ILYSANTHES. |
| Calyx-segments 5, narrow. Stamens 2, both perfect. Cap-
sule long | 26. BONNAYA. |

SUBTRIBE V. **Limoselleæ**. *Calyx* 3-5-toothed or -partite. Two lower *stamens*, perfect, upper 0, or reduced to staminodes; or stamens 3-4, subequal. —Minute and minute-flowered marsh-herbs; flowers usually solitary.

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| Sepals 4, very long and slender. Anther-cells 2, parallel . . . | 27. BYTHOPHYTON. |
| Calyx tubular, 5-fid. Anther-cells confluent. Leaves op-
posite, narrow | 28. MICROCARPÆA. |

- Calyx tubular, 5-toothed. Anthers 1-celled. Leaves opposite, broad, fleshy 29. *PEPLIDIUM*.
 Calyx shortly 3-4-lobed. Anther-cells confluent at the tips. Leaves opposite, fascicled 30. *GLOSSOSTIGMA*.
 Calyx 5-toothed. Stamens 4. Anther-cells confluent. Leaves and pedicels radical 31. *LIMOSELLA*.

SERIES C. **Rhinanthideæ**. *Leaves various. Inflorescence usually centripetal or composite. Corolla-lobes variously imbricate, anterior or lateral usually the outer in bud. Stamens 2 or 4, the 5th very rarely present.*

TRIBE VII. **Digitaleæ**. *Corolla-lobes all flat, usually spreading, the lateral, or one of them, exterior in bud. Anther-cells usually confluent at the tip and spreading below, rarely wholly confluent.—Herbs. Leaves various. Inflorescence simply centripetal.*

SUBTRIBE I. **Sibthorpieæ**. *Corolla subrotate, lobes 4-5 or more. Stamens as many as the lobes, or fewer by one, equal; anthers sagittate or horseshoe-shaped.*

- Calyx 4-8-fid. Corolla 5-8-fid. Creeping herbs 32. *SIBTHORPIA*.
 Calyx 5-partite. Corolla 5-fid. Creeping herb, leaves dimorphic 33. *HEMIPHHRAGMA*.
 Calyx 4-5 partite. Corolla 4-fid. Erect herb 34. *SCOPARIA*.

SUBTRIBE II. **Eudigitaleæ**. *Corolla-tube elongate, ventricose above or below. Stamens 4, didynamous, or 2; anther-cells confluent at the tips or wholly.*

Leaves alternate, linear. Raceme terminal. Stamens 2 35. *CAMPYLANTHUS*.

SUBTRIBE III. **Veroniceæ**. *Corolla rotate or tube campanulate or cylindric, 4-5-lobed. Stamens 2 or 4, exserted (or included in *Wulfenia*), equal; anthers distant; anther-cells parallel or divergent, tips confluent.—Leaves alternate or radical.*

- Flowers dimorphic. Stamens 4. Leaves radical 36. *PICORRHIZA*.
 Corolla-tube cylindric. Stamens 4. Leaves subradical 37. *WULFENIA*.
 Corolla-tube incurved. Stamens 2. Leaves alternate 38. *CALORHABDOS*.
 Corolla-tube short. Stamens 2. Leaves (or the lower) opposite 39. *VERONICA*.

TRIBE VIII. **Gerardieæ**. *Corolla-lobes all flat, spreading, 2 upper usually interior in bud. Anther-cells distinct throughout, bases often mucronate, equal or one imperfect or wanting.—Usually root-parasites, turning black when dry.*

SUBTRIBE I. **Escobedieæ**. *Calyx-lobes valvate. Anthers 2-celled.—Leafy herbs, rarely shrubs.*

Calyx campanulate. Corolla oblique. Spikes bracteate 40. *ALECTRA*.

SUBTRIBE II. **Buchnerieæ**. *Calyx tubular or subcampanulate. Corolla-tube slender, limb spreading. Anthers 1-celled, cell narrow, tip usually mucronate.—Leafy herbs; lower leaves opposite.*

- Calyx tubular, 5-toothed. Corolla-tube straight or sub-curved 41. *BUCHNERA*.
 Calyx tubular, 5-toothed. Corolla-tube abruptly incurved 42. *STRIGA*.
 Calyx subcampanulate, 5-fid. Corolla-tube straight or curved 43. *RAMPHICARPA*.

SUBTRIBE III. EUGERARDIÆ. *Calyx* various. *Corolla-tube* short or broad, rarely slender; limb spreading, upper lobes interior in bud. *Anther-cells* equal, or one smaller and imperfect.—Herbs or shrubs. Leaves all, or the lower, opposite.

- Calyx* spatheaceous, compressed 44. CENTRANTHERA.
Calyx campanulate, 5-toothed. *Anthers* with one cell
 stipitate and empty 45. SOPUBIA.
Calyx campanulate, 5-toothed. *Anther-cells* subequal.
Ovary many-ovuled 46. MICRARGERIA.
Calyx tubular-campanulate. *Anther-cells* equal. *Ovary*
 4-ovuled 47. LEPTORHABDOS.

TRIBE IX. **Euphrasieæ.** *Corolla* 2-lipped, upper lip erect, concave or hooded, interior in bud; lower usually spreading. *Anther-cells* distinct, bases usually mucronate.—Herbs, often parasitic, black when dry. Leaves opposite or alternate. *Inflorescence* centripetal.

* *Cells of ovary more than 2-ovuled. Margins of upper lip of corolla reflexed.*

- Seeds numerous, ovoid, reticulate. Flowers axillary . . . 48. PHTHEIROSPERMUM.
 Seeds numerous, oblong, striate. Flowers spicate . . . 49. EUPHRASIA.
 Seeds numerous, ellipsoid 50. EMMENOSPERMUM.

** *Cells of ovary more than 2-ovuled. Margins of hood of corolla straight.*

- Calyx* 4-toothed or 4-fid. Leaves opposite 51. BAERTSIA.
Calyx split in front, 2-5-toothed. Leaves alternate or
 whorled 52. PEDICULARIS.
 Leaves 0 53. LATHRÆA.

*** *Cells of ovary 2-ovuled.*

- Upper tip of corolla compressed. Leaves opposite . . . 54. MELAMPYRUM.

GENUS OF DOUBTFUL POSITION (NEAR *Wulfenia*?).

- Sepals 5. *Corolla-tube* long. *Stamens* 4, didynamous, included; anthers peltate, cells confluent 55. OREOSOLEN.

TRIBE I. **APTOSIMEÆ.**

1. **ANTICHARIS**, *Endl.*

Erect, small, annual, viscid herbs. Leaves alternate, quite entire. Flowers axillary, solitary. Sepals narrow, subvalvate. *Corolla-tube* long, dilating into the throat; lobes 5, flat, subequal. *Stamens* 2 lower perfect; anthers transverse, curved; staminodes 0. *Style* filiform, stigma obtuse or notched. *Capsule* ovoid or oblong, acuminate, loculicidal and septicidal; valves with inflexed margins separating from the axis. Seeds numerous, minute, ellipsoid, striate; embryo straight.—Species 4, Tropical and S. African, Oriental, and Indian.

1. **A. glandulosa**, *Aschers. in Bericht. Akad. Wiss. Berl.* 1866, 880; densely glandular-hispid, leaves oblong or ovate obtuse, pedicels equalling the calyx or shorter, corolla glabrous, sepals three-fourths as long as the capsule. *Boiss. Fl. Orient.* iv. 423. *Distemon glandulosus*, *Ehrb. & Hempr. mss.*

SCINDE, *Stocks*, *Vicary*.—DISTRIB. Upper Egypt.

A foot high, or less, leafy. Leaves $\frac{1}{2}$ –1 in., narrowed into a short petiole. Flowers

in all the axils. *Corolla* $\frac{1}{2}$ in. long, rosy. *Anthers* narrow, 1-celled, glabrous. *Capsule* $\frac{1}{2}$ in., hispid.—Very near *A. arabica*, Endl.

2. **A. linearis**, *Hochst. in Schimp. Pl. Nub.*; viscidly pubescent, leaves linear acute, pedicels capillary much longer than the calyx, corolla pubescent, sepals about half as long as the capsule. *Aschers. in Bericht. Akad. Wiss. Berl.* 1866, 883; *Boiss. Fl. Orient.* iv. 423. *Doratanthera linearis*, *Benth. in DC. Prodr.* x. 347. *Distemon angustifolius*, *Ehrh. & Hempr. mss.*

PUNJAB PLAIN, *Thomson, Edgeworth*. SCINDE, *Stocks*.—DISTRIB. Westward through Arabia and Tropical Africa to the Cape de Verde Islds.

Usually more slender than *A. glandulosa*. *Leaves* $1-1\frac{1}{2}$ by $\frac{1}{16}-\frac{1}{10}$ in. *Flowers* in all the axils. *Corolla* nearly $\frac{1}{2}$ in. long, rosy. *Anthers* short, 2-celled, hairy. *Capsule* $\frac{1}{4}-\frac{1}{2}$ in., glabrous.

TRIBE II. VERBASCEÆ.

2. VERBASCUM, L.

Erect, tomentose or woolly, usually tall herbs. *Leaves* all alternate. *Flowers* in simple or paniced terminal racemes or spikes, ebracteate, yellow, rarely white or red. *Calyx* 5-lobed or -partite, lobes imbricate. *Corolla* rotate; lobes 5, broad, the upper exterior in bud. *Stamens* 5 (very rarely 4), filaments all or the three upper bearded; anthers transverse or oblique, cells confluent. *Style-top* dilated, stigma simple. *Capsule* globose, oblong, or ovoid, septicidal; valves separating from the axis. *Seeds* numerous, rugose, not winged; embryo straight.—Species about 100; chiefly Mediterranean and Oriental.

V. virgatum, *With. (Wight Ill.* 165, *bis.* f. 1, and *Ic.* t. 1404. *Celsia viscosa*, *Wight Cat.* n. 1599, and *Nees in Trans. Linn. Soc.* xvii. 81, *in part, not of Roth*), a West European species, occurs in the Nilgherries, doubtless as a garden escape.

1. **V. Thapsus**, *Linn.*; *Benth. in DC. Prodr.* x. 225; densely woolly, eglandular, stem simple, leaves oblanceolate very decurrent entire or crenate, flowers in a simple dense woolly spike. *Boiss. Fl. Orient.* iv. 301; *Roxb. Fl. Ind.* i. 461. *V. indicum*, *Wall. Cat.* 2630, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 236; *Nees in Trans. Linn. Soc.* xvii. 79. ? *V. Blatteria*, *T. A. Schmidt in Trimen Journ. Bot.* 1868, 243, *not of Linn.*

TEMPERATE HIMALAYA, alt. 6-11,000 ft.; from Kashmir to Bhotan. WESTERN TIBET; Ladak, *Thomson*.—DISTRIB. Westwards to Britain.

Stem stout, 2-3 ft. *Root-leaves* 6-18 in., cauline oblong, upper acuminate. *Spike* 6-10 in.; bracts longer than the flowers. *Stamens* 5, fertile, 2 glabrous and 3 with white hairs.—As this is the only common Himalayan species, it must be that referred to as *V. Blatteria* by T. A. Schmidt.

VAR. thapsiforme; bracts very long. *V. thapsiforme*, *Schrad.*; *Boiss. l.c.* 301. *V. cuspidatum*, *Schrad.*; *T. A. Schmidt in Trimen Journ. Bot.* 1868, 243.

2. **V. celsioides**, *Benth. in DC. Prodr.* x. 229; glandular-pubescent, lower leaves pinnatisect, upper auricled cordate acuminate, flowers racemose.

KUMAON; at the foot of the hills, *Edgeworth*. The PUNJAB; at Hussan, *Aitchison*.

Stem 2-3 ft. *Leaves* 4-6 in., sessile or petioled, irregularly toothed and lobulate. *Flowers* in a long loose raceme; bracts ovate-lanceolate; pedicels $\frac{1}{2}-\frac{3}{4}$ in. *Sepals* oblong, obtuse. *Corolla* $\frac{1}{2}$ in. diam. *Stamens* 4-5; filaments woolly.—This species, being sometimes tetrandrous, unites *Verbascum* with *Celsia*.

3. **CELSIA**, L.

Characters of *Verbascum*, but stamens 4 (see also *V. celsioides*).

1. **C. coromandeliana**, Vahl *Symb.* iii. 79; finely pubescent or tomentose, glandular above, root-leaves petioled lyrate-pinnatifid, cauline sessile oblong-ovate toothed, racemes simple or paniced, sepals entire or toothed. *Benth. in DC. Prodr.* x. 246; *Roxb. Fl. Ind.* iii. 100; *Wall. Cat.* 2631; *Wight Ill.* t. 165, bis f. 1, right hand, and *lc.* t. 1406; *Dalz. & Gibs. Bomb. Fl.* 176; *Boiss. Fl. Orient.* iv. 358. *C. viscosa*, *Roth Catal. Bot.* ii. 69, and iii. 50; *Wight in Hook. Journ. Bot.* i. (1834) 228, t. 129; *Nees in Trans. Linn. Soc.* xvii. 81, in part.

Throughout INDIA; from the Punjab to Ceylon and Pegu, ascending to 5000 ft.—
DISTRIB. Afghanistan, Ava, China.

Annual. *Stem* 2–3 ft., stout or slender. *Leaves* 2–4 in., the large terminal lobe usually oblong, obtuse, toothed. *Raceme* 1–2 ft.; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in.; bracts ovate, shorter. *Sepals* oblong or ovate. *Corolla* $\frac{1}{2}$ in. diam., yellow. *Filaments* all hairy. *Capsule* subglobose, $\frac{1}{4}$ – $\frac{1}{2}$ in. diam.

4. **LINARIA**, Juss.

Herbs. *Leaves* usually opposite, or whorled below and alternate above. *Flowers* axillary, racemose or spicate, ebracteolate. *Sepals* 5, imbricate. *Corolla* tube spurred in front; upper lip erect, 2-lobed; lower spreading, 3-lobed, throat usually closed by the tumid palate. *Stamens* 4, didynamous, ascending, included; anther-cells distinct, parallel. *Style* filiform, stigma minute. *Capsule* ovoid or globose, 2-celled, each cell or the anterior only opening by an apical pore. *Seeds* numerous, polymorphous.—Species 130, almost exclusively natives of the temperate regions of the old world.

L. striata, DC., a Mediterranean species, has been found in the Khasia Mts. (near Churra), by Clarke, no doubt an escape. *L. triphylla*, Mill., a plant of the same region, also occurs in India according to Bentham (*in DC. Prodr.* x. 274), but I have seen no specimen.

* *Sepals* narrowly lanceolate.

1. **L. ramosissima**, Wall. *Pl. As. Rav.* ii. 43, t. 153, and *Cat.* 3911; perennial, nearly glabrous, branches prostrate slender, leaves alternate petioled ovate-cordate, or lower 6–7-lobed triangular-hastate and upper lanceolate sagittate, pedicels capillary longer than the petiole, spur shorter than the corolla-tube, seeds scabrous. *Benth. in DC. Prodr.* x. 270; *Wight Ill.* t. 165; *Dalz. & Gibs. Bomb. Fl.* 176; *Boiss. Fl. Orient.* iv. 368. *L. Roylei*, *Chavannes Monogr. Antirrh.* 112.

Throughout INDIA, on rocks and stony places, from the Punjab and Scinde to Chittagong and CEYLON; ascending the hills to 5000 ft. DISTRIB. Afghanistan, Ava.

Branches numerous, filiform, spreading from the rootstock. *Leaves* membranous, $\frac{1}{2}$ –2 in., extremely variable. *Flowers* yellow; pedicels 1–1 $\frac{1}{2}$ in. *Sepals* lanceolate. *Corolla* $\frac{1}{2}$ in. long, spur short, tube hairy, upper lip short. *Capsule* with subequal lobes. *Seeds* minute, ovoid.—The var. *ovata*, Benth., with all the leaves ovate-cordate, passes so insensibly into the type that it cannot be retained.

VAR. *pubescens*, Stocks ms.; softly hairy, corolla rather larger and spur rather longer.—This in hairiness resembles *L. cabulica*.

2. **L. cabulica**, Benth. *in DC. Prodr.* x. 270; perennial, softly hirsute, branches prostrate slender, leaves alternate petioled lower ovate subhastate

and lobed, upper lanceolate sagittate, pedicels rigid longer than the leaves, spur longer than the corolla-tube, seeds scabrous. *Boiss. Fl. Orient.* iv. 368.

The PUNJAB, SCINDE and WESTERN HIMALAYA, ascending to 6000 ft., and eastward to Kamptee, *Wight*, and Rotas in BEHAR, *J. D. H.* DISTRIB. Westwards to Persia.

More rigid than *L. ramosissima*, with smaller more entire leaves, and shorter petioles.

3. *L. incana*, *Wall. Pl. As. Rar.* ii. 43; perennial, villous, branches prostrate, leaves ovate or hastate, petiole very short, pedicels rigid often exceeding the leaves, spur much shorter than the corolla-tube, seeds closely roughly pitted.

WESTERN AND CENTRAL HIMALAYA; from Kashmir, alt. 5,500, *Falconer*, &c., to Nepal, *Wallich*.

Habit of *L. cabulica*, but with much larger flowers and capsules, and larger, very different seeds.

** *Sepals linear-spathulate*.

4. *L. minor*, *Désf.*; *Benth. in DC. Prodr.* x. 287; annual, erect, glandular-pubescent, leaves mostly alternate oblong or obovate, pedicels slender, spur shorter than the corolla-tube, seeds oblong truncate ribbed smooth. *Boiss. Fl. Orient.* iv. 383. *Antirrhinum minus*, *Linn.*; *Gaertn. Fruct.* i. 249 to 53.

The PUNJAB PLAIN; *Vicary, Aitchison*. DISTRIB. Westwards to Britain.

Stem 6-18 in., branches ascending. *Leaves* $\frac{1}{2}$ -1 in. obtuse, narrowed into the petiole. *Peduncles* axillary, often exceeding the leaves. *Sepals* enlarging after flowering, nearly equalling the pale purple corolla with a yellow depressed palate. *Capsule* gibbous at the base; cells subequal, opening by ragged pores.

5. SCHWEINFURTHIA, *A. Braun*.

Annual or perennial branched glabrous herbs. *Leaves* nearly always alternate, quite entire. *Flowers* small, axillary. *Sepals* imbricate, the upper largest. *Corolla-tube* subacute; upper lip erect, 2-lobed; lower reflexed 3-lobed; palate closing the throat. *Stamens* 4, didynamous, 5th rudimentary; anther-cells diverging. *Style* filiform, stigma minute. *Capsule* subglobose, fragile, anterior cell many-seeded, bursting irregularly; posterior very small, 3-4-seeded or empty. *Seeds* obconic, 5-winged, furrowed between the ribs.—Species 3, N.E. African and oriental.

1. *S. sphærocarpa*, *A. Braun in Monatsb. Akad. Wiss. Berl.* 1866, 875; robust, glabrous or hairy, leaves orbicular obovate or spatulate fleshy glaucous, pedicels very short, sepals ovate or lanceolate acute. *S. papilionacea*, *Boiss. Fl. Orient.* iv. 387. *Antirrhinum papilionaceum*, *Burm. Fl. Ind.* 121, t. 39, f. 2. *A. glaucum*, *Stocks in Wight Ic.* t. 1459. *Linaria sphærocarpa*, *Benth. in DC. Prodr.* x. 287.

SCINDE; in rocky places; *Stocks, Vicary*. DISTRIB. Beloochistan and Affghanistan.

Perennial; branches 6-12 in. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., obtuse or subacute, narrowed into the short petiole. *Sepals* $\frac{1}{2}$ in. long, equalling the corolla-tubes, enlarged in fruit. *Corolla* dirty-white. *Filaments* hairy at the base. *Capsule* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. *Seeds* pale.—Sunpât of druggists.

6. **ANTIRRHINUM**, Linn.

Annual or perennial herbs. *Leaves* entire or lobed, lower opposite, upper alternate. *Flowers* solitary and axillary or racemed. *Sepals* 5, imbricate. *Corolla* compressed, base saccate; upper lip erect, 2-lobed; lower spreading, 3-lobed; palate broad, bearded, closing the throat. *Stamens* 4, didynamous; anther-cells distinct, parallel. *Style* filiform, stigma 2-lobed. *Capsule* ovoid or globose; cells many-seeded, anterior opening by one pore, posterior by 2 toothed pores, or both opening by one pore. *Seeds* minute, oblong, truncate, rugose or pitted.—Species 25, of northern temperate regions.

The common Snapdragon (*A. majus*, L.) is stated (*Benth. in DC. Prodr. x. 291*) to be spontaneous in India, but I have seen no specimens.

1. **A. Orontium**, Linn.; *Benth. in DC. Prodr. x. 290*; annual or biennial, slender, erect, leaves linear, flowers axillary subsessile, sepals longer than the corolla. *Boiss. Fl. Orient. iv. 385*. *A. gibbosum*, Wall. *Pl. As. Rav. ii. 44*, and *Cat. 3854*.

PUNJAB PLAIN and WESTERN HIMALAYA, ascending to 4000 ft. (an escape in the Nilgherries).—DISTRIB. Westwards to N. Africa and Britain.

Annual or biennial.

Stem 6–18 in., usually glabrous below and glandular above, branched from the base. *Leaves* 1–2 in., very narrow, rarely oblong-lanceolate. *Flowers* $\frac{1}{2}$ – $\frac{2}{3}$ in., rose-purple. *Sepals* very narrow, spreading. *Capsule* $\frac{1}{2}$ in., pubescent. *Seeds* compressed, face concave, back keeled, margins thickened.

7. **SCROPHULARIA**, L.

Annual or perennial, often foetid herbs. *Leaves* opposite or the upper alternate, often pellucidly dotted. *Flowers* in paniced or thyrsoid cymes, greenish-purple or yellow. *Sepals* 5. *Corolla-tube* globose or ovoid, tumid; lobes 5, short, flat; 4 upper erect, lower spreading. *Stamens* 4, declinate, didynamous, 5th rudimentary or 0; anther-cells adnate to the filament, confluent, bursting transversely. *Disc* oblique. *Style* slender, stigma notched. *Capsule* ovoid, acute or beaked, septicidal. *Seeds* many or few, ovoid, more or less rugose.—Species about 120, of northern temperate regions.

* *Cymes contracted, dense-fld.* *Upper corolla-lobes short, subequal. Stamens included.*—*Leaves broad, entire, ovate or ovate-cordate, petiole not appendaged, nerves distinct.*

1. **S. pauciflora**, *Benth. Scroph. Ind. 17*, and in *DC. Prodr. x. 302*; glabrous or sparsely pubescent, leaves long-petioled ovate-cordate coarsely toothed, flowers crowded in distant leafless cymes, sepals ovate acute shorter than the capsule, stamens included, staminode 0.

CENTRAL AND EASTERN HIMALAYA; Nepal, Wallich; Sikkim, alt. 10–13,000 ft., J. D. H., &c.

Stem 2–3 ft., stout, sparingly branched. *Leaves* 2–4 in., primary and secondary nerves distinct; petiole $\frac{1}{2}$ –2 in. *Inflorescence* 2–8 in. long, stiff; cymes crowded, shortly peduncled; pedicels $\frac{1}{4}$ in. and less. *Corolla* green. *Capsule* $\frac{1}{4}$ – $\frac{1}{3}$ in. long, ovoid, acute. *Seeds* oblong.

2. **S. calycina**, *Benth. Scroph. Ind. 18*, and in *DC. Prodr. x. 304*; glabrous or sparsely pubescent above, leaves shortly petioled ovate or cordate-ovate acute coarsely toothed, flowers crowded in approximate leafless cymes,

sepals lanceolate acuminate, equalling or longer than the capsules. Stamens included, staminode ovate acute. *Veronica*? *thyrsoflora*, *Wall. Cat.* 6393.

WESTERN HIMALAYA; from Kashmir, *Royle*, to Kumaon, *Blinkworth*, alt. 6-12,000 ft.

Stem 1-2 ft., stout, sparingly branched. *Leaves* 1-4 in., sometimes oblong, primary and secondary nerves distinct; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Inflorescence* 2-4 in., stiff; cymes very shortly peduncled; pedicels $\frac{3}{8}$ - $\frac{1}{2}$ in. *Capsule* $\frac{1}{4}$ - $\frac{1}{2}$ in. ovoid, acuminate. *Seeds* oblong.

** *Cymes more or less effuse. Two upper corolla-lobes longer than the others. Stamens included or exerted.*—*Leaves broad, entire, ovate or ovate-cordate, petiole not appendaged (except in S. polyantha), nerves distinct.*

3. ***S. urticæfolia***, *Benth. Scroph. Ind.* 18, and in *DC. Prodr.* x. 306; glabrous or sparsely hairy, leaves petioled ovate or cordate-ovate acute coarsely toothed, cymes open lax-fld. long slender, lower peduncles axillary, upper chiefly opposite panicle spreading, calyx-lobes rounded, stamens included. *Wall. Cat.* 3922.

CENTRAL AND EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 7-9000 ft., J. D. H., &c.

Stem 2-3 ft., rather slender. *Leaves* 2-4 in., primary and secondary nerves distinct; petiole $\frac{1}{2}$ -2 in. *Cymes* very slender and lax, lower peduncles 1-3 in.; pedicels divaricate, filiform, bracts very small. *Calyx* hemispheric, cleft half-way down. *Corolla* $\frac{1}{4}$ in. long, greenish-white, 2 posterior lobes longest. *Staminode* obovate. *Calyx-lobes* shorter than the small broadly ovoid acuminate capsule. *Seeds* very minute, broadly oblong, apiculate, broadly furrowed and pitted in the furrows.

4. ***S. obtusa***, *Edgew. ms.*; hoary, leaves shortly petioled ovate or ovate-cordate obtuse crenate, cymes open lax-fld. long-peduncled, lower axillary upper chiefly opposite panicle spreading, calyx-lobes rounded, stamens included. *Herb. Strach. & Winterb., Scroph.* n. 3.

WESTERN HIMALAYA; Kumaon at Almora, alt. 6-6,500 ft., *Edgeworth*, &c.

Stem 2-3 ft., branched, and as well as the leaves beneath and inflorescence clothed with a fine hoary pubescence. *Leaves* 2-3 in., dull-green, primary nerves only distinct; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Cymes* longer or shorter than the leaves; peduncles stout, strict; pedicels also stout, divaricate, sometimes 1 in. long. *Calyx* cleft more than halfway down; lobes nearly equalling the small subglobose capsule. *Corolla* yellowish, tube twice as long as the calyx; two upper lobes longest. *Staminode* orbicular. *Seeds* very minute, as in *S. urticæfolia*.

5. ***S. Scopoli***, *Hoppe*; *Benth. in DC. Prodr.* x. 308; glabrous or sparsely pubescent, leaves petioled ovate oblong or cordate-ovate coarsely irregularly toothed or sublacinate, cymes lax-fld. all erect lower axillary, upper alternate in long strict narrow leafless panicles, peduncles and pedicels short very stout erect, sepals orbicular margins scarious, stamens included. *Reichb. Ic. Pl. Germ.* xx. t. 1675, f. 3. *Boiss. Fl. Orient.* iv. 395. *S. glandulosa*, *Waldst. & Kit.* iii. t. 214. *S. auriculata*, *Scop. Fl. Carniol.* i. 446, t. 32, not of *Linn.* *S. decumbens*, *Fisch. & Mey. in Ann. Sc. Nat.* 3, v. 380.

WESTERN HIMALAYA; Kashmir, *Murree* and *Hazara*, alt. 6000 ft.; *Fleming, Clarke*.—DISTRIB. Afghanistan and westwards to Spain.

Stem stout, 2-3 ft., branched, glabrous in Indian specimens. *Leaves* 1-3 in., compoundly toothed or serrate; petiole $\frac{1}{2}$ -1 in. *Cymes* in stiff stout contracted panicles a foot long and upwards. *Corolla* greenish. *Stamens* included; staminode orbicular. *Capsule* ovoid-globose, beaked. *Seeds* rugulose.—A very variable and widely diffused plant. Afghanistan specimens have lobules on the petiole.

6. ***S. elatior***, *Benth. Scroph. Ind.* 18, and in *DC. Prodr.* x. 304; tall, glabrous or glandular above, stem 4-winged, leaves petioled ovate or lanceolate coarsely toothed, cymes spreading peduncled many-fld. in long panicles, peduncles and pedicels spreading, sepals ovate subacute, stamens far exserted. *Wall. Cat.* 3928.

CENTRAL AND EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 6-10,000 ft., J. D. H., &c. KHASIA Mts., alt. 4-5000 ft., common.

Tall, very stout, 3-5 ft. high, branched, stem below as thick as the middle finger, wings slender. *Leaves* 5-10 by 1-5 in., rarely subcordate, primary and secondary nerves distinct; petiole stout, 1-3½ in. *Panicle* sometimes much branched from the base, bracts linear; peduncles 1-2 in.; branches and pedicels spreading. *Sepals* not margined, not half the length of the globose-ovoid beaked capsule. *Stamens* twice as long as the corolla; staminode spatulate or 0. *Seeds* as in *S. urticæfolia*.

7. ***S. Edgeworthii***, *Benth. in DC. Prodr.* x. 304; glandular-puberulous, stem obtusely 4-angled, leaves petioled ovate-cordate coarsely crenate-toothed, cymes long-peduncled paniced few- and lax-fld. spreading, sepals ovate acute much shorter than the tubular corolla, stamens shortly exserted.

WESTERN HIMALAYA; Gurwhal, at Musa Paria, alt. 12,000 ft., *Edgeworth*; Kumaon, at Sabu, alt. 8,500 ft., *Strach. & Winterb.*

Apparently a tall species. *Leaves* 2-3 in., primary nerves only distinct; petiole 1-1½ in. *Peduncles* and pedicels spreading in fruit; bracts lanceolate; pedicels 1-1½ in. *Sepals* nearly as long as the subglobose capsule. *Corolla* ½ in. long. *Staminode* spatulate. *Seeds* very minute, irregular, obscurely ribbed and pitted.—The specimens of this plant are insufficient; *Edgeworth's* are in flowers only; the Kumaon ones are more advanced and in fruit, are nearly glabrous with a rather shorter corolla.

8. ***S. polyantha***, *Royle; Benth. Scroph. Ind.* 18, and in *DC. Prodr.* x. 304; glabrous below, viscidly puberulous above, stem obtusely 4-angled, leaves ovate or ovate-cordate crenate, petiole short naked or appendaged, cymes many-fld. suberect or ascending alternate in long leafless thyrsoid panicles, pedicels short, sepals round with broad scarious margins, corolla very short, stamens far exserted. *Wall. Cat.* 9081.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 4-11,000 ft., common.

Stem 3-4 ft., stout below. *Leaves* 2-8 in., sometimes pinnatifidly cut towards the base, primary-nerves distinct; petiole ½-1 in., rarely more. *Panicle* 1-2 ft., strict; flowers greenish, amongst the smallest of the Indian species. *Sepals* ⅓ in., half as long as the very broad short corolla, much shorter than the subglobose pointed capsule. *Staminode* spatulate. *Style* filiform. *Seeds* rugulose, larger than in *S. Edgeworthii*.

9. ***S. himalensis***, *Royle in Benth. Scroph. Ind.* 18, and *DC. Prodr.* x. 304; glandular-pubescent above, stem obtusely angled, leaves ovate-cordate or lanceolate crenate, petiole long naked, cymes many- and lax-fld. spreading opposite and alternate in a long rather slender panicle, peduncles and pedicels long slender, sepals rounded obscurely margined or not, corolla very short, stamens far exserted.

WESTERN HIMALAYA, from Kunawur to Kumaon, alt. 5-8000 ft., common.

Very near to *S. polyantha*, but the petioles are longer and not appendaged, and the flowers twice as large; the seeds are similar.

*** *Cymes more or less effuse. Two upper corolla-lobes longer than the others. Stamens hardly exserted. Capsules few-seeded. Seeds oblong, deeply pitted or transversely rugose.—Leaves narrow-obovate-spatulate, coarsely toothed or pinnatisect, nerves often very obscure. (The species are perennial, and very difficult to distinguish satisfactorily.)*

10. **S. lucida**, Linn.; *Benth. in DC. Prodr.* x. 312; glabrous or glandular pubescent above, leaves 1-2-pinnatisect, segments spreading very unequal oblong ovate or lanceolate incised and serrate, cymes ascending shortly peduncled in long contracted panicles, pedicels short, sepals rounded margin broadly scarious, staminode orbicular or reniform. *Boiss. Fl. Orient.* iv. 403. *S. decomposita*, Royle in *Benth. Scroph. Ind.* 18, and in *DC. l.c.* 313. *S. Griffithii*, *Benth. in. DC. l.c.* 312; *excl. var. β*; *Boiss. Fl. Orient.* iv. 410 *excl. syn. Kotschy*.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 8-13,000 ft.—DISTRIB. Kashgar, Affghanistan, and westwards to Italy.

Rootstock stout, perennial, stems 2-3 ft., obscurely 4-angled. *Leaves* 1-2 in., segments horizontal, interrupted. *Cymes* few-fl., lower leafy; peduncles $\frac{1}{2}$ - $\frac{3}{4}$ in., pedicels very short; bracts linear. *Sepals* half as long as the corolla, nearly as long as the globose pointed capsule. *Corolla-tube* $\frac{1}{4}$ - $\frac{1}{2}$ in. broad.—I suspect that this is only a form of *S. canina*, Linn.

11. **S. variegata**, Bieb. *Fl. Taur. Cauc.* ii. 78; glabrous below, glandular above, puberulous, leaves shortly petioled obovate-oblong or spathulate obtuse crenate above incised or pinnatifid toward the base with recurved obtuse lobes, cymes erect or ascending few-fl. alternate in long narrow panicles, pedicels very short, sepals rounded margin broadly scarious, staminode large orbicular or reniform. *Reichb. Ic. Pl. Europ.* iii. 53, t. 257; *Benth. in DC. Prodr.* x. 314. *S. depauperata*, *Boiss. Diagn. Ser.* iv. 68; and *Fl. Orient.* iv. 410. *S. Griffithii*, *var. β*, *Benth. l.c.* 312.

WESTERN HIMALAYA, in the drier regions, and WESTERN TIBET; from Kashmir and the Karakorum to Kumaon, alt. 9-14,000 ft., Thomson, &c.—DISTRIB. Asia Minor.

Rootstock perennial; stems 1-2 ft., stout, obtusely 4-angled. *Leaves* 1-2½ in., coriaceous, contracted into a short broad petiole. *Sepals* about half the length of the corolla and of the small globose pointed capsule. *Corolla* $\frac{1}{4}$ - $\frac{1}{2}$ in. long, tube broad.—Probably only a form of *S. lucida*, with more entire leaves. It precisely accords with Reichenbach's figure in all but the greater size.

VAR. ? tenuicaulis; branches and panicles very slender, staminode ovate-lanceolate acute.—Kishtwar, alt. 8000 ft., Thomson. Kashmir at Srinuggur, alt. 7000 ft., Clarke. This is a puzzling plant, probably referable to *S. canina*, L. The habit and foliage are those of *S. variegata*.

12. **S. dentata**, Royle in *Benth. Scroph. Ind.* 19, and in *DC. Prodr.* x. 316; glabrous below, glandular above, nearly black when dry, leaves small petioled obovate-oblong or spathulate obtuse crenate above, entire or incised towards the base, cymes short erect or ascending few-fl. alternate in narrow panicles, pedicels very short, sepals rounded margins obscurely scarious, staminode small narrow. *S. Kotschy*, *Herb. Ind. Or. H. f. & T.*, not of Boiss.

WESTERN HIMALAYA, Kumaon, Royle, Lahul, Capt. Hay. WESTERN TIBET, alt. 12-15,000 ft., Thomson.

Very similar to *S. variegata*, but nearly black when dry, with smaller thicker leaves, and a very small staminode. *Rootstock* stout, branches very numerous, 1 foot, cylindric. *Leaves* 1-1½ in., midrib and nerves very obscure, rather fleshy. *Flowers* smaller than in *S. variegata* or *lucida*. *Capsule* and seeds similar.

13. **S. scabiosæfolia**, *Benth. in DC. Prodr.* x. 313; glabrous or glandular, leaves obovate oblong or subspathulate entire pinnatifid or lobulate, terminal lobe usually large, cymes spreading or ascending alternate rather long few- or many-fl. branches divaricating, flowers very small often spicate, sepals rounded margins scarious, staminode broad. *Boiss. Fl. Orient.* iv. 412.

PUNJAB HILLS, near Peshawur, *Vicary, Aitchison.* WESTERN HIMALAYA and WESTERN TIBET, alt. 10–12,000 ft., *Thomson.*—DISTRIB. Afghanistan.

Rootstock woody, often with many radical petioled pinnatifid or entire obovate or oblong-cordate leaves which are sometimes 5 in. long, and solitary scape-like panicles; thus resembling a *Scabiosa*. In other specimens the stems are slender, 1–2 feet high, and much branched, like those of *S. lucida*, from which the small flowers about $\frac{1}{8}$ in. long, best distinguish it. *S. bicolor*, of Europe, is very near this.—The Beloochistan plant of Stocks referred to it by Boissier may be the same, but it is not in a sufficiently good state for determination.

TRIBE IV. CHELONEÆ.

8. *BRANDISIA*, Hook. f. & Thoms.

Tomentose or scurfy shrubs. *Leaves* opposite, entire. *Flowers* axillary, solitary or 2-nate; pedicels 2-bracteolate. *Calyx* campanulate, 5-toothed. *Corolla-tubes* incurved, dilated above; upper lip broad, concave, erect, broadly 2-lobed; lower spreading, shortly acutely 3-lobed. *Stamens* 4, didynamous, shorter than the corolla, filaments flattened below; anther-cells divergent, margins bearded. *Style* filiform, stigma simple. *Capsule* ovoid, loculicidal, many-seeded, valves separating from the columnar placentiferous axis. *Seeds* linear, testa lax membranous reticulated.—Species 2, a Chinese and the following.

The supposed second species of *Brandisia*, alluded to in the “Genera Plantarum” as a native of Bhotan, has stellate tomentum, lanceolate leaves and a 2-lipped calyx, and cannot be congeneric. It may be a *Wightia*, but the specimens are far too imperfect for determination. The Chinese plant referred to *B. discolor* by Hance, differs in the broad calyx-lobes and corolla; it is *B. Hancei*, H. f.

B. discolor, H. f. & T. in *Journ. Linn. Soc.* viii. 11, t. 4; leaves ovate-lanceolate finely acuminate base rounded or cordate, calyx-teeth subulate. *Kurz For. Fl.* ii. 250, and in *Journ. As. Soc.* 1873, ii. 236.

PEGU, MARTABAN, and TENASSERIM, alt. 3–6000 ft., *Brandis, Parish, Kurz.*

An evergreen half-scandent shrub. *Leaves* 2–3 in., firm, glabrous above, white or fulvous-tomentose beneath with very prominent nerves, petiole $\frac{1}{4}$ in. *Pedicels* longer than the petiole. *Calyx* $\frac{1}{4}$ in. long, tomentose, 5-ribbed opposite the teeth. *Corolla* $\frac{3}{4}$ in., dull purplish brown, tomentose. *Capsule* ovoid, acute, $\frac{1}{2}$ in. long.

9. *WIGHTIA*, Wall.

A tree. *Leaves* opposite or alternate, quite entire, very coriaceous. *Flowers* in axillary thyrsi, large, rosy, pubescent. *Calyx* campanulate, irregularly 3–5-lobed. *Corolla-tube* incurved, upper lip erect, 2-lobed; lower spreading, 3-fid. *Stamens* 4, didynamous, ascending, exserted; anthers oblong, sagittate, cells parallel. *Style* long, tip incurved, stigma simple. *Capsule* oblong or ovoid, septicidal, many-seeded, valves long, separating from the placentiferous axis, which is 2-partite or entire. *Seeds* linear, ascending, nucleus slender, testa membranous broadly winged all round, albumen 0; embryo straight.—Species 3, a Javan, Bornean, and the following.

W. gigantea, Wall. *Pl. As. Rar.* i. 71, t. 81, and *Cat.* 2703; *Benth. in DC. Prodr.* x. 301; *Gamble Cat. Darjeeling Pl.* 58. *Gmelina speciosissima*, *Don Prodr.* 104; *Schauer in DC. Prodr.* xi. 650.

CENTRAL AND WESTERN HIMALAYA; Nepal, *Wallich*; Sikkim, *J. D. H., &c.*; Bhotan *Griffith*.—DISTRIB. JAVA (*Herb. Horsfield*).

A large tree, often half epiphytic, appressed to and grasping the boles of forest trees by roots given off from the trunk, which is sometimes a foot or more in diameter. *Leaves* 6–12 by 3–6 in., ovate lanceolate rounded or elliptic, acute or obtuse, glabrous above and finally beneath; base acute or rounded; nerves 4–6 pair, oblique; petiole 1–1½ in., stout. *Thyrsi* 4–8 in., erect, narrow; peduncle and rachis very stout; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., 2-bracteolate in the middle, hoary-pubescent. *Calyx* short, $\frac{1}{2}$ in. long and broad, lobes rounded. *Corolla* 1 in. long, mealy. *Stamens* far exerted. *Capsule* ovoid, thinly coriaceous, $1\frac{1}{2}$ in. long by $\frac{3}{4}$ in. broad; columnar axis entire.—The Javan species alluded to in the “Genera Plantarum” differs in the much longer and woody capsules with the columnar axis 2-partite.

TRIBE V. MANULEÆ.

10. *SUTERA*, Roth.

A low diffuse viscid-pubescent herb. *Leaves* pinnatifid, lower opposite, upper alternate. *Flowers* small, axillary and in terminal racemes; pedicels bracteate, ebracteolate. *Sepals* 5, narrow. *Corolla-tube* slender, throat not dilated; lobes 5, small, 2 upper outer in bud and rather smaller. *Stamens* 4, didynamous, included, filaments filiform. *Style* short, stigma obtuse or notched. *Capsule* ovoid-oblong, septicidal, valves bifid. *Seeds* numerous, testa pitted.

S. glandulosa, Roth Bot. Bemerk. 172, and Nov. Sp. 291; Benth. in DC. Prodr. x. 362; Boiss. Fl. Orient. iv. 422; Wight Ic. t. 856; Miquel Fl. Ind. Bat. ii. 676; S. dissecta, Walp. Rep. iii. 271. *Capraria dissecta*, Del. Fl. Eg. i. 95, t. 32, f. 2.

From MAERWAR, Dalzell, BANDA, Edgeworth, BEHAR, J. D. H., and BENGAL, Griffith, to the SOUTH DECCAN, Heyne, but not common.—DISTRIB. Arabia, Egypt, Nubia.

Annual, branched from the base, branches 6–10 in. long. *Leaves* $\frac{1}{2}$ – $\frac{1}{2}$ in., ovate in outline, shortly petioled, segments toothed and cut. *Flowers* axillary all along the branches, sessile or pedicelled, uppermost racemose. *Calyx* $\frac{1}{2}$ in. long. *Corolla* nearly white, about twice as long, glabrous. *Capsule* exceeding the calyx.

TRIBE VI. GRATIOLEÆ.

11. *MIMULUS*, L.

Erect prostrate or creeping herbs. *Leaves* opposite. *Flowers* solitary, axillary. *Calyx* tubular or campanulate, 5-angled, 5-toothed. *Corolla* 2-lipped, upper lip erect or reflexed, 2-lobed; lower spreading, 3-lobed; throat with usually a swollen 2-lobed palate. *Stamens* 4, didynamous; anther-cells divergent, subconfluent. *Style* slender, stigma 2-lamellate. *Capsule* compressed, loculicidal, valves separating from the placentiferous column. *Seeds* numerous, minute, oblong.—Species 40, temperate and tropical.

1. **M. nepalensis**, Benth. Scroph. Ind. 29, and in DC. Prodr. x. 373; prostrate, glabrous, leaves petioled ovate coarsely serrate, calyx truncate 5-toothed, corolla yellow, capsule included. Wall. Cat. 3917; Maxim. Diagn. Pl. Nov. Dec. xix. 401. *M. assamicus*, Griff. in. Madr. Journ. Nat. Sc. iv. 3, and Notul. iv. 92, and Ic. Pl. Ind. Asiat. t. 458, f. 8, 9.

TEMPERATE HIMALAYA; from Nepal, Wallich, to Bhotan, Griffith. ASSAM, on the banks of the Burraumpootra, Griffith.—DISTRIB. Japan.

Stems straggling, 6–10 in. long, stout or slender, sometimes faintly hairy. *Calyx*

very variable in length, breadth, and the size of the teeth, which are always small. Capsule ovate-lanceolate, included.

VAR. 1; leaves $\frac{1}{2}$ –1 in., pedicels usually longer than the leaves, flowers $\frac{3}{4}$ in. long; fruiting calyx straight.—Nepal, Sikkim, and Assam, alt. 1–6000 ft.

VAR. 2; much larger, leaves 1–1 $\frac{1}{2}$ in., pedicels shorter than the leaves, flowers 1–1 $\frac{1}{2}$ in. long, calyx often curved. ? *M. tenellus*, Bunge *En. Pl. Chin.* 49 (*Maxim. l. c.*).—Sikkim, alt. 8–12,000 ft.—Possibly a different species, but intermediate forms occur. The calyx varies from $\frac{1}{4}$ in. long, obconic and straight, to $\frac{3}{8}$ in. long subcylindric and curved with an oblique mouth. Miquel's *M. nepalensis*, var. *japonica*, seems the same as this.

2. *M. orbicularis*, Benth. *Scroph. Ind.* 29, and in *DC. Prodr.* x. 373; creeping, glabrous, leaves petioled orbicular nerveless quite entire, calyx small truncate obscurely 5-lobed, capsule exserted. *Wall. Cat.* 3919.

PEGU and TENASSERIM; Wallich, Griffith, &c.

Stems rather thick, 6–10 in. Leaves $\frac{3}{4}$ –1 in. diam., rather fleshy, base rounded or subacute; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., very thick. Peduncles equalling the leaves or shorter, stout or slender. Calyx $\frac{1}{4}$ in., campanulate. Corolla $\frac{1}{2}$ – $\frac{3}{8}$ in. Capsule $\frac{1}{3}$ in., elliptic, acute at both ends; style stout, persistent.

3. *M. gracilis*, Br. *Prodr.* 439; erect, glabrous, leaves sessile linear-oblong quite entire or slightly toothed, calyx shortly 5-lobed, capsule included. Benth. in *DC. Prodr.* x. 594. *M. strictus*, Benth. *Scroph. Ind.* 28; *Wall. Cat.* 3918.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 1–3000 ft. PUNJAB PLAINS. BENGAL, at Rajmahal, Wallich.—DISTRIB. China, Australia, Tropical and S. Africa.

Stout, branched from the base, 6–12 in. high, branches erect. Leaves radical and cauline, 1 $\frac{1}{2}$ –2 $\frac{1}{2}$ in., rather fleshy, $\frac{1}{2}$ -amplexicaul, obtuse, blackish when dry. Peduncles longer than the leaves, stout. Calyx $\frac{1}{2}$ in. long, tubular, lobes very small rounded. Corolla $\frac{1}{2}$ in. long, white or pale blue. Capsule obovoid.

12. MAZUS, Lour.

Small herbs, often with runners. Leaves opposite below or rosulate, above opposite or alternate. Flowers small, in terminal subsecund racemes; bracts and bracteoles minute or 0. Calyx campanulate, 5-fid. Corolla-tube short, upper lip erect, 2-fid; lower much larger, spreading, 3-fid; throat with a 2-lobed palate. Stamens 4, didynamous; anther-cells contiguous, diverging. Stigma 2-lamellate. Capsule included, globose or compressed, obtuse, loculicidal, valves entire. Seeds numerous, most minute, ovoid.—Species, 4 Asiatic and 1 Australian.

1. *M. rugosus*, Lour. *Fl. Coch.* 385; runners 0, radical leaves obovate-spathulate crenate narrowed into a short petiole, pedicels mostly ebracteate, calyx-lobes half as long as the tube ovate-lanceolate acute, spreading in fruit. Benth. in *DC. Prodr.* x. 375; Boiss. *Fl. Orient.* iv. 424; Sweet *Brit. Fl. Gard.* t. 36; Miquel *Fl. Ind. Bat.* ii. 677; Maxim. *Diagn. Nov. Pl. Dec.* xix. 403. *M. bicolor*, Benth. in *Wall. Cat.* 3913. *M. vandelloides*, Hance; Walp. *Ann.* iii. 193. *Lindernia japonica*, Thunb. *Fl. Jap.* 253. *Hornemannia bicolor*, Willd. *Enum. Hort. Berol.* 654; Reicheb. *Icon. Exot.* 25, t. 37. ? *Columnnea tomentosa*, Roxb. *Fl. Ind.* iii. 98. ? *Stemodia tomentosa*, G. Don *Gen. Syst.* iv. 842. *Tittmannia obovata*, Bunge *Enum. Pl. Chin.* 279. *Vandellia obovata*, Walp. in *Act. Acad. Leopold.* xix. *Suppl.* i. 394. *Gratiola goodeniæfolia*, Hornem. *Hort. Hafn.*

TEMPERATE and SUBTROPICAL HIMALAYA, and Plains of NORTHERN INDIA; from Kashmir to Bhotan, ascending to 7000 ft. KHASIA Mts., alt. 4-6000 ft. BURMA, *Wallich*. UPPER ASSAM, *Griffith*. SOANE RIVER, *J. D. H.*—DISTRIB. Afghanistan, Java, China, Japan, Philippine Islds.

Annual, glabrous or sparsely hairy. Radical leaves numerous, 1-3 in. long, including the petiole, which is rarely as long as the blade, coarsely irregularly crenate-toothed. Flowering-stems numerous from the root, 2-10 in. long, leafless or with alternate spatulate leaves. Racemes 1-6 in., pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in. Calyx in fruit $\frac{1}{4}$ - $\frac{2}{3}$ in. diam. Corolla $\frac{1}{4}$ - $\frac{1}{2}$ in. long, blue. Seeds exceedingly minute, pale.—Roxburgh's *Columnnea tomentosa*, referred here by Bentham, can hardly be this.

2. *M. surculosus*, *Don Prodr.* 86; runners rooting with opposite leaves, radical leaves obovate-spathulate coarsely crenate and often subpinnatifid at the base narrowed into a short petiole, pedicels mostly bracteate, calyx-lobes $\frac{1}{2}$ as long as the tube short obtuse or subacute suberect in fruit. *Benth. in DC. Prodr.* x. 375; *Wall. Cat.* 3912; ? *Wight Ic.* t. 1467.

TEMPERATE HIMALAYA; from Kunawar to Bhotan, alt. 3-7000 ft. KHASIA Mts., alt. 4-5000 ft. ? NILGHIEI Mts., *Schmidt, Hohenacker, G. Thomson*.

In its ordinary state very different from *M. rugosus* in the shorter racemes, the often pinnatifid leaf-bases, bracts and calyx; but small specimens of either are difficult to distinguish. The Nilghiri specimens are very small and dense, without runners or bracts, but they have the short-lobed calyx of *M. surculosus*; they may prove specifically different. The figure in Wight's *Icones* represents the calyx very incorrectly.

3. *M. dentatus*, *Wall. Cat.* 3914; runners 0, radical leaves long-petioled elliptic-oblong or ovate sinuate, pedicels bracteate, calyx-lobes $\frac{1}{2}$ the length of the tube rounded ovate or triangular obtuse or acute suberect in fruit. *Benth. Scroph. Ind.* 27, and in *DC. Prodr.* x. 375.

TEMPERATE HIMALAYA; Kumaon, alt. 8000 ft., *Strach. & Winterb.*; Nepal, *Wallich*; Sikkim, alt. 6-8000 ft., *J. D. H., Treutler*. KHASIA Mts.; Nunklow, alt. 5000 ft., *Simons*.

Glabrous or sparsely hairy. Rootstock perennial. Leaves 1-4 in., base acute rounded or subcordate; petiole $\frac{1}{2}$ -3 in. Flowering branches or scapes 3-6 in., erect or decumbent, slender, few-fld., leafless. Flowers distant, $\frac{1}{2}$ -1 in. long; pedicels $\frac{1}{4}$ - $\frac{1}{3}$ in.; bracts setaceous. Calyx $\frac{1}{4}$ - $\frac{1}{2}$ in. long, lobes sometimes longer and acute as in *M. rugosus*. Seeds twice as large as in *M. rugosus*, black.

13. *LANCEA*, *Hook. f. & Thoms.*

A small glabrous herb. Leaves radical and opposite, obovate-oblong or spatulate, quite entire. Flowers in a very short terminal few-fld. raceme, pedicels bracteate. Calyx campanulate, 5-fld. Corolla-tube dilated above; upper lip suberect, concave, 2-lobed; lower large, spreading, 3-lobed, palate 2-convex. Stamens 4, didynamous, subexserted; anther-cells diverging. Style filiform, stigma 2-lamellate. Fruit globose, indehiscent, exserted. Seeds numerous, small, subglobose, testa thin.

L. tibetica, *Hook. f. & Thoms. in Hook. Kew Journ.* ix. 244, t. 7.

ALPINE HIMALAYA and WESTERN TIBET; from Kashmir to Sikkim, alt. 11-16,000 ft., *Thomson, &c.*

Rootstock slender, horizontal, creeping. Leaves rosulate, or opposite on a very short stem 1-4 in. high, 1-3 $\frac{1}{2}$ in. long, obtuse or subacute, narrowed into a $\frac{1}{2}$ -amplexicaul petiole $\frac{1}{4}$ -1 in. long, rather coriaceous, sometimes very obscurely toothed. Flowers

sunk amongst the leaves, pedicels very short, bracts lanceolate. *Calyx-lobes* acute. *Corolla* $\frac{3}{4}$ –1 in. long, blue, lower lip hairy within. *Fruit* the size of a pea, hardly fleshy. *Seeds* brown.

14. **LINDENBERGIA**, *Lehm.*

Annual or perennial herbs, woody below; branches erect, straggling or ascending. *Leaves* opposite or the upper alternate, toothed. *Flowers* axillary or spicate or racemed, bracteate, ebracteolate, yellow. *Calyx* campanulate, 5-fid. *Corolla-tube* cylindric; upper lip the outer, short, broad, notched or 2-fid; lower larger, 3-lobed, spreading, base with two plaits. *Stamens* 4, didynamous, included; anther-cells separate, stipitate, all with pollen. *Capsule* 2-grooved, loculicidal; valves entire, separating from the placentiferous axis. *Seeds* numerous, minute.—Species 8, African, Indian and Malayan.

1. **L. grandiflora**, *Benth. Scroph. Ind.* 22, and in *DC. Prodr.* x. 576; softly hairy, subscent, leaves petioled ovate acuminate coarsely serrate, flowers secund in terminal lax-fid. spikes, calyx-lobes obtuse, ovary villous. *Stemodia grandiflora*, *Ham. in Don Prodr.* 89; *Wall. Cat.* 3924.

SUBTROPICAL HIMALAYA, alt. 2–6000 ft.; from Sirmore to Bhotan, abundant. *PEGU, Kurz.*

A rambling perennial, with flexuous stem and branches. *Leaves* 2–8 in., pubescent on both surfaces; nerves 6–8 pair; petiole $\frac{1}{4}$ – $1\frac{1}{2}$ in. *Spikes* 6–10 in., sometimes paniced; bracts $\frac{1}{4}$ – $\frac{1}{2}$ in., ovate, sessile or shortly petioled; flowers 1 in. long, sessile or very shortly pedicelled. *Corolla* pubescent, tube 3 times as long as the calyx. *Capsule* ovoid, tip exserted.

2. **L. Hookeri**, *Clarke mss.*; glabrous except the inflorescence, subscent, leaves petioled elliptic-lanceolate acuminate coarsely serrate, flowers secund in terminal lax-fid. spikes, calyx-lobes acute, ovary glabrous. *Lindenbergia* n. 3, *Herb. Ind. Or. H.f. & T.*

TROPICAL SIKKIM HIMALAYA; foot of the outer hills, alt. 3–4000 ft.; *J. D. H., Clarke.*

Habit of *L. grandiflora*, but more slender and nearly glabrous. *Leaves* 2–3 in., base cuneate; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Spikes* 1–2 in., shortly peduncled, glandular, puberulous; bracts sessile, ovate, acute, about equalling the calyx; lower flowers sometimes shortly pedicelled. *Calyx* cleft to the middle, teeth triangular. *Corolla* 1 in. long, glabrous without, tube nearly straight, two to three times as long as the calyx; upper lip short, 2-fid; lobes of lower rounded, crenate, densely pubescent within. *Anther-cells* sausage-shaped, quite separate, pendulous from the top of the filament.

3. **L. philippensis**, *Benth. in DC. Prodr.* x. 377; softly pubescent or villous above, stout, strict, erect, leaves ovate or ovate-lanceolate, toothed, flowers unilateral in rigid erect dense-fid. spikes or racemes, calyx longer than the bracts, lobes ovate-lanceolate acuminate, ovary villous. *Stemodia philippensis*, *Cham. in Linnæa*, iii. 5. *Stemodia* sp., *Griff. Notul.* iv. 99, and *Ic. Pl. Asiat.* t. 421.

CHITTAGONG, *Clarke.* *PEGU, Kurz.* BURMA; common about pagodas, *Griffith.* TENASSEEIM, *Helper, Lobb.*—DISTRIB. Siam, China, Philippine Islands.

Stem 2–3 ft. *Leaves* 2–4 in., much produced below into a slender petiole about half the length of the blade. *Racemes* or *spikes* 1 ft. and upwards; rachis very stout; flowers shortly pedicelled or not; bracts lanceolate. *Calyx* $\frac{1}{4}$ in. long. *Corolla* $\frac{1}{4}$ – $\frac{3}{4}$ in., pubescent. *Capsule* lanceolate, tip exserted.

4. *L. macrostachya*, *Benth. Scroph. Ind.* 22, and in *DC. Prodr.* x. 376; glabrate or pubescent, stem strict erect stout or slender, leaves elliptic-ovate serrate glabrous, flowers unilateral in rigid erect dense or lax-fld. spikes, calyx longer than the bracts, lobes short acute, ovary pubescent. *Stemodia macrostachya*, *Benth. in Wall. Cat.* 3925; and 3852 *Adenosma cuspidatum*. *L. siamensis*, *Miquel in Herb.*

WESTERN HIMALAYA; on the foot-hills and plains below them, from the Punjab to Oudh, ascending to 4000 ft. MARTABAN, *Wallich*.—DISTRIB. Siam, China.

Perhaps only a variety of *L. philippensis*, but more glabrous, with shorter petioles.

5. *L. abyssinica*, *Hochst. in Herb.*; *Benth. in DC. Prodr.* x. 377; glandular-pubescent or villous, leaves broadly ovate coarsely crenate-toothed, flowers unilateral in lax terminal spikes, calyx shorter than the lower bracts, lobes ovate acute, ovary glabrous.

SCINDE, amongst rocks, *Dalzell*.—DISTRIB. Arabia, Somali country, Abyssinia.

Stem rather slender, 11–18 in., branched. *Leaves* 1–1½ in., and nearly as broad, hairy on both surfaces; petiole ¼–½ in. *Spikes* 3–4 in.; lower bracts leafy, coarsely toothed. *Calyx* ¼ in. *Corolla* ½ in. *Capsule* hardly exserted.

6. *L. Griffithii*, *Hook. f.*; silkily villous, subscaudent, leaves short-petioled ovate-lanceolate acuminate, flowers unilateral in axillary and terminal recurved simple or paniced racemes, calyx much longer than the small bracts, lobes short triangular acute, ovary glabrous.

BHOTAN, *Griffith* (Kew Distrib. 3882).

Stem apparently tall, slender, flexuous, clothed, as are the leaves beneath, petioles and rachis of the racemes, with soft silky appressed hairs. *Leaves* 4–6 by 1½–2 in., pubescent above; petiole ¼–½ in. *Racemes* numerous, 2–4 in.; rachis slender; pedicels very short. *Calyx* ⅙ in. long. *Corolla* twice as long, hairy. *Capsule* turgidly ovoid, tip exserted.—A very distinct species.

7. *L. polyantha*, *Royle in Benth. Scroph. Ind.* 22, and in *DC. Prodr.* x. 377; villously pubescent, erect, leaves small ovate obtuse crenately serrate, flowers unilateral in axillary and terminal leafy spikes, calyx shorter than the ovate bracts, lobes obtuse, ovary pubescent. *Dodartea indica*, *Linn. Sp. Pl.* 883.

NORTHERN INDIA; from the Punjab and N. Scinde to the Concan, Behar and Dacca, common on walls and banks, &c., ascending the Himalaya to 6000 feet.

Stem 12–18 in., often branched from the base; branches erect or ascending, stout or slender. *Leaves* very numerous and uniform up the stem and branches, ½ rarely ⅔ in. long; petiole usually very short. *Spikes* 2–6 in.; flowers and bracts crowded. *Calyx* ⅙ in. long. *Corolla* twice as long. *Capsule* glabrous below, hairy above.—The ovary is certainly hairy.

8. *L. urticæfolia*, *Lehm. in Link. et Otto Abbild.* 95, t. 48; slender, glandularly villous or glabrate, leaves ovate obtuse crenate-serrate, flowers unilateral all axillary and solitary or 2-nate or in lax leafy slender spikes or racemes, calyx shorter than the ovate leafy bracts, lobes obtuse, ovary pubescent. *Benth. Scroph. Ind.* 22, and in *DC. Prodr.* x. 377; *Hook. Ic. Pl.* t. 875; *Dalz. & Gibs. Bomb. Fl.* 176; *Boiss. Fl. Orient.* iv. 425. *Stemodia ruderalis*, *Vahl Symb.* ii. 69; *Roxb. Fl. Ind.* iii. 94; *Wall. Cat.* 3923. *S. muralis*, *Roxb. in Don Prodr.* 89. *Brachycoris parviflora*, *Schrad. Ind. Sem. Gott.* 1830.

Throughout INDIA, on walls and banks, ascending to 6000 ft. in the Himalaya;

from Jamu to the Nilgherries and Tenasserim; not seen from Ceylon or Malacca.—
DISTRIB. Afghanistan, Burma.

Annual, 4–10 in. high, brittle. *Stem* sometimes simple with all the flowers solitary in the axils of large leaves, at others branched, the branches running out into leafy racemes. *Leaves* 1–1½ (rarely 2½) in. long, membranous; petiole ¼–½ in. *Flowers* shortly pedicelled. *Calyx* ⅙ in., lobes recurved. *Corolla* twice as long, sparsely hairy, yellow. *Capsule* hairy above the middle.

15. **ADENOSMA**, Br.

Annual, villous or glandular, aromatic herbs. *Leaves* opposite, rugose, crenulate. *Flowers* axillary or in leafy spikes racemes or heads, bracteolate or not. *Sepals* 5, sometimes very large in fruit. *Corolla-tube* cylindric; upper lip erect, entire or notched; lower spreading, 3-lobed, base not plaited. *Stamens* 4, didynamous, included; anther-cells separate, stipitate, one cell of all the anthers, or of the two anterior anthers only empty. *Style* dilated at the tip, winged below the entire or 2-lamellate stigma. *Capsule* ovoid ellipsoid or lanceolate, 2-grooved, loculicidal and septicidal, 4-valved. *Seeds* many, minute, reticulate.—Species 8 or 9, Asiatic, Malayan and Australian.

* *Flowers axillary; outer fruiting sepals very large, cordate or ovate.*

1. **A. ovatum**, Benth. in *Gen. Pl.* ii. 949; puberulous or glabrate, leaves ovate obtuse crenate-serrate, flowers axillary sessile, 3 outer sepals in fruit very large cordate, 2 inner very small lanceolate. *Herpestis ovata*, Benth. *Scroph. Ind.* 30, and in *Wall. Cat.* 3896. *H. javanica*, Blume *Bijd.* 748. *Pterostigma ovatum*, Benth. in *DC. Prodr.* x. 380; *Miquel Fl. Ind. Bat.* ii. 678.

MALAY PENINSULA; from Tenasserim, Griffith, to Malacca, Wallich.—DISTRIB. Sumatra, Java, Borneo.

Branched from the base, black when dry; branches 6–18 in., often rooting below, ascending. *Leaves* 1–1½ in., base cuneate or subcordate; petiole ¼ in. *Fruiting sepals* ¼–½ in., membranous, reticulate, pubescent; small equalling the lanceolate capsule.

2. **A. subrepens**, Benth. in *Gen. Pl.* ii. 949; sparingly hirsute, leaves ovate crenate, 3 outer sepals in fruit large ovate-lanceolate, 2 inner subulate. *Pterostigma subrepens*, Thwaites *Enum.* 426.

CEYLON; Pasdoon Corle and Nana Welle-Galle, Champion, Thwaites.

Very near to *A. ovatum*, but a coarser, larger, more hirsute plant, with narrower fruiting sepals.

** *Flowers racemose, spicate or capitate; upper fruiting sepal lanceolate, not very large.*

3. **A. cœruleum**, Br. *Prodr.* 443; erect, viscidly hirsute, leaves ovate-subulate simply or doubly crenate, spikes long, flowers blue, upper fruiting sepal lanceolate, the others linear. Benth. *Fl. Austral.* iv. 484. *A. villosum*, Benth. in *Wall. Cat.* 3851. *Pterostigma villosum*, Benth. *Scroph. Ind.* 21, and in *DC. Prodr.* x. 380 (in part); *Miquel Fl. Ind. Bat.* ii. 678. *P. strictum*, Griff. *Natul.* iv. 96, and *Ic. Pl. Asiat.* t. 417, f. 3. *Stemodia cœrulea*, Benth. in *DC. l. c.* 381. *Herpestis lanuginosa*, Blume *Bijd.* 747.

KHASIA MTS., alt. 0–4500 ft., Wallich, Clarke. CACHAR, Keenan. TENASSERIM, SINGAPORE, and MALACCA, Wallich, &c.—DISTRIB. Java, Borneo, Australia.

Stem 1–2 ft., strict. *Leaves* 1½–2½ in., base rounded or cordate; petiole ⅙–1 in. *Corolla* blue. *Fruiting calyx* ½ in. long; sepals variable in width.

4. **A. camphoratum**, *Hook. f.*; stem and leaves glabrous or sparingly pubescent, leaves ovate-lanceolate acute obtusely serrate narrowed into the petiole, racemes glandular-pubescent lax-fld., flowers yellow, upper fruiting sepal lanceolate, the others linear. *Stemodia camphorata*, *Vahl Symb.* ii. 69. *S. lutea*, *Moon Cat. Pl. Ceyl.* 45. *Pterostigma villosum*, *Thwaites Enum.* 218.

CEYLON; south parts of the island, common.

Stem 2-3 ft., rather slender. *Leaves* $2\frac{1}{2}$ -4 in., the petiole quite continuous from the blade and stem. *Racemes* numerous, lateral, ascending; pedicels $\frac{1}{2}$ - $\frac{1}{2}$ in. *Flowers* yellow. *Fruiting calyx* $\frac{1}{2}$ - $\frac{3}{4}$ in.—Miquel refers Vahl's *S. camphorata* to *A. cœruleum*; but its yellow flowers and country both indicate its being *A. camphoratum*.

5. **A. malabaricum**, *Hook. f.*; densely glandular-tomentose, leaves subsessile oblong-ovate subacute serrate, flowers sessile in foliaceous elliptic entire bracts, upper fruiting sepal lanceolate, the others subulate-lanceolate.

MALABAR, *Wight*.

Stem 8-12 in., stout, sparingly branched, leafy throughout its length, the leaves gradually passing into bracts. *Leaves* 1 in., narrowed into a very short petiole, margin entire below the middle. *Bracts*, lower $\frac{3}{4}$, upper $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in., a little longer than the capsule.

6. **A. capitatum**, *Benth. in Gen. Pl.* ii. 949; stout, erect, glandular-villous, leaves shortly petioled ovate or oblong subacute serrate, flowers in axillary whorls and dense cylindric villous spikes or globose heads, sepals lanceolate, upper largest. *Stemodia capitata*, *Benth. in Bot. Reg. under t.* 1470; *Wall. Cat.* 3926. *Pterostigma spicatum*, *Benth. Scroph. Ind.* 21. *P. capitatum*, *Benth. Scroph. Ind.* 21, and in *DC. Prodr.* x. 380. *Erinus bilabiatus*, *Roxb. Fl. Ind.* iii. 92.

OUTER LOWER HIMALAYA, from KUMAON to SIKKIM; BENGAL and ASSAM to MALACCA, TRAVANCORE and CEYLON; usually in rice-fields, absent in the plains of Western India.—DISTRIB. Malaya, Burma, China.

Stem 1-2 ft. *Leaves* often reflexed, 1-2 in., base cuneate; petiole hardly any. *Heads* or spikes $\frac{3}{4}$ -4 in. long, involucrate by floral leaves. *Flowers* blue, densely packed; bracts linear, hardly exceeding the flowers. *Calyx* $\frac{1}{2}$ in. long, villous with long hairs, $\frac{1}{2}$ longer than the ovoid capsule.—The specific names of (*Erinus*) *bilabiatus*, *Roxb.*, and (*Stemodia*) *capitata*, were published in the same year. I give the preference to Bentham, who placed the plant approximately in the right genus.

7. **A. microcephalum**, *Hook. f.*; slender, glandular-hairy, leaves small shortly petioled ovate or elliptic subacute serrulate, flowers usually capitate, heads small axillary and peduncled or interruptedly spicate, sepals lanceolate subequal.

TENASSERIM, *Helfer*; Moulmein, *Lobb.*—DISTRIB. Cambodia.

Stem 6-10 in., erect, simple below, branched paniculately above. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., base cuneate; petiole $\frac{1}{10}$ in. *Heads* $\frac{1}{3}$ - $\frac{1}{2}$ in. long, sometimes running out into spikes, and lower flowers sometimes solitary and axillary. *Flowers* blue; bracts small, slender. *Calyx* $\frac{1}{2}$ in. long, $\frac{1}{3}$ longer than the ellipsoid acute capsule.—Very near *A. capitatum*, but much smaller, more slender.

8. **A. macrophyllum**, *Benth. in Wall. Cat.* 3853; leaves ovate acuminate crenate-serrate narrowed at the base flaccid glabrescent, corolla twice as long as the calyx. *Pterostigma macrophyllum*, *Benth. Scroph. Ind.* 21, and in *DC. Prodr.* ix. 380.

BURMA; banks of the Irawaddi, *Wallich*.

This plant has not been found in the Wallichian Herbarium.

16. **STEMODIA**, Linn.

Character of *Adenosma*, but anther-cells all polleniferous. *Leaves* sometimes whorled. *Seeds* ellipsoid, terete, black or brown, most minute.—Species about 26, American, African, Asiatic and Australian.

1. **S. viscosa**, Roxb. *Cor. Pl.* ii. 33, t. 163, and *Fl. Ind.* iii. 94; erect, viscidly pubescent, leaves sessile oblong base cordate serrulate, flowers pedicelled axillary and in terminal racemes, corolla twice as long as the calyx. *Wall. Cat.* 3929; *Benth. Scroph. Ind.* 24, and in *DC. Prodr.* x. 381; *Wight Ic.* t. 1408; *Dalz. & Gibs. Bomb. Fl.* 176. *S. maritima*, Heyne in *Wall. Cat.* 3931. *S. arvensis*, Steud. *Nomencl.*

From CENTRAL INDIA and the Soane river throughout the DECCAN.—DISTRIB. Afghanistan.

Erect, branched from the base, 6–18 in. high, aromatic; stem angular. *Leaves* $\frac{1}{2}$ –2 in., rarely ovate or obovate, sometimes very small throughout the plant; floral bracts shorter than the pedicels. *Flowers* very numerous, nearly $\frac{1}{2}$ in. long, 2-bracteolate; pedicels equalling or exceeding the calyx. *Sepals* lanceolate, acute, half as long as the violet corolla. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, equalling the calyx, acuminate.

2. **S. serrata**, Benth. in *DC. Prodr.* x. 381; erect, viscidly pubescent, leaves sessile obovate-oblong acute serrulate, flowers subsessile axillary, corolla one-half longer than the calyx. *Sutura serrata*, *Herb. Hookstett.*

The CONCAN, *Stocks*, Law.—DISTRIB. Nubia, Upper Nile and Senegambia.

A robust leafy annual a foot high and under, usually densely branched from the base; stem obtusely 4-angled. *Leaves* $\frac{1}{2}$ –2 in., narrowed to the sessile base, entire below the middle. *Flowers* often in all the axils, smaller than in *S. viscosa*. *Capsule* linear-oblong.

17. **LIMNOPHILA**, Br.

Glabrous or pubescent often marsh or water plants, aromatic and with transparent dots. *Leaves* opposite or whorled, toothed, cut, or the submersed multifid. *Flowers* pedicelled or sessile, axillary, solitary or racemose or spicate, bracteolate or not. *Sepals* narrow, subequal or the posterior larger. *Corolla-tube* cylindric, upper lip the outer in bud, suberect, entire or 2-fid; lower spreading, 3-fid, base not plaited. *Stamens* 4, didynamous, included; anther-cells usually separate and stipitate. *Style* deflexed at the tip, stigma shortly 2-lamellate. *Capsule* ovoid or oblong, septi- and loculi-cidal, valves bearing placentiferous septa. *Seeds* numerous, small, angular, truncate, reticulate.—Species about 25, African, Asiatic and Australian.

A very variable genus, the foliage and habit of the species depending upon the depth, &c., of the water in which they grow.

* Nerves of leaf pinnate, arching from the midrib. No whorled and pinnatifid or multifid leaves.

† *Flowers sessile or subsessile (sometimes racemose in L. diffusa)*. *Leaves opposite very rarely 3-nately whorled*.

1. **L. Roxburghii**, G. Don *Gen. Syst.* iv. 543, not of Benth.; pubescent or glabrous, leaves all opposite petioled elliptic or ovate obtuse or subacute crenulate coriaceous punctate beneath, nerves strong, flowers axillary sessile in peduncled heads rarely solitary, calyx pubescent, lobes lanceolate finely acuminate not striate in fruit. *L. menthastrum*, Benth. in *DC. Prodr.* x.

386; *Dalz. & Gibs. Bomb. Fl.* 175. *Herpestis rugosa*, *Roth Nov. Sp.* 290. *Capraria gratissima*, *Roxb. Fl. Ind.* iii. 92, (*excl. citat. of Rheede*). *Antirrhinum gratissimum*, *Roxb. Ic. ined.* *Stemodia menthastrum*, *Benth. Scroph. Ind.* 23; *Wall. Cat.* 3927. *Adenosma triflora*, *Seem. Fl. Viti* 284, *not of Nees*.

Watery places in the plains of N. INDIA, and outer HIMALAYA, ascending to 6000 ft., from Chamba to Mishmi; ASSAM, BENGAL, SILHET, CENTRAL INDIA, and the CONCAN and CIRCARS.—DISTRIB. Java, China, the Philippines, Pacific Islands.

Annual, aromatic; root creeping; stems many, 1–2 ft., stout; “nodes under water emitting many fibrous roots or multifid filiform leaves,” *Roxburgh. Leaves* 2–3 in., often rugose, narrowed into a petiole of $\frac{1}{2}$ –1 in.; nerves many, stout. *Flowers* usually in axillary sessile or shortly peduncled heads. *Corolla* $\frac{1}{2}$ in. long, pubescent, blue-purple, mouth yellow. *Capsule* ellipsoid.—*Roxburgh's* drawing identifies this plant with his *Capraria gratissima*. He quotes *Rheede's* *Pola-tajira* (ix. t. 78) for the same, but I have seen no specimens from Malabar, and *Rheede* makes no mention of the aromatic smell and taste, which he could not fail to have noticed if this plant had been under his observation.

2. ***L. balsamea***, *Benth. in DC. Prodr.* x. 386; softly pubescent, leaves all opposite sessile elliptic subacute narrowed at the base obscurely crenulate punctate beneath, nerves slender, flowers axillary in shortly peduncled heads or spikes, calyx hirsute, lobes lanceolate finely acuminate striate in fruit. *Stemodia balsamea*, *Benth. Scroph. Ind.* 23; *Wall. Cat.* 3928.

PEGU, *M'Lelland*. TENASSERIM, *Wallich*; Mergui, *Griffith*.

Stem 1–2 ft., stout. *Leaves* 1–2 in., entire below the middle, nerves 3–5-pair. *Corolla* $\frac{1}{2}$ in., twice as long as the calyx. *Capsule* broadly elliptic, obtuse.—*L. villifera*, *Miquel*, of Sumatra, is probably this.

3. ***L. conferta***, *Benth. in DC. Prodr.* x. 387; erect or procumbent, glabrous except the inflorescence, leaves all opposite sessile or subpetioled oblong or elliptic-oblong obtuse crenate-serrate punctate beneath, base narrowed or subamplexicaul, nerves slender, flowers axillary solitary or in short axillary heads spikes or cymes, calyx glabrate, segments lanceolate finely acuminate striate in fruit. *Dalz. & Gibs. Bomb. Fl.* 177. *L. repens*, *Benth. l. c.* 387. *L. serrata*, *Benth. l. c.* (*the Burma plant only*); *Thwaites Enum.* 218. ? *L. punctata*, *Vahl Enum.* i. 90, and *Bonnaya punctata*, *G. Don Gen. Syst.* iv. 538. *Stemodia sessilis*, *Benth. Scroph. Ind.* 23; *Wall. Cat.* 3939. *S. tenuiflora*, *Benth. Scroph. Ind.* 23; *Wall. Cat.* 3940. *S. repens*, *Benth. in Wall. Cat.* 3935. *Gratiola lucida*, *Heyne*.—? *Rheede Hort. Mal.* ix. t. 78.

Marshes, from ASSAM, BENGAL and CHITTAGONG to TENASSERIM and BURMA; throughout the DECCAN and CEYLON.

A very variable plant; in its larger state diffuse, 12–18 in. long, with subpetioled leaves 1–1 $\frac{1}{2}$ in. long, and often spicate flowers; in its smaller (*St. sessilis*, *Wall.*) short, stout, with quite sessile oblong leaves $\frac{1}{2}$ in. long, and crowded axillary flowers; in its smallest state (*St. tenuiflora*, *Wall.*, and *serrata*, *Bth.*) erect or procumbent, with oblong sessile leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. long and solitary axillary flowers. Between these there are all intermediates. *Thwaites* has reduced all to *Gaudichaud's L. serrata*, a Polynesian plant with solitary flower and sepals not striated.—*Leaves* very minutely punctate, entire below the middle, nerves few, faint. *Corolla* about $\frac{1}{2}$ in. long. *Capsule* as in *L. balsamea*, but much smaller.—*Heyne's Gratiola lucida*, referred here by *Bentham*, is a small creeping form approaching *L. micrantha*.

4. ***L. diffusa***, *Benth. in DC. Prodr.* x. 387, *not of G. Don*; erect or decumbent, pubescent, leaves all opposite petioled elliptic-ovate or oblong-lanceolate subacute crenate-serrate punctate beneath, nerves slender, flowers

in short axillary cymes or long spikes or racemes, calyx hirsute, lobes lanceolate finely acuminate striate in fruit. *L. camphorata*, *Benth. in Wall. Cat.* 3932, and *Scroph. Ind.* 24, not of *Vahl*. *Stemodia cimicina*, *Benth. in Wall. Cat.* 3933.

EASTERN BENGAL to CHITTAGONG, BURMA and TENASSERIM. TRAVANCORE, Wight. CANARA, *Hohenacker*.—DISTRIB. Sumatra.

Closely allied to *S. conferta*, but with pubescent more strongly nerved crenate-serrate leaves, and often racemose flowers.—Roxburgh's *Capraria diffusa* (*Limnophila diffusa*, G. Don) is *Ebermeyera thyrsoidea*, Kurz in Journ. As. Soc. 1870.

5. ***L. micrantha***, *Benth. in DC. Prodr.* x. 387; small, creeping below, glabrous, leaves opposite small sessile entire or subserrate, nerves very obscure, flowers axillary subsessile, calyx $\frac{1}{2}$ in. long glabrous, lobes subulate fruiting striate. *Stemodia micrantha*, *Benth. Scroph. Ind.* 23; *Wall. Cat.* 3936. *Herpestis pygmæa*, *Griff. Notul.* iv. 104.

Marshy places in BENGAL, ASSAM, SILHET, CHITTAGONG and TENASSERIM.—DISTRIB. Cochín-China.

Stem 3–6 in., stout, branching from the root. Leaves crowded, $\frac{3}{4}$ – $\frac{1}{2}$ in., punctate, thick, teeth few. Flowers $\frac{1}{2}$ – $\frac{1}{6}$ in. long, red-purple.—A very distinct little species.

†† Flowers pedicelled. Leaves all opposite.—See also 10, *L. gratissima*; and 11, *L. hirsuta*.

6. ***L. laxa***, *Benth. in DC. Prodr.* x. 388; stem 8–12 in. slender flaccid sparsely hairy, leaves all opposite subsessile or petioled oblong-lanceolate obtuse subcrenate, nerves very slender, flowers solitary axillary, pedicels longer than the calyx, calyx hirsute, lobes subulate fruiting striate. *Herpestis* sp. 2, *Griff. Notul.* iv. 103.

TENASSERIM; at Mergui, *Griffith*; Tavoy, *Parish*. CEYLON, *Walker*.

Stem ascending, rooting at the lower nodes. Leaves $\frac{3}{4}$ – $1\frac{1}{2}$ in., flaccid, narrowed into a short petiole.—Resembles a reduced form of *L. hirsuta*.

7. ***L. erecta***, *Benth. in DC. Prodr.* x. 388; glabrous, stem 4–6 in. subsimple stout erect, leaves all opposite subsessile linear-oblong subserrate, nerves obscure, flowers solitary axillary, pedicels shorter than the calyx, fruiting recurved, calyx $\frac{1}{2}$ in. glabrous, lobes lanceolate acuminate fruiting striate. *Maxim. Diagn. Pl. Nov. Dec.* xix. 406. *Stemodia gratioloides*, *Benth. Scroph. Ind.* 25; *Wall. Cat.* 3938.

BENGAL; Serampore, *Griffith*. TENASSERIM; at Tavoy, *Wallich*.—DISTRIB. China.

A small stout species, with leaves rarely 1 in. long.

8. ***L. pulcherrima***, *Hook. f.*; stem 4–6 in. pubescent, stout, erect or ascending, leaves all opposite sessile elliptic-oblong subcrenate, nerves obscure, flowers axillary solitary, pedicels shorter than the calyx fruiting erect, calyx $\frac{1}{6}$ in. hirsute, lobes subulate acuminate fruiting striate. *L. laxa*, *Benth. in DC. Prodr.* x. 388, in part. *L. villosa* var. *sumatrana*, *Miquel Fl. Ind. Bat.* ii. 68. *Herpestis pulcherrima*, *Griff. Notul.* iv. 104.

BENGAL; at Comilla, *Clarke*. MALACCA, *Griffith*, *Cuming*. SINGAPORE, *G. Thomson*.—DISTRIB. Sumatra.

Very closely allied to *L. laxa* and *L. erecta*, differing from the former in the stout erect habit, and more sessile shorter leaves; and from the latter in the pubescence and the erect fruiting pedicels.

9. ***L. pygmæa***, *Hook. f.*; glabrous, much branched, creeping, branches 4-6 in. divaricate, leaves all opposite sessile oblong-lanceolate acute serrate, nerves very obscure, flowers axillary solitary, pedicels equalling or exceeding the calyx erect in fruit, calyx $\frac{1}{2}$ in. hirsute, lobes subulate-lanceolate fruiting striate. *Herpestis pygmæa*, *Griff. Notul.* iv. 104. *Stemodia diffusa*, *Benth. in Wall. Cat.* 3937.

TENASSEMBIM; at Tavoy, Gomez, Helfer; Mergui, Griffith. MALACCA, Griffith, Cuming.

Very near to *L. laxa*, but much smaller, more glabrous, with leaves less than $\frac{1}{2}$ in. long.

††† Leaves some or most 3-4-nately whorled, sometimes all opposite in *L. gratissima* and *hirsuta*.

10. ***L. gratissima***, *Blume Bijl.* 749; erect, 1-2 ft., glabrous, leaves opposite and 3-nately whorled $\frac{1}{2}$ -amplexicaul linear-oblong subacute serrulate, flowers in axillary and terminal many-fl. racemes rarely solitary, calyx usually shorter than the pedicels glabrate, lobes lanceolate acuminate fruiting striate. *Benth. Scroph. Ind.* 26; *Wall. Cat.* 3906; *Dalz. & Gibs. Bomb. Fl.* 177. *L. punctata*, *Blume l. c.* 750; *Benth. in DC. Prodr.* x. 388; *Miquel Fl. Ind. Bat.* ii. 682; *Maxim. Diagn. Pl. Nov. Dec.* xix. 406. *Gratiola aromatica*, *Pers. Synops.* i. 14. *Ambulia aromatica*, *Lamk. Encycl.* i. 128.—*Rheede Hort. Mal.* x. 6.

Watery places. CACHAR, Keenan. PEGU, Kurz. MALACCA, Maingay. The DECCAN PENINSULA, from the Concan southwards. CEYLON, common.—DISTRIB. Malay and Philippine Islands, China, Japan, N. Australia.

Stem stout, simple, rarely branched above. *Leaves* $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., nerves few and faint. *Racemes* sometimes 1 foot long and paniculately branched, with the flowers whorled, at others few-fl., or flower solitary and axillary; pedicels $\frac{1}{2}$ -1 in., glandular; bracteoles minute. *Calyx* $\frac{1}{2}$ in. long, glandular, fruiting hemispheric. *Corolla* $\frac{1}{2}$ in. long. *Capsule* oblong, acute.—Blume's *L. gratissima* is the typical form of this plant, *L. punctata* being a reduced state with solitary flowers in the axils.

11. ***L. hirsuta***, *Benth. in DC. Prodr.* x. 388; erect, stem 6-18 in. hirsute rarely glabrate, leaves opposite or 3-4-nately whorled sessile or narrowed into a short petiole elliptic linear-oblong or subspathulate serrulate, nerves very obscure, flowers axillary solitary or cymose or paniced at the top of the stem, pedicels long or short, calyx hirsute, lobes lanceolate finely acuminate fruiting striate. *Stemodia hirsuta*, *Heyne*; *Benth. Scroph. Ind.* 24; *Wall. Cat.* 3930. *Ambulia ebracteata*, *Herb. Ham.*

Wet places, from ASSAM to CHITTAGONG and the NICOBAR ISLANDS. DECCAN PENINSULA, from the Concan southwards. CEYLON, common.—DISTRIB. Borneo, China.

Best distinguished from *L. gratissima* by its pubescence, less racemose inflorescence, and more orbicular capsule. There are what appear to be glabrous states of it from Chota Nagpore (Ranchee, alt. 2000 ft., Clarke) and Balaghat (Wight) with always opposite leaves.

12. ***L. polyantha***, *Kurz mss.*; glandular-pubescent, stem slender 6-18 in., leaves 4-nately whorled $\frac{1}{2}$ -amplexicaul linear serrulate, nerves obscure, cymes terminal paniced, flowers very numerous small shortly pedicelled, calyx $\frac{1}{2}$ in., lobes subulate fruiting not striate.

Marshes. SIKKIM TERAI, *Herb. Griffith*; Siligoree, Clarke. PEGU, Kurz.

A graceful species, conspicuous for the copious minute flowers in a subpyramidal inflorescence. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., all whorled except in starved forms. *Peduncles* and

pedicels very slender; bracteoles nearly as long as the calyx. *Corolla* about $\frac{1}{2}$ in. long. *Capsule* obovoid-oblong.

** Leaves with 3-5 parallel nerves running from the base to the tip, or pinnatifid or multifid.

† *Flowers sessile or very shortly pedicelled.*

13. **L. Helferi**, *Hook. f.*; glabrous, 4-6 in., stem or branches very slender ascending, leaves opposite and 3-4-nately whorled sessile linear obscurely serrulate, flowers minute very numerous in peduncled axillary cymes, pedicels shorter than the calyx and peduncles capillary, calyx $\frac{1}{10}$ in. long, lobes subulate erect, fruiting very narrow striate.

TENASSERIM, *Helfer*.

A very elegant little plant, the smallest flowered of any allied to *L. polyantha*, of which it is a glabrous miniature. *Leaves* $\frac{1}{6}$ - $\frac{1}{2}$ in. long. *Pedicels* rarely as long as the narrow calyx. *Corolla* $\frac{1}{8}$ - $\frac{1}{6}$ in. long. *Capsule* obovoid-oblong.

14. **L. hypericifolia**, *Benth. in DC. Prodr.* x. 386; glabrous, stem 1-2 ft. stout erect simple, leaves all opposite and entire $\frac{1}{2}$ -amplexicaul elliptic or ovate-oblong obtuse crenulate, flowers large sessile in the axils of opposite or alternate leafy bracts forming terminal and axillary sessile or peduncled spikes, calyx-lobes ovate acuminate, fruiting membranous not striate. *Cybbanthera connata*, *Ham. in Don Prodr.* 87. *Herpestis connata*, *Spreng. Syst. cur. post.* 234. *Stemodia hypericifolia*, *Benth. Scroph. Ind.* 23; *Wall. Cat.* 3934.

Marshy places in the WESTERN and CENTRAL HIMALAYA, from Kangra, *Edgeworth*, to Nepal, *Wallich*. KHASIA MTS., alt. 4-5000 ft., *J. D. H. & T. T. NILGIRI MTS.*, *Wight*, &c.

Stem rarely branched. *Leaves* all opposite in every specimen, $\frac{1}{2}$ -2 by $\frac{1}{4}$ -in., rather thick, minutely punctate beneath. *Flowers* $\frac{3}{4}$ in. long, rose-purple, pedicels very rarely $\frac{1}{6}$ in. *Corolla* twice as long as the calyx, purple, fruiting membranous. *Capsule* broadly elliptic.—I find no trace of pinnatifid or multifid leaves on any of the numerous specimens.

15. **L. cana**, *Griff. Notul.* iv. 98; stem 6-10 in. very stout hirsute, leaves 3-6-nately whorled sessile upper elliptic or linear-oblong obtuse serrulate 3-5-nerved, lower pinnatifid, flowers sessile crowded in terminal rarely axillary erect leafy spikes with opposite or whorled bracts, calyx-tubes subulate.

EAST BENGAL, in the Jheels, *Griffith, J. D. H. & T. T.*; Dacca and Pubna, *Clarke*.

Stem extensively creeping, sending up erect simple branches. *Leaves* $\frac{3}{4}$ -1 by $\frac{1}{4}$ - $\frac{1}{2}$ in., thick, gradually passing upwards into the bracts which are almost imbricate. *Flowers* quite sessile, violet. *Calyx* $\frac{1}{6}$ in. long, fruiting not seen.—I have referred this very distinct species to Griffith's *L. cana* at Mr. Clarke's suggestion; from the habitat and other characters it may be the true plant, but I have seen no specimens from Griffith, who describes the leaves as 3-nately whorled and the flowers as furnished with 2 most minute tooth-like bracteoles, which latter I do not find. It should be sought for at Jumalapore, Griffith's locality.

16. **L. polystachya**, *Benth. Scroph. Ind.* 25, and in *DC. Prodr.* x. 790; glabrous, floating, upper leaves opposite or 3-4-nately whorled sessile linear or oblong crenulate, lower capillaceo-multifid, flowers sessile in terminal and axillary long-peduncled slender spikes with short bracts. *Wall. Cat.* 3909; *Wight Ic. t.* 860. *Stemodia aquatica*, *Willd. Sp. Pl.* iii. 316. *Conobea indica*, *Spreng. Syst.* ii. 771.

Flooded grounds in the S. DECCAN, *Rottler*, &c.

Stem 1-2 ft. long, slender, erect or ascending from the long floating portion which is densely clothed with the dissected leaves. *Leaves*, upper $\frac{1}{2}$ -1 $\frac{1}{2}$ in., from narrow linear to oblong, 3-5-nerved; in small specimens 4-8 in. high all the leaves are pinnatisect. *Spikes* sometimes divaricately branched, 2-6 in. long; bracts ovate, usually shorter than the flowers. *Calyx* $\frac{1}{2}$ in., quite glabrous, fruiting hemispheric; lobes ovate, acuminate, not striate. *Corolla* much longer than the calyx, white. *Capsule* globose, as long as the calyx.

17. *L. sessiliflora*, *Blume Bijdr.* 750; stem 4-8 in. slender hirsute above rarely glabrate, leaves 3-6 in. a whorl all lobulate or pinnatisect or the uppermost very rarely opposite and entire, flowers axillary solitary sessile or very shortly pedicelled, fruiting calyx hemispheric membranous not striate, lobes ovate long-acuminate. *Benth. Scroph. Ind.* 25, and in *DC. Prodr.* x. 389; *Miquel Fl. Ind. Bat.* ii. 683; *Wall. Cat.* 3902. *Hottonia sessiliflora*, *Vahl Symb.* ii. 36.

Throughout INDIA, in rice-fields and swamps, from the Punjab to Bengal, Central India, Chittagong. CEYLON, common.—DISTRIB. Java, Japan.

Leaves rarely more than $\frac{1}{2}$ in. long, irregularly pinnatifidly gashed or pinnatisect, but not capillaceo-multifid, or rarely so. *Sepals* with long points. *Corolla* $\frac{1}{2}$ in. long. *Capsule* orbicular, turgid, $\frac{1}{8}$ in. diam.—This strongly resembles a sessile-flowered form of *L. gratioloides*, or a short pubescent form of *L. heterophylla* wanting the multifid submerged leaves. Bentham's *L. gratioloides* var. *myrophylloides* seems more akin to this; it is a Ceylon plant with tufted creeping stems and roots, erect rigid branches 4-8 in. high, densely clothed with whorls of short capillaceo-multifid rigid leaves, giving a cylindric form to the branches, which are $\frac{1}{2}$ -1 in. diam. The flowers are sessile or pedicelled in the upper axils. The uppermost leaves are sometimes entire.

18. *L. heterophylla*, *Benth. Scroph. Ind.* 25, and in *DC. Prodr.* x. 390; glabrous, stem elongate slender, uppermost leaves usually opposite small sessile $\frac{1}{2}$ -amplexicaul oblong crenulate, those next below 4-6 in. a whorl pinnatifid, the submerged long capillaceo-multifid, flowers axillary solitary sessile or subsessile, or the uppermost in a short leafy spike, fruiting calyx hemispheric membranous not striate, lobes ovate shortly acuminate. *Wall. Cat.* 3905; *Griff. Notul.* iv. 97, and *Ic. Pl. Asiat.* 416, f. 2. *L. Roxburghii*, var. *tenuior*, *Plant. Hohenack.* 679, not of *Don*. *Columna heterophylla*, *Roxb. Fl. Ind.* iii. 97.

Throughout INDIA and CEYLON, in rice-fields and swamps.—DISTRIB. Borneo, Japan, China.

The much larger size, glabrous stem, abundant multifid leaves, frequent presence of upper opposite and alternate small entire floral leaves, and the shortly acuminate calyx-lobes distinguish this from *L. sessiliflora*, but there are a good many specimens which in a dried state may be referred to either.

VAR. *reflexa*; very slender, submerged leaves short $\frac{1}{2}$ in. very finely divided, lower pedicels longer than the calyx recurved in fruit. *L. reflexa*, *Benth. Scroph. Ind.* 25, and in *DC. l. c.* 389; *Wall. Cat.* 3904.—Tavoy, *Wallich*; Malacca, *Cuming*.

19. *L. tillæoides*, *Hook. f.*; very small, 2-4 in. high, quite glabrous, leaves all whorled $\frac{1}{2}$ - $\frac{3}{4}$ in. long upper pinnatifid lower multifid, flowers numerous axillary solitary, pedicels shorter than the calyx recurved in fruit, calyx not striate in fruit, lobes short triangular acute.

ASSAM; banks of the Kullung river, *Simons*.

A small loosely tufted species, stem and branches slender but rigid, with the whorls of leaves rather distant. Upper flowers sessile, lower pedicelled. *Corolla* $\frac{1}{2}$ - $\frac{3}{4}$ in.

long. *Calyx* hemispheric in fruit, membranous. *Capsule* broadly oblong, nearly as long as the *calyx*.—A very singular little species.

†† *Flowers pedicelled, pedicels usually longer than the calyx.*

20. **L. racemosa**, *Benth. Scroph. Ind.* 26, and in *DC. Prodr.* x. 390; stem 1-2 ft. stout erect, leaves sessile upper opposite or 3-nately whorled $\frac{1}{2}$ -amplexicaul ovate or linear-oblong serrulate, lower capillaceo-multifid, flowers large usually in erect terminal racemes, *calyx*-lobes ovate acuminate, fruiting not striate. *Wall. Cat.* 3907; *Wight Ic.* t. 861; *Dalz. & Gibs. Bomb. Fl.* 177. *L. Benthamiana*, *Miquel Plant. Hohenack.* n. 71 c. *L. Roxburghii*, *Benth. in DC. Prodr.* x. 388, not of *Dpn.* *Cyrrilla aquatica*, *Roxb. Cor. Pl.* ii. 47, t. 189, and *Fl. Ind.* iii. 115.

Pools, &c., in BENGAL; at Dinagapore, *Clarke*. *MAEWAB*; Mt. Aboo, *Kurz*. DECCAN PENINSULA AND CEYLON, common.—DISTRIB. Java.

Stem hirsute or glabrous. *Leaves* $1\frac{1}{2}$ -2 by $\frac{1}{4}$ - $\frac{1}{2}$ in. most minutely punctate beneath, nerves strong. *Racemes* 2-6 in., strict; *pedicels* $\frac{1}{4}$ - $\frac{3}{8}$ in., much longer than the bracts. *Calyx* $\frac{1}{4}$ in.; lobes with slender points, fruiting membranous. *Corolla* $\frac{1}{4}$ in. diam., $\frac{1}{2}$ - $\frac{3}{4}$ in., bluish or purple, fragrant. *Capsule* almost globose.—The upper part of this resembles *L. hypericifolia* with pedicelled flowers; some states are with difficulty distinguished from *C. heterophylla*, and small ones from *L. gratioides*.

21. **L. gratioides**, *Br. Prodr.* 442; glabrous, stem short erect or diffusely branched or elongate and slender, leaves all whorled and pinnatifid or a few upper entire and opposite, or upper pinnatifid and lower multifid, flowers axillary solitary pedicelled rarely subracemose, *calyx* hemispheric in fruit, lobes ovate acuminate not striate. *Benth. Scroph. Ind.* 25, and in *DC. Prodr.* x. 389; *Gaud. in Freyc. Voy.* 447, t. 57, f. 1; *Wall. Cat.* 3901; *Dalz. & Gibs. Bomb. Fl.* 177; *Miquel Fl. Ind. Bat.* ii. 683. *L. trifida*, *Spreng. Syst.* ii. 802. *L. myriophylloides*, *Roth Nov. Sp.* 294. *Gratiola virginiana*, *Linn. Sp. Pl.* 25 (the *Malabar plant*). *G. trifida*, *Willd. Sp. Pl.* i. 104. *Hottonia indica*, *Linn. Sp. Pl.* 208; *Burm. Thes. Zeyl.* t. 55, f. 1. *Hydropityon pedunculatum*, *Seringe in DC. l. c.* i. 422. *Columna balsamea*, *Roxb. Fl. Ind.* iii. 97.—*Rheede Hort. Mal.* ix. t. 85, and xii. t. 36. *Burm. Fl. Zeyl.* t. 55, f. 1.

Throughout INDIA, in swamps, rice-fields, &c.—DISTRIB. Beluchistan, Malayan Islands, China, Australia, Tropical Africa.

In its most common form a simple or branched plant 4-8 in. high, smelling of turpentine, with whorled pinnatifid leaves, $\frac{1}{4}$ - $\frac{3}{4}$ in. long, which in wetter places appear to acquire a few emersed opposite entire leaves at the top of the stem, and numerous capillaceo-multifid ones at its base. The stems are stout or slender. Very small specimens from Rohilkund (Kuttra, *Edgeworth*) have very fine wiry simple stems 3 in. high, and capillary peduncles three times as long as the leaves; others have stout stems and peduncles, the latter shorter than the leaves. *Calyx* $\frac{1}{2}$ - $\frac{1}{3}$ in. long, rarely larger. *Corolla* $\frac{1}{2}$ in.—Large specimens of var. *intermedia* approach *L. racemosa*; short-pedicelled ones are hardly distinguishable from *L. sessiliflora*; and the var. *elongata* is almost identical with *L. heterophylla*. *Bentham's* var. *myriophylloides* does not seem to me distinguishable from the common form of *gratioides*.

VAR. intermedia; stem robust, leaves all close-set, flowers sometimes racemose with opposite entire bracteal leaves.—N.W. India; Moradabad, *Thomson*; Garwhal, *Strachey & Winterb.* (*L. Roxburghii in Herb.*); Subsivaliks, *Edgeworth*; Kangra and Dharmisala, alt. 3-4000 ft., *Clarke*. (Beluchistan, *Stocks*).

VAR. elongata, *Benth. in DC. l. c.*; stem very long, upper leaves opposite entire, submerged capillaceo-multifid. *L. elongata*, *Benth. in Wall. Cat.* 3903.—Oude, *Wallich*; Moradabad, *Thomson*; Deccan, *Heyne*, &c.

22. **L. Griffithii**, *Hook. f.*; glabrous, stems densely tufted, branches

short 1-2 in. densely clothed with short whorled multifid leaves, flowers solitary long-pedicelled, fruiting pedicels deflexed. *L. sessiliflora*, *Griff. Notul.* iv. 99, t. 418, f. 5. *L. gratioloides* var. *myriophylloides*, *Benth. in DC. Prodr.* x. 389 (the Malacca plant). *Quinquelobus* glaber, *Benj. in Linnæa*, xx. 316. *Benjaminia glabra*, *Benj. l. c.* 761.

MALACCA, Cuming, Griffith, Maingay.

A small black densely tufted herb, with creeping tufted stems that send down long rigid roots, and up short stout and stiff or slender flaccid branches. *Leaves* about $\frac{1}{2}$ in. long, usually densely imbricate. *Pedicels* $\frac{1}{2}$ in. and less, slender. *Calyx* $\frac{1}{10}$ - $\frac{1}{8}$ in. long, fruiting not seen. *Corolla* $\frac{1}{2}$ in. long.—This may, as Griffith supposed, be referable to *L. sessiliflora*, as some of the specimens have pedicels shorter than the leaves, but its habit is very singular, it is of remarkably small size, and the specimens from all three collectors agree. It closely resembles a West African white-flowered plant found near Nufa on the Niger by Barter.

DOUBTFUL SPECIES.

L. HYSSOPIFOLIA, *Roth Nov. Sp.* 297; is not determinable; it is a Peninsular species, and possibly *L. gratissima* or *racemosa*.

18. **HERPESTIS**, *Gaertn. f.*

Glabrous, often punctate herbs. *Leaves* entire, or toothed, or submersed and multifid. *Flowers* axillary or racemose, yellow blue or white; pedicels bracteolate or not. *Sepals* 5, upper often very large. *Corolla-tube* cylindrical; lips spreading, upper the outer in bud, notched or 2-lobed; lower 3-lobed. *Stamens* didynamous, included; anther-cells contiguous, distinct. *Style* dilated at the top and 2-lobed or entire. *Capsule* 2-grooved; valves 2 or 4, separating from an entire column. *Seeds* numerous, very minute.—Species about 50, all warm countries.

The Indian species all belong to the section *Bramia*, with subequal corolla-lobes and stamens, sagittate or didymous anthers, and capitate 2-lobed stigma.

1. **H. Monniera**, *H. B. & K.*; *Benth. Scroph. Ind.* 30, and in *DC. Prodr.* x. 410; creeping, leaves obovate-oblong or spatulate quite entire, peduncles longer than the 2-bracteolate calyx, upper sepal ovate, capsule ovoid acute. *Boiss. Fl. Orient.* iv. 426; *Wall. Cat.* 3900; *Dalz. & Gibs. Bomb. Fl.* 178; *Miquel Fl. Ind. Bat.* ii. 685; *Bot. Mag.* t. 2557. *H. spatulata*, *Blume Bijl.* 748. *Gratiola Monniera*, *Linn.*; *Roxb. Cor. Pl.* ii. 41, t. 178, and *Fl. Ind.*, and *Ed. Carey & Wall.* i. 141. *Septis repens*, *Lour. Fl. Coch.* 392. *Bramia indica*, *Lamk. Dict.* i. 459.—*Rheede Hort. Mal.* x. t. 14.

Marshes throughout INDIA, ascending to 4000 ft.; from the Punjab to Ceylon and Singapore, common.—**DISTRIB.** All warm countries.

Quite glabrous, rather succulent; branches 4-10 in. long. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., sessile, obtuse, entire in the Indian plant, nerves very obscure. *Peduncles* usually longer than the leaves. *Calyx* $\frac{1}{2}$ - $\frac{3}{4}$ in. long. *Corolla* twice as long, lobes subequal. *Capsule* included. *Seeds* pale, irregular.—Mr. Clarke points out to me that the *Calytriplex obovata*, R. & P. of Peru, cited as a synonym of *H. Monniera* in De Candolle's *Prodromus*, is, according to the figure of the authors (overlooked by Benthams), a very different plant.

2. **H. Hamiltoniana**, *Benth. Scroph. Ind.* 30, and in *DC. Prodr.* x. 400; erect, stout, leaves linear-lanceolate entire or subserrate, flowers sessile, upper sepal ovate-cordate, capsule globose. *Wall. Cat.* 3898; *Dalz. & Gibs. Bomb. Fl.* 178. *Cardiophorus decussata*, *Griff. Notul.* iv. 105, and *l. c. Pl. Asiat.* t. 417, f. 1.

Wet places in northern India; from the PUNJAB, ascending to 3000 ft., MALWAR and the CONCAN, to BENGAL, ASSAM and SILHET.—DISTRIB. Senegal.

Quite glabrous. *Stem* about a span high, usually very stout and much branched. *Leaves* $\frac{1}{2}$ –1 in., nerves very obscure. *Calyx* $\frac{1}{2}$ in. *Corolla-tube* hardly exceeding the calyx.

3. **H. floribunda**, *Br. Prodr.* 442; erect, leaves linear-lanceolate entire or obscurely toothed, flowers peduncled, sepals membranous outer very broad upper almost orbicular, capsule globose. *Benth. in DC. Prodr.* x. 400; *Roth Nov. Sp.* 289; *Miqrel Fl. Ind. Bat.* ii. 684. *H. linearis*, *Spreng. Syst. Veg.* ii. 802. *H. lanceolata*, *Wight in Benth. Scroph. Ind.* 30; *Wall. Cat.* 3899. *H. amara*, *Spanoghe in Linnæa*, xv. 332? *Lindernia sesamoides*, *Spreng. new entd.* i. 261.

DECCAN PENINSULA; common in wet places from the Concan southwards, and CEYLON.—DISTRIB. Java, Australia, Tropical Africa.

Nearly glabrous. *Stem* a span high and upwards, more slender than in *H. Hamiltoniana*. *Leaves* $\frac{1}{2}$ –1 in., sometimes linear, at others contracted into a petiole. *Peduncles* about equalling the calyx, very slender, 2-bracteolate below the top, puberulous, as are the reticulate sepals.

19. **GRATIOLA**, *Linn.*

Glabrous or glandular-pubescent herbs. *Leaves* opposite, entire or toothed. *Flowers* axillary, solitary, 2-bracteolate. *Sepals* 5, subequal. *Corolla-tube* cylindric; lips spreading, posterior the outer entire or 2-fid; anterior 3-fid. *Stamens*, 2 posterior perfect included, anther-cells distinct; staminodes 2, filiform or 0. *Style* filiform, stigma deflexed dilated or 2-lamellate. *Capsule* ovoid, loculi- and septi-cidal; valves separating from the placentiferous axis. *Seeds* many, small, reticulate.—Species about 20, chiefly of temperate regions.

1. **G. Griffithii**, *Hook. f.*; glabrous, succulent, erect, leaves elliptic-oblong obtuse 3-nerved entire, flowers sessile diandrous, staminodes 0, capsule globose.

UPPER ASSAM, on moist banks; Gabovo, Nam Senna and Noa Dehing, *Griffith* (*Kew Distrib.* 3915), *Simons*.

Very succulent, branched from the base, 6–10 in. high; branches erect. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., sometimes obscurely sinuate, most minutely punctate; nerves very slender. *Flowers* minute. *Corolla* $\frac{1}{2}$ in., yellow, tube scarcely exceeding the linear-oblong sepals; lobes short, rounded. *Anther-cells* parallel, shortly oblong. *Capsule* $\frac{1}{2}$ in. diam., membranous. *Seeds* cancellate.—A very interesting plant, as being the only tropical Asiatic representative of the genus.

UNKNOWN SPECIES.

G. CHAMÆDREYS and G. STRIGOSA, *Roth Nov. Sp.* 10, two Peninsular plants of Heyne, are unrecognizable from the descriptions, and no doubt well-known species of other genera.

G. CHAMÆDRIFOLIA, *Lamk. Dict.* iii. 27 (*Limnophila chamædrifolia*, *G. Don Gen. Syst.* 343, is doubtfully referred by Miquel (*Fl. Ind. Bat.* ii. 682) to *Limnophila grattissima* Bl. (under *L. punctata* Bl.), of which it may be a small state.

20. **DOPATRIUM**, *Hamilt.*

Very slender glabrous marsh annuals. *Leaves* few, opposite, lower small, upper pairs remote and minute. *Flowers* small, violet, axillary, solitary; pedicels 0 or filiform, ebracteolate. *Calyx* 5-fid. *Corolla-tube* slender below, throat broad; upper lip the outer, short, 2-fid; lower broad, spreading, 3-lobed. *Stamens*, 2 upper perfect, included; anther-cells parallel, distinct,

equal; staminodes 2, minute. *Style* short, stigma 2-lamellate. *Capsule* small, globose or oblong, loculicidal, valves placentiferous. *Seeds* numerous, very minute, tubercled.—Species 5, African, Asiatic and Australian.

1. ***D. nudicaule***, *Ham. in Benth. Scroph. Ind.* 31, and in *DC. Prodr.* x. 407; very slender, 2–4 in. high, bracts minute acuminate, calyx-lobes acuminate, capsule linear-oblong, pedicel deflexed. *Gratiola nudicaulis*, *Willd. in Act. Berol.* iv. 192. *G. aphylla*, *Roth Nov. Sp.* 7. *G. cuneifolia*, *Roxb. Fl. Ind.*, and *Ed. Wall. & Carey*, i. 142.

SOUTH DECAN; *Heyne*, &c. CEYLON; not uncommon.—DISTRIB. Java, Philippine Islands.

Stem simple or branched from the base. *Leaves*, radical 0, or very few, $\frac{1}{10}$ – $\frac{1}{2}$ in. long, oblong, obtuse; cauline few, minute. *Corolla* $\frac{1}{2}$ in. long. *Capsule* $\frac{1}{4}$ in.

2. ***D. junceum***, *Ham. in Benth. Scroph. Ind.* 31, and in *DC. Prodr.* x. 407; stem 6–10 in., bracts minute obtuse, calyx-lobes oblong obtuse, corolla $\frac{1}{2}$ in., capsule globose. *Dalz. & Gibs. Bomb. Fl.* 178; *Griff. Notul.* iv. 102, and *Ic. Pl. Asiat.* t. 418, f. 6; *Miquel Fl. Ind. Bat.* ii. 686. *Gratiola juncea*, *Roxb. Cor. Pl.* ii. 16, t. 129, and *Fl. Ind.*, and *Ed. Wall. & Carey*, i. 142; *Wall. Cat.* 3892. *Morgania juncea*, *Spreng. Syst.* ii. 803.

Throughout INDIA from the Upper Gangetic plain southwards and eastwards to Assam, Burma, and CEYLON.—DISTRIB. Malay Islands, China, Japan, Philippines, Australia.

Rather fleshy, branched from the base. *Leaves*, radical 0 or few, oblong, obtuse, sometimes 2 in. long, nerves parallel; cauline smaller, in distant pairs. *Flowers* in very distant pairs, rose coloured, sessile or on capillary pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. erect in fruit. *Capsule* $\frac{1}{2}$ in. diam.

3. ***D. lobelioides***, *Benth. Scroph. Ind.* 31, and in *DC. Prodr.* x. 407; stem 6–18 in., bracts minute obscure, calyx-lobes very short obtuse, corolla $\frac{1}{2}$ in., capsule globose. *Wight Ic.* t. 859. *Gratiola lobelioides*, *Retz Obs.* iv. 7; *Roxb. Fl. Ind.* i. 142; *Wall. Cat.* 3893. *G. hyssopioides*, *Roxb. Cor. Pl.* ii. t. 128, and *Fl. Ind.* i. 141, and *Ed. Wall. & Carey*, i. 142 (not of *Cor. Pl.* iii. t. 203).

SOUTH DECAN, *Heyne*, &c. CEYLON.

Stem stout and fleshy below, sometimes as thick as a goose-quill above and branches very slender. *Leaves*, lower 2–4 pairs obovate-oblong, obtuse, $\frac{1}{2}$ –2 in. long, upper very few distant and small; nerves parallel, very obscure. *Flowers* subracemose, in distant pairs; pedicels capillary, $\frac{1}{2}$ –1 in., spreading in fruit. *Capsule* $\frac{1}{2}$ in. diam.

21. **ARTANEMA**, *Don*.

Erect herbs, angles of stems and leaves above scabrid. *Leaves* opposite, entire or serrate. *Flowers* large, blue, racemose, ebracteolate; bracts foliaceous. *Sepals* 5, acuminate, bare, much dilated. *Corolla-tube* long, broad; upper lip the outer, erect, broad, notched; lower spreading, 3-fid. *Stamens* 4, didynamous, 2 posterior short, included; 2 anterior with long arching filaments dilated at the base; cells confluent at their tips. *Stigma* 2-lamellate. *Capsule* globose, septicidal; valves entire, separating from the placentiferous axis. *Seeds* rugose.—Species 4, tropical Asiatic, Australian and African.

1. ***A. sesamoides***, *Benth. Scroph. Ind.* 39, and in *DC. Prodr.* x. 408; leaves lanceolate more or less petioled, corolla $\frac{1}{2}$ in. long, tube broad. *Wight Ic.* t. 1410; *Dalz. & Gibs. Bomb. Fl.* 181; *Miquel Fl. Ind. Bat.* ii. 686. *Columnea longifolia*, *Linn. Mant.* 90. *Achimenes sesamoides*, *Vahl Symb.*

ii. 71. *Diceros longifolius*, *Pers. Syn.* ii. 164; *Blume Bijl.* 751; *Wall. Cat.* 3884.—*Rheede Hort. Mal.* ix. t. 87.

DECCAN PENINSULA; on the west side, from the Concan southwards. MALAY PENINSULA; from Tenasserim southwards. CEYLON; common, ascending to 3000 ft.—DISTRIB. Sumatra, Java, Philippine Islands, Borneo; Tropical Africa?

A tall herb, 2-3 ft., sparingly branched. *Leaves* 2-4 in., acuminate, entire or serrate. *Pedicels* equalling or exceeding the calyx, which varies from $\frac{1}{4}$ – $\frac{1}{2}$ in. long. *Corolla* lilac. *Capsule* $\frac{1}{4}$ – $\frac{1}{3}$ in. diam.—A tropical Eastern African plant from Zanzibar seems the same, except that the upper leaves are more amplexicaul. A Western African plant more similar in the leaves has crimson flowers.

2. ***A. angustifolium***, *Benth. Scroph. Ind.* 39, and in *DC. Prodr.* x. 408; leaves sessile narrowly lanceolate or linear-lanceolate, corolla $\frac{1}{3}$ – $\frac{1}{2}$ in. long, tube narrow. *Diceros angustifolius*, *Wall. Cat.* 3885.

SINGAPORE; *Wallich, Cuming.*

Very near to *A. sesamoides*, but the leaves are much narrower, the pedicels usually shorter, and flowers much smaller.

22. **CURANGA**, *Juss.*

Diffuse or creeping herbs. *Leaves* opposite, ovate, crenate. *Flowers* in short terminal or pseudo-axillary racemes; pedicels opposite, bracteate, ebracteolate. *Sepals* 4, spreading, upper and lower very large, much enlarged in fruit, lateral small, narrow. *Corolla-tube* short, upper lip broad, arched, notched; lower longer, spreading, 3-fid. *Stamens*, 2 upper perfect, included; anthers cohering, cells divaricate; staminodes 2, clavate. *Stigma* 2-lamellate. *Capsule* orbicular, included in the much enlarged calyx, septicidal, valves separating from the broad placentiferous axis. *Seeds* numerous, rugose.—Species 2, Indian and Malayan.

C. amara, *Juss. in Ann. Mus.* ix. 320; *Benth. in DC. Prodr.* x. 408. *Caranga amara*, *Vahl Symb.* i. 100. *Gratiola amara*, *Roxb. Fl. Ind.*, and *Ed. Wall. & Carey*, i. 136. *Herpestis amara*, *Benth. Scroph. Ind.* 30. *Synphillium torenioides*, *Griff. in Madr. Journ. Nat. Sc.* iv. 1, t. 11. *Tristeria assamica*, *Griff. Notul.* iv. 111.—*Rumph. Herb. Amb.* v. t. 170, f. 1.

SIKKIM HIMALAYA, alt. 3000 ft., *Clarke*. ASSAM and MISHMI, *Griffith*. CACHAR, *Keenan*. CHITTAGONG, *Clarke*. TENASSERIM; at Mergui, *Griffith*.—DISTRIB. Borneo, Philippine Islands, Amboyna.

Annual, glabrous. *Branches* slender, straggling, divaricate, rooting at the lower nodes, 2-3 ft. long. *Leaves* 2-2½ in., obtuse or acute; petiole $\frac{1}{2}$ in., slender. *Racemes* short, few-fid.; pedicels $\frac{1}{4}$ – $\frac{1}{3}$ in. *Calyx* in flower $\frac{1}{2}$ in., in fruit $\frac{1}{2}$ in.; outer sepals broadly ovate-cordate, membranous, reticulate. *Corolla* red-brown. *Capsule* $\frac{1}{2}$ in. diam., compressed.—Foliage very bitter.

23. **TORENIA**, *Linn.*

Glabrous or pubescent herbs. *Leaves* opposite, entire crenate or serrate. *Flowers* axillary or in terminal or pseudo-axillary umbels or racemes; pedicels ebracteolate. *Calyx* tubular, 3-5-winged or plaited or keeled, 2-lipped, or 3-5-toothed. *Corolla-tube* cylindric, dilated above; upper lip erect, concave, notched or 2-fid; lower larger, spreading, 3-lobed. *Stamens*, 4 perfect, 2 upper included, 2 lower appendaged at the base and conniving under the upper lip; anthers touching or cohering in pairs, cells often confluent. *Stigma* 2-lamellate. *Capsule* linear or oblong, included, septicidal; valves separating from the flat placentiferous axis. *Seeds* numerous, rugose

or cancellate.—Species 20, tropical Asiatic and African, one of them also American.

The species 4 to 8 are imperfectly characterized, and are very difficult of discrimination in the dried state.

SECT. I. **Tridens**. *Fruiting calyx* suborbicular, broadly winged.

1. **T. polygonoides**, *Benth. Scroph. Ind.* 39, and in *DC. Prodr.* x. 409; creeping, glabrous, leaves petioled $\frac{1}{2}$ – $\frac{1}{2}$ in. orbicular-ovate serrate, peduncles axillary 2–4-fld. *Miquel Fl. Ind. Bat.* ii. 688. *T. cardiosepala*, *Benth. l. c.* *Herpestis polygonoides*, *Benth. in Wall. Cat.* 3897.

CACHAB, *Keenan*. TENASSERIM; at Tavoy, *Wallich*. SINGAPORE, PENANG and MALACCA, *Griffith*, &c. Bouton told me PENANG (*Miquel*).—DISTRIB. Borneo, Philippine Islands.

A slender straggling herb, branches 6–10 in. *Corolla* $\frac{1}{2}$ in. diam., white and red. *Fruiting calyx* $\frac{1}{2}$ in. long, as long as the pedicel. *Capsule* ovate-lanceolate,

2. **T. mucronulata**, *Benth. in DC. Prodr.* x. 409; creeping, pubescent, leaves petioled $\frac{1}{2}$ – $\frac{3}{4}$ in. ovate acute serrate, peduncles axillary 1–4-fld.

TENASSERIM; at Mergui, *Griffith*.

Very similar indeed to *T. polygonoides*, but pubescent, with rather larger leaves.

SECT. II. **Nortenia**. *Calyx* oblong ellipsoid or linear-oblong, fruiting keeled or winged (often cordate in outline in *T. cordifolia*).

* *Flowers axillary, solitary or 2-nate, or subumbellate at the ends of the branches.*

3. **T. cordifolia**, *Roxb. Cor. Pl.* ii. 52, f. 161, and *Fl. Ind.* iii. 95; suberect, sparsely hairy, leaves petioled ovate serrate, pedicels axillary and subumbellate fruiting slender, fruiting calyx $\frac{1}{2}$ in. ovoid or oblong winged, base rounded or cordate not decurrent, corolla $\frac{3}{4}$ in. long pale blue, lower filaments toothless. *Benth. Scroph. Ind.* 39, and in *DC. Prodr.* x. 409, *in part*; *Bot. Mag.* t. 3715; *Dalz. & Gibs. Bomb. Fl.* 180.

WESTERN HIMALAYA; from Simla to Kumaon, ascending to 6000 ft. CENTRAL INDIA, BEHAR, on Parusnath. The CIRCARS, the CONCAN, PEGU and TENASSERIM.—DISTRIB. Java, China.

Annual, nearly glabrous, 4–8 in. high, usually erect and trichotomously branched from the base; stem and branches almost 4-winged. *Leaves* 1–1 $\frac{1}{2}$ in., glabrous; base cuneate very rarely cordate, petiole rarely as long as the blade. *Pedicels* often longer than the leaves.—Clarke remarks that Bentham describes the filaments as toothed, but that he has never found them so, and that Roxburgh's figure represents them as toothless. *Rheede's Hort. Mal.* ix. t. 68, must be a very different plant. Wight's *T. cordifolia* from Courtallum with long decumbent stems 12–18 in. long, short petioles, and long axillary pedicels seems hardly the same species, but I cannot satisfactorily identify it with any other.

4. **T. peduncularis**, *Benth. in Wall. Cat.* 3956; suberect, sparsely hairy, much branched, leaves petioled ovate crenate-serrate, pedicels axillary and subumbellate fruiting thickened, fruiting calyx $\frac{3}{4}$ in. ovoid or oblong winged, base acute decurrent, corolla $\frac{3}{4}$ in. pale blue, lower filaments toothless or minutely toothed. *T. edentula*, *Benth. in DC. Prodr.* x. 410, *not of Griffith*, and *T. asiatica*, *Scroph. Ind.* 38, *in part*; *Bot. Mag.* t. 4229. ? *T. exappendiculata*, *Regel Gartenfl.* t. 892. *T. alba*, *Hb. Ham.*; *Wall. Cat.* 3961.

CENTRAL and EASTERN HIMALAYA; Nepal, *Hamilton*; Sikkim, ascending to 7000 ft. KHASIA MTS., ASSAM and SILHET; PENANG, *Schomburgk*.—DISTRIB. Java, Philippine Islands.

Closely resembles a large state of *T. cordifolia* in habit and foliage, but the calyx is longer and narrower, with the wings produced on the pedicel, never cordate at the base, and the capsule is longer and narrower. The plate in *Bot. Mag.* is very characteristic. Hamilton's *T. alba* is, I assume, a white-fl. variety.

5. **T. asiatica**, Linn.; *Wight Ic.* t. 862; nearly glabrous or pubescent, diffuse, creeping below, leaves shortly petioled ovate-cordate or lanceolate serrate, pedicels axillary and subumbellate fruiting thickened, fruiting calyx 1 in., narrowly oblong keeled hardly winged, base decurrent, corolla $1\frac{1}{2}$ – $1\frac{1}{4}$ in. blue with very dark violet lateral lobes, longer filaments toothed. *Benth. in DC. Prodr.* x. 410; *Wall. Cat.* 3953 A. B.; *Miquel Fl. Ind. Bat.* ii. 689; *Gaertn. Fruct.* iii. 29, t. 184; *Lamk. Ill.* t. 523; *Bot. Mag.* t. 4249; *Lem. Ill. Hort.* t. 199; *Fl. de Serres* ii. fasc. x. t. 5, and xiii. t. 1342. *Treisteria cordata*, *Griff. Notul.* iv. 109.—*Rheede Hort. Mal.* ix. t. 53.

WESTERN PENINSULA; Nilgherry Mts., *Wight*, &c. TENASSERIM; at Mergui, *Griffith*. CEYLON, abundant.—DISTRIB. Java, China.

Diffusely branched; branches 6–10 in. long, slender. *Leaves* $1\frac{1}{2}$ –2 in., larger and usually more acuminate than in the allied species; petiole rarely more than $\frac{1}{4}$ in. *Fruiting calyx* narrowly winged or keeled.

VAB. *hirsuta*; more pubescent, lower filaments with a very small tooth. *T. hirsuta*, *Benth. in DC. Prodr.* x. 410; *Bot. Mag.* t. 5167. *T. cordifolia*, *Benth. in Wall. Cat.* 3954, not of Roxb. ? *Lamk. Ill.* t. 523, f. 2.—Nilgherry Mts.

VAB. *concolor*; corolla of a uniform dark blue. *T. concolor*, *Lindl. in Bot. Reg.* 1846, t. 62. *T. longiflora*, *Morren in Ann. de Gand.* ii. 441, 471.

VAB. ? *parvifolia*; leaves much smaller longer petioled less acuminate, petiole often as long as the blade. *T. asiatica*, *Thwaites Enum.* 219.—Nilgherry Mts. and Ceylon. This closely resembles *T. bicolor* in habit and foliage, and is, I suspect, specifically distinct from *T. asiatica*.

6. **T. vagans**, *Roxb. Cat.* 1813, and *Fl. Ind.* iii. 96; nearly glabrous, erect or decumbent, diffusely branched, rooting at the lower nodes, leaves $\frac{3}{4}$ –1 in. all shortly petioled, pedicels scattered axillary fruiting thickened, fruiting calyx $\frac{1}{2}$ – $\frac{3}{4}$ in. narrowly linear-oblong keeled not winged, corolla $\frac{3}{4}$ in. pale blue, lobes small, longer filaments toothed. *T. diffusa*, *Don Prodr.* 86; *Wall. Cat.* 3953. *T. asiatica*, *Wall. Cat.* 3953, in part; *Griff. Notul.* iv. 123. *T. hians*, *Roxb. Fl. Ind.* iii. 96. *T. rubens*, *Benth. l. c.* ? *Peristaira grandiflora*, *Griff. Notul.* iv. 118. *Columnnea diffusa*, *Roxb. mss.*

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, ascending to 4000 ft. ASSAM and KHASIA Mts., common; CHITTAGONG, *Clarke*. NILGHERRIES; Conoor, alt. 5000 ft., *Clarke*.—DISTRIB. China.

Except by the usually more diffuse habit, the not winged calyx and the always toothed longer filaments, I do not see how this can well be distinguished from *T. peduncularis*. The flowers are much smaller than in *T. asiatica* and of a more uniform blue, and the leaves also are smaller. I cannot distinguish *T. rubens* as a variety; the characters assigned to it are the short obtuse tooth of the longer filaments, and often red tips to the calyx teeth.

7. **T. hirtella**, *Hook. f.*; pubescent, very slender, diffusely branched, leaves $\frac{1}{2}$ –1 in. very shortly petioled upper usually sessile ovate or ovate-cordate subacute serrate, pedicels solitary axillary fruiting slender, fruiting calyx $\frac{1}{2}$ in. narrowly oblong keeled not winged, corolla $\frac{1}{2}$ in., longer filaments with an obtuse tooth. *T. rubens* var. *hirtella*, *Benth. in Hohen. Pl. Nilig.* 1156, 1157. *T. rubens*, *Thwaites Enum.* 219.

NILGHERRY MTS., *Hohenacker*. CEYLON; *Gardner*, &c., ascending to 2000 ft.

A very distinct species, at once recognizable by the very slender habit and small very shortly petioled leaves. The corolla is small, with short lobes. Thwaites suspects

that this is only a form of *T. asiatica*; if so, they are united by var. *parvifolia* of the latter.

8. **T. bicolor**, *Dalz. in Hook. Kew Journ.* iii. 38; sparsely hairy or glabrous, diffusely branched, leaves $\frac{1}{2}$ –1 in. long-petioled broadly ovate-cordate or rounded crenate-serrate, peduncles axillary fruiting thickened, fruiting calyx $\frac{1}{2}$ – $\frac{3}{4}$ in. very narrow keeled not winged, corolla 1 in. dark blue, longer filaments toothed at the base. *Dalz. & Gibs. Bomb. Fl.* 181. *T. asiatica*, *Herb. Wight* n. 2205, 5986.—*Torenia* n. sp., *Miquel in Pl. Hohenack.* n. 61.

The CONCAN, near Vingorla, *Dalzell*, &c. CANARA, *Hohenacker*. MALABAR, *Wight* (*T. asiatica*, *Kew Distrib.* 2379).

This again, though difficult to define by words, appears to be a very distinct species with the small leaves and straggling habit of *T. asiatica* var. *parvifolia*, the petiole being often as long as the blade. The fruiting pedicels are much thickened, and the calyx is very narrow.—A drawing from Stock's collection represents the flowers as red-purple, but they are described in the Bombay Flora as deep violet with a white under lip.

9. **T. parviflora**, *Ham. in Wall. Cat.* 3958; glabrous, erect or diffuse, branching from the base, leaves all petioled $\frac{1}{2}$ –1 in. ovate or ovate-lanceolate acute serrate, pedicels axillary 2–4 at the nodes shorter than the leaves fruiting thickened, fruiting calyx $\frac{1}{2}$ in. narrowly oblong-lanceolate keeled not winged, corolla $\frac{1}{2}$ – $\frac{1}{2}$ in. blue, longer filaments minutely toothed. *Benth. Scroph. Ind.* 39, and in *DC. Prodr.* x. 410; *Miquel Fl. Ind. Bat.* ii. 689; *Schmidt in Mart. Fl. Bras. Fasc.* xxx. 322, t. 56, f. 1. ? *Peristaira dichotoma*, *Griff. Notul.* iv. 119. *Nortenia Thomassii*, *Cham. & Schl. in Linnæa*, iii. 18.

ASSAM, *Masters*. KHASIA MTS., ascending to 4000 ft., *J. D. H. & T. T. TENASSERIM*; at Tavoy and Moulmein, *Wallich*, &c.—DISTRIB. Java, China, Tropical Africa and America.

Annual, three to eight inches high; branches often decumbent below, and rooting at the nodes. Leaves abruptly narrowed into a petiole $\frac{1}{2}$ – $\frac{1}{4}$ in. long. Pedicels sometimes very short, erect or spreading.—This has the short pedicels of *T. ciliata* and *flava*.

** *Flowers axillary and racemed at the ends of the branches.*

10. **T. flava**, *Ham. in Wall. Cat.* 3957 A. B.; erect or decumbent, sparsely patently hairy or glabrous, leaves sessile or petioled ovate or oblong-ovate obtuse entire or crenate, pedicels usually shorter than the calyx fruiting thickened, flowers axillary and in distant pairs, fruiting calyx $\frac{1}{2}$ – $\frac{3}{4}$ in. elliptic-lanceolate keeled not winged deeply channelled, corolla $\frac{3}{4}$ –1 $\frac{1}{2}$ in. yellow, longer filaments minutely toothed. *Benth. Scroph. Ind.* 38, and in *DC. Prodr.* x. 414; *Miquel Fl. Ind. Bat.* ii. 689; *Bot. Mag.* t. 6700. *T. Bailoni*, *Godfr. in Ill. Hort.* xxv. t. 324; *E. Morren in Belgique Hort.* xxix. t. 1, f. 2. *Peristaira racemosa*, *Griff. Notul.* iv. 120. *Mimulus hirsutus*, *Blume Bijl.* 756.

ASSAM, *Masters*, &c. KHASIA MTS., ascending to 2000 ft., *J. D. H. & T. T. SILHET* and CACHAR, *Wallich*, &c. TENASSERIM, *Lobb, Parish*.—DISTRIB. Sumatra, Siam, China.

Stem usually robust and branched from the base, 6–10 in. high, and branches strict. Leaves 1–1 $\frac{1}{2}$ in., narrowed into the petiole. Corolla yellow, $\frac{1}{2}$ – $\frac{3}{4}$ in., with a purple eye.—In cultivation the stem becomes decumbent and rooting, the flowers axillary and solitary, and the corolla large (see *Bot. Mag.* t. 6700).

11. **T. ciliata**, *Smith in Rees' Cyclop.* v. 36; erect, patently hairy, leaves sessile or petioled ovate or oblong-ovate obtuse entire or crenate,

pedicels longer than or equalling the calyx fruiting thickened, flowers in distant pairs, fruiting calyx $\frac{1}{2}$ – $\frac{3}{4}$ in. elliptic-lanceolate winged, corolla $\frac{3}{4}$ in. blue. *Benth. in DC. Prodr.* x. 411; *Miquel Fl. Ind. Bat.* ii. 689. *T. racemosa*, *Benth. Scroph. Ind.* 38, not of *Griff.* *T. flava*, *Wall. Cat.* 3957 c. *T. cœrulea*, *Miquel Fl. Ind. Bat. Suppl.* 562.

PENANG, Wallich.

Very similar to *T. flava*, but the fruiting calyx is winged, and the corolla blue.

DOUBTFUL SPECIES.

T. EDENTULA, *Griff. in Madr. Journ. Sc.* iv. 4. "Suberect, softly hirsute, leaves petioled ovate-cordate subrugose, flowers pseudo-axillary fasciated and racemed, corolla usually pale blue with yellow spots."—Upper Assam at Suddya, *Griffith.* Bentham (in *DC. Prodr.*) refers his *T. peduncularis* (*Scroph. Ind.*) to this, but Griffith's character of softly hirsute is irreconcilable. It may be *Vandellia mollis*.

TORENIA ?—*Tresteira lanceolata*, *Griff. Notul.* iv. 111, t. 458, f. 6, from Mergui, with terete pubescent stems suffruticose below, is undeterminable.

24. VANDELLIA, Linn.

Herbs, usually annual, glabrous or pubescent. *Leaves* opposite, often toothed, penninerved (except in *V. erecta*). *Flowers* small, axillary or racemose; pedicels ebracteolate. *Sepals* 5, free or connate in a subcampanulate calyx, angles not winged. *Corolla-tube* cylindric; upper lip erect, broad, concave, notched or bifid; lower broader, spreading, 3-lobed. *Stamens* 4, all perfect (except *V. molluginoides*); 2 posterior usually included; 2 anterior with arched filaments appendaged at or towards the base; anthers touching or cohering in pairs under the upper lip, cells divaricate. *Stigma* 2-lamellate. *Capsule* septicidal, valves separating from the placentiferous septum. *Seeds* rugose.—Species about 30, chiefly tropical Asiatic.

* Capsule about equalling the calyx in length, or shorter.

† Calyx in flower 5-cleft to the middle or above it.

1. *V. crustacea*, *Benth. Scroph. Ind.* 35, and in *DC. Prodr.* x. 413; diffusely branched, glabrous or sparsely hairy, leaves shortly petioled ovate or lanceolate, pedicels axillary or subracemose, calyx shortly 5-lobed exceeding the oblong-ovate obtuse capsule. *Dalz. & Gibs. Bomb. Fl.* 180; *Wight Ic.* t. 863; *Miquel Fl. Ind. Bat.* ii. 690. *V. alba*, *Benth. Scroph. Ind.* 35. *Torenia varians*, *Roxb. Fl. Ind.* iii. 96. *T. lucida*, *Ham. in Wall. Cat.* 3962. *T. alba*, *Ham. in Wall. Cat.* 3261, in part. *T. flaccida*, *Br. Prodr.* 440. *Gratiola lucida*, *Vahl Enum.* i. 95. ? *Roxb. Cor. Pl.* ii. 2, t. 202, and *Fl. Ind.*, and *Ed. Carey & Wall.* i. 138. *G. aspera*, *Roth Nov. Pl.* 11. *Peristeira paniculata*, *Griff. Notul.* iv. 119. *Capraria crustacea*, *Linn. Mant.* 87. *Morgania lucida & aspera*, *Spreng. Syst.* ii. 802, 803. *Mimulus javanicus*, *Blume Bijl.* 283. *Hornemannia ovata*, *Link & Otto Ic. Pl. Sel.* i. 9, t. 3. *Tittmannia ovata*, *Reichb. Ic. Erot.* i. p. 27. *Antirrhinum hexandrum*, *Forsk. Fl. Æg. Arab.* 43.—*Rumph. Herb. Amb.* v. t. 170, f. 3.

Throughout INDIA and CEYLON, a weed.—DISTRIB. Tropics of the Old World; rare (introduced?) into the New.

Stem excessively trichotomously branched from the root, 4–18 in. high. *Leaves* $\frac{1}{2}$ –1 in., entire or serrate. *Pedicels* $\frac{1}{2}$ –1 $\frac{1}{2}$ in., slender, strict. *Calyx* $\frac{1}{10}$ in. long in flower, $\frac{1}{8}$ in fruit.—The citation of Roxburgh's *Gratiola lucida* is doubtful; if correct, Roxburgh's figure of the filaments, where the appendages are omitted, is faulty.

2. *V. molluginoides*, *Benth. Scroph. Ind.* 35, and in *DC. Prodr.*

x. 413; glabrous, except the ciliate leaf-axils and calyx, leaves subsessile ovate-lanceolate or oblong base cuneate or rounded margins scabrid, pedicels rigid umbellately fascicled rather longer than the calyx which is 5-cleft to the middle in flower, sepals free in fruit longer than the ovate-oblong capsule. *Torenia molluginoides*, *Benth. in Wall. Cat.* 3960.

BURMA; Mts. of Prome, *Wallich*. PEGU, *Kurz*. TENASSERIM; at Moulmein, *Lobb, Parish*.

A slender laxly branched herb, 1-1½ foot high, with the habit of a *Mollugo* or *Holosteum*. *Leaves* ½ in. long, margin thickened, obsoletely crenate. *Pedicels* often deflexed in fruit. *Calyx* ½ in. long in fruit. Longer *filaments* with a very short obtuse tooth, according to Bentham.—In Moulmein specimens I find 2 perfect stamens, and 2 filiform staminodes hooked near the top.

3. **V. Hookeri**, *Clarke mss.*; diffusely branched, softly hairy all over, leaves sessile or petioled ovate or lanceolate serrate, pedicels axillary and subumbellate at the ends of the branches about as long as the calyx which is 5-cleft to the middle in flower, sepals free or not in fruit hispidly hairy much longer than the oblong capsule.—*Torenia*, n. 10 *Herb. H.f. & T.*

SIKKIM TERAI; at Siligoree, *Clarke*. KHASIA MTS.; in cultivated fields at Pomrang, &c., *J. D. H. & T. T.* PEGU, *Kurz*. BEHAR; at Parusnath, *Thomson, Clarke*.

Branched from the base; the branches divaricate and do not root, are rather robust, 4-8 in. high. *Leaves* ¾-1 in. hairy on both surfaces. *Pedicels* spreading. *Calyx* ¼-½ in. long. *Corolla* blue-purple.—Very near *V. molluginoides*, but larger, with much larger flowers, and leaves with margins not thickened.

†† *Sepals in flower free to the base or nearly so.*

4. **V. elata**, *Benth. Scroph. Ind.* 36, and in *DC. Prodr.* x. 414; slender, suberect or diffuse, glabrous or sparsely hairy, leaves petioled ovate coarsely crenate-toothed, flowers racemose, sepals narrowly lanceolate equalling the broadly oblong capsule. *Tittmannia elata*, *Benth. in Wall. Cat.* 3944.

TENASSERIM; at Tavoy, *Gomez*; Moulmein, *Lobb, Helfer*.

Stem simple or 3-chotomously branched, 6-10 in. high. *Leaves* ¼-½ in.; petiole half as long. *Pedicels* 2-3 times as long as the fruiting sepals, spreading or deflexed, lower with leafy upper with small lanceolate bracts. *Calyx* ⅓ in. long, fruiting ½ in. *Corolla* very minute, hardly exceeding the calyx.

5. **V. multiflora**, *G. Don Gen. Syst.* iv. 549; erect, succulent, glabrous, leaves sessile or narrowed into a petiole oblong or ovate-oblong or obovate obtuse entire or sinuate, flowers racemed, pedicels exceeding the calyx, sepals lanceolate shorter than the orbicular capsule. *Benth. in DC. Prodr.* x. 414. *V. erecta*, *Benth. Scroph. Ind.* 36, *in part.* *Torenia multiflora*, *Roxb. Fl. Ind.* iii. 96. *Tittmannia trichotoma*, *Benth. in Wall. Cat.* 3943.

Plains of BENGAL, not uncommon.

Stem trichotomously branched, 4-6 in. *Leaves* in few pairs, 1-2 in., sometimes spatulate. *Racemes* usually many-flid.; flowers minute. *Calyx* ⅙ in. long, fruiting ⅓ in.

6. **V. hirsuta**, *Benth. Scroph. Ind.* 36, and in *DC. Prodr.* x. 414; erect, succulent, sparsely clothed with spreading hairs, lower leaves petioled ovate or oblong obtuse entire or sinuate upper sessile broader, flowers racemed, pedicels exceeding the calyx, sepals lanceolate longer than the orbicular capsule. *Dalz. & Gibs. Bomb. Fl.* 179. *V. multiflora*, *Herb. Ind. Or. H.f. & T. in part.* *Tittmannia ovata*, *Benth. in Wall. Cat.* 3942. *T. vis-*

cosa, *Reichb. Ic. Exot.* i. 26, t. 38. *Tittmannia* sp. n. 3, *Griff. Notul.* iv. 117. *Hornemannia prostrata*, *Jacq. Ecl.* t. 150.

EASTERN and SOUTHERN INDIA; from Bengal and Sikkim to Ava, and throughout the Deccan Peninsula. CEYLON, near Kornegalle, *Thwaites*.—DISTRIB. Java, Borneo, China, Philippine Islands.

Very similar in habit, foliage and inflorescence to *V. multiflora*, but always hairy. *Corolla* blueish white, according to *Griffith*.

7. **V. scabra**, *Benth. Scroph. Ind.* 36, and in *DC. Prodr.* x. 414; diffusely branched, more or less clothed with long white spreading hairs, leaves subsessile broadly ovate or ovate-cordate serrate or entire, pedicels axillary and terminal much longer than the calyx, sepals lanceolate hirsute or glabrous equalling the orbicular capsule. *Miquel Fl. Ind. Bat.* ii. 692; *Griff. Notul.* iv. 122, and *Ic. Pl. Asiat.* t. 418, f. 4. *V. monnieroides*, *Ham. mss.* *Torenia hirta*, *Cham. & Schl. in Linnæa*, ii. 571. *T. globosa*, *Ham. mss.* *Gratiola pusilla*, *Willd. Sp. Pl.* i. 105. *Columna minuta*, *Roxb. Fl. Ind.* iii. 98. *Tittmannia pusilla*, *Benth.*, and *T. sulcata*, *Hb. Wight, in Wall. Cat.* 3945, 3946 (both in part only). *Bonnaya Vahl.*, and *Stemodia minuta*, *G. Don Gen. Syst.* iv. 538 & 542. *Selago pusilla*, *Thunb. Prodr. Pl. Cap.* 99.

TROPICAL INDIA, and in CEYLON; in rice-fields, &c., abundant.—DISTRIB. Java, Borneo, China, Philippine Islands, S. Africa, Madagascar.

Stem slender and branches 2–4 (rarely 6–8) inches high, rather rigid. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., sometimes orbicular, acute or obtuse. *Pedicels* capillary, $\frac{1}{4}$ – $\frac{1}{2}$ in., strict, spreading in fruit. *Corolla* about $\frac{1}{2}$ in. long, three times as long as the calyx.

VAR. *laxa*; stem elongate very slender dichotomously branched. *V. laxa*, *Benth. Scroph. Ind.* 36, and in *DC. Prodr.* x. 414; *Dalz. & Gibs. Bomb. Fl.* 179. *Tittmannia pusilla*, *Benth. in Wall. Cat.* 3945 C.—Deccan Peninsula, *Wight*; *Vingorla* (*Dalz. & Gibs.*).—This is, I think, only a drawn up state of *V. scabra*, and hardly even a variety. I have seen no specimen from *Vingorla*.

8. **V. mollis**, *Benth. Scroph. Ind.* 37, and in *DC. Prodr.* x. 414; procumbent, softly villous all over, leaves shortly petioled ovate or ovate-oblong crenate-serrate, pedicels axillary or in axillary or terminal racemes much longer than the calyx, sepals subulate hirsute longer than the oblong capsule. *Tittmannia hirta*, *Benth. in Wall. Cat.* 3948.

SIKKIM HIMALAYA, alt. 3–4000 ft., *J. D. H.*, &c. ASSAM, SILHET and the KHASIA MTS., ascending to 3000 ft.—DISTRIB. S. China.

Stem creeping below, 6–18 in. long, sometimes robust. *Leaves* 1– $1\frac{1}{2}$ in., villous on both surfaces, petiole $\frac{1}{4}$ in. or 0. *Pedicels* very slender, $\frac{1}{4}$ – $\frac{3}{4}$ in. *Sepals* sometimes nearly $\frac{1}{2}$ in. long. *Corolla* with a brown upper and yellow lower lip. *Filaments* hairy at the base, with a process.

9. **V. erecta**, *Benth. Scroph. Ind.* 36, and in *DC. Prodr.* x. 415; erect, quite glabrous, leaves sessile elliptic or oblong obtuse 3–5-nerved entire or obscurely crenate, pedicels axillary longer than the leaves and the sepals, sepals lanceolate or linear rather shorter than the ovoid-orbicular capsule. *Maxim. Diagn. Pl. Nov. Dec.* xix. 413. *V. pyxidaria*, *Maxim. l. c.* 419; *Boiss. Fl. Orient.* iv. 427. *Tittmannia erecta*, *Benth. in Wall. Cat.* 3947. *Lindernia pyxidaria*, *All.*; *Benth. in DC. Prodr.* x. 418; *Gaertn. Fruct.* iii. 34, t. 184, f. 8; *Reichb. Ic. Fl. Germ.* t. 1723; *Lamk. Ill.* t. 522. *L. Kitaibelii*, *G. Don Gen. Syst.* iv. 557. *Ilysanthes gratioloides*, *Regel Fl. Usur.* n. 359, not of *Benth.* (ex *Maxim. l. c.* 420). *Gratiola inundata*, *Kit. in Schultz Fl. Austr.* ii. 32. *G. integrifolia*, *Roxb. Fl. Ind.* i. 137, and *Ed. Carey & Wall.* i. 138.—*Rheede Hort. Mal.* ix. t. 57.

Throughout INDIA; from Kashmir to Assam, Tenasserim and the S. Deccan (not

recorded from Ceylon).—DISTRIB. Siam, China, Japan, Malay and Polynesian Islands, and westwards to France.

Branched from the base; branches divaricate, not rooting, 4-8 in. high. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Pedicels* very slender, usually twice as long as the leaves. *Sepals* $\frac{1}{8}$ - $\frac{1}{6}$ in. long, rather obtuse.—Closely resembles *Ilysanthes parviflora*. So common a plant as this is cannot have escaped the notice of Roxburgh, and I think it must be his *Gratiola integrifolia*. Maximovicz has discussed at length the variations exhibited by this plant, and its passage into the northern *Lindernia pyxidaria*, in which the flowers are sometimes cleistogamous, the filaments straight and sometimes not appendaged. The Indian forms should be carefully studied.

** Capsule much longer than the calyx.

10. **V. nummularifolia**, *Don Prodr.* 86; erect, quite glabrous, leaves sessile or shortly petioled ovate orbicular or obovate obtuse crenate-serrate, pedicels axillary and in subumbellate or few-fld. racemes longer than the leaves, calyx 5-toothed fruiting shorter than the ellipsoid acuminate capsule. *Benth. in DC. Prodr.* x. 416.

SUBTROPICAL HIMALAYA, alt. 2-7000 ft., from Kashmir to Sikkim. KHASIA Mts., alt. 3-4000 ft., *J. D. H. & T. T.*

Simple or branched from the base, the branches not rooting, divaricate, 4-6 in. high. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., often as broad as long, nerves subflabellate. *Pedicels* $\frac{1}{8}$ - $\frac{1}{4}$ in., very slender. *Calyx* $\frac{1}{8}$ in. long, cleft to the middle, teeth acute, irregularly cleft to the base in fruit. *Corolla* red-purple, lateral lobes of lip white. Lower *filaments* with a broad obtuse tooth. *Capsule* nearly $\frac{1}{4}$ in.

11. **V. sessiliflora**, *Benth. Scroph. Ind.* 37, and in *DC. Prodr.* 416; erect, glabrous or puberulous, leaves sessile rounded or broadly ovate crenate-serrate, flowers sessile or very shortly pedicelled, calyx 5-toothed fruiting shorter than the ellipsoid acute capsule. *V. minima*, *Benth. Scroph. Ind.* 37. *Torenia sessiliflora*, *Benth. in Wall. Cat.* 3959.

SUBTROPICAL HIMALAYA, alt. 2-7000 ft., from Kashmir to Mishmi. KHASIA Mts., alt. 2-4000 ft. AVA, *Wallich*. BEHAR; on Parusnath, *J. D. H., Clarke*.

Probably a sessile-flowered form of *V. nummularifolia*, from which the short pedicels alone distinguish it in a dried state.

12. **V. pedunculata**, *Benth. Scroph. Ind.* 37, and in *DC. Prodr.* x. 416; glabrous, branches long procumbent, leaves shortly petioled ovate obscurely crenate-toothed, pedicels axillary much longer than the leaves and in terminal racemes, sepals free to the base half as long as the linear-lanceolate capsule. *Dalz. & Gibs. Bomb. Fl.* 179; *Griff. Notul.* iv. 120, and *Id. Pl. Asiat.* t. 418, f. 2. *V. Roxburghii* & *cordifolia*, *G. Don Gen. Syst.* iv. 549. *Gratiola cordifolia*, *Vahl Enum.* i. 97; *Don Prodr.* 85. *Bonnaya cordifolia*, *Spreng. Syst.* i. 42. *Tittmannia grandiflora*, *Benth. in Wall. Cat.* 3949. *Torenia diffusa*, *Roxb. Fl. Ind.* ii. 95. *T. varians*, *Griff. Notul.* iv. 125, not of *Roxb.*

Throughout INDIA, and in CEYLON; abundant in rice-swamps.—DISTRIB. Borneo, China, Cochinchina.

Stem sometimes creeping at the base, branches 4-10 in., slender, prostrate. *Leaves* $\frac{1}{2}$ -1 in., obtuse or subacute. *Pedicels* twice as long as the leaves, sometimes $1\frac{1}{2}$ in. *Sepals* $\frac{1}{4}$ in., narrowly lanceolate. *Corolla* white, or pale blue with a white spot. Longer *filaments* with a small obtuse tooth. *Capsule* $\frac{1}{2}$ in.—I have seen no specimen of *Bentham* var β *parviflora* from Ceylon. See *Bonnaya peduncularis* and *veronicaefolia* for remarks.

13. **V. angustifolia**, *Benth. Scroph. Ind.* 37, and in *DC. Prodr.* x. 417; diffuse, glabrous, leaves sessile linear or linear-lanceolate obtuse entire

or obscurely toothed, pedicels axillary solitary equalling or exceeding the leaves, sepals free to the base half as long as the linear-lanceolate capsule. *Tittmannia angustifolia*, Benth. in Wall. Cat. 3951. *Torenia calcarata*, Griff. Notul. iv. 124. ? *Lindernia micrantha*, Don Prodr. 85.

SUBTROPICAL HIMALAYA; Kumaon, Edgeworth; Nepal, Wallich. BENGAL, ASSAM, the KHASIA Mts., BURMA and PEGU. CEYLON, not common.—DISTRIB. Sumatra, Java, China, Japan.

Stem sometimes shortly prostrate and rooting at the base; branches erect, divaricating, 6–12 in. high, slender or succulent. *Leaves* $\frac{3}{4}$ –1½ in., rather thick, nerves obscure. *Pedicels* variable in length. *Calyx* $\frac{1}{6}$ –½ in., fruiting $\frac{1}{2}$ as long as the capsule. Longer filaments toothed at the base. *Capsule* linear-lanceolate. See *Bonnaya veronicaefolia* var. *verbenafolia* for a very near ally of this plant.

25. ILYSANTHES, Rafin.

Annual, glabrous, slender marsh-plants. *Leaves* opposite, entire or toothed, parallel-nerved. *Flowers* small, axillary or the upper racemose; pedicels ebracteolate, often reflexed in fruit. *Sepals* narrow. *Corolla-tube* cylindric; upper lip erect, broad, concave, notched; lower larger, spreading, 3-lobed. *Stamens*, 2 upper alone perfect, subincluded, filaments filiform; anthers meeting, cells divaricate; staminodes 2, 2-lobed, one lobe glandular obtuse, the other glabrous of various shapes. *Stigma* 2-lamellate. *Capsule* septicidal; valves entire, separating from the placentiferous septum. *Seeds* numerous, rugose.—Species 8, N. American, S. African, Indian and one S. American.

The staminal characters separating *Ilysanthes* from *Vandellia* are not satisfactory; I should prefer that of the nervation of the leaves, which would remove *Vandellia erecta* (which is hardly recognizable from *I. parviflora*) to this genus.

1. *I. hyssopioides*, Benth. in DC. Prodr. x. 419; erect, simple or diffusely branched, leaves in distant pairs sessile oblong or oblong-lanceolate usually entire 1- or 3-nerved upper linear, pedicels axillary filiform, corolla 3–4 times longer than the calyx, fruiting sepals half the length of the ovate-oblong acute capsule. Dalz. & Gibs. Bomb. Fl. 179; Miquel Fl. Ind. Bat. ii. 695. *Gratiola hyssopioides*, Linn. Mant. 174; Roxb. Cor. Pl. iii. 3, t. 203 (not ii. t. 128, nor of Fl. Ind.). *Morgania hyssopioides*, Spreng. Syst. ii. 803. *Bonnaya hyssopioides*, Benth. in Wall. Cat. 3866 Wight Ic. t. 857.

SILHET, Wallich. KHASIA Mts.; at Nurtiung, alt. 5000 ft., J. D. H. & T. T. DECCAN PENINSULA, abundant. CEYLON, common.—DISTRIB. China.

Usually very slender, 4–18 in. high. *Leaves* $\frac{1}{4}$ –1 in., rather thick, obtuse, seldom toothed. *Pedicels* $\frac{1}{2}$ –1½ in. *Sepals* narrowly lanceolate. *Corolla* $\frac{1}{3}$ –½ in. long, pale blue. *Capsule* $\frac{1}{8}$ in.

2. *I. parviflora*, Benth. in DC. Prodr. x. 419; erect, simple or diffusely branched, leaves sessile ovate elliptic or linear-oblong usually entire 1–5-nerved, pedicels axillary and in terminal racemes filiform, corolla twice as long as the calyx, fruiting sepals shorter than the ovate-oblong acute capsule. *Gratiola parviflora*, Roxb. Cor. Pl. iii. 3, t. 204, and Fl. Ind. i. 140, and Ed. Carey & Wall. i. 141. *Bonnaya parviflora*, Benth. in Wall. Cat. 3867, and Scroph. Ind. 34.

Throughout INDIA; in wet places, from the Punjab to Assam, Bengal and the Deccan Peninsula (not seen from Ceylon).—DISTRIB. Siam, Trop. Africa.

Very near to *I. hyssopioides*, but a shorter stiffer more branched plant, more piously flowering, with usually much shorter pedicels, and white or blue flowers not

half the size.—This differs from *Vandellia erecta* in the reduction of the shorter stamens, and in the longer acute capsule.

3. **I. minima**, *Benth. in DC. Prodr.* x. 420; very small and slender, erect, subsimple, leaves few minute ovate- or elliptic-oblong entire, pedicels axillary capillary, corolla three times as long as the calyx, fruiting sepals equalling the subglobose capsule. *Bonnaya minima*, *Wight Ic. t.* 858, *not of G. Don*.

The DECCAN; at Palamcottah, *Wight*.

Stem 1–3 in., filiform, always simple below. *Leaves* 2–3 pairs, $\frac{1}{10}$ – $\frac{1}{4}$ in., obtuse, quite entire. *Flowers* few, large for the size of the plant; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. *Corolla* $\frac{1}{4}$ – $\frac{1}{2}$ in. *Capsule* $\frac{1}{10}$ in. diam.—A very elegant minute plant.

4. **I. rotundifolia**, *Benth. in DC. Prodr.* x. 420; diffuse or creeping, leaves sessile broadly ovate elliptic or rounded entire or toothed 3–5-nerved, pedicels axillary shorter or longer than the leaves, corolla twice as long as the calyx, fruiting sepals equalling the globose capsule. *Gratiola rotundifolia*, *Linn. Mant.* 174; *Roxb. Cor. Pl.* iii. 3, t. 204, and *Fl. Ind.* i. 137, and *Ed. Wall. & Carey*, i. 138.

COROMANDEL, *Roxburgh*. CANARA, *Hohenacker*. CEYLON, *Macrae*, &c.—DISTRIB. Mauritius and Madagascar.

Stems or branches 6–10 in., often rooting at the nodes. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., obtuse or subacute. *Flowers* few, white; pedicels $\frac{1}{4}$ – $\frac{3}{4}$ in. *Corolla* $\frac{1}{2}$ in. long. *Capsule* $\frac{1}{2}$ in.

26. **BONNAYA**, *Link et Otto*.

Annual, quite glabrous herbs. *Leaves* opposite, entire or serrate, pinninerved, nerves very obscure. *Flowers* solitary, axillary, or the upper opposite and racemose, pedicels ebracteolate. *Sepals* 5, narrow. *Corolla-tube* cylindrical; upper lip erect, broad, concave, 2-fid; lower larger, spreading, 3-lobed. *Stamens*, 2 lower only perfect, subincluded, filaments filiform; anthers touching, cells divaricate; staminodes 2, entire, glandular, obtuse. *Stigma* 2-lamellate. *Capsule* narrow, far exserted, septicidal; valves entire, separating from the placentiferous septum. *Seeds* numerous, rugose.—Species 8, tropical African and Asiatic.

Several species of this genus so closely resemble others of *Vandellia* as to render its validity very doubtful.

1. **B. brachiata**, *Link & Otto, Ic. Pl. Sel.* i. 25, t. 11; erect, diffusely branched, leaves sessile oblong obtuse or acute sharply closely deeply serrate, flowers racemed shortly pedicelled, corolla $\frac{1}{4}$ in. long, capsules spreading or erect twice as long as the calyx or more. *Benth. in Wall. Cat.* 3855, and in *DC. Prodr.* x. 420; *Dalz. & Gibs. Bomb. Fl.* 178; *Miquel Fl. Ind. Bat.* ii. 695. *B. serrata*, *Griff. Notul.* iv. 108, and *Bonnaya* sp. l. c. 106. *Gratiola serrata*, *Roxb. Fl. Ind.* i. 139, and *Ed. Wall. & Carey*, i. 140. *B. brachiata* & *pusilla*, *Benth. Scroph. Ind.* 32, 33.—*Rheede Hort. Mal.* ix. t. 59.

Throughout INDIA, from the Punjab to Travancore and Malacca, ascending the Himalaya to 5000 ft. CEYLON, common.—DISTRIB. Java, China, Philippine Islands.

A rather rigid herb, 4–10 in. high; branches divaricate, outer decumbent below. *Leaves* $\frac{1}{2}$ –1 $\frac{1}{2}$ in., margins thickened, teeth mucronate. *Racemes* sometimes 4 in. long, with opposite bracteate flowers; pedicels about equalling the calyx, rigid. *Corolla* red or white. *Capsule* $\frac{1}{2}$ in., slender.

2. **B. reptans**, *Spreng. Syst.* i. 41; prostrate, creeping, leaves

petioled obovate-oblong obtuse sharply serrate, flowers racemed shortly pedicelled, corolla $\frac{3}{4}$ in. long, capsules spreading twice as long as the calyx or more. *Benth. in DC. Prodr.* x. 420; *Wall. Cat.* 3856; *Dalz. & Gibs. Bomb. Fl.* 179. *B. ruelloides* & ciliata, *Spreng. l. c.* *Gratiola ciliata* & ruelloides, *Kæn.*; *Vahl Enum.* i. 97, 99. *G. reptans*, *Roxb. Fl. Ind.*, and *Ed. Wall. & Carey*, i. 140. *Henckelia Roxburghiana*, *Dietr. Sp. Pl.* i. 572.

Eastern India; from NEPAL and SIKKIM (ascending to 7000 ft.) to ASSAM, the KHASIA MTS., CACHAR and TENASSEERIM. MADRAS, *Shuter*. SOUTHERN CANCAN (*Dalzell & Gibson*).—DISTRIB. Java, Philippine Islands.

Stems or *branches* often a foot long, with distant pairs of leaves, slender, diffusely branched. *Leaves* $\frac{3}{4}$ –1½ in., narrowed into the petiole, finely serrate. *Corolla* light purple. *Capsule* 1 in. long, very slender.

3. ***B. veronicæfolia***, *Spreng. Syst.* i. 41; stem creeping or decumbent; branches ascending, leaves subsessile or narrowed into a short petiole oblong or oblong-lanceolate or obovate serrate or subserrate, flowers racemose, corolla $\frac{1}{4}$ – $\frac{1}{3}$ in., capsules erecto-patent twice as long as the calyx or more. *Wall. Cat.* 3857; *Benth. in DC. Prodr.* x. 421; *Wight Ic.* t. 1411; *Dalz. & Gibs. Bomb. Fl.* 178; *Miquel Fl. Ind. Bat.* ii. 696. *B. marginata*, *Spreng. l. c.* *B. rigida* & procumbens, *Benth. in Wall. Cat.* 3859, 3860. *B. Rothii*, *Dietr. Sp. Pl.* i. 556. *B. bracteata*, *Griff. Notul.* iv. 107. *Gratiola veronicæfolia*, *Retz Obs.* iv. 8; *Roxb. Cor. Pl.* ii. 30, t. 154, and *Fl. Ind.* i. 138, and *Ed. Wall. & Carey*, i. 139. *G. marginata*, *Colsm. in Vahl Enum.* i. 98. *G. racemosa*, *Roth Nov. Sp.* 9.

Throughout INDIA; from the Upper Gangetic plain southwards and eastwards to Assam, Travancore and Singapore. CEYLON, common.—DISTRIB. Java, Siam, China, Philippine Islands.

Very variable in habit, but distinguished from *B. brachiata* and *reptans* by the very different serratures of the leaf, which are more distant and less deep. *Corolla* violet (*Roxb.*).

VAR. *grandiflora*; branches short stout, flowers chiefly axillary light blue, capsules smaller hardly twice as long as the calyx. *B. grandiflora*, *Spreng. Syst.* i. 41; *Benth. in DC. Prodr.* x. 421; *Dalz. & Gibs. Bomb. Fl.* 179; *Miquel Fl. Ind. Bat.* ii. 697. *B. pulegiifolia*, *Spreng. l. c.* *B. Wightii*, *Benth. in Wall. Cat.* 3864. *Gratiola grandiflora*, *Roxb. Cor. Pl.* ii. 42, t. 179, and *Fl. Ind.* i. 136, and *Ed. Carey & Wall.* i. 137. *G. pulegiifolia*, *Vahl Enum.* i. 98. *Henckelia grandiflora*, *Dietr. Sp.* i. 573.—I find it impossible to separate this satisfactorily; it inhabits the same area as *B. veronicæfolia* and *Vandellia pedunculata*, which it closely resembles. The name *grandiflora* is not appropriate. *Corolla* light blue (*Roxb.*)

VAR. *verbenaefolia*; branches usually long and slender, leaves narrower subentire or distantly serrate, flowers larger in often elongate naked racemes. *B. verbenaefolia*, *Benth. in DC. Prodr.* x. 421; *Dalz. & Gibs. Bomb. Fl.* 178; *Wall. Cat.* 3858. *Wight Ic.* t. 1412. *B. Roxburghiana*, *Dietr. Sp. Pl.* i. 559. *B. cyanea*, *Griff. Notul.* iv. 107. *Gratiola verbenaefolia* & ciliata, *Colsm. in Vahl Enum.* i. 96, 97. *G. racemosa*, *Roxb. Fl. Ind.* i. 138, and *Ed. Wall. & Carey*, i. 139. *G. Roxburghiana*, *Roem. & Sch. Syst.* i. 123. *Tittmannia Colsmanni* & *Torenia gracilis*, *Benth. in Wall. Cat.* 3950, 3952.—This again is with difficulty separated as a variety from *B. veronicæfolia*, and it inhabits the same area. It bears the same relation to it as *Vandellia angustifolia* (which it closely resembles) does to *V. pedunculata*.

4. ***B. peduncularis***, *Benth. Scroph. Ind.* 34, and in *DC. Prodr.* x. 421, and in *Wall. Cat.* 3865; stems erect slender simple, leaves sessile linear-oblong obtuse nearly entire, pedicels axillary very long solitary slender much longer than the leaves, capsule nearly three times as long as the calyx.

SILHET, *Wallich*.

This, as Bentham suggests, may be a variety of *B. veronicæfolia* var. *grandifolia*,

growing in moist grassy places; if so, it is a remarkable one, the fruiting calyx being much shorter, not above $\frac{1}{8}$ in. long, and the habit is considerably different. It approaches very closely *Vandellia pedunculata*.

5. **B. oppositifolia**, *Spreng. Syst.* i. 41; very short, erect, diffusely branched, leaves sessile linear-oblong obtuse subserrate, pedicels short often shorter than the calyx axillary or the upper racemed reflexed in fruit, corolla $\frac{1}{4}$ in. long, capsule small twice as long as the calyx or more. *Benth. in DC. Prodr.* x. 421; *Wall. Cat.* 3862; *Dalz. & Gibs. Bomb. Fl.* 179. *B. minima*, *G. Don Gen. Syst.* iv. 538. *Gratiola oppositifolia*, *Roxb. Cor. Pl.* ii. 30, t. 155, and *Fl. Ind.*, and *Ed. Wall. & Carey*, i. 139. *G. minima*, *Roth Nov. Sp.* 8. *Henckelia oppositifolia*, *Dietr. Sp. Pl.* i. 572.

DECCAN PENINSULA, *Heyne, Wight, &c.*

A much smaller plant than any of the first four species, and with a somewhat different habit, and very small blue flowers; but beyond the general characters indicated above, I am unable to add anything. The flowers are blue (*Roxb.*).

6. **B. tenuifolia**, *Spreng. Syst.* i. 42; succulent, erect, diffusely intricately branched, leaves sessile linear nearly entire, pedicels axillary and the upper racemed deflexed in fruit, corolla $\frac{1}{2}$ in. long, capsule slender two to three times as long as the calyx. *Benth. in DC. Prodr.* x. 422; *Wall. Cat.* 3863; *Miquel Fl. Ind. Bat.* ii. 698. *B. pusilla*, *Griff. Notul.* iv. 107. *Gratiola tenuifolia*, *Vahl Enum.* i. 95.

BENGAL; at Serampore, *Griffith*. DECCAN PENINSULA, *Rottler, &c.*; Quilon, *Wight*. TENASSERIM, *Griffith*. CEYLON; at Peradenia and Caltura, *Macrae*.—DISTRIB. China.

This appears to be a very distinct species, growing in a tufted manner, probably in marshes, with interlaced branches and slender leaves $1-1\frac{1}{2}$ by $\frac{1}{16}-\frac{1}{8}$ in. The flowers are very small (pale blue, *Griff.*), and the capsules vary from $\frac{1}{4}-\frac{1}{2}$ in. in length.

27. BYTHOPHYTON, *Hook. f.*

A slender submerged glabrous herb. *Leaves* opposite, subulate-lanceolate, quite entire. *Flowers* axillary, shortly pedicelled, ebracteolate. *Sepals* 4, subulate-lanceolate. *Corolla* minute, much shorter than the calyx, subcylindric, membranous, obscurely 2-lipped, 4-lobed. *Stamens*, 2 anterior perfect, included, filaments very short sometimes gibbous; anther-cells parallel. *Ovary* ovoid; style short, curved, stigma subcapitate. *Capsule* much shorter than the sepals, broadly oblong, compressed, obtuse, 2-valved, valves 2-fid or 2-partite. *Seeds* many, narrowly oblong, reticulate.

B. indicum, *Hook. f.* *Micranthemum indicum*, *H. f. & T. in Hook. Journ. Bot.* ix. (1857) 245, t. 7 (*excl. fig. of anthers*).

KHASIA MTS.; marshes at Nonkreem, alt. 4-5000 ft., *J. D. H. & T. T.*

Stems 2-3 in., loosely tufted, flaccid, erect, wholly submerged, terete. *Leaves* $\frac{1}{2}-\frac{3}{4}$ in. long, 3-nerved at the base. *Sepals* $\frac{1}{4}$ in. *Corolla* with the lobes closed over the anthers as in submerged states of *Limosella*. *Stamens* very variable.—A singular little plant, the flowers of which may assume a different character when the marshes dry up. It is clearly the type of a genus, the exact position of which is uncertain. The anthers are erroneously figured as hairy.

28. MICROCARPÆA, *Br.*

A very small slender diffuse or creeping nearly glabrous herb. *Leaves* opposite, sessile, oblong, obtuse, quite entire. *Flowers* minute, axillary,

solitary, sessile, ebracteolate. *Calyx* tubular, 5-angled, 5-fid. *Corolla* very short, tube broad; lobes 5, broad, spreading, 2 upper subconnate. *Stamens*, 2 perfect, filaments filiform; anthers confluent, 1-celled; staminodes 0. *Style* filiform, stigma capitate recurved. *Capsule* included, ovoid, 2-grooved, loculicidal; valves entire, separating from the placentiferous septum. *Seeds* few, ovoid.

M. mucosa, Br. *Prodr.* 436; *Benth. in DC. Prodr.* x. 433; *Miquel Fl. Ind. Bat.* ii. 700. *M. alterniflora*, Blume *Bijd.* 744; *Benth. l. c.* *Pæderota minima*, Koen. in *Retz Obs.* v. 10.

LOWER BENGAL, on the Mahanuddy river, J. D. H. & T. T. TENASSERIM. MALABAR; at Quilon, Wight. CEYLON, not uncommon.—DISTRIB. Java, China, Australia.

Stems tufted and interlaced, 2–4 in. long, rooting at the nodes, angles of stem and calyx sometimes ciliate. *Leaves* $\frac{1}{2}$ – $\frac{1}{4}$ in. long. *Flowers* in one axil only of each pair of leaves, about $\frac{1}{16}$ in. long. *Corolla-tube* shorter than the calyx, as is the minute capsule.

DOUBTFUL SPECIES.

M. DIANDRA, Griff. *Notul.* iv. 101, and *l. c. Pl. Asiat.* t. 417, f. 2, according to the description, differs from the generic character of *Microcarpæa* in the 5-partite calyx; as also from *Glossostigma* and *Limosella*, of which it has the habit. I have seen no specimens; it is a native of Bengal, and may be the following genus.

29. PEPLIDIUM, Delile.

Very small, prostrate or creeping, glabrous herbs. *Leaves* opposite, fleshy, obovate, quite entire. *Flowers* minute, axillary, 1–3-nate. *Calyx* tubular, 5-ribbed, obtusely 5-toothed. *Corolla-tube* short; lobes 5, broad, subequal. *Stamens* 2, included, filaments arched; anthers 1-celled; staminodes 0. *Ovary* 2-celled; stigma dilated, spatulate, recurved. *Capsule* globose or ovoid, septicidal, or bursting irregularly; valves entire or 2-fid, separating from the placentiferous septum. *Seeds* numerous, small, ovoid.—Species 2, an endemic Australian and the following.

P. humifusum, Del. *Fl. Æg.* 4, t. 4, f. 1; flowers subsessile, capsule globose obtuse. *Benth. in DC. Prodr.* x. 422; *Boiss. Fl. Orient.* iv. 427. *Hedyotis maritima*, Linn. f. *Suppl.* 119. *Oldenlandia maritima*, Roth *Nov. Sp.* 97. *Pæderota cochlearifolia*, Koen. mss.; *Wall. Cat.* 3920. *Microcarpæa cochlearifolia*, Sm. in *Rees' Cyclop.*; *Wight in Hook. Bot. Misc.* iii. 95, *Suppl.* t. 29.

S. DECCAN PENINSULA, Koenig, &c.; Pondicherry, Perottet. CEYLON; at Trincomalee, Glenie.—DISTRIB. Kurdistan, Egypt, Australia.

Stems interlaced, 4–8 in. long, rather stout, forming large tufts. *Leaves* $\frac{1}{2}$ – $\frac{1}{4}$ in., usually obovate, sometimes ovate or orbicular, succulent, narrowed into short petioles which are connected by a membrane. *Calyx* about $\frac{1}{16}$ in. long, larger in fruit, membranous with 5 strong ribs. *Corolla-tube* included. *Filaments* thickened and angularly incurved at the base. *Capsule* nearly enclosed in the membranous tubular calyx, membranous, usually bursting irregularly.

30. GLOSSOSTIGMA, Arn.

Very small, glabrous, creeping herbs. *Leaves* opposite or fascicled, linear or spatulate, quite entire. *Flowers* minute, axillary, solitary, ebracteolate. *Calyx* campanulate, obtusely 3–4-lobed. *Corolla-tube* short; lobes 5, subequal. *Stamens* 2 or 4, filaments filiform; anther-cells diverging, tips con-

fluent. *Ovary* perfectly or imperfectly 2-celled; style short, stigma dilated spathulate recurved. *Capsule* included in the calyx, loculicidal; valves entire, separating from a columnar axis. *Seeds* small, ovoid.—Species 3, all Australian, one of them widely dispersed.

G. spathulatum, Arn. in Nov. Act. Nat. Cur. xviii. 355; leaves narrowly spathulate, calyx 3-lobed, stamens 2. *Benth. in DC. Prodr.* x. 426; *Dalz. & Gibs. Bomb. Fl.* 180; *Miquel Fl. Ind. Bat.* ii. 699. *Limosella diandra*, Linn. Mant. 252 (the Indian plant); *Roxb. Fl. Ind.* iii. 91; *Griff. Notul.* iv. 102, t. 458, f. 12. *Microcarpæa spathulata*, *Benth. Scroph. Ind.* 31; *Wight in Hook. Bot. Misc.* ii. 101, *Suppl.* t. 4. *Pæderota minima*, *Retz Obs.* v. 10.

UPPER GANGETIC plain, *Royle, Thomson*. *BEHAR*, J. D. H. *The DECCAN PENINSULA*, common. *CEYLON*, *Gardner*.—DISTRIB. Tropical Africa and Australia.

A very weak densely tufted creeping rooting herb like *Limosella*. *Leaves* $\frac{1}{2}$ – $\frac{1}{4}$ in. long, tapering into a petiole of variable length. *Pedicels* slender, shorter than the leaves. *Calyx* $\frac{1}{4}$ in. long. *Corolla* blue, tube included. *Capsule* about as long as the calyx.—*Griffith's Microcarpæa diandra* differs from this in the sessile flowers and 5-partite calyx.

31. LIMOSELLA, Linn.

Small tufted creeping glabrous marsh- or water-herbs. *Leaves* opposite or fascicled or rarely alternate, long petioled, linear or spathulate, quite entire. *Flowers* minute, axillary, ebracteolate. *Calyx* campanulate, 5-toothed. *Corolla* subrotate or campanulate; lobes 5, subequal. *Stamens* 4, filaments filiform; anthers confluent, 1-celled. *Ovary* 2-celled at the base; style short, stigma incurved capitate. *Capsule* obscurely dehiscent, valves thin. *Seeds* many, small, ovoid, rugulose.—Species 5 or 6, very variable and widely distributed.

L. aquatica, Linn.; *Benth. in DC. Prodr.* x. 426; leaves long-petioled narrowly spathulate, corolla-lobes very short. *Benth. in DC. Prodr.* x. 426; *Boiss. Fl. Orient.* iv. 427; *Gaertn. Fruct.* i. 228, t. 50, f. 3; *Reichb. Ic. Fl. Germ.* t. 1722.

WESTERN HIMALAYA; Kashmir, alt. 5–8000 ft., *Thomson, &c.* WESTERN TIBET; alt. 13000–14500 ft., *Thomson*. DISTRIB. N. and S. temperate regions.

Stems creeping. *Leaves* 1–2 in., long petioled. *Peduncles* shorter than the leaves, recurved in fruit. *Corolla* $\frac{1}{10}$ in., pink or white. *Capsule* globose, $\frac{1}{2}$ in. diam.

TRIBE VII. DIGITALEÆ.

32. SIBTHORPIA, Linn.

Hairy, creeping herbs. *Leaves* alternate, petioled, reniform or rounded, crenate or pinnatifid. *Flowers* small, axillary, solitary or fascicled, ebracteolate. *Calyx* campanulate, 4–8-fid. *Corolla* subrotate; lobes 4–8, spreading, subequal. *Stamens* as many as the corolla-lobes or one fewer; anthers sagittate, touching. *Stigma* capitate. *Capsule* membranous, compressed, loculicidal, valves septiferous. *Seeds* few, plano- or concavo-convex, rugulose.—Species 6, W. Europe, Africa, the Himalaya and Andes.

S. pinnata, *Benth. in Gen. Pl.* ii. 959; leaves deeply pinnatifid or pinnatisect. *Mazus pinnatus*, *Wall. Cat.* 3915. *Ourisia pinnata*, *Benth. Scroph. Ind.* 47. *Hornemannia pinnata*, *Benth. in DC. Prodr.* x. 428.

NEPAL, *Wallich*.

Hirsute all over with soft spreading hairs. *Stems* very slender, 4-8 in. long, straggling, rooting at the nodes. *Leaves* 1-2 in. long, broadly oblong, or ovate, membranous, segments 5-7 obovate-cuneate broadly adnate, tips crenate or lobulate; petiole 1-3 in. *Pedicels* equalling the petiole or longer or shorter, very slender. *Calyx* $\frac{1}{4}$ in., membranous, lobes ovate acute. *Corolla* $\frac{1}{2}$ in. diam.; lobes spatulate. *Fruit* unknown.

33. **HEMIPHRAGMA**, Wall.

A prostrate diffuse pubescent herb. *Leaves* dimorphic; cauline opposite, very shortly petioled, orbicular-cordate or -ovate, or reniform crenate; those on the branches fascicled, acicular, ciliate. *Flowers* axillary, sessile, rosy. *Sepals* 5, narrow. *Corolla-tube* short, slender; lobes 5, rounded, spreading, subequal. *Stamens* 4, on the base of the corolla, equal, filaments short; anthers sagittate, tips of the cells confluent. *Style* short, stigma minute. *Fruit* ovoid, fleshy, shining, at length septicidal, valves entire or 2-fid. *Seeds* numerous, minute, ovoid, smooth.

H. heterophyllum, Wall. *Cat.* 3895, and *Tent. Fl. Nep.* 16, t. 8, and in *Trans. Linn. Soc.* xiii. 612; *Benth. in DC. Prodr.* x. 429.

TEMPERATE HIMALAYA; from Garwhal to Bhotan, alt. 6-12,000 ft. KHASIA MTS., alt. 4-6000 ft.

Stems loosely tufted, creeping, 1-2 feet, very slender. *Leaves* on the stem $\frac{1}{3}$ - $\frac{2}{3}$ in. diam., membranous, hairy on both surfaces; petiole $\frac{1}{10}$ - $\frac{1}{8}$ in.; those on the branches forming tufts or heads, $\frac{1}{10}$ - $\frac{1}{2}$ in. long, rigid, acute, back convex, face deeply channelled. *Flowers* usually sessile in the tufts of the setaceous leaves, rarely of the cauline ones. *Corolla* pink, $\frac{1}{3}$ in. diam. *Fruit* black, polished, $\frac{1}{3}$ in. diam.

34. **SCOPARIA**, Linn.

Branched glabrous or pubescent herbs or undershrubs. *Leaves* opposite or whorled, entire or toothed, punctate. *Flowers* small, white yellow or blueish, solitary or 2-nate, axillary, ebracteolate. *Sepals* 4-5, imbricate in bud. *Corolla* rotate, 4-fid, throat densely bearded; lobes obtuse, subequal. *Stamens* 4, subequal, filaments filiform; anthers subsagittate, cells distinct parallel or diverging. *Style* subclavate, stigma notched or truncate; ovules many. *Capsule* globose or ovoid, septicidal; valves entire, membranous, margins inflexed separating from the placentiferous axis. *Seeds* many, obovoid, angled, scrobiculate.—Species 5 or 6, all American.

S. DULCIS, Linn.; *Benth. in DC. Prodr.* x. 431; glabrous, leaves lanceolate or elliptic-lanceolate narrowed into a short petiole, sepals 4. *Miquel Fl. Ind. Bat.* ii. 699; *Gaertn. Fruct.* i. 251, t. 53, f. 10; *Beaur. Fl. Ow. & Ben.* t. 115; *Voigt Hort. Sub. Calc.* 507.

PLAINS OF BENGAL; abundant, Clarke.—DISTRIB. Tropics of America and sporadically in Africa, Asia and Australia.

A branching annual erect or ascending leafy herb 1-3 ft. high. *Leaves* opposite and 3-nately whorled, variable in width. *Flowers* numerous; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in., slender strict. *Sepals* oblong. *Corolla* $\frac{1}{2}$ in. diam., white. *Capsule* $\frac{1}{2}$ in. diam., globose.—Though now a superabundant Bengal plant according to Mr. Clarke, it was unknown in Roxburgh's time, and occurs in no Indian Herbarium except Clarke's. Voigt mentions it (1845) as found about Serampore, whence probably it has spread quite recently.

35. **CAMPYLANTHUS**, Roth.

Shrub. *Leaves* alternate, linear, fleshy, quite entire. *Flowers* in terminal

racemes, often secund, pedicels 2-bracteolate. *Calyx* 5-fid or -partite. *Corolla-tube* long, slender, incurved; lobes 5, broad, flat, spreading, subequal. *Stamens* 2, included; anther-cells divaricate, tips confluent. *Style* short or long, straight or inflexed, stigma capitate. *Capsule* broad, compressed, septicidal, valves 2-fid. *Seeds* many, orbicular, compressed, notched at the hilum; funicle expanded into a wing that sometimes surrounds the seed.—Species 4, Canaries, Cape de Verds, Arabia, Scinde.

C. ramosissimus, *Wight Ic. t.* 1416; a much branched, rigid, puberulous shrub, leaves linear-oblong or -spathulate, flowers subcorymbose. *Boiss. Fl. Orient.* iv. 433.

SCINDE; limestone hills at Hyderabad, *Stocks*.—DISTRIB. Beluchistan.

A low shrub, branches slender but very stiff, divaricate, spinescent. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in. *Flowers* shortly pedicelled. *Sepals* short, lanceolate, acute. *Corolla* $\frac{1}{2}$ in., tube villous within, lobes acute. *Fruit* not seen.

36. **PICRORHIZA**, *Royle*.

A low more or less hairy herb, with perennial woody bitter stock. *Leaves* subradical, spatulate, serrate. *Flowers* spicate on radical leafy flowering stems, bracteate, ebracteolate, white or blueish, dimorphic (a longer and shorter stamened form). *Sepals* 5, lanceolate, imbricate in bud. *Corolla* of the long stamened form short, membranous, subequally 5-cleft to the middle; lobes ovate, acuminate, ciliate; of the shorter stamened, corolla-tube curved, broad; limb 2-lipped, upper lip longer subgaleate emarginate, lower of 3 shorter ovate acute lobes, the middle one smallest. *Stamens* 4, filaments in the longer stamened very slender, four times as long as the corolla; of the shorter stamened stout, 2 upper shorter than the upper lip of the corolla, with the anthers under the hood, 2 lower exserted; anther-cells subdivergent confluent at the tip. *Ovary* 2-celled, many-ovuled; style of the longer stamened long and slender, stigma simple; of the shorter stamened stouter and shorter, stigma capitate exserted. *Capsule* ovoid, turgid, acute, septicidal and loculicidal, margins of the valves inflexed, exposing the columnar placentiferous axis. *Seeds* of an oblong curved nucleus, enclosed in the large bladdery loose hyaline reticulated testa.

I have described this plant as dimorphic with some hesitation, the pistil and stamens being in both forms so fully developed, though in so far as I have seen the anthers of the short stamened have very scanty and irregularly formed pollen, whilst those of the long stamened have copious pollen. Both forms seem to ripen fruit abundantly.

P. Kurrooa, *Benth. Scroph. Ind.* 47, and in *DC. Prodr.* x. 454; *Royle Ill.* 291, t. 71. *Valeriana?* *Lindleyana*, *Wall. Cat.* 404 (corrected to *Veronica*, p. 23).

ALPINE HIMALAYA; from Kashmir to Sikkim, alt. 9–15,000 ft., common.

Rootstock as thick as the little finger, 6–10 in. long, clothed with withered leaf-bases. *Leaves* 2–4 in., rather coriaceous, tip rounded, base narrowed into a winged sheathing petiole. *Flowering stems* or scapes ascending, stout, longer than the leaves, naked or with a few bracts below the inflorescence. *Spikes* 2–4 in. long, subcylindric, obtuse, many-flowered, subhirsute; bracts oblong or lanceolate, as long as the calyx. *Sepals* $\frac{1}{2}$ in. long, ciliate. *Corolla* of short stamened form $\frac{1}{2}$ – $\frac{3}{4}$ in. long, with longer filaments $\frac{1}{2}$ in. long, of the longer stamened from $\frac{1}{2}$ in., with filaments $\frac{3}{4}$ in. long. *Capsule* $\frac{1}{2}$ in. long.

37. **WULFENIA**, *Jacq.*

Glabrous herbs, with perennial woody stocks. *Leaves* subradical, petioled,

crenate. *Flowers* bracteate, blue, spicate on radical scapes, secund, ebracteolate. *Sepals* narrow. *Corolla-tube* cylindric; lobes 4, erecto-patent, upper 2-fid, lower entire or crenate. *Stamens* 2, inserted between the upper lobes, exserted; anther-cells divergent, tips confluent. *Stigma* capitate. *Capsule* acute, septi- and loculi-cidal, margins of valves inflexed separating from the placentiferous axis. *Seeds* many, ovoid, concavo-convex; testa lax, smooth.—Species 4, one Carinthian, the others W. Asiatic and Himalayan.

W. Amherstiana, *Benth. Scroph. Ind.* 46, and in *DC. Prodr.* x. 455; nearly glabrous, leaves obovate-oblong or -spathulate coarsely crenate or lobulate base narrowed subpinnatifid, racemes long slender very many-fid., sepals lanceolate or setaceous, corolla-lobes narrow. *Pæderota* *Amherstiana*, *Wall. Cat.* 410.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 7–11,000 ft.—DISTRIB. Afghanistan.

Rootstock long, as thick as a goose-quill. *Leaves* 2–5 in., midrib puberulous or subhirsute beneath; petiole $\frac{1}{2}$ –1 $\frac{1}{2}$ in., sometimes hairy. *Scapes* 5–10 in., slender, glabrous or sparsely pubescent, naked or with setaceous deciduous bracts. *Flowers* horizontal; pedicels shorter than the calyx; bracts setaceous, equalling the pedicels or longer. *Calyx* $\frac{1}{2}$ in., glabrous. *Corolla* $\frac{1}{2}$ in., lobes lanceolate, acute. *Style* filiform, far exserted.

38. **CALORHABDOS**, *Benth.*

Herbs with a perennial stock and tall stems. *Leaves* alternate, serrate. *Flowers* in dense bracteate axillary and terminal spikes, ebracteolate. *Sepals* lanceolate, acuminate. *Corolla-tube* incurved; lobes 4, erecto-patent, entire, 3 lower smaller, one or both lateral exterior in bud. *Stamens* 2, exserted; anther-cells parallel, at length diverging, obtuse, tips confluent. *Style* filiform, stigma slender. *Capsule* acute, septi- and loculi-cidal; valves 4, with inflexed margins, separating from a placentiferous column. *Seeds* numerous, minute, testa appressed.—Species 3, a Chinese, a Japanese and a Himalayan.

C. Brunoniana, *Benth. Scroph. Ind.* 44, and in *DC. Prodr.* x. 456; erect, leaves sessile lanceolate subserrulate, spike terminal elongate very slender and very dense-fid. *Valeriana* (*Veronica*, p. 23) *Brunoniana*, *Wall. Cat.* 405; V. ? alternifolia, *Wall. mss.*

NEPAL, *Wallich.*

Stem erect, subsimple, stout, nearly glabrous, 1–2 ft. (or more?) *Leaves* upper alone known, 3–4 by 1–1 $\frac{1}{2}$ in., long acuminate, base narrowed. *Spikes* subsessile, 6–10 in., erect, flexuous, glabrous or pubescent; flowers imbricate; bracts small, lanceolate. *Sepals* $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in., tube rather broad, lobes short. *Capsule* as long as the calyx.

39. **VERONICA**, *Linn.*

Herbs or shrubs, rarely trees. *Leaves* opposite, rarely scattered or cauline alternate. *Flowers* solitary, axillary, or in terminal or axillary bracteate racemes, ebracteolate, never yellow. *Calyx* 4–5 partite, the lower segments connate, upper if present smaller. *Corolla* rotate, or tube cylindric; lobes 4–5, spreading, lateral, the outer in bud, upper and lower usually narrowest. *Stamens* 2, exserted; anther-cells parallel or not, obtuse, tips confluent. *Stigma* subcapitate; ovules many, rarely 2 in each cell. *Capsule* 2-grooved, compressed or turgid, dehiscence various. *Seeds* few or many, ovate or globose, plano-concave or boat-shaped, smooth or rugulose, sometimes winged.—Species about 160, rare in the tropics and in America.

* Capsule ovoid or oblong, turgid, slightly laterally compressed. Seeds flattened, plano-convex or biconvex.

1. **V. himalensis**, *Don Prodr.* 92; erect, glabrate, leaves sessile ovate acute coarsely irregularly serrate base rounded, racemes terminal and axillary lax-fld., sepals 4 oblong obtuse, corolla very large, capsules ovoid acute. *Benth. in DC. Prodr.* x. 467. *V. grandiflora*, *Wall. Cat.* 403 (and p. 23).

NEPAL; *Wallich*. SIKKIM; at Yakla, alt. 11,500 ft., *Clarke*.

Perennial? *Stem* 1–2 ft., stout for the genus, simple or nearly so. *Leaves* in distant pairs, 1–2 in., nerves beneath pubescent. *Racemes* erect, 3–5 in.; pedicels about equalling the calyx; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., linear-oblong. *Sepals* $\frac{1}{2}$ in. *Corolla* $\frac{3}{4}$ –1 in. diam., oblong. *Capsule* $\frac{3}{4}$ in. long. *Seeds* minute, irregularly suborbicular, plano-convex, much flattened.

2. **V. deltigera**, *Wall. in Benth. Scroph. Ind.* 45, and *Cat.* 402; stems many from the root erect or ascending pubescent often bifariously, leaves sessile ovate oblong-oblong or oblong-lanceolate serrate, racemes terminal and axillary lax-fld. pubescent, sepals 4 linear-oblong subacute, capsule oblong-ovoid obtuse. *Benth. in DC. Prodr.* x. 475. *V. lanosa*, *Benth. Scroph. Ind. l. c.*, and in *DC. l. c.* 481. *V. rupestris*, *Aitch. & Hemsl. in Journ. Linn. Soc.* xix. 180, t. 25.

WESTERN ALPINE HIMALAYA; from Kashmir to Nepal, alt. 8–12,000 ft.—DISTRIB. Afghanistan.

Perennial rootstock short, woody. *Stems* 6–18 in., rigid, slender, subsimple, ascending, leafy. *Leaves* $\frac{3}{4}$ –1 $\frac{1}{2}$ by $\frac{1}{4}$ – $\frac{3}{8}$ in., very variable in breadth, sometimes inciso-serrate, base rounded or acute. *Racemes* 3–6 in., slender, erect, very many-fld.; lower bracts often leaf-like or lower flowers axillary, upper oblong; pedicels of the lower flowers often $\frac{1}{2}$ – $\frac{3}{4}$ in., of the upper shorter. *Sepals* $\frac{1}{2}$ – $\frac{3}{4}$ in. *Corolla* $\frac{3}{4}$ in. diam. or less, lobes broad. *Capsule* $\frac{1}{2}$ in. long, equalling or shorter than the sepals. *Seeds* smaller than in *V. himalensis*.—The description of the fruit in *DC. Prodr.* is taken from some other plant.

3. **V. ciliata**, *Fisch. mss.*; *Benth. in DC. Prodr.* x. 467; hoary-pubescent all over, stems subsimple erect, leaves sessile ovate or oblong obtuse entire serrate or crenulate, flowers subcapitate, sepals 4 oblong obtuse, corolla small, stamens included, capsule ovoid-oblong obtuse, tip notched. *Ledeb. Fl. Ross.* iii. 240.

ALPINE HIMALAYA; from Kashmir to Sikkim, alt. 11–16,000 ft.—DISTRIB. Central Asia, Siberia.

Annual. *Stem* 4–12 in., stiff, usually quite simple. *Leaves* $\frac{3}{4}$ –1 $\frac{1}{2}$ in., very variable in size and toothing, pubescent on both surfaces. *Flowers* sessile in sessile or peduncled terminal hirsute heads; bracts as long as the calyx. *Sepals* $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ in. diam., lobes broad. *Capsule* very variable in size, as long as the calyx or longer. *Seeds* orbicular, compressed, plano-convex.

4. **V. ? macrostemon**, *Bunge in Ledeb. Fl. Alt.* i. 35; hoary-pubescent, stems flexuous diffuse, leaves sessile elliptic or ovate obtuse entire or obscurely crenate, racemes terminal dense-fld. villous, sepals 4 oblong obtuse, stamens long far exerted, anthers large. *Benth. in DC. Prodr.* x. 479.

WESTERN TIBET; Zanskar, alt. 16,000 ft., *Thomson, Lance*.—DISTRIB. Afghanistan, Central Asia.

Perennial. *Rootstock* slender, creeping, with distant scales. *Stems* few, 3–6 in., branched. *Leaves* $\frac{1}{2}$ –1 in., pubescent on both surfaces. *Racemes* 1–2 in., flowers crowded, subsessile, or lower axillary and longer pedicelled; bracts oblong obtuse. *Sepals* $\frac{1}{2}$ in., villous. *Corolla* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. *Capsule* not seen.—Without the fruit it is not possible to identify the Indian plant absolutely with the *V. macrostemon*.

Bentham describes the fruit of the latter as obovate emarginate, but in Kirghis specimens it is oblong and notched at the top.

5. **V. lanuginosa**, *Benth. mss.*; densely woolly, stems very short, leaves sessile imbricate orbicular or upper broadly ovate quite entire, flowers in sessile terminal woolly heads, sepals 4 oblong subacute, corolla-lobes spathulate upper orbicular much larger and broader than the others, capsule elliptic notched.

SIKKIM HIMALAYA; Samdong, alt. 16,000 ft., *J. D. H.*

Stem simple, 2-3 in. high, clothed with imbricating leaves and woolly hairs. *Leaves* $\frac{1}{2}$ in. diam., equally woolly on both surfaces. *Flowers* small amongst the upper bracteal leaves. *Sepals* $\frac{1}{2}$ in. long. *Corolla* $\frac{1}{2}$ in. diam. *Capsule* equalling the sepals, pubescent. *Seeds* few, large, oblong, plano-convex.—A very singular species.

** Capsule somewhat compressed laterally, turgid, orbicular, rarely in *V. Anagallis* broadly ovate. *Seeds* biconvex.

6. **V. Anagallis**, *Linn.*; *Benth. in DC. Prodr.* x. 467; glabrous, rarely pubescent, erect, succulent, leaves sessile or lowest petioled oblong oblong-lanceolate or linear-oblong entire or serrate base usually cordate, racemes long axillary, pedicels spreading. *Reichb. Ic. Fl. Germ.* t. 1762; *Boiss. Fl. Orient.* iv. 437. *V. undulata*, *Wall. Cat.* 406, and in *Roxb. Fl. Ind. ed. Carey & Wall.* i. 147. *Veronica* sp., *Griff. Notul.* iv. 126, and *Ic. Pl. Asiat.* t. 419, f. 2.

N.W. INDIA; from the plains of the Punjab to Western Tibet, and from Kashmir to Bhotan, ascending to 9000 ft. in the Himalaya, and 15,000 in Tibet. BENGAL, the KHASIA MTS. and ASSAM. The DECCAN PENINSULA, in the Concan only.—DISTRIB. Europe, Asia, N. and S. Africa, N. America.

Perennial. *Stem* creeping below, from 6-18 in. high, and from the thickness of a sparrow's quill to that of the middle finger. *Leaves* 2-6 by $\frac{1}{2}$ - $\frac{2}{3}$ in. ($1\frac{1}{2}$ in. broad and ovate-cordate in a Kunawur specimen). *Racemes* 3-6 in., slender, lax-flid.; bracts linear-oblong, shorter than the pedicels, which are usually longer than the calyx. *Sepals* $\frac{1}{6}$ - $\frac{1}{4}$ in. long, subacute. *Corolla* $\frac{1}{6}$ - $\frac{1}{2}$ in. diam., pink or purplish. *Capsule* $\frac{1}{8}$ - $\frac{1}{6}$ in. diam., broadly ovate in some Tibetan specimens. *Seeds* ovoid or oblong, biconvex.

VAR. *oxycarpa*; capsules subacute longer than the sepals. *V. oxycarpa*, *Boiss. Fl. Orient.* iv. 438.—Kunawur, alt. 9000 ft., *Thomson*. Persia, Afghanistan.

VAR. *punctata*; dwarf, leaves all petioled ovate serrate or the upper only linear-oblong sessile amplexicaul. *V. punctata*, *Ham. in Don Prodr.* 93; *Benth. in DC. Prodr.* x. 468, in part.—Nepal, *Hamilton*; Bengal at Beaulah and Malda, *Clarke*. Benares, *Wall.* I think there is no doubt of this being a form of *V. Anagallis*, Assam specimens of which and others have similar lower leaves. The Cabul *punctata* of Bentham is, as Boissier has pointed out, nothing but *V. Anagallis*; and his var. β *extensa* is a luxuriant state of the same with larger bracts, sepals, &c.

VAR. *montioides*, *Boiss. Fl. Orient.* iv. 437; dwarf, slender, stems often simple, leaves ovate or oblong, racemes few few-flid. *V. pusilla*, *Benth. in DC. Prodr.* x. 468.—Western Tibet, *Thomson*. Afghanistan. The Herbarium specimens seem to be partly dwarf forms and partly seedlings of *V. Anagallis*.

7. **V. Beccabunga**, *Linn.*; *Benth. in DC. Prodr.* x. 468; glabrous or puberulous, decumbent, succulent, leaves sessile or shortly petioled elliptic or oblong obtuse crenate-serrate base rounded, racemes axillary few- or many-flowered, pedicels spreading. *Reichb. Ic. Fl. Germ.* t. 1701; *Boiss. Fl. Orient.* iv. 438.

WESTERN HIMALAYA; from Kashmir and Rawul Pindee, *Aitchison*, to Kunawur, *Thomson*. WESTERN TIBET, alt. 9-12,000 ft., *Thomson*.—DISTRIB. Afghanistan to Europe, N. Africa (Abyssinia), N. Asia to Japan.

Stem hollow, branches 6-18 in., spreading. *Leaves* 1-2 in., rarely obovate. *Racemes* 2-4 in.; bracts usually shorter than the pedicels. *Sepals* ovate-oblong, subacute. *Corolla* $\frac{1}{2}$ in. diam., blue or pink. *Capsule* and *Seeds* as in *V. Anagallis*.

*** Capsule didymous, lobes globose or flattened, 1- ∞ -seeded. Seeds cup-shaped, or deeply grooved on one side.

8. *V. hederæfolia*, Linn.; *Benth. in DC. Prodr.* x. 490; prostrate, hairy, leaves petioled orbicular-ovate 5-7-lobed, pedicels axillary solitary fruiting decurved, sepals cordate ciliate exceeding the corolla, capsule biglobose, cells 1-2-seeded. *Boiss. Fl. Orient.* iv. 468; *Fl. Dan.* iii. t. 428.

KASHMIR; alt. 6000 ft., Thomson.—DISTRIB. China, Japan, Persia to Syria, N. Africa and all Europe.

Annual. *Branches* numerous, 6-18 in. *Leaves* $\frac{1}{2}$ - $\frac{2}{3}$ in. diam., petiole short dilated upwards, lobes rounded. *Flowers* appearing in succession as the branch elongates, pedicels about equalling the leaves. *Sepals* membranous, acuminate. *Corolla* $\frac{1}{2}$ in. diam., pale blue. *Seeds* large, rugose, subglobose, with a deep pit on the inner face, black.

9. *V. agrestis*, Linn.; *Benth. in DC. Prodr.* x. 487; prostrate, puberulous, leaves petioled ovate cordate or orbicular coarsely crenate-serrate, pedicels axillary solitary as long as the leaves fruiting decurved, sepals ovate, capsule biglobose turgid, cells 4-10-seeded. *Reichb. Pl. Crit.* t. 277; *Boiss. Fl. Orient.* iv. 466. *V. polita*, Fries; *Reichb. Pl. Crit.* t. 246.

Plains of the PUNJAB, and UPPER GANGETIC VALLEY, and WESTERN HIMALAYA, from Kashmir to Kumaon, ascending to 6000 ft. WESTERN TIBET, Iskardo, alt. 9000 ft.—DISTRIB. Europe, N. E. and W. Asia to Japan, China and Loochoo Islands, N. Africa.

Annual. *Branches* numerous, 6-18 in. *Leaves* $\frac{1}{2}$ -1 in. diam.; petiole rarely $\frac{1}{2}$ in. *Sepals* $\frac{1}{4}$ in., obtuse, ciliate, fruiting sometimes $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ - $\frac{3}{4}$ in., shorter or longer than the sepals, white or blue. *Capsule* $\frac{1}{4}$ in. diam. *Seeds* oblong or orbicular, cup-shaped, tubercled, pale.—The two forms, *agrestis* proper, with larger leaves, narrower sepals, pale blue or white corolla, and 8-10-seeded capsules, and the subsp. *polita*, with smaller leaves, broader sepals, bright blue corolla, and 16-20-seeded capsule, are probably both Indian.

10. *V. persica*, Poir. *Dict.* viii. 542; prostrate, hairy, leaves shortly petioled oblong or ovate coarsely crenate-serrate base rounded or cordate, pedicels axillary solitary much longer than the leaves, sepals ovate or lanceolate fruiting spreading, capsule much broader than long flattened. *V. Buxbaumii*, Tenore, *Fl. Neap.* i. 7, t. 1; *Reichb. Pl. Crit.* t. 268; *Benth. in DC. Prodr.* x. 487; *Boiss. Fl. Orient.* iv. 465.

WESTERN HIMALAYA; Kashmir, alt. 6000 ft., Falconer, &c. Garwhal, at Mussooree, alt. 7000 ft., Edgeworth.—DISTRIB. Europe, W. and Central Asia, N. Africa.

Annual. *Branches* 6-12 in., tips often ascending. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., obtuse; petiole very variable. *Pedicels* slender, fruiting decurved. *Sepals* $\frac{1}{2}$ in., fruiting much longer than the capsule. *Corolla* $\frac{1}{2}$ in. diam., bright blue. *Capsule* $\frac{1}{2}$ - $\frac{1}{2}$ in. diam., very much broader than long; valves strongly reticulated, cells 5-12-seeded. *Seeds* boat-shaped, deeply pitted.

11. *V. biloba*, Linn.; *Benth. in DC. Prodr.* x. 485; erect or ascending, diffusely branched, puberulous or glabrate, leaves sessile or shortly petioled oblong or ovate-lanceolate acute subserrate, floral oblong-lanceolate quite entire, pedicels axillary longer than the leaves, fruiting spreading or decurved, sepals connate in pairs at the base, ovate acute or acuminate, capsule much broader than long flattened. *Boiss. Fl. Orient.* iv. 464. *V. campylopoda*,

Boiss. Diagn. i. iv. 80, and *Fl. Orient. l. c.*; Reichb. Ic. *Fl. Germ.* vii t. 645.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 5–10,000 ft. WESTERN TIBET, alt. 9–15,000 ft.—DISTRIB. Westward to Asia Minor, Soongaria.

Annual. Branches slender, 4–18 in., sparsely leafy, running into very loose racemes. Leaves $\frac{1}{2}$ –1 in., very variable in breadth, teeth few and remote. Pedicels $\frac{1}{4}$ – $\frac{3}{4}$ in. Sepals $\frac{1}{2}$ in., fruiting $\frac{1}{4}$ – $\frac{1}{2}$ in., spreading. Corolla blue, shorter than the calyx. Capsule $\frac{1}{2}$ – $\frac{1}{4}$ in. diam., much smaller than the calyx, cells 2–4-seeded. Seeds oblong, boat-shaped, more or less deeply pitted.—*V. campylopoda* is only a small state with smaller flowers; I cannot distinguish it as a variety even. The seeds of *V. biloba* vary much in depth of pitting. *V. microtheca*, Boiss. & Bal Diagn. Ser. 2, vi. 131, *V. bartsiaefolia*, and *V. elbrusensis*, Boiss. Herb., *V. Griffithii*, Benth. in DC. l. c. 485, *V. argute-serrata*, Regel & Schmalk., and *V. cardiocarpa*, Walp. (*Diplophyllum cardiocarpum*, Kar. and Kir.), all appear to me to be forms of *V. biloba*.

**** Capsule laterally flattened, broadly obcordate, keeled.

† Seeds elliptic, much flattened, biconvex or plano-convex.

12. *V. laxa*, Benth. *Scroph. Ind.* 45, and in DC. *Prodr.* x. 474; glabrous or sparsely pubescent, stems long ascending, leaves sessile ovate or cordate obtuse or subacute coarsely crenate-serrate, racemes axillary peduncled slender, capsule broadly obcordate ciliate. *V. Thunbergii*, A. Gray, *Bot. Japan.* 402.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 5–11,000 ft., Royle, &c.—DISTRIB. Japan.

Root perennial. Stems 10–20 in., rather stout, simple, hairy all over or glabrate. Leaves 1–2 in., pubescent on both surfaces. Racemes 3–10 in., lax-fl.; bracts linear-oblong, longer or shorter than the pedicels; pedicels shorter than the calyx. Sepals unequal, enlarged in fruit. Corolla $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. Capsule $\frac{1}{2}$ in. diam., equalling or shorter than the sepals.

13. *V. cana*, Wall. *Cat.* 401; Benth. *Scroph. Ind.* 45, and in DC. *Prodr.* x. 475; pubescent villous or glabrate, stems elongate ascending, leaves petioled ovate or ovate-cordate obtuse crenate-serrate, racemes axillary and terminal peduncled slender, capsule broadly deltoid top 2-lobed. *V. scrophularioides*, Wall. *mss.*

TEMPERATE HIMALAYA; from Chumba to Sikkim, alt. 9–13,000 ft.—DISTRIB. Japan, Formosa.

Root perennial. Stems 6–12 in., simple, usually slender, pubescent all round, or bifariously, or glabrate. Leaves in very few and distant pairs, 1– $1\frac{1}{2}$ in., pubescent on both surfaces or glabrate; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. Racemes 2–3 in., lax-fl.; bracts small, linear, shorter than the calyx; pedicels equalling or shorter than the calyx. Sepals $\frac{1}{2}$ – $\frac{3}{4}$ in., unequal, linear-oblong. Corolla $\frac{1}{2}$ in. diam., blue. Capsule $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., glabrous or ciliate.—The Sikkim specimens are much more glabrous than the Western, and small specimens have the bifariously pubescent stems.

14. *V. capitata*, Benth. *Scroph. Ind.* 45, and in DC. *Prodr.* x. 481; pubescent, stems short suberect simple, leaves sessile or shortly petioled rounded ovate or shortly oblong obtuse crenate-serrate or subentire, base rounded, flowers in terminal sessile villous umbels or heads, capsule broadly obcordate.

ALPINE HIMALAYA; from Kunawur to Bhotan, alt. 10–14,000 ft.

Annual or roots perennial, 3–6 in. high. Leaves $\frac{1}{2}$ –1 in., usually pubescent on both surfaces, uppermost pair often the largest. Flowers sessile in the uppermost pairs of

leaves, forming a head $\frac{1}{4}$ – $\frac{3}{4}$ in. diam.; pedicels $0\frac{1}{8}$ in. *Sepals* $\frac{1}{8}$ in. long, spatulate-oblong, obtuse. *Corolla* $\frac{1}{4}$ in. diam., blue. *Capsule* $\frac{1}{8}$ in. diam., ciliate.

VAR. ? *sikkimensis*; stem decumbent branched, leaves longer petioled often 2 in. long.—Sikkim; Lachen, alt. 12,000 ft., J. D. H. This looks like a very luxuriant form of *V. capitata* with stems 8–10 in., large membranous leaves and petioles sometimes $\frac{1}{2}$ in. long.

15. **V. javanica**, *Blume Bijd.* 742; pubescent, diffusely repeatedly branched, leaves shortly petioled ovate obtuse crenate-serrate base rounded subcordate or truncate, flowers small in short few-fl. axillary and terminal racemes, capsule very small broadly obcordate or didymous shorter than the calyx. *Miquel Fl. Ind. Bat.* ii. 701; *Benth. in DC. Prodr.* x. 489. *V. Maddeni, Edgew. mss.*

SUBTROPICAL and TEMPERATE HIMALAYA; from Simla to Bhotan, alt. 3–7000 ft. KHASIA Mts., alt. 5–6000 ft., J. D. H. & T. T.—DISTRIB. Java, Loochoo Islands.

Annual. *Stems* very numerous, spreading from the root, ascending, 6–18 in., stout or slender, intricately branched. *Leaves* $\frac{3}{4}$ –1 in., more or less pubescent on both surfaces; petiole $\frac{1}{8}$ – $\frac{1}{2}$ in. *Racemes* subsessile, $\frac{1}{2}$ –1 in., fruiting 1–2 in.; pedicels $\frac{1}{16}$ in., shorter than the small narrow bracts. *Sepals* linear-oblong, obtuse, $\frac{1}{10}$ in. long. *Corolla* $\frac{1}{4}$ in. diam. *Capsule* $\frac{1}{8}$ in. diam., pubescent.

16. **V. verna**, *Linn.*; *Benth. in DC. Prodr.* x. 483; puberulous, glandular upwards, stems short erect simple densely leafy and flowering for most of their length, leaves sessile oblong simple or 3-cleft or pinnatisect, flowers axillary shortly pedicelled, capsule broadly obcordate. *Reichb. Ic. Fl. Germ.* t. 1720, f. 1; *Boiss. Fl. Orient.* iv. 456.

WESTERN HIMALAYA; Kashmir and Jamu, alt. 5–7000 ft., Thomson.—DISTRIB. Europe, N. Asia.

Annual. *Stem* 2–6 in., slender, erect, simple or branched from the base, together with the flowers and leaves forming a cylindric stout spike. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., imbricate, or the lower distant. *Flowers* small, blue, pedicels very short. *Sepals* linear-lanceolate. *Corolla* pale blue, shorter than the calyx. *Capsule* $\frac{1}{8}$ in. diam., glandular, about as long as the sepals.

17. **V. arvensis**, *Linn.*; *Benth. in DC. Prodr.* v. 483; pubescent, stems simple or diffusely branched, branches ending in long bracteate racemes, leaves very small subsessile ovate-cordate crenate, floral alternate oblong or lanceolate quite entire, racemes dense- or lax-fl., pedicels much shorter than the floral leaves, corolla minute, capsule broadly obcordate glandular-hairy shorter than the calyx. *Reichb. Ic. Fl. Germ.* t. 1720, f. 2; *Boiss. Fl. Orient.* iv. 457.

WESTERN HIMALAYA; from Kashmir and Kishtwar, alt. 7–9000 ft., Thomson, to Garwhal, *Edgeworth*.—DISTRIB. Europe, N. Asia, and N. Africa.

Annual, 6–10 in. high; branches bifariously pubescent, often continuously leafy and floriferous throughout. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., mostly sessile; floral alternate, linear-oblong or lanceolate, crowded or scattered. *Pedicels* very short. *Sepals* narrow, obtuse, ciliate. *Corolla* pale blue. *Capsule* $\frac{1}{8}$ – $\frac{1}{2}$ in. broad.

18. **V. serpyllifolia**, *Linn.*; *Benth. in DC. Prodr.* x. 482; glabrous or glandular-pubescent, creeping below, branched from the base, branches ending in long bracteate racemes, leaves sessile rounded or oblong subentire, floral alternate oblong quite entire, racemes dense- or lax-fl., pedicels equalling the floral leaves, capsule broadly obcordate, shorter than the calyx glabrous. *Reichb. Ic. Fl. Germ.* t. 1718; *Boiss. Fl. Orient.* iv. 453.

TEMPERATE and SUBALPINE WESTERN HIMALAYA; from Chumba to Kumaon, alt. 8–13,000 ft.—DISTRIB. Europe, N. Asia, N. Africa, N. and S. America.

Perennial. *Branches* 3-10 in., ascending. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., rather coriaceous. *Racemes* 1-4 in.; lower bracts leaf-like, upper narrow. *Sepals* $\frac{1}{2}$ - $\frac{3}{4}$ in., obovate-oblong, ciliate, shorter than the corolla. *Corolla* $\frac{1}{2}$ in. diam., white or lilac.

TRIBE VIII. GERARDIÆ.

40. **ALECTRA**, Thunb.

Erect, rigid, usually scabrid herbs, black when dry. *Leaves* opposite or the upper (rarely all) alternate, toothed (reduced to scales in *A. Thomsoni*). *Flowers* in terminal spikes or racemes, solitary in the axils of bracts, 2-bracteolate, upper crowded, yellow, or streaked with red or brown. *Calyx* campanulate, subfoliaceous, 5-toothed or -fid, lobes valvate or open in bud. *Corolla-tube* broad; limb oblique; lobes 5, spreading, the lower outer in bud. *Stamens* 4, didynamous; anthers touching in pairs, naked or bearded, cells parallel, bases mucronate. *Style* long, inflexed, stigma elongate tongue-shaped. *Capsule* subglobose, loculicidal, valves entire or 2-fid. *Seeds* very numerous, minute, linear, testa very lax reticulate, nucleus small.—Species 14, tropical American, African and Indian.

1. **A. indica**, Benth. in DC. Prodr. x. 339; scaberulous, leaves sessile or shortly petioled ovate-lanceolate or lanceolate coarsely toothed base cuneate rarely cordate, bracts longer than the sessile flowers. *A. cordata*, Benth. in DC. l. c. (the Himalayan specimen). *Hymenospermum dentatum*, Benth. in Wall. Cat. 3963. *Glossostyles arvensis*, Benth. Scroph. Ind. 49.

TEMPERATE HIMALAYA; from Kumaon to Bhotan, alt. 3-9000 ft. KHASIA MTS., alt. 4-6000 ft. BEHAR; top of Parusnath, Anderson, &c. AVA, Wallich.—DISTRIB. Mauritius.

Stem 6-18 in., naked below, simple, or branched above. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., sparingly coarsely toothed. *Spikes* pubescent, 3-6 in.; flowers crowded; bracteoles ciliate. *Calyx* $\frac{1}{2}$ in. long. *Corolla* $\frac{1}{2}$ in. long, yellow, lobes rounded subequal. *Filaments* ciliate; anthers yellow. *Capsule* shorter than the calyx, subglobose, 4-lobed. *Seeds* linear, nucleus very small in the centre of the transparent sausage-shaped testa.

2. **A. Thomsoni**, Hook. f.; slender, leaves scale-like, flowers racemose, bracts minute.

BEHAR; on Parusnath, alt. 3000 ft., parasitic on a *Strobilanthes*, Thomson.

A very singular plant, resembling the S. African *A. orobanchoides*, Benth. *Stem* rigid but flexuous, 6-15 in. high, simple or branched at the rootstock, hardly scaberulous. *Leaves* represented by a few scattered scales $\frac{1}{10}$ - $\frac{1}{4}$ in. long, the largest oblong, obtuse. *Racemes* 6-10 in., lax-fid.; bracts minute; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in., slender. *Calyx*, fruiting hemispheric, $\frac{1}{2}$ in. diam.; lobes broadly triangular. *Capsule* globose, as long as the calyx. *Seeds* as in *A. indica*, but more minute and elongate-cuneiform.

41. **BUCHNERA**, Linn.

Rigid annual herbs, black when dry. *Leaves*, lower opposite, broad; upper alternate, narrow. *Flowers* sessile, axillary, or in bracteate spikes, 2-bracteolate. *Calyx* tubular, 10-nerved, sometimes 5-ribbed, 5-toothed. *Corolla-tube* slender; lobes 5, flat, subequal, spreading, 2 upper inner in bud. *Stamens* 4, didynamous, included; anthers 1-celled, vertical, dorsifixed, bases obtuse, connative sometimes mucronate. *Style* thickened or clavate above, stigma entire or notched. *Capsule* oblong, loculicidal; valves coriaceous, entire, septiferous, separating from the placentas. *Seeds*

very numerous, obovoid or oblong, reticulated.—Species about 30, widely dispersed in warm countries.

1. **B. tetrasticha**, *Benth. Scroph. Ind.* 41, and in *DC. Prodr.* x. 495; stout, scabrid, root-leaves evanescent, leaves sessile linear-oblong obtuse quite entire, spikes 4-angled stout villous, bracts broadly ovate equalling the calyx. *Wall. Cat.* 3878.

UPPER ASSAM; Mishmi Hills, *Griffith*. TENASSERIM; at Moulmein, *Wallich, Griffith, Helfer*.

Stem simple, 12–24 in., leafy. *Leaves* 1–2½ in., rigid. *Spikes* solitary or several, amentiform, dense-fld., 1–2 by ½–1 in., bracts horizontal. *Calyx* depressed. *Corolla-tube* slender, twice as long as the calyx.

2. **B. cruciata**, *Ham. in Don Prodr.* 91; slender, nearly smooth, root-leaves spreading oblong obtuse, cauline linear entire or toothed, spikes 4-angled pubescent, bracts ovate ciliate equalling or shorter than the calyx. *Benth. in DC. Prodr.* x. 495; *Wall. Cat.* 3879; *Miquel Fl. Ind. Bat.* ii. 702. *B. sumatrana*, *Miquel l. c.* *B. stricta*, *Benth. in Hook. Comp. Bot. Mag.* i. 367, and in *DC. Prodr.* l. c. *B. densiflora*, *Hook. & Arn. Bot. Beech. Voy.* 203.

NEPAL, *Wallich*. KHASIA MTS., alt. 3–5000 ft., *Griffith, &c.* BURMA, *Wallich*.—DISTRIB. Sumatra, Java, China.

Stem 10–18 in., simple or branched upwards. *Leaves*, radical rosulate, 1–1½ in., pubescent, base narrowed; cauline erect, 1–2 in., teeth few and irregular. *Spikes* ½–1 in. by ¼–½ in. *Calyx* longer than in *B. tetrasticha*, half as long as the corolla. *Capsule* longer than the calyx.

3. **B. hispida**, *Ham. in Don Prodr.* 91; slender, hispid, root-leaves obovate or oblong, cauline linear-oblong or lanceolate toothed or entire obtuse, spike slender, flowers distant, bracts narrow. *Benth. in DC. Prodr.* x. 496; *Wall. Cat.* 3875; *Wight Ic.* t. 1413; *Dalz. & Gibs. Bomb. Fl.* 182. *B. Schimperiana*, *Hochst. Pl. Abyss. Exsicc.* n. 23.

WESTERN and CENTRAL HIMALAYA; from Kashmir to E. Nepal, alt. 1–9000 ft. BEHAR, on Parushnath, *J. D. H.* CENTRAL INDIA, at Hazarabagh, *Clarke*. DECCAN PENINSULA, from the Concan southwards.—DISTRIB. Madagascar, Tropical Africa.

Stem 6–18 in., often branched above. *Root-leaves* 1–2 in., cauline usually longer and narrower. *Spikes* 6–10 in., very slender; flowers often distant. *Calyx* hispid, ⅙ in. long, lobes very narrow. *Corolla-tube* not twice as long as the calyx, limb ¼ in. diam. *Capsule* shorter than the calyx.—Wight states that his specimens from Coorg are not hairy, as described in the character of the plant; these I have not found in his Herbarium.

42. **Striga**, *Lour.*

Usually scabrid herbs, discoloured or black when dry. *Leaves*, lower opposite, upper alternate, linear, entire, rarely toothed, sometimes reduced to scales. *Flowers* axillary or the upper in bracteate spikes, often 2-bracteolate. *Calyx* tubular, strongly 5–15-ribbed, 5-toothed or -fid. *Corolla-tube* slender, abruptly incurved at or about the middle or top; limb spreading, 2-lipped, upper lip usually short notched or 2-fid; lower the inner in bud, 3-fid. *Stamens* 4, didynamous; included; anthers 1-celled, vertical, dorsifixed, bases obtuse, connective sometimes mucronate. *Style* thickened above, stigma simple. *Capsule* subglobose or oblong, loculicidal; valves entire, septiferous, separating from the placentas. *Seeds* very numerous, ovoid or oblong, reticulated.—Species about 18, in the hotter regions of the Old World.

* *Calyx* 5-ribbed.

1. **S. orobanchoides**, *Benth. in Hook. Comp. Bot. Mag.* i. 361, t. 19, and in *DC. Prodr.* x. 501; glabrous or pubescent, leaves scale-like, bracts lanceolate hardly as long as the calyx, corolla-tube incurved. *Dalz. & Gibs. Bomb. Fl.* 181; *Wight Ic.* t. 1414. *Buchnera orobanchoides*, *Br. in App. Salt. Abyss., ex Endl. in Flora* 1832, 387, t. 2. *B. hyderabadensis*, *Roth Nov. Sp.* 292; *Wall. Cat.* 3871. *Orobanche indica*, *Spreng. Syst.* ii. 817, not of *Roxb.* *Striga orchidea*, *Hochst. Pl. Nub. Exsicc.* n. 387.

WESTERN INDIA; Scinde, and Marwar, on Mt. Aboo, *Stocks*. The Deccan from the Concan southwards. *Suhunsudhara, Royle*.—DISTRIB. Tropical and S. Africa, Arabia.

Rootstock tuberous; stems 6–10 in., stout or slender, simple or branched, glabrous or pubescent; branches stout, erect. *Leaves* opposite and alternate. *Spikes* variable in length, dense or lax-fl'd. *Calyx-lobes* acuminate. *Corolla* small, 2-lipped, described as white, rosy, blue or red-brown; tube exserted; limb $\frac{1}{4}$ in. diam. *Capsule* subglobose.

2. **S. densiflora**, *Benth. in Hook. Comp. Bot. Mag.* i. 363, and in *DC. Prodr.* x. 502; scabrid or strigose, leaves linear, bracts lanceolate longer than the calyx, corolla-tube incurved. *Dalz. & Gibs. Bomb. Fl.* 181. *Buchnera densiflora*, *Benth. Scroph. Ind.* 41; *Dalz. & Gibs. Bomb. Fl.* 181. *B. asiatica*, L. ? , *Wall. Cat.* 3873 C.

UPPER GANGETIC PLAIN; Saharumpore, *Royle*; Benares, *Madden*. DECCAN PENINSULA, from Guzerat southwards.

Stem 6–18 in., simple or branched; branches erect, stout or slender, sometimes fastigate. *Leaves* $\frac{1}{2}$ –1 by $\frac{1}{16}$ – $\frac{1}{8}$ in., erect. *Spikes* usually slender, sometimes very long with distant flowers; bracts linear. *Calyx* $\frac{1}{8}$ in., lengthening in fruit, lobes subulate. *Corolla* white, tube exserted, limb $\frac{1}{4}$ in. diam. *Capsule* included in the calyx.

** *Calyx* 10–15-ribbed.

3. **S. lutea**, *Lour. Fl. Coch.* 22; scabrid or villous, leaves linear, calyx 10-ribbed. *Benth. in Hook. Comp. Bot. Mag.* i. 363. *S. hirsuta*, *Benth. in DC. Prodr.* x. 502; *Dalz. & Gibs. Bomb. Fl.* 181. *S. coccinea*, and *S. phœnicea*, *Benth. in Hook. l. c.* 364. *S. pusilla*, *Hochst. Plant. Schimp.* *Buchnera asiatica*, *Linn. Sp. Pl. in part*; *Roxb. Fl. Ind.* iii. 31; *Benth. Scroph. Ind.* 40. *B. coccinea*, *Benth. Scroph. Ind.* 40; *Wall. Cat.* 3870. *B. phœnicea*, *Benth. Scroph. Ind.* 40; *Wall. Cat.* 3874. *Campuleia coccinea*, *Hook. Fl. Exot.* t. 203.—*Rheede Hort. Mal.* ix. t. 66.

Throughout WESTERN INDIA and the DECCAN; from Scinde and the Punjab southwards (Kumaon only, in the HIMALAYA, ascending to 6000 ft.) BENGAL. TENASSERIM.—DISTRIB. Siam, Java, China, Arabia, Tropical and S. Africa, Madagascar.

Stem usually slender, 6–18 in., simple or fastigately branched. *Leaves* $\frac{1}{2}$ –1½ in. *Spikes* elongate; flowers usually distant; bracts usually longer than the calyx. *Calyx* rarely 15-ribbed. *Corolla* very variable in size, scarlet, purple, yellow or white; tube twice as long as the calyx, glabrous or nearly so, inflexed at the top. The var. *humilis*, *Benth. in DC. l. c.*, has rather broader leaves and a dense spike.

4. **S. euphrasioides**, *Benth. in Comp. Bot. Mag.* i. 364; and in *DC. Prodr.* x. 503; scabrid or strigose, leaves linear, calyx $\frac{1}{4}$ in. 15-ribbed, lobes as long as the tube, corolla $\frac{1}{3}$ – $\frac{3}{4}$ in. long. *Dalz. & Gibs. Bomb. Fl.* 181; *Miquel Fl. Ind. Bat.* ii. 705. *S. glabrata*, *Benth. in Hook. l. c.* *Buchnera euphrasioides*, *Vahl Symb.* iii. 81; *Roxb. Fl. Ind.* iii. 32; *Wight Ic.* t. 855. *B. angustifolia*, *Don Prodr.* 91. *B. bifida*, *Ham. in Wall. Cat.* 3872. *B. asiatica*, *Linn. Herb. in part*.

Throughout INDIA, in the plains from the Punjab southwards to CEYLON, and eastwards to the Khasia Mts., Pegu and Burma; ascending the Himalaya to 4000 ft. (not seen from the Eastern Peninsula or lower Bengal).—DISTRIB. Java (*Miquel*).

Very variable in habit, from a simple filiform stem 4–6 in., to a stout branched herb 2 ft. *Leaves* $\frac{1}{4}$ –2 in., often 1–2-toothed. *Spikes* interrupted; flowers often distant. *Corolla* white, tube pubescent at the curve. *Calyx* bell- or funnel-shaped in fruit.

5. **S. Masuria**, *Benth. in Hook. Comp. Bot. Mag.* i. 364, and in *DC. Prodr.* x. 503; scabrid, leaves linear, calyx $\frac{1}{2}$ in. narrow 15-ribbed, lobes equalling the tube, corolla-tube 1 in. limb $\frac{3}{4}$ –1 in. diam. *Buchnera Masuria*, *Ham. in Benth. Scroph. Ind.* 41. *B. Wallichii*, *Benth. in Wall. Cat.* 3876.

NEPAL; in the Morung, *Hamilton*. MADRAS; at Guindy, *Shuter*. BURMA; at Promé, *Wallich*.—DISTRIB. China, Philippine Islands.

Stem very slender, 1–2 ft. *Leaves* 1–2 in. *Flowers* distant. *Fruiting calyx* $\frac{3}{8}$ –1 in., tube ventricose, ribs very strong and close.

6. **S. sulphurea**, *Dalz. & Gibs. Bomb. Fl.* 182; very slender, scabrid, leaves linear, flowers mostly axillary, calyx $\frac{1}{2}$ – $\frac{3}{4}$ in., lobes filiform equalling the tube, corolla-tube not exceeding the calyx, limb very small.

The CONCAN; at Seconere hill-fort, *Dalzell*.

Stem 6–12 in. *Leaves* 1–1 $\frac{1}{2}$ in., extremely slender. *Flowers* few, distant, all axillary or the upper subspicate, shorter than the floral leaves. *Calyx* very narrow, fruiting $\frac{3}{8}$ in., tube ventricose, ribs very strong. *Corolla* yellow, limb $\frac{1}{8}$ in. diam.

43. **Rhamphicarpa**, *Benth.*

Erect glabrous herbs. *Leaves*, lower opposite, upper alternate, narrow, entire or pinnatisect. *Flowers* axillary and pedicelled, or in bracteate racemes; bracteoles 1–2 or 0. *Calyx* campanulate, 5-fid, lobes acuminate. *Corolla-tube* slender, long, straight or incurved; lobes 5, broad, spreading, subequal or the upper connate. *Stamens* 4, didynamous, included; anthers 1-celled, vertical, dorsifixed, bases obtuse. *Style* thickened above, stigma simple. *Capsule* compressed at right angles to the septum, usually beaked, loculicidal; valves septiferous. *Seeds* numerous, small, obovoid or oblong, tube reticulate.—Species 6, tropical and S. African, Indian and Australian.

R. longiflora, *Benth. in Hook. Comp. Bot. Mag.* i. 368, and in *DC. Prodr.* x. 504; annual, leaves pinnatisect segments filiform, corolla-tube very long straight, capsule with a slender curved beak. *Dalz. & Gibs. Bomb. Fl.* 182; *Wight Ic. t.* 1415. *Buchnera longiflora*, *Arn. Pugill.* 38.

DECCAN PENINSULA, from the Coeacan southwards.

Very variable in habit and stature, from 2 in. slender and simple, to 10 in. diffusely branched. *Leaves* 1–1 $\frac{1}{2}$ in.; segments few, $\frac{1}{2}$ – $\frac{3}{4}$ in. *Flowers* shortly pedicelled. *Calyx* $\frac{1}{4}$ – $\frac{1}{3}$ in., tube short, lobes lanceolate 3 times as long as the tube. *Corolla* dull white, tube 1–1 $\frac{1}{2}$ in., limb $\frac{2}{3}$ in. diam. *Capsule* $\frac{1}{2}$ in., ovoid, ventricose, beak longer or rather shorter than the cells.—*Bentham* (*Fl. Austral.* iv. 518) unites with this the African *R. fistulosa*, *Benth.*, and an Australian species, but the calyx is much longer in *R. longiflora*, and I think the three are distinct, though very near.

44. **Centranthera**, *Br.*

Annual, rigid, scabrid herbs. *Leaves* opposite or upper alternate, oblong

or linear, obtuse, entire or toothed. *Flowers* axillary or in bracteate spikes or racemes, 2-bracteolate. *Calyx* compressed, spathaceous, split on one side; lobes acute or acuminate, cohering or free. *Corolla-tube* long, incurved, dilated above; limb oblique; lobes 5, broad, subequal, spreading, 2 upper inner in bud. *Stamens* 4, didynamous, included; anthers meeting in pairs, cells transverse, bases spurred or mucronate, one smaller often empty. *Stigma* dilated, acute. *Capsule* ovoid or subglobose, loculicidal; valves entire, placentiferous in the middle. *Seeds* very numerous, oblong-cuneate, testa lax, reticulate.—Species 4, Indian, Malayan and Australian.

1. **C. grandiflora**, *Benth. Scroph. Ind.* 50, and in *DC. Prodr.* x. 525; erect, stout, scabrid, leaves oblong elliptic or narrowly linear, calyx 1 in. oblong inflated acuminate, corolla yellow. *Wall. Cat.* 3880.

SIKKIM HIMALAYA, alt. 1–5000 ft., *J. D. H.*; and KHASIA Mts., alt. 3–5000 ft.

Stem 1–2 ft., branched. *Leaves* sessile, 1–2 by $\frac{1}{2}$ –1 in., rigid. *Flowers* shortly pedicelled. *Calyx-segments* subulate, cohering. *Corolla* $1\frac{1}{2}$ –2 in. long, limb 1 in. diam. *Filaments* hairy. *Capsule* globose.

2. **C. Brunoniana**, *Benth. Scroph. Ind.* 50, and in *DC. Prodr.* x. 525; erect, scabridly hispid, leaves linear-oblong, calyx $\frac{1}{2}$ in. oblong-acuminate, corolla yellow. *Wall. Cat.* 3882. *C. hispida*, *Benth. Fl. Hongk.* 254, the yellow-fl. plant.

MARTABAN and TENASSERIM; at Moulmein, *Wallich*, &c.—DISTRIB. China.

Stem 12–18 in. *Leaves* $\frac{3}{4}$ –2 in. *Flowers* shortly pedicelled. *Corolla* 1 in. long, limb $\frac{1}{2}$ in. diam.

3. **C. hispida**, *Br. Prodr.* 438; erect, hispid, hoary, leaves oblong or linear-oblong, calyx $\frac{1}{3}$ in. ovoid acute, corolla purplish. *Wall. Pl. As. Rar.* i. 39, t. 45, and *Cat.* 3881; *Benth. in DC. Prodr.* x. 525; *Dalz. & Gibs. Bomb. Fl.* 182; *Miquel Fl. Ind. Bat.* ii. 707. *C. nepalensis*, *Don Prodr.* 88. *Digitalis stricta*, *Roxb. Fl. Ind.* iii. 99. *Capraria rigida*, *Hb. Ham.*

Throughout INDIA; from the Punjab, and Kumaon, ascending to 4000 ft., to Canara, Bengal, Tenasserim and Burma. CEYLON, ascending to 3000 ft.—DISTRIB. Java, China, Philippine Islands, Australia.

Stem 1–2 ft. *Leaves* very variable, usually $\frac{1}{2}$ –1 in., and narrowly linear. *Flowers* subsessile. *Corolla* twice as long as the calyx. *Filaments* woolly.

4. **C. procumbens**, *Benth. in DC. Prodr.* x. 525; diffusely branched from the base, rarely erect, hispid, leaves oblong or linear-oblong, calyx $\frac{1}{2}$ in. ovoid-oblong acute, corolla purplish. *C. Brunoniana*, *Thwaites Enum.* 220, not of *Benth.*

DECCAN PENINSULA; from the Concan southwards. CEYLON, ascending to 3000 ft.

Root apparently more than annual. *Stems* rarely simple, erect, 6–10 in., usually with straggling branches 4–8 in. long from the root. *Leaves* $\frac{1}{2}$ –1 by $\frac{1}{6}$ – $\frac{1}{3}$ in. *Flowers* sessile. *Corolla* $\frac{3}{4}$ –1 in.—Possibly a variety of *C. hispida*, but the calyx is much larger.

5. **C. humifusa**, *Wall. Cat.* 3883; dwarf, diffusely branched from the base, glabrous or hispidulous, leaves linear, calyx $\frac{1}{6}$ in. ovoid subacute, corolla yellow. *Benth. in DC. Prodr.* x. 525. *Razumovia tranquebarica*, *Spreng. Syst.* ii. 812. *Torenia lepidota*, *Roth Nov. Sp.* 281.

BENGAL and BEHAR; at Parusnath, *Clarke*. DECCAN PENINSULA; at Tranquebar.

MALACCA, *Griffith*. CEYLON; south end of the island.—DISTRIB. Java, Borneo, China.

Branches slender, 3–6 in. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in. *Flowers* subsessile. *Corolla* $\frac{1}{2}$ – $\frac{1}{3}$ in. long.

45. **SOPUBIA**, *Hamilt.*

Erect herbs. *Leaves* opposite, or the upper alternate, narrow, often lacinate. *Flowers* bracteate, spicate or racemose, pedicels 2-bracteolate. *Calyx* campanulate, 5-toothed or -lobed. *Corolla-tube* short, throat broad; lobes 5, broad, spreading, subequal, 2 upper the inner in bud. *Stamens* 4, didynamous, subincluded; anthers 2 or all meeting in pairs, one cell of each perfect, ovoid, the other small stipitate empty. *Stigma* thickened, sublinguiform, obtuse. *Capsule* ovoid or oblong, tip rounded or compressed, retuse or notched, loculicidal; valves entire or 2-fid, separating from the placentiferous axis. *Seeds* numerous, testa lax.—Species 8 or 9, S. African, Indian, Malayan and Australian.

1. **S. delphinifolia**, *G. Don Gen. Syst.* iv. 560; much branched, scaberulous, leaves pinnatisect, segments filiform, flowers subsessile, calyx-teeth longer than the tube subulate, corolla subcampanulate, capsule rounded at the top. *Benth. in DC. Prodr.* x. 522; *Dalz. & Gibs. Bomb. Fl.* 182. *Gerardia delphinifolia*, *Linn.*; *Roxb. Cor. Pl.* i. 62, t. 90, and *Fl. Ind.* iii. 99; *Wall. Cat.* 3890; *Benth. Scroph. Ind.* 49. *G. Heyneana*, *Benth. in Wall. Cat.* 3891. *Euphrasia Coromandeliana*, *Roth*; *Spreng. Syst.* ii. 775.

BANDA. *Edgeworth*. BEHAR; on Parusnath, *Anderson*. DECCAN PENINSULA, from the Concan southwards. CEYLON, ascending to 4000 ft.

Stem erect, 4-grooved, 3–4 ft., spotted with purple. *Leaves* 1 in., segments few, almost as long, flexuous. *Calyx-lobes* linear, erect. *Corolla* 1–1½ in., rose coloured, limb 1 in. diam. *Filaments*, upper hooked lower horned at the tip. *Capsule* oblong, as long as the calyx.

2. **S. trifida**, *Ham. in Don Prodr.* 88; scaberulous, branched above, leaves linear or filiform lower mostly 3-fid upper entire, flowers pedicelled, calyx-teeth triangular, corolla subrotate, capsule retuse at the top. *Benth. in DC. Prodr.* x. 522. *Gerardia scabra*, *Wall. Cat.* 3889, not of *Linn.*; *Benth. Scroph. Ind.* 49. *G. Sopubia*, *Benth. in Hook. Comp. Bot. Mag.* i. 210.

TEMPERATE AND SUBTROPICAL HIMALAYA; from Kunawur to Sikkim, alt. 3–7000 ft. KHASIA MTS., alt. 3–4000 ft. DECCAN PENINSULA; Nilgherries and Bababoodan Hills, common. CEYLON; elevated parts of the Central province.

Stem slender, 1–2 ft., branches suberect. *Leaves* $\frac{3}{4}$ –1 in., often fascicled. *Pedicels* $\frac{1}{4}$ – $\frac{3}{8}$ in. *Calyx* $\frac{1}{8}$ in., woolly within. *Corolla* $\frac{1}{2}$ in. diam., varying from yellow to purple (*Clarke*).

3. **S. stricta**, *G. Don Gen. Syst.* iv. 559; scaberulous, branched, leaves linear entire or sparingly toothed or cut, flowers pedicelled, calyx-teeth lanceolate acute, corolla subcampanulate, capsule compressed at the top. *Benth. in DC. Prodr.* x. 522. *Gerardia stricta*, *Benth. Scroph. Ind.* 49; *Wall. Cat.* 3887.

SIKKIM HIMALAYA, foot of the hills, *J. D. H. PEGU*, M'Lelland. TENASSEERIM; at Moulmein, *Wallich*. BENGAL; at Sumbulpore, *Griffith*.—DISTRIB. Java.

Stem 8–12 in., rigid, simple or fastigiately branched above. *Leaves* 1–1½ in., scattered and fascicled. *Pedicels* $\frac{1}{8}$ in. *Calyx* $\frac{1}{8}$ in. *Corolla* $\frac{1}{3}$ to $\frac{1}{2}$ in. long, limb as broad.

46. **MICRARGERIA**, Benth.

Rigid, scabrid, erect herbs, black when dry. *Leaves* alternate, or the lower opposite, linear, entire or 3-multifid. *Flowers* small, in the upper axils, or in long terminal spikes, bracteate and 2-bracteolate. *Calyx* campanulate or hemispheric; teeth 5, broad. *Corolla-tube* exserted, dilated above, often incurved; lobes 5, broad, spreading, entire, subequal, 2 upper inner in bud. *Stamens* 4, didynamous, included; anthers free, meeting in pairs, cells distinct subequal attached by their tips, base obtuse. *Stigma* thickened, obtuse. *Capsule* small, globose, loculi- and septi-cidal; valves 4, separating from 2 small globose placentas. *Seeds* numerous, oblong-cuneate, testa lax.—Species 2, a W. African and Indian.

M. Wightii, Benth. in DC. Prodr. x. 509; lower leaves pinnatisect, segments few filiform. *Wight Ic.* t. 1417.

SOUTH DECCAN PENINSULA; *Wight, &c.*

Annual, 8–18 in. high. *Stem* naked below, fastigiately branched above; branches long, slender, erect. *Leaves* $\frac{1}{2}$ in., in scattered fascicles, cut into almost filiform spreading segments $\frac{1}{4}$ – $\frac{1}{2}$ in. long; upper filiform, entire. *Spikes* very long and slender; flowers distant, subsessile; bracts filiform, longer than the calyx; bracteoles linear. *Calyx* $\frac{1}{10}$ in., hemispheric; teeth triangular. *Corolla-tube* $\frac{1}{2}$ in. long, incurved, pubescent, limb as broad. *Capsule* $\frac{1}{8}$ in. diam. enclosed in the calyx.

47. **LEPTORHABDOS**, Schrenk.

Erect, annual, glabrous or glandular-pubescent, twiggly herbs. *Stem* 4-angled. *Leaves* opposite below, alternate above, linear, entire or lacinate or pinnatisect, upper smaller. *Flowers* small, axillary, and in interrupted very slender racemes, bracteate, ebracteolate. *Calyx* tubular-campanulate, 5-toothed or -fid. *Corolla-tube* short; lobes 5, subequal, spreading, broad, entire or notched, 2 upper inner in bud. *Stamens* 4, didynamous, shorter than the corolla; anthers free, cells parallel equal not spurred. *Stigma* shortly dilated, obtuse; ovules 2 in each cell. *Capsule* compressed above at right angles to the septum, obtuse, loculicidal; valves entire, septiferous. *Seeds* 1–2 in each cell, laterally attached, oblong or angled, rugose.—Species 4 or 5, Central Asiatic and N. Indian.

1. **L. Benthamiana**, Walp. Rep. iii. 387; glabrous, inflorescence glandular-puberulous, leaves pinnatisect, segments linear or filiform, calyx-lobes ovate-lanceolate. *L. virgata*, Benth. in DC. Prodr. x. 510; Boiss. Fl. Orient. iv. 470. *L. parviflora*, Benth. l. c. *Gerardia parviflora*, Wall. Cat. 3888; Benth. Scroph. Ind. 48. *Dargeria pinnatifida*, Dene. in Jacq. Voy. Bot. 116.

TEMPERATE WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 5–11,000 ft., Falconer, &c. WESTERN TIBET; Dras, alt. 10,000 ft., Thomson.—DISTRIB. Afghanistan, Persia.

Stem 1–2 ft., slender or rather stout, naked below, simple or fastigiately branched above; branches strict, erect, very slender. *Leaves* 1–3 in., sometimes cut to the base into subequal filiform segments, in others ovate or lanceolate and regularly pinnatisect; segments linear and entire or subpinnatifid. *Racemes* very slender, very many-fid.; pedicels $\frac{1}{10}$ – $\frac{1}{8}$ in.; bracts linear, longer or shorter than the pedicels. *Calyx* $\frac{1}{2}$ in.; lobes lanceolate or triangular-ovate, acute, 5-ribbed in fruit. *Corolla* variable in size, about twice as long as the calyx; limb $\frac{1}{2}$ in. diam. *Capsule* $\frac{1}{8}$ in., as long as the calyx.—I can find no difference between the authentically named specimens of *L.*

virgata and *parviflora*; but there are fruiting specimens from Balti in the Shayuk valley of a plant the capsules of which are nearly $\frac{1}{3}$ in. long.

2. **L. linifolia**, *Walp. Rep.* iii. 388; leaves linear entire or the lowest 3-fid, calyx-lobes linear-lanceolate as long as the tube. *Benth. in DC. Prodr.* x. 510. *Dargeria linifolia*, *Dcne. in Jacquem. Voy. Bot.* 116, t. 121.

KASHMIR, in the upper pine forests, *Jacquemont*.

I have seen no specimens of this, which is probably referable to *L. Benthamiana*. Possibly there is but one species of this genus.

TRIBE IX. EUPHRASIEÆ.

48. **PHTHEIROSpermum**, *Bunge*.

(& 50 **EMMENOSpermum**, *Clarke*.)

Annual or biennial, viscid herbs. *Leaves* opposite, pinnatifid. *Flowers* axillary, solitary, sessile or shortly pedicelled, ebracteolate. *Calyx* campanulate, 5-fid, lobes short narrow. *Corolla* 2-lipped, tube broad, dilated above; upper lip very short, erect, lobes 2 folded back; lower longer, broader, spreading, 2-fid, throat open, palate 2-gibbous. *Stamens* 4, didynamous; anthers beneath the upper lip glabrous, cells equal parallel distinct, bases mucronate. *Stigma* spatulate, shortly 2-lobed. *Capsule* compressed, beaked, loculicidal; valves entire, semiseptiferous, at length separating from the placentiferous column. *Seeds* numerous, ovoid, reticulated.—Species 3, a Chinese and Japanese and 2 Indian.

A new genus (*Emmenospermum*) has been proposed by Clarke (and inadvertently introduced into the key, p. 249) for *P. Parishii*, founded on the seeds being minutely reticulated and not striate, a character not supported by habit or any other. The seeds of *P. chinense* are ellipsoid $\frac{1}{40}$ in. long, with a loose pale reticulated testa; those of *P. Parishii* are about half that size, with a dark close testa. Much greater differences occur in the seeds of all large and many small genera of Scrophularineæ.

1. **P. Parishii**, *Hook. f.*; softly hairy, leaves sessile broadly ovate deeply pinnatifid, lobes obtuse, flowers subsessile, corolla-tube much longer than the calyx, upper lip very short truncate 2-toothed, lobes of lower obcordate.

TENASSERIM; at Moulmein, Koli Mts. and Thoungyne, alt. 5000 ft., *Lobb*; Summit of Moolee, alt. 7400 ft., *Parish*.

Stem 3-8 in., simple or branched from the base or upwards, hairs spreading. *Leaves* $\frac{1}{4}$ - $\frac{1}{3}$ in.; lobes linear, entire or notched. *Calyx* $\frac{1}{6}$ in., glandular, 5-cleft to the middle; lobes linear-lanceolate, obtuse. *Corolla* $\frac{1}{2}$ in. long. *Capsule* $\frac{1}{4}$ in., pubescent. *Seeds* $\frac{1}{80}$ of an inch long, oblong, testa close dark.

2. **P. glandulosum**, *Benth. in Gen. Pl.* ii. 173; glandular-pubescent, leaves sessile 3-partite, segments linear, calyx-lobes unequal, corolla-tube hardly longer than the calyx. *Euphrasia?* *glandulosa*, *Benth. in DC. Prodr.* x. 555.

WESTERN HIMALAYA; (in Garwhal?) at Shioli, alt. 6000 ft., *Edgeworth*.

Stem slender, erect, 3-4 in., simple or branched. *Leaves* $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* few, sessile. *Calyx* $\frac{1}{10}$ in. long. *Corolla* $\frac{1}{6}$ in. wide.—The specimens are quite insufficient for a second analysis of the flower.

49. **Euphrasia**, *Linn*.

Annual or perennial herbs. *Leaves* opposite, toothed lacinate or pal-

matifid. *Flowers* in terminal spikes with large often acutely cut bracts, ebracteolate. *Calyx* tubular or campanulate; lobes 4, equal or connate in pairs, rarely with a minute 5th tooth. *Corolla* 2-lipped, tube dilated above; upper lip erect, concave, 2-lobed, margins replicate; lower larger, not plaited below, 3-lobed, lobes spreading, obtuse or notched. *Stamens* 4, didynamous; anthers beneath the upper lip, cells distinct, parallel, base equally or unequally mucronate or spurred. *Stigma* dilated, entire or with a small dorsal tooth. *Capsule* oblong, compressed, loculicidal; valves septiferous, separating from the placentiferous column. *Seeds* numerous (rarely few), pendulous, oblong, grooved.—Species about 20, of cool regions.

E. officinalis, Linn.; *Benth. in DC. Prodr.* x. 552; annual, pubescent or glabrate, leaves sessile ovate or ovate-cordate deeply crenate-serrate, bracts like the leaves, anthers hairy, cells of posticous ones unequally spurred. *Boiss. Fl. Orient.* iv. 472; *Reichb. Ic. Fl. Germ.* xx. t. 1731, 2. *E. tartarica*, *Fisch. in Spreng. Syst.* ii. 777; *Ledeb. Ic. Fl. Ross.* t. 435. *E. depauperata*, *Benth. in Wall. Cat.* 3886. *E. simplex*, *Don Prodr.* 95.

TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 4–13,000 ft.; Sikkim, alt. 10–12,000 ft., *J. D. H.*—DISTRIB. Afghanistan and N. Persia to Europe, N. Central and East Asia to Japan, N. America.

Stem wiry, 6–18 in., simple or sparingly or fastigiately branched, often naked below; branches slender, erect. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., distant or imbricating, nerves strong. *Spikes* continuous with the foliage, short or long, obtuse, few- or many-fld. *Flowers* very small; bracts imbricating. *Calyx* about equalling the bracts; lobes acute. *Corolla* $\frac{1}{6}$ – $\frac{1}{2}$ in. long, white or lilac, with purple veins. *Anthers* brown. *Capsule* included in the calyx or exserted.—Very variable, attaining a much larger size in the Himalaya than in Europe, and being more constant in foliage. *Benth* distinguishes two Himalayan varieties; *E. tartarica*, with almost orbicular leaves, remote, subacute bracts, and small corollas hardly exserted from the bracts, and *E. vulgaris*, with ovate or oblong obtusely crenate cauline leaves, sharply serrate bracts, and corolla of very variable size. These, which are both widely distributed in Europe and Asia, present no constant characters in India.

50. EMMENOSPERMUM, Clarke.

(See 48, Phtheirospermum.)

51. BARTSIA, Linn.

Annual or perennial herbs. *Leaves* opposite, entire crenate serrate or incised. *Flowers* axillary, spicate or racemose, bracteate, ebracteolate. *Calyx* tubular or campanulate, 4-fld. *Corolla* 2-lipped; tube slender, straight or incurved; upper lip erect, concave, entire or notched, margins not replicate; lower convex or bigibbous at the base, lobes 3 spreading. *Stamens* 4, didynamous; anthers under the upper lip, cells distinct equal parallel, bases usually spurred. *Stigma* obtuse or capitate. *Capsule* loculicidal to the middle or higher; valves entire, placentiferous. *Seeds* numerous, pendulous or horizontal, smooth grooved or winged.—Species about 60, in cool and mountain localities.

B. Odontites, *Huds., Fl. Angl.* 268; annual, erect, scabridly pubescent, leaves sessile lanceolate sparingly serrate, spikes subsecund, lower bracts leafy. *Reichb. Ic. Fl. Germ.* t. 1727. *Odontites rubra*, *Benth. in DC. Prodr.* x. 551. *O. serotina*, *Boiss. Fl. Orient.* iv. 476. *Euphrasia Odontites*, Linn. *E. rubra*, *Pers. Syn.* ii. 150.

KASHMIR, alt. 7–8000 ft., *Clarke*.—DISTRIB. Westwards to Europe and N. Africa; N. and Central Asia to Japan?

Stem 6-18 in., erect or ascending, wiry, 4-angled, paniculately branched; branches ending in leafy spikes. *Leaves* $\frac{1}{2}$ -2 in., very variable. *Calyx* campanulate; lobes ovate, acute, equalling the tube. *Corolla* $\frac{1}{2}$ in., pubescent, pink; upper lip long, entire. *Anthers* exserted, yellow. *Capsule* $\frac{1}{4}$ in., rather longer than the calyx. *Seeds* narrowly oblong.

52. **PEDICULARIS**, Linn.

Annual or perennial herbs. *Leaves* alternate opposite or whorled, simple toothed pinnatifid or pinnatisect. *Flowers* bracteate in terminal spikes or racemes, ebracteolate. *Calyx* tubular or campanulate, entire or split above and often below, 2-5-toothed, lateral teeth free or connate entire or crested, lower small or 0. *Corolla* 2-lipped, tube cylindric; upper lip erect, compressed straight falcate annular or decurved, obtuse acute or beaked, lower with 3 spreading erect or deflexed lobes. *Stamens* 4, didynamous; anthers under the upper lip meeting in pairs; cells distinct, equal, parallel, bases obtuse or rarely awned. *Style* slender, stigma subcapitate. *Capsule* compressed, ovate or lanceolate, falcate or oblique, often obliquely beaked, loculicidal; valves placentiferous, often cohering to the middle. *Seeds* numerous, of various shapes, testa appressed or lax, reticulate pitted striate or ribbed.—Species about 120, northern and mountain plants, with a few S. American and S. Indian.

SERIES I. Cauline leaves whorled, or opposite, or the lower scattered.

* *Upper lip beaked.*

1. **P. pectinata**, Wall. Cat. n. 420; usually tall, stout, glabrous, except the often hairy spike, cauline leaves whorled lanceolate pinnatifid or pinnatisect with serrate segments or 2-pinnatifid, calyx-teeth acute entire, corolla-tube short, upper lip inflated sickle-shaped beak long tip twisted. *Benth. Scroph. Ind.* 52, and in *DC. Prodr.* x. 560.

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 7-11,000 ft.—*DISTRIB.* Afghanistan.

Stem 6-18 in., simple or branched. *Leaves* 3-6 in., sometimes 4 in. broad, ovate or oblong; petiole long, slender. *Spikes* 2-6 in., lax-flid.; bracts as long as the calyx, ovate or lanceolate. *Calyx* $\frac{1}{2}$ in. long, inflated in fruit. *Corolla* $\frac{3}{4}$ in., rose-red, beak with a double flexure, as long as the tube. *Filaments* hairy. *Capsule* $\frac{1}{2}$ in., ovoid acute, tip exserted. *Seeds* large, $\frac{1}{2}$ in. long, ridged and deeply pitted, pale.

VAR. pyramidata; stem sometimes 4-fariously hairy, spikes sometimes 1 ft. long. *P. pyramidata*, Royle in *Benth. Scroph. Ind.* 52, and in *DC. Prodr.* x. 560.

2. **P. robusta**, Hook. f.; pubescent, stems short very stout curved ascending, radical leaves many linear coriaceous pinnatifid or pinnatisect, segments oblong crenate, cauline few opposite or alternate, racemes short, bracts pinnatifid, calyx-lobes crenate, corolla-tube not longer than the calyx, upper lip erect inflated then sharply decurved and shortly beaked. *P. pectinata*, Herb. Ind. Or. H. f. & T. (the Sikkim plant only).

ALPINE SIKKIM; Samdong, alt. 15-16,000 ft., J. D. H., *Elwes*.

Rootstock long, stout, cylindric. *Stems* several from the rootstock, 3-6 in. long or less, as thick as a crow-quill, sometimes very short. *Radical leaves* numerous, 2-5 by $\frac{1}{2}$ - $\frac{3}{4}$ in., lobes numerous and close-set; petiole very stout. *Racemes* dense-flid.; bracts leafy, crenate or pinnatifid; flowers $\frac{3}{4}$ in. long. *Calyx* split half-way down, lobes small. *Corolla* red-purple; upper lip $\frac{1}{2}$ in. long; glabrous, lower $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, 3-lobed. *Capsules* $\frac{3}{4}$ in. long, broadly oblong, tip rounded with a lateral point. *Seeds* $\frac{1}{10}$ in. long, subellipsoid, subacute, finely striate, not punctulate, pale.—Clarke collected on Singa-

lelab, in Sikkim, alt. 11,000 ft., a plant with the habit of this, but in fruit only, with straight oblong-lanceolate acuminate capsules 1 in. long, and seeds nearly $\frac{1}{2}$ in. long, striate and punctulate.

3. **P. tenuirostris**, *Benth. Scroph. Ind.* 52, and in *DC. Prodr.* x. 561; tall, erect, leafy, stem glabrous or 4-fariously hairy, cauline leaves whorled sessile lanceolate pinnatifid segments obtuse crenulate, spikes stout dense-fld., bracts ovate caudate-acuminate, corolla-tube exerted or not, upper lip erect inflated then decurved with a long flexuous beak.

WESTERN HIMALAYA; from Kashmir to Lahul, alt. 7-11,000 ft.—DISTRIB. Afghanistan.

Stem 2-3 ft., stout, simple or branched. *Radical leaves* petioled; cauline 4 in a whorl, 2-5 by $\frac{1}{2}$ -2 in., lobes numerous. *Bracts* ciliate or hirsute, exceeding the calyx. *Corolla* yellow, $\frac{3}{4}$ in. long, upper lip much inflated at the base, beak variable; lower broadly obcordate with a small median lobe. *Capsule* not seen.

4. **P. gracilis**, *Wall. Cat.* 413; stem tall slender branched 4-fariously hairy, cauline leaves whorled deeply pinnatifid, segments oblong-lanceolate obtuse serrate crenate or pinnatifid, racemes or spikes slender lax-fld. or flowers all axillary distant, corolla-tube half as long as the calyx, upper lip falcate swollen in the middle, erect with a horizontal flexuous slender beak, much longer than the small lower broadly obovate or orbicular 3-lobed. *Benth. Scroph. Ind.* 52, and in *DC. Prodr.* x. 561. *P. stricta* & *P. Brunoniana*, *Wall. Cat.* 414, 422.

TEMPERATE and ALPINE HIMALAYA; from Kashmir, alt. 6-10,000 ft., to Sikkim, alt. 8-12,000 ft.—DISTRIB. Afghanistan.

Stem 6-24 in.; branches opposite or whorled, simple or divided, all very slender. *Leaves* 1-2 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., rarely hairy. *Spikes* or *racemes* 3-6 in.; bracts pinnatifid, longer than the calyx; flowers pedicelled or sessile. *Calyx* $\frac{1}{2}$ in.; lobes obtuse or crenulate. *Corolla* rose-purple; tube $\frac{1}{2}$ in., slender, beak decurved as long as the lower lip which is very variable in size and shape. *Capsule* $\frac{1}{4}$ - $\frac{1}{2}$ in., shortly oblong, acute, half or only the tip exerted. *Seeds* very minute, $\frac{1}{30}$ in. long, broadly ovoid, pale, striate and with shallow pits.

VAR. *khassiana*; puberulous or glabrate, leaves very short $\frac{1}{2}$ - $\frac{3}{4}$ in., lobes short close, bracts often shorter than the calyx.—Khasia Mts., alt. 5-6000 ft., *Griffith, &c.*

5. **P. porrecta**, *Wall. Cat.* 423; stem short ascending glabrous or 2-4-fariously hairy, cauline leaves 1-2 pair opposite oblong pinnatifid lobes oblong obtuse serrate, raceme short few-fld., corolla-tube twice as long as the calyx, upper lip sickle-shaped erect inflated then shortly decurved and acutely beaked, as long as the lower lip. *Benth. Scroph. Ind.* 52, and in *DC. Prodr.* x. 561.

ALPINE HIMALAYA; "towards Kashmir," *Royle*; Kumaon, *Wallich*; Sikkim, alt. 14-15,000 ft., *J. D. H.*

Rootstock perennial, stout. *Stems* several from the rootstock, 4-6 in. *Leaves* $\frac{1}{2}$ -1 in., radical petioled, cauline sessile or petioled. *Racemes* 4-6 fld., pubescent; bracts pinnatifid; flowers $\frac{3}{4}$ in. long. *Calyx-lobes* obtuse, crenulate. *Corolla-tube* slender, $\frac{1}{2}$ - $\frac{3}{4}$ in. *Capsule* $\frac{1}{2}$ in., oblong, nearly straight, acute. *Seeds* $\frac{1}{12}$ in. long, subellipsoid, pale, finely striate and punctulate.

6. **P. brevifolia**, *Don Prodr.* 94; pubescent or villous, stem erect simple, leaves few, cauline opposite or whorled oblong pinnatifid lobes short toothed, spikes few-fld. subcapitate, corolla-tube twice as long as the calyx, upper lip falcate erect then inflated with a long straight or decurved beak longer than the lower lip. *Benth. Scroph. Ind.* 53, and in *DC. Prodr.* x. 561. *P. lanigera*, *Wall. Cat.* 419.

ALPINE HIMALAYA; from Kashmir to Sikkim, alt. 13–16,000 ft.

Rootstock stout. *Stem* 4–8 in., stout or slender, rarely glabrate. *Leaves* rarely 1 in.; cauline sessile. *Spikes* 1–1½ in. broad, top rounded; flowers and fruit much as in *P. porrecta*, of which this resembles a hairy form, but the beak is much longer.

7. ***P. flexuosa***, *Hook. f.*: slender, sparsely hairy or glabrate, stems flaccid elongate decumbent diffusely branched, cauline leaves opposite petioled ovate or oblong 2-pinnatifid lobes sharply toothed. flowers axillary and in lax or dense leafy spikes or heads. corolla-tube $\frac{3}{4}$ –1¼ in., limb large, upper lip erect then inflated with a stout horizontal beak shorter than the lower lip. *Pedicularis* n. 5, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; alt. 10–13,000 ft., *J. D. H., Clarke.*

Stems 1–2 ft., curved (dwarf forms 6–8 in. also occur), flexuous. *Leaves* 2–4 in., ovate oblong or oblong-lanceolate, flaccid, irregularly toothed. *Spikes* or racemes usually capitate in flower and fruit, or elongating in fruit; bracts pinnatifid, longer than the calyx. *Calyx* ½ in., lobes crenulate. *Corolla* rosy, tube many times longer than the calyx; limb $\frac{2}{3}$ in. diam. *Capsule* $\frac{1}{3}$ –½ in. long, ovate-oblong or lanceolate, straight, acute. *Seeds* 1½ in. long, ellipsoid, obtuse, smooth or obscurely reticulate, dark.

8. ***P. integrifolia***, *Hook. f.*: softly glandular-pubescent, stems short stout simple, cauline leaves few opposite sessile oblong obtuse crenulate. flower axillary and in short heads, corolla-tube ½ in., upper lip large erect then greatly inflated and narrowed into a very long slender flexuous beak. *Pedicularis* n. 8, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Tungu, alt. 12–14,000 ft., *J. D. H.*

Rootstock very stout. *Stems* 4–6 in., ascending. *Radical leaves* crowded, 1½–2 in., narrowly linear-lanceolate, subacute, margins recurved obscurely crenate, glandular-pubescent on both surfaces; cauline erect, $\frac{3}{4}$ –1 in. *Spikes* capitate, oblong; bracts leaf-like, but broad, as long as the calyx. *Calyx* ½ in., lobes crenate. *Corolla* dark purple, tube twice as long as the calyx; beak longer than the tube, flexuous. *Capsule* not seen.

** *Upper lip of the corolla rounded at the end, not or very shortly beaked.*

9. ***P. globifera***, *Hook. f.*: dwarf, stem stout ascending 4-fariously hairy, leaves whorled short linear-oblong pinnatifid segments crowded crenulate, spikes capitate erect or nodding hirsute many- and dense-fl., corolla-tube short, upper lip short erect, tip rounded sharply deflexed acute or shortly beaked. *Pedicularis* n. 10, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Kongra Lama, alt. 14–15,000 ft., *J. D. H.*

Rootstock stout. *Stems* 2–4 in. *Radical leaves* 1 in., very shortly petioled, lower cauline sessile, ½ in. *Spikes* globose or oblong, top rounded; bracts as long as the calyx, rounded, crenulate; flowers $\frac{1}{2}$ –¾ in. long. *Calyx* ½ in. long, hirsute, lobes obtuse, very short. *Corolla* dark purple; tube broad, half as long again as the calyx; upper lip with a sharply inflexed but hardly beaked tip.—The specimens are from one locality only, and not in fruit; they resemble *P. brevifolia*, Don, a good deal, but the flowers are more numerous and denser, and the upper corolla lip is hardly beaked. *P. Korolkowi*, Regel, is another closely allied plant, differing in the glabrous calyx with longer teeth.

10. ***P. cheilanthifolia***, *Schrenk in Fisch. & Mey. Enum. Pl. Nov. Fasc. ii. 19*; stems erect or ascending simple or branched 4-fariously hairy, cauline leaves whorled petioled linear pinnatifid segments crenate, spike dense- or lax-fl. villous, corolla-tube twice as long as the calyx, upper lip much longer than the lower arched dilated at the apex or not, tip deflexed

obtuse. *Benth. in DC. Prodr.* x. 562. *P. abrotanifolia*, *Herb. Ind. Or. II. f. & T.*, not of *Bieberst.*

WESTERN TIBET; Nubra and Ladak, alt. 11–15,000 ft., *Thomson*, &c.; Balch Pass, N. of Kumaon, alt. 16,500 ft., *Strachey & Winterbottom*.—DISTRIB. Soongaria.

Rootstock stout. *Stems* many, 6–12 in., rarely branched. *Radical leaves* 1–4 by $\frac{1}{2}$ – $\frac{1}{3}$ in., petiole slender, crenatures often callous; cauline opposite and 3–6 in a whorl, $\frac{1}{2}$ –2 in. long. *Spikes* 1–4 in., stout, very villous; bracts longer than the calyx, entire or toothed; flowers $\frac{2}{3}$ in. long. *Calyx* $\frac{1}{4}$ in.; lobes short, obtuse. *Corolla* pink, lower lip small very short. *Capsule* oblong-lanceolate, acuminate, nearly straight, half exserted. *Seeds* $\frac{1}{12}$ in., ellipsoid, subacute, striate and punctate, pale.—Differs from *P. abrotanifolia*, *Bieb.*, in the pink flowers, and long upper lip of the corolla.

11. ***P. verticillata***, *Linn.*; *Benth. in DC. Prodr.* x. 563; sparingly hairy, stems erect or ascending, cauline leaves few whorled sessile or subsessile oblong or linear-oblong pinnatifid segments rather distant ovate subpinnatifid and crenulate, spikes broad short often interrupted, corolla-tube twice as long as the calyx, upper lip small nearly straight subtruncate much smaller than the large broad lower lip. *Jacq. Fl. Austr.* t. 206; *Gaertn. Fruct.* i. 246, t. 53, f. 5; *Reichb. Ic. Fl. Germ.* t. 1762, f. 1–14; *Boiss. Fl. Orient.* iv. 485. *P. Stevenii*, *Bunge in Ledeb. Fl. Alt.* ii. 427.

ALPINE HIMALAYA; Kunawur, *Royle*; Lahul, *Jueschke*; Sanch Pass, alt. 14–15,000 ft., *Ellis*. Sikkim, alt. 11–13,000 ft., *J. D. H.*—DISTRIB. From the Pyrenees to the Himalaya, N. Asia, N. America, and the Arctic regions.

Rootstock rather slender. *Stems* 4–10 in. high. *Radical leaves* 2–3 in., petioled; cauline shorter, whorled. *Spikes* 1–3 in. by $1\frac{1}{2}$ broad, lower whorl of flowers often distant, with leafy bracts, upper dense; bracts usually longer than the calyx, pinnatifid or crenate; flowers $\frac{3}{4}$ in. long. *Calyx* $\frac{1}{4}$ in.; lobes broad, very short. *Corolla* pink-purple; tube broad, lower lip $\frac{1}{2}$ – $\frac{2}{3}$ in. diam. *Capsule* $\frac{1}{2}$ in., oblong-lanceolate, straight, acuminate, twice as long as the calyx. *Seeds* $\frac{1}{16}$ in. long, rather broad, finely striate and punctulate, pale.

12. ***P. denudata***, *Hook. f.*; nearly glabrous, stems long simple very slender, cauline leaves in few distant whorls very short sessile oblong pinnatifid pubescent, segments crenate, spikes elongate interrupted, bracts whorled pinnatifid longer than the flowers, corolla-tube longer than the calyx, upper lip abruptly deflexed longer than the lower, tip subacute. *Pedicularis* n. 11, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Lachen Valley, alt. 12–13,000 ft., *J. D. H.*

Stems solitary or many from the root, 8–12 in., with 1–2 whorls or pairs of leaves. *Root-leaves* evanescent, small, petioled, cauline 4 in a whorl, $\frac{1}{2}$ –1 in. long, obtuse. *Spikes* interruptedly whorled; lower flowers with spreading bracts larger than the cauline leaves; flowers $\frac{1}{2}$ in. long. *Calyx* $\frac{1}{6}$ in.; lobes short, crenate. *Corolla* pink. *Capsule* not seen.—Near *P. verticillata*, differing in the very small lower lip.

13. ***P. mollis***, *Wall. Cat.* 415; tall, stout, erect, hirsute or glabrate, simple or with whorled slender branches, leaves whorled ovate or oblong pinnatifid puberulous segments linear crenate or again pinnatifid, spikes elongate interrupted, calyx-lobes oblong crested, upper lip narrow straight much longer than the lower tip rounded. *Benth. Scroph. Ind.* 53, and in *DC. Prodr.* x. 564; *Bot. Mag.* t. 4599.

ALPINE HIMALAYA and WESTERN TIBET; Nubra, alt. 11–12,000 ft., *Thomson*; Nepal, *Wallich*; Sikkim, alt. 10–14,000 ft., *J. D. H.*

Annual. *Stem* 2–3 ft., sometimes as thick as the little finger, strict, hollow. *Leaves* all cauline in several tiers, 4–5 in a whorl, 1–2 by $\frac{1}{2}$ – $1\frac{1}{2}$ in., segments not crowded. *Spikes* on the branches and main stem 6–16 in., strict; flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. long, in superposed but separated whorls; bracts pinnatifid, longer or shorter than the

flowers. *Calyx* $\frac{1}{4}$ in., ovoid; lobes oblong. *Corolla* dark pinkish purple. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in., tip exserted, ovoid, finely acuminate. *Seeds* $\frac{1}{4}$ in., broad, flattened, punctate, pale.—Described as perennial by Bentham, but the root appears to be clearly annual. Resembles *P. gracilis*, especially in fruit.

14. ***P. pycnantha***, Boiss. *Diagn.* i. xii. 45, and *Fl. Orient.* iv. 484; short, stout or slender, sparsely hairy or glabrous, leaves long-petioled, radical many, cauline few opposite and whorled all lanceolate or ovate-lanceolate pinnatifid segments linear acute recurved toothed or subpinnatifid, spikes oblong dense-fl., calyx-lobes subulate, corolla-tube longer than the calyx, upper lip linear straight rather longer than the lower tip rounded. P. Alberti, *Regel, Descr. Pl. Nov. fasc.* vii. 67.

N.W. HIMALAYA; Lahul, Jaeschke; Hazara, alt. 6–7000 ft., Stewart.—DISTRIB. Afghanistan, N. Persia, Turkestan.

Rootstock stout, with fleshy tuberous root-fibres, and crowned with membranous sheaths. *Stems* several, 3–6 in. high. *Radical leaves* 4–6 by 1–1 $\frac{1}{2}$ in.; petiole 1–2 in.; segments very variously and irregularly cut or serrate, rather flaccid; cauline more shortly petioled. *Spikes* 1–4 in.; bracts lanceolate, acuminate, longer than the calyx; flowers $\frac{3}{4}$ in. long. *Calyx* enlarged and $\frac{1}{2}$ in. long in fruit; lobes very variable, narrow, sometimes elongate. *Corolla* pink. *Capsule* shortly oblong, acute, shorter than the calyx. *Seeds* large, $\frac{1}{2}$ in. long, ellipsoid, obtuse, striate and punctate, pale.—Boissier describes the corolla-tube as scarcely longer than the calyx, but in Kotschy's original specimens, and in Stewart's, and in Aitchison's from the Kurrum Valley, the tube is considerably longer.

SERIES II. Cauline leaves alternate.

* Upper lip of corolla beaked.

§ Tube of the corolla shortly exceeding the calyx; upper lip annular or sickle-shaped, hirsute (or glabrate in *P. Clarkei* and *excelsa*).

15. ***P. trichoglossa***, Hook. f.; hirsute or glabrate, stem stout strict erect leafy, leaves alternate sessile linear obtuse pinnatifid to the middle lobes rounded irregularly toothed, spike strict lax-fl., bracts ovate entire, calyx-lobes ovate crenate, corolla purple upper lip annular densely woolly with a glabrous incurved beak. *Pedicularis* n. 27, *Herb. Ind. Or. H. f. & T.*

SIKKIM and E. NEPAL HIMALAYA; Wallanchoon, Momay and Tungu, alt. 12–13,000 ft., J. D. H.

Stem 8–16 in., sometimes as thick as a swan's quill, unbranched. *Leaves* 2–3 by $\frac{1}{2}$ – $\frac{3}{4}$ in., obtuse, lobules very many. *Spikes* 3–6 in.; bracts longer than the calyx, tips sometimes narrowed and crenate; flowers $\frac{3}{4}$ in. long. *Calyx* broadly oblong, villous; teeth ovate-lanceolate, obtuse. *Corolla-tube* not exceeding the calyx; upper lip turgid in the middle; lower with broadly cuneate or orbicular glabrous lobes. *Capsule* $\frac{1}{2}$ in., shortly oblong, obtuse, turgid, nearly included in the calyx. *Seeds* broad, $\frac{1}{10}$ in. diam., irregularly shaped, deeply reticulate, pale.

16. ***P. Clarkei***, Hook. f.; more or less hirsute, stem stout strict erect leafy, leaves alternate sessile pinnatifid, lobes ovate deeply irregularly toothed, spikes strict dense-fl., bracts long pinnatifid, calyx-lobes slender, corolla purple upper lip sparsely hairy abruptly decurved from the middle beak nearly straight. *Pedicularis* n. 28, *Herb. Ind. Or. H. f. & T.*

ALPINE SIKKIM HIMALAYA, alt. 12–13,000 ft.; Yeumtong and Tungu, J. D. H.; Jongri, Clarke.

Stem 16–20 in., sometimes as thick as the middle finger. *Leaves* 3–5 by $\frac{1}{2}$ in., lobes spreading, rachis winged between them. *Spike* 2–6 in.; bracts with a broad base and slender long crenate-pinnatifid tip, usually longer than the calyx and sometimes

than the flowers; flowers $\frac{3}{4}$ in. long. *Calyx* oblong, villous, lobes rather long and slender entire or crenate. *Corolla* red or purple, tube rather longer than the calyx; lower lip small, narrow, shorter than the upper. *Capsule* as in *P. lachnoglossa*. *Seeds* large, very irregularly obtusely angled and compressed, $\frac{1}{2}$ in. long, deeply reticulate, pale.

17. **P. lachnoglossa**, *Hook. f.*; stem simple strict 1-2-leaved, radical leaves petioled linear-lanceolate pinnatisect, segments very many and regular equidistant linear crenate, raceme strict, flowers distant, bracts lanceolate longer than the calyx, upper lip inflated woolly with a straight horizontal or deflexed beak lower with 3 narrow lobes. *Pedicularis* n. 32, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Lachen Valley, alt. 14,000 ft., *J. D. H.*

Rootstock perennial? crowned with slender membranous leaf-sheaths. *Stem* as thick as a crow-quill. *Radical leaves* 4-6 by $\frac{1}{2}$ - $\frac{3}{4}$ in., petiole and rachis slender, segments 30-40, at regular intervals, $\frac{1}{10}$ in. broad. *Racemes* 4-8 in.; bracts slender, crenulate, erect; pedicels very short; flowers appressed to the rachis, $\frac{3}{4}$ in. long, red-purple. *Calyx* $\frac{1}{2}$ in., glabrous, oblong, lobes lanceolate not crested. *Corolla-tube* not exceeding the calyx; upper lip sickle-shaped inflated in the middle, beak straight much larger and longer than the lower, which has 3 small obovate acute ciliate lobes. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in., lanceolate, finely acuminate, twice as long as the calyx. *Seeds* $\frac{1}{2}$ in. long, subellipsoid, base appendaged, dark, faintly striate and punctate.

18. **P. excelsa**, *Hook. f.*; stem glabrous very tall branched leafy, leaves large alternate petioled bipinnatifid or pinnatisect below, pinnae linear-oblong distant, lobes or segments irregularly toothed, racemes long strict many-fld. pubescent, calyx small glabrous teeth very small, upper lip of corolla with villous margins produced into a slender incurved tail longer than the lower tip entire. *Pedicularis* n. 27, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Yeumtong, in the Lachen Valley, alt. 12,000 ft., *J. D. H.*

Stem 2-4 ft., as thick as the middle finger below, shining, hollow; branches ascending, slender, long, incurved. *Leaves* scattered, flaccid, 6-12 by 2-5 in.; pinnae spreading, 1-2 $\frac{1}{2}$ in. long, rachis puberulous winged with lobules between the segments above, naked and slender below; petiole 2-4 in., slender. *Racemes* a foot long and under, rather dense-fld.; bracts pinnatifid, small, pedicels $\frac{1}{5}$ - $\frac{1}{4}$ in.; flowers small, $\frac{1}{2}$ in. long. *Calyx* $\frac{1}{2}$ in., spathaceous, broadly oblong, split to the base, mouth oblique, minutely toothed. *Corolla-tube* not exceeding the calyx; upper lip with an oblong inflated base usually villous along the margins contracted into an incurved tail; lower lip narrow, with a small rounded median lobe. *Capsule* $\frac{3}{4}$ in. long, oblong-ovate, 4 times as long as the calyx, tip rounded with an apiculus at one side. *Seeds* $\frac{1}{2}$ in., black, minutely reticulate.—I regret having no note of the colour of the flower of this majestic species, which was, I believe, red-purple.

§§ Tube of the corolla not or very little longer than the calyx; upper lip quite glabrous.

19. **P. macrantha**, *Klotzsch in Reise Pr. Wald. Bot.* 107, t. 58; nearly glabrous or hairy, stem erect or ascending short or long leafy, leaves radical and alternate long-petioled linear pinnatifid or pinnatisect segments short ovate or oblong toothed or pinnatifid with acute teeth, racemes short dense-fld. or the lower or all the flowers axillary, bracts leaf-like, flowers large pink, calyx-lobes crested, corolla-tube not exceeding the calyx, upper lip sickle-shaped tumid with a short beak, lower very large. *Pedicularis* n. 7, *Herb. Strach. & Winterb.*

WESTERN and CENTRAL HIMALAYA; Nepal, *Hoffmeister, J. Scully*; Garwhal, at Kulhara, alt. 11,000 ft., *Strachey & Winterbottom.*

Root of many fleshy stout fusiform fibres. *Stem* 4-2 $\frac{1}{2}$ in., sometimes as thick as

a swan's quill. *Leaves* 4-6 by $\frac{1}{2}$ - $\frac{3}{4}$ in., flaccid; segments distant; rachis winged or not; petiole often as long as the blade. *Flowers* 1 in. long; pedicels $\frac{1}{2}$ -1 in.; bracts often exceeding the flowers and bipinnatifid. *Calyx* turgid, $\frac{1}{2}$ in. long, lobes large, nerves distinct. *Corolla* with the upper lip large broad, at the base erect or reflexed, then horizontal with an incurved short beak; lower $1\frac{1}{2}$ in. broad, lobes orbicular, the median smallest. *Capsule* (unripe) $\frac{2}{3}$ in. long, oblong-lanceolate, tip exserted rounded with a lateral point.—Resembles *P. megalantha*, but the short corolla-tube and large upper lip are very different.

20. **P. Elwesii**, *Hook. f.*; glabrous or puberulous, stem stout decumbent or ascending, few-leaved, leaves radical and alternate all shortly petioled linear pinnatifid or pinnatisect, lobes oblong short obtuse coarsely crenate or lobulate, racemes short, flowers very large purple, calyx nerveless pubescent lobes crested, corolla-tube not exceeding the calyx, upper lip inflated sickle-shaped with an incurved beak much smaller than the very broad lower lip. *Pedicularis* n. 24, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Lachen Valley, alt. 12-14,000 ft., *J. D. H., Elwes.*

Rootstock perennial? *Stem* as thick as a goose-quill, rarely 1 ft., curved. *Radical leaves* numerous, 5-7 by $\frac{1}{2}$ - $\frac{3}{4}$ in., puberulous beneath; petiole short, $\frac{1}{2}$ - $\frac{3}{4}$ in., stout; cauline similar. *Racemes* very short; bracts foliaceous, pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in.; flowers $1\frac{1}{2}$ in. long. *Calyx* $\frac{1}{2}$ - $\frac{3}{4}$ in., cylindric, puberulous, split $\frac{1}{4}$ way down, mouth with 2 crenate lobes. *Corolla* dark-purple, upper lip with the inflated portion suddenly contracted into the short incurved beak; lower erect enclosing the upper, 1 in. broad, of a small medial and two lateral very large rounded lobes. *Capsule* not seen.—The calyx of this species is quite unlike that of *P. macrantha*, being terete puberulous and without apparent nerves.

§§§ Tube of the corolla more than twice as long as the calyx; upper lip glabrous, sickle-shaped or annular, not inflated in the middle.

21. **P. megalantha**, *Don Prodr.* 94; pubescent or villous, stem tall stout erect leafy, leaves alternate long-petioled oblong-lanceolate pinnatifid, lobes short or long crenate or again pinnatifid, racemes at length lax-fl., bracts pinnatifid, calyx-lobes crested, corolla-tube twice as long as the calyx, upper lip annular gradually narrowed from the base and produced into a long slender tail, lower very large. *Benth. in DC. Prodr.* x. 564; *Wall. Cat.* 411; *Regel Gartenfl.* t. 943.

TEMPERATE and SUBALPINE HIMALAYA; from Kashmir, alt. 7-14,000 ft., to Sikkim, alt. 11-15,000 ft.

Stem 1-2 ft., solitary or several from the root, often as thick as a swan's quill, hollow. *Radical leaves* 2-10 in., 2-pinnatifid; petiole slender; cauline sometimes as long. *Racemes* 4-10 in.; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in.; lower bracts longer than the flowers. *Calyx* $\frac{2}{3}$ in. long, inflated, birsute, nerves strong. *Corolla-tube* very slender, $\frac{2}{3}$ -1 in.; upper lip slender, lower 1 in. broad. *Capsule* $\frac{1}{2}$ - $1\frac{1}{4}$ in. long, half exserted, linear-oblong, acute. *Seeds* $\frac{1}{8}$ in. long, finely reticulate.—The colour of the flowers is variously noted as yellow and rose-pink; in Sikkim they are rose-purple, in Regel's figure they are golden yellow.

22. **P. bicornuta**, *Klotzsch in Reis. Pr. Waldens. Bot.* 109, t. 61; pubescent or hirsute, stem usually very stout tall erect simple leafy, leaves alternate all petioled linear or linear-oblong pinnatifid to the middle lobes rounded crenate or lobulate, spikes or racemes long stout many-fl., bracts crenate, calyx-lobes crested, corolla yellow, upper lip annular produced into a slender curved bifid tail, lower very large. *P. eximia*, *Watt in Journ. Linn. Soc.* xviii. 381, t. 13. *Pedicularis* n. 23, *Herb. Ind. Or. H. f. & T.*

WESTERN ALPINE HIMALAYA and WESTERN TIBET, from Kashmir to Kunawur, alt. 9-13,000 ft., *Falconer, &c.*—DISTRIB. Afghanistan, Yarkand and Kashgar.

Root of stout fleshy fibres. *Stem* 6–24 in. high, often as thick as the thumb; small specimens are stemless, the raceme or spike apparently springing from the root. *Radical leaves* numerous in small stemless specimens, evanescent in large, blade 4–12 by $\frac{1}{2}$ – $1\frac{1}{2}$ in., lobes very many, close-set; cauline leaves like the radical; petiole 1–2 in. *Raceme* often 8 in. long, with many rather crowded flowers; bracts usually shorter than the calyx; pedicels 0– $\frac{3}{4}$ in. *Calyx* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, broadly oblong, laxly hirsute. *Corolla-tube* from a little longer to twice as long as the calyx; upper lip often sigmoid or cyclöid, lower 1– $1\frac{1}{2}$ in. broad. *Capsule* 1– $1\frac{1}{4}$ in. long, oblong-lanceolate finely acuminate, twice as long as the calyx. *Seeds* $\frac{1}{8}$ in. long, pale, striate and reticulate.

23. **P. bella**, *Hook. f.*; dwarf, stemless, or nearly so, radical leaves tufted obovate obovate-oblong or subspathulate crenate densely pubescent, pedicels axillary, corolla dark purple tube long slender, upper lip small annular very much shorter than and enveloped in the very large broad lower. *Pedicularis* n. 22, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Kongra Lama, alt. 16,000 ft., *J. D. H.*

Root apparently annual. *Leaves* 1 in., narrowed into a broad petiole, densely hoary-tomentose on both surfaces. *Flowers* rather numerous; pedicel $\frac{1}{2}$ – $\frac{3}{4}$ in. *Calyx* $\frac{1}{2}$ in., tubular, hoary; lobes large, rounded, crenate. *Corolla* very large for the size of the plant; lower lip forming a very broadly funnel-shaped cup 1 in. diam., in which the short upper lip nestles. *Capsule* $\frac{2}{3}$ – $\frac{3}{4}$ in. long, narrowly oblong, subfalcate, tip acute oblique. *Seeds* pale, striate and deeply pitted.—A singular and very beautiful species; the corolla resembles that of *P. Perrottetiana*, in its capsular form.

24. **P. siphonantha**, *Don Prodr.* 95; glabrate or sparsely pubescent or hirsute, stems many from the root slender and leafy, rarely solitary with only radical leaves, leaves petioled linear-oblong pinnatifid or pinnatisect, lobes many short crenulate, flowers axillary and in terminal racemes or heads, calyx-lobes crested, corolla pink, tube very slender 3–6 times as long as the calyx, upper lip a slender annular horn gradually narrowed from the base to the point, lower broadly 3-lobed. *Wall. Cat.* n. 417; *Benth. in DC. Prodr.* x. 565. *P. Hookeriana*, *Wall. Cat.* 421; *Benth. Scroph. Ind.* 53, and in *DC. Prodr.* 564. *P. punctata*, *Decne.*, and *P. labellata*, *Jacquem. mss.*, *Decne. in Jacquem. Voy. Bot.* 117, 118, t. 122, 123. *P. himalaica* & *Hoffmeisteri*, *Klotzsch in Reise Pr. Waldem. Bot.* 107, 108, t. 58, 60.

ALPINE HIMALAYA and WESTERN TIBET, from Kashmir to Sikkim, alt. 11–16,000 ft.—DISTRIB. Afghanistan.

Rootstock perennial? *Stems* 2–10 in. erect or ascending. *Leaves* 2–6 by $\frac{1}{2}$ – $1\frac{1}{2}$ in., lobes or segments obtuse, cauline and radical alike. *Racemes* short or long; bracts leaf-like; pedicels of the lower flowers sometimes 1 in. *Calyx* $\frac{1}{2}$ – $\frac{3}{4}$ in., hirsute or glabrate, nerves distinct. *Corolla* rose-pink, tube very slender, sometimes 2 in.; upper lip longer than the broad lower. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, broadly oblong, oblique, acute, half exserted or less. *Seeds* $\frac{1}{12}$ – $\frac{1}{10}$ in.; oblong, obtuse, base apiculate, striate.—Varies greatly in the size of the corolla and length of its tube.

§§§§. Tube of the corolla at least twice as long as the calyx, upper lip sickle-shaped, glabrous, inflated in the middle.

a. *Radical leaves numerous; stem erect or ascending, usually stout.*

25. **P. carnosa**, *Wall. Pl. As. Rar.* ii. 44, t. 154, and *Cat.* 418; hoary-pubescent, or glabrate, stem erect branched at the base long strict leafy, cauline leaves alternate shortly petioled oblong or linear-oblong obtuse narrowed at the base crenate, flowers laxly racemed rose-purple, bracts leafy, calyx-lobes crested, corolla-tube twice as long as the calyx, upper lip arched decurved from the inflated middle acutely beaked. *Benth. Scroph.*

Ind. 54, and in *DC. Prodr.* x. 580. ? *Rhinanthus bifidus*, *Ham. in Don Prodr.* 94.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 5–9000 ft. KHASIA Mts.; Kala pane, &c., alt. 5–6000 ft., *J. D. H. & T. T.*

Annual. *Stem* 4–18 in., rather slender, strict or flexuous, usually tomentose or villous above, branches ascending. *Leaves* 1–3 by $\frac{1}{2}$ – $\frac{3}{4}$ in., often scabrid, narrowed into the short petiole; radical often elliptic or oblanceolate, cauline narrower; crenatures broad, rounded, sometimes crenulate. *Racemes* or spikes 1–6 in., very lax; bracts often longer than the flowers; pedicels slender very short or 0; flowers $\frac{3}{4}$ in. long. *Calyx* $\frac{1}{2}$ in., narrow in flower, hirsute or glabrous, lobes very short, fruiting broadly oblong. *Corolla-tube* rarely less than twice as long as the calyx; upper lip inflated in the middle, longer than the lower, which is $\frac{3}{4}$ in. broad and shallowly 3-lobed. *Capsule* broadly oblong, acute, shortly exserted. *Seeds* minute, orbicular, $\frac{1}{16}$ in. diam., compressed, black, punctulate.—Bentham refers to this Don's *Rhinanthus bifidus*, which differs in the hirsute upper lip of the corolla according to Don's description. Very near the N. Asiatic and Japanese *P. resupinata*, of which the leaves are sessile, or if petioled broad at the base and doubly crenate.

26. ***P. rhinanthoides***, *Schrenk in Fisch. & Mey. Enum.* 22; glabrous except above, stems short ascending simple 1–2-leaved, radical leaves petioled linear or oblong pinnatifid or pinnatisect, lobes short oblong obtusely lobulate and crenate, racemes short, calyx hirsute strongly nerved, corolla-tube 2–3-times as long as the calyx, upper lip sickle-shaped inflated in the middle with a slender incurved or sigmoid beak. *Benth. in DC. Prodr.* x. 565. *P. elephantoides*, *Benth. Scroph. Ind.* 23, and in *DC. l. c.* 564. *P. Elephas*, *Boiss. Diagn. Ser.* 1, iv. 81, and *Fl. Orient.* iv. 489.

ALPINE HIMALAYA and WESTERN TIBET; from Kashmir to Sikkim, alt. 11–13,000 ft.—DISTRIB. Afghanistan, Central Asia, Persia.

Stems one or more from a perennial? rootstock, 4–10 in., stout, curved, usually quite glabrous. *Radical leaves* 2–3 by $\frac{1}{2}$ – $\frac{3}{4}$ in., lobes variable; petiole usually stout, $\frac{1}{4}$ – $\frac{1}{2}$ in. *Racemes* very short; bracts leaf-like; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in.; flowers 1–1 $\frac{1}{2}$ in. long. *Calyx* $\frac{1}{2}$ in., membranous, sparsely villous, shortly cleft, and with 2 short crenate teeth. *Corolla* pale or bright pink; lower lip $\frac{3}{4}$ –1 in. diam., lateral lobes large rounded, median small. *Capsule* $\frac{3}{4}$ in. long, oblong-lanceolate, straight or curved, obtuse with a lateral point, $\frac{1}{2}$ – $\frac{3}{4}$ in. exserted from the calyx. *Seeds* $\frac{1}{2}$ in. long, oblong, obtuse, obscurely striate and punctulate, base shortly appendaged.—The Afghan specimens have more glabrous calyces and longer capsules.

27. ***P. tubiflora***, *Fisch. in Stev. Monogr. Pedic.* 30; glabrous or nearly so, stems many from the root short leafy, radical leaves very many petioled linear pinnatifid or pinnatisect lobes many short crenate, flowers axillary in very short racemes, bracts leaf-like, calyx glabrous with crested lobes, corolla yellow tube very slender 4–6 times as long as the calyx, upper lobe erect inflated with a slender deflexed flexuous beak. *Benth. in DC. Prodr.* x. 565. *P. tubiformis*, *Klotzsch in Reise Pr. Waldem. Bot.* 106, t. 57.

ALPINE HIMALAYA and WESTERN TIBET; from Kashmir to Sikkim, alt. 11–16,000 ft.—DISTRIB. Central Asia, Siberia, Dahuria.

Rootstock apparently perennial. *Stems* 3–6 in., erect or ascending, stout, often branched. *Leaves* 1–3 by $\frac{1}{4}$ – $\frac{1}{2}$ in., lobes or segments numerous; petiole $\frac{1}{4}$ –1 in., stout. *Racemes* subcapitate; bracts longer than the calyx; flowers 1 $\frac{1}{2}$ –2 $\frac{1}{2}$ in. long; pedicels of the axillary flowers sometimes $\frac{3}{4}$ in. *Calyx* $\frac{1}{2}$ in., lobes large. *Corolla* bright yellow with dark spots on the lower lip; tube slender, sometimes 2 in. long; lower lip $\frac{1}{2}$ – $\frac{3}{4}$ in. broad. *Capsule* $\frac{3}{4}$ –1 in. long, obliquely oblong-lanceolate, acute, $\frac{1}{2}$ or $\frac{3}{4}$ exserted. *Seeds* minute, $\frac{1}{16}$ in. long, narrow, with a basal appendage, black, very obscurely striated.—Habit and long tube of short specimens of *P. siphonantha*, but with a very differently coloured corolla and inflated upper lip.

28. **P. microcalyx**, *Hook. f.*; glabrous below, puberulous above, stem simple 1-2-leaved, leaves long-petioled linear pinnatifid lobes oblong obtuse crenate, flowers few subcapitate, calyx very small teeth crested, corolla-tube 3-4 times as long as the calyx purple upper lip inflated sickle-shaped beak nearly straight decurved. *Pedicularis* n. 25, *Herb. Ind. Or. H. f. & T.*

ALPINE SIKKIM HIMALAYA; Lachen and Samdong, alt. 12-15,000 ft., *J. D. H.*
Stem 4-6 in., solitary, rather slender and flexuous. *Radical* and cauline leaves few, 1-1½ by ¼-½ in., petiole as long as the blade. *Flowers* 5-6 in a head, subsessile, with occasionally an axillary pedicelled one below the head; bracts longer than the calyx, pinnatifid. *Calyx* ⅙ in. long, cupular, membranous, 4-nerved, 4-cleft for ⅓ way down, teeth with crested tips. *Corolla* dingy-purple, tube ⅓ in. or less, upper lip as long as the lower which is ½ in. broad with 3 rounded ciliate lobes, the middle the smallest. *Capsule* ⅓-½ in. long, oblong, acute or acuminate, nearly straight, 3-4 times longer than the calyx. *Seeds* ⅒ in. long, oblong, pale, striate and punctate.—The very small calyx well characterizes this species.

29. **P. asplenifolia**, *Floerke; Willd. Sp. Pl.* iii. 208; nearly glabrous or pubescent, stem 3-6 in., few-leaved, leaves all long-petioled linear obtuse pinnatifid or pinnatisect, lobes close-set crenulate, racemes short few-fl., bracts pinnatifid, calyx large glabrous lobes crested, corolla-tube twice as long as the calyx or less, upper lip large sickle-shaped erect, then inflated with a short acute straight or decurved beak. *Benth. in DC. Prodr.* x. 578; *Reichb. Ic. Fl. Germ.* t. 1743. *P. Portenschlagii*, *Saut. in Reichb. Iconogr.* v. 1, t. 401. *P. asplenifolia*, *Wall. Cat.* 416. *P. Wallichii*, *Bunge in Walp. Rep.* iii. 415.

ALPINE HIMALAYA; Nepal, *Wallich*; Sikkim, Samdong and Tunkra Pass, alt. 14-15,000 ft., *J. D. H.*—DISTRIB. Alps of Central Europe.

Rootstock apparently perennial. *Stems* subsolitary or many from the root, simple, 2-4 in. *Leaves* 1-2½ by ¼ in.; petiole slender, as long as the blade. *Racemes* 3-8-fl.; pedicels ⅓-½ in.; flowers 1½ in. long. *Calyx* ½ in., membranous, lobes short all crested. *Corolla* dingy-purple; tube dilated at the mouth; upper lip ½ in. high, lower ⅔ in. broad, 3-lobed, mid-lobe very small, lateral large rounded. *Capsule* ¾ in. long, obliquely lanceolate, acuminate, twice as long as the calyx. *Seeds* ½ in., elliptic, base appendaged, obscurely striate, dark.

VAR. albiflora; densely tufted, flowers white.—Sikkim; at Kankola, alt. 13,000 ft., *J. D. H.*

? *VAR. pubescens*; densely tufted, pubescent or sparsely villous all over, lower peduncles sometimes radical and 1½ in., flowers larger, corolla-tube sometimes 1 in. long, and lower lip 1 in. diam., capsules ½-1 in. *Pedicularis* n. 20, *Herb. Ind. Or. H. f. & T.*—Sikkim, alt. 14-17,000 ft., *J. D. H.*

b. *Stem long slender flexuous or flaccid leafy; radical leaves evanescent.*

30. **P. flagellaris**, *Benth. in DC. Prodr.* x. 581; softly hairy, stems slender diffuse flexuous leafy, leaves alternate very small shortly petioled ovate or oblong-ovate pinnatisect, segments crenate or toothed, flowers few axillary and subracemose, calyx-lobes crested, corolla pink tube 2-3 times as long as the calyx, upper lip forming a semicircular beaked horn tumid in the middle, lower broadly 3-lobed.

UPPER ASEAM, *Griffith*. SIKKIM HIMALAYA; Lachoong, alt. 10-11,000 ft., *J. D. H.*

Stems prostrate and ascending, 8-18 in. long, simple or sparingly branched, naked below. *Leaves* ¼-½ in.; petiole short, slender; pinnules 3-6 pair, rather recurved, lower sometimes petiolulate. *Racemes* very short; bracts pinnatifid, longer than the calyx. *Calyx* rather narrowly oblong. *Corolla-tube* rather broad or slender; upper lip gradually narrowed to the base and to the acute tip, lower lip about ½ in. diam. *Capsule* (unripe) lanceolate, acuminate, ½ longer than the calyx.

31. **P. furfuracea**, *Wall. Cat.* 412; nearly glabrous throughout, stems flaccid branched sparingly leafy, leaves alternate long-petioled broadly ovate oblong or rounded lobulate or subpinnatifid lobes irregularly toothed, flowers axillary and in lax leafy racemes, calyx-lobes very small, corolla pale pink tube short, upper lip arched beaked. *Benth. Scroph. Ind.* 54, and in *DC. Prodr.* x. 580.

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, margins of woods, alt. 8–12,000 ft., *J. D. H.*, &c.

Perennial? *Stems* 1–2 ft., as thick as a crow-quill, flexuous succulent, with one or two lines of pubescence above. *Leaves* 1–3 by 1–2½ in., membranous, sometimes pinnatisect at the base, glabrous on both surfaces, nearly white with finely reticulated venules beneath; petiole very slender, 1–3 in. *Flowers* scarcely racemose, ¾ in. long; bracts leaf-like; pedicels ⅙–⅓ in., very slender. *Calyx* ¼ in. long, tubular, split on one side. *Corolla* very pale pink, lower lip about ½ in. broad. *Capsule* ½ in. long, ovate-lanceolate, nearly straight, acuminate, twice as long as the calyx. *Seeds* ⅓ in. long, ellipsoid, acute, most minutely reticulate, black.

VAR. *integrifolia*; leaves broadly ovate or rounded irregularly toothed or lobulate, calyx villous, corolla red-purple. *Pedicularis* n. 30, *Herb. Ind. Or. H.f. & T.*—Sikkim, alt. 9–10,000 ft., *J. D. H.*

? 32. **P. curvipes**, *Hook. f.*; quite glabrous, stem very slender long flexuous branched branches long curved, leaves scattered small petioled oblong pinnatifid lobes few incised, flowers axillary, long pedicelled, pedicels recurved in fruit, capsules pendulous.

SIKKIM HIMALAYA; Tumbok, alt. 10,000 ft., *Clarke*.

Stems a foot long; as thick as a sparrow's quill, curving. *Leaves* far apart, ½–1 by ¼–1 in., flaccid, lobes 3–4 pair, rather distant; petiole as long as the blade. *Calyx* ⅙ in. long, mouth oblique, lobes short crenate. *Capsule* ½ in. long, oblong, acute, slightly oblique, half exserted, shorter than the decurved slender pedicel. *Seeds* ⅙ in. long, slender, acute at both ends, obscurely striate, pale.—A remarkable species.

33. **P. fissa**, *Turcz.?*; *Benth. in DC. Prodr.* x. 571; stem stout simple leafy pubescent or glabrate, leaves all petioled lanceolate bipinnatisect segments small cartilaginous toothed, spikes dense-fl. villous, bracts long leaf-like lanceolate crenate, calyx-teeth broad obtuse entire, corolla-tube longer than the calyx, upper lip linear-oblong incurved acutely 2-fid hardly beaked, lower glabrous.

N. KASHMIR; Dras, alt. 10–11,000 ft., *Henderson*.—DISTRIB. Altai, Daburia.

Stem (in the solitary Indian specimen) 8 in., stout, strict. *Radical leaves* 4–5 in., puberulous beneath; petiole very slender, as long as the blade; cauline similar. *Spike* 2 in. long; lower bracts pinnatisect, middle ones 3-fid; lobes lanceolate, crenate, longer than the calyx; flower 1 in. long. *Calyx* ½ in., ventricose, woolly, nerves strong; teeth lanceolate, entire. *Corolla* quite glabrous; upper lip ¾ in. long, tip rounded in front; lower shorter broadly 3-lobed. *Filaments* glabrous.—This closely resembles several other species of the *comosa* group, which, with *P. fissa*, may ultimately prove forms of *P. comosa*, Linn., itself, as may *P. lasiostachys*, Bunge, *rubens*, Steph., and *venusta*, Schangin. From the typical *P. comosa* it differs in the villous calyx, glabrous filaments, and in the lower lip not being ciliate (the latter of which characters seems often wanting in Siberian specimens of *comosa*).

** Upper lip of the corolla rounded at the tip, not beaked.

34. **P. versicolor**, *Wahlb.*; *Steven Monogr. Pedic.* 52; hirsute above, stem short, leaves chiefly radical all petioled linear pinnatifid or pinnatisect, lobes short oblong obtuse crenate, racemes oblong dense-fl., bracts pinnatifid,

calyx-lobes entire or toothed, corolla lemon-yellow upper lip erect linear-oblong slightly incurved longer than the lower. *Benth. in DC. Prodr.* x. 578; *Reichb. Iconogr.* t. 14; *Royle Ill.* t. 72, f. 2.

ALPINE HIMALAYA; from Kashmir, alt. 9–13,000 ft., to Sikkim, alt. 14–15,000 ft. —DISTRIB. Mts. of Central Europe, Arctic Europe, Asia and America.

Rootstock stout, perennial? *Stem* usually solitary, 1–4 in., erect, with 1–2 leaves, rather stout. *Leaves* $1\frac{1}{2}$ – $2\frac{1}{2}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in., glabrous, lobes or segments many; petiole stout or slender, shorter than the blade. *Racemes* 1– $2\frac{1}{2}$ in.; flowers erect, $1\frac{1}{2}$ in. long; bracts often longer than the calyx. *Calyx* $\frac{1}{2}$ in. long. *Corolla* yellow with the upper lip often pink or red, tube twice as long as the calyx; upper lip $\frac{1}{2}$ in., compressed, tip rounded; lower shorter, 3-lobed, $\frac{1}{2}$ – $\frac{1}{3}$ in. diam., deflexed. *Capsule* not seen in Indian specimens.

35. **P. polygaloides**, *Hook. f.*; dwarf. branched from the base, sparsely hairy, leaves few alternate very small petioled oblong pinnatifid lobes short crenate or toothed, flowers axillary pedicelled, calyx-lobes crested, corolla pink tube not exceeding the calyx, upper lip erect straight linear-oblong tip truncate inner angle acute lobes of lower divaricate. *Pedicularis* n. 9, *Herb. Ind. Or. H. f. & T.*

ALPINE SIKKIM HIMALAYA; at Yeumtong, alt. 14,000 ft., *J. D. H.*

Annual, whole plant 1– $1\frac{1}{2}$ in. high; branches rather slender. *Leaves* $\frac{1}{2}$ – $\frac{1}{4}$ in., lobes not numerous; petiole short. *Flowers* scattered, $\frac{1}{2}$ in. long; pedicels $\frac{1}{8}$ – $\frac{1}{4}$ in. *Calyx* $\frac{1}{4}$ in. *Corolla* pink, upper lip as long as the lower, the lateral lobes of which spread at right angles. *Capsule* $\frac{1}{3}$ in. long, oblong, obliquely acute. *Seeds* $\frac{1}{16}$ in., ellipsoid, dark, minutely striate and punctulate.

36. **P. Perrottetii**, *Benth. in DC. Prodr.* x. 565; annual, sparsely pubescent, stems flexuous leafy, leaves alternate petioled oblong pinnatifid lobes oblong subrecurved obtuse crenate, flowers few axillary white, corolla-tube 3–4 in., throat shortly funnel-shaped, upper lip oblong straight much shorter than the lower, tip rounded, *Wight Ic.* t. 1418.

NILGHERRY HILLS; *Perrottet, Wight, &c.*

Stems 5–10 in., rigid but wavy, naked below, rarely branched, sparsely hairy. *Leaves* numerous, $1\frac{1}{2}$ – $2\frac{1}{2}$ by $\frac{1}{2}$ in., obtuse, segments with incurved margins, hairy on both surfaces. *Flowers* subsessile. *Calyx* 1 in. long, tubular, lobes crested. *Corolla-tube* $\frac{1}{4}$ in. diam.; limb $1\frac{1}{2}$ in. diam., cup-shaped. *Capsule* not seen.

37. **P. zeylanica**, *Benth. Scroph. Ind.* 54, and in *DC. Prodr.* x. 580; hoary-pubescent or glabrate, stem tall erect leafy, leaves sessile or petioled linear-oblong or oblong margin lobulate or subpinnatifid lobes rounded crenulate, racemes short or long, bracts pinnatifid, calyx short, teeth crested, corolla-tube hardly exerted, upper lip linear-oblong incurved tip rounded. *Wight Ic.* t. 1419.

DECCAN PENINSULA; Mts. of the Concan, *Stocks*; Nilgherry and Pulney Hills, *Wight, &c.* Ceylon; higher parts of the Central Province, abundant.

Annual, 6–18 in. high. *Stem* stout, simple or branched. *Leaves* 1– $1\frac{1}{2}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in., sometimes contracted into a short petiole. *Racemes* usually elongate, few- or many- and dense- or lax-fl., much elongate in fruit; pedicels short; bracts longer than the calyx; flowers $\frac{1}{2}$ –1 in. long. *Calyx* $\frac{1}{2}$ in. long, cleft to near the base. *Corolla* pink; tube broad; upper lip shorter than the lower which is $\frac{1}{2}$ – $\frac{2}{3}$ in. diam. with 3 broadly rounded lobes. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, obliquely ovate-lanceolate, acuminate, twice as long as the calyx. *Seeds* $\frac{1}{10}$ in. long, broadly ellipsoid or irregular, dark, punctulate.—Habit and foliage of *P. carnosa*.

53. **LATHRÆA**, *Linn.*

Leafless low perennial fleshy white or purplish herbs, black when dry, with

a scaly buried rootstock and short erect scaly stems. *Flowers* biseriate in a secund raceme, bracteate, ebracteolate. *Calyx* campanulate, entire or split in front, 4-fid or -lobed, lobes valvate. *Corolla-tube* arched or nearly straight; lips erect, upper arched entire or notched; lower smaller, truncate, 3-toothed, plaited. *Stamens* 4, anthers under the upper lip; cells equal, parallel, margins bearded, bases mucronate. *Disk* glandular, enlarged, opposite the lower lip. *Ovary* 1-celled; placentas 2, 2-fid; style exserted, decurved, stigma capitate. *Capsule* 2-valved. *Seeds* many, small, globose, rugose.—Species 3, Europe, N. Asia, Himalaya.

1. **L. squamaria**, Linn.; Boiss. *Fl. Orient.* iv. 493; calyx split to the base in front. Reuter in DC. *Prodr.* xi. 40; Reichb. *Ic. Fl. Germ.* t. 1764.

WESTERN HIMALAYA, Falconer. KASHMIR, Banahal, alt. 6000 ft., Thomson; Urrukta, Boyle.—DISTRIB. Europe, Siberia.

Rootstock stout, fleshy, branched. *Stems* 4–10 in., stout scaly. *Raceme* 4–6 in., bracts like the scales, broadly oblong. *Flowers* $\frac{1}{2}$ in. long. *Calyx* 2-lipped, 4-toothed to the middle, teeth subacute. *Corolla* longer than the calyx, arched, lobes short erect, anthers cohering. *Capsule* ovoid.

54. **MELAMPYRUM**, Linn.

Annual erect herbs, black or dark when dry. *Leaves* opposite, narrow, entire or incised at the base. *Flowers* axillary or secund in dense spikes with large often coloured bracts, ebracteolate. *Calyx* tubular, 5-toothed, upper teeth often larger. *Corolla* 2-lipped, tube cylindric; upper lip erect, short, hooded, compressed, margins reflexed or with a tooth on each side; lower longer, erecto-patent, 3-lobed, base 2-gibbous. *Stamens* 4, ascending; anthers under the upper lip, meeting in pairs, cells distinct equal parallel, bases obtuse. *Stigma* simple; ovules 2 in each cell, one sessile the other stipitate. *Capsule* compressed, ovate, oblique, loculicidal. *Seeds* 4 or fewer, funicle swollen.—Species 6, of N. temp. regions.

1. **M. indicum**, Hook. f. & T. in Hook. *Kew Journ. Bot.* ix. 246, t. viii.; slender, scaberulous, leaves petioled lanceolate or ovate-lanceolate, bracts leaf-like scaberulous, racemes lax-fid., flowers puberulous, calyx-teeth equalling the tube, corolla-tube much longer than the calyx slender.

KHASIA Mts., alt. 5–6000 ft., Lobb, J. D. H. & T. T.

A slender twiggy branched herb, 2 ft. high. *Leaves* $\frac{3}{4}$ –1 in., acute, quite entire, petiole $\frac{1}{2}$ in. *Flowers* subsessile, $\frac{3}{4}$ in. long, dark red. *Calyx* $\frac{1}{2}$ in., lobes subacute rather shorter than the tube. *Corolla* puberulous, upper lip almost truncate shorter than the 3-fid lower. *Filaments* puberulous. *Capsule* ovoid, beaked, cells 1-seeded.

GENERA OF DOUBTFUL POSITION.

55. **OREOSOLEN**, Hook. f.

A small, tufted, glabrous, rather fleshy herb. *Stem* short, stout. *Leaves* opposite, subsessile, oblong-obovate, obtuse, coarsely irregularly crenate-serrate, nerves subparallel, midrib obscure. *Flowers* fasciated in the leaf-axils, shortly pedicelled, bracteate, ebracteolate. *Sepals* 4, linear, obtuse, erect, puberulous. *Corolla* straight, tube twice as long as the sepals, tubular-funnel-shaped, mouth dilated, limb short, 2-lipped; lips subequal, upper of two round lobes (the outer in bud); lower 3-lobed, lobes short 2 lateral retuse, median smaller ovate obtuse. *Stamens* 4, inserted in the middle of the tube, filaments erect thickened above, glabrous; anthers small, adnate

to the thickened top of the filament, rounded, 1-celled, included in the tube; staminode subulate, on the upper lip. *Ovary* small, ovate, compressed, style long slender, stigma capitate.

1. **O. Wattii**, *Hook. f. in Hook. Ic. Pl. ined.*

SIKKIM HIMALAYA; Jongri, alt. 14,000 ft., *Watt.*

Stem about 1 in. long as thick as a crow-quill, sheathed by a pair of reduced leaves. *Leaves* 1 in. long, quite glabrous, black when dry with translucent nerves which run straight from and through the broad petiole and unite anastomosing near the top and sides of the leaf. *Flowers* $\frac{1}{2}$ in. long.—Probably belongs to the tribe *Veroniceæ*. The specimens are very imperfect and difficult of analysis, owing to their apparently fleshy texture.

56. **FALCONERIA**, *Hook. f.*

A small scabigerous laxly hairy herb, with the habit of a *Mazus*. *Leaves* radical, petioled, obovate or oblong, crenate. *Flowers* racemed, bracteate, ebracteolate. *Sepals* 5, subequal, linear-obovate. *Corolla* 2-labiate, tube short, decurved, upper lip 2-lobed, lower larger 3-lobed, one lateral lobe exterior. *Stamens* 2, included, filaments straight; anthers 2-celled; cells diverging, free below, united at the top. *Ovary* ellipsoid; style short, stigma capitate.

1. **F. himalaica**, *Hook. f. in Hook. Ic. Pl. t. 1438.*

WESTERN HIMALAYA; Kumaon, *Falconer*; Madhari Pass, alt. 8000 ft., *Strachey & Winterbottom* (*Mazus*, No. 4).

Rootstock short with thick fleshy fibres. *Leaves* 3–5 in., more or less pubescent on both surfaces, tip rounded, base crenate; petiole broad, $\frac{1}{2}$ –1 $\frac{1}{2}$ in. long, winged above. *Scape* stout or slender, longer or shorter than the leaves, leafless, laxly hairy, as is the short loose raceme; bracts small, obovate-oblong or spatulate; pedicels short. *Sepals* $\frac{1}{10}$ in. long. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in. long; tube broadly funnel-shaped, suddenly decurved above the base; lower lip twice as long as the upper, lobes obovate retuse. *Style* included.—Apparently near *Wulfenia*, but differing in the 2-lipped corolla and included stamens. I have named it after the late Dr. Hugh Falconer, F.R.S., Superintendent of the Botanical Garden of Saharumpore and afterwards of Calcutta, to whom *Falconeria*, Royle, now included under *Sapium*, was dedicated.

ORDER CIV. **OROBANCHACEÆ**. (By J. D. Hooker.)

Leafless brown annual white or reddish root-parasites. *Stem* usually simple, stout or slender, scaly. *Flowers* solitary or in spikes or racemes, irregular. *Calyx* spathaceous, or of 4–5 free or connate sepals. *Corolla* hypogynous, tube curved; limb 2-lipped; upper lip arched, lower 3-fid, throat often with 2 villous folds. *Stamens* 4, didynamous, inserted on the corolla-tube; anthers 1–2-celled, cells spurred at the base opening by slits or basal pores, one often imperfect. *Disk* unilateral or glandular or 0. *Ovary* of 2 connate carpels, 1- rarely 2-celled; style long, tip curved, stigma capitate 2-lobed; ovules many, rarely few, anatropous on 2 (rarely more) pairs of free or confluent parietal placentas which sometimes meet in the centre of the ovary. *Capsule* 1-celled, 2-valved, few- or many-seeded. *Seeds* minute, testa pitted or tubercled rarely lax and reticulated, albumen fleshy; embryo ovoid, undivided or 2-fid.—DISTRIB. Genera 11, species about 150, temperate and tropical.

I have removed *Lathræa* from this Order to *Scrophularineæ* (p. 317), and taken *Campbellia* from the latter, uniting it with *Christisonia*.

* *Corolla-lobes all broad, subequal, spreading.*

Calyx spathaceous. Anther-cells unequal	1. ÆGINETIA.
Calyx tubular. Anther-cells unequal	2. CHRISTISONIA.
Calyx campanulate. Anther-cells equal	3. CISTANCHE.

** *Corolla 2-lipped.*

Upper lip 2-lobed, lower 3-lobed	4. OROBANCHE.
Upper lip erect hooded subentire, lower very short	5. BOSCHNIACKIA.

1. ÆGINETIA, Linn.

Leafless herbs with branched or simple naked or scaly scapes or stems. *Flowers* few, large, solitary, or corymbose, ebracteolate. *Calyx* spathaceous, split in front nearly to the base. *Corolla-tube* broad, incurved; limb spreading, obscurely 2-lipped; lobes 5, broad, 2 upper connate. *Stamens* included; anthers with one cell perfect adnate to the filament not spurred at the base, the other cell absent in the upper anthers, empty clavate and deflexed in the lower. *Ovary* 1-celled; placentas large, 2-lobed or multifid, filling the cavity, ovuliferous all over; style slender, stigma large peltate. *Capsule* sub-2-valved. *Seeds* crowded, minute, pitted.—Species 4–5, tropical Asiatic.

1. *Æ. indica*, *Roxb. Cor. Pl.* i. 63, t. 91, and *Fl. Ind.* iii. 30; scape very slender naked, corolla purple, placentas multifid. *Reuter in DC. Prodr.* xi. 43; *Wall. Cat.* 3964; *Benth. Scroph. Ind.* 55; *Wight Ill.* t. 158 b, f. 5, and *Id.* t. 895; *Dalz. & Gibs. Bomb. Fl.* 202; *Griff. Ic. Pl. Asiat.* t. 423. *Orobanche Æginetia*, *Linn. Sp. Pl.* 883.

Throughout INDIA, from the Western Himalaya in Kumaon, ascending to 3500 ft., to Nepal, Assam and the Khasia Mts.; and southwards to Tenasserim, Travancore and CEYLON.—DISTRIB. Burma; China, Japan, Philippine Islands.

Root of fleshy interlaced fibres. *Scapes* solitary or several, 6–16 in. high, with a few scales near the base. *Flowers* solitary. *Calyx* $\frac{3}{4}$ to nearly 2 in. long, acute. *Corolla* 1–2 in., limb 1 in. diam. or less, margins fimbriate. *Anthers* of lower stamens with a thick gibbous obtuse spur behind. *Capsule* as large as a filbert. *Seeds* yellowish-white, testa hyaline lax.

2. *Æ. pedunculata*, *Wall. Pl. As. Rar.* iii. 13, t. 219; scape short stout very fleshy many-fld., flowers on long peduncles bracteate at the base, corolla-tube yellow mouth blue, placentas 2 each of 2 plates. *Reuter in DC. Prodr.* xi. 43; *Wight Ill.* t. 158 b, f. 6, and *Id.* t. 1421. *Æ. abbreviata*, *Ham. in Wall. Cat.* 3965; *Benth. Scroph. Ind.* 95; *Reuter l.c.* *Æ. acaulis*, *Walp. Rep.* 481; *Reuter l.c.* *Orobanche pedunculata*, *Roxb. Hort. Beng.* 45, and *Fl. Ind.* iii. 29. *O. acaulis*, *Roxb. Cor. Pl.* iii. 89, t. 292, and *Fl. Ind.* iii. 29.

Throughout INDIA, on the roots of grasses, from Murree, *Elliott*, Sikkim, *Clarke*, and Assam, to Travancore and Singapore.—DISTRIB. Cochin China, Java.

Whole plant 3–6 in. high, red or yellow. *Stem* very short, as thick as a swan's quill, buried in the soil, giving off numerous alternate pedicelled flowers that rise above the surface of the ground, rarely slender and 1-fld. *Peduncles* 1–4 in., slender to stout, bracteate at the base; bract $\frac{1}{4}$ – $\frac{1}{2}$ in., ovate obtuse. *Calyx* $1\frac{1}{2}$ – $2\frac{1}{2}$ in. long, fleshy, red then yellow white, loaded with mucilage, tip obtuse, acute or shortly beaked. *Corolla-tube* as long as the calyx, yellowish, limb bright violet, lobes crenate and erose. *Anthers* of lower stamens with a large dorsal fleshy decurved horn. *Stigma* broadly cordiform, peltate. *Capsule* ovoid. *Seeds* brown.—Wight's figures represent the placentas as more divided than other analyses show.

2. **CHRISTISONIA**, *Gardn.*

Fleshy, low, scaly, parasitic herbs, with white yellow purple or rose-coloured flowers; stems simple or tufted from a short or long rootstock. *Scales* alternate, obtuse or acute. *Flowers* bracteolate or not. *Calyx* tubular, terete or angular, 5-toothed or -lobed. *Corolla-tube* long, inflated, or funnel-shaped, slightly curved, obscurely 2-lipped, 5-lobed; lobes subequal, rounded, 2 upper (inner in bud) suberect, lower spreading. *Stamens* 4, included or subexserted, filaments stout; anther with one perfect cell and one imperfect which is spurred or appendaged, rarely with both cells perfect. *Disc* 0. *Ovary* 1-celled, with 2 2-partite placentas, or 2-celled from the placentas meeting in the axis; style long, tip incurved, stigma large 2-lobed upper lobe very small lower very large orbicular or clavate; ovules numerous. *Capsule* ovoid or subglobose, loculicidal. *Seeds* minute, crowded, many perfect with striate testa, others imperfect with lax testa; embryo half as long as the albumen.—**DISTRIB.** Species 10, all tropical Asiatic.

There is no character by which *Campbellia* can be separated from *Christisonia*, that of the placentas meeting or not in the axis being one of degree and not accompanied by any other. I find it impossible to determine the species from dried specimens, and have been compelled to resort for their limitation to the descriptions and published figures of Gardner and Wight, and to the fine series of drawings of native specimens in the Kew Herbarium. I have also availed myself of some valuable notes made by Mr. Clarke, who attempted the definition of the species when studying the Indian *Cyrtandraceæ*.

1. **C. tubulosa**, *Benth. in Gen. Pl.* ii. 982; quite glabrous, stems tall flexuous, scales very few distant acute, flowers racemose, pedicels slender ebracteolate, calyx angular, lobes acute, anther-spurs acute, ovary 1-celled, placentas ovuliferous all over. *Oligopholis tubulosa*, *Wight Ic.* t. 1422, and *Ill.* t. 158 b, f. 7.

SOUTH DECCAN; Kurg and Courtallam, *Wight*.

Stem 6–10 in., simple or divided below. *Pedicels* stout, 1–4 in.; bracts obtuse. *Calyx* $\frac{3}{4}$ –1½ in., lobes triangular. *Corolla* 1–2½ in. long, mouth $\frac{3}{4}$ –1½ in. diam., blue?, pubescent without in Wight's figure, glabrous in specimens; lobes rounded, quite entire. *Filaments* pubescent. *Stigma* orbicular; "placentas nearly meeting in the centre, ovuliferous on their opposed faces, confluent below" (*Clarke*).

2. **C. subacaulis**, *Gardn. in Calc. Journ. Nat. Hist.* viii. 162; quite glabrous, almost stemless, scales large acuminate, flowers crowded, pedicels longer than the bracts ebracteolate, calyx-lobes acuminate, corolla-lobes edged with violet, cells of shorter stamens both perfect. *Wight Ic.* t. 1423 (*corrections in text*). *Campbellia subacaulis*, *Benth. in Gen. Pl.* ii. 967. *Æginetia acaulis*, *Walp. Rep.* iii. 481. *Æ. acaulis*, var. β *Thw. Enum.* 221. *Phelipæa subacaulis*, *Benth. Scroph. Ind.* 55; *Reuter in DC. Prodr.* xi. 11.

NILGHERRY MTS. and Courtallam, *Wight*. **CEYLON**; Rambodde district.

Wight's figure represents a plant 4 in. high, with a very short stout stem, clothed with scales 1½ in. long, and a corolla 2 in. long. A drawing sent by Thwaites (in Herb. Kew) is indefinite as to the bracts and calyx, and has a white corolla with an inflated white tube 1½ in. long, and limb as broad edged with violet.—*Filaments* glabrous. *Ovary* 1-celled; placentas nearly meeting in the centre, opposed faces not ovuliferous; larger stigmatic lobe orbicular.

3. **C. Hookeri**, *Clarke mss.*; almost stemless, quite glabrous, scales truncate lacerate, pedicels very short ebracteolate, calyx terete, lobes rounded,

upper anthers 1-celled simple, lower with a greatly thickened connective produced behind into a terete appendage rounded at the tip.

SIKKIM HIMALAYA, in low valleys, and KHASIA Mts., alt. 2-4000 ft., J. D. H. & T. T.

Whole plant 3-4 in. high. *Stem* very stout, covered with brown scales $\frac{1}{2}$ in. long with ragged edges. *Flowers* sessile. *Calyx* 1 in., pale violet with red-brown lobes. *Corolla* 2-2 $\frac{1}{2}$ in. long, inclined; tube white, inflated, throat contracted; limb $\frac{3}{4}$ in. diam., pale violet. *Stamens* included, glabrous; connective of lower anthers white, much longer than the purple cell. *Ovary* 1-celled; placentas 2-partite, the divisions cordate in section, covered all over with ovules; larger stigmatic lobe orbicular.—Described from a drawing made by me in Sikkim.

4. **C. Lawii**, *Wight Ic.* t. 1427; quite glabrous except the corolla, rootstock short tuberous lobed, stems short, scales imbricate, pedicels very short ebracteolate, calyx-lobes acute, corolla pale purple with yellow spots pubescent without and within, anthers acutely spurred, ovary 1-celled, placentas 2-fid. *Dalz. & Gibs. Bomb. Fl.* 202. *Campbellia Lawii*, *Benth. in Gen. Pl.* ii. 967.

The CONCAN; Tanna, *Law, Ritchie*; Salsette and between Ram Ghat and Belgaum, *Dalz. & Gibs.*

Stems 1-3 in., very stout, thickened upwards, clothed with scales. *Calyx* $\frac{1}{2}$ in., tubular, dark brown. *Corolla* 2 in., tubular; tube dull white. limb blueish-purple, yellow within; upper lobes erect, lower horizontal shorter. *Filaments* with minute crisped pubescence, white; anthers pale, posterior cells all fertile, apex subulate with a pore; anterior cell subulate, like an inverted comma. *Stigma* of 2 capitate lobes.—Description chiefly from notes by Dr. Ritchie, who remarks that the figures of the capsule and stigma given by Wight are erroneous, the placenta though approaching being quite free with revolute lobes.

5. **C. calcarata**, *Wight Ic.* t. 1426; glabrous except the corolla, stem elongate, scales ovate obtuse, flowers racemose long-pedicelled ebracteolate, calyx-lobes subacute, corolla blueish-white, tube hairy, anthers 2-celled, one cell barren spurred. *C. Stocksii*, *Hook. Ic. Pl.* t. 836; *Dalz. & Gibs. Bomb. Fl.* 202.

The CONCAN; Tanna and Salsette, *Law, Dalzell, &c.*, parasitic on the roots of *Strobilanthes*.

Probably a more fully developed state of *C. Lawii*.

6. **C. bicolor**, *Gardn. in Calc. Journ. Nat. Hist.* viii. 159; hairy, stem very short, scales ovate acute or subacute, flowers racemose, pedicels long or short 2-bracteolate at the base, calyx-teeth acute, corolla funnel-shaped pale rose or yellow. *Thwaites Enum.* 222. *C. pallida*, *Gardn. l. c.* 160. *Christisonia aurantiaca*, *Wight Ic.* t. 1486.

NILGHERRY HILLS; at Neddawattum, *Wight, &c.* CEYLON; Central Province, alt. 3-4000 ft., *Gardner, &c.*

Stem red-brown, scaly, continuous with a cylindric warted rhizoma as thick as a crow-quill and several inches long. *Scales* $\frac{1}{2}$ in. long, red-brown. *Pedicels* $\frac{1}{2}$ in. *Calyx* orange-brown, about 1 in., terete. *Corolla* 1 $\frac{1}{2}$ -2 in.; tube pale straw-coloured in *Wight's* and *Thwaites'* drawings, limb the same or white. *Stamens* included, filaments pubescent; anthers with the barren cell acutely spurred. *Placentas* in *Wight's* figure (of *aurantiaca*) 2-partite, nearly meeting in the centre, with the opposed faces not ovuliferous.—*Thwaites' B. pallidiflora* (*C. pallida*, *Gardn.*) differs according to his drawing only in the paler corolla-lobes.

7. **C. nellgherrica**, *Gardn. in Calc. Journ. Nat. Hist.* viii. 157; quite glabrous except sometimes the corolla, stem short very stout, scales

densely imbricated below obtuse, flowers densely racemose yellow, pedicels 2-bracteolate, calyx 2-lipped 5-angled, lobes broad obtuse, filaments glabrous, anthers ovoid acute 1-celled, larger stigmatic lobe clavate. ? *C. unicolor*, *Gardn. l. c.* 161; *Thwaites Enum.* 222. *Campbellia cytinoides*, *Wight Ic.* t. 1425; *Thwaites l. c.* 427. ? *C. aurantiaca*, *Wight Ic.* t. 1424. *Phelipæa*? *cytinoides*, *Reuter in DC. Prodr.* xi. 14.

NILGHERRY MTS.; *Strobilanthe* in woods at Pycarrah, Neddawattum, &c., *Wight*. CEYLON; Rambodde, alt. 3-4000 ft., Hunasgiriā range, and Pedrotatagalla, alt. 7000 ft., *Thwaites*, &c.

Whole plant yellow. *Stem* 3-6 in. long, thick, obtusely angled. *Scales* $\frac{1}{2}$ in. *Flowers* 8-12; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in., angular, thick; bracteoles below the middle about $\frac{1}{2}$ in. long, acute, veined, toothed at the tip. *Calyx* $\frac{3}{4}$ in. long. *Corolla* $1\frac{1}{4}$ in. long, funnel-shaped; lobes rounded, quite entire. *Placentas* in *Wight's* drawing of *Campb. cytinoides* nearly meeting in the axis of the ovary, the flat opposed faces without ovules.—*Gardner* described *C. unicolor* from a drawing of which I have seen no copy. Except in the subexserted anthers and obtusely 5-lobed calyx, I do not see how it differs by his description from *C. neilgherrica*. A drawing sent by *Thwaites* of the plant he refers to *C. unicolor* has acute calyx-teeth. In *Wight's Campb. aurantiaca* (referred here by *Clarke*) the corolla is represented as hairy on both surfaces, as are the filament and style; and the anthers are exserted ovate acute, and 2-celled. In his *Campb. cytinoides* the anthers are also exserted ovate and acute, but 1-celled. I find the corolla in *Wight's* specimens to be either perfectly glabrous or pubescent, and the anthers to be ovoid acute 1-celled.

8. *C. tricolor*, *Gardn. in Calc. Journ. Nat. Hist.* viii. 153; quite glabrous, stem slender few-fl., scales few ovate acute, calyx 5-angled narrow, lobes acute, corolla with the upper lip blood-red, lower rose-coloured, throat yellow, filaments glabrous. *Thwaites Enum.* 222.

CEYLON; Central Province, alt. 3-4000 ft., parasitical on *Acanthaceæ*, *Gardner*, &c. *Stems* more slender than in any of the preceding, 2-4 in. high. *Scales* about $\frac{1}{2}$ in. *Calyx* $\frac{3}{4}$ in. long. *Corolla* $2\frac{1}{2}$ in. long, lobes denticulate. *Stigma* with the large lobe orbicular. *Placentas* 2-partite, cordate in section, covered all over with ovules.—A coloured figure apparently of this species in *Jerdon's* collection of drawings represents the corolla as 3 in. long, with a violet upper lip, and pale rose lower one; the calyx pedicels and bracts are red-brown.

VAR. *grandiflora*; corolla larger pale rose-coloured. *C. grandiflora*, *Gardn. l. c.* 155; *Thwaites l. c.* 221.—Ceylon; Adam's Peak, alt. 5000 ft., *Gardner*. *Gardner* gives no other characters but greater size and a uniform rose colour of the flower, whereby to distinguish this from *C. tricolor*; for that of the sterile cell of the anther being ascending (and not deflexed) is, as *Thwaites'* (who suggests *grandiflora* being a variety), a fallacious one.

9. *C. albida*, *Thwaites mss.*; sparsely pubescent, stem very short, scales very obtuse, flowers crowded very shortly pedicelled, calyx 2-bracteolate, lobes rounded, filaments very short, anthers all unequally 2-celled, cells oblong parallel. *Campbellia albida*, *Benth. in Gen. Pl.* ii. 967.

CEYLON; near Hankalla, alt. 6000 ft., *Thwaites*.

Stem 1-2 in., from an elongate warted rhizoma like that of *C. bicolor*, very stout. *Scales* $\frac{1}{2}$ in., obovate, tip rounded. *Flowers* crowded, much smaller than in any of the other species. *Calyx* $\frac{1}{2}$ in. long, pubescent, lobes very short, erose. *Corolla* 1 in., pubescent externally. *Anther-cells* acute below. *Ovary* completely 2-celled; stigma very small, clavate.

3. CISTANCHE, Hoffm. & Link.

Scapigerous herbs, scape or stem simple scaly. *Flowers* in dense spikes, subsessile, 2-bracteolate, yellow violet or purple. *Calyx* broadly tubular-

campanulate; lobes 5, subequal, obtuse. *Corolla-tube* long, incurved, dilated above; limb spreading, oblique, lobes 5 broad, subequal. *Stamens* 4, subexserted; anthers subtransverse, often villous, cells equal parallel, bases obtuse. *Ovary* 1-celled; placentas 4, equidistant or in pairs; stigma broad. *Capsule* ovoid, laterally compressed, 2-valved to the base. *Seeds* numerous, subglobose, reticulately punctate.—Species 12, of the Mediterranean region and N. central and subtropical Asia.

C. tubulosa, *Wight Ic. t.* 1420, bis (*C. lutea* in letterpress); glabrous or pubescent, very stout, scales lanceolate, spike dense-fld., calyx-lobes obtuse, corolla-tube 2–3 times as long as the calyx, filaments hirsute below, anthers woolly not apiculate. *C. lutea*, *Wight Ill. t.* 158 b, f. 4. *Phelipæa tubulosa*, *Schrenk Plant. Æg. Arab. Spec.* 23; *Boiss. Fl. Orient.* iv. 500. *P. calotropidis*, *Walp. Rep.* iii. 462; *Reuter in DC. Prodr.* xi. 13. *Orobanche calotropidis*, *Edgew. in Hook. Journ. Bot.* ii. 285.

PUNJAB and SCINDE.—DISTRIB. Central Asia and westwards to Arabia.

Stem 1–5 ft., often as thick as the wrist, unbranched. *Scales* $\frac{1}{2}$ –1 in. *Spike* 6–10 in., sometimes 3 in. diam.; bracts lanceolate, longer than the calyx, bracteoles narrower and shorter, linear. *Calyx* $\frac{3}{4}$ – $\frac{3}{2}$ in. long. *Corolla* 1–1 $\frac{3}{4}$ in., yellow, much incurved, base slender, tube inflated; mouth $\frac{3}{4}$ –1 $\frac{1}{2}$ in. diam.; lobes short. *Anthers* subexserted, tip rounded or obscurely apiculate. *Placentas* 4, subequidistant.—I doubt this being specifically different from the common *C. lutea*, which extends to Spain and Morocco, for I find an obscure mucro on some of the anthers.

VAR. tomentosa; stem above bracts and calyx sparsely woolly.—Lahore, *Thomson*.

4. **OROBANCHE**, *Linn.*

Scapigerous herbs; scape or stem simple or branched, stout or slender, scales acute. *Flowers* in dense or lax or interrupted bracteate spikes or racemes, bracteoles 2 or 0. *Calyx* unequally 4-fid, or 2-partite from back to front, segments entire or 2-fid with rarely a 5th lobe or segment. *Corolla* broad or long, tube curved dilated above circumsiss at the base; limb 2-lipped; upper lip erect trenulate notched or 2-fid, lower more spreading 3-lobed. *Stamens* included; anther-cells equal, parallel, bases usually mucronate. *Disc* 0, or a gland. *Ovary* 1-celled; placentas 4, equidistant or in pairs; stigma funnel-shaped or peltate, more or less 2-lobed, lobes right and left. *Capsule* 2-valved, valves often cohering with the style. *Seeds* very numerous, globose.—Species about 100, chiefly in the northern and subtropical regions of the Old World.

SECT. I. **Osproleon**, *Wallr.* Bracteoles 0.

* *Calyx* divided to the base posteriorly, entire anteriorly, equally 5-toothed.

1. **O. kashmirica**, *Clarke mss.*; pubescent, stem simple, scales lanceolate, bracts lanceolate longer than the short broadly acutely toothed calyx, corolla pale brown short pubescent, filaments inserted at the base of the corolla pubescent below, anthers minutely hairy.

KASHMIR; at Tilail, alt. 11,000 ft., *Clarke*.

Pale brown, a foot high, stem as thick as a swan's quill or less. *Scales* $\frac{1}{2}$ – $\frac{1}{3}$ in., few and distant. *Spikes* few and lax-fld.; bracts $\frac{1}{2}$ – $\frac{1}{3}$ in. *Calyx* $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ – $\frac{2}{3}$ in., softly pubescent; tube broad, lobes rounded. *Anthers* small, included.

** *Calyx* divided to the base posteriorly and nearly so anteriorly, segments 2-toothed or -lobed.

2. **O. cernua**, *Loeffl.*; *Boiss. Fl. Orient.* iv. 514; puberulous or glabrate, spikes dense, flowers blue, bracts lanceolate shorter than the corolla nerves strong parallel, calyx half as long as the corolla, segments 2-fid to the middle, lobes lanceolate, corolla $\frac{1}{2}$ in. glabrous curved lobes crenate not ciliate, filaments glabrous, anthers nearly so. *Reuter in DC. Prodr.* xi. 32; *Reichb. Ic. Fl. Germ.* t. 1808. *O. indica*, *Wall. Cat.* 3966, *not of Roxb.*; *Benth. Scroph. Ind.* 55, *partly*.

WESTERN HIMALAYA; from Nepal to Kashmir and WESTERN TIBET, alt. 10–12,000 ft. OUDH and PATNA to the Punjab; the DECCAN from the Concan southwards.—DISTRIB. Westwards to N. Africa and Spain; extra-tropical Australia.

Stem stout, 6–12 in., pale brown or blueish. *Scales* ovate, upper acute or acuminate. *Spikes* often half as long as the stem or longer. *Sepals* with long points. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, sometimes puberulous above; 2 upper lobes broad, 3 lower ovate acuminate. *Anther-cells* acuminate. *Style* glabrous, stigmatic lobes short thick.—The anthers are sometimes a little hairy.

3. **O. Hansii**, *Kerner Nov. Pl. Sp.* ii. 15; pubescent, spikes dense, flowers blue, bracts ovate shorter than the corolla, nerves strong parallel, calyx half as long as the corolla, segments 2-fid to the middle, lobes lanceolate, corolla 1 in., nearly straight and glabrous, lobes crenate not ciliate, filaments glabrous, anthers hairy. ? *O. foetida*, *Klotzsch in Reise Pr. Walden.* 111, *not of Desfontaines*.

WESTERN TIBET; Karakoram, alt. 8–12,000 ft., *Clarke*. LAHUL, *Jaeschke*.

This looks like a stout large-flowered var. of *O. cernua*, with deeper blue flowers broader bracts, and more hairy anthers.

4. **O. borealis**, *Turcz. in Bull. Soc. Imp. Nat. Hist. Mosc.* 1842, 420; furfuraceously pubescent, stem stout simple, scales few, spikes rather short dense-fld., bracts ovate-lanceolate equalling or exceeding the flower, calyx half as long as the corolla-tube or less with 4 subulate long and a median very small tooth, corolla pubescent tube broad curved lobes crenate blue, filaments and anthers glabrous. *Ledeb. Fl. Ross.* iii. 321; *Reuter in DC. Prodr.* xi. 32.

WESTERN HIMALAYA, from Murree to Kishtwar, alt. 7–8000 ft., *Thomson, Fleming, &c.* WESTERN TIBET; Karakoram, alt. 13,000 ft., *Clarke*.—DISTRIB. Central Asia.

Stem 6–10 in., rarely more, as thick as a goose-quill. *Scales* $\frac{1}{4}$ – $\frac{3}{4}$ in., oblong or ovate-lanceolate. *Spike* 2–4 in. *Corolla* $\frac{1}{2}$ in.—This is certainly the plant of Turczaninov and Ledebour, which Boissier refers to *Phelipæa lanuginosa*, C. A. Meyer.

5. **O. Solmsii**, *Clarke mss.*; very robust, pubescent, bracts usually longer than the flowers lanceolate, calyx half as long as the corolla, segments bifid to the middle, lobes lanceolate, corolla $\frac{1}{2}$ – $\frac{3}{4}$ in. long yellow puberulous, filaments and anthers glabrous. ? *O. Galii*, *Klotzsch in Reise Pr. Wald. Bot.* 111, *not of Dalz.*

WESTERN HIMALAYA; Kumaon at Tola, alt. 11,500 ft., *Strach. & Winterb.*; Kashmir and Kishtwar, alt. 8–11,000 ft., *Falconer, &c.*

Stem 12–18 in., often as thick as the thumb. *Scales* $\frac{1}{2}$ –1 in., lanceolate. *Spike* 6–10 in., dense-fld.; bracts very variable, narrow. *Corolla* curved, lobes crenulate.—Differs in the yellow flowers from *O. borealis*.

*** *Calyx divided to the base anteriorly and posteriorly, the segments undivided.*

6. **O. epithymum**, *DC.*; *Boiss. Fl. Orient.* iv. 509; glandular-

pubescent, rather slender, spike short lax-fld., bracts about equalling the corolla, calyx-segments ovate-lanceolate 3-nerved entire equalling the corolla-tube, corolla $\frac{3}{4}$ in. long pubescent orange-brown, lobes toothed or crenate not ciliate, filaments glabrous except at the base, anthers sparsely pubescent or glabrous. *Reuter in DC. Prodr.* xi. 21; *Reichb. Ic. Fl. Germ.* t. 1784.

WESTERN HIMALAYA; on grass, thyme, &c., from Kumaon, alt. 13,000 ft., *Strach. & Winterb.* (*Orobanche* n. 4), to Kashmir, alt. 7–11,000 ft.—DISTRIB. W. and Central Asia, Central and S. Europe.

Stem 6–12 in., often tuberous below, rarely as thick as a swan's quill. *Spike* 1–3 in. *Corolla* curved, glandular-pubescent. *Stamens* inserted low down in the tube.

7. ***O. nicotianæ***, *Wight Ill.* 179, t. 158; stout or slender, puberulous, spikes many- and dense-fld., bracts lanceolate as long as the corolla-tube, calyx-segments almost as long subulate-lanceolate entire, corolla $\frac{1}{4}$ in. glabrous tube contracted in the middle, lobes pale blue glabrous crenate, filaments pubescent at the base only, anthers glabrous.

The DECCAN; common in and destructive of tobacco crops, *Wight*.

Stem 8–12 in., as thick as the little finger in *Wight's* specimen, much more slender in his figure, pale brown. *Scales* few, ovate, acuminate. *Spike* longer than the rest of the stem, cylindric, obtuse; bracts many-nerved. *Calyx* puberulous. *Corolla* quite glabrous, lobes small.—The contraction of the middle of the corolla-tube distinguishes this species. *Wight* regards the calyx-segments as bracteoles.

8. ***O. Clarkei***, *Hook. f.*; glandular-puberulous, spike short rather lax-fld., bracts lanceolate half as long as the corolla-tube, calyx-segments nearly as long subulate-lanceolate, corolla 1 in. tube nearly straight not contracted in the middle, lobes blue glabrous crenate, filaments and anthers glabrous.

WESTERN TIBET; Karakoram or Artemisia, alt. 9000 ft., *Clarke*.

This *Clarke* was disposed to regard as a form of *O. nicotianæ*, which differs widely in the smaller flowers, and form of the corolla-tube.

SECT. II. ***Trionychon***, *Wallr.* Bracteoles 2. (PHELIPÆA, *Reut. & Boiss.*)

* *Calyx* divided to the base posteriorly, entire anteriorly.

9. ***O. indica***, *Ham. in Roxb. Fl. Ind.* iii. 27; puberulous or pubescent, stem often branched, spikes usually lax-fld., bracts ovate half as long as the corolla-tube, bracteoles filiform, calyx 4- or 5-toothed, corolla $\frac{3}{4}$ –1 in. pubescent without and within, tube rather slender, lobes blue ciliate, anthers woolly. *Wall. Cat.* 3966, *in part*; *Benth. Scroph. Ind.* 55, *excl. localities*. *Phelipæa indica*, *G. Don Gen. Syst.* iv. 632; *Reuter in DC. Prodr.* xi. 8; *Dalz. & Gibs. Bomb. Fl.* 202. ? *P. ægyptiaca*, *Boiss. Fl. Orient.* iv. 499.

Throughout the plains of INDIA, especially in mustard crops.—DISTRIB. Central and Western Asia.

Stem 4–12 in., sometimes fastigiately branched from the base, often inclined. *Scales* very few, chiefly at the forks. *Spikes* many-fld.; bracts pubescent, lobes subulate. *Corolla* pubescent, $\frac{3}{4}$ –1 $\frac{1}{2}$ in. long; tube straight, almost funnel-shaped. *Filaments* smooth, except at the base; anthers almost woolly.—Probably a form of *O. ramosa*.

10. ***O. ramosa***, *Linn.*; *Boiss. Fl. Orient.* iv. 498; furfuraceously pubescent or glabrate, usually much branched, spikes slender longer than

the stem narrowed upwards, bracts ovate caudate-acuminate shorter than the corolla-tube, calyx half the length of the corolla-tube, lobes slender, subulate from a broad base, corolla pubescent without and within, tube narrow, lobes blue ciliate, filaments glabrous, anthers sparsely crinite or glabrous. *Reichb. Pl. Crit.* 933, 934, and *Ic. Fl. Germ.* t. 152. *Phelipæa ramosa*, *C. A. Mey.*; *Walp. Rep.* iii. 459; *Reut. in DC. Prodr.* xi. 8; *Wight Ic.* t. 1618. *P. ægyptiaca*, *Herb. Ind. Or. H. f. & T.*

KASHMIR, *Falconer*; Jamu and Banahal, alt. 6-7000 ft., *Thomson*.—**DISTRIB.** Westwards to Europe and N. Africa.

Stem 6-12 in., usually thick at the base and at once dividing into rather slender erect branches. *Scales* few. *Spikes* lax-fld.; bracts variable in length and in the length of the slender point; bracteoles filiform. *Corolla* $\frac{1}{2}$ - $\frac{3}{4}$ in. long; tube narrow white.—The slender spikes occupying usually two-thirds of the length of the plant are unlike those of any other Indian species. I suspect that *O. ægyptiaca*, *Pers.*, is the same as this, but I have seen no authentic specimens of it. *Boissier* refers *O. indica*, *Roxb.*, to *O. ægyptiaca*, I think erroneously.

**** Calyx divided to the base anteriorly and posteriorly; segments bifid, lobes subulate.**

11. **O. psila**, *Clarke mss.*; furfuraceously pubescent, stem simple slender, spike short lax-fld., bracts lanceolate as long as the flower, calyx half as long as the corolla blue curved pubescent without and within, lobes copiously ciliate, filaments pubescent, anthers sparsely crinite.

KASHMIR; at Mapanon, alt. 9000 ft., *Clarke*.

Stem 12-18 in., as thick as a goose-quill or less. *Scales* long, $\frac{1}{2}$ -1 in., subulate-lanceolate. *Spike* 2-3 in., obtuse; lower bracts $\frac{3}{4}$ in. long; bracteoles filiform. *Corolla* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, lobes almost villous within, 2 upper rounded, 2 lower elliptic.

5. **BOSCHNIACKIA**, *C. A. Mey.*

Robust, brown, leafless herbs; stem simple, scaly. *Flowers* in dense spikes, or racemes, bracteolate, ebracteolate. *Calyx* cup-shaped, truncate or unequally 5-toothed. *Corolla-tube* incurved; limb 2-lipped, upper lip erect hooded entire or 2-fid; lower very short, 3-lobed. *Stamens* subexserted; anther-cells equal, parallel, bases obtuse. *Ovary* 1-celled; placentas 2-3, 2-partite; stigma dilated, broadly 2-lobed. *Capsule* 2-valved, valves at first cohering with the style. *Seeds* numerous, minute, ellipsoid, subglobose or compressed, testa reticulate.—Species 5, N.E. Asia, N.W. America and the Himalaya.

B. himalaica, *Hook. f. & Thoms. Herb. Ind. Or.*; calyx truncate quite entire, flowers $\frac{3}{4}$ in. long, upper lip of corolla cymbiform entire, lateral lobes of lower minute subulate median obsolete, capsules $\frac{3}{4}$ -1 in., seeds orbicular, testa very lax loosely reticulate.

TEMPERATE and SUBALPINE HIMALAYA, on *Rhododendron* roots; Garwhal and Kumaon, alt. 8-10,000 ft., *Strach. & Winterb.*; Sikkim, alt. 10-13,000 ft., *J. D. H., Clarke*.

Plant 6-18 in. high, pale brown, base tuberous; stem often as thick as the thumb. *Scales* numerous, rigid, $\frac{1}{2}$ - $\frac{3}{4}$ in., oblong or ovate-lanceolate, obtuse or acute. *Racemes* 3-8 in., stout, dense-fld., pale ochreous brown streaked with red brown; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., broadly ovate, acute or obtuse, half as long as the flower or longer; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in., stout. *Calyx-limb* quite entire. *Corolla* puberulous, erect, nearly straight. *Stamens* finally exserted, filaments glabrous except at the very base yellow; anthers small, blueish. *Ovary* with 2 or 3 placentas, each with revolute divisions covered with ovals. *Capsule* ovoid-oblong, thickly coriaceous, irregularly 2-3-valved; pedice

very stout, $\frac{1}{4}$ in. Seeds chaff-like, $\frac{1}{30}$ – $\frac{1}{40}$ in. diam., testa hyaline with large reticulations. —This differs widely from the N.E. Asiatic *B. glabra* in its much larger size, the flowers being twice as large, and the fruit three times. The capsule of *B. glabra* is not longer than the bracts, and its seeds are ellipsoid, $\frac{1}{150}$ in. long, with a close testa.

ORDER CV. **LENTIBULARIÆ.** (By C. B. Clarke.)

Herbs, aquatic or in wet places. *Leaves* radical rosulate, or capillary multifid or obsolete. *Scapes* 1– ∞ -fld.; bracts small or 0. *Flowers* hermaphrodite, purple, yellow, or white. *Calyx* inferior, 2–5-lobed. *Corolla* 2-lipped, spurred; upper lip usually smaller, entire or emarginate, lower 3–5-lobed. *Stamens* 2, attached to the base of the corolla, alternate with the lobes of the lower lip, filaments broad curved; anther-cells 2, ovate, transversely confluent. *Ovary* superior, globose, 1-celled; style short, stigma unequally 2-lobed; ovules very many, on a free basal placenta, anatropal. *Capsule* globose, 2–4-valved, or irregularly breaking up. *Seeds* numerous, small, exalbuminous.—Species 180, in all climates.

Calyx deeply 2-lobed, lobes entire or minutely toothed . . . 1. UTRICULARIA.
Calyx 4–5-lobed, more or less 2-lipped 2. PINGUICULA.

I. **UTRICULARIA**, Linn.

Herbs, floating or terrestrial. *Leaves* many-partite with capillary segments in the floating species, entire in the erect species; minute bladders frequently added. *Scapes* simple or branched; racemes few- or many-fld.; pedicels bracteate and often 2 bracteolate. *Calyx* 2-partite; lobes entire or nearly so, often enlarged in fruit. *Corolla* 2-lipped; upper lip entire or emarginate, lower larger 3–6-lobed; spur curved or straight. *Filaments* broad; anthers ovate, 2- or sub-1-celled. *Style* short, stigma unequally 2-lobed. *Seeds* ellipsoid or obovoid, scrobiculate or glochidiate, rarely reticulate or comose.—Species 150, extending nearly throughout the world.

The numerous small scapose species have evanescent rosulate radical leaves on very short creeping branches; but there are specimens from which it would appear that, when some of such species grow in running water, they may produce elongate branched stems, longer linear leaves, and reduced leaves with bladders.

* Stems floating, leaves submerged divided into capillary segments mostly interspersed with bladders; bracteoles 0.

† *Peduncles* bearing about the middle a cluster of oblong vesicles.

1. **U. stellaris**, Linn. f. *Suppl.* 86; flowers pedicellate yellow, calyx-segments ovate enlarged in fruit, corolla-spur shorter than the lower lip more or less curved pubescent or glabrous. *Rorb. Cor. Pl.* ii. 42, t. 180, and *Fl. Ind.* i. 143; *Wall. Cat.* 6400; *Wight in Hook. Bot. Misc.* iii. 91, *Suppl.* t. 27; *A. DC. Prodr.* viii. 3; *Wight Ic.* t. 1567; *Dalz. & Gibs. Bomb. Fl.* 135; *Boiss. Fl. Orient.* iv. 3. *U. macrocarpa*, *Wall. Cat.* 1494.

Throughout INDIA, in rice-swamps and jheels.—DISTRIB. Malaya, S.E. Asia, N. Australia. Nearly all Africa.

Leaves with bladders. *Peduncles* 2–8 in., erect out of the water, glabrous; whorl of vesicles $\frac{1}{2}$ –1 in. long, formed of the inflated bases of reduced branches with often subfoliaceous tips. *Pedicels* 1–8, $\frac{1}{2}$ in., thickened, usually deflexed in fruit. *Corolla*

$\frac{1}{2}$ in. diam. *Capsule* $\frac{1}{2}$ in.; fruit-sepals $\frac{1}{4}$ – $\frac{1}{2}$ in. *Seeds* thickly discoid, concavo-convex by the inflexion of the entire thin hardly winged margin.

VAR. inflexa; corolla white with violet stripes. *U. inflexa*, *Forsk. Fl. Æg. Arab.* 9; *Delile Fl. Æg.* 4, t. 4, fig. 1; *A. DC. Prodr.* viii. 4; *Boiss. Fl. Orient.* iv. 3. *U. Thonningii*, *Schum. Pl. Guin.* 12.—Bengal; frequent, *Clarke*.—Distrib. N. and Central Africa.—The spur of the corolla is frequently as pubescent and as little curved as in *U. stellaris*. Whether this plant be reckoned species or variety, it is by no means rare in Bengal.

†† *Peduncles ebracteate or with a few obscure scales.*

2. *U. flexuosa*, *Vahl Enum.* i. 198; flowers pedicelled yellow, calyx-segments ovate somewhat enlarged in fruit, corolla-spur nearly as long as the lower lip, margin of the seeds entire inflexed scarcely winged. *Blume Bijl.* 739; *A. DC. Prodr.* viii. 24; *Oliver in Journ. Linn. Soc.* iii. 175. *U. australis*, *Br. Prodr.* 430; *A. DC. l. c.* 6. *U. fasciculata*, *Roxb. Fl. Ind.* i. 143; *Wall. Cat.* 1499; *A. DC. l. c.* 7; *Wight Ic.* t. 1568. *U. confertifolia*, *Don Prodr.* 84; *A. DC. l. c.* 8. *U. inæqualis*, *Benj. in Linnæa*, xx. 304. *U. Blumei*, *Miq. Fl. Ind. Bat.* ii. 994. *U. extensa*, *Hance; Walp. Ann.* iii. 3.

Throughout INDIA; in rice-swamps, tanks, and jheels, common.—DISTRIB. S.E. Asia, Malaya, N. Australia.

Generally resembling *U. stellaris*, but rather larger in all its parts. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. *Calyx-segments* in fruit ovate, spiculate, patent, hardly so long as the capsule. *Seeds* as of *U. stellaris*, but rather larger; margin thin, incurved towards the concave face, described by some authors as winged, by others as wingless.—The branches near the base of the peduncle are sometimes inflated, falsely whorled, bearing reduced leaves, but are always much longer and less bract-like than those of *U. stellaris*.

3. *U. punctata*, *Wall. Cat.* 2121; pedicels slender erect in fruit, flowers blue, capsule thin much longer than the calyx, seeds discoid margin thin sharply toothed. *A. DC. Prodr.* viii. 5; *Wight Ic.* t. 1570; *Oliver in Journ. Linn. Soc.* iii. 175.

PEGU and TENASSERIM; from Rangoon, *Wallich*, to Mergui, *Griffith*, &c.—DISTRIB. Borneo.

Leaves multipinnate, segments capillary, with bladders. *Peduncles* 6 in., 5–15-fld., glabrous; pedicels often $\frac{1}{2}$ – $\frac{2}{3}$ in. *Corolla* $\frac{1}{4}$ in. diam., blue (*Parish*); spur shorter than the lower lip. *Capsule* $\frac{1}{6}$ in., ovoid, obtuse. *Seeds* differing little from *U. stellaris*, but the thin margin is patent or obscurely inflexed towards the concave face, with numerous triangular teeth.

4. *U. exoleta*, *Br. Prodr.* 430; leaves very small bearing bladders, peduncles slender 1–3-fld., flowers small yellow, capsule globose exceeding the fruit-sepals, seeds discoid margin thin patent subentire. *A. DC. Prodr.* viii. 7. *U. diantha*, *Roem. & Sch. Syst. i. Mant.* 169; *Wight Ic.* t. 1569; *Oliver in Journ. Linn. Soc.* iii. 175, not of *A. DC.* *U. diflora*, *Roxb. Hort. Beng.* 4. *U. biflora*, *Roxb. Fl. Ind.* i. 143, not of *Lamk.*, nor of *Wall.* *U. Roxburghii*, *Spreng. Syst.* i. 52. *U. elegans*, *Wall. Cat.* 1502. *U. pterosperma*, *Edgew. in Proc. Linn. Soc.* i. 352.

Throughout INDIA, from the N.W. Himalaya and Assam to Ceylon, not common.—DISTRIB. S.E. Asia, Malaya, N. Australia.

Leaves sometimes 2–3 in., multipinnate, segments capillary, often inconspicuous or very slender, easily detached from the peduncle. *Peduncle* 1–4 in., minutely bracteate near the middle. *Corolla* $\frac{1}{2}$ in. diam., spur slightly exceeding the lower lip. *Capsule* $\frac{1}{2}$ in. diam., thin. *Seeds* subtrapezoidal, much depressed; margin somewhat

inflexed towards the concave face, minutely crenulate.—This species, much confused with species of other sections, is distinguishable by the globose (not compressed ovate) capsule, distinctly exceeding the sepals. The capillary bladder-bearing leaves are often absent in dried specimens; and similar small leaves occur in vegetative states of many of the so-called leafless species.

5. *U. minor*, Linn.; *Reichb. Ic. Fl. Germ.* t. 1826, fig. 1; corolla yellow, spur less than half as long as the lower corolla-lip, capsule globose as long as the calyx. *Lamk. Ill.* t. 14, fig. 2; *A. DC. Prodr.* viii. 7; *Oliver in Journ. Linn. Soc.* iii. 176.

ALPINE W. HIMALAYA; Nubra, alt. 11,000 ft., *Thomson*.—DISTRIB. Europe, W. and Central Asia.

Stems often 4–12 in., leafy. *Peduncles* 3–9 in., 2–8-fld.; usually minutely bracteate. *Corolla* $\frac{1}{2}$ in.; lower lip much longer than the upper.—There are examples from the W. Himalaya and Alpine Sikkim, which may be referable to this species; but being flowerless, they are doubtful.

** *Leaves* at the base of the scape linear or spatulate, often evanescent before flowering. *Calyx-lobes* equal or nearly so. *Seeds* smooth, testa reticulate.

† *Scales of the scape and bracts attached by their bases.*

§ *Flowers purple, blue, or whiteish.*

6. *U. albo-cœrulea*, Dalz. in *Hook. Kew Journ.* iii. 279; glabrous, pedicels $\frac{1}{2}$ in. recurved in fruit, lower lip of corolla $\frac{1}{2}$ in. diam. azure, spur $\frac{1}{2}$ in. narrow-conic, seeds short-ellipsoid obtuse at both ends. *Oliver in Journ. Linn. Soc.* iii. 177; *Dalz. & Gibs. Bomb. Fl.* 135.

CONCAN; *Stocks*; at Vingorla, *Dalzell*.

Scapes 4–8 in., erect, 3–8-fld., leafless at flower-time. *Calyx-lobes* ovate, in fruit $\frac{1}{2}$ in., subacute. Lower lip of *corolla* suborbicular, slightly 4-lobed, upper $\frac{1}{2}$ in.; spur pendent, nearly straight. *Seeds* scrobiculate, i.e. exterior cells of the testa oblong, subparallel to the longer diam. of the seed.

7. *U. arcuata*, *Wight Ic.* t. 1571, fig. 1; glabrous, pedicels $\frac{1}{2}$ in. recurved in fruit, lower lip of corolla $\frac{1}{2}$ in. diam. blue-purple, spur $\frac{1}{2}$ – $\frac{3}{4}$ in. linear curved, seeds ellipsoid. *Oliver in Journ. Linn. Soc.* iii. 177; *Dalz. & Gibs. Bomb. Fl.* 136.

W. DECCAN PENINSULA, from Bombay to Mysore; *Law, Ritchie, &c.*

Scapes 4–8 in., erect, 3–8-fld., leafless at flower-time or nearly so, sometimes bearing bladders on the rudimentary leaves. *Calyx-lobes* ovate, in fruit $\frac{1}{2}$ in., subacute. Lower lip of *corolla* suborbicular, scarcely lobed, upper $\frac{1}{2}$ in.; spur pendent from the base, then much curved forwards. *Seeds* scrobiculate, outer cells of the testa elongate.

8. *U. affinis*, *Wight Ic.* t. 1580, fig. 1; glabrous, pedicels short, lower lip of corolla $\frac{1}{4}$ – $\frac{1}{2}$ in. ovate purple-blue, spur $\frac{1}{2}$ – $\frac{3}{4}$ in. narrow-conic straight, seeds subglobose. *Oliver in Journ. Linn. Soc.* iii. 178. *U. brachypoda*, *Wight Ic.* t. 1578, fig. 1. *U. decipiens*, *Dalz. in Hook. Kew Journ.* iii. 279; *Dalz. & Gibs. Bomb. Fl.* 135.

W. DECCAN PENINSULA, from the Concan southward; *Wight, Law, &c.*

Scapes 2–6 in., erect, 3–6-fld., leafless at flower-time. *Pedicels* $\frac{1}{2}$ – $\frac{3}{4}$ in., suberect in fruit. *Calyx-lobes* ovate, entire; in fruit $\frac{1}{2}$ in. scarcely acute. Lower lip of *corolla* obtuse, scarcely emarginate, upper shorter than the spur; spur nearly at right angles

to the axis of the flower, slightly curved forwards. *Seeds* reticulate, cells of the testa subhexagonal not elongate.

VAR. Griffithii, Oliver; rather larger, scapes sometimes a foot, pedicels stouter, fruiting-calyx $\frac{1}{4}$ in. or more. *U. Griffithii*, *Wight Ic.* t. 1576. *U. cœrulea*, *Benth. Fl. Hongk.* 256, not of *Linn.*—Malay Peninsula, from Mergui to Singapore; *Griffith, Murton, &c.*—Distrib. Borneo, S. China.

9. ***U. cœrulea***, *Linn.*; *Oliver in Journ. Linn. Soc.* iii. 179, not of *A. DC.*; glabrous, pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., lower lip of corolla $\frac{1}{4}$ – $\frac{1}{2}$ in. blue-purple, spur $\frac{1}{2}$ in. narrow-conic curved, seeds ellipsoid. *U. uliginoides*, *Wight Ic.* t. 1573. *U. pedicellata*, *Wight Ic.* t. 1578, fig. 2, *exclud. seeds.* ? *U. graminifolia*, *Vahl Enum.* i. 195; *DC. Prodr.* viii. 16. ? *U. purpurascens*, *Grah. Cat. Pl. Bombay*, 165.

MTS. of the DECCAN PENINSULA and CEYLON; frequent.

Scapes 2–8 in., suberect, 3–12-fl., leafless at flower-time. *Pedicels* suberect in fruit. *Calyx-lobes* elliptic, acute, lower often minutely toothed; in fruit $\frac{1}{4}$ in. very acute. Lower lip of *corolla* ovate, subacute, upper $\frac{1}{2}$ in.; spur at base projecting backwards nearly in a line with the axis of the flower, then curved forwards. *Seeds* ellipsoid, outer cells of the testa oblong.—*Wight's* specimen of his *U. pedicellata* shows flowers only, and the seeds figured in his *Ic.* t. 1578, fig. 2, must have been taken from *U. affinis*. *Thwaites (Enum.* 171) unites *U. affinis* with *U. cœrulea*, but the latter has much acuter calyx-lobes, and different seeds. As to *U. acula* (*Benj. in Linn.* xx. 314), doubtfully referred by *Oliver* to *U. affinis*, it is perhaps rather *U. cœrulea*, as the lower calyx-lobe is much oftener toothed in this species.

VAR. conferta; spur bent nearly at its base, so that it is pendent almost at right angles to the axis of the flower. *U. conferta*, *Wight Ic.* t. 1575.—**Mts. of the S. Deccan Peninsula, Wight.**

VAR. squamosa; scape with numerous scales (bracts to suppressed pedicels), flowers few subterminal, corolla rather larger than *U. cœrulea* type. *U. squamosa*, *Wight Ic.* t. 1579.—**Nilgherry Mts., Gardner; Sispara, Wight.** The examples are not in fruit.

VAR. Smithiana; scapes 1 foot sometimes twining, lower lip of corolla nearly $\frac{1}{2}$ in., spur $\frac{1}{2}$ in. *U. Smithiana*, *Wight Ic.* t. 1577. *Utricularia* sp. n. 27, *Oliver in Journ. Linn. Soc.* iii. 190.—**Malabar or Coorg; Wight.** This is referred by *Oliver (Journ. Linn. Soc.* iii. 180) to *U. cœrulea*, possibly correctly. *Wight's Ic.* t. 1577 however shows the seeds reticulate not scrobiculate, i. e. the outer cells of the testa are subhexagonal not oblong or elongate. If this is so, *U. Smithiana* is more nearly allied to *U. affinis*, and is probably a distinct species. The figure can hardly be trusted on such a point, and none of *Wight's* examples exhibits fruit.

10. ***U. reticulata***, *Smith Exot. Bot.* t. 119; glabrous, flowers pedicellate often numerous, calyx-lobes acute, in fruit $\frac{1}{2}$ in. decurrent on the pedicel, lower lip of corolla $\frac{1}{2}$ in. blue, spur $\frac{1}{4}$ in. narrowly conic nearly straight, seeds obovoid scrobiculate. *Wall. Cat.* 1493; *A. DC. Prodr.* viii. 19; *Wight Ill.* ii. t. 143; *Oliver in Journ. Linn. Soc.* iii. 180; *Dalz. & Gibs. Bomb. Fl.* 135. *U. uliginosa*, *Wight Ic.* t. 1574, *right-hand plant only.* *U. graminifolia*, *Grah. Cat. Pl. Bombay*, 165, not of *Spreng.* *U. oryzetorum*, *Miq. in Pl. Hohenack.* n. 574.—*Rheede Hort. Mal.* ix. t. 70.

W. DECCAN PENINSULA, from the Concan southwards, and **CEYLON**; frequent.

Scapes usually elongate, 10–24 in., slender, twining, flower-bearing for half their length; small suberect, few-flowered forms (*Wight Ic.* t. 1574, *right-hand plant*) are slenderer than *U. uliginosa*, *Vahl. Pedicels* $\frac{1}{4}$ – $\frac{1}{2}$ in.; bracteoles filiform. Lower lip of *corolla* broadly ovate, scarcely emarginate; upper $\frac{1}{2}$ in. *Seeds* somewhat rhomboid, hilum prominent; cells of the testa oblong, oblique to the long axis of the seed.

VAR. uliginosa (*Vahl Enum.* i. 203); glabrous, flowers pedicelled often numerous, calyx-lobes acute, in fruit $\frac{1}{4}$ – $\frac{1}{2}$ in. decurrent on the pedicel, lower lip of corolla $\frac{1}{2}$ in. blue, spur $\frac{1}{2}$ – $\frac{3}{4}$ in. conic nearly straight, seeds obovoid scrobiculate. *A. DC. Prodr.*

viii. 15; *Wight Ic.* t. 1574, two left-hand plants. *U. humilis*, Heyne; *Wall. Cat.* 1495; *Wight Ic.* t. 1572, not of Vahl. *U. reticulata* var. β , Oliver in *Journ. Linn. Soc.* iii. 180. *U. polygaloides*, Edgew. in *Proc. Linn. Soc.* i. 351.—S. Deccan Peninsula and Ceylon, frequent. Bengal; Burdwan, Edgeworth. Scape 2-6 in., erect, much thicker than in the starved examples of *U. reticulata*. Pedicels $\frac{1}{4}$ in.: bracteoles linear, less pointed than in *U. reticulata*. Seeds as of *U. reticulata*, but smaller and more finely scrobiculate.

11. ***U. scandens***, Benj. in *Linnaea*, xx. 309, partly; minute, twining, glabrous, calyx-lobes in fruit $\frac{1}{8}$ in. obtuse, lower lip of corolla $\frac{1}{8}$ - $\frac{1}{6}$ in. blue, seeds minute obovoid laxly scrobiculate. Oliver in *Journ. Linn. Soc.* iii. 181. *U. volubilis*, *Wight in Herb. Propr.*

Near MADRAS; Madura Hills, *Wight, Shuter*.

Scapes 1-6 in., exceedingly slender, twining on *U. Wallichiana* & *uliginosa*. Pedicels $\frac{1}{8}$ in., scattered. Seeds minute; testa very lax, almost wrinkled, cells large oblong.

VAR. *capillacea*; scape most slender not twining, calyx-lobes in fruit $\frac{1}{12}$ in. very obtuse. *U. capillacea*, *Wall. Cat.* 6399; Oliver in *Journ. Linn. Soc.* iii. 184, not of *Herb. Wight*.—Madras; *Wight*. *U. capillacea*, *Wight Herb.*, is *U. Wallichiana*, *Wight Ic.* t. 1572, fig. 1. The fragments in Wallich's Herbarium ($1\frac{1}{2}$ in. long) of *U. capillacea*, Vahl, and which are said to have come from Wight's Herbarium, appear to have had blue flowers. Wallich seems to have affixed the name *capillacea* on his own, not Wight's authority.

12. ***U. hirta***, Klein; Oliver in *Journ. Linn. Soc.* iii. 183; hairy, flowers subsessile, lower lip of corolla $\frac{1}{4}$ in. blue, spur $\frac{1}{2}$ in. curved. A. DC. *Prodr.* viii. 25. *U. setacea*, *Wall. Cat.* 6398, partly.

DECCAN PENINSULA (Klein). CHOTA NAGPORE; alt. 2000 ft., Clarke. KHASIA MTS.; alt. 3-5000 ft., Griffith, H. f. & T., &c.

Scapes 3-8 in., erect, slender, minutely densely villous. Calyx-lobes orbicular, in fruit $\frac{1}{10}$ in. Capsule $\frac{1}{10}$ in., globose. Seeds minute, ovoid, obscurely scrobiculate.—By the subsessile flowers and small globose capsules this seems allied to *U. racemosa*, as Prof. Oliver states; but the bracts not being produced backwards below their point of insertion, it must be placed here in the artificial arrangement adopted.

§§ Flowers yellow.

13. ***U. bifida***, Linn.; A. DC. *Prodr.* viii. 21; pedicels finally recurved, calyx-lobes in fruit $\frac{1}{4}$ in. ovate obtuse, lower lip of corolla $\frac{1}{4}$ in., spur nearly $\frac{1}{4}$ in. curved, seeds obovoid, testa lax scrobiculate. Oliver in *Journ. Linn. Soc.* iii. 182 (exclud. syn. *U. humilis*). *U. biflora*, *Wall. Cat.* 1498, not of Roxb. *U. diantha*, A. DC. l. c. 21, exclud. most syn. *U. Wallichiana*, Benj. in *Bot. Zeit.* 1845, 213. *U. brevicaulis*, Benj. in *Linnaea*, xx. 303.

Throughout INDIA, from Nepal and Assam to Ceylon and Malacca.—DISTRIB. E. Asia from Japan to Borneo and the Philippines.

Scapes 2-7 in., erect, glabrous, many-fl. Pedicels $\frac{1}{8}$ in. Seeds almost wrinkled owing to the very lax testa; cells of the testa oblong, oblique to the longer axis of the seed.

14. ***U. Wallichiana***, *Wight Ic.* t. 1572, fig. 1; stems very slender often twining, pedicels 0- $\frac{1}{4}$ in. suberect in fruit, calyx-lobes in fruit $\frac{1}{4}$ in. ovate acute, lower lip of corolla $\frac{1}{2}$ in., spur nearly as long, seeds ellipsoid scrobiculate without papillæ or glochidia. Oliver in *Journ. Linn. Soc.* iii. 182. *U. scandens*, Benj. in *Linnaea*, xx. 309, in most part. *U. macrolepis*, *Wight Ic.* t. 1580, fig. 2, exclud. seeds. *U. capillacea*, *Thwaites Enum.* 171, not of Oliver.

Hills of the S. DECCAN PENINSULA and CEYLON; *Wight, Thwaites*, &c.

In his Herbarium Wight has marked his n. 2709 one sheet *U. Wallichii*, the other *U. macrolepis*; of this the seeds exhibit none of the glochidia shown in Wight's figure of *U. macrolepis*, and insisted on in the accompanying description.

VAR. *firmula*, Oliver in Journ. Linn. Soc. iii. 182; stems stouter erect.—Khasia Mts., alt. 3–5000 ft., common. ALPINE SIKKIM, alt. 9–11,000 ft.; Lachen, *J. D. H.*—The Sikkim examples are 1–2 in. high, but appear to be high-level forms of the Khasian plant.

†† *Scales of the scape and bracts produced backwards below their point of insertion.*

15. ***U. verticillata***, *Benj. in Linnæa*, xx. 312; glabrous, scapes often branched, pedicels (many of them) as long as the fruit-calyx, lower lip of corolla $\frac{1}{2}$ in. *Oliver in Journ. Linn. Soc.* iii. 184. *U. bifida*, *Wight Ic.* t. 1584, fig. 2, not of Linn.

MALACCA, *Griffith.*

Scapes 6–10 in. *Pedicels* $\frac{1}{2}$ in. *Calyx-lobes* in fruit $\frac{1}{2}$ in., ovate, obtuse. *Capsule* $\frac{1}{10}$ in., globose. *Seeds* minute, cells of the testa subhexagonal rather than oblong.

16. ***U. rosea***, *Edgew. in Proc. Linn. Soc.* i. 352; flowers subsessile, lower lip of corolla nearly $\frac{1}{2}$ in. exceeding the obtuse spur. *Oliver in Journ. Linn. Soc.* iii. 184.

BENGAL? *Edgeworth.* **CEYLON;** *Gardner.*

The plant here diagnosed is *Gardner's* n. 507, which is the type of *U. rosea*, Oliver. Whether any such plant was ever found in Bengal is doubtful, there being no-type of Edgeworth's to refer to. Oliver quotes for this species *U. racemosa*, *Wight Ic.* t. 1584, fig. 1, which looks more like *U. racemosa*, Wall., with the flower drawn a little large; the seeds are like none of this set, in all of which they are minute with large obscurely-marked scrobiculations. According to Thwaites (*Enum.* 172), *U. rosea*, *racemosa* and *flicaulis* are forms of one species.

17. ***U. racemosa***, *Wall. Cat.* 1496; glabrous, scapes 6–16 in. sometimes branched, flowers subsessile numerous blue lower distant uppermost often subcapitate, lower lip of corolla $\frac{1}{2}$ in. hardly as long as the subacute spur. *A. DC. Prodr.* viii. 21; *Oliver in Journ. Linn. Soc.* iii. 186. *U. complanata*, *Wall. Cat.* 1497. *U. cœrulea*, *A. DC. l. c.* 19; *Wight Ic.* t. 1583, not of Linn.

KHASIA MTS., alt. 3–5000 ft., common. **CHOTA NAGPORE;** *Clarke.* **DECCAN PENINSULA** and **CEYLON;** *Wight, &c.* **PEGU;** *Kurz.*—**DISTRIB.** Cambodia, China.

Flowers often subfasciculate on the spike. *Calyx-lobes* orbicular in fruit, $\frac{1}{10}$ – $\frac{1}{8}$ in., obtuse. Lower lip of corolla blue or whiteish, obscurely 4-lobed. *Capsule* $\frac{1}{10}$ in., globose. *Seeds* minute, obscurely coarsely scrobiculate.

VAR. *flicaulis*; stem slender with fewer scattered flowers. *U. flicaulis*, *Wall. Cat.* 1501; *A. DC. l. c.* 21; *Oliver in Journ. Linn. Soc.* iii. 186. *U. nivea*, *Vahl Enum.* i. 203; *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* i. 144; *Wight Ic.* t. 1582; *Dalz. & Gibs. Bomb. Fl.* 135. *U. setacea*, *Wall. Cat.* 6398, partly. *U. campestris*, *Miq. in Pl. Hohenack.* n. 596.—From Nepal and the Khasia Mts. to Ceylon and Tenasserim (S.E. Asia and Malaya to Hongkong and Borneo).

*** *Leaves* at the base of the scape orbicular or reniform, persistent. *Calyx-lobes* very unequal. *Seeds* glochidiate (or in *U. kumaonensis* comose).

18. ***U. brachiata***, *Oliver in Journ. Linn. Soc.* iii. 187; scape slender 1–2-fld., leaves reniform slenderly petioled, lower lip of corolla $\frac{1}{4}$ – $\frac{1}{2}$ in. 5-lobed, spur $\frac{1}{2}$ in. linear-cylindric obtuse.

ALPINE SIKKIM, alt. 8-11,000 ft., *J. D. H.*

Scapes 2-3 in. *Leaves* $\frac{1}{2}$ in. diam.; petiole $\frac{1}{2}$ in., linear. *Pedicels* $\frac{1}{2}$ in.; bracts minute, ovate. *Calyx*, upper segment $\frac{1}{10}$ in., ovate, purple. *Corolla* white, yellow-spotted. *Seeds* not seen.

19. ***U. orbiculata***, *Wall. Cat.* 1500; scape slender 1-5-fl., leaves petioled orbicular, lower lip of corolla $\frac{1}{4}$ in. 5-lobed yellowish, spur $\frac{1}{2}$ in. linear-acute, seeds obovoid glochidiate. *A. DC. Prodr.* viii. 18; *Oliver in Journ. Linn. Soc.* iii. 187; *Dalz. & Gibs. Bomb. Fl.* 136. *U. pusilla*, *Grah. Cat. Pl. Bomb.* 165. *U. glochidiata*, *Wight Ic. t.* 1581.

Almost throughout INDIA in the hills: Himalaya Mts., alt. 3-8000 ft., from Nepal to Bhotan, common; Khasia Hills frequent; W. Deccan Peninsula and Ceylon; Tenasserim to Malacca.—*DISTRIB.* Malaya, S. China.

Scapes 2-5 in., slender. *Leaves* $\frac{1}{2}$ in. diam.; petiole $\frac{1}{4}$ in. *Pedicels* $\frac{1}{2}$ in. Lower lip of *corolla* broader than long, with 5 subequal obtuse short lobes (more unequal in an example of Parish from Moulmein); pinkish or whiteish, but the spots or tinge of yellow usually prevailing.

20. ***U. multicaulis***, *Oliver in Journ. Linn. Soc.* iii. 188; scape 1-3-fl., leaves petioled spathulate-orbicular, lower lip of corolla $\frac{1}{2}$ in. 3-4 (sometimes 6-) lobed, spur $\frac{1}{10}$ in. linear-cylindric obtuse.

ALPINE SIKKIM; Lachen, alt. 10-11,000 ft.; Lachong, alt. 6-7000 ft., *J. D. H.*

Tufted; scapes 1-2 in. crowded stouter than those of *U. orbiculata*. *Pedicels* 0- $\frac{1}{2}$ in. *Flowers* pale-flesh colour, throat yellow. *Seeds* not seen.—Allied to *U. orbiculata*, from which it differs at first sight by the much smaller flowers.

21. ***U. furcellata***, *Oliver in Journ. Linn. Soc.* iii. 189; scape 2-6-fl., leaves petioled spathulate-orbicular, lower lip of corolla $\frac{1}{2}$ - $\frac{3}{8}$ in. 4-lobed purplish, spur $\frac{3}{4}$ - $\frac{1}{2}$ in. linear curved.

SIKKIM HIMALAYA; at Darjeeling, alt. 7-9000 ft., frequent (*Herb. Griffith, &c.*).

Scape 2-3 in., slender, resembling that of *U. orbiculata*. Lower lip of *corolla* narrower than broad, purple pink or white, not distinctly yellow. *Seeds* obovoid, glochidiate, as of *U. orbiculata*.—Known in the field from *U. orbiculata* by the smaller, less yellow, flowers.

VAR. minor; scapes $\frac{1}{2}$ -1 in. very slender 1-3-fl.—Temp. Sikkim; Lachen, *J. D. H.* Khasia Mts., Boga Pani, *J. D. H.* These examples were the type of *U. furcellata*, *Oliver*; the plentiful arrival of subsequent material shows the "larger Darjeeling form" referred to by *Oliver* to be the fairly developed state of the species.

22. ***U. kumaonensis***, *Oliver in Journ. Linn. Soc.* iii. 189; scape slender 1-3-fl., leaves petioled spathulate-orbicular, lower lip of corolla $\frac{1}{2}$ - $\frac{1}{6}$ in. 5-lobed, spur $\frac{1}{2}$ in. narrowly cylindric, seeds with a tuft of hairs at each end. *Diurospermum album*, *Edgew. in Proc. Linn. Soc. i.* 351.

TEMPERATE W. HIMALAYA; Kumaon, alt. 7500 ft., near the river Pilti, *Strach. & Winterb.*

Resembling altogether *U. furcellata*; but the lower lip of the corolla is 5-lobed, the spur shorter. The young seeds are ellipsoid, smooth, scabrous-papillose at each end; the ripe seeds have at their end tufts of capillary hairs as long as the seed.

IMPERFECTLY KNOWN SPECIES.

1. *U. MINUTISSIMA*, *Vahl Enum. i.* 204; scape 2-3 in. capillary, bracts basifixed, flowers blue subsessile, calyx-lobes subobtuse. *DC. Prodr.* viii. 16; *Oliver in Journ. Linn. Soc.* iii. 190.—Malacca (*Koenig*). The basifixed scales will not do for *U. racemosa*,

nor the blue flowers for *U. bifida*; and there is no other known Malacca species that will at all suit.

2. *U. FOVEOLATA*, *Edgew. in Proc. Linn. Soc.* i. 351; scape twining leafless 2-6-fl., bracts transfixed, calyx-lobes ovate acute, corolla purple, seeds glistening punctate.—Bengal; *Edgeworth*. Near *U. uliginosa* (ex *Edgew.*), but from the description of the seeds perhaps rather allied to *U. affinis*.

3. *U. ALATA*, *Benj. in Bot. Zeit.* 1845, 212; leafless, scape 1-2 in. 2-3-fl., scales basifixed, calyx-lobes ovate equal subacute decurrent on the pedicel, corolla longer than the calyx, spur conic acute longer than the calyx.—"India" (*Benjamin*). Neither the shape of the corolla-lip, its colour, nor any account of the seeds is supplied.

4. *U. SQUAMOSA*, *Benj. in Bot. Zeit.* 1845, 212; leafless, scape 3 in. 3-fl., scales attached by their middle, flowers subsessile, calyx-lobes equal orbicular-ovate obtuse.—Nepal (*Benjamin*). *Benjamin*'s description fits very well the common *U. racemosa*. This species however must have been so well known to *Benjamin* that he would hardly publish it again under a new name; hence *Oliver* records *U. squamosa* as an indeterminate species.

5. *U. PAUCIFOLIA*, *Benj. in Linnæa*, xv. 309; leaves $\frac{1}{4}$ – $\frac{1}{3}$ in. oblong obtuse, petiole $\frac{1}{4}$ in., scape 4 in., pedicels exceedingly short, calyx-lobes $\frac{1}{8}$ in. equal obtuse.—India (*Benjamin*). Supposed by *Oliver* to be near *U. racemosa*.

6. *U. OBTUSILOBA*, *Benj. in Linnæa*, xx. 312; leaves $\frac{1}{8}$ in. ovate obtuse, petiole $\frac{1}{8}$ in., scapes 3-20 in., scales fixed by their middle, calyx-lobes round obtuse.—Ceylon, Nepal, China (*Benjamin*). Also supposed by *Oliver* to be near *U. racemosa*.

7. *U. ALBIFLORA*, *Griff. Notul.* iv. 168; leafless, scapes simple filiform, pedicels bracteolate at the base, corolla white, lower lip yellow-spotted, spur acutely conic a little longer than the lower lip.—Mergui; *Griffith*.

8. *U. LILACINA*, *Griff. Notul.* iv. 168; leafless, raceme few-fl., fruit-pedicels erect, calyx-lobes equal acute, corolla lilac-blue, lower lip with a yellow spot, spur conic-subulate as long as the lower lip.—Mergui; *Griffith*.

9. *U. CAPILLARIS*, *Don Prodr.* 85; leafless, scape 3-4 in. capillary few-fl., lower calyx-lobe (?) ovate acute longer, corolla blue, spur conic. *DC. Prodr.* viii. 90.—Nepal (*D. Don*).

10. *U. RAMOSA*, *Fahl Enum.* i. 204; leafless, scape few-fl., flowers small, spur conic short, fruit-pedicels recurved. *DC. Prodr.* viii. 25.—Deccan Peninsula (*Koenig*). Doubtfully referred by *Oliver* to *U. flexuosa*; it appears as likely to be *U. cærulea* or one of that section.

U. ambigua is recorded as Indian by *DC.* (*Prodr.* viii. 9) on the faith of a wrong field determination of a specimen by *Wallich*.

II. PINGUICULA, Linn.

Herbs. *Leaves* radical, rosulate, entire. *Scapes* erect. 1-fl., leafless, ebracteate. *Calyx* 4-5-lobed, more or less 2-lipped. *Corolla* 2-lipped, spurred, purple or yellow. *Anthers* ovate, sub-1-celled. *Style* short, stigma very unequally 2-lobed. *Seeds* ellipsoid.—Species 15, all extra-tropical.

P. alpina, *Linn.*; *Reichb. Iconogr.* t. 81, fig. 166; leaves subsessile elliptic sparsely hairy on the upper surface, corolla white yellow-spotted, spur hardly $\frac{1}{2}$ as long as the corolla. *DC. Prodr.* viii. 31; *Oliver in Journ. Linn. Soc.* iii. 190. *U. flavescens*, *Flörke*, and *brachyloba*, *Ledeb.*; *Reichb. Iconogr.* t. 81, fig. 168, 187.

ALPINE HIMALAYA, alt. 11-13,000 ft.; Kumaon, *Strach. & Winterb.*, T.

Anderson; Sikkim, *J. D. H.*—DISTRIB. N. and Alpine Europe; N. and Central Asia.

Leaves $1\frac{1}{2}$ by $\frac{3}{8}$ in. *Scapes* 2-6 in., glabrous. *Corolla* $\frac{1}{3}$ — $\frac{1}{2}$ in. *Capsule* $\frac{1}{4}$ in., ellipsoid, 2-valved. *Seeds* elongate ellipsoid, testa smooth, cells oblong.

ORDER CVI. **GESNERACEÆ.** (By C. B. Clarke.)

Herbs or undershrubs. *Leaves* opposite alternate or solitary, undivided, entire or toothed; stipules 0. *Peduncles* axillary or terminal, rarely 1-fl., bracteate; bracteoles usually small. *Flowers* hermaphrodite, rarely regular. *Calyx-segments* 5, valvate or open in the bud (imbricate in *Monophyllæa*). *Corolla* gamopetalous; tube long or short; segments usually 5, imbricate in the bud. *Stamens* on the corolla-tube mostly didynamous, often 2 only fertile, rarely 5 fertile; anthers 2-celled, often early confluent 1-celled. *Disc* annular or shortly cylindric or 0, sometimes unilateral. *Ovary* 1-celled or sub-2-celled; style linear, stigma small capitate or 2-lobed; placenta parietal, bifid; ovules very many, anatropal. *Fruit* capsular or berried, dehiscent or indehiscent. *Seeds* very many, minute, fusiform or ovoid, smooth; testa reticulate, often striate, albumen 0 or scanty; embryo straight.—Species 800, mostly in S.E. Asia, Polynesia and Tropical America.

The Ordinal character above given is narrowed to the Old World species of the Order, which all belong to the Suborder *Cyrtandrea*. The *Eugesneræ* of the New World have the ovary more or less inferior. The leaf when solitary on the plant is sometimes a highly developed cotyledon.

Subtribe 1. TRICHOSPOREÆ. Seeds tipped with a very long hair. *Capsule* long-linear, loculicidally 2-valved; placenta bifid, recurved, enrolled, covering the seeds, not seed-bearing on their axial faces.

Leaves subentire, fleshy. Stamens 4 perfect, exerted . . .	1. <i>ÆSCHYNANTHUS</i> .
Leaves subcoriaceous. Stamens 2 perfect included . . .	2. <i>LYSIONOTUS</i> .
Leaves membranous, hairy. Stamens 4 perfect included . . .	3. <i>LOXOSTIGMA</i> .

Subtribe 2. DIDYMOCARPÆ. Capsule loculicidally 2-valved, often ultimately 4-valved; placenta deeply intruded nearly meeting, not seed-bearing on their inner faces (except in ****). *Seeds* without hairs.

* *Capsule linear or elongate-lanceolate, valves 2 straight not (or very late) 4-valved, in Didymocarpus frequently subfollicular.*

Stigma oblique, emarginate. Stamens 2 perfect . . .	4. <i>DIDYMOCARPUS</i> .
Stigma ultimately shortly bifid. Stamens 2 perfect . . .	6. <i>CHIRITA</i> .
Leaves several. Stamens 4 perfect . . .	5. <i>DIDISSANDRA</i> .
A 1-leaved herb. Stamens 4 perfect . . .	7. <i>PLATYSTEMMA</i> .

** *Capsule narrowly lanceolate, valves 2 straight soon again bipartite (capsule usually subequally 4-valved).*

A low herb. Leaves opposite. Stamens 4 perfect . . .	8. <i>CHAMPIONIA</i> .
Undershrubs. Leaves alternate. Stamens 4 perfect . . .	9. <i>BEICA</i> .
Flowers capitate. Corolla silky without. Stamens 2 perfect	10. <i>TETRAPHYLLUM</i> .
Cyme lax, few-flowered. Calyx 3-sepalous. Stamens 2 perfect	11. <i>TRISEPALUM</i> .

*** *Capsule linear or elongate-lanceolate, valves (even before dehiscence) spirally twisted.*

Calyx distinctly 2-lipped, sub-3-sepalous . . .	12. <i>PHYLLOBEA</i> .
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Corolla-lobes 5, subsimilar, round 13. BÆA.
Corolla 2-lipped, lower lip larger reflexed 14. ORNITHOBÆA.

**** *Capsule ellipsoid or ovoid, hardly exceeding the calyx, placenta bearing seeds on all sides.*

Caulescent. Stamens 4 perfect 15. KLUGIA.
Caulescent. Stamens 2 perfect 16. RHYNCHOGLOSSUM.
Scapose. Stamens 4 perfect 17. JERDONIA.

Subtribe 3. LEPTOBÆA. Capsule septicidally 2-valved. *Seeds without hairs.*

Twiggy. Cyme-branches capillary 18. LEPTOBÆA.

Subtribe 4. EPITHEMÆA. Capsule circumsciss. *Seeds without hairs.*

A succulent herb. Flowers subcapitate 19. EPITHEMA.

Subtribe 5. EUCYRTANDRÆA. Berry indehiscent, succulent or membranous, breaking up irregularly, in *Cyrtandromœa* sometimes loculicidally 2-valved. *Seeds without hairs.*

Leaf solitary. Flowers racemose. Sepals imbricate. Stamens 4 perfect 20. MONOPHYLLÆA.
Calyx urceolate, enclosing the fruit. Stamens 4 perfect 21. CYRTANDROMÆA.
Calyx plicate. Anthers cruciate. Stamens 4 perfect 22. STAUBANTHERA.
Undershrubs. Leaves all alternate. Stamens 4 perfect 23. ISANTHERA.
Undershrubs. Uppermost leaves opposite. Stamens 4 perfect. 24. RHYNCHOTECHUM.
Undershrubs. Corolla tubular. Stamens 2 perfect 25. CYRTANDRA.

I. **ÆSCHYNANTHUS**, Jack.

Epiphytic undershrubs. *Leaves* opposite, equal, fleshy or leathery, entire rarely obscurely toothed; nerves obscure. *Peduncles* terminal or axillary, 1- or 2-fld., rarely cymose, solitary or clustered; bracts ovate, usually small, sometimes large coloured, deciduous. *Calyx* truncate, 5-fld, or 5-partite. *Corolla* tubular-ventricose, rarely small or greenish; limb 2-lipped. *Stamens* 4 perfect, didynamous; anthers oblong, equalling the corolla or much exerted, usually coherent in pairs by the tips; rudimentary fifth rarely present. *Disc* annular. *Ovary* superior, stipitate, oblong or linear; stigma peltate; placenta deeply inflexed, then recurved bearing the ovules. *Capsule* long-linear, loculicidally 2-valved; valves placentiferous. *Seeds* very many, small, sessile, pendulous, oblong, rugose, with one or more hairs at the end next the hilum, and one at the apex.—Species 52, Indian and Malayan, extending from Kumaon and Ceylon to Hongkong and the Philippines.

Æschynanthus, Jack, was published Jan., 1823; but *Trichosporum*, D. Don, being published July, 1822, has the right of priority; *Æschynanthus*, however, having been accepted for half a century, it would not be expedient to relinquish it.

Sect. 1. **Politrichium**. *Seeds* with many hairs near the hilum, and one hair at the apex.

1. **Æ. longicaulis**, Wall. Cat. 888; glabrous, leaves lanceolate obscurely falcate, sepals narrowly linear-lanceolate. *Br. in Pl. Jav. Rar.* 116; *A. DC. Prodr.* ix. 262.

TENASSERIM; Chappedong, Wallich; Mergui, Griffith; Moulmein, Parish (*Iconed. Kew*).

Stem long, branched, terete. *Leaves* $3\frac{1}{2}$ by $\frac{2}{3}$ in., base cuneate or rhomboid, fleshy, midrib slender, nerves obscure; petiole $\frac{1}{2}$ in. *Pedicels* lateral and terminal, 1-3 together, $\frac{1}{8}$ - $\frac{1}{2}$ in. *Sepals* free, $\frac{1}{3}$ by $\frac{1}{30}$ in. *Corolla* $\frac{2}{3}$ in., glabrous without. *Filaments* much exserted, glandular-hairy. *Capsule* 8 by $\frac{1}{8}$ in. *Seed* $\frac{1}{10}$ in., oblong, rough; hilar hairs 30-40, $\frac{1}{2}$ in. long.

Sect. 2. **Diplotrichium.** *Seeds* with two hairs near the hilum, one at the apex.—*Seeds* in n. 2 unknown, in nn. 3, 7 require verification: nn. 4, 5, 6 are perhaps but one species.

2. **Æ. fulgens**, Wall. Cat. 797; leaves narrowly lanceolate succulent, pedicels terminal clustered, calyx $\frac{1}{2}$ in. nearly glabrous, corolla 2 in. pubescent without. *Br. in Pl. Jav. Rar.* 115; *DC. Prodr.* ix. 261; *Bot. Mag.* t. 4891.

TAYOY; Wallich.

Glabrous except the inflorescence. *Branches* very thick. *Leaves* 5 by 1 in., acute; petiole $\frac{1}{6}$ - $\frac{1}{2}$ in., very thick. *Pedicels* $\frac{1}{2}$ in., nearly glabrous. *Calyx* narrowly tubular; teeth $\frac{1}{12}$ - $\frac{1}{8}$ in., triangular. *Corolla* narrow tubular-funnel-shaped, scarlet, mouth orange purple-marked. *Filaments* far exserted, nearly glabrous. *Seeds* unknown.—Brown assumed the seed to have but one hair at the hilar end, and placed this species (doubtfully) in sect. *Holocalyx*, which the inflorescence and stout stem do not suit.

3. **Æ. Hookeri**, Clarke; glabrous except the corolla, leaves lanceolate, pedicels terminal umbelled, calyx tubular scarlet very shortly obtusely lobed. *Æ. parasitica*, Clarke Comm. & Cyrt. Beng. t. 49, not of Wall.—*Æschynanthus* sp. n. 14, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; alt. 4-6000 ft., J. D. H., Clarke.

Stem branched, terete. *Leaves* $3\frac{1}{2}$ by 1 in., acuminate, base cuneate, fleshy, midrib beneath broad, nerves obscure; petiole $\frac{1}{3}$ in. *Pedicels* 3-8, $\frac{1}{3}$ - $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ in., narrowly oblong; branch after flowering often growing on through the umbel. *Calyx-tube* nearly $\frac{1}{2}$ in., teeth $\frac{1}{8}$ - $\frac{1}{6}$ in. *Corolla* more than 1 in., curved, hairy without, orange-red, the lobes orange black-spotted. *Filaments* far exserted, glandular-hairy; anthers $\frac{1}{6}$ in., narrowly oblong. *Ovary* glabrous; style glandular-hairy. *Capsule* and *seeds* not now at hand; but the species seems very near *Æ. grandiflora*, and (it is believed) was ascertained to belong to sect. *Diplotrichium*.

4. **Æ. grandiflora**, Spreng. Syst. iv. 238; glabrous except the corolla, leaves lanceolate, pedicels clustered, calyx $\frac{1}{2}$ in. lobes shorter than the tube, corolla $1\frac{1}{2}$ in. inflated upwards. *DC. Prodr.* ix. 261; *Bot. Mag.* t. 3843; *Part. Mag.* v. 241, with fig. *Æ. parasitica*, Wall. Cat. 796, partly. *Æschynanthus* sp., Griff. Itin. Notes, 28, n. 427, and *Ic. Pl. Ind. Or.* t. 441 (not descr. of t. 441 in Griff. Notul. iv. 156). *Incarvillea parasitica*, Roxb. Cor. Pl. iii. 88, t. 291, and *Fl. Ind.* iii. 112. *Trichosporum grandiflorum*, Don Prodr. 125.

KHASIA MTS., alt. 0-3500 ft.; Wallich, Griffith, H. f. & T.

Stem terete, branched. *Leaves* 4 by 1 in., narrowed at both ends, often sinuate; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Pedicels* $\frac{1}{8}$ - $\frac{1}{2}$ in., terminal; more rarely on spurs, quasi-axillary. *Calyx* herbaceous; lobes variable, sometimes very short obtuse as in Roxburgh's type, sometimes lanceolate acute as long as the tube. *Corolla* red, lobes orange marked with black-purple, mouth subcontracted. *Filaments* far exserted, glandular-hairy; anthers $\frac{1}{2}$ in., shortly oblong. *Capsule* 6 by $\frac{1}{4}$ in.

VAR. *parasitica*, Wall. Cat. 796, chiefly; leaves narrower, calyx and corolla rather smaller, calyx-lobes acutely lanceolate slightly longer than the tube. *Br. in Pl. Jav. Rar.* 2, p. 115; *Lindl. Bot. Reg.* 1841, t. 49; *Maund. Bot.* iv. t. 167.—Khasia Mts.; Wallich. Whether Wallich's *Æ. parasitica* was Roxburgh's *Incarvillea parasitica* has been long disputed. The type sheet of Wall. Cat. 796 has three

branches on it, whereof one is Roxburgh's plant, the second is that here called Wallich's var. *parasitica*, the third is the remote *Æ. micrantha*. The distributed sheets of Wall. Cat. 766 contain these three plants mixed in varying proportions.

5. *Æ. ramosissima*, Wall. Cat. 799, and *Pl. As. Rar.* i. 55, t. 71; glabrous except the corolla, leaves broadly lanceolate, pedicels clustered, calyx $\frac{1}{2}$ in. lobes lanceolate longer than the tube, corolla 1 in. scarcely contracted at the mouth. *DC. Prodr.* ix. 260; *Past. Mag.* vi. 195, with fig.; *Wight Ill.* t. 159 b, fig. 11, many-haired seed excl.; *Griff. Ic. Pl. Ind. Or.* t. 443, fig. 5; *Clarke Comm. & Cyrt. Beng.* t. 50. *Æ. parviflora*, G. Don *Gen. Syst.* iv. 656; *DC. Prodr.* ix. 261. *Trichosporum parviflorum*, Don *Prodr.* 125.

SUBTROPICAL HIMALAYA, alt. 3–4000 ft.; Kumaon, Strachey & Winterbottom; Nepal, Wallich; Sikkim, J. D. H.

Leaves 4 by $1\frac{1}{2}$ in. Sepals sometimes nearly free, narrowly lanceolate, sometimes united half-way.—Scarcely separable from *Æ. grandiflora* var. *parasitica*, but has broader leaves, and comes from a different area.

6. *Æ. maculata*, Lindl. Bot. Reg. 1841, t. 28; glabrous except the corolla, leaves lanceolate, pedicels clustered, calyx $\frac{1}{2}$ in. lobes lanceolate acute, corolla $\frac{3}{4}$ in. narrow. *DC. Prodr.* ix. 261. *Æ. parasitica*, Wall. Cat. 796, partly.—*Æschynanthus* sp. n. 15, *Herb. Ind. Or. H. f. & T.*

TEMPERATE HIMALAYA, alt. 2–7000 ft., from Nepal to Bhotan, frequent; Lachong Valley, alt. 8000 ft., J. D. H.

Leaves 4 by $1\frac{1}{2}$ in. Pedicels often numerous, sometimes $\frac{1}{2}$ in., sometimes capitate. Calyx (in the typical plant) deeply divided, tube wide subcampanulate, lobes lanceolate; in *H. f. & T.* n. 15, calyx-tube narrow-cylindric teeth sublinear as long as the tube. Anthers (in the typical plant) far exserted; in all the numerous examples of *H. f. & T.* very shortly exserted.—Hardly distinguishable from *Æ. ramosissima*, but by the small calyx.

VAR. *stenophylla*; leaves linear, calyx $\frac{1}{6}$ – $\frac{1}{4}$ in. deeply divided, often pubescent, lobes linear-subulate. *Æschynanthus* sp. n. 18, *Herb. Ind. Or. H. f. & T.*—Khasia Mts., alt. 0–4000 ft., frequent; *H. f. & T.*, &c. Chittagong, alt. 0–1000 ft., *H. f. & T.*

7. *Æ. Griffithii*, Br. in *Pl. Jav. Rar.* 115; glabrous, leaves lanceolate, sepals narrowly linear-lanceolate, corolla $\frac{2}{3}$ in. glabrous without. *DC. Prodr.* ix. 261. *Æ. radicans*, Wall. Cat. 798 partly, not of Jack.—*Æschynanthi* sp., *Griff. Notul.* iv. 156, as to descr. of t. 441?; certainly not *Griff. Ic. Pl. Ind. Or.* t. 441.

INDIA (probably Mergui), Griffith; Tavoy, Wallich.

Stem somewhat slender, elongate, branching, rooting at the nodes, terete. Leaves 3 by $\frac{2}{3}$ in., acuminate, base cuneate, fleshy, midrib beneath scarcely dilated; petiole $\frac{1}{6}$ in. Pedicels 1–2 together, terminal and axillary, $\frac{1}{4}$ in. Calyx divided nearly to the base; lobes $\frac{1}{2}$ by $\frac{1}{2}$ in. Corolla somewhat curved; lobes $\frac{1}{8}$ – $\frac{1}{6}$ in., rounded black purple-marked. Filaments far exserted, minutely glandular-hairy. Seeds not seen.—Examples imperfect; the species is certainly distinct if, as Brown says, “semina extremitate superiore ditricha;” but it exceedingly resembles *Æ. longicaulis*, Wall., from the same place.

Sect. 3. *Haplotrichium*. Seeds with one hair not dilated at its base near the hilum, and one at the apex. Calyx deeply divided.

* Calyx-lobes small, lanceolate, acute, or linear.

8. *Æ. Perrottetii*, A. DC. *Prodr.* ix. 261, not of Wight nor of Gardn.;

glabrous except the corolla, leaves lanceolate base rhomboid or rounded, umbels 2-6-fld., corolla $1\frac{1}{2}$ in. *Jerdon Ic. Ined.*, *Kew*.

“**BOMBAY** (probably in the Ghats of Malabar); *Dalzell, Stocks*. **NILGHERY MTS.**; *Clarke*.

Branches not or scarcely compressed. *Leaves* 3 by $\frac{3}{4}$ in., acuminate, subcoriaceous; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Pedicels* $\frac{1}{2}$ - $\frac{1}{2}$ in. *Sepals* $\frac{1}{4}$ in., linear. *Corolla* elongate, narrow, pubescent or subglabrate without, scarlet purple-marked in the lobes. *Filaments* exserted, minutely glandular-hairy. *Capsule* 5 in.

VAR. *malabarica*; leaves attenuate at the base, sepals $\frac{1}{2}$ - $\frac{1}{2}$ in.—*Mts. of W. Deccan Peninsula*, from Panoar Ghaut near Bombay to Courtallum, frequent.

VAR. *Æ. platyculmis*; branchlets much flattened, leaves dense bifarious broad-lanceolate or elliptic, corolla $1\frac{1}{2}$ in. *Æ. ceylanica*, *Wight Ic. t. 1347, not of Gardn.*—*Madras*; Courtallum, *Wight*; Nilghiri and Kurg Mts., *G. Thomson*. *Bombay* (probably in the W. Ghauts), *Stocks*. *Branchlets* with subacute edges, probably closely applied to the branches of trees. *Leaves* $2\frac{1}{2}$ by 1 in., acute at both ends; petiole $\frac{1}{2}$ in., nearly $\frac{1}{2}$ in. broad. *Flowers* and *capsules* nearly as in *C. Perrottetii*.

9. **Æ. ceylanica**, *Gardn. in Calc. Journ. Nat. Hist.* vi. 474; glabrous except the corolla, leaves narrowly lanceolate, umbels usually 2-fld., corolla 1 in., capsule 5 in. *Thwaites Enum.* 206, *excl. syn.*

CEYLON; *Gardner, Thwaites* (C. P. n. 1782, &c.).

Branches not or scarcely compressed. *Leaves* scattered, $3\frac{1}{2}$ by $\frac{1}{2}$ in. (in *Gardner's* example sometimes wider); petiole $\frac{1}{2}$ in. *Pedicels* very generally 2 terminal, 2-4 in *Gardner's* example. *Sepals* $\frac{1}{4}$ in., linear. *Corolla* pubescent or subglabrous.—Differs from *Æ. Perrottetii* by the considerably shorter corolla.

VAR. *pinguis*; leaves smaller succulent thick often obtuse, corolla glabrous without, capsule 2-5 in. *Æ. Perrottetii*, *Gardn. in Calc. Journ. Nat. Hist.* vi. 475, *not A. DC.*—*Ceylon*; *Wight, Walker*. Nilghiri Mts.; near Pycarah, *Wight*.

10. **Æ. micrantha**, *Clarke*; glabrous except the flowers, leaves elliptic or oblong, pedicels 1-5 together, sepals $\frac{1}{2}$ - $\frac{1}{2}$ in. linear pubescent, corolla $\frac{3}{4}$ in. narrow. *Æ. parviflora*, *Clarke Comm. & Cyrt. Beng.* t. 47, *not of G. Don*. *Æ. parasitica*, *Wall. Cat.* 796, *partly*.

SUBTROPICAL HIMALAYA, alt. 2000 ft.; *J. D. H.*, &c. **ASSAM**; *Wallich, Griffith. KHASIA MTS., alt. 4000 ft.; *Churra, H. f. & T.*, &c.*

Branches somewhat slender, elongate, often rooting, divided, glabrous, not compressed. *Leaves* $2\frac{1}{2}$ by 1 in., sometimes smaller, shortly acuminate, base cuneate, coriaceous; petiole $\frac{1}{2}$ in. *Pedicels* $\frac{1}{2}$ - $\frac{1}{2}$ in., terminal, and on lateral spurs, glabrous or early glabrate. *Sepals* laxly sparsely villous, ultimately glabrate. *Corolla* red, mouth orange, lobes purple-marked. *Filaments* far exserted, minutely glandular-hairy. *Capsule* 6 in.—Much resembles *Æ. maculata*, and confused with it, but the seeds are altogether different; in the absence of seeds, *Æ. micrantha* may generally be recognized by the creeping rooting branches and smaller leaves.

11. **Æ. gracilis**, *Parish*; *Clarke Comm. & Cyrt. Beng.* t. 48, *lower fig.*; branches slender, leaves small broad-lanceolate hairy, flowers scattered subsolitary, corolla 1 in. mouth very oblique. *Æschynanthus* sp. n. 13, *Herb. Ind. Or. H. f. & T.*—*Cyrtandra*, *Griff. Ic. Pl. Ind. Or.* t. 429, *fig. 1*, and *Notul.* iv. 160.

SUBTROPICAL E. HIMALAYA, alt. 1-4000 ft., frequent; Sikkim and Bhotan, *J. D. H.*, &c. **ASSAM**; *Griffith. KHASIA MTS., alt. 4000 ft., *H. f. & T.* **CACHAR**; *Keenan. BURMA*; Moulmein, *Parish*; Mergui, *Griffith.*—**DISTRIB.** Ava.*

Branches elongate, rooting, fulvous or reddish with spreading hairs. *Leaves* $\frac{1}{2}$ by $\frac{1}{2}$ in., base cuneate or rounded; petiole $\frac{1}{2}$ in. *Pedicels* $\frac{1}{10}$ - $\frac{1}{3}$ in., solitary, rarely paired, pilose. *Sepals* $\frac{1}{2}$ in., linear, somewhat villous. *Corolla* villous without, scarlet, mouth orange black-marked, deeply 2-lipped, segments of lower lip with reflexed margins. *Filaments* shortly exserted, minutely glandular-hairy. *Capsule* 2-3 in.

12. **Æ. chiritoides**, *Clarke*; branches slender, leaves opposite and ternate small broad-lanceolate hairy, flowers 1-3 together terminal, corolla $1\frac{1}{4}$ in. straight, lobes short subequal.

BHOTAN; *Nuttall*. ASSAM; *Griffith*. ? KHASIA Mts., alt. 4000 ft., *H. f. & T.*

Stems and leaves closely resembling those of *Æ. gracilis*, but the leaves are not rarely ternate. *Pedicels* $\frac{1}{2}$ - $\frac{1}{4}$ in., villous. *Sepals* $\frac{1}{2}$ - $\frac{1}{3}$ in., linear, villous. *Corolla* narrow-tubular below, suddenly expanding into a tubular upper portion $\frac{1}{3}$ in diam., minutely pilose; lobes $\frac{1}{4}$ in., round-ovate, black-marked. *Filaments* included, glabrous. *Ovary* villous.—A most remarkable species, the corolla, both in shape and texture, resembling a *Chirita*. The example of *H. f. & T.* shows leaves only, so that it cannot be confidently referred anywhere.

13. **Æ. levipes**, *Clarke*; branches very slender, leaves small opposite and ternate, narrow-lanceolate hairy, flowers solitary terminal, pedicels smooth, corolla $1\frac{1}{4}$ in.

UPPER ASSAM; Mishmee, on Mt. Laim-planj, *Griffith* (*Kew Distrib.* n. 3815).

Somewhat densely clothed with white or greyish hair on every part except the pedicels. *Branches* elongate, sparingly rooting. *Leaves* $\frac{1}{2}$ by $\frac{1}{4}$ in., subsessile. *Pedicels* $\frac{1}{2}$ in., glabrous even when young. *Sepals* $\frac{1}{4}$ in., linear, flat, thinly herbaceous, sparsely villous. *Corolla* (imperfectly preserved) appears nearly as of *Æ. chiritoides*, but narrower.

14. **Æ. Mannii**, *Kurz ms.*; branches somewhat thick pubescent upwards, leaves small elliptic early glabrate, pedicels axillary subsolitary, corolla $\frac{3}{4}$ in. narrow, mouth subequal.—Cyrtrandracea, *Griff. Ic. Pl. Ind. Or.* t. 429, fig. 2, and *Notul.* iv. 159.

KHASIA Mts.; *Mann*. S.E. ASSAM; Patkoye Mts., *Griffith* (*Kew Distrib.* n. 3816).

Stem short; branches several, 2-10 in., undivided, terete, soon glabrate. *Leaves* densely approximated, $1\frac{1}{2}$ by $\frac{1}{2}$ in., subobtusate at both ends, coriaceous, young hairy, mature dotted; midrib prominent beneath; petiole $\frac{1}{10}$ in. *Pedicels* $0\frac{1}{2}$ in., villous. *Sepals* $\frac{1}{2}$ in., villous. *Corolla* narrowly tubular-funnel-shaped, curved upwards, pubescent without; lobes $\frac{1}{6}$ - $\frac{1}{5}$ in. diam., roundish, black-marked. *Filaments* far exserted, glandular-hairy.—Allied to *Æ. Andersoni* (*Clarke Comm. & Cyrt. Beng.* t. 48, upper fig.), which has hairy leaves attenuated to the petiole: as to the inflorescence, the pedicels of *Æ. Mannii* are often approximated towards the ends of the branches, but they are shorter than those of *Æ. Andersoni*.

15. **Æ. Masoniæ**, *Kurz. ms.*; branches somewhat thick pubescent upwards, leaves small elliptic base rounded glabrous, pedicels axillary subsolitary, corolla $\frac{1}{2}$ in. slender, mouth narrow subequal.

PEGU; hills of the Red Karens, *Mrs. Mason*.

Branches several, 5-10 in., undivided, terete, early glabrate. *Leaves* (in the solitary example) subsessile, ternate, $\frac{3}{4}$ -1 by $\frac{1}{2}$ in., cuneate, widest near the base; midrib prominent beneath. *Corolla* pubescent without; mouth scarcely $\frac{1}{2}$ in. diam.—Very nearly allied to *Æ. Mannii*; the shape of the leaves is different, and the corolla considerably smaller.

** *Calyx*-lobes wide, obtuse, or large (bracts prominent).

16. **Æ. acuminata**, *Wall. Cat.* 6397; glabrous, leaves largeish elliptic acuminate, peduncles subfasciculate 1- or few-fl., calyx deeply divided, lobes $\frac{1}{2}$ in. round, corolla $\frac{1}{2}$ in. yellow-green. *A. DC. Prodr.* ix. 263; *Clarke Comm. & Cyrt. Beng.* t. 45. *Æ. bracteata*, *Benth. Fl. Hongk.* 258, not of *Wall.* *Æ. chinensis*, *Gard. & Champ. in Hook. Kew Journ.* i. (1849), 328.—Cyrtrandracea, *Griff. Itin. Notes*, 78, n. 1151.

SUBTROPICAL EASTERN HIMALAYA, alt. 1-3000 ft.; Sikkim, Bhotan and Upper Assam, frequent, *H. f. & T.*, &c. KHASIA and JAINTIA MTS., alt. 500-3000 ft.; *Wallich*, &c. CACHAR; *Keenan*.—DISTRIB. Hongkong.

Branches long, divided, terete. *Leaves* $3\frac{1}{2}$ -4 by $1\frac{1}{2}$ in., acuminate, base cuneate; petiole $\frac{1}{2}$ in. *Peduncles* 3-7 together, approximate or clustered towards the ends of the branches, $\frac{1}{2}$ - $1\frac{1}{2}$ in., 1-4 fld.; bracteoles at the forks 2, $\frac{1}{4}$ in. diam., broadly ovate; pedicels $\frac{3}{8}$ in. *Calyx* wide at the base, green; lobes persistent, ultimately reflexed. *Corolla* wide-tubular, straight; upper lip erect, green; lower pendent, yellow, sometimes reddish on the margin without. *Filaments* far exserted, minutely glandular-hairy. *Capsule* 6 in.—The Hongkong plant has narrower leaves than the Khasian. Bentham never proposed to unite *Æ. acuminata*, Wall., to *Æ. bracteata*, Wall.; but to refer to the latter certain specimens which had been wrongfully mixed up with those of *Æ. acuminata*.

17. *Æ. bracteata*, *Wall. Cat.* 794; glabrous, leaves largeish elliptic acuminate fleshy, peduncles 1- or several-fld., calyx-lobes $\frac{3}{8}$ in. lanceolate red, corolla $1\frac{1}{2}$ in. scarlet. *DC. Prodr.* ix. 261; *Clarke Comm. & Cyrt. Beng.* tt. 43, 44. *Æ. Paxtoni*, *Lindl. in Journ. Hort. Soc.* iv. 79, with fig. *Æ. Peellii*, *Hook. f. Ill. Himal. Pl.* t. 17.—*Æschynanthi* sp., *Griff. Ic. Pl. Ind. Or.* t. 432, and *Notul.* iv. 156. *Æschynanthoidea*, *Griff. Itin. Notes*, 28, n. 429. *Cyrtandracea*, *Griff. Itin. Notes*, 25, n. 388.

TEMPERATE HIMALAYA, alt. 4-8000 ft.; Sikkim and Bhotan, *Griffith, J. D. H.*, &c. UPPER ASSAM; *Mrs. Mack*. KHASIA MTS., alt. 2-5000 ft., common; *Wallich, Griffith, H. f. & T.*, &c.—DISTRIB. Ava.

Epiphytic; branches long, terete. *Leaves* 4 by $1\frac{1}{2}$ in., from subrotund to narrow-lanceolate, base cuneate or rounded; petiole $\frac{1}{2}$ in. *Peduncles* mostly terminal, often opposite, 1 in., 1-7-fld.; bracts 1 in., elliptic-lanceolate scarlet as are the pedicels and calyces. *Sepals* nearly free, deciduous. *Corolla* nearly glabrous without, lower lip with reflexed lobes. *Filaments* exserted, minutely glandular-hairy. *Capsule* 4-6 in.

18. *Æ. Kingii*, *Clarke*; glabrous, leaves large long elliptic herbaceous, peduncles 3-7-fld., calyx-lobes $\frac{1}{2}$ in. lanceolate caudate-acuminate green.

SIKKIM; alt. 6000 ft., *King*.

Leaves $7\frac{1}{2}$ by 3 in., base broadly rhomboid; nerves 7-8 pair. *Peduncles* 3-nate, 2-2 $\frac{1}{2}$ in.; bracts caducous. *Calyx* persistent in young fruit, base shortly funnel-shaped, membranous. *Corolla* not seen. *Seeds* with one hair at each end.—Seems nearly allied to *Æ. bracteata*, but the texture is very unlike.

19. *Æ. superba*, *Clarke Comm. & Cyrt. Beng.* t. 46; glabrous, leaves large oblong acuminate, umbels dense few-fld., sepals 1 in. broad-oblong obtuse, corolla 2 $\frac{1}{4}$ in. rose-red. *Æ. longiflora*, *Wall. Cat.* n. 795, not of *Blume*.—*Æschynanthus* sp. n. 4, *Herb. Ind. Or. H. f. & T.* *Cyrtandracea*, *Griff. Ic. Pl. Ind. Or.* t. 431, and *Notul.* iv. 160, and *Itin. Notes*, 43, n. 677.

KHASIA MTS., alt. 1500-4000 ft., frequent; *Wallich, Griffith, H. f. & T.*, &c. ASSAM; *Mrs. Mack*.

Stems several fathoms long, branched, scrambling among rocks. *Leaves* 6 by 2 in., base cuneate or rounded; petiole $\frac{1}{2}$ in. *Peduncles* 1 in., terminal and on short axillary spurs, stout; bracts $\frac{3}{4}$ -2 in., ovate-oblong, deciduous, rose-red as is the whole inflorescence; pedicels 1-6, 0- $\frac{3}{4}$ in., subumbelled. *Sepals* thin, deciduous. *Corolla* tubular, curved, mouth slightly oblique. *Filaments* exserted, minutely glandular-hairy. *Capsule* 12-16 in.

Sect. 4. **Holocalyx.** Seed with an apophysis of hyaline large cells and one hair at the hilum, and one hair at the apex. *Calyx* not deeply lobed.—[*Peduncles* short, 2-fld., axillary and terminal, often crowded near

the ends of the branches, at length clavate; bracts 2, small, ovate, deciduous; pedicels longer than the peduncles. Corolla-lobes ovate, obtuse; 2 upper erect, connate; 3 lower reflexed. Filaments glabrous; ovary and style densely glandular-hairy. Flowers (at least in several species), dimorphic, some with the stigma low down in the corolla-tube, others with the stigma exserted; stamens in both about as long as the corolla.]

* *Calyx tubular, longer than broad.*

20. **Æ. radicans**, *Jack in Trans. Linn. Soc.* xiv. 43, *not of Wall.*; stem thinly hairy, leaves small ovate or oblong thinly hairy or glabrate beneath, calyx $\frac{1}{2}$ in. hairy, corolla $2\frac{1}{2}$ in. hairy without. *DC. Prodr.* ix. 262. *Trichosporum radicans*, *Nees in Flora*, 1825, 144; *Blume Bijl.* 764.

MALACCA; *Griffith.*—DISTRIB. From Sumatra to the Philippines.

Stem slender, branching, rooting, hairs spreading fulvous deciduous. *Leaves* 1 by $\frac{3}{4}$ in. ovate, or 2 by $\frac{3}{4}$ in. on the same branch; petiole $\frac{1}{4}$ in. *Peduncles* $0\frac{1}{2}$ in. pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., villous. *Calyx* subcylindric, somewhat densely covered with spreading, white, multicellular hairs; teeth scarcely $\frac{1}{2}$ in., broadly triangular. *Corolla* scarlet, throat yellow. *Capsule* 5–8 in.

21. **Æ. Lobbiana**, *Hook. Bot. Mag. t.* 4260; leaves small elliptic-oblong glabrous, calyx $\frac{3}{4}$ in. deep purple with white hairs, corolla 2 in. pubescent without.

MALACCA; *Maingay* (*Kew Distrib.* nn. 1218, 1219).—DISTRIB. Java, Borneo.

Branches pendent, glabrous. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ – $\frac{3}{4}$ in., scarcely acute, base rounded, when fresh minutely ciliate, dry glabrous; petiole $\frac{1}{2}$ in., obscurely pilose or glabrous. *Peduncles* axillary and clustered at the ends of the branches, recurved. *Calyx* tubular, scarcely $\frac{1}{2}$ in. diam. upwards, densely covered with spreading glistening hairs; teeth very shallow. *Corolla* scarlet, throat yellow.

** *Calyx obconic broader than long.*

22. **Æ. Wallichii**, *Br. in Benn. Pl. Jav. Rar.* 116; leaves elliptic acuminate or lanceolate glabrous, calyx broadly cup-shaped subentire, corolla 1 in. villous without. *Æ. radicans*, *Wall. Cat.* 798, *type sheet only, not of Jack.*—*Æschynanthus* sp. n. 16, *Herb. Ind. Or. H. f. & T.*

SINGAPORE; *Wallich.* MALACCA; Mt. Ophir, *Lobb.*—DISTRIB. Sumatra.

Stems long, branched, terete, glabrous. *Leaves* 4 by $1\frac{1}{2}$ in., base cuneate or suddenly narrowed, coriaceous; petiole $\frac{1}{4}$ in. *Peduncles* $0\frac{1}{2}$ in.; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., sparsely hairy. *Calyx-mouth* $\frac{1}{4}$ – $\frac{1}{2}$ in. wide, margin patent. *Corolla* probably crimson. *Capsule* 6 in.

23. **Æ. obconica**, *Clarke*; leaves broadly elliptic narrowed at both ends glabrous, calyx very large obconic hairy subentire, corolla $\frac{3}{4}$ in. villous without.

Peninsula of MALACCA; at Klang in Selangore, *Beccari.*

Calyx $\frac{1}{2}$ in. and upwards in length, otherwise very like *Æ. Wallichii*, in which the corolla is thrice as long as the calyx, whereas in *Æ. obconica* the corolla is much less than twice the calyx.

II. **LYSIONOTUS**, *D. Don.*

Glabrous, epiphytic shrubs. *Leaves* opposite, or ternate, similar. *Cymes* peduncled, many-fld., lax; bracts herbaceous, inconspicuous; bracteoles small. *Sepals* narrowly lanceolate. *Corolla* tubular, inflated at

the middle, straight, 2-lipped; lower lip with 2 folds within. *Stamens* 2 perfect (2 or 3 rudimentary), subincluded; filaments flattened, bent; anthers connivent, connective with an oblong process. *Disc* annular. *Ovary* superior, stipitate, linear; style as long as the stamens, stigma shortly 2-lobed; placentæ deeply inflexed, then recurved and ovuliferous. *Capsule* linear, in the following year splitting loculicidally to the base into 2 (ultimately 2-partite) valves. *Seeds* small, oblong, smooth, with a hair at the apex, pendent by a funicle which when detached resembles the apical hair.—Species 3, in N. India, China and Japan.

1. ***L. serrata***, *D. Don in Edinb. Phil. Journ.* vii. 85, and *Prodr.* 124; leaves elliptic acuminate crenate-serrate or lanceolate herbaceous sinuate, sepals narrowly lanceolate thin. *Bot. Mag.* t. 6538. *L. ternifolia*, *Wall. Pl. As. Kar.* ii. 20, t. 118; *A. DC. Prodr.* ix. 264; *Clarke Comm. & Cyrt. Beng.* t. 52. *Calosacme polycarpa*, *Wall. Cat.* 804.

SUBTROPICAL HIMALAYA, alt. 2-7000 ft.; from Kumaon to Bhotan, common, *Wallich*, &c. ASSAM and KHASIA MTS., alt. 1-4000 ft., common.

Stem 12 in., branched. *Leaves* often ternate, 6 by 2 in., from narrow-lanceolate to elliptic, closely serrate nearly to the base or sinuate; nerves prominent, oblique; petiole $\frac{1}{2}$ in. *Peduncles* often 4 in.; bracts $\frac{1}{2}$ in., ovate; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. *Sepals* $\frac{1}{4}$ in., in young fruit often enlarged $\frac{1}{2}$ – $\frac{3}{4}$ in. and somewhat connate at the base. *Corolla* 1 in., deep purple or paler, or white with purplish veins. *Capsule* 2-4 in.

2. ***L. conferta***, *Clarke*; branches long, leaves elliptic acuminate subentire very coriaceous. *Æschynanthus conferta*, *Griff. Priv. Journ.* p. 63, *name only*.

S.E. ASSAM; Patkoye Mts., *Griffith* (Kew Distrib. n. 3819).

Branches 18 in. and more, straight, undivided. *Leaves* ternate, entire, minutely crenate towards the apex; nerves obscure, at right angles to the midrib. *Peduncles* and *capsules* nearly as of *L. serrata*; remains of the calyx somewhat coriaceous. *Flowers* not seen.—This may be a var. of *L. serrata*, but no form of this is known with similarly elongate branches and coriaceous leaves.

III. **LOXOSTIGMA**, *Clarke*.

An undershrub, often rooting near the base; branches long. *Leaves* opposite, often unequal, serrate, pilose. *Cymes* peduncled, lax, many-fld.; bracts and bracteoles small. *Sepals* 5, lanceolate. *Corolla* tubular, inflated above the base, straight, yellow; lobes 5, spreading. *Stamens* 4, didynamous, included; anthers 2-celled, connivent in pairs; connective not excurrent; cells elliptic, subparallel. *Ovary* shortly stalked, linear, glabrous; stigma unilateral, obscurely bifid; placentæ deeply inflexed, bifid, revolute. *Capsule* linear, loculicidal for its whole length; placentæ revolute covering the seeds. *Seeds* pendulous, funicle capillary with a single hair at the apex.

L. Griffithii, *Clarke*; leaves elliptic subfalcate acuminate serrate, sepals oblong acute green sometimes denticulate. *Didymocarpus Griffithii*, *Wight Ill.* ii. 182, t. 159, *bad*. *Dichrotrichum Griffithii*, *Clarke Comm. & Cyrt. Beng.* t. 51. *Chirita Griffithii*, *Herb. Ind. Or. H. f. & T.*

SUBTROPICAL HIMALAYA, alt. 3-6000 ft.; from Sikkim to Mishmee, frequent, *Griffith*, *Hook. f.*, &c. KHASIA MTS., alt. 2-4000 ft., *Griffith*, *H. f. & T.*

Thinly pubescent. *Leaves* opposite, often unequal, 7 by 3 in., base acute or unequally rhomboid; petiole $\frac{1}{2}$ – $1\frac{1}{2}$ in., often unequal. *Peduncles* 2-4 in.; bracts $\frac{1}{2}$ in., narrow; pedicels $\frac{1}{4}$ –1 in. *Sepals* $\frac{1}{4}$ in. *Corolla* $1\frac{1}{4}$ by $\frac{1}{2}$ in., minutely hairy. *Anthers* conni-

vent in pairs, connective not appendaged. *Style* subsistent. *Capsule* 2½–5 in.—Wight's example of this was from Griffith in early flower; in his picture cited he guessed the colour of the flower wrong, and added a figure of a seed of some species (probably) of *Didymocarpus*; the figure thus concocted has defied identification until Griffith's specimen in Wight's Herbarium was found.

IV. **DIDYMOCARPUS**, Wall.

Stemless or erect herbs. *Leaves* opposite, alternate, 3–4-nate or crowded. *Peduncles* axillary, many- or few-fld.; bracts rarely conspicuous; pedicels cymose, subumbelled or subracemed in pairs. *Calyx* small, 5-fid or nearly partite. *Corolla-tube* cylindric or ovoid, mouth oblique or subsymmetric; lobes 5, rounded. *Stamens*, 2 perfect, 2–3 rudimentary; filaments glabrous, bent; anthers cohering in pairs; cells 2, ovate, early confluent. *Disc* cylindric or 0. *Ovary* stalked or sessile, narrow; style long or short, stigma peltate emarginate or unilateral oblong rarely 2-lobed; placenta deeply inflexed, then recurved bearing ovules. *Capsule* linear, rarely lanceolate, loculicidally 2-valved or subfollicular, ultimately usually 2- often 4-valved; valves not twisted before dehiscence; placenta on the valves, revolute, concealing the seeds. *Seeds* ellipsoid, small, smooth, minutely reticulate.—DISTRIB. Species 70, in India, Malaya and S. China, 1 in Madagascar.

Sect. 1. **Monophylloides**. Plant very small, 1-leaved.

1. **D. pygmæa**, Clarke; leaf sessile elliptic base cordate, pedicels few short fascicled in its axil.

CENTRAL INDIA; Rewah, Vicary. Chota Nagpore; Lohardugga, Clarke.

Pubescent. *Stem* ½–2 in., slender, curved, bearing one leaf at its apex. *Leaf* (one cotyledon persistent?) 1 by ½ in. or much smaller, falcate, obtuse at both ends, sinuate scarcely crenate, thin; petiole 0 rarely ⅓ in. *Pedicels* ¼ in.; bracts inconspicuous or 0. *Sepals* ⅓ in., linear, somewhat enlarged in fruit. *Corolla* ¼ in., tubular. *Stamens* 2 fertile, 2 linear rudiments, glabrous; anther-cells 2, ovate, oblique, scarcely confluent by their tips. *Ovary* and style villous; stigma small, subcapitate, scarcely 2-lobed. *Capsule* ½–¾ in., nearly straight; 2-valved, and seeds altogether as in *Didymocarpus*.

Sect. 2. **Eudidymocarpus** (Benth. in Gen. Pl. ii. 1022). *Cymes* many-fld., subcorymbose. *Calyx* 5-lobed, or in *D. Mortonii* nearly 5-partite. *Corolla-tube* cylindric.—Species confined to N. and N.E. India.

2. **D. pedicellata**, Br. in Benn. Pl. Jav. Rar. 118; stem hardly any, leaves roundly ovate glabrous glandular-punctate above, calyx divided one-third the way down lobes rounded, capsule 1–1½ in. long-pedicelled. DC. Prodr. ix. 267; Clarke Comm. & Cyrt. Beng. t. 64. *D. macrophylla*, Wall. Cat. 784, partly; Royle Ill. 294, t. 70, fig. 1.

SUBTROPICAL W. HIMALAYA; from Chumba to Kumaon, alt. 2500–5500 ft., frequent, Wallich, Royle, Falconer, &c.

Stem usually 0, sometimes 1½ in. with 2 or 3 pairs of opposite cauline leaves, glabrous; innovations scabrous-puberulous. *Leaves* usually all radical, 3–6 in. diam., crenate-serrate, the points on their upper surface conspicuous black, in age colourless obscure without a lens; petiole 2–5 in. *Scapes* 4 in.; flowers often very many; bracts ¼ in., ovate, often shortly connate. *Calyx* ¼ in., funnel-shaped. *Corolla* nearly 1 in., purple. *Capsule-stalk* ¼–½ in., filiform.

3. **D. macrophylla**, Wall.; Don Prodr. 122; stemless, leaves ovate

softly hairy above glabrate beneath, calyx divided one-third the way down lobes obtuse, capsule nearly 1 in. sessile. *Wall. Cat.* 784, *ch. efly*; *DC. Prodr.* ix. 267; *Clarke Comm. & Cyrt. Beng.* t. 63, *not of Royle*. *D. aromatica*, *Wall. Pl. As. Rar.* t. 141, fig. 4-7, *only*; *Clarke Comm. & Cyrt. Beng.* t. 59, *as to the fruiting plant only*; *not of others*. *D. plicata*, *Don Prodr.* 122. *Henckelia macrophylla & plicata*, *Spreng. Syst., curæ post.* 13, 14.

NEPAL; *Wallich*.

Leaves all radical, 3-6 in. diam., crenate-serrate; petiole 2-5 in., hairy at the base. *Scapes* 4 in., early glabrate; bracts $\frac{1}{2}$ in., ovate. *Calyx* $\frac{1}{2}$ in., funnel-shaped. *Corolla* $\frac{3}{4}$ - $\frac{2}{3}$ in., deep purple. *Ovary* covered with minute sessile glands. *Capsule* narrowed at its base for $\frac{1}{5}$ in. only.—In ripe fruit the scape is glabrous, the two young leaves at its base are densely villous.

4. **D. cinerea**, *Don Prodr.* 122; stem short or 0, leaves ovate-cordate ashy-pubescent above, calyx divided a third of the way down lobes ovate, capsule $1\frac{1}{2}$ in. pedicelled. *D. obtusa*, *Wall. Cat.* 786; *DC. Prodr.* ix. 267; *Clarke Comm. & Cyrt. Beng.* t. 61. *Henckelia cinerea*, *Spreng. Syst., curæ post.* 14.—*Didymocarpus* sp. n. 19, *Herb. Ind. Or. H. f. & T.*

NEPAL, *Wallich*; near River Tambur, *J. D. H.*

Stem none, or $\frac{1}{2}$ in., ashy-pubescent. *Leaves* radical or opposite, 2-3 $\frac{1}{2}$ in. diam., obtuse, crenate, glabrate beneath, nerves pubescent; petiole 4-8 in. *Peduncles* $\frac{1}{2}$ -2 in.; shorter (cymes included) than the leaves, pubescent, later hardly glabrate; bracts $\frac{1}{2}$ in., ovate, ashy-pubescent on both surfaces. *Calyx* $\frac{1}{2}$ in., subcampanulate, sparsely pubescent; teeth obtuse or mucronulate. *Corolla* nearly 1 in., purple paler downwards, sparsely villous or glabrous.

5. **D. Andersoni**, *Clarke Comm. & Cyrt. Beng.* t. 62; stem short 2-4-leaved, leaves ovate-cordate hairy above and on the nerves beneath, flowers capitellate subincluded within purple connate bracts, calyx-lobes very short obtuse, capsule 1 in. sessile.

SIKKIM; alt. 7-9000 ft., *J. D. H.* Kursiong, alt. 4500 ft., *Anderson, &c.*

Stem $\frac{1}{2}$ -1 $\frac{1}{2}$ in., patently villous, at flower-time leafless at the base, with 2 large and usually 2 small leaves at its apex. *Leaves* opposite 6 by 4 in., coarsely crenate-serrate; petiole $\frac{3}{4}$ -1 $\frac{1}{2}$ in. *Peduncles* 3-7 in., villous; bracts $\frac{1}{2}$ in., obovate and with the whole cyme dark purple-red; pedicels very short, concealed by the bracts. *Calyx* $\frac{1}{2}$ - $\frac{3}{4}$ in., funnel-shaped, glabrous, divided scarcely $\frac{1}{2}$ the way down. *Corolla* more than 1 in., fine rose-purple, tube very narrow, mouth 1 in. diam. *Ovary* glabrous. *Capsule* very acute.

6. **D. aurantiaca**, *Clarke Comm. & Cyrt. Beng.* t. 60; stem short 2-4-leaved, leaves ovate villous above, flowers pedicelled orange-red, calyx divided nearly half-way down, capsule $1\frac{1}{2}$ in. pedicelled.

NEPAL; *Wallich*. SIKKIM, alt. 2-4000 ft., *Herb. Griffith, Anderson, &c.*

Stem $\frac{1}{2}$ -2 $\frac{1}{2}$ in., villous. *Leaves* opposite, 3-6 in., acute or obtuse, usually cordate, serrate, beneath glabrous with villous nerves; petiole $\frac{3}{4}$ -2 $\frac{1}{2}$ in. *Peduncles* 4 in., hairy, ultimately scarcely glabrous; bracts $\frac{1}{2}$ in., ovate, scarcely connate; pedicels often 1 in. *Calyx* $\frac{1}{2}$ in., campanulate, more or less purple, glandular-viscid or nearly glabrous. *Corolla* $1\frac{1}{2}$ in., long funnel-shaped. *Ovary* glabrous. *Capsule-stalk* $\frac{1}{2}$ in., linear.

7. **D. oblonga**, *Wall. in Don Prodr.* 123; stem often 4-leaved at the apex, leaves oblong or elliptic coarsely crenate pilose, petioles patently villous, cyme glabrous, calyx divided one-third way down lobes rounded, capsule $\frac{1}{2}$ in. subsessile. *Wall. Pl. As. Rar.* ii. 34, t. 140; *DC. Prodr.* ix. 266;

Clarke Comm. & Cyrt. Beng. t. 56. D. verticillata, Wall. Cat. 783. Henckelia oblonga, Spreng. Syst. curæ post. 13.

NEPAL; Wallich. SIKKIM; Lachen, alt. 7–11,000 ft., and Sinchul, alt. 8500 ft., *J. D. H.*

Stem 2–5 in., villous-pubescent, at flower-time with 4 subverticillate leaves at its apex otherwise leafless; or elongate with 3 or 4 remote nodes, opposite leaves, and both axillary and terminal peduncles. *Leaves* opposite, 4 by $1\frac{1}{2}$ in., subobtusely, closely villous above, glabrous beneath with villous nerves; petiole $\frac{1}{2}$ – $2\frac{1}{2}$ in., patently villous. *Peduncles* 2 in., glandular-pilose, glabrate upwards; bracts $\frac{1}{2}$ in., broad, connate, glabrous, coloured, subpersistent. *Calyx* $\frac{1}{2}$ in., campanulate. *Corolla* $\frac{1}{2}$ in., dark purple.—Recognized by its small capsule.

8. **D. villosa**, *Don Prodr. 123*; stem 4-leaved at the apex very villous, leaves ovate or obovate obtuse crenate closely silky-villous above, cymes glabrous, calyx divided less than half-way down lobes obtuse, capsule nearly $\frac{3}{4}$ in. sessile. *DC. Prodr. ix. 266, not of Clarke. Henckelia villosa, Spreng. Syst. curæ post. 13.*

NEPAL; Wallich.

Stem 2–6 in., densely covered with long spreading hairs, leafless except at the apex. *Leaves* opposite, 2 by $1\frac{1}{2}$ in., beneath villous or nearly glabrous on the lamina; petiole 0– $\frac{1}{2}$ in., patently villous. *Peduncles* 1–3 in.; bracts $\frac{1}{2}$ in., ovate, connate, coloured, glabrous; pedicels $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in., campanulate, glabrous. *Corolla* $\frac{1}{2}$ in. or rather more (apparently black-purple).—Seems very near *D. aromatica*, Wall., which has not the densely woolly stem.

9. **D. aromatica**, *Wall. Cat. 785 chiefly, Pl. As. Rar. ii. 41, t. 141, excl. fig. 4–7*; stem 4-leaved at the apex, leaves ovate or elliptic crenate softly hairy above, lower bracts herbaceous more or less pubescent, cyme glabrous, calyx divided one-third way down lobes rounded, capsule $\frac{3}{4}$ in. sessile. *Clarke Comm. & Cyrt. Beng. t. 59, excl. fruiting plant; not of D. Don; DC. Prodr. ix. 267, partly. D. primulifolia, Don Prodr. 123, partly. Henckelia primulifolia, Spreng. Syst., curæ post. 14, partly.*

NEPAL; Wallich.

Stem 4–6 in., pilose, leafless except at the apex. *Leaves* opposite, 4 by $2\frac{1}{2}$ in., densely softly strigose on both surfaces or glabrate between the nerves beneath; petiole unequal, $\frac{1}{4}$ –2 in. *Inflorescence* shorter than the leaves; peduncles (usually 2) 1–2 in.; lower bracts $\frac{1}{2}$ in., ovate, green, not connate, often denticulate, deciduous; cymes upwards with the pedicels and calyces glabrous. *Calyx* $\frac{1}{2}$ in., campanulate. *Corolla* $\frac{3}{4}$ in., purple, nearly glabrous. *Capsule-stalk* hardly $\frac{1}{18}$ in.—Don confused *D. aromatica*, Wall., with *D. subalternans*, Pl., and described his *D. primulifolia* from both; Brown therefore (in Benn. Pl. Jav. Rar. p. 118) rejected the name *D. primulifolia*.

10. **D. podocarpa**, *Clarke*; stem 4-leaved at the apex, leaves ovate or elliptic crenate minutely pilose above, bracts glabrous, calyx divided $\frac{1}{2}$ way down lobes obtuse, capsule 1– $1\frac{1}{2}$ in. pedicelled.

SUBALPINE SIKKIM; Lachen, alt. 10–12,000 ft., *J. D. H.*; Sinchul, alt. 8000 ft., *J. D. H.*; Singalelah, alt. 8000 ft., *Treutler, &c.*

Stem 2–8 in., ashy-pubescent, leafless except at the summit. *Leaves* opposite, attaining 6 by 4 in., pubescent only on the nerves beneath; petiole 0–1 in., mostly short. *Peduncles* 2–4, 1– $2\frac{1}{2}$ in.; bracts $\frac{1}{2}$ in., wide-rotund, coloured, subconnate; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., glabrous. *Calyx* nearly $\frac{1}{2}$ in., campanulate. *Corolla* nearly 1 in., purple, glabrous or sparsely pilose without. *Capsule-stalk* longer than, sometimes nearly twice as long as, the calyx.—Differs from the 3 preceding closely allied species by the larger flowers and larger long-pedicelled capsule.

11. **D. subalternans**, *Wall. Cat. 782*; leaves scattered and opposite

ovate or obovate crenate densely pubescent above paler subglabrous beneath, cymes irregular subumbellate viscous-pilose, pedicels short, calyx $\frac{1}{2}$ in. semi-5-fid lobes ovate-triangular, capsule 1 in. pedicelled. *DC. Prodr.* ix. 266, *not of Clarke*. *D. primulifolia*, *Don Prodr.* 123, *partly*. *D. aromatica*, *Don Prodr.* 123; *DC. Prodr.* ix. 267, *excl. all syn., not of Wall., Br., nor Clarke*.

TEMPERATE HIMALAYA; Kumaon, *Wallich*; near Gangootri, alt. 6500 ft., *Strachey & Winterbottom*. Nepal; *Wallich*.

Stem 4-12 in., nearly glabrous; nodes several. *Leaves* opposite alternate and ternate, lower long-petioled (usually alternate), uppermost sessile opposite, 3 by 2 in. *Peduncles* 1-1 $\frac{1}{2}$ in., subumbelled; bracts $\frac{1}{2}$ in., ovate, purplish; pedicels $\frac{1}{4}$ in., sparsely viscous-pilose. *Calyx* funnel-shaped, purplish, glabrous or slightly viscous. *Corolla* $\frac{1}{2}$ in., tubular, somewhat hairy without, purple or pale-purple. *Capsule* often falcate; pedicels up to $\frac{1}{2}$ in.

VAR. curvicapsa; leaves larger, cymes very viscous, bracts and calyx herbaceous, capsule falcate subsessile.—Sikkim; Lachen, alt. 7-8000 ft., *J. D. H.*—Stem exceeding 1 foot. *Leaves* 4 in., glandular-pubescent. *Calyx* $\frac{1}{2}$ in., divided half-way down; lobes lanceolate, acute. *Capsule-stalk* not longer than the calyx.

12. ***D. leucocalyx***, *Clarke*; leaves ovate serrate villous above, calyx small deeply divided lobes white obovate, capsule $\frac{1}{2}$ in. subsessile. *D. villosa*, *Clarke Comm. & Cyrt. Beng.* t. 59, *not of Don*.—*Didymocarpus* sp. n. 17, *Herb. Ind. Or. H. f. & T.*

SIKKIM; alt. 6000 ft., common, *Griffith, J. D. H., &c.* NEPAL; near River Tambur, *J. D. H.*

Stem 2-6 in., hairs patent or deflexed; nodes 1-3. *Leaves* opposite, attaining 6 by 4 in., subacute, often cordate; petiole $\frac{1}{2}$ -4 in. *Peduncles* 2 in., often 4, subumbelled; cyme nearly glabrous, bracts caducous leaving a villous scar. *Flowers* numerous, small. *Calyx* $\frac{1}{10}$ in. *Corolla* $\frac{1}{2}$ - $\frac{1}{2}$ in., violet-purple. *Anthers* minutely pilose.—This plentiful Sikkim species has always been confounded with *Don's D. villosa*.

13. ***D. Mortonii***, *Clarke Comm. & Cyrt. Beng.* t. 65; leaves ovate serrate villous above, calyx divided nearly to the base lobes narrowly oblong, corolla-tube linear limb very oblique wide-expanded, capsule nearly 1 in. sessile.—*Didymocarpus* sp. n. 29, *Herb. Ind. Or. H. f. & T.*

SIKKIM, alt. 5-8000 ft., common, (*Herb. Griffith*), *J. D. H., &c.*

Stem 2-6 in., pilose; nodes 1-3. *Leaves* opposite, attaining 6 by 4 in., scarcely acute, base rounded or cordate; petiole $\frac{1}{2}$ -3 in. *Peduncles* 2-3 in., often several; bracts caducous; bracteoles ovate, green, often concealing the calyx until the flower expands. *Calyx* $\frac{1}{8}$ - $\frac{1}{2}$ in. *Corolla-tube* $\frac{1}{2}$ by $\frac{1}{10}$ in., limb $\frac{1}{2}$ - $\frac{2}{3}$ in. diam., purple. *Ovary* glandular-hairy. *Capsule* straight.

14. ***D. pulchra***, *Clarke*; stem and petioles ashy-puberulous, leaves oblong or elliptic minutely densely pubescent above whitened glabrate beneath, cyme viscous-hairy, calyx divided $\frac{1}{2}$ way down lobes triangular acute, corolla 1 in., capsule 1 $\frac{1}{2}$ in. pedicelled. *D. subalternans*, *Clarke Comm. & Cyrt. Beng.* t. 55, *not of Wall.*

SIKKIM, alt. 6-7000 ft., common, (*Herb. Griffith*), *J. D. H., &c.*

Stem attaining 1 foot; lower cauline leaves long-petioled, often 3-4-nate, uppermost sessile. *Leaves* 4 $\frac{1}{2}$ by 2 in., acute, base often auricled on one side, crenate incised-serrate or nearly entire, coriaceous; nerves beneath raised, pubescent; petiole attaining 2-3 in. *Peduncles* 2-3 in.; bracts more or less foliaceous; bracteoles $\frac{1}{2}$ in., round, coloured; pedicels $\frac{1}{2}$ in. *Calyx* $\frac{1}{4}$ in., rose-purple, viscous-pilose. *Corolla* broadly tubular, sparsely hairy without, violet-purple. *Anthers* minutely hairy. *Ovary* glabrous. *Capsule-stalk* stout, longer than the calyx.—Nearly allied to *D. punduana*.

15. **D. punduana**, *Wall. Cat.* 777; stem and petioles ashy-pubescent, leaves oblong or elliptic crenulate or nearly entire densely puberulous above glabrate whitened beneath, calyx divided $\frac{1}{2}$ the way down lobes ovate obtuse, capsule $1\frac{1}{2}$ in. pedicelled. *DC. Prodr.* ix. 267; *Clarke Comm. & Cyrt. Beng.* t. 53.—*Didymocarpoid* n. 971, *Griff. Itin. Notes*, 63.

KHASIA Mts., alt. 2-4000 ft., frequent; *Wallich, Griffith, H. f. & T., &c. ASSAM*; *Griffith, Mrs. Mack.*

Stem 8-10 in., often with 3-4 petioled leaves in a whorl in its middle and 2 sessile leaves at its apex. *Leaves* coriaceous, base often unequally cordate, glabrous beneath or minutely pubescent on the nerves. Rays of the *cyme* and pedicels subumbellate, less viscous-hairy than in *D. pulchra*. *Calyx* $\frac{1}{6}$ in., nearly glabrous. *Corolla* very sparsely hairy, purple. *Capsules* slightly curved; pedicels $\frac{1}{4}$ in.—Otherwise as *D. pulchra*.

VAR. attenuata; leaves less coriaceous often cuneate at the base, cymes slenderer, bracts narrower, calyx scarcely $\frac{1}{2}$ in., capsule slender pedicel filiform very long.—*Khasia Mts.*, alt. 3-5000 ft., especially in the northern portion of the hills; *Griffith, H. f. & T., &c.*—This may be specifically distinct, for both the capsule and calyx differ, but there are intermediate examples.

16. **D. Hookeri**, *Clarke Comm. & Cyrt. Beng.* t. 54; stem and petioles villous, leaves ovate crenulate softly villous above glabrate (except the nerves) beneath, calyx divided $\frac{1}{2}$ the way down, corolla $\frac{1}{2}$ in. pale, capsule $1\frac{1}{2}$ in.—*Didymocarpus* sp. n. 21, *Herb. Ind. Or. H. f. & T.*

KHASIA Mts., alt. 5000 ft.; Kollong Rock, Moflong, Boga Pani, *H. f. & T., &c.*

Stem 16 in., with usually 3-4 petioled verticillate leaves in the middle, uppermost leaves subsessile. *Leaves* 4 by 3 in. (sometimes much larger), subobtusely, often cordate; petiole $\frac{1}{2}$ -3 in. *Cymes* sparsely hairy; bracts $\frac{1}{2}$ in., round; pedicels 0- $\frac{1}{2}$ in., usually short. *Calyx* $\frac{1}{4}$ in., campanulate. *Corolla* tubular, pale yellow with rose-marks or nearly white. *Capsule* (appearing sessile) narrowing downwards gradually into a thick pedicel.

17. **D. acuminata**, *Br. in Benn. Pl. Jav. Rar.* p. 118; leaves ovate acute serrulate hairy above, calyx tubular glabrous scarcely lobed, corolla $1\frac{1}{2}$ in. tube inflated upwards, capsule 1 in. pedicelled. *DC. Prodr.* ix. 267; *Clarke Comm. & Cyrt. Beng.* t. 58. *Calosacme acuminata*, *Wall. Cat.* 802, partly. *Chirita acuminata*, *A. DC. Prodr.* ix. 269, not of *Br.*—*Chirita* sp. n. 9, *Herb. Ind. Or. H. f. & T.*

KHASIA Mts.; alt. 4000 ft., near Churra, *Wallich, J. D. H. & T. T., &c.*

Stem 6 in., hairy; nodes 1-3. *Leaves* opposite alternate and verticilled, often very unequal, larger 10 by $5\frac{1}{2}$ in., subcordate, glabrous beneath except on the nerves; petiole attaining 4 in. *Peduncles* 1-4, $\frac{2}{3}$ - $1\frac{1}{2}$ in.; cymes 5-8-fl., nearly glabrous; bracts $\frac{1}{2}$ in., glabrous; pedicels $\frac{1}{10}$ - $\frac{1}{3}$ in., mostly short. *Calyx* $\frac{1}{4}$ in. and upwards. *Corolla* glabrous, white or very pale purple; lobes $\frac{1}{4}$ - $\frac{1}{2}$ in., round. *Stamens*, 2 fertile, 2 rudimentary. *Ovary* glabrous; stigma peltate, oblique scarcely emarginate.—The corolla is that of *Chirita*, the capsule of *Didymocarpus*; the stigma is nearly as in *Chirita Kurzii*, from which it can hardly be generically separated.

18. **D. platycalyx**, *Clarke*; leaves oblong or elliptic crenate softly hairy, peduncles 1-5-fl., calyx widely campanulate subentire, corolla 1 in.

TENASSERIM; Moulmein, *Parish.*

Stem 6 in., hairy; nodes 1-3. *Leaves* opposite, 2-4 by $1\frac{1}{4}$ in., subacute, base cuneate or rounded, puberulous beneath; petiole $\frac{2}{3}$ -1 in. *Peduncles* $\frac{2}{3}$ in., axillary, solitary, nearly glabrous; bracts $\frac{1}{4}$ in., broadly orbicular, green, puberulous; pedicels $\frac{1}{2}$ in., puberulous. *Calyx* $\frac{1}{4}$ in., nearly hemispherical; margin undulated, purplish.

Corolla glabrous, tube cylindric violet, limb slightly oblique white; lobes $\frac{1}{4}$ in. diam., obtuse. *Stamens* 2 fertile; anthers oblong-peltate, cohering. *Ovary* minutely hairy, pedicelled elongate; style hardly any, stigma large circular. *Capsule* not seen.

Sect. 3. **Didymanthus**. Caulescent, - sometimes but shortly. *Leaves* distant, upper (at least) opposite. *Peduncles* long; cyme-branches often elongate, subracemose with 2-nate pedicels. *Calyx* sub-5-partite. *Corolla* small or middle-sized; tube narrow or broad at the base. *Disc* 0 or shortly cylindric. *Capsule* 2-valved, rarely at first follicular.—Species of the Malay Peninsula and adjacent islands.

19. **D. mollis**, *Wall. Cat.* 790; leaves elliptic crenate narrowed at both ends hairy above, peduncles long, cyme lax viscous-pubescent, capsule nearly $\frac{3}{8}$ in. sessile. *DC. Prodr.* ix. 266.

BURMA; Mts. near Prome, *Wallich*. CHITTAGONG; at Seetakoond, *J. D. H. & T. T.*

Stem 8 in., villous, near the base hirsute with fulvous deflexed hair. *Leaves* opposite, or the 4 uppermost subverticillate, 4 by $1\frac{1}{2}$ in., acute, membranous, glabrate, beneath hairy on the nerves; nerves 9–11 pair; petiole $\frac{1}{2}$ in., or of the uppermost leaves 0. *Peduncles* subterminal, often 4, 3 in., 12-fld.; pedicels $\frac{1}{8}$ in. *Sepals* $\frac{1}{10}$ in., linear. *Disc* shortly cylindric. *Capsule* symmetrically 2-valved glabrous. *Corolla* not seen.

20. **D. paucinerva**, *Clarke*; leaves elliptic or obovate obtuse crenulate hairy above, peduncles subterminal long, cyme 2–8-fld. lax nearly glabrous, capsule rather more than $\frac{1}{2}$ in. subsessile.

TENASSERIM; at Mergui, *Griffith* (*Kew Distrib.* n. 3853).

Stem 6 in., slender, simple, sparingly pilose except near the base. *Leaves* opposite (or the lower alternate), 2 by 1 in., closely shortly strigose above, glabrous whiter beneath; nerves 5–6 pair, puberulous; petiole $\frac{1}{8}$ –1 in. *Peduncles* 2 in., slender; pedicels $\frac{1}{10}$ – $\frac{1}{3}$ in. *Disc* shortly cylindric. *Capsule* 2-valved, glabrous. *Corolla* not seen.—Appears closely allied to *D. mollis*.

21. **D. cordata**, *Wall. Cat.* 781; leaves cordate deeply crenate fulvous villous on both surfaces, peduncles long, cymes lax subracemose, pedicels distant often in pairs, corolla wide campanulate base gibbous. *DC. Prodr.* ix. 265.

PENANG; *Wallich, Maingay*, n. 1224.

Stem 20 in., fulvous-villous. *Leaves* (at least the upper) opposite, 6 by 4 in., shortly acuminate, base rounded; petiole $1\frac{1}{2}$ in. *Peduncles* 8 in.; cymes often 6 in., glandular-hairy; bracts small, ovate, caducous; pedicels $\frac{1}{2}$ in. *Sepals* $\frac{1}{8}$ in., lanceolate, nearly glabrous. *Corolla-tube* $\frac{1}{4}$ in. long and broad, glabrous; lobes $\frac{1}{4}$ in. diam., round. *Filaments* short; anthers large, 4 cohering. *Disc* 0. *Ovary* glabrous, sessile; style glabrous, stigma small. *Capsule* $\frac{2}{3}$ in., slender, sessile, 2-valved, or sometimes (in *Wallich's* examples) subfollicular (at least at first).

22. **D. barbinerva**, *Clarke*; leaves narrowly obovate minutely crenate glabrous, midrib beneath hirsute, peduncles long, cyme dense glabrate, bracts round, sepals elliptic.

ATTRAN (near Moulmein).

Stem upwards, with the petioles, rufous-villous. *Leaves* (at least the upper) opposite, 6 by $1\frac{3}{8}$ in., suddenly narrowed at the base; nerves 11 pair; petiole $\frac{1}{2}$ –1 in. *Peduncles* 5 in., nearly glabrous; cyme 1– $1\frac{1}{2}$ in. diam., many-fld.; bracts $\frac{1}{4}$ – $\frac{1}{3}$ in. diam.; pedicels short, in fruit sometimes $\frac{2}{3}$ in. *Sepals* $\frac{1}{2}$ in., obtuse. *Corolla* $\frac{1}{2}$ in., widely campanulate (badly preserved, seems nearly as of *D. cordata*). *Stamens* 2 fertile; anthers 2-celled; cells ovate, divaricate, scarcely confluent. *Ovary* glabrous,

sessile; disc 0; style as long as the ovary; stigma small subpeltate. *Capsule* 2 in., narrowly linear, follicular at first, afterwards 2-valved.

23. **D. rufipes**, *Clarke*; stem woody rufous-hirsute, leaves elliptic subacute silvery-hirsute on both surfaces, peduncles long rufous-villous laxly 7-12-fld.

TENASSERIM; at the base of Mooleyit, *Beddome*.

Stem 3 in., densely covered with long red hairs, leafy at the apex. *Leaves* 4 by $1\frac{1}{2}$ in., closely crenate; petiole $0-\frac{1}{2}$ in., rufous-hirsute. *Peduncles* arising below the leaves, 4-5 in.; cyme-branches obscurely or not at all racemose; bracts gone at fruit-time; pedicels $\frac{1}{2}-1\frac{1}{2}$ in. *Calyx-segments* $\frac{1}{2}$ in., densely rufous-hirsute. *Corolla* not seen. *Capsule* 1-1 $\frac{1}{2}$ in., narrowly linear, nearly erect, glabrous, follicular, ultimately 2-4-partite.

24. **D. longipes**, *Clarke*; leaves coriaceous narrowly obovate minutely crenate glabrous villous on the nerves beneath, peduncles very long, cyme laxly subracemose 3-7-fld., corolla more than $\frac{1}{2}$ in. linear-tubular.

MALACCA; Mt. Ophir, *Griffith* (Kew Distrib. n. 3854); *Cuming*, n. 2385; *Main-gay*, n. 2723.

Stem 1-3 in., woody, hirsute, crowded with leaves at the summit. *Leaves* 6 by $1\frac{1}{2}$ in., obtuse, long attenuate at the base sometimes sessile; nerves 6-8 pair, obscure. *Peduncles* attaining 1 foot, nearly glabrous; bracts very small, narrow; pedicels $\frac{1}{10}$ in., in remote pairs. *Sepals* $\frac{1}{10}$ in. *Ovary* and style subglabrous, stigma capitate. *Capsule* 1 in., sessile, ultimately 2-valved.

25. **D. corchorifolia**, *Wall. Cat.* 792; leaves lanceolate or ovate-lanceolate crenulate rusty-villous on both surfaces, peduncles very short 1-4-fld., corolla tubular straight, capsule 2 in. sessile. *DC. Prodr.* ix. 265.

PENANG; *Wallich*, *Maingay*.

Suffrutescent, branched, rufous-villous with deflexed hairs; innovations rufous-hirsute. *Leaves* $2\frac{1}{2}$ by 1 in., acute, base rhomboid, rugose; petiole $\frac{1}{4}$ in. *Peduncles* on short axillary spurs, $\frac{1}{4}-\frac{1}{2}$ in., villous, upwards with the cymes glabrous; bracts $\frac{1}{2}-\frac{1}{3}$ in., round, coloured; pedicels $\frac{1}{2}$ in.; often in pairs. *Sepals* $\frac{1}{2}$ in., ovate or elliptic, obtuse or acute, glabrous, coloured. *Corolla* $\frac{1}{3}$ in., glabrous, scarcely widened upwards. *Ovary* and style glandular-pubescent; disc shortly cylindric. *Capsule* subfollicular, sometimes ultimately 2-valved.

Sect. 4. **Heterobœa**, *Benth. in Gen. Pl.* ii. 1022. *Peduncles* 1-3-fld. short, or not elongate. *Calyx* 5-partite. *Corolla-tube* cylindric. *Disc* short-cylindric. *Capsule* follicular, ultimately sometimes 2-valved.—Species all Malayan.

* *Stem short; leaves crowded, elongate, many-nerved.*

26. **D. crinita**, *Jack in Mal. Misc.* i. ii. 1, and in *Trans. Linn. Soc.* xiv. 33, t. 2, fig. 2; leaves alternate crowded elongate oblanceolate closely serrate villous, corolla $1\frac{1}{2}$ in. narrowly funnel-shaped, capsule 2 in. slender linear villous. *Wall. Cat.* 779; *DC. Prodr.* ix. 265; *Bot. Mag.* t. 4554. *Henckelia crinita*, *Spreng. Syst. curæ post.* 13.

PENANG; *Wallich*, *Helper*. SINGAPORE; *Lobb*.—DISTRIB. Sumatra, Borneo.

Stem suffrutescent, short, thick, hirsute. *Leaves* 6 by 1 in., acuminate, base attenuate, subsessile, thick with shaggy hair; nerves 25 pair. *Peduncles* 1-1 $\frac{1}{2}$ in., axillary or fascicled on shortened lateral spurs, or subconnate with the petiole; bracts minute linear. *Sepals* $\frac{1}{2}-\frac{1}{3}$ in., oblong, villous. *Corolla* nearly straight, scarcely hairy without, pale purplish with yellow lines in the throat. *Capsule* follicular, ultimately 2-valved.

27. **D. platypus**, *Clarke*; leaves alternate crowded sessile oblanceolate sparsely villous base dilated incise-serrate, corolla $1\frac{1}{2}$ in. narrowly funnel-shaped, capsule 2 in. slender linear.—*Chirita* sp. n. 29, *Herb. Ind. Or. H. f. & T.*

MALACCA; *Griffith, Cuming* (n. 2359), &c.; Mt. Ophir (*Herb. Wight*).—DISTRIB. Sumatra.

Leaves 9 by $2\frac{1}{2}$ in., sprinkled above distantly with long hairs; nerves 30 pair, reticulated and villous beneath. *Inflorescence, flowers, and capsules* as of *D. crinita*, of which I suspect that this is a variety.

** *Stem creeping; leaves in opposite distant pairs.*

28. **D. reptans**, *Jack in Mal. Misc.* i. part ii. p. 3, and in *Trans. Linn. Soc.* 14, p. 35; creeping, leaves ovate or elliptic minutely crenate hirsute above with long hairs, peduncles 1-fld., corolla $\frac{1}{2}$ in. nearly glabrous. *Wall. Cat.* 787; *DC. Prodr.* ix. 266. *Henckelia reptans*, *Spreng. Syst.* *curæ post.* p. 14.

PENANG; *Wallich. Maingay, Lobb.* MOULMEIN; *Lobb.*

Stem attaining a foot, branching, villous. *Leaves* opposite, 2 by 1 in., narrowed at both ends, scarcely acute; nerves 6 pair, villous beneath; petiole $\frac{1}{3}$ in. *Peduncles* $1\frac{1}{2}$ in., slender, thinly hairy; bracts small, linear. *Sepals* $\frac{1}{2}$ in., linear, pubescent. *Ovary* and style shortly pubescent. *Disc* short, cylindric. *Capsule* $\frac{2}{3}$ in., follicular, sometimes ultimately 2-valved.

29. **D. marginata**, *Clarke*; creeping, leaves broad elliptic sprinkled with small hairs above ciliate-villous on the margin, peduncles 1-fld., corolla $\frac{1}{2}$ in. villous.

MALACCA; *Lobb.*

Stem villous, rooting at the nodes. *Leaves* $2\frac{1}{2}$ by $1\frac{1}{4}$ in., obtuse at both ends, subentire; petiole 1 in. *Sepals* $\frac{1}{2}$ in., linear.—Very near *D. reptans*; the sepals are twice as long, the corolla hairy, the indumentum of the leaves different.

Sect. 5. **Loxocarpus**. Stemless, or one doubtful species creeping. *Leaves* crowded, nearly entire. *Peduncles* longish, few- or many-fld.; bracts small, narrow. *Calyx* divided nearly to the base. *Corolla-tube* short, limb 2-lipped, wide. *Disc* 0. *Ovary* sessile, pubescent; style as long as the ovary. *Capsule* lanceolate or linear, usually oblique at the base, follicular.—Malayan species. (LOXOCARPUS, *Br. in Benn. Pl. Jav. Rar.* pp. 115, 120.)

30. **D. incana**, *Benth. in Gen. Pl.* ii. 1022; leaves round often subcordate densely white-silky on both surfaces, cyme many-fld., capsule $\frac{1}{4}$ – $\frac{1}{3}$ in. lanceolate base oblique. *Loxonia* ? *alata*, *Wall. Cat.* 809. *Loxocarpus alata*, *Br. in Benn. Pl. Jav. Rar.* 120; *DC. Prodr.* ix. 277.

PENANG; *Wallich, Maingay.* SINGAPORE, *Lobb.*

Scapose. *Leaves* 1–3 in. diam., obtuse, entire or shallow-crenulate; petiole $\frac{1}{2}$ –2 in. *Peduncles* 3 in., white-villous; bracts $\frac{1}{4}$ in., linear; cyme very compound, white silky-villous. *Sepals* $\frac{1}{2}$ in., linear. *Corolla* scarcely $\frac{1}{4}$ in., wide-campanulate, blue. *Ovary* villous; style glabrous. *Capsule* acute, white-villous.

31. **D. semitorta**, *Clarke*; leaves elliptic or ovate silky above, reticulated beneath with broad densely villous nerves, peduncles 1–2-fld., sepals white-pilose, capsule $\frac{1}{2}$ in. doubly curved half twisted round near the base.

MALACCA; Mt. Ophir, *Griffith, Lobb, Maingay.*

Scapose. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$ in., obtuse at both ends, entire or obscurely crenate, densely softly silky above, glabrous between the nerves beneath; petiole up to $1\frac{1}{4}$ in.

Peduncles 2½ in., thinly hairy; bracts ½ in., oblong; pedicels ¼ in. *Sepals* ½ in., oblong. *Corolla* ½ in.; tube widely campanulate, limb very oblique. *Ovary* densely pilose; style nearly glabrous.

Sect. 6. **Orthobœa** (*Benth. in Gen. Pl.* ii. 1022). Stemless, or (*D. repens*) creeping. *Leaves* alternate or crowded. *Peduncles* long, many- or few-fld.; bracts small, narrow. *Sepals* linear or narrowly oblong. *Corolla-tube* cylindric or ventricose, not linear. *Ovary* sessile; style about as long as the ovary; disc 0. *Capsule* linear or sublanceolate, sessile, erect or scarcely oblique at the base; follicular, ultimately sometimes 2-valved.—Species of S. Deccan and Ceylon.

32. **D. Rottleriana**, *Wall. Cat.* 778; leaves oblong or elliptic, base attenuate deeply crenate white-villous on both surfaces, corolla ½ in., capsule ½ in. densely villous when young. *Br. in. Benn. Pl. Jav. Rar.* 119.

NILGHIRI and KURG MTS.; *Heyne, &c.*

Leaves 3½ by 1½ in., obtuse, mature herbaceous softly strigose above pilose between the nerves beneath; petiole ¾ in., broad, entire. *Peduncles* 4 in., many-fld. *Sepals* ⅓ in., narrowly oblong, villous. *Corolla* purple with yellow marks; tube short, mouth very oblique. *Ovary* very hairy; style glabrous. *Capsule* very acute.

VAR. Wightii; leaves less deeply crenate thick rugose tomentose, even when old sometimes densely white, woolly, capsule less than ½ in. *D. Rottleriana*, *Wight Ic.* t. 1348; *A. DC. Prodr.* ix. 268. *Rottlera incana*, *Vahl Enum.* i. 88. *Henckelia incana*, *Spreng. Syst.* i. 38.—Shevagherry Hills, near Courtallum; *Wight*.

33. **D. tomentosa**, *Wight Ic.* t. 1349, and *Ill.* t. 159 bis, fig. 1 (*stigma incorrect*); leaves elliptic attenuate at the base crenate tomentose, corolla ½ in., capsule ¾ in. sparsely villous.

HILLS in S. MADRAS; Courtallum, Jamalay, Bolamputti, *Wight*.

Leaves 3 by 2 in., obtuse, white-villous above, cinnamonaceous or ferruginous villous or lanate beneath even when mature. *Corolla-tube* nearly ½ in., curved. *Style* thick, glabrous; stigma large, glabrous.—In other respects resembling *D. Rottleriana* and a variety perhaps of it (*Thwaites Enum.* 207).

VAR. lanuginosa; petiole 0 or very broad, leaves spatulate-orbicular cinnamonaceous tomentose beneath, peduncles long, cymes large.—Courtallum; *Wight*.

34. **D. lyrata**, *Wight Ic.* t. 1350; leaves lyrate, terminal lobe ovate incise-crenate or sublobulate thinly herbaceous villous on both surfaces, corolla scarcely ½ in., capsule ½–¾ in. sparsely villous.

DECCAN PENINSULA; Courtallum, *Wight*.

Leaves attaining 8 in.; petiole nearly 6 in., incise-pinnatifid; limb 2–3 in. diam., base rounded. *Peduncles* 4–6 in., villous. *Flowers* and capsules nearly as in *D. Rottleriana*.—Closely allied to *D. Rottleriana*, rather than to *D. tomentosa*, which has larger flowers and capsules.

35. **D. Humboldtiana**, *Gardn. in Calc. Journ. Nat. Hist.* vi. 477; leaves broadly elliptic, base usually rounded or cordate shallowly crenate thickly tomentose ultimately silky, sepals ⅓ in. pilose, corolla ½ in. *Bot. Mag.* t. 4757.

CEYLON; up to 5000 ft. alt., common, *Gardner, &c.*

Leaves 3 by 1½–2½ in., obtuse, sometimes orbicular, base rarely shortly attenuate; petiole ½–2 in. *Peduncles* 2–4 in., pubescent, many-fld., or sometimes subracemose few-fld. *Corolla* pale purple, puberulous without. *Filaments* of the sterile stamens nearly as long as of the fertile. *Ovary* pilose; style glabrous. *Capsule* ¾ in., often oblique at the base.

VAR. primulifolia, *Thwaites Enum.* 207 (not *D. primulifolia*, *D. Don*); leaves spatulate-elliptic, cymes subracemose slender, corolla scarcely ½ in., sterile filaments

short, capsule slender. *D. primulæfolia*, *Gardn. in Calc. Journ. Nat. Hist.* vi. 478; *Bot. Mag.* t. 5161.—Ceylon; in the Hantam range near Kandy, *Gardner, Thwaites*.—Petiole $\frac{1}{2}$ –2 in. *Sepals* $\frac{1}{2}$ in., narrowly oblong, white-pilose, not tomentose.

VAR. recedens; leaves large, base attenuate, cymes compound.—Ceylon; Wallekelly Hill, alt. 2000 ft., *Beckett*.—Leaves 6 by 4 in., thinly white-strigose above, rusty-pubescent on the nerves beneath, much thinner in texture than in the type; petiole scarcely $\frac{1}{2}$ in. *Peduncles* up to 8 in.

36. ***D. floccosa***, *Thwaites Enum.* 207; leaves obovate crenulate tomentose above pale fulvous-floccose beneath, sepals $\frac{1}{2}$ in. narrowly oblong floccose, corolla-tube ventricose.

CEYLON; alt. 2000 ft., Central Province, near Dolosbage, *Thwaites*.

Leaves 6 by 3½ in., obtuse, attenuate at the base; petiole 2 in. *Peduncles* 6 in., floccose; cyme 7-fld., densely floccose. *Corolla* $\frac{1}{2}$ in., pale purple; mouth contracted. *Capsule* 1 in., linear, follicular.—Nearly allied to *D. Humboldtiana*.

37. ***D. zeylanica***, *Br. in Benn. Pl. Jav. Rar.* 119; leaves long-petioled cordate-ovate or round crenate or serrate densely strigose on both surfaces, cymes few-fld., corolla-tube nearly $\frac{1}{2}$ in. ovoid-cylindric lobes $\frac{1}{4}$ in. *DC. Prodr.* ix. 266; *Thwaites Enum.* 207. *D. longepetiolata*, *Gardn. in Calc. Journ. Nat. Hist.* vi. 475.

CEYLON, alt. 5–6000 ft.; near Adam's Peak, *Walker, Thwaites*.

Leaves 2–3½ in. diam., subobtuse; petiole $\frac{1}{2}$ –5 in. *Peduncles* 2–4½ in., hairy, 3–9-fld. *Sepals* $\frac{1}{2}$ – $\frac{3}{4}$ in., linear, pubescent with yellow hairs. *Corolla* white, tube dark-purple. *Stigma* oblique, orbicular. *Capsule* early glabrate.

38. ***D. ovalifolia***, *Wight Ic.* t. 1351, and *III.* t. 142, fig. 6; leaves ovate crenate white-strigose on both surfaces, peduncles 3–5-fld., corolla broadly campanulate gibbous, base saccate, capsule 1 in.

S. DECCAN PENINSULA; Courtallum, *Wight*; S. Tinnevely, alt. 5000 ft., *Beddome*.

Leaves 3 by 1½ in., obtuse, base rounded, shallowly crenate, above densely beneath chiefly on the nerves strigose; nerves 8–12 pair, parallel; petiole 1–4 in. *Peduncles* 3½ in. *Sepals* $\frac{1}{6}$ in. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in., blue-yellow, nearly glabrous. *Filaments* short; anthers glabrous. *Ovary* pilose; style about as long as the ovary, nearly glabrous, stigma small subcapitate. *Capsule* linear, straight or somewhat oblique at the base.

39. ***D. missionis***, *Wall. Cat.* 6396; leaves ovate or elliptic entire strigose on both surfaces, cymes subracemose many-fld., corolla funnel-shaped nearly symmetric. *DC. Prodr.* ix. 266; *D. membranacea*, *Bedd. Ic. Pl. Ind. Or.* t. 176.

DECCAN, *Herb. Madr.* S. TRAVANCORE; Pachemallay, alt. 2000 ft., *Beddome*.

Leaves 3½ by 1–1½ in., scarcely acute, base rounded, membranous; hairs brown in Wallich's dried example, white in *Beddome*'s fresh ones; nerves 5–6 pair; petiole 1–2½ in. *Peduncles* 8 in., hairy; pedicels 0–½ in., often in distant pairs. *Sepals* $\frac{1}{6}$ – $\frac{1}{4}$ in., lanceolate-subulate, hairy. *Corolla* $\frac{1}{2}$ in., glabrous, pale blue. *Anthers* minutely hairy. *Style* as long as the ovary, glabrous, stigma unilateral oblong. *Capsule* nearly 1 in., linear; subfollicular (*Beddome*), or 2-valved (*DC.*).

40. ***D. repens***, *Bedd. Ic. Pl. Ind. Or.* t. 120; creeping, leaves long-petioled ovate-cordate serrate softly villous on both surfaces, peduncles 1–5-fld.

TRAVANCORE and TINNEVELLY, alt. 1–3000 ft.; *Beddome*.

Stem slender, hairy; nodes distant, rooting, bearing one leaf and one peduncle. *Leaves* 3 by 2 in., acute; petiole 4 in. *Peduncles* 3–5 in., villous; pedicels sub-

racemed in pairs, or (ex Beddome) nearly umbelled. *Sepals* $\frac{1}{10}$ in. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in., tubular, curved, hairy without, blue, *Ovary* hairy; style as long as the ovary, glabrous, stigma oblique subpeltate. *Capsule* not seen.

V. **DIDISSANDRA**, Clarke.

Scapose perennials or suffrutescent. *Stamens* 4 fertile, didynamous. Otherwise as *Didymocarpus*.—Species 7, extending from India to Bornœo.

Sect. 1. **Bœoides**, Benth. Scapose. *Nerves* of leaf very strong beneath, radiating.

1. **D. lanuginosa**, Clarke; stem hardly any, leaves elliptic or ovate, cymes and calyx glabrous or nearly so. *Didymocarpus lanuginosa*, Wall. Cat. 791, not of Maximov.; DC. Prodr. ix. 268; Clarke Comm. & Cyrt. Beng. t. 67.—*Didymocarpoid*, Griff. Itin. Notes, 64, n. 987.

TEMPERATE HIMALAYA, alt. 5–8000 ft., from Simla (Edgeworth) to Bhotan (Griffith) not common; Sikkim, Lachen, J. D. H. KHASIA MTS., alt. 5000 ft.; Kollong Rock, Griffith, H. f. & T., &c.

Stem hardly any, with the base of the petioles and peduncles fulvous-shaggy. *Leaves* crowded, 3 by $1\frac{1}{2}$ in., obtuse, base attenuated, crenate, above decidedly hirsute, beneath when young fulvous-woolly; petiole $\frac{1}{2}$ –1 in., or from the attenuation of the leaf-base 0. *Scapes* 2–6 in., glabrate upwards; cymes young woolly, ultimately glabrate, compound; pedicels $\frac{1}{6}$ – $\frac{1}{2}$ in. *Sepals* $\frac{1}{3}$ in., lanceolate. *Corolla* $\frac{3}{4}$ in., long, hairy, pale blue or purple. *Anthers* peltate, cohering in pairs. *Ovary* glabrous; style minutely pilose. *Capsule* $\frac{3}{4}$ in., often curved.

2. **D. rufa**, King in Hook. Ic. Pl. t. 1437; stem and leaves of *D. lanuginosa*, but cymes densely woolly with brown hair.

EASTERN TIBET; Chumbi (E. of Sikkim), alt. 12,000 ft. (Herb. King).

Possibly only a state of *D. lanuginosa*, but the scape is stouter, pedicels shorter, inflorescence densely woolly, the flowers smaller, calyx shorter and its lobes more obtuse, the only capsule seen not $\frac{1}{2}$ in. long.

Sect. 2. **Cyrtandroides**. Suffrutescent. *Peduncles* short, axillary, clustered, 1–3-fld. *Nerves* of leaf pinnate.

3. **D. frutescens**, Jack in Mal. Misc. i. ii. 1, and in Trans. Linn. Soc. xiv. 39; leaves oblanceolate fulvous-silky beneath, corolla $1\frac{1}{4}$ in., anthers small round. Wall. Cat. 780; DC. Prodr. ix. 265. *Henckelia frutescens*, Spreng. Syst., curæ post. 13.

PENANG; Wallich. MALACCA; Griffith (Kew Distrib. n. 3856), Maingay (Kew Distrib. n. 1222).—DISTRIB. Sumatra.

Branches densely fulvous-villous upwards. *Leaves* opposite, 9 by $2\frac{1}{2}$ in., acuminate, minutely crenate, mature glabrate above; petiole 2 in. *Peduncles* $\frac{1}{2}$ in., silky; bracts $\frac{1}{2}$ in., narrow, silky; pedicels often $2\frac{1}{4}$ in., soon glabrous. *Sepals* $\frac{1}{2}$ in., narrowly lanceolate, silky. *Corolla* $1\frac{1}{4}$ in. long, funnel-shaped, white, villous, soon nearly glabrous. *Anthers* small, round, cohering in pairs, when young of 2 divaricate ellipsoid cells, cells early confluent. *Ovary* glabrous; style minutely hairy. *Capsule* $3\frac{1}{4}$ in.

VI. **CHIRITA**, Ham.

Herbs or low undershrubs. *Leaves* opposite, often unequal, sometimes whorled or alternate, elliptic or ovate, rarely lanceolate. *Cymes* axillary, many- or few-fld., or peduncles 1-fld.; bracts 2, shorter than the flowers, deciduous. *Calyx* 5-fld or sub-5-partite, not very small (except in *C. hamosa*);

lobes acute. *Corolla* tubular-funnel-shaped or ventricose, middle-sized or large (except in *C. hamosa*); tube not very narrow below nor gibbous; limb 2-lipped, lobes 5, rounded. *Stamens* 2 perfect, 2-3 barren, filaments flattened, geniculate; anthers usually applied to the stigma; cells 2, divaricate, ovate, often confluent. *Ovary* linear; style short or long, stigma (when young) oblique peltate, notched on the lower margin; in age upper margin usually produced oblong bifid; placentæ inflexed to the axis, then revolute bearing the ovules. *Capsule* elongate linear (smaller, slender in *C. hamosa*), sessile, loculicidally 2-valved to the base, valves 2-partite in the next season. *Seeds* ellipsoid, smooth, sometimes with a minute boss or process at the end; testa often striated, reticulate.—Species 25, mainly Indian; a few W. Malayan and Chinese.

The foregoing character does not include the Malayan and Chinese species. The genus, even thus narrowly defined, is with difficulty distinguished from *Didymocarpus*. The stigma is said to be subentire in *Didymocarpus*, bifid in *Chirita*, which is roughly true; in *Chirita* it varies greatly with age.

Sect. 1. **Euchirita**. *Calyx* large or middle-sized. *Corolla* $1\frac{1}{4}$ in. or more, funnel-shaped, tubular towards the base, mouth not very oblique nor unequally lipped. *Capsule* more than 2 in. long, not stalked.

* *Species of Ceylon*.

1. **C. Moonii**, *Gardn. in Calc. Journ. Nat. Hist.* vi. 479; leaves whorled lanceolate or elliptic silky villous on both surfaces, peduncles scattered 1-flid., calyx sub-5-partite silky villous, corolla $2\frac{1}{2}$ in. and upwards. *Bot. Mag.* t. 4405. *Martynia lanceolata*, *Moon Cat. Pl. Ceyl.* 45.

CEYLON; Hantam, alt. 4000 ft., *Thwaites*, *Wight*, &c.

Stem 2-3 ft., branched, villous upwards. *Leaves* 4 or 3 in a whorl, 5 by 2 in., minutely denticulate, densely softly hairy, and shining brown in the dried specimens; petiole $\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ -2 in.; bracts 2, small, deciduous near their middle. *Sepals* $\frac{3}{8}$ in. and upwards, narrowly lanceolate. *Corolla* widely ventricose, mouth 2 in. across, minutely hairy without, purple, yellow-striped within. *Filaments* (fertile and sterile) villous at the top. *Ovary* glabrous; stigma obliquely 1-sided, shortly bifid. *Capsule* 4 in. and upwards.

2. **C. Walkeri**, *Gardn. in Calc. Journ. Nat. Hist.* vi. 480; leaves ternate or opposite elliptic acuminate or lanceolate villous on both surfaces, peduncles 5-1-flid., calyx sub-5-partite villous, corolla $1\frac{1}{2}$ in. *C. Walkeriæ*, *Hook. Bot. Mag.* t. 4327.

CEYLON; *Walker*.

Stem 2 ft., branched, villous upwards. *Leaves* 5 by 2 in., as of *C. Moonii*, but less densely hairy; petiole $\frac{1}{2}$ -1 in. *Peduncles* $\frac{1}{2}$ -2 in., once or twice dichotomous, rarely 1-flid.; bracts small. *Calyx* $\frac{1}{2}$ - $\frac{3}{8}$ in. *Capsule* $2\frac{1}{2}$ -5 in.—Closely allied to *C. Moonii*, which differs in the 1-flid. peduncles and larger corolla.

VAB. parviflora; calyx $\frac{1}{2}$ - $\frac{1}{2}$ in., corolla 1 in., capsule 2 in. *Var. β*, *Thwaites Enum.* 207.—Ceylon; *Thwaites*.

3. **C. zeylanica**, *Hook. Bot. Mag.* t. 4182; leaves opposite ovate or elliptic acuminate strigose on both surfaces, peduncles many-flid., calyx sub-5-partite glabrous, corolla 1 in. *C. communis*, *Gardn. in Calc. Journ. Nat. Hist.* vi. 481.

CEYLON; up to 5000 ft. alt. common; *Gardner*, &c.

Stem 18 in., branched, strigose upwards. *Leaves* 3 by 2 in. ovate, or $4\frac{1}{2}$ by 2 in. elliptic, minutely denticulate, sparsely strigose; nerves 9 pair, hirsute beneath;

petiole $\frac{1}{2}$ –2 in. Peduncles 1–4 in., glabrous upwards; bracts $\frac{1}{4}$ – $\frac{1}{2}$ in., ovate, glabrous. Sepals $\frac{1}{2}$ – $\frac{3}{4}$ in., elliptic-lanceolate. Corolla 1 in. diam., glabrous without, purple, yellow-striped within. Filaments hairy at the tip. Ovary glabrous; stigma unilateral. Capsule 4 in.

VAR. *angusta*; leaves narrowly lanceolate acute at both ends, nerves 6 pair, flowers somewhat smaller and paler. Var. β , *Thwaites Enum.* 208.—Ceylon; between Galle and Ratnapoora, *Thwaites*.

**** Species of the Himalaya and Khasia Mts.**

4. **C. bifolia**, *Don Prodr.* 90; stem 2-leaved, leaves sessile orbicular-quadrate thinly villous on both surfaces, peduncles 3–1-fld., calyx deeply 5-fid. villous. *Royle Ill.* 204, t. 70, fig. 2; *DC. Prodr.* ix. 269; *Clarke Comm. & Cyrt. Beng.* t. 77. *Calosacme amplexens*, *Wall. Cat.* 306. *Henckelia bifolia*, *Dietr. Sp. Pl.* i. 574.

TEMPERATE W. HIMALAYA, alt. 6000 ft., from Gurwhal to Nepal; *Wallich, &c.*

Stem 3–6 in., simple, at flower-time leafless at the base, 2-leaved at the summit; one or two small bract-like leaves rarely added in the middle of the stem. Leaves equal or unequal, or one suppressed, 3 in. diam., base cordate or in the smaller attenuate, serrate. Peduncles 1–2, rarely more, rising between the two leaves, usually 2-fld., about 1 in.; bracts $\frac{1}{2}$ in., oblong, villous; pedicels $\frac{1}{2}$ in. Calyx $\frac{1}{2}$ in. and upwards, thin, subcorolloid; lobes $\frac{1}{2}$ in., broad-lanceolate. Corolla nearly 2 in., almost straight, ventricose above the calyx, nearly glabrous without, purple-blue, below yellowish. Filaments hairy at the top. Ovary and style pubescent; stigma peltate oblique, notched on the lower side. Capsule not seen.

5. **C. pumila**, *Don Prodr.* 90; small or large, leaves elliptic acuminate mature pilose on both surfaces, bracts ciliate, calyx deeply 5-fid. hirsute with white hairs herbaceous. *DC. Prodr.* ix. 269; *Clarke Comm. & Cyrt. Beng.* t. 74. *C. flava*, *Br. in Benn. Pl. Jav. Rar.* 117. *C. Edgeworthii*, *A. DC. Prodr.* ix. 269. *C. diaphana*, *Royle Ill.* 204, name only. *C. polyneura* var. *a*, *Clarke Comm. & Cyrt. Beng.* t. 75, not of *Miq.* *Calosacme flava*, *Wall. Cat.* 801. *Bonnaya humilis*, *Spreng. Syst., cura post.* 15. *Henckelia pumila*, *Dietr. Sp. Pl.* i. 574.—*Didymocarpus* n. 18, *Herb. Ind. Or. H. f. & T.*

SUBTROPICAL HIMALAYA, alt. 1500–6000 ft., from Simla to Mishmee; plentiful in Sikkim and Bhotan. KHASIA MTS., alt. 1–4000 ft., common.

Stem (in well-developed examples) 20 in., erect, branched; small examples with few or 2 leaves not rare. Leaves opposite, often unequal, $5\frac{1}{2}$ by 2 in., closely serrate, mature hirsute above with white hairs, pubescent beneath; petiole $\frac{3}{4}$ in. Peduncles 2 in., 5–1-fld.; bracts $\frac{1}{2}$ in., ovate or oblong; pedicels $\frac{1}{2}$ in. Calyx $\frac{1}{2}$ in. and upwards; lobes $\frac{1}{2}$ in., narrowly lanceolate. Corolla $1\frac{1}{2}$ in., tubular-funnel-shaped, pubescent without, $\frac{3}{4}$ in. diam., purple-blue, yellowish below, sometimes pale-blue. Stamens glabrous. Ovary and style pubescent stigma unilateral, bifid. Capsule 4 in. and upwards.

6. **C. dimidiata**, *Br. in Benn. Pl. Jav. Rar.* 117; leaves elliptic acuminate mature strigose above glabrous beneath, bracts thinly ciliate, calyx 5-fid. half-way down nearly glabrous whiteish. *C. polyneura*, var. β , *Clarke Comm. & Cyrt. Beng.* tt. 76, 72, not of *Miq.* *Calosacme dimidiata*, *Wall. Cat.* 803.

SIKKIM, BHOTAN, ASSAM, alt. 1500–4000 ft., frequent. KHASIA MTS., alt. 1500–3500 ft., common.

Closely resembling *C. pumila*. Pedicels shorter. Calyx $\frac{3}{4}$ in.; segments $\frac{1}{2}$ in., narrowly lanceolate. Corolla $1\frac{1}{2}$ –2 in., rather larger than of *C. pumila*, white, mouth purple-blue, without the yellow-tinge of *C. pumila*.

7. **C. calva**, Clarke; glabrous, leaves elliptic or oblong acuminate, calyx deeply 5-fid segments elliptic-oblong mucronate. *C. glabra*, Clarke *Comm. & Cyrt. Beng. t. 73, not of Miq.*—Chirita n. 20, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 5-7000 ft.; Lachen, *J. D. H.*; Darjeeling, *Gamble*.

Stem 6-12 in. *Leaves* opposite, usually very unequal, sometimes alternate, attaining 6 by 2½ in. (often smaller and narrower). base very unequal, minutely denticulate, obscurely ciliate; petiole ½-2 in. *Peduncles* ¾ in., 3-1-fid. *Calyx* ½ in., lobed ¾ the way down; segments herbaceous, obtuse with a mucro. *Corolla* 1½ in., nearly as of *C. pumila*, pale purple-blue, glabrous without. *Ovary* and style glabrous. *Capsule* not seen.

8. **C. macrophylla**, Wall. *Pl. As. Rar. i. 56, t. 72*; leaves ovate or elliptic acute hairy sparsely above more densely on the nerves beneath, peduncles several-fid., calyx and bracts nearly glabrous, corolla long yellow. *DC. Prodr. ix. 269*; *Clarke Comm. & Cyrt. Beng. t. 71*. Calosacme macrophylla, Wall. *Cat. 805*. Henckelia macrophylla, Spreng, *Syst., curæ post. 14*. *H. grandifolia*, Dietr. *Sp. Pl. i. 576*.

TEMPERATE E. HIMALAYA; from NEPAL to Bhotan, alt. 5-8000 ft., frequent.

Stem 4-18 in., pubescent. *Radical leaves* (usually present at flower-time much larger than the cauline) 6 by 3½ in., base cordate, crenate-serrate; petiole 4-9 in. *Peduncles* ¼-5 in.; bracts ¾ in., ovate, serrulate, subglabrous or pubescent only on the nerves beneath; pedicels ¼-2 in., nearly glabrous. *Calyx* ¾-1 in., divided to the middle or nearly to the base; segments ovate-lanceolate or lanceolate. *Corolla* 2 in., tubular, scarcely swollen upwards. *Filaments* glabrous or minutely pilose. *Ovary* glabrous; style minutely pubescent, stigma unilateral deeply bifid. *Capsule* 4 in. and upwards.

9. **C. Kurzii**, Clarke in *Journ. Linn. Soc. xv. 145*; leaves elliptic or lanceolate acuminate, base cuneate strongly serrate hairy on both surfaces, peduncles few-fid., calyx hairy, corolla yellow. *Didymocarpus Kurzii*, Clarke *Comm. & Cyrt. Beng. t. 66*.

SIKKIM HIMALAYA; on the ridge between Sikkim and Nepal, alt. 9000 ft., *J. D. H.*, Kurz, Dr. Treutler, &c.

Stem 8-20 in., thick, villous, crowned by the larger leaves and approximated peduncles. *Leaves* opposite and alternate, attaining 8 by 4 in., acuminate; petiole ½-2 in. *Peduncles* 2-5 in., often 2-5; bracts ½ in., elliptic, villous; pedicels ¼-½ in., villous. *Sepals* nearly free, ½ in., broadly lanceolate, persistent. *Corolla* nearly 1½ in., narrowly funnel-shaped, pubescent, purple-spotted in the throat. *Ovary* and style pubescent; stigma subpeltate, oblique, notched on one side. *Capsule* 2 by ½ in., sessile, villous.

10. **C. urticæfolia**, Ham. in *Don Prodr. 90*; leaves elliptic acuminate sparsely hispidulous above villous on the nerves beneath, peduncles 5-1-fid., bracts nearly glabrous, calyx 5-fid half-way down hispid with white hairs, corolla largeish purple. *DC. Prodr. ix. 268*; *Clarke Comm. & Cyrt. Beng. t. 69*. *C. grandiflora*, Wall. *Pl. As. Rar. i. 43, t. 50*. Calosacme grandiflora, Wall. *Cat. 800*. Henckelia urticæfolia & Wallichiana, Dietr. *Sp. Pl. i. 574*. Gonatostemon Boucheanus, Regel *Gartenfl. 1866, 353, t. 526*.—*Didymocarpus Griff. Notul. iv. 155*.—Cyrtandra, Griff. *Ic. Pl. Ind. Or. t. 436*.

TEMPERATE HIMALAYA, alt. 4500-8000 ft., from Nepal to Bhotan, frequent.

Stem 8-18 in., hairy upwards. *Leaves* opposite, more or less unequal, 5 by 2 in., unequal at the base, serrate; petiole ¾-2 in. *Peduncles* ¾-2 in., sparingly pubescent; bracts ½ in., ovate; pedicels ¼-½ in., nearly glabrous. *Calyx* ¾ in.; lobes ½ in., triangular-lanceolate. *Corolla* nearly 2 in., narrowly funnel-shaped, sparsely hairy,

purple with yellow lines within. *Ovary* glabrous; style minutely pubescent, stigma unilateral deeply bifid. *Capsule* 4 in. and upwards.—The only species of *Chirita* in which the bracts are much less hairy than the calyx.

11. **C. Clarkei**, *Hook. f.*; almost stemless, leaves ovate or elliptic pubescent on both surfaces, calyx divided nearly to the base dusky villous, ovary dusky pubescent.—*Chirita* sp. n. 27, *Herb. Ind. Or. H. f. & T.*

Sikkim; Lachen, alt. 7–8000 ft., *J. D. H.*

Radical leaves $4\frac{1}{2}$ by 3 in., shortly acute, base obtuse, crenate-serrate; petiole $1\frac{1}{2}$ –4 in. *Peduncles* 4 in., upwards (as the whole inflorescence) with many spreading glandular brown hairs; bracts $\frac{1}{2}$ in., oblong; pedicels 3–1, $\frac{1}{2}$ –1 in. *Calyx* scarcely $\frac{1}{2}$ in., segments wide-lanceolate. *Corolla* (not expanded) of *Chirita*, glandular-villous without. *Stigma* subpeltate. *Capsule* elongate linear.—Seems near *C. urticæfolia*, differing in the smaller calyx and indumentum.

12. **C. Hookeri**, *Clarke Comm. & Cyrt. Beng.* t. 70; leaves elliptic acute hairy on both surfaces, peduncles 5–1-fld., bracts villous, calyx large densely hirsute.—*Chirita* sp. n. 22, *Herb. Ind. Or. H. f. & T.*

UPPER ASSAM; Mishmee Hills, *Griffith* (Kew Distrib. n. 3826). KHASIA MTS., *Griffith*.

Resembling generally *C. urticæfolia*. *Peduncles* villous; bracts 1 in., ovate-oblong, herbaceous; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., villous. *Calyx* $\frac{3}{4}$ in.; lobes $\frac{1}{2}$ in., triangular-lanceolate. *Corolla* nearly as of *C. urticæfolia*; ex *Griffith* “pale blue the lower lip with 2 yellow lines.—Dr. King thinks this may be only a var. of *C. urticæfolia*, the numerous examples of which are however very constant in the comparative glabrousness of their bracts.

13. **C. acuminata**, *Br. in Benn. Pl. Jav. Rar.* 117; leaves elliptic or ovate acuminate hairy on both surfaces, peduncles many-fld., bracts oblong villous, calyx divided hardly half-way down rusty villous. *Clarke Comm. & Cyrt. Beng.* t. 81, not of *A. DC.* *Incarvillea oblongifolia*, *Roxb. Fl. Ind.* iii. 113. *Calosacme acuminata*, *Wall. Cat.* 802. *Babactes oblongifolia*, *DC. Prodr.* ix. 260. *Æschynanthus acuminata*, *G. Don Gen. Syst.* iv. 657.—*Chirita* sp. n. 10, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., ASSAM, MISHMEE and CHITTAGONG HILLS, alt. 500–3500 ft., common.

Stem 2–6 ft., sometimes frutescent, closely villous upwards. *Leaves* opposite, subequal, 8 by $3\frac{1}{2}$ in. (sometimes larger often much smaller), closely serrulate; petiole $\frac{1}{2}$ –3 in. *Peduncles* $\frac{1}{2}$ –2 $\frac{1}{2}$ in., villous, laxly dichotomous; bracts and bracteoles $\frac{1}{2}$ – $\frac{1}{2}$ in.; pedicels $\frac{3}{4}$ in. *Calyx* $\frac{1}{2}$ in.; lobes scarcely $\frac{1}{2}$ in., ovate, acute. *Corolla* $1\frac{1}{2}$ in., tubular-ventricose, yellowish-white (or fide *Roxburgh* somewhat marked with red), nearly glabrous. Fertile filaments dilated, minutely pilose. *Ovary* and style hairy; stigma subpeltate, oblique, notched on one side, ultimately oblong bifid. *Capsule* 2–2 $\frac{1}{2}$ by $\frac{1}{2}$ in. *Seeds* broadly ellipsoid, umbonate at each end, obscurely ribbed and minutely reticulated.

14. **C. brevipes**, *Clarke*; nearly stemless, densely fulvous hairy, leaves ovate or elliptic acute, peduncles short 1–2-fld., calyx 5-fld half-way down lobes lanceolate. *C. speciosa* var. *a*, *Clarke Comm. & Cyrt. Beng.* t. 79, not of *Kurz.*—*Chirita* sp. n. 21, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 1500–4000 ft.; *Griffith* (Kew Distrib. n. 3828), &c.

Rhizome short, creeping with crowded nodes, very hairy. *Leaves* alternate, crowded, attaining 10 by 5 in., serrate; petiole up to 8 in. *Peduncles* $\frac{1}{2}$ –1 in.; bracts $\frac{1}{2}$ in., oblong, densely villous; pedicels $\frac{1}{2}$ –1 $\frac{1}{2}$ in. *Calyx* $\frac{3}{4}$ in., lobes $\frac{1}{2}$ in. *Corolla* nearly 2 in., minutely pubescent without (probably white). *Capsule* 4 in., woody, erect on the rigid thickened pedicel.—*Kurz's C. speciosa* from Yunnan has very

long peduncles, short pedicels and linear calyx-segments: as regards size, *C. brevipes* is often as large as *C. speciosa*.

15. **C. primulacea**, *Clarke Comm. & Cyrt. Beng.* t. 82; almost stemless, softly villous, leaves long-petioled oblong incise-serrate, peduncles numerous short many-fld., calyx divided half-way down densely villous, corolla yellow-white.—*Chirita* sp. n. 16, *Herb. Ind. Or. H. f. & T.*

SIKKIM, alt. 2–3000 ft.; *J. D. H., Anderson, &c.*

Gregarious on steep wet rocks. *Leaves* pendent, 6 by 2½ in.; petiole 2–6 in. *Flowers* forming rosulate clusters; whole inflorescence softly villous. *Peduncles* ½–½ in., 1–2–3-tomous; bracts ½–½ in., oblong; pedicels ½ in. *Calyx* ½ in., lobes lanceolate acute. *Corolla* 1 in. and upwards, narrowly funnel-shaped, minutely pubescent without. *Ovary* and style densely shortly villous, stigma obliquely peltate, lower margin notched. *Capsule* 2 in.

16. **C. monophylla**, *Clarke*; leaf solitary sessile cordate-ovate, peduncle hardly any 1–2-fld., calyx divided half-way down brown-hirsute.—*Chirita* sp. 30, *Herb. Ind. Or. H. f. & T.*

UPPER ASSAM; Mishmee Hills, *Griffith* (Kew Distrib. n. 3832).

Stem 4–10 in., simple, erect, with sometimes 1 or 2 small scale-like leaves in its middle. *Leaf* (at flower-time) 1 in., ovate, acute, at fruit-time 7 in. diam., cordate or shortly peltate, glabrous above, villous on the nerves beneath. *Peduncle* (in the axil of the leaf) scarcely 1 in.; bracts small; pedicels ½–½ in. *Calyx* ½ in. and upwards, white or purple-spotted; lobes ¼–½ in., lanceolate-subulate. *Corolla* 2 in., narrowly funnel-shaped, glabrous without. *Ovary* and style glabrous. *Capsule* 2½ in. *Seeds* of the genus.—From the extraordinary manner in which the solitary leaf continues growing to the period of ripening the capsule, it may be suspected that it is a persistent cotyledon.

17. **C. caliginosa**, *Clarke*; stem long leafy, leaves falcate-elliptic acuminate at both ends pubescent, cymes axillary few-fld. lax, sepals lanceolate much acuminate.

Peninsula of MALACCA; Klang in Selangore, *Beccari*.

Stem 1 foot, pubescent. *Leaves* opposite, 6 by 2½ in., minutely toothed; petiole 1½ in. *Peduncles* 0–¼ in.; bracts and bracteoles 0, or very early caducous; pedicels ¼–2 in., patently pubescent. *Sepals* ¾–1 in., dusky-pubescent. *Corolla* 1½ in.; tube upwards villous with brown hairs, limb within (in the dry specimen) lurid-blue. *Anthers* very large, subquadrate, with long hair. *Ovary* fuscous-pubescent; stigma unilateral, shortly bifid. *Capsule* 3 in., curved, dusky-hairy.—The whole plant is dusky; the habit and inflorescence ally it to the next section, *Microchirita*; but the calyx is large.

Sect. 2. **Microchirita**. *Calyx* about ¼ in., divided nearly to the base into narrow segments. *Corolla* ½–¾ in., tube narrow below much curved above, mouth very oblique, lower lip larger. *Capsule* slender.

18. **C. hamosa**, *Br. in Benn. Pl. Jav. Rar.* 117; leaves ovate or elliptic acute, peduncles connate and adnate to the petiole ebracteolate, capsule slender often much curved. *Clarke Comm. & Cyrt. Beng.* t. 78. *Didymocarpus hamosa*, *Wall. Cat.* 788. *D. cristata*, *Dalz. in Hook. Kew Journ.* iii. 225; *Dalz. & Gibs. Bomb. Fl.* 134.—*Chirita* sp. n. 20, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 1–4000 ft., *Wallich, Griffith, H. f. & T., &c.* MARTABAN; *Wallich*. MOULMEIN; *Lobb, Parish*. W. DECCAN PENINSULA; *Stocks, Law, Dalzell*.

Stem ½–20 in., sparingly pilose. *Leaves* opposite, subequal, 6–1 by 4–½ in., base rounded, obscurely crenate, thin, weakly hairy on both surfaces; petiole ¼–½ in.

Peduncles (their free portion) 0– $\frac{2}{3}$ in., hispidulous. *Sepals* $\frac{1}{4}$ in., sublinear, patently hairy. *Corolla* scarcely $\frac{2}{3}$ in.; tube slender, nearly white, mouth pale blue or somewhat rose. *Stigma* distinctly bifid. *Capsule* 1–3 in.

VAR. *unifolia*; stem $\frac{1}{2}$ –1 in., with one leaf at the top and 5–1 flowers. *Chirita* sp. n. 31, *Herb. Ind. Or. H. f. & T.*—Khasia Mts., alt. 500 ft., on the river bank near Terrya Ghant, J. D. H. Moulmein; Thoungyne, *Lobb.*—Extremely unlike the ordinary form of *C. hamosa*, but except in its minute size no distinction can be found. The single leaf is perhaps a persistent cotyledon, carried up as in some other species of the Order; and the plant may be specifically distinct.

VII. PLATYSTEMMA, Wall.

A small, slender herb. *Leaf* 1 (a persistent cotyledon?) sessile, orbicular-cordate, membranous, hairy. *Peduncle* from the leaf-axil, slender, few-fl.; bracts very small, sublinear. *Calyx* wide-campanulate, deeply 5-fid. *Corolla* violet, subrotate, deeply 2-lipped; lips wide-spreading, upper shortly bifid, lower deeply 3-lobed; lobes all wide-oblong, obtuse. *Stamens* 4 perfect, filaments short, curved; anthers cohering by their tips, 2-celled; cells round, divaricate, early confluent, dehiscing by a single short slit. *Ovary* ovoid; disc annular; style linear, much longer than the ovary, stigma small; placentæ deeply intruded, then bifid, branches recurved, bearing ovules on their margins on both faces. *Capsule* narrowly oblong, nearly as in *Didymocarpus*.

P. violoides, Wall. *Cat.* 4410, and *Pl. As. Rar.* ii. 42, t. 151; *Royle Ill.* 294, t. 71, fig. 1; *DC. Prodr.* ix. 279; *Wight Ill.* t. 159 bis, fig. 10. *P. majus*, Wall. *Cat.* 4411, and *Pl. As. Rar.* ii. 42, *in obs.*

TEMPERATE W. HIMALAYA, alt. 6–9000 ft.; from Nepal, *Wallich*, to Simla, *Strachey & Winterbottom*.

Stem $2\frac{1}{2}$ –5 in., pubescent. *Leaf* $1\frac{1}{2}$ – $2\frac{1}{2}$ in., subacute, coarsely serrate, hairy above, glabrous beneath, pubescent on the nerves. *Peduncle* $\frac{1}{2}$ – $1\frac{1}{2}$ in., 1–11-fl.; bracts $\frac{1}{2}$ in., deciduous; cyme usually trichotomous, lateral branches 3-fl.; pedicels 0– $\frac{1}{4}$ in. *Sepals* $\frac{1}{2}$ in., subovate, puberulous. *Corolla* $\frac{1}{2}$ in., lips of equal length. *Capsule* only known from Royle's figure.

VIII. CHAMPIONIA, Gardn.

A low, perennial, erect, hairy herb. *Leaves* opposite, subequal, petioled. *Peduncles* slender; bracts small; cymes lax; flowers white. *Sepals* 5, small, narrow. *Corolla-tube* short; limb spreading, subequally 4-lobed. *Stamens* 4 perfect, filaments short, thick; anther-cells ellipsoid, nearly parallel, slits confluent at their apex. *Ovary* sessile, oblong; disc 0; style linear, stigma subcapitate; placentæ of two plane plates bearing ovules on both faces. *Capsule* oblong, acute, loculicidally 2-valved, valves soon 2-partite; placentæ in fruit hardly altered. *Seeds* minute, ellipsoid, subacute at each end, smooth, minutely striate and reticulated.

C. reticulata, Gardn. *in Calc. Journ. Nat. Hist.* vi. 485; leaves oblong subentire, nerves slender close together.

CEYLON, alt. 3000 ft., frequent.

Stem 2–6 in., undivided, dusky villous upwards. *Leaves* 4 by $1\frac{1}{2}$ in., obtuse or shortly acute, base cuneate, thinly strigose above, dusky-villous on the nerves beneath; petiole $\frac{1}{2}$ in. *Peduncles* 2–3 in., 3–10-fl., hairy; bracts $\frac{1}{2}$ in., linear; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., slender. *Sepals* $\frac{1}{10}$ in., linear, hairy. *Corolla-tube* $\frac{1}{12}$ in.; lobes $\frac{1}{4}$ in., widely oblong, glabrous. *Ovary* and style glabrous. *Capsule* $\frac{1}{2}$ by $\frac{1}{12}$ in.; placentæ narrower than the valves, not recurved.

IX. **BÆICA**, Clarke.

Undershrubs. *Leaves* alternate, petioled. *Cymes* much branched, axillary, lax-fld.; bracts small. *Calyx* small, 5-fid or -partite. *Corolla* small, deeply 5-fid, glabrous, widely gibbous at the base, obscurely 2-lipped; lobes subequal, obtuse, purple or white. *Stamens* 4, attached near the base of the corolla-tube, subequal, glabrous, filaments short; anthers 2-celled, not cohering in pairs; cells ellipsoid, subparallel, slits curved coalescent at the top. *Ovary* sessile, narrowly oblong; style as long as the ovary, glabrous, stigma punctiform; disc 0; placentæ deeply inflexed, nearly meeting, then recurved bearing ovules. *Capsule* shortly linear, straight, beaked by the erect style, loculicidal, and soon septicidal; placentæ recurved, enrolling the seeds. *Seeds* very small, ellipsoid, smooth.—Species 5, in Assam, Bhotan and N. Burma.

1. **B. filiformis**, Clarke *Comm. & Cyrt. Beng.* t. 87; innovations nearly glabrous, leaves lanceolate acuminate at both ends mature glabrous, peduncles solitary long, cyme with capillary branches and pedicels nearly glabrous.—*Rhynchotechum* sp.?, *Wall. Cat.* 9079, *in part.* *Chelone filiformis*, *Ham. ms.*

ASSAM; near Goalpara, *Hamilton, &c.* BHOTAN; in Upper Singfo everywhere, *Griffith.* KHASIA Mts.; *Griffith.* CACHAR; *Keenan.*

Branches long, leafy, glabrous to the tip. *Leaves* 7 by 2 in., minutely dentate; petiole $\frac{1}{2}$ –1 in. *Peduncles* 2–4 in.; bracts $\frac{1}{8}$ in., linear. *Calyx* $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ in., purple. *Capsule* $\frac{1}{2}$ in.

2. **B. Griffithii**, Clarke *Comm. & Cyrt. Beng.* t. 86; innovations fulvous-silky, leaves lanceolate acuminate at both ends mature fulvous-villous beneath, peduncles short usually 2–3 fascicled, cyme much branched intricate.—*Rhynchotechum* sp.?, *Wall. Cat.* 9079, *in part.* *Chelone rubicunda*, *Ham. ms.*

ASSAM; Goalpara, *Hamilton.*

Leaves 8 by 2½ in., denticulate, mature glabrous above. *Peduncles* 1–2 in., clustered, or peduncle may be considered hardly any branched from the base; cyme branches divaricate and recurved.—Otherwise nearly as *B. filiformis*.

3. **B. fulva**, Clarke *Comm. & Cyrt. Beng.* t. 85; innovations fulvous-woolly, leaves lanceolate acuminate at both ends fulvous-villous beneath, peduncles solitary elongate, bracts fulvous-tomentose.—*Cyrtandracea* n. 328, *Griff. Itin. Notes*, p. 120.

ASSAM; *Masters.* BHOTAN and MISHMEE, alt. 4200 ft., near Chulleree, *Griffith* (*Key Distrib.* n. 3844).

Leaves 7 by 2 in., obscurely denticulate, mature glabrous above or fulvous-pubescent along the nerves. *Peduncles* 4–6 in., fulvous floccose; bracts $\frac{1}{2}$ – $\frac{1}{2}$ in., persistent; pedicels floccose. *Flowers* and capsules nearly as of *B. filiformis*.

4. **B. hirsuta**, Clarke; very shaggy, leaves wide-lanceolate acuminate at both ends densely fulvous-shaggy above, peduncles solitary long, cymes fulvous-hirsute.

UPPER ASSAM?; on the Soondra bank.

Branches thick, shaggy with yellow hair $\frac{1}{4}$ – $\frac{1}{3}$ in. long, dense with leaves. *Leaves* 7 by 2½ in., obscurely denticulate, shaggy above with hairs $\frac{1}{4}$ in. long from tubercular bases, villous beneath; petiole $\frac{1}{2}$ in. *Peduncles* 2–4 in.; bracts $\frac{1}{3}$ in., elliptic or oblong; cymes as though compound umbels. *Sepals* $\frac{1}{2}$ in., linear, shaggy. *Corolla* not seen. *Capsule* $\frac{1}{4}$ in., minutely hairy, 4-valved.

X. **TETRAPHYLLUM**, Griff.

A tawny-villous undershrub; stem elongate, leafless or sparsely scaly below, with 4 leaves whorled at the apex. *Leaves* nearly sessile, ovate, unequal-sided. *Cymes* dense, subcapitate, nearly sessile; bracts elliptic. *Calyx* somewhat large, obscurely 2-lipped, sub-5-partite. *Corolla* widely funnel-shaped, silky, blue; lobes 5, subequal, ovate. *Stamens* 2 perfect, filaments short; anthers 2-celled, apex submucronate; cells ellipsoid, nearly parallel, slits longitudinal. *Ovary* ellipsoid, acute; style linear, stigma small, obscurely 2-lobed; placentæ deeply intruded, 2-partite, revolute, bearing ovules on both sides. *Capsule* narrowly lanceolate, ultimately 4-valved to the base, leaving two ribs united to the style and 4 papery enrolled placentæ. *Seeds* ellipsoid, obtuse at both ends; testa laxly reticulate, appearing rough or scaly.

T. bengalense, Clarke.—*Tetraphyllum*, Griff. *Notul.* iv. 148 (without descr.). *Phyllobœa* sp., *Benth. in Gen. Pl.* ii. 1020.—*Clarke Comm. & Cyrt. Beng.* t. 87 bis.

UPPER ASSAM; *Griffith*. MISHMEE; Namroop, *Griffith* (Kew Distrib. n. 3830). CACHAR (*Keenan*). CHITTAGONG HILLS; *Clarke*.

Stem 4–12 in., duskily woolly, below without leaves or with 1 or 2 pairs of scales 1 in. long; innovations fulvous silky-woolly. *Leaves* 2 pairs at the summit of the stem, 6 by 4 in., acute, base unequal, mature glabrate above, beneath duskily villous at least on the nerves. *Cymes* 10–30-fld. *Sepals* $\frac{1}{2}$ in., lanceolate, fulvous-silky. *Corolla* $\frac{3}{4}$ in.; lobes $\frac{3}{4}$ in. *Stamens* glabrous. *Ovary* (upwards with the style) silky. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{10}$ in., acute.

XI. **TRISEPALUM**, Clarke.

Undershrubs; stems short, villous or tomentose. *Leaves* opposite, alternate or crowded, narrowly lanceolate, obscurely toothed. *Peduncles* axillary, elongate, laxly 1–5-fld.; bracts long. *Calyx* 2-lipped; sepals 3, 2 narrow, the third broader shortly 3-lobed. *Corolla* broadly obliquely campanulate, obscurely 2-lipped; lobes 5, ovate, obtuse. *Stamens* 2 perfect, filaments short; anthers large, cordate-ovate, adhering by their faces, 2-celled; slits short, soon confluent. *Ovary* oblong; stigma simple, one-sided; placentæ deeply intruded, bifid, shortly recurved. *Capsule* oblong, shorter than the calyx, loculicidally 2-valved, soon 4-valved, valves not twisted; placentæ shortly recurved, not membranous. *Seeds* minute.—Species 2, in Lower Burma.

1. **T. obtusum**, Clarke; villous. stem very short, leaves opposite and alternate linear-lanceolate, cymes 1–5-fld., calyx-segments oblong obtuse.—*Phyllobœa* sp. *Benth. in Gen. Pl.* ii. 1020.

TENASSERIM; Moulmein, *Lobb*.

Stem 2–4 in., densely leafy, upwards (with the innovations) rufous-woolly. *Leaves* 5 by $\frac{1}{2}$ in., base much attenuated, crenulate, above white-villous, beneath rufous-woolly on the nerves; petiole $\frac{1}{2}$ in. or hardly any. *Peduncles* 1–3 in., flocculose with rufous deciduous wool; bracts $\frac{1}{2}$ in., ovate, somewhat thick, villous or woolly; pedicels hardly longer than the bracts. *Calyx* $\frac{1}{2}$ in.; one lip 2-partite, the other 3-fld; segments rounded, green at the apex, recurved. *Corolla* $\frac{1}{2}$ in., widely funnel-shaped, glabrous; lobes rounded. *Stamens* of the genus. *Style* linear, scabrous from numerous subseasile glands, stigma very shortly 2-lobed. *Capsule-valves* $\frac{1}{2}$ in., oblong, acute, rigid, bearing the placentæ in the middle.

2. **T. acutum**, *Clarke*; stem very short, leaves alternate narrowly lanceolate hairy, cymes laxly 1-3-fld., calyx-segments elongate-lanceolate.

TENASSERIM; at Moulmein, *Parish*.

* *Stem* scarcely 2 in., densely leafy, upwards (with the innovations) rusty woolly. *Leaves* 5 by 1 in., acuminate at both ends, minutely crenate-sinuate, mature puberulous on both surfaces; petiole 2 in. *Peduncles* 2-4 in., puberulous; bracts $\frac{2}{3}$ in., narrowly lanceolate; pedicels $\frac{1}{2}$ -1 in. *Calyx* $\frac{1}{2}$ in., pubescent, one lip 2-partite the other 3-lobed half-way down. *Corolla* $\frac{3}{4}$ in., wide funnel-shaped, glabrous, purple-rose; lobes rounded, 2 upper more blue. *Stamens* of the genus. *Style* linear, pubescent, stigma produced on one side. *Capsule* (immature) oblong, hairy.

XII. **PHYLLOBÆA**, *Benth. partly.*

An erect herb. *Leaves* opposite. *Cymes* peduncled, bracts conspicuous; flowers rose. *Calyx* large, 2-lipped; one lip 2-partite nearly to the base, the other 3-lobed half-way down. *Corolla* wide-campanulate, sub-bilabiate; lobes 5, ovate, nearly equal. *Stamens* 2 perfect, filaments very short; anthers large, round, connivent, 2-celled; cells ovate, divaricate, soon appearing 1-celled, dehiscing by a single short slit; staminodes 2-3 or 0. *Ovary* oblong, acute; disc unilateral; style longer than the ovary, stigma produced on one side; placentæ deeply intruded, bifid, branches much recurved bearing ovules on both surfaces. *Capsule* narrow-lanceolate, longer than the calyx, follicular, afterwards 2-valved; valves twisted; placentæ papery, revolute. *Seeds* ellipsoid, rugose-reticulate.

P. amplexicaulis, *Benth. in Gen. Pl. ii. 1020*; glabrous, stem long, leaves round, petioles winged amplexicaul, cyme-branches densely many-fld., bracts broad almost imbricate. *Bœa amplexicaulis*, *Parish ms.*; *Clarke Comm. & Cyrt. Beng. t. 84*.

TENASSERIM; at Moulmein, *Parish*. PEGU; Kambila-toung, alt. 3200 ft., *Kurz*.

Branches 6-12 in. *Leaves* 6-10 in. diam., shortly acuminate, crenate-sinuate; petiole $\frac{1}{2}$ by $\frac{1}{4}$ in. *Peduncles* 4-6 in., stout, axillary, solitary, often opposite; bracts $\frac{1}{2}$ in., round, connate at the base; cymes dichotomous; branches 2 in., 5-25-fld.; pedicels $0-\frac{1}{2}$ in.; bracteoles similar to the bracts but smaller. *Calyx* $\frac{1}{2}$ in.; lobes herbaceous, spatulate-oblong, obtuse. *Corolla* $\frac{1}{2}$ in. long, $\frac{3}{4}$ in. diam., white suffused with rose. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in., conical upwards, valves twisted into 2 or 3 complete spires.

XIII. **BœA**, *Commers.*

Perennial herbs; caulescent or scapose. *Leaves* opposite or crowded. *Peduncles* axillary, usually long; cymes lax or few-fld.; bracts small. *Sepals* 5, small, narrow. *Corolla* small or middle-sized, widely campanulate, somewhat unequal at the base, glabrous, 2-lipped; lobes 5, ovate, obtuse. *Stamens* 2 perfect, 2-3 rudimentary; filaments short, linear (in the Indian species); anthers 2-celled, often cohering at the apex; cells ovate, divergent at the base, slits usually confluent at the apex. *Ovary* sessile, linear; disc 0; style as long as the ovary, glabrous upwards, stigma small obscurely 2-lobed; placentæ inflexed nearly to the axis, then recurved bearing the ovules. *Capsule* linear, loculicidal; valves 2, twisted; placentæ at first attached to the valves, twisted with them, afterwards separating from the valves, which often again split each into two. *Seeds* minute, ellipsoid, smooth, testa minutely reticulate.—Species 12, Indian, N. Chinese, N. Australian and the New Hebridean.

The generic name was by Commerson spelt originally *Beaua* in ms., and afterwards simplified to *Bea*, also in ms. It was first published in Lamk. Dict. (1783) i. 401, and spelt *Bœa*; afterwards in Juss. Gen. (1789) 121 as *Bœa*. *Bœa* was adopted by Brown, DC., and by Bentham in Gen. Plant., but *Bœa* has priority of publication.

1. ***B. proliza***, *Clarke*; stem short, leaves lanceolate or ovate-lanceolate coriaceous tomentose beneath, peduncle very long, cymes many-fld., capsule $\frac{1}{2}$ in.

PEGU; at Thoungyun, *Kurz*.

Stem $2\frac{1}{2}$ in., closely tomentose. *Leaves* opposite, crowded, 4 by $\frac{3}{4}$ – $1\frac{1}{2}$ in., acute, rhomboid at the base, minutely crenulate, arachnoid above; nerves beneath obscured by tomentum; petiole 1 in. *Peduncle* 9 in., rusty-tomentose; cyme $2\frac{1}{2}$ in. diam., about 50-fld., with deciduous tomentum; pedicels $\frac{1}{2}$ in., puberulous. *Sepals* $\frac{1}{2}$ in., linear, nearly glabrous. *Corolla* not seen. *Capsule* glabrous.

2. ***B. multiflora***, *Br. in Benn. Pl. Jav. Rar.* 120; stem short, leaves narrowly elliptic regularly crenate mature glabrate above villous or lanate on the reticulated nerves beneath, cymes many-fld., capsule $\frac{1}{2}$ in. *A. DC. Prodr.* ix. 272. *B. flocculosa*, *Clarke Comm. & Cyrt. Beng. t.* 83. *Didymocarpus multiflora*, *Wall. Cat.* 793.—*Bœa* sp. nu. 2 and 4, *Herb. Ind. Or. H. f. & T.*

KHASIA Mts., alt. 1–3000 ft.; *Wallich, H. f. & T., &c.* ASSAM; *Griffith. MOULMEIN; Parish.*—DISTRIB. Cochin China.

Stem 1–5 in.; upwards cinnamoneous-tomentose. *Leaves* crowded, 6 by $2\frac{1}{2}$ in., subobtusely, base unequally rhomboid, deciduously floccose above, ultimately nearly glabrous beneath except on the much-elevated nerves; petiole $\frac{1}{2}$ –1 in. *Peduncles* several, 4–7 in., floccose-tomentose; cyme 2–3 in. diam., up to 50-fld., tomentose. *Sepals* $\frac{1}{3}$ in., sublinear. *Corolla* $\frac{1}{2}$ in., puberulous without. *Ovary* densely covered with sessile glands; style glabrous. *Capsule* glandular-puberulous.—In the Khasian plant the nerves of the leaves beneath are thick, tomentose; in the Burmese plant they are beneath slenderer, pubescent; and the branches of the cyme are slenderer.

3. ***B. herbacea***, *Clarke*; leaves nearly sessile distant opposite elliptic acuminate crenate-serrate sparsely pilose on both surfaces, base attenuate, cymes contracted many-fld., capsule $\frac{1}{4}$ in.—*Bœa* n. 3, *Herb. Ind. Or. H. f. & T.*

TENASSERIM; at Moulmein, *Parish*.

Stem 4–8 in., slender, softly hairy. *Leaves* 8 by 3 in., or hardly half these dimensions, often amplexicaul. *Peduncles* 1–4, $2\frac{1}{4}$ in., softly hairy; cymes $1\frac{1}{2}$ in. diam., green, viscidly hairy. *Sepals* $\frac{1}{10}$ in., narrowly oblong, viscidly hairy. *Corolla* $\frac{1}{4}$ in., glabrous. *Ovary* glistening with yellow glands; style glabrous upwards. *Capsule* glandular-viscous, closely reflexed in young fruit.—Excessively variable in the size of the leaves.

XIV. ORNITHOBÆA, *Clarke*.

A caulescent herb. *Leaves* opposite, distant, petioled. *Peduncles* axillary, solitary, short; cymes panicled. *Sepals* 5, not small. *Corolla* tubular, 2-lipped; upper lip of 2 reflexed lobes; lower 3-lobed, two lateral lobes narrow lanceolate patent, middle lobe smaller recurved, with a dense tuft of blue hairs at its base. *Stamens* 2 perfect, 3 rudimentary, filaments short; anthers 2-celled, united at the apex by a short ligule; cells subparallel, broad, scarcely confluent at the apex. *Ovary* sessile, ellipsoid; disc 0; style as long as the ovary, stigma minute sub-2-lobed; placenta deeply inflexed, nearly meeting, then recurved bearing the ovules. *Capsule* narrowly lanceolate, 2-valved, valves twisted before dehiscence; placenta

recurved enclosing the seeds. *Seeds* minute, ellipsoid, smooth; testa striate, reticulate.

O. Parishii, *Clarke*.

TENASSERIM; at Moulmein, *Parish*.

Stem 7 in., slender, pubescent. *Leaves* 6 by 2½ in., elliptic, acute, base unequal, crenate-serrate, thinly softly hairy on both surfaces; petiole 2-4 in. *Cymes* hardly longer than the petiole, solitary from nearly every axil; bracts ½ in., linear; pedicels ½-¾ in., subracemose. *Sepals* ½ in., oblong, green, pubescent, persistent, subreflexed in fruit. *Corolla* nearly ½ in., personate, pale blue, glabrous except the palate. *Capsule* ½ by ¼ in., hairy, green, scarcely acute.—A complete drawing with full analysis of this plant was sent to Sir W. Hooker by Mr. Parish; it resembles a *Bœa* but for the corolla and the broader submembranous capsule, which resembles *Phyllobœa*.

XV. **KLUGIA**, *Schlecht*.

Herbs, rooting at the base, then erect, somewhat succulent. *Leaves* alternate (or subopposite one of the pair reduced to an auricle), acuminate, unequal-sided, cordately auricled on one side of the unequal base, subentire or sinuate, many-nerved. *Racemes* terminal or leaf opposed, many-flid.; bracts 0; bracteoles at the base of the pedicels small, linear; flowers small, short-pedicelled, pendulous. *Calyx* laxly campanulate, 5-angled or -winged, posterior wing often larger produced at the base; lobes 5, shorter or longer than the tube. *Corolla-tube* cylindric; limb 2-lipped; upper lip very small, lower broad, rounded or shortly 3-lobed, blue with 2 yellow marks. *Stamens* 4 perfect, included; anthers approximated by pairs, 2-celled; cells short, divaricate, early confluent. *Ovary* ovoid, glabrous; disc short, cylindric; style longer than the ovary, glabrous, stigma obliquely dilated obscurely 2-lobed; placentæ deeply inflexed, each divided into 2 thick plates, bearing ovules on all sides. *Capsule* included in the calyx, broadly ellipsoid, loculicidal, 2-valved. *Seeds* ellipsoid, truncate at both ends, minutely striate, more or less reticulated.—Species 3 in India, 1 in Mexico.

1. **K. Notoniana**, *A. DC. Prodr.* ix. 276; leaves minutely scabrous-pubescent, posterior wing of the calyx larger produced at the base, lobes shorter than the tube, lower lip of the corolla ¼-½ in. diam. *Wight Ic.* t. 1353, and *Ill.* t. 159 bis, fig. 4; *Gardn. in Calc. Journ. Nat. Hist.* vi. 487. *Wulfenia Notoniana*, *Wall. Cat.* 409; *Tent. Fl. Nep.* 46, obs. *Glossanthus malabaricus*, *Klein; Benth. Scroph. Ind.* 57; *Wall. Cat.* 6394. *G. Notoniana*, *Br. in Benn. Pl. Jav. Rar.* 121. *Rhynchoglossum obliquum*, *Hohenacker*, n. 1165.

S. DECCAN PENINSULA and CEYLON, alt. 2-5000 ft., frequent, *Wight, Thwaites*, &c.

Annual, 12-18 in., usually with a line of hairs down the stem on one side. *Leaves* 5-8 in.; petiole ½-2 in. *Peduncles* ¾-2 in., racemes often 4 in. *Calyx* ⅝ in., somewhat enlarged in fruit; lobes ⅓ in., triangular, mucronate. *Corolla-tube* ½ in., white; lower lip blue, yellow near the two hooded depressions at its base. *Capsule* ½ in. diam.

VAR. glabra; glabrous, leaves more membranous, flowers smaller. *K. glabra*, *Gardn. in Calc. Journ. Nat. Hist.* vi. 489.—Ceylon; alt. 4-5000 ft., *Walker*, &c.—Even the pedicels are glabrous.

VAR. scabra; leaves minutely scabrous not pubescent beneath, flowers capsules and seeds rather smaller than in *K. Notoniana* type. *K. scabra*, *Dalz. & Gibs. Bomb. Fl.* 134. *Rhynchoglossum scabrum*, *Dalz. in Hook. Kew Journ.* ii. 140.—Mts. of S. Deccan Peninsula and Ceylon; *Dalzell, Johnstone, Walker*.

2. **K. zeylanica**, *Gardn. in Calc. Journ. Nat. Hist.* vi. 490; leaves pubescent, calyx subequally 5-winged lobes longer than the tube remarkably acuminate, lower lip of corolla more than $\frac{1}{2}$ in. diam. *A. DC. Prodr.* ix. 276, *name only*. *K. Notoniana*, *Bot. Mag.* t. 4620. *Glossanthus zeylanicus*, *Br. in Benn. Pl. Jav. Rar.* 121, *name only*.

CEYLON; frequent near Kandy, *Gardner, Thwaites, &c.*

Doubtfully distinct from *K. Notoniana* (ex Thwaites Enum. 208); but seems well separable by the long and remarkably acuminate calyx-lobes; the pubescence also is often stellate.

3. **K. ampliata**; leaves glabrate, calyx subequally 5-winged lobes as long as the tube lanceolate, bracteoles persistent conspicuous.

UPPER ASSAM; Mishmee Hills, near Yen, *Griffith* (Kew Distrib. n. 3846).

Stem at least a foot. *Leaves* 6 by 3 in.; petiole $\frac{1}{2}$ –1½ in. *Peduncles* $\frac{1}{2}$ in.; racemes 3 in., scarcely puberulous; bracteoles $\frac{1}{4}$ in. and upwards; pedicels 0– $\frac{1}{4}$ in. *Calyx* (in fruit) $\frac{1}{2}$ in., broadly cylindric. *Capsule* and *seeds* nearly as of *K. Notoniana*.—Corolla not seen: the species resembles *K. Notoniana*, but is larger in all its parts.

XVI. RHYNCHOGLOSSUM, *Blume.*

Herbs, minutely scabrid-pubescent or nearly glabrous. *Leaves* alternate, elliptic, acuminate, unequal-sided, cordate on one side of the unequal base, subentire or sinuate. *Racemes* long, many-fl'd.; bracts 0; bracteoles minute. *Calyx* campanulate, 5-lobed half-way down. *Corolla-tube* cylindric, contracted at the mouth; limb 2-lipped; upper lip short bifid, lower lip longer, 3-lobed. *Stamens* 2 perfect, included; anthers connivent, 2-celled; cells ellipsoid, subparallel, slits ultimately subconfluent at the apex. *Ovary* ovoid; style linear, stigma minutely 2-lobed; placenta deeply intruded, then bifid into 2 thick plates bearing ovules on all sides. *Capsule* included, ellipsoid, membranous, loculicidally 2-valved. *Seeds* narrowly ellipsoid, smooth; testa minutely reticulated.—Species 2, extending from India to the Philippines.

R. obliquum, *Blume Bijl.* 741; corolla $\frac{1}{2}$ in. long, lower lip ovate 2–3 times longer than the upper. *DC. Prodr.* ix. 274. *R. Blumei*, *DC. l. c.* 274. *Wulfenia intermedia*, *Wall. Cat.* 408. *Loxotis intermedia*, *Benth. Scroph. Ind.* 57. *L. obliqua*, *Br. in Benn. Pl. Jav. Rar.* 102, t. 24.

TENASSERIM; at Moulmein, *Wallich, Parish, &c.* MALACCA; *Zippel*.—DISTRIB. Throughout the Malayan Archipelago.

A succulent, membranous herb, very variable in size; height 2–20 in. *Leaves* 1– $\frac{1}{2}$ in.; petiole $\frac{1}{4}$ –2 in. *Racemes* 8 in., or sometimes depauperated and 1–3-fl'd.; bracteoles $\frac{1}{12}$ – $\frac{1}{6}$ in., filiform. *Calyx* $\frac{1}{2}$ in., somewhat enlarged in fruit; lobes lanceolate, sometimes very acuminate, sometimes subtriangular. *Corolla* blue and white, tube slightly incurved, as though hooded in the throat; 2 lateral lobes of the lower lip narrow falcate. *Capsule* $\frac{1}{2}$ in. diam. *Seeds* not striated.

VAR. *parviflora*; lower lip of corolla narrower hardly twice as long as the upper. *R. obliquum*, *Wight Ill.* t. 159 bis, fig. 7; *Clarke Comm. & Cyrt. Beng.* t. 88. *R. zeylanicum*, *Bot. Mag.* t. 1498. *Wulfenia obliqua*, *Wall. Cat.* 407, and *Tent. Fl. Nep.* 45, t. 35. *Loxotis obliqua*, *Benth. Scroph. Ind.* 57.—*Rheede Hort. Mal.* ix. t. 80.—Throughout India; alt. 0–5000 ft., in and near the hills, very common; from Kumaon to Bhotan; in Chota Nagpore and Central India, and in the W. Deccan Peninsula, from Bombay to Ceylon.

XVII. JERDONIA, *Wight.*

A perennial, stemless herb. *Leaves* elliptic, reticulate; petiole long.

Scapes slender, few-fl'd.; bracts small. *Sepals* 5, lanceolate. *Corolla* pale lilac with red lines; tube elongate, swollen upwards; limb oblique, 2-lipped; lobes 5, ovate, obtuse, nearly equal. *Stamens* 4 perfect; filaments short, dilated upwards, 2 spurred; anthers connivent, cohering by their apices, 2-celled; cells ellipsoid, divergent at base, early divaricate and confluent. *Ovary* ovoid; disc annular; style linear, stigma small scarcely 2-lobed; placenta 2-partite into 2 flat plates bearing ovules on both faces. *Capsule* broadly ovoid, acute, loculicidally 2-valved; placenta scarcely altered in fruit. *Seeds* funicled, ellipsoid, subumbonate at the apex, smooth, testa striate coarsely reticulate.

J. indica, *Wight Ic.* t. 1352, and *Ill.* t. 159 bis, fig. 2; *Bot. Mag.* t. 5814.

S. DECCAN PENINSULA; Nilgherry and Anamally Hills, and Bolimputty near Coimbatore, *Wight*.

Stem 2 in., thick, creeping, upwards (with the innovations) rufous-hirsute or woolly. *Leaves* alternate, dense, $2\frac{1}{2}$ by 2 in., obtuse at both ends, entire, rufous-ciliate on the margin, mature glabrate above, rusty puberulous on the nerves beneath; petiole 2-4 in. *Scapes* 2-4 in., rufous-pilose; bracts $\frac{1}{10}$ in., sublinear; pedicels $\frac{1}{10}$ - $\frac{1}{4}$ in., in fruit somewhat thickened upwards. *Sepals* $\frac{1}{10}$ in., rusty puberulous. *Corolla* $\frac{3}{8}$ in.; lobes $\frac{1}{2}$ in. diam. *Filaments* sparsely pilose. *Ovary* and style glabrous. *Capsule* $\frac{1}{8}$ in. long and broad.

XVIII. **LEPTOBCEA**, *Benth.*

Shrubs. *Leaves* opposite, often crowded. *Peduncles* filiform, lax, few-fl'd.; bracts small, linear; pedicels capillary. *Calyx* small, 5-fl'd. *Corolla* small, campanulate, slightly gibbous at the base, white; limb obscurely 2-lipped; lobes 5, subequal, round. *Stamens* 4 perfect, included; anther-cells ellipsoid, divergent at the base, ultimately confluent at the apex. *Ovary* sessile, ellipsoid; disc 0; style linear, stigma small subcapitate; placenta deeply intruded, of 2 plates, bearing ovules on both faces. *Capsule* linear or oblong, septicidally 2-valved; margins of the valves inflexed bearing the placenta, valves soon or late 2-partite. *Seeds* minute, ellipsoid, smooth.—Species 2, in N. and E. Bengal.

1. **L. multiflora**, *Gamble Darjeeling List*, 58; leaves elliptic acuminate at both ends pubescent, capsule $\frac{3}{4}$ in. linear 2-valved late or scarcely at all 4-valved. *Championia multiflora*, *Clarke Comm. & Cyrt. Beng.* t. 68.—*Cyrtandracea* n. 100, *Griff. Itin. Notes*, p. 107.

SIKKIM and BHOTAN, alt. 3000 ft., frequent; *Griffith, J. D. H.*, &c. ASSAM; *Griffith*. KHASIA MTS., alt. 2000 ft., frequent.

A shrub, 2-6 ft. *Leaves* attaining 4 by $1\frac{1}{2}$ in., minutely crenulate, hairy on both surfaces or at least on the nerves beneath; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Peduncles* $\frac{1}{2}$ -1 in., often several fascicled on shortened lateral branches, 1-5-fl'd., pubescent; bracts $\frac{1}{2}$ in., linear; pedicels $\frac{1}{3}$ - $\frac{2}{3}$ in. *Calyx* $\frac{1}{12}$ in., persistent; teeth linear, pubescent. *Corolla* $\frac{1}{4}$ in., glabrous. *Ovary* minutely glandular; style glabrous, about as long as the ovary. *Capsule* glabrous, acute, beaked by the style; valves 2, often remaining attached at the apex or on one side (in the manner of *Loxocarpus*), ultimately again 2-partite.

2. **L. glabra**, glabrous, leaves elliptic acuminate at both ends, capsule $\frac{1}{2}$ in. oblong 2-valved nearly from the first 4-valved. *Cheilosandra leptopus*, *Griff. ms.*; *Benth. in Gen. Pl.* ii. 1025.

UPPER ASSAM; Mishmee Hills, *Griffith* (Kew Distrib. n. 3843).

A shrub, closely resembling *L. pubescens*, but altogether glabrous. *Petioles*

scarcely $\frac{1}{2}$ in. *Capsule* broadly oblong, subobtuse, early dehiscent from the apex into 4 obtuse valves, very nearly as in *Bœica*.

XIX. EPITHEMA, Blume.

Small, succulent, pubescent herbs. *Leaves* few or solitary, lower alternate, upper often opposite. *Peduncles* 1 or several, in the upper axils, free or confluent with the petiole or leaf-base; bract large, solitary, 1-sided, hooded or subspathaceous; flowers in a dense scorpioid raceme; bracteoles small, narrow. *Calyx* campanulate; lobes 5, acute, valvate in bud. *Corolla* small, tubular, 2-lipped, blue or white; lobes 5, not very unequal. *Stamens* 2 perfect; anthers cohering, 2-celled; cells short, divaricate, early confluent. *Ovary* ovoid; disc 1-sided; style filiform, stigma small subcapitate; placenta stalked, peltate, bearing ovules on all sides. *Capsule* globose, membranous, included, circumsciss. *Seeds* oblong or ellipsoid, subacute at both ends, smooth; cells of the testa elongate, often spiral.—Species 5 (or 1), from India to the Philippines, with 1 at Fernando Po.

E. carnosum, Benth. *Scroph. Ind.* p. 57; lower leaf petioled upper opposite nearly sessile sinuate-crenate thinly pubescent, bract rarely hooded, ovary densely pubescent at the apex, seeds narrowly oblong, cells of the testa nearly straight. *DC. Prodr.* ix. 278; *Clarke Comm. & Cyrt. Beng.* t. 90. *Aikinia carnosia*, G. Don *Gen. Syst.* iv. 665.—*Epithema?*, Wall. *Cat.* 9080.

E. SUBTROPICAL HIMALAYA, alt. 1–5000 ft., from Nepal to Bhotan, common; *Wallich*, &c. *KHASIA MTS.*, alt. 500–4000 ft., frequent; *H. f. & T.*, &c.

Stem $\frac{1}{2}$ –14 in. *Leaves* $\frac{1}{2}$ –8 in., ovate-cordate, sparsely laxly villous above, paler nearly glabrous beneath except on the nerves; petiole of the alternate leaf often 2–4 in., of the subsessile leaves rarely $\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ –4 in., free or racemously (not fasciculate) confluent with the petiole or leaf-base; bract $\frac{1}{2}$ – $\frac{3}{4}$ in., truncate; pedicels 0– $\frac{1}{2}$ in.; raceme subincluded in the bract or not; bracteoles minute, linear. *Calyx* $\frac{1}{2}$ – $\frac{1}{6}$ in., hairy; lobes lanceolate or triangular with a linear point. *Corolla* $\frac{1}{4}$ – $\frac{1}{2}$ in., with a ring of hairs within; lobes of the upper lip lanceolate, acute. *Capsule* $\frac{1}{2}$ in. diam.

VAR. dentata; leaves denticulate or sometimes subacutely doubly serrate.—Pegu and Tenasserim; Attaran, *Brandis*; Moulmein, *Parish*, &c.

VAR. hispida; leaves serrulate almost hispid above, seeds broadly oblong. *E. ceylanicum*, *Wight Ill.* t. 159 bis, fig. 3, and *Ic.* t. 1354; *Dalz. & Gibs. Bomb. Fl.* 135.—S. Deccan Peninsula; Courtallum, *Wight*; Nilgherries, *Thomson*; Concan, *Dalzell*, &c.

VAR. zeylanica; calyx larger, seeds twice as heavy as those of *E. carnosum* type. *E. zeylanica*, *Gardn. in Calc. Journ. Nat. Hist.* vi. 492. *E. carnosum*, *Thwaites Enum.* 208.—Ceylon; in the Central Province up to 4000 ft., common; *Gardner*, &c.

VAR. pusilla; small, nearly glabrous, calyx and ovary nearly glabrous, seeds spirally marked by the long cells of the testa.—Bombay?; *Stocks*.

XX. MONOPHYLLÆA, Br.

Succulent herbs; stem simple, having one leaf and several peduncles at the apex. *Leaf* large, sessile, cordate-ovate, entire. *Racemes* lax or dense, simple or divided; bract 0; bracteoles minute. *Sepals* small, round-ovate, imbricate in bud. *Corolla* small; tube cylindric or short; limb 2-lipped, lobes 5. *Stamens* 4, perfect, filaments short; anthers adherent. *Disc* annular. *Ovary* ovoid, glabrous; style short, linear, stigma sub-

capitate; placenta deeply inflexed, then recurved bearing the ovules. *Capsule* membranous, included, irregularly breaking up; placenta left in the centre. *Seeds* ellipsoid, smooth, striated, reticulated.—Species 5, Malayan.

M. Horsfieldii, *Br. in Benn. Pl. Jav. Rar.* p. 121; leaf nearly glabrous, racemes lax, corolla-tube longer than the calyx. *DC. Prodr.* ix. 274.

MALAYAN PENINSULA; Klang in Selangore, *Beccari*.—DISTRIB. Java, Sumatra.

Stem 4 in. *Leaf* 6–8 in. diam., membranous. *Peduncles* 2–5, 1–4 in., nearly glabrous; racemes simple or divided, $\frac{1}{2}$ –4 in.; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., lower often distant, paired or fascicled. *Sepals* $\frac{1}{10}$ in., glabrous, slightly enlarged in fruit. *Corolla* $\frac{1}{2}$ in. *Anthers* ovate, 2-celled; cells soon confluent at the apex; filaments scabrid-glandular at the apex, not toothed. *Style* subsistent, exerted from the calyx in young fruit.

XXI. CYRTANDROMÆA, Zoll.

Undershrubs, thinly pubescent. *Leaves* opposite, subequal or (in non-Indian species) sometimes unequal, elliptic or oblong, acuminate at both ends, serrate. *Racemes* axillary, small, 1- or few-fl., or elongate many-fl.; pedicels 1-bracteate at base, 2-bracteolate near the middle; bracts and bracteoles small, linear. *Calyx* tubular, 5-ribbed, 5-toothed; in fruit enlarged, membranous, subtruncate. *Corolla* large, white, sometimes with yellow lines in the throat within, glabrous; tube nearly straight; lobes 5, subequal, round, patent. *Stamens* 4, perfect, included, filaments linear; anther-cells 2, oblong, divergent at base. *Disc* obscure. *Ovary* 1-celled (2-celled near the base); placenta nearly meeting in its axis, not there bearing ovules, then recurved ovuliferous; style elongate, stigma of two semicircular plates. *Capsule* included in the inflated calyx, ellipsoid, papery, irregularly breaking up or loculicidal; placenta early free forming a 4-pointed column covered by seeds on all sides. *Seeds* subglobose, testa strongly reticulated by subquadrate cells.—Species 8, Malayan.

1. **C. decurrens**, *Zoll. Syst. Verz. Ind. Arch.* i. 58; leaves elliptic acuminate base much decurrent, racemes many-fl., calyx glabrous, capsule irregularly breaking up. *Loxonia?* *decurrens*, *Blume Bijl.* 776; *DC. Prodr.* ix. 277. *Busea decurrens*, *Miq. Fl. Ind. Bat.* ii. 733. *Cyrtandra acuminata*, *Kurz in Trimen. Journ. Bot.* 1875, 329, not of Wall.

NICOBAR; *Kurz*.—DISTRIB. Java.

A nearly glabrous undershrub, 3–6 ft. high; stem little-divided, leafy at the top. *Leaves* 6 in., serrate nearly from the base; nerves 17–20 pair; petiole hardly any by reason of the much decurrent leaf-base. *Racemes* abbreviated, few-fl., or attaining $3\frac{1}{2}$ in., 20-fl., pendulous; pedicels $\frac{2}{3}$ in.; bracteoles $\frac{1}{2}$ in., linear, glabrous. *Calyx* $\frac{1}{2}$ in., corolloid, white or tinged orange; in fruit $\frac{3}{4}$ –1 in., reticulate. *Corolla* $1\frac{1}{2}$ in. *Capsule* $\frac{1}{2}$ by $\frac{1}{4}$ in., ellipsoid.—Zollinger's specimen agrees with *Kurz's* Nicobar plant; but his description perhaps includes *C. acuminata* as well as *C. decurrens*.

2. **C. acuminata**, *Benth. in Gen. Pl.* ii. 1020; leaves elliptic acuminate, peduncles 1-fl. shorter than the petioles, capsule loculicidal 2-valved. *Cyrtandra?* *acuminata*, *Wall. Cat.* 1808; *DC. Prodr.* ix. 285, name only; not of *Kurz*. *Busea subsessilis*, *Miq. Fl. Ind. Bat.* ii. 734.

PENANG; *Wallich, Porter*. SINGAPORE; *Maingay, Lobb*.—DISTRIB. Sumatra.

An undershrub, 3 ft. high. *Leaves* 4–6 in., serrate nearly from the base, mature sparsely pubescent; nerves 10 pair; petiole $\frac{3}{4}$ in. *Peduncles* pubescent; bracteoles $\frac{1}{2}$ in., linear. *Calyx* $\frac{1}{2}$ in., 5-ribbed, minutely pubescent; in fruit $\frac{3}{4}$ in., reticulate. *Corolla* $1\frac{1}{2}$ in. *Capsule* $\frac{1}{2}$ by $\frac{1}{4}$ in., dehiscent from the apex so as to split the style-base.

3. **C. cymulosa**, *Clarke*; leaves elliptic acuminate petioled, cymes small 1-5-fld. subsessile, calyx nearly glabrous, capsule breaking up irregularly.

TENASSERIM; at Mergui, *Griffith*, *Helser* (Kew Distrib. n. 3827).

Leaves 8 by 3½ in., nearly glabrous, narrowed at the base; nerves 10 pair; petiole ½-¾ in. Cymes scarcely ¾ in., appearing sessile on weak axillary spurs, pubescent. Otherwise as *C. decurrens*, from which it differs in the petioled, much less-nerved leaves.

4. **C. grandiflora**, *Clarke*; leaves petioled elliptic acuminate, peduncles 1-2-fld. with the pedicels nearly 1 in., flowering calyx ¼ in. minutely pubescent.

TENASSERIM; at Moulmein, *Lobb*.

Branch terete, shortly fulvous-pubescent. Leaves 6 by 2 in., both ends much acuminate, serrate, minutely pubescent; nerves 9 pair; petiole ¾ in. Corolla 2½ in. Capsule (and fruit-calyx) as of *C. decurrens*, not perfectly ripe, so that it is not certain whether it opens by valves.

XXII. STAURANTHERA, *Benth.*

Low, succulent, pubescent herbs. Leaves alternate, or opposite one of each pair reduced to a small auricle, falcate, elliptic, acuminate, very unequal-sided. Cymes peduncled, lax, subracemose; bracts small. Calyx wide-campanulate; lobes 5, wide-spreading, subuplicate. Corolla campanulate, spurred or gibbous at the base, somewhat 2-lipped; lobes 5, subequal. Stamens 4 perfect, filaments short; anthers 2-celled, cohering crosswise into a depressed cone; cells diverging at the base, dehiscing on the inner face by slits ultimately confluent at the apex. Disc 0. Ovary sessile, subglobose; style short, stigma broad, margin sublobed; placentæ deeply inflexed, bifid, branches lobed, bearing ovules on both sides. Capsule depressed-globose, overtopped by the calyx, papery, transversely or irregularly breaking up. Seeds minute, obovoid, smooth; testa reticulated, cells often spiral.—Species 4, from Assam and Chittagong to Java and Celebes.

1. **S. umbrosa**, *Clarke Comm. & Cyrt. Beng.* t. 89; leaves alternate, corolla ¼-½ in. gibbous not spurred at the base. *Cyananthus umbrosa*, *Griff. Notul.* iv. 154, and *Ic. Pl. Ind. Or.* t. 437.

UPPER ASSAM; Gubroo Hills, *Griffith* (Kew Distrib. n. 3845).—DISTRIB. Ava.

Stem 4-12 in., occasionally branched, dusky-pubescent. Leaves attaining 8 by 3 in., obscurely crenate, glabrate above, fuscous-pubescent (at least on the nerves) beneath; petiole ½-¾ in. Peduncles ¾-1½ in.; cymes 2-3 in., dusky-pubescent; pedicels ¼-½ in. Calyx ¼-½ in. diam., lobed half-way down; lobes triangular. Corolla white, with blue marks, yellow near the base within. Ovary pubescent. Capsule circumsciss near the base (*Griffith*); placentæ fungose (*Griffith*), but are in the dried state thin.

2. **S. grandiflora**, *Benth. Scroph. Ind.* 57 (by misprint *grandifolia*); leaves opposite, corolla 1 in. spurred at the base. *S. grandifolia*, *Br. in Benn. Pl. Jav. Rar.* 121; *DC. Prodr.* ix. 278; *Bot. Mag.* t. 5409; *Clarke Comm. & Cyrt. Beng.* t. 89 bis. *Glossanthus grandiflorus*, *Benth. in Wall. Cat.* 6395.

PENANG; *Wallich*. CHITTAGONG HILLS; *Clarke*. MOULMEIN; *Parish*.

Stem 4-12 in., dusky-pubescent. Leaves attaining 10 by 4½ in., obscurely toothed, mature nearly glabrate except on the nerves beneath; petiole ½-1 in. Inflorescence and calyx nearly as in *S. umbrosa*. Corolla blue, with yellow marks in the tube within; spur ½ in. Ovary thinly pubescent or glabrous. Capsule ½ in.

broad, breaking up irregularly.—The examples from the Chittagong Hills (without flowers) are more hairy, the leaves beneath closely grey-pilose.

S. ? Brandisi; leaves alternate, pedicels long fascicled in abbreviated cymes, calyx narrow, capsule small longer than broad.

PGU; Thongyun, *Brandis*.

Stem creeping at the base; innovations rusty-silkily woolly. *Leaves* 7 by 4 in., shortly acute, very unequal-sided, somewhat thick, glabrate above, rusty-villous beneath; petiole $\frac{1}{2}$ in. *Pedicels* in fruit $\frac{1}{2}$ – $\frac{3}{4}$ in., glabrous; bracts $\frac{3}{4}$ by $\frac{1}{2}$ in., oblong, obtuse, nearly glabrous. *Sepals* in fruit $\frac{1}{2}$ by $\frac{1}{2}$ in., elliptic, acute, imbricate, shortly united at the base, nearly glabrous. *Capsule* $\frac{1}{2}$ by $\frac{1}{16}$ in., acute, glabrous, papery, indehiscent; placentæ deeply intruded, bifid, branched; plates thin, bearing ovules on both sides. *Seeds* minute, obovoid, smooth.—Probably a new genus, but the flowers are unknown; the leaves are much like those of *Stauranthera umbrosa*; the inflorescence, bracts, calyx and capsule do not suit *Stauranthera*, but *Rhynchotechum*.

XXIII. ISANTHERA, *Nees*.

Small, nearly simple, undershrubs; innovations tawny, silkily woolly. *Leaves* all alternate, broadly oblanceolate, acuminate at both ends. *Cymes* axillary, short-peduncled, towards the end of the stem; bracts narrow. *Sepals* 5, small, narrow. *Corolla* small, shortly campanulate, obscurely 2-lipped; lobes 5, ovate. *Stamens* 4 fertile (sometimes 5 fide *Nees*); filaments short; anthers small, subquadrate, 2-celled, slits marginal, finally confluent at the subemarginate apex. *Disc* very small or 0. *Ovary* ovoid, sessile; style shorter than the ovary, stigma small simple; placentas deeply inflexed, then bifid recurved bearing the ovules. *Berry* small, ovoid or subglobose, fleshy, indehiscent or (fide *Gardner*) ultimately 2-valved. *Seeds* very small, ellipsoid, smooth.—Species 3, in India, Malaya and the Philippines.

A genus which should perhaps be merged in *Rhynchotechum*; differing in having no opposite leaves, a shorter style, and the anthers dehiscent exactly on the margins.

I. permollis, *Nees in Trans. Linn. Soc.* 17, p. 82; leaves nearly entire, nerves 11–19 pair, cymes short-peduncled dense. *Wall. Cat.* 9073; *DC. Prodr.* ix. 279; *Wight Ill.* t. 159 b, fig. 5, and *Id.* t. 1355. I. floribunda, *Gardn. in Calc. Journ. Nat. Hist.* vi. 483. *Cyrtandra* ? lanuginosa, *R. Br. in Wall. Cat.* 7131.

S. MADRAS, *Heyne*; Nilgherries and Courtallum, *Wight*, &c. CEYLON, up to 4000 ft. alt.; *Gardner, Thwaites*, &c.

Stem 8–12 in. *Leaves* attaining $9\frac{1}{2}$ by 4 in.; mature glabrous above, more or less tawny and woolly beneath; petiole $\frac{1}{2}$ –1 in. *Peduncles* scarcely as long as the petioles; cymes $\frac{1}{2}$ –1 $\frac{1}{2}$ in. diam. *Sepals* $\frac{1}{2}$ in., silky, finally nearly glabrous. *Corolla* 1 in., white. *Berry* $\frac{1}{2}$ by $\frac{1}{2}$ in.—In *Wight's* figures the anthers are depicted from an example past flower.

VAR. ? paucinerva; nerves of the leaves 6–8 pair.—*Mergui*; *Griffith* (in *Herb. Wight*).—This might be suspected a misplaced ticket; but out of the abundant Ceylon material, none has few-nerved leaves resembling this.

XXIV. RHYNCHOTECHUM, *Blume*.

Erect, simple undershrubs; innovations tawny, silkily woolly. *Leaves* opposite or lower alternate, usually large. *Cymes* in the lower axils, many-fld., trichotomous or umbellately compound; bracts narrow, inconspicuous.

Sepals 5, small, narrow. *Corolla* small, subcampanulate, purple-rose or white; limb obscurely 2-lipped; lobes 5, subequal, round. *Stamens* 4 perfect, attached near the base of the corolla, filaments short linear curved; anther-cells 2, subparallel below, dehiscent on the inner face, completely confluent at the apex. *Disc* 0 or very small annular. *Ovary* sessile, ovoid; style linear elongate, stigma small; placentæ nearly meeting in the axis of the ovary, there naked, then recurved bearing the ovules. *Berry* small, globose, apiculate, glistening white, pulpy. *Seeds* very small, ellipsoid, smooth.—Species 8, from Bengal through Malaya to the Philippines.

1. *R. parviflorum*, *Blume Bijl.* p. 775; leaves broadly oblanceolate serrate mature glabrate except on the nerves beneath, sepals softly tawny-villous, corolla very small, ovary upwards densely shortly hairy.

JAVA; frequent.

VAR. ? *penangensis*; sepals caudate-acuminate tawny silky in fruit, corolla exceeding the sepals.—PENANG.—The material is a stem with flowers and half-ripe fruit, but no leaves, which has been doubtfully referred to *R. ellipticum*, from which it differs in the indumentum, and the minutely hairy ovary. It is either a large-fl. var. of *R. parviflorum*, or a species nearly allied to it. The peduncles are all opposite at the nodes; in the Java *R. parviflorum* the lower leaves and peduncles are frequently alternate.

2. *R. ellipticum*, *A. DC. Prodr.* ix. 285, *in note*; leaves broadly elliptic or obovate acute minutely dentate mature glabrous above, sepals after flowering patently pilose, corolla $\frac{1}{4}$ in., ovary glabrous or with very few gland-tipped hairs. *Bot. Mag.* t. 5832; *Clarke Comm. & Cyrt. Beng.* t. 91. *Corysanthera elliptica*, *Wall. Cat.* 6411.—*Cyrtandracea*, *Griff. Ic. Pl. Asiat.* t. 439.

SIKKIM, BHOTAN, ASSAM, KHASIA MTS., CACHAR and SILHET; alt. 0-3500 ft. in or near the hills, frequent.

Stem 2-4 ft., thick, cinnamomeous, tomentose or woolly at the apex. *Leaves* opposite, $6\frac{1}{2}$ by $3\frac{1}{4}$ in. (often larger), base cuneate, somewhat coriaceous, whitened beneath, above tawny, silkily woolly, afterwards glabrate, beneath densely cinnamomeous-woolly, afterwards glabrous except the nerves; nerves 15-20 pair, subparallel; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., often 2-4 together (or the peduncle divided from the base), when young tawny-silky, divaricately often umbellately divided. *Sepals* $\frac{1}{2}$ in., narrowly lanceolate, mature squamous or scabrous from the thick spreading hairs, often corolloid, rose. *Corolla* rose-purple, minutely hairy without. *Berry* $\frac{1}{4}$ in. diam.

VAR. *pilosior*; mature leaves above with close short white hairs, sepals patently hispid.—Darjeeling; alt. 3500 ft., *Clarke*.

VAR. *angusta*; leaves narrowly elongate-lanceolate (sometimes 10 by $1\frac{1}{4}$ in.), nerves 10-15 pair.—Cachar; *H. f. & T., Keenan.* MARTABAN; *Parish.*—Possibly a distinct species; see *Hook. f. in Bot. Mag.* t. 5832.

VAR. *Hookeri*; leaves oblong, cymes very dense repeatedly trichotomous.—Chittagong; Seetakoond, alt. 1000 ft., *H. f. & T.*; Demagri, alt. 250 ft., *Clarke.*—Probably only the full form of the preceding variety *angusta*.

3. *R. vestitum*, *H. f. & T.*; *Clarke Comm. & Cyrt. Beng.* t. 92; leaves elliptic acuminate at both ends slightly dentate hirsute on both surfaces, inflorescence very hirsute, corolla $\frac{1}{2}$ - $\frac{3}{4}$ in., ovary glabrous or nearly so. *Corisanthera vestita*, *Griff. Itin. Notes*, 124, n. 426.

SIKKIM and BHOTAN HIMALAYA, ASSAM, KHASIA MTS., alt. 1-3000 ft., not rare; *Griffith, H. f. & T., &c.*

Stem 3 ft., thick, patently hispid upwards. *Leaves* opposite, 9 by $2\frac{1}{2}$ in., hirsute above with long yellow hairs rising from tubercles, more softly hairy beneath; petiole

1 in. *Peduncles* $\frac{1}{2}$ –1 in. *Sepals* $\frac{1}{2}$ in., narrowly lanceolate, patently hispid like the leaves. *Flowers* and berries as of *R. ellipticum*, but a little larger.

4. ***R. latifolium***, *H. f. & T.*; *Clarke Comm. & Cyrt. Beng.* t. 94; leaves oblanceolate or obovate acuminate at both ends subdenticulate mature glabrous above more or less tawny and silkily woolly beneath, cyme 4–6 in. diam. very divaricate compound silkily woolly. *Chelone latifolia*, *Ham. in Herb. Wall.* *Chiliandra obovata*, *Griff. Notul.* iv. 150, and *Ic. Pl. Asiat.* t. 438.

ASSAM, *Wallich, Griffith*; Mishmee Hills, *Griffith*.—DISTRIB. Ava.

Stem thick, silkily woolly upwards. *Leaves* opposite, 8 by 3 in. (sometimes obovate larger); petiole 1 in. *Peduncles* 2 in., stout; cyme umbellately decomposed, many- (sometimes 150-) fld. *Sepals* $\frac{1}{2}$ in., narrowly lanceolate. *Corolla* hardly longer than the calyx, white with the upper lip purple (*Griffith*). *Berry* $\frac{1}{2}$ in. diam. when dry.

5. ***R. alternifolium***, *Clarke*; leaves (except the uppermost pair) alternate elongate elliptic acuminate at both ends denticulate mature nearly glabrous except the nerves, cymes peduncled compound tawny silky.—*Corisanthera* sp., *Griff. ms.*

UPPER ASSAM; Brahmakoond, *Griffith*.

Stem upwards (with the innovations) cinnamoneous, silkily woolly. *Leaves* of the uppermost pair one $7\frac{1}{2}$ by $2\frac{1}{2}$ in., the other $2\frac{1}{2}$ by $\frac{3}{4}$ in.; petiole $1\frac{1}{2}$ in. *Peduncles* 1 in.; inflorescence much as of *R. latifolium*, but less divaricate. *Corolla* distinctly 2-lipped, upper lip longer less deeply divided. *Anthers* largeish, dehiscent on the inner face, minutely glandular at the apex, slits early confluent at the apex. *Style* very long.—This species (with some other Malay plants) entirely annuls the simple distinction given in the Gen. Plant. between *Rhynchotechum* and *Isanthera* of “leaves opposite” and “leaves alternate;” except for the alternate leaves and peduncles it is altogether a *Rhynchotechum*.

6. ***R. calycinum***, *Clarke*; glabrate in fruit, leaves elongate-elliptic nearly entire, cymes short-peduncled very dense, sepals lanceolate prominent.

UPPER ASSAM?; “on the Soondra bank.”

Stem very thick. *Leaves* all opposite, 10 by $3\frac{1}{2}$ in., narrowed at both ends, subcoriaceous, not seen young; petiole 2 in. *Peduncles* 1 in., 2–5-clustered; cymes in fruit subcapitate, very many-fld., glabrate; bracts $\frac{1}{2}$ in., oblong. *Sepals* $\frac{1}{2}$ in. *Corolla* not seen. *Berry* small, glabrous.

XXV. **CYRTANDYA**, *Forst.*

Shrubs or trees. *Leaves* opposite, equal or unequal, or one of each pair rudimentary or wanting. *Flowers* in cymes or heads, peduncled or sessile, axillary; bracts often large or connate into an involucre. *Calyx* free, ovoid or tubular, deciduous or persistent; teeth 5, acute. *Corolla* tubular-funnel-shaped; lobes 5, round, spreading, subequal (in the Indian species). *Stamens* 2 perfect, 2 or 3 rudimentary; anthers included (in the Indian species) 2-celled; cells broad-oblong, subparallel, slits longitudinal. *Disc* annular, or (in non-Indian species) unilateral subquadrate. *Ovary* superior; style long or short, stigma shortly 2-lobed; placenta nearly meeting, then revolute. *Berry* fleshy, ovoid oblong or linear, usually white. *Seeds* very many, minute, ellipsoid, smooth, testa obscurely reticulated.—Species 160, Malayan and Polynesian, from Penang to the Sandwich Islands.

1. **C. dispar**, DC. *Prodr.* ix. 282; leaves apparently alternate petioled lanceolate-obovate, peduncles short, pedicels umbelled, calyx persistent. *C. frutescens*, Wall. *Cat.* 807 partly, not of Jack.

PENANG; Wallich, Maingay.—DISTRIB. Sumatra.

A shrub; branchlets tessellated with imbricate whitened scales, somewhat quadrangular. Leaves opposite, one of the pair reduced to a linear rudiment of the petiole or 0; the other 8 by 3 in., acuminate, base cuneate, glabrate except the rufous-villous nerves beneath; petiole $\frac{1}{2}$ –1 in. Peduncles 0– $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ in., lanceolate; pedicels 3–8, $\frac{1}{2}$ – $\frac{3}{4}$ in. Calyx $\frac{1}{2}$ in., fulvous-hirsute, lobed half-way down. Corolla-tube $\frac{1}{2}$ in., slightly curved, fulvous-hirsute without; limb nearly equally 5-lobed. Disc unilateral, quadrangular. Ovary fulvous-pubescent. Berry $\frac{1}{2}$ in., elongate ellipsoid, tipped by the style-base.

2. **C. pilosa**, Blume *Bijd.* 770; leaves opposite subequal sessile obovate-lanceolate, villous above, peduncles very short, flowers involucred capitate, calyx deciduous. DC. *Prodr.* ix. 282.

TENASSERIM; Helfer. SINGAPORE; Lobb.—DISTRIB. Java, Sumatra.

A shrub; branchlets 4-angled; innovations rufous silky. Leaves 7 by 3 $\frac{1}{2}$ in., acute, base narrowed, closely serrate; nerves beneath fulvous-villous. Peduncles scarcely $\frac{1}{2}$ in.; bracts 1 in., united into a spathaceous involucre, deciduous. Calyx $\frac{1}{2}$ in., lobed about half-way down, rufous-hairy. Corolla-tube 1 in., straight, fulvous-silky without, dirty yellow. Ovary and style hairy. Berry $\frac{3}{4}$ in., elongate ellipsoid, beaked by the style-base, tessellated externally (in the dried state).

3. **C. decurrens**, De Vriese *Pl. Ind. Bat. Reinw.* 14; leaves opposite subequal subsessile obovate-lanceolate glabrous above, peduncles very short, flowers involucred capitate. *C. frutescens*, Wall. *Cat.* 807 partly, not of Jack.

PENANG; Wallich.—DISTRIB. Malaya to Borneo.

Hardly specifically separable from *C. pilosa*. The leaves, even in their young stage, are glabrous on the upper surface, and have the lateral nerves more oblique the midrib.

4. **C. bicolor**, Jack in *Trans. Linn. Soc.* xiv. 27; leaves opposite (one usually reduced to a rudiment) long-petioled elliptic, peduncles short deflexed, flowers capitate, calyx deciduous. DC. *Prodr.* ix. 281.

MALACCA; Maingay.—DISTRIB. Sumatra.

An undershrub; stem short, simple, stout; innovations closely fulvous-villous. Leaves 8 by 5 in., base obtuse, rounded or shortly cordate, coriaceous, mature fulvous-silky beneath or ultimately glabrate except on the nerves; petiole 4 in. Peduncles 1–2 in.; bracts $\frac{3}{4}$ in., united into a spathaceous involucre, deciduous. Calyx $\frac{1}{2}$ in., rufous-hairy; lobes $\frac{1}{2}$ in., lanceolate. Corolla 1 $\frac{1}{2}$ in., fulvous-silky without, pale-yellow purple-spotted within (Maingay). Anthers broadly oblong, minutely pilose at both ends. Disc annular. Ovary and style glabrous. Berry $\frac{1}{2}$ in., narrowly ovoid-cylindric.—*C. Blumeana* of the Javan botanists, figured (as *C. pendula*, Blume) in Hook. Ic. Pl. t. 736, is common in Java, and perhaps does not specifically differ; it has white flowers, and the leaves more glabrous beneath.

5. **C. humilis**, Blume *Bijd.* p. 769; leaves opposite (one often reduced to a rudiment) long-petioled elliptic acute, peduncles hardly any, heads involucred, calyx tubular deciduous. DC. *Prodr.* 9, p. 281.

SINGAPORE; Prince (Ic. Ined. Kew).—DISTRIB. Java.

Scarcely differs from *C. bicolor*: The leaves are often rhomboid or crenate at the base, the peduncles very short not decurved.

ORDER CVII. **BIGNONIACEÆ.** (By C. B. Clarke.)

Trees (*Nyctocalos* a large climber, *Amphicome* a herb). *Leaves* opposite, rarely whorled (in *Amphicome* alternate), 1-2-3-pinnate or sometimes undivided. *Panicles* or racemes terminal, rarely on short lateral branches; bracts inconspicuous; flowers showy, hermaphrodite, irregular. *Calyx* gamosepalous, campanulate (in the Indian species), valvate, spathaceous or 2-5-lobed. *Corolla* tubular-ventricose; mouth 2-lipped; lobes 5, subequal or slightly unequal, bilabiate imbricate in the bud. *Stamens* 4, didynamous, rudiment of the fifth often present (5 subequal in *Oroxylum*); inserted at the point where the corolla-tube is suddenly swollen; filaments linear, glabrous or hairy only at the base; anthers 2-celled, included or rarely shortly exerted; cells elliptic or narrowly oblong, dehiscing by longitudinal slits, parallel or divaricate. *Disc* usually cushion-like or annular. *Ovary* subsessile, 2-celled; style long glabrous, stigma of 2 elliptic lobes; ovules in many rows (in *Amphicome* in 1-2 rows) grouped in a double series in each cell, anatropous. *Capsule* mostly elongate, loculicidally or septicidally 2-valved; septum in fruit enlarged, deciduous together with the placenta. *Seeds* compressed discoid (rarely subtrigonal) prominently winged, exalbuminous.—Species 450, in the tropics of the whole world, a few in the warm temperate zones of both hemispheres.

- | | |
|---|----------------|
| Herb. Leaves alternate, 1-pinnate | 11. AMPHICOME. |
| Large climber. Leaves opposite, trifoliolate | 1. NYCTOCALOS. |
| Tree. Leaves opposite, 2-3-pinnate. Stamens 5 perfect | 3. OROXYLUM. |
| Trees. Leaves opposite. Stamens 4 perfect. | |

* *Leaves undivided.*

- | | |
|--|------------------|
| Leaves narrowly oblong, glabrous | 4. TECOMA. |
| Leaves roundly ovate, pubescent | 10. DIPLANTHERA. |

** *Leaves 1-2-pinnate.*

- | | |
|---|-------------------|
| Calyx large. Capsule winged | 9. PAJANELIA. |
| Calyx spathaceous, cleft to the base on one side | 5. DOLICHANDRON. |
| Calyx irregularly 3-5-lobed | 6. HETEROPHRAGMA. |
| Calyx shortly lobed or truncate. Septum of the capsule
cylindric, spongy | 8. STEROSPERMUM. |

**** *Leaves 2-3-pinnate.*

- | | |
|---|------------------|
| Corolla-tube narrowly linear, very long | 2. MILLINGTONIA. |
| Corolla-tube cylindric-ventricose | 7. MAYODENDRON. |

Bignonia macrostachya, *lata* and *glauca*, Wall. Cat. 6504, 6505, 6506, were collected in Ava, not in British India. *Bignonia oxyphylla*, DC. Prodr. ix. 169, is said to be from India in Wallich's Herbarium. There is no plant under that name now in Wallich's Herbarium, nor is it likely that any tree of the genus *Bignonia* is wild in India.

I. **NYCTOCALOS**, *Teysm. & Binn.*

Large glabrous climbers. *Leaves* opposite, 3-foliolate; leaflets petioled, entire. *Peduncle* terminal, long, few-fl. *Calyx* tubular-campanulate, truncate or with 5 short teeth. *Corolla* large, white; tube very long; segments 5, round. *Stamens* (in the Assam species) 4, didynamous,

attached near the top of the corolla-tube; anther-cells distinct, narrowly oblong, pendulous. *Capsule* oblong, flattened parallel to the septum, septicidally 2-valved. *Seeds* thinly discoid, completely surrounded (except at their base) by a hyaline entire wing.—Species 3, 2 in Malaya, 1 in Assam.

The Malay species, on which the genus is founded, are described and figured with 5 fertile stamens, having the anther-cells combined. The Assam species constitutes a marked sub-genus.

N. Thomsoni; *Hook. f. Bot. Mag. t.* 5678.

ASSAM; Gowhatty Hills, *Jenkins*; Mikir Hills, *Simons*.

Leaflets 6 by 3 in., broadly elliptic, caudate-acuminate, rhomboid at the base; petiolule $\frac{1}{2}$ –2 in.; petiole 4 in. *Peduncles* 6 in.; bracts $\frac{1}{2}$ in.; pedicels 6, $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ by $\frac{1}{2}$ in.; teeth 5, $\frac{1}{10}$ in., linear. *Corolla-tube* 7 by $\frac{1}{2}$ in., mouth $2\frac{1}{2}$ in. diam. *Anthers* subexsert, yellow; connective minutely mucronate; rudiment of the fifth stamen present. *Disc* small, cushion-like. *Style* 7 in.; stigma tongue-shaped, subcapitate. *Capsule* 6 by 2 in.; valves leathery, almost woody; septum ultimately free, simple, flat. *Seeds* $\frac{1}{2}$ – $\frac{1}{4}$ in. diam., or including the wing 1 in. diam.; those attached on opposite margins of the septum much overlapping.

II. **MILLINGTONIA**, *Linn. f.*

An erect tree; bark corky. *Leaves* opposite, 2–3-pinnate. *Panicles* many-flid., terminal on the pendent branches. *Calyx* small, campanulate; teeth 5, obscure. *Corolla* white; tube long, slender; lobes 5, subequal, ovate, acute, subvalvate. *Anthers* of 1 ovate cell, the second cell appearing as a small hook. *Capsule* linear, compressed parallel to the septum, septicidally 2-valved. *Seeds* thinly discoid; wing hyaline, broad.

M. hortensis, *Linn. f. Suppl.* 291; *DC. Prodr.* ix. 182; *Wight Ill.* 161 *bis*, fig. 6, *bad*; *Bureau Monogr. Bign.* t. 8; *Bedd. Fl. Sylv.* t. 249 (*anthers wrong*); *Brand. For. Fl.* 347; *Kurz For. Fl.* ii. 238. *Bignonia Azedarachta*, *Koen. Ann. Bot.* i. 178. *B. suberosa*, *Roxb. Cor. Pl.* iii. 11, t. 214, and *Fl. Ind.* iii. 111; *Wall. Cat.* 6513.

BURMA; in the tropical forests from Ava to Tenasserim, fide *Kurz*.—DISTRIB. Planted extensively in India, and in other tropical countries. Perhaps wild also in Central India and on the Upper Godavery.

An erect tree, 80 ft., lanceolate in outline, branches drooping. *Leaves* 2–3 ft.; leaflets 2–3 in., ovate-lanceolate, acuminate, sinuate or crenate, young pubescent, mature nearly glabrous; petiolules of the upper tertiary leaflets hardly any. *Peduncles* 1–3 in.; panicles 10 by 6 in.; bracts inconspicuous. *Calyx* $\frac{1}{2}$ in. *Corolla-tube* 2–3 by $\frac{1}{2}$ in.; mouth 1 in. diam. *Stamens* shortly exsert, glabrous; anthers white. *Disc* small, cushion-like; stigma exsert, of 2 small ovate plates. *Capsule* 12 by $\frac{1}{2}$ in., acute at both ends; valves woody; septum ultimately free, simple, flat; seeds including the wing 1 by $\frac{1}{2}$ in.; wing narrow at the apex, 0 at the base; seeds attached on opposite margins of the septum much overlapping.

III. **OROXYLUM**, *Vent.*

A glabrous tree. *Leaves* opposite, large, 2–3-pinnate; leaflets ovate, entire. *Raceme* terminal, long. *Calyx* large, leathery, campanulate, truncate or obscurely toothed. *Corolla* large, campanulate-ventricose, white or purplish; lobes 5, subequal, round, crisped, toothed. *Stamens* 5; anthers glabrous, 2-celled; cells parallel, oblong. *Capsule* large, linear, compressed parallel to the septum, septicidally 2-valved. *Seeds* thinly discoid; wing hyaline, broad.

O. indicum, *Vent. Dec. Gen. Nov.* 8; *Kurz For. Fl.* ii. 237. *Bignonia indica*, *Linn. Sp. Pl.* 871; *Lamk. Dict.* i. 423; *Roxb. Fl. Ind.* iii. 110; *Wall. Cat.* 6514; *Bedd. For. Man.* 148. *B. pentandra*, *Lour. Fl. Cochinch.* 379. *Spathodea indica*, *Pers. Syn.* ii. 173. *Calosanthos indica*, *Blume Bijdr.* 760; *DC. Prodr.* ix. 177; *Wight Ic.* t. 1337; *Dalz. & Gibs. Bomb. Fl.* 161; *Bureau Monogr. Bign.* t. 9; *Brand. For. Fl.* 347.—*Rheede Hort. Mal.* i. t. 43.

Throughout INDIA, alt. 0–3000 ft., from the Himalaya to Ceylon and Malacca, common; not in the western drier area, but in the Terai west to the Chenab (*Brandis*).—DISTRIB. Malaya, Cochin China, Ava.

Attains 25–40 ft. (Roxburgh says “one of the tallest trees on the Coromandel coast,” concerning which there must be some mistake); bark thick., *Leaves* 2–4 ft. diam., ternately bipinnate; leaflets 5 by 3–4 in., acuminate; petiolule short. *Peduncle* 1 foot, thick; raceme 10 in.; pedicels $\frac{1}{2}$ –1 in. *Calyx* 1 by $\frac{3}{4}$ in., fleshy. *Corolla* $2\frac{1}{2}$ in., fleshy; mouth 2–3 $\frac{1}{2}$ in. diam. *Stamens* shortly exsert; base of filaments woolly; fifth filament rather shorter than the other 4; anther-cells divergent below; connective with a short mucro. *Disc* large, fleshy. *Style* $2\frac{1}{2}$ in.; stigma $\frac{1}{2}$ in. wide, of 2 semicircular plates. *Capsule* 1–3 ft. by 2–3 $\frac{1}{2}$ in., hardly $\frac{1}{2}$ in. thick, margins somewhat incurved; valves woody; septum flat. *Seeds* including the wing attaining 3 by $1\frac{3}{4}$ in. (usually smaller), winged all round except at the base; those attached on opposite margins of the septum scarcely overlapping.

IV. **TECOMA**, *Juss.*

Shrubs or small trees, erect or scandent. *Leaves* usually opposite, in the 1 Indian species simple, in others compound. *Racemes* or panicles terminal. *Calyx* tubular-campanulate, subequally 5-toothed. *Corolla* tubular-ventricose, orange or red; lobes 5, round, subequal. *Capsule* linear or narrow, loculicidally 2-valved, somewhat compressed at right angles to the septum. *Seeds* thinly discoid; wing hyaline, broad.—Species 24, in the tropics of the whole world, mostly American.

T. undulata, *G. Don Gen. Syst.* iv. 223; leaves narrowly oblong entire undulate. *DC. Prodr.* ix. 222; *Dalz. & Gibs. Bomb. Fl.* 161; *Brand. For. Fl.* 352; *Boiss. Fl. Orient.* iv. 80. *T. ? glauca*, *DC. l. c.* 223. *Bignonia undulata*, *Smith Erot. Bot.* i. 35, t. 19; *Roxb. Fl. Ind.* iii. 101; *Wall. Cat.* 6498. *B. glauca*, *Dene. in Jacquem. Voy. Bot.* 137, t. 142. *Tecomella undulata*, *Seem. in Seem. Journ. Bot.* i. 18.

WESTERN INDIA, alt. 0–3000 ft.; Scinde, Punjab, Guzerat, Rajputana, extending eastwards to the Jumna.—DISTRIB. Beloochistan, Arabia.

A shrub or small tree; innovations stellately grey-puberulous, otherwise glabrate. *Leaves* 6 by $1\frac{1}{2}$ in., obtuse; petiole $\frac{3}{4}$ in. *Corymbs* few-fl., mostly on shortened lateral branches; pedicels $\frac{1}{2}$ – $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in.; lobes hardly $\frac{1}{2}$ in., broad, obtuse. *Corolla* $1\frac{1}{2}$ in., orange. *Stamens* scarcely exsert, glabrous; anther-cells distinct, pendulous, narrowly oblong. *Disc* cup-shaped. *Stigma* spatulate, sub-2-lobed. *Capsule* 8 by $\frac{1}{2}$ in., slightly curved; valves tough, thin. *Seeds* (including the wing) 1 by $\frac{1}{2}$ in., wing very narrow round the apex of the seed, 0 at its base.

V. **DOLICHANDRONE**, *Seem.*

Trees, glabrous or tomentose. *Leaves* opposite, 1-pinnate. *Racemes* or panicles terminal. *Calyx* in aestivation closed, at flower-time cleft to the base on one side, spathaceous. *Corolla-tube* long or short; lobes 5, subequal, round, crisped crenate or incised. *Capsule* elongate, terete or somewhat compressed, loculicidally 2-valved, sub-4-celled. *Seeds* thinly discoid, on

each side broadly winged.—Species 12, in the hotter parts of Africa, Asia and Australia.

1. **D. stipulata**, *Benth. in Gen. Pl.* ii. 1046; leaflets elliptic caudate-acuminate, calyx densely woolly or floccose, corolla yellow-brown, narrow part of its tube 1 in., wings of the seed membranous. *Bignonia stipulata*, *Roxb. Fl. Ind.* iii. 108. *Spathodea stipulata*, *Wall. Cat.* 6518, letters A, D, and part C, and *Pl. As. Rar.* iii. 20, t. 238; *DC. Prodr.* ix. 205; *Kurz For. Fl.* ii. 234. *Markhamia stipulata*, *Seem. in Seem. Journ. Bot.* i. 226.

PEGU; Rangoon, *M'Lelland*; extending thence north to Ava (*Kurz*).

A tree, 30–40 ft.; branchlets and inflorescence with yellow or brown, easily separable, wool. *Leaves* 1–1½ foot; leaflets 3–5 pairs, 6 by 3 in., entire or distinctly serrulate, mature nearly glabrate or with yellow or brown wool adherent; stipules 0, but rudimentary leaves ½–1 in. diam. are often developed in the axils. *Raceme* short, stout, 4–10-fl.; pedicels ½–1 in. *Calyx* ¾–1¾ in., leathery, densely hirsutely woolly or deciduously fleecy. *Corolla* 2–3 in., narrow portion of the tube constricted at the top, then suddenly dilated into a campanulate portion 1 in. long; lobes ¾ in., crisped-crenate. *Anther-cells* large, elliptic, separate, pendulous, attached below their tips. *Capsule* 18–24 by 1 in., thickly tomentose floccose. *Seeds* 1¾ by ½ in. (including the wings).

VAB. *velutina*; leaves serrulate, calyx tawny velvety. *Spathodea velutina*, *Kurz in Journ. As. Soc.* 1873, pt. 2, p. 90, and *For. Fl.* ii. 235.—Pegu; *Kurz*.—Not seen; *Kurz* says it only differs from *D. stipulata* in having the leaves serrulate (not entire), the calyx tawny velvety (instead of tawny villous); which characters can be seen in several standard examples of *D. stipulata*.

2. **D. Rheedii**, *Seem. in Seem. Journ. Bot.* viii. 380; glabrous or minutely puberulous, leaflets elliptic much acuminate, corolla white, narrow portion of its tube 3–5 in., wings of the seed corky. *Bignonia spathacea*, *Linn. f. Suppl.* 283. *B. longissima*, *Lour. Fl. Cochinch.* 380? *Spathodea longiflora*, *Vent. Choix.* n. 40, *in obs.* *S. Rheedii*, *Wall. Cat.* 6516; *DC. Prodr.* ix. 206; *Wight Ic.* t. 1339; *Bedd. For. Man.* 168; *Kurz For. Fl.* ii. 234. *S.?* *Loureiriana*, *DC. l. c.* 209? *S. Diepenhorsti*, *Miq. Fl. Ind. Bat.* ii. 754.—*Rheede Hort. Mal.* vi. t. 29.

MALABAR, *Wight*; common in the plains, *Beddome*. MALAY PENINSULA from Prome to Malacca, common; *Wallich, Griffith, &c.* ANDAMANS; *Kurz*. CEYLON; *Thwaites*.—DISTREB. Malay Archipelago.

A tree, attaining 50–60 ft. *Leaves* a foot long; leaflets 3–4 pairs with an odd one, 2–3 in., rhomboid, often unequal at the base; petiolule ½ in. *Corymbs* few- (sometimes 1-) fld., short-peduncled; pedicels ½–1 in., stout. *Calyx* 1½ in. *Corolla* 4–7 in., white; tube campanulate near the mouth; segments 1 in., crenate-toothed. *Anther-cells* large, elliptic, separate, divaricate. *Capsule* 18 by ¾–1 in., nearly straight, not ribbed. *Seeds* (including the wings) ¾ by ½ in., rectangular.

3. **D. crispa**, *Seem. in Seem. Journ. Bot.* viii. 381, *excl. some syn.*; glabrous or innovations puberulous, leaflets 5–7 shortly acuminate petioluled, corolla white tube 1–2 in. cylindric, pod slightly compressed. *Bignonia crispa*, *Ham. in Roxb. Fl. Ind.* iii. 103. *Spathodea crispa*, *Wall. Cat.* 6515; *DC. Prodr.* 9, p. 206; *Brand. For. Fl.* 350; *Bedd. For. Man.* 168.

S. DECCAN PENINSULA; Coimbatore, Paulghat, *Wight, &c.*

A tree, 40–60 ft. *Leaves* 8–12 in.; leaflets 2–4 in., broadly elliptic; petiolule 0–½ in. *Corymbs* short-peduncled 1–7-fl.; pedicels ½–1½ in. *Calyx* ¾–1 in., rusty puberulous when young, soon glabrate. *Corolla-tube* ½–¾ in. diam.; mouth 2 in. diam.; lobes rounded, crisped-crenate. *Anther-cells* oblong, separate, divaricate.

Capsule 12 by $\frac{3}{8}$ in., valves woody, speckled, smooth. *Seeds* $1\frac{1}{2}$ by $\frac{1}{2}$ in., sub-rectangular, wings membranous.—The Calcutta Botanic Garden specimen in *Herb. Wallich* has the mature leaves, petioles and corymbs softly ashy pilose. As to the synonyms of older authors adduced by Seemann, several are described as hirsute plants; while *Bignonia spathacea*, Linn. f., is founded on *Rheede Hort. Mal.* vi. t. 29, which Seemann himself refers to *D. Rheedii*.

4. *D. falcata*, *Seem. in Seem. Journ. Bot.* viii. 381; grey pubescent or shortly villous, leaflets 5-7 mostly obtuse, corolla white tube 1-1 $\frac{1}{2}$ in. slender below, pod much compressed. *Bignonia spathacea*, *Roxb. Cor. Pl.* ii. 24, t. 144 (*excl. capsule*), and *Fl. Ind.* iii. 103. *B. atrovirens*, *Roth Nov. Sp.* 284. *Spathodea falcata*, *Wall. Cat.* 6517; *DC. Prodr.* ix. 206; *Dalz. & Gibs. Bomb. Fl.* 160; *Bedd. Fl. Sylv.* t. 71; *Brand. For. Fl.* 350, partly. *S. atrovirens*, *Spreng. Syst.* ii. 835.

DECCAN PENINSULA; Mysore and Vellyengry Hills, *Wight*; Belgaum, *Ritchie*, &c.

A tree, 20-50 ft. *Leaves* 3-6 in.; leaflets $\frac{1}{2}$ -1 $\frac{1}{2}$ in., obovate or round elliptic, rarely with a small obtuse point; petiolule 0, rarely $\frac{1}{4}$ - $\frac{1}{2}$ in. *Corymbs* few- (mostly 3-1-) fld.; subsessile; pedicels $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ - $\frac{3}{4}$ in., of the expanded flowers softly grey-pubescent. *Corolla* nearly as of *D. crispa*, but the tube hardly $\frac{1}{10}$ in. diam. downwards. *Anthers* included, cells nearly parallel, differing much from those of *D. crispa*; this may be a sexual character, but is so in all the examples, as in the figure of *Beddome*. *Capsule* (and seeds) nearly as in *D. crispa*, but more compressed and usually more curved.

5. *D. Lawii*, *Seem. in Seem. Journ. Bot.* viii. 380; glabrous or innovations minutely puberulous, leaflets 5-7 subsessile, corolla white tube 1-1 $\frac{1}{2}$ in. slender, pod compressed. *D. serrulata*, *Seem. l. c.* 383 (*as to the Central Indian tree*). *Spathodea falcata*, *Brand. For. Fl.* 350. *S. crispa*, *Bureau Monogr. Bign.* t. 27.

BOMBAY and CONCAN; *Law*. CENTRAL PROVINCES; *Edgeworth, Dr. Stewart, R. Thompson*. RAJPUTANA; *Meywar, Dr. Brandis*.

Considered by *Dr. Brandis* as a glabrous var. of *D. falcata*. The leaflets are sessile, often larger than those of *D. falcata*, and (mostly) very shortly acuminate. The one capsule seen is very nearly straight. The Central Indian example of *Edgeworth*, referred by *Seemann* to the Burmese *Stereospermum serrulatum*, has (as not rarely in *D. falcata* and *D. Lawii*) a few obscure teeth to the leaflets.

6. *D. arcuata*, *Clarke*; pubescent or subfloccose, leaflets 9-11 roundish elliptic, corolla white tube 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in. narrowly cylindric. *Spathodea arcuata*, *Wight Ic.* t. 1340; *Bedd. For. Man.* 169. *S. crispa*, *Dalz. & Gibs. Bomb. Fl.* 160.

S. MADRAS; Coimbatore and Ootacamund, *Wight, Beddome*.

Leaves 6-12 in.; leaflets 2-3 in., obtuse at both ends, sometimes with a short micro, floccose-pubescent on both surfaces; petiolule 0- $\frac{1}{2}$ in. *Calyx* 1 in., floccose-pubescent. *Corolla* 3 in., mouth 2 in. diam., lobes crisped crenate. *Anthers* included, cells nearly parallel. *Capsule* not seen.—United with *D. crispa* by *Seemann* and *Dalzell*.

VI. HETEROPHRAGMA, DC.

Trees. *Leaves* large, 1-pinnate. *Flowers* large; panicles terminal, woolly. *Calyx* ovoid, closed when young, irregularly 3-5-lobed during flower. *Corolla* tubular-ventricose, glabrous or densely tomentose without, rose or yellow; lobes 5, rounded, subequal. *Capsule* elongate, cylindric or compressed, falcate or twisted, loculicidally 2-valved; septum flat or 4-angu-

lar. *Seeds* compressed with a membranous wing on each side.—Species 5, 3 Indian, 2 African.

1. **H. sulfureum**, *Kurz in Journ. As. Soc.* 1873, pt. ii. p. 90, and *For. Fl.* ii. 234; leaflets elliptic crenulate mature nearly glabrous, corolla yellow, tube $1\frac{1}{2}$ in., capsule straight linear much compressed densely woolly.

PEGU; Prome and Pegu Yomah, *Kurz*.

A tree, 25–40 ft. *Leaves* 2–3 ft.; leaflets 9–11, 6 by 3 in.; petiolule $\frac{1}{10}$ in. *Panicles* short, densely tomentose, appearing before the leaves; pedicels $\frac{1}{2}$ in., tomentose. *Calyx* $\frac{3}{4}$ in., 2–3-lobed to the middle, woolly without. *Corolla* floccose without, afterwards nearly glabrate; mouth 2 in. diam.; lobes crisped. *Capsules* 18–24 by 1–1 $\frac{1}{2}$ in. *Seeds* $1\frac{1}{2}$ by $\frac{1}{2}$ in.—*Kurz* remarks that the capsules are exactly as those of *Dolichandrone stipulata*, which is the case with the (unattached) capsules transmitted. The leaves are also very like those of *Dolichandrone stipulata*, but the flowers are considerably smaller. The tree is referred by *Kurz* to *Heterophragma*, because the calyx is irregularly lobed, not spathaceous; but in one example of *Kurz* the calyx is split to the base on one side, and the tree appears a *Dolichandrone*.

2. **H. Roxburghii**, *DC. Prodr.* ix. 210; leaflets elliptic entire or crenate mature nearly glabrous, corolla rose, tube $1\frac{1}{2}$ in., capsule straight narrowly oblong slightly compressed smooth. *Dalz. & Gibs. Bomb. Fl.* 160; *Bedd. For. Fl.* 169. *Bignonia quadrilocularis*, *Roxb. Cor. Pl.* ii. 24, t. 145, and *Fl. Ind.* iii. 107; *Wall. Cat.* 6507. *Spathodea Roxburghii*, *Spreng. Syst.* ii. 835; *Brand. For. Fl.* 350.

W. DECCAN PENINSULA; from Bombay southwards, *Wight, Ritchie, &c.* CENTRAL INDIA; Godavery Forests, *sic* *Brandis*.

A large tree; innovations woolly. *Leaves* 1–2 ft.; leaflets 7–9, $4\frac{1}{2}$ by 2 in., obtuse with a short point; petiolule 0– $\frac{1}{2}$ in. *Corymbs* compound, dense, many-fl.; pedicels short, stout, woolly. *Calyx* $\frac{1}{2}$ – $\frac{3}{4}$ in., irregularly lobed half-way down, or on one side more deeply or obscurely 2-lipped. *Corolla* floccose, ultimately glabrate, mouth 2 in. diam., lobes crisped. *Anther-cells* elliptic, divaricate at base. *Capsule* 8–12 by $1\frac{1}{2}$ –2 in., divided into 4 cells by the 4-ridged septum. *Seeds* $1\frac{1}{2}$ by $\frac{3}{4}$ –1 in.

3. **H. adenophyllum**, *Seem.; Benth. in Gen. Pl.* ii. 1047; leaflets large broadly elliptic mature pubescent, corolla brown-yellow densely tomentose, tube $1\frac{1}{2}$ in., capsule long linear cylindric ribbed twisted. *Kurz For. Fl.* ii. 236. *Bignonia adenophylla*, *Wall. Cat.* 6502. *Spathodea adenophylla*, *A. DC. Prodr.* ix. 206; *Wight Ill.* t. 160.

FROM ASSAM and E. BENGAL to TENASSEERIM and the ANDAMANS; frequent.—DISTRIB. Ava.

A tree, 30–50 ft.; innovations tomentose. *Leaves* 1–1 $\frac{1}{2}$ foot; leaflets 5–7, 7 by 5 in. (or in some examples 12–14 in. long), acute or obtuse, sessile. *Panicle* 8–10 in. diam., stout, many-fl.; bracts $\frac{1}{2}$ in., narrowly lanceolate, deciduous. *Calyx* $\frac{3}{4}$ –1 in., rusty tomentose, irregularly 5-lobed half-way down. *Corolla* when expanded densely woolly-tomentose without, mouth 2 in. diam., lobes hardly crisped or crenate. *Anther-cells* nearly separate, pendulous. *Capsule* 1–3 ft. by 1 in. diam., cylindric, cork-screw-like; septum flat. *Seeds* $1\frac{1}{2}$ by $\frac{1}{2}$ – $\frac{1}{2}$ in.

VII. MAYODENDRON, *Kurz*.

A glabrous tree. *Leaves* ternately decomposed. *Racemes* small, terminal on short lateral shoots. *Calyx* spathaceous, split on one side half-way down. *Corolla* tubular, almost narrowed at the mouth; lobes very short, subequal. *Stamens* 4, scarcely didynamous, rudiment of the fifth present; anther-cells almost parallel. *Capsule* linear cylindric slender, sub-4-celled, loculicidally 2-valved, valves thin. *Seeds* flat, winged on the sides.

M. igneum, *Kurz Preliminary Pegu For. Rep. App. D, with a fig.*, and *For. Fl.* ii. 233. *Spathodea ignea*, *Kurz in Journ. As. Soc.* 1871, pt. ii. p. 77.

MARTABAN up to 3000 ft., not infrequent; *Kurz*.—DISTRIB. Ava, Yunnan.

A tree, 30–40 ft.; innovations minutely puberulous. *Leaves* ample, lower pinnæ 2-pinnate; leaflets 3–4 in., elliptic, acuminate. *Racemes* 5-fld., pedicels $\frac{1}{2}$ in. *Calyx* $\frac{3}{4}$ in., puberulous. *Corolla* $2\frac{3}{4}$ by $1\frac{1}{2}$ in., orange crimson; narrow cylindric portion of the tube much shorter than the funnel-shaped part; lobes $\frac{1}{4}$ – $\frac{1}{2}$ in. long. *Capsule* 18 by $\frac{1}{2}$ in., subterete, glabrous. *Seeds* including the pellucid wings, narrow-linear, $\frac{1}{2}$ in. long.

VIII. STEREOSPERMUM, Cham.

Trees. *Leaves* 1- or 2-pinnate. *Panicles* large, lax, terminal. *Calyx* ovoid, open or closed in the bud, during flower truncate or shortly unequally lobed. *Corolla* tubular-ventricose, yellow or pale rose; lobes 5, nearly equal, round, crisped toothed or laciniate. *Capsule* elongate, terete, subcompressed or obscurely quadrangular, loculicidally 2-valved; septum thickened, subterete. *Seeds* in 1 or 2 series, compressed or subtrigonal, with a membranous wing on each side.—Species 10, in tropical Asia and Africa.

Sect. 1. **Eustereospermum**. *Leaves* 1-pinnate.

1. **S. chelonoides**, DC. *Prodr.* ix. 210; leaflets elliptic caudate-acuminate glabrous, panicle-branches slender glabrous, corolla $\frac{3}{4}$ in., capsule linear obscurely quadrangular, seeds subtrigonal embedded in notches in the septum. *Wight Ic.* t. 1341; *Bedd. Fl. Sylv.* t. 72; *Brand. For. Fl.* 352; *Kurz For. Fl.* ii. 230. *Bignonia chelonoides*, Linn. f. *Suppl.* 282; *Roxb. Fl. Ind.* iii. 106; *Wall. Cat.* 6501. *B. caudata*, Miq. in *Pl. Hohe-nack*, n. 182, not of DC. *Heterophragma chelonoides*, Dalz. & Gibs. *Bomb.* Fl. 160.—*Rheede Hort. Mal.* vi. t. 25.

Through moister INDIA; from the Terai of Oudh and Assam to Ceylon and Pegu.—DISTRIB. Ava.

A tree, 30–60 ft., nearly glabrous except the flowers. *Leaves* 12–18 in.; leaflets 7–11, 5 by 2 in.; petiolule $\frac{1}{2}$ – $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in., shortly 3–5-toothed. *Corolla* thinly villous within and without; tube rose, lobes yellow or pale flesh-colour, crisped. *Capsule* 12–20 by $\frac{1}{2}$ – $\frac{1}{2}$ in., smooth or speckled. *Seeds* 1 by $\frac{1}{2}$ in., easily splitting through the centre.

2. **S. neuranthum**, *Kurz in Journ. As. Soc.* 1873, pt. ii. 91, and *For. Fl.* ii. 230; leaflets oblong or ovate shortly acuminate hairy beneath, panicle short corymb-like viscos-hairy, corolla $1\frac{1}{4}$ in., capsule linear slender subterete keeled, seeds subtrigonal embedded in notches in the septum.

PEGU and MOULMEIN; M'Lelland, *Parish*, *Kurz*.

A tree, 40–60 ft.; innovations softly villous or subumentose. *Leaves* 1–1 $\frac{1}{2}$ foot; leaflets 5–7, 5 by $2\frac{1}{2}$ in.; petiolule $\frac{1}{2}$ in. *Panicle* loose, about 12-fld. *Calyx* $\frac{1}{2}$ in., hairy; lobes 3–5, very short, broad. *Corolla* very pale lilac or blueish white (*Kurz*), sparsely pilose; lobes rounded, crisped crenate hardly toothed. *Capsule* 12 by $\frac{1}{2}$ – $\frac{1}{2}$ in., less woody than that of *S. chelonoides*; valves 1-ribbed on the back; seeds and septum as in *S. chelonoides*.

3. **S. suaveolens**, DC. *Prodr.* ix. 211; leaflets broadly elliptic acuminate or acute entire or serrulate young hairy, panicle very compound many-fld. viscos hairy, corolla 1–1 $\frac{1}{4}$ in., capsule linear terete woody, seeds subtrigonal embedded in notches of the septum. *Wight Ic.* t. 1342; *Bedd. For. Man.* 169; *Brand. For. Fl.* 351; *Kurz For. Fl.* ii. 231. *Bignonia suaveo-*

lens, *Roxb. Fl. Ind.* iii. 104; *Wall. Cat.* 6499. *Tecoma suaveolens*, *G. Don Gen. Syst.* iv. 244. *Heterophragma suaveolens*, *Dalz. & Gibs. Bomb. Fl.* 161.

Throughout moister INDIA from the Himalayan Terai to Travancore and Tenasserim. CEYLON (Thwaites thinks only planted in).

A tree, 30–60 ft.; innovations viscous-hairy. *Leaves* 12–18 in.; leaflets 7–9, 5½ by 3 in.; petiolule hardly $\frac{1}{10}$ in. *Calyx* $\frac{1}{2}$ in., hairy; lobes 3–5, very short, broad. *Corolla* pale or dark purple, puberulous without, hairy in the throat; lobes rounded, crisped-crenate. *Capsule* 18 by $\frac{3}{4}$ in., slightly rough with tubercles, obscurely 4-ribbed, glabrous. *Seeds* 1½ by $\frac{1}{4}$ in., deeply notched at the middle.

4. ***S. fimbriatum***, *DC. Prodr.* ix. 211; leaflets oblong caudate-acuminate subentire young hairy, panicle very compound viscous hairy, corolla 2 in. lobes fimbriate into laciniae $\frac{1}{4}$ in. long. *Kurz For. Fl.* ii. 231. *Bignonia fimbriata*, *Wall. Cat.* 6500.

MALAY PENINSULA; Moulmein, *Wallich*; Tenasserim, *Griffith*; Karen country up to 3000 ft., *Kurz*; Malacca, *Maingay*.

Attaining 80 ft., *Kurz*. *Leaves* 1–2 ft.; leaflets 7–9, 6 by 2 in.; petiolule $\frac{1}{2}$ in. *Corolla* pale-lilac. *Capsule* 12 by $\frac{1}{2}$ in.; valves somewhat woody, smooth, slightly keeled.—Exceedingly like *S. suaveolens*, except as to the fimbriate corolla; the leaflets are usually narrower.

5. ***S. glandulosum***, *Miq. Fl. Ind. Bat. Suppl.* 565; glabrous or the innovations puberulous, leaflets large elliptic acute or acuminate entire, panicles subracemose, calyx campanulate subtruncate, corolla 1½ in., capsule narrowly linear slender smooth. *Spathodea glandulosa*, *Blume Bijl.* 762; *DC. Prodr.* ix. 207. *Bignonia Porteriana*, *Wall. Cat.* 6509; *DC. l. c.* 165. *Lagarophyxis glandulosa*, *Miq. in Ann. Mus. Lugd.* i. 199. *Radermachera stricta*, *Zoll.*; *Bureau Monogr. Bign.* t. 28.

PENANG; *Wallich*. MOULMEIN; *Lobb*. MALACCA; *Maingay*.—DISTRIB. Malay Archipelago.

Leaflets 3–7, 7 by 3 in.; petiolule $\frac{1}{4}$ in. *Panicles* 1 foot long; branches short, 1–2-fld. *Calyx* $\frac{1}{2}$ in., glabrate, in fruit often urceolate. *Corolla* glabrous; narrow cylindric portion of the tube shorter than the campanulate part; lobes $\frac{1}{2}$ in. diam., round, subentire, not crisped. *Capsule* 9 by $\frac{1}{2}$ in.; valves thin, tough. *Seeds* (including the wings) $\frac{3}{4}$ by $\frac{1}{8}$ in., thinly discoid.

6. ***S. ? Wallichii***, *Clarke*; leaflets large rhomboid acuminate subentire mature pubescent, pod linear very long compressed smooth. *Spathodea stipulata*, *Wall. Cat.* 6518 B and part C.

IBRAWADDY ESTUARY; *Wallich*.

Leaflets 7, 8 by 4 in., cuneate at the base, subsessile. *Corolla* not seen. *Capsule* 45 by $\frac{3}{4}$ in.; septum spongy, $\frac{1}{2}$ by $\frac{1}{4}$ in. *Seeds* sub-4-seriate, 1½ by $\frac{1}{2}$ in., subrectangular, compressed flat, wings membranous.—This imperfectly known tree evidently differs from all the other species, and is marked by D. Don (in *Herb. Wallich*) as *Spathodea Wallichii*, D. Don: the septum appears too spongy for *Dolichandrone*. Seemann has merely noted that the seeds are biserial (i.e. in each cell) without making any guess at the genus.

Sect. 2. ***Xylocarpæa***. Leaves 2-pinnate.

7. ***S. xylocarpum***, *Wight Ic.* t. 1335–6; leaflets elliptic acute entire mature glabrous, panicles compound dense pubescent, corolla 1½–2 in. white tinged yellow, capsule stout linear cylindric rugged. *Bignonia xylocarpa*, *Roxb. Fl. Ind.* iii. 108; *Wall. Cat.* 6511; *DC. Prodr.* ix. 169; *Bedd. Fl.*

Sylv. t. 70; *Dalz. & Gibs. Bomb. Fl.* 159. *Tecoma xylocarpa*, *G. Don Gen. Syst.* iv. 225. *Spathodea xylocarpa*, *Brand. For. Fl.* 349, t. 43.

DECCAN PENINSULA; common, extending north to the Satpura Range, *Brandis*.

A tree, 30–60 ft.; innovations pubescent. *Leaves* 1–4 ft.; leaflets 3 by 1½ in., subsessile. *Panicle* somewhat rigid, erect. *Calyx* ¼–⅔ in., pubescent or mature glabrate; lobes 3–5, very short, broad. *Corolla* ventricose from near the base, subglabrous; lobes round, crisped. *Filaments* hairy below. *Capsule* 12–30 by 1–1½ in., glabrous, tubercular. *Seeds* (including the wings) 1½ by ½ in., thinly discoid.

8. *S. hypostictum*, *Miq. Fl. Ind. Bat. Suppl.* 565; glabrous, leaflets oblong or elliptic acuminate entire, panicles compound branches slender, corolla 2 in., pod linear very slender not woody smooth. *Spathodea gigantea*, *Blume Bijl.* 761; *DC. Prodr.* ix. 207. *S. amœna*, *A. DC. Prodr.* ix. 208; *Brand. For. Fl.* 349. *S. Lobbii*, *Teyss. & Binnend. in Nat. Tijdsch.* xxv. 413. *Bignonia amœna*, *Wall. Cat.* 6512, and *Pl. As. Rar.* ii. 78, t. 183. *Lagaropyxis gigantea*, *Miq. in Ann. Mus. Lugd.* i. 198. *Radermachera amœna*, *Seem. in Seem. Journ. Bot.* viii. 146; *Kurz For. Fl.* ii. 232. *R. gigantea & Lobbii*, *Miq. in Ann. Mus. Lugd.* iii. 250.

TAVOY; *Wallich*. MALACCA and SINGAPORE; *Griffith*, *Maingay*.—DISTRIB. Java, Sumatra.

Attaining 80 ft. *Leaves* 2-pinnate (and ex *Kurz* 3-pinnate); leaflets 5 by 2 in.; petiolule ½ in. *Calyx* ¾–1 in., closed in the bud, in flower shortly 2-lipped or subspathaceous. *Corolla* glabrous, white, tube rose; lobes crenulate, hardly crisped. *Capsule* 15 by ½ in.; valves thin, tough. *Seeds* (including the wings) ¾ by ½–⅔ in., thinly discoid.

9. *S. Ghorta*, *Clarke*; glabrous or innovations puberulous, leaflets sessile elliptic acute, partial rachises narrowly winged, corolla 2 in. elongate tubular lobes round subentire. *Bignonia Ghorta*, *Ham. in Wall. Cat.* 6510; *DC. Prodr.* iv. 167.

“DEVIDUBA;” *Hamilton*.

Leaves opposite, bipinnate; leaflets 2 by ¾ in., unequal-sided, subsessile, entire. *Peduncle* terminal; panicle many-fld., branches slender; pedicels ¼–½ in., subfascicled. *Calyx* ½ in., campanulate; lobes 4–5, short, triangular. *Corolla* broadly cylindric, slightly wider upwards, glabrous; mouth hardly 1 in. diam. *Stamens* 4, didynamous; anther-cells narrowly oblong, separate, divaricate. *Capsule* not seen.

IX. PAJANELIA, DC.

A large tree, glabrous except the corolla. *Leaves* large, 1-pinnate; leaflets numerous, entire. *Flowers* large in terminal, thyrsoid panicles. *Calyx* large, ovoid, closed in the bud, in flower ventricose-campanulate, 5-fid. *Corolla* large, tubular-ventricose; lobes 5, crisped. *Capsule* large, narrowly oblong, winged, compressed, loculicidally 2-valved. *Seeds* compressed, with a membranous wing on each side.

P. Rheedii, *DC. Prodr.* ix. 227, excl. syn. *Lour. & Pers.; Wight Ic.* tt. 1343–4; *Bureau Monogr. Bign.* t. 20; *Bedd. For. Man.* 169. *Bignonia indica* var. β , *Linn. Sp. Pl.* 871. *B. Pajanelia*, *Ham. in Trans. Linn. Soc.* xiii. 316. *B. longifolia*, *Willd. Sp. Pl.* iii. 306. *B. multi-juga*, *Wall. Cat.* 6503, and *Pl. As. Rar.* i. 81, tt. 95, 96. *Payanelia multi-juga*, *Kurz For. Fl.* ii. 227.

SILHET and KHASIA HILLS; *Wallich*, *Griffith*. PEGU, TENASSERIM, and ANDAMANS; *Kurz*. MALABAR, common up to 2000 ft., *Beddome, &c.*

A tree, 30–60 ft. *Leaves* 1½–3 ft.; leaflets 19–25, 3–8 in., elliptic, acuminate,

unequal at the base; petiolule $\frac{1}{8}$ in. *Panicles* 12-18 in. *Calyx* $\frac{3}{4}$ -1 in.; lobes irregular, extending about half-way down. *Corolla* $2\frac{1}{2}$ in.; lobes 1 in., hairy especially on the margins, dilated and rounded at the tips. *Capsule* 12-20 by $2\frac{1}{2}$ - $3\frac{1}{2}$ in., glabrous; wing on each margin split, so that the capsule appears 4-winged; septum flat, but with a ridge on each face. *Seeds* $\frac{3}{4}$ by $\frac{1}{2}$ in.

X. **DIPLANTHERA**, R. Br.

Trees, tomentose or villous. *Leaves* undivided, large, opposite or whorled. *Panicles* terminal, sessile, dense, globose. *Calyx* campanulate, closed in the bud, in flower shortly 2-5-lobed. *Corolla* yellow, tubular-ventricose; lobes round, entire, subequal. *Stamens* 4, didynamous; anther-cells lanceolate, separate, pendulous. *Capsule* broadly spindle-shaped, woody, loculicidally 2-valved; septum flat, thick. *Seeds* compressed, discoid, with a hyaline wing.—Species 6, extending from Malacca to N. Australia and New Caledonia.

D. bancana, Scheffer in *Nat. Tidschr.* xxxi. 334.

MALACCA; Walker, Maingay.—DISTRIB. Bangka.

A lofty tree. *Leaves* 8-13 by 5-8 in., round-ovate, subentire, pubescent, tawny villous on the nerves beneath, 1-2 large glands above near the apex of the petiole; petiole 4 in. *Panicles* 4-5 in. diam., tawny-villous. *Calyx* $\frac{3}{4}$ in., puberulous, articulated on the pedicel. *Corolla* 1 in. *Stamens* and style ultimately long exsert. *Capsule* 6 by $1\frac{1}{2}$ in., smooth. *Seeds* $1\frac{1}{2}$ by $\frac{3}{4}$ in., wing continued all round except the base.

XI. **AMPHICOME**, Lindl.

Herbs; rootstock woody. *Leaves* alternate, 1-pinnate; leaflets toothed. *Racemes* terminal; bracts small, linear, persistent. *Calyx* campanulate, truncate or 5-toothed. *Corolla* red, tube elongate widened upwards; lobes 5, round, entire, nearly equal. *Stamens* 4, didynamous, included; anthers glabrous or hairy, cells separate, divaricate, with a tooth-like appendage near the base. *Ovary* subsessile; ovules sub-2-seriate. *Capsule* linear, slender, terete, smooth, loculicidally splitting on one side, subfollicular; septum thin. *Seeds* in one row on each margin of the septum, narrowly oblong, tuberculate, the hyaline wing on each side more or less laciniate.—Species 2, in North-west India and Cabul.

1. **A. arguta**, Lindl. *Bot. Reg.* 1838, t. 19; glabrous, leaflets lanceolate, calyx-teeth very acute, corolla attaining $1\frac{1}{2}$ by $\frac{1}{2}$ in. *DC. Prodr.* ix. 237; *Bureau Monogr. Bign.* t. 24. *Incarvillea arguta*, Royle *Ill.* 296. 1. diffusa, Royle *Ill.* t. 72, fig. 1 (corolla shown too small). *I. emodi*, Wall. *Cat.* 487, first example.

N.W. HIMALAYA, Blinkworth, Royle; Kumaon, alt. 7000 ft., Strachey & Winterbottom; Simla, Fielding; Kunawur and Wangtu, T. Thomson, Stoliczka.

Stems 20 in., sometimes divided. *Leaves* 5 in.; leaflets 5-9, $1-1\frac{1}{2}$ in.; petiolules $\frac{1}{2}$ in. *Racemes* 6-8 in.; pedicels 1 in. *Calyx* $\frac{1}{2}$ in., teeth caudate-acuminate from a triangular base. *Corolla* glabrous; cylindric base of the tube $\frac{1}{2}$ in., campanulate portion of the tube $\frac{3}{4}$ in. *Capsule* 6-8 by $\frac{1}{2}$ - $\frac{3}{4}$ in.; valves thin. *Seeds* (including the wings) $\frac{1}{2}$ by $\frac{1}{2}$ in.

2. **A. emodi**, Lindl. *Bot. Reg.* 1838, t. 19, in note; leaflets elliptic or oblong scarcely acute, calyx truncate or with triangular scarcely acuminate teeth, corolla attaining 2 by $\frac{3}{4}$ in. *DC. Prodr.* ix. 237; *Bot. Mag.* t. 4890. *Incarvillea emodi*, Wall. *Cat.* 487, second example; Royle *Ill.* 296, in note.

W. HIMALAYA, alt. 2-9000 ft., from Kashmir to Nepal; *Wallich*, *Blinkworth*, &c.—DISTRIB. Cabul?

Glabrous. *Racemes* not rarely 2-3, subpanicled. *Flowers* often not larger than those of *A. arguta*.—This species is very near *A. arguta*: the Afghanistan examples referred to *A. emodi* are all hairy.

ORDER CVIII. PEDALINEÆ. (By C. B. Clarke.)

Herbs or undershrubs. *Leaves* opposite, or the upper alternate, entire toothed or divided. *Flowers* irregular, (in the Old-World species) axillary, solitary or rarely clustered; pedicels short; bracts 0 or very small. *Calyx* deeply 4-5-lobed. *Corolla* tubular-ventricose; limb obscurely 2-lipped; lobes 5, imbricate. *Stamens* 4, didynamous; rarely 2. *Ovary* 2- (sometimes 1-) celled; style filiform, stigma shortly 2-lobed; ovules few or many, superposed. *Capsule* 2- or 3-4-celled, indehiscent or dehiscent. *Seeds* (in the Indian species) wingless, exalbuminous.—Species 40, in the warmer parts of both hemispheres.

The Indian species are readily distinguished from *Bignoniaceæ* by their herbaceous habit and wingless seeds, and from most *Scrophularinææ* by their few or 1-seriate seeds.

Martynia diandra, Glox. (DC. Prodr. ix. 253), an American weed (called Tiger-claw or Devil's-claw), is now common in the Gangetic Plain and elsewhere in India; it is a rank coarse herb with capsules beaked by strong curved spines.

Capsule spinous, indehiscent. Seeds 2-1 in each cell 1. PEDALIUM.
Capsule spineless, 2-4-valved. Seeds many in each cell 2. SESAMUM.

I. PEDALIUM, Linn.

A glabrous annual. *Leaves* opposite or alternate, petioled, ovate, incised. *Pedicels* axillary, solitary, short, 2-glandular at the base. *Calyx* small, 5-partite. *Corolla* yellow; lobes round, patent. *Stamens* 4, didynamous, included; anther-cells ovate, parallel, separate, pendulous. *Ovary* 2-celled; ovules 2 in each cell. *Capsule* hard, indehiscent, upper portion pyramidal-ovoid with 4 patent spines from its base. *Seeds* 2-1 in each cell, pendulous, oblong, testa black.

P. Murex, Linn.; DC. Prodr. ix. 256; *Burm. Fl. Ind.* 139, t. 45, fig. 2; *Gaertn. Fruct.* i. 276, t. 58; *Lamk. Ill.* t. 538; *Roxb. Fl. Ind.* iii. 114; *Wall. Cat.* 6410; *Wight Ic.* t. 1615; *Dalz. & Gibs. Bomb. Fl.* 162.

DECCAN PENINSULA AND CEYLON, frequent.—DISTRIB. Trop. Africa.

A weedy herb, 6-15 in. *Leaves* 2-4 in., irregularly toothed or almost lobed; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Pedicels* $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in.; teeth linear. *Corolla* 1 in., funnel-shaped, glabrous. *Fruit* $\frac{3}{4}$ by $\frac{1}{2}$ in.

II. SESAMUM, Linn.

Erect or prostrate herbs. *Leaves* opposite, upper alternate, entire toothed lobed or divided. *Flowers* axillary, solitary, or few and fascicled, short-pedicelled, pale or purplish, sometimes yellow-marked. *Calyx* small, 5-partite. *Corolla* tubular-ventricose, base subgibbous; limb 2-lipped, lobes 5, rounded. *Stamens* 4, didynamous, included; anthers sagittate, cells 2 subparallel. *Ovary* 2-celled, early falsely 4-celled, cells many-ovuled. *Capsule* oblong or ovoid, loculicidally 2-valved, unarmed, in appearance

4-celled. *Seeds* numerous, obliquely oblong.—*DISTRIB.* Species 10, Indian and tropical or southern Africa.

1. ***S. indicum***, *DC. Prodr.* ix. 250; erect, leaves oblong or ovate lower often pedatisect, capsule tetragonous oblong, seeds brown smooth. *Wall. Cat.* 6408; *Wight Ill.* t. 163; *Bot. Mag.* t. 1688; *Dalz. & Gibs. Bomb. Fl.* 161. *S. orientale*, *Linn.*; *Gaertn. Fruct.* ii. 132, t. 110; *Lamk. Ill.* t. 528; *Roxb. Fl. Ind.* iii. 100. *S. luteum*, *Retz. Obs.* vi. 31; *DC. l.c.* *S. occidentale*, *Heer & Regel*; *DC. l.c.*; *Thwaites Enum.* 442.—*Rumph. Herb. Amboin.* t. 76, fig. 1. *Rheede Hort. Mal.* ix. tt. 54, 55.

Throughout the warmer parts of INDIA and CEYLON, cultivated.—*DISTRIB.* Cultivated in all hot countries. Native country doubtful, probably Asiatic.

Height 1-2 ft., pubescent or puberulous. *Leaves* 3-5 in., variable on the same plant; upper often narrowly oblong subentire, middle ovate toothed, lower lobed or pedatisect; petiole $\frac{1}{2}$ -2 in. *Pedicels* $\frac{1}{2}$ in., solitary, rarely 2-3-nate. *Sepals* $\frac{1}{4}$ in., lanceolate. *Corolla* $1\frac{1}{2}$ in., pubescent, whiteish or with red purplish or yellow marks. *Capsule* 1 by $\frac{1}{2}$ in., erect, scabrid-pilose, the same width from top to bottom, usually shortly acuminate; 2-valved half-way down, or sometimes to the base, or ultimately 4-valved.

2. ***S. laciniatum***, *Klein*; *Willd. Sp. Pl.* iii. 359; prostrate, hispid, leaves ovate lobed and deeply subpedately pinnatifid, capsule ovoid compressed, seeds black reticulate. *DC. Prodr.* ix. 209; *Wight Ic.* t. 1345.

S. DECCAN PENINSULA, *Rottler, Wight, &c.*; *Cochin, Johnstone.*

Appressedly prostrate, 1-3 ft., branching. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., orbicular or elliptic in outline, lacinations acute; petiole $0-\frac{1}{2}$ in. *Pedicels* $\frac{1}{2}$ in., solitary. *Sepals* $\frac{1}{2}$ in., lanceolate. *Corolla* 1 in., minutely pubescent, purple, yellow in the palate. *Capsule* $\frac{1}{2}$ by $\frac{1}{3}$ in., scabrous-pilose, shortly mucronate; valves 2, dorsally compressed.

3. ***S. prostratum***, *Retz. Obs.* iv. 23; prostrate, villous, leaves orbicular or obovate crenate or obtusely lobed with white indumentum beneath, capsule ovoid compressed, seeds black reticulate. *Wall. Cat.* 6409; *Wight Ic.* t. 1346.

MADRAS; especially on sandhills near the sea, *Rottler, Wight, Shuter.*

Closely allied to *S. laciniatum*, and hardly separable therefrom by the characters given. The leaves are generally entire, sometimes 3-lobed half-way; the teeth never sharp as in *S. laciniatum*.

ORDER CIX. **ACANTHACEÆ.** (By C. B. Clarke.)

Herbs or shrubs, rarely trees. *Leaves* opposite, exstipulate, very rarely divided. *Flowers* rarely solitary, bracteate and 2-bracteolate. *Calyx* 5-partite (in *Thunbergia* small often multifid). *Corolla* 2-lipped, or subequally 5-lobed; lobes imbricated or twisted in bud. *Stamens* 4 or 2, inserted on the corolla-tube; anthers 2- or 1-celled; cells sometimes remote. *Disc* often conspicuous. *Ovary* superior, 2-celled; style filiform, notched or bifid (1 branch often obsolete); ovules one or more in each cell. 1- or 2-seriate, anatropous. *Capsule* loculicidal; valves often elastically recurved, carrying the seeds on the half-septa. *Seeds* (except in *Thunbergia* and the *Nelsoniæ*) hard, seated on upcurved subacute supports (*retinacula*), ovoid or compressed, testa smooth rugose or warted rarely hispid, often clothed with white elastic hairs (best seen when wetted), albumen 0 (except *Nelsoniæ*); radicle next the hilum.—Species 1500, in the tropical and warm temperate regions.

Tribe 1. **Thunbergiæ**. Scandent or twining. *Calyx* minute, annular or 10-15-toothed. *Corolla-lobes* twisted in bud. *Ovules* 2 in each cell, collateral. *Capsule* beaked; retinacula 0 . . . 1. THUNBERGIA.

Tribe 2. **Nelsoniæ**. *Corolla-lobes* imbricate in bud. *Ovules* many, superimposed in two rows in each cell. *Seeds* small, seated on minute papillæ, not on hard retinacula, obscurely albuminous.

Calyx 4-partite.	Stamens 2.	Bracts rigid, imbricate . . .	2. ELYTEABIA.
Calyx 4-partite.	Stamens 2.	Bracts herbaceous . . .	3. NELSONIA.
Calyx 5-partite.	Stamens 4		4. EBERMAIERA.
Calyx 5-partite.	Stamens 2, exserted		5. OPHIORRHIZIPHYLLUM.

Tribe 3. **Ruellieæ**. *Corolla-lobes* twisted to the left in bud. *Seeds* on retinacula. *Sepals* 5, or 4 with one larger. *Anthems* usually 2-celled; cells parallel or one a little below the other. *Style* 2-fid, one lobe often suppressed.

Subtribe 1. POLYSPERMEÆ. *Ovules* 3-12 in each cell. *Capsule* normally 6- or more-seeded.

* *Corolla distinctly 2-lipped.*

Lower leaves often toothed or pinnatifid. Flowers axillary, sessile. Retinacula scarcely hooked . . .	6. CARDANTHERA.
Leaves entire. Flowers axillary, subsessile. Retinacula hooked	7. HYGROPHILA.
Cymes elongate. Branches sympodal	8. NOMAPHILA.

** *Corolla subequally 5-lobed.*

Bracteoles large. Stamens muticous. Capsule clavate. Base of capsule solid	10. RUELLIA.
Cymes elongate with sympodal branches. Anther-cells mucronate at base	11. ECHINACANTHUS.
Flower-clusters separate on the cyme-branches. Connective excurrent at tip. Capsule seed-bearing from the base	17. ÆCHMANTHERA.
Flowers capitate or axillary, subsessile. Bracteoles small, narrow, or 0. Capsule seed-bearing from the base	15. HEMIGRAPHIS.
Flowers clustered at the nodes of the almost leafless branches in terminal panicles. Stamens muticous. Capsule seed-bearing from the base	16. STENOSIPHONIUM.

Subtribe 2. TETRASPERMEÆ. *Ovules* 2 in each cell. *Capsule* 4- or fewer-seeded.

* *Placentæ not rising elastically from the base of the capsule (except in a few Strobilanthes).*

Corolla subequally 5-lobed. Stamens 4 or 2; anthers muticous	18. STROBILANTHES.
Corolla large, deeply 2-lipped. Stamens 4; anthers muticous	19. CALACANTHUS.
Corolla somewhat 2-lipped. Stamens 4; anthers minutely mucronate at base	9. CALOPHANES.
Corolla-tube very long, linear; lobes subequal. Stamens 2	14. DÆDALACANTHUS.

** *Placentæ rising elastically from the base of the ripe capsule.*

Corolla small. Stamens 4. Bracteoles 0	13. PHAYLOPSIS.
Stamens 4. Bracteoles very large, reticulately nerved	12. PETALIDIUM.

Tribe 4. **Acantheæ**. *Corolla-tube* short; upper lip obsolete, lower 3-lobed. *Ovules* 2 in each cell. *Retinacula* curved, hardened.

Anterior filaments with an excurrent process 20. BLEPHARIS.

Anterior filaments without an excurrent process 21. ACANTHUS.

Tribe 5. **Justicieæ**. *Corolla-lobes* imbricate in bud. *Retinacula* curved, hardened. *Anthers* 2-1-celled; cells often spurred at the base, one frequently placed much above the other. *Style* shortly equally 2-fid or subentire.

Subtribe 1. ANDROGRAPHIDEÆ. *Ovules* 3-10 in each cell. *Capsule* normally 6- or more-seeded.

* *Capsule compressed at right angles to the septum; seeds ovoid, hardly compressed.*

Flowers paniced or thyrsoid 28. ANDROGRAPHIS.

Flowers axillary, clustered, with cladodes (suppressed branchlets) among them 29. HAPLANTHUS.

** *Capsule subterete, seeds much compressed.*

Corolla-tube very slender, limb small 30. GYMNSTACHYUM.

Corolla cylindric, curved, not ventricose nor deeply 2-lipped 31. PHLOGACANTHUS.

Corolla ventricose, not deeply 2-lipped 32. CYSTACANTHUS.

Corolla deeply 2-lipped 33. DIOTACANTHUS.

Subtribe 2. BARLERIÆ. *Ovules* 2-1 in each cell. *Corolla-lobes* 5, subequal. *Stamens* 4, of which 2 are small or obsolete, or 4 1-celled.

Sepals 4, 2 outer opposite larger. *Anthers* 2-celled 22. BARLERIA.

Calyx 2-lipped, 5-lobed. *Anthers* 2-celled 23. NEUBACANTHUS.

Outer calyx-lobes much the larger. *Anthers* 1-celled 24. CROSSANDRA.

Subtribe 3. ASYSTASIEÆ. *Ovules* 2 in each cell. *Corolla-lobes* 5, subequal. *Sepals* 5, small, subequal. *Stamens* 4 or 2; anther-cells 2, subequal, parallel, muticous.

Corolla-tube long, narrow or subventricose. *Stamens* 4 25. ASYSTASIA.

Corolla-tube slender. *Stamens* 2 26. ERANTHEMUM.

Corolla-tube ventricose. *Stamens* 2 27. CODONACANTHUS.

Subtribe 4. EUJUSTICIEÆ. *Ovules* 2 in each cell. *Corolla* distinctly 2-lipped.

* *Stamens* 4, *anthers* all subequal 2-celled.

Calyx deeply 5- or 4-lobed 34. LEPIDAGATHIS.

Calyx campanulate, 5-toothed 35. PHIALACANTHUS.

** *Stamens* 2, *anthers* 1-celled.

Bracts small, narrow. *Corolla* small 36. MONOTHECIUM.

Bracts small, narrow. *Corolla* long 37. CLINACANTHUS.

Bracts larger than the calyx-segments 49. HYPSTES.

*** *Stamens* 2, *anthers* 2-celled.

† *Placentæ* rising elastically from the base of the capsule.

Bracts in 1-sided spikes 46. RUNGIA.

Bracts clustered, shortly peduncled 47. DICLIPTERA.

† *Placenta not rising elastically from the base of the capsule.*

¶ *Anther-cells placed one much higher than the other.*

Anther-cells muticous, bracts in opposite pairs, valvate	48. PERISTROPHE.
Anther-cells minutely spurred at base	38. JUSTICIA.
Anther-cells apiculate, scarcely spurred at base	39. ADHATODA.
Anthers muticous. Flowers clustered. Corolla long	40. RHINACANTHUS.
Anthers muticous. Flowers thyrsoid. Corolla not large	41. DIANTHERA.

¶¶ *Anther-cells parallel, subequal.*

Bracts small, narrow. Corolla small	42. PTYSIGLOTTIS.
Corolla-tube ovoid, constricted in the throat	43. SPHINCTACANTHUS.
Bracts large, imbricate. Corolla-tube narrow, long	44. ECBOLIUM.
Bracts small. Corolla-tube elongate	45. GRAPTOPHYLLUM.

I. **THUNBERGIA**, Linn. f.

Scandent. *Leaves* often cordate, hastate or angular. *Flowers* axillary. 1-2-nate, or racemose; bracts at the base of the pedicels leaf-like; bracteoles large, margins coherent at least when young. *Calyx* small, annular, 10-16-toothed, or obscure. *Corolla* conspicuous; tube ventricose, curved; limb oblique; lobes 5, rounded, twisted to the left in bud. *Stamens* 4, didynamous near the base of the corolla-tube; anthers 2-celled, cells parallel, oblique, spurred or not at the base. *Disc* cushion-shaped or annular. *Style* long; stigma funnel-shaped, 2-lobed or subentire, or style 2-fid with capitate stigmas; ovules 2 in each cell, collateral. *Capsule* globose, suddenly narrowed into a barren sword-shaped beak. *Seeds* 2 in each cell, ovoid or dorsally compressed, not hairy, base plane or excavate, funicle minute or conic.—Species 30, in Africa, Asia, and N. Australia.

Sect. 1. **Euthunbergia**. *Flowers* axillary. *Calyx* 10-16-toothed. *Seeds* ovoid, base excavate.

1. **T. fragrans**, Roxb. *Cor. Pl.* i. 47, t. 67, and *Fl. Ind.* iii. 33; leaves ovate or oblong acute, calyx-teeth in flower lanceolate hardly longer than the tube, capsule glabrous. *Lamk. Ill.* t. 549, fig. 2; *Wall. Cat.* 767, type sheet; *Nees in Wall. Pl. As. Rar.* iii. 77, 78, and in *DC. Prodr.* xi. 57; *T. Anders. in Journ. Linn. Soc.* ix. 448; *Kurz For. Fl.* ii. 240. *T. javanica*, Gaertn. f. *Fruct.* iii. 22, t. 183; *Blume Bijd.* 806; *Nees in DC. l. c.* 56. *T. scandens*, Pers. *Syn.* ii. 179. *T. volubilis*, Pers. *Syn.* ii. 179; *Nees in DC. l. c.* 59. *T. angustifolia*, Ham.; *Nees in Wall. Pl. As. Rar.* iii. 78, and in *DC. l. c.* 56. *T. Roxburghia*, *Nees in Wall. Pl. As. Rar.* iii. 78, and in *DC. l. c.* 58. *T. subsagittata*, Blanco *Fl. Fil.* 518. *T. arnhemica*, F. Muell. *Fragm. Phyt. Austral.* ix. 73.

Throughout INDIA, alt. 1-4000 ft., from the Himalaya Terai to CEYLON and Tenasserim; ascending to 5-7000 ft.—DISTRIB. Malaya to the Philippines and N. Australia.

Stem slender, retrorsely hairy or glabrate. *Leaves* 2-3 by $\frac{1}{2}$ -1 $\frac{1}{2}$ in., obtuse, base cordate or hastate, toothed, mature glabrate; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Pedicels* 1-3 in., 1 rarely 2 in each axil; bracteoles $\frac{3}{4}$ in., broadly falcate-oblong, subacute. *Calyx* in flower $\frac{1}{2}$ in., divided half-way down into 12-16 teeth, nearly glabrous, in fruit $\frac{1}{2}$ in. *Corolla* 1 $\frac{1}{4}$ in., pure white, fragrant. *Anther-cells* elliptic, acute, base unappendaged. *Ovary* glabrous; style funnel-shaped, 2-lipped. *Capsule* $\frac{3}{4}$ -1 in., glabrous, shining. *Seeds* $\frac{1}{2}$ - $\frac{1}{4}$ in., rugose.—The typical *T. fragrans* of the Bengal Terai is considered by T. Anderson, from the pure white of its fragrant flowers, the most charming of Bengal

plants. According to him (in '*Thwaites Enum.* 234) the plant is not fragrant in Ceylon; but this may apply to *Var. vestita*.

VAR. lævis; glabrous or grey puberulous, pedicels often 2 in each axil much thickened upwards in fruit, corolla not fragrant, tube often greenish, capsules grey puberulous. *T. lævis*, *Nees in Wall. Pl. As. Rar.* iii. 77, and in *DC. Prodr.* xi. 56. *T. fragrans*, *Bot. Mag.* t. 1881; *Dalz. & Gibs. Bomb. Fl.* 183. *T. longiflora*, *Benth. in Pl. Hohenack.* 384. *Meyenia longiflora*, *Benth.*; *Hohenack. in Flora*, 1849, 558.—Deccan Peninsula, extending to Behar and W. Bengal.

VAR. vestita, *Nees in Wall. Pl. As. Rar.* iii. 78, and in *DC. Prodr.* xi. 57; stem and leaves more hairy, capsule pubescent.—S. Deccan Peninsula and Ceylon.

VAR. heterophylla; leaves subentire lower suborbicular upper narrow-elliptic acute, uppermost lanceolate sometimes almost linear. *T. heterophylla*, *Wall. Cat.* 771.—Prome Hills and Ava; *Wallich*.—Possibly a distinct species, but the material is fragmentary; the calyx is 12-toothed, and the pedicel solitary axillary, so that it is hence near *T. fragrans*.

2. ***T. tomentosa***, *Wall.*; *Nees in Wall. Pl. As. Rar.* iii. 78, and in *DC. Prodr.* xi. 58; leaves ovate or oblong acute, calyx-teeth in flower filiform much longer than the tube hairy, capsule villous. *T. Anders. in Journ. Linn. Soc.* ix. 449. *T. fragrans*, *Wall. Cat.* 767, partly.

NILGHERRIES, alt. 6500 ft.; *Wight, Sir F. Adam, Hohenacker, &c.*

Calyx-teeth in flower often $\frac{1}{4}$ in. *Bracts* 1 in., ovate, acute. *Corolla* pure white, tube $1\frac{1}{2}$ in., mouth 2 in. diam. *Ovary* densely shortly villous. *Capsule* $1-1\frac{1}{2}$ in.—Closely allied to *T. fragrans*, differing by the filiform calyx-teeth and large villous capsule. The thickening of the peduncles upwards in fruit, insisted on by T. Anderson, is more prominent in *T. fragrans* var. *lævis*.

*3. ***T. ALATA***; *Bojer; Hook. Exot. Fl.* t. 177; softly villous, leaves ovate-cordate, petiole often winged, corolla orange-yellow with a brown or claret eye. *Wall. Cat.* 7141; *Bot. Mag.* t. 2591; *Dalz. & Gibs. Bomb. Fl. Suppl.* 71; *Nees in Wall. Pl. As. Rar.* iii. 78, and in *DC. Prodr.* xi. 58; *T. Anders. in Journ. Linn. Soc.* ix. 449; *Kurz For. Fl.* ii. 240.

INDIA, widely cultivated; naturalized in lower Assam and N.E. Bengal.—DISTRIB. Native of Africa.

Closely allied to *T. fragrans*, and often confounded with it. It is certainly African, and only introduced in India.

Sect. 2. ***Meyenia***. *Flowers* axillary, rarely imperfectly racemed. *Calyx* an entire or scarcely toothed ring. *Seeds* ovoid, base excavate.

4. ***T. Hawtayneana***, *Wall. Tent. Fl. Nep.* 49, in note, and *Cat.* 769, and *Pl. As. Rar.* ii. 52, t. 164; nearly glabrous, leaves sessile cordate-elliptic or -ovate-acute entire, pedicels short, corolla purple. *T. Hawtayneana*, *T. Anders. in Journ. Linn. Soc.* ix. 448. *Meyenia Hawtayneana*, *Nees in Wall. Pl. As. Rar.* iii. 78, and in *DC. Prodr.* xi. 60; *Wight Ill.* t. 164 b, fig. 1, and *Id.* t. 1487.

Hills of the S. DECCAN PENINSULA; Canara, Bellary, Dharwar, Mangalore, Nilgherries, Kurg; *Wight, &c.*—CEYLON; *Walker*.

Stem slender. *Leaves* 3 by $1\frac{1}{2}$ in. *Pedicels* $\frac{1}{4}-1\frac{1}{4}$ in., solitary, a tuft of hair at their base; bracteoles $\frac{1}{2}-1$ in., ovate-oblong, nerved. *Corolla* $1\frac{1}{2}$ in., nearly glabrous, violet-purple, tube yellowish. *Filaments* with shortly stalked glands continued to the connective; anther-cells of the shorter stamens parallel, subsimilar, unappendaged; of the longer divergent, the upper oblique cell shortly mucronate at the base. *Stigma* funnel-shaped; lobes 2, oblong. *Capsule* $1-1\frac{1}{4}$ in., glabrous; seeds (ex *Wallich*) semiglobose.—In one example of *Wight's*, the flowers are on axillary branches 2-4 in. long, the floral leaves are reduced by degrees down to $\frac{1}{2}$ in. long, i. e. to "bracts," and the inflorescence becomes a raceme.

5. **T. lutea**, *T. Anders. in Journ. Linn. Soc.* ix. 448; leaves ovate acuminate or lanceolate toothed, pedicels longer than the petioles, corolla yellow or greenish-white.

SIKKIM, alt. 4-7000 ft., frequent; *J. D. H.*, &c.

Pubescent or nearly glabrous. *Stem* slender. *Leaves* 6 by 4 in. or (especially upper ones) on the same stem 4 by $\frac{3}{4}$ in., wide or cuneate, decurrent at the base, feather-nerved; petiole 1-2 in. *Pedicels* $\frac{1}{2}$ -4 in., solitary, glabrous or pubescent, with a tuft of hairs at the base; bracteoles $\frac{1}{2}$ - $\frac{3}{4}$ in., broadly ovate or round, herbaceous, connate when young. *Calyx* minute, shorter than the small pedicel within the bracteoles, crenulate. *Corolla* $1\frac{1}{2}$ in., glabrous, usually a faint yellow, greenish below. *Stamens* 4, subsimilar, fifth rudimentary; filaments hairy (at the base, glandular upwards; anther-cells lanceolate, subpendent, separate below, sparingly hairy, white, cells with a round green ciliate basal appendage. *Style* bifid, branches short, linear, subequal, stigmas subcapitate.

Sect. 3. **Hexacentris**. *Flowers* racemed, or the lower axillary. *Calyx* an entire or obscurely crenulate ring. *Seeds* dorsally compressed, base plane.

6. **T. grandiflora**, *Roxb. Hort. Beng.* 45, and *Fl. Ind.* iii. 34; leaves ovate or uppermost lanceolate often angular or lobed scabrid or pubescent palmately 5-7-nerved, bracts deciduous lower often petioled leaf-like, corolla blue. *Wall. Cat.* 768, type sheet; *Bot. Mag.* t. 2366; *Bot. Reg.* t. 495; *Nees in Wall. Pl. As. Rar.* iii. 77, and in *DC. Prodr.* xi. 54; *Dalz. & Gibs. Bomb. Fl. Suppl.* 70; *Wight Ic.* t. 872; *T. Anders. in Journ. Linn. Soc.* ix. 447; *Kurz For. Fl.* ii. 240. *T. cordifolia*, *Nees l. c.* 55. *Flemingia grandiflora*, *Rottl. & Willd. in Nov. Act. Nat. Cur.* iv. 1803 (*vide Nees*).

BENGAL, alt. 0-4000 ft.; from Behar and Sikkim to Assam, Muneypoor and Chittagong, frequent.—DISTRIB. N. Burma (cult.? in China, Singapore, Bombay, &c.).

A large climber; uppermost leaves often passing into bracts. *Leaves* 6 by 3 in., acute, base cordate, toothed, often angularly lobed, pubescent, rarely glabrate; petiole 3 in. *Racemes* usually stout, pubescent, angular, somewhat dense-fld., or more slender, elongate, nearly glabrous; upper bracts small, inconspicuous; pedicels $\frac{1}{2}$ -3 in., opposite or fascicled; bracteoles $\frac{1}{2}$ -1 $\frac{1}{4}$ in., falcate-elliptic, acute, often cohering on one margin. *Calyx* subentire. *Corolla* 2-3 in. long and broad. *Filaments* widened below; anthers subsimilar, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, bearded; cells parallel with a fine linear basal spur. *Ovary* pubescent or glabrescent; stigma very large, funnel-shaped; lobes 2, rounded. *Capsule* 1-2 in., pubescent or glabrous. *Seeds* flat, $\frac{1}{2}$ in. diam., sub-trigonal, covered (except the large base) with soft brown scaly plates.—Ordinary forms are easily distinguished by the pubescent angular leaves and pubescent raceme; but some Khasian examples are altogether glabrate with entire elliptic acute leaves; and, except by the leaves being 5-7-nerved rather than 3-nerved at the base, they might be placed with *T. laurifolia*.

VAR. ? *axillaris*; leaves cordate-ovate acute glabrate, pedicels axillary 2-3 in. 1-fld., capsule and seeds as of *T. grandiflora*.—Khasia; Theria Ghaut, *Clarke*.—Stems very slender for *T. grandiflora*; corolla noted yellow (but?). Marked by *Kurz* as a new species; but the examples do not show the ends of the branches.

7. **T. laurifolia**, *Lindl. in Gard. Chron.* 1856, 260; glabrous or innovations puberulous, leaves elliptic or oblong acuminate sinuate or denticulate palmately 3-nerved, bracts deciduous, corolla blue. *Bot. Mag.* t. 4985; *T. Anders. in Journ. Linn. Soc.* ix. 447, excl. syn. *Nees*; *Kurz For. Fl.* ii. 240. *T. grandiflora*, *Wall. Cat.* 768, partly. *T. Harrisii*, *Hook. Bot. Mag.* t. 4998.

MALAY PENINSULA, from Arracan to Malacca; *Wallich, Griffith*, &c. ANDAMANS; *Kurz*.

Resembling altogether *T. grandiflora*, but leaves narrower. *Seeds* very rugose, hardly scaly.—*T. Anderson* refers here “partly” *Hexacentris acuminata*, *Nees*, which is founded on *Wall. Cat.* 7140, collected in Silhet or Khasia, and described as having the leaves distinctly 5-nerved.

8. **T. coccinea**, *Wall. Tent. Fl. Nep.* 49, 58, t. 37, and *Cat.* 766; nearly glabrous, leaves elliptic acuminate toothed palmately 3-5-nerved, racemes elongate pendent, bracts subpersistent lower subsessile lanceolate, corolla red. *Don Prodr.* 120; *Hook. Exot. Fl.* t. 195; *Bot. Mag.* t. 5124; *T. Anders. in Journ. Linn. Soc.* ix. 448. *T. pendula*, *Hassk. Cat. Hort. Bogor.* 147. *Hexacentris acuminata*, *Nees*; *Wall. Cat.* 7140. *H. coccinea*, dentata & acuminata, *Nees in Wall. Pl. As. Rar.* iii. 78, and in *DC. Prodr.* xi. 61.

HIMALAYA, alt. 2-7000 ft., from Kumaon to Bhotan, frequent; *Wallich*, &c. ASSAM; *Griffith*. KHASIA MTS., alt. 1-4000 ft., frequent; *H. f. & T.*, &c. TEXAS-SEERIM; *Beddome*.—(Ceylon, &c., cultivated.)

A large climber; ‘pendent branches often 10-25 ft., terminated by racemes. *Leaves* 5-8 in., lower ovate, upper oblong, obtuse cordate or angular at the base; petiole $\frac{1}{2}$ -2 in., or of the uppermost leaves 0. *Racemes* 6-18 in., lax, pendent; bracts $\frac{1}{2}$ -1 in.; pedicels $\frac{1}{2}$ -1 $\frac{1}{2}$ in., opposite or fascicled; bracteoles $\frac{1}{2}$ -1 in., broadly oblong or ovate, subacute, often coherent on one side, blackish or purple. *Calyx* a minute rim. *Corolla-tube* 1 in., lobes $\frac{1}{2}$ in. round, from red to orange-rose. *Filaments* glabrous, linear, a tuft of hairs at the base; anther-cells parallel; anthers of the longer filaments have 1 cell long-spurred at base, 1 short-spurred or spurless; anthers of the shorter filaments muticous or with 1 cell shortly spurred. *Style-arms* linear; stigmas subcapitate. *Capsule* 1-1 $\frac{1}{2}$ in., minutely pubescent or nearly glabrous. *Seeds* nearly $\frac{1}{2}$ in. diam., subhemispheric (or at least thicker than those of *T. grandiflora*), rugose not scaly; base plane.—*Nees’* description is very erroneous.

9. **T. mysorensis**, *T. Anders. in Journ. Linn. Soc.* ix. 448; nearly glabrous, leaves elliptic acuminate toothed palmately 3-nerved, racemes elongate pendent, bracts small deciduous, corolla yellow. *Hexacentris mysorensis*, *Wight Ic.* t. 871; *Bot. Mag.* t. 4786; *Dalz. & Gibs. Bomb. Fl.* 183.

NILGHERRIES and MYSORE; *Wight*, &c.

An extensive climber; branches pendent. *Leaves* 6 by 1-3 $\frac{1}{2}$ in., base cuneate or rounded, strongly 3-nerved, a slender outer pair of nerves sometimes added; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Racemes* elongate, lax, long- or short-peduncled; bracts $\frac{3}{4}$ - $\frac{1}{2}$ in., linear-lanceolate, inconspicuous; pedicels $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; bracteoles 1 in., falcate-elliptic, subacute, often coherent on one side, purplish-green. *Corolla* 1 $\frac{1}{2}$ in., mouth 2 in. diam.; tube purplish, limb yellow; in cultivation sometimes with a red border (*Part. Fl. Gard.* iii. t. 88). *Anthers* subsimilar; cells parallel, hairy, all spurred at base. *Stigma* funnel-shaped, margin somewhat 2-lipped. *Capsule* 1 $\frac{1}{2}$ in., glabrous. *Seeds* $\frac{1}{2}$ in. diam., rugose.

10. **T. Wightiana**, *T. Anders. in Journ. Linn. Soc.* ix. 448; nearly glabrous, leaves ovate acuminate toothed palmately 3-5-nerved, bracts inconspicuous, bracteoles large cordate-orbicular nerved, corolla light blue. *Schmidia bicolor*, *Wight Ic.* t. 1848.

NILGHERRIES; Sisparah, *Wight*, *Beddome*.

An extensive climber. *Leaves* 5 by 3 $\frac{1}{2}$ in., base rhomboid or rounded; petiole 1-2 in. *Racemes* axillary or from nodes of the old wood, 6-12 in.; bracts $\frac{3}{4}$ - $\frac{1}{2}$ in., linear-lanceolate, deciduous; pedicels opposite, 1 in., 2-ranked, curved; bracteoles 1 by 1 $\frac{1}{2}$ in., obtuse with a mucro, purple and cream-coloured (*Wight*). *Corolla* 1 $\frac{1}{2}$ -1 $\frac{3}{4}$ in., somewhat narrowly tubular, mouth 1 $\frac{1}{2}$ in. diam. *Anthers* subsimilar; cells parallel, glabrous, spurred at the base. *Ovary* and style glabrous; stigma funnel-shaped, hardly 2-lobed. *Fruit* not seen.

II. **ELYTRARIA**, *Vahl*.

Herbs, nearly stemless. *Leaves* alternate, crowded, subradical. *Scapes* covered by imbricated bracts; spikes close, rigid, simple or divided; bracts spirally imbricate, not opposite; bracteoles smaller than the bracts. *Calyx* sub-4-partite, segments unequal, the largest sometimes 2-fid. *Corolla* small, white or blueish; tube linear, limb 2-lipped; lobes 5, oblong, imbricate in bud. *Stamens* 2 perfect, attached in the corolla-throat; anthers elliptic, acute; cells 2, parallel, with or without a minute spur at the base. *Style* shortly 2-lobed; ovules 6-10 in each cell, superimposed. *Capsule* ellipsoid, acute. *Seeds* minute, ovoid, reticulated, minutely papillose, attached at a minute point without retinacula.—Species 3-4, American, whereof 1 is widely spread in tropical Africa and Asia.

E. crenata, *Vahl Enum.* i. 106; leaves obovate or elliptic obtuse crenate, bracts elliptic acuminate to a single sharp point. *Wall. Cat.* 2420; *Nees in Wall. Pl. As. Rar.* iii. 79, and in *DC. Prodr.* xi. 63; *T. Anders. in Journ. Linn. Soc.* ix. 449; *Dalz. & Gibs. Bomb. Fl.* 183. *E. lyrata*, *Vahl l. c.* *E. virgata*, *Vahl l. c.*; *Nees in DC. Prodr.* xi. 63. *E. marginata*, *Beauv. Fl. Ovar.* ii. 58, t. 93; *Nees in DC. l. c.* 63. *E. indica*, *Pers. Syn.* i. 23. *E. Vahlia*, *Michx. Fl. Bor. Am.* i. 9, t. 1. *Justicia acaulis*, *Linn. f. Suppl.* 84; *Roxb. Cor. Pl.* ii. 15, t. 127, and *Fl. Ind.* i. 119.

DECCAN PENINSULA and CEYLON, common southwards; extending north to Delhi, and to the E. Himalaya, *Griffith*.—DISTRIB. Tropical and S. Africa; tropical and N. America.

Stem 0-2 in., woolly. *Leaves* 2-5 in., sometimes obtusely lobed, pubescent at least on the nerves beneath, sessile or narrowed into a petiole. *Scapes* several, 3-10 in., clothed with bract-like scales. *Spikes* $\frac{1}{2}$ -4 in., harsh, simple or branched; bracts $\frac{1}{2}$ in., margins scarious, ciliate; bracteoles $\frac{1}{2}$ in., scarious, ciliate. *Calyx* $\frac{1}{2}$ in.; segments lanceolate, scarious, ciliate, the broad one entire at the apex. *Corolla* $\frac{1}{2}$ - $\frac{3}{4}$ in., white or blueish. *Anthers* muticous at the base; rudiments of 2 barren stamens sometimes (at least) present. *Capsule* $\frac{1}{2}$ in., rigid; valves resilient.—The stem is in African examples sometimes considerably elongate branched, and in American examples the scape is sometimes very tall.

III. **NELSONIA**, *R. Br.*

A diffuse, softly villous herb. *Leaves* opposite, elliptic, entire. *Spikes* ovate or cylindric; bracts ovate, glandular-villous, closely imbricate, alternate or spirally scattered; bracteoles 0. *Sepals* 4, unequal, lanceolate, the larger often bifid. *Corolla* very small, purplish rose or white; tube slender, limb 2-lipped; lobes 5, obtuse, patent. *Stamens* 2, attached above the middle of the tube; anthers 2-celled, subincluded; cells broadly ellipsoid, distinct, more or less divergent, glabrous or ciliate, muticous or minutely spurred. *Stigma* very shortly 2-lobed; ovules in each cell 8-10. *Capsule* oblong, acute, bearing seeds from the base, barren upwards. *Seeds* small, roundly ellipsoid, smooth with granular marks, attached on minute points without retinacula.

N. campestris, *Br. Prod.* 481; *Endl. Iconogr.* t. 79; *Benth. Fl. Austral.* iv. 543. *N. tomentosa*, *Nees in Wall. Pl. As. Rar.* iii. 79, and in *DC. Prodr.* xi. 65; *Griff. Notul.* iv. 132; *Dalz. & Gibs. Bomb. Fl.* 183; *T. Anders. in Journ. Linn. Soc.* ix. 450. *N. organoides*, *Roem. & Sch. Syst.* i. 173. *N. lamiifolia*, *Spreng. Syst.* i. 42. *N. canescens*, *Nees in DC. l. c.* 67.

N. villosa, senegalensis & Smithii, *Oersted in Vidensk Meddel. Kjobenh.* (1854) iv. 117, 118, t. 4, fig. 3-18. *Justicia canescens* & brunelloides, *Lamk. Ill.* i. 40, 41. *J. hirsuta*, *Vahl Enum.* i. 122. *J. lamifolia*, *Koen.*; *Rozb. Fl. Ind.* i. 134. *J. tomentosa*, *Wall. Cat.* 2370. (Other American, African and Australian synonyms omitted.)

Throughout INDIA, alt. 0-4000 ft., from the Himalaya to Ceylon and Malacca, common: not in western desert India.—DISTRIB. S.E. Asia, Australia, Africa, America.

Stems mostly short, with petioled leaves often 4-8 in. long; flowering stems trailing, 1-3 ft., with subsessile leaves $\frac{1}{2}$ -2 in. *Spikes* $\frac{1}{2}$ -2 in., mostly sessile, terminal on lateral branches; bracts $\frac{1}{6}$ - $\frac{1}{4}$ in., obtuse, herbaceous. *Calyx* $\frac{1}{4}$ in., green, striate, hairy or subscabrous. *Corolla* $\frac{1}{6}$ in. *Ovary* and style glabrous. *Capsule* $\frac{1}{6}$ - $\frac{1}{4}$ in., 8-12-seeded. *Seeds* yellowish with brown granulations.—The picture of the seed by Kippist in *Trans. Linn. Soc.* xix. t. 6, fig. 11, showing the surface with hammer-headed spines, is erroneous.

VAR. vestita; suberect, hairy, leaves very large, corolla-lobes acute. *N. vestita*, *Roem. & Sch. Syst.* i. *Mant.* 145. *Justicia tomentosa*, *Rozb. Hort. Beng.* 4, and *Fl. Ind.* i. 131. *J. bengalensis*, *Spreng. Syst.* i. 82. *Dianthera tomentosa*, *Rozb. Ic. Ined. in Herb. Kew.*—Pegu; *M'Leiland, Brandis, &c.*—Cauline leaves attaining 10 in., uppermost 3-5 in.; petiole 2 in. *Bracts* elliptic, acute.—Dr. King says that it is very easy to distinguish this from every form of *N. campestris*, but that he can give no good character for it, and that it had better be regarded as an extreme form of that plant. Roxburgh says the capsule is 4- or 8-seeded; it is really as that of *N. campestris* type.

IV. **EBERMAIERA**, *Nees*.

Herbs or small undershrubs. *Leaves* opposite (in *E. glauca* alternate), entire or nearly so. *Spikes* or *racemes* terminal or quasi-axillary, simple or compound, dense or lax; bract at the base of the pedicel leaf-like or overtopping the flower or small inconspicuous; bracteoles 2 near the base of the calyx, smaller than the bract. *Sepals* 5, oblong or linear, subequal or one larger. *Corolla-tube* elongate, cylindric (in *E. coriacea* & *parviflora* short-funnel-shaped); lobes 5, short, patent. *Stamens* 4, didynamous, included in the corolla-tube (in *E. coriacea* & *parviflora* shortly exsert); filaments patently hairy (in *E. parviflora* glabrous); anther-cells 2, ovoid, separate, mucinous. *Disc* inconspicuous. *Ovary* glabrous or nearly so; style linear glabrous; lobes 2, oblong, the lower frequently again 2-lobed; ovules very many. *Capsule* small, oblong, bearing seeds from the base to near the apex. *Seeds* 15-30 in each cell, small, globose or cuboid; hilum a minute hollow; retinacula 0; unripe glandular, ultimately nearly smooth or with obscure shallow pits; albumen thin, cartilaginous (*Benth.*).—Species 40, in S.E. Asia, Malaya, Australia, and Brazil.

* *Flowers sessile or subsessile, spikes elongate or capitate rarely divided, sepals $\frac{1}{4}$ in. or more one often distinctly larger than the others.*

1. ***E. glauca***, *Nees in DC. Prodr.* xi. 73; stem patently viscous-pubescent upwards, leaves petioled spatulate-oblong upper alternate, spikes elongate lax interrupted below, lower bracts petioled linear-spatulate much exceeding the flowers, corolla $\frac{1}{4}$ - $\frac{1}{2}$ in. *Wall. Cat.* 9083; *Wight Ill.* t. 164 b, fig. 2, and *Ic.* t. 1488; *Dalz. & Gibs. Bomb. Fl.* 184; *T. Anders. in Journ. Linn. Soc.* ix. 450, in some part and excl. syn. *E. ligulata*, *Bedd. Ic. Pl. Ind. Or.* t. 245.

W. DECCAN PENINSULA and S. MADRAS, frequent; *Wight, &c.* BENGAL; Darjeeling Terai, *Clarke*. TENASSERIM; *Beddome*.

Stems 12-15 in.; lower leaves and branches opposite or leaves nearly all alter-

Leaves 2 by $\frac{3}{4}$ in., obtuse, base attenuate, slightly viscous-pubescent or glabrate, entire or sinuate; petiole $\frac{1}{4}$ in. *Spikes* 2-6 in.; lowest bracts altogether leaf-like (whence T. Anderson says "flowers solitary axillary"); tip of the spike often dense with short bracts resembling the spike of neighbouring species; bracteoles linear, obtuse, shorter than the calyx. *Sepals* 4 subsimilar, $\frac{1}{4}$ in., linear-subulate, sparsely glandular-hairy; the fifth longer, much broader, linear-oblong, obtuse. *Corolla* straight, slightly pubescent without, purplish with rose or yellow stripes. *Auther-cells* mucous or minutely mucronate at base. *Capsule* $\frac{1}{2}$ in.—Described from Nees' type specimen; Wight's figure is taken from a form having a much denser more glandular-pubescent spike. The Australian species referred here by T. Anderson and Bentham differs in its hairy ovary and capsule, and many other minute points; but it might be better to unite it, and make a whole-sale reduction of species here.

VAR. spatulata; leaves very spatulate, spikes denser only a few of the lowest elongate, calyx and bracteoles very glandular-hairy, corolla scarcely $\frac{1}{4}$ in. *Adenosma spatulatum*, *Blume Bijdr.* 757. *Ebermaiera spatulata*, *Hassk.*; *Nees in DC. Prodr.* xi. 74, partly?—Pegu; *Kurz.* Tenasserim; *Beddome.* Bengal; Pubna, *Clarke.*—Distrib. Java.—Growing in rice-swamps; stems erect, thick, quadrangular or striate; many or nearly all the leaves alternate.—*Ebermaiera spatulata*, Nees, is described from a Philippine plant of Caming's, which widely differs from Kurz's Pegu specimens.

2. *E. polybotrya*, *Nees in DC. Prodr.* xi. 74; stems erect adpressedly grey-pubescent upwards, leaves elliptic subobtuse at both ends, spikes cylindric not lax downwards, bracts narrowly oblong scarcely exceeding the calyx, corolla $\frac{1}{4}$ in.

BENGAL; frequent in Terai swamps in Sikkim and Silhet, *J. D. H.*, &c. MOULMEIN and MERGUI; *Griffith.*

Stems 6-8 in., often branched from the base. *Leaves* all opposite, even at the base of the spike, $1\frac{1}{2}$ by $\frac{1}{2}$ in., subentire, minutely pubescent on the nerves beneath or glabrous; petiole 0 or in the lower leaves scarcely $\frac{1}{8}$ in. *Spikes* $1\frac{1}{4}$ in.; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in.; bracteoles linear, shorter than the calyx. *Sepals* 4 subsimilar, narrow-linear, subobtuse; the fifth rather longer, much broader, oblong, obtuse. *Corolla*, *stamens*, and *capsule* nearly as of *E. glauca*.

3. *E. humilis*, *Nees in Wall. Pl. As. Rar.* iii. 80, and in *DC. Prodr.* xi. 74; stem erect branched adpressed white-pubescent upwards, leaves opposite subsessile narrowly elliptic, heads terminal small globose, bracts oblong sessile hardly so long as the calyx, corolla $\frac{1}{2}$ in. and upwards. *Wall. Cat.* 7148; *T. Anders. in Journ. Linn. Soc.* ix. 450.

BURMA; Prome Hills, *Wallich.*

Stem 6-8 in., branched from near the base; branches ascending, shorter than the central stem. *Leaves* $1\frac{1}{4}$ by $\frac{1}{2}$ in., obtusely rhomboid at both ends, nearly glabrous, adpressedly white-pubescent on the nerves beneath; petiole hardly $\frac{1}{2}$ in. diam. *Heads* sessile, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; bracts and bracteoles $\frac{1}{4}$ in. *Sepals*, 4 linear, subobtuse; the fifth slightly larger, oblong obtuse.—Nearly allied to *E. polybotrya*, but the heads are not elongate cylindric, the bracteoles and sepals are less acute, the corolla is larger.

4. *E. glutinosa*, *Wall. Cat.* 9087; stem trailing rooting pubescent, leaves elliptic, base attenuate, heads subspherical on short branches and quasi-axillary, bracts elliptic sessile hardly so long as the calyx, corolla $\frac{1}{2}$ in. *Ebermaiera* sp., *Wall. Cat.* 9085. *E. glauca*, *T. Anders. in Journ. Linn. Soc.* ix. 450, in great part.

CENTRAL INDIA, N.W. PROVINCES, and BENGAL, frequent; Moradabad, *Thomson*; Behar, *J. D. H.*; Bundelcund, *Edgeworth*; Silhet, *Wallich*, &c.

Stems numerous, 12-18 in.; nodes in the trailing branches distant. *Leaves* all (or nearly all) opposite, $1\frac{1}{2}$ by $\frac{3}{4}$ in., subobtuse, entire, minutely pubescent or glabrous;

petiole 0- $\frac{1}{4}$ in. *Heads* 2-8-fld.; bracts $\frac{1}{2}$ in.; bracteoles $\frac{1}{4}$ in., narrowly obovate-oblong. *Sepals* 4, linear, subobtusely, viscidly pubescent; the fifth slightly longer, oblong, obtuse. *Corolla* blueish with dark veins. *Ovary* minutely pubescent upwards; one stigma-lobe oblong, the other bifid.—Easily separated from *E. glauca* by its habit, opposite leaves and large flowers.

5. *E. zeylanica*, *Nees in DC. Prodr.* xi. 74; trailing branches pubescent, leaves elliptic subobtusely narrowed at the base, spikes cylindric, bracts obovate slightly longer than the flowers, corolla $\frac{1}{4}$ - $\frac{1}{2}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 451, *excl. syn.* *E. glauca*, *T. Anders. in Thwaites Enum.* 224, *not in Nees.* *Erythracanthus elongatus*, *Dalz. & Gibs. Bomb. Fl.* 184, *not of Nees.*

W. DECCAN PENINSULA and CEYLON; Concan, *Dalzell, Stocks, &c.* CEYLON; *Maeræ, Thwaites.*

Stem erect, short, with large leaves, and flowering runners with much smaller leaves. *Leaves* 3 by 1 in., subentire, sparsely hairy on both surfaces, or glabrate with nerves beneath pubescent; petiole $\frac{1}{2}$ in., or in the leaves of the lateral branches 0. *Spikes* 1-2 in., dense; bracts $\frac{1}{2}$ by $\frac{1}{2}$ in., obtuse, apiculate, strongly 1-nerved; bracteoles $\frac{1}{2}$ in., linear-spathulate. *Sepals* 4, linear, rather shorter than the bracts; the fifth rather broader, linear, subacute. *Corolla*, stamens, and capsule nearly as of *E. glauca*.

6. *E. thyrsoides*, *Nees in Wall. Pl. As. Rar.* iii. 80, and in *DC. Prodr.* xi. 75; stem erect hairy, leaves petioled elliptic-spathulate subobtusely, spikes cylindric thyrsoid, bracts oblong very acute scarcely longer than the flowers, corolla $\frac{1}{2}$ in. *Wall. Cat.* 7149. *E. zeylanica*, *T. Anders. in Journ. Linn. Soc.* ix. 451, *partly.* *E. diffusa*, *Kurz in Journ. As. Soc.* 1871, pt. ii. 74. *Capraria diffusa*, *Roxb. Fl. Ind.* iii. 93, *fide Kurz.*

EAST FRONTIER from Cachar, *Keenan*, to Tenasserim, *Beddome*; plentiful in Chittagong, *J. D. H., &c.*

Stem 8-18 in., decumbent at the very base, then erect, longer than the ascending branches. *Leaves* 3 by $\frac{3}{4}$ in., hairy. *Spikes* axillary and terminal 1-4 in.; pedicels of the lower flowers $\frac{1}{10}$ - $\frac{1}{2}$ in.; bracteoles with fine hairs often $\frac{1}{2}$ - $\frac{1}{4}$ in. long. *Sepals* 4, subsimilar, linear, with fine long hairs; the fifth longer, narrowly lanceolate, twice as broad. *Corolla* (at least often) white or very nearly so. Otherwise as *E. zeylanica*, with which *T. Anderson* united this species; but it appears amply distinct.

7. *E. incana*, *Hassk. Hort. Bogor.* 147; stem short suberect scarcely branched, leaves petioled elliptic shortly softly hairy on both surfaces, spikes cylindric, bracts lanceolate shorter than the calyx not aristate, corolla $\frac{1}{2}$ in. *E. velutina*, *Nees in DC. Prodr.* xi. 76; *T. Anders. in Journ. Linn. Soc.* ix. 452.

MERGUI; *Griffith.* TENASSERIM (or Andamans), *Helfer* (*Kew Distrib.* n. 6080).—DISTRIB. Java?

Stem decumbent, base almost woody, then erect, 3-4 in., closely rusty-villous. *Leaves* 4 by 1 $\frac{1}{2}$ in., obtuse, base narrowed, subentire; petiole $\frac{1}{2}$ -1 in. *Spikes* 1-1 $\frac{1}{2}$ in., dense; bracts $\frac{1}{2}$ in.; bracteoles $\frac{1}{6}$ in., broadly lanceolate, closely softly hairy. *Sepals*, two $\frac{1}{2}$ in. linear, two nearly $\frac{1}{2}$ in. linear, one $\frac{1}{2}$ in. lanceolate; all slightly pubescent and ciliate. *Corolla* and stamens nearly as in *E. glutinosa*. *Capsule* $\frac{1}{4}$ in.—*Nees* says that this is nearly the same as *E. incana*, *Hassk.*, of which I have seen no specimen; and *Kurz* says (*Journ. As. Soc.* 1870, pt. ii. 78) that it is quite the same. By habit, bracts and indumentum it approaches *E. macrophylla*, *T. Anders.*

8. *E. lanceolata*, *Hassk. Hort. Bogor.* 147; stems short branched suberect, leaves oblong or narrowly elliptic cuneate at both ends glabrate or minutely pubescent beneath, spikes cylindric dense, bracts oblong acute

pubescent hardly ciliate, calyx ciliate shorter than the bract, corolla $\frac{1}{2}$ in. and upwards. *Nees in DC. Prodr.* xi. 76; *Kurz in Journ. As. Soc.* 1870, pt. ii. 78. *E. argentea*, *Nees l. c.*; *T. Anders. in Journ. Linn. Soc.* ix. 451. *Adenosma lanceolatum*, *Blume Bijd.* 757. *Staurogyne*, *Wall. Cat.* 7489.

PENANG; *Wallich*. MALACCA; *Griffith*. TENASSERIM (or Andamans), *Helper* (Kew Distrib. n. 6077).—DISTRIB. Java.

Stems 3–6 in., base almost woody, pubescent. *Leaves* 3 by $\frac{3}{4}$ in., narrowed to an obtuse apex, entire, sinuate, pubescent on the nerves beneath, and sometimes also slightly on the lamina; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Spikes* 2 in., dense; bracts $\frac{3}{4}$ in., not aristate; bracteoles $\frac{1}{2}$ in., narrow-lanceolate, ciliate. *Sepals* 4, $\frac{1}{2}$ in., linear; the fifth slightly longer and broader; all prominently ciliate. *Capsule* $\frac{1}{4}$ in.

9. *E. Staurogyne*, *Nees in DC. Prodr.* xi. 75; stem decumbent short, leaves narrowly elliptic whitened beneath, spikes short cylindric or capitate, bracts lanceolate 3-nerved long-aristate pubescent not ciliate, corolla $\frac{3}{4}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 451, *excl. all syn.* *Staurogyne argentea*, *Wall. Pl. As. Rar.* ii. 80, t. 186, and *Cat.* 4905.

KHASIA HILLS up to 3000 ft. alt., and N. SILHET, frequent; *Wallich*, *Griffith*, *H. f. & T.*, &c.

Stems 3–8 in., pubescent, prostrate, rooting, base almost woody. *Leaves* 4 by $1\frac{1}{2}$ in., subobtusate, base rounded or cuneate, entire, glabrous, nerves beneath prominent puberulous; petiole $\frac{1}{2}$ – $1\frac{1}{2}$ in. *Spikes* $\frac{1}{2}$ –2 in.; bracts $\frac{1}{2}$ in. with awns $\frac{1}{2}$ in.; bracteoles $\frac{1}{2}$ in., linear, awns $\frac{1}{2}$ in. *Sepals* $\frac{1}{2}$ in., linear, awns $\frac{1}{2}$ in. *Corolla* purple with rose marks. *Style* bifid, lower lobe 2-partite. *Capsule* $\frac{1}{4}$ in.

10. *E. angustifolia*, *T. Anders. in Journ. Linn. Soc.* ix. 451, *excl. many syn.*; stem decumbent short, leaves narrowly elliptic somewhat whiter beneath, spikes short cylindric or capitate, bracts lanceolate 3-nerved long-awned pubescent ciliate, awns of the bracteoles and sepals without hairs or cilia. *E. Staurogyne* β *angustifolia*, *Nees in DC. Prodr.* xi. 75. *Staurogyne angustifolia*, *Wall. Cat.* 4906.

CHITTAGONG, alt. 0–1000 ft., frequent; *H. f. & T.*, &c. PEGU; *J. Scott*. MOULMEIN; *Griffith*. RANGOON; *M'Lelland*. TENASSERIM; King's Island, *Helper*.

Very near *E. Staurogyne*; but the long white cilia on the margin of the lanceolate portion of the bracts and bracteoles at flower-time give the heads a different aspect. The characters drawn from the breadth of the leaves and the cuneation of their bases fail; and Mr. Bentham has noted the species as perhaps only a var. of *E. Staurogyne*. T. Anderson has variously marked it, *E. Staurogyne*, *setigera*, *angustifolia*, and *aristata*. The awns of the bracteoles and sepals have very minute white adpressed bristles.

11. *E. setigera*, *Nees in DC. Prodr.* xi. 76; stems short branched, leaves short-petioled narrowly elliptic, spikes capitate, bracts almost linear, bracteoles and sepals subulate hairy nearly to their tip with patent long tawny hairs from bulbous bases, corolla $\frac{1}{2}$ in. and upwards. *T. Anders. in Journ. Linn. Soc.* ix. 451. *E. trichocephala*, *Miq. Fl. Ind. Bat.* ii. 774.

MALACCA; *Cuming*.—DISTRIB. Sumatra, Borneo.

Stem 3–6 in., pubescent. *Leaves* 2 by $\frac{3}{4}$ in., cuneate, subobtusate at both ends, glabrous above, puberulous whiter beneath; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Spikes* $\frac{1}{2}$ –1 in.; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., linear, long-attenuate, subulate, scarcely awned, herbaceous not nervose (as in the two preceding species); bracteoles similar, but rather shorter. *Sepals* $\frac{1}{2}$ in., linear-subulate, hardly aristate. *Capsule* $\frac{1}{4}$ in.; bracteoles and sepals less stellate in fruit than in *E. angustifolia*.—*E. trichocephala*, *Miq.*, is referred by *Kurz* (*Journ. As. Soc.* 1870, pt. ii. 78) to *E. lanceolata*, and by T. Anderson (*Journ. Linn. Soc.*

ix. 451) to *E. Staurogyne*; but from the description and habitat is surely *E. setigera*.

12. **E. longifolia**, *Nees in DC. Prodr.* xi. 76; leaves long-petioled lanceolate, spikes cylindric softly hairy, lower flowers somewhat pedicelled, bracts narrow-lanceolate attenuate subulate herbaceous hairy below minutely pubescent upwards, corolla $\frac{1}{2}$ – $\frac{3}{4}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 451.

MALACCA; *Griffith* (Kew Distrib. n. 6079), *Cuming*.

Branches 3–8 in., divided, pubescent; innovations white-silky, subtomentose. *Leaves* 5 by $1\frac{1}{2}$ in., narrowed to both ends, subobtusely, base cuneate, subtire, sinuate, glabrous above, puberulous whiter beneath; petiole $\frac{1}{2}$ –2 in. *Spikes* 1–2 $\frac{1}{2}$ in.; lower pedicels often $\frac{1}{2}$ in.; bracts $\frac{3}{4}$ in.; bracteoles similar but rather narrower and shorter. *Sepals* $\frac{1}{2}$ in., very like the bracteoles. *Capsule* $\frac{1}{4}$ in., rather broader than in the preceding species.

13. **E. axillaris**, *Nees in Wall. Pl. As. Rar.* iii. 80, and in *DC. Prodr.* xi. 75; branches almost woody, leaves elliptic narrowed at both ends minutely punctate above, spikes cylindric drooping very hairy, bracts lanceolate acuminate hairy, corolla $\frac{1}{2}$ in. very hairy without. *T. Anders. in Journ. Linn. Soc.* ix. 452. *Ruellia?* *comosa*, *Wall. Cat.* 2414.

PENANG; *Wallich*.

Leaves 6 by $1\frac{1}{2}$ –2 $\frac{1}{4}$ in., subobtusely, base cuneate, nearly entire, glabrous, pubescent on the nerves beneath; petiole $\frac{1}{4}$ –1 in. *Spikes* 2–4 in., dense, several among the penultimate leaves on the branch; bracts $\frac{1}{2}$ in., flaccid; pedicels hardly any; bracteoles resembling the bracts, but narrower and rather shorter. *Sepals* $\frac{1}{2}$ in., linear-lanceolate, acuminate, softly hairy. *Capsule* $\frac{1}{2}$ in.

** *Lower flowers of the racemes more or less distinctly pedicelled, racemes often paniced, sepals $\frac{1}{2}$ in. or more not very unequal.*

14. **E. Simonsii**, *T. Anders. in Journ. Linn. Soc.* ix. 451; leaves large elliptic narrowed at both ends, racemes paniced white-hairy, bracts linear, sepals linear covered to the tips on all sides with glistening white hairs, corolla $\frac{1}{2}$ in.

KHASIA HILLS; Bor Pani, alt. 2500 ft., *Simons*.

Stems 6 in., stout, woody, branched, villous upwards. *Leaves* 8 by $3\frac{1}{2}$ in., subobtusely, base cuneate, nearly entire, sparsely hairy or finally glabrate above, glabrous, paler beneath, puberulous on the nerves; petiole 1–2 in. *Racemes* dense, sparingly branched or laxly paniculate, 1–4 in.; bracts $\frac{1}{2}$ in., very narrowly linear, obtuse; pedicels often $\frac{1}{2}$ in.; bracteoles $\frac{1}{4}$ – $\frac{1}{2}$ in., narrowly linear. *Sepals* nearly $\frac{1}{2}$ in., two of them somewhat shorter. *Corolla* nearly glabrous without. *Capsule* $\frac{1}{4}$ in.

15. **E. Helferi**, *T. Anders. in Journ. Linn. Soc.* ix. 452, chiefly; stem short stout, leaves obovate-oblong closely minutely pubescent on the surface above and the nerves beneath, peduncles bearing 1 or several racemes, bracts petioled elliptic obtuse whitened membranous nearly glabrous, sepals linear obtuse nearly glabrous.

TENASSERIM; Attaran, *Helfer* (Kew Distrib. n. 6075). PEGU; Thoungyun, *Brandis*.

Stem 4 in., villous, simple. *Leaves* 9 by 5 in., obtuse, base attenuated, somewhat whitened beneath; petiole $\frac{1}{2}$ –1 in. *Peduncles* 1–5 from the penultimate axils, 1–3 in., reddish, minutely pubescent. *Racemes* 1–3 in., somewhat dense; bracts $\frac{1}{2}$ by $\frac{1}{4}$ in., nervose; pedicels sometimes $\frac{1}{2}$ – $\frac{1}{6}$ in.; bracteoles $\frac{1}{2}$ in., narrowly oblong, resembling the bract, upper shorter and narrower. *Sepals* 4, $\frac{1}{4}$ in., of which 2 rather shorter; the fifth rather longer, twice as broad, 3-nerved. *Corolla* $\frac{1}{2}$ in., glabrous or nearly so.

Capsule $\frac{1}{4}$ in.—T. Anderson l. c. describes one of the bracts as at the same time 1-nerved and 3-nerved, but he subsequently himself separated in the Herbarium his *E. macrophylla*.

16. ***E. macrophylla***, T. Anders. in *Herb. Kew*; stem hardly any, leaves short-petioled obovate-oblong obtuse minutely closely pubescent on the surface above and on the nerves beneath, peduncle simple or branched, racemes slender pubescent, bracts and bracteoles small spatulate-elliptic herbaceous pubescent. *E. Helfer*, T. Anders. in *Journ. Linn. Soc.* ix. 452, in part.—Ebermaiera, Wall. Cat. 9086.

LOWER BURMA; Chappedong, Wallich; Moulmein, Parish, Lobb.

Stem 1–3 in., stout, villous. *Leaves* 7 by 4 in., base broadly rhomboid; petiole $\frac{1}{8}$ – $\frac{3}{8}$ in. *Peduncles* $\frac{1}{4}$ in.; spikes 3 in.; bracts $\frac{1}{4}$ – $\frac{1}{2}$ in.; pedicels $\frac{1}{10}$ in.; bracteoles $\frac{1}{8}$ – $\frac{1}{4}$ in., resembling the bracts, unequal. *Sepals* $\frac{1}{2}$ in., linear, scarcely acute, pubescent. *Corolla* $\frac{1}{2}$ in., glabrous or nearly so.—Exceedingly near *E. Helfer*, but the bracts and bracteoles are much smaller, not white membranous nervose.

17. ***E. Griffithiana***, T. Anders. in *Journ. Linn. Soc.* ix. 452; stem short, leaves petioled elliptic rounded at both ends minutely closely pubescent above, racemes elongate paniced, bracts elliptic pubescent, sepals $\frac{1}{4}$ – $\frac{1}{2}$ in. linear. *Erythracanthus Griffithianus*, Nees in *DC. Prodr.* xi. 78. *E. obtusus*, Wight *Ic. t.* 1491, not of Nees.

MALACCA; Griffith (Kew Distrib. n. 6078).

Stem 3–6 in., herbaceous, branched, pubescent. *Leaves* 5 by 3 in., pubescent beneath or finally on the nerves only; petiole $\frac{1}{2}$ – $1\frac{1}{2}$ in. *Peduncles* 1–2 in., reddish; racemes up to 5 in.; bracts $\frac{1}{2}$ by $\frac{1}{2}$ in., hardly acute; pedicels 0– $\frac{1}{4}$ in.; bracteoles $\frac{1}{3}$ by $\frac{1}{2}$ in., similar to the bracts. *Sepals* subequal, narrowly linear, somewhat striate longitudinally. *Capsule* $\frac{1}{4}$ in.

18. ***E. elongata***, Nees in *DC. Prodr.* xi. 721; leaves oblong acute at both ends punctate obscurely pubescent above, racemes elongate lax, bracts linear-lanceolate, sepals $\frac{1}{2}$ in. almost equal sublinear pubescent. T. Anders. in *Journ. Linn. Soc.* ix. 452. *Adenosma elongatum*, Blume *Bijd.* 757. *Erythracanthus elongatus*, Nees in *DC. Prodr.* xi. 78, excluding *Var. β*.

PENANG; Wallich (fide T. Anderson).—DISTRIB. JAVA.

Stem 6 in., erect, pubescent. *Leaves* 6 by 2 in., obscurely pubescent beneath, herbaceous, concolorous or nearly so, nerves beneath inconspicuous; petiole 1–2 $\frac{1}{2}$ in. *Raceme* 10 in., branched near the base; bracts $\frac{1}{2}$ by $\frac{1}{10}$ in., acuminate, scarcely awned; pedicels 0– $\frac{1}{2}$ in.; bracteoles $\frac{1}{2}$ in., linear. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in., minutely pubescent without. *Capsule* nearly $\frac{1}{2}$ in.—The example from Java marked *E. subpaniculata*, Hassk., is *E. elongata*, Nees; but it may perhaps be wrongly named, as the description of Hasskarl (in *Retzia*, 77) says inter alia that the leaves of *E. subpaniculata* are mostly alternate, much whitened beneath.

19. ***E. lasiobotrys***, Nees in *DC. Prodr.* xi. 721; stem erect sub-tomentose upwards, leaves narrowly elliptic cuneate at both ends glabrate above, racemes elongate very lax, bract filiform very small, sepals $\frac{1}{4}$ in. linear with patent white hairs to the tips on all sides. Wall. Cat. 9084; T. Anders. in *Journ. Linn. Soc.* ix. 452.

LOWER BURMA; Chappedong Hills, Wallich; Mergui, Griffith; Moulmein, Falconer; Tavoy, Parish.

Stem decumbent, rooting, then 6–15 in. erect. *Leaves* 5 $\frac{1}{2}$ by 2 in. (usually smaller), mature glabrous minutely pubescent on the nerves beneath; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in. *Panicles* 6–12 in., straggling; racemes 2–5 in., lower flowers distant; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in.;

lower pedicels $\frac{1}{8}$ – $\frac{1}{6}$ in.; bracteoles $\frac{1}{10}$ in., filiform. *Sepals* subequal, somewhat larger in fruit. *Corolla* $\frac{1}{2}$ in., narrow tubular, sparsely minutely hairy. *Capsule* $\frac{1}{4}$ in.

20. **E. paniculata**, *Wall. mss.*; *T. Anders. in Journ. Linn. Soc.* ix. 453; stem erect subtomentose upwards, leaves narrowly elliptic cuneate at both ends glabrate above, panicle compound, racemes lax, bracts filiform very small, sepals $\frac{1}{4}$ in. linear nearly glabrous.

MUNEYPOOR; *Hort. Calcutt.* S.E. ASSAM (or Ava), *Griffith* (Kew Distrib. n. 6082). *Stems* 1 foot, woody, sometimes branched. *Leaves* 7 by 3 in. (often smaller) scarcely acute, prominently reticulated, pubescent on the nerves beneath; petiole $\frac{1}{4}$ – $\frac{3}{8}$ in. *Panicles* (including peduncles) 6–9 in., reddish, minutely pubescent; bracts $\frac{1}{8}$ – $\frac{1}{6}$ in., minutely pubescent; pedicels $\frac{1}{8}$ – $\frac{1}{6}$ in.; bracteoles $\frac{1}{10}$ in., filiform. *Sepals* $\frac{1}{8}$ in. in flower, $\frac{1}{4}$ in. or more in fruit. *Corolla* $\frac{1}{2}$ in., slender, nearly glabrous. *Capsule* $\frac{1}{8}$ – $\frac{1}{2}$ in.—Closely allied to *E. lasiobotrys*, but with smaller flowers and fruit, and the panicle without the abundant hair of *E. lasiobotrys*.

VAR. *glabrior*; leaves less reticulated, panicle thin very glabrous, sepals very slender glabrous.—Patkoy Mts., alt. 4000 ft.; *Griffith* (Kew Distrib. n. 6085).

21. **E. obtusa**, *T. Anders. in Journ. Linn. Soc.* ix. 453; stem short subtomentose, leaves elliptic rounded at both ends closely shortly hairy above, panicles compound shortly pubescent, bracts very small filiform, sepals $\frac{1}{2}$ in. linear minutely pubescent. *Erythracanthus obtusus*, *Nees in DC. Prodr.* xi. 78.

MERGU; *Griffith* (Kew Distrib. n. 6083). MOULMEIN, *Falconer*.

Stem 3–4 in. *Leaves* 3 $\frac{1}{2}$ by 1 $\frac{1}{2}$ in., very obtuse, base sometimes subcordate, beneath glabrous, the nerves pubescent; petiole $\frac{1}{4}$ –2 in. *Peduncles* often numerous from the upper axils; panicles 3–5 in., racemes lax; bracts $\frac{1}{8}$ – $\frac{1}{4}$ in.; lower pedicels $\frac{1}{8}$ – $\frac{1}{6}$ in.; bracteoles $\frac{1}{10}$ in., filiform. *Sepals* $\frac{1}{8}$ in. in flower, in fruit $\frac{1}{4}$ in. *Corolla* $\frac{1}{2}$ in., slender, minutely hairy. *Capsule* $\frac{1}{8}$ in.

22. **E. Maclellandii**, *T. Anders. in Journ. Linn. Soc.* ix. 454; stem erect branched, leaves oblong narrowed at the base obscurely pubescent above, panicles small numerous patently softly hairy lateral and terminal, bracts small oblong herbaceous, sepals $\frac{1}{2}$ in. linear patently hairy.

PERGU; *McLelland*.

Stems 6–12 in., herbaceous, pubescent. *Leaves* 2 $\frac{1}{2}$ by $\frac{1}{2}$ in., obtuse, mature nearly glabrous; petiole 0– $\frac{1}{4}$ in. *Panicles* 1–2 in., on short branches beginning near the base of the stems; lower bracts passing gradually into leaves, upper scarcely $\frac{1}{2}$ in.; pedicels mostly short, some attaining $\frac{1}{6}$ in.; bracteoles $\frac{1}{8}$ in., narrowly oblong. *Corolla* $\frac{1}{4}$ – $\frac{1}{2}$ in.—Allied to *E. glauca* and *E. polybotrya*, but is driven to this position in the linear series by its slender racemes and subequal sepals.

*** *Racemes elongate, lax, calyx small* ($\frac{1}{8}$ – $\frac{1}{6}$ in. long).

23. **E. racemosa**, *Miq. Fl. Ind. Bat.* ii. 775; stem erect somewhat stout, leaves narrowly elliptic cuneate at both ends minutely hairy above, racemes long simple or divided, sepals $\frac{1}{8}$ in. lanceolate minutely pubescent, corolla $\frac{1}{2}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 452. *Ruellia racemosa*, *Roxb. Fl. Ind.* iii. 42; *Wall. Cat.* 2336. *Erythracanthus racemosus*, *Nees in Wall. Pl. As. Rar.* iii. 80, and in *DC. Prodr.* xi. 78.

MALAY PENINSULA, from Moulmein southwards, and Penang, frequent; *Wallich*, &c.—DISTRIB. JAVA.

Stems attaining 15 in., branched, closely brown-villous. *Leaves* 4 $\frac{1}{2}$ by 1 $\frac{1}{4}$ in., scarcely acute, reddish brown, glabrous beneath, pubescent on the nerves; petiole $\frac{1}{2}$ –1 $\frac{1}{4}$ in. *Peduncles* 2–3 in., subterminal; racemes 2–5 in., often simple, sometimes divided; bracts $\frac{1}{8}$ – $\frac{1}{6}$ in., narrowly oblong or linear; pedicels sometimes $\frac{1}{8}$ – $\frac{1}{6}$ in., often

hardly any, the raceme becoming altogether a spike; bracteoles smaller than the bracts. *Corolla* glabrous. *Capsule* $\frac{1}{4}$ by $\frac{1}{8}$ in.

24. **E. merguensis**, *T. Anders. in Journ. Linn. Soc.* ix. 452; stem very short, leaves obovate-oblong obtuse nearly glabrous, base cordate, panicles minutely pubescent, sepals $\frac{1}{2}$ in. lanceolate, corolla $\frac{1}{4}$ — $\frac{1}{2}$ in.

MERGUI; *Helper* (Kew Distrib. n. 6081).

Stem 1–3 in., closely villous. *Leaves* 3 by $1\frac{1}{4}$ in., tip rounded, subcoriaceous; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Peduncles* several, 1–3 in., reddish; racemes 1–4 in., slender, simple or little divided, minutely pubescent or glabrate; bracts $\frac{1}{2}$ in., narrow-lanceolate; lower pedicels scarcely $\frac{1}{8}$ in.; bracteoles smaller than the bracts. *Corolla* narrow, glabrous. *Capsule* scarcely $\frac{1}{2}$ in., broad lanceolate.

25. **E. gracilis**, *T. Anders. in Journ. Linn. Soc.* ix. 453; stem hardly any, leaves short-petioled large obovate-oblong nearly glabrous, panicles slender pubescent, sepals $\frac{1}{2}$ in. sublinear, corolla $\frac{1}{2}$ in. (and upwards) narrowly tubular.

MARTABAN; *Parish*.

Leaves 8 by 3 in., obtuse, minutely pubescent on the nerves beneath; petiole $\frac{1}{4}$ in. *Peduncles* several, 3–5 in., slender; panicles compound; bracts $\frac{1}{16}$ in., linear; pedicels 0– $\frac{1}{8}$ in.; bracteoles $\frac{1}{16}$ in., linear. *Sepals* minutely pubescent. *Corolla* glabrous without when expanded, or nearly so. *Capsule* $\frac{1}{4}$ in.

26. **E. coriacea**, *T. Anders. in Herb. Kew*; stem short closely villous, leaves elliptic nearly glabrous, raceme long densely softly minutely grey hairy, sepals $\frac{1}{2}$ in. lanceolate, corolla $\frac{1}{2}$ in. tube short, anthers shortly exsert.

MOULMEIN; *Lobb*.

Stem 4 in., almost woody at the base. *Leaves* 2 by 1 in., obtuse, base rhomboid, subcoriaceous, secondary nerves obscure; petiole $\frac{1}{8}$ – $\frac{1}{2}$ in. *Peduncle* $1\frac{1}{2}$ in.; raceme 4 in., many-fld.; bracts $\frac{1}{2}$ in., narrow-lanceolate; lower pedicels $\frac{1}{2}$ in.; bracteoles in., narrow-lanceolate. *Calyx* with dense soft, short, grey hair. *Corolla* with a very short cylindric base, a short funnel-shaped portion at the base of which the filaments are inserted, elliptic or oblong erect-patent lobes, closely patently glandular-hairy. *Stamens* and *pistil* of *Ebermaiera*; filaments densely patently hairy upwards. *Capsule* $\frac{1}{2}$ in., oblong, as of *Ebermaiera*.—The corolla is nearly as in *Ophiorrhizophyllum*.

27. **E. parviflora**, *T. Anders. in Herb. Kew*; stem very short, leaves obovate-oblong glabrate except the nerves beneath, panicle compound slender minutely hairy, sepals $\frac{1}{2}$ in. sublinear, corolla $\frac{1}{2}$ – $\frac{1}{4}$ in. tube short, anthers subexsert.

MOULMEIN; *Lobb*.

Stem 1 in., subtomentose. *Leaves* 6 by $2\frac{1}{4}$ in., obtuse, base rhomboid or almost rounded; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in. *Peduncle* 4 in., pubescent, with 9 scattered bracts $\frac{1}{2}$ in. long; panicle $4\frac{1}{2}$ by 3 in.; bracts $\frac{1}{2}$ – $\frac{1}{4}$ in., linear; lower pedicels scarcely $\frac{1}{8}$ in.; bracteoles $\frac{1}{16}$ in., subulate. *Corolla* as of *E. coriacea* but smaller, the external hairs shorter. *Filaments* glabrous except near the base; anther-cells ovoid, minutely puberulous. *Pistil* as of *E. coriacea*.—Closely allied to *E. coriacea*, but with much larger leaves, and smaller flowers.

28. **E. Beddomei**, *Clarke*; leaves elliptic acuminate at both ends puberulous on the nerves beneath, racemes solitary simple linear minutely pubescent, corolla $\frac{1}{2}$ – $\frac{1}{4}$ in. funnel-shaped.

TENASSERIM; Mt. Mooleeyit, *Beddome*.

Stems densely pubescent. *Leaves* $4\frac{1}{4}$ by $1\frac{1}{2}$ in., membranous, whitened underneath;

petiole $1\frac{1}{4}$ in., pubescent; the uppermost leaf sometimes short-petioled, rounded at the base. *Peduncle* $\frac{1}{2}$ in.; raceme 4-5 in.; bract near the base of the pedicel $\frac{1}{10}$ in., linear-lanceolate; bracteoles $\frac{1}{2}$ in., linear-lanceolate, minutely pubescent. *Calyx-segments* 5, unequal, $\frac{1}{2}$ - $\frac{1}{3}$ in., linear-lanceolate, minutely pubescent. *Corolla* funnel-shaped, tube very short. *Filaments* glabrous; anther-cells ovoid, irregularly subdivaricate.—Allied to *E. coriacea*, T. Anders.

V. OPHIORRHIZIPHYLLON, Kurz.

An erect herb. *Leaves* opposite, petioled, elliptic, entire. *Spikes* very long, many-fl'd.; bracts narrowly oblong, exceeding the calyx; bracteoles small. *Sepals* 5, subequal, narrowly lanceolate. *Corolla* shortly tubular, curved at the mouth; lobes 5, elliptic, suberect. *Stamens* 2; filaments long, exsert, glabrous; anther-cells 2, oblong, mucous, separate, approximate, erect. *Disc* inconspicuous. *Ovary* glabrous; style long, glabrous, shortly 2-lobed; ovules very many. *Capsule* oblong and seeds as of *Ebermaiera*.

O. macrobotryum, Kurz in Journ. As. Soc. 1871, pt. ii. 76.

MARTABAN; Thoungyen, Brandis. KAREN HILLS; Kurz.

Stem 6-10 in., undivided, pubescent upwards. *Leaves* 6 by $2\frac{1}{2}$ in., cuneate, subacute at each end, glabrous, or pubescent on the nerves beneath; petiole $\frac{1}{4}$ - $1\frac{1}{4}$ in. *Peduncles* 1-3, subterminal, 1-3 in.; spikes 3-7 in.; bracts $\frac{1}{2}$ in., glabrescent; bracteoles $\frac{1}{2}$ in., linear. *Sepals* $\frac{1}{2}$ - $\frac{1}{3}$ in., pubescent. *Corolla* $\frac{1}{2}$ in., white or pale rose, minutely pubescent without. *Stamens* inserted in a ring of hairs, 2 small staminodes added. *Capsule* $\frac{1}{2}$ in.

VI. CARDANTHERA, Ham.

Herbs, often viscid, aromatic. *Leaves* opposite, upper toothed rarely entire, lower often pinnatifid or in water pectinate. *Flowers* spiked or whorled, or 1-3 together in opposite axils; bract or bracteoles often suppressed. *Sepals* narrow, often unequal. *Corolla* nearly straight, tube shorter than the calyx; limb long, 2-lipped, twisted to the left in bud; palate transversely plicate-rugose, purple-rose and white. *Stamens* 4, didynamous; anthers of the posterior often smaller; anther-cells parallel. *Ovary* narrow; style sparsely hairy. *Capsule* sessile, narrow, 40-100-seeded, bearing seeds from the very base. *Seeds* small, ovoid, somewhat compressed, glandular-puberulous or glabrous; retinacula minute, conical, soft, not curved.—Species 10, Indian and Tropical African.

C. Thwaitesii has solitary flowers, a plane palate, 2 stamens, and stronger retinacula.

Subgenus 1. **Eucardanthera**. *Stamens* 4, fertile. *Flowers* mostly in opposite axils.

* *Spikes* terminal, bracts 4-ranked imbricated in fruit.

1. **C. uliginosa**, Ham. mss.; Benth. in Gen. Pl. ii. 1074; stem pubescent upwards, leaves subsessile oblong or subovate entire or crenate, bracts round ovate. *Ruellia uliginosa*, Linn. f. Suppl. 290; Roth Nov. Sp. 306, obs.; Roxb. Fl. Ind. iii. 52; Wall. Cat. 2378, chiefly. *Adenosma uliginosa*, Nees in Br. Verm. Schrift. iii. 298, and in Wall. Pl. As. Rar. iii. 79, and in DC. Prodr. xi. 69 (excl. syn. *Ruellia ringens*); T. Anders. in Journ. Linn. Soc. ix. 455.

In drying-up rice-swamps, S. MADRAS; frequent. CEYLON; *Walker*. SIKKIM TERRAI; *Herb. Griffith*.

Annual, 1-1½ ft., erect or decumbent, branching from the base. *Leaves* 1 by ½ in., glabrous or subpubescent. *Spikes* 1-3 in., scarcely interrupted at the base even in fruit; bracts ½ in., from elliptic to cordate, glabrous or puberulous; bracteoles ½ in., obovate or elliptic. *Sepals* ½ in., linear, pubescent. *Corolla* ½ in., puberulous. *Anthems* of the posterior stamens half as large as of the anterior. *Capsule* ½ in., minutely pilose upwards.—Much confused by the older botanists with the universal *Hygrophila polysperma*, to which I suspect Miquel's Javanese *C. uliginosa* should be referred.

†† *Whorls or spikes axillary; fruiting interrupted at the base.*

2. **C. Griffithii**, *Benth. in Gen. Pl.* ii. 1074; leaves spatulate oblong or elliptic crenulate pubescent, spikes terminal interrupted at the base in fruit, corolla ¼ in. *Adenosma Griffithii*, *T. Anders. in Journ. Linn. Soc.* xi. 454.

UPPER ASSAM; Suddiya, *Griffith* (Kew Distrib. n. 6087).—DISTRIB. N. Burma.

Annual, decumbent, rooting; branches 1 foot, pubescent. *Leaves* 1½ by ¾ in., subpetioled, obtuse; on the barren shoots smaller, broader. *Spikes* 1-4 in., pubescent, axillary and forming terminal panicles; lower bracts distant (at least in fruit), leaf-like, often containing 2-3 flowers; proper bract ¼ by ½ in., elliptic; bracteoles ½ in., narrowly oblong. *Sepals* linear-lanceolate. *Corolla* purple, puberulous. *Anthems* of the posterior stamens smaller than those of the anterior. *Ovary* nearly glabrous, a few gland-tipped hairs about its apex. *Capsule* ½ in.

3. **C. balsamica**, *Benth. in Gen. Pl.* ii. 1074; branches glabrous upwards, leaves petioled oblong crenate, flowers mostly in axillary whorls, sepals longer than the bracts linear-lanceolate one larger than the others. *Ruellia balsamica*, *Linn. f. Suppl.* 289. *Adenosma balsamea*, *Spreng. Syst.* ii. 829; *Wall. Cat.* 9082; *Wight Ic. t.* 446; *Nees in DC. Prodr.* xi. 68; *T. Anders. in Journ. Linn. Soc.* ix. 454.

S. DECCAN PENINSULA and CEYLON; in rice-swamps, frequent.

Annual, decumbent or erect, branches 6-15 in.; glabrous, or the inflorescence puberulous; lineolate with raphides. *Leaves* 2 by ¾ in., obtuse, base attenuate; petiole ¼ in.; lower leaves sometimes pectinate or pinnatifid. *Whorls* usually numerous, distinct; flowers 1-5-nate; bract ½-⅓ in., obovate or elliptic; bracteoles similar, but smaller, in crowded whorls, often suppressed. *Sepals* ½ in., not widened upwards. *Corolla* ½ in., nearly glabrous. *Anthems* of the posterior stamens smaller than the anterior. *Capsule* nearly ½ in., puberulous upwards.

VAR. *Thymus*; leaves ½ in., corolla ¼ in., capsule scarcely ¼ in. *Adenosma Thymus*, *Nees in Wall. Pl. As. Rar.* iii. 79, and in *DC. Prodr.* xi. 69, *excl. syn.*; *T. Anders. in Journ. Linn. Soc.* ix. 454. *Ruellia cernua*, *Heyne*; *Wall. Cat.* 2380 (part of letter B only), *not of Roxb.*—Deccan Peninsula, *Heyne*. *Nees* and *T. Anderson* place this next *C. triflora*, *Ham.*, from which *Nees* carefully distinguishes it; the example is almost certainly a starved specimen of *C. balsamica*.

4. **C. verticillata**, *Benth. in Gen. Pl.* ii. 1074; branches pubescent upwards, leaves often petioled oblong or elliptic crenate, flowers mostly in axillary whorls, sepals longer than the bracts linear-spathulate. *Ruellia verticillata*, *Wall. Cat.* 2409. *Adenosma verticillata*, *Nees in Wall. Pl. As. Rar.* iii. 79, and in *DC. Prodr.* xi. 69; *Wight Ic. t.* 1524; *T. Anders. in Journ. Linn. Soc.* ix. 454.

DECCAN PENINSULA; Carnatic, *Heyne*, *Wight*; Concan, *Stocks*, &c. CEYLON; *Thwaites*.

Leaves often somewhat pubescent, especially on the midrib beneath. *Inflorescence*

ciliate-pubescent. *Sepals* wider upwards.—Scarcely specifically separable from *C. balsamica*.

5. **C. triflora**, *Ham. mss.*; *Benth. in Gen. Pl.* ii. 1074; pubescent, leaves ovate or round crenate-serrate, flowers mostly in axillary whorls, sepals equalling the bracts linear. *Ruellia triflora*, *Roxb. Hort. Beng.* 46, and *Fl. Ind.* iii. 52. *Adenosma triflora*, *Nees in Wall. Pl. As. Rar.* iii. 79, and in *DC. Prodr.* xi. 68; *Wall. Cat.* 7147; *T. Anders. in Journ. Linn. Soc.* ix. 454.

On the margin of water; BENGAL, very common. ASSAM, PEGU and SINGAPORE.

Annual, decumbent, rooting at the base, 1 foot. Lower leaves often pinnatifid, in water large, pectinate, membranous; cauline $\frac{1}{2}$ –1 in. diam., tip rounded, base cuneate or subpetioled, somewhat closely sharply toothed. Flowers 1–3-nate; bracts nearly $\frac{1}{2}$ in., obovate, sometimes toothed; bracteoles $\frac{1}{4}$ in., oblong. *Sepals* hairy, one longer than the others, very acute. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in. *Anthers* nearly equal. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in., pubescent.

6. **C. avana**, *Benth. in Gen. Pl.* ii. 1074; subhirsute, leaves sessile oblong dentate, base obtuse, spikes elongate interrupted, flowers solitary, sepals exceeding the bracts linear. *Pedicularis* ? *avana*, *Wall. Cat.* 1007; *Benth. Scroph. Ind.* 52. *Synnema avanum*, *Benth. in DC. Prodr.* x. 538. *Adenosma biplicata*, *Nees in Wall. Pl. As. Rar.* iii. 79, and in *DC. Prodr.* xi. 68; *Wall. Cat.* 7146; *T. Anders. in Journ. Linn. Soc.* ix. 454.

BURMA; Wallich, McLelland, &c.—DISTRIB. Ava.

An annual-weed, 1 foot, decumbent, rooting in mud, branches erect or procumbent. Lower leaves usually pinnatifid; upper 1–1 $\frac{1}{2}$ in., obtuse, base often subquadrate, with many patent white hairs. Spikes 1–5 in., weak; bract $\frac{1}{4}$ – $\frac{1}{2}$ in., narrowly elliptic; bracteoles $\frac{1}{2}$ in., narrowly oblong, obtuse. *Sepals* $\frac{1}{2}$ in. and upwards, white-hirsute. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in., pubescent without, purple. *Anthers* nearly equal. *Capsule* $\frac{1}{2}$ in., puberulous.

7. **C. pinnatifida**, *Benth. in Gen. Pl.* ii. 1074; dusky pubescent, leaves petioled oblong or elliptic pinnatifid or crenate, flowers solitary axillary or in lax spikes, sepals linear slightly wider upwards sometimes toothed. *Nomaphila pinnatifida*, *Dalz. in Hook. Kew Journ.* iii. 38; *Dalz. & Gibs. Bomb. Fl.* 184; *Hook. Ic. Pl.* t. 843. *Adenosma pinnatifidum*, *T. Anders. in Journ. Linn. Soc.* ix. 455; *Bedd. Ic. Pl. Ind. Or.* t. 246.

W. DECCAN PENINSULA; Concan and Canara, Dalzell, Beddome, &c.; Mangalore, Wight.

Biennial; branches 1–2 ft. Leaves 2–4 in., deeply pinnatifid; lobes numerous, oblique, oblong; or smaller, or $\frac{1}{2}$ in. and crenate on the same plant, cuneate or spatulate, more or less petioled. Spikes 1–4 in., terminal, weak, hardly interrupted, many-fld.; or more commonly flowers few, distant, solitary, sometimes on very short axillary branches appearing pedicelled; bracts $\frac{1}{4}$ in., elliptic; bracteoles $\frac{1}{2}$ in., oblong. *Sepals* $\frac{1}{4}$ in. *Corolla* $\frac{1}{2}$ in. *Anthers* subequal; cells parallel, base not divaricate nor cordate. *Capsule* nearly $\frac{1}{2}$ in., glabrous.

Subgenus 2. **Plæsiantha**. Stamens 2, fertile. Flowers solitary, on alternate axils. Seeds densely elastically hairy.

8. **C. Thwaitesii**, *Benth. in Gen. Pl.* ii. 1075; pubescent, leaves spatulate-oblong entire, flowers small subsessile in lax compound cymes. *Adenosma Thwaitesii*, *T. Anders. in Thwaites Enum.* 224, and in *Journ. Linn. Soc.* ix. 455.

CYLON; Batticaloa, in the tropical region, Thwaites.

Annual, 6-12 in., erect, branched, viscid. *Leaves* 1-1½ in., obtuse, base much attenuate or petioled. *Flowers* very numerous; cymes dichasial, going off into sym-podes; upper branches of the cyme in appearance scorpioid with distant flowers, i. e. at each bifurcation one branch with one flower is suppressed; bracts $\frac{1}{2}$ to $\frac{1}{2}$ in., ovate or elliptic; bracteoles small or 0. *Sepals* $\frac{1}{2}$ in., linear, unequal. *Corolla* $\frac{1}{2}$ in., puberulous; lobes twisted to the left; palate not transversely plicate. *Anthers* subquadrate; posterior stamens reduced to filaments. *Ovary* glabrous, tip glandular-hairy; style sparsely hairy. *Capsule* $\frac{1}{2}$ in., bearing seeds from the base. *Seeds* 40-60, ovoid, slightly compressed, the white fine hairs starting out on all sides when moistened; retinacula conical, slightly curved, scarcely hardened.—Possibly a distinct genus, resembling *Brillantaisia* except that it is the posterior stamens that are imperfect in this.

VII. **HYGROPHILA**, Br.

Herbs, (in *H. spinosa*) spinescent. *Leaves* opposite, lanceolate or obovate, entire. *Flowers* sessile, in terminal heads or in axillary whorls; bracts elliptic or lanceolate; bracteoles oblong or lanceolate, shorter than the calyx. *Calyx* tubular, 5-fid (or in *H. spinosa* 4-partite); teeth lanceolate or linear. *Corolla* blueish-purple, nearly glabrous; tube ventricose at the apex; limb deeply 2-lipped, oblong, straight. *Stamens* didynamous, posterior similar to the anterior, or smaller, or rudimentary, filaments glabrous; anthers oblong, cells equal, divaricate or connate at the base. *Ovary* oblong, tip hairy; style long hairy, stigma simple linear. *Capsule* linear or narrowly oblong, bearing seeds from the base, 40-100-seeded, or in *H. spinosa* 2-8-seeded. *Seeds* ovoid, compressed, elastically white-hairy when wetted; retinacula hardened, curved and acute.—Species 18, tropical and subtropical.

Subgenus. **Euhygrophila**. Unarmed. *Calyx* 5-toothed. *Capsule* with 8-100 minute seeds.

* *Spikes terminal*.

1. **H. polysperma**, *T. Anders. in Journ. Linn. Soc.* xi. 456; small, procumbent, leaves oblong or ovate nearly entire glabrous or puberulous, spikes terminal dense oblong or linear, fertile stamens 2. *Boiss. Fl. Orient.* iv. 519. *Justicia polysperma*, *Roxb. Hort. Beng.* 3, and *Fl. Ind.* i. 119; *Wall. Cat.* 2483. *Ruellia uliginosa*, *Wall. Cat.* 2378, partly. *Hemiadelphis polysperma*, *Nees in Wall. Pl. As. Rar.* iii. 80, and in *DC. Prodr.* xi. 80 (excl. syn. Roth); *Wight Ill.* t. 164 b, fig. 3, and *lc.* t. 1492; *Griff. Notul.* iv. 135.

Throughout INDIA in wet places, alt. 0-5000 ft., from the Punjab and Bhotan to the S. Deccan and Malacca.—DISTRIB. Cabul.

Annual, 6-18 in., branching and rooting. *Leaves* $\frac{1}{2}$ -1½ in., from narrowly oblong to ovate, base spatulate or petioled. *Spikes* 1-5 in., somewhat pubescent; bracts $\frac{1}{4}$ - $\frac{1}{2}$ in., broadly elliptic, imbricate; bracteoles $\frac{1}{4}$ in., lanceolate. *Sepals* $\frac{1}{4}$ in., linear, hairy. *Corolla* $\frac{1}{2}$ in., slender, pubescent, pale blue or white. *Anthers* oblong, cells slightly divaricate at the base; posterior stamens reduced to teeth. *Ovary* hairy at the apex. *Capsule* $\frac{1}{4}$ - $\frac{1}{2}$ in.; seeds 20-32.—The examples from Tenasserim and Malacca are larger and more glabrous; the capsules $\frac{1}{2}$ in.

2. **H. Serpyllum**, *T. Anders. in Journ. Linn. Soc.* ix. 456; procumbent, leaves small short-petioled ovate or oblong hairy, spikes ovate or shortly oblong, anthers of the posterior stamens half as long as of the anterior. *Ruellia polysperma*, *Roth Nov. Sp.* 305. *Adenosma polysperma*, *Spreng. Syst.* ii. 829. *Physichilus Serpyllum*, *Nees in Hook. Comp. Bot.*

Mag. ii. 311, and in *DC. Prodr.* xi. 81; *Dalz. & Gibs. Bomb. Fl.* 184; *Wight Ic.* t. 1493.

W. DECCAN PENINSULA, from Malwa (*Edgeworth*) to Mysore; frequent in the Concan.

Rootstock woody; stems 4–16 in., procumbent or creeping. *Leaves* $\frac{1}{4}$ –1 in., from lanceolate to orbicular, entire, minutely strigose and with long lax white hairs, lineolate with raphides, nearly glabrate or minutely closely tomentose beneath; petiole $0\frac{1}{2}$ in., but in some basal leaves $\frac{1}{2}$ –1 in. *Spikes* dense, white-strigose; bracts $\frac{1}{2}$ in., elliptic; bracteoles $\frac{1}{4}$ in., oblong. *Sepals* $\frac{1}{4}$ in., linear. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in.; tube ventricose upwards, limb long, deeply 2-lipped. *Style* hairy. *Capsule* $\frac{1}{2}$ in., 8–10-seeded.—The figure of *Wight* (*Ic.* t. 1493) shows the 4 anthers subequal, but this is not the case in his example from which he notes his *Icon* was taken. The synonym, *Ruellia polysperma*, Roth, has been always supposed to have been *Hygrophila polysperma*, T. Anders.; but as Roth says his plant had didynamous stamens and ovate heads, his description must belong here, whatever his plant was.—The leaves of *H. Serpyllum* vary very much in form and indumentum.

VAR. Hookeriana; leaves orbicular obtuse cauline often distinctly petioled.—*Physichilus* sp. nn. 2, 3, *Herb. Ind. Or. H. f. & T.*—Concan; *Stocks.* Bombay, *Lav.* A larger plant; cauline leaves often 1 in. diam., petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., with minute white bristly hairs, but none of the long white hairs characteristic of *H. Serpyllum* type.

3. *H. Stocksii*, *T. Anders. ms.*; cauline leaves petioled spatulate-elliptic, spikes ovate or shortly oblong, anthers of the posterior stamens $\frac{1}{2}$ the length of the anterior.—*Physichilus* n. 4, *Herb. Ind. Or. H. f. & T.*

CONCAN; *Stocks.*

Branches 18 in., stout; internodes 2–3 in. *Cauline leaves* $2\frac{1}{2}$ by 1 in.; petiole $\frac{3}{4}$ in. *Corolla* $\frac{1}{2}$ in. *Anthers* of the posterior stamens minute, but (at least sometimes) they appear to contain a few pollen-grains.—Reduced to a *Var.* of *H. Serpyllum* by T. Anders. (*in Journ. Linn. Soc.* ix. 456), but subsequently marked by him as a species.

** *Whorls axillary, distinct.*

4. *H. salicifolia*, *Nees in Wall. Pl. As. Rar.* iii. 81, and in *DC. Prodr.* xi. 92; erect, leaves lanceolate glabrous, bracteoles lanceolate acute, calyx in flower divided half-way down lobes linear hispid-ciliate, capsule a little longer than the calyx. *Wight Ic.* t. 1490; *Dalz. & Gibs. Bomb. Fl.* 184. *Ruellia salicifolia*, *Vahl Symb.* iii. 84; *Roxb. Fl. Ind.* iii. 50; *Wall. Cat.* 2373. *R. longifolia*, *Roth Nov. Sp.* 306.

Throughout INDIA and CEYLON, very common.

Stems 1–3 ft., nearly glabrous. *Leaves* $2\frac{1}{2}$ by $\frac{1}{2}$ – $\frac{3}{4}$ in., narrowed at both ends, lineolate by raphides; petiole $0\frac{1}{4}$ in.; bract $\frac{1}{4}$ – $\frac{1}{2}$ in., ovate or elliptic; bracteoles $\frac{1}{2}$ as long as the calyx. *Calyx* $\frac{1}{2}$ – $\frac{3}{4}$ in., divided to the base in fruit. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in., pale purple. *Stamens* 4, fertile; anthers subequal. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in., 20–28-seeded.—The whole of the species of this section are included under the present by T. Anders. (*in Journ. Linn. Soc.* ix. 456), which then has a geographic area extending through S.E. Asia, Malaya, Trop. Australia, Trop. America; but if this view be taken, the name of the species should be *H. angustifolia*, Br. (*Prodr.* 479; *Nees in DC. Prodr.* xi. 91).

VAR. assurgens; stem decumbent or geniculate rooting with erect branches, leaves obovate-oblong or elliptic subacute. *H. assurgens*, *Nees in DC. Prodr.* xi. 90, excl. syn. and var. *B.* *H. radicans*, *Nees in Wall. Pl. As. Rar.* iii. 81, and in *DC. l. c.* 92. *Ruellia radicans*, *Wall. Cat.* 2410.—E. Bengal, frequent; *Wallich, &c.* Malacca; *Maingay* (Malaya).

VAR. dimidiata; leaves obovate or elliptic glabrous densely lineolate especially on the upper surface, base attenuate. *H. dimidiata*, *Nees in Wall. Pl. As. Rar.* iii. 81;

Wall. Cat. 7150. *H. obovata*, *Nees in Wall. Pl. As. Rar.* iii. 81, and in *DC. Prodr.* xi. 91 (not of Wight, nor *Ruellia obovata*, *Roxb.*). *H. undulata*, *Nees in DC. l. c.* 91, partly (not *Ruellia undulata*, *Vahl*).—Prome; *Wallich*. Mergui; *Griffith*.—Distrib. Java, Borneo. Lateral nerves of the leaves patent, arcuate, prominent, regular. Whorls often dimidiate, but entire often, as in *Wallich's* type specimen.

5. *H. quadrivalvis*, *Nees in Wall. Pl. As. Rar.* iii. 80, and in *DC. Prodr.* xi. 89; erect, leaves lanceolate or elliptic narrowed at both ends glabrate, bracteoles oblong obtuse, calyx in flower divided $\frac{1}{2}$ the way down lobes lanceolate minutely strigillose, capsule much exceeding the calyx. *H. obovata*, *Wight Ic. t.* 1489; *Nees in Pl. Hohenack.* n. 292. *H. undulata*, *Nees in DC. Prodr.* xi. 91, partly. *Ruellia quadrivalvis*, *Wall. Cat.* 2374, type sheet. *R. undulata*, *Vahl Symb.* iii. 82.—*Rheede Hort. Mal.* ii. t. 46.

From BENGAL to CEYLON and MALACCA, common.

Closely resembling *H. salicifolia* except in the points stated. *Leaves* usually larger, in *Ruellia undulata* attaining 4 by $1\frac{1}{2}$ in., undulate on margin. *Calyx* often gamosepalous long after flowering. *Capsule* frequently $\frac{3}{4}$ in., stouter than in *H. salicifolia*.—*Ruellia barbata*, *Vahl Symb.* iii. 83, adduced here by *Nees*, is stated by *Vahl* to have biaristate anthers, and his description does not otherwise fit well.

6. *H. phlomoides*, *Nees in Wall. Pl. As. Rar.* iii. 80, and in *DC. Prodr.* xi. 90; erect, leaves subsessile elliptic or oblong hairy, whorls of flowers hirsute often distant, calyx in flower divided half-way down teeth linear hispid. *Ruellia phlomoides*, *Wall. Cat.* 2376, type sheet. *R. hirsuta*, *Roxb. Fl. Ind.* iii. 51. *Dipteracanthus ciliatus*, *Nees in Wall. Cat.* 715.

BENGAL, SIKKIM and ASSAM, near the base of the hills; CACHAR, CHITTAGONG, PEGU.

Stems 2–3 ft., hirsute upwards. *Leaves* often 3–6 in., base narrowed, mostly quite sessile. Whorls of flowers dense; bracteoles linear-oblong, as long as the calyx-tube. *Corolla* $\frac{3}{4}$ in. *Capsule* $\frac{1}{2}$ in., somewhat exceeding the calyx.

VAR. *Roxburghii*; branched or decumbent, leaves obovate often shortly petioled usually small hairy or nearly glabrous, calyx-teeth linear-lanceolate, corolla $\frac{1}{2}$ in. *H. obovata*, *Griff. Notul.* iv. 134. *Ruellia obovata*, *Roxb. Fl. Ind.* iii. 51; *Wall. Cat.* 2375, type sheet.—Chittagong, *Roxburgh*; Soonderbunds, *J. D. H.*, &c.; Pegu, *Beddome*; Mergui, *Griffith*.

VAR. *repens*; procumbent, rooting, leaves $\frac{1}{2}$ – $1\frac{1}{2}$ in. obovate, flowers rather smaller. Silhet; *H. f. & T.*, &c.

7. *H. incana*, *Nees in DC. Prodr.* xi. 91 (excl. syn. *Roxb.*); erect, innovations closely softly white-hairy, leaves narrowly lanceolate adult densely lineolate on both surfaces, calyx in flower divided more than half-way down, teeth linear softly white-hairy and hispid. *Ruellia incana*, *Heyne in Herb. Rottler.* *R. mollissima*, *Klein ms.*, not of *Vahl*.

DECCAN PENINSULA; *Rottler*.

Leaves 4 by $\frac{3}{4}$ in., very acute at both ends; petiole hardly any. *Capsule* $\frac{1}{2}$ in., shortly exceeding the calyx.—Very distinct by its soft close white hairiness, to which scattered long white hispid hairs are added. It is altogether remote from *Ruellia obovata*, *Roxb.* (= *H. phlomoides*, *Nees* Var.), of which *Roxburgh's* picture is in *Herb. Kew*.

Subgenus 2. **Asteracantha.** Spinous. *Calyx* 4-partite. *Seeds* 4–8.

8. *H. spinosa*, *T. Anders. in Thwaites Enum.* 225, and in *Journ. Linn. Soc.* vii. 22; stout, erect, hispid, leaves lanceolate, whorls axillary spinose

hispid. *H. longifolia*, *Kurz in Journ. As. Soc.* 1870, ii. 78. *Barleria longifolia*, *Linn. Amœn. Acad.* iv. 320; *Wall. Cat.* 2505. *B. hexacantha*, *Morisi in Mem. Acad. Torin.* xxxvi. 200, t. 7. *Ruellia longifolia*, *Roxb. Fl. Ind.* iii. 50. *Asteracantha longifolia*, *Nees in Wall. Pl. As. Rar.* iii. 90, and in *DC. Prodr.* xi. 247; *Dalz. & Gibs. Bomb. Fl.* 189; *Wight Ic.* t. 449. *A. auriculata*, *Nees in DC. Prodr.* xi. 248, with syn.—*Rheede Hort. Mal.* ii. t. 45; *Jones in As. Research.* iv. 291.

Throughout INDIA in ditches, abundant; from the Himalaya to CEYLON (not seen from Malay Peninsula).

Stems 2-5 ft., usually fascicled and undivided. *Leaves* 3-7 in., subsessile, acute at both ends, sparsely hispid with long white hairs. Whorls large, dense, with (normally 6) straight stout spines $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ -1 in., lanceolate; bracteoles $\frac{1}{4}$ - $\frac{1}{2}$ in., narrow. *Sepals* $\frac{1}{2}$ - $\frac{3}{4}$ in., lanceolate; upper rather the largest, lower obtuse emarginate or shortly bifid. *Corolla* 1 in., nearly glabrous, pale blue-purple. *Anthers* oblong, subequal. *Capsule* $\frac{1}{2}$ in., shorter than the sepals, linear-oblong, 4-8-seeded from the base.

VIII. *NOMAPHILA*, Blume.

Erect herbs. *Leaves* petioled, entire. *Cymes* axillary, subsessile; branches unilateral, sympodal upwards; flowers pedicelled; bracts linear, minute; bracteoles 0. *Sepals* 5, linear, one somewhat larger. *Corolla* tubular, ventricose upwards; limb deeply 2-lipped; lobes 5, twisted to the left, edges narrowly overlapping in bud. *Stamens* 4, didynamous, glabrous; anthers 2-celled; lower somewhat smaller; cells oblong, parallel; muticous. *Ovary* oblong; style linear, stigma simple linear. *Capsule* linear, seed-bearing from the base, 8-32-seeded. *Seeds* ellipsoid, reticulate, elastically white-hairy when wetted; retinacula hardened, hooked, but slender.—Species 7, in S.E. Asia, Madagascar, and Trop. Africa.

1. *N. Parishii*, *T. Anders. in Journ. Linn. Soc.* ix. 455; leaves lanceolate pubescent or mature nearly glabrous, cymes and calyx glandular-pubescent, sepals subulate. *N. pubescens*, *Kurz in Journ. As. Soc.* 1871, pt. ii. 74, excl. all syn.

MOULMEIN; *Falconer, Parish*. PEGU; *Kurz, Brandis*. TENASSERIM; *Beddome*.—DISTRIB. Java.

Stem 1-2 ft., pubescent upwards. *Leaves* 3 by $\frac{1}{2}$ - $\frac{3}{4}$ in., acute at both ends (larger ovate fide T. Anders.), young minutely softly pubescent, mature glabrate lineolate above, sparsely pubescent or glabrate beneath; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Cymes* 1 $\frac{1}{2}$ in. diam.; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., opposite; pedicel in one axil $\frac{1}{2}$ - $\frac{3}{4}$ in., in the other suppressed. *Sepals* $\frac{1}{2}$ in., one slightly longer than the others, acute. *Corolla* $\frac{3}{4}$ -1 in., nearly glabrous. *Ovary* glandular; style patently hairy. *Capsule* $\frac{1}{2}$ in., 32-seeded, pubescent from the base.—Very near to, and doubtfully distinct from the Javan *N. corymbosa* (Blume *Bijd.* 804; *Nees in DC. Prodr.* xi. 84). Col. Beddome has collected in Tenasserim two forms, one with the calyx and corolla half as large again as in the other; but no other difference can be found.

2. *N. stricta*, *Nees in DC. Prodr.* xi. 84, excl. syn.; leaves broadly lanceolate mature glabrate, cymes nearly glabrous, sepals linear subobtusate glabrate or minutely puberulous, ovary nearly glabrous except at the tip. *Ruellia paniculata*? *Heyne in Herb. Rottler*.

DECCAN PENINSULA?; *Rottler*.—DISTRIB. Malaya to the Philippines.

This plant is in Rottler's Madras collection at Kew, but it may be doubted (see T. Anders. in *Journ. Linn. Soc.* ix. 456) whether it was collected wild in India. It closely resembles *N. corymbosa*, Bl., except in the points specified. *Nees'* synonymy is all wrong: *Justicia stricta*, *Vahl Symb.* ii. 6, has calyx shorter than the bracts; *J. pubescens*, *Lamk. Ill.* i. 40, has ovate bracts, and is from Guinea; while *J. caulescens*,

Lamk. Ill. i. 40 (referred here by Nees in DC. Prodr. xi. 722), is an American plant of another genus.

IX. **CALOPHANES**, *D. Don*.

Perennial herbs. *Leaves* opposite, petioled, entire. *Flowers* in axillary clusters or short cymes; bracts and bracteoles narrow. *Calyx* tubular; teeth 5, subequal, lanceolate or subulate. *Corolla* tubular, mouth obscurely 2-lipped; lobes 5, obtuse, twisted to the left in bud, patent in flower. *Stamens* 4, perfect, didynamous, filaments glabrous or hairy; anthers similar, 2-celled; cells oblong, parallel, base minutely mucronate or spurred. *Ovary* glabrous, shortly stalked; ovules 2 in each cell; style linear, hairy, stigma simple linear. *Capsule* oblong, base for a short space narrowed solid. *Seeds* 4, orbicular, much compressed, densely elastically white-hairy when wetted; retinacula strong, curved.—Species 30, in S.E. Asia, Africa and America.

* *Pedicels hardly any, flowers axillary 2-8 together or solitary.*

1. **C. Nagchana**, *Nees in DC. Prodr. xi.* 109; prostrate, glabrous or hoary, leaves spatulate-elliptic or obovate, flowers clustered, bracteoles small linear, calyx-teeth longer than the tube, filaments glabrous, anther-cells mucronate. *C. depressa*, *T. Anders. in Thwaites Enum.* 225, and in *Journ. Linn. Soc. ix.* 459. *Ruellia Nagchana*, *Ham. in Wall. Cat.* 2396. *R. erecta*, *Burm. Fl. Ind.* 135, t. 41, fig. 3. *R. depressa & cernua*, *Wall. Cat.* 2379, 2380, chiefly. *Dipteracanthus Nagchana*, *Nees in Wall. Pl. As. Rar. iii.* 82. *Dyschoriste depressa & cernua*, *Nees in l. c.* 81, and in *DC. Prodr. xi.* 106.

DECCAN PENINSULA; *Rottler, Dr. Shuter, &c.* BEHAR; *Patna, Ham., J. D. H. CEYLON; Thwaites.*

Stems 6-18 in., branched, lineolate, sometimes obscurely scabrid. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., obtuse, base attenuate; petiole 0- $\frac{1}{4}$ in. *Bracts* small, spatulate-elliptic or 0; bracteoles $\frac{1}{2}$ in. *Calyx* lineolate, glabrous or puberulous; tube $\frac{1}{2}$ in., teeth $\frac{1}{2}$ in. *Corolla* scarcely so long as the calyx, puberulous, flesh-coloured or bluish, palate not corrugate. *Filaments* connate near the base; anther-cells very shortly but distinctly mucronate. *Capsule* $\frac{1}{2}$ in.—*T. Anderson* has not indicated the grounds on which he keeps *C. Nagchana* and *C. depressa* distinct; *Nees* says *C. Nagchana* differs by having the bracteoles spatulate, which is not the case in his type specimen. In *C. Nagchana*, where the flowers are clustered, the bracts of the upper flowers are much smaller, the bracteoles 0- $\frac{1}{2}$ in., but this is exactly as in *Ruellia cernua*, *Wall.*

2. **C. littoralis**, *T. Anders. in Thwaites Enum.* 225, and in *Journ. Linn. Soc. ix.* 460; shrubby, nearly glabrous, leaves small obovate, flowers solitary or 2-3 together axillary, bracteoles elliptic, calyx-teeth shorter than the tube, filaments glabrous, anther-cells mucronate. *Justicia madurensis*, *Burm. Fl. Ind.* 9, t. 4, fig. 3. *Ruellia littoralis*, *Linn. f. Suppl.* 289; *Roth Nov. Sp.* 300; *Wall. Cat.* 2381. *Dyschoriste littoralis*, *Nees in Wall. Pl. As. Rar. iii.* 81, and in *DC. Prodr. ix.* 106; *Wight Ic. t.* 447.

S. DECCAN PENINSULA; near the sea, *Perottet, Wight, &c.*; and inland at Coimbatore, *Beddome*. CEYLON; N. of the island, *Gardner*.

Stems 1-3 ft., sometimes woody, much branched, or elongate less stiff; innovations lineolate, sometimes hoary. *Leaves* $\frac{1}{2}$ in. diam., obtuse, base cuneate or rounded; petiole 0- $\frac{1}{4}$ in. *Flowers* mostly solitary; bracteoles $\frac{1}{2}$ in. *Calyx* densely lineolate, sometimes hoary; tube $\frac{1}{2}$ in., teeth $\frac{1}{2}$ in. lanceolate. *Corolla* $\frac{3}{4}$ in. and upwards, nearly glabrous, narrowly cylindric below, funnel-shaped upwards. *Stamens, ovary, and capsule* nearly as in *C. Nagchana*.

** *Cymes small, flowers pedicelled.*

3. **C. vagans**, *Wight Ic. t. 1526*; leaves ovate or oblong more or less pubescent, calyx-teeth long-linear hairy, filaments hairy, anther-cells with prominent white divaricate spurs at the base. *T. Anders. in Journ. Linn. Soc. ix. 459, excl. syn.* *Ruellia racemosa*, *Heyne in Herb. Rottler, not of Roxb.*

DECCAN PENINSULA, *Rottler*; Kurg, *Wight*; Concan, *Stocks*; Belgaum, *Ritchie*. *Stems* 1–2 ft., erect or diffuse, branched; innovations softly pubescent, not lineolate. *Leaves* $1\frac{1}{2}$ – $2\frac{1}{2}$ in., usually narrowed at both ends, mature pubescent on both surfaces or glabrate except a few hairs on the nerves or margin; petiole $\frac{1}{4}$ in. *Cymes* $1\frac{1}{2}$ in., or some short 3-fld., softly hairy; bracts $\frac{1}{4}$ in., oblong; bracteoles $\frac{1}{2}$ in., linear. *Calyx-tube* $\frac{1}{6}$ in., teeth $\frac{1}{3}$ – $\frac{1}{2}$ in. *Corolla* $\frac{3}{4}$ in., pubescent, blueish, palate transversely plicate. Spurs of the anther-cells much larger than in the preceding species. *Capsule* $\frac{1}{2}$ in.

4. **C. Dalzellii**, *T. Anders.*; *Bedd. Ic. Pl. Ind. Or. t. 248*; leaves ovate or oblong pubescent or nearly glabrate, calyx-teeth linear hairy, filaments glabrous or minutely hairy, anther-cells minutely mucronate at base or mucous. *C. rigidus*, *Dalz. ms.*—*Dipteracanthus* sp. n. 11, *Herb. Ind. Or. H. f. & T.*

CONCAN, *Dalzell, Stocks*; Poona, *Dalzell, Beddome.*

Closely resembling *C. vagans*, but cymes denser, pedicels rarely exceeding $\frac{1}{4}$ in., calyx-teeth broader, sometimes linear-lanceolate, flowers rather larger, sometimes exceeding 1 in., and capsule $\frac{1}{3}$ – $\frac{1}{2}$ in., 4-seeded (entirely of *Calophanes*).—The larger flowers and the stamens are quite as of *Ruellia*; the mucro of the anther-cells is either absolutely wanting or so minute that it requires a microscope to find it. Hence the plant was marked a *Dipteracanthus* by Benth (not *Dipteracanthus vagans*, as T. Anders. states, which was T. Anderson's own mistake, not Benth's); but as the ovules appear never more than 4, it must remain in *Calophanes*. It invalidates the genus *Calophanes* as distinguished from *Ruellia*.

X. RUELLIA, Linn.

Herbs or undershrubs. *Leaves* opposite, entire. *Flowers* sessile or subsessile, solitary or clustered; bract 0; bracteoles large, exceeding the calyx except in *R. ciliata*. *Calyx* 5-partite or 5-fid; teeth subequal, narrow, acute. *Corolla* tubular-ventricose; limb more or less oblique; lobes subequal, rounded, twisted to the left in bud, patent in flower. *Stamens* 4, didynamous, filaments glabrous, unless near the base; anthers subequal, 2-celled; cells oblong, mucous, glabrous. *Ovary* glabrous; ovules in each cell 3–10; style long-linear, hairy, stigma simple linear (except in *R. macrosiphon*). *Capsule* clavate, base solid, cylindric, ellipsoid, seed-bearing upwards. *Seeds* large, thinly discoid, marginate, much imbricated, densely elastically hairy when wetted; retinacula large, hooked, strong.—Species 150, in all warm regions.

The generic character here given is narrowed to the section *Dipteracanthus* (Genus, Nees), to which section all the Indian species strictly belong. In other sections (Genera of Nees), reunited now with *Ruellia* in the Gen. Pl., the bracts, capsules and seeds recede materially from the characters of *Dipteracanthus*.

Ruellia flagelliformis, Roxb. Fl. Ind. iii. 47, came from the Moluccas.

1. **R. prostrata**, *Lamk. Encycl. vi. 349*; prostrate pubescent upwards, leaves small ovate sparsely hairy or nearly glabrous, bracteoles spathulate-elliptic or petioled ovate foliaceous, corolla 1 in. pale purple caducous.

T. Anders. in Journ. Linn. Soc. ix. 460; *Bedd. Ic. Pl. Ind. Or.* t. 282. *R. Wightiana*, *Wall. Cat.* 2397. *R. repens*, *Heyne in Herb. Rottler.* *Dipteracanthus prostratus*, *Nees in Wall. Pl. As. Rar.* iii. 81, and in *DC. Prodr.* xi. 124.

DECCAN PENINSULA, extending North to BEHAR; *J. D. H.*

Stems 6–18 in., much branched, nodes short, glabrous downwards. *Leaves* $\frac{3}{4}$ in., subobtusely, lineolate by raphides and minutely sparsely pilose; petiole $\frac{1}{8}$ in. *Flowers* few together or often solitary; bracteoles $\frac{1}{2}$ – $\frac{3}{4}$ in., often altogether like the leaves. *Sepals* $\frac{1}{2}$ in., linear, ciliate. *Corolla* pubescent, ventricose portion of the tube twice the cylindric portion. *Capsule* $\frac{3}{4}$ in., pubescent, seed-bearing $\frac{2}{3}$ its length. *Seeds* 16–20, $\frac{1}{8}$ in. diam.

VAR. dejecta; diffuse sometimes rambling among bushes with very long nodes, leaves larger often 3 in. frequently acute. *Ruellia ringens*, *Roxb. Fl. Ind.* iii. 44; *Wall. Cat.* 2403. *R. repens*, *Wall. Cat.* 2384, chiefly. *R. deccanensis*, *Grav. Cat. Pl. Bomb.* 162. *Dipteracanthus dejectus*, *Nees in Wall. Pl. As. Rar.* iii. 82, and in *DC. Prodr.* xi. 125; *Dalz. & Gibs. Bomb. Fl.* 185, excl. syn. *D. prostratus*, *Griff. Notul.* iv. 135.—Throughout India, from the N. Punjab and Assam to Ceylon, very common (not seen from the Malay Peninsula).—Distrib. E. Africa. This variety passes into *R. prostrata* type by insensible gradations.

2. *R. repens*, *Linn. Mant.* 89 (not of *Burm. nor of Heyne*); stem nearly glabrous, leaves ovate acuminate or lanceolate mature nearly glabrous, bracteoles spatulate elliptic or petioled ovate foliaceous, corolla $\frac{3}{4}$ in. *Blume Bijdr.* 794; *T. Anders. in Journ. Linn. Soc.* ix. 460. *Dipteracanthus lanceolatus*, *Nees in Wall. Pl. As. Rar.* iii. 82, and in *DC. Prodr.* xi. 124.

MALAY PENINSULA; Moulmein, *Parish*; Mergui and Malacca, *Griffith*; Singapore, *Lobb*.—DISTRIB. Throughout Malaya to the Philippines. Siam.

Usually more glabrous with narrower leaves than *R. prostrata*, but can only be clearly separated by the smaller flowers; the capsule rarely exceeds $\frac{1}{2}$ in.

3. *R. patula*, *Jacq. Misc. Bot.* ii. 358, and *Ic. Pl. Rar.* i. t. 119; hoary pubescent, leaves ovate, bracteoles spatulate elliptic or petioled ovate foliaceous, corolla 1– $1\frac{1}{4}$ in. *Lamk. Ill.* t. 550 (smaller than nat. size); *Wall. Cat.* 2385; *Roxb. Fl. Ind.* iii. 45; *T. Anders. in Journ. Linn. Soc.* ix. 460. *R. erecta*, *Roth Nov. Sp.* 308. *Dipteracanthus patulus*, *Nees in Wall. Pl. As. Rar.* iii. 82, and in *DC. Prodr.* xi. 126; *Wight Ic.* t. 1505; *Oerst. in Vidensk. Meddel. Kjob.* 1854, t. 4, fig. 19–21. *D. erectus*, *Nees in Wall. Pl. As. Rar.* iii. 82, and *Cat.* 7186. *Petalidium patulum*, *Dalz. & Gibs. Bomb. Fl.* 185.

DECCAN PENINSULA, extending to Scinde, Rajpootana and Bundelkund (*Edgeworth*). CEYLON, frequent.—DISTRIB. Arabia, Abyssinia, Ava.

Resembling *R. prostrata*, but densely closely pubescent. *Corolla* pubescent, very pale grey purple, the cylindric portion of the tube as long as the ventricose part.

4. *R. longifolia*, *T. Anders. in Journ. Linn. Soc.* ix. 460; hairy, leaves linear-lanceolate, bracts linear-spatulate, calyx-lobes lanceolate scarcely longer than the tube, corolla $\frac{3}{4}$ in. *Boiss. Fl. Orient.* iv. 519. *Dipteracanthus longifolius*, *Stocks in Hook. Kew Journ.* iv. 177.

SCINDE; *Stocks, Dalzell*.—DISTRIB. Beloochistan.

Woody at the base, with many ascending stems 12 in. high; whole plant with glandular viscous white or hoary pubescence. *Leaves* 2 by $\frac{1}{2}$ in.; petiole continuous with the attenuate leaf-base. *Flowers* mostly solitary; bracteoles $\frac{3}{4}$ in. *Calyx* $\frac{1}{2}$ in. *Corolla* pubescent, blue. *Capsule* $\frac{3}{4}$ in., pubescent, nearly as of *prostrata*.

5. **R. cernua**, *Roxb. Fl. Ind.* iii. 45; leaves oblong or elliptic acuminate hairy, bracteoles petioled elliptic acute leaf-like, sepals $\frac{1}{2}$ in., corolla $1\frac{1}{4}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 460.

CHOTA NAGPORE; Parasnath, alt. 2000–4500 ft., *Thomson, Anderson, Clarke.*

Rootstock woody; annual stems 6–24 in., hairy upwards. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{4}$ in., much acuminate, with scattered short white hairs on both surfaces; petiole $\frac{3}{4}$ in. *Flowers* 1–3 together, axillary and terminal; bracteoles 1 in. *Sepals* exceeding $\frac{1}{2}$ in., linear, hairy. *Corolla* pubescent, white with rose or pink-purple marks, tubular portion equalling the ventricose. *Stamens* of the genus. *Capsule* $\frac{1}{2}$ in., as of *R. prostrata*.—The plant here described is the Parasnath one, which is a typical *Ruellia* sect. *Dipteracanthus*, and which Anderson identifies confidently with Roxburgh's *R. cernua*, of which nothing is known but that the seeds came from Mysore, and Roxburgh's description and picture. In his description Roxburgh says the flowers were small, and his picture shows them $\frac{3}{8}$ in. long, so that it must be a striking variety of the Parasnath plant.

6. **R. suffruticosa**, *Roxb. Fl. Ind.* iii. 53; leaves elliptic hairy not acuminate, bracteoles petioled elliptic leaf-like, sepals $\frac{1}{4}$ in., corolla $1\frac{1}{2}$ in. white. *T. Anders. in Journ. Linn. Soc.* ix. 461. *R. repens*, *Wall. Cat.* 2384, letter F only. *Dipteracanthus* Sibua, *Nees in Wall. Pl. As. Rar.* iii. 81, and in *DC. Prodr.* xi. 121.

BENGAL; Dinajpur, *Hamilton*; throughout CHOTA NAGPORE, alt. 1–2000 ft., *Clarke*. UPPER GANGETIC PLAIN; Moradabad, *Thomson*.

Rootstock woody; annual stems sometimes 1–3 in. only (especially after the fires), sometimes 1–2 ft. *Leaves* 4 by $1\frac{1}{2}$ in., obtuse in the typical form, or acute hardly acuminate in Thomson's specimens. *Bracteoles* $\frac{3}{4}$ in., hardly acute. *Sepals* linear, puberulous or glabrate. *Capsule* $\frac{3}{4}$ –1 in.—Very closely allied to *R. cernua*.

7. **R. Beddomei**, *Clarke*; leaves elliptic acute hairy on both surfaces, bracteoles subpetioled ovate acute leaf-like, sepals $\frac{1}{2}$ in., corolla 3 in. *R. cernua*, *Anders. in Journ. Linn. Soc.* ix. 460, partly, not of *Roxb.*

CENTRAL INDIA; Jubbulpore, *Beddome*.

This seems nearer *R. suffruticosa* than *R. cernua*, of which T. Anderson reckoned it a form; but it differs from both in the very large corolla, the lobes of which are $1\frac{1}{2}$ by $\frac{3}{4}$ in., roundly elliptic.

8. **R. ciliata**, *Hornem. Hort. Hafn.* ii. 585; pubescent, leaves ovate shortly obtusely acuminate, bracteoles scarcely so long as the calyx-tube, corolla $1\frac{1}{2}$ in. *T. Anders. in Journ. Linn. Soc.* xi. 120. *Dipteracanthus ciliatus*, *Wall. Cat.* 7151; *Nees in Wall. Pl. As. Rar.* iii. 81, and in *DC. Prodr.* xi. 120. *Larysacanthus ciliatus*, *Oerst. in Vidensk. Meddel. Kjobenh.* 1854, 123.

BURMA; Prome, *Wallich*.

Stems 2 ft., shortly pubescent upwards. *Leaves* $3\frac{1}{2}$ by 2 in., base shortly cuneate, obscurely sinuate-crenulate; petiole $\frac{1}{2}$ –1 in. *Bracteoles* $\frac{1}{4}$ – $\frac{1}{2}$ in., oblong or spatulate-elliptic. *Calyx-tube* $\frac{1}{2}$ in.; teeth $\frac{1}{2}$ in., linear, pubescent. *Corolla* nearly glabrous, cylindric tubular much shorter than the ventricose part. *Filaments* hairy at the base. *Ovules* about 12. *Capsule* not seen.

9. **R. macrosiphon**, *Kurz in Journ. As. Soc.* 1873, pl. ii. 92; hairy, leaves linear-lanceolate or linear, bracteoles linear-lanceolate foliaceous, calyx-segments $2\frac{1}{2}$ in. linear-subulate, corolla 2 in. *Ruellia* sp., *T. Anders. in Journ. Linn. Soc.* ix. 461.

PEGU; *Beddome*.

Perennial, 2–3 in., woolly with crisped white hairs. *Leaves* 2 in., entire, narrowed at both ends; petiole obscure. *Flowers* sessile, solitary; bracteoles $\frac{1}{2}$ by $\frac{1}{2}$ in., linear-

oblong, white-hirsute. *Sepals* $\frac{1}{4}$ in., linear-lanceolate, glabrous, densely lineolate. *Corolla* pubescent; tube long-linear, ventricose for $\frac{1}{3}$ its length. *Stamens* 4, subequal; anther-cells similar, parallel, minutely white-tailed. *Style* elongate, branches $\frac{1}{10}$ in., subequal. *Capsule* many-seeded.—This recedes from the genus in the subequally bifid style; but the corolla-lobes are twisted in bud, and it must be a *Ruellia* or very near it.

DOUBTFUL SPECIES.

R. ? INVOLUCRATA, *Vahl Symb.* iii. 83; leaves short-petioled lanceolate attenuate at both ends entire glabrous, spikes small ovoid hirsute, bracts ovate attenuate quadri-farious. *Nees in DC. Prodr.* xi. 150.

INDIA (Madras?); *Koenig*.

General aspect of *Justicia Gendarussa*. *Leaves* 6-8 by 1- $\frac{3}{4}$ in., shining, conspicuously lineolate above. *Spikes* as large as a hazel-nut; bracteoles linear, hairy, shorter than the bracts. *Calyx* as long as the bracts. *Corolla* hairy in the throat. *Anthems* subsagittate at base. *Style* simple lanceolate branch. *Ovary* "pluri-ovulate."—Described by Nees from Koenig's specimen. The number of the ovules uncertain, and it is impossible to guess the genus.

R. ? GLANDULOSA, *Roth Nov. Sp.* 312; shortly villous, leaves petioled ovate-lanceolate subserrate, racemes axillary short subsecund, bracts minute linear-subulate glandular-villous. *Nees in DC. Prodr.* xi. 153. *Ruellia glabra*, *Heyne*.

INDIA (Madras?); *Heyne*.

Stem 4-angled, geniculate. *Leaves* 1 in. or a little longer; petiole $\frac{1}{8}$ in. *Racemes* nearly horizontal; peduncle solitary, shorter than the petiole, 5- or 6-fld.; bracts at the apex of the pedicels 2. *Sepals* $\frac{1}{2}$ in., equal, linear-subulate, glandular-villous. *Corolla* scarcely longer than the calyx, unequal, pubescent.—The combination of minute bracts with a corolla hardly longer than the calyx has defeated all attempts to ascertain the genus of this plant.

XI. *ECHINACANTHUS*, *Nees*.

Erect herbs or undershrubs. *Leaves* opposite, ovate or oblong, acute-toothed. *Cymes* lax, short, few-fld., or long compound, axillary, upper forming a terminal panicle; pedicels short or 0; bracts small, linear; bracteoles small or 0. *Sepals* 5, long, linear, subequal. *Corolla* tubular-ventricose, nearly straight, widened about the middle; lobes 5, subequal, rounded, twisted to the left in bud. *Stamens* 4, didynamous, included; anthers sub-similar, 2-celled; cells oblong, parallel, base spurred or not. *Ovary* with 6-8 ovules in each cell; style linear, stigma simple linear. *Capsule* oblong-linear, 8-16-seeded nearly from the base; retinacula stout, hooked. *Seeds* compressed, discoid, densely hairy, the hairs starting out on applying water.—Species 5, all Indian.

The character of the genus has been here widened to include plants closely resembling *Echinacanthus* except that the anther-cells are muticous.

* *Anther-cells spurred at the base*.

1. *E. attenuatus*, *Nees in Wall. Pl. As. Rar.* iii. 90, and in *DC. Prodr.* xi. 168; leaves oblong or ovate subdentate, sepals linear viscoso-pubescent, corolla $1\frac{1}{4}$ in. puberulous. *T. Anders. in Journ. Linn. Soc.* ix. 459. *Ruellia attenuata*, *Wall. Cat.* 2345; *Nees in Wall. Pl. As. Rar.* iii. 83 (not *Strobilanthes attenuatus*, *Nees in DC. Prodr.* xi. 193).

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Tambur River, alt. 2-4000 ft., *J. D. H. Sikkim*, alt. 4000 ft., *Treutler*, &c.

Stems 1-2 ft., pubescent upwards. Lower *leaves* $3\frac{1}{2}$ by 2 in., broadly elliptic;

middle cauline oblong, narrowed to both ends, upper $1\frac{1}{2}$ by $\frac{1}{2}$ in.; mature subsessile, glabrate, lined or obscurely pubescent. *Cymes* 1–2 in., viscous pubescent, forming a quasi-panicle 6–8 in. long; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., linear, secund, opposite, one barren, the other stipitate 0– $\frac{1}{2}$ in.; bracteoles 0. *Calyx-tube* $\frac{1}{8}$ – $\frac{1}{6}$ in.; lobes $\frac{1}{2}$ in. *Corolla* dark purple with lilac veins, cylindric equalling the ventricose portion. *Filaments* and *anthers* sparsely hairy. *Ovary* glabrous, style hairy. *Capsule* $\frac{3}{4}$ in., oblong scarcely ventricose; solid cylindric portion scarcely $\frac{1}{10}$ in.—(See 6, *E. Pumilio*.)

2. ***E. parviflorus***, *T. Anders. in Journ. Linn. Soc.* ix. 459; leaves ovate acuminate serrate, sepals linear glabrous, corolla 1– $1\frac{1}{4}$ in. glabrous.

KHASIA MTS.; *Griffith, Simons* (fide T. Anderson).

Glabrous, erect, divaricate. *Leaves* 3–6 by 2–3 in., base obliquely rounded; petiole 2–3 in. *Panicles* axillary and compound, terminal 6–10 in. long; flowers opposite, sessile; flowers often secund; bracts $\frac{1}{2}$ in., linear; bracteoles minute. *Calyx* divided to the base. *Corolla* straight, thrice as long as the calyx, funnel-shaped portion thrice as long as the cylindric. *Capsule* compressed, 8-seeded; seeds small, compressed.—Not seen; the foregoing abstracted from T. Anderson.

3. ***E. Brugmansianus***, *Nees in DC. Prodr.* xi. 168; leaves oblong attenuate at both ends repand sub-crenate hirsute-tomentose.

INDIA? in Vahl's Herbarium (Nees).

Calyx-segments a little shorter and less attenuate than those of *E. attenuatus*.—Not seen; the foregoing copied from Nees.

** *Anther-cells muticous at the base.*

4. ***E. Andersoni***, *Clarke*; leaves ovate acuminate mature glabrate, cymes lax large zigzag glabrous, corolla $\frac{3}{4}$ in.—*Echinacanthus* sp., *T. Anders. ms.*

SIKKIM HIMALAYA; Darjeeling; Pomong, alt. 3000 ft., *Clarke*. KHASIA MTS.?; *Calcutta Herbarium*.

An undershrub, 3 ft.; young parts (at least sometimes) with dense snow-white wool. *Leaves* $4\frac{1}{2}$ by $2\frac{1}{2}$ in., base rounded, crenate-serrate, raphides obscure; petiole $1\frac{1}{2}$ in. *Cymes* in terminal panicles 12 by 15 in., flowers all solitary, mostly opposite on the ultimate branches; pedicels $\frac{1}{2}$ in.; bract at the base of the pedicel $\frac{1}{2}$ in., linear; bracteoles $\frac{1}{2}$ in., linear. *Calyx* $\frac{1}{2}$ in. and upwards, narrow, glabrous or nearly so; segments long-linear acute, connate at base for $\frac{1}{4}$ – $\frac{1}{6}$ in. *Corolla* nearly glabrous, bluish. Anterior *filaments* hairy at their base, sparsely so upwards; posterior *filaments* glabrous, anthers rather smaller. *Style* glabrous, stigma rather short. *Capsule* exceeding $\frac{1}{2}$ in., narrowly-oblong, 12–16-seeded from the base. *Seeds* discoid; on applying water the hairs start out.—Habit and inflorescence of a sympodal *Strobilanthes*, but the capsule is many-seeded. The inflorescence differs from that of *E. attenuatus* in that, of the 2 flowers in the axils of opposite bracts, one is not usually obsolete.

VAB. *viscosa*; panicle and sepals viscous-pubescent, corolla $\frac{1}{2}$ in. pubescent.—Sikkim, alt. 4000 ft.; Lingcham, *Clarke*.

5. ***E. longistylus***, *Clarke*; leaves ovate acuminate mature nearly glabrate, cymes lax large zigzag viscous-pubescent, corolla $1\frac{1}{2}$ in.

SIKKIM HIMALAYA, alt. 1–4000 ft.; Punkabari and Kursiong, *Clarke*.

Closely resembling the viscous-pubescent Var. of *E. Andersoni*, but the corolla very much larger. *Style* hairy, thickened upwards, stigma linear-lanceolate (resembling the pistil of *Æchmanthera*). *Seeds* 8–12 to the capsule, the hairs on them starting out when wetted.—The position of this and of *E. Andersoni* is doubtful between *Strobilanthes* and *Echinacanthus*.

6. ***E. Pumilio***, *Clarke*; finely glandular-pubescent, leaves small

elliptic crenate or toothed, cymes lax compound zigzag pubescent, corolla $\frac{3}{4}$ in.

KHASIA MTS., alt. 4200 ft.; Cherpa Coal-hill, *Clarke*.

An undershrub, 6–15 in., very woody, much branched, densely covered on all sides with cymes. *Leaves* 1 by $\frac{1}{2}$ in., narrowed at both ends (many $\frac{1}{2}$ – $\frac{1}{3}$ in. ovate), blackish; hairs scattered, very fine, often gland-tipped; petiole $\frac{1}{2}$ in. *Cymes* as of *E. Andersoni*; bracts $\frac{1}{4}$ in., linear; pedicels often $\frac{1}{4}$ in.; bracteoles $\frac{1}{8}$ – $\frac{1}{6}$ in., linear. *Sepals* $\frac{1}{2}$ in., linear, finely glandular-pubescent. *Corolla* light-purple, nearly glabrous. *Filaments* glabrous except near the base, where they are shortly connate; anthers subequal, 2-celled; cells oblong, mucicous, connective not excurrent. *Ovary* glabrous; style very sparsely hairy, stigma long narrowly lanceolate; ovules 3 in each cell. *Capsule* not seen.—This may prove to be *E. parviflorus*, T. Anders., but it is not likely that T. Anderson would have put that species in *Echinacanthus* without remark, had the anther-cells been mucicous.

XII. PETALIDIUM, Nees.

Minutely hairy undershrubs. *Leaves* ovate or narrowly oblong, entire or toothed. *Flowers* sessile or nearly so, solitary, usually crowded on abbreviated lateral branches; bracts 0; bracteoles large, ovate, reticulate-nerved becoming scarious. *Sepals* subequal, linear-lanceolate. *Corolla-tube* straight, ventricose nearly from the base; lobes rounded, twisted to the left in bud, patent in flower. *Stamens* 4, didynamous; anthers subsimilar, 2-celled; cells parallel, spurred at the base. *Ovary* with 2 ovules in each cell; style long-linear, stigma unequally 2-lobed. *Capsule* clavate, compressed parallel to the septum, 2- or 4-seeded; placentæ dehiscing elastically from the bottom of the capsule, raising the discoid seeds with them.—Species 12, one Indian, the rest African.

The above character is drawn chiefly from the Indian species; the number of African species received since the Gen. Pl., vol. ii., pl. 2, was published, may necessitate widening of the generic character.

P. barlerioides, Nees in *Wall. Pl. As. Rar.* iii. 82, and in *DC. Prodr.* xi. 114, excl. syn. *Eranthemum barlerioides*, *Roxb.*; leaves ovate crenate, bracteoles $\frac{3}{4}$ in., corolla 1 in. *Bot. Mug.* t. 4053; *Dalz. & Gibs. Bomb. Fl.* 185; *T. Anders. in Journ. Linn. Soc.* ix. 461. *Ruellia barlerioides*, *Roth Nov. Sp.* 310; *Wall. Cat.* 2389. *R. bracteata*, *Roxb. Fl. Ind.* iii. 47.

N.W. HIMALAYA and N. DECCAN PENINSULA, alt. 1–3000 ft.; extending from Canara and the Concan to Rajmahl and Rajpootana, frequent; reappearing in the Oude and KUMAON dry Terai, alt. 1500 ft.

Stems several, 2–3 ft., terete. *Leaves* 2–4 in., acuminate, hoary or dusky puberulous; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; leaves on the shortened flower-bearing spurs $\frac{1}{2}$ –1 in. *Bracteoles* ovate or elliptic, acute. *Sepals* $\frac{1}{2}$ in., linear, puberulous or pubescent. *Corolla* narrow-campanulate, pale-blue or white, yellow-tinged; palate with long deflexed fulvous hairs within. *Filaments* and *anthers* minutely sparsely hairy (all but glabrous). *Ovary* glandular upwards, style shortly hairy. *Capsule* $\frac{1}{2}$ in., usually 2-seeded. *Seeds* shaggy, hairs somewhat elastic when wetted; retinacula (with the placentæ) stout, rigid.—*Eranthemum barlerioides*, *Roxb.*, placed here by Nees (and T. Anderson), is either *Eranthemum Parishii* or very near it, and came from the Andamans.

XIII. PHAYLOPSIS, Willd.

Prostrate, perennial herbs. *Leaves* opposite, petioled, ovate, entire or obscurely crenate. *Spikes* terminal, 1-sided, dense; bracts orbicular, closely

imbricate, each usually 3-fld.; bracteoles 0. *Sepals* 5, one ovate, nervose, the others linear like bracts. *Corolla* small; tube slender, cylindric; lobes 5, slightly unequal, rounded, contorted in the bud, patent in flower. *Stamens* 4, didynamous; anthers subsimilar, 2-celled; cells parallel, shortly oblong, base minutely mucronate. *Ovary-cells* 2-ovuled; style long-linear, hairy, stigma simple linear. *Capsule* clavate, compressed parallel to the septum, 4-seeded; placenta dehiscing elastically from the base of the capsule, raising the seeds with them. *Seeds* compressed, discoid, densely elastically white-hairy when wetted.—Species 10, all Tropical and African, one Indian and one Arabian.

P. parviflora, Willd. *Sp. Pl.* iii. 342; hairy, leaves opposite unequal ovate, bracts orbicular or reniform membranous becoming in fruit whitened nervose. *T. Anders. in Journ. Linn. Soc.* ix. 461. *Micranthus oppositifolius*, Wendl. *Obs.* 39. *Ruellia imbricata*, Vahl *Symb.* ii. 73; *Rorb. Fl. Ind.* iii. 48; *Wall. Cat.* 2353. *R. dorsiflora*, Retz. *Obs.* vi. 31. *Ætheilema reniforme*, Nees in *Wall. Pl. As. Rar.* iii. 94, and in *DC. Prodr.* xi. 261; *Wight Ic.* t. 1533; *Dalz. & Gibs. Bomb. Fl.* 192. *Æ. parviflorum*, Spreng. *Syst.* ii. 826. *Æ. mucronata?* Griff. *Notul.* iv. 137.—*Ætheilema*, Griff. *Notul.* iv. 136.

Throughout INDIA (except the N.W.), alt. 0–3000 ft., from the Himalaya to CEYLON and Tenasserim; common in Bengal both in the plains and in the lower hills.—DISTRIB. Madagascar, Tropical Africa.

A prostrate, closely-branched herb; branches often flagellate, 2–3 ft. *Leaves* 3½ by 1½ in., acuminate at both ends, obscurely pubescent, petiole ½ by 1½ in.; leaves of lateral branches ½–1½ in. *Spikes* ½–2 in., densely or thinly hairy; bracts ¼–½ in. *Calyx* ¼ in., hairy. *Corolla* ½ in., nearly white. *Stamens* glabrous. *Capsule* ¼ in.; valves with rigid backs and scarious sides. *Seeds* ⅛ in. diam.

XIV. DÆDALACANTHUS, T. Anders.

Shrubs or perennial herbs. *Leaves* opposite, petioled, entire or obscurely toothed, lineolate by raphides. *Spikes* linear with distant flowers, or dense or capitate; bracts usually large; bracteoles linear-lanceolate, hardly so long as the calyx. *Corolla-tube* linear, long, widened only near the top or in a few species from the middle; lobes obovate, twisted to the left in bud, horizontal in flower, blue, rarely rose, veined. *Stamens* 2, glabrous; anthers narrowly oblong, 2-celled, mucous, exerted or subincluded. *Ovary* glabrous, 4-ovuled; style long, sparingly hairy, stigma simple linear. *Capsule* clavate, base solid cylindric. *Seeds* normally 4, compressed, discoid, densely finely elastically hairy when wetted.—Species 17, Indian and Malayan.

This genus, in the long corolla and 2 stamens with mucous anthers, greatly simulates *Eranthemum*; the species are in general easily distinguished by the bracts much exceeding the calyx; in *D. microstachyus* & *concanensis*, however, the bracts are small, and they can only be recognized by their twisted corolla-lobes.

* *Corolla lower half cylindric, upper half ventricose or funnel-shaped.*

1. **D. tubiflorus**, T. Anders. in *Journ. Linn. Soc.* ix. 485; leaves elliptic acuminate at both ends glabrate, spikes axillary simple dense, corolla 1½ in. upper half ventricose.

E. BENGAL (? Mishmee); Griffith (Kew Distrib. n. 6122).

Stem upwards and innovations pubescent. *Leaves* 8½ by 3 in., obscurely crenulate, lineolate with raphides on both surfaces; nerves 12 pair; petiole 1 in. *Spikes*

3 in., short-peduncled; bracts $\frac{3}{4}$ in., closely imbricate, 1-fl'd., obovate, shortly acute, glabrous, white with green reticulating nerves; bracteoles $\frac{1}{4}$ in., lanceolate, acuminate. *Calyx* nearly $\frac{1}{2}$ in., divided $\frac{2}{3}$ the way to the base; lobes lanceolate, acuminate, puberulous. *Corolla* slightly curved, glabrate; lobes $\frac{1}{2}$ by $\frac{1}{4}$ in., roundly elliptic, nervose. *Stamens* glabrous; anthers exserted. *Capsule* not seen.

2. **D. Griffithii**, *T. Anders. in Journ. Linn. Soc.* ix. 486; leaves oblong or elliptic acuminate at both ends glabrate, spikes long-peduncled simple dense, corolla $1\frac{1}{4}$ in. upper half funnel-shaped.—*Eranthemum* sp., *Griff. Itin. Notes*, 96, n. 1437.

BHUTAN; Ghoorgong, *Griffith* (Kew Distrib. n. 6126).

Branchlets upwards tetragonous, obscurely pubescent. *Leaves* 6 by 2 in., lineolate with raphides on both surfaces; nerves 9 pair; petiole $\frac{3}{4}$ in. *Peduncles* 3-4 in., 4-angled; spikes 2-5 in.; bracts 1 in., densely imbricated, 1-fl'd., ovate, acuminate, glabrous, whitish with green reticulating nerves; bracteoles $\frac{1}{4}$ in., linear-lanceolate. *Calyx* $\frac{1}{4}$ - $\frac{1}{2}$ in., divided more than half-way down; lobes linear-lanceolate, minutely puberulous. *Corolla* slightly curved, flesh-coloured without, rose within (*Griffith*), nearly glabrous, narrower at the summit and less suddenly narrowed in the middle than that of *D. tubiflorus*. *Stamens* glabrous; anthers exserted. *Capsule* $\frac{1}{2}$ in., glabrous. *Seeds* $\frac{1}{8}$ - $\frac{1}{4}$ in.—Seems very near *D. tubiflorus*.

3. **D. splendens**, *T. Anders. in Journ. Linn. Soc.* ix. 486; leaves ovate or elliptic acuminate at both ends somewhat pubescent, spikes short-peduncled usually very long, corolla $1\frac{1}{2}$ in. pubescent upper half of the tube funnel-shaped.—*Eranthemum* sp. n. 23, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; alt. 1-3000 ft., frequent; *Griffith* (Kew Distrib. n. 6129), *J. D. H.*, &c.

Stems 3-5 ft., pubescent upwards. *Leaves* 6 by 3 in., subentire, lineolate with raphides on both surfaces; nerves 12 pair; petiole $\frac{1}{2}$ - $1\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ - $1\frac{1}{2}$ in.; spikes 3-12 in.; bracts $\frac{3}{4}$ in., all imbricate, 1-fl'd., obovate, glandular-pubescent, whitish or brownish with reticulated green nerves; bracteoles $\frac{1}{4}$ in., linear-lanceolate. *Calyx* $\frac{1}{2}$ in., lobed half-way down; lobes narrow-lanceolate, puberulous. *Corolla* slightly curved, brick-red; lobes $\frac{1}{2}$ in., roundly elliptic, patent or recurved in flower. *Stamens* glabrous, anthers exserted. *Capsule* $\frac{3}{4}$ in., thinly glandular-pubescent.—Near *D. tubiflorus*.

** *Corolla-tube cylindric, widened below the summit for scarce $\frac{1}{2}$ its length.*

4. **D. nervosus**, *T. Anders. in Journ. Linn. Soc.* ix. 487; leaves ovate acuminate glabrous lineolate, base shortly attenuate, spikes short uninterrupted, bracts elliptic subobtusate or shortly acuminate nervose glabrate margins entire incurved not ciliate, corolla $1\frac{1}{4}$ in. blue glabrous. *Justicia nervosa*, *Vahl Enum.* i. 164; *Bot. Mag.* t. 1358. *Ruellia varians*, *Vent. Jard. Cels.* t. 46. *Eranthemum nervosum*, *Br. Prodr.* 477; *Nees in Wall. Pl. As. Rar.* iii. 106, and in *DC. Prodr.* xi. 445; *Wall. Cat.* 2493, in chief. *E. pulchellum*, *Andr. Bot. Repos.* t. 88, not of *Roxb.* *E. Edgeworthianum*, *Nees in DC. Prodr.* xi. 446.

Base of the HIMALAYA, alt. 1-3000 ft., from the Punjab to Bhotan, frequent. SILHET; *Wallich.* SOONDERBUND; *Clarke.*—(Cultivated in various tropical countries.)

Stems 2-6 ft., glabrous, or very nearly so to the summit. *Leaves* often 8 by 4 in., entire or obscurely crenulate, upper shortly attenuate at the base, raphides copious on both surfaces; nerves 10 pair; petiole $\frac{1}{2}$ - $1\frac{1}{2}$ in. *Spikes* 1-3 in., often ternate, forming close terminal panicles; peduncles $\frac{1}{2}$ - $1\frac{1}{2}$ in., often acutely quadrangular, lineolate, glabrous or obscurely pubescent; bracts $\frac{1}{2}$ in., much more concave than in the neighbouring species, imbricated deeply but somewhat laxly, sometimes obtuse never

long-acuminate, lineolate, puberulous; bracteoles $\frac{1}{2}$ in., narrowly lanceolate. *Calyx* $\frac{1}{2}$ in., lobed half-way down, whitish, minutely but densely pubescent; lobes lanceolate. *Corolla-lobes* $\frac{1}{2}$ – $\frac{3}{4}$ in., broadly elliptic. *Stamens* glabrous; anthers exerted, narrowly oblong. *Ovary* glabrous; style nearly glabrous. *Capsule* $\frac{1}{2}$ in.; solid cylindric base short. *Seeds* $\frac{1}{2}$ in. diam.—The Soonderbund plant has the calyx-lobes unusually short. The Var. *scabra* of Nees is merely a specimen in young flower, and therefore slightly scabrid-puberulous (it is not Anderson's *scabra*).

5. **D. macrophyllus**, *T. Anders. in Journ. Linn. Soc.* ix. 487; stem pubescent upwards, leaves elliptic-lanceolate ovate acuminate attenuate at the base often obscurely scabrid-puberulous, spikes linear subinterrupted, bracts elliptic subobtusely nervose margins entire obscurely pubescent not ciliate, corolla $1\frac{1}{2}$ in. *Bot. Mag.* t. 6686. *Eranthemum macrophyllum*, *Wall. Cat.* 7179; *Nees in Wall. Pl. As. Rar.* iii. 106, and in *DC. Prodr.* xi. 446.

PEGU, BURMA and TENASSERIM; *Wallich, &c.* (Kew Distrib. n. 6128).

Closely allied to *D. nervosus*, but the inflorescence more lax. *Leaves* similar to (not larger than) those of *D. nervosus*, but (even when mature) often with scattered minute hairs on the upper surface, and a scabrid pubescence on the nerves beneath; raphides fewer and less prominent. *Peduncles* 2–5 in., pubescent; spikes 2–5 in.; bracts as of *D. nervosus*, the lower often scarcely overlapping.—A single specimen of this from Hort. Kew put into the Herbarium in 1869 is marked *D. scaber* by T. Anderson, but is not the plant so called of his monograph in *Journ. Linn. Soc.*, which is a *D. nervosus*.

6. **D. strictus**, *T. Anders. in Journ. Linn. Soc.* ix. 487; leaves ovate or elliptic narrowed at both ends glabrous or nearly so, spikes linear interrupted forming a large terminal panicle, bracts narrowly elliptic obtuse herbaceous not whitened, corolla $1\frac{1}{4}$ –2 in. blue. *Eranthemum strictum*, *Colebr.*; *Roxb. Fl. Ind. ed. Carey*, and *Wall.* i. 114; *Wall. Cat.* 2494; *Bot. Reg.* t. 867; *Bot. Mag.* t. 3068; *Nees in Wall. Pl. As. Rar.* iii. 106, and in *DC. Prodr.* xi. 448 (excl. syn. *Wall. Cat.* 2492 a.).

EASTERN FRONTIER, in the lower hills, alt. 0–3000 ft., from KHASIA MTS. to CHITTAGONG, *Wallich, H. f. & T., &c.*, frequent.

A herb, 1–3 ft., with large basal leaves, pubescent, sparingly leafy upwards. Basal leaves 6–12 in., narrowed at the base, short-petioled, subentire, raphides obscure; upper often 1–2 in. only, base sometimes rounded. *Spikes* 3–8 in., hairy in the Chittagong plants, nearly glabrous in some of the Khasian; bracts $\frac{1}{2}$ –1 in., much exceeding the calyx, green, 1-fl.; bracteoles $\frac{1}{2}$ in., linear-lanceolate. *Calyx* $\frac{1}{2}$ in., divided half-way down; lobes lanceolate. *Corolla* often pubescent. *Stamens* glabrous; anthers included. *Style* hairy in the Chittagong specimens, very slightly so in the Khasian. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in., glandular-pubescent, or in the Khasian examples nearly glabrous.

7. **D. roseus**, *T. Anders. in Journ. Linn. Soc.* ix. 487; leaves elliptic acuminate at both ends glabrous lineolate, spikes linear subinterrupted, bracts obovate with a short recurved mucro glandular-pubescent strongly nerved, corolla 1– $1\frac{1}{2}$ in. rose subglabrous. *Justicia rosea*, *Vahl Enum.* i. 165. *Eranthemum roseum*, *Br. Prodr.* 447; *Nees in DC. Prodr.* xi. 447; *Dalz. & Gibs. Bomb. Fl.* 195.

W. and S. DECCAN PENINSULA, from the Bombay Ghats to Mangalore, frequent; *Wight, Hohenacker, &c.*

Resembling *D. nervosus*, but inflorescence more lax and bracts different. *Peduncles* 0–2 in., axillary and terminal; spikes often 6 in. *Bracts* (all but the lowest) imbricated, $\frac{1}{2}$ – $\frac{3}{4}$ in., strongly rugose by raised inarching green nerves; margins entire, glabrous, ciliate or very hairy. *Seeds* $\frac{1}{2}$ in. diam., much compressed. Otherwise (except the colour of corolla) as *D. nervosus*.

VAR. *Neesii*; leaves ovate acuminate not lineolate, nerves much raised beneath scabrous, spikes short dense, bracts ciliate.—ASSAM?

8. **D. tetragonus**, *T. Anders. in Journ. Linn. Soc.* ix. 488; leaves lanceolate acuminate at both ends glabrous densely lineolate, spikes solitary short-peduncled oblong very dense, bracts elliptic green long-ciliate, corolla $1\frac{1}{2}$ in. pale blue. *Eranthemum tetragonum*, *Wall. Cat.* 7180; *Nees in Wall. Pl. As. Rar.* iii. 106, and in *DC. Prodr.* xi. 447.

BRITISH BURMA, *Wallich*; Moulmein, *Parish*; Thoungyen Hills, *Beddome*; Beeling Forest, *Brandis*.

Branches upwards slender, quadrangular, nearly glabrous. *Leaves* $7\frac{1}{2}$ by $1\frac{1}{4}$ in., much attenuate, subentire; nerves 7–8 pair; petiole 1 in. *Spikes* 2 in., hairy; bracts $\frac{3}{4}$ by $\frac{1}{2}$ in., subobtusely. *Calyx* and *bracteoles* as of *D. nervosus*. *Corolla-tube* glabrous; mouth $\frac{3}{4}$ –1 in. *Anthers* not exerted. *Capsule* $\frac{1}{2}$ in.; solid narrowed base scarcely $\frac{1}{8}$ in.—Not nearly allied to *Eranthemum salaccense* (Blume Bijl. 792), as *T. Anderson* supposed; *Kurz* erroneously reduced it thereto in *Journ. As. Soc.* 1870, pt. ii. p. 78.

9. **D. suffruticosus**, *T. Anders. in Journ. Linn. Soc.* ix. 488; leaves elliptic narrowed at both ends glabrate not lineolate, spikes short dense nearly glabrous, bracts obovate nervose not whitened, corolla $1\frac{1}{4}$ in. pale blue. *Eranthemum suffruticosum*, *Roxb. Fl. Ind.* i. 111; *Nees in Wall. Pl. As. Rar.* iii. 107, and in *DC. Prodr.* xi. 448. *E. barlerioides*, *Roxb. Fl. Ind.* i. 113. *E. amoenum*, *Ham. ms.*

ANDAMANS; *Herb. Hamilton, Kurz*.

Nearly glabrous; branches leafy, obscurely tetragonous. *Leaves* 6 by $2\frac{1}{4}$ in., undulate; nerves 6 pair; petiole $\frac{3}{8}$ in. *Spikes* 1– $1\frac{1}{2}$ in., terminal, solitary, dense with (in *Roxburgh's* drawing) sometimes a few straggling flowers at the base; bracts $\frac{3}{4}$ in., obtuse with a short mucro, glabrous; nerves prominent beneath; bracteoles $\frac{1}{2}$ in., linear-lanceolate. *Calyx* $\frac{1}{2}$ in., divided half-way down; lobes linear-lanceolate. *Corolla-tube* glabrous; mouth $\frac{3}{4}$ in. diam. *Anthers* included.—*E. barlerioides*, somewhat doubtfully referred here by *T. Anderson*, is merely one of the cases where *Roxburgh* changed the name of a species, and his editors *Wallich* and *Carey* printed the description twice over.

10. **D. microstachyus**, *T. Anders. in Journ. Linn. Soc.* ix. 488; leaves elliptic narrowed at both ends glabrate, flowers remote sessile paniced, bracts small none imbricate, corolla $1\frac{1}{2}$ in. purple.

MOULMEIN; *Lobb*.

A herb, 2–3 ft., with large basal leaves, sparingly leafy upwards, habit of *D. strictus*. *Leaves* 8 by 3 in., base attenuate or rounded, subentire, obscurely or not lineolate; nerves 10 pair; petiole 0–1 in. *Panicle* large, compound, trichotomous, glandular-pubescent, branches quadrangular; bracts $\frac{1}{2}$ in., ovate or elliptic; bracteoles $\frac{1}{8}$ in., oblong. *Calyx* $\frac{1}{2}$ in., deeply divided; green; lobes linear, viscid-pubescent. *Corolla-mouth* $1\frac{1}{4}$ in. diam. *Anthers* included. *Ovary* and *style* somewhat glandular-pubescent. *Capsule* $\frac{3}{4}$ in., acute; solid cylindric base longer than the seed-bearing part.—Though the shortened bracts give this so different an aspect, the species appears very closely allied to *D. strictus*.

11. **D. purpurascens**, *T. Anders. in Journ. Linn. Soc.* ix. 488; leaves ovate acuminate upper often rounded at the base, spikes solitary oblong very dense, bracts ovate much acuminate nervose ciliate. *Justicia pulchella*, *Roxb. Cor. Pl.* ii. 41, t. 177. *Eranthemum pulchellum*, *Roxb. Fl. Ind.* i. 111, not of *Andr.* *E. purpurascens*, *Nees in Wall. Pl. As. Rar.* iii. 106, and in *DC. Prodr.* xi. 447. *E. montanum*, *Wall. Cat.* 2492, partly. *E.*

nervosum, Dalz. & Gibs. *Bomb. Fl.* 195, not of others.—*Eranthemum* sp. n. 12, *Herb. Ind. Or. H. f. & T.*

CENTRAL INDIA, alt. 1-4000 ft., common; from the Bombay Ghats, *Jacquemont*, and Belgaum, *Ritchie*, to Parasnath and South Behar, *J. D. H.* UPPER ASSAM; Dibroo-mook, *Griffith*.

Stems 2-4 ft., leafy. *Leaves* attaining 9 by 4 in., base decurrent, uppermost much smaller, subsessile, often cordate, subentire, sometimes glabrate, densely lineolate, sometimes pubescent on the nerves on both surfaces (the raphides in such case obscure); nerves 7-9 pair. *Spikes* 1-2½ in., usually appearing long-peduncled, the uppermost leaves being much reduced; bracts 1 in., base rounded, rigid, green not whitened but with much elevated nerves, apex divaricate, margins not incurved; bracteoles ½ in., linear-lanceolate. *Calyx* ½ in., lobed half-way down; segments lanceolate, whitened, minutely pubescent. *Corolla* 1½ in., bluish, pubescent or nearly glabrous. *Anthers* included. *Capsule* ½-¾ in., lower solid cylindric portion short.—The bracts in Roxb. *Cor. Pl. t. 177* are characteristically those of *D. purpurascens*, and in the description he says bracts ciliate. Moreover Roxburgh got his *E. pulchellum* from "the drier parts of India."

12. **D. montanus**, *T. Anders. in Thwaites Enum.* 229, and in *Journ. Linn. Soc.* ix. 489; leaves elliptic attenuate at both ends subglabrous lineolate, spikes linear or capitate viscidly hairy, bracts lanceolate linear-acuminate green, calyx deeply divided segments linear green glandular hairy, corolla 1½ in. blue. *Eranthemum capense*, *Linn. Amœn. Acad.* i. 385. *E. montanum*, *Roxb. Fl. Ind.* i. 110; *Wall. Cat.* 2492; *Nees in Wall. Pl. As. Rar.* iii. 107, and in *DC. Prodr.* xi. 448. (excl. syn. *Bot. Mag.* t. 4031); *Wight Ic.* t. 466; *Dalz. & Gibs. Bomb. Fl.* 195. *E. fastigiatum*, *Spreng. Syst.* i. 89. *Justicia fastigiata*, *Lamk. Ill.* i. 41. *J. montana*, *Roxb. Cor. Pl.* ii. 41, t. 176.

W. and S. DECCAN and CEYLON, alt. 1-6000 ft., frequent; *Wallich, Wight, &c.*

Herb 2-3 ft., leafy; upper branches or peduncles quadrangular, usually white-hairy or glandular. *Leaves* 4½ by 1½ in., all (except the floral) gradually attenuate at the base; nerves 6-7 pair; petiole ½-1½ in. *Inflorescence* extremely variable; from linear elongate spikes in compound corymbs or panicles with distant flowers to distant short-oblong very dense heads, always more or less glandular-hairy; bracts from elliptic with linear tips to linear-lanceolate, apex subobtusely, viscid-pubescent not whitened, lowest often 2-fld., bracts usually narrower in the elongate spikes broader in the shortened; bracteoles ½ in. *Calyx* ½ in. *Corolla* 1½ in., pale blue. *Anthers* subexserted from the corolla-tube. *Capsule* ½-1 in. *Seeds* ⅛ in. diam.—A variable species best distinguished by the long linear green viscidly hairy calyx-teeth. The high-level form with shortened spikes hardly differs from *D. purpurascens* by any other character than this. The Javan *D. salaccensis* does not much differ but by the bracts being obscurely linear-spathulate upwards.

VAR. Wightiana; leaves large ovate, corymb very compound with linear branches, bracts linear, calyx and capsule small. *Eranthemum Wightianum*, *Wall. Cat.* 2495, letter A only; *Nees in Wall. Pl. As. Rar.* iii. 107, and in *DC. Prodr.* xi. 449.—Deccan Peninsula?, *Russell*.—This is a remarkable specimen, estimated a species by Nees; it seems that T. Anderson never saw it; the remainder of *Wall. Cat.* 2495 with distant capitate heads being that which T. Anders. reduced to a Var. of *D. montana*. In *Russell's* plant the leaves are 7 by 3½ in., shortly suddenly attenuate at the base, the uppermost subcordate; the bracts are exactly linear, parallel-sided (in *D. montanus* they are always dilated downwards); the corolla is not fully expanded, but seems smaller than in *D. montanus*.

VAR. concanensis, *T. Anders. ms.*; panicle compound, spikes linear interrupted, bracts ovate abbreviated, not rarely 2-fld.—Concan; *Law*.

13. **D. Parishii**, *T. Anders. in Journ. Linn. Soc.* ix. 489; leaves ovate or elliptic acuminate at both ends undulate-crenate glabrous, spikes sub-

capitate or oblong dense, bracts leaf-like glabrous often undulate-crenate, corolla $1\frac{1}{2}$ in. blue.

MALAY PENINSULA; Tenasserim, *Helper* (Kew Distrib. n. 6176), *Beddome*; Tavoy and Moulmein, *Parish*.

Whole plant lineolate with raphides. *Stems* erect, elongate, tetragonous, leafy upwards. *Leaves* $5\frac{1}{2}$ by $2\frac{1}{2}$ in., tip long acuminate, base shortly acuminate; nerves 7-8 pair; petiole $0-1\frac{1}{4}$ in. *Flowers* often appearing densely clustered at the nodes on shortened axillary spurs; bracts $1-1\frac{3}{4}$ in., leafy, imbricated usually densely sometimes laxly; bracteoles $\frac{1}{2}$ in., linear-lanceolate. *Calyx* $\frac{1}{2}$ in., divided half-way down; lobes narrow-lanceolate, whitened, puberulous. *Corolla*-limb $\frac{3}{4}$ in. diam. *Anthers* included. *Capsule* 1 in., glabrous.—This much resembles *D. suffruticosus*, but the leaves are conspicuously lineolate. T. Anderson has overlooked the true bracteoles; they are exactly similar in size, form and situation to those of other species. The bracts (bracteoles of T. Anders.) are 1 to each flower; when they are opposite on the spike and the flower in the axil of one is aborted, they appear superficially 2 to each flower; as is the case often in *D. montanus* and several other species and genera.

XV. HEMIGRAPHIS, Nees.

Herbs or shrubs. *Leaves* opposite, toothed or subentire. *Flowers* sessile, in heads or spikes, rarely solitary; heads terminal or quasi-axillary on shortened branchlets, rarely (in *H. flava*) paniced; bracts imbricated, large, 1-fld.; bracteoles small, narrow, or 0. *Calyx* 5-partite nearly to the base; segments 5, subequal, linear-lanceolate or lanceolate. *Corolla* long-tubular, lower half cylindric, upper funnel-shaped or ventricose; lobes 5, rounded, subequal, sinistrosely contorted, blue or yellow. *Stamens* 4, didynamous, included or nearly so; anthers oblong, 2-celled, muticous, sometimes triangular, bases acute. *Style* long, stigma of one linear and one very short lobe; ovules 3-8 in each cell. *Capsule* linear or linear-oblong, 6-20-seeded nearly from the base. *Seeds* compressed, discoid, brown when dry, apparently glabrous with a white margin, when wetted densely hairy with white long unicellular hairs, each with numerous annular thickenings.—Species 20, Indian, Malayan, a few Chinese and Japanese.

Sect. 1. *Corolla* tubular-ventricose, limb blue. Longer *filaments* glabrous in their upper half or very nearly so.

1. **H. dura**, T. Anders. in Journ. Linn. Soc. ix. 461 (excl. syn. *Ruellia crispata*); bristly, leaves spatulate-elliptic crenate, bracteoles 0, calyx $\frac{1}{2}$ in. subscariosous. *Ruellia urens*, Heyne in Herb. Rottler; Roth Nov. Sp. 302; Roxb. Ic. Ined. *R. dura*, Nees in DC. Prodr. xi. 146; Dalz. & Gibs. Bomb. Fl. 186.

DECCAN PENINSULA; Kurnool (in Madras), *Beddome*; Bombay, *Jacquemont*; Central India, *Edgeworth*; Belgaum, *Ritchie*; Nilgherries, *Hohenacker*, &c.

Stems 1-2 ft., branched, diffuse, often almost prickly from white deflexed bristles. *Leaves* $1\frac{3}{4}$ by $\frac{3}{4}$ in., obtuse, harshly scabrous; petiole $\frac{1}{4}$ in. *Heads* many-fld., with white and often much brown hair; bracts $\frac{3}{4}$ in., oblong or spatulate. *Calyx* divided nearly to the base; segments linear, green with scarios margins, setulose. *Corolla* $\frac{3}{4}$ in., subequal, blueish-purple, ventricose portion about as long as the cylindric. Longer *filaments* laxly hairy below. *Capsule* $\frac{1}{2}$ in., 6-8-seeded.—Nees erroneously maintains (DC. Prodr. xi. 146) that *R. urens* of Heyne, Roth and Roxburgh is the same as their *R. latebrosa*.

2. **H. hirta**, T. Anders. in Journ. Linn. Soc. ix. 462; softly hirsute, leaves small ovate crenate, bracteoles 0, calyx $\frac{1}{2}$ in. green. *Ruellia hirta*, Vahl

Symb. iii. 84, t. 67; *Roxb. Fl. Ind.* iii. 46 *Nees in DC. Prodr.* xi. 145, *excl. Var. β.* *R. latebrosa, Roxb. Fl. Ind.* iii. 46?; *Wall. Cat.* 2382, *not of Roth nor of Dalz. nor of Wight.* *R. sarmentosa, Nees in Wall. Pl. As. Rar.* iii. 83.

BENGAL; very common. UPPER GANGETIC PLAIN; Moradabad, Thomson.

Hirsute (not harshly) with white hairs. *Stems* 6–18 in., creeping in grass. *Leaves* $\frac{1}{2}$ –1 in., obtuse; petiole 0– $\frac{1}{3}$ in. *Heads* 2–6-fld.; axillary solitary flowers not rarely added; bracts $\frac{1}{2}$ in., elliptic. *Sepals* linear, or in fruit subspathulate. *Corolla* $\frac{1}{2}$ in., subequal, pale lavender-blue, fugacious, glabrous with 2 hairy lines in the palate; ventricose portion nearly as long as the cylindric. Longer filaments laxly hairy below. *Style* sparsely hairy. *Capsule* $\frac{1}{2}$ in., 12-seeded.—It is doubtful whether Roxburgh described this species under two names, or whether one of these applied to *H. venosa* or some other species. Kurz (*Journ. As. Soc.* 1871, ii. 74) proposed (unhappily) to unite this with *Ruellia Blumeana*.

3. **H. venosa**, Clarke; scabrid-pubescent, leaves petioled ovate crenate, bracteoles as long as the calyx. *Ruellia venosa, Heyne in Herb. Rottler. R. crispa, Nees in Wall. Pl. As. Rar.* iii. 83, and in *DC. Prodr.* xi. 146, *not of Linn.*

DECCAN PENINSULA; Rottler, Wight.

Stems 6–12 in., branched, rooting, sparingly pubescent. *Leaves* 2 by 1 in., acuminate at both ends, crisp, lineolate; petiole $\frac{3}{4}$ in. *Heads* many-fld., axillary and terminal; bracts $\frac{1}{2}$ in., obovate; bracteoles $\frac{1}{2}$ in., lanceolate, densely lineolate, white-hirsute upwards. *Sepals* $\frac{1}{2}$ in., 5, subequal, lanceolate, below glabrous scarious, tips hispid with white hairs. *Corolla* $\frac{3}{4}$ in., tube for $\frac{1}{4}$ in. cylindric, for $\frac{1}{4}$ in. ventricose or almost hemispheric; mouth subequal. *Anthems* subequal, of the longer filaments subexsert. *Ovary* glabrous, tip glandular-pubescent; ovules 6–8, on retinacula. *Capsule* not seen.—Much resembling *Cardanthera triflora*, but the corolla is smaller, not (or obscurely) bilabiate. T. Anderson placed this with his *Stenosiphonium zeylanicum*, which has 4 ovules and a differently shaped corolla, and is *Strobilanthes exsertus* described below.

4. **H. confinis**, T. Anders. in *Journ. Linn. Soc.* ix. 463; thinly softly white-hairy, leaves petioled elliptic narrowed to both ends obsoletely crenate, bracteoles hardly half as long as the calyx. *Ruellia confinis, Nees in DC. Prodr.* xi. 148.

MERGUI and MALACCA; Griffith, Maingay, Cuming.—DISTRIB. Java, Borneo (not Philippines).

Stems 2 ft., sparsely hairy. *Leaves* 3 $\frac{1}{2}$ by 1 $\frac{1}{2}$ in., obtuse or obtusely acuminate, raphides plentiful but obscure; petiole $\frac{1}{2}$ in. *Spikes* terminal, dense, often elongate (especially in fruit) 2–3 in., oblong, or subglobose when young; bracts $\frac{1}{2}$ – $\frac{1}{4}$ in., ovate, subacute, imbricate, sub-4-seriate, hairy often viscidly; bracteoles $\frac{1}{2}$ – $\frac{1}{4}$ in., linear or narrow. *Sepals* $\frac{1}{4}$ – $\frac{1}{3}$ in., narrowly lanceolate sublinear, one slightly larger. *Corolla* $\frac{1}{2}$ in., with few white hairs within; lower cylindric portion about as long as the suddenly ventricose. *Filaments* glabrous or nearly so; anthers 2-celled, long. *Ovary* and style glabrous. *Capsule* about $\frac{1}{2}$ in., usually 8-seeded.—Kurz (*Journ. As. Soc.* 1871, pt. ii. 74) reduces this to *Ruellia Blumeana*, Nees, which differs much, by the spikes short not quadrifarious, the filaments bearded, &c.

Sect. 2. *Corolla* narrowly tubular-funnel-shaped, limb blue. Longer filaments densely bearded in their upper half by long obtuse white papillose hairs.

5. **H. latebrosa**, Nees in *DC. Prodr.* xi. 723; diffuse, hairy, leaves petioled ovate crenate or serrate, bracteoles 0, capsule less than $\frac{1}{2}$ in. 6-seeded. *Wight Ic.* t. 1504. *H. elegans, T. Anders. in Journ. Linn. Soc.* ix. 463, *not of Nees.* *H. Pavala, Kurz in Journ. As. Soc.* 1870, pt. ii. 78.

Ruellia Pavala, *Roxb. Fl. Ind.* iii. 47. *R. latebrosa*, *Roth Nov. Sp.* 307; *Nees in Wall. Pl. As. Rar.* iii. 83, *not of Roxb.* *R. erecta*, *Ham.*; *Wall. Cat.* 2395. *R. fasciculata*, *Wall. Cat.* 2394, *part of A sheet only.* *Ruellia elegans*, *Bot. Mag.* t. 3389; *Dalz. & Gibs. Bomb. Fl.* 186.

Throughout the DECCAN PENINSULA, alt. 0-4000 ft., from S. Behar (*J. D. H.*) to Coorg (*Wight*); common.

Stems 1-2 ft., branching, weak, hairs soft patent white. *Leaves* $2\frac{1}{2}$ by 1-1 $\frac{1}{2}$ in., acuminate at both ends, sparsely hairy, obscurely (or not) lineolate; petiole 1-1 $\frac{1}{2}$ in.; leaves on the secondary flowering branches much smaller. *Bracts* ovate or elliptic, scarcely longer than the calyx, or of the outermost flowers petioled, and greatly exceeding the calyx. *Sepals* $\frac{1}{4}$ - $\frac{1}{2}$ in., subequal, linear-lanceolate, whitened, hairy not obviously lineolate. *Corolla* $\frac{3}{8}$ - $\frac{1}{2}$ in., nearly straight; tube pale or yellowish, gradually narrowed upwards, limb blue. *Shorter filaments* glabrous; anthers narrowly oblong, cells triangular acute (not awned). *Capsule* $\frac{1}{4}$ in., rarely $\frac{1}{2}$ in., minutely patently hairy, 6-seeded.—This hardly differs from *H. elegans*, *Nees*, but by the smaller capsule with 6 (not 8) seeds. T. Anderson considered them one.

VAR. rupestris; more pubescent, often viscid aromatic, heads denser. *Ruellia diffusa*, *Wall. Cat.* 2383, *letters C, D.* *R. satporensis*, *Wawra in Oestr. Bot. Zeit.* 1881, 281, and in *It. Pr. Cob. Bot.* i. 90, t. 8 B.—Deccan Peninsula, Chota Nagpore, Rajpootana. N.W. Himalaya, alt. 2-5000 ft.; Kumaon, *Strachey & Winterbottom*; Sewaliks, *Stewart*.—Even commoner than the type, more rigid, growing in drier places. It was distributed as *Ruellia rupestris* to Wallich and to Roth (see *Roth Nov. Sp.* 307). The authentic sheet named by Heyne in *Herb. Rottler* consists partly of this, partly of *Lepidagathis fasciculata*.

VAR. Beddomei; much less hairy, leaves small ovate serrate or crenate glabrate.—Bellary; *Beddome*.

6. **H. ebracteolata**, *Clarke*; hispid with scattered white hairs, leaves small petioled ovate serrate, bracteoles 0, capsule $\frac{1}{2}$ in. 6-seeded. *H. rupestris*, *T. Anders. in Journ. Linn. Soc.* ix. 462, *partly.* *Ruellia ebracteolata*, *Dalz. in Hook. Kew Journ.* ii. 342. *R. latebrosa*, *Dalz. & Gibs. Bomb. Fl.* 186.

BOMBAY GHATS; *Dalzell, Stocks*.

Leaves $1\frac{1}{4}$ by 1 in. (mostly smaller), obtuse or very shortly acuminate, base obtuse or almost rounded, cuneately decurrent on the petiole, coarsely toothed, hairs stiff (almost bristly) especially on the nerves beneath; raphides plentiful but obscure. Otherwise altogether as *H. latebrosa*, *Nees*, of which *Dalzell* finally considered it a form.—*H. rupestris*, *T. Anders.*, is made up of *Ruellia rupestris* and of *R. ebracteolata*, *Dalz.*; but *Dalzell's R. ebracteolata* is much remoter from *R. rupestris* than is the latter from *Hemigraphis latebrosa*, *Nees*.

7. **H. faccida**, *Clarke*; stems long softly patently hairy, leaves petioled ovate or elliptic subentire or obsoletely crenate, heads small few-fl., bracteoles 0. *Ruellia faccida*, *Kurz in Journ. As. Soc.* 1873, pt. ii. 91.

PEGU; *Kurz*.

Longer filaments bearded upwards, shorter naked. *Bracts* not fimbriate nor flowers solitary (as *Kurz* describes). *Capsule* not seen.—As *Kurz* admitted *H. latebrosa* to be of the genus *Hemigraphis*, he erred in placing this species in *Ruellia*; for it is closely allied to *H. latebrosa*. The white hairs on the stems are $\frac{1}{2}$ in. long, very copious, nearly similar to those of *H. latebrosa*. If this is well separable from *H. latebrosa*, it must be by the very entire leaves; in *H. latebrosa* the larger leaves (on the principal stem) are always prominently toothed.

8. **H. elegans**, *Nees in DC. Prodr.* xi. 722, *of T. Anders. partly*; diffuse, patently softly white-hairy, leaves petioled ovate or elliptic crenate-serrate, bracteoles 0, capsule $\frac{1}{2}$ in. 8-10-seeded. *Ruellia diffusa*, *Wall.*

Cat. 2383, letters A, B; *Nees in Wall. Pl. As. Rar.* iii. 83. *Strobilanthes burmanica*, *Kurz in Journ. As. Soc.* 1873, pt. ii. 92.

PEGU; *Wallich, Kurz.*—DISTRIB. Ava.

Similar to, but stouter than, *H. latebrosa*; leaves less sharply toothed. Inner bracts of the heads $\frac{1}{2}$ – $\frac{3}{4}$ in., narrowly elliptic or oblong, overtopping the calyx. Corolla $\frac{3}{4}$ in. and upwards; larger and broader than that of *H. latebrosa*. Stamens as in *H. latebrosa*, or (fide *Nees*) one anther-cell sometimes rudimentary.—The long inner bracts give this plant a different aspect from the Deccan *H. latebrosa*. Bracteoles 0; *Nees* says lanceolate longer than the calyx, from which it is probable that he means by bracteole that which he has called bract in the diagnosis of the same species. *Kurz's Strobilanthes burmanica* is more hairy than *Wallich's Pegu* examples; and it may be doubtful if several of the species here admitted are other than local varieties of *H. latebrosa*.

VAR. *crenata*; viscid-pubescent, less softly white hairy, leaves crenate. *Ruellia crenata*, *Benth.*; *Hohenack. in Flora* 1849, 558. Malabar; Canara, *Hohenacker*, n. 737; Concan, *Stocks*; Belgaum, *Ritchie*; Bombay, *Law*; Bellary, *Beddome*.

9. **H. Griffithiana**, *T. Anders. in Journ. Linn. Soc.* ix. 463; leaves lanceolate remotely obscurely toothed glabrate, heads terminal shortly cylindric hairy, bracteoles much shorter than the calyx. *Ruellia Griffithiana*, *Nees in DC. Prodr.* xi. 149.

MERGUI; *Griffith* (Kew Distrib. n. 6091); Tenasserim, *Helper* (Kew Distrib. n. 6187).

Rootstock perennial; stems several, 1 foot, erect, scarcely branched, slender, pubescent upwards. Leaves 2 by $\frac{1}{2}$ in., sessile, attenuate to both ends, pubescent when young. Spikes $\frac{1}{2}$ –1 in., viscidly hairy; bracts $\frac{1}{4}$ – $\frac{1}{2}$ in., elliptic, subobtusely; bracteoles $\frac{1}{8}$ – $\frac{1}{6}$ in., narrow. Sepals $\frac{1}{2}$ in. and upwards, linear-lanceolate, not very unequal. Corolla $\frac{1}{2}$ in. and upwards, more ventricose than in others of this section, bearded in the palate within. Longer filaments densely bearded upwards with long white hairs, shorter glabrous. Capsule rather more than $\frac{1}{4}$ in., usually 8-seeded. Seeds $\frac{1}{16}$ in., much compressed, discoid, densely elastically white-hairy when wetted.

10. **H. quadrifaria**, *T. Anders. in Journ. Linn. Soc.* ix. 463; hirsute, leaves ovate or elliptic acute, bracts large, corolla $1\frac{1}{4}$ in. *Ruellia quadrifaria*, *Wall. Cat.* 7152; *Nees in Wall. Pl. As. Rar.* iii. 83, and in *DC. Prodr.* xi. 147.

MOULMEIN; *Parish*, n. 403. TENASSERIM; *Beddome*, nn. 96, 97.—DISTRIB. Ava.

Hirsute with white or yellowish hairs from tubercular bases. Branch stout, shrubby. Leaves $4\frac{1}{2}$ by $2\frac{1}{2}$ in., upper narrower, base obtusely rhomboid, crenate-serrate; petiole $\frac{1}{3}$ in. Heads dense, terminal and peduncled on short axillary branches, hirsute; bracts 1 by $\frac{1}{3}$ – $\frac{1}{2}$ in., inner gradually smaller; bracteoles linear-lanceolate rather shorter than the calyx. Sepals $\frac{1}{2}$ in., narrowly lanceolate, bases subconnate. Corolla sparingly pubescent, more ventricose than in the other species of this section, "deep blue" (*Parish*). Filaments of the longer stamens densely shaggy with long white hairs to the apex; anthers all subequal, mucous. Style simple, hairy; ovules 4–6 in each cell. Capsule $\frac{1}{2}$ in., narrowly oblong, slightly hairy upwards, 8–12-seeded nearly from the base.

11. **H. glaucescens**, *Clarke*; leaves oblong narrowed to each end scabrid pubescent on the nerves beneath, spikes dense strobilate, bracts ovate acute hirsute, bracteoles very small lanceolate. *Strobilanthes glaucescens*, *Nees in Wall. Cat.* 7155, and in *Wall. Pl. As. Rar.* iii. 85, and in *DC. Prodr.* xi. 178; *T. Anders. in Journ. Linn. Soc.* ix. 467.

PEGU and TENASSERIM; *Griffith*, &c.

A shrub; branches scabrous. Leaves 6 by 2 in., crenulate, lineolate, sparingly

setulose above, more pubescent beneath; nerves 9-10 pair; petiole $\frac{3}{4}$ in. *Spikes* 1-3 in., ovoid or cylindric, very shortly peduncled, solitary; bracts $\frac{3}{4}$ in., green, persistent; bracteoles $\frac{1}{2}$ - $\frac{1}{3}$ in. *Sepals* $\frac{1}{2}$ in., linear-lanceolate, hairy. *Corolla* 1 in. (purple?) straight, subsymmetric, upper half narrowly ventricose. Longer *filaments* densely bearded with long white hairs turned to one side. *Ovary* glandular-hirsute upwards; style sparsely hairy. *Capsule* $\frac{1}{2}$ in., pubescent, 6-seeded. *Seeds* $\frac{1}{2}$ in., compressed, orbicular, when wet the fine white hairs spring out abundantly on all sides; areoles 0.—Habit and fruit-spikes so exactly those of a typical *Strobilanthes* that neither Nees nor T. Anderson appear to have tried the ovules; they are always 6, and the capsule has 6 seeds on 6 retinacula.

Sect. 3. *Corolla* large, tubular, yellow. Longer *filaments* bearded in their upper half by long obtuse white papillose hairs.

12. *H. flava*, Kurz in *Journ. As. Soc.* 1871, pt. ii. 74; leaves large obovate narrowed at both ends scabrous finally glabrate, bracts elliptic long acuminate, bracteoles lanceolate acuminate, corolla $1\frac{1}{2}$ - $1\frac{3}{4}$ in. *Ruellia flava*, Roxb. *Fl. Ind.* iii. 43, and *lc. Ined.*; Nees in *DC. Prodr.* xi. 153. *Strobilanthes scaber*, T. Anders. in *Thwaites Enum.* 227, excl. all syn.; Benth. in *Gen. Pl.* ii. 1087 (as to the Pegu plant). *S. flavus*, Kurz *For. Fl.* ii. 243.

PEGU; Roxburgh, Kurz. MOULMEIN; Griffith (Herb. Propr. n. 278), Lobb. TENASSERIM; Beddome. CEYLON?; Walker (? cultivated).—

A shrub; branches glabrous. *Leaves* 8 by 3 in., minutely crenulate, tubercular, scabrous, becoming nearly glabrous; petiole $\frac{1}{2}$ in. *Heads* terminal on the arms of a panicle, dense, sparingly ciliate or glabrous; bracts $\frac{3}{4}$ in.; bracteoles $\frac{1}{2}$ in. *Sepals* nearly $\frac{1}{2}$ in., linear. *Corolla* densely hairy within, ventricose portion about as long as the cylindric. *Anthers* connivent in pairs. *Ovary* with (at least) 6 ovules. *Capsule* (fide Kurz) 8-seeded.—The inflorescence is *Strobilanthes*-like, and it might be more naturally placed in *Strobilanthes*; but it is very distinct specifically from *S. scaber*, Nees, by the 6-8 ovules, very much longer flower and bearded filaments.—The 3 examples ticketed as from Ceylon have 6 ovules, and seem identical with the Pegu plant. Nees' *S. scaber* was a purple-fl. species founded on Wight n. 1945, on which type-sheet T. Anderson has written *S. heteromallus*, T. Anders., nov. sp.

XVI. STENOSIPHONIUM, Nees.

Shrubs. *Leaves* ovate or elliptic, acuminate, lower tapering into the petiole, upper subsessile, subcordate, crenate, upper surface densely covered by raphides. *Flowers* sessile, solitary or 2-3-nate in opposite axils; clusters running into close or interrupted spikes, or paniced; bract ovate or lanceolate; bracteoles 2, narrow, about as long as the calyx. *Calyx* subequally 5-fid, segments linear or lanceolate, imperfectly connate often for half their length. *Corolla* tubular-ventricose, suddenly widened about the middle; limb oblique, lobes 5, subequal, twisted to the left in bud. *Stamens* 2 perfect, or 4 perfect the 2 posterior much the smaller, anterior usually exserted; anthers oblong, 2-celled, muticous. *Ovary* and style glabrous, or at the apex of the ovary glandular. *Disc* small, annular. *Stigma* simple; ovules 3-4 in each cell. *Capsule* oblong-linear, seed-bearing nearly from the base. *Seeds* 6-8, on stout hooked retinacula, compressed, discoid, apparently glabrous; when moistened the abundant white hairs of extreme tenuity straighten out.—Species 5, all of the Deccan and Ceylon.

1. *S. diandrum*, Wight *lc.* t. 1502 (not of Nees); leaves rhomboid-elliptic or ovate, spikes interrupted viscous-pubescent, bracts ovate shorter than the calyx, flowering calyx divided more than half-way down teeth

linear viscous-pubescent, stamens 2. *S. confertum*, *T. Anders. in Journ. Linn. Soc.* ix. 464, *partim*.

S. MADRAS; Courtallum, *Wight*.

Branches glabrous. *Leaves* 3 by $1\frac{1}{2}$ in., young obscurely scabrous beneath; petiole $\frac{1}{2}$ in. *Spikes* 2-3 in., in terminal panicles, densely clothed with minute patent gland-headed hairs; lower whorls mostly 4-6-fld., distant even at flower-time; bract $\frac{1}{2}$ in., ovate with a short obtuse apex; bracteoles rather longer than the bract, similar to the calyx-segments. *Calyx* $\frac{1}{2}$ in.; segments linear-ligulate (not subulate), united at flower-time about $\frac{1}{2}$ their length, in fruit free. *Corolla* exceeding $\frac{1}{2}$ in. Anterior *filaments* minutely hairy at the base, posterior reduced to 2 microscopic teeth.

2. ***S. confertum***, *Nees in DC. Prodr.* xi. 105; leaves rhomboid-elliptic or ovate, spikes scarcely interrupted viscous-hairy, bracts obovate shorter than the calyx, flowering calyx divided nearly half-way down segments linear viscidly hairy, stamens 4. *T. Anders. in Journ. Linn. Soc.* ix. 464, *partim*. *S. Russellianum*, *Wight Ic.* t. 873, not t. 1503, as see *Wight's note under the latter*.

S. DECCAN; Pulney Mts. and near Courtallum, *Wight*.

Very near *S. diandrum*, *Wight*, and united therewith by *T. Anderson*; probably the posterior stamens may be present or absent in the same species. The present plant differs from *S. diandrum* in the leafy habit and shortened very hairy spikes, which have numerous white simple hairs in addition to the gland-tipped hairs. The stamens differ from those of all the other species, being all exerted; but the anthers of the posterior pair are hardly $\frac{1}{2}$ as long as those of the anterior (this is not correctly shown by *Wight*).

3. ***S. setosum***, *T. Anders. in Journ. Linn. Soc.* ix. 464; leaves rhomboid-elliptic or ovate, flowering spikes dense somewhat interrupted below very hairy, bracts linear as long as the calyx, stamens 2.—*Strobilanthes* n. 67, *Herb. Ind. Or. H. f. & T.*

MYSORE or *CARNATIO*; *G. Thomson*.

Leaves altogether as of *S. diandrum*. *Spikes* 2-5 in., with white simple and gland-tipped hairs; bracts $\frac{1}{2}$ in. and upwards, linear only slightly widened towards the base. *Calyx-segments* united for about $\frac{1}{2}$ their length at flower-time, subulate, very hairy. *Flowers, stamens and capsules* exactly as of *S. diandrum*, from which this species hardly differs except by the bracts.

4. ***S. Russellianum***, *Nees in Wall. Pl. As. Rar.* iii. 84, and in *DC. Prodr.* xi. 105; leaves rhomboid-elliptic or ovate glabrous beneath, spikes linear much interrupted, bracts ovate as long as the calyx, corolla $\frac{3}{4}$ -1 in., stamens 4. *Wight Ic.* t. 1503 (not t. 873); *T. Anders. in Journ. Linn. Soc.* ix. 464, *partly*. *Ruellia Russelliana*, *Wall. Cat.* 2400. *R. arcuata*, *Wall. Cat.* 2334 a & b.

S. DECCAN PENINSULA; plentiful in and around the Nilgherries, *Wight*, &c. *Ceylon*; *Walker, Thwaites*.

Stems and leaves as of *S. diandrum*. *Spikes* 3-6 in., elongate, all the whorls generally distinct even at flower-time, glabrous except a few minute bristles at the sepal-tips or (in *Wight's* n. 2189) sparingly glandular-pubescent; bracts (from the middle of the spike) $\frac{1}{2}$ in., rhomboid, shortly obtusely mucronate, but the lower bracts often pass into leaves being $\frac{3}{4}$ in. broad cordate-ovate, and the upper are often narrowly obovate. *Calyx* $\frac{1}{2}$ in., segments united to the middle, teeth narrowly lanceolate acuminate, glabrous with minute white bristles or glandular-pubescent. Anterior *filaments* very hairy at their base; posterior about half as long, included. *Pistil* and *capsule* as in *S. diandrum*.

VAR. subsericea, *T. Anders. in Journ. Linn. Soc.* ix. 464; younger leaves densely white-silky beneath mature silky or glabrous beneath. *S. subsericeum*, *Nees in Wall.*

Pl. As. Rar. iii. 84, and in *DC. Prodr.* xi. 105. *Ruellia cordifolia*, *Vahl Symb.* iii. 84. *R. sesamoides*, *Wall. Cat.* 2408, part of sheet A only. *R. subsericea*, *Wall. Cat.* 2416. *R. canescens*, *Heyne in Herb. Rottler.*—*S. Deccan Peninsula*, *Rottler*; *Courtallum*, *Wight*.

Often twiggy, with small leaves.

5. ***S. parviflorum***, *T. Anders. in Journ. Linn. Soc.* ix. 464; leaves rhomboid-elliptic or ovate glabrate, spikes linear subinterrupted at base, bracts lanceolate, calyx small, teeth linear glandular-pubescent, corolla $\frac{1}{2}$ – $\frac{2}{3}$ in., stamens 2.—*Strobilanthes* sp. n. 68, *Herb. Ind. Or. H. f. & T.*

MYSORE or CARNATIC; *G. Thomson*.

Very near *S. Russellianum*, differing mainly by the smaller calyx and corolla and narrower bracts. *Bract* $\frac{1}{2}$ in. *Calyx* scarcely $\frac{1}{4}$ in., divided half-way down. *Stamens* 2 only in n. 68 *H. f. & T.*; when T. Anderson says 4, he must have examined *Wall. Cat.* 2334 a & b; which T. Anderson referred to *S. parviflorum*, but which is typically *S. Russellianum*, *Nees*.

XVII. **ÆCHMANTHERA**, *Nees*.

Small, hairy *shrubs*. *Leaves* broad-elliptic acute, crenate, often viscid. Clusters of *flowers* sessile on the branches of a trichotomous or 1-sided panicle, distant or close; bracts linear, as long as the calyx; bracteoles similar smaller. *Calyx* sub-5-partite; segments linear, subequal. *Corolla* tubular-ventricose, nearly straight, widened suddenly near the middle, glabrous, 2 hairy lines on the palate within; segments 5, subequal, rounded, twisted to the left in bud, pale-violet or purplish. *Stamens* 4, didynamous, included, longer filaments hairy, shorter glabrous; anthers subsimilar, ovate or oblong, 2-celled, cells mucous; connective excurrent at the tip or not. *Ovary* densely hairy at the apex; style sparsely hairy thickened upwards, stigma large simple linear-lanceolate; ovules 4–6 in each cell. *Capsule* narrowly oblong, 6–8- (or ex Benth. 12-) seeded from the base, retinacula strong, hooked. *Seeds* discoid, densely hairy, or thicker glabrous.—Species 2, Indian.

1. ***Æ. tomentosa***, *Nees in Wall. Pl. As. Rar.* iii. 87; leaves elliptic acute hairy, bracts linear-ligulate as long as the calyx, anthers oblong connective not excurrent, seeds densely hairy. *Ruellia tomentosa*, *Wall. Cat.* 2333.

TEMPERATE HIMALAYA, alt. 3–5000 ft.; Kumaon and Nepal, *Wallich, Thomson*.

A small shrub, 1–3 ft., dusky grey or whiteish, villous, not with snowy or silvery wool. *Leaves* $4\frac{1}{2}$ by 2 in., base rounded, slightly crenate, densely (not prominently) lineolate with raphides; petiole $1\frac{1}{2}$ in. *Panicles* often 1 foot, one-sided; clusters 3–8-fld., distant or approximate; bracts $\frac{1}{2}$ in. or more; bracteoles narrowly ligulate, as long as the calyx or more often about half as long. *Sepals* $\frac{1}{2}$ – $\frac{1}{2}$ in., linear-ligulate, somewhat unequal, herbaceous, pubescent, usually viscous. *Corolla* 1 in. *Anthers* particularly obtuse in *Wall. Cat.* 2333, and the examples closely similar therewith, even in the buds just before expansion. *Capsule* $\frac{1}{2}$ in., 8-seeded; hairs of the seeds starting out when wetted.

VAR. *Wallichii*; stem and leaves with snow-white wool or glabrate sparsely hairy, anthers ovate, tip of the connective excurrent recurved. *Æ. Wallichii*, *Nees in DC. Prodr.* xi. 170; *T. Anders. in Journ. Linn. Soc.* ix. 485. *Æ. gossypina*, *Nees in Wall. Pl. As. Rar.* iii. 87. *Ruellia gossypina*, *Wall. Cat.* 2332, and *Pl. As. Rar.* i. 38, t. 42.—*Acanthacea*, *Griff. Itin. Notes*, 119, n. 308.—Temperate Himalaya, alt. 3–5000 ft., from Kashmir to Bhotan. Chittagong; Seetakoond, alt. 1000 ft., *H. f. & T.*—*Wallich's* figure shows the connective non-excurrent, but it always is more or

less so in the white-woolly form. In the two examples on one sheet marked by Nees' hand *Wallichii* and *tomentosa*, the former has the connective conspicuously, the latter minutely, excurrent. The East Himalaya examples are flowerless, and may belong to *Æ. tomentosa*, type. The Chittagong example is densely snowy-woolly with 6 hairy seeds, and is therefore *Æ. tomentosa* var. *Wallichii*, or a new species.

2. *Æ. leiosperma*, Clarke; hairy, leaves ovate or elliptic acute, bracts linear-ligulate as long as the calyx, anthers oblong connective excurrent at the tip, seeds glabrous.

JAINTEA and E. KHASIA, alt. 3-4000 ft.; abundant, Clarke.

A small shrub, 2-3 ft. high, very hairy, often viscid, with both brown and white hairs. *Leaves* 3 by $1\frac{1}{2}$ in., rounded at the base, crenulate; petiole $\frac{1}{2}$ in. *Panicle* resembling that of *Æ. tomentosa*, often somewhat leafy; bracts $\frac{1}{2}$ in., linear-ligulate; bracteoles $\frac{1}{2}$ in., similar to the bracts. *Sepals* $\frac{1}{2}$ in., subequal, linear-ligulate, very hairy. *Corolla, stamens* and *pistil* as of *Æ. tomentosa*, but the connective more excurrent than in any form of *Æ. tomentosa*. *Capsule* $\frac{1}{2}$ in., 6-seeded. *Seeds* much thicker than in *Æchmanthera*, and without hairs.—I cannot match these seeds without going to quite another part of the Acanthaceæ Order. They are glabrous when wetted, not discoid. On the other hand, except the seeds, the plant is hardly distinguishable from *Æ. tomentosa*. There are abundant specimens with seeds *in situ*.

XVIII. STROBILANTHES, Blume.

Large or small shrubs, or herbs. *Leaves* opposite, often unequal, in *S. anisophyllus* often apparently alternate, toothed or subentire, often bearing raphides. *Flowers* capitate, or in strobiliform or interrupted spikes, or paniced, sessile or sometimes pedicelled, purple yellow or white; bracts and bracteoles large or small or 0, persistent or caducous. *Calyx* deeply subequally 5-fid; or (in Sect. Buteræa) 2-lipped, with one lip very shortly 3-toothed; segments narrow, equal or unequal. *Corolla* tubular-ventricose, straight or curved; lobes 5, ovate or round, subequal, contorted in bud. *Stamens* 4, didynamous, or (in Sect. Endopogon) 2; anthers oblong, 2-celled, mucous. *Disc* small, or prominent as a stalk to the ovary. *Ovary* 4-ovulate; style linear, stigma of one long linear-lanceolate branch, the other suppressed. *Capsule* 4- or 2-seeded; placentæ (in a few species only) rise elastically from the base, carrying the seeds with them. *Seeds* much compressed, glabrous or hairy, hairs elastic when wetted; retinacula curved, strong.—Species 180, Asiatic and 1 in Africa.

This genus contains a great number of species differing widely in habit, inflorescence and size of the flowers. It is here limited to species with 2 ovules in each cell of the ovary. All with more than 2 in each cell have been carried to *Ruellia*, *Echinacanthus*, *Hemigraphis*, *Stenosiphonium* and *Æchmanthera*.

Strobilanthes roseus, Wall. Cat. 7154, is an Ava plant, not known from British India.

Strobilanthes salicifolius, T. Anders. in Journ. Linn. Soc. ix. 484, is a plant of altogether uncertain origin.

Strobilanthes biceps, T. Anders. in Journ. Linn. Soc. ix. 476 = *Goldfussia biceps*, Wall. Cat. 7161, Nees in DC. Prodr. xi. 172, is an Ava plant.

Key to the Sections of *Strobilanthes*.

Subgenus 1. BUTERÆA. Calyx bilabiate. Species 1-4, of Pegu and Tenasserim.

Subgenus 2. ENDOPOGON. Stamens 2.

Seeds glabrous. Species 5-12, of Ceylon with 1 in S. Deccan.

Seeds hairy. Species 13-18, of S. Deccan.

Species 19, 20, of Khasia.

Subgenus 3. **EUSTROBILANTHES**. Calyx subequally deeply 5-fid. Stamens 4.

Series A. *Bracteata*. Bracts persistent. Flowers spiked or opposite, not mostly alternate.

* Flowers capitate or shortly spicate.

† Seeds glabrous. Species 21–32, of Ceylon and Deccan.

†† Seeds hairy.

‡ Species 33–46, of Ceylon and Deccan.

‡‡ Species 47–56, of N. India and Malay Peninsula.

** Flowers strobilate.

† Seeds glabrous. Species 57–64, of Ceylon and Deccan.

†† Seeds hairy. Species 65–78.

*** Spikes elongate often much interrupted. Species 79–87.

Series B. *Nudata*. Bracts caducous. Flowers capitate or opposite, not mostly alternate.

* Heads in fruit capitate. Species 88–100.

** Heads in fruit elongate or flowers distant. Species 101–119.

Series C. *Alternifloræ*. Flowers mostly distant alternate, or panicled. Species 120–136, of N. India and Malaya.

Series D. *Paniculata*. Bracts persistent. Flowers panicled or interruptedly spicate. Capsule wide, very acute. Species 137–145, of Ceylon and S. Deccan.

Residuary. Species 147–154, not seen.

Subgenus 1. **Buteræa**. Calyx 2-lipped to the base; one lip 3-fid less than one-third the way down, the other 2-fid or 2-partite.—(Spikes strobiliform; bracts prominent, imbricate. Stamens 4. Seeds (where known) elastically hairy when wetted.—Species of Pegu and Tenasserim.)

1. **S. rufescens**, *T. Anders. in Journ. Linn. Soc.* ix. 472; leaves ovate acute crenate more or less rufous-hairy, spikes dense strobilate hirsute, bracts broadly ovate, calyx 2-partite both segments very shortly toothed. *Ruellia rufescens*, *Roth Nov. Sp.* 304. *R. comosa*, *Roxb. Fl. Ind.* iii. 43, and *lc. Ined. in Herb. Kew.* *R. ulmifolia*, *Wall. Cat.* 2360. *Buteræa ulmifolia*, *Nees in Wall. Pl. As. Rar.* iii. 84, and in *DC. Prodr.* xi. 196.

PEGU; *Brandis*.—DISTRIB. Moluccas (*Roxburgh*).

A shrub; branches perfectly glabrous, or intensely shaggy with red hairs $\frac{1}{4}$ – $\frac{1}{2}$ in. long. Leaves $1\frac{1}{2}$ –4 in., often unequal, base obtuse or rounded, hirsute on both surfaces in the type examples, nerves 6 pair; petiole $\frac{1}{2}$ – $1\frac{1}{2}$ in. Spikes 1–2 in., short-peduncled; bracts $\frac{1}{2}$ in., fulvous-hirsute; bracteoles scarcely $\frac{1}{2}$ in., sublinear. Calyx $\frac{1}{2}$ in., 2-partite to the base, rufous-ciliate towards the apex; segments very shortly toothed, one 2-toothed, the other 3-toothed with the middle tooth broader subemarginate. Corolla 1 in., pale-purple, cylindric base of the tube rather shorter than the moderately ventricose part. Capsule $\frac{1}{4}$ in., densely pubescent, 4-seeded. Seeds less than $\frac{1}{12}$ in., orbicular, fine elastically white-hairy, areoles 0.

VAR. *rubiginosa*; leaves larger thinner glabrate lineolate above, bracteoles $\frac{1}{16}$ in., ovate.—Tenasserim; *Helfer* (*Kew Distrib.* n. 6118). Chittagong; *Clarke*.—Stems thinly shortly rufous-hirsute; leaves $5\frac{1}{2}$ by $2\frac{3}{4}$ in., base shortly acuminate, crenate, green, herbaceous; nerves beneath thinly rufous-hairy.—*Helfer's* example is unlike those of *Ruellia ulmifolia*, but very like the figure of *R. comosa*, *Roxb.* *Clarke's* examples have the stems sparsely or densely rufous-hirsute, the leaves glabrate lineolate above or rufous-hirsute; the corolla is $1\frac{1}{2}$ in., pale-purple, nearly glabrous with glabrous filaments, altogether as in *Roxburgh's* picture.

2. **S. acuminatus**, *T. Anders. in Journ. Linn. Soc.* ix. 473, partly; leaves lanceolate acuminate at both ends crenate nearly glabrous, spikes oblong short-peduncled glandular, bracts ovate shorter than the calyx, calyx sub-2-partite one lip shortly trifid the other bifid nearly to the base. *S. subflaccidus*, *Kurz in Journ. As. Soc.* 1873, pt. ii. 94, ex descr. *Adena-*

canthus acuminatus, *Nees in Wall. Cat.* 7153, and in *Wall. Pl. As. Rar.* iii. 84, and in *DC. Prodr.* xi. 197 (*excl. tab. cited*).

BURMA; "locus incertus," *Wallich*.

A herb; branches elongate, nearly glabrous. *Leaves* 5 by $1\frac{1}{2}$ in., base long attenuate, often subserrate, lineolate above; nerves 6-7 pair, minutely fuscous pubescent beneath; petiole $0-\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ -2 in.; spikes $\frac{1}{2}$ -1 in.; bracts $\frac{1}{2}$ in., ovate; bracteoles $\frac{1}{2}$ in., elliptic, wider upwards than the bracts. *Calyx* scarcely $\frac{1}{2}$ in., glandular-ciliate. *Corolla* (ex *Nees*) $\frac{1}{2}$ in. at least, glabrous, tubular; limb equal with obtuse segments. *Ovary* 4-ovulate. *Capsule* not known.—Description mainly from *Nees*, the single sheet of *Wallich* being too imperfect to verify several points. *T. Anderson*, proceeding on the similarity in the leaves, has assumed that *Nees'* description is materially wrong, and that *Wall. Cat.* 7152 is really identical with *S. longipes*, n. 76 *infra*. If that be so, it remains as *S. subflaccidus*, *Kurz*.

3. **S. Parishii**, *Clarke*; leaves elliptic acuminate thinly hirsute, spikes linear-oblong strobilate white-hairy, bracts oblong or slightly wider upwards, calyx 2-partite both segments very shortly toothed.

MOULMEIN; *Parish*. TENASSERIM; *Beddome*.

A branching herb; stems subterete rufous-pubescent or subhirsute. *Leaves* $5\frac{1}{2}$ by $2\frac{1}{2}$ in., base cuneate or obtuse, crenate, nerves 6 pair; petiole $\frac{1}{2}$ -2 in. *Spikes* 2 by $\frac{1}{2}$ in., short-peduncled; bracts $\frac{1}{2}$ by $\frac{1}{8}-\frac{1}{6}$ in., obtuse; bracteoles $\frac{1}{2}$ in., linear. *Calyx* $\frac{1}{3}$ in., nearly as of *S. rufescens*. *Corolla* $1\frac{1}{4}$ in., nearly straight, glabrous, blue; cylindric base of the tube hardly half so long as the campanulate; lobes short, round. *Capsule* $\frac{1}{4}-\frac{1}{3}$ in., pubescent, 4-seeded. *Seeds* scarcely $\frac{1}{2}$ in., orbicular, elastically white-hairy; areoles hardly any.

4. **S. foetidissima**, *Kurz in Journ. As. Soc.* 1873, pt. ii. 93; leaves ovate acuminate at both ends serrate-dentate hirsute on both surfaces, spikes short-peduncled lax short tawny-hirsute, bracts obovate-cuneate obtuse, calyx-segments deeply lobed.

MARTABAN; *Kurz*.

A herb; branches fulvous-hairy. *Leaves* 3-5 in., membranous, long-petioled. *Bracts* $\frac{1}{2}$ in., glandular-hirsute; bracteoles similar, but shorter and broader. *Calyx* as long as the bracts, adpressedly glandular-puberulous. *Corolla* $1\frac{1}{2}$ in., and filaments glabrous. *Style* hirsute. *Capsule* $\frac{1}{2}$ in., glabrous. *Seeds* $\frac{1}{2}$ in. diam., adpressedly villous.—Copied from *Kurz*, who says it is allied to *S. rufescens*, whence it is presumed the calyx is definitely 2-lipped; but in the large capsule and seeds it differs from the other species allied to *S. rufescens*.

Subgenus 2. **Endopogon**. *Calyx* deeply subequally 5-fid. *Stamens* 2 fertile.—(Spikes mostly continuous, sometimes shortened into heads, less commonly interrupted at the base, the lowest flowers then in opposite pairs; bracts persistent).

* *Seeds (even in water) glabrous, without areoles on the faces.*—Lower half of the corolla-tube cylindric, suddenly widening into the ventricose part.—Species of Ceylon, with one (*S. foliosus*) in the S. Deccan Peninsula.

5. **S. viscosus**, *T. Anders. in Thwaites Enum.* 226, *excl. syn.* *Wight*, and in *Journ. Linn. Soc.* ix. 465, *partly*; leaves elliptic acuminate at both ends crenulate sparsely pubescent or glabrate, spikes linear subinterrupted viscous-hairy, flowering calyx $\frac{1}{2}$ in. divided less than half-way down. *Endopogon viscosus*, *Nees in DC. Prodr.* xi. 104, *excl. Var. humilis, not of Wight*.

CEYLON, up to 7000 ft. alt., frequent; *Gardner, Walker, Thwaites* (n. 2898, n. 2002, *partly*), &c.

A shrub, 2-5 ft. *Leaves* 4 by $1\frac{3}{8}$ in.; nerves 7-8 pair, not conspicuously parallel; petiole $\frac{3}{4}$ in. *Spikes* 3-8 in., axillary, simple or compound, and running into terminal panicles; flowers opposite, lowest pair usually distant; bracts $\frac{1}{2}$ in., elliptic or oblong, attenuated upwards; bracteoles $\frac{1}{4}$ - $\frac{1}{2}$ in., narrow. *Calyx* viscidly hairy, teeth lanceolate; calyx in fruit enlarged often $\frac{3}{8}$ in. or more, split to the base into lanceolate segments. *Corolla* $1\frac{1}{2}$ in., densely pubescent without; linear-base of the tube $\frac{1}{4}$ in., very narrow, ventricose portion $\frac{1}{2}$ by $\frac{1}{2}$ in., oblique, lobes ovate. *Filaments* glabrous except near the base; anthers large, pendulous, subexserted. *Capsule* $\frac{1}{2}$ in., 4-seeded. *Seeds* more than $\frac{1}{8}$ in., ovoid, thinning towards the apex, smooth, hairless.

VAR. *microphyllus*, Nees in DC. Prodr. xi. 104; leaves $\frac{1}{2}$ - $1\frac{1}{4}$ in., spikes very weak few-fl.—Ceylon.—The type specimen of this has no fruit; but Walker, n. 122, has similar small leaves and fruit exactly as of *S. viscosus* type.

VAR. *digitalis*; bracts abbreviated, spikes elongate slender, minutely deciduously cinereous-woolly not hairy nor viscous. *Endopogon digitalis*, Nees in DC. Prodr. xi. 104 (sp.).—Ceylon; Walker.—This is possibly nearer *S. exareolatus*, but the example is in young flower.

VAR. *arguta*; leaves more rigid more acutely (though minutely) toothed, spikes dense, bracts $\frac{1}{2}$ in. oblong imbricate, calyx minutely cinereous-woolly. *Endopogon argutus*, Nees in DC. Prodr. xi. 104.—Ceylon; Gardner.—The examples referred here by Nees (probably on the characters of the leaves) having fulvous viscid hairy spikes seem nearer *S. viscosus*, T. Anders. type.

6. *S. stenodon*, Clarke; glabrous, leaves ovate acuminate crenate, spikes linear scarcely interrupted, bracts short obovate, calyx divided half-way down, corolla-lobes narrowly oblong.

CEYLON; Matelle East, Beckett, Thwaites, C. P. n. 3874.

Leaves $4\frac{1}{2}$ by 2 in., shortly narrowed into the petiole; nerves 8 pair; petiole $1\frac{1}{2}$ in.; leaves white underneath in Beddome's Ceylon specimen. *Spikes* 2-5 in., axillary, simple or compound, running into terminal panicles; bracts $\frac{1}{2}$ in.; bracteoles $\frac{1}{2}$ in., narrowly oblong. *Calyx* glabrous, teeth lanceolate. *Corolla* glabrous in bud, white-hairy within; cylindric base $\frac{1}{2}$ in., very narrow; ventricose tube $\frac{1}{2}$ in. long and broad; lobes $\frac{3}{4}$ -1 in. *Anthers* exserted, pendulous. *Ovules* 2 in each cell. *Capsule* not seen.—A remarkable plant with the habit, inflorescence and bracts of *Stenosiphonium Russellianum*; the narrow lobes of the corolla are unlike any neighbouring species or genus.

7. *S. exareolatus*, Clarke; leaves elliptic acuminate at both-ends slightly undulate crenate glabrous, spikes linear lax hairy, calyx narrow overtopping the bracts divided less than half-way down. *S. consanguineus*, T. Anders. in Thwaites Enum. 226, and in Journ Linn. Soc. ix. 465, partly. *Stenosiphonium diandrum*, Nees in DC. Prodr. xi. 105, not of Wight. *Endopogon consanguineus*, Nees l. c. as to the Ceylon material.

CEYLON, alt. 3000 ft.; Walker.

A shrub. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in.; nerves 6 pair; petiole $\frac{3}{4}$ in. *Spikes* 2-4 in., running into terminal panicles; bracts $\frac{1}{4}$ - $\frac{1}{2}$ in., ovate or oblong; bracteoles $\frac{1}{2}$ in., narrow. *Calyx* (in flower) $\frac{1}{4}$ - $\frac{1}{2}$ in., teeth sublinear; in fruit enlarged. *Corolla* $\frac{3}{4}$ in., resembling that of *S. viscosus* but smaller. *Capsule* $\frac{1}{2}$ in., 4-seeded. *Seeds* scarcely $\frac{1}{10}$ in., ellipsoid, smooth, hairless, without lateral areoles.—Near *S. viscosus*, differing by the short bracts, narrow cylindric calyx, smaller flowers and much smaller seeds. As to the synonyms, the type specimens of Nees and T. Anderson, written on by their own hands, are preserved at Kew.

VAR. *densa*; spikes denser, bracts elliptic imbricate often as long as the calyx.—Ceylon, alt. 2-6000 ft.; Thwaites, n. 2002 chiefly, &c.

8. *S. rhytisperma*, Clarke; leaves elliptic acuminate at both ends denticulate thinly white-cottony beneath, spikes linear uninterrupted glabrous, bracts lanceolate about equalling the calyx. *S. hypoleucus*, T. Anders. in Thwaites Enum. 226, not *Endopogon hypoleucus*, Nees.

CEYLON; Central Province, *Thwaites*, C. P. 2897, collected by Gardner.

Stem glabrous. *Leaves* 5 by $1\frac{3}{4}$ in., mature glabrous above; nerves 8 pair; petiole $\frac{3}{8}$ in. *Spikes* 3-4 in., clustered in the axils (end of the branch not seen); bracts $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in., divided half-way down, hardly enlarged in fruit; teeth narrowly lanceolate, glabrous. *Corolla* glabrous without in bud. *Capsule* $\frac{1}{2}$ in., 4-seeded. *Seeds* $\frac{1}{10}$ in., obovate-elliptic, smooth, hairless, longitudinally wrinkled, without lateral areoles.

9. ***S. nigrescens***, *T. Anders. in Thwaites Enum.* 226, and in *Journ. Linn. Soc.* ix. 465; leaves narrowly elliptic acuminate at both ends serrulate glabrous, spikes linear uninterrupted hirsute, bracts lanceolate mostly overtopping the calyx. *Bedd. Ic. Pl. Ind. Or.* t. 217.

CEYLON, alt. 3000 ft.; *Thwaites*, C. P. n. 3353.

A shrub, 4-5 ft., blackish-green when dry. *Leaves* 5 by $1\frac{1}{2}$ in., lineolate above, reticulate beneath; nerves 7 pair; petiole $1\frac{1}{4}$ in. *Spikes* 2-5 in., axillary, simple or compound, and running into terminal panicles; bracts $\frac{1}{2}$ in.; bracteoles $\frac{1}{4}$ - $\frac{1}{2}$ in., narrow. *Calyx* $\frac{1}{2}$ in. and upwards hairy, divided about half-way down, enlarged in fruit. *Corolla* pale-purple, very nearly as of *S. viscosus*. *Capsule* $\frac{3}{4}$ in., very broad and stout, 2-seeded (in *Thwaites*, 3353). *Seeds* $\frac{1}{4}$ in. diam. (unripe), hairless and without lateral areoles.

10. ***S. rhamnifolius***, *T. Anders. in Thwaites Enum.* 226, and in *Journ. Linn. Soc.* ix. 466; leaves ovate shortly acuminate crenate-serrulate glabrous, spikes linear-oblong very hairy densely paniced, bracts widely-elliptic imbricated. *Buteraa rhamnifolia*, *Nees in DC. Prodr.* xi. 725. *Endopogon rhamnifolius*, *Wight Ic.* t. 1521.

CEYLON, *Gardner*; alt. 3000 ft., *Thwaites*, C. P. n. 2007.

A shrub, 1-2 ft., hairy upwards. *Leaves* $2\frac{1}{2}$ by $1\frac{1}{2}$ in., base obtusely rhomboid; nerves 6 pair; petiole $1\frac{1}{4}$ in. *Spikes* 1-4 in.; bracts $\frac{3}{4}$ in., not acuminate; bracteoles $\frac{1}{4}$ - $\frac{1}{2}$ in., linear-oblong. *Calyx* $\frac{1}{2}$ in., very hairy, divided hardly half-way down (not so deeply as figured by *Wight*); teeth narrowly lanceolate. *Corolla* $1\frac{1}{4}$ in., purple, pubescent, cylindric portion more than $\frac{1}{2}$ in., very narrow, ventricose portion $\frac{1}{2}$ - $\frac{3}{4}$ in.; teeth ovate. *Stamens* 2; filaments sparsely hairy more than half their length. *Ovules* 2 in each cell.—The habit, bracts and shape of the corolla are much as in *S. exareolata* var. *densa*; but the capsule and seeds being unknown, the exact position is doubtful.

11. ***S. deflexus***, *T. Anders. in Thwaites Enum.* 227, and in *Journ. Linn. Soc.* ix. 470; glabrous, leaves lanceolate acuminate at both ends denticulate, heads peduncled few-fl. closely capitate. *Bedd. F. Pl. Ind. Or.* t. 218.

CEYLON, alt. 3-4000 ft.; *Gardner, Thwaites*, C. P. 1998.

A shrub, 4-5 ft., green. *Leaves* $4\frac{1}{2}$ by $1\frac{1}{4}$ in.; nerves 6 pair; petiole 1 in. *Peduncles* axillary, $1\frac{1}{2}$ in., thickened upwards, deflexed; outer bracts $\frac{3}{4}$ in., elliptic, often nearly enclosing the whole head; proper bract $\frac{3}{4}$ in., lanceolate; bracteoles rather shorter, linear. *Calyx* $\frac{3}{4}$ in., divided half-way down, glabrous or the linear-lanceolate teeth puberulous. *Corolla* $\frac{3}{4}$ -1 in., pale purple, nearly glabrous, hairy in the palate within; cylindric base of the tube as long as (and suddenly widened into) the ventricose portion, not so funnel-shaped as in *Beddome's* figure. *Stamens* 2, glabrous. *Pistil* glabrous. *Capsule* not seen; and, the seeds being unknown, the affinity is doubtful.

12. ***S. foliosus***, *T. Anders. in Journ. Linn. Soc.* ix. 467; leaves ovate serrulate glabrous, heads sessile ovoid densely capitate. *Goldfussia Leschenaultiana*, *Nees in DC. Prodr.* xi. 172. *Endopogon foliosus* & *capitatus*, *Wight Ic.* tt. 1501, 1499.

NILGHERY Mts., alt. 6-7000 ft., frequent; *Gardner, Wight, &c.*

Stems 1-2 ft., much branched, rigid. *Leaves* 2 by $1\frac{1}{2}$ in., shortly acuminate at both ends, conspicuously lineolate above; nerves 5-6 pair; petiole $\frac{1}{2}$ in. *Heads* numerous, terminal, $\frac{1}{2}$ in. diam., each closely embraced by the two uppermost leaves (exclusive of the proper bracts); bracts $\frac{3}{4}$ in., linear-oblong, at first nearly glabrous or hairy; bracteoles $\frac{3}{4}$ in., linear, at first nearly glabrous or hairy. *Calyx* $\frac{3}{4}$ in., divided hardly half-way down, obscurely or prominently hairy at flower-time, hirsute in fruit, segments narrowly lanceolate. *Corolla* $1\frac{1}{4}$ in., blue or whitish, glabrous without, hairy along 2 lines within; linear base of the tube about as long as the suddenly-widened ventricose part. *Filaments* hairy nearly to the summit; rudiments often 3, whereof 2 often carry minute rudimentary anthers. *Ovary* slightly hairy upwards. *Capsule* $\frac{3}{4}$ in., 4-seeded. *Seeds* $\frac{1}{2}$ in. long, very thin, glabrous; areoles 0.—There is no difference between the typical *foliosus* and the Var. *capitatus*; the heads on one stem which appear (superficially) glabrous in flower are very hairy in fruit, owing to the development of the hairs on the bract, bracteoles and calyx.

**** Seeds** (in water) densely hairy except on two lateral circular areoles near the base on each face.—(Linear or subcylindric base of the corolla short, more gradually narrowing into the ventricose portion than in the preceding section.—Species of the S. Deccan Peninsula.)

13. **S. Kunthianus**, *T. Anders. in Journ. Linn. Soc.* ix. 465; leaves elliptic narrowed into the petiole crenate-serrate rigid strongly nerved beneath, spikes dense, bract ovate, calyx deeply divided, corolla 1 in. blue. *Ruellia Kunthiana*, *Wall. Cat.* 2367. *Phlebophyllum Kunthianum*, *Nees in Wall. Pl. As. Rar.* iii. 83, and in *DC. Prodr.* xi. 102; *Wight Ic.* t. 448. *P. angustifolium*, *Benth. in Pl. Hohenack.* n. 1178.

Mts. of S. DECCAN PENINSULA, alt. 5000-7500 ft.; plentiful in the Nilgherries, *Wight*, &c.

Stems 12-20 in., numerous, erect, rigid, quadrangular upwards. *Leaves* 2 by 1 in., obtuse or subacuminate, bristly or scabrid above; primary nerves beneath close, parallel, prominent, secondary reticulated more or less concealed by close hard white tomentum; petiole $\frac{1}{4}$ in., very broad. *Spikes* 1-3 in., hairy; bract $\frac{1}{2}$ in.; bracteoles $\frac{1}{2}$ in., linear-ligulate. *Calyx* $\frac{1}{2}$ in., floccose-villous; segments linear-lanceolate, base shortly connate. *Corolla* ventricose from near the base, palate hairy within, blue or whitish. *Filaments* pilose. *Ovary* glabrous; style hairy. *Capsule* $\frac{1}{2}$ in., oblong, rigid. *Seeds* 4, densely hairy (hairs spreading when wet) except on the circular basal areola on each of its faces.

14. **S. gossypinus**, *T. Anders. in Journ. Linn. Soc.* ix. 466; leaves ovate acute entire woolly beneath, spikes linear-oblong woolly, corolla $1\frac{1}{2}$ in. woolly without. *Bedd. Ic. Pl. Ind. Or.* t. 198.

Mts. of S. DECCAN PENINSULA, alt. 4000-5500 ft.; Mysore, *Lobb*; *Sispara* plentiful, &c., *Beddome*.

Shrubby, covered (except the leaves above) with dense yellowish wool, flowering at 6-7 years old, then dying. *Leaves* 4 by 2 in., base broadly rhomboid, subcoriaceous, wool of upper surface deciduous; nerves 13 pair, approximate, subparallel; petiole $\frac{3}{4}$ in. *Spikes* 1-3 in., compound and (by the reduction of the upper leaves) running into terminal panicles; bracts $\frac{1}{2}$ in., elliptic, obtuse; bracteoles $\frac{1}{2}$ in., linear-oblong. *Calyx* nearly $\frac{1}{2}$ in., divided about half-way down; segments narrowly lanceolate, subobtus. *Corolla* nearly straight; ventricose portion of the tube much longer than the cylindric base. *Filaments* hairy. *Ovary* glabrous, with a few long hairs near the apex; style glabrous; ovules 4. *Seeds* not seen.

15. **S. canaricus**, *Bedd. Ic. Pl. Ind. Or.* t. 215; leaves ovate acuminate subentire mature puberulous on the nerves beneath, spikes linear-oblong minutely cinereous-lanate, bracts ovate, corolla $\frac{3}{4}$ in. white.

DECCAN PENINSULA; S. Canara, on the Kudra Mukh Mt., alt. 6000 ft., *Beddome*.

A rigid shrub, 3-4 ft.; tips of the branches and young leaves densely clothed with caducous yellowish wool. *Leaves* crowded towards the ends of the branches, 3 by $1\frac{1}{2}$ in., base rhomboidal, mature nearly glabrous except the nerves beneath; nerves 9 pair, approximate, subparallel; petiole $\frac{1}{2}$ in. *Spikes* 1-2 in., clustered in the upper axils, forming a dense terminal panicle, thinly, duskily, deciduously woolly; bracts $\frac{1}{4}$ - $\frac{1}{2}$ in., ovate, obscurely acuminate; bracteoles scarcely $\frac{1}{4}$ in., narrowly lanceolate. *Calyx* $\frac{1}{2}$ in., divided half-way down; segments narrowly lanceolate. *Corolla* very pubescent, ventricose portion much longer than the cylindric base. *Filaments* hairy. *Ovary* glabrous, style minutely sparsely hairy; ovule solitary in each cell (in the only ovary examined), probably never as in *Beddome's* figure, which shows the ovules 2 in each cell, the lower pendulous.

16. ***S. cuspidatus***, *T. Anders. in Journ. Linn. Soc.* ix. 465; leaves ovate acuminate subentire densely white silky beneath, spikes linear oblong glandular fulvous hairy, bracts narrowly elliptic acuminate, corolla 1 in. blue-purple. *Bedd. Ic. Pl. Ind. Or.* t. 221. *Endopogon cuspidatus*, *Benth. in Pl. Hohenack.* n. 1169, and in *Linnaea*, xxiv. 646. *E. versicolor*, *Wight III.* t. 164 b. fig. 4 (left-hand), and *Ic.* t. 1497, both figure and description.

NILGHERRIES, alt. 4-7000 ft., frequent; *Wight, Gen. Munro, &c.*

A shrub, 2-5 ft. *Leaves* 4 by $2\frac{1}{2}$ in., base shortly acuminate, mature glabrous above, raphides not prominent; nerves 8 pair, approximate, subparallel; petiole $1\frac{1}{4}$ in. *Spikes* 1-3 in., often laxly paniced at the ends of the branches; bracts $\frac{3}{4}$ in., base concave, acuminate, tip recurved; bracteoles $\frac{1}{4}$ in., linear. *Calyx* $\frac{1}{2}$ in., divided $\frac{3}{4}$ the way down; teeth linear, very glandular-hairy (not so lanceolate as in *Beddome's* figure). *Corolla* nearly glabrous; 2 rows of long white hairs on the palate within, between which the style (itself nearly glabrous, not as in *Beddome's* figure) lies. *Filaments* glabrous, except near the base. *Capsule* $\frac{1}{2}$ in., 4-seeded; seeds discoid, with a circular areola on each face, densely hairy except on the areola.—*T. Anderson* refers *Wight Ic.* t. 1497 to *S. viscosus*, but the plant from which that figure was drawn is at Kew, and is *S. cuspidatus*.

17. ***S. consanguineus***, *Clarke, not of T. Anders.*; leaves ovate acuminate obscurely toothed glabrous beneath, spikes linear-oblong glandular hairy, bracts narrowly elliptic hardly so long as the calyx, corolla $\frac{3}{4}$ in. *S. neglectus*, *T. Anders. ms.* *Endopogon consanguineus*, *Nees in Wall. Pl. As. Rar.* iii. 99, and partly in *DC. Prodr.* xi. 104. *Ruellia spicata*, *Roth Nov. Sp.* 310; *Nees in DC. Prodr.* xi. 153.

S. MADRAS; Negapatam and Nilgherries, *Wight*; Courtallum, *Wight*, n. 1982.

Very similar to the last species; but the leaves are more distinctly toothed, the flowers smaller. *Leaves* glabrate, prominently lineolate above; nerves 7 pair. *Spikes* compound, axillary and terminal, often slender, sublinear. *Calyx* $\frac{1}{2}$ in., divided half-way down or more; segments narrowly lanceolate, glandular-hairy. *Corolla-lobes* ovate, acute. *Filaments* glabrous, except at the very base. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in., 4-seeded. *Seeds* discoid, areolate on both faces, densely hairy except on the areolae.—This is the original *Endopogon consanguineus* of *Nees*, which was founded on *Wight* n. 1982, the example of which authenticated in *Nees' hand* is at Kew. Subsequently, in *DC. Prodr.*, *Nees* united with this species the totally remote *S. exareolatus*. *T. Anderson* published (in *Thwaites Enum.* 226) this latter species as *S. consanguineus*, *T. Anders.*, while he separated in the herbarium the old *Wight* n. 1982 on which he has written *S. neglectus*, nov. sp.

VAR. *Amomum*; leaves more clearly toothed, spikes slender minutely pubescent or very nearly glabrous, bracts acuminate to an obtuse apex often overtopping the calyx. *S. consanguineus*, *T. Anders. in Journ. Linn. Soc.* ix. 465, partly; *Bedd. Ic. Pl. Ind. Or.* t. 216. *Ruellia sesamoides*, *Wall. Cat.* 2408, c and a chiefly. *Endopogon Amomum*, *Nees in Wall. Pl. As. Rar.* iii. 99, and in *DC. Prodr.* xi. 104.—*Nilgherries*; *Wight*, n. 1980, &c.

VAR. hypoleuca; as Var. *Amomum*, but the leaves often (when young) silky white beneath. *Ruellia sesamoides*, *Wall. Cat.* 240 B. *Endopogon hypoleucus*, *Nees in Wall. Pl. As. Rar.* iii. 99, and in *DC. Prodr.* xi. 104. *E. viscosus*, *Nees*, Var. *humilis*, *Wight Ic.* t. 1498; *Nees in DC. Prodr.* xi. 104.—Mts. of S. Madras, *Wight*; Bellary, *Beddome*.—A very trifling var. of the preceding Var. *Amomum*; but the Ceylon plant, the *S. hypoleucus* of T. Anderson, is the very different *S. rhytisperma*.

18. **S. jeyporensis**, *Bedd. Ic. Pl. Ind. Or.* t. 1214; leaves ovate acuminate crenulate mature nearly glabrous, spikes linear-oblong viscidly patently hairy, bracts lanceolate acuminate recurved, corolla $\frac{1}{2}$ in. white.

S. DECCAN PENINSULA; Golconda in Vizigapatam, alt. 2500 ft., and Mts. in Jeypore, *Beddome*.

A large shrub. *Leaves* $7\frac{1}{2}$ by 4 in., base shortly acuminate, mature densely obscurely lineolate above, thinly puberulous beneath; nerves 11 pair; petiole $2\frac{3}{4}$ in. *Spikes* 1–2½ in., uninterrupted; bracts $\frac{2}{3}$ in.; bracteoles $\frac{1}{2}$ in., narrow. *Calyx* $\frac{1}{2}$ in. and upwards, divided $\frac{2}{3}$ the way down; segments linear from a short lanceolate base, patently hairy. *Corolla* nearly straight, ventricose portion of the tube much longer than the cylindric. *Ovary* 4-ovulate in *Beddome's* figure. *Capsule* $\frac{1}{2}$ in., 2-seeded in *Beddome's* example. *Seeds* discoid, areolate on each face, densely hairy except on the areolæ.

*** *Species of the Khasia Hills.*

19. **S. adnatus**, *Clarke*; leaves widely elliptic acuminate at both ends subtentire glabrous, spikes linear stout dense strobiliform, bracts ovate acute adnate, calyx and corolla small. *S. decurrens*, *T. Anders. in Journ. Linn. Soc.* ix. 470, not of *Nees* (in *DC. Prodr.* xi. 189). *Endopogon decurrens*, *Nees in DC. Prodr.* xi. 105.

KHASIA MTS., alt. 3–5000 ft., frequent; *Griffith, H. f. & T.*, &c. UPPER ASSAM; *Jenkins*.

A shrub, 2–4 ft., nearly glabrous. *Leaves* 6 by 2½ in.; nerves 10 pair; petiole $1\frac{1}{4}$ in. *Spikes* 3–5 in., axillary and terminal in short dense panicles; bracts $\frac{2}{3}$ by $\frac{1}{2}$ in., glabrous, ciliate, persistent, reticulate, scarious; bracteoles 0. *Calyx* scarcely $\frac{1}{2}$ in., divided nearly to the base into linear segments. *Corolla* $\frac{1}{2}$ – $\frac{1}{2}$ in., glabrous without. *Stamens* 2, glabrous except at their point of attachment, 2 linear rudiments added. *Capsule* $\frac{1}{2}$ in., 4-seeded. *Seeds* ovate, glistening, glabrous, hairless, without lateral areoles.

20. **S. khasyanus**, *T. Anders. in Journ. Linn. Soc.* ix. 471; hirsute, leaves ovate acuminate toothed, spines axillary clustered linear lax, bracts linear-spathulate as long as the calyx, corolla slender white. *Endopogon khasyanus*, *Nees in DC. Prodr.* xi. 104.

KHASIA MTS., alt. 2–4000 ft.; *Griffith, H. f. & T.*, &c. SIKKIM; Darjeeling (*Herb. Griffith*).

A shrub, 2–4 ft., densely patently brown-hairy, somewhat glandular-viscid. *Leaves* 4 by 2 in., shortly narrowed into the petiole, strongly crenate or subserrate, mature hirsute on both surfaces; nerves 9 pair; petiole $1\frac{1}{4}$ in. *Spikes* 1–4 in., forming axillary tufts of unequal length, linear but scarcely interrupted; bracts $\frac{1}{4}$ – $\frac{1}{2}$ in.; bracteoles $\frac{1}{4}$ in., linear. *Sepals* $\frac{1}{4}$ in., linear, somewhat enlarged in fruit. *Corolla-tube* $\frac{1}{2}$ in., linear, funnel-shaped only towards the top, lobes $\frac{1}{4}$ – $\frac{1}{2}$ in., roundish, patent. *Filaments* glabrous, unless at the very base, anthers much exsert. *Capsule* $\frac{1}{2}$ in., 4-seeded. *Seeds* ovate, with an areola on each side; hairy (except on the areoles) with adpressed hairs inelastic when wetted.

Subgenus 3. **Eustrobilanthes**. Calyx deeply subequally 5-fid. *Stamens* 4, perfect; anthers not very unequal.

Series A. *Bracteata*. Bracts prominent, persistent or only late deciduous. Flowers spiked, clustered or strobilate; spikes sometimes interrupted below, but flowers never all scattered.

* *Flowers capitate or shortly spicate*. (An artificial section passing by gradations into the strobiliform or interruptedly spicate sections.)

† *Seeds glabrous* (in a few not known).—Species of Ceylon and the Deccan Peninsula.

21. **S. barbatus**, *Nees in Wall. Pl. As. Rar.* iii. 85, and in *DC. Prodr.* xi. 179; leaves broad-elliptic acuminate at both ends glabrous, bracts obovate cuspidate squarrose, corolla white very hairy within, seeds usually 2. *T. Anders. in Journ. Linn. Soc.* ix. 468; *Bedd. Ic. Pl. Ind. Or. t.* 212. *S. tetrapterus*, *Dalz. in Hook. Kew Journ.* ii. 342; *Dalz. & Gibs. Bomb. Fl.* 187; *T. Anders. in Journ. Linn. Soc.* ix. 468. *Ruellia ciliata*, *Heyne in Herb. Rottler*; *Wall. Cat.* 2392 (not *Wall. Cat.* 2415).

W. DECCAN PENINSULA; from the Bombay Ghats to Cape Comorin, alt. 3000 ft., *Wight, Dalzell, &c.*

A gregarious shrub, flowering once at about 7 years old, then dying (*Beddome*); stem often winged. Leaves 7 by 3 in., crenulate or subentire, lineolate especially above; nerves 7-8 pair; petiole 1-3 in., base often auriculate, sometimes winged. Heads 1-2 in., sessile, very dense; bracts $\frac{3}{4}$ in., obscurely quadrifarious, green, ciliate; bracteoles $\frac{1}{2}$ in., linear, ciliate. Calyx $\frac{1}{2}$ in., divided more than half-way down, green, ciliolate; segments linear-lanceolate. Corolla $\frac{3}{4}$ -1 in.; cylindric base as long as the suddenly-widened subcampanulate portion; limb nearly erect, subequal. Filaments sparsely hairy upwards. Pistil sparsely hairy and glabrous. Capsule $\frac{1}{2}$ - $\frac{2}{3}$ in., clavate, always 2-seeded. Seeds nearly $\frac{1}{4}$ in. long, very thin, elliptic, areoles 0.—The fruit has only been seen in the form *S. tetrapterus*, *Dalz.* In the old examples of *S. barbatus* the corolla is barely $\frac{1}{2}$ in., the heads and bracts are smaller, the calyx less deeply divided; but *Beddome* says (from knowledge of the living plant) that there is only one species here.

22. **S. lanceolatus**, *Nees in DC. Prodr.* xi. 181; glabrous except the calyx, leaves lanceolate acuminate at both ends nearly entire, heads small capitate few-fl., calyx-segments in flower lanceolate acute slightly hairy in fruit, capsule 4-seeded. *S. adenophorus*, *Nees l. c.* 182; *T. Anders. in Thwaites Enum.* 228, and in *Journ. Linn. Soc.* ix. 466, not of *Beddome*. *Martynia lanceolata*, *Moon Cat. Pl. Ceyl.* *Goldfussia Myrtinia*, *Nees l. c.* 174.

CEYLON; Four Korles and Saffragam, *Macrae, Thwaites, &c.*

A small shrub; branches quadrangular. Leaves 3 by $\frac{3}{4}$ in., prominently lineolate above; nerves 6 pair; petiole $\frac{1}{2}$ in. Heads $\frac{1}{2}$ in. (exclusive of the corolla), 2-4-fl., in appearance solitary peduncled, peduncles slightly thickened upwards quadrangular or subulate; floral leaves 2, elliptic, $\frac{1}{2}$ in., in the dried examples erect, overtopping closely enveloping the flower-head; proper bract $\frac{1}{2}$ in., oblong; bracteoles 2, $\frac{1}{4}$ in., sublinear, often suppressed in the upper flowers as commonly in close heads. Calyx $\frac{1}{2}$ in., divided half-way down, segments in fruit elongate obtuse. Corolla $1\frac{1}{4}$ -1 $\frac{1}{2}$ in., nearly glabrous without, light-blue; cylindric nearly as long as the ventricose part. Filaments hairy downwards. Ovary hairy at the apex. Capsule $\frac{3}{4}$ in., narrowly oblong. Seeds $\frac{1}{8}$ in. long, thin, elliptic, glabrous; areoles $\frac{1}{2}$ the length of the seed.

23. **S. heteromallus**, *T. Anders. ms.*; villous, subhispid, leaves ovate acute, heads ovoid, bracts oblong overtopping the calyx, ovary densely hairy at the tip. *S. scaber*, Var. γ *Nees in Wall. Pl. As. Rar.* iii. 84. Var. β *Nees in DC. Prodr.* xi. 178, as to *Wight's Deccan material*. *Ruellia scabra*, *Wall. Cat.* 2377 (not *Wall. Cat.* 2393).

NILGHERRIES; Canoor, *Wight* (nn. 1945, 2207, herb. propr.).

A coarsely hairy shrub, resembling *S. Wightianus*. *Leaves* attaining $5\frac{1}{2}$ by $3\frac{1}{4}$ in. (mostly much smaller), base obtuse shortly decurrent on the petiole, nearly entire, thick, rugose, upper surface subhispid with hairs from tubercular bases, under villous; nerves 7-8 pair; petiole $1\frac{1}{2}$ in. *Heads* sessile, 1 in., dense, hairy; bracts $\frac{3}{4}$ -1 in., erect; bracteoles $\frac{3}{4}$ in., sublinear. *Calyx* $\frac{1}{2}$ in. or more, divided more than half-way down; segments linear-lanceolate, hairy upwards. *Corolla* 1 in., glabrous without, hairy within, subsymmetric, cylinder portion of the tube as long as the ventricose. *Stamens* 4; filaments very hairy at the base. *Ovary* dense fulvous-hairy at the tip; style sparsely hairy; ovules 4. *Capsule* scarcely $\frac{1}{2}$ in., narrowly ellipsoid, 2- or 4-seeded. *Seeds* more than $\frac{1}{4}$ in., glabrous; areoles 0.—This in the dry state greatly resembles *S. Wightianus*, but the ovary, style and seeds differ. Col. Beddome says the shrub is well known to him at Canoor, but has not flowered during his whole residence in the Nilgherries.

24. ***S. Wightianus***, *Nees in Wall. Pl. As. Rar.* iii. 86, and in *DC. Prodr.* xi. 180; coarsely hairy, leaves ovate, heads ovoid, bracts elliptic-acuminate overtopping the calyx, ovary glabrous at the tip, capsule 4-seeded. *Wight Ic.* t. 1514; *T. Anders. in Journ. Linn. Soc.* ix. 466.

NILGHERRY MTS., alt. 7-8000 ft., frequent; *Gardner, Wight, Gen. Munro, &c.*

Stems 2-3 ft., stout, often almost shaggy. *Leaves* $1\frac{1}{2}$ -2 by 1 in., obtuse, base shortly cuneate, thick, rugose. *Bracts* $\frac{3}{4}$ -1 in., acute; bracteoles $\frac{3}{4}$ in., linear-spathulate. *Calyx* $\frac{3}{4}$ in., divided nearly to the base; segments linear-oblong, sub-obtuse, softly hairy; in fruit somewhat membranous nervose. *Corolla* $\frac{3}{4}$ -1 in., blueish, nearly glabrous without, with hairy lines within; cylindric base of the tube much shorter than the ventricose part. *Ovary* glabrous; style sparsely hairy. *Capsule* $\frac{1}{2}$ in., oblong, 4-seeded. *Seeds* $\frac{1}{10}$ in. long, thin, elliptic, glabrous; areoles 0—Otherwise as the preceding species, which *Wight* appears to have included under *Wightianus*.

25. ***S. pulneyensis***, *Clarke*; hirsute, leaves ovate shortly acute, heads subglobose abbreviated dense with foliaceous bracts, style-base patently hairy, corolla-tube with long linear-cylindric base. *S. punctatus*, *Bedd. Ic. Pl. Ind. Or.* t. 204 in note, not of *Nees*.

S. DECCAN; Pulney Hills and Anamallays, *Beddome*.

Resembling *S. Wightianus*, but with a differently shaped corolla. *Leaves* 3 by 2 in., base rounded or cuneate, crenate, thick, tubercular-hairy above, more softly hairy beneath; petiole $1\frac{1}{2}$ in. *Heads* much depressed, as if into flattened rosettes, the rounded bracts patent on all sides; bracteoles $\frac{1}{2}$ - $\frac{3}{4}$ in., linear-lanceolate. *Calyx* $\frac{1}{2}$ - $\frac{3}{4}$ in., divided more than half-way down; segments linear-lanceolate, hairy. *Corolla* 1 in., somewhat hairy in the bud; cylindric base as long as the ventricose part. *Filaments* glabrous, except at the base. *Ovary* slightly patently hairy towards the apex, 4-ovulate. *Capsule* not seen.—Communicated by Col. Beddome as probably *Ruellia* ? *punctata* of *Wight*, which differs very considerably. In the absence of seeds, it is placed by guess next *S. Wightianus*.

26. ***S. neilgherrensis***, *Bedd. Ic. Pl. Ind. Or.* t. 196; hirsute, sub-hispid, leaves large ovate acuminate, heads ovoid; bracts narrow-oblong, bracteoles and calyx-segments in fruit elongate caudate patently bristly, capsule 4-seeded.

S. DECCAN, common in the mountains, Nilgherries, Pulneys, Coorg, &c., *Beddome*.

A shrub, general aspect of *S. Perrottetianus*. *Leaves* 6 by $3\frac{1}{2}$ in., base obtuse, crenate, coarsely hispid with white or yellow hairs from tubercular bases; nerves 8 pair; petiole 1-2 in. *Heads* sessile, capitate, not elongate even in fruit; bracts 1 by $\frac{1}{6}$ in.; bracteoles at flower-time $\frac{1}{2}$ in., linear, in fruit elongate very long-tailed. *Sepals* $\frac{1}{3}$ in.; in fruit at least 1 in., base lanceolate with leaden glabrous scarious margins.

Corolla $1\frac{1}{2}$ – $1\frac{1}{2}$ in., glabrous without, white (Beddome), cylindric base nearly as long as the urceolate part. *Filaments* hairy, especially downwards. *Style* sparsely patently hairy. *Capsule* $\frac{3}{4}$ in., oblong ellipsoid. *Seeds* thin, obovate, obtuse, glabrous; areoles 0.—Beddome says “ovary very hairy at the apex,” but in his figure and specimens it is very slightly so. Possibly the note applied to *heteromallus*?

27. **S. Perrottetianus**, *Nees in DC. Prodr.* xi. 179; rufous-hirsute, leaves ovate acuminate, heads ovoid or subclavate, bracts ovate acute overtopping the calyx, capsule 2-seeded. *Wight Ic.* t. 1513; *T. Anders. in Journ. Linn. Soc.* ix. 466.

NILGHERY MTS., alt. 6–8000 ft., frequent; *Wight, &c.*

Stem 2–3 ft. *Leaves* $4\frac{1}{2}$ by $2\frac{1}{2}$ in. (often smaller), base broadly rhomboid, crenate; nerves 7 pair; petiole $1\frac{1}{2}$ in. *Heads* 1–2 in., often wider upwards, or substrobiliform, hirsute, in appearance peduncled or paniced, but the two outermost bracts are empty, and more or less leafy; bracts $\frac{3}{4}$ in.; bracteoles $\frac{1}{2}$ in., linear. *Calyx* $\frac{3}{4}$ in., divided $\frac{3}{4}$ the way down, subscarios with numerous red hairs; segments sublinear, acute. *Corolla* 1 in., pale-lilac, subsymmetric; narrow portion of the tube short; glabrous without. *Filaments* hairy. *Ovary* glabrous; base of style patently hairy. *Capsule* $\frac{1}{2}$ in., oblong-ellipsoid, 2-seeded. *Seeds* $\frac{1}{2}$ in. long and upwards, very thin, ovate, not hairy, but minutely scabrous-lamellate; areoles 0.

28. **S. Zenkerianus**, *T. Anders. in Journ. Linn. Soc.* ix. 467; glabrous except the fruiting calyx-tips, leaves ovate shortly acuminate, spikes ovoid or oblong, bracts narrowly elliptic-oblong overtopping the calyx, capsule 4-seeded. Goldfussia Zenkeriana, *Nees in DC. Prodr.* xi. 172. *G. Leschenaultiana*, *Nees l. c. p.* Endopogon *Strobilanthes*, *Wight Ic.* t. 1500.

NILGHERY MTS., alt. 6–8000 ft., frequent; *Sir F. Adam, Schmidt, Wight, &c.*

A shrub, 2–3 ft., much resembling *S. foliosus* (n. 8), and really closely allied to it. *Leaves* 3 by $1\frac{3}{4}$ in., base cuneate, serrulate, upper surface prominently lineolate; nerves 7 pair; petiole $1\frac{1}{2}$ –2 in. *Spikes* 1–2 $\frac{1}{2}$ in.; young globose or oblong, mature oblong; bracts $\frac{3}{4}$ in.; bracteoles $\frac{3}{4}$ in., sublinear. *Calyx* $\frac{1}{2}$ – $\frac{3}{4}$ in., divided nearly to the base; segments linear-lanceolate, glabrous or in the fruiting examples with scattered patent gland-tipped hairs. *Corolla* $1\frac{1}{2}$ in., blueish, glabrous without; cylindric nearly as long as the ventricose part. *Filaments* hairy in their lower half. *Pistil* glabrous or nearly so. *Capsule* $\frac{1}{2}$ in., oblong-ellipsoid. *Seeds* $\frac{1}{2}$ in. long, very thin, elliptic, glabrous; areoles 0.

29. **S. warreensis**, *Dalz. in Hook. Kew Journ.* ii. 341; leaves broad-lanceolate acuminate at both ends glabrous, spikes oblong hairy, calyx greatly enlarged in fruit, corolla $\frac{1}{2}$ in., capsule 4-seeded. *Dalz. & Gibs. Bomb. Fl.* 187. *S. ciliatus*, *T. Anders. in Journ. Linn. Soc.* ix. 468, partly. *S. parviflorus*, *Bedd. Ic. Pl. Ind. Or.* t. 197.

W. DECCAN PENINSULA; near Belgaum, Warree country, *Dalzell*; Ram Ghant, *Ritchie*; Coorg and S. Canara, alt. 3000 ft., *Beddome*.

Shrub, 2–5 ft. *Leaves* 6 by 2 in., much acuminate, crenate, lineolate on both surfaces; nerves 7 pair; petiole $\frac{3}{4}$ in. *Spikes* 1–2 in., peduncles hairy, erect in fruit; bracts (flowering) $\frac{1}{4}$ – $\frac{1}{2}$ in., elliptic, hairy; bracteoles $\frac{1}{2}$ in., linear. *Calyx* (flowering) $\frac{1}{4}$ in., divided nearly to the base; segments linear pubescent upwards. *Corolla* straight, nearly symmetric, glabrous, linear-cylindric about as long as the subcampanulate portion; white purple-spotted. *Filaments* hairy below, not more monadelphous than in many other species. *Pistil* glabrous. *Capsule* $\frac{1}{2}$ in., clavate-oblong; fruit-sepals $\frac{3}{4}$ in., narrowly oblong, hairy. *Seeds* $\frac{1}{2}$ in. long, thin, elliptic, glabrous; areoles 0.—The extraordinary enlargement of the calyx in fruit was noted by Dr. Ritchie, whose examples have flowering and fruiting spikes on the same branch.

30. **S. ciliatus**, *Nees in Wall. Pl. As. Rar.* iii. 85, and in *DC. Prodr.*

xi. 183; glabrous, leaves broad-lanceolate acuminate at both ends, spikes small oblong often deflexed at flower-time, corolla small. *T. Anders. in Journ. Linn. Soc.* ix. 468, partly; *Bedd. Ic. Pl. Ind. Or.* t. 211. *Ruellia ciliata*, *Wall. Cat.* 2415 (not *Wall. Cat.* 2392). *Goldfussia Zenkeriana*, *Wight Ic.* t. 1517?, not of *Nees*.

S. DECCAN PENINSULA; the Ghauts up to 4000 ft., common, *Beddome*; Nilgherries, Mangalore, &c., Courtallum, *Wight* (n. 1949, Herb. Propr.).

Resembling *S. warreensis* in leaves and spikes; but the peduncles and bracts are perfectly glabrous, the spikes slenderer. *Corolla* in the dried examples $\frac{1}{2}$ – $\frac{3}{4}$ in.; *Wight's* figure shows them very much too large; *Beddome* figures (and describes) them an inch, but his description appears largely taken from *S. warreensis*.

31. **S. adenophorus**, *Bedd. Ic. Pl. Ind. Or.* t. 225, not of *Nees* nor of *T. Anders.*; glabrous, leaves lanceolate acuminate at both ends subintire, heads oblong, bracts obovate, calyx-segments lanceolate subobtus.

S. DECCAN; Anamallay Mts., alt. 4–5000 ft., *Beddome*.

Shrubby, 3–4 ft. *Leaves* 4 by 1 in., conspicuously lineolate above; nerves 6 pair, slender; petiole $\frac{1}{2}$ in. *Heads* 1–2 in., often deflexed; bracts $\frac{1}{2}$ – $\frac{1}{2}$ in., obtuse, sometimes mucronate, glabrous, lineolate; bracteoles $\frac{1}{2}$ in., narrowly ligulate. *Calyx* nearly $\frac{1}{2}$ in., divided about half-way down; segments membranous. *Corolla* 1–1 $\frac{1}{4}$ in., glabrous without, very hairy within, nearly straight; cylindric rather shorter than the urceolate part. *Filaments* hairy downwards. *Pistil* glabrous. *Capsule* not seen.—*Beddome* says that *T. Anderson* identified this plant with the Ceylon *S. lanceolatus*, but there must have been some mistake, as except in the leaves there is little resemblance between the two. In its habit, deflexed peduncles, and bracts, this seems very nearly allied to *S. ciliatus*, *Nees*, but in the absence of seeds it is hazardous to guess at affinity.

32.? **S. decurrens**, *Nees in DC. Prodr.* xi. 189; glabrous, leaves elliptic acuminate at both ends, spikes clavate-oblong, bracts large narrowly elliptic obtuse decurrent. *S. pallidus*, *T. Anders. in Journ. Linn. Soc.* ix. 470. *Goldfussia decurrens*, *Wight Ic.* t. 1522 (not *Endopogon decurrens*, *Nees*).

S. DECCAN; Coimbatore, Courtallum and Nilgherries, *Wight*; Anamallays, *Beddome*.

Herbaceous (fide *Wight*), green. *Leaves* 7 by 2 $\frac{1}{2}$ in., entire or obscurely crenate, conspicuously lineolate above; nerves 10 pair; petiole 1 in. *Peduncles* 1–2 in., slightly thickened upwards, quadrangular or subulate, divaricate or deflexed, often with 2 bract-like leaves below the head; heads 1 $\frac{1}{2}$ in., tapering at the base; bracts 1 by $\frac{1}{2}$ in. bracteoles $\frac{1}{2}$ in., linear-ligulate. *Calyx* $\frac{1}{2}$ in., subscarios, divided more than half-way down, segments lanceolate. *Corolla* 1 $\frac{1}{4}$ in., glabrous without; cylindric portion scarcely so long as the ventricose. *Filaments* hairy-downwards. *Pistil* glabrous. *Capsule* not seen.—This species is placed here from its similarity to *S. ciliatus* and *S. adenophorus*.

†† *Seeds hairy.*

¶ *Species of the Deccan Peninsula and Ceylon.*

33. **S. Walkeri**, *Nees in DC. Prodr.* xi. 181; nearly glabrous, leaves broadly elliptic acuminate at both ends, spikes ovoid few-fl'd. cymose, bracts ovate adnate obtuse bullate, capsule with 2 very large seeds. *Bedd. Ic. Pl. Ind. Or.* t. 222; *T. Anders. Thwaites Enum.* 227, and in *Journ. Linn. Soc.* ix. 470.

CEYLON; alt. 4–7000 ft., *Walker*, &c.

A shrub, 6 ft., gregarious, flowering when about six years old, then dying. *Leaves* 6 $\frac{1}{2}$ by 2 $\frac{3}{4}$ in., crenate, minutely sparsely scabrid-pubescent; nerves 7–8 pair; petiole

1½ in. *Cymes* often of 3 heads, sometimes compound; peduncles clavellulate or winged; heads $\frac{2}{3}$ in., 2-4 fld., enveloped by the two outer bract-like erect leaves; proper bracts $\frac{1}{2}$ in., green, slightly ciliate; bracteoles $\frac{1}{4}$ in., sublinear. *Sepals* $\frac{1}{2}$ in., linear-lanceolate, obtuse, scarious, nearly glabrous. *Corolla* $\frac{3}{4}$ in., subsymmetric, glabrous without, hairy within, white or purplish; contracted base short. *Filaments* hairy at the base. *Pistil* glabrous. *Capsule* $\frac{3}{4}$ in., ellipsoid. *Seeds* nearly $\frac{1}{2}$ in., very thin, ovate, shaggy with adpressed wavy silky hair not elastic in water; areoles 0.—Beddome's figure shows the corolla within and filaments glabrous, which they may be sometimes, for it is not a very constant character in *Strobilanthes*; but none of the numerous specimens are so.

VAR. ? *stenocarpa*; leaves broadly ovate pubescent beneath somewhat flaccid, capsules $\frac{1}{2}$ in. 2-seeded, seeds $\frac{1}{2}$ in. shaggy with silky hair, areoles hardly any.—Ceylon; Thwaites, C. P. n. 3517. This probably differs specifically from *S. Walkeri*, the difference in the size of the fruit being startling; but it must stand next to it.

34. **S. Thwaitesii**, *T. Anders. in Thwaites Enum.* 227, and in *Journ. Linn. Soc.* ix. 470; leaves elliptic acuminate at both ends scabrous pubescent beneath, spikes oblong few-fld. cymose, bracts sessile elliptic elongate acute bullate. *Bedd. Ic. Pl. Ind. Or.* t. 219.

CEYLON; Ambagamowa, *Thwaites*.

A shrub, 4-5 ft. *Leaves* 6½ by 2½ in., crenulate, subcoriaceous, mature glabrate above fuscous pubescent beneath; nerves 7 pair; petiole 1½ in. *Peduncles* fascicled or cymose, thickened upwards, more or less pubescent; outermost empty, bracts $\frac{1}{2}$ in., ovate; bract proper nearly 1 in., ciliate; bracteoles $\frac{1}{2}$ in., linear. *Calyx* $\frac{1}{2}$ in., divided $\frac{2}{3}$ the way down; segments narrowly lanceolate, ciliate. *Corolla* exceeding 1 in., subsymmetric, white, glabrous without, hairy within; linear-cylindric base of the tube hardly so long as the campanulate part. *Filaments* and *style* sparsely hairy. *Capsule* not seen.

35. **S. caudatus**, *T. Anders. in Thwaites Enum.* 228, and in *Journ. Linn. Soc.* ix. 470; leaves lanceolate caudate-acuminate fuscous-pubescent beneath, heads oblong fuscous-villous, bracts oblong, corolla nearly glabrous within. *Bedd. Ic. Pl. Ind. Or.* t. 213.

W. DECCAN PENINSULA; S. Canara, 2-6000 ft., *Beddome*; common also in Koorg and Wynaad, *sic* *Beddome*. CEYLON; Hantani, *Thwaites* (C. P. n. 364).

A shrub, 4-5 ft. *Leaves* 6 by 1½ in., base tapering, subentire, mature glabrate lineolate above; nerves 10-12 pair; petiole $\frac{1}{2}$ in. *Peduncles* 1-2 in., hairy, divaricate, carrying 1-3 nodding spikes $\frac{1}{2}$ -1½ in. long; bracts $\frac{1}{2}$ in., oblong; bracteoles $\frac{1}{2}$ in., narrowly oblong. *Calyx* nearly $\frac{1}{2}$ in., oblong, softly brown-hairy, divided nearly to the base; segments sublinear, obtuse. *Corolla* $\frac{3}{4}$ -1 in., nearly glabrous, white tinged orange or reddish; cylindric portion shorter than the ventricose; limb suboblique, segments short round. *Filaments* glabrous. *Ovary* scabrous, slightly glandular-hairy; style thinly hairy. *Capsule* $\frac{3}{4}$ in., broadly ellipsoid, fuscous-pubescent, 2-seeded. *Seeds* $\frac{1}{4}$ in. diam., rufous, inelastically shaggy; areoles small.—Col. Beddome's Malabar plant has rather longer hairs on the stem and leaves than the Ceylon.

VAR. *laniceps*; tips of the branchlets purple, peduncles and spikes densely white with patent hairs $\frac{1}{4}$ - $\frac{1}{2}$ in. long, corolla 1½ in. very hairy within, filaments hairy.—Ceylon; *Thwaites*.—Sent by Thwaites, numbered 364, subsequently to the rest of n. 364, and probably not seen by T. Anderson before Thwaites' Enum. was published.

36. **S. tristis**, *T. Anders. in Journ. Linn. Soc.* ix. 470; leaves elliptic acuminate at both ends nearly glabrous, heads oblong 2-3-fld. panicle, bracts elliptic acuminate overtopping the densely hairy calyx-teeth, capsule 2-seeded. *Goldfussia tristis*, *Wight Ic.* t. 1508.

NILGHERRIES; *Gardner*; below Sispara, *Wight*. S. TINNEVELLY; *Beddome*.

An erect shrub. *Leaves* 7 by $2\frac{1}{2}$ in., crenate, lineolate on both surfaces; nerves 6-7 pair beneath, minutely scabrid; petiole 2 in. *Heads* several (sometimes 35) to the panicle; panicle branches slender, glabrescent; outermost pair of pollen bracts usually $\frac{1}{4}$ in., lanceolate, next pair resembling the proper bracts but empty, patently glistening hairy or quite glabrous; bract proper $\frac{3}{4}$ in., sessile, green; bracteoles 0. *Sepals* nearly $\frac{1}{2}$ in., linear, scarious below, terminating in a dense tuft of multicellular hairs. *Corolla* 1 in., subsymmetric, pale-blue, hairy within; ventricose portion longer than the contracted; segments round. *Filaments* hairy towards the base. *Style* sparsely hairy. *Capsule* $\frac{1}{2}$ in., narrowly ellipsoid. *Seeds* $\frac{1}{4}$ in., thin, subquadrate elliptic, shaggy with adpressed wavy silky hair not elastic when wetted, glabrous on the oblong large areoles.

37. **S. anceps**, *Nees in DC. Prodr.* xi. 189; thinly hairy, leaves ovate acuminate, heads small oblong, bracts obovate obtuse tips green squarrose or reflexed. *T. Anders. in Journ. Linn. Soc.* ix. 466; *Bedd. Ic. Pl. Ind. Or.* t. 204.

CEYLON; alt. 3-6000 ft., frequent, *Gardner, &c.*

A small undershrub, much branched. *Leaves* 3 by $1\frac{1}{4}$ in., obtuse or acuminate at the base, subentire, with scattered hairs and occasionally a few red glands beneath; nerves 6 pair; petiole $\frac{1}{2}$ in. *Peduncles* 0- $1\frac{1}{2}$ in., numerous, often in clusters of 3, thickened upwards, 1-headed; heads $\frac{1}{2}$ in., ovoid, in fruit often 1-2 in. oblong; bracts $\frac{1}{2}$ - $\frac{1}{2}$ in., adpressed downwards often densely red, glandular, tips prominently reflexed; bracteoles $\frac{1}{4}$ in., linear. *Calyx* $\frac{1}{4}$ in., divided nearly to the base; segments linear, thin, hairy, much enlarged in fruit. *Corolla* $\frac{3}{4}$ in., slightly pubescent without, slightly hairy within, straight, subsymmetric, white; contracted base much shorter than the urceolate portion, segments rounded. *Filaments* with long hairs. *Ovary* densely glandular at the tip, style glabrous. *Capsule* $\frac{1}{2}$ in., oblong, pubescent, 4-seeded. *Seeds* $\frac{1}{10}$ in., ovoid, closely hairy with short thick annulate hairs, elastically springing out when wetted.

VAR. *microstachya*; leaves and heads more hairy less glandular, calyx very small, corolla more hairy without. *S. macrostachya*, *Benth. in Flora* 1849, 557. *Ruellia*? punctata, *Nees in DC. Prodr.* xi. 147; *Wight Ic. t.* 1563.—Hills of S. Deccan; Courtallum, *Wight*; Mangalore, *Hohenacker*, n. 463; Anamallays, *Beddome*. Leaves 5 in.; filaments nearly glabrous. *Beddome* says that this plant is "very scabrous, the hairs arising from harsh papillæ." *Wight's* figure of *Ruellia*? punctata is drawn from his *Herb. Propr.* n. 656, preserved at Kew, written up by *Wright*, and quoted by *Nees*; but it is a particularly softly hairy form. As *Beddome* remarks, it is not taken up by *T. Anderson*.

VAR. ? *punctata*, *T. Anders. in Thwaites Enum.* 229; leaves small ovate glabrous densely glandular beneath, bracts orbicular glabrous ciliated densely glandular tips not reflexed. *Strobilanthes punctatus*, *Nees in DC. Prodr.* xi. 182 (sp.), not of *Bedd.*—Ceylon; *Walker*. Leaves $\frac{1}{2}$ - $1\frac{1}{4}$ in., subobtusely, base often subcordate. Perhaps specifically distinct, but there is only one example, without fruit, named by *Nees*.

38. **S. Arnottianus**, *Nees in DC. Prodr.* xi. 179; softly laxly hairy, leaves cordate-ovate acute, heads obovoid nodding, bracts ovate acuminate, corolla subcampanulate lobes somewhat acute. *T. Anders. in Thwaites Enum.* 228, and in *Journ. Linn. Soc.* ix. 466; *Bedd. Ic. Pl. Ind. Or.* t. 261.

CEYLON; Newera Ellia, *Walker, &c.*

An undershrub, branches hirsute upwards. *Leaves* 4 by 2 in., crenate-serrate, thinly hairy on both surfaces; nerves 4-5 pair; petiole 1-2 in. *Heads* $\frac{1}{2}$ -1 in., white-hairy; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., sessile; bracteoles $\frac{1}{2}$ - $\frac{1}{2}$ in., linear-oblong. *Calyx* $\frac{1}{2}$ - $\frac{1}{2}$ in., divided nearly to the base; segments linear-lanceolate. *Corolla* $\frac{3}{4}$ in., straight, symmetric, almost funnel-shaped from the very short contracted base, slightly hairy within and without, whitish. *Filaments* attached very low down the corolla, glabrous; anthers exserted. *Ovary* and *style* hairy. *Capsule* 4-seeded; seeds (unripe) hairy.

—The segments of the corolla are ovate, longer and much more acute than in Beddome's figure.

39. **S. asperimus**, *Nees in DC. Prodr.* xi. 183; leaves broadly elliptic acuminate at both ends hairy, heads paniced, bracts elliptic concave glabrous, bracteoles 0. *S. lupulinus*, *T. Anders. in Journ. Linn. Soc.* ix. 469, *partly*. *S. Hookeri* Var. β , *Nees l. c.* 185.

CEYLON; *Walker, Gardner, &c.*

Apparently a large shrub; branches swollen at the joints, scabrous, hirsute upwards. *Leaves* 9 by 4 in., crenate; nerves 11 pair; petiole $1\frac{1}{2}$ in. *Panicles* in *Walker's* examples very compound; heads $1-1\frac{1}{2}$ in., broadly oblong; bracts $\frac{3}{4}$ in. *Calyx* less than $\frac{1}{2}$ in., divided nearly to the base; segments ligulate, scarious, lineolate. *Corolla* $\frac{3}{4}$ in., little contracted below, subsymmetric, glabrous without, hairy within. *Capsule* $\frac{1}{2}$ in., 4-seeded. *Seeds* $\frac{1}{2}$ in., thin, suborbicular, densely elastically hairy on the margin, areoles very large extended over all the seed but the margin.

40. **S. trifidus**, *Nees in DC. Prodr.* xi. 185; nearly glabrous, leaves elliptic acuminate, heads globose solitary or in small cymes, bracts ovate or elliptic concave, bracteoles 0. *S. tener*, *Nees l. c.* 184. *S. coloratus*, *Nees l. c.* 86, *not of T. Anders.* *S. lupulinus*, *T. Anders. in Thwaites Enum.* 228, and in *Journ. Linn. Soc.* ix. 469, *partly*.

CEYLON, frequent; *Gardner, &c.*

Regarded by *T. Anderson* as a glabrescent form of *S. asperimus*, which it may be, but the capsule is unknown and the inflorescence much less compound. *Leaves* 3-10 in., base attenuated or rounded, drying black. *Bracts* membranous, the upper even in the young heads often coloured membranous.

41. **S. lupulinus**, *Nees in Wall. Pl. As. Rar.* iii. 85, and in *DC. Prodr.* xi. 184; hairy, leaves elliptic acuminate at both ends, spikes in small dense cymes, bracts elliptic obtuse concave softly hairy, bracteoles obsolete. *S. Dalzellii*, *T. Anders. ms. in Herb. Kew.* *Ruellia lupulina*, *Wall. Cat.* 2355 *a & c.*

W. DECCAN PENINSULA; Concan, *Dalzell, Stocks*; Ram Ghaut near Belgaum, *Ritchie*. COURTALLUM; *Wight*.

Branches stout, woody, hairy upwards. *Leaves* 6 by 2-3 in., denticulate, laxly villous on both surfaces or subsetulose above; nerves 8 pair; petiole $1\frac{3}{4}$ in. *Peduncles* axillary, very short; spikes $1\frac{1}{2}$ in., oblong, subumbellate or solitary; bracts $\frac{3}{4}-1$ in. *Calyx* $\frac{1}{2}-\frac{3}{4}$ in., divided nearly to the base; segments ligulate, obtuse, scarious, glabrous, tips bristly. *Corolla* $\frac{3}{4}-1$ in., glabrous without, hairy within, straight, subsymmetric; cylindric part as long as the suburceolate, lobes short. *Filaments* hairy downwards. *Pistil* glabrous or the style upwards microscopically hairy. *Capsule* scarcely $\frac{1}{2}$ in., oblong, 4-seeded. *Seeds* $\frac{1}{2}$ in., elliptic, elastically white hairy only on the very margin.—The Bombay botanists took this species for a hairy-bracteate form of *S. rugosus* (*Wight Ic. t.* 1619).

42. **S. Heyneanus**, *Nees in Wall. Pl. As. Rar.* iii. 85, and in *DC. Prodr.* xi. 184; leaves broadly elliptic acuminate at both ends hairy, spikes subglobose cymose, bracts elliptic ventricose glabrous, bracteoles 0, corolla $\frac{3}{4}$ in. *Dalz. & Gibs. Bomb. Fl.* 187. *S. rugosus*, *Wight Ic. t.* 1619. *S. lupulinus*, *T. Anders. in Journ. Linn. Soc.* ix. 469, *partly*. *Ruellia bracteata*, *Heyne in Herb. Rottler*; *Wall. Cat.* 2357, *type sheet only, not Goldfussia bracteata, Nees.*

W. DECCAN PENINSULA from the Bombay Ghats to the Bababooduns and Nilgherries; *Heyne, Wight, Dalzell, &c.*

Stems never exceeding 18 in. high (*Dalzell, Stocks*), hirsute upwards. *Leaves* 6 by $2\frac{3}{4}$ in., closely serrate, tubercular-hairy above, softly hairy beneath, drying green

(not black); nerves 7 pair; petiole 2 in. *Peduncles* short or 0; spikes 1–1½ in.; bracts ¾ in., ventricose, membranous. *Calyx* ½ in., divided nearly to the base; segments ligulate, subobtuse, membranous, lineolate. *Corolla* glabrous without, hairy within, pale blue; contracted portion scarcely shorter than the ventricose; limb equal, segments round. *Filaments* and *style* hairy. *Capsule* scarcely ½ in., oblong, 4-seeded. *Seeds* ⅓ in., ovoid, glabrous except on the very margin.

VAR. ? campanulata; leaves ovate subacute hairy, spikes subglobose solitary or few together, bracts elliptic ventricose glabrous, bracteoles 0, corolla scarcely ½ in. *S. campanulata*, *Wight Ic. t.* 1562. *S. involucratu* *Var. B*, *Nees in DC. Prodr.* xi. 184. *S. lupulinus*, *T. Anders. in Journ. Linn. Soc. ix.* 469, partly. *Ruellia lupulina*, *Wall. Cat.* 2355 b, partly.—*Coorg*; *Wight*.—Plant 5–10 in. *Leaves* 1–2 in., drying green. *Heads* ½–1 in. *Corolla* subcampanulate; lobes very short. *Capsule* less than ½ in., seeds glabrous. Possibly an alpine var. of *S. Heyneanus*, but the corolla is a different shape, as well shown in *Wight's* figure. The example of *Wall. Cat.* 2355 b in his own *Herb.* is nearer *S. Heyneanus*, *Nees*, type; that in *Herb. Hook.* agrees closely with *Wight's campanulatus*.

VAR. ? fusca; leaves broadly elliptic acuminate at both ends very sparsely hairy, heads globose nodding mostly solitary, bracts broadly elliptic ventricose glabrous, bracteoles 0. *S. lupulinus*, *Benth. in Pl. Hohenack. n.* 814; *T. Anders. in Journ. Linn. Soc. ix.* 469 partly, not of *Nees*.—*Mercara* in *Canara, Hohenacker*. *Branches* 15 in., nearly glabrous. *Leaves* 5 by 2½ in., somewhat black in drying, densely lineolate on both surfaces, very minutely sparsely hairy. *Heads* 1–1½ by ¾–1 in.; bracts and calyx as of *S. Heyneanus*. *Corolla* not known.

VAR. viridis; stem stout rough, leaves 1–3 in. very scabrous, heads small bracts (at flower-time) closely adpressed. *S. asperimus*, *Dalz. & Gibs. Bomb. Fl.* 187, not of *Nees*.—*Strobilanthes* sp. n. 32, *Herb. Ind. Or. H. f. & T.*—*Mysore*; *G. Thomson*.—The specimens do not match those of *S. lupulinus*, but *Col. Beddome* after seeing them says it is that species.

43. *S. ixiocephalus*, *Benth. in Flora* 1849, p. 557; leaves lanceolate or elliptic acuminate slightly hairy, heads ovoid closely cymed, bracts elliptic acuminate to an obtuse apex viscous hairy. *Bedd. Ic. Pl. Ind. Or. t.* 203. *S. Neesianus*, *Wight Ic. t.* 1523; *Dalz. & Gibs. Bomb. Fl.* 188. *S. eriocephalus*, *T. Anders. in Journ. Linn. Soc. ix.* 466.—*Strobilanthes* sp. n. 64, *Herb. Ind. Or. H. f. & T.* *S. glutinosus*, *Grah. Cat. Pl. Bomb.* 162 ?.

W. DECCAN PENINSULA and S. MADRAS, alt. 1–3000 ft., frequent; *Wight, Hohenacker, &c.*

A small shrub. *Leaves* 5 by 2 in., or oftener smaller narrower, base cuneate (sometimes very shortly), crenate, mature nearly glabrous, conspicuously lineolate above; nerves 7 pair; petiole ¾ in. *Heads* ½–1½ in., bracts and calyx enlarged in fruit, usually very glutinous, sometimes softly hairy; bract ¾ by ½ in.; bracteoles ½ in., linear-spathulate. *Calyx* ¼–½ in., divided nearly to the base; segments ligulate, fruiting spatulate, obtuse, membranous. *Corolla* ¾–1 in., glabrate without, hairy within, subsymmetric, white; cylindric portion nearly as long as the ventricose. *Filaments* hairy towards the base. *Pistil* glabrous. *Capsule* ½ in., often 2-seeded. *Seeds* ⅓ in., thin, ovate, densely elastically hairy on all sides; areoles very small.

44. *S. micranthus*, *Wight Ic. t.* 1519; leaves ovate acuminate sparsely thinly pubescent, heads solitary ovoid nodding, bracts broadly lanceolate pubescent, bracteoles longer corolla shorter than the calyx. *T. Anders. in Journ. Linn. Soc. ix.* 468.

NILGHERY MTS.; *Wight*.

Suffruticose or herbaceous (*Wight*), erect; stems glabrous. *Leaves* 6 by 3½ in., base broad, shortly decurrent, closely serrate; nerves 11 pair; petiole 1½ in. *Heads* 1½–2½ in.; bracts 1 in., widest close to the base, thinly herbaceous; bracteoles ¾ in., linear-lanceolate. *Calyx* ¾–¾ in., divided nearly to the base; segments linear-lanceolate, very acute, pubescent. *Corolla* ½ in., subcampanulate, dry appearing dull red; lobes very short, round. *Filaments* glabrous; anthers exserted. *Pistil* glabrous.

Capsule unknown.—This imperfectly known species may very possibly have its true position nearer to *S. Heyneanus* var. *campanulata*.

45. **S. scrobiculatus**, *Dalz. ms.*; leaves elliptic acuminate at both ends nearly glabrous, spikes numerous subsessile along the naked branches, corolla 1 in. blue.

BOMBAY GHATS; *Dalzell*; Mahabeshwur, *Ralph*.

Woody branches elongate, much divided, leafless, covered with flowers, tips leafy. *Leaves* 3 by 1 in., nearly entire; nerves 7 pair; petiole $\frac{1}{2}$ in. *Spikes* 1 in., subsessile, viscid hairy; bracts $\frac{1}{4}$ in., narrowly obovate, persistent in fruit; bracteoles $\frac{1}{4}$ in., sublinear. *Calyx* $\frac{1}{2}$ in., divided nearly to the base; segments linear, hairy. *Corolla* symmetric, nearly glabrous, pale below, a beautiful blue upwards; ventricose part rather narrow longer than the contracted; lobes ovate, crenulate. *Stamens* included, glabrous. *Style* with a few hairs. *Capsule* $\frac{1}{2}$ in., 4-seeded. *Seeds* $\frac{1}{10}$ in., thin, ovate, densely covered with fine long hairs, elastic when wet, except the small areoles.—Appears to be the most beautiful species of the genus; it is allied to *S. tricephalus*.

46. **S. papillosus**, *T. Anders. in Journ. Linn. Soc.* ix. 468; scabrous hispid, leaves ovate acute, heads ellipsoid, bracts elliptic elongate scabrous hispid, corolla $1\frac{1}{2}$ – $1\frac{3}{4}$ in. *Bedd. Ic. Pl. Ind. Or.* t. 201. *S. scaber*, Var. ? β , *Benth. in Pl. Hohenack.* n. 1431.

NILGHERY MTS.; alt. 7000 ft., *Hohenacker, Beddome.* MYSORE; *Lobb*.

A large shrub (*Beddome*); branches very harshly scabrous. *Leaves* 2½ by 1½ in., obtuse, base very shortly cuneate, callous-dentate, hispid with tubercle-based hairs above, setulose beneath; nerves 6 pair; petiole $\frac{3}{4}$ in. *Heads* 1½–2 in., strictly capitate; peduncles thickened upwards, acutely 4-angled, very harshly scabrous; floral leaves 2 in., empty, overtopping the head; bract very rigid; bracteoles 1 in., narrowly lanceolate, membranous, ciliate. *Calyx* divided nearly to the base; segments 1½ in., linear-lanceolate, very acute, membranous, ash-coloured, ciliate. *Corolla* subsymmetric, nearly glabrous, blueish; cylindric part hardly so long as the ventricose; lobes ovate. *Stamens* glabrous, included. *Pistil* thinly hairy. *Capsule* unknown.—Allied to *S. Perrottetianus* according to *Beddome*, and it may turn out so to be when the seeds are known.

47. **S. exsertus**, *Clarke*; leaves petioled ovate acute at both ends scabrid-pubescent, spikes densely capitate solitary terminal, bracts obovate as long as the calyx, corolla $\frac{3}{4}$ in., anthers exsert. *Stenosiphonium zeylanicum*, Var. α , *T. Anders. in Thwaites Enum.* 225, and in *Journ. Linn. Soc.* ix. 463.

Ceylon; *Thwaites* (C. P. 3577); Damboul, *Beckett*.

A shrub, 1–2 ft., creeping, rooting; branches suberect, quadrangular, pubescent. *Leaves* 1½ by ¾ in., crenate, rather harsh, lineolate on both surfaces, sparsely setose above, more softly beneath; nerves 5–6 pair; petiole $\frac{1}{2}$ in. *Heads* sessile between 2 somewhat enveloping leaves; quasi-peduncles 0–1½ in., often thickened upwards; bracts $\frac{1}{2}$ in., subobtuse, green, persistent, patently white-hairy. *Calyx* $\frac{1}{2}$ in., divided about half-way down at flower-time, teeth lanceolate, hairy. *Corolla* curved, nearly glabrous without; cylindric base $\frac{1}{2}$ in., funnel-shaped part nearly as long; lobes ovate. *Filaments* glabrous except at the base, 2 longer distinctly exserted; anthers all subequal. *Ovary* glabrous, tip glandular, 4-ovulate; style glabrous, stigma simple. *Capsule* $\frac{1}{2}$ in., oblong, glabrous, 4-seeded from near the base. *Seeds* $\frac{1}{8}$ in. diam., much compressed, orbicular, densely elastically hairy, except on the conspicuous areoles.—Placed in *Stenosiphonium* by T. Anderson, and regarded as a var. of *Hemigraphis venosa*. The inflorescence does not do for *Stenosiphonium*, nor the leaves, and the ovules are never more than 4 to the ovary.

VAR. β *integra*, *T. Anders.* l. c.; leaves entire glabrous, corolla 1 in. ventricose, constricted cylindric base of the tube short.—Ceylon; *Thwaites* (C. P. n. 3661).

The only scrap of this does not permit of dissection; it can hardly be conspecific with *S. exsertus*, but may not be congeneric; it closely resembles *S. lanceolatus*.

48. **S. Gardnerianus**, *T. Anders. in Thwaites Enum.* 226; hairy, leaves sessile ovate, spikes ovoid or interrupted at base, bracts and bracteoles longer than the calyx, corolla 1 in. purple, anthers included. Endopogon *Gardnerianus*, *Nees in DC. Prodr.* xi. 723.

CEYLON; *Gardner, Thwaites*.

Shrubby, 1-2 ft.; stems terete, scabrous below, white-hirsute upwards. *Leaves* 2 by $1\frac{1}{2}$ in., acute or subobtusely, base rounded, subrenate. *Spikes* capitate, $\frac{3}{4}$ in., nearly enclosed by bracts, few-fl., or lower axillary flowers being added becoming interrupted, linear-oblong; bracts $\frac{3}{4}$ in., ovate; bracteoles $\frac{1}{2}$ in., linear-oblong. *Calyx* $\frac{1}{2}$ in., slightly hairy. *Corolla-tube* linear-cylindric below, suddenly inflated upwards, as of *Stenosiphonium*. *Capsule* and *seeds* unknown: hence the place of this species is uncertain; some of the examples might, so far as the inflorescence is concerned, be placed next *S. sexennis* among the Series D. "Paniculatæ."

¶¶ *Species of N. India and the Malay Peninsula.*

49. **S. scaber**, *Nees in Wall. Pl. As. Rar.* iii. 84, and in *DC. Prodr.* xi. 177, partly; leaves elliptic or obovate acuminate scabrous or ultimately glabrate, spikes dense often clustered, bracts lanceolate large hairy, corolla $\frac{3}{4}$ -1 in. yellow very hairy within. *Bot. Reg.* xxvii. t. 32; *T. Anders. in Thwaites Enum.* 227, and in *Journ. Linn. Soc.* ix. 467, partly. *Ruellia scabra*, *Wall. Cat.* 2393, not *Wall. Cat.* 2377. *R. aspera*, *Nees in DC. Prodr.* xi. 147, as to the Bengal material. *R. crispa*, *Herb. Linn. Propr.*

N. and E. BENGAL PLAINS; Silhet, *Wallich*; Purneah, *J. D. H.*; Maldah, Mymensingho, Dacca, &c., *Clarke*.—DISTRIB. Burma.

Stems 1-3 ft., pubescent or hairy upwards. *Leaves* $4\frac{1}{2}$ by 2 in., base narrowed, crenate, sometimes very coarsely scabrous-subhispid, sometimes nearly smooth but hard; nerves 7-8 pair; petiole $\frac{3}{4}$ in. *Spikes* 1-2 in., hairy; bracts 1 by $\frac{1}{2}$ in., obtusely acuminate, green; bracteoles $\frac{1}{2}$ in., linear-oblong. *Calyx* $\frac{1}{2}$ - $\frac{3}{4}$ in., divided nearly to the base; segments linear, pubescent. *Corolla* symmetric, glabrous; cylindric base nearly as long as the ventricose portion; lobes rounded. *Stamens* included; filaments hairy towards the base. *Ovary* glandular at the apex, always 4-ovulate; style nearly glabrous. *Capsule* nearly $\frac{1}{2}$ in., 4-seeded. *Seeds* $\frac{1}{12}$ in. diam., discoid; numerous fine hairs near the margin, elastic when wet; areoles very large, glabrous.—This is only *S. scaber*, *Nees*, in so far as that includes *Ruellia scabra*, *Wall.*; *Nees'* description (purple flowers, &c.) is totally different. *S. scaber* only occurs in Ceylon as a cultivated plant, according to *Thwaites* and *Beddome*.

50. **S. phyllostachyus**, *Kurz in Journ. As. Soc.* 1871, pt. ii. 75; leaves elliptic or obovate acuminate scabrous, spikes dense often in close cymes, bracts large elliptic with a ligulate apex softly hairy, corolla $\frac{3}{4}$ -1 in. yellow somewhat hairy within. *S. crispus*, *T. Anders. in Journ. Linn. Soc.* ix. 467, not of *Blume*.

PEGU; *Kurz*. MOULMEIN; *Parish*. TENASSEIM; *Beddome*.

Herbaceous, 2-3 ft.; stems glabrate. *Leaves* 4-9 in.; petiole 2 in. *Spikes* nearly as of *S. scaber*; bracts 1 in., ligulate tips often recurved; bracteoles $\frac{3}{4}$ -1 in., linear. *Calyx* $\frac{1}{2}$ - $\frac{3}{4}$ in., divided nearly to the base; segments linear silky. *Corolla* nearly as of *S. scaber*. *Capsule* $\frac{1}{2}$ in., 4-seeded; seeds $\frac{1}{2}$ - $\frac{3}{4}$ in., thin, ovate, with dense long elastic hairs on all sides except the small areoles.—So like *S. scaber* (except the seeds) that it is difficult to distinguish it.

VAR. *dura*; leaves smaller bracts narrowed upwards without ligulate tip.—*Strobilanthes* sp. n. 14, *Herb. Ind. Or. H. f. & T.*—Chittagong; Seetakoond, *H. f. & T.* Rangoon; *M'Leelland*. *T. Anderson* refers this to *S. scaber* (in *Journ. Linn. Soc.* ix. 467), which the bracts resemble; he subsequently saw it was different, and wrote it up

as *S. durus*, *T. Anders. sp. nov.*; from the imperfectly ripe seeds it is either a var. of *S. phyllostachyus*, or a new species very closely allied to it.

51. ***S. fimbriatus***, *Nees in Wall. Pl. As. Rar.* iii. 85, and in *DC. Prodr.* xi. 180, not of *T. Anders. nor of Kurz*; leaves oblong acuminate at both ends glabrous lineolate on both surfaces, heads ovoid 1-3 together subsessile, bracts obovate-oblong acuminate inciso-serrate rufous hairy. *Ruellia fimbriata*, *Wall. Cat.* 2363.

KHASIA MTS.; *Wallich*.

Shrubby; branches glabrous. *Leaves* 4 by 1 in., denticulate; nerves 8 pair; petiole $\frac{3}{4}$ in. *Heads* $\frac{1}{2}$ -1 in., closely capitate, mostly on very short axillary spurs; bracts $\frac{3}{4}$ in., shortly acuminate, the innermost lanceolate, the outermost often subtruncate; bracteoles $\frac{1}{4}$ in., linear. *Corolla* $1\frac{1}{4}$ -1 $\frac{1}{2}$ in., glabrous without. *Capsule* $\frac{1}{2}$ -1 in., oblong, 4-seeded. *Seeds* $\frac{1}{2}$ in., ovate, shaggy; areoles small.—*Nees'* account of the bracteoles is erroneous; and *T. Anderson* has taken for *fimbriatus* the remote *S. macrostegius*.

52. ***S. pectinatus***, *T. Anders. in Journ. Linn. Soc.* ix. 474; leaves elliptic acuminate at both ends hairy, heads short-peduncled subsolitary ellipsoid, bracts large ovate truncate or pectinate, corolla $1\frac{1}{2}$ -2 $\frac{1}{4}$ in. pale purple. *S. echinatus*, *Nees in Wall. Pl. As. Rar.* iii. 85, and in *DC. Prodr.* xi. 181. *Ruellia pectinata*, *Wall. Cat.* 2356.

SIKKIM and BHOTAN, alt. 6000-7500 ft., frequent; *Griffith*, &c. KHASIA and JAINTIA MTS., alt. 4000 ft., frequent; *Wallich*, &c.

A spreading shrub; often 10 ft. *Leaves* 5 by 2 $\frac{1}{4}$ in., serrate, usually thinly hairy, villous or submentose beneath; nerves 9 pair; petiole $\frac{1}{2}$ -1 in. *Heads* 1 in., hairy or hirsute; bracts $\frac{3}{4}$ -1 in., concave, green; bracteoles $\frac{3}{4}$ in., linear, widened upwards. *Calyx* $\frac{2}{3}$ - $\frac{3}{4}$ in., deeply divided; segments linear, glabrous, scarious. *Corolla* wide-funnel-shaped, nearly glabrous. *Filaments* and *pistil* sparsely puberulous. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Seeds* $\frac{1}{2}$ in., thin, ovate, mature shaggy with brown, somewhat deciduous, scarcely elastic hairs; areoles small.—From *Nees'* quotation (in *Wall. Pl. As. Rar.*) it is clear that he adopted the name *echinatus* from misreading *Wallich's* ticket.

VAR. *Daltoni*; brown-villous, leaves tubercular subrugose above, bracts serrulate.—*Darjeeling*; *J. D. H.*—Possibly a distinct species, but the examples are in early bud, and very near *S. pectinatus*.

53. ***S. Simonsii***, *T. Anders. in Journ. Linn. Soc.* ix. 474; leaves broadly lanceolate acuminate softly shortly hairy, heads ellipsoid elongate hairy, bracts elliptic apex produced crenate, bracteoles linear acuminate at both ends softly hairy. *Kurz For. Fl.* ii. 244.

ASSAM; Dewangiri Hills, *Simons*; Namroop in the Patkoye Mts., *Griffith* (*Herb. Propr.* n. 249). MARTABAN and TENASSERIM, in the tropical forests, *Kurz*.

A shrub; branches pubescent or viscous-hairy. *Leaves* 5 $\frac{1}{2}$ by 2 in., base cuneate, crenate, minutely lineolate above, more hairy (especially on the 7-8 pair of nerves); petiole $\frac{1}{2}$ in. *Heads* $1\frac{1}{4}$ by $\frac{1}{2}$ in., on very short quasi-peduncles, often 2-3 together; outer pair of bracts (of *T. Anderson*) leaf-like, sometimes like the true bracts; bract $1\frac{1}{4}$ in., softly shortly hairy; bracteoles 2, $\frac{3}{4}$ in., more acuminate than in the allied species. *Sepals* nearly as the bracteoles. *Corolla* 2 in. (*Anderson*), glabrous. *Capsule* glabrous, 4-seeded (*Anderson*).—*Anderson* apparently had better material than exist now at Kew; he says "buds yellow fide *Griffith*;" but it is more probable that the flowers are purplish: he certainly erred in reading "Kamroop" in Lower Assam (for Namroop).—It is not probable that a Patkoye Mt. plant should be common in the tropical Tenasserim forests: no example has been seen thence, but *Kurz's* description coincides with the Patkoye plant. He describes the flowers as blue.

54. ***S. glabratus***, *Nees in Wall. Pl. As. Rar.* iii. 85, and in *DC.*

Prodr. xi. 183; leaves elliptic acuminate at both ends mature glabrate, heads ovoid peduncled pubescent or glabrate, bracts ovate or elliptic narrowed upwards concave entire. *T. Anders. in Journ. Linn. Soc.* ix. 474. *Ruellia*? glabrata, *Wall. Cat.* 2390.—*Acanthaceæ*, *Griff. Ic. Pl. As.* t. 425.

KHASIA and JAINTEA MTS., alt. 3–4000 ft.; *Wallich, Griffith, &c.*

A shrub, 3–4 ft., erect; branches pubescent, glabrate or with spreading fulvous hairs. *Leaves* 5 by $1\frac{1}{2}$ in., undulate, crenulate or nearly entire, raphides very obscure on either surface; nerves 7–9 pair; petiole scarcely $\frac{1}{4}$ in. *Peduncles* 1–3 in., often subcymose, quadrangular, slightly thickened upwards, fulvous pubescent or glabrate; heads $1\frac{1}{4}$ in., dense; bracts $1\frac{1}{2}$ in., coriaceous in fruit; bracteoles $\frac{3}{4}$ in., sublinear, scarious. *Sepals* resembling the bracteoles. *Corolla* 1 in., subsymmetric, glabrous (blue, *Nees*). *Capsule* $\frac{3}{4}$ in., broadly oblong, glabrous, 4-seeded. *Seeds* $\frac{1}{2}$ in., ovate, shaggy with silky, dusky, subinelastic hair, except on the small areoles.—*Wallich's* examples are subglabrous, but others are very pubescent.—In *Griff. Notul.* iv. 145, the plate cited t. 425 is named *Phlogacanthus curviflorus*: there is some great blunder here, and the description is puzzling.

55. **S. Maingayi**, *Clarke*; leaves lanceolate acuminate at both ends somewhat pubescent, heads subsessile ovoid nearly glabrous, bracts ovate or elliptic large concave often crenate upwards glabrous.

MALAYA, probably Malacca or Penang; *Maingay* (*Kew Distrib.* n. 1182).

A shrub, apparently allied to *S. pectinatus* & *glabratus*; branches pubescent. *Leaves* 4 by 1 in., serrulate, puberous and interspersed with most minute raphides; nerves 8 pair, brown-pubescent beneath at least when young; petiole scarcely $\frac{1}{4}$ in. *Peduncles* 0– $\frac{1}{2}$ in., rusty-pubescent; heads 1 in.; bracts $\frac{3}{4}$ –1 in., outermost barren ovate, inner elliptic, usually with a few coarse crenations near the apex; bracteoles $\frac{1}{2}$ – $\frac{3}{4}$ in., linear, glabrous. *Sepals* rather larger than, similar to, the bracts. *Corolla* $1\frac{1}{4}$ in. at least, glabrous.—No capsule nor expanded flowers seen. There are specimens (unnamed) from Sumatra which may be conspecific with this, but they have hairy heads.

56. **S. glomeratus**, *T. Anders. in Journ. Linn. Soc.* ix. 475; leaves ovate acute serrate hairy, heads ovoid subsessile hairy, bracts elliptic elongate or oblong entire or toothed, corolla $1\frac{1}{4}$ – $2\frac{1}{4}$ in. purplish glabrous. *Ruellia glomerata*, *Wall. Cat.* 2361. *Goldfussia glomerata*, *Nees in Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 173; *Bot. Mag.* t. 3881; *Maund Botanist*, t. 155.

KHASIA MTS., alt. 1000–3500 ft., frequent; *Wallich, &c.* BRITISH BURMA, in the hills, *Brandis, Parish*.

A shrub, 2–6 ft.; branches hairy upwards, often horizontal with complanate foliage. *Leaves* $4\frac{1}{2}$ by $2\frac{1}{2}$ in., base narrowed or rounded (often unequal), villous above, less so beneath; nerves 6 pair; petiole $\frac{1}{4}$ –1 in. *Heads* $1\frac{1}{2}$ in., often pseudo-axillary; bracts 1 by $\frac{1}{2}$ in., herbaceous, softly hairy, outermost pair usually serrate subfoliaceous, inner entire; bracteoles $\frac{1}{2}$ – $\frac{3}{4}$ in., linear-lanceolate. *Calyx* $\frac{1}{2}$ – $\frac{3}{4}$ in., divided nearly to the base; segments linear-oblong, in fruit nervose, membranous, subobtusate. *Corolla* subsymmetric; cylindric nearly as long as the ventricose part. *Filaments* and *pistil* sparsely hairy. *Capsule* $\frac{3}{4}$ in., broadly oblong, 4-seeded. *Seeds* $\frac{1}{2}$ in., densely silkily subinelastically hairy; areoles very small.—*T. Anderson* has placed this in his *Goldfussia* section, which has “the spikes naked in flower-time and bracts early deciduous;” but the outermost bracts, including the empty pair (floral leaves), are persistent when the capsule is dehiscent.

57. **S. Brandisii**, *T. Anders. in Journ. Linn. Soc.* ix. 475; leaves elliptic acuminate each end thinly hairy, heads obovoid softly densely white-hairy, bracts linear-spathulate, corolla $1\frac{1}{4}$ in. nearly glabrous.

PEGU; Karen Hills, *Kurz*; Tóngoo, alt. 4000 ft., *Brandis* (fide *T. Anderson*).

Stems slender, shrubby, pubescent or softly shaggy. *Leaves* 4 by 2 in., crenate, lineolate and sparsely slenderly bristly above, paler more glabrate beneath; nerves 6 pair; petiole $\frac{3}{4}$ in. *Heads* $\frac{3}{4}$ in., numerous, on axillary and terminal peduncles; bracts $\frac{3}{4}$ in., very narrow, outermost pair often more or less leaf-like, persistent; bracteoles $\frac{1}{4}$ in., linear. *Sepals* $\frac{1}{4}$ in. and upwards, linear, densely softly white-hairy. *Corolla* nearly straight and symmetric; cylindric part shorter than the ventricose, lobes ovate. *Stamens* glabrous (T. Anders.). *Capsule* $\frac{1}{4}$ in., oblong, glabrous, with a tuft of hairs at the apex, 4-seeded. *Seeds* $\frac{1}{2}$ in., ovate, densely subinelastically silky; areoles very small.

58. **S. Falconeri**, *T. Anders. in Journ. Linn. Soc.* ix. 484; leaves ovate or elliptic acuminate hairy, heads small subsessile dense with long soft silvery bristles, bracts ovate hirsute herbaceous, corolla $\frac{1}{4}$ in. straight slightly hairy without. *S. Karensium*, *Kurz in Journ. As. Soc.* 1873, pt. ii. 94, *ex descr.*

MOULMEIN; *Falconer*. TENASSERIM; *Beddome*.

Stem tetragonous, ciliate with long, patent, weak, white hairs. *Leaves* 4 by $1\frac{1}{4}$ in., narrowed at both ends (upper ovate base obtuse), sparsely white-hairy on both surfaces, not lineolate; nerves 6 pair; petiole $\frac{2}{3}$ in. *Heads* $2\frac{1}{2}$ in., surrounded by leaves; bracteoles $\frac{1}{2}$ in., linear. *Calyx* deeply 5-partite; segments shorter than the bracteoles, linear, hirsute. *Corolla* $1\frac{1}{4}$ in., curved near the mouth, a little hairy without, deep blue; stamens included. *Capsule* tomentose at the apex. *Seeds* large, ovate, hirsute.—The species seems allied to *S. Brandisii*, but is remarkable by the copious long soft white bristles upon the flower-heads, which extend in less numbers to the leaves and stem.

** *Flowers strobilate.*

† *Seeds glabrous.* (Species of Ceylon and S. Deccan Peninsula.)

59. **S. vestitus**, *Nees in DC. Prodr.* xi. 180; hirsute, leaves rhomboid-elliptic acuminate, bracts ovate acuminate hirsute. *T. Anders. in Journ. Linn. Soc.* ix. 466; *Bedd. Ic. Pl. Ind. Or.* t. 260.

CEYLON, alt. 5-7000 ft.; *Walker, Thwaites*.

Herbaceous (fide *Beddome*); branches stout. *Leaves* $5\frac{1}{2}$ by $2\frac{3}{4}$ in., narrowed downwards, cuneate or shortly rounded on the petiole, serrulate, hirsute on both surfaces; nerves 7 pair; petiole $1\frac{1}{2}$ in. *Spikes* 1- $3\frac{1}{2}$ in.; bracts $\frac{3}{4}$ in., somewhat squarrose; bracteoles $\frac{1}{4}$ in., oblong. *Calyx* $\frac{1}{2}$ in. (in fruit $\frac{2}{3}$ in.), divided nearly to the base; segments lanceolate, shaggy with white or tawny hairs. *Corolla* $1\frac{1}{4}$ in., subsymmetric, glabrous; cylindric base short, broad. *Filaments* and *pistil* glabrous. *Capsule* $\frac{1}{2}$ - $\frac{2}{3}$ in., 4-seeded. *Seeds* $\frac{1}{4}$ in., thin, ovate, apiculate, glabrous; areoles very small, oblong.

60. **S. Hookeri**, *Nees in DC. Prodr.* xi. 185, *excl. Var. β*; leaves broadly lanceolate, base cuneate sparsely hairy or glabrate, bracts orbicular or ovate glabrous or slightly ciliate. *T. Anders. in Thwaites Enum.* 227, and in *Journ. Linn. Soc.* ix. 469; *Bedd. Ic. Pl. Ind.* t. 262.

CEYLON, alt. 7000 ft.; *Gardner, Thwaites, &c.*

A shrub, 5-6 ft., branches nearly glabrous. *Leaves* $5\frac{1}{2}$ by 2 in., acuminate, serrulate, upper surface with scattered weak hairs above or mature glabrous; nerves 8 pair; petiole 1 in. *Spikes* 1-3 in.; bracts 1 in., entire or minutely toothed, obtuse or subacute, white; bracteoles $\frac{1}{2}$ in., spatulate-oblong. *Calyx* $\frac{3}{4}$ in., divided nearly to the base; segments lanceolate, often setulose, white. *Corolla* $1\frac{1}{4}$ in., campanulate, subsymmetric, glabrous, white with purple streaks; cylindric base broad, very short. *Stamens* and *pistil* glabrous. *Capsule* $\frac{1}{2}$ in., frequently 2-seeded. *Seeds* $\frac{1}{4}$ in., very thin, ovate, apiculate, glabrous; areoles very small, oblong.—The colours are from a field note of Col. Walker. This is placed by T. Anderson in a section

far removed from *S. vestitus*; but it is so nearly allied that the specimens have been sometimes confounded by the best botanists.

61. ***S. calycinus***, *T. Anders. in Thwaites Enum.* 227, and in *Journ. Linn. Soc.* ix. 469; leaves elliptic acuminate at both ends hairy on both surfaces, bracts spathulate ovate obtuse glabrous or hairy. *Bedd. Ic. Pl. Ind. Or.* t. 209. *S. coloratus*, *Nees in DC. Prodr.* ix. 186, not of *T. Anders.*

CEYLON, alt. 5-7000 ft.; *Gardner, &c.*

A shrub, 4-6 ft., stem glabrous below, more or less hairy upwards. *Bracts* spathulate, often subpetioled, lower passing sometimes into leaves as shown in *Beddome's* figure. *Corolla* varying from green to a lurid reddish yellow. *Seeds* 4 to the capsule, scarcely $\frac{1}{2}$ in., obovate.—Otherwise as *S. Hookeri*, from which this species (which is *Nees' S. coloratus*) differs at sight by being a little more hairy. The *S. calycinus* var. β of *Nees* is founded on a sheet of 3 fragments, whereof 2 are *S. calycinus* *T. Anders.*, 1 is *S. Hookeri*.

VAR. ? parvifolia; leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. long, heads small 2-5-flid., corolla scarcely $\frac{3}{8}$ in., anthers subexserted. *S. calycinus*, *Nees in DC. Prodr.* ix. 469.—Ceylon; *Walker*.

62. ***S. laxus***, *T. Anders. in Thwaites Enum.* 228, and in *Journ. Linn. Soc.* ix. 469; leaves cordate ovate acuminate minutely scabrous-hairy or glabrate, bracts ovate or orbicular subentire glabrous or. ciliate. *Bedd. Ic. Pl. Ind. Or.* t. 223.

CEYLON; Hantani, alt. 4000 ft., *Thwaites*.

A shrub, 4-6 ft.; branches glabrate. *Leaves* 6 by $3\frac{1}{2}$ in., crenate or toothed; nerves 6 pair; petiole 2 in. *Spikes* 2-5 in., often in dense subsessile clusters on the old wood; bracts $\frac{1}{2}$ –1 in.; bracteoles $\frac{1}{2}$ in., linear-oblong. *Sepals* $\frac{1}{2}$ in. (or more in fruit), lanceolate or broadly lanceolate, ciliate. *Corolla* $\frac{3}{4}$ –1 in., glabrous except hairy lines within, orange-red; ventricose portion short, about as long as the contracted portion; lobes ovate, elongate, subacute, as described by *T. Anderson*, not well shown in *Beddome's* figure. *Stamens* and *pistil* glabrous. *Capsule* $\frac{1}{2}$ in., narrowly ellipsoid, 4-seeded. *Seeds* $\frac{1}{8}$ – $\frac{1}{2}$ in., thin, obovate or subquadrate, glabrous; areoles obsolete.—Easily distinguished from the allied Ceylon species by the broad decisively-cordate base of the leaves.

63. ***S. Andersonii***, *Bedd. in Trans. Linn. Soc.* xxv. 222, and *Ic. Pl. Ind. Or.* t. 208; leaves rhomboid-elliptic or ovate acuminate loosely villous on both surfaces, bracts elliptic obtuse glabrous ciliate. *T. Anders. in Journ. Linn. Soc.* ix. 469.

S. DECCAN; Anamallay Mts., alt. 6000 ft., *Beddome*.

A very large shrub up to 20 ft. (*Beddome*); branches hairy upwards. *Leaves* 7 by 4 in., rhomboid, base rounded or subcordate, crenulate; nerves 7 pair; petiole $1\frac{1}{2}$ in. *Spikes* 1–2 $\frac{1}{2}$ in., axillary, nodding; bracts $\frac{3}{4}$ in.; bracteoles $\frac{3}{8}$ in., linear-oblong. *Sepals* $\frac{3}{8}$ – $\frac{1}{2}$ in., linear-oblong, ciliate. *Corolla* $1\frac{1}{2}$ in., subcampanulate, contracted base very short, subsymmetric, glabrous except hairy lines within, pale-blueish. *Stamens* and *pistil* glabrous. *Capsule* not seen; but the species is doubtless closely allied to *S. calycinus*, as *Beddome* says, and the leaves still more resemble *S. vestitus*.

64. ***S. luridus***, *Wight Ic.* t. 1515–6; leaves ovate acuminate closely softly hairy on both surfaces, bracts large orbicular entire glabrous. *T. Anders. in Journ. Linn. Soc.* ix. 469.

NILGHERY MTS., alt. 3-5000 ft.; *Gardner, Wight, &c.* ANAMALLAY MTS. (fide *Beddome's* list).

Gregarious shrubs, 10-18 ft. high, often forming entire coppices, flowering every

spring from the old wood, often from near the ground. *Leaves* 6 by 3 in., tapering at the base, crenulate; nerves 9 pair; petiole $1\frac{1}{2}$ in. *Spikes* 3–11 in., often clustered, pendulous; bracts $\frac{3}{4}$ in., blackish-purple; bracteoles $\frac{3}{4}$ in., ligulate, minutely scabrous. *Calyx* $\frac{3}{4}$ in., divided nearly to the base; segments lanceolate, minutely scabrous. *Corolla* $1-1\frac{1}{2}$ in., glabrous except lines within, lurid purple, somewhat 2-lipped; ventricose portion short, longer than the contracted portion; lobes ovate. *Stamens* and *pistil* glabrous. *Capsule* $\frac{3}{4}$ in., usually 4-seeded. *Seeds* $\frac{1}{2}$ in., thin, obovate, obtuse, glabrous; areoles obsolete.

65. ***S. bolamputtensis***, *Bedd. Ic. Pl. Ind. Or.* t. 200; leaves ovate acuminate glabrous except few scattered minute bristles, bracts large orbicular serrate softly hairy afterwards glabrate.

S. DECCAN; Bolamputti Hills near Coimbatore, alt. 6000 ft., *Beddome*.

A shrub, 15 ft., flowering every year from the old wood; habit of *S. luridus*. *Leaves* 6 by 3 in., base attenuate, crenulate or toothed, lineolate, white-bristly sparsely on the surface above and on the 6–7 pair of nerves beneath; petiole $1\frac{1}{2}$ in. *Spikes* 2–4 in., very broad, from the old wood and also terminal; bracts $\frac{3}{4}-1\frac{1}{2}$ in. wide, obtuse; bracteoles $\frac{1}{2}$ in., narrowly oblong. *Sepals* $\frac{3}{4}$ in. (at least in fruit), broadly lanceolate, ciliate, somewhat white-bristly. *Corolla* 1 in., subcampanulate, glabrous, brown (*Beddome*); lobes short in *Beddome's* picture, appear longer more as of *S. luridus* in his example. *Stamens* and *pistil* glabrous. *Capsule* $\frac{3}{4}$ in., broadly oblong, 4-seeded. *Seeds* $\frac{1}{4}$ in., thin, subquadrate, glabrous; areoles obsolete.

†† *Seeds hairy* (where known).

66. ***S. callosus***, *Nees in Wall. Pl. As. Rar.* iii. 85 chiefly, and in *DC. Prodr.* xi. 185 chiefly; leaves elliptic acuminate at both ends sparsely hairy above glabrate beneath, bracts ovate or elliptic concave obtuse glabrous, bracteoles 0, capsule 2-seeded. *Dalz. & Gibs. Bomb. Fl.* 188; *T. Anders. in Journ. Linn. Soc.* ix. 469. *S. Grahamianus*, *Wight Ic.* t. 1520; *Dalz. & Gibs. Bomb. Fl.* 187; *T. Anders. in Journ. Linn. Soc.* ix. 469. *Ruellia callosa*, *Wall. Cat.* 2359.—*Strobilanthes* sp. n. 69, *Herb. Ind. Or. H. f. & T.*

BOMBAY GHATS and CENTRAL INDIA; *Graham, Dalzell, &c.*

A shrub, 6 ft.; branches glabrate, often warted or scabrous-tubercled. *Leaves* 7 by 3 in., sometimes much larger, crenate, conspicuously lineolate above; nerves 8–16 pair; petiole 2 in. *Spikes* 1–4 in., often densely or laxly cymose; bracts $\frac{1}{2}-1$ in., orbicular or elliptic. *Calyx* $\frac{1}{2}$ in., in fruit often exceeding $\frac{3}{4}$ in., lobed nearly to the base, segments oblong, obtuse, softly hairy. *Corolla* $1\frac{1}{2}$ in., subsymmetric, glabrous without, very hairy within, deep-blue (*Dalzell*); cylindric base as long as the ventricose portion. *Filaments* hairy downwards. *Pistil* glabrous. *Capsule* $\frac{3}{4}$ by $\frac{1}{2}$ in. *Seeds* more than $\frac{1}{2}$ in. long, thin, obovate acute, densely shaggy with white adpressed inelastic hairs, except on the large oblong areoles.—As *Dalzell* says his *S. callosus* had the seeds “quite smooth,” it might be supposed that he considered the present plant *S. Grahamianus*, and called *S. Dalzellii*, *T. Anders.* his *S. callosus*; but a reference to his Herbarium and notes shows this was not so. He distinguished *S. Dalzellii* as a species, but proposes no name for it; while he (most erroneously) notes on his own excellent fruiting specimen of *S. callosus* that it differs from *S. Grahamianus* in having the seeds glabrous.

VAR. hispida; bracts copiously white-hispid.—Dasgown, in the Mahratta country, *Hove*.

67. ***S. zeylanicus***, *T. Anders. in Thwaites Enum.* 227, and in *Journ. Linn. Soc.* ix. 470; glabrescent, leaves ovate shortly acuminate at both ends, bracts ovate often with a ligulate apex, bracteoles about as long as the calyx. *Bedd. Ic. Pl. Ind. Or.* t. 224. *S. callosus*, *Nees in Wall. Pl. As. Rar.* iii. 85, and in *DC. Prodr.* xi. 185, the Ceylon material.

CEYLON; *Walker*; alt. 2000 ft., *Thwaites*.

A shrub, 3–5 ft. *Leaves* 7 by $3\frac{1}{2}$ in., crenate, lineolate on both surfaces; nerves 7 pair; petiole $1\frac{1}{2}$ in. *Spikes* quasi-peduncled, mostly solitary, sometimes 1 in. ovoid capitate, sometimes $2\frac{1}{2}$ in., distinctly densely strobiliform; bracts 1 in., entire or denticulate, the ligulate tip often squarrose sometimes closely reflexed in fruit, sometimes obsolete. *Calyx* $\frac{1}{2}$ in., divided more than half-way down; segments lanceolate, slightly hairy. *Corolla* $1\frac{1}{4}$ in., narrow, hairy, white (*T. Anderson*); linear-cylindric base shorter than the long urn-shaped upper part; lobes short. *Filaments* hairy towards the base. *Pistil* glabrous. *Capsule* not seen.—Evidently different from the Bombay *S. callosus*, but may not belong to this part of the series.

68. **S. asper**, *Wight Ic. t. 1518, not of Dene.*; thinly softly hairy, leaves ovate shortly acuminate at both ends, spikes in close panicles or subfasciculate, bracts oblong or ovate, base narrowed. *T. Anders. in Journ. Linn. Soc. ix. 466.*

MTS. of S. INDIA, alt. 5–8000 ft.; Nilgherries, Anamallays, Bababooduns, *Gardner, Wight, &c.* MALABAR GHATS; Concan, *Stocks*.

A shrub, 2–4 ft. *Leaves* $4\frac{1}{2}$ by $2\frac{1}{4}$ in., crenate; nerves 7 pair; petiole $1\frac{1}{2}$ in. *Spikes* in flower 1– $1\frac{1}{2}$ in., oblong; in fruit 2–3 in., with bracts and calyces enlarged; thinly softly hairy, somewhat viscous; bracts $\frac{1}{4}$ – $\frac{1}{2}$ in., often reddish; bracteoles $\frac{1}{4}$ in., linear. *Sepals* $\frac{1}{2}$ in., linear-lanceolate. *Corolla* $\frac{3}{4}$ in. (or in *Wight's* figure much larger), glabrous without, hairy within; linear-cylindric base about as long as the ventricose portion; limb somewhat oblique, segments short rounded. *Filaments* hairy towards the base. *Pistil* glabrous. *Capsule* $\frac{1}{2}$ in., oblong, 4-seeded. *Seeds* $\frac{1}{12}$ in., orbicular, elastically hairy; areoles prominent, round, glabrous.—The form of the bracts seems very variable; the typical Nilgherry plant has them broadly ovate; a Bababoodun example (reckoned by *Wight* distinct) has them linear-oblong; and there are a great number of intermediate forms.

69. **S. sessilis**, *Nees in Wall. Pl. As. Rar. iii. 85*, and in *DC. Prodr. xi. 177*; leaves sessile ovate acute hairy, spikes cylindric exactly strobiliform, bracts large ovate acute hairy, bracteoles 0, corolla $1\frac{1}{4}$ in. pale purple. *Bot. Mag. t. 3902*; *Wight Ill. t. 164 b*, fig. 4 (right-hand), and *Ic. t. 1511*; *T. Anders. in Journ. Linn. Soc. ix. 467.*

NILGHERRY MTS., alt. 6–8000 ft.; *Wight, &c.*, frequent. WYNAAD and TRAVANCORE; *Beddome*.

Stems 12–18 in., numerous, erect, little divided, from a woody perennial root, patently villous. *Leaves* $\frac{3}{4}$ – $1\frac{1}{2}$ in., base rounded or subcordate, crenate, softly villous on both surfaces. *Spikes* 1–2 in., short-peduncled, quasi-axillary and terminal; bracts $\frac{3}{4}$ in., softly hairy. *Sepals* $\frac{1}{2}$ in., lanceolate. *Corolla* nearly straight, subsymmetric, slightly hairy within and without; cylindric base nearly as long as the ventricose part; segments rounded. *Filaments* included; longer shaggy, shorter glabrous with much smaller anthers. *Ovary* glabrous, gland-bearing near the tip; style thinly hairy; ovules 4. *Capsule* not seen.

VAR. sessiloides (*Wight Ic. t. 1512*); leaves larger bristle-hirsute rugose, spikes larger, bracts (especially the upper) corolloid glabrate upwards, corolla rather larger more hairy both within and without. *S. sessiloides*, *Wight Ic. t. 1512, not of T. Anders.*—Nilgherries; *Wight*.—A very trifling variety (or mere form, *Beddome*) of *S. sessilis*.

VAR. Ritchiei; bristly without any soft hairs, leaves nearly glabrous beneath except the bristly nerves, bracts acuminate long-bristly. *S. sessiloides*, *Dalz & Gibs. Bomb. Fl. 187*; *T. Anders. in Journ. Linn. Soc. ix. 467, not of Wight.*—Malabar Ghats; near Bombay, *Dalzell*; Purwhar Ghat, *Ritchie*; Tulkut (perhaps i.e. Talikote), *Stocks*.—Noted by *Ritchie* as flowering only once in 7 years, but the woody root with annual undivided stems seems the same as in *S. sessilis*. *Stems* densely hispid with very long stout white bristles or glabrate. *Leaves* scabrous-hispid lineolate above, much more glabrous than in *S. sessilis*. *Bracts* and *spikes* with white or tawny bristles nearly $\frac{1}{4}$ in. long, sometimes dense sometimes few scattered.

70. **S. Dupeni**, *Beddome ms.*; leaves subcordate ovate acuminate bristly pubescent on both surfaces, spikes large oblong dense viscous slightly hairy, bracts 4-ranked large ovate obtuse adnate at base closely imbricate, capsule 4-seeded, seeds hairy.

ANAMALLAY MTS.; top of Neliamputti Ghat, *Beddome*.

A shrub. *Leaves* $4\frac{1}{2}$ by $2\frac{1}{2}$ in., crenate, bristly above, chiefly on the 9 pair of nerves beneath; rachides small, obscure; petiole 1-2 in. *Spikes* $2\frac{1}{2}$ by $\frac{3}{4}$ in., appearing terminal on short axillary peduncles; bracts $\frac{3}{4}$ by $\frac{1}{2}$ in., coloured, nervose, very sticky; bracteoles small, lanceolate. *Calyx* $\frac{1}{2}$ in., deeply 5-lobed; linear green acumination of the segments longer than the short elliptic scarious base. *Corolla* large, blue. *Capsule* $\frac{1}{2}$ in., ellipsoid, sessile, glabrous. *Seeds* $\frac{1}{2}$ in. diam.; areolæ nearly half the diam. of the seed.

71. **S. auriculatus**, *Nees in Wall. Pl. As. Rar.* iii. 69, 86, t. 295, and in *DC. Prodr.* xi. 191; leaves sessile auriculate oblong or ovate acuminate hairy, spikes linear oblong closely velvety, bracts obovate obtuse, bracteoles 0. *T. Anders. in Journ. Linn. Soc.* ix. 472; *Bedd. Ic. Pl. Ind. Or.* t. 210. *S. amplexens*, *Nees in Wall. Cat.* 7158, and in *DC. Prodr.* xi. 191. *Ruellia auriculata*, *Wall Cat.* 2341.

CENTRAL INDIA, alt. 1-4000 ft., common; Behar; Jubbulpore to Chota Nagpore, *J. D. H., Beddome*, &c.—DISTRIB. Ava.

A shrub, 2-6 ft.; branches many divaricate often zigzag, quadrangular, glabrous, tips more or less hairy. *Leaves* often very unequal, sometimes one 10 by $2\frac{1}{2}$ in. oblong, the other 3 by $1\frac{1}{2}$ ovate, sometimes subequal, serrulate, sparsely hairy above; nerves (in the longer leaves) 10-13 pair, minutely hairy beneath. *Spikes* $3\frac{1}{2}$ by $\frac{1}{2}$ in., mostly terminal, solitary, quasi-peduncled; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., broader than long, very obtuse, apex often recurved in fruit. *Calyx* divided nearly to the base; segments $\frac{1}{4}$ - $\frac{1}{2}$ in., unequal, linear, obtuse, closely velvety. *Corolla* 1 in., curved, very slightly hairy, pale purple; cylindric base much shorter than the ventricose part; limb somewhat 2-lipped. *Stamens* and *pistil* nearly glabrous. *Capsule* $\frac{1}{2}$ in., glabrous, 4-seeded. *Seeds* scarcely $\frac{1}{2}$ in. thin, orbicular, elastically white-hairy; areoles very small.

VAR. *Edgeworthiana*; bracts with spreading white cilia $\frac{1}{2}$ in. long, sepals long white-ciliate at the tips. *S. Edgeworthiana*, *Nees in DC. Prodr.* xi. 190.—Subtropical Himalaya, alt. 500-2000 ft., from the Siwaliks (*Stewart*) to Sikkim (*Gamble*), frequent in the dry Terai. *Parasnath, Edgeworth.* Tenasserim; alt. 2000 ft., *Beddome*.—Distrib. Upper Burma.

VAR. *plumulosa*; leaves broadly elliptic, spikes short axillary subsessile densely white-ciliate. *S. plumulosus*, *Nees in Wall. Cat.* 7157, and in *Wall. Pl. As. Rar.* iii. 86, and in *DC. Prodr.* xi. 191.—Mts. of Prome; *Wallich*.—*Leaves* 8 by $3\frac{1}{2}$ in., subequal, spatulate to the widened auriculate base. *Spikes* 1-1 $\frac{1}{2}$ in.

VAR. *bracteolata*; leaves sessile auriculate oblong acuminate hairy, spikes linear-oblong ciliate, bracts obovate, bracteoles $\frac{1}{2}$ in. linear-spathulate.—Khasia Mts., alt. 5000 ft.; Nunklow and Myrung, *H. f. & T.*—Branches divaricate, hairy. *Leaves* unequal, the larger $4\frac{1}{2}$ by $\frac{3}{4}$ -1 in., serrate. *Spikes* 1-2 $\frac{1}{2}$ in., quasi-peduncled, mostly solitary; bracts $\frac{1}{2}$ in., less obtuse than those of *S. auriculatus*.

72. **S. Maclellandi**, *Clarke*; leaves large elliptic acuminate at both ends sparsely hairy, spikes linear, bracts obovate obtuse white hairy, bracteoles 0.

RANGOON; *McLelland*.

Branches stout, quadrangular, zigzag, hairy. *Leaves* 12 by $4\frac{1}{2}$ in., lower petioled, uppermost subsessile, none auricled; nerves 20 pair. *Spikes* 3 by $\frac{1}{4}$ in., slender, white, hairy, pendent mostly 3 together from short axillary peduncles.—This has been supposed a form of *S. auriculatus*, but the large many-nerved leaves and slender pendent spikes give it a different aspect: the capsule is rather larger, the seeds nearly the same as in *S. auriculatus*. It would appear distinct enough but for the subjoined variety.

VAR. ? *latipes*; leaves sessile suddenly narrowed subauriculate, bracts narrowly obovate.—Tenasserim; *Beddome*.—*Leaves* 13 by $4\frac{1}{2}$ in., primary nerves 20 on each side the midrib.

73. **S. Sabinianus**, *Nees in Wall. Pl. As. Rar.* iii. 86, and in *DC. Prodr.* xi. 190; leaves petioled broadly elliptic shortly acuminate at both ends nearly entire uppermost often sessile cordate, spikes linear pubescent often interrupted towards the base, bracts obovate obtuse, sepals oblong minutely pubescent. *T. Anders. in Journ. Linn. Soc.* ix. 472. *Ruellia Sabiniana*, *Wall. Cat.* 2338; *Bot. Reg.* t. 1238; *Reichb. Exot.* t. 210. *R. argentea*, *Wall. Cat.* 2339.

NEPAL; *Wallich*. KHASIA MTS., alt. 1–4000 ft., frequent; *Wallich*, &c.

A shrub, 2–5 ft.; branches glabrous. *Leaves* $6\frac{1}{2}$ by 3 in., undulate, subrenate, lineolate, minutely setulose above, glabrate or obscurely pubescent beneath; upper leaves often unequal dissimilar, one of each pair smaller sessile cordate. *Spikes* 2–4 in., quasi-peduncled, mostly solitary; bracts $\frac{1}{2}$ by $\frac{1}{2}$ in.; bracteoles $\frac{1}{2}$ in., oblong. *Sepals* scarious, minutely glandular-pilose, obscurely oblanceolate not spatulate. *Corolla* $1\frac{1}{4}$ in., curved, much ventricose nearly glabrous, lavender-coloured, contracted base short. *Filaments* glabrous. *Capsule* scarcely $\frac{1}{2}$ in., pubescent, 4-seeded. *Seeds* $\frac{1}{2}$ in., much compressed, orbicular; when wet the fine white hairs spring out abundantly; areoles nearly half the diam. of the seed, glabrous.—The figures *Bot. Mag.* t. 3517 and *Lodd. Bot. Mag.* t. 1712, adduced for this species by Nees and T. Anderson, show the uppermost leaves petioled much acuminate at the base. Some examples of *S. Sabinianus* have the spike much interrupted, and the species might be placed in the next section. *Wallich* notes, in the Nepal example named *R. argentea*, that the flowers were white.

74. **S. tamburensis**, *Clarke*; leaves ovate shortly acuminate serrate, spikes linear interrupted towards the base ciliate subhirsute, bracts ovate, sepals spatulate ciliate.

E. NEPAL; at the Tambur River, alt. 4–5000 ft., *J. D. H.*

Capsule upwards of $\frac{1}{2}$ in., 4-seeded. *Seeds* $\frac{1}{2}$ in., much compressed, orbicular in outline, covered all over with short inelastic hairs; areoles 0. The general habit and corolla as of *S. Sabinianus*, but the serrate leaves, subhirsute spike, and seeds will not match.

75. **S. nutans**, *T. Anders. in Journ. Linn. Soc.* ix. 475; leaves ovate or broadly elliptic acuminate serrate hairy, spikes ellipsoid or oblong very dense glabrous, bracts large elliptic concave. *Ruellia strobilina*, *Wall. Cat.* 2362. *R. hirta*, *Don Prodr.* 119. *Goldfussia nutans*, *Nees in Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 174.

NEPAL; *Wallich*.

A shrub, 1–2 ft.; branches hairy. *Leaves* 3 by $1\frac{1}{2}$ in., base attenuate or rounded, with scattered hairs on both surfaces, not lineolate; nerves 7 pair; petiole $\frac{1}{4}$ –1 in. *Peduncles* $\frac{1}{2}$ – $1\frac{1}{2}$ in., divaricate or deflexed, hairy; spikes 1 – $1\frac{1}{2}$ by $\frac{2}{3}$ in.; bracts $\frac{1}{2}$ in., subacute; bracteoles $\frac{1}{2}$ in., oblong. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in., divided nearly to the base, segments linear glabrous. *Corolla* 1 – $1\frac{1}{4}$ in., curved; ventricose part longer than the contracted base. *Capsule* not seen; and the place of the species is dubious; the spike resembles that of some of the strictly strobiliform Malabar species; Nees says the bracts are deciduous, but they cannot be so till long after flower.

76. **S. acrocephalus**, *T. Anders. in Journ. Linn. Soc.* ix. 473; leaves ovate acute crenate hirsute, spikes peduncled solitary linear-cylindric dense hairy, bracts ovate, seeds puberulous subglabrate. *Adenosma affinis*, *Griff. Notul.* iv. 133.

KHASIA MTS., alt. 4–5000 ft., plentiful in the northern half, *Griffith, H. f. & T.*, &c.

Shrubby, 1-2 ft., branching; stems hirsute. *Leaves* $2\frac{1}{2}$ by $1\frac{1}{2}$ in., base obtuse or rounded, densely minutely lineolate above; nerves 7-8 pair; petiole $\frac{3}{8}$ in. *Peduncles* 1-4 in., hirsute; bracts $\frac{1}{2}$ - $\frac{1}{2}$ in., obtuse or scarcely acute, closely strobilate; bracteoles $\frac{1}{2}$ in., spatulate-oblong. *Calyx* $\frac{1}{2}$ in., divided $\frac{3}{8}$ the way down; segments narrowly oblong, obtuse, hairy. *Corolla* 1 in., curved, glabrous without, purplish; cylindric base scarcely so long as the ventricose portion; limb somewhat 2-lipped. *Stamens* glabrous. *Ovary* hirsute at the apex, style sparsely hairy. *Capsule* $\frac{1}{2}$ in., hairy, 4-seeded. *Seeds* $\frac{1}{16}$ in., orbicular, distinctly pubescent when young, mature subglabrous, the base of the short hairs only remaining; areoles 0.—A species not very closely allied to any other in the genus.

77. **S. imbricatus**, *Nees in Wall. Pl. As. Rar.* iii. 86, and *Cat.* 7156, and in *DC. Prodr.* xi. 186; leaves spatulate elliptic acute sparsely hairy on both surfaces, spikes cylindric strobiliform in axillary quasi-panicles, corolla very small, placentæ rising elastically from the bottom of the dehiscent capsule. *T. Anders. in Journ. Linn. Soc.* ix. 473. *S. pterocaulis*, *Kurz in Journ. As. Soc.* 1873, pt. ii. 93.

PEGU and TENASSERIM; *Helfer, M. Lelland, Kurz.*—DISTRIB. Ava.

An annual herb fide Kurz, but the examples have all the appearance of the other perennial species; stems stout, sharply quadrangular, hirsute or glabrate. *Leaves* attaining $12\frac{1}{2}$ by 5 in. (or the upper much smaller 2 by 1 in.), crenate or toothed, lineolate on the upper surface; nerves (in the larger leaves) 15 or more pair; petiole very short owing to the long-decurrent leaf-base. *Spikes* $1\frac{1}{2}$ in., mostly 5-11 in lax hirsute axillary panicles; leaves at the trichotomous divisions scarcely $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ in., obovate-oblong, hirsute towards the apex; bracteoles $\frac{1}{2}$ in., linear-spatulate. *Sepals* $\frac{1}{4}$ in., linear, obtuse, hirsute at the tips. *Corolla* $\frac{1}{2}$ in., subcampanulate, violet ex *Nees*, yellow ex *Kurz*. *Capsule* $\frac{1}{2}$ in., hairy at the tip, 4-seeded. *Seeds* $\frac{1}{16}$ in., orbicular, hairy; areoles nearly half the diam. of the seed, glabrous.—The spikes in fruit are like those of *Rungia*. *Wallich's* specimens from Ava have much smaller leaves than the Pegu examples.

78. **S. longipes**, *Clarke*; leaves elliptic acuminate at each end subentire pubescent or glabrate, spikes oblong hairy or glandular-puberulous, bracts narrowly obovate obtuse or emarginate, calyx nearly equally sub-5-partite segments linear-spatulate obtuse, corolla $1\frac{3}{4}$ in. *S. acuminatus*, *T. Anders. in Journ. Linn. Soc.* ix. 478, chiefly (not *Adenacanthus acuminatus*, *Nees*).

TENASSERIM; *Helfer* (*Herb. Propr.* n. 304, *Kew Distrib.* n. 6114); *Mooleyit, Beddome*.

Branches slender. *Leaves* 6 by $2\frac{1}{2}$ in., obscurely toothed, raphides conspicuous in the lower paler surfaces, embedded obscure in the upper; nerves 8 pair; petiole $\frac{1}{4}$ in. *Spikes* 1- $2\frac{1}{2}$ in., clavate-oblong, continuous; bracts $\frac{1}{2}$ - $\frac{1}{2}$ in., lower deciduous in fruit; bracteoles $\frac{1}{2}$ in., linear-obovate. *Calyx* $\frac{1}{2}$ in. and upwards; segments distinctly wider at the tips. *Corolla* nearly straight, puberulous; ventricose portion nearly 1 in., linear portion $\frac{1}{2}$ in.; lobes rounded, subequal. *Capsule* $\frac{1}{2}$ in., pubescent at the tip, 4-seeded. *Seeds* $\frac{1}{16}$ in., ovoid, inelastically shaggy; areoles subobsolete.—*Kurz* has founded his *S. subflaccidus* on *Helfer's* plant (*Kew*, n. 6114), but, as he says the calyx is 2-lipped with the upper lip three-lobed only $\frac{1}{2}$ the way down, it is clear that his *S. subflaccidus* cannot be this plant; there may have been some error in distribution, or *Kurz* may have relied on *T. Anderson's* reduction of this n. 6114 under *Adenacanthus*, *Nees*.

79. **S. subcapitatus**, *Clarke*; leaves elliptic acuminate subentire glabrous, spikes ellipsoid or subovoid small laxly peduncled, bracts elliptic concave or obovate minutely ciliate-pubescent.

TENASSERIM; *Helfer* (*Kew Distrib.* n. 6111).

Shrubby; branches slender, quadrangular, glabrous. *Leaves* 4 by $1\frac{1}{2}$ in., base

attenuate or obtuse, conspicuously lineolate above, obscurely so beneath; nerves 6 pair; petiole $\frac{1}{4}$ in. *Peduncles* 2-4 in., slender, quadrangular, glabrous, numerous, axillary, often divided, sometimes bearing reduced caducous leaves; bracts $\frac{1}{2}$ in., rounded at the tip, densely lineolate; bracteoles $\frac{1}{2}$ in., linear-obovate, densely lineolate. *Calyx* $\frac{1}{4}$ in., divided subequally nearly to the base; segments linear-spathulate, minutely ciliate. *Corolla* not seen. *Capsule* $\frac{1}{2}$ in., pubescent at the tip, 4-seeded. *Seeds* $\frac{1}{2}$ in., ovate, densely shaggy; areoles small.—Seems very nearly allied to *S. subflaccidus*, Kurz; but the spikes are in general so much shortened that it might be looked for among the capitate series. As in *S. subflaccidus*, the fruiting spikes have the upper bracts, but some of the lower fallen.

*** *Spikes elongate more or less interrupted, or flowers nearly all distant but mostly opposite.*—(Seeds in all hairy.)

80. **S. Helferi**, *T. Anders. in Journ. Linn. Soc.* ix. 472; leaves ovate acuminate rounded or subcordate at the base nearly glabrous, spikes simple elongate lax submentose, flowers distant opposite, bracts broadly obovate obtuse, corolla $1\frac{1}{4}$ - $1\frac{1}{2}$ in.

TENASSERIM, "Three Pagodas," *Helper* (Kew Distrib. n. 6117).

Branches divaricate, somewhat zigzag, terete, pubescent upwards. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., crenate, puberulous and lineolate above, subpubescent on the 7 pair of nerves beneath; petiole 1 in. *Spikes* axillary, short-peduncled, solitary, opposite, 2-5 in.; flowers nearly all paired and distant; bract 1 to each flower, $\frac{1}{2}$ in., densely minutely fuscous-pubescent, ciliate, apex $\frac{1}{2}$ in. broad green patent or reflexed; bracteoles 0. *Calyx* $\frac{1}{2}$ in., equally sub-5-partite; segments linear-ligulate, pubescent, subobtusate. *Corolla* nearly glabrous, straight; cylindric base twice as long as the calyx. *Capsule* $\frac{1}{4}$ in. *Seeds* $\frac{1}{2}$ in., orbicular, dusky pubescent; areoles small.—T. Anderson errs in saying "corolla small;" the buds, which appear on the point of expansion, are scarcely $\frac{1}{2}$ in. long; but there is one fully expanded flower overlooked by T. Anderson, which is (dry) nearly $1\frac{1}{2}$ in.

81. **S. macrostegius**, *Clarke*; leaves elliptic acuminate subentire nearly glabrous, spikes axillary sessile lax scarcely interrupted, bracts obovate suddenly linear-acuminate, capsule and seeds large. *S. fimbriatus*, *T. Anders. in Journ. Linn. Soc.* ix. 470 partly, not of *Nees*. *Endopogon macrostegius*, *Nees in DC. Prodr.* xi. 470.

ASSAM and KHASIA MTS.; *Griffith*. CHITTAGONG; *Kasalong, Clarke*.

A straggling, inelegant shrub, 2-5 ft.; branches terete, pubescent upwards or nearly glabrous. *Leaves* 6 by $2\frac{1}{4}$ in., base cuneate, lineolate above, obscurely so beneath, minutely pubescent on the 9 pair of nerves beneath; petiole $1\frac{1}{2}$ in. *Spikes* 2-5 in., with 6-8 flowers in opposite pairs; bracts $\frac{3}{4}$ -1 in., including the linear acumen $\frac{1}{2}$ in. long, pubescent, or in *Griffith's* examples subglabrous; bracteoles $\frac{3}{4}$ in., linear-oblancoate cuspidate, fulvous-pubescent upwards. *Sepals* in fruit similar to the bracteoles. *Corolla* not seen. *Ovary* glabrous, a dense fulvous tuft of hairs at the apex. *Capsule* 1 in., oblong, 4-seeded. *Seeds* $\frac{1}{2}$ in., ovate, shaggy; areoles obsolete.—Probably *S. fimbriatus*, Kurz (*For. Fl.* ii. 244), from the forests of the Pegu Yomah and Tenasserim, the bracts of which Kurz says are entire, so that it could not have been *Nees' S. fimbriatus*.

82. **S. polythrix**, *T. Anders. in Journ. Linn. Soc.* ix. 470; leaves elliptic acuminate rufous-ciliate, spikes axillary subseßile continuous very rufous-ciliate, bracts 1 - $1\frac{1}{2}$ in. linear-lanceolate.

KHASIA MTS.; *Herb. Kew* and *Herb. Calc.*

A shrub; branches terete, with patent long rufous hairs. *Leaves* $6\frac{1}{2}$ by $2\frac{1}{2}$ in., base attenuate or subobtusate, remotely serrate, mature with few scattered long rufous hairs; nerves 9 pair; petiole 1 in. *Spikes* 2-4 in., rufous hairs $\frac{1}{4}$ in. long, slender, patent; bracteoles $\frac{3}{4}$ in., linear, green, rufous-ciliate. *Calyx* in fruit nearly 1 in.,

divided nearly to the base; segments linear-lanceolate, scarious below, rufous-ciliate upwards. *Corolla* not seen. *Capsule* $\frac{3}{4}$ in., linear-oblong, glabrous, tip minutely rufous-hairy, 4-seeded. *Seeds* $\frac{1}{2}$ in., ovate, silky; areoles hardly any.

83. **S. Brunonianus**, *Nees in Wall. Pl. As. Rar.* iii. 87, and in *DC Prodr.* xi. 188; leaves lanceolate attenuate at both ends nearly glabrous, spikes subpaniculate linear, bracts oblong, sepals linear oblong fulvous hirsute, corolla $\frac{3}{4}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 472. *S. petiolaris*, *Nees in DC. Prodr.* xi. 189, partly. *Ruellia Brunoniana*, *Wall. Cat.* 2368.

KHASIA MTS., alt. 2-4000 ft., common, *Wallich*, &c.; lower hills of ASSAM, JAINTEA, and NAGAS country.

An erect, dense, annually-flowering shrub, 2-3 ft. *Leaves* 4 by $\frac{1}{2}$ in. subentire in *Wallich's*, often broader, sometimes 2 by $\frac{3}{4}$ in. crenate nearly to the base, base always gradually attenuated; nerves 8 pair, often obscure; petiole $\frac{1}{2}$ in., often narrowly winged. *Spikes* 1-4 in., usually very numerous, dense but often interrupted towards the base, erect; bracts $\frac{1}{4}$ - $\frac{1}{2}$ in., spatulate-oblong, obtuse, apex recurved or the lowest ovate narrowed upwards, subglabrous in *Wallich's* specimens, often fulvous-hirsute; bracteoles $\frac{1}{2}$ in., oblong, erect. *Sepals* $\frac{1}{2}$ in. *Corolla* curved, pubescent without in the bud, lavender or white, cylindric base shorter than the much-ventricose upper part. *Stamens* glabrous, more monadelphous than usual. *Capsule* $\frac{1}{2}$ in., oblong, pubescent, 4-seeded. *Seeds* $\frac{1}{10}$ in., orbicular, pubescent; areoles 0.—*S. petiolaris*, *Nees*, is founded on two plants collected by Griffith, one in Khasia, one in Assam, which are both preserved at Kew, authenticated in *Nees' hand*; of these the Khasia one is identically *S. Brunonianus*, *Nees*, the other is taken as *S. petiolaris* below.

84. **S. maculatus**, *Nees in DC. Prodr.* xi. 190; leaves ovate (upper elliptic) acuminate at both ends nearly glabrous, spikes erect linear sub-interrupted at the base compound hairy, bracts oblong or cuneate-oblong, corolla scarcely $\frac{3}{4}$ in. ventricose. *Ruellia maculata*, *Wall. Pl. As. Rar.* iii. 33, t. 250.

KHASIA MTS., alt. 1-3000 ft., frequent, *Clarke*.

Shrub, 2-4 ft., lax. *Leaves* 5 by $2\frac{1}{2}$ - $3\frac{1}{2}$ in. (upper 5 by $1\frac{1}{2}$ -2 in.), serrate, mature glabrous or obscurely scabrid-puberulous on the nerves beneath, densely lineolate on the upper surface, often beautifully blotched with white when fresh, and as often uniformly green; nerves 10-11 pair; petiole $1\frac{1}{2}$ in. *Spikes* 1-3 in., forming lateral and terminal cymes or panicles, the uppermost leaves being small, caducous; bracts $\frac{1}{2}$ by $\frac{1}{8}$ in., linear-oblong (in the most characteristic form), but vary to cuneate-oblong bracteoles $\frac{1}{2}$ in., linear-oblong. *Calyx* $\frac{1}{4}$ - $\frac{1}{2}$ in., sub-5-partite; segments linear-oblong, unequal, subobtusely hairy. *Corolla* slightly curved, nearly glabrous, pale blue or lavender, cylindric base nearly as long as the greatly ventricose upper portion; limb subequal, segments short round reflexed. *Stamens* glabrous, monadelphous, exactly as in *S. Brunonianus*. *Capsule* $\frac{1}{2}$ in., oblong, pubescent, 4-seeded. *Seeds* $\frac{1}{10}$ - $\frac{1}{12}$ in. diam., orbicular, shaggy with long hairs; areoles rather small.—This was sent to *Wallich* from Silhet; it is common along the lower Khasia range 20 miles N. of Silhet. *Wallich's* picture, from a cultivated plant, shows the flowers larger than in any of the wild specimens seen; his statement that the species differs essentially from *S. monadelphus* by having the "filaments free at base" is altogether misleading; *Nees* perhaps went entirely on the somewhat coarse picture in *Wall. Pl. As. Rar.*

85. **S. monadelphus**, *Nees in Wall. Cat.* 7159, and in *Wall. Pl. As. Rar.* iii. 87, and in *DC. Prodr.* xi. 188; leaves ovate acuminate at both ends pubescent on the nerves beneath, spikes erect linear panicle very hairy, bracts ovate often squarrose, corolla scarcely $\frac{3}{4}$ in. ventricose.

KHASIA and JAINTEA MTS., alt. 3-5000 ft., frequent; *Wallich*, &c.

A rather rigid shrub, 2-3 ft.; branches often scabrous, hairy, quadrangular. *Leaves* $3\frac{1}{2}$ by 2 in., serrate, mature usually more or less hairy on both surfaces, not known to

occur blotched; nerves 9–11 pair. *Inflorescence* and *flowers* as of *S. maculatus*, but the bracts usually $\frac{1}{2}$ – $\frac{1}{4}$ in. wide towards their base. *Seeds* $\frac{1}{10}$ in. diam., pubescent.—Certainly closely allied to *S. maculatus*, and may be a high-level hairy form of it, as T. Anderson supposed; but besides the difference in the bracts fixed on by Nees the seeds are about double the diam., much more shortly dusky hairy.

86. ***S. petiolaris***, *Nees in DC. Prodr.* xi. 189, *in part*; leaves ovate acuminate at both ends mature nearly glabrous, spikes linear panicle hairy, bracts obovate-spathulate, corolla $1\frac{1}{4}$ in. ventricose. *S. maculatus*, T. Anders. in *Journ. Linn. Soc.* ix. 473, *chiefly*.

SIKKIM and BHOTAN, alt. 3–10,000 ft., common; Griffith, T. Anderson, &c. ASSAM; Griffith.

A lax shrub, perhaps not specifically distinct from *S. maculatus*; the leaves are often spotted as on it, the small seeds are similar; but the bracts are much broader (as Nees states), and the corolla is much larger, usually purplish or even rose instead of lavender blue; nerves 7 pair, i. e. much more distant than in *S. maculatus* & *monadelphus*. The species reaches a very high level, the Alpine specimens being smaller with smaller leaves but equally large flowers.

VAR. *tubiflos*; spikes divaricate densely glandular-hairy, corolla (unexpanded) more than 1 in. the ventricose portion scarcely $\frac{1}{2}$ in. diam.—Mishmee; Dailoo, Griffith (Kew Distrib. nn. 6095, 6103).—"Corolla deep blue; bracts lead-coloured" (Griffith's field-note).—This is very possibly a distinct species, though it must be closely allied to *S. petiolaris*; but it is very dangerous to assume the shape of the corolla from buds in this genus.

87. ***S. perfoliatus***, T. Anders. in *Journ. Linn. Soc.* ix. 471; leaves sessile lanceolate or elliptic much acuminate at both ends glabrous, spikes axillary cymose lax subcontinuous very viscid ciliate, bracts oblong linear-acuminate, capsule clavate 2-seeded. *Endopogon integrifolius*, Dalz. in *Hook. Kew Journ.* ii. 342; Dalz. & Gibs. *Romb. Fl.* 185. *Leptacanthus alatus*, *Wight Ic.* t. 1527.

W. DECCAN PENINSULA; Concan, Canara, Coorg, Law, Dalzell, &c.

Shrubby, nearly glabrous except the spikes. *Leaves* attaining 15 by $4\frac{1}{2}$ in., more often 6 by $1\frac{1}{4}$ – $2\frac{1}{2}$ in., very variable in size and in width, sparingly toothed, lineolate above; nerves 6–12 pair; petiole winged to the base, there dilated, auriculate, sometimes subdecurrent, never perfoliate. *Spikes* 2–5 in., closely cymed (or solitary) on very short axillary peduncles, very open, hardly interrupted even at the base in fruit; bracts $\frac{3}{4}$ by $\frac{1}{2}$ in.; bracteoles $\frac{1}{4}$ in., linear. *Calyx* $\frac{1}{2}$ – $\frac{1}{3}$ in. (elongate in fruit), divided nearly to the base, segments linear. *Corolla* $1\frac{1}{4}$ in., straight, glabrous without, hairy within; cylindric base of the tube nearly as long as the ventricose part. *Stamens* included; longer filaments glabrous. *Ovary* glabrous, style thinly hairy. *Capsule* $\frac{1}{4}$ – $\frac{1}{2}$ in., compressed. *Seeds* $\frac{1}{6}$ in., ovate, shaggy; areoles hardly any.

88. ***S. glutinosus***, *Nees in Wall. Pl. As. Rar.* iii. 86, and in *DC. Prodr.* xi. 194; viscous hairy, leaves ovate acute, spikes short, lowest bracts leaf-like upper obovate or oblong shorter than the calyx, corolla 2 in. T. Anders. in *Journ. Linn. Soc.* ix. 476. *Ruellia glutinosa*, Wall. *Cat.* 2350. *R. Jacquemontiana*, *Nees in DC. Prodr.* xi. 145.

KASHMIR, GURWHAL, KUMAON and NEPAL; Wallich, Jacquemont, &c.

A shrub, 2–5 ft.; branches villous. *Leaves* 3 by $1\frac{1}{2}$ in., base cuneate or rounded, crenate, villous on both surfaces; nerves 5–6 pair; petiole $\frac{1}{4}$ – $\frac{3}{8}$ in. *Spikes* densely capitate, or more often the lowest flowers are remote, solitary, opposite in the axils of bract-like leaves; bract $\frac{1}{4}$ – $\frac{1}{2}$ in., ovate, subfoliaceous, persistent; bracteoles $\frac{1}{2}$ in., oblong. *Calyx* $\frac{1}{2}$ – $\frac{1}{3}$ in., divided nearly to the base; segments linear, obtuse, viscous hairy. *Corolla* nearly glabrous; linear-cylindric base nearly as long as the ventricose part. *Stamens* glabrous. *Capsule* $\frac{3}{4}$ in., viscous-pubescent, 4-seeded.

Seeds $\frac{1}{8}$ – $\frac{1}{6}$ in., ovate, shaggy; areoles hardly any.—In spite of the enormous differences in the capsule and seeds, this plant has been much mixed with *Echmanthera tomentosa*.

Series B. *Nudata*. *Bracts* caducous, often before the flowers expand. *Flowers* clustered or in distant mostly opposite pairs; not most of them scattered alternate. *Seeds* in all hairy.—(All, except *S. Newii* from N. India or Malay Peninsula.)

* *Heads even in fruit capitate or ovate, not interrupted below.*

89. **S. geniculatus**, Clarke; nearly glabrous, leaves elliptic acuminate serrate, heads 2–3-fld., bracts large ovate acuminate caducous, bracteoles 0. *S. gracilis*, T. Anders. in Journ. Linn. Soc. ix. 474, not of Beddome.

MISHMEE; Griffith (Kew Distrib. n. 6116).

A small shrub; branches slender, somewhat zigzag. *Leaves* 5 by $1\frac{1}{2}$ in., base cuneate or rhomboid, serrulate, upper surface dense with raphides; nerves 6–7 pair; petiole $\frac{1}{2}$ in. *Peduncles* 1–3 in., with a node carrying two reduced caducous leaves at the middle, these geniculate and sometimes divided; heads $\frac{3}{4}$ in., 2–4 outer bract-like leaves barren, early caducous; bract $\frac{3}{4}$ by $\frac{1}{2}$ in., lineolate. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in., divided nearly to the base; segments linear, unequal, obtuse, glandular. *Corolla* $1\frac{1}{4}$ in., glabrous, purple. *Capsule* $\frac{3}{4}$ in., clavate, 4-seeded, glandular-pubescent. *Seeds* $\frac{1}{10}$ in., ovate, shaggy; areoles small.—Each flower is subtended by one bract, and there are 2–4 outer empty similar bracts; before the expansion of the corolla all the bracts but 1 or 2 of the uppermost fall, and these disappear before fruit.

VAR. *integra*; leaves nearly entire, sepals in fruit nearly $\frac{1}{2}$ in. hairy.—Khasia Mts.; Clarke. *Leaves* 5 by $2\frac{1}{4}$ in., subovate; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Seeds* $\frac{1}{8}$ in. and upwards.—Probably merely the fully-developed state of *S. geniculatus*, which Griffith collected in a colder country.

90. **S. capitatus**, T. Anders. in Journ. Linn. Soc. ix. 475; leaves ovate acuminate at each end nearly glabrous, bracts elliptic-oblong herbaceous pubescent as long as the calyx, bracteoles half as long as the calyx, corolla $1\frac{1}{2}$ –2 in. deep blue. *Ruellia capitata*, Wall. Cat. 2351, partly; Don Prodr. 120. *Goldfussia capitata*, Nees in Wall. Pl. As. Rar. iii. 88, and in DC. Prodr. xi. 173. *G. biceps*, Nees in Wall. Cat. 7161; and in Wall. Pl. As. Rar. iii. 88, and in DC. Prodr. xi. 172.—Acanthacea sp. Griff. Itin. Notes, 116, n. 213.

SUBTROPICAL HIMALAYA, alt. 1–5000 ft., from NEPAL to BHOTAN, common; Wallich, Griffith, H. f. & T., &c. PEGU; Karen Hills (fide T. Anderson).—DISTRIB. Ava.

A shrub, 1–3 ft. *Leaves* 6 by $2\frac{3}{4}$ in., serrate, obscurely lineolate above, minutely hairy on the nerves beneath; nerves 6–7 pair; petiole $1\frac{1}{2}$ in. *Peduncles* usually short, $\frac{1}{2}$ –1 in., sometimes 2–4 in., glabrous or pubescent. *Heads* 1 in. diam., closely capitate even in fruit, many-fld., outer empty bracts sometimes long leaf-like, sometimes hardly half so long as the heads, caducous; bracts proper to each flower elongate upwards, closely adpressedly softly white pubescent; bracteoles $\frac{1}{4}$ – $\frac{1}{2}$ in., ligulate, herbaceous, pubescent, caducous in fruit. *Calyx* $\frac{1}{2}$ in., deeply divided but connate into a hardened short tube at the base; segments narrowly lanceolate, softly hairy even in fruit. *Corolla* curved, tubular-ventricose, nearly glabrous. *Stamens* glabrous. *Ovary* glandular; style thinly patent hairy. *Capsule* $\frac{1}{2}$ in., slightly clavate, pubescent, 4-seeded. *Seeds* $\frac{1}{8}$ – $\frac{1}{6}$ in., ovate, shaggy; areoles small.

VAR. *nitida*; heads larger shining glabrate in fruit, bracteoles nearly as long as the calyx obovate-oblong glabrous fimbriate in fruit.—Khasia Mts.; Mousto, alt. 2500 ft., Clarke.—*Bracts* and *bracteoles* shining scarious in fruit from a short green base. *Seeds* $\frac{1}{2}$ in., densely silky.

91. **S. quadrangularis**, *Clarke*; leaves large subsessile broadly elliptic acuminate at both ends serrate minutely hairy, heads ovoid peduncled, bracts large ovate acute grey pubescent caducous, corolla $1\frac{1}{2}$ in. pubescent without. *Ruellia quadrangularis*, *Wall. Cat.* 2358. *R. bracteata*, *Wall. Cat.* 2357 b only. *Goldfussia bracteata*, *Nees in Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 173.

NEPAL; *Wallich*. KUMAON; Mohargari, alt. 6500 ft., and Kalamundi, alt. 8500 ft., *Strachey & Winterbottom*.

Stem 2 ft., herbaceous, acutely quadrangular, somewhat pubescent upwards. *Leaves* 8 by $3\frac{1}{2}$ in., shortly scabrous-setulose above, remotely minutely hairy beneath; nerves 13 pair. *Peduncles* 1-4 in., 1-2 in each axil or the uppermost-subumbellate, hairy, clavate, quadrangular upwards, 1-headed; heads in flower $1\frac{1}{2}$ in.; bracts $\frac{3}{4}$ -1 in., deciduous before the flowers expand; bracteoles 0. *Calyx* $\frac{1}{2}$ in., distinctly gamosepalous, subequally 5-fid; segments linear-oblong, green, very viscidly golden-pubescent. *Corolla* in shape nearly as of *S. Dalhousianus*. *Capsule* not seen.

92. **S. pentstemonoides**, *T. Anders. in Journ. Linn. Soc.* ix. 477, in part; leaves elliptic acuminate at both ends glabrous, bracts orbicular concave whitened glabrous, bracteoles 0, calyx pubescent, corolla $1\frac{1}{2}$ in. nearly glabrous pale purple. *Ruellia pentstemonoides*, *Wall. Cat.* 2340. *R. Cephalotes*, *Wall. Cat.* 2352. *R. capitata*, *Wall. Cat.* 2351, partly. *Goldfussia pentstemonoides*, *Nees in Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 175; *Wight Ic.* t. 1510.

SUBTROPICAL HIMALAYA, alt. 1-6000 ft., from NEPAL to BHOTAN, frequent; *Wallich, H. f. & T., &c.*

A much branched shrub, 3-8 ft. diam.; stems glabrous. *Leaves* $6\frac{1}{2}$ by $2\frac{1}{2}$ in., closely serrate, lineolate on both surfaces; nerves 7 pair; petiole $\frac{1}{2}$ in. *Peduncles* 1-3 in., sometimes glandular-hairy, 1-2 together, mostly 1-3-headed; heads $\frac{1}{2}$ -1 in., young exactly globular, outer bracts enclosing the heads; but in some of *Wallich's* examples the young heads are oblong-cylindric, strobiliform; bracts $\frac{1}{4}$ - $\frac{1}{2}$ in., obtuse, early caducous. *Calyx* $\frac{1}{2}$ in., in fruit often $\frac{1}{2}$ in., divided nearly to the base, segments linear. *Corolla* more or less curved; narrow part of the tube sometimes minutely pubescent. *Stamens* glabrous. *Capsule* $\frac{3}{4}$ in., oblong-clavate, glandular-pubescent, 4-seeded. *Seeds* $\frac{1}{8}$ in., ovate, silky; areoles very small.

VAR. *flexuosa*; small, branches short flexuose rooting, peduncles long with 1 small head. *Ruellia flexuosa*, *Wall. Cat.* 2412. *Goldfussia flexuosa*, *Nees in Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 175.—"India," *Herb. Wight*. Branches 1- $1\frac{1}{2}$ foot, apparently prostrate. *Leaves* $2\frac{1}{2}$ by $\frac{3}{4}$ in., thinly herbaceous; nerves 5 pair.—The example in *Herb. Wight* looks very unlike the Himalayan *S. pentstemonoides*; and, though taken up as a species by *Nees*, *T. Anderson* seems to have been so dissatisfied about it that he has left it out altogether. But there is a piece of the same thing mixed in *Wallich's* herbarium with *Ruellia Cephalotes* (*Wall. Cat.* 2352, type sheet); and it is probably an alpine starved (or cultivated?) form of *S. pentstemonoides*.

93. **S. Dalhousianus**, *Clarke*; leaves elliptic acuminate at both ends hairy, bracts orbicular concave whitened glabrous, bracteoles 0, calyx glabrate or sparingly hairy, corolla nearly 2 in. glabrous purple. *S. pentstemonoides*, *T. Anders. in Journ. Linn. Soc.* ix. 477, partly. *Goldfussia Dalhousiana*, *Nees in DC. Prodr.* xi. 174; *Wight Ic.* t. 1509.

W. TEMPERATE HIMALAYA, alt. 6-8000 ft.; from Kashmir to Kumaon, frequent; *Lady Dalhousie, Thomson, &c.*

A suberect shrub, 2-3 ft.; stems hairy. *Bracts* scarcely $\frac{1}{2}$ in., caducous; outermost oblong, green upwards, small, not enclosing the heads. *Calyx* in the typical form glabrous, subscarios, lobes linear-oblong, sometimes minutely softly hairy.—United with *S. pentstemonoides* by *T. Anders.*, from which it differs in habit, in having much more hairy leaves and less hairy calyx. It also grows at a different level.

94. **S. multidentens**, *Clarke*; leaves ovate shortly acuminate at both ends minutely sparsely hairy on both surfaces, heads panicle viscos hairy, bracts small obovate viscos hairy deciduous, calyx viscos-pubescent, corolla $1\frac{3}{4}$ in. purple.

SIKKIM, alt. 3-6000 ft.; *J. D. H.*, &c. BHOTAN; *Griffith, Herb. Propr.* n. 2398.

Leaves $7\frac{1}{2}$ by 4 in., closely regularly serrate (often with more than 100 teeth to the leaf; both surfaces with few remote minute hairs and small scattered raphides. *Bracts* $\frac{1}{2}$ in., very viscos-hairy; bracteoles $\frac{1}{2}$ in., linear-oblong. *Capsule* $\frac{3}{4}$ in., viscos-pubescent, 4-seeded. *Seeds* $\frac{1}{2}$ in., subquadrate, fulvous-hairy; areoles sub-obsolete.—This is the so-called Sikkim *S. Dalhousianus*; it is nearer the true *S. pentstemonoides*, but the young heads are never glabrous globose as in that, and the panicle is compound very glandular-hairy. The corollas in Griffith's Bhotan example are not more than $1\frac{1}{4}$ in., but are not thoroughly expanded.

95. **S. rhombifolius**, *Clarke*; leaves subsessile rhomboid-ovate shortly acute at both ends glabrous, bracts small elliptic concave caducous, bracteoles 0, corolla $1\frac{1}{2}$ – $1\frac{3}{4}$ in. nearly glabrous. *Goldfussia sessilis*, *Nees in DC. Prodr.* xi. 172, not *Strobilanthes sessilis*, *Nees*.

ASSAM; *Jenkins*.

Branches long, subterete, glabrous. *Leaves* (often unequal) $3\frac{1}{2}$ by 2 in., remotely serrulate, lineolate on both surfaces; nerves 5 pair. *Peduncles* 1–3 in., 1–3-headed; heads $\frac{1}{2}$ in. diam., closely capitate; all the bracts early caducous. *Calyx* in flower $\frac{1}{4}$ – $\frac{1}{2}$ in., divided nearly to the base; segments narrowly lanceolate, fuscous pubescent. *Corolla* nearly as of *S. pentstemonoides*, purple-mouthed. *Filaments* glabrous, longer hairy near the base. *Capsule* not seen.—This seems very near *S. pentstemonoides*, differing little but in the shape of the leaves; the heads however, by the time the first flowers expand, have lost all their bracts, which gives them a very different look.

96. **S. oligocephalus**, *T. Anders. ms. in Herb. Kew*; leaves elliptic caudate-acuminate nearly glabrous ciliate, young heads globose, bracts round concave glabrous, bracteoles 0, calyx hairy, corolla $1\frac{1}{4}$ in. pubescent without dark-purple.—*Goldfussia* sp. n. 24, *Herb. Ind. Or. H. f. & T.*

UPPER SIKKIM, alt. 5-7000 ft.; *Yoksun, J. D. H.*, &c.

A small shrub, 1-2 ft.; branches slender, terete, glabrous. *Leaves* attaining $6\frac{1}{2}$ by 3 in. (usually smaller much narrower), base cuneate, minutely remotely denticulate, sparingly thinly lineolate, sparsely puberulous especially toward the margins beneath; nerves 5-6 pair; petiole $\frac{3}{4}$ in. *Bracts* as in *S. pentstemonoides*, but rather smaller. *Corolla* viscos-pubescent without, usually nearly black.—When dried hardly distinguishable from *S. pentstemonoides* but by the smaller heads and the ciliate leaves.

VAR.? *Treutleri*; heads slightly elongate, bracts ovate-lanceolate herbaceous hairy, bracteoles $\frac{1}{2}$ in. linear, sepals $\frac{2}{3}$ – $\frac{3}{4}$ in.—Sikkim, alt. 9-10,000 ft., frequent on Tonglo and Sundukphoo, *Treutler*, &c.

97. **S. dasyspermus**, *Kurz in Journ. As. Soc.* 1873, pt. ii. 94; leaves elliptic or ovate acuminate very sparsely minutely hairy, heads even in fruit capitate forming (by the falling of the floral leaves) quasi-panicles, bracts small oblong caducous, corolla 1 in. blue glabrous without.

PEGU; *Kurz*.

An erect, nearly glabrous herb, 3-4 ft. (*Kurz*); branches obscurely quadrangular. *Leaves* $5\frac{1}{2}$ by $2\frac{1}{2}$ in., base suddenly shortly acuminate (the uppermost and reduced floral leaves sessile cordate), crenate-serrate, subglabrous, minutely lineolate above; nerves 7-8 pair; petiole $0\frac{1}{2}$ in. *Heads* few-fl., glandular-hairy; peduncles $\frac{1}{2}$ – $\frac{3}{4}$ in.; bracts $\frac{1}{2}$ in.; bracteoles $\frac{1}{2}$ in., obovate-oblong, caducous. *Calyx* $\frac{1}{3}$ – $\frac{1}{2}$ in., divided nearly to the base; segments linear-ligulate. *Corolla* nearly straight; cylindric base

about as long as the moderately-widened ventricose part; segments ovate. *Filaments* and *style* sparsely hairy. *Capsule* $\frac{1}{2}$ in., narrowly elliptic, pubescent upwards, 4-seeded. *Seeds* $\frac{1}{8}$ in., ovate, silky; areoles hardly any.—Kurz rightly refers this to the neighbourhood of *S. pentstemonoides*.

98. **S. discolor**, *T. Anders. in Journ. Linn. Soc.* ix. 477; leaves elliptic cuspidate-acuminate glabrous, heads cymose running into compound panicles, bracts fugacious, calyx hairy, corolla $1\frac{1}{4}$ in. nearly glabrous. *Goldfussia discolor*, *Nees in DC. Prodr.* xi. 172 (excl. West Himalayan examples).

BHOTAN, ASSAM, and KHASIA MTS.; *Griffith (Herb. Propr.* nn. 2399, 2400; *Kew Distrib.* nn. 6105, 6120).

A shrub, closely resembling *S. pentstemonoides* and *S. sessilis*; differing from the former in having the leaves more shortly petioled, less sharply toothed, the inflorescence more compound; from the latter in the leaves cuspidate acuminate. In the type examples of *Nees* the leaves are scarcely whitened beneath. *Bracts* not seen, oblong-lanceolate, *vide Nees*.

VAR. nudicalyx; leaves densely lineolate above coriaceous very white beneath, bracts $\frac{1}{2}$ in. obovate, sepals glabrate lineolate. *Goldfussia* sp. n. 25, *Herb. Ind. Or. H. f. & T.*—Khasia, alt. 4000 ft.; Mausmai Falls, *Griffith* (*Kew Distrib.* n. 6120); Cherra, *H. f. & T.*—The type examples of this collected by J. D. H. look like a very distinct species; but some of the pieces of *Griffith* have the sepals glandular hairy.

99. **S. isophyllus**, *T. Anders. in Cat. Hort. Calcutt.* 43, and in *Journ. Linn. Soc.* ix. 478; leaves linear-lanceolate attenuate at both ends glabrous, heads numerous small cymed, bracts elliptic obtuse green shorter than the calyx, bracteoles nearly as long as the bracts, corolla 1 in. nearly glabrous lavender. *Goldfussia isophylla*, *Nees in Wall. Cat.* 7162, and in *Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 176; *Bot. Mag.* t. 4363; *Maudsl. Bot.* t. 244. *Strobilanthes Goldfussia*, *Dalz. & Gibs. Bomb. Fl. Suppl.* 71, *excl. syn.*

KHASIA MTS., or adjoining parts of Silhet or Assam. All the examples are of cultivated plants.

A nearly glabrous, erect, very ramous shrub, 1-2 ft. *Leaves* 3 by $\frac{1}{2}$ – $\frac{1}{2}$ in., opposite, subequal, entire or slightly serrulate, covered with raphides on both surfaces; nerves 4-5 pair; petiole 0– $\frac{1}{4}$ in. *Heads* $\frac{1}{2}$ in. diam., 1-4-fl., terminal but appearing axillary cymed, the reduced leaves on the short axillary branches being caducous; bracteal leaves to the heads caducous; bract $\frac{1}{2}$ in., green, nearly glabrous, subsistent; bracteoles $\frac{1}{2}$ in., linear-oblong, green, nearly glabrous. *Calyx* $\frac{1}{4}$ in., divided nearly to the base, pubescent; segments sublinear. *Corolla* curved; cylindric base much shorter than the ventricose portion, lobes short round. *Stamens* and *style* hairy. *Capsule* nearly $\frac{1}{2}$ in., glabrous, 4-seeded. *Seeds* $\frac{1}{10}$ in., ovate, silky; areoles hardly any.

100. **S. anisophyllus**, *T. Anders. in Cat. Hort. Calcutt.* 43, and in *Journ. Linn. Soc.* ix. 478; leaves very unequal or pseudo-alternate lanceolate acuminate at both ends glabrous, heads small often cymed, bracts elliptic obtuse green about as long as the calyx, bracteoles rather shorter than the bracts, corolla $1\frac{1}{4}$ in. nearly glabrous lavender. *Ruellia anisophylla*, *Wall. Cat.* 2349; *Hook. Fl. Exot.* t. 191. *R. persicifolia*, *Griff. Ilin. Notes*, 70; *Bot. Reg.* t. 955. *Goldfussia anisophylla*, *Nees in Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 176; *Bot. Mag.* t. 3404.

KHASIA MTS., alt. 1-4000 ft., common; *Wallich*, &c.

A shrub, 2-3 ft. *Leaves* $3\frac{1}{2}$ by $\frac{3}{8}$ –1 in.; the opposite leaf of each pair $1\frac{1}{4}$ by $\frac{1}{2}$ in. or obsolete.—Except in the unequal, rather broader leaves, this wholly agrees with

S. isophyllus; and as *S. isophyllus* cannot be found wild, it may prove to be a reverſionary (under cultivation) form of *S. anisophyllus*.

101. ***S. cratægifolius***, *T. Anders. in Journ. Linn. Soc.* ix. 477; leaves subsessile elliptic or obovate crenulate glabrous, heads 1-5-flid. terminal solitary on numerous short leafy lateral branches hairy, bracts and bracteoles linear-oblong about as long as the calyx, corolla $1\frac{1}{4}$ in. blue.

MOULMEIN; *Griffith, Parish.*

Branches elongate (15 in. at least), glabrous, subsimple with numerous shortened small-leaved lateral branches in opposite pairs each terminated by a flower-head. *Leaves* $2\frac{1}{4}$ by 1 in. (those on the lateral branches $\frac{1}{4}$ - $\frac{1}{2}$ in.), lineolate above, pale leathery beneath; nerves 6 pair. *Peduncles* 0- $\frac{1}{2}$ in.; bract $\frac{1}{3}$ - $\frac{1}{2}$ by $\frac{1}{4}$ in., green, prominently white-ciliate; bracteoles similar to, rather smaller. *Sepals* $\frac{1}{2}$ in., linear-lanceolate, green, ciliate, $\frac{1}{2}$ in. in fruit. *Corolla* nearly straight, glabrous; cylindric base much shorter than the ventricose portion. *Capsule* $\frac{1}{2}$ in., broadly clavate-elliptic, minutely pubescent, 2-seeded. *Seeds* $\frac{1}{2}$ in., fulvous-shaggy; areoles very small.

**** Heads elongate mostly interrupted 'below, frequently all the flowers scattered or only a few at the tips of the spikes capitellate.**

102. ***S. lamiifolius***, *T. Anders. in Journ. Linn. Soc.* ix. 476, partly; leaves ovate acute nearly glabrous, young heads strobilate, bracts ovate acute scarcely pubescent, bracteoles oblong about as long as the calyx, corolla $1\frac{1}{4}$ - $1\frac{1}{2}$ in. nearly glabrous. *Ruellia rotundifolia*, *Don Prodr.* 120. *R. lamiifolia*, *Wall. Cat.* 2347. *Goldfussia lamiifolia*, *Nees in Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 172.

NEPAL; *Wallich.*

Stems 15 in., flexuose, glabrous. *Leaves* 2 by $1\frac{1}{4}$ in., base rounded or shortly acuminate, serrate, minutely pubescent on the nerves beneath, lineolate on the upper surface; nerves 6-7 pair; petiole $\frac{1}{2}$ in. *Spikes* peduncled, mostly solitary, 1 in. in flower scarcely 2 in. not interrupted in fruit; bracts $\frac{1}{2}$ in.; bracteoles $\frac{1}{2}$ in., caducous. *Calyx* $\frac{1}{2}$ in., in fruit $\frac{1}{2}$ in., divided nearly to the base; segments linear-lanceolate, pubescent. *Corolla* purple (Nees). *Capsule* $\frac{1}{2}$ in., pubescent, 4-seeded. *Seeds* $\frac{1}{2}$ in., ovate, silky; areoles hardly any.

103. ***S. pauper***, *Clarke*; leaves lanceolate acuminate at both ends puberulous beneath or glabrate, heads oblong in fruit interrupted small or 1-flid., bracts obovate quadrate shorter than the calyx, corolla $1\frac{1}{2}$ in. purple. *S. lamiifolius*, *T. Anders. in Journ. Linn. Soc.* ix. 476, partly.—*Goldfussia* sp. n. 26, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 4-6000 ft.; Nunklow and Nungbree, *H. f. & T.*, &c.

A meagre shrub, 1-2 ft.; branches upwards hairy or glabrate. *Leaves* $3\frac{1}{4}$ by $\frac{3}{4}$ -1 in., minutely toothed or subentire, densely obscurely lineolate; nerves 6-7 pair; petiole $\frac{1}{2}$ -1 in. *Spikes* in fruit sometimes 2 in., usually shorter, or the flowers occasionally nearly all solitary; bracts scarcely $\frac{1}{2}$ in., tip obtusely triangular, green, subpubescent, caducous; bracteoles $\frac{1}{2}$ in., oblong, caducous. *Calyx* $\frac{1}{4}$ in., in fruit $\frac{1}{2}$ in., sub-5-partite; segments linear-spathulate, glandular-pubescent. *Corolla* nearly glabrous; narrow cylindric base nearly as long as the ventricose part. *Stamens* glabrous. *Capsule* $\frac{1}{2}$ in., pubescent, 4-seeded. *Seeds* $\frac{1}{10}$ - $\frac{1}{8}$ in., ovate, shaggy; areoles small.

104. ***S. extensus***, *Nees in DC. Prodr.* xi. 195; leaves subsessile ovate acuminate hairy base rounded or cordate, spikes long interrupted below, bracts ovate, corolla $1\frac{1}{4}$ - $1\frac{1}{2}$ in. nearly glabrous purple. *T. Anders. in Journ. Linn. Soc.* ix. 476. *Goldfussia extensa*, *Nees in Wall. Cat.* 7160, and in *Wall. Pl. As. Rar.* iii. 88.

KHASIA MTS., alt. 4-6000 ft., common; *Wallich, &c.* ASSAM; *Griffith, Mrs. Mack.*

An erect shrub, 1-2 ft.; branches hairy. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$ in., upper cordate sessile, lower sometimes short-petioled, serrate; nerves 5 pair, springing near the leaf-base. *Spikes* 2-6 in., terminal, hairy, dense at the tip, usually much interrupted below; the lowest flowers often distant solitary in the axil of altogether leaf-like persistent bracts; bract proper $\frac{1}{2}$ - $\frac{3}{4}$ in., herbaceous, glandular, deciduous; bracteoles $\frac{1}{2}$ in., elliptic. *Calyx* $\frac{1}{3}$ - $\frac{1}{2}$ in. (or more in fruit), divided nearly to the base; segments linear-oblong, subobtuse, glandular-pubescent. *Corolla* curved; narrow cylindric base of the tube hardly so long as the ventricose part. *Filaments* glabrous; style thinly hairy. *Capsule* $\frac{1}{3}$ - $\frac{2}{3}$ in., glandular-pubescent, 4-seeded. *Seeds* $\frac{1}{8}$ in., ovate, hairy; areoles small.

105. **S. phyllocaulos**, *Clarke*; leaves short-petioled ovate acute hairy, spikes long dense interrupted below in fruit, bracts ovate, corolla $1\frac{1}{4}$ in. nearly glabrous purple.

KHASIA MTS., alt. 5000 ft.; Moflong, *J. D. H.*; Dingling, *Clarke*.

Stems stout, hairy; internodes not half as long as the leaves. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., without the acumination characteristic of *S. extensus*, base of the lower leaves shortly acuminate, serrations often 40-50 to the leaf (rarely 20 in *S. extensus*), upper surface softly densely adpressedly hairy, lower softly patently hairy reticulately nervose; nerves 8 pair, subequally distant (not all springing near the base of the leaf). *Inflorescence, flowers and capsule* exactly as of *S. extensus*.—So unlike *S. extensus* in its densely leafy stem that it has been sorted in the Herbarium with *Echmanthera leioperma*, which it exceedingly resembles; but it is difficult to separate it from *S. extensus* by any technical character.

106. **S. Newii**, *Beddome ms.*; leaves petioled ovate acute pubescent, spikes much interrupted panicled, bracts lanceolate, corolla $1\frac{1}{4}$ - $1\frac{1}{2}$ in. nearly glabrous purple. *S. extensus*, *Bedd. Ic. Pl. Ind. Or. t. 202, not of Nees*.

W. MYSORE; Manjeerabad, *New* (fide *Beddome*).

A small shrub; branches puberulous, glandular hairy towards the tips. *Leaves* 2 by $1\frac{1}{4}$ in., base rounded or subcordate, serrate, puberulous scabrous above pubescent beneath; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. (uppermost leaves sessile). *Panicles* 6-10 in.; flowers nearly all opposite distant. *Calyx and corolla* nearly as of *S. extensus*.—*Col. Beddome* published this as *S. extensus*, to which it is no doubt closely allied, but the leaves will not match, and the bracts are totally different, very hairy, early caducous, the bracteoles subobsolete.

107. **S. alatus**, *Nees in DC. Prodr. xi. 194*; leaves petioled ovate acute hairy, spikes early panicled, flowers all distant, bracts narrowly oblong caducous, corolla $1\frac{1}{4}$ in. nearly glabrous purple. *T. Anders. in Journ. Linn. Soc. ix. 476 (excl. Sikkim examples)*. *S. reflexus*, *Nees l. c. 194*. *S. attenuatus*, *Nees l. c. 193 (excl. syn.)*. *Ruellia urticifolia*, *Wall. Cat. 2346*.

W. TEMPERATE HIMALAYA, alt. 6-10,000 ft., common; from Kashmir to Kumaon. —DISTRIB. N.E. Cabul.

A shrub, 2-4 ft., erect, viscous-hairy. *Leaves* 5 by $2\frac{3}{4}$ in., upper sessile, lower long-petioled, base cordate rounded or attenuate, serrate; nerves 7-8 pair; petiole 1-3 in., linear or winged upwards. *Spikes* (by the early fall of the bracts) forming terminal panicles; upper flowers soon in distant pairs, not capitate; bracts narrow-lanceolate or oblong, caducous; upper hardly so long as the calyx; bracteoles $\frac{1}{2}$ in., narrowly oblong, caducous. *Calyx* $\frac{1}{4}$ - $\frac{1}{2}$ in., deeply divided; segments unequal, linear, obtuse, green, viscous-hairy. *Corolla* ventricose, mouth curved, constricted base hardly longer than the calyx, 2 hairy lines within. *Stamens* glabrous. *Ovary* glandular, style very remotely minutely hairy. *Capsule* $\frac{3}{4}$ in., narrowly elliptic, glandular-hairy,

4-seeded. *Seeds* $\frac{1}{2}$ in., ovate, shaggy; areoles hardly any.—The lower long-petioled leaves are usually cordate, but leaves acuminate at the base occur on the same plant. The species is better distinguished by the tips of the spikes having the flowers (quite early) spicate not capitate, and all the bracts very narrow; but the leaves about the base of the panicle are cordate ovate acuminate. Nees has written this species up under 3 names in the Kew Herbarium: as *S. alatus*, which is altogether right; as *S. attenuatus*, which is erroneous so far as he doubtfully meant it for *Ruellia attenuata*, Wall. & Nees (an *Echinacanthus*); and as *S. extensus*, which is a blunder.

108. ***S. Lachenensis*, Clarke**; leaves ovate attenuated at the base laxly hairy, spikes long interrupted at the base, bracts sessile elliptic truncate at the base exceeding the calyx caducous, corolla middle-sized glabrate without.

SIKKIM HIMALAYA; Lachen, alt. 10,000 ft., *J. D. H.*

Branches elongate, with lax white patent hairs. *Leaves* $2\frac{1}{2}$ by $1\frac{1}{2}$ in., obtuse or triangular, base (even in the uppermost) acuminate, decurrent. *Spikes* 2–5 in., solitary, simple; lower bracts $\frac{1}{2}$ by $\frac{1}{4}$ in., green, entire, exactly truncate, not at all cordate. *Corolla* (not expanded) $\frac{3}{4}$ in., with a few scattered lax hairs towards the apex without.—This has been referred as a Sikkim form to *S. alatus*, to which it is certainly allied; but no one of the numerous examples of *S. alatus* will it match even reasonably well.

109. ***S. collinus*, Nees in Wall. Pl. As. Rar. iii. 86, and in DC. Prodr. xi. 192**; leaves large elliptic acuminate glabrous, spikes forming thin terminal pubescent panicles, bracts narrowly elliptic overtopping the calyx, corolla 2 in. nearly glabrous. *T. Anders. in Journ. Linn. Soc. ix. 476.* *Ruellia collina, Wall. Cat. 2343.*

PENANG; *G. Porter.*

Branch-tips stout, glabrous; internodes elongate. *Leaves* $9\frac{1}{2}$ by $3\frac{1}{2}$ in., base cuneate, repand-crenate, bearing raphides on both surfaces; nerves 7 pair; petiole $\frac{3}{4}$ in. *Spikes* 3–4 in., with few flowers in remote opposite pairs, early running into a few-branched panicle; bracts $\frac{1}{2}$ in., concave; bracteoles 0. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in., divided nearly to the base; segments linear, with weak subulate pubescent tips. *Corolla* slightly curved, cylindric base as long as the ventricose part. *Capsule* $\frac{3}{4}$ in., clavate-oblong, puberulous, 4-seeded. *Seeds* $\frac{1}{2}$ in., ovate, shortly fulvous-hairy; areoles small.—Habit and calyx much like those of the large *Asystasias*, but the capsule and seeds are of *Strobilanthes*.

110. ***S. lancifolius*, T. Anders. in Journ. Linn. Soc. ix. 480**; leaves elliptic acuminate at both ends glabrous, spikes linear interrupted hairy collected into terminal panicles, bracts oblong obtuse green shorter than the calyx deciduous, corolla $1\frac{1}{4}$ in. minutely pubescent without deep-blue.

MOULMEIN; *Parish. TENASSERIM; Beddome.*

A shrub; branches terete. *Leaves* 7 by 3 in., widest about the middle, serrate, minutely lineolate above; nerves 7–8 pair; petiole 1 in. *Spikes* ascending, straight; flowers nearly all in opposite pairs; bracts $\frac{1}{4}$ – $\frac{1}{2}$ in.; bracteoles $\frac{1}{4}$ in., linear-oblong, obtuse, deciduous. *Calyx* $\frac{1}{2}$ – $\frac{3}{4}$ in., subequally divided nearly to the base; segments linear-oblong, obtuse, pubescent. *Corolla* nearly straight, funnel-shaped, ventricose upwards; segments ovate, dense rows of long white hair within. Longer filaments white hairy. *Capsule* $\frac{3}{4}$ in., glabrate, 4-seeded. *Seeds* shaggy.

111. ***S. denticulatus*, T. Anders. in Journ. Linn. Soc. ix. 483**; leaves long-petioled elliptic acuminate at both ends fuscous-pubescent on the nerves beneath, spikes linear interrupted fuscous-pubescent, flowers (or many of them) in distant pairs, bracts lanceolate. *Ruellia denticulata, Wall. Cat. 2418.* *Asystasia denticulata, Nees in Wall. Pl. As. Rar. iii. 89, and in DC. Prodr. xi. 164.*

KHASIA Mts.; *Wallich.* PATKOYE Mts. (in S.E. Assam), at the river Namyoon (by error Kamyoon in Griffith's Journals); *Griffith* (Kew Distrib. n. 6112).

A shrub; branches quadrangular, scabrid puberulous upwards. *Leaves* 6 by $2\frac{1}{2}$ in., crenulate-dentate, with small raphides on both surfaces, paler beneath; nerves 12 pair; petiole $\frac{1}{2}$ –3 in. (often very unequal in the opposite pairs). *Spikes* 1–4 in., axillary, 1 or 2 together, interrupted, slender even before flower-time; bracts $\frac{1}{4}$ – $\frac{1}{2}$ in., green, slightly pubescent; bracteoles $\frac{1}{2}$ in. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in., divided nearly to the base; segments lanceolate, scarcely acute, fuscous-pubescent. *Corolla* $1\frac{1}{4}$ in., pubescent without, nearly straight; linear-cylindric part of the tube nearly as long as the ventricose part. *Filaments* very hairy (Nees). *Capsule* not seen.

112. *S. microcarpus*, *T. Anders. in Journ. Linn. Soc.* ix. 482; leaves large petioled ovate acuminate coarsely serrate hirsute on both surfaces, flowers paniced distant mostly in opposite pairs, bracts and bracteoles very small, corolla $\frac{3}{4}$ in. glabrous without.

TENASSERIM or ANDAMANS; *Helper* (Kew Distrib. n. 6113).

A shrub; branches terete, swollen at the nodes, glabrous. *Leaves* 8 by $4\frac{1}{2}$ in., base broadly rhomboid, hirsute with white hairs which are stellately clustered on the upper surface, closely minutely lineolate on both surfaces; nerves 15 pair; petiole $1\frac{1}{2}$ –2 in. *Inflorescence*, viscidly glandular-hairy; spikes proper apparently laxly few-fl., axillary and running into a terminal panicle; bracts $\frac{1}{2}$ in., linear; bracteoles similar to the bracts. *Calyx* $\frac{1}{2}$ in., divided nearly to the base, viscous; segments linear, more or less unequal. *Corolla* nearly straight, very hairy within; cylindric base much shorter than the ventricose portion; segments short. *Capsule* scarcely $\frac{1}{2}$ in., clavate, 2-seeded where examined.—*Helper's* examples are in bad condition, with the leaves (both cauline and floral) all detached; and the species very possibly is not placed here correctly.

113. *S. angustifrons*, *Clarke*; leaves elliptic acuminate at both ends nearly glabrous, spikes lateral and terminal paniculate with capitellate tips, bracts oblong acuminate caducous, corolla $1\frac{1}{2}$ in. nearly glabrous purple.—*Strobilanthes* sp. n. 29, *Herb. Ind. Or. H. f. & T., partly*. *Goldfussia Edgeworthiana*, *Nees in DC. Prodr.* xi. 173?

N.W. HIMALAYA; Deyra, alt. 2500 ft., *Thomson*; Kangra and Dhurmsala, alt. 3–6000 ft., *Clarke*.

A suberect shrub, 2–3 ft.; branches glabrous. *Leaves* $4\frac{1}{2}$ by $1\frac{3}{4}$ in., upper all attenuate at the base, serrulate, upper surface and margin minutely hairy or glabrous, raphides small on both surfaces; nerves 6 pair; petiole $\frac{1}{2}$ in. *Spikes* forming short irregular panicles, branches nearly glabrous; lower bracts leaf-like, lanceolate (base never cordate), upper shorter than the calyx; bracteoles $\frac{1}{2}$ in., linear, scarcely pubescent. *Sepals* $\frac{1}{2}$ – $\frac{3}{4}$ in., linear, pubescent. *Corolla* nearly as of *S. alatus*, but much narrower. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in., sparsely pubescent, 4-seeded. *Seeds* scarcely $\frac{1}{2}$ in., orbicular, hairy; areoles hardly any.—This differs from *S. alatus* by the slenderer corolla, capsule and seeds, and by the uppermost leaves being narrowed never cordate at the base.

114. *S. agrestis*, *Clarke*; leaves ovate acuminate at both ends sparsely hairy on both surfaces, spikes elongate paniculate with capitellate tips, bracts shorter than the calyx obovate pubescent caducous, corolla 2 in. glabrous without.

SUBTROPICAL SIKKIM and W. BHOTAN, alt. 2–5000 ft., frequent; *Clarke*.

An erect, branched undershrub, 1–2 ft.; branches upwards quadrangular, pubescent. *Leaves* 4 by 2 in., often unequal, shortly acuminate at the base, serrulate, shortly sparsely hairy above, minutely pubescent beneath, minutely lineolate on both surfaces; nerves 6 pair; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Spikes* 1–4 in., hairy, lower flowers in distant pairs; bracts $\frac{1}{2}$ in.; bracteoles $\frac{1}{2}$ in., linear-oblong. *Corolla* slightly curved, rather narrowly tubular-ventricose, lavender colour. *Capsule* and *seeds* as of *S. angustifrons*, to which it is nearly allied.

VAR. *hemiotis*; one leaf of every pair sessile cordate less than $\frac{1}{2}$ the length of the other.—Khasia Mts., *Herb. Watt.*

115. **S. Thomsoni**, *T. Anders. in Journ. Linn. Soc.* ix. 478; leaves ovate or elliptic acuminate at both ends glabrous, spikes short cymose or fascicled axillary shorter than the leaves glabrous or viscous-hairy, bracts and bracteoles very small, corolla $1\frac{1}{2}$ in. purple.—*Strobilanthes* sp. n. 30, *Herb. Ind. Or. H. f. & T.*

SUBTROPICAL SIKKIM and W. BHOTAN, alt. 2–6000 ft., common; *J. D. H., T. Anders., &c.*

A shrub, 3–5 ft.; branches elongate, flexuose, glabrous. *Leaves* $4\frac{1}{2}$ – $6\frac{1}{2}$ by $2\frac{1}{2}$ in., serrate, with small raphides on both surfaces; nerves 6 pair; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., sometimes 0. *Spikes* 1–3 in., in nearly all the axils, densely divided from the base, the flowers nearly all in crowded but distinct opposite pairs; lower bracts resembling reduced leaves, lanceolate; upper $\frac{1}{2}$ in. spatulate, glabrous pubescent or very viscous-hairy. *Calyx* in flower often less than $\frac{1}{2}$ in., in fruit sometimes nearly $\frac{1}{2}$ in., divided nearly to the base; segments equal or unequal, glaucous or green, hairy. *Corolla* somewhat curved, minutely pubescent, ultimately glabrate. *Capsule* scarcely $\frac{1}{2}$ in., minutely pubescent, 4-seeded. *Seeds* $\frac{1}{10}$ in., orbicular, innumerable fine white hairs springing out on applying water; areoles very small.—There is a wide series of forms here collected, varying much in the size and hairiness of the calyx, but all remarkable by the fasciculate axillary inflorescence. Possibly T. Anderson also included here *S. agrestis*, which has different inflorescence, and much larger capsules.

116. **S. lævigatus**, *Clarke*; nearly glabrous, leaves elliptic acuminate at both ends serrate, flowers loosely paniced nearly all in opposite distant pairs, bracts very caducous, corolla $1\frac{3}{4}$ in. nearly glabrous.

SIKKIM; *J. D. H.*

A shrub, glabrous except a few glandular hairs occasionally on the calyx and panicle-rachis. *Leaves* 7 by $2\frac{1}{2}$ in., sharply serrate, obscurely lineolate, nerves 8 pair; petiole $\frac{3}{4}$ in. *Panicles* axillary and terminal, large, lax; bracts and bracteoles all fallen before some of the corollas have opened. *Calyx* $\frac{1}{2}$ in., divided nearly to the base; segments subequal, narrowly lanceolate, subobtusate, somewhat enlarged, membranous in fruit. *Corolla* nearly as of *S. angustifrons* & *agrestis*. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in., glabrous, tip obscurely glandular.

117. **S. debilis**, *Clarke*; leaves small elliptic sparsely hairy, spikes small interrupted, flowers in opposite pairs, bracts linear-lanceolate, corolla 1 in. nearly glabrous without long white-hairy within.

PEGU; *Kurz.*

Stem creeping, rooting; flowering branches 4–8 in., erect, branching, pubescent. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$ in., apex triangular, very obtuse, base cuneate, undulate or crenate, densely lineolate and with a few long multicellular hairs above, pubescent beneath; nerves 5 pair; petiole $\frac{1}{2}$ in. *Spikes* 1–2 in., weak, hairy; bracts $\frac{1}{2}$ in.; bracteoles $\frac{1}{2}$ – $\frac{3}{4}$ in., linear, green, hairy. *Sepals* $\frac{1}{2}$ – $\frac{3}{4}$ in., linear, subulate, very hairy. *Corolla* nearly straight; cylindric base hardly half as long as the urceolate part; segments 5, short, round, subequal. *Filaments* glabrous. *Ovary* 4-ovulate. *Capsule* not seen.—A very anomalous species; it is possible that the bracts are not caducous, and that it should not be arranged here.

118. **S. glandulosus**, *Kurz in Journ. As. Soc.* 1873, ii. 92; viscous, leaves narrowly elliptic repand-crenate, spikes very numerous, lowest bracts leaf-like subsistent, proper bracts small oblong caducous, corolla scarcely $\frac{1}{2}$ in. yellow. *Hemigraphis glandulosa*, *T. Anders. in Kurz Andaman Rep. App.* B. 13.

S. ANDAMAN ISLANDS; *Kurz.*

A branched herb (*Kurz*). *Leaves* 3 by 1 in., subobtusely cuneate at both ends nearly glabrous; nerves 6 pair; petiole $\frac{1}{2}$ in. *Inflorescence* exceedingly sticky, very compound; lower bracts persistent, or deciduous forming the spikes into compound panicles; flowers distant in opposite pairs, or in small heads; or in appearance solitary,

terminal, pedicelled. *Calyx* $\frac{1}{4}$ – $\frac{1}{3}$ in., divided nearly to the base; segments linear. *Corolla* straight, tubular-ventricose, hardly $\frac{1}{2}$ in. diam.; segments short, round. *Filaments* and *style* glabrous; ovary 4-ovulate. *Capsule* $\frac{1}{2}$ in., clavate, compressed, pubescent, 4-seeded. *Seeds* $\frac{1}{2}$ in., orbicular; when wetted the fine hairs spring out; areoles very small.—Kurz, after removing this species to *Strobilanthes*, suggests that it is allied to *Hemigraphis Griffithiana*, of which not merely the ovules, but the inflorescence, &c., are totally different.

119. **S. secundus**, *T. Anders. in Journ. Linn. Soc.* ix. 480; leaves elliptic acute at both ends nearly glabrous, spikes lax long, flowers distant in opposite pairs, bracts petioled ovate deciduous, corolla $1\frac{1}{2}$ in. minutely pubescent without yellow with a brown-purple tube.—*Strobilanthes* sp. n. 23, *Herb. Ind. Or. H. f. & T.*, partly.

MISHMEE and ASSAM; *Griffith* (Kew Distrib. n. 6122). ASSAM; *Simons*.

Leaves $6\frac{1}{2}$ by 3 in., crenate or subentire, ashy puberulous on the nerves beneath otherwise glabrous, upper surface with minute raphides; nerves 8 pair; petiole $\frac{1}{2}$ in. *Spikes* 12 in., whip-like, sparingly branched (in Griffith's type specimens), sometimes depauperated 3 in., 5-fld.; lower bracts leaf-like, upper gradually smaller, leaf-like, deciduous, uppermost only $\frac{1}{2}$ in., lanceolate; bracteoles obsolete. *Calyx* $\frac{1}{2}$ in., divided nearly to the base, glabrous, enlarged in fruit; segments unequal, narrowly lanceolate, linear-elongate, subobtuse. *Corolla* curved, cylindric base hardly so long as the calyx. *Capsule* nearly 1 in., base long barren narrow, 4-seeded. *Seeds* $\frac{1}{2}$ – $\frac{3}{4}$ in., ovate, shaggy; areoles very small.

120. **S. flaccidifolius**, *Nees in DC. Prodr.* xi. 194; glabrous, leaves elliptic acute at both ends, spikes forming somewhat dense panicles, flowers opposite many remote, bracts petioled ovate deciduous, corolla 2 in. nearly glabrous purple. *T. Anders. in Journ. Linn. Soc.* ix. 481. *S. Championi*, *T. Anders. in Benth. Fl. Hongk.* 261. *S. flaccidus*, *Mann. Assam For. Rep.* 1876-7, par. 135; *Gamble, Man. Ind. Timb.* 280; *Kurz For. Fl.* ii. 239. *Ruellia indigofera*, *Griff. Trav.* 237. *R. indigotica*, *Fortune, Resid. Chin.* 158. *Balfour, Cyclop. Ind. IV.* (*Ruellia*). *R. Cusia*, *Ham. in Wall. Cat.* 2386. *Goldfussia Cusia*, *Nees in Wall. Pl. As. Rar.* iii. 88, and in *DC. Prodr.* xi. 175. *Dipteracanthus* ? *calycinus*, *Champ. in Hook. Kew Journ.* v. 133.

N. and E. BENGAL with ASSAM, alt. 1–4000 ft. in the lower hills, often cultivated, *Hamilton, Griffith, &c.*—DISTRIB. N. Burma, S. China.

A shrub. *Leaves* and *flowers* closely resembling (when dry) those of *S. secundus*, but the inflorescence denser, the flowers rather larger. *Capsule* $\frac{3}{4}$ in., not constricted at the base; lower seeds less than $\frac{1}{4}$ in. from the base.—Except as to the capsule, this looks exceedingly like a cultivated form of *S. secundus*. Yields the dye “Room.”

Series C. *Alternifloræ*. *Bracts* persistent or caducous, large or small, in opposite pairs (sometimes unequal) one of each pair mostly barren. *Spikes* linear lax usually interrupted often flexuose, zigzag or twisted, or compound passing into much-branched panicles; spikes upwards at least generally sympodal. *Flowers* mostly distant, alternate.—(Several species in this section have some of their flowers opposite, but these are in such case often twisted much to one side; and in many cases where such occur as solitary in the axils of leaves, they are really alternate on shortened axillary branches with 2 opposite bracts, whereof one only contains a flower.)—Species of N. India and the Malay Peninsula.

121. **S. divaricatus**, *T. Anders. in Journ. Linn. Soc.* ix. 478; leaves lanceolate or elliptic acuminate at both ends glabrous, spikes axillary and terminal elongate flexuose or zigzag, flowers distant both paired and alter-

nate, bracts very small caducous, corolla $1\frac{1}{2}$ in. nearly glabrous purple. *Ruellia divaricata*, Wall. Cat. 2372. *Goldfussia divaricata*, Nees in Wall. Pl. As. Rar. iii. 89, and in DC. Prodr. xi. 176.—*Strobilanthes* sp. n. 23, Herb. Ind. Or. H. f. & T., partly.

TEMPERATE HIMALAYA, alt. 5–9000 ft., from Nepal to Bhotan, common; Wallich, &c. KHASIA MTS., alt. 3–5000 ft., frequent; H. f. & T., &c.

A shrub, 2–5 ft., nearly glabrous. Leaves $5\frac{1}{2}$ by 2 in. (in the Himalaya plant usually narrower), serrulate, obscurely setulose; nerves 7 pair; petiole $\frac{1}{2}$ in. Spikes very lax, divaricate; glabrous or (in the Khasia form) thinly hairy upwards. Bracts $\frac{5}{8}$ in., ovate, caducous; bracteoles $\frac{1}{2}$ – $\frac{1}{6}$ in., obovate-oblong, caducous. Calyx $\frac{1}{2}$ –1 in., subequally divided to the base; segments narrow elongate caudate, often glabrous in the Himalaya form, usually hairy (sometimes very hairy in fruit) in the Khasia form. Corolla curved, tubular, ventricose, subviscid dark purple, glossy in the high-level Himalaya plant. Stamens glabrous or the filaments minutely pubescent at the base. Capsule $\frac{1}{2}$ in., glabrate, 4-seeded. Seeds $\frac{1}{10}$ in., ovate, pubescent; areoles small.

122. **S. rubescens**, T. Anders. in Journ. Linn. Soc. ix. 479; lower leaves subsessile oblong acuminate subentire coriaceous hairy or glabrate, spikes curved, flowers mostly remote not opposite, bracts very small ovate, corolla nearly 2 in., seeds $\frac{1}{2}$ in.—*Goldfussia* sp., Griff. Itin. Notes, 20, n. 309. *Goldfussia* sp. n. 27, Herb. Ind. Or. H. f. & T., in great part.

KHASIA and JAINTIA MTS., alt. 3–5000 ft., common; Griffith, H. f. & T., &c.

Suberect flexuose, or lax curved, 1–2 ft., hairy or glabrous. Lower leaves $3\frac{1}{2}$ by $1\frac{1}{2}$ in. with petiole rarely $\frac{1}{6}$ in., upper cordate sessile, sparsely lined above; nerves 5 pair. Spikes 1–5 in., axillary, and forming a quasi-terminal panicle, secund, glabrous or sparingly glandular-hairy; bracts scarcely $\frac{1}{2}$ in., ovate, opposite, usually only one bearing a flower; bracteoles nearly as long as the bracts, linear. Calyx $\frac{1}{2}$ – $\frac{1}{2}$ in., divided nearly to the base; segment linear-lanceolate, somewhat enlarged in fruit. Corolla nearly straight, glabrous, purple or lilac; cylindric base $\frac{1}{2}$ in., ventricose part 1 in. Capsule $\frac{1}{2}$ – $\frac{3}{4}$ in., glabrous, 4-seeded. Seeds ovate, shaggy principally on the margin; areoles small.

VAR. ? *microsperma*; leaves more distinctly serrate lower sessile cordate, capsule scarcely $\frac{1}{2}$ in., seeds $\frac{1}{10}$ in.—Khasia Mts., alt. 4–5000 ft., H. f. & T. Darjeeling; Jor Bungalow, alt. 7500 ft., Beddome.—The small seeds appear perfectly ripe. Col. Beddome's Darjeeling plant may be a new species.

123. **S. boerhaavioides**, T. Anders. in Journ. Linn. Soc. ix. 479; lower leaves long-petioled ovate acuminate crenate glabrate, spikes curved, flowers mostly remote not opposite, bracts very small ovate, corolla $1\frac{1}{2}$ in., seeds $\frac{1}{2}$ in.—*Goldfussia* sp. n. 27, Herb. Ind. Or. H. f. & T., in part.

SIKKIM HIMALAYA; Thomson. KHASIA MTS., alt. 4–5000 ft.; Pomrang, J. D. H.

Lower leaves $6\frac{1}{2}$ by 3 in.; petiole 1– $1\frac{1}{2}$ in., winged upwards. Otherwise so closely resembling *S. rubescens* type, that the species have been thrown into one in Herb. Kew.

124. **S. Helictus**, T. Anders. in Journ. Linn. Soc. ix. 479; leaves lanceolate or elliptic acuminate at both ends glabrous, spikes elongate zigzag twisted glabrous or viscous hairy, bracts linear shorter than the calyx, corolla $1\frac{1}{2}$ in. creamy-white. *Ruellia calycina*, Wall. Cat. 2417. *Asystasia calycina*, Nees in Wall. Pl. As. Rar. iii. 90. *Echinacanthus calycinus*, Nees in DC. Prodr. xi. 168.

SIKKIM, alt. 6000 ft.; Treutler. KHASIA and JAINTIA MTS., alt. 4000 ft. frequent; Griffith, &c.

A shrub, 1–4 ft.; branches sometimes pubescent upwards. Leaves $4\frac{1}{2}$ by 1 – $1\frac{1}{2}$ in. lanceolate (in the Sikkim example $4\frac{1}{2}$ by 2 in. elliptic), serrate; upper surface lineo-

late; nerves 5-9 pair; petiole $\frac{3}{4}$ in. *Spikes* 3-8 in., axillary and terminal, but little branched; flowers all distant alternate; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., unequal, opposite, the smaller one barren; bracteoles $\frac{1}{2}$ in., linear. *Calyx* $\frac{1}{2}$ - $1\frac{1}{4}$ in., divided subequally nearly to the base; segments linear, glabrous or very viscous hairy, more or less enlarged in fruit. *Corolla* nearly glabrous, very ventricose from a constricted base scarce $\frac{1}{4}$ in. long; segments short, round. *Stamens* 4, filaments very hairy downwards. *Capsule* $\frac{3}{4}$ in., glabrous, 4-seeded. *Seeds* $\frac{1}{4}$ in., ovate, pubescent hair at first dense white, ultimately tawny less; areoles very small.—T. Anderson says the leaves are "softly tomentose beneath," which is a mistake.

125. **S. Griffithianus**, *T. Anders. in Journ. Linn. Soc.* ix. 481; leaves broadly lanceolate acuminate at both ends puberulous on the nerves beneath, spikes elongate zigzag viscous pubescent, flowers distant alternate, bracts lanceolate obtuse persistent, corolla $1\frac{3}{4}$ in. yellow. *Triænanthus* Griffithianus, *Nees in DC. Prodr.* xi. 169.

KHASIA MTS., alt. 2-3000 ft., *Griffith, J. D. H.*, &c., frequent on the southern face.

A spreading shrub, 3-7 ft. diam.; branches fuscous-puberulous upwards. *Leaves* 6 by $1\frac{1}{2}$ in., minutely denticulate; nerves 10 pair; petiole $\frac{3}{4}$ in. *Spikes* 3-8 in., lateral and in lax terminal panicles; bracts 1 in., opposite, more or less unequal, one of each pair supporting a flower; bracteoles $\frac{1}{4}$ in., linear-oblong. *Calyx* $\frac{1}{4}$ - $\frac{1}{2}$ in., divided subequally very nearly to the base; segments (one a little longer than the other 4) linear-oblong, green, viscous-pubescent. *Corolla* nearly straight glabrous, yellow with brown or red spots or lines; linear-cylindric base of the tube about as long as the ventricose part. *Filaments* very hairy. *Capsule* $\frac{3}{4}$ in., nearly glabrous, 4-seeded. *Seeds* $\frac{1}{8}$ - $\frac{1}{6}$ in., fulvous-hairy; areoles very small.—Nees erected this plant into a genus on the ground that the calyx was 2-lipped with one lip trifid but half-way down; an error of fact.

126. **S. paucinervius**, *T. Anders. in Herb. Kew*; glabrous, leaves elliptic acuminate, spikes linear elongated interrupted flexuose alternate-fld., bracts lanceolate persistent.

TENASSERIM OR ANDAMAN ISLANDS; *Helper* (Kew Distrib. n. 6115).

Apparently a lax shrub. *Leaves* $4\frac{1}{2}$ by $1\frac{1}{2}$ in., base rhomboid, subentire or minutely denticulate, lineolate on both surfaces; nerves 5-6 pair; petiole $\frac{1}{2}$ in. *Spikes* 2-4 in., axillary, short peduncled, 1 or 2 together; bracts $\frac{1}{2}$ in., bracteoles nearly as long, narrower, persistent. *Calyx* subequally 5-fid nearly to the base; segments linear-lanceolate acute. *Capsule* $\frac{3}{4}$ in., glabrous, 4-seeded. *Seeds* $\frac{1}{8}$ in., ovate, shaggy; areoles hardly any.

127. **S. elongatus**, *Clarke*; glabrous, leaves lanceolate acuminate, spikes very long lax, flowers alternate and opposite distant, bracts lanceolate persistent, sepals linear-lanceolate rather longer than the bracts.

ASSAM; Namroop, *Griffith* (Kew Distrib. n. 6183).

A shrub. *Leaves* $4\frac{1}{4}$ by $1\frac{1}{4}$ in., base cuneate, minutely serrate, densely lineolate above; nerves 11 pair; petiole $\frac{1}{4}$ in. *Spikes* axillary and quasi-terminal, 1 or 2 together, attaining 7 in., sparingly branched, leafless; bracts in opposite pairs, all distant, both or one or neither bearing a flower, $\frac{1}{2}$ by $\frac{1}{10}$ in.; bracteoles linear, shorter than the bracts. *Sepals* $\frac{1}{2}$ in., glabrous. *Corolla* not seen. *Capsule* $\frac{1}{4}$ - $\frac{1}{2}$ in., 4-seeded, glabrous. *Seeds* compressed, orbicular, subelastically hairy.

128. **S. farinosus**, *Clarke*; leaves elliptic acuminate at each end serrate glabrous, spikes in a pubescent panicle, flowers distant alternate, bracts very small persistent, corolla $1\frac{1}{2}$ in. nearly glabrous without.

MOULMEIN; Thoung Yun, *Lobb*.

Branch terete, glabrous. *Leaves* 5 by $1\frac{3}{4}$ in., upper surface lineolate, lower pale; nerves 7 pair; petiole $\frac{3}{4}$ in. *Spikes* axillary, and a terminal panicle 4 in. diam.;

bracts $\frac{1}{2}$ in., elliptic, pubescent, opposite one of each pair usually barren; bracteoles oblong rather longer than the bracts. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in., divided subequally nearly to the base; segments linear-ligulate, softly pubescent, densely white papillose down the back. *Corolla* nearly straight, much ventricose upwards, constricted base of the tube short. *Style* glabrous. *Capsule* $\frac{1}{2}$ in., spatulate-oblong, puberous, 4-seeded. *Seeds* $\frac{1}{8}$ – $\frac{1}{4}$ in., ovate, shaggy; areoles very small.—The papillæ on the backs of the sepals (and continued also on the bracts) give this species a powdered or farinose look.

129. **S. nobilis**, *Clarke*; leaves elliptic acuminate at both ends sparsely hairy on the nerves beneath, spikes long flexuose paniced pubescent, flowers alternate, bracts lanceolate acute persistent.

JAINTA HILLS; Jarain, alt. 3500 ft., *Clarke*.

An erect gregarious shrub, 6–10 ft. *Leaves* 9 by 3 in., unequal-sided, upper sessile, serrate, thinly lineolate above; nerves 10 pair. *Spikes* 6–12 in., hardly interrupted; bracts $\frac{1}{2}$ –1 in., very acuminate, minutely hairy; bracteoles $\frac{1}{2}$ in., linear-lanceolate. *Calyx* $\frac{3}{8}$ in., divided nearly to the base equally; segments linear, minutely scabrous-pubescent. *Capsule* $\frac{1}{2}$ in., nearly glabrous, 4-seeded. *Seeds* $\frac{1}{8}$ in., ovate, shaggy; areoles very small.—*Corolla* not preserved, believed to be yellow.

130. **S. inflatus**, *T. Anders. in Journ. Linn. Soc.* ix. 476; villous, leaves elliptic or subovate acuminate, flowers alternate or some opposite in flexuose or twisted 1-sided spikes, lower bracts leaf-like upper spatulate, corolla $1\frac{1}{2}$ in. much curved pubescent without.—*Goldfussia* sp. n. 28, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 5–8000 ft.; *J. D. H.*

Branches woody, flexuose, terete, fulvous-villous. *Leaves* $2\frac{1}{2}$ by $\frac{3}{4}$ – $1\frac{1}{4}$ in., serrate, hairy on both surfaces; nerves 6 pair; petiole $1\frac{1}{4}$ in. *Spikes* 1–3 in., fulvous villous, internodes zigzag or contorted almost as in *S. Helictus*; most of the bracts foliaceous; bracteoles minute linear. *Corolla* funnel-shaped, inflated, tube very much curved towards the top; segments subquadrate orbicular. *Capsule* $\frac{2}{3}$ in., narrowly elliptic, glabrous, 4-seeded. *Seeds* $\frac{1}{8}$ in., subquadrate, shaggy; areoles subobsolete.—Nearly all the bracts are leaf-like, persistent; the uppermost, entirely bracteiform ones, are deciduous.

131. **S. Wallichii**, *Nees in Wall. Pl. As. Rar.* iii. 87, and in *DC. Prodr.* xi. 193; leaves petioled elliptic acuminate nearly glabrous upper sessile cordate, spikes lax 1-sided, flowers solitary or paired, many of the lower bracts large leaf-like, sepals linear subobtuse glabrous in fruit elongate somewhat hairy at the tips, corolla $1\frac{1}{4}$ in. blue. *T. Anders. in Journ. Linn. Soc.* ix. 477. *Ruellia alata*, *Wall. Pl. As. Rar.* i. 26, t. 31, and *Cat.* 2371 a. *Goldfussia Thomsoni*, *Bot. Mag.* t. 5119, not *Strobilanthes Thomsoni*, *T. Anders.*

SUBALPINE HIMALAYA, alt. 7–11,000 ft.; from Nepal to Bhotan, common, *Wallich*, &c.

Stems 6–24 in., weak, quadrangular sometimes sharply, glabrous or pubescent on the angles. *Leaves* 3 by 1 in., crenate-serrate, puberulous or glabrate, thinly lineolate above; nerves 6 pair; petiole $\frac{3}{4}$ in. *Spikes* 1–6 in., often flexuose or zigzag, lowest flowers appearing often axillary solitary opposite; bracts (many of the middle ones) ovate or subcordate, altogether resembling the upper leaves; uppermost bracts often small, less than $\frac{1}{4}$ in., ovate or obovate, glabrate; bracteoles linear-oblong, small or 0. *Sepals* in flower $\frac{1}{2}$ in., usually quite glabrous, in fruit often more than 1 in., laxly flexuose, very narrow, usually more or less glandular hairy at least at the tips. *Corolla* nearly straight, glabrous or with minute lines of hairs within; cylindrical base about as long as the ventricose portion; segments short, round. *Filaments* and *style* glabrous. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in., glabrous, 4-seeded. *Seeds* $\frac{1}{8}$ in., ovate, pubescent; areoles small.—The lowest flowers often appear axillary opposite, with 2 small ovate bracteoles each: more careful comparison shows that the axillary flower is on a

short axillary branch which has 2 opposite bracts, 1 barren, the other with a flower often supported by the two normal but minute bracteoles.

VAR. *microphylla*, Nees; leaves very thin herbaceous uppermost cuneate or rhomboid at the base, bracts lanceolate or subovate many foliaceous not cordate, sepals in fruit much broader than in *S. Wallichii* type, corolla-mouth much on one side, capsule more than $\frac{1}{2}$ in., seeds $\frac{1}{2}$ in. *Ruellia alata*, *Wall. Cat.* 2371 b.—N.W. Himalaya, alt. 7–11,000 ft.; from Kashmir to Kumaon, common, *Wallich*, &c.—Connected by intermediate forms with the Sikkim type. Leaves often large, sometimes small.

132. ***S. atropurpureus*, Nees in Wall. Pl. As. Rar.** iii. 86, and in *DC. Prodr.* xi. 195; leaves ovate acute coarsely serrate sparsely hairy, spikes lax, flowers solitary or paired, many of the lower bracts leaf-like, sepals linear subobtuse patently hairy, corolla $1\frac{1}{2}$ in. blue. *T. Anders. in Journ. Linn. Soc.* ix. 477. *Ruellia atropurpurea*, *Wall. Cat.* 2398.

SUBALPINE W. HIMALAYA, alt. 6–10,000 ft.; from Jamu to Nepal, frequent, *Wallich*, &c.

A perennial, often growing in swamps; stems 1– $1\frac{1}{2}$ foot, thick, succulent, hirsute upwards, or dwarfed 3–6 in. Lower leaves petioled or the petiole winged to the base. Corolla usually much curved, the ventricose part of the tube very broad. Otherwise as *S. Wallichii* var. *microphylla*, of which this species has been treated (perhaps correctly) at Kew as a var.

133. ***S. subnudatus*, Clarke;** leaves petioled elliptic acuminate at both ends nearly glabrous uppermost sessile cordate, spikes linear hairy interrupted, nearly all the bracts small oblong, sepals linear elongated subobtuse hairy, corolla $1\frac{1}{2}$ in. purple.—*Goldfussia* sp. n. 29, *Herb. Ind. Or. H. f. & T.*

SUBALPINE SIKKIM; Lachoong, alt. 9000 ft., *J. D. H.*

Stems 1 foot, from a woody rootstock, slender, nearly glabrous. Leaves $1\frac{1}{2}$ by $\frac{1}{2}$ in., crenate, with minute scattered bristly hairs above and on the nerves beneath, raphides obsolete; petiole $\frac{1}{2}$ in., one or two pairs of the leaves at the base of the spikes sessile cordate. Spikes $1\frac{1}{2}$ –4 in.; flowers mostly subsolitary, occasionally opposite; bracts $\frac{1}{2}$ in., oblong or elliptic (none of the flowers with large bracts similar to the uppermost sessile cordate leaves as in *S. Wallichii*); bracteoles similar to the bracts. Sepals in fruit $\frac{1}{2}$ – $\frac{3}{4}$ in., as of *S. Wallichii*.—This has been taken as a form of *S. Wallichii*; but none of the numerous forms of *S. Wallichii* have bracts and hairy spikes without foliaceous bracts like it.

134. ***S. urophyllus*, Nees in DC. Prodr.** xi. 192; leaves lanceolate acuminate at both ends glabrous, flowers scattered, lower bracts leaf-like upper small long-petioled ovate, corolla $\frac{1}{2}$ in. curved pubescent without. *T. Anders. in Journ. Linn. Soc.* ix. 477. *Ruellia urophylla*, *Wall. Cat.* 2344. *Dipteracanthus urophyllus*, *Nees in Wall. Pl. As. Rar.* iii. 82.

KHASIA MTS.; *Wallich*. JAINTIA, alt. 4000 ft.; Jarain, *Clarke*.

A small, ramous, nearly glabrous shrub. Leaves $5\frac{1}{2}$ by $1\frac{1}{2}$ in., those on the flowering branches much reduced, serrate, not (or very obscurely) lincolate; nerves 9 pair; petiole $1\frac{1}{2}$ in. Flowers scattered, alternate and subopposite on small-leaved branches; bracts $\frac{1}{2}$ in. exclusive of their $\frac{1}{2}$ in. petioles, nearly glabrous, persistent; bracteoles similar. Calyx $\frac{1}{4}$ – $\frac{1}{2}$ in., divided nearly to the base, pubescent; segments linear, enlarged more hairy in fruit. Capsule $\frac{3}{4}$ – $1\frac{1}{2}$ in., 4-seeded. Seeds $\frac{1}{2}$ in., ovate, pubescent; areoles very small.

VAR. *sikkimensis*; leaves much broader, corolla 1 in. much curved purple-blue.—Darjeeling; *Griffith* (Kew Distrib. n. 6125); alt. 6000 ft., *Treutler*.—Leaves $5\frac{1}{2}$ by $2\frac{1}{2}$ in. “Flowers faintly fragrant” (*Treutler*).

135. ***S. stenophyllus*, Clarke;** leaves narrowly lanceolate attenuate

at both ends ciliate pubescent, flowers alternate or opposite in leafy spikes, upper bracts ovate or spatulate persistent, corolla 1 in. nearly glabrous purple.

KHASIA Mts., alt. 3-5000 ft., frequent; *J. D. H.*, &c.

A small, erect, somewhat densely branched shrub. *Leaves* $2\frac{1}{2}$ by $\frac{1}{2}$ in., equal or subequal, minutely dentate undulate or subentire; nerves 5-6 pair, puberulous, beneath ciliate; petiole obscure. *Spikes* 1-3 in., numerous, axillary and terminal, nearly glabrous; lower bracts leaf-like; upper sometimes spatulate (hardly petioled as in *S. urophyllus*); bracteoles $\frac{1}{2}$ in., ovate. *Sepals* $\frac{1}{2}$ - $\frac{1}{2}$ in., subequal, linear, obtuse. *Corolla* nearly straight, hairy within; cylindric base shorter than the ventricose portion; segments short, round. *Filaments* very hairy downwards. *Ovary* glabrous; style sparsely hairy. *Capsule* $\frac{3}{4}$ in., 4-seeded. *Seeds* $\frac{1}{4}$ - $\frac{1}{2}$ in., ovate, pubescent; areoles hardly any.—This common Khasia in habit and leaves remarkably resembles *S. isophyllus*; the inflorescence, sepals, &c., are totally different.

136. **S. Panichanga**, *T. Anders. in Journ. Linn. Soc.* ix. 478; leaves broadly elliptic acuminate at both ends rusty-pubescent, panicles lax capillary pubescent, flowers scattered mostly alternate, bracts minute persistent, corolla $1\frac{1}{2}$ in. nearly glabrous. *Ruellia Panichanga*, *Wall. Cat.* 2387. *Asystasia Panichanga*, *Nees in Wall. Pl. As. Rar.* iii. 90, and in *DC. Prodr.* xi. 167.

SILHET; *Wallich.* CACHAR; *Keenan.*

A shrub; branches tetragonous, pubescent upwards. *Leaves* $6\frac{1}{2}$ by $2\frac{1}{2}$ in., serrate; nerves 10 pair; petiole $\frac{3}{4}$ in. *Peduncles* $\frac{1}{2}$ -2 in., repeatedly trichotomous; bracts and bracteoles scarcely $\frac{1}{2}$ in., linear, pubescent. *Calyx* $\frac{1}{2}$ in., deeply subequally 5-fid, closely uniformly pubescent; segments linear-lanceolate. *Corolla* nearly straight, puberulous, cylindric base longer than the calyx, gradually widening into the rather narrow cylindric portion of the tube; segments round, short, contorted in bud. *Filaments* and style with scattered white hairs. *Capsule* more than $\frac{1}{2}$ in.

137. **S. coloratus**, *T. Anders. in Journ. Linn. Soc.* ix. 481, not of *Nees*; leaves ovate or elliptic acuminate glabrous, panicles capillary very compound glabrous, bracts elliptic caducous, corolla $1\frac{1}{2}$ in. nearly glabrous pale purple. *Ruellia colorata*, *Wall. Cat.* 2388. *Goldfussia colorata*, *Nees in Wall. Pl. As. Rar.* iii. 89, and in *DC. Prodr.* xi. 176.—*Acanthacea*, *Griff. Itin. Notes*, 87, n. 1280.

EASTERN HIMALAYA; Sikkim and Bhotan, alt. 2-5000 ft., *Clarke.* ASSAM and KHASIA Mts., alt. 2-4000 ft., frequent; *Griffith, H. f. & T.*, &c.

A nearly glabrous shrub, 3-6 ft. *Leaves* 7 by $2\frac{1}{2}$ -4 in., serrate; nerves 7-8 pair; petiole $\frac{1}{4}$ - $1\frac{1}{2}$ in. *Panicle* often 1 foot in diam., leafless bractless with 200-500 flowers, sometimes denser with stouter shorter branches; bracts $\frac{1}{2}$ in. *Calyx* $\frac{1}{4}$ - $\frac{1}{2}$ in., deeply 5-fid; segments subequal, lanceolate, glabrous. *Corolla* tubular-ventricose, glabrous. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in., 4-seeded. *Seeds* $\frac{1}{4}$ - $\frac{1}{2}$ in., ovate, pubescent; areoles hardly any.—The flowers said by *Nees* to be capitate are mostly alternate scattered; they are capitate only at the tips of the younger panicle-branches.

VAB. *crinita*; panicle-branches minutely thinly glandular-hairy. *S. crinitus*, *T. Anders. in Journ. Linn. Soc.* ix. 481. *Goldfussia crinita*, *Nees in DC. Prodr.* xi. 176.—Bhotan, alt. 1000 ft.; *Griffith.* Assam.—Varies in the thinness of the panicle-branches just as does the type.

Series D. *Paniculata*: Flowers paniced laxly, or densely, secund, subspicate. *Bracts* conspicuous, persistent. *Capsule* elliptic, compressed, cuneate at both ends. *Seeds* shaggy, often only 2 perfected, or if 4 imbricated.—Species of Ceylon or S. Deccan Peninsula. (This series approaches in technical character, though not in habit, the section *** of the series A, *Bracteata*. Compare *S. perfoliatus* above, which Wight placed here.)

138. **S. sexennis**, *Nees in DC. Prodr.* xi. 187; leaves sessile elliptic attenuate at each end denticulate nearly glabrous, bracts sessile ovate base rounded or subcordate glandular-hairy or glabrate, corolla $1\frac{1}{2}$ in. glabrous. *T. Anders. in Journ. Linn. Soc.* ix. 483. *S. interruptus*, *Benth. in Pl. Hohenack.* n. 1432.

CEYLON; *Walker, Thwaites*, C. P. n. 2593. NILGHERY MTS.; on Dodabetta, *Hohenacker*.

A shrub, flowering at 6 or 7 years old, then dying down. Branches subquadrangular, glabrous, transversely verrucose. Leaves 3 by 1 in.; nerves 5-6 pair; petiole winged, base dilated. Bracts $\frac{1}{2}$ by $\frac{1}{4}$ - $\frac{1}{2}$ in., glabrous or hairy on the same spike; bracteoles $\frac{1}{2}$ in., oblong obtuse. Calyx divided subequally nearly to the base; segments linear-oblong, hairy at least at the tips. Corolla white (Beddome). Capsule $\frac{1}{2}$ in., glabrous, 2-seeded.—Described from *Nees'* type specimen; the specimen in leaf only which he adds has very large many-nerved leaves very woolly when young, and is a gregarious undershrub well known to Col. Beddome in Ceylon, of which the flower has not yet been observed.

VAR. *arguta*; leaves distinctly dentate sometimes slightly hairy, petiole (even in the leaves near the spikes) usually well defined sometimes 1-2 in. not dilated at the base, spikes often elongate secund sometimes dense. *S. argutus*, *Nees in DC. Prodr.* xi. 188.—Ceylon, frequent; *Gardner, Thwaites*, C. P. 66 partly, &c.—Appears a trifling variety.

VAR. *cerinthoides*; leaves sessile elliptic or oblong narrowed suddenly at the very base subentire coriaceous few-nerved. *S. cerinthoides*, *Nees in DC. Prodr.* xi. 724; *T. Anders. in Thwaites Enum.* 229. *Mackenzia sessilis*, *Nees in DC. Prodr.* xi. 308.—Ceylon; *Thwaites* (C. P. nn. 2594, 66 partly), *Mackenzie*, &c.—The type of this with nearly all the leaves subsessile rounded at the base seems to form a distinct species, but there are examples wherein the lower leaves are cuneate at the base. The flowers are noted white with much purple marking.

VAR. *hirsutissima*; stem and leaves hirsute. *S. hirsutissimus*, *Nees in DC. Prodr.* xi. 187.—Ceylon; *Walker, Thwaites* (C. P. n. 3626), &c.

139. **S. homotropus**, *Nees in DC. Prodr.* xi. 187; leaves oblong or elliptic long attenuate at the base glabrous, spikes very hairy flexuose or somewhat twisted, bracts elliptic or subovate narrowed at the base, corolla 1 in. nearly glabrous. *S. sexennis*, *Bedd. Ic. Pl. Ind. Or.* t. 206, not of *Nees*.

NILGHERY MTS., alt. 8000 ft.; *Wight*, &c.

This has been treated as a var. of *S. sexennis*, but the bracts are quite unlike.

140. **S. violaceus**, *Bedd. Ic. Pl. Ind. Or.* t. 205; leaves large petioled ovate hairy on both surfaces, bracts elliptic or oblong much shorter than the calyx, corolla $1\frac{1}{4}$ in. glabrous without deep violet.

NILGHERY MTS.; *Sisparah*, alt. 6000 ft., *Beddome*.

A large shrub, very rarely flowering (Beddome); branches quadrangular, hairy upwards. Leaves $6\frac{1}{2}$ by $3\frac{1}{4}$ in., shortly acuminate at both ends, crenulate; nerves 14 pair; petiole 1-2 in. Panicles 6-10 in., lax, hairy; bracts $\frac{1}{2}$ in.; bracteoles $\frac{1}{2}$ in., oblong hairy. Calyx divided nearly to the base, less hairy than the bracteoles; segments $\frac{1}{4}$ in., narrowly oblong, obtuse. Corolla nearly straight, urceolate, very hairy within; constricted base short; segments short, rounded. Capsule not seen.

141. **S. gracilis**, *Bedd. in Trans. Linn. Soc.* xxv. 222, and *Ic. Pl. Ind. Or.* t. 207, not of *T. Anders.*; leaves sessile lanceolate attenuate at both ends glabrous, panicle glabrous, bracts oblong much shorter than the calyx, bracteoles 0, corolla 1 in. white lilac tinged. *S. Beddomei*, *T. Anders. in Journ. Linn. Soc.* ix. 482.

ANAMALLAY MTS., alt. 5-6000 ft.; *Beddome*.

A very large shrub (Beddome), glabrous or the sepal-tips thinly glandular-hairy; branches terete. *Leaves* 7 by $2\frac{1}{4}$ in., serrulate; nerves 10 pair. *Panicle* lax, branches long curved, flowers distant; bracts in opposite pairs, $\frac{1}{8}$ – $\frac{1}{4}$ in., sometimes both, more often one only, carrying a flower on a pedicel $0\text{--}\frac{1}{10}$ in. *Sepals* $\frac{1}{4}$ – $\frac{1}{2}$ in., linear-ligulate. *Corolla* slightly curved, nearly glabrous, constricted part of the tube short (from Beddome). *Filaments* and *style* hairy (Beddome). *Capsule* $\frac{1}{2}$ in., glabrous.

142. **S. hellicoides**, *T. Anders. in Thwaites Enum.* 229, and in *Journ. Linn. Soc.* ix. 483; leaves elliptic or obovate acuminate glabrous, panicle very compound capillary divaricate glabrous, flowers scattered mostly in appearance pedicelled, bracts much smaller than the calyx, corolla 1 in. glabrous without violet. *Bedd. Ic. Pl. Ind. Or.* t. 220. *Leptacanthus hellicoides*, *Nees in DC. Prodr.* xi. 170.

CEYLON, up to 3000 ft. alt.; *Walker, Thwaites.*

A shrub, 2–3 ft., glabrous except the sepal-tips. *Leaves* 4 by $1\frac{1}{4}$ in. (lower larger), base cuneate rounded (or the upper cordate), toothed, paler beneath; nerves 5–6 pair; petiole $0\text{--}\frac{1}{2}$ in. *Panicle* 6–12 in. diam., dense with slender divaricate recurved or zigzag branches; bracts at the forks $\frac{1}{2}$ – $\frac{1}{2}$ in., ovate; bracts below the flowers $\frac{1}{2}$ – $\frac{1}{2}$ in., linear or linear-obovate. *Sepals* $\frac{1}{4}$ in., linear, glabrous or sparsely glandular-hairy at the tips. *Corolla* nearly straight, ventricose, constricted base very short; segments short, rounded. *Capsule* $\frac{1}{2}$ in., glabrous, 2-seeded (4-seeded, *Nees*).—The flowers are in appearance solitary terminal on pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., with 2 bracts (called bracteoles by Beddome) placed $0\text{--}\frac{1}{20}$ in. below the flower.

143. **S. rubicundus**, *T. Anders. in Journ. Linn. Soc.* ix. 483 (not of Thwaites Enum. 229); leaves lanceolate acuminate at both ends nearly glabrous, panicle compound slender glandular-pubescent, bracts at the forks ovate acuminate, flower-bracts 0, corolla $\frac{3}{4}$ in. pubescent without violet. *S. paniculatus*, *Bedd. Ic. Pl. Ind. Or.* t. 199, not of *T. Anders.* *Ruellia rubicunda*, *Heyne in Herb. Rottler; Wall. Cat.* 2337. *Leptacanthus rubicundus*, *Nees in Wall. Pl. As. Rar.* iii. 90, and in *DC. Prodr.* xi. 170.

S. DECCAN PENINSULA; Wynaad and Coorg, alt. 2–3000 ft., *Rottler, Beddome.*

A rather delicate shrub, 5–6 ft.; branches cylindric, glabrous. *Leaves* 5 by $1\frac{1}{4}$ in., unulate crenate or subentire; nerves 6–7 pair, glabrous or pubescent beneath; petiole $\frac{1}{2}$ in. *Panicle* 8 in., narrow; bracts at the forks $\frac{1}{2}$ – $\frac{1}{2}$ in., lanceolate from an ovate base; pedicels $\frac{1}{2}$ – $\frac{1}{2}$ in., mostly ebracteolate except at the base. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in., divided deeply, closely pubescent; segments lanceolate-subulate, often very unequal. *Corolla* nearly straight; base funnel-shaped, hardly cylindric. *Capsule* not seen.

144. **S. paniculatus**, *T. Anders. in Journ. Linn. Soc.* ix. 483, not of *Bedd.*; leaves lanceolate acuminate at both ends nearly glabrous, panicle compound slender glandular-pubescent, bracts at the forks linear or linear-oblong, pedicels very short, flower-bracts 0, corolla nearly 1 in. glabrous without. *S. rubicundus*, *T. Anders. in Thwaites Enum.* 229, not of *Journ. Linn. Soc.* ix. 483.

CEYLON; *Thwaites* (C. P. n. 3351).

Pedicels $0\text{--}\frac{1}{10}$ in. *Calyx* $\frac{1}{8}$ – $\frac{1}{4}$ in., glandular-hairy. Otherwise as *S. rubicundus*; the leaves are in the examples a good deal longer.

145. **S. pulcherrimus**, *T. Anders. in Thwaites Enum.* 229, excl. syn., and in *Journ. Linn. Soc.* ix. 483, the Ceylon plant only; leaves elliptic acuminate at both ends hairy on the nerves beneath, panicle large very compound viscos hairy, bracts at its divisions ovate acute, flower-bracts obsolete, corolla 1 in. puberulous without violet, capsule hairy. *Leptacanthus Walkeri*, *Nees in DC. Prodr.* xi. 170, not of *Wight*.

CEYLON, alt. 4-7000 ft.; *Walker, Thwaites* (C. P. nn. 266, 301).

A large, rambling shrub (*Walker*); branches terete, glabrous. *Leaves* 6½ by 2½ in., minutely toothed; nerves 9 pair; petiole 1½ in. *Panicle* 8-14 in.; branches ascending, bracts ½-¾ in., sessile, base rounded or cordate; pedicels ⅓-½ in., mostly ebracteolate except at the base. *Calyx* ½-⅓ in., divided nearly to the base, viscidous-hairy; segments linear caudate. *Corolla* nearly straight; tube broad-cylindric from the base, very hairy within; segments short, round. *Capsule* ⅔ in., 4-seeded.

146. *S. amabilis*, *Clarke*; leaves broadly elliptic acuminate at both ends glabrous, panicle large compound viscidous hairy, bracts at its divisions linear-oblong, flower-bracts linear much shorter than the calyx, corolla 1½-1¾ in. glabrous without purplish, capsule glabrous. *Leptacanthus Walkeri*, *Wight Ic. t. 1507*, not of *Nees*, nor *Strobilanthes Walkeri, Nees*.

NILGHERY MTS., alt. 6000 ft.; *Gardner, &c., Hohenacker*, n. 1440.

Leaves 7½ by 3½ in., glabrous beneath; nerves 10-12 pair. *Calyx* ½-⅔ in., closely subtended by 2 linear bracts. *Capsule* ⅔ in. and upwards, conspicuously stipitate.—Closely allied to *S. pulcherrimus*, which it was taken for by *Wight*. *T. Anderson* overlooked the numerous points of difference above diagnosed, which are constant. A much finer species than the Ceylon one, the panicle stouter with fewer but larger flowers.

SPECIES NOT SEEN.

147. *S. NEESII*, *Kurz in Journ. As. Soc. 1873*, pt. ii. 93, and *For. Fl.* ii. 245; leaves large lanceolate minutely hairy on both surfaces, spikes sessile dense bracteate ultimately elongated interrupted below, bracts proper oblong-linear shorter than the calyx slightly serrate at the tips, corolla 1¼-1½ in. glabrous without purple.

MARTABAN; *Kurz*.

A large shrub, 10-12 ft. *Leaves* attaining 10 in., shortly acuminate, base attenuate, obsoletely repand-toothed; petiole ¼-1½ in. Lowest bracts (or floral leaves) leaf-like, caducous, ½ in., tips serrate; bracteoles 2, linear-lanceolate, glandular-hirsute, as long as the calyx. *Calyx-segments* ⅔ in. or more, linear, hoary, ciliate. *Corolla-tube* long, slender, hairy within. *Stamens* 2 only; filaments glabrous. *Style* hairy. *Capsule* a little longer than the calyx, glabrous, tip pubescent, 4-seeded. *Seeds* silky.

148. *S. REMOTUS*, *T. Anders. in Journ. Linn. Soc.* ix. 471; leaves ovate acuminate subentire glabrous, spikes axillary 1 or 2 together elongate, flowers remote solitary, bracteoles and calyx-segments smaller than the bracts, capsule elongate glabrous.

TENASSERIM; *Helper*.

Stem subterete, glabrous. *Spikes* 1½-3 in.; bracts ½ in., lanceolate, mucronate, 1-nerved, glabrous; bracteoles and calyx-segments ½ in., narrower than the bracts. *Capsule* ⅔ in.—Allied to *S. fimbriatus* and *S. polythrix*.

149. *S. HAPLANTHOIDES*, *T. Anders. in Journ. Linn. Soc.* ix. 471; leaves petioled ovate acuminate at both ends crenate or undulate glabrous or floral leaves ciliate, spikes suberect lax, bracts bracteoles and calyx-segments linear hirsute with hyaline bristles, corolla funnel-shaped pubescent without hairy within.

BRITISH BURMA; Moulmein, *Falconer* (n. 402 in *Herb. Calcutt.*), *Helper*, n. 255.

An erect herb, 1-1½ foot. *Stem* terete, swollen at the nodes, glabrous. *Leaves* 2-3½ by 1-1½ in., paler beneath; petiole ¼ in. *Spikes* 2-3 in., lax, crowded in the upper axils and subterminal, on slender hirsute peduncles; bracts ½ in.; bracteoles and calyx ½ in. *Corolla* ⅔ in., tube suddenly narrowed, segments small. *Capsule* ½ in., constricted at the base, upwards ovate, acute, glabrous.—Placed by *T. Anderson* next *S. khasyanus*.

150. *S. MASTERSI*, *T. Anders. in Journ. Linn. Soc.* ix. 481; upper leaves sessile lanceolate acute serrate subglabrous, panicles dichotomous lax erect viscidous, pedicels elongate mostly 1-fld., bracts lanceolate acute sparsely glandular deciduous, corolla funnel-shaped suberect glabrous.

ASSAM; *Masters, Simons*.

Stem erect, tetragonous, glandular, viscous. *Calyx-segments* equal, linear, glandular, viscous. *Stamens* included. *Capsule* oblanceolate, elongate, tip glandular, 4-seeded.—Placed by Anderson next *S. coloratus*.

151. *S. SPICATUS*, *T. Anders. in Journ. Linn. Soc.* ix. 484; leaves subsessile ovate or ovate-lanceolate acute base subcordate serrate tomentose above pale pubescent beneath, spikes terminal elongate, flowers solitary sessile opposite, bracts leaf-like ovate pubescent, bracteoles small herbaceous spatulate, corolla $1\frac{1}{2}$ in. funnel-shaped glabrous.

KHASIA MTS. ; above Nunklow, *Simons*.

Softly pubescent; stem tetragonous. *Leaves* 1-3 by $\frac{1}{2}$ -1 in., floral passing into bracts. *Bracts* $\frac{1}{2}$ - $\frac{3}{4}$ in.; bracteoles $\frac{1}{4}$ in. *Calyx* $\frac{1}{2}$ in.; segments linear, unequal. *Capsule* oblanceolate, glandular at the tip, 4-seeded. *Seeds* large.—Affinity uncertain, *T. Anderson*.

152. *S. LAMIOIDES*, *T. Anders. in Journ. Linn. Soc.* ix. 485; floral leaves large sessile ovate acuminate serrate tomentose beneath, heads terminal few-fl., bracts spatulate glandular-tomentose ciliate, corolla straight tomentose without and within. *Kurz For. Fl.* ii. 244.

PEGU; Mt. Taijoo, alt. 4000 ft., *Brandis*; Mts. Nattoung, *Cross*. MARTABAN HILLS, alt. 2-4000 ft.; *Kurz*.

An evergreen shrub (*Kurz*), glandular-tomentose; stem subtetragonous. Floral leaves 3-1 by 2-1 in., glabrous above. *Heads* leafy, lax, sessile or shortly peduncled; bracteoles linear, acute, subglabrous. *Calyx* 5-cleft to the middle; lobes linear, acute. *Corolla* $\frac{1}{2}$ in., like that of *Ruellia*. *Stamens* included. *Capsule* $\frac{1}{2}$ in., compressed, tip bearded. *Seeds* large.—Of doubtful affinity (*T. Anderson*). Corolla blueish-purple, seeds shortly tomentose (*Kurz*).

153. *S. VIOLEFOLIUS*, *T. Anders. in Journ. Linn. Soc.* ix. 485; leaves petioled obliquely ovate acute serrate subglabrous, spikes few-fl., flowers distant subsessile in opposite pairs, bracts linear, corolla funnel-shaped straight glabrous without and within.

SIKKIM HIMALAYA, alt. 5000 ft.; Ratong Valley, *T. Anderson*.

Stem herbaceous, weak; innovations pubescent. Lower leaves round; petiole 1 in., filiform; upper leaves sessile, $1\frac{1}{2}$ -3 $\frac{1}{2}$ by 1-1 $\frac{1}{2}$ in. *Spikes* 3-4 in., terminal on lateral branches; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., linear sometimes spatulate, herbaceous; bracteoles $\frac{1}{8}$ in., subulate. *Calyx* deeply divided; segments $\frac{1}{2}$ in., linear, acute, glabrous. *Corolla* $\frac{1}{2}$ in., pale blue; lobes equal, small.—Of doubtful affinity (*T. Anderson*).

154. *S. ? LANATUS*, *Nees in DC. Prodr.* xi. 191; leaves ovate acuminate entire glabrate above woolly-tomentose beneath, spikes axillary and terminal ternate cylindric dense, bracts oblong obtusely cuspidate woolly-tomentose beneath glabrous lanceolate above.

NILGHERRIES; *Perrottet*.

Very distinct from the stem, petioles under surface of leaves and spikes being densely softly tomentose. *Corolla-tube* 1 in., slender, throat campanulate, approaching that of *Stenosiphonium*. *Calyx* sub-5-partite; segments linear, obtuse, very villous.—Genus doubtful: referred to *Strobilanthes* from its similarity to *S. Mysurensis*, *Nees*, which is an *Asystasia*.

S. VERUCULOSUS, *Nees in DC. Prodr.* xi. 181, from "India" remains obscure; *Nees* doubts whether it may not have been a *Ruellia*.

XIX. CALACANTHUS, *T. Anders.*

A shrub. *Leaves* large, entire. *Spikes* terminal, dense or elongate, hairy; bracts prominent, elliptic; flowers large, purple. *Calyx* sub-5-partite, segments unequal. *Corolla* deeply 2-lipped; posterior lip narrow, shortly 2-fid, anterior of 3 short emarginate lobes; lobes all contorted in bud. *Stamens* 4, didynamous; anthers subequal, oblong, 2-celled, muticous. *Ovary* 4-ovulate; style long, stigma simple linear. *Capsule* ellipsoid,

compressed, acute at both ends, 2-seeded. *Seeds* compressed, exareolate, densely shortly hairy.

C. Dalzelliana, *T. Anders.*; *Benth. in Gen. Pl.* ii. 1088. *Lepidagathis grandiflora*, *Dalz. in Hook. Kew Journ.* ii. 138; *Dalz. & Gibs. Bomb. Fl.* 190; *Bedd. Ic. Pl. Ind. Or. t.* 226.

SYHADREE MTS.; near Bombay, *Dalzell*. CANARA; near the foot of the Ghats, plentiful, *Beddome*; Parwhur Ghat, *Ritchie*.

Leaves 7 by $3\frac{1}{2}$ in., acuminate at both ends, very sparsely hairy above, glabrous beneath, minutely lineolate on both surfaces; nerves 11 pair; petiole 0-1 in. *Spikes* 1-6 in., sometimes interrupted towards the base; bracts $\frac{2}{3}$ in.; bracteoles $\frac{1}{2}$ - $\frac{1}{4}$ in., oblong. *Calyx* $\frac{1}{2}$ in., hairy; one segment elliptic, two narrowly oblong, two linear-lanceolate. *Corolla* $1\frac{1}{2}$ -2 in.; cylindric base shorter than the lobes; palate bullate, yellow-hairy. *Filaments* glabrous; anther-cells hairy. *Ovary* glabrous; style hairy. *Capsule* $\frac{2}{3}$ by $\frac{1}{2}$ in. *Seeds* nearly $\frac{1}{2}$ in. diam.

XX. BLEPHARIS, *Juss.*

Herbs or undershrubs, harsh often rigid or prickly. *Leaves* opposite or 4 in a whorl, subentire toothed or prickly. *Spikes* terminal or on suppressed axillary branches, strobiliform, 4-ranked or capitate and few-fld., or many-bracteate and 1-fld., bracteate and bracteolate. *Sepals* 4, unequal, in opposite pairs, inner smaller; one of the outer pair emarginate or 2-lobed. *Corolla-tube* ovoid, horny; limb of 2 lips, upper subobsolete; lower patent, 3-lobed, blue or pinkish. *Stamens* 4, didynamous; filaments thick, rigid, anterior produced above the insertion of the anthers; anthers 1-celled, margins densely bearded, second cell small or 0. *Ovary* glabrous, 4- or 2-ovulate; style linear, very shortly 2-fld. *Capsule* oblong or ellipsoid, 2- or 4-celled. *Seeds* compressed, orbicular, echinate by thick papillæ formed of closely connected tubes spirally or annularly thickened, which when moistened usually become free at their upper ends (see *Kippist in Trans. Linn. Soc.* xix. t. 6, fig. 5).—Species 20, Indian and African.

1. **B. asperima**, *Nees in DC. Prodr.* xi. 267; leaves ovate subentire setulose, bracteoles obovate 3-toothed subglabrous green-nerved, capsule 4-seeded. *Dalz. & Gibs. Bomb. Fl.* 192; *Wight Ic.* t. 1534; *T. Anders. in Journ. Linn. Soc.* ix. 499.

W. DECCAN PENINSULA; Concan and Canara, on the Ghauts common, *Daltell*, &c.

Stems 8-24 in., herbaceous, erect, glabrous or sparsely setulose. *Leaves* $2\frac{1}{2}$ by $1\frac{1}{2}$ in., base rounded or obtuse; petiole $\frac{1}{2}$ in. *Heads* terminal and quasi-axillary, few-fld.; outermost bracts leafy; proper bracts $\frac{1}{2}$ in. or small, obovate or subpetioled, ovate; bracteoles $\frac{1}{2}$ - $\frac{1}{2}$ in., usually with 3 lanceolate subspinescent teeth, the middle the shortest. *Calyx* green-and-white nerved, glabrous thinly ciliate or setulose; 2 outer segments $\frac{3}{4}$ -1 in., spatulate, one bilobed; 2 inner much smaller, lanceolate. *Corolla* $\frac{3}{4}$ -1 in., blue. *Capsule* $\frac{1}{2}$ in., oblong, seed-bearing from the base. *Seeds* $\frac{1}{2}$ - $\frac{1}{2}$ in., compressed, ovate, closely echinate; spines obtuse, lanceolate, many closely connected tubes containing spiral filaments, which rise elastically when moistened, but do not separate.

2. **B. boerhaaviæfolia**, *Pers. Syn.* ii. 180; leaves usually 4 in a whorl elliptic repand-toothed puberulous or glabrate, bracteoles spatulate bristle-ciliate subglabrous green-nerved, capsule 2-seeded. *Wall. Cat.* 2513; *Nees in Wall. Pl. As. Rar.* iii. 97, and in *DC. Prodr.* xi. 266; *Wight Ill.* t. 164 b, fig. 6, and *Ic.* t. 458; *Dalz. & Gibs. Bomb. Fl.* 192; *T. Anders. in*

Journ. Linn. Soc. ix. 500. *B. maderaspatensis*, *Roth Nov. Sp.* 320. *Acanthus maderaspatensis*, *Linn. Sp. Pl.* 892; *Roxb. Fl. Ind.* iii. 33. *A. ciliaris*, *Burm. Fl. Ind.* 139, t. 42, fig. 2.

DECCAN PENINSULA, from Mt. Aboo and Behar to Ceylon; common. *PERU*; *Wallich*, &c.—*DISTRIB.* Ava, Tropical Africa.

Prostrate, scabrous or puberulous. *Leaves* $1\frac{3}{4}$ by $\frac{3}{4}$ in., acute at both ends; petiole $\frac{1}{2}$ in. *Spikes* axillary or peduncled, 1- or few-fl'd.; bracts $\frac{1}{2}$ in., ovate, bristle-ciliate; bracteoles $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in.; segments 4, oblong, unequal, nerved, subglabrous, one of the outer pair minutely emarginate. *Corolla* $\frac{3}{4}$ in., pink, purple or nearly white. *Capsule* $\frac{1}{2}$ in., ellipsoid, compressed, shining glabrous. *Seeds* densely covered with obtuse spines formed of tubes free at the vertex when moistened.—*Wight* depicts the ovary 2-ovulate, and no more can be found; nor does the capsule show (as 2-seeded capsules usually do) the papillæ of the suppressed ovules; but *Nees* and *Benth.* in *Gen. Pl.* say the ovary is always 4-ovulate.

3. ***B. molluginifolia***, *Pers. Syn.* ii. 180; leaves usually 4 in a whorl oblong hairy or minutely scabrous, heads mostly 1-fl'd. many of the outer bracts barren, bracteoles elliptic or oblong subsessile, capsule 2-seeded. *Wall. Cat.* 2514; *Nees in Wall. Pl. As. Rar.* iii. 97, and in *DC. Prodr.* xi. 266; *Dalz. & Gibs. Bomb. Fl.* 192; *T. Anders. in Journ. Linn. Soc.* ix. 500. *B. repens*, *Roth Nov. Sp.* 321. *Acanthus repens*, *Vahl Symb.* ii. 76. *A. maderaspatensis*, *Linn. Herb. partly*.

DECCAN PENINSULA; common in the Carnatic, and from Delhi and Chota Nagpore to CEYLON.

A wiry perennial; branches 3-6 in., prostrate, usually roughly hairy. *Leaves* $\frac{1}{2}$ -1 in., subsessile, obtuse. *Bracts* and *bracteoles* bristle-ciliate; bracts shorter than the bracteoles. *Calyx* and *corolla* nearly as of *B. boerhaaviaefolia*, but much smaller; corolla (including the larger lip) only $\frac{1}{4}$ - $\frac{1}{2}$ in. *Capsule* and *seeds* as of *B. boerhaaviaefolia*, but the seeds appear (even when dry) shaggy, from the numerous bundles of annular tubes being connected only at the base.—As in *B. boerhaaviaefolia*, only 2-ovulate ovaries and 2-seeded capsules have been seen.

4. ***B. sindica***, *Stocks*; *T. Anders. in Journ. Linn. Soc.* ix. 500; leaves linear or narrowly oblong pubescent, heads few- or many-fl'd., bracteoles linear hairy shorter than the bracts, capsule 2-seeded. *Acanthodium grossum*, *Wight Ic.* tt. 1535, 1536, *not of Nees*.

SCINDE; *Stocks*, *Dalzell*. PUNJAB; *Stewart*, *Vicary*, *Aitchison*.

Stems 3-6 in., or very short. *Leaves* 1-2 in., toothed or subspinescent. *Heads* few- or many-fl'd., 3-4 in. in fruit, quadrifarious; bracts 1 in. or more, ovate with divaricate lanceolate tips, prickly, hairy within and without; bracteoles $\frac{1}{2}$ in. *Calyx* softly hairy; 2 outer segments $\frac{3}{4}$ in., ovate; 2 inner $\frac{1}{2}$ in. narrowly ovate. *Corolla* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Capsule* $\frac{1}{2}$ in., ellipsoid, compressed, shining brown. *Seeds* $\frac{1}{2}$ in.; appearing echinate, but the tufts of tubes (even in the dry state) have all their ends free.

5. ***B. edulis***, *Pers. Syn.* ii. 180; leaves elliptic or oblong glaucous or pubescent, heads few- or many-fl'd., bracteoles linear hairy shorter than the bracts, capsule 2-seeded. *T. Anders. in Journ. Linn. Soc.* ix. 500; *Boiss. Fl. Orient.* iv. 520. *Acanthus edulis*, *Forsk. Fl. Æg.-Arab.* 114. *A. Delillii*, *Spreng. Syst.* ii. 819. *Ruellia persica*, *Burm. Fl. Ind.* p. 135, t. 42, fig. 1. *Acanthodium spicatum*, *Delile Fl. Eg.* 97, t. 33, fig. 3; *Nees in DC. Prodr.* xi. 274.

PUNJAB and SCINDE (*T. Anderson*).—*DISTRIB.* S.W. Asia, N.E. Africa.

Stems short or 1 foot or more, branched. *Leaves* often $\frac{1}{2}$ in. broad, spinescent. *Bracts* longer and more spinous than in *B. sindica*. *Corolla* $\frac{3}{4}$ -1 in., blue.—This differs from *B. sindica* by the broader usually glabrous-glaucous leaves, and the larger flowers: no Indian specimens have been seen. *Ruellia ciliaris*, *Linn. Mant.*

89, adduced as a syn. by *Nees* and *T. Anderson*, described as from India with ciliate leaves, seems more likely to have been *Blepharis boerhaaviaefolia*, i. e. *Burmamn's ciliaris*.

XXI. ACANTHUS, Linn.

Erect or twining shrubs, or herbs. *Leaves* pinnatifid, toothed, spinous or rarely entire. *Spikes* terminal or pseudo-axillary, dense strobiliform or interrupted; bracts ovate, large spinescent, or small; bracteoles large, lanceolate, rarely 0; flowers subsessile, blue or white. *Sepals* 4, 2 outer opposite, 2 inner opposite smaller. *Corolla-tube* short, ovoid, horny; limb of 2 lips, upper obsolete, lower elongate obovate, shortly obtusely 3-lobed. *Stamens* 4, didynamous, shorter than the lip; filaments stout, narrowed curved below the anther, not excurrent near the apex; anthers oblong, 1-celled, bearded. *Disc* 0. *Ovary* 4-ovulate; style very shortly 2-fid; ovules 2 in each cell. *Capsule* ellipsoid, compressed, shining chestnut-brown, 4-seeded. *Seeds* compressed, orbicular, without hairs; testa very lax.—Species 14, in the warm and hot zones of the Old World.

1. **A. carduaceus**, *Griff. Itin. Notes*, 144, and *Ic. Pl. As. Or.* t. 427; leaves large sessile elliptic deeply pinnatifid glabrous lobes toothed spinescent, spikes long woolly, bracteoles 1 in. linear silky-woolly. *T. Anders. in Journ. Linn. Soc.* ix. 500.

BHOTAN; Oongar, *Griffith*.

A robust shrub, scandent on rocks (*Griffith*). *Leaves* 12–20 by 6 in., black-green or (*Griff. Priv. Journ.* 265) flesh-coloured; lobes lanceolate. *Spikes* 6–12 in., crowded towards the ends of the branches, and on long axillary peduncles, the leaves at the base of the sessile spike being only 2–4 in. long, strobiliform, obscurely 4-ranked; bracts $1\frac{1}{4}$ by $\frac{3}{4}$ in., ovate, hairy within and without, spinous; bracteoles lanceolate. *Calyx* silky, 2 outer lobes $\frac{3}{4}$ –1 in., lanceolate one shortly 2-toothed; 2 inner lobes $\frac{3}{4}$ in., lanceolate. *Corolla* $1\frac{1}{4}$ in., white (*Griffith*), altogether as in the genus. *Capsule* $1\frac{1}{4}$ in., ellipsoid, compressed, glabrous, shining brown, 4-seeded, much as of *A. ilicifolius*.

2. **A. leucostachyus**, *Wall. Cat.* 2512; leaves short-petioled elliptic or oblong spinous-serrate slightly hairy beneath, spikes hairy, bracteoles $\frac{3}{4}$ in. linear-lanceolate hairy. *Nees in Wall. Pl. As. Rar.* iii. 98, and in *DC. Prodr.* xi. 270; *T. Anders. in Journ. Linn. Soc.* ix. 501.

KHASIA Mts., alt. 0–3000 ft., frequent; *Wallich*, &c. Namroop in the PATKOYE Mts., *Griffith*. CACHAR; *Keenan*.

Stem 6–15 in., decumbent, viscous-woolly. *Leaves* 8 by $3\frac{1}{2}$ in., cuneate at both ends, whitened beneath; nerves beneath viscous-pubescent, prominently reticulate; petiole $\frac{3}{4}$ in., woolly. *Spikes* 3–6 in., mostly terminal, solitary; bracts $\frac{3}{4}$ –1 by $\frac{1}{2}$ in., elliptic, spinous-toothed, hairy on both sides. *Calyx* softly hairy; 2 outer lobes $\frac{3}{4}$ in., one shortly 2-toothed; 2 inner $\frac{1}{2}$ – $\frac{3}{4}$ in., sublinear. *Corolla* $\frac{3}{4}$ in., white (*Nees*). *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in., ellipsoid, compressed, glabrous, shining-brown, 4-seeded.—The capsule and seeds greatly resemble *A. ilicifolius*, but are not ripe.

3. **A. longipetiolatus**, *Kurz For. Fl.* ii. 241; leaves long-petioled ovate subserrate pubescent on the nerves beneath, bracts obovate spinous-toothed softly hairy, corolla $1\frac{1}{2}$ in. nearly glabrous.

PEGU; *Brandis* (*Herb. Kurz*).

Stem 1 foot, rather stout, decumbent, rooting, then erect, simple, rusty-pubescent. *Leaves* $6\frac{1}{2}$ by $3\frac{1}{4}$ in., cuneate subacute at both ends, serratures very shallow not spinescent; petiole nearly 2 in. *Spike* solitary, simple, $5\frac{1}{2}$ by $1\frac{1}{2}$ in., continuous; peduncle $\frac{1}{2}$ in., stout, pubescent; bracts $\frac{3}{4}$ by $\frac{1}{2}$ in., teeth few, large; bracteoles 1 in., linear-subulate, hairy. *Sepals* 5, softly hairy; one $1\frac{1}{4}$ by $\frac{1}{2}$ in. oblong obtuse, two

1 by $\frac{1}{2}$ in. oblong, two $\frac{3}{4}$ by $\frac{1}{6}$ in. *Corolla* and *stamens* as in *A. ilicifolius*, the curving of the top of the filament insisted on by Kurz being the same as in the other species of *Acanthus*, and without the excurrent point of *Blepharis*. *Capsule* not seen.

4. ***A. ilicifolius***, Linn.; *Benth. Fl. Austral.* iv. 548; leaves shortly petioled oblong or elliptic toothed or pinnatifid spinous rigid glabrous, spikes elongate often interrupted, bracteoles broadly lanceolate glabrous, calyx $\frac{3}{4}$ in., corolla $1\frac{1}{2}$ in. blue. *Burm. Fl. Ind.* 138; *Blume Bijd.* 806; *Wall. Cat.* 2511; *Roxb. Fl. Ind.* iii. 32; *T. Anders. in Journ. Linn. Soc.* ix. 501; *Kurz For. Fl.* ii. 241. *A. Doloarius*, *Blanco Fl. Filip.* 487. *Dilivaria ilicifolia*, *Nees in Wall. Pl. As. Rar.* iii. 98, and in *DC. Prodr.* xi. 268; *Wight Ic.* t. 459; *Dalz. & Gibs. Bomb. Fl.* 192.—*Rheede Hort. Mal.* ii. t. 48.

Sea-coast, from MALABAR to CEYLON, and from the Soonderbund to Malacca.—**DISTRIB.** Malaya to the Philippines and Australia.

Stems 1–5 ft., in clumps, little divided, terete, glabrous. *Leaves* 6 by $2\frac{1}{2}$ in.; petiole $\frac{1}{4}$ in., base usually spinous. *Spikes* 4–16 in., terminal, commonly solitary; flowers mostly opposite; bract $\frac{1}{2}$ – $\frac{3}{4}$ in., ovate, acute, glabrous; bracteoles $\frac{1}{4}$ – $\frac{1}{2}$ in. *Sepals*, 2 outer elliptic rounded, 2 inner broadly lanceolate subacute. *Corolla* pubescent within. *Capsule* $1\frac{1}{2}$ by $\frac{3}{4}$ in. *Seeds* $\frac{1}{4}$ – $\frac{1}{2}$ in., testa white very lax.

VAB. integrifolia, *T. Anders. in Thwaites Enum.* 232; leaves lanceolate entire tip acute spinous.—Ceylon; *Thwaites*:

5. ***A. ebracteatus***, *Vahl Symb.* ii. 75, t. 40; leaves shortly petioled oblong or elliptic toothed or pinnatifid spinous rigid glabrous, spikes elongate somewhat lax, bracts caducous, bracteoles obsolete, calyx $\frac{1}{2}$ in., corolla $\frac{3}{4}$ in. white. *Blume Bijd.* 806; *T. Anders. in Journ. Linn. Soc.* ix. 501; *Kurz For. Fl.* ii. 242. *A. ilicifolius*, *Lour. Fl. Cochinch.* 375, not of Linn.; *Wall. Cat.* 2511, E and part D. *Dilivaria ebracteata*, *Pers. Syn.* ii. 179; *Nees in Wall. Pl. As. Rar.* iii. 98, and *Cat.* 7169, and in *DC. Prodr.* xi. 269.—*Rumph. Amb.* vi. t. 71, fig. 1.

MALACCA; *Griffith, Maingay*. ANDAMANS; *ex Kurz*.—**DISTRIB.** Siam, Java, Cochinchina.

Stems and leaves of *A. ilicifolius*; base of petiole spinous or not. *Bracts* $\frac{1}{2}$ in., usually caducous before the flowers expand. *Capsule* $\frac{3}{4}$ in.—Seems to differ from *A. ilicifolius* by the much smaller calyx, corolla and capsule. *Vahl* puts the difference too strongly when he says the flowers are only one quarter the size. *Bentham (Fl. Austral.* iv. 548) doubts the distinctness of the species. Herbarium examples of *A. ilicifolius* with the flowers in bud, which show neither the evanescence of the bracts nor the true size of the corolla, can only be distinguished by the presence of the bracteoles.

6. ***A. volubilis***, *Wall. Pl. As. Rar.* ii. 56, t. 172; twining, unarmed, leaves oblong or elliptic entire glabrous, spikes linear-oblong, bracteoles 0, corolla white. *T. Anders. in Journ. Linn. Soc.* ix. 501; *Kurz For. Fl.* ii. 242. *Dilivaria volubilis*, *Nees in Wall. Pl. As. Rar.* iii. 98; *Griff. Notul.* iv. 138. *D. scandens*, *Nees in DC. Prodr.* xi. 269.

Sea-shores of the MALAY PENINSULA; Soonderbund, *Wallich*, &c.; Pegu, *Kurz*; Mergui, *Griffith*.—**DISTRIB.** Siam.

Stems twining in long grass, internodes often 4–8 in. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., obtuse or subacute, base attenuated; petiole $\frac{1}{2}$ in. *Spikes* 2–3 in., hardly interrupted; flowers sub-2-seriate; bracts $\frac{3}{4}$ in., elliptic, acute. *Calyx* $\frac{1}{2}$ – $\frac{3}{4}$ in., outer segments elliptic, acute, glabrous; inner similar, much shorter. *Corolla* 1 in., white, slightly tinged yellow (*Wallich*), probably when fading; rose (*Nees*).—The syn. of *Rumphius (Herb. Amb.* vi. t. 71, fig. 2, wrongly cited as t. 72 by *Nees*) has alternate leaves and fruits quite unlike *Acanthaceæ*.

7. **A. longibracteatus**, Kurz in *Flora* 1870, 363, and in *Journ. As. Soc.* 1870, ii. 79; leaves long-petioled ovate or elliptic-oblong acute at both ends remotely toothed pubescent, spikes terminal linear-oblong, bracts lanceolate spinous-mucronate, corolla $\frac{3}{4}$ in.

PEGU; *Brandis* (fide Kurz).

Annual, 3-5 in.; stems terete, decumbent or ascending, densely puberulous. *Leaves* 2 in., membranous, setulose between the teeth, sparsely hairy above, nerves beneath pubescent. *Spikes* as in *A. leucostachyus*; rachis pilose; bracts $\frac{1}{2}$ in., pubescent, lower entire, upper with 2 or 3 spinous teeth on each side; bracteoles as long as the bracts, linear. *Calyx* $\frac{1}{2}$ in., adpressedly pubescent and nervose; lower segment deeply 2-fid, lobes lanceolate acuminate. *Corolla* 5-lobed, minutely hirsute in the throat.—Copied from Kurz. Notwithstanding the narrow bracts and small corolla, I suspect that this is Kurz's subsequently described *A. longipetiolatus*.

XXII: **BARLERIA**, Linn.

Undershrubs or herbs, spinescent or unarmed. *Leaves* opposite, entire. *Flowers* showy, purple blue yellow or white, sessile, solitary or in dense or subax spikes; bracts and bracteoles large, small or 0. *Sepals* 4, in opposite pairs, outer pair very much the larger, anterior often emarginate bifid or deeply 2-lobed. *Corolla-tube* elongate, sometimes very long, funnel-shaped upwards; lobes 5, subequal, ovate, or elliptic, imbricate in bud. *Stamens* 2 with oblong 2-celled anthers; 2 small, rudimentary, or rarely with a few grains of pollen; rudimentary 5th often present. *Disc* large, often a toothed cup half enclosing the ovary. *Ovary* 4-ovulate; style long, shortly bifid or subentire. *Capsule* ovoid or oblong, 2- or 4-seeded below the middle. *Seeds* compressed, ovate, hairs wavy silky close-adpressed non-elastic (except in *B. Gibsoni*).—Species 60, tropical, mostly Old World.

Barleria lupulina, Lindl. in Bot. Reg. t. 1483, is frequently cultivated in India, and appears as an escape.

Barleria rubra, Ham., and *B. spicata*, Roxb., are entered in Steudel's Nomenclature as Indian; but it is not known from what source obtained.

Subgenus 1. **Prionitis**. Capsule ovoid, beak solid, 2-seeded close to the base.

1. **B. Prionitis**, Linn.; *Nees* in *Wall. Pl. As. Rar.* iii. 93, and in *DC. Prodr.* xi. 237; leaves elliptic acuminate at both ends spine-tipped glabrous or sometimes tawny sericeous beneath, flowers in terminal spikes yellow, bracts large elliptic spine-tipped, bracteoles very small bristles or 0. *Burm. Fl. Ind.* 135; *Blume Bijdr.* 805; *Wall. Cat.* 2510; *Roxb. Fl. Ind.* iii. 36; *Decne. in Nouv. Ann. Mus.* iii. 388; *Wight Ic.* t. 452; *Dalz. & Gibs. Bomb. Fl.* 189; *T. Anders. in Journ. Linn. Soc.* ix. 490. *B. Hystrix*, Linn. *Mant.* 89; *Wall. Cat.* 7145; *Nees* in *Wall. Pl. As. Rar.* iii. 93, and in *DC. l. c.* 239. *B. pubiflora*, *Benth. in Flora* 1849, 558. *Prionitis Hystrix* & *pubiflora*, *Miq. Fl. Ind. Bat.* ii. 809, 810.—*Rumph. Herb. Amb.* vii. 13. *Rheede Hort. Mal.* ix. t. 41.

Tropical India; from the HIMALAYA to CEYLON and MALACCA, probably in most cases introduced.—DISTRIB. Tropical Asia and Africa.

A bush, 2-5 ft., sometimes planted for a fence; usually very prickly, rarely nearly unarmed; densely scabrid lineolate, sometimes puberulous. *Leaves* 4 by $1\frac{1}{2}$ in., entire; petioles of the lower leaves usually distinct sometimes $\frac{1}{2}$ -1 in. *Flowers* axillary, 1-3-nate, uppermost spiked; bracts $\frac{1}{2}$ -1 in., entire, the lower larger, foliaceous. *Sepals* broadly lanceolate, acuminate, 2 outer $\frac{3}{4}$ - $\frac{1}{2}$ in., 2 inner $\frac{1}{2}$ in. *Corolla* $1\frac{1}{4}$ - $1\frac{1}{2}$ in., glabrous or puberulous. *Stamens* 4, 2 minute or sterile. *Disc* annular.

Pistil glabrous. *Capsule* $\frac{3}{4}$ –1 in., 2-seeded. *Seeds* $\frac{1}{3}$ in. diam., much compressed, ovate.

2. **B. cuspidata**, Heyne; *Nees in Wall. Pl. As. Rar.* iii. 93, and in *DC. Prodr.* xi. 239; glabrous, leaves sessile narrowly oblong-lanceolate spine-tipped, flowers axillary scarcely spiked at the end of the branches, bracts lanceolate acuminate spine-tipped, bracteoles minute bristles or 0. *Wall. Cat.* 2499; *Wight Ic.* t. 451; *T. Anders. in Journ. Linn. Soc.* ix. 490.

S. DECCAN PENINSULA, alt. 0–2000 ft.; Concan, Canonic, Mysore, Coimbatore, Rottler, Wight, &c.

A lower, harsher, more prickly undershrub than *B. Prionitis*, with shorter internodes. *Leaves* $2\frac{1}{2}$ by $\frac{1}{2}$ in., occasionally 1 by $\frac{1}{2}$ in., elliptic, entire. *Flowers* nearly all axillary, distant; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., usually very narrow. *Calyx* $\frac{3}{4}$ –1 in., segments long acuminate. *Corolla* $1\frac{1}{2}$ in., yellow. *Capsule* and *seeds* as of *B. Prionitis*.—Exceedingly near *B. Prionitis*, as Heyne has noted in *Herb. Rottler*. *Nees* erroneously says the corolla is pale blue; does not allow it to have been *B. cuspidata*, Heyne, but says it is part of *B. noctiflora*, Heyne. Heyne has, however, named these two species correctly in Rottler's Herbarium.

3. **B. Hochstetteri**, *Nees in DC. Prodr.* xi. 231; pubescent, leaves elliptic or oblong entire, flowers pedicelled, bracteoles small narrow remote from the calyx, corolla $\frac{3}{4}$ –1 in. lilac. *Wight Ic.* t. 1528; *Hook. Ic. Pl.* t. 803; *T. Anders. in Journ. Linn. Soc.* ix. 494; *Boiss. Fl. Orient.* iv. 523. *Barlerites Hochstetteri*, *Oerst. in Vidensk. Meddel. Kjob.* 1854, 137.

SCINDE; *Stocks*.—DISTRIB. S.W. Asia, N.E. Africa.

A woody, harsh undershrub, scarcely 1 foot high, sometimes spinescent. *Leaves* 2 by $\frac{3}{4}$ –1 in., obtuse, base narrowed; petiole $\frac{1}{2}$ in. *Pedicels* $\frac{1}{4}$ – $\frac{1}{2}$ in., pubescent, often 3 on an apparent peduncle, the 2 leaves at their base much reduced, usually petioled, oblong or sublinear; bracteoles about the middle of the pedicel 2, 1, or 0, very small, linear (? bracts). *Calyx* green, pubescent; 2 outer lobes $\frac{1}{2}$ – $\frac{1}{2}$ in., triangular-ovate, 2 inner very small. *Stamens* 2, the 3 smaller nearly obsolete. *Disc* prominent, cup-shaped. *Ovary* hairy; stigma scarcely bifid. *Capsule* nearly $\frac{1}{2}$ in., pubescent, ovoid, rostrate, 2-seeded near the base. *Seeds* densely silky.—*Oersted* attributes to his very bad genus *Barlerites* a unilateral linear stigma and glabrous seeds, which is wholly wrong.

Subgenus 2. **Eubarleria**. *Capsule* oblong or narrowly ellipsoid, 4-rarely 2-seeded at or near the middle by the suppression of the 2 lower seeds.

* *Bract* 0, bracteoles 2 divaricate long-linear or spines, 2 outer sepals large. [Each flower on the sympodal raceme is in the axil of one of two opposite bracteoles, and the terminal flower also is apparently 2-bracteolate; by comparing such species as *B. longiflora* & *tomentosa*, it is seen that it is the bracteoles that are really aborted in this section. The next section differs in the terminal flower having 3 (or 4) bracts in place of 2.]

† *Prickly*.

4. **B. buxifolia**, *Linn.*; *Nees in Wall. Pl. As. Rar.* iii. 94, and in *DC. Prodr.* xi. 241; leaves small broadly elliptic obtuse mucronate hairy, flowers solitary pedicelled or sessile, 2 outer sepals oblong entire. *Roth Nov. Sp.* 313; *Wall. Cat.* 2504, partly; *Roxb. Fl. Ind.* iii. 37; *Wight Ic.* t. 870; *T. Anders. in Journ. Linn. Soc.* ix. 489. *Dicranacanthus buxifolia*, *Oerst. in Vidensk. Meddel. Kjob.* 1854, 136.

S. DECCAN PENINSULA, alt. 0–4000 ft.; Rottler; Courtallum, Wight; Concan, Law, &c.

A small, very prickly undershrub; branches hairy. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in.; petiole hardly any. *Bracteoles* $\frac{1}{4}$ – $\frac{3}{4}$ in., simple spines; pedicel (above the bracteoles) $\frac{1}{8}$ – $1\frac{1}{2}$ in., sometimes 0 (*B. rotundifolia*, Heyne in Herb. Rottler). *Sepals* pubescent, ciliate; 2 outer in flower $\frac{1}{2}$ by $\frac{1}{2}$ in. often lanceolate, in fruit sometimes $\frac{3}{4}$ in., oblong, obtuse, scarious, nervose, glabrate; 2 inner small. *Corolla* 1 in., purple blueish rose or white. *Capsule* $\frac{3}{4}$ in., 4-seeded.—Separable from the following by the much narrower entire outer sepals. The variation in the length of the pedicel is remarkable, but there appears to be only one species here.

5. ***B. mysorensis***, *Roth Nov. Sp.* 313; leaves broadly elliptic obtuse mucronate hairy, flowers axillary sessile, 2 outer sepals large ovate sub-spinose denticulate softly hairy. *Heyne in Herb. Rottler. B. buxifolia, Wall. Cat.* 2504, sheets A and B partly, not of Linn. *B. spina-ceylanica, Nees in DC. Prodr.* xi. 242; *T. Anders. in Journ. Linn. Soc.* ix. 490. *B. bispinosa, Nees in Wall. Pl. As. Rar.* iii. 94, and in *DC. Prodr.* xi. 241, not of Vahl. *Dicranacanthus spina-ceylanica, Oerst. in Vidensk. Meddel. Kjob.* 1854, 136.

S. DECCAN PENINSULA with CEYLON, alt. 0–4000 ft.; *Rottler, Wight, Thwaites, &c.*

A very prickly small shrub; branches hairy. *Leaves* $\frac{1}{2}$ –1 in., hairy beneath, deciduously scabrid pubescent above; petiole hardly any. *Bracteoles* simple spines. Outer *sepals* $\frac{3}{4}$ –1 by $\frac{3}{8}$ in., broadest very near the base; in fruit scarious, nerved. *Corolla* $1\frac{1}{2}$ in., purple. *Capsule* $\frac{3}{4}$ in., 4-seeded.—Nees reduced *B. mysorensis*, Heyne, to *B. noctiflora*, but both Heyne's examples and Roth's description show it to have been this.

6. ***B. noctiflora***, *Linn. f. Suppl.* 290; leaves oblong or narrowly obovate mucronate pubescent afterwards glabrate, flowers axillary solitary, 2 outer sepals large ovate acute spinous-dentate sparsely pubescent, corolla-tube elongate narrowly cylindric. *Heyne in Herb. Rottler; Wall. Cat.* 2496; *Nees in Wall. Pl. As. Rar.* iii. 93, and in *DC. Prodr.* xi. 240, excl. syn. Roth; *T. Anders. in Journ. Linn. Soc.* ix. 490 (by typog. error *B. noctifolia*). *B. cristata, Lamk. Dict.* i. 380, not of Linn. *Barleriacanthus noctiflora, Oerst. in Vidensk. Meddel. Kjob.* 1854, 136.

NILGHERRY MTS., alt. 7500 ft.; Ootacamund, *Wight. CEYLON; Rottler.*

A small, very prickly undershrub; branches pubescent upwards. *Leaves* $\frac{3}{4}$ by $\frac{1}{2}$ in., obtuse or acute, grey pubescent at first; petiole hardly any. *Bracteoles* $\frac{1}{4}$ – $\frac{3}{4}$ in., with simple spines or denticulate near the base. *Sepals* soon scarious, glabrate, nervose; 2 outer $\frac{3}{4}$ by $\frac{1}{2}$ in. *Corolla-tube* $1\frac{1}{2}$ by $\frac{1}{2}$ in., pubescent without; lobes $\frac{1}{2}$ in., round-ovate. *Capsule* $\frac{3}{4}$ in., 4-seeded.

7. ***B. acanthoides***, *Vahl Symb.* i. 47; leaves obovate or elliptic obtuse mucronate pubescent, flowers solitary or in dense 1-sided spikes, 2 outer sepals ovate subentire pubescent, corolla-tube very long sublinear. *Nees in DC. Prodr.* xi. 240; *T. Anders. in Journ. Linn. Soc.* ix. 490 (excl. syn. *B. candida*); *Boiss. Fl. Orient.* iv. 524. *Barleriacanthus acanthoides, Oerst. in Vidensk. Meddel. Kjob.* 1854, 136.

SCINDE; *Stocks. PUNJAB*; Kirana Hill, *Edgeworth.*—DISTRIB. Arabia, N.E. Africa.

A small, hoary, prickly undershrub; prickles often pinnatifid near the base. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ in., base attenuated; petiole 0– $\frac{1}{2}$ in. *Bracteoles* linear or linear-lanceolate, spine-tipped, rigid, often denticulate. *Sepals* soon scarious, glabrate, nervose; 2 outer $\frac{1}{2}$ by $\frac{1}{2}$ in., acute, mucronate, scarcely denticulate. *Corolla* white; tube $2\frac{1}{2}$ by $\frac{1}{2}$ – $\frac{1}{4}$ in., puberulous without; lobes $\frac{1}{2}$ in., ovate. *Capsule* $\frac{3}{4}$ in., 4-seeded.

†† Unarmed.

8. **B. longiflora**, Linn. f. *Suppl.* 239; pubescent, leaves petioled ovate, flowers in short dense few-fl. spikes or solitary, bracteoles very long linear laxly patent, corolla-tube very long linear pubescent without. *Vahl Symb.* i. 46, t. 16; *Gaertn. Fruct.* i. 253, t. 54; *Wall. Cat.* 2501; *Roxb. Fl. Ind.* iii. 40; *Nees in Wall. Pl. As. Rar.* iii. 93, and in *DC. Prodr.* xi. 235. *B. longifolia*, T. Anders. in *Journ. Linn. Soc.* ix. 491, by typog. error not of Linn. *Barleriosiphon longiflorus*, Oerst. in *Vidensk. Meddel. Kjob.* 1854, 136.

S. DECCAN PENINSULA; *Rottler, &c.*; Tinnevely, *Beddome*.

A shrub, 2-4 ft. *Leaves* 1½ by 1 in., subacute, base rounded, entire; petiole ½-1 in. *Spikes* mostly 1-4-fl.; bracteoles ½-1 by ⅓ in., softly pubescent. *Sepals* pubescent, afterwards scarious, glabrate, nerve; 2 outer ¾-1 by ½ in., ovate, entire. *Corolla-tube* 2-3 by ½ in.; lobes ¼-½ in., ovate. *Capsule* ¾ in., 4-seeded.

9. **B. tomentosa**, Roth Nov. Sp. 314; leaves elliptic or ovate acuminate at both ends yellow-hirsute above, bracteoles linear or linear-spathulate, sepals oblong acute young scarious coloured, corolla 2-2½ in. glabrous. *Nees in Wall. Pl. As. Rar.* iii. 92, and in *DC. Prodr.* ix. 233; T. Anders. in *Journ. Linn. Soc.* ix. 451. *B. paniculata*, Wall. Cat. 2407; *Nees in Wall. Pl. As. Rar.* iii. 92, and in *DC. Prodr.* xi. 233.

S. DECCAN PENINSULA; *Rottler, &c.*

A low shrub; branches hirsute. *Leaves* 2½ by 1 in., yellow-hirsute on the nerves beneath, more or less so on the surface; petiole ½ in. *Racemes* mostly 1-3-fl.; bracteoles ½-¾ in. *Calyx* scarious, purple-veined before the flower expands; 2 outer segments ½ in., broadly oblong, entire, 2 inner ½ in.; elongated in fruit. *Corolla* rose (Beddome); tube 2 in., linear-cylindric, upper ½ in., funnel-shaped; lobes ¾ in., elliptic. *Capsule* ¾ in., 4-seeded, occasionally the 2 lower seeds suppressed.

VAR. acuminata; leaves densely pubescent subtomentose rounded or subcordate at the base, petiole 1 in. *B. acuminata*, *Wight Ic.* t. 450; *Nees in Wall. Pl. As. Rar.* iii. 93, and in *DC. Prodr.* xi. 234. *B. tomentosa*, Wall. Cat. 2503. *B. racemosa*, Heyne in *Herb. Rottler*.—S. Deccan Peninsula; Nilgubberies, Anamallays, Madura, &c., *Rottler, Wight, &c.*—Easily distinguished from *B. tomentosa*, but differs only in the shape of the leaves and indumentum; the corolla is somewhat smaller.

10. **B. involucrata**, *Nees in Wall. Pl. As. Rar.* iii. 92, and in *DC. Prodr.* xi. 232; leaves elliptic narrow at both ends yellow-strigose on the nerves beneath, racemes few-fl. axillary, bracteoles lanceolate or linear much shorter than the sepals, sepals 1 in. elongate elliptic, corolla 2 in. blue. *Wight Ill.* t. 164; T. Anders. in *Journ. Linn. Soc.* ix. 492. *B. pentandra*, Arn.; *Nees in DC. Prodr.* xi. 232; T. Anders. in *Thwaites Enum.* 230, partly. *B. Macraei*, Arn. ms.

CEYLON, in the hills; *Macrae, Gardner, &c.* MALABAR (var. *elata*).

Herbaceous, strigose. *Leaves* 4½ by 1½ in., sparsely yellow strigillose above; petiole ½ in. *Racemes* yellow-strigose; bracteoles ½ by ⅓ in. (in *Nees' type*), ¼ by ⅓ in. (in *Arnott's B. pentandra*). *Sepals* subacute. *Corolla-tube* 1½ in.; lobes 1½ in., obovate-elliptic. *Capsule* nearly 1 in., 4-seeded.—*Nees* has confounded the Ceylon and Nilgiri varieties of this species; his description of *B. involucrata* is founded on *Wight's n.* 1958 from Ceylon, and he says the bracteoles are 4 lines long; he then places under this the Malabar specimens, which do not suit the description, and which all belong to his *B. terminalis* (see *B. strigosa*, var.). The Ceylon specimens are very uniform, drying black, and having the racemes mainly axillary. The bracteoles are in well-developed specimens much longer than in the poor pieces *Nees* and *Arnott* had, but still much shorter than in *B. elata*. *Wight's n.* 1958 has the bracteoles unusually broad and obtuse.

VAR. *elata*; leaves larger lower often a foot long, racemes stout helicoid often collected towards the ends of the branches, bracteoles often 1-1½ in., linear-lanceolate, corolla 3-3½ in. *B. elata*, Dalz. in Hook. *Kew Journ.* iii. 227; Dalz. & Gibs. *Bomb. Fl.* 183. *B. cœrulea*, Wall. *Cat.* 2509, sheet *β*, partly.—Malabar, alt. 2-5000 ft., from the Bombay Ghauts to the Pulneys and Anamallays, frequent; Gardner, &c.—Shrubby, 6 ft. high (Dalzell). In Wight's Nilgherry examples, the corolla-tube is 1½ in., the upper ⅔ whereof is considerably inflated; the lobes are 1½ by ¾ in., obovate, obtuse; the racemes form dense sub-leafless short terminal panicles.

11. *B. vestita*, T. Anders. in Thwaites *Enum.* 230, and in *Journ. Linn. Soc.* ix. 492; leaves elliptic or somewhat obovate acuminate at both ends fulvous-shaggy on both surfaces, racemes lax, bracteoles linear-lanceolate, outer sepals elliptic elongate-acuminate, corolla 3 in. *Bedd. Ic. Pl. Ind. Or. t.* 263. *B. pentandra*, Var. *β*, Nees in *DC. Prodr.* xi. 233.

CEYLON, alt. 5000 ft.; Walker, Thwaites.

Herbaceous; stems stout, hirsute. Leaves 7 by 3 in.; nerves 12-15 pair, conspicuous; petiole ¼-½ in. Racemes on peduncles 3 in., i.e. the leaves at their base ¾ in., linear-lanceolate, scarcely larger than the other bracts; lower flowers 1 in. or more apart. Calyx and corolla exactly as of *B. involucrata*, of which Nees considered it a var.

** Bracteoles 2, opposite, close to the calyx or above the bract at the base of the pedicel, narrow, much smaller than the 2 outer sepals.

12. *B. pilosa*, Wall. *Cat.* 2502; softly hairy, leaves ovate acuminate, flowers axillary solitary, outer sepals ovate or orbicular scarious dentate, corolla 1½ in. blue. Heyne in *Herb. Rottler*; Nees in Wall. *Pl. As. Rar.* iii. 93, and in *DC. Prodr.* xi. 234; T. Anders. in *Journ. Linn. Soc.* ix. 491; *Bedd. Ic. Pl. Ind. Or. t.* 256.

S. DECCAN PENINSULA, alt. 1000-1500 ft.; Courtallum, Rottler, Wight; Coimbatore; Beddome.

A small, ramous shrub. Leaves 4 by 2 in., often much smaller on the lateral flower-bearing branchlets, sometimes obscurely denticulate; petiole 2 in. Pedicels ½ in.; bracteoles ¼-½ in., linear, subdenticulate, hairy, above the base of the pedicel. Sepals hairy, ultimately glabrate, nervose; 2 outer ¼-½ in. diam., subspinosely toothed. Corolla glabrous; tube nearly 1 in.; lobes ¼-½ in., broadly elliptic. Capsule ½ in., 4-seeded; seeds shaggy, the hair finally rubbing off except near the hilum.

13. *B. Lawii*, T. Anders. in *Journ. Linn. Soc.* ix. 492; leaves elliptic acuminate at both ends lineolate above fulvous-strigose on the nerves beneath, racemes short capitate, bracts and bracteoles small linear, outer sepals 1 in. elliptic acute entire, corolla 3-3½ in. minutely pilose without. B. Beddome, *Bedd. Ic. Pl. Ind. Or. t.* 258.—*Barleria* sp. n. 33, *Herb. Ind. Or. H. f. & T.*

W. DECCAN PENINSULA, in the Ghauts; Bababoodun Hills, Law (T. Anderson).

An erect shrub; branches strigose upwards. Leaves 6 by 2½ in.; petiole ¼-½ in. Racemes fulvous-strigose; bracts ½ in., linear-spathulate; bracteoles nearly as long, linear, acute. Sepals nervose, strigose without; 2 outer ¼-½ in. broad, one of these shortly 2-toothed. Corolla white (Dalzell), beautifully veined when dry, noted blue in Wight's Herbarium; tube elongate funnel-shaped, lobes 1 in., obovate. Capsule nearly 1 in., oblong or slightly obovate, 4-seeded; fruiting-sepals somewhat enlarged.

14. *B. Arnottiana*, Nees in *DC. Prodr.* xi. 232; leaves elliptic acuminate at both ends hairy, pedicels axillary solitary, bracteoles lanceolate,

outer sepals large ovate subobtusate, corolla $2\frac{3}{4}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 492.

CEYLON, alt. 6000 ft.; *Gardner, Thwaites, &c.*

Herbaceous; stems fulvous-strigose. *Leaves* 4 by $1\frac{1}{2}$ in., with scattered yellow hairs above, obscurely lineolate, beneath yellow-strigose especially on the nerves; petiole $\frac{1}{4}$ –1 in. *Bracteoles* $\frac{1}{4}$ – $\frac{3}{4}$ in., lanceolate or elliptic spatulate or O. Outer *sepals* $1\frac{1}{4}$ by $\frac{1}{2}$ in., yellow-strigose, obtuse, one shortly bifid. *Corolla* blue; tube $1\frac{1}{2}$ in., lobes 1 in., obovate, subemarginate. *Capsule* 1 in., broadly oblong, 4-seeded; sepals enlarged, scarious, nerved in fruit.

VAR. *pentandra*; leaves thinner glabrescent conspicuously lineolate above, bracteoles $\frac{1}{2}$ in., linear-setaceous, outer sepals elliptic elongate acute nearly glabrous. *B. pentandra*, Arn.; *T. Anders. in Thwaites Enum.* 230 partly, excl. syn.—Ceylon, *Thwaites* (C. P. n. 2558).

VAR. *Beddomei*; leaves elliptic acute at both ends bristly pubescent on both surfaces, flowers solitary axillary, sepals large ovate acute nervose bristly-pubescent.—Tenasserim; Mooleyit slopes, *Beddome*.—Herbaceous; stems fulvous-pubescent or substrigose. *Leaves* 3–4 by $1\frac{1}{2}$ in., not acuminate, petiole $\frac{1}{2}$ in. *Pedical* $\frac{1}{2}$ in.; bracteoles $\frac{1}{4}$ – $\frac{1}{2}$ in., linear, rigid, bristly-pubescent. Outer *sepals* nearly 1 by $\frac{1}{2}$ in., one of them very shortly bifid at the tip. *Corolla* $2\frac{3}{4}$ in., beautifully veined when dry, altogether as of *B. Arnottiana*. *Capsule* $\frac{3}{4}$ in., narrowly ellipsoid, rigid. *Seeds* more than $\frac{1}{2}$ in. diam., obovate-truncate, compressed, rugose-silky.—Possibly a new species; close to *B. Arnottiana*.

15. **B. sepalosa**, *Clarke*; hairy, leaves elliptic acute, racemes axillary 1–3 fld., bracteoles narrowly lanceolate, outer sepals very large broadly elliptic acute.—*Barleria* sp. n. 35, *Herb. Ind. Or. H. f. & T.*

CONCAN; *Gibson*.

Shrubby; stems upward villous, subtomentose. Upper *leaves* $3\frac{1}{2}$ by $1\frac{1}{4}$ in., base shortly narrowed, covered with short yellow hairs on both surfaces, somewhat rigid, strongly reticulated beneath; petiole $\frac{1}{2}$ in. *Bracteoles* $\frac{3}{4}$ by $\frac{1}{2}$ in., rigid, acute. Outer *sepals* $1\frac{3}{4}$ by $\frac{3}{4}$ in., one bifid, base rounded, yellow-villous, subtomentose, in fruit nervose, subscarious. *Capsule* $\frac{3}{4}$ –1 in. *Corolla* not seen.

16. **B. montana**, *Nees in Wall. Pl. As. Rar.* iii. 92, and in *DC. Prodr.* xi. 232; nearly glabrous, leaves narrowly ovate acuminate at both ends, flowers axillary solitary and running into terminal spikes, outer sepals large ovate, corolla 2 in., seeds densely silky. *Dalz. & Gibs. Bomb. Fl.* 189; *T. Anders. in Journ. Linn. Soc.* ix. 493; *Bedd. Ic. Pl. Ind. Or.* t. 257. *B. purpurea*, *Lodd. Bot. Cab.* t. 344. *Ruellia?* *montana*, *Wall. Cat.* 2391.—*Barleria* sp. n. 32, *Herb. Ind. Or. H. f. & T.*

W. DECCAN PENINSULA, in the Ghauts frequent; from Jubbulpore to Travancore.

Herbaceous, erect, 2 ft. high. *Leaves* 5 by 2 in., often glaucous, margins sometimes minutely scabrous; petiole $\frac{1}{4}$ –1 in. *Bracteoles* linear, $\frac{1}{2}$ in. or in large examples 1 in. Outer *sepals* $1\frac{1}{2}$ by $\frac{3}{4}$ in. in large examples, often hardly half so large, rounded or very acute, entire, glabrous or minutely scabrous. *Corolla* blue (*Beddome*), rose (*Dalzell*); lobes $\frac{3}{4}$ in. diam., orbicular. *Capsule* 1 in., 4-seeded. *Seeds* $\frac{1}{2}$ in. diam. or more, close covered with wavy silky yellowish hair, as in many other species.

17. **B. Gibsoni**, *Dalz. in Hook. Kew Journ.* ii. 339; nearly glabrous, leaves ovate acute, flowers axillary solitary and running into terminal spikes, outer sepals large ovate, corolla 2 – $2\frac{1}{2}$ in., seeds glabrous. *Dalz. & Gibs. Bomb. Fl.* 189; *T. Anders. in Journ. Linn. Soc.* ix. 493. *B. montana*, *Wight & Nees* partly; *Herb. Ind. Or. H. f. & T.* n. 34.

W. DECCAN PENINSULA; Concan, *Stocks*; Ellora Hill, *Ralph*; Belgaum, *Ritchie*; Bombay Ghauts and Brahminwara Range, *Dalzell*; N. Canara, *Brandis*.

So exceedingly like *B. montana*, except as to the seeds, that it has been mixed

therewith from Wight's day. Lower leaves often very large and very glaucous. Terminal spike more closely imbricated than in *B. montana*; flowers rather larger, corolla-lobes often 1 in. Capsule $\frac{3}{4}$ in., 4-seeded. Seeds $\frac{1}{2}$ in. diam., when ripe nearly black; always glabrous, and so differing from all other *Barlerias*.

18. ***B. grandiflora***, Dalz. in Hook. Kew Journ. ii. 339; nearly glabrous, leaves elliptic narrowed at both ends, flowers solitary axillary, outer sepals very large broadly elliptic acute, corolla 4 in. white. Dalz. & Gibs. Bomb. Fl. 189; T. Anders. in Journ. Linn. Soc. ix. 493.

CONCAN; Stocks; Mangallee Ghaut, Dalzell.

Herbaceous; innovations shortly minutely pubescent. Leaves 5 by 2 in., often glaucous; petiole $\frac{1}{2}$ in., pubescent. Bracteoles $\frac{1}{2}$ – $\frac{3}{4}$ in., linear-ligulate. Outer sepals 2 by 1 in., entire, herbaceous, pubescent within. Corolla minutely pubescent without; lobes $1\frac{1}{2}$ in. Capsule not seen.—Closely allied to *B. Gibsoni*.

19. ***B. cristata***, Linn.; Benth. Fl. Hongk. 262; leaves oblong or elliptic acute yellow-hairy beneath, spikes capitate, outer sepals ovate-acuminate or lanceolate toothed nervose, corolla $1\frac{1}{2}$ in. purple-blue or white. Burm. Fl. Ind. 136; Roxb. Fl. Ind. iii. 37; Wall. Cat. 2506; Don Prodr. 119; Roth Nov. Sp. 315; Nees in Wall. Pl. As. Rar. iii. 92, and in DC. Prodr. xi. 229; Bot. Mag. t. 1615; Wight Ic. t. 453; Dalz. & Gibs. Bomb. Fl. 188; T. Anders. in Thwaites Enum. 230, and in Journ. Linn. Soc. ix. 490. *B. dichotoma*, Roxb. Fl. Ind. iii. 39; Wall. Cat. 2508; Nees in Wall. Pl. As. Rar. iii. 91, and in DC. l. c. 227; Dalz. & Gibs. l. c. 188. *B. ciliata*, Roxb. l. c. 38; Wall. Cat. 2507; Nees in Wall. Pl. As. Rar. iii. 92, and in DC. l. c. 228. *B. napalensis* & *nuda*, Nees in Wall. Pl. As. Rar. iii. 91, 92, and in DC. l. c. 228, 229. *B. laciniata*, Wall. Cat. 7144, and Nees l. c.

SUBTROPICAL INDIA; N.W. Himalaya, Sikkim, Khasia, Burma, Central India, Nilgherries, common.—DISTRIB. Gardens of India, Malaya, China, &c.

An erect or diffuse undershrub; branches adpressedly yellow-hairy. Leaves 3–4 by 1 in., or, where burnt up, 1 by $\frac{1}{2}$ in., yellow-hairy or lineolate above; petiole $\frac{1}{2}$ – $\frac{1}{3}$ in. Spikes ovate, often compound, dense; bracteoles $\frac{1}{2}$ – $\frac{3}{4}$ in., linear-lanceolate, toothed. Outer sepals $\frac{3}{4}$ in., toothed, softly hairy, glabrous, subspinescent. Corolla-tube funnel-shaped in the upper half; lobes $\frac{1}{2}$ in., ovate. Capsule $\frac{3}{4}$ in., 4-seeded. Seeds orbicular, compressed, silky.—Uniform except as to habit and indumentum. The common Sikkim form has erect stems, leaves 4 in. long, glabrate lineolate above, outer sepals subspinous-ciliate; a common Khasia form is similar, but has the sepals very sparingly toothed; the West Himalaya form (*B. napalensis* var. *microphylla*, Nees) has leaves hardly an inch long and many solitary flowers; *B. salicifolia*, Heyne, has a diffuse weedy habit, linear-oblong leaves and much yellow hair; the South Indian plant, on hotter drier rocks, has often smaller more rigid very hairy leaves, and very hairy sepals. There can be, as T. Anderson states, no doubt that this plant is wild everywhere in the lower hills of N.E. and Central India; and no doubt in the Mts. of S. India also.

20. ***B. nutans***, Nees in DC. Prodr. xi. 227; leaves narrowly obovate attenuately acuminate at both ends glabrous, spikes elongate pubescent, bracts and bracteoles small lanceolate, sepals lanceolate minutely pubescent, corolla 1 in. blueish purple. T. Anders. in Thwaites Enum. 230, and in Journ. Linn. Soc. ix. 493; Bedd. Ic. Pl. Ind. Or. t. 264.

CEYLON, alt. 1–3000 ft.; Gardner, Champion, &c.

An undershrub. Leaves 8 by $1\frac{1}{2}$ in., lineolate above; petiole $\frac{1}{2}$ – $1\frac{1}{4}$ in. Spikes 1–5 in., often nodding, dense with flowers; bracts and bracteoles $\frac{1}{2}$ – $\frac{1}{4}$ in. Outer sepals nearly $\frac{1}{2}$ in., nervose, one divided $\frac{1}{2}$ the way down into 2 narrow-lanceolate teeth. Corolla nearly glabrous, deep blue-purple; tube funnel-shaped upwards; lobes $\frac{1}{2}$ in., ovate. Capsule $\frac{3}{4}$ –1 in., 4-seeded. Seeds $\frac{1}{4}$ in. diam., silky.

21. **B. courtallica**, *Nees in DC. Prodr.* xi. 226; leaves narrowly obovate or elliptic attenuately acuminate at both ends glabrous, spikes elongate pubescent, bracts and bracteoles small linear-lanceolate, sepals elliptic acuminate very pubescent, corolla $1\frac{1}{2}$ –2 in. *Dalz. & Gibs. Bomb. Fl.* 188; *Wight Ic.* t. 1529; *T. Anders. in Journ. Linn. Soc.* ix. 493. *B. inæqualis*, *Benth. in Flora* 1849, 577.

W. DECCAN PENINSULA; from the Concan to Courtallum, *Wight*, &c.

A large shrub (*Wight*). *Spikes* 1–3 in., dense; bracts $\frac{1}{4}$ in.; bracteoles $\frac{1}{4}$ – $\frac{1}{2}$ in. Outer sepals $\frac{3}{4}$ by $\frac{1}{4}$ in., nervose, subcorolloid, much more pubescent than in *B. nutans*. Corolla blue and yellow (*Dalzell*), white (*Ritchie*). Capsule and seeds as in *B. nutans*.—Closely allied to *B. nutans*, differing in the broader sepals and larger flowers.

*** *Bracteoles* 2, lanceolate or elliptic, often nearly as long as the calyx.

22. **B. conspicua**, *Nees in Wall. Pl. As. Rar.* iii. 92, and in *DC. Prodr.* xi. 226; leaves elongate-oblong acuminate at both ends, spikes linear-oblong somewhat yellow-strigose, bracteoles linear-oblong as long as the calyx, corolla 1 in. *T. Anders. in Journ. Linn. Soc.* ix. 493. *Justicia conspicua*, *Wall. Cat.* 2460.

PENANG; *Wallich*.

Leaves 8 by 2 in., lineolate above, somewhat yellow-strigose on the nerves beneath; petiole $\frac{3}{4}$ in. *Spikes* 4 in., terminal, erect, somewhat lax; bracts $\frac{3}{4}$ by $\frac{1}{2}$ in., spatulate-oblong; bracteoles $\frac{3}{4}$ by $\frac{1}{2}$ in. Outer sepals $\frac{3}{4}$ in., lanceolate, acute, yellow-hairy, one bifid at the apex. Capsule $\frac{3}{4}$ in., narrowly ellipsoid, acute at both ends, glabrate, 4-seeded. Seeds ultimately nearly glabrous except near the base.

23. **B. Stocksii**, *T. Anders. in Journ. Linn. Soc.* ix. 493; leaves subsessile elliptic acute shining nearly glabrous, flowers solitary axillary, bracteoles narrowly oblong hispid-ciliate as long as the calyx, capsule 2-seeded.

BOMBAY; Bababoodun Hills, *Stocks*.

A small undershrub; branches erect, sparsely hispid. Leaves $2\frac{1}{4}$ by 1 in., base rounded, glabrous or slightly hispid-ciliate; petiole $0\frac{1}{2}$ in. Bracteoles 1 by $\frac{1}{2}$ in., subobtusate. Sepals 1 in., subentire, hispid-ciliate, 2 outer lanceolate, one bifid $\frac{1}{2}$ the way down into narrow lanceolate segments. Corolla not seen. Capsule $\frac{3}{4}$ in., shortly obovoid compressed rostrate. Seeds nearly $\frac{1}{2}$ in. diam., silky, occupying the middle of the capsule.—*T. Anderson*, from the habit and leaves of this plant, evidently considered it allied to *B. montana*. The capsule is narrowed towards the base, or it might be arranged in the section *Prionitis*. It is really a very marked species, almost worthy a section to itself.

24. **B. strigosa**, *Willd. Sp. Pl.* iii. 379; leaves large ovate acute long-decurrent on the petiole glabrate above, spikes dense many-fl. 1-sided, bracteoles oblong or elliptic shorter than the calyx, outer sepals ovate ciliate-denticulate minutely strigose, corolla $1\frac{1}{2}$ –2 in. blue. *Heyne in Herb. Rottler. B. cærulea*, *Roxb. Hort. Beng.* 45, and *Fl. Ind.* iii. 39; *Wall. Cat.* 2509; *Nees in Wall. Pl. As. Rar.* xi. 91, and in *DC. Prodr.* xi. 226; *T. Anders. in Journ. Linn. Soc.* ix. 491. *B. macrophylla*, *Heyne in Herb. Rottler. Pseudobarleria cærulea*, *Oerst. in Vidensk. Meddel. Kjob.* 1854, 135.

BENGAL, in the lower hills, alt. 0–4000 ft., common; ORISSA, CHOTA NAGPORE, SIKKIM, ASSAM.—DISTRIB. Much cultivated in India and Malaya.

Shrubby, 2–4 ft.; branches fulvous-strigose upwards. Leaves $5\frac{1}{2}$ by $2\frac{1}{2}$ in. (sometimes twice as large), widest towards the base, lineolate above, fulvous-strigose on the nerves beneath; petiole $\frac{1}{2}$ –1 in., or 0, i.e. subulate by the much decurrent leaf-base.

Spikes 1-3 in., very dense, often glomerate, always secund, the sepals densely imbricated, the bracteoles appearing patent or reflexed on one side; bracteoles $\frac{1}{2}$ - $\frac{3}{4}$ in., lanceolate or subovate. Outer *sepals* 1 in., sometimes more, nervous. *Corolla* funnel-shaped in the upper half of the tube; lobes $\frac{3}{4}$ in., ovate. *Capsule* $\frac{3}{4}$ in., 4-seeded; seeds silky.

VAR. polystachya; leaves very large fulvous-hirsute above somewhat glaucescent beneath, spikes densely agglomerated yellow-hirsute. *B. polystachya*, *Nees in DC. Prodr.* xi. 226.—Concan; *Stocks*.

VAR. terminalis; leaves thinly fulvous-hirsute above, spikes substrobilate not or very obscurely 1-sided, outer sepals more softly hairy often obtuse. *B. terminalis*, *Nees in DC. Prodr.* xi. 225; *Dalz & Gibs. Bomb. Fl.* 188.—Concan; *Jacquemont*, &c. Belgaum; *Ritchie*.—This may be a distinct species, as Dalzell considers; but T. Anderson does not deem it worth notice as a var.

25. *B. polytricha*, *Wall. Pl. As. Rar.* i. 72, t. 82, and *Cat.* 7143; leaves large oblong attenuate at both ends hirsute above, spikes dense many-fl. 1-sided, bracteoles oblong or elliptic somewhat shorter than the calyx, outer sepals ovate ciliate-denticulate hirsute, corolla $1\frac{1}{2}$ -2 in. blue. *Nees in Wall. Pl. As. Rar.* iii. 91, and in *DC. Prodr.* xi. 225; *T. Anders. in Journ. Linn. Soc.* ix. 491. *B. cærulea*, *Wall. Cat.* 2509, letter K only. *B. hirsuta*, *Wall. Cat.* 7142; *Nees ll. c.* *Pseudobarleria polytricha*, *Oerst. in Vidensk. Meddel. Kjob.* 1854, 135.

CHITTAGONG, PEGU and TENASSERIM; *Wallich*, &c., frequent.—DISTRIB. Ava.

Leaves 6 by $1\frac{1}{2}$ in., base gradually cuneately attenuated, hairs long on the upper surface; otherwise altogether as *B. strigosa*.

VAR. polystachya has the leaves suddenly narrowed to the subulate petiole. *B. hirsuta* is a young state, having the heads substrobiliform, not (or very obscurely) 1-sided; probably always more or less 1-sided in fruit.

26. *B. nitida*, *Nees in Wall. Pl. As. Rar.* iii. 91, and in *DC. Prodr.* xi. 224; leaves ovate or elliptic shortly acuminate at both ends lineolate nearly glabrous above, spikes dense 1-sided, bracteoles elliptic or subovate nearly as long as the calyx, outer sepals ovate strongly ciliate-denticulate shining sparsely hispidulous not strigose, corolla $1\frac{1}{2}$ in. blue. *Wight Ic.* t. 454; *T. Anders. in Journ. Linn. Soc.* ix. 491. *B. cærulea*, *Wall. Cat.* 2509, letter H only. *B. bracteata*, *Heyne in Herb. Rottler*.

Hills of S. DECCAN PENINSULA; *Rottler*; Courtallum, *Wight*; Nilghiries. *Foulkes*; Tinnevely Hills, *Beddome*.

Leaves $1\frac{1}{2}$ -2 in. Outer *sepals* shining, with scattered yellow hairs, but no strigose pubescence on the nerves without; otherwise as *B. strigosa*, from which T. Anderson admits it to be specifically distinct. The Simla plant referred to this species by Nees is *B. strigosa*, with (as usual in the N.W. Himalaya) smaller leaves than in the Sikkin Terai form.

XXIII. NEURACANTHUS, *Nees*.

Perennials; flowering stems erect, annual. *Leaves* entire. *Flowers* small, blue, spicate; spikes axillary or terminal, elongate strobilate or dense capitate; bracts ovate, membranous or coriaceous; bracteoles 0 or minute. *Calyx* 2-partite; posterior segment 3-toothed, anterior 2-toothed or 2-partite. *Corolla* tubular, upper half wide-funnel-shaped; limb subentire or obscurely lobed, plicate. *Stamens* 4, didynamous; anterior anthers 2-lobed, posterior 1-lobed (second lobe rudimentary); lobes ovoid, distinct, sometimes hairy. *Style* at the apex 2-branched, 1 branch linear-lanceolate, the other obsolete; ovary 4-ovulate. *Capsule* oblong, glabrous, 4-seeded. *Seeds* much compressed, ovate, densely inelastically silky.—Species 6, the 5 following and a tropical African one.

Lepidagathis differs by the anthers all 2-celled, the stigma subequally minutely 2-lobed, and the presence of bracteoles. *N. subuninervius*, Kurz, has been removed to *Lepidagathis*.

* *Spikes axillary, elongate, bracts sub-4-ranked.*

1. ***N. trinervius***, *Wight Ic. t. 1532*; leaves sessile elliptic cuneate at both ends nearly glabrous, bracts ovate or obovate spinous-mucronate 5-nerved, calyx-segments linear-lanceolate long-ciliate. *Dalz. & Gibs. Bomb. Fl. 190*; *T. Anders. in Journ. Linn. Soc. ix. 494*.

CONCAN; in the Ghauts, *Law, Dalzell, &c.*; Salsette, *Herb. Wight*.

Stems 1-3 ft., glabrous except at the tips. *Leaves* $4\frac{1}{2}$ by $1\frac{3}{4}$ in., lineolate above, obovate-minutely setose. *Spikes* 1-5 in., hairy; bracts $\frac{3}{4}$ by $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in.; segments divided about half-way down; cilia $\frac{1}{8}$ in., rising from minute glistening tubercles. *Corolla* $\frac{1}{2}$ in., blue, nearly glabrous without, 2-lipped; segments 5, subsimilar, obtusely triangular, plicate in bud, tips tufted. *Capsule* $\frac{1}{4}$ in. *Seeds* $\frac{1}{10}$ in.

2. ***N. tetragonostachyus***, *Nees in Wall. Pl. As. Rar. iii. 97*, and *Cat. 7168*, and in *DC. Prodr. xi. 248*; leaves short-petioled elliptic or obovate-lanceolate attenuate at both ends thinly pubescent or glabrous, bracts elliptic spinous-mucronate 5-nerved, calyx-segments linear-lanceolate long-ciliate. *T. Anders. in Journ. Linn. Soc. ix. 494*.

PEGU; Prome Hills, *Wallich*; Rangoon, *M'Lelland*; Moulmein, *Parish*.

Hardly differs from *N. trinervius* except in the greater attenuation of the leaves at both ends. *Flowers* blue (*Parish*).

3. ***N. grandiflorus***, *Kurz in Journ. As. Soc. 1873, pt. ii. 95*; leaves small obovate or oblong subobtuse nearly glabrous, bracts ovate-lanceolate rigid 5-nerved, calyx-segments lanceolate long-ciliate.

PEGU; Prome, *Kurz*.

Leaves $1\frac{1}{2}$ by $\frac{3}{4}$ in., not lineolate, minute scabrid-pubescent (in Kurz's specimen); petiole obsolete. *Corolla* $\frac{1}{2}$ in., or rather more, blue.—Exceedingly near *N. tetragonostachyus*, but has much smaller leaves, and larger flowers. *Neuracanthus* sp. (*Kew Distrib. n. 6144*), collected by Griffith in Hookhoom Valley, Upper Burma, is perhaps a variety, but has the leaves closely pubescent beneath.

** *Spikes axillary, densely capitate, bracts not 4-ranked.*

4. ***N. sphærostachyus***, *Dalz. in Hook. Kew Journ. ii. 140*; leaves subsessile elliptic nearly glabrous, bracts ovate softly white-hairy, calyx-segments lanceolate or subovate subobtuse. *Dalz. & Gibs. Bomb. Fl. 190*; *Hook. Ic. Pl. t. 835*. *N. Lawii, Wight Ic. t. 1531*; *T. Anders. in Journ. Linn. Soc. ix. 494*. *Lepidagathis sphærostachya, Nees in DC. Prodr. xi. 254*.

CONCAN; *Dalzell, &c.*; common in Bombay Island.

Stems 1-2 ft. *Leaves* $4\frac{1}{2}$ by 2 in., obtuse or subacute, lineolate above; petiole scarcely $\frac{1}{2}$ in. *Spikes* 1-2 in., sometimes agglomerated into axillary globes 3-4 in. diam.; bracts $\frac{1}{2}$ in., purplish. *Calyx* $\frac{1}{2}$ in., one lobe shortly 3-toothed, the other deeply 2-fid. *Corolla* $\frac{3}{4}$ in.; limb a fine blue, obconic, subentire, plicate; lower lip of 3 very depressed triangular lobes, upper an emarginate subsimilar lobe. *Anthers* pubescent. *Capsule* $\frac{3}{4}$ in., 4-seeded. *Seeds* $\frac{1}{2}$ in. diam.—The plant appears rarely to seed, as Dalzell notes.

*** *Spikes terminal, oblong.*

5. ***N. Neesianus***, *Clarke*; hoary silky subtomentose, leaves sessile

ovate or broadly elliptic base cuneate. *Lepidagathis* Neesianus, *Wight*; *T. Anders. in Journ. Linn. Soc.* ix. 499.

MADRAS; Paloor (in Arcot) on black cotton-soil, *Wight*.

Stems 12–18 in., procumbent, terete, softly hairy. *Leaves* 2 by 1 in., obtuse, entire, silky on both surfaces, young white-tomentose beneath. *Spikes* 2 by $\frac{3}{4}$ in., dense; bracts $\frac{1}{2}$ in., ovate, acute, obscurely 4-ranked; bracteoles small, subulate. *Calyx* 2-partite; one segment 3-lobed less than half-way down, lobes lanceolate acute; the other 2-lobed nearly to the base. *Corolla* 2-lipped; upper lip ovate minutely bifid, lower 3-partite, lobes ovate mucronate. *Stamens* 4, included; the upper anthers 2 with 2 divaricate cells, lower 1-celled; connective hairy. *Capsule* $\frac{1}{2}$ in., oblong, 4-seeded. *Seeds* compressed, hairy.—Flowers or stamens described by T. Anderson, whose account of the stamens requires the species to be transferred from *Lepidagathis* to *Neuracanthus*, as does also the structure of the calyx, which is erroneously given by T. Anderson. *Wight* has written on his original ticket “Paloor, in black cotton soil,” which T. Anderson has taken to be Palamcottah (near Tinnevely), where it is believed there is no black cotton-soil.

XXIV. **CROSSANDRA**, *Salisb.*

Undershrubs. *Leaves* entire or undulate, subdentate. *Spikes* linear-oblong; bracts imbricate; bracteoles linear; flowers sessile, yellow. *Sepals* 5, ovate, acute, 2 inner much smaller. *Corolla-tube* linear, incurved; limb on one side of 5 subequal, elliptic lobes, imbricate in the bud. *Stamens* 4, didynamous; anthers 1-celled, muticous; connective mucronate. *Style* minutely 2-lobed at the tip; ovary 4-ovulate. *Capsule* oblong, acute, 4-seeded. *Seeds* compressed, orbicular, adpressedly scaly; scales of numerous hairs coalescing nearly to their tips, which are seen imperfectly free when moistened.—Species 5; 1 in India, 4 in Tropical Africa or Madagascar.

C. undulæfolia, *Salisb. Par. Lond.* t. 12; leaves ovate or lanceolate narrowed at both ends, spikes sessile or peduncled pubescent. *Bot. Reg.* t. 69; *Bot. Mag.* t. 2186. *C. axillaris*, *Nees in Wall. Pl. As. Rar.* iii. 98, and in *DC. Prodr.* xi. 281; *Wight Ill.* t. 164 b, fig. 7, and *Ic.* t. 460; *Dalz. & Gibs. Bomb. Fl.* 193. *C. infundibuliformis*, *Nees in Wall. Pl. As. Rar.* iii. 98, and in *DC. l. c.* 280; *Wight Ic.* t. 461; *T. Anders. in Journ. Linn. Soc.* ix. 494. *C. oppositifolia*, *Nees in Wall. Pl. As. Rar.* iii. 98, and in *DC. l. c.* 281. *C. coccinea*, *Dalz. & Gibs. Bomb. Fl. Suppl.* 71. *Justicia infundibuliformis*, *Linn.*; *Burm. Fl. Ind.* 7. *Harrachia speciosa*, *Jacq. Ecl.* 33, t. 21; *Blume Bijd.* 793. *Ruellia infundibuliformis*, *Roxb. Fl. Ind.* iiii. 41; *Wall. Cat.* 2364.—*Rheede Hort. Mal.* ix. t. 62.

DECCAN PENINSULA and CEYLON.—**DISTRIB.** Cult. in N. India, the Malay Peninsula and Islands.

Stems 1–3 ft., pubescent upwards. *Leaves* 4 by $1\frac{1}{2}$ in. (often much smaller), glabrous or pubescent beneath; petiole $\frac{1}{4}$ –1 in. *Peduncles* 0–5 in.; spikes 1–4 in.; bracts $\frac{1}{2}$ by $\frac{1}{2}$ in., elliptic, acute; bracteoles $\frac{1}{2}$ in. *Sepals* much imbricated, outer $\frac{1}{2}$ in., rigid, subscarious. *Corolla* glabrous; tube $\frac{3}{4}$ by $\frac{1}{16}$ in.; lobes $\frac{1}{2}$ by $\frac{1}{4}$ in. *Capsule* $\frac{1}{2}$ in., glabrous.—Wallich's and Griffith's Nepal and Sikkim specimens, treated as wild by Nees and T. Anderson, are no doubt cultivated ones.

XXV. **ASYSTASIA**, *Blume.*

Herbs or undershrubs. *Leaves* entire. *Spikes* or *racemes* lax or dense, simple or compound, 1-sided or suberect; bracts and bracteoles linear, shorter than the calyx (except in *A. Lawiana*); flowers opposite or alter-

nate, usually solitary, blue purple rose or yellow. *Sepals* narrow. *Corolla-tube* short or long, funnel-shaped ventricose or narrow; lobes 5, subequal, imbricate in bud. *Stamens* 4, all perfect, didynamous, subequal; anthers oblong, cells parallel, approximate, base minutely spurred or submucous, the points only obscurely whitened. *Ovary* 4-ovulate, very hairy; stigma minutely bifid or subcapitate. *Capsule* elliptic, 4-seeded, base contracted solid. *Seeds* compressed, orbicular or irregularly angular, rugose or tubercular, glabrous.—Species 15, Tropical Asiatic and S. African.

The species having only 2 fertile stamens are transferred to *Eranthemum*, and those with large bracts to *Lepidagathis*. It might be better to sink *Asystasia* in *Eranthemum*, for many of the species have a long narrow corolla-tube as in *Eranthemum*, and the character of the stamens appears of rather less value than in separating *Hemidelphis* from *Hygrophila*.

* *Corolla* tubular-ventricose, about $\frac{3}{4}$ – $1\frac{1}{4}$ in. long.

1. **A. intrusa**, *Blume Bijl.* 796, not of *Nees*; leaves ovate or elliptic acuminate puberulous above, calyx subsessile glabrous or minutely ciliate, corolla $\frac{3}{4}$ –1 in. tube exceedingly slender. *A. Blumei*, *Nees in DC. Prodr.* xi. 167. *A. nemorum*, *Nees in Wall. Pl. As. Rar.* iii. 90, as to descr. and Malay material.

SINGAPORE; *Schomburgk*.—DISTRIB. Java.

Stems 1 foot, dichotomous, slender, nearly glabrous. *Leaves* 2 by $\frac{3}{4}$ in., base cuneate or rhomboid, undulate, subcrenate, dotted with most minute hairs above, glabrous beneath; nerves 5–6 pair; petiole $\frac{1}{4}$ in. *Spikes* 1–2 in., slender; flowers mostly opposite; bracts scarcely $\frac{1}{10}$ in.; lowest pedicels subobsolete. *Calyx* $\frac{1}{6}$ in.; segments linear-lanceolate, glabrous on the back. *Corolla* glabrous; tube hardly $\frac{1}{12}$ in. diam.; limb hardly $\frac{1}{2}$ in. in expanse. *Stamens* 4, nearly equal. *Style* nearly glabrous; stigma subcapitate. *Capsule* $\frac{1}{2}$ in., 4-seeded, minutely hairy.—This differs from *A. coromandeliana* (and its allies) in the very slender corolla; the tube is widened only near its apex, and is there scarcely $\frac{1}{2}$ in. broad.

2. **A. coromandeliana**, *Nees in Wall. Pl. As. Rar.* iii. 89, and in *DC. Prodr.* xi. 165; grey puberulous, leaves ovate acute some rounded or suddenly narrowed at base, lower pedicels manifest, corolla 1– $1\frac{1}{4}$ in. inflated part of the tube much longer than its cylindric base. *Dalz. & Gibs. Bomb. Fl.* 186. *A. plumbaginea*, *Nees in Wall. Pl. As. Rar.* iii. 89, and in *DC. Prodr.* xi. 164. *A. gangetica*, *T. Anders. in Thwaites Enum.* 235. *A. violacea*, *Bot. Mag.* t. 5882. *Justicia Gangetica*, *Linn. Amæn. Acad.* iv. 299. *J. plumbaginea*, *Wall. Cat.* 2487. *Ruellia secunda*, *Vahl Symb.* iii. 84; *Wall. Cat.* 2401. *R. Digitalis*, *Koen.*; *Spreng. Syst.* ii. 825; *Nees l. c.* xi. 153. *R. zeylanica*, *Koen.*; *Roxb. Fl. Ind.* iii. 42. *R. Coromandeliana*, *Wall. Cat.* 2399, partly.—*Rheede Hort. Mal.* ix. t. 45.

DECCAN PENINSULA and CEYLON, common.—DISTRIB. Malaya, Africa, Arabia.

A procumbent, perennial weed, 1–2 ft., usually dusky pubescent. *Leaves* 1– $1\frac{1}{2}$ in., lower mostly subcordate, base rounded or suddenly narrowed; nerves 5–6 pair; petiole $\frac{1}{2}$ in. *Racemes* 2–5 in., lax; lower pedicels often attaining $\frac{1}{2}$ in.; bract and bracteoles at the base of the pedicel, about $\frac{1}{2}$ in. *Sepals* $\frac{1}{2}$ in., linear-lanceolate, puberulous or pubescent on the back. *Corolla* pubescent; tube yellow, limb pink or pale purple, usually dull or lurid, sometimes yellow altogether. *Filaments* with few small hairs. *Style* glabrous except near the base. *Capsule* 1 in., pubescent; solid cylindric compressed base $\frac{1}{2}$ in. *Seeds* $\frac{1}{2}$ in. diam., much compressed, ovoid angular wrinkled or subtubercular glabrous.

3. **A. chelonoides**, *Nees in Wall. Pl. As. Rar.* iii. 89, and in *DC. Prodr.* xi. 164; leaves elliptic narrowed at both ends minutely hairy or

glabrate, racemes compound many-fld., lower pedicels longer than the pubescent calyx, corolla $\frac{2}{3}$ – $\frac{3}{4}$ in. purple. *T. Anders. in Thwaites Enum.* 286.

CEYLON; *Walker, Thwaites, &c.* TRAVANCORE and TINNEVELLY HILLS; *Beddome* (wild).—DISTRIB. Cultivated in S. India and Malabar.

Leaves $5\frac{1}{2}$ by $1\frac{3}{4}$ in., lower all cuneate or acuminate at the base, punctate or puberulous or with scattered hairs (without the dull grey pubescence of *A. coromandeliana*); nerves 6–8 pair. *Racemes* usually paniced, often peduncled, sometimes 50–60-fld.; lower pedicels $\frac{1}{2}$ – $\frac{1}{3}$ in. *Capsule* nearly of *A. coromandeliana*.—Described from Nees' type specimen marked *A. chelonoides*, Var. *a*, in Nees' hand. It is the species with numerous small purple flowers much cultivated in S. India; and Col. Beddome believes it to be wild in S. Malabar, but there are no specimens except from Ceylon.

VAR. *amœna*; more hairy, leaves hairy on both surfaces, sepals subhirsute, corolla as of *A. chelonoides*, type.—Arracan; forests near Akyab, *Kurz*.

VAR. *quadrangularis*; stem acutely quadrangular, leaves ovate or narrowly lanceolate glabrate, corolla small as of *A. chelonoides*, type. *A. coromandeliana*, Var. *variabilis*, *Nees in DC Prodr.* xi. 165. *A. nemorum*, Var. *B*, *T. Anders. in Journ. Linn. Soc.* ix. 525. *Ruellia quadrangularis*, *Heyne in Herb. Rottler*.—Wynaad; *Rottler*. Anamallays; *Bedd.* Ceylon; *Macrae, Thwaites*.—Leaves very variable; in *Macrae's* example 1 by $\frac{3}{8}$ in., in *Beddome's* 7 by 1 in., in *Thwaites' 2* by $\frac{1}{2}$ in.

4. ***A. violacea***, *Dalz. ms.*, not in *Hook. Kew Journ.* ii. 139; leaves large subovate lower narrowed at base, lower pedicels shorter than the hairy calyx, corolla $1\frac{1}{4}$ – $1\frac{1}{2}$ in. fine blue. *A. chelonoides*, *Nees in DC. Prodr.* xi. 164, Var. β only; *T. Anders. in Journ. Linn. Soc.* ix. 525, chiefly. *A. nemorum*, *Nees in Wall. Pl. As. Rar.* iii. 90, and in *DC. Prodr.* xi. 167 (except the Nilgiri material). *A. coromandeliana*, *Bot. Mag.* t. 4248. *Ruellia filiformis*, *Heyne in Herb. Rottler*. *R. coromandeliana*, *Wall. Cat.* 2399, type sheet partly.

W. DECCAN PENINSULA, alt. 2–6000 ft., frequent; *Rottler, &c.*

Leaves often $6\frac{1}{2}$ by $2\frac{3}{8}$ in., membranous, green, sparsely pubescent or glabrate. *Calyx-segments* nearly $\frac{1}{3}$ in., narrowly oblong, acute. *Capsule* 1– $1\frac{1}{4}$ in.—Described from specimens named by himself, which are identical with Wight's *Herb. Propr.* ii. 1952. In his original description Dalzell says the flowers of *A. violacea* are about half as large as those of *A. coromandeliana*, and the description appears to belong altogether to *A. chelonoides*, Nees' type; but in *Dalz. & Gibs. Bomb. Fl.* 186 the character of *A. violacea* is at once shortened and widened.

5. ***A. crispata***, *Benth. in Linnæa* 1851, 647; leaves elliptic or oblong acuminate lower narrowed into the petiole repand crispately crenulate glabrate, lower pedicels shorter than the pubescent calyx, corolla 1 in. white with rose or dark purple dots in the palate. *T. Anders. in Journ. Linn. Soc.* ix. 526. *A. nemorum*, *Nees in Wall. Pl. As. Rar.* iii. 90, and in *DC. Prodr.* xi. 167, as to the Nilgiri material; *T. Anders. in Journ. Linn. Soc.* ix. 524. *A. coromandeliana*, *Wight Ic. t.* 1506, not of *Nees*. *Ruellia chelonoides*, *Wall. Cat.* 2335 chiefly, not *Asystasia chelonoides*, *Nees*.

MTS. of S. DECCAN PENINSULA, alt. 4–8000 ft.; *Rottler, Wight, &c.*, common about Ooty.

Leaves very variable in width, nearly always crisped subcrenulate; upper often sessile, with base rounded. *Flowers* very constant in colour. *Capsule* as of *A. coromandeliana*.—This species (as also *A. chelonoides*) is so closely allied to *A. coromandeliana* that Col. Beddome says he can hardly distinguish them but by the colour of the flower. They sort out pretty well in the Herbarium, and among the large non-Indian material there is nothing like *A. chelonoides* or *crispata*.

6. ***A. travancorica***, *Bedd. Ic. Pl. Ind. Or.* t. 178; leaves elongate-

lanceolate sparingly pubescent, lower pedicels often longer than the calyx, corolla $1\frac{1}{4}$ – $1\frac{1}{2}$ in. purple-violet (or in cultivation white).

TRAVANCORE, S. TINNEVELLY and ANAMALLAYS, alt. 3000 ft.; *Beddome*.

A large shrub, 6–8 ft. high; branches pubescent upwards. *Leaves* 4–5 by $\frac{3}{4}$ – $1\frac{1}{4}$ in., base cuneate or rhomboid; nerves 7–9 pair, very oblique; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Racemes* 2–8 in., pubescent; lower pedicels sometimes $\frac{1}{2}$ in. *Capsule* 1 in., nearly as of *A. coromandeliana*.—Closely allied to *A. coromandeliana*, though the elongate oblique-nerved leaves give it a very different aspect.

7. **A. macrocarpa**, *Nees in Wall. Pl. As. Rar.* iii. 89, and in *DC. Prodr.* xi. 163; pubescent, leaves oblong or elliptic narrowed at both ends, racemes dense or elongate very pubescent, corolla $1\frac{1}{4}$ in. dull pink, cylindric base of its tube much shorter than the ventricose part. *T. Anders. in Journ. Linn. Soc.* ix. 525. *Ruellia macrocarpa*, *Wall. Cat.* 2348.—*Acanthaceæ*, *Griff. Itin. Notes*, 106, n. 92, and *Id. Pl. As.* t. 438.

SUBTROPICAL HIMALAYA, from Kumaon to Bhotan; in the Terai, alt. 1000 ft., and in the hotter valleys ascending to 4000 ft.

A diffuse, rambling undershrub, 1–4 ft. *Leaves* $4\frac{1}{2}$ by $1\frac{1}{4}$ in.; nerves 8 pair; petiole $\frac{1}{2}$ in. *Racemes* usually condensed, 1-sided; sometimes 3–4 in., erect, lax, with opposite flowers; lower pedicels $0\frac{1}{6}$ in.; bracts $\frac{1}{2}$ in. *Sepals* $\frac{1}{4}$ in., linear-lanceolate, pubescent. *Corolla* pubescent. *Stamens* 4, perfect; anther-cells distinctly spurred at the base. *Capsule* $1\frac{1}{2}$ in., pubescent; cylindric base $\frac{3}{8}$ in. *Seeds* $\frac{1}{4}$ in. diam., much compressed, tubercular, rugose, glabrous.

8. **A. lanceolata**, *T. Anders. in Journ. Linn. Soc.* ix. 524; leaves lanceolate acuminate glabrous, bracts lanceolate acute villous as long as the calyx, corolla 1 in. funnel-shaped constricted base of the tube short.

BUUMA; Baragyn, *Brandis (T. Anderson)*.

An erect, glabrous herb; stem terete, sparingly branched, internodes long. *Leaves* 4–6 by $1\frac{1}{2}$ in., undulate; petiole short. *Spikes* terminal, erect; bracts opposite, $\frac{1}{2}$ in., subherbaceous, lax, decussate, somewhat remote; flowers sessile, 1 or 2 in the axil of each bract. *Sepals* linear, equal, villous, membranous. *Corolla* villous without; lobes 5, unequal, small, erect. *Anther-cells* 2, bases mucronate.—Not seen.

VAR. ? *Beddomei*; leaves linear-lanceolate hairy on both surfaces, corolla $1\frac{1}{2}$ in. and upwards before expansion.—Tenasserim, Mooleyit, *Beddome*.—*Leaves* 8 by $\frac{3}{4}$ –1 in., caudate-acuminate, widest close to the rounded or subcordate base; petiole $0\frac{1}{10}$ in. *Spikes* compound, most of the lower bracts and calyces small without flowers; upper bracts $\frac{1}{4}$ – $\frac{1}{2}$ in., lanceolate, glabrate. *Corolla* broad, nearly straight, urn-shaped on a short cylindric base; lobes subequal, $\frac{1}{2}$ in., ovate, obtuse. *Stamens* 4, 2 conspicuously longer; anthers 2-celled, cells broadly oblong, parallel, equal, white-apiculate at base. *Pistil* as of *Asystasia*. *Capsule* not seen.

** *Corolla linear shortly funnel-shaped upwards about 2 in. long.*

9. **A. atroviridis**, *T. Anders. in Journ. Linn. Soc.* ix. 526; leaves large elliptic acuminate at both ends nearly glabrous, racemes condensed nearly glabrous, corolla 2 in. rose-pink tube very long linear. *Ruellia atroviridis*, *Wall. Cat.* 2404.—*Asystasia* sp. n. 15, *Herb. Ind. Or. H. f. & T. Verbenacearum* sp., *Nees in DC. Prodr.* xi. 155.

KHASIA MTS., alt. 0–3000 ft., frequent; *Wallich, Griffith, H. f. & T., &c.*

Stems 1–3 ft., herbaceous. *Leaves* $8\frac{1}{2}$ by $3\frac{1}{4}$ in.; nerves 10–14 pair; petiole $1\frac{1}{2}$ in. *Racemes* usually paniculate in a dense terminal subsessile head; bracts $\frac{1}{2}$ in.; pedicels $\frac{1}{2}$ in., often pubescent. *Sepals* $\frac{1}{2}$ in., sublinear, glabrous or pubescent. *Corolla* glabrous, linear portion of the tube $1\frac{1}{4}$ in., limb about 1 in. diam. *Stamens* 4, glabrous; anthers mucous, or very obscurely mucronate at the base. *Capsule*

1½ in., with the seeds nearly as of *A. macrocarpa*.—The name is very misleading; the corolla is always a fine rose. In one example the raceme is developed into a lax very compound panicle, and the plant is noted as 6 ft. high.

10. **A. Neesiana**, *Nees in Wall. Pl. As. Rar.* iii. 89, and in *DC. Prodr.* xi. 164; leaves large broadly elliptic acute sparingly pubescent, racemes elongate very lax pubescent, corolla 2 in. pink tube very long linear. *T. Anders. in Journ. Linn. Soc.* ix. 526. *Ruellia Neesiana*, *Wall. Pl. As. Rar.* i. 73, t. 83, and *Cat.* 2342.—*Asystasia* sp. n. 14, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 0–3000 ft., frequent; *Wallich, &c.* CACHAR; *Keenan*. MOULMEIN; *Parish*.

Leaves 8 by 3 in., lower long-petioled, uppermost pair usually (not always) sessile. *Raceme* often nearly a foot long, very pubescent. *Corolla*, *capsule* and *seeds* nearly as of *A. atroviridis*. *Anther-cells* minutely mucronate at the base.

DOUBTFUL SPECIES.

11. **A. ? KUNTHIANA**, *Nees in Wall. Pl. As. Rar.* iii. 89, and in *DC. Prodr.* xi. 163; leaves oblong or elliptic acuminate at both ends pubescent beneath, spikes dense few-fl'd. on very short axillary peduncles. *T. Anders. in Journ. Linn. Soc.* ix. 525. *Ruellia Kunthiana*, *Wall. Cat.* 2419.

PENANG; *Wallich*.

Stems creeping, rooting; branches 1 foot, erect, subterete, glabrous. *Leaves* 3½ by 1½ in., lineolate above; petiole scarcely ¼ in. *Peduncles* 0–½ in.; spikes ¼–½ in., glabrous, lineolate; bracts ⅙ in. *Sepals* ½ in., linear. *Capsule* ½ in., constricted for a short space at the base, 4-seeded, glabrous. *Flowers* not seen.—*T. Anderson* does not doubt this being an *Asystasia*, but it might quite as well be a *Justicia*.

12. **A. ? Eranthemum montanum**, *Bot. Mag.* t. 4031, *not of Roxb.*; leaves elliptic acuminate at both ends glabrate, racemes lax compound puberulous, sepals linear-subulate ciliate, corolla 2½ in. purple tube very long linear.

"INDIA;" cultivated formerly at Kew.—Upper *leaves* 4½ by 1½ in.; nerves 7 pair; petiole ½ in. *Peduncle* 3 in., grey puberulous; panicle lax; bracts ½–⅔ in., linear-lanceolate, much shorter than the calyx; lower pedicels 0–½ in. *Sepals* ½ in. *Corolla* glabrous. *Stamens* 4 perfect, subsimilar, glabrous; anther-cells 2, bases acute. *Stigma* minutely equally bifid.—A plant of which nothing is known, but the excellent figure cited, and the specimen from which it was taken. The description is incorrect as to the 2 stamens, of which there are 4, hardly at all didynamous. The minute bracts are as in *Asystasia*, and will not do for *Dædalacanthus*. Its true place is, in the absence of fruit, uncertain.

13. **A. LAWIANA**, *Dalz. in Hook. Kew Journ.* iv. 344; leaves elliptic acute at both ends very sparsely hairy, spikes short-oblong dense softly-hairy, bracts large imbricated, corolla 1–¾ in. white. *Dalz. & Gibs. Bomb. Fl.* 186. *A. mysurensis*, *T. Anders. in Journ. Linn. Soc.* ix. 524. *Ruellia mysurensis*, *Roth Nov. Sp.* 303; *Wall. Cat.* 2402. *Strobilanthes mysurensis*, *Nees in Wall. Pl. As. Rar.* iii. 86, and in *DC. Prodr.* xi. 192.

W. DECCAN PENINSULA; from Saugur to Kurg, frequent; *Rottler, &c.*

Stem herbaceous, erect, thinly hairy. *Leaves* 4 by 1½ in., with few distant multicellular hairs above, minutely lineolate, puberulous beneath; petiole 1½ in. *Flower-heads* 1½ by ¾ in., substrobiliform; bracts ¾–1 by ¼ in., broadly lanceolate, softly hirsute; bracteoles ¾ in., lanceolate membranous. *Sepals* ½ in., linear hairy. *Stamens* slightly didynamous, nearly glabrous; anthers 2-celled; cells ovate or subellipsoid, muticous, one slightly above the other. *Style* glabrous; stigma very minutely bifid; ovary pubescent. *Capsule* ¾ in., 4-seeded; solid cylindric base ½ in. *Seeds* compressed, angular; testa minutely laxly hexagonal, glabrous.—Very unlike the genus in the bracts, corolla, anthers, and habit, in which it more resembles *Strobilanthes micranthus*.

XXVI. **ERANTHEMUM**, Linn.

Stamens 2 fertile, 2 rudimentary or 0. *Ovary* often glabrous. Otherwise as *Asystasia*.—Species 30, tropics of both hemispheres.

E. diantherum, Roxb. *Fl. Ind.* i. 112, Wall. *Pl. As. Rar.* iii. 108, and *E. racemosum*, Roxb. *l. c.* 113, Wall. *l. c.* 107, DC. *Prodr.* xi. 455, came from the Moluccas.—*E. semperflorens*, Roth *Nov. Sp.* 2, Nees in DC. *Prodr.* xi. 458, came from Martinique, nor is there reason from Roth's account to believe it otherwise than cultivated by Heyne.—*Justicia* sp., Griff. *Ic. Pl. As.* t. 426 (Kew Distrib. n. 6177), is a fine *Eranthemum*, collected in Ava, outside the bounds of British India.

* *Corolla tubular-ventricose.*

1. ***E. indicum***, Clarke; leaves lanceolate or subovate acuminate at both ends glabrous, racemes dense puberulous or glabrate, corolla $1\frac{1}{4}$ in. white abundantly purple-veined. *Thysacanthus indicus*, Nees in DC. *Prodr.* ix. 325. *Asystasia thysacanthus*, T. Anders. in *Journ. Linn. Soc.* ix. 525.

SIKKIM and BHOTAN, alt. 1–5000 ft., frequent; *H. f. & T.*, &c. ASSAM, in the lower hills; KHASIA and JAINTIA MTS., alt. 1–4000 ft., frequent.

A diffuse undershrub, 1–4 ft. *Leaves* 7 by $2\frac{1}{2}$ in.; nerves 5–7 pair; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in. *Racemes* 1–5 in.; lower pedicels 0– $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ – $\frac{1}{2}$ in., linear. *Sepals* $\frac{1}{2}$ in., linear-lanceolate, glabrous or puberulous. *Corolla* distinctly 2-lipped, upper lip subentire emarginate galeate, lower 3-fid, middle lobe the widest. *Filaments* and *style* minutely hairy. *Capsule* $1\frac{1}{2}$ in., base long, cylindric, solid. *Seeds* $\frac{1}{4}$ in., orbicular, tubercled, rugose, glabrous.—It is difficult to give a reason why this is not a *Thysacanthus*, except that it is not American; the curved subgaleate corolla does not agree well either with *Asystasia* or *Eranthemum*.

** *Corolla-tube linear-cylindric, often very narrow.*

2. ***E. crenulatum***, Lindl. in *Bot. Reg.* t. 879, not of Nees; leaves lanceolate or elliptic acuminate at both ends, racemes slender glabrous or puberulous, flowers solitary, corolla pale purple or lilac tube $\frac{3}{4}$ in. slender narrowly funnel-shaped upwards, ovary glabrous.

KHASIA TERAI, alt. 0–2000 ft., frequent; Wallich, *H. f. & T.*, &c.

Perennial; 18 in., glabrous. *Leaves* $6\frac{1}{2}$ by 2 in., undulate-crenate; nerves 8 pair; petiole $\frac{1}{2}$ in. *Racemes* in a terminal panicle with curved drooping slender branches; bracts $\frac{1}{2}$ in., linear-lanceolate; pedicels 0– $\frac{1}{2}$ in. *Sepals* $\frac{1}{2}$ in., sublinear, glabrous or puberulous. *Corolla-limb* obscurely 2-lipped, $\frac{1}{2}$ in. diam. *Stamens* 2, subincluded. *Capsule* $\frac{3}{4}$ in.; cylindric base $\frac{1}{2}$ in. *Seeds* $\frac{1}{2}$ in., rugose, glabrous.—Lindley's picture is excellent, but shows a small example in young flower; the panicle is often 8–12 in. diam., the flowers becoming distant on the branches. The species has been quite lost sight of by Nees and T. Anderson, Hooker's examples having (probably from the short corolla) been referred to *Codonacanthus*.

3. ***E. malabaricum***, Clarke; leaves elliptic or ovate narrowed at both ends glabrous, spikes glabrous or puberulous, corolla white or yellowish tube $1-1\frac{1}{4}$ in., ovary glabrous. *E. crenulatum*, Wall. *Cat.* 2491; Dalz. & Gibs. *Bomb. Fl.* 195. T. Anders. in *Thwaites Enum.* 235, and in *Journ. Linn. Soc.* ix. 523, chiefly. *Justicia latifolia*, Vahl *Symb.* ii. 4?

W. DECCAN PENINSULA, frequent; Wight, Hohenacker. CEYLON; Thwaites (*C. P.* n. 1979).

Suffrutescent, 2 ft. high. *Leaves* 5 by $2\frac{1}{2}$ in., undulate-crenate, minutely lineolate on both surfaces; nerves 6–7 pair; petiole $\frac{1}{2}$ in. *Spikes* 4–9 in.; lowest pedicels obsolete in fruit; bracts $\frac{1}{2}$ in., linear-lanceolate. *Sepals* $\frac{1}{2}$ in., sublinear,

glabrous or puberulous. *Corolla-tube* linear, only slightly widened close to the apex; limb 1-1½ in. diam., obscurely 2-lipped. *Capsule* ½ in., cylindric base ¼ in. *Seeds* ⅙ in., rugose, subterbecled glabrous.—Vahl's description agrees pretty well with this Malabar species, and he received his examples from Koenig; but his reference to Rheede Hort. Mal. ix. t. 44 (which has extremely different flowers) throws a doubt on the identification. Nees says his *E. crenulatum* was founded entirely on material from Silhet to Malacca, and therefore it should not belong to *E. malabaricum*, even in part; but in fact a good deal of Nees' material came from Malabar.

4. ***E. palatiferum***, Nees in *Wall. Pl. As. Rar.* iii. 108, and in *DC. Prodr.* xi. 457; leaves elliptic acuminate at both ends pubescent on the midrib beneath or ultimately glabrate, racemes pubescent flowers often fascicled, corolla pale-purple tube 1¼-1½ in. linear, ovary pubescent. *T. Anders. in Journ. Linn. Soc.* ix. 524. *Justicia palatifera*, *Wall. Pl. As. Rar.* i. 80, t. 92. *J. rubicunda*, *Ham. in Wall. Cat.* 2480.

SUBTROPICAL SIKKIM and BROGAN, alt. 0-3000 ft., frequent; *Treutler, Gamble, &c.* ASSAM and KHASIA MTS., alt. 0-3000 ft., common; *Wallich, Griffith, &c.*

Perennial, 3 ft.; stems pubescent upwards. *Leaves* 7 by 2-3 in., very obscurely (or not) lineolate; nerves 8-10 pair; petiole ½ in. *Racemes* often one foot long, pubescent; bracts ⅙-⅓ in., sublinear; lower pedicels rarely attaining ½ in. *Sepals* ½ in., linear, pubescent. *Corolla-tube* linear almost to its apex; limb 1¼ in. diam., obscurely 2-lipped; purple often with a yellowish spot on the middle lobe of the lower lip. *Capsule* nearly 1 in., pubescent. *Seeds* ⅙ in. diam., reticulate-rugose, glabrous.

VAR. *levicapsa*; leaves more conspicuously lineolate on the upper surface, spikes long slender in more or less compound panicles, flowers often slenderer, capsule less pubescent usually soon glabrate. *E. crenulatum*, *Wall. Cat.* 2491, letter F.—Chittagong, alt. 0-2000 ft., frequent; *H. f. & T., &c.* Pegu, *M'Lelland.* Mergui, *Griffith.* Attran, *Wallich.*

VAR. *elata*; leaves large uppermost petioled elongate-cuneate at the base. *E. elatum*, *Kurz in Journ. Bot.* 1872, 46, and 1873, 47. *E. latifolium*, *Kurz in Flora* 1870, 363 excl. syn. ?—Pegu, Yomah, *Kurz.* Rangoon, *M'Lelland.*—*Kurz* notes that this species produces on the same plant dimorphous flowers; one kind as of *E. palatiferum* type, the other (usually the upper ones in the spike) about ½ in. long, which chiefly produce fruit. Similar dimorphic flowers occur in typical Khasian *E. palatiferum*.

5. ***E. album***, Nees in *DC. Prodr.* xi. 455; leaves elliptic acuminate puberulous on the midrib beneath or glabrate, spikes panicked minutely pubescent, corolla white tube 1½ in. linear. *T. Anders. in Journ. Linn. Soc.* ix. 523. *E. crenulatum*, *Wall. Cat.* 2491, letters D, E. *Justicia alba*, *Roxb. Fl. Ind.* i. 116, and *Id. Ined. in Herb. Kew.*

ANDAMANS; *Roxburgh, Kurz.* PEGU; *Brandis.* CHITTAGONG; *J. D. H. PENANG; Wallich.* NICOBARS; *Kurz.*

Stem woody upwards, bark whitish. Uppermost leaves very shortly petioled, base usually rounded, but in *Roxburgh's* picture (and in the Chittagong example) cuneate.—This, when dry, seems very difficult to separate from *E. palatiferum*, Nees, *Var. levicapsa*, except by the woodiness of the stems, almost to the panicle as shown in *Roxburgh's* picture and in *Kurz's* and *Hooker's* examples; the stems in *E. palatiferum* being distinctly herbaceous unless very near the base.

6. ***E. malaccense***, *Clarke*; leaves broad-lanceolate minutely pilose on the midrib beneath, spikes 1-3 subterminal puberulous or pubescent, corolla pale-purple tube 1-1½ in. linear, ovary nearly glabrous. *E. crenulatum*, Nees in *Wall. Pl. As. Rar.* iii. 107, and in *DC. Prodr.* xi. 453, chiefly; *T. Anders. in Journ. Linn. Soc.* ix. 523, partly (not of *Lindl.*). *E. palatiferum*, *Bot. Mag.* t. 5957, left-hand fig. only. *Justicia orbiculata*, *Wall. Cat.* 2489, letter b.

MALACCA; *Griffith* (*Kew Distrib.* n. 6175), *Cuming*, nn. 2357, 2389, &c.

An undershrub, 4 ft. high. *Leaves* $5\frac{1}{2}$ by $1\frac{1}{4}$ in., acuminate, base cuneate, obscurely or obsoletely lineolate; nerves 5-6 pair, much curved, usually crispedly pubescent when young; petiole $\frac{1}{2}$ in. *Spikes* 2-5 in., fuscous-puberulous, few- or little-branched, never forming a lax panicle; bracts $\frac{1}{10}$ in.; lower pedicels very short. *Flowers* and *fruits* very nearly as of *E. palatiferum*. Young *capsule* sometimes sparsely pilose, soon glabrous.—This plant seems plentiful at Malacca, and probably occurs in the Malay Isles, but does not exactly agree with any Malay species at Kew, nor with the descriptions of the Dutch botanists. It may (ex descr.) possibly be *E. punctatum*, *Nees in DC. Prodr.* xi. 455.

7. **E. Andersoni**, *Masters in Gard. Chron.* 1869; leaves large lanceolate acute at both ends glabrous, spike very long linear flower-clusters whorled below, bracts and calyces glabrous or puberulous, corolla-tube $1\frac{1}{2}$ - $1\frac{3}{4}$ in. *Bot. Mag.* t. 5771. *E. elegans*, *Masters l. c.* 1868, p. 1234, not of Br. *E. Blumei*, *Teijs.*? *Miq. Fl. Ind. Bat.* ii. 836; *T. Anders. Journ. Linn. Soc.* ix. 523; *Kurz in Flora* 1870, 363.

SINGAPORE; *T. Anderson*.—DISTRIB. Malaya.

Upper *leaves* 5 by $1\frac{1}{2}$ in.; petiole $\frac{3}{8}$ in. *Spike* (coming into flower) 10 in.; lower clusters distant, many-fl'd., upper few-fl'd., continuous; bracts $\frac{1}{2}$ in. *Calyx* $\frac{1}{4}$ in.; lobes linear-lanceolate. *Corolla* white, pubescent; lobes $\frac{3}{8}$ by $\frac{1}{4}$ in. *Capsule* not seen.—Described from *T. Anderson's* Singapore example. The name should be *E. Blumei*, but there is no authentic example of that for comparison; nor is it known whether, by recording *E. Blumei* among the Indian *Acanthaceæ*, *T. Anderson* alluded to his Singapore plant.

8. **E. cinnabarinum**, *Wall. Pl. As. Rar.* i. 20, t. 21, and *Cat.* 9088; leaves large elliptic acuminate at both ends glabrous, spikes rather short rigidly paniced fuscous-puberulous, corolla crimson tube $1\frac{1}{2}$ in. linear. *Nees in Wall. Pl. As. Rar.* iii. 108, and in *DC. Prodr.* xi. 453; *T. Anders. in Journ. Linn. Soc.* ix. 524. *E. palatiferum*, *Bot. Mag.* t. 5957, right-hand fig.

LOWER BURMA and TENASSERIM; *Wallich, Parish, Beddome*.

Leaves $8\frac{1}{2}$ by $2\frac{1}{2}$ in., undulate-crenulate; raphides sunk, obscure; nerves 8-11 pair; petiole $\frac{1}{2}$ - $1\frac{1}{2}$ in. *Panicles* compound, stout; branches short, patent or ultimately recurved; flowers subsessile, often fasciated; bracts $\frac{1}{4}$ in., linear. *Sepals* $\frac{1}{2}$ in., sublinear. *Corolla-tube* linear to the apex; limb 2-lipped, lobes of the lower lip wider than those of the upper; eye often more intensely crimson, sometimes a yellowish spot on the middle lobe of the lower lip.

VAR. *succisifolia*; flowers white. *E. succisifolium*, *Kurz in Journ. As. Soc.* 1876, pt. ii. 142.—*Nicobars*; *Kurz*.—The dried examples show no good distinction between this and *E. cinnabarinum*; the leaves have rather fewer nerves than in *Wallich's* specimen, but not than in his picture; the flowers are hardly smaller than *Wallich's*; the capsules are $\frac{3}{4}$ in., altogether as of the genus.

9. **E. Parishii**, *Clarke*; leaves elliptic acuminate at both ends glabrous, spikes puberulous or pubescent subpaniced, flowers often fasciated, corolla purplish-pink tube $1\frac{1}{2}$ in. distinctly funnel-shaped upwards. *E. crenulatum* var. *grandiflora*, *Hook. f. in Bot. Mag.* t. 5440. *Asystasia Parishii*, *T. Anders. in Journ. Linn. Soc.* ix. 526.

MOULMEIN; *Parish*. TENASSERIM; *Beddome*.

Leaves $4\frac{1}{2}$ by $1\frac{1}{4}$ - $1\frac{1}{2}$ in., very acute, variegated in all the wild examples, densely punctulate not lineolate above; nerves 6 pair; petiole $\frac{3}{8}$ in. *Spikes* 2-5 in., suberect; bracts $\frac{1}{2}$ in. *Sepals* $\frac{1}{2}$ in., linear-lanceolate, pubescent. *Corolla-tube* linear below, upper $\frac{1}{2}$ part distinctly widened subinflated; limb $\frac{3}{4}$ in. diam., segments subequal. *Anthers* subexsert. *Ovary* glabrous or very nearly so.—In *Bot. Mag.* t. 5440, the stamens are figured 4 subequal; in the accompanying text they are said to be 2 or 4. Wild specimens have 2 perfect and 2 minute rudimentary stamens.

10. ***E. leptanthus***, Clarke; leaves elliptic acuminate at both ends glabrous, racemes elongate many-fl. subglabrous, corolla small tube $\frac{1}{4}$ – $\frac{1}{3}$ in. linear curved.

MISHMEE HILLS; *Griffith* (Kew Distrib. n. 6181).

Apparently a large herb; branches subterete, glabrous. *Leaves* $7\frac{1}{2}$ by $2\frac{1}{2}$ in., not or very obscurely lineolate; nerves 11–16 pair; petiole $1\frac{1}{4}$ in. *Racemes* 5–9 in., 1–5 subterminal, nearly simple; pedicels fascicled, unusually long, upper often $\frac{1}{2}$ in.; bracts at the base of the pedicels, minute, linear. *Sepals* $\frac{1}{2}$ in., linear-lanceolate, glabrous, margins puberulous. *Corolla* glabrous; tube linear, slightly inflated, base gibbous; limb subequally 5-lobed. *Stamens* 2, with 2 minute linear rudiments; filaments somewhat ligulate, glabrous; anthers oblong; cells straight, parallel, muticous, on the same level exactly. *Pistil* glabrous; disc annular; ovary 4-ovulate; stigma minute, obscurely bifid. *Capsule* not seen.—A species differing widely from all others, but referred by Mr. Bentham to this genus, of which it appears to possess all the essential characters.

SPECIES IMPERFECTLY KNOWN.

11. ***E. GRACILIFLORUM***, *Nees in Wall. Pl. As. Rar.* iii. 107, and in *DC. Prodr.* xi. 454; leaves 8 by $3\frac{1}{2}$ in. elliptic acute at both ends subglabrous, nerves 7–9 pair puberulous beneath, petiole $2\frac{1}{2}$ in. puberulous, thyrses 4 in. dense-fl. and densely pubescent, pedicels $0\frac{1}{2}$ in., bracts $\frac{1}{2}$ in. linear, sepals $\frac{1}{2}$ in. pubescent, corolla-tube $1\frac{1}{2}$ in. linear for $\frac{1}{2}$ its length. *Justicia graciliflora*, *Wall. Cat.* 2427.—Penang Mts.; *Wallich* (specimens without fruit, and with only a very imperfect flower).

12. ***E. BIFARIUM***, *Nees in DC. Prodr.* xi. 458; leaves ovate attenuate at both ends glabrate, spike small puberulous, flowers solitary opposite, bracts and bracteoles linear-subulate shorter than the calyx. *Gendarussa bifaria*, *Wall. Cat.* 7173; *Nees in Wall. Pl. As. Rar.* iii. 104.—Pegu; *Pingee*, *Wallich*.—*Leaves* 7 by $3\frac{1}{4}$ in., entire, minutely lineolate on both surfaces; petiole $1\frac{1}{2}$ in., puberulous. *Spike* (one only seen) $2\frac{1}{2}$ in., puberulous; flowers $\frac{1}{2}$ in. apart. *Calyx-segments* $\frac{1}{2}$ in., linear, puberulous. *Corolla* not seen. *Capsule* $\frac{3}{4}$ –1 in., altogether of *Eranthemum*.—*Nees* founded this on the 2 opposite lines of minute crisped hairs near the tips of the branches; which may be seen in *E. album*, *malaccense* and others. The solitary example of *E. bifarium* in Herb. *Wallich* differs from the neighbouring species in its depauperated spike and long-petioled leaves, but it is impossible to say that it may not be one of them.

13. ***E. PUBESCENS***, *Roth Nov. Sp.* 1; leaves ovate obtuse, spikes terminal subdistichous, bracts imbricated obovate-oblong mucronate keeled densely pubescent, calyx unequal scarious. *Nees in DC. Prodr.* xi. 458.—India; *Heyne*.—A shrub; branches subtetragonous, ashy farinose. *Leaves* from oblong to ovate, nearly entire, nervose, paler beneath, farinose; petiole 1 in. *Spike* terminal, 3 in., enveloped at base by 4 or 5 ovate acute bracts; proper bracts $\frac{1}{2}$ in., dense clothed with capitate hairs; bracteoles 2, linear-subulate. *Calyx* 5-leaved, 2 lanceolate subulate, 1 broader 2-nerved sub-bifid, 2 smaller. *Corolla* showy, pubescent without; tube 1 in. filiform, limb of 5 subequal round lobes. *Stamens* 2 with oblong villous anthers, 2 sterile very short. *Style* long, tip semi-bifid. *Capsule* oblong-ovoid, 4-seeded. *Seeds* brown, compressed, ovate subrotund, under a lens elegantly clothed with imbricated adpressed ferruginous scales.

XXVII. CODONACANTHUS, *Nees*.

Corolla small ventricose nearly from the base.—Otherwise as *Eranthemum*.

The solitary species differs from *Eranthemum indicum* in its very small flowers; from *E. leptanthus* in its ventricose corolla.

C. pauciflorus, *Nees in DC. Prodr.* xi. 103; leaves elliptic acuminate at both ends pubescent on the nerves beneath or glabrate,

flowers $\frac{1}{2}$ in. many of them distinctly pedicelled. *T. Anders. in Journ. Linn. Soc. ix.* 524. *C. acuminatus, Nees l. c.* *Ruellia pauciflora, Wall. Cat.* 2369. *Asystasia pauciflora, Nees in Wall. Pl. As. Rar.* iii. 90.

KHASIA HILLS, alt. 0-3000 ft., and ASSAM; *Wallich, Jenkins, H. f. & T., &c.* CHITTAGONG HILLS; *Clarke.*—DISTRIB. S. China.

An erect herb. *Leaves* 5 by $1\frac{1}{2}$ –2 in.; petiole $\frac{1}{2}$ in., usually pubescent. *Racemes* in the Indian examples forming very compound, slender, terminal, lax panicles; bracts minute linear; pedicels often $\frac{1}{2}$ – $\frac{3}{4}$ in. *Sepals* $\frac{1}{2}$ in., linear-lanceolata. *Corolla* glabrous, pink or whiteish; cylindric base of the tube scarcely $\frac{1}{8}$ in.; lobes 5, ovate, subequal. *Stamens* 2, with 2 minute linear rudiments. *Capsule* $\frac{1}{2}$ in.; base cylindric, solid. *Seeds* 4 as of *Eranthemum*, but nearly smooth, scarcely rugose.—The Chinese examples all differ from the Indian in their much simpler inflorescence. Benth, in allowing the genus 2 species in the Gen. Pl., appears to think the Chinese plant distinct, but in the Flora of Hongkong he had united them.

XXVIII. ANDROGRAPHIS, Wall.

Annual herbs or very small shrubs, erect or procumbent. *Leaves* entire. *Racemes* axillary and terminal, lax, often compound subpanicled, or dense or subcapitate, sometimes reduced and 1-fl., frequently 1-sided; bracts small; bracteoles minute or 0. *Sepals* narrow. *Corolla* small, tubular, 2-lipped, white or pink with dark-purple lower lip, pubescent. *Stamens* 2; filaments ciliate or setulose; anthers exerted, 2-celled; cells oblong, parallel, muticous, subequal, base bearded. *Ovary* 6-12-ovulate, thinly hairy; style slender, tip minutely bifid. *Capsule* linear-oblong or elliptic, compressed contrary to the septum, 6-12-seeded. *Seeds* osseous, subquadrate or oblong, not compressed, rugose-pitted, glabrous.—Endemic in India; the 17 species being very closely connected, and identical as to form and colour of flower, and as to seeds.

* *Capsule linear, thrice as long as broad.*

† *Racemes elongate often loosely subpaniculate, lower flowers distant.*

1. **A. paniculata**, *Nees in Wall. Pl. As. Rar.* iii. 116, and in *DC. Prodr.* xi. 515; leaves lanceolate glabrous, racemes lax paniculate divaricate, pedicels manifest, capsule nearly glabrous. *Wight Ic.* t. 518; *Dalz. & Gibs. Bomb. Fl.* 198; *T. Anders. in Journ. Linn. Soc. ix.* 502; *Bentl. & Trim. Med. Pl.* t. 197. *Justicia paniculata, Burm. Fl. Ind.* 9; *Wall. Cat.* 2454; *Blume Bijd.* 788; *Roxb. Fl. Ind.* i. 117.—*Rheede Hort. Mal.* t. 56.

Throughout INDIA from Lucknow and Assam to Ceylon (probably introduced in some of the northern stations).—DISTRIB. Cultivated in the E. and W. Indies.

An erect annual, 1-3 ft.; stems quadrangular, base not pubescent. *Leaves* $2\frac{1}{2}$ by $\frac{1}{2}$ – $\frac{3}{4}$ in., narrowed at both ends, never spatulate, ovate at base, paler beneath; petiole $0\frac{1}{4}$ in. *Racemes* 1-4 in.; pedicels $0\frac{1}{2}$ in., distant, usually pubescent; bract $\frac{1}{8}$ in., linear; bracteoles smaller or 0; inflorescence mostly sympodal, the pedicel in the axil of one of each pair of bracts suppressed. *Sepals* $\frac{1}{2}$ in., linear-lanceolata, pubescent. *Corolla* $\frac{1}{2}$ in., 2-lipped for at least half its length, hairy; white, spotted rose-purple. *Filaments* hairy upwards. *Ovary* and base of style subglabrous or very thinly hairy. *Capsule* $\frac{3}{4}$ by $\frac{1}{2}$ in., young slightly glandular-hairy, mature glabrous. *Seeds* subquadrate, osseous, rugose, without hairs or scales at any period, wet or dry, yellow or deep brown.—Bentley and Trimen's figure is erroneous as to the seeds being hairy. *Nees* and others have doubted this being Roxburgh's *Justicia paniculata*, because Roxburgh says the bracts are large; but Roxburgh regards the reduced leaves at the base of the racemes as bracts, and does not notice the true small bracts at the base of the pedicels.

2. **A. subspathulata**, *Clarke*; leaves subspathulate elliptic minutely scabrid-punctate on both surfaces, racemes lax divaricate, pedicels manifest, capsule nearly glabrous.

MADRAS; Kurnool at the foot of the Nellymallays, *Beddome*.

In habit resembling *A. paniculata*; stem minutely hispid near the base. *Leaves* 3 by 1 in., apex scarcely acute, base suddenly narrowed; petiole $\frac{1}{2}$ in., often winged to the base. Lower *pedicels* $\frac{1}{2}$ in. *Corolla* $\frac{3}{4}$ in., similar to that of *A. paniculata*, but rather longer.—This has been considered a var. of *A. paniculata*; but points above noted as differential are constant.

3. **A. elongata**, *T. Anders. in Journ. Linn. Soc.* ix. 502; leaves petioled ovate-lanceolate pubescent or glabrate, spikes forming straggling panicles, sepals glabrate or minutely pubescent, anthers exsert not barbate, capsule nearly glabrous. *Justicia elongata*, *Vahl Enum.* i. 130. *J. cordifolia*, *Wall. Cat.* 2482. *Cryptophragmium cordifolium*, *Nees in Wall. Pl. As. Rar.* iii. 100. *C. elongatum*, *Nees in DC. Prodr.* xi. 95.

S. DECCAN PENINSULA; Courtallum, *Wight*; Tinnevely Hills, *Beddome*.

Annual, erect, 2–3 ft.; branches divaricate, acutely quadrangular. *Leaves* 2 by 1 in., base somewhat suddenly narrowed or rarely subcordate; raphides inconspicuous; petiole often attaining $\frac{1}{2}$ in. *Panicles* often a foot each way; pedicels mostly very short. *Sepals* $\frac{1}{2}$ in., linear-lanceolate. *Corolla* $\frac{1}{2}$ in., tube curved, limb $\frac{1}{2}$ – $\frac{3}{4}$ in., obscurely 2-lipped. *Filaments* flattened, glabrous or very nearly so, a little longer than the corolla; anthers glabrous. *Capsule* $\frac{3}{4}$ by $\frac{1}{2}$ in., compressed, at first minutely hairy, soon glabrous. *Seeds* osseous, rugose, not compressed, glabrous.

4. **A. ovata**, *Benth. in Gen. Pl.* ii. 1100; stem glandular-hirsute, leaves petioled ovate, spikes often panicled rather lax somewhat recurved, corolla $\frac{1}{2}$ in., anthers included not barbate, capsule hairy. *Gymnostachyum ovatum*, *T. Anders. ms.*; *Bedd. Ic. Pl. Ind. Or.* t. 250.

DECCAN PENINSULA; Myhendra Hills, Berhampore and Jeypur Hills (Vizagapatam), alt. 2–4000 ft., *Beddome*.

Stems 6–10 in., quadrangular, glandular-pubescent or subhirsute below. *Leaves* 2½–3 by nearly 2 in., shortly attenuated into the petiole, sparsely hairy above, pubescent on the nerves beneath. *Racemes* axillary and terminal, 2–4 in. *Corollas* as of *A. elongata*. *Filaments* much dilated, thinly minutely hairy. *Capsule* $\frac{3}{4}$ by $\frac{1}{2}$ in., compressed. *Seeds* 8–10, subquadrate, osseous, rugose, glabrous, not compressed.—Perhaps a form only of *A. elongata*, *Nees*.

5. **A. tenuiflora**, *T. Anders. in Journ. Linn. Soc.* ix. 502; leaves ovate or lanceolate glabrous or pubescent on the nerves, spikes lax simple or compound, corolla $\frac{1}{2}$ in. obscurely 2-lipped, anthers included pubescent or slightly bearded, capsule pubescent ultimately glabrate. *Haplanthus tener*, *Nees in Wall. Pl. As. Rar.* iii. 115, and *Cat.* 7185, and in *DC. Prodr.* xi. 512. *Gymnostachyum Parishii* & *andrographioides*, *T. Anders. l. c.* 504.

EASTERN FRONTIER, alt. 500–3000 ft., from Assam to Tavoy, frequent. **ANDAMANS**; *Kurz*.—**DISTRIB.** Java, Borneo.

Stems 1–2 ft., quadrangular, pubescent, or glabrous unless at the very base. *Leaves* suddenly or cuneately narrowed at base; or the upper sessile, base rounded or subcordate. *Pedicels* rarely $\frac{1}{10}$ in.—Perhaps not distinct from *A. ovata*: it presents three leading variations, viz. (a) *tenuiflora* type, *T. Anders.*, leaves ovate, spikes long, flowers in remote clusters; (b) *Parishii*, *T. Anders.*, leaves ovate, panicles lax glabrate, flowers mostly solitary; (c) *andrographioides*, *T. Anders.*, leaves lanceolate.

VAR. recedens; nearly glabrous except the very lax compound closely glandular-pubescent panicle.—Tenasserim; Mooleeyit, alt. 2000 ft., *Beddome*.

6. **A. alata**, *Nees in DC. Prodr.* xi. 516; leaves petioled ovate upper

linear-oblong glabrous, panicle large lax branches 4-winged, sepals pubescent or subhirsute, capsule hairy. *T. Anders. in Thwaites Enum.* 232, and in *Journ. Linn. Soc.* ix. 502. *Justicia alata*, *Vahl Enum.* i. 139.

S. DECCAN PENINSULA, alt. 1-3000 ft.; Coimbatore, *Wight*, &c.; Nilgherries, *Gardner*. CEYLON; *Thwaites*.

Stems 2-4 ft., annual, erect, glabrous, 4-angular. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., somewhat suddenly attenuate into the petiole, conspicuously lineolate above; upper leaves few, distant, narrow. *Panicle* often 15 in. diam.; branches glabrous; pedicels $0\frac{1}{4}$ in., pubescent. *Sepals* $\frac{1}{2}$ - $\frac{1}{3}$ in., bristle-pointed, pubescent or very hairy. *Corolla* $\frac{1}{2}$ - $\frac{3}{4}$ in., hairy, white with pink spots; tube curved, limb obscurely 2-lipped. *Anthers* exerted; filaments subglabrous. *Capsule* 1 by $\frac{1}{2}$ in., compressed. *Seeds* osseous, glabrous, not compressed.—Perhaps only a variety of *A. elongata*. The panicle being large, the examples of the old collectors show only the panicle with the reduced narrow leaves belonging thereto; and the descriptions of *Vahl*, *Nees* and *T. Anderson* do not describe the proper cauline leaves.

7. ***A. stenophylla***, *Clarke*; glabrous, cauline leaves linear, racemes lax, flowers nearly all pedicelled, capsule glabrous.

COIMBATORE; *Wight* (*Herb. Propr.* n. 2245).

Rootstock woody; annual stems from its crown numerous, erect and diffuse, quadrangular. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ - $\frac{1}{3}$ in.; rachides 0 or obscure. *Racemes* 2-5 in., axillary and terminal, not distinctly paniced, the upper leaves being nearly similar to the cauline; pedicels mostly nearly as long as the calyx. *Sepals* $\frac{1}{2}$ in., linear-lanceolate, glabrous or very nearly so. *Corolla* nearly as of *A. paniculata*. *Capsule* $\frac{3}{4}$ by $\frac{1}{2}$ in., compressed.

8. ***A. Wightiana***, *Arn. ex Nees in DC. Prodr.* xi. 517; nearly glabrous, leaves subsessile lanceolate, racemes lax few-fl., pedicels sometimes as long as the calyx, corolla $\frac{3}{4}$ in. conspicuously 2-lipped, capsule glabrous. *Wight Ic.* t. 1558. *A. gracilis*, *Nees l. c.* 516; *T. Anders. in Journ. Linn. Soc.* ix. 503.—*Rheede Hort. Mal.* ix. t. 44.

S. DECCAN PENINSULA; Courtallum and Anamallay Forests, *Wight*; Mysore, *G. Thomson*; Mangalore, *Hohenacker*; Travancore and Tinnevely Ghauts, *Beddome*.

Stems elongate, diffuse, lax, quadrangular, glabrous, or thinly obscurely glandular-hairy. *Leaves* attaining 3 by 1 in., subovate, base obtuse rarely cordate, glabrous minutely lineolate above rarely obscurely scabrid puberulous; petiole $0\frac{1}{10}$ in. *Racemes* 2-4 in., weak, glabrous or rarely minutely glandular-hairy; lower pedicels sometimes $\frac{1}{2}$ in. *Sepals* $\frac{1}{2}$ in., sublinear, lineolate, glabrous. *Corolla* purplish, spotted on the lower lip; lips $\frac{1}{2}$ in. *Anthers* exerted, slightly bearded at the base; filaments setulose. *Capsule* $\frac{3}{4}$ -1 by $\frac{1}{2}$ - $\frac{1}{3}$ in.—Authentic examples only differ from *A. gracilis* in the few thin glandular hairs scattered on the upper part of the stem and panicle. That *Nees* understood the same plant as *Arnott* and *Wight* is clear from his saying that in his *A. Wightiana* the calyx was glabrous.

9. ***A. macrobotrys***, *Nees in DC. Prodr.* xi. 516; sparingly pubescent, leaves very short-petioled oblong-lanceolate, racemes elongate, sepals glandular-hairy, corolla $\frac{3}{4}$ in. conspicuously 2-lipped, capsule glabrous. *A. Wightiana*, *T. Anders. in Thwaites Enum.* 232, and in *Journ. Linn. Soc.* ix. 502, not of *Nees*.

MTS. of S. DECCAN PENINSULA; Mangalore, *Hohenacker*; Anamallays and Pulneys, *Beddome*. CEYLON; *Macrae*, &c.

Leaves 3 by $\frac{3}{4}$ in.; base cuneate or rhomboid, not rounded; nerves beneath often puberulous; petiole $0\frac{1}{4}$ in. *Racemes* 6-8 in. or more, glandular-hairy, often 1-2-branched. *Corolla* and *capsule* exactly as of *A. Wightiana*.—Very near *A. Wightiana*; but dries blacker, and has the leaves not widest at the base.

VAR. *parvifolia*; leaves 1- $1\frac{1}{2}$ in. *A. ceylanica*, *Nees l. c.* 518; *T. Anders. in Journ. Linn. Soc.* ix. 502, not of *Wight*.—Ceylon; *Walker*.

†† *Racemes dense, forming a viscous brown-hairy head or panicle.*

10. **A. viscosula**, *Nees in Wall. Pl. As. Rar.* iii. 116, and in *DC. Prodr.* xi. 517; leaves lanceolate glabrous densely lineolate above, corolla $\frac{3}{4}$ in. hairy. *Wight Ic.* t. 1559; *T. Anders. in Journ. Linn. Soc.* ix. 502. *Justicia lineata*, *Wall. Cat.* 2486, letter b.

S. DECCAN PENINSULA; Courtallum, *Wight* (Herb. Propr. n. 677); Pulney Hills, *Beddome*.

An undershrub, scarcely 1 foot; branches numerous, glabrous, 4-lineolate. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ in., narrowed at both ends; petiole $0-\frac{1}{2}$ in. *Panicles* $1-2\frac{1}{2}$ in., terminal, many-fl., viscidly brown-hairy; pedicels $0-\frac{1}{10}$ in.; bracts $\frac{1}{10}$ in., linear. *Sepals* $\frac{1}{2}-\frac{1}{3}$ in., linear-lanceolate. *Corolla* conspicuously 2-lipped; lips $\frac{1}{2}-\frac{1}{3}$ in. *Anthers* exserted, bases thinly bearded, filaments thinly bristly. *Capsule* $\frac{1}{2}-\frac{2}{3}$ by $\frac{1}{8}$ in., pubescent. *Seeds* osseous, rugose, glabrous, not compressed.

VAR. *explicata*; leaves 3 by $\frac{3}{4}-1$ in., panicle elongate 6-8 in. less dense, capsules rather larger. *A. ceylanica*, *Wight Ic.* t. 1560, not of *Nees*.—Courtallum; *Wight* (Herb. Propr. nn. 676, 2242). Concan; *Stocks*. Anamallays and Nilgheries, *Beddome*.—Wight himself, after figuring his *A. ceylanica* from n. 676, has altered the name of a portion of his n. 676 to *A. viscosula*.

11. **A. Neesiana**, *Wight Ic.* t. 1561; leaves elliptic acute at both ends sparsely minutely hairy above glabrate beneath, racemes terminal subcapitate, sepals $\frac{1}{2}$ in., corolla $\frac{3}{4}$ in. hairy. *T. Anders. in Journ. Linn. Soc.* ix. 502, excl. syn.

PULNEY MTS.; *Wight* (Herb. Propr. n. 2705). WYNAAD; *Beddome*.

Branches elongate, undivided, glabrate, obscurely quadrangular. *Leaves* $2\frac{3}{4}$ by $1\frac{1}{4}$ in.; hairs remote many-cellular, raphides 0; petiole $0-\frac{1}{4}$ in. *Racemes* forming a dense panicle 2-5 in. diam., viscidly brown-hairy. *Capsule* attaining 1 by $\frac{1}{2}$ in., compressed, minutely hairy.—Differs from *A. viscosula* in the absence of raphides from the leaves above.

VAR. *producta*; leaves elongate, heads produced into oblong sub-lax panicles. *A. ceylanica*, *Wight in Herb. Andrographis* sp. n. 13, *Herb. Ind. Or. H. f. & T.*—Shevagberry Hills; *Wight* (Herb. Propr. n. 2702). Tinnevely; *Beddome*. Malabar; *Gibson* (in Herb. Dalzell), &c.—*Leaves* $4\frac{1}{2}$ by $\frac{1}{2}$ in., subsessile. *Panicles* 5 in., pyramidal. Texture, indumentum, &c., of the leaves exactly as in *A. Neesiana* type.

VAR. *affinis*, *Nees in Wall. Pl. As. Rar.* iii. 116, and in *DC. Prodr.* xi. 517 (sp.); leaves small elliptic or oblong pubescent, panicles pyramidal or oblong viscidly brown-pubescent, corolla $\frac{1}{2}$ in. *T. Anders. in DC. Prodr.* ix. 502.—Nilgherry and Kurg Mts., frequent; *Wight*, &c.—*Leaves* 1 by $\frac{1}{2}$ in., or smaller; minutely bristly above with no raphides, pubescent beneath; nerves less impressed on the upper surface, usually fulvous-pubescent. *Capsule* very hairy.

12. **A. stellulata**, *Clarke*; hairy, leaves short-petioled elliptic narrowed at both ends, heads terminal dense, sepals exceeding $\frac{1}{4}$ in. linear-setaceous, corolla $\frac{3}{4}$ in. *A. Neesiana*, *Benth. in Pl. Hohenack.* n. 1435, not of *Wight*.

NILGHERY MTS., alt. 6000 ft., *Hohenacker*, &c.

Branches elongate, obscurely quadrangular, closely villous. *Leaves* $2\frac{1}{2}$ by 1 in., copiously sprinkled with fulvous multicellular hairs above, closely villous beneath; petiole $0-\frac{1}{2}$ in. *Heads* 1-2 in. diam., viscidly brown-hairy. *Corolla* pale pink with purple spots on the lower lip. *Filaments* somewhat flattened, hairy upwards. *Capsule* $\frac{3}{4}$ by $\frac{1}{8}$ in. (and upwards), hairy, compressed. *Seeds* osseous, rugose, glabrous, not compressed.—Much resembling *A. Neesiana* and others of this subsection, but distinguished by the long substellate sepals.

13. **A. lineata**, *Nees in Wall. Pl. As. Rar.* iii. 116, and in *DC.*

Prodr. xi. 516; leaves subsessile ovate or broadly oblong shortly acute glabrous, panicles very compound viscidly grey- or dusky-pubescent, corolla $\frac{3}{8}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 502.—*Andrographis* sp. n. 14, *Herb. Ind. Or. H. f. & T.* *Justicia lineata*, *Wall. Cat.* 2486, *letter a*.

S. DECCAN PENINSULA; Mysore and adjacent parts of the Nilghiri and Kurg Mts., *Wight, G. Thomson, Lobb*; Anamallays, *Beddome*.

Branches elongate, quadrangular, glabrous. *Leaves* $1\frac{3}{4}$ by 1 in., suddenly acute, base rounded; raphides above embedded, obscure; nerves beneath usually strongly elevated; petiole $0-\frac{1}{12}$ in. *Panicle* 2–10 in.; pedicels 0 or very short. *Sepals* $\frac{1}{2}-\frac{3}{4}$ in., linear-lanceolate acute, glandular-hairy. *Corolla* hairy. *Anthers* bearded at the base. *Capsule* $\frac{3}{4}$ by $\frac{1}{2}-\frac{3}{8}$ in., thinly hairy.—Hardly separable from *A. viscosula* var. *explicata* by the less acuminate leaves with more strongly-marked nerves and the more densely bearded anthers.

VAR. Lawii; stem closely pubescent, leaves 3 in. sparsely pilose above pubescent beneath, panicle large open.—Bababoodun Hills; *Law. Nundidroog, Beddome*.—Referred to *A. affinis* in *Herb. Hooker*: the large strongly lineate leaves, large panicle and densely barbate anthers bring it nearer to *A. lineata* type.

14. ***A. lobelioides***, *Wight Ill. t.* 164 b, fig. 11, and *Ic. t.* 1557; leaves small sessile ovate pubescent or glabrous, racemes in a subterminal panicle, corolla $\frac{1}{2}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 503. *Justicia lobelioides*, *Wall. Cat.* 2484. *Erianthera lobelioides*, *Nees in Wall. Pl. As. Rar.* iii. 115, and in *DC. Prodr.* xi. 514.

NILGHIRI MTS., alt. 6–8000 ft., common in the open grass, *Wight, &c.*

Very rusty pubescent or nearly glabrous. *Rootstock* woody; stems 2–8 in., very numerous, procumbent. *Leaves* $\frac{1}{2}-\frac{3}{4}$ in. diam. *Panicles* 1–4 in.; lower pedicels $\frac{1}{10}-\frac{1}{4}$ in. *Sepals* $\frac{1}{2}$ in. *Anthers* much exserted, conspicuously white-barbate. *Capsule* $\frac{3}{8}$ by $\frac{1}{2}$ in.—Very variable in indumentum. Easily distinguished (without the fruit) from *A. serpyllifolia* by the absence of flowers in the lower axils.

VAR. composita; racemes elongate compound forming a terminal quasi-panicle 12 by 8 in.—Courtallum Hills and Tiunnevely; *Beddome*.

**** Capsule elliptic, 2–3 times as long as broad.**

15. ***A. echioides***, *Nees in Wall. Pl. As. Rar.* iii. 117, and in *DC. Prodr.* xi. 518; erect, hairy, leaves sessile oblong or subelliptic obtuse, racemes numerous axillary, corolla $\frac{1}{2}-\frac{3}{4}$ in. *Wight Ic. t.* 467; *Dalz. & Gibs. Bomb. Fl.* 198; *T. Anders. in Journ. Linn. Soc.* ix. 503. *Justicia echioides*, *Linn.*; *Burm. Fl. Ind.* 9; *Roxb. Fl. Ind.* i. 118; *Wall. Cat.* 2439. —*Rheede Hort. Mal.* ix. t. 46.

TROPICAL INDIA, in the drier districts from the Punjab and Chota Nagpore to Ceylon, common (absent in Bengal proper and humid Malabar).

Annual, 8–24 in., closely pubescent and with patent white hairs. *Leaves* $2\frac{1}{2}$ by 1 in., base cuneate. *Racemes* about as long as the leaves, divaricate or recurved, often one from each axil about the middle of the stem; pedicels very short. *Sepals* $\frac{1}{2}-\frac{3}{4}$ in., linear; in fruit elongated, sometimes $\frac{1}{2}$ in. *Corolla* pubescent, pink or white, lower lip dark-purple. *Anthers* much exserted, white-barbate. *Capsule* $\frac{1}{2}$ by $\frac{1}{2}$ in., acute at both ends, hairy. *Seeds* twice as long as broad, oaceous, rugose, glabrous, not compressed.

16. ***A. glandulosa***, *Nees in Wall. Pl. As. Rar.* iii. 115, and in *DC. Prodr.* xi. 518; hairy, leaves petioled oblong or subelliptic obtuse, racemes numerous axillary, lower pedicels nearly as long as the calyx. *Justicia glandulosa*, *Wall. Cat.* 2485.

MYSOORE; *Heyne* (fide *Nees*), *Wight* (*Herb. Prop.* n. 2026).

Leaves 1 by $\frac{1}{2}$ in., both in *Wight's* and *Wallich's* examples, on which *Nees*

finds his species; which both hardly differ from *A. echinoides* but by their short-petioled (not sessile) leaves and rather shorter ($\frac{1}{8}$ in.) sepals.—This is certainly *A. glandulosa*, Nees, for he has written his name on Wight's n. 2026, though this appears to be an erect annual.

17. **A. Rothii**, *Clarke*; shrubby, hairy, leaves small shortly petioled ovate or orbicular, racemes axillary lax few-fl., lower pedicels nearly as long as the calyx. *Justicia glandulosa*, *Roth Nov. Sp.* 13?; *not of Wall.*

S. DECCAN PENINSULA; *Wight* (Herb. Propr. n. 675).

Rootstock woody; branches 8–12 in., wavy, closely pubescent, and with white patent hairs, some glandular. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., base rounded or in a few of the lower very shortly attenuated; petiole 0– $\frac{1}{8}$ in. *Racemes* 2–4 in., patent or recurved, wavy, sometimes bifid, upper subpanicled; bracts $\frac{1}{2}$ in., ovate. *Sepals* $\frac{1}{6}$ – $\frac{1}{5}$ in. *Capsule* $\frac{1}{2}$ by $\frac{1}{4}$ in., subobtuse.—Found loose in Wight's Herbarium, marked simply *Erianthera*: it appears to fit very closely Roth's description of his *Justicia glandulosa*.

18. **A. serpyllifolia**, *Wight Ic. t.* 517; stems procumbent villous, leaves small sessile orbicular, racemes many 1- or few-fl. in the lower axils. *T. Anders. in Journ. Linn. Soc.* ix. 503. *Justicia serpyllifolia*, *Vahl Enum.* i. 169. *J. nummularifolia*, *Wall. Cat.* 2461. *Erianthera serpyllifolia*, *Nees in Wall. Pl. As. Rar.* iii. 115, and in *DC. Prodr.* xi. 514.

S. DECCAN PENINSULA; Mysore, Palamcotta, &c., *Shuter, Wight, &c.*

Rootstock woody; annual stems 2–12 in., closely procumbent, curved, densely leafy. *Leaves* $\frac{1}{2}$ in. diam., obtuse, more or less hairy. *Racemes* sometimes forming a small terminal quasi-panicle, but always with many 1–2-fl. in the lower axils; bracts $\frac{1}{10}$ – $\frac{1}{6}$ in., orbicular, being gradually reduced leaves. *Sepals* $\frac{1}{6}$ – $\frac{1}{4}$ in., linear; in fruit often $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ – $\frac{1}{3}$ in. *Capsule* $\frac{1}{2}$ – $\frac{1}{4}$ by $\frac{1}{4}$ – $\frac{1}{6}$ in.

19. **A. Beddomei**, *Clarke*; leaves short-petioled elliptic and obovate glabrous, racemes solitary axillary small few-fl., lower pedicels viscoso-pubescent, corolla $\frac{1}{2}$ – $\frac{3}{4}$ in. conspicuously 2-lipped, anthers exerted bases densely white-bearded.

MADRAS; Kurnool, Nallaymallays, alt. 2000 ft., *Beddome*.

Stems 4–6 in., subsimple, quadrangular. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ –2 in., subobtuse, somewhat coriaceous, base cuneate, raphides 0 or obscure; petiole 0– $\frac{1}{8}$ in. *Racemes* $\frac{1}{2}$ in., 3–5-fl., viscoso-pubescent; bracts $\frac{1}{2}$ in., oblong, subobtuse. *Calyx* $\frac{1}{4}$ in. *Corolla* and *stamens* nearly as of *A. echinoides*. *Capsule* not seen.

XXIX. HAPLANTHUS, *Nees*.

Erect herbs. *Leaves* petioled, ovate, entire. *Flowers* axillary, appearing whorled, whorls sometimes approximated into terminal spikes, surrounded by numerous barren branchlets, reduced to acicular cladodes terminated by 2–3 minute spines; proper bracts and bracteoles small. *Calyx* small; sepals sublinear. *Corolla* smallish, tubular; limb 2-lipped; lobes imbricated. *Stamens* 2; anthers 2-celled; cells ovate, equal or one sometimes much smaller, muticous; connective very hairy behind. *Ovary* 6–16-ovulate; style shortly bifid at the tip. *Capsule* narrowly oblong acute, 6–16-seeded from the base. *Seeds* ellipsoid, somewhat compressed, densely shortly hairy when moistened.—Species 3, endemic in India.

1. **H. verticillaris**, *Nees in DC. Prodr.* ix. 513; cladodes in fruit stout rigid pubescent scarcely ciliate towards the tips, calyx minutely pubescent or glabrate. *Dalz. & Gibs. Bomb. Fl.* 197; *T. Anders. in Journ. Linn. Soc.* ix. 504. *Justicia verticillata*, *Rorb. Fl. Ind.* i. 135.

W. DECCAN PENINSULA, frequent, Roxburgh, &c., extending north to Mt. Aboo, *Stocks*.

Stems 2-3 ft., pubescent or nearly glabrous. *Leaves* $3\frac{1}{2}$ by 2 in., shortly acuminate, base suddenly attenuated, pubescent or nearly glabrous; petiole 1 in. *Cladodes* often 1-1 $\frac{1}{2}$ in. in fruit, pubescent or glabrous, with or without scattered patent bristles in their lower half. *Calyx* $\frac{1}{2}$ in., glabrous or puberulous. *Corolla* $\frac{2}{3}$ in., pale lilac. *Calyx* $\frac{1}{2}$ in. and upwards, glabrous.

2. **H. tentaculatus**, *Nees in DC. Prodr.* xi. 513; cladodes in fruit slender curved glabrous or pubescent not ciliate, calyx pubescent scarcely ciliate. *Dalz. & Gibs. Bomb. Fl.* 197; *T. Anders. in Journ. Linn. Soc.* ix. 503. *Ruellia tentaculata*, *Linn. Amœn. Acad.* iv. 320; *Burm. Fl. Ind.* 134, t. 40, fig. 1. *R. aciculata*, *Roth Nov. Sp.* 301.

BOMBAY; *Dalzell*. BELGAUM; *Ritchie*. MALABAR; Yelwah Hill in Palghaut, *Beddome*. CENTRAL INDIA; Mandoo, *Edgeworth*.

Cladodes in fruit $\frac{1}{2}$ in. *Corolla* less than $\frac{1}{2}$ in., white (*Ritchie*). *Capsule* $\frac{1}{4}$ - $\frac{1}{2}$ in., glabrous; seeds much smaller than in *H. verticillaris*.—Very near *H. verticillaris*. *Dalzell* says l. c. that *H. tentaculatus* is a much stouter species than *H. verticillaris*; but his numerous examples submitted are named by him in accordance with *Nees'* naming.

VAR. *nilgherrensis*; whorls collected mostly in terminal spikes, cladodes and sepals with many patent needle-like white hairs. *H. nilgherrensis*, *Wight Ic.* t. 1556. —Mts. of Nilghiri and Kurg, frequent; *Wight*, *Hohenacker*, &c.

VAR. *plumosa*; calyx densely hispid-hairy subplumose. *H. plumosa*, *T. Anders. in Journ. Linn. Soc.* ix. 504. *Haplanthus* sp. n. 4, *Herb. Ind. Or. H. f. & T.*—Concan; *Stocks*. Belgaum; *Ritchie*.

3. **H. ? hygrophiloides**, *T. Anders. in Journ. Linn. Soc.* ix. 503; leaves petioled ovate acute tomentose on both surfaces, flowers axillary aggregated, bracts minute linear.

PEGU; *Brandis* (fide T. Anderson).

An insignificant weed; stems 4-angular furfuraceous. *Leaves* 1-1 $\frac{1}{2}$ by $\frac{1}{2}$ -1 in., minutely lineolate. *Sepals* $\frac{1}{4}$ in., subulate. *Corolla* small, pubescent. *Stamens* 2; anthers 2-celled, one cell bearded. *Capsule* linear, compressed, glandular, many-seeded.—No example seen; the foregoing copied from T. Anderson.

XXX. GYMNOSTACHYUM, *Nees*.

Herbs or undershrubs. *Leaves* cauline or subradical, entire, sinuate crenulate or toothed. *Cymes* axillary or in a terminal panicle, often spicate or racemose, sometimes small axillary; bracts and bracteoles very small, except in *G. hirsutum*; flowers subsessile or shortly pedicelled. *Calyx* small (except in *G. hirsutum*), sub-5-partite; segments equal, linear-lanceolate. *Corolla-tube* slender, cylindric; limb small, 2-lipped; lobes 5, subequal, quadrate-elliptic, imbricate. *Stamens* 2, nearly as long as the corolla; filaments usually hairy at least near the base; anthers 2-celled; cells subequal, oblong or ovate, hairy or glabrous. *Ovary* pubescent, many-ovulate; style subentire at the tip. *Capsule* linear, pubescent or nearly glabrate, 16-24-seeded. *Seeds* ovoid, compressed, hairy, hairs very shortly spreading when moistened.—Species 15, Indian, with a few Malayan.

* Panicle terminal, leafless or nearly so.

† *Leaves mostly near the base of the stem*.

1. **G. venustum**, *T. Anders. in Journ. Linn. Soc.* ix. 506; leaves large

ovate, panicle large pubescent, corolla $\frac{3}{4}$ -1 in. slender. *Justicia venusta*, *Wall. Cat.* 2470, and *Pl. As. Rar.* i. 53, t. 66; *Bot. Reg.* t. 1380. *Cryptophragmium venustum*, *Nees in Wall. Pl. As. Rar.* iii. 180, and in *DC. Prodr.* xi. 94; *Bot. Mag.* t. 3208.

KHASIA MTS., alt. 0-4000 ft., common on the southern face, *Wallich., H. f. & T., &c.*

Attaining 1-4 ft.; stem leafless or with few remote very small leaves. Radical leaves 6 by 3-4 in., or larger, acute, decurrent on the petiole, entire or undulate-crenate, nearly glabrous, or with scattered minute hairs above, nerves beneath pubescent; petiole 0-4 in. *Panicle* sometimes 8 by 12 in., or reduced to a single spike; flowers opposite, 1-3 together; bracts small, linear; bracteoles 0. *Sepals* $\frac{1}{2}$ - $\frac{3}{4}$ in., linear, hairy. *Corolla* pubescent; limb deep purple or blueish. *Anthers* oblong, glabrous. *Capsule* $\frac{1}{2}$ in.

2. **G. febrifugum**, *Benth. in Flora* 1849, 558; leaves ovate, panicle puberulous, corolla $1\frac{1}{4}$ in. upper half inflated, capsule 1 in. *G. alatum*, *Wight Ic.* t. 1525; *T. Anders. in Journ. Linn. Soc.* ix. 506.

S. DECCAN PENINSULA; Mangalore, *Hohenacker* (n. 374), *Wight*.

Nearly stemless. *Leaves* $6\frac{1}{2}$ by 3 in., decurrent on the petiole, subentire or undulate-crenulate, above lineolate nearly glabrous or minutely sparsely setulose, beneath paler glabrous or pubescent on the nerves. *Panicles* 6-12 in., in appearance radical; flowers opposite, solitary or in very small few-fld. cymes; bracts small, narrow; bracteoles 0. *Sepals* $\frac{1}{2}$ - $\frac{3}{4}$ in., glabrous or puberulous. *Corolla* glabrous. *Anthers* ovate, hairy.—*Hohenacker* observes that "a decoction of the root is a febrifuge," and *Bentham's* name *febrifugum* has one year's priority over *alatum*.

3. **G. ceylanicum**, *Arn. & Nees in DC. Prodr.* xi. 93; leaves elliptic glabrate lineolate above, panicles linear pubescent, corolla $\frac{3}{4}$ in. *T. Anders. in Thwaites Enum.* 232, and in *Journ. Linn. Soc.* ix. 506; *Bedd. Ic. Pl. Ind. Or.* t. 265.

CEYLON; *Walker, Thwaites, &c.*

Stem 1-3 in., villous. *Leaves* 3 by $1\frac{1}{4}$ in., obtuse, base acuminate, undulate-crenate, pubescent beneath especially on the nerves; petiole $1\frac{1}{2}$ in. *Peduncles* 1-6 in.; panicles 5-9 by $\frac{3}{4}$ in.; cymes small, subfascicled; bracts $\frac{1}{2}$ in., linear. *Sepals* $\frac{1}{2}$ in., linear-lanceolate, grey-pubescent. *Corolla* nearly glabrous; tube narrow purplish; limb small greenish-yellow. *Anthers* subquadrate, glabrous. *Capsule* $\frac{3}{4}$ in.

4. **G. Thwaitesii**, *T. Anders. in Thwaites Enum.* 232; leaves elliptic hairy on both surfaces, panicles oblong pubescent, corolla $\frac{1}{2}$ in. *Bedd. Ic. Pl. Ind. Or.* t. 255.

CEYLON; Ambagamowa District, *Thwaites*.

Leaves above with many lax multicellular hairs. *Panicle* open; lateral cymes $\frac{1}{2}$ - $1\frac{1}{2}$ in. Otherwise as *G. ceylanicum*.

5. **G. polyanthum**, *Wight Ic.* t. 1494; leaves broadly ovate subglabrate base rounded or cordate, panicles linear glabrous or nearly so, corolla $\frac{3}{4}$ in.

COORG; *Jerdon, in Herb. Wight*.

Stem 1 in., grey-puberulous. *Leaves* $2\frac{1}{2}$ in. diam., shortly acute or subobtuse, nearly entire, punctulate above; nerves beneath much raised, grey-puberulous; petiole $1\frac{1}{2}$ in. *Panicles* 8 by $\frac{3}{4}$ in.; flowers in subcapitate cymes; bracts minute, linear. *Sepals* $\frac{1}{2}$ - $\frac{3}{4}$ in., linear-lanceolate, glabrous or obscurely puberulous. *Corolla* puberulous, pink (in the dried example). *Capsule* $\frac{3}{4}$ in.—Overlooked by *T. Anderson*.

†† *Stems* elongate, leafy upwards.

6. **G. paniculatum**, *T. Anders. in Thwaites Enum.* 232; leaves ovate

or elliptic acute at both ends pubescent at least on the nerves beneath, panicle subterminal pubescent branches cymose, corolla $\frac{3}{4}$ in. *Bedd. Ic. Pl. Ind. Or. t.* 252.

CEYLON, alt. 1–2000 ft.; *Walker, Thwaites.*

Erect, 2–3 ft., hairy, leafy to the panicle. *Leaves* 5 by 2 in., undulate, lineolate, glabrate or hairy above; petiole $\frac{1}{2}$ in. *Panicles* 7 by 3 in., sometimes somewhat leafy at the base; lateral branches repeatedly closely 2–3-chotomous; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., linear; pedicels 0– $\frac{1}{2}$ in., often distinct. *Sepals* $\frac{1}{2}$ in., linear-lanceolate, pubescent. *Corolla* pubescent. *Anthers* ovate, glabrous. *Capsule* $\frac{3}{4}$ in.

7. **G. glabrum**, *T. Anders. in Journ. Linn. Soc.* ix. 506; leaves ovate or elliptic acuminate at both ends undulate-crenate pubescent on the nerves beneath, panicle terminal villous, flowers fascicled on the spikes, corolla $\frac{3}{4}$ in. *Bedd. Ic. Pl. Ind. Or. t.* 251. *Cryptophragmium glabrum*, *Dalz. in Hook. Kew Journ.* ii. 338; *Dalz. & Gibs. Bomb. Fl.* 185.

CONCAN; *Law, Dalzell.*

An undershrub (Beddome); stems nearly glabrous. *Leaves* 7 by 2 $\frac{1}{2}$ in., puberulous on both surfaces or glabrate; petiole $\frac{3}{4}$ in. *Flowers* sessile, clustered; bracts $\frac{1}{2}$ in., linear-lanceolate. *Sepals* $\frac{1}{2}$ in., sublinear, villous, often viscid glandular. *Corolla* minutely pubescent, white purple-spotted in the throat. *Anthers* ovate, glabrous. *Capsule* $\frac{3}{4}$ in.

VAR. *denticulata*; leaves distinctly toothed glabrous even when young.—Concan Ghauts; *Dalzell, Ritchie.*

8. **G. leptostachyum**, *Nees in Wall. Pl. As. Rar.* iii. 106, and *Cat.* 7178, and in *DC. Prodr.* xi. 93; leaves elliptic acuminate at both ends slightly pubescent, panicle reduced to 1 or 2 long-linear spikes hairy, corolla $\frac{3}{4}$ in.

TAVOY; *Wallich.*

Stems creeping, rooting; annual flowering branches 3–5 in., erect, simple, villous. *Leaves* 4 $\frac{1}{2}$ by 1 $\frac{1}{2}$ in., subentire, upper surface with distant multicellular lax hairs, lower pubescent on the nerves; petiole $\frac{1}{2}$ in. *Spikes* 1 or 2 terminal, 3–10 in.; flowers solitary, distant; bracts $\frac{1}{2}$ in., linear-lanceolate. *Sepals* $\frac{1}{2}$ in., linear-lanceolate, pubescent. *Corolla* narrow, straight. *Capsule* $\frac{1}{2}$ in., very slender, 20-seeded.—Overlooked by T. Anderson.

** Inflorescence axillary, a terminal panicle sometimes added.

9. **G. canescens**, *T. Anders. in Journ. Linn. Soc.* ix. 505; leaves ovate acuminate at both ends pubescent on both surfaces, panicles axillary and terminal pubescent or villous, corolla $\frac{3}{4}$ in. *G. serrulatum*, *T. Anders. l. c.*; *Bedd. Ic. Pl. Ind. Or. t.* 254. *Cryptophragmium canescens*, *Nees in Wall. Pl. As. Rar.* iii. 100, and in *DC. Prodr.* xi. 95; *Wight Ic. t.* 1495. *C. serrulatum*, *Nees l. c.* *Justicia serrulata*, *Wall. Cat.* 2452.

W. DECCAN PENINSULA, from Bombay to Courtallum, *Wight*; Tinnevely, *Beddome.*

Apparently a shrub. *Branches* pubescent or villous. *Leaves* 8 by 3 $\frac{1}{2}$ in., undulate or minutely toothed; petiole 1 $\frac{1}{2}$ in. *Panicles* trichotomous; bracts $\frac{1}{2}$ in., lanceolate; pedicels hardly any. *Sepals* $\frac{1}{2}$ – $\frac{3}{4}$ in., linear-lanceolate, minutely pubescent. *Corolla* pubescent. *Anthers* ovate, puberulous. *Capsule* $\frac{1}{2}$ in.—Nees made 2 species out of Wallich's 4 branches; and it is not clear why T. Anderson kept them up, unless he meant to transfer Nees' name *serrulatum* to the following var.

VAR. *longifolia*; leaves 9 by 1 $\frac{1}{2}$ in. elongate lanceolate distinctly toothed. *G. longifolia*, *T. Anders. ms.*—Canara Ghauts; *Law.*

10. **G. latifolium**, *T. Anders. in Journ. Linn. Soc.* ix. 505; glabrous,

leaves large long-petioled ovate, panicles mostly lateral many-fl., corolla 1 in. *Bedd. Ic. Pl. Ind. Or.* t. 253. *Cryptophragmium latifolium*, *Dalz. in Hook. Kew Journ.* ii. 137; *Dalz. & Gibs. Bomb. Fl.* 185. *Phlogacanthus latifolius*, *Wight Ic.* t. 1537; *T. Anders. in Journ. Linn. Soc.* ix. 508.

CONCAN, CANARA, and MALABAR, *Dalzell, Wight, &c.*; Bababoodun Hills, *Wight*.

An undershrub, 3 ft. (*Dalzell*). Leaves attaining 9 by 5½ in., acute, very shortly acuminate into the petiole, subentire; petiole often 6 in. Panicles chiefly from the axils of fallen leaves, 3-5 in.; branches subspicate; flowers solitary or clustered; bracts small, linear. *Sepals* ½ in., linear. *Corolla* puberulous; limb greenish-yellow. *Anthers* ovate, minutely hairy. *Capsule* ¾ in., very narrow, glabrate, 24-seeded. *Seeds* ovoid, compressed, hairy.

11. **G. sanguinolentum**, *T. Anders. in Thwaites Enum.* 232, and in *Journ. Linn. Soc.* ix. 506; leaves elliptic narrowed at both ends nearly glabrous, cymes small axillary short-peduncled few-fl. subglobose somewhat pubescent, corolla ¾ in. *Justicia sanguinolenta*, *Vahl Symb.* ii. 10. *Cryptophragmium sanguinolentum*, *Nees in DC. Prodr.* xi. 96. *C. axillare*, *Nees l. c.*; *Wight Ic.* t. 1496.

CEYLON; *Champion, Walker, &c.*

Diffuse; branches nearly glabrous. Leaves 4 by 1½ in., entire undulate or irregularly subdentate, punctate or minutely lineolate above sometimes obscurely scaberulous; petiole ¼-½ in. *Peduncles* ¼-½ in., nearly glabrous; cymes ½-1 in. diam.; bracts ½ in., linear; pedicels 0-½ in. *Sepals* ½ in., linear, puberulous. *Corolla* pubescent. *Capsule* ¾ in.

12. **G. tomentosum**, *T. Anders. in Journ. Linn. Soc.* ix. 505; glandular-tomentose, leaves ovate hirsute on both surfaces, spikes axillary and terminal trichotomous, corolla ½ in. subcylindric pubescent.

CENTRAL INDIA; *Beddome* (fide *T. Anderson*).

A perennial, erect herb. 1-2 ft. Upper leaves 1 by ¾ in., sessile, base attenuated, undulate, whitened beneath. Spikes dense; flowers pedicelled; bracts ½ in., linear, glandular ciliate. *Sepals* ½ in., aristate ciliate. *Stamens* included; anther-cells equal. *Capsule* 1 in., linear, many-seeded; retinacula erect, acute (*T. Anderson*).—Not seen, genus very doubtful.

13. **G. hirsutum**, *T. Anders. in Thwaites Enum.* 233, and in *Journ. Linn. Soc.* ix. 505; leaves broadly elliptic acute or ovate acute at both ends hairy on both surfaces, spikes axillary and terminal dense cylindric hirsute, bracteoles ½ in. linear, corolla ¾ in. *Bedd. Ic. Pl. Ind. Or.* t. 249.

CEYLON; *Thwaites*.

Erect, 2-3 ft., glabrous except at the tip. Leaves 8 by 3½ in., entire or undulate; petiole 2 in. Spikes 1-4 by 1 in., quasi-peduncled, sometimes paniced, resembling those of the dense-fl. species of *Ebermaiera*. *Sepals* ½ in., linear, hirsute. *Corolla*, *stamens* and *pistil* as of *Gymnostachyum* (fide *Beddome*). *Capsule* ¾ in., many-seeded.

XXXI. PHLOGACANTHUS, *Nees*.

Shrubs or tall herbs. Leaves entire, or obscurely crenate. Flowers orange red or pink; thyrses or narrow panicles terminal, rarely racemes or cymes axillary; bracts small, bracteoles 0. *Calyx* deeply 5-fl.; segments very narrow. *Corolla* tubular, curved upwards; limb on one side or (not very deeply) 2-lipped; segments ovate or oblong, connivent patent or recurved, imbricate in bud. *Stamens* 2, sometimes 2 small rudiments added;

anthers 2-celled, oblong, muticous, glabrous. Ovary usually glabrous, 10-16-ovulate; style filiform, subsimple at the tip. Capsule elongate, sub-tetragonous, many-seeded from the base. Seeds lenticular, ovate in outline, glabrous or densely shortly hairy.—Species 11, endemic in India.

This genus differs from *Gymnostachyum* in the broader, curved corolla, the glabrous ovary, and the much stouter capsule. The 2 following genera *Cystacanthus* and *Diotacanthus* are with difficulty discerned by the form of the corolla.

* *Thyrse* or *dense panicles* terminal.

1. **P. curviflorus**, *Nees in Wall. Pl. As. Rar.* iii. 99, and in *DC. Prodr.* xi. 320; leaves large elliptic or obovate nearly glabrous, thyrse dense closely villous, calyx-teeth $\frac{1}{2}$ in., corolla $1\frac{3}{4}$ in. tubular curved scarcely widened upwards. *Bot. Mag.* t. 3783; *T. Anders. in Journ. Linn. Soc.* ix. 506; *Kurz For. Fl.* ii. 246. *Justicia curviflora*, *Wall. Cat.* 2429, and *Pl. As. Rar.* ii. 9, t. 112.

KHASIA MTS., alt. 0-4000 ft.; frequent on the southern face, *Wallich*, &c.

Stem 3-6 ft., stout, glabrous, puberulous upwards. Uppermost leaves often 12 by 4-5 in., acuminate at both ends, subentire, punctulate on both surfaces, nerves beneath sometimes puberulous; petiole $2\frac{1}{2}$ in. Thyrse 4-8 in., short-peduncled; bracts $\frac{1}{2}$ in., linear. Calyx-tube $\frac{1}{2}$ in.; teeth sublinear, closely villous. Corolla densely villous, brick-red or orange; limb small, lobes hardly patent. Stamens glabrous, 2 small rudiments present. Style thinly hairy. Capsule $1\frac{1}{2}$ by $\frac{1}{4}$ in., glabrous, 12-14-seeded. Seeds $\frac{1}{8}$ in. diam., much compressed, glabrous.—*Wallich* says the flowers are bright orange-red; it is generally a brick-red obscurely orange; it is not known wild of the colour depicted by *Wallich*, or in *Bot. Mag.*

VAR. *brevicalyx*; calyx-teeth scarcely $\frac{1}{2}$ in.—*Pegu*; *Kurz.* Moulmein; *Parish.* Tenasserim; *Beddome*.—A shrub, 15 ft. (*Beddome*). Thyrse much less densely villous than in *P. curviflorus* type. Sepals without sometimes nearly glabrous, much shorter than in *P. curviflorus* type. Flowers greenish-yellow (*Parish*).—*T. Anderson* is mistaken in supposing that this variety is cultivated in Lower Burma, and not wild.

2. **P. Wallichii**, *Clarke*; leaves large elliptic acuminate at both ends glabrous, thyrse dense closely villous, calyx-teeth $\frac{1}{2}$ in., corolla $\frac{3}{4}$ in. tubular curved scarcely widened upwards. *P. asperulus*, *Wall. Cat.* 7171 partly, not of *Nees*. *Loxanthus Gomezii*, *Nees in Wall. Cat.* 7170, and in *Wall. Pl. As. Rar.* iii. 99, and in *DC. Prodr.* xi. 322, partly.

KHASIA MTS.; *Gomez*. JAINTEA HILLS; Jarain, alt. 3000 ft., *Clarke*.

Leaves $10\frac{1}{2}$ by $3\frac{1}{2}$ in., subentire; petiole 1 in. Thyrse 2-4 in., short-peduncled; bracts $\frac{1}{2}$ in., linear. Calyx-tube $\frac{1}{8}$ in., teeth linear-lanceolate villous. Corolla densely villous, red; limb small, lobes subequal, scarcely patent. Stamens and style glabrous.—Resembling *P. curviflorus*, but with a smaller thyrse, and very much smaller corolla.

3. **P. tubiflorus**, *Nees in Wall. Pl. As. Rar.* iii. 99, and in *DC. Prodr.* xi. 321; leaves large elliptic or ovate narrowed at both ends softly pubescent beneath, panicles elongate dense somewhat pubescent, calyx-teeth $\frac{1}{2}$ in., corolla $\frac{3}{4}$ in. tubular curved scarcely widened upwards. *T. Anders. in Journ. Linn. Soc.* ix. 506, partly. *Justicia tubiflora*, *Wall. Cat.* 2428.

ASSAM PLAINS; *Hamilton, Jenkins, Masters*: and adjacent KHASIA TERAI, alt. 2000 ft.; *Borpani, H. f. & T.*

Leaves attaining 10 by 3-5 $\frac{1}{2}$ in., subentire or crenulate, densely punctulate above, almost woolly (but deciduously) pubescent beneath; petiole 1-2 in., pubescent. Panicle 2-8 in., densely closely ramosus, subthyrsoid; pedicels often $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ in., linear. Calyx-tube $\frac{1}{8}$ in.; teeth linear-lanceolate, pubescent or glabrate. Corolla nearly as of *P. Wallichii*, yellow-red (*Nees*). Capsule $1\frac{1}{2}$ by $\frac{1}{2}$ in., glabrous,

12-seeded. *Seeds* much compressed, glabrous.—Nearly allied to *P. Wallichii*, differing in the softly hairy under surface of the leaves and the much more open panicle.

4. ***P. parviflorus***, *T. Anders. in Journ. Linn. Soc.* ix. 506; leaves large broadly lanceolate glabrous, panicle terminal linear nearly glabrous, sepals $\frac{1}{2}$ in., corolla 1 in. narrowly tubular curved.

S.E. ASSAM; Namyoon in the Patkoye Mts., *Griffith* (Kew Distrib. n. 6154, n. 6155 partly).

A shrub similar in habit to *P. Wallichii*. *Leaves* 9 by $2\frac{1}{4}$ in., acuminate at both ends, subentire, obscurely puberulous above, paler and glabrous beneath; petiole 1 in. *Panicles* 4 by $\frac{3}{4}$ in., subsessile; pedicels $0-\frac{1}{2}$ in. *Calyx-tube* scarcely $\frac{1}{10}$ in.; teeth linear-lanceolate, nearly glabrous. *Corolla* very slightly pubescent, blood-red, miniate (*Griffith*); lobes small, scarcely patent. *Capsule* not seen.—*Griffith's* original ticket remains on the example authenticated by T. Anderson, and shows that the plant was not collected in Mishmee.

5. ***P. thyrsiflorus***, *Nees in Wall. Pl. As. Rar.* iii. 99, and in *DC. Prodr.* xi. 321; leaves large lanceolate glabrous, thyrses elongate dense villous, calyx-teeth $\frac{1}{4}-\frac{1}{2}$ in., corolla $\frac{3}{4}$ in. wide-tubular 2-lipped. *T. Anders. in Journ. Linn. Soc.* ix. 506; *Kurz For. Fl.* ii. 246. *Justicia thyrsiflora*, *Roxb. Fl. Ind.* i. 114; *Wall. Cat.* 2430.

SUBTROPICAL HIMALAYA, alt. 0-4000 ft., from Gurwhal to Bhotan, very common. KHASIA MTS. and ASSAM, alt. 0-3000 ft., common. MOULMEIN; *Parish*.—DISTRIB. Ava.

A shrub, 3-7 ft. *Leaves* 7 by $1\frac{1}{2}$ in., tapering at both ends, subentire, densely punctulate; petiole $\frac{3}{4}$ in. *Thyrses* 4-12 in., terminal, solitary or several, or quasi-axillary on lateral branches; peduncles short; bracts $\frac{1}{2}$ in., linear. *Calyx-tube* $\frac{1}{2}$ in.; teeth setaceous, densely pubescent. *Corolla* closely villous, orange; tube broad from the base, curved; upper lip suberect, lower patent. *Stamens* glabrous, or slightly hairy near the base of the filaments; 2 rudiments often discernible. *Style* glabrous. *Capsule* $1\frac{1}{4}$ by $\frac{1}{2}$ in., subquadrangular, glabrous, 12-14-seeded. *Seeds* much compressed, orbicular in outline, densely shortly hairy, hairs elastically spreading when moistened.

6. ***P. asperulus***, *Nees in Wall. Pl. As. Rar.* iii. 99, and *Cat.* 7171, and in *DC. Prodr.* xi. 321, *excl. some syn.*; leaves elliptic acuminate at both ends glabrous, panicles linear subthyrsoid somewhat pubescent, calyx-teeth $\frac{1}{2}$ in., corolla $\frac{1}{2}-\frac{3}{4}$ in. tube cylindric limb much inflated ovoid. *P. vitellinus*, *T. Anders. in Journ. Linn. Soc.* ix. 507, *excl. some syn.*; *Kurz For. Fl.* ii. 246. *Justicia vitellina*, *Roxb. Fl. Ind.* i. 115, and *Ice. Ined. in Herb. Kew.* *J. quadrangularis*, *Wall. Cat.* 2451; *Bot. Mag.* t. 2845. *J. asperula*, *Lodd. Bot. Cab.* t. 1681, *not of Wall.* *J. guttata*, *Wall. Cat.* 2431, *by mixture.* *Endopogon vitellinus*, *Nees in DC. Prodr.* xi. 723.

KHASIA MTS. and ASSAM; *Wallich, Simons*. CHITTAGONG HILLS; *Roxburgh, Clarke*.

A shrub, 3 ft., nearly glabrous. *Leaves* 5 by 2 in., undulate, scarcely puberulous or punctate; petiole $\frac{3}{4}$ in. *Panicle* 2-4 in., terminal, usually solitary, very narrow; bracts $\frac{1}{2}$ in., linear. *Calyx-tube* $\frac{1}{8}$ in.; teeth setaceous, puberulous. *Corolla* suddenly curved and inflated at the summit of the tube, pubescent, pink-purple often yellow-marked; limb ringent (*Roxburgh*), segments connivent or not widely patent. *Capsule* $\frac{3}{4}$ by $\frac{1}{2}$ in., glabrous. *Seeds* glabrous.—This is one of the many species which *Nees* named *Thyrsacanthus indicus*.

7. ***P. guttatus***, *Nees in Wall. Pl. As. Rar.* iii. 99, and in *DC. Prodr.* xi. 321; leaves large oblong or elliptic acuminate at both ends glabrous, panicles linear dense somewhat pubescent, calyx-teeth $\frac{1}{2}$ in., corolla $\frac{3}{4}-\frac{1}{2}$ in. 2-lipped, segments oblong patent subrecurved. *T. Anders. in Journ.*

Linn. Soc. ix. 507. *Justicia guttata*, *Wall. Cat.* 2431 chiefly, and *Pl. As. Rar.* i. 24, t. 28; *Bot. Reg.* t. 1334.

KHASIA MTS., alt. 2-4000 ft.; on the southern face common, *Wallich, &c.* BHOTAN (*T. Anderson*).

Leaves often 9 by 3 in.; petiole $1\frac{1}{2}$ in. *Panicles* 3-6 by 1 in., terminal or quasi-terminal, solitary or 2-3 together. *Corolla* pubescent; upper lip suberect, shortly 2-lobed, yellow; lower deeply 3-lobed, segments patent subrecurved, green with purple spots. *Capsule* $1\frac{1}{2}$ by $\frac{1}{2}$ in., 12-seeded.—Confused with *P. asperulus*, but the leaves are larger, the corolla larger and altogether a different shape and colour. *Nees* doubts whether *Bot. Reg.* t. 1334 belongs here, but it is a most faithful picture.

8. ***P. elongatus***, *T. Anders. in Journ. Linn. Soc.* ix. 508; leaves long-petioled ovate acuminate at both ends glabrous, spikes elongate slender, corolla $\frac{1}{2}$ in. tubular 2-lipped. *Kurz For. Fl.* ii. 246.

TENASSERIM; *Amberst, Falconer (T. Anderson)*.

An undershrub, 1-2 ft.; stem terete, primrose. *Leaves* including the petiole 4-6 by $2\frac{1}{2}$ in. *Spikes* nearly a foot, most terminal trichotomously branched or axillary simple; flowers distichously opposite, sessile, solitary; bracts $\frac{1}{2}$ in., ovate, acute; bracteoles subulate. *Calyx* deeply 5-partite, segments linear. *Corolla-tube* straight, pubescent, lower lip hirsute within. *Stamens* of the genus. *Capsule* $\frac{1}{2}$ in., clavate, subtetragonous, glabrous, 8-seeded (*T. Anderson*).—Not seen.

** *Cymes or short panicles axillary.*

9. ***P. pubinervius***, *T. Anders. in Journ. Linn. Soc.* ix. 508; leaves elliptic or ovate acute at both ends pubescent on the nerves beneath, cymes axillary, calyx-segments woolly within nearly glabrous on the back.—*Phlogacanthus* sp. n. 7, *Herb. Ind. Or. H.f. & T.*

SIKKIM, alt. 5-7000 ft., *J. D. H.* BHOTAN; *Griffith.* ASSAM and KHASIA MTS., alt. 3-5000 ft., frequent, *Griffith, &c.*

A much-branched shrub, 3-8 ft. diam. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., subentire, puberulous or glabrate above; petiole $\frac{3}{4}$ in. *Cymes* numerous, 1 in. diam., subsessile, nearly glabrous; pedicels often $\frac{1}{2}$ in., ebracteolate at the apex; bracts at their base minute. *Calyx-tube* $\frac{1}{8}$ in.; teeth $\frac{1}{8}$ in., linear-lanceolate, appearing woolly on the margins. *Corolla* $\frac{1}{2}$ in., mature puberulous, tubular-inflated nearly from the base, red; limb small, segments ovate subconnivent. *Stamens* 2, glabrous; anthers far-exserted. *Ovary* glabrous. *Capsule* elongate, many-seeded.—*Nees* marked this *Graptophyllum hortense*.

10. ***P. Jenkinsii***, *Clarke*; leaves elliptic acute at both ends glabrous, racemes or small panicles axillary grey pubescent, calyx-segments uniformly grey pubescent.

ASSAM; *Jenkins*.—DISTRIB. Bhamo.

Branches elongate, stout, quadrangular, glabrous, puberulous upwards. *Leaves* $6\frac{1}{2}$ by $2\frac{3}{4}$ in., subentire; petiole $1\frac{1}{2}$ in. *Racemes* 1-2 $\frac{1}{2}$ in., dense-fld., sometimes compound; pedicels 0- $\frac{1}{2}$ in., closely grey pubescent. *Calyx-tube* $\frac{1}{2}$ in., segments $\frac{1}{2}$ in., linear-lanceolate. *Corolla* nearly as of *P. pubinervius*, but rather more pubescent; appears to have been orange. *Stamens* 2, glabrous; anthers very shortly exserted. *Ovary* glabrous, 12-ovulate; style glabrous. *Capsule* not seen.—The calyx and corolla of this species are very like those of *P. pubinervius*, but the habit is more that of *P. thyrsiflorus*. *Nees* marked this *Thyrsacanthus indicus*, regardless of the 2 stamens, and 12 ovules.

XXXII. CYSTACANTHUS, *T. Anders.*

Corolla tubular, ventricose upwards; segments 5, ovate, scarcely patent.

Otherwise as *Phlogacanthus*.—Species 4, in Pegu, Tenasserim, and Cochin China.

1. **C. paniculatus**, *T. Anders. in Journ. Linn. Soc.* ix. 458; leaves elliptic acuminate at both ends puberulous on the nerves beneath, panicle terminal ovate-oblong somewhat lax hairy, calyx-segments $\frac{1}{4}$ – $\frac{1}{2}$ in.

MOULMEIN; *T. Lobb*.

Branches elongate, stout, tetragonous, glabrous. *Leaves* $5\frac{1}{2}$ by $2\frac{1}{4}$ in., undulate; petiole hardly $\frac{1}{2}$ in. *Panicle* 7 by 3 in., many-fl.; bracts at the main division 1 by $\frac{1}{2}$ in., glabrous, foliaceous, otherwise very hairy. *Sepals* linear-oblong. *Corolla* 1 in., upper half ventricose, hairy, violet (*Lobb*); segments ovate, suberect. *Anthers* included. *Capsule* $1\frac{1}{4}$ by $\frac{1}{2}$ in., very hairy, 16-seeded. *Seeds* lenticular, densely shortly hairy; hairs standing out when wetted.

2. **C. cymosus**, *T. Anders. in Journ. Linn. Soc.* ix. 458; leaves elliptic or lanceolate pubescent on both surfaces, cymes axillary few-fl. *Phlogacanthus cymosus*, *Kurz For. Fl.* ii. 246.

BURMA; *Brandis*.

A shrub; branches puberulous, internodes short. *Leaves* 3–4 by $\frac{3}{4}$ – $1\frac{1}{2}$ in., acute at both ends, softly silky beneath; petiole 1 in. *Cymes* viscous-hairy; pedicels $\frac{1}{2}$ in. *Sepals* $\frac{3}{4}$ in., linear-oblong, very hairy. *Corolla* $1\frac{1}{4}$ in., inflated upwards, viscous; lobes small, subequal. *Capsule* $1\frac{1}{4}$ by $\frac{1}{2}$ in., tomentose.—Mostly copied from *T. Anderson*, the Kew example being imperfect; but it is sufficient to show that the species is congeneric with *C. paniculatus*, which *Bentham* (*Gen. Pl.* ii. 1098) doubts.

3. **C. pulcherrimus**, *Clarke*; leaves large elongate-lanceolate glabrous, panicle terminal linear, calyx-teeth $\frac{1}{2}$ – $\frac{1}{2}$ in. *Loxanthus Gomezii*, *Nees in DC. Prodr.* xi. 322 (as to the *Mergui plant*). *Phlogacanthus pulcherrimus*, *T. Anders. in Journ. Linn. Soc.* ix. 507; *Kurz For. Fl.* ii. 246.

MERGUI; *Griffith* (*Kew Distrib. n.* 6155, partly). MOULMEIN; *Parish*. TENASSERIM; *Beddome*.

A shrub. *Leaves* 8 by 2 in., acuminate at both ends, subentire; petiole 1 in. *Panicle* 4–18 by $\frac{3}{4}$ in., nearly glabrous; proper bracts small, but foliaceous; other bracts $\frac{3}{4}$ by $\frac{1}{2}$ in. are sometimes scattered throughout the panicle; pedicels 0– $\frac{1}{2}$ in. *Calyx-tube* $\frac{1}{8}$ in., teeth linear, slightly or densely pubescent. *Corolla* 1 in., tubular-funnel-shaped, somewhat curved, nearly glabrous, appears to have been green-yellow with purple spots; lobes ovate, erect-patent. *Filaments* very hairy at the base; connective minutely hispid on the back. *Capsule* $\frac{3}{4}$ –1 in., stout, glabrous.—This was no part of the original *Loxanthus Gomezii*, *Nees* (*in Wall. Pl. As. Rar.* iii. 99).

VAR. ? *bracteosa*; panicle ashy pubescent, bracts and bracteoles numerous large oblong or linear-spathulate, corolla straight subsymmetric.—Pegu; *Brandis*. Tenasserim, Mooleyit, *Beddome*. Mergui, *Griffith* (*Herb. Propr. n.* 875).

4. **C. insignis**, *Clarke*; leaves large broadly elliptic acute at both ends glabrous, panicle terminal dense slightly pubescent, calyx-teeth $\frac{1}{2}$ in. *Phlogacanthus insignis*, *Kurz in Flora* 1870, 364, and in *Journ. As. Soc.* 1870, ii. 79, and *For. Fl.* ii. 246.

PEGU; in tropical forests up to 3000 ft., *Kurz, Brandis*.

An evergreen meagre shrub, 3–5 ft.; stem tetragonous, white. *Leaves* 9 by $4\frac{1}{4}$ in.; petiole 1 in. *Panicles* 2–4 in., sessile, compound oblong; bracts minute, linear, a few foliaceous $\frac{3}{4}$ in. sometimes interspersed. *Corolla* $1\frac{1}{4}$ in., ventricose for $\frac{3}{4}$ its length, dark violet golden villous in the throat (*Kurz*); lobes $\frac{1}{2}$ in., broadly lanceolate, subequal, nearly erect. *Filaments* and *style* glabrous. *Capsule* $1\frac{1}{2}$ by $\frac{1}{2}$ in., cylindric, glabrate, 10-seeded. *Seeds* $\frac{1}{2}$ – $\frac{1}{3}$ in. diam., compressed, orbicular, fulvous-hairy.

XXXIII. **DIOTACANTHUS**, *Benth.*

Corolla-tube short, limb large ventricose 2-lipped. Otherwise as *Phlogacanthus* or *Cystacanthus*.—Species 2, S. Malabarica.

1. **D. grandis**, *Benth. in Gen. Pl.* ii. 1101; glabrous, leaves large lanceolate or obovate-lanceolate, panicles axillary peduncled many-fl'd. mostly exceeding the leaves, corolla crimson. *Phlogacanthus grandis*, *Bedd. Ic. Pl. Ind. Or.* t. 179.

TINNEVELLY and TRAVANCORE, alt. 3–4000 ft.; *Beddome*.

A shrub, 8–12 ft. *Leaves* 7 by $2\frac{3}{4}$ in., attenuate at both ends, undulate, obscurely crenate; nerves 12 pair; petiole $\frac{3}{4}$ in. *Peduncles* 2–5 in., stout, compressed; panicles often 4–8 in.; bracts at its divisions $\frac{3}{8}$ in., linear; proper bracts $\frac{1}{8}$ in., linear. *Sepals* $\frac{1}{4}$ in., linear. *Corolla* minutely pubescent, tube $\frac{1}{8}$ in., limb $\frac{3}{4}$ in.; upper lip emarginate, lower shortly 2-lobed. *Filaments* as long as the corolla, stout, minutely scabrous. *Style* minutely pubescent, subentire. *Capsule* 1 by $\frac{1}{8}$ – $\frac{1}{4}$ in., 24-seeded. *Seeds* much compressed, orbicular in outline, minutely crisped-pubescent.

2. **D. albiflorus**, *Benth. in Gen. Pl.* ii. 1101; nearly glabrous, leaves elliptic acute at both ends, panicles axillary peduncled few-fl'd. shorter than the leaves, corolla pure white. *Phlogacanthus albiflorus*, *Bedd. Ic. Pl. Ind. Or.* t. 180.

S. TINNEVELLY, alt. 3–5000 ft., and near Courtallum, *Beddome*.

A shrub, 6–10 ft. *Leaves* 5 by $1\frac{1}{2}$ in., subentire; nerves 7 pair; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Peduncles* 1–2 in., slender; panicles 1– $1\frac{1}{2}$ in., depressed corymbiform. *Calyx*, *corolla* and *capsule* nearly as of *D. grandis*.—*Beddome* describes the filaments as "much dilated below, articulated near the apex, quite black above the articulation;" this character being remarkable in the *Acanthaceæ*, Mr. Bentham refers to (*Gen. Pl.* ii. 1101) the articulation of the filaments. But in a prolonged examination of the very filaments supplied by *Beddome* no articulation whatever has been made out by myself and Prof. Oliver.

XXXIV. **LEPIDAGATHIS**, *Willd.*

Herbs or undershrubs, with often pubescent bracts or leaves. *Leaves* entire or crenate-serrate. *Flowers* sessile, usually capitate, sometimes opposite or solitary; heads terminal or axillary, dense (rarely lax), usually 1-sided, often fascicled; bracts usually larger than the calyx-segments, rarely small; bracteoles narrower than the bracts. *Calyx* deeply 5-lobed; segments unequal, the 2 anterior more or less connate (calyx 4-partite). *Corolla* small (except in *L. longifolia*), tubular, suddenly ventricose in the middle, 2-lipped; lower lip 3-lobed, patent, usually spotted. *Stamens* 4, didynamous; anthers all 2-celled; cells oblong, mucicous, parallel, or one lower somewhat divergent. *Stigma* capitate, minutely bifid or entire. *Capsule* 2- or 4-seeded, elongate conoid or oblong. *Seeds* compressed, ovate-oblong, or orbicular, hairy.—Species 50 tropical, whereof 2 only are American.

Lepidagathis falcata & *dulcis*, *Wall. Cat.* 7166, 7167, came from Ava, outside the bounds of British India.

Sect. 1. *Capsule* 2-seeded, elongate-conic, dorsally scarious, thin, irregularly tearing, only ultimately 2-valved from the subsolid tip. *Seeds* ovate-lanceolate, with very long hair spreading elastically when wet, very mucilaginous.

* *Spikes chiefly aggregated, globose, near the base of the stem.*

1. ***L. cristata***, Willd. *Sp. Pl.* iii. 400; leaves linear or oblong nearly glabrous, bracts and bracteoles elliptic ovate or obovate suddenly spinose-acuminate, sepals elliptic or obovate suddenly spinulose in fruit thickened very hairy upwards. *Roxb. Cor. Pl.* iii. 63, t. 267, and *Fl. Ind.* iii. 53; *Wall. Cat.* 2421, chiefly; *Nees Monogr. Lepidag.* 25, and in *Wall. Pl. As. Rar.* iii. 96, and in *DC. Prodr.* xi. 256, *Var. a* only; *Wight Ill.* t. 164 b, fig. 5, and *lc.* t. 455; *Dalz. & Gibs. Bomb. Fl.* 191; *T. Anders. in Journ. Linn. Soc.* ix. 494. *L. Shuteri*, *T. Anders. l. c.*—*Lepidagathis* sp. n. 18, *Herb. Ind. Or. H. f. & T.*

COROMANDEL, in the tropical region, frequent; *Rottler, Wight* (*Herb. Propr.* n. 1971), &c.

Rootstock perennial; stems 6–18 in., branched, procumbent, quadrangular, puberulous or slightly pubescent. *Leaves* 1 by $\frac{1}{2}$ in., sessile, lineolate above, minutely scabrid-pubescent on the nerves beneath or glabrate. *Inflorescence* subradical, globose; one or two smaller heads sometimes added on the lower part of the leafy branches; bracts $\frac{1}{2}$ in., rigid in fruit; bracteoles membranous, hairy, spinescent. *Calyx* sub-4-partite, one segment bifid; segments upwards thickened, oblong obtuse with a mucro, hairy, in fruit densely hairy. *Corolla* $\frac{1}{2}$ in., densely hairy in bud, white with brown or purple spots in the palate. *Stamens* glabrous; anther-cells one slightly above the other, papillose-ciliate. *Ovary* glabrous. *Capsule* $\frac{1}{2}$ in.—*T. Anderson's* specimens of *L. Shuteri* are merely the fruiting states of *L. cristata*, with particularly glabrous leaves, &c. His description again appears drawn up chiefly from *L. mitis*. The older botanists did not separate *L. cristata* from the 2 following, and Willdenow's original description does not mention the bracts, and may belong to all of the three. So Roxburgh's picture cited shows obtuse bracts; but his description says "bracts lanceolate ciliated pointed," which may have been taken from *L. Hookeri*.

VAR. rupestris; stem pubescent, leaves elliptic pubescent on both surfaces. *L. rupestris*, *Nees in Wall. Pl. As. Rar.* iii. 96, and in *DC. Prodr.* xi. 256; *T. Anders. in Journ. Linn. Soc.* ix. 494.—Coromandel (?), *Wight* (*Herb. Propr.* n. 1970).

2. ***L. Hamiltoniana***, *Wall. Cat.* 2422; leaves linear or narrowly oblong nearly glabrous, bracts lanceolate spinescent patently ciliate upwards, calyx-lobes lanceolate spinescent not thickened upwards. *Nees Monogr. Lepidag.* 23, and in *Wall. Pl. As. Rar.* iii. 96, and in *DC. Prodr.* xi. 255. *L. Beddomei*, *T. Anders. in Journ. Linn. Soc.* ix. 499.

BEHAR, alt. 1000 ft.; R. Sone at Rotasghur, *J. D. H.*; Bhagulpore, *Hamilton*. BUNDELKUND; *Edgeworth*. JUBBULPORE; *Beddome*. CHOTA NAGPORE, alt. 1–3000 ft., plentiful.

Closely resembling *L. cristata* in habit, leaves and inflorescence. *Bracts* long-tapering upwards, with long white hairs on their margins. *Calyx-segments* tough-membranous. *Corolla* with adpressed straight white hairs, not densely furred as in *L. cristata*.—The flowers in *Beddome's* example are detached; *T. Anderson* describes them as terminal, which is certainly not the case.

3. ***L. mitis***, *Dalz. in Hook. Kew Journ.* iii. 226; leaves oblong pubescent scabrous on the nerves beneath, flower-heads not prickly, bracts softly membranous obtuse or shortly acute. *Dalz. & Gibs. Bomb. Fl.* 191.

W. DECCAN PENINSULA; Concan, Belgaum, Mangalore, *Wight, Stocks*, &c.

Closely allied to *L. cristata*. *Stems* usually acutely quadrangular, puberulous or pubescent. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ – $\frac{1}{4}$ in., broader than in the two preceding species, often distinctly scabrid-ciliate. *Bracts* chaffy, purple or yellow.—Seems well separated from *L. cristata*, but the bracts pass insensibly into the following var.

VAR. subarmata; bracts lanceolate soft or subsperouscent or rigidly spinous. *L. cristata* var. *latifolia*, *Nees in DC. Prodr.* xi. 256; *Dalz. & Gibs. Bomb. Fl.* 191. *L.*

cristata, Wall. Cat. 2421, letter C. *L. rupestris*, Bedd. Ic. Pl. Ind. Or. t. 229.—Malabar; frequent, Wight, &c.—This form differs from *L. Hamiltoniana* by its much wider usually ciliate leaves.

** *Spikes mostly axillary scattered.*

4. ***L. trinervis***, Nees Monogr. *Lepidag.* 21, and in Wall. Pl. As. Rar. iii. 96, and in DC. Prodr. xi. 254; leaves linear or linear-lanceolate entire glabrous 3-nerved, bracts ovate or obovate spinose-cuspidate glabrous or cobweb-ciliate, corolla white. *T. Anders. in Journ. Linn. Soc.* ix. 495. *Barleria*? *trinervis*, Wall. Cat. 2500.

Dry hills of CENTRAL INDIA, alt. 1–2000 ft.; from Bombay Ghauts, Dalzell, and Goojerat, Stocks, to the Kymore Hills, J. D. H., and Chota Nagpore. SIKKIM (probably base of the hills), Herb. Griffith. N.W. HIMALAYA? Herb. Falconer.

Rootstock woody; stems numerous, 5–10 in. *Leaves* $1\frac{1}{4}$ by $\frac{1}{8}$ – $\frac{1}{4}$ in., sessile, mucous, lineolate above; midrib beneath distinct, with 2 slender nerves parallel to it near the margins. *Spikes* $\frac{2}{3}$ in., ovoid, often numerous, generally near the base of the stems, sometimes all conglomerated into a subradical globe as in *L. cristata*; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., nearly half their length occupied by the subsquarrose cusp; bracteoles linear-lanceolate, softly membranous. *Calyx* non-spinescent. *Corolla* and *capsule* nearly as of *L. cristata*.

VAR. *asperima*, T. Anders. ms.; leaves $\frac{1}{2}$ by $\frac{1}{12}$ in. mucronate very scabrous. *Lepidagathis* sp. n. 21, Herb. Ind. Or. H. f. & T.—Concan; Stocks.—*Stem* 6 in., branched, stoutly lignescent; branches numerous, internodes very short.

5. ***L. lutea***, Dalz. in Hook. Kew Journ. ii. 139; leaves linear or linear-lanceolate nearly glabrous 3-nerved, outer bracts often stout elongate spinous inner much smaller, corolla yellow. Dalz. & Gibs. Bomb. Fl. 190; T. Anders. in Journ. Linn. Soc. ix. 495.

BOMBAY GHAUTS; Dalzell, Stocks, Law.

Rootstock woody; stems 6–20 in., quadrangular, pubescent or nearly glabrous. *Leaves* 2 by $\frac{1}{4}$ in., sessile, minutely hairy above, glabrous beneath. *Spikes* usually 1–3 together in many of the axils, and also a subradical congested globe, pubescent; outermost bract of each spike often 1–2 in. with a very stout bayonet-like tip; inner bracts $\frac{1}{2}$ – $\frac{1}{2}$ in., membranous, acute or shortly spinescent. *Calyx* shortly spinescent or innocuous. *Corolla* $\frac{1}{2}$ in. (fide Dalzell); but appears only $\frac{1}{2}$ in. in the dried specimens, much as of *L. cristata*.

6. ***L. spinosa***, Wight; Nees in Wall. Pl. As. Rar. iii. 97, and Monogr. *Lepidag.* 32, and in DC. Prodr. xi. 258; leaves obovate spinous-mucronate mostly entire glabrous, bracts broadly oblong acuminate spinescent. T. Anders. in Journ. Linn. Soc. ix. 495. *Barleria*? *spinosa*, Wall. Cat. 2497. *Acanthus mucronatus*, Heyne in Herb. Rottler.

CARNATIC and MYSORE; Rottler, Wight, Hamilton, &c.

A prostrate, much-branched perennial, 6–20 in. *Leaves* $\frac{1}{2}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in., sessile, usually with one spine only at the tip, rarely 1–2 spines on the margins added. *Heads* $\frac{1}{2}$ – $\frac{3}{4}$ in., scattered, ovoid, few-fl'd.; outer barren bracts numerous, $\frac{2}{3}$ in. including the strong spine, rigid; inner bracts and bracteoles softer; calyx (or its inner segments at least) villous mucous. *Corolla* and *capsule* as of *L. cristata*.

7. ***L. pungens***, Nees in Wall. Pl. As. Rar. iii. 97, and in Monogr. *Lepidag.* 33, and in DC. Prodr. xi. 58; leaves ovate spinous-serrate glabrous, bracts lanceolate or ovate lanceolate spinous-mucronate. Wight Ic. t. 456; T. Anders. in Journ. Linn. Soc. ix. 495. *Barleria*? *pungens*, Wall. Cat. 2498.

S. MADRAS; Rottler, Wight, G. Thomson.

Nearly all the leaves with 2-3 strong spines on each margin; otherwise closely resembling *L. spinosa*.

8. ***L. clavata***, *Dalz. in Hook. Kew Journ.* ii. 340; leaves sessile ovate subentire spinous-mucronate glabrescent, spikes solitary terminal oblong or subclavate, bracts sub-4-ranked resembling the leaves but woolly. *Dalz. & Gibs. Bomb. Fl.* 191; *T. Anders. in Journ. Linn. Soc.* ix. 495.

BOMBAY GHATS and SYHADREE MTS.; *Dalzell, Stocks*.

Rootstock stout, woody; stems several 8-12 in., erect, undivided or rarely divided, lower leaves caducous. *Leaves* 1 in., rigid, plicate, squarrose, slightly ciliate or glabrate. *Spikes* 1-3 in., dense, harsh; lower bracts altogether as the leaves, upper smaller, becoming very woolly; bracteoles resembling the calyx-segments. *Calyx* $\frac{1}{2}$ in.; segments unequal, silky. *Corolla* $\frac{2}{3}$ in. as of *L. cristata*, but (fide *Dalzell*) rose. *Capsule* and *seeds* as of *L. cristata*.

9. ***L. prostrata***, *Dalz. in Hook. Kew Journ.* ii. 138; leaves sessile ovate subentire spinous-mucronate pubescent, spikes terminal on short lateral branches ovate or oblong, bracts resembling the leaves. *Dalz. & Gibs. Bomb. Fl.* 190; *T. Anders. in Journ. Linn. Soc.* ix. 495.

W. DECCAN PENINSULA; Concan, *Dalzell, Stocks*; Canara, *Ritchie*. SUB-TROPICAL W. HIMALAYA; Kangra, alt. 1-4000 ft., *Clarke*.

Rootstock woody; branches 6-15 in., prostrate, much branched pubescent. *Leaves* $\frac{1}{2}$ -1 in., rigid, plicate, squarrose, strongly nerved. *Spikes* $\frac{1}{2}$ -2 in., in appearance axillary, dense, varying much in length; lower bracts as the leaves, upper smaller. *Calyx* $\frac{1}{3}$ - $\frac{1}{2}$ in., villous; inner segments smaller, not spinescent. *Corolla* and *capsule* as of *L. clavata*, to which this species appears closely allied, though differing so greatly in habit.

10. ***L. diffusa***, *Clarke*; leaves sessile linear or elliptic entire mucous glabrescent, spikes ovate axillary often clustered, bracts lanceolate acuminate spinescent. *Barleria diffusa*, *Wight in Herb. Propr.*

DECCAN PENINSULA; *Wight*; Bellary, *Beddome*.

Rootstock woody; branches 3-10 in., prostrate, much-divided, nearly glabrous. *Leaves* 1 by $\frac{1}{2}$ - $\frac{3}{4}$ in., varying considerably on the same plant, sometimes acute almost mucronate. *Spikes* $\frac{1}{2}$ - $\frac{3}{4}$ in., dense, hairy, mostly towards the upper ends of the stems, really terminal on much-shortened lateral branches; bracts $\frac{1}{2}$ in. *Calyx* 4-partite, villous; 2 outer segments lanceolate undivided, inner narrower. *Corolla* $\frac{1}{2}$ in.—*Wight* doubtless referred this to *Barleria* because both the outer larger calyx-segments are undivided. The corolla, stamens and capsule are altogether as of *L. cristata*.

Sect. 2. *Capsule* 4-seeded, oblong, early 2-valved from the apex. *Seeds* ovate or orbicular, with very short hairs elastic when wetted.

* *Leaves* entire or undulate.

11. ***L. rigida***, *Dalz. in Hook. Kew Journ.* ii. 341; softly hairy, leaves linear-lanceolate mucous, spikes oblong dense terminal often appearing clustered, bracts narrowly ovate shortly spinescent. *Dalz. & Gibs. Bomb. Fl.* 191; *T. Anders. in Journ. Linn. Soc.* ix. 495.

BOMBAY GHATS; *Dalzell, Stocks, &c.* SCINDE (*T. Anderson*).

Suffruticose, 1-2 ft. (at least), erect, softly hairy. *Leaves* $3\frac{1}{2}$ by $\frac{1}{2}$ in., attenuate at both ends, glandular-pubescent on both surfaces; petiole indistinct. *Spikes* $\frac{1}{2}$ -2 $\frac{1}{2}$ in., often appearing as in terminal clusters on shortened lateral branches; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., entire, rigid. *Corolla* $\frac{1}{2}$ in., yellow-white. *Capsule* $\frac{1}{2}$ in., 4-seeded. *Seeds* $\frac{1}{12}$ in. diam.—The inflorescence, capsule and seeds approach those of *L. hyalina*.

12. **L. cuspidata**, *Nees in Wall. Pl. As. Rar.* iii. 97, and *Monogr. Lepidag.* 31, and in *DC. Prodr.* xi. 258; leaves elliptic or ovate attenuate at both ends puberulous, spikes dense or very lax pubescent, bracts ovate cuspidate 3-nerved. *T. Anders. in Journ. Linn. Soc.* ix. 495; *Bedd. Ic. Pl. Ind. Or. t.* 227. *Ruellia cuspidata*, *Wall. Cat.* 2405.

TROPICAL INDIA; extending from W. Himalaya, *Falconer, Edgeworth*, to COORG, *Rottler*, and MALABAR from the plains nearly to the top of the Ghauts.

Shrubby; stems 1-2½ ft., erect or diffuse, glabrous or pubescent towards the apex. *Leaves* of the main stem 4½ by 1½ in., mucous; petiole ¼-½ in.; on the lateral flowering branches the leaves are mostly 1 in., sessile, mucronate. *Spikes* 1 in., dense, or 6 in. lax with the flowers in distinct opposite pairs; bracts ⅔ by ½ in. *Calyx* ½ in., 5-partite. *Corolla* scarcely ½ in., whiteish with purple spots. *Capsule* 4-seeded.

13. **L. calycina**, *Hochst.*; *Nees in DC. Prodr.* xi. 252; leaves petioled oblong entire nearly glabrous, spikes numerous small ovoid sparingly scabrid puberulous, bracts obovate 3-nerved aristate not spinescent. *T. Anders. in Journ. Linn. Soc.* ix. 496; *Boiss. Fl. Orient.* iv. 525. *L. strobilifera*, *Stocks in Hook. Kew Journ.* iv. 177.

SCINDE; *Stocks*.—DISTRIB. Beloochistan, Abyssinia.

A small, erect, rigid, much-branched undershrub. *Leaves* 1½ by ½ in., lineolate, obscurely ciliate-pubescent; petiole ⅓-½ in. *Heads* ¾ in., appearing sessile often conglomerate; bracts ½ by ½ in., scarious, 3-5 nerved, scabrid-puberulous on the nerves; bracteoles ¼ in., linear, ciliate. *Calyx* 4-partite; 2 outer segments ⅓-½ in. broad, scarious, nerved, one bifid half-way down; 2 inner segments ¼-½ in., linear. *Corolla* ½ in., white, lower lip purple-spotted. *Capsule* nearly ½ in., 4-seeded.

14. **L. chlorostachya**, *Nees in DC. Prodr.* xi. 256; leaves large petioled elliptic acuminate at both ends glabrous, spikes axillary oblong dense ciliate scarcely pubescent, bracts and bracteoles narrowly lanceolate mucronate scarcely spinescent. *T. Anders. in Journ. Linn. Soc.* ix. 496.

MERGUI; *Griffith* (*Kew Distrib.* n. 6141).

Shrubby, erect. *Leaves* 6½ by 1½ in., entire membranous; petiole ½-1 in. *Spikes* 2 by ½ in., subsessile, mostly solitary in each axil sometimes 2 together, erect, 1-sided or subsymmetric; bracts ½ by ⅓ in., white ciliate, subsymmetric or in the 1-sided spikes falcate; bracteoles similar rather smaller. *Calyx* 5-partite; segments linear-lanceolate, nearly similar. *Corolla* ½ in., and *stamens* as of *L. hyalina*. *Capsule* oblong, 4-seeded.

15. **L. subuninervia**, *Clarke*; spikes linear-oblong pubescent, bracts linear-lanceolate sub-1-nerved ciliate mucronate. *Neuracanthus subuninervius*, *Kurz in Journ. As. Soc.* 1873, pt. ii. 95.

PROME HILLS; *Kurz*.

The fragment on which *Kurz* founded this species is the leafless base of a stem, whence arise 2 erect spikes, very similar to those of *L. chlorostachya*, but pubescent as well as ciliate, and the bracts rather smaller. *Stamens* 4; anthers all 2-celled, cells superposed; filaments slightly bearded at the apex. *Style* glabrous, stigma small minutely bifid.—The *stamens* and bracts are not those of a *Neuracanthus*; and the fragmentary solitary specimen is so like *L. chlorostachya* that it might be merely a burnt-down hill specimen of it.

16. **L. purpuricaulis**, *Nees in Wall. Pl. As. Rar.* iii. 96, and *Monogr. Lepidag.* 27, and in *DC. Prodr.* xi. 257; leaves lanceolate or ovate-lanceolate pubescent, spikes axillary sessile solitary or clustered oblong hairy, bracts lanceolate or ovate-lanceolate mucronate striate, calyx sub-5-partite one segment broad the other 4 very narrow. *T. Anders. in Journ. Linn. Soc.* ix.

496. *L. striata*, *Nees in Wall. Pl. As. Rar.* iii. 96, and *Monogr. Lepidag.* 26, and in *DC. Prodr.* xi. 257, and in *Wall. Cat.* 7165. *Ruellia mucronata*, *Wall. Cat.* 2366, sheets β , δ , ζ .

SUBTROPICAL W. HIMALAYA; Hooshianpur, *Aitchison*; Hurdwar, *Wallich*; Kumaon, *Strachey & Winterbottom*. CHOTA NAGPORE; Parasnath, *Edgeworth*; Rajmahl, *Watt*. PROME HILLS; *Wallich*.

Stems herbaceous, 8-24 in., suberect or diffuse, glabrous or hairy, often purple. *Leaves* 1-5 in., sometimes in unequal pairs; larger attenuate at both ends glabrate, smaller subovate more pubescent. *Spikes* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., dense; bracts $\frac{1}{3}$ by $\frac{1}{6}$ in.; bracteoles $\frac{1}{4}$ in., linear-falcate. Large *sepal* $\frac{1}{3}$ - $\frac{1}{2}$ by $\frac{1}{3}$ in.; 2 next $\frac{1}{3}$ in., linear-lanceolate, 2 inner linear. *Corolla* and *capsule* as of *L. hyalina*, from which this species differs very little.

17. ***L. dulcis***, *Nees in Wall. Pl. As. Rar.* iii. 96, and *Monogr. Lepidag.* 30, and in *DC. Prodr.* xi. 257, and in *Wall. Cat.* 7167; leaves petioled elliptic narrowed at both ends pubescent on the nerves beneath, spikes axillary ovoid or somewhat elongate hairy, bracts elliptic scarious, calyx sub-5-partite, outer segment broad. *T. Anders. in Journ. Linn. Soc.* ix. 496. *Ruellia dulcis*, *Wall. Cat.* 7167.

PROME HILLS; *Wallich*. PEGU; *Kurz*.

Annual *stems* 6-12 in., subundivided, flexuose, in appearance procumbent, somewhat pubescent. *Leaves* 3 $\frac{1}{2}$ by 1 $\frac{1}{4}$ in., undulate, soon glabrate above; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Spikes* 1 by $\frac{1}{2}$ in., mostly solitary opposite, 1-sided; bracts $\frac{1}{3}$ by $\frac{1}{6}$ in., somewhat obovate, apiculate not spinescent, nerved, scarious, ciliate; bracteoles similar, but rather smaller, subfalcate. Outer *sepal* nearly $\frac{1}{2}$ by $\frac{1}{4}$ in., obovate, nerved, scarious, ciliate; 2 next $\frac{1}{3}$ by $\frac{1}{4}$ in. falcate, 2 inner $\frac{1}{4}$ in. linear. *Corolla* $\frac{1}{2}$ in. (*Nees*). *Capsule* exceeding $\frac{1}{4}$ in., 4-seeded.

18. ***L. scariosa***, *Nees in Wall. Pl. As. Rar.* iii. 95, and *Monogr. Lepidag.* 15, and in *DC. Prodr.* xi. 251; leaves petioled ovate furfuraceous-pubescent, spikes mostly terminal ovoid dense, bracts narrowly obovate mucronate, outer calyx-segment large obovate scarious. *Wight Ic.* t. 457; *T. Anders. in Journ. Linn. Soc.* ix. 497. *L. terminalis*, *Hochst.*; *Nees in DC. Prodr.* xi. 251. *Ruellia scariosa*, *Wall. Cat.* 2354.

S. DECCAN PENINSULA; Coimbatore, *Wight*; S. Canara, *Beddome*.—DISTRIB. Abyssinia.

A small undershrub; branches numerous, much-divided, stellately woolly or glabrate. *Leaves* 2 by 1 $\frac{1}{4}$ in., hardly acute, undulate; petiole 0- $\frac{1}{2}$ in. *Spikes* 1 in. diam., solitary or 2-3, conglomerate, all at the tips of the branches; bracts $\frac{1}{3}$ in., ciliate, scariosa; bracteoles $\frac{1}{3}$ in., nearly linear. *Calyx* $\frac{1}{2}$ in., sub-5-partite; outer segment $\frac{1}{2}$ in. broad; 2 next $\frac{1}{2}$ in. broad, 2 innermost linear. *Corolla* $\frac{1}{2}$ in. and upwards. *Capsule* $\frac{1}{3}$ in., 4-seeded.—*T. Anderson*, as well as *Nees*, keeps *L. terminalis* distinct; but the only difference is that the corolla in *L. terminalis* is $\frac{3}{4}$ in., whereas in *L. scariosa* it must not exceed $\frac{2}{3}$ in.

19. ***L. simplex***, *T. Anders. in Journ. Linn. Soc.* ix. 497; leaves sessile narrowly oblong glabrous, spikes terminal solitary ovoid or ellipsoid, bracts and bracteoles narrowly obovate white-ciliate, calyx sub-5-partite, segments lanceolate submucronate.

TENASSERIM; *Helper* (*Kew Distrib.* n. 6140).

Stem simple, 4-10 in., erect, glabrous, 4-angular. *Leaves* 1 by $\frac{1}{2}$ in., rigid, obtuse, entire, shining. *Spike* $\frac{1}{2}$ -1 in., sessile, 1-sided; bracts $\frac{1}{3}$ by $\frac{1}{3}$ in., scarcely acute, scarious; bracteoles similar to the bracts, but rather smaller. *Calyx* $\frac{1}{2}$ - $\frac{1}{3}$ in., white ciliate; 2 outer segments oblong, subentire, 2 inner linear. *Corolla* not seen. *Capsule* $\frac{1}{2}$ in., oblong, 4-seeded. *Seeds* densely, elastically hairy.—This looks like a form of *L. hyalina* var. *semiherbacea*.

20. *L. hyalina*, *Nees in Wall. Pl. As. Rar.* iii. 95, and *Monogr. Lepidag.* 16, and in *DC. Prodr.* xi. 252; leaves petioled ovate or oblong minutely viscid-pubescent, spikes oblong very dense axillary and terminal often clustered ciliate often softly hairy, bracts lanceolate acuminate mucronate, calyx sub-5-partite, segments linear-lanceolate mucronate outer larger, corolla $\frac{1}{4}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 498. *L. incurva*, *Don Prodr.* 119. *Ruellia dependens*, *Roxb. Fl. Ind.* iii. 49; *Wall. Cat.* 2365.

Throughout N. INDIA, alt. 0-4000 ft., very common; from Jamu to Upper Assam and Chittagong. BEHAR and CHOTA NAGPORE, frequent. PEGU and TENASSERIM, common.—DISTRIB. Burma, S. China.

A perennial herb, 1-2 ft. *Leaves* 3 by $1\frac{1}{2}$ in., uppermost often narrower, pendent, undulate; petiole $\frac{1}{2}$ in. *Spikes* $\frac{1}{2}$ - $1\frac{1}{2}$ in., erect, 1-sided; bracts nearly $\frac{1}{2}$ in.; bracteoles $\frac{1}{2}$ in., linear-lanceolate, mucronate. *Sepals* $\frac{1}{2}$ in., ciliate, sometimes softly hairy. *Corolla* white with brown spots in the palate. *Capsule* $\frac{1}{2}$ in., 4-seeded.—Of this plant so universal in N. India there is no plate extant; nor is there any example of the typical form at Kew collected in the Deccan. Roxburgh says his *Ruellia dependens* is native in Mysore; but the examples in his collections under that name are all the common Bengal form.

VAR. *mollis*; leaves all ovate hairy on both surfaces, heads very softly hairy.—Himalaya Terai, frequent.

VAR. *ustulata*; plant 1-5 in., leaves 1 in., spikes $\frac{1}{2}$ -1 in. ovoid, bracts rather larger than in *L. hyalina* type. *L. ustulata*, *Nees in Wall. Pl. As. Rar.* iii. 95, and *Monogr. Lepidag.* 18, and in *DC. Prodr.* xi. 253. *Ruellia mucronata*, *Wall. Cat.* 2366, letters γ , ϵ .—Kashmir and N.W. Himalaya, alt. 2-4000 ft., Thomson, *Strachey & Winterbottom*, &c. A very local and easily separable form.

VAR. *mucronata*; leaves ovate pubescent beneath, spikes and heads small or large, bracts $\frac{1}{4}$ in. *L. mucronata*, *Nees in Wall. Pl. As. Rar.* iii. 95, and *Monogr. Lepidag.* 11, and in *DC. Prodr.* xi. 250. *L. neurophylla*, *T. Anders. in Journ. Linn. Soc.* ix. 497. *Ruellia mucronata*, *Wall. Cat.* 2366, type sheet.—Concan, Canara, Nilgherries, &c., Stocks, Wight, Dalzell, &c.—Nees founded this species on Wight's plant (*Herb. Propr.* n. 1968), which has small leaves; subsequently he (in *DC. Prodr.*) added such specimens from Mergui as had small leaves: these, however, having bracts $\frac{1}{2}$ - $\frac{1}{4}$ in. are nearer *L. purpuricaulis*, though their stems are not very purple. T. Anderson's *L. neurophylla* has full-sized leaves; the bracts are nearly the same as in Var. *mucronata*.

VAR. *lophostachyoides*, *Nees in DC. Prodr.* xi. 252; leaves large, spikes $2\frac{1}{2}$ by $\frac{1}{2}$ in. 1-sided, bracts as in *L. hyalina* type.—Ceylon; Gardner, Walker, &c. Bababoodun Hills; Cleghorn.—This variety in habit and in details runs very near *L. chlorostachya*, but has the spikes rather slenderer, the bracts rather smaller.

VAR. *semiherbacea*; leaves linear-lanceolate often shining. *L. semiherbacea*, *Nees in Wall. Pl. As. Rar.* iii. 96, and *Cat.* 7164, and *Monogr. Lepidag.* 20, and in *DC. Prodr.* xi. 253; *Wall. Cat.* 7164. *L. iridescens*, *T. Anders. in Journ. Linn. Soc.* ix. 496. *Lepidagathis* sp., *Griff. Notul.* iv. 137.—From Sikkim and Assam to Burma, very common in the Terai and adjacent Tropical Valleys.—Stems often elongate, diffuse, with long nodes; the lower stem leaves (in the extreme form of the variety) 7 by $\frac{3}{4}$ in. But intermediate forms are more common, having the lower leaves ovate, the upper or uppermost oblong or linear, large or small. Some of the examples only differ from *L. simplex*, T. Anders., in having numerous heads.

VAR. *riparia*; leaves large ovate, heads large softly ciliate, bracts $\frac{1}{2}$ in. (or sometimes longer) acuminate long aristate. *L. riparia*, *Nees in DC. Prodr.* xi. 253. *L. aristata*, *Nees in Wall. Pl. As. Rar.* iii. 95, and *Monogr. Lepidag.* 19; *Wall. Cat.* 7163 (not *Ruellia aristata*, Vahl).—Rangoon; M'Lelland. Pegu Yomah; Kurz. Tenasserim; Beddome. Siamese Hills; Parish.—Kurz and Beddome have noted on their specimens that this is probably a distinct species; and it seems more distinct from *L. hyalina*, to which T. Anderson reduced it, than some usually admitted species.

21. *L. linearis*, *T. Anders. in Cat. Hort. Calc.* 43, and in *Journ.*

Linn. Soc. ix. 496; leaves subsessile linear acute at both ends scabrous pale beneath, spikes terminal or axillary tetragonal subsecund dense woolly, bracts herbaceous obliquely lanceolate mucronate ciliate 1-nerved, calyx 5-partite membranous ciliate upper segment lanceolate rounded at the tip 3-nerved.

BURMA; *R. Scott*.

Perennial; stems several, 2-3 ft., tetragonous, winged, glabrous. *Leaves* 3-6 in., scabrous. *Spikes* 1-2 in., hoary woolly. Terminal *spikes* 2-3 together, axillary solitary opposite; bracteoles membranous, concave, obovate, obtuse at both ends, ciliate. *Corolla* and *capsule* appear (ex descr.) same as of *L. hyalina* (*T. Anderson*). —Not seen.

** *Leaves crenate or crenate-serrate*. (Anther-cells more separated and more divergent at the base than in the rest of the genus.)

22. ***L. ceylanica***, *Nees Monogr. Lepidag.* 35, and in *DC. Prodr.* xi. 259; leaves petioled ovate-lanceolate nearly glabrous, bracts as long as the calyx elliptic or obovate scarious 3-nerved glabrous ciliate. *T. Anders. in Journ. Linn. Soc.* ix. 498. *L. nervosa*, *Wight Ic.* t. 1620.

CEYLON; *Walker, Thwaites*.

Stems 2-3 ft., herbaceous, diffuse, 4-angular, glabrous. *Leaves* 3 by $\frac{1}{4}$ in., acuminate at both ends, crenate-serrate, obscurely puberulous; petiole $\frac{1}{2}$ in. *Spikes* $\frac{3}{4}$ in., ovoid or obovoid, in dense panicles or clusters; bracts $\frac{1}{2}$ by $\frac{1}{4}$ in., mucronate; bracteoles $\frac{1}{2}$ by $\frac{1}{4}$ in., subfalcate, scarious, 3-nerved, ciliate. *Calyx* $\frac{1}{2}$ - $\frac{1}{4}$ in., deeply 5-fid, scarious, glabrous, ciliate; outer segment oblong or elliptic, other 4 narrow. *Corolla* $\frac{1}{2}$ in. *Capsule* $\frac{1}{2}$ in., 4-seeded.

23. ***L. Walkeriana***, *Nees in DC. Prodr.* xi. 260; leaves petioled ovate-lanceolate nearly glabrous, bracts half as long as the calyx elliptic. *Wight Ic.* t. 1530; *T. Anders. in Journ. Linn. Soc.* ix. 499. *L. ceylanica*, Var. β , *Nees Monogr. Lepidag.* 35.

CEYLON; *Walker, Macrae, &c.*

Bracts $\frac{1}{2}$ in., 3-nerved, subscarious. *Calyx* $\frac{1}{4}$ in., densely minutely glandular-hairy or glabrate ciliate. Otherwise as *L. ceylanica*, which it so greatly resembles that Wight has noted on the specimen he has figured a doubt whether it was the "true *Walkeriana*," which it certainly is.

24. ***L. fasciculata***, *Nees in Wall. Pl. As. Rar.* iii. 95, and *Monogr. Lepidag.* 10, and in *DC. Prodr.* xi. 260; leaves petioled ovate or ovate-lanceolate pubescent, bracts herbaceous as long as the calyx ovate or elliptic 3-nerved hairy. *T. Anders. in Journ. Linn. Soc.* ix. 498; *Bedd. Ic. Pl. Ind. Or.* t. 228; *Wawra Bot. It. Pr. S. Cob.* i. 88, t. 13. *L. hirta*, *Nees Monogr. Lepidag.* 37. *L. goensis*, *Dalz. in Hook. Kew Journ.* ii. 340; *Dalz. & Gibs. Bomb. Fl.* 191. *Ruellia fasciculata*, *Retz. Obs.* iv. 28; *Rorb. Fl. Ind.* iii. 48; *Wall. Cat.* 2406, and 2394 partly.

Throughout TROPICAL and SUBTROPICAL INDIA, from the base of the N.W. HIMALAYA and BENGAL to CEYLON and TENASSEERIM; mostly rare, plentiful in Malabar.

Stems 1 foot, herbaceous, diffuse, hairy. *Leaves* 2 by 1 in., crenate-serrate, pubescent at least on the nerves beneath; petiole $\frac{1}{4}$ in. *Spikes* $\frac{1}{2}$ in. diam., or often elongate, interrupted below with the lower flowers in opposite pairs; bracts $\frac{1}{2}$ - $\frac{1}{4}$ in., in fruit somewhat enlarged; bracteoles rather shorter than the bracts, falcate-oblong. *Corolla* and *capsule* nearly as of *L. hyalina*.—This plant always occurs mixed with *Hemigraphis latebrosa*, *Nees*; without counting the ovules or seeds it may be distinguished therefrom by the presence of bracteoles, the capi-

tellate sub-bifid stigma, the corolla suddenly ventricose in the middle not tubular (as in *Hemigraphis latebrosa*).

VAR. *major*; leaves larger toothed or subentire, heads larger, bracts $\frac{1}{2}$ by $\frac{1}{4}$ in. acute subspinnulose, calyx $\frac{1}{2}$ in., corolla $\frac{1}{2}$ in.—Tenasserim; Mooleyit, *Bed dome*.—Much finer than the ordinary *L. fasciculata*, of which some examples from moist valleys in Malabar (marked *L. goensis*) come so near this Tenasserim plant that it is difficult to treat the latter as a species.

DOUBTFUL SPECIES.

L. LONGIFOLIA, *Wight Ic. t.* 1564; leaves large lanceolate glabrous, spikes elongate lax terminal subpanicled, bracts large elliptic acute, flowers large, anthers minutely spurred at the base. *T. Anders. in Journ. Linn. Soc.* ix. 499.

MALACCA; *Griffith* (Kew Distrib. n. 6138), *Maingay*.

Branches terete, glabrescent. *Leaves* 9 by 2 in., acute at both ends, entire; petiole $\frac{3}{8}$ in. *Spikes* 3–7 by 1 in., clustered towards the end of the branch, lax, nodding, pubescent; bracts $\frac{3}{4}$ by $\frac{1}{4}$ in., opposite, one of each pair usually barren; bracteoles $\frac{1}{2}$ in., oblong. *Calyx* nearly $\frac{1}{2}$ in., 5-lobed nearly to the base; 3 segments broadly lanceolate, 2 linear. *Corolla* in form nearly as of *Lepidagathis* but larger, minutely hairy without, nearly glabrous; no traces of dots on the lower lip. *Stamens* 4, slightly didynamous; filaments glabrous, connective papillose; anthers oblong, cells parallel approximate each with a divaricate minute mucro at the base. *Ovary* depressed, glabrous, 4-ovulate; style patently hairy; stigma capitellate (not as in *Wight Ic.*). *Capsule* not seen.—A remarkable plant, both in habit and characters removed from *Lepidagathis*; in the absence of fruit it is advisable not to found a new genus on it. Nees marked it “Species ab Acanthaceis aliena.” In many points it approaches *Asystasia Lawiana* and *Strobilanthes*.

L. STROBILINA, *T. Anders. ms.*; *Kurz in Journ. As. Soc.* 1873, pt. ii. 96; glabrous, leaves lanceolate membranous entire, heads lax terminal largeish, corolla 1 in. funnel-shaped purple-lilac tube short.

MARTABAN; *Parish* (fide *Kurz*).

A herb, 1–2 ft., stems terete with 4 elevated lines. *Leaves* 7–8 in., acuminate at both ends, shining, petioled. *Bracts* 1 in., oblong-lanceolate acuminate thin-papery, tinged purple-lilac, 1-nerved and reticulated, glandulose-puberulous; bracteoles similar to the bracts but narrower. *Calyx* large. *Capsule* wanting.—Not seen; the foregoing translated from *Kurz l. c.* Appears ex descr. to be allied to *L. longifolia*.

XXXV. **PHIALACANTHUS**, *Benth.*

An erect, glabrous shrub. *Leaves* large, entire. *Cyme* terminal, loosely corymbose; pedicels slender; bracts minute. *Calyx* membranous, coloured, tubular-campanulate, shortly 5-toothed. *Corolla-tube* elongate, ventricose upwards; limb 2-lipped; lobes 5, subequal, imbricate in bud. *Stamens* 4; anthers all 2-celled; cells oblong, parallel, muticous. *Style* filiform; stigma minutely 2-lobed; ovules 2 in each cell. *Capsule* shortly stalked, oblong, 4-seeded. *Seeds* (unripe) compressed, orbicular in outline, retinacula stout.

P. Griffithii, *Benth. in Gen. Pl.* ii. 1102.

MISHMEE; *Griffith*.

Leaves $7\frac{1}{2}$ by $2\frac{1}{2}$ in., broad-elliptic, acuminate at both ends, bearing raphides on both surfaces; petiole $1\frac{1}{2}$ in. *Cymes* 3 in. diam., short-peduncled; lower bracts $\frac{1}{4}$ in., linear, upper minute; pedicels $\frac{1}{4}$ in. *Calyx* $\frac{1}{4}$ by $\frac{1}{8}$ in., enlarged in fruit; teeth $\frac{1}{8}$ in., triangular. *Corolla* $1\frac{1}{2}$ in., orange with yellow mouth (*Griffith*). *Stamens* glabrous; anthers minutely pubescent. *Style* glabrous. *Disc* small, cup-shaped. *Capsule* (unripe) $\frac{1}{4}$ in., glabrous.

XXXVI. **MONOTHECIUM**, *Hochst.*

Diffuse herbs. *Leaves* entire. *Spikes* small, ovate or oblong, dense;

bracts and bracteoles linear or setaceous. *Sepals* 5, equal, linear-setaceous. *Corolla* small, tubular, limb deeply 2-lipped. *Stamens* 2; anthers narrowly oblong, 1-celled, mucous, attached by the middle of the back. *Style* minutely bifid. *Capsule* oblong, on a short solid stalk, 4-seeded. *Seeds* compressed, orbicular, rugose subtubercled; retinacula stout.—Species 2, Indian and Tropical African.

M. aristatum, *T. Anders. in Thwaites Enum.* 234; leaves ovate or ovate-lanceolate pubescent on the nerves beneath, bracts $\frac{1}{4}$ – $\frac{1}{2}$ in. linear setaceous lineolate. *Bedd. Ic. Pl. Ind. Or.* t. 269. *Justicia aristata*, *Wall. Cat.* 2481; *Nees in Wall. Pl. As. Rar.* iii. 115. *Anthocometes aristatus*, *Nees in DC. Prodr.* xi. 312.

CEYLON; *Walker, Wight, &c. NILGHERY MTS.; G. Thomson.*

Stems 1 foot, procumbent, much branched, often rooting. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$ in., cuneate at both ends; petiole $\frac{1}{2}$ in. *Spikes* $\frac{1}{2}$ – $1\frac{1}{2}$ in., peduncled or sessile, pubescent or nearly glabrous; bracteoles 0 (barren bracts frequent). *Sepals* $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ in., white, lower lip brown-spotted. *Capsule* $\frac{1}{4}$ in.—This is so like *Justicia procumbens* that an example of it in *Herb. Kew* is marked "*Rostellularia procumbens*, Var. α or β ," by *Nees'* hand.

XXXVII. CLINACANTHUS, *Nees*.

A tall herb, minutely pubescent. *Leaves* ovate-lanceolate, entire or toothed. *Flowers* conspicuous, dull red, in small drooping cymes at the tips of the branches; bracts and bracteoles small, linear. *Sepals* 5, equal, linear-subulate. *Corolla-tube* elongate, curved at the base, widened upwards; limb 2-lipped. *Stamens* 2; anthers scarcely exerted, 1-celled, narrowly oblong, mucous, attached by the middle of the back. *Style* minutely bifid. *Capsule* oblong, on a short solid stalk, 4-seeded. *Seeds* muricate (*Nees*).

Only differs from *Hypoestes* by the small bracts.

C. Burmanni, *Nees in DC. Prodr.* xi. 511. *Justicia nutans*, *Burm. Fl. Ind.* 10, t. 5, fig. 1. *J. fulgida*, *Blume Bijd.* 784. *Beleropone?* *fulgida*, *Hassk. Cat. Hort. Bogor.* 151.

MALACCA; *Maingay*.—DISTRIB. Java, Borneo, Hainan.

Leaves $2\frac{1}{2}$ by 1 in., acuminate, base cuneate or rounded; petiole $\frac{1}{4}$ in., puberulous. *Cymes* about 5-fl.; bracts $\frac{1}{2}$ in., linear; pedicels $\frac{1}{6}$ in. *Sepals* $\frac{1}{4}$ in., rusty pubescent. *Corolla* $1\frac{1}{4}$ in., lobed $\frac{1}{3}$ – $\frac{1}{2}$ in. *Stamens* and *pistil* glabrous.

XXXVIII. JUSTICIA, *Linn.*

Herbs or shrubs. *Leaves* entire. *Flowers* sessile or nearly so, spiked or paniced (rarely solitary), small or middle-sized; bracts large or small; bracteoles narrow or 0. *Calyx* 5- or 4-partite; segments narrow. *Corolla-tube* shorter, or scarcely longer, than the 2-lipped limb; upper lip 2-lobed or subentire, lower 3-lobed, lobes imbricate in bud. *Stamens* 2, filaments often dilated, hairy near the base; anthers 2-celled; cells oblong or round, usually more or less separate, lower always with a white basal appendage. *Ovary* 4-ovulate; style filiform, shortly bifid. *Capsule* ovoid or ellipsoid, 4-seeded from the base, or with a long solid cylindric stalk 4-seeded at the apex. *Seeds* ovoid, more or less compressed, tubercular, scaly or glochidiate-subspinescent (appearing hispid), never with fine elastic hairs springing out when wetted.—Species 100, in the warm regions of both hemispheres.

Justicia bivalvis, Roxb. Fl. Ind. i. 124, came from the Moluccas, and was probably a *Dicliptera*; though Roxburgh quotes his species as the same as Linnæus' under that name, he excludes (correctly) the plate on which Linnæus founded his species.

Gendarussa virgata, Wall. Cat. 7176, was collected in Ava, outside the bounds of British India.

Justicia inconspicua, Wall. Cat. 2475, collected in Penang, is not in Wallich's Herbarium at the Linn. Soc., nor are there any data for determining its genus.

Sect. 1. **Hemichoriste.** Shrubby. *Spikes* elongate; flowers clustered; bracts herbaceous, subovate. *Corolla* and *capsule* large.

1. **J. montana**, Wall. Cat. 2471, not of Roxb.; leaves large elliptic acute at both ends glabrous, spikes near the ends of the branches subpaniculate, inflorescence subviscidly pubescent. *T. Anders. in Journ. Linn. Soc.* ix. 509; *Benth. in Gen. Pl.* ii. 1109. *J. longifolia*, Wall. Cat. 2437. *Hemichoriste montana*, Nees in Wall. Pl. As. Rar. iii. 102, and in DC. Prodr. xi. 367; *Dalz. & Gibs. Bomb. Fl.* 194; *Wight Ic.* t. 1538.

W. DECCAN PENINSULA, in the Ghats, from Mahabalaishwur (Law) to Nilgherries (Wight).

Stem erect, subtetragonous, puberulous upwards. *Leaves* 9 by $3\frac{1}{2}$ in., both surfaces punctulate; petiole 1 in. *Spikes* 6-15 in., the terminal often paniculately branched; lower clusters of flowers usually distant, upper continuous; bracts $\frac{1}{2}$ by $\frac{1}{2}$ in., lower larger; bracteoles smaller, elliptic, near the base of the pedicel; pedicels $0-\frac{1}{8}$ in. *Sepals* 5, $\frac{1}{2}$ in., sublinear, pubescent. *Corolla* 1-1 $\frac{1}{4}$ in., 2-lipped half its length, minutely pubescent, red. *Stamens* 2 (without any rudiments); lower anther-cells long-spurred. *Capsule* 1 in., clavate, pubescent, 4-seeded near the top. *Seeds* glabrous, intensely rugose, but possibly smooth when fully ripe.—Nees says "stamens 4, 2 shorter with 1-celled anthers or rudimentary;" but there is no trace of these shorter stamens in the example named by Nees' hand.

Sect. 2. **Betonica.** Shrubs or herbs. *Spikes* continuous; bracts ovate or elliptic, often 4-ranked, mostly imbricate. *Calyx-segments* 5, nearly equal.

* *Bracts* white, green-nerved.

2. **J. Betonica**, Linn.; Roxb. Fl. Ind. i. 128; tall shrubby puberulous, leaves ovate-lanceolate, bracteoles large ovate-lanceolate, corolla $\frac{1}{2}$ in. white rose-spotted. *Burm. Fl. Ind.* 8; Wall. Cat. 2433; *T. Anders. in Journ. Linn. Soc.* ix. 510; *Kurz For. Fl.* ii. 247. *J. ochroleuca*, Blume Bijdr. 786. *Adhatoda Betonica*, Nees in Wall. Pl. As. Rar. iii. 103, and in DC. Prodr. xi. 385.—*Rheede Hort. Mal.* ii. t. 21.

Throughout INDIA and CEYLON, common; often cultivated.—DISTRIB. Malaya, Tropical Africa.

Branches terete, glabrous, tips pubescent. *Leaves* 3 by $1\frac{1}{2}$ in. (lower sometimes much larger), punctulate on both surfaces, not lineolate, base shortly attenuate; petiole $\frac{1}{2}$ in. *Spikes* 1-4 by $\frac{3}{4}$ in., short-peduncled, terminal, often on short lateral branches appearing lateral; bracts $\frac{3}{4}$ by $\frac{1}{2}$ in., ovate acute, white, minutely pubescent; bracteoles $\frac{1}{2}-\frac{1}{3}$ in., similar to the bracts. *Sepals* $\frac{1}{2}$ in., linear-lanceolate, pubescent. *Capsule* $\frac{3}{4}$ in., stoutly clavate, pubescent, 4-seeded. *Seeds* ovoid, somewhat compressed, glabrous, densely rugose in nearly all herbarium specimens, but smooth in some fully ripened.

VAR. *villosa*; stem softly hairy, leaves hairy beneath, flowers salmon-coloured. *J. Pseudo-Betonica*, Roth Nov. Sp. 17.—Central India and Chota Nagpore, alt. 1-5000 ft., common.

VAR. *ramosissima*; stems decumbent diffuse, bracts rather narrower. *J. ramosissima*, Roxb. Fl. Ind. i. 129; *T. Anders. in Journ. Linn. Soc.* ix. 510. *Adhatoda*

ramosissima, *Nees in Wall. Pl. As. Rar.* iii. 103, and in *DC. Prodr.* xi. 385; *Dalz. & Gibs. Bomb. Fl.* 193.—Throughout India, frequent.—This plant is said to have both axillary and terminal spikes, while *J. Betonica* is said to have only terminal; but there is no difference in the inflorescence between them.

3. ***J. nilgherrensis***, *Wall. Cat.* 2435; small procumbent nearly glabrous, leaves sessile oblong obtuse, spikes dense, bracteoles $\frac{1}{2}$ – $\frac{1}{3}$ by $\frac{1}{4}$ in., corolla $\frac{1}{2}$ – $\frac{3}{4}$ in. pale. *J. neilgherriensis*, *T. Anders. in Journ. Linn. Soc.* vii. 118. *Adhatoda nilgherrensis*, *Nees in Wall. Pl. As. Rar.* iii. 103. *A. nilgherrica*, *Nees in DC. Prodr.* xi. 386; *Wight Ic.* t. 1544.

NILGHERRIES, alt. 7–8000 ft.; plentiful in the grass round Ooty.

Rootstock woody. **Stems** 2–8 in., numerous. **Leaves** $1\frac{1}{2}$ by $\frac{1}{2}$ in. **Spikes** terminal, $\frac{1}{2}$ –2 in.; bracts $\frac{2}{3}$ by $\frac{1}{3}$ in., scarious-margined, very acute. **Capsule** $\frac{2}{3}$ in., stout, clavate, pubescent, 4-seeded. **Seeds** (not ripe) glabrous, subtubercular, rugose, not differing from those of some examples of *J. Betonica* at the same stage.—Seems distinct, but not allowed by T. Anderson (in *Thwaites Enum.* 233). Though the plant is so humble, the bracts, corolla and capsule are full as large as in *J. Betonica*.

4. ***J. trinervia***, *Vahl Enum.* i. 156; small, procumbent, nearly glabrous, leaves ovate or elliptic, spikes lax continuous, bracteoles $\frac{1}{2}$ in. lanceolate, corolla $\frac{1}{2}$ in. *Wall. Cat.* 2446. *J. Betonica*, *T. Anders. in Journ. Linn. Soc.* ix. 509, partly. *Adhatoda trinervia*, *Nees in Wall. Pl. As. Rar.* iii. 103, and in *DC. Prodr.* xi. 386; *Dalz. & Gibs. Bomb. Fl.* 194.

W. DECCAN PENINSULA, in the Ghauts, frequent; Concan, *Stocks*, *Dalzell*; Canara, *Ritchie*; Nilgherries, *Wight*, &c.

Rootstock woody; stems 3–8 in. **Leaves** $\frac{1}{2}$ –1 in., lower mostly short-petioled, upper sessile. **Spikes** 1–4 by $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ by $\frac{1}{3}$ in., lanceolate, white or sometimes green, not or obscurely nervose.—This plant, “a small var. of *J. Betonica*” (*T. Anders. ms.*), differs considerably in the slender spikes and narrow bracts, as well as in size and habit, nor are there intermediates in the Herbarium.

VAR. arenaria; leaves linear-oblong, spikes often small. *Adhatoda arenaria*, *Nees in DC. Prodr.* xi. 387.—W. India; Concan, Belgium, &c.

**** Bracts green, often purple-tinged, not white though sometimes scarious-margined.**

5. ***J. ventricosa***, *Wall. Pl. As. Rar.* i. 80, t. 93, and *Cat.* 2436, and 7174 in part; leaves elliptic cuneate at both ends glabrous minutely lineolate, bracts orbicular imbricated usually 3-fld., bracteoles minute, corolla $\frac{3}{4}$ in. white rose-spotted. *Bot. Mag.* t. 2766; *T. Anders. in Journ. Linn. Soc.* ix. 509; *Kurz For. Fl.* ii. 248. *Adhatoda ventricosa*, *Nees in DC. Prodr.* xi. 407. *Gendarussa ventricosa*, *Nees in Wall. Pl. As. Rar.* iii. 104.

PEGU and TENASSERIM; *Wallich*, *M'Lelland*, &c.—**DISTRIB.** Siam, China (cultivated?).

Branches stout, glabrous. **Leaves** 6 by $2\frac{1}{2}$ in.; petiole $\frac{1}{4}$ in. **Spikes** 3 by $\frac{3}{4}$ in., continuous, somewhat dense; peduncles 0–1 in., terminal, or terminal on short lateral branches; bracts $\frac{1}{2}$ – $\frac{1}{3}$ in. diam., sub-4-ranked, puberulous. **Flowers** usually 3 in the axil of each bract subsessile; bracteoles $\frac{1}{8}$ in., subulate, or 0. **Calyx** $\frac{1}{2}$ – $\frac{1}{3}$ in.; segments sublinear. **Capsule** $\frac{1}{2}$ in., hairy.

6. ***J. oreophila***, *Clarke*; leaves broadly elliptic acute at both ends pubescent beneath, bracts orbicular imbricate 1-fld., bracteoles large spatulate-oblong.

CHITTAGONG Seetakoond alt. 1000 ft., *J. D. H.*

A shrub, habit of *J. ventricosa*; innovations densely silky strigose. *Leaves* $8\frac{1}{2}$ by $3\frac{1}{2}$ in., above minutely thinly hairy, nerves reticulate impressed, beneath pubescent especially on the nerves; petiole $\frac{3}{4}$ in. *Peduncles* 1-3 in., axillary; spikes 4 by 1 in., rachis softly hairy; bracts sub-4-ranked, $\frac{1}{2}$ by $\frac{1}{2}$ in., green, puberulous, 5-nerved; bracteoles $\frac{1}{2}$ by $\frac{1}{8}$ in., green. *Calyx* $\frac{1}{8}$ in., pubescent; segments linear-lanceolate.—Differs from *J. ventricosa* in the indumentum and bracteoles.

7. ***J. punduana*, Wall. Cat.** 2453; leaves broadly elliptic acute at both ends minutely lineolate nerves beneath villous, bracts ovate scarious-margined 1-fld., bracteoles oblong acute scarious longer than the calyx, corolla $\frac{1}{2}$ in. *Rungia punduana*, *Nees in Wall. Pl. As. Rar.* iii. 110, and in *DC. Prodr.* xi. 473; *T. Anders. in Journ. Linn. Soc.* ix. 518.

E. BENGAL; Jaintea Mts., Gomez; Cachar, Keenan.

A shrub; stem rooting; annual branches 1 foot, villous-pubescent. *Leaves* 6 by 2-2 $\frac{3}{4}$ in.; petiole $\frac{1}{4}$ in. *Spikes* axillary and terminal, $1\frac{1}{2}$ by $\frac{1}{2}$ in., dense; peduncles $\frac{1}{4}$ in.; bracts closely imbricate, imperfectly 4-ranked, $\frac{1}{2}$ by $\frac{1}{3}$ in., obtuse or subacute; bracteoles $\frac{1}{4}$ in., minutely hairy. *Sepals* $\frac{1}{2}$ in., equal, linear-lanceolate, minutely hairy. *Anther-cells* minutely hairy, lower distinctly white-tailed. *Capsule* scarcely $\frac{1}{4}$ in., pubescent, clavate, 4-seeded; pedicel solid, placentæ not rising elastically from the capsule-base. *Seeds* glabrous, rugose, subtubercular.—Very few of the plants marked Pundua by Wallich were collected at or near Pundua; the present species was collected by Gomez (Wallich's trained Eurasian collector), and delivered to Wallich in his boat at Pundua. It is strange that Nees and T. Anderson should have removed this species to *Rungia*; for it is a shrub resembling *J. Atkinsoni*, &c.

8. ***J. burmanica*, Clarke**; leaves long-petioled broadly elliptic acute at both ends villous on the nerves beneath, bracts obovate or orbicular nearly glabrous 1-fld., bracteoles broadly lanceolate longer than the calyx.

BURMA; Griffith (Kew Distrib. n. 6184).

Resembling very much *J. Keenani*, but the leaves are long-petioled, the bracts herbaceous, uniformly intensely green (even when dried) without a scarious margin. *Spikes* 2-5 in., continuous but lax; bracts sometimes scarcely imbricate, subpatent. *Corolla* not seen. *Capsule* $\frac{1}{2}$ in., 4-seeded, glabrous or puberulous.

9. ***J. argyrostachya*, T. Anders. in Journ. Linn. Soc.** ix. 510; leaves large ovate minutely pubescent, bracts ovate patently softly long-hairy 1-fld., bracteoles falcate-oblong longer than the calyx, corolla $\frac{1}{2}$ in. *Adhatoda argyrostachya*, *Nees in Wall. Pl. As. Rar.* iii. 1027, and *Cat.* 7172, and in *DC. Prodr.* xi. 385.

BURMA; Prome Hills, Wallich.

An undershrub (or large herb) with the habit of the preceding species. *Leaves* 11 by 5 in., shortly attenuate at both ends; petiole $1\frac{1}{2}$ in. *Spikes* axillary, solitary and terminal, 2-5 by 1 in., continuous; peduncles short; bracts $\frac{1}{2}$ - $\frac{3}{4}$ by $\frac{1}{2}$ in., imbricate, green purple-margined; bracteoles $\frac{1}{4}$ - $\frac{1}{2}$ in. *Sepals* 5, $\frac{1}{4}$ in., linear-lanceolate. *Corolla* (fide Nees) yellowish-white purple-marked. *Capsule* $\frac{1}{2}$ in., clavate, 4-seeded.—This differs from the allied species (except *J. Kurzii*) by the long soft hairs on the bracts.

10. ***J. Kurzii*, Clarke**; leaves large ovate minutely pubescent, bracts large elliptic acute softly long-hairy 1-fld., bracteoles sublinear longer than the calyx, corolla nearly 1 in.

PEGU; Kurz.

A large herb, closely resembling *J. argyrostachya* except as to the corolla. *Leaves* 7 by $4\frac{1}{2}$ in., acute, base suddenly attenuate; petiole $2\frac{1}{2}$ in. *Spikes* 3-4 in.; bracts $\frac{3}{4}$ by $\frac{1}{4}$ in., sub-4-ranked; bracteoles $\frac{1}{4}$ - $\frac{1}{2}$ in., hairy. *Calyx-segments* $\frac{1}{4}$ - $\frac{1}{2}$ in., linear-

setaceous hairy. *Corolla* (dried) rose-purple, spotted; tube much inflated upwards. Lower *anther-cell* conspicuously white-tailed.—A specimen, issued by Kurz under the same number (2167), has large oblong leaves much attenuate at both ends; petiole winged to the base, and there often auriculate; capsules $\frac{1}{2}$ in., clavate, 4-seeded. From the variations of the leaves in some allied species, it is probably a form of *J. Kurzii*.

11. **J. Atkinsoni**, *T. Anders. in Journ. Linn. Soc.* ix. 509; leaves long-petioled ovate caudate-acuminate puberulous on the nerves beneath, bracts suborbicular pubescent 1-fld., bracteoles linear nearly as long as the bracts, corolla $\frac{1}{2}$ in.

SIKKIM and E. BHOTAN, alt. 2–6000 ft., from the outer hills to the northern valleys frequent, *T. Anderson, &c.*

A shrub, 2–3 ft. *Leaves* 8 by $4\frac{1}{2}$ in. (many smaller narrower), base shortly decurrent; petiole 3 in. *Spikes* terminal, solitary, 2–5 by $\frac{3}{4}$ in., continuous; peduncles $\frac{1}{2}$ –2 in.; bracts $\frac{1}{2}$ – $\frac{1}{2}$ in., green, purple-margined; bracteoles $\frac{1}{2}$ in., green. *Sepals* 5, $\frac{1}{2}$ – $\frac{1}{2}$ in., linear, puberulous. *Corolla* hairy without, yellowish-white rose-marked. *Stamens* and *pistil* glabrous; lower *anther-cell* distinctly white-tailed. *Capsule* $\frac{1}{2}$ in., clavate, 4-seeded. *Seeds* glabrous, rugose, subtubercular.

12. **J. grandifolia**, *T. Anders. in Journ. Linn. Soc.* ix. 510; leaves long-petioled large round-ovate nearly glabrous, bracts elliptic acute rusty pubescent 1-fld., bracteoles $\frac{1}{2}$ in. linear-lanceolate hairy, corolla $\frac{3}{4}$ –1 in.

MOULMEIN; *Parish*. TENASSERIM; *Beddome*.

A herb (*T. Anders.*). *Leaves* 8–5 in., attaining 14 by 7 in. (*T. Anders.*), shortly acuminate, base rounded or very shortly decurrent; petiole $3\frac{1}{2}$ in. *Spikes* axillary and terminal, 3–11 by 1 in., continuous, somewhat lax, very pubescent; peduncles 0–1 in.; bracts $\frac{3}{4}$ –1 by $\frac{1}{2}$ in. *Sepals* 5, $\frac{1}{2}$ in., linear-lanceolate, very pubescent. *Corolla* $\frac{3}{4}$ –1 in., pubescent, white purple-marked. *Anther-cells* glabrous, subparallel, lower minutely white-tailed. *Capsule* $\frac{1}{2}$ in., stoutly clavate, pubescent, 4-seeded.

13. **J. dasycarpa**, *Kurz in Journ. As. Soc.* 1873, pt. ii. 96; leaves ovate acute subglabrous, bracts ovate softly hairy, bracteoles oblong longer than the calyx, corolla $\frac{1}{2}$ in. *Neuracanthus tetragonostachyus*, *Wall. Cat.* 7168, *by admixture*.

TENASSERIM; Chappedong, *Wallich*. RANGOON; *McLelland*. KAREN HILLS, *Kurz*.

Stem $1\frac{1}{2}$ –3 ft., glabrous, pubescent upwards. *Leaves* 3 by 2 in., base obtuse, raphides conspicuous on both surfaces; petiole $\frac{1}{2}$ in., pubescent. *Spikes* axillary and terminal, $\frac{1}{2}$ –1 $\frac{1}{2}$ by $\frac{1}{2}$ in., continuous; peduncles $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ in., green; bracteoles $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in.; segments 5, linear-lanceolate, pubescent. Lower *anther-cell* shortly white-tailed. *Capsule* $\frac{1}{2}$ in., clavate, pubescent, 4-seeded.—The bracts are 1–3-fld.; where several flowers occur, some of the bracteoles are suppressed. The leaves, bracts and flowers are considerably smaller than in the preceding species.

14. **J. fragilis**, *Wall. Cat.* 7174, *type sheet only*; leaves oblong narrowed at both ends glabrous, bracts elliptic acute puberulous several-fld., bracteoles small linear or 0, corolla $\frac{2}{3}$ in.—*Justicia* sp., *Griff. Notul.* iv. 143.

TENASSERIM; Amherst, *Wallich*; Mergui, *Griffith*.

Branch elongate, glabrous. *Leaf* 5 by $1\frac{1}{4}$ in.; petiole $\frac{1}{2}$ in. *Spikes* 1–5 in., terminal and quasi-axillary on short-lateral branches, interrupted below; bracts $\frac{1}{2}$ by $\frac{1}{2}$ in., uniformly green, somewhat deciduous, upper imbricate; flowers clustered on the spikes; bracteoles 0– $\frac{1}{2}$ in. *Sepals* 5, $\frac{1}{2}$ – $\frac{1}{2}$ in., linear, puberulous. *Corolla* pubescent, altogether as of *Sect. Betonica*. *Stamens* and *pistil* very nearly glabrous; lower *anther-cell* distinctly shortly white-tailed.—The elongate spikes interrupted below

and deciduous bracts are very unlike *J. ventricosa*, with which Nees united this, and which has been distributed by Wallich under the same number.

15. **J. caloneura**, *Kurz in Journ. As. Soc.* 1873, pt. ii. 96; leaves elliptic acute at both ends minutely pubescent, bracts ovate acuminate pubescent, bracteoles broadly lanceolate exceeding the calyx, corolla $\frac{1}{2}$ – $\frac{1}{2}$ in.

TENASSEEIM; *Beddome*.

A perennial herb; stems 2–3 ft., glabrous or crisped-pubescent. *Leaves* 4 by $1\frac{1}{2}$ in., nerves conspicuously reticulate on both surfaces; petiole $0\frac{1}{2}$ in., crisped-pubescent. *Spikes* terminal, $1\frac{1}{2}$ by $\frac{1}{2}$ in., dense; peduncles $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ by $\frac{1}{2}$ in., 4-ranked, striate, green black-tipped, ciliate; bracteoles $\frac{1}{2}$ by $\frac{1}{4}$ in., green. *Sepals* 5, $\frac{1}{2}$ in., linear, pubescent. *Corolla* minutely hairy, straw-coloured (*Kurz*). *Anther-cell* distinctly white-tailed. *Capsule* not seen.—Identified with *Kurz's J. caloneura* from description only.

16. **J. ceylanica**, *T. Anders. in Thwaites Enum.* 233, and in *Journ. Linn. Soc.* ix. 513; leaves lanceolate or ovate-lanceolate glabrous, bracts and bracteoles spatulate orbicular, corolla $\frac{1}{2}$ in. *Adhatoda ceylanica*, *Nees in DC. Prodr.* xi. 400.

CEYLON; *Walker, Gardner, &c.*

Herbaceous, 2–3 ft., branched, glabrous; whole plant, including the bracts, drying black. *Leaves* 3 by 1 in., acuminate, not or very obscurely lineolate, base cuneate, midrib beneath glabrous; petiole $\frac{1}{2}$ in. *Spikes* axillary, branched, lax, nearly glabrous; bracts $\frac{1}{2}$ in., orbicular, on a $\frac{1}{2}$ in. pedicel, patent; bracteoles similar, but rather smaller; flowers in distant opposite pairs. *Calyx-segments* 5, $\frac{1}{2}$ in., linear, nearly glabrous. *Corolla* nearly glabrous, purple (fide *Nees*); lower lip longer. *Capsule* $\frac{1}{2}$ in., clavate, puberulous, 4-seeded.

VAR. viridescens; leaves larger pubescent on the nerves beneath, bracts larger obovate, bracteoles oblong.—Ceylon; *Walker, Thwaites*, C. P. n. 2422, partly.—Whole plant drying green. *Leaves* 5 by 2 in., conspicuously lineolate on both surfaces. *Spikes* 2–4 in., much interrupted; bracts $\frac{1}{2}$ by $\frac{1}{2}$ in., green, nearly glabrous; bracteoles $\frac{1}{2}$ in. *Calyx-segments* $\frac{1}{2}$ – $\frac{1}{2}$ in., green, lineolate. *Capsule* as of type.—Very unlike *J. ceylanica*, of which both *Nees* and *T. Anderson* consider it a form.

VAR. capitata, *T. Anders. ms.*; leaves pubescent, spikes capitate globose solitary on short axillary peduncles.—Ceylon; *Thwaites*, n. 3919, and 2422 partly.—Branches pubescent. *Leaves* subhispidly pubescent on both surfaces, drying green. *Peduncles* $\frac{1}{2}$ in.; heads $\frac{3}{8}$ in. diam., rusty pubescent; bracts densely imbricate. *Calyx-segments* $\frac{1}{2}$ in., oblong-lanceolate, subscarious. *Corolla* and *stamens* as of *J. ceylanica*. *Capsule* not seen.—A very puzzling plant, not seen by *Nees*; *Mr. Benth* observes that it is “very near *Sect. Anisostachya*.”

17. **J. glauca**, *Rottler; Roem. & Sch. Syst.* i. 165; herbaceous, leaves 1–2 in. ovate puberulous or pubescent, bracts ovate or orbicular puberulous ciliate or pubescent, corolla $\frac{1}{2}$ in. *J. brachioides*, *Roth Nov. Sp.* 16. *J. orixensis*, *Roxb. Fl. Ind.* i. 132; *T. Anders. in Journ. Linn. Soc.* ix. 510, partly. *J. tranquebariensis*, *Roxb. l. c.* 130; *Wall. Cat.* 2424 (not 2462); *T. Anders. l. c.* 513, partly; not of *Linn. f.* *J. brachionoides*, *Spreng. Syst.* i. 82. *Gendarussa orixensis*, *Nees in Wall. Pl. As. Rar.* iii. 104. *Adhatoda orixensis* & *diversiformis*, *Nees in DC. Prodr.* xi. 400, 399.

DECCAN PENINSULA, alt. 0–2000 ft., frequent; *Rottler, &c.*

Stems 8–20 in., herbaceous, puberulous, diffuse; internodes long. *Leaves* pubescent on the nerves beneath, those at the main nodes acute at both ends, many smaller often rounded leaves on the lateral branches; petiole $\frac{1}{2}$ in. *Spikes* 1–5 by $\frac{1}{2}$ in., terminal, lax; solitary bractless flowers often scattered in the distant lower axils; bracts $\frac{1}{2}$ in. diam., often subpatent, very variable in indumentum; bracteoles $\frac{1}{2}$ in., obovate-oblong, or often 0. *Sepals* $\frac{1}{2}$ – $\frac{1}{2}$ in., linear, pubescent or glabrous. *Capsule* $\frac{1}{2}$ in., nearly glabrous short-stalked, 4-seeded. *Seeds* hispid with ovate acute scales.—Perhaps not

distinct from the next. T. Anderson regards the presence of scattered solitary flowers in the lower axils as of specific importance, and has deviated from the results of the older botanists accordingly.

18. **J. tranquebariensis**, *Linn. f. Suppl.* 85; very woody, leaves $\frac{1}{8}$ – $\frac{1}{2}$ in. orbicular or obovate puberulous or pubescent, bracts ovate or orbicular puberulous or pubescent, corolla $\frac{1}{2}$ in. *Wall. Cat.* 2462; *T. Anders. in Journ. Linn. Soc.* ix. 513, partly. *Gendarussa tranquebariensis*, *Nees in Wall. Pl. As. Rar.* iii. 105; *Wight Ill.* t. 164 b, fig. 8, and *Id.* t. 462. *Adhatoda tranquebariensis*, *Nees in DC. Prodr.* xi. 399.

S. MADRAS and CEYLON, especially on hot dry low hills, frequent; *Wight, &c.*

A low, intricate undershrub; nodes very short. Inflorescence, corolla, capsule and seeds as of *J. glauca*.—Wight's figure represents a more diffuse plant with leaves considerably larger than in any of the specimens; it is a form intermediate between *J. glauca* & *tranquebariensis* as here understood; Col. Beddome believes these two not specifically distinct.

19. **J. salsoloides**, *T. Anders. in Journ. Linn. Soc.* ix. 514; branches softly white-hairy, leaves small spatulate or oblong subglabrous, bracts elliptic or oblong, corolla $\frac{1}{4}$ – $\frac{1}{3}$ in. densely white-hairy.

CARNATIC and MYSORE; *Wight, G. Thomson.*

A rigid, much-branched, small undershrub; branches densely shortly hairy. *Leaves* sessile, $\frac{1}{2}$ – $\frac{3}{4}$ in., obtuse. *Spikes* terminal, few-fl., with scattered solitary, often ebracteate flowers in the axils below; bracts $\frac{1}{4}$ by $\frac{1}{2}$ in.; bracteoles similar, smaller, or often 0. *Sepals* $\frac{1}{6}$ in., linear-lanceolate, pubescent. Lower *anther-cell* tailed. *Capsule* $\frac{1}{2}$ in., clavate, densely pubescent (T. Anderson).—Easily separated from *J. trinervis* (and its Var. *arenaria*) by the white-furred branches and narrower non-marginate bracts.

Sect. 3. **Calophanoides**. *Flowers* axillary, solitary clustered or in dense cymes, without a terminal spike or panicle. *Calyx* sub-5-partite. *Corolla* small. *Seeds* subtubercular or verrucose, not hispid.

* *Bracts* obovate or spatulate (all perhaps var. of one).

20. **J. quadrifaria**, *Wall. Cat.* 2479; leaves shortly petioled elliptic acute at both ends puberulous on the nerves beneath, flowers in close axillary clusters, corolla $\frac{1}{4}$ – $\frac{1}{3}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 514, partly. *Gendarussa quadrifaria*, *Nees in Wall. Pl. As. Rar.* iii. 105. *Adhatoda quadrifaria*, *Nees in DC. Prodr.* xi. 396.

KHASIA and JAINTIA MTS., alt. 3000 ft.; *Wallich, &c.* ASSAM; *Griffith* (*Kew Distrib.* n. 6188).—DISTRIB. S. China.

Branches 2 ft., little divided, rusty-pubescent. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., drying black, not or obscurely lineolate; petiole $\frac{1}{2}$ in. *Flowers* 1–5-nate; bracts $\frac{1}{2}$ in., spatulate, orbicular or emarginate, very rusty-pubescent; bracteoles similar, smaller, or 0. *Sepals* $\frac{1}{4}$ in. and upwards, linear-lanceolate, lineolate, puberulous. *Corolla* hairy, white rose-spotted. Lower *anther-cell* white-tailed. *Capsule* $\frac{1}{4}$ in., minutely pubescent, 4-seeded; solid pedicel very short. *Seeds* tubercular, verrucose, glabrous.

21. **J. Zollingeriana**, *Clarke*; leaves shortly petioled oblong acuminate at both ends nearly glabrous, flowers in close axillary clusters, corolla $\frac{1}{4}$ – $\frac{1}{2}$ in. *J. quadrifaria*, *T. Anders. in Journ. Linn. Soc.* ix. 514, partly. *Adhatoda Zollingeriana*, *Nees in DC. Prodr.* xi. 396.

TENASSERIM; *Beddome*.—DISTRIB. JAVA.

Resembling *J. quadrifaria*, but much more glabrous. *Branches* minutely pubes-

cent. *Leaves* 4 by 1 in.; nerves conspicuous. *Bracts* $\frac{1}{2}$ in., spatulate, orbicular, subglabrous. *Corolla* subglabrous.

22. **J. salicifolia**, *T. Anders. in Journ. Linn. Soc.* ix. 514; leaves subpetioled lanceolate acuminate at both ends glabrous or pubescent, flowers in close axillary clusters, corolla $\frac{1}{2}$ in. minutely hairy.—*Adhatoda* sp. n. 20, *Herb. Ind. Or. H. f. & T.*

N. KHASIA MTS., alt. 3-5000 ft.; Borpani and Shillong, *H. f. & T.*, &c.

Leaves $2\frac{1}{2}$ by $\frac{1}{2}$ in.; petiole $\frac{1}{12}$ in. *Bracts* $\frac{1}{4}$ in., spatulate, orbicular, glabrous or sparsely pubescent.

23. **J. Neesiana**, *Wall.*; *T. Anders. in Journ. Linn. Soc.* ix. 513; leaves linear-lanceolate glabrous, flowers in close axillary clusters, corolla $\frac{1}{4}$ in. Gendarussa *Neesiana*, *Wall. Cat.* 7175; *Nees in Wall. Pl. As. Rur.* iii. 105. *Adhatoda Neesiana*, *Nees in DC. Prodr.* xi. 397.

KHASIA MTS.; *Wallich.*

A small undershrub; internodes very short. *Leaves* $1\frac{1}{2}$ by $\frac{1}{4}$ in.; petiole hardly any. *Bracts* as in the 3 preceding species, which differ from the present by their diffuse habit and elongate internodes.

**** Bracts lanceolate or linear-lanceolate.**

24. **J. flava**, *Kurz in Journ. As. Soc.* 1873, pt. ii. 97; subglabrous, leaves ovate or ovate acuminate; cymes small axillary densely subcapitate subglabrous, corolla $\frac{1}{3}$ – $\frac{1}{2}$ in. pubescent yellow.

TENASSERIM; *Beddome*; Martaban (fide *Kurz*).

A herb, 2-3 ft., erect (*Kurz*). *Leaves* 4-6 in., acuminate at both ends, nerves prominent; petiole $\frac{1}{4}$ in. *Cymes* forming axillary heads $1\frac{1}{4}$ in. diam.; bracts and bracteoles small, linear, glabrous. *Sepals* 5, $\frac{1}{4}$ – $\frac{1}{2}$ in., linear-lanceolate, caudate, glabrous. Lower *anther-cell* distinctly white-tailed. *Capsule* $\frac{1}{2}$ in., clavate, glabrous, 4-seeded; seeds minutely rugulose (*Kurz*).—No specimen of *Kurz's* plant has been seen, but his description fits very satisfactorily *Beddome's* *Herb. Prop.* n. 84.

25. **J. Brandisii**, *T. Anders. in Journ. Linn. Soc.* ix. 514; leaves ovate acute pubescent on the nerves beneath, flowers sessile or sometimes aggregated on a very short peduncle, corolla pubescent tube short.

BURMA; Mt. Toungoo, *Brandis*, and Karen Hills, *Masson* (fide *T. Anderson*).

An undershrub, 1-2 ft.; stem terete, glabrous. *Leaves* scabrous above, puberulous beneath, decurrent into the petiole; nerves prominent, approximate. *Bracts* and bracteoles small, subulate. *Sepals* 5, equal, $\frac{1}{2}$ in., subulate, hoary pubescent. Lower *anther-cell* long-tailed. *Ovary* 4-ovulate (*T. Anderson*).—Not seen. *Anderson* places it in a section with "flowers axillary solitary or 2 or 3 together," along with *J. salicifolia* & *quadrifaria*. Nevertheless it may be *J. flaccida*, *Kurz*, of the Section *Gendarussa*.

26. **J. heterocarpa**, *T. Anders. in Journ. Linn. Soc.* vii. 41; leaves petioled ovate minutely lineolate subglabrous, flowers minute in small axillary clusters, capsules of 2 kinds in nearly every axil. abnormal winged crested 1-seeded. *Harnieria dimorphocarpa*, *Solms in Schweinf. Æthiop.* 110.

WESTERN INDIA; Deesa (Goojerat) and Kurrachee (Scinde), *Stocks*; Ferozepore (Punjab), *Vicary*.—DISTRIB. Abyssinia.

A herb, 8-12 in., minutely grey-pubescent. *Leaves* 1 by $\frac{1}{2}$ in.; petiole $\frac{1}{2}$ in. *Flowers* 1-4-nate, closely axillary; bracts and bracteoles small, linear. *Calyx* sub-5-partite; segments $\frac{1}{2}$ in., linear, minutely pubescent. *Corolla* $\frac{1}{2}$ in., upper lip shortly 2-lobed, lower transversely marked shortly 3-lobed. *Anther-cells* ovate; lower white-tailed.

Normal capsule $\frac{1}{8}$ – $\frac{1}{4}$ in., ellipsoid, acute at each end, hardly stalked, pubescent, 4-seeded. *Seeds* papillose, subhispid; abnormal 1-celled, 1-seeded capsules occur $\frac{1}{2}$ in., ellipsoid with 3–6 vertical crested wings, with seed ovoid, larger than in the normal, nearly smooth, on a nearly basal retinaculum.—The examples collected far apart show the heterocarpous capsules to be characteristic, not monstrous. The species is not nearly allied to any other; but as the inflorescence is axillary and the calyx 5-merous, it has been moved here so as to fortify the characters of the section *Rostellaria*.

Sect. 4. **Gendarussa.** *Spikes* terminal and on short lateral branches (in *J. Hookeriana* axillary), interrupted; terminal often large, paniculate; bracts mostly narrow, lower rarely imbricate. *Calyx* sub-5-partite. *Flowers* small or middle-sized. *Seeds* (where known) verrucose or tubercular, glabrous, not glochidiate nor hispid.

27. **J. Gendarussa**, *Linn. f. Suppl.* 85; leaves short-petioled lanceolate glabrous, spikes puberulous or glabrous, bracts linear shorter than the calyx, corolla $\frac{1}{2}$ in. *Jacq. Ecl.* t. 11; *Burm. Fl. Ind.* 10; *Roxb. Fl. Ind.* i. 128; *Blume Bijd.* 785; *Wall. Cat.* 2442; *Bot. Reg.* t. 635; *Blanco Fl. Fil.* 14; *Dalz. & Gibs. Bomb. Fl. Suppl.* 71; *T. Anders. in Journ. Linn. Soc.* ix. 513; *Kurz For. Fl.* ii. 247. *Gendarussa vulgaris*, *Nees in Wall. Pl. As. Rar.* iii. 104, and in *DC. Prodr.* xi. 410; *Wight Ic.* t. 468; *Decne. in Nouv. Ann. Mus. d'Hist. Nat.* iii. 382.—*Rumph. Herb. Amb.* iv. t. 28. *Rheede Hort. Mal.* ix. t. 42.

Throughout INDIA, from Bengal to Ceylon and Malacca, often an escape from cultivation.—DISTRIB. Malaya and China to the Philippines (? wild).

Stems 2–4 ft., erect. *Leaves* 4 by $\frac{3}{4}$ in.; petiole $\frac{1}{2}$ in. *Spikes* 2–5 by $\frac{3}{4}$ in., terminal often forming a panicle; flowers clustered, lower clusters usually distant; bracts $\frac{1}{2}$ in. *Sepals* $\frac{1}{2}$ in. *Corolla* nearly glabrous, white or rose with purple spots. Lower anther-cell distinctly tailed. *Capsule* $\frac{1}{2}$ in., clavate, glabrous, 4-seeded.—No capsule has been seen except on an example of Wight's; and that does not suffice for a description of the seed. This commonly cultivated plant is considered by Nees and T. Anderson wild in various parts of India, but the rarity of the seeds renders this doubtful. Col. Beddome says "wild on Mooleyit in Tenasserim."

28. **J. Hookeriana**, *T. Anders. in Thwaites Enum.* 233, and in *Journ. Linn. Soc.* ix. 513; leaves short petioled lanceolate glabrous, spikes simple or compound all axillary lax nearly glabrous, bracts linear or linear-spathulate mostly shorter than the calyx, corolla $\frac{1}{3}$ – $\frac{1}{2}$ in. *Bedd. Ic. Pl. Ind. Or.* t. 268. *Adhatoda Hookeriana*, *Nees in DC. Prodr.* xi. 403. *Leptostachya zeylanica*, *Nees l. c.* 379.

CEYLON; *Macrae, Walker, &c.*

An undershrub, less erect, more branched than *J. Gendarussa*. *Leaves* as of *J. Gendarussa*. *Spikes* 2–7 in., simple or paniculate; flowers distant, solitary or opposite; bracts $\frac{1}{2}$ in., linear, rarely spatulate; bracteoles $\frac{1}{2}$ in., linear, or 0. *Flowers* nearly as of *J. Gendarussa*. *Capsule* $\frac{1}{2}$ in., clavate, 4-seeded. *Seeds* verrucose, glabrous.—Beddome figures the inflorescence terminal, but in the examples the uppermost axils are sterile, many lower axils with spikes.

29. **J. decussata**, *Roxb. Hort. Beng.* 4, and *Fl. Ind. ed. Carey & Wall.* i. 128; leaves ovate or obovate pubescent or glabrate, panicle terminal large divaricate pubescent, flowers in distant clusters, corolla $\frac{1}{3}$ – $\frac{1}{2}$ in. pubescent. *Wall. Cat.* 2476; *T. Anders. in Journ. Linn. Soc.* ix. 515. *Gendarussa decussata*, *Nees in Wall. Pl. As. Rar.* iii. 104. *Adhatoda decussata*, *Nees in DC. Prodr.* xi. 408.

PEGU and TENASSERIM, frequent; *Wallich, Griffith, &c.*

A shrub, 3-6 ft.; branches pubescent upwards. *Leaves* (upper cauline alone seen) 6-10 by 3-6 in., petioled ovate, or sessile spatulate-obovate, base auricled, punctulate, puberulous at least when young. *Panicles* 12-20 in. long and broad; branches long, subsimple, often recurved in fruit; clusters 2-8-fl., pubescent, lower often 1-3 in. apart; bracts $\frac{1}{2}$ in., linear-lanceolate, but the clusters are often supported by reduced leaves $\frac{1}{2}$ -1 in.; bracteoles $\frac{1}{2}$ in., linear, often 0. *Sepals* $\frac{1}{2}$ - $\frac{3}{4}$ in., linear-lanceolate, pubescent. Lower *anther-cell* distinctly white-tailed. *Capsule* $\frac{3}{4}$ in., long-stalked, pubescent, 4-seeded. *Seeds* verrucose, glabrous.

30. **J. Helferi**, *Clarke*; leaves petioled elliptic acute at both ends glabrous, panicle terminal of 3 erect spikes, clusters of flowers distant pubescent, corolla $\frac{1}{2}$ in. pubescent.

TENASSEM OR ANDAMANS; *Helfer* (Kew Distrib. n. 6185).

Branch woody, terete, glabrous. Upper *leaves* $5\frac{1}{2}$ by 2 in., minutely lineolate on both surfaces; petiole $\frac{1}{2}$ in. *Panicle* 3 in. diam., trichotomous, sparingly pubescent; lateral spikes curved, ascending; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., linear-lanceolate, pubescent. *Calyx* and *corolla* as of *J. decussata*, but rather smaller.—This may be a small var. of *J. decussata*, as the example is poor; but the leaves do not match, and the curved ascending spikes are very unlike the habit of *J. decussata*.

31. **J. flaccida**, *Kurz in Journ. As. Soc.* 1870, ii. 80, and in *Flora* 1870, 364; leaves large sessile spatulate-elliptic nearly glabrous, panicles terminal very lax, flowers distant rarely clustered, corolla $\frac{3}{4}$ in. nearly glabrous pale yellow or testaceous (*Kurz*).—*Adhatoda* n. 19, *Herb. Ind. Or. H. f. & T.*

PEGU; *M'Lelland, Kurz, Brandis.*

Annual, 1-2 ft., erect. *Leaves* opposite and ternate, 7-12 in., acuminate, lineolate above; petiole winged to the base, there often auriculate. *Panicle* often 12 in. long and broad, very thin flaccid, nearly glabrous; flowers opposite or alternate, lower often 1 in. apart; bracts hardly $\frac{1}{2}$ in., linear-lanceolate. *Sepals* $\frac{1}{2}$ in., linear-lanceolate, puberulous or glabrate. *Corolla* slender. Lower *anther-cell* white-tailed. *Capsule* $\frac{3}{4}$ in., long-stalked, thinly pubescent, 4-seeded.

32. **J. wynaadensis**, *Wall. Cat.* 2474; leaves petioled elliptic acuminate at both ends pubescent or glabrous, spikes simple or compound axillary and terminal pubescent interrupted, flowers solitary opposite, bracts linear-lanceolate shorter than the calyx, corolla $\frac{1}{2}$ - $\frac{3}{4}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 515. *J. lineata*, *Wall. Cat.* 2486, *second sheet*. *Gendarussa wynaadensis*, *Nees in Wall. Pl. As. Rar.* iii. 104. *Adhatoda wynaadensis*, *Nees in DC. Prodr.* xi. 406; *Dalz. & Gibs. Bomb. Fl.* 194; *Wight Ic.* t. 1545.

S. DECCAN PENINSULA, alt. 1-3000 ft.; Wynaad, Belgaum, Ooorg, &c., *Wight, Ritchie, &c.*

Branches elongate, terete, glabrescent; internodes long. *Leaves* $4\frac{1}{2}$ by 2 in., pubescent beneath or glabrous; petiole $\frac{3}{4}$ in. *Spikes* 2-4 in., somewhat dense in flower, elongate interrupted in fruit; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in.; bracteoles $\frac{1}{2}$ in., linear. *Sepals* $\frac{1}{2}$ in., linear, very pubescent. *Corolla* pubescent, purple. Lower *anther-cell* white-tailed. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in., very pubescent, clavate, 4-seeded. *Seeds* verrucose, glabrous.—Very variable in indumentum; *Wight's* type, from the Nilgubberies' base, has the leaves very pubescent beneath, and has been marked *Rhaphidospora* sp. by *T. Anderson*. *Dalzell's* specimens have the leaves glabrous beneath.

33. **J. vasculosa**, *Wall. Cat.* 2469; leaves ovate attenuate at both ends minutely crisped pubescent on the midrib beneath, flowers solitary opposite, corolla $\frac{1}{2}$ - $\frac{3}{4}$ in. upper lip oblong entire lower pendent. *T. Anders. in Journ. Linn. Soc.* ix. 515. *Ruellia rivinaefolia*, *Wall. Cat.* 2413. Gen-

darussa vasculosa, *Nees in Wall. Pl. As. Rar.* iii. 104. *Adhatoda vasculosa*, *Nees in DC. Prodr.* xi. 407.

E. HIMALAYA and KHASIA MTS., alt. 2-5000 ft., common; *Wallich, H. f. & T.*, &c.

Rootstock perennial; branches 8-20 in., glabrous except at the tip. *Leaves* 5 by 2 in., punctulate above; petiole $\frac{3}{4}$ in. *Spikes* 1-4 in., axillary and terminal, simple or paniculate, pubescent; bracts oblong or linear, mostly shorter than the calyx, pubescent; bracteoles similar to the bracts, but smaller. *Calyx* sub-5-partite; segments $\frac{1}{2}$ in., lanceolate. *Corolla* pubescent, yellowish slightly pink-spotted; tube cylindric; upper lip hardly broader than one of the three lobes of the lower. *Anther-cells* divaricate, lower with a minute white appendage at the base. *Ovary* glabrous; style pubescent in the lower part. *Capsule* not seen, the abundant specimens all being in flower.—T. Anderson places this in *Raphidospora*, and in the absence of the seed it is impossible to prove he is wrong; but in the Sect. *Raphidospora*, the flowers are "laxly panicled," as T. Anderson says.

VAR. ? *Parishii*; leaves glabrous, upper lip of corolla ovate $\frac{1}{2}$ in. broad lower erect-patent.—Moulmein; *Parish, n.* 417. Tenasserim, Mooleyit; *Beddome, n.* 86. —This may be specifically distinct.

VAR. *Brandisi*; bracts (even in the upper part of the spikes) exceeding $\frac{1}{4}$ in. elliptic-acuminate.—Pegu; Sitang, *Brandis*.—*Capsule* $\frac{1}{2}$ in., narrowly cylindric, clavate, very hairy. *Seeds* roughly verrucose, glabrous.

34. **J. andrographioides**, *Clarke*; leaves ovate acuminate glabrous base rhomboid or rounded, flowers solitary opposite, corolla $\frac{1}{2}$ in. both lips erect-patent.

TENASSERIM; Mooleyit, *Beddome*.

Closely resembling *J. vasculosa*, both in leaves and inflorescence, but the corolla as of *Andrographis*. *Leaves* 3 by 1 in. *Spikes* (all seen) solitary, terminal, simple, pubescent; bracts small linear, or the lower $\frac{1}{2}$ in., linear-spatulate. Lower *anther-cell* with a microscopically small white spur.

35. **J. ptychostoma**, *Wall. Cat.* 2478; leaves ovate acuminate at both ends minutely pubescent on the nerves beneath, spikes axillary linear dense nearly glabrous, bracts minute, corolla $\frac{1}{4}$ - $\frac{1}{2}$ in. *T. Anders., in Journ. Linn. Soc.* ix. 517? *Gendarussa*? *sumatrana, Mig. Fl. Ind. Bat.* ii. 832.

PENANG; *Wallich*.—DISTRIB. Sumatra.

Wallich's imperfect example is perhaps the same as *J. vasculosa* var. *Parishii* above. *Branches* slender, with long internodes, glabrous. *Leaves* 6 by 2½ in., nearly glabrous, closely lineolate above; petiole 1½ in. *Spikes* 3½ by $\frac{1}{4}$ in., those seen all axillary, but there may have been also terminal spikes; bracts $\frac{1}{20}$ in., ovate or lanceolate; bracteoles $\frac{1}{10}$ in., linear-lanceolate. *Sepals* $\frac{1}{8}$ in.—*J. ptychostoma, Nees in Wall. Pl. As. Rar.* iii. 108 (*Rhytiglossa*? *ptychostoma, Nees in DC. Prodr.* xi. 337), is founded on this *Wallichian* number, but the description of the bracts is so different from the example that there must have been some confusion.

36. **J. Maingayi**, *Clarke*; leaves ovate-lanceolate or narrowly lanceolate minutely pubescent on both surfaces, flowers solitary mostly alternate, corolla $\frac{1}{2}$ in.

PENANG; *Maingay* (*Kew Distrib. n.* 1181).

A small shrub (*Maingay*); branches elongate, slender, glabrous except at the tips. *Leaves* 4 by $\frac{1}{2}$ -1 in., very variable in breadth on the same branch, base cuneate; petiole $\frac{1}{2}$ in. *Spikes* axillary and terminal, simple or divided, 2-3 in., slender, lax, pubescent; lower flowers distant, mostly alternate; bracts $\frac{1}{8}$ in., linear-lanceolate, pubescent. *Calyx* and *corolla* nearly as of *J. vasculosa*, but upper corolla-lip ovate, broader. *Capsule* $\frac{1}{2}$ in., stalk solidified.—The line between the small *Justicias* of this section and *Dianthera* is artificial, and the present species has quite the habit of others which have been removed by Bentham (in *Herb. Kew*) to *Dianthera*. It is

retained in *Justicia* because the white tail of the lower anther-cell, though small, is yet larger than in *J. vasculosa*, a species retained by name in *Justicia* by Bentham. —These small *Justicias* (*J. vasculosa*, *Mainayi*, &c.) form with *Dianthera collina*, &c., a very natural group; but they cannot be kept together unless we pull the Acanthaceæ all to pieces, and abolish anther-tails from the generic characters (which will be done some day).

37. **J. flagelliformis**, *Clarke*; leaves ovate attenuate at both ends minutely crisped pubescent on the midrib beneath, spikes linear, bracts and bracteoles lanceolate longer than the calyx, corolla $\frac{1}{2}$ in.

TENASSERIM or ANDAMANS; *Helper* (Kew Distrib. n. 6172).

Branches elongate slender, glabrous except at the tips. *Leaves* 5 by 2 in., punctulate above; petiole $\frac{2}{3}$ in. or frequently 0. *Spikes* 1-3, terminal, 3-5 by $\frac{1}{4}$ in., wavy, subinterrupted below; bracts $\frac{1}{4}$ - $\frac{1}{2}$ by $\frac{1}{10}$ in., green, minutely pubescent; bracteoles nearly as long, narrower, subfalcate. *Calyx* sub-5-partite; segments $\frac{1}{2}$ in., linear pubescent. *Corolla* nearly as of *J. vasculosa*; upper lip ovate subentire. Lower *anther-cell* white-tailed. *Capsule* $\frac{1}{2}$ in., clavate. —The leaves closely resemble those of *J. vasculosa*, but the narrow subimbricate bracts are altogether different.

38. **J. grossa**, *Clarke*; leaves petioled large ovate glabrous, spikes terminal solitary linear pubescent, bracts elliptic or oblong often as long as the calyx, corolla $\frac{1}{2}$ in.

MERGUI; *Griffith*.

Branches glabrous, with numerous large leaves near the tips. *Leaves* 8-10 by 4 in., acute, base rhomboid or obtuse; petiole 1 in. *Spike* 5 in., subsessile, interrupted below; bracts $\frac{1}{4}$ - $\frac{1}{2}$ in., puberulous. *Sepals* $\frac{1}{2}$ in., linear-lanceolate. *Anther-cells* subparallel, slightly divaricate at the base, one somewhat lower, both white-tailed at the base. *Ovary* glabrous, 4-ovulate; style minutely hairy below; stigma minute, subsimple. *Capsule* not seen. —This plant has been named by Nees *Phlogacanthus asperulus*, together with many others which he did not recognize. Wight marked it "*Hemichoriste*?" and this is probably its true affinity, though its small flowers are opposed to it. It is nearly allied to *J. flagelliformis*.

39. **J. boerhaaviæfolia**, *T. Anders. in Journ. Linn. Soc.* ix. 517; leaves petioled ovate-lanceolate uppermost sessile cordate, spikes $\frac{1}{2}$ in. second on filiform dichotomous terminal branches, bracts subulate narrowly white-margined, corolla $\frac{1}{2}$ in. purple in the throat.

TENASSERIM; Amherst, *Falconer* (fide T. Anderson).

A weedy herb; stem diffuse, terete, glabrous. *Cauline leaves* long-petioled, 2-5 in. long (petiole included); upper and floral leaves $\frac{1}{2}$ -1 $\frac{1}{2}$ by $\frac{1}{4}$ - $\frac{1}{2}$ in.; all glabrous above, glaucous beneath. *Corolla* 2-lipped, glabrous, with 2 lines of recurved hairs in the throat. Upper *anthers* small, sterile. *Capsule* $\frac{1}{8}$ - $\frac{1}{6}$ in., compressed, sterile part very short (T. Anderson). —Anderson was seldom wrong in generic determinations, but his description suggests that this is a *Rungia*.

Sect. 5. **Rhaphidospora**. *Flowers* laxly paniced. *Bracts* small linear or linear-lanceolate. *Seeds* retrorsely hispid.

40. **J. glabra**, *Koen.; Roxb. Hort. Beng.* 4, and *Fl. Ind. ed. Carey & Wall.* i. 132; leaves petioled ovate acute puberulous on the nerves or glabrate, cymes axillary and terminal, corolla $\frac{1}{4}$ in. *Wall. Cat.* 2455; *T. Anders. in Journ. Linn. Soc.* ix. 516. *J. Careyana*, *Wall. Cat.* 2456. *Rhaphidospora glabra*, *Nees in Wall. Pl. As. Rar.* iii. 115, and in *DC. Prodr.* xi. 499; *Wight Ic.* t. 1554.

S. DECCAN PENINSULA; *Roxburgh, Wight.* CEYLON; *Walker, &c.* —DISTRIB. Java.

An erect, branched herb. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$ in. (in one example $4\frac{1}{2}$ by 1 in.), base attenuate or rounded; petiole $\frac{1}{2}$ – $1\frac{1}{2}$ in. Axillary *peduncles* numerous, $\frac{1}{2}$ – $1\frac{1}{2}$ in., divaricate; pedicels $0\frac{1}{4}$ in., puberulous or pubescent; bracts and bracteoles minute. *Calyx-segments* scarcely $\frac{1}{2}$ in., narrow, pubescent. *Corolla* upper lip erect, emarginate, lower pendent or reflexed. Lower *anther-cell* distinctly white-tailed. *Capsule* $\frac{1}{2}$ in.; seed-bearing part subquadrate ellipsoid suddenly narrowed into the linear-cylindric pedicel.

41. **J. pubigera**, *Wall. Cat.* 2490; leaves short-petioled ovate lanceolate hairy on both surfaces, cymes axillary trichotomous, corolla $\frac{3}{4}$ in. *J. Edgeworthii*, *T. Anders. in Journ. Linn. Soc.* ix. 516. *Peristrophe pubigera*, *Nees in Wall. Pl. As. Rar.* iii. 114, and in *DC. Prodr.* xi. 498. *Rhaphidospora ciliata*, *Nees l. c.* 500.

TEMPERATE N.W. HIMALAYA; Bhuddimath (Kumaon), *Wallich, Royle*; Simla, *Madden*; Gangotri, alt. 4500 ft., *Strachey & Winterbottom*; Mussoorie, alt. 7000 ft., *W. S. Atkinson*.

Stems herbaceous, erect, terete, hairy. *Leaves* $2\frac{3}{4}$ by $1\frac{1}{4}$ in., cuneate or rhomboid at the base; petiole $\frac{1}{2}$ in. *Cymes* axillary, 2–3 in., somewhat rigid, dense, ascending, hairy; bracts $\frac{1}{2}$ – $\frac{1}{2}$ in., linear; pedicels $0\frac{1}{2}$ in.; bracteoles 0 or minute. *Calyx* sub-5-partite; segments $\frac{1}{2}$ in., linear, pubescent. *Corolla* pubescent, purplish-red; lower lip $\frac{1}{2}$ in., pendent. Lower *anther-cell* distinctly white-tailed. *Capsule* $\frac{1}{2}$ in., linear-clavate, pubescent. *Seeds* unripe, probably glabrous, only slightly tubercular; in which case the species will not belong to Sect. *Rhaphidospora*. The inflorescence and corolla are exceedingly like *Peristrophe*; but the small bracts and distinct anther-tails do not suit.

Sect. 6. **Rostellularia** (Gen. Nees). *Spikes* terminal and axillary, cylindric or linear. *Bracts* and *bracteoles* narrowly lanceolate, usually about as long as the calyx. *Calyx* sub-4-partite (5th segment if sometimes present small), segments linear or linear-lanceolate. *Corolla* small. *Capsule* small, 4-seeded nearly from the base. *Seeds* subconcentrically tubercular or rugose or nearly smooth.—Small closely allied weeds, abundant in the tropics, all collected under 3 or 4 ill-defined species by T. Anderson. To facilitate their description it is necessary to arrange them in more species, or reduce them to vars. of one.

42. **J. micrantha**, *Wall. Cat.* 2449, partly; leaves ovate or elliptic, spikes short cylindric dense, sepals oblong scarious glabrous midrib green excurrent as a very hispid arista, seeds small concentrically rugose. *J. procumbens*, *Linn.*; *T. Anders. in Journ. Linn. Soc.* ix. 511, partly. *Rostellularia crinita*, *Nees in Wall. Pl. As. Rar.* iii. 101, and in *DC. Prodr.* xi. 373; *Dalz. & Gibs. Bomb. Fl.* 193.

DECCAN PENINSULA; *Wight*; Vingorla (S. Concan), *Dalzell*.

Stems much branched, minutely pubescent or hirsute. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$ in., mature subglabrous or sparsely setose; raphides numerous sunk on both surfaces; petiole $\frac{1}{2}$ in. *Spikes* $\frac{1}{2}$ – $1\frac{1}{2}$ in.; bracteoles $\frac{1}{2}$ in., sublinear. *Sepals* much wider than the bracteoles, nearly glabrous except the awns, hispid with many patent multicellular hairs. *Corolla* $\frac{1}{4}$ in., rose-purple. *Capsule* $\frac{1}{2}$ in., pubescent.—A strongly marked species, but it is difficult to settle the best name. *Wallich's* type sheet is mixed, and his name *micrantha* perhaps relates really to the small-fl. *J. procumbens* mixed thereon. As to the name *J. crinita*, that appears to relate chiefly to a mixture of *J. procumbens* var. *latispica* with *J. diffusa* var. *orbiculata*.

43. **J. quinqueangularis**, *Koen.*; *Roxb. Fl. Ind. ed. Carey & Wall.* i. 134; nearly glabrous, branches elongate, leaves linear or linear-lanceolate, spikes elongate $\frac{1}{2}$ in. broad, sepals linear-oblong tip obtuse herbaceous glabrous, capsule $\frac{1}{4}$ – $\frac{1}{2}$ in. stout. *Wall. Cat.* 2443, partly. *J. peploides*,

Var. **B angustifolia**, *T. Anders. in Journ. Linn. Soc. ix. 511 (excl. syn. J. Vahlil)*. *Rostellularia quinquangularis*, *Nees in Wall. Pl. As. Rar. iii. 101*, and in *DC. Prodr. xi. 375*.

CENTRAL INDIA, common; from W. Bengal and Agra to Belgaum.

Branches often 20 in., rigid, 4-5-angular, geniculate; internodes long. *Leaves* 3 by $\frac{1}{2}$ - $\frac{3}{4}$ in., glabrous, raphides obscure; petiole $0-\frac{1}{8}$ in., puberulous. *Spikes* 1-6 in.; lower flowers usually opposite solitary, calyx just reaching to the next pair; bracts $\frac{1}{4}$ in., linear-oblong, glabrous, scarious-margined; bracteoles similar, smaller. *Sepals* $\frac{1}{4}$ - $\frac{1}{2}$ in., hardly broader than the bracteoles. *Seeds* much larger than in the neighbouring species, slightly concentrically tubercular-rugose.—*J. Vahlil*, Roth, resembles this in the narrow leaves.

VAR. *peploides*; leaves oblong or ovate petiole often $\frac{1}{4}$ in., spikes shorter often subovate when young. *T. Anders. in Journ. Linn. Soc. ix. 511 (sp.)*; *Boiss. Fl. Orient. iv. 525*. *J. procumbens*, *Wall. Cat. 2441, partly*. *Rostellularia peploides*, *Nees in Wall. Pl. As. Rar. iii. 101*, and in *DC. Prodr. xi. 375*; *Dalz. & Gibs. Bomb. Fl. 193*.—Throughout the Gangetic Plain, from the Punjab to Bengal, and through Central India to the Concan. Distrib. Afghanistan.—Usually much more branched than the type, sometimes small 3-6 in. diam. This var. is very unlike the type in general aspect, and does not graduate into it; but the obtuse glabrous sepal-tips and large capsule and seeds agree closely.

44. **J. notha**, *Clarke*; stems simple glabrous, leaves sessile oblong white-setulose on the nerves beneath, bracts elliptic, sepals linear-oblong white-setulose upwards. *Rostellularia simplex*, *Wight Ic. t. 1542* (not *Justicia simplex*, D. Don).

INDIA?; *Herb. Wight*.

Stems 1 foot, slender, 4-5-angular. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ in., subobtusate at both ends, transversely lineolate glabrate above. *Spikes* 2 by $\frac{1}{2}$ in., terminal, solitary, dense; bracts $\frac{1}{4}$ by $\frac{1}{2}$ in., setulose-ciliate on margins and midrib, otherwise glabrous. *Corolla* $\frac{1}{2}$ in. *Capsule* $\frac{1}{2}$ in., ellipsoid.—*Wight* gives no locality for this; it is a well-characterized plant, and probably Malayan.

45. **J. khasiana**, *Clarke*; stems elongate hispid, leaves sessile oblong hispid on both surfaces, bracts linear-oblong hispid, sepals sublinear hispid.

KHASIA MTS., alt. 5000 ft., common; *Griffith, H. f. & T., &c.*

Stems $1\frac{1}{2}$ -3 ft., branched. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ in. *Spikes* 2-4 by $\frac{1}{2}$ in., hardly interrupted at the base, very hispid; bracts $\frac{1}{2}$ by $\frac{1}{16}$ - $\frac{1}{12}$ in. *Corolla* $\frac{1}{3}$ - $\frac{1}{2}$ in. *Capsule* $\frac{1}{2}$ in., ellipsoid. *Seeds* undulate obscurely rugose; testa minutely reticulated.—Nearly allied to *J. notha*, but differing in the indumentum and narrower bracts.

46. **J. assamica**, *Clarke*; leaves sessile narrowly obovate obtuse glabrous, bracts narrowly oblong minutely hispid, sepals narrowly lanceolate hispidulous.

ASSAM; *Griffith* (Kew Distrib. n. 6159).

Stems prostrate, copiously rooting; flowering branches 3-4 in., numerous, erect, 1-spicate. *Leaves* 1 by $\frac{1}{2}$ in., base long-cuneate; raphides sunk. *Spikes* 2 by $\frac{1}{2}$ in., continuous, somewhat dense; bracts $\frac{1}{8}$ by $\frac{1}{16}$ in., scarious-margined. *Corolla* nearly $\frac{1}{2}$ in. *Capsule* $\frac{1}{3}$ - $\frac{1}{6}$ in., ellipsoid.—In the sessile leaves, large corolla, and small capsule, this is allied to *J. notha* and *J. khasiana*.

47. **J. Royeniana**, *Clarke*; leaves subsessile linear-oblong obtuse glabrous, bracts and sepals linear-lanceolate acute glistening bristle-ciliate. *Rostellularia Royeniana*, *Nees in DC. Prodr. xi. 373*; *T. Anders. in Thwaites Enum. 234, partly*.

CEYLON; *Walker, Thwaites*.

Stems 10–15 in., procumbent, branched, glabrous. *Leaves* 2 by $\frac{1}{4}$ in., obtuse, transversely lineolate above; base long attenuate, petiole 0, or in some lower leaves short. *Spikes* $2\frac{1}{2}$ by $\frac{1}{2}$ in., subinterrupted at base, longer or shorter than the peduncle; bracts $\frac{1}{2}$ by $\frac{1}{10}$ – $\frac{1}{8}$ in., bracteoles $\frac{1}{4}$ in. *Sepals* $\frac{1}{4}$ – $\frac{1}{2}$ in., glistening ciliate on the margins and keel, otherwise glabrate. *Corolla* $\frac{1}{2}$ in. *Capsule* $\frac{1}{2}$ in.—Nearly allied to *J. notha*, differing principally in the glabrate leaves and very narrow bracts.

48. *J. diffusa*, Willd. *Sp. Pl.* i. 87; leaves petioled elliptic acuminate at both ends sparsely hairy, spikes slender sparsely hairy, bracts linear-lanceolate or linear mostly shorter than the calyx, sepals lanceolate acute minutely scabrous upwards. *Roth Nov. Sp.* 14; *Wall. Cat.* 2444; *T. Anders in Journ. Linn. Soc.* ix. 512. *J. procumbens*, Linn. partly; *Vahl Symb.* ii. 14; *Roxb. Fl. Ind.* i. 132. *Rostellularia diffusa*, Nees in *Wall. Pl. As. Rar.* iii. 100, and in *DC. Prodr.* xi. 371; *Dalz. & Gibs. Bomb. Fl.* 193 (several of these citations referring partly or mainly to plants here separately described as vars.).

KUMAON and PUNJAB TERAI; *Strachey & Winterbottom*, &c. DECCAN PENINSULA and CEYLON, plentiful; extending north to Chota Nagpore. RANGOON; *M'Lelland*.—DISTRIB. Siam.

Stems 1–2 ft., herbaceous, quadrangular, glabrous or minutely pubescent. *Leaves* (well developed) $3\frac{1}{2}$ by $1\frac{1}{4}$ in.; raphides large, sunk, on both surfaces; petiole $\frac{1}{4}$ in., pubescent. *Spikes* 1–7 by $\frac{1}{2}$ in.; lower flowers opposite, distant the length of the calyx; bracts $\frac{1}{2}$ in., narrowly or not scarious-margined, tip minutely scabrous; bracteoles $\frac{1}{10}$ – $\frac{1}{8}$ in., lanceolate. *Sepals* $\frac{1}{2}$ in., resembling the bracts. *Corolla* $\frac{1}{2}$ in. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in., glabrous. *Seeds* very nearly smooth, concentric rugosities remaining as obscure tubercles.

VAR. *prostrata*, Roxb. ms.; leaves smaller often obtuse or orbicular, bracts and sepals shorter broader rather more scabrous, capsule hairy.—Deccan Peninsula and Ceylon, common.—*Stems* prostrate, intricately branched, patently hairy. *Leaves* $\frac{1}{2}$ – $\frac{1}{3}$ in. diam. *Spikes* 1–2 by $\frac{1}{2}$ in.

VAR. *Vahlia*; leaves narrowly lanceolate or linear, bracts lanceolate white-margined, sepals lanceolate subacute tips minutely scabrous. *J. Vahlia*, *Roth Nov. Sp.* 14. *J. quinqueangularis*, *Wall. Cat.* 2443, type sheet and mainly. *J. Vahliana*, *Roem. & Sch. Syst. Mant.* i. 138. *Rostellularia Vahlia*, Nees in *Wall. Pl. As. Rar.* iii. 102, and in *DC. Prodr.* xi. 376, partly.—Deccan Peninsula and Ceylon, extending to Chota Nagpore, common.—It is vain to quote extensively synonymy for this plant, as the same specimen has been named differently by the highest authorities. The narrow-leaved forms have been, both by Nees and T. Anderson, mixed with *J. quinqueangularis*, which differs in the large capsule and seeds, and in the glabrous obtuse sepal-tips. In the linear-leaved forms the spikes, bracts and sepals are often as in *J. diffusa* var. *prostrata*. Connected by imperceptible gradations with *J. diffusa*, type.

VAR. *hedyotidifolia*; woody, leaves petioled ovate, spikes shortened dense, sepal-tips lengthened sometimes very ciliate. *J. hedyotidifolia*, *Wall. Cat.* 2450. *Rostellularia hedyotidifolia*, Nees in *Wall. Pl. As. Rar.* iii. 100, and in *DC. Prodr.* xi. 370; *Wight Ic.* t. 1540.—Mts. of S. India.—The extreme forms in Wight's herbarium are very woody and glabrous, with small black leaves; but there are herbaceous examples with larger more hairy leaves, even from the Nilgherries at 8000 ft. alt., which have been marked *J. hedyotidifolia* by Mr. Benthams, and which cannot be distinguished from *J. diffusa*, type.

VAR. *orbiculata*; leaves petioled ovate hairy specially beneath. *J. orbiculata*, *Wall. Cat.* 2489; *T. Anders. in Journ. Linn. Soc.* ix. 512, partly. *Rostellularia rotundifolia*, Nees in *Wall. Pl. As. Rar.* iii. 100, and in *DC. Prodr.* xi. 370.—Deccan Peninsula, northwards to Parasnath, *T. Anderson*. Distrib. Siam.—The examples are marked by Nees (doubtless on account of the pubescent or patently hairy stem) "*Rostellularia procumbens*, Var. β and γ ," but the same thing is marked by T. Anderson "*hedyotidifolia*," which is the true affinity. Most of the examples marked *orbiculata* by Nees and T. Anderson are *J. simplex*, D. Don.

49. **J. simplex**, *Don Prodr.* 118 (not *Rostellularia simplex*, Wight); leaves petioled ovate hairy or oblong, spikes cylindric dense hairy, bracts elliptic shortly acute scarious-marginate, sepals lanceolate acute hairy nearly to their base. *J. orbiculata*, *T. Anders. in Journ. Linn. Soc.* ix. 512, partly. *J. mollissima*, *Wall. Cat.* 2445. *J. procumbens*, *Wall. Cat.* 2441, partly; *T. Anders. in Journ. Linn. Soc.* vii. 40, not of *Linn.* *Rostellularia rotundifolia* & *mollissima*, *Nees in Wall. Pl. As. Rar.* iii. 100, 101, and in *DC. Prodr.* xi. 370, 373, partly. *R. abyssinica*, *Brongn.*, and *glandulosa*, *Nees in DC. Prodr.* xi. 372, 373.

WESTERN INDIA, alt. 2-5000 ft., in the hills, common; from Kashmir, Scinde Hills (*Stocks*), Nepal (*Wallich*), to the Nilgherries. Abundant in CENTRAL INDIA and CHOTA NAGPORE.—DISTRIB. Abyssinia, Malaya to the Loochoo Isles.

Herbaceous, hairy, branched; branches sometimes long as in *Wallich's* Nepal examples, whence *D. Don* took his unfortunate name. *Spikes* much broader and more hairy than in any var. of *J. diffusa*. *Bracts* usually as long as the calyx, green-keled, very hairy with glistening many-jointed tawny or whiteish hairs.—Near *J. procumbens*, differing in its bracts; it is very uniform to its character, but the synonymy is uncertain, as the abundant examples are marked "*crinita*, *peplodes*," &c., and the Abyssinian examples have several names.

VAR. *serpyllifolia*, *Benth. ms. in Hohenack.* n. 571; very small, leaves spikes bracts and flowers smaller.—Throughout the Deccan from Chota Nagpore to S. Madras, frequent.—*Leaves* $\frac{1}{2}$ in. diam., elliptic or round, obtuse or subacute. *Spikes* 1 by $\frac{1}{2}$ in.; bracts $\frac{1}{8}$ – $\frac{1}{2}$ in., elliptic or broadly lanceolate, fulvous-hirsute.—Regarded by *Benth* as a var. of *J. procumbens*, *Linn.*

50. **J. procumbens**, *Linn. Fl. Zeyl.* 19; leaves petioled elliptic or lanceolate hairy or glabrate, spikes cylindric dense hirsute, bracts linear-lanceolate acute, sepals sublinear acute hirsute nearly their whole length. *Roxb. Fl. Ind.* i. 132, partly; *Wall. Cat.* 2441, partly; *T. Anders. in Journ. Linn. Soc.* ix. 511, partly; *Benth. Fl. Austral.* iv. 549, with *Australian syn.* *J. micrantha*, *Wall. Cat.* 2449, chiefly. *J. hirtella*, *Wall. Cat.* 2448. *Rostellularia procumbens*, *Nees in Wall. Pl. As. Rar.* iii. 101, and in *DC. Prodr.* xi. 371, partly (excl. all Himalayan examples); *Dalz. & Gibs. Bomb. Fl.* 193. *R. adenostachya*, *Nees in Wall. Pl. As. Rar.* iii. 101, and in *DC. Prodr.* xi. 373.

S. DECCAN PENINSULA with CEYLON, frequent; extending north to the S. Concan.—DISTRIB. Malaya, Australia.—Separated from *J. simplex* by the narrower bracts; a character which at all events suits the geography better than the distinctions put forward by *Nees*, and accepted by *T. Anderson*.

VAR. *latispica*, *Clarke*; stouter, spikes larger, bracts and corolla longer. *Rostellularia procumbens*, *Wight Ic.* t. 1539. *R. mollissima*, *Nees in DC. Prodr.* xi. 373, partly.—Mts. of S. India and Ceylon, common. Khasia Mts. and adjacent parts of Assam, frequent. Pegu and Tenasserim.—*Bracts* $\frac{3}{4}$ – $1\frac{1}{2}$ by $\frac{1}{20}$ in., hispid-ciliate. *Corolla* $\frac{1}{2}$ – $\frac{1}{2}$ in. *Capsule* $\frac{1}{8}$ – $\frac{1}{4}$ in.—The type of this var. is *Wight Ic.* t. 1539 (excellent), which shows the narrow bracts very correctly, and represents the common Nilgherry form: from this the Khasian and Malayan forms cannot be distinguished. In Ceylon a larger, more woody form is frequent; this is marked by *Nees R. procumbens* & *grandiflora*. The objection to calling this plant *mollissima* is that the type of *J. mollissima* (and *J. orbiculata*) was the round-leaved hairy Var. *vestita* of *J. diffusa*.

SPECIES NOT SEEN.

J. BIFLORA, *Fahl Symb.* ii. 9; leaves ovate, peduncles axillary 2-fld. as long as the leaves, bracts subulate. *Nees in DC. Prodr.* xi. 428.

INDIA; *Schumacher*.

A branched undershrub. *Leaves* 1 in., but little attenuate, base acute, very glabrous; petiole lax, lower as long as the leaves. *Peduncles* filiform; 2 petioled

bracts at the base of the unequal pedicels, oblong, acute; floral bracts 3 under each calyx, unequal; 2 subulate, the third ovate. *Calyx* 5-partite (Vahl).

J. MORETIANA, *Vahl Enum.* i. 162; leaves lanceolate, flowers solitary axillary and in a short bracteated terminal spike, calyx 5-toothed half the way down, corolla $\frac{1}{2}$ in. 2-lipped, capsule $\frac{1}{2}$ in. 4-seeded. *Nees in DC. Prodr.* xi. 428.—*Burm. Thes. Zeyl.* t. 3, fig. 1.

CEYLON; *Burm.*

Leaves $2\frac{1}{2}$ by $\frac{3}{4}$ in., acute at both ends; petiole $\frac{1}{2}$ in. Axillary flowers on peduncles $\frac{1}{4}$ in., ebracteate; spicate flowers subsessile, bracts $\frac{1}{2}$ in., oblong, acute. *Calyx* $\frac{1}{2}$ in., toothed hardly half-way down, lobes subtriangular lanceolate. *Corolla* upper lip erect, ovate, subentire, lower pendent deeply 3-lobed. *Capsule* solid below.—The good picture of the capsule and seeds renders it nearly certain that this was some *Justicia*: the inflorescence is very nearly that of *J. glauca*, but the bracts are much too narrow and acute for that species.

XXXIX. ADHATODA, *Nees*.

As *Justicia* Sect. *Betonica*, except that the anther-cells are acute, sometimes minutely apiculate, but scarcely spurred.—Species 6, Tropical; 1 Indian, 1 Cosmopolitan, 5 African or American.

Bentham (in *Gen. Plant.*) says of the anther-cells, “minime calcaratæ,” but this is an error, and the genus should be merged in *Justicia* Sect. *Betonica*, following *Nees* and *Anderson*.

1. ***A. vasica***, *Nees in Wall. Pl. As. Rar.* iii. 103, and in *DC. Prodr.* xi. 387; leaves elliptic acute at both ends entire minutely pubescent, spikes dense short, bracts ovate or obovate subacute puberulous or glabrate, corolla $1\frac{1}{4}$ in. white tube short. *Dalz. & Gibs. Bomb. Fl.* 194. *Justicia Adhatoda*, *Linn.*; *Lamk. Ill.* t. 12, fig. 1; *Roxb. Fl. Ind.* i. 126; *Blume Bijdr.* 785; *Wall. Cat.* 2434; *Bot. Mag.* t. 861; *Griff. Notul.* iv. 140; *T. Anders. in Journ. Linn. Soc.* ix. 509.—*Adhatoda* sp. *Griff. Notul.* iv. 141, and *Ic. Pl. As.* t. 424. *Rheede Hort. Mal.* ix. t. 43.

INDIA; from the Punjab and Assam to CEYLON and Singapore, common, frequently cultivated.—DISTRIB. Malaya, S.E. Asia.

A dense shrub, 4–8 ft.; sometimes arborescent, 20 ft. *Leaves* 8 by 3 in.; petiole 1 in. *Spikes* 1–3 in., terminal, often several together; bracts $\frac{3}{4}$ by $\frac{1}{4}$ in., elliptic; bracteoles $\frac{1}{2}$ by $\frac{1}{8}$ in., falcate-oblong. *Calyx* $\frac{1}{2}$ – $\frac{1}{3}$ in., deeply 5 lobed; lobes equal, lanceolate. *Corolla-tube* $\frac{1}{2}$ – $\frac{1}{3}$ in. broad; lips white, palate transversely rose-banded. *Stamens* glabrous; anther-cells acuminate at base, sometimes minutely white-tailed. *Ovary* and style-base minutely hairy. *Capsule* $\frac{3}{4}$ in., clavate, pubescent, 4-seeded. *Seeds* $\frac{1}{2}$ in. diam., glabrous, tubercular-verrucose.

2. ***A. Beddomei***, *Clarke*; leaves oblong attenuate at both ends entire minutely pubescent, spikes peduncled capitate, bracts ovate subacute puberulous or glabrate, corolla $\frac{3}{4}$ in. creamy white tube short.

S. TRAVANCORE, alt. 3000 ft.; *Beddome*.

A very large shrub (*Beddome*). *Leaves* 6 by $1\frac{1}{2}$ in.; petiole $\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ – $\frac{3}{4}$ in., axillary, opposite, stout; heads 1 in. diam.; bracts $\frac{1}{2}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in., narrowed at base; bracteoles $\frac{1}{4}$ – $\frac{1}{2}$ in., narrowly oblong. *Calyx* $\frac{1}{4}$ in., sub-5-partite; segments narrowly oblong, acute, minutely pubescent especially within. *Corolla* hairy; tube $\frac{1}{2}$ in., broadly cylindric; lips oblong, upper emarginate, lower 3-lobed nearly to the base. *Filaments* stout, glabrous except at base; anther-cells superposed, lower obscurely tailed. *Ovary* glabrous, 4-ovulate; style hairy; stigma minutely bifid. *Capsule* not known.

XL. RHINACANTHUS, Nees.

Shrubs, sometimes subscandent. *Leaves* entire. *Panicle* divaricate or dense; flowers solitary (or in minute cymes), sessile; bracts and bracteoles small, linear-lanceolate. *Calyx* small, sub-5-partite, segments linear-lanceolate. *Corolla* white, tube very long narrowly cylindric, scarcely widened at the top; limb 2-lipped, upper lip lanceolate acuminate entire or shortly 2-lobed, recurved or twisted, lower broad 3-lobed. *Stamens* 2, inserted near the top of the corolla-tube; anthers 2-celled; cells superposed, muticous. *Ovary* 4-ovulate; style filiform, minutely bifid at the tip. *Capsule* clavate, 4-seeded, stalk long solid cylindric. *Seeds* ovoid, moderately compressed, glabrous, obscurely rugose or tuberculate.—Species 4, tropical Asiatic and African.

1. ***R. communis***, Nees in Wall. *Pl. As. Rar.* iii. 109, and in DC. *Prodr.* xi. 442; leaves oblong or ovate-oblong pubescent or glabrate, panicle large spreading, calyx densely pubescent. *Wight Ill.* 164 bis, fig. 9, and *Jc.* t. 464; *Dalz. & Gibs. Bomb. Fl.* 194; *T. Anders. in Journ. Linn. Soc.* ix. 522. *Rh. Rottlerianus*, Nees in Wall. *Pl. As. Rar.* iii. 109, and in DC. *Prodr.* xi. 443. *Justicia nasuta*, Linn.; *Roxb. Fl. Ind.* i. 120; *Blume Bijdr.* 785; *Wall. Cat.* 2440; *Blanco Fl. Filip.* 14; *Bot. Mag.* t. 325; *Griff. Notul.* iv. 143. *J. Rottleriana*, Wall. *Cat.* 2477.—*Rheede Hort. Mal.* ix. t. 69.

Throughout INDIA, cultivated; perhaps wild in the Deccan Peninsula and CEYLON.—**DISTRIB.** Java, Madagascar, &c., cultivated.

Leaves 3-4 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., usually narrowed at both ends, margin undulate; petiole $\frac{1}{2}$ in. *Cymes* terminal and on short lateral branches, dusky-pubescent; flowers often clustered; bracts and bracteoles 0- $\frac{1}{2}$ in., linear. *Calyx* $\frac{1}{10}$ in. *Corolla-tube* 1 by $\frac{1}{10}$ in.; lobes $\frac{1}{2}$ in., 3 lower each twice as broad as the shortly bifid upper.

VAR. *montana*; leaves ovate softly hairy often furred beneath base frequently obtuse. *J. scandens*, Vahl *Symb.* ii. 7. *J. dichotoma*, Rottl. & Willd. in Nov. Act. Nat. Cur. iv. 221 (fide Nees). *Dianthera paniculata*, Lour. *Fl. Cochinch.* i. 26.—*Mts. of S. Deccan*, alt. 3-6000 ft., frequent.—Perhaps the wild state, of which the narrow-leaved glabrate *R. communis* is the domesticated form.

2. ***R. calcaratus***, Nees in Wall. *Pl. As. Rar.* iii. 109, and in DC. *Prodr.* xi. 444; leaves large elliptic or narrow-obovate acuminate at both ends glabrous, panicle terminal somewhat dense flowers very many. *T. Anders. in Journ. Linn. Soc.* ix. 522. *Justicia calcarata*, Wall. *Pl. As. Rar.* ii. 9, t. 113, and *Cat.* 2426.

KHASIA MTS.; Wallich, &c. **CACHAR**; Keenan.

Branches stout. *Leaves* 10 by 4 in.; petiole 1 $\frac{1}{2}$ in. *Panicle* 6 by 4 in., nearly glabrous; peduncle 1-2 in.; bracts $\frac{1}{10}$ in. *Calyx* $\frac{1}{3}$ - $\frac{1}{2}$ in., nearly glabrous; lobes linear-lanceolate. *Corolla* as of *R. communis*, but larger; tube 1 $\frac{1}{4}$ in.; lobes $\frac{1}{2}$ in.; upper lip subentire, or lobes minute setaceous, twisted. *Capsule* not seen.

XLI. DIANTHERA, Linn.

Diffuse herbs or undershrubs. *Leaves* petioled, ovate or oblong, puberulous or glabrate. *Spikes* or *panicles* terminal, axillary sometimes added; flowers, or many of the lower, distant; bracts and bracteoles small. *Calyx* sub-5-partite; segments narrow. *Corolla* small or middle-sized, white yellowish or rose-purple, 2-lipped; upper lip suberect emarginate, lower pendent, 3-lobed. *Stamens* 2, glabrous or nearly so; anther-cells 2, ellips-

oid, muticous, subopposite or superposed. *Ovary* glabrous or nearly so, 4-ovuled; style minutely hairy below, tip sub-bifid. *Capsule* clavate, 4-seeded, base subcylindric solid. *Seeds* compressed, scabrous verrucose or subhispid.—Species 80, chiefly American; about 10 in the tropics of the Old World.

The character of the genus is here narrowed to the Indian species, which differ from the small-flowered *Justicias* (*J. vasculosa*, &c.) only by having the lower anther-cell absolutely muticous.

Flowers $\frac{1}{4}$ – $\frac{1}{2}$ in., sessile or nearly so.

1. ***D. leptostachya***, *Benth. in Gen. Pl.* ii. 1114; leaves elliptic or oblong narrowed at both ends puberulous on the nerves beneath or glabrate, bracts hardly $\frac{1}{10}$ in. linear. *Ruellia leptostachya*, *Wall. Cat.* 2411. *Leptostachya Wallichii*, *Nees in Wall. Pl. As. Rar.* iii. 105, and in *DC. Prodr.* xi. 379, the *Indian plant only*; *Wight Ic.* t. 1543. *Justicia Wallichii*, *T. Anders. in Journ. Linn. Soc.* ix. 516.—*Adhatoda* sp. n. 17, *Herb. Ind. Or. H. f. & T.*

MTS. of S. DECCAN PENINSULA; Courtallum, &c., *Wight, &c.*

A herb; stem terete, puberulous. *Leaves* $4\frac{1}{2}$ by $1\frac{3}{4}$ in., punctulate on both surfaces; petiole $\frac{1}{2}$ –2 in. *Spikes* linear, slender, interrupted, mostly collected in a terminal panicle 8–10 in. diam., puberulous; flowers opposite; pedicels 0– $\frac{1}{10}$ in., or the lower developed into very small cymes. *Calyx-segments* $\frac{1}{10}$ – $\frac{1}{8}$ in., linear-lanceolate, puberulous. *Corolla* scarcely $\frac{1}{4}$ in., nearly glabrous. *Capsule* $\frac{1}{2}$ in., clavate, puberulous. *Seeds* glabrous, tubercular-verrucose.—The Philippine plant (Cuming, n. 548), combined with this species by Nees, is different, and probably not of this genus (fide Bentham).

2. ***D. virgata***, *Benth. in Gen. Pl.* ii. 1114; leaves elliptic narrowed at both ends pubescent on the nerves beneath, bracts ovate or elliptic acute as long as the calyx. *Justicia virgata*, *T. Anders. in Journ. Linn. Soc.* ix. 516, chiefly.—*Adhatoda* sp. n. 18, *Herb. Ind. Or. H. f. & T.*

SIKKIM and KHASIA MTS., alt. 1–3000 ft., frequent; *Griffith, H. f. & T., &c.*

A somewhat slender herb, 2–3 ft. *Leaves* $4\frac{1}{2}$ by $1\frac{3}{4}$ in., acuminate, punctulate on both surfaces, base attenuate or rhomboid; petiole 1 in., pubescent. *Spikes* 3–6 in., linear, slender, interrupted, terminal, 1–3 together, or sometimes panicked; bracts $\frac{1}{6}$ in.; flowers opposite, solitary, sessile. *Calyx* sub-5-partite; segments $\frac{1}{2}$ in., linear-lanceolate, minutely pubescent. *Corolla* $\frac{1}{4}$ in., white or slightly yellow-tinged. *Anther-cells* completely superposed. *Capsule* $\frac{1}{2}$ in., clavate, puberulous. *Seeds* glabrous, tubercular-verrucose.—*Leptostachya virgata*, *Nees in Wall. Pl. As. Rar.* iii. 105, and *Cat.* 7177, and in *DC. Prodr.* xi. 379, from Ava, united with this by T. Anderson, has a very large panicle, cymose flowers and linear bracts, and seems much nearer *D. leptostachya*.

3. ***D. debilis***, *Clarke*; leaves cordate-lanceolate pubescent on the nerves beneath, bracts linear or linear-oblong shorter than the calyx.

KHASIA TERAI, alt. 500 ft.; Shaila, *Clarke*.

Resembling *D. virgata*, but very weak. *Leaves* $4\frac{1}{2}$ by $1\frac{3}{4}$ in., acuminate, membranous; petiole $1\frac{1}{2}$ in. *Spikes* 1–3 in., linear, often 3 on a terminal peduncle 1–2 in.; bracts $\frac{1}{12}$ in., pubescent; flowers opposite, solitary, distant. *Calyx* sub-5-partite; segments $\frac{1}{2}$ in., linear, pubescent. *Corolla* $\frac{1}{2}$ in., yellowish-white. *Anther-cells* parallel, one very slightly higher than the other. *Ovary* glabrous; base of style hairy. Young capsule as of *D. virgata*.

4. ***D. Griffithii***, *Benth. in Gen. Pl.* ii. 1114; leaves petioled ovate acute glabrous, panicles terminal trichotomous, bracts and bracteoles

minute subulate glabrous. *Justicia Griffithii*, *T. Anders. in Journ. Linn. Soc.* ix. 516.

MISHMEE HILLS; *Griffith* (fide T. Anderson).

A glabrous herb; stem terete, base woody, upwards herbaceous tetragonous. *Leaves* 4-10 by 2-4 in.; base decurrent. *Panicles* with elongate, ascending branches; flowers remote, opposite, solitary, sessile. *Sepals* 5, linear. *Corolla* $\frac{1}{2}$ in., tube ventricose; limb 5-partite, green, lower lip spotted red. *Ovary* 4-ovulate. *Capsule* a little longer than the corolla, subclavate at the tip, acute (T. Anderson).—Not seen.

** *Flowers* $\frac{1}{2}$ in. or more, many distinctly pedicelled.

5. **D. collina**, *Clarke*; leaves ovate nearly glabrous, panicles terminal and axillary, anther-cells mucinous distant superposed. *Justicia collina*, *T. Anders. in Journ. Linn. Soc.* ix. 515.

SIKKIM and BHOTAN, alt. 5-7000 ft.; *Griffith, H. f. & T., &c.* KHASIA MTS., alt. 4000 ft.; *Griffith*.

A diffuse herb, 1-2 ft., branches puberulous. *Leaves* 3 by $1\frac{1}{2}$ in., acute, base cuneate or of the upper leaves almost rounded; petiole 1 in., or of the upper leaves sometimes 0. *Cymes* few-fl., running into an elongate terminal panicle by the gradual reduction of the leaves into bracts; proper bract hardly $\frac{1}{10}$ in., linear; pedicels 0- $\frac{1}{2}$ in.; bracteoles minute or 0. *Sepals* $\frac{1}{2}$ in., linear, green, glabrous. *Corolla* $\frac{1}{2}$ in., white, nearly glabrous; tube elongate cylindric. *Capsule* $\frac{1}{2}$ in., clavate, glabrous, 4-seeded. *Seeds* verrucose-scaly, obscurely hispidulous.

6. **D. dichotoma**, *Clarke*; leaves ovate acute nearly glabrous, panicles terminal minutely pubescent, anther-cells mucinous one superposed for half its length. *Justicia dichotoma*, *Blume Bijdr.* 783; *T. Anders. in Journ. Linn. Soc.* ix. 516. *Rhaphidospora dichotoma*, *Nees in DC. Prodr.* xi. 500. *Leptostachya dichotoma*, *Nees l. c.* 379. *Peristrophe dichotoma*, *Hassk. Cat. Hort. Bogor.* 152.

CEYLON (fide T. Anderson).—DISTRIB. Java, Philippines.

Much resembling *D. collina*, the corolla rather more ventricose and rose-purple.—There is no Ceylon example of this at Kew. We may suppose that T. Anderson had seen such at Calcutta; C. P. 2718, which he quotes, is certainly not this plant.

DOUBTFUL SPECIES.

D.? **INDICA**; leaves scarcely 1 in. rhomboid-ovate acute hairy, flowers congested into axillary and terminal decompound globose or oblong spikes, spikelets by suppression mostly 1-fl. supported by a lanceolate often empty bract. *Rhytiglossa*? *indica*, *Wawra in Oestr. Bot. Zeit.* 1881, 281, and *Bot. Reis. Pr. S. Cob.* 82, t. 9, fig. A.

GARWHAL; at Mussoorie, alt. 4000 ft., *Wawra*.

An undershrub; branches prostrate, variously twisted and incurved. Uppermost bract sterile, with the fertile valvately enclosing the single flower of the spikelet; bracteoles linear-setaceous, similar to the calyx-segments. *Corolla* ringent, rose, hairy; tube as long as the calyx; lips as long as the tube, upper ovate, emarginate; lower longer, cuneately 3-lobed. *Filaments* flattened; anther-cells superposed, ovate, mucinous. *Style* capillary, elongate after flowering, bifid. *Ovary* 4-ovulate.—Not seen. I know of no woody prostrate Acanthaceous plant at Mussoorie, and do not understand the bracts as described.

XLII. **PTYSSIGLOTTIS**, *T. Anders.*

A small, procumbent herb. *Leaves* ovate, entire. *Spikes* peduncled, few-fl.; bracts and bracteoles linear. *Calyx* sub-5-partite; segments

linear. *Corolla-tube* short, limb 2-lipped; upper lip shortly 2-fid, lower 3-lobed; lobes imbricate in bud. *Stamens* 2; anthers 2-celled; cells ellipsoid, parallel, approximate, muticous or base minutely apiculate. *Ovary* 4-ovulate; style filiform, minutely bifid. *Capsule* clavate, 4-seeded. *Seeds* compressed, orbicular, verrucose-scaly, almost muricate, not hairy.

P. radicata, *T. Anders. in Thwaites Enum.* 235, excl. syn.; *Bedd. Ic. Pl. Ind. Or.* t. 267. *Rhytiglossa radicata*, *Nees in DC. Prodr.* xi. 344.

CEYLON; Champion, *Thwaites*.

Stems 3-8 in., weak, rooting, branched, puberulous. *Leaves* $\frac{3}{4}$ by $\frac{1}{2}$ in., obtuse or subacute at either end, lineolate, nearly glabrous; petiole $\frac{1}{16}$ - $\frac{1}{8}$ in. *Peduncles* $\frac{1}{2}$ -1 in., terminal, slender; spikes $\frac{1}{2}$ - $\frac{3}{4}$ in.; bracts $\frac{1}{2}$ in. *Sepals* $\frac{1}{8}$ in. *Corolla* $\frac{1}{2}$ - $\frac{3}{4}$ in., nearly straight, pubescent. *Capsule* $\frac{1}{2}$ in., 4-seeded near the top; stalk solid, linear-cylindric.—*Rostellaria sarmentosa*, *Zoll.*, described as having the capsule 4-seeded nearly from the base, does not belong here (cf. *Benth. in Gen. Pl.* ii. 1118).

XLIII. SPHINCTACANTHUS, *Benth.*

An erect, glabrous shrub. *Leaves* large, toothed or subentire. *Spikes* interrupted, forming a terminal panicle; flowers opposite; bracts and bracteoles small. *Calyx* sub-5-partite; segments linear. *Corolla-tube* ovoid, inflated, constricted at the top; limb 2-lipped, upper emarginate, lower 3-lobed pendent; lobes imbricated in the bud. *Stamens* 2; anthers 2-celled; cells oblong, approximate, muticous. *Ovary* 4-ovulate; style linear, minutely bifid. *Capsule* unknown.

S. Griffithii, *Benth. in Gen. Pl.* ii. 1118; *Hook. Ic. Pl.* t. 1205. *Justicia orchiodes*, *Griffith ms.*

MISHMEE MTS., or PATKOYE HILLS in S.E. Assam; *Griffith* (*Kew Distrib.* n. 6161).

Leaves $7\frac{1}{2}$ by $3\frac{1}{4}$ in., acute at both ends; petiole 1 in. *Panicle* 5 by 4 in.; branches opposite; bracts $\frac{1}{10}$ in. *Calyx* $\frac{1}{10}$ in. *Corolla-tube* $\frac{1}{2}$ by $\frac{1}{2}$ in.; lobes $\frac{1}{8}$ - $\frac{1}{4}$ in., those of the lower lip subacute. *Filaments* glabrous, except near the base.

XLIV. ECBOLIUM, *Kurz.*

A small, nearly glabrous, shrub. *Leaves* entire. *Spikes* terminal, dense; bracts large, imbricate, somewhat 4-ranked; bracteoles small, narrow. *Calyx* sub-5-partite; segments equal, narrow. *Corolla-tube* long, subfiliform; limb 2-lipped; upper lip narrow shortly bifid, lower 3-lobed pendent; lobes imbricate in bud. *Stamens* 2, attached near the top of the corolla-tube; anthers 2-celled; cells oblong, parallel, approximate, muticous. *Ovary* 4-ovulate; style filiform, very shortly bifid. *Capsule* long-stalked, ovoid, compressed, 4-seeded. *Seeds* 4 or more often 2, large, compressed, orbicular, tubercular-scabrous.

E. Linneanum, *Kurz in Journ. As. Soc.* 1871, pt. ii. 75; leaves petioled ovate or lanceolate, bracts ovate obtuse entire puberulous or pubescent, corolla greenish-blue or purplish. *Boiss. Fl. Orient.* iv. 526. *Justicia Ecbolium*, *Linn.*; *Roxb. Fl. Ind.* i. 114; *Wall. Cat.* 2432; *Bot. Mag.* t. 1847; *Wight Ic.* t. 463; *Nees in Wall. Pl. As. Rar.* iii. 108, and in *DC. Prodr.* xi. 427; *Dalz. & Gibs. Bomb. Fl.* 194. *J. ligustrina*, *Vahl Enum.* i. 118. *J. emarginata*, *Nees in DC. Prodr.* xi. 427. *Eranthemum Ecbolium*, *T. Anders. in Thwaites Enum.* 235, and in *Journ. Linn. Soc.* ix. 523.—*Burm. Thes. Zeyl.* 7, t. 4, fig. 1. *Rheede Hort. Mal.* ii. t. 20.

S. DECCAN PENINSULA and CEYLON. MALACCA; *Maingay*.—DISTRIB. Arabia, Abyssinia, Madagascar.

Branches pubescent upwards. *Leaves* 4 by $1\frac{1}{2}$ in., cuneate or rhomboid at both ends, puberulous or pubescent on the nerves; petiole $\frac{1}{2}$ in. *Spikes* $2\frac{1}{2}$ by $\frac{3}{4}$ in., dense; bracts $\frac{3}{4}$ by $\frac{1}{2}$ in., sometimes softly hairy; bracteoles scarcely $\frac{1}{4}$ in., sublinear. *Calyx* $\frac{1}{4}$ in., pubescent. *Corolla* pubescent; tube $1-1\frac{1}{4}$ by $\frac{1}{16}$ in.; lobes $\frac{1}{2}$ in. *Stamens* glabrous, except the base of the filaments; anther-cells submucronate at the base. *Ovary* hairy at the tip. *Capsule-stalk* $\frac{1}{2}$ in., linear-cylindric, seed-bearing part $\frac{1}{2}$ in. diam. *Seeds* $\frac{1}{2}$ in. diam., pale-coloured.—This, the typical form, is stated by Wight to be frequent in S. Madras, but there is very little of it in the Herbarium.

VAR. *rotundifolia*; leaves sessile ovate or roundish, bracts subdentate often with a very short acumination. *Justicia rotundifolia*, *Nees* *ll. c.*—Coimbatore; *Wight*, nn. 2008, 2266.—A woody undershrub, with shortened internodes and smaller leaves; *Wight's* are the only examples at Kew.

VAR. *latevirens*; glabrescent, leaves larger petioled broadly lanceolate acute at both ends, spikes often 6–8 in. more lax, bracts $\frac{3}{4}$ by $\frac{1}{2}$ in. broadly lanceolate entire dusky-pubescent. *Justicia latevirens*, *Vahl Enum.* i. 118; *Nees in DC. Prodr.* xi. 427.—S. Deccan Peninsula and Ceylon.—This appears the common South Indian form, and when the bracts become denticulate it passes by degrees into the next.

VAR. *dentata*; glabrescent, leaves larger petioled ovate or lanceolate acute, spikes dense, bracts $\frac{3}{4}$ by $\frac{1}{2}$ in. ovate acuminate toothed. *Justicia dentata*, *Klein*; *Nees in Wall. Pl. As. Rar.* iii. 108, and in *DC. Prodr.* xi. 427. *J. livida*, *Nees in DC. Prodr.* xi. 427; *Wight Ic. t.* 1546.—Bengal, Assam and Pegu, very common. *W.* Deccan Peninsula, *Wight*, *Ritchie*.—The Bengal form has glabrate thin bracts, and a lurid or steely green-blue corolla. The Malabar form should perhaps be referred to *Var. latevirens*.

XLV. GRAPTOPHYLLUM, *Nees*.

Glabrous shrubs. *Leaves* often variegated. *Flowers* pedicelled, clustered; clusters forming terminal thyrses; bracts and bracteoles very small, narrow. *Calyx* small, sub-5-partite; segments equal, linear-lanceolate. *Corolla-tube* curved; limb 2-lipped, upper lip shortly 2-fid, lower 3-lobed. *Stamens* 2, 2 minute staminodes added; anthers oblong, 2-celled; cells parallel, muticous. *Ovary* 4-ovulate; style filiform, scarcely bifid. *Capsule* oblong, hard, contracted into a long stalk. *Seeds* usually 2, orbicular or subquadrate, compressed flat, lacunose-rugose.—Species 4, Australian or Pacific, one long time cultivated.

G. hortense, *Nees in Wall. Pl. As. Rar.* iii. 102, and in *DC. Prodr.* xi. 328; leaves petioled broadly elliptic narrowed at both ends entire, corolla $1-1\frac{1}{2}$ in. crimson. *T. Anders. in Journ. Linn. Soc.* ix. 523. *G. pictum*, *Griff. Notul.* iv. 139. *Justicia picta*, *Linn.*; *Roxb. Fl. Ind.* i. 117; *Wall. Cat.* 2438; *Blume Bijl.* 784; *Blanco Fl. Filip.* 12; *Bot. Mag.* t. 1870; *Bot. Reg.* t. 1227; *Dalz. & Gibs. Bomb. Fl. Suppl.* 71.—*Rheede Hort. Mal.* vi. t. 60. *Rumph. Herb. Amb.* iv. t. 30.

Throughout INDIA and MALAYA cultivated; where wild, uncertain.

Leaves $4\frac{1}{2}$ by $1\frac{1}{2}$ in.; petiole $\frac{1}{2}$ in. *Pedicels* often $\frac{1}{2}$ in. *Calyx* $\frac{1}{8}$ in. The description of the capsule and seeds is taken from "Gen. Plant."

XLVI. RUNGIA, *Nees*.

Diffuse or erect herbs, or shrubs. *Leaves* entire. *Spikes* dense, terminal or axillary, 1-sided; bracts 2-ranked, or 4-ranked, with 2 of the ranks often flowerless; flowering bracts often scarious-margined; bracteoles

similar to the bracts or narrow. *Calyx* small, deeply 5-lobed; segments linear-lanceolate. *Corolla* small, blueish or white; limb 2-lipped, upper lip emarginate shorter than the lower 3-lobed lip. *Stamens* 2; anthers 2-celled, cells parallel subequal, or more often superposed, lower cell muticous or white-tailed. *Ovary* 4-ovulate; style filiform, minutely bifid. *Capsule* ovoid or oblong, shortly stalked; after dehiscence the placenta with the retinacula rise elastically from the base of the capsule, scattering the seeds. *Seeds* 4, compressed, orbicular, glabrous, verrucose, sometimes minutely, sometimes very strongly, so that the seed is concentrically rugose or subcristate.—Species 20, mostly Asiatic, a few Tropical African.

I am unable to make sections of this genus; the species are described in order of their size, beginning with the largest.

1. ***R. sisparensis***, *T. Anders. in Journ. Linn. Soc.* ix. 518; leaves large elliptic acuminate at both ends glabrous, bracts dimorphic bifarious ovate subacute not acuminate glabrous, corolla $\frac{1}{2}$ – $\frac{1}{2}$ in. *Adhatoda sisparensis*, *Benth. in Pl. Hohenack.* n. 1436.

NILGHERRIES; *Sispara*, *Wight, Gardner, &c.*; *Valla Caudoo*, *Wight*; *Wynaad*, *Beddome*.

Shrubby, nearly glabrous. *Leaves* 6 by $1\frac{1}{2}$ in., obscurely lineolate; petiole 1 in. *Spikes* 2–3 by $\frac{3}{4}$ in., 1-sided, 2 series of large empty bracts on one side, 2 series of smaller flowering ones on the other; empty bracts $\frac{1}{2}$ by $\frac{1}{4}$ in., narrowed at both ends, shining green, not or very narrowly marginate, striate; flowering bracts similar but hardly half so large, subscarioso, more acute; bracteoles $\frac{1}{2}$ in., lanceolate. *Calyx* $\frac{1}{2}$ in.; segments linear-lanceolate, minutely pubescent. *Anther-cells* separated, lower white-tailed. *Capsule* $\frac{1}{4}$ – $\frac{1}{2}$ in., minutely pubescent. *Seeds* verrucose, almost tubercled.

2. ***R. Wightiana***, *Nees in Wall. Pl. As. Rar.* iii. 110, and in *DC. Prodr.* xi. 472; leaves large lanceolate or ovate-lanceolate glabrous, bracts dimorphic obscurely 2-ranked round-ovate prominently margined nearly glabrous, corolla $\frac{1}{2}$ in. *Wight Ic.* t. 1549; *T. Anders. in Journ. Linn. Soc.* ix. 518. *R. Arnottiana*, *Wight Ic.* t. 1550. *Justicia Wightiana*, *Wall. Cat.* 2472.

S. DECCAN PENINSULA; Courtallum, *Wight, G. Thomson*; Attramallay, *Beddome*.

Leaves $6\frac{1}{2}$ by 2 in., base attenuate, lineolate; petiole $1\frac{1}{2}$ in. *Spikes* 2 by $\frac{1}{2}$ in., somewhat laxly imbricate, often paniced; empty bracts $\frac{1}{4}$ in. diam., obtuse rarely minutely apiculate; flowering bracts rather narrower, somewhat obovate; bracteoles $\frac{1}{2}$ in., subovate, pubescent. *Calyx* $\frac{1}{2}$ – $\frac{1}{2}$ in.; segments linear-lanceolate, minutely pubescent. *Anther-cells* superposed, lower white-tailed. *Capsule* $\frac{1}{2}$ in., minutely pubescent. *Seeds* subtubercular verrucose.—*R. Arnottiana*, *Wigh.*, differs only in the uppermost leaves being as broad as the middle cauline.

3. ***R. læta***, *Clarke*; leaves ovate acute at both ends subglabrous, bracts large broadly elliptic acute marginate ciliate, corolla $\frac{3}{4}$ in.

S. DECCAN PENINSULA (?); *Herb. Wight*.

Leaves $2\frac{1}{2}$ by $1\frac{1}{2}$ in.; petiole $\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ in., axillary; spikes $1\frac{1}{2}$ by $\frac{3}{4}$ in.; bracts sub-4-seriate, all fertile, $\frac{3}{4}$ by $\frac{1}{2}$ in., narrowed at base; margin prominent, scarious, purplish; bracteoles $\frac{1}{2}$ in., linear, glabrous. *Calyx* $\frac{1}{2}$ in.; segments linear-lanceolate, puberulous. *Anther-cells* oblong, contiguous, parallel, one scarcely lower than the other, slightly whitened, not tailed at the base. *Ovary* glabrous, subglandular, style hairy near the base. *Capsule* not seen.—This appears much the finest species in the genus, but there is only a branchlet in *Herb. Wight*.

4. ***R. latior***, *Nees in DC. Prodr.* xi. 472; scabrous-pubescent, leaves

petioled ovate or broad-lanceolate, spikes ovoid or oblong dense often clustered, bracts roundly obovate margined hairy, bracteoles obovate margined, corolla $\frac{1}{2}$ in. *Wight Ic. t.* 1548; *T. Anders. in Journ. Linn. Soc.* ix. 518 (except the Ceylon plant). *R. longifolia*, *T. Anders. in Thwaites Enum.* 235, *partim*.

MTS. of S. DECCAN PENINSULA; *Wight, Gardner, &c.*

Stems herbaceous, hairy. *Leaves* $2\frac{3}{4}$ by $1\frac{1}{4}$ in., cuneate at both ends; petiole $\frac{1}{2}$ in. *Spikes* 1 by $\frac{1}{2}$ in.; bracts obscurely 4-seriate (many barren more or less unlike the fertile), $\frac{1}{4}$ by $\frac{1}{2}$ in., obtuse rarely apiculate; bracteoles similar to the bracts, but smaller. *Calyx* $\frac{1}{2}$ in.; segments linear-lanceolate, softly hairy. *Anther-cells* superposed, lower white-tailed. *Capsule* $\frac{1}{6}$ in., nearly glabrous. *Seeds* small, minutely glandular-verrucose, ultimately glabrous.—This is not allied to *R. repens* as Nees supposed, but may be a var. of *R. longifolia*, as T. Anderson first supposed.

5. *R. longifolia*, *Nees & Arn. in DC. Prodr.* xi. 471, *excl. Philippine example, not of Beddome*; nearly glabrous, leaves linear-lanceolate, spikes shortly oblong, often clustered, bracts biform fertile roundly obovate marginate minutely pubescent, corolla $\frac{1}{2}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 517, *chiefly*.

CEYLON; *Walker, &c.*

Leaves 4 by $\frac{1}{2}$ in. Flowerless bracts in 2 ranks on one side of the spike, ovate-lanceolate, obscurely margined. Otherwise as *R. latior*, from which this typical form of *R. longifolia* is easily separable: not so the

VAR. *latifolia*, *Wight ms.*; leaves lanceolate or ovate-lanceolate, barren bracts few less distinctly 2-ranked less unlike the fertile. *R. latior*, *Nees & T. Anders. in herb. partim*.—Ceylon, numerous examples. S. Travancore; *Beddome*.—I follow *Wight* (in preference to *Nees* and *T. Anderson*) in regarding all the Ceylon forms as one species, of which the S. Indian is an allied species, or a variety. *T. Anderson* divided *Thwaites* n. 89 between *R. latior* and *R. longifolia*, depending upon the breadth of the leaves alone.

6. *R. crenata*, *T. Anders. in Journ. Linn. Soc.* ix. 518; leaves petioled ovate-lanceolate sparsely hairy, spikes short dense 1-sided, bracts markedly biform barren oblong acute mucronate fertile orbicular marginate, corolla $\frac{1}{2}$ in. *Rungia* sp. n. 9, *Herb. Ind. Or. H. f. & T.*

W. DECCAN PENINSULA; Canara, *Law*; Concan, *Stocks*; Belgaum, *Ritchie*.

Stem herbaceous, ramous, nearly glabrous. *Leaves* $2\frac{1}{2}$ by 1 in., base shortly acuminate, sparsely laxly hairy on both surfaces, finally scabrid lineolate glabrate; petiole $\frac{1}{2}$ in. *Spikes* 1 by $\frac{2}{3}$ in., terminal, or sessile quasi-axillary clustered; flowerless bracts in 2 regular series on one side the spike, $\frac{1}{2}$ by $\frac{1}{10}$ in., green, striate, not or very narrowly margined; flowering bracts $\frac{1}{2}$ in. diam., somewhat hairy; bracteoles $\frac{1}{2}$ in., obovate, scarious-margined. *Calyx* $\frac{1}{2}$ in.; segments linear-lanceolate, pubescent. *Capsule* scarcely $\frac{1}{2}$ in., pubescent.—Allied to *R. parviflora*, *Nees*, but with much longer flowerless bracts.

7. *R. stolonifera*, *Clarke*; leaves petioled ovate minutely scabrid-pubescent, bracts ovate minutely hairy, calyx glabrous, corolla tubular $\frac{1}{2}$ – $\frac{3}{4}$ in., anther-cells white-tailed. *Dicliptera* sp. n. 14, *Herb. Ind. Or. H. f. & T.* *Justicia* sp. (Sect. *Rostellularia*), *Benth. ms. in Herb. Kew.*

KHASIA MTS., alt. 2–5000 ft.; *H. f. & T., &c.*

Stems 18 in., procumbent, rooting, branched; many small-leaved barren branches from the lower nodes. *Leaves* 1–3 by $\frac{3}{4}$ – $1\frac{1}{2}$ in., cuneate at both ends, undulate sometimes sinuate, with few minute scattered hairs on both surfaces; petiole $\frac{1}{2}$ in. *Spikes* $\frac{1}{2}$ – $1\frac{1}{2}$ in., terminal and quasi-axillary, imperfectly 2–4-farious; bracts $\frac{1}{2}$ by $\frac{1}{2}$ in., sub-obtuse, scarious-margined; bracteoles oblong, nearly as long as the bracts. *Calyx* $\frac{1}{2}$ in., deeply 5-partite; segments narrowly lanceolate, scarious. *Corolla-tube* $\frac{1}{2}$ by

$\frac{1}{2}$ in., narrowly cylindric, straight; limb $\frac{1}{8}$ in., 2-lipped; upper lip erect, subentire, lower pendent. *Capsule* $\frac{1}{8}$ – $\frac{1}{6}$ in., nearly glabrous; placentæ rising elastically from the base. *Seeds* minutely glandular-papillose, glabrate when fully ripe.

8. **R. khasiana**, *T. Anders. in Journ. Linn. Soc.* ix. 518; leaves petioled ovate or elliptic minutely scabrid-pubescent, bracts ovate acuminate somewhat pubescent, calyx minutely pubescent, corolla $\frac{1}{4}$ – $\frac{1}{3}$ in. *Rungia* sp. n. 11, *Herb. Ind. Or. H. f. & T. Acanthacea, Griff. Itin. Notes*, 36, n. 589.

KHASIA MTS., alt. 3000 ft.; *Griffith* (Kew Distrib. n. 6165), *H. f. & T.*

Much branched; branches 10 in., pubescent, or with deflexed hairs. *Leaves* $3\frac{1}{2}$ by $2\frac{1}{2}$ – $1\frac{1}{2}$ in., cuneate at both ends; petiole $\frac{1}{2}$ in. *Spikes* 1–2 in., terminal and on short lateral branches, quadrifarious; bracts $\frac{1}{2}$ – $\frac{1}{4}$ by $\frac{1}{4}$ in., acutely or long acuminate, scarious-margined, nervous; bracteoles $\frac{1}{2}$ in., linear. *Calyx* scarcely $\frac{1}{4}$ in., segments narrowly linear. *Anther-cells* superposed, mucous. *Capsule* $\frac{1}{2}$ in., pubescent, placentæ rising elastically from the base. *Seeds* minutely verrucose.

9. **R. himalayensis**, *Clarke*; leaves long-petioled ovate minutely scabrid-pubescent, spikes slenderly peduncled 4-farious secund, bracts ovate shortly acuminate somewhat pubescent, calyx minutely pubescent, corolla $\frac{1}{4}$ – $\frac{1}{3}$ in.

E. NEPAL; Tambur River, alt. 4000 ft., *J. D. H. SIKKIM*, alt. 3–4000 ft.; *Dikeeling, Clarke*.

Stems 1 foot, diffuse, weak, branched, pubescent. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$ –1 in., cuneate at both ends; petiole $\frac{1}{2}$ in. *Spikes* 1 in.; peduncles $\frac{1}{2}$ –1 in.; bracts $\frac{1}{4}$ by $\frac{1}{6}$ in., scarious-margined; bracteoles $\frac{1}{2}$ in., linear. *Calyx* $\frac{1}{6}$ in., segments sublinear. *Anther-cells* superposed, lower mucous or whitened at base. *Ovary* nearly glabrous; style thinly hairy at base. *Capsule* less than $\frac{1}{2}$ in., minutely pubescent; young shortly glandular-verrucose. *Seeds* small, minutely verrucose, appearing punctate.—Differs from *R. repens* in the longer-petioled broader leaves and much smaller capsule and seeds; from *R. apiculata* in the longer petioled leaves, glabrous ovary, and slender peduncles (perhaps hardly sufficiently).

10. **R. linifolia**, *Nees in Wall. Pl. As. Rar.* iii. 110, and in *DC. Prodr.* xi. 469; leaves short-petioled elliptic acute nearly glabrous, spikes peduncled slender 4-farious secund, bracts lanceolate acute, corolla $\frac{1}{4}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 517. *Justicia linifolia*, *Wall. Cat.* 2447. *J. gracilis*, *T. Anders. l. c.* 512. *Rostellularia gracilis*, *Wight Ic. t.* 1541.

W. DECCAN PENINSULA, from the Concan southwards, *Heyne, Wight, &c.*

Stems 6–12 in., slender, minutely pubescent. *Leaves* 1 by $\frac{1}{2}$ – $\frac{1}{3}$ in., from ovate to narrow-lanceolate, often apiculate, base cuneate or almost rounded, minutely scabrid or glabrous, lineolate on both surfaces; petiole usually less than $\frac{1}{6}$ in. *Spikes* 1 by $\frac{1}{4}$ in.; peduncles 0–1 in., slender; bracts $\frac{1}{2}$ – $\frac{1}{6}$ in., minutely pubescent, green or narrowly scarios-margined, obscurely striate; bracteoles $\frac{1}{2}$ in., linear-lanceolate. *Calyx* $\frac{1}{4}$ in.; segments sublinear, pubescent. One *anther-cell* lower than the other, acute hardly tailed at the base. *Ovary* pubescent, style glabrous except close to the base. *Capsule* not seen.

11. **R. apiculata**, *Bedd. Ic. Pl. Ind. Or. t.* 247; leaves petioled ovate or linear-oblong puberulous on the nerves beneath, spikes peduncled quadrifarious secund, bracts ovate-lanceolate apiculate minutely pubescent, calyx pubescent, corolla $\frac{1}{4}$ – $\frac{1}{3}$ in. *R. repens*, var., *T. Anders. in Thwaites Enum.* 235, in *Obs.*—*Rungia* sp. n. 8, *Herb. Ind. Or. H. f. & T.*

MTS. OF S. DECCAN; Tinnevely Hills, alt. 4000 ft., *Beddome*. CEYLON; *Thwaites*, *C. P.* n. 1973.

Stems 6–15 in., diffuse, branched, rooting, minutely pubescent. *Leaves* $2\frac{1}{2}$ by

$\frac{3}{4}$ –1 in., cuneate at both ends; petiole $\frac{1}{8}$ in.; leaves very variable, on one branch are seen ovate upper leaves and below them a leaf $1\frac{1}{4}$ by $\frac{1}{8}$ in. *Spikes* $1\frac{1}{2}$ in.; peduncles $\frac{1}{4}$ –1 in.; bracts $\frac{1}{4}$ in., narrowly scarious-margined, finely striate; bracteoles $\frac{1}{2}$ in., sublinear. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in., segments sublinear. *Anther-cells* superposed, muticous. *Ovary* hairy, style-base glabrous; young capsule densely hairy. *Capsule* $\frac{1}{2}$ in., pubescent; seeds small, verrucose.

VAR. *compta*; leaves small short-petioled lanceolate.—S. Travancore; *Beddome*.—*Leaves* 1 by $\frac{1}{2}$ in.; petiole $\frac{1}{10}$ in.: spikes in flower, capsule not seen.

12. *R. repens*, *Nees in Wall. Pl. As. Rar.* iii. 110, and in *DC. Prodr.* xi. 472; leaves subsessile oblong-lanceolate scabrid-puberulous, bracts round apiculate nearly glabrous, corolla $\frac{1}{4}$ in., seeds $\frac{1}{16}$ in. diam. concentrically rugose. *Wight Ic.* t. 465; *Dalz. & Gibs. Bomb. Fl.* 196; *T. Anders. in Journ. Linn. Soc.* ix. 518. *Justicia repens*, *Linn.*; *Roxb. Corom. Pl.* ii. 29, t. 152, and *Fl. Ind.* i. 132; *Wall. Cat.* 2459. *Dicliptera repens*, *Ruem. & Sch. Syst.* i. 171.—*Burm. Thes. Zeyl.* t. 3, fig. 2.

Throughout INDIA, from the Punjab and Bengal to CEYLON; common. (No specimens from the Malay Peninsula.)

A procumbent, rooting, ramous weed; branches quadrangular, pubescent or nearly glabrous. *Leaves* 2 by $\frac{2}{3}$ in., or often smaller narrower; petiole rarely so much as $\frac{1}{8}$ in. *Spikes* 2 by $\frac{1}{2}$ in., appearing often peduncled, the 2 leaves close to their base usually much reduced; bracts closely regularly imbricated 4-farious, spike less 1-sided than in most species; bracts $\frac{1}{4}$ by $\frac{1}{8}$ – $\frac{1}{4}$ in., white margin broad prominent; bracteoles $\frac{1}{2}$ in., linear-lanceolate, minutely pubescent. *Calyx* $\frac{1}{2}$ in.; segments linear-lanceolate, pubescent. *Corolla* white, with rose or purple spots. *Anther-cells* superposed, lower white-tailed. *Ovary* glabrous, style thinly hairy at base. *Capsule* $\frac{1}{2}$ in. and upwards, minutely thinly hairy. *Seeds* ovoid, moderately compressed, rugose almost furrowed.

13. *R. elegans*, *Dalz. & Gibs. Bomb. Fl.* 196; stems patently white-hirsute, leaves subsessile ovate acuminate, bracts round ovate apiculate minutely hairy, corolla $\frac{1}{2}$ in. fine blue. *R. repens* var. *villosa*, *Nees in DC. Prodr.* xi. 472. *Justicia repens*, *Wall. Cat.* 2459, letter B partly.

W. DECCAN PENINSULA; Concan and Canara, *Wight, Law, Stocks, &c.*

Possibly a large form of *R. repens*. *Leaves* attaining 3 by $1\frac{1}{2}$ in., nerves beneath prominent, often patently white-hairy. *Spikes* $\frac{1}{2}$ – $\frac{3}{4}$ in. broad; bracts large, scarious margin very prominent sometimes coloured purplish. *Capsule* $\frac{1}{2}$ in., thin, very hairy; seeds concentrically furrowed, the ridges very sharp sometimes crested.

14. *R. Beddomei*, *Clarke*; leaves nearly sessile ovate acute subglabrous, spikes slenderly peduncled dense, bracts broadly ovate apiculate nearly glabrous, corolla $\frac{1}{4}$ in.

TENASSEERIM; Mooleyit and the Forest Ranges, *Beddome*.

Stems diffuse, branched, puberulous. *Leaves* 2 by $\frac{3}{4}$ –1 in., obscurely or not lineolate; petiole $\frac{1}{8}$ in. *Spikes* $1\frac{1}{2}$ by $\frac{1}{2}$ in., appearing to form lax terminal corymbs; uppermost leaves $\frac{1}{4}$ by $\frac{1}{20}$ in.; bracts nearly as of *R. repens*, more densely imbricated, 4-farious, regular. *Capsule* $\frac{1}{2}$ in. *Seeds* very small, minutely verrucose.—The spikes bear considerable resemblance to *R. repens*; but it seems more nearly allied to *R. himalayensis*, which differs in its long-petioled leaves, and slenderer spikes.

15. *R. Brandisii*, *Clarke*; leaves ovate or ovate-lanceolate acuminate at both ends nearly glabrous, bracts all fertile ovate acuminate nearly glabrous, bracteoles boat-shaped acuminate pubescent, corolla $\frac{1}{4}$ in.

TENASSEERIM; *Parish, Brandis, Beddome*.

Stems 18 in., nearly glabrous. *Leaves* $3\frac{1}{2}$ by $\frac{3}{4}$ – $1\frac{1}{2}$ in., membranous, finely lineolate; petiole 1 in. *Spikes* $1\frac{1}{2}$ by $\frac{1}{2}$ in., terminal and axillary clustered short-peduncled; bracts $\frac{1}{4}$ by $\frac{1}{8}$ in., obscurely 4-ranked, very narrowly marginate; bracteoles $\frac{1}{2}$ in.

Calyx $\frac{1}{2}$ in.; segments linear-lanceolate, pubescent. *Anther-cells* superposed, lower white-tailed. *Capsule* $\frac{1}{2}$ in., puberulous. *Seeds* small, minutely verrucose.

16. **R. parviflora**, *Nees in Wall. Pl. As. Rar.* iii. 110, and in *DC. Prodr.* xi. 469, excl. *syn.*; leaves small ovate or lanceolate nearly glabrous, bracts dimorphic barren elliptic or oblong subobtusely striate hardly margined, fertile obovate glabrous scarious-margined ciliate, bracteoles elliptic scarcely acute, corolla $\frac{1}{2}$ in. *R. repens*, *T. Anders. in Journ. Linn. Soc.* ix. 518 partly, not of *Nees*. *R. longifolia*, *Bedd. Ic. Pl. Ind. Or.* t. 266, not of *Nees*.

S. DECCAN PENINSULA; *Wight* (2011, 2285 *Herb. Propr.*). CEYLON; *Thwaites* (C. P., nn. 257, 3354).

A small, ramous weed. Lower leaves 1 by $\frac{1}{4}$ – $\frac{1}{2}$ in., petioled, ovate, upper narrow sometimes linear. *Spikes* $\frac{3}{4}$ by $\frac{1}{2}$ in., nearly all terminal, markedly 1-sided; barren bracts not cuspidate. *Capsule* $\frac{1}{2}$ in.; seeds small, minutely verrucose.—This, the typical *R. parviflora*, *Nees*, appears a very rare plant; *Nees*, however, referred numerous specimens with the fertile bracts hairy all over to *R. parviflora*, but which are *R. pectinata*, *Nees*, as far as the description goes.

VAR. pectinata; flowerless bracts mucronate often cuspidate flowering hairy. *R. pectinata*, *Nees in DC. Prodr.* xi. 470; *Wight Ic.* t. 1547; *T. Anders. in Journ. Linn. Soc.* ix. 517. *R. parviflora*, *Nees l. c. partly*; *Griff. Notul.* iv. 144; *Dalz. & Gibs. Bomb. Fl.* 195. *R. polygonoides*, *Nees in Wall. Pl. As. Rar.* iii. 110, and *Cat.* 7181, and in *DC. Prodr.* xi. 471; *Dalz. & Gibs. Bomb. Fl.* 196. *Justicia pectinata*, *Linn. Amœn. Acad.* iv. 299; *Lamk. Ill. i.* t. 12, fig. 3; *Roxb. Corom. Pl.* ii. 29, t. 153, and *Fl. Ind. i.* 133; *Wall. Cat.* 2458. *J. parviflora*, *Retz Obs.* v. 9. *J. infracta*, *Vahl Enum. i.* 155.—Throughout India, from the Himalaya to Ceylon and Pegu, a universal weed.—Usually ramous. Leaves $\frac{3}{4}$ by $\frac{1}{2}$ in.; petiole $\frac{1}{4}$ in. *Spikes* 1 by $\frac{1}{2}$ in., terminal and axillary, clustered, subsessile, distinctly 1-sided; barren bracts $\frac{1}{2}$ by $\frac{1}{12}$ in., scarcely margined; fertile $\frac{1}{10}$ in. diam., orbicular, apiculate, scarious-marginate, hairy on back as well as on margins; bracteoles $\frac{1}{10}$ in., elliptic, subacute. *Calyx* $\frac{1}{12}$ in.; segments linear-lanceolate, pubescent. *Corolla* blue or whiteish, upper lip short. *Anther-cells* superposed, lower white-tailed.—The area of this abundant plant should perhaps be extended to Java, &c., but the examples thence (*Dicliptera cœrules*, *Blume Bijl.* 791) differ considerably from all the Indian material, which is very uniform in character, the size of the heads and bracts varying a little.

VAR. muralis; spikes very dense, barren bracts ovate acute hardly longer than the fertile. *R. muralis*, *Nees in DC. Prodr.* xi. 470.—S. Deccan Peninsula; *Hohenacker*, n. 18, &c. Chittagong; *J. D. H.*, &c. *Distrib. Ava.*—Spikes sometimes $1\frac{1}{2}$ by $\frac{1}{2}$ in., densely strobiliform.

VAR. origanoides; leaves narrowly lanceolate, spikes dense narrow, barren bracts orbicular scarious-margined very hairy on the back nearly as the fertile. *R. origanoides*, *Nees in Wall. Pl. As. Rar.* iii. 110, and *Cat.* 7182, and in *DC. Prodr.* xi. 471.—Pegu; *Wallich*.

SPECIES NOT SEEN.

R. MASTERSI, *T. Anders. in Journ. Linn. Soc.* ix. 519; glabrous, leaves long-petioled ovate, spikes terminal ternate or paniced lax, bracts remote alternate spatulate-linear obtuse, corolla small.

ASSAM; banks of *R. Soonder*, *Masters*.

Herbaceous, larger than the other species of the genus. Leaves (including petiole) 5–8 by $1\frac{1}{2}$ –2 in., minutely lineolate, pale beneath. *Spikes* 3–6 in., more or less secund, glabrous or pubescent; bracts $\frac{1}{2}$ by $\frac{1}{4}$ in., mostly linear, obtuse, glabrous; bracteoles as the bracts or ovate acute glumaceous. *Corolla* $\frac{1}{2}$ in., glabrous. *Capsule* $\frac{1}{2}$ in., sparsely puberulous or pubescent (*T. Anderson*).

XLVII. DICLIPTERA, *Juss.*

Diffuse herbs. Leaves ovate, acute, entire or obscurely undulate. Inflorescence cymose, clustered or paniced; proper bracts opposite, unequal,

larger than the calyx (except in *D. parvibracteata*); flowers sessile, opposite, one of each pair usually reduced to a rudimentary calyx and bracteoles; bracteoles linear or linear-lanceolate, as long as the calyx (except in *D. parvibracteata*). *Calyx* sub-5-partite; segments equal, linear-lanceolate, more or less pubescent. *Corolla* red or rose, purple-spotted, tube slender, limb deeply 2-lipped; upper lip entire or emarginate, lower 3-lobed recurved. *Stamens* 2; anthers 2-celled; cells ovoid, superposed, muticous. *Ovary* 4-ovulate; style filiform, shortly bifid. *Capsule* clavate, stalk solid; placentæ rising elastically from their base. *Seeds* ovoid, compressed, glabrous, verrucose or glandular subpapillose.—Species 60, tropics of both Hemispheres.

Justicia chinensis, Vahl, *Roxb. Fl. Ind.* i. 124, Wall. *Cat.* 2466 (type sheet), has been long cultivated at Calcutta, having been introduced from China or Malaya; it looks like an enlarged or garden form of *D. Burmanni*, noticed below under *D. Leonotis*, Dalz.

* *Inflorescence panicled*, i. e. each pair of bracts mostly long-petioled.

1. ***D. parvibracteata***, Nees in Wall. *Pl. As. Rar.* iii. 111, and in DC. *Prodr.* xi. 488; leaves ovate acuminate nearly glabrous, bracts $\frac{1}{6}$ in. linear. *Justicia retorta*, Vahl *Enum.* i. 150 ? *J. latebrosa*, Koen.; *Roxb. Fl. Ind.* i. 125.

MADRAS; Circars, Wight (Herb. Propr. n. 51 or 2014); Vizagapatam (Jaipoor Hills), Beddome.

Stem diffuse, striate, obscurely pubescent upwards. *Leaves* 5 by $2\frac{3}{4}$ in. (or all except the lowest small, 1–2 in.), base shortly acuminate; petiole 1 in. *Panicle* 6 in., divaricate, lax, nearly glabrous; floral leaves at the bifurcations $\frac{1}{10}$ – $\frac{1}{4}$ in., linear-lanceolate; bracteoles $\frac{1}{16}$ in., linear. *Calyx* $\frac{1}{16}$ in., sub-5-partite; segments linear-lanceolate, minutely pubescent. *Corolla* $\frac{1}{2}$ in., slender, minutely pubescent. *Capsule* $\frac{1}{2}$ in., clavate, pubescent; placentæ rising elastically.—*Justicia latebrosa*, Koen., has never been satisfactorily recovered. The Ic. Ined. of this at Kew is *D. parvibracteata*; a separate imperfect drawing of a capsule added in the corner perhaps not pertaining. But Roxburgh's description does not suit in several points, of which "Flowers large" is difficult to get over. A scrap in Wallich's Herbarium, marked in old handwriting "*Justicia latebrosa*, Roxb.," is *Dicliptera cuneata*.

2. ***D. Beddomei***, Clarke; leaves ovate acuminate minutely pubescent, bracts $\frac{1}{2}$ in. linear-oblong suddenly mucronate ciliate.

N. MADRAS; Nallaymallays (in Kurnool), Beddome.

Stems diffuse, striate, glabrous except the tips. *Leaves* $5\frac{1}{2}$ by $3\frac{1}{4}$ in., pubescent beneath or nearly glabrous, base acuminate; petiole 2 in. *Panicle* 6 in., lax branches often patently white-hairy; floral leaves at the bifurcations gradually reduced, uppermost linear; bracteoles $\frac{1}{4}$ in., linear-lanceolate. *Corolla* $\frac{1}{2}$ in., minutely pubescent. *Capsule* nearly $\frac{1}{2}$ in., clavate, pubescent; placentæ rising elastically from the base. *Seeds* verrucose.

3. ***D. Kurzii***, Clarke; patently white-hairy, leaves lanceolate, bracts $\frac{1}{2}$ in. linear-lanceolate, hirsute glandular-hairy. *D. speciosa*, Var. β only, Kurz in Journ. As. Soc. 1873, pt. ii. 97.

PEGU; Kurz.

Stem stout, striate, patently white-hairy. *Leaves* 5 by $1\frac{1}{2}$ in., acuminate at both ends, thinly hairy on both surfaces; petiole $\frac{1}{4}$ in. *Panicle* 6–15 in., divaricate, lax, patently white-hairy; bracts and bracteoles with glandular hammer-headed hairs, and also white-hirsute. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in., slender, minutely hairy. *Capsule* $\frac{1}{2}$ in., clavate, pubescent, placentæ rising elastically. *Seeds* verrucose.—Placed doubtfully as a var. of *D. speciosa* by Kurz; the inflorescence is different, and the corolla is considerably smaller.

4. ***D. speciosa***, Kurz in *Journ. As. Soc.* 1873, pt. ii. *Var. a. only*; leaves large lanceolate thinly hairy on both surfaces, bracts $\frac{1}{2}$ – $\frac{1}{2}$ in. spatulate-oblong obtuse hirsute glandular-hairy.

PEGU; Kurz.

Stem terete, glabrous, except towards the top. *Leaves* 8 by $2\frac{1}{2}$ in., acuminate at both ends; petiole $1\frac{1}{2}$ in. *Cymes* 1– $1\frac{1}{2}$ in., axillary, often several together, sometimes from the lower axils; mostly subsimply umbelled, rarely compound; floral leaves $\frac{1}{2}$ in., linear; proper bracts $\frac{1}{2}$ in. broad, on cinereous-pubescent peduncles $\frac{1}{2}$ in. long. *Corolla* nearly 1 in., lower lip broad. *Capsule* (immature) clavate, minutely glandulose-pubescent, 4-seeded.

5. ***D. zeylanica***, Nees in *DC. Prodr.* xi. 474; leaves ovate acuminate minutely scabrid or glabrate, bracts ovate or elliptic mucronate glabrous or minutely pubescent. *D. bivalvis*, Nees l. c. 475 (as to the Indian material); Dalz. & Gibs. *Bomb. Fl.* 196; Wight *Ill. t.* 164 b, fig. 10, and *l.c.* t. 1551; T. Anders. *Thwaites Enum.* 235, and in *Journ. Linn. Soc.* ix. 519, not of Juss.

W. DECCAN PENINSULA from the Concan southward, and CEYLON; frequent.

Stem glabrous, sometimes pubescent or densely woolly. *Leaves* attaining 5 by $2\frac{1}{2}$ in., base shortly acuminate; petiole $\frac{3}{4}$ in. *Inflorescence* variable; in the type of Wight running into terminal panicles, upper floral leaves linear, peduncles $\frac{1}{2}$ –1 in.; more often cymes axillary, abbreviated, peduncles ternate; or peduncles subobsolete, or the inflorescence reduced to one pair of bracts; bracts $\frac{1}{2}$ in. broad in the type specimen, often only $\frac{1}{4}$ in. broad, never acuminate, either cuneate or subobtusely mucronate, frequently nervose; bracteoles small, linear-lanceolate. *Corolla* $\frac{1}{2}$ in. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in., clavate, pubescent. *Seeds* minutely verrucose.—*Dicliptera bivalvis*, Juss., is exactly *Justicia bivalvis*, Linn.; which, in so far as it relates to any Indian plant, is founded on Rheede *Hort. Mal.* ix. t. 43, which cannot represent the present plant (and may be *Peristrophe montana*). *D. bivalvis*, Juss., can, therefore, not even *partim* be the present *D. zeylanica*.

** *Inflorescence clustered subcapitate*, i. e. each pair of bracts, subsessile or very shortly petioled (see also 5, *D. zeylanica*).

6. ***D. cuneata***, Nees in *Wall. Pl. As. Rar.* iii. 111, and in *DC. Prodr.* xi. 481; leaves ovate acuminate glabrous, flower-clusters often long-peduncled, bracts obovate elliptic or cuneate apiculate or mucronate nearly glabrous. Wight *l.c.* t. 1552; T. Anders. in *Journ. Linn. Soc.* ix. 521. *Justicia umbellata*, Wall. *Cat.* 2467.

S. MADRAS; Wight, &c.; Tinnevely, Beddome.

Pairs of bracts on short peduncles $0\frac{1}{2}$ – $1\frac{1}{2}$ in., often 3–8 together forming a subcapitate cluster; these clusters often on a peduncle $\frac{1}{2}$ – $1\frac{1}{2}$ in., floral leaves supporting the cluster usually reduced, narrow.—Otherwise very near the glabrous forms of *D. zeylanica* with congested inflorescence: both T. Anderson and Beddome have, however, treated the species as distinct.

7. ***D. reptans***, Nees in *DC. Prodr.* xi. 483; leaves elliptic acuminate puberulous beneath, flower-clusters axillary subsessile, bracts elliptic acute mucronate softly pubescent.

MERGUI; Griffith.

Stems procumbent, rooting; branches 6–10 in., erect, puberulous. *Leaves* 3 by 1 in., base shortly acuminate; petiole $\frac{1}{4}$ in. *Peduncles* to the flower-clusters $0\frac{1}{2}$ in.; floral leaves $\frac{1}{2}$ in., linear; peduncles to the pairs of bracts $0\frac{1}{2}$ in., minutely pubescent; bracts nearly $\frac{1}{2}$ by $\frac{1}{4}$ in., 1-nerved; secondary nerves oblique, subprominent. *Corolla* $\frac{3}{4}$ in., slender.—*Capsule* not seen; and anther-cells rather long for a *Dicliptera*; it is possibly a *Peristrophe* (as Griffith marked it in the field), and greatly resembles *P. acuminata* var. *fragilis*, except that the flower is smaller.

8. **D. micranthes**, *Nees in Wall. Pl. As. Rar.* iii. 112, and in *DC. Prodr.* xi. 484, *excl. syn.*; leaves ovate acuminate nearly glabrous, flower-clusters mostly in axillary whorls, bracts oblong somewhat obovate cuspidate ciliate. *Dalz. & Gibs. Bomb. Fl.* 197; *T. Anders. in Journ. Linn. Soc.* ix. 521.

CENTRAL INDIA, alt. 1-3000 ft.; from Behar (*J. D. H.*) and Chota Nagpore to the Concan, frequent.—DISTRIB. Abyssinia.

Branches striate, puberulous or glabrate. *Leaves* 4 by $1\frac{1}{2}$ in., base shortly acuminate; petiole $1\frac{1}{2}$ in. *Bracts* $\frac{1}{2}$ by $\frac{1}{2}$ in., often nearly glabrous except the densely white ciliate margins. *Corolla* scarcely exceeding $\frac{1}{2}$ in., very slender. *Capsule* $\frac{1}{2}$ in., clavate, very shortly stalked, membranous, glabrous except the minutely hairy tip. *Seeds* very small, conspicuously verrucose.

9. **D. Leonotis**, *Dalz. ms.*; leaves elliptic acuminate glabrous, flower-clusters mostly in axillary whorls, bracts oblong-lanceolate acuminate cuspidate minutely pubescent. *D. Burmanni*, *Nees in Wall. Pl. As. Rar.* iii. 112, and in *DC. Prodr.* xi. 483 *partly, not of T. Anders.*; *Dalz. & Gibs. Bomb. Fl.* 196?. *Justicia chinensis*, *Wall. Cat.* 2466, *letter c partly.*

DECCAN PENINSULA?; *Wight* (*Herb. Propr. n.* 2016). GOOJERAT and AJMERE, *Dalzell.*

Closely allied to *D. micranthes*, but the bracts, flowers, capsules and seeds considerably larger. *Leaves* 3 by 1 in.; petiole $\frac{1}{2}$ in. *Bracts* $\frac{1}{2}$ by $\frac{1}{2}$ in., much acuminate. *Corolla* $\frac{3}{4}$ in. *Capsule* $\frac{1}{4}$ in., very hairy. *Seeds* much larger than in *D. micranthes*, minutely glandulose-papillose, scarcely verrucose.—*Nees* grounds his *D. Burmanni* on *Burmans* figure of a Java species; this is *D. Burmanni*, *T. Anders. in Journ. Linn. Soc.* ix. 520. In founding the species, *Nees* states he had only seen one specimen, viz. *Wight n.* 2016, which sheet named by *Nees*' hand is at Kew; but it is not the plant figured by *Burmans*.

10. **D. riparia**, *Nees in Wall. Pl. As. Rar.* iii. 112, and *Cat.* 7183, and in *DC. Prodr.* xi. 480; leaves ovate acuminate glabrous or pubescent, flower-clusters terminal and axillary subverticillate, bracts narrowly obovate obtuse hairy ciliate, corolla $\frac{3}{4}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 520.

PEGU and TENASSERIM; *Wallich, Griffith, McLelland, &c.*

Branches elongate. *Leaves* $4\frac{1}{2}$ by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., base shortly acuminate; petiole $1\frac{1}{2}$ in. *Flowers* subsessile; bracts unequal, similar, larger $\frac{1}{2}$ by $\frac{1}{2}$ in.; bracteoles $\frac{1}{2}$ in., linear. *Calyx* $\frac{1}{2}$ in.; segments linear, nearly glabrous. *Capsule* $\frac{1}{2}$ in., clavate, nearly glabrous. *Seeds* minutely papillose, hardly verrucose.—Perhaps only a form of *D. Roxburghiana*, differing in the softly pubescent flower-clusters, and the very obtuse often emarginate bracts. The numerous examples are exactly alike, but come from one neighbourhood.

11. **D. Roxburghiana**, *Nees in Wall. Pl. As. Rar.* iii. 111, and in *DC. Prodr.* xi. 483, *excl. syn.*; leaves elliptic acute obscurely pubescent or glabrate, flower-clusters axillary and terminal sessile more rarely shortly peduncled, bracts cuneate-elliptic or obovate apiculate not acuminate. *T. Anders. in Journ. Linn. Soc.* ix. 519, *partly*; *Dalz. & Gibs. Bomb. Fl.* 196?. *Justicia chinensis*, *Wall. Cat.* 2466, *letter D*, and *part B, C.*

Plains of N. INDIA, from the Punjab to Assam, Silhet and E. Bengal, frequent. BHOTAN; *Griffith.*

Stems 1-3 ft., elongate, nearly glabrous. *Leaves* $2\frac{1}{2}$ by 1 in., base cuneate; petiole $\frac{1}{2}$ in. *Bracts* nearly $\frac{1}{2}$ by $\frac{1}{2}$ in., often 3-nerved, ciliate, thinly pubescent. *Corolla* $\frac{3}{4}$ in. *Capsule* $\frac{1}{2}$ in., clavate, puberulous or glabrous. *Seeds* conspicuously verrucose.—The whole of the plains form of *D. Roxburghiana* differs from *Var.*

bupleuroides in the broader, more or less obovate, bracts. Nees founded his species on the common Assam and E. Bengal plant, and the original ticket on his type specimen is marked Assam. Benthams, however (in Fl. Hongk. 266), says this was an error, and that this type specimen came from the Calcutta Botanic Garden; but it is not known how Benthams discovered this. Nees, however, is in error in citing Roxburgh's *Justicia chinensis*, for Roxburgh's *Ic. Ined.* proves this to have been the true plant, long cultivated at Calcutta.

VAR. *bupleuroides*, Nees in Wall. Pl. As. Rar. iii. 111, and in DC. Prodr. xi. 485, excl. syn. Roxb. (sp.); leaves ovate or elliptic acute or acuminate glabrous or somewhat pubescent, flower-clusters dense axillary and terminal mostly sessile, bracts linear or linear-oblong nearly parallel-sided acuminate cuspidate. *D. cardiocarpa*, Nees in Wall. Pl. As. Rar. iii. 111, and in DC. Prodr. xi. 480. *D. hirtula*, Nees in DC. Prodr. xi. 485. *D. Roxburghii*, T. Anders. in Journ. Linn. Soc. ix. 519, chiefly. *D. Roxburghiana*, Boiss. Fl. Orient. iv. 526, not of Nees. *D. rupestris*, Nees in DC. Prodr. xi. 486. *D. crinita*, Nees l. c. 485, as to the Indian examples so named by Nees. *Justicia chinensis*, Wall. Cat. 2466, letter B, C partly; Roxb. Fl. Ind. i. 125, Obs. only. *J. canescens*, Wall. Cat. 2423.—Throughout India in the hills, alt. 1–6000 ft., abundant in the north, becoming rare in the Malabar Ghauts; in the Himalaya from Kashmir to Upper Assam and the Chittagong Hills; Mt. Aboo, Stocks; Central India. Distrib. Afghanistan.—A large very uniform series, varying only slightly in the pubescence of the bracts. In the extreme forms the bracts are $\frac{3}{4}$ by $\frac{1}{16}$ in., glistening ciliate, and in some of Beddome's Malabar specimens they are almost subulate. Though the bracts are often broader than in these, the plant as a whole is tolerably well separable from *D. Roxburghiana*.

XLVIII. PERISTROPHE, Nees.

Erect, spreading herbs. Leaves entire. Flower-clusters axillary or terminal, often paniced by the reduction of the floral leaves; bracts 1–4 together, linear or ovate, longer (rarely shorter) than the calyx; bracteoles linear-lanceolate, shorter than the bracts. Calyx deeply 5-lobed; segments equal, linear-lanceolate. Corolla rose or purple; tube slender, limb deeply 2-lipped, upper lip subentire, lower very shortly 3-lobed. Stamens 2; filaments pubescent below; anthers 2-celled, cells linear (or in *P. bicalyculata* ovoid), mucous, one higher than the other or distant. Ovary 4-ovulate; style filiform, minutely bifid. Capsule ellipsoid, stalked, usually 4-seeded, more or less dusky pubescent. Seeds ovoid, compressed, glabrous, minutely glandular-papillose, scarcely verrucose.—Species 15, from Tropical and S. Africa to New Caledonia and S. Japan.

1. *P. bicalyculata*, Nees in Wall. Pl. As. Rar. iii. 113, and in DC. Prodr. xi. 496; thinly patently hairy, leaves ovate acuminate, panicle lax divaricate, bracts linear or linear-spathulate acute mucronate, corolla $\frac{1}{2}$ – $\frac{1}{3}$ in. Dalz. & Gibs. Bomb. Fl. 197; T. Anders. in Journ. Linn. Soc. ix. 521. *P. Kotschyana*, Nees l. c. 197. *Justicia bicalyculata*, Vahl Symb. ii. 13; Roxb. Fl. Ind. i. 126; Blume Bijdr. 783; Wall. Cat. 2457. *J. ligulata*, Lamk. Ill. t. 12, fig. 2; Cav. Ic. t. i. 52, t. 71. *Dianthera malabarica*, Linn. f. Suppl. 85. *D. bicalyculata*, Retz in Act. Holm. 1775, 297, t. 9, and Obs. i. 10. *Ruellia paniculata*, Linn. Herb.

TROPICAL and SUBTROPICAL INDIA; from the Punjab and Scinde to Assam, Pegu and Madras, very common; not known from Ceylon.—DISTRIB. Tropical Africa.

Leaves 2 by 1 in.; petiole $\frac{1}{4}$ in. Each pair of proper bracts long-petioled; bracts $\frac{1}{2}$ by $\frac{1}{16}$ in., unequal. Anther-cells ovoid, remote, resembling those of *Dicliptera*, not of other *Peristrophes*. Capsule $\frac{1}{2}$ – $\frac{1}{3}$ in. Seeds minutely glandular-papillose.

VAR. rivinoides; young inflorescence axillary very short-peduncled capitellate. *P. rivinoides*, Wall. Cat. 2488. *P. bicalyculata*, Var. *B*, Nees ms. in Wight Herb. Propr. n. 2018 c.—S. India.

2. **P. undulata**, Nees in DC. Prodr. xi. 496; puberulous, leaves lanceolate undulate, panicles small close, bracts linear-lanceolate, corolla $\frac{3}{4}$ in. *Justicia undulata*, Vahl Symb. ii. 8, excl. syn.

MALABAR (Koenig, fide Vahl). **NILGIRIS**; Beddome.

Leaves $2\frac{3}{4}$ by $\frac{3}{4}$ in., attenuate at both ends, sinuate, in Beddome's examples variegated; petiole $\frac{1}{2}$ in. Panicle 1–2 in. diam., terminal, hardly exceeding the upper leaves; bracts $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{2}$ in., 2 or 3–4 together, 2–4-fld., lineolate, nearly glabrous. Corolla purple-red, tube $\frac{1}{2}$ in., limb $\frac{1}{2}$ in., lobes 2 very shortly toothed. Anther-cells linear, one placed close above the other. Capsule not seen.—This appears closely allied to *P. acuminata*, as Nees states.

3. **P. acuminata**, Nees in Wall. Pl. As. Rar. iii. 113, and in DC. Prodr. xi. 496; leaves narrowly lanceolate nearly glabrous, panicles compact, bracts $\frac{1}{2}$ by $\frac{1}{8}$ in. glabrous, corolla $\frac{3}{4}$ in. T. Anders. in Journ. Linn. Soc. ix. 521. *P. Blumeana*, Nees l. c. 495. *Justicia acuminata*, Wall. Cat. 2425, sheet B partly.

TAVOY; Wallich. **MALACCA**; Griffith.—**DISTRIB.** Java.

Leaves 3 by $\frac{3}{4}$ in., acuminate at both ends, lineate on both surfaces, minutely pubescent on the midrib beneath or glabrous; petiole $\frac{1}{2}$ in. Bracts 2–4 together, $\frac{1}{2}$ in. long or in other cymes of the same branch scarcely $\frac{1}{2}$ in. Anther-cells linear, one slightly overlapping the other, upper usually narrower curved. Capsule $\frac{1}{2}$ – $\frac{1}{2}$ in., nearly glabrous.—The plants here collected under *P. acuminata* are separated from *P. montana* by the much smaller corolla, and possibly include 2 or more species; but the material is insufficient. As noted by Nees, some of the specimens show great variation in the bracts on one branchlet; yet species have been founded on characters almost wholly drawn from them. In justification of throwing the species into one, it may be observed that the Malacca plant marked *P. acuminata* by T. Anderson is identical with the Java plant marked *P. Blumeana* by Nees; but there is no specimen from Burma (much less from Khasia) that matches this, as might be inferred from Nees and T. Anderson: and Miquel's *P. acuminata* from Java is very unlike *P. acuminata*, Nees.

VAR. fragilis; leaves larger ovate-lanceolate, bracts $\frac{3}{4}$ by $\frac{1}{2}$ in. broadly lanceolate glabrous. *P. gracilis*, Nees in Wall. Pl. As. Rar. iii. 113, and in DC. Prodr. xi. 495, and in Wall. Cat. 7184; T. Anders. in Journ. Linn. Soc. ix. 522. *Justicia acuminata*, Wall. Cat. 2425, sheet B partly.—Tavoy; Wallich. Rangoon; M'Lelland. Mergui; Griffith.—Leaves 5 by 2 in.; nerves many, pubescent; uppermost leaves linear-lanceolate.—The Tavoy example marked by Nees *fragilis* is identical with some of that marked by him *acuminata*.

VAR. khasiana, bracts all small $\frac{1}{8}$ in. fuscous-pubescent. *Justicia acuminata*, Wall. Cat. 2425, letter A right-hand fragments.—Khasia Mts.; Wallich.—This does not look like a *Peristrophe*, but the corolla and stamens are exactly as in *P. acuminata*, type.

4. **P. lanceolaria**, Nees in Wall. Pl. As. Rar. iii. 114, and in DC. Prodr. xi. 496; leaves lanceolate or ovate-lanceolate nearly glabrous, panicles densely glandular-pubescent, bracts $\frac{3}{4}$ in. linear-lanceolate, corolla $1\frac{3}{4}$ in. Bot. Mag. 5566; T. Anders. in Journ. Linn. Soc. ix. 522. *Justicia lanceolaria*, Roxb. Fl. Ind. i. 121; Wall. Cat. 2463.

SILHET and **JAINTEAPOOR**, alt. 500 ft.; Wallich, &c., frequent. **MOULMEIN**; Parish. **TENASSERIM**; Beddome.

Leaves $5\frac{1}{2}$ by 2 in., acute at both ends, pubescent on the nerves beneath or glabrate, obscurely or not lineolate; petiole $\frac{3}{4}$ in. Panicles strict, branches erect. Calyx $\frac{1}{2}$ – $\frac{1}{2}$ in.; segments sublinear. Anther-cells linear-oblong, immediately superposed.

Capsule $\frac{3}{4}$ in., viscous-pubescent.—A strongly marked species; the Moulmein plant (*P. grandiflora*, Parish ms.) has the flowers hardly larger than in some examples from Silhet.

5. **P. speciosa**, *Nees in Wall. Pl. As. Rar.* iii. 113, and in *DC. Prodr.* xi. 495; leaves ovate-lanceolate or elliptic acute nearly glabrous, floral leaves mostly large, bracts linear-oblong not acute nearly glabrous many widened upwards, corolla $1\frac{3}{4}$ in. *T. Anders. in Journ. Linn. Soc.* ix. 521. *Justicia speciosa*, *Roxb. Fl. Ind.* i. 122; *Bot. Mag.* t. 2722; *Wall. Cat.* 2464; *Lodd. Bot. Cab.* t. 1915.

SUBTROPICAL HIMALAYA, alt. 1-5000 ft., from Kumaon to Bhotan, frequent; *Wallich, &c.* SILHET STATION; *Clarke.*

Leaves 5 by 2 in., base rhomboid or acute; petiole 1 in. *Floral leaves* often 1-2 in., so that the flower-clusters often appear terminal or axillary subcapitate rather than paniced; bracts $\frac{3}{4}$ by $\frac{1}{2}$ - $\frac{1}{4}$ in., subobtusely, sometimes spatulate, tips often recurved. *Anther-cells* linear-oblong, one superposed half its length.

6. **P. montana**, *Nees in Wall. Pl. As. Rar.* iii. 113, and in *DC. Prodr.* xi. 493, partly; leaves elliptic acuminate at both ends subglabrous, bracts large elliptic glabrous nervose, corolla $2\frac{1}{4}$ in. *Wight Ic.* t. 1553; *T. Anders. in Journ. Linn. Soc.* ix. 521. *Justicia sylvestris*, *Wall. Cat.* 2468.

W. DECCAN PENINSULA from the Concan southward, and CEYLON, frequent; *Wight, &c.*

Leaves $5\frac{1}{2}$ by $1\frac{3}{4}$ in., raphides very slender on both surfaces; petiole $1\frac{1}{4}$ in. *Bracts* $\frac{3}{4}$ by $\frac{1}{2}$ - $\frac{1}{4}$ in., obtuse or minutely apiculate, not acuminate. *Filaments* pubescent; *anther-cells* linear, one half its length below the other.—Described from Wight, *Herb. Propr.* n. 2017, its type (named in Nees' hand); and includes all the S. Indian examples of Nees and T. Anderson, not their Khasi material.

7. **P. tinctoria**, *Nees in Wall. Pl. As. Rar.* iii. 113, and in *DC. Prodr.* xi. 493 P; dusky-puberulous, leaves short-petioled ovate subacute not large, bracts elliptic subacute nervose not ciliate, corolla $1\frac{1}{4}$ in. slender. *T. Anders. in Journ. Linn. Soc.* ix. 521, partly. *Justicia tinctoria*, *Roxb. Fl. Ind.* i. 123; *Wall. Cat.* 2465. *J. Roxburghiana*, *Roem. & Sch. Syst. Mant.* i. 140.

INDIA; cultivated frequently from Assam to CEYLON.—DISTRIB. Malaya, S.E. Asia; where wild not known.

Leaves 2-3 by $1-1\frac{1}{4}$ in.; lower petioles rarely exceeding $\frac{1}{4}$ in., dusky-puberulous. *Bracts* $\frac{3}{4}$ by $\frac{1}{2}$ in., somewhat nervose, dusky-puberulous. *Anther-cells* linear, one superposed for half its length. *Capsule* hardly $\frac{1}{2}$ in., shortly stalked.—A well-marked cultivated form, described from Roxburgh's and Wallich's specimens. Nees has diagnosed his *P. tinctoria* so as expressly to exclude (by the ciliate bracts, &c.) all the examples; so that the name *P. tinctoria*, Nees, can only be understood to refer to some of Nees' synonyms. The figure of *Dianthera japonica*, *Thunb. Fl. Jap.* 21, t. 4, cited by Nees for this species, is a *Dicliptera*, and with it much of Nees' synonymy falls to the ground.

8. **P. fera**, *Clarke*; leaves long-petioled ovate-lanceolate acuminate more or less pubescent, bracts elliptic often elongate nervose ciliate often hairy, corolla $1\frac{3}{4}$ in. *P. montana*, Var. β *sylvestris*, *Nees in DC. Prodr.* xi. 493 (as to the N. Indian examples). *P. tinctoria*, *Nees l. c.* as to *descr. only*; *T. Anders. in Journ. Linn. Soc.* ix. 521, chiefly. *Justicia acuminata*, *Wall. Cat.* 2425, left example on type sheet.—*Peristrophe* sp., *Griff. Itin. Notes*, 36, n. 596.

EASTERN FRONTIER Bhotan, *Griffith*. ASSAM and KHASIA Mts., alt. 1-4000 ft., common, *H. f. & T.*, &c.

Leaves $4\frac{1}{2}$ by $1\frac{3}{4}$ in.; raphides obscure or 0; petiole (of the middle cauline leaves) often exceeding 1 in. *Bracts* $\frac{3}{4}$ by $\frac{1}{4}$ in., often obtusely rennminate. *Corolla* much broader than in *P. tinctoria*.—Possibly the wild form of *P. tinctoria*. Nees, after diagnosing his *P. montana* as having non-ciliate bracts, has thus named examples of *P. fera* with intensely ciliate bracts.

VAR. intermedia; bracts more hairy, flowers smaller.—Chittagong, alt. 1000 ft.; *H. f.* & *T.* Pegu; *Kurz*. Tenasserim; *Beddome*.—This has been named *P. jalap-pafolia*, Nees, but the corolla is much smaller than in the Malay examples of that species. It is suspiciously intermediate between the *P. acuminata* var. *fragilis* and *P. fera*; and both plants were collected by Beddome on the slopes of Mooleyit in Tenasserim; the corolla is the same size in both, and the only difference between them is that in *Var. intermedia* the bracts are $\frac{1}{4}$ in. broad and hairy, but in *P. acuminata* var. *fragilis* $\frac{1}{2}$ in. broad and glabrous.

XLIX. HYPOESTES, *R. Br.*

Herbs or shrubs. *Leaves* entire or toothed. *Flower-clusters* spiked, capitellate or rarely solitary; bracts 2-4 together, free or united at base, enclosing 1-4 flowers, of which all but 1 are usually reduced or obsolete; bracteoles shorter than the bracts, narrow. *Calyx* very small (or in *H. lanata* nearly equalling the bracteoles), deeply 5-lobed, scarious or membranous; segments linear-lanceolate. *Corolla* pink purple or white (in the Indian species); tube slender, limb 2-partite; upper lip subentire, lower very shortly 3-lobed. *Stamens* 2; anthers 1-celled, mucous. *Ovary* 4-celled?; style filiform, scarcely bifid at the tip. *Capsule* ellipsoid, stalked, usually 4-seeded. *Seeds* ovoid, compressed, glabrous, in the Indian species verrucose.—Species, 70, from Tropical and S. Africa, the Himalaya, China and Australia.

Hypoestes purpurea, *R. Br.*, *Nees in Wall. Pl. As. Rar.* iii. 114 (*Justicia purpurea*, *Wall. Cat.* 2473), is a Malay Archipelago plant, cultivated from long ago in Bengal.

1. ***H. lanata***, *Dalz. in Hook. Kew Journ.* ii. 343; leaves elliptic acuminate entire nearly glabrous, spikes elongate interrupted softly hairy axillary and running into large terminal panicles, bracts distinct linear, corolla 1 in. *Dalz. & Gibs. Bomb. Fl.* 197; *T. Anders. in Journ. Linn. Soc.* ix. 522.

CONCAN GHATS; *Law, Dalzell*.

An undershrub. *Leaves* 5 by $1\frac{3}{4}$ in., minutely lineolate on both surfaces; petiole $\frac{3}{4}$ in., sometimes winged. *Spikes* 6 in. and upwards; flowers mostly in opposite distant clusters, each cluster consisting of 1-3 bracts and 1 (with 1 or 2 reduced) flower; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., very hairy. *Calyx* $\frac{1}{2}$ in., hairy. *Capsule* nearly $\frac{3}{4}$ in., stalked, pubescent. *Seeds* verrucose.—Habit very remote from *Hypoestes*, superficially resembling *Strobilanthes perfoliatus*, but the corolla and stamens are typical *Hypoestes*.

2. ***H. triflora***, *Roem. & Sch. Syst.* i. 88; leaves ovate somewhat hairy on both surfaces, flower-clusters capitellate axillary and terminal, bracts narrowly obovate subobtus, corolla scarcely $\frac{1}{2}$ in. *Nees in DC. Prodr.* xi. 506; *T. Anders. in Journ. Linn. Soc.* ix. 522. *H. Wallichii*, *Nees in Wall. Pl. As. Rar.* iii. 114. *Justicia chinensis*, *Wall. Cat.* 2466, letter E.

NEPAL; *Wallich*; Tambur River, alt. 1-3000 ft., *J. D. H.* SIKKIM and BHOTAN, alt. 4-7000 ft., *Clarke, Griffith*.—DISTRIB. Abyssinia.

Herbaceous, ramous. *Leaves* attaining $3\frac{1}{2}$ by 2 in., mostly much smaller, crenate or denticulate, sparsely hairy above, pubescent beneath; petiole $1\frac{1}{2}$ in. *Flower-clusters* 1-5 (often 3) together, subsessile; bracts opposite, paired, flower in one of each pair nearly always 0 or much reduced; bracteoles $\frac{1}{4}$ - $\frac{1}{2}$ in., linear-lanceolate.

nearly as long as the bracts. *Calyx* $\frac{1}{8}$ in. *Corolla* pink or white. *Capsule* $\frac{1}{2}$ in., nearly glabrous. *Seeds* verrucose.—The placentae tend to rise elastically, and the inflorescence also draws this plant very close to *Dicliptera*.

3. **H. malaccensis**, *Wight Ic. t.* 1555; leaves elliptic acuminate pubescent beneath, flower-clusters numerous capitate, bracts lanceolate acute connate at base, corolla $\frac{3}{4}$ in. slender. *T. Anders. in Journ. Linn. Soc.* ix. 522. *H. Decaisneana & laxiflora*, *Nees in DC. Prodr.* xi. 508.

MALACCA; *Griffith, Capt. A. C. Wight, Maingay.*

Branches herbaceous, diffuse, minutely pubescent. *Leaves* $2\frac{1}{2}$ by 1 in., petiole $\frac{1}{2}$ in. *Inflorescence* dense, minutely ashy-pubescent; bracts $\frac{1}{2}$ – $\frac{3}{8}$ in., several connate into a tube, enclosing 1–4 flowers, of which all but 1 are usually rudimentary; bracteoles $\frac{1}{4}$ in., linear, scarious. *Calyx* scarcely $\frac{1}{6}$ in., membranous. *Capsule* nearly $\frac{1}{2}$ in.—This extends, with slight variation in size of corolla and degree of union of the bracts, throughout the Malay Archipelago to the Philippines.

ORDER CX. SELAGINÆ. (By J. D. Hooker.)

Herbs or shrubs. *Leaves* alternate or the lower opposite, entire or toothed. *Flowers* small, solitary or spicate, irregular, 2-sexual. *Calyx* inferior, spathaceous or tubular and 2–5-fid or -partite, imbricate in bud. *Corolla* monopetalous; tube entire or split, limb 2-lipped or 4–5-lobed, imbricate in bud. *Stamens* inserted on the corolla-throat or -lobes, 2, or 4 with a rudimentary 5th, filaments filiform; anther-cells confluent. *Ovary* free, 2-celled; style simple, terminal, stigma subcapitate or 2-lobed; ovules 1 pendulous from the top of each cell, anatropous. *Fruit* small, 2-celled, indehiscent or of 2 cocci, one often imperfect. *Seeds* pendulous; embryo straight in the axis of fleshy albumen; cotyledons $\frac{1}{2}$ -cylindric, radicle superior.—DISTRIB. Species 140, all S. African, except the European genus *Globularia* and the following.

LAGOTIS, Gaertn. (GYMNANDRA, Pall.)

Perennial fleshy herbs. *Leaves* radical and cauline, entire crenate or incised. *Flowering branches* scape-like, ascending, leafy above. *Flowers* spicate or capitate, bracteate, blue or purple, ebracteolate; bracts usually broad, imbricating, as long or longer than the flowers. *Calyx* spathaceous or of 2 sepals. *Corolla-tube* curved; limb 2-lipped, lower lip 2–4-lobed. *Stamens* 2, inserted on the corolla-throat; anthers very large, reniform. *Ovary* 2-celled; style slender, jointed at the base, stigma capitate or 2-fid. *Drupe* small, 2-celled, 1–2-seeded, sometimes separable into 2 indehiscent cocci.—DISTRIB. Species 4 or 5, Arctic Regions and Mts. of N. Asia and N.W. America.

L. stolonifera, Koch (Gymnandra), a species found from Armenia to Afghanistan, has been collected in Wazuristan, alt. 5–7000 ft., by Stewart, close to the British frontier. It may be known by its small size, narrow leaves, and long stolons.

* *Calyx* of 2 oblong sepals.

1. **L. globosa**, *Kurz in Journ. As. Soc.* xxxix. 2, 80, t. 7, f. 1 (Gymnandra); leaves long-petioled oblong pinnatifid, scape almost naked, bracts much larger than and concealing the flowers suborbicular densely imbricate forming a globose head.

WESTERN TIBET; Therichan Pass, alt. 15–16,000 ft., *Heyde*; Gilgit, *Col. Turner (fid. C. B. Clarke)*.

Rootstock slender. *Leaves* few, cut to the midrib; lobes linear-oblong, widened towards their obtuse or notched tips; petiole 2-3 in. *Scape* slender, shorter than the leaves, with a few leafy bracts at the tip. *Heads* 1-1½ in. diam., like a double rose; outer bracts ½ in., orbicular-obovate, concave (when dry membranous), inner narrower. *Flowers* ¼ the length of the bract. *Sepals* obovate-oblong, one obtuse, the other 2-toothed. *Filaments* slender, as long as the upper lip; anthers small for the genus. *Style* included, stigma notched. *Fruit* ½ in. long, ellipsoid.

2. **L. decumbens**, Ruprecht Sert. Thianschan, 64; leaves long-petioled ovate or oblong coarsely crenate, scape few-leaved, bracts much larger than and concealing the flowers broadly ovate densely imbricate forming an oblong head.

WESTERN TIBET; Karakorum, alt. 16-18,000 ft., Thomson, Henderson; Karakash Mts., Stewart.—DISTRIB. Thianschan Mts.

Rootstock small. *Leaves* 1-1½ in., obtuse, base cuneate; petiole 2-4 in., tapering downwards. *Flowering stems* ascending, longer than the leaves, with a few leafy bracts near the top. *Spike* 1½-2 in.; bracts ½ in. long, entire, obtuse, membranous. *Flowers* ½ in. long. *Sepals* as in *L. globosa*. *Lower corolla-lip* 3- or 4-cleft. *Anthers* subsessile. *Style* short, included, stigma notched. *Fruit* narrowly oblong.

** *Calyx* very large, spathaceous, hooded, concealing the corolla, acute, nerves meeting in the tip.

3. **L. Clarkei**, Hook. f.; stem ascending leafy, leaves elliptic-ovate acute irregularly toothed, spike elongate, calyx longer than the bract.

SIKKIM HIMALAYA; Yakla, alt. 16,000 ft., Clarke.

Stems or *branches* 6-8 in., stout, flexuous. *Leaves*, radical long-petioled; cauline 2-3 in., sessile; nerves many, strong, reticulate. *Spike* recurved; bracts ¼ in., toothed. *Calyx* twice as long, ovate-lanceolate, complicate, open by a narrow slit in front nearly to the base, veined. *Corolla* half as long, lips very short, subequal, recurved, upper dilated at the hooded tip, lower obtusely 3-lobed? *Filaments* adnate to the margins of the upper lip. *Ovary* slender; style exserted, stigma 2-fid.—A very remarkable plant, more caulescent than its congeners. The specimens are very bad, and the description of the corolla may want correction. I found at Tungu (in N. Sikkim) what I take to be young plants of this, judging from the reticulate nervation of the leaves.

*** *Calyx* spathaceous, dorsally plane, 2-nerved; nerves ending apart in the terminal lobes or teeth.

4. **L. glauca**, Gaertn. in Nov. Comm. Petrop. xiv. 533, t. 18, f. 2; stolons 0, leaves oblong ovate or obovate toothed or crenate petiole very stout, cauline obtuse, spike elongate, bracts obovate or elliptic equalling or longer or shorter than the flowers. Maximovicz in Bull. Imp. Acad. St. Petersb. xxvii. (1881) 523, excl. syn. *L. decumbens*. Gymnandra Stelleri, Herb. Ind. Or. H. f. & T.

ALPINE HIMALAYA, alt. 11-15,000 ft., Royle, &c.—DISTRIB. Mts. of Central and N. Asia, and Arctic Asia and America.

Rootstock stout, with thick fleshy root-fibres. *Leaves* fleshy, radical 2-3 in., variable in breadth and toothing, narrowed into the very stout petiole; cauline ½ to 1½ in., ½-amplexicaul, often quite entire. *Flowering stems* several, 3-10 in. high, decumbent below, stout, leafy above. *Spike* 2-5 in.; bracts ½-¾ in. *Calyx* nearly as long as the corolla-tube or shorter; lobes minutely fimbriate. *Corolla-tube* rather slender, tips very variable.

VAR. *cashmeriana*; radical leaves elliptic or oblong obtuse, bracts ovate toothed rather longer than the calyx, corolla deep blue much longer than the calyx, lower lip 2-cleft, or 3-cleft with the mid-lobe narrowest, filaments from half as long to as

long as the upper lip adnate below to its margins, style far exserted, stigma minute. *Gymnandra cashmeriana*, *Royle in Benth. Scroph. Ind.* 47, and *Ill. Himal. Pl.* 291, t. 73, f. 3; *Chois. in DC. Prodr.* xii. 25.—Western Himalaya, from Chumba to Kashmir, alt. 11–15,000 ft.

VAR. kunawurensis; radical leaves ovate or oblong-lanceolate, obtuse crenate-toothed, cauline sessile ovate subacute, bracts broadly ovate rather longer than the calyx, corolla purplish tube about equalling the calyx, lower lip usually 3-cleft, anthers subsessile, style shortly exserted 2-fid, fruit ovoid rugose. *Gymnandra kunawurensis*, *Royle & Chois. ll. cc.*—Western Himalaya; Kunawur, alt. 12–15,000 ft.; Rajhoti, N. of Kumaon, alt. 15,000 ft., *Strachey & Winterbottom*.—A stouter plant than *Var. cashmeriana*.

VAR. sikkimensis; habit of *Var. kunawurensis*, but flowers larger, corolla-lobes longer, lower lip cleft into 2 narrow lobes.—Sikkim Himalaya, alt. 16–17,000 ft., *J. D. H.*

I follow Maximovicz in referring all the Himalayan plants to *L. glauca*, except *L. decumbens* (the calyx of which is widely different, as are the habit and bracts). That author further refers *Gymnandra borealis*, *Pallasii*, and *Stelleri* to the same species, and I suppose with good reason. The two principal Himalayan forms, *kunawurensis* and *cashmeriana*, are however readily distinguishable, if I mistake not, by size, colour of flower, length of filaments, and stigma; and possibly by fruit, if, as I suspect (judging from unripe ones), that of *cashmeriana* is much the smaller, narrower, and smother.

5. ***L. spectabilis***, *Kurz in Journ. As. Soc.* xxxix. 2, 80 (*Gymnandra*); tall, very robust, stem leafy, cauline leaves sessile orbicular-obovate cuspidate quite entire, spike long, bracts ovate acute toothed rather longer than the calyx, anthers subsessile, style included, stigma capitate.

SIKKIM HIMALAYA; Phalloot, alt. 13,000 ft., *Kurz*.

Rootstock and radical leaves not seen. *Stem* 18 in., $\frac{1}{2}$ in. diam., tapering downwards, naked below the middle. *Leaves* 2–3 in. long, $\frac{1}{2}$ -amplexicaul, decumbent; nerves very slender, nearly parallel to the margin, finely reticulate. *Spike* 4 in.; bracts $\frac{1}{2}$ in. *Calyx-teeth* fimbriate. *Corolla-tube* equalling the calyx; upper lip short, lower of 2 long linear lobes.—Probably a very large state of *L. glauca* var. *sikkimensis*; I have seen but one specimen, without root-leaves.

ORDER CXI. VERBENACEÆ. (By C. B. Clarke.)

Herbs, shrubs, or trees. *Leaves* opposite or whorled, apparently scattered in *Geunsia*, simple or digitate (in *Peronema* pinnate); stipules 0. *Inflorescence* cymose, racemose or spicate; cymes often compound or paniced; bracts various. *Calyx* gamosepalous, persistent, 5-4- (rarely 6-8-) toothed. *Corolla* gamopetalous; tube often cylindric, limb 2-lipped or subequal 5- (rarely many-) lobed. *Stamens* 4, didynamous, rarely 2, 5-6. *Ovary* superior, 2-carpellary (except in *Geunsia*), 2-4-celled, or sub-1-celled, 4-ovuled (in *Phryma* 1-celled 1-ovuled), entire or 4-lobed; style terminal; ovules variously attached. *Fruit* a drupe or almost capsular, 4-2-1-celled (with many pyrenes in *Geunsia*), cells 1-seeded. *Seeds* erect or pendulous, albumen 0 (in the Indian genera); radicle inferior (except in *Phryma*).—Species 700, chiefly tropical.

Duranta, a large American bush, is much cultivated in India; it differs from all the Indian genera in its 8-celled ovary, drupe with 4 2-seeded pyrenes.

Tribe 1. PHRYMEÆ. *Ovary* 1-celled, 1-ovuled.

Herb. Spike slender, interrupted 1. PHRYMA.

Tribe 2. VERBENEÆ. *Inflorescence* spicate, centripetal.

* *Pyrenes* of the fruit 2-1, 1-seeded.

- Shrubs. Calyx small. Fruit a drupe 2. LANTANA.
 Small shrubs. Calyx small. Fruit capsular 3. LIPPIA.
 Small shrubs. Calyx narrowly cylindric, 5-ribbed. Stamens 4 4. BOUCHEA.
 Herb. Calyx narrowly cylindric, 5-ribbed. Stamens 4 5. STACHYTARPHETA.

**** Pyrenes of the fruit 2, 2-seeded.**

- Herb. Calyx accrescent, enclosing the fruit 6. PRIVA.

***** Pyrenes of the fruit 4, 1-seeded.**

- Herb. Calyx tubular, not accrescent 7. VERBENA.

Tribe 3. VITICÆ. *Inflorescence* cymose, centrifugal; cymes paniced.
Drupe with 4 (in *Geunsia* many) pyrenes.—Trees or shrubs.

*** Corolla regular, stamens isomerous, equal.** (Leaves entire.)

- Flowers 5-merous. Leaves scattered. Drupe with 5-2 pyrenes 8. GEUNZIA.
 Flowers 4-merous. Drupe with 4 pyrenes 9. CALLICARPA.
 Flowers 4-6-merous. Drupe with 1 4-celled pyrene, included
 in the accrescent calyx 10. TECTONA.

**** Corolla 2-lipped, stamens didynamous.**

† Drupe with 1 pyrene.

- Leaves entire or toothed. Flowers small 11. PREMNA.
 Leaves entire or toothed. Corolla 1 inch 12. GMELENA.
 Leaves digitate (in 1 species unifoliate) 13. VITEX.

†† Drupe with 4 pyrenes. (Leaves simple.)

- Calyx in flower campanulate 14. CLERODENDRON.
 Calyx in flower large, patelliform 15. HOLMSKIOLDIA.

Tribe 4. CARYOPTERIDÆ. *Inflorescence* cymose, centrifugal; cymes paniced. *Fruit* dividing into 4 pyrenes.—Trees or shrubs.

- Leaves simple. Cymes axillary dense or thyrsoid 16. CARYOPTERIS.
 Leaves entire. Cymes in a dense corymbose panicle 17. GLOSSOCARYA.
 Leaves entire. Panicle pyramidal, lax 18. HYMENOPYRAMIS.
 Leaves large, impari-pinnate 19. PERONEMA.

Tribe 5. SYMPHOREMÆ. *Cymes* 3-9-flowered, capitate; bracts of the flower-head 6 or 3-4, usually large, involucriform. *Fruit* nearly dry, small. —Large climbers.

- Bracts 6. Corolla 6-16-merous. Anthers long exsert 20. SYMPHOREMA.
 Bracts 6. Corolla 5-6-merous. Anthers included or shortly
 exsert 21. SPHENODESMA.
 Bracts 3-4. Corolla 2-lipped 22. CONGEA.

Tribe 6. AVICENNIEÆ. *Cymes* densely capitate. *Calyx* 5-partite; segments concave, much imbricate. *Fruit* capsular, somewhat fleshy, dehiscent.
 Shrubs. Leaves entire. Flowers small 23. AVICENNIA.

I. PHRYMA, Linn.

An erect herb. *Leaves* petioled, membranous, toothed. *Spikes* long, slender; bracts linear, small; bracteoles minute. *Calyx* tubular; teeth 3, linear, hooked. *Corolla* small, tubular, 2-lipped; lower lip larger, of 3

rounded patent lobes. *Stamens* 4, didynamous; anthers round. *Ovary* oblong, oblique; ovule 1, erect, attached on one side near the base; style linear; stigma shortly unequally 2-lobed. *Utricle* membranous, enclosed in the reflexed calyx; radicle superior, cotyledons convolute.

P. leptostachya, Linn.; Schauer in DC. Prodr. xi. 520; leaves ovate or ovate-lanceolate thinly pubescent, peduncles terminal and from the upper axils. Gaertn. Fruct. i. 363, t. 75, fig. 10; Lamk. Ill. t. 516; Wall. Cat. 2088; Schnizl. Ic. Fum. Nat. t. 150 a; Walp. Rep. iv. 36.

W. HIMALAYA, alt. 3-7000 ft.; from Kashmir to Nepal frequent, Wallich, Royle, &c. KHASIA MTS., alt. 4-6000 ft., H. f. & T., &c.—DISTRIB. Amurland and Japan, Temp. N. America.

Height 1-2 ft. Leaves 2-4 in.; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. Spikes 6-15 in.; flowers alternate. Calyx-tube $\frac{1}{4}$ in.; nerves 15, in 5 groups of 3; teeth $\frac{1}{10}$ in. with purplish hooks. Corolla $\frac{1}{4}$ - $\frac{1}{2}$ in., pink or pale purple. Calyx in fruit deflexed and appressed to the rachis. Utricle $\frac{1}{2}$ in., oblong.

II. LANTANA, Linn.

Rambling shrubs, pubescent or scabrous; branches tetragonous, sometimes prickly. Leaves simple, petioled, crenate, often rugose. Spikes peduncled, capitate, ovoid or cylindric; bracts conspicuous, exceeding the calyx; bracteoles 0. Calyx small, membranous, truncate or sinuate-toothed. Corolla-tube slender, cylindric; lobes 4-5, spreading. Stamens 4, didynamous, included; anthers broadly oblong. Ovary 2-celled, 2-ovuled; style short, stigma oblique subcapitate. Drupe fleshy or nearly dry, containing 2 bony, 1-celled pyrenes. Seed without albumen; radicle inferior.—Species 40, tropical or subtropical, mostly American.

L. Camara, Linn. (Schauer in DC. Prodr. xi. 598; *L. aculeata*, Linn.; Roxb. Hort. Beng. 46. ? *L. mixta*, Linn. in Thwaites Enum. 242), an American plant, has run wild in India, especially in the W. Deccan Peninsula and Ceylon. It is readily recognized by the numerous recurved prickles on the branches.

1. **L. indica**, Roxb. Hort. Beng. 46, and Fl. Ind. iii. 89; leaves ovate or lanceolate softly hairy above, bracts ovate or elliptic acuminate softly loosely hairy. Wall. Cat. 1823, type sheet a, b; Wight Ill. t. 173 b, fig. 3, and Ic. t. 1464. *L. latifolia*, Tausch in Flora 1836, 391. *L. dubia*, Wall. Cat. 1821, 2 and C not 1; Royle Ill. 300, t. 73, fig. 2. *L. collina*, Decne. in Jacquem. Voy. Bot. 136, t. 141. *L. alba*, Schauer in DC. Prodr. xi. 606; Dalz. & Gibs. Bomb. Fl. 198; Brandis For. Fl. 369; Kurz For. Fl. ii. 253; Boiss. Fl. Orient. iv. 532, not of Miller, Decne., nor Link.

Throughout INDIA and CEYLON in the warmer parts, common; on the riverbanks of Bengal one of the commonest weeds.—DISTRIB. Beloochistan, Trop. Africa.

A shrub, 3-8 ft. high; branches long, rambling, appressedly scabrid-pubescent, or towards the tips patently densely fulvous-hairy. Leaves 1-3 in., opposite or ternate, tip not rounded, rugose, above softly hairy, beneath more densely often woolly sometimes white-woolly; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., sometimes in fruit 2-3 in. long, cylindric; bracts $\frac{1}{4}$ - $\frac{1}{2}$ in., upper smaller, ovate or even cordate in the typical form, but varying to lanceolate. Calyx less than $\frac{1}{10}$ in., hairy. Corolla $\frac{1}{2}$ in., hairy, mouth $\frac{1}{4}$ in. diam., usually pink, the tube yellowish, varying from dull purple to white. Drupe $\frac{1}{2}$ - $\frac{1}{3}$ in. diam., purple.

VAR. *albiflora*, Wight ms.; leaves small obtuse, outer bracts ovate minutely closely pubescent. *L. Wightiana*, Wall. Cat. 2655. *Lantana* n. 1, Herb. Ind. Or. H. f. & T.—S. Madras, in or near the hills; Pulney Mts. and Courtallum, Wight, &c.—Leaves $\frac{1}{4}$ - $\frac{1}{2}$ in. Corolla $\frac{1}{2}$ in. diam. Drupe $\frac{1}{2}$ in. diam.

2. **L. crenulata**, *Otto & Dietr. in Berlin Gartenzeit.* ix. 363; leaves ovate-lanceolate very scabrous above, bracts narrowly oblong or subspathulate scabrid-pubescent. *Schauer in DC. Prodr.* xii. 598. *L. indica* var. *salvifolia* only, *Wall. Cat.* 1823. *L. annua*, *Hort. Calc.*, not *Linn.*

N.W. INDIA, *Royle, Falconer*; Moradabad (cultivated), *Thomson*. MADRAS; Vola Charnce, *Thomson*.

Resembling *L. indica*. Leaves finely crenated, very scabrid above. Outermost bracts $\frac{1}{4}$ by $\frac{1}{16}$ in. Corolla from yellow to orange.—This plant may not be wild in India, but it is not known where it is so.

3. **L. trifolia**, *Linn.*; *Bot. Mag.* t. 1449; branches patently hairy, leaves often ternate ovate-lanceolate hairy somewhat scabrous above, outer bracts lanceolate much acuminate hairs not closely appressed. *Schauer in DC. Prodr.* xi. 607. *L. indica*, *Wall. Cat.* 1823, sheet B, letters a, d. *L. dubia*, *Wall. Cat.* 1821, n. 1 only.

Throughout INDIA, naturalized from the N.W., *Royle*, to CEYLON, *Wight*. BENGAL; Dacca, Burisal, Chittagong, *J. D. H.*, &c.—DISTRIB. Trop. America.

Resembling *L. indica*; so much so that ternate-leaved examples of *L. indica* are generally marked *L. trifolia*. Perhaps only a denizen in British India.

DOUBTFUL SPECIES.

L. SCABRA, *Wall. Cat.* 1822, is not to be found in Wallich's Herbarium.

III. LIPPIA, *Linn.*

Fruit dry, separating into 2 1-seeded pyrenes. Otherwise as *Lantana*.—Species 90, mostly American.

The genus *Lippia* can hardly be distinguished from *Lantana*, but the present species is easily recognized by its creeping habit and alternate peduncles. *Rheede Hort. Mal.* x. t. 93, sometimes quoted for this plant, has large bracts to the heads, nor does it represent the creeping habit. Roxburgh, by some slip, has omitted the genus *Verbena* in *Fl. Ind.*, though he has it in *Hort. Beng.*

1. **L. nodiflora**, *Rich. in Michx. Fl. Bor. Amer.* ii. 15; annual, creeping, minutely strigose, leaves cuneate-spathulate serrate, peduncles axillary rarely opposite, bracts obovate shortly acuminate as long as the corolla-tube. *Schauer in DC. Prodr.* xi. 585; *Wight Ill.* t. 173 b, fig. 2, and *Id.* t. 1463; *Dalz. & Gibs. Bomb. Fl.* 198; *Boiss. Fl. Orient.* iv. 532. *Verbena nodiflora*, *Linn.*; *Burm. Fl. Ind.* 12, t. 6, fig. 1; *Roxb. Hort. Beng.* 4; *Sibth. Fl. Gr.* t. 553. *V. capitata*, *Forsk. Fl. Æg.-Arab.* 10. *Blairia nodiflora*, *Gaertn. Fruct.* i. 266, t. 56. *Zapania nodiflora*, *Lamk. Ill.* t. 17; *Wall. Cat.* 1824. *L. repens*, *Bert. Rar. Ital. Pl.* iii. 27. *Lantana sarmentosa* & *repens*, *Spreng. Syst.* ii. 752. *Phyla chinensis*, *Lour. Fl. Cochinch.* 66.

Throughout INDIA and CEYLON, in wet grass; abundant.—DISTRIB. All tropical and warm-temperate regions.

Extending 6–30 in., much branched, often rooting from the nodes. Leaves subsessile, 1 by $\frac{1}{4}$ in., sharply toothed, base attenuate entire. Peduncle 1–3 in., with very rarely another from the opposite axil; heads $\frac{1}{2}$ by $\frac{1}{4}$ in., ovoid or cylindric; bracts $\frac{1}{16}$ in., ovate, shortly acute, outermost not much larger than the others. Calyx minute, 2-fid, hairy. Corolla $\frac{1}{20}$ – $\frac{1}{8}$ in., tube slender, mouth 2-lipped, lower lip rather longer, pinkish-purple to white. Fruit hardly $\frac{1}{12}$ in. diam., nearly dry.

2. **L. geminata**, *H. B. K. Nov. Gen. & Sp. Pl.* ii. 266; shrubby, leaves ovate-oblong crenate softly strigose, peduncles mostly opposite, bracts ovate acuminate softly hairy. *Schauer in DC. Prodr.* xi. 582, with syn.

Lantana sp. n. 5, *Herb. Ind. Or. H. f. & T.* *Lantana canescens*, *Hort. Calc.*, not *Linn.*

BENGAL, frequent; below Dacca, *J. D. H.*, &c.—DISTRIB. Trop. America, a widely dispersed weed.

So closely resembling *Lantana indica* that without fruit it is difficult to distinguish. *Leaves* and *peduncles* opposite or ternate. *Peduncles* rarely exceeding $\frac{1}{2}$ –1 in.; outer bracts rarely exceeding $\frac{1}{2}$ in. *Fruit* $\frac{1}{8}$ – $\frac{1}{2}$ in. diam.

IV. **BOUCHEA**, Cham.

Herbs or undershrubs. *Leaves* petioled, ovate or oblong, toothed. *Spikes* terminal, linear, elongate; bracts much shorter than the calyx. *Calyx* narrowly cylindric, strongly 5-ribbed, very shortly 5-toothed, in fruit slightly enlarged, split to the base on the outer side (in the Indian species). *Corolla-tube* very narrowly cylindric; limb patent, 5-lobed. *Stamens* included, didynamous; anthers ovate, cells 2 parallel. *Ovary* 2-celled, cells 1–2-ovuled; style short, linear; stigma 1-sided, toothed. *Fruit* dry, included in the calyx, of 2 elongate-oblong 1-seeded pyrenes.—Species 16, in the warmer parts of America and Africa, 2 extending to India.

1. **B. marrubifolia**, Schauer in *DC. Prodr.* xi. 558; hoary-pubescent, leaves ovate, corolla-tube $\frac{1}{3}$ – $\frac{1}{2}$ in., mouth scarcely $\frac{1}{2}$ in. diam. *Wight Ic.* t. 1461.

SCINDE; *Stocks, Dalzell*.—DISTRIB. Arabia, Egypt, Abyssinia, Central Africa.

Woody, much branched. *Leaves* 1 by $\frac{1}{2}$ in., coarsely toothed, hoary-pubescent on both surfaces; petiole $\frac{1}{2}$ in. *Spikes* 2–5 in., nearly continuous; flowers alternate; bracts $\frac{1}{2}$ in., lanceolate. *Calyx* $\frac{1}{4}$ in., subtruncate, inflated in fruit. *Corolla-tube* scarcely $\frac{3}{10}$ in. diam. *Pyrenes* $\frac{1}{8}$ – $\frac{1}{6}$ in., linear-oblong, black.

2. **B. hyderabadensis**, Walp. *Rep.* iv. 12; leaves ovate-oblong glabrescent, corolla-tube $\frac{1}{2}$ – $\frac{2}{3}$ in. mouth $\frac{1}{2}$ in. diam. *Wight Ill.* t. 173 b, fig. 1, and *Ic.* t. 1462; Schauer in *DC. Prodr.* xi. 559; *Thwaites Enum.* 241. *Verbena hyderabadensis*, Heyne in *Herb. Rottler*; *Wall. Cat.* 6318.

DECCAN PENINSULA and CEYLON; *Rottler, Wight, Thwaites*, &c.

Branches woody, elongate little divided upwards, nearly glabrous. *Leaves* 3–4 by $1\frac{1}{2}$ in., serrate, nerves beneath minutely pubescent; petiole $\frac{2}{3}$ in. *Spikes* 2–6 in., dense; bracts $\frac{1}{6}$ in., lanceolate. *Calyx* $\frac{1}{2}$ in., nearly glabrous; teeth $\frac{1}{8}$ in., linear. *Corolla-tube* funnel-shaped upwards; limb pink-purple. *Pyrenes* exceeding $\frac{1}{4}$ in., linear-oblong, slightly wider upwards, margined, straw-coloured, smooth on the inner face (the thickened inner layer of tissue becoming white and flaking off).

V. **STACHYTARPHETA**, Vahl.

Herbs or shrubs. *Leaves* toothed. *Spikes* terminal, long, slender (in the Indian species); bracts long or short; bracteoles 0. *Calyx* narrowly cylindric, shortly 4–5-toothed. *Corolla-tube* cylindric; limb oblique, patent, 5-lobed. *Stamens* 2 fertile, included; anther-cells ovate, vertically divaricate. *Ovary* and *fruit* nearly as of *Bouchea*.—Species 40, in warm America.

S. indica, Vahl *Enum.* i. 206; leaves elliptic serrate nearly glabrous, flowers ultimately somewhat sunk in the thickened rachis, bracts lanceolate as long as the oblique 4-toothed calyx. *Thwaites Enum.* 241. *S. jamaicensis*, Vahl l. c.; *Bot. Mag.* t. 1860. *S. urticifolia*, Dalz. & Gibs. *Bomb. Fl. Suppl.* 68. *Stachytarpha indica* & *jamaicensis*, Schauer in *DC. Prodr.* xi.

564. *S. villosa*, Turcz. in Bull. Soc. Imp. Nat. Mosc. 1863, ii. 197. *Verbena indica*, Linn.; Wall. Cat. 2656. *V. jamaicensis*, Linn.; Roxb. Hort. Beng. 4.

TROPICAL INDIA from the Punjab and Silhet to Travancore and Singapore; Ceylon, plentiful.—DISTRIB. Trop. Asia and America.

A herb, 1–2 ft., nearly glabrous; branches quadrangular. *Leaves* 1–4 in., sub-obtuse, base decurrent. *Spikes* 3–12 in., nearly continuous. *Calyx* $\frac{1}{2}$ in., 4-nerved. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in., deep-blue. *Pyrenes* $\frac{1}{8}$ in.—Probably naturalized in Asia; the examples from extra-tropical India are almost surely escapes.

VI. **PRIVA**, Adans.

Erect herbs. *Leaves* toothed. *Spikes* slender; bracts small, narrow. *Calyx* tubular, shortly 5-toothed; in fruit enlarged, ovoid with a very small mouth. *Corolla-tube* narrowly cylindric; limb oblique, patent, 5-lobed. *Stamens* 4, didynamous, included; anther-cells parallel. *Ovary* 2-celled, cells 2-ovuled; style linear, stigma on one side. *Fruit* dry, separating into 2 2-seeded pyrenes.—Species 9, chiefly tropical American.

P. leptostachya, Juss. in Ann. Mus. vii. 70; leaves petioled ovate, spikes long interrupted, calyx with hooked hairs, fruit obcordate muricate. Walp. Rep. iv. 35; Schauer in DC. Prodr. xi. 533; Datz. & Gibs. Bomb. Fl. 198. *P. abyssinica* & *P. Forskalii*, Meyer; Jaub. & Spach. Ill. Pl. Or. tt. 453–455. *Tortula aspera*, Roxb.; Willd. Sp. Pl. iii. 359; Roth Nov. Sp. 299. *Streptium asperum*, Roxb. Cor. Pl. ii. 25, t. 146, and Fl. Ind. iii. 90; Wall. Cat. 2657; Wight in Hook. Journ. Bot. i. 230, t. 130.

DECCAN PENINSULA; Roxburgh, Wight, &c.—DISTRIB. Africa.

Stem 6–18 in. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$ in., crenate-serrate, thinly somewhat softly hairy in all the examples, but (ex Roxburgh) covered with stiff hooked hairs; petiole 1 in. *Spikes* 6–12 in., lower flowers distant. *Calyx* $\frac{1}{2}$ by $\frac{1}{2}$ in. in flower; in fruit $\frac{1}{2}$ in. broad, hispid with 1-celled white hooked hairs. *Corolla* $\frac{1}{2}$ in., white. *Pyrenes* obcordate, with 2 rows of hooked small spines on the back, each presenting a large cavity towards the axis.

VII. **VERBENA**, Linn.

Pubescent herbs or undershrubs. *Leaves* opposite or ternately whorled, toothed or pinnatifid. *Spikes* terminal, simple or corymbose; bracts and flowers small. *Calyx* tubular, shortly 5-toothed. *Corolla* tubular; limb more or less oblique, sub-2-lipped, 5-lobed. *Stamens* 4, didynamous, included; anthers ovate, 2-celled, cells sub-parallel. *Ovary* 1-celled, more or less 4-lobed (sometimes even at flower-time 4-celled), 4-ovuled; style short, obscurely 2-lobed; ovules attached laterally near the base of the cell. *Fruit* included in the calyx; pyrenes 4 or fewer, oblong.—Species 80; all except 2 American.

V. bonariensis, Linn. (Roxb. Hort. Beng. 4; Schauer in DC. Prodr. xi. 541), a native of Brazil, is naturalized in the Himalaya, the Nilgherries, and elsewhere in the Old World. It has sessile, oblong, sharply serrate leaves, and short spikes in dense corymbs or heads.

V. officinalis, Linn.; Schauer in DC. Prodr. xi. 547; herbaceous, leaves oblong or ovate pinnatifid or coarsely toothed, spikes paniced slender ultimately interrupted below. Lour. Fl. Cochinch. 27; Roxb. Hort. Beng. 4; Wall. Cat. 1825; Hayne Pl. Off. 5, t. 42; Boiss. Fl. Orient. iv. 534.

V. spuria, Linn. *Sp. Pl.* 29. *V. sororia*, Don *Prodr.* 104; *Sweet Brit. Fl. Gard.* iii. t. 202.

HIMALAYA, alt. 1-6000 ft., from Kashmir to Bhotan, frequent. BENGAL PLAIN to the Sunderbunds, frequent.—DISTRIB. Temperate and subtropical regions.

Stems 1-2 ft., decumbent, then erect, quadrangular, puberulous. *Leaves* 2-4 in., variously lobed, base narrowed, lower petioled, more or less pubescent, usually hoary on the nerves beneath. *Spikes* at first dense, in fruit 3-10 in. *Calyx* $\frac{1}{8}$ - $\frac{1}{2}$ in., apparently of 4 oblong and 1 linear segments united into a tube by their scarious margins; teeth most minute. *Corolla* $\frac{1}{4}$ in., blue; lobes subquadrate, throat hairy. *Pyrenes* $\frac{3}{16}$ - $\frac{1}{8}$ in., oblong, 3-ribbed, smooth dorsally, their inner faces with minute white flaking cells similar to those of *Bouchea hyderabadensis*.—T. Thomson collected at Kusoor, and Clarke at Chumba, a monstrous form with proliferous spikes, forming densely branched panicles, the lower flowers all pedicelled, variously altered and infertile.

VIII. GEUNSLA, Blume.

Trees or large shrubs, stellately tomentose. *Leaves* opposite, every alternate pair usually widely separated so that there appear to be 2 alternate leaves on each internode, petioled, nearly entire. *Cymes* peduncled, axillary, many-flowered; bracts linear, small. *Calyx* campanulate, shortly 5-6-toothed. *Corolla* tubular; limb equally 5-6-toothed. *Stamens* 5; anthers exserted; cells oblong, parallel. *Ovary* imperfectly 5-3-celled; cells 2-ovuled; style exserted, stigma dilated 5-3-lobed. *Drupe* small; pyrenes 5-2, 1-seeded.—Species 4, Malayan.

G. farinosa, Blume *Bijd.* 819; leaves broadly oblong acuminate minutely toothed stellate-tomentose beneath, flowers 5-merous. *Callicarpa pentandra*, Roxb. *Fl. Ind.* i. 395; *Wall. Cat.* 1835; *Schauer in DC. Prodr.* xi. 646. *C. acuminatissima*, Teijs. & Binn. in *Batav. Nat. Tijdschr.* xxv. 316.

SINGAPORE; Wallich.—DISTRIB. Malaya.

A lofty tree. *Leaves* 8 by 3 in., base cuneate or rounded, mature glabrate above; petiole 1 in. *Peduncles* 1-2 in.; cymes 2-3 in. diam., densely stellate-tomentose. *Corolla* $\frac{1}{2}$ in., lilac, occasionally 6-merous, fide Teijs. & Binnend. *Drupe* $\frac{1}{8}$ in. diam.—Resembling the arborescent *Callicarpas*; readily distinguished by the mixture of both opposite and alternate leaves, and by the 5-merous flowers. *C. hexandra*, Teijs. & Binn. *l. c.*, is *C. Cumingiana*, Schauer *l. c.* 644, or very nearly so, and perhaps neither is distinct from *Geunsia farinosa*; but Cuming's n. 1773, reduced to *G. farinosa* by Schauer, is probably, as stated in Gen. Pl. 2, p. 1150, a good species.

IX. CALLICARPA, Linn.

Shrubs or trees; innovations stellately hairy. *Leaves* opposite, rarely ternately, whorled toothed or subentire (in *C. lobata* lobed). *Cymes* axillary, shorter than the leaves; bracts linear, inconspicuous. *Calyx* very small (less than $\frac{1}{2}$ in.), campanulate, limb minutely 4-lobed, unaltered in fruit. *Corolla* small (about $\frac{1}{4}$ in.), tubular, subsymmetric, purple or red; lobes 4, subquadrate-oblong, patent. *Stamens* 4; anthers exserted, 2-celled, glandular. *Ovary* imperfectly 2-celled, cells 2-ovuled; style linear, stigma dilated obscurely bifid. *Drupe* small (less than $\frac{1}{2}$ in.), globose; pyrenes 4, or by suppression fewer, 1-seeded. *Seeds* shortly oblong, exalbuminous.—Species 30, mostly E. Asian, Malayan and N. Australian; a few Polynesian, Columbian and W. Indian.

1. **C. lobata**, Clarke; leaves very long-petioled ample cordate-ovate

3-5-lobed mature nearly glabrate, cymes dense stellately tomentose shorter than the petiole. *Callicarpa* sp. n. 27, *Herb. Ind. Or. H. f. & T.*

ALPINE N.E. NEPAL; Yalloong, alt. 10-11,000 ft., *J. D. H.*

A deciduous tree, 16 ft.; branches thick, stellately tomentose, crowded with leaves at the tips. *Leaves* 12-15 in. diam., palmately 5-7-nerved, membranous; lobes ovate, acuminate, denticulate, stellately hairy on both surfaces when young, mature with some stellate hair along the nerves beneath; hairs stalked, often with 2 whorls of secondary hairs; glands scattered; petiole 4-8 in. *Peduncles* 2½ in., often 2 superposed in each opposite axil; leaves fallen from the flower-bearing axils in the specimens; cymes 2-4 in. diam., resembling those of *C. arborea*. *Calyx* ⅓ in., funnel-shaped, subtruncate, stellately hairy. *Corolla* ⅓ in., tubular, nearly glabrous in flower; lobes 4, short, ovate. *Stamens* 4. *Fruit* not seen.

2. *C. arborea*, *Roxb. Hort. Beng.* 10, and *Fl. Ind.* i. 390; arboreous, leaves ovate to narrowly oblong acute entire or nearly so closely tomentose beneath, peduncles as long as the petioles closely tomentose, fruit purple ultimately black. *Wall. Cat.* 1826, chiefly; *Schauer in DC. Prodr.* xi. 641; *Brand. For. Fl.* 368; *Kurz For. Fl.* ii. 274. *C. tectonaefolia*, *Wall. Cat.* 1827. *C. villosa*, *Roxb. Hort. Beng. l. c.* *C. farinosa*, *Roxb. mss.*

N. INDIA, in the lower hills, alt. 0-4000 ft., from Kumaon to Assam, common in the Sikkim Terai; Rajmahl. E. PENINSULA, from the Khasia Terai and Muneypoor to Singapore.—DISTRIB. Ava, Sumatra.

A tree, often 40 ft., with a thick trunk and round head. *Leaves* usually 6-8 in., base rhomboid, leathery, mature glabrate above; stellate hairs beneath very close, sessile, persistent, covering the numerous glands; petiole 1-2 in. *Calyx* ⅓ in., subtruncate, stellately pubescent. *Corolla* ⅓ in., puberulous, lavender or pale purple. *Berry* ⅓ in. diam.—Generally to be recognized by the entire leaves with very close persistent hard tomentum beneath; but the leaves are toothed in Khasian examples collected at Nunklow, and the tomentum is spreading and very woolly on some from the Malay Peninsula. Leaves usually cuneate at base, but rounded in the form *C. villosa*, *Roxb.* *C. villosa*, *Vahl*, is a doubtfully Indian plant.

3. *C. vestita*, *Wall. ms.*; arboreous, leaves ovate acute subentire silkily white-tomentose beneath, peduncles as long as the petioles stellately tomentose. *C. lanata*, *Gamble Darjeeling List* 60, not of *Linn.* *C. arborea*, *Wall. Cat.* 1826, partly.—*Callicarpa* sp. n. 3 & 4, *Herb. Ind. Or. H. f. & T.*

NEPAL; Noakote, *Wallich.* SIKKIM, alt. 1-4000 ft., in the outer valleys and Terai, frequent; *Herb. Griffith, J. D. H.* (*Kew Distrib.* n. 6042), &c.

A tree, 30 ft.; resembling *C. arborea*. *Leaves* 4-10 in., base rounded or cuneate; tomentum beneath of stellate hairs having the secondary hairs fine, long and white. *Inflorescence* stellately white or tawny tomentose. *Calyx* at flower-time nearly glabrous.—Otherwise resembling *C. arborea*.

4. *C. lanata*, *Linn. Mant.* 331, not of *Schauer*, nor of *Griff.*; arboreous, leaves ovate or ovate-lanceolate subentire stellately tomentose beneath, peduncles shorter than the petioles furred. *Vahl Symb.* iii. 13; *Roxb. Fl. Ind.* i. 391; *Ham. in Trans. Linn.* xvii. 251; *Wall. Cat.* 1831; *Grah. Cat. Pl. Bomb.* 156; *Brand. For. Fl.* 368; *Bedd. For. Man.* 173, and *Anal. Pl.* 21, fig. 6. *C. Tomex*, *Poir. Suppl.* ii. 32. *C. cana*, *Dalz. & Gibs. Bomb. Fl.* 200, not of *Linn.* *C. Wallichiana*, *Walp. Rep.* iv. 125; *Schauer in DC. Prodr.* xi. 641; *Wight Ill.* t. 173 b, fig. 5, and *l. c.* t. 1480. *C. arborea*, *Miq. in Pl. Hohenack.* n. 152, not of *Roxb.* *Tomex tomentosa*, *Linn. Fl. Zeyl.* 24. *Cornutia corymbosa*, *Lamk. Dict.* i. 54.

Throughout the DECCAN PENINSULA and CEYLON, common; ascending to 4000 ft.

A tree, 20-40 ft.; tips of branches cinnamoneous, shaggy and woolly. *Leaves*

4-8 in., base cuneate rounded or subcordate; tomentum beneath of stalked hairs often with several whorls of secondary hairs, usually dense, in a few examples from Cochin thin but of similar structure. *Calyx* at flower-time stellately hairy.—Otherwise much resembling *C. arborea* and *Hookeri*. The leaves vary from subcordate orbicular cuspidate to oblong and acuminate at both ends. The nature of the hairs appears absolutely constant. *C. lanata*, *Griff. Notul.* iv. 173, and *l.c. Pl. Asiat.* t. 447 from Bhamo, has 5 stamens.

5. ***C. macrophylla***, *Vahl Symb.* iii. 13, t. 53; shrubby, leaves ovate or ovate-lanceolate closely crenate densely persistently stellate-tomentose beneath, peduncles short, berry white. *Roxb. Fl. Ind.* i. 393; *Wall. Cat.* 1832; *Schauer in DC. Prodr.* xi. 644; *Benth. Fl. Hongk.* 270; *Brandis For. Fl.* 368; *Kurz For. Fl.* ii. 274. *C. incana*, *Roxb. l.c.* *C. Roxburghii*, *Wall. Cat.* 1833, partly. *C. cana*, *Gamble Darjeeling List* 60, and *Indian Timbers* 283, not of *Linn.*—*Callicarpus* sp., *Jones in As. Research.* iv. 233.

Throughout N. and E. INDIA, ascending to 6000 ft. in the W. Himalaya; from Kashmir to Assam and Pegu; abundant in Bengal Plain. ? DECCAN PENINSULA.

A shrub, 3-8 ft.; trunk hardly any, branches wand-like, usually shaggy as well as tomentose at the tips. *Leaves* 4-7 in., acuminate, base rounded or cuneate, mature glabrate above, tomentose with compound stellate hairs beneath; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Peduncles* usually shorter than the petioles; cymes 1-3 in. diam., globose. *Calyx* scarcely $\frac{3}{16}$ in. long, stellately hairy at flower-time, lobes small triangular or hardly any. *Anthers* small, ovate.—There is only one example of this from the Deccan, marked as communicated by W. Barclay from Malabar. From Wight and Beddome's silence it may be doubted if it is wild there. *Rheede Hort. Mal.* 4, t. 60, usually quoted as *C. macrophylla*, looks as like *C. lanata*, but may not be a *Callicarpa* at all. *Wall. Cat.* 1833 type sheet is the true *C. Roxburghii* (*Schauer l.c.* 640), a non-Indian plant. The typical *C. macrophylla*, *Vahl*, has ovate leaves, somewhat obtuse at base, thickly white-tomentose beneath. This is common in and near the hills. *Roxburgh's C. incana* is the less showy form, common in Bengal Plain (as he truly says), with the leaf-base often cuneate.

VAR. *Griffithii*; much branched, leaves smaller fuscous-woolly obscurely stellate beneath ultimately glabrate.—Bhojan; *Griffith* (*Kew Distrib.* n. 6041).—Differs a good deal in habit from *C. macrophylla*, but connected by *E. Nepal* specimens collected by Sir J. D. H.

VAR. *sinensis*; leaves oblong-lanceolate closely denticulate, peduncles longer than the petioles, anthers oblong larger.—Canara; *Gibson*. *Caleutta*; cult. *Distrib. China*.—Branches upwards dense with leaves. Teeth of the leaves with minute black glandular points. *Calyx* in flower stellately tomentose, soon nearly glabrate; teeth triangular, in fruit sometimes longer than the tube. Probably a cultivated plant: it seems as near to *C. Reevesii* as to *C. macrophylla*.

6. ***C. Reevesii***, *Wall. Cat.* 1830; shrubby, leaves elliptic-lanceolate closely crenate mature glabrate above densely stellate-tomentose beneath, peduncles longer than the petioles, cymes somewhat lax stellately tomentose, calyx at flower-time nearly glabrous. *Schauer in DC. Prodr.* xi. 641; *Benth. Fl. Hongk.* 270. *C. nudiflora*, *Hook. et Arn. Bot. Beech. Voy.* p. 206, t. 46.

TENASSERIM (?); *Falconer*. SINGAPORE; *Murton*.—DISTRIB. S. China.

May be a cultivated plant; it is very near *C. macrophylla*. The leaves are very handsome, dark above, white tomentose beneath; the anthers are nearly as of *C. macrophylla* var. *sinensis*.

7. ***C. cana***, *Linn. Mant.* 198; shrubby, leaves broadly elliptic shortly acuminate at both ends sharply crenate-serrate mature glabrate above densely stellate-tomentose beneath, peduncles very short, calyx in fruit stellate-tomentose. *Vahl Symb.* iii. 12; *Roxb. Fl. Ind.* i. 392; *Wall. Cat.*

1834, *type sheet*; *Blume Bijd.* 817; *Dcne. in Nouv. Ann. Mus.* iii. 401; *Schauer in DC. Prodr.* xi. 643; *Benth. Fl. Austral.* v. 56. *C. tomentosa*, *Lamk. Dict.* i. 562. *C. americana*, *Lour. Fl. Cochinch.* 70, *not of Linn.* *C. adenantha*, *Br. Prodr.* 513. *C. Heynei*, *Roth Nov. Sp.* 82; *Blume Bijd.* 819. *C. bicolor*, *Juss. in Ann. Mus.* vii. 77; *Schauer l. c.* 642. *C. sumatrana*, *Miq. Fl. Ind. Bat.* ii. 886. *C. dentata*, *Herb. Roxb., Wall. Cat.* 1834 *by admixture, not of Roth.*

PENANG; *Wallich.* MALACCA; *Griffith, Maingay.*—DISTRIB. Malaya and Philippine Islands, N. Australia.

Leaves $4\frac{1}{2}$ by $2\frac{1}{2}$ in., suddenly cuneate and narrowed into the petiole, often almost spatulate, mature shining above, usually very white beneath; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in. *Peduncles* usually $\frac{3}{8}$ – $\frac{1}{2}$ in.; cyme 1–2 in. diam., globose. *Fruit* deep-purple, finally black.—Widely cultivated for the strong contrast between the upper and lower surface of the leaves. The figure in *Bot. Mag.* (t. 2107) is doubted by *Bentham l. c.*, and with reason.

8. *C. pedunculata*, *Br. Prodr.* 513; shrubby, leaves broadly elliptic acuminate base rounded closely serrulate mature puberulous above thinly stellate-flocculose beneath, peduncles often as long as the petiole. *Benth. Fl. Austral.* v. 57. *C. cuspidata*, *Roxb. Fl. Ind.* i. 394. *C. dentata*, *Roth Nov. Sp.* 81; *Blume Bijd.* 818; *Wall. Cat.* 6319. *C. cana*, *Wall. Cat.* 1834, n. 2. *C. lanata*, *Schauer in DC. Prodr.* xi. 644, *not of Linn., nor of Vahl.* *C. tiliaefolia*, *Teijsm. & Binnend. fide Kurz ms.*

PENANG; *Wallich.*—DISTRIB. Malaya, Trop. Australia.

Leaves 5 by $2\frac{1}{4}$ in., membranous, stellate tomentum somewhat deciduous; petiole $\frac{1}{4}$ in., stellate-woolly. *Cymes* 1–2 in. diam., globose, dense, stellately woolly; peduncles $\frac{1}{4}$ – $\frac{1}{2}$ in. *Fruit.* $\frac{1}{10}$ in. diam., dark purple.—Easily distinguished from *C. cana* by the nearly concolorous surfaces of the leaf.

9. *C. rubella*, *Lindl. Bot. Reg.* t. 883; arborescent, leaves very short-petioled cordate-oblong acuminate crenate-serrate mature softly pubescent above tomentose beneath, peduncles short, calyx in flower stellately tomentose. *Schauer in DC. Prodr.* xi. 645; *Benth. Fl. Hongk.* 271. *C. sessilifolia*, *Wall. Cat.* 1837; *Walp. Rep.* iv. 130. *C. tenuiflora*, *Champ. in Hook. Kew Journ.* v. 135.

SIKKIM, alt. 2000 ft.; *Clarke.* KHASIA and JAINTIA Mts., alt. 2–4000 ft., frequent; *Wallich, H. f. & T., &c.*—DISTRIB. China.

An erect, single-stemmed shrub, 10–20 ft., with horizontal branches and complanate foliage. *Leaves* 5 by $1\frac{1}{4}$ in., parallel-sided or slightly obovate, closely covered with short simple hairs above, concolorous beneath; petiole $\frac{1}{10}$ – $\frac{1}{4}$ in. *Peduncles* $\frac{1}{4}$ – $\frac{1}{2}$ in.; cymes 1–2 in. diam., stellately tomentose. *Calyx* not membranous, nor glabrate in fruit. *Corolla* pink. *Fruit* $\frac{1}{8}$ – $\frac{1}{6}$ in. diam., fine purple.—*Lindley's* figure represents correctly the Chinese form of this species having the leaves “crossing each other” subsessile, mature nearly glabrate above very thinly stellate-hairy beneath. The description of *Schauer l. c.* is taken from the Indian form, *C. sessilifolia*, *Wall.*, which, however, has the petioles longer than the Chinese.

10. *P. psilocalyx*, *Clarke*; arborescent, leaves elliptic acuminate denticulate mature nearly glabrous, cymes small short-peduncled stellately villous, calyx membranous in flower glandular scarcely hairy.

KHASIA Mts., alt. 4–5000 ft.; *Wallich, J. D. H., &c.*

A small tree; branchlets densely stellate-tomentose. *Leaves* 8 by $2\frac{3}{4}$ in., or $2\frac{1}{2}$ by 1 in., base rounded or cuneate thinly membranous, mature with scattered stellate hairs on the midrib beneath, tertiary venation close prominent, glands minute scattered; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Peduncles* mostly very short; cymes usually few-fl.; pedicels sometimes pink. *Calyx* $\frac{3}{4}$ in., minutely 4-toothed, greenish or pinkish,

minutely gland-dotted, with a few scattered hairs when young, whiteish or membranous in fruit. *Corolla* pink. *Fruit* scarcely $\frac{1}{2}$ in. diam.—*C. longitolia*, *Benth. Fl. Hongk.* 270 (not of *Lamk.*), in the glabrous calyx, inflorescence, and structure of leaves comes very near this; but in that the leaves are linear-lanceolate, and the fruit very much larger.

11. *C. longifolia*, *Lamk. Ill.* i. 563, and *Ill.* t. 69; shrubby, leaves petioled broadly lanceolate acuminate at both ends serrulate mature thinly stellate-hairy beneath, cymes short-peduncled dense, calyx stellately white-tomentose. *Bot. Reg.* t. 864; *Roxb. Fl. Ind.* i. 394; *Brand. For. Fl.* 369; *Kurz For. Fl.* 275; *Schauer in DC. Prodr.* xi. 645, *Var. β only*; *Benth. Fl. Austral.* v. 57, not *Fl. Hongk.* 270. *C. Roxburghiana*, *Roem. & Sch. Syst.* iii. *Mant.* 54. *C. attenuata*, *Wall. Cat.* 1835. *C. cana*, *Wall. Cat.* 1834, partly. *C. dentata*, *Wall. Cat.* 6319, partly.

MALAY PENINSULA; Penang, *Wallich, Roxburgh*; Malacca, *Griffith* (*Kew Distrib.* n. 6039), &c. NICOBAES; *Kurz.*—DISTRIB. W. Malaya to N. Australia.

Branchlets densely stellate-tomentose. *Leaves* 5 by 2 in., base much attenuate, mature nearly glabrous above, beneath so closely fulvous stellate-villous that few of the largeish glands can be seen; petiole $\frac{1}{2}$ in. *Cyme* in flower $1\frac{1}{2}$ in. diam., densely stellate-tomentose; peduncle $\frac{1}{2}$ in. *Calyx* $\frac{1}{8}$ – $\frac{1}{2}$ in. *Corolla* purple or pink, or sometimes white (fide *Benth.*). *Berry* $\frac{1}{10}$ in. diam., white.—The details of this description are from the Penang plant. *C. longifolia*, *Hook. Fl. Exot.* ii. t. 133, is *C. longifolia* var. *brevipes*, *Benth. Fl. Hongk.* 270, which has sessile obtuse-based linear-lanceolate leaves, glabrous calyx, &c.

VAR: lanceolaria; leaves narrower thinner mature beneath glabrate densely minutely glandular-dotted. *C. lanceolaria*, *Roxb. Fl. Ind.* i. 395; *Wall. Cat.* 1829. *C. lanceolaria*, *Var. α subglabrata*. *Schauer l. c. excl. syn.*—E. Bengal; in the plains, common; also in the Khasia, Chittagong Hills up to 3000 ft., plentiful. (W. Malaya.)—Cymes laxer, flowers and fruits smaller, than in the type. The abundant material for this common plant is very uniform; except that, while the leaves are generally regularly serrulate, a form with them subentire appears in Chittagong, and is common in the Malay Peninsula and islands.

12. *C. acuminata*, *Roxb. Fl. Ind.* i. 394; shrubby, innovations stellately white-tomentose, leaves broadly lanceolate acuminate denticulate, panicles axillary long-peduncled dichotomous shorter than the leaves.

SILHET; *Roxburgh*.

Leaves 4–5 by 2 in., mature glabrate reticulate above, hairy beneath. *Peduncles* longer than in the other species.—Not seen; the foregoing copied from *Roxburgh*. *Schauer* reduces this to *C. longifolia*; but there is no form of that known with the peduncles longer than in the other species described by him. His description points altogether to *C. Reevesii*, for which the locality does not suit. Possibly *Roxburgh's* specimen was a cultivated one, as *C. Reevesii* has been long cultivated.

X. TECTONA, *Linn. f.*

Trees, stellately tomentose. *Leaves* opposite or whorled, large, petioled, entire. *Cymes* dichotomous, many-fl., in large terminal panicles; bracts small, narrow. *Calyx* campanulate, shortly 5–6-lobed, in fruit enlarged ovoid or urceolate. *Corolla* small, tube short; limb equally 5–6-lobed, spreading. *Stamens* as many as corolla-lobes, on the corolla-tube; anthers exerted, oblong. *Ovary* 4-celled, cells 1-ovuled; style linear, tip shortly bifid. *Drupe* enclosed in the calyx, 4-celled; endocarp bony. *Seeds* erect, oblong.—Species 3, the following and a Philippine Island one.

1. *T. grandis*, *Linn. f. Suppl.* 151; leaves opposite ovate mature

scabrous or subglabrate above, calyx in fruit 1 in. diam. ovoid membranous. *Gaertn. Fruct.* i. 275, t. 57; *Roxb. Cor. Pl.* i. 10, t. 6, and *Fl. Ind.* i. 600; *Wall. Cat.* 772; *Graham Cat. Pl. Bomb.* 158; *Schauer in DC. Prodr.* xi. 629; *Dalz. & Gibs. Bomb. Fl.* 199; *Bocq. Rev. Verb.* 99, t. 10; *Bedd. Fl. Sylv.* t. 250 (two); *Brand. For. Fl.* 354, t. 44; *Kurz For. Fl.* ii. 259; *Gamble Indian Timbers*, 283.—*Theka, Juss. Gen.* 108; *Lamk. Ill.* t. 136.—*Rumph. Herb. Amb.* iii. t. 18; *Rheede Horæ. Mal.* iv. t. 27.

W. DECCAN PENINSULA, alt. 500–4000 ft., common; from CENTRAL INDIA to ORISSA. MALAY PENINSULA, alt. 500–4000 ft.; from Burma (common) to Malacca. —DISTRIB. Sumatra, Java.

A tree, 80–150 ft.; branchlets quadrangular, stellately tomentose. *Leaves* 12 by 8 in. (of seedlings sometimes 3 ft.), cuneate at both ends, mature with hard close tomentum beneath; petiole 1 in. *Panicles* 18 in. diam., and more; flowers very numerous, but only a few fertile; bracts $\frac{1}{2}$ by $\frac{1}{10}$ in., deciduous, with also usually some reduced leaves at the forks. *Calyx* (in flower) $\frac{1}{8}$ – $\frac{1}{6}$ in., lobed less than half-way down, stellately white-tomentose. *Corolla* scarcely $\frac{1}{4}$ in. long, white, glabrous in the throat. *Drupe* $\frac{3}{8}$ in. diam.; cells 4 with a central cavity, densely hirsute; calyx in fruit ovoid or subpyramidal, membranous, often reticulately-nerved nearly glabrous, mbuth very small.—Teak.

2. **T. Hamiltoniana**, *Wall. Pl. As. Rar.* iii. 68, t. 294, and *Cat.* 773; leaves mostly ternate whorled, ovate mature scabrid above, calyx in fruit $\frac{1}{2}$ in. diam. narrowly urceolate densely woolly. *Walp. Rep.* iv. 99; *Schauer in DC. Prodr.* xi. 629 (excl. the Philippine Island plant); *Kurz For. Fl.* ii. 259; *Gamble Indian Timbers*, 293. *Theka ternifolia*, *Ham. in Trans. Linn. Soc.* xvii. 185.

BURMA, at Prome; *Wallich, Kurz.*—DISTRIB. Ava.

A small tree, 30–40 ft.; branchlets 6–8-angular. *Leaves* sometimes opposite or 4-nate, 8 by 5 in., base rhomboid or obtuse, white tomentose beneath or ultimately softly hairy; petiole $\frac{3}{8}$ in. *Panicle* 6–12 in., stellately woolly; branches ascending. *Calyx* (in flower) $\frac{1}{8}$ in., lobed scarcely half-way down. *Corolla* $\frac{1}{2}$ in. long, throat very hairy; lobes pale blue. *Drupe* $\frac{1}{2}$ by $\frac{1}{2}$ in., glabrous or with some soft wool, 4-celled without a central cavity; calyx in fruit $\frac{1}{2}$ by $\frac{1}{2}$ in., narrower upwards.—This tree flowers before the leaves are fully developed.

XI. PREMNA, Linn.

Trees or shrubs, sometimes climbing. *Leaves* opposite, entire or toothed. *Cymes* corymbose or paniced, sometimes thyrsoid, pubescent; bracts small, narrow. *Flowers* often polygamous, greenish or yellowish white, small (in *P. cordifolia* and *P. corymbosa* rather larger, then scarcely $\frac{1}{4}$ in. long). *Calyx* small, cup-shaped, subentire or minutely 2–5-toothed, subequal or 2-lipped. *Corolla* tubular, throat hairy; limb 2-lipped, 5-lobed, or subequally 4-lobed. *Stamens* 4, didynamous. *Ovary* 2- or 4-celled, 4-ovuled; style linear, shortly bifid. *Drupe* small, surrounded below by the calyx, globose or oblong-obovoid; endocarp hard undivided 1–4-celled 1–4-seeded. *Seeds* oblong.—Species 40, chiefly Indian.

* *Calyx* 2-lipped or subtruncate, lips subentire.

† *Cymes* forming an elongate interrupted thyrses.

1. **P. racemosa**, *Wall. Cat.* 1777; leaves petioled ovate or obovate acuminate, spikes simple densely shortly villous, calyx minutely hairy or glabrate. *Schauer in DC. Prodr.* xi. 633; *Brand. For. Fl.* 367; *Kurz For. Fl.* ii. 263.

KHASIA MTS., alt. 3-5000 ft.; *Wallich, Griffith* (Kew Distrib. n. 6023); *H. f. & T.*, &c. TENASSERIM (*Kur*).

A small tree, 10-30 ft.; innovations minutely fulvous-villous. *Leaves* 3 by $1\frac{1}{2}$ in., obscurely crenate, mature nearly glabrous, nerves 4-5 pair; petiole $\frac{1}{4}$ in. *Spikes* 2-5 in.; bracts $\frac{1}{3}$ in., elliptic, nerved, whitened, deciduous, or much smaller inconspicuous. *Calyx* $\frac{1}{8}$ in., usually whitened upwards, glabrate, lobed half-way down into 2 rounded lips, or subtruncate and very shallowly lobed. *Corolla* $\frac{1}{8}$ - $\frac{1}{4}$ in., greenish-white, mouth subequally 4-lobed, throat very hairy. *Ovary* nearly glabrous at the tip. *Drupe* $\frac{1}{8}$ in., mostly 1-seeded, narrowly obovoid.

2. **P. interrupta**, *Wall. Cat.* 1778; leaves subsessile ovate or obovate very shortly acuminate, spikes simple densely shortly villous, calyx puberulous or glabrate. *Schauer in DC. Prodr.* xi. 633; *Brand. For. Fl.* 367.

TEMPERATE HIMALAYA, frequent, alt. 5-8000 ft., from Kumaon, *Strachey & Winterbottom*, to Sikkim, *J. D. H.*

A small tree, 10-30 ft., resembling *P. racemosa* very closely, except in the larger subsessile leaves. *Leaves*, those next the spikes 9 by $4\frac{1}{4}$ in., sometimes 6 by 3 in.; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in., broadly channelled. *Spikes* as of *P. racemosa*, but rather larger; bracts $\frac{1}{2}$ in., whitened, nervose, or inconspicuous. *Corolla* hairy in the throat. *Drupe* (the few examined) 1-seeded, rather shorter and broader than in *P. racemosa*.—Gamble (*Darjeeling List*, 61, and *Indian Timbers*, 293) says that this and the next are large climbers, and it is very probable that they are so sometimes. But Gamble's plants being published with imperfect diagnoses, and some being wrongly identified, the information regarding others is doubtful.

3. **P. bracteata**, *Wall. Cat.* 1772; leaves short-petioled elliptic or obovate acuminate at both ends, spikes panicle and calyx densely puberulous. *P. racemosa*, *Gamble Darjeeling List*, 61?, not of *Wall. Labiata?* *Griff. Itin. Notes* 199, n. 1138.

SUBTROPICAL SIKKIM, alt. 2-3000 ft.; *J. D. H.*, &c. BHOTAN; *Griffith* (Kew Distrib. n. 6022). KHASIA MTS., alt. 4000 ft.; *Wallich, Griffith, H. f. & T.*

A tree, 40 ft.; innovations densely cinereous pubescent. *Leaves* 9 by $3\frac{1}{2}$ in., subentire, mature glabrate, nerves 8 pair; petiole $\frac{1}{4}$ in., somewhat winged, or 0. *Panicles* 7 by 4 in.; bracts $\frac{1}{2}$ in., broadly lanceolate, acute, or 0; cymes mostly in distant capitate whorls on the panicle branches. *Calyx* $\frac{1}{20}$ in.; lips entire shallow, or sometimes one minutely 2-toothed, the other still more obscurely 3-toothed. *Corolla* $\frac{1}{8}$ in., white, as of *P. interrupta* but smaller, hardly hairy in the throat. *Drupe* not seen.

†† *Cymes in compound corymbs.*

4. **P. cordifolia**, *Roxb. Fl. Ind.* iii. 78; leaves subcordate-ovate acuminate, corymb dense, pedicels very short hairy, corolla $\frac{1}{4}$ in. tube cylindric densely hairy nearly to the base. *Walp. Rep.* iv. 94; *Schauer in DC. Prodr.* xi. 632 partly, not of *Wight or Beddome*.

PENANG; *Roxburgh*. SINGAPORE; *Lobb*.

A shrub, 6-8 ft. *Leaves* 6 by 3 in., subentire, drying red, mature nearly glabrous, nerves 5-6 pair; petiole 1 in., fulvous-puberulous. *Corymb* 3-5 in. diam., many-fl.; bracts $\frac{1}{8}$ in., lanceolate, acute; branches thick, shortly yellow-hirsute. *Calyx* $\frac{1}{16}$ in., scabridly puberulous, 2-lipped; lips broad, rounded. *Corolla-tube* twice as long as the calyx, densely filled with hair within in the lower part; limb 2-lipped. *Ovary* glabrous at the tip. *Drupe* $\frac{1}{4}$ in. diam., subglobose, usually 3-4-seeded.—*Schauer's* diagnosis is taken from *Roxburgh*; his description mainly from *P. Perrottetii*. *P. cordifolia*, *Wall. Cat.* 2467, is not in *Wallich's Herbarium*; but, as it came from *Gongachora*, it is very unlikely to have been *P. cordifolia*, *Roxb.*

5. **P. corymbosa**, *Rottl. & Willd. in Gesell. Nat. Freunde Neue Schr.* iv. (1803) 187, 188; leaves subcordate-ovate acuminate undulate, panicles dense branches dichotomous slender glabrate coloured, corolla $\frac{1}{2}$ in. tube cylindric hairy near the top. *P. densiflora*, *Wall. Cat.* 1773. *P. cordifolia*, *Wight Ic.* t. 1483; *Bedd. For. Man.* 172; *Schauer in DC. Prodr.* xi. 632, partly; *Dalz. & Gibs. Bomb. Fl.* 199?, not of *Roxb.* *P. truncata*, *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1863, ii. 215, ex. descr. *Cornutia corymbosa*, *Burm. Fl. Ind.* 133, t. 41, fig. 1, not of *Lamk.*

CARNATIC; *Wight, Shuter*; Cuddapah Hills, *Beddome*. CEYLON; *Burmans, Thwaites*, C. P. n. 193.

Leaves $3\frac{1}{2}$ by $1\frac{1}{2}$ in., young sometimes woolly, mature nearly glabrous, upper surface impressed reticulate; petiole 1 in., pubescent. *Panicles* small, pyramidal, very dense, brachiately, patently deciduously pubescent with simple hairs; bracts narrowly lanceolate. *Calyx* $\frac{1}{10}$ in., early glabrate; in fruit enlarged, 2-lipped, membranous or whitened. *Corolla* tubular, limb subequally 4-lobed. *Drupe* $\frac{1}{2}$ in., obovoid, 3-4-seeded.

6. **P. coriacea**, *Clarke*; leaves cordate ovate or orbicular shortly acuminate mature coriaceous glabrous, corymbs large compound, corolla $\frac{1}{2}$ in. *P. cordifolia*, *Grah. Cat. Pl. Bomb.* 155, not of *Roxb.* *P. scandens*, *Dalz. & Gibs. Bomb. Fl.* 199, not of *Roxb.*

W. DECCAN PENINSULA, in the Ghauts, from Bombay to Cochin, common; *Wight, Graham, Hohenacker*, &c.

A large climber (*Ritchie*) or a tree (*Graham*). *Leaves* 5 by $3\frac{1}{2}$ in., entire, mature very shining smooth, nerves 4-5 pair; petiole 1 in. *Corymb* 8 in. diam., 3 in. high, closely shortly hairy; bracts $\frac{1}{2}$ in., lanceolate, scattered. *Calyx* $\frac{1}{2}$ in., cup-shaped, truncate, hardly 2-lipped, minutely pubescent. *Corolla* greenish-yellow, throat hairy. *Drupe* $\frac{1}{2}$ in., 1-seeded, narrowly obovoid.

VAR. oblonga; leaves elliptic or oblong often caudate. *P. scandens*, *Wall. Cat.* 1774, partly. *Premna* n. 23, *Herb. Ind. Or. H. f. & T.*—Khasia Terai; *H. f. & T.* Nathpur; *Hamilton*. Sikkim Terai; *Clarke*.—A tree, 20-40 ft.

VAR. cuneata; leaves oblong base cuneate often caudate. *Premna* n. 23, *Herb. Ind. Or. H. f. & T.*—Khasia Terai; Silhet and Pundua, *H. f. & T.*

7. **P. villosa**, *Clarke*; leaves cordate-ovate shortly acuminate mature densely villous beneath, corymbs large compound closely pubescent, corolla $\frac{1}{2}$ in.—*Premna* n. 25, *Herb. Ind. Or. H. f. & T.*

DECCAN PENINSULA; Mts. of Kurg, *Wight, G. Thomson*; Wynaad, alt. 3000 ft., *Beddome*.

A tree (or a large climber, *Beddome*), closely resembling *P. coriacea* except as to the indumentum. *Leaves* (mature) densely villous with simple straight hairs beneath, most copiously on the nerves, glabrate above; petiole 2 in. *Corymb*, *calyx*, *corolla*, and young *drupe* as of *P. coriacea*, of which this may be a var., as *Beddome* suspects.

8. **P. scandens**, *Roxb. Fl. Ind.* iii. 82; leaves petioled elliptic and acuminate or lanceolate entire membranous glabrous, corymbs large compound lax puberulous many-fld., calyx subentire membranous in fruit, corolla scarcely $\frac{1}{2}$ in. *Schauer in DC. Prodr.* xi. 632; *Kurz For. Fl.* ii. 263. *P. ramosa*, *Wall. Cat.* 1774.—*Premna* n. 24, *Herb. Ind. Or. H. f. & T.*

TERAI of N. and E. BENGAL, frequent; SIKKIM, *J. D. H.*, &c.; BHOTAN and ASSAM, *Griffith* (*Kew Distrib.* n. 6034). SILHET; *Roxburgh, Wallich*; CACHAR, *Keenan*. MARTABAN; *Kurz*.

A tree, 20-40 ft., or (side *Roxburgh*) a large climber. *Leaves* 11 by 4 in., base rounded or cuneate, nerves 6 pair; petiole $1\frac{1}{2}$ in., glabrous. *Corymbs* 4-10 in. diam.

Calyx $\frac{1}{8}$ in., cup-shaped, nearly glabrous at flower-time. *Corolla* bearded in the throat. *Drupe* (fide Roxburgh) size of a pea, globose, tubercled.—The immature drupes appear narrowly obovoid, and the plant hardly to differ from *P. coriacea* var. *oblonga*, except in the thinner texture. Roxburgh says the petioles are sometimes hairy; from which it may be doubted whether he did not erroneously refer other things to this species. I cannot satisfactorily identify from the descriptions the *P. scandens* & *cordifolia* of Brandis For. Flora.

9. ***P. purpurascens***, *Thwaites Enum.* 242; leaves broadly oblong suddenly shortly acuminate entire glabrous, corymbs large closely pubescent, calyx small truncate cinereous-pubescent.

CEYLON; Ambagamowa District, *Thwaites*.

A large climber. *Leaves* $4\frac{1}{2}$ by $2\frac{1}{4}$ in., suddenly subobtusely acuminate, base obtuse or subcordate, mature fulvous-puberulous on the nerves beneath or glabrate; nerves 8 pair; petiole 1 in. *Corymbs* 6 in., straggling, with many small flowers clustered at the ends of the branches. *Calyx* $\frac{3}{8}$ in., obscurely 2-lipped. *Corolla* $\frac{1}{2}$ in., subequally 4-lobed, pale-purple, *Thwaites*. *Drupe* not seen.

VAR. ? *paucinervis*; nerves 3–4 pair, not inarching except very close to the margin. —Anamallays, alt. 3000 ft., *Beddome*.—A gigantic climber with the purple colour of *Thwaites' P. purpurascens* by *Beddome*, and referred doubtfully thereto by him. *Beddome's* specimen is very immature, but the nervation of the leaves is unlike that of *P. purpurascens*, and may indicate a new species.

** *Calyx* 2-lipped, one lip 2-toothed, the other subentire.

10. ***P. integrifolia***, *Linn. Mant.* 252 (excl. syn. Burm.); leaves broadly oblong or ovate subobtusely undulate or coarsely toothed mature glabrous, corymbs dense minutely hairy, calyx sparsely minutely pubescent or scabrid puberulous. *Wight Ic. t.* 1469; *Brand. For. Fl.* 366. *P. serratifolia*, *Linn. l. c.* 253; *Wall. Cat.* 1767; *Schauer in DC. Prodr.* xi. 632; *Bedd. For. Man.* 172; *Kurz For. Fl.* ii. 263. *P. spinosa*, *Roxb. Fl. Ind.* iii. 77. *P. sambucina*, *Wall. Cat.* 1775; *Schauer l. c.* 631; *Kurz l. c.* 261. *P. viburnoides*, *Wall. Cat.* 2646, letter C. *P. subcordata*, *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1863, ii. 216. *P. ovalifolia*, *Wall. Cat.* 1782.—*Gumira littorea*, *Rumph. Herb. Amb.* iii. 209, t. 134. *G. integrifolia*, *Hassk. Hort. Bogor.* 135.

INDIA, near the sea from Bombay to Malacca. SILHET; *Wallich*. CEYLON. ANDAMANS; and NICOBARS, *Kurz*.—DISTRIB. Malaya.

A small tree, or shrub; trunk and large branches often spinous, branchlets unarmed. *Leaves* 4 by $2\frac{1}{4}$ in. (sometimes 1 by $\frac{1}{2}$ in.), subobtusely very shortly acuminate or obtuse, sometimes obovate, entire sinuate or in the upper half with a few coarse teeth, mature glabrous or minutely hairy on the nerves above or beside the nerves beneath; nerves 4–5 pair; petiole $\frac{3}{4}$ in., usually somewhat pubescent. *Corymbs* 2–4 in. diam., short-peduncled, minutely cinereous-pubescent, and often with some fulvous deciduous hair; bracts $\frac{1}{16}$ in., lanceolate, pubescent. *Calyx* $\frac{1}{8}$ in., 3-toothed. *Corolla* $\frac{1}{2}$ in., greenish-white, throat hairy, subequally 4-lobed. *Drupe* $\frac{1}{2}$ in. diam., globose, 3–4-seeded.—Some of the synonyms cited above are uncertain; specimens with the calyx at all distinctly 5-toothed (rather than 3-toothed) must be referred to *P. latifolia*, *Roxb.*: it may be doubted whether any of the examples said to have come (*Brandis l. c.*) from Oudh and Gurwhal belong here. *Gamble*, however, says (*Darjeeling List*, 60, and *Indian Timbers*, 295) that the tree is found in the Sikkim Terai; and as he describes the tree as thorny, it would appear that he identified it correctly.

VAR. *angustior*; leaves elliptic narrowed at both ends obtuse, corymbs small.—Malacca; *Griffith* (*Kew Distrib. n.* 6030).—*Leaves* $2\frac{1}{2}$ by $\frac{3}{4}$ in., widest about the middle. *Corymbs* numerous, 1–2 in. diam.

11. ***P. parasitica***, *Blume Bijl.* 816; leaves ovate or obovate very

shortly acuminate entire glabrous, corymbs nearly glabrous, flowers mostly sessile, calyx nearly glabrous. *Schauer in DC. Prodr.* xi. 633. *P. trichostoma*, *Miq. Fl. Ind. Bat.* ii. 892.

MALACCA; *Griffith* (Kew Distrib. n. 6019). TENASSERIM; *Helper*. SINGAPORE; *G. Thomson*.—DISTRIB. Java, Borneo.

A large climber. *Leaves* $5\frac{1}{2}$ by 3 in., base obtuse or cordate, nerves 5 pair; petiole $\frac{3}{8}$ in. *Corymbs* 3-4 in. diam., puberulous, hardly pubescent; branches somewhat thick, bracts deciduous. *Calyx* $\frac{1}{16}$ in., 2-lipped, usually membranous, glabrous after flowering; one lip shortly 2-fid, the other subentire. *Drupe* not seen.

12. *P. divaricata*, *Wall. Cat.* 1781; leaves ovate acuminate entire mature nearly glabrous, corymbs compound many-fld. pubescent, calyx subtruncate with 2 minute teeth. *Schauer in DC. Prodr.* xi. 633. *P. lucidula*, *Kurz For. Fl.* ii. 263 (? of *Miquel*).—*Premna* n. 33, *Herb. Ind. Or. H. f. & T.*

MERGUI; *Griffith*. MALACCA; *Maingay* (Kew Distrib. n. 1198, 1199). ANDAMANS (*Kurz*).—DISTRIB. Java.

A climber. *Leaves* 5 by $2\frac{1}{2}$ in., nerves 5-6 pair, usually puberulous above, beneath most obscurely dotted and sometimes pubescent; petiole $\frac{1}{2}$ - $2\frac{1}{2}$ in. *Corymbs* 3 in. diam.; bracts $\frac{1}{8}$ in., lanceolate; flowers shortly pedicelled or sessile. *Calyx* $\frac{1}{4}$ in., broadly cup-shaped; upper lip in flower of 2 minute acute teeth, lower subentire. *Corolla* $\frac{1}{4}$ in., throat hairy. *Drupe* $\frac{1}{2}$ in. diam., globose, 3-4-seeded.—An authentic Javan example from *Miquel* of his *lucidula* has the corymbs stouter, the calyx larger, more distinctly toothed, the corolla fully $\frac{1}{2}$ in.

13. *P. punctulata*, *Clarke*; leaves broadly elliptic suddenly shortly acuminate entire mature glabrate punctulate beneath, corymbs large pubescent, calyx closely pubescent 2-lipped, lips subequal one 2-toothed the other subentire.

MALACCA; *Maingay* (Kew Distrib. n. 1200).

Leaves $5\frac{1}{2}$ by 3 in., base obtuse or rounded, nerves 4 pair; petiole 1 in. *Corymbs* 4-5 in. diam.; lower bracts $\frac{1}{2}$ in., linear-oblong; flowers sessile or shortly pedicelled. *Calyx* $\frac{1}{8}$ in., closely minutely grey-pubescent; after flowering somewhat deeply 2-lipped. *Drupe* not seen.—This may be *P. ceramensis* (*Miq. Fl. Ind. Bat.* ii. 893), of which no authentic specimen is at Kew.

14. *P. khasiana*, *Clarke*; leaves large ovate caudate-acuminate entire glabrous nerves pubescent above, corymbs large lax pubescent, calyx 2-lipped sub-5-toothed.

KHASIA MTS., alt. 4300 ft.; Jasper Hill near Cherra, *H. f. & T.*

Subscandent (*Hooker*). *Leaves* 7 by $4\frac{1}{2}$ in., base obtuse, shining, subcoriaceous, young scarcely pubescent beneath, nerves 7 pair; petiole $1\frac{1}{2}$ in., pubescent. *Corymbs* 6 in. diam., straggling, closely pubescent with simple hairs and minute scales; bracts $\frac{1}{2}$ in., linear. *Calyx* $\frac{1}{8}$ - $\frac{1}{2}$ in., pubescent; one lip distinctly 2-toothed, the other more shortly 3-toothed or subentire. *Corolla* $\frac{1}{2}$ in., subequally 4-lobed, glabrous without, throat somewhat hairy. *Drupe* not seen.—From the subcoriaceous, shining, much acuminate large leaves and scandent habit, the true affinity of this may be near *P. coriacea*; but the artificial sectional character taken from the calyx does not allow it to stand there.

15. *P. longifolia*, *Roxb. Hort. Beng.* 46, and *Fl. Ind.* iii. 79, not of *Wall. nor of Schauer*; leaves large long-petioled ovate acute entire mature glabrate, corymbs compound pubescent, calyx 2-lipped lower lip shorter subentire or obscurely 3-toothed. *Walp. Rep.* iv. 93.

BENGAL; *Roxburgh*.

A tree. *Leaves* 9 by $4\frac{1}{2}$ in., base obtuse or subcordate, mature glabrate epunctate,

a little yellow hair clinging to the sides of the midrib beneath; nerves 6 pair, secondary reticulating nerves conspicuous; petiole $2\frac{1}{2}$ in. *Corymbs* terminal, short-peduncled, 3-4 in. diam., closely pubescent and with some deciduous fulvous hairs, exceedingly like *P. integrifolia*, but rather larger. *Calyx* $\frac{1}{10}$ in., in fruit 3-toothed, closely scabrid-puberulous. *Corolla* $\frac{1}{8}$ in., greenish-white, hairy in the throat. *Drupe* $\frac{1}{2}$ in. diam., globose, 4-seeded (Roxburgh).—The two examples of Roxburgh, one named by himself, agree exactly with his Ic. Ined. at Kew, and with his description; and are very unlike the *P. longifolia* of Wallich, accepted as Roxburgh's by Schauer. It seems very near *P. integrifolia*, Linn.

*** *Calyx* 5-4-toothed, subequally or obscurely 2-lipped.

† *Leaves entire or nearly so.*

16. ***P. milleflora*, Clarke**; leaves large long-petioled ovate acute entire mature minutely crisped-pubescent on the nerves, corymb large very many-fl'd., calyx minutely 5-toothed.—*Premna* n. 30, *Herb. Ind. Or. H. f. & T.*

ASSAM; *Griffith* (Kew Distrib. n. 6028); Upper Assam, *Jenkins*.

Generally resembling *P. longifolia*, Roxb., but with a very large dense corymb of very small flowers. *Leaves* 7 by 4 in., base rhomboid, mature minutely pubescent on the nerves (primary and secondary) beneath, nerves 8 pair; petiole $2\frac{1}{2}$ in. *Corymb* a foot diam., about 2000-flowered (in *Griffith's* n. 320), and *calyx* ($\frac{1}{4}$ in.), minutely pubescent. *Corolla* $\frac{1}{12}$ in., throat hairy. *Drupe* $\frac{1}{2}$ in., globose.

17. ***P. tomentosa*, Willd. Sp. Pl. iii. 314**; leaves ovate acuminate entire mature stellate-woolly beneath, corymbs paniced densely stellate-woolly, calyx shortly 5-fl'd., ovary upwards very hairy. *Roxb. Fl. Ind. iii. 76*; *Wall. Cat. 1769*; *Schauer in DC. Prodr. xi. 634*; *Wight Ic. t. 1468*; *Bedd. Fl. Sylv. t. 251*; *Brand. For. Fl. 367*. *P. flavescens*, *Juss. in Ann. Mus. d'Hist. Nat. vii. 77*, not of *Wall.* *Cornutia corymbosa*, *Lamk. Dict. i. 54*, not of *Burm.*

DECCAN PENINSULA and Ceylon, frequent; from the Circars and Central Provinces southward.

A tree, often 50 ft.; branchlets densely stellate-woolly. *Leaves* 6 by $3\frac{1}{2}$ in., base rounded or subcordate, coriaceous, minutely glandular scabrous above, nerves 7 pair; petiole 1 in. *Corymbs* $\frac{3}{4}$ in. diam., often sessile, upper branches (or nearly all) alternate; bracts $\frac{1}{2}$ in., linear. *Calyx* $\frac{1}{10}$ in., stellately woolly. *Corolla* $\frac{1}{8}$ in., 2-lipped, hairy in the throat, greenish-yellow. *Drupe* $\frac{1}{2}$ in. diam., deciduously hairy, ovoid, 3-1-seeded.—This is certainly *P. tomentosa* of Roxb., but whether of Willd. may be questioned. Willdenow founds his plant as a syn. of *Cornutia corymbosa*, Lamk. Lamarck does not say whether it was the same as *Cornutia corymbosa*, Burm. If it was the same, which from the description seems not improbable, then *Premna tomentosa*, Willd., is a mere syn. of *P. corymbosa*.

VAR. *detergibilis*; mature leaves with most of the wool rubbed off. *P. latifolia*, *Thwaites Enum. 242*, not of *Roxb.*—Ceylon; Thwaites, C. P. n. 2893.

18. ***P. pyramidata*, Wall. Cat. 1779**; leaves large ovate very shortly acuminate subentire mature glabrous above hairy and somewhat woolly beneath, panicles pyramidal many-fl'd. stellately villous. *Schauer in DC. Prodr. xi. 633*. *P. tomentosa*, *Kurz For. Fl. ii. 260*; *Gamble Indian Timbers*, 294.

TAVOY and AMHERST; *Wallich*.—DISTRIB. Java?

A large tree (*Wallich*). *Leaves* 8 by 5 in., from ovate to orbicular, base obtuse sometimes subcordate, nerves 7 pair; petiole $1\frac{1}{2}$ in., stellately villous. *Panicles* 6 in. diam.; branches opposite, ascending, peduncles $1\frac{1}{2}$ in., flowers crowded at the ends of the branches; bracts $\frac{1}{2}$ in., linear, numerous. *Calyx* $\frac{1}{2}$ in., distinctly 5-toothed at flower-time, stellately villous. *Corolla* $\frac{1}{4}$ in., or rather more, stellately villous with-

out. *Drupe* $\frac{1}{2}$ in. diam., globose, glabrous.—Brandis and Kurz consider this the same as *P. tomentosa*; but the rounded shoulders of the leaves, and the brachiate panicles give it a very different aspect; and the drupe marks it a distinct species. The Javan *P. tomentosa*, Blume (Bijd. 816), is nearly allied to this.

19. **P. bengalensis**, Clarke; leaves ovate or narrowly elliptic acuminate entire mature stellately pubescent on the nerves, corymbs spreading stellately pubescent or tomentose, calyx shortly 5-toothed. *C. longifolia*, Wall. Cat. 1771; Schauer in DC. Prodr. xi. 634.

Throughout BENGAL PLAIN, alt. 0-1000 ft., common; extending to the SIKKIM TERAI, ASSAM and CACHAR; Wallich, Griffith (Kew Distrib. n. 6029), &c.

A large shrub, or a tree, 30 ft.; shoots stellately tomentose. Leaves 8 by $3\frac{1}{2}$ in., ovate, or 5 by 2 in. obovate-oblong, mature with minute scattered stellate hair on the surface beneath or glabrous except the 7-8 pair of nerves; petiole 1 in. *Corymb* 4-8 in. diam., closely stellate-tomentose without any patent hairs; bracts $\frac{1}{2}$ in., linear. *Calyx* $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ - $\frac{1}{3}$ in., 2-lipped; yellowish or greenish white, throat hairy. *Drupe* $\frac{1}{2}$ - $\frac{1}{3}$ in., globose or somewhat obovoid.—This has been supposed to be *P. pubescens*, Blume, in which the leaves are described as repand-toothed, and the pubescence of the corymb as simple.

20. **P. punduana**, Wall. Cat. 2651; leaves elliptic acuminate entire nerves stellately tomentose, panicle-branches elongate raceme-like, calyx minutely 5-toothed stellately tomentose. Schauer in DC. Prodr. xi. 637. —Premna n. 26, Herb. Ind. Or. H. f. & T.

KHASIA Mts.; below Churra, Wallich, Griffith, H. f. & T., &c.

A large shrub; shoots stellately tomentose. Leaves 8 by 3 in., base cuneate, mature punctulate glabrate on both surfaces, nerves 7 pair; petiole $1\frac{1}{2}$ in. *Panicles* 6-8 in., pyramidal, densely stellate-tomentose; branches mostly opposite, often 3 by $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ - $\frac{1}{3}$ in., linear-lanceolate, numerous, persistent, conspicuous. *Calyx* $\frac{1}{2}$ in., obscurely 2-lipped, the 3 teeth of the lower lip wider apart (at flower-time) than those of the upper, but hardly shorter. *Corolla* $\frac{1}{2}$ - $\frac{1}{3}$ in., 2-lipped; lobes stellately tomentose without. *Drupe* $\frac{1}{2}$ - $\frac{1}{3}$ in., globose.

21. **P. integerrima**, Wight Ic. t. 1484; leaves large oblong acuminate entire glabrous, corymbs large minutely closely pubescent, calyx very shortly 5-toothed minutely pubescent. Bedd. For. Man. 172.

S. DECCAN PENINSULA; Courtallum, Wight; Mts. of Kurg, G. Thomson; Tinnevely Mts., Beddome.

A shrub, 6 ft. Leaves 7 by $2\frac{1}{2}$ in., base obtuse or cuneate, entire or (sides Beddome) sometimes serrate, nerves 5 pair; petiole $\frac{1}{2}$ in. *Corymbs* 5 in. diam.; bracts $\frac{1}{2}$ in.; broad-lanceolate. *Calyx* $\frac{1}{2}$ - $\frac{1}{3}$ in.; lobes very small, obtuse or broadly triangular. *Corolla* $\frac{1}{2}$ - $\frac{1}{3}$ in., 2-lipped. *Drupe* not seen.

22. **P. latifolia**, Roxb. Hort. Beng. 46, and Fl. Ind. iii. 76; leaves cordate-ovate shortly acuminate undulate young softly minutely hairy on both surfaces, corymbs closely simply villous, calyx strigose shortly 5-toothed much enlarged in fruit. Schauer in DC. Prodr. xi. 635.

Lower hills of the COROMANDEL COAST and BENGAL; from Rajmahl to the Southern Circars; Roxburgh, &c.

A small, poor tree, attaining 25 ft. Leaves 4 by $2\frac{1}{2}$ in., usually smaller, base (in the type form) shallowly cordate but then usually with a small cuneate decurrence on the petiole, entire, rarely serrate, dusky pubescent, drying blackish above cinereous beneath, mature usually pubescent at least on the nerves; nerves 7 pair, reticulations distinct; petiole $\frac{1}{2}$ in. *Corymbs* 2-3 in. diam., hard y brachiate; bracts small, deciduous. *Calyx* $\frac{1}{2}$ in., in fruit often nearly $\frac{1}{2}$ in. diam. *Corolla* $\frac{1}{2}$ - $\frac{1}{3}$ in., 2-lipped, densely hairy in the throat. *Drupe* $\frac{1}{2}$ in. diam., globose, hardly verrucose.—

Roxburgh grounds his species on the cordate base of the leaves: this form appears confined to the Coromandel Hills.

VAR. cuneata; leaf-base rhomboid or cuneate, calyx strigose. *P. viburnoides*, *Kurz For. Fl.* ii. 261.—Pegu; *Kurz*. Burma; *Griffith* (Kew Distrib. n. 6035).—A small tree of the dusky sombre colour of *P. latifolia* Roxb. type, the leaves drying blue-black above, ashy beneath, often very pubescent when young.

VAR. mollissima; leaves small base obtuse or rhomboid, corymbs $1\frac{1}{2}$ in. diam. *P. mollissima*, *Roth Nov. Sp.* 287; *Schauer in DC. Prodr.* xi. 638. *P. viburnoides*, *Wall. Cat.* 2646, *letter a only*; *Schauer l. c.* 635, *chiefly*.—Madras; *Wight*.—This looks like a burnt-up form of *Var. cuneata*, than which it is not more hairy, but has smaller calyx and corolla.

VAR. mucronata; leaves cuneate at both ends mature minutely pubescent on the midrib beneath, corymbs somewhat broad rusty-pubescent, calyx subpatently pubescent. *P. mucronata*, *Roxb. Fl. Ind.* iii. 635; *Wall. Cat.* 1766; *Schauer in DC. Prodr.* xi. 635; *Brand. For. Fl.* 366.—N. India from Kumaon to Bhotan and the Khasia Mts., ascending to 5000 ft., and spreading into Bengal Plain, common, *Wallich, H. f. & T., &c.*—This could not be distinguished from *P. latifolia* by Wallich or Brandis, and seems to be a state of *P. latifolia* grown in a moister soil. The leaves are often 6 in. long, the drupes larger and more verrucose.

VAR. viburnoides, *Wall. Cat.* 2646, *letter b only*; leaves ovate base rhomboid glabrate drying green surfaces concolorous. *Schauer in DC. Prodr.* xi. 635, *in small part*. *P. latifolia*, *Wight Ic. t.* 869.—S. Deccan Peninsula; Cochin and Gingee Hills, *Wight*; near Madras, *G. Thomson*.—Leaves broad, not cordate, nearly glabrous even when young.—This may be a distinct species; the green colour easily separates it from all the preceding forms of *P. latifolia*.

23. ***P. flavescens*, Ham.; Wall. Cat.** 2649; leaves ovate or obovate acuminate entire mature setulose above villous beneath, corymbs large densely pubescent, calyx closely pubescent shortly 5-toothed.

E. BENGAL; Goalpara, *Hamilton*; Dacca, *Clarke*.

A shrub or a small tree; shoots villous or woolly. Leaves 6 by $2\frac{1}{2}$ in., base obtuse or subcordate, upper surface with minute scattered hairs erect from the reticulating nerves; nerves 7 pair; petiole 1 in. Corymbs 4–7 in. diam., usually rusty-villous; bracts $\frac{1}{4}$ in., linear. Calyx $\frac{1}{12}$ in. Corolla $\frac{1}{8}$ – $\frac{1}{6}$ in., 2-lipped, very hairy below within. Drupe $\frac{1}{8}$ in.

VAR. glabrior; leaves setulose above sparingly pubescent or glabrate beneath green. *Premna* n. 24, *Herb. Ind. Or. H. f. & T.*—Subtropical Sikkim, alt. 3000 ft., *Clarke*. Silhet; *H. f. & T.*

VAR. rubens; leaves setulose above glabrate beneath drying usually reddish. *Premna* n. 32, *Herb. Ind. Or. H. f. & T.*—Malacca; *Griffith* (Kew Distrib. n. 6020). (Java).—Possibly a distinct species; but, except as to the colour of the leaves, no diagnostic mark has been found to separate it from *Var. glabrior*.

24. ***P. micrantha*, Schauer in DC. Prodr.** xi. 635; leaves ovate acuminate entire mature setulose above somewhat pubescent beneath, corymbs compound minutely pubescent, calyx very small minutely 5-toothed. *P. scandens*, *Wall. Cat.* 1774, *in small part*.

SILHET; *Wallich*.

Leaves $3\frac{1}{2}$ by $1\frac{1}{4}$ in., base rounded. Calyx $\frac{1}{24}$ – $\frac{1}{18}$ in. when the flower is expanded.—This very closely resembles *P. flavescens*, Ham., and may be a form of it; it differs in the very small calyx. The bristliness of the upper surface of the leaves is peculiar to *P. flavescens* and *P. micrantha* among *Premnas*.

25. ***P. Wightiana*, Schauer in DC. Prodr.** xi. 635; leaves ovate shortly acuminate subentire mature sparsely pubescent above, panicles narrow subthyrsoid in fruit minutely thinly scabrid-pubescent, calyx-teeth 5, subequal ovate or triangular. *P. thyrsiflora*, *Heyne; Wall. Cat.* 1770.

S. DECCAN PENINSULA; *Heyne*; Sira Mullee, *Wight*; Anamallay Mts., *Beddome*.

Appears a large rambling or subcaudex shrub. *Leaves* 3 by 2 in. (mostly smaller), membranous, base obtuse or subcordate, undulate, rarely shallowly crenate, mature nearly glabrous beneath; nerves 5 pair, secondary distinct; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Panicle* $1\frac{1}{2}$ in., pyramidal; in fruit often 2–3 in., oblong; bracts $\frac{1}{10}$ in., lanceolate, persistent, nearly glabrous. *Calyx* $\frac{1}{7}$ in., minutely scabrid, hardly pubescent. *Corolla* $\frac{1}{8}$ in., glabrate without, subequally 4-fid. *Drupe* $\frac{1}{8}$ in., obovoid, dry tubercular-rugose.

26. **P. Thwaitesii**, *Clarke*; leaves ovate acuminate entire or remotely crenate softly hairy beneath, panicles subthyrsoid densely shortly villous, calyx shortly subequally 5-toothed. *P. micrantha*, *Thwaites Enum.* 242, *not of Schauer*.

CEYLON; *Thwaites*.

A tree, 8–10 ft. (*Thwaites*). *Leaves* 3 by $1\frac{1}{2}$ in., base cuneate, minutely hairy above, densely deciduously simply hairy beneath, nerves 5 pair; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., villous. *Panicle* $1\frac{1}{2}$ by 1 in., densely branched; bracts $\frac{1}{8}$ in., linear, villous, persistent. *Calyx* $\frac{1}{18}$ – $\frac{1}{12}$ in., minutely appressedly hairy. *Corolla* $\frac{1}{8}$ – $\frac{1}{6}$ in., yellowish. *Drupe* $\frac{1}{2}$ in. diam., globose, smooth.—Possibly a var. of *P. Wightiana*, but not at all like *P. micrantha*, Schauer.

†† *Leaves (mature) toothed* (teeth sometimes very few in *P. barbata*).

27. **P. thyrsoides**, *Wight Ic.* t. 1485; leaves ovate shortly acuminate serrate mature glabrate, panicle thyrsoid villous or woolly, calyx pubescent or villous shortly subequally 5-toothed.

TRAVANCORE and COURTALLUM; *Wight*.

A small tree or large shrub (*Wight*). *Leaves* $3\frac{1}{2}$ by 2 in., base rhomboid or subcordate, mature minutely pubescent on the nerves or glabrous; nerves 5 pair, secondary distinct; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Panicle* (in flower) 4 by 2 in., densely branched; bracts subpersistent. *Calyx* $\frac{1}{10}$ in. *Corolla* $\frac{1}{8}$ – $\frac{1}{6}$ in., glabrous without; lobes 4, subequal. *Drupe* $\frac{1}{2}$ in., globose, verrucose-tubercular.—*Wight* subsequently reduced this species to *P. Wightiana*, Schauer, remarking that the thyrses were much larger. This may be so, but in addition to the differences noted by *Wight*, the leaves are always serrate, and the indumentum differs. *Beddome's* description of *P. Wightiana* (*For. Man.* 173) is designed to include the two.

28. **P. barbata**, *Wall. Cat.* 1768; leaves oblong or ovate acuminate more or less toothed mature minutely pubescent beneath, corymbs villous with small simple hairs, calyx subequally 4-toothed glabrate or pubescent. *Schauer in DC. Prodr.* xi. 636; *Brand. For. Fl.* 366. *P. cana*, *Wall. Cat.* 1783.

SUBTROPICAL HIMALAYA, alt. 500–5000 ft., from Kumaon to Bhotan, frequent; *Wallich, H. f. & T.*, &c.

A small tree or a shrub. *Leaves* 6 by $1\frac{3}{4}$ – $2\frac{1}{2}$ in., base obtuse sometimes subcordate, usually distinctly toothed, sometimes with only a few teeth towards the tip, young softly minutely pubescent on both surfaces, mature nearly glabrous above, nerves 6 pair; petiole 1 in. *Corymbs* 1– $2\frac{1}{2}$ in. diam., somewhat dense, in fruit sometimes subglabrate; bracts small, linear, deciduous. *Calyx* $\frac{1}{12}$ in.; teeth oblong, obtuse. *Corolla* $\frac{1}{8}$ – $\frac{1}{6}$ in., 2-lipped, hairy in the throat. *Drupe* $\frac{1}{8}$ in., globose or somewhat obovoid, glabrous obscurely verrucose.

VAR. *anodon*; leaves very sparingly toothed, often nearly glabrous when young.—Sikkim and Bhotan, frequent; *Clarke*.

29. **P. pinguis**, *Clarke*; leaves ovate acuminate serrate mature pubescent on the nerves, corymbs dense subsessile, calyx subequally 5-toothed glandular scarcely pubescent. *Premna* n. 22, *Herb. Ind. Or. H. f. & T.*

ASSAM; *Griffith* (Kew Distrib. n. 6025). KHASIA TERRAI; *H. f. & T.*—DISTRIB. Ava.

An undershrub; stems 1–1½ foot (*Griffith*), thick, patently hairy. *Leaves* 6½ by 4½ in., somewhat coriaceous, base rounded often cordate, serrate nearly to the base, sparsely pubescent on both surfaces when young, nerves 5 pair; petiole 1 in., pubescent or woolly. *Corymb* (in flower) 1½ in diam., in fruit 2½ in.; branches hairy. *Calyx* ½ in., green. *Corolla* ⅓–½ in., white. *Drupe* ½ in., obovoid, smooth, purple.

30. ***P. esculenta***, *Rowb. Hort. Beng.* 46, and *Fl. Ind.* iii. 80; leaves short-petioled obovate or elliptic acuminate sharply serrate, corymbs compact nearly glabrous, calyx minutely 5-toothed, corolla ⅓ in. *Wall. Cat.* 1761; *Schauer in DC. Prodr.* xi. 636; *Kurz For. Fl.* ii. 261.

ASSAM (without name of collector). CHITTAGONG; fide *Roxburgh*.—Cultivated in the Calcutta Botanic Garden.

A branching shrub, 6–8 ft., trunk hardly any. *Leaves* 6½ by 3 in., base entire cuneate suddenly narrowed sometimes very shortly cordate, mature glabrate, nerves 5 pair; petiole ¼ in., obscurely puberulous. *Corymb* 2½ in. diam., short-peduncled, globose, many-fl., bracts ⅛ in., linear. *Calyx* ⅛ in., cup-shaped, obscurely puberulous; somewhat enlarged, more distinctly toothed, in fruit. *Corolla* yellowish-white, 2-lipped, throat hairy. *Drupe* ⅓ in., globose or somewhat obovoid, usually 3–4-seeded. —All the examples seen of this appear to be cultivated; and the native habitat is uncertain.

31. ***P. amplexans***, *Wall. Cat.* 1762; leaves sessile narrowly obovate acuminate serrate, corymbs compact nearly glabrous, calyx minutely 5-toothed, corolla ⅓ in. *Schauer in DC. Prodr.* xi. 636; *Kurz For. Fl.* ii. 262. *P. angustata*, *Wall. Cat.* 1763.—*Clerodendron* n. 33, *Herb. H. f. & T.*

RANGOON; *Wallich, M'Lelland*. PEGU, MARTABAN and UPPER TENASSERIM, common, *Kurz*.

An undershrub (*Kurz*), throwing up flower-shoots 1–2 ft. high after the jungle fires. *Leaves* whitened underneath; sessile cordate, or petiole sometimes ⅛ in. (*Kurz*). —This agrees so closely with *P. esculenta* except in the want of petioles, that it may be the wild state of it. *P. angustata*, *Wall.*, is the same, the leaves being 10 by 4 in.

32. ***P. macrophylla***, *Wall. Cat.* 1765; leaves sessile elongate-obovate remotely shallowly toothed, corymbs compact patently softly pubescent, calyx 5-toothed enlarged in fruit. *Schauer in DC. Prodr.* xi. 636; *Kurz For. Fl.* ii. 262.

PROME HILLS; *Wallich*. MARTABAN and PEGU; common (*Kurz*).

A low undershrub, sending up flower-shoots 1–2 ft. after the jungle fires; all the young parts softly pubescent. *Leaves* 12 by 4 in., base attenuate cuneate, whitened beneath, mature glabrous. *Corymbs* 2 in. diam., dense, softly hairy even in fruit; bracts ½ in., narrowly lanceolate, hairy, persistent. *Calyx* in fruit ½ in., deeply 2-lipped, striate. *Drupe* ⅓ in., tubercular-rugose (in the dried state), usually 2-seeded (*Kurz*). —Perhaps a var. of *P. amplexans*, of which the drupe when dried appears nearly smooth (as in *P. esculenta*).

33. ***P. procumbens***, *Moon; Wall. Cat.* 1780; leaves cordate-oblong acute serrate mature glabrescent, corymbs small subsessile globose pubescent, calyx shortly 5-toothed. *Schauer in DC. Prodr.* xi. 636.

CEYLON, fide *Wallich*; not uncommon in the hotter parts of the island, *Thwaites*.

Branches minutely strigose-pubescent. *Leaves* 3½ by 1½ in., base abrupt or cordate, sparsely pubescent above when young, nerves 5 pair; petiole ½ in. *Corymbs* 1 in. diam.; in fruit 1½–2 in., pyramidal or subthyrsoid. *Calyx* ⅛ in., minutely pubescent or scabrid. *Corolla* ⅓ in. *Drupe* ½ in., obovoid, tuberculate. —All the specimens seen are from the Calcutta Botanic Garden, cultivated.

34. **P. herbacea**, *Roxb. Hort. Beng.* 46, and *Fl. Ind.* iii. 80; stem hardly any, leaves sessile obovate coarsely serrate mature pubescent on the nerves, corymbs small, calyx subequally 5-toothed. *Schauer in DC. Prodr.* xi. 637; *Griff. Itin. Notes*, p. 96, n. 1422, and *Ic. t.* 447, lower fig.; *Brand. For. Fl.* 368. *P. pygmæa*, *Wall. Cat.* 1776.

SUBTROPICAL HIMALAYA, alt. 500–3000 ft., from Kumaon to Bhotan, frequent in the Terai, *Wallich*, &c. S. DECCAN PENINSULA; Mudumallay, *Beddome*.

A small undershrub; flowering branches 1–4 in., springing up after the jungle fires. *Leaves* 4 by 2–3 in., obtuse, mature microscopically dotted above, minutely deciduously pubescent beneath, nerves 5 pair. *Corymbs* $1\frac{1}{2}$ in. diam., pubescent, somewhat dense; peduncle 0– $1\frac{1}{2}$ in. *Calyx* $\frac{1}{10}$ in., closely pubescent; lobes ovate, obtuse. *Corolla* $\frac{1}{2}$ in., greenish-white, hairy in the throat, 4-lobed obscurely 2-lipped. *Drupe* $\frac{1}{4}$ in. diam., globose.

IMPERFECTLY KNOWN SPECIES.

35. **P. GROSSA**, *Wall. Cat.* 1764, *type sheet*; leaves short-petioled narrowly obovate or elliptic coarsely obtusely toothed mature glabrate, petiole stellately fulvous-tomentose. *Schauer in DC. Prodr.* xi. 638; partly.—Burma; *Pingee, Wallich*.

Wallich's example is a branch with leaves only, in habit exceedingly like *P. esculenta*, except as to the points mentioned in the diagnosis. *Leaves* $5\frac{1}{2}$ by 2 in., mature glabrate. *Schauer's* description appears compounded out of *Wallich's* two sheets of 1764, the second of which may very possibly not be of the same genus or order.

VAR. ? orbiculata; leaves suborbicular base shortly cuneate coarsely toothed soft with simple hairs on both surfaces. *P. grossa*, *Wall. Cat.* 1764, second sheet only.—*Prome; Wallich*.

PREMNA ROXBURGHIANA, *Wall. Cat.* 2648, is not in the *Wallichian Herbarium*.

PREMNA ? *Wall. Cat.* 9077, is *Viburnum sambucinum*, *Reinw.*

XII. GMELINA, Linn.

Trees or shrubs, shoots tomentose, unarmed or spinous. *Leaves* opposite, entire toothed or lobed. *Cymes* paniced or small; bracts narrow, except in *G. Hystrica*. *Flowers* large, yellow or brownish, tomentose at least when young. *Calyx* campanulate, shortly 5-toothed or subentire. *Corolla-tube* slender below, ventricose upwards; limb oblique, 5- (or 4-) lobed. *Stamens* 4, didynamous, subexserted; anther-cells oblong, pendulous, subseparate. *Ovary* 4-celled, 4-ovuled; style slender, shortly bifid. *Drupe* succulent; endocarp bony, undivided, 4–2-celled; calyx persistent, unaltered. *Seeds* oblong.—Species 8, E. Asiatic and N. Australian.

1. **G. arborea**, *Linn.; Roxb. Cor. Pl.* iii. 41, t. 246, and *Fl. Ind.* iii. 84; arboreous, leaves large cordate-ovate acute beneath and panicles fulvous-tomentose, bracts linear-lanceolate, corolla $1\frac{1}{2}$ in. *Wall. Cat.* 1817; *Schauer in DC. Prodr.* xi. 680; *Dalz. & Gibs. Bomb. Fl.* 201; *Wight Ic. t.* 1470; *Griff. Notul.* iv. 179, and *Ic. Pl. Asiat.* t. 443; *Bocq. Rev. Verben.* t. 14, fig. 1–11; *Bedd. Fl. Sylv.* t. 253; *Brand. For. Fl.* 364; *Kurz For. Fl.* ii. 264; *Gamble Indian Timbers*, 295. *G. Rheedii*, *Hook. Bot. Mag.* t. 4395; *Thwaites Enum.* 244. *Premna arborea*, *Roth Nov. Sp.* 287. *P. tomentosa*, *Miq. in Pl. Hohenack.* n. 554, not *Willd.*—*Rheede Hort. Mal.* i. t. 41.

Throughout the DECCAN PENINSULA and CEYLON, frequent, extending to the foot of the N.W. HIMALAYA. CHITTAGONG.—DISTRIB. Malayan and Philippine Islands.

An unarmed tree, sometimes attaining 60 ft., deciduous, flowering with the young leaves. *Leaves* 9 by 6 in., more or less acuminate, entire, mature glabrate above, stellately hairy beneath; petiole 3 in., top glandular. *Panicles* often 1 foot, terminal; bracts $\frac{1}{2}$ in.; flowers numerous. *Calyx* $\frac{1}{2}$ in., teeth very small or obsolete. *Corolla* brown-yellow, upper lip shortly bifid, longer than the lower. *Drupe* $\frac{3}{4}$ in., ovoid, usually 2–1-seeded.

VAR. *glaucescens*; leaves glaucous beneath mature often nearly glabrous, calyx-teeth larger triangular.—Subtropical Himalaya and Khasia Mts., alt. 0-2000 ft.; *J. D. H.*, &c. Burma and Tenasserim, *Kurz*.—Probably only the form of *G. arborea* from moist places; some N.W. Himalayan examples are intermediate between it and the type.

2. ***G. villosa***, *Roxb. Hort. Beng.* 46, and *Fl. Ind.* iii. 86; arboreous, leaves ovate or elliptic mature beneath and small racemose cymes fulvous-tomentose, bracts broadly lanceolate acuminate, corolla $1\frac{1}{2}$ in. *Jack in Malay Misc.* i. 17, and in *Hook. Bot. Misc.* i. 284; *Wall. Cat.* 1816; *Schauer in DC. Prodr.* xi. 679. *G. asiatica*, *Wall. Cat.* 1818, partly; *Kurz For. Fl.* ii. 265, not of *Linn.*—Gmelina sp. n. 2, *Griff. Notul.* iv. 179. *Rumph. Herb. Amb.* ii. t. 39.

PENANG; *Wallich.* MALACCA; *Griffith, Maingay.* SINGAPORE; *G. Thomson.* NICOBARS; *Kurz*.—DISTRIB. Malaya.

Spinous (Roxburgh); branchlets unarmed. *Leaves* 3 by 2 in., obtuse or cuneate at both ends, subtentire or coarsely toothed, mature glabrate above; petiole $\frac{3}{4}$ in. *Racemes* terminal, 1-2 in.; bracts $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ - $\frac{1}{3}$ in., tomentose with several large glabrous glands; teeth small. *Corolla* yellow; tube very narrow below; upper lip of the limb larger than the lower, subtentire. *Drupe* $\frac{3}{4}$ in., ovoid or obovoid, 2-1-seeded.

3. ***G. asiatica***, *Linn.*; *Roxb. Fl. Ind.* iii. 87; shrubby, leaves small ovate or obovate entire or lobed mature glabrous, racemes terminal fulvous-tomentose, bracts small caducous, corolla $1\frac{1}{2}$ in. *Lamk. Ill.* t. 542; *Wall. Cat.* 1818, partly; *Schauer in DC. Prodr.* xi. 679; *Wight Ill.* t. 174; *Bedd. For. Man.* 172; *Brand. For. Fl.* 365. *G. coromandeliana*, *Burm. Fl. Ind.* 132. *G. lobata*, *Gaertn. Fruct.* i. 268, t. 56, excl. syn. *Rumph.* *G. parvifolia*, *Roxb. Cor. Pl.* ii. 32, t. 162; *Wall. Cat.* 2654; *Schauer l. c.* *G. parviflora*, *Roxb. l. c.* *G. inermis*, *Blanco Fl. Filip.* 493. *Michelia spinosa*, *Amman. in Act. Petrop.* viii. 218, t. 18.

DECCAN PENINSULA and CEYLON, frequent; *Roxburgh*, &c.—BENGAL; cultivated.

Spinescent, or unarmed. *Leaves* $\frac{1}{2}$ - $1\frac{1}{2}$ in., entire or coarsely lobed, mature beneath glabrous glaucescent from a close coat of minute round glands; petiole $\frac{1}{4}$ in. *Racemes* 1-2 in.; bracts $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in., tomentose, but with large bare glands, as in *G. villosa*, as is the corolla. *Drupe* also as of *G. villosa*, with which this species has been confounded by *Kurz* and others.

4. ***G. Hystrix***, *Kurz in Journ. As. Soc.* 1870, ii. 81, and *For. Fl.* ii. 265; leaves elliptic cuneate or rhomboid at both ends mature glabrous, cymes subcapitate, bracts very large nervose coloured, corolla 2 in. *Benth. in Gen. Pl.* ii. 1154. *G. Finlaysoniana*, *Wall. Cat.* 6317.

TENASSERIM; fide *Kurz*.—DISTRIB Siam, Philippines.

A large, spinous, scandent shrub. *Leaves* 3 by $1\frac{1}{2}$ in., entire, beneath glaucous with scattered round glands; petiole 1 in. *Cymes* 2 in.; bracts $1\frac{1}{4}$ by 1 in., ovate, 5-nerved. *Corolla* yellow, much as of *G. villosa*, but less tomentose without; dried exceeding 2 in., 1 in. (*Kurz*). *Drupe* $\frac{1}{2}$ in., obovoid, 2-seeded.

5. ***G. oblongifolia***, *Roxb. Fl. Ind.* iii. 83; arboreous. leaves ovate or oblong entire somewhat rough, panicles terminal brachiate brown-farinose, bracts small caducous, corolla large rosy. *Schauer in DC. Prodr.* xi. 679.

E. BENGAL (*Roxburgh*).

A tall timber tree. *Leaves* 6-12 by 3-8 in.; petiole 2 in., with several glands close to the apex. *Calyx* cyathiform, entire, farinose, a few glands on the outside. *Corolla-tube* short; limb 5-partite, lower lip longer with a deep yellow mark in the centre of its base. *Anthers* bipartite. *Drupe* oblong, somewhat 4-cornered and

obtuse, size of a large olive, smooth, ripe bright crimson, 1-celled; endocarp clavate, 4-cornered, 4-celled, perforated from the base up the centre. *Seed* solitary, lanceolate. —The foregoing is extracted from Roxburgh, and indicates a remarkable tree that no one else has seen. There is at Kew an unpublished drawing of Roxburgh's of this tree, agreeing exactly with the description.

EXCLUDED SPECIES.

G. SPECIOSISSIMA, *Don Prodr.* 104, *Schauer in DC. Prodr.* xi. 680, is *Wightia gigantea*, *Wall.*

XIII. VITEX, *Linn.*

Trees or shrubs; shoots hairy or tomentose. *Leaves* opposite, digitately 3-5-foliolate (in *V. simplicifolia* 1-foliolate). *Inflorescence* terminal and axillary, or wholly axillary; cymes peduncled or sessile, forming large or small panicles or corymbs; bracts small or longer than the calyx. *Calyx* campanulate, truncate or shortly 5-toothed (in *V. gamosepala* 3-toothed). *Corolla* small, tubular; limb 2-lipped, 5-toothed; central lobe of the lower lip usually much larger than the others. *Stamens* 4, didynamous, usually exserted; anther-cells at first parallel pendulous, afterwards divaricate, often twisting so that their lower ends are suberect. *Ovary* 2-4-celled, 4-ovuled; style filiform, shortly bifid. *Drupe* globose or obovoid, supported by the more or less enlarged calyx; endocarp bony 4-, or by suppression 3-1-celled. *Seeds* obovate or oblong.—Species 60; in all tropical and warm temperate regions.

Subgenus 1. **Euagnus**, *Schauer*. *Calyx* cup-shaped, shortly subequally 5-toothed or truncate.

* *Panicles* terminal, penultimate axillary peduncles often added.

1. **V. trifolia**, *Linn. f. Suppl.* 293; leaves simple and 3-foliolate, leaflets sessile obovate or obovate-oblong entire glabrate above beneath and panicles closely white-tomentose, corolla $\frac{1}{2}$ – $\frac{1}{2}$ in., drupe $\frac{1}{2}$ in. diam. black. *Roxb. Fl. Ind.* iii. 69; *Wall. Cat.* 1743; *Bot. Mag.* t. 2187; *Schauer in DC. Prodr.* xi. 683; *Bedd. For. Man.* 172; *Brand. For. Fl.* 370. *V. ovata*, *Thunb. Fl. Jap.* 257; *Hook. & Arn. Bot. Beech. Voy.* 206, t. 47. *V. repens*, *Blanco Fl. Filip.* 513. *V. incisa*, *Wall. Cat.* 1746 partly, not of *Lamk.* *V. Agnus castus*, var. *Kurz For. Fl.* ii. 269.—*Rumph. Herb. Amb.* iv. t. 18. *Rheede Hort. Mal.* ii. t. 11.

Scattered throughout INDIA, in the tropical and subtropical region, from the foot of the Himalaya to Ceylon and Malacca, nowhere common.—DISTRIB. S. E. Asia to Japan, the Philippines and N. Australia.

A shrub or small tree. *Leaflets* 1-3 in., subobtusely, tomentum beneath of matted scarcely stellate hairs, so close as with difficulty to be scraped off; petiole 1 in. *Panicles* 1-4 in., oblong, often leafy at the base; bracts minute. *Calyx* $\frac{1}{2}$ – $\frac{1}{2}$ in., minutely 5-toothed. *Corolla* tomentose, lavender to blue. *Filaments* hairy at the base.—Perhaps commoner than supposed, being frequently unnoticed from its close general resemblance to the universal *V. Negundo*.

2. **V. Negundo**, *Linn.*; *Roxb. Fl. Ind.* iii. 70; leaves 3-5-foliolate, leaflets petioluled lanceolate entire or crenate glabrate above beneath and panicles closely white-tomentose, corolla $\frac{1}{4}$ – $\frac{1}{2}$ in., drupe $\frac{1}{2}$ in. diam. black. *Wall. Cat.* 1744; *Schauer in DC. Prodr.* xi. 684; *Wight Ic.* t. 519; *Bedd. For. Man.* 171; *Brant. For. Fl.* 369; *Kurz For. Fl.* ii. 269; *Boiss. Fl. Orient.* iv. 535. *V. bicolor*, *Willd. Enum. Hort. Berol.* 660; *Schauer l. c.* 683; *Dalz. & Gibs. Bomb. Fl.* 201. *V. arborea*, *Desf. Cat. Hort. Paris.* 391.

V. paniculata, *Lamk. Dict.* ii. 612; *Roxb. l. c.* 71.—*Rumph. Herb. Amb.* iv. t. 19. *Rheede Hort. Mal.* ii. t. 12.

Throughout INDIA and CEYLON, in the warmer zone a universal plant. NICOBARS; *Kurz.*—DISTRIB. Cabul, E. Asia to the Philippines.

A shrub or small tree, hardly distinguishable from *V. trifolia* but by the points mentioned in the diagnosis. The leaflets are frequently 5, the centre one at least usually distinctly petioluled, the flowers rather smaller.

VAR. *incisa*; leaflets crenate-serrate or subpinnatifid. *V. incisa*, *Lamk. Dict.* ii. 611, and *Ill.* t. 541, fig. 2; *Bot. Mag.* t. 364; *Roxb. l. c.* 72; *Wall. Cat.* 1746, partly; *Schauer l. c.* 684.—Throughout India. Distrib. E. Asia.—The extreme pinnatifid form of this var. is Chinese; the wild Indian examples are crenate-serrate, i.e. intermediate.

3. *V. altissima*, *Linn. f. Suppl.* 294; leaves 3-foliolate, leaflets subsessile lanceolate subentire mature glabrate above thinly pubescent beneath, panicles compound fulvous-villous, corolla scarcely $\frac{1}{4}$ in., drupe $\frac{1}{2}$ in. diam. *Roxb. Fl. Ind.* iii. 71; *Wall. Cat.* 1755; *Schauer in DC. Prodr.* xi. 685; *Dalz. & Gibs. Bomb. Fl.* 201; *Wight Ic.* t. 1466; *Bedd. Fl. Sylv.* t. 252; *Brand. For. Fl.* 370.

DECCAN PENINSULA, especially the west side, up to 4000 ft., common; *Heyne*, *Wight*, &c.

A very large tree; shoots tawny-villous or woolly. *Leaves* 3-foliolate, occasionally 5-foliolate (*Beddome*); leaflets $5\frac{1}{2}$ by $1\frac{3}{4}$ in., mature glabrous above except the midrib, beneath closely distinctly reticulate and with scattered round yellow glands; petiole $2\frac{1}{2}$ in., sometimes somewhat winged upwards. *Panicles* 3-8 in. diam.; branches elongate, interrupted, cymes clustered; bracts $\frac{1}{2}$ – $\frac{1}{6}$ in., elliptic. *Calyx* $\frac{1}{2}$ in., fulvous-villous, teeth short, triangular. *Corolla* woolly. *Ovary* and young fruit fulvous-villous at the apex.

VAR. *zeylanica*; mature leaves glabrate beneath. *V. zeylanica*, *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1863, ii. 223. *V. altissima* (forma subglabra), *Thwaites Enum.* 244.—Ceylon; *Walker*, *Thwaites*.—Leaves beneath reticulate, the depressions microscopically tomentose, as in *V. altissima* after all the hair is rubbed off.

4. *V. alata*, *Heyne*; *Roth Nov. Sp.* 316; leaves 3-foliolate, leaflets subsessile broadly lanceolate subentire mature glabrate above thinly pubescent beneath, wing of the petiole broad cordate at base, panicles terminal compound fulvous-villous, corolla scarcely $\frac{1}{4}$ in., drupe $\frac{1}{2}$ in. diam. *Dalz. & Gibs. Bomb. Fl.* 201, not of *Schauer*, nor of *Kurz*. *V. appendiculata*, *Rottler in Herb. Wall.*—*Rheede Hort. Mal.* v. t. 1.

MADRAS; *Van Royen*; *Tuichecoonum*, *Rottler*. MYSORE; *Cleghorn*.

Scarcely differs from *V. altissima* but by the wing of the petiole, which is $\frac{1}{2}$ – $\frac{2}{3}$ in. wide, continuous, dilated, cordate and subamplexicaul at the base; leaflets $2\frac{1}{2}$ in. wide.—Some branches, apparently of this, collected by *Shuter*, *Law*, and *Stocks*, have some of the leaves 5-foliolate.

5. *V. limonifolia*, *Wall. Cat.* 1754; leaves 3-foliolate, leaflets sessile ovate entire mature pubescent beneath, petiole broadly winged, panicles long-branched, cymes clustered distant, bracts prominent persistent. *Kurz For. Fl.* ii. 271. *V. alata*, *Schauer in DC. Prodr.* xi. 685, not of *Heyne*.

PEGU and TENASSERIM; *Wallich*, &c.—DISTRIB. Ava, Siam.

A tree; shoots fulvous-hairy or woolly. *Leaflets* 7 by $2\frac{3}{4}$ in., acute at both ends, mature nearly glabrate above, minutely densely fulvous-pubescent beneath; petiole 3-4 by $\frac{1}{2}$ – $\frac{3}{4}$ in. *Panicles* 18 by 6 in., fulvous-hairy; branches interruptedly spicate; bracts $\frac{1}{2}$ – $\frac{1}{4}$ in., lanceolate, often imbricate. *Calyx* $\frac{1}{2}$ in., very shortly toothed, closely fulvous-strigillose. *Corolla* $\frac{1}{2}$ in., fulvous-villous. *Drupe* $\frac{1}{2}$ in. diam., globose, smooth.—The leaves are exceedingly like those of *V. pubescens*, except that the petiole is winged; the elongated interrupted panicle-branches are quite different.

6. **V. pubescens**, *Vahl Symb.* iii. 85; leaves 3-4-foliolate, leaflets sessile ovate or oblong entire pubescent, corymbs dense fulvous-tomentose, bracts ovate persistent prominent, corolla $\frac{1}{2}$ - $\frac{1}{2}$ in., drupe $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. *Schauer in DC. Prodr.* xi. 686; *Blume Bijdr.* 812; *Decne. in Nouv. Ann. Mus. d'Hist. Nat.* iii. 401; *Bedd. For. Man.* 171; *Kurz For. Fl.* ii. 271. *V. arborea*, *Roxb. Hort. Beng.* 46, and *Fl. Ind.* iii. 73; *Jack in Mal. Misc.* i. 18, and in *Hook. Bot. Misc.* i. 285; *Wall. Cat.* 1747; *Wight Ic.* t. 1465. *V. inæquifolia*, *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1863, ii. 223. *Pistacia Vitex*, *Linn. Fl. Zeyl.* 195. *Wallrothia articulata*, *Roth Nov. Sp.* 317.

S. DECCAN PENINSULA and CEYLON, frequent. E. BENGAL and MALAY PENINSULA, from the Khasia Terai, *H. f. & T.*, to Singapore; frequent from Pegu southwards.—DISTRIB. Throughout Malaya.

A tree, 30-50 ft. Leaves 3-foliolate, one or two smaller leaflets occasionally added; leaflets attaining 8 by 3 in., cuneate or scarcely acuminate, base cuneate rhomboid or of the lateral leaflets unequal rounded on one side, minutely pubescent on both surfaces, more strongly on the nerves; petiole 2-3 in., not winged. Corymbs 3-5 in. diam., depressed-pyramidal; bracts $\frac{1}{2}$ - $\frac{1}{2}$ in. Calyx $\frac{1}{2}$ in., densely fulvous-tomentose. Corolla tomentose, blue, upper lip ochroleucous. Drupe glabrous at the apex.

7. **V. diversifolia**, *Kurz Andam. Rep. App.* A 45 and B 14; leaves simple and 3-foliolate glabrate, leaflets sessile oblong cuneate at both ends entire, panicles terminal fulvous-strigose, bracts ovate prominent, corolla $\frac{1}{2}$ in.

ANDAMAN ISLANDS; *Kurz*.

Branchlets and shoots fulvous-strigose, or subtomentose. Leaflets attaining 5 by $1\frac{1}{2}$ in., above with minute thinly-scattered white glands, beneath finely reticulated, microscopically white-tomentose in the depressions, obscurely puberulous on the midrib; nerves 6-8 pair; petiole $1\frac{1}{2}$ in. Panicles 2-3 in., upper leaves graduating into bracts; upper bracts $\frac{1}{2}$ in. Calyx $\frac{1}{2}$ in., campanulate, subtruncate, fulvous-strigose. Corolla fulvous-villous, subtomentose. Drupe not seen.

8. **V. heterophylla**, *Roxb. Hort. Beng.* 46, and *Fl. Ind.* iii. 75; leaves 5-foliolate glabrate, leaflets petioluled elliptic or oblong much acuminate entire, panicles compound thinly cinereous-tomentose branches elongate, calyx $\frac{1}{10}$ in. cup-shaped, corolla tomentose. *Wall. Pl. As. Rar.* iii. 15, t. 226, and *Cat.* 1745; *Schauer in DC. Prodr.* xi. 686, partly.

ASSAM; *Jenkins*. E. BENGAL; Tipperah (*Roxburgh*).

A large tree, *Wallich*. Upper leaves generally 5-foliolate; leaflets 7 by $2\frac{1}{2}$ in., with scattered white glands above and yellow glands beneath, petiolule of the central leaflet usually $\frac{1}{4}$ - $\frac{1}{2}$ in.; petiole 2 in., glabrate. Panicles 8 by 6 in., cymes dense-fld., clustered along the branches; bracts $\frac{1}{2}$ in., linear, deciduous. Calyx truncate. Corolla $\frac{1}{4}$ in., ochroleucous, lower lip blue. Drupe scarcely $\frac{1}{2}$ in. diam., glabrous at the apex.

VAR. *undulata*; leaves smaller all the upper 3-foliolate, leaflets shining undulate. *V. undulata*, *Wall. Cat.* 1756. *V. heterophylla*, *Kurz For Fl.* ii. 270. *Stereosperma* n. 7, *Herb. H. f. & T.*—Pegu; *M'Lelland*. Rangoon; *Wallich*. Tenasserim; *Helfer* (Kew Distrib. n. 6068). Distrib. Java.—*Branchlets* sharply quadrangular. *Drupe* small.

9. **V. urceolata**, *Clarke*; leaves 3-foliolate glabrate, leaflets petioluled obovate shortly suddenly acuminate entire, panicles compound thinly cinereous-tomentose branches elongate, calyx $\frac{1}{8}$ - $\frac{1}{6}$ in. oblong or suburceolate, corolla tomentose. *V. heterophylla*, *Schauer in DC. Prodr.* xi. 686, partly. *V. Loureirii*, *Herb. Wight, not of Hook. & Arn.* *Vitex* n. 12, *Herb. Ind. Or. H. f. & T.*

MALACCA; *Griffith* (Kew Distrib. n. 6064), *Maingay* (Kew Distrib. nn. 1205, 1207).—DISTRIB. S. E. Asia, Malaya.

A medium-sized tree (Maingay). *Leaves* (all the upper) 3-foliolate, a small leaflet rarely added; leaflets 5 by $2\frac{1}{4}$ in., obtuse, tip usually less than $\frac{1}{4}$ in., with scattered white glands above and yellow beneath, petiolule of the middle leaflet often $\frac{1}{2}$ in.; petiole 1-2 in., not winged. *Panicles* 8 by 5 in., terminal, penultimate sometimes added; cymes densely flowered clustered along the branches; bracts $\frac{1}{8}$ in., linear, deciduous. *Calyx* minutely toothed at flower-time, much enlarged, $\frac{1}{2}$ in. diam., roundly 5-lobed in fruit. *Corolla* $\frac{1}{4}$ - $\frac{1}{3}$ in. *Drupe* $\frac{1}{3}$ - $\frac{1}{2}$ in., apiculate.—This species differs from all the preceding by (inter alia) the large drupe. The inflorescence, calyx, corolla and drupe are so like those of *V. sumatrana* (Miq. Fl. Ind. Bat. Suppl. 567), that it may be a var. of it; but in *V. sumatrana* the leaves are mostly 5-foliolate and pubescent beneath.

10. **V. coriacea**, *Clarke*; leaves 3-foliolate coriaceous glabrous, leaflets petioluled oblong entire, panicles terminal fulvous-pubescent, flowers clustered on the elongate branches, calyx $\frac{1}{10}$ in. 5-toothed. *Vitex* n. 13, *Herb. Ind. Or. H. f. & T.*

MALACCA; *Griffith* (Kew Distrib. n. 6065), *Maingay* (Kew Distrib. n. 1203).

Branchlets round, tips puberulous. *Leaflets* 4 by $1\frac{3}{4}$ in., obtuse or acute, beneath minutely glandular and with thick elevated nerves, petiolule of the central leaflet $\frac{1}{4}$ - $\frac{1}{2}$ in., petiole 1-2 in., not winged. *Panicles* 6 by 3 in., strict, branches elongate ascending; bracts $\frac{1}{8}$ in., oblong, fulvous-pubescent, deciduous; cymes condensed almost to clusters. *Calyx* fulvous-pubescent, wide funnel-shaped, in flower conspicuously 5-toothed; in fruit enlarged, cup-shaped, subtruncate. *Corolla* $\frac{1}{4}$ in., fulvous-pubescent, as are the pistil and filaments. *Drupe* $\frac{1}{2}$ by $\frac{1}{4}$ in., teretely ellipsoid, very smooth.

11. **V. canescens**, *Kurz in Journ. As. Soc.* 1873, ii. 101, and *For. Fl.* ii. 270; leaves 3-foliolate, leaflets petioluled ovate or elliptic entire young fulvous-villous, panicles compound fulvous-pubescent branches elongate pedicels whorled.

ASSAM; *Griffith* (Kew Distrib. n. 6066), *Masters*. PEGU; *McLelland*, *Kurz*.—DISTRIB. Ava.

A tree, 20-30 ft., or a shrub (*Griffith*); innovations fulvous- or dusky-pubescent. *Leaves* (upper alone seen) 3-foliolate, or (*Kurz*) 5-foliolate; leaflets $4\frac{1}{2}$ by 2 in., mature scabrid or glabrate fulvous-pubescent on the nerves; petiolule of the middle leaflet $\frac{1}{2}$ in.; petiole 2 in., fulvous-pubescent, not winged. *Panicles* 12 by 6 in., with numerous elongate spreading branches; bracts very small, deciduous; pedicels $\frac{1}{12}$ - $\frac{1}{8}$ in. *Calyx* $\frac{1}{10}$ in., pubescent, very shortly toothed. *Corolla* $\frac{1}{4}$ in., fulvous-tomentose. *Drupe* $\frac{1}{2}$ - $\frac{1}{3}$ in. diam., globose, smooth.—*Vitex canescens*, *Wall. Cat.* 1757, is not in *Wallich's Herbarium*; *Kurz* does not state whether he intended or guessed his own *V. canescens* to be the same as *Wallich's* or no.

12. **V. Wimberleyi**, *Kurz For. Fl.* ii. 271; leaves 5-3-foliolate glabrous, leaflets petioluled elliptically oblong or lanceolate coarsely crenate-serrate, panicles terminal and penultimate puberulous.

ANDAMAN ISLANDS; *Kurz*.

A small evergreen tree, much resembling *V. sumatrana*. *Petioles* 2-3 in., slender, glabrous. *Flowers* small, clustered or cymulose; bracts caducous, lower leaf-like, upper linear-oblong as long as the calyces. *Calyx* $\frac{1}{2}$ in., subtruncate, velvety. *Corolla* pubescent; tube wide, short; lobes obtuse, lowest much produced.—Not seen; the foregoing is copied from *Kurz*. Imperfect specimens of a plant collected by me in the Chittagong Hills show similar coarsely crenate-serrate leaflets, but have the petioles winged; it may be the young state of this species.

13. **V. simplicifolia**, *Clarke*; leaves 1-foliolate coriaceous glabrous, leaflet lanceolate entire, panicles terminal branches elongate, calyx $\frac{1}{4}$ - $\frac{1}{2}$ in. fulvous-hairy pedicelled. *Vitex* nn. 14 and 11, *Herb. Ind. Or. H. f. & T.*

MALACCA; *Griffith*.—DISTRIB. Borneo.

A small tree; branchlets round, puberulous or glabrate. *Leaflet* $7\frac{1}{2}$ by $2\frac{1}{4}$ in., punctulate beneath, sessile, articulate on a petiole $\frac{1}{2}$ in. *Panicle* a foot, one branch 15 by $1\frac{1}{2}$ in. in *Griffith's* example, rusty-pubescent; cymes distant; bracts small, caducous; pedicels 12 – 16 in., thickened in fruit. *Calyx* shortly but distinctly toothed, enlarged in fruit. *Corolla* nearly $\frac{1}{2}$ in., tomentose, ochroleucous, the middle lobe of the lower lip purple-lilac (*Griffith*). *Drupe* $\frac{1}{2}$ in. or more, ovoid; apex depressed. —*Wight* supposed this to be *Vitez macrophylla*, R. Br. (now removed to *Gmelina* by *Bentham*); and it is so very like it, except in having narrow leaves, that it appears unnatural to refer the two plants to different genera.

** *Peduncles all axillary, sometimes subobsolete.*

14. **V. vestita**, *Wall. Cat.* 1750; leaves 3-foliolate, leaflets petioluled ovate-lanceolate entire mature softly pubescent beneath, cymes axillary mostly shorter than the petioles. *Schauer in DC. Prodr.* xi. 692; *Kurz For. Fl.* ii. 272. *V. Finlaysoniana*, *Wall. Cat.* 6314.

PENANG; *Wallich*. MALACCA; *Griffith* (*Kew Distrib.* n. 6063), *Cuming*.—DISTRIB. Ava, Sumatra, Java, Borneo.

A tree; shoots softly hairy or almost woolly. *Leaflets* 6 by $2\frac{3}{4}$ in., acuminate at both ends; petiolule of the middle leaflet often $\frac{3}{4}$ in.; petiole 2–3 in., not winged. *Cymes* sessile, small, few-fl'd., fulvous-pubescent; bracts $\frac{1}{2}$ in., linear; pedicels 0– $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in., subtruncate, fulvous-pubescent. *Corolla* $\frac{1}{2}$ in.; tube narrow, glabrate, densely yellow-glandular; lobes small. *Anther-cells* not very unequal, divaricate. *Drupe* $\frac{1}{4}$ in. diam.; fruit-calyx saucer-shaped.

15. **V. peduncularis**, *Wall. Cat.* 1753; leaves 3-foliolate, leaflets petioluled lanceolate entire mature glabrate, panicles long-peduncled elongate many-fl'd. cinereous-farinos. *Schauer in DC. Prodr.* xi. 687.

From ASSAM and BENGAL to TENASSERIM, frequent; *Roxburgh, Wallich, &c.*

A tree, 20–40 ft.; shoots cinereous-pubescent. *Leaflets* $4\frac{1}{2}$ by 1 in., acuminate, mature densely covered by minute yellow glands beneath, midrib sometimes puberulous; petiolule of the middle leaflet $\frac{1}{2}$ – $\frac{3}{4}$ in.; petiole 2–4 in., slender or sometimes slightly winged. *Peduncles* 3–4 in., from the penultimate axils; panicles often 6–8 by 2 in., open; bracts $\frac{1}{2}$ in., linear. *Calyx* $\frac{1}{10}$ in., grey-pubescent, subtruncate. *Corolla* $\frac{1}{2}$ in., grey-pubescent. *Drupe* $\frac{1}{2}$ in. diam., cuboid-globose.

VAR. *Roxburghiana*; less grey-pubescent, petioles winged, panicles lax few-fl'd. *V. alata*, *Roxb. Fl. Ind.* iii. 72; *Wall. Cat.* 1752; *Kurz For. Fl.* ii. 272, not of *Heyne* nor of *Schauer*.—Behar, at Parasnath, *Edgeworth*. E. Bengal and Khasia Terai; *H. f. & T. Pegu*; *Kurz*.—*Roxburgh* quotes (for his Chittagong *V. alata*) *Rheede Hort. Mal.* v. t. 1, which has leaves that might do, but a totally different inflorescence, and is *Heyne's V. alata*.

16. **V. leucoxydon**, *Linn. f. Suppl.* 293; leaves 5-foliolate, leaflets petioluled oblong entire mature woolly along the midrib beneath otherwise glabrate, corymbs divaricate lax, drupe $\frac{2}{3}$ in. *Roxb. Hort. Beng.* 46, and *Fl. Ind.* iii. 74; *Wall. Cat.* 1748; *Schauer in DC. Prodr.* xi. 692, partly; *Dalz. & Gibs. Bomb. Fl.* 201; *Bedd. For. Man.* 171; *Brand. For. Fl.* 370 partly, not of *Kurz*. *V. saligna*, *Roxb. Fl. Ind.* iii. 75; *Wall. Cat.* 6313; *Schauer l. c.* *Vitez l. c.* 18, *Herb. Ind. Or. H. f. & T.* *Wallrothia leucoxydon*, *Roth Nov. Sp.* 319; *Wight Ic.* t. 1467.—*Rheede Hort. Mal.* iv. t. 36.

S. DECCAN PENINSULA and CEYLON, up to 3000 ft., *Roxburgh, Rottler, &c.*

A small tree. *Leaflets* 5 by 1 in., obtuse or obtusely acuminate, when young sparsely hairy, mature with patent yellowish hairs along each side of the midrib beneath; petiolules $\frac{1}{4}$ – $\frac{3}{4}$ in.; petiole 1–3 in., not winged. *Corymbs* nearly glabrous; bracts $\frac{1}{2}$ in., lanceolate, scarious, marcescent; flowers sessile in each dichotomy. *Calyx*

$\frac{1}{2}$ in., minutely toothed, tomentose or nearly glabrous. *Corolla* $\frac{1}{2}$ in., woolly without. *Drupe* obovoid, succulent.—In the typical form the leaflets are coriaceous, shining, yellowish beneath, nervation obscure: in *V. saligna*, Roxb., they are more membranous, the reticulated nervation distinct on both surfaces. A very handsome form with broader leaflets is marked *Wallrothia tomentosa* by Wight; but the extreme membranous narrow-leaved *V. saligna* (Roxburgh's specimen) shows similar hair on each side the midrib beneath.

17. **V. glabrata**, Br. *Prodr.* 512; leaves 5-3-foliolate, leaflets ovate or oblong subentire mature sparsely strigillose beneath, corymbs divaricate, drupe $\frac{1}{2}$ in. *Schauer in DC. Prodr.* xi. 695; *Benth. Fl. Austral.* v. 68. *V. Cunninghamii*, *Schauer l. c.* 690. *V. leucoxylon*, *Schauer l. c.* 692, *partly*; *Blume Bijl.* 813; *Kurz For. Fl.* ii. 273; *Gamble Indian Timbers*, 298. *V. bombacifolia*, *Wall. Cat.* 1749; *Walp. Rep.* iv. 86. *V. pallida*, *Wall. Cat.* 1751.—*Vitex* nn. 10 and 18, *Herb. Ind. Or. H. f. & T.*

From S. ASSAM and CACHAR to MALACCA, frequent.—DISTRIB. Siam, Cochin China, Malaya. N. Australia.

A small tree; shoots fulvous-tomentose or woolly. *Leaves* mostly 5-foliolate (in the Indian tree); leaflets 5 by $2\frac{1}{2}$ in., acute or cuneate at both ends, entire rarely toothed, young very softly hairy or subtomtose, mature with scattered appressed minute hairs beneath; petiolules $\frac{1}{2}$ in.; petiole 1-4 in., not winged. *Peduncles* long or more often short; flowers somewhat numerous, mostly shortly pedicelled; bracts inconspicuous. *Calyx* $\frac{1}{10}$ in., minutely toothed. *Corolla* $\frac{1}{2}$ in., tomentose, ochroleucous; lowest segment much the largest, hairy, blue-purple. *Filaments* minutely hairy. *Pistil* glabrous. *Drupe* obovoid, succulent.—The typical *V. glabrata*, R. Br., has leaves usually 3-foliolate and rounder more glabrate leaflets and fewer-fl. corymbs than the Indian tree; but some of the examples of *V. Cunninghamii* appear identical with Sihet specimens. The typical *V. bombacifolia*, Wallich (*Vitex* n. 18, *Herb. Ind. Or. H. f. & T.*), has the leaflets mostly 5, large and broad; *V. pallida*, Wallich (*Vitex* n. 10, *Herb. Ind. Or. H. f. & T.*), has smaller, more hairy leaflets, and short peduncles.

Subgenus 2. **Glossocalyx**. Calyx unequally 2-lipped, deeply 3-toothed.

18. **V. gamosepala**, *Griff Notul.* iv. 178, and *l.c. Pl. Asiat.* t. 448, fig. 2; leaves 3-foliolate, leaflets petioluled ovate or lanceolate entire glabrate except the nerves beneath, cymes axillary sessile short. *Benth. in Gen. Pl.* ii. 1154.—*Vitex* nn. 15, 16, *Herb. Ind. Or. H. f. & T.*

MALACCA; *Griffith* (Kew Distrib. n. 6065), *Maingay* (Kew Distrib. n. 1202).

A middle-sized tree; shoots fulvous-hairy. *Leaflets* 4 by $1\frac{1}{2}$ in., somewhat coriaceous, petiolule of the middle leaflet $\frac{1}{2}$ in.; petiole 1-2 in., not winged. *Cymes* 1-3 in. diam., globose, repeatedly 2-3-tomous, sparingly fulvous-hairy; bracts caducous. *Calyx* $\frac{1}{2}$ in.; tube shorter than the lip, ovoid; upper lip of two oblong segments, lower twice as long, elliptic, entire. *Corolla* nearly $\frac{1}{2}$ in.; tube narrow, glabrate, with many yellow glands, limb small. *Anther-cells* divaricate as in *Vitex* type (*Griffith's* drawing shows them very young). *Drupe* $\frac{1}{2}$ in., ovoid, glabrous.—The corolla as well as the inflorescence shows the affinity to *V. vestita*.

UNKNOWN SPECIES.

VITEX? AXILLARIS, *Wall. Cat.* 1760, from Tavoy, is not in Wallich's Herbarium.

VITEX HAYNGA, *Roxb. Hort. Beng.* 46, from Chittagong (name only), is probably one of the species described in *Fl. Ind.*, under which Roxburgh has omitted to record the earlier name.

VITEX SCABEA, *Wall. Cat.* 1758, from Ava (*Schauer in DC. Prodr.* xi. 695), is represented by a branchlet and leaves only in Wallich's Herbarium.

XIV. **CLERODENDRON**, Linn.

Trees or shrubs, sometimes rambling. *Leaves* opposite, rarely 3-4-nate, simple, occasionally lobed. *Cymes* axillary or in terminal panicles, often leafy below; bracts prominent or small. *Calyx* campanulate, truncate or 5-toothed, or sub-5-partite, persistent often accrescent or coloured. *Corolla-tube* slender, cylindric, usually long filiform; limb 5-fid. spreading, more or less oblique. *Stamens* 4; anthers long-exserted, cells parallel. *Ovary* imperfectly 4-celled, 4-ovuled; style filiform, shortly bifid. *Drupe* globose, succulent, more rarely nearly dry, 4-grooved, separating into 4 pyrenes of which 1-3 are often suppressed. *Seeds* oblong.—Species 70, in the warmer regions of both Hemispheres, chiefly in the Eastern.

Clerodendron aculeatum, Linn. (under *Volkameria*), a native of America, is cultivated in Indian gardens; it is allied to *C. inerme*, but has axillary spines. *C. fragrans*, Vent., a Chinese species, is extensively cultivated, particularly the double-flowered variety; it is allied to *C. bracteatum*. *C. canescens*, Wall., also Chinese, and closely allied to the last, is occasionally cultivated.

Subgenus 1. **Euclerodendron**. Corolla-tube less than $1\frac{1}{2}$ in.

* *Peduncles mainly axillary, or panicle lax leafy below.*

1. **C. inerme**, Gaertn. *Fruct.* i. 271, t. 57, fig. 1; leaves obovate or elliptic subobtusate entire glabrate, calyx $\frac{1}{2}$ – $\frac{1}{3}$ in. minutely toothed, in fruit somewhat enlarged subtruncate closely embracing the base of the obovoid drupe. *Roxb. Fl. Ind.* iii. 58; *Wall. Cat.* 1788, chiefly. *Schauer in DC. Prodr.* xi. 660; *Dalz. & Gibs. Bomb. Fl.* 200; *Bedd. For. Man.* 174; *Brand. For. Fl.* 363; *Kurz For. Fl.* ii. 266. *Volkameria*, Linn. *Fl. Zeyl.* 231.—*Rheede Hort. Mal.* v. t. 49.

INDIA and CEYLON near the sea, from Bombay to Tenasserim.

A straggling shrub, 3–7 ft.; shoots grey-pubescent. *Leaves* opposite, rarely ternate, $\frac{3}{4}$ – $1\frac{1}{2}$ in., young somewhat grey-pubescent, base cuneate; petiole $\frac{1}{4}$ in. *Peduncles* $\frac{1}{2}$ – $1\frac{1}{2}$ in., all axillary, 3–7-fid.; bracts $\frac{1}{16}$ in., linear; pedicels $\frac{1}{2}$ – $\frac{1}{3}$ in. *Calyx* grey-puberulous or glabrate. *Corolla* white; tube $\frac{3}{4}$ in., glabrate; lobes $\frac{1}{2}$ in., oblong. *Drupe* $\frac{1}{2}$ by $\frac{1}{3}$ in., spongy, hardly succulent, smooth hardly sulcate, separating into 4 woody pyrenes.

2. **C. neriifolium**, Wall. *Cat.* 1789; leaves elliptic acute or linear-oblong entire glabrate, calyx $\frac{1}{2}$ in. shortly toothed, in fruit enlarged subpatent striate distinctly toothed or lobed. *Schauer in DC. Prodr.* xi. 660. *C. inerme*, Benth. *Fl. Hongk.* 271, and *Fl. Austral.* v. 61; *Schauer l. c.*, in great part; *Wall. Cat.* 1788, type sheet. *C. inerme* var. *neriifolia*, Kurz *For. Fl.* ii. 266. *Volkameria neriifolia*, *Roxb. Fl. Ind.* iii. 64.—*Rumph. Herb. Amb.* v. t. 46 (drupe very immature).

MALAY PENINSULA near the sea, from Chittagong to Malacca, frequent.—

DISTRIB. Malaya, China, Australia, Polynesia.

Leaves mostly ternate, $3\frac{1}{2}$ by $1\frac{1}{4}$ in.; or in the extreme type form of Roxburgh, sublinear, $4\frac{1}{4}$ by $\frac{1}{3}$ in. *Cymes* and drupe rather larger than in *C. inerme*. *Calyx* often $\frac{1}{2}$ in. diam. in fruit.—Otherwise as *C. inerme*, of which this may be a var., as Benthham and Kurz have treated it.

VAR. *macrocarpa*, Wall. ms.; drupe $1\frac{1}{4}$ by $\frac{3}{4}$ in.—Martaban; Wallich. Rangoon; M'Lelland.

3. **C. disparifolium**, Blume *Bijd.* 809; leaves oblong or elliptic acuminate subentire glabrate, calyx $\frac{1}{2}$ in. deeply 5-lobed nearly glabrous. *Schauer in DC. Prodr.* xi. 672; *Hassk. Relzia*, i. 57. *C. acuminatum*, Wall.

Cat. 1792; *Schauer l. c.* 664. *C. Jackianum*, *Wall. Cat.* 1794, and in *Bot. Mag.* t. 3049, in note; *Schauer l. c.*

MALACCA and SINGAPORE, frequent; *Wallich, Griffith, &c.*—DISTRIB. Throughout Malaya.

A shrub; branchlets puberulous. *Leaves* opposite, unequal or equal, 4 by $1\frac{3}{4}$ in., base obtuse, undulate or obscurely toothed, young scarcely pubescent; petiole 1–2 in. *Peduncles* numerous, axillary, or penultimate forming a terminal panicle; bracts $\frac{1}{4}$ in., linear; cymes 10–20-fl., puberulous; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. *Calyx* divided nearly to the base, often purplish, minutely puberulous; segments broad-lanceolate acuminate. *Corolla* pale yellow (Blume); tube nearly 1 in., glabrous; lobes $\frac{1}{2}$ in., narrowly obovate. *Drupe* $\frac{1}{4}$ in. diam., globose, succulent; calyx-lobes in fruit $\frac{1}{2}$ in., pendent. —Wallich's specimens exactly agree with those from Java; but the one species has been made into two because Blume describes the panicle as terminal, which Schauer regarded as axillary.

4. **C. Griffithianum**, *Clarke*; leaves oblong acuminate minutely toothed pubescent beneath at least on the midrib, inflorescence subterminal very lax, calyx $\frac{1}{3}$ – $\frac{1}{2}$ in. deeply 5-lobed.

ASSAM; *Griffith* (*Kew Distrib.* n. 6054).—DISTRIB. Ava.

A small tree (*Griffith*); in habit resembling *C. disparifolium*, but the branches viscous-pubescent. *Leaves* 6 by $1\frac{1}{2}$ in., base rounded or cuneate, mature glabrate above, pubescent (usually minutely) on the lamina beneath; petiole 1 in., viscidly pubescent. *Peduncles* penultimate from petioled leaf-like bracts, and running into completely terminal panicles; bracts $\frac{1}{2}$ in., filiform; cymes lax, viscidly pubescent; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. *Calyx* minutely pubescent; tube short, distinctly campanulate; lobes lanceolate, acuminate, more or less reddish. *Corolla* glabrate, white (*Griffith*); tube 1 in.; lobes $\frac{1}{2}$ in., oblong. *Drupe* $\frac{1}{2}$ by $\frac{1}{2}$ in., ovoid; calyx-tube much enlarged, almost enclosing the drupe; segments $\frac{1}{2}$ in., triangular, thickened, erect, overtopping the drupe.

5. **C. Lobbii**, *Clarke*; leaves ovate entire minutely pubescent beneath, peduncles axillary long, calyx $\frac{1}{2}$ in. deeply lobed.

PENANG; *Lobb*.

Apparently a rambling shrub; branchlets minutely pubescent. *Leaves* 3 by $2\frac{1}{4}$ in., obtuse, base rounded, glabrate above; petiole probably short. *Peduncles* numerous, 3–4 in.; bracts $\frac{1}{2}$ in., linear; cymes minutely grey-pubescent, 12-fl.; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. *Calyx* obovoid, minutely grey-pubescent, enclosing the corolla, with scattered round glands; segments $\frac{1}{4}$ in., ovate-triangular, valvate in bud. *Corolla* (not fully expanded) glabrate, probably $\frac{2}{3}$ in. long, altogether of *Clerodendron*, as are the stamens and pistil.

6. **C. phlomoides**, *Linn. f. Suppl.* 292; leaves ovate sinuate or serrate mature puberulous or pubescent beneath, calyx lobed half-way down lobes triangular caudate-acuminate. *Rorb. Fl. Ind.* iii. 57; *Wall. Cat.* 1787; *Schauer in DC. Prodr.* xi. 663; *Dalz. & Gibs. Bomb. Fl.* 200; *Wight Ic.* t. 1473; *Bedd. For. Man.* 174; *Brand. For. Fl.* 363. *Volkameria multiflora*, *Burm. Fl. Ind.* 137, t. 45, fig. 1.

From the N.W. HIMALAYA TERRAI to Ceylon, general in the drier climates, extending to BEHAR and ORISSA (not to Bengal).

A large bush, sometimes 30 ft.; shoots pubescent. *Leaves* $1\frac{3}{4}$ by $1\frac{1}{4}$ in., obtuse or acute, often sub-rhomboid, usually sinuate-crenate sometimes entire, rarely crenate-dentate; petiole $\frac{3}{4}$ in., pubescent. *Peduncles* 1 in., axillary, or panicle sometimes truly terminal; cymes 12-fl., lax, pubescent; bracts $\frac{2}{3}$ in., obovate-lanceolate; pedicels $\frac{1}{8}$ – $\frac{1}{2}$ in. *Calyx* $\frac{3}{4}$ – $\frac{1}{2}$ in., puberulous; in fruit slightly enlarged, more rigid, glabrescent. *Corolla* puberulous, white; tube nearly 1 in., filiform; segments $\frac{1}{2}$ in., elliptic. *Drupe* $\frac{1}{2}$ – $\frac{1}{4}$ in., obovoid, slightly succulent, separating into 4 pyrenes much as in *C. inerme*.

7. **C. calamitosum**, *Linn. Mant.* 90; leaves broadly elliptic coarsely toothed mature nearly glabrous, calyx lobed nearly to the base lobes narrowly oblong cuneately acute. *Schauer in DC. Prodr.* xi. 663; *Bot. Mag.* t. 5294. *Volkameria alternifolia*, *Burm. Fl. Ind.* 137, t. 44.

MALACCA; *Maingay*.—DISTRIB. Java.

A shrub; branches minutely pubescent. *Leaves* 4 by 2 in., opposite rarely alternate, obtuse, base rhomboid; petiole 1 in. *Peduncles* axillary and in a terminal panicle, puberulous; bracts $\frac{1}{2}$ in., linear; cymes 6-fld.; pedicels $\frac{1}{8}$ – $\frac{1}{4}$ in. *Calyx* exceeding $\frac{1}{2}$ in., minutely pubescent. *Corolla* puberulous, white; tube 1 in.; lobes $\frac{1}{4}$ – $\frac{1}{2}$ in., narrowly obovoid. *Drupe* not seen.—Appears closely allied to *C. phlomoides*.

** *Panicles terminal, elongate, lax, often pendulous.*

8. **C. nutans**, *Wall. in Bot. Mag.* t. 3049, and *Cat.* 1793; glabrous, leaves short-petioled narrowly obvate or lanceolate subentire, calyx divided nearly to the broad base segments ovate-lanceolate. *Don Prodr.* 103; *Schauer in DC. Prodr.* xi. 663; *Griff. Itin. Notes*, 24, n. 375; *Kurz For. Fl.* ii. 268.

From SIKKIM and ASSAM to CHITTAGONG, alt. 0–3000 ft.; *Wallich, &c.*—DISTRIB. Ava.

A shrub, commonly 6 ft. *Leaves* 8 by $1\frac{1}{2}$ in., or 6 by 2 in., much acuminate, base attenuate, entire or occasionally slightly toothed; petiole $\frac{1}{2}$ in. *Panicles* 3–12 by 2–3 in., very lax, few-fld., brachiate; bracts $\frac{1}{4}$ in., filiform; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in.; in fruit stellate red, more or less enlarged, in one example $1\frac{3}{4}$ in. diam. *Corolla* white; tube $\frac{1}{2}$ in.; lobes $\frac{1}{2}$ in., obovate. *Drupe* $\frac{1}{2}$ in. diam., succulent, dark-purple, pyrenes 1–4.

9. **C. penduliflorum**, *Wall. Cat.* 1795, and in *Bot. Mag.* t. 3049, *in note*; leaves distinctly petioled lanceolate or oblong acuminate subentire mature glabrate, panicle minutely pubescent, calyx divided nearly to the base segments oblong cuneately acute minutely pubescent. *Schauer in DC. Prodr.* xi. 664.

MALAY PENINSULA, from Akyab, *Kurz*, to Tenasserim, *Helfer* (Kew Distrib. n. 6047). NICOBAR ISLES.

A shrub, resembling *C. nutans* except as to the calyx. *Leaves* from 8 by 1 in. to 5 by $2\frac{1}{4}$ in., or sometimes 9 by 4 in.; base cuneate or frequently obtuse, usually entire, sometimes distinctly toothed. *Panicle* puberulous in the typical form, but (as the corolla) very nearly glabrous in some Moulmein examples. *Calyx* $\frac{1}{2}$ to $\frac{3}{4}$ in., segments scarcely wider at the base. *Drupe* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., globose, succulent, pyrenes 4; sepals in fruit slightly enlarged, reflexed, reddish.

10. **C. macrostachyum**, *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1863, ii. 220; leaves long-petioled cordate-ovate toothed sparsely pubescent, calyx very small subtruncate. *Clerodendron* n. 34, *Herb. Ind. Or. H. f. & T.*—Verbenacea, *Wall. Cat.* 6316.

KHASIA Mts., alt. 2000 ft.; on limestone rocks above Chela, *Wallich, H. f. & T.*; Upper Kala Pani, alt. 5000 ft., *Clarke*. MOULMEIN; on limestone rocks, *Parish, Cobb.*

A membranous herb. *Leaves* attaining 9 by $6\frac{1}{2}$ in., subacute, deeply cordate, very membranous, whitened beneath; petiole $6\frac{1}{2}$ in. *Panicles* 5–12 in., terminal, sometimes compound, branches long, narrow, many-fld., pubescent somewhat glandular or glabrate; bracts $\frac{1}{6}$ in., ovate, or smaller oblong; pedicels slender, $\frac{1}{2}$ in. *Calyx* $\frac{1}{6}$ – $\frac{1}{4}$ in., cup-shaped, limb shallowly toothed, glabrate or obscurely pubescent or with red glands; unaltered or slightly inflated in fruit. *Corolla* glabrous, delicate, pale blue (Hooker); tube $\frac{1}{2}$ in., linear; lobes $\frac{1}{2}$ in., obovate. *Stamens* long-exserted. *Ovary* 2- (imperfectly 4-) celled, 4-ovuled, with large red glands, style subterminal. *Drupe* $\frac{1}{10}$ in., obovoid, nearly dry, covered with red glands, dividing into 4 pyrenes.—Not allied to any other

Clerodendron. The Moulmein material has smaller, less toothed, leaves, and has more pubescence and glands than the Chela plants.

*** *Panicles terminal, elongate, conspicuously bracteate; calyx sub-truncate.*

11. *C. serratum*, *Spreng. Syst.* ii. 758; shrubby, leaves subsessile oblong or elliptic acuminate serrate, pedicels densely pubescent. *Don Prodr.* 103; *Wall. Cat.* 1809; *Ham. in Trans. Linn. Soc.* xvii. 187; *Schauer in DC. Prodr.* xi. 664; *Dalz. & Gibs. Bomb. Fl.* 200; *Wight Ic.* t. 1472; *Brand. For. Fl.* 364; *Kurz For. Fl.* ii. 267. *C. ternifolium*, *Don Prodr.* 103. *C. macrophyllum*, *Bot. Mag.* t. 2536; *Reich. Fl. Erot.* t. 209; *Schauer l. c.* 674. *C. ornatum*, *Wall. Cat.* 1811; *Schauer l. c.* 675. *C. herbaceum*, *Wall. Cat.* 1815; *Schauer l. c.* 675. *C. cuneatum*, *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1863, ii. 221. *Volkameria serrata*, *Linn. Mant.* 90; *Roxb. Fl. Ind.* iii. 62. *V. herbacea*, *Roxb. Hort. Beng.* 46.

From the HIMALAYA, east of the Sutlej, to CEYLON and TENASSERIM, alt. 0-4000 ft., frequent; very common in Bengal.

Stems usually 2-8 ft., simple, hardly woody, being burnt annually in the jungle fires; when more than a year old becoming branched, more or less hairy or glabrate. *Leaves* usually some of them ternate, commonly 6 by 2 in., narrowly obovate-oblong or subelliptic, base cuneate, mature glabrate puberulous pubescent or (in some S. Indian examples) closely villous on the lamina beneath; petiole $0\frac{1}{4}$ in. *Panicle* 6 by 1 in., sublinear, or 10 by 5 in. subpyramidal, pubescent often villous, branches and pedicels patently shortly hairy; bracts $\frac{3}{4}$ -1 $\frac{1}{2}$ in., from obovate to lanceolate, pubescent, subsistent, often coloured; pedicels $0\frac{1}{4}$ in. *Calyx* $\frac{1}{2}$ in., cup-shaped, pubescent or puberulous, limb very shortly 5-lobed, slightly enlarged in fruit. *Corolla* nearly glabrous without, hairy at the base of the stamens, from purplish-blue and white to nearly white; tube $\frac{3}{4}$ -1 in., narrow-cylindric; mouth oblique, 2-lipped; lobes $\frac{1}{2}$ -1 in., oblong or elliptic. *Drupe* $\frac{1}{4}$ by $\frac{1}{8}$ - $\frac{1}{4}$ in., succulent, purple-black, 4-1-pyrened. —In the form *C. herbaceum*, *Wall.*, the panicle is cylindric dense subspicate; in *C. ornatum*, *Wall.* (only seen from Pegu), the panicle is diffuse, slender, unusually glabrous.

VAR. Wallichii; leaves large often shortly petioled, panicle large pyramidal open pubescent, bracteoles prominent lanceolate, calyx truncate or very nearly so. *C. farinosum*, *Wall. Cat.* 1810 (not *Volkameria farinosa*, *Roxb.*). *C. divaricatum*, *Jack in Mal. Misc.* i. 2, and in *Hook. Bot. Misc.* ii. 89; *Schauer l. c.* 674. *C. javanicum*, *Walp. Rep.* iv. 113.—Eastern India; from Sikkim and Assam to Malacca, common. Distrib. Sumatra, Java, Cambodia.—The upper leaves (at least) in some examples of this are quite entire.

12. *C. venosum*, *Wall. Cat.* 1807; arboreous, leaves opposite petioled elliptic acuminate glabrescent, panicle often farinose-tomentose. *Volkameria farinosa*, *Roxb. Hort. Beng.* 46, and *Fl. Ind.* iii. 64, not *C. farinosum*, *Wall.* —*Volkameria* sp., *Griff. Itin. Notes*, 70, n. 1082. *Clerodendron* n. 30, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 4000 ft.; Mamloo, *Griffith* (Kew Distrib. n. 6052); Cherra, *H. f. & T.*, &c.

A tree (Roxburgh), 40 ft., with well-marked trunk (Clarke). *Leaves* (none ternate) 7 by 3 in., base attenuate; petiole $\frac{1}{4}$ -1 in. (or uppermost leaves sessile). *Panicle* 8 by 5 in., brachiate, branches divaricate; rachis acutely quadrangular; bracts 1-2 in., ovate, acuminate, leaf-like; bracteoles $\frac{1}{2}$ in., linear-oblong, persistent, farinose-tomentose without spreading hairs; pedicels secund. *Calyx* $\frac{1}{2}$ in., truncate, glabrescent. *Corolla* nearly as of *C. serrata*, but with a greenish-white tinge. *Drupe* nearly as of *C. serrata*.

*** *Panicles peduncled, of 1 or more heads, axillary or sometimes pseudo-terminal.*

13. **C. deflexum**, Wall. *Pl. As. Rar.* iii. 10, t. 215, and *Cat.* 1808; leaves elliptic or oblong acuminate subentire mature softly pubescent beneath, bracts narrow, a few leaf-like often added. *Schauer in DC. Prodr.* xi. 665.

PENANG; Wallich. MALACCA and SINGAPORE; Griffith, &c.

A shrub, 4 ft. (Wallich); branches pubescent. *Leaves* opposite, 13 by 4 in., base cuneate or rounded, mature glabrate above; petiole 1 in. *Peduncles* 1-5 in., axillary, or sometimes one pseudo-terminal lateral deflexed, with 1 rarely 3 heads. *Panicles* 1-3 in. diam., pubescent, red. *Calyx* $\frac{1}{4}$ - $\frac{1}{2}$ in., divided more than half-way down; lobes lanceolate, suberect, scarcely acuminate, sparingly pubescent. *Corolla* slightly pubescent, white suffused rose-purple; tube $\frac{3}{4}$ in.; lobes $\frac{1}{2}$ in., elliptic. *Drupe* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., succulent, purple.—Hardly any of Schauer's section of *axilliflora* have the inflorescence so exclusively axillary as this, which he places in a section defined as having a terminal panicle.

14. **C. bracteatum**, Wall. *Cat.* 1800; leaves ovate acuminate entire mature villous, bracts numerous ovate or oblong. *Walp. Rep.* iv. 106; *Schauer in DC. Prodr.* xi. 665.—*Clerodendron*, Griffith. *Itin. Notes*, 34, n. 563.

SIKKIM and BHOTAN, alt. 2-5000 ft., frequent. MISHMEE; Griffith. ASSAM, CACHAR and KHASIA MTS. up to 4000 ft., Wallich, *H. f. & T.*, &c.

A shrub, 8 ft., or arborescent 20 ft.; branches fulvous-villous. *Leaves* opposite, 6 by 3-4 in., base from cordate to cuneate, mature softly hairy above, villous or almost woolly beneath; petiole 1-3 in. *Inflorescence* fulvous-villous; peduncles 3 in., bearing 1 rarely 3 heads; bracts $\frac{3}{4}$ by $\frac{1}{2}$ in., prominent. *Calyx* $\frac{1}{2}$ in., divided more than half-way down; segments ovate-lanceolate, suberect. *Corolla* pubescent, white; tube 1 in.; lobes $\frac{1}{2}$ in., elliptic. *Drupe* $\frac{1}{2}$ in., purple; calyx enlarged, reddish; segments subpatent.

***** *Leaves beneath glabrate, with many round glands; petioles connected by a dense ring of hairs; panicle terminal, large, open.*

15. **C. paniculatum**, Linn. *Mant.* 90; leaves cordate-ovate 5-3-lobed, calyx $\frac{1}{2}$ - $\frac{1}{3}$ in. divided nearly to the base, segments narrowly oblong. *Vahl Symb.* ii. 74; *Bot. Reg. t.* 406; *Reichb. Fl. Exot. t.* 208; *Schauer in DC. Prodr.* xi. 668. *C. pyramidale*, Andr. *Bot. Rep. t.* 628; Wall. *Cat.* 1802. *C. splendidum*, Wall. *Cat.* 1803. *Volkameria angulata*, Lour. *Fl. Cochinch.* 389.

PENANG; Wallich. MERGUI and MALACCA; Griffith.—DISTRIB. Siam, Cochinchina, Java.

A shrub, 3-6 feet. *Leaves* 8 in. diam., lobed 1-3 in. deep, denticulate, above with scattered multicellular hairs or glabrate; petiole 1-4 in. *Panicle* 4-12 by 3-8 in., pubescent, often leafy below, very lax, the branches often prolonged subracemose, usually coloured red; bracteoles linear. *Corolla* pubescent or nearly glabrous, red orange or nearly white; tube $\frac{1}{2}$ - $\frac{3}{4}$ in., filiform; lobes $\frac{1}{4}$ - $\frac{1}{2}$ in. *Drupe* not seen.

VAR. *diversifolia*; upper leaves not lobed base cordate or hastate. *V. diversifolia*, *Vahl Symb.* ii. 75; *Schauer l. c.*—Moulmein; Parish.

16. **C. squamatum**, Vahl *Symb.* ii. 74; leaves cordate roundly ovate shortly acuminate denticulate, calyx $\frac{1}{4}$ - $\frac{1}{2}$ in. deeply divided segments broad lanceolate acute. Wall. *Cat.* 1798; *Bot. Reg. t.* 649; *Maund Bot. t.* 13; *Schauer in DC. Prodr.* xi. 669. *C. dentatum*, Wall. *Cat.* 1799; *Schauer l. c.* 674. *Volkameria Kaempferi*, Jacq. *l. c.* Pl. *Rar. t.* 500. *V. dentata*, Roxb. *Fl. Ind.* iii. 61.

SIKKIM, BHOTAN, ASSAM, KHASIA MTS. and SILHET, alt. 0-4000 ft.; Wallich. *H. f. & T.*, &c., frequent.—Widely cultivated.

A shrub, 2-5 ft.; glabrate, or the panicle and innovations minutely thinly hairy.

Leaves 6-15 in. diam., teeth usually scarcely $\frac{1}{2}$ in. deep; petiole 2-4 in. *Panicle* often 18 by 12 in., open, red; bracts small. *Corolla* nearly glabrous, scarlet; tube $\frac{3}{4}$ -1 in., filiform; lobes $\frac{1}{2}$ in. *Drupe* $\frac{1}{2}$ - $\frac{1}{2}$ in. diam., blue-black; fruiting calyx enlarged, patent $1\frac{1}{2}$ in. diam.

VAR. urticifolia; teeth of the leaves $\frac{1}{4}$ - $\frac{1}{2}$ in. deep patent all round the leaves. *V. urticifolia*, *Wall. Cat.* 1801; *Schauer l. c.* *Volkameria urticifolia*, *Roxb. Fl. Ind.* iii. 61.—Assam, E. Bengal, Pegu; *Wallich, &c.* Distrib. Ava.

***** *Panicles terminal, capitate or corymbose; leaves beneath not or very obscurely glandular.*

17. *C. lasiocephalum*, *Clarke*; leaves ovate acuminate dentate pubescent, panicle subcapitate, calyx-segments $\frac{2}{3}$ in. linear-subulate.

MISHMEE; *Griffith* (Kew Distrib. n. 6055).

Branches pubescent upwards. *Leaves* opposite, 10 by $\frac{1}{2}$ in., base cuneate or rounded, membranous, sparsely pubescent on both surfaces; petiole 2 in. *Panicle* sessile, 2-3 in. diam., dense, depressed-globose, pubescent; bracts linear. *Calyx* divided, nearly to the base; segments flaccid caudate, pubescent. *Corolla* not seen. *Drupe* $\frac{1}{2}$ in. diam., red.

18. *C. Colebrookianum*, *Walp. Rep.* iv. 114; leaves shallowly cordate ovate acute entire mature subglabrate, panicle large spreading, flowers clustered, calyx $\frac{1}{6}$ - $\frac{1}{4}$ in. *Schauer in DC. Prodr.* xi. 672; *Gamble Indian Timbers*, 299. *C. glandulosum*, *Wall. Cat.* 1806; *Lindl. in Bot. Reg.* 1844. 19, *in note*; *Schauer l. c.*

SIKKIM, ASSAM, and KHASIA Mts., alt. 1-4000 ft., frequent; *H. f. & T.*, &c. MOULMEIN; *Parish*. PROME HILLS; *Col. Benson*. SINGAPORE; *Lobb*.

A shrub, 4-8 ft. *Leaves* often 9 in. diam., young puberulous, beneath eglandular or with a few scattered large glands especially near the apex of the petiole; petiole 2-8 in. *Panicles* 1-2 ft. diam., straggling, pubescent; flowers very numerous in clusters; bracts lanceolate, caducous at flower-time. *Calyx* pubescent, often bearing a few large glands, divided hardly half way down; teeth triangular or lanceolate. *Corolla* nearly glabrous, from rose-purple to white; tube 1 in.; lobes $\frac{1}{4}$ in., elliptic. *Drupe* $\frac{1}{2}$ in. diam., blue, pyrenes usually 4; calyx in fruit $\frac{1}{2}$ - $\frac{1}{2}$ in. diam.—*C. glandulosum*, *Wall.*, is a specimen from the Calc. Bot. Garden, with the leaves rather more pubescent, and the bracts persistent.

VAR. denticulata; leaves irregularly sinuate denticulate.—Jaintea Hills; *Jowye, Clarke*.

19. *C. infortunatum*, *Gaertn. Fruct.* i. 271, t. 57, fig. 1; leaves ovate acuminate entire or serrulate mature hairy, panicle open villous, corolla-tube exceeding the eglandular calyx-lobes $\frac{1}{2}$ in. *Lamk. Ill.* t. 544; *Wall. Cat.* 1796; *Schauer in DC. Prodr.* xi. 667; *Dalz. & Gibs. Bomb. Fl.* 200; *Wight Ic.* t. 1471; *Bedd. For. Man.* 173, and *Anal. Pl.* xxii. fig. 1; *Brand. For. Fl.* 363; *Kurz For. Fl.* ii. 267. *C. viscosum*, *Vent. Jard. Malm.* t. 25; *Bot. Mag.* t. 1805; *Bot. Reg.* t. 629. *C. cordatum*, *Don Prodr.* 103; *Schauer l. c.* 674. *C. castaneæfolium*, *Klotzsch in Reis. Pr. Wald. Bot.* 102, t. 65. *C. calycinum*, *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1863, ii. 222. *Volkameria infortunata*, *Roxb. Fl. Ind.* iii. 59.—*Clerodendron*, *Linn. Fl. Zeyl.* 232; *Burm. Thes. Zeyl.* 66; *Rumph. Herb. Amb.* iv. t. 49; *Rheede Hort. Mal.* ii. t. 25.

Throughout INDIA, from Gurwhal and Assam to CEYLON and Singapore, in the warm region; very common.—DISTRIB. Malaya.

A shrub, 4 ft., often gregarious, yellow- or white-villous upwards, sometimes a small tree according to a note in *Herb. Wallich*. *Leaves* 4-8 in., base cordate or obtuse, varying from round-ovate to broad-oblong, in the Deccan examples usually entire, in

the N. Indian denticulate, somewhat roughly hairy above, beneath densely villous or thinly hairy often with small obscure round glands; petiole 1-4 in. *Panicle* 6-12 by 4-8 in., erect, brachiate, sometimes leafy on the main rachis, upper branches and calyces more or less reddening; bracts of the cymes usually caducous. *Calyx*, in flower, $\frac{1}{2}$ in., divided nearly to the base; segments broadly lanceolate, very acute, suberect. *Corolla* pubescent without, white pink-tinged; tube $\frac{3}{4}$ in. *Drupe* $\frac{1}{2}$ in. diam., black; calyx in fruit enlarged, sometimes $1\frac{1}{2}$ in. diam.—Mountain specimens have often large leaves, and are unusually high-coloured. *Lindl. Bot. Reg.* 1844, t. 19, doubtfully referred here by Schauer, has high-red flowers, and may possibly be some garden form of *C. infortunatum*, which in the wild state produces a nearly white corolla.

20. **C. villosum**, *Blume Bijdr.* 811 (*excl. syn. Rheedee*); leaves cordate-ovate entire mature villous, panicle open silky hairy, corolla-tube about as long as the glandular calyx-lobes $\frac{1}{2}$ in. *Schauer in DC. Prodr.* xi. 667; *Kurz For. Fl.* ii. 268. *C. molle*, *Jack in Malay Misc.* i. 15, and in *Hook. Bot. Misc.* i. 283, not of H. B. K. *C. velutinum*, *Wall. Cat.* 1797. *C. ferrugineum*, *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1863, ii. 221. *C. ? trichotomum*, *Wall. Cat.* 6315, letter B, not of Thunb.

MALAY PENINSULA frequent; from Mergui (*Griffith*) to Singapore (*Sir R. Schomburgk*).—DISTRIB. Java.

A shrub 3-5 ft., or a small tree 15-20 ft. (*Kurz*). *Leaves* as of *C. infortunatum*, but slightly more silky rather than roughly villous. *Panicle* as of *C. infortunatum*, but more softly hairy, and not red. *Calyx* $\frac{1}{2}$ in., divided rather more than half-way down. *Corolla* pubescent, greenish-white, altogether smaller than of *C. infortunatum*. *Drupe* $\frac{1}{2}$ in. diam., dry black appearing hardly succulent.—Very like *C. infortunatum*, but distinguished by its small flowers, and generally also by the glandular calyx-segments. But in a few examples of *C. infortunatum* from the Malay Peninsula the calyx is full of glands.

Subgenus 2. **Siphonanthus**. Corolla-tube more than 3 in., filiform.

21. **C. Siphonanthus**, *Br. in Ait. Hort. Kew. ed.* 2, iv. 65; glabrous, leaves 3-4-nate or opposite subsessile narrowly lanceolate subentire, panicle terminal elongate lax. *Wall. Cat.* 1784; *Wight Ill.* t. 173; *Schauer in DC Prodr.* xi. 670; *Brand. For. Fl.* 364. *C. verticillatum*, *Don Prodr.* 102; *Schauer l. c.* 671. *Siphonanthus indica*, *Willd. Sp. Pl.* i. 606; *Lamk. Ill.* t. 79, fig. 1; *Poxb. Fl. Ind.* iii. 67. *S. angustifolia*, *Willd. l. c.* *Ovieda mitis*, *Burm. Fl. Ind.* 136, t. 43, fig. 1, 2.

From SIKKIM and ASSAM to TENASSERIM, frequent. MTS. of S. DECCAN PENINSULA. KUMAON, wild, fide *Brandis*.—DISTRIB. Sumatra, extensively cultivated in both hemispheres.

A shrub, 4-8 ft., branches virgate. *Leaves* 6 by 1 in., shortly acuminate, base tapering, usually entire or sinuate, rarely remotely crenately lobed; petiole $0-\frac{1}{8}$ in. *Panicle* 8-18 by 4-6 in., often leafy below; cymes very lax, few-fl.; bracts $\frac{1}{2}$ in., linear or linear-lanceolate; pedicels $\frac{1}{2}-1\frac{1}{4}$ in. *Calyx* $\frac{1}{2}$ in., divided $\frac{3}{4}$ the way down; segments oblong, cuneately acute. *Corolla* glabrous, white; tube 3-4 $\frac{1}{2}$ in.; lobes $\frac{3}{4}$ in., obovate-oblong.

VAR. *semiserrata*; leaves opposite short-petioled elliptic crenate-lobate, panicle terminal 3-4-fl. *C. semiserrata*, *Wall. Cat.* 1785.—Prome and Seguin; *Wallich*.—Apparently a much-branched shrub; but the specimens are possibly only short imperfect flower-branches rapidly developed from a normal plant of *C. Siphonanthus* cut to the base by a hot-weather jungle-fire; for the calyx and corolla are exactly as of *C. Siphonanthus*.

22. **C. hastatum**, *Lindl. in Bot. Reg.* t. 1307; pubescent or villous, leaves opposite hastate ovate or oblong often angular or sublobate, panicle

terminal densely corymbose. *Bot. Mag.* t. 3398; *Schauer in DC. Prodr.* xi. 671. *C. sagittatum*, *Wall. Cat.* 1786. *Siphonanthus hastata*, *Roxb. Fl. Ind.* iii. 67.

SILHET; *Wallich*. KHASIA MTS., alt. 0-3000 ft., *H. f. & T.*, &c.

A large shrub. *Leaves* 6 by 4 in., angular, toothed, or oblong and hardly angular; petiole 4 in. *Corymb* subsessile, 4-8 in. diam., pubescent, with reduced leaves often scattered; proper bracts $\frac{3}{4}$ in., linear. *Calyx* $\frac{1}{2}$ in., divided nearly to the base; segments oblong, shortly acute. *Corolla* pubescent, white; tube 4 in.; lobes $\frac{1}{2}$ in., elliptic. *Drupe* $\frac{1}{2}$ in. diam., succulent, black-purple; calyx much enlarged in fruit, dark red.

DOUBTFUL OR EXCLUDED SPECIES.

C. COROMANDELIANUM, *Spreng. Syst.* ii. 758, *Schauer in DC. Prodr.* xi. 673, is another name for *C. ovatum*, *Poir. Suppl.* iv. 352; a species founded on a plant from Pondicherry, resembling *C. squamatum*, but with entire glabrous leaves and whitish flowers.

C. BUCHANANI, *Roxb. Fl. Ind.* iii. 60 (under *Volkameria*), and *IC. Ined. at Kew*, is a *Clerodendron* with terminal compact red panicle and ovate leaves from Amboina and Celebes. This was united by D. Don (*Prodr. Nepal.* 103) with his *Cl. fetidum* from Nepal, a plant with axillary inflorescence, which Hamilton's original specimen in the British Museum shows to have been *Caryopteris grata*. Walpers (*Rep.* iv. 108) and Schauer (*DC. Prodr.* xi. 672) have copied; there is no reason to suppose that Roxburgh's *Buchanani* has ever been found in Nepal or in British India. *C. Buchanani*, *Wall. Cat.* 2653, is not in his Herbarium.

C. FORTUNATUM, *Linn.*, erroneously stated by Schauer (*in DC. Prodr.* xi. 671) to be an Indian species, is a Chinese plant. *C. fortunatum*, *Wall. Cat.* 2652, is not in his Herbarium.

C. SERICEUM, *Wall. Cat.* 1814, is *Hiptage sericea*, *Hook. f.*

XV. HOLMSKIOLDIA, Retz.

Shrubs. *Leaves* opposite. *Cymes* short, axillary or collected at the tips of the branches; bracts small. *Calyx* widely obconic, subtruncate, membranous, coloured. *Corolla* cylindric, curved; limb oblique; lobes 5, short. *Stamens* 4, didynamous; anthers exserted, ovate; cells parallel. *Ovary* obtuse or obscurely depressed, imperfectly (afterwards completely) 4-celled, 4-ovuled; ovules laterally attached; style terminal, shortly 2-fid. *Drupe* obovoid, included in the enlarged calyx, divaricately 4-lobed nearly half-way down, pyrenes 1-4. *Seeds* oblong.—Species 3, an Indian, Madagascanian, and Tropical African.

H. sanguinea, *Retz. Obs.* vi. 31, and in *Hoffm. Phyt. Blaett.* 35, t. 3; leaves petioled ovate acuminate base obtuse somewhat pubescent, cymes bright red. *Wall. Cat.* 2087; *Bot. Reg.* t. 692; *Benth. Lab.* 642; *Schauer in DC. Prodr.* xi. 696; *Reichb. Fl. Exot.* t. 149; *Decne. in Jacquem. Voy. Bot.* t. 140; *Bocq. Rev. Verben.* 135, t. 20, fig. 1-8; *Brand. For. Fl.* 370; *Kurz For. Fl.* ii. 257. *H. rubra*, *Pers. Syn.* ii. 144. *Hastingsia coccinea*, *Smith Exot. Bot.* ii. 41, t. 80; *Roxb. Fl. Ind.* iii. 65. *H. scandens*, *Roxb. l. c.* *Platunium rubrum*, *Juss. in Ann. Mus. d'Hist. Nat.* vii. 76.

SUBTROPICAL HIMALAYA, alt. 0-4000 ft., from Kumaon to Bhotan, and the PROMETHEUS HILLS, frequent.

A straggling shrub, 10-30 ft. *Leaves* 3 by 2 in., entire or toothed; petiole $\frac{1}{2}$ in. *Cymes* 1-2 in., puberulous, red becoming scarlet in fruit. *Corolla* 1 by $\frac{1}{2}$ in., brick-red or somewhat orange. *Stamens* glabrous. *Ovary* glandular; style glabrous. *Drupe* $\frac{1}{2}$ in.; fruiting calyx 1 in. diam.

XVI. **CARYOPTERIS.** Bunge.

Shrubs, erect or rambling. *Leaves* opposite, acuminate, toothed or subentire, minutely punctate with yellow glistening glands. *Cymes* small, dense, many-fl., axillary or running into a terminal thyrses; bracts small. *Calyx* deeply 5-fid; segments triangular or lanceolate, somewhat accrescent. *Corolla-tube* short, cylindric; limb spreading, middle lobe of the lower lip larger, crisped or (in the typical non-Indian species) fimbriate. *Stamens* 4, didynamous; anthers exserted, cells divaricate (in the Indian species), confluent. *Ovary* imperfectly 4-celled, 4-ovuled; style filiform, shortly 2-fid. *Capsule* small, globose, dividing into 4 concave valves with incurved margins holding the seeds. *Seeds* oblong, erect.—Species 5, two N.E. Asiatic and the following.

Though the genus is near *Clerodendron*, two of the Indian species are easily distinguished by their very short corolla: the third, *C. Wallichiana*, has the corolla-tube scarcely $\frac{1}{2}$ in. The capsule is hardly less succulent than in several species of *Clerodendron*, nor is the incurving of the edges of the valves different from what occurs in that genus.

1. **C. Wallichiana**, *Schauer in DC. Prodr.* xi. 625; leaves elliptic acuminate, cymes collected mostly in terminal thyrses, corolla $\frac{1}{2}$ in., calyx-segments in fruit lanceolate erect 1-3-ribbed. *Brand. For. Fl.* 370. *Volkameria odorata*, *Roxb. Hort. Beng.* 46. *Clerodendron odoratum*, *Don Prodr.* 102; *Wall. Cat.* 1812.—*Volkameria* sp., *Griff. Itin. Notes*, 128, n. 504.

SUBTROPICAL HIMALAYA, alt. 0-4500 ft., from the Punjab to Bhotan; frequent.

A spreading shrub, 4-12 ft.; shoots ashy-pubescent or subtomentose. *Leaves* 4 by $1\frac{1}{2}$ in., base cuneate, toothed or nearly entire, ashy-pubescent or puberulous; petiole $\frac{1}{4}$ in. *Cymes* mostly in terminal thyrses 3-5 by 1 in., ashy-pubescent, glandular. *Calyx* $\frac{1}{12}$ in., in fruit $\frac{1}{2}$ in. *Corolla-tube* $\frac{1}{2}$ in., pubescent, glandular; middle lobe of lower lip nearly $\frac{1}{2}$ in. blue, 4 other lobes about $\frac{1}{4}$ in., white. *Capsule* $\frac{1}{8}$ - $\frac{1}{2}$ in. diam., globose, closely pubescent.

2. **C. grata**, *Benth. in Gen. Pl.* ii. 1158; leaves elliptic acuminate pubescent, cymes mostly axillary small corymbose, corolla $\frac{1}{2}$ in., calyx-segments in fruit subpatent triangular. *Clerodendron gratum*, *Wall. Cat.* 1813; *Schauer in DC. Prodr.* xi. 674, not of Kurz. *C. foetidum*, *Don Prodr.* 103; *Schauer l. c.* 672, not of Bunge. *Vitex sex-dentata*, *Wall. Cat.* 1759; *Schauer l. c.* 696.

KUMAON; below Nynee Tal, alt. 4000 ft., *Thomson, Strachey & Winterbottom.* NEPAL; *Wallich*.

A rambling shrub; branches pubescent or tomentose. *Leaves* $4\frac{1}{2}$ by $1\frac{1}{2}$ in. (mostly smaller), base rhomboid or almost rounded, toothed or subentire, mature softly pubescent or almost villous beneath; petiole $\frac{1}{2}$ in. *Cymes* $\frac{1}{4}$ - $\frac{3}{4}$ in., densely pubescent, 3-8-fid., dichotomous, without a common rachis. *Calyx* $\frac{1}{10}$ in., densely pubescent, in fruit $\frac{1}{2}$ - $\frac{1}{2}$ in., membranous, not ribbed. *Corolla* pubescent, glandular. *Capsule* $\frac{1}{2}$ in. diam., globose, nearly glabrous, somewhat ribbed.

3. **C. paniculata**, *Clarke*; leaves elliptic acuminate mature glabrate, panicles axillary small dense many-fl., corolla $\frac{1}{2}$ in., calyx-segments in fruit small lanceolate. *Clerodendron gratum*, *Kurz For. Fl.* ii. 268, not of Wall. —*Callicarpa* n. 9, *Herb. Ind. Or. H. f. & T.*

SUBTROPICAL HIMALAYA, alt. 1-4000 ft., frequent; from E. Nepal, *J. D. H.*, to Mishmee, *Griffith* (Kew Distrib. n. 6044).—DISTRIB. Ava.

A spreading shrub; branches terete, slender, pubescent. *Leaves* mostly obtuse or rounded at the base. *Panicles* axillary, subsessile, $\frac{1}{2}$ -2 $\frac{1}{2}$ in., distinctly paniced, rachis

distinct, often 20–60-fld., pubescent or glabrate. *Corolla* pubescent, deep red. *Drupe* pubescent; calyx hardly accrescent.—Otherwise much resembling *C. grata*: the whole panicle usually is red; but in *C. grata* it is often more or less red.

XVII. GLOSSOCARYA, Wall.

Grey-tomentose, scandent shrubs. *Leaves* opposite, ovate, shortly petioled, entire. *Cymes* many-fld., in a dense terminal corymbose panicle; flowers sessile; bracts small. *Calyx* campanulate, 5-toothed, hardly accrescent. *Corolla-tube* narrow-cylindric; limb 2-lipped, 5-lobed. *Stamens* 4, didynamous; anthers long-exserted, ovate; cells parallel. *Ovary* imperfectly 4-celled, 4-ovuled; style filiform, 2-fid. *Capsule* oblong, somewhat widened upwards, exserted, 4-valved; valves narrowly obovoid, substipitate, margins inflexed holding the seed, one produced downwards as a 1-sided wing. *Seeds* narrowly oblong, erect.—Species 3, an Australian and the following.

1. **G. Linnæi**, *Benth. in Gen. Pl.* ii. 1158; leaves ovate or obovate subcordate mature glabrescent, capsule grey strigose. *Clerodendron* Linnæi, *Thuwaites Enum.* 243.

CEYLON, in hot dry places; *Walker, Thuwaites*.

Scandent; branches pubescent. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., apiculate; petiole $\frac{1}{2}$ in. *Corymbs* 3 in. diam., grey-tomentose; bracts $\frac{1}{2}$ in., elliptic, or some of the lower foliaceous. *Calyx* $\frac{1}{2}$ in., or in fruit $\frac{5}{8}$ in., limb shallowly roundly lobed. *Corolla* strigose, white; tube $\frac{1}{2}$ in., slender; lobes $\frac{1}{2}$ – $\frac{1}{4}$ in. *Filaments* exserted 1 in. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{2}$ in.

2. **G. mollis**, *Wall. Cat.* 1741; leaves ovate mature softly pubescent beneath, capsule patently grey-hairy. *Griff. in Calc. Journ. Nat. Hist.* iii. 366; *Schauer in DC. Prodr.* xi. 626; *Kurz For. Fl.* ii. 257.

MOULMEIN; *Griffith* (Kew Distrib. n. 6017), *Lobb*.

Closely resembling *G. Linnæi*, but generally more hairy; branchlets and panicles densely softly grey-villous. *Capsule* rather longer, $\frac{1}{2}$ in.

XVIII. HYMENOPYRAMIS, Wall.

A large, rambling shrub; branches grey-tomentose. *Leaves* opposite, ovate, entire. *Cymes* lax, in large, pyramidal, axillary or terminal panicles; flowers very small; bracts minute. *Calyx* minute, 4-fid; greatly accrescent in fruit, membranous, 4-winged, utricular. *Corolla-tube* cylindric; limb oblique, 4-fid. *Stamens* 4; anthers exserted, ovate; cells parallel. *Ovary* 2-celled, 4-ovuled; style filiform, shortly 2-fid. *Capsule* small, obovoid, included, 4-valvular; valves obovoid-oblong, margins inflexed holding the seed. *Seeds* pendulous, subtriquetous.

H. brachiata, *Wall. Cat.* 774; *Griff. in Calc. Journ. Nat. Hist.* iii. 365; *Schauer in DC. Prodr.* xi. 626; *Bocq. Rev. Verben.* 113, t. 11, fig. 1–10; *Kurz For. Fl.* ii. 258.

PEGU; *Wallich*.—DISTRIB. Ava.—In N. and Central India cultivated.

Leaves $3\frac{1}{2}$ by $\frac{1}{2}$ in., acuminate, base obtuse or rhomboid, mature glabrate above, grey-tomentose or pubescent beneath; petiole $\frac{1}{2}$ in. *Panicles* 12 by 8 in., leafy below, grey-tomentose. *Calyx* $\frac{1}{4}$ in. *Corolla* $\frac{1}{2}$ in., pubescent, white. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in., fulvous-hirsute; utricle $\frac{1}{2}$ – $\frac{3}{4}$ in., ovoid, acutely 4-winged, mouth minute.

XIX. **PERONEMA**, *Jack.*

A lofty tree; branchlets grey-tomentose. *Leaves* opposite, unequally pinnate; leaflets several pair, entire. *Panicles* in the upper axils large, compound; bracts small; flowers very small. *Calyx* shortly 5-fid, not accrescent. *Corolla-tube* cylindric; limb 2-lipped, 5-lobed. *Stamens* 2; anthers subexserted, ovate; cells parallel, subseparate. *Ovary* 4-celled, 4-ovuled; style filiform, subentire. *Capsule* small, globose, longer than the calyx, 4-valved; valves quarter-spheres, margins inflexed holding the seeds. *Seeds* pendulous.

P. canescens, *Jack in Mal. Misc.* 2, vii. 46, and in *Hook. Comp. Bot. Mag.* i. 152; *Wall. Cat.* 9057; *Schauer in DC. Prodr.* xi. 627; *Wight Ic.* t. 1460; *Griff. Notul.* iv. 177. C. heterophyllum, *Miq. Fl. Ind. Bat. Suppl.* 570.

MALACCA; *Griffith* (Kew Distrib. n. 6015).—DISTRIB. Sumatra, Java, Borneo.

Leaves 1-2 ft., grey-tomentose or pubescent beneath; rachis winged, leaflets 9 by 2 in., sessile, acute; petiole 2-7 in. *Panicles* 1 foot, corymbose, pubescent. *Calyx* $\frac{1}{2}$ in., deeply toothed. *Corolla* $\frac{1}{8}$ - $\frac{1}{6}$ in., pubescent. *Capsule* $\frac{1}{10}$ in., hirsute.

XX. **SYMPHOREMA**, *Roxb.*

Scandent shrubs. *Leaves* opposite, entire or toothed. *Cymes* peduncled, capitate, 7-fld.; involucre of 6 oblong bracts, accrescent in fruit. *Calyx* obovoid, short 4-8-toothed, somewhat accrescent. *Corolla* small, white; tube cylindric; lobes 6-16, subequal, narrowly oblong. *Stamens* as many as the corolla-lobes; anthers exserted, ovate; cells parallel. *Ovary* 2- (imperfectly 4-) celled, 4-ovuled; style filiform, shortly bifid. *Fruit* nearly dry, included in the calyx, 1-seeded. *Seed* erect, cotyledons fleshy.—Species 3, a Philippine Island one and the following.

1. **S. involucratum**, *Roxb. Cor. Pl.* ii. 46, t. 186, and *Fl. Ind.* ii. 262; leaves ovate or elliptic pubescent or villous, corolla $\frac{1}{4}$ in. 6-8-lobed, involucre in fruit reticulate membranous. *Wight Ic.* t. 362; *Dalz. & Gibs. Bomb. Fl.* 199, not of *Wall. nor of Schauer*. *Congea paniculata*, *Wall. Cat.* 1739, partly.

W. DECCAN PENINSULA from the Concan southwards, frequent, and in CEYLON. BEHAR; Monghyr Hills, *Hamilton*.

Innovations stellately tomentose. *Leaves* $2\frac{1}{2}$ by $1\frac{1}{2}$ in., subacute, usually toothed, ultimately nearly glabrous above; petiole $\frac{1}{2}$ in. *Peduncles* 1 in.; bracts in flower $\frac{1}{4}$ in., pubescent or villous; in fruit $1\frac{1}{4}$ by $\frac{1}{2}$ in., spatulate-elliptic, thinly pubescent. *Calyx* $\frac{1}{2}$ in., stellately tomentose; in fruit $\frac{1}{4}$ in., or more, narrower upwards. *Fruit* $\frac{1}{2}$ in., subglobose, nearly glabrous.—The leaves on the main branches are often large; the flowering branches often produce only small leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. The picture of Roxburgh shows the corolla decidedly too large, which misled Wallich, whom Schauer followed. Kurz (*For. Fl.* ii. 254) says this species is "common all over Ava, Martaban and Pegu," where no one else has found it: it might be suspected that Kurz had mistaken for it some *Sphenodesma*, but he describes the corolla as having 6-8 linear-lanceolate acute lobes, and the leaves as coarsely toothed.

2. **S. polyandrum**, *Wight Ic.* t. 363, and *Ill.* t. 173 bis, fig. 7; leaves ovate villous, corolla $\frac{1}{2}$ in. 14-18-lobed, involucre in fruit tomentose. C. involucratum, *Wall. Cat.* 1740; *Schauer in DC. Prodr.* xi. 621, not of *Roxb.* S. involucratum, *Kew Distrib.* n. 6007.

S. DECCAN PENINSULA in the hills; *Wight, Beddome, &c.*, extending north to Belgaum.

Similar to *S. involucreatum*, but larger in all its parts and more hairy. *Leaves* 4 by $2\frac{3}{4}$ in., some on the main stem 8-9 by 4 in., stellately villous beneath. *Calyx* $\frac{1}{4}$ in. and upwards in flower. *Bracts* in fruit $1\frac{1}{2}$ by $\frac{3}{4}$ in., obscurely membranous.

XXI. SPHENODESMA, Jack.

Scandent, mostly large, shrubs. *Leaves* opposite, entire, shortly petioled. *Cymes* capitate, 3- or 7-fl., with an involucre of 6 oblong or obovate bracts; paniced, i. e. the leaves at the base of the peduncles to the cymes more or less bract-like, mostly deciduous. *Calyx* funnel-shaped, 5- (rarely 4-6-) toothed, sometimes enlarged or inflated in fruit. *Corolla-tube* short, cylindric; lobes 5, rarely 6, ovate oblong or narrowly lanceolate. *Stamens* 5, included, rarely subexserted; anthers ovate. *Ovary* imperfectly 2-celled, 4-ovuled; ovules pendulous from the apex of the placentiferous axis; style filiform, shortly bifid, or (in subgenus *Brachynema*) very short or obsolete, stigma obscurely 2-lobed. *Drupe* globose or obovoid, small, included or subincluded in the calyx; 1- (or rarely 2-) seeded in the few (mostly imperfectly ripe) examples seen.—Species 9, some Bornean and those here described.

The cyme in this genus is dichotomous with a single flower in the fork; the two lateral branches are again dichotomous with a single flower in the fork; the cyme is thus 7-fl.; or, in 1 or 2 species, 3-fl. by the lateral flowers of the 2 cyme-branches being undeveloped. The flower in the principal fork is necessarily the oldest, and bracteate: hence the bracts are always 6.

Sect. 1. **Brachynema**, Griff. (Genus). *Corolla-lobes* oblong, or narrowly lanceolate. *Anthers* included. *Style* obsolete or minute.

1. **S. microstylis**, Clarke; leaves ovate mature softly pubescent or villous beneath, corolla-lobes 5-6 narrowly lanceolate. *Brachynema ferruginea*, Griff. *Nutl.* iv. 176. *Symphorema microstylis*, *Bedd. ms.*

MERGUI and MOULMEIN, Griffith (Kew Distrib. n. 6007, partly). ΤΑΥΟΥ; Parish.—DISTRIB. Siam.

A shrub, 6-8 ft. (Parish); shoots and inflorescence rusty stellate-villous or submentose. *Leaves* $5\frac{1}{2}$ by $3\frac{1}{2}$ in., subacute, base obtuse, entire, mature pubescent above at least on the nerves; petiole $\frac{1}{2}$ in. *Peduncles* $1\frac{1}{2}$ in.; heads 7-fl., rusty villous; bracts (at flower-time) $\frac{3}{4}$ by $\frac{1}{2}$ in., spatulate-elliptic, obtuse. *Calyx* in flower $\frac{1}{2}$ in. or more; teeth ovate. *Corolla-tube* $\frac{1}{2}$ in., narrowly funnel-shaped, densely hairy to the base within; lobes $\frac{1}{2}$ - $\frac{1}{3}$ by $\frac{1}{16}$ in., puberulous, submentose. *Anthers* ovate, low in the corolla-tube. *Ovary* 4-ovuled; style minute. *Drupe* not seen.—Wight, Parish and Beddome have all referred this to *Symphorema* from the narrow corolla-lobes, but the short filaments will not suit. Supposing the state of the style to be due to dimorphism, the species is distinct and possibly indicates a new genus. It cannot be Kurz's *Symphorema involucreatum*, which Kurz says has coarsely toothed leaves.

2. **S. paniculata**, Clarke; leaves ovate or elliptic mature pubescent beneath, corolla-lobes 5-6 oblong obtuse or narrowly obovoid. *Congea paniculata*, Wall. *Cat.* 1739.

DECCAN PENINSULA; Kurg, Rottler; Cochin, Johnstone.

A scandent shrub; shoots and inflorescence rusty stellately villous. *Leaves* $3\frac{1}{2}$ by $1\frac{3}{4}$ - $2\frac{1}{2}$ in., subacute; petiole $\frac{1}{4}$ in. *Peduncles* $\frac{1}{2}$ -1 in., appearing paniced, the half-bractlike leaves at their base often deciduous; bracts $\frac{3}{4}$ by $\frac{1}{2}$ in., narrowly obovoid. *Calyx* $\frac{1}{2}$ in.; lobes ovate. *Corolla-tube* $\frac{1}{2}$ in., densely hairy to the base within; lobes $\frac{1}{2}$ by $\frac{1}{16}$ in., puberulous, submentose. *Anthers* ovate, low in the corolla-tube. *Ovary* 4-ovuled; style 0. *Drupe* not seen.—Very near *S. microstylis* except as to the obtuse corolla-lobes.

3. **S. unguiculata**, Schauer in DC. Prodr. xi. 623; leaves elliptic acuminate young stellately fulvous-hairy mature glabrate, corolla-lobes 5-6 oblong or narrowly obovoid. *Congea unguiculata* & ferruginea, Wall. Cat. 1736, 1737. *Vitex involucratus*, Presl Bot. Bemerk. 148. *Symphorema unguiculatum*, Kurz For. Fl. ii. 255.—*Congea* sp., Griff. Notul. iv. 91, n. 1353.

KHASIA Mts., alt. 2-3000 ft.; Wallich, H. f. & T., &c. CACHAR; Keenan. CHITTAGONG; Wallich. MOULMEIN and TENASSERIM; Griffith & Helfer (Kew Distrib. n. 6010), &c. S. ANDAMAN; Kurz.

A large, climbing shrub. Leaves 6 by 2½ in., base obtuse or rounded, scattered stellate hairs deciduous; petiole ½ in. Bracts 1½ by ½ in., spatulate-elliptic, obtuse, membranous, whitened, ultimately nearly glabrate. Calyx less than ½ in., obconic, stellately fulvous-tomentose; teeth triangular, rather rigid. Corolla pale yellow; tube hardly so long as the calyx, lobes ½-⅓ in., obtuse. Stigma sessile, bifid. Drupe (young) obovoid, glabrous, glandular at the apex.—This has larger leaves and bracts, shorter calyx and corolla, than *S. astylis*.

Sect. 2. **Eusphenodesma**. Corolla-lobes ovate or oblong. Anthers subexserted. Style filiform.

* Bracts of the involucre small, shorter than the calyx.

4. **S. eryciboides**, Kurz in Flora 1871, 345; leaves elliptic mature pubescent or grey-tomentose beneath, flower-heads nearly sessile fulvous-tomentose, corolla white. *S. grossum*, Kurz For. Fl. ii. 254. *Sphenodesma*? Wall. Cat. 9076.

PEGU and TENASSERIM, frequent; Wallich, Helfer (Kew Distrib. n. 6011).

A large, scandent shrub, or a small tree (Parish); shoots tomentose. Leaves 4½ by 2½ in., subacute, base rhomboid, glabrate above; petiole ½ in. Heads 7-fld., hardly ½ in. diam.; bracts ½ in., round-elliptic; peduncles numerous, 0-⅓ in., bracts at their base caducous; the inflorescence thus appearing a compound spike thyrse, or panicle. Calyx ½ in., broadly funnel-shaped, fulvous-tomentose, densely white-silky within, globular and inflated in fruit; teeth triangular. Corolla ¼ in.; lobes 5-6, narrowly obovoid, puberulous.

** Bracts of the involucre mostly longer than the calyx.

5. **S. triflora**, Wight Ic. t. 1478; leaves lanceolate grey-puberulous, panicles compound, heads short-peduncled 3-fld. Griff. Notul. iv. 182. *Congea Jackiana*, Wall. Cat. 1735, partly.

PENANG; Wallich. MALACCA; Griffith (Kew Distrib. n. 6009, partly), Maingay (Kew Distrib. n. 1196).

Branchlets grey-puberulous. Leaves 5 by 1½ in., cuneate at both ends; petiole ½ in. Panicles 9 in. diam., ashy-pubescent; leaves ¼-½ in., half-bractlike; peduncles to the heads ¼-½ in.; bracts, usually 6 to each head, exceedingly variable in size on the same panicle; many small, lanceolate, hardly exceeding the calyx, others 1 by ½ in., spatulate-elliptic, obtuse, membranous, reticulate, cinereous-puberulous. Calyx ¼-½ in., ribbed, teeth triangular. Corolla ¼ in., throat hairy, lobes ovate. Style linear, subincluded. Drupe (imperfectly ripe) ½ in., narrowly obovoid, glabrous, 1-seeded; calyx not inflated.—A plant collected by Beccari in Borneo is perhaps not specifically separable, but has the heads shortly fulvous-villous.

6. **S. barbata**, Schauer in DC. Prodr. 623; branchlets and inflorescence patently rufous-hirsute, leaves elliptic acute hairy, heads 7-fld. closely capitate. *S. ferrugineum*, Wight Ic. t. 1474. *Congea barbata*, Wall. Cat. 1738. ? *Viticastrum racemosum*, Presl Bot. Bemerk. 148; Walp. Rep. vi. 691 (ex Schauer).

PENANG; *Wallich*. MALACCA; *Griffith* (Kew Distrib. n. 6009, partly), *Maingay* (Kew Distrib. n. 1194).

Leaves 3 by $1\frac{1}{4}$ in., subacute at both ends, above thinly, beneath more thickly, rufous- or fulvous-hairy; petiole $\frac{1}{2}$ – $\frac{1}{3}$ in. *Peduncles* $\frac{1}{2}$ – $1\frac{1}{2}$ in., axillary and running into terminal panicles; bracts 1 by $\frac{1}{2}$ in., spatulate-elliptic, obtuse, thinly rufous-pubescent. *Calyx* scarcely $\frac{1}{2}$ in., densely rufous-hirsute. *Corolla* $\frac{1}{2}$ in., blue. *Drupe* not seen.—*Schauer* l. c. doubtfully reduces here *Viticastrum racemosum*, Presl Bot. Bemerk. 148; but the description does not fit in several points; inter alia in the 5-celled ovary.

7. **S. Griffithiana**, *Wight Ic. t. 1477, text*; leaves ovate or lanceolate mature nearly glabrate, heads 7-fl., bracts oblong, fruit-calyx patently hairy teeth closely incurved with a narrow horn-like tooth recurved from each sinus. *S. Jackianum*, *Wight Ic. t. 1477, not of Schauer*. *Decadontia cœrulescens*, *Griff. Notul. iv. 175*. *Symphorema pentandrum*, *Kurz For. Fl. ii. 255, not Sphenodesma pentandra, Jack, nor Congea pentandra, Roxb.*

MERGUI; *Griffith*. TAVOY; *Helper* (Kew Distrib. n. 6008).

A large, scandent shrub. *Leaves* $3\frac{1}{2}$ by 1 in., oblong acuminate, or 3 by 2 in. ovate, acute, base rounded or obtuse; petiole $\frac{1}{4}$ in. *Panicles* terminal, 12–18 in. diam., leafless (i. e. main bracts caducous), minutely hairy, rufous-villous in the axils; peduncles $\frac{1}{4}$ –1 in., slender, fulvous-pubescent; bracts 1 by $\frac{1}{2}$ in., spatulate-oblong, obtuse, membranous, nearly glabrous; flowers sessile. *Calyx* $\frac{1}{8}$ in.; in fruit $\frac{1}{2}$ in., slightly inflated, obconic. *Corolla* $\frac{1}{2}$ in., purple; lobes ovate; throat hairy. *Drupe* not seen.

8. **P. pentandra**, *Jack in Mal. Misc. i. 19*, and in *Hook. Bot. Misc. i. 285*; leaves oblong or ovate acuminate mature nearly glabrous, calyx nearly glabrous funnel-shaped shortly 5-toothed in fruit mouth inflated with 5 accessory teeth. *Wight Ic. t. 1475*; *Griff. Notul. iv. 181*. *S. Wallichiana* & *Jackiana*, *Schauer in DC. Prodr. xi. 622*. *S. acuminata*, *Wight Ic. t. 1476*. *Roscoea pentandra*, *Roxb. Fl. Ind. iii. 54*. *Congea pentandra* & *Jackiana*, *Wall. Cat. 1734, 1735*. *C. azurea*, *Wall. Cat. 1733, partly*. *Symphorema Jackianum*, *Kurz For. Fl. ii. 256*.

From ASSAM and the KHASIA MTS. to MALACCA; frequent.

A scandent shrub. *Leaves* 4 by $1\frac{1}{4}$ – $1\frac{3}{4}$ in., base rounded or obtuse, maturely thinly hairy about the midrib beneath; petiole $\frac{1}{4}$ in. *Panicles* 6–15 in., often very dense with heads, sparingly pubescent; bracts 1 by $\frac{1}{2}$ in., broad-oblong, obtuse, membranous, glabrescent. *Calyx* $\frac{1}{2}$ – $\frac{1}{3}$ in., in fruit sometimes $\frac{1}{2}$ in., glabrous within; teeth usually more prominent, sometimes triangular, acuminate in fruit; accessory teeth only developed after flower. *Corolla* $\frac{1}{4}$ – $\frac{1}{2}$ in., glabrate without, densely hairy within, purple. *Ovary* fulvous-hirsute; style filiform, shortly bifid. *Drupe* size of a pea (*Roxburgh*), hairy, half hid in the calyx.—In unexpanded flowers the calyx-limb appears obtusely 5-toothed; after flowering the teeth are sometimes triangular abbreviated, sometimes lanceolate-subulate, and 5 linear teeth are developed in the sinuses. *Wallich* declares (in *Hook. Bot. Misc. i. 286*) that *Jack* mistook his Malacca plant for *Roxburgh's* Silhet one, and accordingly *Wight* and *Schauer* call the Malayan plant *S. Jackiana* or *acuminata*; but the calyx-teeth are so little longer, and other points so exactly accord, that the species have been united.

XXII. CONGEA, *Roxb.*

Large climbing shrubs. *Leaves* opposite, entire. *Cymes* peduncled, capitate, 3–9-fl., in large terminal panicles; bracts at the base of the peduncles leaf-like, often white or coloured; involucre to the cymes of 3 or 4 elliptic or oblong bracts, connate at the base. *Calyx* funnel-shaped, 5-toothed, slightly accrescent. *Corolla-tube* slender, rarely much longer

than the calyx, glabrate without; throat usually hairy; limb 2-lipped, upper lip erect-patent of 2 linear-oblong lobes, lower pendent of 3 much shorter obovate lobes. *Stamens* 4; anthers exerted, ovate; cells parallel. *Ovary* imperfectly 2-celled, 4-ovuled; ovules pendulous from the apex of the axis; style filiform, shortly bifid. *Drupe* small, obovoid, nearly dry; in the few examples seen 4-seeded, 4-partite.—Species 4, Malayan.

1. **C. vestita**, *Griff. Notul.* iv. 174, and *Ic. Pl. Asiat.* t. 458, fig. 21; branches patently fulvous-hirsute, leaves ovate villous beneath, involucrel bracts broadly elliptic white-tomentose beneath, calyx white-hirsute teeth ovate-lanceolate.

TENASSERIM; *Helper* (Kew Distrib. n. 6014); Mergui, and Donat Range, alt. 1500 ft., *Griffith*.

A large climber. *Leaves* 6 by 3 in., acute, base obtuse or shortly cordate, mature scabrous-pubescent above, villous and tomentose beneath; petiole $\frac{1}{4}$ in. *Panicles* very large, bracts like small whitened leaves; involucrel bracts 1 by $\frac{3}{4}$ in., not attenuate at the base. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in., funnel-shaped, lobed $\frac{1}{2}$ the way down. *Corolla* glabrous without, tube shorter than the calyx; limb 2-lipped, rose, somewhat brown-striated, especially the upper lip (Griffith). *Ovary* glabrous, glandular upwards. *Drupe* nearly dry, obovoid, 4-partite.

2. **C. velutina**, *Wight Ic.* t. 1479, 3 or 1566; leaves ovate acuminate mature glabrous, involucrel bracts spatulate-oblong distinctly nervose, calyx densely shortly hirsute teeth triangular.

TENASSERIM; at Mergui, *Griffith* (Herb. Propr. n. 838). TAVOY; *Helper* (Kew Distrib. n. 6012).

A large climber; branches closely pubescent. *Leaves* 5 by 2 $\frac{1}{2}$ in., base obtuse or rounded, young thinly sparsely pubescent; petiole $\frac{1}{2}$ in. *Panicle* large, more lax than in *C. vestita*, closely pubescent, nodes villous; bracts 1 $\frac{1}{4}$ by $\frac{1}{3}$ in., obtuse, base attenuate, tomentose beneath. *Calyx* $\frac{1}{6}$ in., lobed scarcely $\frac{1}{4}$ the way down. *Corolla* small, tube shorter than the calyx; limb white, somewhat brown, streaked near the base of the lobes (Griffith). *Drupe* not seen.

3. **C. villosa**, *Wight Ic.* t. 1479, 1, fig. B; leaves ovate or oblong mature villous beneath, involucrel bracts spatulate-oblong, calyx tomentose teeth shortly triangular. *Roscoe villosa*, *Roxb. Hort. Beng.* 95, and *Fl. Ind.* iii. 56, and *Ic. Ined.* at Kew.

PEGU; Rangoon (Roxburgh). MERGUI; *Griffith* (Kew Distrib. n. 6012, partly).

A large climber, resembling *C. velutina*, but the leaves very villous beneath. *Leaves* in Roxburgh's drawing ovate, in Griffith's example oblong; glabrate above except the midrib. *Panicle* large, very lax; bracts uniformly 4 in Griffith's example, 3 (one of which is often bifid) in Roxburgh's picture; resembling in form the bracts of *C. velutina*.

4. **C. tomentosa**, *Roxb. Cor. Pl.* iii. 90, t. 293; branchlets tomentose, leaves ovate acute softly hairy beneath, involucrel bracts elliptic, calyx shaggy toothed $\frac{1}{2}$ the way down. *Wight Ic.* t. 1479, 2 or 1565; *Schauer in DC. Prodr.* xi. 623; *Kurz For. Fl.* ii. 256. *Roscoe tomentosa*, *Roxb. Hort. Beng.* 95, and *Fl. Ind.* iii. 57. *Calochlamys capitata*, *Presl Bot. Bemerk.* 149.

CHITTAGONG; Roxburgh. BURMA; *Griffith* (Kew Distrib. n. 6013).—DISTRIB. Siam.

A large climber. *Leaves* 3 by 2 $\frac{1}{4}$ in., base rounded or shortly cordate, minutely setulose above, closely villous beneath. *Bracts* 1 by $\frac{1}{2}$ in., not attenuated at base, tomentose, white or lilac-blue. *Corolla* white.

VAR. *azurea*; leaves elliptic acute more thinly hairy beneath, bracts oblong or narrowly oblong, calyx larger lobed half-way down teeth broadly lanceolate. *C. azurea*, *Wall. Cat.* 1733; *Wight Ic.* t. 1479, 1, fig. A. *C. tomentosa* var. oblongifolia, *Schauer l. c.* 624, excl. syn. *Roxb.*—Pegu and Tenasserim, frequent; *Wallich M. Lelland*, &c. Cultivated in N. India.

XXIII. **AVICENNIA**, Linn.

Shrubs or small trees. *Leaves* opposite, entire coriaceous. *Cymes* contracted, or densely capitate heads peduncled, in the penultimate axils or in a trichotomous corymb; bracts and bracteoles small. *Calyx* 5-partite, unaltered in fruit; segments ovate, concave, deeply imbricate. *Corolla-tube* short-cylindric, limb spreading 5-4-lobed. *Stamens* 4, on the corolla-throat; anthers shortly exerted, ovate; cells parallel. *Ovary* imperfectly 4-celled by a 4-winged central column, 4-ovuled; ovules pendulous between the wings of the central column; style long or short, tip bifid. *Capsule* broad, compressed, dehiscing by 2 thick valves, 1-seeded. *Seed* erect; embryo imperfectly clothed by its two integuments; cotyledons large, plaited lengthwise; radicle inferior, villous.

A. officinalis, Linn.; *Schauer in DC. Prodr.* xi. 700; leaves obovate or elliptic obtuse whitened beneath, corolla-limb glabrate yellow, style short. *Bedd. For. Man.* 174, and *Anal. Pl.* xx. fig. 2; *Brand. For. Fl.* 371; *Boiss. Fl. Orient.* iv. 536. *A. resinifera*, *Forst.*; *Decne. in Nouv. Ann. Mus.* iii. 402. *A. tomentosa*, *Jacq.*; *Br. Prodr.* 518; *Roxb. Fl. Ind.* iii. 88; *Wall. Pl. As. Rar.* iii. 44, t. 271; *Wight Ic.* t. 1481; *Griff. Notul.* iv. 185; *Kurz For. Fl.* ii. 276. *Halodendron Thouarsii*, *Roem. & Sch. Syst.* iii. 485.—*Rumph. Herb. Amb.* iii. t. 76. *Rheede Hort. Mal.* iv. t. 45.

Mangrove swamps of the DECCAN PENINSULA and CEYLON, common; less frequent in the Malay Peninsula.—**DISTRIB.** Malaya, Shores of the Indian and Pacific Ocean.

A shrub, or tree, 25 ft. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., base tapering, beneath with hard tomentum or glabrate; petiole $\frac{1}{2}$ in. *Bract* $\frac{1}{12}$ in., ovate; bracteoles similar, rather smaller. *Calyx* $\frac{1}{4}$ in., minutely pubescent. *Corolla* $\frac{1}{4}$ in.; lobes 4, ovate, acute, or one lobe shortly bifid, or lobes 5 subequal (not rarely all forms on one bush). *Style* distinct, sometimes nearly as long as the hairy ovary. *Fruit* 1 in.

VAR. *alba*, Blume Bijl. 821 (sp.); leaves lanceolate acute, style short or hardly any. *Decne. l. c.*; *Wight Ic.* t. 1482. *A. resinifera*, *Griff. Notul.* iv. 186, and in *Trans. Linn. Soc.* xx. 6, fig. 1. *A. intermedia*, *Griff. l. c.* *A. officinalis*, *Kurz For. Fl.* ii. 275.—Malay Peninsula; common. **Distrib.** Malaya, S.E. Asia, N. Australia.—Mr. Bentham considers the American and African *A. tomentosa* not specifically separable.

ORDER CXII. **LABIATÆ**. (By J. D. Hooker.)

Herbs, rarely shrubs, usually loaded with oil-glands. *Stem* usually 4-gonous. *Leaves* opposite or whorled, stipules 0. *Flowers* irregular, solitary 2-nate or fascicled and axillary, or in centrifugal spicate cymes which by their union in pairs form false whorls. *Calyx* persistent, subregular, 4-5-cleft or 2-lipped. *Corolla* monopetalous, hypogynous; limb 4-5-lobed or 2-lipped, lobes imbricate in bud. *Stamens* inserted in the corolla-tube, 4 didynamous, or the 2 upper imperfect. *Anther-cells* connate or separate or confluent. *Disc* prominent. *Ovary* free, 2 of 2-celled carpels; style simple, inserted between the lobes, stigma usually 2-fid; ovules one in each cell, erect, anatropous. *Fruit* of 4 dry or rarely fleshy 1-seeded lobes (nutlets) at the base of the calyx. *Seeds* small, erect, albumen sparing

or 0, radicle inferior.—Species about 2600, chiefly of north temperate regions.

Tribe 1. **Ocimoideæ**. Perfect *stamens* 4, rarely 2, declinate; anther-cells confluent. *Ovary* 4-partite. *Nutlets* dry, basal scar small.

Subtribe 1. **Euocimeæ**. Upper *calyx-lobe* usually broadest. *Corolla* with 4 of the lobes equal or the 2 upper connate, the lower (lip) dissimilar. *Stamens* usually exserted.

* *Lower lip of corolla flat or nearly so.*

- | | |
|---|------------------|
| Fruiting calyx deflexed, upper tooth very large, decurrent, stigma 2-fid | 1. OCIMUM. |
| Fruiting calyx suberect or declinate, tube deeply pitted | 2. GENIOSPOREUM. |
| Fruiting calyx declinate, 2-lipped, upper filaments toothed | 3. MESOMA. |
| Fruiting calyx declinate, 2-lipped; filaments simple, included | 4. PLATYSTOMA. |
| Fruiting calyx suberect, 4 lower teeth cuneate; filaments simple, included | 5. ACROCEPHALUS. |
| Fruiting calyx usually declinate, equally 5-toothed, or upper tooth broader; filaments included | 6. MOSCHOSMA. |
| Fruiting calyx deflexed; corolla-tube often long; stigma entire | 7. ORTHOSIPHON. |

** *Lower lip of corolla concave or boat-shaped.*

- | | |
|---|------------------|
| Calyx equally 5-toothed or 2-lipped; filaments free | 8. PLECTRANTHUS. |
| Stamens 4; filaments connate below | 9. COLEUS. |
| Calyx-mouth oblique, upper lip usually decurved; filaments free | 10. ANISOCHILUS. |
| Corolla-lip deflexed, contracted at the base | 10*. HYPTIS. |

Subtribe 2. **Lavanduleæ**. *Corolla* 2-lipped; upper lip 2-fid, lower 3-fid. *Stamens* included. *Nutlets* with an oblique basal scar.

11. LAVANDULA.

Tribe 2. **Satureiineæ**. Perfect *stamens* 4 with the upper pair longest, or 2, straight diverging or ascending; anthers (1- or) 2-celled, cells short. *Corolla-lobes* flat.

Subtribe 1. **Pogostemoneæ**. *Stamens* 4; filaments straight; anthers 1-celled.

- | | |
|---|------------------|
| Calyx 5-toothed; corolla 4-fid, lip spreading | 12. POGOSTEMON. |
| Calyx 5-toothed; corolla subequally 4-fid; stamens exserted | 13. DYSOPHYLLA. |
| Calyx 5-partite, segments plumose; stamens included | 14. COLEBROOKIA. |

Subtribe 2. **Menthoidæ**. *Stamens* 4 or 2, distant, erect or spreading; anthers 2-celled (at least when young).

* *Whorls many-fl., spiked or racemed, not axillary.*

- | | |
|---|-----------------|
| Fruiting calyx erect, elongate; stamens 4 | 15. ELSHOLTZIA. |
| Fruiting calyx declinate, 2-lipped; stamens 4 | 16. PERILLA. |
| Stamens 2 | 17. MOSLA. |

** *Whorls many-fl., axillary, rarely spicate; calyx 10-13-nerved.*

- | | |
|---|--------------|
| Calyx 10-nerved; stamens 4, anther-cells parallel | 18. MENTHA. |
| Calyx 4-5-toothed stamens 2; nutlets truncate | 19. LYCOPUS. |

*** *Whorls many-fld., capitate, involucrate.* Stamens 4.
20. ORIGANUM.

**** *Whorls few-fld.* Stamens 4. 21. THYMUS.

***** *Whorls axillary secund.* Calyx 15-nerved.
22. HYSSOPUS.

Subtribe 3. MELISSEÆ. Calyx 13-nerved. Corolla 2-lipped. Stamens 2 or 4, ascending.

Calyx 5-toothed 23. MICROMERIA.
Calyx 2-lipped; corolla-tube nearly straight 24. CALAMINTHA.
Calyx 2-lipped; corolla-tube recurved 25. MELISSA.

Tribe 3. **Monardeæ.** Perfect *stamens* 2, ascending, parallel; anther-cells linear, solitary or separated by a filiform connective.

Anther-cells equal, contiguous, pendulous from a small connective 26. PEROWSKIA.
Anther-cells equal, distant, pendulous from a long connective 27. MERIANDRA.
Anther-cells very unequal or solitary, on a long connective 28. SALVIA.

Tribe 4. **Nepeteæ.** Perfect *stamens* 4 with the upper pair longest, rarely 2, ascending or diverging; anthers 2-celled, cells at length diverging. Ovary 4-partite. Nutlets dry, with a small basal areola.

Calyx tubular, 5-toothed 29. NEPETA.
Calyx 2-lipped, upper lip much the largest. 30. DRACOCEPHALUM.
Calyx 2-lipped, lateral lobes of upper lip on the face of the midlobe 31. LALLEMANTIA.

Tribe 5. **Stachydeæ.** Perfect *stamens* 4, ascending, lower pair longest. Calyx 5-10-nerved. Upper lip of *corolla* erect hooded, lower spreading 3-fid. Nutlets dry, basal areola small.

Subtribe 1. SCUTELLARIÆ. Calyx 2-lipped, mouth closed after flowering.

Fruiting calyx 2-partite; lips entire, upper with a broad plate 32. SCUTELLARIA.
Fruiting calyx tubular, upper lip 3- lower 2-toothed 33. BRUNELLA.

Subtribe 2. MARRUBIÆ. Calyx tubular or campanulate. Stamens included in the corolla-tube 34. MARRUBIUM.

Subtribe 3. LAMIEÆ. Calyx tubular or campanulate. Stamens exerted from the corolla-tube.

* *Upper lip of the corolla short, nearly flat, glabrous or pubes cen*

Calyx subglobose; anther-cells divaricate; nutlets subglobose 35. CRANIOTOME.
Anther-cells of lower stamens parallel, transverse, of upper dimidiate 36. ANISOMELES.
Anther-cells confluent; nutlets hispid or scaly 37. ACHYROSPERMUM.
Anther-cells confluent; nutlets winged. 38. COLQUHOUNIA.

** *Upper lip of the corolla hooded, villous.*

Calyx 5-toothed; anther-cells divergent; nutlets obtuse 39. STACHYS.

- Calyx 5-spinous; anther-cells ciliate; nutlets compressed 40. GALEOPSIS.
 Calyx 5-spinous; anther-cells parallel; nutlets triquetrous 41. LEONURUS.
 Calyx 5-toothed; anther-cells hairy; nutlets triquetrous 42. LAMIAM.
 Calyx-lobes 5, oblong 5-reticulate 43. ROYLEA.
 Calyx-limb dilated; fruiting very large, membranous 44. OTOSTEGIA.
 Calyx 8-10-toothed; corolla lower lip large 45. LEUCAS.
 Calyx 8-10-toothed; corolla lower lip very small 46. LEONOTIS.
 Calyx 5-toothed; corolla upper lip compressed 47. PHLOMIS.
 Calyx-teeth 5, membranous, with hooked awns 48. NOTOCHÆTE.
 Calyx-teeth 5, broad, apiculate or spinous; nutlets bearded 49. EREMOSTACHYS.
 Calyx-limb very broad membranous, broadly 5-toothed 50. ERIOPHYTON.

Tribe 6. **Prasiææ**. *Calyx, corolla and stamens of Stachydeæ. Ovary* 4-partite or 4-fid. *Nutlets* smooth, thick or fleshy, with a small basal areola.

- Calyx 5-toothed; corolla-tube slender, throat broad 51. GOMPHOSTEMMA.

Tribe 7. **Ajugoideæ**. *Calyx* 10-nerved. *Stamens* 4, ascending. *Ovary* 4-lobed. *Nutlets* with a large very oblique or lateral areola.

- Upper corolla-lip very short; stamens very long straight diverging 52. LEUCOSCEPTRUM.
 Upper corolla-lip very short, 2-fid, with the incurved stamens exerted from the cleft; nutlets minute 53. TEUCRIUM.
 Upper corolla-lip short, notched, usually shorter than the incurved stamens 54. AJUGA.
 Upper corolla-lip arched, longer than the stamens 55. CYMARIA.

1. **OCIMUM**, Linn.

Strongly scented herbs, undershrubs, or shrubs. *Whorls* 6-10-fld., spiked or racemed, tips of pedicels recurved; bracts minute, caducous; flowers small. *Calyx* ovoid or campanulate, deflexed in fruit; upper tooth broadest, decurrent, 2 lower acuminate. *Corolla-tube* short, not annulate within; upper lip subequally 4-fid, lower hardly longer declinate entire. *Stamens* declinate, exerted, filaments free or the lower connate below, naked or the upper toothed or hairy below; anther-cells confluent. *Disc* entire or 3-4-lobed. *Style-lobes* subulate or flattened. *Nutlets* smooth or subrugose, mucilaginous when moistened.—Species about 40, tropical and chiefly Asiatic.

1. **O. canum**, Sims Bot. Mag. t. 2452 (*stamineum* in text); herbaceous, erect, pubescent, leaves petioled narrowly ovate toothed or entire, bracts petioled, two lower calyx-teeth ovate-lanceolate awned longer than the rounded upper, lateral smaller than the lower, corolla $\frac{1}{2}$ in. long. Wall. Cat. 2714 A; Benth. in DC. Prodr. xii. 32; Grah. Cat. Bomb. Pl. 147; Dalz. & Gibs. Bomb. Fl. 203. *O. americanum*, Linn. Amæn. Acad. iv. 276, and Sp. Pl. 833, not of Jacq. *O. album*, Roxb. Hort. Beng. 44, and Fl. Ind. iii. 15, not of Linn.

Plains and lower hills of INDIA; from Silhet, Bengal, Behar and Central India to the S. Deccan, &c. CEYLON; abundant about native gardens, *Thcaites*.—DISTRIB. Java, W. Asia, Trop. Africa, Madagascar (America, cult.).

Branched from the base, 1-2 ft. high. *Leaves* 1-1½ in.; petiole very slender,

usually ciliate. *Spikes* 3-8 in.; whorls rather close; flowers subsessile; bracts ovate, awned, not so large as the nearly glabrous calyx, ciliate. *Filaments* twice as long as the white corolla, hairy at the knee. *Nutlets* pitchy-black, narrowly ellipsoid, punctulate.

2. **O. Basilicum**, Linn.; herbaceous, erect, glabrous or pubescent, leaves ovate toothed or entire, bracts petiolate, fruiting calyx very shortly pedicelled, two lower teeth ovate-lanceolate awned longer than the rounded upper, lateral smaller than the lower, corolla $\frac{3}{8}$ - $\frac{1}{2}$ in. long. *Lamk. Ill. t.* 514; *Burm. Fl. Ind.* 129; *Hayne Gew.* xi. t. 3; *Boiss. Fl. Orient.* iv. 539; *Roxb. Fl. Ind.* iii. 17; *Benth. in DC. Prodr.* xii. 33; *Wall. Cat.* 2713 & 2714 (*O. canum* in part); *Dalz. & Gibs. Bomb. Fl.* 203; *Grah. Cat. Bomb. Pl.* 147. *O. minimum*, *Burm. Fl. Ind.* 129, not of Linn. *O. hispidum*, *Lamk. Dict.* i. 384. *O. pilosum*, *Willd. Enum. Hort. Berol.*; *Roxb. l. c.* 16; *Fleming in Asiat. Res.* xi. 173. *O. menthaefolium*, *Benth. in DC. l. c.* (the Indian plant). *O. ciliatum*, *Hornem. Hort. Hafn.* ii. 565. *O. americanum*, *Jacq. Hort. Vind.* iii. t. 86, not of Linn. *O. album*, Linn. *Mant.* 85, not of *Roxb.* *O. integerrimum*, *Willd. Sp. Pl.* iii. 162. *O. caryophyllatum*, *Roxb. Hort. Beng.* 45, and *Fl. Ind.* iii. 16. *O. Basilicum*, var. *thyrsiflorum*, *Wight Ic.* t. 868; *Benth. Lab.* 5, and in *Wall. Pl. As. Rar.* ii. 13; *Wall. Cat.* 2715. *O. thyrsiflorum*, Linn. *Mant.* 84; *Jacq. Hort. Vind.* iii. t. 72; *Roxb. Fl. Ind.* 15. *O. Barrelieri*, *Roth Nov. Sp.* 278. *Plectranthus Barrelieri*, *Spreng. Syst.* ii. 691.—*Rheede Hort. Mal.* x. t. 87.

Throughout tropical and hotter INDIA, cultivated from the PUNJAB to Ava, Travancore, Malacca and Penang. Indigenous in the PUNJAB on low hills, *Aitchison*. CEYLON, cultivated; *Thwaites*.—DISTRIB. Hotter W. Asia, Africa, the Malay and Pacific Islands (perhaps always cultivated only).

This widely cultivated plant differs from *O. canum* chiefly in the much larger size of all its parts, the flowers and seeds being often three times as large. *Corolla* white, pink or purplish. I cannot distinguish the varieties described by *Bentham* by any constant characters. It varies much in robustness and the hairiness of all its parts. Var. *thyrsiflora* is a luxuriant state; var. *difforme*, *Benth. l. c.* (*O. lacerum*, *Heyne* in *Herb. Rottl.*, *O. bullatum*, *Lamk.*), has abnormal deeply cut leaves; var. *purpurascens*, *Benth. l. c.* (*O. medium*, *Mill.*), is a purple-coloured state, imported from Persia; var. *glabratum* has very large fruiting calyces sometimes $\frac{1}{2}$ in. diam., with a rather elongate upper lobe. *O. ciliatum*, *Hornem.* (*O. ciliare*, *Heyne* in *Herb. Rottl.*, *O. scabrum*, *Herb. Wight*), has a hispidulous white corolla; it is cult. in *Hort. Calcutt.* under the erroneous name of *O. cristatum*, *Roxb.*

3. **O. gratissimum**, Linn.; shrubby, glabrescent, leaves ovate acute crenate or coarsely toothed, bracts sessile lanceolate awned from a rounded base, two lower calyx-teeth minute much shorter than the rounded upper, lateral triangular broader than the lower, corolla $\frac{1}{2}$ in. *Jacq. Ic. Pl. Rar.* iii. t. 495; *Wall. Cat.* 2720; *Roxb. Fl. Ind.* iii. 17; *Benth. in DC. Prodr.* xii. 34 (excl. syn.); *Grah. Cat. Bomb. Pl.* 147; *Dalz. & Gibs. Bomb. Fl.* 203. *O. citronatum*, *Ham.*, and *O. robustum*, *Heyne* in *Herb. Wall.*—*Rheede Hort. Mal.* x. t. 86.

BENGAL, CHITTAGONG, E. NEPAL, and throughout the DECCAN PENINSULA; and CEYLON, doubtful if indigenous.—DISTRIB. Java, Trop. Africa and America (? native).

A shrub, 4-8 ft., much branched, woody below. *Leaves* 2-4 in.; petiole 1-2 in. *Racemes* strict, slender; whorls rather close-set; pedicels shorter and bracts longer than the calyx. *Calyx* pubescent, fruiting $\frac{1}{2}$ in. long, recurved. *Corolla* hardly exceeding the calyx, pale yellow. *Filaments* exserted, knee bearded. *Nutlets* subglobose, rugose with glandular depressions.

VAR. suavis; leaves densely softly tomentose on both surfaces. *O. suave*, Willd. *Enum. Hort. Berol.* 629; *Benth. in DC. Prodr.* xii. 35, excl. various syn.; *Thwaites Enum.* 236. *O. urticæfolium*, *Roth Catal. Bot.* ii. 52. *O. menthaefolium*, *Hochet. in Schimp. Herb. Abyss.* n. 1860.—Ceylon; Ambagamowa district, *Thwaites*.—Distrib. Trop. Africa and Madagascar (apparently native). Cult. in W. Indies, &c.—This differs from *O. gratissimum* only in pubescence.

4. *O. adscendens*, Willd. *Sp. Pl.* iii. 166; herbaceous, puberulous, erect, or prostrate with ascending branches, leaves small oblong-ovate obtuse entire or sparingly toothed, floral lanceolate petiolate, two lower calyx-teeth reduced to short bristles, upper broadly obovate, lateral truncate ciliate, corolla $\frac{1}{2}$ in. *Wall. Cat.* 2719; *Benth. in DC. Prodr.* xii. 35; *Dalz. & Gibs. Bomb. Fl.* 203. *O. indicum*, *Roth Nov. Sp.* 273. *O. cristatum*, *Roxb. Hort. Beng.* 45, and in *Fl. Ind.* iii. 19. *O. verticillatum*, *Heyne in Herb. Rottl.* *Plectranthus indicus*, *Spreng. Syst.* ii. 691.

The DECCAN, in sandy places; *Heyne*, &c. CENTRAL INDIA; Jubbulpore, *Beddome*.

Annual, very variable in habit, 4–16 in. high; branches often widely spreading. *Leaves* $\frac{1}{2}$ –1 in., narrowed into the petiole. *Racemes* short, rather lax-fld.; bracts lanceolate, caducous, with a gland at the base. *Corolla* $\frac{1}{2}$ in., pale rose. *Filaments* twice as long as the corolla; knees dilated, hairy. *Fruiting calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in.; lower lip as long as the upper, rather membranous. *Nutlets* subglobose, compressed, smooth, red-brown.

5. *O. sanctum*, Linn. *Mant.* 85; herbaceous, erect, softly patently hairy, leaves oblong obtuse or acute entire or subserrate, floral sessile ovate-lanceolate or cordate, racemes very slender, calyx short, two lower teeth very long-awned longer than the broadly oblong upper, lateral broadly ovate shorter than the lower, corolla scarcely exceeding the calyx. *Roxb. Fl. Ind.* iii. 14; *Wall. Cat.* 2716; *Benth. in DC. Prodr.* xii. 38, and in *Fl. Austral.* v. 74; *Grah. Cat. Bomb. Pl.* 147; *Dalz. & Gibs. Bomb. Fl.* 204; *Thwaites Enum.* 236; *Boiss. Fl. Orient.* iv. 539. *O. monachorum*, Linn. *Mant.* 85. *O. tenuiflorum*, Linn. *Sp. Pl.* 833; *Benth. in DC. l. c.* 39. *O. inodorum*, *Burm. Thes. Zeyl.* 174, t. 80, f. 2, and *Fl. Ind.* 130, not of *Koenig*.—*Burm. Thes. Zeyl.* 174, t. 80, f. 1; *Rumph. Herb. Amb.* v. t. 92, f. 2. *Parnassa*, *Jones in Asiat. Research.* iv. 288.

Throughout INDIA, ascending the Himalaya to 6000 ft. (doubtfully indigenous). CEYLON; common in waste places, *Thwaites*.—DISTRIB. Malay Islands to Australia and the Pacific, W. Asia to Arabia.

Stem sometimes woody below; branches erect, ascending or spreading. *Leaves* 1–2 $\frac{1}{2}$ in., variable in breadth, base narrowed. *Racemes* 6–8 in. long; pedicels as long as the calyx. *Corolla* very small, hardly longer than the calyx. *Filaments* exserted, knee villous. *Fruiting calyx* $\frac{1}{2}$ in. long, on a slender pedicel, broadly campanulate, membranous. *Nutlets* subglobose or broadly oblong, slightly compressed, nearly smooth, pale red-brown.

VAR. hirsuta; densely pubescent. *O. hirsutum*, *Benth. in Wall. Pl. As. Rar.* ii. 14; *Wall. Cat.* 2717? *O. villosum*, *Roxb. Fl. Ind.* iii. 13. *O. subserratum*, *Heyne in Herb. Rottl.*—South Deccan.

DOUBTFUL SPECIES.

O. MINIMUM, Linn. (*Benth. in DC. Prodr.* xii. 33), is a very small cultivated form, probably of *O. Basilicum* (with which it agrees in all essential characters), to which Linnæus has assigned Ceylon as a habitat. I have seen specimens from gardens in various parts of the world.

2. GENIOSPORUM, Wall.

Herbs. *Whorls* many-fld., in long lax racemes or spikes; bracts often

coloured; flowers small or minute. *Calyx* ovoid in flower, in fruit tubular, suberect or declinate, 5-toothed, upper tooth broadest, not decurrent; lateral free, or connate with the upper; lower short, free or connate. *Corolla-tube* short, upper lip 4-fid, lower declinate entire. *Filaments* free, toothless. *Disk* tumid, gibbous. *Style-arms* short, flattened. *Nutlets* ovoid or oblong, smooth or punctulate.—Species 6 or 7, Indian and African.

1. **G. strobiliferum**, *Wall. Cat.* 2749; erect, puberulous, leaves petioled lanceolate coarsely serrate, floral exceeding the flowers, fruiting calyces erect, throat glabrous. *Benth. Lab.* 20, and in *DC. Prodr.* xii. 45; *Hook. Ic. Pl.* t. 462. *Plectranthus coloratus*, *Don Prodr.* 116.—*Labiata*, *Griff. Itin. Notes*, 82, n. 1192.

SUBTROPICAL HIMALAYA; in dry forests from Kumaon to Bhotan, alt. 1–5000 ft. KHASIA MTS., alt. 3–5000 ft., common.

Stem 2–3 ft., obtusely angled. *Leaves* 2–5 by $1\frac{1}{2}$ –2 in., base acute or rounded, narrowed into the petiole of $\frac{1}{4}$ – $\frac{3}{4}$ in. *Spikes* 2–5 in.; bracts white, deciduous. *Flowers* $\frac{1}{2}$ in. long. *Calyx* pubescent, with 2 black glands on the lower lip. *Corolla* white with purple veins, hairy, lower lip narrow. *Filaments* exserted. *Fruiting calyx* tubular, pedicelled, $\frac{1}{2}$ in. long, deeply pitted. *Nutlets* ellipsoid, black, smooth, hispid towards the top.

2. **G. elongatum**, *Benth. Lab.* 21, and in *DC. Prodr.* xii. 45; erect or ascending, pubescent, stems very slender, leaves subsessile narrowly lanceolate, lower floral exceeding the flowers, fruiting calyces spreading, throat naked. *Thwaites Enum.* 236. *Rhinanthus indica*, *Linn.*; *Burm. Fl. Ind.* 131, t. 39, f. 1.

NORTHERN CIRCARS; Jeypur Hills, *Beddome*. CEYLON; Central Province, in grassy places, alt. 4–6000 ft.

Stem 1–2 ft., angles thickened. *Leaves* in distant pairs, 1–2 by $\frac{1}{4}$ – $\frac{1}{3}$ in., crenate-serrate, base narrowed. *Spikes* 3–5 in.; bracts orbicular-ovate, subsistent; flowers $\frac{1}{10}$ in. long. *Calyx* hirsute. *Corolla* very small, hairy. *Filaments* exserted. *Fruiting calyx* $\frac{1}{12}$ in. long, ovoid, strongly ribbed, pitted, lobes short. *Nutlets* ellipsoid, smooth.

3. **G. prostratum**, *Benth. in Pl. As. Rar.* ii. 18, *Lab.* 21, 708, and in *DC. Prodr.* xii. 45; prostrate, stems slender glabrous pubescent or hirsute, leaves small sessile or petioled obovate-lanceolate or oblong or linear sparingly toothed, fruiting calyces spreading shorter than their pedicels, calyx-throat with a ring of hairs. *Wall. Cat.* 2751; *Grah. Cat. Bomb. Pl.* 148; *Thwaites Enum.* 237. *Ocimum menthoides*, *Burm. Fl. Ind.* 129. *O. prostratum*, *Linn. Mant.* 166. *O. macrostachyum*, *Poir. Suppl.* i. 492; *Benth. Lab.* 16. *O. tenuiflorum*, *Heyne in Herb. Rottl., not of Benth. ? of Linn.* *Mentha ocimoides*, *Lamk. Dict.* iv. 103. *Elsholtzia ocimoides*, *Pers. Syn.* ii. 114. *Lumnitzera prostrata*, *Spreng. Syst.* ii. 687. *Thymus indicus*, *Burm. Fl. Ind.* 129.—*Mentha*, *Burm. Thes. Zeyl.* 158, t. 70, f. 2.

DECCAN PENINSULA, from the Concan southwards. CEYLON; warmer part of the island.

Stems many from a woody stock. *Leaves* in distant pairs, very variable, from $\frac{1}{4}$ by $\frac{1}{2}$ in. to 2 by $\frac{3}{4}$ in., rather thick, base narrowed. *Spikes* elongate, slender; whorls close or distant; bracts ovate, acute, reflexed; flowers minute, pedicelled. *Calyx* hairy, upper lip very variable in size, throat hairy. *Corolla* $\frac{1}{12}$ in., hairy. *Filaments* exserted. *Fruiting calyx* $\frac{1}{12}$ in., subcampanulate, ribbed, tube not pitted, pubescent. *Nutlets* extremely minute, ellipsoid, smooth, naked.

VAR. *gracilis*, *Thwaites Enum.* 237; stems very slender, 12–18 in., leaves glabrous, narrower. *G. gracile*, *Benth. Lab.* 21, and in *DC. Prodr.* xii. 45.—Deccan Peninsula and Ceylon.

3. **MESONA**, Blume.

Annuals. *Whorls* many-fl., racemose; flowers small; bracts caducous. *Calyx* campanulate; fruiting tubular, declinate, 2-lipped, tube deeply pitted between the nerves; lips rather broad, upper 3-fid, lower entire. *Corolla-tube* short, upper lip truncate or 4-toothed, lower oblong. *Stamens* 4, filaments exserted, free, upper toothed at the base. *Style* 2-fid. *Disk* tumid, gibbous. *Nutlets* ellipsoid or ovoid.—Species 4, Trop. Asiatic and Malayan.

M. Wallichiana, Benth. in DC. Prodr. xii. 46; erect, sparsely hairy, leaves ovate-lanceolate serrate. *Geniosporum parviflorum*, Wall. Cat. 2750; Benth. Lab. 20, and in Wall. Pl. As. Rar. ii. 18.

KHASIA MTS., alt. 3–5000 ft.; De Silva, &c.

Stem 1–2 ft., branching upwards, slender, rigid. *Leaves* 1–3 in., narrowed into a petiole $\frac{1}{4}$ – $\frac{3}{4}$ in. *Racemes* numerous, slender, erect, 3–7 in.; flowers very numerous, purplish, $\frac{1}{2}$ in. long; bracts deflexed, ovate, purplish. *Fruiting calyx* $\frac{1}{2}$ in. long, on a slender rigid pedicel longer than itself. Smells like Patchouli.

4. **PLATYSTOMA**, Beauv. (Platostoma.)

Small annuals. *Whorls* many-fl., racemose; flowers minute; bracts caducous. *Calyx* campanulate; fruiting deflexed 2-lipped, upper lip ovate, toothed on each side; lower broad inflexed, sinus very open. *Corolla-tube* short; lips subequal, upper broad 2-fid, lower entire concave. *Stamens* 4, declinate, filaments free included, dilated downwards. *Disk* tumid, gibbous. *Style* 2-fid. *Nutlets* ovoid.—Species 3, Indian and African.

P. flaccidum, Benth. in Gen. Pl. ii. 1173; sparingly pubescent, leaves ovate serrate, fruiting pedicel as long as the calyx-tube. *Ocimum flaccidum*, A. Rich. Tent. Fl. Abyss. ii. 179.

The CONCAN; on the Kela nuddeh, Ritchie, Dalzell.—DISTRIB. Trop. Africa.

Strict, erect, slender, 4–8 in. high, simple or branched, branches erect. *Leaves* $\frac{1}{2}$ –1 in., membranous. *Racemes* slender, strict, as long as the whole plant; flowers $\frac{1}{2}$ in. long. *Calyx-lobes* ovate. *Nutlets* black, minutely reticulate.—Probably only a state of *P. africanum*, Beauv.

5. **ACROCEPHALUS**, Benth.

Annuals. *Whorls* in terminal or axillary globose or ovoid dense heads with imbricate bracts; flowers very small, sessile. *Calyx* ovoid, fruiting tubular, base gibbous; upper lip flat, entire, lower entire or 4-toothed; throat naked. *Corolla-tube* very short, subequally 4-lobed. *Stamens* 4, filaments free, toothless, included. *Disk* small, gibbous. *Style* 2-fid. *Nutlets* smooth.—Species 10, Tropical and Subtropical Asiatic and African.

1. **A. capitatus**, Benth. in Wall. Pl. As. Rar. ii. 18, Lab. 23, and in DC. Prodr. xii. 47; sparingly pubescent, leaves petioled few-nerved, heads terminal. Dalz. & Gibs. Bomb. Fl. 204; Hook. Ic. Pl. t. 456. *A. scariousus*, Wall. Cat. 1563. *A. Blumei*, Benth. l. c. *Prunella indica*, Burm. Fl. Ind. 130. *Ocimum capitellatum*, Linn. f. Suppl. 276. *O. capitatum*, Roth Nov. Sp. 276. *O. acrocephalum*, Blume Bijdr. 834. *O. Chandra*, Ham. in Herb. Wall. *Lumnitzera capitata*, Spreng. Syst. ii. 687.

Throughout INDIA from Kashmir to Bhotan in the Himalaya, ascending to 5000 ft.; and in hilly districts from the Khasia Mts. to Cape Comorin and Pegu. (Not seen from Ceylon or the Malay Peninsula.)—DISTRIB. Muneypoor, Burma, Java, Borneo.

Stem 6–12 in., simple or branched from the base; branches ascending or decumbent. *Leaves* $\frac{1}{2}$ –1 in., ovate or lanceolate, coarsely serrate, narrowed into the petiole. *Heads* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., rarely cylindric, often with two spreading leaves at the base; flowers imbricating, suberect, $\frac{1}{2}$ in. long, pale purple.

2. A. axillaris, *Benth. in DC. Prodr.* xii. 48; stems and leaves beneath pubescent, leaves small lower oblong upper orbicular many-nerved, heads axillary sessile.

ASSAM; *Jenkins, Mack.*

Stem slender, erect, simple, a foot long and upwards. *Leaves* in distant pairs, lower $\frac{3}{4}$ in., upper $\frac{1}{2}$ in.; nerves very strong beneath, forming salient parallel ribs. *Heads* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam.—A very singular plant, with the habit and ribbed leaves of a *Spermacoce*; the corollas have fallen away.

6. MOSCHOSMA, *Reichb.*

Herbs, annual or perennial. *Whorls* 6–10-fld., secund, in axillary and terminal paniced racemes, flowers very minute; bracts small. *Calyx* ovoid or campanulate, 5-toothed, fruiting declinate, upper or 3 upper teeth largest, margins not decurrent; throat naked. *Corolla-tube* very short; upper lip shortly 4-fid; lower entire with 4 flat lobes. *Stamens* 4, declinate, filaments free, toothless; anther-cells confluent. *Style* clavate-capitate, tip 2-fid. *Nutlets* compressed, smooth.—Species 6, Tropical Asiatic, African and Australian.

M. polystachyum, *Benth. in Wall. Pl. As. Rar.* ii. 13, *Lab.* 24, 708, and in *DC. Prodr.* xii. 48; nearly glabrous, stem acutely 4-angled, leaves long-petioled ovate long-acuminate coarsely serrate, racemes very slender. *Reichb. in Wall. Cat.* 2711; *Dalz. & Gibs. Bomb. Fl.* 204. *Ocimum tenuiflorum*, *Burm. Fl. Ind.* 129, *excl. syn. Rumph., not of Linn.* *O. polystachyum*, *Linn. Mant.* 567; *Roxb. Fl. Ind.* iii. 18. *Plectranthus parviflorus*, *Br. Prodr.* 506, *not of Willd.* *P. micranthus*, *Spreng. Syst.* ii. 691.

Wet places in BENGAL; Dacca, *Clarke*. DECCAN PENINSULA, BURMA and TENASSERIM. CEYLON.—DISTRIB. Java, China, Philippine Islands, Trop. Africa and Australia.

A very slender much-branched annual glabrate or puberulous herb, 2–3 ft.; angles of stem often scabrid. *Leaves* 1–2 in., very membranous, base cuneate, rounded or subcordate, quite entire, narrowed into a filiform petiole as long as the blade. *Racemes* 3–6 in.; peduncles and rachis filiform; whorls about 6-fld.; bracts minute, caducous; pedicels shorter than the calyx. *Flowers* $\frac{1}{8}$ in. long. *Fruiting calyx* $\frac{1}{10}$ in. *Corolla* flesh-coloured. *Nutlets* black, smooth, ellipsoid.

7. ORTHOSIPHON, *Benth.*

Under-shrubs or shrubs. *Whorls* 6- or fewer-fld., racemose. *Calyx* ovoid, campanulate or tubular, fruiting deflexed, upper tooth broad membranous, margins decurrent on the tube, lateral and lower distinct or shortly connate, usually subulate. *Corolla-tube* often slender, straight or incurved; upper lip 3–4-fid; lower entire, concave. *Stamens* 4, declinate, filaments free, toothless; anther-cells confluent. *Disc* usually gibbous. *Style* with a

minute capitate or clavate entire or notched stigma. *Nutlets* ovoid or orbicular, smooth or nearly so.—Species 16, tropics of the Old World.

* Calyx-throat villous. Stamens included.

1. **O. diffusus**, *Benth. in DC. Prodr.* xii. 50; woody, diffusely branched, viscidly tomentose, leaves ovate or elliptic obtuse crenate, corolla-tube shortly exserted, fruiting calyx $\frac{1}{8}$ – $\frac{1}{4}$ in. *Ocimum* ? *diffusum*, *Benth. in Wall. Cat.* 2718, and in *Wall. Pl. As. Rar.* ii. 14. *O. hirsutum*, *Wall. Cat.* 2717 in part.

DECCAN PENINSULA; Pulney and Nilghiri Mts., in dry rocky places, *Klein*, &c. ? CEYLON; *Walker*.

Branches many and straggling from the woody stock, stout, cylindric, 6–8 in. high. *Leaves* $\frac{1}{2}$ in. long, tomentose on both surfaces, base rounded; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in. *Racemes* 3–4 in., stout or slender; whorls rather distant, 2–4-fl., floral leaves minute. *Calyx* pubescent, throat with long hairs, fruiting ribbed, 2 lower lobes rigid, subulate. *Corolla* about $\frac{1}{4}$ in. long. *Nutlets* oblong, obscurely reticulate, brown, nearly smooth.—I suspect that the Ceylon habitat is an error.

VAR. hispida; tomentose or villous, branches longer more slender, leaves more narrowed at the base. *O. hispidus*, *Benth. l. c.*—Nilghiri and Cuddapah Hills.

** Calyx-throat naked. Stamens included.

† *Leaves petioled*.

2. **O. pallidus**, *Royle mss.*; *Benth. in Hook. Bot. Misc.* iii. 70, *Lab.* 708, and in *DC. Prodr.* xii. 50; woody, diffusely branched, glabrous or finely pubescent, leaves petioled ovate obtuse coarsely toothed or crenate, two lowest calyx-teeth awned, corolla-tube about equalling the calyx. *Dalz. & Gibs. Bomb. Fl.* 205; *Boiss. Fl. Orient.* iv. 539. *O. verticillatus*, *Heyne in Herb. Rottl.* *O. inodorus*, *Koen.*; *Roxb. Ic. ined. in Herb. Kew*, not of *Fl. Ind.* iii. 19.

NORTH-WESTERN INDIA; from Kashmir and the Punjab to Behar, and southwards to Travancore.—DISTRIB. Beluchistan, Arabia.

Branches 6–12 in., many, ascending from a stout woody stock. *Leaves* $\frac{1}{2}$ –2 in., obtuse or acute, scentless, base cuneate entire and narrowed into a petiole $\frac{1}{4}$ – $\frac{1}{2}$ the length of the blade. *Racemes* long or short, stout or slender; floral leaves minute; flowers $\frac{1}{2}$ in. long. *Corolla* white. *Fruiting calyx* as long as the pedicel, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, deflexed; lower teeth subulate or aristate. *Nutlets* subglobose, compressed, pale, nearly smooth.—With difficulty distinguished from states of *Ocimum adscendens*, the calyx being nearly identical. Roxburgh's figure of *O. inodorus* is this plant, but his description refers to some other with cordate rugose leaves and cordate bracts.

3. **O. tomentosus**, *Benth. in Wall. Pl. As. Rar.* ii. 14, *Lab.* 27, and in *DC. Prodr.* xii. 51; tomentose, pubescent or glabrate, sometimes viscid, leaves petioled ovate, base rounded cuneate or cordate, racemes elongate, bracts ovate, 4 lower calyx-teeth awned, corolla from half as long to thrice as long as the calyx, tube subincurved, nutlets subglobose compressed pale brown nearly smooth.

DECCAN PENINSULA; on the Ghats, and from the Concan southwards. CEYLON.

A most variable plant. I am quite unable to find any characters whereby to define strictly the following forms. The *O. rubicundus* is distinguished by the long sessile or subsessile leaves.

VAR. tomentosa proper; 12–18 in., rarely more, pubescent or tomentose, leaves $\frac{1}{2}$ –1 in., petiole half the length of the blade or less, corolla about $\frac{1}{2}$ in. long, twice as long as the calyx or less. *O. tomentosus*, *Benth. l. c.* ? *O. triste*, *Roth Nov. Sp.* 270. *Plectranthus tristis*, *Spreng. Syst.* ii. 690.—Nilghiri Hills.

VAR. *viscosa*; usually taller and stouter, viscidly pubescent or tomentose with spreading hairs, leaves 1-3 in., base often cordate, petiole slender, corolla $\frac{1}{2}$ - $\frac{3}{4}$ in. twice or thrice as long as the calyx. *O. viscosus*, *Benth. in Wall. Cat.* 2723 and ll. c.—On the Ghats from Canara southwards.

VAR. *rubiginosa*, Clarke mss.; branches and leaves beneath clothed with a fine close rusty pubescence, leaves of var. *viscida*, flowers rather larger.—Nilghiris; *Wight, Clarke, &c.*

VAR. *glabrata*; usually more slender, quite glabrous or sparsely patently hairy, leaves 1-3 in., usually broadly ovate-cordate or base rounded coarsely toothed, petiole sometimes as long as the blade and very slender, corolla about $\frac{1}{2}$ in., tube slender 2-3 times as long as the calyx. *O. glabratus*, *Benth. in Wall. Cat.* 2724, and ll. c.; *Dalz. & Gibs. Bomb. Fl.* 205; *Thwaites Enum.* 237. ? *Ocimum thymiflorum*, *Roth Nov. Sp.* 269. ? *Plectranthus thymiflorus*, *Spreng. Syst.* ii. 690. *Ocimum glaucum*, *Heyne in Herb. Rottl.* *O. ascendens*, *Wight*, and *O. cordifolium*, *Herb. Madr. in Wall. Cat.*—Common from the Concan southwards. Ceylon common. Thwaites remarks that this in Ceylon varies much in the size of the flowers. *O. petiolaris*, *Miquel*, of Java, with the habit of this, differs in the narrow bracts and form of the calyx.

VAR. *parviflora*; pubescent or glabrate, leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. ovate, calyx shorter broader, fruiting $\frac{1}{2}$ in. long campanulate, corolla $\frac{1}{2}$ in. long very narrow, twice as long as the calyx. *O. tomentosus*, var. *parviflora*, *Benth. in DC. Prodr.* xii. 51.—Nilghiris; *Wight, &c.*—Probably a distinct species.

4. ***O. incurvus***, *Benth. in Wall. Cat.* 2725, and in *Wall. Pl. As. Rar.* ii. 15, *Lab.* 28, and in *DC. Prodr.* xii. 52; puberulous, pubescent or tomentose, stem usually subsimple ascending 4-angled, leaves 3-6 in. petioled ovate or ovate-lanceolate coarsely crenate, bracts ovate, 2 lower calyx-teeth awned, corolla $\frac{1}{2}$ -1 in. straight or incurved, nutlets broadly ellipsoid compressed asperulous. *Hook. Bot. Mag.* t. 3847; *Maund Botanist.* iv. t. 173.

SUBTROPICAL HIMALAYA; Nepal, *Hamilton*; Sikkim (*Herb. Griff.*), *J. D. H.*, &c. KHASIA HILLS, alt. 3-4000 ft.; *Bruce, Masters, &c.*

Stem 1-3 ft., rarely branched. Leaves narrowed into winged petioles $\frac{1}{2}$ -3 in. long, rough or smooth above, sometimes of a fine purple beneath. Calyx in fruit $\frac{1}{2}$ in.; lateral teeth triangular, hardly awned. Corolla pale pink, variable in size and curvature.—*O. rubicundus*, *Benth.*, consists of two plants, one of which with petioled leaves I refer to *O. incurvus*, the other with more lanceolate subsessile leaves is the true *rubicundus*, *Bth.*

VAR. *elata*; tall, branched, racemes densely tomentose, bracts larger longer than the pedicels.—E. Nepal, Tambur and Khabili rivers, alt. 4-6000 ft.; *J. D. H.*—A very large form with ovate-lanceolate leaves 4-7 in. long, scaberulous above and beneath. Corolla $\frac{1}{2}$ in. long, tube slender.

5. ***O. robustus***, *Hook. f.*; finely pubescent, stem robust terete, leaves 5-6 in. shortly petioled oblong-lanceolate subacute obscurely crenate, bracts ovate acute, 2 lower calyx-teeth awned, corolla 1 in.

ASSAM; Jyrungh Hills, *Simons (Herb. Calcutt.)*.

Whole plant when dried a dark rusty purple colour, clothed uniformly with a fine pubescence. Stem nearly as thick as a goose-quill. Leaves $2\frac{1}{2}$ in. broad, base cuneate; petiole stout, $\frac{1}{2}$ - $\frac{3}{4}$ in. Racemes stout, whorls rather distant. Fruiting calyx (unripe) $\frac{1}{2}$ in. long.

†† Leaves sessile, rarely petioled in *O. rubicundus*.

6. ***O. rubicundus***, *Benth. in Wall. Pl. As. Rar.* ii. 141, *Lab.* 26, and in *DC. Prodr.* xii. 57; erect, tomentose pubescent or glabrate, stems 4-angled, leaves ovate or ovate-lanceolate coarsely toothed, bracts minute, 4 lower calyx-teeth subulate, corolla twice as long as the calyx pubescent, nutlets

suborbicular compressed nearly smooth. *Wall. Cat.* 2721; *Hook. Ic. Pl.* t. 459. *O. virgatus*, *Benth. ll. c.*; *Wall. Cat.* 2722. *Ocimum tuberosum*, *Roxb. Fl. Ind.* iii. 18. *Plectranthus rubicundus* & *virgatus*, *Don Prodr.* 116. *P. mollissimus*, *Wall. mss.* *P. amœnus*, *Wall.* *Lumnitzera rubicunda* & *virgata*, *Spreng. Syst., Cur. post.* 223. *Ocimum Miria*, *Ham. in Wall. Cat.* 2722. *O. rubicundum* & *virgatum*, *Ham. mss.* *O. mollissimum*, *Wall. mss.* *O. tuberosum*, *Roxb. mss.*

WESTERN SUBTROPICAL HIMALAYA; from Central Nepal to Jamu, alt. 2–4000 ft. and southward to the Circars and Nilghiris. *AVA*; *Wallich.*—DISTRIB. Upper Burma.

Stem 1–2 ft., slender. *Leaves* 2–4 in., variable in breadth, and toothed obtuse or acute, base cuneate. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in., white rose or pink, throat funnel-shaped. *Nutlets* punctulate.

VAR. rigida; leaves petiolate. *O. rubicundus*, *v. rigida*, *Benth. ll. c.* *Ocimum rigidum*, *Ham.*

VAR. ? Hohenackeri; smaller, laxly tomentose, leaves 1 in., corolla $\frac{1}{4}$ in., fruiting calyx smaller $\frac{1}{2}$ in.—Nilghiri Mts.; *Hohenacker*, n. 1394.—Possibly a distinct species, but the specimens are insufficient. The nutlets are as in *O. rubicundus*.

7. *O. comosus*, *Wight mss.*; *Benth. in DC. Prodr.* xii. 52; tomentose, shrubby, branches opposite terete leafy, leaves close set oblong or linear-oblong or obovate obtuse crenate, racemes sessile, bracts deciduous upper very large coloured, calyx tubular, lips subequal in length, 4 lower teeth subequal subulate. *O. bracteatus*, *Wight Ic.* t. 1428.

DECCAN PENINSULA; Shevagherry and Tinnevely Hills, *Wight*, *Beddome*.

This differs greatly in habit from its congeners. *Wight* figures the stem as 4-angled, but they appear quite cylindric. *Branches* as thick as a crow-quill. *Leaves* $\frac{3}{4}$ –1 in., rugose. *Rachis* of raceme stout; whorls 6-fld.; flowers suberect. *Calyx* nearly $\frac{1}{2}$ in., upper lip orbicular, straight. *Corolla* $\frac{3}{4}$ –1 in., pubescent, tube very slender. *Nutlets* not seen.

*** Calyx-throat naked. Stamens far exerted.

8. *O. stamineus*, *Benth. in Wall. Pl. As. Rar.* ii. 15, *Lab.* 29, and in *DC. Prodr.* xii. 52; slender, glabrous or pubescent, leaves petioled ovate acuminate coarsely toothed, base cuneate, calyx campanulate, 2 lower teeth subulate, corolla-tube thrice as long very slender, filaments capillary twice as long as the corolla. *Wall. Cat.* 2727; *Bot. Mag.* t. 5833; *Miquel Fl. Ind. Bat.* ii. 944. *Ocimum grandiflorum*, *Blume Bijdr.* 835. *O. longiflorum*, *Ham. in Wall. Cat.* 2727.

ASSAM; *Jenkins.* BURMA and MARTABAN; *Wallich.* DECCAN PENINSULA; Anamallay Hills, *Wight.* NICOBAR ISLANDS.—DISTRIB. Malay and Philippine Islands, Australia.

Stem 1–2 ft., 4-angled. *Leaves* in distant pairs, 2–4 in., narrowed into the petiole. *Racemes* very lax-fld. *Calyx* $\frac{1}{2}$ in. *Corolla* 1 in., glabrous, white or purplish. *Nutlets* broadly oblong, compressed, rugulose.

9. *O. scapiger*, *Benth. in Wall. Pl. As. Rar.* ii. 15, *Lab.* 28, and in *DC. Prodr.* xii. 52; glabrous, stem very short, leaves subradical petioled oblong obtuse coarsely crenate, racemes very long, calyx campanulate, 4 lower teeth subulate, corolla-tube short, throat funnel-shaped, filaments twice as long as the limb, nutlets oblong rugulose. *Wall. Cat.* 2726 (*scapigerum*).

NEPAL; *Wallich.*

Rootstock short, woody. *Leaves* 4–6 in., narrowed into a short or long slender petiole. *Racemes* 1 foot, strict, puberulous. *Calyx* $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, blue; upper lip short, 4-toothed; lower longer, concave.

8. **PLECTRANTHUS**, *L'Herit.*

Herbs or undershrubs. *Flowers* usually small, in lax (rarely close) paniced or racemed 6-8-fld. cymes (whorls). *Calyx* 5-toothed, 2-lipped, enlarged in fruit. *Corolla-tube* exserted, long or short, straight or decurved, limb equal or gibbous or spurred, 2-lipped; upper lip usually short, broad, 3-4-fld recurved; lower much longer, entire, boat-shaped, narrow at the base or stipitate. *Stamens* 4, declinate; filaments simple, free; anther-cells usually confluent. *Disc* usually produced in front, and there equalling or exceeding the ovary. *Style* subequally 2-fld. *Nutlets* orbicular, ovoid or oblong, smooth, granulate or punctate.—Species about 80, Tropical and Subtropical Asiatic, African, Australian and Polynesian.

The species of the sections *ISODON* and *COLEOIDES* are numerous and very difficult of discrimination, and the latter should perhaps be referred to *Coleus*, or better still refer all the *Plectranthi* to sections of *Coleus*, of which genus *P. coleoides* and *urticifolius* have all the habit.

Sect. 1. **Isodon**. *Fruiting calyx* decurved, subequally 5-toothed, or 2-lipped, upper lip 3-toothed, lower 2-toothed. *Nutlets* oblong or rounded, obtuse.

* *Fruiting calyx* broad, open, deeply 2-lipped, upper lip very broad with 3 distant spinous teeth, lower of 2 long subulate teeth. *Corolla* 1 in. long, tube straight, base equal.

1. **P. macranthus**, *Hook. f.*; sparsely hairy, leaves petioled ovate-lanceolate coarsely serrate, inflorescence racemose, flowers opposite.

SIKKIM HIMALAYA; Chola, alt. 6-8000 ft., *J. D. H.* KHASIA MTS., alt. 5-6000 ft.; *Lobb, J. D. H. & T. T., &c.* BURMA; *Griffith*.

Stem 6-12 in., simple or branched, weak. *Leaves* 3-5 in., membranous. *Racemes* 6-12 in.; bracts ovate-lanceolate, persistent; pedicels $\frac{1}{4}$ in. *Corolla-tube* straight, 1 in. long, $\frac{1}{8}$ in. diam.; lips short, subequal, rounded. *Fruiting calyx* $\frac{1}{2}$ in. long. *Nutlets* globose, $\frac{1}{16}$ in. diam.—Very near the Japanese *P. longitubus*, *Miq.*, and possibly a variety of it, but the cyme branches are much shorter and 1-fld.; the inflorescence being a simple raceme with opposite flowers.—Probably both should be referred to *Orthosiphon*.

** *Fruiting calyx* longer than broad, distinctly 2-lipped for $\frac{1}{3}$ way down, upper lip subequally 3-toothed, lower 2-toothed. *Corolla* $\frac{1}{6}$ - $\frac{1}{3}$ in. long, tube straight, base equal. (It is not easy to distinguish this section from the next.)

2. **P. scrophularoides**, *Wall. Pl. As. Rar. ii. 16*, and *Cat. 2738*; tall, slender, nearly glabrous, leaves long-petioled ovate crenate, base cordate or cuneate, corolla-tube broad about twice as long as the lower lip, fruiting calyx with obtuse teeth, nutlets subglobose smooth. *Benth. Lab. 40*, and in *DC. Prodr. xi. 55*; *Hook. Ic. Pl. t. 464 in part*.

TEMPERATE HIMALAYA, alt. 8-1000 ft., from Kumaon to Sikkim; *Wallich, &c.*

Stem 2-4 ft. or more. *Leaves* 3-7 in., often as broad, sparsely minutely hairy; petiole 1-4 in. *Cymes* in broad open slender panicles. *Corolla* $\frac{1}{2}$ in., pale rose, tube nearly straight, upper lip very short, lower short, narrow, acute, hardly cymbiform. *Stamens* far exserted. *Fruiting calyx* $\frac{1}{4}$ in.—A much larger plant than *P. Gerardianus*, which it closely resembles. The figure in *Icones Plantarum* (copied from a drawing by Heyland of Paris) is, I suspect, made up of the magnified calyx and corolla of this, but of the leaves, panicle and nutlets of *P. Gerardianus*.

3. **P. pulneyensis**, *Hook. f.*; tall, robust, villous, lower leaves stoutly petioled ovate-cordate reticulate crenate, racemes narrow, branches short, corolla-tube short broad, lips short subequal, stamens far exserted, fruiting calyx $\frac{1}{2}$ in. sparingly hispid, lobes obtuse, nutlets broadly oblong. *P. striatus*, *Herb. Wight* 2096.

DECCAN PENINSULA; Pulney Mts., *Wight*.

Foliage, hairiness, and stout stems of *P. nilghiricus*, but flowers and fruit quite different.

4. **P. nigrescens**, *Benth. Lab.* 710, and in *DC. Prodr.* xii. 58; erect, finely pubescent, rarely subvillous, blackish when dry, leaves small petioled ovate or ovate-cordate crenate, cymes narrow usually terminal and solitary, corolla-tube short, lips subequal short, stamens shortly exserted or included, fruiting calyx sparsely scabrid, lobes obtuse, nutlets suborbicular. *Thwaites Enum.* 237, excl. syn. *P. Walkeri*. *P. montanus*, *Herb. Wight*. *P. hians*, and *P. scabrellus*, *Benth. in DC. l. c.* 57, 58.

CEYLON; Central Province, alt. 4-7000 ft., *Mackenzie, &c.*

Stem stout or slender, simple or branched, variable in pubescence. *Leaves* 1-1 $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ in., white, spotted with red. *Fruiting calyx* about as long.

5. **P. Walkeri**, *Arn. Pugill. Fl. Ind. Or.* 36, and in *Nov. Act. Nat. Cur.* xviii. 354; stems subsimple ascending leafy pubescent, leaves petioled lanceolate serrate above the middle glabrous, cymes terminal solitary narrow hoary, corolla-tube rather broad longer than the subequal lips, stamens shortly exserted, fruiting calyx nearly glabrous, lobes obtuse, nutlets broadly oblong. *P. nigrescens*, var. *Thwaites Enum.* 237.

CEYLON; Ramboddi, &c., alt. 4-5000 ft., *Sir G. Mackenzie, Walker*. DECCAN PENINSULA; Tinnevely Hills, alt. 4000 ft., *Beddome*.

A very distinct plant, blackish when dry. *Stem* 12-18 in. *Leaves* 1 $\frac{1}{2}$ -2 in., acute, puberulous on the nerves. *Racemes* 2-5 in. *Calyx* nearly as in *P. nigrescens*.

6. **P. rivularis**, *Wight mss.*; stem erect leafy pubescent, leaves long-petioled lanceolate crenate to below the middle pubescent or glabrate, racemes terminal and axillary narrow pubescent, corolla-tube rather broad longer than the subequal lips, stamens shortly exserted, fruiting calyx nearly glabrous, lobes subacute, nutlets broadly oblong. *P. nigrescens*, β . *scabrellus*, *Wight* (*Kew Distrib.* 2093).

NILGHIRI and ANAMALLAY HILLS; Sispara, *Wight, Gardner, Beddome*.

Very near *P. Walkeri*, and perhaps a variety, but taller, more hairy, green when dry, leaves longer petioled, crenate (not serrate) to near the base.

*** *Fruiting calyx* indistinctly 2-lipped, shortly 5-toothed. *Corolla* $\frac{1}{2}$ - $\frac{1}{3}$ in. long, tube straight, equal at the base.

7. **P. Gerardianus**, *Benth. in Wall. Pl. As. Rar.* ii. 17, *Lab.* 40, and in *DC. Prodr.* xii. 56 (*all in part*); tall, branched, nearly glabrous, leaves large lower petioled ovate crenate or toothed, floral and bracts small, cymes in branched panicles, corolla $\frac{1}{2}$ in., tube subcylindric, lips subequal, fruiting calyx $\frac{1}{10}$ in. glabrous or nearly so, teeth subacute, nutlets ellipsoid. *Wall. Cat.* 2742. *P. oblongifolius*, *Wall. Pl. As. Rar.* ii. 16; *Cat.* 2739; *Benth. ll. c.*

TEMPERATE HIMALAYA, alt. 3-9000 ft.; from Kashmir to Sikkin (ascending to 12,000). KHASIA MTS., alt. 4-6000 ft.; *Wallich, &c.*

Stem 4-6 ft., glabrous or puberulous above. *Leaves* 3-7 by 1-4 in., acuminate,

membranous or rigid, sparsely scaberulous above or more so all over; base of lower narrowed into the long or short petiole. *Panicles* pyramidal, branches slender. *Flowers* white, speckled with pink. *Stamens* exserted.—I cannot distinguish *P. graciliflorus* by any sufficient character. *Hyssopus lophanthoides*, Ham., referred here by Bentham, is, according to an original specimen of Hamilton's, a different plant (see end of genus). *P. oblongifolius* is a diseased state with inflated barren calyces.

VAR. graciliflora; leaves more scabrous above, and usually red-brown when dry. *P. graciliflora*, Benth. in *DC. Prodr.* xii. 56. *P. Gerardianus*, var. *hispidus*, *Herb. Ind. Or. H. f. & T.*—Nepal, Sikkim, and Khasia Mts.

VAR. brachyantha; corolla-tube very short and wide, scarcely exceeding the calyx. —Khasia Mts.; Churra, alt. 4000 ft., *J. D. H. & T. T.* Sikkim, alt. 5–8000 ft., Clarke, *J. D. H.* Prome Hills, Benson (in *Herb. Maingay*).—A dubious plant, referred by Clarke (inss.) to *P. striatus*, which small specimens resemble. Fruiting calyx not seen.

8. *P. striatus*, Benth. in *Wall. Pl. As. Rar.* ii. 17, and in *DC. Prodr.* xii. 56; stem usually 6–12 in. glabrous pubescent or subvillous, leaves small lower petioled broadly ovate crenate, cymes paniced, corolla-tube broad or narrow short or tubular, fruiting calyx $\frac{1}{2}$ in. hispid, teeth obtuse, nutlets oblong. *Wall. Cat.* 2740.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 4–8000 ft., Wallich, &c. KHASIA MTS., alt. 3–6000 ft., common.

The usually much smaller size, shorter broader leaves, more flaccid habit, and hispid calyx best distinguish this from *P. Gerardianus*, but there are many specimens that I am in doubt about. The corolla is very variable, and the stamens are normally far exserted.

9. *P. Stracheyi*, Benth. mss.; stem simple ascending puberulous, leaves 4–5 in. short-petioled narrowly lanceolate serrate above the middle, cymes in a terminal narrow panicle.

WESTERN HIMALAYA; Kumaon, in the Surja valley, alt. 4500 ft., Strachey & Winterbottom.

Flowers of *P. Gerardianus*, but very distinct in foliage and habit, which resemble *P. Walkeri*. The fruit is not ripe. A very similar but more flaccid plant (specimens without corolla and fruit), and with longer petioles, is found in Pegu by Dr. Brandis.

10. *P. hispidus*, Benth. in *Wall. Pl. As. Rar.* ii. 17, Lab. 41, and in *DC. Prodr.* xii. 57; stout, erect, scaberulous, densely pubescent or villous, leaves subsessile ovate crenate or serrate tomentose beneath, corolla tubular pubescent, lower lip much longer than the upper, fruiting calyx $\frac{1}{2}$ in. densely villous, nutlets very minute ellipsoid. *Wall. Cat.* 2741.

KHASIA MTS., alt. 4000 ft.; Wallich, &c.

Like a robust and (usually) densely woolly form of *P. Gerardianus*, with a very minute woolly calyx. *Flowers* white, speckled with red.

11. *P. Stocksii*, Hook. f.; slender, simple or branched, glabrous or sparsely hairy, leaves petioled ovate or ovate-cordate crenate membranous, panicles pyramidal, corolla-tube short broad, fruiting calyx $\frac{1}{10}$ in. scaberulous, teeth subacute, nutlets broadly oblong. *P. striatus* & Concan, *Herb. Ind. Or. H. f. & T.* *P. Wightii*, *Grah. Cat. Bomb. Pl.* 148; Dalz. & Gibs. *Bomb. Fl.* 205.

DECCAN PENINSULA; the Concan, Stocks, Law, &c.; Bababoodan Hills, Heyne in *Herb. Rottler*; Belgaum, at Purwar Ghat, Ritchie.

Possibly a form of *P. striatus*, but is a larger plant. Small specimens from the Kala Nuddi (banks above Saopa), from Ritchie, have very minute fruiting calyces. Heyne's specimen is a very small one, but, I think, of this species.

12. **P. Wightii**, *Benth. Lab.* 41, and in *DC. Prodr.* xii. 56; tall, robust, branched, glabrous or scaberulous, leaves petioled broadly ovate or cordate crenate-toothed rather rigid, cymes lax-fld. often leafy, large pyramidal panicles, corolla-tube short broad, fruiting calyx $\frac{1}{10}$ – $\frac{1}{8}$ in. scaberulous, teeth obtuse, nutlets oblong. *Wight Ic.* t. 1429.

NILGHIRI and PULNEY MTS., alt. 1–7000 ft.; *Wight, &c.*

The var. *macrophylla*, *Benth.*, is only a larger-leaved specimen.

13. **P. nilghiricus**, *Benth. in DC. Prodr.* xii. 57; villous, stem very robust, leaves thick stoutly petioled broadly ovate-cordate rugose crenate, cymes in pyramidal panicles, flowers rather crowded, corolla tubular, lobes pubescent, fruiting calyx $\frac{1}{12}$ in. densely woolly, nutlets suborbicular. ? *P. bullatus*, *Benth. l. c.*

NILGHIRI and ANAMALLAY MTS.; *Sir F. Adams, Wight, Beddome.*

Apparently a very distinct species. Whole plant yellowish-brown when dry. *P. bullatus*, *Benth.*, may be the same thing; I have seen no authentic specimens of it.

14. **P. capillipes**, *Benth. in DC. Prodr.* xii. 57; annual, small, softly pubescent, rather slender, leaves small petioled ovate or cordate crenate, cymes in narrowly pyramidal panicles, corolla tubular, lips subequal lower very small, fruiting calyx $\frac{1}{10}$ in. puberulous, teeth obtuse, nutlets oblong. *Thwaites Enum.* 237.

CEYLON; Central Province, alt. 3–5000 ft., *Walker, &c.*

Habit of *P. striatus*, which small specimens resemble, whilst larger ones approximate to *P. Wightii*. Corolla white, with pink spots on upper lip. Stamens exerted.

15. **P. nepetæfolius**, *Benth. in DC. Prodr.* xii. 57; villous with soft spreading hairs, stem 1–2 ft. simple, leaves petioled ovate-cordate crenate soft and softly hairy on both surfaces, cymes in narrowly pyramidal panicles, corolla tubular, lips subequal, fruiting calyx $\frac{1}{4}$ in. pubescent, teeth obtuse, nutlets ovoid-oblong.

DECCAN PENINSULA, *Wight, Perrottet*; Nilghiri and Anamallay Hills, *Beddome.*

A much smaller plant than *P. Wightii*, clothed with long hairs, and with a tubular corolla $\frac{1}{4}$ in. long.

**** *Fruiting calyx longer than broad, 2-lipped or subequally 5-toothed. Corolla $\frac{1}{6}$ – $\frac{1}{4}$ in., tube declinate or abruptly decurved (except *P. repens*), base usually gibbous.*

16. **P. repens**, *Wall. Pl. As. Rar.* ii. 17, and *Cat.* 2746; pubescent or villous, stem short, leaves long-petioled broadly ovate- or orbicular-cordate obtuse crenate, cymes in narrow racemes which are longer than the stem, corolla-tube nearly straight cylindric obtusely spurred at the base above, stamens included, fruiting calyx scaberulous, teeth short obtuse, nutlets very minute broadly oblong. *Benth. Lab.* 43, and in *DC. Prodr.* xii. 58.

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 6–9000 ft., *J. D. H., Clarke.*

Stem 4–6 in., prostrate below. Leaves $1\frac{1}{2}$ –3 in. broad, membranous; petiole 1–3 in. Panicles solitary and terminal, or few axillary, 1 foot long and under, lax fld. Corolla $\frac{1}{6}$ in. *Fruiting calyx $\frac{1}{4}$ in.*—The corolla is not like that of *P. Coetsa*, nor are the calyx-teeth lanceolate and acute (as described in *DC. Prodr.*).

17. **P. Coetsa**, *Ham. in Don Prodr.* 117; tall, erect, branched, pubescent

or glabrate, leaves ovate crenate narrowed into the winged petiole, cymes in lax-fld. paniced racemes, corolla-tube much shorter than the large saccate lower lip, fruiting calyx narrow shortly 2-lipped, teeth acute, nutlets oblong or subglobose. *Benth. in Wall. Pl. As. Rar.* ii. 17, *Lab.* 42, and in *DC. Prodr.* xii. 58 (excl. syn. Burm.); *Wall. Cat.* 2743. *Ocimum Coetsa*, *Spreng. Syst., Cur. post.* 223.

TEMPERATE and SUBTROPICAL HIMALAYA; from Murree to Mishmi, alt. 3–8000 ft., abundant. KHASIA MTS., alt. 3–5000 ft.; Burma, *Wallich*.

A tall strong-smelling 6–8 ft. undershrub. *Leaves* 1–3 in. *Cymes* very numerous, branchlets subsecund. *Corolla* $\frac{1}{2}$ in., lavender-blue; upper lip very short. *Stamens* included in the lower lip. *Fruiting calyx* $\frac{1}{10}$ – $\frac{1}{8}$ in., hoary or scabrous. *Nutlets* apparently variable.

VAR. *Hookeri*; tall, leaves sometimes 5 in. glabrous or puberulous, fruiting calyx larger $\frac{1}{4}$ – $\frac{1}{2}$ in. very broad, teeth longer more acute, nutlets twice as large. *Plectranthus* no. 15, *Herb. Ind. Or. H. f. & T.* *P. Hookeri*, *Clarke mss.*—Khasia Mts.; Moflong, alt. 5000 ft., *J. D. H. & T. T.*

18. ***P. menthoides***, *Benth. in Wall. Pl. As. Rar.* ii. 17, *Lab.* 42, and in *DC. Prodr.* xii. 59; tall, erect, branched, hoary pubescent or tomentose, leaves petioled ovate crenate narrowed into the winged petiole, cymes in long racemes dense or lax-fld., corolla short, tube about as long as the saccate lower lip, fruiting calyx hoary, teeth subequal subacute, nutlets oblong. *Wall. Cat.* 2744. *P. Macraei*, *Benth. Lab.* 42, and in *DC. l. c.*; *Wight Ic. t.* 1430. *P. rugosus*, β . tomentosus, *Benth. in Wall. l. c. ii.* 17; *Wall. Cat.* 2745 B. *P. Coetsa*, *Thwaites Enum.* 237. *Scutellaria japonica*, *Burm. Fl. Ind.* 130.

SOUTH DECCAN PENINSULA, from Belgaum southward; Nilghiri and Pulney Mts., by wet ditches, *Wight*. CEYLON; Central Province, alt. 4–6000 ft.

The southern representative of *P. Coetsa*, and probably only a variety of that plant. The length of the corolla-tube is variable, as is the pubescence of the leaves.

19. ***P. Maddeni***, *Benth. in Strach. Cat. Pl. Kumaon*, 86; stout, erect, branched, nearly glabrous, leaves ovate crenate narrowed into the winged petiole, cymes in lax- or dense-fld. racemes, corolla-tube much shorter than the saccate lower lip, fruiting calyx broadly campanulate glabrous, teeth obtuse, nutlets subglobose.

TEMPERATE HIMALAYA; Kumaon, alt. 7–8500 ft., *Strachey & Winterbottom, Duthie*; Sikkim, alt. 5–10,000 ft., *J. D. H.*

Very near *P. Coetsa*, and perhaps a form of it, but more glabrous, with broader fruiting calyces, which have obtuse teeth and more rounded nutlets.

20. ***P. melissoides***, *Benth. Lab.* 39, and in *DC. Prodr.* xii. 62; herbaceous, erect, tomentose or puberulous, leaves small sessile or shortly petioled ovate or rounded crenate, cymes in lax-fld. slender racemes, corolla-tube short broad, fruiting calyx 2-lipped subhispid, teeth acute, nutlets globose. *Wall. Cat.* 7122.

KHASIA MTS., alt. 4–6000 ft.; *Wallich, Mack, Griffith, H. f. & T.*, &c.

Stem 1–2 ft., rather slender, strict. *Leaves* $\frac{1}{2}$ –1 in., glabrate or very tomentose beneath or on both surfaces, narrowed into the short petiole. *Racemes* long, slender, strict. *Corolla* $\frac{1}{2}$ in., pink; lips short, gibbously hemispheric. *Fruiting calyx* $\frac{1}{4}$ in., broadly campanulate.

21. ***P. rugosus***, *Wall. Pl. As. Rar.* ii. 17, and *Cat.* 2745; shrubby, erect, hoary with stellate down, leaves small petioled ovate or elliptic obtuse crenate rugose above beneath densely white-tomentose, cymes axillary lax-

fld. panicked, corolla-tube very short, lips very large, fruiting calyx hoary, teeth subequal acute, nutlets oblong. *Benth. Lab.* 43, and in *DC. Prodr.* xii. 59, var. a.; *Gamble Ind. Timbers*, 300.

WESTERN HIMALAYA; dry hills from Kashmir to Garwhal, alt. 3–8000 ft. BHOTAN; *Griffith.* MARWAR; on Mt. Abo, *Stocks.*—DISTRIB. Afghanistan.

A shrub; branches slender, strict. *Leaves* 1 in. and less, leathery, finely reticulate above; base subcordate, rarely acute; petiole slender. *Cymes* in leafy racemes, with slender peduncles and pedicels. *Corolla* $\frac{1}{2}$ in., white, with rose or purple spots; lips much longer than the tube, lower longest. *Fruiting calyx* $\frac{1}{8}$ in. long, very shortly 2-lipped.

Sect. 2. **Pyramidium.** *Fruiting calyx* erect, tubular, equally 5-toothed. *Corolla-tube* decurved, base gibbous. *Nutlets* trigonous, ovoid-oblong, acuminate.

22. **P. ternifolius**, *Don Prodr.* 117; robust, densely white-tomentose, leaves opposite and ternately whorled subsessile lanceolate acuminate serrate rugose, cymes in dense long white villous panicles, corolla very short villous, fruiting calyx cylindric, teeth subequal. *Wall. Cat.* 2748; *Benth. in Lab.* 44; in *Wall. Pl. As. Rar.* ii. 17, and in *DC. Prodr.* xii. 61; *Hook. Ic. Pl.* t. 460. *Ocimum ternifolium*, *Spreng. Syst.*, *Cur. post.* 224.

TROPICAL HIMALAYA; from Kashmir to Bhotan, alt. 0–4000 ft. KHASIA MTS., alt. 0–3000 ft. BENGAL, ASSAM. BEHAR, at Parusnath, *J. D. H.*—DISTRIB. Burma, S. China.

A bush, 3–5 ft., with strict erect branches. *Leaves* 3–7 in., thick, rugose, base acute. *Panicles* cylindric, white; lower bracts leafy; flowers subsessile, densely crowded. *Corolla* white, with pink spots at base of upper lip; tube inflated, and lips very short. *Stamens* included. *Fruiting calyx* $\frac{1}{8}$ – $\frac{1}{4}$ in., straight, erect; teeth rounded. *Nutlets* trigonous, acuminate.

Sect. 3. **Coleoides.** *Fruiting calyx* 2-lipped, upper lip large, rounded, reflexed, very shortly 2-toothed or entire; lower with 3 acute, awned, or subulate pointed teeth. *Corolla-tube* deflexed or declinate, base gibbous or not.

23. **P. incanus**, *Link Enum. Hort. Berol.* ii. 120; herbaceous, pale, hoary, stem subsimple, leaves large long-petioled broadly ovate-cordate crenate, cymes lax-fld. racemose, corolla-tube short longer than the short hemispheric lower lip, base not gibbous, fruiting calyx broadly campanulate, lower lip longest, teeth with long points, nutlets large subglobose. *P. cordifolius*, *Don Prodr.* 116; *Benth. Lab.* 35, in *Wall. Pl. As. Rar.* ii. 16, and in *DC. Prodr.* xii. 66; *Wall. Cat.* 2736; *Grah. Cat. Bomb. Pl.* 148; *Dalz. & Gibs. Bomb. Fl.* 205. *P. secundus*, *Roxb. Hort. Beng.* 45, and *Fl. Ind.* iii. 20. *P. divaricatus*, *Weinm. in Syll. Pl. Soc. Ratisb.* i. 68, and in *Flora*, 1826, 174. *P. mollis*, *Spreng. Syst.* ii. 690. *Ocimum molle*, *Ait. Hort. Kew.* ii. 322. *O. mayporensis*, *Roth Nov. Sp.* 271.—*Rheede, Hort. Mal.* x. t. 84.

Hills of CONTINENTAL INDIA, from the HIMALAYA (Simla to Sikkim), ascending to 5500 ft., KHASIA MTS. and CENTRAL INDIA, to the ANAMALLAYS. (Absent in Ceylon and in the Malay Peninsula.)

Whole plant usually hoary with very fine pubescence. *Stem* robust below. *Leaves* 2–4 in., sometimes as broad; petiole as long or longer than the blade. *Corolla* $\frac{1}{4}$ in. long, slightly decurved, white pubescent. *Stamens* included. *Fruiting calyx* $\frac{1}{2}$ in. *Nutlets* $\frac{1}{2}$ in. diam.—Lower lip of corolla longest of any Indian species.

24. **P. subincisus**, *Benth. in Wall. Pl. As. Rar.* ii. 16, *Lab.* 36, and in *DC. Prodr.* xii. 66; glabrous or puberulous, stem short branched, leaves long petioled orbicular ovate obtuse sinuate-crenate, corolla very small, tube

slender decurved longer than the short lower lip, fruiting calyx campanulate, lips short upper rounded, teeth of lower with subulate tips, nutlets globose smooth or rugose. *Wall. Cat.* 2737.

DECCAN PENINSULA; near Courtallum and Dindigul, *Herb. Rottler, Wight*. CEYLON (var. *Gardneri*).

Stem a foot high, flaccid, vaguely branched. *Leaves* $1\frac{1}{2}$ –2 in. long and broad, flaccid; petiole as long. *Corolla* $\frac{3}{8}$ in. long, pubescent. *Fruiting calyx* dimorphic, larger $\frac{1}{2}$ in., with deeply pitted brown nutlets; smaller $\frac{3}{8}$ in., with smooth pale nutlets.—The specimens in Wallich's, Wight's, and Rottler's Herbaria are very imperfect.

VAR. *Gardneri*; leaves narrowed into the petiole, purplish when dry. P. Gardneri, *Thwaites Enum.* 237.—Ceylon; Central Province, Adam's Peak, &c., *Walker, &c.*

25. **P. Parishii**, *Hook. f.*; annual, puberulous, flaccid, branched, leaves orbicular-ovate narrowed into the very long petiole coarsely crenate or lobulate, cymes in lax-fl. racemes, corolla $\frac{3}{8}$ in., tube very slender with the inflated throat much longer than the narrow lip.

TENASSERIM; Moulmein, *Parish*.

Stem succulent, 6–10 in. *Leaves* 2 in. long and broad, membranous, obtuse. *Calyx* minute in flower; peduncles and pedicels pubescent; lower lip with subulate teeth. *Corolla* with pale blue lower lip. *Fruiting calyx* $\frac{1}{2}$ in., broadly campanulate, subequally very shortly 2-lipped; upper lip triangular, tip subulate; teeth of lower similar but narrower. *Nutlets* very pale.—I have but one specimen of this very distinct species.

26. **P. zeylanicus**, *Benth. Lab.* 36, and in *DC. Prodr.* xii. 66; tall, slender, densely finely glandular-pubescent, leaves shortly petioled orbicular-crenate crenate, flowers minute whorled in very long slender racemes, corolla-tube longer than the short lower lip, fruiting calyx minute subspheric, upper lip rounded mucronate, teeth of lower subulate.

CEYLON; Central Province, at Ramboddi, *Gardner*. (Commonly cultivated in native gardens as a medicine, unknown wild, *Thwaites*.)

Stem 2–3 ft., stout, succulent, naked. *Leaves* in few pairs, 1–4 in. diam., rather thick. *Racemes* 6–12 in., very narrow; flowers in 6–10-fl. whorls on the main rachis; pedicels $\frac{1}{4}$ in. *Corolla* $\frac{1}{2}$ in. long, slightly curved, tube hardly gibbous at the base. *Fruiting calyx* $\frac{1}{10}$ in., densely glandular-pubescent like the whole raceme. *Nutlets* not seen.

27. **P. coleoides**, *Benth. in DC. Prodr.* xii. 64; very stout, branched, glandular-tomentose or glabrate, leaves long-petioled ovate or orbicular-ovate crenate obtuse, flowers racemed on the branches of a pyramidal densely glandular-tomentose panicle, corolla pubescent, tube about equalling the lower lip, upper lip of fruiting calyx rounded, teeth of lower lanceolate acuminate, nutlets oblong black shining. *Bot. Mag. t.* 5841; *Saunders Refug. Bot. t.* 256. *Coleus* Wightii, *Benth. Lab.* 58, and in *DC. Prodr.* xii. 78; *Wight Ic. t.* 1433. *C. glabratus*, *Benth. Lab.* 58, and in *DC. l. c.* *C. paniculatus*, *Benth. in Wall. Plant. As. Rar.* ii. 79; *Wall. Cat.* 2734, and in *DC. l. c.*

NILGHIRI and ANAMALLAY MTS.; ascending to 7000 ft. in moist places, *Wight, Perrottet, &c.*

Stem 2–3 ft., succulent. *Leaves* 1–4 in. diam., fleshy; petiole as long as the blade. *Panicles* thyrsiform, sometimes 1 foot across the lower branches. *Corolla* $\frac{1}{2}$ in. long, lilac; lower lip ciliate. *Stamens* included. *Fruiting calyx* very variable, broad straight and campanulate, or narrowed and curved.

28. **P. urticifolius**, *Hook. f.*; very robust, glabrous except the

puberulous panicle, leaves very large stoutly petioled broadly ovate obtusely acuminate, margin regularly obtusely lobulate, lobules crenate, cymes in stout branched panicles, corolla-tube equalling the narrow lower lip, fruiting calyx large, upper lip orbicular ovate, teeth of lower subulate-lanceolate, nutlets large orbicular oblong brown shining. *Coleus urticifolius*, *Benth. in DC. Prodr.* xii. 78.

DECCAN PENINSULA; Courtallum, *Wight*; Tinnevely Hills, alt. 4500 ft., *Beddome*. *Stem* short. *Leaves* 3-6 in. long and nearly as broad, sometimes minutely puberulous above, gland-dotted beneath, lobules rounded or ovate; petiole 2-3 in., very thick. *Panicle* very large; branches suberect; flowers racemed or corymbose. *Flowers* $\frac{2}{3}$ in. long. *Corolla-tube* cylindric, decurved; lips subequal, upper very broad, lower narrowly cymbiform. *Stamen* quite free. *Fruiting calyx* $\frac{1}{2}$ in. long, 2 lowest teeth longest, incurved. *Nutlets* large.—Near *P. coleoides*.

29. **P. fruticosus**, *Wight Cat.* 2524; very robust, shrubby, branches and leaves beneath densely tomentose, leaves large rounded ovate or cordate obtusely acuminate coarsely crenate, flowers secundly racemed on the erect branches of a dense stout glandular-pubescent thyrsus, corolla decurved. *Coleus fruticosus*, *Benth. in DC. Prodr.* xii. 78.

DECCAN PENINSULA; Pulney Mts., *Wight*.

Stem as thick as the middle finger, spongy. *Leaves* 3-5 in. long and broad, pubescent above, margin sublobulate; petiole 1-2 in., very stout, almost woolly. *Panicle* 6-10 in., rachis and primary branches woody, ultimate 1-3 in., flexuous, many-flid.; flowers alternate, shortly pedicelled. *Corolla* pubescent, $\frac{2}{3}$ in. long. *Filaments* quite free. *Upper calyx-lip* ovate, teeth of lower acuminate.—A very robust well-marked species. The fruit is not ripe.

30. **P. Griffithii**, *Hook. f.*; erect, branched, hirsutely tomentose, leaves petioled ovate acuminate toothed or crenate, cymes very short in long slender narrow racemes, corolla-tube very slender longer than the lower lip, fruiting calyx sparsely hairy, upper lip broad rounded, teeth of lower acuminate, nutlets orbicular smooth black shining.

EASTERN ASSAM; Mishmi Hills, *Griffith*.

Stem rather woody, tomentose; branches, racemes and leaf nerves beneath with long hairs amongst the tomentum. *Leaves* 3-5 in., hirsute on both surfaces, base rounded, shortly cordate at the insertion of the $\frac{1}{2}$ -1 $\frac{1}{2}$ in. long petiole. *Racemes* 6-10 in., $\frac{3}{4}$ in. diam., leafless, rather dense-flid., rachis very hirsute; cymes short, sessile, with pedicelled flowers. *Corolla* $\frac{1}{2}$ in. long, tube declinate, curved, white, lips subequal, pale rose-coloured. *Fruiting calyx* $\frac{1}{6}$ in., contracted above the swollen base, mouth campanulate, lips subequal in length.

31. **P. crenulatus**, *Hook. f.*; erect, densely finely tomentose throughout, leaves petioled ovate acute crenulate, cymes short in axillary racemes, fruiting calyx hairy, upper lip broad rounded, teeth of lower acuminate, nutlets orbicular black granulate opaque.

UPPER ASSAM; Namroop, *Griffith*.

Very near *P. Griffithii*, but not at all hirsute, leaves similar in shape but less acuminate, and crenatures smaller, racemes shorter and nutlets opaque and granulate. *Flowers* not seen.

32. **P. Helferi**, *Hook. f.*; stem woody below and branches and young leaves finely puberulous, leaves shortly petioled lanceolate subacute crenate above the entire base glabrous, cymes short subsessile in branched glandular-tomentose racemes, upper lip of glandular-hairy fruiting calyx orbicular, teeth of lower subulate.

TENASSERIM; *Helfer*.

Stem 1–2 feet. *Leaves* $1\frac{1}{2}$ – $2\frac{1}{2}$ in., narrowed into the petiole, rather coriaceous, nerves oblique. *Fruiting calyx* $\frac{1}{2}$ in. *Corolla* and *nutlets* not seen.—The specimens are hardly fit for description, but the species is too remarkable to be passed over.

DOUBTFUL SPECIES.

P. PATCHOULI, *Clarke mss.*; tall, erect, branched, hirsutely tomentose, leaves petioled ovate-cordate crenate-toothed, cymes branched, flowers subsecundly sessile on the branchlets of a loose panicle, calyx-teeth subequal, corolla-limb subclavate with a large incurved cymbiform obtuse lower lip and shorter narrow upper lip.

ASSAM; *Jenkins* (Herb. Calcutt.). KHASIA MTS.; Johra, alt. 4000 ft., cult., *Clarke*.

Stem stout, branched. *Leaves* 2–3 in., hairy on both surfaces. *Cymes* paniced, irregularly branched; bracts small, leafy; pedicels $\frac{1}{10}$ in. or 0. *Calyx* hardly 2-lipped, teeth acute. *Corolla* $1\frac{1}{2}$ in., tube slender, upper lip much shorter and narrower than the saccate obtuse lower, which is much larger than the tube.—“This, I am told, is the true Patchouli plant, and has the true scent, which *Pogostemon Patchouli* has not,” *C. B. Clarke*. I have seen no fruit, and the inflorescence is very peculiar; it may not be a *Plectranthus*.

P. ? MONTANUS, *Benth. in Wall. Pl. As. Rar.* ii. 17, and in *DC. Prodr.* xii. 60; *Wall. Cat.* 2747; densely tomentose, stem short very robust, leaves shortly petioled ovate or rounded crenate very thick rugose, racemes dense-fld. pyramideate, branches very thick ascending, whorls close set but not confluent, flowers sessile or pedicelled, calyx $\frac{1}{10}$ in. hemispheric with 5 triangular subacute teeth, nutlets suborbicular polished pale.—Mysore; at Nundydroog, *Klein. Herb. Rottler*.—Habit of *P. coleoides*, but calyx very different. The specimens are very imperfect, and have no corolla.

HYSSOPUS LOPHANTHOIDES, *Ham. in Don Prodr.* 110, referred to *P. Gerardianus* by *Bentham*, can hardly be that plant; a specimen of it from Hamilton more resembles *P. striatus*, being very pubescent. It may, however, be a hairy form of *P. Gerardianus*.

OCIMUM DENSIFLORUM, *Roth Nov. Sp.* 275, doubtfully referred by *Bentham* to *P. rugosus*, must be a very different plant, according to the description.

P. ROTUNDIFOLIUS, *Spreng. Syst.* ii. 690; *Benth. Lab.* 34, and in *DC. Prodr.* xii. 65; *Grah. Cat. Bomb. Pl.* 148. *Coleus ? rugosus*, *Benth. in Wall. Pl. As. Rar.* ii. 15. *Germania rotundifolia*, *Poir. Dict.* ii. 763. *Nepeta madagascariensis*, *Lam. ? Dict.* i. 712.—*Kurka, Rheede Hort. Mal.* xi. t. 25?—A reputed native of Mauritius and Coromandel? The last habitat is no doubt founded on the supposed identity of the Mauritian with the plant figured by *Rheede*, which represents a flowerless tuberiferous herb which has not been identified. Local botanists should be able to discover what *Rheede's* plant is.

9. COLEUS, *Lour.*

Characters of *Plectranthus*, but filaments combined below into a sheath around the style.—Species about 50, Tropical African and Asiatic, and one Australian.

* *Calyx-throat villous within.*

1. *C. spicatus*, *Benth. in Wall. Pl. As. Rar.* ii. 15, *Lab.* 49, and in *DC. Prodr.* xii. 71; stem very stout villous with long spreading hairs or glabrate, leaves sessile obovate ovate or orbicular glabrous fleshy entire or crenate, floral large concave deciduous, whorls in a dense cylindric spiciform villous thyrses, upper calyx-lip very broad truncate. *Wight Ic.* t. 1431; *Wall. Cat.* 2729. *C. Heynii*, *Benth. Lab.* 50, and in *DC. l. c.* *C. Zatarhendi*, *Dalz. & Gibs. Bomb. Fl.* 206; ? *Benth. Lab.* 50. *Plectranthus*

monadelphus, *Heyne mss.*; *Roxb. Hort. Beng.* 45, and *Fl. Ind.* iii. 22. *P. caninus*, *Roth Nov. Sp.* 279. *Ocimum monadelphum*, *Roth l. c.* 267. ? *O. Zatarhendi*, *Forsk. Fl. Æg. Arab.* 109.

SOUTH DECCAN; on low rocky hills, common.

Stem 6–12 in., simple or branched. *Leaves* few, very variable, $\frac{1}{2}$ by $3\frac{1}{2}$ in. *Spikes* 4–8 in. by $\frac{1}{2}$ – $\frac{3}{4}$ in. diamf.; bracts broad, acute, ciliate; flowers $\frac{1}{2}$ in. long; upper calyx-lip crenulate, teeth of lower acute. *Corolla-tube* slender, bent above the middle; upper lip 4-lobed, lower boat-shaped.

2. **C. barbatus**, *Benth. in Wall. Pl. As. Rar.* ii. 15, *Lab.* 49, and in *DC. Prodr.* xii. 71; stem stout villous with long hairs, leaves petioled ovate or obovate obtuse crenate villous or hispid, floral ovate deciduous, whorls distant, upper calyx-lip rounded ovate acute. *Wall. Cat.* 2728; *Grah. Cdt. Pl. Bomb.* 148; *Dalz. & Gibs. Bomb. Fl.* 205; *Wight Ic.* t. 1432. *C. Schimperii*, *Vatke in Linnæa*, xxxvii. 320. *Plectranthus barbatus*, *Andr. Bot. Rep.* t. 494. *P. comosus*, *Bot. Mag.* t. 2318. *P. Forskohlii*, *Willd. Sp. Pl.* iii. 169; *Bot. Mag.* t. 2036. *P. asper*, *Spreng. Syst.* ii. 690. *P. mysorensis*, *Heyne mss.* *Germania Forskohlii*, *Poir. Dict.* ii. 764. *Ocimum asperum*, *Roth Nov. Sp.* 268. *O. cinereum*, *Brown in Salt. Abyss. App.* *O. saccharoides*, *Willd. f. Heyne.*

SUBTROPICAL HIMALAYA; Nepal and Kumaon, ascending to 8000 ft. BEHAR; top of Parusnath, *Thomson*. DECCAN PENINSULA; common. CEYLON; Oovah district, alt. 3–5000 ft.—DISTRIB. Tropical E. Africa.

Stem 1–2 ft., ascending, branched. *Leaves* 3–5 in., narrowed into the petiole. *Racemes* 6–12 in., stout; flowers $\frac{3}{4}$ –1 in. *Corolla* pale blue, much like *C. spicatus*. *Fruiting calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in., upper lip acuminate, teeth of lower subulate, all pungent.

** *Calyx-throat glabrous within.*

3. **C. aromaticus**, *Benth. in Wall. Pl. As. Rar.* ii. 15, *Lab.* 51, and in *DC. Prodr.* xii. 72; shrubby below, hispidly villous or tomentose, leaves petioled broadly ovate or cordate crenate fleshy, floral minute, whorls distant densely many-fld., upper calyx-lip ovate acute membranous, lower acuminate. *Wall. Cat.* 2730; *Wight Ill.* ii. t. 175; *Grah. Cat. Bomb. Pl.* 148; *Dalz. & Gibs. Bomb. Fl. Suppl.* 66; *Bot. Reg.* t. 1520. *C. amboinicus*, *Lour. Fl. Coch.* 372. *C. crassifolius*, *Benth. in Wall. Pl. As. Rar.* ii. 13, and *Lab.* 52; *Wall. Cat.* 2731. *Plectranthus aromaticus*, *Roxb. Hort. Beng.* 45, and *Fl. Ind.* iii. 22.

Cultivated throughout INDIA, CEYLON and various tropical countries.

Stem 1–3 ft., fleshy. *Leaves* 1–2 in., very aromatic. *Flowers* shortly pedicelled, $\frac{1}{2}$ in. long. *Corolla* pale purplish, tube short, throat inflated, lips short. *Stamens* shortly exserted. *Fruiting calyx* suberect.—*Roxburgh* describes the flowers as blue. *C. amboinicus* is the earliest name, but not very appropriate.

4. **C. parviflorus**, *Benth. in DC. Prodr.* xii. 72; stem stout fleshy, roots tuberous, leaves petioled rounded-ovate obtuse coarsely crenate glabrous or nearly so, whorls subdistant slender pubescent, racemes laxly many-fld., upper calyx-lip ovate, teeth of lower obtuse or lowest mucronate. ? *C. tuberosus*, *Benth. Lab.* 59 (*Plectranthus tuberosus*, *Blume*).

DECCAN PENINSULA; Quilon and Panpanassum, *Wight*. CEYLON, cultivated, *Gardner*.

Stem 1–2 ft. *Leaves* $1\frac{1}{2}$ –2 in., often as broad, base cuneate or subcordate. *Flowers* $\frac{1}{4}$ – $\frac{1}{2}$ in. *Corolla* decurved, lips short. *Stamens* included. *Fruiting calyx* not seen.—Probably *C. tuberosus*, which is cultivated for its tubers in Java as this is in Ceylon, but *Blume* describes the Javan plant as having quite entire leaves.

5. **C. scutellarioides**, *Benth. in Wall. Pl. As. Rar.* ii. 16, *Lab.* 53, and in *DC. Prodr.* xii. 73; tall, slender, glabrous or minutely hairy, leaves petioled ovate or ovate-lanceolate acuminate crenate membranous, whorls in distant slender puberulous racemes laxly many-fl., upper calyx-lip ovate, lateral teeth of lower obtuse, lowest acute. *Wall. Cat.* 2732. *Ocimum scutellarioides*, *Linn.*; *Burm. Fl. Ind.* 130; *Bot. Mag.* t. 1446. *Plectranthus scutellarioides*, *Br. Prodr.* 506; *Roxb. Fl. Ind.* iii. 21. *P. nudiflorus*, *Willd. Sp. Pl.* iii. 168. *Germania nudiflora*, *Poir. Dict. Suppl.* ii. 763.

Cultivated in INDIA.—DISTRIB. Malay Islands, Australia.

Stem 2-3 ft. *Leaves* 1-3 in., usually purplish beneath, base rounded or cuneate. *Flowers* $\frac{1}{2}$ in., white with a blue lower lip, tube abruptly decurved. *Stamens* included. —There are several very distinct varieties described from Australia (*Benth. Fl. Austral.* v. 30).

6. **C. atropurpureus**, *Benth. in Wall. Pl. As. Rar.* ii. 17, *Lab.* 54, and in *DC. Prodr.* xii. 74; tall, slender, finely pubescent, leaves long-petioled broadly ovate or rounded obtuse or acute coarsely crenate, flowers in lax whorled cymes which form narrow panicles, upper calyx-lip ovate sub-acute, teeth of lower variable, two lowest aristate. *Nunes Fl. Filip.* t. 208; *Wall. Cat.* 2733.

MALACCA, PENANG and SINGAPORE; *Wallich, &c.*—DISTRIB. Malay and Pacific Islands.

Stem 2-3 ft. *Leaves* 2-4 in., membranous, base rounded truncate or cuneate; petiole 1-2 in. *Cymes* irregularly branched, peduncled; flowers pedicelled. *Corolla* $\frac{1}{2}$ in., much as in *C. scutellarioides*. *Stamens* included. *Fruiting calyx* variable, $\frac{1}{6}$ - $\frac{1}{4}$ in. long.

7. **C. malabaricus**, *Benth. in Wall. Pl. As. Rar.* ii. 16, *Lab.* 57, and in *DC. Prodr.* xii. 76; glabrous, puberulous or villous, leaves large membranous long-petioled ovate or lanceolate acute or acuminate crenate, flowers laxly cymose or racemose on the branches of spreading panicles, fruiting calyx broad membranous, upper lip large rounded acute, teeth of lower longer acuminate. *Wall. Cat.* 2735; *Thwaites Enum.* 238. *C. ovatus* & *Macraei*, *Benth. Lab.* 57, 58, and in *DC. l. c.* 76, 77. *C. Macraei*, *Bot. Mag.* t. 4690. *C. Walkeri*, *Benth. in DC. l. c.* 77.

TRAVANCORE and the NILGHIRI MTS.; *Wight, Gardner*. CEYLON; common up to 6000 ft.

Stem 2-3 ft., usually dark purple, as are the leaves beneath and peduncles, pedicels, and calyx. *Leaves* 3-6 in., petiole often as long, base rounded, cuneate or narrowly cordate; floral caducous. *Panicles* usually pyramidal; branches with distant whorls of cymes; flowers $\frac{3}{4}$ -1 in. long. *Calyx* $\frac{1}{4}$ in. long and broad. *Corolla-tube* pale lilac, abruptly decurved, throat inflated; upper lip short, crenate, dark blue; lower boat-shaped, acute, pale. *Stamens* included.—Very variable.

VAR. mollis; leaves softly pubescent. *C. mollis*, *Benth. in D.C. l. c.* 77.—Ceylon.

VAR. leptostachys; puberulous, leaves narrowly oblong or lanceolate, flowers smaller.—Ceylon.

8. **C. inflatus**, *Benth. Lab.* 58, and in *DC. Prodr.* xii. 78; stout, glabrous or puberulous, leaves long-petioled ovate or lanceolate acuminate toothed or serrate, base cuneate, cymes lax-fl. racemed on the branches of a pyramidal panicle, corolla-tube very long flexuous, lips very small, calyx membranous, upper lip ovate acuminate, lateral teeth of lower small, lowest longer acuminate. *Bot. Mag.* t. 5236. *Waurra*, *Itin. Pr. S. Cob. Bot.* 105. *C. Benthamianus*, *Arn. Pugill.* 36, and in *Nov. Act. Nat. Cur.* xviii. 354.

CEYLON; Central Province, alt. 6-8000 ft., *Macrae*, &c.

Stem stout, green. *Leaves* 2-5 in., petiole 1-2 in. *Racemes* or branches of the panicle 3-6 in.; pedicels short. *Corolla* 1 in. long, pale lilac, slightly decurved at the middle, tube slender, as long as the cylindric throat, lips very short, upper crenate larger than the small ovate acute lower.

10. ANISOCHILUS, Wall.

Herbs or undershrubs. *Flowers* small, in dense oblong 4-gonal or cylindric spikes. *Calyx* suberect, inflated below the middle, 2-lipped or 5-toothed, rarely 1-lipped, upper lip entire and deflexed or short and 3-crenate. *Corolla* 2-lipped; tube slender, decurved; throat inflated; upper lip short, entire or 3-4-fid; lower elongate, concave. *Stamens* 4, filaments free. *Style* 2-fid. *Disc* lobed.—*DISTRIB.* Species about 16, Asiatic.

* *Fruiting calyx with the upper lip large, broad, entire, deflexed, concealing the mouth, lower truncate obscurely toothed.*

1. **A. carnosus**, Wall. *Pl. As. Rar.* ii. 18, *Cat.* 2753; annual, erect, glabrous or tomentose, leaves petioled ovate oblong or rounded obtuse crenate fleshy, floral ovate obtuse, fruiting spikes 4-gonous then cylindric obtuse, calyx glabrous pubescent or ciliate, lip deflexed ovate acute ciliate. *Benth. Lab.* 59, and in *DC. Prodr.* xii. 81; *Wight Ill.* t. 176 b, f. 1; *Grah. Cat. Bomb. Pl.* 148; *Dalz. & Gibs. Bomb. Fl.* 206. *A. crassus*, *Benth. in DC. l. c.* *A. glaber*, *Schrad. Ind. Sem. Hort. Goett.* 1833, 1. *A. rupestris*, *Wight Cat.* 2521. *Plectranthus strobiliferus*, *Roxb. Hort. Beng.* 45, and in *Fl. Ind.* iii. 23. *P. carnosus*, *Smith in Rees Cyclop.* v. 27. *P. dubius*, *Spr. Syst.* ii. 691. *Lavandula carnosa*, *Linn. Amœn. Acad.* x. 56, t. 3. *Organum watariense*, *IC. Roxb.—Rheede Hort. Mal.* x. t. 90.

WESTERN HIMALAYA; Kumaon and Garwhal, ascending to 8000 ft., *Edgeworth*, and throughout CENTRAL and SOUTHERN INDIA to Travancore and CEYLON.—*DISTRIB.* Ava.

Stem 1-2 ft., stout, 4-angled. *Leaves* 2-3 in., rugose, sometimes densely tomentose; petiole $\frac{1}{2}$ -2 in. *Spikes* long-peduncled, 1-3 in. long, $\frac{1}{3}$ - $\frac{3}{4}$ in. diam.; flowers $\frac{1}{2}$ in. long, pale purple. *Calyx-tube* very variable in length, glabrous or pubescent; upper lip sometimes with the tip erect throughout the spike.—A protean plant, the varieties of which I fail to distinguish by good characters.

VAR. purpurascens, *Benth.*, from Ava, has narrow purple cylindric spikes and very short calyces.

VAR. glabrior and *villosior*, *Benth.*, explain themselves.

VAR. ? viridis, *Benth. (A. rupestris, Wight)*, is founded on an immature plant with the habit of *A. eriocephalus*. *A. crassus*, *Benth.*, differs in no way from the type.

2. **A. scaber**, *Benth. in DC. Prodr.* xii. 81; shrubby, hoary-tomentose; leaves small petioled oblong obtuse crenulate thick, peduncles very long stout, spikes 1-3 oblong, calyx pubescent, lip deflexed ovate obtuse ciliate.

DECCAN PENINSULA; Courtallum, *Wight*.

Branches short, stout, ascending from a woody stem. *Leaves* 1-1 $\frac{1}{2}$ in., densely tomentose beneath. *Peduncles* 6-12 in.; spikes 1-1 $\frac{1}{2}$ by $\frac{1}{2}$ in., purplish when dry. *Calyx-tube* very short; upper lip glabrous except the ciliate margins.

3. **A. eriocephalus**, *Benth. in DC. Prodr.* xii. 81; herbaceous, glabrous or puberulous, leaves petioled broadly ovate or cordate crenate, peduncles slender, spikes many ovoid or cylindric, calyx villous or woolly.

upper lip deflexed broadly ovate acuminate. *A. decussatus*, *Dalz. & Gibs. Bomb. Fl.* 206.

BEHAR; on the Kymore Hills, *J. D. H.* DECCAN PENINSULA; rocky ghats from the Concan, *Dalzell, &c.*, southwards; Bellary, *Wight*.

A more slender plant than the Concan form of *A. carnosus*, but perhaps only a state of that variable plant.

4. ***A. Wightii***, *Hook. f.*; shrubby, hoary-tomentose, leaves shortly petioled oblong or ovate obtuse crenate, peduncles long stout, spikes 3-6 cylindric narrow, calyx minute villous, upper lip deflexed very small acute.

DECCAN PENINSULA; Anamallay Mts., *Wight*.

A very distinct-looking plant, with the habit and dense pubescence of *A. scaber*, but the long narrow spikes not $\frac{1}{4}$ in. diam., almost black when dry, and the minute calyx (about $\frac{1}{10}$ in. long) with acute upper lip, seem very different.

5. ***A. paniculatus***, *Benth. in DC. Prodr.* xii. 82; stout, shrubby?, glabrous or hoary-tomentose, leaves shortly petioled obovate or rounded obtuse crenate, spikes numerous small short paniced, calyx pubescent or tomentose very short, upper lip small deflexed obtuse ciliate.

DECCAN PENINSULA; Maisor? *G. Thomson*. CEYLON; *Herb. Rottler, Walker*.

Stem very stout below. *Leaves* and *branches* densely ciliate-tomentose in the Madras specimens, puberulous brown in the Ceylon ones. *Spikes* $\frac{1}{4}$ - $\frac{2}{3}$ in. long, on divaricating peduncles and pedicels. *Calyx* hispidly pubescent, about $\frac{1}{12}$ in. long, tube very short. *Fruit* not seen.

** *Fruiting calyx with the upper lip short, broad, recurved or hooded. entire or 3-notched, not concealing the mouth, lower truncate.*

6. ***A. dysophylloides***, *Benth. in Wall. Pl. As. Rar.* ii. 19, *Lab.* 60, and in *DC. Prodr.* xii. 82; silkily tomentose, stout, shrubby, decumbent, leaves thick subsessile obovate or oblong obtuse entire or crenate, spikes very many longer than the leaves axillary and terminal cylindric, peduncles very stout, calyx woolly, corolla-tube very short included. *Wall. Cat.* 2756; *Wight Ic.* t. 1434. *A. purpureus*, and *A. albidus*, *Wight Ic.* tt. 1435, 1436.

NILGHIRI HILLS; *Wight, &c.*; ANAMALLAYS, *Beddome*.

Stem as thick as a swan's quill, woody. *Leaves* 1-2 in., narrowed into the petiole, silky on both surfaces. *Spikes* 1-3 in.; peduncles short, very stout. *Fruiting calyx* $\frac{1}{10}$ in. long, nearly as broad. *Corolla* white or purple.

7. ***A. plantagineus***, *Hook. f.*; dwarf, shrubby, pubescent, stem or branches very short, leaves sessile oblong-obovate obtuse entire, spikes terminal solitary elongate narrow, peduncles very stout tomentose, calyx woolly, corolla-tube exerted declinate.

DECCAN PENINSULA; Bababoodan Hills, *Dalzell, Law, Stocks*.

Rootstock often as thick as the thumb, sending up short stout branches leafy at the top. *Leaves* $\frac{3}{4}$ -1 $\frac{1}{2}$ in. *Spikes* 2-3 in., longer than their peduncles; bracts 3-lobed. *Calyx* small, upper lip obscurely lobed.

8. ***A. suffruticosus***, *Wight Ic.* t. 1437; shrubby, very stout, densely thickly tomentose, leaves shortly petioled ovate-lanceolate subacute entire, nerves very stout and close beneath, spikes numerous long peduncled in terminal racemes, calyx pubescent, corolla-tube exerted sharply declinate from above the base, calyx-lips very short truncate.

NILGHIRI MTS.; Sisparah, *Wight, Gardner*; Tinnevely, *Beddome* (a drawing).

Branches (annual from a woody rootstock, *Wight*) as thick as a swan's quill, covered with broad scars, spreading, tomentose above. *Leaves* towards the ends of the branches, $1\frac{1}{2}$ –2 in. long; petiole and midrib very stout. *Spikes* $1\frac{1}{2}$ –2 in., stout, peduncles usually longer, rarely with 2 spikes, rusty brown when dry.—The Ceylon plant referred to this by Thwaites seems quite different (see end of genus).

9. **A. sericeus**, *Benth. in DC. Prodr.* xii. 82; erect, densely silkily tomentose, leaves densely crowded sessile linear-oblong obtuse subcrenate or entire, nerves stout parallel, spikes in terminal panicles, bracts much longer than the flowers.

DECCAN PENINSULA; Courtallum, *Wight*.

Stem stout, simple, 1–2 ft., densely leafy. *Leaves* $1\frac{1}{2}$ –2 $\frac{1}{4}$ in., rather thick, imbricating, narrowed at the very base. *Spikes* 1–2 in., shortly peduncled; bracts ovate acute, $\frac{1}{8}$ in. long, imbricating over the young flowers.—The material from which Bentham described this consists of two very imperfect specimens of the true plant, along with one of *A. dysophylloides*. *Wight's* later specimens are in full leaf, but very young flower.

10. **A. robustus**, *Hook. f.*; suffruticose, very robust, densely tomentose, leaves very large stoutly petioled ovate crenulate thick reticulate above, spikes slender in terminal panicles with a stout woolly rachis and short peduncles, fruiting calyx ventricose, upper lip truncate recurved, lower very short.

DECCAN PENINSULA; Courtallum, *Wight*.

Stem as thick as the little finger, densely woolly. *Leaves* 4–6 by 2–3 $\frac{1}{2}$ in., obtuse, most densely woolly beneath, nerves diverging, base rounded; petiole 1–2 in., woolly. *Panicle* of spikes 10 in.; rachis woolly. *Spikes* 2–3 in., slender, fruiting only seen. *Fruiting calyx* $\frac{1}{8}$ in., hoary; upper calyx-lip contracted at the truncate tip. *Nutlets* oblong.—A very singular species.

11. **A. verticillatus**, *Hook. f.*; silkily villous, stem stout erect simple, leaves mostly whorled sessile narrowly lanceolate obtuse or acute crenulate or entire, spike large solitary terminal, bracts large lanceolate, fruiting calyx shortly cylindric, lips very short truncate.

THE CONCAN; Cheetah Hills, at Purwar Ghat, *Ritchie, Dalzell, &c.*; Golconda, *Beddome*.

Stem $1\frac{1}{2}$ –3 $\frac{1}{2}$ ft., channelled when dry. *Leaves* 4–6 in a whorl, 2–3 in., spreading and recurved, upper smaller rarely alternate. *Spike* 2–7 in., peduncled; bracts very variable, sometimes $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ in. long, pubescent, very pale blue. *Fruiting calyx* $\frac{1}{8}$ in. long, pubescent, mouth transverse, small.

*** *Fruiting calyx with the upper lip forming a narrow 3-toothed galeate beak decurved closing the mouth; lower very short.*

12. **A. pallidus**, *Wall. Pl. As. Rar.* ii. 18, and *Cat.* 2754; stem tall, branched, puberulous, leaves long-petioled ovate-lanceolate acuminate membranous toothed, spikes paniced long-peduncled, flowering narrowed upwards, fruiting-calyx tomentose, midlobe of upper lip subulate. *Benth. Lab.* 60, and in *DC. Prodr.* xii. 82.

SIKKIM HIMALAYA, alt. 1–5000 ft.; *J. D. H., Clarke*. BURMA; Taong-dong, *Wallich*; Patkoye Mts., *Griffith*; Prome Hills, *Benson*.

Annual, 2–3 ft. *Leaves* 3–8 in.; petiole 1–2 in., very slender. *Spikes* $1\frac{1}{2}$ –3 in., submentose, shorter than their peduncles; fruiting cylindric, much thickened. *Corolla* bluish, tube slender; upper lip inflated, minutely toothed; lower longer, linear, obtuse. *Fruiting calyx* $\frac{1}{8}$ in. long, like a cat's claw.

**** *Fruiting calyx slit in front, mouth very oblique, 1-lipped, lip decurved, 5-toothed, not closing the mouth.*

13. **A. polystachyus**, *Benth. in Wall. Pl. As. Rar.* ii. 19, *Lab.* 66, and in *DC. Prodr.* xii. 82; finely tomentose, stem tall branched, leaves subsessile lanceolate acuminate membranous serrate, spikes paniced long peduncled, flowering narrowed upwards, fruiting calyx curved upwards tomentose. *Wall. Cat.* 2755.

TROPICAL HIMALAYA, from Nepal, *Wallich*, to Mishmi, *Griffith*. KHASIA MTS.; *J. D. H. & T. T. ASSAM*; *Jenkins*.

Annual. *Stem* strict, 3-9 ft., subsimple below. *Leaves* 3-6 in., much narrowed at the base, almost petioled. *Panicles* of spikes sometimes much branched branches and peduncles stout, stiff, suberect. *Spikes* 1-1½ in., hoary-tomentose, fruiting thickened, cylindric. *Corolla* cream-coloured, form as in *A. pallidus*, but tube longer. *Fruiting calyx* ½ in. long, mouth vertical, teeth subequal. *Nutlets* ellipsoid.

DOUBTFUL SPECIES.

A. SUFFRUTICOSUS, *Thwaites Enum.* 238, is not Wight's plant of that name, but more like *A. paniculatus*. The specimen is too imperfect for determination.

A. ADENANTHUS, *Dalz. & Gibs. Bomb. Fl.* 206; spikes dense, pyramidal, floral leaves lanceolate acuminate pubescent 3-nerved 3 lines long, calyx minute oblique truncate scarcely toothed tomentose, corolla glandular-dotted 5 lines long tomentose, lower lip long entire boat-shaped, upper 3- or 4-lobed rounded obtuse short.—Bababoodan Hills, near Darwar, *Dalzell*.

10*. **HYPTIS**, *Jacq.*

Herbs or shrubs. *Inflorescence* various, capitate in the following species. *Corolla* 5-lobed, lower lobe or lip abruptly deflexed, saccate, contracted at the base. *Stamens* 4, declinate; anther-cells confluent. *Style* subentire or 2-fid. *Nutlets* various.—Species 250, all American.

1. **H. brevipes**, *Poit.*; *Benth. in DC. Prodr.* xii. 107; erect, stem pilose or glabrate, leaves petioled ovate oblong or lanceolate serrate hispid above or glabrate, peduncles equalling the globose heads or shorter, bracts lanceolate, calyx pubescent, teeth erect subulate.

MALACCA, *Griffith*; introduced. SINGAPORE; *Anderson*.—DISTRIB. Mexico to Brazil, introduced into Tropical Africa and the Malay Archipelago.

An erect annual. *Leaves* 2-3 in. long, nerves beneath hispid or glabrous. *Heads* ½ in. diam.; bracts often as long, inner and calyx ciliate. *Corolla* about equalling the calyx.

2. **H. suaveolens**, *Poit.*; *Benth. in DC. Prodr.* xii. 126; stem hairy, leaves petioled broadly ovate sinuate and serrulate pubescent villous or tomentose lower cordate, peduncles racemose equalling the globose heads, bracts minute setaceous, calyx striate, mouth villous, teeth erect subulate. *Bysteropogon graveolens*, *Blume Bijl.* 824. *Schauera graveolens*, *Hassk. in Flora*, 1842, ii. *Beibl.* 25.

DECCAN PENINSULA, CACHAR and NICOBAR ISLANDS; introduced.—DISTRIB. Trop. America, introduced into Trop. Asia.

A rigid annual, 2-3 ft. *Leaves* 1-3 in., very variable. *Heads* secund, fruiting ½ in. long, sometimes reduced to a few flowers.

11. **LAVANDULA**, *Linn.*

Herb or shrub. *Leaves* entire or cut. *Flowers* in 2-10 fld. whorls

collected into simple or branched spikes. *Calyx* erect, 13-15-nerved, 5-toothed. *Corolla* blue, 2-lipped, upper lip 2-fid, lower 3-partite, lobes all spreading. *Stamens* 4, declinate, included, filaments free; anther-cells confluent. *Style* 2-fid. *Nutlets* smooth.—Species about 20, chiefly Mediterranean.

1. **L. Gibsoni**, *Grah. Cat. Bomb. Pl.* 149; villous, leaves pinnatifid, lobes oblong or linear, spikes densely villous, bracts ovate-lanceolate. *Dalz. & Gibs. Bomb. Fl.* 206. *L. Perrottetii*, *Benth. in DC. Prodr.* xii. 147. *L. Lawii*, *Wight Ic.* t. 1439.

The CONCAN; hills at Sattara, Law, &c.

Stem 2-3 ft., robust, leafy. *Leaves* 4-8 in., lower petioled, lobes acute or obtuse. *Spikes* few, 1-2 in., robust; bracts villous, 1-fid., $\frac{1}{4}$ in. *Fruiting calyx* 1 in. long.

2. **L. Burmanni**, *Benth. Lab.* 157, and in *DC. Prodr.* xii. 147; pubescent, leaves pinnatisect, segments linear simple or cut, spikes pubescent, bracts subulate. *Grah. Cat. Bomb. Pl.* 149; *Wight Ic.* t. 1438; *Dalz. & Gibs. Bomb. Fl.* 1438. Wawra, *Itin. Pr. S. Cob. Bot.* 109. *L. multifida*, *Burm. Fl. Ind.* 126 (excl. t. 33, f. 1). *Bysteropogon bipinnatus*, *Roth Nov. Sp.* 255. *Chætostachys multifida*, *Benth. in Wall. Pl. As. Rur.* ii. 19, and *Cat.* 2757.

DECCAN PENINSULA; common on the West from the Concan to Coorg. CENTRAL INDIA; Jubbulpore, *Beddome*.

Stem 2-3 ft., stout or slender, simple or branched. *Leaves* 3-4 in. long and broad; segments $\frac{1}{15}$ - $\frac{1}{8}$ in. broad. *Spikes* solitary or few, or numerous and subumbellate; bracts 1-fid., nearly glabrous, tips capillary. *Corolla* blue or white. *Fruiting calyx* $\frac{1}{8}$ in. long.

12. POGOSTEMON, Desf.

Herbs or undershrubs. *Leaves* opposite, very rarely 3-nately whorled. *Flowers* small, in solitary or panicled spikes or contracted racemes formed of many and dense-fid. subcapitate cymes (whorls). *Calyx* subequally 4-5-toothed. *Corolla-tube* exserted or included; limb spreading, sub-2-lipped; lobes 4, lower usually longest. *Stamens* 4, exserted, straight or declinate, filaments usually bearded; anther-cells confluent. *Disc* subentire, equal. *Style* 2-fid. *Nutlets* smooth, ovoid or oblong.—Species about 30, Indian and E. Asiatic.

* Spikes or racemes terminal and axillary, forming a panicled inflorescence. Filaments bearded in all.

† Whorls forming continuous (rarely interrupted) spikes.

1. **P. paniculatus**, *Benth. in Wall. Pl. As. Rar.* i. 30, *Lab.* 153, and in *DC. Prodr.* xii. 151; erect, branched, laxly hairy or villous, leaves petioled ovate irregularly inciso-serrate, base cuneate, whorls globose secund in slender spikes, bracts obliquely suborbicular membranous ciliate, calyx narrow, teeth lanceolate ciliate, filaments bearded. *Wall. Cat.* 1561; *Grah. Cat. Bomb. Pl.* 149; *Dalz. & Gibs. Bomb. Fl.* 207. *Elsholtzia paniculata*, *Willd. Sp. Pl.* iii. 59. *Hyssopus cristatus*, *Lamk. Dict.* iii. 187.—*Rhede Hort. Mal.* x. t. 65.

TENASSERIM; MARTABAN and Tavoy, *Wallich*, &c. PEGU; *McClelland*. W. DECCAN PENINSULA, from the S. Concan to Travaucore.

Stem 3-5 ft., rather flexuous. *Leaves* 3-5 in., very membranous; petiole short or long. *Spikes* 4-8 in.; whorls $\frac{1}{2}$ in. diam.; bracts very variable, shorter or longer than the calyces, regularly secund and imbricate. *Calyx* $\frac{1}{8}$ - $\frac{1}{2}$ in. long, membranous; teeth variable in length.—*P. comosus*, *Miq.*, of Java, is very near this.

2. ***P. Gardneri***, *Hook. f.*; erect, stout, villous, leaves long-petioled ovate inciso-crenate, base cuneate, whorls globose in stout dense spikes, bracts oblong-lanceolate membranous ciliate, calyx-teeth short broad ciliate.

NILGHIRI Mts.; Wynaad, *Wight*, *Gardner*.

Very near *P. paniculatus*, but much stouter, more villous, leaves longer petioled, whorls denser, bracts much narrower, not so unilateral and regularly secund and imbricate, and calyx shorter with broader teeth.

3. ***P. plectranthoides***, *Desf. in Ann. Mus.* ii. 156, t. 6; shrubby, hoary-pubescent, leaves petioled ovate acute doubly-toothed or -serrate, whorls subsecund crowded in large stout spikes, bracts ovate glandular exceeding the hirsute calyx, calyx-teeth shortly triangular-lanceolate ciliate. *Wall. Cat.* 1530; *Benth. in Wall. Pl. As. Rar.* i. 31, *Lab.* 153, and in *DC. Prodr.* xii. 151; *Dalz. & Gibs. Bomb. Fl.* 207; *Bot. Mag.* t. 3238. ? *Origanum benghalense*, *Burm. Fl. Ind.* 128, t. 38, f. 3. ? *O. indicum*, *Roth Nov. Sp.* 265. *Mentha secunda*, *Roxb. Hort. Beng.* 44. ? *M. fruticosa*, *Roxb. Fl. Ind.* iii. 6 (not of his drawings).

WESTERN HIMALAYA, from Nepal to Simla, alt. 1-5000 ft. LOWER BENGAL and BEHAR; Patna and top of Parusnath, *J. D. H.*, &c. The CONCAN, CANARA and the CIRCARS.

A large bush; branches round, often dark purple. *Leaves* 3-6 in., longer than the petiole. *Panicle* usually elongate, whorls distant or confluent, silkily villous. *Calyx* subcylindric, $\frac{1}{8}$ in., silky, ciliate. *Corolla* pink or white.—Roxburgh's description of *Mentha fruticosa* agrees with this, but his drawing represents a different plant with glabrous filaments.

4. ***P. villosus***, *Benth. Lab.* 153, and in *DC. Prodr.* xii. 152; stout, erect, villous all over, leaves large long-petioled ovate acute crenulate or subsinuate and crenate, whorls crowded in cylindric panicle stout spikes not secund, bracts ovate equalling the villous calyx, calyx silky or villous, teeth shortly lanceolate. ? *Elscholtzia villosa*, *Roxb. Fl. Ind.* iii. 4.

SILHET; *Wallich*.

There are two forms of this in *Herb. Wallich*, both with leaves 5-7 in. long and 2-4 broad; one is more robust with exactly ovate finely crenulate leaves; the other is more villous, and has broader sinuate and obscurely crenate leaves, and much more numerous denser and shorter branched panicles. In both the whorls form continuous cylindric spikes 2-3 in. long and $\frac{1}{2}$ in. diam. *Calyx* $\frac{1}{8}$ in., sessile, narrow.

5. ***P. purpurascens***, *Dalz. in Hook. Kew Journ.* ii. 337; erect, branched, softly villous with spreading hairs, leaves long-petioled large membranous ovate or ovate-lanceolate sinuate or cut and toothed or crenate, base narrowly cuneate, whorls dense-fl. globose secund continuous or separate in long peduncled hirsute spikes, bracts narrow falcate equalling the calyx ciliate, calyx tubular, teeth long-subulate ciliate. *Dalz. & Gibs. Bomb. Fl.* 207.

The CONCAN and CANARA; *Law*, &c.

Habit and villosity of *P. Gardneri*, but the calyx-teeth are much longer and more slender. *Stem* 4-angled. *Leaves* sometimes 9 in. long. *Spikes* sometimes as long. *Calyx* $\frac{1}{2}$ in. long. *Corolla* white, with purple upper lip.—Probably a large form of *P. parviflorus*.

6. ***P. parviflorus***, *Benth. in Wall. Pl. As. Rar.* i. 31, *Lab.* 154, and

in *DC. Prodr.* xii. 152; stout, erect, branched, glabrous pubescent or scabrous, leaves long-petioled ovate or ovate-lanceolate singly or doubly crenate-toothed or serrate, base cuneate, whorls dense-fld. subglobose in dense cylindric or one-sided softly hairy spikes, bracts elliptic-ovate exceeding the hirsute calyx, calyx-teeth short triangular-lanceolate ciliate. *Wall. Cat.* 1531. *P. pubescens*, *Benth. in DC. l. c.* *P. frutescens*, *Grah. Cat. Bomb. Pl.* 149. *P. purpuricaulis*, *Dalz. in Hook. Kew Journ.* ii. 336; *Dalz. & Gibs. Bomb. Fl.* 207. *P. intermedius*, *Wall. Cat.* 2327.

SUBTROPICAL HIMALAYA, from Kumaon to Bhotan, alt. 500–4000 ft. ASSAM, KHASIA MTS. and SILHET, alt. 2–3000 ft. CHITTAGONG and TENASSERIM. WEST DECCAN PENINSULA, from the Concan to the Anamallays.—DISTRIB. Burma, Hong-kong.

This most resembles a small *P. plectranthoides*, the bracts imbricating over the flowers in the young spikes, but spikes and narrower bracts are much smaller, and the whole plant when pubescent is never hoary. In its usual glabrous form it is a very distinct plant. The leaves vary much in shape and cutting of the margin, and attain 9 inches in length, and are sometimes velvety beneath. The stem and branches are usually dark purple, but not constantly. *Calyx* $\frac{1}{8}$ in. long, narrow, usually purplish.—It is difficult to distinguish some states of this from *P. Heyneanus*. Benthams says that his var. *Jacquemontii* is almost intermediate between *P. parviflorus* and *glaber*; it has more glabrous leaves and villous spikes.

7. ***P. glaber***, *Benth. in Wall. Pl. As. Rar.* i. 31, *Lab.* 154, and in *DC. Prodr.* xii. 152; erect, branched, glabrous or sparsely hairy, leaves long-petioled ovate or ovate-lanceolate acuminate doubly-toothed or -serrate, whorls small subglobose dense-fld. continuous in slender ciliate spikes, bracts ovate much shorter than the very small calyx, calyx-teeth triangular shortly ciliate. *Wall. Cat.* 1533.

SUBTROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 1–3000 ft., *J. D. H. KHASIA Mts.*, alt. 4000 ft.; *Griffith, J. D. H. & T. T.*

Habit of *P. parviflorus*, but spikes more slender, bracts smaller, and calyx only $\frac{1}{10}$ in. long, obovoid, with shortly ciliate teeth. *Stem* and *branches* green or purple, sometimes very dark.

†† *Whorls usually separate, forming interrupted spikes (except P. Patchouli, var. suavis).*

8. ***P. tuberosus***, *Benth. in Wall. Pl. As. Rar.* i. 31, *Lab.* 154, and in *DC. Prodr.* xii. 152; stout, erect, branched, scabrid with stellate hairs, leaves long-petioled ovate or deltoid-ovate acuminate doubly toothed, base cuneate, whorls small subglobose many-fld. distant or separate on the long slender paniced spikes, bracts scabrid oblong shorter than the small scabrid obovoid calyx, calyx-teeth short triangular ciliate.

TROPICAL HIMALAYA, alt. 1–5000 ft.; from Nepal, *Wallich*, to Bhotan, *Clarke*.

Stem and *branches* woody, terete, striate. *Leaves* 3–5 by $1\frac{1}{2}$ – $3\frac{1}{2}$ in., scabrid on both surfaces. *Spikes* 7–10 in. *Calyx* $\frac{1}{10}$ in. *Corolla* twice as long, purple.

9. ***P. Patchouli***, *Pelletier in Mem. Soc. Sc. Orleans*, v. 5, with fig.; erect, branched, pubescent or glabrate, leaves long-petioled ovate acute acuminate or obtuse crenate or simply or doubly toothed or incised, base cuneate, whorls subglobose many- and dense-fld. distinct or subconfluent on the slender pubescent or tomentose paniced spikes, calyx pubescent or tomentose, teeth triangular ciliate. *Benth. in DC. Prodr.* xii. 153; *Dalz. & Gibs. Bomb. Fl., Addend.* 66. *P. Heyneanus*, *Benth. in Wall. Pl. As. Rar.* i. 31, *Lab.* 154, and in *DC. l. c.*; *Wall. Cat.* 1532; *Grah. Cat. Bomb. Pl.*

149; *Dalz. & Gibs. Bomb. Fl.* 207; *Thwaites Enum.* 239; *Wight Ic.* t. 1440.
 ? *Origanum indicum*, *Roth Nov. Sp.* 265.—*Rheede Hort. Mal.* x. 77.

WESTERN PENINSULA, from Bombay southwards, wild and cultivated. CEYLON, common. (MALACCA and SINGAPORE, cult.)—DISTRIB. Sumatra and Borneo (cult. ?).

A herb, 2-3 ft.; stem more or less softly hairy. *Leaves* 2-3 in., rarely more, subglabrous, membranous, sometimes incised; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Spikes* 3-6 in., rarely short and dense; whorls $\frac{1}{2}$ in. diam., usually distant; bracts elliptic, acute, equalling the calyx or shorter. *Calyx* $\frac{1}{8}$ in., teeth acute. *Corolla* very small, tube shortly exserted.—Perhaps only a var. of *P. parviflorus*. A tracing of Pelletier's figure kindly sent me by M. de Candolle enables me to identify *P. Heyneanus* with *P. Patchouli*. It is a common Indian garden plant, noted for its perfume, often much altered by cultivation.

VAR. *suavis*; leaves larger more rounded 3 in. long and broad, margin lobulate and crenate, spike much broader, whorls $\frac{3}{4}$ in. diam., calyx $\frac{1}{4}$ in. angular more pubescent, teeth subulate-lanceolate. *P. suavis*, *Tenore in Giorn. Bot. Ital.* (1847), ii. 56. *P. Patchouli*, *Hook. Kew Journ. Bot.* i. 328, t. 11, *excl. syn. Putcha-pat.*; *Wallich in Kew Journ.* i. 22.—Cult. in Palermo and Kew Bot. Gardens.—This more resembles *parviflorus* in the shape of the calyx-teeth, but it has the scent of *Patchouli*.

10. ***P. amarantoides***, *Benth. in DC. Prodr.* xii. 153; glabrous or minutely pubescent, leaves ovate or oblong acuminate incised-serrate, whorls small few- or many-fld. separate or confluent on the long slender paniced spikes, bracts short, calyx small terete glabrous or hoary, teeth short triangular pubescent within, edges not ciliate but with finely pubescent margins.

SIKKIM HIMALAYA, alt. 5-6000 ft. KHASIA MTS., alt. 5-6000 ft.; *Griffith, &c.*

A tall leafy herb. *Leaves* 3-6 in., serrate or biserrate, membranous; petiole 1-2 in., slender. *Spikes* 2-6 in.; whorls $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.; bracts elliptic. *Calyx* $\frac{1}{2}$ - $\frac{1}{10}$ in., campanulate, terete, more pubescent in the Khasia form. *Corolla* minute, white or pink. *Filaments* purple.—Flowers much smaller, and whole plant more glabrous than in its allies.

11. ***P. elsholtzioides***, *Benth. in DC. Prodr.* xii. 153; erect, branched, stem above young parts and inflorescence hoary-tomentose, leaves petioled lanceolate long-acuminate serrulate glabrous, whorls small subsecund many-fld. separate or confluent in very slender spikes, calyx small terete hoary, teeth narrow subacute not ciliate.

BHOTAN, *Griffith*. KHASIA MTS., *Griffith*; Churra, alt. 4000 ft., *J. D. H. & T. T.*

Very leafy; stem and branches slender. *Leaves* 4-6 in., petiole rather short. *Spikes* 3-4 in.; whorls sometimes all secund, $\frac{1}{6}$ - $\frac{1}{4}$ in. diam. *Calyx* $\frac{1}{10}$ in. long. *Corolla* very short, purple. *Filaments* sparingly hairy.—The very narrow leaves and small second hoary spikes well distinguish this.

** Spikes or racemes simple, axillary and terminal or solitary.

† *Filaments bearded*.

12. ***P. rupestris***, *Benth. Lab.* 156, and in *DC. Prodr.* xii. 154; glabrous, leaves small ovate or ovate-lanceolate coarsely obtusely serrate, racemes slender, whorls distant few-fld., bracts and bracteoles minute, calyx glabrous, teeth short ovate.

CEYLON; Central Province, alt. 5-8000 ft., *Macrae, &c.*

Stem 1-2 ft., often decumbent below. *Leaves* 1-1 $\frac{1}{2}$ in., obtuse, base cuneate

rounded or subcordate, brown when dry; petiole slender, $\frac{1}{4}$ – $\frac{3}{4}$ in. Racemes 1–3 in.; whorls 3–5-fld. Calyx $\frac{1}{4}$ in. long. Corolla minute.

13. **P. hirsutus**, *Benth. Lab.* 155, and in *DC. Prodr.* xii. 154; stem hirsute with reflexed hairs or glabrate, leaves small ovate or ovate-lanceolate coarsely serrate, spikes short stout usually dense-fld., bracts linear-subulate, calyx hispid, teeth lanceolate subulate ciliate. *P. rupestris*, var. β . *hirsutus*, *Thwaites Enum.* 239.

CEYLON; Central Province, alt. 5–7000 ft., *Macrae*, &c.

Stem 1–2 ft., branched, decumbent and rooting below. *Leaves* 1–2 in., hairy above and on the nerves beneath, base rounded or acute; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in. *Spikes* usually sessile and dense-fld., $\frac{1}{2}$ in. diam., hirsute. *Calyx* $\frac{1}{4}$ in. long, inflated. *Corolla* minute.—*Thwaites* regards this as a var. of *P. rupestris*, but this must be through inadvertence.

14. **P. paludosus**, *Benth. in DC. Prodr.* xii. 154; stem sparingly pubescent or glabrate, leaves rounded-ovate obtuse coarsely crenate, base rounded, spike strict stiff, whorls small remote few-fld., bracts and bracteoles minute, calyx terete hispid, teeth triangular subacute ciliate.

NILGHIRI HILLS; Ootamacund, *Perrottet*, *Wight*.

Stem stiff, erect. *Leaves* 2 in. long, and nearly as broad, sparingly hairy above and on the nerves beneath; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in., slender. *Spike* 3–5 in., rachis and calyces hispid with spreading hairs; whorls $\frac{1}{2}$ in. diam. *Calyx* $\frac{1}{4}$ in. long.—I have seen only indifferent specimens gathered by *Wight*.

15. **P. fraternus**, *Miquel Fl. Ind. Bat.* ii. 963; much branched, branches above and racemes glandular-tomentose or hirsute, leaves ovate singly or doubly crenate or serrate, racemes terminating all the branches elongate, whorls distinct many-fld., bracts and bracteoles linear, calyx pedicelled hirsute, teeth long lanceolate ciliate. *Pogostemon* n. 28, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 3–5000 ft.; *J. D. H., Clarke.* KHASIA MTS.; *Lobb. TENASSERIM; Beddome.*—DISTRIB. Java.

Stem 2–3 ft.; branches straggling. *Leaves* 2–4 $\frac{1}{2}$ in., base acute rounded or cordate; petiole sometimes as long as the blade. *Racemes* 3–6 in. long, nearly $\frac{1}{2}$ in. diam.; whorls close but distinct; bracts and bracteoles often as long as the flowers, but very variable; pedicel sometimes as long as the calyx, which is $\frac{1}{2}$ in. long or less and angled. *Corolla* funnel-shaped, twice as long as the calyx.—*Miquel* describes the filaments as glabrous in the Javan plant; they are hairy towards the base in the Indian.

16. **P. Wightii**, *Benth. Lab.* 155, and in *DC. Prodr.* xii. 154; hirsute with long lax cellular often glandular hairs, much branched, leaves ovate doubly crenate or sublaciniate, base rounded or broadly cuneate, spikes stout cylindric dense-fld., whorls densely crowded, bracts and bracteoles short linear, calyx inflated membranous terete glabrous or sparsely hairy, teeth triangular ciliate. *P. petiolaris*, *Benth. in DC. l. c.* *P. hirsutus*, *Wight Ic. t.* 1442.

NILGHIRI and ANAMALLAY MTS., *Wight*, &c., in wet places.

Branches suberect or spreading, stout. *Leaves* 1–2 in., base rarely subcordate; petiole half as long as the blade. *Spikes* 2–4 in., very stout, $\frac{3}{4}$ in. diam.; lowest whorls sometimes remote. *Calyx* $\frac{1}{2}$ in. long, sessile. *Corolla-tube* very short.—Two specimens were amongst the Concan collections of *Stocks*, but I suspect were from the south.

17. **P. mollis**, *Benth. Lab.* 155, and in *DC. Prodr.* xii. 154; villous,

softly tomentose or finely pubescent, leaves shortly petioled orbicular or oblong crenate, tip rounded, spikes cylindric dense-fl., whorls crowded or the lowest distant, bracts and bracteoles slender, calyx small sessile terete villous, teeth subulate-lanceolate ciliate. *P. rotundatus*, *Wight Ic. t. 1441*.

NILGHIRI HILLS; common on outskirts of forests, alt. 7-8000 ft., *Wight*, &c. The CONCAN; *Dalzell, Stocks*.

A low-growing plant, very variable in hairiness, branched from the woody base; hairs of branches not reflexed. *Leaves* 1-1½ in. *Spikes* 3-7 in., ½ in. diam., flexuous, rachis stout. *Calyx* ⅙ in. *Corolla* white, tube hardly exerted. *Filaments* bearded at the middle.—I do not find the leaves to be acute, as represented by *Wight*, in any of the numerous specimens examined.

18. *P. rotundatus*, *Benth. in Wall. Pl. As. Rar. i. 31, Lab. 155*, and in *DC. Prodr. xii. 155*; low, villous, leaves orbicular doubly crenate, base rounded truncate or cordate, spikes stout dense-fl., whorls distinct but close many-fl., bracts and bracteoles linear-subulate, calyx large angled villous, teeth triangular-lanceolate ciliate. *Wall. Cat. 1535*.

DECCAN PENINSULA; *Heyne*.

Stem short, ascending, hairs not reflexed. *Leaves* 1-2½ in. long and broad, laxly hairy on both surfaces; petiole 1 in. and less. *Spikes* 3-5 in., ⅓ in. diam., rachis stout. *Calyx* sessile, ¼ in. long. *Corolla-tube* hardly exceeding the calyx. *Filaments* bearded.—Only known from specimens distributed by *Wallich*. In foliage it much resembles the *P. Patchouli* figured in the *Kew Journal of Botany*, but the calyx is much larger, with broader teeth and the corolla-tube shorter, and there is no appearance of a paniculate form of inflorescence.

19. *P. vestitus*, *Benth. in Wall. Pl. As. Rar. i. 31, Lab. 155*, and in *DC. Prodr. xii. 155*; shrubby, densely white-woolly, leaves shortly petioled thick ovate oblong or cordate crenate rugose above, tip rounded, spikes short thick dense, whorls confluent, bracts and bracteoles linear-subulate, calyx large terete densely villous, teeth triangular-lanceolate. *Wall. Cat. 1534*.

DECCAN PENINSULA, *Heyne*; *Paul Ghaut, Wight*.

A low species; branches stout, terete, often bearing below tufts of long soft shaggy or silky hairs. *Leaves* 1-1½ in., nerves beneath very thick, surfaces equally woolly; petiole stout, ¼-½ in. *Spikes* 2-4 in., ⅓-1 in. diam. *Calyx* ¼ in. long and upwards, teeth woolly not ciliate. *Corolla-tube* a little longer than the calyx. *Filaments* bearded in the middle.

20. *P. strigosus*, *Benth. in DC. Prodr. xii. 155*; erect, branches strigose with erect hairs, leaves subsessile lanceolate acuminate serrate hairy, spikes long slender, whorls confluent or separate below, bracts and bracteoles long slender, calyx tubular terete hirsute, teeth unequal subulate ciliate. *Dysophylla strigosa*, *Benth. in Wall. Plant. As. Rar. i. 30, and Cat. 1549, Lab. 157*.

KHASIA MTS., alt. 4-5000 ft.; *Wallich*, &c.

Stem 2-3 ft.; branches erect. *Leaves* sometimes ternately whorled, 2-3 in., narrowed into the very short stout petiole. *Spikes* 3-5 in., ½ in. diam., rachis stout. *Calyx* ⅙ in., sessile. *Corolla* very small, tube hardly exerted, lobes sparingly hairy. *Filaments* ⅙ in., bearded in the middle.

†† *Filaments naked or nearly so*.

21. *P. atropurpureus*, *Benth. in DC. Prodr. xii. 154*; shrubby, densely velvety, leaves thick stoutly petioled ovate subacute doubly crenulate, spikes with the rachis very stout, whorls crowded few-fl., bracts and

bracteoles minute setaceous, calyx terete tubular velvety, lobes short triangular obtuse ciliate. *P. imberbe*, *Wight mss.*

NILGHIRI HILLS; *Perrottet, Wight, Gardner.*

Branches terete, woody; hairs most dense, reflexed. *Leaves* 1-2 in., dark brown when dry, velvety on both surfaces, base subacute. *Calyx* $\frac{1}{2}$ - $\frac{1}{4}$ in. long, teeth short, throat villous. *Corolla* dark purple; tube slender, exserted. *Filaments* glabrous.

22. ***P. speciosus***, *Benth. in Wall. Pl. As. Rav. i. 31, Lab. 156*, and in *DC. Prodr. xii. 155*; branches above petioles and spikes hirsute with long spreading and glandular hairs, leaves large long-petioled broadly ovate doubly crenate, base rounded or cordate, spikes stout dense, whorls confluent, bracts minute, calyx tubular angled glabrous or sparsely hairy, teeth subulate ciliate or not. *Wall. Cat. 2328; Wight Ic. t. 1443.*

NILGHIRI and ANAMALAY HILLS; on the outskirts of woods, alt. 7-8000 ft.

Stem 2-3 ft., woody. *Leaves* 2-3 in., sometimes nearly as broad, sparsely hairy above and beneath; petiole 1-1 $\frac{1}{2}$ in. *Spikes* 3-5 in. by 1 in. or less. *Calyx* sessile, membranous, $\frac{1}{10}$ in. and under, teeth very narrow. *Corolla-tube* not exserted. *Filaments* $\frac{1}{2}$ in., glabrous.

23. ***P. travancoricus***, *Beddome Ic. Pl. Ind. Or. t. 159*; quite glabrous, leaves long-petioled ovate doubly crenate subacute, base rounded or cuneate, racemes lax-flid., flowers pedicelled reflexed, whorls few-flid., bracts minute or 0, calyx terete glabrous, teeth triangular not ciliate.

TRAVANCORE; Attraymallay Ghat, alt. 4000 ft., *Beddome.*

Stem woody below, branches smooth and racemes black when dry. *Leaves* 1-2 in.; petiole $\frac{1}{2}$ -1 in., slender. *Racemes* 3-6 in., tapering upwards. *Calyx* $\frac{1}{4}$ in., pedicel half its length. *Corolla* funnel-shaped, tube exserted, lobes pubescent. *Filaments* $\frac{1}{2}$ in., glabrous.

24. ***P. reflexus***, *Benth. in DC. Prodr. xii. 155*; branches stout densely shortly tomentose with reflexed hairs, leaves long-petioled ovate or ovate-cordate subacute doubly crenate, spikes villous dense-flid., whorls confluent or lower distinct, bracts minute, flowers sessile spreading or reflexed, calyx densely hirsute or villous terete, teeth triangular-subulate ciliate.

CEYLON; higher parts of the island, alt. 5000 ft., *Mackenzie, Walker, &c.*

Erect, branched, woody below. *Leaves* 2-3 in., pubescent above, velvety beneath, base cordate rounded or acute; petiole stout, $\frac{1}{2}$ -1 in. *Spikes* 2-4 in., $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. *Calyx* $\frac{1}{4}$ in., sessile. *Corolla-tube* shortly exserted, lobes sparsely pubescent. *Filaments* $\frac{1}{3}$ in., glabrous or nearly so.

25. ***P. brachystachys***, *Benth. in DC. Prodr. xii. 156*; low, procumbent below, much branched, branches pubescent with reflexed hairs, leaves small ovate subacute doubly crenate hirsute or finely tomentose, spikes narrow dense villous, whorls confluent or the lower separate, bracts minute linear, calyx minute hirsute or hispid, teeth subulate ciliate.

KHASIA MTS., alt. 4-6000 ft.; *Griffith, Mack, &c.* ASSAM; Naga Hills to N. Burma. *Griffith.*

A low, straggling, much-branched species, procumbent and rooting below, variable in hairiness. *Leaves* 1-2 in., very variable in form, rarely oblong-lanceolate. *Spikes* 1-4 in., narrow, very dense-flid. *Calyx* sessile, $\frac{1}{12}$ in. *Corolla* very small, dull purple; tube hardly exserted; lobes hirsute. *Filaments* $\frac{1}{6}$ in., glabrous or nearly so.—The specific name is not very appropriate.

13. **DYSOPHYLLA**, *Blume.*

Herbs. *Leaves* opposite or whorled. *Flowers* minute, in very dense long spikes formed of many- and dense-flid. cymes (whorls). *Calyx* very

minute, ovoid, equal, 5-toothed, throat naked within. *Corolla* minute, tube exserted or included; limb equally 4-fid; upper lobe entire or 2-fid, lower spreading. *Stamens* 4, exserted, straight or subdeclinate; filaments very long, bearded; anther-cells confluent. *Disc* equal, subentire. *Style* 2-fid. *Nutlets* smooth or rough, ovoid or oblong.—Species about 12, Tropical Asiatic and Australian.

* Calyx-tube terete or obscurely angled.

† *Leaves opposite*.

1. ***D. myosuroides***, *Benth. in Wall. Pl. As. Rar.* i. 30, *Lab.* 157, and in *DC. Prodr.* xii. 156 (*all in part*); perennial, erect, silkily tomentose, branches woody, leaves subsessile linear-oblong obtuse denticulate, spikes very slender 3–5 in. by $\frac{1}{2}$ in. diam. tomentose, calyx-teeth very short triangular. *Wall. Cat.* 1547; *Dalz. & Gibs. Bomb. Fl.* 208. *Mentha myosuroides*, *Roth Nov. Sp.* 257. *M. venulosa*, *Herb. Heyne*.

DECCAN PENINSULA, *Heyne, Wight*; Bababoodan Hills and Copper Mts., Bellary, *Law, Stocks*.

Stem erect, 8–12 in., from a large woody rootstock, terete. *Leaves* 1–1½ by $\frac{1}{4}$ – $\frac{1}{2}$ in., thick, silkily pubescent on both surfaces. *Spikes* very slender, shortly peduncled, flexuous. *Calyx* $\frac{1}{4}$ in., densely tomentose, fruiting hardly enlarged, teeth erect in fruit. *Corolla* minute, glabrous; tube included. *Nutlets* ellipsoid, compressed, granulate.—*Bentham's* var. *bracteata* is founded on a young spike with the bracts protruded.

2. ***D. rugosa***, *Hook. f.*; perennial, erect, appressed, fulvous-woolly, branches woody, leaves subsessile linear-oblong obtuse subentire, spikes slender 2 in. by $\frac{1}{4}$ in. diam. tomentose, calyx-teeth very short triangular. *D. myosuroides*, *Benth. ll. c. in part*. *Mentha rugosa*, *Herb. Heyne*.

DECCAN PENINSULA; Mountains of Tinnevely, *Beddome*; at Pallamcotta, *Heyne*.

Very closely allied to *D. myosuroides*, and confounded with it by Wallich and *Bentham*; of the same size and habit, but not at all silky; form of leaves the same, but nerves more spreading, spikes much shorter and thicker.—*Heyne* seems to have distinguished the two from the names quoted by Wallich, of which that of *M. rugosa* is attached to a specimen in *Rottler's* Herbarium, no doubt collected by *Heyne* himself.

3. ***D. salicifolia***, *Dalz. mss.*; stem and young leaves appressedly pubescent or silky, leaves sessile or petioled linear-lanceolate subentire or remotely serrate, spikes slender 2–4 in. villous, calyx villous short, teeth triangular almost equalling the tube. *Dysophylla* sp. 3, *Herb. Ind. Or. H. f. & T.*

The CONCAN; Mahableshwur Hills, *Gibson*; Hingreege Watercourse, Belgaum, *Ritchie*; Bombay, *Dalzell*.

Stem 1–2 ft., much branched; branches slender, erect, woody. *Leaves* 1–3½ in., rather membranous. *Spikes* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., on slender peduncles; whorls confluent. *Calyx* in fruit $\frac{1}{2}$ in., with erect teeth. *Corolla-tube* exserted, lobes sparsely hairy. *Nutlets* ellipsoid, obtusely 3-gonous, shining.

4. ***D. auricularia***, *Blume Bijl.* 826; annual, hirsute or villous, leaves sessile or shortly petioled oblong serrate, spikes 2–3 in. villous, calyx-teeth triangular incurved in fruit. *Benth. Lab.* 158, in *Wall. Pl. As. Rar.* i. 30, and in *DC. Prodr.* xii. 156; *Wall. Cat.* 1548; *Wight Ic. t.* 1445; *Grah. Cat. Bomb. Pl.* 150. *Mentha auricularia*, *Linn. Mant.* 81; *Roxb. Fl. Ind.* iii. 4; *Griff. Notul.* iv. 200. *M. foetida*, *Burm. Fl. Ind.* 126.

From SIKKIM and ASSAM through E. BENGAL to PENANG and SINGAPORE. DECCAN PENINSULA, from Goa southwards. CEYLON.—DISTRIB. East to S. China, Borneo and the Philippines.

A coarse annual, 1-2 ft.; hairs often shaggy, spreading. *Leaves* 1-3 in., acute or obtuse; petiole rarely $\frac{1}{2}$ in. *Spikes* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., pedicelled; whorls all confluent. *Calyx* not $\frac{1}{16}$ in., enlarged in fruit. *Corolla* $\frac{1}{10}$ in., usually pink; tube slender, far exserted; lobes hairy. *Filaments* very villous. *Nutlets* ellipsoid, nearly smooth.—Some very villous specimens from S. India and Ceylon have stouter spikes and white flowers, and may prove to belong to a distinct form.

†† *Leaves in whorls of three or four (rarely more).*

5. **D. quadrifolia**, *Benth. in Wall. Pl. As. Rar.* i. 30, *Lab.* 158, and in *DC. Prodr.* xii. 157; perennial, erect, tomentose, subsilky or pubescent, leaves 4 in a whorl, shortly petioled linear or linear-oblong acute or obtuse serrate or subentire, spikes elongate tomentose or pubescent, base often interrupted. *Wall. Cat.* 1539. *D. velutina*, *Benth. in Wall. Cat.* 1538. *D. linearis*, *Wall. Cat.* 1540. *D. rupestris*, *Dalz. in Hook. Kew Journ.* iii. 120; *Dalz. & Gibs. Bomb. Fl.* 208. *Mentha quadrifolia*, *Roxb. Hort. Beng.* 44, and *Fl. Ind.* iii. 4. *M. quaternifolia*, *Heyne in Herb. Rottl.*; ? *Roth Nov. Sp.* 256. *Chotellia sericea*, *Opiz & Corda in Flora*, 1830, 35.

KHASIA MTS.; on rocks by streams, alt. 3-6000 ft. CHITTAGONG, alt. 300 ft., CLARKE, to TENASSERIM, *Wallich.* SOUTH CANARA; on dry rocks, Malwar, *Dalzell*, &c., from the CIRCARS and CONCAN to MYSORE and the Anamallay Hills, *Heyne*, &c.; Anamallays, *Beddome*.

A stout undershrub, 2-4 ft., with a woody rootstock; stem simple or branched. *Leaves* very variable, 1-4 by $\frac{1}{2}$ - $\frac{3}{4}$ in.; petiole very short. *Spikes* 4-8 in., $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. *Calyx* sometimes glabrate, teeth triangular.—Order of chamomile (*Dalzell*).

6. **D. cruciata**, *Benth. in Wall. Pl. As. Rar.* i. 30, and *Cat.* 1541; *Lab.* 158, and in *DC. Prodr.* xii. 157; hirsute, stem simple erect, leaves 3-6 in a whorl sessile linear obtuse, margins revolute quite entire, spikes villous. *D. tetraphylla*, *Wight Ic.* t. 1444. *Mentha quadrifolia*, *Don Prodr.* 113. *Dysophylla*, *Griff. It. Notes*, 80, n. 1165.

SUBTROPICAL HIMALAYA, from Kumaon, alt. 5000 ft., *Royle*, &c., to Nepal, *Wallich.* KHASIA MTS., alt. 2-4000 ft.; *Griffith*, &c. NILGHIRI HILLS; *Wight*.

Stem 12-18 in., stout, strict. *Leaves* 1-1 $\frac{1}{2}$ in., suberect. *Spikes* sometimes 5 in., $\frac{1}{2}$ in. diam.; whorls confluent. *Calyx* villous. *Corolla-tube* scarcely exserted, lobes glabrous.

7. **D. linearis**, *Benth. in DC. Prodr.* xii. 157; annual, stem erect simple and leaves sparsely hairy or glabrate, leaves sessile 4 in a whorl linear or linear-lanceolate obtuse, margins revolute entire or sparingly toothed, spikes short, calyx glabrous.

KHASIA HILLS, alt. 4-6000 ft., in swamps and rice-fields; *Mack, H. f. & T., Clarke*.

Habit of *D. cruciata*, but nearly glabrous, with very different spikes, $\frac{1}{2}$ -2 in. long and 1- $\frac{3}{4}$ broad, and corolla and nutlets twice as large.

8. **D. verticillata**, *Benth. in Wall. Pl. As. Rar.* i. 30, and *Lab.* 159, and in *DC. Prodr.* xii. 157; annual, erect, branched, glabrous or very sparsely hairy, leaves 4-10 in a whorl linear quite entire or obscurely toothed, spikes sometimes whorled tomentose or villous, teeth of fruiting calyx stellately spreading. *Wall. Cat.* 1544; *Thwaites Enum.* 239, excl. *syn.* *D. ramosissima*, *Benth. in Wall. Cat.* 1543. *D. Benthamiana*,

Hance in Ann. Sc. Nat. Ser. 5, v. 234. *Mentha stellata*, *Lour. Fl. Cochinch.* 36. *M. verticillata*, *Roxb. Hort. Beng.* 44, and *Fl. Ind.* iii. 5. *Pogostemon verticillatus*, *Miq. Fl. Ind. Bat.* ii. 965.

BENGAL, SILHET, RANGOON and TENASSERIM, in swamps and rice-fields. CEYLON; *Rottler, Thwaites*.—DISTRIB. Malay Archipelago, China, Philippine Islands, Australia.

Very variable, sometimes 2 ft. high, excessively branched, with stem as thick as the thumb, at others very slender (var. ? *gracilis*, Benth.), subsimple, with stem as thick as a crow-quill; branches erect. *Leaves* 1–3 in., rarely $\frac{1}{4}$ in. diam., spreading and deflexed. *Spikes* 1–3 in., $\frac{1}{4}$ in. diam. *Calyx* very conspicuous in fruit from the spreading teeth.

9. **D. crassicaulis**, *Benth. in Wall. Pl. As. Rar.* i. 30, *Lab.* 159, and in *DC. Prodr.* xii. 158; annual, glabrous, decumbent below, leaves 4–6 in. a whorl sessile linear or linear-oblong or -lanceolate obtuse subentire or serrate, spikes elongate glabrate or pubescent, calyx campanulate, teeth erect or conniving in fruit. *Wall. Cat.* 1545.

N.W. HIMALAYA, in swamps; Kashmir, Chumba and Kulu, alt. 2–4000 ft., *Jacquemont, Thomson, Clarke*. SIKKIM; *Herb. Griffith, J. D. H.* BENGAL; ASSAM, SILHET and KHASIA MTS., *Wallich, &c.*

Very similar to *D. verticillata*, and similarly variable, best distinguished by the larger flowers, more glabrous calyx with teeth that do not spread stellately. *Leaves* rounded subcordate or acute at the base, very variable in breadth. *Bracts* oblanceolate. *Calyx* $\frac{1}{8}$ in., lobes triangular, fruiting $\frac{1}{10}$ in. *Corolla-tube* exserted, lobes nearly glabrous. *Nutlets* very small, orbicular, compressed, pale, shining.

VAR. *pumila*; dwarf, spikes $\frac{1}{2}$ –1 in., calyx more hairy. *D. pumila*, *Benth. l. c.*; *Wall. Cat.* 1546. *Mentha pumila*, *Grah. in Edinb. New Phil. Journ.* 1828, 393. *M. verticillata*, *Don Prodr.* 114; *Hook. Bot. Mag.* t. 2907.

10. **D. Helferi**, *Hook. f.*; annual, dwarf, erect, glabrous, leaves few 4 in a whorl sessile linear or oblong serrate, spikes short pubescent, calyx-teeth lanceolate erect in fruit.

TENASSERIM; East Pagoda, *Helfer*.

Stem a span high and under, very slender; branches slender, spreading. *Leaves* $\frac{1}{2}$ –1 in. *Spikes* $\frac{1}{2}$ –1 $\frac{1}{4}$ in.; bracts minute, linear-lanceolate. *Calyx* (fruiting) $\frac{1}{2}$ in., campanulate, membranous, sparsely pubescent. *Corolla* not seen. *Nutlets* very minute, orbicular-oblong, dark chestnut, shining.

††† *Annuals. Leaves in whorls of 5 or more, sessile, very narrow, quite entire* (see also sp. 5, 8 and 9).

11. **D. stellata**, *Benth. in Wall. Pl. As. Rar.* i. 30, *Lab.* 159, and in *DC. Prodr.* xii. 158; stem decumbent or creeping below much branched, branches short densely leafy hairy, internodes very short, leaves many in a whorl very short narrowly linear obtuse, margins revolute, spikes slender tomentose, bracts linear or clavellate equalling the flowers, flowering calyx $\frac{1}{30}$ in. hemispheric, teeth short erect or incurved in fruit. *Wall. Cat.* 1542; *Bot. Reg.* 1845, t. 23; *Grah. Cat. Bomb. Pl.* 150; *Dalz. & Gibs. Bomb. Fl.* 209. *Mentha stellata*, *Ham. in Roxb. Fl. Ind.* iii. 5. *M. malabarica*, *Herb. Heyne*.

DECCAN PENINSULA; from Belgaum southwards, in rice-fields.

Branches numerous, ascending, flexuous, stout, leafy to the base with close-set whorls. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., rarely $\frac{1}{10}$ in. broad, base obtuse, upper often pubescent. *Spikes* 1–2 in., $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., bracteoles filiform or clavellate. *Calyx* $\frac{1}{30}$ – $\frac{1}{20}$ in., cupular or obconic, very variable, a little enlarged in fruit. *Corolla-tube* very short, lobes hirsute. *Nutlets* very small, shining.—The differences between the extreme

forms of fruiting calyx are great, and possibly indicate two species; in some specimens it is almost campanulate with erect teeth, in others almost globose with incurved teeth.

12. **D. tomentosa**, Dalz. in Hook. *Kew Journ.* ii. 337; stout, erect, branched, softly pubescent all over with long hairs, internodes very short, leaves many in a whorl linear obtuse, margins revolute, spikes stout villous, bracts equalling the flowers linear, flowering calyx $\frac{1}{2}$ in. subcampanulate. Dalz. & Gibs. *Bomb. Fl.* 208.

SOUTHERN CONCAN; Malwar, in rice-fields, Dalzell.

Probably a large hairy state of *D. stellata*, with spikes $\frac{1}{2}$ in. diam. Young specimens are decumbent, old and large ones have the habit of *D. Stocksii* and *pentagona*.

13. **D. gracilis**, Dalz. in Hook. *Kew Journ.* ii. 377; stem erect stout or slender hairy or glabrate, internodes very short, leaves sessile 5-20 in a whorl narrowly linear obtuse, or subacute glabrous or hoary, margins revolute quite entire, spikes 1-2 in. slender villous, bracts equalling the flowers filiform, calyx $\frac{1}{10}$ in. campanulate hemispheric and hardly enlarged in fruit with erect teeth. Dalz. & Gibs. *Bomb. Fl.* 208.

DECCAN PENINSULA; Sihadree Hills, near Phonda Ghat, Ritchie, Dalzell.

Very near *D. tomentosa*, with which it agrees in habit, but the spikes are more slender, and the calyx much smaller. The form of the bracts affords an inconstant character in this and in *D. stellata*, of which I suspect this is only a tall form. Stem 2-3 ft., sometimes as thick as a swan's quill. Leaves $\frac{1}{4}$ - $\frac{1}{2}$ in., often recurved. Spikes $\frac{1}{2}$ in. diam. Calyx densely villous.—I do not find the toothing of the leaves described by Dalzell.

14. **D. erecta**, Dalz. in Hook. *Kew Journ.* ii. 337; stem erect tall hispidulous, leaves 9-12 in a whorl linear or almost filiform obtuse or acute glabrous or scaberulous, margins recurved, spikes slender pubescent, bracts very short equalling the calyx clavellate, calyx shortly campanulate, teeth obtuse erect. Dalz. & Gibs. *Bomb. Fl.* 208.

SOUTHERN CONCAN; margins of swamps, Malwar, Dalzell.

This is hardly distinguishable from *D. gracilis*. Dalzell's specimens (named by himself) are of two forms; one from very wet places has nearly simple flexuous stems, almost capillary lower leaves (evidently immersed), and linear obtuse glabrous upper ones $\frac{2}{3}$ in. long, in whorls of about 12; the other, from drier places, is shorter, more robust, much branched, with scaberulous leaves 4-8 in a whorl, and spikes exactly like *D. stellata*, of which I suspect the species is a form.

** Calyx-tube deeply 5-grooved, with 5 elevated ridges (all annuals, with sessile quite entire leaves).

15. **D. pentagona**, Clarke mss.; slender, erect, nearly glabrous, leaves 4 in a whorl linear obtuse, spikes slender pubescent, calyx densely pubescent all over, angles obtuse, mouth closed by the minute obtuse teeth.

CHOTA NAGPORE; at Songhboom, alt. 2000 ft., Clarke.

Stem 12-18 in., branches suberect. Leaves 1-1 $\frac{1}{2}$ in., erecto-patent, base obtuse or acute. Spikes 2-3 in., $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.; rachis hirsute; bracts linear. Fruiting calyx $\frac{1}{18}$ in., nearly globose, pointed at either end; angles or wings thick. Nutlet solitary, linear-oblong, completely enveloped by the calyx-tube.

16. **D. Griffithii**, Hook. f.; slender, erect, nearly glabrous, leaves 4 in a whorl linear obtuse, spikes slender pubescent, fruiting calyx obconic acutely 5-angled, tube glabrous, lobes incurved villous.

ORISSA; at Sumbulpore, *Griffith*.

Habit and foliage of *D. pentagona*, but calyx very different, fruiting about $\frac{1}{2}$ in., chestnut brown and shining below, crowned with white bearded lobes. *Nutlets* 4, minute suborbicular.

17. **D. Stocksii**, *Hook. f.*; very stout, erect, nearly glabrous, leaves 9–20 in. a whorl narrowly linear obtuse, margins recurved, spikes slender, fruiting calyx densely pubescent all over, angles acute, mouth closed by the minute obtuse teeth.

The CONCAN; *Stocks*.

Stem as thick as a goose-quill, decumbent and closely annulate below, branches suberect. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{12}$ – $\frac{1}{15}$ in., spreading. *Spikes* 2–3 in. by $\frac{1}{8}$ – $\frac{1}{4}$ in. diam.; rachis hairy; bracts filiform, tips clavellate. *Calyx* $\frac{1}{4}$ in., lobes as long as the tube, obtuse. *Corolla-tube* very short; lobes nearly glabrous. *Fruiting calyx* $\frac{1}{8}$ in., very concave between the angles. *Nutlet* solitary enclosed as in *D. pentagona*.

14. **COLEBROOKIA**, *Smith*.

A densely woolly hoary shrub. *Leaves* opposite or 3-nate, petioled, rugose, elliptic-oblong, crenulate. *Whorls* dense-fid. in panicled spikes, flowers small; bracts connate. *Calyx-tube* very short; teeth long, subulate, at length elongate, capillary and feathery. *Corolla* minute, tube short; limb very short, subequally 4-fid. *Stamens* 4, very short, included, equal, distant; anthers orbicular, cells confluent. *Disk* equal. *Style* 2-fid; lobes subulate. *Nutlets* hairy, obovoid.

C. oppositifolia, *Smith Exot. Bot.* ii. t. 111; *Benth. in Wall. Pl. As. Rar.* i. 29, *Lab.* 165, and in *DC. Prodr.* xii. 158; *Wall. Cat.* 1528; *Roxb. Fl. Ind.* iii. 26; *Kurz For. Fl.* ii. 277; *Gamble Darjeel. Timbers*, 63, and *Indian Timbers*, 300. *C. ternifolia*, *Roxb. Cor. Pl.* iii. 40, t. 245, and *Fl. Ind.* iii. 25; *Wall. Cat.* 1529; *Benth. ll. c.*; *Grah. Cat. Bomb. Pl.* 150; *Dalz. & Gibs. Bomb. Fl.* 209. *Elsholtzia oppositifolia*, *Poir. Dict. Suppl.* v. 663.

SUBTROPICAL HIMALAYA; from the Salt range and Peshawur to Sikkim, alt. 1–4000 ft. BEHAR, CENTRAL INDIA and the DECCAN PENINSULA to TRAVANCORE. TENASSERIM; *Helper*.

Shrub, 5–10 ft. high; trunk stout; branches stout, terete, often whorled in threes. *Leaves* 4–8 in.; petiole stout, $\frac{1}{2}$ –1 in. *Spikes* very numerous, 2–4 in. long, flowering $\frac{1}{4}$ in. diam., fruiting $\frac{1}{2}$ in. *Calyx* very minute, teeth in fruit $\frac{1}{8}$ in., tube deeply grooved, villous. *Corolla* white.

15. **ELSHOLTZIA**, *Willd.*

Herbs or undershrubs. *Leaves* opposite. *Whorls* in simple or panicled slender or stout terete or second spikes; flowers minute; bracts various. *Calyx* 5-toothed, throat naked, fruiting erect often enlarged or inflated. *Corolla* small, tube straight or incurved; limb oblique or sub-2-lipped, 4-fid, upper lobe or lip erect, notched, the others spreading. *Stamens* 4, diverging or distant, filaments naked; anther-cells divaricate, or at length confluent. *Disk* much produced behind the ovary. *Style* subequally 2-fid, lobes subulate. *Nutlets* smooth or tubercled.—Species about 20, Temperate and Tropical Asiatic and Malayan, one of them also European.

* *Spikes* panicled, cylindric or subsecund; bracts narrow, linear subulate or acicular. *Nutlets* shining. *Aphanochilus*, *Benth.*

1. **E. flava**, *Benth. Lab.* 161, and in *DC. Prodr.* xii. 160; tall,

branches and petioles scaberulous, leaves large long-petioled ovate or rhombic-ovate caudate-acuminate toothed, spikes stout terete puberulous, corolla-tube twice as long as the calyx, fruiting calyx $\frac{1}{2}$ in. pedicelled tubular inflated below, teeth erect. *Aphanochilus flavus*, *Benth. in Wall. Pl. As. Rar.* i. 28, t. 34, and *Cat.* 1553.

TEMPERATE HIMALAYA; from Kumaon to Nepal, alt. 5-9500 ft. KHASIA MTS., alt. 5-6000 ft.

An annual bush, 3-5 ft.; branches obtusely 4-angled, sometimes muricate. *Leaves* 4-8 in., base cuneate rounded or cordate. *Spikes* axillary and terminal, 2-4 in., $\frac{1}{2}$ in. broad in fruit. *Bracts* ovate or lanceolate acute, deciduous. *Flowers* shortly pedicelled. *Corolla* yellow, puberulous. *Nutlets* ellipsoid, dark brown.

2. **E. polystachya**, *Benth. Lab.* 161, and in *DC. Prodr.* xii. 159; tall, branched, puberulous or hoary-pubescent, leaves subsessile lanceolate or elliptic-lanceolate acuminate serrate, spikes long slender, corolla villous, tube twice as long as the calyx, fruiting calyx $\frac{1}{2}$ in. pedicelled narrowly tubular curved, teeth erect. *Gamble Ind. Timbers*, 301. *Aphanochilus polystachyus*, *Benth. in Wall. Pl. As. Rar.* i. 27, t. 33, and *Cat.* 1554. *Colebrookia oppositifolia*, *Lodd. Bot. Cab.* t. 487. ? *Perilla fruticosa*, *Don Prodr.* 115.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 7-9000 ft., *Wallich, &c. KHASIA MTS.*, alt. 4-5500 ft., *Griffith, &c.*

An annual bush, 3-4 ft.; branches obscurely 4-angled. *Leaves* 3-6 in., rather rigid, base acute, sometimes deeply toothed or crenate. *Spikes* 4-10 in., often fascicled, flowering $\frac{1}{2}$ in. diam., narrower in fruit; bracts minute. *Corolla* white, pubescent. *Fruiting calyx* ribbed to the base, with short triangular acute teeth. *Nutlets* narrow.—Bentham cites Don's *Perilla fruticosa*, but his description of the calyx with linear teeth and corolla with a very large midlobe of the lower lip is wholly at variance. Graham (*Cat. Bomb. Pl.* 150) gives "Chibler in the Surat collectorate as a habitat," which is very unlikely, and is not taken up in Dalzell and Gibson's Bombay Flora.

3. **E. Thompsoni**, *Hook. f.*; stout, densely tomentose, leaves subsessile lanceolate acuminate serrate, spikes leafy interrupted, corolla-tube shortly exserted, fruiting calyx $\frac{1}{2}$ in. pedicelled tubular straight woolly, teeth spreading.

ODDH; at Gadughat, *R. Thompson.*

Branches terete, very stout, with brown close short pubescence. *Leaves* 4-5 in., hard, scabrid above, almost woolly beneath. *Spikes* many, panicle, bracts leafy, buds woolly. *Corolla* pubescent. *Calyx* ribbed to the base; teeth short, broadly triangular. *Nutlets* linear-oblong.

4. **Beddomi**, *Clarke mss.*; hoary-tomentose, branches slender, leaves shortly petioled narrowly oblong-lanceolate obtuse crenulate, hoary on both surfaces, spikes long slender terete white-villous interrupted, corolla tomentose, tube incurved twice as long as the calyx.

TENASSERIM; Thongyeen forests, *Beddomi.*

Shrubby? *Branches* nearly terete. *Leaves* 2-3 by $\frac{1}{2}$ - $\frac{1}{2}$ in., rather thick, base entire narrowed into the petiole. *Spikes* 3-4 in., $\frac{1}{2}$ in. diam., very white; bracts minute, lanceolate; flowers $\frac{1}{2}$ in. long, sessile. *Calyx-teeth* lanceolate; fruiting not seen.

5. **E. blanda**, *Benth. Lab.* 162, and in *DC. Prodr.* xii. 160; slender, puberulous or hoary, leaves petioled elliptic-lanceolate acuminate serrate, spikes slender panicle one-sided, corolla-tube short, fruiting calyx

$\frac{1}{2}$ in. pedicelled urceolate glandular-pubescent, teeth erect lanceolate. *Aphanochilus blandus*, *Benth. in Wall. Pl. As. Rar.* i. 19, and *Cat.* 1550; *Bot. Mag.* t. 3091. ? *Perilla elata*, *Don Prodr.* 115. *Mentha blanda*, *Wall. mss.*

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 3-7500 ft., *J. D. H.*, &c. KHASIA MTS., alt. 2-6000 ft., *De Silva*, &c. Tenasserim, *Beddome*.—DISTRIB. Ava, Sumatra.

Bushy, 2-5 ft. high; branches slender, obtusely 4-angled. *Leaves* 1-4 in.; petiole short. *Spikes* 2-5 in., flowering $\frac{1}{2}$ in. diam., fruiting broader, whorls lax or dense; bracts subulate-lanceolate. *Corolla* white, sparingly pubescent. *Fruiting calyx* short, mouth contracted. *Nutlets* broadly ellipsoid.—Bentham refers *Don's Perilla elata* to this, but the description of the leaves "scabrid above, tomentose beneath," does not agree. He also quotes "Arabia" on Forsköl's authority as a habitat, which is most improbable.

6. ***E. incisa***, *Benth. Lab.* 162, and in *DC. Prodr.* xii. 161; puberulous, leaves long-petioled broadly ovate obtuse coarsely crenate-toothed, petiole winged above, spikes terete, flowering very slender terete, corolla-tube short, fruiting calyx urceolate $\frac{1}{2}$ in. sessile glandular-pubescent, teeth erect lanceolate. *Aphanochilus incisus*, *fœtens* & *paniculatus*, *Benth. in Wall. Pl. As. Rar.* i. 29, 30, and *Cat.* 1551, 1552, 1557. *Perilla leptostachya*, *Don Prodr.* 115. *Hyptis stachyodes*, *Link Enum.* ii. 106. *Mentha paniculata*, *Roxb. Fl. Ind.* iii. 4. *M. blanda*, *DC. Pl. Rar. Hort. Genes.* 27, t. 8.

TEMPERATE and SUBTROPICAL HIMALAYA; often in cultivated fields, from Kishmir to Mishmi, alt. 3-5000 ft. CHITTAGONG; *Roxburgh*.—DISTRIB. Ava.

A tender herb, 1-3 ft., branches 4-gonous. *Leaves* 1-2 in., membranous, base entire, cuneate, produced into the slender petiole, which is as long as the blade. *Spikes* paniced, 4-6 in., flowering $\frac{1}{2}$ in. diam., fruiting $\frac{1}{2}$ in.; bracts setaceous, often exceeding the flowers. *Corolla* minute, tube short, lobes glabrous. *Nutlets* ellipsoid.

VAR. ? *major*; tall very stout, stem with soft spreading hairs, fruiting spikes very stout, $\frac{1}{2}$ in. diam., fruiting calyx $\frac{1}{2}$ -nearly $\frac{1}{2}$ in.—Kumaon, near Dol, alt. 6500 ft., *Strachey*. Sikkim, at Ryang, alt. 6000 ft., *Clarke*.—I have seen only fruiting branches.

7. ***E. Griffithii***, *Hook. f.*; hoary-pubescent, leaves short-petioled lanceolate subacute, spikes short terete dense-fld., calyx in flower narrow, teeth lanceolate, 2 upper much the longest.

UPPER ASSAM; Mishmi Hills, *Griffith*.

Habit of *E. incisa*, but leaves rigid, 1 by $\frac{1}{2}$ in., narrowed into a petiole not one-third the length of the blade. *Spikes* 1-2 in., flowering $\frac{1}{2}$ in. diam., very dense-fld.; bracts setaceous, exceeding the flowers. *Calyx* hoary-pubescent; fruiting not seen. *Corolla-tube* twice as long as the calyx, lobes pubescent.

8. ***E. pilosa***, *Benth. Lab.* 163, and in *DC. Prodr.* xii. 162; coarsely hairy, leaves petioled ovate obtuse coarsely crenate, spikes subsolitary short stout terete dense-fld., bracts subulate awned ciliate longer than the flowers, fruiting calyx $\frac{1}{2}$ in. urceolate hispid, teeth lanceolate. *Aphanochilus pilosus*, *Benth. in Wall. Pl. As. Rar.* ii. 30, and *Cat.* 1556.

TEMPERATE HIMALAYA; from Kumaon to Sikkim, alt. 5-7000 ft., *Wallich*, &c. KHASIA MTS., alt. 4-6000 ft.

A coarse herb, 1-2 ft.; stem stout or slender, hairs flaccid. *Leaves* 1-2 by $\frac{1}{2}$ - $\frac{3}{4}$ in., membranous, base cuneate; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in. *Spikes* 1-1 $\frac{1}{2}$ in., stout both in flower and fruit, hispid, very dense-fld.; bracts rigid, with a stout pale midrib. *Calyx-teeth* very unequal. *Corolla* minute, lobes hairy.

** *Bracts rounded or broadly ovate, very short. Nutlets opaque.*

9. **E. densa**, *Benth. Lab.* 714, and in *DC. Prodr.* xii. 162; sparsely pubescent, leaves shortly petioled oblong-lanceolate or elliptic acute or obtuse serrate, spikes oblong or shortly cylindric villous, bracts short rounded, fruiting calyx $\frac{1}{4}$ in. broadly funnel-shaped inflated membranous, teeth short rounded. *Jacquem. Voy. Bot.* 127, t. 131. *E. eriostachya*, *Herb. Ind. Or. H. f. & T.*

WESTERN HIMALAYA and WESTERN TIBET; from Kumaon to Ladak, alt. 10–13,000 ft., *Jacquemont*, &c.

Annual, 6–18 in., branched from the base; stem slender to very stout, 4-angled. *Leaves* 1–3 in., rarely ovate or elliptic; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Spikes* 1–1 $\frac{1}{2}$ in., or more and interrupted, fruiting $\frac{3}{4}$ – $\frac{3}{8}$ in. broad; bracts shorter than the flowers. *Calyx*, flowering very minute, cupular; fruiting greatly enlarged. *Corolla* minute, villous, lilac, tube very short. *Nutlets* $\frac{1}{10}$ in. long, ellipsoid, opaque.

10. **E. eriostachya**, *Benth. Lab.* 163, and in *DC. Prodr.* xii. 162; softly hairy, leaves shortly petioled oblong or ovate-oblong obtuse denticulate, spikes solitary cylindric stout villous, bracts short ovate, fruiting calyx $\frac{1}{2}$ in. campanulate membranous, teeth minute triangular. *E. Hoffmeisteri*, *Klotzsch in Reise Pr. Waldem. Bot.* 105, t. 66. *Aphanochilus eriostachya*, *Benth. in Wall. Pl. As. Rar.* i. 29, and *Cat.* 155.

ALPINE HIMALAYA; from Kumaon, alt. 10–12,000 ft., *Blinkworth*, &c., Nepal, *Wallich*, to Sikkim, alt. 14–16,000 ft., *J. D. H.*

A strong-scented annual, 6–18 in., branched from the base, branches 4-angled suberect. *Leaves* 1–1 $\frac{1}{2}$ in., sometimes tomentose beneath; petiole $\frac{1}{2}$ – $\frac{1}{4}$ in. *Spikes* 1–2 $\frac{1}{2}$ in., flowering $\frac{1}{2}$ in. fruiting $\frac{1}{2}$ in. diam.; flowers densely imbricate. *Calyx*, flowering $\frac{1}{10}$ in. *Corolla* very minute, yellow. *Nutlets* $\frac{1}{10}$ in., ellipsoid, opaque.

VAR. *pusilla*; dwarf, 3–6 in., stem usually simple, leaves $\frac{1}{2}$ – $\frac{1}{3}$ in., fruiting calyx smaller. *E. pusilla*, *Benth. Lab.* 714, and in *DC. Prodr.* xii. 162.—Interior Himalaya; from Sikkim to W. Tibet, alt. 12–16,000 ft., and to 18,000 ft. in Rupchu, *Stoliczka*.

*** *Spikes cylindric; bracts broad, obcuneate, membranous, ciliate, forming together imbricating cups longer than the calyx.* CYCLOSTIGIA, *Benth.*

11. **E. strobilifera**, *Benth. Lab.* 163, and in *DC. Prodr.* xii. 162; sparsely hairy, leaves small petioled ovate obtuse crenulate or serrate, spikes villous or pubescent. *Cyclostigia strobilifera*, *Benth. in Wall. Pl. As. Rar.* i. 30, *excl. syn.*, and *Cat.* 1562.

TEMPERATE and ALPINE HIMALAYA; from Simla, alt. 5–10,000 ft., to Sikkim, alt. 6–14,000 ft.

Very variable, from a simple filiform stem 2 in. high, to a much-branched herb of 18 in.; stem and branches with usually a line of crisp hairs. *Leaves* $\frac{1}{2}$ –1 in., rarely ovate and coarsely serrate; petiole $\frac{1}{2}$ – $\frac{1}{4}$ in. *Spikes* $\frac{1}{2}$ –2 in., fruiting sometimes $\frac{1}{2}$ in. diam.; bracts imbricating all round the spike very broad, margin semicircular. *Calyx* hyaline, narrow-tubular, fruiting $\frac{1}{10}$ in., teeth lanceolate. *Corolla-tube* very slender, much longer than the calyx, lobes minute glabrous. *Nutlets* $\frac{1}{10}$ in., oblong, red-brown, not shining.

**** *Spikes completely one-sided; bracts large, secund, orbicular, cuspidate, closely imbricate, membranous, ciliate.* ELSHOLTZIA, *Willd.*

12. **E. cristata**, *Willd. Sp. Pl.* iii. 29; nearly glabrous, leaves long-petioled ovate- or elliptic-lanceolate acuminate coarsely serrate, spikes broad pubescent or villous, fruiting calyx $\frac{1}{2}$ in. tubular hairy. *Benth. in Wall.*

Pl. As. Rar. i. 29, and *Cat.* 1560; *Lab.* 164, and in *DC. Prodr.* xii. 163; *Bot. Mag.* t. 2560. *Mentha ovata*, *Cav. Ic.* 36, t. 360, f. 1. *Hyssopus ocyimifolius*, *Lamk. Dict.* iii. 187. *Perilla polystachya*, *Don Prodr.* 115.

TEMPERATE and TROPICAL HIMALAYA; from Kashmir to Mishmi, alt. 1–9000 ft. WESTERN TIBET, alt. 9–11,000 ft. (Nilghiris, introduced).—DISTRIB. N. Europe, N. Asia, China, Japan.

An erect fragrant herb, very variable in size, from 6 in. to 2 ft.; stem simple or branched. *Leaves* 1–3 in., membranous, base cuneate; petiole half as long as the blade or more. *Spikes* 1–3 in., fruiting $\frac{1}{2}$ in. diam. or less, rather villous; bracts shortly petioled, cusps acicular. *Calyx* minute in flower, in fruit vesicular, teeth triangular. *Corolla* pink or purplish, tube exserted, curved; limb villous. *Nutlets* $\frac{1}{8}$ in., oblong, smooth.—Some N. Chinese specimens are almost woolly.

DOUBTFUL SPECIES.

E. LEPTOSTACHYA, *Benth. Lab.* 713, and in *DC. Prodr.* xii. 160; *Cambess. in Jacquem. Voy. Bot.* 128, t. 32, from Kashmir (Jacquemont). I have seen no specimens. Bentham compares it with *E. polystachya*, from which the extremely slender spike distinguishes it, as do the distant whorls, and leaves contracted above the base. Is it an *Elsholtzia*?

16. *PERILLA*, *Linn.*

Herbs. *Leaves* opposite. *Whorls* 2-fld., in second axillary and terminal simple or paniced racemes; flowers and bracts small. *Calyx* campanulate, 5-toothed; fruiting greatly enlarged, 2-lipped, base gibbous, upper lip dilated 3-toothed, lower of 2 lanceolate-subulate teeth. *Corolla-tube* short, throat bell-shaped, 5-fld. *Stamens* 4, subequal, erect, distant, hardly exserted; anther-cells distinct, parallel, at length diverging. *Disk* a large posticous gland. *Style* equally 2-fld. *Nutlets* subglobose, coarsely reticulate.—Species 1 (or 2), Eastern Asiatic.

P. ocimoides, *Linn.*; *Benth. Lab.* 166, in *Wall. Pl. As. Rar.* i. 29, and *Cat.* 1558, and in *DC. Prodr.* xii. 163; *Grah. Cat. Bomb. Pl.* 150; *Don Prodr.* 114; *Bot. Mag.* t. 2395. *P. macrostachya*, *Benth. in Wall. Cat.* 1559. *Ocimum frutescens*, *Linn. Sp. Pl.* ii. 832, excl. syn. *Rheede. Melissa maxima*, *Arduin Sp.* ii. 28, t. 13. *Mentha perilloides*, *Willd.*; *Lamk. Dict.* iv. 112; *Roxb. Fl. Ind.* iii. 7.

TROPICAL and TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 1–10,000 ft., common, often cultivated. KHASIA MTS., alt. 3–6000 ft.—DISTRIB. Burma, China, Japan.

A coarse aromatic often shaggy annual, 2–4 ft. *Leaves* 3–6 in., ovate or rounded, obtuse toothed serrate or coarsely crenate; petiole 1–3 in. *Racemes* 3–8 in., erect; bracts lanceolate. *Corolla* white, $\frac{1}{2}$ in. *Fruiting calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in., villous. *Nutlets* $\frac{1}{10}$ in.—Some Japan specimens are nearly glabrous; others have fruiting calyx $\frac{1}{4}$ in., and nutlets nearly $\frac{1}{12}$ in.

DOUBTFUL SPECIES.

PERILLA FRUTICOSA, *Don Prodr.* 115, see under *Elsholtzia polystachya*, p. 643.

PERILLA ELATA, *Don Prodr.* 115, see *Elsholtzia blanda*, p. 643.

17. *MOSLA*, *Ham.*

Annual fragrant herbs. *Leaves* opposite. *Whorls* 2-fld., in terminal and axillary second racemes; flowers and bracts very minute or the lower leafy. *Calyx* campanulate, 5-toothed, fruiting enlarged, subequal or 2-lipped, base gibbous; upper lip truncate or 3-toothed, lower of 2 longer teeth; throat closed with hairs. *Corolla-tube* naked or with a ring of hairs; lips

short, upper notched, lower 3-fid. *Stamens* 2, posticous, short, erect, distant; anther-cells 2, divaricate; staminodes 2. *Disk* a large posticous gland. *Nutlets* globose, smooth or reticulate.—Species 6, East Asiatic.

M. dianthera, *Maximovicz in Bull. Imp. Acad. Petersb.* ix. 430; slender, sparsely pubescent, leaves petioled ovate acute serrate, nutlets reticulate. *M. ocimoides*, *Ham. mss. in Benth. Lab.* 366. *Hedeoma nepalensis*, *Benth. Lab.* 366, and in *DC. Prodr.* xii. 244; *Dene. in Jacquem. Voy. Bot.* 133, t. 138. *Melissa nepalensis*, *Benth. in Wall. Pl. As. Rar.* i. 66; *Wall. Cat.* 2124. *Moschosma ocimoides*, *Reichb. in Wall. Cat.* 2712. *Lycopus dianthera*, *Ham. in Roxb. Fl. Ind.* i. 144. *Cunila Buchanaui*, *Spreng. Syst.* i. 54. *C. nepalensis*, *Don Prodr.* 107.

TROPICAL and TEMPERATE HIMALAYA and N. BENGAL PLAINS; from Kashmir to Bhotan, alt. 1–6000 ft. KHASIA MTS., alt. 0–5000 ft. CHITTAGONG, *J. D. H. & T. T.*—DISTRIB. Burma, China.

A very strong-scented strict erect herb, 1–3 ft. *Leaves* 1–1½ in.; petiole ½–¾ in. *Racemes* very slender, terminating the branches, lax-fld. *Corolla* ¼ in. long, white or purplish, tube short. *Fruiting calyx* ½ in., hemispherical. *Nutlets* as in *Perilla*.—The other described species are all extremely near *M. dianthera*, and perhaps forms of it.

18. MENTHA, Linn.

Strong-scented perennial herbs, rootstock creeping. *Whorls* many-fld., in axillary and terminal spikes, bracts various; flowers small. *Calyx* campanulate or tubular, 5-toothed, throat naked or villous. *Corolla* subequally 4-lobed. *Stamens* 4, equal, erect, distant; anther-cells parallel. *Style-arms* short. *Nutlets* smooth or reticulate.—Species about 25, N. temp. regions, introduced in many countries.

Mentha viridis, L. (spear-mint), *M. piperita*, L. (peppermint), *M. sativa*, L., and *M. aquatica*, L., occur in Indian gardens, and as escapes.

1. **M. sylvestris**, Linn.; leaves broadly or narrowly oblong obovate or lanceolate subacute serrate hoary beneath, whorls in terminal spikes, calyx-teeth triangular or lanceolate, corolla hairy glabrous within. *Benth. Lab.* 171, and in *DC. Prodr.* xii. 166; *Reichb. Ic. Fl. Germ.* t. 82.

TEMPERATE WESTERN HIMALAYA and WESTERN TIBET; from Kashmir to Gurwhal, alt. 4–12,000 ft., *Royle, &c.*—DISTRIB. Afghanistan, Temp. Europe and W. and Central Asia.

Stem robust or slender, 2–3 ft., hoary-tomentose. *Leaves* 1–3 by ¾–2 in., base rounded or cordate. *Spikes* 1–3 in., ¼–½ in. diam.; bracts lanceolate; pedicels hairy. *Corolla* lilac, about ½ in. diam. *Nutlets* usually pale, smooth, sometimes brown and conspicuously delicately reticulate.

I have vainly endeavoured to find any character whereby to distinguish *M. incana* and *Royleana* from *M. sylvestris*, the only available one afforded by the calyx being excessively variable. Boissier unites them under one variety *δ. petiolata* (*Fl. Orient.* iv. 543), distinguished from *sylvestris* proper by the hoariness and petioled leaves, but I think the slender spike and usually minute calyx of *incana* are better varietal characters. Strachey and Winterbottom's specimens from Gurwhal (Niti, alt. 11,500 ft.) appear to be typical *M. sylvestris* with purplish calyces.

VAR. incana; uniformly hoary-tomentose, spikes slender much interrupted, calyx very small, teeth short. *M. incana*, *Willd. Enum. Hort. Berol.* 609; *Benth. Lab.* 170, and in *DC. Prodr.* xii. 169.—Simla to Murree, Mooltan, *Edgeworth*.—Sometimes densely woolly. Peshawur specimens have small capitate spikes.

VAR. Royleana; uniformly hoary-tomentose, spikes stout usually continuous, calyx-teeth lanceolate or triangular with subulate lips. *M. Royleana*, *Benth. in Wall. Pl. As. Rar.* i. 29, and *Cat.* 1537; *Lab.* 171, and in *DC. Prodr.* xii. 169.

2. **M. arvensis**, Linn.; hairy or glabrate, leaves shortly petioled or sessile oblong ovate or lanceolate serrate, whorls axillary capitate, calyx-teeth triangular or lanceolate. *Benth. in DC. Prodr.* xii. 171; *Boiss. Fl. Orient.* iv. 544.

WESTERN HIMALAYA; Kashmir, alt. 5–10,000 ft.—DISTRIB. Europe, N. and W. Asia to China.

Stem 1–2 ft. *Leaves* 1–2 in., obtusely or acutely serrate. *Bracts* acute, shorter than the flowers. *Calyx* hairy. *Corolla* hairy without and within.

VAR. *javanica*; leaves lanceolate, calyx-teeth longer, often exceeding the tube. *M. javanica*, *Blume Bijl.* 826; *Benth. l. c.* *M. sativa*, *Roxb. Fl. Ind.* iii. 6. *M. arvensis*, *Thwaites Enum.* 239.—Malacca, *Griffith*; Ceylon, *Gardner*, &c., borders of paddy-fields in the Central Province, *Thwaites*.—I suspect this is introduced, and is *M. sativa*, L., to which Boissier refers as a synonym to *M. arvensis*, L.

19. **LYCOPUS**, Tourn.

Marsh perennial herbs. *Leaves* toothed or pinnatifid. *Flowers* small in dense axillary whorls. *Calyx* subequally 4–5-toothed, throat naked. *Corolla* campanulate, subequally 4–5-fid. *Stamens* 2, distant; anther-cells parallel; staminodes 2. *Style* 2-fid, lobes flattened. *Nutlets* smooth, obovate, compressed, margins thickened.—Species 2, N. temp. regions and Australia.

L. europæus, Linn.; glabrous or puberulous, leaves sinuate-toothed or serrate, staminodes minute. *Benth. in DC. Prodr.* xii. 179; *Boiss. Fl. Orient.* iv. 545.

WESTERN HIMALAYA; Kashmir, alt. 1–6000 ft.—DISTRIB. Europe, W. N. and Central Asia.

Rootstock creeping or stoloniferous. *Stem* 1–3 ft. *Leaves* subsessile, elliptic-oblong, sometimes pinnatifid. *Corolla* blueish-white, dotted with purple, hairy within. *Nutlets* longer than the calyx-tube.

VAR. *exaltata*; stouter, leaves more pinnatifid, staminodes capitellate. *L. exaltatus*, Linn.; *Benth. in DC. Prodr.* xii. 179; *Boiss. Fl. Orient.* iv. 545.—Kashmir, alt. 3–6000 ft.—Distrib. of *L. europæus*.

20. **ORIGANUM**, Tourn.

Aromatic herbs or undershrubs. *Leaves* entire or toothed. *Cymes* corymbose, bracts large, imbricating. *Calyx* 10–13-nerved, 5-toothed or 2-lipped; throat villous. *Corolla* obscurely 2-lipped, upper lip notched or 2-fid; lower spreading, 3-fid. *Stamens* 4, distant, ascending; anther-cells distinct, spreading. *Style-lobes* acute. *Nutlets* smooth.—Species about 25, of N. temperate regions.

The Marjoram, *O. Marjorana*, L. (*O. Wallichianum*, *Benth. in Wall. Cat.* 1565) is extensively cultivated in India.

O. vulgare, Linn.; erect, villous or glabrate, corymbosely branched, leaves broadly ovate. *Benth. in DC. Prodr.* xii. 193; *Boiss. Fl. Orient.* iv. 551. *O. Watsoni*, *T. A. Schmidt in Trim. Journ. Bot.* 1868, 234, t. 82, f. 5–7. *O. normale*, *Don Prodr.* 113; *Benth. in Wall. Pl. As. Rar.* i. 31, in *Lab.* 335, and in *DC. l. c.*; *Wall. Cat.* 1564. *O. laxiflora*, *Royle in Hook. Bot. Misc.* iii. 376; *Benth. Lab.* 336, and in *DC. l. c.* 194.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 7–12,000 ft.—DISTRIB. Europe, N. Africa, W. and N. Asia.

Stoloniferous, erect or prostrate; stem 1–3 ft. *Leaves* $\frac{1}{2}$ –1 in., entire or toothed,

lower early withering. *Cymes* $\frac{1}{2}$ –1 in., ovoid, 4-gonous; bracts green or purple, ovate, obtuse or acute. *Flowers* dimorphic, larger 2-sexual, purple, smaller ♀, paler. *Calyx-teeth* short. *O. laxiflorum*, Royle, is a prostrate state. *O. normale*, Don, has usually smaller less-coloured bracts, but intermediates are very common.

21. THYMUS, Linn.

Small, slender, much-branched shrubs, very aromatic. *Leaves* small, quite entire. *Cymes* few-fld., in dense or lax spikes, bracts minute; flowers small. *Calyx* 10–13-nerved, 2-lipped; throat villous. *Corolla* obscurely 2-lipped; upper lip straight, flattish, notched, lower 3-fld. *Stamens* 4, distant, straight, lower pair longer; anther-cells parallel or diverging. *Style-lobes* subulate. *Nutlets* nearly smooth.—Species about 50, of N. temperate regions.

T. Serpyllum, Linn.; branches prostrate or ascending, leaves ovate linear oblong or obovate obtuse. *Benth. in DC. Prodr.* xii. 200; *Boiss. Fl. Orient.* iv. 554. *T. linearis*, *Benth. in Wall. Pl. As. Rar.* i. 31, *Lab.* 346, and in *DC. Prodr.* xii. 202; *Wall. Cat.* 1567.

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 5–13,000 ft. WESTERN TIBET, alt. 10–15,000 ft.; *Strachey & Winterbottom*, &c.—DISTRIB. Europe, N. Africa, W. and N. Asia.

Glabrous or hairy. *Rootstock* woody, stems or branches usually decumbent. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., short-petioled. *Whorls* capitate; flowers dimorphic, males largest. *Calyx-teeth* ciliate. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in., purple, very variable.—Common Thyme.

22. HYSSOPUS, Linn.

An undershrub. *Leaves* sessile, obtuse, entire. *Whorls* 6–15-fld., secund, axillary and in terminal spikes. *Calyx* 15-nerved, 5-toothed, throat naked. *Corolla* 2-lipped; upper lip erect, flat, notched; lower spreading, 3-lobed, midlobe very broad. *Stamens* 4, exserted, diverging, lower longer; anther-cells linear, spreading. *Style-lobes* subequal, subulate. *Nutlets* narrow, nearly smooth, triquetrous.

H. officinalis, Linn.; *Benth. in DC. Prodr.* xii. 251; *Boiss. Fl. Orient.* iv. 584; *Reichb. Ic. Fl. Germ.* t. 1259.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 8–11,000 ft., *Falconer*, &c.—DISTRIB. E. Europe, W. Asia.

Usually glabrous; stem below branched, woody; branches 1–2 ft., erect or diffuse. *Leaves* sessile, oblong-linear or lanceolate. *Calyx*, fruiting $\frac{1}{2}$ – $\frac{3}{4}$ in. long. *Corolla* blueish-purple.

23. MICROMERIA, Benth.

Herbs or undershrubs. *Leaves* usually small, entire or toothed. *Whorls* axillary or in terminal spikes, rarely panicle; flowers small. *Calyx* 13-nerved, 5-toothed or 2-lipped. *Corolla* 2-lipped; upper lip erect, flattish, entire or notched; lower spreading, 5-lobed. *Stamens* 4, lower longer ascending, incurved with diverging tips; anther-cells distinct, parallel, at length diverging, connective usually thickened. *Style-lobes* equal or upper very-short, lower recurved flattened. *Nutlets* smooth.—Species about 60, all regions but Australia.

1. **M. capitellata**, *Benth. in DC. Prodr.* xii. 218; pubescent, stems tall slender erect, leaves entire or subserrate obtuse, whorls subglobose

distant in slender spikes, lower peduncled. *M. Malcolmiana*, *Benth. in Pl. Hohenack*, n. 1402; *Dalz. & Gibs. Bomb. Fl.* 209. *Marrubium Malcolmii*, *Dalz. in Hook. Kew Journ.* iv. 109.

BEHAR; or Parusnath, alt. 4500 ft., *Clarke*. WESTERN HIMALAYA; Dehra Doon, *Duthie*. WESTERN GHATS; from the Concan to the Nilghiris, *Wight*, &c.

Rootstock woody; stem 1-2 ft. *Leaves* $\frac{1}{2}$ -1 in., ovate or oblong, flat; floral small; petiole short. *Bracts* small. *Flowers* $\frac{1}{2}$ in. *Calyx* villous; teeth long, subulate, erect; fruiting $\frac{1}{2}$ in.—Very aromatic.

2. *M. biflora*, *Benth. Lab.* 378, and in *DC. Prodr.* xii. 220; glabrous, hairy or puberulous, stems short dense leafy, leaves small sessile ovate subacute, whorls axillary small few-fld. *Dcne. in Jacquem. Voy. Bot.* 129, t. 134; *Wight Ill.* t. 176 bis, f. 5, and *lc.* t. 1446. *M. ovata*, *Beck. in Schimp. Pl. Iter Abyss.* n. 12. *Thymus biflorus*, *Ham. in Wall. Cat.* 1556, *Don Prodr.* 112; *Benth. in Wall. Pl. As. Rar.* i. 31.

TROPICAL and TEMPERATE HIMALAYA (exclusive of Sikkim); from Kashmir to Bhotan, alt. 1-7000 ft. NILGHIRI and ANAMALLAY HILLS.—DISTRIB. Afghanistan, Arabia, Abyssinia, S. Africa.

Dwarf. *Rootstock* woody, stems or branches excessively numerous, 3-6 in., fastigate, filiform. *Leaves* $\frac{1}{2}$ - $\frac{1}{4}$ in., margins thickened. *Flowers* small, often solitary, pedicelled. *Calyx* hirsute, fruiting $\frac{1}{2}$ in.; teeth subulate, very variable in length.

3. *M. hydaspidis*, *Falc. mss.*; *Benth. in DC. Prodr.* xii. 224; pubescent, stem erect, leaves shortly petioled ovate obtuse subcrenate, whorls spicate many-fld. shortly peduncled, flowers pedicelled.

WESTERN KASHMIR; Jhelum Valley from Patlee to Nashga Valley, *Falconer*.

Stem 10-18 in., erect, rather stout, subsimple. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Spikes* continuous or interrupted. *Calyx* $\frac{1}{2}$ in. long, erect, puberulous; teeth lanceolate.

24. CALAMINTHA, Moench.

Herbs or shrubs. *Leaves* entire or toothed. *Whorls* dense and axillary or loose and paniced or spiked. *Calyx* 13-nerved, 2-lipped, upper lip 3-toothed, lower 2-fid, teeth narrower than of the upper; throat naked or villous. *Corolla-tube* straight, throat villous; upper lip erect, flattish; lower spreading, 3-lobed. *Stamens* 4 (or 2 upper imperfect), ascending under the upper lip; anther-cells parallel or diverging. *Style-lobes* equal, or the lower larger. *Nutlets* minute, subglobose, smooth, dry.—Species about 40, of N. temperate regions.

1. *C. Clinopodium*, *Benth. in DC. Prodr.* xii. 233; erect, softly hairy, whorls dense-fld., bracts filiform equalling the calyx, calyx-teeth subequal in length all very slender. *Boiss. Fl. Orient.* iv. 579; *Reichb. Ic. Fl. Germ.* t. 1274, f. 1. *Melissa Clinopodium*, *Benth. Lab.* 392. *Clinopodium vulgare*, *Linn.*

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 4-12,000 ft.—DISTRIB. Europe, N. Africa, N. and W. Asia, Canada.

Rootstock woody, stoloniferous. *Stem* 1-3 ft., slender, subsimple. *Leaves* remote, 1-2 in., ovate, subacute, subcrenate. *Whorls* terminal and axillary, $\frac{1}{2}$ -1 in. diam., depressed. *Calyx* $\frac{1}{2}$ in. usually curved, hispid. *Corolla* $\frac{3}{4}$ -1 in., purple, hairy.—*Wild Basil*.

2. *C. umbrosa*, *Benth. in DC. Prodr.* xii. 232; procumbent, laxly hairy, whorls globose lax or dense-fld., bracts short or long, upper calyx-teeth with triangular teeth, lower with often longer subulate ones. *Boiss.*

Fl. Orient. iv. 578. *C. Clinopodium*, var. *umbrosa*, *Hook. f. in Thwaites Enum.* 239. *C. repens*, *Benth. in DC. l. c.* 233. *C. nepalensis*, *Fisch. & Mey. Ind. Sem. Hort. Petrop.* 1845, 53, n. 521. *Clinopodium repens*, *Roxb. Hort. Beng.* 44, and *Fl. Ind.* iii. 13; *Benth. in Wall. Pl. As. Rar.* i. 66; *Wall. Cat.* 2130. *Thymus repens*, *Don Prodr.* 113. *Melissa umbrosa*, *Bieb. Fl. Taur. Cauc.* ii. 63; *Benth. Lab.* 392; *Wight Ic.* t. 1447. *M. repens*, *Benth. Lab.* 392.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 4-12,000 ft. KHASIA MTS., alt. 4-6000 ft. WESTERN GHATS; from the Concan to the Anamallay Hills. CEYLON; at Newera Elia.—DISTRIB. Afghanistan, Caucasus, China, Japan, Java.

A very common and variable Indian plant with difficulty distinguishable in some states from *C. Clinopodium*, Wallich's Nepal specimens being as robust, and with equally long bracts, and calyx almost as large; but the habit is usually decumbent or procumbent, and more slender, the bracts shorter, calyces only $\frac{1}{2}$ – $\frac{1}{4}$ in., their upper-lip segments shorter and more recurved. I am quite unable to distinguish *C. repens* from *C. umbrosa*; a diminutive form of it has very small calyces with short broad upper teeth sometimes strongly recurved. *C. nepalensis* is a very stout suberect Kashmir form with numerous often close-set and sometimes spicate whorls, short bracts and short calyx-teeth.

3. ***C. longicaulis***, *Benth. in DC. Prodr.* xii. 234; erect or decumbent, softly hairy, whorls lax-fld. subsecund, bracts very minute, calyx-teeth short subequal in length not $\frac{1}{2}$ the length of the tube. *Thymus piperitus* & *origanifolius*, *Don Prodr.* 112. *Clinopodium longicaule*, *Benth. in Wall. Pl. As. Rar.* i. 66; *Wall. Cat.* 2131. *Melissa longicaulis*, *Benth. Lab.* 395.

CENTRAL HIMALAYA; Nepal, *Wallich*.

Stem 2-3 ft., slender, woody below. *Leaves* $\frac{1}{2}$ in., quite entire or with a few crenatures. *Whorls* towards the ends of the branches, 2-6-fld.; bracts shorter than the calyx. *Calyx* $\frac{1}{2}$ in., hispid, glabrate or hairy within, teeth short. *Corolla* violet, tube slender, twice as long as the calyx.—A very distinct plant.

25. MELISSA, Linn.

Erect branched herbs. *Leaves* opposite, crenate. *Whorls* axillary, secund, lax-fld. *Calyx* 13-ribbed; lips small; upper flattish, 3-toothed; lower 2-toothed. *Corolla-tube* recurved and ascending; upper lip erect; lower flat, spreading, 3-lobed. *Stamens* 4, arching and meeting under the upper lip; anther-cells at length divaricate. *Style-lobes* subequal, subulate. *Nutlets* narrowly obovoid, smooth, dark.—Species 2 or 3, S. European and Asiatic.

1. ***M. parviflora***, *Benth. Lab.* 394, in *Wall. Pl. As. Rar.* i. 65, and in *DC. Prodr.* xii. 241; leaves ovate or ovate-lanceolate acute, calyx $\frac{1}{4}$ – $\frac{1}{2}$ in., corolla white, tube very short. *Wall. Cat.* 2825. *Geniosporum axillare*, *Benth. in Wall. Pl. As. Rar.* ii. 18; *Wall. Cat.* 2752.

TEMPERATE HIMALAYA; from Gurwhal, alt. 5-8000 ft., to Sikkim, alt. 7-10,000 ft., and Mishmi. KHASIA MTS., alt. 4-6000 ft.—DISTRIB. Java.

Pubescent or glabrate. *Stem* tall, erect, angles hirsute. *Leaves* 1-4 in., base acute rounded or cordate; petiole $\frac{1}{4}$ –1 in., slender. *Whorls* numerous, few- or many-fld.; flowers pedicelled. *Calyx-teeth* very variable in length of the acute points; bracts narrow. *Corolla-tube* scarcely exceeding the calyx.—Very near *M. officinalis*, which has its Eastern limit in Eastern Persia, but the leaves are more acute and the lower calyx-teeth are broader and shorter, but these are variable characters in the European plant.

2. *M. flava*, *Benth. Lab.* 394, in *Wall. Pl. As. Rar.* i. 65, and in *DC. Prodr.* xii. 241; calyx nearly $\frac{1}{2}$ in., corolla yellow, tube longer than the calyx. *Wall. Cat.* 2126.

NÉPAL, *Wallich*; KUMAON, alt. 7600 ft., *Madden, Strachey & Winterbottom. BHOTAN, Griffith.*

I much doubt this being more than a variety of *M. parviflora*. It is, however, a larger plant.

26. *PEROWSKIA*, *Karel.*

Erect, branched, strong-scented, rigid, hoary and scurfy, dioecious undershrubs. *Leaves* opposite, incised or crenate. *Whorls* small, distant, in simple or compound or paniced spikes, 2- or more-fld.; flowers small. *Calyx* short, terete; lips short, upper minutely 2-3-toothed, lower 2-toothed. *Corolla* 2-lipped, tube exserted, with a ring of hairs within, lower lip oblong entire, upper broad spreading erect 3-lobed. *Stamens*, 2 lower fertile, erect, diverging; 2 upper minute, imperfect; anther-cells linear, parallel. *Disk* swollen behind. *Style-lobes* acute. *Nutlets* pyriform, smooth, dry.—Species 4 or 5, Central Asiatic:—Genus of doubtful affinity.

1. *P. atriplicifolia*, *Benth. in DC. Prodr.* xii. 261; densely clothed with white stellate scurf, leaves oblong-ovate or lanceolate crenate-serrate or incised, calyx hispid. *Boiss. Fl. Orient.* iv. 589.

WESTERN TIBET, *Falconer*; Lahul, *Capt. Hay*; Karakoram and Iskardo, alt. 7500–10,200 ft., *Clarke*.—DISTRIB. Afghanistan and Beluchistan.

A rigid herb, 2–3 ft., paniculately branched. *Leaves* 1–2 in., rigid, rugose. *Whorls* 2–6-fld. *Calyx* $\frac{1}{2}$ in. *Corolla* twice as long.—I doubt this being more than a form of the following.

2. *P. abrotanoides*, *Kiril. in Bull. Mosq.* 1841, 15, t. 1; densely or sparsely clothed with white or grey stellate scurf, leaves linear-oblong incised or pinnatisect, calyx clothed with long cottony wool. *Boiss. Fl. Orient.* iv. 389.

WESTERN TIBET, alt. 8–13,000 ft., *Thomson, &c.*—DISTRIB. Afghanistan, Persia, Turcomania.

A much-branched twiggy shrub or undershrub, 2–4 ft. high, woody below, with the habit of a *Lavandula*. *Leaves* 1–2 in., sometimes bipinnatisect, crenatures or lobes or segments obtuse.

27. *MERIANDRA*, *Benth.*

Shrubs smelling of sage, hoary or woolly. *Leaves* opposite, coriaceous, oblong, crenulate, rugulose above. *Whorls* many, dense-fld., large and in terminal broad spikes or small and in paniced calkin-like spikes with closely imbricating bracts; flowers small. *Calyx* ovoid, upper lip concave, subentire; lower 2-fld; throat naked. *Corolla-tube* short, equally 4-fld; lobes flat, upper entire or 2-fld. *Stamens* short, stout; 2 lower fertile erect distant, one or both of upper imperfect; anther-cells separate, stipitate, pendulous. *Style* 2-lamellate. *Nutlets* obovoid, smooth, brown.—The following are the only species.

1. *M. strobilifera*, *Benth. Lab.* 188, in *Wall. Pl. As. Rar.* i. 29, and in *DC. Prodr.* xii. 262; flocculently woolly, spikes 4-angled with imbricating appressed bracts. *Wall. Cat.* 1527; *Gamble Ind. Timbers*, 301.

WESTERN TEMPERATE HIMALAYA; on dry rocks from Simla to Kumaon, alt. 5–6000 ft.

A small shrub; branches obscurely angled. *Leaves* 3-4 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., obtuse or acute, base sagittate or cordate, upper surface almost granulate, lower white; petiole $\frac{1}{2}$ in., very stout. *Spikes* 1-2 in. by $\frac{1}{2}$ in. diam., paniced; bracts broadly ovate. *Calyx* $\frac{1}{15}$ in., woolly. *Corolla* rather longer, as much in diameter.

2. **M. bengalensis**, *Benth. Lab.* 189, in *Wall. Pl. As. Rar.* i. 29, and in *DC. Prodr.* xii. 262; finely tomentose or hoary, spikes terminal with interrupted ebracteate globose whorls. *Wall. Cat.* 1526; *Grah. Cat. Bomb. Pl.* 151; *Dalz. & Gibs. Bomb. Fl., Addend.* 66; *Dcne. in Jacquem. Voy. Bot.* 134, t. 139. *Salvia bengalensis*, *Roxb. Fl. Ind.* i. 145. *S. dianthera*, *Roth Nov. Sp.* 18. *S. abyssinica*, *Br. in Append. Salt's Travels.* *S. Schimperiana*, *Hochst. in Schimp. Iter Abyss.* n. 1781.

Cultivated in INDIA. DISTRIB. Native of Abyssinia.

A large straggling shrub; branches cylindric. *Leaves* 2-3 by 1-1 $\frac{1}{2}$ in., finely crenulate, obtuse, thinner than in *M. strobilifera*, as finely granulate above and reticulate beneath, base rounded or bractate; petiole slender, $\frac{1}{4}$ - $\frac{1}{2}$ in. *Whorls* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., villous. *Calyx* $\frac{1}{4}$ in. long, pedicelled, teeth acute. *Corolla* white, lips spreading or recurved.

28. SALVIA, Linn.

Herbs or shrubs. *Whorls* usually racemed or spiked; bracts small or large. *Calyx* tubular or campanulate, upper lip entire or 3-toothed, lower 2-fid, throat naked. *Corolla-tube* naked or with a ring of hairs inside; upper lip erect, lower 3-lobed, lateral lobes spreading. *Stamens*, 2 perfect, filaments short, jointed on the slender connective which bears 1 or 2 perfect cells. *Disk* tumid behind. *Style* ascending, 2-fid. *Nutlets* 3-quetrous, smooth.—Species 450, tropical and temperate.

Sect. 1. **Drymosphace**, *Benth.* Perennial herbs; floral leaves very small. *Upper calyx-lip* entire or 3-toothed. *Corolla-tube* exserted, annulate within; upper lip falcate, compressed. *Connectives* with an imperfect cell behind.

1. **S. glutinosa**, *Linn.*; herbaceous, tall, robust, viscidly hairy, leaves hastately ovate-oblong toothed, whorls distant few- and lax-fid., calyx tubular-campanulate, corolla large yellow. *Benth. in DC. Prodr.* xii. 276; *Reichb. Ic. Fl. Germ.* t. 1246, f. 1; *Boiss. Fl. Orient.* iv. 609. *S. nubicola*, *Benth. Lab.* 219, and in *Wall. Pl. As. Rar.* i. 68; *Sweet Brit. Fl. Gard.* t. 140; *Wall. Cat.* 2146.

TEMPERATE HIMALAYA; from Kashmir, alt. 6-9000 ft., to Sikkim, alt. 10-12,000 ft. DISTRIB. Affghanistan, S. Europe, W. Asia.

Stem 2-3 ft. *Leaves* 4-7 by 2-4 in.; petiole 1-3 in. *Flowers* in large branched spreading panicles, shortly pedicelled. *Calyx* $\frac{1}{2}$ in., upper lip ovate acute entire, teeth of lower ovate acute. *Corolla* 1-1 $\frac{1}{2}$ in., tube exserted, throat dilated, limb gaping. *Nutlets* $\frac{1}{8}$ in., elliptic-obovate, compressed, smooth.

2. **S. hians**, *Royle mss. in Hook. Bot. Misc.* iii. 373, and *Ill. Pl. Himal.* 303, t. 75, f. 3; herbaceous, tall, robust, viscidly hairy, leaves long-petioled ovate-hastate or -cordate toothed, whorls distant few- and lax-fid., calyx broadly shortly campanulate, corolla very large blue. *Benth. Lab.* 219, 717, and in *DC. Prodr.* xii. 276; *Bot. Reg.* 1841 t. 39; *Bot. Mag.* t. 6517 (*excl. syn. S. macrophylla*?).

WESTERN TEMPERATE HIMALAYA; Kashmir, alt. 8-11,000 ft., *Falconer, &c.*

Habit of *S. glutinosa*, but petioles much longer, often 10 in., and leaves rather broader; calyx much broader; corolla 1 $\frac{1}{2}$ in., blue with very inflated throat and shorter lips; nutlets similar but larger, $\frac{1}{6}$ in. long.

3. **S. campanulata**, *Wall. Cat.* 2143; herbaceous, robust, viscidly hirsute, leaves long-petioled ovate-cordate toothed, whorls few- and lax-fl., calyx broadly shortly campanulate, corolla large yellow. *Benth. in Wall. Pl. As. Rar.* i. 67, and in *DC. Prodr.* xii. 276.

SUBALPINE HIMALAYA; from Kumaon to Sikkim, alt. 9-13,000 ft., *Wallich*, &c.

Habit of *S. hians*, but leaves much broader with more cordate bases, and petioles equally long; calyx $\frac{1}{2}$ in., gaping very wide; corolla-tube shortly exserted, inflated, lips very stout; nutlets the same.

Sect. 2. **Æthiopis**, *Benth.* Perennial herbs with large orbicular cuspidate floral leaves. *Upper calyx-lip* 3-toothed. *Corolla-tube* exserted, not annulate within; upper lip falcate, compressed; lower with the side lobes oblong often erect or twisted, midlobe rounded, *Connectives* connected by callous tips deflexed backwards, imperfect cell abruptly dilated.

4. **S. asperata**, *Falc. mss. ex Benth. in DC. Prodr.* xii. 282; stout, erect, branched, sparsely glandular and hispid, leaves oblong-ovate cordate obtuse crenate, whorls distant 6-10-fl., calyx broadly campanulate hispid. *Bot. Mag.* t. 4884.

WESTERN TEMPERATE HIMALAYA; Kashmir, alt. 5-6000 ft., *Falconer, Thomson*.

A harsh coarse herb. *Leaves* 3-6 by 2-3 in., petiole as long stout, floral orbicular 1 in. diam. and under, ciliate. *Calyx* $\frac{1}{2}$ in. long, rigid, teeth spinous. *Corolla* $\frac{3}{4}$ in. long, white, tube short, slender; throat shortly inflated, upper lip long, narrow, arched, lower shorter. *Nutlets* $\frac{1}{10}$ in., subglobose.

5. **S. Moorcroftiana**, *Wall. Cat.* 2144; tall, robust, woolly, leaves long-petioled oblong or oblong-cordate obtuse doubly crenate and lobulate, whorls many distant 6-10 fl., calyx campanulate equally spinous-5-toothed scabrid. *Benth. in Wall. Pl. As. Rar.* i. 67, *Lab.* 228, and in *DC. Prodr.* xii. 286.

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 6-9000 ft.

Very robust; stem leaves beneath and often above petiole and branches of panicle usually thickly woolly, rarely glabrate. *Leaves* 6-12 by 3-5 in., thick, rugose, rarely acute, base rounded or cordate; petiole 4-8 in., stout, floral 1 in. diam. and under, white and rose-coloured. *Calyx*, flowering $\frac{1}{2}$ in., fruiting $\frac{2}{3}$ in. *Corolla* 1 in., rose-coloured, tube slender, upper lip long arched, very narrow. *Nutlets* subglobose.—The Ladak habitat given by Wallich is an error, for the plant is not Tibetan. Moorcroft no doubt collected it en route to Ladak.

6. **S. lanata**, *Roxb. Fl. Ind.* i. 147; robust, densely softly woolly, leaves sessile oblong or oblanceolate obtuse crenulate, whorls many distant, calyx campanulate 2-lipped subequally spinous-5-toothed. *Benth. in Wall. Pl. As. Rar.* i. 67, and ii. 11, t. 116, *Lab.* 228, and in *DC. Prodr.* xii. 286; *Wight Ic.* t. 325, and *Ill.* t. 176 bis, f. 3. *S. integrifolia*, *Hardw. in Asiat. Res.* vi. 349. *S. cana*, *Wall. Cat.* 2145. *Stenarrhena lanata*, *Don Prodr.* 111.

WESTERN TEMPERATE HIMALAYA; Kumaon to Murree, alt. 5-8000 ft.

Stems usually many from the root, 12-18 in. high, simple or branched. *Leaves* subradical, 6-8 by 1-1 $\frac{1}{2}$ in., white beneath, narrowed at the base; floral $\frac{1}{2}$ in. diam.; whorls distant, viscidly hairy, 6-8-fl. *Calyx*, flowering $\frac{1}{2}$ in., fruiting $\frac{1}{3}$ in., glandular-hairy. *Corolla* $\frac{2}{3}$ in. long, tube slender, throat inflated, upper lip about as long as the tube, lower small. *Nutlets* $\frac{1}{10}$ in., brown.

Sect. 3. **Plethiospace**, *Benth.* Perennial herbs, floral leaves

small. *Calyx* ovoid-campanulate, upper lip recurved with 3 conniving teeth, lower acutely 2-toothed. *Corolla-tube* not annulate within; upper lip arched, lower with oblong lateral lobes and a rounded midlobe. *Connectives* deflexed behind, united by the callous tips, imperfect cell abruptly dilated.

7. **S. dumetorum**, Andr. in Rep. Enum. Pl. Volhyn. 3, 40; hirsute tomentose or pubescent, lower leaves long-petioled ovate- or oblong-cordate doubly crenate rugulose above, floral rounded, whorls viscid distant 6-fld., calyx subsessile viscid. Benth. in DC. Prodr. xii. 290; Ledeb. Fl. Alt. i. 24.

WESTERN HIMALAYA; Kashmir, alt. 6000 ft., Falconer, Clarke.—DISTRIB. Volhynia, Podolia, Altai.

Stem 1-3 ft., very robust, tall and much branched in Kashmir specimens. *Leaves* 3-4 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., petiole of lower 1-4 in.; floral cuspidate, $\frac{1}{2}$ in. diam. *Calyx*, flowering $\frac{1}{2}$ in. *Corolla* $\frac{1}{2}$ - $\frac{3}{4}$ in., blue, tube exserted, throat inflated.—Very near and perhaps only a variety of *S. pratensis*, L.

Sect. 4. **Notiosphace**, Benth. Herbs or shrubs with minute floral leaves. *Calyx* with the upper lip entire, or shortly 3-toothed, lower 2-fid. *Corolla* small, tube annulate within. *Connectives* distant in front, acute or bearing an empty anther.

8. **S. saxicola**, Wall. Cat. 2147; dwarf, subscapigerous, radical leaves long-petioled broad oblong or rounded cordate coarsely crenate, cauline few or 0, floral minute ovate, whorls distant or the upper crowded, calyx nodding, corolla very short. Benth. in Wall. Pl. As. Rar. i. 68, Lab. 310, and in DC. Prodr. xii. 355.

KHASIA Mts., alt. 4-6000 ft.; Wallich, &c.

Rootstock woody. *Leaves* 1- $1\frac{1}{2}$ in. diam., nearly glabrous; petiole 2-3 in., slender. *Scapes* 6-12 in., pubescent. *Calyx*, flowering $\frac{1}{2}$ in., fruiting $\frac{1}{2}$ in., glandular-hairy. *Corolla* very short, pale purple, lips short. *Connective* with the antheriferous arm decurved, the other shorter, acute, *Nutlets* $\frac{1}{2}$ in., ellipsoid.

9. **S. plectranthoides**, Griff. Notul. iv. 199, and Ic. Pl. Asiat. t. 450; herbaceous, slender, sparsely hairy, leaves chiefly radical pinnate, segments few ovate or broadly oblong-cordate, terminal much the largest, lateral sessile or petiolulate, petiole very slender, scape long, spike simple. calyx nodding glandular-hairy. *Plectranthus*, Griff. It. Notes, 163, n. 845.

EASTERN HIMALAYA; Bhotan, near Panukka, Griffith.

Habit of a *Valeriana*. *Rootstock* rather slender. *Leaves* membranous, 3-5 in.; pinnules 2-5 pairs, terminal 2-3 in. long, base rounded or deeply lobed, lateral ovate-lanceolate. *Scape* or stem very slender, 18 in.; whorls few-fld. *Calyx* pedicelled, upper lip entire, lower 2-toothed. *Corolla* flesh-coloured; tube shortly exserted, hairy; upper lip arched, lower with small erect lateral lobes and an orbicular notched midlobe. *Connectives* recurved, barren arm obtuse.—Griffith's figure of this remarkable species represents a very stout plant with sessile leaflets; his specimens are very slender, with usually petiolulate leaflets. It is very near *S. japonica*, Thunb., differing only in the shorter calyx-teeth.

10. **S. plebeia**, Br. Prodr. 501; annual, stem stout erect hoary or scaberulous, leaves petioled oblong obtuse or upper ovate acute crenate, spikes paniced often fastigate, whorls very numerous, upper calyx-lip entire, lower obtusely 2-toothed, stamens very small whitish. Benth. Lab. 309, and in DC. Prodr. xii. 355; Dalz. & Gibs. Bomb. Fl. 209. *S. brachiata*, Roxb. Fl. Ind. i. 145; Wall. Cat. 2149. ? *S. parviflora*, Roxb. Hort. Beng. 4.

S. minutiflora, *Bunge Enum. Pl. Chin. Bor.* 50. *Ocimum fastigiatum*, *Roth Nov. Sp.* 277. *Lumnitzera fastigiata*, *Spreng. Syst.* ii. 687.

Throughout INDIA, in the plains and ascending the hills to 5000 ft. (absent from Ceylon).—DISTRIB. China, Malay Islands, Australia.

Stem stout, 6–18 in., strict, fastigiately branched. *Leaves* 1–3 in., narrowed at both ends; floral small, lanceolate. *Calyx* pedicelled, $\frac{1}{8}$ in. *Corolla-tube* very short, not exserted, limb very small. *Nutlets* very minute, $\frac{1}{35}$ in. long, ellipsoid.

11. *S. ægyptiaca*, *Linn.*; a very dwarf scaberulous hispid or hoary much-branched undershrub, leaves few small sessile linear or lanceolate acute rigid crenate, whorls remote 2–3-fld., flowers small, calyx glandular-hairy. *Benth. in DC. Prodr.* xii. 355; *Boiss. Fl. Orient.* iv. 631; *Jacq. Hort. Vind.* ii. 49, t. 108.

PANJAB PLAIN, from Delhi westwards, alt. 1–2000 ft.; *Jacquemont, &c.*—DISTRIB. Afghanistan, W. Asia, N. Africa to the Cape Verde Islands.

Branched from the base; branches straggling, divaricate, rigid. *Leaves* rarely 1 in. *Whorls* distant. *Calyx* nodding, pedicelled, ovoid-campanulate, fruiting $\frac{1}{4}$ in. long; upper lip orbicular minutely 3-toothed, teeth of lower subulate. *Corolla* and *stamens* as in *S. plebeia*. *Nutlets* $\frac{1}{2}$ in. long, narrowly oblong, nearly black.

VAR. *pumila*; more scabrid and hispid, leaves very rigid and rugose, calyx villous with long hairs. *S. pumila*, *Benth. Lab.* 726, and in *DC. Prodr.* xii. 356; *Dcne. in Jacquem. Voy. Bot.* 128, t. 133.—The Panjab plains and hills from Delhi westward; Scinde, *Stocks*; Afghanistan and Beluchistan.

12. *S. santolinæfolia*, *Boiss. Diagn. Ser.* 1, v. 13, and *Fl. Orient.* iv. 632; a dwarf much-branched hoary undershrub, leaves minute petioled linear pectinately lobed, lobes rounded, margins revolute, whorls 2–3-fld. on very slender spikes, flowers minute, calyx hispid with long hairs.

SCINDE; on the Boogie Hills, *Vicary*.—DISTRIB. Afghanistan, Persia.

The specimens are flowerless and very insufficient, but I think referable to this curious little species. The calyx resembles that of *S. ægyptiaca*, var. *pumila*. Floral leaves persistent, elliptic, acute, $\frac{1}{10}$ in. long.

EXCLUDED AND UNKNOWN SPECIES.

S. INDICA, *Linn.*, is a Syrian plant, and not Indian, whence the name is changed by Boissier to *S. brachycalyx*.

S. ACAULIS, *Vahl Enum.* i. 157; *Benth. in DC. Prodr.* xii. 354 (*S. ocimoides*, *Roxb. in Wall. Cat.* 2148; *Benth. in Wall. Pl. As. Rar.* i. 68. *S. lyrata*, *Roxb. Hort. Beng.* 4, fid. *Wight in Herb.*), is only known as a plant cultivated in the Mission Garden by Rottler, and is doubtless not Indian; it has a long tubular corolla. Roxburgh says his *S. lyrata* is American.

S. GERARDIANA, *Benth. in Wall. Cat.* 2150, is the American *S. coccinea*, L. (see *Wall. Cat.*, p. 92), cultivated in India.

29. *NEPETA*, *Linn.*

Erect or prostrate herbs. *Leaves* opposite. *Whorls* axillary or terminal; flowers blue, yellow or white. *Calyx* tubular, 15-ribbed, equally 5-toothed, or 2 lower teeth narrower. *Corolla-tube* not annulate within, throat inflated; upper lip straight, notched or 2-fid; lower 3-fid, midlobe largest. *Stamens* 4, ascending under the upper lip or exserted, upper pair longest; anther-cells diverging. *Style-lobes* subulate. *Nutlets* smooth.—Species about 120, Temp. Europe, N. Africa and Asia.

The following arrangement of the species of this troublesome genus is very artificial. I think that much better characters may be found in the corolla, but this would

require a careful re-examination of the whole genus. I suspect that some of the Indian species will prove identical with Persian. *Dracocephalum stamineum* & *Hookeri* should probably be transferred to *Nepeta*.

A. Whorls in simple terminal oblong or cylindric spikes, which are rarely interrupted at the base.—(The spikes of 13. *N. discolor* and others are occasionally interrupted; and species placed under C. occasionally present solitary simple spikes.)

* *Leaves bipinnatifid.*

1. **N. botryoides**, *Ait. Hort. Kew*, ii. 287; annual, branched, laxly hairy; leaves sub-2-pinnatifid, bracts linear-subulate, spikes cylindric dense-fld., calyx tubular straight. *N. multifida*, *Linn. Suppl.* 273. *N. annua*, *Pall. in Act. Petrop.* 1879, ii. 263, t. 12. *N. bipinnata*, *Cav. Ic. Rar.* i. 36, t. 49.

WESTERN TIBET; Rupchu, alt. 14,500 ft., *Thomson*.—DISTRIB. Soongaria, Altai.

Annual, 6–12 in., robust. *Leaves* $\frac{1}{2}$ –1 in., segments linear or oblong, obtuse. *Spikes* 1–3 in., flowers small. *Calyx* pedicelled, fruiting $\frac{1}{4}$ in. long, membranous, teeth mucronate. *Corolla* very small, yellow. *Stamens* short.

** *Leaves entire or crenate, sessile or subsessile.*

2. **N. linearis**, *Royle mss. ex Benth. in Hook. Bot. Misc.* iii. 377, *Lab.* 469, and in *DC. Prodr.* xii. 371; rootstock tuberous, stems ascending, leaves sessile linear acute or obtuse, spike ovoid or oblong, bracts lanceolate or subulate, calyx $\frac{1}{4}$ in. peduncled hairy, teeth spinescent.

WESTERN TEMPERATE HIMALAYA; from Kashmir to Simla, alt. 7–11,000 ft., *Falconer*, &c.

Rootstock often as large as a walnut. *Stems* 6–18 in., stout, sparsely leafy, glabrous or puberulous. *Leaves* 1–3 by $\frac{1}{10}$ – $\frac{1}{4}$ in. *Spikes* 1–2 $\frac{1}{2}$ in. *Calyx* tubular, fruiting $\frac{1}{4}$ in. or more. *Corolla-tube* twice as long, throat dilated, lips short.—Varies much in size of all parts.

3. **N. connata**, *Royle ex Benth. in Hook. Bot. Misc.* iii. 378, *Lab.* 469, and in *DC. Prodr.* xii. 371; tall, stout, glabrous or hairy, rootstock tuberous, stem simple, leaves sessile narrowly linear-lanceolate acuminate entire, base cordate, spike cylindric, lowest floral bracts large ovate aristate, upper narrow, calyx $\frac{1}{2}$ in. pedicelled hairy, teeth very long-awned.

WESTERN TEMPERATE HIMALAYA; from Dalhousie to Kashmir, alt. 8–11,000 ft., *Falconer*, &c.

Stem 1–2 ft., sometimes as thick as a swan's quill, glabrous, rarely woolly. *Leaves* 3–6 by $\frac{1}{8}$ – $\frac{3}{4}$ in., coriaceous, sometimes sinuate-toothed. *Spikes* 1–5 in., lower whorls sometimes axillary. *Calyx-teeth* as long as the tube, very slender. *Corolla* twice as long, blue. *Stamens* included. *Nutlets* $\frac{1}{2}$ in., orbicular, compressed-trigonal, brown, shining.

4. **N. eriostachya**, *Benth. Lab.* 734, and in *DC. Prodr.* xii. 371; stem subsimple sparsely hairy, leaves sessile broadly ovate or ovate-cordate obtuse crenate, lower floral similar, spike cylindric-oblong dense-fld. villous, calyx sessile $\frac{1}{4}$ in., teeth slender plumose.

WESTERN TEMPERATE HIMALAYA; Buspa Valley, *Jacquemont*; Kashmir, over Sonamurg, alt. 11,500 ft., *Clarke*; Gurwhal, alt. 11–12,000 ft., *Duthie*.

Stem ascending, 6–10 in. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., sometimes nearly as broad, pubescent beneath. *Spikes* 1–3 in. *Calyx* membranous, teeth as long as the tube. *Corolla* twice as long, bright blue. *Stamens* included.—I have not seen *Jacquemont's*

specimens. Clarke makes of his a var. *latibracteata* with broader bracts than Bentham describes. Habit of *Brunella*.

5. **N. nervosa**, *Royle ex Benth. in Hook. Bot. Misc.* iii. 378, *Lab.* 469, and in *DC. Prodr.* xii. 372; stem tall subsimple glabrous, leaves sessile or shortly petioled linear-lanceolate acuminate serrate, spike cylindric robust, bracts ovate or lanceolate mucronate, calyx sessile $\frac{1}{2}$ in., teeth very slender laxly villous. *N. campestris*, *Herb. Ind. Or. H. f. & T.*

WESTERN TEMPERATE HIMALAYA; Kashmir, alt. 6–10,000 ft., *Falconer, Jacquemont, &c.*

Rootstock long, woody. *Stems* 1–2 ft. *Leaves* 2–4 by $\frac{1}{2}$ – $\frac{3}{4}$ in., base rounded or cordate. *Spike* stout, 1–3 in. *Calyx* membranous; teeth as long as the tube, filiform. *Corolla* twice as long, pale blue. *Stamens* included.

VAR. *lutea*; flowers yellow.—Western Tibet; Karakoram, alt. 14,000 ft., *Clarke*.

6. **N. campestris**, *Benth. Lab.* 734, and in *DC. Prodr.* xii. 372; stem tall subsimple sparsely hairy, leaves sessile narrowly oblong-lanceolate subacute serrate, spikes slender, bracts all ovate mucronate, calyx sessile $\frac{1}{2}$ in., teeth very slender glabrous or ciliate.

WESTERN TEMPERATE HIMALAYA; from Kashmir, *Jacquemont*, to Kumaon, alt. 7–9000 ft., *Madden, &c.*

Closely allied to *N. nervosa*, but the leaves appear to be always sessile (which distinguishes it from *N. spicata*), the spikes are much longer and more slender, the calyx-teeth more glabrous and divergent, and the corolla-tube more slender.

7. **N. elliptica**, *Royle ex Benth. in Hook. Bot. Misc.* iii. 378, *Lab.* 470, and in *DC. Prodr.* xii. 373; stem branched villous, leaves subsessile elliptic oblong or oblong-cordate, tip rounded or acute pectinately crenate, spike long slender often interrupted, bracts ovate or lanceolate awned, calyx sessile $\frac{1}{2}$ in., teeth filiform ciliate as long as the tube. *N. polystachya*, *Benth. in Hook. Bot. Misc. l. c.*

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 5–8000 ft.

Stem 1–2 ft., often flexuose, usually woolly. *Leaves* $\frac{1}{2}$ –1 in., tomentose. *Flowers* very much as in *N. nervosa*.

8. **N. Thomsoni**, *Benth. mss.*; finely pubescent, stems short stout very leafy, leaves sessile or shortly petioled oblong-cordate obtuse or acute crenate, floral large, whorls in a dense ovoid or conical spike with large leafy crenate bracts, calyx $\frac{1}{2}$ in. scaberulous, teeth ovate-lanceolate much shorter than the tube.

WESTERN TIBET; Hanle, alt. 14,500–16,000 ft., *Thomson*. EASTERN TIBET; north of Sikkim, *J. D. H.*

Stem a span to a foot high, stout, simple or with simple ascending branches from the base. *Leaves* close set, 1–2 by $\frac{1}{2}$ – $\frac{3}{4}$ in.; petiole rarely $\frac{1}{2}$ in.; floral similar. *Spike* of dense approximate superposed whorls with green elliptic bracts far exceeding the calyces. *Corolla* not seen. *Nutlets* large, nearly $\frac{1}{4}$ in., suborbicular.

9. **N. supina**, *Stev. in Mem. Soc. Nat. Mosq.* iii. 365; erect, branched, finely pubescent, leaves small sessile ovate obtuse crenate, floral subsimilar or narrow, whorls dense-fld., lower axillary, upper in an ovoid spike, bracts lanceolate, calyx $\frac{1}{2}$ in. curved narrow villous, mouth very oblique, teeth setaceous shorter than the tube, nutlets linear. *Benth. Lab.* 473, and in *DC. Prodr.* xii. 374; *Boiss. Fl. Orient.* iv. 462.

WESTERN TEMPERATE HIMALAYA; from Murree, *Fleming*, to Gurwhal, alt. 15,000 ft., *Strachey & Winterbottom*. WESTERN TIBET; Iskardo, alt. 12,000 ft., *Clarke*.—DISTRIB. Caucasus.

Stem 8–18 in. *Leaves* $\frac{1}{2}$ –1 in., tomentose beneath. *Corolla* $\frac{1}{4}$ – $\frac{1}{2}$ in. long. *Nutlets* nearly $\frac{1}{2}$ in. long, trigonous.—The largest Indian specimens are taller, stouter and more branched than the Caucasian, and the flowers are smaller, but the remarkable long narrow seeds are quite the same.

*** *Leaves distinctly petioled, entire or crenate.*

10. **N. spicata**, *Benth. in Wall. Pl. As. Rar.* i. 64, *Lab.* 470, and in *DC. Prodr.* xii. 372; stem erect branched glabrous hoary or pubescent, leaves petioled ovate- or triangular-cordate acute coarsely crenate or serrate, spike oblong or cylindric, bracts ovate or lanceolate awned, calyx sessile $\frac{1}{4}$ in. scabrid, teeth slender as long as the tube ciliate or hispid. *Wall. Cat.* 2083; *Bot. Mag.* t. 6405 (starved form). *Betonica lævigata*, *Don Prodr.* 110.

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 6–12,000 ft.—DISTRIB. Afghanistan.

Stem 1–3 ft., with often spreading branches. *Leaves* $1\frac{1}{2}$ –4 by $\frac{1}{2}$ –3 in., glabrous or pubescent or hoary beneath; petiole 1–3 in. *Spike* 2–4 in., stout or slender, often interrupted; bracts very variable. *Flowers* as in *N. campestris*, pale blue.—Bentham's var. *elata* seems only a large state.

11. **N. lamiopsis**, *Benth. mss.*; stems ascending subsimple flaccid sparsely hairy, leaves few sessile or petioled broadly ovate-cordate obtuse coarsely crenate, floral large, whorls dense-fld., lower axillary, upper in ovoid spikes, bracts orbicular and green crenate or narrower or linear, calyx $\frac{1}{2}$ in. pubescent, mouth oblique, teeth slender diverging as long as the tube, nutlets broadly oblong.

ALPINE SIKKIM HIMALAYA; alt. 12–16,000 ft., *J. D. H.*

Stems succulent, 6–18 in. *Leaves* $\frac{1}{2}$ –1 $\frac{1}{2}$ in., flaccid; petiole 0– $\frac{1}{2}$ in., floral sessile. *Axillary whorls* few, much shorter than the leaves, terminal in an ovoid spike $\frac{1}{2}$ –1 $\frac{1}{2}$ in.; bracts sometimes all linear. *Corolla* deep blue, tube twice as long as the calyx, limb small. *Nutlets* about $\frac{1}{14}$ in. long.—Habit of a *Lanium*.

12. **N. raphanorhiza**, *Benth. Lab.* 734, and in *DC. Prodr.* xii. 373; rootstock tuberous, stems weak ascending glabrous or villous, leaves small petioled broadly ovate or ovate-cordate obtuse crenate or toothed, spikes short ovoid, bracts ovate to lanceolate, calyx $\frac{1}{2}$ in. sessile, teeth lanceolate ciliate shorter than the tube.

WESTERN TEMPERATE HIMALAYA; Kashmir to Chamba, alt. 5–12,000 ft., *Jacquemont, &c.*—DISTRIB. Afghanistan.

Stems many from a globose black rootstock as large as a nut or walnut, diffuse or ascending, 6–18 in. high, simple or branched. *Leaves* $\frac{1}{2}$ –1 in., sometimes nearly as broad; petiole half their length. *Spikes* 1 in. and less, pubescent or villous. *Calyx* smaller than in the preceding species, with shorter teeth. *Corolla* purplish blue, tube twice as long as the calyx, slender.—Roots eaten.

13. **N. discolor**, *Benth. in Hook. Bot. Misc.* iii. 378, *Lab.* 470, and in *DC. Prodr.* xii. 373; rootstock elongate, stems weak ascending glabrous or villous, leaves small petioled broadly ovate or ovate-cordate crenate, spikes ovoid or cylindric, bracts elliptic mucronate, calyx $\frac{1}{4}$ in. sessile villous, teeth filiform as long as the tube. *N. Sabinei*, *T. A. Schmidt in Trim. Journ. Bot.* 1868, 238, t. 82, f. 1–4.

WESTERN TEMPERATE and ALPINE HIMALAYA; from Kashmir to Gurwhal and WESTERN TIBET, alt. 10–15,000 ft.—DISTRIB. Afghanistan.

Closely resembles in habit and foliage large forms of *N. raphanorhiza*, but wants the tuberous rootstock, and has much longer spikes with long calyx-teeth as in *N. spicata*. *Leaves* often white with appressed tomentum beneath. *Flowers* white or pale blue.

14. ***N. longibracteata***, *Benth. Lab.* 737, and in *DC. Prodr.* xii. 392; dwarf, diffuse, softly pubescent or woolly, leaves petioled fan-shaped or cuneate-obovate crenate or lobulate, spikes capitate with the cymes sessile amongst the crowded uppermost and long silky bracts, calyx $\frac{1}{2}$ in. silky, teeth subequal nearly equalling the tube, stamens included, nutlets oblong. *Dcne. in Jacquem. Voy. Bot.* 132, t. 137.

ALPINE WESTERN HIMALAYA and WESTERN TIBET, alt. 14,000–17,000 ft.; *Falconer, Jacquemont*, &c.

Rootstock long, stout, excessively divided at the top; stems 3–6 in., suberect or prostrate, simple or branched. *Leaves* $\frac{1}{2}$ in. long or broad or less, petiole about as long. *Heads* subglobose, 1 in. diam.; lower bracts fan-shaped, pectinate. *Corolla* twice as long as the calyx, blue, tube curved, funnel-shaped, limb small. *Stamens* included. *Nutlets* $\frac{1}{10}$ in.—Strongly aromatic, lemon-scented. Placed by Benthham in the *Glechoma* section. It very closely resembles the Siberian *Dracocephalum pinnatum* except in the calyx-teeth, which are, however, very variable in that plant.

B. Whorls all or mostly axillary, many, distant.

15. ***N. glutinosa***, *Benth. Lab.* 735, and in *DC. Prodr.* xii. 377; glandular-pubescent, stem stout strict erect leafy, leaves small sessile ovate-cordate acute pectinately inciso-serrate, whorls few-fld., bracts linear-oblong aristate, calyx $\frac{1}{2}$ in. pedicelled, teeth ovate mucronate much shorter than the tube.

WESTERN SUBALPINE HIMALAYA; Kashmir and WESTERN TIBET, alt. 11–13,000 ft., *Jacquemont, Thomson*, &c.

Strongly scented. *Stem* $1\frac{1}{2}$ –2 ft., stiff. *Leaves* $\frac{3}{4}$ –1 in., sometimes $\frac{1}{2}$ -amplexicaul; floral often equalling the calyx. *Corolla* $\frac{3}{4}$ in. long, white or blue, tube curved, slender, limb small.

C. Whorls forming interrupted spikes, rarely solitary heads.

16. ***N. mollis***, *Benth. Lab.* 734, and in *DC. Prodr.* xii. 378; softly tomentose, stem slender subsimple, leaves shortly petioled ovate-cordate obtuse crenate or subcrenate, whorls few-fld., bracts elliptic ovate or lanceolate awned, calyx $\frac{1}{4}$ in., mouth oblique, teeth lanceolate shorter than the tube softly hairy. *Nepeta* n. 23, *Herb. Ind. Or. H.f. & T.*

WESTERN TEMPERATE HIMALAYA; Marri, *Fleming*; Kashmir, alt. 8–9000 ft., *Jacquemont, Falconer, Thomson*, &c.

Rootstock elongate, woody. *Stems* 6–18 in., slender, sparingly leafy. *Leaves* 1–2 by $\frac{1}{2}$ –1 in., grey-tomentose; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Spikes* 3–8 in.; lower bracts (floral leaves) ovate or lanceolate, longer or shorter than the cymes, which are sometimes peduncled. *Whorls* white, softly hairy. *Calyx* villous, often decurved. *Corolla* rose-coloured, tube shortly exserted, limb small.

17. ***N. distans***, *Benth. in Hook. Bot. Misc.* iii. 379, *Lab.* 475, and in *DC. Prodr.* xii. 378; softly tomentose, stem slender subsimple, leaves shortly petioled ovate-cordate obtuse crenate, whorls few-fld., bracts narrowly linear, calyx $\frac{1}{4}$ in. curved, mouth oblique, teeth lanceolate shorter than the tube glabrous or softly hairy.

WESTERN TEMPERATE HIMALAYA; Gurwhal, Mussorie and the Syen Range, *Royle*. Panjab Himalaya, *Falconer, Stewart*.

I doubt this being more than a form of *N. mollis* with narrow bracts and a longer more curved calyx.

18. *N. ciliaris*, Benth. in Wall. Pl. As. Rar. i. 64, Lab. 475, and in DC. Prodr. xii. 379; tall, erect, branched, softly densely tomentose, leaves shortly petioled ovate-cordate obtuse crenate, whorls secund dense-fld. in long interrupted villous spikes, upper crowded, bracts lanceolate, calyx $\frac{1}{4}$ in. curved villous, teeth slender shorter than the tube, nutlets broadly ellipsoid. Wall. Cat. 2082.

WESTERN TEMPERATE HIMALAYA, alt. 6-8000 ft.; from Kashmir to Gurwhal, Royle, Jacquemont, Edgeworth.

Stem 2-3 ft., strict. Leaves $\frac{3}{4}$ -1 $\frac{1}{2}$ in., sometimes almost as broad, lower floral large. Spikes 4-8 in., pale; whorls sometimes shortly pedicelled. Corolla very small, about $\frac{1}{2}$ in., lilac, tube slender.—Very like *N. ruderalis*, but the inflorescence is more simple, the whorls rarely peduncled. Bentham describes the nutlets as minutely granular, but I find them smooth. Clarke doubts Royle's habitat of "road to Kashmir," and suspects that the species is confined to the Simla and neighbouring hills.

D. Whorls in branched panicles, some or all more or less peduncled.

* Corolla less than $\frac{1}{2}$ in. long.

21. *N. ruderalis*, Hamilt. mss.; annual, erect or ascending, finely pubescent or hoary, leaves petioled broadly ovate- or orbicular-cordate obtuse crenate, whorls very dense-fld. subglobose in interrupted spikes villous, the lower peduncled, calyx $\frac{1}{4}$ in. villous, mouth subequal, 3 upper teeth triangular aristate, 2 lower filiform, nutlets obscurely granulate. Benth. Lab. 475, in Wall. Pl. As. Rar. i. 64, and in DC. Prodr. xii. 381. *N. secunda*, Wall. Cat. 2122. *N. calaminthoides*, Benth. in DC. l. c. in part. *N. clinopodioides*, Royle ex Benth. in Hook. Bot. Misc. iii. 379, Lab. l. c., and in DC. Prodr. l. c. 382. *Glechoma erecta*, Rorb. Fl. Ind. ii. 7. *G. hindostana*, Roth Nov. Sp. 258. *G. indica*, Spreng. Syst. ii. 727. *Thymus nepetoides*, Don Prodr. 113.

TROPICAL AND SUBTROPICAL INDIA; from the Indus to Behar, Central India and the Concan, ascending the Himalaya to 8000 ft.—DISTRIB. Afghanistan.

Stem 6-18 in., branched from the base, robust or slender, obtusely angled. Leaves $\frac{1}{2}$ -2 $\frac{1}{2}$ in., green or hoary; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. Whorls $\frac{1}{2}$ -1 in. diam., unilateral, depressed; peduncles sometimes 1 in.; flowers pedicelled. Corolla very small, $\frac{1}{4}$ in., purplish, tube shortly exerted. Nutlets $\frac{1}{8}$ in. long, broadly oblong. The granulation consists of more or less tumid separated areolæ, and is sometimes very indistinct.—*N. clinopodioides*, with a calyx less hairy and flowers smaller, is scarcely a variety, found on the Jumna by Royle. Woodrow sends from Poona a plant resembling *N. ruderalis* in habit, but with a large calyx and nutlets like *N. bombaiensis* (from which the calyx-teeth distinguish it).

22. *N. bombaiensis*, Dalz. in Dalz. & Gibs. Bomb. Fl. 209; erect, branched, tomentose or laxly villous, leaves long-petioled rounded ovate-cordate coarsely crenate, cymes all axillary few and lax-fld., peduncles equalling the petioles, flowers long pedicelled, calyx $\frac{1}{4}$ in. laxly hairy, 3 upper teeth broadly triangular acute much shorter than the tube, 2 lower subulate, nutlets nearly smooth.

The CONCAN; old walls and rocks at Swenere Fort, Dalzell.

Stem 1 foot. Leaves 2 in., green, sparsely hairy; petiole 1 in. Cymes 6-8-fld.; bracts at the base elliptic-lanceolate, acuminate, green. Corolla very small, pale blue, with purple spots. Nutlets ellipsoid, $\frac{1}{10}$ in. long.—A remarkable species, unlike

any other in habit, in the great size of the foliage and smallness of the long peduncled axillary cymes.

23. **N. Cataria**, Linn.; perennial, erect, branched, hoary-pubescent, leaves petioled ovate or ovate-cordate acute coarsely crenate or toothed, whorls in long narrow terminal shortly peduncled dense-fl. spikes, bracts subulate equalling the calyx or shorter, calyx $\frac{1}{4}$ in. curved pubescent, mouth oblique, teeth subequal subulate shorter than the tube, nutlets smooth. *Benth. in DC. Prodr.* xii. 383; *Boiss. Fl. Orient.* iv. 643; *Reichb. Ic. Fl. Germ.* xviii. t. 1242. *N. calaminthoides*, *Benth. in DC. l. c. in parts.* *N. ruderalis*, var. *clinopodioides*, *Herb. Ind. Or. H. f. & T.* *N. ruderalis*, *Boiss. l. c.* 644.

WESTERN TEMPERATE HIMALAYA; Kashmir, alt. 1-5000 ft., *Falconer, Jacquemont, Thomson*.—DISTRIB. Afghanistan to W. Europe.

Stem 2-3 ft., leafy, acutely angled. *Leaves* 1-3 in.; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Spikes* 4-10 in., narrow, strict, with 6-20 whorls or cymes; bracts of lower leafy, of upper reduced; flowers pedicelled. *Corolla* $\frac{1}{2}$ in., dotted with purple. *Nutlets* $\frac{1}{10}$ in., broadly oblong, smooth.

24. **N. leucophylla**, *Benth. Lab.* 476, and in *DC. Prodr.* xii. 381; slender, branched, erect or ascending, hoary-tomentose, leaves small shortly petioled ovate-cordate obtuse or acute crenate rugose above, whorls distant dense-fl. in very long narrow interrupted shortly peduncled terminal spikes, bracts subulate, calyx $\frac{1}{4}$ in. villous, mouth oblique, teeth lanceolate-subulate rather shorter than the tube, corolla very small, nutlets smooth. *Wight III. t.* 176 bis, f. 6.

WESTERN TEMPERATE HIMALAYA; Simla to Kumaon, alt. 6-8000 ft., *Royle, Edgeworth, &c.*

Stem 2-3 ft., obtusely angled, leafy. *Leaves* 1-1 $\frac{1}{2}$ in.; petiole $\frac{1}{8}$ - $\frac{1}{2}$ in. *Spikes* as in *N. Cataria*, but more slender and villous. *Corolla* about twice as long as the calyx. *Nutlets* as in *N. Cataria*.

25. **N. leucolaena**, *Benth. mss.*; erect, branched, white-tomentose, leaves small subsessile ovate acute or obtuse crenate, whorls distant in interrupted terminal spikes, the lower very shortly peduncled, bracts lanceolate, calyx $\frac{1}{2}$ in. woolly, upper teeth much shorter than the tube triangular, lower subulate much shorter, nutlets linear-oblong.

WESTERN TIBET; Zaskar and Ladak, alt. 12-13,000 ft., *Thomson*.

Stem 2-3 ft., nearly cylindrical, leafy. *Leaves* $\frac{1}{2}$ -1 in., furfuraceously tomentose on both surfaces, petiole 0- $\frac{1}{2}$ in. *Whorls* few-fl., the lower axillary. *Corolla* thrice as long as the calyx, tube curved, funnel-shaped; lips short. *Nutlets* $\frac{1}{16}$ in. long, smooth.—Habit of *N. ciliaris*, and perhaps referable to Section C, but the spikes which are not very advanced have pedicelled lower cymes.

26. **N. floccosa**, *Benth. Lab.* 736, and in *DC. Prodr.* xii. 380; floccose with white wool, stems many from the root ascending, leaves long-petioled orbicular cordate crenate, whorls distant in brachiate branches or terminating long peduncles woolly, bracts linear, calyx $\frac{1}{4}$ - $\frac{1}{2}$ in. villous, mouth oblique, teeth much shorter than the tube, upper triangular or lanceolate, lower much shorter, nutlets linear-oblong. *N. rotundifolia*, *Benth. in DC. l. c.* 392. *Marmoritis rotundifolia*, *Benth. Lab.* 490.

WESTERN TIBET, alt. 7-11,000 ft., *Jacquemont, Falconer, &c.*

Stems stout or slender, central sometimes 2-3 ft. and branched, obtusely 4-angled. *Leaves* 1-3 in. diam., margin sometimes sinuate; petiole stout, 4 in. and less. *Whorls* dense-fl., often coloured rose or purple; peduncle of lateral often 3 in. *Calyx-teeth* variable. *Corolla* $\frac{1}{2}$ in., tube slender, lips small. *Nutlets* $\frac{1}{12}$ in., quite

smooth.—*N. rotundifolia* (*Marmoritis*, Benth. Lab.) is founded on imperfect specimens of *N. floccosa*.

27. **N. gracilliflora**, *Benth. in Wall. Pl. As. Rar. i. 65, Lab. 476*, and in *DC. Prodr. xii. 382*; annual, glabrate or pubescent, stems many from the root very slender branched, leaves long-petioled ovate or ovate-cordate acute coarsely serrate or crenate, whorls very few-fl. axillary and forming lax panicles with capillary branches and peduncles and long pedicelled flowers, bracts setaceous, calyx $\frac{1}{2}$ in. pubescent or glabrous, upper teeth triangular or lanceolate awned, lower shorter setaceous, nutlets granulate. *Wall. Cat. 2123*.

PANJAB PLAINS, from Hurdwar to the Indus, and SUBTROPICAL HIMALAYA N. of it, ascending to 4000 ft.

Nearly allied to *N. ruderalis*, but much more slender, with membranous coarsely crenate leaves, longer petioles and very lax few-fl. cymes, often on axillary long filiform peduncles, and nutlets more strongly tubercled. *Calyx-teeth* as long as the tube or shorter, variable in breadth. *Corolla* $\frac{1}{4}$ in., pale rose. *Nutlets* oblong, $\frac{1}{16}$ in. long.

**** Corolla more than $\frac{1}{2}$ inch long.**

28. **N. Govaniana**, *Benth. Lab. 482*, and in *DC. Prodr. xii. 388*; tall, erect, branched, finely pubescent, leaves large petioled ovate oblong or elliptic acute crenate, cymes few-fl. distant long-peduncled in axillary and terminal racemes, calyx $\frac{1}{2}$ in. pedicelled puberulous, teeth triangular much shorter than the tube, corolla 1 in. yellow, nutlets broadly oblong. *Dracocephalum Govanianum*, *Benth. in Wall. Pl. As. Rar. ii. 65*, and *Cat. 2127*.

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 8–11,000 ft.

Stem 2–4 ft., 4-angled. *Leaves* 3–6 by $1\frac{1}{2}$ –3 in., very variable, base acute rounded or cordate; petiole $\frac{1}{2}$ –2 in. *Racemes* 3–6-fl.; bracts minute. *Calyx* straight, cylindric. *Corolla* yellow; tube long, very small, curved, greatly dilated above the middle. *Nutlets* $\frac{1}{16}$ in. long, broadly obovoid-oblong, quite smooth.

29. **N. erecta**, *Benth. Lab. 482*, and in *DC. Prodr. xii. 388*; tall, erect, branched, finely pubescent, leaves petioled ovate or oblong acute, whorls many-fl. distant axillary or in terminal spikes, the lower usually peduncled, calyx $\frac{1}{2}$ in. pubescent, teeth triangular much shorter than the tube, corolla $\frac{1}{2}$ –1 in. blue, nutlets broadly oblong. *Dracocephalum erectum*, *Royle ex Benth. in Hook. Bot. Misc. iii. 380*. *N. macrantha*, *Led. Herb. Ind. Or. H. f. & T.*

Foliage of *N. Govaniana*, and calyx the same, but the inflorescence is contracted to spikes of interrupted sometimes many-fl. whorls with only a tendency to the lower being peduncled, and the flowers are blue.—It is very near the Siberian *N. macrantha*, but the nutlets are not linear.

30. **N. Clarkei**, *Hook. f.*; finely pubescent, erect, branched, leaves shortly petioled ovate-oblong or lanceolate subacute toothed or crenate, whorls dense-fl. distant in strict terminal spikes and shortly peduncled in the lower axils, bracts lanceolate, lower leafy, calyx $\frac{1}{2}$ in. pubescent, teeth triangular acute much shorter than the tube, corolla $\frac{1}{2}$ in. blue, tube very slender, nutlets linear.

WESTERN HIMALAYA; Kashmir, at Tilail, alt. 11,000 ft., and Kunylwan, alt. 7500 ft., *Clarke*.

Stem strict, obtusely angled. *Leaves* 1–2 in., base acute or cordate; petiole

$\frac{1}{4}$ – $\frac{1}{2}$ in. *Spikes* terminal, 3–6 in.; bracts of upper lanceolate, inner linear about equalling the calyx. *Calyx* nearly straight, mouth oblique; teeth subequal. *Nutlets* $\frac{1}{2}$ in., smooth. *Corolla-tube* three times as long as the calyx, mouth dilated; lips small, not $\frac{1}{4}$ in. across.—I have seen no lower leaves of this very distinct species.

31. ***N. salviæfolia***, *Royle ex Benth. in Hook. Bot. Misc.* iii. 397, and in *DC. Prodr.* xii. 388; slender, erect, branched, densely white-tomentose all over, leaves small shortly petioled oblong or ovate obtuse crenate, whorls or cymes shortly peduncled distant in long strict narrow racemes or spikes, bracts minute subulate, calyx $\frac{1}{4}$ in. pedicelled scaberulous, teeth triangular subequal much shorter than the tube, corolla $\frac{3}{4}$ in. pale blue or white, tube very slender, nutlets oblong.

TEMPERATE WESTERN HIMALAYA; Kashmir, alt. 6–10,000 ft., *Jacquemont, Falconer, &c.* WESTERN TIBET, alt. 10–12,000 ft.; *Thomson*.

Stem 1–2 ft., nearly cylindric. *Leaves* thick, 1–1 $\frac{1}{2}$ in., base acute rounded or cordate, wrinkled above, densely closely woolly beneath. *Racemes* a foot long and under; peduncles of cymes $\frac{1}{2}$ –1 in. *Corolla* $\frac{1}{2}$ – $\frac{3}{4}$ in.; tube very slender, throat shortly dilated, limb $\frac{1}{4}$ in. across. *Nutlets* $\frac{1}{3}$ in. long, smooth.—The Tibetan specimens have more contracted racemes than the Kashmir, and the nutlets are rather narrower. Habit and white tomentum of *N. leucophylla* and *N. leucolana*, but the calyx is very different.

E. Dwarf species. *Leaves* crowded. *Cymes* or whorls axillary, floral leaves as large as the cauline, and close set. (GLECHOMA, L.) See 14. *longibracteata* in A.

32. ***N. nivalis***, *Benth. Lab.* 737, and in *DC. Prodr.* xii. 391; erect, pubescent, leaves sessile orbicular rugose green crenate, cymes all axillary few-fl. shorter than the leaves, calyx $\frac{1}{3}$ in. pubescent, teeth subequal lanceolate, stamens exserted, nutlets linear-oblong.

WESTERN TIBET; alt. 15–16,000 ft., *Jacquemont, Thomson*.

Rootstock creeping; stems 3–6 in. *Leaves* $\frac{1}{2}$ –1 in. diam., close-set, base rounded or cordate. *Cymes* shortly peduncled, bracts minute. *Corolla* $\frac{1}{2}$ – $\frac{2}{3}$ in., pale blue, resupinate, tube upcurved, throat slightly dilated, limb small. *Nutlets* $\frac{1}{2}$ in., smooth.

33. ***N. tibetica***, *Benth. Lab.* 737, and in *DC. Prodr.* xii. 392; prostrate, softly tomentose, leaves petioled fan-shaped rugose crenate, cymes all axillary few-fl. shorter than the leaves, calyx $\frac{1}{2}$ in. woolly, teeth subequal lanceolate shorter than the tube, stamens included, nutlets linear-oblong.

WESTERN TIBET; Kookioghong, *Jacquemont*; Lunjar (N. of Kumaon), alt. 17,500 ft., *Strachey & Winterbottom*.

Rootstock long, slender, branching; stems 3–6 in. *Leaves* $\frac{1}{2}$ –1 in. diam., close-set; base cuneate; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in. *Cymes* subsessile, bracts filiform. *Corolla* $\frac{3}{4}$ in., white; tube straight, funnel-shaped; limb small, regular. *Nutlets* $\frac{1}{2}$ in., smooth.

DOUBTFUL SPECIES.

N. NEPALENSIS, *Spreng. Syst.* ii. 730, *Benth. in DC. Prodr.* xii. 395, from Nepal.—Of this nothing is known, and the description is insufficient to identify it.

30. **DRACOCEPHALUM**, *Linn.*

Erect or prostrate herbs. *Whorls* axillary or terminal, flowers blue, purple or white. *Calyx* tubular, 15-nerved, 5-toothed; teeth all subequal,

or upper much the largest, or 3 upper combined into a broad lip. *Corolla-tube* not annulate within, upper lip erect notched, lower spreading 3-fid, midlobe largest. *Stamens* 4, ascending under the upper lip, anther-cells diverging. *Style-lobes* subulate. *Nutlets* smooth.—Species about 30, S. European and Temperate Asiatic.

As characterized in modern works, *Dracocephalum* cannot be distinguished from *Nepeta*, to which latter genus the two last described species should probably be referred.

* *Calyx* coriaceous, 2-lipped, upper lip of one very broad ovate entire acute tooth. *Stamens* included.

1. **D. speciosum**, *Benth. in Wall. Pl. As. Rar.* ii. 65, *Lab.* 494, and in *DC. Prodr.* xii. 399; stem simple tall robust, radical leaves long-petioled orbicular-cordate crenate, cauline sessile, floral orbicular, whorls in a large solitary spike or axillary, calyx $\frac{1}{2}$ in. coriaceous, upper tooth ovate, lower lanceolate. *Wall. Cat.* 2128; *Bot. Mag.* t. 6281.

ALPINE HIMALAYA; from Simla to Sikkim, alt. 12–15,000 ft.

Glabrous or woolly upwards. *Root* of very thick fleshy fibres; stem solitary, 6–18 in., 4-angled. *Leaves*, radical 2–4 in. diam., cauline smaller; petiole 5–12 in., slender. *Flowers* sessile in dense heads; bracts small, orbicular. *Calyx-teeth* apiculate, very variable in length and breadth. *Corolla* 1 in., blue-purple with dark spots, tubular, pubescent, lips short. *Stamens* subexserted. *Nutlets* $\frac{1}{8}$ in., linear-oblong, top crenate.—Near *D. altaica*.

2. **D. nutans**, *Linn.*; stem ascending, leaves shortly petioled ovate or oblong obtuse crenate, spikes long interrupted, lower whorls axillary, calyx $\frac{1}{4}$ in. coriaceous puberulous, upper tooth broadly ovate, lower setaceous. *Benth. Lab.* 499, and in *DC. Prodr.* xii. 400; *Pall. Fl. Ross.* iii. t. 17; *Bot. Reg.* t. 841. *Zornia nutans*, *Moench Meth.* 411.—*Gmel. Fl. Sibir.* iii. 231, t. 49.

TEMPERATE WESTERN HIMALAYA; Kashmir, alt. 9–10,000 ft., *Falconer & Thomson, Clarke*.—DISTRIB. Central Asia, from Soongaria to Dahuria.

Scaberulous. *Stems* 6–12 in., simple or branched, 4-angled. *Leaves* $\frac{1}{2}$ –1 in.; petiole $\frac{1}{8}$ – $\frac{1}{2}$ in. *Spikes* 4–6 in.; whorls dense-fld., flowers horizontal or drooping, sessile; bracts ovate or oblong. *Calyx* often purple. *Corolla* $\frac{1}{2}$ in., bright blue, tube slender. *Stamens* included. *Nutlets* $\frac{1}{2}$ in., linear-oblong.

** *Calyx* coriaceous, 2-lipped; upper lip broad, 3-toothed. *Stamens* included.

3. **D. moldavicum**, *Linn.*; annual, erect, branched, leaves sessile or petioled lanceolate obtusely deeply serrate or subpinatifid, spikes long leafy, whorls distinct or distant, bracts lanceolate, teeth long-awned, calyx $\frac{1}{2}$ in. glabrous, upper teeth broadly ovate mucronate. *Benth. in DC. Prodr.* xii. 401; *Lamk. Ill.* t. 513, f. 1; *Pall. Fl. Ross.* iii. t. 18; *Reichb. Ic. Fl. Germ.* t. 1240, f. 1.

WESTERN TEMPERATE HIMALAYA; Kashmir, alt. 7–8000 ft., *Falconer, Edgeworth, Clarke*.—DISTRIB. Siberia, Dahuria.

Quite glabrous. *Stem* 1–2 ft., branched from the base. *Leaves* 1–2 in., narrowed into a short slender petiole. *Spikes* 4–8 in. *Flowers* pedicelled, shorter than the floral leaves. *Corolla* $\frac{3}{4}$ –1 in., blue, tube greatly dilated to the throat. *Stamens* subexserted. *Nutlets* $\frac{1}{10}$ in., narrowly oblong truncate.

4. **D. heterophyllum**, *Benth. Lab.* 738, and in *DC. Prodr.* xii. 401; stems ascending, leaves petioled oblong ovate or cordate obtuse crenate,

spikes large dense-fl. leafy, floral leaves and bracts pectinate, teeth awned, calyx $\frac{1}{3}$ –1 in. glabrous or pubescent, upper teeth broadly ovate aristate.—*D. acanthoides*, *Edgew. ex Benth. in DC. l. c.*

WESTERN TIBET, alt. 13–16,000 ft.; *Jacquemont, Falconer, &c.*—DISTRIB. Turkestan.

Glabrous or scaberulous, brittle. *Stems* 6–8 in., stout, ascending, obtusely angled, simple or divided. *Leaves* 1–1½ in., coriaceous; petiole $\frac{1}{4}$ –1 in. *Spikes* often larger than the rest of the plant, cylindric, 1–1½ in. diam.; bracts green, elliptic, membranous. *Calyx* most variable in size, thinly coriaceous. *Corolla* $\frac{3}{4}$ –1½ in., white, hoary, inflated beyond the calyx, lower lip short. *Stamens* included. *Nutlets* $\frac{1}{4}$ – $\frac{1}{2}$ in., narrow oblong, tip truncate or crenulate.—*D. acanthoides* is a rather larger leaved and flowered state from Tibet N. of Kumaon, alt 12–15,500 ft. (*Edgeworth, Strachey & Winterbottom*).

5. ***D. Ruprechtii***, *Regel Descr. Plant. Nov. fasc. vii. 77*; stems ascending scaberulous, leaves sessile pinnatifid, lobes linear, whorls few-fl. distant, bracts pinnatifid with awned lobes, calyx $\frac{1}{2}$ – $\frac{3}{4}$ in. glabrous, upper teeth broadly ovate mucronate. *D. bipinnatum*, *Rupr. Sert. Thianschen. 65 (ex Regel)*.

WESTERN TIBET; Gilgit, *Col. Tanner*.—DISTRIB. Turkestan.

Nearly allied to *D. moldavicum*, but leaves pinnate with narrow lobes, corolla much larger, 1–1½ in. long, more tubular, not so abruptly inflated, nutlets larger. *Calyx* often purple. *Corolla* pubescent, blue.

*** *Calyx* nearly equally 5-cleft. *Stamens* exserted.

6. ***D. stamineum***, *Karel. & Kiril.*; low, diffusely branched from the base, stems terete few-leaved, leaves small petioled orbicular-cordate or reniform deeply crenate, whorls tomentose dense-fl. in terminal heads and one or more lower on the stem, calyx $\frac{1}{4}$ – $\frac{1}{2}$ in. tomentose, teeth ovate-lanceolate aristate.

WESTERN HIMALAYA; Kashmir, on Barjila, alt. 11,000 ft., *Clarke*. WESTERN TIBET, alt. 14–16,000 ft., *Thomson, Clarke*.—DISTRIB. Turkestan, Alatau Mts.

Stems excessively numerous from the root, ascending, green or purple. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., rugose, glabrous or tomentose; petiole of lower 1–3 in., very slender. *Heads* $\frac{1}{2}$ in. diam.; bracts small, cuneate, entire or toothed. *Calyx* sessile, often coloured. *Corolla* small, dark blue, tube shortly exserted, limb small. *Filaments* sometimes twice the length of the tube. *Nutlets* $\frac{1}{12}$ in. long, oblong, smooth.—Rather a *Nepeta* than a *Dracocephalum*.

7. ***D. Hookeri***, *Clarke mss.*; scaberulous, leaves pinnatifid, segments narrow linear, margins recurved, whorls in a dense terminal spike interrupted at the base, bracts pinnatifid, calyx $\frac{1}{2}$ – $\frac{3}{4}$ in. scaberulous, teeth equal nearly as long as the tube lanceolate pungent, sinus thickened.

EASTERN TIBET; north of Sikkim, alt 15,000 ft. ? *J. D. H.*

Specimens incomplete procured by collectors; upper portions of stem and spikes alone seen. *Stem* 4-angled. *Leaves* 1 in., sessile; segments few, spreading. *Spikes* 2–3 in. long by 1 broad. *Flowers* sessile. *Calyx* straight or curved. *Corolla* twice as long, tube narrow, throat moderately inflated. *Stamens* shortly exserted. *Nutlets* $\frac{1}{10}$ in., oblong, smooth.

31. **LALLEMANTIA**, *Fisch. & Mey.*

Characters of *Dracocephalum*, but upper lip of calyx with 3 obtuse lobes, of which the lateral are placed under the central.—DISTRIB. Species 4, Oriental and N.W. Indian.

This genus would better be included in *Dracocephalum*.

L. Royleana, *Benth. in DC. Prodr.* xii, 404; hoary-pubescent or glabrate, leaves shortly petioled ovate or oblong obtuse coarsely crenate, bracts oblong or lanceolate, teeth long-awned, calyx-teeth erect with incurved margins. *Boiss. Fl. Orient.* iv. 674. *Dracocephalum Royleanum*, *Benth. in Wall. Pl. As. Rar.* i. 65, and *Lab.* 497; *Wall. Cat.* 2129. *D. inderiense*, *Karel. & Kiril. in Bull. Soc. Imp. Mosc.* xv. 424. *Nepeta erodiifolia*, *Boiss. Diagn.* v. 24.

PANJAB PLAINS and HILLS; from Lahore westward indigenous? and cultivated. —DISTRIB. Afghanistan, Persia, Turkestan.

Annual, erect, 6–18 in.; stem branched or simple, obtusely angled. *Leaves* $\frac{1}{2}$ –1 in., base cordate or narrowed into the petiole. *Whorls* very numerous, in long interrupted narrow spikes; flowers shortly pedicelled; bracts small, deciduous. *Calyx* $\frac{1}{2}$ in., erect, rigid. *Corolla* pale lilac, tube hardly exerted, limb small. *Stamens* included. *Nutlets* $\frac{1}{16}$ in., narrowly oblong, smooth.

32. SCUTELLARIA, Linn.

Herbs or undershrubs. *Inflorescence* various. *Calyx* 2-lipped, lips closed in fruit, upper deciduous; tube with a large deciduous shield or pouch opposite the upper lip. *Corolla-tube* long, usually sharply recurved from the base and erect, not annulate within; upper lip entire or notched, lower broad, 3-lobed. *Stamens* 4; anthers conniving, ciliate, lower 1- upper 2-celled. *Disk* elongate. *Ovary* oblique, upper style-lobe short. *Nutlets* very minute, smooth, granulate or hispidulous.—Species about 90, N. Temp. and Tropical, many Andean.

* *Flowers in short leafy terminal spikes that are 4-angled in bud, bracts leafy.*

1. **S. prostrata**, *Jacquem. mss.*; *Benth. Lab.* 733, and in *DC. Prodr.* xii. 413; dwarf, prostrate, much branched, tomentose, leaves small petioled ovate coarsely toothed, spikes short 4-gonous, bracts ovate, corolla 1 in.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 8–14,000 ft., *Jacquemont*, &c.

Rootstock stout; stems many, 4–8 in., flexuous, subterete. *Leaves* $\frac{1}{2}$ –1 in., base cordate or cuneate. *Spikes* 1–2 in. *Corolla* yellow tipped with violet. *Nutlets* hispidulous.

2. **S. Heydel**, *Hook. f.*; dwarf, prostrate, much branched, branches and calyx hirsute with long spreading hairs, leaves very small shortly petioled ovate or cordate obtuse crenate, spikes short 4-gonous, bracts ovate, corolla $\frac{3}{4}$ in. *S. glutinosæ*, *Benth. var.?*, *Aitchison in Journ. Linn. Soc. Bot.* xix. 183.

WESTERN ALPINE HIMALAYA; Zaskar, alt. 15–16,000 ft., *Thomson, Heyde.* —DISTRIB. Afghanistan.

Habit of *S. prostrata*, but leaves more woolly, smaller, shorter-petioled, and with long spreading white hairs on the branches and calyx. *Corolla* yellow, tipped with blue or rose.—Near *S. pulchella*, Bunge, of the Altai.

** *Flowers in long narrow racemes, bracts shorter than the pedicel and calyx.*

3. **S. discolor**, *Coleb. in Wall. Pl. As. Rar.* i. 66; pubescent or tomentose, leaves long-petioled elliptic obtuse crenate, base rounded or cordate, floral minute, racemes very long slender, flowers scattered rarely

opposite secund, corolla $\frac{1}{2}$ – $\frac{3}{4}$ in., nutlets scabrid. *Benth. in DC. Prodr.* xii. 417; *Dalz. & Gihb. Bomb. Fl.* 210. *S. indica*, *Blume Bijdr.* 839; *Wall. Cat.* 2134; *Don Prodr.* 109; *Grah. Cat. Bomb. Pl.* 152. *S. heteropoda*, *Miq. Fl. Ind. Bat.* ii. 972.

SUBTROPICAL HIMALAYA; from Kumaon to Assam, alt. 1–6000 ft. KHASIA MTS., alt. 4–6000 ft. TENASSEEIM, *Parish*. MALABAR GHATS; Concan and Canara, *Ritchie*, &c.—DISTRIB. Burma, Java.

Stem ascending from a creeping rootstock, 1–2 ft., rarely branched, often naked above. *Leaves* 2–5 by $\frac{1}{2}$ –3 in., rarely orbicular; petiole 1–3 in. *Racemes* 6–10 in.; pedicels $\frac{1}{2}$ in.; bracts linear or oblong, all or all but the lowest shorter than the pedicel.

4. ***S. violacea***, *Heyne mss.*; *Benth. in Wall. Pl. As. Rar.* i. 66, *Lab.* 429; and in *DC. Prodr.* xii. 418; pubescent tomentose or glabrate, leaves long-petioled ovate-cordate subacute coarsely crenate or sinuate-toothed, flowers opposite secund. *Wall. Cat.* 2136; *Wight Ic.* t. 1449, and *Ill.* 176 bis, f. 7. *Thwaites Enum.* 239. *S. indica*, *Roxb. Hort. Beng.* 45, and *Fl. Ind.* iii. 24.

DECCAN PENINSULA; Mts. from the Nilghiris, alt. 5–7000 ft., southwards. CEYLON, ascending to 7000 ft.

Habit of *S. discolor*, but at once distinguished by the opposite flowers. *Corolla* 1 in. long, "white or tinged with rose," *Wight*. *Nutlets* hispid. The following forms do not seem to me to constitute definitely marked varieties.

VAR. *Colebrookiana*; leaves more deltoid thicker softly tomentose on both surfaces, calyx larger. *S. Colebrookiana*, *Benth. in Wall. Pl. As. Rar.* i. 67, and in *DC. l. c.*; *Wall. Cat.* 2135.

VAR. *hispidior*, *Benth. in DC. l. c.*; stouter, more rigid, leaves thick, bracts sometimes equalling the pedicels. *S. robusta*, *Benth. in DC. l. c.* *S. Wightiana*, *Benth. in Wall. Pl. As. Rar.* i. 67; *Wall. Cat.* 2708. *S. nodulosa*, *A. Ham. Monogr. Scutell.* 26.—Ceylon and Nilghiris.

VAR. *floribunda*; branched, inflorescence compound, flowers rather smaller. *S. floribunda*, *Benth. in DC. l. c.*—Ceylon.

VAR. *sikkimensis*; often tall, rambling and much branched.—Sikkim, *J. D. H.*

5. ***S. oblonga***, *Benth. in Bot. Reg.* x. t. 1493 in note, *Lab.* 429, and in *DC. Prodr.* xii. 418; pubescent or glabrate, erect or decumbent, leaves petioled oblong- or linear-lanceolate obtuse or acute or acuminate serrate or sinuate-toothed, flowers opposite, corolla $\frac{1}{2}$ in. *Thwaites Enum.* 240.

CEYLON; Central Province, ascending to 7000 ft.

Stem often woody below, 6–24 in., simple or branched, leafy. *Leaves* 1–2 $\frac{1}{2}$ by $\frac{1}{2}$ –1 in., base acute, rarely rounded, never cordate, pale beneath. *Racemes* rarely 6 in.; pedicels $\frac{1}{2}$ in., longer than the bracts. *Corolla* blue. *Nutlets* minutely granulate.

6?. ***S. incurva***, *Wall. Pl. As. Rar.* i. 67; "stem ascending branched pubescent, leaves subsessile elliptic-oblong acute remotely serrate almost glabrous, floral minute, flowers opposite secund, pedicels thrice as long as the calyx, corolla-tube slender incurved, lips deeply split, upper broad hooded, lower shorter." *Benth. in DC. Prodr.* xii. 418; *Wall. Cat.* 2138.

BURMA; at Taongdong, *Wallich*.

The above is Bentham's description of the solitary imperfect specimen in the Wallichian Herbarium. The habitat is beyond the British boundary.

*** *Flowers in long narrow racemes, bracts longer than the pedicel and calyx but hardly leafy.*

7. **S. glandulosa**, *Hook. f.*; dwarf, erect, glandular-hairy, leaves small sessile oblong-lanceolate obtuse subserrate, flowers opposite, pedicels very short, corolla $\frac{1}{2}$ in.

BURMA; valley of Mogoung, dry plains towards the Serpentine mines, *Griffith*.

A span high; rootstock woody; stem simple or sparingly branched. *Leaves* few, $\frac{1}{2}$ -1 in., sparsely hairy on both surfaces. *Racemes* strict, very glandular; bracts elliptic, longer than the pedicels.—A curious little species from beyond the British boundary.

8. **S. grossa**, *Wall. Pl. As. Rar. i.* 67; *Cat.* 2142; pubescent, stem procumbent below much branched, leaves petioled ovate acute coarsely crenate-serrate, base truncate rarely cuneate, bracts elliptic exceeding the calyx, corolla $\frac{3}{4}$ in. *Benth. in DC. Prodr. xii.* 419. *S. mussooriensis*, *Wawra in Estr. Bot. Zeit.* 1881, 69, and *It. Pr. Sax. Cob. Bot.* 106.

TEMPERATE WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 4-8000 ft., *Wallich*, &c.

Black when dry. *Stems* slender, 1-2 ft., creeping below. *Leaves* 1-2½ in., nearly glabrous; petiole $\frac{1}{2}$ -1 in., slender. *Raceme* slender, 3-6 in.; pedicels very short; bracts $\frac{1}{2}$ -½ in. *Corolla* pubescent, blue-purple. *Nutlets* puberulous.

9. **S. khasiana**, *Clarke mss.*; glabrescent, slender, leaves long-petioled ovate acute crenate, base acute, bracts small longer than the pedicels, corolla $\frac{1}{2}$ in. throat inflated.

KHASIA MTS., alt. 4-5000 ft.; Nunklow, *Griffith*; Kala pani, *Clarke*.

Stem 2-3 ft., branched, rambling, terete, glabrous. *Leaves* 1½-2 in., glabrous, membranous; petiole $\frac{1}{2}$ -1 in. *Racemes* 3-4 in., lax-fl., pubescent; bracts $\frac{1}{2}$ -½ in., elliptic or ovate, lower crenate. *Corolla* pale blue? *Nutlets* granulate.

10. **S. angulosa**, *Benth. in Wall. Pl. As. Rar. i.* 67, *Lab.* 444, and in *DC. Prodr. xii.* 430; tall, sparsely hairy, branches diffuse acutely 4-angled, leaves short-petioled ovate or lanceolate obtuse or acute crenate or serrate, base rounded or subcordate, racemes tomentose, lower bracts leafy, corolla 1 in. *Wall. Cat.* 2139. *S. scandens*, *Don Prodr.* 110; *Benth. Lab.* 444. *S. celtidifolia*, *A. Ham. Monogr. Scutell.* 27.

TEMPERATE WESTERN and CENTRAL HIMALAYA; from Kashmir to Nepal, alt. 4-9000 ft., *Wallich*, &c.

Stem very stout below; branches rambling for several feet (not scandent); angles with slender ribs. *Leaves* 1-3 in., with a few small scattered hairs, often purple beneath; petiole $\frac{1}{2}$ -½ in. *Racemes* 3-4 in.; bracts all leafy, upper small entire. *Corolla* white. *Nutlets* granulate.

11. **S. repens**, *Ham. in Don Prodr.* 110; pubescent or tomentose, diffuse, branches long ascending, leaves petioled ovate acute entire or crenate-serrate, base acute or truncate, racemes long glandular-hairy, bracts $\frac{1}{2}$ -½ in. ovate, corolla $\frac{1}{2}$ in. *Benth. Lab.* 443, and in *DC. Prodr. xii.* 429. *S. cana*, *Wall. Pl. As. Rar. i.* 67, and *Cat.* 2141. *S. Wallichiana*, *A. Ham. Monogr. Scutell.* 28, t. 2, f. 1.

SUBTROPICAL HIMALAYA; from Kashmir to Sikkim, alt. 1-5000 ft.—DISTRIB. Ava.

Stems long, stout, curved, brittle, obtusely 4-angled; branches crowded, curved, ascending. *Leaves* $\frac{1}{2}$ -1½ in., upper quite entire; base rarely subcordate; petiole $\frac{1}{2}$ -1 in. *Racemes* 6-10 in., stout or slender, curved; bracts ovate, $\frac{1}{2}$ -½ in., entire or crenate; pedicels very short. *Corolla* sharply recurved, pale purple ("yellow," *Don*). *Nutlets* subgranulate.

12. **S. linearis**, *Benth. in Wall. Pl. As. Rar. i.* 66, *Lab.* 435, and in

DC. Prodr. xii. 423; dwarf, puberulous, stems prostrate and ascending, leaves subsessile linear obtuse, margins recurved quite entire, racemes very short glandular-pubescent, bracts ovate entire, corolla $\frac{3}{4}$ –1 in., throat much inflated. *Wall. Cat.* 2137.

TEMPERATE WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 3–8000 ft.—DISTRIB. Afghanistan.

Rootstock stout, woody; stems very numerous, 4–8 in., terete. *Leaves* $\frac{1}{2}$ –1 $\frac{1}{2}$ in., rarely oblong-lanceolate. *Racemes* $\frac{1}{2}$ –1 in.; pedicels very short; bracts $\frac{1}{4}$ – $\frac{1}{2}$ in., *Corolla* purple, tube nearly straight. *Nutlets* puberulous.

**** *Flowers all axillary.*

13. *S. rivularis*, *Wall. Pl. As. Rar.* i. 66, and *Cat.* 2140; dwarf, glabrous, stems subsimple leafy, leaves lower shortly petioled, upper sessile ovate or lanceolate obtuse entire or crenate, base acute dilated or cordate, flowers axillary subsessile or spicate, corolla $\frac{1}{4}$ – $\frac{1}{2}$ in. nearly straight. *Benth. Lab.* 437, and in *DC. Prodr.* xii. 426; *Wight Ic.* t. 1450. *S. peregrina*, *Roxb. Hort. Beng.* 45, and *Fl. Ind.* iii. 24. *S. barbata*, *Don Prodr.* 109. *S. squamulosa*, *A. Ham. Monogr. Scutell.* 35. *S. minor*, β indica, *Benth. in DC. l. c.* 427.

CENTRAL HIMALAYA; Nepal, *Wallich.* KHASIA MTS., alt. 4–5000 ft.; *Griffith*, &c. TENASSERIM; at Moulmein, *Parish.* NILGHIRI and ANAMALLAY MTS.; *Wight*, &c.—DISTRIB. China.

Stem creeping below, ascending 6–8 in. and leafy, or drawn out to 12–15 in., subterete. *Leaves* very variable, $\frac{1}{2}$ –1 in., close set, passing into the floral or bracts. *Spikes* 3–6 in., bracts quite entire ovate or lanceolate. *Calyx* and *corolla* (blue) glabrous or pubescent. *Nutlets* granular.—Very near *S. minor*, L.

14. *S. galericulata*, *Linn.*; puberulous, erect, leaves shortly petioled ovate-lanceolate obtuse or subacute, base cordate crenate or upper entire, flowers axillary, bracts all leafy much exceeding the calyx, pedicels very short, corolla $\frac{3}{4}$ in. *Benth. in DC. Prodr.* xii. 425; *Boiss. Fl. Orient.* iv. 690 *Reichb. Ic. Fl. Germ.* t. 1256, f. 2.

WESTERN TEMPERATE HIMALAYA; Kashmir, alt. 5–8000 ft.—DISTRIB. Europe, from the Caucasus westward, N. Africa, Central and N. Asia, N. America.

Stem below creeping, then erect, 2–3 ft. *Leaves* 1 $\frac{1}{2}$ –2 $\frac{1}{2}$ in., crenatures rather remote, upper often entire.

33. *BRUNELLA*, *Linn.* (PRUNELLA, *Linn.*)

Perennial herbs. *Whorls* in dense heads; bracts orbicular; flowers purplish, rarely white. *Calyx* reticulate, 2-lipped, closed in fruit, upper lip flat, 3-toothed, lower 2-lobed; throat naked. *Corolla* ascending, tube annulate at the base within; upper lip erect, concave; lower spreading, side lobes deflexed, midlobe concave. *Stamens* 4, exserted, filaments 2-fid, lower arm antheriferous; anthers conniving, cells diverging. *Disk* erect, symmetrical. *Style-lobes* subulate. *Nutlets* oblong, smooth.—Species 3, N. and S. temp. regions.

B. vulgaris, *Linn.*; leaves petioled ovate or oblong entire toothed or pinnatifid. *Don Prodr.* 109; *Benth. in Wall. Pl. As. Rar.* i. 66, and in *DC. Prodr.* xii. 410; *Wall. Cat.* 2132; *Wight Ic.* t. 1448; *Boiss. Fl. Orient.* iv. 691.

TEMPERATE HIMALAYA and WESTERN TIBET; from Kashmir to Bhotan; alt.

4-11,000 ft. KHASIA MTS., alt. 4-6000. NILGHIRI and TRAVANCORE MTS., alt. 6-8000 ft.—DISTRIB. N. Temp. Zone, Andes, Australia.

Rootstock creeping. *Stem* 4-12 in., erect or ascending. *Leaves* 1-2 in., upper sessile. *Spikes* 1-3 in., cylindric; bracts ovate-cordate, ciliate, edges often purple. *Flowers* dimorphic, larger 2-sexual, smaller female. *Calyx-teeth* very variable, awned or not. *Corolla* $\frac{1}{2}$ - $\frac{3}{4}$ in., purple or white.

VAR. *vulgaris*; glabrous or sparingly hairy.—Himalaya Mts.

VAR. *hispida*, Benth. in DC. l. c.; hispidly hairy. B. *hispida*, Benth. in Wall. Pl. As. Rar. i. 66. B. *ovata*, Wall. Cat. 2133.—Sikkim, Khasia and Nilgiri Mts.

34. MARRUBIUM, Linn.

Perennial tomentose or woolly herbs. *Whorls* axillary, flowers small. *Calyx* tubular, 5-10-nerved; teeth 5-10, equal, short, subspinescent. *Corolla* short, tube naked or annulate within, upper lip erect, lower spreading, midlobe largest. *Stamens* 4, included; anthers glandular, cells diverging. *Style-lobes* short, obtuse. *Nutlets* obtuse.—Species 30, temperate and warm regions of the Old World.

1. *M. vulgare*, Linn.; tall, robust, shortly woolly, leaves petioled ovate or orbicular crenate rugose, whorls axillary many and dense-fld., calyx-teeth 10 subulate spreading and recurved, throat woolly. Benth. in DC. Prodr. xii. 153; Boiss. Fl. Orient. iv. 703; Reichb. Ic. Fl. Germ. t. 1224, f. 1. M. *propinquum*, Benth. in DC. l. c. (the Kashmir plant).

WESTERN TEMPERATE HIMALAYA; Kashmir, alt. 5-8000 ft., Falconer.—DISTRIB. Westward through Europe and N. Africa.

Stem 2-4 ft., leafy. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in. diam., base rounded or cordate or cuneate, leathery, wrinkled; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Whorls* depressed, villous. *Calyx* $\frac{1}{2}$ - $\frac{1}{2}$ in., coriaceous; teeth often hooked at the tip. *Corolla* $\frac{1}{2}$ in., white, tube slender, upper lip long, 2-fid. *Nutlets* $\frac{1}{2}$ in., smooth.

2. *M. lanatum*, Benth. Lab. 587, and in DC. Prodr. xii. 448; dwarf, clothed with long soft white wool, leaves petioled rounded lobed and crenate or $\frac{1}{2}$ -pinnatifid, whorls in a dense terminal cylindric or oblong thickly woolly spike, calyx-teeth 5 acicular spreading and recurved, throat naked. Mollucella *Marrubiastrum*, Steph. in Mem. Soc. Nat. Mosc. ii. 8; Ledeb. Ic. Pl. Fl. Ross. Alt. t. 150. *Lagopsis incana*, Bunge Monog. Molucc. ined.

WESTERN TIBET, alt. 15-16,000 ft.; Thomson, Henderson. NORTHERN GUERWAE; at Sheshil, alt. 16,000 ft., Strachey & Winterbottom. DISTRIB. Turkestan and Altai Mts.

Stems many, ascending from the stout rootstock, stout, 3-6 in. *Leaves* very thick, $\frac{1}{2}$ -1 in. diam.; petiole stout, as long or shorter. *Spikes* 1-2 in., 1 in. diam.; flowers immersed in wool; bracts linear or setaceous. *Calyx-tube* $\frac{1}{2}$ in., membranous, teeth as long, pungent. *Corolla* very small, upper lip short, entire. *Nutlets* $\frac{1}{2}$ in. long, hoary.

35. CRANIOTOME, Reichb.

A perennial erect branched herb. *Leaves* long-petioled. *Flowers* minute, in slender lax-fld. paniced racemes. *Calyx* ovoid, fruiting globose, equally 5-toothed; throat constricted, villous within. *Corolla*, upper lip minute, concave, entire; lower longer, spreading, 3-fid. *Stamens* ascending under the upper lip; anther-cells didymous, at length diverging. *Style* subequally 2-fid. *Nutlets* very minute, subglobose, smooth.

C. *versicolor*, Reichb. Iconogr. i. 39, t. 54; Benth. in Wall. Pl. As.

Rar. i. 64, *Lab.* 704, and in *DC. Prodr.* xii. 455; *Wall. Cat.* 2081. *Nepeta versicolor*, *Trevir. in Nov. Act. Nat. Cur.* xii. 183. *Anisomeles nepalensis*, *Spreng. Syst.* ii. 706. *Ajuga furcata*, *Link Enum.* ii. 99.

TEMPERATE HIMALAYA; from Simla to Bhotan, alt. 5-7000 ft., *Wallich*, &c. KHASIA MTS., alt. 4-6000 ft.

Usually densely patently softly hirsute all over. *Stem* erect, 1-2 ft., terete, stout or slender. *Leaves* 2-4 by 1-3 in., broadly ovate-cordate, acuminate, toothed or crenate; petiole slender, 1-2 in. *Cymes* copious and very compound; bracts subulate. *Calyx* $\frac{1}{15}$ in., teeth triangular. *Corolla* about twice as long, pale purple or rose-coloured. *Nutlets* $\frac{1}{16}$ in., pale, shining.—In Sikkim a state occurs with the fruiting calyx campanulate and $\frac{1}{2}$ in. long, without nutlets.

36. ANISOMELES, Br.

Tall, erect, branching, coarse herbs. *Flowers* in axillary whorls or lax-fld. branched panicked cymes, purplish. *Calyx* ovoid or tubular, straight, equally 5-toothed. *Corolla-tube* short, annulate within; upper lip erect, entire; lower broad, spreading, midlobe notched. *Stamens* exerted; anthers conniving, of the longer pair dimidiate, of the shorter 2-celled, cells transverse parallel. *Style* subequally 2-fid. *Nutlets* smooth.—Species about 8, warmer Asia and Australia.

1. **A. Heyneana**, *Benth. in Wall. Pl. As. Rar.* i. 59, *Lab.* 702, and in *DC. Prodr.* xii. 455; sparsely hairy or glabrate, leaves ovate-lanceolate acuminate crenate-serrate, cymes peduncled lax-fld., calyx $\frac{1}{6}$ - $\frac{1}{4}$ in. hispid, teeth triangular-lanceolate acuminate, margins fringed. *Dalz. & Gibs. Bomb. Fl.* 210. *Teucrium secundum*, *Heyne in Wall. Cat.* 2028.

DECCAN PENINSULA; Western Ghats, from the Concan southwards.

Stem 3-4 ft., acutely angled. *Leaves* 2-3 in., green; petiole $\frac{1}{2}$ - $\frac{1}{3}$ in. *Cymes* sometimes elongate and many-flowered; bracts small, subulate. *Calyx-teeth* strongly reticulate, hairy within, margin fringed. *Corolla* $\frac{1}{2}$ in., white. *Nutlets* $\frac{1}{16}$ in., broadly oblong, polished.—Perhaps only a variety of *A. ovata*.

2. **A. ovata**, *Br. in Ait. Hort. Kew*, ed. 2, ii. 364; tomentose or densely woolly rarely sparsely hairy, leaves ovate acuminate crenate-serrate, whorls axillary dense-fld. and in dense terminal spikes, calyx $\frac{1}{4}$ - $\frac{1}{2}$ in. hirsute, teeth triangular-lanceolate acuminate. *Wall. Cat.* 2040; *Jacq. Eclog.* i. t. 86; *Hook. Bot. Misc.* ii. 358, *Suppl.* t. 19; *Benth. in Wall. Pl. As. Rar.* i. 59, and in *DC. Prodr.* xii. 455; *Grah. Cat. Bomb. Pl.* 153; *Wight Ic.* t. 865. *A. disticha*, *Heyne in Roth Nov. Sp.* 254; *Roxb. Fl. Ind.* iii. 2; *Dalz. & Gibs. Bomb. Fl.* 210. *A. glabrata*, *Benth. in Wall. Cat.* 2041. *A. mollissima*, *Wall. Cat.* 2039. *Nepeta indica*, *Linn. Sp. Pl.* 799. *N. amboinica*, *Linn. fil. Suppl.* 273. *N. disticha*, *Blume Bijl.* 823. *Ballota disticha*, *Linn. Mant.* 83. *B. mauritiana*, *Pers. Syn.* ii. 126. *Ajuga disticha*, *Roxb. Fl. Ind.* iii. 2. *Marrubium indicum*, *Burm. Fl. Ind.* 227. *M. odoratissimum*, *Burm. Thes. Zeyl.* t. 71, f. 1. *Monarda zeylanica*, *Burm. Fl. Ind.* 12. *Phlomis alba*, *Blanco Fl. Filip.* ed. i. 474.—*Rheede Hort. Mal.* x. t. 88.

TROPICAL AND SUBTROPICAL INDIA, from the INDUS to ASSAM, ascending the Himalaya to 5000 ft., and south to SINGAPORE, TRAVANCORE and CEYLON.—DISTRIB. Malay Archipelago, China, Philippines.

Annual, 3-6 ft., most variable in hairiness. *Leaves* 1-3 in., thick, 6 in. green and membranous in Sikkim specimens, white or green; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Whorls* many- and dense-fld.; bracts variable. *Corolla* purplish. *Nutlets* as in *A. Heyneana*.—Order of Camphor.

3. **A. candicans**, *Benth. in Wall. Pl. As. Rar.* i. 59, and in *DC. Prodr.* xii. 456; softly tomentose or velvety, leaves shortly petioled lanceolate or oblong acuminate serrate, whorls axillary dense-fl. and in dense terminal spikes, calyx $\frac{1}{4}$ – $\frac{1}{2}$ in. hirsute, teeth triangular-lanceolate acuminate. *Wall. Cat.* 2038. *M. malabarica*, β nigrescens, *Benth. in DC. l. c.* 457; *Wall. Cat.* 2037.

BURMA; at Prome and Yenanghuen, *Wallich*.

A very doubtful species, of which there are two forms in *Wallich's Herbarium* under the name, one with oblong obtuse petioled leaves, the other with subsessile lanceolate ones, the latter agreeing with *Bentham's A. malabarica*, var. *nigrescens*. Of this last the calyx is that of *ovata*, the leaves of *malabarica*.

4. **A. malabarica**, *Br. in Bot. Mag.* t. 2071; densely tomentose or thickly woolly, leaves short-petioled oblong linear-oblong or oblong-lanceolate obtuse acute or acuminate crenate or serrate, calyx $\frac{1}{4}$ – $\frac{1}{2}$ in. villous or woolly, teeth narrow lanceolate. *Wall. Cat.* 2037; *Hook. Journ. Bot.* i. 225, t. 127; *Wight Ic.* t. 164; *Benth. in Wall. Pl. As. Rar.* i. 59, Lab. 702, and in *DC. Prodr.* xii. 456; *Grah. Cat. Bomb. Pl.* 153; *Dalz. & Gibs. Bomb. Fl.* 210. *A. intermedia*, *Wight in Benth. Lab.* 703, and in *DC. l. c.* *Nepeta malabarica*, *Linn. Mant.* 566. *Ajuga fruticosa*, *Roxb. Fl. Ind.* iii. 1.

DECCAN PENINSULA, abundant; Penang, *Wallich*. CEYLON, in hot dry places.—*DISTRIB.* Mauritius.

Shrubby, 4–6 ft.; branches sometimes very stout and most densely clothed with snow-white appressed wool. *Leaves* 2–6 in., very thick, base cuneate, very rarely cordate; petiole $\frac{1}{8}$ – $\frac{1}{2}$ in., very stout. *Spikes* sometimes very heavy with dense whorls 2 in. diam., densely woolly; bracts filiform, teeth very slender. *Corolla* purple. *Nutlets* pale.

37. **ACHYROSPERMUM**, *Blume*.

Softly pubescent undershrubs or herbs; branches terete. *Whorls* in dense spikes. *Calyx* 10-nerved, lips short, upper erect, 3-fid; lower shorter, spreading, 2-fid. *Corolla-tube* slender, not annulate within; upper lip short, erect, notched; lower 3-lobed, midlobe largest concave. *Stamens* 4, subequal, ascending; anthers 2- or by confluence 1-celled. *Style* 2-fid. *Nutlets* crowned with a rugged annulus or chaffy beard.—Species 5 or 6, of India, the Malaya Islands, Tropical Africa and Madagascar.

A. Wallichianum, *Benth. mss.*; hoary or tomentose or villous, leaves elliptic-ovate acuminate crenate-toothed, blade decurrent on the long petiole, bracts exceeding the calyx orbicular acuminate, nutlets crowned with a jagged annulus. *Teucrium Wallichianum*, *Benth. in Wall. Pl. As. Rar.* ii. 19, Lab. 671, and in *DC. l. c.* 580; *Wall. Cat.* 2758.

EASTERN SUBTROPICAL HIMALAYA; from Sikkim, alt. 3–6000 ft., *J. D. H.*, to Mishmi, *Griffith*. KHASIA HILLS, alt. 2–5000 ft.; *Bruce, Griffith*. TENASSERIM, *Helper*.

Suffrutescent; stem terete, 1–3 ft., simple or branched, rigid. *Leaves* 4–6 by 2–4 in., membranous, sparsely pubescent. *Spikes* 2–6 in., cylindric, glabrate or villous; bracts membranous, ciliate. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in., rather inflated, membranous; teeth triangular, reticulate. *Corolla* $\frac{1}{2}$ in., white dotted with rose. *Nutlets* $\frac{1}{2}$ in., turgid, faintly hairy.—There are two varieties, one tomentose with villous spikes from Silhet (*Wallich*) and Tenasserim; the other more glabrous from the Khasia and Himalaya. I suspect both may prove forms of the Javan *A. densiflorum*, *Bl.*, from which *A. philippinense*, *Benth.*, does not differ.

38. **COLQUHOUNIA**, Wall.

Tall, robust, rambling shrubs; branches terete. *Whorls* axillary and in lax-fld. spikes or racemes of orange or scarlet flowers. *Calyx* obscurely 10-nerved, subequally 5-toothed, throat naked. *Corolla-tube* incurved, not annulate, throat inflated; upper lip short, entire or notched, lower subequally 3-lobed. *Stamens* 4, ascending; anthers conniving in pairs; cells divaricate, confluent. *Style* subequally 2-fid. *Nutlets* winged above.—Species 3 or 4, Indian.

I am quite unable to distinguish the first three species, or to reconcile their specimens, descriptions and published drawings with one another.

1. **C. coccinea**, Wall. in *Trans. Linn. Soc.* xiii. 608; *Tent. Fl. Nap.* i. 13, t. 6, and *Cat.* 2085; branches tomentose, leaves elliptic ovate or cordate glabrate or subtomentose, calyx $\frac{1}{3}$ – $\frac{1}{2}$ in. hoary. *Benth.* in *DC. Prodr.* xii. 457; *Bot. Mag.* t. 4514. *C. tomentosa*, *Houlet* in *Rev. Hort.* 1873, 131, with fig.

TEMPERATE HIMALAYA; from Kumaon, *Wallich*, to Sikkim, alt. 7–9000 ft., *J. D. H.*

A shrub, 8–10 ft. *Leaves* 2–5 in., very variable in form and clothing. *Flowers* in an original drawing named by Wallich, and in the Tentamen figure, chiefly axillary, with a short subhemispheric calyx $\frac{1}{2}$ in. long (Bentham's var. *β parviflora*), and dull red corolla with the broad cylindric tube not twice the length of the calyx; in Wallich's and other specimens the flowers are very different, both axillary and in terminal spikes, the calyx and corolla are both twice as long, and the latter has a narrow tube. The plant figured in the Botanical Magazine, which was raised from seed sent by Wallich, has flowers all axillary, small calyces, a corolla $\frac{2}{3}$ in. long, funnel-shaped above the calyx, with much narrower orange-red lobes, the latter golden yellow at the base and in the throat.—*Nutlets* $\frac{1}{2}$ in. long, wing obliquely truncate.

2. **C. vestita**, Wall. *Tent. Fl. Nap.* i. 14; *Plant. As. Rar.* iii. 43, t. 267, and *Cat.* 2086; densely clothed with thick white wool, leaves elliptic ovate or cordate, calyx $\frac{1}{3}$ – $\frac{1}{2}$ in. woolly. *Benth.* in *DC. Prodr.* xii. 457.

TEMPERATE HIMALAYA; Kumaon, alt. 6–8000 ft.; Bhotan and Mishmi, *Griffith*. KHASIA MTS., alt. 5–7000 ft.; *Griffith*, &c.

This, I suspect, is only a woolly variety of *C. coccinea*, which, owing to the wetness of the climate, does not occur in Sikkim. Wallich's figure, however, represents a plant of very different habit from that of *C. coccinea*, having long subracemose terminal spikes of rose-pink flowers $1\frac{1}{2}$ in. long. Of the specimens both from Kumaon and the Khasia, many agree with the plate; others with smaller more axillary flowers and less clothed leaves pass into *C. coccinea*. Khasia specimens have often very thick leaves finely rugose on the upper surface, and densely cottony beneath.

3. **C. elegans**, Wall. *Pl. As. Rar.* i. 65, iii. 43, t. 268, and *Cat.* 2084; densely softly tomentose, leaves shortly petioled, flowers in small axillary heads, calyx $\frac{1}{2}$ in. subhemispheric, corolla-tube broad thrice as long as the calyx. *Benth.* in *DC. Prodr.* xii. 457.

BURMA; on Taëng Dong, *Wallich*.

Probably only another variety of *C. coccinea*, which I cannot distinguish from Bentham's var. *parviflora* of that plant, except in the longer corolla.

4. **C. tenuiflora**, *Hook. f.*; branches scaberulous and hirsute, leaves elliptic serrate pubescent, flowers subcapitate on very short lateral villous branches, calyx $\frac{1}{4}$ in., teeth acuminate, corolla 1 in. very slender densely pubescent.

PEGU; Karene Hills, *Rev. F. Mason*. TEXASSERIM; at Moulmein, *Parish*.

Apparently a very distinct species, of which the specimens are indifferent; the acuminate calyx-teeth and long slender corolla are very unlike any form of *C. coccinea*.

39. STACHYS, Linn.

Herbs or undershrubs. *Leaves* crenate or serrate. *Whorls* axillary and in terminal spikes or racemes. *Calyx* 5-10-nerved, teeth 5 subequal. *Corolla* with usually a ring of hairs within, throat not dilated, upper lip erect; lower spreading, 3-lobed, midlobe the largest. *Stamens* 4, ascending; anthers conniving, cells parallel or diverging. *Style-lobes* subequal. *Nutlets* obtuse.—Species about 160, all temperate and some warm climates, chiefly Oriental.

* *Herbs, stem 4-angled. Whorls many-fld., bracts as long as the calyx.*

1. *S. floccosa*, *Benth. Lab.* 739, and in *DC. Prodr.* xii. 465; stout, tall, erect, densely clothed with soft white wool, leaves petioled ovate or ovate-lanceolate cordate acute crenulate, whorls many-fld. axillary and in a terminal spike, calyx-teeth spinescent, corolla woolly.

WESTERN TEMPERATE HIMALAYA; Kashmir, alt. 5-6000 ft.; *Jacquemont, Falconer, &c.*—DISTRIB. Afghanistan.

Stem 2-4 ft., simple, sometimes as thick below as the little finger, obtusely 4-gonous. *Leaves* 3-4 by 1-2 in., thick, velvety above; petiole $\frac{1}{2}$ -1 in., very stout. *Whorls* dense, depressed, villous; bracts nearly equalling the calyx; flowers sessile. *Calyx* $\frac{1}{2}$ in.; fruiting $\frac{3}{4}$ in., villous; teeth triangular, spinous point coloured. *Corolla-tube* shortly exserted. *Nutlets* turgidly obpyriform, smooth.

2. *S. sericea*, *Wall. Pl. As. Rar.* i. 64, and *Cat.* 2077; tall, erect, more or less densely villous with long silky hairs, leaves shortly petioled ovate or oblong-cordate acute crenate, whorls many-fld. axillary and in terminal spikes, calyx-teeth spinescent, spines coloured. *Benth. Lab.* 537, and in *DC. Prodr.* xii. 465. *S. vestita*, *Benth. ll. c. in part.* *S. splendens*, *Wall. l. c.*, and *Cat.* 2075, *Benth. ll. c.*, and in *DC. l. c.* 466, *in part.*

TEMPERATE HIMALAYA; from Nepal to Kashmir, alt. 6-9000 ft.—DISTRIB. Afghanistan, Central Asia.

A most variable plant, differing only in the hairiness from *S. floccosa*, of which it is possibly a form. I cannot distinguish most of the specimens of *Bentham's S. vestita* and *S. splendens* from it, though some plants under the former name may be separated by the usually shorter calyx, the teeth of which have not the yellow spines of *sericea*; and these must be referred to *S. melissæfolia*. The corolla varies in length of tube, which is rarely exserted (*S. splendens*), and in breadth across the lips, of $\frac{1}{3}$ - $\frac{2}{3}$ in.; the usual colour is pale pink spotted with purple.

3. *S. melissæfolia*, *Benth. Lab.* 538, and in *DC. Prodr.* xii. 466, *in part*; tall, erect, tomentose or villous with silky hairs, rarely pubescent only, leaves sessile or shortly petioled ovate- or oblong-cordate acute crenate, whorls many-fld. axillary distant, calyx short, teeth triangular acute not spinescent. *S. oblongifolia*, *Benth. partly (Nepal specimens)*. *S. splendens*, *Wall. in part.*

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 8-10,000 ft.

Usually a smaller more slender and less hairy silky and leafy plant than *S. sericea*, best distinguished in its typical state by the shorter calyx as broad as long, with the triangular teeth acute or with a thickened tip, not ending in a pale spine; but there

are specimens difficult to refer to either one. The specimens described by Bentham under the names of *sericea*, *vestita*, *splendens* and *melissæfolia*, are so mixed up that it is useless to individualize them. *Corolla* colour as of *S. sericea*; tube exserted or not.

** *Herbs, stem 4-angled. Whorls few-fl'd.; bracts minute.*

4. ***S. oblongifolia***, Benth. in Wall. Pl. As. Rar. i. 64, Lab. 545, and in DC. Prodr. xii. 474; erect, pubescent or villous, leaves shortly petioled oblong-lanceolate subacute crenate-serrate, floral longer than the calyx, whorls 2-6-fl'd. all distant, calyx $\frac{1}{4}$ - $\frac{1}{2}$ in. villous, teeth triangular or lanceolate, tips setaceous, corolla-tube included. Wall. Cat. 2076, in part.

Plains of BENGAL, ASSAM and SILHET; in wet places, Wallich, &c.

Annual. Stem 1-2 ft., scabrid below. Leaves 2-3 by $\frac{3}{4}$ -1 in., base broadly cordate; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in., floral sessile. Whorls $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., never spicate. Calyx variable, sometimes short and cupular with very broad teeth. Corolla very small, pink. Nutlets subglobose, smooth.—The form of the leaves best distinguishes this from *S. melissæfolia*.

5. ***S. palustris***, Linn.; erect, stem scabrid or hispid with reversed hairs, leaves sessile narrowly oblong- or ovate-lanceolate acuminate serrate, base rounded or cordate, floral longer than the calyx, whorls sub-6-fl'd. all distant, calyx $\frac{1}{2}$ in. hispid, teeth lanceolate, tips spinescent, corolla-tube included. Benth. in DC. Prodr. xii. 470; Boiss. Fl. Orient. iv. 726; Reichb. Ic. Fl. Germ., t. 1211.

WESTERN HIMALAYA; Kashmir, alt. 5-6000 ft.; Thomson.—DISTRIB. N. and W. Asia, Europe, N. America.

Herbaceous, 1-2 ft., perennial. Leaves 3-4 by $\frac{3}{4}$ -1 in., floral leafy. Whorls $\frac{1}{2}$ -1 in. diam., never spicate. Calyx-teeth equalling the tube. Corolla small, pink. Nutlets broadly obovoid, nearly smooth.

6. ***S. sylvatica***, Linn.; stem erect hispidly hairy, leaves long-petioled broadly ovate-cordate serrate softly hairy, floral sessile longer than the calyx, whorls few-fl'd., calyx $\frac{1}{2}$ in., teeth triangular, tips acicular, corolla small, tube exserted. Benth. in DC. Prodr. xii. 469; Boiss. Fl. Orient. iv. 726; Reichb. Ic. Fl. Germ. t. 1211, 1232.

WESTERN HIMALAYA; Kashmir, Falconer.—DISTRIB. Europe and N. Asia.

Fœtid when bruised. Rootstock creeping, stoloniferous. Stem 1-3 ft., rather slender. Leaves 2-4 in., radical early withering; petiole of lower often longer. Whorls glandular-hairy. Corolla $\frac{1}{2}$ in. long, pink. Nutlets subglobose.

7. ***S. scaberula***, Vatke in Bot. Zeit. 1875, 462; erect, stem scabrid with reversed hairs, leaves petioled ovate-cordate acuminate crenate pubescent, floral longer than the calyx sessile, whorls 4-6-fl'd. distant or upper crowded, calyx $\frac{1}{2}$ in. glandular-pubescent, teeth triangular acuminate, corolla-tube exserted.

KHASIA MTS.; banks of the Kala Panee, alt. 5-6000 ft., J. D. H. & T. T.

Rootstock slender, creeping; stem 1-2 ft., simple or branched. Leaves 1-2 in., broadly cordate, beneath subscaberulous; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., scabrid. Calyx broadly campanulate, teeth shorter than the tube. Corolla $\frac{1}{2}$ in. long, white dotted with pink. Nutlets subglobose, smooth.

*** *Shrubs or undershrubs, stems terete or nearly so.*

8. ***S. tibetica***, Vatke in Bot. Zeit. 1875, 447; glabrous or puberulous, much branched, branches slender, leaves shortly petioled oblong ovate lan-

ceolate or linear entire or irregularly lobed, whorls 1-2-fld. all axillary. *Stachys*, n. 8, *Herb. Ind. Or. H. f. & T.*

WESTERN TIBET and NORTHERN KASHMIR, alt. 10-14,000 ft.; *Thomson, &c.*—**DISTRIB.** Kashgar.

Rootstock stout, woody; stems 1-2 ft., twiggy, much branched. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., obtuse, narrowed into the petiole or sessile, green. *Flowers* sessile. *Calyx* $\frac{1}{2}$ in., campanulate, glabrous or villous; teeth as long as the tube, triangular; tips long, pubescent, erect or spreading. *Corolla* $\frac{3}{4}$ -1 in., long, pink, pubescent; tube thrice as long as the calyx; upper lip long, narrow. *Nutlets* $\frac{1}{2}$ in., broadly obovoid-oblong. —Near the Persian *S. macrocheilos*, but the tube of the corolla is much longer than the calyx.

9. ***S. parviflora***, *Benth. in DC. Prodr.* xii. 490; densely clothed with flocculent white wool, leaves sessile thick elliptic oblong or oblong-ovate or -lanceolate subacute entire or serrate, floral far exceeding the flowers, whorls distant 2-4-fld., calyx $\frac{1}{2}$ - $\frac{1}{2}$ in. densely woolly cupular, teeth short acute, corolla very small. *Boiss. Fl. Orient.* iv. 740.

PANJAB PLAINS and HILLS, from the Jhelum eastwards and northwards to Murree.—**DISTRIB.** Afghanistan.

Erect, branched from the base and upwards; stem and branches very stout, nearly terete. *Leaves* 1-3 in., extremely variable, glabrous and shining or cottony above, upper woolly all over. *Calyx* immersed in wool, fruiting closed over the nutlets with the teeth incurved. *Corolla* red-purple; lips very small, upper short rounded. *Nutlets* enclosed in the ovoid or subglobose calyx, usually 2, turgid, plano-convex, $\frac{1}{4}$ in. long, grey, granulate.

40. **GALEOPSIS**, *Linn.*

Annuals. *Whorls* many-fld., axillary and in terminal leafy spikes. *Calyx* 5-nerved; teeth 5, subequal, spinescent. *Corolla-tube* straight, not annulate; throat dilated; upper lip arched, lower 3-fld, midlobe obcordate or 2-fld; palate with erect teeth at the union of the lips. *Stamens* 4, exserted; anther-cells transversely 2-valved, inner valve rounded, ciliate; outer larger, naked. *Nutlets* rounded, compressed, subreticulate.—Species 3, Europe, N. and W. Asia.

G. Tetrahit, *Linn.*; hispid, nodes thickened, calyx-teeth equalling or exceeding the tube. *Benth. in DC. Prodr.* xii. 198. *Reichb. Ic. Fl. Germ.* t. 1231.

SIKKIM HIMALAYA; fields at Lachen, alt. 11-12,000 ft., *J. D. H.*—**DISTRIB.** of the genus.

Stem 1-3 ft., hairs spreading and deflexed, nodes very hispid. *Leaves* 1-4 in., ovate or ovate-lanceolate, acute or acuminate, coarsely serrate. *Calyx* $\frac{1}{2}$ - $\frac{3}{4}$ in., teeth straight. *Corolla* $\frac{1}{2}$ -1 $\frac{1}{4}$ in., yellow and purple.

41. **LEONURUS**, *Linn.*

Erect, leafy, stout herbs. *Leaves* lobed. *Whorls* axillary, dense-fld., distant; bracts subulate, flowers small. *Calyx* 5-nerved, turbinate; teeth 5, spreading, spinescent. *Corolla-tube* naked or annulate within, upper lip entire, erect; lower 3-fld, midlobe obcordate. *Stamens* 4; anthers conniving, cells transverse. *Style-lobes* obtuse or subulate. *Nutlets* triquetrous, truncate, smooth.—Species 10, Europe, Asia and America.

* *Corolla-tube annulate within, upper lip flattish, narrowed at the base, lower spreading, midlobe entire.*

1. **L. Cardiacæ**, Linn.; leaves lanceolate ovate or orbicular lacerate or pinnatifid, corolla with the galea densely villous. *Benth. in DC. Prodr.* xii. 500; *Boiss. Fl. Orient.* iv. 753; *Reichb. Ic. Fl. Germ.* t. 1232, 1233.

TEMPERATE WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 6–10,000 ft.—DISTRIB. Europe, N. Asia and Asia Minor.

Rootstock stout. *Stem* 2–4 ft., stout, erect. *Leaves* very variable, close set, radical long-petioled, 1–3 in. long, often as broad, base cuneate, lower sometimes multifid, upper palmately lobed. *Whorls* very many; bracts large, lower petioled; bracteoles subulate. *Calyx* $\frac{1}{2}$ in., teeth triangular, spines long. *Corolla* $\frac{1}{2}$ in., rosy or white. *Nutlets* smooth.

L. Cardiacæ proper; leaves cordate-ovate serrate or lacerate pubescent or villous beneath.

VAR. *pubescens*; leaves elliptic-lanceolate coarsely serrate finely pubescent. *L. pubescens*, *Benth. in Wall. Fl. As. Rar.* i. 63, and *Lab.* 518, and in *DC. Prodr.* xii. 499; *Wall. Cat.* 2072.—Kashmir to Kumaon.

VAR. *Royleana*; leaves ovate-lanceolate rhomboid or orbicular or obovate, base rounded or cordate pinnatifidly cut white-tomentose beneath. *L. Royleanus*, *Benth. Il. c.*; *Wall. Cat.* 2073.—Kashmir to Scinde.

** *Corolla-tube* straight, not annulate; upper lip arched, lower sub-erect or with the midlobe alone spreading obcordate or 2-fid.

2. **L. sibiricus**, Linn.; glabrous or pubescent, leaves pinnati- or palmati-partite, segments linear incised, galea of corolla pubescent. *Benth. in DC. Prodr.* xii. 501; *Wall. Cat.* 2071; *Sm. Exot. Bot.* ii. 67, t. 94; *Sweet Brit. Fl. Gard.* iii. 204. *L. tartaricus*, *Burm. Fl. Ind.* 127; *Roxb. Fl. Ind.* iii. 8 (not Linn.). *L. heterophyllus*, *Sweet l. c.* ii. 197. *Stachys Artemisiæ*, *Lour. Fl. Coch.* 365.

Plains of INDIA; from Bengal and Silhet to Coorg, indigenous?—DISTRIB. Tropical Asia, Africa and America.

Annual. *Stems* 2–6 ft. *Leaves* 2–4 in., long-petioled, 3-multi-partite, upper floral entire, all pale beneath; petiole slender. *Whorls* numerous; bracts equalling the calyx, spinescent. *Calyx* $\frac{1}{2}$ in.; teeth spinescent. *Corolla* red. *Stamens* exserted. *Nutlets* smooth (hispid, *Benth.*).

42. **LAMIUM**, Linn.

Annual or perennial hairy herbs. *Whorls* axillary, many-fld. or in leafy heads, bracteoles 0 or subulate. *Calyx* 5-nerved; teeth 5, equal or the upper longer. *Corolla-tube* annulate or not within, throat dilated; upper lip arched; lower spreading, 3-lobed, midlobe broad contracted at the base. *Stamens* 4; anthers conniving; cells diverging. *Style-lobes* subulate. *Nutlets* triquetrous, truncate, smooth, scaly or tubercled.—Species 40, Europe, Temp. Asia and N. Africa.

1. **L. rhomboideum**, *Benth. Lab.* 509, and in *DC. Prodr.* 504; dwarf, densely softly velvety, leaves very large crowded rhomboid rugose crenate, flowers very large, corolla thrice as long as the calyx, anthers hirsute. *Dcne. in Jacquem. Voy. Bot.* t. 135. *Erianthera rhomboidea*, *Benth. in Hook. Bot. Misc.* iii. 380.

ALPINE WESTERN HIMALAYA and WESTERN TIBET; in stony debris from Kashmir to Kunawur, alt. 12–15,000 ft.—DISTRIB. Afghanistan, Turkestan.

Stem 6–12 in., very stout, often as thick as a goose-quill, more slender below where it is sunk deep in the ground, flexuous, densely tomentose, rarely divided. *Leaves*, lower small, upper 2–4 in. diam., base suddenly contracted into a very thick short woolly petiole; veins flabellate and reticulate, crenatures shallow or deep. *Bracts*

subulate. *Flowers* few, $1\frac{1}{2}$ in. long, subsessile. *Calyx* $\frac{3}{4}$ in., woolly; teeth lanceolate. *Corolla* purplish; tube straight, naked within; galea broad, woolly; lateral lobes ovate, entire.—A most remarkable plant.

2. **L. amplexicaule**, *Linn.*; annual, leaves petioled orbicular inciscrenate, whorls distant, calyx small pubescent, teeth equalling the tube converging in fruit, corolla-tube long slender nearly straight. *Wall. Cat.* 2074; *Don Prodr.* 111; *Benth. in DC. Prodr.* xii. 508; *Boiss. Fl. Orient.* iv. 760; *Reichb. Ic. Fl. Germ.* t. 1204, f. 2.

The PANJAB, TEMPERATE HIMALAYA and WESTERN TIBET; in fields, alt. 2–10,000 ft.—*DISTRIB.* N. and W. Asia, Europe, N. Africa.

Hairy or glabrescent, 4–10 in., branched from the base. *Leaves* $\frac{1}{4}$ – $\frac{3}{4}$ in., lower long-petioled, almost lobulate; base rounded or cordate; floral sessile, broader than long. *Corolla* $\frac{3}{4}$ in., or shorter, very slender, rosy, pubescent. *Nutlets* scaly.

3. **L. album**, *Linn.*; perennial, glabrous or hispidly hairy, leaves all petioled ovate-cordate crenate or serrate, upper whorls crowded lower distant, calyx-teeth longer than the tube, points long, corolla-tube curved gibbous at the base below. *Benth. in DC. Prodr.* xii. 510; *Boiss. Fl. Orient.* iv. 763; *Reichb. Ic. Fl. Germ.* t. 1205. *L. petiolatum*, *Royle ex Benth. in Hook. Bot. Misc.* iii. 381, *Lab.* 513, and in *DC. Prodr.* xii. 509.

TEMPERATE WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 5–10,000 ft.—*DISTRIB.* N. and W. Asia, Europe, N. Africa.

Rootstock creeping, stoloniferous; stem 6–18 in., ascending. *Leaves* 1–3 in., lower long-petioled, rarely incised; floral shortly petioled. *Calyx* glabrous or hispid with long hairs; teeth triangular-subulate, ciliate or not. *Corolla* $\frac{3}{4}$ –1 in.; upper lip vaulted, villous; lateral lobes various, with or without a minute basal tooth; ring in the tube oblique, tube constructed below it. *Nutlets* naked.

43. ROYLEA, *Wall.*

A tall hoary undershrub. *Leaves* shortly petioled, deeply crenate-toothed or lobed. *Whorls* all axillary, 6–10-fld.; bracteoles small, subulate. *Calyx* 10-nerved, lobes 5, large, obovate-oblong, obtuse, rigid, reticulate. *Corolla-tube* included, annulate within; upper lip erect, entire; lower spreading, 3-fld, midlobe entire. *Stamens* 4, ascending; anthers conniving, cells diverging. *Style-lobes* subequal. *Nutlets* obovoid-oblong, obtuse, smooth.

R. elegans, *Wall. Pl., As. Rar.* i. 57, t. 74, and *Cat.* 2069; *Benth. Lab.* 601, and in *DC. Prodr.* xii. 516. *Phlomis calycina*, *Roxb. Fl. Ind.* iii. 2. *Ballota cinerea*, *Don Prodr.* 111.

SUBTROPICAL WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 2–5000 ft., *Wallich, &c.*

Much branched, 3–5 ft. high; branches slender, terete, finely tomentose. *Leaves* 1– $1\frac{1}{2}$ in., ovate, tomentose beneath, base cuneate; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Fruiting calyx* $\frac{1}{2}$ – $\frac{3}{4}$ in., tube deeply ribbed, lobes as long. *Corolla* narrow, $\frac{1}{2}$ in., white or pinkish. *Nutlets* $\frac{1}{2}$ in.—Odour of lemons.

44. OTOSTEGIA, *Benth.*

Shrubs. *Whorls* axillary, many-fld.; outer bracteoles often spinescent. *Calyx* 10-nerved; limb dilated, membranous; upper lip very short, 3-angled or -toothed; lower very large, broad, angled or shortly 4-toothed. *Corolla-tube* included, annulate within; upper lip erect, concave, crown villous;

lower spreading, 3-fid, midlobe broad. *Stamens* 4, ascending; anthers conniving, cells at length divaricate. *Style* subequally 2-fid. *Nutlets* obovoid, obtuse.—Species 8, Oriental.

O. limbata, *Benth. mss.*; hoary, leaves subsessile elliptic-lanceolate obtuse quite entire nerveless, bracts spinescent. *Ballota limbata*, *Benth. Lab.* 743, and in *DC. Prodr.* xii. 521.

PANJAB; lower hills in rocky places west of the Jhelum to the Salt range, *Falconer, Jacquemont, &c.*

A small grey spiny bush; branches tomentose, white, terete; spines $\frac{1}{2}$ – $\frac{3}{4}$ in. *Leaves* 1 in., base narrowed, hoary on both surfaces, floral exceeding the calyces. *Whorls* distant; lower bracts spinescent, upper dilated, pungent. *Calyx* villous, throat bearded; flowering $\frac{1}{2}$ in., turbinate, with a broad membranous 5-toothed limb, which in fruit expands into a reticulated 5-angled cup, $\frac{3}{8}$ in. diam., with often toothed margins. *Corolla* $\frac{1}{2}$ in., tube short; upper lip very long, villous. *Stamens* exserted. *Nutlets* $\frac{1}{3}$ in., solitary?, flattened, smooth.

45. **LEUCAS**, *Br.*

Woolly or villous rarely glabrate herbs or undershrubs. *Whorls* axillary, usually distant. *Calyx* 10-nerved, striate; mouth equal or oblique, equally or unequally 6–10-toothed. *Corolla-tube* included, annulate or not within; upper lip erect, concave, crown villous; lower spreading, 3-fid, midlobe very large. *Stamens* 4, ascending; anthers conniving, cells divaricate at length confluent. *Style* subulate, posterior lobe obsolete. *Nutlets* ovoid, triquetrous, obtuse.—Species 50, Asiatic and African.

Sect. 1. **Hemistoma**. *Calyx* membranous, mouth oblique, split above, produced below. *Whorls* dense, many-fid., bracteoles equalling the calyx.

1. **L. urticæfolia**, *Br. Prodr.* 504; annual, leaves ovate coarsely toothed, whorls remote globose, calyx cylindric reticulated $\frac{1}{4}$ – $\frac{1}{2}$ in. pubescent or villous, lower lip truncate, teeth minute. *Benth. in DC. Prodr.* xii. 524; *Wight Ill.* t. 176 b. f. 10, and *Ic.* t. 1451; *Dalz. & Gibs. Bomb. Fl.* 212; *Boiss. Fl. Orient.* iv. 778. *L. membranacea*, *Benth. in Wall. Cat.* 2052. *Phlomis urticæfolia*, *Vahl Symb.* iii. 76; *Roxb. Fl. Ind.* iii. 11.

UPPER GANGETIC PLAIN; from Patna to the Panjab, and southward to SCINDE, COROMANDEL and MALABAR.—DISTRIB. Beluchistan, Arabia, Abyssinia.

Annual. *Stem* 6–18 in., hoary. *Leaves* 2–3 in., petioled, glabrous or hoary. *Whorls* 1 in. diam.; bracts ciliate. *Corolla* white, not annulate.

Sect. 2. **Ortholeucas**. *Calyx* straight, mouth nearly equal, throat naked; teeth 10, triangular, subulate or lanceolate. *Whorls* numerous, axillary; bracts usually minute, setaceous (long in 4. *Helperi*, 13. *marrubioides* and 15. *pubescens*).

* Perennial rooted. Branches terete. *Calyx-teeth* not $\frac{1}{2}$ the length of the tube.

2. **L. teres**, *Benth. in Wall. Pl. As. Rar.* i. 62, *Lab.* 608, and in *DC. Prodr.* xii. 526; shrubby, hoary-pubescent, branches very slender terete, leaves very shortly petioled elliptic obtuse subserrate, whorls few-fid., bracts minute, calyx-teeth minute subulate. *Wall. Cat.* 2060.

BURMA; banks of the Irawaddi, *Wallich*.

Branches long, hairs deflexed. *Leaves* $\frac{1}{2}$ –1 in., scaberulous above, tomentose

beneath; petiole $\frac{1}{2}$ in. Calyx shortly pedicelled, $\frac{1}{8}$ – $\frac{1}{4}$ in. Corolla very small. Nutlets $\frac{1}{16}$ in.

3. **L. nepetæfolia**, Benth. in Wall. Pl. As. Rar. i. 62, Lab. 609, and in DC. Prodr. xii. 527; shrubby, tomentose, branches terete, leaves petioled orbicular-ovate obtuse coarsely crenate, whorls few-fl., bracts setaceous, calyx-teeth triangular. Wall. Cat. 2526.

DECCAN PENINSULA; at Pullejmadam ("in a journey to Hydrabad," ex Rottler mss.).

Branches hoary; hairs spreading, yellow. Leaves 1–1 $\frac{1}{2}$ in., pubescent above, tomentose beneath; petiole $\frac{1}{4}$ in., very slender. Calyx $\frac{1}{8}$ – $\frac{1}{4}$ in., villous; teeth short. Corolla small. Nutlets $\frac{1}{16}$ – $\frac{1}{12}$ in., grey.

4. **L. Helferi**, Hook. f.; floccose with soft spreading white wool or glabrate, stem procumbent very slender flexuous terete, leaves shortly petioled ovate obtuse crenate, whorls few-fl., bracts slender short or long, calyx $\frac{1}{4}$ in. villous, teeth subulate spreading.

TENASSERIM; Helfer.

Stem 1–2 ft., wiry, sparingly branched; wool on branches and leaves very fine and long, easily removed. Leaves $\frac{1}{2}$ –1 in., membranous, sometimes silky beneath; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., very slender. Corolla very small.—The specimens are far from satisfactory.

** Perennial rooted. Branches 4-angled, hairs on them erect or spreading (not deflexed). Calyx-teeth not $\frac{1}{2}$ the length of the tube.

5. **L. lanata**, Benth. in Wall. Pl. As. Rar. i. 61, Lab. 607, and in DC. Prodr. xii. 525; everywhere densely softly woolly or subsilky, branches stout, their hairs erect, leaves mostly sessile thick ovate or oblong obtuse or acute crenate, whorls many-fl., bracts setaceous, calyx truncate, teeth minute erect. Wall. Cat. 2055. *L. collina*, Dalz. in Hook. Kew Journ. ii. 338; Dalz. & Gibs. Bomb. Fl. 211. *Marrubium mollissimum*, Don Prodr. 112.

WESTERN HIMALAYA, from Kashmir to Kumaon, alt. 3–8000 ft. BANDA; Edgeworth. BEHAR; on Parusnath, J. D. H., &c. DECCAN PENINSULA, dry hills in the west from the Concan to the Nilghiris.—DISTRIB. S. China.

Rootstock stout, woody; stem 2–3 ft., often woody; branches stout, obtusely 4-angled. Leaves 1–3 in., lower shortly petioled, sometimes silky beneath, nerves above impressed. Whorls dense-fl. Calyx-teeth variable, always very short.—Dalzell's *L. collina* is in no point different enough to be a marked variety; some states of it have the leaves beautifully silky beneath. The Parusnath specimens have a smaller calyx and browner more scurfy tomentum on the branches. The hairs of the branches at once distinguish this from *L. montana*. A variety with longer setaceous calyx-teeth and bracts half as long as the calyx, is in Dalzell's Herbarium, marked "*L. zeylanica*."

*** Perennial rooted. Branches 4-angled, hairs on them deflexed (also spreading in *L. pilosa*). Calyx-teeth not $\frac{1}{2}$ the length of the tube.

† Whorls many-fl.; few-fl. in impoverished states and varieties of some.

6. **L. chinensis**, Br. Prodr. 504; densely tomentose, leaves shortly petioled broadly ovate acute or obtuse crenate, whorls few-fl., calyx $\frac{1}{4}$ – $\frac{1}{2}$ in. funnel-shaped, teeth equal spreading broadly triangular, tip spinulose. Benth. in DC. Prodr. xii. 524; Wall. Cat. 2527. *Phlomis chinensis*, Retz Obs. ii. 19.

SOUTH DECCAN; Pulney Hills, *Wight*; Anamallay and Balarangar Hills, *Beddome*.—DISTRIB. China.

Somewhat shrubby, sometimes only hoary. *Leaves* 1-2½ in., membranous or coriaceous, upper sessile; petiole ¼-½ in. *Calyx* pedicelled; bracts setaceous.—*Calyx* of the section *Astrodon*, but the mouth not villous, and the bracts are minute.

VAR. *lanata*; densely clothed with woolly tomentum, calyx-teeth not awned.—Vellyengry Hill, *Wight*.—As densely clothed as *L. lanata*.

7. ***L. montana***, *Spreng. Syst.* ii. 742; shrubby, all over densely softly woolly or tomentose, leaves thick shortly petioled ovate or ovate-rotundate obtuse crenate, whorls many-fld., calyx ¼-½ in. subcylindric, teeth minute erect. *Wall. Cat.* 2056; *Benth. in Wall. Pl. As. Rar.* i. 61, *Lab.* 607, and in *DC. Prodr.* xii. 525. ? *L. Hamiltoniana*, *Benth. ll. c.*; *Wall. Cat.* 2525. *Phlomis montana*, *Roth Nov. Sp.* 263; *Roxb. Fl. Ind.* iii. 8.

DECCAN PENINSULA; *Heyne, Wight*. Pulney Hills and Bellary, *Beddome*. BEHAR; Monghir, *Hamilton*; on Parusnath, alt. 4,5000 ft., *Clarke*.

Lower branches woody, upper 4-gonous, with deflexed hairs. *Leaves* 1-2 in., velvety; petiole 0-½ in. *Calyx* subsessile; bracts minute.—I doubt if it is possible to determine by descriptions what *Roth's Phlomis montana* was. In Rottler's Herbarium there is under this name a mixture of several things. I doubt the species being distinct from *L. mollissima*. *L. Hamiltoniana*, *Benth.*, is I think referable here.

VAR. *Wightii*; calyx ½ in. long. *L. montana*, *Herb. Wt. propr.*

8. ***L. mollissima***, *Wall. Pl. As. Rar.* i. 62, and *Cat.* 2054; slender, much branched, hoary-tomentose, leaves sessile or shortly petioled ovate-lanceolate or ovate acute rarely obtuse serrate, calyx ¼-½ in. tomentose or woolly cylindric straight, teeth very short usually slender. *Benth. Lab.* 607, and in *DC. Prodr.* xii. 525. *L. pilosa*, var. *pubescens*, *Benth. in Wall.* and *DC. ll. c.*

SUBTROPICAL HIMALAYA; Nepal, *Wallich*; Kumaon, *Falconer*, &c. KHASIA MTS., alt. 1-4000 ft., *Griffith*, &c. The CONCAN, *Stocks*, &c. CENTRAL INDIA; Chota Nagpore, *Clarke*. CEYLON; N. of the island, *Gardner*.—DISTRIB. China.

More slender than *L. montana*, and never so densely woolly, with more acute calyx-teeth; but these are sometimes very short and broad.

Bentham describes the flower as "white? but oftener purple."

VAR. *scaberula*; more glabrous, calyx hispid.—Central India and Khasia Mts., *Clarke*.

VAR. *angustifolia*; puberulous, very slender, leaves membranous linear-lanceolate subentire. *L. angustifolia*, *Wall. Pl. As. Rar.* i. 62; *Cat.* 2064; *Benth. in DC. l. c.* 527.—Nepal, *Wallich*.

VAR. *strigosa*; branches very slender and leaves above strigosely pubescent, leaves sessile elliptic- or linear-lanceolate subacute subserrate tomentose beneath, whorls few-fld. *L. strigosa*, *Benth. in Wall. l. c.*, *Lab.* 608, and in *DC. l. c.* 526; *Wall. Cat.* 2059.—Burma; at Prome, *Wallich*. Rangoon, *McClelland*.

9. ***L. ovata***, *Benth. in Wall. Pl. As. Rar.* i. 61, *Lab.* 607, and in *DC. Prodr.* xii. 525; branches long slender tomentose, leaves large sessile broadly ovate-cordate subcrenate, tip rounded, pubescent above, woolly beneath, whorls many-fld., bracts minute, calyx ¼ in. straight villous, teeth minute, tips acicular. *Wall. Cat.* 2057.

BURMA; banks of the Irawaddi, *Wallich*.

This may be another form of *L. mollissima*, but is a very different-looking plant.

Branches 3 ft., 4-angled; hairs deflexed. *Leaves* 3 by 2 in., very obscurely crenate.—Described from a single specimen.

10. **L. pilosa**, *Benth. in Wall. Pl. As. Rar.* i. 62, *Lab.* 609, and in *DC. Prodr.* xii. 526 (excl. var. β); branches very slender with appressed deflexed and long spreading hairs, leaves petioled membranous ovate acuminate coarsely serrate sparsely hairy on both surfaces, upper sessile, whorls few-fld., calyx $\frac{1}{4}$ in. straight hispid, teeth very short, tips acicular. *Wall. Cat.* 2058.

BURMA; banks of the Irawaddi, *Wallich*.

Branches long, leaves and whorls very distant. *Leaves* 3 by $1\frac{1}{2}$ in.; petiole $\frac{1}{2}$ in. —Described from a single specimen; the long spreading hairs are quite unlike those of any other species in this section.

†† *Whorls* 1-2-fld.

11. **L. procumbens**, *Desf. in Mem. Mus.* xi. 7, t. 3; procumbent, nearly glabrous, branches very long and slender, leaves petioled membranous elliptic-ovate or lanceolate acute subserrate, flowers 1-3 pedicelled, bracts minute, calyx $\frac{1}{2}$ in. straight glabrous, teeth short lanceolate acuminate. *Benth. in Wall. Pl. As. Rar.* i. 62, *Lab.* 610, and in *DC. Prodr.* xii. 527, in part. *L. biflora*, *Wall. Cat.* 2063, in part. *Phlomis biflora*, *Roxb. Fl. Ind.* iii. 12, in part.

BENGAL PLAINS; *Roxburgh*, &c. CANARA; *Ritchie*, &c. MYSORE; *Heyne*, &c.

Branches from a woody rootstock, 2-3 ft.; angles and tips puberulous. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., base acute; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in. *Calyx* with the pedicel sometimes half as long as the tube.

**** Perennial rooted. *Calyx-teeth* $\frac{1}{2}$ - $\frac{1}{2}$ the length of the tube.

12. **L. biflora**, *Br. Prodr.* 504; procumbent, pubescent, branches long slender, leaves petioled ovate elliptic or oblong coarsely serrate or crenate, flowers 1-2 subsessile, bracts minute, calyx $\frac{1}{2}$ in. straight hispid, teeth subulate $\frac{1}{2}$ the length of the tube. *Wall. Cat.* 2529; *Benth. in Wall. Pl. As. Rar.* i. 62, *Lab.* 610, and in *DC. Prodr.* xii. 527; *Wight Ic.* t. 866 (bad); *Grah. Cat. Bomb. Pl.* 153; *Dalz. & Gibs. Bomb. Fl.* 211. *L. procumbens*, *Thwaites Enum.* 240. *Phlomis biflora*, *Vahl Symb.* iii. 77; *Roxb. Fl. Ind.* iii. 12. *Nepeta indica*, *Burm. Fl. Ind.* 126, and *Thes. Zeyl.* t. 63, f. 1.

DECCAN PENINSULA, in dry places from the Concan southward. CEYLON; from the sea to 8000 ft., *Thwaites*.

Habit and foliage of *L. procumbens*, distinguished by its pubescence and long calyx-teeth, and native country.

13. **L. marrubioides**, *Desf. in Mem. Mus.* xi. 6, t. 3, f. 1; stem very stout, leaves sessile or shortly petioled thick ovate rounded or broadly ovate-cordate crenate velvety above densely white woolly beneath, whorls densely many-fld., calyx woolly, teeth subulate $\frac{1}{2}$ as long as the tube. *Benth. in Wall. Pl. As. Rar.* i. 61, *Lab.* 611, and in *DC. Prodr.* xii. 528; *Thwaites Enum.* 240.

WEST DECCAN PENINSULA, on the Ghats from the Concan to Travancore. CEYLON, common.

Stem 1-2 ft., simple or sparingly branched, densely white-tomentose with reflexed or spreading hairs. *Leaves* 1-2 in. long and broad, or more ovate, rarely acute, often rugose above, white beneath; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in., stout. *Whorls* very dense and woolly or silky; bracts villous, often equalling the calyx-tube. *Calyx-teeth* very variable in length.

VAR. *pulneyensis*; leaves ovate acute not so thick, calyx less densely tomentose, teeth flexuous as long as the tube.—Pulney Mts., *Wight*.

14. ***L. angularis***, *Benth. in Wall. Pl. As. Rar.* i. 62, *Lab.* 608, and in *DC. Prodr.* xii. 526; pubescent or tomentose, branches long ascending or erect, leaves shortly petioled subacute or obtuse coarsely crenate-serrate or toothed, whorls few- or many-fld., bracts minute, calyx $\frac{1}{2}$ in. hispid, teeth very slender ciliate half as long as the tube. *L. pubescens*, *Thwaites Enum.* 240.

NILGHIRI HILLS; *Wight*, &c. CEYLON; *Walker*, &c.—DISTRIB. Java.

Stem and *branches* rather slender, several feet long, straggling. *Leaves* 1–2 in., pubescent on both surfaces; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Whorls* lax-fld.; flowers shortly pedicelled, bracts subulate.—*L. javanica*, var. *Horsfieldiana*, of Java appears to be this.

15. ***L. pubescens***, *Benth. Lab.* 610, and in *DC. Prodr.* xii. 628; pubescent or tomentose, rather stout, erect, leaves petioled rounded or ovate coarsely crenate-serrate, whorls densely many-fld., bracts linear nearly as long as the calyx or less, calyx $\frac{1}{2}$ in. hispid, teeth subulate ciliate half as long as the tube. *L. marrubioides*, *Wall. Cat.* 2524.

DECCAN PENINSULA; *Wight*. Pulney Hills, *Beddome*.

Differs from *L. angularis* in the stouter erect habit, usually rounder longer-petioled leaves, and especially in the long ciliate bracts.

***** Annuals. *Stem* 4-angled.

16. ***L. flaccida***, *Br. Prodr.* 505; pubescent or tomentose, branched from the base, branches weak, hairs deflexed, leaves membranous long-petioled ovate or oblong obtuse crenate, whorls few-fld., bracts minute, calyx $\frac{1}{4}$ in. hairy or villous, teeth $\frac{1}{2}$ the length of the tube, alternate ones with capillary points. *Benth. Lab.* 609, and in *DC. Prodr.* xii. 526. *L. parviflora*, *Benth. in Wall. Pl. As. Rar. l. c.*; *Wall. Cat.* 2061. *L. melissæfolia*, *Benth. in Wall. l. c.* *L. melissæflora*, *Benth. in Wall. Cat.* 2062. *L. decemdentata*, *Smith in Rees Cyclop.*; *Benth. in DC. l. c.*

BURMA and TENASSERIM; *Wallich*, *Griffith*.—DISTRIB. Siam, Malay and Pacific Islands, Australia, W. Indies (introduced).

A slender flaccid annual; stem 6–8 in.; hairs on stem deflexed. *Leaves* 1–2 in., base cuneate; petiole $\frac{1}{2}$ –1 in., very slender. *Calyx* slightly curved, pedicelled. *Corolla-tube* much exserted.

17. ***L. longifolia***, *Benth. Lab.* 744, and in *DC. Prodr.* xii. 527; erect, branched above, scaberulous or hispid, leaves sessile narrowly linear quite entire, whorls few-fld., bracts minute, calyx $\frac{1}{4}$ in. sessile hispid turbinate truncate, teeth minute. *Grah. Cat. Bomb. Pl.* 153; *Dalz. & Gibs. Bomb. Fl.* 210.

The CONCAN; at Poona, &c., *Jacquemont*, *Stocks*, &c.

A foot high, rigid; stem naked below; hairs erect or spreading. *Leaves* $1\frac{3}{4}$ – $2\frac{1}{4}$ by $\frac{1}{10}$ – $\frac{1}{4}$ in., obtuse or subacute. *Calyx-mouth* villous. *Corolla* $\frac{1}{2}$ in., tube exserted; upper lip very short, lower very much longer and broader.—An unmistakable species.

Sect. 3. ***Astrodon***. *Calyx* straight, mouth equal, throat villous; teeth 10, usually stellately spreading. *Whorls* terminal and axillary, densely many-fld.; bracteoles usually about equalling the calyx (setaceous in *L. suffruticosa*). (See also 28. *L. stricta* and 34. *diffusa*.)

* *Leaves quite entire.*

18. **L. suffruticosa**, *Benth. Lab.* 611, and in *DC. Prodr.* xii. 528; a low shrub, branches densely fulvous-tomentose and hispid, leaves 1 in. sessile coriaceous linear obtuse hispid above white-tomentose beneath, whorls 1-2 terminating very long scapiform branches, calyx $\frac{1}{4}$ in. villous turbinate, teeth spinulose erect. *Wight Ic.* t. 1454.

SOUTH DECCAN; Nilghiri Hills, common in pastures, alt. 7000 ft., *Wight*, &c. Anamallay Hills, *Beddome*.

Rootstock very long and stout; branches ascending, rigid, terete, 4-6 in. (without the scape), appressed hairs erect, bristles spreading. *Leaves* quite entire; margins recurved. *Scapes* 6-10 in., tomentose only. *Whorls* $\frac{1}{2}$ -1 in. diam., with one or a pair of floral leaves; bracts setaceous, half the length of the calyx. *Calyx* sessile, villi of throat shorter than the teeth. *Corolla-tube* included, galea most densely villous. *Nutlets* $\frac{1}{8}$ in., oblong, terete, smooth.

19. **L. rosmarinifolia**, *Benth. in Wall. Pl. As. Rar.* i. 61, *Lab.* 612, and in *DC. Prodr.* xii. 528; a low excessively branched strigosely tomentose shrub, leaves 1 in. sessile fascicled linear obtuse softly villous beneath, whorls 1-2 terminating short scapiform branches, calyx $\frac{1}{4}$ in. turbinate hispidly villous, teeth very minute erect. *Wall. Cat.* 2521; *Wight Ic.* t. 1455.

NILGHIRI MTS.; alt. 7-8000 ft., in any soil, *Wight*, &c.

Stem woody, terete, fastigiately branched, hairs erect. *Leaves* $\frac{1}{10}$ - $\frac{1}{8}$ in. diam., rigid, grey; margins quite entire, revolute. *Whorls* often solitary, $\frac{3}{4}$ 1 in. diam., hemispheric, villous, with a pair of floral leaves; bracts linear, rigid, nearly equalling the calyx. *Calyx* sessile, closing over the fruit, villi of throat white, much exceeding the teeth. *Nutlets* oblong, $\frac{1}{10}$ in., obtusely trigonous.

20. **L. helianthemifolia**, *Desf. in Mem. Mus.* xi. 2, t. 1, f. 1; a low shrub, densely softly subsilkily villous (white or buff) tomentose, leaves opposite and ternate $\frac{3}{4}$ -1 $\frac{1}{4}$ in. sessile coriaceous linear-oblong obtuse, whorls few few-fld., calyx $\frac{1}{4}$ in. turbinate densely woolly, teeth minute erect. *Benth. Lab.* 612, and in *DC. Prodr.* xii. 528. *L. ternifolia*, *Desf. l. c.* t. 1, f. 2; *Bent. ll. c.*; *Wight Ic.* t. 1453.

SOUTH DECCAN; Pulney, Nilghiri and Anamallay Hills, alt. 5-7000 ft., *Wight*, &c.

Stem woody, terete, much branched; branches 6-12 in., rigid, erect; hairs spreading or erect. *Leaves* $\frac{1}{6}$ - $\frac{1}{2}$ in. diam., sometimes narrowed from the middle downwards; margin revolute, quite entire. *Whorls* $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, often crowded, dense-fld.; bracts almost equalling the calyx, subulate, tomentose. *Calyx* sessile, villi of the mouth as long as the teeth. *Corolla* very short. *Nutlets* $\frac{1}{8}$ in., oblong.

21. **L. lanceæfolia**, *Desf. in Mem. Mus.* xi. 5, t. 2, f. 2; tall, erect, shrubby, stem stout rufous-tomentose, leaves 3-4 in. petioled coriaceous lanceolate subacute scaberulous above white-tomentose beneath, nerves distinct, whorls axillary many- and dense-fld., calyx $\frac{1}{4}$ in. campanulate pubescent or tomentose, teeth minute spinulose spreading. *Benth. Lab.* 61, and in *DC. Prodr.* xii. 612; *Wight Ic.* t. 1452. *L. lanciformis*, *Wall. Cat.* 2759.

NILGHIRI MTS., alt. 6-8000 ft., *Wight*, &c., common.

Tall, 6-8 ft., very stout, "forming great clumps" (*Wight*); stem terete, hairs erect. *Leaves* $\frac{1}{2}$ -1 in. diam., subacute, dark above when dry, grey beneath with reddish silky veins; floral similar. *Whorls* 1 in. diam.; bracts linear-lanceolate, shorter than the calyx. *Calyx* sessile, hairs of mouth shorter than the teeth. *Corolla* small, tube included.

** *Leaves more or less serrate or crenate.*

22. **L. stelligera**, *Wall. Pl. As. Rar.* i. 61, and *Cat.* 2049; herbaceous, erect, branched, pubescent or tomentose, leaves 2-4 in. shortly petioled elliptic-lanceolate subacute obtusely serrate, whorls large crowded many- and dense-fl'd., calyx $\frac{1}{4}$ - $\frac{3}{4}$ in. tubular-campanulate scabrid or tomentose, teeth thick triangular subulate spreading and recurved longer than the villi of the mouth. *Benth. Lab.* 61, and in *DC. Prodr.* xii. 529; *Dalz. & Gibs. Bomb. Fl.* 211. *L. hamatula*, *Arn. Pugill. Pl. Ind. Or.* 37; *Benth. in DC. l. c.*

CEYLON; on the Ghats, *Dalzell*; Warree country, *Stocks*; Belgaum, *Ritchie*.

Stem 2-3 ft.; branches obtusely 4-gonous, hairs spreading. *Leaves* $\frac{1}{4}$ - $\frac{3}{4}$ in. diam., green, scaberulous or glabrate above, pubescent beneath, narrowed into the petiole. *Whorls* 1-1 $\frac{1}{2}$ in. diam.; bracts linear-lanceolate, nearly as long as the calyx. *Calyx* very variable in size, fruiting membranous, naked below the middle; teeth rarely spinescent, tomentose. *Nutlets* $\frac{1}{2}$ in., oblong.

23. **L. eriostoma**, *Hook. f.*; suffruticose, hispidly hairy, woolly or tomentose, leaves 1 $\frac{1}{2}$ -4 in. shortly petioled narrowly linear-lanceolate or oblong obtuse obtusely serrate, whorls axillary many- and dense-fl'd., bracts equalling the calyx plumose or ciliate, calyx $\frac{1}{4}$ - $\frac{1}{2}$ in. tubular-funnel-shaped villous above the middle, teeth very minute much shorter than the dense ring of white villi in the mouth. *Phlomis eriostoma*, *Heyne mss.*

DECCAN PENINSULA; Western Ghats, from the Concan to the Nilghiris.

Branches 6-10 in., stout, nearly terete. *Leaves* very variable in length, nerves unpressed above. *Whorls* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. *Calyx* naked below the middle. *Corolla* very small, tube included. *Nutlets* $\frac{1}{10}$ in., oblong.—There are several varieties of this.

VAR. *Heynii*; hispidly hairy on the branches and leaves, hairs spreading, leaves 2-3 in.—Wynad, *Heyne*.

VAR. *longifolia*; hoary-tomentose, leaves 3-4 in. nearly glabrous. *Herb. Wight, &c.*

VAR. *latifolia*; very robust, villously tomentose, leaves broader elliptic oblong or lanceolate, 2-3 by 1-1 $\frac{1}{2}$ in., whorls large globose 1 $\frac{1}{2}$ in. diam. *Herb. Wight.*

VAR. *lanata*; branches clothed with dense long soft white spreading hairs, leaves 1-1 $\frac{1}{2}$ in. oblong lanceolate villous on both surfaces.—Nilghiris and Bababoodan Hills.—*L. lepidstoma*, *Herb. Wight.*

VAR. *Stocksii*; branches densely clothed as in var. *lanata*, but tomentum shorter and whiter, leaves subsilky beneath 1-1 $\frac{1}{2}$ in.

24. **L. lamiifolia**, *Desf. in Mem. Mus.* xi. 4, t. 2, f. 1; tall, shrubby below, branches very stout square and petioles hirsute with long brown hairs, leaves 3-5 in. shortly petioled ovate subacute crenate-serrate villous above densely tomentose beneath, whorls subsolitary subglobose many- and dense-fl'd., calyx $\frac{1}{2}$ in. subcampanulate villous, teeth slender erect longer than the villi of the mouth ciliate, corolla-tube included. *Benth. Lab.* 613, and in *DC. Prodr.* xii. 529.

NILGHIRI HILLS, alt. 6500-7500 ft.; *Wight, &c.*

Much the largest and largest-leaved species, 8 ft. high, branches $\frac{1}{4}$ in. diam. *Leaves* 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in. broad, base sometimes cordate. *Whorls* terminal, rarely 2 on the same branch, 1 $\frac{1}{2}$ in. diam.; bracts exceeding the calyx, outer linear-lanceolate, inner filiform. *Calyx* membranous, teeth about $\frac{1}{2}$ the length of the tube, villi of the mouth sparse. *Corolla* small. *Nutlets* $\frac{1}{8}$ in. long, oblong.

25. **L. vestita**, *Benth. in Wall. Pl. As. Rar.* i. 61, *Lab.* 613 (*excl. Silhet*), and in *DC. Prodr.* xii. 530; tall, herbaceous, branches square and petioles hirsute, leaves shortly petioled 2-4 in. ovate-lanceolate acute ser-

rate pubescent above tomentose beneath, whorls subsolitary and terminal many- and dense-fld., calyx $\frac{1}{2}$ – $\frac{2}{3}$ in. tubular narrowed below villous, teeth slender erect ciliate longer than the villi of the mouth, corolla large. *Wight Ic. t.* 338.

SOUTH DECCAN PENINSULA; *Wight*. Pulney and Balaramgan Hills (Mysore), *Beddome*.

A more slender plant than *L. lamiifolia*, apparently annual, more sparsely hairy, with narrower leaves, smaller heads, longer calyx and larger corolla.

VAR. *oblongifolia*; shorter, stem woody below, leaves smaller $1\frac{1}{2}$ –2 in. more oblong and villous above.—Courtallam, *Wight*.

VAR. *sericostoma*; branches with soft spreading hairs, leaves silkily villous, calyx-teeth shorter than the long white silky hairs of the mouth.—Anamallay Hills, *Beddome*.

VAR. *angustifolia*; tall, branches with soft spreading hairs, leaves 2–3 by $\frac{1}{2}$ in. elliptic-lanceolate obtuse, calyx-teeth as long as two-thirds of the tube.—Sisparah, *Wight*; Palghat high range, *Beddome*.

26. **L. hirta**, *Spreng. Syst. ii.* 743; villously hirsute or scabrid, stem woody below, leaves 1–2 in. sessile or shortly petioled elliptic or linear oblong obtuse obscurely toothed, whorls solitary terminal, bracts as long as the scabrid turbinate calyx, calyx-teeth recurved equalling or shorter than the copious villi of the mouth. *Benth. Lab.* 613, and in *DC. Prodr.* xii. 530. *L. helianthemifolia*, *Benth. in Wall. Pl. As. Rar.* i. 61; *Wall. Cat.* 2053, *non Desf.* *L. rufescens*, *Benth. in Wall. Cat.* 2053. *Phlomis hirta*, *Heyne in Roth Nov. Sp.* 264.

DECCAN PENINSULA; Bangalore, *Rottler*; Nilghiri, Mysore and Shevaghery Hills, *Wight*.

Probably a dry country or locality form of *L. vestita*, much smaller, more scrubridly hirsute or villous, with very much smaller leaves and calyces and longer villi of the mouth than the latter. The hairs on the branches are deflexed or spreading, rarely appressed.

VAR. *prostrata*; smaller, more slender, branches prostrate or ascending, leaves $\frac{1}{2}$ –1 in. broadly ovate often petioled, villi of calyx-mouth shorter.—Anamallay and Nilghiri Hills, alt. 6–8000 ft.

VAR.? *Beddomei*; erect, softly villous with spreading hairs, leaves 2– $2\frac{1}{2}$ in. linear-oblong subsilkily villous on both surfaces, whorls in several axils, calyx $\frac{1}{2}$ in., teeth very small recurved triangular subulate spinescent longer than the villi of the mouth.—Chambra Peek, Wynaad, alt. 5000 ft., *Beddome*.

27. **L. ciliata**, *Benth. in Wall. Pl. As. Rar.* i. 61, *Lab.* 614, and in *DC. Prodr.* xii. 530; stem and branches hirsute with spreading and deflexed hairs, leaves petioled 2–4 in. ovate or lanceolate coarsely serrate pubescent or glabrate, whorls globose large many- and dense-fld. terminal and axillary, bracts as long as the calyx hirsute, calyx $\frac{1}{2}$ – $\frac{2}{3}$ in. tubular scabrid or villous, teeth long slender patent or recurved, mouth wide naked or ciliate. *Wall. Cat.* 2046; *Dalz. & Gibs. Bomb. Fl.* 211.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 7–9000 ft., *J. D. H.*; Bhotan, *Griffith*. KHASIA MTS., alt. 4–5000 ft.; *Wallich*, &c. DECCAN PENINSULA; on the Ghats, from the Concan to Travancore.

A tall annual? 1–3 ft., stem branched, obtusely 4-angled. *Leaves* membranous, narrowed at the base; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in. *Whorls* 1– $1\frac{1}{2}$ in. diam., ciliate from the slender long bracts and calyx-teeth. *Calyx* very variable in size and hairiness, teeth flexuous, ciliate, in small forms more than half as long as the tube. *Corolla-tube* included. *Nutlets* $\frac{1}{10}$ – $\frac{1}{8}$ in., oblong, smooth.

SECT. 4. **Plagiostoma**. *Bracts* usually as long as the calyx or nearly so. *Calyx* turbinate obconic or tubular, mouth very oblique, the

upper part projecting forwards, throat glabrous or nearly so, teeth erect (mouth straight in *28. stricta*, *34. diffusa*).

* *Annuals. Whorls terminal or axillary. Calyx-teeth long and slender.*

28. *L. stricta*, Benth. in Wall. Pl. As. Rar. i. 61, Lab. 614, and in DC. Prodr. xii. 531; annual, slender, erect, hispidly hairy, leaves oblong-lanceolate or linear, whorls solitary terminal, calyx $\frac{1}{2}$ in. hispid between tubular and funnel-shaped nearly straight, teeth long very slender ciliate. *Wall. Cat. 2045. Phlomis stricta, Heyne mss.*

DECCAN PENINSULA; Pulicat Mts., *Heyne*; Sandstone Hills, N.E. of Belgaum, *Ritchie, &c.*; Bellary, *Beddome*.

Stem 6-10 in., branches acutely 4-gonous. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., obtuse, floral like the cauline, bracts filiform rigid ciliate. *Calyx* slightly hairy within; teeth sometimes nearly as long as the tube, much longer than the villi of the mouth. *Corolla-tube* included, upper lip very short, lower twice as large.

29. *L. Clarkei*, Hook. f.; annual? slender, sparsely appressedly pubescent, branches ascending scabrid, leaves linear or linear-lanceolate entire or subserrate, whorls terminal globose, calyx short $\frac{1}{4}$ in. pubescent turbinate subdecurved, teeth very slender, 3 upper much the longest, mouth laxly hairy.

BEHAR; on Parusnath, alt. 1500 ft., *Clarke*.

Branches 1-2 ft., up-curved, 4-gonous, hairs short deflexed. *Leaves* 1-2 in., obtuse, floral many, like the cauline. *Whorls* subglobose, $\frac{1}{2}$ -1 in. diam.; bracts very slender, ciliate, tips and of calyx-teeth acicular. *Calyx* broad; teeth rather squarrose, scabrid, longer than the villi of the mouth. *Corolla-tube* included, upper lip short, lower $\frac{1}{2}$ in. long, widely spreading.

30. *L. nutans*, Spreng. Syst. ii. 743; annual, dwarf, diffusely branched, laxly hairy, leaves 1-2 in. shortly petioled oblong or linear-oblong obtuse subserrate, whorls terminal and axillary dense-fl'd., calyx $\frac{1}{4}$ in. falcately decurved hispid deeply striate, teeth subequal lanceolate ciliate. *Benth. Lab. 616, and in DC. Prodr. xii. 532. L. decurva, Benth. in Wall. Pl. As. Rar. i. 60, and Cat. 2050. Phlomis nutans, Roth Nov. Sp. 263.*

N. and N.W. INDIA, from the upper Gangetic plain to the Indus. SCINDE; *Stocks*. The DECCAN; *Heyne*. BEHAR; on Parusnath, *Clarke*. BURMA; on the Irawaddi, *Wallich*.

A small often straggling species. *Leaves* sometimes petioled. *Whorls* conspicuous for the sharply decurved calyces, the teeth of which are less slender than in *L. Clarkei* or *martinicensis*. *Bracts* ciliate, very slender. *Calyx* membranous, teeth much longer than the hairs of the mouth. *Corolla* small.

31. *L. martinicensis*, Br. Prodr. 504; annual, tall, stout, scaberrulous, leaves 3-4 in. petioled ovate or ovate-lanceolate obtuse coarsely crenate-serrate, whorls axillary globose, bracts and calyx-teeth spinescent ciliate, calyx $\frac{1}{2}$ - $\frac{3}{4}$ in. pubescent tubular sigmoidly curved, teeth slender, uppermost longest. *Benth. in Wall. Pl. As. Rar. i. 60, Lab. 617, and in DC. Prodr. xii. 533. L. polycephala, Wall. Cat. 2051.*

Sporadic in INDIA, doubtfully indigenous. The DECCAN; from the Concan southwards, *Heyne, &c.* AVA; *Wallich*.—DISTRIB. Tropical Africa and America.

A stout herb, 2-4 ft.; branches 4-gonous, sometimes hispidly hairy. *Leaves* membranous, base cuneate; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; floral sessile, more lanceolate. *Whorls* numerous, $\frac{1}{2}$ -1 in. diam.; bracts slender, tips pale, often hooked. *Calyx* much

enlarged in fruit, teeth tipped like the bracts, ciliate, often recurved. *Corolla* small. *Nutlets* $\frac{1}{2}$ in., obovate-oblong, shining.

**** Annuals.** *Whorls* terminal, rarely axillary. *Calyx-teeth* very short.

32. **L. Cephalotes**, *Spreng. Syst.* ii. 743; annual, tall, stout, scabrous, leaves 2-4 in. shortly petioled ovate or ovate-lanceolate subacute crenate-serrate, whorls very large terminal globose, bracts membranous elliptic- or linear-lanceolate awned, calyx $\frac{3}{4}$ in. tubular slightly curved, teeth short subulate scabrid, mouth hairy. *Benth. in Wall. Pl. As. Rar.* i. 60, *Lab.* 616, and in *DC. Prodr.* xii. 532; *Wall. Cat.* 2043; *Wight Ic.* t. 337; *Grah. Cat. Bomb. Pl.* 153; *Dalz. & Gibs. Bomb. Fl.* 211; *Boiss. Fl. Orient.* iv. 779. *L. capitata*, *Desf. in Mem. Mus.* xi. 8, t. 4. *Phlomis Cephalotes*, *Roth Nov. Sp.* 262; *Roxb. Fl. Ind.* iii. 10.

HIMALAYA; from Simla to Bhotan, alt. 2-6000 ft. Plains from CHITTAGONG and ASSAM to the PANJAB, and south through the DECCAN (not in Ceylon).—DISTRIB. Afghanistan.

Stem 2-3 ft., hairs spreading. *Leaves* membranous, more or less pubescent. *Whorls* 1-2 in. diam., surrounded by the imbricating membranous appressed bracts, which are quite unlike those of any other species. *Calyx* usually softly pubescent, membranous; hairs of mouth as long as the teeth.

33. **L. zeylanica**, *Br. Prodr.* 504; annual, erect, pubescent or hispidly hairy, leaves 2-3 in. shortly petioled linear- or elliptic-lanceolate obtuse subserrate, whorls subterminal many-fld., bracts few ciliate, calyx $\frac{1}{4}$ - $\frac{1}{2}$ in. obliquely turbinate glabrous scabrid or sparsely hispid, teeth minute, mouth broad pubescent within. *Benth. in Wall. Pl. As. Rar.* i. 60, *Lab.* 614, and in *DC. Prodr.* xii. 531; *Wight. Ill.* t. 176; *Thwaites Enum.* 240 (*excl. syn.*). *L. involucrata*, *Benth. in Wall. Cat.* 2047. *Phlomis zeylanica*, *Linn. Sp. Pl.* 820. *Leonurus Marrubiastrum*, *Burm. Fl. Ind.* 127, *non Linn.*

ASSAM; *Jenkins*. CACHAR and CHITTAGONG; *Clarke*. MALAY PENINSULA; from Rangoon, *Wallich*, to Singapore, *G. Thomson*. CEYLON, common.—DISTRIB. Malay Islands, China.

Stem 1-3 ft., branched above; hairs spreading, deflexed or appressed. *Leaves* sometimes 1 in. diam. *Whorls* small, $\frac{1}{2}$ - $\frac{2}{3}$ in. diam., rarely axillary; bracts fewer and shorter than in the allies, filiform, ciliate. *Calyx* very constant in size and shape, teeth erect or spreading horizontally.

VAR. *Walkeri*; branches long and strict, hairs appressed or spreading, leaves very narrow 2-3 by $\frac{1}{4}$ - $\frac{1}{2}$ in. *L. Walkeri*, *Benth. in DC. Prodr.* xii. 531. —Ceylon, *Walker, Champion*.—Bentham regards this as near *L. hyssopifolia*. Without knowing whether it is annual or perennial, it is difficult to say whether it is a variety of that plant or of *L. zeylanica*, of which it has the tall habit and solitary terminal whorls.

34. **L. diffusa**, *Benth. Lab.* 615, and in *DC. Prodr.* xii. 531; annual, diffusely branched from the root, branches slender ascending hispid or hirsute, leaves $\frac{1}{2}$ -1 in. linear or linear-oblong obtuse subentire, whorls chiefly solitary and terminal few-fld., calyx $\frac{1}{4}$ in. turbinate curved smooth below ribbed and hispid above, mouth wide truncate, teeth small subulate erect rather longer than the villi. *Phlomis diffusa*, *Herb. Rotter.*

DECCAN PENINSULA; *Heyne, Wight, &c.*

This differs from *L. zeylanica* in the diffuse habit and small leaves. It has been mixed in Wallich's Herbarium with *L. nutans* and *L. dimidiata*, *Benth.* (? of Sprengel), which is the same as *L. aspera*. From the latter the habit, almost entire leaves, smaller fewer-fld. whorls, and much shorter calyx with a wider truncate not oblique mouth abundantly distinguish it.

*** *Annual, except L. hyssopifolia. Whorls terminal and axillary. Calyx-teeth very short.*

35. **L. hyssopifolia**, *Benth. in Wall. Pl. As. Rar.* i. 60, *Lab.* 615, and in *DC. Prodr.* xii. 531; perennial, erect, hispidly hairy, leaves 1-2½ in. linear obtuse, margins recurved entire, whorls terminal and axillary small, bracts few subulate, calyx ¼ in. obconic glabrous, mouth wide truncate glabrous, teeth very minute erect. *Wall. Cat.* 2044.

SUBTROPICAL HIMALAYA and plains at their feet; from Jamu to Sikkim, alt. 1-3000 ft. CHOTA NAGPORE; at Sumbulpore, *Griffith*.

Rootstock stout, woody; branches numerous, 4-8 in. *Leaves* spreading, ½-¾ in. broad, often rigid. *Whorls* ½-¾ in. diam.; bracts very slender. *Calyx* very like *L. zeylanica* and *Wightii*; mouth glabrous within.

36. **L. Wightiana**, *Benth. in Wall. Pl. As. Rar.* i. 60; annual, erect, scabrid, leaves 1-2 in. linear obtuse entire, whorls small axillary and terminal or in dense terminal cylindric spikes, calyx ¼ in. obovoid hispid, mouth wide very oblique villous, teeth irregular triangular, upper longer. *Wall. Cat.* 2520. *L. aspera*, var. *Wightiana*, *Benth. Lab.* 616, and in *DC. Prodr.* xii. 532.

DECCAN PENINSULA; *Wight, G. Thomson*.

Stem 6-10 in., and branches very stout, and leaves grey; hairs minute, deflexed and appressed. *Leaves* ½-¾ in. broad, margins flat or recurved. *Whorls* ½-¾ in.; bracts slender, hispid. *Calyx* membranous below, green and striated above, not contracted at the junction. *Corolla* very small.—The stout scabrid habit, narrow entire leaves, small whorls, and short calyx, not contracted above the nutlets (with, however, similar teeth) distinguish this from *L. aspera*.

37. **L. aspera**, *Spreng. Syst.* ii. 743; annual, erect or diffuse, stem stout hispid or scabrid, leaves 1-3 in. linear or oblong obtuse entire or crenate, whorls large terminal and axillary, bracts long linear and filiform, calyx ⅓-¾ in. tubular curved smooth below green and ribbed and scabrid above contracted above the nutlets, mouth small glabrous very oblique shortly irregularly toothed. *Benth. Lab.* 615, and in *DC. Prodr.* xii. 532; *Grah. Cat. Bomb. Pl.* 153; *Dalz. & Gibs. Bomb. Fl.* 211. *L. Plukenetii*, *Benth. in Wall. Pl. As. Rar.* i. 60 (? *Spreng.*); *Wall. Cat.* 2522. *L. dimidiata*, *Benth. in DC. l. c.* 532 (? of *Spreng.*). *Phlomis aspera*, *Willd. Enum. Hort. Berol.* ii. 621. *P. Plukenetii*, *Roth Nov. Sp.* 261. *P. esculenta*, *Roxb. Fl. Ind.* iii. 10. *P. obliqua*, *Ham. mss.*—*Rheede Hort. Mal.* x. t. 91.

PLAINS OF INDIA; from Sikkim and Behar to the Panjab, and southward to Cape Comorin.—DISTRIB. Mauritius, Java, Philippine Islands.

Very variable. *Stem* erect, usually much diffusely branched from below, the branches 4-6 in., rather leafy, sometimes taller with erect branches and larger leaves ⅔ in. broad. *Whorls* often 1 in. diam., very dense-fld. and hispid. *Calyx* variable, but with always the upper lip produced and with short triangular teeth. *Corolla* small.—Whole plant fragrant and used as a pot-herb, *Roxb.* *Bentham's L. dimidiata*, from Burma (Wallich) is certainly *L. aspera*, and may or may not be Sprengel's plant of that name. A piece of *L. nutans* is on the same sheet.

38. **L. linifolia**, *Spreng. Syst.* ii. 743; annual, erect, smooth or scaberulous, leaves 2-4 in. linear or linear-lanceolate obtuse entire or subserrate, whorls axillary and terminal, bracts few short, calyx ¼-½ in. obovoid glabrous or puberulous, mouth very oblique contracted glabrous within, upper lip projecting acute 3-toothed, lower 2-fld. *Benth. in Wall. Pl. As. Rar.* i. 60, *Lab.* 617, and in *DC. Prodr.* xii. 533; *Wall. Cat.* 2048; *Grah.*

Cat. Bomb. Pl. 153; *Dalz. & Gibs. Bomb. Fl.* 211. *L. lavandulæfolia*, *Sm. in Rees Cyclop.* *Phlomis linifolia*, *Roth Nov. Sp.* 260. *P. zeylanica*, *Roxb. Fl. Ind.* iii. 9; *Jacq. Ic. Pl. Rar.* i. 11, t. 111. *Leonurus indicus*, *Burm. Fl. Ind.* 127.—*Rumph. Herb. Amb.* vi. t. 16, f. 1.

PLAINS of INDIA; from Assam and Bengal and Silhet to Singapore. In the DECCAN; from the Concan to Travancore (not seen from the W. or N.W. Provinces of India, nor from Ceylon).—DISTRIB. Mauritius, Malay Islands.

Stem 2-3 ft., usually stout and much branched above. *Leaves* rarely $\frac{3}{4}$ in. broad; petiole $0-\frac{1}{2}$ in. *Whorls* towards the ends of the branches, $\frac{1}{2}-\frac{3}{4}$ in. diam.; bracts setaceous. *Calyx* pale below, not striate above, toothing variable, sometimes spinescent.

VAR. *decipiens*; hispidly hairy, bracts very many ciliate, tips spinescent, calyx larger hirsute or pubescent, teeth longer spinous, uppermost pungent. *L. aspera*, *Pl. Ind. Or. Hohenack.* n. 1234.—South Deccan; Pycarrah, *Wight*; Nilghiris, *Hohenacker*.—Confounded with *L. aspera* in various collections, with which it agrees in hairiness.

DOUBTFUL SPECIES.

L. DIMIDIATA, *Spreng. Syst.* ii. 743; stem hairy, leaves oblong-lanceolate subserrate hirsute, whorls dimidiate, calyx oblong hairy above, teeth 10 subulate subpungent.—East Indies.—Probably *L. aspera*, to which belongs the specimen referred to this species by Bentham in his "Labiatarum Gen. & Sp.," and which is entirely different from *L. diffusa*.

46. LEONOTIS, Br.

Herbs or shrubs. *Whorls* axillary, densely many-flid.; bracteoles many, slender; flowers scarlet or yellow. *Calyx* 10-nerved, often incurved, mouth oblique; teeth 8-10, rigid, upper largest. *Corolla-tube* exerted; upper lip long, concave, crown villous; lower very small, spreading, concave, midlobe largest. *Stamens* 4, ascending; anthers conniving, cells divaricate. *Disk* equal. *Style* subulate, upper lobe very short. *Nutlets* oblong or ovoid, triquetrous, obtuse or truncate, glabrous.—Species 12, African, one also Indian.

L. nepetæfolia, *Br. Prodr.* 504; herbaceous, leaves membranous ovate crenate, bracts spinescent, calyx $\frac{1}{2}-1$ in., upper lip prominent rigid spinescent, lower with three erect or recurved spinescent teeth. *Benth. in Wall. Pl. As. Rar.* i. 59, *Lab.* 618, and in *DC. Prodr.* xii. 535; *Wall. Cat.* 2042; *Grah. Cat. Bomb. Pl.* 153; *Dalz. & Gibs. Bomb. Fl.* 211; *Wight III.* ii. t. 176 bis, f. 11, and *Ic.* t. 867; *Bot. Reg.* t. 281; *Bot. Mag.* t. 3700. *Phlomis nepetæfolia*, *Linn.*; *Roxb. Fl. Ind.* iii. 8. *Leonurus globosus*, *Moench Meth.* 400.

Throughout hotter India, from the Panjab to Travancore and Singapore, but not very common; cultivated and naturalized, doubtfully indigenous. CEYLON; in the drier parts.—DISTRIB. Tropical Asia, Africa and America.

A tall annual, 4-6 ft.; stem as thick as the finger, 4-angled with concave faces, puberulous. *Leaves* 4-8 by 2-5 in.; floral lanceolate, deflexed; petiole 1-3 in., winged above, slender. *Whorls* distant, globose, 2-3 in. diam., squarrose; bracts slender, linear, deflexed. *Calyx* $\frac{3}{4}$ in. long, ribbed and reticulate, pubescent or villous, tubular, incurved, teeth spinescent, upper $\frac{1}{4}$ in. long; throat glabrous. *Corolla* orange-red, 1 in. long; tube slender, exerted, villous like the upper lip, lower lip minute. *Nutlets* linear-oblong, widening upwards, truncate.

47. PHLOMIS, Linn.

Herbs or shrubs. *Whorls* axillary, dense-flid.; bracteoles many, ovate

lanceolate, or linear; flowers yellow, purple or white. *Calyx* 5- or 10-nerved, usually plicate, mouth equal truncate or 5-toothed. *Corolla-tube* usually annulate within; upper lip concave, crown villous (except *P. rugosa* & *breviflora* ?), lower spreading, 3-fid. *Stamens* 4, ascending, posterior filaments often appendaged at the base; anthers conniving, cells divaricate. *Disk* equal. *Style* 2-fid, upper lobe shortest. *Nutlets* ovoid or obovoid, triquetrous, top glabrous.—Species about 45, Oriental and Temperate Asiatic.

* *Stem and branches terete.*

1. ***P. spectabilis***, *Falc. mss.*; *Benth. in DC. Prodr.* xii. 542; tall, stout, hoary, leaves large broadly ovate-cordate crenate or sublobulate rugose stellately tomentose beneath, tip rounded, whorls many-fld., bracts filiform rigid hispid, calyx $\frac{1}{2}$ – $\frac{3}{4}$ in. pubescent, teeth spiniform $\frac{1}{2}$ shorter than the tube.

WESTERN HIMALAYA; Kashmir and Kishtwar, alt. 3–8000 ft., *Jacquemont, Falconer, &c.*—DISTRIB. Afghanistan.

Stem 4–6 ft., terete, as thick as the little finger, hoary or loosely stellately downy. *Leaves* sometimes a foot broad and not so long, nerves beneath softly hairy; floral small; petiole 6–12 in. *Whorls* $1\frac{1}{2}$ –2 in. diam.; bracts with acicular tips. *Corolla* rose-purple, galea beautifully fringed with silvery hairs. *Nutlets* $\frac{1}{4}$ in. long, linear.—*P. oreophilla*, *Karel. & Kiril.*, from Alatau, is probably a small state of this.

2. ***P. cashmeriana***, *Royle Ill.* 303, t. 75 A; stout, erect, densely clothed with stellate white flocculent wool, leaves linear-oblong obtuse crenate rugose, base cordate, whorls many-fld., bracts filiform tomentose and ciliate, calyx $\frac{1}{2}$ – $\frac{3}{4}$ in. plicate tomentose, teeth spiniform half the length of the tube. *Benth. in Hook. Bot. Misc.* iii. 382, *Lab.* 630, and in *DC. Prodr.* xii. 542; *Bot. Reg.* 1844, t. 22.

WESTERN HIMALAYA; Kashmir, alt. 5–6500 ft., *Royle, Thomson, &c.*—DISTRIB. Afghanistan.

Stems several from the very stout rootstock, 2–3 ft. high, terete. *Radical leaves* long-petioled, 5–9 by 2–4 in., coriaceous, finely pubescent above, nerves reticulate beneath; petiole 4–6 in. *Whorls* 1– $1\frac{1}{2}$ in. diam.; bracts numerous, $\frac{2}{3}$ in., tips acicular. *Corolla* pale purple; galea very large, tomentose, not fringed; lower lip very broad, adze-shaped. *Nutlets* broadly oblong, $\frac{1}{2}$ in. long.

3. ***P. Stewartii***, *Hook. f.*; densely stellately woolly, stem short stout woody branched, leaves shortly petioled linear-lanceolate subulate crenulate rugose above, base attenuate, whorls many-fld., bracts stout narrowly linear acute, calyx $\frac{1}{2}$ in. densely woolly angled, teeth very short triangular recurved.

PANJAB; beyond the Indus, on the Suliman and Salt ranges, alt. 2500–4500 ft., *Stewart, Talbot*.

A low shrub, with spreading terete branches 6–10 in. long; wool flocculent, buff-coloured. *Leaves* 3–5 by $\frac{1}{4}$ – $\frac{3}{4}$ in., very leathery, scaberulous above. *Whorls* 1 in. diam.; bracts as long as the calyx, much thicker than in *P. cashmeriana*. *Corolla* small; galea tomentose, margin not fringed. *Nutlets* (ripe ?) very small.

** *Stem and branches 4-angled.*

4. ***P. macrophylla***, *Wall. Pl. As. Rar.* i. 62, and *Cat.* 2065; stem tall stout hirsute or glabrate, leaves long-petioled broadly ovate or oblong crenate, base broadly cordate, petiole almost as long as the blade, bracts equalling the calyx slender rigid ciliate, tips spinescent, calyx $\frac{1}{2}$ in. sparsely

hairy, teeth spiniform $\frac{1}{2}$ the length of the tube. *Benth. Lab.* 631, and in *DC. Prodr.* xii. 543.

TEMPERATE HIMALAYA; Kumaon, alt. 10,000 ft., *Strachey & Winterbottom, Anderson*; Nepal, *Wallich*; Sikkim, alt. 10–13,000 ft., *J. D. H.*

Stem 5–6 ft., as thick as the little finger. *Leaves* 4–8 by 3–6 in., variable in breadth, base rarely cuneate, pubescent above and beneath; petiole stout. *Whorls* 1–1 $\frac{1}{2}$ in. diam. *Corolla-tube* included, galea villous. *Nutlets* narrowly obcuneate, nearly $\frac{1}{4}$ in. long.

5. *P. breviflora*, *Benth. in Wall. Pl. As. Rar.* i. 62, *Lab.* 631, and in *DC. Prodr.* xii. 543; tall, erect, glabrous or slightly pubescent, leaves long-petioled broadly ovate deeply cordate acuminate crenate, whorls few-fld., bracts slender glabrous, calyx $\frac{1}{4}$ – $\frac{1}{2}$ in. short nearly glabrous, teeth very short. *P. parviflora*, *Benth. in Wall. Cat.* 2066.

EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 10–12,000 ft., *J. D. H.*, &c.

Perhaps only a variety of *P. macrophylla*, but the leaves are much more deeply cordate with rounded lobes, and the calyx is very small with minute teeth.

6. *P. setigera*, *Falcon. mss.*; *Benth. in DC. Prodr.* xii. 543; tall, erect, nearly glabrous or sparsely pubescent, leaves short-petioled ovate acuminate crenate, base rounded or cordate, whorls many-fld., bracts short rigid setaceous ciliate, tips spinescent, calyx $\frac{1}{3}$ – $\frac{1}{2}$ in. hairy, teeth erect subulate ciliate $\frac{1}{3}$ the length of the tube.

TEMPERATE HIMALAYA; Kashmir, *Clarke*; Kumaon, *Falconer*; Sikkim, alt. 10–12,000 ft., *J. D. H.*, &c.

Habit of *P. macrophylla*, differing in the short $\frac{1}{2}$ –1 in. petioles, the much shorter bracts, and the nutlets, which are $\frac{1}{6}$ in. long, obovoid, with a truncate top.

? *VAR. occidentalis*, *Clarke mss.*; bracts much longer and less rigid, calyx-teeth longer half the length of the tube.—Kashmir, Palgam, alt. 7000 ft., *Clarke*.

? *VAR. filiformis*; bracts soft filiform flexuous hirsute (not rigid nor spinous-tipped), nutlets $\frac{1}{2}$ in. long oblong.—Sikkim, Jongri and Tungu, alt. 1200–13,000 ft., *J. D. H.*—Of this subalpine plant the specimens are very poor; the bracts are very different from those of *P. setigera*, which, however, *Clarke* gathered at Jongri. It may be a form of *P. bracteosa*.

7. *P. bracteosa*, *Royle mss.*; *Benth. in Hook. Bot. Misc.* iii. 383, *Lab.* 633, and in *DC. Prodr.* xii. 545; hoary pubescent or subtomentose, leaves petioled ovate obtuse crenate, base broadly cordate, whorls many- and dense-fld., bracts ciliate long, outer membranous lanceolate or linear tip not spinous, inner narrower, calyx $\frac{1}{3}$ – $\frac{1}{2}$ in. hispid or glabrate, teeth slender ciliate. *P. lamiifolia*, *latifolia*, *simplex* and *cordata*, *Royle mss.*; *Benth. ll. c.*

WESTERN TEMPERATE HIMALAYA; from Kumaon to Kashmir, alt. 5–11,000 ft.—*DISTRIB.* Afghanistan.

A tall stout herb, stem simple or branched, hairs stellate on the leaves, spreading or deflexed when present on the stem. *Leaves* 2–4 in. long, very variable in breadth and in the base, which is never deeply cordate and is sometimes truncate, tip usually rounded, rarely subacute, both surfaces tomentose or almost silky in *Royle's P. cordata*, finely tomentose in the ordinary form, much more glabrous in *P. lamiifolia*; petiole usually shorter than the blade. *Whorls* $\frac{1}{2}$ –1 in. diam.; bracts usually equalling the calyx, erect. *Calyx-teeth* half the length of the tube or shorter. *Corolla* blue-purple; galea fringed with white hairs. *Nutlets* $\frac{1}{8}$ – $\frac{1}{6}$ in., obovoid, tip rounded.

VAR. longifolia; leaves 6–8 in. ovate-lanceolate acuminate or acute sparsely pubescent.—Kashmir, Tragbol and Shapryon, alt. 7–8500 ft., *Clarke*.

8. *P. rugosa*, *Benth. in Wall. Pl. As. Rar.* i. 63, *Lab.* 634, and in

DC. Prodr. xii. 545; nearly glabrous, leaves long-petioled membranous elliptic or oblong-ovate acuminate minutely toothed, whorls small, bracts filiform, calyx $\frac{1}{2}$ in. obconic-campanulate glabrous or hispid, teeth very slender from a triangular base. *Wall. Cat.* 2067. *Gomphostemma membranifolium*, *Miquel Fl. Ind. Bat.* ii. 988.

SIKKIM HIMALAYA; Pomong, alt. 2-5000 ft., *J. D. H., Clarke*. KHASIA MTS., alt. 5-6000 ft.; *Wallich, &c.* UPPER ASSAM; Mishmi Hills and Patkoye Mts., *Griffith*.—DISTRIB. Java, Philippines.

Stem tall, 2-3 ft., stout or slender, minutely hairy, hairs deflexed. *Leaves* 6-8 by 3-4 in., glabrous or with minute scattered hairs above, base acute or rounded; petiole 3-4 in., very slender. *Whorls* distant, often many below the leaves $\frac{1}{2}$ -1 in. diam. *Calyx* coriaceous, teeth half the length of the tube. *Corolla* faintly pubescent, white or yellowish, upper lip narrow, lower with narrow side-lobes. *Nutlets* very large, $\frac{1}{2}$ in. long, obovoid, base acute, tip rounded.—An anomalous *Phlomis* with the calyx of *P. breviflora*, but very different leaves. The name *rugosa* is wholly inapplicable.

9. ***P. rotata***, *Benth. in Herb. Ind. Or. H. f. & T.*; stemless, leaves large rotately spreading orbicular or reniform coriaceous crenate rugose densely tomentose lacunosely reticulate beneath, whorls in a very short spike or subsessile head, bracts filiform, calyx sparsely hispid, teeth spinous.

ALPINE SIKKIM HIMALAYA; in the inner ranges, alt. 13-16,000 ft., *J. D. H.*

Annual? *Leaves* 3-6 in. diam., very thick, suddenly contracted into a very broad tomentose petiole $\frac{1}{2}$ in. broad; nerves very thick, flabellate; floral 0 or 2 oblong crenate. *Whorls* sometimes on a slender peduncle 2-3 in. long, at others forming a dense head $1\frac{1}{2}$ in. diam. or less in the centre of the leaves; bracts with acicular tips. *Calyx* $\frac{1}{2}$ in., funnel-shaped, rather membranous, teeth short. *Corolla* small; tube included, galea pubescent, densely fringed with white hairs.—A very remarkable plant, with the habit of *Lamium rhomboideum*.

48. **NOTOCHÆTE**, *Benth.*

An erect herb. *Leaves* long-petioled. *Whorls* axillary, globose, densely many-fld.; bracts slender, at length spinous with hooked lips. *Calyx* 5-nerved, membranous; teeth 5, equal, with long hook-tipped spines at the back. *Corolla* very small, tube included, not annulate; upper lip erect, concave; lower spreading, subequally trifid. *Stamens* 4, ascending; anthers conniving, cells divaricate. *Style-lobes* minute, subequal. *Nutlets* narrow oblong, triquetrous, truncate, smooth.

N. hamosa, *Benth. in Wall. Pl. As. Rar.* i. 63, *Lab.* 636, and in *DC. Prodr.* xii. 547; *Wall. Cat.* 2068; *Hook. Ic. Pl.* t. 1217.

CENTRAL AND EASTERN TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 4-8000 ft., *J. D. H., &c.*

Glabrous or pubescent. *Stem* creeping at the base, 2-4 ft., stout, 4-angled. *Leaves* 5-10 by 3-5 in., membranous, ovate, acuminate, toothed, base acute rounded or subcordate; petiole 2-3 in. *Whorls* 1-1 $\frac{1}{2}$ in. diam., densely spiny, bracts longer than the calyx-tube. *Calyx-tube* $\frac{1}{2}$ - $\frac{1}{2}$ in., slender, villous above the middle, fruiting hard 4-valved; spines at length $\frac{1}{2}$ in. *Corolla* as long as the calyx-spines, galea villous, lower lip as long subequally 3-lobed.

49. **EREMOSTACHYS**, *Bunge.*

Erect herbs. *Leaves*, radical broad, toothed or cut; cauline few, smaller. *Whorls* densely many-fld., axillary and in a terminal spike. *Calyx* subcam-

panulate or upper lip broad membranous; teeth 5, equal, setaceous. *Corolla-tube* included, upper lip erect, hooded, bearded within; lower spreading, 3-lobed, midlobe largest. *Stamens* 4, ascending, upper filaments fimbriate or appendaged at the base; anthers conniving, cells divaricate. *Disk* equal. *Style-lobes* equal or upper shorter. *Nutlets* obovoid, triquetrous, truncate, top densely hairy. Species 27, W. Asiatic.

1. **E. superba**, *Royle mss.*; *Benth. in Hook. Bot. Misc.* iii. 381, *Tab.* 637, and in *DC. Prodr.* xii. 548; root-leaves pinnatisect, segments lobulate, the lower petioled, floral ovate acute, whorls many-fl. crowded in a very stout woolly spike, calyx subcampanulate, mouth truncate shortly broadly 5-lobed. *Royle Ill.* 303, t. 74.

WESTERN HIMALAYA; Gurwhal, on the Kheree Pass, *Royle*. WESTERN PANJAB; Peshawur, *Vicary*.

Stem 2 ft., strict, erect, unbranched, base $\frac{3}{4}$ in. diam., softly hairy. *Leaves*, radical ovate in outline, 8–12 in.; lobes or peduncles broad, obtuse; petiole hirsute; cauline few, small, sessile, pinnatifid. *Spike* 6–10 in.; floral leaves erect, concave, covering the flowers, deciduous. *Calyx* $\frac{3}{4}$ in., woolly. *Corolla-tube* included, galea $\frac{1}{4}$ in., villous; lower lip broad, 3-lobed.

2. **E. Vicaryi**, *Benth. in Aitch. Cat. Pl. Panjab & Scinde*, 119; root-leaves pinnatisect, segments sessile pinnatifid, lower floral sessile oblong lobulate, whorls many-fl., at length distant, calyx campanulate scurfily tomentose, mouth truncate shortly 5-crenate, crenatures apiculate.

WESTERN PANJAB; Peshawur, *Vicary*; Salt range, Jhelum, *Aitchison*.—DISTRIB. Beluchistan.

Stem 3–5 ft., very stout, simple or branched. *Leaves* radical, 12–18 in., ovate in outline, segments or pinnules sessile glabrous; petiole stout, base woolly. *Spikes* 8–10 in., rachis very stout. *Calyx* $\frac{1}{2}$ in. *Corolla* smaller than in *E. superba*, galea villous and fringed with white hairs.

3. **E. acanthocalyx**, *Boiss. Diagn.* 2, iv. 49, and *Fl. Orient.* iv. 795; root-leaves pinnatisect, segments pinnatifid or lobulate, lower petioled, floral short broad, whorls many-fl., bracts linear-lanceolate spinescent, calyx campanulate stellately pubescent, teeth spinescent. *E. laciniata*, *Aitchison Cat. Pl. Panjab & Scinde*, 118 (*not of Bunge*).

WESTERN PANJAB; Peshawur, *Stewart*.—DISTRIB. Beluchistan, Afghanistan.

Stem 3–5 ft., very stout, simple or branched. *Leaves*, radical 6–12 in., oblong-ovate, hispid beneath; floral very broad, sessile, concave, as long as the flowers, deciduous; petiole and rachis hirsute. *Whorls* 1–2 in. diam., lower distant; bracts shorter than the calyx. *Calyx* $\frac{3}{4}$ in., mouth very shortly 5-lobed, lobes with a dorsal spreading spine $\frac{1}{8}$ in. long. *Corolla* 1 in., tube exserted, galea pubescent, fringed with white hairs.

50. **ERIOPHYTON**, *Benth.*

A dwarf thickly woolly herb. *Leaves* rounded or rhomboid, toothed. *Whorls* 6-fl., axillary, crowded or the lower distant, flowers very large, yellow. *Calyx* campanulate, 10-nerved, membranous, 5-lobed to the middle, lobes finely acuminate. *Corolla-tube* included, upper lip very broad, galeate, compressed, arching over the lower, which is small with 3 rounded lobes. *Stamens* 4, posterior filaments thickened at the base; anthers conniving, villous, cells divaricate. *Disk* equal. *Style-arms* subequal. *Nutlets* large, irregularly broadly obovoid and triquetrous, truncate, glabrous.

E. Wallichianum, *Benth. in Wall. Pl. As. Rar.* i. 63 (*Wallichii*). *Lab.* 638, and in *DC. Prodr.* xii. 549; *Wall. Cat.* 2070.

ALPINE CENTRAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 15–17,000 ft., *J. D. H.*

Rootstock stout; stem 4–6 in., stout, simple, naked below; wool on leaves, bracts and calyx $\frac{1}{2}$ in. long, white, very soft, hardly silky. *Leaves* very close set, imbricating, spreading or deflexed, $1\frac{1}{2}$ –2 in. diam., base broadly cuneate, nerves flabellate. *Bracts* 1– $1\frac{1}{2}$ in. broad, broadly cuneate, membranous, deeply toothed; bracteoles filiform. *Calyx* hidden amongst the leaves, 1 in. long; lobes triangular, finely pointed. *Corolla* $1\frac{1}{2}$ in., galea pubescent. *Nutlets* $\frac{1}{2}$ in. diam.—A very remarkable Labiate, which should be placed near *Lamium*, from which the broad galea and nutlets distinguish it.

51. **GOMPHOSTEMMA**, *Wall.*

Perennial, stellately pubescent or tomentose herbs; roots often with elongate tubers. *Whorls* 6–8-fid., dense- or lax-fid., axillary or in terminal spikes. *Calyx* 10-nerved, subequally 5-toothed. *Corolla-tube* slender; throat dilated, not annulate; upper lip galeate, lower broadly 3-fid. *Stamens* ascending; anthers conniving, cells parallel, transverse, naked. *Disk* symmetric or produced behind. *Style-lobes* subequal. *Nutlets* (drupes) various, glabrous or pubescent, hilum broad, pericarp thick corky or fleshy. *Cotyledons* often unequal.—Species 16, Indian, Malayan and Chinese.

* *Upper or all the whorls in terminal or axillary spikes.*

1. **G. strobilium**, *Wall. Cat.* 2151; stem scurfily scabrid or tomentose, leaves elliptic-ovate subacute crenate scabrid above densely tomentose beneath, whorls in a dense stout terminal tomentose spike, bracts broadly elliptic-ovate exceeding the calyx, calyx $\frac{1}{2}$ in., lobes triangular acute. *Benth. in Wall. Pl. As. Rar.* ii. 12, *Lab.* 647, and in *DC. Prodr.* xii. 550.

BURMA; Prome, Rangoon, &c., *Wallich*, *M'Clelland*.—DISTRIB. Ava.

Leaves 4–10 by 2–6 in., narrowed into a petiole $\frac{1}{2}$ –3 in. *Spike* sometimes 1 ft. and 2 in. broad; bracts 1 in. and under. *Calyx* $\frac{1}{2}$ in. *Corolla* twice as long. *Nutlets* $\frac{1}{2}$ in., turgid.

VAR. *viridis*; leaves more membranous narrowly elliptic-lanceolate finely pubescent beneath, flowers larger. *G. viride*, *Wall. Cat.* 2153; *Benth. ll. c.*—Tenasserim, *Wallich*; Moulmein, *Parish*.

VAR. *Heyneana*; stem petioles spikes and leaves beneath tomentose or densely woolly, “flowers blueish with a purple tinge,” *Wight*. *G. Heyneanum*, *Wall. Cat.* 2152; *Benth. ll. c.*; *Wight Ill.* t. 176 *bis*, f. 9, and *lc.* t. 1456.—Deccan, from the Bababoodan Hills to Travancore.

2. **G. pedunculatum**, *Benth. mss.*; tomentose, leaves long-petioled 3–12 by $1\frac{1}{2}$ –7 in., ovate or elliptic-ovate denticulate pubescent above, whorls crowded in short axillary peduncled oblong heads or spikes, bracts longer than the calyx ovate serrate, calyx $\frac{1}{2}$ in., lobes triangular acute.

KHASIA MTS.; below Nurtiung, *J. D. H. & T. T.*

Stem long, flexuous, prostrate, rooting below. *Leaves* distant. *Spikes* 1–4 in. long, axillary and from below the leaves or even from the rooting portion of the stem; peduncle tomentose, $\frac{1}{4}$ –1 in.; bracts and calyx red-brown. *Corolla* $\frac{2}{3}$ in., glabrous, pale sulphur colour. *Nutlets* $\frac{1}{2}$ in., subglobose, rugose.

3. **G. acaule**, *Kurz mss.*; stemless, densely pubescent, leaves 4–8 by 3– $4\frac{1}{2}$ in. elliptic obtuse crenate, petiole very stout long or short, whorls in a very short velvety terminal sessile spike softly tomentose, bracts much longer than the calyx ovate crenate, calyx $\frac{3}{4}$ in., lobes lanceolate.

ABACAN; on the Mingoo Hill, Boronga Island, *Kurz.*

Leaves spreading from the crown; petiole 1–3 in. *Spike* 2 in. long, 1 in. broad, leafy.

4. *G. nutans*, *Hook. f.*; stem very slender and leaves beneath and spikes softly densely tomentose, leaves 2–3½ in. subsessile ovate acute toothed pubescent above, whorls in a solitary short oblong terminal nodding or drooping spike, bracts longer than the calyx ovate subentire, calyx ¾ in., lobes lanceolate.

KHASIA MTS., *Simons, Lobb*; Nunklow, alt. 3500 ft., *Clarke.*

Stem 12–18 in., erect, much more slender than in any other species. *Leaves* in distant pairs, base acute, petiole ¾–1 in. *Spike* 2 in. long, 1 in. broad. *Corolla* 1–1½ in. long. *Nutlets* rugose.

** *Whorls axillary.*

† *Stem stout.*

5. *G. oblongum*, *Wall. Cat.* 2154; stem-leaves beneath and whorls densely tomentose, leaves shortly petioled 6–10 by 2–3½ in. oblanceolate or acuminate crenate scabrid above, whorls sessile few-fl., bracts small, calyx ½ in. ribbed, teeth linear-lanceolate, corolla 1½ in. pubescent. *Benth. in Wall. Pl. As. Rar.* ii. 12, *Lab.* 648, and in *DC. Prodr.* xii. 551.

TENASSERIM; Tavoy and Mergui, *Wallich, &c.*

Stem 2–3 ft., stout, erect. *Leaves* acute at the base; petiole ¼–1 in. *Bracts* variable, shorter than the calyx. *Corolla-tube* far exserted, very slender.

VAB. ? *Helferi*; leaves much broader 8–9 by 4½–5 in. obovate brown tomentose beneath, calyx ¾ in.—Tenasserim, *Helfer.*

6. *G. lucidum*, *Wall. Cat.* 2156; stem-leaves beneath and whorls densely brown woolly or tomentose, leaves short-petioled elliptic acute or oblanceolate acuminate subserrate scabrid above, whorls sessile few-fl., bracts small subulate, calyx ¼ in. ribbed, teeth short triangular, corolla 1½ in. pubescent. *Benth. in Wall. Pl. As. Rar.* ii. 12, *Lab.* 648, and in *DC. Prodr.* xii. 551.

KHASIA and JAITEA MTS., alt. 4–5000 ft., common.

Stem very stout. *Leaves* shining above, base narrowed; petiole ¼–1 in. *Bracts* variable. *Calyx* cupular in fruit. *Corolla* as in *G. oblongum*. *Nutlets* ½ in., oblong.

7. *G. niveum*, *Hook. f.*; stem and leaves beneath white-tomentose, leaves sessile or shortly petioled, oblanceolate acuminate serrate glabrous above, whorls sessile many-fl., bracts slender, calyx ½ in., teeth very slender as long as the tube.

EAST BENGAL; *Griffith.*

Stem erect, rather stout. *Leaves* much narrowed downwards either to the stem or into a very stout petiole. *Bracts* membranous, as long as the calyx. *Corolla* unexpanded, ½ in. *Nutlets* ½ in., oblong.

8. *G. parviflorum*, *Wall. Cat.* 2158; stem-leaves beneath and cymes densely softly tomentose, leaves shortly petioled 6–16 by 1–5 in. broadly or narrowly oblanceolate acuminate toothed, cymes peduncled many-fl., bracts slender or broad and leafy, calyx ½ in., teeth very slender as long as the tube, corolla 1 in. glabrate. *Benth. in Wall. Pl. As. Rar.* ii. 12, *Lab.* 648, and in *DC. Prodr.* xii. 551. *G. multiflorum*, *Benth. ll. c.*

TROPICAL HIMALAYA; from Nepal to Mishmi, alt. 0–4000 ft. ASSAM, KHASIA MTS., CHITTAGONG and TENASSERIM. PENANG, *Wallich.*

Stem very stout. *Leaves* narrowed into a stout petiole 1-2 in. long. *Cymes* laxly fascicled; peduncle $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; flowers often pedicelled; bracts longer than the calyx, from linear to ovate-lanceolate. *Corolla* very slender, ochreous, throat and limb small. *Nutlets* usually solitary, ellipsoid, rugose.

9. **G. crinitum**, *Wall. Cat.* 2159; stem and leaves beneath finely tomentose, leaves petioled 8-12 by 2 $\frac{1}{2}$ -4 $\frac{1}{2}$ in. elliptic and decurrent on the petiole or oblanceolate subacute entire or toothed, whorls sessile many- and dense-fld., bracts exceeding the calyx long linear, calyx $\frac{1}{2}$ in., teeth capillary exceeding the terete tube. *Benth. in Wall. Pl. As. Rar.* ii. 12, *Lab.* 648, and in *DC. Prodr.* xii. 552.

TENASSERIM; Tavoy, *Wallich.* MALACCA, Mount Ophir and Cheboo Forest, *Griffith.*

Stem stout. *Leaves* in Wallich's specimen broad, toothed, suddenly narrowed into a wing, in Griffith's narrow subentire and narrowed into a stout petiole. *Whorls* in Wallich's glabrate, in Griffith's pubescent or villous. *Corolla* $\frac{3}{4}$ in., lemon-coloured, tube very slender, limb subglobose.

10. **G. Thomsoni**, *Benth. in Herb. Ind. Or. Hook. f. & T.*; stem woody, and leaves beneath pubescent or tomentose, leaves long-petioled 6-12 by 2 $\frac{1}{2}$ -8 in. membranous oblong or orbicular ovate acute crenulate pubescent above, whorls in dense crowded masses in the lower axils and on the stem below then sessile very many-fld., bracts as long as the calyx linear and lanceolate, calyx $\frac{1}{2}$ in., tube narrow, teeth subulate as long as the tube, corolla slender, limb small glabrous.

KHASIA MTS.; Churra, alt. 3-5000 ft., *J. D. H. & T. T.*

Stem as thick as the little finger, hoary; wood hard. *Leaves* the largest of the genus, very variable in breadth. *Whorls* in globose or irregular clusters 1 in. long and broad, suberinite from the slender tips of the bracts and the calyx-teeth. *Calyx* small in flower, tube in fruit oblong. *Corolla* glabrous, pale yellow, tube extremely slender, throat hardly inflated; upper lip narrow, lower small. *Nutlets* $\frac{1}{2}$ in., oblong, rugose.

11. **G. eriocarpum**, *Benth. in Wall. Pl. As. Rar.* ii. 12, *Lab.* 649, and in *DC. Prodr.* xii. 552; stem rather slender tomentose, leaves 3-5 in. shortly petioled elliptic-oblong or lanceolate acute toothed glabrous above softly tomentose beneath, nerves reticulate, whorls small sessile few-fld., bracts broad and narrow, calyx $\frac{1}{2}$ in., teeth filiform as long as the tube, corolla slender, limb small puberulous, nutlets globose tomentose. *Wall. Cat.* 2710. *G. oblongum*, *Wight Ic.* t. 1457.

SOUTHERN DECCAN; Courtallum, *Wight, &c.*; Anamallays and Tinnevely Hills, *Beddome.*

Stem 2-3 ft., leafy. *Leaves* narrowed into the petiole of 1-2 in. *Whorls* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., suberinite. *Calyx-tube* cupular in fruit, with one globose nutlet $\frac{1}{8}$ in. diam. clothed with grey pubescence.

†† *Stem* very short, or slender prostrate, rooting at the base and ascending above.

12. **G. melissæfolium**, *Wall. Cat.* 2157; puberulous or glabrate, stem slender prostrate, leaves petioled 2-3 $\frac{1}{2}$ in. elliptic acute faintly toothed, whorls 2-5 fld., calyx $\frac{1}{4}$ in. puberulous, teeth lanceolate, corolla very large. *Benth. in Wall. Pl. As. Rar.* ii. 12, *Lab.* 649, and in *DC. Prodr.* xii. 552. *Prasium melissifolium*, *Roxb. Fl. Ind.* iii. 26.

SIKKIM HIMALAYA, alt. 2000 ft.; *J. D. H.* ASSAM, SILHET and CACHAR, *Wallich, &c.*

Stem 2-3 ft., flexuous, rooting for half its length. *Leaves* membranous, sometimes sparsely hairy above, nerves beneath puberulous, base acute; petiole $\frac{1}{2}$ -1 in. *Bracts* ovate or lanceolate. *Corolla* $1\frac{1}{2}$ in. long, pubescent; throat inflated, $\frac{1}{2}$ in. diam. *Nutlets* scarlet.

13. **G. velutinum**, *Benth. in Wall. Pl. As. Rar.* ii. 13, *Lab.* 649, and in *DC. Prodr.* xii. 552; densely velvety-tomentose, stem prostrate rooting below, leaves $1\frac{1}{2}$ -2 in. thick the petioled elliptic subacute crenate, whorls few-fld., bracts equalling the calyx slender, calyx $\frac{1}{2}$ in. villous, teeth lanceolate. *Wall. Cat.* 2709.

ASSAM, SILHET and KHASIA MTS., ascending to 4000 ft.; *Wallich*, &c.

Stem flexuous or tortuous. *Leaves* the smallest of the Indian species, equally velvety on both surfaces; base cuneate; petiole $\frac{1}{2}$ -1 in. *Corolla* 1 in., tube rather short; throat long, moderately inflated.

14. **G. ovatum**, *Wall. Cat.* 2155; stem short suberect, petioles whorls and leaves beneath softly tomentose, leaves 4-6 in. long-petioled broadly elliptic obtuse crenate puberulous above, whorls few-fld., bracts longer than the calyx ovate leafy, calyx $\frac{1}{2}$ in., teeth narrowly lanceolate, corolla $1\frac{1}{2}$ in., tube and throat long.

TROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 3-4000 ft., *J. D. H.*

Stem ascending or suberect, not creeping, 10-12 in. *Leaves* membranous, base cuneate; petiole 1-3 in. *Bracts* as in *G. strobilinum*. *Corolla* pale yellow, pubescent, tube gradually dilating into the funnel-shaped throat.

15. **G. Mastersii**, *Benth. in Herb. Ind. Or. H. f. & T.*; stem short ascending and leaves beneath and whorls pubescent or tomentose, leaves petioled 4-8 in. broadly (rarely narrowly) elliptic ovate obtuse toothed or crenate pubescent or setose or subsilky above, whorls few-fld., bracts equaling the calyx lanceolate with filiform points, outer sometimes ovate, calyx $\frac{1}{2}$ - $\frac{3}{4}$ in., teeth lanceolate, points very slender, corolla 2 in., tube long. *G. melissæfolium*, *Wall. Cat.* 2157, *in part.*

SIKKIM HIMALAYA, alt. 3000 ft.; *J. D. H.* ASSAM, KHASIA MTS., ascending to 4000 ft., SILHET and CACHAR; *Wallich*, &c.

A very variable plant, possibly not distinct from *G. ovatum*. *Root-tubers* fusiform, $\frac{1}{2}$ -1 in. long. *Leaves* in some specimens with long spreading hairs on the upper surface, in others with deep irregular crenatures, in others with a rounded or even cordate base; petiole 1-2 $\frac{1}{2}$ in. *Whorls* occasionally shortly peduncled (as in *G. pedunculatum*). *Corolla* pubescent, ochreous, yellow, tube gradually dilating into the throat.

52. **LEUCOSCEPTRUM**, *Smith.*

A tomentose or villous shrub or small tree. *Leaves* large. *Whorls* in dense cylindric terminal spikes, bracts large, transversely-oblong caducous. *Calyx* campanulate decurved, teeth rounded. *Corolla* minute, 5-lobed; lobes rounded, upper largest. *Stamens* very far exserted, filaments very long, straight in flower, diverging, pubescent below; anthers reniform, 1-celled, very short. *Style-arms* minute, subulate. *Nutlets* elongate-cuneate, triquetrous.

L. canum, *Sm. Exot. Bot.* ii. 113, t. 116; *Benth. in Wall. Pl. As. Rar.* i. 58; *Wall. Cat.* 2023. *Teucrium macrostachyum*, *Wall. in Benth. Lab.* 664; *Benth. in DC. Prodr.* xii. 574; *Gamble Ind. Timbers*, 302, and *List of Trees, &c., of Darjeeling*, 62. *Clerodendron Leucosceptrum*, *Don Prodr.* 103. *Buddleia*, *Griff. Notul.* iv. 125; *Itin. Notes*, 107 (n. 94 a),

and *Ic. Pl. Asiat.* t. 422. *Colquhounia* sp., *Clarke in Journ. Linn. Soc. Bot.* xv. 145.

TEMPERATE HIMALAYA; from Kumaon to Bhotan, alt. 2-8000 ft. KHASIA MTS., alt. 4-5000 ft.

Tree, 30 ft., trunk short. *Branches* nearly terete, very stout, and as well as the leaves beneath petioles and spikes densely or laxly tomentose or woolly, rarely glabrate. *Leaves* 6-12 by $2\frac{1}{2}$ - $4\frac{1}{2}$ in., elliptic-lanceolate, acuminate, entire or crenate, glabrous above, beneath with silvery-white or buff or brown tomentum most variable in thickness, rarely green and glabrate; petiole $1-1\frac{1}{2}$ in. *Spikes* 4-6 in., $\frac{3}{4}$ in. diam. (without the stamens); bracts $\frac{1}{2}$ in. broad, subreniform, hoary or tomentose, imbricating and covering the buds when very young, early caducous. *Calyx* $\frac{1}{2}$ in., hoary, sessile or pedicelled. *Corolla* white or pinkish, hoary without. *Stamens* $\frac{1}{2}$ - $\frac{3}{4}$ in., filaments diverging, at length deflexed, stout, yellow; anthers minute.—This seems to me as distinct a genus as any in the Order; the stamens are very characteristic, spreading as in *Satureineæ*, with the anther-cells parallel, not divergent, and the filaments involute in bud.

53. **TEUCRIUM**, Linn.

Herbs or shrubs. *Whorls* in 2-6-fld. axillary or terminal spikes racemes or heads. *Calyx* 10-nerved, teeth 5, equal or the upper larger. *Corolla-tube* not annulate, limb 1-lipped, the 2 upper and lateral lobes cuneate and very short or obsolete, lower lobe very large. *Stamens* 4, exserted; anther reniform, cells short, at length confluent. *Disk* symmetrical. *Style-lobes* subequal. *Nutlets* minute, reticulate, smooth or rugulose; hilum large, oblique or lateral.—Species about 100, chiefly temperate and S. European.

Sect. 1. **Scorodonia**. *Whorls* 2-fld., secund, in terminal racemes. *Calyx* campanulate, declinate, upper tooth largest.

1. **T. tomentosum**, Heyne in *Wall. Cat.* 2025; pubescent tomentose or woolly, leaves ovate serrate toothed or crenate, base cuneate, racemes paniced, calyx $\frac{1}{4}$ in. villous, lower teeth triangular acuminate. *Benth. in Wall. Pl. As. Rar.* i. 58, *Lab.* 674, and in *DC. Prodr.* xii. 582; *Thwaites Enum.* 241. *T. paniculatum*, *Herb. Madr. in Wall. Cat. sub.* 2025.

DECCAN PENINSULA; on the Ghats from the Concan southward, Heyne, &c. CEYLON, alt. 5-7000 ft.; Walker, &c.

An erect copiously flowering herb, 2-3 ft. high. *Leaves* 2-3 in., base rarely rounded or cordate; petiole $\frac{1}{2}$ - $1\frac{1}{2}$ in., slender. *Bracts* lanceolate, usually longer than the pedicels. *Corolla-tube* included, limb small. *Nutlets* minute, globose, granulate.

2. **T. stoloniferum**, Roxb. *Hort. Beng.* 44, and *Fl. Ind.* iii. 3; stoloniferous, glabrous or puberulous, leaves ovate or oblong-ovate subacute deeply crenate or obtusely serrate, base truncate or cuneate, racemes simple or paniced, calyx $\frac{1}{2}$ in. glandular-pubescent, lower teeth short obtuse. *Benth. in Wall. Pl. As. Rar.* i. 58, *Lab.* 674, and in *DC. Prodr.* xii. 583; *Maxim. in Bull. Acad. Petersb., Mel. Biol.* ix. 825. *T. elevatum*, *Benth. in Wall. Cat.* 2026. *T. viscidum*, *Blume Bijdr.* 827.

SIKKIM HIMALAYA, alt. 1-5000 ft.; J. D. H. BENGAL PLAINS, KHASIA MTS., ascending to 4000 ft., and CHITTAGONG.—DISTRIB. Ava, Java, China.

An erect herb, 1-2 ft., stem sometimes woody below. *Leaves* 1-3 in., base rarely cordate. *Racemes* slender; bracts lanceolate, fruiting pedicels usually longer than the shortly campanulate calyx. *Corolla* pink, tube included, limb very small. *Nutlets* enclosed in the globose calyx-tube, nearly smooth.

3. **T. Royleanum**, Wall. *Cat.* 2027; stoloniferous, pubescent, tomen-

tose or villous, leaves petioled ovate or oblong-ovate cordate acute serrate, racemes short, calyx $\frac{1}{2}$ in. villous, upper tooth rounded acute, 2 lower lanceolate acuminate, lateral shorter, corolla-lobe exserted. *Benth. in Wall. Pl. As. Rar.* i. 58, *Lab.* 675, and in *DC. Prodr.* xii. 583.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 3-5000 ft., *Royle, &c.*—
DISTRIB. Afghanistan.

Stem prostrate and rooting below, then erect, 12-18 in., rather slender. *Leaves* $1\frac{1}{2}$ -3 in.; petiole $\frac{1}{2}$ -1 in., slender. *Racemes* subsimple, 1-3 in., rarely more; bracts lanceolate, longer than the pedicels. *Calyx* campanulate, upper and 2 lower teeth usually incurved. *Corolla* $\frac{1}{2}$ - $\frac{1}{2}$ in., tube sometimes twice the length of the calyx. *Nutlets* enclosed in the globose calyx-teeth, subrugose.

4. **T. laxum**, *Don Prodr.* 109; stem slender diffusely branched laxly villous or glabrate, leaves petioled ovate acuminate serrate, racemes short often recurved, calyx $\frac{1}{4}$ in. pubescent, upper lip rounded acute, 2 lower lanceolate acute, corolla-tube included. *Benth. Lab.* 675, and in *DC. Prodr.* xii. 583. *Ajuga laxa*, *Ham. mss.*

CENTRAL HIMALAYA; Nepal, *Hamilton*; Kumaon, *Edgeworth*, alt. 8000 ft.; Ramgunga River, alt. 4500 ft., *Strachey & Winterbottom* (*Hedeoma* n. 2).

Stems or branches 10-12 in., rather slender, villous with long sparse spreading hairs in *Edgeworth's* specimen, glabrous in *Strachey's*. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., base rounded, petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Racemes* 1-2 in.; bracts ovate-lanceolate, shorter than the calyx. *Corolla* not twice the length of the calyx.—*Don's* character hardly agrees with the specimens above described in the ventricose calyx.

5. **T. quadrifarium**, *Ham. in Don Prodr.* 108; stout, erect, tomentose or villous, rarely glabrate, leaves sessile or short-petioled ovate or oblong-ovate cordate acute serrate racemes paniced, bracts ovate acute much exceeding the flowers, calyx $\frac{1}{2}$ in., upper lip rounded, 2 lower acute or obtuse, corolla-tube included. *Wall. Cat.* 2024; *Benth. in Wall. Pl. As. Rar.* i. 58, *Lab.* 675, and in *DC. Prodr.* xii. 583; *Maxim. in Bull. Acad. Petersb., Mel. Biol.* ix. 827. *T. Fortunei*, *Benth. in DC. l. c.* (excl. *Perrottet's* plant).

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 4-8000 ft. KHASIA MTS., alt. 4-5500 ft.—DISTRIB. Ava, China.

A stout herb, stem 2-4 ft., almost terete below, sometimes villous with long spreading hairs. *Leaves* 2-3 in., often rugose; petiole usually $\frac{1}{2}$ in., rarely 1 in. *Spikes* 2-6 in., stout, with the bracts on $\frac{3}{4}$ in. diam.; bracts $\frac{1}{2}$ in., broadly ovate, suddenly acuminate, villous near the base, young quadrifarious imbricating and concealing the flowers, often red-purple; flowers sessile or very shortly pedicelled. *Corolla* purple, not twice the length of the calyx. *Style* entire. *Nutlets* subglobose, rugose.

6. **T. Wightii**, *Hook. f.*; very robust, densely villous, leaves short-petioled very thick rugose rounded ovate obtuse toothed, racemes paniced, bracts shorter than the calyx elliptic acute, calyx $\frac{1}{2}$ in. villous, upper tooth rounded apiculate, 2 lower lanceolate, corolla-tube included. *T. quadrifarium*, *Herb. Wight* (*Kew Distrib.* 2168). *T. tomentosum*, *Wight l. c.* t. 1458. *T. n. sp.*, *Benth. Pl. Hohenack.* n. 1396.

NILGHIRI HILLS; in dry rocky places, alt. 7000 ft., *Wight, &c.*

Stem 1-2 ft., obtusely angled; hairs tawny, most dense, spreading. *Leaves* 1-1 $\frac{1}{2}$ in.; petiole stout, $\frac{1}{4}$ in. *Racemes* 3-4 in. *Corolla* purple, $\frac{1}{2}$ in. long. *Style* entire or 2-toothed. *Nutlets* subglobose, glistening, faintly reticulate.—*Wight* represents the leaves acute, which is the case in *T. tomentosum*, but never in this.

7. **T. palmatum**, *Benth. in Herb. Ind. Or. H. f. & T.*; nearly glabrous, slender, stoloniferous, leaves long-petioled 3-foliolate leaflets rhomboid-ovate acuminate coarsely serrate, racemes short puberulous few-fl., calyx $\frac{1}{2}$ in., upper lip of 3 triangular acuminate teeth, corolla-tube included, upper lip oblong.

SIKKIM HIMALAYA; Lachen, alt. 9-10,000 ft., *J. D. H.*

Stem 1-2 ft., weak, erect, puberulous above. *Leaves* membranous, leaflets 2-3 by 1-1 $\frac{1}{4}$ in., base cuneate; petiole 1 $\frac{1}{2}$ -3 in. *Racemes* 1-2 in.; bracts subulate, equalling or shorter than the pedicel. *Corolla* $\frac{1}{2}$ in., upper lip half as long as the lower, concave, obtusely 2-fid, lateral lobes of lower broad, midlobe longest retuse. *Fruiting calyx* membranous reticulate, lips broad gaping. *Nutlets* $\frac{1}{2}$ in. diam., globose, faintly reticulate.

Sect. 2. **Scordium**. *Whorls* 2-6-fl., axillary.

8. **T. Scordium**, *Linn.*; perennial, tomentose or glabrate, leafy, leaves small sessile oblong obtuse coarsely toothed. *Benth. in DC. Prodr.* xii. 586; *Boiss. Fl. Orient.* iv. 812; *Reichb. Ic. Fl. Germ.* t. 1239.

WESTERN HIMALAYA; Kashmir, *Jacquemont*.—DISTRIB. Afghanistan, N. & W. Asia, Europe, N. Africa.

Stoloniferous, foetid and glandular. *Leaves* uniform, $\frac{1}{2}$ -1 $\frac{1}{2}$ in., base cuneate. *Flowers* pedicelled. *Calyx* $\frac{1}{2}$ in., shortly campanulate, base gibbous, teeth triangular subequal. *Corolla* $\frac{1}{2}$ in., rose-purple. *Nutlets* oblong, rugose.

54. **AJUGA**, *Linn.*

Annual or perennial herbs. *Whorls* 2- or more-fl., axillary or in terminal leafy spikes. *Calyx* 10- or more-nerved; teeth 5, subequal. *Corolla-tube* often annulate within, upper lip very short, 2-fid; lower spreading, midlobe usually the largest notched or 2-fid. *Stamens* 4, ascending, exserted or included; anther-cells diverging, distinct or at length confluent. *Disk* symmetric or produced behind. *Ovary* shortly 4-lobed; style-lobes subequal. *Nutlets* obovoid, rugose, hilum lateral.—Species 30, of the temperate Old World.

* *Corolla-tube* straight, base not inflated. *Stamens* exserted.

1. **A. lobata**, *Don Prodr.* 108; softly hairy or glabrate, stems very long and slender prostrate or creeping, leaves long-petioled orbicular or broadly oblong cordate sinuate-lobed, whorls axillary or in short erect axillary spikes. *Wall. Cat.* 2034; *Benth. in Wall. Pl. As. Rar.* i. 58, *Lab.* 692, and in *DC. Prodr.* xii. 595.

CENTRAL and EASTERN HIMALAYA, alt. 8-10,000 ft.; from Nepal, *Wallich*, to Bhotan, *Griffith*. KHASIA MTS., alt. 5-6000 ft.; *J. D. H. & T. T.*, &c.

Stems 1-2 ft., flexuous. *Leaves* distant, 1-2 in. long and broad; petiole as long or longer. *Spike* 1-3 in.; bracts ovate-oblong, toothed; lower whorls distant, 2-fid., upper 6-fl. *Calyx* $\frac{1}{2}$ in.; teeth long, lanceolate. *Corolla* lilac; tube thrice as long as the calyx, slender, laxly pubescent; upper lip very short; lower very large, side lobes linear-oblong, midlobe broadly dilated retuse.

2. **A. bracteosa**, *Wall. Cat.* 2032; softly pubescent villous or glabrate, rarely substrigose or hispid, stolons 0, stems or branches erect or ascending, leaves oblanceolate or subspathulate obtuse sinuate-toothed, whorls axillary or crowded in spikes much shorter than the leafy ovate or cuneate-obovate entire or toothed bracts, calyx-teeth ovate-lanceolate, corolla-tube exserted,

stamens exserted. *Benth. in Wall. Pl. As. Rar.* i. 59, *Lab.* 696, and in *DC. Prodr.* xii. 598; *Maximov. in Bull. Acad. Sc. Petersb., Mel. Biol.* xi. 818. *A. remota*, *Benth. l. c.*; *Maximov. l. c.* 817.

WESTERN HIMALAYA, from Kashmir to Nepal, alt. 1-7000 ft., and in the plains near them from Oudh to Peshawur.—DISTRIB. Afghanistan, China, Japan, Abyssinia.

Stem or branches many from the rootstock, 4-12 in., simple or divided, usually stout, leafy, pubescence most variable. *Leaves* 1-4 in., lower petioled, upper sessile. *Calyx* $\frac{1}{8}$ in., villous; teeth half the length of the tube, ovate-lanceolate, acute. *Corolla* pale blue or lilac, pubescent; tube rarely twice as long as the calyx; upper lip erect, 2-fid; side lobes of lower oblong, midlobe dilated variable in length. *Nutlets* $\frac{1}{10}$ in., ellipsoid, deeply rugosely pitted.—I am quite unable to distinguish Bentham's *A. remota*, which was probably intended to include the form with distant whorls and large floral leaves. Nor can I distinguish a common Japanese plant from *A. bracteosa*.

VAR. densiflora; stem scapiform, radical leaves obovate-oblong obtuse subentire, cauline 0 or oblong sessile, spike 2-3 in. villous, bracts shorter than the flowers, corolla very shortly exserted. *A. densiflora*, *Wall. Cat.* 2031; *Benth. l. c.*—Nepal, *Wallich*.—This looks like a starved *A. bracteosa*, which the form of the calyx, corolla and nutlets entirely resemble.

**** Corolla-tube straight. Stamens included in the tube.**

3. *A. parviflora*, *Benth. in Wall. Pl. As. Rar.* i. 59, *Lab.* 696, and in *DC. Prodr.* xii. 598; softly villous, stems or branches short diffuse ascending, stolons 0, radical leaves sessile or shortly petioled oblanceolate or obovate-spathulate obtuse entire or crenate, whorls in bracteate spikes, calyx-teeth lanceolate, corolla very small, tube exserted. *Maxim. in Bull. Acad. Sc. Petersb., Mel. Biol.* xi. 825; *Wawra Itin. Pr. S. Cob., Bot.* 105. *Teucrium hispidum*, *Wall. Cat.* 2029 (corrected p. 89).

WESTERN HIMALAYA, from Kashmir to Kumaon, alt. 2-7000 ft.—DISTRIB. Afghanistan.

Branches very numerous from the woody rootstock, stout or slender, leafy. *Radical leaves* 2-3 (rarely 5 by 2) in.; cauline smaller, obovate or oblong. *Spike* 1-4 in., whorls generally crowded, lower sometimes distant; bracts ovate or oblong, much longer than the flowers. *Calyx* $\frac{1}{10}$ - $\frac{1}{8}$ in., teeth as long as the tube. *Corolla* blue, tube slender, $\frac{1}{8}$ - $\frac{1}{6}$ in. long, glabrous or hairy; limb very small, upper lip very short 2-lobed, lateral lobes of lower subequal or the midlobe the largest. *Nutlets* $\frac{1}{8}$ in., rugosely pitted.—Very variable in habit and size of leaves.

VAR. depressa; densely villous, branches depressed. *A. depressa*, *Maxim. l. c.* 826.—This is a stunted alpine state from an elevation of 8000 ft. in Kumaon. (*Strachey & Winterbottom*, *Ajuga*, n. 5.)

4. *A. brachystemon*, *Maximov. in Bull. Acad. Imp. Sc. Petersb.* xi. 825; dwarf, villous, stem very short ascending leafy, radical leaves petioled obovate obtuse crenate, cauline sessile, whorls in very short subsessile leafy spikes, shorter than the ovate bracts, calyx-teeth very short rounded, corolla-tube shortly exserted.

WESTERN HIMALAYA; Kumaon, Pindari, alt. 12,500 ft., *Strachey & Winterbottom* (*Ajuga*, n. 4).

Stem 1-2 in. from a small woody rootstock. *Leaves* 1-1 $\frac{1}{2}$ in., radical shortly petioled, crenulate, cauline shorter. *Spike* $\frac{1}{2}$ in. *Calyx* obconic, $\frac{1}{10}$ in. long, teeth ciliate. *Corolla* $\frac{1}{4}$ in., tube straight, upper lip short, 2-lobed; side-lobes of lower linear-oblong, obtuse; midlobe twice as broad, dilated, retuse. *Stamens* wholly included.—This looks like a starved state of something, but I cannot refer it to any described species; the calyx resembles *A. macrosperma* in miniature, but the corolla-tube is straight with included stamens.

*** *Corolla inflated at the base, geniculate above the swelling. Stamens exerted.*

5. **A. macrosperma**, Wall. Cat. 2030; glabrous pubescent or villous, stem or branches decumbent or ascending often stout and tall, leaves petioled ovate-oblong or obovate obtuse sinuate-crenate, whorls villous continuous or interrupted longer than the ovate bracts, calyx-teeth very short obtuse. *Benth. in Wall. Pl. As. Rar.* i. 58, *Lab.* 697, and in *DC. Prodr.* xii. 599; *Maxim. in Bull. Acad. Imp. Sc. Petersb., Mel. Biol.* xi. 823. *A. repens*, *Roxb. Fl. Ind.* iii. 3. *A. geniculata*, *Maxim. l. c.* 821.

TROPICAL and TEMPERATE HIMALAYA, from Kumaon to Bhotan, alt. 1-8000 ft. KHASIA MTS., alt. 1-5000 ft. CHITTAGONG, PEGU.—DISTRIB. Ava.

Very variable; stems or branches 6 in. to 3 ft.; sometimes as thick as a swan's quill, spreading and branching, sometimes rooting, and glabrous or densely pubescent or villous. *Leaves* 1-6 in. long, very variable in breadth, narrowed into the often very long petiole, rarely lobed or cut. *Spikes* 1-8 in., whorls continuous or interrupted, lower bracts leaf-like. *Calyx* short, teeth always obtuse. *Corolla* azure, tube twice as long as the calyx, usually glabrous, limb small; upper lip erect, 2-lobed; lobes of lower subequal or midlobe broadest. *Nutlets* $\frac{1}{12}$ - $\frac{1}{20}$ in. long, deeply rugosely pitted.—A very common species in the hilly countries of N. India, being the largest of the genus; in the low grounds forming a bushy herb sometimes 3 feet high, with widely spreading decumbent branches and abundant spikes of blue flowers. In the higher elevations it assumes a lower and more slender form with smaller leaves (*A. sikkimensis*, Miq.), with the corolla laxly hairy and its tube scarcely exerted. This form has sometimes stems only a few inches high and irregularly toothed leaves. Whether *A. macrosperma*, and any of its states, be the *A. decumbens*, Thunb., of Japan, as would follow from Don's and Bentham's references, is unknown to me, as I have seen no Japanese Ajuga with a geniculate corolla-tube. According to Maximovicz's description of *A. decumbens*, it must differ in the deeper sharper calyx-lobes, the more prominent midlobe of the corolla, and in the minutely reticulate nutlets.

VAR. *Thomsoni*; glabrous, stems slender flaccid rooting prostrate, spikes with a very slender rachis, calyx-teeth very short rounded, corolla glabrous, tube exerted. *A. Thomsoni*, *Maxim. l. c.* 821.—Sikkim, alt. 6-9000 ft., *J. D. H. & T. T.*—This is certainly only an upland state of *A. macrosperma*. However unlike the extreme low-land form, it is united by intermediates collected near to it at lower elevations.

VAR. *breviflora*; smaller, branches more slender than the type 4 in.-2 ft., corolla-tube shorter sometimes quite included often hairy. *A. decumbens*, *Don Prodr.* 108; *Benth. in DC. l. c.* 598 (? of Thunberg). *A. sikkimensis*, *Miq. Prolus. Fl. Jap.* 46; *Maxim. l. c.* 822.—Higher parts of the Khasia Mts., ascending to 10,000 ft. in Sikkim. Behar; top of Parusnath, *J. D. H.*—Perhaps all the Himalayan forms of *A. macrosperma* should be referred to this, but I can find no definite characters for them.

UNKNOWN SPECIES.

A. ? OVATA, Wall. Cat. 2036, from Ava, is indeterminable, having no flower or fruit.

55. CYMARIA, Benth.

Shrubs. *Flowers* small, in lax many-fl. axillary peduncled cymes, ebracteate or crowded in a terminal thyrses. *Calyx* erect, 10-nerved, 5-toothed, fruiting-tube globose, throat naked. *Corolla-tube* straight; lips subequal, upper arched, erect; lower spreading, 3-fl. midlobe largest. *Stamens* 4, ascending; anthers conniving, cells divaricate. *Disk* symmetric. *Ovary* shortly 4-lobed; upper style-lobe very short. *Nutlets* subglobose or obovoid, rugosely pitted; hilum lateral.—Species 3, Burman and Malayan.

1. **C. dichotoma**, *Benth. in Wall. Pl. As. Rar. i. 64, Lab. 705*, and in *DC. Prodr. xii. 603*; branches petioles cymes and leaves beneath finely pubescent, leaves ovate or rhomboid subacute faintly crenate, cymes axillary long-peduncled lax-fl'd. *Wall. Cat. 2080*.

BURMA; at Taong-dong, *Wallich*.

Stem terete, woody; branches strict, slender, obtusely 4-angled. *Leaves* 3-4 by $1\frac{1}{2}$ -2 in., membranous, base cuneate; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Peduncle* $\frac{1}{2}$ -2 in., slender. *Calyx* $\frac{1}{8}$ in., teeth triangular acute, as long as the tube. *Corolla* minute, tube hardly exserted. *Stamens* included. *Nutlets* $\frac{3}{16}$ in.

2. **C. elongata**, *Benth. in Wall. Pl. As. Rar. i. 64, Lab. 705*, and in *DC. Prodr. xii. 603*; branches petioles leaves beneath and cymes densely tomentose, leaves sessile ovate obtuse subcrenate, cymes short-peduncled dense-fl'd. in a long terminal leafy raceme. *Wall. Cat. 2079*.

BURMA; at Taong-dong, *Wallich*.

Branches long, robust. *Leaves* $1\frac{1}{2}$ -3 in., thick, finely tomentose above. *Peduncle* $\frac{1}{4}$ - $\frac{1}{2}$ in., and pedicels stout. *Calyx* $\frac{1}{8}$ in., as in *C. dichotoma*, but tomentose. *Nutlets* $\frac{1}{4}$ in., obovoid.

ORDER CXIII. PLANTAGINÆ.

Scapigerous herbs. *Leaves* usually radical. *Scapes* axillary. *Flowers* small, greenish, spicate, often dimorphic. *Sepals* 4, imbricate in bud, persistent. *Corolla* hypogynous, salver-shaped, scarious; lobes 4, imbricate in bud. *Stamens* 4, inserted on the corolla-tube; filaments capillary, inflexed in bud, persistent; anthers large, pendulous, versatile. *Ovary* free, 2-4-celled; style filiform with 2 lines of stigmatic hairs; ovules 1 basal in each cell, or several peltately attached to the septum. *Capsule* 1-4-celled, circumsciss, membranous, 1- or more-seeded, septum free. *Seed* usually peltate, testa thin, mucilaginous, albumen fleshy; embryo cylindric, transverse, radicle inferior.—Genera 3, species about 50.—The above character does not include the anomalous monotypic genera *Littorella* and *Bougueria*.

Plantago, *Linn.*

Characters of the Order.

Sect. 1. **Euplantago**, *Boiss.* Leaves all radical.

* *Corolla* glabrous. *Capsule* 2-celled, cells 4-8-seeded. *Seeds* angular.

1. **P. major**, *Linn.*; perennial, leaves petioled oblong or oblong-ovate subentire or toothed 3-7-ribbed, scape short, spike very long and slender. *Boiss. Fl. Orient. iv. 878*; *Dcne. in DC. Prodr. xii. 1, 696*; *Theaites Enum. 245*. *P. erosa*, *Wall. in Roxb. Fl. Ind., Ed. Carey & Wall. i. 423*, and *Cat. 6412*; *Don Prodr. 77*; *Dcne. l. c.* *P. asiatica*, *Linn. Sp. Pl. 163*, *Dcne. l. c. 695*; *Wight Ill. t. 177*. *P. longiscapa*, *Jacquem. mss.*

TEMPERATE and ALPINE HIMALAYA; from Peshawur and Kashmir to Bhotan, alt. 2-8000 ft., and WESTERN TIBET, alt. 10-12,000 ft. ASSAM, *Griffith*. KHASIA Mts., alt 4-5000 ft. BURMA and MALACCA, *Griffith*. SINGAPORE or PENANG, *Walker*. BOMBAY, *Stocks*. NILGHIRI HILLS, *Foulkes*, &c. CEYLON; higher parts of the island, *Walker*, &c.—DISTRIB. Malay Islands; Afghanistan and westwards to the Atlantic; wild or introduced, in these and many other countries.

Glabrous or hairy; rootstock stout, truncate. *Leaves* 2-5 in., variable in breadth, toothed irregular; petiole sometimes 4 in. *Spike* 3-6 in.; flowers scattered or crowded; bracts equalling the calyx. *Sepals* glabrous, $\frac{1}{2}$ in. long, margins broadly scarious, obtusely keeled. *Filaments* short. *Seeds* very minute, black.

** *Corolla* glabrous. *Capsule* 2-celled, cells 1-2-seeded.

2. ***P. lanceolata***, Linn.; perennial, leaves shortly petioled lanceolate entire or toothed 3-5-ribbed, axils woolly, scape long deeply furrowed, spike very short. *Boiss. Fl. Orient.* iv. 881; *Don Prodr.* 77; *Thwaites Enum.* 245; *Dcne. in DC. Prodr.* xiii. 1, 714. *P. attenuata*, Wall. in *Roxb. Fl. Ind.*, Ed. Carey & Wall. i. 422, and *Cat.* 6413.

WESTERN HIMALAYA; from Kashmir to Simla, *Royle, Thomson, &c.* Salt range, *Aitchison*. Waziristan, alt. 5-8000 ft., *Stewart*. (NEPAL and CEYLON introduced.)—DISTRIB. Europe and N. Asia; introduced into many countries.

Very variable in size. *Rootstock* tapering. *Leaves* 1-12 in. *Scape* as long or longer. *Spike* $\frac{1}{2}$ -3 in., ovoid, subglobose or cylindric; bracts acuminate. *Sepals* usually ciliate. *Filaments* long. *Seeds* oblong, concavo-convex, black.

3. ***P. tibetica***, *Herb. Ind. Or. Hook. f. & T.*; perennial, glabrous or nearly so, leaves sessile or petioled elliptic or elliptic-lanceolate entire or toothed 5-ribbed, axils glabrous, scape grooved, spike slender.

WESTERN HIMALAYA; Kashmir, alt. 4-11,000 ft., *Stewart*. WESTERN TIBET; common, alt. 10-13,000 ft., *Thomson, Henderson*.

Rootstock short, stout. *Leaves* 2-4 in., variable in width, subacute. *Scapes* glabrous or puberulous. *Spikes* 1-6 in.; flowers very pale; bracts oblong, obtuse, equalling the calyx. *Sepals* broadly oblong, scarious, midrib green. *Corolla* very small, lobes acute. *Capsule* twice as long as the calyx, very pale.—Some specimens of apparently first year's plants from wet places have oblong membranous leaves 4 in. long or petioles as long, and very slender scapes and spikes.

4. ***P. brachyphylla***, *Edgew. mss.*; *Dcne. in DC. Prodr.* xiii. 1, 696; perennial, glabrous, leaves elliptic-ovate subsessile or petioled 3-5-ribbed, axils glabrous, scapes stout glabrous longer than the leaves and cylindric spikes. *P. gentianoides*, *Dcne. l. c.* 721 (the Himalayan plant).

WESTERN HIMALAYA; from Kumaon to Kashmir, alt. 9-13,000 ft., *Edgeworth, &c.* WESTERN TIBET, alt. 11-14,000 ft.; *Thomson*.—DISTRIB. Afghanistan.

Much resembling a small state of *P. major*, but the seeds are 1-2 in each cell, oblong and plano-convex.

5. ***P. Stocksii***, *Boiss. in DC. Prodr.* xiii. 1, 720, and *Fl. Orient.* iv. 882; annual or perennial, cobwebby or subsilky, leaves shortly petioled lanceolate long-acuminate entire 3-nerved, scape slender longer than the leaves, spike short and few-fl. or long with many distant flowers, corolla-lobes acute. *P. remotiflora*, *Stocks in Hook. Kew Journ. Bot.* iv. 179.

N.W. INDIA; Waziristan, alt. 3-5000 ft., *Stewart*.—DISTRIB. Afghanistan and Beluchistan, Persia.

Root fusiform. *Leaves* 2-4 in. *Spikes* sometimes 5 in. long, at others only $\frac{1}{2}$ in.; bracts rather shorter than the calyx, obtuse, hairy or glabrate, margin membranous, back green. *Sepals* subsimilar, ovate-oblong, obtuse. *Seeds* large, narrowly oblong, boat-shaped, black.—Waziristan is just beyond the British frontier, but as the species will probably occur on this side of it, I have thought it right to introduce the description.

6. ***P. amplexicaulis***, *Cav. Ic.* ii. 22, t. 125; annual or perennial, stemless or subcaulescent, sparsely hairy or glabrate, leaves long very narrowly lanceolate finely acuminate 5-nerved, base sheathing, scapes axillary terete equalling or exceeding the leaves, spikes ovoid, corolla-lobes ovate acute. *Boiss. Fl. Orient.* iv. 883; *Dcne. in DC. Prodr.* xiii. 1, 719. *P. Bauphula*, *Edgew. in Hook. Journ. Bot.* ii. 285 (1840); *Dcne. l. c.* *P. salina*, *Dcne. l. c.* 720. *P. lagopoides*, *Desf. Fl. Atlant.* i. 135, t. 39.

PANJAB PLAINS; from the Sutlej westwards, *Falconer, &c.* MALWA, *Edgeworth.* SCINDE; on the Boogta Hills, *Vicary.*—DISTRIB. Westwards to Greece and Egypt.

Stem 0, or branched from the base, and 2–4 in. high, bearing leaves and axillary scapes. *Leaves* 3–6 in., rarely 2 in. diam.; margin entire or very sparingly toothed. *Scapes* very numerous, stout, glabrous. *Spikes* $\frac{1}{2}$ –1 $\frac{1}{2}$ in.; flowers large; bracts cupular, glabrous, membranous except the green midrib. *Sepals* rounded, outer with a green keel, inner all membranous. *Seeds* $\frac{1}{8}$ in., boat-shaped, brown; septum $\frac{1}{4}$ in. long, oblong, thickened, black.

7. ***P. ovata*, Forsk. Fl. Æg. Arab.** 31; annual, stemless or subcaulescent, sparsely or thickly villous, leaves narrow-linear or filiform finely acuminate, scapes longer or shorter than the leaves, spikes ovoid or cylindric, corolla-lobes rounded concave obtuse. *Boiss. Fl. Orient.* iv. 885; *Dcne. in DC. Prodr.* xiii. 1, 706. *P. decumbens*, *Forsk. l. c.*; *Dcne. l. c.* *P. Ispaghul*, *Roxb. Fl. Ind.* i. 404, and *Ed. Carey & Wgll. l. c.* 421; *Fleming in As. Research.* xi. 174; *Royle Ill.* 312; *Dcne. l. c.* (*Ispaghula*); *Bentl. & Trim. Med. Bot.* t. 211. *P. argentea*, *Desf. Fl. Atlant.* ii. 136. *P. lanata*, *Wall. Cat.* 6414.

PANJAB PLAINS and low HILLS; from the Sutlej westwards. SCINDE, *Stocks.*—DISTRIB. Westwards to Spain and the Canaries.

Stem rarely branched, as in *P. amplexicaulis*. *Leaves* 3–9 in., rarely $\frac{1}{2}$ in. diam., usually 3-nerved, entire or distantly toothed. *Scapes* glabrous or pubescent. *Spikes* $\frac{1}{2}$ –1 $\frac{1}{2}$ in.; bracts with broad scarious margins, ovate-oblong, obtuse, glabrous. *Sepals* subsimilar, glabrous or pubescent. *Seeds* cymbiform.

*** *Corolla-lobes hirsute. Capsule 2-celled, cells 1-seeded.*

8. ***P. ciliata*, Desf. Fl. Atlant.** i. 137, t. 39; annual or perennial, stemless or subcaulescent, densely silky or woolly, leaves long- or short-petioled oblanceolate acuminate, scapes stout longer or shorter than the leaves, spikes oblong or cylindric, bracts sepals and acuminate corolla-lobes villous. *Dcne. in DC. Prodr.* xiii. 1, 708; *Boiss. Fl. Orient.* iv. 887. *P. eriantha*, *Dcne. l. c.* 707.

The PANJAB HILLS, west of the Jhelum; Salt range, *Fleming*; Peshawur, *Vicary, &c.*—DISTRIB. Westwards to Arabia and Egypt.

Usually a dwarf species, with broadly oblanceolate apiculate leaves 1–4 in. long, but sometimes caulescent with narrow leaves 6 in. long. *Scapes* numerous. *Spikes* stout, 1–2 in.; bracts ovate, obtuse, broadly membranous, back green. *Sepals* membranous. *Seeds* boat-shaped.

Sect. 2. ***Psyllium*.** *Stem* leafy. *Leaves* opposite.

9. ***P. Psyllium*, Linn.**; annual, erect, strict, glandular-pubescent, leaves linear or linear-lanceolate flat obtuse, peduncles in the upper axils, spikes ovoid, bracts acute, lower elongate. *Boiss. Fl. Orient.* iv. 891; *Dcne. in DC. Prodr.* xiii. 1, 734; *Sibth. Fl. Græc.* t. 149; *Reichb. Ic. Fl. Germ.* t. 84. *P. arenaria*, *Dcne. l. c.* 735 (the Indian plant).

NORTH-WESTERN PANJAB; Peshawur and South of Brumoo, *Stewart*; Tarki, N. of Indus, alt. 2800 ft., *Aitchison.*—DISTRIB. Westwards to Greece and Egypt.

Stem 4–8 in. *Leaves* 1–1 $\frac{1}{2}$ in., with fascicles in their axils, hence appearing whorled, margin entire with a very few glandular tubercles, bases ciliate. *Scapes* usually shorter than the leaves. *Spikes* $\frac{1}{2}$ – $\frac{3}{4}$ in.; lower bracts sometimes spreading, hispid. *Sepals* oblong, subacute. *Corolla* very small.

10. ***P. pumila*, Willd. Enum. Hort. Berol.** i. 162; stem ascending

flexuous glabrous or puberulous, leaves filiform, margins revolute, peduncles in the upper axils, spikes ovoid or subglobose puberulous, bracts all longer than the calyx, lower equalling the spike, corolla lobes finely acuminate. *Dcne. in DC. Prodr.* xiii. 1, 735; *Boiss. Fl. Orient.* iv. 891. *Plantago*, *Griff. It. Notes*, 214, n. 84, and *Notulæ*, iv. 213; and *Ic. Pl. Asiat.* t. 462.

NORTH-WEST INDIA; *Royle* (raised from seed bought in Bazaar).—DISTRIB. Afghanistan, Egypt.

This is, I think, a form of *P. Psyllium*, or of *P. stricta*, Schousb. *Royle's* only specimen is very small, 6 in. high and slender, but *Griffith's* from Afghanistan is a foot high with a very robust stem.—*Boissier* doubtfully refers *P. indica*, L., to this.

ORDER CXIV. NYCTAGINEÆ.

Herbs, shrubs or trees. *Leaves* usually opposite, quite entire, exstipulate. *Inflorescence* various, flowers often involucre. *Perianth* petaloid, monopetalous; tube persistent, enveloping the fruit; limb 3-5-lobed, plaited in bud: *Stamens* 8-20, hypogynous, sometimes unilateral, filaments usually unequal, inflexed in bud; anthers didymous. *Ovary* free, 1-celled; style involute in bud, stigma simple or multifid; ovule 1, erect. *Fruit* membranous, enclosed in the hardened perianth-tube. *Seed* erect, testa adherent, albumen floury or soft; embryo curved, coiled or with folded cotyledons, radicle inferior.—Genera 23, species 215, chiefly tropical American.

TRIBE I. **Mirabilieæ.** *Embryo* hooked, radicle long.

Flowers involucre 1. OXYBAPHUS.
Flowers not involucre 2. BOERHAAVIA.

TRIBE II. **Pisonieæ.** *Embryo* straight, radicle short.

3. PISONIA.

1. OXYBAPHUS, Vahl.

Herbs. *Leaves* opposite. *Involucre* 1-5-fld. *Perianth-tube* short, limb deciduous. *Stamens* 2-5, filaments connate below. *Fruit* small.—Species about 20, all but the following American.

O. himalaicus, *Edgew. in Trans. Linn. Soc.* xx. 87; glandular-pubescent, viscid, leaves petioled ovate or ovate-cordate, flowers solitary in each involucre. *Chois. in DC. Prodr.* xiii. 2, 430.

WESTERN HIMALAYA; from Kulu to Gurwhal, alt. 6-9000 ft., *Edgeworth, &c.*

Stem 2-4 ft., branched, terete, brittle. *Leaves* 2-3 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., acute, ciliolate; petiole $\frac{1}{2}$ -1 in. *Flowers* paniced, involucre $\frac{1}{4}$ in., campanulate, 5-toothed, viscid. *Perianth* included, rosy, contracted above the ovary, limb spreading. *Stamens* 4, included. *Fruit* $\frac{1}{2}$ in. long, ellipsoid or ovoid, rough, black.

2. BOERHAAVIA, Linn.

Herbs. *Leaves* opposite. *Flowers* minute or small, paniced umbelled or capitate, jointed on the pedicel; bracteoles small, rarely forming a minute involucre. *Perianth-tube* long or short; limb funnel-shaped, 5-lobed. *Stamens* 1-5, exserted. *Ovary* oblique, stipitate, stigma peltate. *Fruit* small, glandular. *Cotyledons* broad, thin, enclosing a soft scanty albumen.—Species 30, tropical and subtropical.

* *Flowers capitate.*

1. **B. repens**, *Linn.*; diffusely branched, leaves linear ovate oblong or rounded obtuse or acute, base rounded or cordate, heads small in terminal or axillary panicles, flowers minute capitate, fruit $\frac{1}{2}$ in. long shortly clavate 5-ribbed viscid all over, top rounded. *Boiss. Fl. Orient.* iv. 1045; *Dalz. & Gibs. Bomb. Fl.* 213.

Throughout INDIA; from the Panjab to Assam and south to Travancore and Singapore; ascends in the hot Himalayan valleys to 7000 ft. CEYLON.—DISTRIB. Tropical and subtropical Asia, Africa and America.

Root fusiform, very stout; rootstock woody; branches 6–24 in., glabrous or pubescent. *Leaves* $\frac{1}{2}$ –2 in., thick, usually white beneath; petiole as long as the blade or shorter. *Panicle* with very slender branches. *Perianth* red. *Stamens* 2–3.—I have refrained from quoting any but Indian authorities for this plant, the whole genus appearing to me to be in a state of utter confusion. *B. ascendens*, Willd.; *hirsuta*, Willd., and *viscosa*, Lag., are probably the same as this. I am further unable to draw any line between the following forms, two of which are characterized by Boissier.

B. repens proper; small, branches 6–10 in. not very stout appressedly pubescent, leaves small ovate or oblong often acute rarely cordate green above white beneath.—*B. repens*, *Delile Fl. Eg.* t. 3, f. 1.

VAR. *procumbens*; branches 2–3 ft. usually slender glabrous, leaves larger broader often rounded white beneath, inflorescence paniced. *B. procumbens*, *Herb. Banks in Roxb. Fl. Ind.* i. 146; *Wight Ic.* t. 874; *Grah. Cat. Bomb. Pl.* 167.

VAR. *diffusa*; more robust, branches long stout glabrous pubescent or viscons, leaves 1–2 in. ovate obtuse or acute usually cordate green beneath, inflorescence chiefly axillary. *B. diffusa*, *Linn. Sp. Pl.* 3; *Wall. Cat.* 6770; *Boiss. l. c.* 1045. *B. repanda*, *Wall. Cat.* 6769, in part.—*Rheede Hort. Mal.* vii. t. 56.

2. **B. crispa**, *Heyne in Wall. Cat.* 6771; stout, erect, scaberulously pubescent, stem subsimple, leaves shortly petioled oblong or ovate-oblong rounded at both ends coriaceous scabrid on both surfaces, nerves very numerous and strong beneath, flowers few capitate in a laxly branched panicle with capillary peduncles, fruit $\frac{1}{2}$ in. long clavate 5-ribbed glandular, top rounded. *B. rugosa*, *Rottler mss.*

DECCAN-PENINSULA; *Heyne*.

A robust species. *Leaves* 1–1 $\frac{1}{2}$ in., very thick and hard, margin crisped; petiole stout, $\frac{1}{2}$ – $\frac{1}{4}$ in. *Panicles* with decurved branches.—The specimens of this very distinct-looking plant are in fruit only.

** *Flowers umbelled or whorled.*

3. **B. repanda**, *Willd. Sp. Pl.* i. 22; subscaudent, branches long pale, leaves triangular-ovate or -cordate acute or acuminate repand-sinuate, umbels long-peduncled axillary and terminal few-fld., pedicels long slender, fruit $\frac{1}{2}$ in. long slender glandular. *Chois. in DC. Prodr.* xiii. 1, 455; *Wall. Cat.* 6769, excl. part of *B*; *Wight Ic.* t. 1766; *Dalz. & Gibs. Bomb. Fl.* 213. *B. umbellata*, *Wight mss.* *Valeriana chinensis*, *Burm. Fl. Ind.* 15, t. 6, f. 3.

UPPER GANGETIC PLAIN and ROHILKUND, *Wallich, Edgeworth, &c.* The CONCAN, *Stocks*. MYSORE, TRAVANCORE and the CAENATIC, *Wight, &c.* PEGU and BURMA, *Wallich*.—DISTRIB. Beluchistan.

Branches diffuse, subscaudent, glabrous or pubescent, 6 ft. long. *Leaves* 1–3 in., base usually truncate or cordate; petiole slender, $\frac{1}{2}$ –1 $\frac{1}{2}$ in. *Peduncles* 1–2 in., very slender, 2–6 fld.; pedicels $\frac{1}{4}$ –1 in., capillary. *Perianth* pink, tube $\frac{1}{2}$ in. long; limb $\frac{1}{2}$ in. diam. *Stamens* far exerted. *Fruit* slightly clavate, covered with large glands,

obscurely ribbed.—This closely resembles the American *B. scandens*, but the flower is much larger and the stamens are far exserted.

4. ***B. verticillata***, Poir. *Dict.* v. 56; branches long pale, leaves broadly ovate or rounded rarely oblong obtuse sinuate, umbels long-peduncled axillary and paniced few-fl. often superposed, pedicels long slender, fruit $\frac{1}{2}$ in. clavate with large semi-globose glands round the crown. *Chois. in DC. Prodr.* xiii. 1, 454; *Wall. Cat.* 6772; *Boiss. Fl. Orient.* iv. 1044. *B. stellata*, Wight *Ic. t.* 875; *Chois. l. c.*; *Dalz. & Gibs. Bomb. Fl.* 213. *B. scandens*, *Gibs. Cat. Bomb. Pl.* 167; *Wall. Cat.* 6773.

WESTERN PANJAB; Salt range, Mt. Tilla, *Aitchison*. The CONCAN, KATTYWAR and SCINDE, *Dalzell, Stocks, &c.* GOOJERAT, *Gibson*. MYSORE, at Hyderabad, *Heyne*. TRAVANCORE and the CARNATIC, *Wight*.—DISTRIB. Afghanistan, Beluchistan, and westward to Syria and Tropical Africa.

Habit, foliage and inflorescence much as in *B. repanda*, but leaves usually obtuse; flowers smaller, white or pink, and fruit very different.

5. ***B. fruticosa***, *Dalz. in Dalz. & Gibs. Bomb. Fl.* 213; "erect, shrubby, viscidly tomentose, leaves ovate or triangular acuminate much wrinkled beneath, base truncate, peduncles axillary, pedicels slender, flowers umbelled small pink, fruit linear-oblong sulcate pubescent, ribs tubercled."

The CONCAN; Ghats east of Bombay and Sewnere forts, *Dalzell*.

Stem 2 in. diam.; branches very stout. *Leaves* 1–2 in.; petiole short, stout. *Peduncles* as long as the leaves, stout; umbels sometimes superposed; pedicels stout, $\frac{1}{4}$ – $\frac{1}{2}$ in. *Perianth* $\frac{1}{2}$ in. diam. *Fruit* not seen.—Probably an African species. It resembles *B. grandiflora*, A. Rich, a good deal.

*** *Flowers in di-tri-chotomous cymes; pedicels very long, capillary.*

6. ***B. elegans***, *Chois. in DC. Prodr.* xiii. 2, 453; shrubby below, branches erect, leaves sessile linear oblong or oblong-lanceolate obtuse or apiculate fleshy pruinose, flowers in a very large excessively di-tri-chotomously branched panicle with very long capillary peduncles and pedicels, fruit $\frac{1}{2}$ in. long narrowly ellipsoid or clavate strongly ribbed perfectly smooth. *Boiss. Fl. Orient.* iv. 1045.

The PANJAB; at Sandal bar, *Edgeworth*. SCINDE, *Stocks*.—DISTRIB. Beluchistan, S. Arabia.

Stock woody, much divided; branches erect, 1–2 ft., glaucous below. *Leaves* few, 1–1 $\frac{1}{2}$ in., curiously mottled with white when dry. *Peduncles* or branches of panicle divaricate; pedicels 1–2 in.; bracts (if present) setaceous. *Flowers* minute. *Fruit* narrowed at both ends, minutely hairy between the ribs.—Schimper's No. 744 from Arabia, which Steudel has named *B. rubicunda*, and which is referred here by Choisy and Boissier, is perhaps a different species, having broader petioled leaves (of the same texture however) and fruit twice as large; it is No. 159 of Fischer's, and No. 98 of Schwenfurth's Arabian collections.—Seeds eaten, *Edgew.*

3. **PISONIA**, Linn.

Trees or shrubs, sometimes spinous. *Leaves* opposite or alternate. *Flowers* in corymbose cymes, not involucrate. *Flowers* usually dioecious, 2–3-bracteolate. *Perianth* 5–10-toothed, of male flower funnel-shaped, of female tubular. *Stamens* 6–10, exserted. *Ovary* sessile, oblique; stigma capitate or feathery. *Fruit* large or small. *Cotyledons* crumpled, enclosing a scanty soft albumen.—Species 60, all tropical, one only African.

1. **P. aculeata**, Linn.; a tall woody climber with axillary recurved prickles, cymes dense-fld., fruit narrowly oblong or clavate 5-ribbed, ribs muricate with several rows of glands. *Chois. in DC. Prodr.* xiii. 1, 440; *Lamk. Ill.* t. 861; *Gaertn. Fruct.* i. t. 76; *Roxb. Fl. Ind.* ii. 217; *Wight Ic.* t. 1763-4; *Grah. Cat. Bomb. Pl.* 167; *Kurz For. Fl.* ii. 279; *Bedd. Sylv. Madr.* 175, t. 22, f. 3. *P. Georgiua*, Wall. *Cat.* 6768. *P. villosa*, Poir. *Diet.* v. 347; *Chois. l. c.* *Tragularia horrida*, Koen. *mss.*

SOUTH CONCAN, and elsewhere in the DECCAN PENINSULA, Heyne, &c. CEYLON, Walker, &c. BURMA, Wallich.—DISTRIB. Tropical Asia, Africa, Australia and America.

Trunk very short; branches subopposite, horizontal. *Leaves* 2-3 in., elliptic, obtuse, entire, base cuneate; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Flowers* in dense axillary and terminal corymbose cymes, greenish-white. *Male flower* $\frac{1}{2}$ in. long, campanulate, pedicelled, 5-toothed. *Stamens* 7-8. *Female flower* ovoid, obscurely toothed; stigma lacerate. *Fruit* long-pedicelled, $\frac{1}{2}$ – $\frac{3}{4}$ in.

2. **P. alba**, *Spanoghe in Linnæa*, 1841, 342; unarmed, arboreous, leaves large, fruit narrow club-shaped 5-angled, angles with one row of prickles. *Kurz For. Fl.* ii. 279; *Wight Ic.* t. 1765; *Miq. Fl. Ind. Bat.* i. 1, 990; *Chois. in DC. Prodr.* xiii. 2, 446. ? *P. inermis*, Forst. *Prodr.* 397. *P. morindæfolia*, Br. in Wall. *Cat.* 7130; *Chois. l. c.* 447. ? *P. malabarica*, Poir. *Encycl. Suppl.* ? *P. mitis*, Linn. *Sp. Pl.* 1511; *Burm. Fl. Ind.* 224 (excl. citation of Rheede).

ANDAMAN ISLANDS; beach forests rare, *Kurz*; cultivated in India and Ceylon.—DISTRIB. Malay Islands.

A tree, 30-40 ft., glabrous except the inflorescence; branches stout. *Leaves* 6-10 in., oblong-ovate or oblong, acute or acuminate; petiole $\frac{1}{2}$ – $1\frac{1}{2}$ in. *Flowers* in dense corymbose terminal cymes. *Male flower* $\frac{1}{2}$ in. long, tubular-campanulate, pedicelled, 5-toothed; stamens 8. *Female flower* much smaller; stigma penicellate. *Fruit* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, long-pedicelled.—It is very doubtful what name this should bear; it may probably be identified with *P. inermis*, Forst., of the Pacific Islands.

3. **P. excelsa**, *Blume Bijl.* 735; unarmed, arboreous, leaves large petioled opposite alternate or 3-nately whorled, fruit elongate linear truncate 5-angled, angles smooth viscid. *Chois. in DC. Prodr.* xiii. 2, 441; *Hassk. Pl. Jav. Rar.* 227; *Spanoghe in Linnæa*, 1841, 342; *Miquel Fl. Ind. Bat.* i. 1, 990. *P. umbellifera*, Seem. ex *Kurz For. Fl.* ii. 280. *P. macrocarpa*, Presl *Symb.* t. 56.

ANDAMAN ISLANDS; forests along the coast, *Kurz*.—DISTRIB. Malay Islands.

A tree, 30-50 ft., glabrous except the puberulous shoots. *Leaves* $1\frac{1}{2}$ –1 ft. glossy; petiole $\frac{1}{2}$ –1 in. *Flowers* small, cymose or umbellate; peduncles sparingly tomentose or glabrescent. *Perianth* nearly glabrous. *Fruit* $1\frac{1}{2}$ in. or less, glabrous.—*Kurz* has referred this to Seemann's *P. umbellifera*, which Bentham affirms (*Fl. Austral.* v. 281) to be Blume's *P. excelsa*. I have seen only leaf and fruit, the rest of the above description being from *Kurz*.

EXCLUDED SPECIES.—*P. racemosa*, Wall. *Cat.* 7296, is *Petunga longifolia*, DC. (See v. iii. 120).

ORDER CXV. ILLECEBRACEÆ.

Herbs, usually small and tufted. *Leaves* opposite or alternate; stipules scarious. *Flowers* cymose, minute. *Sepals* 4-5, persistent, closing over the fruit. *Petals* minute or 0. *Stamens* hypogynous or perigynous; filaments short; anthers didymous. *Ovary* free, 1-celled; style 2-3-fld, stigmas decurrent; ovule 1, erect or pendulous from a basal funicle. *Utricle* enclosed in the perianth. *Seed* globose lenticular or reniform, testa smooth, albumen floury; embryo straight curved or annular.—Genera 17, species 70, most warm dry regions.

Gymnocarpus fruticosus, Pers., is in the Genera Plantarum (iii. 17) erroneously stated to be a native of Scinde, owing to a misstatement in the Herbarium; it has not been found further east than Beluchistan.

TRIBE I. **Paronychieæ**. *Flowers* clustered, all perfect and similar. *Embryo* annular.

Sepals 5, obtuse. Style 2-fid 1. HERNIARIA.

TRIBE II. **Pteranthææ**. *Flowers* 3-nate, surrounded by squarrose bracts, the centre one of the 3 alone perfect. *Embryo* nearly straight.

Floral leaves pinnatifid 2. COMETES.

1. **HERNIARIA**, Linn.

Tufted prostrate small herbs. *Leaves* opposite or the upper alternate, narrow. *Flowers* minute, in green axillary clusters. *Sepals* 4-5, obtuse, connate below. *Petals* 4-5, minute, setaceous or 0. *Disk* annular. *Stamens* 4-5. *Utricle* indehiscent; style 2-fid; ovule erect. *Seed* subglobose or reniform, testa crustaceous shining; embryo annular.—Species 8 or 10, Europe, N. and S. Africa, W. and Central Asia.

H. hirsuta, Linn.; strigosely hirsute, leaves elliptic- or linear-oblong, sepals 5 not so broad as the rigid hairs are long, stigmas very short subsessile.

WESTERN HIMALAYA; from Kashmir to Kunawur, alt. 4-8000 ft., Royle, &c. The PANJAB, from the Sutlej to Peshawur.—DISTRIB. Westward to the Atlantic and the Canary Islands.

Branches 2-8 in. long, densely tufted, internodes long or short. *Leaves* $\frac{1}{10}$ - $\frac{1}{2}$ in., acute or obtuse, base acute. *Flowers* $\frac{1}{16}$ - $\frac{1}{12}$ in. long. *Capsule* as long as the sepals. —I am quite unable to discriminate between the species of *Herniaria*, or to refer this to any descriptions of Boissier. There is plenty of it under several forms in Griffith's Afghan collections, and these Boissier alludes to under both *H. incana*, Lamk., and *H. cinerea*, DC. (Fl. Orient. i. 739). The *incana* form looks at first sight very distinct, but there appear to me to be many intermediates.

VAR. *incana*; hoary, most densely matted, leaves densely crowded $\frac{1}{10}$ in. long, flowers many in a cluster $\frac{1}{10}$ in. long. *H. incana*, Lamk. Dict. iii. 124; Boiss. Fl. Orient. i. 741. *H. macrocarpa*, Sibth. Fl. Græc. t. 252. *H. Besseri*, Fisch. in Hornem. Suppl. Hort. Bot. Hafn. 127.

2. **COMETES**, Linn.

Annual branched herbs. *Leaves* opposite, mucronate; stipules setaceous. *Flowers* 3 together, surrounded by feathery at length squarrose bracts, centre flower only perfect. *Sepals* 5, erect, linear-oblong, awned behind. *Stamens* 5, subperigynous, alternating and united with 5 membranous staminodes forming a cup below. *Ovary* narrow; style filiform, stigma 3-toothed; ovule erect. *Utricle* obovoid. *Seed* obovoid, erect, testa membranous; embryo large, on one side of a scanty albumen; cotyledons oblong, plano-convex.—Species 2, N. African and Oriental.

C. surattensis, Burm. Fl. Ind. 39, t. 15, f. 5; leaves petioled elliptic acute at both ends, stamens longer than the staminodes. Boiss. Fl. Orient. i. 753; Wall. Pl. As. Rar. i. 17, t. 17; Cat. 810. *C. apiculata*, DCne. in Ann. Sc. Nat. Ser. 2, ii. 244. *Ceratonychia Nidus*, Edgew. in Journ. As. Soc. Beng. xvi. 1215.

SCINDE, *Vicary, Stocks*.—DISTRIB. Beluchistan, Waziristan, and westward to S. Arabia.

Stem woody below; branches 4–10 in., very numerous, stout, erect, terete, dichotomous. *Leaves* $\frac{1}{2}$ –1 in., elliptic, acute at both ends, variable in width; petiole short. *Heads* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., including the feathery rusty appendages which close over the fruit to prevent the escape of the seed, which germinates in the head. *Sepals* with the dorsal awn variable in length. *Stamens* and *staminodes* variable in length.

ORDER CXVI. AMARANTACEÆ.

Herbs, rarely shrubs. *Leaves* opposite or alternate, exstipulate. *Flowers* usually in terminal simple or paniced spikes, cymes or clusters (outer in the cluster sometimes deformed); bracts and 2 bracteoles scarious. *Sepals* 5, rigid or scarious, persistent, imbricate in bud. *Stamens* 1–5, opposite the sepals, filaments free or connate below or united with intervening membranous staminodes into a hypogynous cup; anthers 1- or 2-celled. *Ovary* 1-celled; styles 1–3; ovules 1 or more, basal, panicle capillary. *Fruit* a utricle, rarely a berry or capsule, enclosed in or resting on the persistent perianth. *Seed* erect, orbicular or ovate, compressed, testa crustaceous; embryo horseshoe-shaped or annular, surrounding a mealy albumen.—Genera 48, species 480, tropical and subtropical.

TRIBE I. **Celosieæ**. *Leaves* alternate. *Anthers* 2-celled. *Ovary* 2–∞-ovuled.

Fruit a berry. A shrub 1. DEERINGIA.
Fruit membranous. Herbs 2. CELOSIA.

TRIBE II. **Amaranteæ**. *Anthers* 2-celled. *Ovary* 1-ovuled.

* Ovule erect. *Leaves* alternate.

Sepals spreading under the fruit 3. BOSIA.
Sepals erect, enclosing the fruit.
Flowers paniced, 2-sexual. Utricle indehiscent 4. BANALIA.
Flowers capitate, 2-sexual. Utricle circumsciss 5. ALLMANIA.
Flowers spicate, 2-sexual. Nut crustaceous 6. DIGERA.
Flowers unisexual 7. AMARANTUS.

** Ovule suspended from a basal funicle.

† *Flowers clustered*, 1–3 perfect surrounded by deformed ones. *Leaves* opposite.

Stamens with interposed staminodes 8. CYATHULA.
Stamens without staminodes 9. PUPALIA.

†† *Flowers all perfect*. *Staminodes* 0.

Outer sepals 3-ribbed. Stamens 5. Spikes axillary 10. PSILOTRICHUM.
Outer sepals 3-ribbed. Stamens 5. Spikes paniced 11. PSILOSTACHYS.
Sepals all hyaline. Stamens 1 or 2 12. NOTHERUA.

††† *Flowers all perfect*. *Stamens with interposed staminodes*.

Sepals hyaline, woolly. Staminodes short 13. ERUA.
Sepals scarious, tipped with wool. Staminodes long 14. STILBANTHUS.
Sepals spinescent 15. ACHYRANTHUS.

TRIBE III. **Gomphreneæ**. *Anthers* 1-celled. *Ovary* 1-ovuled; ovule suspended from a basal funicle. *Leaves* opposite.

Staminal tube very short. Stigma subsessile, capitate . . . 16. ALTERNANTHERA.
Staminal tube long. Style long. Stigma 2-fid 17. GOMPHRENA.

1. **DEERINGIA**, Br.

Rambling or climbing shrubs. *Leaves* alternate, petioled. *Flowers* small, in simple or paniced spikes, 1-2-sexual. *Sepals* 5, oblong, spreading in fruit. *Stamens* 4-5; anthers 2-celled; staminodes 0. *Ovary* ovoid or subglobose; stigmas 2-4, subulate; ovules few or many, funicle long. *Fruit* a globose berry or circumsciss utricule, seated on the spreading perianth. *Seeds* few or many; radicle descending.—Species 5-6, Asiatic, Australian and Pacific.

D. celosioides, Br. *Prodr.* 413; leaves ovate or ovate-lanceolate acuminate, racemes long paniced. *Roxb. Fl. Ind.* i. 682, and *Ed. Wall. & Carey*, ii. 511; *Wight Ic.* t. 728; *Wall. Cat.* 6888; *Dalz. & Gibs. Bomb. Fl.* 214; *Bot. Mag.* t. 2717; *Endl. Iconogr.* t. 62. *D. baccata*, Moq. in *DC. Prodr.* xiii. 236. *D. indica*, Retz. in *Blume Bijl.* 542; *Spreng. Syst.* i. 816. *Celosia baccata*, Retz. *Obs.* v. 23. *Cladostachys frutescens*, Don *Prodr.* 76, excl. syn.—*Blitum frutescens*, Rumph. *Herb. Amb.* v. t. 83, f. 2.

SUBTROPICAL HIMALAYA; from Simla to Bhotam, alt. 1-5000 ft. ASSAM, SILHET, KHASIA MTS., alt. 0-4000 ft. CHITTAGONG and LOWER BENGAL; at Pubna, J. D. H. & T. T. BEHAR; Monghir, Hamilton; and Rotas, J. D. H. PEGU, Wallich. The CONCAN, Dalz. & Gibs. (I have seen no specimen).—DISTRIB. Malay Islands, China, Australia.

Blackish or dark green when dry, subscandent, sometimes climbing 18 ft. high; branches long, arching. *Leaves* 2-4 in., base rounded or acute, rarely cordate; petiole $\frac{1}{4}$ -1 in. *Spikes* 4-10 in. *Flowers* greenish-white, $\frac{1}{8}$ in. diam.; pedicels short; bracts acute. *Berry* globose, $\frac{1}{8}$ - $\frac{1}{4}$ in. diam., scarlet.

2. **CELOSIA**, Linn.

Usually annual herbs. *Leaves* alternate. *Flowers* clustered or spicate, white or pink, shining. *Sepals* scarious, striate or ribbed. *Stamens* 5, united below into a cup; anthers 2-celled; staminodes 0. *Utricle* circumsciss, sometimes corky or thickened. *Seeds* erect, testa crustaceous, radicle inferior or ascending.—Species 30, tropical Asiatic, African and American.

* *Spikes very stout; flowers densely imbricate. Utricle acute; style filiform, lengthening after flowering.*

1. **C. argentea**, Linn.; annual, glabrous, erect, leaves linear or lanceolate, spikes long-peduncled cylindric or oblong or ovoid, flowers $\frac{1}{2}$ - $\frac{1}{2}$ in., style filiform. Moq. in *DC. Prodr.* xiii. 2, 242; *Roxb. Fl. Ind.* i. 678, and *Ed. Carey & Wall.* ii. 507; *Grah. Cat. Bomb. Pl.* 167; *Dalz. & Gibs. Bomb. Fl.* 215; *Wight Ic.* t. 1767; *Wall. Cat.* 6916; *Boiss. Fl. Orient.* iv. 987. *C. linearis*, Sweet *Hort. Brit.* 569. *C. margaritacea*, L., *Wall. Cat.* 6917; *Don Prodr.* 76.—*Rheede Hort. Mal.* x. t. 38, 39.

Throughout INDIA and CEYLON in fields, ascending the hills to 4000 ft. (nowhere really indigenous).—DISTRIB. Trop. Asia, Africa, America, cultivated or introduced.

Stem 1–3 ft., stout or slender, simple or branched. *Leaves* 1–6 in., narrow. *Spikes* solitary, few or many, 1–8 by $\frac{1}{4}$ –1 in.; peduncle slender; flowers white, glistening; bracts much shorter than the acute sepals.—The top of the spike sometimes branches out in a cock's-comb form.

2. **C. cristata**, Linn.; annual, glabrous, erect, leaves from linear to ovate acute or acuminate, spikes cylindric, flowers $\frac{1}{4}$ – $\frac{1}{2}$ in., style filiform. *Moq. in DC. Prodr.* xiii. 2, 242; *Roxb. Fl. Ind.* i. 679, and *Ed. Wall. & Carey*, ii. 508; *Wall. Cat.* 6918; *Grah. Cat. Bomb. Pl.* 168; *Dalz. & Gibs. Bomb. Fl.* 215. *C. cernua*, *Roxb. l. c.* 680, and *Ed. Carey & Wall.* 509; *Wall. Cat.* 6919; *Wight Ic.* 730. *C. cristata*, Linn.; *Lamk. Ill.* t. 168; *Wall. Cat.* 6918. *C. coccinea*, Linn.; *Bot. Reg. t.* 1834. *C. comosa*, *Retz. Obs.* vi. 26; *Andr. Bot. Rep. t.* 635. *C. pyramidalis*, *Burm. Fl. Ind.* 65, t. 25.

Throughout INDIA, cultivated and as an escape.—DISTRIB. Tropical Asia, Africa and America.

Usually a tall branching plant, with broad ovate-lanceolate leaves, sometimes 9 in. long and 3 broad, and much smaller flowers than *C. cristata*, but narrow-leaved forms are difficult to distinguish. Roxburgh's *C. cernua* is only a very narrow-leaved strict form; I doubt its being indigenous in the Rajmahal hills, where, as Dr. King informs me, there are traces of very old cultivations.—The sportiveness of this species under cultivation, and its tendency to produce cock's-comb crests and feathery branched yellow pink or rose fasciated ends of the spikes, have resulted in the creation of many spurious species. Its native country, like that of *C. argentea*, of which it is no doubt a form, is unknown. Burmann's *C. pyramidalis* is referred by Moquin to *Chamissoa* (Allmania), but the habit is totally dissimilar to that of an *Allmania*, and quite that of *C. cristata*.

** *Spikes very slender, flowers in distant clusters. Utricle obtuse, top thickened; style short, stigmas 2–3 recurved. Seeds minute reniform.*

3. **C. pulchella**, *Moq. in DC. Prodr.* xiii. 2, 238; glabrous, leaves petioled ovate acute. *Wight Ic.* t. 1768. *C. polygonoides*, *Wall. Cat.* 6913.

NILGIRI HILLS; in moist soil, *Wight*, &c. CEYLON, *Walker*, &c.; in hot drier parts of the island, *Thwaites*.

Slender, 2–3 ft. high, diffusely branched. *Leaves* $1\frac{1}{2}$ –2 in., membranous, base cuneate truncate or subcordate; petiole slender, $1\frac{1}{2}$ in. *Spikes* 4–10 in., very slender; clusters few-fl.; flowers $\frac{1}{10}$ in. long, white. *Sepals* ovate-oblong, acute. *Utricle* flask-shaped, exserted. *Seeds* minute, reniform, black, opaque.

4. **C. polygonoides**, *Retz. Obs.* ii. 12; branches glabrous or hispidulous, leaves petioled rounded-ovate or -cordate obtuse. *Celosia trigyna*, *Willd.*; *Wall. Cat.* 6915.

DECCAN PENINSULA; in sandy soil, Mysore and the Carnatic, &c., *Heyne*, &c. CEYLON; north part of the island, *Gardner*.

Slender, 6–10 in. high; stem woody below, diffusely branched. *Leaves* $\frac{3}{4}$ – $1\frac{1}{2}$ in. long, often as broad, glabrous or very sparsely hairy, rarely cordate, tip rounded or apiculate; petiole as long as the blade. *Spikes* 3–5 in.; clusters few-fl.; flowers $\frac{1}{10}$ in. long, white. *Sepals* ovate-oblong, acute. *Utricle* flask-shaped, with a very thick exserted head.—Very near the tropical African species.

UNDETERMINABLE SPECIES.

C. ALLMANOIDES, *Moq. in DC. Prodr.* xiii. 2, 243, from Ava, *Wallich*, is possibly an *Allmania*.

C. EXSTIPULATA, *Hornem. in Schrank Syllog. Ratisb.* i. 202; *Moq. l. c.* 244.—Nepal.

C. PATULA, Willd. in *Act. Berol.* vi. 198; *Moq. l. c.* (*C. glauca*, Rottl. & Willd. in *Nov. Act. Nat. Cur.* iv. 1803).—Mountains of Madras.

C. SANGUINEA, Hoffmann *Verz.* ii. 85; *Moq. l. c.*—East Indies.

3. **BOSIA**, Linn. (BOSEA.)

Erect, stout, glabrous, nauseous shrubs. *Leaves* alternate, persistent. *Flowers* small, 2-4-bracteolate, green, spicate or racemose, often polygamous. *Sepals* 5, herbaceous, rounded, concave. *Stamens* 5, inserted on a hypogynous 10-lobed disk; anthers 2-celled. *Ovary* ovoid; stigmas 2-3, sessile, recurved; ovule erect, funicle short. *Berry* globose. *Seed* subglobose, testa crustaceous, albumen fleshy; embryo annular, cotyledons broad.—Species 3, Canaries, Mediterranean, N.W. India.

Bosea trinervia, Roxb. *Fl. Ind.* ii. 87, is no doubt, as Dr. King informs me, *Celtis Wightii*, Planch.

B. Amherstiana, Hook. f.; leaves ovate acute or acuminate, flowers spicate, bracteoles 2-4. *Rodetia Amherstiana*, *Moq. in DC. Prodr.* xiii. 2, 323; *Gamble Man. Ind. Timb.* 302; *Deeringia Amherstiana*, Wall. *Cat.* 6889.

WESTERN TEMPERATE HIMALAYA, alt. 4-7000 ft.; from Kumaon, *Amherst, Govan*, to Kashmir, *Thomson*.

Quite glabrous. *Leaves* 3-7 by 1-4 in.; base acute or rounded; blade narrowed into a petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Spikes* shorter than the leaves. *Flowers* $\frac{1}{2}$ in. diam.; bracts and bracteoles rounded, closely imbricated, green with white margins. *Berries* $\frac{1}{2}$ in. diam.—*Rodetia* differs from the original *Bosia Yerva-Mora* only in the pedicelled flowers and fewer bracts and dioecious flowers, but the flowers are really only polygamous, and the *Bosia cyprica* of Boissier (from Cyprus) has sessile flowers and bracts imbricating as in *Rodetia*.

4. **BANALIA**, Moq.

An erect, glabrous, branching herb. *Leaves* alternate, membranous. *Flowers* in axillary and terminal paniced spikes. *Sepals* 5, membranous, linear-oblong, acute, 3-nerved. *Stamens* 5, united below into a cup, anthers 2-celled. *Ovary* ovoid, compressed; style erect, stigmas 2 linear; ovule erect. *Utricle* subglobose, indehiscent. *Seed* orbicular, testa black crustaceous; embryo annular.

B. thyrsiflora, *Moq. in DC. Prodr.* xiii. 2, 278; *Wight Ic.* t. 1774. *Celosia thyrsiflora*, and *C. missionis*, Wall. *Cat.* 6914, 6915 A. B. *Achyranthes thyrsiflora* & *polygonata*, *Herb. Heyne*.

NILGHIRI MTS., alt. 4-7000 ft.; *Heyne*, &c.

A tall very slender herb, branches angular. *Leaves* 3-4 in., ovate or ovate-lanceolate, acuminate. *Flowers* in large thyrsoid white panicles, sessile, $\frac{1}{2}$ in. long.

5. **ALLMANIA**, Br.

Herbs. *Leaves* alternate, narrow. *Flowers* in axillary and terminal globose or ovoid heads. *Sepals* 5, scarious, acuminate, striate. *Stamens* 5, united below into a cup; anthers 2-celled; staminodes 0. *Ovary* ovoid; style slender, stigma capitate; ovule 1, erect. *Utricle* circumsciss. *Seed* erect, aril cupular, testa crustaceous; embryo annular, cotyledons linear flat.—Species 2 or 3, tropical Asiatic.

1. **A. nodiflora**, Br. in Wall. *Cat.* 6890, excl. B; annual, diffusely

dichotomously branched, leaves short or long from linear or oblong to spatulate and orbicular, heads sessile axillary and terminal globose.

SIKKIM TERAI, *Clarke*. MYSORE and the CARNATIC, MALACCA, SINGAPORE and CEYLON.—DISTRIB. China, Malay Islands.

Rootstock sometimes woody; branches rigid or flaccid, 6–12 in., glabrous or hispidly hairy. *Leaves* excessively variable, membranous or rigid. *Heads* $\frac{1}{4}$ –1 in. diam. white or brown. *Seeds* turgidly lenticular, opaque or shining.—The following forms are certainly varieties of no great constancy.

VAR. *angustifolia*; glabrous, rarely with a few scattered hairs, often tall, leaves 1–3 in. oblong or linear-oblong or elongate obovate-oblong obtuse or acute, heads usually large. A. nodiflora, *Wall. Cat.* 6980 A. C. E. in part. *Chamissoa angustifolia*, *Herb. Ham.* C. javanica, *Hassk. Pl. Jar. Rar.* 434.—Mysore, Ceylon, widely diffused. Java, Sumatra.—A tall slender unbranched form of this occurs, apparently drawn up amongst grass, &c.

VAR. *dichotoma*; glabrous or nearly so, leaves shortly petioled $\frac{3}{4}$ –1½ in. elliptic acute, heads $\frac{1}{4}$ –½ in. A. nodiflora, *Wall. Cat.* 6890 E. in part. A. dichotoma, *Wight Ic. t.* 1771. *Celosia dichotoma*, *Heyne in Roth Nov. Sp.* 172.—Courtallum, *Wight*.

VAR. *Roxburghii*; glabrous or pubescent, leaves 1–2 in. spatulate or orbicular-spatulate often apiculate. A. nodiflora, *Wight in Hook. Journ. Bot. i.* (1834). 226, t. 128; *Wall. Cat.* 6890 E. in part. *Achyranthes nodiflora*, *Roxb. Fl. Ind. i.* 678. *Celosia nodiflora*, *Linn. Sp. Pl.* 205; *Roth Nov. Sp.* 17; *Burm. Fl. Zeyl.* 16, t. 5, f. 2.—Mysore, the Carnatic and Ceylon.

VAR. *aspera*; hispidly hairy, other characters of Var. *angustifolia*. A. aspera, *Wight Ic. t.* 1770. *Celosia aspera*, *Roth Nov. Sp.* 173; *Moq. l. c.* 241. *Chamissoa dichotoma*, *Moq. l. c.* 249.—Corn-fields, Coimbatore and Mysore.

VAR. *procumbens*; diffuse, branches prostrate often several feet long from a slender or stout (perennial?) woody branched stock, glabrous or scabrid, leaves small $\frac{1}{2}$ –¾ in. spatulate or linear mucronate, heads small $\frac{1}{4}$ –½ in. *Wall. Cat.* 6980 E. in part. A. procumbens, *Wight mss.* A. nodiflora, *Wight Ic. t.* 1770.—Sands and Red Hill at Madras.—DISTRIB. Java.

VAR. *esculenta*; flaccid, glabrous, leaves 1–2 in. very narrow linear, heads usually small sometimes pedicelled. A. esculenta, *Br. in Wall. Cat.* 6892; *Moq. l. c.* 249. *Chamissoa Brownii*, *Steudel Nomencl. Ecl. i.* 344.—Malacca and Singapore.

2. **A. albida**, *Br. in Wall. Cat.* 6981; annual, erect or suberect, leaves short or long from linear to spatulate or obovate, heads ovoid or oblong rarely globose peduncled. *Chamissoa albida*, *Mart. Beitr. Amarant.* 79; *Wight Ic. t.* 1769. C. pyramidalis, *Moq. l. c.* *Celosia pyramidalis*, *Burm. Fl. Ind.* 65, t. 25. C. albida, *Willd. Sp. Pl. i.* 1197. C. nodiflora, *Wall. Cat.* 6890 B.

The CARNATIC; in sandy soil near the coast, *Wight*, &c. CEYLON, common.—Java, Philippines.

Usually tall, erect, 1–2 ft. high, with erect branches, and foliage simulating many of the forms of A. nodiflora, of which Thwaites regards it as a form, but I can scarcely agree with him.

6. DIGERA, *Forsk.*

An annual herb. *Leaves* alternate. *Flowers* spicate, 3-nate, the 2 outer reduced to crested scales. *Sepals* 4–5, oblong, outer larger 5–9-nerved, inner 2–4-nerved. *Stamens* 5, free; anthers 2-celled; staminodes 0. *Ovary* oblong, truncate; style filiform, stigmas 2 recurved; ovule 1, erect. *Nut* subglobose, compressed, rugulose. *Seed* globose, erect, testa thin crustaceous, adhering to the albumen; embryo annular, cotyledons linear.

D. arvensis, *Forsk. Fl. Æg. Arab.* 65; *Moq. in DC. Prodr.* vol. 2.

324; *Griff. Notul.* iv. 343, and *Ic. Pl. Asiat.* t. 527; *Dalz. & Gibs. Bomb. Fl.* 218, f. 2. *D. muricata* & *ciliata*, *Mart. Beitr. Amaranth.* 77; *Wall. Cat.* 6886, 6887. *D. ciliata*, *Mog. l. c.* *D. Forskalii*, *Blume Bijl.* 542. *D. alternifolia*, *Aschers. in Schweinf. Beitr.* 180; *Boiss. Fl. Orient.* iv. 994. *Desmochete alternifolia*, *DC. Cat. Hort. Monsp.* (1813), 103. *D. muricata*, *Wight Ic. t.* 732. *D. ciliata*, *Roem. & Sch. Syst.* v. 553; *Mart. l. c.* 113; *Wall. Cat.* 6887. *Achyranthes polygonoides Retz. Obs.* ii. 12 (not of *Heyne*). *A. Digera*, *Poir. Dict. Suppl.* i. 2, 11. *A. alternifolia*, *Linn. Mant.* 50, 341; *Roeb. Fl. Ind.* i. 674, and *Ed. Carey & Wall.* ii. 500. *A. muricata*, β , *Willd. Sp. Pl.* i. 1193. *Chamissoa arabica*, *ciliata*, *commutata* & *muricata*, *Spreng. Syst.* i. 815. *Cladostachys alternifolia*, *Sweet Hort. Brit. Ed.* 3, 570. *C. muricata*, *Mog. l. c.* 235.

BENGAL and N.W. INDIA in the plains to Peshawur and the Salt range. *PEGU, Wallich.* SOUTH DECCAN; the Concan, Mysore, and the Carnatic, *Heyne, &c.* CEYLON, N. part of the island.—*DISTRIB.* Java, Afghanistan and Beluchistan to Arabia and N. Africa.

A glabrous or ciliate slender annual, 1–2 ft. high, becoming perennial, with spreading branches, prostrate below. *Leaves* very variable, membranous, $\frac{1}{2}$ –3 in., ovate and acute or elliptic or rounded, base rounded or cuneate; petiole $\frac{1}{2}$ –2 in., slender. *Spikes* 1–3 in., slender, axillary, long or short peduncled; bracts subulate, persistent; flowers $\frac{1}{4}$ in. in distant clusters, greenish. *Seeds* pale.

7. AMARANTUS, Linn.

Annuals. *Leaves* alternate. *Flowers* unisexual, small, in axillary clusters, or in panicle erect or drooping densely or laxly spiked clusters. *Sepals* 5 or 1–3, ovate oblong linear lanceolate or aristate. *Stamens* 1–5, free; anthers 2-celled; staminodes 0. *Ovary* compressed; style short or 0, stigmas 2–3 filiform or subulate; ovule 1, erect. *Utricle* compressed, indehiscent or circumsciss, tip entire or 2–3-toothed. *Seed* orbicular, compressed, testa crustaceous; embryo annular, cotyledons linear.—Species undetermined, tropical and subtropical, a large proportion known only in cultivation.

* *Bracts* setaceous or awned, exceeding the 5 sepals. *Stamens* 5. *Utricle* circumsciss, top 2–3-fid.

1. **A. spinosus**, Linn.; erect, glabrous, stem terete, leaf-axils with 5 spines, leaves long-petioled ovate or oblong obtuse, flowers in axillary clusters and long dense- or lax-fid. spikes, bracts setaceous equalling or exceeding the sepals, stamens 5, utricle rugose nearly equalling the sepals. *Mog. in DC. Prodr.* xii. 2, 260; *Willd. Amarant. t.* 4, f. 8; *Roeb. Fl. Ind.* iii. 611; *Grah. Cat. Bomb. Pl.* 169; *Dalz. & Gibs. Bomb. Fl.* 216; *Wight Ic. t.* 513; *Wall. Cat.* 6894.

Throughout INDIA and CEYLON, in waste places, fields and gardens.—*DISTRIB.* Various tropical countries.

Stem 1–2 ft., hard; spines straight, $\frac{3}{4}$ in. and under. *Leaves* $1\frac{1}{2}$ –4 by $\frac{3}{4}$ –2 in., base cuneate; petiole slender, equalling the blade or shorter. *Flowers* $\frac{1}{4}$ in. long. *Sepals* of male acuminate, of female obtuse apiculate. *Stigmas* 2. *Utricle* with a thickened top. *Seeds* $\frac{1}{30}$ in. diam., black, shining, border obtuse not thickened.—The plant varies in colour from green to red and purple.

2. **A. paniculatus**, Linn. *Sp. Pl. Ed.* 2, 1406; tall, robust, stem striate, leaves long-petioled elliptic- or ovate-lanceolate acute or finely acuminate, spikes in dense thyrses squarrose from the long recurved bracts, centre one

longest, bracts acicular recurved very much longer than the oblong-lanceolate acuminate sepals. *Moq. in DC. Prodr.* xiii. 2, 257; *Willd. Amarant.* 32, t. 2, f. 4; *Wall. Cat.* 6904, excl. F; *Dalz. & Gibs. Bomb. Fl.* 215. *A. speciosus*, *Sims Bot. Mag.* t. 2227; *Don Prodr.* 75. *A. sanguineus* *Linn.*; *Willd. l. c. t.* 2, f. 3; *Mill. Icon.* t. 22. *A. strictus*, *Willd. l. c. t.* 1, f. 5. *A. frumentaceus*, *Ham. in Roxb. Fl. Ind.* iii. 610; *Moq. l. c.* 265; *Wight Ic.* t. 720. *A. farinaceus*, *Herb. Roxb.* *A. Anacardana*, *Ham. in Wall. Cat.* 6903; *Moq. l. c.* 256. *A. flavus*, var. δ . *bracteatus*, *Linn.*; *Moq. l. c.* 258.

Cultivated throughout INDIA and CEYLON, and up to 9000 ft. in the HIMALAYA.—DISTRIB. Cultivated or an escape in E. and W. Asia, and Africa.

Stem 4–5 ft., sometimes thicker than the thumb, glabrous or puberulous. *Leaves* 2–6 by 1–3 in., base cuneate; petiole as long. *Spikes* suberect, red, green or yellow. *Seeds* $\frac{1}{10}$ in. diam., either yellowish-white or pitchy black with a thickened rounded border, or pitchy with a narrow thin border.—I follow Moquin, Wallich, &c., in referring this to *paniculatus* of Linnæus with some doubt, and I am still more perplexed about the synonyms I have cited, some of which may belong to the following species. Boissier says of *A. paniculatus* that it is an introduction from America, whereas this has been cultivated in India from time immemorial. Like the following, of which it may be a form, the seeds vary extraordinarily in size, form and colour.

3. ***A. caudatus***, *Linn. Sp. Pl.* 990; tall, robust, stem striate, leaves long-petioled elliptic- or ovate-lanceolate, tip obtuse, spikes in dense soft thyrses hardly squarrose, centre one and often the lateral usually very long and pendulous, bracts acicular longer than the obovate mucronate sepals. *Moq. in DC. Prodr.* xiii. 2, 255; *Wall. Cat.* 6907; *Boiss. Fl. Orient.* iv. 988. *A. paniculatus*, *Wall. Cat.* 6904 F. *A. cruentus*, *Willd., Roxb. l. c.* 610. *A. caudatus* and *A. Alopecurus*, *Hochst.*; *Bouché & Braun in Append. Obs. Bot. ad Ind. Sem. Hort. Berol.* 1872, 1.

Cultivated in various parts of INDIA.—DISTRIB. Various hot countries, wild or cultivated.

I find it very difficult to distinguish some states of this from *A. paniculatus*. In its typical state it is a smaller plant with the leaves obtuse at the tip, more globose softer masses of smaller red green or white flowers on the thyrse, the terminal spike of which is very long, thick and drooping; the acicular bracts are shorter and not squarrose, the sepals shorter, broader, more obtuse and usually obovate-oblong, and the utricle and seeds are smaller; the latter present the same variations as in *A. paniculatus*. Bouché and Braun, from an examination of Abyssinian specimens cultivated at Berlin, point out the remarkable distinction between the two forms of seeds that this and the foregoing species produce, one white or yellow with a very thick rounded border (the true *caudatus* of old authors); the other lenticular and pitch-black with a compressed border (*A. alopecurus*, *Hochst.*). The plants which bear them, however, present no other differences, and I have seen the black seed with the thick border.

*** Bracts subulate, equalling or exceeding the 3 lanceolate sepals and utricle. Stamens 3. Utricle circumsciss.*

4. ***A. gangeticus***, *Linn.*; *Moq. in DC. Prodr.* xiii. 2, 261; erect, glabrous, leaves long-petioled ovate oblong or lanceolate obtuse or emarginate, clusters crowded in the lower axils and forming a long terminal spike, bracts awned, sepals long-awned much longer than the utricle. *Willd. Amarant.* t. 6, f. 11; *Roxb. Fl. Ind.* iii. 606; *Wall. Cat.* 6896, excl. C. *A. tricolor*, *Linn. Sp. Pl.* 989; *Roxb. l. c.* 608, and *Wall. Cat.* 6902. *A. lanceolatus*, *Roxb. l. c.* 607; *Wall. Cat.* 6895. *A. tristis*, *Linn. Sp. Pl.* 989?; *Roxb. l. c.* 604; *Wall. Cat.* 6905, A. C; *Grah. Cat. Bomb. Pl.* 169; *Wight Ic.* t. 713; *Dalz. & Gibs. Bomb. Fl.* 215. *A. oleraceus*, *Roxb. l. c.* 605; *Grah. l. c.*; *Wight Ic.* t. 715, and *Thwaites Enum.* 247, not of Linnæus.

A. polygamus, *Roxb. l. c.*; *Wall. Cat.* 6899, *excl. D.* and *Wight Ic.* 714, *not of Linn.* *A. lividus*, *Roxb. l. c.*; *Wall. Cat.* 6896 C. *A. amboinicus*, *Herb. Ham. in Wall. Cat.* 6897. *A. inamœnus*, *Willd. Amarant. t.* 7, f. 14. *A. melancholicus*, *Linn. Sp. Pl.* 989; *Roxb. l. c.* 608.

Throughout INDIA and CEYLON, cultivated and in cultivated ground.—DISTRIB. Tropical Asia, Africa, and America.

An erect, stout, handsome species, 2–3 ft., leafy, green, pink, rufous, liver-coloured or bright red. *Leaves* 2–5 in., very variable, from linear-lanceolate to rounded oval and 3 in. diam., or deltoid ovate; tip rounded or long and slender but always obtuse and often notched, base elongate cuneate; petiole equalling the blade. *Clusters* squarrose, bracts $\frac{1}{6}$ in. long. *Seeds* lenticular, pitch-black, $\frac{1}{30}$ in. diam.; border acute.—This is Roxburgh's *A. tristis*, and possibly that of Linnæus, but the latter describes the leaves as ovate-cordate, which these are not. Roxburgh says that his *gangeticus* and *oleraceus* differ from his *polygamus* and *tristis* and their varieties in not admitting of being cut for successive crops, but being hence unrooted for market. I have not cited Boissier, who says his *A. gangeticus* is always pentamerous. Of *A. melancholicus* Roxburgh says that it differs from *tricolor* in being 6–12 ft. high, ramous, pyramidal, with more remote broader rarely more than 2-coloured (dull livid purple and bright crimson) leaves, whereas *tricolor* in the same soil is 3–4 ft. with simple erect stem, many numerous variegated leaves, and long axillary clusters of flowers. *A. inamœnus*, *Wall. Cat.* 6905 C, is a curious small state, 6 in. high, erect, strict, with rhomboid leaves and long spikes; it is the *A. tristis*, *Herb. Rottler and Heyne*.

5. ***A. mangostanus***, *Linn. Amœn. Acad.* iv. 294; branches diffuse, leaves small long-petioled ovate elliptic or deltoid-ovate obtuse emarginate, clusters green all axillary, bracts awned, sepals lanceolate awned longer than the utricle. *Moq. in DC. Prodr.* xiii. 2, 261; *Willd. Amarant. t.* 12, f. 23. *A. polygamus*, *Thwaites Enum.* 247. *A. tristis*, *Wall. Cat.* 6905 B.

Throughout INDIA and CEYLON in cultivated ground.

This, as Thwaites observes, is extremely near and perhaps a form of *A. gangeticus*, of smaller size and procumbent habit; he refers it to Roxburgh's *A. polygamus*, but I think that the want of a terminal spike is against this. A specimen from Roxburgh, marked *A. mangostanus*, precisely accords with Willdenow's figure. To me it looks like a starved or stunted form of *gangeticus*; the perianth and seeds are the same in both. It is *A. mucronatus*, *Hort. Petrop.*

6. ***A. Caturus***, *Heyne in Wall. Cat.* 6900; tall, glabrous, leaves long-petioled elliptic-lanceolate acuminate thin, nerves very slender, clusters small globose soft green in very long and very slender axillary simple and terminal paniced spikes, the upper confluent, bracts equalling or longer than the lanceolate aristate sepals, ovary elongate.

DECCAN PENINSULA, *Heyne*.

Stem 2–3 ft., very slender. *Leaves* 6 by 2 in., decurrent on the equally long slender petiole, tip apiculate. *Spikes* 6–10 in. long. *Clusters* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., the lower axillary; the lowest on the rachis remote. *Flowers* $\frac{1}{2}$ in. long; sepals transparent with a green rib and short awn. *Stamens* 3, anthers linear. *Young utricle* with a rather longer neck and 3 slender styles.—I know of no species at all like this; none has such slender spikes.

*** *Bracts usually shorter than the 2 or 3 sepals and utricle. Stamens 2 or 3. Utricle indehiscent or circumsciss.*

7. ***A. viridis***, *Linn. Sp. Pl.* 1405; erect, glabrous, leaves long-petioled ovate, tip rounded or notched, base truncate or cuneate, clusters very small green in axillary and terminal paniced slender spikes, sepals 3, utricle rugose acute indehiscent. *Roxb. Fl. Ind.* iii. 605; *Grah. Cat. Bomb. Pl.* 169. *A. polystachyus*, *Ham. in Wall. Cat.* 6901. *A. fasciatus*, *Roxb. l. c.* 609;

Wight Ic. t. 717 (bad); *Euxolus caudatus*, *Moq. in DC. Prodr. xiii. 2, 274*; *Wight Ic. t. 1773*. *Albersia caudata*, *Boiss. Fl. Orient. iv. 992*. *Chenopodium caudatum*, *Jacq. Ic. Rar. t. 344*.

Throughout INDIA, in waste places.—DISTRIB. All tropical and warm countries.

Stem 1–2 ft., rarely decumbent below. *Leaves* 1–2 in., variable in breadth; petiole equalling the blade or shorter. *Clusters* lax, on slender branches; flowers $\frac{1}{2}$ in. long; bracts and sepals ovate-oblong, acute, membranous with a green keel. *Styles* 2–3. *Seed* $\frac{3}{16}$ in diam., pitchy black, border obtuse.—This is the *A. viridis* of *Herb. Linn.* *A. fasciatus*, *Roxb.*, is a sport with a pale crescentic band across the leaf.—Eaten, but not cultivated (*Roxb.*).

8. **A. Blitum**, *Linn. Sp. Pl. 990*; annual, erect or decumbent, glabrous, leaves long-petioled oblong-ovate or rounded obtuse retuse or 2-lobed, base acute, clusters all axillary or the upper in a dense or lax spike, sepals 3 shorter than the utricle linear-oblong or -lanceolate obtuse and apiculate or acute, utricle orbicular or broadly ovate membranous dehiscent or not.

Waste places throughout INDIA and CEYLON.—DISTRIB. temperate and tropical regions.

I find it impossible satisfactorily to discriminate the Indian forms of this variable weed from one another, and from *A. polygamus*; I recognize the following varieties as more or less constant.

A. Blitum, *Linn. Herb.*; procumbent, leaves small 2-lobed, sepals oblong obtuse apiculate, clusters small all axillary, utricle indehiscent (*A. Blitum*, *Herb. Fries e Scania*). *A. tristis*, *Wall. Cat. 6905 D.*—A weed, not cultivated.

VAR. A. oleraceus, *Linn. Sp. Pl. 1403*; tall, succulent, usually erect, leaves ovate oblong or rounded, top rounded or 2-lobed, clusters axillary and in terminal simple or lobed spikes, sepals linear-oblong obtuse or acute, utricle indehiscent. *Willd. Amarant. t. 5, f. 9*. *A. adscendens*, *Reichb. Ic. Crit. v. t. 472 (by error spicatus)*. *A. gangeticus*, *Wall. Cat. 6896 C.* *A. polygamus*, *Wall. Cat. 6899 D.* *Euxolus oleraceus*, *lividus & viridis*, *Moq. in DC. Prodr. xiii. 273*. *E. oleraceus*, *Dalz. & Gibs. Bomb. Fl. 216*. *Albersia oleracea & livida*, *Kunth Fl. Berol. ii. 144*. *Pxydium oleraceum*, *lividum & viride*, *Moench Meth. 359*.—Cultivated in India and elsewhere.—I find this in the Kew Herbarium as *A. Blitum*, Japan (*Maximov.*); Geneva (*Herb. Boiss.*); *A. lividus*, *Hort. Petrop.*; *A. adscendens*, *Hort. Petrop. and Herb. Requien*; *A. Blitum*, *var. adscendens*, *Herb. Gay*; and *A. miniatus*, *Hort. Avignon and Monsp.*

VAR. A. sylvestris, *Desf. Cat. Hort. Par. 41*; erect, simple or branched, leaves oblong or obovate-oblong obtuse, clusters all axillary sessile, sepals linear keeled mucronate, utricle rugose or smooth circumscrib. *Boiss. Fl. Orient. iv. 990*. *A. Blitum*, *var. sylvestris*, *Moq. l. c. 263*.—Kashmir, alt. 4–6000 ft., *Thomson* (*Europ. Asiatic*).

9. **A. polygamus**, *Linn. Amœn. Acad. iv. 294 (not of Roxb.)*; stem prostrate or ascending, leaves small obovate oblong or ovate obtuse rarely retuse or 2-lobed, often rigid and apiculate, clusters all axillary, sepals 3 as long as the utricle or shorter subulate acuminate, utricle ovoid rugose dehiscent or not. *Thwaites Enum. 247*. *A. polygonoides*, *Roxb. Fl. Ind. iii. 602*; *Wight Ic. t. 512, 719*; *Wall. Cat. 6906*. *A. Blitum*, *var. polygonoides*, *Moq. in DC. Prodr. xiii. 2, 263*. *A. tenuifolius*, *Wall. Cat. 6893 E.* *Amblogyna polygonoides*, *Dalz. & Gibs. Bomb. Fl. 219*. *Albersia polygama*, *Boiss. Fl. Orient. iv. 991*. *Euxolus polygamus*, *Moq. in DC. Prodr. l. c. 272*; *Thwaites Enum. 248*, *excl. syn. Amblogyne*.

Throughout INDIA and CEYLON, abundant.—DISTRIB. All hot countries.

I believe that this can only be ranked as a form of *A. Blitum* (the Linnean form), with small usually obovate apiculate leaves, fewer flowers in a cluster, often larger more subulate sepals and smaller more acute utricles.

VAR. angustifolia; stems and branches angled grooved rigid erect or ascending, leaves linear or linear-oblong more rigid.—The Panjab, *Thomson*. Mooltan, *Edge*.

worth. The Carnatic *Perrottet*.—This is almost identical with *A. græcizans*, Linn. (*A. Blitum*, var. *græcizans*, Moq. ; *A. sylvestris*, var. *græcizans*, Boiss.).

10. **A. tenuifolius**, Willd. *Sp. Pl.* iv. 381 ; glabrous, branches many spreading from the root prostrate or ascending, leaves small petioled linear-oblong or widened to the rounded obtuse or 2-lobed tip, clusters minute all axillary, sepals 2 oblong concave nearly as long as the orbicular compressed membranous indehiscent utricle. *Roxb. Fl. Ind.* iii. 602 ; *Wight Ic.* t. 718 ; *Wall. Cat.* 6893, excl. *E.* *A. angustifolius*, *Roxb. mss.* *Mengea tenuifolia*, Moq. in *DC. Prodr.* xiii. 2, 271 ; *Dalz. & Gibs. Bomb. Fl.* 218.

BENGAL, the GANGETIC VALLEY and PANJAB.—DISTRIB. Tropical Africa.

Branches slender, 6–18 in., leafy. Leaves very variable, $\frac{1}{2}$ –1 in. long, narrowed into the petiole. Clusters smaller than in any other species, green. Stamens 2. Utricle plicate when dry. Seed $\frac{1}{15}$ in. diam., brown, lenticular, border obtuse.

DOUBTFUL SPECIES.

A. ATROPURPUREUS, *Roxb. Fl. Ind.* 688, is a garden plant, possibly a form of *A. oleraceus*.

A. CAMPESTRIS, Willd. *Sp. Pl.* iv. 382 ; Moq. in *DC. Prodr.* xiii. 2, 264, is undeterminable.

A. RUBRICAULIS, *Page Hort. Angl.* (fid. Moq. l. c. 267) name only, is indeterminate.

8. **CYATHULA**, Lour.

Herbs or undershrubs. Leaves opposite. Flowers clustered, clusters solitary spicate and reflexed in fruit, or in dense globose solitary or spicate heads ; perfect flowers 1–2 in each cluster, surrounded by imperfect ones reduced to sepals with rigid hooked awns. Sepals 5, scarious, 1-nerved, acuminate or with hooked rigid awns. Stamens 5, connate, united below with the linear lacerate or 2-fid staminodes into a cup ; anthers 2-celled. Ovary obovoid ; style filiform stigma capitellate ; ovule 1, pendulous from a long basal funicle. Utricle ovoid, indehiscent, top areolate. Seed inverse, oblong, testa coriaceous ; embryo annular, cotyledons linear flat.—Species 10, tropical Asia, Africa and America.

* Clusters of flowers in large globose heads.

1. **C. tomentosa**, Moq. in *DC. Prodr.* xiii. 2, 327 ; densely tomentose or woolly, leaves short-petioled elliptic acute or acuminate, base acute, heads globose spicate. *C. Sequax*, Moq. mss. *Achyranthes tomentosa*, *Roth Nov. Sp.* 167 ; *Wight Ic.* t. 1781. *A. Sequax*, *Wall. in Roxb. Fl. Ind.*, *Ed. Carey & Wall.* ii. 506. *Desmocharta tomentosa*, *Roem. & Sch. Syst. v.* 554. *Polyscelis Sequax*, *Wall. Cat.* 6939.

TEMPERATE HIMALAYA ; from Dalhousie to Bhotan, alt. 2–6500 ft., *Wallich*, &c. KHASIA MTS., alt. 2–5000 ft.

A straggling undershrub, variable in density of tomentum ; branches strict, obtusely 4-angled. Leaves 2–10 in., rarely orbicular or elliptic-lanceolate, pubescent or glabrate above, often velvety or subsilky beneath ; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. Spikes 2–6 in. long peduncled ; heads close or distant, 1–1 $\frac{1}{2}$ in. diam., white, glistening ; bracts ovate below, back hairy. Sepals $\frac{1}{4}$ – $\frac{1}{2}$ in., linear-lanceolate, 2 or all ending in hooked awns, lengthening in age. Staminodes fimbriate. Anthers linear. “Utricle 2-nerved ; seed ovate shining,” *Wallich*.—I find no seed in any of the numerous specimens.

2. **C. capitata**, Moq. in *DC. Prodr.* xiii. 2, 329 ; sparsely hairy, leaves short-petioled elliptic subcaudate-acuminate, base acute, heads globose sub-

solitary peduncled bracteate or not. *Wight Ic. t.* 1782. *Polyscelis capitata*, *Wall. Cat.* 6940.

TEMPERATE HIMALAYA; from Dalhousie to Sikkim, alt. 6-9000 ft.

More herbaceous and slender than *C. tomentosa*. *Leaves* 2-5 in., membranous; petiole $\frac{1}{4}$ -1 in. *Heads* 1-1 $\frac{1}{4}$ in diam., white, glistening; flowers as in *C. tomentosa*.

3. ***C. ceylanica***, *Hook. f.*; erect, tomentose, leaves subsessile elliptic subacute, heads globose solitary. *C. capitata*, *Thwaites Enum.* 249.

CEYLON; near Kandy, *Thwaites*.

Branches slender, terete. *Leaves* 1 $\frac{1}{2}$ -2 in., pubescent above, tomentose beneath. *Heads* 1 in. diam. *Sepals* villous.—The specimens are very indifferent. The leaves resemble those of the African *C. globulifera*, *Moq.*, but the branches are more slender and the leaves almost sessile.

** *Clusters of flowers small, solitary, spicate, reflexed.*

4. ***C. prostrata***, *Blume Bijl.* 549; annual, stem creeping below, branches erect or ascending, leaves subsessile elliptic rhomboid-oblong or subpanduriform obtuse, spikes very slender terminal peduncled. *Moq. in DC. Prodr.* xiii. 2, 326; *Dalz. & Gibs. Bomb. Fl.* 219. *C. repens*, *Moq. l. c.* 330. *Achyranthes prostrata*, *Linn.*; *Roxb. Fl. Ind. i.* 674, and *Ed. Carey & Wall.*, ii. 501; *Grah. Cat. Bomb. Pl.* 168. *A. repens*, *Heyne in Roth Nov. Sp.* 167. *A. debilis*, *Poir. Dict. Suppl. i.* 2, 10. *Desmochæta prostrata* & *micrantha*, *DC. Cat. Hort. Monsp.* 1813, 102. *D. prostrata*, *Wight Ic. t.* 733. *D. patula*? *Wall. Cat.* 6937. *D. repens*, *Roem. & Sch. Syst. v.* 552; *Wall. Cat.* 6938. *Pupalia prostrata*, *Mart. Beitr. Amarant.* 113.—*Rheede Hort. Mal. x. t.* 79.

BENGAL, SIKKIM, KHASIA MTS., CHITTAGONG to MALACCA, the DECCAN PENINSULA, BURMA, and CEYLON.—DISTRIB. Tropical Asia, Africa, Australasia, Oceania, and America.

Very slender, 1-2 ft. high, glabrous or scaberulous. *Leaves* 1-2 in., base narrowed often suddenly from below the middle. *Spikes* 4-6 in., rarely paniculately branched. *Clusters of flowers* $\frac{1}{2}$ in. long, ovoid, blueish. *Sepals* oblong, pubescent, outer (of imperfect flowers) as long as the perfect. *Staminodes* 2-fid or retuse. *Seeds* ovoid-oblong.—*Roxburgh* believes this to have been introduced into Bengal from the Moluccas.

9. **PUPALIA**, *Juss.*

Herbs or undershrubs. *Leaves* opposite. *Flowers* in spicate clusters, perfect and imperfect; the imperfect reduced to awns bearing stellately spreading hooked bristles. *Sepals* 5, herbaceous, acuminate, 3-5-nerved. *S. mens* 5, nearly free below; anthers 2-celled; staminodes 0. *Ovary* ovoid; style slender, stigma capitellate; ovule 1, pendulous from a long basal funicle. *Utricle* ovoid, compressed, indehiscent, top areolate.—Species 3, Asiatic and African.

1. ***P. atropurpurea***, *Moq. in DC. Prodr.* xiii. 2, 331; slender, erect, leaves petioled ovate or elliptic acute or acuminate, spikes long, rachis slender, clusters remote bracteate woolly, sepals broadly 3-nerved, laxly villous. *Dalz. & Gibs. Bomb. Fl.* 219; *Miq. Fl. Ind. Bat.* i. 1046. *Achyranthes lappacea*, *Linn. Sp. Pl. Ed.* 2, 95 (*excl. syn. Ed.* 1); *Roxb. Fl. Ind. i.* 673, and in *Ed. Carey & Wall.* ii. 500. *A. atropurpurea*, *Lamk. Dict. i.* 546. *Desmochæta atropurpurea*, *DC. Cat. Hort. Monsp.* 102; *Wall. Cat.* 6933, *excl. K*; *Wight Ic. t.* 731; *Grah. Cat. Bomb. Pl.* 1230.—*Burm. Fl. Zeyl. t.* 18, f. 1; *Rheede Hort. Mal. x. t.* 59.

NEPAL, *Wallich*. BENGAL; Maldah, *Clarke*. DECCAN PENINSULA, from Guzerat southward, Singapore and Penang, *Wallich*. CEYLON.—DISTRIB. Java, Madagascar, S. Africa, Philippines.

Biennial or annual, 2–5 ft.; branches long, straggling, glabrous. *Leaves* 1–5 in., membranous, narrowed into the ($\frac{3}{4}$ –1 in.) petiole. *Spikes* 1–10 in.; rachis sparsely pubescent; clusters sessile, flowering $\frac{1}{4}$ in., fruiting rarely $\frac{1}{2}$ in. diam.; bracts broadly ovate, pungent. *Sepals* ovate-lanceolate, woolly. *Awns* often purplish.

2. **P. orbiculata**, *Wight Ic.* t. 1783; sparsely pubescent, robust, leaves short-petioled orbicular very broadly ovate or elliptic obtuse or retuse nearly glabrous, spikes stout, clusters distant woolly. *Dalz. & Gibs. Bomb. Fl.* 219. *Cyathula orbiculata*, *Moq. in DC. Prodr.* xiii. 2, 330. *Achyranthes orbiculata*, *Heyne in Roxb. Fl. Ind., Ed. Carey & Wall.* ii. 507. *A. rotundifolia*, *Klein. mss.* *Desmochæta orbiculata*, *Wall. Cat.* 6936.

CONCAN GHATS (*Dalzell*). The CAERNATIC; in sandy soil near the sea, *Heyne, &c.* CEYLON; Jaffna, *Moon*.

Stem stout, erect from a woody stock, terete, glabrate or hispidulous, rarely tomentose. *Leaves* 1–1 $\frac{1}{2}$ in. diam., rigid and brown when dry, suddenly narrowed into the flattened petiole. *Spikes* 4–8 in., rachis stout, sparsely hairy or pubescent; when flowering clusters $\frac{1}{4}$ in. long, fruiting $\frac{3}{8}$ in., spines pale; outer bract short with a long spine, inner narrow.

3. **P. lappacea**, *Moq. in DC. Prodr.* xiii. 2, 331; shrubby below, tomentose, leaves short-petioled from broadly ovate to lanceolate acute or subacute, clusters remote or approximate, outermost bract very broad membranous, sepals 3-nerved, densely woolly. *Dalz. & Gibs. Bomb. Fl.* 219; *Miquel Fl. Ind. Bat.* i. 1046. *Achyranthes lappacea*, *Linn. Sp. Pl. Ed. i.* 204. *A. echinata*, *Retz. Obs.* ii. 12. *A. patula*, *Linn. Suppl.* 160. *A. lappacea*, *echinata & patula*, *Willd. Sp. Pl.* i. 1192, 1193. *A. styracifolia*, *Lamk. Dict.* i. 546, *encl. syn.* *Desmochæta flavescens*, *DC. Cat. Hort. Monsp.* 102; *Wall. Cat.* 6934. *D. patula*, *Roem. & Schult. Syst.* v. 550. *Amarantus arctioideus*, *Perrottet Pl. Exsic.* No. 94.

UPPER GANGETIC VALLEY and PANJAB. WESTERN TROPICAL HIMALAYA, alt. 1–3000 ft., from Kashmir to Kumaon. BEHAR, SCINDE, GUZERAT and the DECCAN PENINSULA.—DISTRIB. Tropical Asia and Africa.

A large straggling undershrub; branches terete. *Leaves* 2–4 in., base acute; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowering clusters* $\frac{1}{4}$ in. long, fruiting $\frac{1}{2}$ in. diam.

VAR. *velutina*; erect, subsimple, densely villously tomentose, leaves $\frac{1}{2}$ –1 in., shortly petioled orbicular. *Desmochæta velutina*, *Wall. Cat.* 6935; *Moq. l. c.* 332. *Ærua velutina*, *Moq. l. c.* 301.—Deccan Peninsula, *Wight in Herb. Wall.* Burma, at Lounggee Yenong and Pagham on the Irawaddi, *Wallich*.—Moquin has described Wallich's 6935 under both *Desmochæta* and *Ærua*, quoting the same number in each case.

10. **PSILOTRICHUM**, *Blume*.

Herbs or shrubs. *Leaves* opposite. *Flowers* white or greenish, in solitary or panicked dense clusters or spikes. *Sepals* 5, hard; outer boat-shaped, gibbous below, ribbed. *Stamens* 5, unequal, connate below into a cup; anthers 2-celled; staminodes 0. *Ovary* oblong or subglobose; style slender, stigma capitate or 2-fid; ovule 1, pendulous from a long basal funicle. *Utricle* globose or compressed, indehiscent. *Seed* inverse, lenticular, testa coriaceous or crustaceous; embryo annular.—Species 10, Asiatic, African and Pacific.

* *Shrubs or undershrubs with woody stocks and lower branches.*

1. **P. nudum**, *Moq. in DC. Prodr.* xiii. 2, 280; shrubby, branches

divaricate glabrous, leaves petioled ovate-lanceolate acute glabrous, spikes sessile many-fl'd., bracts lanceolate, sepals $\frac{1}{4}$ in. deeply grooved hairy. *Achyranthes nuda*, *Herb. Heyne in Roxb. Fl. Ind., Ed. Carey & Wall.* ii. 507; *Wall. Cat.* 6926. *A. montana*, *Klein mss.* *A. polygonoides*, var. *Herb. Heyne.*

DECCAN PENINSULA; *Heyne, G. Thomson.*

Branches many from the woody stock, 2-3 ft., terete, woody, tips only hairy. Leaves $1\frac{1}{2}$ -3 in., glabrous, narrowed into a short petiole, nerves faint. Spikes $\frac{1}{2}$ -1 $\frac{1}{2}$ in., strict, hairy, 6- or many-fl'd.; bracts persistent, acuminate. Sepals pubescent, deeply grooved, rigid, acuminate.—Very near a S.E. Tropical African species.

2. ***P. scleranthum***, *Thwaites Enum.* 248; an undershrub, branches divaricate tomentose, leaves subsessile ovate-lanceolate acute scaberulous, spikes terminal peduncled 3-nate, bracts broadly ovate, sepals $\frac{1}{4}$ in. obscurely grooved hairy.

CEYLON; at Anooradhapoor, *Gardner.*

Habit of *P. nudum*, but branches tomentose, leaves scaberulous on both surfaces and inflorescence branched. The 3 terminal spikes are sessile on the top of a tomentose peduncle $\frac{1}{2}$ in. long, are dense-fl'd., oblong, the middle one $\frac{1}{2}$ in. erect, the lateral horizontal and shorter. Sepals pubescent, pungent.—Described from a single specimen.

3. ***P. calceolatum***, *Moq. in DC. Prodr.* xiii. 2, 280; a small undershrub, branches divaricate pubescent or glabrate, leaves subsessile ovate or elliptic acute glabrous sparsely hairy, spikes axillary sessile or peduncled short few-fl'd., bracts cymbiform acute, sepals $\frac{1}{2}$ in. oblong acute ribbed villous. *P. nudum*, *Wight Ic.* t. 1775. *Achyranthes calceolata*, *Herb. Russel in Wall. Cat.* 6927. *A. glauca*, *Herb. Heyne.* *Ptilotus ovatus*, *Moq. l. c.* 281.

DECCAN PENINSULA, *Heyne*, in jungles on the hills, *Wight*. CEYLON; in the hotter parts of the island, *Moon*, &c.

Habit of *P. nudum* (sometimes subscent, *Wight*), but much smaller and more slender. Leaves $\frac{1}{2}$ -1 $\frac{1}{2}$ in. Spikes 4-6-fl'd., sometimes peduncled by being terminal on a leafless axillary branch, at others the peduncle itself lengthens.—A Natal species hardly differs.

VAR. *tomentosa*; leaves pubescent above tomentose beneath.—Scraps of this are on sheets of 6926 A and 6927 B in *Herb. Wall.*

** *Annuals.*

4. ***P. trichotomum***, *Blume Bijl.* 545; annual, slender, glabrous, branches erect, leaves petioled elliptic- or elliptic-lanceolate acute, spikes terminal and in the forks sessile or peduncled, bracts lanceolate, sepals $\frac{1}{2}$ in. deeply grooved acuminate glabrous. *Moq. in DC. Prodr.* xiii. 2, 280. *Achyranthes* ? *carnosa*, *Wall. Cat.* 6931. *Leiospermum ferrugineum*, *Wight Ic.* t. 721.

ASSAM, *Griffith.* SILHET, at Terrya Ghat, *H. f. & T. PEGU, McClelland.*—DISTRIB. Java, Borneo, Philippines.

Flaccid, 12-18 in. high, decumbent. Leaves 1-2 $\frac{1}{2}$ in., rarely obovate, thin, narrowed into a very short petiole. Spikes $\frac{1}{2}$ - $\frac{3}{4}$ in., green, terminal, sometimes 3-nate; flowers crowded. Sepals narrow.

5. ***P. ferrugineum***, *Moq. in DC. Prodr.* xiii. 2, 279; annual, glabrous, branches prostrate, leaves linear- or obovate-oblong, spikes terminal and in the forks sessile or peduncled, bracts subulate-lanceolate, sepals $\frac{1}{2}$ in. deeply grooved glabrous, outer obtuse. *Achyranthes ferruginea*, *Roxb. Fl. Ind.* i.

675, and *Ed. Carey & Wall.*, ii. 502. *Leiospermum ferrugineum*, *Wall. Cat.* 6923.

BENGAL; a weed in the gardens and cultivated lands of Calcutta, *Roxburgh*.

Wallich's specimen forms an excessively branched prostrate mass 9 in. diam., with divaricate branches and linear-oblong leaves 1-1½ in. long. *Spikes* ½ in. long, dense-fld., yellow when dry.—*Roxburgh's* description applies more nearly to *P. trichotomum* in the form of the leaves, and *Wight's* figure, copied from *Roxburgh's* drawing, and which shows acuminate sepals, is, I think, certainly taken from the latter plant. There are no indications in Wallich's specimens gathered in the Calcutta Garden of the rust-coloured stem, reddish leaves and dull red flowers described by *Roxburgh*.

11. **PSILOSTACHYS**, *Hochst.*

Slender dichotomous herbs. *Leaves* opposite. *Flowers* minute, spicate at the tips of the filiform branches of a lax panicle. *Sepals* 5, 2-3 outer convex, strongly 3-nerved, inner narrower. *Stamens* 5, free; anthers 2-celled; staminodes 0. *Ovary* rounded or ovoid, compressed; style slender? stigma capitellate. *Utricle* indehiscent. *Seed* inverse, testa coriaceous; embryo hooked, cotyledons slender.—Species 3, Indian, Arabian and African.

P. sericea, *Hook. f. in Gen. Plant.* iii. 32; stem erect, villous with long hairs, leaves orbicular-ovate acute densely villous above silky beneath, peduncles very long axillary filiform, pedicels capillary, spikes 4-6 fld. *Achyranthes sericea*, *Koen. in Roxb. Fl. Ind.* iii. 675, and *Ed. Carey & Wall.* ii. 502; *Moq. in DC. Prodr.* xiii. 2, 318; *Wight Ic.* 726; *Wall. Cat.* 6930. *Psilotrichum sericeum*, *Dalz. in Dalz. & Gibs. Bomb. Fl.* 216.

GOOZERAT; sandy hills on the coast of Kattiarwar, *Dalzell* (and *Koenig*?).

Annual? *Stem* stout, hard, terete; hairs patent, ¼ in. long, flexuous, terminating in a lax panicle of erecto-patent opposite branches 2 in. long, which divide at the tip into capillary pedicels bearing the spikes. *Leaves* 1 in., thick, base rounded or cordate; petiole very short. *Spikes* ¼-½ in., rachis capillary zigzag; flowers ⅓ in. long. *Sepals* ovate-lanceolate; outer pungent, deeply ribbed, silky.—A very beautiful plant; it is not known where *Koenig* procured it, if indeed he did himself procure it. The specimen in the Wallichian Herbarium is marked "Herb. Koenig."

12. **NOTHOSÆRUA**, *Wight.*

An annual with opposite spreading branches. *Leaves* opposite. *Flowers* most minute, woolly, in axillary solitary or clustered spikelets. *Sepals* 3-5, hyaline, obtuse, 1-nerved. *Stamens* 1-2, free; anthers 2-celled; staminodes 0. *Ovary* oblong, compressed; stigma subsessile, capitellate; ovule 1, pendulous from a long basal funicle. *Utricle* oblong, compressed, indehiscent. *Seed* inverse, lenticular, testa crustaceous; embryo hooked, cotyledons linear.

N. brachiata, *Wight Ic.* vi. 1. *Pseudanthus brachiatus*, *Wight l. c. t.* 1776, *excl. analyses*, and v. 3, t. 1776 *bis*, B. *Ærua brachiata*, *Mart. Beitr. Amarant.* 83, n. 3; *Moq. in DC. Prodr.* xiii. 2, 304 (*incorrect as to staminodes*); *Dalz. & Gibs. Bomb. Fl.* 217. *Æ. chenopodiifolia*, *Bojer Hort. Maurit.* 268. *Achyranthes brachiata*, *Linn. Mant.* 50; *Roth Nov. Sp.* 169. *Illecebrum brachiatum*, *Linn. Mant.* 23. *Amarantus minutus*, *Lesschen. mss.*

UPPER GANGETIC VALLEY and the PANJAB, from Moradabad north-eastward.

SCINDE and the CONCAN, *Stocks*, &c. MAISOR and the CARNATIC. BURMA, *Wallich*. CEYLON, common.—DISTRIB. Mauritius, E. and W. tropical Africa.

Erect, 1–2 ft., branched from the base; branches puberulous, spreading. *Leaves* 1–2 in., ovate elliptic or subovate, obtuse or subacute, membranous, green; petiole $0\frac{1}{4}$ in. *Spikes* very numerous, sessile, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, cylindric, white, dense-fld., bracts broadly ovate, hyaline, persistent. *Sepals* $\frac{1}{10}$ in. long, silkily villous.—One of the smallest flowered plants provided with a regular perianth. Moquin has probably confounded this with the very similar *Ærua lanata* (as did Wight), to which the latter part of his description applies.

13. *ÆRUA*, Forsk.

Woolly herbs or undershrubs. *Leaves* alternate or opposite. *Flowers* small or minute, in solitary or paniced spikes, often polygamous. *Sepals* 4–5, short, membranous, all or the inner only woolly. *Stamens* 4–5, connate below with interposed linear staminodes into a cup; anthers 2-celled. *Ovary* ovoid or subglobose; style long or short, stigma capitate or 2-fid; ovule 1, pendulous from a long basal funicle. *Utricle* indehiscent, or the coriaceous crown circumsciss. *Seed* inverse, testa coriaceous; embryo annular.—Species 10, tropical Asiatic and African.

* *Spikes axillary and in terminal panicles. Leaves opposite or alternate.*

1. *Æ. javanica*, *Juss. in Ann. Mus.* xi. 131; hoary-tomentose, shrubby below, leaves from linear to oblanceolate or oblong acute obtuse or retuse, spikes elongate densely woolly not glistening, style elongate, stigmas long. *Wall. Cat.* 6908; *Wight Ic.* t. 876; *Moq. in DC. Prodr.* xiii. 2, 299; *Dalz. & Gibs. Bomb. Fl.* 216; *Boiss. Fl. Orient.* iv. 992. *Æ. Wallichii*, *Moq. l. c.* 300. *Æ. tomentosa*, *Forsk. Fl. Æg. Arab.* 122; *Lamk. Dict.* i. 46. *Æ. ægyptiaca*, *Gmel. Syst.* 1026. *Æ. Bovii*, *Edgew. in Journ. Linn. Soc.* vi. 206. *Æ. incana*, *Mart. in Nov. Act. Acad. Nat. Cur.* xii. (1826), 291. *Achyranthes alopecuroides*, *Lamk. l. c.* 548. *A. javanica*, *Pers. Syn.* i. 259. *A. incana*, *Roxb. Fl. Ind.* i. 671, and *Ed. Carey & Wall.* ii. 495. *Illecebrum javanicum*, *Ait. Hort. Kew.* 289. *Iresine javanica* & *persica*, *Burm. Fl. Ind.* 212 (by error 312), t. 65. *Celosia lanata*, *Linn. Sp. Pl.* 298.

From the OUDH TERAI, *Wallich*, to the PANJAB, *Royle*, &c. SCINDE, *Stocks*. CENTRAL INDIA, *Clarke*. The DECCAN from the CONCAN southward. BURMA, *Wallich*. CEYLON; N. of the island, *Gardner*.—DISTRIB. Westward to Arabia, E. and W. tropical Africa, and the Cape Verde Islands. Java?

Diœcious. *Stem* terete, 2–3 ft., branched, as thick as a goose-quill. *Leaves* alternate, 1–4 in., flat or with recurved margins, sessile or narrowed into a petiole; nerves distinct. *Spikes* often in large panicles, sessile, erect or nodding, 1–6 in. long. *Flowers* $\frac{1}{10}$ in. long, enveloped in long wool, males very rare.—*Edgeworth* (*Fl. Mall.* l. c.) insists that the narrow-leaved form is a distinct species, and is odorous, which *Æ. javanica* (which grows with it) is not. *Boissier* makes a variety of it; local botanists should see to this.

2. *Æ. scandens*, *Wall. Cat.* 6911, *excl. M*; a climbing undershrub, branches hoary-tomentose, leaves ovate elliptic oblong or lanceolate obtuse or acute glabrous or hoary, spikes globose ovoid or shortly cylindric woolly shining, sepals lanceolate acuminate, stigmas very short. *Moq. in DC. Prodr.* xiii. 2, 302; *Wight Ic.* t. 724 (utricle and seed wrong); *Dalz. & Gibs. Bomb. Fl.* 217. *Achyranthes scandens*, *Roxb. Fl. Ind.* i. 676, and *Ed. Carey & Wall.*, ii. 503.

Plains of BENGAL, and from ASSAM to the PANJAB; ascending the HIMALAYA to 5000 ft. from Kumaon to Bhotan. CENTRAL INDIA and BEHAR, and summit of Parusnath. CONCAN, *Stocks*. PEGU, *M'Clelland*. BURMA, *Wallich*, &c.—DISTRIB. China, Malay Islands, Philippines, E. and W. tropical Africa.

Stem woody below; branches straggling, several feet long. *Leaves* opposite and alternate, soft, green, 1–4 in. long, sometimes almost rounded; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Spikes* sessile, rarely peduncled, $\frac{1}{4}$ –1 in. *Sepals* $\frac{1}{10}$ in. long, lanceolate.—Wight has erroneously figured the utricle as circumsciss and seed horizontal. I doubt if *Æ. sanguinolenta*, Blume, and *Æ. timorensis*, Moq., differ from this.

VAR. ? *subglobosa*; branches glabrous, spikes large subovoid or globose, $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., on slender peduncles.—Mergui, *Griffith* (in *Herb. Wight*).—This resembles very indifferent specimens of *Æ. scandens* (*Æ. velutina*, Moq.) from the Philippines (Cuming, No. 1635), but the spikes are larger.

3. *Æ. glabrata*, *Hook. f.*; minutely hairy, leaves elliptic-ovate subacute, spikes small cylindric paniced or fascicled towards the ends of the branches glistening, bracts ovate equalling the very minute flowers, sepals broadly oblong-ovate obtuse or apiculate sparingly hairy.

BURMA or MALAY PENINSULA, *Griffith*.

Habit of *Æ. scandens*, but the flowers are very minute, about $\frac{1}{8}$ in. long, with very broad short and sparsely hairy bracts and sepals, the latter with usually a very broad green midrib. Hance's *A. scandens*, var. from Canton, may be the same, but the spikes are too young for comparison.

** *Spikes all axillary sessile. Leaves alternate.*

4. *Æ. lanata*, *Juss. in Ann. Mus.* xi. 131; erect or prostrate, branched from the base, hoary tomentose, leaves small petioled elliptic orbicular-ovate or orbicular obtuse or acute, spikes small very numerous oblong or subcylindric densely woolly not glistening. *Moq. in DC. Prodr.* xiii. 2, 303; *Wall. Cat.* 6909; *Wight Ic.* t. 723; *Grah. Cat. Bomb. Pl.* 168; *Dalz. & Gibs. Bomb. Fl.* 217; *Boiss. Fl. Orient.* iv. 993. *Æ. floribunda*, *Wight Ic.* t. 1776, the analysis only, and vol. v. t. 1776 bis, f. A. *Achyranthes villosa*, *Forsk. Fl. Æg. Arab.* 48. A. *lanata*, *Linn. Sp. Pl.* 296; *Roxb. Fl. Ind.* i. 676, and *Ed. Carey & Wall.* ii. 503. *Illecebrum lanatum*, *Linn. Mant.* 344.—*Rheede Hort. Mal.* x. t. 29; *Burm. Fl. Zeyl.* t. 60, f. 1.

Plains of BENGAL from Dacca and Behar westward to the Indus. The CONCAN, CENTRAL INDIA, and throughout the DECCAN. CEYLON abundant.—DISTRIB. Westward to Arabia and tropical and S. Africa, Java, Philippines.

Branches many, 6–10 in., from a woody stock, simple or divided, woolly. *Leaves* $\frac{1}{2}$ –1 in., woolly or glabrate. *Spikes* $\frac{1}{4}$ – $\frac{1}{2}$ in., sometimes excessively crowded and forming subglobose clusters. *Sepals* obtuse.—Wight's t. 723 is probably *A. scandens*.

5. *Æ. Wightii*, *Hook. f.*; branches short woody and leaves beneath densely woolly, leaves small broadly ovate or elliptic obtuse thick, clusters all axillary sessile shortly oblong or globose densely woolly not glistening, outer sepals linear-oblong aristate, inner obtuse.

TRAVANCORE; at Courtallum, *Wight*.

A low-growing bushy plant, 6–12 in. high, with many stiff branches as thick as a crow-quill, from a stout woody tap-root. *Leaves* 1 in. long, narrowed into a short petiole. *Clusters* $\frac{1}{4}$ – $\frac{1}{3}$ in. long, with the acicular tips of the bracts and outer sepals a little longer than the wool; flowers $\frac{1}{12}$ in. long.

*** *Spikes peduncled. Sepals 4. Leaves filiform in opposite fascicles.*

6. *Æ. Monsonia*, *Mart. Beitr. Amarant.* 83; stem hoary-tomentose

or woolly trichotomously branched angled and grooved, spikes cylindric on opposite strict horizontal peduncles or branches glistening, sepals lanceolate acuminate, utricle oblong, top circumsciss. *Moq. in DC. Prodr.* xiii. 2. 305; *Wall. Cat.* 6912; *Dalz. & Gibs. Bomb. Fl.* 217. *Æ. ? setacea, Mart. l. c.*; *Moq. l. c.* Achyranthes Monsonia, *Pers. Syn.* i. 258; *Roxb. Fl. Ind.* i. 673, and *Ed. Carey & Wall.* ii. 499; *Wight Ic.* t. 725. *A. setacea, Roth Nov. Sp.* 168. *A. pungens, Lamk. Dict.* i. 546. *Celosia Monsonia, Retz Obs.* ii. 13. *Illecebrum Monsonium, Linn. f. Suppl.* 161.

BENGAL, *Roxburgh*. CENTRAL INDIA; Sumbulpore, *Griffith*. BURMA; at Yenongheum, *Wallich*. THE CONCAN and DECCAN PENINSULA; abundant in dry places.

Branches many, prostrate or ascending from a very long flexuous woody tap-root, 1-3 ft., with numerous woolly nodes, and opposite or 3-nately whorled fascicles of leaves and peduncled spikes or branches. *Leaves* $\frac{1}{2}$ -1 in., exceedingly slender, woolly. *Spikes* as long, with densely imbricating rose-coloured flowers, solitary or subpanicled; bracts many, lanceolate. *Sepals* 4, subulate-lanceolate, acuminate, $\frac{1}{2}$ in. long. *Utricle* enclosed in the large staminal cup; stigma capitate, subsessile.

DOUBTFUL SPECIES.

Æ. RADICANS, Mart. Beitr. Amarant. 83 (*Moq. in DC. Prodr.* xiii. 2. 302. *Achyranthes radicans, Heyne in Roth Nov. Sp.* 170), is undetermined.

Æ. ? NERVOSA, Mart. l. c. (*Moq. l. c.* 306, *Achyranthes nervosa, Roth l. c.*), and *A. PUBESCENS, Mart. l. c.* (*Moq. l. c.*, *Achyranthes pubescens, Roth l. c.* 171; *Illecebrum pubescens, Willd. Enum. Hort. Berol.* i. 271) are both indeterminable.

14. STILBANTHUS, Hook. f.

A climbing tree with pendulous branches. *Leaves* opposite. *Flowers* large, white, shining, in paniced pubescent spikes. *Sepals* 5, hard and scarious, narrowly ovate-lanceolate, acute, tips bearded at the back, outer broader. *Stamens* 5, filaments shortly connate below, with long ligulate lacerate staminodes; anthers 2-celled. *Ovary* oblong, compressed, tip penicillate; style filiform, stigma capitate; ovule 1, pendulous from a long basal funicle. *Utricle* oblong, top villous, indehiscent. *Seed* inverse, testa coriaceous; embryo annular.

S. scandens, Hook. f. in Hook. Ic. Pl. t. 1286. *Ærua scandens, Gamble, Trees, &c., of Darjeeling, not of Wallich.*

EASTERN BENGAL, *Herb. Griffith*. SIKKIM HIMALAYA, alt. 5-7000 ft., *J. D. H.*

Trunk as thick as the thigh, "reaching the tops of tall trees, which it covers with masses of handsome flowers and soft whitish leaves." *Gamble. Branches* soft, herbaceous, obtusely 4-angled, terminal silkily hairy, bases of internodes and of petioles contracting when dry. *Leaves* 4-6 by 2-3 in., elliptic, acuminate at both ends, finely pointed, sparsely pubescent above, villous or glabrate beneath; petiole $\frac{1}{2}$ -1 in., villous. *Spikes* 1-3 in. long, in terminal spreading trichotomously branched panicles, sessile or peduncled, cylindric; peduncles and pedicels villous. *Flowers* spreading, $\frac{1}{2}$ in. long, white, shining; bracts short, ovate, apiculate; bracteoles rather longer. *Sepals* striate. *Filaments* very slender, hairy, shorter than the filiform staminodes; anthers oblong.—The most gigantic Asiatic plant of the Order.

15. ACHYRANTHES, Linn.

Herbs. *Leaves* opposite. *Flowers* in slender simple or paniced spikes, soon deflexed; bracts and bracteoles spinescent. *Sepals* 4-5, subulate-lanceolate, aristate, shining, at length hardened and strongly ribbed. *Stamens* 2-5, filaments connate at the base with as many square staminodes, each of which is toothed or has a toothed scale at its back; anthers 2-celled.

Ovary oblong, subcompressed; style filiform, stigma capitate; ovule 1, pendulous from a long basal funicle. *Utricle* oblong or ovoid, indehiscent, top areolate or rounded. *Seed* inverse, oblong, testa coriaceous; embryo annular.—Species 12, all tropical or subtropical.

* *Outer sepal longest.*

1. **A. aquatica**, *Br. Prodr.* 417; tall, stout, finely pubescent, leaves elliptic-lanceolate acuminate, spikes elongate, rachis villous or pubescent, flowers $\frac{1}{2}$ in. long, bracts small scarious, bracteoles orbicular, sepals rigid glabrous, outer longer pungent. *Roxb. Fl. Ind.* i. 673, and *Ed. Carey & Wall.* ii. 497. *A. natans*, *Ham. in Wall. Cat.* *A. trichotoma*, *Perrott. Herb. Seneg.* n. 180. *Centrostachys aquatica*, *Wall. Cat.* 6932; *Moq. in DC. Prodr.* xiii. 2, 321; *Endl. Iconog.* t. 20. *Celosia spinescens*, *Herb. Russel.*

NEPAL TERAI, *Wallich.* ASSAM and SILHET, *Griffith, De Silva.* TENASSERIM; at Moulmein, *Wallich.* CIRCARS and COROMANDEL, *Roxburgh.*—DISTRIB. Tropical Africa.

Stem 2–4 ft., as thick as the thumb below, straggling in the water and rooting along the banks of rivers, &c., branched. *Leaves* 3–6 in., narrowed into a petiole, $\frac{1}{2}$ –1 in. *Spikes* 3–18 in.; bracts small, membranous, concave, long-acuminate from an ovate base; bracteoles membranous, embracing the thickened perianth base. *Perianth* shining, very variable in size and thickness, base much thickened.

** *Sepals subequal.*

2. **A. aspera**, *Linn. Sp. Pl.* 204; leaves orbicular obovate or elliptic, spikes rigid, bracteoles ovate half as long as their spine or longer, stamens 5, staminodes fimbriate. *Moq. in DC. Prodr.* xiii. 2, 314; *Boiss. Fl. Orient.* iv. 993; *Roxb. Fl. Ind.* i. 672, and *Ed. Carey & Wall.* ii. 496; *Dalz. & Gibs. Bomb. Fl.* 218; *Wight Ic.* 1780; *Wall. Cat.* 6924, excl. H.

Throughout INDIA and CEYLON; an abundant weed in dry places.—DISTRIB. Tropical Asia, Africa, Australia and America.

Stem 1–3 ft., simple or branched. *Leaves* 1–5 in., extremely variable, generally thick, pubescent tomentose or velvety, rarely glabrate; petiole short. *Spikes* usually with a robust rachis that rapidly lengthens, sometimes to a foot long. *Flowers* $\frac{1}{2}$ – $\frac{1}{4}$ in., longer than the bracteoles. *Staminodes* fimbriate from the margin or from an appendage below the margin behind.

VAR. rubro-fusca; leaves elliptic-ovate acute brown when dry. *A. rubro-fusca*, *Wight Ic.* t. 1778 (*A. viridis*).—Nilghiris, *Wight.* Ceylon.

VAR. porphyristachya; much larger, 4–6 ft., diffusely branched, leaves 3–10 in. broadly elliptic acuminate glabrous or pubescent, membranous, spikes with a more slender rachis. *A. porphyristachya*, *Wall. Cat.* 6925; *Moq. l. c.* 316. ? *A. argentea*, *Thwaites Enum.* 249.—In moister climates than *A. aspera* proper. Sikkim Himalaya, alt. 2–5000 ft. Chittagong, *J. D. H. & T. T. Nilghiris, Wight, &c. Ava, Wallich.*

VAR. argentea; leaves silverily silky beneath. *A. argentea*, *Thwaites Enum.* 249; *Lamk. Dict.* i. 545.—Thwaites mentions this as found at Caltura by Moon, but I have seen no specimens; he includes under it *A. porphyristachya* and *rubro-fusca*, which makes me doubt his being Lamarck's plant, which is an European, Arabian and African one.

3. **A. bidentata**, *Blume Bijd.* 545; branches slender rambling, leaves from elliptic to linear lanceolate acuminate glabrous or pubescent membranous, spikes very slender, bracteoles usually reduced to a spine minutely 2-auricled at the base, stamens 5, staminodes toothed. *Moq. in DC. Prodr.*

xiii. 2, 312; *Wight Ic.* t. 1779. *A. Wightiana* and *A. lanceolata*, *Wall. Cat.* 6928, 6929. *A. aspera*, *Wall. Cat.* 6924 H.

TEMPERATE and SUBTROPICAL HIMALAYA; from Kishtwar, *Clarke*, to Sikkim, alt. 4-6000 ft., *J. D. H.* KHASIA MTS., alt. 4-6000 ft. BEHAR; top of Paruanath, *Thomson*. THE CONCAN, NILGHIRI and TRAVANCORE MTS., *Wight*, &c. CEYLON, abundant.—DISTRIB. China, Java, Japan.

Habit of *A. aspera*, var. *porphyristachya*, and leaves often as large, but the bracteoles are reduced to spines with scarcely a blade, or with a minute auricle on each side of the base, and the staminodes are not fringed. It may prove a form of that plant. Some Nynee-tal specimens, collected by Col. Davidson, almost with the blade of the bracteoles half as long as the spine, unite them in this respect. The very narrow-leaved forms (*Wallichiana* and *lanceolata*) occur in the Khasia and Himalaya along with the more typical, as they do in the Deccan hills.

4. *A. diandra*, *Roxb. Fl. Ind.* i. 504; stem slender diffusely branched, leaves linear-lanceolate or linear glabrous or nearly so, spikes very slender pubescent, bracteoles of a spine as long as the sepals 2-auricled at the base, stamens 2, staminodes fimbriate. *Centrostachys diandra*, *Wall. in Roxb. Fl. Ind.*, *Ed. Carey & Wall.* ii. 504; *Moq. in DC. Prodr.* xiii. 2, 322; *Wight Ic.* t. 722.

CEYLON; common in the warmer districts, *Thwaites*.

Annual or biennial, 12-18 in. high, very much more slender than any other species. *Leaves* 2-4 by $\frac{1}{4}$ - $\frac{3}{8}$ in., membranous, green. *Spikes* 3-6 in.; flowers distant, $\frac{1}{8}$ in. long, very slender.

UNDETERMINABLE SPECIES.

A. BENGALENSIS, *Lamk. Dict.* i. 459; *Moq. in DC. Prodr.* xiii. 2, 317. *Paronychia bengalensis*, *Roem. & Schultes Syst.* v. 521, not of *Juss.* *Illecebrum bengalense*, *Linn. Mant.* 213.

A. SARMENTOSA, *Vahl Symb.* ii. 44; *Moq. l. c.* 318.

16. *ALTERNANTHERA*, *Forsk.*

Herbs, usually prostrate. *Leaves* opposite. *Flowers* small, white, capitate; heads axillary, often clustered. *Sepals* unequal, anterior and 2 posterior flattened; 2 lateral innermost, concave. *Stamens* 2-5, filaments short, connate into a short cup with or without interposed staminodes; anthers 1-celled. *Ovary* orbicular or ovoid; stigma subsessile, capitate (rarely 2-fid); ovule 1, pendulous from a long basal funicle. *Utricle* compressed, ovoid orbicular or obcordate, margins often winged or thickened. *Seed* inverse, lenticular, testa coriaceous; embryo annular, cotyledons narrow.—Species about 16, tropical and subtropical.

1. *A. sessilis*, *Br. Prodr.* 417; branches many from the root prostrate or ascending, leaves linear oblong lanceolate or elliptic obtuse or subacute, sepals glabrous rigid acute, anthers 2-3, utricle obcordate. *Moq. in DC. Prodr.* xiii. 2, 357. *Boiss. Fl. Orient.* iv. 996; *Dalz. & Gibs. Bomb. Fl.* 220; *Wight Ic.* t. 727; *Wall. Cat.* 6921. *A. denticulata*, *Wall. Cat.* 6922. *A. prostrata*, *Don Prodr.* 86; *Moq. l. c.* 360, for the most part. *Achyranthes triandra*, *Roxb. Fl. Ind.* i. 678, and *Ed. Carey & Wall.* ii. 505. *Gomphrena sessilis*, *Linn. Sp. Pl.* 225.—*Rheede Hort. Mal.* x. t. 11.

Throughout hotter INDIA and CEYLON in damp places, ascending the HIMALAYA to 4000 ft.—DISTRIB. All warm countries.

Branches 3-18 in. long, glabrous, the ultimate with 2 lines of hairs; nodes often villous. *Leaves* 1-3 in., in watery places even longer (4 by 1 in.), rather fleshy, sometimes obscurely denticulate. *Clusters* $\frac{1}{8}$ - $\frac{1}{2}$ in. long, white, hardly glistening; flowers $\frac{1}{8}$ - $\frac{1}{2}$ in. long. *Utricle* usually broader than the perianth, very broadly

obcordate, rarely exceeding the sepals, wings often corky.—Wallich's *A. sessilis* & *denticulata* are all *sessilis* except Sheet 6921 F, of which all but the left-hand specimens are as *nodiflora*.

2. ***A. nodiflora***, Br. Prodr. 417; branches prostrate or ascending, leaves linear linear-oblong or lanceolate obtuse or subacute, sepals glabrous hyaline finely acuminate, anthers 3, utricles much shorter than the sepals obcordate. Moq. in DC. Prodr. xiii. 2, 356; Benth. Fl. Austral. v. 249. *A. denticulata*, Br. l. c.

SILHET, Wallich. TENASSERIM, at Mergui, Griffith.—DISTRIB. Tropical Asia, Australia, Polynesia and Africa, Japan.

Often very difficult to distinguish from *A. sessilis*, heads often in great clusters (not seen in Indian specimen), sepals thinner, much more pointed, and utricles smaller and not so broad.—This would seem to be the most abundant African and Australian plant, though scarce in India proper. Benth's *A. denticulata* (Fl. Austral. v. 249) is, I think, *A. sessilis*; he mentions the difficulty of distinguishing it from *nodiflora*, but says nothing about *sessilis*. Boissier (Fl. Orient. iv. 996) considers *nodiflora* and *denticulata* to be one and the same, and different from *sessilis*.

17. **GOMPHRENA**, Linn.

Herbs, hirsute or villous, with usually thickened nodes. Leaves opposite. Flowers capitate or spicate, white or coloured. Sepals 5, lanceolate, acuminate. Stamens 5, filaments linear united below into a long tube cleft at the top, with a one-celled anther in each cleft, usually without interposed staminodes. Ovary subglobose or turbinate; style short or long, stigmas 2; ovules 1, pendulous from a long basal funicle. Utricle compressed, indehiscent. Seed inverse, lenticular, testa coriaceous; embryo annular.—Species 70, S. American and Australian, of which one is also Asiatic.

Gomphrena hispida, Linn. Sp. Pl. Ed. 2, i. 326 (Moq. in DC. Prodr. xiii. 1, 411), is founded on a plate in Hortus Malabaricus (ix. t. 72) which is quite unworthy of notice. It represents a plant with the habit of *G. globosa*, but with serrated leaves. *G. angustifolia*, Vahl Symb. iii. 45 (Moq. l. c. 417), stated to be a native of the East Indies (Koenig) and Guinea (Schumacher), is probably some garden escape of which nothing is known.

G. globosa, Linn. Sp. Pl. 224; erect, branched, hairy or silky, leaves shortly petioled elliptic or obovate-oblong acute or obtuse, heads large globose with 2 leafy bracts, bracteoles pinkish purple, lateral with a cristate dorsal wing, sepals densely woolly. Moq. in DC. Prodr. xiii. 2, 409; Roxb. Fl. Ind. ii. 63; Griseb. Cat. Bomb. Pl. 169; Dalz. & Gibs. Bomb. Fl., Suppl. 72; Wight Ic. 1784; Bot. Mag. t. 2815.—Rheede Hort. Mal. x. t. 37.

An escape from gardens in various parts of INDIA; cultivated in all countries—probably originating in America.

A tall dichotomously branched annual, branches stout obscurely 4-angled. Leaves 2–4 in., scaberrulous, pale green; petiole 0–1 in. Heads 1–1½ in. diam., peduncled, terminating the branches; bracts under the head ½–1 in.; flowers densely imbricate; branches ½–¾ in., scarious, lanceolate, much longer than the perianth. Sepals lanceolate, densely woolly, shorter than the staminal tube.

ADDITIONS AND CORRECTIONS, VOL. IV.

P. 7. *Uleria salicifolia*, Beddome; add *Hook. f. Ic. Pl. t. 1432*.

P. 8. *Atherolepis Wallichii*, Hook. f.; add *Hook. f. Ic. Pl. t. 1433*.

P. 33. At end of *Gymnema* add:—

G. ? *MACRANTHUM*, *Hook. f. Ic. Pl. t. 1436*; stem robust, leaves elliptic-ovate acuminate glabrous, cymes corymbose or subumbellate puberulous, peduncles stout, flowers large ebracteolate, sepals elliptic-oblong obtuse, corolla-tube equalling the sepals, lobes pubescent within, coronal processes of the corolla small villous inserted at the mouth of the corolla alternating with its lobes.

SIKKIM HIMALAYAS, *King*.

Stem terete. Leaves 3–5 in., distant, base rounded or cordate, nerves 3–4 pair; petiole $1\frac{1}{2}$ –2 in. *Peduncles* 2–3 in., stout, often decurved; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. *Sepals* $\frac{1}{4}$ in. *Corolla* $\frac{1}{4}$ in. diam., thick, tube glabrous within. *Column* large, stoutly stipitate; scales of the staminal corona adnate to the backs of the anthers, obtuse; anther-tips large, ovate-oblong, obtuse, membranous; pollen-masses shortly stipitate, oblong-reniform, corpuscle elongate erect. *Stigma* thick, obtuse, exserted.—A doubtful *Gymnema*, larger and more robust than any other Indian species, with singularly stout peduncles. The corolline coronal scales are almost reduced to tufts of hairs; the staminal scales resemble those of a *Marsdenia*.

P. 41. To section ** of *Tylophora* add:—

T. *MICROSTACHYS*, *Hook. f. Ic. Pl. t. 1450*; quite glabrous, leaves shortly petioled linear-lanceolate acuminate, cymes reduced to very short axillary sessile racemes, bracts minute setaceous, flowers minute shortly pedicelled, sepals setaceous equalling the corolla, staminal column subovoid, coronal processes obscure, follicles elongate poignard-shaped, tips elongate.

TENASSERIM; Moulmein, *Falconer in Herb. Calcutta*.

Stem very slender, twining. *Leaves* 2–3 by $\frac{1}{4}$ – $\frac{1}{2}$ in., subcoriaceous, midrib stout, nerves obscure. *Racemes* $\frac{1}{4}$ – $\frac{1}{2}$ in., oblong. *Flowers* $\frac{1}{2}$ in. diam. *Corolla-lobes* ovate. *Column* rather large, tips of anthers rounded. *Follicles* 2–4 in., thinly coriaceous. *Seeds* $\frac{1}{2}$ in. long, oblong-ovoid, concavo-convex, brown, hairs $\frac{1}{2}$ in. long.

P. 97. *Exacum zeylanicum*, Roxb.; add *Wawra It. Pr. S. Cob. Bot. t. 112*.

P. 112. *Gentiana argentea*, Royle; add *Wawra l. c. t. 113*.

P. 114. To *Gentiana* add:—

G. (*Chondrophyllum*) *LODERI*, *Hook. f. Ic. Pl. t. 1440 A*; quite glabrous, perennial, branches prostrate leafy, leaves subsessile broadly elliptic obtuse 3-nerved, flowers terminal solitary sessile, calyx campanulate, lobes equalling the tube spatulate spreading and recurved, corolla tubular-campanulate blue, lobes 5 rounded ovate, scales erect fimbriate, style slender.

KASHMIR, in the Sind or Lidar Valley? *Mrs. C. Radcliffe*.

Branches 2–3 in. *Leaves* $\frac{1}{2}$ in. long and broad, spreading, coriaceous, green or purplish-brown; floral hardly smaller. *Calyx* $\frac{1}{2}$ in., tube purplish; lobes green, coriaceous. *Corolla-limb* 1 in. diam.—I am indebted to E. G. Loder, Esq., for a specimen of this pretty species, which is quite unlike any other Indian one. It was brought to him by his friend the finder, who is uncertain as to its exact locality in the Kashmir Valley where she gathered it.

G. (*Chondrophyllum*) *TIBETICA*, *King in Hook. f. Ic. Pl. t. 1441*; stem very stout erect, stem-leaves 6 in. lanceolate connate at the base in a cylindric sheath, uppermost sessile whorled, flowers crowded in the uppermost axils sessile, calyx tubular membranous truncate split on one side, mouth minutely 5-toothed, corolla twice as long tubular-funnel-shaped, lobes 5 triangular with a triangular fold in each sinus, capsule included, seeds ellipsoid, testa reticulated.

EASTERN HIMALAYA; Chumbi (between Sikkim and Bhotan), alt. 11,000 ft. (*Herb. Calcutta*).

Stem 18 in. high, erect, as stout as a goose-quill, simple. *Cauline leaves* 5-7 by 1-1½ in., upper broader, uppermost spreading, forming an involucre to the flowers. *Corolla* nearly 1 in. long, not spotted, rather inflated in the middle. *Ovary* sessile; style short, stigma 2-lobed. *Capsule* sessile, linear-oblong, dehiscing at the tip by recurved valves.—The calyx and broader leaves distinguish this from the following.

G. (*Chondrophyllum*) *ROBUSTA*, *King mss.*; stem ascending robust simple, cauline leaves narrowly linear connate at the base in a tubular sheath, upper crowded, flowers sessile axillary and in a dense terminal involucre head, calyx spathaceous membranous half as long as the corolla 5-toothed, teeth short subulate, corolla tubular-campanulate, lobes short triangular with a triangular fold in each sinus.

EASTERN HIMALAYA with *T. tibetica* (Herb. Calcutta).

Stem 8-12 in. *Cauline leaves* 10-12 by 1 in., thickly coriaceous, nerves obscure near the midrib; floral shorter, broader at the base. *Calyx* split to the base, teeth setaceous, and usually longer than the others. *Corolla* 1¼-1½ in. long, not spotted, rather inflated in the middle.—This may prove a variety of *G. tibetica*.

P. 118. 35 *G. detonsa*, Fries. Asa Gray has shown that *G. serrata*, Gunner, is the earlier name for this species.

P. 123. 7 *Swertia bimaculata*, H. f. & T.—The anthers of this species become hastate in age.

P. 128. To subgenus *Euswertia* of *Swertia* add:—

S. KINGII, *Hook. f. in Ic. Pl.* t. 1442; perennial-rooted, stem tall erect robust simple, leaves opposite, radical broad elliptic subacute narrowed into a broad petiole, cauline oblong-ovate ½-amplexicaul, cymes axillary and in a terminal thyrses, sepals lanceolate quite entire, corolla 2 in. diam., petals oblong obtuse with two basal pits, margins fimbriate with long hairs, filaments with a fimbriate scale at the base behind.

SIKKIM HIMALAYA; at Na Tung (Herb. Calcutta).

Rootstock crowned with long fibrous remains of old leaves. *Stem* 2 ft. high, as thick as the thumb below. *Lower leaves* 3-6 by 2-4 in., many-nerved; petiole 2-3 in., semi-amplexicaul. *Flowers* greenish-white, pedicels sometimes umbellate. *Sepals* ¾ in., one-third shorter than the corolla-lobes. *Filaments* subulate-filiform. *Ovary* narrowly oblong, stigma sessile.—Most nearly allied to *S. petiolata*, Royle.

P. 133. Order *Polemoniaceæ*; in description for ovules many, read few or many; and for capsule *septicidal*, read *loculicidal*.

P. 135. Remove 19 *Bothriospermum* from **, and place it after 16 *Rochelia* in *.

P. 167. 19 *Bothriospermum*, Bunge. In 7th line of description after scar insert basal, and erase the 4 following words. In 8th line erase large.

P. 168. Line 7th from top, erase scar, &c.

P. 176. Under *A. Griffithii*, Boiss., erase *A. echiioides*, Hook. Bot. Mag. t. 4409, not of l. c.

P. 207. For *Ipomæa Stocksii*, Clarke, read *I. Clarkei*, Hook. f.

P. 220. Under *Evolvulus* insert "*E. numularius*, Linn., is getting common about Calcutta," King.

P. 248. 37 *Wulfenia*, for stamens 4, read 2.

P. 249. Under *Phtheirospermum* erase *reticulate*. Erase 50 *Emmenospermum* and the rest of the line.

P. 250. Before 4 *Linaria* insert Tribe III. *Antirrhineæ*.

P. 253. Before 7 *Scrophularia* insert Tribe IV. *Cheloneæ*.

P. 275. In description of *Torenia*, in 6th line after appendaged insert or not.

P. 277. 5 *T. asiatica*, var. *concolor*.—This I have since seen growing, and think it may be a different species; see Bot. Mag. t. 6797 A; it is *T. rubens*, Benth. Fl. Hongk., and a native of China.

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BY

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ASSISTED BY VARIOUS BOTANISTS.

VOL. V.

CHENOPODIACEÆ TO ORCHIDEÆ.

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FLORA OF BRITISH INDIA.

ORDER CXVII. **CHENOPODIACEÆ.**

Herbs or shrubs. *Leaves* simple, alternate, exstipulate. *Flowers* 1-2-sexual, small, usually regular, often dimorphic; bracts 1-3, or 0. *Calyx* inferior, of 3-5 free or connate sepals, imbricate in bud. *Petals* 0. *Stamens* usually 5, opposite the sepals, perigynous or hypogynous; anthers 2-celled. *Ovary* ovoid, globose or depressed, 1-celled; stigma 2-4; ovule solitary, basal or lateral, campylotropous. *Fruit* usually a utricle enclosed in the often enlarged fleshy calyx. *Seeds* horizontal or vertical, testa crustaceous, coriaceous or membranous; albumen floury fleshy or 0; embryo curved, annular or spiral.—Genera 80; species about 520, natives of all climates.

Three genera of the Tribe *Camphorosmeæ* are so characteristic of Afghan or Soongarian vegetation, that they may be expected to occur within the Indian frontier; they are *Camphorosma*, with an unequally 3-5-toothed compressed not tubercled perianth; *Panderia*, with an equally 5-lobed tubercled perianth; and *Kirilovia* with an equally 5-toothed smooth perianth.

Suborder I. CHENOPODIÆ. *Stem* not twining. *Bracteoles* free from the perianth. *Anthers* erect or incurved in bud.

Series 1. CYCLOLOBÆ. *Embryo* annular or horseshoe-like; albumen copious (0 in *Salicornia*).

Tribe I. **Euchenopodiæ.** *Stem* not jointed. *Flowers* clustered, all similar. *Leaves* flat. *Stamens* perigynous. *Embryo* usually annular.

Utricle circumsciss	1. ACROGLOCHIN.
Utricle indehiscent. Perianth 5-partite	2. CHENOPODIUM.
Utricle indehiscent. Perianth 5-lobed, base thickened	3. BETA.

Tribe 2. **Atriplicæ.** *Stem* not jointed. *Flowers* dimorphic; ♂ ebracteolate, 3-5-lobed or parted; ♀ usually without perianth and enclosed in 2 free or connate bracts, except *Spinacia*. *Stamens* perigynous. *Testa* crustaceous or coriaceous; embryo annular.

Fl. ♀ ebracteolate. Perianth 3-4-toothed	4. SPINACIA.
Fl. ♀ bracteoles flat, edges united or not	5. ATRIPLEX.
Fl. ♀ bracteoles conduplicate, edges united	6. EUROTIA.

Tribe 3. **Camphorosmeæ.** *Stem* not jointed. *Flowers* all similar or perianth in ♀ 0. *Stamens* hypogynous. *Utricle* naked or enclosed in the unchanged perianth. *Testa* membranous, adhering to the copious albumen; embryo horseshoe-formed.

Sepals 3-5. Utricle crested above	7. AXYSIS.
Sepals 3-5, united, of ♀ 0. Utricle crested above	8. MICROGYNÆCIUM.

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Tribe 4. **Corispermæ.** *Stem* not jointed. *Flowers* 2-sexual. *Fruit* exserted from the perianth. *Seed* erect, compressed; testa membranous, adhering to the copious albumen; embryo annular.

Fruit unarmed, hidden by the large bracts 9. CORISPERMUM.

Tribe 5. **Chenoleæ.** *Stem* not jointed. *Flowers* all similar. *Utricle* included in the usually enlarged perianth. *Stamens* hypogynous. *Seed* usually horizontal; testa membranous or coriaceous, adhering to the scanty albumen; embryo annular.

Fruiting perianth with simple or spinescent lobes 10. CHENOLEA.

Fruiting perianth with transverse wings 11. KOCHIA.

Tribe 6. **Salicorniæ.** *Stem* fleshy, usually jointed. *Flowers* 2-sexual, immersed in cavities of the joints or between the scales of a fleshy cone. *Testa* crustaceous, fleshy or membranous.

Seed with fleshy albumen; embryo semi-annular 12. ARTHROCNEMUM.

Seed exalbuminous; embryo conduplicate 13. SALICORNIA.

Series 2. **Spirolobeæ.** *Embryo* spiral; albumen scanty or 0.

Tribe 7. **Suædæ.** *Utricle* enclosed in the simply enlarged perianth. *Stem* not jointed.

Perianth 5-lobed. Leaves linear fleshy 14. SUEDA.

Tribe 8. **Salsolæ.** *Utricle* enclosed in the transversely winged perianth. *Stem* jointed or not.

* *Seed* horizontal. *Sepals* dorsally winged.

Stem jointed 15. HALOXYLON.

Stem not jointed 16. SALSOLA.

** *Seed* vertical. *Sepals* dorsally winged or not.

Seed dorsally compressed. Stem jointed 17. ANABASIS.

Seed laterally compressed. Sepals not winged. Anthers appendaged 18. HALOCHARIS.

Seed laterally compressed. Sepals winged. Anthers simple 19. HALOGETON.

Suborder II. **Baselleæ.** *Stem* twining. *Bracteoles* 2, broad, adnate to the face of the perianth. *Filaments* straight or recurved in bud.

Filaments straight in bud. Embryo spiral 20. BASELLA.

1. **ACROGLOCHIN**, Schrad.

An erect, strict, glabrous annual. *Leaves* alternate. *Flowers* minute, sessile, clustered in the axils of short axillary cymes, subtended by needle-like flowerless branches; bracts and bracteoles 0. *Sepals* 5, subacute, green. *Stamens* 1-3, filaments dilated below. *Ovary* depressed; style short, stigmas 2 subulate; ovule erect. *Utricle* disciform, depressed, circumsciss. *Seed* horizontal, testa black shining, albumen floury; embryo annular.

A. chenopodioides, Schrad. *Cat. Hort. Gött.* 1824. A. Schradenianus, *Schultes Herb.* A. persicarioides, *Moq. in DC. Prodr.* xiii. 2. 254.

Amarantus persicarioides, Poir. *Dict. Suppl.* i. 311. *A. cauliflorus*, Link *Enum. Hort. Berol.* ii. 389. *A. diandrus*, Spreng. *Neue Entd.* iii. 20. *A. persicarioides* and *A. acroglöchin*, Spreng. *Syst.* i. 927. *Lecanocarpus cauliflorus* Nees *Pl. Hort. Bonn.* 4, t. 2. *L. nepalensis*, Fisch. *ms.* *Blitanthus nepalensis*, Reichb. *Cat. Hort. Dresd.* 1824.

WESTERN HIMALAYA; from Kashmir, alt. 8-5000 ft., to Kumaon and ? Nepal. KHASIA MTS., alt. 5-6000 ft., J. D. H. & T. T.—DISTRIB. Yunnan.

Stem 1-2 ft.; branches 0 or short, erecto-patent, strict. *Leaves* 1-2½ in., obtuse or acute, lobulate and erose; petiole ¼-1 in. *Cymes* shorter than the leaves, ½ in. long and broad, branches rigid spreading. *Flowers* about ⅙ in. diam., green.

2. CHENOPODIUM, Linn.

Erect or prostrate herbs. *Stem* angled. *Leaves* alternate, entire lobed or toothed. *Flowers* minute, 2-sexual, in axillary clusters or cymes. *Sepals* 3-5. *Stamens* 1-5. *Disk* 0. *Ovary* free, depressed or compressed; styles 2-3. *Utricle* membranous, included in the perianth. *Seed* horizontal or vertical, testa crustaceous, albumen floury; embryo annular.—Species about 50, all climates.

* *Scentless or fœtid herbs. Sepals* 5, herbaceous (not succulent in fruit). *Embryo* perfectly annular.

1. **C. album**, Linn. *Sp. Pl.* 219; erect or ascending, mealy or green, leaves rhombic deltoid or lanceolate acute or obtuse, entire toothed or irregularly lobulate, upper narrower more entire, sepals keeled covering the utricule, seed smooth keeled. *Moq. in DC. Prodr.* xiii. 2. 70; *Boiss. Fl. Orient.* iv. 901; *Wall. Cat.* 6952 (excl. most of *C.* (= *Amarantus viridis*). *C. giganteum*, Don *Prodr.* 74; *Moq. l. c.* *C. nepalense*, Hort. *Monsp.* *C. album*, Linn. *C. viride*, Linn., and *C. laciniatum*, Linn.; *Roxb. Fl. Ind.* ii. 58, 59. *C. purpurascens*, Ham., in *Wall. Cat.* 6955. ? *C. vulpinum*, *Wall. Cat.* 6954 A.

TROPICAL and TEMPERATE HIMALAYA; from Kashmir to Sikkim, ascending to 12,000 ft. (wild and cultivated), and in WESTERN TIBET to 14,000 ft. Plains of HENGAL, the GANGETIC VALLEY and the PANJAB, KHASIA MTS., cult. DECCAN PENINSULA.—DISTRIB. Ubiquitous.

Stem 1-10 ft., rarely slender or decumbent, angled, often striped green, red or purple. *Leaves* extremely variable, in the cult. forms 4-6 in. long, with the petiole sometimes as long or longer. *Clusters* in compact or lax paniced spikes, which in cult. forms become thyrsoid. *Seeds* rarely vertical.—The cultivated forms vary from green to red.

2. **C. opulifolium**, Schrad. in *DC. Fl. Franc.* v. 372; erect or ascending, mealy, leaves broadly rhombic obtuse or acute sinuate-lobed upper similar, cymes axillary lax-fld, usually shorter than the leaves, sepals keeled partially covering the utricule, seed punctulate margin rounded. *Moq. in DC. Prodr.* xiii. 2. 67; *Boiss. Fl. Orient.* iv. 901.

CENTRAL and WESTERN HIMALAYA; Nepal, Wallich; Garwhal ?, Edgeworth; Kashmir and Lahore, alt. 6-8000 ft., Clarke. WESTERN TIBET, alt. 10-14,000 ft., Thomson.—DISTRIB. Europe, N. and W. Asia.

Very near *C. album*, and not easily distinguished in the small acute-leaved form except by the seed. In the ordinary state with broad openly sinuate obtuse leaves it is distinct enough.

3. **C. hybridum**, Linn. *Sp. Pl.* 219; erect, nearly glabrous, leaves large broadly triangular ovate long acuminate with 2-4 broad acute lobes

on each side, clusters in lax axillary and terminal almost leafless corymbose panicles, sepals obtusely keeled spreading in fruit, seed horizontal large opaque pitted hardly keeled. *Boiss. Fl. Orient.* iv. 902; *Moq. in DC. Prodr.* xiii. 2. 68; *Fl. Dan.* t. 2049.

WESTERN TIBET; Ladak, alt. 12,000 ft., *Thomson*. PESHAWUR; *Stewart*.—DISTRIB. Europe, N. Africa, N. Asia, N. America (introduced).

Stout or slender, with spreading branches, 1–3 ft. high, odour heavy. *Leaves* 3–5 in., almost shining, broadly ovate, pale green, thin, 3–5-nerved from near the usually cordate base. *Clusters* large or small.

4. **C. murale**, *Linn. Sp. Pl.* 219; nearly glabrous, leaves bright-green rhombic or deltoid-ovate acute sides lobed and sharply toothed base cuneate, clusters in lax or dense axillary divaricate cymes, sepals obtusely keeled incurved in fruit, seed horizontal dotted acutely keeled opaque. *Boiss. Fl. Orient.* iv. 902; *Moq. in DC. Prodr.* xiii. 2. 69; *Fl. Dan.* t. 2048. *C. Gandhium*, *Ham.* (& *Chamrium*, *Ham.*), *Wall. Cat.* 6953. *C. Hookerianum*, *Moq. in DC. Prodr.* xii. 2. 68.

UPPER GANGETIC VALLEY and the PANJAB; *Royle, &c.* KUMAON and NEPAL; *Hamilton, &c.* DECCAN PENINSULA; at Bangalore, Coimbatore and elsewhere. CEYLON; at Trincomalee, *Glenie*.—DISTRIB. Ubiquitous.

Rather fœtid. *Stem* 6–14 in., stout or slender, erect or ascending; branches decumbent. *Leaves* $\frac{3}{4}$ –3 in. broad, rather shining; petiole long or short. *Spikes* sometimes very slender.

5. **C. glaucum**, *Linn. Sp. Pl.* 220; branches decumbent or prostrate, leaves oblong or ovate-oblong sinuate-lobed or -toothed very mealy beneath, clusters in short dense axillary spikes, sepals keeled nearly covering the utricle. *Boiss. Fl. Orient.* iv. 333; *Moq. in DC. Prodr.* xiii. 2. 72.

WESTERN TIBET; Ladak, alt. 12–14,000 ft., *Thomson*.—DISTRIB. Europe, N. and W. Asia, N. America, S. Chili, Australasia.

Much and widely branched, often succulent; stem 6–18 in., shining. *Leaves* $\frac{1}{2}$ –1 in., tip obtuse or rounded, base cuneate. *Spikes* $\frac{1}{4}$ –1 in., simple or compound; lateral flowers usually 2–4-merous, with a vertical very small seed; terminal 5-merous, with a larger often horizontal seed.

**** Strongly aromatic glandular herbs. Embryo incompletely annular.**

6. **C. Botrys**, *Linn. Sp. Pl.* 219; erect, glandular-pubescent, branches and cymes spreading and recurved, lower leaves petioled ovate or oblong deeply sinuate or lobulate upper oblanceolate more entire, cymes short axillary and in long terminal racemes, sepals glandular-pubescent enclosing the utricle, seed horizontal subglobose smooth margin obtuse. *Moq. in DC. Prodr.* xiii. 2. 75; *Boiss. Fl. Orient.* iv. 903; *Sibth. Fl. Græc.* t. 253. *C. ilicifolium*, *Griff. Notul.* iv. 337, and *Ic. Pl. Asiat.* t. 521. *C. nepalense*, *Hort. Monsp.* *Ambrosia Botrys*, *Moq. Chenop. Enum.* 37; *Dalz. & Gibs. Bomb. Fl. Suppl.* 73.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 4–10,000 ft. PESHAWUR; *Stewart*. WESTERN TIBET; alt. 11–14,000 ft., a weed in fields.—DISTRIB. Europe, N. and W. Asia, N. Africa, introduced into America.

Very aromatic. *Stem* grooved and ribbed, 6–18 in. high, stout or slender. *Leaves* 1–3 in., usually oak-like, very obtuse; petiole variable. *Cymes* short, branched, flowers solitary or clustered, minute.

7. **C. ambrosioides**, *Linn. Sp. Pl.* 219; erect, puberulous and glandular, branches strict, leaves shortly petioled oblong or lanceolate obtuse

sinuate-toothed upper entire, clusters in slender axillary and terminal simple or paniced spikes, sepals enclosing the utricle, seed horizontal smooth shining margin obtuse. *Wall. Cat.* t. 6956; *Moq. in DC. Prodr.* xiii. 2. 72; *Boiss. Fl. Orient.* iv. 904; *Wight Ic.* t. 1786; *Dalz. & Gibs. Bomb. Fl. Suppl.* 73. *C. vulpinum*, *Wall. Cat.* 6954 B.

BENGAL, SILHET and the DECCAN; *Wallich, Heyne, &c.*—DISTRIB. Widely spread in the Old World, introduced into America.

Usually a tall rank aromatic much-branched plant, easily distinguished by the long slender spikes of small clusters. Wight remarks that the flowers are polygamous at Coimbatore.

*** *Scentless herbs.* *Sepals* 1-3, *succulent, baccate in fruit.* *Embryo imperfectly annular.*

8. **C. Blitum**, *Hook. f. in Gen. Plant.* 52; glabrous, erect or ascending, leaves petioled triangular hastate or deltoid and cordate acuminate deeply acutely unequally toothed, clusters sessile axillary and in terminal leafy spikes, perianth baccate not enclosing the utricle, seed vertical smooth margin obtuse. *Blitum virgatum*, *Linn. Sp. Pl.* 4; *Boiss. Fl. Orient.* iv. 905; *Moq. in DC. Prodr.* xiii. 2. 83; *Lamk. Ill.* t. 5; *Bot. Mag.* t. 276.

N.W. INDIA; Kashmir, alt. 8500 ft. WESTERN TIBET, alt. 12-14,000 ft., *Thomson, &c.*—DISTRIB. Europe, N. and W. Asia, N. Africa.

Stem 1-3 ft., rather stout, white. *Leaves* 1-3 in., bright green; petiole slender, shorter or longer than the blade. *Clusters* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. *Stamen* 1. *Seed* opaque.

3. **BETA**, *Linn.*

Succulent herbs. *Leaves* alternate, subentire. *Flowers* 2-sexual, solitary or in axillary spiked or cymose clusters. *Perianth* urceolate, 5-lobed, cohering in fruit by their enlarged hardened bases. *Stamens* 5. *Disk* fleshy, annular. *Ovary* depressed, sunk in the disk; style short, stigmas 2-4 subulate. *Utricle* adnate to the disk and base of perianth. *Seed* horizontal, testa thin, albumen floury; embryo annular.—Species 2 (or 6-8), N. Asiatic and European.

B. vulgaris, *Linn. Sp. Pl.* 222; annual or perennial, glabrous, root-leaves ovate or oblong obtuse base cuneate or cordate cauline rhombic ovate oblong obovate or lanceolate, spikes slender paniced, flowers sessile solitary or 2-3-nate, bracts narrow acute, sepals oblong obtuse thickened at the base in fruit. *Moq. in DC. Prodr.* xiii. 2. 55; *Boiss. Fl. Orient.* iv. 898; *Lamk. Encycl.* t. 182; *Grah. Cat. Bomb. Pl.* 171; *Dalz. & Gibs. Bomb. Fl. Suppl.* 73. *B. benghalensis*, *Roxb. Fl. Ind.* ii. 59; *Wall. Cat.* 6948. *B. orientalis*, *Roth Nov. Sp.* 181.

Cultivated in various parts of INDIA.

Stem 1-3 ft., erect, furrowed. Lower *leaves* 1-10 in., often trowel-shaped, base decurrent on the petiole, margin waved, upper short incurved. *Spikes* 6-18 in. slender; clusters remote. *Sepals* with membranous margins.—*Beet.*

4. **SPINACIA**, *Linn.*

Annual herbs. *Leaves* attenuate. *Flowers* diœcious, ebracteate, males in terminal leafless spikes; females in axillary clusters. MALE fl. *Sepals* 4-5, herbaceous, simple. *Stamens* 4-5, filaments capillary. FEM. fl.

Perianth subglobose, 2-4-toothed; fruiting enclosing the utricle, coriaceous, unarmed or with 2-3 dorsal spines. *Stigmas* long, filiform, connate below. *Utricle* hard, compressed, adnate to the perianth. *Seed* vertical, testa thin, albumen floury; embryo annular.—Species 4, Oriental, 2 of them extensively cultivated.

S. oleracea, Linn. *Sp. Pl.* 1027; erect, leaves deltoid ovate acuminate acutely broadly pinnatifidly lobed, fruiting perianths free. 2-spinous. *Moq. in DC. Prodr.* xiii. 2. 118; *Lamk. Encycl.* t. 814; *Grah. Cat. Bomb. Pl.* 171; *Dalz. & Gibs. Suppl.* 23. *S. tetrandra*, Roxb. *Fl. Ind.* iii. 771; *Wight Ic.* t. 818; *Wall. Cat.* 6949.

Cultivated throughout INDIA.—Native country unknown.

The *S. tetrandra* of Roxburgh is not the plant of Stevens, as M. de Candolle assumes it to be ("Origine des Plantes Cultivée," 79), but the common *S. oleracea*—which, as Boissier points out, is distinguished from *S. tetrandra* by the free fruiting perianths. Nevertheless De Candolle's suggestion that the cultivated *S. oleracea* is a derivative from the *S. tetrandra*, Stev., which is indigenous in the Caucasus, is a very reasonable one.—*Spinach*.

5. **ATRIPLEX**, Linn.

Herbs or shrubs, usually mealy. *Leaves* rarely opposite. *Flowers* monœcious or dicœcious. MALE fl. ebracteate. *Sepals* 3-5, oblong, obtuse. *Stamens* 3-5. FEM. fl. 2-bracteate; bracts flat, accrescent, dilated in fruit and forming a 2-valved covering to the utricle. *Perianth* 0. *Utricle* at the base of the greatly enlarged and hardened bracts; stigmas 2. *Seed* erect, or inverse and suspended from the funicle, rarely horizontal, testa various, albumen floury; embryo annular.—Species about 100, all temperate, cool and tropical regions.

* *Flowers* polygamous. *Seed* of the female fl. vertical, of the bisexual horizontal.

1. **A. hortensis**, Linn. *Sp. Pl.* 1053; annual, stout, erect, leaves not mealy triangular-cordate upper ovate-lanceolate, spikes axillary and in terminal panicles, fruiting bracts nearly free thin orbicular or elliptic reticulate obtuse or mucronate. *Moq. in DC. Prodr.* xiii. 2. 91; *Boiss. Fl. Orient.* iv. 907; *Grah. Cat. Bomb. Pl.* 171; *Dalz. & Gibs. Bomb. Fl. Suppl.* 73. *A. virgata*, Roth Nov. Sp. 377; *Moq. l. c.* 97. *A. bengalensis*, Lamk. *Dict.* i. 276. *A. heterantha*, Wight *Ic.* t. 1787.

Cultivated in many parts of BENGAL, the DECCAN, N.W. INDIA and up to 12,000 ft. in the WESTERN HIMALAYA and TIBET.—DISTRIB. Cultivated in Europe and N. and W. Asia.

This, the Arroche, Orache or Mountain Spinach of the French, is of unknown origin, being found only under cultivation or in cultivated ground.—A specimen of this from Heyne, in Rottler's Herbarium, bears the name *A. virgata*, thus identifying that obscure plant, which Roth described from very young individuals.

** *Annuals*, with monœcious flowers.

2. **A. crassifolia**, C. A. Mey. in Ledeb. *Fl. Alt.* iv. 309; green and hoary, erect or ascending and diffuse, branches white, leaves petioled oblong or ovate-oblong or hastately ovate obtuse entire or sinuate-toothed upper entire often acute, male clusters in slender leafless interrupted spikes, fruiting bracts rhombic-ovate or orbicular herbaceous entire or toothed with a very thick white convex smooth disk and base. *Moq. in DC. Prodr.* xiii.

2. 93; *Boiss. Fl. Orient.* iv. 909; *Lédeb. Ic. Fl. Alt.* t. 42. *A. laciniata*, *Aitchison Cat. Panjab Pl.* 125, and *Herb. Ind. Or. H. f. & T.*

N.W. INDIA and the PANJAB; from the Jumna westward. KUNAWUR and WESTERN TIBET, alt. 8–12,000 ft., *Falcener, Thomson*.—DISTRIB. Afghanistan, Turkestan, Soongaria, Altai Mts.

Branched from the root; branches firm, 1–2 ft., *Leaves* usually small, 1–1½ in., pale; petiole slender. *Fruiting-bracts* very variable, from ovate with a cuneate base to orbicular, ½–½ in. long.—I fear that this is only a dry country form of *A. laciniata*, L., with white stems, small leaves, and hardened disk of the bracts, which Boissier describes as smooth or tubercled (they are quite smooth in the Indian plant). The name seems a singularly inappropriate one.

3. *A. rosea*, Linn. ? *Sp. Pl. Ed.* 2, 1493; green, mealy, branches very many diffuse slender ascending, leaves small petioled rhombic-ovate with obtuse sides and tips entire or subsinuate, male clusters in short axillary spikes, fruiting bracts small broadly triangular-hastate or flabelliform crenate thin disk coarsely reticulate or rugose. *Schkuhr Handb.* t. 350; *Fl. Dan.* 1284; *Boiss. Fl. Orient.* iv. 911. ? *A. tartarica* β *virgata*, *Boiss l. c.* 910.

WESTERN TIBET; banks of Salt Lakes, alt. 12–14,000 ft., in Sassar, Hanle, &c., *Thomson*.—DISTRIB. (of *A. rosea*) Westward to the Atlantic.

A very slender plant; branches 4–6 in., greenish-white. *Leaves* ½–½ in., base canescent. *Bracts* about ½ in. broad or long, sometimes sinuate-lobed, sessile or contracted into a hardened pedicel.—An obscure plant.

*** *Perennials, with monœcious flowers.*

4. *A. repens*, Roth *Nov. Sp.* 377; shrubby, white, stem woody prostrate rooting, leaves small petioled oblong elliptic or suborbicular obtuse, male clusters in short branched spikes, fruiting bracts united into a thick corky obovate or orbicular turgid pouch with thin free tips contracted at the base into a stout cylindric pedicel, disk smooth or rugose. *Moq. in DC. Prodr.* xiii. 2. 99. *A. Kœnigii*, Wall. *Cat.* 6951. *A. cristata*, *Kœnig mss.* *A. Belangeri*, *Boiss. Fl. Orient.* iv. 913. *Obione Belangeri*, *Moq. l. c.* 108. *O. nummularia*, *Moq. Enum. Chenopod.* 72. *O. Kœnigii*, *Moq. l. c.* 109; *Wight Ic.* t. 1790.

DECCAN PENINSULA, *Kœnig*; Tuticoreen in Tinnevely, *Wight*. CEYLON, *Thwaites*.—DISTRIB. ? Afghanistan, Persia.

Branches woody, 1–2 ft. long, straggling or tufted and short. *Leaves* ½–1 in. long, thick, tip rounded or retuse, base cuneate; petiole very short. *Fruiting-bracts* very variable, ¼–½ in. long or broad, sometimes compressed, smooth, at others almost globose with thick processes on the surface, lips very short crenate. *Radicle* pointing upwards.—The Afghan plant has smaller bracts, but of the same corky character, and with thick cylindric pedicels.

5. *A. Stocksii*, *Boiss. Diagn. Ser.* iv. 73; shrubby, white, branches woody prostrate or suberect, leaves small petioled oblong elliptic or suborbicular obtuse, male clusters axillary or in short leafy spikes, fruiting bracts cuneate at the base only orbicular or broadly ovate and suddenly contracted into a short pedicel disk small, lips broad quite entire thin reticulate. *A. Griffithii*, var. *Stocksii*, *Boiss. Fl. Orient.* iv. 916. *A. repens*, *Aitchison Cat. Pl. Panjab* 125. *Obione Stocksii*, *Wight Ic.* t. 1789; *Dalz. & Gibs. Bomb. Fl.* 212.

SCINDE; salt marshes at Kurrachee, *Stocks, Vicary*. GUZERAT; common, *Dalz. & Gibs.*

Habit and foliage very much like *A. repens*, but leaves often larger and fruiting-bracts very different.—Boissier has made this a variety of *A. Griffithii*, which appears

to me to differ in its much larger orbicular sinuate thin leaves, and rhombic fruiting-bracts, which are corky throughout, united to the middle, and perfectly smooth. This is Moquin's type of *Griffithii*, so named by himself. Another plant of Griffith also numbered 1751 has very large orbicular fruiting-bracts nearly $\frac{3}{4}$ in. diam., with a woody veined disk, the thin margins united all round (like an *Alyssum* fruit). As for Moquin's description, it agrees with neither of these plants, and it is difficult to account for this, and for his suggestion that *A. Griffithii* may be a var. of the Australian *A. Lindleyi*.

6. **EUROTIA**, *Adeus*.

Herbs or undershrubs, woolly or tomentose. *Leaves* small, alternate, entire. *Flowers* minute, 1-sexual. MALE fl. spicate, ebracteate. *Sepals* 4, obovate, obtuse. *Stamens* 4, filaments filiform. FEM. fl. axillary, 2-bracteate; bracts conduplicate, connate with free lips, at length closing over the utricle, becoming coriaceous, veined, villous, 2-beaked, and at length splitting into 4 valves. *Perianth* 0. *Utricle* ellipsoid, compressed, membranous; stigmas 2, filiform. *Seed* sessile, free, obovoid, beaked below, testa membranous, albumen floury; embryo horseshoe-shaped.

E. ceratoides, *C. A. Meyer in Led. Fl. Alt.* iv. 239; shrubby, hoary with stellate hairs, leaves linear-oblong or lanceolate obtuse floral narrower, fruiting bracts urceolate silkily villous with long reddish hairs. *Boiss. Fl. Orient.* iv. 917; *Moq. in DC. Prodr.* xiii. 2. 120. *Axyris ceratoides*, *Linn. Sp. Pl.* *Achyranthes papposa*, *Jacq. Ic. Rar.* t. 189. *A. Moorcroftiana*, *Brown in Wall. Cat.* 6950; *Moq. l. c.* 117.

WESTERN HIMALAYA; in the drier regions from Kunawur westward, and in WESTERN TIBET, alt. 8-14,000 ft., *Moorcroft*, &c.—DISTRIB. Central Europe from Spain eastward, Afghanistan, Central Asia, Siberia, Mongolia, N.W. America.

A bush, 2-4 ft. high, stunted and dwarf at high and dry elevations; branches strict, slender, leafy, glabrous or tomentose. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., rarely ovate or elliptic, margin often recurved; petiole very short; upper sessile. *Fruiting-bracts* crowded along the upper parts of the branches conspicuous for their long silky red-brown hairs $\frac{1}{2}$ in. long.

7. **AXYRIS**, *Linn.*

Annual, stellately hairy or glabrate herbs. *Leaves* small, alternate, entire. *Flowers* minute, monœcious, ebracteate. MALE fl. in terminal clusters with 3-5 hyaline sepals, often irregularly placed, and 2-5 slender stamens. FEM. fl. axillary, solitary or mixed with the males. *Sepals* 3-4, unequal, at length scarious. *Utricle* membranous, embraced by the sepals, obovoid, compressed or spherical, tip shortly winged crested or 2-auricled, stigmas capillary very long. *Seed* erect, obovoid, adhering to the utricle, testa membranous marked with concentric lines, albumen granular; embryo horseshoe-shaped.—Species 5 or 6, N. and Central Asia, N.W. America.

A. amaranthoides, *Linn. Sp. Pl.* 979; erect, branched from the base, leaves ovate or oblong obtuse or acute. *Moq. in DC. Prodr.* xiii. 2. 116; *Lamk. Encycl.* t. 753; *Schkuhr Handb.* 285^b. *A. hybrida*, *Linn.*; *Moq. l. c.*; *Schkuhr l. c.*

WESTERN HIMALAYA; in the drier regions from Lahul to Kumaon, alt. 8-13,000 ft., and in WESTERN TIBET, alt. 10-14,000 ft., *Jacquemont*, *Strachey & Winterbottom*, *Thomson*, &c.—DISTRIB. Turkestan, Ssongaria, the Altai, Siberia, N. China.

Very variable in size, 4-10 in. high; stem stout or slender. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in.,

pale-yellowish or reddish-brown when dry; nerves faint; petiole short, slender. *A. hybrida* is, I think, only the longer branched state of *A. amaranthoides*.

Var. *humifusa*, Moq. l. c.; very small, procumbent.—Western Tibet, Thomson, Clarke. Topedunga (with *Microgynæcium*), Strachey & Winterbottom.—I suspect that the *A. prostrata* does not differ from this.

There is a fragment of an *Axyris* gathered in Lahul by the Rev. H. Jaeschke, and described as a garden weed, which has ovate obtuse leaves 1 in. long, on petioles of the same length.

8. MICROGYNÆCIUM, Hook. f., Gen. Plant. iii. 56.

A small diffuse prostrate puberulous or glabrous annual. *Leaves* alternate, petioled, ovate, entire. *Flowers* monœcious, very minute, clustered, hidden amongst the leaves. MALE fl. ebracteate. *Perianth* hyaline, 5-lobed. *Stamens* 1-4, filaments very long. FEM. fl. 2-bracteate, solitary or crowded, bracts unchanged in fruit. *Perianth* 0. *Utricle* hyaline, obliquely ovoid, turgid, compressed, covered with scattered processes, and 1-2-auricled at the top; stigmas capillary. *Seed* erect, testa coriaceous, albumen granular; embryo horseshoe-shaped.

M. tibeticum, Hook. f. l. c.

WESTERN TIBET; Topedunga, north of Kumaon, Strachey & Winterbottom. SIKKIM; at Tungu, alt. 12-14,000 ft., J. D. H.

Stem branched from the base, branches 1-2 in., slender. *Leaves* $\frac{1}{4}$ - $\frac{3}{4}$ in., green, rather fleshy, nerves indistinct; petiole half as long. *Flowers* microscopic.—A very inconspicuous plant.

9. CORISPERMUM, Linn.

Annual stiff herbs. *Leaves* alternate, rigid, 1-nerved, narrow, floral margined with white, hiding the short spikes. *Flowers* 2-sexual, ebracteolate. *Sepals* 1-3, unequal, scarious. *Stamens* 1-5, unequal. *Utricle* exerted, orbicular or oblong, compressed, hardened, margined or winged; stigmas subulate, recurved. *Seed* erect, adherent to the pericarp, testa coriaceous, albumen floury; embryo annular.—Species 8, S. Europe, N. and W. Asia, China, N.W. America.

C. hyssopifolium, Linn.; Boiss. *Fl. Orient.* iv. 930; glabrous or softly hairy, diffusely branched from the base, leaves linear or narrowly linear-obovate obtuse, spikes axillary and terminal dense or lax, bracts linear oblong green or margin white. Moq. in DC. *Prodr.* xiii. 2. 140; Sibth. *Fl. Græc.* t. 1.

WESTERN TIBET; alt. 10-15,000 ft., Falconer, Thomson.—DISTRIB. S. France, Caucasus, Soongaria to China.

Branches 6-10 in., rigid, stout or slender. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., thick, green, usually obtuse and apiculate. *Spikes* 3-6 in., continuous with the branches; bracts laxly or closely imbricate, $\frac{3}{4}$ -1 in. long, oblong-lanceolate, acute, coriaceous. *Utricle* oblong, shining, winged all round.

10. CHENOLEA, Thunb.

Tomentose, silky or villous herbs or shrubs. *Leaves* alternate, narrow, entire. *Flowers* minute, axillary, 2-sexual and female, immersed in wool, ebracteate. *Perianth* with 5 incurved lobes, at length closing over the utricle, with the lobes usually tubercled or spinous at the back. *Stamens* 5. *Utricle* membranous, included in the crustaceous or coriaceous perianth; stigmas 2-3, capillary. *Seed* orbicular, horizontal, testa thin, albumen

scanty; embryo annular.—Species 20, S. Europe, N. Africa, Temp. Asia, Australia, with one N. American and one S. African.

1. ***C. divaricata***, *Hook. f.*; annual, erect, excessively branched from the base and upwards, softly rufous villous, leaves linear obtuse, fruiting perianth with 5 acute dorsal straight spines about as long as the diameter of the disk. *Echinopsilon divaricatus*, *Kar. & Kiril. in Bull. Soc. Hist. Nat. Mosq.* 736. *E. tibeticus*, *Herb. Ind. Or. H. f. & Thoms.*

WESTERN TIBET; alt. 11–14,000 ft., *Thomson, &c.*—DISTRIB. Soongaria, W. China.

Whole plant clothed with long soft spreading hairs. *Stem* 4–15 in., stout, straight in well-developed specimens, sometimes as thick as a goose-quill, very leafy, striped green and white; branches innumerable, forming a pyramidal mass. *Leaves* $\frac{1}{2}$ –1 $\frac{1}{2}$ in. long, soft, mottled green and white (when freed of hairs). *Clusters* of flowers axillary. *Perianth* minute; sepals short, villous. *Stamens* as long as the sepals. *Utricle* depressed; styles 2, filiform.

2. ***C. ? sedoides***, *Hook. f.*; annual, tall, slender, erect, hoary-tomentose or glabrate, branches ascending very slender, leaves fleshy semiterete green some filiform others oblong and minute glabrous or the upper villous, clusters 2–3 fld. in long slender spikes shorter than the floral leaves, perianth villous, fruiting with conical spines equalling the diameter of the disk or shorter often unequal. *Kochia sedoides*, *Schrad. Neue Journ.* 1809, 86; *Boiss. Fl. Orient.* iv. 926. *Echinopsilon sedoides*, *Mog. in Ann. Sc. Nat. Ser.* 2. 127, and in *DC. Prodr.* xiii. 2. 136. *Salsola sedoides*, *Pall. Voy.* 280, t. 41, f. 2. *S. cinerea*, *Waldst. & Kit. Pl. Hung.* ii. 110, t. 106. *Suaeda sedifolia*, *Pall. Illust.* t. 32, 33, 34.

SCINDE, *Stocks*.—DISTRIB. Siberia, Soongaria, Caucasus to Bulgaria.

The specimens are flowerless, but seem to belong to this species. *Stem* white. *Leaves* $\frac{1}{5}$ – $\frac{1}{4}$ in., often gibbous at the base below, then at the tips of the branches longer and villous with tawny hairs, but for which the plant might be taken for a *Suaeda*.

11. **KOCHIA**, *Roth.*

Villous or pubescent rarely glabrous undershrubs or herbs. *Leaves* alternate, sessile, narrow, entire. *Flowers* minute, 2-sexual and female, axillary, ebracteate. *Perianth* subglobose, lobes 5 incurved, fruiting closing over the utricle coriaceous girt by 5 free or confluent horizontal wings. *Stamens* 5; anthers large, exserted. *Utricle* depressed, membranous; style slender, stigmas 2–3 capillary. *Seed* orbicular, horizontal, testa membranous, albumen scanty; embryo annular.—Species 20, S. Europe, Temp. Asia, N. and S. Africa, Australia, N.W. America.

* *Perennials*:

1. ***K. prostrata***, *Schrad. Neue Journ.* 1809, 85; a villously pubescent low undershrub with a very stout woody rootstock, branches slender erect or spreading, leaves flat linear subacute, clusters in long leafy spikes, wings of fruiting perianth subquadrate hard and scarious strongly nerved crenate about equalling the diameter of the disk. *Boiss. Fl. Orient.* iv. 923; *Mog. in DC. Prodr.* xiii. 2. 132. *Salsola prostrata*, *Linn.*; *Jacq. Fl. Austr.* t. 294. *Chenopodium Augustanum*, *All. Fl. Pedem.* ii. 198, t. 38, f. 4.

WESTERN HIMALAYA; in the dry regions of Kunawur and Zanskar; and in WESTERN TIBET, alt. 10–14,000 ft., *Thomson, &c.*—DISTRIB. Westwards to Spain and N. Africa, Siberia, Central Asia.

Rootstock as thick as the thumb; branches very numerous, 6-10 in., as well as the leaves and flowers densely fulvous-villous. *Leaves* $\frac{1}{2}$ - $\frac{1}{4}$ in., nerveless. *Spikes* slender. *Fruiting-calyx* $\frac{1}{2}$ - $\frac{1}{4}$ in. diam., margins of adjacent wings approximate.

** *Annuals* (always?).

2. ***K. odontoptera***, Schrenk in *Bull. Acad. Petersb.* i. 361 (1843); annual, diffusely branched from the base, densely tomentose, leaves small short flat linear acute, clusters in long or short simple or branched leafy spikes, wings of fruiting perianth cuneate or flabellate scarious strongly nerved crenate-lobed about equalling the diameter of the disk. *Boiss. Fl. Orient.* iv. 924. *K. stellaris*, *Belang. Voy. Or. Ic. ined.* *K. odontoptera* & *K. stellaris*, *Moq. Enum. Chenopod.* 93, and in *DC. Prodr.* xiii. 132. *Panderia pilosa*, *Herb. Ind. Or. H. f. & T. in part.*

WESTERN TIBET, alt. 8-12,000 ft., Thomson.—DISTRIB. Afghanistan, Turkestan, Persia.

Root sometimes as thick as the finger and possibly perennial; branches long or short, slender; pubescence closer and paler than in *K. prostrata*; leaves much shorter, $\frac{1}{2}$ - $\frac{1}{4}$ in. long; wings of fruiting perianth narrower, contracted at the base, the margins of adjacent ones distant.—I follow Boissier in identifying this with Schrenk's *K. odontoptera*.

3. ***K. scoparia***, Schrad. *Neue. Journ.* 1809, 85; annual, glabrous or pubescent, strict, erect, leaves green linear-lanceolate acute, clusters in leafy-panicked spikes, wings of the fruiting perianth short semicircular scarious nerved entire shorter than the diameter of the disk. *Boiss. Fl. Orient.* iv. 925; *Moq. in DC. Prodr.* xiii. 2. 130. *Chenopodium scoparia*, *Linn.*

NORTH-WEST INDIA, Royle, Jacquemont.—DISTRIB. N. and Central Asia to Japan and westward to Spain.

A tall herb, 3-5 ft.; branches erect and stem white smooth, usually glabrous, the ultimate twigs pilose or villous. *Leaves* 1-1 $\frac{1}{2}$ in., midrib distinct. *Fruiting-perianth* described as being very variable.—The characters given above apply to the only Indian specimen I have seen; it is Royle's, and without particular locality; others have the wings reduced to a short acute tubercle, or are quite simple.

4. ***K. indica***, Wight *Ic. t.* 1791; annual? softly villous, diffusely branched from the base, branchlets divaricate long, leaves small elliptic or linear-oblong acute, wings of fruiting perianth short broadly triangular-ovate obtuse thick nerveless much shorter than the diameter of the disk. K. Griffithii, Bunge in *Boiss. Fl. Orient.* xiii. 2. 924. *Panderia pilosa*, *Herb. Ind. Or. H. f. & T. in part.*

NORTH-WEST INDIA, from Delhi to the Indus, common. DECCAN PENINSULA salt soils at Coimbatore, Wight.—DISTRIB. Afghanistan.

Branches of this closely resemble long ones of *K. prostrata* in hairiness, &c., but the habit is much more straggling, the plant is apparently annual, and the wings of the fruiting perianth are very different. Wight states that the flowers are sometimes male only, and I think it probable that fertile males are on different plants from the female or hermaphrodite. Boissier observed that Wight's plant is the same as *Griffithii*, but was unaware that Wight had published it. The Panjab plant distributed under "*Herb. Ind. Or. H. f. & T.*" as *K. scoparia*, is, I think, rather referable to *K. indica*.

XII. **ARTHROCNEUM**, Moq.

Fleshy leafless jointed shrubs or herbs. *Flowers* minute, 2-sexual, 2-3 together in the axils of the scales of sessile cone-like spikes, 2-bracteate.

Perianth obpyramidal, 3-4-gonous. *Stamen* 1. *Utricle* compressed, membranous; stigmas 2-3. *Seed* inverse, compressed, testa membranous, albumen fleshy; embryo dorsal, comma-shaped, radicle stout inferior.—Species 7 or 8, of temperate and tropical saline places.

1. **A. indicum**, *Moq. Chenopod. Enum.* 113, and in *DC. Prodr.* xiii. 2. 151; stem prostrate woody, branches short diffuse ascending, joints $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., spikes cylindric broader than the joints, floral joints very short hardly 2-lipped concealing the flowers. *Ung. Sternb. in Atti Bot. Congr. Firenz.* 1874, 282; *Dalz. & Gibs. Bomb. Fl.* 212. *Salicornia indica*, *Willd. in Nov. Act. Hist. Nat.* ii. 3, ex *Vahl Enum.* i. 10; *Wight Ic.* t. 737; *Roxb. Fl. Ind.* 185, and *Ed. Carey & Wall.* i. 84; *Grah. Cat. Bomb. Pl.* 171.

BENGAL; in salt marshes, *Roxburgh*. NORTHERN CERCARS, *Wight*. BOMBAY, *Graham*, &c.—DISTRIB. Trop. Africa.

Stems several feet long, branches opposite and alternate, 1-3 in. high; joints $\frac{1}{6}$ – $\frac{1}{3}$ in. long, mouth slightly dilated. *Spikes* $\frac{1}{2}$ –1 in. long, joints $\frac{1}{6}$ in. deep, cup-shaped, closely imbricate, fruiting very spongy with thin margins. *Fruiting-perianths* 3 together, shorter than the cup-shaped joints, closely appressed, laterally compressed spongy, gibbous towards the axis of the spike, flat towards the cup; top broadly truncate with a minute hole for the protrusion of the stigmas. *Stamens* not seen. *Utricle* adnate to the perianth, ovoid, compressed, indurated. *Seed* free, erect, orbicular, testa membranous; embryo and albumen of the genus.

2. **A. ?glaucum**, *Ung. Sternb. in Atti Bot. Congr. Firenz.* 1874, 283; shrubby, densely branched, joints $\frac{1}{6}$ – $\frac{1}{8}$ in. diam., spikes hardly stouter than the branches, floral joints not closely imbricate, fruit exposed. *Boiss. Fl. Orient.* iv. 932. A fruticosum, *var. glaucum*, *Moq. in DC. Prodr.* xiii. 2. 151.

DECCAN PENINSULA, *Herb. Wight (Kew Distrib. No. 2474, 2475)*. CEYLON, *Thwaites*.—DISTRIB. Mediterranean, W. Asia, Trop. Africa.

Apparently tall, stem below as thick as the little finger; branches many, erect or ascending, slender. *Male flowers* (in threes, consisting of 3 stamens each in a membranous perianth?). *Female spikes* about as long as broad, obscurely 2-lipped. *Utricle* flagon-shaped, enclosed in the broadly ovoid spongy perianth, which has a minute hole for the protrusion of the stigmas. *Seeds* orbicular, testa black thinly crustaceous; embryo and albumen of the genus.—I am not quite sure as to the structure, &c., of the male flowers (No. 2474), and am doubtful as to its distinctness from *A. fruticosum*. It is, I think, monœcious.

XIII. **SALICORNIA**, Linn.

Herbs or shrubs with the habit of *Arthrocnemum*, but with the flowers sunk in cavities of the joints. *Perianth* obpyramidal, 3-4-toothed, fruiting spongy. *Stamens* 1-2. *Utricle* included in the spongy perianth, membranous; stigmas subulate. *Seed* erect, compressed, testa hispid with hooked hairs, albumen 0; embryo conduplicate, radicle inferior parallel to the folds of the cotyledons.—Species 8, temperate and tropical.

S. brachiata, *Roxb. Fl. Ind.* i. 84, and *Ed. Wall. & Carey*, i. 82; perennial erect with diffuse opposite rather slender branches, joints stout shortly bifid, lobes rounded, spikes slender cylindric. *Wall. Cat.* 6941; *Wight Ic.* t. 738; *Moq. in DC. Prodr.* xiii. 2. 145; *Ung. Sternb. in Atti Bot. Congr. Firenz.* 1874, 304. *Arthrocnemum indicum*, *Thwaites Enum.* 246.

BENGAL; in salt marshes, *Roxburgh*. TANJORE, *Wight*. CEYLON, north of the island, *Thwaites*.

Stem woody, 12-18 in., thick at the base, much branched; branches about $\frac{1}{2}$ - $\frac{1}{4}$ in. diam.; lobes of joints with (when dry) membranous margins. *Flowers* 3-nate. *Stamen* 1. *Utricle* ovoid, subacute, styles distinct. *Testa* thinly coriaceous; embryo hooked, both ends pointing downwards.—Moquin erroneously cites Nepal as a habitat, and suggests its not being distinct from *S. herbacea*, which it does not resemble. Roxburgh describes the perianths as flask-like, fleshy, with a longitudinal slit for the exertion of stamens and styles, and as adhering together firmly and to the joints till the seed is ripe.

XIV. **SUÆDA**, Forsk.

Herbs or shrubs. *Leaves* fleshy, terete, rarely flattish. *Flowers* minute, axillary, usually 2-sexual, bracteate and 2-bracteolate. *Perianth* short, 5-lobed or -partite; lobes or segments equal or unequal, simple or gibbous or subwinged. *Stamens* 5, short. *Utricle* included, membranous or spongy; stigmas 2-5, minute, subulate, recurved. *Seed* erect, oblique or horizontal, testa crustaceous or coriaceous, albumen scanty or 0; embryo plano-spiral.—Species about 40, in saline shores and deserts.

Many annual species have dimorphic flowers; viz. summer ones with albuminous seeds and crustaceous testa, and autumnal ones with larger almost exalbuminous seeds and a membranous testa. I am far from sure that I have correctly determined the names and synonymy of the Indian species.

* *Perennials*. *Styles* usually 3-5, rarely 2.

1. ***S. fruticosa***, Forsk. *Fl. Æg. Arab.* 70; suberect or decumbent, branches erect or divaricate, leaves $\frac{1}{2}$ -terete linear or ellipsoid obtuse floral very short, spikes slender leafy, flowers axillary solitary or 2-3-nate, 2-sexual, fruiting perianth subglobose segments obtuse incurved, styles 3 short, seed vertical or horizontal, testa black shining. *Boiss. Fl. Orient.* iv. 939; *Moq. in DC. Prodr.* xiii. 2. *Salsola fruticosa*, Linn.; *Grah. Cat. Bomb. Pl.* 17; *Engl. Bot. t.* 635; *Cav. Ic. t.* 285; *Sibth. Fl. Græc. t.* 255. *S. indica*, Wall. *Cat.* 6946 C. *S. Lana*, Edgew. in *Hook. Journ. Bot.* ii. (1840) 286; *Moq. l. c.* 190.

NORTH-WEST INDIA; from Delhi, and throughout the Panjab, westward to the Indus, common in the plains.—DISTRIB. Westward to the Atlantic, Africa and America.

Stem and branches usually slender. *Leaves* very variable, $\frac{1}{2}$ - $\frac{1}{4}$ in. long.—I have seen no specimen of Edgeworth's *Salsola Lana*, which I assume from his description and locality to be *S. fruticosa*. Bunge, according to Boissier (*Fl. Or.* iv. 950, under *Haloxylon recurvum*) refers it to *Schoberia indica*.

2. ***S. monoica***, Forsk. *Fl. Æg. Arab.* 70; shrubby, branches suberect, leaves linear flattish obtuse, spikes leafy paniced, flowers axillary 2-3-nate polygamous, bracts minute scarious entire, fruiting perianth obovate-oblong lobes obtuse incurved, styles 2-5 short, seed vertical, testa black shining. *Boiss. Fl. Orient.* iv. 940; *Moq. in DC. Prodr.* xiii. 2. 156; *Wight Ic. t.* 1792. *S. nudiflora*, Thwaites *Enum.* 246.

SOUTH DECCAN; on the sea coast at TINNEVELLY, and Tuticorin, *Wight*. CEYLON, *Moon*, &c.—DISTRIB. Arabia, Trop. Africa.

I am in great doubt about this Indian plant, which in a dry state is difficult to distinguish from *S. fruticosa* and *vermiculata*. Boissier, l. c. 940, says that Thwaites' *S. indica* is *S. monoica*, but Thwaites quotes *Wight Ic. t.* 1796, which has densely crowded flowers (not 2-3 together as Boissier describes). Boissier (under *S. fruticosa*) further says that all the specimens he has seen of *S. indica*, Willd., are referable to *S. fruticosa* or *monoica*. The plant I have here called *monoica* is *Wight's t.* 1792;

it has a longer fruiting-perianth than *S. fruticosa*, which is very shortly lobed, and the bracts are smaller and more entire; it is also more erect.

3. *S. nudiflora*, *Mog. in Ann. Sc. Nat. Ser. xxiii.* 316, and in *DC. Prodr.* xiii. 2. 155; stem woody diffusely branched, leaves semiterete obtuse ellipsoid or the lower linear or obovate-oblong, bracts hyaline toothed often forming persistent stellate tufts, flowers crowded in dense globose clusters forming leafless spikes polygamous, fruiting perianth obovoid lobes short, styles 3, seed erect, testa crustaceous black. *Dalz. & Gibs. Bomb. Fl.* 213. *S. indica*, *Mog. l. c.*; *Wight Ic. t.* 1796; *Thwaites Enum.* 246; *Dalz. & Gibs. l. c.* *Wall. Cat.* 6946 A. *Salsola nudiflora*; *Willd. Sp. Pl.* ii. 1313; *Roxb. Fl. Ind.* ii. 60; *Grah. Cat. Bomb. Pl.* 270. *S. fruticosa*? *Wall. Cat.* 6944. *S. elata*, *Wight in Wall. Cat. l. c.* *Chenopodium prostratum*, *Roxb. mss.*

On the sea coast; BENGAL, BOMBAY, the DECCAN and CEYLON.

I retain this species with much hesitation, suspecting that it is a form of *S. monoica*, Forsk., or *S. vermiculata*, Forsk. It is evidently a common coast plant; and there is a good figure of it in Roxburgh's *Icones*, with the mss. name of *Chenopodium prostratum*, by which it is by inadvertence alluded to (under *S. indica*) in Roxburgh's *Flora* (ii. 62). The stellate tuft of toothed bracts left at the axils of leaves after the fruiting perianths have fallen away, is often a very-marked character, as are the leafless spikes of confluent globose many-fl. clusters.

** *Annuals. Styles 2.*

4. *S. maritima*, *Dumort. Fl. Belg.* 22; erect, glaucous green, glaucous, branched usually from the base, leaves linear or filiform semiterete floral very small, clusters of flowers minute in very slender spikes, fruiting perianth depressed lobes rounded covering the utricle, styles long slender, seed usually horizontal. *Boiss. Fl. Orient.* iv. 941; *Trimen in Journ. Bot.* xxiii. (1885) 173. *S. nudiflora*, *Mog. in DC. Prodr.* xiii. 2. 155. *Chenopodium maritimum*, *Linn.*; *Engl. Bot. t.* 633; *Fl. Dan.* t. 489. *Schoberia maritima*, *C. A. Mey. in Ledeb. Fl. Alt.* i. 400. *Chenopodium maritima*, *Mog. l. c.* 161. *C. indica*, *Wight l. c. t.* 1793. *Salsola salsa*, *Jacq. Hort. Vind.* iii. 44, t. 83. *S. indica*, *Willd. Sp. Pl.* i. 1317, ex *Roxb. Fl. Ind.* ii. 62; *Wall. Cat.* 6946 F; *Grah. Cat. Bomb. Pl.* 170. *S. nudiflora*, *Wall. Cat.* 6945. *S. sativa*, *Wight in Wall. Cat. l. c.*

UPPER GANGETIC PLAINS; Delhi, *Clarke*. Sea coast of BENGAL, BOMBAY, the DECCAN and CEYLON.—DISTRIB. Siam, Europe, N. Africa, N. and W. Asia, N. America.

This appears to be the European plant, though apparently sometimes becoming woody, if not shrubby. Roxburgh indeed describes it as a perennial, but his figure is that of an annual. Graham states that it is universally eaten and an essential article of food during famines. Wallich's (not Willdenow's) *Salsola nudiflora* is a common state with the floral leaves shorter than the clusters. *Trimen* (l. c.) describes as an erect variety of *S. maritima*, a plant with slender ascending branches and very short leafy bracts, which is found in salt pans in Ceylon with *S. nudiflora* & *indica*, adding that it is not the *S. indica* of *Wight Ic. t.* 1793. I have no material for ascertaining what it is.

5. *S. corniculata*, *Hook. f. in Gen. Pl.* iii. 67; slender, small, diffusely branched from the base, leaves $\frac{1}{4}$ in. oblong or linear-oblong obtuse floral ovate, flowers very minute 2-3-nate axillary unisexual?, perianth turbinate fleshy lobes gibbous behind or two produced into rounded vertical wings, utricle orbicular membranous adherent to the perianth, seed vertical or horizontal not or hardly beaked some subglobose with thinly coriaceous pale testa, others lenticular with black crustaceous testa. *Schoberia corniculata*,

C. A. Mey. in Ledeb. Fl. Alt. i. 399, and Ic. Fl. Ross. t. 195; Moq. in DC. Prodr. xiii. 2. 166.

WESTERN TIBET; Parang Valley and Hanle Plains, alt. 14–15,000 ft., Thomson.—DISTRIB. Soongaria, Siberia.

Glaucous; branches 4–8 in., spreading and ascending, white. *Leaves* scattered or crowded, pale when dry. *Bracts* microscopic, jagged. *Flowers* extremely minute; perianth fleshy but thin.—The black seeds occur indiscriminately amongst the pale.

6. ***S. microsperma***, *Ledeb. Fl. Ross. iii. 785*; diffusely branched from the base, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. linear-oblong obtuse flattish floral oblong, flowers very minute 2–5-nate axillary 2-sexual, perianth subglobose lobes equal rounded obscurely tubercled in fruit, utricle orbicular membranous adherent to the perianth, seed vertical or horizontal orbicular with a long beak, testa thinly coriaceous pale. *Boiss. Fl. Orient. iv. 943.* *Schoberia microsperma*, *C. A. Mey. in Eichw. Pl. Casp. Cauc. 14, t. 13.* *Chenopodina prostrata & parviflora*, *Moq. in DC. Prodr. xiii. 2. 163, 165.* *C. pygmæa*, *Moq. ? Herb. Ind. Or. H. f. & T.*

WESTERN TIBET; banks of the Indus, and of Lake Thogji Chumo, alt. 13–15,500 ft., Thomson; Lake Pangong, *H. Strachey*.—DISTRIB. Siberia, Lake Aral, Soongaria.

This appears to me to be very near *S. corniculata*, having the same structure and minute size of perianth seed, &c., but the perianth is globose without the gibbosities of that plant, and the seed has the radicular end produced into a long beak. *S. microsperma* is described as having a black shining testa, which I do not find in either the Tibetan or Soongarian specimens, and it is reasonable to suppose that the seeds are dimorphic in this as in *S. corniculata*.

15. **HALOXYLON**, Bunge.

Shrubs or small trees with opposite jointed branches. *Leaves* opposite, triangular and very short, or longer and terete. *Flowers* small solitary or spicate, axillary, 2-sexual; 2-bracteolate. *Sepals* 5, concave, accrescent and horizontally winged. *Stamens* 5 or fewer, on the margin or base of a cupular disk with alternating rounded or square staminodes. *Utricle* globose or depressed, enclosed in the perianth; stigma 2-lobed or stigmas 3–4 recurved. *Seed* horizontal, testa membranous, albumen 0; embryo plano-spiral.—Species 8–10, S. Europe, W. and Central Asia, Indian.

This genus might be united to *Anabasis*, differing only in the position of the seed.

* *Leaves distinct.*

1. ***H. recurvum***, *Bunge in Boiss. Fl. Orient. iv. 949*; tall, glabrous, pruinose, dark brown, paniculately branched, branches divaricate, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. trigonous or semiterete ovate-subulate or ellipsoid obtuse or acute, floral about equalling the axillary flowers, stigma obtuse or obscurely 2-lobed, fruiting sepals with large erect ovate obtuse lips and orbicular erose scarious wings. *H. recurvum* & *H. Stocksii*, *Hook. f. in Gen. Pl. iii. 70.* *Caroxylon recurvum*, *Moq. in DC. Prodr. xiii. 2. 175.* *C. indicum*, *Wight Ic. t. 1794.* *Salsola Stocksii*, *Boiss. Diagn. Ser. 2. iv. 75.* *S. Lana*, *Stocks mss.* *S. recurva*, *Wall. Cat. 6943.*

The WESTERN PANJAB PLAINS and SALT RANGE, ascending to 2500 ft., *Edgeworth, Stewart.* SCINDE, *Stocks.* SOUTH DECCAN PENINSULA; Coimbatore, *Wight.* BURMA; banks of the Irawaddi, *Wallich.*—DISTRIB. Afghanistan, Yunnan.

A straggling bush, blackish when dry, several feet high with long spreading

strict or recurved branches a foot long or less, ending in strict spikes 2-6 in. long; joints of stem $\frac{1}{2}$ - $\frac{3}{4}$ in. apart, of spikes $\frac{1}{2}$ in. or less. *Sepals* obtuse; fruiting perianth $\frac{1}{2}$ in. diam. *Style* elongate. *Staminodes* rounded.—The Scinde specimens have more fleshy and obtuse leaves; most of the Coimbatore and all the Panjab ones are very robust with strict branches; the Burmese ones and one of the Coimbatore are much more slender with recurved branches. In the "Genera Plantarum" I proposed the name *S. Stocksii* for the Scinde specimens, regarding them as distinct from the Burmese by their much stouter habit and thicker obtuse leaves, but more copious specimens from all the localities have convinced me that all are forms of one variable plant. Boissier gives Beluchistan as the locality for Stocks's specimens, but those in the Kew and Wight's Herbaria are from Scinde.

2. **H. Thomsoni**, *Bunge in Boiss. Fl. Orient.* iv. 950; a dwarf hoary pale puberulous much-branched shrub, leaves $\frac{1}{2}$ - $\frac{1}{3}$ in. linear terete obtuse floral shorter and small rounded bracteoles villous in the axils, flowers often densely crowded, fruiting sepals with very short rounded tips and orbicular or subreniform scarious entire wings, stigmas 2 linear-oblong. *H. Griffithii*?, *Herb. Ind. Or. H. f. & T.* (not of Boissier).

WESTERN TIBET; alt. 10-14,000 ft., *Falconer, Thomson*. Shigar Valley, alt. 7-8000 ft., *Clarke, Bellew*.

Rootstock short, stout, woody, sending up many branches 4-10 in. high; branches woody below, rather slender, glaucous; branchlets divaricate, rather slender, joints 1 in. or less. *Flowers* 2-3-nate or in globose clusters which are broader than the floral leaves. *Perianth* $\frac{1}{10}$ in. long in flower, in fruit $\frac{1}{2}$ in., wings brown. *Ovary* laxly woolly.—Very near *C. Griffithii*, but the leaves are always developed, and there are only 2 stigmas.

Var. gracillima; 12-18 in. high, extremely slender, paniculately branched, flowers more distant subsolitary.—*Iskardo*, alt. 8000 ft., *Clarke*. In flower only.—Habit much more slender, but the flowers are identical.

** *Leaves reduced to the dilated tips of the joints.*

3. **H. salicornicum**, *Bunge in Boiss. Fl. Orient.* iv. 949; a low erect strict pale almost leafless shrub, joints produced into two very short triangular points woolly within, spikes long erect, bracteoles ovate axils woolly, fruiting sepals with very short obtuse tips and flabelliform scarious white crenate wings, stigmas subclavate. *Caroxylon salicornicum*, *Moq. in DC. Prodr.* xiii. 2. 174.

SCINDE; *Stocks* (in *Herb. Dalzell*).—DISTRIB. Beluchistan, Afghanistan.

Stem woody, 1-2 ft. high; branches erect or ascending, terete; joints of stem $\frac{1}{2}$ in., of branches about $\frac{1}{4}$ in., of spikes shorter. *Fruiting-perianth* about $\frac{1}{2}$ in. diam., tips of sepals with membranous margins, wings often irregularly developed.—Possibly the specimen in Dalzell's Herbarium is from Beluchistan, though marked Scinde; it is in flower only.

4. **H. multiflorum**, *Bunge in Boiss. Fl. Orient.* ix. 949; a low erect pale much-branched almost leafless shrub, joints produced into two very short rounded tips, spikes short, bracteoles orbicular concave, sepals very short obtuse, fruiting sepals with very short obtuse tips and orbicular cordate or flabellate scarious wings, stigmas lanceolate. *Anabasis multiflora*, *Moq. in DC. Prodr.* xiii. 2. 212.

NORTH-WESTERN PANJAB PLAINS, and the SALT RANGE, ascending to 2000 ft., *Stewart*.—DISTRIB. Afghanistan.

Closely allied to *H. salicornicum*, but much lower, 4-6 in. high, with a very stout woody stem and almost fascicled branches; the leaves and bracteoles are much broader, not woolly, the spikes shorter, and fruiting perianth larger, $\frac{1}{2}$ in. diam.

16. **SALSOLA**, Linn.

Herbs or shrubs; branches not jointed. *Leaves* usually alternate, sessile, often short and pungent. *Flowers* small, solitary or fascicled, axillary, 2-sexual, 2-bracteolate. *Sepals* 4-5, concave, fruiting accrescent usually horizontally and broadly winged above the middle, completely embracing the utricle. *Stamens* 5 or fewer, usually hypogynous. *Utricle* ovoid or orbicular, fleshy or membranous; stigmas 2-3, subulate or linear. *Seed* usually horizontal, testa membranous, albumen 0; embryo spiral.—Species 40, Europe, N. and S. Africa, Temp. Asia, Australia, N. America.

* *Annual spinescent herbs. Leaves ovate-subulate or linear.*

1. **S. Kali**, Linn.; Boiss. *Fl. Orient.* iv. 954; pubescent, scabrid or glabrous, diffusely branched from the base, branches stout rigid, leaves short subulate-lanceolate from a $\frac{1}{2}$ -amplexicaul base thick rigid pungent, flowers 1-3 together axillary or subspicate, bracts and sepals subequal pungent, fruiting perianth cartilaginous base rounded, wings obovate orbicular or reniform scarious sometimes obsolete. *Moq. in DC. Prodr.* xiii. 2. 187. ? *S. Jacquemontii*, *Moq. l. c.* 188.

NORTH-WESTERN PANJAB; Peshawur, Stewart. WESTERN TIBET, alt. 12-14,000 ft., Thomson, &c.—DISTRIB. Westward to the Atlantic, N. Asia, N. and S. Africa, Australia, N. America.

Usually glaucous; stem 6-18 in. rarely erect, and branches soft and pithy within, striped green and white. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., spreading and recurved. *Fruiting-perianth* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., transparent, often rose-coloured. *Seed* adherent to the utricle.

2. **L. collina**, C. A. Mey. in Led. *Fl. Alt.* i. 393; erect or decumbent, simple or branched, protean in habit and foliage, glabrous or hispid, leaves ovate rigid or broadly subulate or linear and flaccid tip pungent base $\frac{1}{2}$ -amplexicaul, floral similar much longer than the bracts, flowers 1-3 axillary, perianth membranous, sepals lanceolate equal or unequal, fruiting dimorphic, either little changed and adnate below to and enclosed within the hardened and thickened bases of the floral leaf, bracts and bracteoles, or with the the bracts, &c., unchanged and the sepals becoming broadly equally or unequally winged. *Moq. in DC. Prodr.* xiii. 2. 188; *Pall. Ill. Pl.* 34, t. 26; *Ledeb. Fl. Ross.* iii. 800.

KUNAWUR, Herb. Royle. WESTERN TIBET, alt. 12-15,000 ft., common, Thomson, Clarke.—DISTRIB. S. Russia; Siberia, Soongaria.

A most puzzling plant, usually smaller in all its parts than *L. Kali*, so variable in habit that it is difficult to believe that the various Tibetan forms are referable to one species. The originally described form, well figured by Pallas, has diffuse stiff branches uniformly clothed throughout with imbricating ovate-lanceolate appressed coriaceous green leaves $\frac{1}{4}$ - $\frac{1}{2}$ in. long, with white margins and 1-2 flowers in the axils of each, with ovate erect pungent bract and bracteole; its exact counterpart occurs in Tibet. The greatest contrast to this is a strict erect simple or branched form, with scattered distant spreading cylindric or filiform flaccid leaves an inch long, and axillary flowers sunk in the hardened nut-like connate bases of the leaf bracts and bracteoles. Another form is 6-14 in. high, erect, with green striped stout stem and branches, and rigid-spreading or recurved or flexuous spinescent linear or lanceolate leaves $\frac{1}{4}$ - $\frac{1}{2}$ in. long. Another has stout branches spreading on the ground, with filiform leaves $1\frac{1}{2}$ in. long. Another form has dense squarrose tufts of branches beset closely with rigid subulate recurved imbricating leaves $\frac{1}{4}$ - $\frac{1}{2}$ in. long. The perianth is as variable as the habit and foliage: when the perianth becomes winged, it is rarely regularly so; when the bases of the bracts, &c., become indurated round the flower, the sepals rarely

become winged; their indurated bases vary from $\frac{1}{2}$ – $\frac{1}{4}$ in. long, are pale and smooth, rounded and often gibbous, or bigibbous below; they are very thick and woody; they occur on the same plant with the normal fruiting-bracts. Ledebour notices a similar condition of *S. Kali* as *lusus nodiflora* (Fl. Ross. iii. 799). He regards *collina* as a species between *S. Kali* & *tamariscinum*, differing from *Kali* in the bracts being never rigidly spinescent, and the fruiting perianth being always membranous below, and from both in the minute perianth wings: these distinctions altogether break down in Tibetan and other examples of *S. collina*.

** *Unarmed shrubs. Leaves minute subglobose.*

3. *S. foetida*, Del. Fl. Ægypt. 57; a stout hoary pale excessively branched shrub with stout stem and filiform crowded branchlets clothed with uniformly minute subglobose fleshy leaves, floral leaves imbricate rather longer, forming short spikes, bracteoles like the leaves, fruiting perianth minute ($\frac{1}{5}$ in. diam.) silvery-white, wings symmetrical rounded margins often overlapping, stigmas 2 recurved. Boiss. Fl. Orient. iv. 961. *S. Moorcroftiana*, Wall. Cat. 6947 (and misspelt *S. Marosteum* by Moq. in DC. Prodr. xiii. 2. 191). *S. indica*, Herb. Royle. *S. spinescens*, Wight Ic. t. 1795. *Caroxylon foetidum*, Moq. in l. c. 178.

PANJAB PLAINS, UPPER GANGETIC PLAIN, from Delhi, *Moorcroft*, westwards, *Royle*, *Edgeworth*, &c. SCINDE, *Stocks*.—DISTRIB. Beluchistan, Persia, Arabia, N. Africa.

A large shrub, stinking of rotten fish (in Egypt, not hitherto observed in India), forming dense masses of filiform twigs and minute leaves, amongst which the little perianths shine like silver stars.—The branchlets often bear globose villous galls, $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., beset with linear leaves, and caused by insect-puncture.

4. *S. verrucosa*, M. Bieb. in Mem. Soc. Hist. Nat. Mosq., i. 141; a stout hoary shrub or tree with the habit and leaves of *S. foetida*, but flowers in dense clusters and spikes, and fruiting perianth $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. dark brown. Boiss. Fl. Orient. iv. 961; Moq. in DC. Prodr. xiii. 2. 180. *S. dendroides*, Pall. Ill. Pl. t. 14 (with the leaves too thick, according to Boiss.). *S. georgica*, Bunge in Ledeb. Fl.-Ross. iii. 814.

NORTH-WESTERN PANJAB; lower hills and the Peshawur Valley, *Stewart*. DISTRIB. Siberia, Persia, Armenia, the Caucasus, S. Russia.

Boissier says that this differs from *S. foetida* in the lower leaves being filiform, 1–1½ lines long, and the others he describes as “ $\frac{1}{2}$ -terete filiform slender;” but this does not at all agree with any of the numerous specimens in Herb. Kew, except one of a var. *glabrescens* (Caucasus, *Hohenacker*). Some specimens have smaller and white fruiting-perianth, approaching those of *S. foetida*.—This plant is (like *S. foetida*) infested with galls.

17. ANABASIS, Linn.

Perennial herbs or shrubs, branches jointed. Leaves opposite, fleshy or obsolete. Flowers small, solitary or clustered, axillary, 2-sexual, female minutely 2-bracteolate. Sepals 5, scarious, fruiting winged or not. Stamens 5, on a short disk, alternating with 5 staminodes. Utricle included or exerted, subglobose, dorsally compressed, dry or fleshy; style short, stigmas 2 subulate. Seed erect, orbicular, compressed, testa membranous or coriaceous, albumen 0; embryo spiral.—Species 15, S. Europe, N. Africa, W. and Central Asia.

1. *A. phyllophora*, Kar. & Kir. in Bull. Soc. Nat. Mosq. 1840; a dwarf glabrous pale leafless shrub, stems many erect from a woody stock, joints long terminating in two triangular acute teeth (leaves), flowers soli-

tary in opposite axils spicate, staminodes ciliolate, fruiting perianth with 3 conniving wings the posterior largest. *Boiss. Fl. Orient.* iv. 970 (*from which the above character is taken*).

The PANJAB; by the Jhelum River, *Aitchison*.—DISTRIB. Soongaria, Turkestan, Altai.

The only specimen is not in flower; but it precisely accords with the Soongarian plant. I have refrained from quoting the synonyms that Boissier (on Bunge's authority) gives, because I suspect some confusion to exist. *Anabasis intermedia*, Moq. and *A. subulifolia*, Schrenk, must, according to the characters attributed to them, differ much from this. Nor do I see why this, all the specimens of which are as leafless as a *Salicornia*, should be called *phyllophora*.—Boissier gives Damascus as the locality for his plant, and speaks doubtfully of its identity with the Soongarian.

2. *A. setifera*, *Moq. in Chenop. Enum.* 164, and in *DC. Prodr.* xiii. 2. 214; a dwarf leafless glaucous pale shrub, stem rough when dry, leaves short oblong thick fleshy semiterete obtuse with a deciduous bristle, axils woolly, flowers crowded in the upper axils, floral leaf oblong or rounded, bracts minute linear membranous ciliate, staminodes subquadrate, fruiting perianth $\frac{1}{2}$ in. diam., wings 3-5 obovate or orbicular-cordate hyaline not nerved, stigma obscurely 2-lobed. *Boiss. Fl. Orient.* iv. 970.

The PANJAB; on the Salt Range, *Stewart*.—DISTRIB. Persia, Arabia, Egypt.

The solitary specimen precisely accords with the *A. subulifolia*, Schrenk, of Haussknecht's *Iter Orientale* from Persia, which differs altogether from Schrenk's character of that species and from *A. phyllophora*, with which Boissier unites *subulifolia*. It agrees with the characters of *A. setifera* in everything but having only 3 winged sepals instead of 5, and, as I find 3 and 4 in some of Bunge's specimens gathered and named by himself, this character is evidently of no value.

18. HALOCHARIS, Moq.

Hispidulous annuals, branches often whorled. *Leaves* alternate, sessile, fleshy, tipped with rigid hairs. *Flowers* axillary, solitary, 2-sexual, 2-bracteolate. *Sepals* 5, lanceolate, hyaline. *Stamens* 5, on a fleshy disk; anthers linear, cells narrow parallel separate, connective inflated; staminodes 0. *Utricle* included, ovoid or orbicular, compressed, membranous, rugulose; stigmas 2, slender. *Seed* suspended, inverse, lenticular, laterally compressed, testa membranous, albumen 0; embryo plano-spiral.—Species 5, Persia, Affghanistan and Central Asia.

1. *H. violacea*, *Bunge Anabas. Revis.* 63, t. 1, f. 3; a small sparsely hispid prostrate diffusely branched annual, hairs very long, leaves linear subtriquetrous obtuse floral oblong equalling or exceeding the bracteoles, spikes subcapitate, perianth squarrosely hispid with very long hairs, connective produced into an obovoid violet appendage longer and broader than the anther-cells. *Boiss. Fl. Orient.* iv. 975.

WESTERN PANJAB PLAINS, the SALT RANGE, alt. 2000 ft., and PESHAWUR VALLEY, common, *Stewart*.—DISTRIB. Affghanistan, Beluchistan, S.E. Persia.

Branched from the base; branches slender, 3-6 in., tips ascending. *Leaves* scattered, $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* minute, concealed by the long bristles.

2. ? *H. sulphurea*, *Moq. in DC. Prodr.* xiii. 2. 201, *in part*; erect, hispid with long bristles, leaves linear subtrigonal obtuse floral oblong about equalling the lanceolate hirsute bracteoles, flowers in capitate clusters which are spicate on terminal short branches, outer sepals villous, connective produced into a sessile elongate ellipsoid yellow appendage

much longer and broader than the anther-cells. *Bunge Anab. Revis.* 63, t. 1, f. 2; *Boiss. Fl. Orient.* iv. 975. *Halimocnemis sulphurea*, *Moq. Chenop. Enum.* 152.

The PANJAB; west of the Indus, *T. W. H. Tolbert*.—DISTRIB. Assyria, Persia.

A much larger and stouter plant than *H. violacea*, with capitate clusters of leaves and flowers $\frac{1}{2}$ in. diam., forming long interrupted spikes. I have seen but one specimen, which differs from the only authentic one I have seen of *H. sulphurea* in the larger more globose heads, and longer appendage of the anthers.

19. **HALOGETON**, *C. A. Meyer*.

Annuals. *Leaves* alternate, sessile, fleshy, obtuse or tipped with a long bristle. *Flowers* minute, axillary, clustered, polygamous, immersed in wool, 2-bracteolate. *Sepals* 5, 2 outermost winged or gibbous, hyaline. *Stamens* 5 or fewer, filaments linear, anthers simple; staminodes 0 or 5, lingulate. *Utricle* included, ovoid, membranous; stigmas 2, filiform. *Seed* usually inverse, laterally compressed, rostellate, testa membranous or subcoriaceous, albumen 0; embryo spiral.—Species 5, Spain, N. Africa, West and Central Asia.

This genus would perhaps be better united with *Salsola*. There are in Falconer's and Thomson's Tibetan collections flowerless specimens of what is probably another species, with more or less woolly stems, leaves cylindric $\frac{1}{4}$ – $\frac{3}{8}$ in. long, terminated by a very long stout pale-brown bristle.

H. glomeratus, *C. A. Mey. in Ledeb. Fl. Alt.* i. 378; and *Ik. Ross.* t. 40; a much-branched soft glaucous or hoary erect or ascending leafy green herb, leaves minute cylindrical ellipsoid or obovate often tipped with a fugacious bristle axils glabrous or woolly, floral and bracteoles similar, flowers very minute solitary or clustered, sepals 4–5 hyaline lanceolate fruiting with long claws and fan-shaped or orbicular white pink or brownish hyaline veined wings. *Boiss. Fl. Orient.* iv. 985; *Moq. in DC. Prodr.* xiii. 2. 206. *Anabasis glomerata*, *M. Bieb. in Act. Mosq.* i. 110, and iv. 19. *H. tibeticus*, *Bunge mss.*

WESTERN TIBET; alt. 12–14,000 ft., abundant, *Falconer, Thomson, &c.*—DISTRIB. Siberia, Soongaria, Turkestan, Afghanistan.

Branched from the base; primary branches 2–10 in. long, white, as thick as a goose-quill or less. *Leaves* often in clusters (arrested branches) $\frac{1}{8}$ – $\frac{1}{4}$ in. long, green, the larger with membranous basal auricles. *Fruiting-perianths* densely crowded, $\frac{1}{4}$ – $\frac{1}{2}$ in. diam.—Bunge (in lett.) regards the Tibetan plant as different from the Soongarian, but I can find no character; both are very variable in the size of the leaves and of the fruiting perianth. Boissier describes the flowers as clustered, the outer in each cluster female, the rest 2-sexual and diandrous.

20. **BASELLA**, *Linn.*

A much-branched twining fleshy herb. *Leaves* alternate, broad, entire. *Flowers* spicate, sessile, 2-sexual, white red or violet; bract minute, caducous; bracteoles 2, united into a 2-lipped cup and adnate to the perianth. *Perianth* fleshy, 5-fid, at length baccate, lobes short incurved. *Stamens* 5, on the mouth of the tube, filaments short, erect in bud; anthers versatile. *Utricle* globose, included, thin, adhering to the seed; stigmas 3, linear-clavate. *Seed* erect, subglobose, testa crustaceous, albumen scanty; embryo plano-spiral, cotyledons large thin involute.

B. rubra, *Linn.*; *Moq. in DC. Prodr.* xiii. 2. 223; *Lamk. Ill.*

t. 215, f. 1; *Gærtn. Carp.* t. 126. *B. alba*, *Linn.*; *Roxb. Fl. Ind.* ii. 104; *Wall. Cat.* 6960; *Wight Ic.* t. 896; *Grah. Cat. Bomb. Pl.* 170; *Dalz. & Gibs. Bomb. Fl. Suppl.* 73. *B. canalifolia*, *Ham.*; *Wall. Cat.* 6961. *B. alba*, *L.*, *nigra*, *Lour.*, *cordifolia*, *Lamk.*, *ramosa*, *Jacq.*, *japonica*, *Burm.*, and *lucida*, *L.*, *Moq. l. c.* 223, 224. *B. ramosa*, *Jacq. f. Eclog.* ii. 10, t. 161; *Reichb. Hort.* t. 61. *B. crassifolia*, *Wight mss.*—*Rheede Hort. Mal.* vii. t. 24.

Throughout INDIA, wild or cultivated, and in CEYLON.—DISTRIB. Trop. Asia and Africa.

Glabrous. *Leaves* petioled, broadly ovate or cordate or orbicular, 2-7 in. diam., narrowed into the petioles. *Spikes* 1-6 in., axillary, peduncled, simple or branched, flowers white or red. *Fruit* size of a pea, red white or black.—Roxburgh regards two varieties of this, a red- and a green-stemmed one, as wild in India, and adds three cultivated sorts, a red- and a white-stemmed that are raised from seed, and differ only in luxuriance from the corresponding wild forms; and lastly a large sort (*B. lucida*, *L.*, and *cordifolia*, *Lamk.*), which is the most cultivated, and is always increased by slips; it is the largest form, covering trellises and native houses, and is the most succulent, and more used as a pot-herb than the others.

ORDER CXVIII. PHYTOLACCÆÆ.

Glabrous trees shrubs or herbs. *Leaves* alternate, quite entire; stipules small or 0. *Flowers* racemed, bracteate and 2-bracteolate. *Sepals* 4-5, imbricate in bud. *Petals* 0. *Stamens* 4, alternate with the petals, or more and irregularly inserted; filaments usually persistent and anthers deciduous. *Carpels* 1 or more, superior, free or connate, 1-ovuled; stigmas usually sessile and recurved; ovules amphitropous or campylotropous. *Ripe carpels* dry or fleshy. *Seeds* erect, often arillate; albumen fleshy or floury; embryo peripheric.—Genera 20, species about 60, tropical and temperate.

Rivina Latbenia, *Ham. in Wall. Cat.* 6952, from Patna, erroneously cited by Moquin under his *Pircunia Latbenia*, is the common South American *Rivina lavis*, *L.* (*R. orientalis*, *Moq.*), or an allied plant, no doubt cultivated at Patna. *Mohlana nemoralis*, *Mart.*, a Brazilian and African undershrub with reticulate fruit, is naturalized in several parts of Ceylon (Trimen in *Lond. Journ. Bot.* xxiii. (1885) 173).

PHYTOLACCA, *Linn.*

Shrubs or herbs, rarely trees. *Leaves* exstipulate. *Flowers* 1-2-sexual. *Sepals* 4, oblong, obtuse. *Stamens* 5-25. *Carpels* 5-10, free or connate, fleshy in fruit. *Seeds* reniform, compressed, exarillate, albumen floury; embryo annular, cotyledons slender, radicle ascending.—Species 10, tropical and subtropical.

P. acinosa, *Roxb. Fl. Ind.* ii. 458; quite glabrous or puberulous, leaves elliptic-ovate or lanceolate acuminate narrowed into the stout petiole, racemes shortly peduncled. *Wall. Cat.* 1598. *P. decandra*, *var. β. acinosa*, *Moq. in DC. Prodr.* xiii. 2. 33. *P. Kæmpferi*, *A. Gray in Mem. Amer. Acad. N. S.* vi. 404. *Pircunia Latbenia*, *Moq. l. c.* 29, *excl. syn. Wall. Cat.*

TEMPERATE HIMALAYA, wild or cultivated, from Hazara and Kashmir to Bhotan, alt. 5-9000 ft.—DISTRIB. China, Japan.

Stems 3-5 ft., stout, herbaceous, succulent. *Leaves* 6-10 by 2½-4 in., green, thinly succulent. *Racemes* 2-6 in., erect, many-fl., rachis stout; bracts linear-lanceolate, membranous; pedicels ½ in. *Flowers* ½ in. diam. *Sepals* broadly oblong,

obtuse. *Ripe carpels* about 10, nearly free, blue-black.—The Japanese specimens have broader leaves than the Himalayan. The leaves are eaten cooked.

ORDER CXIX. POLYGONACEÆ.

Herbs, rarely shrubs. *Leaves* rarely opposite, entire or serrulate; stipules (ochrææ) scarious or membranous, usually sheathing the stem. *Flowers* usually 2-sexual, jointed on the pedicel. *Perianth* of 3-6, free or connate, persistent sepals, imbricate in bud. *Stamens* 5-8, rarely more or fewer, opposite the sepals. *Disk* annular glandular or 0. *Ovary* free, 2-4-gonous; styles 1-3, stigmas various; ovule 1, basilar, orthotropous. *Nut* hard, usually enclosed in the calyx. *Seed* erect, testa membranous, albumen floury or horny; embryo various, radicle superior.—Genera 30, species about 600, chiefly temperate.

Polygonear. familiæ sedifolia, Wall. Cat. 6286, from the mountains of Nepal, is a remarkable plant, which being without flower or fruit I fail to refer to its genus, or even order. It is prostrate, hirsute, consisting of creeping interlaced stems and branches as thick as a sparrow's quill, the terminal ones bearing imbricate membranous short cup-shaped ochrææ with oblique entire ciliate mouths, and fleshy linear-oblong obtuse subsessile leaves $\frac{1}{2}$ – $\frac{1}{2}$ in. long, and hirsute on both surfaces; filiform simple root fibres are given off from the stem, and these also are hirsutely fibrillose. A solitary rigid peduncle, $\frac{1}{2}$ – $\frac{1}{2}$ in. long, terminates some of the branches, and this bears a small short cupular ochrea. The whole plant much resembles (superficially) a small creeping hirsute *Æschynanthus*.

Tribe 1. **Eupolygoneæ.** *Perianth* 3-5-cleft. *Stamens* 1-8, rarely more. *Stigmas* 2-3, capitate, rarely fimbriate.

* Shrubs.

Stamens 12-18. Styles 4 1. CALLIGONUM.
Stamens 8. Styles 3 2. PTEROPYRUM.

** Herbs or undershrubs.

Stamens 8 or fewer. Cotyledons flat 3. POLYGONUM.
Stamens 8. Cotyledons plaited 4. FAGOPYRUM.

Tribe 2. **Rumiceæ.** *Perianth* 4-6-cleft. *Stamens* 9, rarely 6. *Stigmas* fimbriate, peltate or horseshoe-shaped.

Sepals 6, unchanged in fruit. Nut 3-winged 5. RHEUM.
Sepals 4, unchanged in fruit. Nut 2-winged 6. OXYRIA.
Sepals 6, 3 inner enlarged in fruit (except *R. acetosella*) 7. RUMEX.

See *Königia* under *Polygonum*.

1. CALLIGONUM, Linn.

Rigid much-branched shrubs. *Leaves* alternate, linear subulate or obsolete, ochrea short. *Flowers* solitary or few, loosely clustered, ochreate, 2-sexual. *Sepals* 5, flat. *Stamens* 12-18. *Ovary* 4-angled. *Nut* exserted, 4-angled, angles variously crested winged echinate or setose. *Seed* oblong, terete or 4-angled; embryo central, straight, cotyledons narrow.—Species 20, in deserts of W. and Central Asia and Africa.

C. polygonoides, Linn.; Meissn. in DC. Prodr. xiv. 1. 29; an almost leafless shrub or small tree with terete pale flexuous branches and

very slender branchlets, leaves most minute bristles at the distant nodes, nuts oblong hard densely clothed with many series of branching intricate rigid red-brown flexuous bristles. *Boiss. Fl. Orient.* iv. 1000.

The PANJAB, *Edgeworth, Talbart*; Salt Range, alt. 2000 ft., *Stewart*. SCINDE, *Stocks*; Boogtee Hills, *Vicary*.—DISTRIB. Persia, Armenia, Syria.

Flowering branches about as thick as a crow-quill or less, internodes 1-1½ in. long; pedicels ½-¾ in.; sepals about as long. *Fruit* ½-1 in. diam. including the shaggy branched bristles, nucleus about ¼ in.

2. **PTEROPYRUM**, *Jaub. & Spach.*

Rigid shrubs. *Leaves* small, alternate or fascicled, linear or spatulate; ochrea very short or obsolete. *Flowers* small, ochreate, 2-sexual. *Sepals* 5, subequal. *Stamens* 8. *Ovary* 3-angled, acuminate; styles 3. *Nut* broadly 3-winged, beaked. *Seed* beaked, base broad; embryo eccentric, cotyledons oblong, short.—Species 5-6, Western Asiatic.

P. Oliveri, *Jaub. & Spach. Ill. Plant. Orient.* ii. 9, t. 108; leaves fascicled thick glaucous obovate oblong spatulate or linear-oblong obtuse nerveless, nut broadly 6-winged in two superposed series of wings, the lower wings broadest. *Meissn. in DC. Prodr.* xiv. 1. 31; *Boiss. Fl. Orient.* iv. 1002; *Wight Ic.* t. 1809. *P. Griffithii*, *Meissn. l. c.* *Atraphaxis* sp., *Aitchison Cat. Pl. Panjab.* 125.

SCINDE, *Vicary, Stocks*.—DISTRIB. Afghanistan, Persia.

An excessively branched shrub, branchlets white. *Leaves* ½-¾ in., margins often recurved. *Clusters* many-fl., sessile; flowers shortly pedicelled. *Fruit* ¼ in. diam., nearly circular in outline; each angle of the nut with 2 superposed wings brought about by the 3-gonous nucleus twisting as the wings grow, the effect of which is that each vertical wing is as it were cut in two in the middle, and the upper half of the wing of one angle alternates with the lower half of the wing of another angle.

3. **POLYGONUM**, *Linn.*

Herbs, rarely undershrubs. *Leaves* alternate, entire, rarely lobed; stipules tubular, membranous, rarely minute and 2-fid. *Flowers* 2-sexual, small or minute, clustered; clusters axillary or terminal, bracteate and bracteolate, axillary and sessile, or in spiciform capitate or paniced racemes; pedicel short usually jointed under the perianth; bracts and bracteoles membranous, ochreate. *Disk* glandular or 0. *Perianth* 4-5, rarely 3-cleft, 2 outer sepals usually smallest. *Stamens* 5-8, rarely 1-4, perigynous. *Ovary* compressed or 3-gonous; styles 2 or 3, free or combined below, stigmas usually capitellate. *Nut* included in the more or less enlarged (rarely fleshy) perianth, trigonous or biconvex. *Seed* albuminous; embryo lateral, radicle long, cotyledons small (rarely large), flat, accumbent, rarely incumbent.—Species about 150, in all latitudes.

A very troublesome genus, the Indian species of which have been much confused, and I cannot hope that I have finally settled the limits of those especially of the *Persicaria* and *Avicularia* sections. *Kænigia* is regarded as a section of *Polygonum*.

KEY TO THE SECTIONS.

A. *Stipules* minute 2-partite.

Sect. 1. **KÆNIGIA**. A minute annual. Flowers in terminal clusters. Stigmas subsessile. Nut subterete.—Sp. 1.

Sect. 2. ELEUTHEROSPERMA. Slender annuals. Flowers in terminal and axillary clusters. Styles minute free. Seed loose in the triquetrous nut.

B. *Stipules tubular elongate*.—Sp. 2-3.

Sect. 3. AVICULARIA. Herbs. Leaves small; stipules hyaline, cleft or torn. Flowers axillary. Styles minute free. Albumen horny.—Sp. 4-11.

Sect. 4. AMBLYGONON. Perennial-rooted herbs. Flowers in spiciform racemes; bracts tubular, truncate. Nut orbicular; *cotyledons incumbent*.—Sp. 12-14.

Sect. 5. TOVARA. A perennial-rooted tall herb. Leaves broad. Flowers distant in very slender racemes; bracts tubular. Nut flattened with 2 rigid persistent hooked styles.—Sp. 15.

Sect. 6. BISTORTA. Erect or prostrate annual or perennial-rooted herbs. Flowers in spiciform racemes; bracts hyaline, ovate or lanceolate not tubular.—Sp. 16-23.

Sect. 7. PERSICARIA. Erect or decumbent unarmed often glandular annuals or perennials. Leaves narrow. Flowers in slender or dense spiciform racemes; bracts tubular.—Sp. 24-38.

Sect. 8. CEPHALOPHILON. Erect or prostrate unarmed annuals rarely perennials or shrubs. Leaves broad, sometimes lobed or auricled. Flowers capitate; bracts not tubular.—Sp. 39-48.

Sect. 9. ECHINOCAULON. Erect or ascending usually prickly annuals. Leaves usually broad, often hastate. Flowers capitate or racemose, bracts tubular. (Hardly distinct from *Cephalophilon*.)—Sp. 49-55.

Sect. 10. ACONOGONON. Erect shrubs, rarely herbs. Flowers in branched panicles; bracts open or very shortly tubular.—Sp. 56-67.

Sect. 11. TINIARIA. Twining herbs. Leaves broad, hastate or cordate. Flowers in axillary clusters or slender racemes; bracts not tubular.—Sp. 68-70.

Sect. I. KÆNIGIA, *Hook. f.* A minute annual. Leaves often opposite; stipules short 2-lobed or partite. Flowers in terminal and axillary clusters or heads; bracts not tubular or sheathing. Perianth 3-5-cleft. Stamens 1-5 without interposed glands. Stigmas 2-3, subsessile. Nut subterete or compressed; cotyledons accumbent.

1. **P. islandicum**, *Hook. f.*; glabrous, leaves obovate, flowers very minute. *Kœnigia islandica*, *Linn.*; *Meissn. in DC. Prodr.* xiv. 1. 83; *Lamk. Ill.* t. 51; *Fl. Dan.* t. 418. *K. monandra*, *Decne. in Jacq. Voy. Bot.* 142, t. 147; *Meissn. l. c.*

ALPINE WESTERN HIMALAYA; in marshy places from Kashmir to Kumaon, alt. 12,000 ft. WESTERN TIBET, alt. 11-14,000 ft.—DISTRIB. Arctic and subarctic regions and Altai Mts.

Stems very slender, succulent, forming tufts 1-6 in. high with matted roots. *Leaves* $\frac{3}{8}$ — $\frac{1}{2}$ in., petioled, obtuse. *Flowers* 2-sexual or female. *Perianth-lobes* equal or unequal. *Stamen* usually solitary (rarely 2) in the Indian plant. *Nut* rather longer than the perianth.—*Maximovicz* (*Mel. Biol.* xi. 309) doubts the validity of *Kœnigia* as a genus.

Sect. II. ELEUTHEROSPERMA, *Hook. f.* Slender annuals. Leaves small, broad; stipules 2-partite. Flowers in axillary and terminal clusters. Perianth 5-cleft; bracts not tubular or sheathing. Stamens 2-4. Styles minute, free. Seed loose in the acutely triquetrous nut; cotyledons accumbent.

2. **P. delicatulum**, *Meissn. in DC. Prodr.* xiv. 1. 127; quite glabrous, stem filiform, leaves sessile or subsessile $\frac{1}{8}$ — $\frac{1}{4}$ in. elliptic ovate or ovate-cordate acute, flowers minute in axillary clusters scarcely exceeding

the bracts, stamens 2-3, nut 3-quetrous usually much longer than the perianth. *Kœnigia*, No. 3 & 4 *Herb. Ind. Or. H. f. & T.*

ALPINE HIMALAYA; on wet rocks, alt. 10-16,000 ft., from Sikkim to Kashmir, *Wallich*, &c.

Annual, 4-12 in., tuited, flaccid. *Leaves* distant, nerves obscure; petiole rarely $\frac{1}{10}$ in.; stipular segments acute or obtuse, entire or crenate. *Perianth* very minute, $\frac{1}{10}$ in. long, segments obtuse or acute, 2 outer smaller. *Stamens* very short. *Nut* very variable in size, ovate-lanceolate, twice or thrice as long as the perianth, pale, coriaceous, angles very prominent, faces concave. *Seed* loose.

3. ***P. filicaule***, *Wall. Cat.* 1694; sparingly strigose, stem very slender, leaves petioled $\frac{1}{2}$ - $\frac{2}{3}$ in. ovate or ovate-lanceolate obtuse or acute, flowers in axillary and terminal sessile clusters pedicelled, stamens 3-4, nut trigonous slightly longer than the perianth. *Meissn. in Wall. Pl. As. Rar.* iii. 59, and in *DC. Prodr.* xiv. 1. 127; *Bab. in Trans. Linn. Soc.* xviii. 104; *Gercke in Bot. Reis. Pr. Waldem.* 136. *P. alpestre*, *Wall. Cat.* 1725. *P. microphyllum*, *Klotzsch mss.* *Kœnigia nepalensis*, *Don Prodr.* 74. *Kœnigia*, No. 2 *Herb. Ind. Or. H. f. & T.*

SUBALPINE and ALPINE HIMALAYA; in woods, &c., alt. 9-16,000 ft., from Sikkim to Kashmir. WESTERN TIBET; Ladak, alt. 11-12,000 ft., *Stewart*.

Annual, 4-18 in., flaccid, tuited, rather succulent; stem with often a few reflexed hairs below the nodes. *Leaves* distant, rarely 1 in., soft, most strigose beneath; stipular lobes glabrous or hairy, acute or obtuse. *Perianth* $\frac{1}{10}$ in. long, white; segments rounded, 2 outer smaller. *Filaments* very short. *Nut* ellipsoid; pale, coriaceous, angles very prominent, faces concave. *Seed* loose.—*Meissner* and *Babington* describe 8 stamens. I find only 3-4. *P. alpestre*, *Wall.*, is the fully developed state; vars. *cœspitosum* and *extenuatum* of *Meissner* are more Alpine forms.

Sect. III. AVICULARIA, *Meissn.* Erect or prostrate herbs, rarely undershrubs. *Leaves* small; stipules tubular hyaline, cleft or torn. *Flowers* in axillary clusters; bracts tubular. *Perianth* 4-5-cleft. *Stamens* 3-8, very short. *Styles* 3, minute, free. *Nut* 3-gonous. *Albumen* horny, cotyledons incumbent.

* *Root* perennial, branches herbaceous (shrubby in 7. *P. salicornioides*).—See also *P. plebejum*.

4. ***P. recumbens***, *Royle mss.*; *Bab. in Trans. Linn. Soc.* xviii. 116; puberulous or scaberulous, stems long stout woody much-branched grooved prostrate and ascending, leaves $\frac{1}{2}$ - $\frac{2}{3}$ in. petioled broadly elliptic flat obtuse or acute nerves obscure, stipules ovate-lanceolate tumid with a strong excurrent nerve on each side, pedicels short jointed at the tip, fruiting perianth obvoid 5-partite. *Meissn. in DC. Prodr.* xiv. 1. 96.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 4500-8000 ft., *Royle*, &c.

Rootstock stout; branches many, 1-2 ft., as thick as a crow-quill and more, rooting at the base. *Leaves* close set; stipules $\frac{1}{2}$ - $\frac{1}{2}$ in., lanceolate and acuminate or truncate and lacerate, nerves variable, longer than the pedicels. *Nuts* $\frac{1}{16}$ in., long, broadest below the middle, black, shining.

5. ***P. cognatum***, *Meissn. Polyg. Prodr.* 91, and in *DC. Prodr.* xiv. 1. 96; glabrous or nearly so, stems short subsimple prostrate and ascending angled, leaves $\frac{1}{2}$ - $\frac{1}{2}$ in. petioled elliptic obtuse or acute thick nerveless, stipules ovate tumid hyaline subentire nerves 2 short included, pedicels crowded short jointed at the tip, fruiting perianth very thick urceolate tube twice as long as the orbicular lobes. *P. alpestre*, *C. A. Meyer Enum. Pl. Cauc.* 157; *Boiss. Fl. Orient.* iv. 1037; *Jaub. & Sp. Ic. Pl. Orient.* t. 118.

P. rupestre, Karel & Kiril. *En. Plant. Alt.* 789. *P. confertum*, Royle mss.; *Bab. in Trans. Linn. Soc.* xviii. 116; *Meissn. l. c.* *P. ammannioides*, Jaub. & Sp. l. c. t. 119. *P. affine*, Stephan. mss.; *Spreng. Syst.* ii. 256, not of Don.

WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 11,000–14,500 ft., Royle, &c. WESTERN TIBET; ascending to 16,500 ft., Thomson, Stewart, &c.—DISTRIB. Soongaria, Persia, Syria, Asia Minor, Caucasus.

Branches many, stout, flexuous, 2–6 in., from a woody stock, scaly at the base, but not rooting. Leaves rarely 1 in., elliptic-lanceolate, almost succulent; stipules silvery, obtuse, acute or acuminate. Perianth very thick, lobes with white margins. Nut $\frac{1}{10}$ in. long, ovate, compressed or obtusely trigonous, black, shining, usually compressed and obtuse in Indian examples.—Boissier adopts the later name of *P. alpestre* for this, because Meissner described his *cognatum* from a variety (*P. rupestre*, Kar. and Kiril.) with longer pedicels. He further refers the Himalayan plant to Meissner's var. *ammannioides*, a Persian form with shorter internodes, and smaller narrower leaves; but the majority of Indian specimens do not differ from the common form.

6. *P. paronychioides*, C. A. Mey. *En. Pl. Talysch.* 20; rootstock very stout woody, branches short tufted erect and ascending scaberulous young concealed by the stipules, internodes very short, leaves linear with a deciduous mucro margins recurved, stipules large hyaline lanceolate tumid 2-nerved tip lacerate, pedicels short jointed at the tip, fruiting perianth urceolate lobes rounded shorter than the tube 2 outer awned at the back. Boiss. *Fl. Orient.* iv. 1040; *Meissn. in DC. Prodr.* xiv. 1. 89. *P. Paronychia*, C. A. Mey. *Enum. Pl. Cauc.* 158 (not of Cham. & Schl.). *P. Meyeri*, Steud. *Nomencl.* *P. mucronatum*, Royle mss.; *Bab. in Trans. Linn. Soc.* xviii. 115.

WESTERN HIMALAYA, in the drier regions; Kunawur to Zanskar, alt. 8–12,000 ft., Royle, &c.—DISTRIB. Afghanistan, Persia.

Root or rootstock often as thick as the middle finger, tortuous, woody, with chestnut scaling back. Stem 1–4 in., fragile, white or red-brown, not grooved. Leaves $\frac{1}{2}$ in., nerveless, glabrous or scaberulous; stipules in young plants concealing both leaves and stem, lower with often two very faint included nerves, upper with two strong exerted ones. *Fruiting-perianth* as in *P. cognatum*, but shorter. Nut $\frac{1}{2}$ in., broadest in the middle, black, smooth.—The character of the dorsally mucronate outer sepals appears pretty constant, though not referred to by authors.

7. *P. salicornioides*, Jaub. & Spach. *Ill. Pl. Orient.* t. 123; shrubby, scaberulous, branches stout divaricate grooved at length spinescent and leafless, internodes crowded, leaves minute fleshy linear ovate or oblong rigid 1-nerved margin revolute, stipules short hyaline lacerate, perianth rosy, nut large thick opaque punctate. *Meissn. in DC. Prodr.* xiv. 1. 90; *Boiss. Fl. Orient.* iv. 1042.

SCINDE, Vicary.—DISTRIB. Persia.

The specimen is very imperfect, and I have taken much of the specific character from Boissier.

** Root mostly annual (except some forms of *P. plebejum*).

8. *P. aviculare*, Linn.; *Boiss. Fl. Orient.* iv. 1036; glabrous, branches procumbent or ascending grooved leafy, leaves elliptic or elliptic-oblong or lanceolate obtuse flat nerveless, stipules shorter than the internodes hyaline lacerate many-nerved, flowers axillary, pedicel short jointed at the tip, perianth obovoid cleft to near the base, nut ovoid obtusely 3-gonous minutely rugosely striolate. *Bab. in Trans. Linn. Soc.* xviii. 114. *P. aviculare* γ. *diffusum*, *Meissn. in DC. Prodr.* xiv. 1. 97.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 6-10,000 ft., *Royle, &c.*; Rawul Pindee, *Aitchison*. WESTERN TIBET, alt. 10-12,000 ft., *Thomson, &c.*—DISTRIB. Widely dispersed, indigenous in Europe and N. Asia, probably a colonist elsewhere.

The Himalayan and Tibetan specimens are intermediate in several points between *P. aviculare* and *P. Bellardi*, as these are defined by Boissier; the leaves are not veined as he describes them in *aviculare*, nor are they acute as they should be in *P. Bellardi*; and though the branches sometimes run out into a subsperate inflorescence, this is not so slender and interrupted as in true *Bellardi*. Boissier gives "*India borealis*" as a habitat for the latter plant; but I have seen no specimens.

9. ***P. tubulosum***, *Boiss. Diagn. Ser. i. 83*, and *Fl. Orient. iv. 1032*; glabrous, branches short prostrate or ascending leafy angular not grooved internodes very short, leaves linear acute or obtuse margins recurved, stipules hyaline subentire lacerate or fimbriate faintly 1-2-nerved, flowers axillary sessile, perianth ovoid tube much longer than the small rounded white or pink lobes, nut rhomboid triquetrous smooth shining. *Meissn. in DC. Prodr. xiv. 1. 91*. *P. rottboellioides*, *Jaub. & Sp. Ill. Pl. Ori. t. 122*; *Meissn. l. c. 92*. ? *P. Olivieri*, *Meissn. l. c. 92, in part*.

NORTH-WESTERN HIMALAYA; Kunawur and Lahul, alt. 6-7000 ft., *Royle, Thomson, Stewart*. WESTERN TIBET, alt. 10-11,000 ft., *Thomson*.—DISTRIB. Afghanistan, Persian Alps.

A small annual, with sometimes rosy flowers, crowded leaves and hyaline stipules, $\frac{1}{8}$ in. long, very different from *P. aviculare* in the sessile perianth cleft at the top only, and in the small broad short shining nut.—Meissner has cited "Kumaon, Strachey and Winterbottom, No. 49," as a locality for *P. Olivieri*, *Jaub. and Spach*. I have seen no specimens, and suspect some error. The calyx-lobes of *P. Olivieri* (which is a synonym of *P. polycnemoides*) equal the tube.

Var. *tibetica*; branches very slender much longer, leaves usually acute or acuminate. —Western Tibet; Karakoram, alt. 12,000 ft., *Clarke*; Lahul, *Jaeschke*; Chamba, *Ellis*.

10. ***P. mollisforme***, *Boiss. Diagn. Ser. i. 7. 84*, and *Fl. Orient. iv. 1043*; very small and slender, stems short dichotomous bearing axillary clusters of stipules and flowers; leaves spreading linear setaceous apiculate 3-5-nerved margins recurved, stipules ventricose hyaline white 1-2-nerved split to the middle into several lanceolate segments, perianth sessile concealed by the stipules cleft to below the middle, nut ovoid acute obtusely 3-gonous. *Meissn. in DC. Prodr. xiv. 1. 91*.

WESTERN TIBET; Nubra, alt. 14-16,000 ft., *Thomson*.—DISTRIB. Persia.

Root almost capillary. Stems spreading, 1-2 in., filiform, rigidly flexuous, red. Leaves very narrow, $\frac{1}{4}$ - $\frac{1}{2}$ in. long; stipules large for the size of the plant. Flowers minute. Perianth hyaline.—This curious little species resembles a seedling state of *P. paronychioides*, but differs in the perianth: Boissier describes the stipules as nerveless, but I find 1 or 2 nerves, one always exerted, in both Persian and Tibetan specimens.

11. ***P. plebejum***, *Br. Prodr. 420*; diffusely branched, prostrate, smooth or minutely scaberulous, branches terete grooved, internodes usually shorter than the leaves, stipules hyaline short lacerate to the middle and fimbriate nerve unilateral excurrent (rarely 2 or more or 0), flowers 1-3-nate, pedicels 0 or short, perianth $\frac{1}{10}$ in. or less cleft to near the base, nut rhomboid 3-gonous smooth and shining. *Meissn. in DC. Prodr. xiv. 1. 94*. *P. Dryandri*, *Spr. Syst. Veg. ii. 255*; *Wall. Cat. 1691*; *Meissn. Polyg. Prodr. 88*. *P. aviculare*, *Don Prodr. 72*. *P. herniarioides*, *Del. Fl. Egypt. 13*; *Meissn. l. c. 94*, and in *Wall. Pl. As. Rar. iii. 62*. *P. Roxburghii*, *Meissn. l. c.*; *Miquel Fl. Ind. Bat. i. 997*.

Throughout TROPICAL INDIA; and (but rarely) ascending the HIMALAYA to

7000 ft., from Bhotan to Kashmir (absent in Ceylon).—DISTRIB. Afghanistan, Tropical Asia, Java, Philippines, Australia, Madagascar, Egypt, Tropical and S. Africa.

If (following Wallich's example for most of them) I am right in bringing all the following forms under one species, this is a far more protean plant than *P. aviculare*, with which it is generally compared, but from which it differs entirely in habit, in the few-nerved stipules, and rhombic smooth nut. I have spent some days in analyzing the flowers and fruit of the vast number of specimens of it at my disposal, in the vain attempt to discover constant even varietal characters amongst them. The utmost I can effect is to select eleven forms, the extremes of which differ so much from one another that I have described them as varieties, though there is not one of these that does not seem to pass insensibly into two or more others, and I regard my work as provisional only. If any one is specifically distinct, it is var. *Miqueliana*, with its larger flowers and all the sepals acute; I have, however, seen no other specimens than Hohenacker's; and the shape of the sepals is so variable with age in other species, that much importance must not be attached to them. Var. *micranthema*, with nuts sometimes only $\frac{1}{15}$ in. long, at first sight appears very distinct, but there are transitions of all its characters (nuts included) into those of the commoner forms. For the rest I must leave the further elucidation of this aggregate species to local botanists working on fresh specimens. In the matter of the citation of published works and Herbarium numbers, &c., I have been very sparing, because I cannot reconcile in several cases Meissner's descriptions and references with the specimens of Wallich, and with other authors' writings; and the diagnoses of the earlier authors are vague and incomplete. Though described as annual, the root is so often woody, that I think it must be at times biennial or even perennial.

P. plebejum proper; branches stout or slender, stipules rather short lower internodes often longer than the leaves upper shorter or very short, leaves $\frac{1}{2}$ to $\frac{3}{4}$ in. upper often much shorter oblong or linear obtuse margin often recurved, flowers sunk amongst the stipules rarely exserted, sepals short broad rounded. *P. illecebroides*, Meissn. l. c. 94. *P. cliffortioides*, Meissn. l. c., and in Wall. *Pl. As. Rar.* iii. 62. *P. berniarioides*, Herb. Strach. & Winterb. 23. *P. Roxburghii*, var. *brevifolia* & pedicellaris, Meissn. l. c. 93.

Common from Assam to the N.W. Provinces and on the lower hills.—This is intended to include all the forms known to me that do not better agree with the diagnosis of the following ones. It is a common African and Australian plant. To it I should refer Wallich's 1691/1, 1691/3, 1691/4, the lower left-hand specimen, 1691/5, except the *Prome specimen*, and 1691 G, I, K.

Var. *effusa*; lax, slender, flaccid, internodes longer, leaves narrowly linear or dilated upwards from a very narrow base tip rounded, flowers all or most pedicelled, sepals short broad. *P. effusum*, Meissn. l. c. 93, in part.—Bengal to Bombay, Guzerat and N.W. India; Kumaon, Herb. Strach. & Winterb. 22.—Probably a native of wet places, whence its characters. Strachey and Winterbottom's specimens are characteristic, but Wallich's 1691/3 from Oude appears to me to be nothing but common *plebejum*.

Var. *indica*; branches uniformly spreading all round from the crown and leafy, internodes short, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. uniformly spreading horizontally linear- or obovate-oblong flat obtuse or apiculate, stipules very short, flowers crowded in the axils, pedicels shorter than the perianth or 0, sepals broad 2 outer acute, nut $\frac{1}{15}$ in. *P. indicum* (& ? *P. linifolium*), Heyne in Roth Nov. Sp. 208; Wight Ic. t. 1808; Dalz. & Gibs. Bomb. Fl. 214. *P. Roxburghii*, var. *a. longifolium* & *γ. spatulatum*, Meissn. l. c. 93. *P. Dryandri*, Wall. Cat. 1691 H, L.—The common Mysore and Carnatic form, also occurring in Bombay. When more irregular in development of leaves and branches not distinguishable from *P. plebejum proper*. Both habit and locality point to its being *P. indicum* of Roth, who describes the occasional scabridity of the end of the leaf as serrulation, and suspects its identity with *P. plebejum*. It is a common Australian and African form.

Var. *brevifolia*; rootstock very woody, branches very stout grooved often 1–2 ft. dark brown, internodes of branchlets very short concealed by the leaves and stipules which latter show as a continuous white villous band on the underside of the branchlets, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. obovate acute or apiculate flat coriaceous dark brown when dry,

flowers sessile almost concealed by the stipules, sepals narrower outer acute, nut $\frac{1}{10}$ – $\frac{1}{12}$ in. *P. Dryandri*, *Wall. Cat.* 1691/5, from *Prome*.—From Bengal (Griffith, *Kew Distrib.* 4098) to Garwhal, Banda, Bombay, Scinde, Guzerat and *Prome*. Also in Africa.—This is a short crowded leaved form allied to *indica*, and differs from *Griffithii* in its stoutness and narrower longer leaves, which are not so covered by the stipules.

Var. *Griffithii*; branches excessively numerous from the root very slender flexuous and quite naked below, branchlets very slender with the internodes so close that they look woolly from the crowded fimbriate and crinite stipules, leaves shorter than the stipules $\frac{1}{10}$ – $\frac{1}{8}$ in. orbicular or broadly obovate flat apiculate, flowers subsessile minute hidden amongst the stipules, sepals rounded 2 outer apiculate, nut not seen.—East Bengal, *Griffith (Kew Distrib.* 4099, 4101); plains of N.W. India, *Falconer (Kew Distrib.* 268).—A very singular form, probably a modification of var. *brevifolia*, with the bases of the branches buried in soil, and hence leafless and very slender.

VAR. *scindica*; branches rather stout flexuous pale red brown with scattered leaves below, branchlets slender, internodes very short woolly from the crinite stipules, leaves $\frac{1}{10}$ – $\frac{1}{8}$ in. elliptic-oblong pale obtuse margins strongly recurved, flowers very minute sessile sunk amongst the stipules, sepals narrow obtuse, nut half the length of the perianth $\frac{1}{10}$ in. long black.—Scinde, *Stocks*.—This has much the habit of some common forms of the species, but the branchlets are crinite as in *Griffithii*, and the nut very minute. No doubt it is only one of many forms to be found in Scinde.

Var. *elegans*; black when dry, branches stout grooved smooth or scaberulous, internodes longer or shorter than the leaves, stipules brownish fimbriate, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. upper as long as the lower linear-lanceolate acute or acuminate rarely obtuse margins flat or revolute, flowers sessile or shortly pedicelled, sepals narrow 2 outer acute. *P. elegans*, *Roxb. Hort. Beng.* 29, and *Fl. Ind.* ii. 291. - *P. prostratum*, *Roxb. mss.* *P. ciliosum*, *Meissn. l. c.* 95. - *P. Dryandri*, *Wall. Cat.* 1691/2.—From Bengal, Assam and Bhotan to Nepal, Belgaum, Chittagong and Tenasserim.—Usually rather a large form, passing into *plebejum* proper by insensible transitions. The dark colour when dry, long narrow acuminate leaves and narrow sepals distinguish typical specimens. It is well described by Roxburgh and figured in his unpublished *Icones* (as *P. prostratum*). It occurs in Australia.

Var. *micranthema*; small, branches 2–8 in. very slender, stipules short, leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. linear or linear-oblong obtuse base narrowed flat, upper crowded as long as the often distant lower, flowers very minute pedicelled crowded in the upper axils, pedicel often as long as the perianth, sepals narrow obtuse, nut $\frac{1}{30}$ – $\frac{1}{20}$ in. *P. Dryandri Wall. Cat.* 1691/4, the upper left-hand specimen from Kumaon. *P. micranthemum*, *Franchet mss.*—Birma, *Griffith*; Bengal and Silhet, *Clarke*; Soane River sands, *J. D. H.*; Kumaon.—This is only a small state of *plebejum*, into which it passes by insensible gradations. *Franchet* named it as above from Mongolian specimens.

Var. *Miqueliana*; branches rather stout flexuous straggling dark when dry, internodes longer than the leaves, stipules short 2-nerved, leaves $\frac{1}{2}$ in. obovate or oblong-obovate or linear-oblong obtuse flat, flowers 1–2 in the axils, pedicels slender longer than the perianth jointed towards the base, sepals narrow all acute, nut $\frac{1}{10}$ in. *P. Miquelianum*, *Meissn. Pl. Hohenack.*, No. 1613, and in *DC. l. c.* 92.—Canara; near Mangalor.—A very distinct variety, but more material is wanted to judge of its constancy. *Meissner* describes the stipules as 6-nerved, and the margins of the leaves as revolute, neither of which is the case in my specimens. Nor do I know of many-nerved stipules in any Indian form of *P. plebejum* except the following, which singularly enough comes from Mangalor, has revolute leaf-margins, and all the sepals acute.

Var. *polyneura*; branches straggling dark when dry, internodes longer or shorter than the leaves, stipules 4–6-nerved, leaves $\frac{1}{2}$ in. linear oblong acute or obtuse margins recurved, flowers 1–2 in the axils, pedicels as long as the perianth jointed at the base, sepals narrow acute, nut $\frac{1}{10}$ in. *P. elegans*, *Miquel in Herb. Hohenacker*, No. 19 (not of *Roxb.*). *P. Roxburghii*, var. *longifolia*, *Meissn. l. c.* 93.—Canara; near Mangalor.

Sect. IV. AMBLYGONON, *Meissn.* Erect or ascending herbs. Leaves large; stipules with often a dilated mouth. Flowers in cylindric spikes or

racemes; bracts tubular. *Perianth* 4-5-partite. *Stamens* 5-8, alternating with glands. *Styles* 2-3, short, stigmas capitate. *Nut* orbicular, compressed; embryo slender, cotyledons narrow incumbent.

12. **P. orientale**, Linn.; Meissn. *Monog. Polyg.* 53, t. 1, f. 30-35, and t. 3, and in *DC. Prodr.* xiv. 1. 123; tall, branched, softly pubescent or silkily villous, leaves long-petioled ovate or ovate-cordate acuminate, stipules short strigose and ciliate, racemes cylindric laxly paniced, bracts close 3-6-fld. *Bot. Mag.* t. 213; *Gärtn. Fruct.* ii. t. 119, f. 5; *Miquel Fl. Ind. Bat.* i. 1005; *Bab. in Trans. Linn. Soc.* xviii. 99. *P. altissimum*, Mæneh. *Meth.* 630. *P. amœnum*, *Bl. Bijd.* 531. *P. pilosum*, Roxb. *Hort. Beng.* 20, and *Fl. Ind.* ii. 286; *Wall. Cat.* 1710, excl. C. *P. cochinchinense*, Meissn. *Monog. Polyg.* 55. *P. torquatum*, De Bruyn in *Pl. Jungh.* 303. *Lagunea cochinchinensis*, Lour. *Fl. Coch.* i. 271.—*Rheede Hort. Mal.* xii. t. 76.

Wet places from ASSAM and SILHET westwards to OUDE and JAMU; ascending the Himalaya to 5000 ft.—*DISTRIB.* Siam, Java, Borneo; China, Japan, Turkestan (often cultivated).

A branching annual, 3-10 ft.; branches hollow. *Leaves* 6-9 by 2-5 in., grey with hairs; nerves very numerous; petiole 1-4 in.; stipules short, hirsute, truncate, mouth membranous or dilated herbaceous and recurved. *Racemes* 3-5 in., on long stout strict peduncles and pedicels, erect or cernuous; bracts crowded strigosely tomentose and ciliate; flowers large, white red or green. *Stamens* 7-8, included. *Styles* connate below, stigmas capitate. *Nuts* $\frac{1}{2}$ in. diam., orbicular, flattened with rounded margins and rather concave faces, black, shiny, pericarp very thick. *Cotyledons* incumbent.—Roxburgh remarks that the ends of the branches when moistened become thickly glutinous.

Var. *glabrata*; very sparsely pubescent or glabrate, petiole narrowly winged.—Kashmir, Thomson; Saharunpore Bot. Garden, Royle, Falconer.

Var. *parvifolia*; sparingly pubescent, leaves 2-3 $\frac{1}{2}$ in. elliptic acuminate membranous, petiole winged, stipules very short, mouth herbaceous. *Wall. Cat.* 1709/2 (under *P. tomentosum*).—Silhet, De Silva.—I have seen no other specimen. A note on the specimen says the shoots are eaten and have a sour taste.

13. **P. tomentosum**, Willd. *Sp. Pl.* ii. 447; stem simple very stout erect pubescent or glabrous, leaves 4-8 in. shortly petioled lanceolate finely acuminate silky beneath rarely glabrate, stipules strigose truncate mouth erect with rigid bristles half their length or less, racemes stoutly peduncled paniced, bracts crowded hispid and ciliate. Meissn. in *DC. Prodr.* xiv. 1. 124, excl. var. β ; Roxb. *Hort. Beng.* 29, and *Fl. Ind.* ii. 287; *Miquel Fl. Ind. Bat.* i. 1006; *Wall. Cat.* 1709, excl. B, E, G, H, and part of D. *P. orientale*, *Wall. Cat.* 1710 C. *P. ochreatum*, Houtt. *Pfl. Syst.* vi. 442, t. 49, f. 1. *P. pulchrum*, Blume *Bijd.* 530.

In ditches, &c., from BENGAL, ASSAM and CACHAR, southwards to MALACCA; and from BOMBAY to MALABAR and CEYLON.—*DISTRIB.* Java, Philippines, Trop. and S. Africa.

Stems one or more from a prostrate rooting annual stock, 2-4 ft., often as thick as the finger. *Leaves* 1-1 $\frac{1}{2}$ in. diam., usually pubescent or subsilky above; petiole rarely $\frac{1}{2}$ in.; stipules $\frac{1}{2}$ -1 in., membranous. *Racemes* 2-4 in., always erect, strict; bracts 6-8-fld.; flowers large, white. *Stamens* 7-8. *Nut* large, $\frac{1}{2}$ in. diam., orbicular flattened with rounded margin and convex faces; pericarp very thick, crustaceous, black, shining; cotyledons incumbent.—This is apt to be confounded with *P. barbatum*. Meissner quotes *Wall. Cat.* 1708 A, and 1708 G, I, for this, but the first and last are certainly *barbatum*, and only one piece of G appears to be *tomentosum*.

14. **P. limbatum**, Meissn. in *DC. Prodr.* xiv. 1. 123; stem simple

very stout erect, leaves 4-8 in. shortly petioled lanceolate acuminate scaberrulous on both surfaces, stipules strigose truncate mouth with a spreading or recurved herbaceous scabrid ciliate limb, racemes stoutly peduncled paniced, bracts crowded hispid. *Boiss. Fl. Orient.* iv. 1031.

BENGAL; in the Jheels, *J. D. H. & T. T.*; Maldah, *Clarke*. UPPER GANGETIC PLAIN, *Thomson*. GARHWAL, *Edgeworth*. CONCAN, *Law*.—DISTRIB. Egypt, Trop. Africa.

Habit, inflorescence and nut of *P. tomentosum*, but the leaves in all the specimens are minutely scabrid on both surfaces, and the stipules have constantly a herbaceous limb. Fruit and pericarp as in *P. tomentosum*, and cotyledons incumbent.

Sect. V. TOVARA, *A. Gray*. A tall herb with perennial root. *Leaves* broad; stipules tubular. *Flowers* in a very slender raceme; bracts tubular. *Perianth* 4-partite. *Stamens* 5, alternating with glands. *Styles* 2, long, rigid, hooked, persistent, stigmas simple. *Nut* flattened; cotyledons accumbent.

15. *P. virginianum*, *Linn.*; *Meissn. Monog. Polyg.* 81, t. 1 I, f. 27-29, t. 3 N, and in *DC. Prodr.* xiv. 1. 112; sparsely hispid, leaves 4-10 in. short-petioled elliptic or elliptic-lanceolate, stipules short hispid, racemes 6-16 in., bracts distant 2-fld. *P. filiforme*, *Thunb. Fl. Jap.* 163; *Meissn. Monog.* 75, and in *DC. l. c.* *P. muticum*, *Mæsch Suppl.* 266. *Persicaria virginiana*, *Gærtn. Fruct.* ii. t. 119, f. 3.

TEMPERATE HIMALAYA, very rare, *Falconer*; Kashmir, on the Jhelum River, alt. 2-4000 ft., and Pir Panjal, alt. 7-10,500 ft., *Stewart*; Sikkim, on the Balesun River, alt. 7-8000 ft., *King*.—DISTRIB. China, Japan, Eastern United States.

Stem 5 ft. and upwards, branches hollow. *Leaves* thin, base acute, nerves many, slender; petiole $\frac{1}{2}$ -1 in.; stipules $\frac{1}{4}$ - $\frac{1}{2}$ in., mouth truncate and ciliate. *Racemes* long-peduncled, very long and slender; bracts ciliate, $\frac{1}{4}$ -1 in. apart; bracteoles narrow, hyaline; pedicels $\frac{1}{2}$ in., rigid, stout in fruit. *Perianth* eglandular, thin. *Fruit* ellipsoid, flattened, pale brown, as long as the persistent styles.—The long hooked persistent style free to the base, serving to attach the fruit to foreign bodies, is unique in the genus, and indicates that the species should form a separate section (it is singular that though provided with so obvious a means of transport the species should be so rare in India). I find no difference between the Himalayan and East American plants; the W. Asiatic and some American have shorter and blunter leaves. The Sikkim specimen has leaves sparsely strigillose on both surfaces, as in some American ones, others of both countries are nearly glabrous.

Sect. VI. BISTORTA, *Tourn.* Perennial eglandular herbs, erect with simple stems from a woody rootstock, or with branching prostrate stems and erect leafy scapes. *Leaves* broad or narrow; stipules tubular, eciliate. *Flowers* in spiciform racemes, eglandular; bracts membranous, ovate or lanceolate, open not tubular nor truncate. *Perianth* 4-5-partite, not enlarged in fruit. *Stamens* 4-10. *Styles* 2-3, long, slender, free; stigma simple. *Nut* trigonous or biconvex; cotyledons accumbent.

* *Stem* solitary, simple, erect from a woody rootstock.

16. *P. viviparum*, *Linn.*; *Boiss. Fl. Orient.* iv. 2027; root-leaves long-petioled linear or linear-oblong acute or obtuse crenulate base acute obtuse or cordate, spikes solitary erect slender, flowers suberect pink, the lower replaced by bulbils. *Meissn. in Wall. Pl. As. Rar.* iii. 53, and in *DC. Prodr.* xiv. 1. 124; *Fl. Dan.* t. 13. *P. angustifolium*, *Don Prodr.* 70. *P. bracteatum*, *Spreng. Cur. post.* 154. *P. bulbiferum*, *Royle mss.*; *Bab. in Trans. Linn. Soc.* xviii. 94; *Meissn. in DC. l. c.* 125. *P. affine*,

Wall. Cat. 1683/3, not of Don. *P. bistorta*, Gærcke in Bot. Reis. Pr. Waldem. 135.

ALPINE and SUBALPINE HIMALAYA, from Kashmir to Sikkim, &c. WESTERN TIBET, alt. 9–15,000 ft.—DISTRIB. Alpine North and Arctic Europe, Asia and America.

Rootstock woody, as thick as the thumb or less; stem 4–12 in., slender. *Leaves* very variable, 1–6 in., coriaceous, sometimes pubescent or even tomentose beneath; cauline sessile, erect. *Spikes* 1–4 in. long; bracts ovate, acuminate. *Perianth* very variable in size. *Stamens* included or exserted. *Styles* filiform, slender, free and included or greatly lengthened and connate below. *Nut* very small, trigonous or biconvex.—Probably an Alpine state of *P. bistorta*.

17. *P. sphærostachyum*, Meissn. Monog. Polyg. 53, and in Wall. Pl. As. Rar. iii. 52, and in DC. Prodr. xiv. 1. 125; root-leaves long-petioled linear or linear-oblong acute or obtuse crenulate base acute or obtuse, spikes solitary erect stout cylindric or capitate very dense-fl., flowers crimson drooping. Bot. Mag. t. 6847. *P. macrophyllum*, Don Prodr. 70; Bab. in Trans. Linn. Soc. xviii. 95. *P. gracillimum*, Spreng. Cur. post. 154. *P. tenue*, Don l. c. *P. stenophyllum*, Meissn. in DC. l. c. *P. splendens*, Klotzsch in Bot. Reis. Pr. Wald. t. 88. *P. affine*, var. *angustifolium*, Wall. Cat. 1683.

TEMPERATE and SUBALPINE HIMALAYA; from Scinde to Sikkim, alt. 11–15,000 ft. WESTERN TIBET, Heyde.

The dense spike of brilliantly coloured drooping flowers is the best character for this beautiful plant; I am very doubtful about some of the synonyms cited for it and for *P. viviparum*, especially as to Don's *angustifolium*, *tenue* & *gracillimum*.

18. *P. perpusillum*, Hook. f. Ic. Pl. t. 1490 A; very dwarf, glabrous, radical leaves subsessile narrowly linear obtuse margins recurved quite entire, scape very slender 1-leaved, flowers few capitate pendulous, sepals 4 unequal, stamens 1–3 perfect, nut trigonous or biconvex.

ALPINE HIMALAYA, alt. 12–15,000 ft.; Sikkim, J. D. H.; Kumaon and Garwhal, Strachey & Winterbottom (Polyg. No. 39), Duthie.

Subcæspitose; rootstock stout, clothed with membranous torn stipules. *Leaves* $4\frac{1}{2}$ by $\frac{1}{10}$ in., spreading; stipules 2-fid. *Scape* $1\frac{1}{2}$ in., erect; head $\frac{1}{2}$ – $\frac{1}{4}$ in. diam.; flowers $\frac{1}{10}$ in. long, white or pink; bracts crowded, obtuse; pedicel short, jointed at the top. *Sepals* broad, obtuse, very unequal, inner orbicular or oblong. *Styles* 2–3, nearly free, stigmas capitate. *Nut* pale, smooth.—A very singular little species, allied to *P. sphærostachyum*; variable in number of stamens, some of which are reduced to capitellate filaments, and in the form of the sepals and fruit.

19. *P. paleaceum*, Wall. Cat. 1684; root-leaves long-petioled linear-oblong or -lanceolate crenulate base very narrow, spike solitary erect stout cylindric, flowers crowded suberect pink. *P. confusum*, Meissn. in Wall. Pl. As. Rar. iii. 53. *P. carneum*, C. Koch in Linnæa, xxii. 197.

KHASIA Mts.; alt. 4–6000 ft., abundant.

Rootstock as thick as the thumb; stem 6–16 in., slender. *Leaves* 3–9 in., very variable in breadth, obtuse or acute, base always narrowed into the slender petiole. *Spikes* 1–2 in., flowers crowded; bracts ovate, acuminate, scarious.—Very nearly allied to *P. bistorta*, but the leaves are always very gradually narrowed to the base, not forming broad wings below the base as usual in the European plants. This species is omitted by Meissner in the Prodromus.

** *Perennial herbs with tufted or creeping branched rootstocks and erect simple rarely branched flowering stems bearing erect spikes.*

20. *P. amplexicaule*, Don Prodr. 70; glabrous, densely tufted,

flowering stems 2-3 ft. very slender, leaves large long-petioled ovate-cordate caudate-acuminate crenulate upper amplexicaul, racemes very long-peduncled erect, bracts ovate, styles free slender. *Meissn. in Wall. Pl. As. Rar.* iii. 54, and in *DC. Prodr.* xiv. 1. 126; *Bab. in Trans. Linn. Soc.* xviii. 96; *Bot. Reg.* 1839, t. 46; *Bot. Mag.* t. 6500. *P. oxyphyllum*, *Wall. Cat.* 1715; *Meissn. ll. c.* *P. ambiguum*, *Meissn. ll. c.*; *Wight Ic.* t. 1797. *P. petiolatum*, *Don l. c. fid. Bab.*

TEMPERATE HIMALAYA; from Murree, alt. 6-8000 ft., to Sikkim, alt. 9-13,000 ft.

Rootstock stout, woody, branched. *Stems* 2-3 ft., green, sparingly leafy. *Lower leaves* 3-6 in. long, minutely papillose beneath, especially on the nerves; stipules 1-2 in., narrow, tips torn. *Racemes* 1-2, 2-6 in. long. *Flowers* red, white or greenish-white, $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. *Stamens* 8, anthers exserted. *Ovary* 3-gonous.

Var. speciosa; flowers larger, $\frac{1}{2}$ in. diam., deep purplish-red or claret-coloured. *P. speciosum*, *Wall. Cat.* 1716; *Meissn. ll. c.*—Occurs throughout the range of the species, and is the only form found hitherto in Sikkim, the specimens from whence are very stout. In Nepal it occurs in a large branched form.

21. ***P. affine***, *Don Prodr.* 70, *excl. syn.*; glabrous, densely tufted, flowering stems 4-12 in., leaves sessile or shortly petioled linear- or elliptic-lanceolate or oblanceolate acute or obtuse crenulate glaucous beneath cauline few, racemes shortly peduncled stout erect, flowers suberect, styles free slender. *Meissn. Monog. Polyg.* 52, and in *DC. Prodr.* xiv. 1. 126; *Bab. in Trans. Linn. Soc.* xviii. 97; *Bot. Mag.* t. 6472. *P. Brunonis*, *Wall. Cat.* 1692; *Royle Ill.* 317, t. 80, f. 3; *Meissn. in Wall. Pl. As. Rar.* iii. 54; *Lindl. & Paxt. Fl. Gard.* ii. t. 37; *Lemaire Jard. Fleur.* t. 117. *P. Donianum*, *Spreng. Syst. Cur. post.* 154.

ALPINE and SUBALPINE HIMALAYA; from Kashmir, alt. 8-14,000 ft., eastward Kumaon, alt. 11-13,000 ft. WESTERN TIBET.

Rootstock woolly, long, branched, often tortuous, and 4-8 in. long; crown clothed with scarios old stipules. *Leaves* chiefly radical, 2-4 in., narrowed into the petiole, finely reticulate, margins recurved; stipules $\frac{1}{2}$ -1 in., entire or split, many-nerved, brown. *Peduncles* 3-8 in., usually stout. *Racemes* 2-3 in., obtuse, flowers crowded, rosy, $\frac{1}{2}$ - $\frac{1}{4}$ in. diam. *Sepals* elliptic-oblong. *Nut* 3-gonous.—Iskardo and Kashmir specimens attain 16 in. in height.

22. ***P. vacciniifolium***, *Wall. Cat.* 1695; tufted, glabrous, branches trailing and creeping, leaves shortly petioled small orbicular or elliptic acute at both ends or acuminate quite entire, stipules rigid lacinate with many long strong excurrent nerves, racemes subsessile, styles filiform free. *Meissn. in Wall. Pl. As. Rar.* iii. 54, and in *DC. Prodr.* xiv. 1. 126; *Royle Ill.* 317, t. 80, f. 2; *Bab. in Trans. Linn. Soc.* xviii. 96; *Lindl. & Paxt. Fl. Gard.* ii. 37; *Bot. Mag.* t. 4622.

TEMPERATE and SUBALPINE HIMALAYA; from Kashmir to Bhotan, alt. 9-14,000 ft. WESTERN TIBET; Ladak, alt. 14-16,500 ft. *Stewart.*

Rootstock sometimes as thick as the little finger and twisted, usually longer more slender and much branched; branches leafy. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., rather glaucous beneath; stipules $\frac{1}{2}$ - $\frac{3}{4}$ in., brown, giving a crinite appearance to the tips of the young branches. *Racemes* $\frac{1}{2}$ -3 in.; bracts acuminate; flowers rose-red, $\frac{1}{2}$ in. diam. *Stamens* at length exserted.—*Meissner's* vars. *obtusifolium*, *medium*, and *flagelliforme*, are not sufficiently distinguishable.

23. ***P. emodi***, *Meissn. in Wall. Pl. As. Rar.* iii. 51, 54, t. 287, and in *DC. Prodr.* xiv. 1. 127; glabrous, rootstock elongate, branches trailing and creeping, leaves subsessile rigid linear-lanceolate acuminate at both ends quite entire striate-nerved, stipules long membranous acuminate many-nerved, racemes peduncled, stamens included, flowers pedicelled, styles free

filiform. *Bab. in Trans. Linn. Soc.* xviii. 98. *P. Meissneri*, *Wall. Cat.* 1693.

TEMPERATE HIMALAYA; from Dalhousie to Bhotan, alt. 8–11,000 ft.

Rootstock as thick as a goose-quill; branches 6–10 in., internodes often 1–1½ in., with short ascending leafy branches. *Leaves* 1½–2 in., margins recurved; stipules 1 in. *Racemes* 1–1½ in., few-fl'd.; bracts acuminate; flowers red. *Perianth* ¼ in. long. *Stamens* 8. *Nut* ellipsoidly rhombic, angles very obtuse.

Sect. VII. *PERSICARIA*, *Meissn.* Erect or decumbent annual or perennial herbs. *Leaves* usually narrow; stipules tubular, often ciliate. *Flowers* in spiciform racemes, often glandular; bracts more or less tubular, usually truncate, often ciliate. *Perianth* 4–5-partite, not enlarged in fruit. *Stamens* 4–8, often alternating with glands. *Styles* 2–3, free or connate below, stigmas usually capitate. *Nut* trigonous or biconvex, cotyledons accumbent.

* *Styles* 2, rarely 3; *nut* biconvex. (See also *P. Hydropiper*.)

24. *P. glabrum*, *Willd. Sp. Pl.* ii. 447; glabrous, leaves 4–8 in. petioled lanceolate or linear-lanceolate finely acuminate glandular or not, stipules membranous eciliate glabrous, racemes slender paniced, peduncles usually quite glabrous, bracts rarely ciliolate. *Meissn. in DC. Prodr.* xiv. 1. 115, and in *Mart. Fl. Bras.* v. 1, t. 14; *Roxb. Fl. Ind.* ii. 287; *Bab. in Trans. Linn. Soc.* xviii. 102; *Wight Ic.* t. 1799; *Wall. Cat.* 1711; *Grah. Cat. Bomb. Pl.* 172; *Dalz. & Gibs. Bomb. Fl.* 214. *P. Poirerii*, *Meissn. in Wall. Cat.* 1712, &c. *P. Persicaria*, *Wall. Cat.* 1720.—*Rheede Hort. Mal.* xii. t. 77.

In ditches, &c., from ASSAM, SILHET and BENGAL westward to the INDUS and SCINDE, and southward to BURMA, ascending the HIMALAYA to 6400 ft. in GARHWAL. CEYLON, common.—DISTRIB. Tropical Asia, Africa and America.

Stem 2–4 ft., sometimes as thick as the finger, rarely diffusely branched, often red. *Leaves* usually dark brown and shining when dry; stipules rarely with a few short cilia. *Racemes* 2–4 in., very slender; bracts truncate, tip oblong or rounded, few-fl'd. *Perianth* very variable in size, white or rosy. *Stamens* 6–8. *Nut* orbicular, biconvex, black, shining.—It is difficult to separate this from smooth forms of *P. Persicaria*, of which it is the tropical representative; it is, however, much larger, less branched, with more attenuate leaves brown when dry, and normally eciliate bracts and stipules. *Meissner* doubtfully cites under his var. *obscurum* (which is the common state of the plant in India) *Roxburgh's P. tenellum*, on the faith of a note of Wallich's in *Herb. DC.*; but the published *tenellum* of *Roxburgh* has filiform racemes and trigonous nuts, and is what I suppose to be *P. flaccidum*. *Boissier* points out (under *P. senegalense*) that the Afghan habitat attributed to this by *Meissner* is a mistake for *Loodiana*. Var. *glandulosissima*, *Meissn. in Wall. Pl. As. Rar.* iii. 57, and in *DC. l. c.*, is the glandular-leaved state of the plant, and is the *P. fluviatile*, *Herb. Ham. and Wall. Cat.* 1711 E; the nut is trigonous in *Hamilton's* specimen.

Var. *scabrinervis*; peduncles often glandular above, leaves glandular, midrib beneath scabrid. *P. scabrinerve*, *Royle mss.*; *Meissn. l. c.* 121, in part; *Bab. l. c.* 101. *P. quadrifidum*, *Ham. in Wall. Cat.* 1711 F.—N.W. India, *Royle*; Soane River, *J. D. H.*; Bengal; Burma; Ceylon.—*Hamilton's* specimens have a deceased inflorescence.

Var. ? *macrantha*; leaves densely gland-dotted, midrib beneath scabrid, racemes very stout, bracts oblong, flowers nearly ¼ in. diam. rose-cold., styles 2 or 3.—Silhet station, *Clarke*.—The specimens are very indifferent, but I think referable to *P. glabrum*. It must be a handsome plant.

25. *P. amphibium*, *Linn.*; *Boiss. Fl. Orient.* iv. 1028; perennial, leaves usually floating oblong or lanceolate, stipules truncate ciliate or not, racemes solitary dense-fl'd., peduncles hairy, bracts eciliate, perianth

eglandular, fruit ovoid faces convex. *Meissn. in DC. Prodr.* xiv. 1. 115; *Fl. Dan.* t. 282.

WESTERN HIMALAYA, *Falconer*; Kumaon, alt. 6400 ft., *Strachey & Winterbottom*; Kashmir, *Thomson*.—DISTRIB. Westward to the Atlantic, N. Asia and America.

Rootstock creeping, woody. *Leaves* long petioled and floating, or subsessile and aerial, obtuse or acute, serrulate or ciliate, eglandular; stipules glabrous or hispid. *Racemes* very stout, 1–2 in. long; peduncle stout; bracts acute obtuse or cuspidate. *Sepals* $\frac{1}{2}$ in., not nerved, bright red, much longer than the shining nut.

26. ***P. lanigerum***, *Br. Prodr.* 419; much branched, clothed with snow-white cottony tomentum, leaves petioled or sessile narrowly lanceolate acuminate rarely glabrous above, stipules short truncate eciliate, racemes 1–2 in. slender, bracts small crowded glabrous or tomentose eciliate. *Meissn. in Wall. Pl. As. Rar.* iii. 55, and in *DC. Prodr.* xiv. 1. 117; *Benth. Fl. Austral.* v. 271; *Boiss. Fl. Orient.* iv. 1030; *Wall. Cat.* 1714. *P. lanatum*, *Roxb. Hort. Beng.* 29, and *Fl. Ind.* ii. 285. *P. arachnoideum*, *Klotzsch mss.*

In ditches, &c.; BENGAL, *Roxburgh*, ROHILKUND, *Wallich*, *Thomson*, and along the lower HIMALAYA from Sikkim to the Beas River; Belgaum, *Herb. Wight*.—DISTRIB. Java, Philippines, Egypt, Tropical and S. Africa and America, Australia.

Stem 2–5 ft., procumbent and creeping below, sometimes much thicker than the thumb; branches slender, much divided, divaricating, white, “deep red within, especially at the joints,” *Roxb.* *Leaves* 4–8 in., finely acuminate, thickly cottony beneath; stipules membranous, mouth unequal. *Racemes* in slender divaricate cottony peduncles; bracts very small, obtuse or acute, and small red or white perianth eglandular. *Stamens* 6. *Nut* orbicular, small, flat, black, shining.—*Roxburgh* describes this as annual, *Bossier* calls it annual in his *clavis* and perennial in his description, others say perennial; the great size of the rooting base of the stem would indicate the latter.

Var. *glutinosa*; peduncles and perianth glandular. *P. glutinosum*, *Wall. Cat.* 1717; *Meissn. in Wall. Pl. As. Rar.* iii. 55, and in *DC. l. c.* 120.—Banks of the Irawaddy, *Wallich*.—This appears to me a form of *P. lanigerum* growing in dry places. The root is annual. S. Africa.

27. ***P. lapathifolium***, *Linn.*; *Boiss. Fl. Orient.* iv. 1030; annual, erect, branched, leaves subsessile elliptic-ovate or lanceolate glandular beneath ciliolate, stipules sparingly ciliate, racemes dense-fld. erect or nodding, bracts eciliate, pedicels usually glandular, perianth greenish glandular nerves strong, stamens usually 6. *Meissn. in DC. Prodr.* xiv. 1. 119; *Reichb. Ic. Crit.* v. t. 495; *Engl. Bot.* t. 1382.

Plains of N. INDIA; var. *nodosa* from Lahore westwards to Kashmir, ascending the Himalaya to 7000 ft.; var. *laxa* from BENGAL to the Sutlej, ascending the Himalaya to 6000 ft. The CONCAN.—DISTRIB. W. and N. Asia, Europe, Africa, and America.

I am indebted to Mr. Baker for identifying the Indian forms of this and the following species, which present a series of varieties more or less representing the European ones described above, but none of them conforming to the typical *P. lapathifolium*. The var. *nodosa* is, he informs me, often very difficult to distinguish from *P. Persicaria*.

Var. *nodosa*; taller, more branched, spikes oblong, perianth reddish not so strongly veined, nut smaller. *P. nodosum*, *Pers.*; *Meissn. in DC. l. c.* 118. *P. maculatum*, *Dyer & Trimen*.

Var. *laxa*; spikes laxer cylindric. *P. laxum*, *Reichb. Ic. Crit.* v. 56, t. 492. *P. nutans*, *Roxb. Fl. Ind.* ii. 285. *P. quadrifidum*, *Herb. Strachey & Winterbottom, Polyg.* 24.

28. ***P. Persicaria***, *Linn.*; *Boiss. Fl. Orient.* iv. 1030; annual, erect

or ascending, leaves subsessile elliptic-oblong or lanceolate eglandular, stipules usually hirsute and ciliate, racemes oblong dense-fl., bracts ciliate, pedicels glabrous, perianth red eglandular nerves slender, stamens usually 6. *Meissn. in DC. Prodr.* xiv. 1. 117; *Reichb. Ic. Crit.* v. 55; t. 491; *Engl. Bot.* t. 756.

WESTERN HIMALAYA; Kashmir, *Falconer*, &c. WESTERN TIBET, alt. 9-14,000 ft., *Thomson*, &c.—DISTRIB. N. and W. Asia, Europe, Africa, N. America.

Under *P. lapathifolium* I have alluded to the difficulty of distinguishing this plant from its var. *nodosa*, in India at any rate. I must leave a further study of the forms of both to Indian botanists, with living specimens to work upon.

29. ***P. minus***, *Huds.*; *Meissn. in DC. Prodr.* xiv. 1. 111; slender, erect or ascending, glabrous, leaves sessile linear- or oblong-lanceolate subacute, stipules sparsely strigose truncate ciliate cilia much shorter than the tube, racemes erect filiform, bracts close rarely interrupted glabrous ciliate, perianth eglandular, nut polished. *Boiss. Fl. Orient.* iv. 1029; *Miquel Fl. Ind. Bat.* i. 1002. *P. Posumbu*, *Wall. Cat.* 1722 (not of *Ham.*). *P. tenellum*, *Blume Bijl.* 530. *P. hypostictum*, *Miquel in Herb. Hohen.*, No. 971. *P. Banca*, *Herb. Ham.* *P. strictum*, *Allioni*; *Wight Ic.* t. 1800.

Throughout the hotter parts of India, from ASSAM and CHITTAGONG to KASHMIR, and southward to TRAVANCORE, ascends the Himalaya to 6000 ft. CEYLON, ascending to 4000 ft.—DISTRIB. Europe, Temperate and Tropical Asia.

Stem sometimes creeping, 6-10 in. high or long, much branched or simple. *Leaves* usually under 2 in., glabrous or puberulous beneath, or minutely strigose on the midrib beneath; stipules $\frac{1}{4}$ - $\frac{1}{2}$ in., with stiff closely appressed bristles. *Racemes* $\frac{1}{2}$ -1 in., erect; flowers minute. *Nut* orbicular.—The nuts are rather smaller than in European specimens, but I find no other difference. *Wight* describes the Nilghiri plant as 2-3-gynous and 5-6-androus. Small states of *P. serrulatum* are with difficulty distinguished from this.

30. ***P. assamicum***, *Meissn. in DC. Prodr.* xiv. 1. 111; diffusely branched and creeping, and ascending, branches glabrous, leaves dark green when dry petioled elliptic-ovate or lanceolate subacute or acuminate glabrous or with the nerves beneath setulose and margins ciliate, stipules strigose cilia as long as the tube, racemes 1-1 $\frac{1}{2}$ in. very slender and on very slender pedicels, bracts interrupted glabrous truncate ciliate, perianth eglandular, stamens 5 or 6.

ASSAM, *Wallich*, *Masters*; CACHAR, *J. D. H. & T. T.*—DISTRIB. Burma, *Griffith*.

The prostrate habit, dark-green petioled broader leaves, longer cilia of the stipules and more slender interrupted racemes, at once distinguish this remarkable species, which has the colour of *P. tinctorium* when dry. The Burmese specimen is very much stouter than the Assam and Cachar ones, and has leaves 4 by 1 $\frac{1}{2}$ in. The nut is like that of *P. minus*.

†† *Style* 3, rarely 2. *Nut* 3-gonous, rarely biconvex.

31. ***P. viscosum***, *Ham. in Don Prodr.* 71; annual, stem ascending and branches hirsute with spreading bristly hairs and glands, leaves shortly petioled lanceolate acute or acuminate strigose, stipules short hirsute, racemes 1-1 $\frac{1}{2}$ in. erect, bracts close strigose and ciliate, perianth eglandular. *Meissn. Monog. Polyg.* 73; in *Wall. Pl. As. Rar.* iii. 55, and in *DC. Prodr.* xiv. 1. 102; *Wall. Cat.* 1713. *P. strigosum* & *hirsutum*, *Herb. Ham.*

NEPAL, *Hamilton*; KHASIA Mts., SILHET and CACHAR, *De Silva, Griffith*, &c.

Stem 1-3 ft., stout or slender, hollow, hairs flexuous, glandular or not. *Leaves* 2-7 in., glandular or not beneath, usually drying brown, stipules $\frac{1}{2}$ - $\frac{3}{4}$ in. *Racemes*

rather slender; peduncles densely glandular; bracts short; flowers bright red, hardly exerted. *Stamens* 8. *Nut* broadly trigonous, black.—I find no character for Meissner's var. *verrucosum*, of which I think the varnish is due to the glue used in mounting the specimen.

Var. *minor*; smaller, weaker, more slender and sparsely hirsute, green when dry, leaves 1–1½ in. elliptic-lanceolate obtuse. *Wall. Cat.* 1713 C.—Nepal (cult. in Hort. Bot. Calc.); Silhet.

32. *P. stagninum*, *Ham. mss.*; *Meissn. in Wall. Pl. As. Rar.* iii, 56, in *DC. Prodr.* xiv. 1. 104; stem erect or ascending and branches glabrous below above and peduncles subsilkily strigose, leaves 3–5 in. lanceolate or linear-lanceolate acuminate strigosely pubescent on both surfaces glandular or not beneath, stipules strigose cilia shorter than the tube, racemes strict erect, bracts close glabrous or strigose ciliate, perianth eglandular. *P. tomentosum*, *Wall. Cat.* 1709/4 in part, E, G, H. *P. barbatum*, *Wall. Cat.* 1708 F. *P. Bishiræ*, *Ham. mss.*; and *P. conspersum*, *Meissn. in Wall. Pl. As. Rar. l. c.*, and in *DC. l. c.* 102. *P. hispidum*, *Bab. in Trans. Linn. Soc.* xviii. 100 (not of *Don*). *P. Hamiltonii*, *Meissn. in DC. l. c.* 104, excl. syn. *P. hispidum*, (not of *Sprengel*). *P. Goyalpara*, *Herb. Ham.* *P. Hornemannii*, *Meissn. in DC. l. c.* 107.

Throughout the hotter parts of India, from CHITTAGONG, CACHAR and BENGAL to CHAMBA, ascending the Himalaya in Sikkim and Kumaon to 4000 ft. *MYSORE*, *Clarke*. *PEGU* and *BURMA*, *Wallich*.

Annual? *Stem* simple or branched. *Leaves* usually grey when dry, young often silky. *Racemes* stout or slender; peduncles usually long and stout; bracts glabrous or more or less (sometimes densely) strigose, very many-fld.; flowers white. *Styles* long, slender, connate below. *Nut* pitchy black.—Very near *P. barbatum*, and probably a form of it; but the peduncles are invariably strigose, the racemes and cilia of the stipules both shorter. Meissner refers Sprengel's *Hamiltonii* (which is Hamilton's *hispidum*) to the neighbourhood of *P. barbatum*, but I am disposed to place it under *P. flaccidum*, whilst the rest of Meissner's *Hamiltonii* comes here.

33. *P. barbatum*, *Linn.*; *Meissn. in DC. Prodr.* xiv. 1. 104; branches stout erect and peduncles glabrous, or nearly so, leaves 4–7 in. lanceolate or linear-lanceolate acuminate glabrous except the ciliate margins and mid-rib beneath, stipules strigose cilia longer than the tube, racemes 2–4 in. slender erect, bracts close glabrous sparingly and shortly ciliate, perianth eglandular white, stamens 5–8. *Bab. in Trans. Linn. Soc.* xviii. 100; *Wall. Cat.* 1708, excl. F; *Wight Ic. t.* 1798; *Miquel Fl. Ind. Bat.* i. 999. *P. rivulare*, *Kæn., Roxb. Fl. Ind.* iii. 290; *Grah. Cat. Bomb. Pl.* 172; *Dalz. & Gibs. Bomb. Fl.* 214. *P. Hornemannii*, *Meissn. in DC. l. c.* 107. *P. Maromoræ* & *fluviatile*, *Herb. Ham.*

Throughout the hotter parts of India, from ASSAM to the INDUS, and southwards to MALACCA, PENANG and CEYLON.—DISTRIB. Tropical Asia and Africa.

The nearly or quite glabrous stems and peduncles, the long bearded stipules, long weak slender but erect racemes, and shorter weaker cilia of the bracts, best distinguish this from *P. stagninum*; but none of these characters holds good by itself, and I look to Indian botanists for further information. I am not certain that the synonymy of these plants is quite right, there is so much confusion between the names adopted by Hamilton, Wallich and Roxburgh, which last author has different names for the same plant in his Herbarium, his Icones and his Flora. The *barbatum* of "Flora Indica" is, I think, certainly what I have retained as *flaccidum*; that so called on his authority in *Herb. Wallich* is *P. Hydropiper*; that of his *Icones* is undoubtedly *P. tomentosum*; whilst in his Herbarium *P. barbatum* is labelled *P. aquaticum*, which suggests to me that it is the *rivulare* of "Flora Indica," of which there is a poor drawing in his *Icones*, representing a very narrow-leaved plant with short stipules and slender racemes of white flowers.

34. **P. serrulatum**, *Lagasc.*; *Boiss. Fl. Orient.* iv. 1028; stem prostrate and rooting below, branches and peduncles glabrous, leaves 2-4 in. subsessile linear- or elliptic-oblong or -lanceolate acute or acuminate, glabrous or sparsely hairy beneath, base rounded cordate or acute, stipules strigose cilia as long as the tube, racemes $\frac{1}{2}$ -1 $\frac{1}{2}$ in. slender erect, bracts glabrous strongly often squarrosely ciliate, perianth eglandular, stamens 5-8, nut trigonous polished. *Meissn. in DC. Prodr.* xiv. 1. 110. *P. flaccidum*, *Roxb. Fl. Ind.* ii. 291 (not of *Meissn.* or *Boiss.*). *P. mite*?, *Wall. Cat.* 1721 E, G, 1721/a in part. *P. Rapte*, *Herb. Ham.*

Plains and low hills of N. INDIA, from ASSAM and BENGAL to the INDUS, ascending to 4000 ft.; in the HIMALAYA, from Kumaon westwards.—DISTRIB. W. Asia, S. Europe, all Africa, America, Australia.

Habit between small states of *P. barbatum* and *P. minus*, of which latter this is probably a form with stouter racemes and more ciliate bracts and stipules. Specimens with leaves rounded or cordate at the base are distinct enough from both. Boissier describes it as perennial with rosy flowers, but the Indian plant is an annual with white flowers. Meissner and Boissier could not have attended to Roxburgh's description of his *P. flaccidum* (leaves cordate at the base), or they would have identified that plant with this; Roxburgh's figure of this (under the name of *P. flaccidum*) represents the leaves as much broader and more cordate at the base than I have ever seen them to be. A remarkable state from Dufa in Bhotan, collected by Booth, has the under surface of the leaves studded with a yellow secretion in minute dots.

Var. *Donii*; tall, slender, leaves petioled elliptic or lanceolate acuminate at both ends sparsely hairy beneath, racemes long slender erect, bracts close imbricate with one far removed and low on the slender peduncle, cilia as long as the tube. *P. Donii*, *Meissn. Monog. Polyg.* 72, excl. syn., and in *DC. Prodr.* xiv. 1. 105, excl. cit. of *Wight*.—Nepal, *Wallich*.

There are two sheets of this in the Hookerian Herbarium (from Wallich, 1821), one with the narrow leaves described by Meissner, the other with much broader elliptic ones. They closely resemble *P. flaccidum* var. *hispida*, but the closer bracts with long spreading cilia and eglandular perianth distinguish it. From *P. Posumbu* most of the same characters separate it, but it is in many respects intermediate between these two.

35. **P. Posumbu**, *Ham. in Don Prodr.* 71 (not of *Wallich*); flaccid, very slender, stem extensively creeping below and peduncles quite glabrous, leaves 1-3 in. petioled elliptic-lanceolate caudate-acuminate glabrous or sparsely hairy, stipules sparingly strigose, cilia stiff longer than the tube, peduncles and erect racemes filiform sometimes very long, bracts minute close or distant very shortly ciliate, perianth very small eglandular, nut perfectly smooth and polished. *Meissn. in DC. Prodr.* xiv. 1. 105, in part; *Miquel Fl. Ind. Bat.* i. 1000. *P. Donii*, *Wall. Cat.* 1723 B. *P. cæspitosum*, *Blume Bijd.* 532 (of *Herb. Lugd. Bat.*). *P. gracile*, *Herb. Ham.*

TEMPERATE and SUBTROPICAL HIMALAYA; from Sikkim to Nepal. ASSAM, SILHET, CACHAR and the KHASIA Mts., ascending to 5000 ft.—DISTRIB. Munnipore, Java, China and Japan.

Stem creeping for 1-3 ft., then ascending or decumbent for 12-18 in., simple or branched. Leaves very membranous, ciliate; petiole sometimes $\frac{1}{2}$ in. Racemes 1-3 in., always erect, very variable in length, sometimes almost capillary and 5 in. long with distant bracts, at others short with imbricate upper bracts and remote lower ones (these resembling small specimens of *serrulatum*). Nut 3-gonous, very small.—There are no Nepal specimens of this in Hamilton's or Wallich's Herbaria. Hamilton's are from Goalpara in Assam, and are not ticketed *P. Posumbu*, which name nowhere appears in his collection. Meissner's *a tenerum* is the right plant; his β *firmum* is composed of this and of *P. flaccidum*; his γ *macrophyllum* is *P. flaccidum*; his δ ? *cæspitosum* is right; his ϵ ? *ovatum* would appear to be *Ceratogo*

non atriplicifolium, both from the number of Wallich's, which he quotes (1719), and from the length of the petiole (6-8 lines).—Don's publication of *Posumbu* and Blume's of *caespitosum* are contemporaneous.

36. **P. Hydropiper**, Linn.; Boiss. *Fl. Orient.* iv. 1029; glabrous, rather robust, stem erect or ascending branched, leaves sessile or petioled lanceolate or oblong-lanceolate glabrous or with the costa scabrid beneath, stipules glabrous or sparsely strigose very shortly ciliate, racemes filiform decurved interrupted, bracts glabrous glandular or not mouth naked or minutely ciliate, perianth very glandular pink, nut usually trigonous opaque granulate. Meissn. in *DC. Prodr.* xiv. 1. 109; *Fl. Dan.* t. 1376; Reichb. *Ic. Crit.* v. t. 494. P. mite, Wall. *Cat.* 1721 F, H.

Plains and hills of INDIA, in wet places, from ASSAM, SILHET, CHITTAGONG and BENGAL to N.W. INDIA; ascending the KHASIA Mts. to 5000 ft., and the HIMALAYA to 7000 ft. MADRAS (coll. G. Thomson).—DISTRIB. Westward to Europe and N. Africa, Temperate and Subtropical Asia, Java, N. America, Australia.

Annual, roots tufted or shortly creeping; stems and branches rather stout, leafy, 12-18 in. high, always glabrous, often glandular, nodes often swollen. Leaves rarely more than 3 in. long, very variable in width and in the length of the apex, usually covered with impressed glands; stipules glabrous, or with scattered erect appressed hairs that are sunk in the tissue of the stipule. Racemes flexuous/leafy at the base; bracts variable as to ciliation, which is always short, usually broader than in *P. flaccidum*; perianth pinkish. Nut sometimes flat, finely granular.—I cannot distinguish this from the European *P. Hydropiper*, though the cilia of the stipules are often longer and the nut smaller. Hamilton in a note upon his specimen (under the name of *flaccidum*), says that Roxburgh desired that it should bear the name of *Pani-maricha*, i.e. water-pepper. The Eastern specimens have more commonly a scabrid costa (which, however, varies in amount to total absence), and have more often sunk hairs in the stipules. I find these latter in European specimens; in which also I find occasional cilia on the bracts, but never a scabrid costa to the leaf. It is the *P. barbatum* of Roxb., according to a specimen in Herb. Wallich, but not of the "Flora Indica." Zollinger's No. 95 from Java is identical with the Indian plant. The long cilia of the more glabrous species, shorter racemes and more crowded flowers distinguish this from *P. flaccidum*.

Var. ? *eglandulosa*; perianth eglandular, nut compressed.—Western Himalaya, Edgeworth; Kunawur, Jamu and Ladak, Thomson.—But for the more drooping racemes and smaller pink flowers this would be *P. mite*, L., to which I was inclined to refer it, but Mr. Baker regards it as a form of *Hydropiper*.

37. **P. flaccidum**, Meissn. in *DC. Prodr.* xiv. 1. 107, in part, excl. syn. (not of Roxburgh); glabrous or pubescent, stem erect or ascending simple or branched, leaves usually petioled lanceolate or elliptic-lanceolate acuminate, stipules strigose or hirsute, cilia half as long as the tube or longer, racemes very long filiform decurved, bracts usually very distant glabrous glandular, mouth ciliate, nut trigonous rarely compressed opaque granulate. Boiss. *Fl. Orient.* iv. 1029, excl. syn. Donii. *P. barbatum*, Roxb. *Fl. Ind.* ii. 289 (not of Willd.). *P. Posumbu*, Thwaites *Enum.* 245. ? *P. tenellum*, Roxb. *Fl. Ind.* ii. 289. *P. Donii*, Wight *Ic.* t. 1801. *P. mite*?, Wall. *Cat.* 1721/2, 3, D, 1723 1 b, C. *P. Rottleri*, Roth *Nov. Pl. Sp.* 205. *P. rivulare*, Herb. Helf. (ex Meissn.). *P. asperulum*, Wall. *ms.* *P. Bisculatum*, Herb. Ham. *P. ciliatum*, *Ic.* Roxb.

Common throughout INDIA in wet places, ascending the Himalaya to 4000 ft., and extending to CEYLON and MALACCA.—DISTRIB. Malay Archipelago.

Usually a much taller, longer and larger leaved species than *P. Hydropiper*, and differing in other characters indicated under that plant.

Root perennial?, shortly creeping; stems 2-3 ft., usually erect and slender

glabrous or strigose. *Leaves* 2-6 in., glabrous altogether or with the exception of the costa and nerves beneath, or hispidly or strigosely hairy on the surfaces or below only, brown when dry, more or less glandular. *Stipules* usually very strigose with stiff appressed hairs, cilia often as long as the tube. *Racemes* subpaniculate, sometimes 6 in. long and extremely slender; bracts glabrous, more or less ciliate, glandular or not; perianth bright pink, very thickly glandular. *Stamens* 8. *Nut* small, black, minutely granular.—The taller, longer-leaved, hairy forms of this are very distinct from *P. Hydropiper*, but amongst a large suite of specimens of both, some occur that it is difficult to refer to one rather than to the other. As pointed out under *P. serrulatum*, Roxburgh's *P. flaccidum* is that plant. This obliges me to retain the name (*flaccidum*) as Meissner's, though in so doing I am unable to take in his synonymy and his varieties, which are much confused. Boissier gives Afghanistan Griffith as a locality for this species, but I have seen no specimens, and his description quite agrees with the Indian plant. I can hardly doubt this being Roth's *P. Rottleri*, which he received from Heyne (under the name of *P. barbatum*, Rottler), but am puzzled by his description of "style quite simple and stigma capitate"—in allied species he always speaks of stigmas. I do not see how glabrous forms differ from the American *P. acre*, HBk., except, as Meissner observes (in Fl. Bras.), by the granulate (not smooth polished) nut.

Var. *hispidum*; leaves elliptic ovate much smaller 1-1½ in. long, hirsute beneath or on both surfaces, glands of perianth less strong. *P. hispidum*, Ham. in *Don Prodr.* 71, not of Meissn. or Bab. *P. Posumbu*, Meissn. in *DC. l. c.* 105, in part. *P. Hamiltonii*, Spreng. *Syst. Veg.*, Cur. post. 155 (not of Meissn.). *P. Babingtoni*, Endl. *Gen. Pl. Suppl.* iv. 47, excl. syn. *Bab.*, *P. mite*, Wall. *Cat.* 1723, 1 a, in part.—Nepal, Hamilton; Kumaon, at Naini tal, alt. 6400 ft., *Strach. & Winterb.* (No. 17); Hawalbagh, Thomson.—A specimen in Wallich's Herbarium of Hamilton's *P. hispidum* shows that this plant has been misunderstood first by Babington, who described for it a variety of *P. barbatum*, or *P. Bishiræ*, followed by Meissner (in De Candolle), who did the same, adopting the name of *Hamiltonii*, which had been proposed for it by Sprengel (there being an earlier *P. hispidum*); and lastly by Endlicher, who included both Hamilton's and Babington's plants under the third name of *P. Babingtoni*. Beyond this I have been unable to unravel completely the synonymy of this obscure plant, which differs from *P. flaccidum* in its much shorter leaves and less glandular perianth. It resembles *P. serrulatum* var. *Donii*, which differs in the coarse strong cilia of the bracts.

38. ***P. macranthum***, Meissn. in *DC. Prodr.* xiv. 1. 207; tall, erect, stem glabrous or sparsely strigose, leaves 3-6 in. petioled elliptic-lanceolate acuminate glabrous or sparsely hispid beneath, stipules substrigose, cilia as long as the tube, racemes long narrow erect strict, bracts closely imbricate with one or two removed far below glabrous shortly ciliate eglandular, perianth very large, nut large polished. *Polygonum*, No. 21, *Herb. Ind. Or. H. f. & T.*

ASSAM, Wallich, Griffith, &c. SILHET, the JHEELS and KHASIA Mts., ascending to 5000 ft., J. D. H. & T. T., Clarke.

Habit and size of *P. flaccidum*, but at once distinguished by the strict rarely flexuous (never decurved) racemes 3-6 in. long, with closely imbricating bracts and the polished nut.—I have seen but two flowering specimens, in which the perianth is nearly ½ in. diam.; and from the small size of the buds in numerous other specimens I suspect that the perianth may vary much in size. The nut is nearly ½ in. long, jet-black, quite smooth, shining with obtuse angles.

Sect. VIII. CEPHALOPHILON, Meissn.; erect or prostrate unarmed annuals, rarely perennial-rooted, or shrubs. *Leaves* usually broad entire or runcinately lobed or auricled; stipules short, tubular. *Flowers* in single or corymbose heads (spikes in *P. muricatum*); bracts flat, hardly tubular. *Perianth* 4-5-lobed or -partite. *Stamens* 6-8, glands 0 or obscure. *Styles* 2-3, filiform, connate below or throughout, stigmas capitate. *Nut* tri-

gonous or biconvex, enclosed in or adnate to the often enlarged and sometimes fleshy perianth-tube; cotyledons accumbent.

39. **P. humile**, *Meissn. in Wall. Pl. As. Rar.* iii. 59, and in *DC. Prodr.* xiv. 1. 128; small, sparsely glandular-hairy, stem filiform, leaves $\frac{1}{2}$ in. subsessile ovate acute or rhombic-ovate, mouth of stipules very oblique, heads long peduncled small, bracts very small ovate-lanceolate acute, stamens 5-6, nut biconvex striate and punctate. *P. perforatum*, *Wall. Cat.* 1700, in part.

TEMPERATE and ALPINE HIMALAYA; Kunawur, *Grant*; Kumaon, alt. 8500 ft., *Strachey & Winterbottom*; Nepal, *Wallich*; Sikkim, alt. 7-11,000 ft., *J. D. H., Clarke*.

Annual. *Stem* 4-6 in., simple and erect or diffusely branched from the base. *Leaves* very uniform, epunctate, sometimes narrowed into a short broad petiole. *Heads* $\frac{1}{4}$ in. diam., on long slender pedicels, without an involucre leaf; bracts longer than the flowers. *Perianth* greenish, tube closely investing but not cohering with the nut, eglandular; lobes very short, rounded. *Nut* black, coarsely punctate; styles slender, connate below, stigmas capitate.

40. **P. glaciale**, *Hook. f.*; dwarf, flaccid, glabrous, subsucculent, leaves long-petioled broadly ovate obtuse, heads small sessile or peduncled, peduncle minutely glandular at the tip, bracts broadly ovate obtuse glabrous about equalling the 3-gonous nut. *P. perforatum* γ . *glaciale*, *Meissn. in DC. Prodr.* xiv. 1. 128. *P. perforatum*, *Aitchison in Journ. Linn. Soc.* xviii. 90.

ALPINE and SUBALPINE HIMALAYA; Kashmir, alt. 8400-12,000 ft., *Clarke*; Kunawur and Piti, alt. 9000-11,000 ft., *Thomson*; Kumaon, alt. 13,000 ft., *Strachey & Winterbottom*, &c.—DISTRIB. Afghanistan.

Annual, 2-4 in. high, branched from the root, branches diffuse. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., nerves indistinct, surfaces minutely granular when dry; petiole as long as the blade, winged above only; stipules short, cupular, simple or 2-lobed, glabrous. *Heads* $\frac{1}{2}$ - $\frac{1}{4}$ in. diam., without an involucre leaf. *Perianth* hyaline; lobes subequal, obtuse. *Stamens* 5. *Nut* minute, closely invested by the perianth-tube, black, striolate and punctate.—The long petioles at once distinguish this from *P. alatum*.

41. **P. alatum**, *Ham. mss.*; *Spreng. Syst. Veg., Cur. post.* 154; tall, erect or low and procumbent, glabrous or sparsely hairy, leaves large or small ovate or deltoid-ovate obtuse or acute narrowed into a broadly winged often amplexicaul petiole glandular or not, stipules tubular obliquely truncate, peduncles glandular hispid at the tip, heads usually with an involucre leaf, bracts ovate-lanceolate glabrous not ciliate, perianth 1-5-fid., stamens 7-8, nut biconvex or trigonous striate and punctate. *P. punctatum*, *Ham. in Don Prodr.* 72; *Bab. in Trans. Linn. Soc.* xviii. 105. *P. perforatum*, *Meissn. Monogr. Polyg.* 83, and in *Wall. Pl. As. Rar.* iii. 59, and in *DC. Prodr.* xiv. 1. 128, excl. γ . *glaciale*; *Wall. Cat.* 1700. *P. nepalense*, *Meissn. Monog.* 84, in *Wall. Pl. As. Rar.*, and in *DC. U. c.*; *Fresen. in Mus. Senkenb.* iii. 64; *Bab. l. c.* 106; *Wight Ic.* t. 1804.

Throughout the HIMALAYA; abundant at 4-10,000 ft. elevation, from Sikkim to Kashmir. KHASIA MTS., alt. 4-6000 ft. NILGHIRI MTS. (a weed in gardens), *Wight*, CANARA; Bababudan Hills, *Heyne*. CEYLON, abundant.—DISTRIB. Afghanistan, Java, Japan, Abyssinia.

Annual. *Stem* rarely creeping for a short distance at the base, erect and sub-simple or branched from the base; branches 6-18 in. high, slender or rather stout, flaccid or stiff, erect ascending or prostrate, glabrous or sparsely glandular-hairy. *Leaves* in the largest specimens 2-3 in. long, and the smallest $\frac{1}{2}$ in., base sometimes subcordate, suddenly contracted into the broadly-winged petiole which is often

auricled at the base; stipules glabrous or hairy, sometimes glandular, rarely ciliate. Heads $\frac{1}{4}$ – $\frac{1}{2}$ in. diam.; peduncles short or long, always glandular-hairy above; involucreal leaf often longer than the head, sessile, ovate-cordate, obtuse or acute. *Sepals* white or pale purple, membranous, subequal, very variable in size. *Stamens* included. *Style* long with one or two long arms and capitate stigmas. *Nut* varying in size in the same head, closely invested with and cohering with the thin perianth-tube and crowned with its lobes.—I fail to discriminate between Meissner's *P. perforatum* and *P. nepalense*, and I have taken for both Hamilton's name of *alatum* as adopted by Sprengel for his *punctatum*. The absolute character whereby these supposed species were distinguished, that of the biconvex and trigonous nut, is accompanied by no other, and I have taken typical nuts of both forms from one head of a Nilghiri specimen. Meissner himself observes that his *nepalense* has sometimes trigonous nuts. The character of glandular leaves again is most variable, and eglandular specimens are far the most abundant. Of the following forms some may prove to belong to distinct species, but I doubt it.

P. alatum proper; stems 1–2 ft., leaves large glandular or not, heads large, invol. leaf large, bracts obtuse or subacute, nut trigonous. *P. alatum*, *Spreng. l. c.* *P. punctatum*, *Ham. mss.*—Abundant.

Var. *nepalense*; stems 1–2 ft., leaves large glandular or not, heads large, invol. leaf large, bracts obtuse or subacute, nut biconvex. *P. nepalense*, *Meissn. Monog. l. c. t. 7, f. 2*; *Wall. Cat. l. c.* *P. guttuliferum*, *Miq. Pl. Hohenack.*, No. 968 (*leaves glandular*).—Abundant.

Var. *parviflora*; stem 1–2 ft. slender, leaves about 1 in., heads small on more slender peduncles, bracts acute, lower recurved, nut trigonous. *P. perforatum*, *Meissn. l. c. excl. γ.*; *Wall. Cat. 1700*.—Common, also in Ceylon (nuts flat).

Var. *arenaria*; smaller, diffusely branched, stem elongate prostrate with ascending flowering branches, leaves $\frac{1}{2}$ –1 in. narrower eglandular, petiole shorter, heads large, invol. leaf very small, bracts obtuse, fruiting perianth with a median rib on each face, nut biconvex.—Sikkim, sands of the River Rungeet, &c., *Clarke, Treutler*.

Var. *Metziana*; small, diffusely branched from the base, branches very slender prostrate and ascending, leaves broad $\frac{1}{2}$ –1 in. long glandular or not, petiole short, heads small, peduncles very slender, invol. leaf large or small, bracts acute, nut trigonous or biconvex. *P. Metzianum*, *Miq. in Herb. Hohenack.*, No. 610.—Specimens with 3-gonous nuts are from Sikkim and the Khasia Mts., at 5000 ft.; Kumaon and Dalhousie, 7000 ft.; and with flat nuts from Parusnath, the Khasia Mts., Canara, the Nilghiri Mts. and Ceylon, all at above 4000 ft.

Var. *rigidula*; dwarf, nearly glabrous, stem 2–3 in. strict erect subsimple or dichotomously branched, leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. acute eglandular, petiole short, heads small (large for the size of the plant), invol. leaf large or small, bracts acute or acuminate, flowers purple-red, nut biconvex.—Kunawur, *Grant*; Sikkim, alt. 7300 ft., *Clarke*.—Very like small specimens of *P. humile*.

Var. *tenuicaulis*; very slender, diffusely branched, quite glabrous except the tips of the peduncles, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. very narrow acuminate glandular, heads very small, peduncles capillary, bracts acuminate recurved, nut trigonous.—Khasia Mts., alt. 4–5000 ft., *J. D. H. & T. T., Clarke*.

42. ***P. microcephalum***, *Don Prodr.* 72; glabrous or sparsely hairy, stem rigid tall erect or decumbent below angled and grooved, leaves 3–5 in. hastately ovate-lanceolate or oblong acuminate abruptly narrowed into the long winged petiole, stipules truncate often ciliate, heads small, peduncle filiform quite glabrous, involucreal leaf 0, bracts oblong obtuse more or less ciliate, nut 3-gonous granulate. *Meissn. Monog. Polyg.* 82, in *Wall. Pl. As. Rar.* iii. 59, and in *DC. Prodr.* xiv. 1. 129. *P. staticiflorum*, *Wall. Cat.* 1704, *excl. D.* *P. strigosum*, *Herb. Ham.*; *Wall. Cat.* 1732, under *P. Wallichii*. ? *P. ciliatum*, *Ham. in Don Prodr.* 73.

TEMPERATE HIMALAYA; Nepal, *Wallich*; SIKKIM, alt. 4–5000 ft., *J. D. H. KHASIA Mts. and SILHET*, alt. 0–4000 ft.

Root slender, perennial, woody; stem 2–3 ft., often decumbent and rooting below at the nodes, glabrous or subhispid above. *Leaves* membranous, eglandular, ciliolate,

with the petiole sometimes auricled at the base, uppermost sessile and deeply amplexicaul. *Peduncles* axillary and subterminal, often forked; heads $\frac{1}{4}$ – $\frac{1}{2}$ in. diam.; perianth white, 5-cleft. *Stamens* 8. *Styles* 2–3, slender, connate below, stigma capitate.—It is curious that of 60 specimens examined not one bears ripe fruit. Meissner and Clarke (mss.) describe it as 3-gonous, but I find both digynous and trigynous flowers. Meissner's var. *P. subvillosa* is a hirsute leaved state. Hamilton's *P. ciliatum* is a very doubtful plant; according to Don's description it differs from *P. microcephalum* only in the decumbent stem. Meissner describes the peduncles as sometimes hispidulous, but I never find them so.

43. **P. Wallichii**, Meissn. Monogr. Polyg. 83, t. 7, f. 1, in Wall. Pl. As. Rar. iii. 60, and in DC. Prodr. xiv. 1. 129; glabrous, stem slender decumbent, branches ascending, leaves 1–2 in. ovate-cordate acuminate ciliolate, petiole not winged auricled at the base, stipules ciliolate, heads small, peduncles subterminal short very slender quite glabrous, involucre leaf 0 or small, bracts broadly oblong obtuse eciliate. Wall. Cat. 1702, excl. cit. of Wight.

TEMPERATE HIMALAYA; Nepal, Wallich, Scully; Sikkim, alt. 4000 ft., Clarke.

Root perennial, creeping. *Stems* 2–3 ft., flexuous, stout, angled and grooved, prostrate but not rooting. *Leaves* 1–2 in., rather abruptly acuminate, uppermost cordate amplexicaul, auricles minute green; stipules long, loose, glabrous or hairy. *Peduncles* subterminal; heads as in *P. microcephalum*, but bracts not ciliate. *Perianth* 5-fid. *Stamens* 6–8. *Nut* trigonous.—I have seen only a few specimens. The habit, and naked petioles with minute basal auricles and eciliate bracts distinguish this from *P. microcephalum*. Meissner is in error in citing Wight's t. 1805 for this; it is clearly *P. sphærocephalum*.

44. **P. sphærocephalum**, Wall. Cat. 1703; rarely glabrous, stem very long slender creeping, branches short erect, leaves 1–3 in. ovate or oblong-cordate acuminate ciliolate, petiole not winged nor auricled, stipules truncate mouth naked, peduncles glandular-hairy terminal and axillary, involucre leaf 0, bracts ovate-oblong acute eciliate. Meissn. in Wall. Pl. As. Rar. iii. 60; Bab. in Trans. Linn. Soc. xviii. 107; Gærcke in Bot. Reise Pr. Waldem. 136. *P. Wallichii*, Wight Ic. t. 1805. *P. podocephalum*, Klotzsch in Bot. Reise Pr. Waldem. t. 86.

TEMPERATE HIMALAYA; Nepal, Wallich; Kumaon, alt. 6–8000 ft., Royle, &c. NILGIRI MTS., Wight.

Perennial? *Stems* 2–3 ft. long, rooting at the nodes, angular and grooved; branches erect from the nodes, 2–4 in. high, with 2–3 long-petioled leaves terminating in a solitary 1-headed peduncle. *Leaves* 1–3 in., eglandular, sparsely hairy or glabrous; petiole $\frac{1}{2}$ to 1 in., winged at the top only. *Heads* $\frac{1}{2}$ in. diam.; flowers longer than the bracts, rose-cold. *Nut* flat or 3-gonous.—A specimen in Wight's Herbarium has much larger leaves (3–3 $\frac{1}{2}$ by 2 in.), with petioles winged to near the base; it is marked *P. Wallichii*? and is the only one seen of the Nilgiri plant figured by Wight: In the plate he correctly figures the peduncles as hairy, and the stipules as eciliate, but he describes the former as glabrous, and the latter as shortly ciliate. He has, I suppose, figured *sphærocephalum* from native specimens, and copied Meissner's description of *P. Wallichii*.

45. **P. runcinatum**, Ham. in Don Prodr. 73; stem ascending from a creeping base smooth scabrid or hairy, leaves runcinate-pinnatifid glabrous terminal lobe triangular-ovate acuminate, petiole short with amplexicaul auricles, peduncles glandular-hispid above, heads large, involucre leaf 0, bracts oblong eciliate, nut minute globosely 3-gonous. Meissn. Monogr. Polyg. 85, in Wall. Pl. As. Rar. iii. 60, and in DC. Prodr. xiv. 1. 130; Wall. Cat. 1698. *P. reticulatum*, De Bruyn. in Pl. Jungh. 300.

CENTRAL and EASTERN HIMALAYA; Nepal, Hamilton, Wallich; Sikkim, alt.

7-10,000 ft., *J. D. H.*, &c. KHASIA Mts., alt. 4-5000 ft., *Lobb, J. D. H. & T. T.*, &c.—DISTRIB. Java.

Annual. *Stems* 10-18 in., slender, flaccid, grooved and angled, strict or flexuous, simple or branched. *Leaves* $1\frac{1}{2}$ -6 in., membranous, ciliolate, glabrous or sparsely hairy, uppermost simple and cordate-amplexicaul; lateral lobes 1-3 pairs horizontally spreading, rounded or oblong; auricles very variable, sometimes in mere green rings, at others nearly 1 in. diam.; stipules short, hairy and ciliate. *Peduncles* slender. *Heads* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; flowers white or pink. *Perianth* 5-cleft. *Stamens* 7-8. *Styles* 3, slender, connate below. *Nut* opaque.—The var. *P. javanicum* has much larger more ovate trigonous nuts.—Extensively cultivated in Sikkim.

46. *P. sinuatum*, *Royle mss.*; *Meissn. in DC. Prodr.* xiv. 1. 130; glabrous, stem creeping with short erect leafy branches, leaves runcinate-pinnatifid, terminal lobe rhomboid acute, petiole short with amplexicaul auricles, peduncles glabrous axillary, heads solitary, involucre leaf 0, bracts ovate obtuse, nut minute globosely trigonous.

WESTERN HIMALAYA; Kumaon, *Royle*, alt. 9000 ft., *Strachey & Winterbottom*; Garwhal, *Falconer*; Kulu, alt. 8-10,500 ft., *Stewart*.

Perhaps, as *Meissner* suggests, a variety of *P. runcinatum*, but creeping, much smaller in all its parts, and quite glabrous except occasionally the stipules, leaves $\frac{1}{2}$ -1 in., terminal lobe much smaller in proportion to the lateral and of a very different shape, sometimes almost transversely oblong and apiculate. The nut is the same in both.

47. *P. capitatum*, *Ham. in Don Prodr.* 73; stems or branches many stout creeping from a woody rootstock leafy, and stipules glandular-hirsute, leaves $\frac{1}{2}$ - $1\frac{1}{2}$ in. shortly petioled elliptic acute, petiole 2-auricled at the base, stipules short cupular, heads 1-3, peduncles glabrous or glandular-hispid, involucre leaf 0, bracts ovate acute eciliate. *Meissn. Monog. Polyg.* 82, and in *DC. Prodr.* xiv. 1. 129; *Bab. in Trans. Linn. Soc.* xviii. 107. *P. repens*, *Wall. Cat.* 1699; *Meissn. in Wall. Pl. As. Rar.* iii. 60.

SUBTROPICAL AND TEMPERATE HIMALAYA; on rocks, walls, &c., alt. 4-6000 ft., from Chamba to Bhotan. KHASIA Mts., alt. 3-5000 ft.

Perennial; rootstock stout, twisted; stems or branches 6-10 in. long, trailing and rooting below, red-brown; hairs brown. *Leaves* crowded, bifarious, rather thick, brownish when dry, eglandular, base sometimes cordate; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., auricles small rounded. *Heads* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., dense-flid., glandular and hairy; bracts glabrous. *Perianth* pink, 5-cleft; segments obtuse. *Stamens* 8. *Nut* 3-gonous, very small, $\frac{1}{4}$ in., much smaller in proportion to the perianth than in its allies.—*Meissner's* var. *macilentum* appears to have no definite character.

48. *P. chinense*, *Linn.*; *Meissn. in DC. Prodr.* xiv. 1. 130; shrubby, glabrous or sparsely pubescent or glandular-pubescent, leaves petioled 3-5 in. from linear-oblong to oblong- or deltoid-ovate or -rotundate entire or crenulate, base truncate rounded acute or subcordate uppermost cordate amplexicaul, petiole hardly winged usually 2-auricled at the base, stipules long very obliquely truncate acute, heads panicled or corymbose, peduncles usually glandular-hairy, involucre leaf 0, bracts glabrous usually acute, fruiting perianth dry or fleshy, nut trigonous. *Meissn. Monog.* 60, and in *Wall. Pl. As. Rar.* iii. 60; *Bab. in Trans. Linn. Soc.* xviii. 109; *Roxb. Fl. Ind.* ii. 289; *Wight Ic.* t. 1806; *Grah. Cat. Bomb. Pl.* 172; *Dalz. & Gibs. Bomb. Fl.* 214. *P. cymosum*, *Roxb. l. c.* *P. auriculatum*, *Meissn. Monog.* 39, t. 6, and in *Wall. Cat.* 1705. *P. polycephalum*, *Wall. Cat.* 1707. *P. brachiatum*, *Poir. Dict.* iv. 15; *Lamk. Ill.* 315, t. 4; *Wall. Cat.* 1706. *P. patens*, *Don Prodr.* 73; *Meissn. Monog.* 60. *P. corymbosum*, *Willd. Sp. Pl.* ii. 452. *P. ovatum*, *Heyne in Roth Nov. Sp.* 206. *P. adenotrichum*, *Wall.*

mss. *Ampelygonum chinense*, Lindl. in *Bot. Reg.* 1838; *Misc.* 63, No. 118. *P. panduræforme*, Ham. *mss.*; Wall. *Cat.* 1704 D. *Coccoloba crispata*, Ham. in Roxb. *Fl. Ind.* ii. 292.

SUBTROPICAL and TEMPERATE HIMALAYA; from Simla to Bhotan, alt. 4-8000 ft. ASSAM, the KHASIA MTS., SILHET, CACHAR, CRITTAGONG, RANGOON and BURMA to MALACCA. BEHAR, top of Parusnath, alt. 4000 ft. DECCAN PENINSULA; on the Western Ghats from the Concan southward. CEYLON, abundant.—DISTRIB. Sumatra, Java, Philippine Islands, China and Japan.

A rambling or erect shrub, reaching 5 ft.; stems and branches many from the root, stout, flexuous, angled and grooved. *Leaves* extremely variable, rarely orbicular; gland-dotted or not, rigid or membranous, flat or undulate; petiole short, winged above, auricles extremely variable, deciduous usually rounded, sometimes $\frac{1}{2}$ in. broad, at others suppressed; stipules often $\frac{3}{4}$ in. long with long waving points. *Heads* very variable in number, $\frac{1}{4}$ – $\frac{1}{2}$ in. diam.; peduncles divaricate; flowers white, pink or purplish. *Perianth* 5-cleft. *Stamens* 8. *Styles* 3, connate below. *Nuts* variable in size, enclosed in the dry or fleshy perianth.—A polymorphous plant, of which the following forms may show the extent of variation, but are not approximately constant, nor do they comprise all the departures from any assumed type that could be defined by words, which would be a very great many. I cannot conceive what other *Polygonum* than this Roth describes as *P. ovatum*.

P. chinense proper; leaves ovate-oblong or deltoid-ovate base truncate or subcordate, peduncles eglandular.—Var. *Thunbergianum*, Meissn. in Wall. *Pl. As. Rar.* iii. 60, and in *DC. l. c.*

Var. *ovalifolia*, Meissn. l. c.; leaves ovate or oblong-ovate acute at both ends often crenulate glabrous, peduncles glandular-hispid, heads large or small.—Himalaya, Parusnath, common in the Deccan Mts., Ceylon, &c.

Var. *subhastata*, Meissn. l. c.; leaves oblong or lanceolate base cordate or subhastate sometimes very long, peduncles eglandular, heads small.

Var. *corymbosa*, Meissn. l. c.; leaves oblong-lanceolate base acute or acuminate, peduncles eglandular, heads large.

Var. ? *parvifolia*; stem slender prostrate, leaves 1½–2 in. hastate oblong, petiole not auricled, bracts obtuse or subacute.—Silhet, Wallich; Assam, Jenkins.—This may be a different species; the habit is that of *P. Wallichii*, but the leaves are not ciliate.

Var. *hispida*; branches leaves on both surfaces and inflorescence hispidly hairy, hairs on the branches reflexed.—Tenasserim, Gallatly (in *Herb. Calcutt.*).

Sect. IX. ECHINOCAULON, Meissn. Erect prostrate or subscandent often prickly herbs. *Leaves* usually broad, often cordate or hastate; stipules tubular. *Flowers* in simple or panicked heads or spikes; bracts usually shortly tubular, ciliate. *Perianth* 5-lobed. *Stamens* 5–8, with alternating glands. *Styles* 2–3, free, stigmas capitate. *Nut* free, trigonous or biconvex; cotyledons accumbent.

* *Nut exerted.*

49. **P. muricatum**, Meissn. *Monog. Polyg.* 74, in Wall. *Pl. As. Rar.* iii. 58, and in *DC. Prodr.* xiv. 1. 133 (not of Wall. *Cat.*); stem very long and slender flaccid smooth or angles sparsely scabrid, leaves distant lower petioled ovate or oblong-ovate acute or obtuse, base rounded truncate or cordate upper amplexicaul-cordate, stipules glabrous ciliate, heads laxly paniced, peduncles glandular-hispid or glabrous, spikes few-fl'd. *P. asperulum*, Wall. *Cat.* 1724. *Polyg. pedunculare* var. and *Polyg. n.* 57, *Herb. Ind. Or. H. f. & T.*

CENTRAL and EASTERN HIMALAYA; Nepal, Wallich; Sikkim, alt. 10–12,000 ft., J. D. H. KHASIA MTS., alt. 4–5000 ft., J. D. H. & T. T., Clarke.

Perennial? *Stems* creeping and often tufted at the base, above rambling over bushes, sometimes quite smooth even at the nodes. *Leaves* 1–2 in., membranous, sometimes sparsely hairy beneath, ciliolate or not, midrib beneath smooth or scabrid; petiole very slender, smooth or scabrid; stipules truncate, base naked or with a ring of reversed prickles. *Spikes* $\frac{1}{2}$ –1 in. long, on almost capillary peduncles; flowers distant in Himalayan specimens, closer in Khasian; bracts ovate or lanceolate, hispid and ciliate or glabrate. *Perianth* white or pink. *Stamens* 5 or 6. *Styles* very slender, connate below. *Nut* ovoid, with acute angles, pale, smooth, shining.—Wallich's Nepal specimens have the spikes and bracts densely glandular-pubescent or glabrate, and partially exserted nuts. Sikkim ones have perfectly smooth and glabrous stems, stipules, spikes and bracts, eciliate stipules, and smaller flowers with subacute sepals much shorter than the nut; they may form a different species. Khasian ones have subcapitate densely glandular-pubescent spikes, and nuts closely wrapped in the perianth, the segments of which are obtuse as in the Nepal specimens.

50. ***P. arifolium***, Linn.; Meissn. in DC. Prodr. xiv. 1. 134; stem very slender flaccid smooth or angles retrorsely scabrid, leaves long-petioled broadly hastate acuminate basal lobes spreading acute, stipules very short hispid and ciliolate, peduncles glandular-hispid, heads small few-fl., involucreal leaves 1–2 linear, bracts small hispid, nuts broadly trigonous exserted. Polyg. n. 53, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Dikeeling, alt. 7000 ft., Clarke. KHASIA MTS., in woods, alt. 5000 ft., J. D. H. & T. T.—DISTRIB. N. America.

Stems 2–3 ft., weak. *Leaves* 2–3 in., membranous, ciliolate, glabrous, or sparsely setose on the nerves beneath and on one or both surfaces, base truncate; petiole nearly as long as the blade, very slender, smooth or scabrid; stipules $\frac{1}{4}$ in. long, lax, base naked or with a few retrorse hairs. *Heads* small, very few-fl., on strict forked peduncles, usually subtended by one or two narrow spreading ciliate invol. leaves; bracts very small, lanceolate, acute, ciliate; flowers small. *Perianth* 5-cleft. *Stamens* 5. *Styles* very slender, connate below. *Nut* ovoid, acutely 3-gonous, acute, pale, shining.—This is a slender form of the American plant quite like some Pennsylvanian specimens. Flowers and ripe fruits are formed on short stolons from the creeping base of the stem.

** *Nut included in the perianth.*

51. ***P. perfoliatum***, Linn.; Meissn. in DC. Prodr. xiv. 1. 132; stem rambling or climbing, flexuous angles and petioles with stout recurved prickles, leaves very long-petioled peltate deltoid angles obtuse or subacute, stipules foliaceous orbicular amplexicaul, peduncles smooth or sparingly prickly, racemes solitary short, bracts broad rounded glabrous, nut globose obscurely 3-gonous. *Roxb. Fl. Ind.* ii. 288; *Wall. Cat.* 1696; *Lamk. Ill.* t. 315, f. 3; *Burm. Fl. Ind.* 90, t. 31, f. 2. *Echinocaulos perfoliatus*, Hassk. *Cat. Hort. Bogor.* 85, and *Pl. Rar. Jav.* 220. *Chilocalyx perfoliatus*, Hassk. in *Flor. Bot. Zeit.* 1842, *Beibl.* ii. 20; *Miquel Fl. Ind. Bat.* i. 1013.

CENTRAL AND EASTERN HIMALAYA; Nepal, Wallich; Sikkim, alt. 4–5000 ft., J. D. H.; Bhotan, Booth. KHASIA MTS., alt. 4000 ft., J. D. H. & T. T. BENGAL, in the Jheels, &c. SILHET, Wallich. CACHAR, Keenan.—DISTRIB. Java, China, Japan.

Stem rambling for several feet. *Leaves* 2–5 in. long and broad, membranous, midrib and nerves beneath sometimes prickly; petiole slender, as long as the blade; stipules $\frac{1}{2}$ –1 in. diam. *Peduncles* very short; racemes $\frac{1}{2}$ – $\frac{3}{4}$ in.; bracts membranous; flowers white or lilac, large for the genus. *Perianth-lobes* rounded. *Stamens* 8. *Styles* short, connate below. *Nut* large, black, apiculate, included in the often fleshy perianth. *Cotyledons* very large, radicle short inflexed accumbent.—Leaves acid, eaten in Cachar, Keenan.

52. **P. sagittatum**, Linn.; Meissn. in DC. Prodr. xiv. 1. 132; glabrous, stem suberect or prostrate angles petioles and midrib beneath covered more or less with recurved prickles, leaves petioled 1-2 in. linear-oblong obtuse or acute base sagittate, margins smooth, stipules very short glabrous, heads few small, involucre leaf 0, peduncles slender distantly muricate or smooth, bracts oblong obtuse glabrous, nut 3-gonous. *P. muricatum*, Herb. Griff. Kew Distrib. 4125. *P. Sieboldii*, Meissn. l. c. 133.

WESTERN HIMALAYA, Falconer; Kulu and Kumaon, alt. 7-8000 ft., Edgeworth; Lohoo Ghat, Thomson. EAST BENGAL, Griffith. KHASIA Mts., in marshes at Myrning, alt. 5000 ft., J. D. H. & T. T.—DISTRIB. Siberia, China, Japan, Eastern N. America.

Very similar to slender form of *P. strigosum*, but the leaves are shorter, more glaucous beneath, not truncate or cordate below, but with two long deflexed or incurved obtuse or acute auricles, and their margins are quite smooth.

53. **P. strigosum**, Br. Prodr. 420; stem 2-4 ft. suberect angles petioles and nerves of leaf beneath more or less covered with recurved prickles, leaves shortly petioled linear or linear-oblong acuminate or acute base truncate or shortly cordate, margin retrorsely prickly, racemes panicle oblong or subglobose, peduncles scabrid prickly or glandular-hispid, bracts ovate or oblong ciliate and strigose, nut globosely 3-gonous included in the perianth. Meissn. in DC. Prodr. xiv. 134. *P. horridum*, Roxb. Cat. 29, and Fl. Ind. ii. 291; Meissn. in Wall. Pl. As. Rar. iii. 58, and in DC. l. c. 133. *P. muricatum*, Wall. Cat. 1697 (not of Meissn.), excl. var. *glabrata*; Miguel Fl. Ind. Bat. i. 1011. *P. sagittatum*, Don Prodr. 73 (not of Linn.). *P. sagittatum* β. indicum, Meissn. Monog. Polyg. 65. *P. hispidulum*, Blume Bijl. 535. *P. auriculatum*, Herb. Ind. Or. H. f. & T.

TROPICAL HIMALAYA from Kulu to Bhotan, and the KHASIA Mts., ascending to 5000 ft., in watery places; and southward to the NILGHIRI Mts., CHITTAGONG and PENANG. CEYLON; alt. 5-6000 ft. (C. P. 3348).—DISTRIB. Ava, Malay Archipelago, China.

Stem 1-3 ft., often rather stout, very variable in amount of prickles. *Leaves* 1-5 in., rigid, glabrous or pubescent beneath, sometimes scabrid above, margin with rigid minute recurved prickles, midrib usually prickly; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. or 0; stipules 1 in., ciliate, glabrous or hairy, base with usually a pectinate ring of reversed prickles. *Peduncles* slender; racemes $\frac{1}{2}$ - $\frac{3}{4}$ in., densely many- or few-fl.; flowers pink. *Perianth*-lobes obtuse. *Stamens* 6-8. *Styles* slender, connate below. *Nut* black, opaque, punctulate.—Meissner describes the nuts as sometimes biconvex; I find all the Northern Indian specimens to be trigynous, all the Peninsular digynous, which favours the view that this does not differ from *P. pedunculare*. Bentham indeed (Fl. Austral. v. 268) unites with this *P. pedunculare*, *P. glabratum*, and *P. muricatum*. For the first and second there is something to be said, but *P. muricatum* is an entirely different species. The American *P. Meissnerianum* differs from *P. strigosum* chiefly in the prickles not being recurved.

54. **P. prætermissum**, Hook. f.; small, glabrous, stem 6-8 in. ascending subsimple nearly or quite unarmed, leaves shortly petioled linear obtuse base sagittate with obtuse lobes, stipules glabrous eciliate with a few recurved bristles at the base, flowers very few and distant in forked or simple glabrous axillary racemes, bracts erect oblong glabrous or subciliate; nut globosely 3-gonous included in the perianth. *P. strigosum*, Thwaites Enum., in part; Benth. Fl. Austral. v. 268, in part. *P. muricatum*, var. *glabrata*, Wall. Cat. 1697/3. *P. muricatum*, Herb. Ind. Or. H. f. & T.

SILHET, Wallich. KHASIA Mts., in watery places, alt. 4-5500 ft., J. D. H. & T. T., Clarke. CEYLON, alt. 6-7000 ft., Walker (C. P. 2250).—DISTRIB. Tasmania. *Stem* 4-18 in., creeping and rooting at the base, quite smooth except rarely a few

deflexed prickles beneath the nodes. *Leaves* 1-2 in., perfectly glabrous, margin not ciliate, basallobes deflexed or decurved, rarely horizontal; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., quite smooth; stipules $\frac{1}{2}$ in. *Peduncles* very slender; racemes $\frac{1}{2}$ -1 in. long, with only 3-5 bracts, which are usually very distant. *Sepals* obtuse. *Stamens* 5. *Style-arms* slender. *Nut* pale (ripe?) punctulate.—The inflorescence of this species is very characteristic and constant, and its habit being the same wherever it has been found, I am constrained to regard it as a distinct species, though in doing so I contravene Bentham's opinion as expressed in the "Flora Australiensis." My first knowledge of the plant was from Tasmanian specimens, which (Flora Tasmanica; i. 307) I referred to Brown's *P. strigosum*, and doubtfully to Meissner's plant of that name. I had then no opportunity of consulting Brown's Herbarium, which was during his lifetime closed to botanists. This being now accessible, I find that his *strigosum* is identical with the Indian plant subsequently published by Roxburgh as *P. horridum*. *P. prætermisum* is the *P. muricatum* var. *glabrata* of Wall. Cat. 1697/3, but not the *P. glabratum* of Meissner (in Wall. Cat. 6285), which is referable to *P. pedunculare*.

55. ***P. pedunculare***, Wall. Cat. 1718; glabrous, stem 1-2 ft. ascending unarmed or angles with recurved prickles, leaves petioled elliptic oblong or linear-oblong acute base acute sagittate cordate or truncate, margin smooth or most minutely scaberrulous, racemes panicle oblong or globose, peduncles glabrous or glandular-hispid, bracts acuminate ciliate, nut orbicular biconvex included in the perianth-tube. *Meissn. in DC. Prodr.* xiv. 1. 133, in part; *Miquel Fl. Ind. Bat.* i. 1011. *P. dichotomum*, *Blume Bijdr.* 529? *P. glabratum*, Wall. Cat. 6285.

ASSAM, *Masters*. CACHAR, *Keenan*. The CONCAN, *Stocks*, &c. NILGHIRI and PULNEY MTS., *Wight*, &c. SINGAPORE, *Wallich*. MALACCA, *Cuming*. CEYLON, *Walker*.—DISTRIB. China, Java, Borneo, Philippine Islands, Australia.

It is difficult to define this variable plant in words. It may be a form of *P. strigosum*, but is certainly as distinct as are the species of the *Persicaria* and other sections of this perplexing genus. The following very distinct forms are united by exceptional ones.

P. pedunculare proper; glabrous, stem quite smooth except a few reversed prickles at the nodes and sometimes on the angles, leaves 1-2 in. elliptic-lanceolate or -ovate acuminate at both ends, peduncles and bracts glabrous or glandular pubescent. *Wight Ic. t.* 1802 C.—Singapore, Cachar, Pulney Mts., Ceylon.

Var. *robusta*; tall, stems stout glabrous unarmed or with reversed prickles at the angles and nodes, leaves 3-6 by $\frac{1}{2}$ - $\frac{3}{4}$ in. linear-lanceolate acuminate at both ends, peduncles and pedicels stout glandular-hispid, heads large. *Wight Ic. t.* 1802 B.—Nilghiri and Pulney Mts.

Var. *angustissima*; stem nearly smooth, leaves petioled or upper sessile 4-5 by $\frac{1}{4}$ - $\frac{1}{2}$ in. narrowly linear-lanceolate acuminate at both ends, peduncles very slender glandular-hispid, heads small, bracts glabrous. *Wight Ic. t.* 1802 A; *Polyg.* No. 49, *Herb. Ind. Or. H. f. & T.*—The Concan, Belgaum, &c., *Ritchie*, &c.; Nilghiris.

Var. *nilagirica*; stem nearly smooth, leaves petioled 4-6 by $\frac{1}{2}$ -1 in. flaccid membranous, linear-oblong or oblong-lanceolate obtuse, peduncles very slender glandular-hispid, heads rather large, bracts subciliate.—Nilghiri Mts., at Conoor, alt. 6000 ft., *Clarke*.

Var. *assamica*; small, 6-10 in. high, stem nearly smooth, leaves subsessile or shortly petioled 1-2 by $\frac{1}{4}$ - $\frac{1}{2}$ in. linear-lanceolate acute with an acute base or linear-oblong and obtuse with a contracted hastate base, peduncles very slender sparsely glandular-hispid, heads very small few-fl., bracts subhispid.—Assam, *Masters*; Jynteapore, *Clarke*.—This approaches in habit *P. prætermisum*.

Var. *glabrata*; tall, 12-18 in., stem nearly smooth except a few reversed bristles at the nodes, leaves linear-oblong 2-3 by $\frac{1}{2}$ - $\frac{3}{4}$ in., base rounded and truncate, peduncles and heads as in var. *assamica*. *P. glabratum*, *Meissn. in Wall. Cat.* 6285.—Silhet.

Sect. X. ACONOGON, *Meissn.* Shrubs, rarely perennial-rooted herbs. *Leaves* usually broad; stipules tubular, eciliate. *Flowers* in branched panicles, pedicelled; bracts not tubular, very open. *Perianth* 5-partite. *Stamens* 8, rarely fewer, with or without interposed glands. *Styles* 2-3, short, free or connate below, stigmas capitate. *Nut* trigonous, not tightly enclosed in the perianth; cotyledons accumbent.

* *Tall herbaceous or shrub-like species. Flowers very small $\frac{1}{12}$ - $\frac{1}{8}$ in. diam.; perianth cleft nearly to the cuneate base, segments spreading.*

56. **P. alpinum**, *All. Fl. Pedem.* i. 206, t. 68, f. 1; stem glabrous, or young parts softly pubescent, pale reddish or white, leaves shortly petioled lanceolate or linear-lanceolate acuminate glabrous or puberulous, flowers in terminal thyrsoid dense-fld. pyramidal panicles, perianth $\frac{1}{2}$ - $\frac{1}{4}$ in. diam. cleft nearly to the cuneate base, inner segments obovate-spathulate, nut broadly rhomboid-ovoid acutely 3-gonous pale rather longer than the enlarged perianth. *Meissn. Monog. Polyg.* 56, t. 3 G; *Boiss. Fl. Orient.* iv. 1031. *P. sibiricum*, *Linn. fil. Suppl.* 228 (not of Pallas). *P. acidum*, *Pall. Reise* ii. 25, iii. 316 (*fid. Ledeb.*). *P. divaricatum*, *Vill. Dauph.* iii. 322 (not of Linn.). *P. polymorphum* & *alpinum*, *Meissn. in DC. Prodr.* xiv. 1. 139.

NORTH-WESTERN HIMALAYA; from Kulu to Kashmir, alt. 7-12,000 ft., *Thomson*, &c.—DISTRIB. Turkestan westward to S. Spain, Siberia, N. America.

Root perennial. *Stems* 6 ft., annual, grooved, paler than in any of the following species. *Leaves* 3-5 in., glabrous or finely pubescent beneath especially, margins flat; base acute; stipules long, lax, deciduous above the base. *Inflorescence* a foot long and more, of myriads of white or pale pink flowers; pedicels much longer than the short obtuse bracts, jointed close below the perianth or lower down. *Nut* $\frac{1}{2}$ in. long, shining—This agrees well with the European and N. Asiatic plant. *Boissier* and *Meissner* give Afghanistan as a habitat, but *Griffith's* specimens have much larger sepals which conceal the much smaller nut, and the inflorescence is more corymbose; I refer them to *P. polystachyum*.—Eaten raw and cooked; tastes like rhubarb (*Aitchison*).

57. **P. paniculatum**, *Blume Bijl.* 533; shrubby, quite glabrous, branches terete, leaves petioled elliptic-ovate or lanceolate acuminate or caudate-acuminate base acute or rounded, flowers in terminal large lax-fld. thyrsoid panicles, perianth $\frac{1}{2}$ in. diam., segments oblong, nut very small included in the simple or baccate perianth. *Meissn. Monog. Polyg.* 95, and in *DC. Prodr.* xiv. 1. 137; *Miquel Fl. Ind. Bat.* i. 1012.

TEMPERATE HIMALAYA, *Herb. Griffith*; Garwhal, alt. 5-6000 ft., *Duthie*; E. Nepal and Sikkim, alt. 7-8000 ft., *J. D. H.*—DISTRIB. Java.

A shrub, 4-6 ft., with flexuous branches that are not grooved. *Leaves* 5-7 by 2-3 in., firm, often black when dry. Margins ciliate; nerves 15-30 pairs; petiole $\frac{1}{2}$ -1 in.; stipules with a long limb deciduous above the base. *Panicle* effuse, quite glabrous; pedicels usually short, but here and there long; bracts minute, obtuse; flowers white. *Nut* $\frac{1}{3}$ in. long, turgidly ovoid, 8-gonous, black.—The Indian specimens are perfectly glabrous, Javan have minute pubescence on the midrib and nerves beneath. *Duthie's* Garwhal plant has more membranous fewer-nerved (10-14 pairs) leaves, and pedicels sometimes $\frac{1}{2}$ in. long; but the number of nerves varies remarkably in individual specimens of all the species of this section.

58. **P. rude**, *Meissn. in DC. Prodr.* xiv. 1. 137; shrubby, branches stout terete strigose with depressed hairs, leaves petioled elliptic-lanceolate acuminate softly pubescent beneath or on the nerves only, flowers in large terminal thyrsoid hirsute panicles, perianth $\frac{1}{2}$ in. diam., segments

oblong, nut very small exceeding the simple or baccate perianth. *Wall. Cat.* 1685/2. *P. molle*, in part, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 4–5000 ft., *De Silva, Mack, &c.*

A robust shrub, 6–8 ft.; branches stout, not grooved. *Leaves* 4–5 by $1\frac{1}{2}$ –2 in., glabrous or finely pubescent above, base acute, nerves 10–30 pairs; stipules glabrous or sparsely hairy. *Inflorescence* as in *P. paniculatum*, but laxly hirsute with flexuous hairs, flowers (white) and fruit nearly the same.

? *Var. sikkimensis*; branches glabrous except a few deflexed hairs at the nodes.—Sikkim; Lachen, alt. 10,000 ft., *J. D. H.*—Of this I have only a single specimen in fruit; it is unlike either *rude* or *molle* in its all but glabrous branches. The hairs of the nodes and laxly hirsute panicle are those of *P. rude*. The fruiting perianths are not baccate.

59. ***P. molle***, *Don Prodr.* 72; shrubby, branches stout terete villous with erect or spreading hairs, leaves petioled elliptic-lanceolate silkily pubescent tomentose or villous beneath, flowers in large terminal thyrsoid tomentose panicles, perianth $\frac{1}{2}$ in. diam., segments oblong, nut included in the usually baccate perianth. *Meissn. Monog. Polyg.* 56, in *Wall. Pl. As. Rar.* iii. 64 (partly), and in *DC. Prodr.* xiv. 1. 136 (excl. cit. of *Wight Ic.*); *Lindl. in Bot. Reg.* 1841, Misc. 66. *Coccoloba Totnea*, *Ham. in Don Prodr.* 74.

CENTRAL AND EASTERN HIMALAYA; Nepal, *Hamilton, Wallich*; Sikkim, alt. 5–7000 ft., *J. D. H., Clarke*. MISHMI HILLS, *Griffith*.

Habit and general characters of *P. rude*, but more softly tomentose, and with the hairs on the branches never deflexed, and stipules more silky. *Flowers* white.

60. ***P. frondosum***, *Meissn. in DC. Prodr.* xiv. 1. 137; shrubby, quite glabrous, branches stout terete, leaves broadly ovate- or elliptic-oblong acuminate or caudate-acuminate, base rounded or cordate, flowers in short thyrsoid axillary and larger terminal dense-fld. panicles, perianth $\frac{1}{2}$ in. diam., segments oblong, fruiting long-pedicelled, nut small longer than the perianth. *P. Hayii*, *Herb. Strach. & Winterb. Polyg.* n. 34.

WESTERN HIMALAYA; Garwhal, *Falconer*; Kumaon, alt. 7500–9000 ft., *Edgeworth, Strachey & Winterbottom*.

A very distinct species, perfectly glabrous in all its parts, easily distinguished by its very broad leaves, 5–7 by $2\frac{1}{2}$ – $3\frac{1}{2}$ in., of firm texture, long petioles $\frac{1}{2}$ – $1\frac{1}{2}$ in., axillary panicles, and the long pedicels of the fruiting perianths $\frac{3}{4}$ – $1\frac{1}{2}$ in. long; the nuts are, however, so diseased that this last may be an abnormal character.

** *Tall herbaceous or shrub-like species. Flowers* $\frac{1}{4}$ in. diam.; *perianth cleft* nearly to the cuneate base, *segments widely spreading*.

61. ***P. polystachyum***, *Wall. Cat.* 1686; shrubby, glabrous or pubescent, branches grooved, leaves subsessile or petioled oblong-lanceolate caudate-acuminate, base usually contracted and subhastately cordate or truncate, flowers in large pubescent or glabrate terminal thyrsoid spreading panicles with erect or decurved branches, pedicels very slender, perianth $\frac{1}{4}$ in. diam., 3 inner segments broadly obovate-spathulate, nut small triquetrous shorter than the unaltered perianth. *Meissn. in Wall. Pl. As. Rar.* iii. 61, and in *DC. Prodr.* xiv. 1. 137; *Bab. in Trans. Linn. Soc.* xviii. 111. *P. molle*, *Wight Ic.* t. 1807 (not of *Don*). *Polyg.* n. 69, *Herb. Ind. Or. H. f. & T.*

TEMPERATE HIMALAYA; from Mishmi to Kashmir, alt. 7000 to 12,000 ft., and to 14,000 ft. in Sikkim.—DISTRIB. Afghanistan.

Shrubby, 3–6 ft. high. *Leaves* 4–9 by $1\frac{1}{2}$ – $3\frac{1}{2}$ in., nerves very numerous, base of the uppermost usually acute, of the lower sometimes the same, but usually as described above; margins smooth or crisped; stipules ample, glabrous or sparsely hairy.

Panicle very variable in form, effuse, branches sometimes strict and erect or diverging, at others horizontal and decurved; bracts short, obtuse; pedicels sometimes $\frac{1}{2}$ in.; flowers white or pink. *Sepals*, 2 outer oblong, inner much larger and broader. *Nut* pale, not tightly enclosed in the perianth.—The Afghanistan plant of Griffith (Journ. No. 1040) referred by Boissier and Meissner to *P. alpinum*, is, I think, certainly *P. polystachyum*.

Var. *glabra*, Meissn. l. c.; quite glabrous.

Var. *pubescens*, Meissn. l. c.; puberulous pubescent or tomentose with grey or buff tomentum on the leaves beneath.

Var. *longifolia*; leaves linear-oblong 8-9 by 2-2 $\frac{1}{2}$ in. glabrous above finely pubescent beneath, base subcordately truncate, panicle small.—Sikkim; at Yakla, alt. 12-16,000 ft., Clarke.

Var. *crispata*; leaves glabrous margins crisped and undulately crenulate.—Chumba, R. Ellis.

Var. *Griffithii*; leaves densely clothed beneath with silky tomentum, stipules silky.—Mishmi Hills, Griffith.

62. ***P. rumicifolium***, Royle mss.; Bab. in Trans. Linn. Soc. xviii. 112; herbaceous, glabrous or sparsely puberulous or laxly pubescent, stem very robust simple, leaves petioled broadly ovate or ovate-cordate obtuse or subacute, flowers in small axillary and terminal dense-fld. panicles, nut very broadly ovate acutely 3-gonous, about as long as the perianth. Meissn. in DC. Prodr. xiv. 1. 138, excl. var. *oblongum*; Garcke in Bot. Reise Pr. Waldem. 136. *P. ramoso-spicatum*, Klotzsch in Bot. Reise Pr. Waldem. t. 87.

WESTERN HIMALAYA; from Nepal, Wallich, to Kashmir, alt. 10-14,000 ft., Royle, &c.

Root stout, perennial. *Stem* 6-18 in., as thick as a swan's quill or less, pale, grooved. *Leaves* 3-5 by 1 $\frac{1}{2}$ -3 in., succulent, green, margin even or undulate, nerves very slender; petiole $\frac{1}{2}$ -1 in., very stout; stipules large, lax, glabrous. *Panicles* sessile, the axillary ones usually shorter than the leaves; flowers green, $\frac{1}{8}$ - $\frac{1}{4}$ in. diam. *Perianth* cleft to near the cuneate base, segments subequal, orbicular, spreading. *Nut* pale, very broad.—I think that some of Boissier's varieties of *P. alpinum* (*polymorphum*) are referable to this, which closely resembles the *P. alpinum*, var. *lapathifolium* of N.E. Asia and N.W. America, but has much larger flowers. I do not know what Babington's var. β is with retrorsely hairy stems and much smaller leaves. The young parts are acid, and eaten like rhubarb in the Western Himalaya. I find specimens of this distributed by Wallich from Nepal, under the number 1727 (*Rheum emodi*) in Herbs. Hooker and Bentham, but not in the Linnæan Society Herb., where the species is absent.

*** *Tall, herbaceous or shrubby species. Perianth campanulate, cleft two-thirds way down, base rounded; lobes oblong erecto-patent.*

63. ***P. campanulatum***, Hook. f.; pubescent or tomentose, stem creeping and stoloniferous below slender grooved, leaves petioled elliptic ovate or lanceolate acuminate or tip caudate base acute or rounded, flowers nodding or pendulous in terminal cymes with divaricate branches, nut 3-winged rather longer than the campanulate perianth. *P. rumicifolium*, var. γ ? *oblonga*, Meissn. in DC. Prodr. xiv. 1. 138.—Polyg. n. 69 and 71, Herb. Ind. Or. H. f. & T.

TEMPERATE and SUBALPINE HIMALAYA; E. Nepal and Sikkim, alt. 9-12,000 ft., J. D. H., Clarke; Kumaon, alt. 7500 ft., Strachey & Winterbottom.

Stem 2-3 ft. high, prostrate or ascending, dichotomously branched, glabrous or pubescent above. *Leaves* 3-6 by 1-2 $\frac{1}{2}$ in., more or less pubescent on both surfaces with grey, or (beneath) buff tomentum, membranous or rather coriaceous; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules ample, deciduous near the base or altogether. *Inflorescence* quite

different from those of the other species of the section, and like that of *Fagopyrum cymosum*; branches pubescent or villous, short or long and flowering towards the extremity only; flowers pale pink or red, shortly pedicelled; bracts small, usually ovate, acute. *Perianth* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, truly campanulate; lobes oblong, obtuse, subequal. *Stamens* 8, filaments very long. *Nut* pale, tip exserted.—A very distinct plant, which I have attempted to identify with the obscure *P. Hagei*, Royle. This, however, is described as having scabridly hairy branches and peduncles, very short petioles, and broad leafless panicles, and as a native of Nagkunda, whence various collectors have sent *P. polystachyum*, but none the *P. campanulatum*, the form of whose perianth could scarcely have escaped notice.

Var. membranifolia; leaves large broad membranous, bright green, pubescence inconspicuous, cymes much smaller than the leaves.—Sikkim, in woods, alt. 6–10,000 ft.

Var. longipes; leaves elliptic ovate sparingly pubescent, branches of cymes dichotomously long naked leafy at the base.

Var. fulvida; leaves clothed beneath with dense matted fulvous tomentum. *P. crispatum*, *Clarke in Journ. Linn. Soc.* xv. 116 (where it is taken for *Roxburgh's Coccoloba crispata*, which is *P. chinense*).

64. ***P. tortuosum***, *Don Prodr.* 71; a low shrub, glabrous or finely pubescent, much dichotomously branched, leaves sessile coriaceous elliptic obovate or orbicular obtuse or acute, panicles short terminal dense-fl., nut trigonous included in the campanulate perianth. *Meissn. in DC. Prodr.* xiv. 1. 138. *P. tataricum*, *Wall. mss.*

WESTERN HIMALAYA; Garwhal, at Gangotri, *Duthie*; Kunawur and Lahul, alt. 9–13,000 ft., *R. Inglis*, &c. WESTERN TIBET, alt. 15,500 ft., *Strachey & Winterbottom*; Ladak, alt. 16,500 ft., *Stewart*.

Root woody; branches 8–16 in., divaricate, geniculate, as thick as a goose-ill below, smooth, shining, red-brown. *Leaves* 1–2 in., pale green, crimson in autumn; nerves very slender; stipules short, truncate. *Panicles* $\frac{1}{2}$ –1 in. long, very dense-fl.; peduncles and very short pedicels pubescent. *Perianth* $\frac{1}{2}$ in. long; lobes oblong, erect. *Stamens* 8, short. *Nut* pale, ovate.—A remarkable species. *Meissner's var. tibetanum* is the common state of the plant, closely allied to and possibly a state of *P. sericeum*, *Pall.* Don's habitat of Nepal is no doubt an error, as Wallich's *mss.* name of *P. tataricum*, cited by Don himself, shows.

Var. spicata; flowers in solitary simple terminal and axillary spikes longer than the leaves.—Dras, alt. 8–9000 ft., *Thomson*.

**** *Small herbaceous species with capitate or racemose panicles.*

65. ***P. sibiricum***, *Laxm. in Nov. Act. Acad. Petrop.* xviii. (1773) 531, t. 7, f. 2; dwarf, quite glabrous, coriaceous fleshy, branches many from the long perpendicular root erect or decumbent, leaves narrowly linear obtuse 2-auricled towards the base, flowers in capitate terminal panicles shorter than the leaves, nut enclosed in the perianth. *Meissn. in DC. Prodr.* xiv. 1. 139; *Ledeb. Fl. Ross.* iii. 527. *P. hastatum*, *Murr. Comm. Goett.* v. (1774) 37, t. 6; *Ledeb. Fl. Alt.* ii. 80, t. 361. *P. crassifolium*, *Murr. in Linn. Syst. Veg.* ed. 14, 378. *P. rumicifolium*, *Pall. (non Royle)*.—*Polyg. n.* 37, *Herb. Ind. Or. H. f. & T.*

WESTERN HIMALAYA; Kangra, alt. 11–12,000 ft., *Edgeworth*. WESTERN TIBET, common; alt. 12–15,000 ft., *Strachey & Winterbottom* (*Polyg. n.* 48), *Thomson*, &c.

Root several inches long, simple. *Stems* or branches 1–6 in., stout (much longer in Siberian specimens). *Leaves* 1–3 by $\frac{1}{16}$ – $\frac{1}{4}$ in., flat, opaque, base cuneate being narrower below the acute or obtuse equal or unequal auricles into a thick petiole; midrib broad, nerves invisible; stipules short, membranous. *Heads of flowers* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. (effuse in Siberian specimens); bracts minute; pedicels short or long. *Perianth* $\frac{1}{16}$ in. long, subglobose, pink, segments broadly oblong. *Stamens* 5–8,

filaments short. *Nut* oblong-ovate, 3-gonous, black, shining, about as long as the perianth.—The larger Tibetan specimens are the size of small Siberian ones; the smallest Tibetan are quite minute.—Eaten in Tibet.

66. **P. acaule**, *Hook. f. Ic. Pl.* t. 1490 B; dwarf, diœcious, hirsute, leaves all radical sessile oblong obtuse, flowers in an erect narrow terminal peduncled panicle bearing short lateral dense-fl. branches, perianth very small subglobose or campanulate, nut 3-gonous exceeding the perianth. *Polyg.* n. 70, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Donkia and Kangra lama passes, on the Tibetan frontier, alt. 17,000 ft., *J. D. H.*

Rootstock very stout, ending below in a thick woody tap-root, simple or divided above into two or more very short branches clothed with membranous stipules. *Leaves* many, spreading or erect, 1 in. long or less, coriaceous, hirsute on both surfaces or beneath only, nerves above impressed; stipules glabrous or hirsute. *Panicle* with its peduncle 2–4 in. high; peduncle stout, naked (rarely with a single leaf), and rachis hirsute; branches $\frac{1}{2}$ – $\frac{1}{4}$ in. long, horizontal or drooping; flowers crowded, often drooping. *Perianth* $\frac{1}{2}$ in. long, segments unequal oblong or rounded. *Stamens* 8, minute and imperfect in the female flower; filaments short. *Styles* 3, short, free. *Nut* (unripe) oblong, trigonous, base contracted (as if stipitate).—A remarkable species, evidently of this section, but very unlike any other.

67. **P. nummularifolium**, *Meissn. in DC. Prodr.* xiv. 1. 127; very small, stems creeping and forming matted tufts, nodes hairy, leaves $\frac{1}{10}$ – $\frac{1}{8}$ in. petioled orbicular ciliate, stipules tubular hairy, clusters many-fl., flowers pedicelled subdiœcious?, sepals orbicular, stamens 5, nut orbicular biconvex.

ALPINE HIMALAYA; on rocks, Kumaon, *Edgeworth*, alt. 14–15,000 ft., *Strachey & Winterbottom*; Kashmir, alt. 13,400 ft., *Clarke*; Sikkim, alt. 14–17,000 ft., *J. D. H.*

Perennial. *Stems* one inch or two long, internodes short. *Leaves* rather fleshy, brown when dry; petiole as long as the blade; stipules truncate. *Flowers* numerous and large for the size of the plant, white or bright pink, males largest. *Stamens* very short; anthers purple. *Nut* included, smooth, pale; stigmas 2 minute subsessile.—The smallest species of the genus, and very unlike any other, referred by Meissner to § *Cephalophilon*, but the flowers are not capitate, and the minute styles are quite free.

Sect. XI. TINIARIA, *Meissn.* Twining unarmed annuals or with perennial roots. *Leaves* broad, cordate or hastate; stipules tubular, eciliate. *Flowers* axillary, or in slender racemes; bracts short, not tubular. *Perianth* 5-partite, 3 outer sepals at length enlarged and dorsally winged. *Stamens* 8 without interposed glands. *Styles* 3, very short, stigmas capitate or fimbriate. *Nut* 3-gonous; cotyledons accumbent.

68. **P. Convolvulus**, *Linn.*; *Boiss. Fl. Orient.* iv. 1032; annual, prostrate or twining, leaves sagittate-cordate, flowers in axillary clusters and terminal cymes, 3 outer sepals obtusely keeled rarely winged, pedicels short jointed above the middle. *Meissn. in DC. Prodr.* xiv. 1. 135; *Fl. Dan.* t. 744.

WESTERN HIMALAYA; Kunawur, *Royle*. WESTERN TIBET; Nubra, *Thomson*.—DISTRIB. N. and W. Asia, Europe, N. Africa.

Annual. *Stem* 1–4 ft., angles puberulous. *Leaves* $1\frac{1}{2}$ –4 in., gradually acuminate, angles obtuse or acute, puberulous beneath; petiole slender; stipules short. *Racemes* suberect, short, slender, pedicels recurved. *Perianth-segments* obtuse, green with white margins, $\frac{1}{2}$ in. in fruit. *Nut* black, $\frac{1}{10}$ in. long.

69. **P. dumetorum**, Linn.; Boiss. *Fl. Orient.* iv. 1032; st. ... twining or prostrate, leaves broadly ovate-cordate or subhastately cordate acuminate, fruiting perianth broadly oblong or obovate, 3 outer sepals broadly winged, pedicels very slender, not winged to the base, usually jointed below the middle, nut $\frac{1}{2}$ in. long. Meissn. in DC. *Prodr.* xiv. 1. 135; *Fl. Dan.* t. 756; *Engl. Bot.* t. 2811.

TEMPERATE HIMALAYA; from Kunawur to Kashmir, alt. 4-9000 ft.—DISTRIB. Europe, N. and W. Asia.

Habit of *P. Convolvulus*, but stem terete, flowers more racemose, pedicels capillary, and fruiting perianth very different. This last varies exceedingly in size and shape from elliptic oblong $\frac{1}{2}$ in. long, to cuneate-obovate $\frac{1}{4}$ in. long and tapering into the shortly winged pedicel. I find no difference between nuts of this and *P. Convolvulus*.

70. **P. pterocarpum**, Wall. *Cat.* 1690; stem twining, leaves broadly ovate-cordate acuminate, fruiting perianth cuneate-obovate rarely broadly oblong, 3 outer sepals broadly winged, pedicel very slender winged often to the base, nut $\frac{1}{2}$ in. long. Meissn. in Wall. *Pl. As. Rar.* iii. 62, and in DC. *Prodr.* xiv. 1. 135; Bab. in *Trans. Linn. Soc.* xvii. 113.—Polyg. n. 62, *Herb. Hook. f. & T.*

TEMPERATE HIMALAYA; from Sikkim to Simla, alt. 6-9000 ft.,—also in Kashmir, Stewart.

Probably only a state of *P. dumetorum*, but the fruiting perianth is usually much larger, sometimes $\frac{1}{2}$ in. long, or even $1\frac{1}{4}$ in. including the winged petiole, and the nut is always larger. In both there are obscure lines of pubescence on the stem and petioles.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

P. (Bistorta?) **GRIFFITHII**, Hook. f.; very stout, leaves 6-7 in. long-petioled coriaceous oblong-lanceolate acuminate pubescent beneath, petiole as long as the blade, raceme incurved very stout, bracts lanceolate densely imbricate.—Bhotan Himalaya; on rocks above Sanah, alt. 9500-10,000 ft., Griffith (Itin. Notes, p. 410, n. 637).—A remarkable plant, and quite unlike any other, probably near to *P. Bistorta*, but much more robust. The curvature of the top of the peduncle is possibly due to this terminating a pendulous branch. The specimens are very imperfect, consisting of old, apparently radical leaves, and hollow glabrous stems or peduncles, a foot long and as thick as a goose-quill, each bearing the remains of two cauline leaves, and terminated by a stout incurved raceme $2\frac{1}{2}$ in. long. The raceme is clothed with membranous bracts enclosing each many pedicels, from which the perianths have fallen. The stipules on the stem are 1-2 in. long, quite glabrous, with free tips.

P. **HAGEI**, Royle mss; Bab. in *Trans. Linn. Soc.* xviii. 110; Meissn. in DC. *Prodr.* xiv. 1. 139, from Nagkunda, is probably *P. polystachyum*, a common plant of that locality.

P. **PALUDOSUM**, Griff. *Rep. Bot. Gard. Calcutt.* 1843, 39, is a mss. name and unidentifiable.

POLYONEARUM FAMILIÆ SEDIFOLIA, Wall. *Cat.* 6286, see p. 22.

4. **FAGOPYRUM**, Gærtn.

Erect herbs. Leaves deltoid, hastately deltoid, or -cordate. Flowers in terminal or axillary cymes. Perianth 5-partite; segments subequal, not enlarged in fruit. Stamens 8, alternating with glandular disk-lobes. Ovary 3-gonous; styles 3, stigmas capitate. Nut much longer than the perianth, 3-gonous. Cotyledons very broad, twisted, or rolled round the ascending radicle.—Species 3, Europe and Temp. Asia, one cultivated.

1. **F. esculentum**, Moench *Method.* 290; annual, glabrous, leaves triangular-cordate acute, flowers in axillary and terminal peduncled subcapitate many-fl. cymes, nut ovate angles acute. Meissn. in *Wall. Pl. As. Rar.* iii. 63, and in *DC. Prodr.* xiv. 1. 143; Bab. in *Trans. Linn. Soc.* xviii. 117. *F. emarginatum*, Meissn. in *DC. l. c.*, excl. var. β .; Bab. *l. c.* 118. *Polygonum Fagopyrum*, Linn.; Roxb. *Fl. Ind.* ii. 292; Wall. *Cat.* 1687. *P. dioicum*, Ham. mss. *P. emarginatum*, Roth *Catalect. Bot.* i. 48; *Don Prodr.* 73.

Cultivated in the KHASIA MTS., throughout the HIMALAYA and WESTERN TIBET at elevations of 2000 to 12,000 ft., and in the NILGHIRI HILLS.—DISTRIB. Centre of Europe and N. Asia.

Stem 1–3 ft. *Leaves* 1–4 in. diam. (5 in very large specimens). *Flowers* pink or white, in heads or compound cymes $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. *Nut* $\frac{1}{4}$ – $\frac{1}{2}$ in. long, pale.

2. **F. cymosum**, Meissn. in *Wall. Pl. As. Rar.* iii. 63, and in *DC. Prodr.* xiv. 1. 144; puberulous, root perennial, leaves triangular, flowers secund on the long recurved branches of peduncled terminal and axillary cymes, nut ovate angles acute. Bab. in *Trans. Linn. Soc.* xviii. 119; Lindl. *Bot. Reg.* 1847, t. 26. *F. triangulare*, Meissn. *l. c.* *F. emarginatum*, var. kunawarens, Meissn. in *DC. l. c.* 143. *Polygonum cymosum*, Treviran. *Dlect. Sem. Hort. Vratisl.* 1824; Reichb. *l. c. Exot.* ii. t. 176. *P. acutatum*, Lehm. *Cat. Sem. Hort. Hamb.* 1820. *P. triangulare*, Wall. *Cat.* 1689. *P. emarginatum*, Wall. *Cat.* 1688 (not of Roth). *P. dibotrys*, Don *Prodr.* 73. *P. volubile*, Turcz. in *Bull. Soc. Imp. Nat. Mosq.* 1840, 77. *P. rugosum*, Herb. Ham.

TEMPERATE HIMALAYA; in woods, &c., from Kashmir to Sikkim, alt. 5–11,000 ft. KHASIA MTS., alt. 4–5000 ft.—DISTRIB. Yunnan.

A tall branching perennial-rooted sparsely pubescent species. *Leaves* large, usually 3–4 in. diam., angles acute or obtuse, upper usually narrow and amplexicaul; petiole long, slender. *Inflorescence* very lax, branches of panicle 2–5 in. long; flowers pedicelled, white. *Nut* $\frac{1}{4}$ – $\frac{1}{2}$ in., more than twice as long as the perianth.—I suspect that Meissner has described the fruit of *tataricum* under his *F. triangulare*.

3. **F. tataricum**, Gært. *Fruct.* ii. 182, t. 119, f. 6; annual, glabrous, leaves very broadly triangular-cordate or hastate, flowers in axillary and terminal peduncled subcapitate cymes, nut with 3 deep grooves and rounded angles. Meissn. in *DC. Prodr.* xiv. 144. *F. rotundatum*, Bab. in *Trans. Linn. Soc.* xviii. 117; Meissn. *l. c.* *Polygonum tataricum*, Linn.; Don *Prodr.* 74; Meissn. *Monog. Polyg.* 62, t. 4, 8; Dalz. & Gibs. *Bomb. Fl. Suppl.* 74.

Cultivated throughout the HIMALAYA, at elevations of 3–12,000 ft.—DISTRIB. N. Europe and N. Asia.

Stem 2–3 ft., usually simple. *Leaves* 1–2 in. diam. *Flowers* white or pink. *Nut* $\frac{1}{2}$ in. long, conico-ovoid, opaque, rounded, angles keeled towards the tip.

5. **RHEUM**, Linn.

Stout herbs with woody large roots. *Leaves* large, entire toothed or lobed; stipules scarious. *Flowers* clustered in panicked racemes usually 2-sexual. *Sepals* 5. *Stamens* 6–9. *Ovary*, 2–4-angled; styles 2–4. stigmas dilated capitate or horseshoe-shaped. *Nut* 2–4-winged, very much larger than the usually unchanged sepals. *Embryo* straight, cotyledons broad.—Species 20, Central Asia and the Himalaya.

* *Stemless species.* *Flowers* in a spike-like raceme.

1. **R. spiciforme**, Royle *Ill.* 318, t. 78; leaves all radical thickly

coriaceous orbicular broadly ovate or cordate glabrous or stellately puberulous beneath, racemes 1-3 glabrous, fruit broadly ellipsoid or oblong, wings broader than the disk. *Meissn. in DC. Prodr.* xiv. 1. 36. *R. Moorcroftianum*, *Meissn. l. c. (not of Royle)*; *Herb. Ind. Or. H. f. & T.*

WESTERN HIMALAYA; in the drier ranges, from Kumaon, alt. 14-16,000 ft. westwards to WESTERN TIBET, alt. 9-14,000 ft., abundant.—DISTRIB. Afghanistan.

Root short or long, thicker than the thumb. *Leaves* all radical, 6-12 in. diam., very leathery, with prominent radiating nerves and reticulated nervules beneath, red-brown in age; petiole 3-6 in., very stout, glabrous or puberulous. *Racemes* 1-3, radical, 4-12 in., strict, dense-fl.; peduncle and rachis stout, glabrous; bracts minute, ovate, scarious; flowers $\frac{1}{10}$ in. diam., on capillary pedicels. *Fruit* $\frac{1}{4}$ - $\frac{1}{2}$ in. long, 3-4 times as long as the oblong obtuse sepals, tip rounded or notched, wings membranous; pedicel half as long as the fruit or less.

2. *R. Moorcroftianum*, *Royle Ill.* 315, 318; leaves all radical thickly coriaceous orbicular glabrous or stellately puberulous beneath, racemes pubescent, fruit ovoid, wings narrow. *Wall. Cat.* 1727, *in part.*

WESTERN HIMALAYA; Kumaon, *Moorcroft in Herb. Wallich.*

I am uncertain about this plant, which differs from *R. spiciforme* in the very much larger pubescent peduncles and racemes, which together are two feet long, and in the form of the fruit. The only specimens are Wallich's, are very bad, and have neither locality nor collector's name. They are ticketed "large broad-leaved small-stalked Rhubarb; the root more purgative than the long-stalked." Another sheet has attached to it a ticket in the same handwriting, "narrow round-leaved long-stalked Rhubarb." *R. Moorcroftianum* is written in pencil on the sheets, I think by Royle (certainly not by Wallich). Hence they are no doubt the plants mentioned by Royle (*Ill. Pl. Himal.* 315) as brought by Moorcroft from Niti, alt. 12,000 feet, in Kumaon, and of which Royle says that "Major Hearsay, Moorcroft's companion, has described two kinds to me, one round-leaved and short-stalked, and the other short-stalked, but large and broad-leaved (*R. Moorcroftianum*, nob.) with the root more purgative than that of the former." From this it appears that Royle, not Wallich, as hitherto supposed, is the author of *R. Moorcroftianum*; and that Meissner is further in error in describing it as everywhere glabrous.

** *Stemless species. Flowers panicle; panicles leafless.*

3. *R. tibeticum*, *Maxim. mss.*; leaves very coriaceous orbicular-cordate and short thick petioles scaberulous, fruit nearly orbicular notched at both ends, wings very broad. *Rheum*, No. 6, *Herb. H. f. & T.*

WESTERN HIMALAYA; Zaskar, *Thomson*; Kashmir, Barji la, alt. 12,000 ft., *Clarke*. WESTERN TIBET; common, alt. 12-14,000 ft., *Thomson*, &c.

Root very stout. *Leaves* 6-12 in. diam., entire or crenulate, nerves 5 very stout radiating from the petiole which is 4-8 in. long and as thick as the finger. *Panicles* puberulous or quite glabrous, with the peduncle 4-10 in. high, fruiting a foot high; branches erecto-patent, simple or again branched; fruiting peduncle very thick, deeply grooved; bracts very minute; flowers $\frac{1}{10}$ in. diam., pedicels short. *Fruit* $\frac{1}{2}$ in. long and broad, four times as large as the unchanged sepals; wings much broader than the nucleus.—Resembles *R. leucorhizum*, *Pall.*, but none of the sepals enlarge in fruit.

*** *Stem branched and panicle leafy.*

4. *R. emodi*, *Wall. Cat.* 1727; stem tall leafy, leaves long-petioled very large orbicular or broadly ovate obtuse base cordate 5-7-nerved, panicle papilloely puberulous fastigiate branched and leafy, flowers dark purple, fruit ovoid-oblong base cordate apex notched wings narrow. *Meissn. in Wall. Pl. As. Rar.* iii. 65, and in *DC. Prodr.* xiv. 1. 35 (*exclude syn. Webbium*); *Bot. Mag.* t. 3508. *R. emodium*, *Wall. mss.*; *Nees & Eberm.*

Med. Pharm. Bot. i. 455. ? *R. australe*, *Don Prodr.* 75, *Hayne Arnz. Gewachs.* 12, t. 6; *Nees Pl. Offic. Suppl.* 5, t. 5, 6; *Sweet, Brit. Fl. Gard.* t. 269.

SUBALPINE and ALPINE HIMALAYA; Nepal, *Wallich*; Sikkim, *Is. Cathcart*; ? Simla, on Choor, alt. 11–12,000 ft., *Edgeworth*.

Root very stout; stem very stout, 5–6 feet high, streaked green and brown. *Radical leaves* often 2 ft. diam., papillose beneath, subscaberulous above; petiole 12–18 in., very stout, scaberulous. *Panicle* 2–3 ft., with erect strict branches; flowers $\frac{1}{2}$ in. diam. *Fruit* $\frac{1}{2}$ in. long, purple, wings narrower than the disk.—I am not quite satisfied as to the synonymy of this plant, for it is difficult to distinguish it in a dried state from *R. Webbianum*. *Wallich's* are the only native specimens I am sure about; for the Sikkim locality I depend on an excellent drawing in the Kew collection, made by Mr. Cathcart's artists in Darjiling. *Edgeworth's* has the larger flowers of this, but the habit and glabrous panicle of *emodi*.

5. *R. acuminatum*, *Hook. f. & Thoms. mss. in Bot. Mag.* t. 4877; stem leafy, leaves long-petioled triangular- or orbicular-ovate acuminate base cordate 5–7-nerved, panicles papillosely puberulous fastigiate branched and leafy, flowers dark red, fruit ovoid-oblong base cordate tip entire or notched, wings narrower than the nucleus.

SIKKIM HIMALAYA; alt. 10–13,000 ft., *J. D. H., Clarke*.

Probably only a small form of *R. emodi* with acuminate leaves, but the flowers are considerably larger, and though long under cultivation it does not attain half the size of that plant, or vary in its character.

6. *R. Webbianum*, *Royle Ill.* 318, t. 17 a; stem leafy, leaves long-petioled orbicular-cordate or reniform 5–7 nerved papillose or glabrous, tip rounded or subacute, panicles axillary and terminal quite glabrous, flowers pale yellowish, fruit broadly oblong or orbicular notched at both ends. *R. emodi*, *Wall. Cat.* 1727 C; *Herb. Strach. & Winterb.*; *Herb. H. f. & T.*

CENTRAL and WESTERN ALPINE HIMALAYA; from Nepal to Kashmir, alt. 10–14,000 ft.

Very variable in size, from 1 to 6 ft. high, with leaves 4 in.–2 ft. in diameter; flowers very much smaller than in *R. emodi*, the panicle less strict and quite glabrous, and the fruit broader ($\frac{1}{2}$ in. diam.), with broader wings more like that of *C. spiciforme*.—*Royle* describes the leaves as somewhat hairy above, but they are quite glabrous in most of the specimens. The habit differs a good deal from that of *R. emodi*, the inflorescence being more axillary, and its branching more diffuse after flowering. The flowers are not above $\frac{1}{2}$ in. diam., on capillary pedicels without bracts.

**** *Stem simple; panicles axillary concealed by bullate bracts.*

7. *R. nobile*, *Hook. f. & Thoms.; Ill. Himal. Pl.* t. 19; stem simple densely clothed with reflexed inflated imbricating (downwards) bladder-like reticulated bracts which conceal the short axillary panicles, leaves ovate-oblong or rounded base cuneate or cordate, fruit broadly ovoid 2–4-winged, disk tuberculate. *Meissn. in DC. Prodr.* xiv. 1. 36.

SIKKIM HIMALAYA; in the interior ranges, alt. 13–15,000 ft., *J. D. H., Clarke*.

Root very long, 3 in. diam. and under. *Leaves* very coriaceous, 1 foot diam. and under, usually edged with red, upper passing into the bracts; petiole 2–6 in., stout; stipules voluminous, 6–8 by 4–6 in., rose-red. *Stem* 3–4 ft., as thick as the wrist below, deeply grooved. *Bracts* orbicular, 6 in. diam., pale straw-coloured, reticulate, deciduous in age. *Panicles* 3–4 in., branched, glabrous; and flowers crowded, $\frac{1}{10}$ in. diam., green. *Fruit* $\frac{1}{2}$ in. long.—*Gill*, in his "River of the Golden Sands," speaks of

a plant inhabiting the lofty regions of East China bordering Tibet, which is probably this or an allied species.

6. **OXYRIA**, *Hill*.

An erect herb, with stout rootstock. *Leaves* chiefly radical, orbicular-cordate or reniform; stipules broad, lax. *Flowers* in paniced racemes, 2-sexual. *Sepals* 4, 2 outer reflexed; 2 inner larger, erect, appressed. *Stamens* 6. *Ovary* compressed; styles 2, short, stigmas fimbriate. *Nut* biconvex, 2-winged. *Embryo* lateral, nearly straight, cotyledons linear-oblong.

O. digyna, *Hill*; *Boiss. Fl. Orient.* iv. 1004; leaves cordate or reniform. *O. reniformis*, *Hook. Fl. Scot.* 111; *Meissn. in DC. Prodr.* xiv. 1. 37; *Engl. Bot.* t. 910. *O. elatior*, *Br. in Wall. Cat.* 1726; *Meissn. in Wall. Pl. As. Rar.* iii. 64, and in *DC. l. c.*; *Royle Ill. Pl. Him.* 314; *Hook. Ic. Pl.* t. 483.

ALPINE HIMALAYA; from Sikkim to Kashmir, alt. 10–14,000 ft. WESTERN TIBET, alt. 12–17,500 ft.—DISTRIB. Mts. of Europe, N. Asia and America, Arctic Regions.

Glabrous, fleshy. *Rootstock* tufted, with many erect succulent stems 4–18 in. high. *Leaves* radical, many, long-petioled, 1–4 in. diam., rarely 3-lobed or sub-hastate, cauline 1–2; petiole sometimes 8 in. *Racemes* slender, lax-fl'd.; pedicels jointed in the middle, tip thickened. *Outer sepals* spreading or reflexed; inner spatulate, 3–5-nerved. *Fruit* $\frac{1}{2}$ – $\frac{1}{4}$ in. diam., orbicular-cordate, wing membranous veined top notched.—A most agreeable salad, raw and cooked. Except in often attaining a very large size (18 in. high), the Himalayan plant does not differ from the European.

7. **RUMEX**, *Linn.*

Perennial herbs, or annuals, rarely shrubby. *Leaves* various; stipules often disappearing with age. *Flowers* in axillary clusters or in whorls arranged in simple or paniced racemes. *Sepals* 6 (rarely 4); outer unchanged, inner enlarging entire or toothed, midrib or disk often enlarged or tubercled. *Stamens* 6. *Ovary* 3-gonous; styles 3, stigmas fimbriate. *Nut* included in the usually enlarged inner sepals (valves) angles acute. *Embryo* lateral, nearly straight; cotyledons linear or oblong.—Species described about 100 (probably greatly exaggerated), in all temperate and some tropical countries.

I think that this genus wants revision and a very great reduction of species, when most of the Indian ones will be referred to European, in the directions I have indicated under each.

Sect. I. **Lapathum**, *Meissn.* *Flowers* 2-sexual. *Styles* terminal. *Inner sepals* (valves) coriaceous much enlarged in fruit. *Leaves* not hastate.

* *Inner fruiting-sepals quite entire, disk tumid or not.*

1. **R. orientalis**, *Bernh. & Boiss. Fl. Orient.* iv. 1009; tall, stout, leaves elongate-oblong obtuse base cordate, racemes in an open lax or thyrsoid dense panicle, whorls crowded, pedicels about equalling the fruiting perianth, valves broadly orbicular-cordate obtuse reticulate quite entire with or without a small tubercle. *Meissn. in DC. Prodr.* xiv. 1. 51. *R. Dioscoridis*, *Hayne Arzneik.* xiii. 5, t. 5.

WESTERN HIMALAYA; Kumaon to Kashmir, alt. 6–9000 ft., *Falconer, &c.*

WESTERN TIBET; alt. 11-13,000 ft., Thomson, &c.—DISTRIB. Westward to Asia Minor, Syria and Greece.

Stem 3-4 ft., often very stout, deeply grooved. *Lower leaves* 1-2 ft., upper narrow at the base. *Valves* $\frac{1}{4}$ - $\frac{1}{2}$ in. long, quite entire in all Indian specimens, pale, flat, finely reticulate.—The Indian specimens with no tubercle resemble *R. aquaticus*, L., and those with a tubercle *R. Patientia*, and I do not see why all these should not be united.

**** Inner fruiting-sepals with very narrow margins and few or no teeth.**

2. ***R. maritimus***, Linn.; Meissn. in DC. Prodr. xiv. 1. 59; annual, leaves lanceolate narrowed into the petiole, panicle leafy to the top, valves rhombic- or oblong-ovate with a lanceolate tip all with an oblong tubercle unarmed or with 2-3 long needle-like spines. *Fl. Dan.* t. 1208. *R. palustris*, Sm. *Fl. Brit.* i. 394; *Fl. Dan.* t. 1873; Boiss. *Fl. Orient.* iv. 1014. *R. Wallichii*, Meissn. l. c. 48. *R. Wallichianus*, Meissn. in Wall. *Pl. As. Rar.* iii. 64. *R. acutus*, Roxb. *Fl. Ind.* ii. 208. *R. Roxburghianus*, Wall. *Cat.* 1731, in part. *R. comosus* & *setaceus*, Ham. mss.; Wall. *Cat.* 6287, 6288. *R. chinensis*, Campd. *Rum.* 63, 76.

Marshes in ASSAM, SILHET, CACHAR, and BENGAL, common.—DISTRIB. Europe, Asia, N. Africa, N. and S. America.

Stem 1-4 ft., angled and deeply grooved. *Leaves* 3-10 in., petioled, base always narrowed into the petiole. *Whorls* of flowers lax or dense, many- or few-fl'd. *Fruiting perianths* all unarmed, or, on the same plant, some armed and some unarmed, yellow brown when ripe, tubercle smooth, with a narrow sometimes reticulate margin; spine sometimes 4 times as long as the valve, tip straight or slightly hooked.—The fruit varies greatly in size and number and length of the spines or the valves, and I am quite unable to discriminate between the various plants I have here referred to *R. maritimus*.

3. ***R. nigricans***, Hook. f.; annual, leaves linear-oblong obtuse contracted above the cordate base, flowering branches rigid divaricate leafy or leafless, fruiting perianths densely crowded in globose distant or confluent heads, turning black in drying, pedicels short, valves with very large oblong dark tubercles and lanceolate tips, margins very narrow entire or with one or two short straight teeth or spines. *R. dentatus*, Wall. *Cat.* 1730 (not of Linn.).

BENGAL, Clarke. KHASIA MTS., Griffith. BEHAR, J. D. H. DECCAN PENINSULA, Herb. Heyne (Wallich).

Stem 6-18 in., angled and grooved. *Leaves* 6-8 by 1-1½ in., thin; petiole long, slender. *Fruiting perianth* much larger than in *R. maritimus*, very dark when dry, as is the whole raceme.—Closely resembles *R. conglomeratus*, but the leaf is *panduriform*, and the tips of the valves acute.

***** Inner fruiting-sepals with broad much-toothed wings.**

4. ***R. dentatus***, Linn.; Boiss. *Fl. Orient.* iv. 1013; annual, leaves oblong obtuse often contracted above the rounded or cordate base, often waved or crisped, whorls distinct leafy or not, fruiting perianth ovate or oblong-ovate with an oblong smooth tubercle and broad densely reticulated wings which are irregularly toothed, teeth short stout straight. Meissn. in DC. Prodr. xiv. 1. 56 (excl. syn. Wall. Cat.). *R. Roxburghianus*, Wall. *Cat.* 1731, in part. *R. Klotzschianus*, Meissn. l. c. 57. *R. obtusifolius*, Herb. Ham., Wall. *Cat.* 6289. *Rumex*, No. 3, Herb. Strach. & Winterb.

From ASSAM and SILHET to the INDUS, common, ascending the Himalaya to 1000 ft. SCINDE, Stocks. The CONCAN, Law, &c.

Habit of *R. Patientia*, L., to which this is closely allied. Distinguishable from

the other Indian annual species by its broad irregularly-toothed wings, the teeth of which are not hooked.—A specimen from Oude has very narrow wings, and thus shows a transition to *nigricans*. I cannot in Herbarium specimens distinguish large specimens of this with petioled floral leaves cordate at the base from states of *R. nepalensis*. Except for its shorter pedicels, this would pass for *R. obtusifolius*, L.

5. ***R. nepalensis***, *Spreng. Syst.* ii. 159; perennial?, tall, branched, radical leaves large oblong ovate-oblong or triangular-ovate acute or obtuse base widely or narrowly cordate, upper sessile or petioled similar or with narrowed bases, racemes elongate, whorls distant, valves orbicular-ovate one or all with an oblong tubercle broadly winged, wing pectinately toothed strongly reticulate, teeth usually hooked at the tip. *Boiss. Fl. Orient.* iv. 1011; *Wall. Cat.* 1728; *Meissn. in Wall. Pl. As. Rar.* iii. 64, in *Linnaea* xiv. 192, and in *DC. Prodr.* xiv. 1. 55; *Wight Ic.* t. 1810. *R. Roxburghianus*, *Schultes fil. Syst.* vii. 1402 (not of Wallich). *R. hamatus*, *Trevir. in Nov. Act. Leopold.* xiii. 174; *Meissn. in DC. l. c.* 56. *R. ramulosus*, *Meissn. in DC. l. c.* *R. peregrinus*, *Boiss. Diagn. Ser.* 1, v. 46. *R. tuberosus*, *Roxb. in Herb. Willd.* (ex *Meissn.*). *R. uncinatus*, *Hort.*

TEMPERATE HIMALAYA; from Bhotan to Kashmir, alt. 4–9000 ft. (12,000 on the Chenab, *Stewart*). KHASIA MTS. ? WESTERN PENINSULA; on the Ghats from the Concan to the Nilghiris.—DISTRIB. Westward to Asia Minor, Java, S. Africa.

Root with tuberous fibres (*Boissier*). Stem 2–4 ft., stout, erect. Lower leaves often 6–14 by 3–5 in., undulate or not; petiole very slender, upper petioled or sessile.—Probably not specifically different from *R. pulcher*, L.

Sect. II. ***Acetosa***, *Tournef.* Flowers unisexual or polygamous. Styles arising from the angles of the ovary, inner sepals (valves) much enlarged, membranous, entire, midrib with a deflexed tubercle near its base. Leaves hastate.

6. ***R. scutatus***, *Linn.*; *Boiss. Fl. Orient.* iv. 1015; perennial, polygamous, papillose, stem creeping below branched, leaves all long-petioled hastately cordate or sub-3-lobed lateral lobes rounded suddenly contracted into the narrower midlobe, racemes very slender, whorls 2–4-fl. distant, valves cordate at the base. *Meissn. in DC. Prodr.* xiv. 1. 69; *Campd. Rum.* 132, t. 2, f. 6. *R. hastifolius*, *M. Bieb. Fl. Taur. Cauc.* i. 290.

WESTERN HIMALAYA; Simla, *Thomson*.—DISTRIB. Persia and westward to Middle and South Europe and N. Africa.

Somewhat glaucous. Branches slender, 1–2 ft., flexuous, dichotomously divided, ending in long lax panicles. Leaves 1–2 in. diam., the lobes all broad. Flowers small; pedicels jointed about the middle, elongating in fruit.—The specimens are not in fruit.

7. ***R. hastatus***, *Don Prodr.* 74; glaucous, polygamous, branches erect from a stout shrubby base all petioled rhombic deltoid or hastately 3-lobed with the lobes all narrow, racemes very slender paniced, whorls few-fl. distant, valves orbicular notched at both ends. *Meissn. in Wall. Pl. As. Rar.* iii. 64, and in *DC. Prodr.* xiv. 1. 72; *Wall. Cat.* 1729.

HIMALAYA; from Kumaon to Kashmir, alt. 1–8000 ft. BHOTAN, *Booth*.—DISTRIB. Afghanistan.

Rootstock woody, often as thick as the thumb; branches much divided, slender, 1–2 ft., obscurely angled. Leaves $\frac{1}{2}$ –1 in., coriaceous, nerveless. Racemes ending the branches, rachis filiform; flowers very small, pedicels lengthening in fruit. Valves $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., often pink, very delicately veined.

8. ***R. acetosa***, *Linn.*; *Boiss. Fl. Orient.* iv. 1015; perennial, diœcious,

green, stem subsimple, radical leaves petioled oblong obtuse base cordate hastate or sagittate, cauline sessile, racemes lax, whorls 6-8-fl., outer sepals reflexed, valves orbicular. *Meissn. in DC. Prodr.* xiv. 1. 64; *Fl. Dan.* t. 2534; *Engl. Bot.* t. 127.

WESTERN HIMALAYA; from Kumaon to Kashmir, alt. 8-12,000 ft.—DISTRIB. N. Asia, Europe from the Caucasus westward, N. America.

Root of slender fibres, from a short woody stock. Stem 1-2 ft., deeply grooved. Leaves 2-6 in.; petiole of lower slender; stipules ragged. Panicle contracted; branches strict, erect, leafless. Sepals of male with scarious margins. Valves of ripe female perianth broadly ovate-cordate, pink or crimson.

9. **R. vesicarius**, Linn.; Boiss. *Fl. Orient.* iv. 1017; annual, monœcious, glabrous, branched from the root, rather fleshy, leaves petioled elliptic ovate or oblong 3-5-nerved, base cuneate rarely cordate or hastate, racemes short terminal and leaf-opposed leafless, flowers pedicelled sometimes 2-nate and connate, valves large orbicular 2-lobed at each end very membranous and reticulate without a marginal nerve. *Meissn. in Wall. Pl. As. Rar.* iii. 64, and in *DC. Prodr.* xiv. 1. 70; Roxb. *Fl. Ind.* ii. 209; *Campd. Rum.* 129, t. 3, f. 1. 8; *Wall. Cat.* 1732.

WESTERN PANJAB; on the Salt range, and trans-Indus hills; cultivated and an escape in other parts of India.—DISTRIB. Afghanistan, Persia, the Levant, and N. Africa.

Pale green, 6-12 in. high, dichotomously branched. Leaves 1-3 in., obtuse or acute; petiole as long as the blade. Racemes 1-1½ in.; pedicels slender, jointed about the middle or unjointed. Fruit ½ in. diam., white or pink, valves hyaline.

SECT. III. **Acetosella**, Meissn. Flowers diœcious. Styles arising from the angles of the ovary. Inner sepals herbaceous, hardly enlarged in fruit. Leaves hastate.

10. **R. acetosella**, Linn.; Boiss. *Fl. Orient.* iv. 1018; perennial, stem slender simple or branched from the base, lower leaves petioled lanceolate or hastate, uppermost sessile, racemes leafless, flowers minute, pedicels jointed at the top. *Meissn. in DC. Prodr.* 63; *Fl. Dan.* 1161; *Engl. Bot.* t. 1674.

EASTERN HIMALAYA; Sikkim, at Darjeeling, alt. 7-8000 ft., Clarke; introduced? —DISTRIB. Europe, N. Africa, N. Asia.—Introduced elsewhere.

Glabrous, often bright red in autumn; rootstock creeping, much branched. Leaves ½-2 in., variable in breadth and form; stipules silvery, torn. Racemes erect; male fl. largest. Fruiting sepals oblong, erect, closely appressed to the small 3-gonous fruit.—*Sheep-sorrell*.

ORDER CXX. **PODOSTEMONACEÆ.**

Aquatics, growing on stones in tropical streams, annual or perennial. Stem branched with leaves, or with these confluent into amorphous fronds. Inflorescence various, often of a 1- or many-flowered scape, naked or arising from a tubular sheath. Flowers 1-sexual, rarely diœcious, usually enclosed in a spathe. Perianth 0, or membranous, lobed or partite or of a few scales. Stamens definite or not, free or connate, hypogynous or perigynous, filaments flat; anthers 2-lobed. Ovary free, sessile or stalked, smooth or ribbed, 1-3-celled; styles 2-3, or one and columnar, stigma one capitate, or 2-3, simple toothed or lacinate; ovules many, anatropous, axile or parietal. Capsule 1-3-celled; septicidal or septifragal, valves 2-3. Seeds

minute, testa mucilaginous, albumen 0; embryo straight, cotylédons 2, radicle inferior.—Genera 21; species about 120, chiefly tropical.

An Order of very doubtful affinity, some genera of which I am disposed to regard as perhaps consisting of reduced forms of *Scrophularinæ* or *Lentibularinæ*. The species are probably very numerous in India, though unknown in rivers having snow-feeders. I have followed Weddell's most careful monograph in describing the Indian species, reducing the genera in accordance with Bentham's revision of these in the *Genera Plantarum*. I suspect that an examination of more copious materials will modify the characters of the species, and perhaps bring some of them together as varieties or forms of dimorphic or polymorphic plants.

Tribe I. **Tristicheæ**. *Flowers* 2-sexual. *Stamens* 1-3. *Ovary* 3-celled. *Styles* 3.

Stamens 3 1. **TERNIOLA**.

Tribe II. **Eupodostemeæ**. *Perianth* of 2 rarely 3 scales. *Stamens* 1, or 2-3 with the filaments connate.

Stigmas subsessile, broad, flat, crested. Stamens 2 2. **HYDROBRYUM**.
Stigmas short, linear or ovate, entire. Stamens 2 3. **PODOSTEMON**.

1. **TERNIOLA**, *Tulasne*.

Stems confluent into an expanded horizontal lobed frond, or in one species long and floating. *Leaves* minute, setaceous. *Flowering-buds* adnate to the base of the stem, or scattered along the elongated branches; pedicel solitary, with a ring of scale-like leaves usually forming a short sheath round its base. *Flowers* 2-sexual. *Perianth* hyaline, 3-lobed. *Stamens* 3, filaments free. *Ovary* 3-celled; styles 3, spreading, inner, linear; placentæ thick, in the inner angles of the cells. *Capsule* ovoid, septically 3-valved, valves equal, septa vanishing.—Species 7, all Indian.

* *Stems* frond-like horizontal.

1. **T. zeylanica**, *Tul. Monogr. Podost.* 190, t. 13, f. 3; plant flat suborbicular or irregularly lobed, leaves some very narrow in rosettes, others connate into a short broad tubular or cup-shaped echinate sheath with a ciliate mouth. *Wedd. in DC. Prodr.* xvii. 46. *T. ceylanica*, *Wight Ic.* t. 1919. *Tristicha zeylanica*, *Gardn. in Calc. Journ. Nat. Hist.* vii. 177. *Lawia zeylanica*, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 112. *Dalzellia zeylanica*, *Wight l. c.* 34. *Mnianthus zeylanicus*, *Walp. Ann.* iii. 443.

CEYLON; on smooth gneiss rocks in streams at Peradeniya.

Plant frond-like, attached to stones, about 1 in. diam. *Leaves* simple, sometimes forked or lacerate, $\frac{1}{2}$ in. long, mixed with papillæ. *Sheath* bristling with rigid teeth (tips of connate leaves). *Pedicel* equalling the flower, at length elongate and $\frac{1}{2}$ in. long. *Perianth* oblong. *Stamens* included. *Capsule* ellipsoid, subsessile, 9-ribbed, crowned with 3 recurved stigmas.

2. **T. pulchella**, *Tul. Monogr. Podost.* 192, t. 13, f. 4; plant minute narrow flat lobed, leaves distichous short linear acute, sheath cylindric of slender connate leaves mouth ciliate. *Wedd. in D.C. Prodr.* xvii. 46. *Lawia pulchella*, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 113. *Mnianthus pulchellus*, *Walp. Ann.* iii. 443.

THE CONCAN; near Bombay.

Plant frond-like, $\frac{1}{8}$ – $\frac{1}{2}$ in. diam.; lobes very short, terminated by buds. *Leaves* $\frac{1}{8}$ in.

long, with a white mesial line, upper shorter, *Pedicel* about as long as the leaves. *Perianth* obtusely 3-lobed. *Capsule* obovoid, crowned with 3 short stigmas.

3. **T. Lawii**, *Wedd. in DC. Prodr.* xvii. 47; plant very minute flat, leaves sublanceolate crowded round the base of the sheath which is formed of connate leaves with free recurved tips, pedicel very short. *Tulasnea Lawii*, *Wight Ic.* t. 1919, f. 3. *Dalzellia Lawii*, *Wight l. c.* 35.

The CONCAN; in the Salset River, *Law*.

Plant about $\frac{1}{8}$ in. diam. *Flowering buds* crowded round the margins of the frond. *Perianth-segments* obtuse. *Capsule* ellipsoid, obscurely ribbed.

4. **T. longipes**, *Tul. Monogr. Podost.* 193, t. 13, f. 2; plant minute, narrow, lobed, leaves crowded round the base of the sheath subdistichous linear-elongate acute longer than the pedicel, sheath broad formed of connate leaves ciliate. *Wedd. in DC. Prodr.* xvii. 47. *Lawia longipes*, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 113. *Mnianthus longipes*, *Walp. Ann.* iii. 443.

The CONCAN; in streams near Bombay, *Law*.

Similar to *T. Lawii*; margins of the lobes studded with buds. *Leaves* flat; broad at the base, $\frac{1}{2}$ – $\frac{1}{4}$ in. long. *Pedicel* lengthening to $\frac{3}{8}$ in.

5. **T. pedunculosa**, *Wedd. in DC. Prodr.* xvii. 47; plant flat lobed, leaves short subulate all connate into a sheath that is much shorter than the pedicel. *Dalzellia pedunculosa*, *Wight Ic.* 35. *Tulasnea pedunculosa*, *Wight l. c.* t. 1919, f. 4.

The CONCAN; Bombay, in the Salset River, *Law*; North Canara, *Talbot*.

Probably only a variety of *T. longipes*, as surmised by Weddell, but considered distinct by Wight; the capsule is the same.

6. **T. foliosa**, *Wedd. in DC. Prodr.* xvii. 47; plant broad flat lobed, leaves elongate linear crowded round the base of the pedicel and much shorter than it, none of them connate into a sheath. *Dalzellia foliosa*, *Wight Ic.* 35. *Tulasnea foliosa*, *Wight l. c.* t. 1919, f. 2.

The CONCAN; Bombay, in the Salset River, *Law*.

Plant about $\frac{1}{4}$ in. broad; margin of lobes studded with buds. *Leaves* numerous in a cluster, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, very narrow, flat, very acute, translucent. *Pedicel* $\frac{1}{2}$ in. long.

** *Stems elongate, filiform.*

7. **T. ramosissima**, *Wedd. in DC. Prodr.* xvii. 47; stem filiform very long floating much branched, branches some like the stems, others short and flowering, leaves alternate narrowly linear almost acicular, sheath very short of connate leaves much shorter than the pedicel. *Dalzellia ramosissima*, *Wight Ic.* 35. *Tulasnea ramosissima*, *Wight l. c.*

MALABAR; rivers in Cochin, *Johnson*.

A foot or more long; leafy, stems submerged; flowering branches floating, attached to the upper face of the stem and accompanied by two very slender branchlets. *Leaves* on the sterile branches almost acicular, shorter than on the flowering. *Sheath* hardly any, its outer leaves short and very acute. *Pedicel* $\frac{1}{2}$ – $\frac{3}{4}$ in. long. *Perianth* 3-lobed almost to the middle. *Filaments* at length exserted; anthers oblong, base sagittate. *Capsule* oblong, narrowed at both ends, 9-ribbed; stigmas slender, suberect.

2. **HYDROBRYUM**, *Endl.*

Plants small, green, herbaceous, frond-like, spreading over stones, sending up buds clothed at the base with distichous scale-like leaves. *Flowers*

2-sexual, each enclosed in a sessile membranous sheath. *Perianth* 0. *Stamens* 2, filaments united below; staminodes 2, linear. *Ovary* ovoid, 2-celled; stigmas 2, subsessile, broad, flat, spreading, crested or toothed, deciduous. *Capsule* long-pedicelled, ovoid; valves equal 5-ribbed.

H. Griffithii, *Tul. in Ann. Sc. Nat. Ser. 3*, xi. 104, and *Monogr. Podost.* 141; *Wedd. in DC. Prodr.* xvii. 67. *Podostemon* [Griffithii, *Wall. mss.*; *Griff. in As. Res.* xix. 105, t. 17, and *Ic. Pl. As.* t. 541, f. 2, & t. 544. P. Griffithii, *Gardn. in Calc. Journ. Nat. Hist.* 1850, 40, 41.

KHASIA MTS., on rocks in streams, alt. 2-3000 ft., *Griffith, J. D. H. & T. T.*

Plants consisting of small coriaceous green frond-like lobed patches about 1 in. broad adhering firmly to stones, with buds irregularly scattered over the surface; flowering buds of 6 distichously imbricating leaves about $\frac{1}{10}$ in. long, the lower of which have often filiform tips. *Spathe* about $\frac{1}{10}$ in. long. *Stamens* as long as the ovary; anthers oblong; staminodes with subspathulate tips, appressed to the ovary in bud. *Ovary* subglobose; style very short, stigmas cuneate. *Capsule* oblong-lanceolate, valves delicately ribbed.

3. **PODOSTEMON**, *Michaux.*

Herbs of various habits. *Pedicels* scattered and adnate to the stem or in terminal or lateral very short branches which are naked or scaly at the base. *Flower* 2-sexual sessile in a little spathe, with 2 linear staminodes at the side of the staminal column. *Stamens* 2, filaments united below. *Ovary* ovoid, 2-celled; styles short linear subulate or ovate acute. *Capsule* long-pedicelled, ovoid, or ellipsoid; valves 3-5-ribbed, persistent or one deciduous. —Species about 20, American, Madagascarian and Indian.

Sect. I. **Dicræa**. *Stems* branched, floating. *Flower-buds* few, lateral on the branches.

1. **P. dichotomus**, *Gardn. in Calc. Journ. Nat. Hist.* vii. 165; stems dichotomously branched compressed floating, flowering branches elongate flexuous, flowers distichously alternate on short leafy branches, sheath of connate leaves the lower of which are scale-like the upper subulate, capsule ellipsoid. *Dicræa dichotoma*, *Tul. in Ann. Sc. Nat. Ser. 3*, xi. 101, and *Monogr. Podost.* 119, t. 9, f. 1.; *Wedd. in DC. Prodr.* xvii. 69.

DECCAN PENINSULA, in streams of the Western Ghats.

P. dichotomus proper; stems slender flexuous and angled. *Dicræa dichotoma*, *Tul. in Ann. Sc. Nat. Ser. 3*, xi. 100, and *Monogr. Podost.* 114; *Wight Ic.* t. 1916, f. 2.—Nilghiri Mts.; in the Pycarrah River, *Wight*.

Var. *Wightii*, *Wedd. l. c.*; stems and branches shorter broader more flexuous, leaves subulate, flowers more numerous. *P. Wightii*, *Gardn. l. c.*; *Wight Ic.* t. 1916, f. 3. *Dicræa Wightii*, *Tul. ll. c.*—Nilghiri Mts.; in the Pycarrah River, *Wight*.

Var. *longifolia*, *Wedd. l. c.*; habit of var. *Wightii*, but leaves longer only born on the lower buds. *Dicræa longifolia*, *Wight l. c.* 1916, f. 4.—Malabar, *Johnson*.

Var. *rigida*, *Wedd. l. c.*; stems and branches stouter more rigid flowering throughout, leaves all scale-like and connate into a tubular 2-fid sheath. *P. rigidus*, *Gardn. l. c.* *Dicræa rigida*, *Tul. ll. c.*; *Wight Ic.* t. 1916, f. 5.—Nilghiri Mts.; in the Pycarrah River, *Wight*.

2. **P. stylosus**, *Benth. in Gen. Pl.* iii. 112; stems very long branched compressed margins floriferous, leaves 4 distichously imbricate inner obtuse subcuspidate sheathing the spathe, stigmas pubescent equalling or exceeding

the ovary, capsule 6-ribbed. *Dicræa stylosa*, *Wight Ic.* t. 1917, f. 2; *Wedd. in DC. Prodr.* xvii. 70.

MALABAR; in mountain streams, near Calicut, *Johnson*. TRAVANCORE; in streams of the Anamallay Hills, *Wight*.

The long stigmas distinguish this species.

3. ***P. elongatus***, *Gardn. in Calc. Journ. Nat. Hist.* vii. 188; stems long filiform subsimple terete floating below and branches flowering, tips elongate leafy flowerless, leaves acicular, flowers distichous in spikes or racemes terminating short branches, capsule ellipsoid. *Dicræa elongata*, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 102, and *Monogr. Podost.* 124, t. 9, f. 2; *Wight Ic.* t. 1917, f. 1; *Wedd. in DC. Prodr.* xvii. 70.

CEYLON; in the Mahawalle Gunga River, below Peradenya, *Gardner*.

Stems tufted, 1-2 in., clothed with distichous buds; upper buds flowerless, consisting of clusters of linear or subspathulate leaves $\frac{1}{2}$ - $\frac{1}{3}$ in. long.; lower buds of boat-shaped acute keeled leaves connate at the base and enclosing the flower. *Spathe* funnel-shaped, mouth 2-fid. *Filamen'* stout, equalling the ovary and subulate staminodes; anthers oblong. *Capsule sessile* on the fruiting pedicels, which terminate short leafless branches, 8-12-ribbed; stigmas ovate, acute.

4. ***P. algæformis***, *Benth. in Gen. Plant.* iii. 112; stems long compressed floating simply or dichotomously branched from the base, branches strap-shaped simple or forked obtuse, flowers on the margins of the stem below or branches, pedicel with minute leaves at the base, of which the inner are large and concave, capsule elliptic-oblong 8-ribbed. *Dicræa algæformis*, *Beddome in Trans. Linn. Soc.* xxv. 223, t. 24; *Wedd. in DC. Prodr.* xvii. 70; *Warm. in Videlsk. Selsk. Skr.* vi. 2, t. 12; *Trim. in Journ. Bot.* xxiii. (1855) 173.

TRAVANCORE; on rocks in streams of the Anamallay Mts., *Beddome*. CEYLON; near Kandy, *Trimen*.

Stems tufted, dark green, $\frac{3}{4}$ in., like a *Fucus*; branches unequal, alternate or clustered. *Spathe* with a dilated 2-3-fid mouth. *Staminodes* 2-3, subulate, as long as the ovary. *Filaments* connate below; anthers oblong. *Stigmas* subulate.—Mr. Hemsley, who has examined the Ceylon specimens, regards them as intermediate between *P. algæformis* and *Wallichii*.

5. ***P. subulatus***, *Gardn. in Calc. Journ. Nat. Hist.* vii. 184; stem short simple or dichotomous, branches short leafy, leaves amplexicaul distichous elongate-subulate, pedicels short, stigmas subulate-lanceolate. *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 103, and *Monogr. Podost.* 135, t. 9, f. 4; *Wedd. in DC. Prodr.* xvii. 74; *Wight Ic.* t. 1918, f. 1; *Thwaites Enum.* 222. *P. dendroides*, *Thw. mss.*

CEYLON; on rocks in the Mahawalle Gunga River, near Holnicut.

Stems stout, rough, 1-1 $\frac{1}{2}$ in., attached to stones by a small fleshy depressed rootstock. *Leaves* 1-2 $\frac{1}{2}$ in., base very broad, with rarely a short stipule on the margin of the sheath. *Spathe* broadly tubular, 2-4-lobed unequally. *Filament* much longer than the ovary; staminodes shorter, narrowly linear. *Capsule* ellipsoid, usually longepeduncled; valves 8-ribbed, one falling before the other.

Sect. II. **Polypleurum.** *Stem* flat dilated frond-like. *Flower-buds* scattered or submarginal, with few scales.

6. ***P. Hookerianus***, *Wedd. in DC. Prodr.* xvii. 74; plant an irregularly dilated thickish sinuate or lobulate frond with marginal 1-fid. buds of about 6 distichously imbricate ovate obtuse or acuminate leaves, capsule

smooth. *Mniopsis Hookeriana*, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 104, and *Monogr. Podost.* 147, t. 8, f. 5; *Wight Ic.* t. 1918, f. 4.

The CONCAN; near Bombay, in streams, *Law.* N. CANARA, in the Kala nuddi, *Talbot.*

Plant 1-2 in. broad, appressed to rocks, &c. *Leaves* not keeled, lower short obtuse, upper $\frac{1}{2}$ in. long. *Spathe* tubular, mouth 2-lobed. *Pedicel* about $\frac{1}{2}$ in. *Filament* flat; staminodes linear, acute, shorter than the ovary. *Ovary* sessile, globose; stigmas long, subulate-lanceolate. *Capsule* subglobose, one valve falling away before the other.—Mr. Hemsley regards the Canara specimens as intermediate between *P. stylosus* and *algaformis*.

7. **P. Johnsonii**, *Wedd. in DC. Prodr.* xvii. 75; plant an irregularly dilated membranous suborbicular or lobed frond, buds on the upper surface 1-fl. of 4-6 distichously imbricate ovate obtuse keeled leaves, capsule smooth or with 8 confluent broad ribs. *Mniopsis Johnsonii*, *Wight Ic.* t. 1919, f. 5.

MALABAR; in rivers, *Johnson.*

Plant 1-1 $\frac{1}{4}$ in. broad, appressed to the stones, &c. *Leaves* $\frac{1}{2}$ in., spreading, rigid when dry, upper rather the longest. *Spathe* ovoid, subcompressed, split ventrally and at the tip. *Filament* longer than the ovary; anthers ovate; staminodes very narrow, incurved above, equalling the ovary. *Ovary* globose, sessile; stigmas short, linear. *Capsule* ellipsoid.

8. **P. olivaceus**, *Gardn. in Calc. Journ. Nat. Hist.* 181; plant a membranous irregularly lobed flat frond, buds crowded on its upper surface 1-fl. of 6 equitant oblong obtuse acutely keeled leaves, capsule with 8 thick ribs. *Wedd. in DC. Prodr.* xvii. 75. *P. griseus*, *Gardn. l. c.* *Hydrobryum olivaceum* & *griseum*, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 104 and *Monogr. Podost.* 138, 140, t. 9; *Wight Ic.* t. 1918, f. 2. ? *P. Gardneri*, *Harv. mss.*; *Thwaites Enum.* 223.

NILGHIRI MTS.; in the Pycarrah River, *Wight.* CEYLON; in the Mahawalle Gunga River, *Gardner*, &c.

Plant about 1 in. broad, appressed to rocks, &c., its lobes sometimes imbricating. *Leaves* $\frac{1}{2}$ in., upper larger. *Spathe* elliptic-oblong, incumbent on the frond, at length split longitudinally. *Pedicel* at length $\frac{1}{2}$ in. long. *Filament* compressed, arms short, anthers ovate; staminodes linear, shorter than the ovary. *Ovary* sessile; stigmas short, triangular-lanceolate. *Capsule* ellipsoid, ribs of the persistent valve decurrent on the pedicel.—*P. Gardneri*, which consists of a simple terete stem crowned with capillary leaves, and grows on the rootstock of *P. olivaceus*, is supposed to be an abnormal foliaceous development of that plant.

9. **P. acuminatus**, *Wedd. in DC. Prodr.* xviii. 75; plant a flat frond radiately lobed, buds in the sinus and angles between the lobes 1-fl. of 6 equitant leaves terminating in long subulate caducous points, capsule broadly 8-ribbed.

KHASIA MTS., in the Bogapane and Kalapane Rivers, *J. D. H. & T. T.*

Plant minute, membranous, subdichotomously irregularly shortly forked or lobed and toothed. *Buds* horizontal; lower leaves shorter, obtuse. *Spathe* ellipsoid, narrowed below, at length split longitudinally. *Pedicel* ascending, $\frac{1}{10}$ in. *Filament* flattened, arms short, spreading, staminodes linear, half as long as the ovary. *Stigmas* subulate-lanceolate. *Capsule* obliquely ellipsoid, ribs of the persistent valve decurrent on the pedicel.

10. **P. microcarpus**, *Wedd. in DC. Prodr.* xvii. 76; plant a dichotomous flat branching frond bearing scattered 1-fl. buds of 6-8 equitant subacute compressed keeled leaves, spathe boat-shaped, capsule obovoid

ellipsoid not ribbed. *Hydrobryum lichenoides*, *Kurz in Journ. As. Soc. Beng.* xlii. 2. 103.

TENASSERIM; on branches of shrubs near waterfalls at Tavoy and Moulmein, *Parish*.

Plant 1-2 in. broad, adhering to bark, irregularly or subradiately spreading. *Leaves* $\frac{1}{2}$ in. long, upper largest. *Spathe* open, rather shorter than the pedicel. *Stamens* unknown.—I have seen no specimen of Kurz's *Hydrobryum lichenoides*, of which the description is very meagre; as, however, he states it to have been received from Parish and collected in Burma, there is little room to doubt its identity. Weddell describes the plant as not ribbed, Kurz as broadly 8-ribbed.

11. **P. Wallichii**, *Br. in Wall. Cat.* 5225; plant a minute flat veined lobulate frond, buds on the edges of the lobes 1-fld. continuous with the veins, of 5-7 scale-like subdistichous fleshy at length deciduous leaves, spathe tubular, capsule 8-ribbed. *Griff. in As. Research.* xix. 103, t. 17, and *Notul.* 378, and *Ic. Pl. Asiat.* t. 541, f. 1, 542, 543; *Gardn. in Calc. Journ. Nat. Hist.* 183; *Royle Ill.* i. 331. *Dicræa Wallichii*, *Tul. in Ann. Sc. Nat. Ser. 3*, xi. 101, and *Monogr. Podost.* 118; *Wight Ic.* t. 1916, f. 1; *Meissn. in DC. Prodr.* xvii. 70. *Lacis Wallichii*, *Steud. Nomencl. Polypleurum orientale*, *Tayl. mss.* *Blandovia striata*, *Lehm. mss.*

KHASIA Mts., *Wallich*; at the falls near Churra, *Griffith*. AVA; at Cheppedong, *Wallich*.

Plant ascending, about 1 in. long, veins radiating. *Buds* usually from between the lobes, rarely superficial. *Leaves* irregularly disposed, more or less connate. *Pedicel* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Spathe* dilated at the mouth, invaginate about the middle. *Filament* subterete; anthers broadly ovate; staminodes 2 or with a third arising from the fork of the filament. *Ovary* ovoid; stigmas thick, subulate, unequal, divaricate. *Capsule* narrowed into the pedicel; valves persistent, incurved.

12. **P. pterophyllus**, *Benth. in Gen. Pl.* iii. 112; plant a very small flat-veined lobed frond, lobes entire or forked, buds arising from the veins at about the middle of the frond of 4-6 distichous leaves with winged keels, capsule ellipsoid 8-12-ribbed. *Dicræa pterophylla*, *Wedd. in DC. Prodr.* xvii. 71.

KHASIA Mts.; in rivulets, *J. D. H.*

Plant variable in form, appressed; veins radiating from the centre; lobes or segments short or sometimes $1\frac{1}{4}$ in. long. Upper leaves the longest, about $\frac{1}{4}$ in. long, keel dilated into an oblong wing. *Pedicels* $\frac{1}{4}$ - $\frac{1}{2}$ in. *Stigmas* (imperfect) ovate or ovate-lanceolate. *Capsule* about $\frac{1}{16}$ in.

13. **P. minor**, *Benth. in Gen. Pl.* iii. 112; plant a minute stellately lobed flat veinless frond, lobes narrow simple or subdichotomously branched, buds on the margins and upper surface of the fronds leafless, spathe enclosed in a very obliquely funnel-shaped sheath, capsule ellipsoid 10-ribbed. *Dicræa minor*, *Wedd. in DC. Prodr.* xvii. 71.

KHASIA Mts.; *Griffith*.

Plant fragmentary, fragments $1\frac{1}{4}$ in. long and less, very narrow, olive-brown when dry. *Sheath* split to the base on one side, margin waved or lobed, fleshy; spathe seated in the sheath, tubular, mouth 2-lobed, longer than the pedicel. *Filament* equalling the capsule; anthers ovate; staminodes very slender, half as long as the filament. *Capsule* sessile, subacute, dorsal nerve acute; stigmas linear, acute.

Sect. III. **Selaginoides**. *Stems* of two forms, flowering densely fascicled elongate, clothed with imbricating tetrastichous thick scales; leaves of the flowerless stem with very long filiform tips.

14. **P. selaginoides**, *Benth. in Gen. Pl.* iii. 113; stems densely tufted simple erect the flowerless naked below, flowering densely clothed from the base with 4-ranked imbricating scales, flowers terminal subsessile, capsule ellipsoid smooth. *Mniopsis selaginoides*, *Beddome in Trans. Linn. Soc.* xxv. 223, t. 28. *Dicræa selaginoides*, *Wedd. in DC. Prodr.* xvii. 68.

SOUTH DECCAN; in streams of the Anamallay Hills, *Wight, Beddome*.

Rootstock small, depressed, stems 2-3 in. rather fleshy. *Leaves* of the flowerless stems $\frac{1}{2}$ - $\frac{3}{4}$ in. long, semiterete below then strap-shaped, those of the flowering stems subclavate, the upper $\frac{1}{10}$ in., lower shorter, keeled at the back, channelled in front; filiform tips jointed at the base and deciduous. *Spathe* amongst the upper leaves, saccate, mouth 2-lobed. *Ovary* ellipsoid, obtuse, stigmas unequal. *Filament* equaling the ovary, anthers oblong; staminodes narrowly linear. *Capsule* $\frac{1}{2}$ in. long.

DOUBTFUL SPECIES.

DICRÆA APICATA, *Tul. Monogr. Podost.* 204; *Wedd. in DC. Prodr.* xvii. 71; stems $\frac{1}{2}$ - $\frac{3}{4}$ in. compressed simple naked crowned with a brush of filiform branchlets, flowers as in *P. dichotomus*.—N ilghiri Mts., *Wight*; in streams at Pycarra, *Gardner*. ? Ceylon, *Thwaites* (C. P. 2989). Probably (according to Tulasne) an abnormal form of *P. dichotomus* var. *rigida*.

ORDER CXXI. NEPENTHACEÆ.

Climbing or prostrate evergreen undershrubs. *Leaves* alternate, exstipulate; midrib stout, produced into a peduncle which bears a pitcher of various forms, nerves parallel; pitcher with 2 longitudinal ribs or wings in front, at first closed by a lid which opens and becomes erect or reflected, inner surface covered below the middle with glands that secrete water; mouth with a revolute and closely ribbed margin (*peristome*). *Inflorescence* terminal or lateral; flowers racemose rarely paniced, diœcious, small, green or brownish. *Perianth* 4-, rarely 3-partite; segments oblong, glandular within. *MALE FL.* *Stamens* 4-16, united in a column crowned by the usually connate anthers with extrorse dehiscence. *FEMALE FL.* *Ovary* superior, 4- rarely 3-gonous, 4-3-celled; stigma sessile, discoid, 4-3-lobed. *Ovules* numerous, in many series, attached to the septa, anatropous, ascending. *Capsule* coriaceous, loculicidally 4-3-valved. *Seeds* very numerous, minute, imbricate, testa membranous, produced into a thread at each end; albumen fleshy; embryo axile, straight, cotyledons linear, radicle short inferior.—Genus 1, species about 30, Tropical Asia, Malay Islands, N. Australia, New Caledonia, Madagascar and the Seychelles.

NEPENTHES, Linn.

Character of the Order.

* *Flowers paniced.*

1. **N. distillatoria**, *Linn.*; *Hook. f. in DC. Prodr.* xvii. 93; glabrous, leaves elliptic-lanceolate, petiole broadly winged $\frac{1}{2}$ -amplexicaul, pitcher cylindric hardly inflated below, mouth subcordate, ribs not winged, peristome narrow not dilated behind, lid smooth within. *Burm. Fl. Ind.* 190; *Gartn. Fruct.* ii. 18, t. 33; *Thwaites Enum.* 290. *N. indica*, *Poir. Encycl.* iv. 458; *Brongn. in Ann. Sc. Nat.* i. 43, t. 5, f. 1. *Bandura zeylanica*, *Burm. Thes. Zeyl.* 42, t. 17.

CEYLON; south of the island, common.

A tall climber. *Leaves* 5-12 by 1-2 $\frac{1}{2}$ in., coriaceous, acute or acuminate. *Pitchers*

4-6 in. long; peristome very narrow; lid orbicular. *Panicle* 8-12 in., puberulous. *Flowers* $\frac{1}{4}$ in. diam.

**** Flowers in a raceme with at its base short branches with scorpioid inflorescence.**

2. **N. ampullaria**, *Jack in Mal. Misc. ex Hook. Comp. Bot. Mag.* i. 271; stem stout rusty-pubescent, leaves elliptic- or obovate-lanceolate or obcuneate pubescent beneath narrowed into a short winged $\frac{1}{2}$ -amplexicaul petiole, lower pitchers fascicled globose leafless, upper saccate, wings fimbriate, peristome broad and deep, lid linear reflexed, peduncle short and inflorescence rusty-tomentose. *Hook. f. in DC. Prodr.* xvii. 93; *Lambert, Pinus II. App.* t. 8; *Korth. Verh. Nat. Gesch.* 39, t. 13; *Hook. Bot. Mag.* t. 5109. *N. ampullacea*, *Blume Mus. Bot.* ii. 9; *Wall. Cat.* 2243 A, in part.

SINGAPORE, *Jack*. MALACCA, *Cuming, Griffith*.—DISTRIB. Sumatra, Borneo.

Stem prostrate below, with a whorl of many short pitchers, above erect. *Leaves* 3-12 by 1-4 in., nerves 2-4 on each side. *Pitchers* green, purple-spotted, lower 1-2 in. diam., upper cylindric cup-shaped or hemispheric, often gibbous or inflated in front; mouth orbicular; throat glandular to the top; peristome forming a deep curtain in the pitcher; lid very much smaller than the mouth, eglandular, *Racemes* 4-10 in., dense-fld. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. *Capsule* 1-1 $\frac{1}{2}$ in.

***** Flowers simply racemose; pedicels rarely 2-fld.**

3. **N. Rafflesiana**, *Jack in Mal. Misc. ex Hook. Comp. Bot. Mag.* i. 270; stem stout cylindric, lower leaves lanceolate upper oblong to linear-lanceolate, petiole long $\frac{1}{2}$ -amplexicaul, lower pitchers ventricose below, wings fimbriate upper funnel-shaped not winged, neck elongate, peristome convex dilated and pectinate posteriorly, lid smooth within. *Wall. Cat.* 2242, 2243 A, in part; *Hook. f. in DC. Prodr.* xvii. 96; *Hook. Bot. Mag.* t. 4285; *Fl. des Serres*, t. 213, 214; *Korth. in Ann. de Gand.* iii. 7, t. 105; *De Vriese Tuinbow Flor.* i. 208, t. 5. *N. Hookeri*, *Alphand Prom. de Paris, cum Ic.*

SINGAPORE, *Jack*, &c.—DISTRIB. Sumatra, Borneo.

Stem long, stout, and young leaves thinly woolly. *Leaves* 4-18 in., lower membranous; petiole 3-8 in. *Pitchers* puberulous, peduncle stout, lower 3-4 in. diam., greenish yellow blotched with purple, mouth oblique contracted; peristome $\frac{1}{2}$ in. broad; upper pitchers 6-12 in. long; wings narrow, ciliate or not; lid with large glands. *Racemes* 6-10 in., white and woolly, dense-fld.; flowers $\frac{1}{2}$ in. diam. *Capsule* 1-1 $\frac{1}{2}$ in.—Varies from glabrous to white-woolly.

4. **N. phyllamphora**, *Willd. Sp. Pl.* iv. 2. 874; stem cylindric, leaves elliptic-oblong or lanceolate young denticulate and ciliate, petiole long $\frac{1}{2}$ -amplexicaul, pitchers subcylindric, peristome narrow, lid oblong or orbicular, racemes pubescent, pedicels slender. *Wall. Cat.* 2244; *Brongn. in Ann. Sc. Nat.* i. 458; *Jack in Mal. Misc. ex Hook. Comp. Bot. Mag.* i. 271; *Korthals in Verh. Nat. Gesch.* 28, t. 15; *Hook. f. in DC. Prodr.* xvii. 97. *N. fimbriata* & *macrostachya*, *Blume l. c.*; *Miquel III. Fl. Ins. Archip.* 3, t. 2, and 5, t. 6. *Phyllamphora mirabilis*, *Lour. Fl. Coch.* 606.—*Rumph. Herb. Amboin.* v. t. 121.

SINGAPORE, *Wallich*; MALACCA, on Mt. Ophir, *Lobb*.—DISTRIB. Malay Archipelago, China, New Guinea.

Stem short, creeping and climbing. *Leaves* 4-18 in., young puberulous, nerves many; petiole 1 $\frac{1}{2}$ -5 in. *Pitchers* 4-6 in. long, narrowed at the base, not winged; peristome $\frac{1}{2}$ - $\frac{1}{2}$ in. diam., lid densely glandular within. *Racemes* slender, mealy and hairy; flowers $\frac{1}{2}$ - $\frac{1}{2}$ in. diam. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in. long.

5. **N. sanguinea**, *Lindl. in Gard. Chron.* 1849, 580, with wood-cut; stem stout 3-gonous, leaves sessile obovate-oblong or cuneate cordately amplexicaul, pitchers large young short ventricose below narrowly 2-winged, old cylindric narrowed below, peristome broad dilated posteriorly, lid densely glandular within, racemes lax-flid., pedicels long capillary. *Hook. f. in DC. Prodr.* xvii. 100. *N. sanguinea*, *Griff. Posth. Papers*, iv. 348.

MALACCA; at Goonong Ledang, *Griffith*; Mt. Ophir, *Lobb*.

Often epiphytic; branches short, stout. *Leaves* with imbricating bases; nerves 2-3 hairs, obscure. *Pitchers* 12 by $2\frac{1}{2}$ - $3\frac{1}{4}$ in., blood-red, scurfy; mouth broad, ovate, produced behind; peristome $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, inner margin inflexed; lid membranous. *Racemes* pubescent, male a foot long, female shorter; pedicels 1- $1\frac{1}{2}$ in.; flowers small, $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.

6. **N. khasiana**, *Hook. f. in DC. Prodr.* xvii. 102; stem cylindric, leaves sessile amplexicaul lanceolate base shortly decurrent penninerved, pitchers large subcylindric inflated below, mouth contracted, peristome broad, racemes robust puberulous, pedicels short. *N. distillatoria*, *Wall. Cat.* 2244, *in part*; *Grah. in Bot. Mag.* t. 2798. *N. phyllamphora*, *Herb. Ind. Or. H. f. & T.*

KHASIA and JYNTEA MTS., *Wallich*, &c.

Stem short, stout, elongate under cultivation, prostrate, leafy. *Leaves* 1-2 ft. by $1\frac{1}{2}$ - $3\frac{1}{2}$ in., acute or acuminate, base narrowed, nerves numerous. *Pitchers* 4-7 by $1\frac{1}{2}$ -3 in., membranous, glabrous, green, reddish above, young shortly winged; mouth orbicular; peristome cylindric; lid membranous. *Racemes* lateral and terminal, puberulous; pedicels $\frac{1}{2}$ in.; flowers $\frac{1}{2}$ in. diam., green. *Capsule* $\frac{3}{4}$ -1 in. long.—A specimen of this in *Herb. Wallich* is marked as from "Courtallam, *Herb. Heyne*," but has never been found there by any subsequent collector, and it is inconceivable that the natives should not know so remarkable a plant.

7. **N. albo-marginata**, *Lobb ex Lindl. in Gard. Chron.* 1849, 580, with wood-cut; stem subcylindric and racemes and pitchers hoary-pubescent, leaves subsessile with a shortly decurrent $\frac{1}{2}$ -amplexicaul base elliptic-lanceolate acuminate, pitchers cylindric or funnel-shaped, or younger ventricose below, with a white velvety band on the neck, peristome narrow, lid orbicular glandular within, racemes long, pedicels very slender. *Hook. f. in Trans. Linn. Soc.* xxii. 422, t. 73, and in *DC. Prodr.* xvii. 102. *N. tomentella*, *Miquel Fl. Ind. i. at. i. pt. 1*, 1075, and *Ill. Fl. Ins. Archip.* v., t. 5. *N. distillatoria*, *Wall. Cat.* 2244, *in part*.

SINGAPORE, *Wallich*.—DISTRIB. Borneo.

Hoary-pubescent. *Stem* elongate, subtomentose or subsilky. *Leaves* 8-14 by $\frac{1}{2}$ - $1\frac{1}{4}$ in.; nerves 1-2 on each side, slender. *Pitchers* 3-5 by $1\frac{1}{2}$ in., green purple or mottled with purple and red, stellately downy, lower ventricose below with fimbriate wings, upper narrower. *Racemes* elongate, lax-flid.; pedicels $\frac{3}{4}$ -1 in.; flowers $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. *Capsule* $1\frac{1}{2}$ -2 in.

8. **N. Reinwardtiana**, *Miquel in Plant. Jungh.* i. 168, and *Fl. Ind. Bat.* i. pt. 1, 1075, and *Illust. Pl. Ins. Archip.* 4, t. 4; stem glabrous obtusely 3-gonous, 2-3-winged above, leaves sessile $\frac{1}{2}$ -amplexicaul linear-lanceolate acuminate shortly decurrent glabrous, pitchers subcylindric inflated below glabrous, mouth dilated produced posteriorly, peristome narrow smooth, lid densely glandular within, racemes downy lax-flid., pedicels slender. *Hook. f. in DC. Prodr.* xvii. 103. *N. distillatoria*, *Wall. Cat.* 2244, *in part*.

SINGAPORE, *Wallich*.—DISTRIB. Sumatra, Borneo.

Stem subcylindric below, winged above by the decurrent leaf bases. *Leaves* 5-10

by $\frac{3}{4}$ –1 in., lower long acuminate, upper shorter often obtuse, nerves 3–4 on each side. *Pitchers* 4–8 in., violet; mouth 2–2 $\frac{1}{2}$ in. wide; peristome very obscurely if at all striate. *Racemes* 5–7 in. long; female shorter, tomentose; pedicels $\frac{1}{2}$ –1 in.; flowers small, $\frac{1}{4}$ – $\frac{3}{8}$ in. diam. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in.—Differs from *N. gracilis* in the glandular lid and smooth peristome.

9. **N. gracilis**, *Korthals in Verh. Nat. Gesch.* xxii. t. 1 and 4, f. 1–38; stem glabrous 3–4 angled, leaves sessile linear-lanceolate decurrent, pitchers cylindric inflated below, contracted in the middle, mouth orbicular, peristome very narrow ribbed, lid orbicular with few glands within, racemes narrow downy, pedicels short. *Hook. f. in DC. Prodr.* xvii. 104; *Blume Mus. Bot.* ii. 10; *Miquel Fl. Ind. Bat.* i. pt. 1, 1071; *Spach Suites à Buffon Veg. Phan.* t. 144. *N. Korthalsiana*, *Miquel l. c.* 1071, and *Fl. Ins. Archip.* 7, t. 1. *N. lævis*, *Korth., in part.*

MALACCA and SINGAPORE; *Jack, Wallich.*—DISTRIB. Borneo.

Stem slender, angles obtuse. *Leaves* 4–7 by 1 in., glabrous, coriaceous; nerves 3–5 pairs, conspicuous. *Pitchers* 2 $\frac{1}{4}$ –4 in. long, glabrous, membranous, lower winged; mouth rather dilated; peristome very narrow or almost filiform; glands of lid very few and large. *Racemes* tomentose or glabrate, pedicels $\frac{1}{2}$ – $\frac{1}{2}$ in. *Flowers* $\frac{1}{6}$ – $\frac{1}{3}$ in. broad. *Capsule* slender, $\frac{3}{4}$ –1 $\frac{1}{2}$ in. long, glabrous.

ORDER CXXII. CYWINACEÆ.

Leafless brown reddish or yellowish parasites, or with leaves reduced to scales. *Flowers* solitary or in a spadix-like spike, or clustered on the root or branch of the host. *Perianth* superior, 3–10-cleft, segments or lobes imbricate or valvate. *Stamens* 8 or more, forming a fleshy ring round the style, or inserted on the perianth, 2-celled, bursting by pores or slits. *Ovary* 1-celled, or with many spurious cells formed of branching fleshy pendulous or parietal placentas; stigmas various. *Ovules* excessively numerous, orthotropous or anatropous. *Fruit* fleshy, 1-celled. *Seeds* innumerable, very minute, sometimes sunk in the placentas, nucleus homogeneous, or albumen cellular with a most minute embryo.—Genera 7, species 22, mostly tropical.

1. **SAPRIA**, *Griff.*

Plant diœcious, consisting of a solitary large flower sessile in a cup formed of the bark of a vine-stem, surrounded at the base by large broad opposite imbricating bracts. MALE FL. *Perianth-tube* hemispheric and solid below, cupular above and marked with 20 radiating ridges; limb 10-partite, segments rounded or oblong imbricate in two rows, spreading; from the base of the tube rises a stout columnar style crowned with a broad cup-shaped very hairy disk. *Anthers* about 20, sessile in a ring under the disk, subglobose, 2–3-celled, opening outwards by one pore. FEM. FL. *Perianth* of the male. *Ovary* traversed by longitudinal sinuous cells the walls of which are covered with anatropous ovules; stigma, a papillose cone in the centre of the disk. *Fruit* the swollen globose ovary crowned with the perianth.

S. himalayana, *Griff. in Proc. Linn. Soc.* i. 216, and in *Trans. Linn. Soc.* xix. 314, t. 34, 35; *Hook. f. in DC. Prodr.* xvii. 112. *S. Griffithii*, *Brown in Trans. Linn. Soc.* xix. 244.

EASTERN ASSAM; in the Mishmi Hills, on the roots of a vine, alt. 3–5000 ft., *Griffith.*

Buds globose; bracts white and pink. *Flowers* fœtid, 5-6 in. diam., tube blood-red within; segments fleshy, warted; ring at throat clothed with filiform processes; disk of column rosy.

ORDER CXXIII. **ARISTOLOCHIACEÆ.**

Herbs or shrubs, often climbing. *Leaves* alternate, entire or 3-5-lobed, exstipulate. *Flowers* 2-sexual, often large, usually lurid, terminal axillary or lateral, solitary racemose or cymose, bracteate or not. *Perianth* superior, regular or irregular, 3-lobed or tubular and variously shaped, lobes valvate. *Stamens* 6 or more, subsessile in a ring round the base of the style, cells parallel opening by dorsal slits. *Ovary* 4-6-celled, placentas parietal, free or meeting in the axis; style columnar, stigma lobed; ovules numerous, anatropous. *Fruit* capsular or baccate. *Seeds* numerous, various, albumen copious fleshy; embryo minute.—Genera 5, species about 200, chiefly tropical.

Perianth short, regular, 3-lobed. Ovary very short	1. ASARUM.
Perianth short, regular. Stamens 1-seriate. Ovary linear	2. BRAGANTIA.
Perianth regular. Stamens 2-seriate. Ovary linear	3. THOTTEA.
Perianth tubular with an inflated base, irregular	4. ARISTOLOCHIA.

1. **ASARUM**, Linn.

Perennial herbs; rootstock stout, woody. *Leaves* radical. *Flowers* solitary, terminal, peduncled, purple. *Perianth* shortly campanulate, regular, persistent, 3-lobed. *Stamens* 12, connective produced. *Ovary* inferior or $\frac{1}{2}$ -inferior, 6-celled; styles 6, tubular, grooved or 2-fid. *Fruit* coriaceous, bursting irregularly. *Seeds* boat-shaped, convex face wrinkled, opposite face winged or with a fleshy raphe.—Species 13, N. temperate hemisphere.

A. himalaicum, Hook. f. & Thoms. mss.; Duchartre in DC. Prodr. xv. 1. 424; leaves long-petioled rounded-ovate deeply cordate finely acuminate. Klotzsch in Monatsb. Berl. Akad. 1859, 385; Braun Ind. Sem. Hort. Berol. App. 1861, 12.

SIKKIM HIMALAYA; alt. 9-11,000 ft., J. D. H.

Rootstock slender. *Leaves* 3-4 in. diam., membranous; petiole 4-8 in., slender. *Peduncle* 1-2 in. *Perianth* broadly campanulate, lurid purple, $\frac{3}{4}$ in. diam., puberulous, lobes triangular. *Connective* with a subulate tip.—Belongs to the section *Eusasarum* with a European and N.W. American species.

2. **BRAGANTIA**, Lour.

Shrubs or undershrubs; hairs stellate. *Leaves* petioled, 3-5-nerved; veins closely reticulate beneath. *Flowers* axillary or subradical, cymose, bracteate. *Perianth* shortly campanulate, equally 3-lobed, deciduous. *Stamens* 6-12, 1-seriate, free or connate, connective thick. *Ovary* elongate, 4-celled; style short, stigmas 3 or more linear; ovules 2-seriate. *Capsule* elongate, 4-gonous, septicidally 4-valved, valves separating from a placentiferous column. *Seeds* oblong, 3-gonous, rugose or deeply pitted, often coated with remains of the placenta.—Species 4 or 5, Malayan and Indian.

* *First pair of basal nerves reaching far beyond the middle of the leaf. Cymes axillary. Stamens* 9-12.

1. **B. corymbosa**, *Griff. in Trans. Linn. Soc. xix. 335*; shrubby, branches leaves beneath and inflorescence finely puberulous, leaves distichous oblong-ovate acuminate glabrous above, flowers in cymose spikes, perianth-tube 0, segments cordate acute, anthers 8-10, stigma discoid. *Duchartre in DC. Prodr. xv. 1. 429*. *B. melastomæfolia*, *Duchartre l. c.* *Asiphonia piperiformis*, *Griff. l. c. 333, t. 37*, and *Notul. 344*, and *l. c. Pl. Asiat. t. 528*; *Ann. Sc. Nat. Ser. 3, vii. 338*. *Strakæa melastomæfolia*, *Presl Epimel. Bot. 221*.

MALACCA, *Griffith, Lobb, Cuming*.

Branches slender, terete. Leaves 5-6 by 2-2½ in., shining above; petiole very short, base rounded. Cymes much shorter than the leaves; spikes peduncled, divaricate. Flowers ¼ in. diam. Capsule 1 foot long, torulose. Seeds ½-¾ in. long, lanceolate, 3-gonous, rugose.

2. **B. Wallichii**, *Br. in Wall. Cat. 7415*; shrubby, branches and leaves beneath finely pubescent or glabrate tips and inflorescence tomentose, leaves oblong-lanceolate glabrous above, flowers in small irregular few-fl. cymes not spicate, perianth hemispheric, segments broadly ovate. *Duchart. in DC. Prodr. xv. 1. 430*; *Wight l. c. t. 520*; *Wight & Arn. in Ed. Phil. Journ. 1833, 181*; *Dalz. & Gibs. Bomb. Fl. 225*. *B. siliquosa*, *Miq. Pl. Ind. Or. Hohenack. n. 64*. *Apama siliquosa*, *Lamk. Encycl. i. 91*, and *Ill. t. 640*. *Trimeriza piperina*, *Lindl. in Bot. Reg. under t. 1543*. — *Rheede Hort. Mal. vi. t. 28*.

DECCAN PENINSULA; in the western forests, from the Southern Concan southwards. Ceylon; ascending to 4000 ft.

Branches angled. Leaves 5-8 by 1½-2 in., base acute or rounded. Cymes ½-1 in. long, rarely longer. Flowers 1 in. diam. Capsule 3-4 in., straight. Seeds ⅓ in. long, 3-gonous, deeply pitted.

Var. *brachycarpa*; leaves ovate-oblong or oblong acuminate finely puberulous beneath, flowers in cymose spikes, capsule 2½ in. *B. brachycarpa*, *Thwaites mss.*

Var. *latifolia*, *Duchart. l. c.*; leaves larger broader obovate-oblong tomentose beneath. *B. hispida*, *Thwaites mss.*

3. **B. Dalzellii**, *Hook. f.*; shrubby, stout, leaves very large oblong-lanceolate acuminate finely puberulous beneath, capsules 5-8 in. long torulose, seeds ½ in. long 3-gonous rugose and deeply pitted.

THE CONCAN? *Herb. N. A. Dalzell*.

A very fine species with leaves a foot long by 3 in. broad, and very long pods and large seeds. From the remains of the inflorescence its branches do not appear to have been spicate. Seeds lemon-yellow.

** *First pair of basal nerves not reaching the middle of the leaf. Cymes from the base of the stem. Stamens 6.*

4. **B. tomentosa**, *Blume Enum. Pl. Jav. 82*; herbaceous, low, stem simple and leaves beneath densely tomentose, leaves 1-3 oblong or ovate cordate, flowers in simple spikes. *Duchart. in DC. Prodr. xv. 1. 431*; *Bennett Plant. Jav. Rar. 43, t. 11*; *Griff. in Trans. Linn. Soc. xix. 335*; *Miquel Fl. Ind. Bat. B. khasiana*, *Griff. l. c. B. latifolia*, *Lindl. in Bot. Reg. under t. 1543*. *Bragantia*, n. sp., *Br. in Trans. Linn. Soc. xiii. 219*. *Ceramiu tomentosum*, *Bl. Bijdr. 1135*. *Cyclodiscus tomentosus & latifolius*, *Klotzsch in Monatsb. Berl. Akad. 1859, 592*. *Aristoloch.*, *Wall. Cat. 9108*.

SILHET, *De Silva*; Moulmein, *Lobb, Parish*. — DISTRIB. JAVA.

Stem creeping below, and rooting, then ascending, 6-12 in., simple, angular,

geniculate, tomentose. *Leaves* 4-6 by $2\frac{1}{2}$ -4 in., smooth but opaque above, 6-9-nerved at the base and penninerved beyond. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; bracts oblong, persistent. *Perianth-lobes* rounded-cordate, acute. *Capsule* 2 in. long, straight. *Seeds* $\frac{1}{2}$ in. long, 3-gonous, rugose.

Var. *lanuginosa*; leaves densely woolly beneath.—South Andaman Islands, Kurz.

3. **THOTTEA**, Rottb.

Shrubs, erect or straggling. *Leaves* broad, coriaceous, 3-5-nerved. *Flowers* axillary, cymose. *Perianth* broadly campanulate or urceolate, equally 3-lobed, deciduous. *Stamens* numerous, 2-seriate; connective broad. *Ovary* elongate, 4-celled; style broad, stigmas 5-25, radiating; ovules 2-seriate. *Capsule* elongate, 4-gonous, septicidally 4-valved, placentas usually free. *Seeds* oblong, 3-gonous, rugose, coated with remains of the placenta.—Species 5, Malayan.

1. **T. grandiflora**, Rottb. in *Dansk. Vidensk. Selks. Schrift.* ii. 530, t. 2; tomentose, leaves obovate-oblong oblong or elliptic-oblong or -lanceolate acute or acuminate, corolla very large campanulate. Griff. in *Trans. Linn. Soc.* xix. 325, t. 36, and in *Notul.* iv. 346, and *Ic. Pl. Asiat.* t. 530, 531; *Ann. Nat. Hist. Ser.* 3, vii. 328; *Bennett Pl. Jav. Rar.* i. 45; *Klotzsch in Monatsb. Berl. Akad.* 1859, 589; *Duchart. in DC. Prodr.* xv. 1. 428.

MALACCA, Ringit (1779), Griffith, Maingay. SINGAPORE, Oxley, Lobb.—DISTRIB. BORNEO?

Branches stout, woody, sometimes villous with spreading hairs. *Leaves* 1-1 $\frac{1}{2}$ ft. by 6-8 in., coriaceous, basal nerves 3-5; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., stout. *Spikes* 1-2 in., bracts $\frac{1}{4}$ - $\frac{1}{2}$ in. *Perianth* attaining 5 in. long and as broad, ribbed, mottled with purple, pubescent outside, arachnoid within. *Style rays* 12-15. *Capsule* 4-6 in., straight or twisted, angles acute, pubescent. *Seeds* $\frac{1}{2}$ in. long, 3-gonous, acute at both ends, tubercled.—The doubtful Bornean plant has a rounded leaf 1 foot by 10 in.

2. **T. dependens**, Klotzsch in *Monatsb. Berl. Akad.* 1859, 589; glabrous, leaves lanceolate or elliptic-lanceolate acuminate, corolla urceolate base inflated. *Duchart. in DC. Prodr.* xv. 1. 428. *Lobbia dependens*, *Planch. in Hook. Lond. Journ. Bot.* vi. (1847) 144, t. 3. *Piper arborescens*, *Rowb. ex Wall. Cat.* 6648 B.

SINGAPORE; Wallich, Lobb.

Branches slender, terete. *Leaves* 6-10 by $2\frac{1}{2}$ -3 $\frac{1}{2}$ in., thinly coriaceous; petiole $\frac{1}{2}$ in. *Spikes* simple or cymose, quite glabrous. *Flowers* 1 in. long. *Ovary* 1-1 $\frac{1}{2}$ in., very slender. *Perianth-base* inflated; tube above it short, cylindric, lobes broader than long.

3. **T. tricornis**, Maingay mss.; branches and leaves beneath hoary, leaves elliptic-oblong or oblong-lanceolate or oblanceolate acute or subacute base acute or rounded, cymes short not spicate, perianth depressed acutely 3-angled in bud, broadly lanceolate.

MALACCA; Maingay (Kew Distrib. 1819).

Branches stout, terete or obtusely angled. *Leaves* 7-9 by 3-4 in., coriaceous; petiole $\frac{1}{2}$ in. *Cymes* $\frac{1}{2}$ -1 in., branched, and perianth densely tomentose. *Flowers* $\frac{3}{4}$ in. diam., tomentose. *Ovary* short. *Stamens* 12 in 2 rows. *Capsules* 7-8 in. long, downy with brown pubescence, straight or twisted, not torulose. *Seeds* nearly $\frac{1}{2}$ - $\frac{3}{4}$ in. long, 3-gonous, tubercled.—This has more the habit of a *Bragantia* than a *Thottea*. The two genera may well be united.

4. **ARISTOLOCHIA**, Linn.

Shrubs or perennial herbs, often twining. *Leaves* entire or lobed;

petiole with a dilated base, and with often the stipule-like leaf of an undeveloped bud in the axil. *Perianth* coloured, tube inflated at the base, then contracted, hairy within; limb dilated, obliquely 1-2-lipped. *Anthers* 6, rarely 5, or more; style very short, 3-6-lobed. *Capsule* septicidally 6-valved or splitting through the placentas. *Seeds* various, often covered with the remains of the placenta.—Species about 180, chiefly tropical.

Sect. I. **Diplolobus**, *Duchart*. Column 6-lobed. *Anthers* 6.

1. **A. bracteata**, *Retz*. *Obs.* v. 29; quite glabrous, stem slender decumbent, leaves reniform or broadly cordate tip obtuse or subacute margins flat or waved glaucous beneath, flowers solitary, peduncle bracteate. *Roxb. Fl. Ind.* iii. 490; *Wall. Pl. As. Rar.* ii. 3, and *Cat.* 2706; *Grah. Cat. Bomb. Pl.* 178; *Dalz. & Gibs. Bomb. Fl.* 224; *Klotzsch in Monatsb. Berl. Akad.* 1859, 598. *A. bractiolata*, *Lamk. Encycl.* i. 258; *Klotzsch l. c.* *A. mauritiana*, *Pers. Encheir.* ii. 527. *A. Kotschyi*, *Hochst. ex A. Rich Tent. Fl. Abyss.* ii. 237. *A. manorum* and *A. abyssinica*, *Klotzsch l. c.* (not of *Lin.*).

DECCAN PENINSULA, northward to BUNDELKUND, *Wallich*, *Edgeworth*, &c. SCINDE, *Vicary*. CEYLON; north of the island, *Gardner*.—DISTRIB. Arabia, Trop. Africa.

Root slender, perennial. *Stem* or branches 12-18 in., angled and striate. *Leaves* $1\frac{1}{2}$ -3 in. long and broad, widely and shallowly cordate at the base; petiole $1-1\frac{1}{4}$ in. *Peduncle* short; bract usually orbicular, variable in position, sometimes basal. *Perianth* $1-1\frac{1}{2}$ in., base globose, tube cylindric erect slender; lip erect, linear, as long as the tube, dark purple with revolute edges, villous with purple hairs. *Fruit* pyriform, 1 in. long, many-grooved. *Seeds* triangular-cordate.

2. **A. indica**, *Linn.*; *Duchart. in DC. Prodr.* xvi. 479; shrubby, quite glabrous, twining, leaves from linear to obovate-oblong or subpanduriform base cuneate rounded or shallowly cordate 5-nerved, flowers 1-3, bract opposite the base of the peduncles. *Roxb. Fl. Ind.* iii. 489; *Wall. Cat.* 2704; *Klotzsch in Monatsb. Berl. Akad.* 1859, 595; *Grah. Cat. Bomb. Pl.* 178; *Dalz. & Gibs. Bomb. Fl.* 224. *A. lanceolata*, *Wight Ic.* t. 1858. *Klotzsch l. c.* *A. mayorensis*, *Fisch. mss.* *A. pandurata*, *Wall. mss.* *Aristolochia*, *Griff. Notul.* iv. 348, and *Ic. Pl. Asiat.* t. 529.—*Rheede Hort. Mal.* viii. t. 25.

Throughout the low country of INDIA from NEPAL, *Hamilton*, and lower BENGAL, *Clarke*, to CHITTAGONG, *J. D. H. & T. T.*; and the DECCAN PENINSULA, from the Concan southward. CEYLON common up to 3000 ft.

Stem woody below, branches slender. *Leaves* membranous, excessively variable, in the narrowest forms 4 by $\frac{1}{2}$ - $\frac{3}{4}$ in., in the broadest 4-5 by 3 in., broadest part at the base or middle or above the middle, abruptly or gradually obtusely acuminate or apiculate, often oblong and quite obtuse; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., very slender. *Perianth* straight, greenish, base globose, tube shortly funnel-shaped, mouth oblique trumpet-shaped gradually passing into the short oblong obtuse glabrous brownish lip. *Capsule* $1\frac{1}{2}$ -2 in. long, oblong, grooved. *Seeds* flat, triangular, winged.—*Wight's A. lanceolata* occurs both in the Peninsula and Ceylon.

3. **A. Roxburghiana**, *Klotzsch in Monatsb. Berl. Akad.* 1859, 596; quite glabrous, shrubby, twining, leaves large cordate upper often narrow subsagittately lanceolate lower or all ovate or broadly ovate-oblong pedately 5-7-nerved, upper with the 2 principal nerves produced far beyond the middle, lower with all the nerves spreading, flowers in racemose puberulous cymes, lip of perianth villous. *Duchart. in DC. Prodr.* xv. 1. 480. *A. acuminata*, *Roxb. Fl. Ind.* iii. 489 (not of *Lamarck*); *Wall. Cat.* 2705; *Wight*

l.c. t. 771; *Miq. Fl. Ind. Bat.* i. 1086; *Grah. Cat. Bomb. Pl.* 178; *Dalz. & Gibs. Bomb. Fl.* 224. *A. acuminata*, *Duchart. l. c.*

EASTERN HIMALAYA; from Sikkim, alt. 2-5000 ft., *J. D. H.*, to Mishmi, *Griffith*. ASSAM, SILHET, CHITTAGONG, &c., south to PENANG, *Wallich*, &c. DECCAN PENINSULA; and the Ghats from the Concan southward. CEYLON, *Gardner*.—DISTRIB. Java, Borneo.

A stout lofty climber. *Leaves* 4-8 in.; upper 2-3 in. broad, lower 3-5; broadest at the cordate base, sinus deep or shallow, basal lobes sometimes incurved. *Cymes* 1-3 in., lax-flid.; peduncle and pedicels slender; bracts small, oblong. *Perianth* 2-2½ in. long, pale green; base globose, tube curved, mouth oblique with recurved margins; lip linear, straight, obtuse, villous, as long as the tube. *Capsule* very variable, globosely pyriform or oblong, with the long stipes 1-2½ in. long, membranous. *Seeds* most variable, obtusely triangular in the smaller capsules, ¼-½ in. broad, with narrow wings and one face studded with tubercles; in larger capsules the seeds are larger and more broadly winged and lip tubercled; in the largest capsules the seeds are ½ in. diam., with very broad wings, and a thin disk quite smooth or sparsely tubercled on one face.—The variations in the leaves of this plant are remarkable, but not so much so as are those of the capsule and seeds. I long thought that these indicated at least two species.

4. ***A. atropurpurea***, *Parish mss.*; slender, herbaceous, stem straggling and petiole and cymes pubescent, leaves ovate-lanceolate acuminate base cordate, cymes few-flid. subsessile, lip of perianth glabrous, capsule ½ in.

TENASSERIM; on limestone rocks at Moulmein, *Parish*.

Rootstock woody; stem 1-2 ft., pendulous, zigzag, angular and grooved. *Leaves* purple, 5-7 by 2½-5 in., membranous; 5 basal nerves diverging, slender; petiole 2-3 in. *Cymes* very short. *Perianth* 1-1½ in., very like in form *P. Roxburghii*, base globose, tube funnel-shaped, mouth oblique passing into the straight obtuse glabrous lip with recurved edges. *Capsules* globose, shortly stipitate.

Sect. II. ***Siphisia***, *Duchart.* *Column* 3-lobed. *Anthers* 6.—(Lofty climbers; stem in all woody below; branches twining. *Leaves* large. *Flowers* axillary or chiefly in villous cymes on the old wood. *Perianth* sharply bent back upon itself, lower half on obovoid sac, upper trumpet- or cup-shaped, as long.)

5. ***A. platanifolia***, *Duchart. in DC. Prodr.* xv. 1. 437; branches glabrous or pubescent, leaves very broad deeply digitately 3-lobed glabrous or tomentose beneath lobes pinnatifidly lobulate, flowers axillary and solitary also in villous cymes on the old wood, perianth tomentose or villous, mouth obtusely 6-angled lips recurved villous with purple papillose hairs.

EASTERN HIMALAYA; Mishmi Mts., *Griffith*; Sikkim and E. Nepal, alt. 3-6000 ft., *J. D. H.*, &c. KHASIA Mts., alt. 4000 ft., *J. D. H. & T. T.*

A stout lofty climber; old wood with corky rugged fissured bark. *Leaves* a foot long and as broad or broader, cleft to near the base with a rounded sinus, glabrous and shining above, glaucous glabrous pubescent tomentose or woolly beneath, base rounded-cuneate or cordate, lobes very variable, lobules few acute or acuminate; petiole 2-3 in. often stout and twining. *Cymes* shortly peduncled; pedicels 1-1½ in. *Perianth* yellowish with purple veins externally, sac 1½ in. long, tube as long golden yellow within, mouth 1 in. diam. *Capsule* 4-6 by 1-1½ in. diam., linear-oblong with 6 ribs divided by deep furrows.

6. ***A. saccata***, *Wall. Pl. As. Rar.* ii. 2, t. 103, and *Cat.* 2707; branches tomentose or glabrate, leaves ovate- or linear-oblong or linear-lanceolate acuminate base deeply cordate glabrous or puberulous above,

beneath pubescent silky or densely tomentose rarely nearly glabrous and glaucous, cymes villous with long hairs, mouth of perianth nearly circular with a narrow reflexed purple papillose border. *Duchart. in Ann. Sc. Nat. Ser. 4, ii. t. 5, 6, and in DC. Prodr. xv. 1. 436; Bot. Mag. t. 3640.* *Siphisia saccata, Klotzsch in Monatsb. Berl. Akad. 1859, 603.*

EASTERN and CENTRAL HIMALAYA; Nepal, *Wallich*; Sikkim, *J. D. H.*; Bhotan, *Griffith*. ASSAM, *Griffith*. KHASIA MTS., alt. 1-4000 ft., *J. D. H. & T. T.* SILHET, *Bruce*.

Habit and stature of *A. platanifolia*, of which *Duchartre* suggests it may be a form, but no intermediates have occurred. *Leaves* very variable in size and pubescence, largest 12 by 6 in., longest 16 by 4 in., narrowest (var. *angustifolia*, *Duchart. l. c.*) 12 by 2½ in., cordate base deep or shallow, petiole 1-2 in. *Cymes* and perianth much more villous than *A. platanifolia*.

Var.? *dilatata*, lips of perianth greatly dilated ½-¾ in. diam.—Kumaon, *Blinkworth (Wall. Cat. 2707 B)*; alt. 7-8000 ft., *Strachey & Winterbottom*.

7. **A. Cathcartii**, *Hook. f.*; branches petioles and leaves beneath densely silky villous, leaves rounded-cordate acute or ovate-lanceolate acuminate, cymes and perianth densely villous with very long spreading hairs, perianth bearded with long hairs, mouth very wide square with very broad recurved lips fringed with long purple papillose hairs. *A. saccata. var. villosa, Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA and KHASIA MTS.?, alt. 2-3000 ft., *J. D. H. & T. T.*

Habit of *A. saccata*, but leaves shorter broader with dense silky shaggy wool beneath, and a very different perianth, the tube of which is far more dilated, with a much broader square mouth. *Capsule* as in *A. saccata*.—A fine drawing of this, made by Mr. Cathcart's artists, represents so different a plant from *A. saccata*, that it can hardly be a variety.

8. **A. Griffithii**, *Hook. f. & T. in Herb. Ind. Or.; Duchart. in DC. Prodr. xv. 1. 437*; branches glabrous with villous tips, leaves broadly ovate- or orbicular-cordate acute densely tomentose beneath, flowers axillary, perianth densely pubescent, tube above the sac abruptly dilated into a hemispheric cup 3-4 in. diam. with erect margins. *Aristolochia, Griff. Notul. iv. 190, No. 1015.*

EASTERN HIMALAYA; Bhotan, alt. 8000 ft., *Griffith*; Sikkim, alt. 7-9000 ft., *J. D. H.*

A tall climber. *Leaves* 4-6 in. long and often as broad, woolly but not shaggy beneath; petiole 2-4 in. *Flowers* apparently all solitary and axillary (extra-axillary, *Griffith*); peduncle villous, 2-3 in., with one or two leafy bracts. *Perianth* uniformly closely pubescent; sac ribbed and veined; limb or cup "ochreous yellow with radiating lines of clavate red warts, throat blood-red; tube yellow and spotted red within," *Griffith*. *Capsules* 7 inches long, shortly stipitate, twisted at the base, with 6 strong ribs and as many deep furrows. *Seeds* orbicular, convex on one face, concave with a median ridge on the other.—A remarkable species. The extracts translated from *Griffith's Notulæ* must be accepted cautiously, the Latin not being very intelligible.

DOUBTFUL AND EXCLUDED SPECIES.

ARISTOLOCHIA SPECIES.—Western Himalaya; Chamba, alt. 5000 ft., *Clarke*.—A slender climber, branches puberulous, leaves shortly petioled, 4-5 by 1-1½ in., membranous lanceolate finely acuminate from a truncate or broadly cordate base, basal nerves short.—This flowerless plant referred to *Aristolochia* doubtfully by Mr. *Clarke*, and I should think correctly, is far beyond the geographic range of any other Indian species.

A. THWAITESII, *Hook. Bot. Mag. t. 4918, and under 5295*, was erroneously supposed to be a Ceylon species. Its native country is unknown.

ORDER CXXIV. PIPERACEÆ.

Herbs or shrubs, rarely subarborescent, aromatic. *Leaves* alternate opposite or whorled, often pellucid-dotted, entire; stipules 0 or 2 connate, or adnate to the petiole. *Flowers* minute, 1-2-sexual, in axillary or terminal catkin-like spikes subtended by a peltate bract. *Perianth* 0. *Stamens* 2-6, rarely 7-8, hypogynous; anthers often jointed on the filaments, bursting longitudinally, or with the cells confluent. *Ovary* 1-celled, or of 3 or more carpels free or connate below; stigmas sessile, simple or penicillate. *Ovules* 1 or more, orthotropous. *Fruit* small, of the 1-celled genera indehiscent, of the pluri-carpellar forming cocci or follicles. *Seeds* globose ovoid or oblong; testa thin, albumen copious floury; embryo minute, enclosed in a sac, radicle superior.—Genera 8, species enumerated about 1000 (probably exaggerated), chiefly Tropical American.

Tribe I. **Saurureæ**. *Ovary* of 3-4 free or connate carpels.

Stamens 3-6. *Ovary* 1-celled 1. **HOULTUYNIA**.

Tribe II. **Pipereæ**. *Ovary* 1-celled.

Anther-cells distinct. *Fruit* not minute, stigmas 3-5 confluent . 2. **PIPER**.

Anther-cells confluent. *Fruit* minute, stigma usually penicillate 3. **PEPEROMIA**.

1. **HOULTUYNIA**, *Thunb.*

Perennial herbs? *Leaves* alternate, usually cordate; stipules broad, membranous. *Spikes* terminal and leaf-opposed, peduncled, involucrate; involucre of 4-6 white petaloid bracts. *Flowers* minute. *Perianth* 0. *Stamens* 3-6; filaments below adnate to the ovary; anthers oblong. *Ovary* of 3-4 partially connate 1-celled carpels; styles free, erect, stigmatose on the inner surface; ovules many, on parietal placentas. *Fruit* subglobose, bursting between the styles. *Seeds* globose, testa membranous.—Species 2 or 3; Eastern Asiatic and Californian.

H. cordata, *Thunb. Fl. Jap.* 234, t. 26; leaves cauline cordate, bracteoles minute. *Cas. DC. in Prodr.* xvi. 1. 238; *Poir. Encycl.* ii. t. 739; *Bot. Mag.* t. 2731; *Schnizl. Icon.* t. 82; *Roxb. Fl. Ind. Ed. Wall. & Carey*, i. 360. *Polypara cochinchinensis*, *Lour. Fl. Coch.* i. 78.

TROPICAL HIMALAYA; from Garwhal to Sikkim, alt. 1-5000 ft. ASSAM and KHASIA MTS., *Griffith, &c.* DISTRIB.—Siam, China, Japan.

Rootstock creeping; stem 1-3 ft., herbaceous, erect, leafy, subsimple, angular, pubescent at the nodes. *Leaves* $1\frac{1}{2}$ - $2\frac{1}{2}$ in. long and broad, very broadly ovate-cordate, acuminate, 5-nerved, abruptly narrowed into the petiole, glabrous or nerves pubescent beneath, gland-dotted; petiole 1-2 in., base sheathing; stipules long, linear-oblong, obtuse. *Bracts* $\frac{1}{2}$ - $\frac{1}{2}$ in., rounded or oblong. *Spike* $\frac{1}{2}$ in., elongating in fruit to 1-2 in., dense-fl'd. *Stamens* 3.

2. **PIPER**, *Linn.*

Shrubs, rarely herbs or trees, with swollen nodes, often glandular and aromatic. *Leaves* entire, often unequal-sided; stipules various. *Flowers* very minute, diœcious, very rarely 2-sexual, spiked, each in the axil of a bract with or without lateral bracteoles; bracts peltate, or cupular and adnate to the rachis, sometimes decurrent on the rachis with or without raised margins; bracteoles if present forming low ridges on each side of the flower,

or connate in a semilunar form. *Perianth* 0. *Stamens* 1-4, rarely more, filaments short; anthers 2-celled, cells often confluent by dehiscence. *Ovary* 1-celled; style conic beaked or 0, stigmas 2-5; ovule solitary, erect. *Berry* ovoid or globose. *Seed* usually globose, testa thin, albumen hard.—Species described about 500 (probably greatly exaggerated), all tropical or subtropical.

A most difficult genus, Herbarium materials for the analysis of which have never been intelligently collected, whilst the descriptions of the published species are quite inadequate for their accurate determination. Wallich's Herbarium, and the diagnoses in Vahl's "Enumeratio" and in Roxburgh's "Flora Indica" form the basis of the works of the only two authors who have attempted the revision of the Indian species, namely Miquel and Casimir De Candolle. Of these Wallich's specimens are so mixed that in some cases three or four species are included under one name and number, and even on one sheet; whilst of Vahl's diagnoses not one is sufficient to identify the plant he means, and of Roxburgh's only one or two species are recognizable. Wallich, it is true, often attaches to his specimens names given by Roxburgh, but these are rarely the names that are taken up in the "Flora Indica;" or if they are, they do not apply to the plants described in that work. The only considerable collections of Indian *Piperaceæ* made since Wallich's were distributed, are Wight's Peninsular, Griffith's Transgangetic Indian, and Thomson's and my own from Sikkim, Bengal, the Khasia Mts., &c. Wight published good figures of several, but confined himself to such as were named by Miquel and to the reproduction of a few of Roxburgh's unpublished *Icones*, procured from the Calcutta Botanic Gardens. Griffith's specimens were hurriedly collected, with no attempt to match the sexes, or the flowering with the fruiting specimens, for doing which his rapid journeys precluded the possibility. Unfortunately the Ceylon peppers were not thoroughly studied by either Gardner or Thwaites, the only two botanists who had opportunities for so doing previous to Dr. Trimen's incumbency of the Botanical Gardens, and who will doubtless elucidate them. In the process of attempting (with little success, I fear) to discriminate the Indian species for this work, and to unravel their intricate synonymy, I have been much impressed by the correctness of Miquel's views as to the ordination of the species, and the skill with which he has grouped them. When he undertook to monograph the Order, the materials were very bad, were in a chaotic state of confusion, and were so scattered in the British and Continental herbaria, that he could bring no two large collections under his eye at one time. Yet he traced the outlines of a good system, gave characters to a large proportion of well-defined species, and founded genera, which though now reduced to sections of one genus are for the most part natural groups. In the discrimination and elucidation of species he was too hasty by far. For the rest I must leave the further study of the Order to local botanists in the four great centres of its Indian distribution, namely its transgangetic provinces, the South Deccan, the Malayan Peninsula, and Ceylon; in each of which the species should be examined on the spot, with a view to matching the sexes, and flowering with fruiting specimens, and to observing the transition from young to old foliage, and the effects of locality and climate on the characters of each species.

Sect. I. **Muldera**. *Spikes* solitary. *Flowers* dicæious, the males sunk in a fleshy stipitate or sessile receptacle formed of the greatly enlarged bract (and bracteoles?). *Berries* sessile; stigmas sessile.—The female plants of this section are imperfectly known, and may possibly be confounded with others.

* *Receptacle of male fl. stipitate.*

1. **P. Schizonephros**, *Cas. DC. in Prodr.* xvi. 241; quite glabrous, leaves coriaceous elliptic-lanceolate acuminate 3-nerved at the very base, male spikes hoary, receptacles distant stipitate not recurved about 8-androus. *Schizonephros glaucescens*, *Griff. Notul.* iv. 383.

MALACCA; at Ching, *Griffith*.

Branches very slender, terete, stiff; nodes much thickened. *Leaves* 3-5 by 1-2 in., base unequal; petiole stout, $\frac{1}{2}$ - $\frac{1}{2}$ in. *Spikes* 6-7 in., very slender; receptacles reniform, about $\frac{1}{10}$ in. diam., tomentose within.—*Cas. DC.* unites with this a Javan plant in fruit which is named by Junghuhu *P. Cubeba*, possibly rightly; but the leaves are more narrowed at the tip and the spike is not hoary. I have altered the misprint "*Schizonephos*" to "*-nephros*," as in *Griffith's* mss., the derivation from *νεφρός* a kidney being obvious.

2. ***P. Maingayi***, *Hook. f.*; leaves thickly coriaceous elliptic-ovate or lanceolate acuminate 5-7-nerved quite glabrous, male spikes finely tomentose, receptacles stipitate not recurved 3-5-androus.

SINGAPORE and MALACCA. *Maingay*.

Branches stout. *Leaves* 4-5 by 2-2 $\frac{1}{2}$ in., nerves prominent on both surfaces, nervules obsolete; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in. *Spikes* 1-2 in.; peduncle short. *Receptacles* of male peltate, $\frac{1}{10}$ in. diam.; of female minute, cupular. *Berry* about $\frac{1}{2}$ in. diam.—The leaf is like *P. firmum*, but the pubescent spikes very different.

3. ***P. galeatum***, *Cas. DC. in Prodr.* xvi. 242; quite glabrous, leaves thinly coriaceous elliptic-ovate or lanceolate finely acuminate 3-nerved from the very base, male spikes slender, receptacles distant stipitate recurved diandrous. *Muldera galeata* (in part), *Miquel in Hook. Lond. Journ. Bot.* v. 557. *M. Wightiana*, *Wight Ic. t.* 1943, right-hand figure only; *Miquel l. c.*

TRAVANCORE; at Courtallam, *Wight*.

Branches slender, nodes thickened. *Leaves* 3-5 by 1 $\frac{1}{2}$ -2 in., nervules distinct beneath; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in. *Male spike* 6-10 in., quite glabrous; receptacles obliquely kidney-shaped, recurved, longer than the stipes, mouth very small.—*Miquel* describes female flowers, but I find none in *Wight's* Herbarium. Some authentically-named specimens in *Arnott's* Herbarium ticketed *M. Wightiana* are identical with *galeata*.

** *Receptacle of male spikes sessile or unknown.*

4. ***P. trichostachyon***, *Cas. DC. in Prodr.* xvi. 1. 242; glabrous, leaves elliptic-lanceolate acuminate moderately coriaceous with 3 basal nerves and 2 subopposite from the midrib above them, spike stout hoary, male receptacles sessile globose diandrous. *Muldera trichostachya*, *Miquel in Hook. Lond. Journ. Bot.* v. 556; *Wight Ic. t.* 1944.

DECCAN PENINSULA; The Concan and Canara, *Stocks, &c.*; Kandella, *Dalzell*. NILGHERRY and SHEVAGHERY HILLS, *Wight*.

Stem stout, woody; branches stout or slender. *Leaves* 5-6 by 1-2 in., 2nd pair of nerves often stronger than the first, nervules slender. *Spikes* stout, 3-4 in. *Receptacles* tomentose at the mouth. *Fruit* globose, $\frac{1}{2}$ in. diam.

5. ***P. pachyphyllum***, *Hook. f.*; glabrous, leaves shortly petioled very thickly coriaceous oblong or orbicular-obovate or elliptic acute or acuminate, nerves broad faint 2-3 pairs basal and one higher up, all lost above in the thick texture of the leaf, fruiting spike very stout, sunk in the fleshy rachis.

MALACCA, *Griffith*.

Leaves 4-6 by 2-4 in., probably fleshy, pale yellowish when dry, nerves obscure; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in., very stout. *Fruiting spike* 2 $\frac{1}{2}$ in.; peduncle much longer than the petiole, very stout; rachis glabrous, bract and bracteoles forming a ring round the base of the smooth globose fruit.—I place this in *Muldera* from its resemblance to *P. Maingayi* in foliage, but which has a very different fruiting-spike. I have seen no male or female flowers.

Sect. II. **Cubeba**. *Spikes* solitary; flowers diœcious; bracts of female spikes peltate. *Fruit* contracted at the base into a pedicel.

* *Quite glabrous* (see also *P. caninum* var. *glabra*).

6. **P. ribesioides**, *Wall. Pl. As. Rar.* i. 79, t. 9, and *Cut.* 6637; quite glabrous, very robust, leaves 8–12 in. very coriaceous linear- or ovate-oblong acuminate base deeply cordate 5–9-nerved at the very base 3-nerved higher up, petiole 1–2 in., fruiting spike short stout, pedicel glabrous as long as the globose apiculate fruit. *Cas. DC. in Prodr.* 342. *Cubeba Wallichii*, *Miq. Syst. Pip.* 289, and *Ill. Pip.* 47, t. 46, 47.

TENASSERIM, *Helper, Falconer*. PENANG and SINGAPORE, *Wallich, Maingay*. BURMA; at Chappedong, *Wallich*.

A very stout climber; branches pale, as thick as a goose-quill, deeply furrowed when dry. *Leaves* variable, sometimes 5 in. broad, basal sinus 1–1½ in. deep, lobes rounded equal or not; nerves very strong beneath, nervules slender; petiole very stout; young leaves small, lanceolate, subsagittately cordate. *Spikes* 1–3 in.; bracts short coriaceous, rachis of spike stout rigid; bracteoles together semilunar. *Fruit* ½ in. diam.

7. **P. sumatranum**, *Cas. DC. in Prodr.* xvi. 1. 343; quite glabrous, very robust, leaves 8–12 in. very coriaceous oblong or linear-oblong acuminate 5–7-nerved at the very shortly cordate base and 3-nerved higher up, petiole 1–1½ in., fruiting spike 2–3 in. very stout, pedicel glabrous as long as the globose apiculate fruit is broad. *Cubeba sumatrana*, *Miq. Comm. Phyt.* 42, t. 5 a; *Syst. Pip.* 290, and in *Fl. Ind. Bat.* i. 2. 448, and *Suppl.* 186. *P. pedicellosum*, *Wall. Cat.* 6646 B?

TENASSERIM and ANDAMAN ISLANDS, *Helper*. PENANG, *Wallich*. SINGAPORE, *Maingay*.—DISTRIB. Sumatra.

Very closely allied to *P. ribesioides*, and perhaps only a state of that plant, which the fruit entirely resembles, but the leaves are narrower, more contracted at the base, with a very small short sinus. The male flowers are unknown in both. Possibly they are both large forms of *P. Cubeba*, L. fil.

8. **P. pedicellosum**, *Wall. Cat.* 6646 A; quite glabrous, robust, leaves 2–4 in. very coriaceous elliptic or ovate-cordate obtuse 5–7-nerved near the base, petiole ¼–½ in., fruiting spikes 1–1½ in. very stout, pedicel hoary as long as the subovoid obtuse fruit. *Cas. DC. in Prodr.* xvi. 1. 343. *Cubeba Neesii*, *Miq. Syst. Pip.* 292, and *Fl. Ind. Bat.* i. 2. 449.

SINGAPORE, *Wallich*.

This resembles *P. Cubeba*, Linn. f., but has hoary pedicels of the fruit. The smaller leaves, short petiole, and fruit, distinguish it from *P. ribesioides* & *sumatranum*.

9. **P. Griffithii**, *Cas. DC. in Seem. Journ. Bot.* 1866, 163, and in *Prodr.* xvi. 1. 343; quite glabrous, branches slender, leaves thinly coriaceous ovate or elliptic 3–5-nerved at the base and 3-nerved higher up, fruiting spikes 6–8 in., pedicels slender longer than the very small globose fruit.

ASSAM, *Masters, Griffith*.

Branches terete or obscurely furrowed when dry. *Leaves* 4–6 by 2–3½ in., base rounded or subacute; nerves very slender, nervules faint; petiole ¼–½ in. *Female spikes* slender; bracts obscure in fruit, cup-shaped, adnate to the glabrous rachis, bracteoles short. *Fruits* numerous, globose, ⅓ in. diam.

** *Leaves more or less pubescent beneath* (glabrous in vars. of *P. caninum*).

10. **P. caninum**, *Blume in Verh. Batav. Genoots.* xi. 214, f. 26, and *Enum. Pl. Jav. fasc.* 1. 72; hirsute pubescent or glabrate, branches slender terete, leaves petioled membranous ovate ovate-cordate or lanceolate acuminate rarely elliptic-lanceolate 3-5-nerved towards the base, male spikes slender, fruiting slender, fruit very small, pedicel sometimes very short. *Cas. DC. in Prodr.* xvi. 1. 341. *P. Cubeba*, *Vahl Enum.* i. 332; *Roxb. Fl. Ind.* i. 159; *Ed. Carey & Wall.* i. 161; *Wall. Cat.* 6645; *Nees Plant. Med.* t. 22. *Cubeba canina*, *Miq. Comm. Phyt.* 33, t. 3; *Syst. Pip.* 293, and *Fl. Ind. Bat.* i. 2. 449, and in *Ann. Mus. Lugd. Bat. fasc.* v. 137.

TENASSERIM (or Andaman Islands?), *Helper*. MALACCA, *Griffith*, *Maingay*. PENANG, *Wallich*.—DISTRIB. Malay Islands.

A rambling climber, more or less hirsute with flaccid hairs, rarely quite glabrous. *Leaves* 2-4 by $1\frac{1}{2}$ -2 in., usually broadest at the base which is rarely unequal-sided, nerves slender; petiole $\frac{1}{4}$ -1 in., slender. *Male spikes* 2-3 in.; bracts adnate by a broad base, stamens 2, anther-cells distinct. *Fruiting spike* $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; peduncle slender; bracts peltate, villous. *Fruit* $\frac{1}{8}$ in. diam., pedicel variable in length, always shorter than the fruit.

P. caninum proper; branches glabrate, except the younger, leaves glabrous above, finely pubescent beneath.

Var. glabra; leaves quite glabrous.—Tenasserim (or Andaman Islands), *Helper*.

Var. lanceolata; leaves elliptic-lanceolate finely acuminate very sparsely hairy beneath, pedicel of fruit very short. *P. Lonchites*, *Wall. Cat.* 6644 B, *in part* (the centre plant of the four on the sheet). Penang, *Wallich*.—*Wallich* tickets this *P. lanceolatum*, *Roxb.*, but *Roxburgh's* plant of that name is, I think, clearly *P. miniatum*.

Var. angustifolia, *Miq. mss.*; leaves smaller linear-lanceolate 2-2 $\frac{1}{2}$ by $\frac{1}{2}$ - $\frac{2}{3}$ in. nearly glabrous.—Malacca, *Maingay* (*Kew Distrib.* 1333/4).—This appears the same as *Zollinger's* No. 698 f. from Java, named *Cubeba canina* var. *angustifolia*, *Miq. Mant. Pip.*

Var. lanata; branches and leaves beneath hirsute. *P. lanatum*, *Roxb. Fl. Ind.* i. 159; *Ed. Carey & Wall.* i. 161; *Wall. Cat.* 6647; *Cas. DC. in Prodr.* xvi. 1. 341. *P. Lonchites*, *Wall. Cat.* 6644 A, *in part*. *P. Cubeba*, *Wall. Cat.* 6645 (not of *Linn. f.*). *P. javanicum*, *Cas. DC. l. c.* 343. *Cubeba lanata*, *Miq. Syst. Pip.* 298, and *Fl. Ind. Bat.* i. 2. 450. *C. Lowong* var. *quintuplinervis*, *Miq. l. c.* 298.—Penang, *Wallich*.

Var. ? Thwaitesii; branches glabrous, leaves ovate-lanceolate glabrous or sparsely pubescent beneath, fruiting spikes nearly glabrous, fruit very shortly pedicelled. *P. arcuatum*, *Thwaites Enum.* 293, *in part* (not of *Blume*). *P. arborescens*, *Thwaites l. c.* (not of *Roxb.*). *P. Thwaitesii*, *Cas. DC. l. c.* 357. *P. bantamense*, *Cas. DC. l. c.* 362 (the Ceylon plant only).—Ceylon, *Thwaites* (*C. P.* 35 *in part*, and 2178).

11. **P. muricatum**, *Blume in Verh. Batav. Nat. Genoots.* xi. 219, f. 1, and *Enum. Pl. Jav. fasc.* i. 68; branches stout hirsute or glabrate, leaves large membranous elliptic or elliptic-oblong acuminate 7-9-nerved sparsely hairy above tomentose beneath, female spike 5-6 in. stoutly pedicelled tomentose, rachis stout, bracts peltate, fruit sessile and pedicelled. *Miquel Syst. Pip.* 326; *Ill. Pip.* 55, t. 55, *in Hook. Lond. Journ. Bot.* iv. 438, and *Fl. Ind. Bat.* i. 2. 2454; *Cas. DC. in Prodr.* xv. 1. 341. *P. birmanicum* β . *macrostachyum*, *Cas. DC. l. c.* 338.

MALACCA, *Griffith*.—DISTRIB. Sumatra, Java, Borneo.

Stem evidently stout and soft; branches as thick as a goose-quill, roughly hairy. *Leaves* 6-9 by 3 $\frac{1}{2}$ -6 in., base rounded or subcordate rarely subacute, equal or unequal; petiole $\frac{1}{2}$ -3 in. *Spike* 1-2-sexual, erect or drooping; peduncle $\frac{1}{2}$ in.; bracts glabrous above, subsessile, orbicular. *Fruit* unripe on thick pedicels, many imperfect, the pedicel being truncate. "*Seed*, subglobose," *Miquel*.—The leaves are most variable in form and pubescence.

Var. *glabrata*; branches glabrous below, above hispid, as are the petioles peduncles and leaf-nerves beneath.—Mishmi Hills in Upper Assam, *Griffith*.

Sect. III. **Chavica**. Spikes solitary; flowers diœcious. Bracts orbicular, peltate. Fruit very small, in dense cylindric rarely globose spikes, sessile.

* Fruiting spikes much longer than broad. Stigma sessile.

† Leaves quite glabrous (see also 23. Hapnium) sometimes slightly pubescent in *P. sylvaticum*.

12. **P. longum**, Linn. *Sp. Pl.* 29; glabrous, branches soft angular and grooved when dry, lower leaves long-petioled ovate-cordate upper narrower oblong-cordate sessile amplexicaul, fruiting spikes short suberect. *Cas. DC. in Prodr.* xvi. 1. 355; *Vahl Enum.* i. 334; *Roxb. Fl. Ind.* i. 156, and *Ed. Carey & Wall.* i. 156; *Grah. Cat. Bomb. Pl.* 199; *Dalz. & Gibs. Bomb. Fl. Suppl.* 84; *Wall. Cat.* 6640; *Nees Med. Bot.* t. 23; *Woodv. Med. Bot.* iv. t. 247; *Bentl. & Trim. Med. Pl.* iii. t. 244. *P. sarmentosum*, Wall. *Cat.* 6641. *P. latifolium*, Hunter in *As. Research.* ix. 390. *Chavica Roxburghii*, *Miq. Syst. Pip.* 239, *Ill. Pip.* 35, t. 30, and *Fl. Ind. Bat.* i. 2. 440; *Hayne Arnz. Gewachs.* xiv. t. 20; *Wight Ic.* t. 1923. *C. sarmentosa*, *Miq. in Hook. Lond. Journ. Bot.* iv. 433, v. 531 (not of *Syst. Pip.*?).—*Rheede Hort. Mal.* vii. 27, t. 14.

Hotter provinces of India, from EAST NEPAL to ASSAM, the KHASIA MTS. and BENGAL, westward to BOMBAY, and southward to TRAVANCORE, CEYLON and MALACCA, wild or cultivated.—DISTRIB. Malay Islands.

Stems creeping below; "young shoots downy, branches prostrate or creeping with broad leaves, flowering shoots erect," *Roxb. Lower leaves* 2-3 in., often rounded-ovate, acuminate, 7-nerved, sinus rounded but narrow, basal lobes equal; petiole 1-3 in.; upper leaves much narrower, with often unequal basal lobes. Male spikes 1-3 in.; female $\frac{1}{2}$ - $\frac{3}{4}$ in. Fruit about $\frac{1}{10}$ in. diam.—The Malabar plant referred to *P. sarmentosum* by Miquel (*Lond. Journ. Bot.* l. c.), and a Malacca one so named by him, seem to me undistinguishable from *P. longum*, and I doubt *sarmentosum* being a distinct species. Of the Mergui *P. sarmentosum* (*Fl. Ind. Bat.*) I have seen no specimens. Wallich's *P. sarmentosum* (No. 6641) has broader upper leaves, and is perhaps the true plant. He is the authority for referring Hunter's *P. latifolium* to it.

13. **P. peepuloides**, *Roxb. Fl. Ind.* i. 159, and *Ed. Carey & Wall.* i. 158; glabrous, branches slender rigid terete often warted, leaves membranous shortly petioled very uniform oblong linear- or ovate-oblong caudate-acuminate, base rounded 3-5-nerved nearly to the tip, fruit minute. *Wall. Cat.* 6650 A. *P. brachystachyum*, *Wall. Cat.* 6656, in part. *Chavica peepuloides*, *Miq. Syst. Pip.* 237; *Cas. DC. in Prodr.* xvi. 1. 389. *C. Neesiana*, *Miq. l. c.* 249.

TROPICAL HIMALAYA; from Nepal, Wallich, to Bhotan, Griffith. ASSAM, SILHET and the KHASIA MTS., common, ascending to 3000 ft. CHITTAGONG, *J. D. H. & T. T.*

A slender bush, climbing below with free spreading slender branches. Leaves 2-5 by 1-2 in., variable in breadth, sometimes narrowed to a minutely cordate base; petiole of upper leaves $\frac{1}{2}$ - $\frac{1}{4}$ in., of lower rarely $\frac{1}{2}$ in. Male spikes slender, 2-3 in., clothed with peltate bracts; stamens 2-4; female $\frac{1}{2}$ - $\frac{3}{4}$ in., cylindric, longer than their peduncle. Fruit $\frac{1}{10}$ in. diam.—The branches are frequently warted as in *P. brachystachyum*, to which this is most closely allied.

14. **P. Chaba**, Hunter in *As. Research.* ix. 391 (not of Blume); quite glabrous, stem stout climbing and rooting, leaves very short-petioled rather

coriaceous oblong-ovate or lanceolate acuminate 3-5-nerved at the very obliquely cordate auricled base penninerved above it, fruiting spike stoutly peduncled suberect conico-cylindric. *Roxb. Fl. Ind.* i. 156, and *Ed. Carey & Wall.* i. 158. *P. maritimum*, *Blume Herb. Lugd. Bat.* *P. longum*, *Blume Verh. Bat. Genoots.* ix. 197, and *Enum. Pl. Jav.* i. 70 (*excl. various syn.*). *P. callosum*, *Opiz in Reliq. Hænk.* iii. 152. *P. officinarum*, *Cas. DC. in Prodr.* xvi. 356. *P. Arnottianum*, *Cas. DC. l. c. excl. syn.* *P. glabrum*, *Roxb. Ic. pict. ined.* *P. peepuloides*, *Wall. Cat.* 6650 E, F. *Chavica officinarum*, *Miq. Syst. Pip.* 256, *Ill. Pip.* 39, t. 34, and *Fl. Ind. Bat.* i. 2. 444; *Hayne Arnz. Gewachs.* xiv. t. 21. *C. maritima*, *Miq. Syst.* 262. *C. peepuloides*, *Wight Ic.* t. 1927 (*not of Roxb.*).—*Rumph. Herb. Amb.* v. 333, t. 116, f. 1.

Cultivated in various parts of INDIA and the Malay Islands.

Branches flexuous, terete, hard, finely striate when dry, pale. *Leaves* 5-7 by $2\frac{1}{2}$ - $3\frac{1}{2}$ in., rather shining above, pale when dry, base very variable, nerves 3-6 pair above the 3-5 basal; nervules arching; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Fruiting spikes* 1-2 in. long, $\frac{1}{2}$ in. diam., broadest at the base, obtuse, forming a fleshy cone of innumerable fruits $\frac{1}{4}$ in. diam.—The alternate nerves of the main portion of the leaf, all starting from the midrib, are very characteristic of this species. I have seen no certain male fl. Rumph's figure, quoted by Hunter, is very characteristic of the venation above the base, but it omits the basal nerves.

15. ***P. sylvaticum***, *Roxb. Fl. Ind.* i. 156, and *Ed. Carey & Wall.* i. 158; glabrous, stem flaccid creeping angular and furrowed when dry, leaves membranous long-petioled broadly ovate or ovate-cordate acuminate 5-7-nerved from the base or the inner pair higher inserted, upper leaves elliptic or oblong-lanceolate shorter petioled, male spikes 2-3 in. slender, fruiting female short erect $\frac{3}{4}$ -1 $\frac{1}{2}$ in., fruit free. *Cas. DC. in Prodr.* xvi. 1. 355; *Wall. Cat.* 6653 A, B. ? *P. Betle*, *Wall. Cat.* 6652 C. *P. Malamiri*, *Roxb. ex Wall. Cat.* 6642 A (*not of Roxb.*). *Chavica sylvatica*, *Miq. Syst. Pip.* 248; *Wight Ic.* t. 1930.—*Chavica*, No. 19, *Herb. Ind. Or. Hook. f. & T.*

Upper and lower ASSAM, *Masters, Griffith, &c.* Jheels of BENGAL, *J. D. H. & T. T.* (? NEPAL) and AVA, *Wallich.* TENASSERIM; at Mergui, *Griffith.*

A low creeping species; stems succulent, several feet long, contracting much in drying; branches short, erect, or ascending, flexuous. *Leaves* rarely puberulous on the nerves beneath, lower 3 by $2\frac{1}{2}$ -3 in., nerves slender; upper as long but narrower; petiole of lower 2-4 in. *Spikes* shortly peduncled; males as in *P. peepuloides*, but bracts larger; stamens generally 4 (*Roxburgh*, I find 2); anthers reniform, cells confluent, dehiscing over the crown, female always erect. *Fruit* $\frac{1}{2}$ - $\frac{1}{3}$ in. diam.—A very distinct species, something like *P. attenuatum* with more the habit of *P. longum*; it is probably not uncommon in marshy districts. It may be *Roxburgh's P. Malamiri*, as *Wallich's* ticket says; but the original of *P. Malamiris* of Linnæus (*Sp. Pl. Ed.* i. p. 29) consists of a mixture of plants, for which he cites the *Flora Zeylanica*, *Plukenet*, and the *Amalago* of *Rheede*, giving as the native country both the East and West Indies.

16. ***P. petiolatum***, *Hook. f.*; quite glabrous, branches stout, leaves large long-petioled thinly coriaceous rounded-ovate acuminate 7-nerved nervules arching, fruiting peduncle very short spike short cylindric. *Chavica petiolata*, *Cas. DC. in Prodr.* xvi. 1. 389 (*excl. the Khasian plant*).

UPPER ASSAM; Mishmi Hills, *Griffith.*

There are only 2 specimens, both in fruit; each consists of a stout branch 6 in. long and with 4 leaves, each 6 by 3 $\frac{1}{2}$ -5 in. with rounded bases, opaque above with the nerves obscure, the latter strong beneath, connected by the arching venules; fruiting spike 1-1 $\frac{1}{2}$ in.; fruit globose, $\frac{1}{4}$ in. diam., yellow.

17. **P. Betle**, Linn. *Sp. Pl.* 28; quite glabrous, or with the petioles puberulous, stem and branches stout climbing compressed when dry, leaves large coriaceous petioled obliquely ovate-oblong or rounded ovate-cordate 5-7-nerved, base often unequal, petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in., male spikes 3-6 in., female long-peduncled, fruiting stout 1-5 in. pendulous. *Hunter in As. Res.* ix. 390; *Vahl Enum.* i. 328; *Roxb. Fl. Ind.* i. 158, and *Ed. Carey & Wall.* i. 166; *Dalz. & Gibs. Bomb. Fl. Suppl.* 89; *Wall. Cat.* 6652 A; *Bot. Mag.* t. 3132; *Cas. DC. in Prodr.* xvi. 1. 359; *Burm. Fl. Ind.* 14, and *Fl. Zeyl.* t. 82, f. 2. *P. Siriboa*, Linn. *Sp. Pl.* 29; *Hunter l. c.* 391; *Vahl l. c.* 332. *P. Betle* var. *Siriboa*, *Cas. DC. l. c.* *P. peepuloides*, *Wall. Cat.* 6650 C. *P. Chavya*, *Ham.*; *Cas. DC. l. c.* *Chavica Betle*, *Miq. Syst. Pip.* 224, and *Fl. Ind. Bat.* i. 2. 439; *Wight Ic.* t. 2926. *C. Siriboa*, *Miq. l. c.* 228, in *Hook. Lond. Journ. Bot.* iv. 433, and in *Fl. Ind. Bat.* i. 1. 438; *Thwaites Enum.* 292. *C. Chuyva*, *Miq. Syst. Pip.* 267, and *Ill. Pip.* 42, t. 39.—*Rheede Hort. Mal.* vii. 29, t. 15.

Cultivated in the hotter and damper parts of INDIA and CEYLON, and in the Malay Islands.

Apparently a larger and stouter plant than the other species of this section, with more coriaceous usually broadly ovate leaves, sometimes 4-5 in. diam.; spikes longer and longer-peduncled; fruit $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., very fleshy and often confluent into a cylindric fleshy red mass. *P. Chuyva* and *Siriboa* are, I suppose, large-leaved cultivated forms; the latter is described as having pubescent young leaves, which I do not observe, though the petioles are sometimes, but not always, puberulous.

18. **P. miniatum**, *Blume in Verh. Bat. Genoots.* xi. 166, and *Enum. Pl. Jav. fasc.* i. 65; quite glabrous, branches rigid terete, nodes much swollen, leaves very shortly petioled large coriaceous elliptic-oblong or lanceolate caudate-acuminate 5-nerved from the very base, spikes very long erect most dense-flid., fruit very minute. *Cas. DC. in Prodr.* xvi. 1. 354. *P. auriculatum*, *Blume ll. c.* 171 and 66. *P. glandulosum*, *Opiz in Presl. Rel. Hænk.* 158. *P. arborescens*, *Wall. Cat.* 6648 A. *P. lanceolatum*, *Rorb. Fl. Ind.* i. 159. *P. Lonchites*, *Wall. Cat.* 6644 A, the two upper specimens only. *P. moluccanum*, *Spreng. Syst. Veg.* i. 112. *Chavica miniata*, macrostachya & ? lanceolata, *Miq. Syst. Pip.* 234 and 236, *Ill. Pip.* 32, 33, t. 28, 29, and *Fl. Ind. Bat.* i. 2. 440. ? *C. lanceolata*, *Miq. Syst. Pip.* 264, and *Fl. Ind. Bat.* i. 1. 445. *Cubeba macrostachya*, *Miq. Comm. Phyt.* 38.

MALACCA, *Griffith (Kew Distrib.* 1327). SINGAPORE, *Lobb.* PENANG, *Wallich.*—DISTRIB. Java, Banda, Philippines.

Branches as thick as a crow-quill, very hard and smooth. Leaves 3-7 by $1\frac{1}{2}$ -3 $\frac{1}{2}$ in., rigid, shining above, base nearly equal, nerves stout, nervules transverse; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. Spikes most dense-flid. of any Indian species; fruiting $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., tapering from the base; bracts minute, peltate, hairy; stamens 3. Fruit $\frac{1}{20}$ in., ellipsoid; stigmas 3.—Miquel describes a Sumatran variety with hairy shoots and nerves beneath. *llis C. lanceolata* is a very doubtful plant.

19. **P. bœhmeriæfolium**, *Wall. Cat.* 6654 A; tall, quite glabrous, branches subterete when dry, often warted, leaves membranous very shortly petioled or the upper sessile obliquely oblong or linear-oblong acuminate often narrowed at the very unequal almost auricled base 5-7-nerved, nerves distant, male and female spikes 3-6 in., peduncles slender much longer than the petioles. *Cas. DC. in Prodr.* xvi. 1. 348. *Chavica bœhmeriæfolia*, *Miq. Syst. Pip.* 265, and *Ill. Pip.* 41, t. 37.

TROPICAL EASTERN HIMALAYA; Sikkim, ascending to 5000 ft., *J. D. H. Bhotan, Griffith.* ASSAM, SILHET and the KHASIA MTS., *Wallich, &c.* PEGU, *Kurz.* TENASSERIM, *Parish.*—DISTRIB. Ava.

Branches not stout, rather soft. Leaves very variable, in the typical form

(Wallich's) 6-7 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., broadest above the middle with narrow unequal 'sides; in some Khasian specimens much broader and larger, 8-9 by $5\frac{1}{2}$ in.; in Sikkim and Bhotan ones much smaller and more symmetrical, 3-3 $\frac{1}{2}$ by 2-3 in.; petiole rarely $\frac{1}{2}$ in. *Spikes* flexuous; bracts of male pedicelled, the pedicel sometimes elongate; anthers 2 sessile 2-celled. *Fruit* $\frac{1}{8}$ in. diam.—The long peduncles at once distinguish this from *P. peepuloides*, which is included with it under Wallich's No. 6654.

20. ***P. pothiforme***, *Wall. ex Cas. DC. in Prodr.* xvi. 1. 351; tall, quite glabrous, leaves membranous petioled 7-9 by 3 in. linear-oblong acuminate base oblique cordate, nerves 5 of which 3 run to the tip, fruiting spike 3 in., rachis and fruits coalescing into a fleshy cylindric mass 1 in. diam. *P. pothoides*, *Wall. Cat.* 6639 B?

BURMA; at Chappedong, *Wallich*.

Habit of the large forms of *P. bæhmeriaefolium*, but the petioles are longer and the fruiting spike very different. Wallich's specimen is the only one known.

†† *Leaves more or less pubescent.* (See also 15. *sylvaticum*.)

21. ***P. anisotis***, *Hook. f.*; branches densely shortly tomentose, leaves membranous subsessile obliquely oblong acuminate from a very unequal auricled base 5-7 nerved from the very base, sparsely hairy above beneath rusty tomentose on the veins especially, fruiting spikes $\frac{1}{2}$ in.

UPPER ASSAM; Thaumathaya, in the Mishmi Hills, *Griffith*.

Habit of the branches of *P. longum*, but the leaves are more unequal-sided and more cordate. *Leaves* 3-5 by $1\frac{1}{2}$ -2 in., very thin, finely acuminate, nerves slender, nervules transverse. *Fruiting spikes* cylindric, like those of *P. peepuloides*; peduncle hispidly hairy, slender; bracts minute, peltate. *Fruit* about $\frac{1}{8}$ in. diam.

22. ***P. aurantiacum***, *Wall. Cat.* 6658 A; stems climbing and rooting glabrous, leaves all petioled coriaceous ovate elliptic- or orbicular-ovate caudate-acuminate 5-nerved hairy or glabrate beneath base rounded or acute, spikes $1\frac{1}{2}$ -3 in., stigmas very minute, young fruit angular ripe globose. *Cas. DC. in Prodr.* xvi. 1. 357. *Chavica Wallichii*, *Miq. Syst. Pip.* 254, and *Ill. Pip.* 38, t. 33, and *Fl. Ind. Bat.* i. 2. 143.

NEPAL; at Sheopore, *Wallich*. ASSAM, from Suddya and elsewhere, *Griffith*.

A rather stout climber, of a yellowish colour when dry; branches not hard or woody, glabrous. *Leaves* or young trailing shoots with petioles 2-3 in. long; leaves on the main stem and branches 3-4 in. long, with petioles $\frac{3}{4}$ -1 in., upper surface almost shining; nerves very slender above, strong beneath; nervules indistinct on both surfaces. *Spikes* drooping, peduncle of both sexes about as long as the petioles; flowers densely crowded; bracts peltate, quite glabrous; stamens 2, anthers reniform, cells confluent dehiscing across the tip; fruiting spikes variable in length. *Fruit* distinctly pyramidal when young and dry, when ripe about $\frac{1}{2}$ in. diam., not so crowded as usual in the section from many not ripening. It is curious that this very distinct species has not been collected in Sikkim or Bhotan.

23. ***P. Hapnium***, *Ham. in Wall. Cat.* 6650 D; climbing, branches stout rooting warted below, leaves petioled rugose oblong or oblong-lanceolate acuminate 7-nerved above the base nerves beneath pubescent or glabrate, base very unequal auricled on one side, peduncles longer than the leaves, fem. spikes short cylindric. *P. Siriboa*, *Herb. Heyne in Wall. Cat.* 6651 B. *P. nigrum*, 6643 C, the centre specimen only. *Chavica Arnotiana*, *Miq. Syst. Pip.* 268, and *Ill. Pip.* 43, t. 40 (not *P. Arnottianum*, *Cas. DC.*).

TRAVANCORE, *Heyne*; Courtallam, *Wight*. "Phuranbari," *Hamilton*.

Branches hoary; warts minute. *Leaves* 3-4 by $1\frac{1}{2}$ -2 in., the older ones very

rugosely reticulated, basal auricle sometimes incurved and overlapping the petiole, at others absent, nerves impressed above; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., slender. *Female spike* young, $\frac{3}{4}$ in. long; peduncle as long hoary.—An obscure but very distinct plant, of which the specimens are insufficient. Miquel unites with it Wallich's 6651 A (P. Chuvya, Hunter?), which is a Siam plant collected by Finlayson and is quite different, having glabrous leaves; it is in too imperfect a state for determination. Cas. De Candolle quotes *Chavica Arnottiana*, Miquel, and Wall. Cat. 6651 A, B, under his *P. Arnottianum*, but describes from Wall. Cat. 6650 E, F, which are unquestionably *P. Chaba*. I do not know where Phuranbari, Hamilton's habitat, is

** Fruiting spikes globose. Stigmas sessile.

24. **P. brachystachyum**, Wall. Cat. 6656, *in part*; quite glabrous, branches slender rigid lower warted, leaves petioled thinly coriaceous elliptic-lanceolate or -ovate obtusely caudate-acuminate 5-nerved, base acute, fruiting spike globose very shortly peduncled. *P. vasculosum*, Wall. Cat. 6660. *P. Mullesua* & Guigual, *Don Prodr.* 20; *Cas. DC. in Prodr.* xvi. 1. 338, 339. *Chavica sphærostachya*, *Miq. Syst. Pip.* 279, *Ill. Pip.* 44, t. 42, 43, *in Hook. Lond. Journ. Bot.* v. 551, and *Fl. Ind. Bat.* i. 2. 446, t. 27 B, *excl. var. β*; *Cas. DC. in Prodr.* xvi. 1. 388; *Wight Ic.* t. 1931. *C. Mullesua* & Guigual, *Miq. Syst. Pip.* 280.

SUBTROPICAL HIMALAYA; from Simla to Bhotan, alt. 2–5000 ft. KHASIA MTS., alt. 3–5000 ft. NILGHIRI HILLS, alt. 5000 ft., *Noton*, &c.

A much-branched twiggy shrub, 5–6 ft. high; branches terete, woody. *Leaves* membranous, rarely coriaceous, 3–7 by 1–3 $\frac{1}{2}$ in., nerves strong beneath, nervules transverse; petiole slender, $\frac{1}{4}$ – $\frac{1}{2}$ in.; young leaves in Kumaon specimens are rounded-cordate. *Male spikes* only seen on Nilghiri specimens, 2–3 in., slender, drooping; bracts minute, peltate; stamens 2; anthers reniform, cells confluent, dehiscing across the tip. *Female spikes* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., rachis pubescent. *Fruit* $\frac{1}{10}$ in. diam.; stigmas 3, very minute.—Only to be distinguished from *P. peepuloides* by the globose fruiting spikes, having like it the frequently warted branches. Amongst a host of specimens I have not one collected as male in the Himalaya, and suspect that the males are mixed up with those of *P. peepuloides*, *hasianum* and *nepalense*, which are often undistinguishable in young foliage.

Var. rhombica; leaves more coriaceous rhombic-ovate 7-nerved, fruiting spikes larger, $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.—Assam, mouth of the Now Dihong River, *Griffith*.

25. **P. Thomsoni**, *Hook. f.*; scandent, quite glabrous, branches stout herbaceous, leaves long-petioled ovate-oblong, or -lanceolate acuminate 5-nerved at the rounded or cordate often oblique base, fruiting spike shorter than its peduncle subglobose. *Chavica Thomsoni*, *Cas. DC. in Prodr.* xvi. 1. 389. *C. petiolata*, *Cas. DC. l. c.*, the *Khasian specimen*.—*Chavica* No. 18, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 7000 ft., *Treutler*. KHASIA MTS., alt. 3–4000 ft., *J. D. H. & T. T. Cachar*, *Keenan*.

Branches as thick as a crow-quill and more, rooting at the nodes, not woody, black when dry. *Leaves* 4–7 by 2 $\frac{1}{2}$ –3 $\frac{1}{2}$ in., thick, nervules indistinct; petiole 1–2 $\frac{1}{2}$ in. *Male spikes* 1–2 in., bracts peltate. *Fruiting spikes* very young, $\frac{1}{2}$ in.—A very distinct-looking species, I think, but hardly in condition for description; the fruiting spikes are too young to judge of their mature form.

*** Fruiting spike long or short. Ovary produced into a distinct style. RHYNCHOLEPIS, *Miq.*

26. **P. rostratum**, *Roxb. Fl. Ind.* i. 160, and *Ed. Carey & Wall.* i. 163; stem erect, branches petioled leaves beneath and peduncles roughly tomentose, leaves large membranous shortly petioled oblong orbicular or somewhat

fiddle-shaped acuminate 7-nerved at the rounded or cordate often unequal base, peduncle short, fruiting spikes short cylindric, style elongate. *Cas. DC. in Prodr.* xvi. 1. 377; *Miq. Syst. Pip.* 284, and *Fl. Ind. Bat.* i. 2. 447. *P. stylosum*, *Miq. in Ann. Mus. Bot. Lugd. Bat.* i. fasc. 5, 139; *Cas. DC. l. c.* 344. *P. birmanicum*, *Cas. DC. l. c.* 338, *excl. var. β.* *Rhyncholepis*? *Roxburghii*, *Miq. Syst. Pip.* 284, and *Fl. Ind. Bat.* i. 2. 447.

MALACCA, *Griffith*. SINGAPORE, *Maingay*.—DISTRIB. Sumatra.

Stem 18 in. from a creeping stock, rusty-tomentose, suberect, dichotomously branched, lower nodes thickened. *Leaves* 5–7 by 2–4 in., base usually narrowed, glabrous or puberulous above, nerves slender; petiole stout, $\frac{3}{8}$ – $\frac{1}{2}$ in. *Male spikes* not seen. *Fruiting spikes* $\frac{1}{2}$ –1 in. long; peduncle very short; bracts orbicular. *Fruit* globose, $\frac{3}{8}$ – $\frac{1}{2}$ in. diam.; style very variable in length, as long as the fruit or shorter.—I have not seen authentic specimens of Roxburgh's *P. rostratum*, but there seems no reason to doubt that Miquel's *P. stylosum* is the same.

27. ***P. penangense***, *Cas. DC. in Prodr.* xvi. 1. 353; erect, quite glabrous, branches terete, leaves petioled membranous oblong or ovate-lanceolate caudate-acuminate 5-nerved, base acute or subacute, peduncle equalling the very short fruiting-spike, style elongate. *P. Lonchites*, *Wall. Cat.* 6644 B, in *Herb. Hook. only*. *Chavica penangensis*, *Miq. Syst. Pip.* 279, and *Ill. Pip.* 45, t. 44 (not *Miq. in Hook. Lond. Journ. Bot.*).

PENANG, *Wallich*. SINGAPORE? *Lobb*.

A shrub; branches hard, smooth. *Leaves* 3–5 by $1\frac{1}{2}$ –2 in., nerves slender, alternate, bases rather distant; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Female spikes* $\frac{1}{2}$ in. or less, peduncle slender; bracts peltate. *Fruits* few $\frac{1}{10}$ – $\frac{1}{8}$ in. diam. globose, styles slender equalling their diameter.—Miquel cites *Wall. Cat.* 6642 B for this, no doubt a mistake for 6644 B, which, however, he must have taken from the Hookerian Herbarium, as there is no specimen at all of this species in the Linnean Society's, where 6642 B is *P. attenuatum*.

Sect. IV. ***Pseudochavica***. *Spikes* solitary; flowers diœcious. *Fruits* forming a loose interrupted spike, usually much larger than in Sect. *Chavica*; fruits and stigmas sessile. *Bracts* peltate, orbicular, margins free all round.

28. ***P. Hamiltonii***, *Cas. DC. in Prodr.* xvi. 1. 359, *in part*; quite glabrous, shrubby, branches finely striate, leaves petioled coriaceous elliptic or almost rounded obtuse or subacute 5–7-nerved from above the base, bracts orbicular ciliate, fruiting spikes slender, fruit ovoid. *P. plantagineum*, *Herb. Ham. in Wall. Cat.* 6659 A, B *in part*. *P. Betle*, *Wall. Cat.* 6652 B, *the two left-hand specimens only*; *Cas. DC. l. c.* p. 359, *in part*; *Miq. Syst. Pip.* 229, *in part*.

SIKKIM TERAI, J. D. H. ASSAM, *Simons*. SILHET and KHASIA MTS., *Wallich*, &c. CHITTAGONG; at Seetakoond, J. D. H. & T. T.

Stem stout, flexuous, scandent and rooting below; branches subterete or angular. *Leaves* remarkably uniform, 2–3 by 1–2 $\frac{1}{2}$ in., pale when dry, nerves strong, nervules transverse, base nearly equal, never cordate; petiole $\frac{1}{2}$ –1 in. *Male spikes* slender, $1\frac{1}{2}$ –3 in.; flowers 2–3-androus. *Fruiting spikes* 4–6 in., flexuous; peduncle $\frac{1}{2}$ in., slender; rachis glabrous, except the ciliate pits.—This is one of the most constant of Indian species in the form of the leaf. The name *P. plantagineum*, Hamilton, has been overlooked by Miquel and *Cas. DC.*, though the type of Wallich's No. 6659. *Cas. DC.* has described with *P. Hamiltonii* Wallich's 6659 C (misprinted G), which is a very different plant, with caudate-acuminate leaves, and is referred by Miquel (*Syst.* 225) to *Chavica Siriboa*. It is, I think, neither *Hamiltonii* nor *Siriboa*, and is in too young a condition of flowering to determine.

29. ***P. Hookeri***, *Miq. in Hook. Lond. Journ. Bot.* iv. 437; shrubby,

branchlets petioles peduncles and leaves beneath sparsely hirsute, leaves petioled rather coriaceous ovate ovate-oblong or -lanceolate obtusely acuminate 5-7-nerved from the rounded or subcordate equal or oblique base, spikes long slender, bracts orbicular. *Cas. DC. in Prodr.* xvi. 1. 366; *Dalz. & Gibs. Bomb. Fl.* 115.

The CONCAN and CANARA; Mahableshwar and Bababoodan Hills, *Law, Cleg-horn, &c.*

Branches stout, terete, angled when dry. *Leaves* 3-5 by $1\frac{1}{2}$ -2½ in., brownish when dry, glabrous above, nerves beneath slender, nervules transverse; petiole $\frac{1}{4}$ -¾ in. *Male spikes* 3-6 in., flexuous, peduncle equalling the petiole; bracts glabrous; stamens 2. *Fruiting spikes* 3-6 in.; bracts sometimes adnate below and shortly decurrent; scar glabrous within.—A distinct species, but the fruiting spikes are immature, and the bracts being sometimes decurrent, it should perhaps be removed to *Sect. Eupiper*.

30. **P. Schmidtii**, *Hook. f.*; shrubby, quite glabrous, branches woody terete, leaves petioled very coriaceous ovate-oblong or -lanceolate acuminate 5-nerved from above the base, nerves alternate, base rounded or acute strongly reticulated on both surfaces, peduncles longer than the petioles, male spikes 4-6 in., female shorter fruiting with a very thick flexuous rachis, fruit globose or ovoid, bracts orbicular. *P. arborescens, in part, Miq. Syst. Pip.* 320; *Wight Ic. t.* 1940, *right-hand figure*; *Cas. DC. in DC. Prodr.* xvi. 1. 359, *the Nilghiri plant only*. *P. nigrum, Wall. Cat.* 6643 D, *the lower specimen only*. ? *P. arcuatum, γ. quintuplinervium, Cas. DC. l. c.* 360.

NILGHIRI MTS., *Schmidt, Wight, &c.*

A large shrub, clothing trunks of trees; branches usually drying black. *Leaves* 3-4 by 1-2 in., drying brown; nerves beneath very stout, sometimes whitish beneath, margin often recurved; petiole stout, $\frac{1}{2}$ in. *Male spikes* stout, peduncle twice as long as the petiole; female stout, very dense-fld. *Fruiting spike* variable, often tortuous, rachis usually very thick.—*Fruit* in some very fleshy and described by Wight as oblong, in others less fleshy and quite globose.—I cannot imagine this to be what Roxburgh intended as the Moluccan *P. arborescens*, and of which he says the peduncles are about as long as the petioles, and which Miquel describes as having puberulous nervules beneath, and short male spikes. The Ceylon plant (*C. P.* 2461), referred to by Thwaites and *Cas. DC.* as *P. arborescens*, is *P. argyrophyllum*. Wallich's 6643 E from Penang, referred by Miquel both to *P. arborescens* (*Syst. Pip.* 320) and to *P. attenuatum* (p. 307), is *P. phyrophyllum*.

31. **P. nepalense**, *Miq. Syst. Pip.* 318; shrubby, quite glabrous, leaves petioled membranous or thinly coriaceous elliptic-ovate or -oblong or -lanceolate more or less caudate-acuminate 5-7-nerved above the equal or oblique acute or rounded base, male spikes long slender, fruiting spike long or short, rachis densely tomentose, bracts orbicular, fruit ovoid sessile granulate. *Cas. DC. in Prodr.* xvi. 1. 357. *P. peepuloides, Wall. Cat.* 6650 B.—*Piper* Nos. 5 and 20 (*for the most part*), *Herb. Ind. Or. H. f. & T.*

SUBTROPICAL HIMALAYA, alt. 3-5000 ft., from Garwhal, *Edgeworth*, to Bhotan and Mishmi, *Griffith*. KHASIA MTS., alt. 3-5000 ft., *Griffith, &c.*

Branches slender. *Leaves* very variable, 3-5 by 1-3 in., base rarely rounded or cordate; petiole $\frac{1}{2}$ -¾ in. *Spikes* 2-7 in.; bracts sessile. *Fruiting spikes* often 6 in., puberulous, straight or flexuous. *Fruit* $\frac{1}{2}$ in. long, pointed.—The commonest Himalayan and Khasian species. No. 20 *Herb. H. f. & T.* appears to be a form with broader and more coriaceous leaves, for the flowers and fruit afford no character.

32. **P. khasianum**, *Cas. DC. in Prodr.* xvi. 349, *in part*; glabrous or peduncles and petioles sparsely pubescent, leaves petioled membranous lanceolate or oblong-lanceolate caudate-acuminate 5-nerved above the equal

acute or rounded base, peduncle longer than the petiole, fruiting spike short, rachis tomentose, bracts orbicular, fruit small globose obscurely pedicelled.

NEPAL? *Wallich*. SIKKIM HIMALAYA, alt. 2-6000 ft., *Clarke*. UPPER ASSAM, *Griffith*. KHASIA MTS., alt. 3-5000 ft., *J. D. H. & T. T.*

It is difficult without the fruit to distinguish this from *P. nepalense*; the leaves are never so large, not exceeding 5 in., and are narrower with much longer often falcately curved points. The spikes are never more than $1\frac{1}{2}$ in., and the small fruits are only $\frac{1}{2}$ - $\frac{1}{4}$ in. diam.—I find no specimen of this in Wallich's Herbarium, but good ones in Herb. Hook. received from him. I have retained the name of *khasianum*, though the description in the Prodrômus is drawn up in part from *P. Hamiltonii* and from *P. nepalense*, whence the fruit is described as ovoid.

33. **P. Lonchites**, *Roem. & Sch. Syst. i. Mant.* 241; quite glabrous, branches woody terete, nodes much enlarged, leaves shortly petioled thinly coriaceous elliptic- or oblong-lanceolate subacute 3-5-nerved from near the base, peduncles longer than the petioles, male spikes $\frac{1}{2}$ -1 in., fruiting females 1-2 in. flexuous, rachis tomentose, bracts orbicular. *Miq. Syst. Pip.* 331, *Ill. Pip.* 56, t. 57, and *Fl. Ind. Bat. i.* 2. 454; *Wall. Cat.* 6644 B, the left-hand and lower right-hand specimens. *Chavica penangensis*, *Miq. in Hook. Lond. Journ. Bot.* iv. 433 (not of *Syst. Pip.*).

PENANG, *Porter, Wallich*.

Branches rigid, internodes short. Leaves very uniform, $2\frac{1}{2}$ -3 by $1-1\frac{1}{4}$ in., subacute at both ends, tip not at all caudate, nervules reticulate, uppermost oblique and subauricled at the base; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. Male spikes uniformly short; bracts ciliate; female much longer. Fruits unripe, sessile, ovoid.—A very distinct species, the authorship of which is attributed in the Prodrômus to Miquel, and no allusion made to Roemer and Schultes, who profess to have described from Wallich's No. 6644 B, quoting "*P. lanceolatum* Roxb." which is inscribed on one of Wallich's tickets. As, however, there are 3 species on the sheet of 6644 B, it is doubtful to which Roemer and Schultes refer.

Sect. V. **Eupiper**. Spikes solitary; flowers diœcious, rarely polygamous. Fruits forming loosely interrupted spikes usually larger than in Sect. *Chavica*; fruits and stigmas sessile. Bracts and bracteoles either wholly adnate to the rachis or with raised membranous margins.

* Bracts of the female spike forming (when dry) a short hemispheric cup under the ovary, margins not or very slightly raised; bracteoles forming a semilunar ridge above the ovary.

34. **P. nigrum**, *Linn. Sp. Pl.* 28; quite glabrous, stem stout climbing and rooting terete, leaves petioled coriaceous usually broadly ovate oblong or nearly orbicular base usually rounded and oblique 5-9-nerved above the base, nerves strong alternate, peduncles longer or shorter than the petioles, flowers often polygamous, bracts of female short cupular wholly adnate without raised margins, fruit globose. *Vahl Enum. i.* 329; *Roxb. Fl. Ind. i.* 150, and *Ed. Carey & Wall. i.* 153; *Hunter in As. Research.* ix. 383; *Burm. Fl. Ind.* 13; *Blume in Verh. Bat. Genoots.* xi. 191, f. 11-17; *Wall. Cat.* 6643 A, B, C in part, D in part; *Miq. Syst. Pip.* 308, *Ill. Pip.* 50, t. 50, in *Hook. Lond. Journ. Bot.* v. 552, and *Fl. Ind. Bat. i.* 2. 451; *Cas. DC. in Prodr.* xvi. 1. 363; *Marsden Sumatr.* t. 1; *Bot. Mag.* t. 3139; *Hayne Arnz. Gewachs.* xiv. t. 6; *Nees Pl. Med.* t. 21; *Woodv. Med. Bot.* iv. t. 246; *Bentl. & Trim. Med. Pl.* t. 245; *Dict. Sc. Nat.* t. 291; *Spach Suites Buff.* t. 125. *P. trioicum*, *Roxb. ll. c.*; *Miquel Syst.* 310, and in *Hook. Journ.* iv. 438, v. 552; *Wight Ic.* t. 1935. *P. nigrum var. trioicum*, *Cas. DC. l. c.* *P. malabarens* and *P. baccatum* (the Indian synonyms only), *Cas.*

DC. l. c. 242. Muldera multinervis & Wightiana, Miq. in Hook. Lond. Journ. Bot. v. 557-8.—Rheed. Hort. Mal. vii. 23, t. 12.

Native in the forests of the CIRCARS and ? of ASSAM and MALABAR; cultivated in hot damp parts of India, Ceylon and the tropics generally.

Branches stout, trailing and rooting at the nodes. *Leaves* 5-7 by 2-5 in., most variable in breadth, sometimes glaucous beneath; base acute rounded or cordate, equal or unequal; nerves stout, 2-3 pairs basal, with another pair higher up which run to the tip; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in., stout. *Flowers* usually diœcious, but often the female bears 2 anthers, or the male a pistillode; anthers 2-celled. *Fruiting spikes* very variable in length and robustness, rachis glabrous. *Fruit* globose, sessile, red, pulp thin.—The distinctions, if any, between the wild and cultivated black Peppers (*P. nigrum* and *trioicum*) want careful study, from fresh specimens. Roxburgh, who first distinguished them, gives no other character than that the leaves of *P. trioicum* are glaucous beneath. Miquel, who retained both species in his *Systema*, observes that *P. trioicum* has less coriaceous narrower more lanceolate leaves, less white beneath, and in the Fl. Ind. Bat. he simply refers to *trioicum* as perhaps the wild form of *nigrum*. Clarke has collected in the Khasia (at Amwee, alt. 3000 ft.) a membranous-leaved pepper otherwise like *P. nigrum* with young female spikes. I have examined authentic specimens of *Muldera Wightiana* and *multinervis* in Arnott's Herbarium, and do not see how they differ from *P. nigrum*; those of *M. Wightiana* are in male flower only. The transversely dehiscing female receptacle of *M. multinervis* described by Miquel seems to me to be formed of the ordinary bracts and bracteoles of *P. nigrum*. I however advance this with hesitation, for our knowledge of the specific limits of *P. nigrum* are as vague as of its geographical.

35. **P. zeylanicum**, *Miq. in Lond. Journ. Bot. iv. 436*; quite glabrous, branches terete stout woody, nodes much thickened, leaves small long-petioled coriaceous broadly ovate or ovate-cordate acuminate 3-5-nerved from the base, nerves and nervules impressed above very prominent beneath, peduncles longer than the petioles, fruiting spikes short robust, bracts adnate tips raised in fruit, fruit globose smooth densely crowded. *Cas. DC. in Prodr. xvi. 1. 366. P. arcuatum, Thwaites Enum. 293, in part (C. P. 2177).*

CEYLON; in the higher parts of the central province, *Walker, &c.*

Dark brown when dry, much branched. *Leaves* 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ by 1-1 $\frac{1}{2}$ in., paler beneath, often bullate above, base usually equal; petiole $\frac{1}{2}$ -1 in. *Male spikes* 1-1 $\frac{1}{2}$ in.; bracts closely imbricate, the lowest sometimes oblong and peltate; stamens 2, filaments very broad. *Fruiting spikes* 1-1 $\frac{1}{2}$ in., flexuous.—A very distinct-looking species. I do not find the filaments to be margined beneath the anthers as described by Miquel. The *forma major* of that author, from the Deccan (Mayabam, Sir F. Adam), is a very doubtful plant, in fact indeterminable.

36. **P. trineuron**, *Miq. in Hook. Lond. Journ. v. 555*; quite glabrous, branches slender rigid, leaves thin elliptic-lanceolate subacute or acuminate 3-nerved nearly to the tip, peduncles longer than the petioles, male spikes slender shorter than the leaves, male and female bracts closely adnate to the rachis, stamens 2, fruits distant globose quite smooth. *Cas. DC. in Prodr. xvi. 362. P. insulare & ceylanicum, Cas. DC. l. c. 242. Muldera diandra, Thwaites Enum. 428 (omitted in DC. Prodr.).*

CEYLON, in damp forests in the south of the island, *Walker, Thwaites.*

Branches slender, black, nodes much enlarged. *Leaves* 3-5 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., base acute; principal nerves 1-2 pair, slender; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Male spikes* 2-3 in.; bracts semicircular, rather distant. *Fruiting spike* rigid; bracts forming a thick cup; rachis black, naked between the fruits.—This is certainly not a *Muldera*, though it resembles *P. arcuatum*, Blume, of Java.

37. **P. leptonema**, *Hook. f.*; quite glabrous, branches terete firm,

nodes much enlarged, leaves petioled thinly coriaceous broadly elliptic or rounded abruptly acuminate, 5-nerved from near the rounded rarely subcordate base, peduncles slender longer than the petioles, female spikes very slender longer than the leaves, flowers very minute in separate whorls. *P. Lonchites*, *Wall. Cat.* 6644 B, *the right-hand upper specimen only*.

PENANG, *Wallich, Maingay*.—DISTRIB. JAVA (*Zollinger*, 3771/8).

Apparently shrubby. *Leaves* very symmetrical for the genus, dull brown when dry, 3–4 by 2–3 in., nerves slender, nervules distinct on both surfaces; petiole slender, $\frac{1}{2}$ in. *Female spikes* alone seen; flowers sometimes in a broken spiral, but usually in distinct whorls; bracts cupular, confluent below with the slender quite glabrous rachis. *Fruit* $\frac{1}{2}$ in. long, ellipsoid, with a very short style when dry.—A very distinct species, which Miquel appears to have overlooked in Wallich's Herbarium, where the only specimen is fastened on a sheet with two other species (*P. caninum* and *Lonchites*). In the Hookerian Herbarium he has named it "a *P. acre*, Bl., vix diversum;"—it differs from *P. acre* totally in the bracts and flowers.

** *Bracts of the female spike adnate to the rachis with decurrent raised more or less membranous margins which are confluent with the bracteoles on either side of the ovary.* (The species of this group are involved, and I have failed in the attempt to dissociate Nos. 40 to 43.)

38. ***P. rhytidocarpum***, *Hook. f.*; a stout quite glabrous climber, leaves long-petioled large coriaceous elliptic ovate oblong or orbicular acuminate not glaucous beneath 3–5-nerved above the rounded acute or cordate base, spikes very long, fruiting females 8–12 in., bracts with slightly raised margins, fruit granulate (when dry). *P. aurantiacum*, *Wall. Cat.* 6658 B. *P. nigrum*, *var. macrostachyum*, *Cas. DC. in Prodr.* xvi. l. 363.

ASSAM, SILHET and the KHASIA MTS., ascending to 4000 ft., common, *Wallich, Griffith, &c.* CHITTAGONG, *J. D. H. & T. T.*

Habit and foliage of *P. nigrum*, but distinguished by the long petioles, often 2 in. long, larger leaves, attaining 7 in. in breadth, very long spikes, raised margins of the bracts and granulate fruit.—Miquel has named a specimen without fruit in *Herb. Hook.* as *P. trioicum*? and alludes to it in *Syst. Pip.* (314, parag. 3).

39. ***P. attenuatum***, *Ham. in Wall. Cat.* 6642 B, C, D *in part*; branches soft compressed angled and grooved when dry, leaves long-petioled membranous orbicular-ovate or cordate abruptly acuminate upper more ovate glabrous or puberulous beneath 7-nerved from near the base, fruiting female spikes very long slender, bracts decurrent with raised membranous margins, fruit small globose. *Miq. Syst. Pip.* 306, *Ill. Pip.* 49, t. 49, and in *Fl. Ind. Bat.* i. 2. 451; *Cas. DC. in Prodr.* xvi. l. 363; *Wight Ic.* t. 1933. ? *P. Sirium*, *Cas. DC. l. c.* 361. *P. Malamiris*, *Roxb. Fl. Ind.* i. 160, and *Ed. Carey & Wall.* i. 162.

EASTERN TROPICAL HIMALAYA; Sikkim, *J. D. H.*, &c.; Bhotan, *Griffith*. ASSAM, SILHET and the KHASIA MTS., *Hamilton*, &c. NILGHIRI HILLS; on the Eastern slopes, *Wight*, &c.—DISTRIB. ? Penang and Java.

Apparently a rambling species, not unlike *P. sylvaticum*. *Branches* stout, but evidently soft, flexuous, glabrous. *Leaves* 2½–6 in., often as broad as long, from finely downy to glabrous beneath; base usually equal rounded truncate or cordate, of the upper usually acute; nerves slender; petiole 1–3 in., rarely shorter. *Male spikes* slender; bracts adnate, cupular; bracteoles slender; stamens 2–4. *Female spikes* very slender, lengthening in fruit to 9 in.; rachis glabrous, except in the ciliate scars left by the fruit; ovaries ovoid; stigmas minute. *Fruit* globose, $\frac{1}{2}$ in. diam.—The 7 basal nerves seem to distinguish this from the following. *Cas. DC.* refers the *Sirium* of Rumph (V. 119, t. 2) and Vahl's *P. diffusum* to it, but the evidence is very slight. According to Miquel, a specimen of Roxburgh's *P. Malamiris* so named by himself

in Delessert's Herbarium is this; unfortunately Roxburgh's names of *Polygonum* and *Peppers* are often at issue both with his descriptions, and these again with his *Icones*; he quotes Linnæus for his *Malamiris*, but Linnæus includes plants of both the old and new worlds under *Malamiris*. Rheedé's figure of Linnæus' plant of that name, Amalago (vii. t. 16), cited by Roxburgh, cannot well be *P. attenuatum*.

40. **P. sylvestre**, Lamk. *Ill.* 79?; quite glabrous, branches subterete, leaves petioled hardly coriaceous elliptic or ovate acuminate base acute rounded or subcordate 5-nerved from near the base, spikes long very slender, bracts of male cupular adnate to the rachis, of the female with raised margins glabrous within, rachis glabrous, fruit globose. *Miq. Syst. Pip.* 314, and in *Hook. Lond. Journ. Bot.* iv. 438, and v. 552; *Thwaites Enum.* 293 (C. P. 3688); *Cas. DC. in Prodr.* xvi. 1. 361; *Wight Ic.* t. 1937.

ASSAM and SILHET, Wallich, Griffith. DECCAN PENINSULA, at Courtallam, Wight. CEYLON, Walker; south end of the island, Thwaites.

A branching climbing shrub, with apparently soft branches, much compressed and furrowed when dry in the Ceylon specimens. *Leaves* 4-5 by 2-3 in., more coriaceous than in *P. attenuatum*, with much shorter petioles, and never rounded-ovate as in that plant, base acute or rounded rarely cordate, nerves not so basal; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Male spikes* 5-6 in., flowers rather distant; stamens 2-4; female lengthening much in fruit, rachis slender, glabrous. *Fruit* $\frac{1}{2}$ to nearly $\frac{1}{4}$ in.—I accept this as Lamarck's *P. sylvestre* with great doubt, and I find it difficult to define it by description from narrow-leaved forms of *P. attenuatum*, and from some states of *P. argyrophyllum*, but feel sure it is quite distinct from the former. A specimen in Wight's Herbarium is marked *P. trioicum*, as is another from Roxburgh's Herbarium, but the fruit seems too small for that form of *nigrum*, the rachis too is slender, and leaves too membranous. I refrain from citing any of the extra-Indian descriptions or habitats for *sylvestre*, but there is in Herb. Hook. a plant said to be from Mauritius which tallies with this, and is marked *P. sylvestre* by Miquel; it is probably a garden specimen, and is in male fl. only.

41. **P. Hymenophyllum**, *Miq. in Hook. Lond. Journ. Bot.* v. 554; petioles and leaves beneath pubescent with crisped hairs, branches terete, leaves shortly petioled very membranous ovate elliptic-ovate or oblong or ovate-cordate acuminate base acute or rounded 2-3-nerved towards the base, nerves slender alternate, spikes very long and slender, fruiting rachis very slender glabrous or pubescent in the scars, bracts confluent with the rachis. *Cas. DC. in Prodr.* xvi. 1. 364; *Wight Ic.* t. 1942. *P. Malamiris*, Wall. *Cat.* 6642 G, H. *P. nilghirianum*, *Cas. DC. l. c.* *P. lanatum*, *Wight mss*; *Miq. l. c.* 553 (not of Roxb.). *P. Wightii*, *Miq. in Hook. Lond. Journ. Bot.* v. 552 for the most part.

DECCAN PENINSULA; on the Nilghiri, Shevagherry and Travancore Mountains, Wight, &c.

A slender climber, with branches that do not appear to shrink in drying. *Leaves* 3-5 in., very variable in breadth, always thinly membranous, base usually equal; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Male spike* very slender; bracts with free rounded tips, peduncle longer or shorter than the petiole. *Fruiting spikes* 3-6 in., rachis very variable; bracts usually inconspicuous being entirely confluent with the rachis, but sometimes they have more or less conspicuously raised margins and are ciliated within. *Fruit* oblong when unripe, with often a distinct style, globose and $\frac{1}{8}$ - $\frac{1}{4}$ in. diam. when ripe.—Wight, not having seen male plants, is disposed to regard this as the female of *P. argyrophyllum*, and though males are now known, they do not help to distinguish them. The pubescence, which is the best character for this, is far from constant in amount, and is sometimes almost evanescent. So too the development of the bracts in the fruiting rachis is very various. A Javan plant of Zollinger's (II. No. 304) closely resembles this.

42. **P. argyrophyllum**, *Miq. Syst. Pip.* 330, *Ill. Pip.* 55, t. 56, and

in *Hook. Lond. Journ. Bot.* v. 555; quite glabrous, shrubby, branches terete, leaves petioled membranous or coriaceous lanceolate or elliptic- or ovate-lanceolate acuminate sometimes silvery beneath 5-nerved above the base, nerves distant alternate, base acute often oblique, male spikes very slender, peduncles longer than the petioles, fruiting spike 3-6 in., bracts usually decurrent with raised margins, scars naked or ciliate. *Cas. DC. in Prodr.* xvi. 1. 365; *Wight Ic.* t. 1941. *P. Malamiri*, *Wall. Cat.* 6642 E, F, I. *P. Wightii*, *Miq. in Hook. Lond. Journ.* l. c. 552, in part.

DECCAN PENINSULA, *Heyne*; Travancore Mts., *Wight*. CEYLON; in the central province.

Some states of this appear to differ from *P. Hymenophyllum* only in being glabrous, others have the much more coriaceous foliage of other forms, and the leaves are normally more white beneath. There is so much variation in the development of the bracts that possibly there is more than one species here. The following appear to me to be probably varieties of this.

1. *P. argyrophyllum proper*; leaves long 4-6 by $1\frac{1}{2}$ -2 in. whitish beneath, petiole nearly 1 in., peduncle very slender, fruiting spike $\frac{1}{2}$ -2 $\frac{1}{2}$ in., rachis very slender glabrous, bracts almost confluent with the rachis, fruit small $\frac{1}{8}$ in. diam. *Wall. Cat.* 6642 F.—This was sent to Wallich by Wight, but I find no specimen in the Herbarium of the latter. There are, however, good ones in Arnott's Herbarium.

2. Leaves smaller shorter petioled more elliptic sometimes bullate not white beneath, fruiting spikes 5-7 in., rachis slender, bracts with raised margins, scars distant with fimbriate edges, young fruit oblong subtruncate with a distinct style globose when ripe. *Wall. Cat.* 6642 E, I.—Courtallam, *Wight*. Concan?, *Sticks*.

3. Leaves elliptic more coriaceous less acuminate not white beneath, bracts with conspicuous sinuate raised margins which embrace the bases of the young fruits, ripe fruit globose $\frac{1}{4}$ in. diam. *P. nepalense*, *Wight Ic.* t. 1938 (not of Miquel).—Courtallam, in dense forests.—This resembles *P. sylvestre* in the form of the leaf, and *P. Wightii* in their texture.

4. Leaves coriaceous 3-5 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in. elliptic-lanceolate acuminate bullate above silvery beneath, nerves stronger more distant, petiole $\frac{1}{2}$ in., fruiting spikes 4-6 in., bracts with raised sinuate margins, fruit large "yellow" (*Clarke*). *P. argyrophyllum*, *Thwaites Enum.* 293.—Nilghiri Hills, alt. 7000 ft., *Clarke*. Ceylon (C.P. 3625).—This should perhaps be referred to *P. Wightii*, but the alternate nerves are very constant.

5. Leaves much smaller 2-2 $\frac{1}{2}$ by 1 in. elliptic-lanceolate, petiole short $\frac{1}{4}$ in., fruiting spikes 1-2 in. slender, rachis slender, bracts with hardly raised margins, scars ciliate, fruit $\frac{1}{8}$ in. diam.—Nilghiri or Kurg Hills, *G. Thomson*.—This very small form a little resembles *P. khasianum*.

6. Leaves thinly coriaceous elliptic-lanceolate or oblong ovate silvery or not beneath, fruiting spikes 2-7 in., bracts with raised sinuate margins, rachis rather slender, fruit globose $\frac{1}{2}$ in. diam. *P. Walkeri*, *Miq. in Hook. Lond. Journ. Bot.* iv. 439; *Cas. DC. l. c.* 3362. *P. arborescens*, *Thwaites Enum.* 293, excl. syn.—Ceylon, *Walker*, *Thwaites* (C. P. 35 in part, and 2461).—I do not find the minute hairs described by Miquel.

43. *P. Wightii*, *Miq. in Hook. Lond. Journ. Bot.* v. 552, in part; quite glabrous, branches stout terete, leaves petioled coriaceous broadly ovate or orbicular rarely elliptic or oblong often glaucous beneath base rounded or cordate rarely acute 5-7-nerved near the base, spikes 2-3 in. stout, bracts with prominent sinuate margins. *Wight Ic.* t. 1939 (*P. Wightiana* on plate). *P. nigrum*, *Wall. Cat.* 6643 D, the upper right-hand specimen only.

NILGHIRI and TRAVANCORE HILLS, *Wight*, &c.

The robust habit, broader leaves with stronger more basal nerves, longer petioles, and often stouter fruiting-spikes with almost winged bracts, best distinguish this

from the coriaceous-leaved plants referred to *P. argyrophyllum*. Whether, however, what I have described above should be regarded as Miquel's *P. Wightii* is perhaps doubtful, there being much confusion in both Wight's and Arnott's Herbaria, where alone authentic specimens of Miquel's plants are preserved. Miquel's description of leaves sparsely hairy on the nerves, together with specimens named by Miquel *P. Wightii* in Herb. Arnott with this character, obviously apply to *P. Hymenophyllum*; others equally authentically named *P. Wightii*, and quite glabrous, with membranous leaves, are identical with forms of *P. argyrophyllum* (perhaps *sylvestre*); whilst still a third series, with coriaceous leaves and more basal stronger nerves, also named *Wightii* by Miquel, represent that plant as here limited. Furthermore, specimens of this last in Arnott's Herbarium are named by Miquel "*P. nigrum forma sylvestre*." In short the confusion is inextricable, and I cannot say whether *P. sylvestre*, *argyrophyllum*, *Hymenophyllum* and *Wightii* represent as many species, or fewer, or one only. Lastly, *P. Wightii* must be carefully distinguished from *P. Schmidtii* (*P. arborescens* Miq. not of Roxb.), which though not easily distinguishable by words is a very different species.

44 **P. leptostachyum**, Wall. Cat. 6649; quite glabrous, branches stout contracted angled and grooved when dry, leaves large coriaceous petioled obliquely ovate oblong-ovate or lanceolate acuminate 5-nerved above the base, nervules transverse, fruiting spike 7 in., peduncle much longer than the petiole, rachis stout glabrous, bracts with obscure margins, scars glabrous. *Miq. Syst. Pip.* 315. *P. indicum*, *Miq. fid. Cas. DC. Prodr.* xvi. 1. 498.

BURMA; banks of the Attran River, Wallich.

Branches white when dry, internodes long, nodes hardly swollen. Leaves very pale, 5-8 by 2-4 in., base acute rounded or cordate; petiole stout, $\frac{1}{2}$ -1 in. Spikes pendulous, scars narrow. Fruit scattered, globose, unripe with a distinct style, ripe globose $\frac{1}{2}$ in. diam.—A very handsome species, of which the male is unknown. Cas. DC. changes Wallich's name to *P. indicum*, citing as the authority Miquel's Systema (p. 315), where, however, the name *leptostachyum* is preserved, and I find no authority in Miquel for the name *P. indicum*. The *P. leptostachyum* of A. Richard is undescribed, and only mentioned in Grisebach's Cat. Pl. Cub. 69. Miquel's citation of Wall. Cat. 1540 for this is an error.

Sect. VI. **Heckeria**. Spikes subumbellate. Flowers 2-sexual.

45. **P. subpeltatum**, Willd. Sp. Pl. i. 166; shrubby, branches very stout soft, leaves very large long-petioled membranous orbicular-cordate glabrous or puberulous beneath, nerves flabellate, spikes erect. Cas. DC. in *Prodr.* xvi. 1. 333; *Vahl Enum.* i. 337, excl. syn. Lam.; Wall. Cat. 6638. *Heckeria subpeltata*, Kunth in *Linnaea* xiii. 171. Pothomorphe subpeltata, Miquel Syst. Pip. 213, Ill. Pip. 29, t. 26, in Hook. Lond. Journ. Bot. iv. 431, and Fl. Ind. Bat. i. 2. 437; Wight Ic. t. 1925.

DECCAN PENINSULA; from the Concan Hills, alt. 5000 ft., southwards, Heyne Wight, &c. PENANG, Wallich. CEYLON, ascending to 4000 ft., Walker, &c.—DISTRIB. Malay Islands, Tropical Africa and Madagascar.

A succulent shrub, 4-5 ft. high, with very thick stem and branches. Leaves a foot diam. or less, acute or tip rounded, deeply cordate with a narrow sinus; petiole 6-10 in., with a narrow deciduous wing. Spikes 3-7 together, 3-5 in. long, very shortly pedicelled; bracts pedicelled, peltate, triangular or $\frac{1}{2}$ -lunar, ciliate; flowers very minute; stamens 2; stigmas 3. Fruit very minute, trigonous, cuneiform, truncate.

UNDETERMINABLE AND EXCLUDED SPECIES.

P. AMALAGO, Linn. Fl. Zeyl. No. 28.—Miquel (Syst. Pip. 258) correctly observes that Linnæus's Amalago is a mixture of various species from the old and new worlds. The Amalago of Rheede (vii. t. 16) with elliptic leaves and very long peduncles is not recognizable.

P. ARBORESCENS, *Roxb. Fl. Ind.* i. 159, and *Ed. Carey & Wall.* i. 161.—To this Miquel refers Wallich's No. 6643 E, a native of Penang, which is a flowerless barren state with variegated leaves of a plant called *Cissus*? *porphyrophyllus* by Lindley. At p. 307, however, he refers the same number to *P. attenuatum*. He also refers a Nilghiri plant of Perrottet to it; this plant I have not seen, but assume it to be *P. Schmidtii*. Lastly he figures his *P. arborescens* (Ill. Pip. 54, t. 54), but does not state where the figured specimen comes from. The only authority for Roxburgh's plant is his citation of Rumph (V. t. 28, f. 1), which is not recognizable as depicting any of the above-mentioned plants.

P. ARCUATUM, *Blume*, var. *nervis remotioribus*, *Miq. Syst. Pip.* 334; from the Nilghiri Mts., Perrottet.—This is, I assume, the *P. arcuatum* var. *β. quintuplinervium*, *Cas. DC. in Prodr. xvi.* 1. 360. It is probably *P. Schmidtii*.

P. ARANEUM, *Wall. Cat.* 6661; from Taong-dong in Ava, has neither flower nor fruit, and is indeterminate.

P. CLYPEATUM, *Wall. Cat.* 6655 (*P. obtusissimum* and *P. manillanum*, *Miq. Syst. Pip.* 337, 339)—are both species of *Ficus*.

P. CORIACEUM, *Vahl Enum.* i. 314, is doubtfully referred to *P. Cubeba* by Miquel (*Syst. Pip.* 289), and omitted by *Cas. DC.*

P. DIFFUSUM, *Vahl Enum.* i. 333, from Ceylon, is referred by *Cas. DC.* (*Prodr.* xvi. 1. 364) to *P. attenuatum*, but I have seen no specimen of this from Ceylon. *Cas. DC.* omits this habitat, as does Miquel (*Syst. Pip.* 327), who gives Java and Amboyna.

P. EXASPERATUM, *Vahl Enum.* i. 322; *Cas. DC. in DC. Prodr.* xvi. 1. 378. (*Chavica*? *exasperata*, *Miq. Syst. Pip.* 275), is indeterminate.

P. FALLAX, *Vahl Enum.* 335, is doubtfully referred by *Cas. DC.* to *P. nigrum* var. *trioicum*, and by Miquel to *P. longum* or *P. sarmentosum* (*Syst. Pip.* 241).

P. LÆVE, *Vahl Enum.* i. 332; *Cas. DC. in Prodr.* xvi. 1. 362; *Miq. Syst. Pip.* 335, is indeterminate.

P. MALAMIRIS, *Linn. Sp. Pl.* 29; *Vahl Enum.* i. 327 (see Nos. 15, 39, 41, 42).

P. NIGRUM?, *Wall. Cat.* 6643 E, F; from Malacca, Singapore and Penang.—These are young plants, with broadly cordate rounded leaves variegated green white and purple, of a *Piper*, species unknown, and are the *Cissus*? *porphyrophyllus*, *Lindl. in Journ. Hort. Soc.* i. 225, and *Flore des Serres Ser.* 2, iv. t. 1491. It is *P. porphyrophyllum*, *N. E. Brown in Gard. Chron.* (1884) xxii. 438.

P. POTHOIDES, *Wall. Cat.* 6639 A; *Cas. DC. in Prodr.* xvi. 1. 351 (*Chavica pothoides*, *Miq. Syst. Pip.* 266).—There are two species on this sheet, neither in flower or fruit. Of one of these there is a specimen in *Herb. Kew* from the Andamans, collected by Kurz, in an equally imperfect state.

P. RETROFRACTUM, *Vahl Enum.* i. 314; *Cas. DC. in Prodr.* xvi. 1. 378 (*Chavica retrofracta*, *Miq. Syst. Pip.* 275), is indeterminate.

P. SUIPIQUA, *Ham. in Don Prodr.* 20; *Cas. DC. in Prodr.* xvi. 1. 378 (*Chavica Suipiqua*, *Miq. Syst. Pip.* 275), is no doubt a common Nepal species, but I cannot guess which.

P. SYLVESTRE, *Lour.*; *Vahl Enum.* i. 326, is evidently a mixture.

P. SYRINGÆFOLIUM, *Vahl Enum.* i. 328; *Cas. DC. in Prodr.* xvi. 1. 378 (*Chavica syringæfolia*, *Miq. Syst. Pip.* 275), is indeterminate.

P. THERMALE, *Vahl Enum.* i. 328; *Cas. DC. in Prodr.* xvi. 1. 3378 (*Chavica thermalis*, *Miq. Syst.* 276), from hot springs at Tranquebar, should be obtained and determined by botanists in Madras by means of the locality.

P.? *VENUSTUM*, *Wall. Cat.* 6666; *Cas. DC. in Prodr.* xvi. 1. 378, from Singapore, is a *Pothos* in a very young state, not distinguishable from *P. remotiflorus*, *Hook.*, of Ceylon.

P. ZUCCARENII, *Cas. DC. in Prodr.* xvi. 1. 365, from India, *Griffith* in *Herb. Munich*, is indeterminate. The petiole is described as sheathing throughout its length, which I have not observed in any Indian *Piper*. It is probably a *Pothos*.

3. *PEPEROMIA*, *Ruiz & Pav.*

Annual or perennial, usually succulent herbs. *Leaves* alternate opposite

or whorled, quite entire, pellucid-punctate, exstipulate. *Spikes* terminal or leaf-opposed, solitary or fascicled, rarely axillary. *Flowers* 2-sexual, minute, sessile or sunk in the rachis, often whorled, erect, bracteate. *Perianth* 0. *Stamens* 2, very short; anther-cells confluent. *Ovary* obtuse acute or beaked, 1-celled; stigma lateral or terminal, usually penicillate; ovule 1, erect. *Fruit* minute, indehiscent. *Seed* with a membranous testa.—Species 3-400, chiefly tropical and American.

* *Leaves alternate.* (See also *P. Wightiana.*)

1. ***P. exigua***, *Miq. Syst. Pip.* 77, and *Fl. Ind. Bat.* i. 2. 432; quite glabrous, stem very slender decumbent, leaves alternate petioled rounded-ovate-cordate or subdeltoid 5-7-nerved, tip rounded, spikes solitary axillary and terminal, fruit sessile, stigma terminal. *Cas. DC. in Prodr.* xvi. 1. 403. *Micropiper exiguum*, *Miquel Comm. Phyt.* 56, t. 9 D. *Piper exiguum*, *Blume in Verh. Bat. Genoots.* xi. 232. *P. hyalinum*, *Wall. Cat.* 6662.

BURMA; hills opposite Prome, *Wallich*.—DISTRIB. Java, Philippines, ? West Africa.

Stems 3-6 in., sparingly branched. *Leaves* hyaline when dry, $\frac{1}{2}$ -1 in. diam., base sometimes truncate; petiole $\frac{1}{2}$ -1 in. *Spikes* $\frac{1}{4}$ in., filiform. *Fruit* ovoid, beaked.

2. ***P. moulmeiniana***, *Cas. DC. in Seem. Journ. Bot.* 1866, 140, and in *DC. Prodr.* xvi. 1. 415; quite glabrous, stem succulent straggling, leaves alternate shortly petioled elliptic-lanceolate obtuse 5-nerved from the base, spikes slender panicle, fruit globose, stigma minute.

TENASSERIM; at Moulmein, *Parish*.

Stems tufted, 6-8 in. high, sparingly branched; branches divaricate. *Leaves* 2-2 $\frac{1}{2}$ in. long, succulent, nerves faint; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Spikes* 1-1 $\frac{1}{2}$ in. *Fruit* not so broad as the rachis.

3. ***P. pseudo-rhombea***, *Cas. DC. in Prodr.* xvi. 1. 440; quite glabrous, stem stout erect succulent, leaves alternate petioled fleshy elliptic-lanceolate acute 3-nerved, spikes solitary axillary and terminal shorter than the leaves. *P. courtallensis*, var. β ., *Thwaites Enum.* 292.

CEYLON; Central Province, alt. 3-5000 ft., *Thwaites*.

Stem simple, 1 foot high, as thick as a goose-quill. *Leaves* 2 in., narrowed into the short petiole, nerves obscure.—I have seen but one specimen, and in young flower only.

4. ***P. Thomsoni***, *Hook. f.*; quite glabrous, erect, branched, leaves alternate petioled elliptic-ovate subacute 5-nerved, spikes slender axillary and terminal. *Peperomia* No. 9, *Herb. Ind. Or. H. f. & T.* *Piper ovalifolium*, *Wall. Cat.* 6663 B, the lower specimen.

DECCAN PENINSULA; Nilgiri or Kurg Mts., *G. Thomson*; Courtallam, *Wight*; Dindigul, alt. 2500 ft., *Wight in Herb. Wall.* ? CEYLON, *Thwaites*.

Stem very stout, erect or ascending at the base, naked below, as thick as a swan's quill; branches all reaching about the same height, leafy. *Leaves* all alternate, 2-3 in. long, succulent, 3 principal nerves broad; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Spikes* when flowering as long as the leaves, much longer in fruit.—A specimen of this in *Herb. Arnott* is mentioned by *Miquel* (in *Hook. Lond. Journ. Bot.* v. 549) as a glabrous, luxuriant, alternate-leaved var. of *P. dindigulensis*, from which it appears to me to be widely different, and to be very near *pseudo-rhombea* of Ceylon.

** *Leaves mostly opposite or whorled.*

5. ***P. Wightiana***, *Miq. in Hook. Lond. Journ. Bot.* v. 548; suberect, rather slender, glabrous or with the tips of the leaves ciliate, leaves opposite and alternate petioled obovate elliptic oblong or orbicular obtuse, 3-nerved, spikes 1-3 usually terminal. ? *P. Wightiana*, *Cas. DC. in Prodr.* xvi. 1. 420. *P. ceylanica*, *Miq. l. c.* 550; *Cas. DC. l. c.* 457.

The CONCAN, on trees, *Stocks*. MALABAR, *Wight*. NILGHIRIS, *G. Thomson*. CEYLON, *Walker*; Central Province, alt. 6000 ft., *Thwaites* (*C. P.* 3954).

Stems 6-10 in., straggling and rooting below, glabrous or puberulous. *Leaves* $\frac{1}{2}$ -1 in., very variable, rarely obovate, succulent, glabrous except at the tip; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Spikes* 1-2 in., very slender, sometimes paniculate.—*Cas. DC.* describes the stem as pubescent, but it is glabrous in authentic specimens (in *Herb. Arnott*), and Miquel does not describe it as pubescent. *Wight's* figure is, I think, taken from *P. dindigulensis*. I suspect this is only a variety of *P. Heyneana*. Specimens from the Nilghiris have all the leaves alternate: Miquel's *P. ceylanica* has most minute pubescence on the branches; the leaves are chiefly opposite.

6. ***P. dindigulensis***, *Miq. Syst. Pip.* 122, in *Hook. Journ. Bot.* v. 549, and *Ill. Pip.* 19, t. 13; stem and leaves pubescent, leaves opposite rarely alternate or 3-nately whorled petioled elliptic-ovate or rounded obtuse or acute 3-5-nerved, spikes slender axillary and terminal solitary or paniced. *Cas. DC. in Prodr.* xvi. 1. 442; ? *Wight Ic.* t. 1921. *P. Heyneana*, *Wight Ic.* t. 1922; *Thwaites Enum.* 292. ? *P. Wightiana*, *Wight Ic.* t. 1924. *P. Thwaitesii*, *Cas. DC. l. c.* 448. *Piper ovalifolium*, *Wall. Cat.* 6663 A and B (except the lower specimen).

DECCAN PENINSULA; from the Concan southward, in the moist ghats.

Very variable, sometimes 18 in. high, with a stem as thick as a goose-quill and suberect, at others more slender and straggling; stem simple or branched. *Leaves* 1-1½ in., succulent, narrowed into the petiole. *Spikes* 1-3 in. long.—I find nothing answering to *Wight's* figure of *P. Wightiana* in his or *Arnott's* Herbarium; its alternate leaves resemble *P. Wightiana*, but the hairiness is that of *P. dindigulensis*. His figure of *P. dindigulensis* represents a glabrous plant, unlike any species I have seen; but for its opposite leaves I should refer it to *P. Thomsoni*. I have seen no specimens of *P. Thwaitesii*, *Cas. DC.*, but the description entirely accords with *P. dindigulensis*.

7. ***P. portulacoides***, *A. Dietr. Sp. Pl.* i. 172; quite glabrous, tufted, stem very stout branched and succulent, leaves opposite or the upper whorled petioled obovate or subrhomboid tip rounded 3-nerved, spikes stout longer than the leaves axillary and terminal. *Miq. Syst. Pip.* 130, and in *Hook. Lond. Journ. Bot.* v. 550; *Cas. DC. in Prodr.* xvi. 1. 443; *Wight Ic.* t. 1922. *P. Candolleana*, *Miq. Syst.* 146. *Piper portulacoides*, *Lamk. Ill.* 82; *Vahl Enum.* i. 350. *P. trifolium*, *Herb. Willd.*

TRAVANCORE mountains; at Courtallam, *Wight*.—DISTRIB. Mauritius, Bourbon, Madagascar, Seychelles.

Stem erect from a creeping base, sometimes as thick as a swan's quill, leafy. *Leaves* all opposite, 1-2 in. long, very variable in width and thickness, very succulent; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Spikes* 1-2 in., axillary and terminal.

Var. *courtallensis*; smaller, leaves narrower. *P. courtallensis*, *Miq. in Hook. Lond. Journ. Bot.* v. 594; *Cas. DC. in Prodr.* xvi. 1. 463. Courtallam, *Wight*.—I see no material difference between this and *P. portulacoides*; and they inhabit the same locality.

8. ***P. confusa***, *Hook. f.*; quite glabrous, stem and branches diffuse creeping and rooting, leaves sessile succulent opposite and 3-nately whorled oblong obtuse 3-nerved narrowed at the base, spikes axillary and terminal paniced stout erect more or less thickened upwards. *P. courtal-*

lensis, *Thwaites Enum.* 292, and *Cas. DC. in Prodr.* xvi. 1. 463 (not of *Miquel*).

CEYLON; Central Province, alt. 3-5000 ft., *Gardner, Thwaites* (C. P. 2173).

Stems 6-10 in. long, diffusely branched, as thick as a crow-quill, naked below, rooting at the distant nodes. *Leaves* $\frac{3}{4}$ -1 in., narrowed into a very short petiole. *Spikes* $\frac{1}{2}$ - $\frac{3}{4}$ in., stoutly peduncled, obtuse.—This is the *P. courtallensis* of *Cas. DC.*, who cites *Miquel*, but omits the Continental Indian localities where *P. courtallensis* proper alone is found, and the number (831) which he quotes is of *Gardner's* (not *Thwaites's*) collection. This differs from *P. portulacoides* in habit, and the form of the subsessile leaves, and the spikes.

9. **P. Heyneana**, *Miq. Syst. Pip.* 123; quite glabrous, stem diffusely branched creeping and rooting, leaves opposite and 3-4-nately whorled petioled linear- or obovate-oblong obtusate or orbiculate rarely orbicular 3-nerved, spikes slender axillary terminal and paniced. *Cas. DC. in Prodr.* xvi. 1. 453. *Piper oblongum*, *Wall. Cat.* 6663 C?

SUBTROPICAL HIMALAYA; from Kumaon, alt. 3500 ft., *Strachey & Winterbottom*, to Sikkim, alt. 5-6000 ft. KHASIA MTS., alt. 4-5000 ft., *J. D. H. & T. T. Patkoye Mts. in UPPER ASSAM, Griffith.*

A small prostrate tufted very variable species. *Stem* 4-10 in. long, rather slender. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in. long, thinly fleshy, drying green; petiole $\frac{1}{8}$ - $\frac{1}{2}$ in. *Spikes* $\frac{1}{2}$ -1 $\frac{1}{2}$ in.—It is unfortunate that *Miquel* should have attached the name of *Heyne* to a species which *Heyne* never saw, and which grows very far from the region which that author rendered botanically classical.

10. **P. reflexa**, *A. Dietr. Sp. Pl.* i. 180; stem pubescent stout densely branched and tufted leafy, leaves sessile or shortly petioled coriaceous 4-nately whorled orbicular or nearly so 3-nerved pubescent beneath or glabrate, spikes solitary axillary and terminal stout much exceeding the leaves. *Miq. Syst. Pip.* 169, in *Hook. Lond. Journ. Bot.* iv. 426, *Fl. Ind. Bat.* i. 2. 436, and in *Mart. Fl. Bras.* iv. 17; *Wight Ic.* t. 1933. *P. reflexa*, *vars.* ζ . *Berlandieri & \eta*. *parviflora*, *Cas. DC. in Prodr.* xvi. 1. 452. *Piper saxatile*, *Wall. Cat.* 6664. *P. pusillum*, *Blume in Verh. Bat. Nat. Genoots.* xi. 382, f. 37. *Micropiper pusillum*, *Miq. Comm. Phyt.* t. 5.

SUBTROPICAL HIMALAYA; from Garwhal, alt. 4-6000 ft., *Edgeworth*, to Sikkim, ascending to 7000 ft., and to UPPER ASSAM, *Griffith.* KHASIA MTS., alt. 4-6000 ft. TRAVANCORE, at Courtallam, *Wight.* CEYLON, Central Province, ascending to 6000 ft.—DISTRIB. Malay Islands, China, Australia, Africa, America.

Stem or branches 3-10 in., rooting at the lower nodes, lower as thick as a goose-quill in Courtallam specimens, which are nearly glabrous, more slender in others. *Leaves* very uniform, rarely opposite or 6-nate, $\frac{1}{2}$ in. long, rarely more, sometimes elliptic, lower shortly petioled, wrinkled and yellowish when dry. *Spikes* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., stoutly pedicelled, obtuse.

ORDER CXXV. CHLORANTHACEÆ.

Herbs shrubs or trees, usually aromatic. *Leaves* opposite, usually toothed, petioles often connate and forming a sheath; stipules small, subulate. *Flowers* in terminal or pseudo-axillary spikes, heads or panicles, 1-sexual (one of each sex sometimes cohering). FL. ♂. *Perianth* 0. *Stamens* 1 or 3 connate, filaments very short and thick; anthers 2-celled, or the lateral when 3 are connate 1-celled. FL. ♀. *Perianth* 0, or adnate to the ovary, with a 3-toothed limb. *Ovary* 1-celled; style very short linear or subclavate or 0; ovule 1, orthotropous, pendulous from the top of the cavity. *Drupe* small ovoid or globose. *Seed* pendulous, testa membranous, albumen copious fleshy; embryo minute, far from the hilum, cotyledons diverging,

radicle inferior.—Genera 3, species 25, tropical and subtropical (not African).

—The above character does not embrace the anomalous genus *Circæaster* which is appended to the Order.

CHLORANTHUS, Swartz.

Perennial herbs, or shrubs. *Flowers* in terminal simple or paniced spikes, connate ♂ and ♀ in pairs. *Stamens* 1, or 3 confluent; central anther 2-celled, lateral anthers 1-celled. *Ovary* naked; stigma subsessile, truncate.—Species 8, Eastern Asiatic.

1. *C. officinalis*, *Blume Enum. Pl. Jav.* 79; *Fl. Jav.* iii. 10, t. 1; leaves subsessile elliptic or elliptic-lanceolate acuminate finely gland-serulate, anthers 3 connate by their connective. *Solms in DC. Prodr.* xvi. 1. 474; *Miq. Fl. Ind. Bat.* i. 1. 804. *C. elatior*, *Br. in Bot. Mag.* t. 2190. *C. erectus*, *Sweet*; *Wall. Cat.* 6881. *Cryphea erecta*, *Ham. in Brewst. Ed. Journ.* 1825, 11, t. 2.

EASTERN HIMALAYA; Sikkim, in hot valleys, *J. D. H. BHOTAN*, *Clarke*. ASSAM, SILHET and the KHASIA Mts., ascending to 4000 ft., *Wallich*, &c., and southward to PENANG, the ANDAMAN ISLANDS, and MALACCA, *Maingay*.—DISTRIB. Yunan, Malay Archipelago, Philippine Islands.

An evergreen erect undershrub, 1–3 ft., quite glabrous and shining. *Leaves* very variable in size and breadth, subsessile, from 3 by 1 in. to 10 by 4 in.; petiole $\frac{1}{2}$ – $\frac{1}{4}$ in. *Spikes* 1–2 in., in panicles 2–5 in. long; flowers minute, distant. *Berries* $\frac{1}{4}$ in. diam., white.

2. *C. brachystachyus*, *Blume Fl. Jav. fasc.* viii. 13, 14, t. 2; leaves shortly petioled elliptic or elliptic-lanceolate acuminate coarsely callously serrate, anthers solitary 4-celled. *Solms in DC. Prodr.* xvi. 1. 475; *Miq. Fl. Ind. Bat.* i. 2. 801, and *Ann. Mus. Lugd. Ind. Bat.* iii. 129. *C. monander*, *Br. in Bot. Mag.* t. 2190 in note. *C. ceylanicus*, *Miq. l. c.* 802. *C. denticulatus*, *Cord. in Adæus* iii. 296. *Ascarina serrata*, *Bl. En. Fl. Jav.* i. 79. *Sarcandra chloranthoides*, *Gardn. in Calc. Journ. Nat. Hist.* viii. 348; *Wight Ic.* t. 1946; *Cord. l. c.* 301.

KHASIA Mts., alt. 4–5000 ft., *Jenkins*, &c.—TRAVANCORE; on the Pulney Mts., *Wight*. PENANG, *Porter*, *Wallich*, *Maingay*. CEYLON; Central Province, alt. 8–5000 ft., *Walker*, &c.—DISTRIB. China, Philippine Islands, Japan.

Habit of *C. officinalis*, but taller and more woody, with deeply serrate leaves and red berries.

UNDETERMINABLE AND EXCLUDED SPECIES.

C. GRANDIFOLIUS, *Miq. Fl. Ind. Bat.* i. 1. 802; *Solms in DC. Prodr.* xvi. 1. 477; “branches warted, leaves petioled membranous 7–8 in. long, obversely oblong acuminate remotely callously mucronate-serrate base acute or subcuneate, nerves 8–10 erecto-patent, petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., spikes brachiately subopposite or alternate, bract ovate boat-shaped tip subcallous. *Herb. Wight*, n. 878.”—I can form no guess as to what this is, having found nothing corresponding to the description in *Wight’s Herbarium*.

C. INCONSPICUUS, *Swartz in Phil. Trans.* lxxviii. 359, t. 15; *Solms l. c.* 474. *C. indicus*, *Wight Ic.* t. 1915.—The specimens of this from which *Wight’s* published drawing was made are in his Herbarium, but without locality, nor is any locality given with his description in the *Icones*; they are no doubt from China.

ANOMALOUS GENUS.

CIRCÆASTER, Maxim.

A small, inconspicuous, very slender annual, with a simple filiform

erect stem, bearing at the top a whorled fascicle of leaves and many axillary few-fl. short peduncles. *Leaves* membranous, rhomboidly spathulate, cuneate and quite entire below the middle, above it semicircular and toothed. *Flowers* minute, 2-sexual or female. *Sepals* 2-3, minute, scale-like, persistent. *Petals* 0. *Stamens* 1-2, alternate with the sepals, persistent, filaments linear flattened; anther subglobose, cells rather diverging, opening laterally. *Carpels* 1-4, free, linear-oblong, 1-celled; stigma sessile, oblique; ovule pendulous from the top of the cell. *Ripe carpels* oblong, terete, pericarp membranous, narrowed at the base, sparsely clothed with hooked bristles. *Seed* oblong, testa membranous adherent to the hard fleshy albumen; embryo in the axis of the albumen terete, cotyledons linear, radicle superior.

C. agrestis, Maxim. in *Bull. Acad. St. Petersb.* xxvii. 556; *Mel. Biol.* xi. 345.

WESTERN HIMALAYA; Kumaon, alt. 8000 ft., *Strachey & Winterbottom*, *Duthie*.—DISTRIB. W. China.

Stem 3-5 in., ending in fibrous roots. *Leaves* very many in a solitary false whorl, formed of crowded pairs, pale green, narrowed into a broad petiole and together with it 1-1½ in. long, nerves flabellate; immediately below the whorl of leaves are two linear 1-nerved ones, which are the primordial leaves. *Pedicels* shorter than the petioles, very slender. *Sepals* $\frac{1}{10}$ in. long, ovate-oblong. *Stamens* twice as long. *Ripe carpels* cylindric, $\frac{1}{2}$ in. long, green, tip acute.—A very obscure plant, of doubtful or indeed unknown affinity, but regarded by Bentham as near *Chloranthaceæ*. It occurs in fields in W. China, and in Kumaon on mossy rocks in woods, &c. The hooked bristles on the carpels are such aids to dispersion that it may be supposed to be common, though so inconspicuous as to be overlooked.

ORDER CXXVI. MYRISTICÆÆ.

Evergreen trees, often stellately tomentose. *Leaves* alternate, quite entire, exstipulate, often pellucid-punctate. *Flowers* dioecious, small, regular, fascicled umbelled or paniced; bracteoles persistent or caducous. MALE FL. *Perianth* 3-(2-4)-lobed, valvate in bud. *Anthems* 3 or more, connate in a sessile or stipitate column head ring or disk, 2-celled. FEM. FL. *Perianth* of the male. *Staminodes* 0. *Ovary* superior, free, sessile, 1-celled; style short or 0; stigma capitate discoid or lobed; ovule 1, basal, erect, anatropous. *Fruit* fleshy, at length 2- rarely 4-valved. *Seed* erect, enclosed in a thin or fleshy entire or lacerate often highly coloured aril, testa thin or crustaceous, albumen hard densely ruminant; embryo basal, small, cotyledons rounded spreading often wrinkled, radicle short inferior.—Species about 80, Tropical East Asiatic, Malayan and American; a few African, and one Australian.

Previous to the publication of the "Flora Indica" of Dr. Thomson and myself, the British Indian Nutmegs were known only through the named but undescribed specimens distributed by Wallich; for the species contained in Roxburgh's Flora are for the most part from the Archipelago, and were quite undeterminable by that author's brief descriptions. Wallich's types are therefore the foundation of our knowledge; but then there are often several species under one name, and most are in so incomplete a condition, that it is impossible to draw up satisfactory descriptions from them alone, and very difficult to identify other collections by them. Nor is their imperfection the only obstacle; more serious ones are, the excessive variability of the foliage of individual species, throughout the genus, in size, form, texture, pubescence and number of nerves; and the alterations in all these characters in leaves taken at different stages of growth of the same tree. The only other Indian collections available for the "Flora Indica" were Griffith's, and these were assiduously compared

with Wallich's in the endeavour to unravel the intricacies of the genus and limit its species. The arrival of Maingay's splendid Malay Peninsular Herbarium, and his notes on this genus, have enabled me in the present work to correct several erroneous determinations of the "Flora Indica," and to approach nearer to a satisfactory description of the species; but much still remains to be done, which can only be accomplished by a study of living specimens at different times of the year. For every species, flowers of both sexes and ripe fruit are all absolutely necessary for its exact limitation, and the knowledge of its affinities, as well as for establishing sections of the genus. Hitherto for the latter purpose most importance has been given to the structure of the staminal column, which from its minuteness (in most of the species) is difficult of analysis, in dried specimens especially; and I am inclined to think that this organ is more variable than has been supposed, and that some sections founded on it by Alph. De Candolle and others must be abandoned. In the following descriptions, that of the colour of the foliage applies only to dried specimens. This genus affords a fine field for study, but to do this effectually requires a careful comparison of the materials in the Herbaria of Holland, Florence, and Kew. Until this is done, it will be impossible to say which of many of the Indian species are natives of the Malay Archipelago.

MYRISTICA, Linn.

Character of the Order.

Sect. I. **Eumyristica**. *Male flowers* racemed or panicled; perianth with a persistent scale-like bracteole at its base. *Anthers* elongate, firmly connate in a shortly stipitate or sessile column.

M. fragrans, *Houtt. Hist. Nat.* ii. 3. 233; glabrous, leaves 3-3½ in. elliptic-oblong or -lanceolate acuminate glaucous beneath, nerves about 8 pair slender, flowers bracteolate males in lax slender supra-axillary racemes. *Alph. DC. in Prodr.* xiv. 1. 189; *Blume Rumph.* 180, t. 55; *Miquel Fl. Ind. Bat.* i. 2. 53; *Bentl. & Trim. Med. Pl.* iii. t. 218. *M. officinalis*, *Linn. f. Suppl.* 265; *Gærtn. Fruct.* i. 194, t. 41 (*excl. syn. Rumph.*); *Hook. Exot. Bot.* t. 155, 156, and *Bot. Mag.* t. 2756, 2757; *Spach Suites Buff.* t. 143. *M. moschata*, *Thunb.*; *Wall. Cat.* 6785; *Roxb. Fl. Ind.* iii. 843; *Reichb. Ic. Exot.* t. 276, 277; *Woodv. Med. Bot.* iv. t. 238; *Hayne Arnz. Gewachs.* ix. t. 12; *Nees Pl. Med.* t. 133; *Guimp. & Schl.* t. 73, 74. *M. aromatica*, *Lamk. in Act. Par.* 1788, 155, t. 5-7, and *Ill. Gen.* t. 832; *Roxb. Cor. Pl.* iii. 267.—*Rumph. Herb. Amb.* ii. 14, t. 4.

Cultivated in the MALAYAN PENINSULA, PENANG and the MALAY ISLANDS;—native of the Eastern Moluccas.

A lofty tree; branches slender. *Leaves* coriaceous, sometimes oblanceolate, and tip caudate, base acute, pale yellow brown, paler with red-brown nerves beneath; petiole ¼-½ in. *Male racemes* 1-2 in.; flowers ¼ in. long, ellipsoid or urceolate, nodding; bracteole a scale under the glabrate perianth; anthers 9-12, connate in a cylindric stipitate column. *Fruit* ovoid, subglobose or pyriform, 1½-2 in. long.—*Alph. DC.* describes the perianth as strigose with appressed hairs, but I find them to be nearly or quite glabrous; *Blume* says very sparsely strigose.

1. **M. elliptica**, *Wall. Cat.* 6798 A; glabrous, leaves 8-10 in. linear-oblong subacute subglaucous beneath, nerves about 12 pair slender, male fl. in short axillary racemes bracteolate urceolate, fem. fl. few fascicled on short supra-axillary peduncles. *H. f. & T. Fl. Ind.* 162; *Alph. DC. in Prodr.* xiv. 1. 190; ? *Kurz For. Fl.* ii. 282.

PENANG and SINGAPORE, *Wallich.* MALACCA, *Maingay (Kew Distrib.* 1296). ? Andaman Islands, *Kurz.*

A tree; branches stout. *Leaves* very pale; petiole ½-1 in., stout. *Male perianth*

elongate-urceolate or ellipsoid, $\frac{1}{2}$ in. long, 3-toothed; bracteole orbicular; connective apiculate; *fem.* urceolate; ovary stipitate strigose, stigma oblong. *Fruit* $2\frac{1}{2}$ in. long, oblong, glabrous; "aril blood-red lacinate," *Maingay*.—I have seen no Andaman specimens, and Kurz's description is quite at variance with Wallich's plant in the scurfy tomentose inflorescence (see *M. andamanica*). Wallich's "6798 B? fructu maximo" is doubtful.

2. *P. laurifolia*, *Hook. f. & T. Fl. Ind.* 163; glabrous except the inflorescence, leaves 6–9 in. shortly petioled very coriaceous linear-oblong or lanceolate obtuse or subacute glaucous beneath, nerves 12–20 pair, male fl. bracteolate tomentose densely crowded in a very short stout axillary peduncle. *Alph. DC. in Prodr.* xiv. 1. 191; ? *Beddome Fl. Sylv.* t. 267. *M. diospyrifolia*, *Alph. DC. l. c.* *M. tomentosa*, *Thwaites, fid. Alph. DC. l. c.*

DECCAN PENINSULA; on the Western Ghats from Canara to Cape Comorin, from the plains up to 5000 ft., *Beddome, &c.* CEYLON, Central Province, alt. 1500–4000 ft., *Walker, &c.*

Branches moderately stout. *Leaves* variable, shining above with impressed nerves, pale brown or whitish beneath, base acute rounded or cuneate; nerves sometimes very faint; petiole 1–1 $\frac{1}{2}$. *Peduncle* very stout indeed, $\frac{1}{2}$ in. long or less; flowers densely crowded, sessile or stoutly pedicelled, nearly $\frac{1}{2}$ in. long, silkily pubescent, shortly 3-lobed.—*Beddome's* figure represents a much more slender plant than any of the specimens I have seen, with slender petioles and pedicels, the latter loosely clustered on an almost obsolete peduncle. *Fruit* in *Beddome's* figure $2\frac{1}{2}$ in. diam., globose, apiculate, with a deep longitudinal furrow; aril deeply cut into linear lacerate lobes, nearly enclosing the seed.—*Alph. De Candolle* gives *M. tomentosa*, *Thwaites* (not *H. & T.*), as a synonym of *M. diospyrifolia*, but I do not find that name of *Thwaites*, and as the plant is glabrous, I suspect some error of citation.

Var. *lanceolata*; leaves lanceolate 6 by 1 $\frac{1}{2}$ in., petiole very stout, nerves very faint.—*S. India, Beddome.*

Var. *zeylanica*; leaves linear-oblong obtuse 7–8 by 2–2 $\frac{1}{2}$ in., petiole more slender, pedicels longer. *M. ceylanica*, *Alph. DC. in Ann. Sc. Nat. Ser. 4*, iv. 29, and in *Prodr.* xiv. 1. 190. *M. zeylanica*, *Thwaites Enum.* 11 and 399.—*Ceylon, Thwaites.*—*Beddome's* figure more resembles this than it does the other Ceylon form of the species, which is identical with the peninsular Indian.

3. *M. andamanica*, *Hook. f.*; glabrous, leaves petioled membranous elliptic-oblong subacute not glaucous beneath, nerves 12–15 pair very slender, male flowers in sessile or peduncled clusters on the branches very shortly pedicelled, bracteole large, perianth globose 3-lobed, staminal column oblong obtuse. ? *M. elliptica*, *Kurz For. Fl.* ii. 282 (not of *Wall.*).

ANDAMAN ISLANDS; *Herb. Hort. Bot. Calcutta.*

Branches slender, quite glabrous, youngest shoots rustily hoary. *Leaves* almost membranous, 3–4 in. diam., pale brown when dry on both surfaces, base acute, nerves spreading; petiole $\frac{3}{4}$ –1 $\frac{1}{2}$ in., slender. *Clusters of flowers* sessile or on a thick 3–6 fld. peduncle $\frac{1}{4}$ – $\frac{1}{2}$ in. long; pedicel $\frac{1}{2}$ in., stout, rather scurfy; perianth quite glabrous and smooth, $\frac{1}{8}$ – $\frac{1}{6}$ in. diam.—Apparently a very distinct species, but approaches *M. malabarica*.

4. *M. malabarica*, *Lamk. in Act. Par.* 1788, 162; nearly glabrous, flowering branches slender, leaves 4–8 by 1 $\frac{1}{2}$ –4 in. linear-oblong or elliptic-lanceolate subacute glaucous beneath, nerves 8–14 pair, male fl. in subcymose panicles bracteolate, peduncles and pedicels slender, perianth globose, anthers 10–15, fruit narrowly oblong pubescent. *Blume Rumph.* i. 185; *Hook. f. & T. Fl. Ind.* 163; *Alph. DC. in Prodr.* xiv. 1. 195; *Dalz. & Gibs. Bomb. Fl.* 4; *Beddome Fl. Sylv.* t. 269. ? *M. tomentosa*, *Grah. Cat. Bomb. Pl.* (not *H. f. & T.*). *M. dactyloides*, *Wall. Cat.* 6786 (hardly of *Gärtner*). *M. notha*, *Wall. Cat.* 6787.—*Rheede Hort. Mal.* iv. t. 5.

The CONCAN, CANARA and N. MALABAR, *Heyne*, &c.

A tall tree. *Leaves* thinly coriaceous on the flowering branches, thick and leathery on the fruiting, more or less shining above, nerves very slender; petiole $\frac{3}{4}$ –1 in. *Male panicles* 1–1½ in., axillary and supra-axillary; peduncle naked below, subumbellately cymose above; bracteole an orbicular scale; perianth $\frac{1}{8}$ in., puberulous, 3-toothed; anthers connate in a cylindric shortly stipitate-column. *Female panicles* few-fl.; flowers larger. *Fruit* 2 by 1 in., pubescent.—A fruiting specimen apparently of this species from Dalzell (marked *amygdalina*?) has oblong leaves 10 by 4 in. and rounded at the base; the detached fruit accompanying it is, however, long and pubescent as in Rheedé's and Beddome's figures of *malabarica*. On the other hand, fruits that accompany Wight's Malabar specimens of *malabarica* are shorter broader and only 1½ in. long.

5. *M. malaccensis*, *Hook. f.*; quite glabrous, branches rather slender, leaves 8–10 in. linear-oblong acute or acuminate, nerves 15–20 pair slender, male fl. in subcymose fascicles bracteolate subglobose, anthers about 7.

MALACCA, *Maingay* (*Kew Distrib.* 1305).

Habit of *M. malabarica*, but leaves longer, usually rounded at the base but sometimes acute, petiole rather short $\frac{1}{3}$ –½ in., panicle longer 3–4 in., with more numerous much smaller flowers $\frac{1}{10}$ in. long, on slender rather longer pedicels. *Perianth* 3-toothed; anthers connate in a broad sessile column, tips acute.—The probable fruiting state of this, according to Dr. Maingay's Herbarium notes (*Kew Distrib.* 1304) in specimens of which the leaves 6 in. long are elliptic-oblong obtuse very leathery acute at the base with a very stout petiole, "Fruit subglobose 1½ by 1½ in., glabrous, pale-yellowish; pericarp thick, fleshy, $\frac{2}{10}$ – $\frac{3}{10}$ in. thick; aril complete, slightly lobed at the tip, clear reddish orange, testa slightly crustaceous pale brown."

6. *M. magnifica*, *Beddome Fl. Sylv.* t. 268; young parts clothed with golden pubescence, leaves 10–24 in. thickly coriaceous linear-oblong acute or acuminate densely stellately tomentose beneath glabrate in age, nerves 20–26 pairs, male flowers tomentose dense crowded on very short stout axillary peduncles bracteolate, fruit large oblong.

SOUTH TRAVANCORE; in the plains, *Beddome*.

An immense gregarious tree, 100 feet high, described by Beddome as having buttressed trunks, most like *M. laurifolia*, but different looking, with different pubescence venation and antheriferous column, and a larger fruit. Except in the much larger size and pubescence, I see no difference between this and *laurifolia*. The specimen communicated by Beddome, and which he says was pronounced at Kew to be *M. malabarica*, consists of a single leaf 20 by 6 in., with 20 pairs of nerves, and a very stout petiole and midrib; it is perfectly glabrous, presents no definite character but size and corresponding number of nerves; both the texture, colour and nervation occur in leaves of *M. laurifolia* and *malabarica*.

7. *M. Maingayi*, *Hook. f.*; branches stout black, shoots and inflorescence rusty-tomentose, leaves 7–10 in. linear-oblong acute or acuminate glabrous, nerves 14–18 pairs, male panicles axillary and supra-axillary, peduncle and pedicels short very stout, perianth bracteolate ovoid, column of anthers slender acute.

MALACCA, *Maingay* (*Kew Distrib.* 1289).

A lofty tree. *Branches* much angled by the contraction of the bark in longitudinal ridges. *Leaves* very coriaceous, 2–2½ in. broad, pale brown, nerves slender, base acute or rounded; petiole 1 in. *Male panicles* decurved, 8–10-fl.; peduncle compressed; pedicels about ¼ in.; perianth as long, broadly ovoid; bracts caducous; bracteole broad half as long as the perianth; anthers 9, stipes very short, pubescent.—Approaches *M. hyposticta*, Miquel, of Java, but the stout branches with black bark and very coriaceous leaves not glaucous beneath appear to distinguish it.

Sect. II. **Pyrrhosa**, *Blume* (*Irya*, *H. f. & T.*, *Horsfieldia* & *Gymna-cranthera*, *Alph. DC.*). *Male flowers* ebracteolate (bracteoles fugacious) generally minute, in many-fld. compound panicles (or paniculate heads in *M. Horsfieldii*). *Anthers* combined in a fleshy oblong turbinate spherical or 3-gonous sessile (rarely stipitate) column or cup.

* *Anthers* produced to the base of the column, closely combined throughout their length (not separable), or the tips alone free.

† *Panicles* more or less tomentose.

8. **M. superba**, *Hook. f. & Thoms. Fl. Ind.* 162; branchlets leaves beneath and panicles scurfily rusty-tomentose, leaves 12-18 in. elliptic-lanceolate or oblanceolate, nerves 25-30 pair, male panicles robust, perianth glabrous, staminal column subsessile solid ovoid obtuse, anthers 10. *Alph. DC. in Prodr.* xiv. 1. 194.

. PENANG, *Phillips*.

Branches stout. *Leaves* coriaceous, 4-8 in. broad, bright red brown, and loosely stellately tomentose beneath; nerves firm, nearly straight; petiole $\frac{3}{4}$ in. *Male panicles* in the axils of fallen leaves, 4-6 in. long; perianth $\frac{1}{2}$ in. long, ellipsoid, obtuse, 3-4-toothed; pedicel as long, very stout; anthers closely confluent to their tips in a subsessile column not apiculate. *Female fl. and fruit* unknown.

9. **M. Murtoni**, *Hook. f.*; branchlets young leaves beneath and panicles rustily tomentose, leaves 10-12 in. oblong very coriaceous glaucous beneath, base rounded or cordate, nerves 20-30 pair slender spreading, male fl. $\frac{1}{2}$ in. long broadly ovoid in short stout dense-fld. panicles very shortly pedicelled, staminal column fusiform sessile, anthers with the tips free.

SINGAPORE, *H. J. Murton*.

Branches very stout. *Leaves* 3-5 in. broad, brown and shining above, old quite glabrous beneath; petiole $\frac{3}{4}$ - $\frac{1}{2}$ in., very stout, glabrous. *Male panicles* 1-2 in. long; flowers densely crowded, perianth lobed $\frac{1}{2}$ -way down; anthers slightly twisted. *Fem. fl. and fruit* unknown.—This appears to be nearest to *M. superba*, differing in the much smaller flowers and fewer anthers with free tips.

10. **M. tomentosa**, *Hook. f. & Thoms. Fl. Ind.* 161; branchlets leaves beneath and panicles softly rusty-tomentose, leaves 5-12 in. elliptic-oblong lanceolate or oblanceolate at length glabrate, nerves 12-20 pair, male panicles robust, perianth $\frac{1}{4}$ in. diam. globose glabrous granulate, staminal column sessile turbinate solid top depressed. *Alph. DC. in Prodr.* xiv. 1. 204.—*Myristicaceae*, *Wall. Cat.* 9025.

PENANG, *Porter, Phillips*. MALACCA, *Maingay* (*M. Wallichii*, *Kew Distrib.* 1284).—DISTRIB. Borneo?.

Branches stout, bark grey. *Leaves* 2-2 $\frac{1}{2}$ in. broad, thinly coriaceous, dull brown above, bright red-brown beneath; base acute or cuneate; petiole $\frac{1}{2}$ in. *Male panicles* like those of *M. Wallichii*, but not so long and stout; pedicels slender; perianth 3-4-cleft, glabrous; anthers about 15, quite confluent; tips incurved but not free.—A Bornean plant entirely resembles this, except in that it has a much smaller staminal column, with only about 10 anthers. I greatly doubt the constancy of the characters drawn from the number of anthers in this genus.

11. **M. Wallichii**, *Hook. f. & Thoms. Fl. Ind.* 161; shoots ashy grey, leaves 8-12 in. oblong or linear-oblong acute or acuminate glabrous or sparingly rusty-tomentose beneath, nerves 20-25 pair, male panicles very stout rusty-pubescent, perianth $\frac{1}{4}$ in. diam. subsessile glabrous, staminal column a depressed 3-gonous 3-lobed fleshy sessile cup with incurved

anther-cells. *Alph. DC. Prodr.* xiv. 1. 203. *M. Horsfieldii*, *Blume?* *Wall. Cat.* 6806, *in part.*

MALACCA, *Maingay* (*Kew Distrib.* 1284). SINGAPORE, *Wallich, Lobb, Maingay* (*M. crassifolia*, *Kew Distrib.* 1283).

A tall tree, branches robust. *Leaves* 2-3½ in. broad, very coriaceous, dull brown above, red brown beneath, nerves spreading; petiole 1-1½ in., often stout. *Male panicles* axillary and from the axils of fallen leaves, branched from the base which is often as thick as the petiole, branches stout; flowers pedicelled, thickly coriaceous, in globose clusters of 8-10, 3-4-cleft; anthers 10-12 (24-27 cells?, *Maingay*), forming a low obconic 3-gonous fleshy column of firmly united cells. *Female panicles* short; fruit (unripe) very shortly and stoutly pedicelled.—This species, which is probably a variety of *M. tomentosa*, was founded on the young fruit and leaves of one of a mixed lot of species comprised under Wallich's No. 6806, of which he says "forsan duæ species mixtæ." There are two sheets of specimens under this number; one contains the fruiting specimens taken up as *Wallichii*, together with a panicle of male fl. of *M. crassifolia*; the other contains scraps of *M. polyspherula* and *M. crassifolia*.

12. *M. Kingii*, *Hook. f.*; leaves 8-10 in. long-petioled obovate or oblanceolate obtusely acuminate thinly coriaceous quite glabrous not glaucous beneath, nerves 15-20 pair very slender, panicles 4-6 in. sparsely rusty-tomentose flowers pedicelled, male perianth globose ½ in. diam. 3-4 cleft, staminal column sessile depressed-globose top concave, anthers firmly united with incurved tips.

SIKKIM HIMALAYA; near Sivoke, alt. 10,000 ft., *King*. ? ASSAM, *Masters in Herb. Calcutt.*

Branches very stout with rough bark and large scars of fallen leaves. *Leaves* 3½-5 in. broad, pale brown on both surfaces when dry, nerves spreading; petiole 1-1½ in. *Panicles* rather stout, from the axils of fallen leaves, much and loosely branched, flowers not very crowded; pedicels short stout. *Perianth* thick. *Staminal column* small; anthers about 20?—This differs from *M. glabra*, to which it is perhaps too closely allied, in the pubescent panicle, longer petiole, larger leaves with more numerous veins and stouter panicles and pedicels, larger perianth and small depressed staminal column. The Assam specimens are of leaves only, 12-18 in. long by 5-7 broad.

13. *M. Horsfieldii*, *Blume Bijl.* 577, and *Rumph.* i. 192; leaves very coriaceous 8-12 in. oblong or elliptic-oblong rusty-tomentose beneath at length glabrate, nerves 16-30 pair very strong, male panicles rusty-tomentose, flowers sessile in dense globose heads, perianth ⅓ in. long clavate angled 3-4-toothed, anthers 6 confluent in a clavate sessile column depressed at the top. *Hook. f. & T. Fl. Ind.* 164; *Alph. DC. in Prodr.* xiv. 1. 200; *Bedd. For. Man.* 176. *M. Iryadghedhi*, *Gærtn. Fruct.* i. 196, t. 41, f. 4, *excl. syn.* *M. ferruginea*, *Wall. Cat.* 6803. *Pyrrhosa Horsfieldii*, *Wight Ic.* t. 1857. *Horsfieldia odorata*, *Willd. Sp. Pl.* iv. 872.

CEYLON; in the Ambagamowa and Ratnapoora districts. SINGAPORE (*cult.?*), *Wall.*—DISTRIB. *Cult.* in Java.

A tall tree, branches very stout, densely woolly, at length glabrate. *Leaves* 2½-4 in. diam., pale bright-brown above, rufous at first beneath, or red brown; petiole very stout, ½-1 in. *Male panicles* 3-6 in., rachis and branches very stout; heads of flowers ¼-½ in. diam., quite globose; perianths subsessile, compacted, glabrous, hardly pedicelled; bracteoles orbicular, retained amongst the flowers but caducous, densely woolly outside; anthers quite confluent to the tips. *Female panicles* short, few-fl., ovary tomentose. *Fruit* shortly stoutly peduncled, ovoid, 1 in. long, rusty-tomentose; aril fleshy, entire.

** *Panicles glabrous.*

14. *M. amygdalina*, *Wall. Pl. As. Rar.* i. 79, t. 90, and *Cat.* 6797;

glabrous, leaves 6-8 in. elliptic-lanceolate acute at both ends, nerves 8-12 pair, male panicles much branched, perianths $\frac{1}{10}$ in. diam. globose 2-3-fid, staminal column cupular subglobose, anthers firmly united, fruit ellipsoid, aril nearly entire yellow. *Hook. f. & Thoms. Fl. Ind.* 160; *Alph. DC. in Prodr.* xiv. 1. 203; ? *Kurz For. Fl.* ii. 283. *M. exaltata*, *Wall. Cat.* 6804 B?.

TENASSERIM; at Tavoy and Moulmein, *Wallich*.

A tall perfectly glabrous tree. *Leaves* $1\frac{1}{2}$ -2 in. diam., coriaceous, pale brown on both surfaces, narrowed into a petiole $\frac{1}{2}$ in. long. *Male panicles*, from the axils of fallen leaves, 3-5 in. long and nearly as broad, branched from the base, quite glabrous; flowers loosely clustered, pedicels as long as the perianth, slender; staminal column globosely trigonous, fleshy, concave; anthers about 8, wholly combined. *Fruit* shortly peduncled, $1\frac{1}{2}$ in. long; pericarp rather thin, glabrous; aril yellow, lacerate at the tip only.—This species again was founded on fruiting specimens of *Wallich's*, but I think there is no doubt that his *M. exaltata*, B?, from the same country is the same in male flowering state. In the "Flora Indica" there are united with it two very similar Malaccan plants, which have, however, quite different stamens (one is *M. polyspherula*, the other perhaps the same). I am in doubt as to *Kurz's M. amygdalina*; his description agrees with that here described except in that the leaves have 12-19 pairs of nerves and the panicles are supra-axillary. A plant of Helfer's differs only in having more anthers and rather larger flowers, tending to unite the following with this.

15. *M. glabra*, *Blume Bijl.* 575, and *Rumphia* i. 191, t. 64, fig. 1; quite glabrous, leaves 3-8 in. elliptic-lanceolate or oblong obtuse acute or acuminate, base acute, nerves 7-14 pair, male panicle much branched, perianths $\frac{1}{4}$ - $\frac{1}{10}$ in. diam. ovoidly globose 2-4-cleft glabrous, staminal column oblong or turbinate, anthers firmly united tips incurved or inflexed, fruit oblong or ellipsoid, aril thin scarlet. *Hook. f. & Thoms. Fl. Ind.* 161; *Alph. DC. in Prodr.* xiv. 1. 202. *M. integra* and *M. floribunda*, *Wall. Cat.* 6799, 6805.

SILHET, *Wallich, J. D. H. & T. T.* ? TENASSERIM, *Helfer (Kew Distrib.* 4858). SINGAPORE, *Wallich, Murton.* MALACCA, *Maingay (Kew Distrib.* 1286).—DISTRIB. Java.

Leaves coriaceous, not glaucous beneath, rather pale brown, very variable in size and apex, but base always acute and petiole short, hardly exceeding $\frac{1}{2}$ in. *Male panicles* 2-6 in., quite glabrous, branched from the base; peduncles and pedicels slender. *Staminal column* variable in length, top rounded; anthers 12-15, the tips meeting in a concavity or not. *Fruit* broadly oblong or ellipsoid, 1 in. long, deeply grooved on one side towards the base; valves thick. I doubt this being different from *M. amygdalina*. Helfer's specimens have much smaller flowers than the Silhet ones, and more numerous anthers.

16. *M. bivalvis*, *Hook. f.*; quite glabrous, leaves 7-10 in. linear-oblong obtusely acuminate, nerves 15-20 pair, male panicles much branched, perianths $\frac{1}{2}$ in. diam. broader than long transversely 2-valved, staminal column a laterally compressed 2-fid fleshy cup clothed with numerous and deeply inflexed anthers.

SINGAPORE; in jungles behind the Botanical Gardens, *Murton*.

A bushy tree, 30-40 ft. high, bark grey. *Leaves* 2-2 $\frac{1}{4}$ in. diam., darker brown above, pale not glaucous beneath; nerves very spreading; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Male panicles* quite glabrous; perianths the largest of the group, turgid, transversely oblong; pedicel as long as the valves; anther column an obconic compressed sessile fleshy cup, or rather a cup formed of the firmly united anther-cells, which are incurved as two inflexed opposite flaps, tips of the cells not free.—A plant from Roxburgh's Herbarium resembles this closely, but the leaves are more membranous

with more oblique nerves, and the inflexed anthers are confined to the upper part of an obconic stipes, as in *Irya*. It is probably one of the species described by Roxburgh in terms too brief to be of any use in identifying the plants intended.

** Anthers produced to the base of the column or not, cells more or less free, easily separable.

17. **M. Farquhariana**, *Wall. Cat.* 6795; glabrous except the panicle, leaves 5-10 in. oblong or linear- or elliptic-oblong acute or acuminate usually very glaucous beneath, nerves 8-20 pair, male panicles spreading, perianth bell-shaped 3-fid pubescent within, staminal column sessile, anthers free above, tips erect acute. *Hook. f. & Thoms. Fl. Ind.* 162; *Alph. DC. in Prodr.* xiv. 1. 200; *Beddome Fl. Sylv.* t. 270. *M. paniculata*, *Alph. DC. in Ann. Sc. Nat. Ser. 4*, iv. 31, and in *Prodr. l. c.*

DECCAN PENINSULA; from the Concan to Wynaad and Tinnevely, ascending the Ghats to 2000 ft. MALACCA, PENANG and SINGAPORE, *Wallich, &c., Griffith (Kew Distrib.* 4355), *Maingay (Kew Distrib.* 1290, 1293, ?1302).—DISTRIB. Philippine Islands.

A tall tree, young parts pubescent; branches stout, grey. *Leaves* extremely variable in size, form and texture, nerves faint or strong; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Male panicles* 3-8 in., rather slender, branched from the base; flowers fascicled, perianth $\frac{1}{2}$ in.; anthers 7-11, narrow, connectives attached behind and from the base to about the middle only, so that the anthers are easily detached by dissection. *Female panicles* 6-10-fid. *Fruit* 1-1 $\frac{1}{4}$ in., subglobose, glabrous, aril lacerate.—This species is founded on Wallich's Singapore fruiting specimen; the identity in foliage of those and a Malaccan plant of Griffith with small flowers suggested their union in the "Flora Indica." As stated under *M. Griffithii*, there are specimens of that plant as like Wallich's type in foliage. In the "Flora Indica" the anthers are described as having involute tips, but this is not the case. *Alph. DC.* separates the Malayan specimens from the Deccan ones on characters taken from the foliage, but the leaves vary greatly in both countries, and identical forms are common to both.

18. **M. crassifolia**, *Hook. f. & Thoms. Fl. Ind.* 160; nearly glabrous, leaves 8-12 in. thickly coriaceous oblong obtuse or acute, base rounded or cuneate, nerves 12-15 pair, male panicle sparsely rusty-pubescent, perianth $\frac{1}{2}$ in. glabrous usually 2-fid, anthers 3-5 in a depressed ring, cells separable. *Alph. DC. in Prodr.* xiv. 1. 204. *M. Horsfieldia*, *Blume?*, *Wall. Cat.* 6806, in part. *M. Irya*, var. *crassifolia*, *Miquel in Herb.*

MALACCA, *Griffith (Kew Distrib.* 4550). SINGAPORE, *Wallich, Anderson*.—DISTRIB. Borneo.

Branches very robust. *Leaves* 3-4 $\frac{1}{2}$ in. diam., grey-brown above, red-brown beneath, nerves slender; petiole $\frac{3}{4}$ -1 in., very stout. *Male panicle* 3-4 in., branched from near the base; flowers clustered, globose; anther-cells 6-10, slightly cohering by their backs, sessile, tips free, hardly incurved.

19. **M. polyspherula**, *Hook. f.*; glabrous except the panicle, leaves 6-10 in. linear-oblong or lanceolate obtuse acute or acuminate, nerves 8-16 pair base rounded or acute, male panicle rusty-tomentose, perianth globose $\frac{1}{2}$ in. diam. glabrous 2-4-cleft, anthers 4-6 in a depressed column, cells separable. *M. globularia*, *Hook. f. & Thoms. Fl. Ind.* 160; *Alph. DC. in Prodr.* xiv. 1. 202 (not of *Blume*). *M. Horsfieldia*, *Blume?*, *Wall. Cat.* 6806, in part.

SINGAPORE, *Wallich*. MALACCA, *Griffith (Kew Distrib.* 4351 *amygdalina*, and 4352 *globularia*); *Maingay (Kew Distrib.* 2286, *glabra*).

Branches stout, shoots slightly scurfy, bark grey. *Leaves* rarely 2 in. broad,

coriaceous, greenish grey above, brown beneath; nerves slender, nearly horizontal; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., stout. *Male panicles* 3–3 $\frac{1}{2}$ in., branching from near the base, flowers pedicelled, glabrous, yellow, black when dry; anthers in a sessile broadly obconic trigonous truncate mass, anther-cells incurved and meeting in a tricurral line.—Specimens of *M. globularia* from Amboyna show that this was erroneously referred to that plant in “*Flora Indica*.” From *M. amygdalina*, with which it was confounded in “*Flora Indica*,” the stamens at once distinguish it.

20. *M. Griffithii*, Hook. f.; glabrous except the finely pubescent panicles and flowers, leaves 5–6 in. linear-lanceolate finely acuminate shining above glaucous beneath, base acute, nerves 8–10 pair very faint, male panicles slender, perianth globose $\frac{1}{10}$ in. diam. 2–3-cleft, anthers 8 in a globose sessile mass, cells separable.

MALACCA, Griffith (*Kew Distrib.* 4356). SINGAPORE, Maingay (*Kew Distrib.* 1306).

Leaves 1 $\frac{1}{2}$ –1 $\frac{3}{4}$ in. broad, very coriaceous (smaller in Maingay’s specimens), and 2 $\frac{1}{2}$ –3 by 1–1 $\frac{1}{4}$ in., pale brown above, very glaucous beneath with a reddish midrib; petiole $\frac{1}{2}$ in. *Male panicle* narrow, rachis and distant branches very slender, naked below; flowers clustered, pedicel slender; anthers easily separable, curved, attached by the back with free tips and sides; cells confluent. Fruit “racemed, size of a cherry, pedicel $\frac{1}{2}$ in., pericarp thick with a deep longitudinal furrow; aril white, as long as the seed,” Griffith mss.—In Maingay’s specimens fruit “elliptic or subglobose $\frac{1}{4}$ in. long dirty orange minutely scurfy, aril complete pinkish convolute lacerate at the tip,” Maingay mss. I cannot be certain of Maingay’s and Griffith’s plants being conspecific; their foliage is identical, but this is all undistinguishable from states of *M. Farquhariana*.

21. *M. Irya*, Gært. *Fruct.* i. 195, t. 41; leaves 6–10 in. linear- or elliptic-oblong acuminate glabrous, nerves 12–20 pair slender, perianth globose $\frac{1}{10}$ in. diam. glabrous 2–3-cleft, anthers 6–8 free in a ring crowning an obconic receptacle, fruit paniced globose. Hook. f. & T. *Fl. Ind.* 159; *Alph. DC. in Prodr.* xiv. 1. 202; *Miquel Fl. Ind. Bat.* i. 2. 64; *Beddome Forest. Man.* 176. *M. javanica*, *Blume Bijl.* 576, and *Rumph.* i. 190, t. 62. *M. sphaerocarpa*, *Wall. Pl. As. Rar.* i. 79, t. 89, and *Cat.* 6796. *M. exaltata*, *Wall. Cat.* 6804, in part.

TENASSERIM, Wallich. SOUTH ANDAMAN ISLANDS, Kurz. MALACCA, Griffith (*Kew Distrib.* 4357), Maingay (*Kew Distrib.* 1291, 1292). CEYLON, not uncommon.—DISTREB. Sumatra, Java, Borneo.

A tree, buds ashy. Leaves 2–3 in. broad, membranous at length coriaceous, dark brown above, lighter beneath, base rounded cuneate or acute; petiole $\frac{1}{2}$ in. *Male panicles* 3–6 in., very many-flid.; fem. shorter, perianths larger. Fruit 1 in. diam., glabrous; pericarp coriaceous; aril thin, entire, yellow or reddish, seed globose.—With the habit inflorescence and minute flowers of Sect. *Pyrhrosa*, this has nearly the staminal column of a *Knema*.

Sect. III. *Knema*. *Male flowers* fascicled on the top of a short stout peduncle or tubercle; pedicels with a persistent bracteole about the middle (under the flower in *M. Cantleyana*). *Anthers* short, in a whorl round a peltate disk.

22. *M. Hookeriana*, Wall. *Cat.* 6802 A; branchlets very stout leaves beneath and panicle most densely flocculent and woolly, leaves 1–2 ft. at length glabrate and glaucous beneath linear-oblong or narrowed downwards obtuse or acute, petiole short thick, nerves 20–30 pair, male fl. $\frac{1}{2}$ in. diam. densely clustered on a short peduncle or tubercle 3-cleft, anthers about 20 on the margin of a long-stipitate orbicular peltate disk. *Hook. f. & Thoms. Fl. Ind.* 156; *Alph. DC. in Prodr.* xiv. 1. 204.

PENANG, *Wallich, Porter*. MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1279).

Branches as thick as the fore-finger; wool tawny, $\frac{1}{2}$ in. thick, flocculent. *Leaves* very variable in breadth, narrowest 12 by $2\frac{1}{2}$ in., broadest 24 by 8 in., thickly coriaceous, pale brown and shining above, wool on under-surface deciduous in large flakes leaving the surface perfectly glabrous. *Male fl.* "crimson within," *Maingay*; pedicels $\frac{1}{2}$ –1 in. long, with a persistent bracteole about the middle; stamens pale rose, filaments very short, anthers deflexed; *fem.-fl.* not seen. *Ovary* "rusty tomentose; stigma subsessile, disciform, concave, crenate-serrate," *Maingay*. *Fruit* $2\frac{1}{2}$ in. long, ellipsoid, most densely woolly, perianth very thick; aril fleshy, lobed.—*Wallich's* 6802 B, without flower or fruit, is probably *Laurineous*.

23. **M. Cantleyi**, *Hook. f.*; branchlets robust and petioles and young leaves and inflorescence densely rusty-tomentose, leaves 9–12 in. oblong or linear-oblong coriaceous glaucous beneath, nerves 20–30 pair strong, male fl. clustered on a tubercle shortly stoutly pedicelled, perianth bracteolate at the base 3-fid, anthers 6–8 on the margin of a stoutly clavately stipitate small disk.

SINGAPORE, *N. Cantley*.

Branches stout with pale bark. *Leaves* 3–5 in. diam., dark brown above, young clothed with flocculent rusty fagacious wool which is more persistent on the midrib above, beneath finely pubescent (probably glabrate in age); petiole very short, stout. *Male fl.* $\frac{1}{6}$ – $\frac{1}{4}$ in. diam., with the pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. long; bracteole orbicular, appressed to the perianth; perianth-lobes short; staminal column small, anthers short sessile separate. *Fem. fl.* and *fruit* unknown.—This appears to be most nearly allied to *M. Hookeriana*; it differs from the other Indian species of this section in the bracteole being close under the perianth.

24. **M. longifolia**, *Wall. Cat.* 6801; branches scurfy or glabrous, leaves 1–2 ft. linear or linear-oblong or obovate-oblong obtuse glabrous glaucous beneath base rounded cordate or acute, nerves 20–40 pair stout, male fl. clavate $\frac{1}{4}$ in. diam. fascicled on a tubercle pedicelled 3-cleft, anthers 12–18 on the teeth of a long-stipitate circular disk, style long glabrous, stigma small toothed. *M. longifolia*, *in part*, *Hook. f. & Thoms. Fl. Ind.* 156; *Alph. DC. Prodr.* xiv. 1. 204; *Kurz For. Fl.* ii. 283. ? *M. linifolia*, *Roxb. Fl. Ind.* iii. 847.

SIKKIM HIMALAYA, in hot valleys, *Thomson*. ASSAM, SILHET and the KHASIA MTS., *Wallich, &c.* CHITTAGONG, *J. D. H. & T. T.* PEGU, MATABAN and TENASSERIM, *Kurz*.—DISTRIB. Ava.

A lofty tree, branchlets stout or slender, sometimes tomentose. *Leaves* extremely variable, usually linear, 12–18 by 2– $2\frac{1}{2}$ in., sometimes much broader, 18–24 by 6–7 in. and narrowed below the middle, thickly coriaceous, pale yellow-brown and shining above, nerves arched or nearly horizontal; petiole $\frac{1}{2}$ –1 in., stout, glabrous or tomentose. *Male fl.* very variable in size, $\frac{1}{2}$ – $\frac{1}{4}$ in. diam., densely tomentose, scarlet within; pedicel $\frac{1}{6}$ – $\frac{3}{8}$ in., bracteole obscure; anther-disk concave or plane; pedicel grooved, contained in the tubular base of the perianth; anthers short, deflexed. *Female* pedicels very short; ovary densely tomentose. *Fruit* 1–2 in. long, subglobose or ellipsoid, tomentose; aril pale, thin, lobed above the middle.—The Malayan plant referred to under this species in "*Flora Indica*" is *M. furfuracea*.

Var. *erratica*; leaves smaller 6–10 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in. *M. erratica*, *Hook. f. & Thoms. Fl. Ind.* 156; *Alph. DC. in Prodr.* xiv. 1. 205. *M. corticosa*, *Hook. f. & Thoms. l. c.* 156, *in part*.—Khasia Mts. and Chittagong.—I fear this is only a small-leaved state of *M. longifolia*, and not even a variety; the stigma is identical, and the character taken from the top of the antheriferous disk being flat (in opposition to concave in *longifolia*), cannot be relied on. The flowers are, however, much more trigonously globose, and the stalk of the anther-disk is shorter.

25. **M. attenuata**, *Wall. Cat.* 6791; branchlets and inflorescence furfuraceously tomentose, leaves 5–9 in. elliptic-oblong or -lanceolate acute

or acuminate glaucous beneath, nerves 14–20 pair, male fl. fascicled on a short peduncle, pedicels slender, perianth subglobose 3-fid $\frac{1}{4}$ in. diam., anthers 12 on the toothed margin of a stipitate peltate disk, fruit ovoid beaked. *Hook. f. & Thoms. Fl. Ind.* 157; *Alph. DC. in Prodr.* xiv. 1. 205; *Beddome For. Man.* 176. *M. corticosa*, *Bedd. Fl. Sylv.* t. 271 (not of *H. f. & T.*). *M. amygdalina*, *Grah. Cat. Bomb. Pl.* 175; *Dalz. & Gibs. Bomb. Fl.* 4.

On the CONCAN GHATS, *Heyne, Dalzell, &c. TRAVANCORE MTS.*, alt. 2–3000 ft., *Beddome*.

Branches slender, at length glabrous. Leaves 2–3 in. diam., thinly coriaceous, pale brown above; midrib and spreading nerves beneath stout, tomentose when young; base acute or rounded; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. Male peduncle $\frac{1}{2}$ in.; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., bracteolate above the middle. Female flower not seen; pedicels of fruit about as long as of the male fl. Fruit 1– $1\frac{1}{2}$ in. long, ellipsoid or ovoid with a short point or beak, densely furfuraceous rusty-tomentose; pericarp thin; aril entire, except towards the lobed apex.—Wallich's specimens (from Heyne) have nearly globose fruits; the Concan and Travancore ones have longer fruits with acute tips.

26. ***M. glaucescens***, *Hook. f. & Thoms. Fl. Ind.* 157; branchlets and inflorescence rusty-hairy, leaves 4–6 (rarely 12) in. linear-oblong obtuse acute or acuminate glaucous beneath, nerves 12–20 pair, male and female fl. few fascicled on a very short peduncle long-pedicelled, male perianth subglobose, female turbinate, anthers about 10 on the toothed margin of a subsessile peltate disk with a flat top, stigma subsessile peltate toothed, fruit small subglobose, aril nearly complete. *M. intermedia* β . minor, *Miquel Fl. Ind. Bat.* i. 270. ? *M. sumatrana*, *Blume Rumph.* i. 187. *M. corticosa*, in part, *Hook. f. & T. l. c.* 158; *Alph. DC. in Prodr.* xiv. 1. 205, in part; *Kurz. For. Fl.* 284. *M. missionis*? & *lanceolata*, *Wall. Cat.* 6788, 6794. ? *M. angustifolia*, *Roxb. Fl. Ind.* iii. 847. ? *Knema glaucescens*, *Jack in Mal. Misc.* No. vii. 35, and in *Hook. Comp. Bot. Mag.* i. 149 (not of Wallich). ? *K. corticosa*, *Lour. Fl. Coch.* 742.

TENASSERIM, *Griffith, Helfer (Kew Distrib.* 4343, 4344, 4349), &c. ANDAMAN ISLANDS, *Kurz. SINGAPORE, Wallich. MALACCA, Griffith (Kew Distrib.* 4343), *Cunning (No. 2315), Maingay (Kew Distrib.* 1280, 1282, 1299). SINGAPORE, *Wallich, Murton*.—DISTRIB. Sumatra, Java.

I have retained the name adopted for this plant in the "Flora Indica," though there is no certainty of its being the *Knema glaucescens* of Jack; it, however, agrees with it in the important character of its very small fruit, which is ovate-oblong as described in the Flora, or nearly globose or ellipsoid (*Kurz*). It is no doubt the *M. lanceolata* and probably *missionis* of Wallich; the latter, from Heyne's Herbarium, was probably collected in the Straits and sent to that missionary. Whether it is the *M. sumatrana* of Blume and *M. angustifolia* of Roxburgh is altogether doubtful. The copious specimens received since the date of the "Flora Indica," show that the Tenasserim and Malayan plants included under *M. corticosa* in that work are not different from *M. glaucescens*. With regard to *M. glauca*, Blume, referred also in that work to *M. corticosa*, its fleshy aril divided low down should (according to his plate) separate it from *glaucescens*, but Javanese specimens named *glauca* and *corticosa* by Miquel and others only differ from the Indian plant in the larger fruit, and *Kurz* describes the aril of *corticosa*, *H. f. & T.*, as "blood-red somewhat fleshy and lacerate;" and as to Loureiro's *Knema corticosa*, much more complete specimens are wanted before it can safely be identified with any Malayan species. The Andaman specimen of *Kurz* has leaves fully a foot long. The small leaves, subglobose male flowers $\frac{1}{4}$ in. diam., and turbinate female ones $\frac{1}{4}$ in. long, together with the subsessile or short styled peltate stigma, and small fruit $\frac{3}{8}$ in. long, with their furfuraceous pericarp and almost entire thin aril, well distinguish this species, whose proper name can only be determined when more is known of the plants quoted under it.

27. **M. laurina**, *Blume Rumph. i.* 139, t. 61; branches inflorescence and leaves beneath especially the nerves scurfily tomentose, leaves 9–12 in. oblong or linear-oblong acute or acuminate glaucous beneath, nerves 20–30 pair, base rounded or cordate, fruit 2–3 in. long subsessile on tubercles of the branch oblong-ovoid, pericarp thick densely scurfily tomentose, aril scarlet entire except at the lacerate tip, seed oblong. *Alph. DC. in Prodr. xiv.* 1. 206; *Miquel Fl. Ind. Bat. i.* 2. 70. *M. tomentosa*, *Blume Bid.* 577 (not of Thunb.).

MALACCA, *Maingay (Kew Distrib.* 1294).—DISTRIB. ? Java, Sumatra.

Without flower it is not possible to identify this, which may be a form of *M. furfuracea*, with any described plant. It agrees with Blume's figure and description of *M. laurina*, except in the more numerous nerves, and very much longer fruit. A plant from the Andamans, collected and named *M. laurina* by Kurz, resembles the Malacca plant except in the fruit, which is that of *glaucescens*, to which I refer it.

28. **M. intermedia**, *Blume Rumph. i.* 187; glabrous except the inflorescence and fruit, leaves 6–12 in. linear-oblong acuminate glabrous glaucous beneath, nerves 12–20 pair; male fl. $\frac{1}{2}$ in. diam. fascicled on tubercles of the branches pedicelled 3-gonously globosely scurfily tomentose 3-cleft, anthers 12–18 on the toothed margin of a peltate disk with a pyramidal boss, fruit pedicelled ovoid-oblong finely pubescent base intruded. *Hook. f. & T. Fl. Ind.* 158; *Alph. DC. in Prodr. xiv.* 1. 206; *Miquel Fl. Ind. Bat. i.* 270 (excl. var. β).

MALACCA, *Griffith (Kew Distrib.* 4359), *Maingay (Kew Distrib.* 1281, 1288). SINGAPORE, *Lobb*.—DISTRIB. Java.

Branchlets usually slender. *Leaves* narrow, $\frac{3}{4}$ –2 $\frac{1}{2}$ in. broad, rarely elliptic-oblong, very coriaceous, nerves strong, base acute obtuse or rounded, pale brown and shining with very prominent closely reticulated nerves above; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., stout, quite glabrous. *Male fl.* rufous-tomentose, pedicel $\frac{1}{2}$ – $\frac{1}{2}$ in., stout, bracteolate in the middle; perianth subpyramidal; staminal disk subsessile, circular or trigonous, central boss 3-gonous; anthers short. *Fruit* $1\frac{1}{4}$ in. long, broadly oblong with a groove on one side, top rounded; aril thin, entire except at the tip.—The tubercles from which the flowers spring are often diseased and present a mass of brown floccose hairs, probably caused by insect puncture.

29. **M. gibbosa**, *Hook. f. & Thoms. Fl. Ind.* 158; glabrous except the inflorescence and fruit, leaves linear-lanceolate acuminate at both ends hardly glaucous beneath, nerves 15–30 pair, male fl. pedicelled fascicled on a peduncle urceolately campanulate 3-fid, anthers 10–12 on the margin of a long-stalked circular disk, fruit pedicelled oblong base gibbous and intruded. *Alph. DC. in Prodr. xiv.* 1. 205.

KHASIA Mts., *Griffith (Kew Distrib.* 4348); near Churra, *J. D. H. & T. T. PEGU, McClelland*.

Branchlets slender, glabrous. *Leaves* long and narrow, $1\frac{1}{4}$ –2 in. broad, thinly coriaceous, nerves strong, pale brown, hardly shining above, sometimes a little glaucous beneath, nerves slender; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., slender, glabrous. *Male fl.* $\frac{1}{4}$ in. long, rufous-pubescent, a good deal like the female of *M. glaucescens*, constricted below the 3-fid limb; pedicel of antheriferous disk clavate. *Fruit* 1– $1\frac{1}{2}$ in. long, rather like *M. intermedia*, but gibbous at the base; aril entire, except at the top.

30. **M. furfuracea**, *Hook. f. & Thoms. Fl. Ind.* 159; branchlets petioles and inflorescence densely scurfily tomentose, leaves 6–14 in. linear-oblong obtuse acute or acuminate glaucous beneath, nerves 10–40 pair, male fl. fascicled on short peduncles or tubercles globosely 3-gonous 3-fid pedicelled, anthers about 10 on the toothed margin of a 3-gonous peltate shortly stipitate disk, fem. fl. larger sessile on tubercles, stigma sessile discoid

crenulate. *Alph. DC. in Prodr.* xxiv. 1. 206. *M. longifolia*, *Hook. f. & T. Fl. Ind.* 156 (the *Malayan plant*). *Knema glaucescens*, *Wall. Cat.* 6810 (not of Jack).

PENANG, *Porter. MALACCA, Griffith (Kew Distrib.* 4346, ? 4345), *Maingay (Kew Distrib.* 1287). SINGAPORE, *N. Cantley.*

Branchlets stout, older with black shining cracked bark. *Leaves* most variable in size, $\frac{3}{4}$ –1½ in. diam., usually pale brown and shining above, base acute obtuse or cordate; nerves strong, arched; petiole usually very short, thick, and thickly furfuraceous, but sometimes more slender and glabrate. *Male fl.* about $\frac{1}{2}$ in. diam., pedicels $\frac{1}{4}$ –½ in., bracteolate about the middle; antheriferous disk orbicular or 3-gonous, flat; pedicel short but distinct. *Fem. fl.* ovoid, nearly $\frac{1}{2}$ in. long; stigma concave, many-toothed. *Fruit* 1½ in. long, ovoid-oblong, densely scurfily tomentose; pericarp thick; aril entire except at the tip.—The black bark of the older branchlets seems a good character for this species. *Griffith's No.* 4345, from Malacca, has very numerous crowded flowers on a very short thick peduncle, with pedicel $\frac{1}{2}$ in. long, and 18 anthers on a less toothed disk.

DOUBTFUL, INDETERMINABLE AND EXCLUDED SPECIES.

M. FINLAYSONIANA, *Wall. Cat.* 6793, is *Melodorum fulgens* H. f. & T. (see vol. i. p. 82).

M. EUGENIEFOLIA, *Alph. DC. in Prodr.* xxiv. 1. 190, described from leaf and fruit only, and placed in Section *Eumyristicæ*, is indeterminable.

M. GLAUDESCENS, *Wall. Cat.* 6790, is *Tetranthera venulosa*, *Meissn.*

M. HEYNEANA, *Wall. Cat.* 6789; *Alph. DC. l. c.* 207, without flower or fruit, is probably Laurineous.

M. HOOKERI, *Wall. Cat.* 6802 B, is indeterminable.

M. INTEGRIFOLIA, *Steud. Nom.*, is *Myrica integrifolia*, *Wall.*

M. MICRANTHA, *Wall. Cat.* 6807; *A. DC. l. c.* 208, is a Siam plant, and not Indian.

M. MONTANA, *Roxb. Fl. Ind.* iii. 846; *Wall. Cat.* 6792, is referred by A. DC. (*Prodr.* xxiv. 1. 190) to *M. iners*, *Blume*. It has not been found in British India.

M. ? OBTUSIFOLIA, *Wall. Cat.* 6808; *H. f. & T. Fl. Ind.* 163; *A. DC. l. c.* 194, from Singapore, is indeterminable.

M. SAPIDA, *Steud. Nom.*, is *Myrica sapida*, *Wall.*

M. SESQUIPEDALIS, *Wall. Cat.* 6809 “an Laurin. fam.,” from Penang, is *Actinodaphne sesquipedalis*, *Hk. f. & T.*

MYRISTICA? *Wall. Cat.* 9017, from Silhet, *Gomez*, is not of this genus.

MYRISTICA; Malacca, *Maingay (Kew Distrib.* 1298), in fruit only, is a very fine probably new species, with very coriaceous large glabrous leaves rounded at the base, dark brown when dry, and oblong fruit 2½ in. long, in large long-peduncled panicles; pericarp very thick; seed ellipsoid, 2 in. long, beautifully mottled, pale brown and white.—The following is Dr. Maingay's description of the fruit: “ovoid-elliptic, 2 by $\frac{3}{8}$ in., dark green, perfectly glabrous, dotted with black; seed 2 in., cylindric-elliptic; aril complete, fleshy, blood-red, tip lacerate.”

MYRISTICA; Malacca, *Maingay (Kew Distrib.* 1301), has slender pale glabrous branchlets with finely tomentose fulvous tips; elliptic pale greenish leaves 2½–3 in. long, shining above paler beneath with 6–10 pair of very slender nerves; fruit ovoid, 1–1½ in. long, long-peduncled, fascicled on a tubercle of the stem, keeled on one side and gibbous at the intruded base, pericarp thin, aril entire, seed small ovoid.—The following is from Dr. Maingay's notes: “Fruit elliptic-ovate, 1½ by 1 in., suddenly narrowed into a short stalk, keeled at the suture of the valves, pale greenish-orange, rusty-puberulous; seed $\frac{9}{10}$ by $\frac{1}{10}$ in. elliptic; aril complete, blood-red, tip lobulate, testa pale membranous, tegmen crustaceous.”

MYRISTICA; Singapore, *Maingay (Kew Distrib.* 1297), closely resembles *M. fur-*

furacea in habit and foliage; fem. flowers densely crowded forming almost globose fascicles on tubercles of the stem, clavate, with the stout pedicel $\frac{1}{4}$ in. long, densely rufous-tomentose; stigma sessile with 3-4 radiating teeth.—Apparently the same species is sent by Murton also from Singapore, with leaves glabrous and glaucous beneath.

ORDER CXXVII. **MONIMIACEÆ.**

Trees or shrubs, often aromatic. *Leaves* opposite, rarely alternate, entire or serrate, usually coriaceous, exstipulate. *Flowers* 1-2-sexual, regular, usually in short cymes or racemes; bracts small or 0, or 2 valvately enclosing the bud. *Perianth* inferior, globose ovoid or depressed, rarely campanulate; limb 4-many-toothed, teeth in one or several series, equal or the outer sepaloid and inner petaloid, or various, or obsolete, when the mouth closes over the ovary. *Stamens* few or many, in one or many series on a disk adnate to the perianth-tube, included; filaments short, simple or with a basal scale; anthers erect, 2-celled, bursting by slits or valves. *Carpels* many, rarely solitary, sessile in the base or on the sides of the perianth-tube, or immersed in a disk, 1-celled; styles long or short, stigma small; ovule solitary, erect or pendulous, anatropous or orthotropous. *Fruiting carpels* free, enclosed in the perianth or exposed on a discoid receptacle, indehiscent. *Seed* erect or pendulous, testa membranous, albumen fleshy; embryo usually next the hilum and minute, cotyledons erect or diverging, radicle superior or inferior.—Genera 22; species about 150, tropical and temperate.

* Drupes on an enlarged disciform receptacle, fem. perianth circumsciss.

Anther-cells confluent 1. KIBARA.
Anther-cells parallel, distinct. 2. MATTHEÆ.

** Drupes on a small receptacle, perianth-lobes persistent. 3. HORTONIA.

1. **KIBARA**, *Endl.*

Aromatic trees or shrubs. *Leaves* opposite, entire or toothed. *Flowers* 1-sexual, small, in short axillary or lateral cymes or panicles; bracts minute or 0. **MALE FL.** *Perianth* short, teeth or lobes 4, 2-seriate; mouth contracted. *Disk* annular or tubular. *Anthers* subsessile, 5-8, 2-seriate, cells confluent above. **FEM. FL.** *Perianth* circumsciss above the disk. *Carpels* many, free; style very short; ovule pendulous, anatropous. *Ripe carpels* sessile or stipitate on a dilated receptacle. *Seed* pendulous; embryo small, axile, radicle superior.—Species 10, Eastern Tropical Asia, Australia.

K. coriacea, *Endl. Gen. Pl.* 314; leaves elliptic obtuse acute or acuminate subentire, cymes umbellately compound puberulous much branched exceeding the petioles. *A. DC. Prodr.* xvi. 2. 670; *Miquel Fl. Ind. Bat.* i. 2. 73. *Tulasne in Archiv. Mus.* viii. 404. *K. Blumei*, *Stewd. Nomencl. Ed.* 2; *Blume Mus. Bot.* ii. 88, f. 9. *Brongniartia coriacea*, *Blume Bijdr.* 436. *Sciadicarpus Brongniartii*, *Hassk. Plant. Jav. Rar.* 209. *Sarcodiscus chloranthiformis*, *Griff. Notul.* iv. 381, and *Ic. Pl. Asiat.* t. 545.

MALACCA, *Griffith, Maingay*.—**DISTRIB.** Java, Sumatra, Celebes.

A tree, branches stout, smooth, and leaves when dry yellowish. *Leaves* 5-10 in., coriaceous, obscurely toothed towards the tip; midrib puberulous beneath. *Cymes*

branched from the base; branches and pedicels long, slender. *Perianth* 2-bracteolate, pyriform, $\frac{1}{2}$ in. long, "closed by scales arranged in an alternating series of twos and threes," *Maingay*. *Stamens* 5-7, included; anthers dehiscing apically and transversely. *Drupes* 1-15, $\frac{1}{2}$ -1 in. long, seated singly on fleshy lobes of the orange-cold receptacle, umbelled on the thickened peduncle, subtended by the excessively thickened reflexed perianths, ellipsoid, tip rounded, purple-black.—Beccari (Malina, 186) describes a variety from the Arou Islands.

2. *MATTHÆA*, Blume.

A glabrous shrub. *Leaves* opposite, entire or subserrate, coriaceous. *Flowers* fascicled, axillary, pedicelled. *Perianth* depressed-turbinate, mouth central, very minute obtusely 4-toothed, at length circumsciss. *Stamens* 4-6, filaments fleshy; anthers 2-celled, dehiscence lateral. *Pistillode* of male fl. minute. *Carpels* very many, covering a broad flat receptacle; style very short, conical; ovule pendulous, anatropous. *Ripe carpels* long-stipitate, seated on the thickened receptacle, and perianth ellipsoid.

M. sancta, Blume *Mus. Bot.* ii. 89, fig. 10; *A. DC. Prodr.* xvi. 2. 669; *Miquel Fl. Ind. Bat.* i. 2. 74.

MALACCA, *Maingay*.—DISTRIB. Sumatra, Borneo.

Branches terete, smooth. *Leaves* 6-9 by 2-3 $\frac{1}{2}$ in., coriaceous, oblong, shortly acuminate, base acute; nerves very spreading, slender; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$ - $\frac{1}{2}$ in. long, rather stout, puberulous. *Flowers* $\frac{1}{2}$ in. diam. *Ripe carpels* $\frac{3}{4}$ in. long, numerous, about as long as their slender stalks, dark purple.

3. *HORTONIA*, Wight.

An aromatic shrub. *Leaves* opposite, subentire, coriaceous. *Flowers* 2-sexual, in short axillary cymes; bracts small or 0. *Perianth-tube* short, campanulate; lobes many, many-seriate, outer sepaloïd, inner petaloïd. *Disk* hairy. *Stamens* 7-12, 1-2-seriate; filaments short, base 2-glandular; anther-cells parallel, extrorse. *Carpels* numerous, sessile, style short or 0; ovule pendulous, anatropous. *Ripe carpels* obliquely ovoid, seated on a small receptacle surrounded with the withered thickened perianth-lobes. *Seed* flattened, albumen fleshy; cotyledons erect or divergent, radicle short superior.

H. floribunda, Wight in *Jard. Mag. Zool. & Bot.* ii. 546; *Thwaites Enum.* 11; *Hook. f. & Thoms. Fl. Ind.* 166.

CEYLON; Central Province, alt. 4-7000 ft.

A glabrous aromatic bush; branches stout or slender, terete; buds puberulous. *Leaves* very variable in form, usually red-brown when dry, but sometimes green or yellowish; nerves few; petiole $\frac{1}{2}$ in. *Cymes* glabrous or puberulous, $\frac{1}{2}$ -3 in. long; flowers pedicelled, alternate or subumbellate, greenish-yellow, pedicels $\frac{1}{6}$ - $\frac{1}{2}$ in., stout or slender. *Perianth* $\frac{1}{2}$ in. diam. *Fruit* $\frac{1}{2}$ in. long, ellipsoid, subacute, red-black.—A very variable plant. Thwaites had doubts of the permanent distinctness of var. β . I have, in making its varieties, regarded as the type the commonest form, which is that on which the genus was founded.

H. floribunda proper; leaves 3-5 by 1-2 in. ovate-lanceolate obtusely acuminate, nerves arching. *H. floribunda var. acuminata*, *Hook. f. & Thoms. Fl. Ind.* 166; *Thwaites Enum.* 12. *H. floribunda & acuminata*, *Wight Ic.* 1997, 1998, right-hand figure; *A. DC. Prodr.* xvi. 2. 272, excl. syn. *angustifolia*; *Tulasne in Arch. Mus.* viii. 427.

Var. *ovalifolia*, *Hook. f. & Thoms. l. c.*; leaves 2-4 by 1 $\frac{1}{2}$ -2 in. broadly elliptic or oblong obtuse or apiculate, nerves spreading. *Thwaites l. c.* *H. ovalifolia*, *Wight Ic.* t. 1998, left-hand figure; *A. DC. l. c.*; *Tulasne l. c.* 428.

Var. *angustifolia*, Thwaites l. c.; leaves 4-6½ by 1-1½ in., linear-lanceolate acuminate 3-nerved from above the base, nerves parallel to the margin, cymes very slender.—Galle.

ORDER CXXVIII. LAURINÆÆ.

Aromatic, erect, trees or shrubs (except *Cassytha*). *Leaves* alternate, rarely opposite or deciduous, gland-dotted, exstipulate. *Flowers* (except *Cassytha* and *Hernandia*) 1-2-sexual, regular, in axillary cymes clusters panicles or racemes; bracts 0 or deciduous, often involucriform. *Perianth* inferior, tube sometimes enlarged in fruit; limb usually 6-cleft. *Stamens* usually a multiple of the perianth-lobes, in 2-4 series on the tube, filaments flattened; inner or some or all the filaments often 2-glandular at the base; anthers erect, 2-4-celled (1-celled in *Syndiclis*), cells opening by upcurved at length deciduous lids. *Ovary* sessile in the base of the perianth-tube, 1-celled; style terminal, stigma simple or discoid or dilated; ovule solitary, pendulous from the top of the cell, anatropous. *Fruit* on an often thickened peduncle, fleshy or dry, indehiscent, naked or (in *Cryptocarya*) enclosed in or adnate to the perianth-tube. *Seed* pendulous, testa membranous, albumen 0; cotyledons plano-convex, fleshy, radicle superior minute.—Genera 34, species about 900.

The species of this Order are very difficult of discrimination without fruits, and the genera are in some cases far from natural; the character of 2- and 4-celled anthers separating generically plants otherwise very nearly related.

TRIBE I. **Perseacæ**. Shrubs or trees. Third row of *stamens*, if present, with the anther-cells opening outwards by valves. *Inflorescence* lax-fld.

* *Anthers* 2-celled. *Fruit* enclosed in the perianth-tube.

Perianth-segments 6, subequal 1. CRYPTOCARYA.

** *Anthers* 2- rarely 1-celled. *Fruit* not enclosed wholly in the perianth-tube.

† *Stamens* 9 in 3 series; 4th series 0 or of staminodes only.

Staminodes ovate or cordate. Fruiting perianth 6-fld., enlarged 2. APOLLONIAS.

Staminodes ovate or cordate. Fruiting perianth not enlarged 3. BEILSCHMIEDIA.

Staminodes 0 or imperfect. Fruiting peduncle swollen 4. DEHAASIA.

†† *Perfect stamens* 3; *anthers* 2-celled 5. ENDIANDRA.

††† *Perfect stamens* 4; *anthers* 1-celled 6. SYNDICLIS.

*** *Anthers* 4-celled. *Perfect stamens* 9.

Fruiting perianth with deciduous lobes and persistent base wholly or in part 7. CINNAMOMUM.

Fruiting perianth with persistent, reflexed lobes 8. MACHILUS.

Fruiting perianth with persistent, erect lobes 9. PHOEBE.

Fruiting perianth wholly deciduous; pedicel greatly thickened 10. ALSEODAPHNE.

TRIBE II. **Litsecæ**. All the anthers opening inwards.

* *Anthers 4-celled.*

- Flowers diœcious, enclosed in densely imbricating bracts . . . 11. ACTINODAPHNE.
 Flowers diœcious, umbelled, umbels involucrate 12. LITSEA.
 Flowers 2-sexual, solitary or paniced, enclosed in imbricating
 bracts 13. DODECADENIA.

** *Anthers 2-celled.*

- Flowers umbelled, umbels involucrate 14. LINDERA.

TRIBE III. **Cassytheæ.** Twining leafless herbs or shrubs. Flowers of *Perseaceæ*.

15. CASSYTHA.

TRIBE IV. **Hernandiæ.** Trees. Anther-valves opening laterally.

16. HERNANDIA.

1. **CRYPTOCARYA**, Brown.

Evergreen trees or shrubs. *Leaves* rarely subopposite, 3- or pinninerved. *Flowers* small, 2-sexual, in axillary and subterminal panicles. *Perianth* ovoid or turbinate; lobes 6, subequal. *Perfect stamens* 9, those of the 1st and 2nd series eglandular, anthers introrsely 2-celled; of the 3rd series 2-glandular, anthers extrorsely 2-celled; staminodes of 4th series stipitate. *Fruit* wholly included in and often adnate to the oblong or globose perianth-tube.—Species about 40, tropical and subtropical.

A. Species of North-Eastern India and the Malay Peninsula.

* *Adult leaves tomentose or pubescent, at least on the nerves and midrib beneath.*

1. **C. Griffithiana**, *Wight Ic.* t. 1830; branchlets inflorescence and leaves beneath densely rusty-villous, leaves 8–12 in. very coriaceous oblong caudate-acuminate shining above glaucous beneath, nerves very strong, panicles short and shortly peduncled, flowers subsessile crowded mixed with long bracts, fruit globosely flask-shaped. *Kurz For. Fl.* ii. 295. *C. infectoria* & *caudata*, *Meissn. in DC. Prodr.* xv. 1. 68.

TENASSERIM (South), *Kurz.* MALACCA, *Griffith, Maingay.*

A small evergreen tree; branchlets stout. *Leaves* 2–4 in. broad, rarely rounded-ovate, margin usually recurved; nerves 8–10 pair, sunk above; midrib rusty-pubescent, tip sometimes 1 in. long; petiole $\frac{1}{2}$ in., very stout. *Panicles* 1–2 in., oblong. *Flowers* about $\frac{1}{6}$ in. diam., perianth-tube very short. *Fruit* globose, narrowed into a thick neck exactly like a round-bellied flask, 2–3 in. diam., smooth, black, shining, pedicel and peduncle greatly enlarged.—Wight was the first to publish this as *Griffithiana*. Meissner, supposing it to be Blume's *Cylicodaphne infectoria* (Mus. Bot. ii. 11), has adopted (from Miquel) that specific name. I have seen no authentic specimen of Blume's plant, of which Meissner makes a variety *C. infectoria* *B. acuminata*, giving Borneo as the habitat; but the Borneo plant differs from the Malaccan not only in the short apex of the leaf, but in the elliptic or oblong fruit.

2. **C. impressa**, *Miquel Fl. Ind. Bat.* i. 923; branchlets inflorescence and leaves beneath densely finely rusty-tomentose, leaves 3–6 in. very coriaceous elliptic or oblong shortly acuminate opaque above, nerves 4–6 pair very strong beneath, panicles often equalling the leaves loosely branched, flowers pedicelled, bracts deciduous. *C. infectoria* γ . *opaca*, *Meissn. in DC. Prodr.* xv. 1. 69. *C. venosa*, *Meissn. mss.*

MALACCA, *Griffith (Kew Distrib.* 4277), *Maingay (Kew Distrib.* 1250).—DISTRIB. Sumatra.

Referred by Meissner to a form of his *infectoria*, but abundantly distinct in the

short tomentum, much smaller leaves opaque above, with short points, petioles twice as long, long loose panicles, and smaller flowers. The fruit is undescribed.—King regards this as *C. crassinervia*, Miquel, of Sumatra, and he may be right. I have seen no authentic specimens of either *impressa* or *crassinervia*.

3. *C. andamanica*, Hook. f.; branchlets inflorescence and leaves beneath densely rusty-tomentose, leaves 3–5 in. coriaceous linear-oblong acute shining flat and even above subglaucous beneath, nerves 10–14 pair strong beneath, panicles peduncled compound shorter than the leaves, flowers pedicelled, fruit long-pedicelled narrowly ellipsoid. *C. tomentosa*, Herb. Hort. Calc., not of Blume.

ANDAMAN ISLANDS, Herb. Hort. Calcutt.

Branchlets stout. Leaves $1\frac{1}{2}$ – $2\frac{1}{2}$ in. broad, very pale on both surfaces when dry, margins flat, nervules beneath very fine. Panicles sometimes as long as the leaves; branches erecto-patent, rather dense-fl. Flowers pale when dry, $\frac{1}{10}$ in. long; tube of perianth shorter than the lobes. Fruit $1\frac{1}{2}$ in., subacute at both ends, quite smooth; peduncle $\frac{1}{2}$ in., swollen.—This differs from *C. tomentosa* in the more numerous nerves and shape of the leaves.

4. *C. rugulosa*, Hook. f.; branchlets and leaves beneath finely rusty-pubescent, leaves 3–5 in. linear-oblong acute or acuminate rugose and shining above, beneath with 5–8 pairs of strong nerves, panicles hoary rather slender much branched as long as the leaves, flowers pedicelled minute, fruit globosely flask-shaped.

MALACCA, Maingay (Kew Distrib. 1262).

A very distinct species, allied to *C. Griffithiana*, but much smaller in all its parts, not villous, with slender much-branched panicles of very small pedicelled flowers; the fruit is of nearly the same shape, but only $\frac{2}{3}$ in. long.—King takes this to be Miquel's *C. impressa* of Sumatra; he may be right, but it differs from the description.

5. *B. Ferrarsi*, King in Herb. Hort. Calcutt.; branchlets and leaves beneath very finely rusty-pubescent, leaves 6–9 in. thinly coriaceous narrowly linear-oblong narrowed into the petiole acute or acuminate flat and smooth above subglaucous beneath, nerves 12–15 pair tomentose beneath, panicles very long-peduncled, fruit small narrowly ovoid.

ANDAMAN ISLANDS, Herb. Bot. Calc.

A shrub; branches elongate. Leaves about 2 in. broad, pale above, not shining; base very acute; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., pubescent. Fruiting panicle 4–6 in. Fruit $\frac{1}{2}$ in. long, smooth, even, obtuse; peduncle $\frac{1}{4}$ in., stout.

** Adult leaves quite glabrous beneath.

6. *C. amygdalina*, Nees in Wall. Pl. As. Rar. ii. 69, and Syst. Laurin. 208; branchlets and inflorescence hoary-pubescent, leaves 3–8 in. coriaceous elliptic or oblong acute or obtuse quite glabrous shining above opaque beneath with 6–10 pair of strong straight very oblique nerves, panicles as long as the leaves long-peduncled, fruit elliptic or cylindric-oblong. Meissn. in DC. Prodr. xv. 1. 72 and 507. *C. floribunda*, Nees l. c.; Meissn. l. c. 71. *Laurus amygdalina*, Ham. in Wall. Cat. 2585. *L. floribunda*, Wall. Cat. 2593, in part.

NEPAL, Wallich. SIKKIM, at the foot of the hills, King. ASSAM, SILHET and the KHASIA MTS., Hamilton, Wallich, Griffith. ? ANDAMAN ISLANDS, Herb. Hort. Bot. Calc.

A tree; branches spreading. Leaves rigid, pale brown (not glaucous) beneath; base acute or obtuse; nervules faint, costa sometimes faintly hairy; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., hoary. Panicles long-peduncled, often very large and much branched, pedicels

jointed. *Flowers* $\frac{1}{10}$ in.; perianth-tube as long as the lobes. *Fruit* $\frac{3}{4}$ in. long, very shortly pedicelled, obtuse, quite smooth and even.—The Andaman specimens have much longer and more coriaceous leaves, 6–7 in. long, and a more turgid fruit; they may prove specifically distinct.

7. **C. enervis**, *Hook. f.*; branchlets slender and leaves quite glabrous, leaves 4–5 in. elliptic-lanceolate caudate-acuminate base narrowed into the slender petiole subglaucous beneath, nerves 6–8 pair very faint on both surfaces, fruit globose.

MALACCA, *Griffith (Kew Distrib. 4336)*.

Branches black when dry. *Leaves* thinly coriaceous, $1\frac{1}{4}$ –2 in. diam., brownish green, smooth and even above when dry with faintly raised obliquely arching nerves, violet brown beneath, with very faint nerves and obsolete nervules; petiole $\frac{1}{2}$ in. *Panicles* apparently slender and shorter than the leaves. *Fruit* $\frac{1}{2}$ in. diam., smooth, even, not shining, with an obtuse very short tip.—A very distinct species, without flowers, remarkable for the slender branches and very faint nerves of the leaf.

8. **C. Kurzii**, *Hook. f.*; branchlets slender black and leaves glabrous, leaves shortly petioled 4–8 in. oblong or linear-oblong or -oblanceolate obtusely acuminate smooth and shining above, glaucous brown beneath, nerves about 8 pair strong beneath, panicles shorter than the leaves nearly glabrous, flowers minute hoary. *C. Wightiana*, δ . *Griffithii*, *Meissn. in DC. Prodr.* xv. 1. 70 (*excl. the Canara plant*). *C. ferrea*, *Kurz For. Fl.* ii. 295 (*not of Blume*).

TENASSERIM; Mergui, *Griffith No. 1142 (Kew Distrib. 4274)*.

Branchlets black when dry. *Leaves* $1\frac{1}{2}$ –2 $\frac{1}{2}$ in. diam., thinly coriaceous, base acute; nerves oblique, finely reticulated beneath; petiole $\frac{1}{4}$ in., stout. *Flowers* pedicelled, $\frac{1}{2}$ in. long.—This may, as Kurz holds, be referable to *C. ferrea*, which it is very near; but in all the (indifferent) specimens of *ferrea* that I have seen, the branches are stouter and pale when dry, the panicle pubescent and flowers larger. Without knowing the fruit (which is linear-oblong and $\frac{3}{4}$ in. long in *C. ferrea* var. *Mentek*) it is impossible to identify this with the Javanese plant. It differs entirely from *Wightiana* in foliage and pubescence of panicle.

9. **C. ferrea**, *Blume Bijd.* 557?; branchlets stout pale and panicle pubescent or puberulous, leaves 4–8 in. glabrous linear- or elliptic-oblong or lanceolate obtusely acuminate smooth hardly shining above glaucous brown beneath, nerves 8–12 pair strong beneath, panicles often equalling the leaves hoary, flowers minute, fruit (in Java specimens) linear-oblong. *Meissner in DC. Prodr.* xv. 1. 69; *Nees Syst. Laurin.* 216; *Miquel Fl. Ind. Bat.* i. 921.

MALAY PENINSULA; Pomerong Johore, *Cantley (No. 8)*.

Under *L. Kurzii* I have indicated the differences between that and this, which quite agrees with Javan specimens of *ferrea*, though it is impossible to identify it certainly without the fruit.

10. **C. cœsia**, *Blume Bijd.* 335?; whitish, branchlets petioles and panicles rusty-pubescent, leaves 5–7 in. glabrous oblong or elliptic-oblong acuminate smooth above glaucous white beneath, nerves 6–10 pair arched and strong beneath, nervules very fine, panicles often longer than the leaves, flowers hoary, fruit globose. *Meissn. in DC. Prodr.* xv. 1. 71; *Miquel Fl. Ind. Bat.* i. 925.

ANDAMAN ISLANDS; *Herb. Hort. Bot. Calc.*—DISTRIB. Java.

Branchlets rather stout. *Leaves* firmly coriaceous, 2–3 in. diam., base rounded or acute, midrib and nerves beneath sometimes slightly pubescent; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Panicles* large with spreading branches; flowers $\frac{1}{2}$ in. long, pedicelled. *Fruit* fleshy,

$\frac{3}{4}$ in. diam.—King notes this as either *casia* or a new species; it agrees with Blume's character of *casia* except in that the midrib beneath is almost quite glabrous. The fruit of the Javan plant being unknown, the identification is not sure. A similar plant, but with shorter petioles, more nerves and more pubescent flowers, occurs in Celebes. Meissner regards the Javan *casia* as perhaps a var. of *ferrea*, from which the Indian plant seems to be very distinct.

11. **C. ? Andersoni**, *King in Herb. Hort. Bot. Calc.*; very robust, leaves 8–12 in. long-petioled glabrous elliptic acute at both ends thickly coriaceous finely reticulated above red-brown beneath with 10 pairs of very oblique stout nerves and transverse nervules, panicle very large stout corymbose and much branched hoary-pubescent, flowers minute.

ASSAM, *Jenkins in Herb. Hort. Calc.*

I have seen only a leaf, a portion of a panicle and a drawing (lent by Dr. King) of this remarkable plant, which resembles no other of the Order in foliage or flowers. The panicle is 8 in. long, and must have been as broad at the top, the peduncle is as thick below as a goose-quill, black and shrunken when dry (as if soft when fresh); it branches repeatedly corymbosely from low down, the ultimate divisions flowering at the tips; the flowers are about $\frac{1}{8}$ in. diam., on pedicels of the same length; perianth-segments oblong, obtuse; stamens short, glabrous; ovary ovoid, style short, stigma discoid.

B. Species of Ceylon and Western India.

12. **C. Wightiana**, *Thwaites Enum.* 254; branchlets and inflorescence rusty-pubescent or puberulous, leaves 4–10 in. rigidly coriaceous elliptic or oblong acuminate glabrous smooth hardly shining above, glaucous white and glabrous or faintly puberulous beneath with 6–10 pair of strong arched nerves, panicles spreading equalling or shorter than the leaves, fruit globose. *Meissn. in DC. Prodr.* xv. 1. 70 (*excl. var. δ.*); *Beddome Forest. Fl.* t. 299. *C. floribunda*, *Wight Ic.* t. 1829 (*not of Nees*); *Dalz. & Gibs. Bomb. Fl.* 222.

DECCAN PENINSULA; from Canara southwards. CEYLON; ascending to 5000 ft. A tall tree; branches rather stout, often lenticellate. *Leaves* variable in breadth, $1\frac{1}{2}$ –4 in., strongly reticulate beneath, base rounded or acute; petiole $\frac{1}{2}$ –1 in. *Panicles* very many-fl.; flowers pedicelled, $\frac{1}{4}$ in. long. *Fruit* $\frac{1}{2}$ in. diam., smooth, black, glossy. —Wight figures and describes the Ceylon plant as having oblong fruit, as does Meissner, but Thwaites correctly states it to be globose. I have seen no fruit of Peninsular specimens. Meissner's vars. *parvifolia* and *lanceolata* are not separable from the type.

13. **C. Stocksii**, *Meissn. in DC. Prodr.* xv. 1. 71; branches and panicles rusty-tomentose, leaves $2\frac{1}{4}$ –4 in. rigidly coriaceous oblong-obtuse or rounded at the tip glabrous smooth above, glaucous beneath with 6–7 pair of stout pubescent or glabrous nerves, panicles shorter than the leaves stout dense-fl., fruit ovoid. *C. neilgherriensis*, *Meissn. l. c.*

DECCAN PENINSULA; Canara, *Stocks*, &c.; Nilghiri Hills, *Wight*; Anamallay Hills, *Beddome*.

A large tree, very near *C. Wightiana*, but the leaves are much smaller, shorter-petioled, and usually very obtuse; the panicles short, contracted, and dense-fl., the flowers larger, and the fruit only $\frac{1}{2}$ in. long and ovoid, not shining.

14. **C. membranacea**, *Thwaites Enum.* 254; branchlets slender and panicles rusty-pubescent, leaves 3–5 in. glabrous membranous elliptic-oblong acute or acuminate finely reticulated on both surfaces, beneath somewhat glaucous with 5–7 pair of strong nerves, panicles very small few-fl., fruit

oblong-ovoid. *Meissn. in DC. Prodr.* xv. 1. 72; *Beddome Forest Man.* 185.

CEYLON; in the Saffragam district, alt. 2000 ft., *Sir J. Mackenzie, Thwaites.*

A tree of middle size; branches very slender. *Leaves* $1\frac{1}{4}$ –2 in. diam., hardly shining but beautifully reticulated above, reddish brown, base narrowed into a slender petiole of $\frac{1}{4}$ – $\frac{1}{2}$ in. *Panicles* $\frac{1}{2}$ – $\frac{1}{3}$ in. long, few and lax-flid.; flowers pedicelled, $\frac{1}{10}$ in. long. *Perianth-tube* rather longer than the limb. *Fruit* (not seen) about $\frac{1}{2}$ in. long, black-purple.

DOUBTFUL SPECIES.

CRYPTOCARYA sp., from the Anamallay Hills, alt. 3000 ft., *Beddome*, closely resembling *C. Griffithiana*, Wight, but in too young a state for determination.

CRYPTOCARYA sp., from Tenasserim, alt. 5000 ft., *Beddome*, a fragment in flower with very membranous leaves, resembles *C. costata*, Blume, of Java.

2. APOLLONIAS, Nees.

Evergreen trees. *Leaves* scattered, penninerved. *Flowers* 2-sexual, small, in axillary and subterminal panicles. *Perianth-tube* short; lobes 6, subequal. *Perfect stamens* 9; filaments filiform, 1st and 2nd series eglandular with introrse 2-celled anthers, of 3rd series 2-glandular with extrorse 2-celled anthers, staminodes of 4th series ovoid or cordate. *Berry* globose or ovoid, with the 6-cleft hardened perianth at its base.—Species 2, a Canarian and the following.

A. Arnottii, *Nees Syst. Laurin.* 670; quite glabrous or young parts sparsely hairy, leaves lanceolate acuminate, panicles few-flid. long-peduncled. *Meissn. in DC. Prodr.* xv. 1. 65; *Wight Ic.* t. 1819; *Beddome Forest. Fl.* t. 291.

DECCAN PENINSULA; Malabar, Tinnevely and Travancore, *Wight.*

Leaves 3–5 by $\frac{3}{4}$ – $1\frac{1}{2}$ in., thinly coriaceous, young red-brown when dry, with sparse silky hairs beneath and on the young panicles, old quite glabrous, greenish-brown when dry, both ends very acute; nerves prominent but very slender on both surfaces; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Panicles* 1–2 in., slender, erect or spreading, sparingly branched; flowers pedicelled, $\frac{3}{8}$ – $\frac{1}{2}$ in. diam. *Fruit* $\frac{1}{4}$ – $\frac{1}{2}$ in. long, ovoid, acute, girt at the base by the hardened perianth.—This I should regard as forming (along with the Canarian species) a section of *Phæbe* with 4-celled anthers, which would, however, upset the present artificial arrangement of the genera in the Order.

3. BEILSCHMIEDIA, Nees.

Evergreen trees or shrubs. *Leaves* alternate or opposite, penninerved. *Flowers* small, 2-sexual, fascicled or paniced. *Perianth-tube* short; lobes 5, subequal. *Perfect stamens* 9; filaments of 1st and 2nd series eglandular with introrse 2-celled anthers, of 3rd series 2-glandular with extrorse anthers; staminodes of 4th series ovoid or cordate. *Fruit* ovoid oblong or globose, perianth wholly deciduous.—Species about 20, all tropical.

Sect. I. *Leaves* opposite or alternate; terminal buds very small, pubescent or tomentose, not enclosed in coriaceous scales (except *B. Clarkei*). *Flowers* $\frac{1}{2}$ – $\frac{1}{3}$ in. diam., broadly campanulate or cup-shaped.

* *Perianth cleft nearly to the base into linear or oblong segments.*

1. **B. Roxburghiana**, *Nees in Wall. Pl. As. Rar.* ii. 69, and *Syst. Laurin.* 198; terminal buds and inflorescence tomentose, leaves 7–9 in. ovate or ovate-lanceolate or elliptic-oblong obtusely acuminate shining and finely reticulate on both surfaces, panicles short shortly peduncled, fruit

2 in. long cylindric-oblong. *Meissn. in DC. Prodr.* xv. 1. 63 (*excl. β*); *Wight Ic.* t. 1828; *Kurz For. Fl.* ii. 293; ? *Brandis For. Fl.* 378; *Gamble Man. Ind. Tymb.* 309. *Laurus bilocularis*, *Roxb. Fl. Ind.* ii. 311.

ASSAM; at Negrigam, &c., *Griffith*. TIPPERA, *Roxburgh*. TENASSERIM, *Helper (Kew Distrib.* 4335).

A deciduous tree, branches woody. *Leaves* $2\frac{1}{2}$ – $3\frac{1}{2}$ in. broad, firmly coriaceous; nerves 10–12 pair, slender and prominent on both surfaces; base acute, rarely rounded, sometimes unequal-sided; petiole $\frac{1}{2}$ – $1\frac{1}{4}$ in. *Panicles* 1 – $1\frac{1}{2}$ in., subsilkily tomentose; bracts small, broad, caducous; pedicels as long as the flowers. *Perianth* $\frac{1}{2}$ in. diam.; segments linear-oblong obtuse, hairy on both surfaces. *Stamens* pubescent; staminodes conical, tomentose. *Ovary* glabrous, stigma simple. *Fruit* pruinose, purple.—Wight's figure, copied from Roxburgh's drawings, represents the sepals as acute. Brandis and Gamble give Sikkim, ascending to 8000 ft., as its locality, and Kurz adds the Andaman Islands; the latter is likely, but not the former; and these *Laurineæ* are so very difficult of discrimination, that I suspect all unlikely habitats, to which may be added those of the Forests of Kumaon, Oude, and Nepal, mentioned by Brandis. (See *B. sikkimensis*.)

2. **B. fagifolia**, *Nees in Wall. Pl. As. Rar.* ii. 69, and *Syst. Laur.* 200; terminal buds and inflorescence pubescent, leaves 3–4 in. elliptic or elliptic-lanceolate obtusely acuminate, panicles very short crowded subsessile, young flowers enclosed in broad silky caducous scales, fruit $\frac{1}{4}$ in. ellipsoid-oblong. *Meissn. in DC. Prodr.* xv. 1. 64. *Tetranthera fagifolia*, *Wall. Cat.* 2539.

SILHET, *De Silva*. ? ASSAM, *Jenkins*.—DISTRIB. ? Munnipore.

A little known tree, very closely allied to *B. Roxburghiana*, but it has smaller more elliptic leaves on shorter petioles, very small panicles, and the bracts are apparently much larger and broader. The Silhet specimens are in flower only, they have very glabrous shining leaves $2\frac{1}{2}$ –3 in. long; the Assam ones are in fruit only, they have leaves 3 – $4\frac{1}{2}$ in. long, sparsely puberulous beneath; the Munnipore ones (in flower) have more lanceolate shining glabrous leaves with shorter thicker petioles. The following variety strengthens my suspicion (shared by Kurz), that *fagifolia* and *Roxburghiana* are forms of a wide-spread Indian forest tree.

Var. ? *Dalzellii*, *Meissn. in DC.* l. c. (*excl. the Assam plant*); leaves 4–7 in. oblong or lanceolate very coriaceous and shining, base acute or obtuse, nerves more numerous, fruit 1 – $1\frac{1}{2}$ in. ellipsoid-oblong or globose. *B. fagifolia*, *Beddome, Forest. Fl.* t. 263. *B. Roxburghiana*, *Dalz. & Gibs. Bomb. Fl.* 222.—Deccan Peninsula, in forests of the Western Ghats from the Concan southwards.—The flowers of this are identical with those of *B. fagifolia*, but if the Assam specimens of the latter plant are true, the fruit is considerably larger and broader. Dalzell describes it as a large forest tree. The Assam plant referred here by Meissner, is, I think, typical *fagifolia*.

3. **B. Clarkei**, *Hook. f.*; terminal buds and inflorescence tomentose, leaves 5–7 in. subopposite membranous elliptic-lanceolate acuminate not shining reticulate on both surfaces, panicles 3–4 in. peduncled lax-fl'd.

SIKKIM HIMALAYA; Reinak, alt. 4500 ft., *Clarke*.

A tree, 80 ft.; branches slender, rough, tips tomentose; bud-scales lanceolate, $\frac{1}{2}$ in. long. *Leaves* thinner in texture than in any other Indian species, $1\frac{1}{2}$ –2 in. diam., very acute at both ends, beautifully reticulated with 10–12 pairs of nerves, dull green when dry; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., slender, pubescent. *Panicles* 12–20-fl'd., suberect, not densely tomentose; peduncle short and branches rather stout; flowers pedicelled. *Perianth* cup-shaped, $\frac{1}{2}$ in. diam., cleft nearly to the base; segments oblong, obtuse. *Filaments* broad, hairy; staminodes ovate-hastate, glabrous. *Fruit* not seen.

4. **B. sikkimensis**, *King in Herb. Hort. Calc.*; terminal buds pale tomentose, leaves 3–4 in. opposite elliptic oblong obtuse or subacute base obtuse or rounded opaque above, nerves strong beneath, fruit ellipsoid.

SIKKIM HIMALAYA and EAST NEPAL; alt. 4-5000 ft., *J. D. H., King.*

Possibly a form of *B. Roxburghiana*, but the branches and leaves are all opposite, and the leaves much smaller and more rounded at both ends; the fruit is 1 in. long. Dr. King's specimens are in fruit only, mine gathered in E. Nepal I noted as being exactly like a small plum.—This is probably the tree referred to *B. Roxburghiana* by Gamble and Brandis, and stated to grow at 8000 feet elevation in Sikkim.

5. *B. malaccensis*, *Hook. f.*; terminal buds and young panicles rusty-pubescent, leaves 6-9 in. thickly coriaceous glabrous elliptic-oblong obtuse or subacute, nerves very strong beneath, panicles short axillary, peduncle and divaricating branches very stout, perianth deeply cleft, segments linear-oblong sparsely pubescent. *B. Roxburghiana* *β.*? *malaccensis*, *Meissn. in DC. Prodr.* xv. 1. 63.

MALACCA; *Griffith, Maingay (Kew Distrib.* 1260).

Branches very stout, woody. Leaves $2\frac{1}{2}$ -5 in. broad, rather shining above, beneath red-brown with 8-10 very stout arched nerves; petiole $\frac{3}{4}$ -1 in., very stout. Panicles horizontal, 2-3 in. long, very stout, shortly peduncled; flowers $\frac{1}{2}$ in. diam., broadly campanulate, stoutly pedicelled. Filaments hairy; staminodes stipitate. Ovary glabrous, style rather slender. Fruit not seen.—An imperfect specimen of a plant much resembling this is in Kurz's Andaman Herbarium.

6. *B. macrophylla*, *Meissn. in DC. Prodr.* xv. 1. 63; branches very stout with terminal bud and petioles rusty-pubescent, leaves 10-12 in. alternate thickly coriaceous elliptic-oblong obtusely acuminate, nerves strong beneath, panicles very short, fruit globose. *Kurz For. Fl.* ii. 294.

TENASSERIM; at Mergui, *Griffith.*

Very near *B. malaccensis*, and possibly only a large-leaved form of that plant, but without fruit of the latter they cannot be identified.

†† *Perianth-lobes short, rounded.*

7. *B. Maingayi*, *Hook. f.*; branchlets terminal buds and inflorescence densely tomentose, leaves 8-10 in. alternate thinly coriaceous elliptic-oblong brown and opaque on both surfaces, nerves beneath rather slender, panicles short stout very dense-fld., flowers mixed with short broad coriaceous tomentose deciduous bracts, perianth shortly cleft, lobes rounded densely pubescent.

MALACCA, *Maingay (Kew Distrib.* 1268).

Branches very stout. Leaves red-brown when dry, base acute; petiole stout, $\frac{3}{4}$ in. Panicles 1-1 $\frac{1}{2}$ in., peduncle very short and branches stout. Flowers (in bud only) $\frac{1}{4}$ in. diam. Filaments hairy; staminodes stipitate.

8. *B. Brandisii*, *Hook. f.*; leaves alternate 6-10 in. elliptic-oblong acuminate glabrous, panicles short pubescent, perianth with 5 rounded lobes, fruit 2-2 $\frac{1}{2}$ in. long oblong.

ASSAM; in the Naraber Forest, Golaghat, *Brandis.*

A moderate-sized tree. Leaves thinly coriaceous, base acute; nerves 8-10 pair, very slender; petiole 1-1 $\frac{1}{2}$ in. Flowers about $\frac{1}{2}$ in. diam., almost tomentose. Ovary glabrous. Fruit stontly peduncled, obtuse, smooth.—Flowering state imperfect, but anthers clearly 2-celled, glabrous, otherwise it a good deal resembles *Alseodaphne petiolaris*.

9. *B. ? longipes*, *Hook. f.*; terminal buds and panicle and leaves beneath ashy-pubescent, leaves 5-7 in. coriaceous elliptic-lanceolate acuminate base cuneate shining above, nerves beneath very strong, panicles 6 in. long stout, branches distant few-fld., perianth shortly cleft, lobes rounded densely tomentose.

MALACCA, Maingay (*Kew Distrib.* 1248).

Branches rather stout. *Leaves* 7-8 by $2\frac{1}{2}$ - $3\frac{1}{2}$ in., usually broadest above the middle, pale greyish green above, beneath pale brown, nerves oblique, 10-12 pair; petiole stout, $\frac{1}{2}$ - $\frac{3}{4}$ in. *Panicles* axillary, 5 in. long, erect, narrow; peduncle and rachis rather stout, branches very short, few-fl.; flowers $\frac{1}{10}$ in. diam.; pedicel short, stout. *Perianth* cup-shaped, cleft to about the middle. *Filaments* pubescent, glands sessile; staminodes minute. *Ovary* glabrous, style minute. *Fruit* unknown.—In the absence of fruit the genus is doubtful.

Sect. II. *Leaves* usually opposite; terminal buds enclosed in large glabrous coriaceous concave scales. *Flowers* about $\frac{1}{10}$ in. diam., subglobose. (I suspect that this section may constitute a genus.)

10. **B. oppositifolia**, *Benth. in Gen. Pl.* iii. 152; quite glabrous, terminal buds lanceolate, leaves opposite lanceolate or oblong-lanceolate obtuse shining and reticulate on both surfaces, panicles long-peduncled slender, branches spreading, flowers minute, fruit cylindric-oblong, pedicel thickened clavate. *Haasia oppositifolia*, *Meissn. in DC. Prodr.* xv. 1. 61; *Beddome For. Man.* 184. *Apollonias zeylanica*, *Thwaites Enum.* 253.

CEYLON; Central Province, alt. 3-4000 ft., *Thwaites*.

A tree, 50-60 ft.; branches rather slender, bud-scales linear-oblong concave, very rigid. *Leaves* 5-7 by $1-2\frac{1}{4}$ in., thinly coriaceous, alike in colour &c. on both surfaces; base acute; nerves 6-8 pair, very slender and oblique; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Panicles* 4-6 in. long, and flowers nearly black when dry; branches divaricate; pedicels 2-3 times as long as the subglobose flower, which is about $\frac{1}{12}$ - $\frac{1}{10}$ in. diam. *Perianth* wholly deciduous; lobes rounded, obscurely pubescent. *Stamens* glabrous, glands and staminodes sessile. *Fruit* $\frac{3}{4}$ -1 $\frac{1}{4}$ in. long, sometimes subclavate, pedicel $\frac{1}{4}$ in. long.

11. **B. Wightii**, *Benth. in Gen. Pl.* iii. 152; quite glabrous, terminal buds lanceolate, leaves opposite elliptic or elliptic-lanceolate obtusely acuminate shining and reticulate on both surfaces, panicles long-peduncled slender, branches spreading, flowers minute. *Haasia Wightii*, *Nees Syst. Laur.* 676; *Meissn. in DC. Prodr.* xv. 1. 61; *Beddome Forest Fl.* t. 298.

SOUTH DECCAN PENINSULA; Travancore, Tinnevely and Anamallay Hills, *Wight*, *Beddome*.

Except in the form of the leaves this seems to be *B. oppositifolia*, but without seeing fruit I hesitate before uniting them.

12. **B. assamica**, *Meissn. in DC. Prodr.* xv. 1. 64; quite glabrous, terminal buds lanceolate, leaves opposite elliptic-ovate or lanceolate obtusely acuminate shining and reticulate on both surfaces, fruit $1\frac{1}{2}$ in. long very shortly pedicelled elliptic- or ovoid-oblong tip rounded or subacute base shortly contracted pericarp thick.

ASSAM, *Jenkins*.—DISTRIB. Burma (*Griffith*), Munnipore.

Branches rather slender, terminal compressed; buds $\frac{1}{2}$ in. long, scales very coriaceous, linear-oblong, quite glabrous. *Leaves* 5-6 in., firmly coriaceous, pale brown when dry, base cuneate; nerves about 10 pair, very slender, equally prominent on both surfaces; petiole $\frac{3}{4}$ in., slender. *Flowers* unknown.

13. **B. Gammieana**, *King in Herb. Hort. Calc.*; quite glabrous, terminal buds ovoid, leaves opposite elliptic-oblong or -ovate obtusely acuminate shining and reticulate on both surfaces, fruit $\frac{3}{4}$ in. long shortly pedicelled globosely obovoid apiculate or mammillate.

EAST NEPAL, on the north slope of Phulloot, alt. 6000 ft., *J. D. H.*, and SIKKIM at the same elevation, *King*.

A small tree; branches stout; terminal buds $\frac{1}{2}$ in., scales glabrous very coriaceous. *Leaves* 4-6 in., firmly coriaceous, variable in breadth, colour (pale brownish yellow when dry) and reticulation the same on both surfaces; base cuneate; nerves very

slender, 12–15 pair, spreading; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Panicles* apparently (in the absence of flowers) very short, about 1 in. long in fruit, then stout and curved but not swollen.

14. **B. globularia**, *Kurz For. Fl.* ii. 294; quite glabrous, terminal buds ovoid acute, leaves opposite elliptic-oblong or lanceolate reticulate on both surfaces, fruit 1–1 $\frac{1}{4}$ in. diam. globose very fleshy with a thick hard endocarp.

MARTABAN; on the hills, alt. 3–4000 ft., *Kurz*.

Buds of *B. Gammieana*, leaves narrower longer and less shining, fruiting panicle very short and stout.—The specimens are very imperfect, and *Kurz's* description is wholly insufficient; he regards it as possibly a hill form of *B. Roxburghiana*, but judging from the buds I should doubt its being of the same genus, and its close affinity to *B. Gammieana* is obvious.

4. **DEHAASIA**, *Blume*.

Evergreen trees. *Leaves* alternate, often fascicled at the ends of the branches, penninerved. *Flowers* small, 2-sexual, in axillary peduncled panicles. *Perianth-tube* very short; segments 6, 3 outer much the shortest. Perfect *stamens* 9, filaments of 1st and 2nd series eglandular, with 2-celled introrse anthers, of the 3rd series 2-glandular with 2-celled extrorse anthers; staminodes 0, or few and minute. *Berry* oblong, pedicel very much enlarged, coloured, perianth wholly deciduous.—Species 10, Malayan.

The 4-celled anthers alone distinguish this genus from *Alseodaphne*. The species require revision with ample materials.

1. **D. cuneata**, *Blume Rumph.* i. 164, t. 46; glabrous, leaves subverticillate cuneate-obovate much narrowed at the base obtuse acute or subacute glaucous or not beneath, panicles long-peduncled very slender, fruit ellipsoid-oblong. *Haasia cuneata*, *Nees Syst. Laurin.* 378. *Cryptocarya cuneata*, *Blume Bijl.* 558. *Endiandra*? *Candolleana*, *Meissn.* (by error) ex *Kurz For. Flor.* ii. 295. ? *Cyanodaphne cuneata*, *Blume Mus. Bot.* i. 333; *Meissn. in DC. Prodr.* xv. 1. 76; *Miquel Fl. Ind. Bat.* i. 926; ? *Dictyodaphne Candolleana*, *Meissn. l. c.* 30. *Alseodaphne grandis*, *Kurz For. Fl.* ii. 293 (not of *Nees*).

PEGU, ARRACAN and TENASSERIM, *Helper (Kew Distrib.* 4270), *Kurz, &c.*—DISTRIB. Java.

Old branches stout, scarred; young elongate, stout, clothed with white bark. *Leaves* at the tips of the branches only, 4–10 by 2–5 in., hard, coriaceous, dark brown when dry, often with a violet-glaucous hue beneath, base narrowed into a petiole $\frac{1}{2}$ –1 $\frac{1}{2}$ in. long, smooth and opaque above; nerves 8–10 pair, impressed above, strong beneath. *Panicles* 3–6 in., peduncle and pedicels black when dry, minutely puberulous, branches and pedicels divaricate, slender in flower; flowers subglobose, $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. *Stamens* short, densely tomentose. *Fruit* 1–1 $\frac{1}{2}$ in. long, bluish black, pruinose; swollen pedicel $\frac{3}{4}$ to 1 $\frac{1}{2}$ in. long, straight or curved, warted.—I have doubtfully referred to this *Blume's Cyanodaphne cuneata*, suspecting that the character ascribed to the fruit (of being, as in *Cryptocarya*, enclosed in the perianth-tube) is founded in error; *Blume's* Javanese flowering specimens of *Cyanodaphne cuneata* (I have seen no fruit from him) are identical with the Indian *D. cuneata*, and the fruit I have described unquestionably belongs to it. *Kurz* quotes *Meissner's* authority for *Endiandra*? *Candolleana*, intending no doubt *Dictyodaphne Candolleana*, an obscure Burmese plant for which *Meissner* quotes the numbers 566 and 1610 of Wallich's Burma collection.

2. **D. Kurzii**, *King in Herb. Hort. Calcutt.*; glabrous, leaves subverticillate cuneate- or rhombic-obovate much narrowed at the base obtusely acuminate glaucous or not beneath, panicles long peduncled very slender, outer perianth-lobes $\frac{1}{4}$ smaller than the inner, fruit cylindric oblong.

TENASSERIM, *Helfer* (Kew Distrib. 4272). ANDAMAN ISLANDS, *Herb. Hort. Bot. Calc.*

Very similar to *D. cuneata*, and perhaps a variety of that plant with longer more elliptic and acuminate leaves, which in Helfer's specimens are 3-6 in. long, but in the Andaman ones 6-10 in. The fruit of the Andaman plant is 2 in. long, with a stout fleshy warted pedicel 1 in. long.

3. ***D. elongata***, *Blume in Nees Syst. Laur.* 377, and in *Rumphia* i. 163, t. 47; characters of *D. cuneata*, but fruit globose on a very short pedicel. *Meissn. in DC. Prodr.* xv. 1. 60 (*Haasia*); *Miquel Fl. Ind. Bat.* i. 929 (*Haasia*).

ANDAMAN ISLANDS, *Herb. Hort. Calc.*—DISTRIB. Sumatra.

Dr. King suspects this to be a form of *D. cuneata*, and I think he is right; the leaves are 8-11 in. long, the flowers larger than in *D. cuneata*, the fruit 1-1½ in. diam. with a very fleshy sarcocarp and quite globose.

4. ***D. microcarpa***, *Blume in Nees Syst. Laurin.* 373, and *Rumph. i.* 162, t. 44; glabrous, leaves shortly petioled elliptic-oblong acuminate not glaucous beneath, panicles shortly peduncled, outer perianth-lobes ¼ smaller than the inner, fruit cylindric-globose. *Meissn. in DC. Prodr.* xv. 1. 60; *Miquel Fl. Ind. Bat.* i. 928. *Laurus incrassata*, *Jack in Mal. Misc.* ii. 7. 33? (*ex Wall. Cat.* 2589.) *Persea incrassata*, *Nees Syst.* 127. *Machilus incrassatus*, *Nees in Wall. Pl. As. Rar.* ii. 70. ? *Haasia incrassata*, *Nees Syst. Laurin.* 376; *Miquel l. c.* 390.

MALACCA, *Griffith, Maingay* (Kew Distrib. 1274). ? Singapore, *Prince*.—DISTRIB. Sumatra, Java, Borneo.

Branches woody, white. Leaves not so fascicled towards the ends of the branches as in the preceding species, 9-14 by 3½-5½ in., coriaceous, base acute, smooth, greenish or pale greenish brown on both surfaces when dry; nerves about 12 pair, very prominent beneath; petiole stout, ¾-1 in. Panicles 2-6 in., black when dry, branches stout, spreading; pedicels obconic in flower, ¼-½ in. Perianth ½ in. diam., nearly glabrous; lobes broad, outer obtuse, inner subacute. Stamens longer and less villous than in the preceding species. Fruit "baccate, 1 in. long, blue-black, shining, subtended by the enlarged slightly thickened perianth, pedicel enlarged fleshy trigonous, bright scarlet warted," *Maingay*.—Though the fruit is large, I refer this to Blume's *D. microcarpa*, of which that author describes and figures apparently young fruit only; for after a most careful analysis I can find no difference between authentic specimens of Blume's plant and this; furthermore Blume states that both his figure and description of the fruit are taken from another source. *D. squarrosa*, *Zoll.*, seems identical. Jack quotes *Rumph. Amb.* i. 162, t. 44, for his *L. incrassata*, but the plate is not characteristic, if taken for this plant.

DOUBTFUL SPECIES.

HAASIA NITIDA, *Meissn. in DC. Prodr.* xv. 1. 61, from Borneo, has 4-celled anthers and is an *Alseodaphne*.

HAASIA PEDUNCULARIS, *Nees, Meissn. l. c.* See *Alseodaphne peduncularis*.

5. **ENDIANDRA**, *Brown*.

Evergreen trees. Leaves alternate, penninerved. Flowers small, in axillary panicles. Perianth-tube very short; segments 6, in 2 series. Perfect stamens 3, all of the 3rd order, extrorsely 2-locular, filaments 2-glandular or not; staminodes 0, or 3 minute, or replaced by a fleshy ring. Berry oblong or subglobose, pedicel hardly thickened; perianth usually wholly deciduous.—Species about 15, Indian, Malayan, Australian and Pacific.

1. ***E. firma***, *Nees in Wall. Pl. As. Rar.* ii. 68, and *Syst. Laurin.* 195;

glabrous, leaves 5–8 in. elliptic-oblong obtusely acuminate coriaceous base acute concolorous and finely reticulate on both surfaces, nerves distinct, panicles lax-fld. much shorter than the leaves. *Meissn. in DC. Prodr.* xv. 1. 79. *Laurus firma*, *Wall. Cat.* 2597.

SILHET, *De Silva*. CACHAR, *Keenan*.

Branches terete, woody; terminal buds small, puberulous. *Leaves* when dry red-brown on both surfaces; nerves 10–11 pair, sunk above, prominent beneath, very obliquely arched; petiole $\frac{1}{2}$ in., stout. *Panicle* 1–2 in., obscurely puberulous, black when dry; branches spreading; flowers pedicelled, minutely bracteolate. *Perianth* campanulate, $\frac{1}{4}$ in. diam.; segments broadly ovate, obtuse, glabrous externally, three inner smaller, tomentose within, as is a triangular space at the base of the outer and the base of the perianth within. *Anthers* 3, sessile, subsagittately oblong, obtuse, thick, tomentose, with linear-oblong obtuse sublateral cells and oblong valves. *Fruit* (in Cachar specimen) $1\frac{1}{4}$ in. long, elliptic-ovoid, quite smooth, tip rounded.—Nees describes the leaves as sometimes opposite, and the fruit as oblong, 2 by $\frac{1}{2}$ in., seated on the small orbicular base of the perianth; but Wallich's specimens, the only ones known to Nees, are in flower only (having no fruit), and all the leaves are alternate.

2. **E. Maingayi**, *Hook. f.*; leaves 3–4 in. coriaceous elliptic or elliptic-oblong obtusely subcaudate acuminate, minutely reticulated, nerves very obscure, racemes very short glabrous few-fld., perianth unequally 6-cleft, fruit $1\frac{1}{2}$ –2 in. oblong.

MALACCA, *Maingay* (*Kew Distrib.* 1270).

Branches rather slender. *Leaves* $1\frac{1}{2}$ –2 in. diam., firmly coriaceous, red-brown, shining and finely reticulated on both surfaces; nerves 8–10 pair, very slender and faintly raised on both surfaces, base acute; petiole $\frac{3}{4}$ –1 in. *Racemes* $\frac{1}{2}$ in. long or less, hoary; buds globose, $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. *Sepals* very coriaceous, concave. *Stamens* sessile, almost in the centre of the flower. *Ovary* sunk in the very short perianth-tube; style short, stigma minute. *Fruit* solitary, axillary, peduncles (or pedicels) not $\frac{1}{2}$ in. long.

6. SYNDICLIS, *Hook. f.*

A glabrous tree. *Leaves* alternate, penninerved. *Flowers* minute, paniced, bisexual, gland-dotted. *Perianth* 4-partite, wholly deciduous; segments transversely oblong, 2-seriate, the two inner rather smaller. *Perfect stamens* 4, opposite to and as long as the perianth-lobes, broadly ovate, thick, pubescent and gland-dotted, 1-celled; cell small, opening introrsely by a single valve; staminodes 4, minute, lanceolate, hirsute. *Ovary* glabrous, tapering into an acute style.

S. paradoxa, *Hook. f. Ic. Plant.* t. 1515.

BHOTAN, *Booth*.

Branchlets slender, leafy at the tips, the very young obscurely pubescent or hoary. *Leaves* petioled, 3–5 by 2–2 $\frac{1}{2}$ in., rather membranous, obovate-oblong, acuminate, with 10–12 pairs of slender nerves, drying pale brown, conspicuously reticulated with raised nervules on both surfaces; base acute; petiole $\frac{1}{2}$ in., slender. *Panicles* shorter than the leaves, axillary, slender, with spreading few-flowered branches; flower- $\frac{1}{10}$ in. diam.; pedicels long, thickened under the flower. *Perianth-segments* short, broader than long, subreniform, early falling away in one piece. *Stamens* (apparently sessile anthers) very large for the size of the flower, pubescent all over except the valve, hollowed in front with the small cell towards the lip in front; valve emarginate (as if of 2 confluent valves), finally recurved over the top of the anther; staminodes, I think, alternate with the anthers.—An exceedingly curious plant, the only one of the Order with 1-celled anthers; it was in a collection of plants made in Bhotan by Mr. Booth, nephew of the late Thomas Nuttall, who gave the collection to Sir W. Hooker.

7. **CINNAMOMUM**, *Blume*.

Evergreen trees or shrubs. *Leaves* opposite or alternate, usually triple-nerved. *Flowers* small, 2-sexual or polygamous, in axillary and subterminal panicles; females usually largest, with often fewer parts. *Perianth-tube* short; segments 6, subequal. *Perfect stamens* 9 or fewer, filaments of 1st and 2nd series eglandular, with introrse 4-celled anthers; of the 3rd 2-glandular with extrorse 4-(rarely 2-)celled anthers; staminodes of the 4th series cordate or sagittate. *Fruit* seated on the enlarged perianth, the segments of which are wholly or in part deciduous, or very rarely persistent and entire.—Species about 130?, tropical and subtropical Eastern Asia, Australia and the Pacific.

The following is a very imperfect account of the British Indian *Cinnamoma*, to discriminate the species of which with any approach to completeness or accuracy requires a careful study of living specimens. I am so uncertain of the limits of the described species and their synonymy, that I have sparingly quoted from such authors as Miquel and Nees, who must often have worked upon very incomplete materials; and from referring to extra-Indian species, which may or may not be identical with Indian. Meissner did much towards reforming the genus, but more remains to be done. I have retained a good many species that I suspect will not stand. In the "Genera Plantarum" it is suggested that the genus may be reduced to ten species, but I do not see my way to this. The fruiting perianth is incorrectly described in that work; it is usually greatly enlarged, and the lobes sometimes persist.

Sect. I. **Malabathrum**. *Buds* naked or with very small scales. *Leaves* opposite, triple-nerved, rarely alternate or penninerved; axils of principal nerves without pits.

* *Leaves* opposite or subopposite, triple-nerved.

a. *Species of the Himalaya and Northern India.*

1. **C. Tamala**, *Fr. Nees* in *Nees & Eberm. Med. Pharm. Bot.* ii. 426, and *Plant. Officin. fasc.* 4; leaves 3–10 in. ovate oblong or lanceolate usually acuminate 3-nerved, nerves not impressed above, panicles scarcely exceeding the leaves, perianth sparingly silky-pubescent, lobes deciduous in fruit, stamens and ovary villous, fruit small ellipsoid. *Meissn. in DC. Prodr.* xv. 1. 17; *Hayne, Arnz. Gew.* xii. t. 26; *Blume Rumph.* t. 14, f. 3, 4; *Nees in Wall. Pl. As. Rar.* ii. 75, and *Syst. Laurin.* 56; *Brand. For. Fl.* 374; *Gamble Man. Ind. Timb.* 306. *O. albiflorum*, *Nees in Wall. Pl. As. Rar.* ii. 75, and iii. 32, and in *Syst. Laurin.* 58; *Wight Ic.* t. 140; *Blume Rumph.* t. 14, f. 2?. *C. Cassia*, *Don Prodr.* 67 (not of Linn.). *C. pauciflorum*, *var.* ? *β. Tazia*, *Meissn. in DC. Prodr.* xv. 1. 17. *Persea Tamala*, *Spreng. Syst.* ii. 268. *Laurus Cassia*, *Roxb. Hort. Beng.* 30; *Wall. Cat.* 2580. *L. albiflora*, *Wall. Cat.* 2569. *L. Tamala*, *Tazia*, *Somcaurium* & *Saillyana*, *Ham. in Trans. Linn. Soc.* xiii. 555–558.

TROPICAL and SUBTROPICAL HIMALAYA; from near the Indus to Bhotan, alt. 3–5000 ft., ascending to 7800 in Sikkim. SILHET and KHASIA Mts., alt. 3–4000 ft.

A moderate-sized tree. *Leaves* usually 4–5 in. long, very variable in breadth, rarely alternate, shining above, rarely elliptical and obtuse, venules below very obscure, more distinct in Sikkim specimens; a single specimen from the Deyra doon (Falconer) has broader ($2\frac{1}{2}$ in.) leaves with 5 nerves. *Flowers* $\frac{1}{4}$ – $\frac{1}{2}$ in. long. *Fruit* $\frac{1}{2}$ in. long; peduncle and calyx small, $\frac{1}{2}$ in. long, the latter usually $\frac{1}{4}$ in. diam. with truncate lobes.—Khasian specimens from the Bor-panee River have leaves only $\frac{1}{2}$ –1 in. diam. Brandis is the authority for this species advancing westward to near the Indus; Garwhal is the most western locality known to me. Meissner's three varieties have no distinctive characters.

2. **C. obtusifolium**, *Nees in Wall. Pl. As. Rar.* ii. 73, and *Syst.*

Laur. 33; leaves quite glabrous 8-12 in. very coriaceous elliptic-oblong obtuse acute or acuminate 3-nerved, nerves not impressed above, panicles very large and stout subterminal and corymbiform often exceeding the leaves, perianth subsilky-pubescent, lobes persistent in fruit, stamens and ovary sparsely hairy or glabrous, fruit small ellipsoid or subglobose. *Meissn. in DC. Prodr.* xv. 1. 12; *Wight Ic.* t. 139; *Kurz For. Fl.* ii. 287; *Gamble Man. Ind. Timb.* 305. *Laurus obtusifolia*, *Roxb. Fl. Ind.* ii. 302; *Wall. Cat.* 2574. *L. macrophylla*, *Wall. Cat.* 2575. *L. Bejolgota* and *L. Bazania*, *Ham. in Trans. Linn. Soc.* xiii. 559, 560. *L. Cassia*, *Herb. Ham.*

CENTRAL and EASTERN HIMALAYA; Nepal, *Hamilton*, &c.; Sikkim, ascending to 7000 ft. ASSAM, SILHET and the KHASIA MTS., and southwards to TENASSERIM and the ANDAMAN ISLANDS.

A large robust plant, the largest leaved of the Indian species. *Leaves* often glaucous beneath, nervules faint or distinct; petiole short, robust. *Flowers* small ($\frac{1}{4}$ in diam.), often crowded at the ends of the much-branched long-peduncled crowded panicles. *Fruit* $\frac{1}{3}$ - $\frac{1}{2}$ in. long, succulent; peduncle and calyx $\frac{1}{4}$ - $\frac{1}{2}$ in. long, the latter $\frac{1}{2}$ in. broad in fruit, lobes rounded in Sikkim specimens, narrower and more acute in Silhet ones.

3. ***C. impressinervium***, *Meissn. in DC. Prodr.* xv. 1. 21; leaves quite glabrous 3-5 in. elliptic-lanceolate acuminate 3-nerved, nerves deeply impressed in age, panicles shorter than the leaves silkily tomentose, fruiting calyx small pyriform or cupular, enclosing the small unripe fruit, lobes wholly deciduous.

SIKKIM HIMALAYA, alt. 4-6000 ft., *Herb. Griffith, J. D. H.*—DISTRIB. Yunan.

Branches slender; buds and young shoots silky. *Leaves* brown when dry, 1-2 in. diam., shining above, paler beneath, with faint reticulations; petiole very slender. *Panicles* shortly peduncled, rather few-fl. *Fruiting calyx* and pedicels $\frac{1}{4}$ in.; mouth quite entire; the fruit is too young to determine its nature.

4. ***C. pauciflorum***, *Nees in Wall. Pl. As. Rar.* ii. 75, and *Syst. Laur.* 68; leaves quite glabrous 2-4 in. ovate or ovate-lanceolate acuminate 3-nerved, base acute rounded or cordate, panicles shorter than the leaves few-fl. nearly glabrous, calyx-lobes wholly deciduous in fruit. *Meissn. in DC. Prodr.* xv. 1. 17, *excl. var. β .*; *Gamble Man. Ind. Timb.* 305; *Wall. Cat.* 2579. *C. recurvatum*, *Wight Ic.* t. 133. *Laurus recurvata*, *Roxb. Fl. Ind.* ii. 301.

KHASIA MTS.; alt. 4000 ft., *De Silva, J. D. H. & T. T.* ASSAM VALLEY and SILHET, *Gamble*.

A small tree, buds and young shoots glabrous. *Leaves* very much smaller than in the preceding species, firmly coriaceous, usually glaucous and finely reticulated beneath, rarely 5-nerved, tip sometimes caudate-acuminate. *Panicles* sometimes reduced to 3 flowers. *Perianth* $\frac{1}{10}$ - $\frac{1}{8}$ in. long. *Stamens* hairy. *Fruiting calyx* very small, with a quite entire mouth; fruit too young to describe.—*Hamilton's C. Tazia*, referred doubtfully to this as a variety, is clearly *C. Tamala*, as the specimen in *Herb. Wallich* proves, and it was moreover found at the foot of the Sikkim Himalaya, where *C. pauciflorum* does not occur. *Roxburgh* states that his *L. recurvata* was supposed to have come from China, and if so, it may be the *C. dulce* of the Hong Kong Flora, and possibly the same species as *C. pauciflorum*. *Roxburgh* describes his *L. dulcis* from China as having long narrow leaves with the lateral nerves vanishing a little above the middle, and must be a very different plant. The drawing of *Roxburgh* which *Wight* has copied (*Ic.* t. 138) is unnamed in the original. Another drawing of *Roxburgh's* named *L. dulcis* equally disagrees with the description in "Flora Indica" in having strong lateral nerves produced to the tip. *Wallich* doubtfully refers *Roxburgh's L. recurvata* to *Daphnidium*.

b. *Species of Burma and the Malay Peninsula.* (See also *C. zeylanicum* & *obtusifolium*.)

5. **C. javanicum**, *Blume Bijd.* 570, and *Rumph.* 42, t. 19; branches petioles young leaves beneath and panicles fulvous-tomentose at length glabrate, leaves 6–12 in. elliptic or elliptic-oblong acuminate strongly 3-nerved transverse nerves very strong beneath, panicle shorter than the leaves few-fl. *Meissn. in DC. Prodr.* xv. 1. 10.

SINGAPORE, at Madang, *Cantley*. ? Penang, *Walker*.—DISTRIB. Java, Sumatra, Borneo.

Branches robust. *Leaves* firmly coriaceous, shining above; petiole stout. *Panicles* 3–4 in. long, perianth densely tomentose. *Fruit* unknown.—The Singapore specimens in late flower are certainly the Javan plant, but the Penang ones, which have neither flower nor fruit, have the leaves more narrowed into the very short thick petiole.

6. **C. Cassia**, *Blume Bijd.* 570 ?; leaves 3–4 in. glabrous oblong to oblong-lanceolate caudate-acuminate 3-nerved, petiole slender, panicles cymose silky terminal and axillary, flowers small, fruit the size of a pea with the perianth-lobes persistent or truncate.

AVA; on the Kakhyen Hills, *Kurz*.—DISTRIB. China.

I have refrained from quoting synonyms for *Kurz*'s plant, of which I have seen no specimens; it is remarkable for the small size of the fruit, in which respect it agrees with the plant that yields the Cassia bark of China, but differs in the perianth-lobes being sometimes persistent, these being wholly deciduous in the China plant, leaving a perfectly entire mouth of the fruiting perianth. In *Bentley* and *Trimen*'s *Med. Pl.* (iii. t. 233) they are represented as minute and persistent.

7. **C. iners**, *Reinw. in Blume Bijd.* 570; leaves glabrous 3–8 in. lanceolate oblong or linear-oblong 3-nerved, base acute or obtuse, panicles slender long-peduncled often exceeding the leaves silky pubescent, flowers small, perianth $\frac{1}{10}$ in. long lobes persistent, fruit oblong $\frac{1}{2}$ in. long base sunk in the perianth. *Meissn. in DC. Prodr.* xv. 1. 19 (*excl. var. γ.*); *Nees in Wall. Pl. As. Rav.* ii. 73; *Wight Ic.* t. 122; ? *Kurz For. Fl.* ii. 287. *C. malabathrum*, *Batka in Nov. Act. Nat. Cur.* xvii. 2. 618, t. 45; *Nees Syst. Laur.* 38, 663. *C. Griffithii*, *Meissn. l. c.* 19. *C. gracile*, *Miquel Ann. Mus. Bot. Lugd. Bat.* i. 259. *Laurus malabathrum*, *Wall. Cat.* 2583 A *in part* (*not of Roxb.*). *L. nitida*, *Roxb. Fl. Ind.* iii. 300; *Wall. Cat.* 2582, *excl. B.*

TENASSERIM, *Kurz*; at Mergui, *Griffith*. MALACCA, *Griffith*, *Maingay* (*Kew Distrib.* 1242, 1243). PENANG, *Wallich*, *Phillips*.—DISTRIB. Sumatra, Java.

A tree, branchlets nearly glabrous. *Leaves* very variable in breadth, rarely ovate and rounded at the base, shining above, nerves continued to the tip. *Panicles* very lax-fl., with spreading branches and pedicels; flowers about $\frac{1}{10}$ in. long. *Fruiting perianth* rather spreading when dry, $\frac{1}{2}$ in. diam.—*Kurz* describes the fruiting perianth as truncately 6-lobed, implying that the lobes are partially deciduous, and the fruit as $\frac{3}{4}$ in. long, which makes me doubt the identity of his plant with that described above. *Wallich*'s *L. malabathrum* is, I think, this, and is not *Roxburgh*'s, who takes the name, following *Solander*, for *Rheede*'s Malabar plant. There is in the *Kew Herbarium* a Canara specimen of what resembles this, but it is not in fruit.

8. ? **C. nitidum**, *Blume Rumph.* i. 35, t. 13, f. 2, and t. 16, f. 1, 2; leaves 3–9 in. glabrous elliptic oblong or linear-oblong obtuse 3-nerved, panicles slender long-peduncled often longer than the leaves silkily pubescent, perianth $\frac{1}{2}$ in. long lobes rounded and persistent in fruit: *C. iners*, γ . *subvenosum*, *in part*, *Meissn. in DC. Prodr.* xv. 1. 21. *C. eucalyptoides*, *F. Nees Pl. Off. Suppl. fasc.* iv. t. 9; *Nees Syst. Laur.* 41. *C. iners*, *Wall. Cat.* 2583 E, and in *Wall. Pl. As. Rav.* ii. 73. ? *L. Culit-laban*, *Roxb. Fl. Ind.* ii. 299; *Wight Ic.* t. 137; *Wall. Cat.* 2583 C. *Laurus malabathrum*, *L. ?*, *Wall. Cat.* 2583 *in part* (*not of Roxb.*).

TENASSERIM; at Mergui, *Griffith*. PENANG and BURMA, *Wallich*. CANARA?, *Herb. Stocks & Dalzell*.—DISTRIB. Malay Islands and Moluccas.

Very like *C. iners*, and perhaps only a variety, but the flowers are longer and almost twice as large.—Roxburgh's *L. Culillaban*, for which he cites Willdenow, and which he identifies with Rumph. Amb. ii. t. 14, is from Amboyna, and described as a slender Cypress-like tree with short appressed branches, and panicles stouter than the leaves; his figure (Wight Ic. t. 137) represents the leaves as much more acute than in the specimen in *Herb. Wallich*.

9. *C. Tavoyanum*, *Meissn. in DC. Prodr.* xv. 1. 20; branchlets young leaves beneath and panicles tomentosely pubescent, leaves 4–6 in. elliptic- or oblong-lanceolate obtusely acuminate 3-nerved, panicles slender long-peduncled few-fl., flowers long-pedicelled $\frac{1}{2}$ in. long. *C. sulphuratum*, *Kurz For. Fl.* ii. 288; not of Nees. *C. sulphuratum* γ *merguense*, *Meissn. l. c.* 18. *C. lucens*, *Miquel Ann. Mus. Bot. Lugd. Bat.* i. 261. *C. obtusifolium*, var., *Wall. Cat.* 2569 G.

TENASSERIM; at Tavoy, *Gomez*; Mergui, *Griffith* (*Kew Distrib.* 4241), *Helper* (*Kew Distrib.* 4245, *C. iners* ?); Moulmein, *Parish*.

This again is very near *C. iners*, from which the copious fulvous tomentum, narrower leaves, usually slender and longer petiole, longer pedicels and larger flowers distinguish it. It is also very near if not identical with *C. sulphuratum*, but in the absence of fruit I do not venture to unite it.

10. *C. vimineum*, *Nees Syst. Laur.* 82, and in *Wall. Pl. As. Rar.* ii. 76; quite glabrous, branches very slender, leaves 3–4 in. subopposite lanceolate obtuse 3-nerved shining above, margins waved. *Meissn. in DC. Prodr.* xv. 1. 19. *Laurus viminea*, *Wall. Cat.* 2578.

PENANG; *Porter*.

The slender habit and small shining leaves with waved margins distinguish this species. There are no flowers in *Wallich*'s specimens, and two flowers distributed with it to *Herb. Hook.* are detached, and perhaps do not belong to the leaf-bearing ones; they are very small and nearly glabrous.—*Kurz* informs me that boiled leaves smell of fennel.

11. *C. mollissimum*, *Hook. f.*; branches petioles and leaves beneath densely villous with soft white hairs, leaves elliptic acuminate 3-nerved, peduncles very slender strict few-fl. shorter than the leaves, flowers minute shortly pedicelled.

PENANG; *Curtis*.

Branches slender, but thickened by the long soft spreading hairs. Leaves 5–6 in., pale greyish white beneath when dry, above pale green and finely softly hairy, at length glabrate; nerves strong beneath, reaching the tip; petiole stout, $\frac{1}{2}$ – $\frac{3}{4}$ in. Peduncle 2 in., trichotomously branched at the tip only. Flowers $\frac{1}{2}$ in. long, tomentose, pedicels hardly as long. Perianth-lobes short, rounded.—A very remarkable and singularly fragrant species.

c. Species of the Deccan Peninsula and Ceylon. (See *C. iners* & *nitidum* in b.)

12. *C. zeylanicum*, *Breyn in Ephem. Nat. Cur. dec. i. ann. 4*, 139; leaves 4–7 in. glabrous very coriaceous ovate or ovate-lanceolate 3–5-nerved obtuse or subacute reticulate beneath, panicle often longer than the leaves subsilky pubescent, perianth $\frac{1}{2}$ in. long, fruiting peduncle campanulate $\frac{1}{2}$ in. diam. crowned with the rounded perianth-lobes, fruit oblong $\frac{3}{4}$ in. long apiculate dry. *Nees Syst. Laurin.* 95, and in *Wall. Pl. As. Rar.* ii. 74, and iii. 32; *Meissn. in DC. Prodr.* xv. 1. 13; *Blume Bijl.* 588; *Wight Ic.*

t. 123, 129, 134; *Wall. Cat.* 2573; *Beddome For. Fl.* t. 262, and *For. Man.* 184, and *Flor. Sylv.* t. 242; *Bentl. & Trim. Med. Pl.* iii. t. 224; *Thwaites Enum.* 252 (excl. some vars.); *Kurz For. Fl.* ii. 287; *Miquel Fl. Ind. Bat.* i. 898. *C. aromaticum*, *Grah. Cat. Bomb. Pl.* 173; *Dalz. & Gibs. Bomb. Fl. Suppl.* 71. ? *C. iners*, *Wight Ic.* t. 122 bis. *Laurus cinnamomum*, *Rorb. Fl. Ind.* ii. 295. *L. nitida*, *Wall. Cat.* 2582 ? *B. L. Cassia*, *Burm. Fl. Ind.* 91; *Ham. in Trans. Linn. Soc.* xiii. 555; *Spreng. Syst.* ii. 567; *Bot. Mag.* t. 1636, copied in *Wight Ic.* t. 128.

TENASSERIM, BURMA and the MALAY PENINSULA; DECCAN PENINSULA and CEYLON, indigenous or cultivated.—DISTRIB. Cultivated in the Malay Islands and elsewhere in the tropics.

I am unable to unravel the synonymy of the varieties attributed to this species by Nees and others. Thwaites suspects that it passes into *C. nitidum* and *iners*. This is possible if the fruiting calyces prove the same, though not into *C. obtusifolium*, which, besides its characters of leaf and panicle, appears to have a different range. I have also kept *C. multiflorum* and *ovalifolium* (which Thwaites unites with *zeylanicum*) as distinct, though with hesitation. Kurz (For. Fl.) describes the fruiting perianth of *zeylanicum* as truncately 5-cleft, but I find the lobes in fruit all perfect and rounded in what I take to be typical specimens. Meissner's var. *sceniculaceum* (Ceylon, Thwaites 2284) seems to have no recognizable character, and Thwaites does not distinguish it. Vars. *inodorum* and *Cassia* of Nees I suppose to be the same thing, and are the faintly aromatic wild forms, passing probably into *nitidum*, the fruiting perianth of which is unknown. Beddome's figure of *zeylanicum* is of a very coarse-leaved var. from the Nilghiris, which he calls Var. *Wightii*; his fig. 11 on the same plate representing what he supposes to be fruit of *iners* is perhaps referable to *C. macrocarpum*.

13. **C. multiflorum**, *Wight Ic.* t. 126 and 131; branches slender, branchlets and young leaves beneath clothed with fine white pubescence, leaves opposite 2-4 in. thinly coriaceous usually ovate-lanceolate acuminate 3-nerved, panicles slender much branched many-fl'd., flowers small subcorymbose, pedicels slender, perianth $\frac{1}{2}$ in. long. *Meissn. in DC. Prodr.* xv. 1. 15. *C. zeylanicum*, var. β , *Thwaites Enum.* 252. *C. villosum* & *dubium*, *Wight Ic.* t. 127, 135. *C. perpetuo-florens*, *Burm. Fl. Zeyl.* 63; *Wight Ic.* t. 141. *C. iners*, var. δ ? *dubium*, *Meissn. l. c.* 20. *Laurus dubia*, *Wall. Cat.* 2571.

CEYLON; common in the Central Province, ascending to 3000 ft.

This, which Thwaites finds it difficult to distinguish from *zeylanicum*, is a more slender plant, with much smaller and less coriaceous leaves, and very much smaller flowers. Wallich's *L. dubia* received from Wight as *L. Cassia* seems the same thing, and probably came from Ceylon.

14. **C. sulphuratum**, *Nees in Wall. Pl. As. Rar.* ii. 74, and *Syst. Laur.* 55; branches petioles young leaves beneath or on both surfaces and panicles densely fulvous-tomentose, leaves thickly coriaceous elliptic oblong or ovate-lanceolate obtuse or acute 3-5-nerved, panicles shorter than the leaves long-peduncled, flowers few corymbose, perianth $\frac{1}{2}$ in. long lobes persistent, fruit $\frac{1}{2}$ - $\frac{3}{4}$ in. ellipsoid fleshy. *Meissn. in DC. Prodr.* xv. 1. 18. (excl. vars. and syn. *villosum*). *Laurus malabathrum*, *Wall. Cat.* 2583 D.

NILGHIRI HILLS, Heyne, &c.

Leaves very variable in breadth, base acute, nerves very strong and often pubescent on the upper surface, old perfectly glabrous and very rigidly coriaceous, in mountain ? specimens often short broad and convex with recurved margins; petiole usually short, $\frac{1}{2}$ in., and stout. Panicles stout, 2-4 in. Fruiting perianth $\frac{1}{2}$ in. diam., lobes rounded. Fruit minutely apiculate.—Very closely allied to *C. Tavoyanum*, if not conspecific.

15. **C. Wightii**, *Meissn. in DC. Prodr.* xv. 1. 11; branches and

petioles very robust, terminal buds globose silky, leaves subopposite 3-4 in. thickly coriaceous elliptic broadly ovate or oblong obtuse glaucous beneath, nerves 3-5 continued to near the tip, panicles fulvous-tomentose usually longer than the leaves, peduncle branches and pedicels very stout few- or many-fld., perianth $\frac{1}{4}$ in. lobes deciduous, fruit globose seated on the very thick obconic base of the perianth. *C. Bazania*, var. *parvifolia*, *Nees in Wall. Pl. As. Rar.* iii. 32, and *Syst. Laurin.* 36.

NILGHIRI HILLS, *Wight, Perrottet, &c.*; Dindygul, *Wight*.

Branches as thick as a goose-quill, apparently soft, shrinking and black when dry, young nearly glabrous. *Leaves* sometimes almost rounded, finely reticulated beneath, base acute; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., often very broad. *Panicles* long-peduncled; pedicels shorter than the perianth. *Fruit* $\frac{1}{2}$ in. diam.; base of perianth about $\frac{1}{2}$ in. diam., obconic, fleshy.—Apparently a very distinct species, but I am not certain that the fruit is normal, it has a diseased look.

16. *C. ovalifolium*, *Wight Ic.* t. 125; branches and petioles very robust, terminal buds very small, leaves subopposite 3-4 in. thickly coriaceous elliptic orbicular or sublanceolate tip rounded or obtuse, nerves 3 vanishing beyond the middle, panicles hoary usually shorter than the leaves long-peduncled few-fld. *Meissn. in DC. Prodr.* xv. 1. 22. *C. zeylanicum*, var. *ovalifolium*, *Thwaites Enum.* 252.

CEYLON; in the Central Province, alt. 4-8000 ft.

Very young branchlets and leaves silky. *Leaves* rarely 5 in. long and elliptic-lanceolate, pale and finely reticulated beneath, with 3 faint or distinct nerves, base sometimes cordate; petiole usually short and very stout, but sometimes $\frac{1}{2}$ in. *Panicles* solitary or 2-3-nate, often only 3-fld. *Perianth* about $\frac{1}{2}$ in. long.—*Thwaites*, from a note on his specimens made subsequently to the publication of his Enumeration, was disposed to regard this as distinct from *zeylanicum*. The evanescence of the three nerves beyond the middle of the leaf is a very constant but not an absolute character.

17. *C. litseæfolium*, *Thwaites Enum.* 253; glabrous or nearly so, leaves subopposite 3-5 in. thickly coriaceous ovate or oblong tip obtuse or rounded, nerves 3-5 very indistinct rarely produced to the middle, petiole slender, panicles subterminal longer than the leaves branched laxly many-fld., perianth small campanulate silky, lobes early caducous. *Meissn. in DC. Prodr.* xv. 1. 22.

CEYLON; Central Province, at Hapotelle, alt. 5000 ft., *Thwaites*.

A tree, 50-60 ft. high, branched at the top; branchlets and small terminal buds subsilky. *Leaves* hard, flat, pale brown; nerves almost immersed in the substance; base acute; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Panicles* on long stout peduncles; flowers subcorymbose at the ends of the branches; pedicels longer than the perianth, stout. *Perianth* about $\frac{1}{10}$ in. long.

18. *C. macrocarpum*, *Hook. f.*; branches slender, leaves 5-8 in. oblong-lanceolate 3-5-nerved, petiole $\frac{1}{2}$ -1 in., fruiting perianth $\frac{2}{3}$ in. diam. broadly funnel-shaped very shortly 6-toothed, fruit 1 in. long globosely oblong. *C. iners*, *Wight Ic.* t. 130. *Carua*, *Ham. in Trans. Linn. Soc.* i. 57. —*Rheede Hort. Mal.* i. t. 51.

CANARA, *Dalzell*.

Leaves $1\frac{1}{2}$ -3 in. broad, rather thinly coriaceous, very faintly reticulate beneath, lateral nerves sometimes $\frac{2}{3}$ in. above the base; petiole $\frac{3}{4}$ -1 in. *Panicles* shorter than the leaves; fruiting peduncle long, slender for the size of the fruit, which is much the largest of the genus. *Fruiting perianth* apparently fleshy, together with the thickened pedicel nearly 1 in. long.

19. *C. gracile*, *Hook. f.*; quite glabrous, branches slender, leaves

opposite 3-4 in. thinly coriaceous elliptic ovate or lanceolate obtusely acuminate 3-nerved finely reticulate on both surfaces, panicles axillary very slender shorter than the leaves few-fl., pedicels very long and slender, flowers very small.

SOUTH DECCAN; Tinnevely Hills, alt. 3-4500 ft., *Beddome*.

A shrub or tree; branches usually pale. *Leaves* $\frac{3}{4}$ -1 $\frac{1}{2}$ in. broad, pale green, subcaudate, glaucous or not beneath, base acute, nerves not produced to the tip; petiole slender, $\frac{1}{4}$ - $\frac{1}{2}$ in. *Panicles* 6-8-fl.; pedicels $\frac{1}{4}$ - $\frac{3}{4}$ in. long; flowers $\frac{1}{10}$ in., glaucous, quite glabrous, as are the stamens and ovary.—Apparently a very distinct and pretty little species, but more specimens are wanted.

** Leaves mostly alternate, triple-nerved.

20. **C. caudatum**, *Nees in Wall. Pl. As. Rar.* ii. 76, and *Syst. Laurin.* 83; leaves alternate 3-4 in. thinly coriaceous orbicular or elliptic obtusely caudate-acuminate 3-5-nerved, flowers minute in very short axillary few-fl. pubescent cymes, fruiting perianth turbinate funnel-shaped fleshy 6-lobed, fruit ellipsoid or globose fleshy. *Meissn. in DC. Prodr.* xv. 1. 23; *Kurz For. Fl.* ii. 289. *Laurus caudata*, *Wall. Cat.* 2603.

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 1-4000 ft., *J. D. H. & T. T.*, &c. BURMA, in the Kakhien Hills, *Kurz*.—DISTRIB. YUNAN.

A large glabrous shrub with slender spreading branches. *Leaves* rarely opposite, brown when dry, sometimes oblique, base acute, nervules transverse, very slender; petiole slender, $\frac{1}{2}$ in. *Cymes* irregular, sometimes reduced to one or two axillary flowers; flowers $\frac{1}{12}$ in. diam.; pedicels slender. *Fruiting perianth* $\frac{1}{2}$ - $\frac{1}{2}$ in. diam., very fleshy. *Fruit* rarely obovoid.

21. **C. Perrottetii**, *Meissn. in DC. Prodr.* xv. 1. 22; densely fulvous-tomentose on branches and both surfaces of young leaves and panicles, leaves mostly alternate long-petioled oblong or ovate-oblong 3-nerved tip obtuse or rounded, panicles shorter or longer than the leaves stout few-fl., flowers large subsessile.

NILGHIRI HILLS, *Perrottet*, *Wight*.

A shrub? branches stout. *Leaves* thickly coriaceous, in age glabrous on both surfaces and shining above, base acute; petiole $\frac{3}{4}$ -1 $\frac{1}{2}$ in. *Flowers* 3-nate, $\frac{1}{2}$ in. long, sessile, or narrowed into a very short stout pedicel, densely tomentose. *Fruit* not seen.

*** Leaves subopposite, penninerved.

22. **C. citriodorum**, *Thwaites Enum.* 253; leaves 2-3 in. subopposite quite glabrous densely coriaceous ovate or oblong obtuse penninerved, nerves very faint, panicles longer than the leaves stout branched laxly many-fl. subsilky, flowers stoutly pedicelled. *Meissn. in DC. Prodr.* xv. 1. 22.

CEYLON; Saffragam and near Galagama, alt. 1-2000 ft., *Thwaites*.

A tree, 20-30 ft.; branches stout. *Leaves* very hard, pale brown and shining when dry, base rounded or acute, nerves spreading from the very obscure midrib; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Flowers* about $\frac{1}{2}$ in. long, pedicels about as long.—I have seen no fruit. *Meissner* describes the calyx-lobes as deciduous, the fruiting calyx as truncate and quite entire, 2 lines in diameter, and the fruit as ovoid.

Sect. II. **Camphora**. *Buds* enclosed in large orbicular concave silky caducous imbricating scales. *Leaves* alternate, penninerved; axils of principal nerves often pitted. *Perianth-lobes* wholly caducous in age.

The Camphor tree, *C. camphora*, *F. Nees (Wall. Cat.* 6347), belongs to this section; it is commonly cultivated in India.

23. **C. glanduliferum**, Meissn. in DC. Prodr. xv. 1. 25 (excl. var. β .); leaves 3-5 in. alternate elliptic or lanceolate caudate-acuminate penninerved, panicles axillary long-peduncled few-fld. nearly glabrous, flowers sparsely pubescent without villous within. *Camphora glandulifera*, Nees in Wall. Pl. As. Rar. ii. 72, and Syst. Laurin. 90. *Laurus glandulifera*, Wall. in Act. Ser. Med. & Phys. Calcutt. i. 45, with plate, and Cat. 2601; Brandis For. Flor. 376; Gamble Man. Ind. Timb. 306.

CENTRAL HIMALAYA; Nepal, top of Sheopore, Wallich; ? Kumaon, at Petors, alt. 5000 ft., Thomson. KHASIA Mts.; Myrung, alt. 5-6000 ft., J. D. H. & T. T.

A tree; branches stout, smooth, black when dry. Leaves very variable in size and breadth, thickly coriaceous, often glaucous beneath, brown when dry; nerves erecto-patent; petiole $\frac{1}{2}$ -1 in., slender. Panicles 2 in. long, peduncle very slender glabrous; flowers shortly pedicelled, $\frac{1}{10}$ in. diam. Stamens hairy. Ovary glabrous.—I have described this species from Wallich's Nepal plants with nearly glabrous panicles, referring the tomentose flowered var. β . *caniflora* of Meissner to *C. cecicodaphne*. Brandis and Gamble no doubt include it under their *glanduliferum*. If the fruit which is unknown be not different, I do not see how Wallich's plant is to be distinguished from *C. Parthenoxylon*.

24. **C. cecicodaphne**, Meissn. in DC. Prodr. xv. 1. 25; habit and characters of *C. glanduliferum*, but panicles shorter crowded and densely tomentose as are the flowers within and without, fruit $1\frac{1}{4}$ in. long oblong. *C. glanduliferum*, β . *caniflorum*, Meissn. l. c. *Camphora caniflora*, Meissn. mss. *Cecicodaphne glaucescens*, Nees in Wall. Pl. As. Rar. ii. 70, and Syst. Laurin. 203. *Tetranthera glaucescens*, Wall. Cat. 2560. *Laurus glaucescens*, Herb. Ham.

EASTERN HIMALAYA; Sikkim, J. D. H.; Bhotan, Griffith. ASSAM, Mann; Patkôye Mts., Griffith (Kew Distrib. 4247). SILHET, Hamilton, &c.

As stated under *C. glanduliferum*, this may prove a form of that plant, as Meissner supposed; it differs from *C. Parthenoxylon* in the tomentose panicles and large oblong fruit.

25. **C. inunctum**, Meissn. in DC. Prodr. xv. 1. 25; leaves alternate 3-5 in. long-petioled elliptic-oblong or ovate obtusely acuminate penninerved, nerves very faint finely reticulate beneath, panicles solitary slender glabrous few-fld., flowers long-pedicelled glabrous. *Kurz For. Fl.* ii. 289. *Camphora inuncta*, Nees in Wall. Pl. As. Rar. iii. 32, and Syst. Laurin. 89; Miquel Fl. Ind. Bat. i. pt. 1, 905. *Tetranthera camphoracea*, Wall. mss. *Phoebe micrantha*, Meissn. mss.

TAYOY, Gomez, Herb. Calcutt. MALACCA, Griffith (Kew Distrib. 4256).

A tree with slender branches which are black when dry. Leaves in Wallich's specimens 3 in., in King's 5 in., thinly coriaceous, with two long sub-basal nerves; petiole $\frac{1}{2}$ -1 in. Panicle slender, 2-3 in. long, long-peduncled, subcorymbosely few-fld.; flowers $\frac{1}{10}$ in. broad, on slender pedicels $\frac{1}{8}$ - $\frac{1}{4}$ in. "Fruiting perianth funnel-shaped. Berry ovoid the size of a pea," Meissner.—Wallich's specimens are very imperfect, and the fruit described by Nees is not on it. I suspect *C. inodorum*, Meissn., of Borneo, may be the same plant, and both may possibly be referable to *C. Parthenoxylon*.

26. **C. Parthenoxylon**, Meissn. in DC. Prodr. xv. 1. 26; leaves alternate elliptic ovate or oblong subcaudate-acuminate penninerved often glaucous beneath, panicles short nearly glabrous shorter than the leaves, perianth nearly glabrous without pubescent within, fruit $\frac{1}{4}$ in. diam. globose. *Kurz For. Fl.* ii. 289; Benth. Fl. Hongk. 290. *C. pseudo-sassafras*, Meissn. l. c. 27. *C. ? malaccense*, Meissn. l. c. 27. *C. Neesianum*, Meissn. l. c. *Camphora Parthenoxylon*, Nees in Wall. Pl. As. Rar. ii. 76. *C. pseudo-sassafras*, Miquel in Zolling. Verzeichn. 113, 114 in part. *C. chinensis*,

Nees in Otto Gartenzeit. 1833, 91, and *Syst. Laurin.* 92. *Sassafras Parthenoxylon*, *Nees Syst. Laurin.* 491; *Wight Ic. t.* 1832. *Parthenoxylon porrectum* and *P. pseudo-sassafras*, *Blume Mus. Bot. Lugd. Bat. i.* 323; *Miquel Fl. Ind. Bat. i.* 1. 917. *Persea pseudo-sassafras*, *Zolling. in Nat. en Geneesk. Arch. ii.* 635. *Laurus Parthenoxylon*, *Jack in Mal. Misc. i.* 28; *Wall. Cat.* 2602. *L. porrecta*, *Roxb. Hort. Calc.* 30, and *Fl. Ind. ii.* 308. *Phœbe latifolia*, *Champ. in Kew Journ. Bot. v.* 197.

MALAY PENINSULA; from Tenasserim, *Griffith, &c. (Kew Distrib.* 4248, 4249), to PENANG, *Wallich, Maingay (Kew Distrib.* 1514 and 1244).—DISTRIB. Sumatra, Java, China.

A large tree, branches stout, black when dry, with very smooth bark. *Leaves* extremely variable, the largest 8 by 4 in., coriaceous, others thinner almost membranous and glaucous beneath, base acute; nerves spreading, the lowest pair sometimes longest; petiole slender, 1–1½ in. *Panicles* 1–3 in. long, with the young shoots enclosed in rounded coriaceous silky caducous scales, black when dry, many-fl.; flowers ½ in. diam., pedicelled. *Perianth-lobes* broadly oblong, obtuse, wholly deciduous. *Stamens* very short, hairy. *Ovary* glabrous. *Stigma* discoid. *Fruiting perianth* ¼–½ in. long, funnel-shaped, suddenly expanding into the fruit-bearing disk. *Fruit* succulent.—I find no specimen of *C. malaccense*, Meissn., said to be described from specimens in Herb. Hook.; but I cannot doubt its being *C. Parthenoxylon*.

DOUBTUL AND EXCLUDED SPECIES.

C. BURMANNI, *Blume (Laurus dulcis, Roxb. Hort. Beng.* 30, and *Fl. Ind. ii.* 303; *Wall. Cat.* 2581), is a Malayan Island species, not hitherto found in India. Meissner quotes Wight's *Icones*, t. 138, copied from a drawing of Roxburgh under the name of *dulce*, for this, but it differs in the very strong nerves produced to the very tips of the leaves.

C. CATHIA, *Don Prodr.* 67, is probably *Phæbe paniculata*.

C. HEYNEANUM, *Nees Syst. Laur.* 77 (*Laurus Heyneana*, *Wall. Cat.* 2576), is referred to var. γ . *subrenosum* of *C. iners*, Reinw., by Meissner (in *DC. Prodr.* xv. 1. 20). It is not very like any species described above; it is a very slender plant, the subopposite leaves are very long and narrow, 5–7 by ½–1 in., with nerves obscure above; the fruiting peduncles are very long and slender; the pedicels ¼ in., suddenly dilating into the almost rotate fruiting-perianth ½ in. diam. with rounded spreading lobes, and the fruit (apparently dry) is oblong ½ in. long.—It is from Heyne's Herbarium without habitat.

LAURUS MALABATHRICA, *Soland. mss. in Roxb. Fl. Ind. ii.* 297. Roxburgh quotes Rheede's *Katou-Karua (Hort. Mal. v. t.* 53) for this; and Hamilton (in *Trans. Linn. Soc. xiii.* 550) has a long article upon it and upon Rheede's *Carua (Hort. Mal. i. t.* 57), which I have referred to *C. macrocarpum*. It appears to me to be impossible to identify absolutely the plants which such figures are supposed to represent.

LAURUS RIGIDA, *Wall. Cat.* 2570, from Silhet, with rigid elliptic very coriaceous leaves 3–5 in. long, is indeterminate.

C. TOMENTOSUM, *Don Prodr.* 67, is probably *Phæbe paniculata*.

LAURUS ?? SMILACIFOLIA, *Wall. Cat.* 2572, from Penang, is *Grewia laurifolia*, with leaves 10 in. long.

8. MACHILUS,* *Nees.*

Evergreen trees. *Leaves* alternate, penninerved. *Flowers* 2-sexual, in axillary panicles. *Perianth-tube* short or 0; segments 6, subequal or outer rather smaller, all persistent (except *M. edulis*) and spreading or reflexed in

* Further information on this genus will appear at the end of the volume, additional materials being expected from Calcutta.

fruit. *Perfect stamens* 9, filaments of the 1st and 2nd series eglandular with introrse 4-celled anthers; of the 3rd series eglandular with extrorse 4-celled anthers; staminodes of the 4th series cordate. *Berry* globose or oblong, seated on the persistent perianth.—Species about 15, Eastern Asiatic.

A. Species of Northern India, Himalaya, Assam and the Khasia Mts.

* *Flowers quite or nearly glabrous.* (See also *M. odoratissima*.)

1. **M. parviflora**, *Meissn. in DC. Prodr.* xv. 1. 505; quite glabrous, leaves linear-oblong or oblanceolate obtuse subacute or obtusely acuminate glaucous beneath minutely reticulate on both surfaces, panicles shorter than the leaves few-fl., perianth subglobose $\frac{1}{2}$ in. diam. glabrous, lobes broad short, pedicels about twice as long stout, fruit $\frac{3}{4}$ –1 in. long elliptic-oblong.

KHASIA MTS., alt. 4–5000 ft., *Griffith (Kew Distrib.* 4263), *J. D. H. & T. T.*

A small tree; bark of flowering branches whitish, rough. *Leaves* very variable in breadth, youngest faintly silky, firmly coriaceous, base acute; nerves 8–12 pair; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Panicles* narrow, long-peduncled; flowers small for the genus, obscurely puberulous within. *Filaments* nearly glabrous; anthers very short. *Ovary* glabrous.

2. **M. Gammieana**, *King in Herb. Calcutt.*; quite glabrous, leaves linear- or ob-lanceolate finely acuminate brown beneath when dry, nerves very slender oblique, panicles longer than the leaves with spreading branches, perianth $\frac{1}{2}$ in. diam., pedicels twice as long, fruit $1\frac{1}{2}$ in. diam. globose.

SIKKIM HIMALAYA, *Herb. King*; Darjeeling, alt. 7500 ft., *J. D. H.*

Branches with pale bark. *Leaves* 5–7 in., hardly shining above, base much attenuated; petiole $\frac{3}{4}$ in.; nerves 10–20 pair, very slender. *Panicles* long-peduncled, branches spreading, corymbosely few-fl. *Perianth* short, lobes obtuse, silky within. *Filaments* very hairy. *Anthers* oblong.—King's flowering specimen has much fewer (10–12 pair) nerves than the fruiting (15–20).

3. **M. Clarkeana**, *King in Herb. Calcutt.*; quite glabrous, leaves 6–10 in. narrowly elliptic-lanceolate acuminate brown on both surfaces when dry, panicles few-fl. shorter than the leaves, peduncles and pedicels stout, perianth $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. nearly glabrous, fruit globose.—*M. odoratissima* γ., *Herb. Ind. Or. H. f. & T.* (not of Meissn.).

SIKKIM HIMALAYA; alt. 5–8000 ft., *J. D. H., Treutler, King.*

Branches stout, black when dry. *Leaves* 1–1 $\frac{1}{2}$ in. broad, young glabrous except the densely silky very young ones which resemble bud-scales; petiole very short. *Panicle* 2–2 $\frac{1}{2}$ in., black and subglaucous when dry; flowers the largest of the genus. *Sepals* linear-oblong, nearly glabrous within. *Filaments* long, hairy towards the base; anthers linear-oblong. *Fruit* (detached) $\frac{3}{4}$ in. diam.—The long narrow leaves, very robust few-fl. panicles and thickly pedicelled large flowers are prominent characters of this very distinct-looking plant.

4. **M. ? Khasyana**, *Meissn. in DC. Prodr.* xv. 1. 42; leaves membranous glabrous lanceolate or oblanceolate or obovate acute dark brown above when dry blue-glaucous beneath reticulate on both surfaces, nerves strong arched, panicles usually long-peduncled hoary shorter than the leaves, perianth-lobes rounded.

KHASIA MTS., *Griffith.*

Branches very short, rough with the scars of fallen leaves. *Leaves* 6–10 by 1 $\frac{1}{2}$ –3 in.; nerves 10–15 pair; petiole 1–1 $\frac{1}{2}$ in., stout. *Panicles* 3–6 in.; flowers corymbose, $\frac{1}{2}$ in. diam., more globose than usual in the genus. *Filaments* very short indeed; anthers broad. *Ovary* glabrous; style long, slender. *Fruit* unknown.—The subglobose buds, with broad almost rounded perianth-lobes, and very dark membranous leaves, are unlike those of any other species.

** *Panicles pubescent*. (The species all want further investigation.)

5. **M. Gamblei**, *King in Herb. Calcutt.*; leaves 3-4 in. thinly coriaceous obovate to elliptic-lanceolate obtuse acute or caudate-acuminate very pale and glabrous or subsilky beneath, petiole slender, panicles few-fl. shorter than the leaves, pedicels slender, flowers silky, fruit small globose. *M. odoratissima*, β . *canescens*, *Blume Mus. Bot.* 330; *Meissn. in DC. Prodr.* xv. 1. 41 (*the Assam plant only*).

NORTHERN BENGAL; Cocch Behar, *King*. ASSAM, *Jenkins, Griffith*.

Branches rather slender, dark. *Leaves* sometimes elliptic or lanceolate, acute at both ends, finely reticulate above; nerves 8-10 pair, very slender, oblique; petiole $\frac{1}{2}$ in., glabrous or pubescent. *Perianth-lobes* linear-oblong, villous or tomentose within. *Filaments* very slender, nearly glabrous; anthers oblong. *Fruit* (quite young) $\frac{1}{2}$ in. diam. "always globose," *King*.—This looks different from *M. odoratissima* in the broad pale leaves with cuneate bases.

6. **M. Listeri**, *King in Herb. Calcutt.*; leaves 3-5 in. glabrous oblong or lanceolate rarely obovate glaucous beneath, petiole slender, panicles shortly peduncled shorter than the leaves hoary-pubescent, pedicels long slender, flowers silky, fruit globose 1 in. diam.

UPPER ASSAM; Narainpore and Dukrung Valley in the Daphla Hills, alt. 3000 ft., *Col. Lister*.

The plants sent me by King as flowering and fruiting specimens of this are considerably different; the first (from Narainpore, which resemble *M. Gamblei*) have slender branches and elliptic-lanceolate acuminate leaves with very slender nerves; the fruiting ones have much thicker obovate or oblong leaves with stouter petiole midrib and nerves. *Flowers* $\frac{1}{2}$ in. long; pedicel twice as long as the perianth, which is about $\frac{1}{2}$ in. long and silkily tomentose without and within; lobes linear-oblong. *Filaments* short, nearly glabrous; anthers oblong. *Style* very slender.

5. **M. edulis**, *King in Herb. Calcutt.*; young leaves and panicles subvillously tomentose, leaves obovate oblong or oblanceolate substrigose beneath or glabrate with many rigid prominent nerves, tip rounded acute or acuminate, panicles stoutly peduncled appearing with the young leaves, perianth deciduous?, fruit very large globose.

SIKKIM HIMALAYA; near Darjeeling, alt. 6000 ft., *Herb. Griffith, King, Lister*.

Branches of old wood as thick as a swan's quill, woody, with prominent large leaf-scars; bark rugged. *Leaves* 5-6 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., brown when dry, thinly coriaceous, narrowed from above the middle to the base; nerves 10-12 pair, very oblique, nearly straight; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., rather slender. *Panicles* densely softly tomentose, 3-4 in. long including the long peduncle; branches short, stout, few-fl.; flowers about $\frac{1}{2}$ in. diam. *Perianth-lobes* broadly oblong, villous within. *Filaments* very short, broad, villous; anthers broad. *Fruit* nearly 2 in. diam., on a stout woody peduncle, with no trace of a perianth.—Young-shoots smooth and very stout, terminal leaves and large terminal buds enclosed in imbricating subsilky scales, the outer of which are semicircular, and the inner oblong and $\frac{1}{2}$ in. long.

8. **M. bootanica**, *Meissn. in DC. Prodr.* xv. 1. 42; branches leaves beneath and panicles hoary-pubescent, leaves 8-10 in. long-petioled membranous obovate abruptly acuminate, nerves slender, panicles long-peduncled few-fl., flowers large.

BHUTAN; in woods near Chuka, alt. 4000 ft., *Griffith*.

"A moderate-sized tree," *Griff*. *Branches* stout, wood rugged with very large leaf-scars. *Leaves* pale brown beneath when dry; nerves 15-20 pairs, spreading, nearly straight; petiole 2-2 $\frac{1}{2}$ in. *Panicles* 6-8 in. long, including the long stout peduncle; branches few and few-fl.; pedicels long (for the genus) often $\frac{1}{2}$ in. long;

flowers $\frac{1}{2}$ in. diam. *Perianth-lobes* oblong, finely tomentose without and within. *Filaments* long, villous; anthers narrow. *Fruit* unknown.—A very distinct-looking plant from its large broad membranous leaves and large long-pedicelled flowers.

9. *M. sericea*, *Blume Mus. Bot.* i. 330; branches very stout and panicles hoary-pubescent, leaves long-petioled 6–8 in. coriaceous oblong-lanceolate acuminate young silky beneath, nerves very slender, panicles 4–8 in. long, branches usually short few-fld. *Meissn. in DC. Prodr.* xv. 1. 41. *Phœbe sericea*, *Nees Syst. Laurin.* 99 (*excl. syn. Fl. Nep.*); *Meissn. l. c.* 35. *Ocotea sericea*, *Nees in Wall. Pl. As. Rar.* ii. 71, and iii. 32. *Laurus sericea*, *Wall. Cat.* 2606.

CENTRAL HIMALAYA; Nepal and Kumaon, in the Deyra hoon, *Wallich*.

Branches as thick as a swan's quill. *Leaves* when young polymorphous, oblong to lanceolate obtuse acute or acuminate, base acute or rounded, white-silky beneath; old leaves rigidly coriaceous, brown when dry, rather glaucous beneath, finely reticulate on both surfaces; nerves 12–15 pair, arched; petiole 1–1 $\frac{1}{2}$ in. *Panicles* sometimes very long, with few short branches; flowers shortly pedicelled, $\frac{1}{2}$ – $\frac{1}{2}$ in. diam. *Filaments* short, hairy; anthers narrow. *Fruit* unknown.—*Wallich's* specimens of *Laurus sericea*, A, B, C, may or may not belong to one species; it is described by *Nees* as a *Phæbe*; but *Blume* afterwards separated some of the specimens as *Machilus sericea*, observing that it differs from the *Phæbe* in the absence of rings (caused by the fall of the bud-scales) at the bases of the branches. This difference is due to the age of the branches, of which the old bear scars of scales, which scales the first year's shoots do not bear. *Meissner* quotes *Wallich's* 2606 B under both. The specimens are very bad, and are all possibly referable to *M. odoratissima*, but the petioles are longer. The Nepal specimens have hairy filaments and anthers, those of the Kumaon ones are glabrous. When the Western Himalayan *Machili* are cleared up, *M. sericea* will probably be suppressed as being a composite book-species.

10. *M. odoratissima*, *Nees in Wall. Pl. As. Rar.* ii. 70, and *Syst. Laurin.* 172; glabrous except the panicle, leaves 3–9 in. long-petioled lanceolate or oblong or elliptic-lanceolate acuminate usually slightly glaucous beneath, nerves slender, panicles long- or short-peduncled hoary-tomentose or glabrous, flowers glabrous or pubescent, fruit oblong or globose. *Meissn. in DC. Prodr.* xv. 1. 40; *Brand. For. Fl.* 378; *Gamble Man. Ind. Timb.* 308; *Blume Mus. Bot.* i. 329. *M. indica*, *Kurz For. Fl.* ii. 291; *Miquel Fl. Ind. Bat.* i. 1. 914 (*excl. var. β.*). *M. rimosa*, *Blume l. c.* 330; ? *Meissn. l. c.* 42; ? *Kurz l. c.* 292. *Laurus odoratissima*, *Wall. Cat.* 2607. *L. indica*, *Lour. Fl. Coch.* i. 311 (*ex Nees*). *L. Champa* and *L. bombycina*, *Herb. Hamilt.*

SUBTROPICAL and TEMPERATE HIMALAYA, from Murree eastwards; ascending to 8000 ft. in Sikkim; ASSAM and the KHASIA Mts. TENASSERIM and MARTABAN, alt. 3–7000 ft. ? SINGAPORE, *Wallich*.—DISTRIB. Java, Sumatra, Cochin China.

A large tree, stunted at high elevations, shoots pubescent. *Leaves* very variable in breadth, coriaceous; nerves irregular, usually 15–20 pair; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., slender. *Panicles* about equalling the leaves, but very variable, loosely branched; peduncle glabrous hoary or subsilkily pubescent, as are the flowers, which are sometimes corymbose on the short branches. *Perianth* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam.; lobes oblong obtuse, lengthening a little after flowering. *Filaments* glabrous or slightly hairy; anthers oblong, rarely hairy. *Fruit* $\frac{1}{2}$ – $\frac{3}{4}$ in. long.—I am very much puzzled with this plant, and suspect that it consists of several species, the differences being marked between the specimens with glabrous and those with silkily pubescent perianths, and those with globose and with oblong fruit. The type of the species is *Laurus odoratissimus*, *Wall. Cat.* 2607, from Nepal, which has copiously silkily pubescent shoots and panicles (which however are hardly developed); No. 2607 C and D (from *Herb. Hamilton*) with globose fruit seem the same; and other specimens with globose fruit are from Sikkim and Simla. The other form is *Wallich's* 2607 B from Kumaon, with glabrous

panicles, of which there are flowering specimens from Kumaon (*M. odoratissimus* and *Ocotea ligustrina*, Herb. Strach. and Winterb.) accompanied by specimens with oblong fruit. Furthermore, glabrous panicles with oblong fruit occur in Sikkim and ? Singapore, and oblong fruit in Bhotan. Of *M. rimosa*, Blume, little is known; Kurz describes it as differing from *M. odoratissimus* in the smaller flower. The Moulmein plant referred to *rimosa* by Meissner has small flowers, but the specimen is too small to judge of its identity. Wallich's Singapore locality I suspect to be erroneous.

11. ***M. villosa*, Hook. f.**; shoots and panicles densely softly ashy or rufous-tomentose, leaves 3-5 in. coriaceous elliptic or elliptic- or linear-lanceolate or oblanceolate obtuse acute or acuminate, pale above brownish beneath, nerves 6-8 pair, panicles subterminal fascicled usually longer than the leaves, branches spreading, flowers densely tomentose, fruit globose. *Ocotia glaucescens*, Nees in Wall. *Pl. As. Rar.* ii. 71, and iii. 32. *Phœbe glaucescens*, Nees *Syst. Laurin.* 100 and 671; *Meissn. in DC. Prodr.* xv. 1. 36. *P. villosa*, Wight *Jc. t.* 1822; *Kurz For. Fl.* ii. 290. *Laurus glaucescens*, Roxb. ex Wall. *Cat.* 2592 (not of *Fl. Ind.*). *L. floribunda*, Wall. *Cat.* 2593 B. *L. villosa*, Roxb. *Fl. Ind.* ii. 310. (*L. villosa* & *glaucescens*, *Jc. Roxb.*)

SIKKIM HIMALAYA; alt. 7000 ft., Gamble. UPPER ASSAM; Nuku Hills, Simons, *Griffith (Kew Distrib.* 4261); Patkoye Hills, *Griffith (Kew Distrib.* 4259). SILHET, Wallich. CACHAR, Keenan. CHITTAGONG, Roxburgh, J. D. H. & T. T.

A large tree; branchlets dark brown. Leaves very pale, rather shining above, base very acute; nerves strong beneath; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. Panicles sometimes excessively numerous and umbellate, almost terminating the branches, the minute villous terminal bud not lengthening; peduncle stout, branches spreading; flowers sub-corymbose, shortly pedicelled. Perianth hemispheric, densely tomentose; lobes short, broad, rounded. Filaments and anthers short, glabrous. Berry globose, $\frac{1}{2}$ in. diam., seated on the reflexed calyx.—Specimens collected in fruit by Keenan, together with Roxburgh's excellent drawings (it is unquestionably his *L. villosa*), prove this to be a *Machilus*. Much confusion has attended its history from Roxburgh having figured it under two names (*glaucescens* and *villosa*), and by his having further, as pointed out by Wight, described two plants under the name of *glaucescens*. Of these names Wallich took *glaucescens* for his No. 2592, which is that which Roxburgh described as *villosa*. Roxburgh's other plant described under *L. villosus*, with alternate triple-nerved leaves and flowers in lateral panicles, is no doubt an *Actinodaphne*.

12. ***M. fruticosa*, Kurz in Journ. As. Soc. Beng.** 1873, ii. 101, and *For. Fl.* ii. 292; glabrous except the hoary panicles, leaves 4-6 in. thickly coriaceous oblong or linear- or elliptic-oblong obtuse or obtusely acuminate dark brown above glaucously brown beneath, nerves faint beneath, panicles axillary long-peduncled, flowers very small corymbose, fruit small globose.

TENASSERIM; at Mergui, *Griffith (Kew Distrib.* 4262), Helfer (*Kew Distrib.* 4268); Martaban, alt. 4000 ft., Brandis.

Branches stout, black. Leaves rounded or acute at both ends, often shining above, margin sometimes recurved; nerves 10-12 pair; petiole $\frac{1}{2}$ in. Panicles 3-8 in. long, stiff, black when dry, branches spreading; flowers about $\frac{1}{2}$ in. diam., hoary; pedicels about twice as long. Perianth subglobose; lobes rounded, obtuse, hoary. Filaments glabrous, except at the base; anthers oblong. Fruit "the size of a pea, on a long thickened pedicel," Kurz.—I have seen no fruit.

13. ***M. macrantha*, Nees in Wall. Pl. As. Rar.** ii. 70, and iii. 31, and *Syst. Laurin.* 174; leaves long-petioled glabrous from oblong rounded at both ends to elliptic-lanceolate and acute at both ends rarely obovate bluish and glaucous beneath, panicles in subterminal corymbs longer or shorter than the leaves much branched more or less hoary-pubescent, perianth tomentose, filaments villous, fruit globose. *Meissn. in DC. Prodr.*

xv. 1. 40; *Wight Ic.* t. 1824; *Beddome For. Fl.* t. 264; *Thwaites Enum.* 254; *Dalz. & Gibs. Bomb. Fl.* 221. *M. glaucescens*, *Wight Ic.* t. 1825 (*excl. syn.*); *Dalz. & Gibs. l. c.* *Cryptocarya floribunda*, *Miquel Pl. Hohenack.* n. 1458 (*not of Nees*). *Laurus macrantha*, *Wall. Cat.* 2587.

DECCAN PENINSULA; on the Ghats from the Concan southwards, ascending to 7000 ft. CEYLON, alt. 1500–4000 ft.

A large tree; branches brown when dry. *Leaves* 3–9 by $1\frac{1}{2}$ – $3\frac{1}{2}$ in., finely reticulate on both surfaces; nerves 8–12 pair, slender, sometimes indistinct; petiole slender, 1– $1\frac{1}{2}$ in. *Panicles* grouped in a subterminal corymb as in *M. villosa*, sometimes 10 in. long and with very long peduncle and spreading branches; at others short and subsessile, peduncle and branches from hoary-pubescent to glabrate; flowers very variable in size, $\frac{1}{2}$ – $\frac{1}{4}$ in. diam. *Perianth* tomentose without and within; lobes oblong or linear-oblong. *Anthers* pubescent. *Fruit* black, $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.—I can find no characters whereby to distinguish *Wight's glaucescens* from *macrantha*. *Dalzell* and *Gibson* describe the fruit of the former as about the size of a small gooseberry, and of the latter as of a large currant. The length of the petiole at once distinguishes it from *M. villosa*, as does the pubescence of the panicle.

9. PHÆBE, Nees.

Evergreen trees or shrubs. *Leaves* alternate or scattered, penninerved. *Flowers* small, 2-sexual or polygamous, in axillary and subterminal panicles. *Perianth-tube* short; segments 6, subequal, erect and enlarging and clasping the base of the fruit. *Perfect stamens* 9; filaments of 1st and 2nd series eglandular with introrse 4-celled anthers, of 3rd series 2-glandular with extrorse 4-celled anthers; staminodes of 4th series cordate or sagittate. *Fruit* ellipsoid or oblong, clasped at the base by the hardened perianth-segments.—Species about 26, Indian and Malayan.

Phæbe, which in the “Genera Plantarum” is reduced to *Persea*, must, I think, be restored; the fruiting perianth is very characteristic and habit uniform.

* *Perianth* quite glabrous.

1. **P. lanceolata**, *Nees Syst. Laurin.* 109; quite glabrous, leaves elliptic-lanceolate finely or caudate-acuminate, perianth glabrous, segments equal, fruit $\frac{1}{2}$ in. *Meissn. in DC. Prodr.* xv. 1. 34 (*excl. var. γ.*); *Wight Ic.* t. 1821; *Brandis For. Flor.* 377; *Kurz For. Fl.* ii. 290; *Gamble Man. Ind. Timb.* 308; ? *Beddome For. Man.* 184. *Ocotea lanceolata*, *Nees in Wall. Pl. As. Rar.* ii. 71. *Laurus lanceolata*, *Wall. Cat.* 2599. *L. lanceolaria*, *Roxb. Fl. Ind.* ii. 309. *L. salicifolia* and *L. ? camphorata*, *Herb. Hamilt.*

SUBTROPICAL HIMALAYA, from Simla eastwards, ascending to 6000 ft. KHASIA MTS., common. BURMA, *Griffith*. MARTABAN and TENASSERIM, *Kurz*. SOUTH DECCAN, Nilghiri Hills and southward, alt. 3000 ft., *Beddome*.

An evergreen tree; branches slender, bark usually yellowish white. *Leaves* 5–10 by 1– $2\frac{1}{2}$ in., thinly coriaceous, pale when dry above and pale brown beneath, base very narrow; nerves 6–10 pair; petiole slender, $\frac{1}{2}$ – $\frac{3}{4}$ in. *Panicles* axillary, very variable, shorter or longer than the leaves, peduncle sometimes strict and 1–2 in., at others curved and 4–6 in., branches few; flowers $\frac{1}{10}$ – $\frac{1}{8}$ in., pale yellow or white. *Perianth* cup-shaped; segments broad, obtuse, pubescent within, hardening and clasping the fruit, which is narrowly ellipsoid, black.—*Nees* describes the leaves as very finely pubescent beneath. I have seen no Deccan specimens. Very near *P. declinata*, *Nees*, of the mountains of Java. *Var. γ. ligustrina*, *Meissn.*, is *P. declinata*, *Nees*.

2. **P. angustifolia**, *Meissn. in DC. Prodr.* xv. 1. 34; quite glabrous

leaves very narrowly lanceolate acuminate or caudate, perianth glabrous, segments equal, fruit $\frac{1}{2}$ in.

KHASIA Mts., alt. 2-4000 ft., *Griffith, Lobb, J. D. H. & T. T.*

A small shrub, perhaps only a form of *P. lanceolata*, but the leaves are much narrower, 4-10 by $\frac{1}{2}$ -1 in.

3. *P. declinata*, *Nees Syst. Laur.* 114; quite glabrous, branches black when dry, leaves elliptic-lanceolate or -oblong obtuse or obtusely acuminate red brown, nerves 6-8 pair very obscure beneath, perianth glabrous, segments subequal. *Meissn. in DC. Prodr.* xv. 1. 34; *Miquel Fl. Ind. Bat.* i. 1. 906. *P. ligustrina*, in part, *Nees Syst.* 113. *P. lanceolata*, γ . *ligustrina*, in part, *Meissn. l. c.* *Ocotea declinata*, *Blume Bijl.* 572. *O. ligustrina*, in part, *Nees in Wall. Pl. As. Rar.* ii. 71, and iii. 32. *Laurus declinata*, *Blume Cat. Hort. Bot. Buitenz.* 66. *L. ligustrina*, *Wall. Cat.* 2588 A.

SINGAPORE, *Wallich*.—DISTRIB. Java.

A very distinct species, remarkable for the black shoots, brown finely reticulate leaves, 4-5 by 1-1 $\frac{1}{4}$ in., with slender black petioles and midrib beneath, and very faint slender nerves.—I have seen no fruit. *Wallich's* 2588 B from Tavoy consists of three specimens of two plants, both different from *declinata*, one is probably *P. lanceolata*; two others have elliptic acute thin reticulated leaves only 2 in. long, with numerous very slender spreading nerves; these resemble no other species except in the flowers, which are like those of *P. lanceolata*, but rather smaller.

** *Perianth silky pubescent or tomentose.*

4. *P. pallida*, *Nees Syst. Laurin.* 112; shoots very finely puberulous, leaves elliptic-lanceolate or oblanceolate finely acuminate puberulous beneath at length glabrous, nerves 8-10 pair very oblique deeply impressed above strong beneath, panicles axillary long-peduncled and flowers very finely pubescent. *Meissn. in DC. Prodr.* xv. 1. 34; *Brandis For. Fl.* 377. *P. glaucescens* & *fusca*, *Meissn. l. c.* 37, in part. *Laurus pubescens*, *Wall. Cat.* 2595 (excl. B, C). *Ocotea pallida*, *Nees in Wall. Pl. As. Rar.* ii. 71.

SUBTROPICAL HIMALAYA; Kumaon, *Thomson, Strachey & Winterbottom*; Nepal, *Wallich*. ? Sikkim, *J. D. H.* EASTERN OUDE forests, *Brandis*.

Very closely allied to *P. lanceolata*, but the young leaves, panicles and flowers are finely tomentose, and the leaf-nerves deeply sunk above.—The Sikkim specimens doubtfully referred here are flowerless, the leaves are much larger, 6-10 by 1 $\frac{1}{2}$ -3 $\frac{1}{2}$ in., more membranous, and the nerves less deeply sunk, as might be expected in plants from a moist climate; they are certainly not referable to *Laurus glaucescens* (*Machilus villosa*) as *Meissner* supposed, and have not the rusty tomentum of *P. paniculata*. Fruit too young for description.

5. *P. paniculata*, *Nees Syst. Laurin.* 105; shoots rusty-tomentose, leaves elliptic or elliptic-lanceolate rarely obovate acuminate pubescent and with 8-12 pair of very strong nerves beneath, panicles axillary long-peduncled and flowers pubescent or tomentose, fruit turgidly ellipsoid $\frac{1}{4}$ - $\frac{1}{2}$ in. *Meissn. in DC. Prodr.* xv. 1. 37 (excl. syn. *Laurus villosa* and *Phæbe villosa*); *Brand. For. Fl.* 377 (excl. syn. *L. villosa*); *Wight Ic.* t. 1820. *P. pubescens*, *Nees Syst. Laur.* 107; *Kurz For. Fl.* 290. *P. Wightii*, *Meissn. in DC. l. c.* 38; *Beddome Forest. Fl.* t. 292. *Ocotea pubescens* & *paniculata*, *Nees in Wall. Pl. As. Rar.* ii. 71, 72, and iii. 32. *Laurus paniculata*, *Wall. Cat.* 2598. *L. pubescens*, *Wall. Cat.* 2595 B, C. *Cinnamomum tomentosum* and *C. Cathia*, *Don Prodr.* 66 (*sic* *Nees*).

CENTRAL HIMALAYA; Nepal, *Wallich*. BURMA; from Chittagong and Ava to

Tenasserim, *Griffith* (*Kew Distrib.* 4271), *Kurz*, &c. NILGHIRI HILLS, alt. 5-6000 ft., *Wight*, &c.

The ferruginous tomentum of the young shoots, usually shorter and broader leaves pubescent or even tomentose beneath, with stronger nerves and nervules; best distinguish this from *P. pallida*. The fruit is quite like that of *P. lanceolata*, but rather broader.—Very near *P. multiflora*, Blume, of Java.

6. **P. attenuata**, *Nees Syst. Laurin.* 104 (excl. syn. *Blume*) ; branches very stout, young shoots and leaves beneath rusty-pubescent or -villous, leaves oblanceolate acute or acuminate, nerves 15-20 pair, panicles stoutly peduncled and flowers tomentose. *Meissn. in DC. Prodr.* xv. 1. 38. *Ocotea attenuata*, *Nees in Wall. Pl. As. Rar.* ii. 71. *Laurus attenuata*, *Wall. Cat.* 2600.

EASTERN HIMALAYA; Sikkim, *Gamble, King*. BHOTAN, *Griffith* (*Kew Distrib.* 4254), *King*. SILHET, *Wallich*.

Well distinguished by the very stout branches, leaves broadening upwards, 5-10 by $1\frac{1}{2}$ -3 in., more numerous nerves, and stout petioles, peduncles and branches of the panicle. *Flowers* $\frac{1}{2}$ in. diam., shortly stoutly pedicelled. *Fruiting perianth* $\frac{1}{2}$ in. long, campanulate, very rigid; fruit nearly $\frac{3}{4}$ in. long, narrowly ellipsoid.

7. **P. opaca**, *Blume Mus. Bot.* i. 327; branches very stout, leaves rigidly coriaceous obovate obovate-cuneate or oblanceolate rarely oblong abruptly obtusely acuminate subglabrous or puberulous beneath, nerves 10-12 pair, panicles and flowers rusty-pubescent. *Miquel Fl. Ind. Bat.* i. 1. 909. *P. attenuata*, *Miquel in Herb. Jungh.* *P. malaccensis*, *Meissn. in DC. Prodr.* xv. 1. 37. *Alseodaphne* ? *grandis*, *Nees in Wall. Pl. As. Rar.* ii. 72, and *Syst. Laurin.* 183; *Meissn. l. c.* 28. *Laurus grandis*, *Wall. Cat.* 2594 A. *Persea grandis*, *Nees in Wall. l. c.* iii. 32. *P. lucida*, *Blume*.

MALACCA, *Griffith, Maingay*. PENANG, *Porter*.—DISTRIB. Java, Sumatra, Borneo.

Young parts finely rusty-pubescent. *Leaves* very variable, 5-10 by 2-4 in., brown when dry, usually shining above and subglaucous beneath, base acute, rarely obtuse; petiole $\frac{1}{2}$ -1 in. *Panicles* numerous, usually shorter than the leaves; peduncles stout, finely pubescent; flowers numerous, $\frac{1}{2}$ in. diam., pedicelled; fruiting panicle very stout indeed, a foot long, with thickened branches and pedicels. *Fruiting perianth* broadly campanulate, very rigid. *Fruit* $\frac{3}{4}$ in. long, ellipsoid. *P. lucida*, Blume, of Sumatra and Borneo, seems the same.

8. **P. Tavoyana**, *Hook. f.*; young shoots petioles and nerves beneath silky or rusty-villous, leaves membranous elongate-lanceolate caudate-acuminate pubescent or tomentose beneath, nerves 10-15 pair, panicles with very slender peduncles and flowers pubescent. *Machilus Tavoyana*, *Meissn. in DC. Prodr.* xv. 1. 41; *Kurz For. Fl.* ii. 292.

TENASSERIM; King's Island, Mergui Archipelago, *Helper* (*Kew Distrib.* 4260); Tavoy, *Parish*.

Apparently a very distinct species, nearest to *P. attenuata*, but with membranous leaves 5-10 by 1-2 in., ending in very slender tails, slender petioles sometimes $2\frac{1}{2}$ in., and very slender flowering panicles.—The specimens are in bud and young fruit; the perianth in the latter is $\frac{1}{2}$ in. long, very rigid, as in the genus.

10. **ALSEODAPHNE**, *Nees*.

Evergreen trees. *Leaves* usually subverticillate towards the ends of the branches, penninerved, often obovate. *Flowers* bisexual, subumbellate on the branches of axillary and subterminal panicles. *Perianth-tube* short; segments 6, subequal or the three outer smaller, deciduous or not at all

enlarged after flowering, obsolete in fruit. *Stamens* and *staminodes* as in *Phæbe*. *Fruit* ellipsoid, seated on the truncate end of the long or short often much swollen and fleshy peduncle.—Species about 15, Tropical Asiatic.

Habit of *Dehaasia*, but anthers 4-celled. The species are very imperfectly known.

* *Perianth-segments subequal or the outer rather narrower.*

1. **A. semecarpifolia**, *Nees in Wall. Pl. As. Rar.* ii. 72, and *Syst. Laurin.* 182; nearly glabrous, leaves coriaceous cuneately obovate or oblong tip obtuse or rounded 6-8-nerved often glaucous beneath, panicles long-peduncled branches spreading, perianth nearly glabrous segments subequal, fruit ellipsoid acute equalling its swollen warted peduncle. *Meissn. in DC. Prodr.* xv. 1. 28; *Wall. Cat.* 2586 A; *Dalz. & Gibs. Bomb. Fl.* 222; *Wight Ic.* t. 1826, 1827; *Thwaites Enum.* 254; *Beddome For. Fl.* t. 297.

DECCAN PENINSULA; in dry forests from the Concan southwards. CEYLON in the drier parts of the island.

A small tree, very variable in foliage, young parts obscurely puberulous. *Leaves* 2-7 in., usually very finely reticulate above when dry and glaucous beneath, base acute; nerves faint or strong; petiole $\frac{1}{2}$ -1 in. *Panicles* about as long as the leaves or shorter; peduncle and branches slender, glabrous, black when dry; flowers on rather long pedicels, $\frac{1}{2}$ in. diam., subumbellate at the tips of the branches. *Perianth-segments* usually subequal, but in one specimen from Herb. Stocks the outer are as short as in the next section.—The following seem to be forms of one species, but I am far from confident about this.

1. *A. SEMECARPIFOLIA* proper; leaves rather thinly coriaceous glaucous beneath, panicles equalling the leaves, fruit $\frac{1}{2}$ - $\frac{3}{4}$ in.

Var. *angustifolia*, (Meissn. l. c.; leaves 3-5 by 1-1 $\frac{1}{2}$ in. elliptic-oblong or lanceolate obtuse or subacute glaucous beneath, panicles as long as the leaves, fruit $\frac{3}{4}$ in. rather narrower.—Ceylon and the Concan.

Var. *macrocarpa*; leaves 4-7 in. elliptic-oblong subacute very glaucous beneath tip rounded, fruit 1 in., peduncle much thickened.—Ceylon, *Thwaites* (C. P. 2269).

Var. *rufa*; young parts and young leaves beneath rufous-hoary, leaves broadly cuneate-obovate very coriaceous red when dry tip rounded, panicles as long as the leaves, fruit $\frac{1}{2}$ in.—Concan, *Herb. Dalzell*.

Var. *parvifolia*; leaves 2-3 in. obovate very glaucous beneath tip rounded, petiole very short, panicles much shorter than the leaves. *Wight Ic.* t. 1827.—Courtallam, *Wight*.

2. **A. peduncularis**, *Hook. f.*; quite glabrous, branches slender, leaves membranous elliptic-lanceolate obtusely subcaudate-acuminate, nerves 6-10 pair, panicles very slender few-fl. much shorter than the leaves, perianth glabrous outer segments rather smaller, stamens very short. *Haasia peduncularis*, *Nees Syst. Laurin.* 376; *Meissn. in DC. Prodr.* xv. 1. 61. *Machilus peduncularis*, *Nees in Wall. Pl. As. Rar.* ii. 70. *Persea peduncularis*, *Nees Syst. Laurin.* 125 (*excl. syn. Rumph.*). *Laurus peduncularis*, *Wall. Cat.* 2596.

PENANG, *Wallich*.

Branches with white bark, except the first year's, which are smooth and very slender. *Leaves* 4-6 by 1 $\frac{1}{2}$ -2 in., rather wavy from their thin-texture, base very acute; nerves beneath much raised, slender, arching and meeting far within the margin; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in., very slender. *Panicles* 1-1 $\frac{1}{2}$ in., peduncle and branches filiform; flowers $\frac{1}{10}$ in., pedicelled. *Perianth* subglobose, segments short, quite glabrous without (persistent, *Nees*). *Stamens* very short, hairy; *staminodes*? *Fruit* according to *Nees* immature, ovoid, in a cylindric fleshy curved pedicel two inches long and as thick as a goose-quill.—*Wallich's* specimens in the Linnæan Society have neither flower nor fruit, but I find one or two flowers in *Herb. Hook.* which were

bisexual and agree with Nees' description except in that the anthers are decidedly 4-celled. The slender habit and thin leaves are unlike its congeners.

3. **A. decipiens**, *Hook. f.*; nearly glabrous, leaves subverticillate rigidly coriaceous cuneately obovate or lanceolate very obtusely acuminate glaucous beneath, nerves 8-10 pair sunk above very strong beneath, panicles shorter than the leaves shortly peduncled, perianth minutely hoary, outer segments rather smaller.

SINGAPORE, *N. Cantley*.

Branches rather robust, bark brown. *Leaves* 4-6 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., base very acute, smooth, brown above and not reticulated, finely reticulate and bluish beneath; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Panicles* rather stout, loosely branched, branches and pedicels obscurely puberulous; flowers $\frac{1}{2}$ in. diam., subglobose. *Perianth-segments* hairy within, as are the stamens and staminodes.—Very similar to *Dehaasia cuneata*, Bl.

4. **A. petiolaris**, *Hook. f.*; branches very stout subverticillate, leaves very large thickly coriaceous long-petioled oblong or oblong-obovate obtuse or subacute not narrowed into the petiole glabrous, nerves 8-10 pair very strong, panicles very stout longer or shorter than the leaves sparsely scurfy, fruit $1\frac{1}{2}$ in. oblong much longer than the cylindric pedicel. *Nothaphœbe* ? *petiolaris*, *Meissn. in DC. Prodr.* xv. 1. 59.

ASSAM; on the Nuku Hills, *Simons*. CACHAR, *Keenan*.—DISTRIB. Burma; in the Hookhoom Valley, at Camein, *Griffith*.

A large tree, branchlets as thick as the little finger. *Leaves* 8-12 by 4-6 in., shining and reticulated above, brown on both surfaces, young glaucous beneath, base acute or cuneate; petiole very stout, $1\frac{1}{2}$ - $2\frac{1}{2}$ in. *Panicles* about half the length of the leaves, loosely branched often from near the base; branches stout, ascending, when fruiting as thick as a duck's quill and soft; flowers shortly pedicelled, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. *Perianth* scurfy, segments short, subequal, obtuse. *Fruit* apparently very fleshy, top rounded, pedicel $\frac{1}{2}$ - $\frac{3}{4}$ in. long.

** *Outer segments of the perianth much smaller than the inner.* (See also *A. semecarpifolia*.) (NOTHAPHŒBE, *Blume*.)

5. **A. umbelliflora**, *Hook. f.*; nearly glabrous, leaves scattered very coriaceous elliptic-oblong or lanceolate caudate-acuminate shining above, panicles much shorter than the leaves, fruit oblong much longer than the short cylindric pedicel. *Nothaphœbe umbelliflora*, *Blume Mus. Bot.* i. 328; *Meissn. in DC. Prodr.* xv. 1. 58. *Ocotea umbellifera*, *Blume Bijdr.* 573. *Phœbe* ? *umbelliflora*, *Nees Syst. Laur.* 115; *Miquel Fl. Ind. Bat.* i. 1. 911. *Euphœbe umbelliflora*, *Blume in Herb. Lugd. Bat.* *Haasia nitida*, *Meissn. l. c.* 61.

MALACCA, *Griffith*, *Maingay* (*Kew Distrib.* 1247, 1247/2).—DISTRIB. Sumatra, Java, Borneo.

Branches rather stout, leafy, bark dark. *Leaves* scattered (not subverticillate at the ends of the branches), 4-6 by $1\frac{1}{2}$ -2 in., very dark brown above, red-brown beneath when dry, base acute; nerves strong, oblique; petiole $\frac{1}{2}$ -1 in. *Panicles* 1-2 in., shortly peduncled, faintly rusty-hoary; flowers globose, $\frac{1}{2}$ in. diam., glabrous, shortly pedicelled. *Perianth-lobes* nearly glabrous within, outer about half the length of the inner. *Stamens* very short, anthers broad. *Fruit* $1\frac{1}{2}$ in. long, top rounded; pedicel $\frac{1}{2}$ in., woody.—This is the plant mentioned by Wight (under tab. 1831) as having the habit of *Haasia*, but 4-celled anthers.

6. **A. panduriformis**, *Hook. f.*; leaves large very shortly petioled glabrous thinly coriaceous panduriform obtuse base cordate, nerves 16-18 pair, panicles shorter than the leaves, branches short many-fl'd., perianth

rusty-pubescent, 3 outer segments much shorter, fruit $2\frac{1}{2}$ –3 in. long cylindric-oblong, pericarp thin 5-ribbed.

MALACCA, Maingay.

Branchlets rather stout, glabrous. *Leaves* 8–12 by 3–4 in., brown on both surfaces, narrowed above the cordate base and then dilating; nerves raised on both surfaces, very numerous in the basal portion; petiole $\frac{1}{4}$ in., very stout. *Panicles* 2–6 in.; peduncle and rachis rather stout and branches glabrous; flowers $\frac{1}{2}$ in diam., subglobose, bright yellow, crowded on short pedicels, rusty-pubescent. *Outer perianth-segments* broadly ovate, inner rounded. *Stamens* very short, hairy, as are the staminodes. *Fruit* very remarkable, slightly curved, dull red, somewhat narrowed towards the base, top rounded; pericarp coriaceous, ribs very narrow. *Seed* cylindric.—A distinct species.

*** *Perianth* unknown.

7. **A. ? grandis**, *Nees Syst. Laurin.* 183, *in part*; glabrous, branchlets very stout, leaves subverticillate large thickly coriaceous cuneately obovate obtuse or subacute glaucous beneath, nerves 8–10 pair very strong beneath impressed above, panicles shorter than the leaves, fruit globosely ellipsoid apiculate, pedicel very short thickened. *Meissn. in DC. Prodr.* xv. l. 28, *in part*. *Persea grandis* *in part*, *Nees in Wall. Pl. As. Rar.* iii. 32. *Laurus grandis*, *Wall. Cat.* 2594 C, D.

TENASSERIM; Tavoy, *Gomez*. BURMA, at Amherst, *Wallich*.

Branchlets woody, as thick as a swan's quill, bark rough. *Leaves* 6–12 in., greenish brown when dry, base very acute; petiole stout, $\frac{1}{2}$ –1 in. *Fruiting panicles* not very stout, bearing tuberos excrecences (insect nidi?) on the rachis and under the fruit, the pedicel of which is often deformed. *Fruit* 1 in. long, sometimes seated on the diseased pedicel, which is then woody, rough and as large as a small nut; the healthy pedicels appear to be short, $\frac{1}{4}$ in. long and cylindric.

8. **A. ? costalis**, *Nees in Wall. Pl. As. Rar.* ii. 72, and *Syst. Laurin.* 185; glabrous, leaves 12–24 in. very coriaceous oblanceolate or cuneately obovate glaucous beneath, top rounded or subacute, nerves 12–20 pairs very strong beneath. *Meissn. in DC. Prodr.* xv. l. 29. *Laurus grandis*, *Wall. Cat.* 2594 B.

SINGAPORE, *Wallich*.—DISTRIB. Burma; Nammarsa, *Griffith* (*Actinodaphne*, *Leaves Distrib.* 4326).

Leaves pale, 5–8 in. diam., opaque, when dry midrib flat above, nerves hardly immersed, base very narrow; petiole stout, 1–3 in.—*Wallich's* specimens consist of leaves only, *Griffith's* of leaves and branches; the latter are as thick as the thumb, smooth, striate with a very thick pith, and bear axillary globose flower-buds $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., clothed with orbicular silky scales.—The genus is altogether doubtful.

9. **A. crassipes**, *Hook. f.*; branchlets and shoots rusty-tomentose, leaves coriaceous scattered long-petioled elliptic-lanceolate acuminate falcately recurved, nerves 6–8 pair capillary, fruiting peduncles very thick woody, fruit $\frac{1}{2}$ in. ellipsoid twice as long as the very thick woody cylindric pedicel.

MALACCA, Maingay.

Branches stout, woody, smooth, bark ashy. *Leaves* 4–5 by 1–1 $\frac{1}{2}$ in., very pale, nerves excessively slender and very laxly reticulate on both surfaces, base very acute; petiole slender, $\frac{1}{2}$ –1 in. *Fruiting peduncles* numerous, 3–4 in., very strict, often thickened upwards, as rigid and woody as the branches and thicker at the top than the pedicel is broad; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. long, cylindric, black, confluent with the thickened ends of the panicle. *Fruit* smooth, "dark blue-black, pruinose, globose, pedicel red," *Maingay*.

DOUBTFUL SPECIES.

A? *LUCIDA*, *Nees in Wall. Pl. As. Rar.* ii. 72, and *Syst. Laurin.* 186; branches stout lenticellate, leaves 8–12 in. scattered very coriaceous obovate-oblong acuminate base obtuse shining above paler beneath, nerves 16–20 pair spreading slender, midrib prominent above, reticulations beneath very faint, petiole 1–1½ in. terete thickened and rugose at the base. *Meissn. in DC. Prodr.* xv. 1. 29. *Laurus* ?? *lucida*, *Wall. Cat.* 2590.—Singapore, *Wallich*.—Probably not a Laurineous plant.

11. **ACTINODAPHNE**, *Nees*.

Evergreen shrubs or trees. *Leaves* subverticillate, rarely scattered or opposite penni- or triple-nerved. *Flowers* small diœcious, in axillary or lateral dense bracteate sessile or peduncled umbels or clusters; bracts imbricating, caducous (not whorled as in *Litsæa*). *Perianth-tube* short, segments 6, subequal, rarely persistent. *Perfect stamens* 6–9, filaments of the 1st and 2nd series eglandular, of the 3rd 2-glandular; anthers all introrse and 4-locellate; staminodes of fem. 9. *Fruit* seated on the usually enlarged flat or concave perianth-tube.—Species about 50, Eastern Asiatic and Malayan.

The inflorescence is abnormal in *A. sikkimensis* & *leiantha*. The genus is with difficulty separable from *Litsæa*.

* Leaves more or less whorled, penninerved, or if triple-nerved with the lower pair of nerves very short (sometimes triple-nerved in *A. molochina* & *Hookeri*).

† Female fl. in sessile or subsessile clusters or umbels. (In *A. madras-patana* and occasionally in a few others the clusters or umbels are peduncled.) (This is an artificial subdivision, but I can suggest no better, except perhaps into glabrous and villous styles, if enough were known of these.)

a. *Species of Northern India and the Eastern Peninsula.*

1. ***A. reticulata***, *Meissn. in DC. Prodr.* xv. 1. 212; leaves 5–7 in. whorled penninerved coriaceous linear- or elliptic-lanceolate acuminate young softly pubescent beneath not glaucous, nerves 12–15 pair very slender, flowers clustered, fruit broadly ellipsoid seated on the cupular quite entire long-pedicelled perianth-tube.

KHASIA MTS.; alt. 4–5000 ft., *J. D. H. & T. T., Clarke*.

A small tree; branches not robust, branchlets when young softly tomentose. *Leaves* in whorls of 4–8, 1–1½ in. diam., greenish and almost shining above, very finely impressed-reticulate on both surfaces, paler beneath, nerves very faint; petiole ½ in. *Flowers* ½ in. diam., pedicels as long, both silky; bud-scales nearly glabrous. *Filaments* glabrous. *Fruit* ½ in. long, rather longer than broad, black, pedicel ¾ in., cup ½ in. diam.—To a specimen of this in the Hookerian Herbarium, received from Sir J. Smith about 1821, and no doubt sent by Wallich or Hamilton, the habitat, “Nepal? *Wallich*,” was subsequently added by myself, because Smith gave it along with many Nepal plants to Sir W. Hooker at that date. *Meissner* hence gave Nepal as a habitat, but omitted the query; his var. *glabra* is the same plant with old and therefore glabrous branches.

2. ***A. sikkimensis***, *Meissn. in DC. Prodr.* xv. 1. 213; leaves whorled penninerved 3–6 in. membranous lanceolate caudate-acuminate glabrous glaucous or not beneath, nerves 10–12 pair very slender, female

flowers clustered subsessile or pedicelled, fruit oblong seated on the very small quite entire base of the perianth.

SIKKIM HIMALAYA, alt. 3-6000 ft., *J. D. H., Clarke, King.*—**DISTRIB.** Munnipore.

Branches very slender, filaments glabrous; branchlets and young leaves beneath puberulous. *Leaves* in whorls of 4-6, very thin, greenish and almost shining above, paler beneath, not impressed-reticulate; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., slender. *Flowers* very small, subsessile, each 2-4-bracteate independently of the bracts surrounding the whole cluster. *Filaments* and style glabrous. *Fruit* $\frac{3}{4}$ in. long, top rounded, pedicel about as long.—The inflorescence is very anomalous.

3. **A. concolor**, *Nees in Wall. Pl. As. Rar.* iii. 31, and *Syst. Laurin.* 593; leaves whorled penninerved 5-7 in. thinly coriaceous elliptic or subcuneate-obovate acuminate base elongate shining above glaucous beneath, nerves 5-8 pair deeply impressed above, flowers subsessile in very small clusters. *Wall. Cat.* 6346; *Kurz For. Fl.* ii. 304.

TENASSERIM; at Tavoy, *Gomez*.

Branches rather slender, young finely rusty-pubescent; scales of leaf-buds clothed with long rufous silky hairs. *Leaves* in whorls of 3, usually broadest above the middle, base much produced, quite smooth and not reticulate above, young obscurely pubescent beneath; petiole $\frac{1}{2}$ in. *Clusters* of flowers $\frac{1}{2}$ - $\frac{1}{2}$ in. diam.; flower-buds silkily tomentose, very shortly pedicelled.—Described from Wallich's type specimen, which has buds only; it answers to Meissner's *β. fagifolia*, but it is clear that his *concolor* and its variety are only large and small leaves of the same plant.

4. **A. malaccensis**, *Hook. f.*; branchlets leaves beneath and petioles brown-tomentose, leaves whorled penninerved 4-8 in. coriaceous elliptic-oblong obtuse or subacute polished above, nerves 10-12 pairs strong beneath, female fl. in dense globose clusters very shortly pedicelled or subsessile, fruit globose seated on the very small cup-shaped thickened perianth-tube.

MALACCA, *Maingay*.

Branches rather stout, densely tomentose. *Leaves* dark brown when dry, $1\frac{1}{2}$ -3 in. diam., smooth above, at length glabrous beneath, base acute or subacute; petiole stout, $\frac{1}{2}$ - $\frac{3}{4}$ in. *Clusters* of female fl. globose, $\frac{1}{2}$ in. diam.; pedicels $\frac{1}{4}$ in. long. *Perianth* turbinate, $\frac{1}{2}$ in. diam., tube villous within, lobes short, rounded, glabrous. *Style* slender, glabrous; stigma lobulate. *Fruit* $\frac{3}{4}$ in. diam.; cup $\frac{1}{2}$ in. diam.; pedicel very short and thick.

b. *Species of the Deccan Peninsula.*

5. **A. salicina**, *Meissn. in DC. Prodr.* xv. 1. 212; leaves whorled penninerved coriaceous 4-6 in. linear-lanceolate subcaudate-acuminate glaucous beneath glabrous, nerves 10-12 pair very slender, fruit globose seated on the enlarged 6-lobed perianth-tube.

NILGHIRI HILLS, *Wight, Gardner*.

Branches slender, branchlets densely rusty-tomentose. *Leaves* 4-8 in a whorl, $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, flat, hardly shining above; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in. *Flowers* not seen. *Fruit* $\frac{1}{2}$ in. diam.; pedicel as long.—Very near *A. stenophylla* of Ceylon in habit, but very different in the fruiting calyx. The supposed Ceylon specimens mentioned by Meissner are not so; they have no collector's name nor locality, and are no doubt Peninsular. I have not seen var. *abbreviata*, which appears to be founded on a shorter leaved specimen.

6. **A. campanulata**, *Hook. f.*; glabrous except the tomentose subsilky inflorescence, leaves whorled penninerved 2-3 in. thinly coriaceous elliptic obtuse base acute green on both surfaces or subglaucous beneath,

nerves 6-8 pair very slender, flowers in simple fascicles, male subglobose shortly pedicelled, female campanulate shortly 6-cleft. *A. salicina*, *Beddome Fl. Sylv.* t. 295, and *Forest Man.* 186 (not of *Meissn.*).

DECCAN PENINSULA; Tinnevely, *Beddome*.

Apparently a shrub, with slender whorled glabrous branches. *Leaves* $\frac{3}{4}$ -1 $\frac{1}{4}$ in. diam., 4-8 in a whorl, minutely impressed-reticulate on both surfaces; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers*; male $\frac{1}{2}$ in. diam., stamens nearly glabrous; female $\frac{1}{2}$ in. long, tube silky outside villous within, lobes obtuse glabrous deciduous. *Style* slender, glabrous; stigmas 3, lobulate, stipitate.—Near *M. molochina* in habit, but the slender nerves and female flowers are very different. I think this is undoubtedly what *Beddome* has figured as *A. salicina*, referring it (*For. Man.*) to Wight's var. *abbreviata*: he figures the style as hairy, stigma 4-cleft, fruiting calyx cupular with deciduous lobes, and fruit 4 lines in diameter. Female flower same form as in *Litsæa zeylanica*, Wight *l.c.* t. 1844.

7. ***A. lanata*, Meissn. in DC. Prodr.** xv. 1. 219; branchlets and young leaves densely softly rusty-tomentose, leaves whorled penninerved coriaceous 3-5 in. elliptic-lanceolate acuminate glaucous beneath, nerves 8-10 pair very slender, flowers in sessile clusters, fruit pisiform seated on the wholly persistent 6-lobed perianth.

NILGHIRI MTS., Wight, *Gardner*.

Leaves 4-8 in a whorl; midrib and petiole rusty-tomentose, at length glabrous; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., rather slender. *Fruit* $\frac{1}{2}$ in. diam., pedicel about as long stout.—Probably a broad-leaved state of *A. salicina*. It is not a Ceylon plant, and it is erroneously placed in the section *Notholitsæa* in the *Prodromus*.

8. ***A. madraspatana*, Beddome in Herb.**; branchlets and petioles pubescent, leaves whorled penninerved 6-10 in. elliptic-lanceolate obtuse glaucous beneath, nerves 8-10 pair very oblique, flowers in dense globose silky tomentose clusters, females very shortly peduncled. *A. Hookeri*, var. *longifolia*, *Meissn. in DC. Prodr.* xv. 1. 219. *A. Hookeri*, *Beddome For. Fl.* t. 296 (excl. locality of *Sikkim*).

DECCAN PENINSULA; on the Cuddepah Hills, Wight, *Beddome*.

Branchlets very robust, minutely but closely tomentose. *Leaves* 4-8 in a whorl, pale green when dry, youngest densely clothed with long golden silky hairs (as in *A. angustifolia*); midrib and nerves strong but not stout, orange-red; nervules very faint; petiole $\frac{3}{4}$ -1 in., stout. *Male fl.* $\frac{1}{2}$ in. diam.; lobes oblong, membranous, silkily hairy without, glabrous within. *Ovary* 0. *Fruit* not seen.—*Beddome* remarks that this is the only Laurineous plant of the Cuddepah Hills (except, I suppose, *Cassytha*); it is very near *A. angustifolia*, but the leaves are more obtuse, glaucous beneath, and the male fl. are much larger. *Meissner* describes the leaves as triple-nerved, but the lower pair are too short to admit of this.

9. ***A. Hookeri*, Meissn. in DC. Prodr.** xv. 1. 218 (excl. var. γ .); branchlets and young leaves densely softly rusty-tomentose or villous, leaves whorled penninerved (rarely subtriple-nerved) 5-8 in. coriaceous ovate- or elliptic-lanceolate finely acuminate glabrous or tomentose beneath, nerves 6-8 pair very slender, male fl. clustered, fem. umbelled or subracemose on a short stout peduncle, fruit ellipsoid seated on the much-thickened subcampanulate entire perianth-tube. *A. angustifolia*, *Nees?*; *Herb. Ind. Or. H. f. & T.*

THE CONCAN AND CANARA; on the Ghats, *Stokes, Law, Dalzell*.

Young leaves and branches almost woolly; buds large, silky. *Leaves* green when dry, sometimes 3 in. diam., smooth and often polished above, hardly glaucous beneath, and even when old then often rusty villous (var. *dasy-poda*, *Meissn.*); petiole 1-1 $\frac{1}{4}$ in., always tomentose. *Flowers* silky; males very shortly pedicelled, $\frac{1}{2}$ in. diam.; fem.

fewer, longer pedicelled, umbels sessile or subracemose on a short peduncle. *Filaments* woolly. *Fruit* $\frac{1}{2}$ in. long; perianth-cup as broad, thick; pedicel very stout, $\frac{3}{4}$ –1 in. long.—Habit of *A. lanata*, but distinguished from all its Peninsular allies by the broad leaves ending in long points. It may, however, be a form of *angustifolia*, in which case *madraspatana* and *lanata* may be varieties of it. It is erroneously placed in the section *Notholitsæa* in the Prodrômus.

c. *Species of Ceylon.*

10. ***A. molochina***, *Nees Syst. Laurin.* 603 (*excl. var. γ.*); leaves 1–3 in. whorled penninerved rigidly coriaceous elliptic obovate or cuneate-obovate obtuse shining above, beneath tomentose glabrous or glaucous, fem. fl. in simple clusters shortly pedicelled, fruit globose seated on the 6-fid perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 211; *Thwaites Enum.* 257; *Wight Ic. t.* 1843; *Beddome For. Man.* 186.

CEYLON; Central Province, alt. 6–8000 ft., *Walker, &c.*

A small tree, branches rather stout glabrous or scurfily tomentose. *Leaves* rarely orbicular, shining above, hard; nerves 4–6 pair, very prominent beneath, variable and sometimes triple-nerved on the same branch with the penninerved; petiole short, stout, rarely $\frac{1}{2}$ in. *Bracts* 9, outer smaller, 6-flowered. *Flowers* silky without, glabrous within; pedicel $\frac{1}{2}$ in., stout. *Style* glabrous. *Fruit* “about $\frac{1}{2}$ in. diam.” (*Thwaites*), seated on the scarcely enlarged perianth.—*Meissner* has two varieties, but their characters are found on the same branch, and many more as good might be made of this most variable species, the extremes of which would but for intermediates be regarded as distinct species.

Var. Moonii; leaves ovate or elliptic-lanceolate obtusely acuminate. *A. Moonii*, *Thwaites Enum.* 256 (not of *Meissner*).—Ceylon, alt. 5–7000 ft., *Moon, Sir G. McKenzie*.—*Meissner*, misled by a misplaced ticket of *Thwaites*, took a glabrous leaved form of *molochina* for this. The only specimens are very bad.

11. ***A. stenophylla***, *Thwaites Enum.* 256; leaves 2–5 in. whorled penninerved coriaceous linear-oblong or -lanceolate obtuse quite glabrous glaucous beneath, nerves 10–15 pair, fem. fl. in simple clusters shortly pedicelled, fruit globose seated on the entire cup-shaped perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 212; *Beddome For. Man.* 186. *A. Thwaitesii*, *Meissn. l. c.*

CEYLON; in the Oova and Badulla districts, ascending to 3000 ft.

A tree, 20–30 ft.; branchlets glabrous or rusty-pubescent. *Leaves* 4–8 in a whorl, $\frac{3}{4}$ –1 in. broad, hardly shining above, midrib beneath stout, nerves usually very regular and slender; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Bracts* subsilky and ciliate. *Flowers* many, in rounded clusters $\frac{1}{2}$ in. diam., fulvous silky. *Perianth-lobes* wholly deciduous. *Style* villous. *Fruit* $\frac{1}{2}$ in. diam., black, pedicel $\frac{1}{4}$ – $\frac{1}{2}$ in.—Small forms with leaves $1\frac{1}{2}$ by $\frac{1}{2}$ in. look very different, but are united by intermediates with the larger leaved.

12. ***A. elegans***, *Thwaites Enum.* 256; leaves 2–4 in. whorled penninerved thinly coriaceous lanceolate or elliptic-lanceolate caudate-acuminate quite glabrous glaucous beneath, nerves 8–10 pairs very faint, fem. fl. in simple clusters very shortly pedicelled, fruit globose seated on the entire cup-shaped perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 212; *Beddome For. Man.* 186.

CEYLON; Central Province and Pasdoon Corle, ascending to 3000 ft., *Thwaites*.

A small tree; branches slender. *Leaves* 4–6 in a whorl, nerves very finely reticulated above almost evanescent, capillary beneath; petiole very slender, $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* in subsolitary clusters, rusty-tomentose, $\frac{1}{2}$ in. diam. *Perianth-lobes* wholly deciduous. *Filaments* villous. *Fruit* nearly $\frac{1}{2}$ in. diam.; pedicel $\frac{1}{2}$ in.

13. ***A. glauca***, *Nees Syst. Laurin.* 599; leaves 2–4 in. whorled penni-

nerved coriaceous elliptic-oblong rounded at both ends glaucous beneath minutely impressedly reticulate, nerves 6-8 pair very slender raised on both surfaces, male fl. large in sessile clusters stoutly pedicelled. *A. glauca*, *β. Walkeri*, *Meissn. in DC. Prodr.* xv. 1. 213.

CEYLON, *Walker*.

Branchlets petioles and strong midrib beneath rusty-tomentose. *Leaves* 4-6 in a whorl; petiole $\frac{1}{2}$ in., stout. *Male fl.* $\frac{1}{2}$ in. diam., tomentose, pedicels $\frac{1}{4}$ in. slender. *Bracts* about 14, 5-fld. *Perianth* villous without and at the base within. *Filaments* woolly at the base. *Ovary* and slender style glabrous.—This is the plant (the specimen indeed) described by Nees as *A. glauca*, and which Meissner referred to a variety of the *glauca* of Thwaites, which again is a different plant (my *pisifera*). Nees describes the leaves as glaucous above (no doubt a slip), and as “scrobiculo-reticulata,” alluding to the impressed minute reticulation which in a less marked degree is not uncommon in the genus.

14. *A. pisifera*, *Hook. f.*; quite glabrous, branches slender, leaves 2-3 in. whorled penninerved elliptic-oblong obtuse impressed punctate on both surfaces glaucous beneath with 6-8 pairs of nerves, unopened clusters of flowers solitary sessile pisiform quite glabrous 5-fld. bracts eciliate. *A. glauca*, *Thwaites Enum.* 256; *Meissn. in DC. Prodr.* xv. 1. 213, not of Nees; *Beddome For. Man.* 186.

CEYLON; at Pedrotatagalla, alt. 7-8000 ft., *Thwaites* (C. P. 2536).

A tree, 30-40 ft. (*Thwaites*). *Leaves* in Thwaites' indifferent specimen thinly coriaceous, with recurved margins, base acute; petiole $\frac{1}{2}$ in., very slender. *Unexpanded clusters* of flowers $\frac{1}{2}$ in. diam., quite globose, pale, with about 14 perfectly glabrous bracts, the outer smallest. *Sepals* 6, substrigosely hairy in bud. *Filaments*, *ovary* and *style* quite glabrous.—This is quite distinct from *A. glauca* in the slender glabrous branches, and in the flower-buds, which are scattered like small peas along the branches, and by the glabrous eciliate bracts. *Stamens* young, but apparently quite glabrous. Thwaites describes the fem. fl. as $1\frac{1}{2}$ line long, with the 2-line long pedicels rusty-hairy; the sterile stamens as spatulate, acute, glabrous, and the fruit as subglobose, on the slightly enlarged crenulate perianth. I have described from C. P. 2536.

†† Female flowers in peduncled umbels or clusters; or mixed, some pedicelled simply, others umbelled on peduncles in the same inflorescence. (See also *A. madraspatana*, *lanata* & *Hookeri*.)

15. *A. sesquipedalis*, *Hook. f. & Thoms. in Herb. Ind. Or.*; branches very robust tomentose, leaves whorled penninerved very coriaceous 1-2 feet linear or oblanceolate acute shining above subglaucous beneath, nerves 15-20 pair strong venules 0 or faint, fem. fl. solitary and umbellate on short peduncles in the same cluster, fruit globose on a broad flat entire or 5-crenate disk. *Litsæa macrophylla*, *Kurz For. Fl.* ii. 305 (not of Blume). *Myristica sesquipedalis*, *Wall. Cat.* 6809.

TENASSERIM; at Mergui, *Griffith*. PENANG, *Wallich*.

Branches as thick as the fore-finger, terete, smooth, finely pubescent, young villously hirsute. *Leaves* many in a whorl, 2-7 in. diam., dark brown and glossy above, the largest more membranous, base very acute, finely pubescent beneath, at length glabrous, surfaces not reticulate, midrib impressed above, but not the nerves; petiole very stout, $\frac{1}{2}$ -1 in. *Flowers* not seen. *Fruit* in clusters of 2 in. diam., globose, $\frac{3}{4}$ -1 in. diam., shining; peduncles and pedicels $\frac{1}{2}$ in., very stout, hard, pubescent; disciform enlarged and thickened perianth hard, rugose outside, flat and smooth on the face.—Kurz has referred this to Blume's *Litsæa macrophylla*, which differs in the much smaller leaves not narrowed at the base and short petiole.

16. *A. Maingayi*, *Hook. f.*; branches very robust, leaves whorled

penninerved 1-2 feet very coriaceous oblanceolate or oblong-obovate sub-acute shining above rusty-tomentose beneath, nerves 15-20 pair very strong beneath with strong parallel transverse venules, fem. fl. solitary and umbellate on short peduncles in the same cluster, fruit globose on a broad flat 6-lobed perianth.

MALACCA, *Maingay* (*Kew Distrib.* 1275 and 1258, *sesquipetalis*).

Habit of *A. sesquipetalis*; leaves as large and of the same shape and texture, but tomentose beneath and barred between the nerves with strong parallel venules; the fruiting calyx is much smaller and less coriaceous and thick, the perianth-lobes persistent, and the globose black fruit is only $\frac{1}{2}$ in. diam.

17. **A. pruinosa**, *Nees in Wall. Pl. As. Rar.* ii. 68, iii. 31, and *Syst. Laurin.* 591; branches slender, leaves whorled penninerved 3-5 in. coriaceous lanceolate or elliptic-lanceolate or oblanceolate caudate-acuminate smooth and shining above glaucous beneath, nerves 8-10 pair very slender, fem. fl. very small in peduncled umbels or clusters, fruit seated on the cupular-turbinate perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 216. *Laurus pruinosa*, *Wall. Cat.* 2584.

PENANG, SINGAPORE and MALACCA, *Wallich, Maingay*.

Branches rather slender, branchlets densely rusty-tomentose. *Leaves* 4-6 in a whorl, dark brown glossy and quite smooth above with the nerves obscure beneath, not reticulate, midrib red on both surfaces, finely pubescent beneath when young, glabrous in age; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in., slender. *Flowers* $\frac{1}{2}$ in. diam., silky, shortly pedicelled. *Style* slender, glabrous. *Fruiting perianth* $\frac{1}{4}$ in. diam., lobes deciduous; fruit not seen.

18. **A. angustifolia**, *Nees in Wall. Pl. As. Rar.* iii. 31, and *Syst. Laurin.* 594 (*excl. syn. Blume*); branches robust, leaves whorled penninerved 4-12 in. lanceolate oblanceolate or elliptic obtusely acuminate shining above young tomentose beneath, nerves 6-10 pair strong beneath very oblique, fem. fl. in peduncled umbels, fruit globose on a small cup-shaped entire perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 214; *Wight Ic.* t. 1841; *Miquel Fl. Ind. Bat.* i. 1. 967; *Beddome Fl. Sylvat.* t. 295, figs. 10, 11. ? *A. heterophylla*, *Blume Mus. Bot.* t. 342; *Meissn. l. c.* 214. *Tetranthera angustifolia*, *Wall. Cat.* 2559. *T. caduca*, *Herb. Ham.* *Litsæa angustifolia*, *Kurz For. Fl.* ii. 305. *Laurus Gullawara*, *Herb. Ham.*

ASSAM, *Hamilton, Jenkins*. SILHET and KHASIA MTS., alt. 1-2000 ft., *J. D. H. & T. T., Clarke*. CHITTAGONG, *Clarke*. PEGU and TENASSERIM, *Wallich, &c.*—DISTRIB. Sumatra, Java.

A tree, branches rather robust, young softly tomentose. *Leaves* 4-6 in a whorl, very variable in length and breadth, glossy with slender raised nerves above, beneath glaucous or not, quite veinless between the strong nerves, villous when young; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Clusters* silkily villous; flowers $\frac{1}{2}$ in. diam. *Style* villous. *Fruit* $\frac{1}{2}$ in. diam. or less, cup $\frac{1}{6}$ in. diam., pedicel about as long.—Judging from the leaf only, *A. macrop-tera*, *Miquel*, of Sumatra, is this. It a good deal resembles *A. Hookeri*.

19. **A. hirsuta**, *Hook. f.*; branchlets petioles and leaves beneath hirsute and brown-tomentose, leaves whorled penninerved 4-6 in. thinly coriaceous elliptic-lanceolate acuminate smooth and shining above, nerves 8-10 pair very slender, fem. fl. long-pedicelled umbellate or subracemose on a hirsute peduncle, fruit (young) seated on the cup-shaped quite entire perianth-tube.

MALABAR; at Quillon, *Wight*.

Apparently a very distinct species, in young fruit only, allied to *A. lanata* of the Nilghiris, but with broader ($1\frac{1}{2}$ -2 in.) leaves densely tomentose beneath, and hirsute branches petioles and nerves beneath; the flowers too are long-pedicelled and umbel-

late; the common peduncle is $\frac{1}{2}$ in. long, and the pedicels rather longer.—Being found at Quillon, this is probably a coast species.

** Leaves in interrupted whorls, or the lower opposite, triple-nerved at the base, the lateral nerves reaching beyond the middle of the leaf.

20. **A. speciosa**, *Nees Syst. Laurin.* 602; branchlets stout and leaves beneath densely rusty-tomentose, leaves opposite and whorled triple-nerved long-petioled very thickly coriaceous orbicular rugose above, nerves 4-6 pair very strong beneath with strong cross-venules, clusters globose small silkily tomentose. *Meissn. in DC. Prodr.* xv. 1. 219; *Wight Ic.* t. 1842; *Thwaites Enum.* 257; *Bedd. For. Fl.* 187.

CEYLON; Central Province, ascending to 8000 ft.

A small tree, 30-40 ft.; branches very stout. *Leaves* 6-10 in. diam., 3-4 in a whorl and opposite, abruptly acuminate, base rounded or subacute, shining brown above with deeply impressed nerves and nervules, the former tomentose beneath almost velvety with rusty-brown hairs; petiole 1-2 in., very stout. *Clusters* of flowers $\frac{3}{4}$ -1 in. diam.; pedicels very short. *Male perianth* $\frac{1}{4}$ in. diam.; tube very short; lobes glabrous within; fem. longer pedicelled. *Filaments* villous. *Style* woolly. *Fruit* "subspherical, seated on the enlarged truncate base of the perianth," *Thwaites*.

Var. β . *Candolleana*, *Thwaites l. c.*; leaves less coriaceous more sparingly hairy ovate or oblong-lanceolate acuminate base acute. *A. Candolleana*, *Meissn. l. c.*—Central Province, at about 4000 ft., *Thwaites*.

21. **A. obovata**, *Blume Mus. Bot.* i. 342; branchlets and leaves rusty-pubescent, leaves whorled triple-nerved 10-18 in. long-petioled thinly coriaceous broadly elliptic-oblong or obovate acuminate smooth and shining above often glaucous beneath, nerves 3-4 pairs slender beneath, male fl. large clustered, fem. panicle, fruit ellipsoid seated on the thickened cupular entire perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 219. *Tetranthera obovata*, *Wall. Cat.* 2562. *Tetradenia obovata*, *Nees in Wall. Pl. As. Rar.* ii. 64. *Litsæa obovata*, *Nees Syst. Laurin.* 636. *Laurus obovata*, *Herb. Ham.*

SIKKIM HIMALAYA, alt. 1-2000 ft., *J. D. H., Clarke*. ASSAM, *Jenkins*. SILHET and KHASIA MTS., ascending to 3000 ft.—DISTRIB. Munnipore.

A small tree; branches stout. *Leaves* 4-12 in. diam., very variable in size and shape, largest often quite membranous, rarely elliptic-lanceolate; petiole 1-2 in. *Male fl.* $\frac{1}{2}$ in. diam., tube very short, lobes membranous; fem. much smaller, but longer pedicelled. *Style* glabrous. *Fruit* $\frac{3}{4}$ -1 in. long; cup dilated, $\frac{1}{3}$ - $\frac{1}{2}$ in. diam., turbinate; pedicel very stout, $\frac{1}{2}$ in. long.

22. **A. ambigua**, *Hook. f.*; nearly glabrous, leaves subverticillate $1\frac{1}{2}$ -3 in. orbicular or broadly oblong (rarely oblong-lanceolate) obtuse or tip rounded triple-nerved glaucous beneath margins recurved, umbels 4-6-fl. sessile solitary or clustered, bracts 6-8, fruit ellipsoid subovoid or subglobose. *A. molochina*, γ . *subtriplinervis*, *Meissn. in DC. Prodr.* xv. 1. 211. *Litsæa ambigua*, *Meissn. l. c.* *L. zeylanica*, var. β , *Thwaites Enum.* 257, in part. *L. orbicularis*, *Thwaites Enum.* 258; *Meissn. l. c.* 222 (*C. P.* 2699, 3155, 2280, 72, 2278).

CEYLON; Ambagamowa district and Central Province, alt. 4-7000 ft., *Gardner*, *Thwaites*.

A small tree; branchlets usually black, "brown-tomentellous," *Thwaites*. *Leaves* very rigidly coriaceous, pale brown, convex above and shining with 6-8 pair of impressed nerves, glaucous (white and pruinose, *Thwaites*) beneath with rather slender nerves, the 2 basal reaching about the middle of the leaf, base rounded or acute rarely cordate; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. (and midrib hairy at the base, *Thwaites*). *Umbels*, unopened

globose, $\frac{1}{2}$ – $\frac{1}{4}$ in. diam., scattered along the branches and axillary; bracts hard, strongly ciliate, outer smaller glabrous, inner hemispheric rusty silky hairy; flowers pedicelled, $\frac{1}{2}$ in. diam., and pedicel silkily tomentose. *Sepals* 4–6, oblong. *Stamens* 6–9, filaments short. *Fruit* about $\frac{1}{2}$ in. long.—A very-distinct species, strangely mixed up with others by Thwaites and Meissner. I have adopted Meissner's specific name as the orbicular-leaved state is quite exceptional, and it is certainly not a *Litsæa*. Meissner's var. *β. lanceolata* is a narrower leaved form.

*** Leaves scattered or alternate more or less triple-nerved.

23. **A. confertiflora**, Meissn. in DC. Prodr. xv. 1. 219; glabrous, leaves alternate 5–7 in. coriaceous orbicular-ovate or -oblong acute or obtuse triple-nerved and with 3–4 pair of strong superior nerves,[†] pale or subglaucous beneath and delicately reticulate, flowers very numerous long-pedicelled in dense axillary sessile fascicled clusters, bracts not seen.

EASTERN HIMALAYA; Bhotan, near Dewangiri, alt. 2–3000 ft., Griffith (*Kew Distrib.* 433).

Branches stout, black when dry, smooth. *Leaves* 3–4 in. broad, pale brown and shining above, with slender raised nerves; paler beneath with very strong nerves, of which the two lower pair are penninerved towards the margin of the leaf; base acute; petiole $\frac{3}{4}$ –1 in. long. *Flowers*, unexpanded $\frac{1}{2}$ in. diam., globose, glabrous, or nearly so; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in.; common peduncle $\frac{1}{10}$ in., scarred by the fallen bracts. *Sepals* rounded, concave, coriaceous. *Filaments* glabrous, anthers short. *Ovary* subglobose, with three lateral furrows, a subulate style and acute stigma. *Fruit* unknown.—The ovary is remarkable for the genus.

24. **A. leiantha**, Hook. f.; glabrous except the rusty-tomentose inflorescence, leaves scattered 5–9 in. coriaceous subtriple-nerved lanceolate acute or subacute, nerves 6–8 pair beneath subglaucous not reticulate, flowers in axillary and infra-axillary racemes which when young are clothed with imbricate rounded silky caducous bracts. *Litsæa leiantha*, Kurz For. Fl. ii. 305.

TENASSERIM (or Andaman Islands), Helfer (*Kew Distrib.* 4330).

Branches black, bark smooth. *Leaves* brown when dry, 2– $2\frac{1}{2}$ in. diam., rigid, margins undulate, base acute, shining above with raised nerves, beneath glaucous when young, lowest pair of nerves longest, $\frac{1}{2}$ – $\frac{3}{4}$ the length of the leaf; petiole 1– $1\frac{1}{2}$ in., slender. *Flowers* $\frac{1}{4}$ in. diam., clusters arranged on an erect raceme 1–2 in. long; rachis slender, nearly glabrous; pedicels short; bracts $\frac{1}{2}$ in. diam., coriaceous. *Perianth* villous within at the base; segments concave. *Filaments* and anthers short. *Ovary* and style slender glabrous, stigma discoid. *Fruit* unknown.—The foliage resembles that of *A. sphaerocarpa* of Java, in which the flowers are umbelled. The racemose inflorescence is unique in the genus.

DOUBTFUL SPECIES.

ACTINODAPHNE sp., South Andaman, Kurz in Herb. Calcutt.; branches very stout and petiole and midrib above and beneath brown-tomentose, leaves whorled penninerved 12–18 by 4–7 in. oblong-lanceolate acuminate shining above glaucous and reticulate beneath, nerves 12–15 pair and cross nerves impressed above raised beneath, petiole stout 1– $1\frac{1}{2}$ in.

ACTINODAPHNE sp. Beddome in his Forest Manual (187) alludes to a new and fine species called Nattee as forming a lofty tree in the South Canara Ghats.

ACTINODAPHNE? from Seetakoond, near Chittagong, Clarke; a plant very like *A. leiantha*, having similar racemose inflorescence. *Branches* slender and leaves glabrous. *Leaves* scattered triple-nerved, thinly coriaceous, 3–5 in., elliptic or elliptic-lanceolate, obtusely caudate-acuminate, narrowed into a very long slender petiole $\frac{1}{2}$ – $1\frac{1}{2}$ in., impressed punctate on both surfaces, subglaucous beneath, lower pair of nerves very long, others few or 0. *Racemes* $\frac{1}{2}$ –1 in., solitary or 2-nate, erect, simple

or compressed, formed of globose clusters of 3-5 flowers enclosed in 6-8 subsilky pubescent rounded concave bracts; peduncle of raceme slender, with a few small scales. *Flowers* too young to analyze.—This may be a *Lindera*, for the inflorescence somewhat resembles that of *L. caudata*; or possibly a *Litsæa* of the section *Neolitsæa*.

11. **LITSÆA**, Lamk. (TETRANTHERA, Jacq.)

Evergreen, rarely deciduous trees or shrubs. *Leaves* alternate, rarely opposite or subopposite, penninerved, rarely triple-nerved, leaf-buds naked or scaly. *Flowers* diœcious, umbellate; umbels 4-6- rarely more-flowered, sessile or pedicelled; pedicels clustered rarely solitary, axillary or on the leaf-scars, sometimes racemose or fascicled on a common peduncle; involucre bracts 4-6, rarely more, concave, coriaceous or membranous. *Perianth-tube* ovoid campanulate or very short; lobes or segments 6-4, rarely more or fewer, equal or unequal, or in a few wanting. *Stamens* 6, 9, 12, rarely more or fewer; filaments of 1st and 2nd series usually eglandular, of the 3rd (and 4th if present) 2-glandular; anthers all introrse, 4-celled. *Fruit* a drupe or succulent, seated on the often greatly enlarged perianth-tube.—Species about 140, Tropical and Eastern Asia, Australasia, the Pacific Islands, rare in Africa and America.

After many weeks of study I am unable to offer a satisfactory account of the Indian *Litsæas*, flower of one or other sex and fruit of most being wanted to determine their affinities and formulate the diagnoses of the species. The sections *Conodaphne* and *Cylicodaphne* pass into one another, and cannot be distinguished without ripe fruit, which is wanting in two-thirds of the plants referred by Meissner to the first of these sections. Blume's section *Tomingodaphne*, if confined to the deciduous leaved species, may, I think, be retained.

It is to be borne in mind that neither Nees nor Meissner cites Roxburgh's "Flora Indica;" as also that Roxburgh adopted different names for the same plant in his "Flora," in his unpublished "Icones," and in the Calcutta Bot. Garden. I have been very cautious in identifying Indian species with Malayan, for want of better specimens of the latter. I think it probable that sect. *Neolitsæa* will be restored to generic rank, as *Tetradenia*, from its habit and floral characters.

Sect. I. **Tomingodaphne**, Blume. *Leaves* deciduous, alternate, penninerved, terminal buds usually perulate (clothed with imbricate chartaceous scales. *Perianth-segments* 6; tube not enlarged in fruit.—Mountain species, of 5-11,000 feet elevation.

* *Terminal buds naked*.

1. **L. citrata**, Blume *Bijd.* 565; quite glabrous, branches black when dry, leaves 5-7 in. deciduous alternate long-petioled penninerved membranous greenish when dry lanceolate caudate-acuminate glaucous beneath, nerves 12-15 pair very slender, umbels solitary or corymbose on a very short peduncle 4-10-fld., pedicels very slender, fruit small globose, perianth-base not enlarged. *Tetranthera citrata*, Nees *Syst. Laurin.* 560; *Blume Mus. Bot.* i. 385; *Miquel Fl. Ind. Bat.* i. 958. *T. polyantha*, Wall. *Cat.* 2538; *Nees in Wall. Pl. As. Rar.* ii. 67, and *Syst. Laurin.* 545; *Meissn. in DC. Prodr.* xv. 1. 182 (including *β. citrata*, but excluding China as locality); *Kurz For. Fl.* ii. 301.

EASTERN HIMALAYA; from Sikkim to Mishmi, alt. 5-9000 ft. KHASIA MTS., alt. 5-6000 ft. AVA, Kurz.—DISTRIB. Java.

A deciduous bush or small tree, with a delightful fragrance of oranges; branches slender, quite smooth; terminal bud naked. *Leaves* the most membranous of the genus, bright green above, dull glaucous beneath, youngest silky; nerves variable, from

nearly horizontal or obliquely ascending, base acute; petiole $\frac{1}{2}$ –1 in., very slender. *Umbels* $\frac{1}{2}$ in. diam.; bracts membranous, not in decussating pairs, glabrous or sparsely silky; flowers with usually villous white pedicels; males about $\frac{1}{8}$ in. diam., with an abortive ovary; females smaller, stamens imperfect, stigma disciform. *Sepals* membranous, obovate, subequal. *Stamens* 9–10 in the male, 3 of them 2-glandular; filaments usually hairy; anthers quadrate. *Fruit* $\frac{1}{4}$ – $\frac{1}{3}$ in. diam.—This is not the *L. citrata* of Hong Kong.

2. **L. Kingii**, *Hook. f.*; quite glabrous, branches black when dry, leaves 3–4 in. alternate deciduous penninerved short-petioled thinly coriaceous greenish when dry elliptic-lanceolate acute glaucous and reticulate beneath, nerves 12–18 pair very slender and spreading, umbels solitary or few and corymbose stoutly pedicelled recurved in bud 5-fld., fruit small globose, perianth-base not enlarged. *L. citrata*, *Herb. Calcutta*, in part. *Tetranthera* No. 5, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 6–8000 ft., *J. D. H., King, Clarke. KHASIA MTS., Griffith.*

A deciduous bush, with a delightful spicy fragrance; branches stout, quite smooth; terminal buds with the young leaves quite glabrous and convolute (like a lanceolate or perulate bud). *Leaves* thin but firm in texture, shining and reticulate above, with pale nerves, base acute; petiole $\frac{1}{3}$ – $\frac{1}{2}$ in. *Umbels* $\frac{1}{2}$ in. diam.; bracts 4–5, quite glabrous, not decussately opposite; flowers with short quite glabrous pedicels; males about $\frac{1}{8}$ in. diam. *Sepals* 6, oblong, unequal. *Stamens* 8–12, 4 or 6 2-glandular; filaments glabrous. *Ovary* minute; female in smaller fewer-fld. umbels; perianth more irregular; stigma discoid. *Fruit* $\frac{1}{4}$ in. diam.—Closely allied to *L. citrata*, but quite distinct in the stouter branches, more elliptic acute leaves, short petioles, and much stouter pedicels of the umbels.

**** Terminal buds perulate.**

3. **L. sericea**, *Wall. Cat.* 2545 (*Tetranthera*); branches black when dry, terminal buds perulate, leaves 3–4 in. alternate deciduous penninerved subcoriaceous oblong-lanceolate base acute softly tomentose and reticulate beneath, nerves slender 10–12 pair, umbels solitary very shortly pedicelled 8–20 fld., bracts 4 caducous, fruit long-pedicelled small subglobose on the very small flat perianth-tube. *Tetranthera sericea*, *Wall.*; *Nees in Wall. Pl. As. Rar.* ii. 67, and *Syst. Laurin.* 565; *Blume Mus. Bot.* i. 376. *T. sericea* and *T. sikkimensis* (*excl. syn. T. elongata* and *hab. Khasia*), *Meissn. in DC. Prodr.* xv. 1. 181.

TEMPERATE HIMALAYA, alt. 9–11,000 ft.; from Nepal, *Wallich*, to Bhotan, *Griffith*.—DISTRIB. Muunipore.

A small very aromatic tree, sometimes 50 ft. high; bud-scales rigid, outer short obtuse, innermost long, lanceolate, acuminate; branches robust. *Leaves* pale brown when dry, young clothed with fulvous brown silky shining tomentum, base very acute; petiole $\frac{1}{4}$ in., tomentose. *Umbels* nearly 1 in. diam., on very short tomentose peduncles; bracts glabrous; flowers pedicelled, $\frac{1}{8}$ in. diam. *Sepals* 6, rounded, hairy at the base within. *Stamens* 12, short, filaments hairy; anthers broad, square; glands very large. *Ovary* ovoid, style stout, stigma very large. *Fruit* $\frac{1}{4}$ in. long, pedicels $\frac{3}{4}$ –1 in. long.

4. **L. oreophila**, *Hook. f.*; quite glabrous, branches rather slender, leaves alternate penninerved deciduous ovate-lanceolate acuminate finely reticulate on both surfaces, nerves 8–10 pair very slender, umbels solitary pedicelled ovoid in bud and mucronate 6-fld., bracts 4 broadly ovate acute cucullate glabrous, flowers tomentose. *Lindera Hookeri*, *Meissn. in DC. Prodr.* xv. 1. 245.

SIKKIM HIMALAYA; Lachoong Valley, alt. 10–11,000 ft., *J. D. H.*

A bushy tree, branches terete; buds scaly, glabrous. *Leaves* 2-3 in., rather membranous, greenish when dry, not glaucous beneath, base rounded or cuneate; petiole $\frac{1}{2}$ in., very slender. *Umbels* in bud $\frac{1}{2}$ in. long, erect on a rather stout pedicel $\frac{1}{2}$ in. long. *Flowers* very young, 9?, filaments villous; anthers 4-celled.—Meissner describes this as a *Lindera*, but I find that I many years ago made a note that the anthers are 4-celled, and on a second examination I am confirmed in this. I am not positive as to the leaves being deciduous, judging from appearance only.

Sect. II. **Eulitsæa**, Benth. *Leaves* persistent, alternate, penninerved. *Perianth-segments* very incomplete or 0, tube not or slightly enlarged in fruit. *Stamens* often more than 12.

5. **L. tomentosa**, Herb. Heyne, ex Wall. Cat. 2550; densely softly tomentose except the leaves above, leaves 3-7 in. alternate penninerved coriaceous elliptic or oblong obtuse acute or acuminate, nerves 8-10 pair, umbels large solitary many-fld., perianth incomplete or 0, fruit globose on the small thickened perianth-tube. *Tetranthera tomentosa*, Roxb. ex Wall. Cat. l. c. A, B; Meissn. in DC. Prodr. xv. 1. 177 (excl. habitat of Sirmore and citat. of Nees); Wight Ic. t. 1834; Kurz For. Fl. ii. 297 (description only). *T. apetalæ*, Dalz. & Gibs. Bomb. Fl. 222. *T. japonica* fem., Herb. Wight. Laurineæ, Wall. Cat. 7455.

DECCAN PENINSULA; on the Western Ghats, from the Concan southwards. CEYLON; Central Province, ascending to 4000 ft.

An evergreen tree; branchlets stout. *Leaves* pale when dry, finely reticulated above, laxly beneath, base acute or rounded; petiole $\frac{1}{2}$ - $\frac{1}{4}$ in. *Umbels* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; pedicel as long, stout; bracts 4, tomentose on both surfaces; flowers very shortly pedicelled. *Stamens* 18-20, filaments long, slender, villous; glands long-pedicelled. *Fruit* $\frac{1}{2}$ in. diam.—Griffith's Mergui plant, and Wallich's 2550 C (not A as quoted by Meissner), are flowerless specimens of *L. sebifera*, as is probably Meissner's var. *β. ? birmanica*, which I have not seen. Kurz, who introduces the latter in his Forest Flora on Meissner's authority, never saw it. I have no idea what Gamble's *T. tomentosa* from Sikkim, alt. 6-8000 ft., is (Man. Ind. Timb. 310); his Birman *T. tomentosa* is doubtless *L. sebifera*, var. *tomentosa*. Wallich's lithographed ticket, "No. 7455, Laurin.," is attached to a sheet without a specimen; but another sheet, also marked 7455 in pencil, contains a specimen of *L. tomentosa*.

6. **L. sebifera**, Pers. Syn. ii. 4; glabrous or tomentose, leaves alternate 3-9 in. coriaceous or chartaceous elliptic ovate or oblong, tip acute obtuse or rounded, nerves 8-10 pair, umbels corymbose or racemose usually long-pedicelled few- or many-fld., perianth very incomplete or 0, fruit globose on the small thickened perianth-tube.

Throughout the hotter parts of INDIA, from the PANJAB and lower HIMALAYA at GARHWAL, eastwards to SIKKIM, ASSAM and the KHASIA Mts., the GANGETIC PLAIN and BENGAL; and southwards to MALACCA and throughout the DECCAN PENINSULA. CEYLON, ascending to 3000 ft.—DISTRIB. Malay Islands, China, Australia (introd. in Mauritius).

An evergreen tree, 20-50 ft., of protean habit foliage and inflorescence. *Leaves* subterminal on the branches, pale when dry; petiole $\frac{1}{2}$ -1 in. *Umbels* few or many, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; pedicels clustered on a stout or slender common peduncle $\frac{1}{2}$ -3 in. long; bracts 4, more or less tomentose. *Stamens* 9-20 or more, filaments more or less villous. *Fruit* the size of a pea, pedicel sometimes thickened.—I recognize three principal forms of this variable plant: 1, leaves usually thin, glabrous or nearly so, often small, oblong, tip rounded; 2, leaves much larger, more pubescent beneath, and more or less acute; 3, leaves large, ovate or oblong, acute, thickly tomentose beneath or on both surfaces (as in states of *L. tomentosa*, for which flowerless specimens have been taken by Nees and Meissner). The varieties proposed by Blume and Meissner may be grouped as follows. I am compelled to query Jacquin's plate of *laurifolia*,

which represents the perianth of 6 equal lobes toothed at the tips; which is totally unlike anything I have met with in the large suite of specimens examined.

Var. 1. *L. sebifera* proper; leaves 3-6 in. thin oblong glabrous above sparingly pubescent beneath. *L. sebifera* & *tetranthera*, *Pers. Synops.* ii. 4. *L. multiflora*, *Blume Bijl.* ii. 564. *L. chinensis*, *Lamk. Dict.* iii. 574. *Tetranthera laurifolia*, multiflora, racemoso-umbellata & Roxburghii, *Blume Mus. Bot.* ii. 373, 374, and including Var. *Jacquinii*, *Meissn. in DC. Prodr.* xv. 1. 178, 179. *T. laurifolia* (? *Jacq. Hort. Schoenb.* i. 59, t. 113); *Roxb. Fl. Ind.* iii. 823; *Bot. Reg.* t. 893; *Blume Mus. Bot.* i. 372; *Wall. Cat.* 2555 A, D; *Brand. For. Fl.* 319; *Gamble Man. Ind. Timb.* 310. *T. Roxburghii*, *Nees in Wall. Pl. As. Rar.* ii. 65 and iii. 30, and *Syst. Laurin.* 515; *Thwaites Enum.* 255. *T. apetala*, *Roxb. Cor. Pl.* ii. 25, t. 147, and *Fl. Ind.* iii. 819; *Gærtn. f. Fruct.* iii. 226, t. 222; *Wall. Cat.* 2554 B, C. *T. capitata*, *Herb. Roxb.* *Tomex tetranthera* & *sebifera*, *Willd. Sp. Pl.* ii. 839, 840. *Sebifera glutinosa*, *Lour. Fl. Coch.* ii. 783. *Laurus involucrata*, *Koenig in Retz. Obs.* vi. 27. *Gaja nippeli*, *Jones in Asiat. Res.* iv. 303.—Widely distributed.

Var. 2. *glabraria*; leaves usually larger more ovate and acute usually more tomentose beneath. *L. glabraria* & *lævis*, *Juss. in Ann. Mus.* vi. 212. *L. geminata*, *Blume Bijl.* 564. *L. platyphylla*, *Pers. Synops.* *Tetranthera geminata*, *glabraria* & *platyphylla*, *Nees Syst. Laurin.* 559, 569, 570. *T. citrifolia* & *tersa*, *Spreng. Syst. Veg.* ii. 266, 267. *T. apetala*, *Wall. Cat.* 2554, in part. *T. polyccephala*, *Wall. mss.* *T. laurifolia*, *Nees in Wall. Pl. As. Rar.* ii. 66 and iii. 30, and *Syst. Laurin.* 519; *Benth. Fl. Austral.* v. 305. *T. litoralis*, *Blume Mus. Bot.* i. 375, and *B. glabrescens*, *Meissn. in DC. Prodr.* xv. 1. 180. *T. laurifolia*, vars. *citrifolia*, *platyphylla* & *attenuata*, *Blume l. c.* 374, and (including var. *longifolia*) *Meissn. l. c.* 179. *Glabraria tersa*, *Linn. Mant.* 276. *G. tersa* & *litoralis*, *Miquel Fl. Ind. Bat.* i. 941, 943.—Widely distributed.

Var. 3. *tomentosa*; leaves ovate or oblong acute and branches densely softly tomentose on both surfaces or sparingly above. *Tetranthera tomentosa*, *Nees in Wall. Pl. As. Rar.* ii. 65, and *Syst. Laurin.* 511 (not of *Roxb.*). *T. laurifolia*? *Wall. Cat.* 2550 C.—Western Himalaya; Sirmore, *Wallich*; Kumaon and Garwhal, alt. 2-3000 ft. Birma and Tenasserim, *Wallich*, &c.—Except by the compound umbels this is undistinguishable from *L. tomentosa*, and favours the view taken by Dalzell and Gibson, that *tomentosa* and *sebifera* are forms of one species.

7. *L. ligustrina*, *Nees in Wall. Pl. As. Rar.* ii. 65, and *Syst. Laurin.* 513, 677 (*Tetranthera*); glabrous or the shoots pubescent, leaves 3-4 in. persistent alternate penninerved shortly petioled elliptic oblong or obovate obtuse or acute shining and reticulated above, nerves 6-8 pair, umbels solitary or clustered many-fld., bracts glabrous, perianth very incomplete or 0. *Tetranthera ligustrina*, *Nees*; *Meissn. in DC. Prodr.* xv. 1. 180; *Wight Ic.* t. 1835; *Wall. Cat.* 2555 C, E. *T. celastroides*, *Miq. in Pl. Hohenack.* n. 1336.

DECCAN PENINSULA; on the Ghats, from the Nilghiri Hills and southward.

A bush or small tree, similar at first sight to states of *L. sebifera*, but more glabrous, leaves always small, with very fine reticulation above, shorter petioles rarely $\frac{1}{2}$ in., and simple umbels, with slender pedicels and glabrous bracts. *Filaments* villous. *Fruit* not seen.—The Ceylon plant referred here by Thwaites is the following.

8. *L. undulata*, *Hook. f.*; branchlets petioles and inflorescence hoary pubescent, leaves 3-6 in. alternate penninerved coriaceous linear-oblong obtuse glabrous except the midrib beneath, margins waved, umbels solitary and clustered stoutly pedicelled, bracts pubescent, perianth very incomplete. *Tetranthera ligustrina*, *Thwaites Enum.* 254, not of *Nees*.

CEYLON; in the Central Province, *Walker, Macrae*.

Branches robust. *Leaves* 1-1 $\frac{1}{2}$ in. broad, shining and not reticulated above, pale grey-brown beneath, nerves 10-12 pair, slender; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., at length

glabrous. *Umbels* globose, $\frac{1}{2}$ – $\frac{1}{3}$ in. diam.; pedicels $\frac{1}{2}$ in. *Stamens* villous. *Fruit* not seen.—Possibly a form of *L. ligustrina*.

9. **L. membranifolia**, *Hook. f.*; branches stout, shoots petioles leaves beneath and umbels hoary-pubescent, leaves 8–12 by 4–6 in. alternate penninerved very membranous oblong-obovate obtuse or apiculate green when dry hardly glaucous beneath, nerves 10–14 pair slender, cross nervules strong beneath, umbels solitary large long-pedicelled, bracts 4 hoary, flowers numerous pedicelled, perianth incomplete.

UPPER ASSAM; Mishmi Hills, and woods at Yen, *Griffith* (*Kew Distrib.* 4310).

A medium-sized tree; bark of branches smooth, red-brown. *Leaves* with cuneate bases, obscurely pubescent between the nerves, very thin. *Umbels* (flowering) 1 in. diam.; pedicel as long, slender; flowers and pedicels villous. *Sepals* 3 or more, unequal, small. *Filaments* very slender, $\frac{1}{4}$ in. long, sparsely villous.—Possibly an extreme form of *L. sebifera*, but most dissimilar.

Sect. III. **Conodaphne**, *Blume*. *Leaves* persistent, alternate or opposite, penninerved. *Perianth-segments* usually 6, equal or subequal, rarely unequal; tube not or slightly enlarged in fruit, except *L. Blumii*. (The fruit and fruiting perianth-tube are known in very few species referred to this section by Blume and Meissner. Some of the following are possibly referable to Sect. *Cylicodaphne*.)

* *Leaves opposite or subopposite (sometimes alternate on the same specimen).*

10. **L. lancifolia**, *Roxb. ex Wall. Cat.* 2532 (*Tetranthera*) (not *T. lanceafolia* of *Fl. Ind.*); branches slender finely tomentose, leaves opposite and alternate 3–8 in. thin shortly petioled penninerved oblong or elliptic-oblong or -lanceolate acute or acuminate glaucous beneath, nerves 6–8 pair, umbels few small in usually very shortly pedicelled clusters villously tomentose, bracts 6 3-fld., fruit globose on the very minute flat perianth-tube. *T. lancifolia*, *Roxb.*; *Nees in Wall. Pl. As. Rar.* ii. 65, and *Syst. Laurin.* 509; *Meissn. in DC. Prodr.* xv. 1. 194; *Miquel Fl. Ind. Bat.* i. 944 (excl. var. ϵ . and syn. *Roxb. Fl. Ind.*). *T. chrysantha* and *T. pusilla*, *Blume Mus. Bot.* i. 376. *T. attenuata*, *Wall. Cat.* 2534, in part.

TROPICAL EASTERN HIMALAYA; from Bhotan to Mishmi, *Griffith*. SILHET and KHASIA MTS., ascending to 3000 ft., *Wallich*, &c. TENASSERIM, *Griffith*, &c.—DISTRIB. Borneo.

A bush or small tree; pubescence grey or rusty. *Leaves* very variable in size, drying grey or red-brown, not coriaceous, young finely tomentose beneath, smooth above with impressed nerves, nervules faint beneath; petiole $\frac{1}{10}$ – $\frac{1}{3}$ in. *Clusters* $\frac{1}{2}$ in. diam.; umbels very small and shortly pedicelled, in bud $\frac{1}{2}$ in. diam.; flowers $\frac{1}{10}$ in. diam. *Sepals* very unequal, villous. *Stamens* about 6, usually shorter than the sepals, but very unequal. *Fruit* $\frac{1}{2}$ in. diam., apiculate.—Meissner's vars. *glaucophylla*, *pusilla*, *borneensis* and *alternifolia* offer no constant characters; his var. ϵ . appears to be *L. oblonga*.

Var. *pedicellata*; pedicels very slender $\frac{1}{2}$ in. long, branches less tomentose.—Tenasserim or Andaman Islands, *Helfer* (*Kew Distrib.* 4306).

Var. *alternifolia*, *Meissn.* l. c.; leaves mostly alternate more glabrous.—Sikkim Himalaya, *J. D. H.* (*Herb. Ind. Or., Tetranthera*, No. 15).

11. **L. gracilipes**, *Hook. f.*; quite glabrous, leaves opposite and subopposite 4–5 in. penninerved thinly coriaceous pale elliptic- or oblong-lanceolate acute or subacute smooth above beneath obscurely reticulate and

when dry with close impressed points, nerves 5-7 pair very slender and oblique, umbels few in a cluster 3-4-fld. pedicel filiform.

MALACCA, *Griffith* (*Kew Distrib.* 4311).

Branchlets slender; bark brown, smooth. *Leaves* $1\frac{1}{4}$ - $1\frac{1}{2}$ in. broad, nerves above very obscure; base very acute; petiole $\frac{1}{4}$ - $\frac{1}{3}$ in. *Umbels* (male) about $\frac{1}{4}$ in. when expanded; pedicels $\frac{1}{3}$ - $\frac{1}{2}$ in.; bracts 4, minutely puberulous, as are the sessile flowers. *Sepals* 4-6, spatulate, membranous, ciliate. *Stamens* 10, filaments slender, glabrous; anthers short. *Ovary* 0. *Perianth-tube* after flowering (when $\frac{1}{12}$ in. long) clavate, truncate, with a contracted mouth.—A very distinct plant, of which more specimens are much wanted. The leaves are attacked by a species of fungus like that of *L. chartacea*. The pedicels of the umbels do not seem to thicken after flowering, but they are too young to judge from.

12. **L. Blumii**, *Nees in Wall. Pl. As. Rar.* ii. 65; branches stout and leaves beneath and umbels rusty-tomentose, leaves opposite 6-12 in. pinninerved rigidly coriaceous linear-oblong obtuse or acute smooth above obscurely reticulate beneath with 8-15 pair of very strong arched nerves, umbels many clustered very shortly pedicelled 6-8 fld., fruit ellipsoid half sunk in the large hemispheric truncate quite entire warted very shortly pedicelled perianth-tube. *L. ferruginea*, *Blume Bijl.* 561. *Cylicodaphne ferruginea*, *Meissn. in DC. Prodr.* xv. 1. 207. *Actinodaphne Blumii*, *Nees Syst. Laurin.* 598. *Tetranthera fulva* *B. rigida* in part, *Meissn. l. c.* 195. *Lepidadenia ferruginea*, *Miq. Fl. Ind. Bat.* i. pt. 1, 935.

MALACCA, *Griffith, Maingay, &c.*—DISTRIB. JAVA.

A tree; branches rather stout. *Leaves* very rarely subopposite, 2-3 $\frac{1}{2}$ in. diam., above smooth, usually yellow-green with faintly-impressed nerves and recurved margins, base acute or cuneate; petiole stout, $\frac{1}{2}$ -1 in. *Umbels* (female) $\frac{1}{2}$ in. diam. when expanded; bracts 4, coriaceous; flowers small, tomentose. *Sepals* oblong, densely silky-tomentose. *Stamens* (in sketch in Wight's Herb. from Griffith's specimens) 12, all imperfect, hairy, of 1st and 2nd row hairy, 2-glandular with the anthers produced into a ligula. *Ovary* with a slender erect style and lobed stigma. *Fruit* 1 in. long; cup of perianth $\frac{3}{4}$ in. diam., edge of mouth acute.—That this is *Litsæa ferruginea* of Blume is nearly certain from comparison with a named specimen from Blume in the Hookerian Herbarium. Meissner describes the fruit as globose and the perianth-tube as flat with a torn margin, characters foreign both to Miquel's description of the fruit, and to that of the Malaccan plant. The species is omitted in Blume's revision of the *Litsæas*, &c., in *Mus. Bot. Lugd. Bat.*

13. **L. sessiliflora**, *Hook. f.*; branches stout and leaves beneath and inflorescence rusty-tomentose, leaves 8-12 in. opposite pinninerved very shortly petioled oblong-lanceolate acuminate rugose above, nerves 16-20 pair very strong beneath with raised cross-nervules, umbels axillary sessile 3-fld., flowers sessile, perianth villous, fruit small globose seated on the persistent 6-lobed perianth.

PENANG; on Government Hill, *Maingay*.

A tree, 10 feet high (*Maingay*); branchlets as thick as a goose-quill, densely tomentose. *Leaves* bifarious, coriaceous, rusty-brown, above glabrous except the tomentose midrib with deeply sunk nerves, beneath red brown; petiole $\frac{1}{6}$ in., very stout. *Umbels* appressed to the axils, solitary or crowded, $\frac{1}{4}$ in. diam.; bracts 4, scarious, villous. *Sepals* subequal, obtuse. *Stamens* 9, shorter than the perianth; filaments short, villous, 3 inner 2-glandular; anthers short. *Ovary* and style glabrous. *Fruit*, young size of a pea, seated on the stellate perianth.—A very remarkable species, with the habit of *L. Blumii*, but a very different fruit and with rugose leaves.

**. *Leaves alternate, glabrous beneath or nearly so.*

14. **L. Wallichii**, *Hook. f.*; quite glabrous, leaves alternate 4-18 in.

penninerved thinly coriaceous elliptic-oblong-ovate or -lanceolate acuminate exquisitely reticulate on both surfaces subglaucous beneath, nerves strong 4-6 pair, umbels axillary solitary or clustered, bracts membranous glabrous 4-fld., stamens glabrous, fruit small ovoidly globose on the persistent 6-lobed perianth. *Lindera nervosa*; *Kurz For. Fl.* ii. 308. *Tetranthera chartacea* P., *Wall. Cat.* 2531 B. T. chartacea, β . ? *nervosa*, *Meissn. in DC. Prodr.* xv. 1. 186 and 513. *Laurin.*, *Wall. Cat.* 7531, the right-hand specimen.

EASTERN TROPICAL HIMALAYA; Bhotan, *Griffith (Kew Distrib.* 4290). BURMA; at Amherst, *Wallich*. ARACAN and TENASSERIM, *Kurz*, &c.

A tree; branches quite smooth. *Leaves* coriaceous, but flexible, shining, pale brown or greenish above when dry, largest 20 by 9 in., the reticulations between the nerves extremely fine, base acute obtuse or (in Bhotan specimens) rounded; nerves beneath slender but prominent, often reddish, petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Umbels* few, $\frac{1}{2}$ in. diam., pedicel $\frac{1}{4}$ - $\frac{1}{2}$ in.; bracts caducous; male flowers small, glabrous within and without, subsessile. *Sepals* oblong. *Stamens* 9, 3 inner 2-glandular, anthers oblong. *Ovary* 0 or imperfect, with a slender style and small stigma. *Fruit* $\frac{1}{2}$ in. long, pedicel $\frac{1}{10}$ in., thick.—A very handsome species.

15. **L. mishmiensis**, *Hook. f.*; branches black and leaves quite glabrous, leaves 4-6 in. alternate penninerved long-petioled thinly coriaceous oblong-lanceolate acuminate base acute smooth above pale brown beneath, nerves 12-16 pair very slender, umbels solitary axillary and on short leafy branches long-pedicelled 10-15-fld., bracts caducous and long-pedicelled flowers pubescent or tomentose.

UPPER ASSAM; Mishmi Hills at Laim-Planj-thaya, *Griffith*.

A large tree, branches smooth; buds silkily tomentose. *Leaves* $1\frac{1}{2}$ -2 in. diam., not rigid, faintly irregularly reticulated beneath; petiole slender, $\frac{1}{2}$ - $\frac{3}{4}$ in. *Umbels* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; pedicel $\frac{1}{2}$ in., pubescent, not stout; bracts 4-5, very concave, coriaceous; pedicels of flowers $\frac{1}{2}$ - $\frac{3}{4}$ in., and base of male perianth white-tomentose. *Sepals* 6, small, oblong. *Stamens* 9, 3 inner 2-glandular; filaments short, glabrous, anthers square. *Ovary* minute; style slender, stigma small. *Fruit* unknown.—Quite unlike any other species in the long pedicels of the male flowers, whence the inflorescence resembles a *Lindera*.

16. **L. assamica**, *Hook. f.*; branches and leaves glabrous or the latter faintly puberulous beneath, leaves 4-6 in. alternate penninerved thinly coriaceous greenish when dry very shortly petioled elliptic acuminate at both ends smooth above faintly reticulate and pale beneath with 6-10 very slender nerves, umbels axillary solitary and fascicled 4-fld., bracts 4 glabrous, sepals 6, stamens 9 very villous below. *Tetranthera rangoonensis*, *var. assamica*, *Meissn. in DC. Prodr.* xv. 1. 188.

ASSAM plains, *Jenkins*, *Griffith (Kew Distrib.* 4309).

Branches rather slender, terete, pale, tips petioles and nerves beneath of very young leaves puberulous. *Leaves* 1-2 in. broad, very symmetrical in all the specimens, but varying greatly in size, narrowed into the very short ($\frac{1}{2}$ - $\frac{3}{4}$ in.) petiole, hardly shining above. *Umbels* few and scattered (probably the specimens are not in good flower), $\frac{1}{2}$ in. diam.; pedicel about as long; bracts very concave; flowers very small, shortly pedicelled, $\frac{1}{12}$ in. diam., villous at the base without and within, as are their pedicels. *Sepals* oblong. *Stamens* exerted, filaments villous, 3 2-glandular; anthers oblong. *Fruit* unknown.

17. **L. venulosa**, *Meissn. in DC. Prodr.* xv. 1. 187 (*Tetranthera*); quite glabrous, branches very slender, leaves 3-4 in. alternate penninerved very membranous oblong-lanceolate obtusely caudate-acuminate glaucous beneath, nerves 6-12 pair very slender, umbels 3-5-fld. male solitary, fem. often racemed, peduncle and pedicels very slender. *Myristica glaucescens*, *Wall. Cat.* 6790.

SOUTH DECCAN, *Heyne, Wight*. Tinnevely Hills, alt. 3-4000 ft., *Beddome*.

An evergreen straggling bush; bark brownish. *Leaves* greenish when dry, quite smooth above, loosely reticulate beneath, base acute; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., slender. *Umbels* $\frac{1}{4}$ in. diam.; pedicel $\frac{1}{4}$ - $\frac{1}{2}$ in.; common peduncle in fem. $\frac{1}{2}$ in. or less; flowers quite glabrous. *Sepals* 5 or 6, oblong, unequal, very transparent and gland-dotted. *Stamens* in the male 10, filaments glabrous, 6 2-glandular; anthers nearly square, gland-dotted; outer stamens of fem. with small subspatulate heads, inner short with large glands. *Ovary* ovoid, tapering into the slender style; stigma large, discoid. *Fruit* unknown. —Very closely allied to *Tetr. gemelliflora*, Miquel, of Java, which has a remarkable oblong fruit nearly 2 in. long seated on the unaltered perianth-tube; it is possibly a variety of it.

18. **L. firma**, *Blume Mus. Bot.* i. 381 (Tetranthera); branches glabrous, leaves 3-7 in. alternate penninerved red-brown when dry rigidly coriaceous oblong or obovate smooth above beneath minutely pubescent with 10-12 pairs of very strong arching nerves and slender parallel cross-nervules, male umbels 5-fld., pedicels sometimes on a very short peduncle, perianth densely villous, sepals narrow unequal. *Meissn. in DC. Prodr.* xv. 1. 190; *Miquel Fl. Ind. Bat.* i. 950.

MALACCA, *Maingay (Kew Distrib.* 1271).—DISTRIB. Borneo, Celebes.

An evergreen tree or bush; branches woody, bark wrinkled when dry and quite glabrous. *Leaves* 3-7 in., very hard when dry, pale or dark red-brown, not reticulate above, often redder beneath; base acute or narrowed into the smooth glabrous petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. long. *Male umbels* very numerous, axillary and at the old leaf-scars, $\frac{1}{2}$ in. diam., pedicels $\frac{1}{8}$ - $\frac{1}{4}$ in.; bracts 4, pubescent. *Stamens* 9-16, 3-6 2-glandular. *Ovary* filiform or 0. *Fruit* not seen.

*** *Leaves alternate, pubescent or tomentose beneath.*

19. **L. grandis**, *Wall. Cat.* 2552 (Tetranthera); branches very stout, and leaves beneath densely brown-tomentose, leaves 8-16 in. alternate penninerved very thickly coriaceous and hard brown when dry oblong or obovate-oblong obtuse smooth above beneath with 12-16 pairs of very strong spreading nerves and strong parallel cross-nervules, petiole very stout, male umbels large 5-7-fld. in sessile fascicles or corymbose on a very stout peduncle, sepals long narrow subequal silky. *Tetranthera grandis*, *Meissn. in DC. Prodr.* xv. 1. 188; *Kurz For. Fl.* ii. 299. *Polyadenia grandis*, *Nees in Wall. Pl. As. Rar.* ii. 62, and *Syst. Laurin.* 574.

PEGU and TENASSEERIM, *Kurz*. PENANG, *Porter*. MALACCA and SINGAPORE, *Maingay*.

A tree, 20-40 ft., with warted bark (*Kurz*). *Leaves* large, hard, 3-7 in. broad, nerves impressed above, tip often rounded; base obtuse or rounded; petiole very stout, 1-2 in. *Male umbels* numerous, rather silkily tomentose, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., in bud as large as a pea; pedicels $\frac{1}{2}$ in.; bracts 5, coriaceous. *Sepals* linear-elongate. *Stamens* 12-14, anthers short, 3-4-glandular. *Fruit* unknown.—I do not know Meissner's *β. javanica* (*T. multiflora*, Zoll.), nor have I found amongst Wallich's plants specimens of *L. grandis* from Birma (as cited by Meissner). A Bornean plant of Beccari (Sarawak n. 2537) closely resembles this; it is in bud only.

20. **L. polyantha**, *Juss. in Ann. Mus.* vi. 211; branches and leaves beneath pubescent or tomentose, leaves 3-16 in. alternate penninerved chartaceous broadly or narrowly oblong ovate or obovate tip obtuse rounded or apiculate glabrous above strongly reticulate beneath base acute rounded or cordate, nerves 5-10 pair, umbels 5-6-fld. clustered and subcorymbose on a short peduncle, bracts 4-5, fruit globosely ellipsoid on a very small perianth-base. *L. monopetala*, *Pers. Synops.* ii. 4. *Tetranthera monopetala*, *Roarb. Cor. Pl.* ii. 26, t. 148, and *Fl. Ind.* iii. 821; *Nees in Wall. Pl. As. Rar.* ii.

66, and *Syst. Laurin.* 525; *Blume Mus. Bot.* i. 378; *Meissn. in DC. Prodr.* xv. 1. 189; *Miquel Fl. Ind. Bat.* i. 948; *Brand. For. Fl.* 380, t. 45; *Kurz For. Fl.* ii. 299; *Gamble Man. Ind. Timb.* 310. *T. macrophylla*, *Wall. Cat.* 2549. *T. alnoides*, *Miquel Pl. Jungh.* 180, and *Fl. Ind. Bat.* l. c. 948. *T. fruticosa* & *verticillata*, *Herb. Ham.* ? *T. semecarpifolia*, *Wall. Cat.* 6345 A. *T. hexantha*, *Sieb. Fl. Maurit.* 92. *Tomex pubescens*, *Herb. Willd.*

From PANJAB and the SALT RANGE along the foot of the HIMALAYA ascending to 3000 ft., eastwards to ASSAM and southwards to the SATPURA RANGE (*Brandis*). CO ROMANDEL (*Roxburgh*), TENASSERIM and PENANG. (*Not in Ceylon*).—DISTRIB. Java, China (introd. in Mauritius).

An evergreen bush or small tree, 20–40 ft.; branches rather stout. *Leaves* extremely variable, the largest (*Ava, Wallich*) 16 by 9 in., usually rusty-brown when dry, rarely green, glossy above; nerves strong beneath; petiole $\frac{1}{2}$ –1 in. *Umbels* (unopened $\frac{1}{2}$ in. diam.) densely tomentose, stoutly pedicelled. *Perianth* 5–6-partite. *Stamens* 9–13, filaments hairy. *Ovary* in ♂ 0, or with a slender style and small stigma. *Fruit* $\frac{1}{4}$ – $\frac{1}{2}$ in.—*Brandis* gives South India and Ceylon as habitats, but I have seen no Peninsular specimens, and the only authority for Ceylon is an unnamed scrap of Thwaites (*C. P.* 326), for which he gives no locality, and was probably not of his own collecting. *Wallich's semecarpifolia* (*Cat.* 6345 A) is, I think, this, but the specimen is a very bad one.

21. **L. amara**, *Blume Bijl.* 563; branches and leaves beneath rusty-tomentose rarely glabrate, leaves 4–6 in. alternate penninerved shortly petioled coriaceous brown elliptic or elliptic-lanceolate acute smooth above beneath reticulate with 8–15 pair of very strong nerves, umbels tomentose males clustered or very shortly racemose, females clustered sessile, perianth densely villous, sepals small narrow very unequal, fruit ovoid or elliptic on the very small calyx-tube. *Tetranthera amara*, *Nees Syst. Laurin.* 551; *Kurz For. Fl.* ii. 299; *Blume Mus. Bot.* i. 379; *Miquel Fl. Ind. Bat.* i. 949; *Meissn. in DC. Prodr.* xv. 1. 190. *T. fruticosa*, *Nees l. c.* 543. *T. capitulata*, *Miquel Pl. Jungh.* i. 182, and *Fl. Ind. Bat.* l. c.

MALAY PENINSULA; from Pegu southwards to PENANG and MALACCA, *Griffith, Maingay (Kew Distrib.* 1276).—DISTRIB. Sumatra, Java, Borneo, Celebes.

An evergreen shrub or small tree, very variable in pubescence. *Leaves* rather hard when dry, usually shining above with fine impressed nerves, base acute or obtuse; petiole $\frac{1}{2}$ – $\frac{1}{3}$ in. *Inflorescence* very variable; umbels $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., pubescent or hirtellous; males sometimes merely clustered in the axils, at others corymbose or racemose on a short stout peduncle; pedicels very variable $\frac{1}{10}$ – $\frac{1}{2}$ in., stout or slender, hirtellous or tomentose, as are the bracts. *Sepals* small, narrow, very unequal, almost obscured by the long villous hairs. *Stamens* 8–10, filaments villous, at length longer than the sepals, 3 inner 2-glandular; anthers short. *Ovary* in male 0, in female with a slender style and small discoid sub-2-lobed stigma. *Fruit* $\frac{1}{2}$ in. long, very shortly stoutly pedicelled; perianth-base disciform, truncate or obscurely 6-lobed or -toothed.—A very variable plant, of which there are many forms in the Archipelago.

Var. *fusco-tomentosa*, *Meissn.* l. c.; branches and leaves beneath villously rusty-tomentose. (Vars. *puberula* & *pubescens*, *Herb. Maingay (Kew Distrib.* 1251 and 1251/2), and var. *velutina*, *Herb. Griff.*, *Kew Distrib.* 4293.)

Var. *angusta*, *Meissn.* l. c.; branches and leaves beneath very finely pubescent or almost glabrous, umbels on slender fascicled pedicels $\frac{1}{2}$ – $\frac{1}{2}$ in. long. *Tetranthera angusta*, *Wall. Cat.* 6344; *Nees in Wall. Pl. As. Rar.* iii. 30, and *Syst. Laurin.* 641.—Pegu to Tavoy, *Helfer (Kew Distrib.* 4294 and 4304), *Griffith (Kew Distrib.* 4295).

22. **L. rangoonensis**, *Meissn. in DC. Prodr.* xv. 1. 187 (excl. var. β .) (*Tetranthera*); branches leaves beneath and inflorescence finely rusty-tomentose, leaves 4–6 in. alternate penninerved thinly coriaceous green when dry oblong-lanceolate acuminate smooth above base rounded beneath finely reticulated with 10–14 pair of strong nerves, male umbels small axillary clustered 4–5-fld., perianth densely villous, sepals small very unequal.

PEGU; at Rangoon, *McClelland*. TENASSERIM, *Beddome*.

Very closely allied to *L. amara*, differing in the green very acuminate leaves; the perianth is quite the same, as are the 8 stamens, 3 of which are 2-glandular. The female, however, seems distinct in resembling the male, in being pedicelled, and having a large discoid stigma. *Fruit* unknown.—*Meissner's* *β. assamica* is a totally distinct plant (*L. assamica*, nob.), with slender nerves and leaves puberulous beneath.

23. **L. Kurzii**, *King in Herb. Calcutt.*; branches stout leaves beneath and inflorescence shortly brown-tomentose, leaves 6–10 in. alternate penninerved pale coriaceous oblong or oblanceolate-oblong acute or acuminate smooth and minutely reticulate above beneath with 12–18 pair of very strong rather spreading nerves and strong parallel cross-nervules, male umbels axillary in clusters 5-fld., perianth densely villous, sepals large unequal.

ANDAMAN ISLANDS, *Kurz*, &c.

An evergreen tree? *Leaves* glabrous above except the midrib, with the nerves impressed, base acute or rounded; petiole $\frac{1}{2}$ –1 in., stout. *Umbels* $\frac{1}{2}$ in. diam.; bracts rather thin, sparsely tomentose; flowers densely villous without and within. *Perianth-lobes* much larger than in *L. amara*, and less unequal. *Stamens* 6–10, 3 2-glandular. *Fruit* unknown.

Sect. IV. **Cylicodaphne**, *Nees* (gen.). *Leaves* persistent, alternate (rarely opposite in *L. Wightiana*), penninerved. *Perianth-segments* usually 6, tube much enlarged disciform or cupular in fruit.—See also *L. Blumei*. (The fruit is known in most of the species; but not in most of the previous section, species of which may hence prove to be referable to this.)

* Umbels solitary or fascicled, rarely corymbose; if racemose, the peduncle or rachis is very short. (Some species of the racemose section have the raceme occasionally reduced to an umbel, as *L. Stocksii*, *Wightiana* and others.)

† Leaves more or less pubescent or tomentose beneath.

24. **L. khasyana**, *Meissn. in DC. Prodr.* xv. 1. 185 (*Tetranthera*); branchlets leaves beneath and inflorescence finely pubescent, leaves 6–12 in. alternate penninerved oblong or oblong-lanceolate pale above white or glaucous beneath with 10–15 pairs of very strong nerves and slender cross-nervules, umbels 6–8-fld. fascicled or subracemose on a very stout peduncle, fruit oblate much broader than the turbinate fleshy perianth-tube. *Tetranthera glauca*, var.? *Herb. Ind. Or. H. f. & T.*

KHASIA Mts.; on Ladder Hill, near Churra, alt. 2–4000 ft., *J. D. H. & T. T.*

A tree; branches long, rather stout. *Leaves* 2–4 in. broad, above greenish and quite smooth with impressed nerves, beneath white or rather rusty, at length glabrous, base acute; petiole about $\frac{1}{2}$ –1 in., at first tomentose. *Umbels* shortly stoutly pedicelled, flowering $\frac{1}{2}$ in. diam.; bracts 4; peduncle $\frac{1}{4}$ – $\frac{1}{2}$ in. *Sepals* silky without, glabrous within. *Stamens* (young) 7–9, glabrous. *Ovary* 0 in male, or very minute. *Fruit* 1 in. diam., greatly depressed, broadest above the middle, $\frac{1}{2}$ in. diam., $\frac{1}{2}$ in. long with the pedicel.

Var. *Hookeri*; umbels larger, pedicel stouter, swollen perianth-tube as broad as the fruit which is larger. *L. khasyana*, *Herb. Calcutt.* *Tetranthera Wightiana*? *Herb. Ind. Or. H. f. & T.* *Cylicodaphne*? *Hookeri*, *Meissn. l. c.* 209, excl. var. *β.*—Sikkim, alt. 6000 ft., *King*, *Kurz*. Assam, Mishmi Hills, *Griffith* (*Kew Distrib.* 4286, 4287). Khasia Mts., at Churra and Amwee, alt. 3–4000 ft., *J. D. H. & T. T.*

25. **L. martabanica**, *Kurz For. Fl.* ii. 301; branchlets and leaves beneath densely tomentose, leaves 4–8 in. alternate penninerved coriaceous

long-petioled pale elliptic-ovate or lanceolate acuminate, nerves 5-7 pair strong beneath with cross-nervules and conspicuous reticulations, male umbels 4-5 fld. solitary stoutly pedicelled, bracts 5-6, perianth-tube tomentose, fruit oblong seated on the thickened cupular or truncate very shortly pedicelled perianth-tube. *T. calophylla*, *Kurz in Journ. As. Soc. Beng.* 1873, ii. 102.

TENASSERIM and MARTABAN; in the drier hill forests, alt. 4-6000 ft., *Kurz*.

A tree, 25-35 ft.; branches rather stout, pale. *Leaves* in the male plant $3\frac{1}{2}$ -4½ in., almost ovate, in the fem. 8 in. and elliptic-lanceolate and caudate-acuminate, above yellow green when dry with impressed nerves, beneath grey or pale rusty-brown and shortly tomentose; petiole $\frac{1}{2}$ -1 in. *Male umbel* apparently always solitary, female shortly racemose (umbels sometimes in short corymbose peduncled racemes, *Kurz*); bracts broad, concave, coriaceous; flowers sessile. *Sepals* membranous, oblong, obtuse. *Stamens* 9, glabrous, 3 inner 2-glandular. *Fruit* $\frac{1}{2}$ in. long, perianth-cup $\frac{1}{2}$ in. broad, and with the pedicel about as long.—The foliage resembles *Lindera bifaria*.

26. ***L. semecarpifolia***, *Wall. Cat.* 6345 B (*Tetranthera* ?); branchlets petioles leaves beneath and umbels tomentose or pubescent, leaves 6-7 in. alternate penninerved rigidly coriaceous obovate or obovate- or elliptic-oblong obtuse or subacute, beneath pale brown with 6-10 pairs of strong nerves and transverse nervules, umbels 6-fld. clustered subracemously on a short stout peduncle, flowers large $\frac{1}{4}$ in. diam., fruit depressed globose seated on the large entire puberulous turbinate cup-shaped shortly thickly pedicelled perianth-tube. *Tetranthera semecarpifolia*, *Wall.*; *Nees Syst. Laurin.* 559; *Kurz For. Fl.* ii. 303; *Meissn. in DC. Prodr.* xv. 1. 198.

EAST BENGAL, *Griffith (Kew Distrib.* 4284). BURMA, *Wallich, Griffith.* MARTABAN, *Kurz.*—DISTRIB. Munnipore.

A tree, 25-30 ft. (*Kurz*); branchlets tawny-pubescent. *Leaves* $2\frac{1}{2}$ -5 in. broad, above green or brown smooth with impressed nerves, beneath grey brown or purplish. *Umbels* tomentose, about $\frac{1}{2}$ in. broad in flower; bracts 4 (perhaps more); male flowers about 6, sessile, $\frac{1}{4}$ in. diam. when open. *Sepals* free to the base, linear-oblong, pubescent without and within, very unequal. *Stamens* about 8, very unequal, pubescent. *Ovary* (in the male) 0, or with a stout style and decurved discoid stigma. *Fem. fl.* smaller, with a thick funnel-shaped calyx-tube and very small lobes. *Fruit* $\frac{3}{4}$ in. diam., perianth-tube as broad, very thick, quite entire, with the very stout pedicel $\frac{3}{4}$ in. long.—Under *L. polyantha* it is stated that *Wallich's* 6345 A is probably that plant.

27. ***L. elongata***, *Wall. Cat.* 2546 (*Tetranthera*); branchlets and leaves beneath rusty-tomentose, leaves alternate penninerved oblong or elliptic-lanceolate obtuse acute or acuminate, nerves 5-20 pair strong beneath with strong cross-nervules and conspicuous reticulations, umbels 4-5-fld. usually solitary peduncled, bracts coriaceous very unequal strongly ciliate, fruit oblong seated on the thickened expanded usually lobed pedicelled perianth-tube. *Daphnidium* ? *elongatum*, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 620; *Meissn. in DC. Prodr.* xv. 1. 231. *Tetranthera sikkimensis*, *Meissn. l. c.* 181, in part.

TEMPERATE and SUBTROPICAL HIMALAYA; Garwhal, *King*; Nepal, *Wallich*; Sikkim alt. 6-8000 ft., *J. D. H.*, &c. Bhotan, *Griffith.* KHASIA MTS., alt. 5-6000 ft., *Griffith*, &c.

A bush or small tree, branches rather stout. *Leaves* exceedingly variable, rarely obovate or oblanceolate, longest 9 by 2 in. and caudate-acuminate, average 4-5 by 1-1½; broadest 8 by 3 in. with rounded or subacute tips, base acute, rarely obtuse or rounded; petiole stout, $\frac{1}{2}$ -¾ in. *Umbels* very rarely clustered; males $\frac{1}{2}$ -¾ in. diam. in flower, fem. smaller; pedicel $\frac{1}{2}$ -1 in., stout or slender; flowers silkily villous. *Sepals* 4-6, membranous, oblong, obtuse. *Stamens* 8-12, filaments villous with long

hairs, sometimes $\frac{1}{4}$ in. long and very slender; anthers oblong. *Ovary* in male fl. minute; in fem. glabrous with a stout style and discoid stigma. *Fruit* $\frac{1}{2}$ in. long; perianth-base about $\frac{1}{3}$ in diam. with the thickened pedicel $\frac{1}{3}$ – $\frac{1}{2}$ in. long.—The leaves are so variable in shape and size, that I have difficulty in sorting the specimens into varieties thereby. A small-leaved state from Bhotan, Griffith, and Sikkim alt. 8000 ft., has rounded bases to the leaf. The only Garwhal specimen I have seen has sessile clustered umbels. In the *Genera Plantarum* this species is inadvertently (under *Lindera*, Sect. 3, v. iii. p. 163) referred to the section *Eulitsæa*, but the perianth is very well developed, and its tube much enlarged; it is therefore a good *Cylicodaphne*. It is very easily confounded with *Lindera assamica* and states of *L. bifaria*.

28. **L. nukulanea**, *Kurz in Journ. As. Soc. Beng.* 1873, ii. 102, and *For. Fl.* ii. 301; branchlets petioles and leaves beneath softly tomentose or sublanate, leaves 5–6 in. alternate penninerved thinly coriaceous obovate or obovate-oblong to oblong-lanceolate acute, base acute beneath glaucous reticulated and with 6–8 pair of rather slender nerves, umbels subsessile, fruit oblong mucronate pale yellow longer than the large subhemispheric truncate nearly smooth shortly peduncled cup. *Cylicodaphne Hookeri*, var. *siamensis*, *Meissn. in DC. Prodr.* xv. 1. 209.

TENASSERIM, *Kurz*; on Molyet, alt. 6000 ft., *Gallatly (in Herb. Calcutt.)*.—DISTRIB. Siam.

A shrub; branchlets slender. *Leaves* 2–3 $\frac{1}{2}$ in. diam., very softly tomentose beneath, above green and smooth with impressed nerves; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* unknown. *Fruit* about $\frac{3}{4}$ in. long, cupular perianth-tube $\frac{2}{3}$ in. diam., warted.—The fruit of this a good deal resembles in its colour and mucronate top that of the plant named *T. lata* in *Herb. Calcutt.* (not the true *lata*), which has lobed cups and longer petioles.

29. **L. coriacea**, *Heyne in Wall. Cat.* 2556 (*Tetranthera*); branchlets leaves beneath and umbels finely pubescent, leaves 4–6 in. alternate penninerved coriaceous elliptic-ovate or lanceolate acute or acuminate at both ends greenish above beneath at length glabrous brown and reticulated, nerves 6–10 pair, umbels 4-fld. small crowded subsessile, fruit small oblong seated on the enlarged cupular shortly pedicelled truncate perianth-tube. *Tetranthera coriacea*, *Heyne*; *Meissn. in DC. Prodr.* xv. 1. 186. *T. micrantha*, *Meissn. l. c.* 183.

DECCAN PENINSULA, *Heyne*; Courtallam, *Wight (Kew Distrib.* 2532).

Branches rather slender, bark pale. *Leaves* very variable in breadth, 1–2 $\frac{1}{2}$ in., red-brown beneath, transverse nervules obscure; petiole very short, $\frac{1}{2}$ – $\frac{1}{4}$ in. *Umbels* $\frac{1}{4}$ in. diam., when flowering, appressed to the branch in a small globose head; pedicel elongating a little in fruit; bracts 4, silky. *Male fl.* funnel-shaped, silky below. *Sepals* small, glabrous. *Stamens* 12, apparently glabrous; glands of those opposite the sepals very large. *Ovary*, if present, slender, with an erect small stigma. *Fruit* (unripe) $\frac{1}{4}$ in. long, obtuse, perianth-tube $\frac{1}{3}$ in. broad, with the thickened pedicel sometimes $\frac{1}{2}$ in. long.

30. **L. Hookeriana**, *Meissn. in DC. Prodr.* xv. 1. 188 (*Tetranthera*); branchlets very stout and leaves beneath densely softly brown-tomentose, leaves 4–6 in. alternate penninerved thickly coriaceous elliptic or obovate obtuse beneath not reticulate, nerves 6–8 pair, petiole very stout, male umbels 8–12-fld. subsilky or nearly glabrous, pedicel slender. *L. nemoralis* in part, *Trimen. Syst. Cat. Ceyl. Pl.* 76.

CEYLON, *Gardner*.

Branches with pale bark, and large scars of fallen leaves (mossed in the specimens). *Leaves* remarkably coriaceous, 2–2 $\frac{1}{2}$ in. diam., smooth and pale brown above with faintly impressed nerves and a puberulous costa which is very stout beneath, not

reticulated beneath under the pubescence; petiole $\frac{1}{2}$ in. *Umbels* axillary and at the leaf-scars, in bud $\frac{1}{8}$ in. diam., obscurely pubescent; pedicel $\frac{1}{2}$ in., slender; bracts concave; flowers (very young) funnel-shaped, silky below without and within. *Sepals* oblong, glabrous, small. *Stamens* 6, apparently glabrous. *Fruit* and fem. fl. unknown.—A well-marked plant (totally distinct from *T. nemoralis*), of which only two specimens are known, both in young flower; so the above character will probably require modification. Its nearest ally is *L. longifolia*.

31. ***L. longifolia***, *Nees Syst. Laurin.* 528 (Tetranthera); branchlets leaves beneath and umbels rusty-tomentose, leaves 6–12 in. alternate penninerved coriaceous elliptic elliptic-lanceolate or obovate obtuse acute or acuminate, beneath strongly reticulate, nerves 6–10 pair, umbels densely clustered shortly peduncled about 10-fl., fruit small globose seated on the expanded concave thickened perianth-tube. *L. cauliflora*, *Moon Cat. Tetranthera longifolia*, *Nees ex Meissn. in DC. Prodr.* xv. l. 188 (excl. var. β .); *Thwaites Enum.* 255 (excl. var. γ .).

CEYLON; common in the Central Province, alt. 4–7000 ft.

A small sparingly branched tree (*Thwaites*). *Leaves* very variable in size, the largest 7 in. broad, brownish green when dry and often harshly pubescent above, reticulations beneath broad, base acute or rounded; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in., stout. *Umbels* in flower $\frac{1}{2}$ in. diam.; bracts 4, subequal; flowers rusty-tomentose, villous below. *Sepals* unequal, sometimes antheriferous. *Stamens* 12, filaments slender hairy, inner anthers short sometimes 2-celled. *Fruit* about $\frac{1}{2}$ in. diam., much broader than the entire perianth-tube.—The name *longifolia* is not appropriate. Meissner's var. β . *nitida*, from Moulmein, is unknown to me. *Thwaites' var. γ .* is *L. glaberrima* (*T. nervosa* *B. chartacea*, Meissner.)

32. ***L. nemoralis***, *Thwaites Enum.* 255; branchlets petioles and leaves beneath densely rusty-villous or tomentose, leaves 1–2 ft. alternate penninerved linear- or elliptic-lanceolate acuminate, nerves 12–15 pair strong and spreading beneath, umbels small clustered glabrous or very sparsely hairy.

CEYLON; about 21 miles from Galle, alt. 1000 ft., under large forest trees, *Gardner, Thwaites*.

A bush, 10–12 ft.; stem erect or sparingly branched; branches robust. *Leaves* 3–4 in. broad, not thickly coriaceous, green above when dry with tomentose midrib, almost woolly, loosely reticulate and pale beneath between redder villous nerves; petiole 1–2 in., very stout. *Flowers* and *fruit* not seen.—Most of the above description is from *Thwaites*, who says in a note that he has never found flowers or fruits, but that the former were found by *Gardner*. It is a noble species, and quite unlike any other.

†† Leaves glabrous beneath or nearly so. (See also *L. Stocksii*.)

a. *Species of the Himalaya, Assam, Khasia and Silhet.*

33. ***L. salicifolia***, *Roxb. ex Wall. Cat.* 2536 (Tetranthera); glabrous or branches and leaves beneath hoary, leaves 3–12 in. alternate penninerved chartaceous broadly or narrowly elliptic or oblong acute or acuminate usually glaucous beneath, nerves 8–15 pair, umbels clustered glabrous rarely hoary 4–6-fl., pedicels short, stamens villous, fruit ellipsoid, perianth-tube hardly enlarged or small and cup-shaped. *T. salicifolia*, *Roxb.*; *Nees in Wall. Pl. As. Rar.* ii. 66 and 30, and *Syst. Laurin.* 534. *T. glauca*, *Wall. Cat.* 2533; *Meissn. in DC. Prodr.* xv. l. 185 (excl. var. δ .); *Nees ll. c.* 66 and 531; *Kurz For. Fl.* ii. 300. *T. laurifolia*, *Roxb. in Wall. Cat.* 2535 (not of *Fl. Ind.*). *T. attenuata*, *Wall. Cat.* 2534; *Nees in Wall. l. c.* ii. 6 and iii. 30, and *Syst. Laurin.* 533. *T. lanceæfolia*, *Roxb. Fl. Ind.* iii. 822; *Kurz*

For. Fl. ii. 300 (*lancifolia*). *T. salicifolia* & *saligna*, *Herb. Ind. Or. H. f. & T.*

NORTHERN and EASTERN INDIA; from Oude and Nepal to Sikkim (ascending to 6000 ft.). Assam, Bengal, Chittagong and Pegu.

An evergreen bush or small tree; branches never very stout, bark dark or black. *Leaves* very variable, pale brown or darker above when dry, smooth and usually obscurely reticulated above, nerves beneath strong with faint nervules; petiole $\frac{1}{2}$ –1 in. *Umbels* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., nerves corymbose, glabrous or hoary. *Stamens* 6–9, usually very short, with villous filaments. *Fruit* $\frac{1}{2}$ in. long, purple-black; perianth-tube variable in size, but always small and narrower than the base of the ripe fruit, and rarely cupular as in *L. oblonga*, from which it is hardly distinguishable.—I have vainly endeavoured to arrange the many forms of this protean plant under the varieties proposed by Meissner, the characters of which are chiefly taken from the reticulation and hoariness of the foliage. Of Nees' var. γ . *laevigata*, which is Meissner's var. δ ., from Courtallam, Wight, I know nothing. The following marked forms are united by intermediates.

Var. 1. *ellipsoidea*, Meissn.; branches hoary, leaves large 4–12 in. broadly elliptic or oblong passing into lanceolate glaucous beneath, petiole often 1 in., umbels sessile in dense subglobose heads.—Sikkim, Assam, Khasia, Silhet.—The type of Wallich's *glauca*.

Var. 2. *elongata*, Meissn.; branches hoary or glabrous, leaves narrower, petiole often long, umbels on stout pedicels more loosely clustered.—Assam, Khasia and Silhet.—I suppose this to be Meissner's var. as named; his locality of Penins, Ind. *Hb. Wight*, founded on an Assam specimen in Herb. Wight.

Var. 3. *attenuata*, Meissn.; branches quite glabrous, leaves subdistichous about 6 by $1\frac{1}{2}$ in. linear-oblong acute shining above brown beneath, petiole short, umbels in globose clusters.—Assam, Silhet, &c.—This is Wallich's *T. attenuata* (Cat. 2534 A.).

Var. 4. *laurifolia*; branches hoary, leaves subdistichous 3–5 by $\frac{3}{4}$ –1 in. linear-oblong obtuse or acute brown and glabrous or grey and hoary beneath, petiole short, umbels loosely clustered, pedicels short slender.—Common in Assam, Khasia, Silhet and Bengal, from the Sunderbunds to Chittagong.—This is *T. laurifolia*, Herb. Ham., and Wallich's *T. salicifolia*, Herb. Roxb. (Cat. 2536), and *T. angustifolia* of Gamble (Man. Ind. Timb. 311). It is very similar to *L. angustifolia*, Wall., but has fewer nerves and broader leaves.

Var. 5. *polyneura*; leaves 5–10 in. elliptic-lanceolate acuminate polished above, nerves 12–16 pair.—Sikkim and Khasia, alt. 3–4000 ft.

Var. 6. *reticulata*; leaves 5–9 in. elliptic-lanceolate caudate-acuminate, upper surface reticulated with pale nervules under brown, stigma in male fl. very large discoid.—A small tree from the Myrung woods, Khasia. *T. salicifolia* in part, *Herb. Ind. Or. H. f. & T.*—This is probably a different species, but in the absence of fruit I hesitate to name it as such.

34. *L. oblonga*, Wall. Cat. 2542 (Tetranthera); glabrous or nearly so, leaves 4–7 in. alternate penninerved elliptic- or oblong-lanceolate subacute pale brown and subglaucous beneath with 8–10 pair of slender nerves and no cross-nervules, umbels in shortly peduncled corymbs or shortly racemose 3–6-fl., bracts and pedicels glabrous or hoary, fruit oblong base immersed in the small cupular perianth-tube. *Cylichodaphne oblonga*, Meissn. in DC. Prodr. xv. 1. 205, excl. var. Tetranthera oblonga, Nees in Wall. Pl. As. Rar. ii. 67, and Syst. Laurin. 551. ? *T. Doshia*, Don Prodr. 65. Tomex Doshia, Ham. mss.

NEPAL, Wallich. Assam and Khasia Mts., Jenkins, Griffith (Kew Distrib. 4300).

A shrub or small tree, so similar to *L. salicifolia*, that I suspect it to be only a more glabrous state of that plant with more corymbose inflorescence, rather larger umbels, and a longer narrower fruit, $\frac{3}{4}$ of an in. long.—Meissner's var. *Stocksii* is *L. Stocksii*, nob., and his var. *Griffithii* is *L. myristicæfolia*, Wall. This and *L.*

salicifolia are referable either to sect. *Conodaphne* or *Cylicodaphne*, according to the development of the perianth-tube.

Var. ? *albescens*; leaves shorter and broader nearly white beneath.—Outer ranges of the Sikkim Himalaya, alt. 4-6000 ft., J. D. H., Clarke.

35. **L. angustifolia**, Wall. Cat. 2537 (Tetranthera); nearly or quite glabrous, leaves 3-8 in. shortly petioled alternate penninerved narrowly linear-lanceolate acute or acuminate, nerves 15-30 pair, umbels simple chiefly axillary solitary or clustered glabrous, pedicels slender. *Tetranthera angustifolia*, Wall.; Meissn. in DC. Prodr. xv. 1. 183, in part. *T. saligna*, Nees in Wall. Pl. As. Rar. ii. 67, and Syst. Laurin. 539.

SILHET, De Silva. Chittagong, Clarke, Lister.—DISTRIB. Munnipore.

Branches slender, young hoary. Leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., dark brown when dry above, grey brown beneath, smooth, nerves slender; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. Umbels small, male $\frac{1}{2}$ in. diam., about 6 fld.; flowers nearly glabrous. Sepals oblong. Stamens 6-9, filaments sparsely hairy, hardly longer than the sepals. Fem. fl. and fruit not seen.—Wallich's specimens have very slender branches and leaves only 3-4 in. Meissner, misled by wrongly named specimens, has described the young fruit of another plant for that of this. The usually much longer narrow leaves with many nerves and slender pedicels of the umbels distinguish this from *L. salicifolia*. It is perhaps nearer to *L. oblonga*.

36. **L. Meissneri**, Hook. f.; quite glabrous except the bracts and flowers, leaves 3-5 in. alternate penninerved coriaceous narrowly elliptic-lanceolate obtusely subcaudate-acuminate pale finely reticulated on both surfaces subglaucous beneath, nerves 10-15 pair slender and raised above, umbels 4-fld. solitary shortly pedicelled, bracts 4 silky long ciliate coriaceous very unequal outer smaller, perianth 4-lobed, stamens 9. *Litsæa*? khasiana, Meissn. in DC. Prodr. xv. 1. 227. *Dodecadenia*? Herb. Ind. Or. H. f. & T.

KHASIA MTS.; near Churra and the Boga panee, alt. 4-5000 ft., J. D. H. & T. T.

Branches rather slender. Leaves $\frac{1}{2}$ -1 $\frac{1}{2}$ in. broad, very pale yellowish brown, smooth and almost shining above when dry, base acute, nervules raised beneath, but hardly transverse; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., slender. Umbels (male) $\frac{1}{2}$ in. diam., on stiff stout pedicels or subsessile; bracts very concave, whitish when dry, fringed with long brown hairs; flowers sessile, silky. Sepals membranous, broadly oblong. Stamens short, filaments hairy; anthers small, very short. Ovary imperfect, style hairy, stigma 2-lobed.—This is quite unlike any other species of either *Actinodaphne* or *Litsæa*, but is in some respects nearest *L. elongata* in the solitary umbels with unequal long ciliate bracts. I found specimens of a similar shrub at the coal-pits near Churra, in which the nerves are more numerous and spreading, and the very young umbels seem to be crowded on a very short peduncle.

37. **L. læta**, Wall. Cat. 2541 (Tetranthera); glabrous or nearly so, leaves 5-14 in. alternate penninerved coriaceous pale when dry elliptic- or linear-oblong or lanceolate acute glaucous beneath finely reticulate on both surfaces, nerves 5-8 pair, umbels 3-8-fld. large in sessile clusters usually long-pedicelled glabrous or hoary, bracts 4-5, stamens 9-12, fruit large globose seated on a large pedicelled turbinate perianth-tube. *Tetranthera læta*, Nees in Wall. Pl. As. Rar. ii. 67, and Syst. Laurin. 548 and 677; Meissn. in DC. Prodr. xv. 1. 186 (excl. var. γ ? *glauca*).

TROPICAL EASTERN HIMALAYA; Sikkim and Bhotan. ASSAM, KHASIA MTS. and SILHET, alt. 2-4000 ft., common.

A small tree; branches rather slender; shoots and young leaves beneath very finely pubescent. Leaves very variable in breadth, pale green or yellow above when dry, and white or very pale reddish beneath, base acute; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., stout in the larger

leaves. *Umbels* 3-10 in a cluster, in bud $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., usually finely hoary, sometimes tomentose or glabrous; pedicel $\frac{1}{4}$ -1 in., stout; flowers subsessile, about $\frac{1}{2}$ in. diam. *Sepals* oblong, subequal, nearly glabrous. *Stamens* very unequal and irregular as to glands, at length far exserted, filaments hairy. *Ovary* with a large discoid stigma. *Fruit* 1 in. diam.; perianth-tube fleshy, as is its large turbinate pedicel. —Meissner's *β. major* is only a large-leaved specimen; his *γ. glauca*, from Ceylon, is *L. glaberrima*, Thwaites. A plant called *T. læta* in Herb. Calcutt. from the Ryang River in Sikkim, alt. 2000 ft., differs remarkably in the fruit, which is $\frac{3}{2}$ in. long, oblong, mucronate, and nearly white; its fruiting perianth-tube is subcampanulate, $\frac{1}{2}$ in. diam., with a sinuately lobed mouth.

38. **L. Thomsonii**, Meissn. in DC. Prodr. xv. 1. 183 (Tetranthera); quite glabrous, leaves 5-7 in. alternate penninerved firmly coriaceous linear-oblong or elliptic-lanceolate acuminate pale brown above paler beneath with 6-10 slender nerves very obscurely reticulated, umbels in short subracemose corymbs, peduncles and pedicels short stout, young fruit globose. *Tetranthera læta*, Wall. ? Herb. Ind. Or. H. f. & T.

SILHET; near the station, J. D. H. & T. T.

A large tree; branches stout. *Leaves* 2-3 in. broad, base acute, hardly shining above, not glaucous beneath; petiole $\frac{1}{2}$ -1 in. long, stout. *Corymbs* axillary and in the leafless axils, rounded, about 1 in. diam.; pedicels spreading; pedicels of very young fruit clavate with the truncate perianth-tube of immature fruit $\frac{1}{4}$ in. diam., and globose; young fruit about $\frac{1}{2}$ in. —Apparently a very distinct plant, but having neither flower nor ripe fruit, it is not in a state for satisfactory description.

39. **L. chartacea**, Wall. Cat. 2531 (Tetranthera); quite glabrous except the inflorescence, branches slender, leaves 3-5 by $1\frac{1}{4}$ - $1\frac{1}{2}$ in. alternate penninerved thinly coriaceous elliptic-lanceolate acuminate pale subglaucous and reticulated beneath, nerves 6-8 pair slender, petiole very slender, female umbels small fascicled peduncled 6-8-fld., flowers stoutly pedicelled, fruit ellipsoid on a broad cupular perianth-tube. *Tetranthera chartacea*, Wall.; Meissn. in DC. Prodr. xv. 1. 186 (the Nepal plant only); Nees in Wall. Pl. As. Rar. ii. 67 and iii. 30, and Syst. Laurin. 546.

NEPAL, Wallich. SIKKIM; at Rishap, alt. 5500 ft., King.

A moderate-sized tree (King). *Leaves* finely reticulate between the nerves beneath, base acute; petiole $\frac{1}{2}$ in., more slender than in its allies. *Umbels* $\frac{1}{2}$ in. diam. when expanded, pedicels about as long, both finely fulvous-pubescent; bracts 4, rounded; flowers $\frac{1}{2}$ in. diam., coriaceous, funnel-shaped. *Sepals* small, very variable in shape and length. *Ovary* ovoid; style stout, stigma simple. *Fruit* $\frac{3}{4}$ in. long, obtuse, black when dry; cupular perianth-tube $\frac{1}{2}$ in. diam., rather suddenly narrowed into the thickened clavate peduncle, together $\frac{1}{2}$ - $\frac{3}{4}$ in. long. —Wallich's specimens from Nepal are males, King's from Sikkim are in fruit, but they appear conspecific; together they form very insufficient material. The small umbels and pale leaves with very slender petioles are the most prominent characters. The Sikkim plant referred to this by Meissner is *Dodecadenia paniculata*, with a very different flower and fruit. Of his Java plant (Zollinger 2853 b) I know nothing. His var. *β. ? nervosa* (Wall. Birm. Herb. 1463, from Amherst) is *L. Wallichii*, nob.

b. *Species of Pegu, the Eastern Peninsula, Penang and the Andamans.*

40. **L. leiantha**, Kurz For. Fl. ii. 300 (Tetranthera); quite glabrous, branches and leaves blackish when dry, leaves 4-6 in. alternate penninerved coriaceous elliptic obovate or obovate-oblong obtuse or subacute smooth above faintly reticulate beneath with 6-9 pairs of moderately stout nerves, umbels fascicled long-pedicelled glabrous 5-fld., bracts glabrous, perianth nearly glabrous.

ANDAMAN ISLANDS; Mount Harriet, in forests, Kurz.

Branches stout, smooth, young buds quite glabrous. *Leaves* 3-3½ in. broad; base acute or obtuse, rather unequal; petiole 1-2 in., stout, black. *Umbels* in bud as large as a small pea, pedicels ½ in., not very stout; bracts hardly coriaceous, 2 outer opposite, very concave, inner membranous; flowers sessile, sparsely hairy below. *Sepals* scarious, unequal, linear-oblong. *Filaments* hairy. *Ovary* of male minute, with a large stigma. *Fruit* unknown.—I have seen but one specimen, in bud, communicated by Dr. King; it much resembles (and is probably) *Tetr. elliptica*, Nees, of Java, and *T. nigricans* of Borneo, which latter has smaller cymose or subracemose umbels.

41. ***L. petiolata***, *Hook. f.*; branches and leaves glabrous, leaves 4-5 in. alternate long-petioled penninerved coriaceous pale brown when dry elliptic or oblong obtuse or subacute smooth above beneath minutely reticulate with 5-6 pairs of slender nerves, umbels below the leaves clustered very shortly pedicelled 5-fld., bracts 5 outer glabrous, sepals 6 with long lax hairs, stamens 9-10, filaments long slender villous.

MALACCA, *Maingay* (*Kew Distrib.* 1265).

Branches grey brown when dry, tips and young leaves glabrous. *Leaves* much like *L. leiantha*, but the petioles rather shorter and more slender, shining above, hardly glaucous beneath. *Umbels* ½ in. diam.; outer bracts hardly coriaceous, inner membranous slightly pubescent, innermost small; flowers on villous pedicels laxly clothed with long rufous flexuous hairs. *Sepals* linear-oblong, membranous. *Filaments* far exserted, 2 or more 2-glandular. *Ovary* (in male) rudimentary, filiform, with a very large discoid stigma. *Fruit* and *fem. fl.* unknown.—The long petioles are characteristic.

42. ***L. castanea***, *Hook. f.*; branchlets hoary, leaves 3-6 in. alternate penninerved hard coriaceous and dark brown when dry glabrous oblong or obovate-oblong obtuse very finely reticulate on both surfaces, base acute or obtuse, nerves 12-16 pair impressed above very strong beneath, umbels solitary clustered or corymbose on a very short peduncle 5-4-fld., pedicels stout, bracts 4 very coriaceous white-tomentose, stamens 10-15 villous.

MALACCA, *Maingay* (*Kew Distrib.* 1269).

Branches woody, dark grey brown, not stout. *Leaves* 1½-2½ in. diam., smooth but not shining above, paler brown beneath; petiole ¾-1 in., rather slender. *Umbels* ½ in. diam., pedicels as long; bracts very concave, persistent with involute margins when dry, glabrous within; flowers minute, sessile, ⅞ in. diam. *Sepals* 6, linear-oblong, or linear, obtuse, very unequal, villous. *Stamens* variable in number, filaments very slender, villous, 3-4 with small pedicelled glands; anthers short, broad. *Ovary* in fl. male 0. *Fruit* unknown.—This *Maingay* has referred to *Cylicodaphne obtusifolia*, Nees, of Java, which differs in the leaves being nerveless.

43. ***L. albicans***, *Kurz in Journ. As. Soc. Beng.* 1873, ii. 102, and *For. Fl.* ii. 303 (*Tetranthera*); glabrous except the shoots and inflorescence, leaves 6-10 in. alternate penninerved thinly coriaceous lanceolate or oblong-lanceolate shortly acuminate base narrowed beneath glaucous and reticulate, nerves 6-10 pairs slender, umbels clustered on a short peduncle, fruit in a large fleshy waved perianth-tube narrowed into a thick pedicel.

PEGU; in tropical forests on the Eastern slopes, *Kurz*.

A tree, 20-25 ft.; branches rather slender. *Leaves* 2-2½ in. broad, obscurely reticulate above, base very acute; petiole ½-¾ in. long. *Umbels* small.—I have seen only leaves and very young umbels. The description is almost wholly from *Kurz*.

44. ***L. penangiana***, *Hook. f.*; glabrous or nearly so, leaves 5-8 in. alternate penninerved coriaceous pale when dry elliptic-oblong obtuse or acute finely reticulate on both surfaces, nerves 5-8 pair, umbels in sessile

clusters hoary-pubescent 6-fld., bracts 4, fruit $\frac{1}{2}$ in. ellipsoid seated on the sessile hemispheric perianth-tube.

PENANG, *Phillips*; on Government Hill, *Maingay* (*Kew Distrib.* 1258/2).

Hardly distinguishable without the fruit from *T. lata*. - It is very closely allied to *Tetranthera sessiliflora*, *Meissn.*, *T. accedens*, Blume, *T. lucida*, Blume, and *T. diversifolia*, Blume, but the fruit is larger than in any of these. It may be the same as *T. tuberculata*, but that is described as having subglobose fruit.—In shape the cup of the fruit resembles *L. Blumii*, which differs in the opposite leaves.

45. **L. longipes**, *Meissn. in DC. Prodr.* xv. 1. 205 (Cylcodaphne); quite glabrous, leaves 6-8 in. alternate penninerved very coriaceous oblong obtuse pale above glaucous beneath with 6-10 pairs of slender nerves and very faint reticulations, umbels quite glabrous, fruiting perianth-tube 1 in. diam. hemispheric very fleshy, pedicel $1\frac{1}{2}$ in. long. *Tetranthera myristicæfolia*, *Wall.*; var. *longipes*, *Kurz For. Fl.* ii. 302.

TENASSERIM, *Helper* (*Kew Distrib.* 4281); *Mergui*, *Griffith*.

Branches rather slender, black when dry. Leaves 3-3 $\frac{1}{2}$ in. diam., when dry greenish above smooth and hardly shining, base acute; petiole $\frac{3}{4}$ -1 in. Umbels very young, quite glabrous. Fruit umbels axillary, peduncle much shorter than the pedicels, which are gradually thickened upwards; large perianth-tube very rugose when dry.

46. **L. myristicæfolia**, *Wall. Cat.* 2548 (*Tetranthera*); quite glabrous, leaves 3-9 in. alternate penninerved oblong or elliptic-oblong or lanceolate rarely obovate obtuse or acute beneath brown or glaucous with 6-10 pairs of very faint nerves, umbels numerous 4-6-fld. quite glabrous in peduncled clusters or corymbs, fruit small globose immersed in the cupular fleshy shortly pedicelled perianth-tube. *Cylcodaphne myristicæfolia*, *Meissn. in DC. Prodr.* xv. 1. 208; *Kurz For. Fl.* ii. 102 (in part). *C. oblonga*, var. γ . ? *Griffithii*, *Meissn. l. c.* 205. *Lepidadenia Griffithii*, *Wight Ic. t.* 1846. *Diospyros* ? *acuminata*, *Wall. Cat.* 4129.

PEGU, *Kurz*. TENASSERIM, at Tavoy, *Wallich*. PENANG, *Porter*. MALACCA, *Griffith*, *Cumming*, *Maingay*.

A small tree; branches woody. Leaves very variable in size and form, but uniform in texture, drying dark or light-coloured, above quite smooth, not shining; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., rather stout. Umbels, flowering $\frac{1}{2}$ in. diam.; pedicels rather slender, $\frac{3}{4}$ -1 in.; bracts 4-6, coriaceous, 6-fld. (4-fld., *Kurz*). Sepals 6, glabrous, obscurely lobed or toothed. Stamens 10-12, quite glabrous. Fruit $\frac{1}{2}$ in. diam.; perianth-tube clavate, $\frac{1}{2}$ in. diam., very fleshy, rugose when dry, narrowing into the very fleshy clavate pedicel, together $\frac{1}{2}$ - $\frac{3}{4}$ in. long.—This and the preceding are almost the only species of this section with quite glabrous umbels. *Kurz*, who unites them as varieties describes the fruit as obovate-globular, of the size of a small cherry, and the thick fleshy entire smooth cup as $\frac{3}{4}$ in. diam. *Meissner's* var. β . *tavoyana* is the form with short leaves, and var. *acutata* the narrower more acute leaved one. The Canara plant referred to the latter is *L. Stocksii*, nob.

47. **T. Helfer**, *Hook. f.*; glabrous, leaves 3 in. alternate penninerved very coriaceous ovate or elliptic-ovate acuminate smooth and brown when dry above beneath pale brown with 4-6 very slender nerves and very faint reticulations, umbels solitary pedicelled 4-fld., bracts 4 glabrous outer largest, sepals 6 glabrous, stamens 12.

TENASSERIM (or Andaman Islands), *Helper* (*Kew Distrib.* 4307).

Branches woody; bark rough, whitish. Leaves very finely acuminate, margins slightly recurved when dry, base acute; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., very slender. Umbels (male) about $\frac{1}{2}$ in. diam.; bracts black when dry; pedicel $\frac{1}{2}$ in., slender, decurved. Sepals subequal. Filaments quite glabrous except at the base; anthers short. Ovary

not seen. *Fruit* unknown.—A very distinct species, of which the materials are scanty.

c. *Species of Ceylon.*

48. **L. glaberrima**, *Thwaites Enum.* 255 (Tetranthera); glabrous or nearly so, branches slender, leaves 2-7 in. alternate penninerved thinly coriaceous greenish when dry oblong-lanceolate or oblanceolate acuminate smooth above very finely reticulate (rarely puberulous) beneath with 6-8 pair of very strong arched nerves that form large loops within the margin lowest pair shortest, umbels in very short racemes or fascicles 4-fld., bracts 4-5 glabrous, fruit oblong seated on the small dilated cup-shaped perianth-tube. *Tetranthera nervosa*, *Meissn. in DC. Prodr.* xv. 1. 187. *T. longifolia* var. γ , *Thwaites l. c.* *T. læta*, var. γ . ? *glauca*, *Meissn. l. c.* 187. *Cylicodaphne Thwaitesii*, γ . *angustata*, *Meissn. l. c.* 208.

CEYLON; in the Central Province, alt. 4000 ft., *Walker, &c.*

A small tree; branches glabrous or puberulous. *Leaves* variable in size, opaque above, glaucous or not beneath, base acute or obtuse; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., glabrous or puberulous. *Umbels* few, $\frac{1}{2}$ in. diam.; pedicel short, slender; common peduncle, if present, not $\frac{1}{2}$ in. long; outer bracts very concave, membranous, innermost narrow; flowers shortly pedicelled; pedicels silkily villous, as are the perianth-tube and bases of the sepals. *Sepals* unequal, membranous, linear-oblong, sparsely hairy, villous at the base within. *Stamens* 8; filaments very slender, hairy; anthers broad, 2 or 3 2-glandular. *Ovary* in male a slender minute column with no stigma. *Fruit* $\frac{1}{2}$ in. diam.; base of perianth as broad, on a thickened pedicel.—The remarkable nervation distinguishes this. *Meissner's T. nervosa* vars. α . and β . are individuals only.

49. **L. ovalifolia**, *Thwaites Enum.* 256 (Tetranthera); quite glabrous, branches robust, leaves 2-4 in. alternate penninerved rather long-petioled thickly coriaceous brown when dry broadly oblong orbicular or elliptic rarely ovate-lanceolate rounded at both ends or base acute, very finely reticulate beneath with 6-10 very faint free nerves, umbels clustered very shortly stoutly pedicelled 5-6-fld., bracts 4 pubescent, sepals 6 (4-8), fruit subglobose seated on the thickened cupular perianth-tube. *Lepidadenia ovalifolia*, *Wight Ic. t.* 1839. *Cylicodaphne Thwaitesii*, *Meissn. in DC. Prodr.* xv. 1. 208, var. α . only.

CEYLON; Central Province, alt. 2-7000 ft., *Walker, &c.*

A tree, 30-40 ft.; branches rather rough. *Leaves* very variable, rigid, flat, above smooth or shining with very obscure nerves, beneath pale or dark brown opaque or rather shining with a stout midrib, base rarely cordate; petiole stout, $\frac{1}{4}$ - $\frac{3}{4}$ in. *Umbels* sometimes clustered on a short stout peduncle, $\frac{1}{2}$ in. diam.; bracts very coriaceous; flowers on short villous pedicels. *Sepals* 6 in the flowers I have examined (4-8 according to Thwaites), oblong, glabrous. *Stamens* 9-12 (8-16 or more, Thwaites), inner 2-glandular; filaments short, sparsely hairy; anthers broad. *Fruit* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. in a large fleshy shortly stoutly pedicelled almost hemispheric cup.—Some specimens from Walker, doubtfully referred to *Cylicodaphne Gardneri* by Meissner, have elliptic leaves with the surface convex above between the deeply sunk nerves, and correspondingly concave beneath; others, as Thwaites' C.P. No. 10 and 351, are exactly intermediate between this and *L. iteodaphne*. I refer here Thwaites' C.P. 2487, which has longer petioles than *L. iteodaphne*.

50. **L. iteodaphne**, *Thwaites Enum.* 255 (Tetranthera); glabrous except the pubescent umbels, leaves alternate penninerved coriaceous shortly petioled oblong or linear-oblong and obtuse or linear-lanceolate and acuminate smooth above beneath finely reticulate glaucous or not, nerves 6-10 pair very slender, umbels small few or solitary clustered 4-5-fld., pedicels

very short and usually stout, sepals usually 4, fruit oblong on the small cupular swollen perianth-tube. ? *Tetranthera iteodaphne*, *Nees Syst. Laurin.* 542. *Cylicodaphne Thwaitesii*, *Meissn. in DC. Prodr.* xv. 1. 208 (*excl. var. a. ovalifolia*).

CEYLON; in the Central Province, ascending to 6000 ft., *Walker, &c.*

A very puzzling plant, of which the specimens are not sufficient for a full description. I am uncertain as to its being the *T. iteodaphne* of Nees, whose description is insufficient, and who further describes the sepals as 6, and the bracts as strigose. I find only 4 sepals, and rarely more than 8 stamens. Thwaites sends three forms.

1. Leaves 3-4 by 1-1½ in. oblong or narrowly oblong obtuse or acute dark brown above when dry, base acute obtuse or rounded.—Adams Peak (C.P. 10, 357, 729, 2605). *Cylicodaphne Walkeri*, *Meissn. l. c.* This approaches *L. ovalifolia*, Thw.

2. Leaves 3-5 in. oblong-lanceolate acute or acuminate pale above more so and almost glaucous beneath, petiole very short.

3. Leaves 4-6 by ¾-1 in. linear lanceolate acuminate pale on both surfaces, petiole short, male umbels solitary on slender pedicels ½ in. long, fem. fruiting perianth smaller. Var. β., Thwaites (C.P. 360). *C. iteodaphne γ. angustata*, *Meissner l. c. in part.*

Another form, sent by Walker only, has leaves 5-6 by 1 in., oblong-lanceolate, grey-brown beneath with often 12-15 pairs of more conspicuous nerves.—I assume it to be *T. Walkeri*, *Meissn.* Thwaites' numbers are very confusing, because of the badness of most of the specimens, and because those in different herbaria are attached to dissimilar specimens. I have hence not quoted some of them, or Meissner's references to them. C.P. 729 in *Herb. Hook.* is quite undeterminable: probably referable to var. 2.

** Umbels racemed.

† Leaves quite glabrous beneath (except *L. Stocksii*). (See also *L. Gardneri*.)

51. ***L. glabrata***, *Wall. Cat.* 2543 (*Tetranthera*); quite glabrous except the silkily hoary inflorescence, leaves 5-7 in. alternate penninerved coriaceous linear- or elliptic-oblong or -lanceolate acute or acuminate faintly reticulate beneath with 10-12 pairs of nerves, male in racemes 3-5 in. long 6-fld., pedicels long. *Tetranthera* ? *glabrata*, *Wall.*; *Nees in Wall. Pl. As. Rar.* ii. 67, and *Syst. Laurin.* 560; *Meissn. in DC. Prodr.* xv. 1. 197. *Laurus salicifolia* ? *Wight mss.*

DECCAN PENINSULA; Dindygul Hills, alt. 3000 ft., *Wight.*

Very near *L. Panamonia*, and perhaps only a variety of that plant, or rather of its Tenasserim larger umbelled form; but the flowers, which are in bud only, are densely silky (not tomentose), the racemes less tomentose, the stamens more hairy; and in the absence of developed flowers and fruit I hesitate to unite them. Their foliage is very similar, but the umbels of the Deccan plant are rather larger.

52. ***L. nitida***, *Roxb. ex Wall. Cat.* 2540 (*Tetranthera*); quite glabrous; leaves 4-10 in. alternate penninerved thinly coriaceous oblanceolate or obovate-oblong tip rounded retuse or subacute, faintly loosely reticulate beneath with 10-14 pair of very slender nerves, male umbels long-pedicelled 4-5-fld. in slender glabrous racemes 2-4 in. long, female racemes much shorter, fruit ellipsoid sunk in the enlarged subspherical shortly pedicelled perianth-tube. *Tetranthera nitida*, *Roxb.*; *Nees in Wall. Pl. As. Rar.* ii. 67 and iii. 31, and *Syst. Laurin.* 556; *Kurz For. Fl.* ii. 302. *T. Baula*, *Herb. Ham.* *Cylicodaphne nitida*, *Meissn. in DC. Prodr.* xv. 1. 203.

EASTERN HIMALAYA; Bhotan, *Griffith.* ASSAM, near Goalpara, *Hamilton.* SILHET, *Wallich.* PEGU, at Rangoon, *Wallich, McClelland.*

A timber tree; branchlets woody, angular, bark pale. Leaves 2-3 in. broad, much

narrowed towards the base, pale brown when dry, above smooth with slender raised nerves; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., stout. *Male racemes* axillary and below the leaves, numerous, rachis and pedicels very slender, the latter often $\frac{3}{4}$ in.; umbels quite glabrous; bracts rather membranous; flowers sessile. *Perianth-tube* turbinate, silky; sepals 4 nearly glabrous, very unequal. *Stamens* about 14, filaments slender hairy. *Female racemes* 1 in. long; umbels shortly pedicelled; flower not seen. *Fruit* (unripe) apparently sunk in the globose or at length hemispheric smooth perianth-tube, which with its short pedicel is about $\frac{1}{2}$ in. long; edge of mouth thin, obscurely lobed; ripe fruit "oblong 6–7 lines long seated in the 3–5-cleft large fleshy cup," Kurz.—The raised nerves of the upper surface of the dried leaves is in contrast to those of the three last species.

53. **L. Maingayi**, *Hook. f.*; quite glabrous except the umbels, leaves 7–16 in. alternate very long-petioled penninerved rigidly coriaceous oblong or oblanceolate obtuse or acute, nerves 10–18 pair strong beneath with transverse nervules, male umbels in racemes 5–6 in. long hoary 6-fld. long-pedicelled.

MALACCA, *Maingay* (*Kew Distrib.* 1264, 1273).

Branches woody, bark blackish when dry. *Leaves* 2–5 in. broad, brownish and shining above with impressed nerves, paler beneath and finely reticulated between the rather distant nervules; base narrowed; petiole 2 in., slender. *Racemes* from below the leaves, numerous; rachis rather slender, arched or drooping, nearly glabrous; umbels in bud globose, $\frac{1}{2}$ in. diam., expanded $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; bracts 4, coriaceous, concave, subequal, white and hoary; pedicel $\frac{1}{2}$ – $\frac{3}{4}$ in. long; flowers pedicelled. *Perianth* with a funnel-shaped tube, tomentose, sepals 6–8. *Stamens* about 12, filaments long slender glabrous; anthers linear-oblong. *Ovary* sunk in the tube of the perianth (imperfect). *Fruit* unknown.

54. **L. Panamonja**, *Ham. in Wall. Cat.* 2553 (*Tetranthera*); quite glabrous except the tomentose racemes, leaves 5–12 in. alternate penninerved coriaceous oblong or lanceolate acuminate reticulate beneath between the 10–12 pair of slender nerves, male umbels in racemes 5–7 in. long 6-fld. long-pedicelled, female in shorter racemes. *Tetranthera Panamonja*, *Ham.*; *Meissn. in DC. Prodr.* xv. 1. 197; *Kurz For. Fl.* 302. *T. Panamanja*, *Nees in Wall. Pl. As. Rar.* ii. 67, and *Syst. Laurin.* 561 and 677; ? *Wight Ic.* t. 1836.

ASSAM Plains, *Wallich*, &c. TENASSERIM frequent, *Griffith*, *Kurz*.

A large tree; young shoots puberulous. *Leaves* firmly coriaceous, 2–3½ in. broad, pale brown when dry, rarely oblanceolate, base acute or cuneate; petiole $\frac{1}{2}$ –1 in. *Racemes* solitary or in pairs from below the leaves, slender, drooping; umbels in bud globose, $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., tawny-tomentose; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in.; bracts 4, subequal, coriaceous, concave; flowers 6, sessile. *Perianth* tomentose, tube funnel-shaped; sepals 6, oblong. *Stamens* hirsute at the base. *Stigma* dilated. "*Fruit* broader than long, almost didymous, size of a pea, 2-seeded, seated on an entire small cup-like expansion of the perianth-base," Kurz.—The description of the fruit is from Kurz; that it is called 2-seeded is no doubt an oversight. The Tenasserim specimens (var. *β. longiracemosa*, *Meissn. l. c.*) have longer racemes and larger flowers than the Assam ones. In Herb. Wight there is a plant in very young flower, figured in his *Icones* (t. 1836), from Courtallam, called *T. Panamanja*, which differs much in habit from that species. The leaves are very coriaceous elliptic acute shining above, petiole $\frac{1}{2}$ in.

55. **L. oleoides**, *Meissn. in DC. Prodr.* xv. 1. 195 (*Tetranthera*); quite glabrous except the tomentose racemes, branches very stout, leaves 3–4 in. alternate penninerved very coriaceous elliptic tip obtuse or rounded base acute beneath not glaucous faintly reticulate with 8–10 pair of slender nerves, petiole stout, male racemes short erect, umbels shortly pedicelled, fruit globose seated on the broad turbinate subsessile perianth-tube.

NILGHIRI MTS.; at Sispara, *Wight, Gardner*.

Apparently a robust shrub, or tree, with erect leaves greenish above and hardly glaucous beneath, and branches as thick as a goose-quill. The very young racemes are axillary, erect, 1 in. long, with a stout rachis and very shortly stoutly pedicelled umbel, much too young for analysis. *Fruiting racemes* 1-2 in. long, rachis stout, pedicels of umbels short and thick; pedicel and perianth-tube together forming a broadly obconic or turbinate cup $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. with an entire or lobed thin margin.—Meissner describes this as having opposite or subopposite leaves, but I find them opposite only on very young shoots. Possibly an extreme form of *L. Wightiana*.

56. *L. Stocksii*, *Hook. f.*; glabrous except the silky-tomentose inflorescence, leaves 4-6 in. alternate penninerved coriaceous oblong-lanceolate or oblanceolate rarely obovoid acute or acuminate, glaucous and very finely but distinctly reticulate and sometimes puberulous beneath with 10-16 pairs of strong nerves, fem. umbels 6-8-fld. in stout suberect racemes 1-3 in. long, fruit ellipsoid seated on the entire or irregularly lobed turbinate thickly pedicelled perianth-tube. *Tetranthera lanceæfolia*, *Grah. Cat. Bomb. Pl.* 174. ♀ T. glauca, ♂ P. lævigata, *Nees Syst. Laur.* 677; *Meissn. l. c.* 185. *C. myristicæfolia*, var. *acutata*, *Meissn. l. c.* 209 (the Canara plant only).

The CONCAN and CANARA; on the Ghats and Mahableshwar Hills, *Gibson, Stocks, Ritchie, &c.*

Branches stout. *Leaves* 1-2 in. broad, often of a purplish or brown glaucous hue beneath, greenish above with impressed nerves; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Female umbels* shortly pedicelled, flowering nearly $\frac{1}{2}$ in. diam.; bracts 4, and flowers silvery silky. *Perianth-tube* oblong-turbinate in flower; stamens (of female) reduced to the 2 glands and a ligule. *Fruiting umbels* sometimes solitary or corymbose; fruit (unripe) $\frac{1}{2}$ in. long; perianth-tube nearly $\frac{1}{2}$ in. diam.—It is with great hesitation that I advance this as distinct from *L. Wightiana*, and on the other hand I am not quite satisfied whether or no *L. Stocksii* may not include two species, or that the synonymy of the three following forms is absolutely correct. Meissner evidently had the same difficulty as I have experienced in respect of these *Litsæas*.

1. *Stocksii proper*; leaves very minutely puberulous beneath.—Along with ellipsoid-fruited specimens of this from near Parwar Ghat, Ritchie sends detached fruits which are transversely oblong, 1 in. diam. *Tetranthera oblonga*, var. *Stocksii*, *Meissn. in DC. Prodr.* xv. 1. 205.

2. Var. *acutata*; leaves quite glabrous and more glaucous beneath, but reticulated as in *Stocksii proper*. *Cylicodaphne myristicæfolia*, var. *acutata*, *Meissn. l. c.* 209, in part. *Tetranthera lanceæfolia*, *Roxb.?*; *Grah. Cat. Bomb. Pl.* 171.

3. Var. *glabrescens*; leaves obovate-oblong rarely lanceolate very white and glaucous beneath with no or very obscure traces of reticulation.—*Cylicodaphne Wightiana*, var. *glabrescens*, *Meissn. l. c.* 201 (the plant of Stocks), and var. *acutata*, *Meissn. l. c.* 515.—Canara, *Stocks*. Nilghiri Hills, at Villa Cadoo, *Wight*.

†† *Leaves more or less pubescent beneath. (sometimes glabrous in L. Gardneri).*

57. *L. Gardneri*, *Thwaites Enum.* 255 (*Tetranthera*); nearly glabrous, branches robust, leaves 4-6 in. alternate penninerved thickly coriaceous oblong or broadly elliptic obtuse glabrous or hoary beneath with 8-10 pair of very strong nerves and transverse nervules reticulations very obscure, racemes short tomentose with stout rachis and pedicels, bracts silky, fruit oblong seated on a broad turbinate stoutly pedicelled perianth-tube. *Cylicodaphne zeylanica & rigida*, *Meissn. in DC. Prodr.* xv. 1. 201.

CEYLON; Central Province, alt. 4-6000 ft., *Thwaites*.

A tree, 40-50 ft.; branches as stout as a goose-quill. *Leaves* 1½-4 in. broad, brown when dry above with impressed nerves, paler beneath but not glaucous; base acute; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in., stout. *Racemes* 1-3 in. long, strict; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in.; umbels

5-fld., $\frac{1}{2}$ in. diam. when flowering; flowers silky. *Perianth* turbinate, glabrous within; 4-6-partite. *Stamens* usually 9. *Fruit* nearly globose, $\frac{1}{4}$ - $\frac{1}{2}$ in. broad (Thwaites); perianth-tube with the very thick pedicel $\frac{1}{4}$ -1 in. long, and $\frac{1}{2}$ in. diam.—Quite possibly a form of *L. Wightiana*. The flowers according to Thwaites are polygamous.

58. **L. Beddomei**, *Hook. f.*; branchlets midrib beneath and racemes pubescent, leaves 2-3 in. alternate penninerved coriaceous linear-oblong or lanceolate obtuse acute or acuminate silvery glaucous beneath with 8-10 pair of very faint and slender nerves, male racemes 1-2 in., bracts silvery 4-fld.

SOUTH DECCAN; Tinnevely Hills, *Beddome*.

Apparently a small bush; branches scarred. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, smooth and greenish above when dry with very faint nerves, obscurely reticulate beneath. *Racemes* 1-2 in., or less; pedicels $\frac{1}{2}$ in., male umbels $\frac{1}{2}$ in. diam. in flower; bracts coriaceous. *Perianth-tube* pubescent, lobes 6 membranous. *Stamens* 8; filaments short, glabrous.—A very distinct-looking small species, of which the specimens are insufficient for a full character.

59. **L. Wightiana**, *Wall. Cat.* 2557 (Tetranthera); branchlets leaves beneath and inflorescence more or less rusty-tomentose or villous, leaves 3-9 in. alternate penninerved coriaceous from oblong to elliptic-lanceolate obtuse acute or acuminate, brown beneath with 8-12 pair of strong nerves and reticulations, racemes stout 1-4 in., umbels stoutly pedicelled silky large 4-6-fld., fruit $\frac{1}{2}$ in. seated on the turbinate or hemispheric stoutly pedicelled entire or 6-toothed perianth-tube: *Cylichodaphne Wightiana*, *Nees in Wall. Pl. As. Rar.* ii. 68 and iii. 31; *Meissn. in DC. Prodr.* xv. 1. 200 and 515 (*excl. var. β . and γ .*); *Dalz. & Gibs. Bomb. Fl.* 222. ? *C. floribunda*, *Blume Mus. Bot.* i. 387; *Meissn. l. c.* Tetranthera *Wightiana*, *Bedd. Fl. Sylv.* 293.

Nilghiri and Travancore Hills, alt. 6-8000 ft., *Wight*, &c. CANARA, *Stocks*, *Dalzell*.

A rather large tree (*Wight*); branches robust. *Leaves* very variable in size and breadth, usually greenish above with impressed veins and light or dark brown beneath, rarely purplish and glaucescent; base acute; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., stout. *Racemes* suberect or spreading, rachis stout; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in., stout; umbels $\frac{1}{2}$ - $\frac{3}{4}$ in. broad when flowering; bracts 4, coriaceous. *Perianth* turbinate, tube and 6 lobes silkily tomentose. *Stamens* about 12, filaments hairy. *Stigma* discoid. *Fruit* as in *L. Stocksii*, but in the Canara specimens the mouth of the perianth-cup has 6 remote erect or spreading teeth.—I have under *L. Stocksii* and *Gardneri* stated my suspicions that they are forms of this very variable plant, as may be *L. ovalifolia*. *Meissner's vars. tomentosa* and *parvifolia* have no certain characters; his locality of Assam is founded on an erroneous label, and that of Ceylon refers to *L. Gardneri*.

60. **L. cordata**, *Jack in Mal. Misc. ex Calc. Journ. Nat. Hist.* iv. 356; branchlets leaves beneath and racemes rusty-tomentose, leaves 4-6 in. alternate penninerved thinly coriaceous broadly ovate-oblong cordate acute or acuminate, nerves 10-12 pair spreading with transverse nervules beneath, racemes slender axillary and in terminal panicles drooping, umbels 6-8-fld. *Tetranthera cordata*, *Jack ex Meissn. in DC. Prodr.* xv. 1. 196. *T. cordifolia*, *Meissn. l. c.* *T. Perrottetii*, *Blume Mus. Bot.* 384; *Meissn. l. c.*

MALACCA, *Griffith*.—DISTRIB. Sumatra, Philippines.

Branches black when dry. *Leaves* 3-4 in. broad, brown when dry and polished above with raised nerves and nervules, base always cordate, sometimes unequal; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., rather slender. *Racemes* 1-4 in., slender; pedicels $\frac{1}{4}$ in.; umbels in flower $\frac{1}{2}$ in.; bracts 4, nearly glabrous; flowers villous. *Sepals* 6. *Filaments* hirsute. *Fruit* in Philippine specimens $\frac{1}{2}$ - $\frac{3}{4}$ in. long, ellipsoid, seated on the turbinate

shortly thickly pedicelled perianth-tube, which is about $\frac{1}{2}$ in. diam. at the mouth.—Meissner's locality of "Penins. Ind. Or., Wight," is erroneous. Wight's specimen is from Griffith.

Sect. V. **Neolitsæa**, *Benth.* Leaves persistent, alternate, triple-nerved, sometimes subverticillate. Umbels in sessile clusters. Perianth-segments usually 4, deciduous, tube not or rarely enlarged in fruit. Stamens usually 6. Fruit small.—LITSÆA, *Nees*, *Meissner*. TETRADENIA, *Nees*. (I think *Tetradenia*, *Nees*, should be restored as a genus.)

61. **L. lanuginosa**, *Nees Syst. Laurin.* 634; leaves 5–12 in. alternate and whorled elliptic-lanceolate or oblanceolate acuminate triple-nerved softly thinly tomentose beneath soon glabrous and glaucous, bracts and flowers silky villous, fruit oblong. *Meissn. in DC. Prodr.* xv. 1. 221; *Brand. For. Fl.* 382; *Gamble Man. Ind. Timb.* 312. *Tetranthera lanuginosa*, *Wall. Cat.* 2561. *T. Cuipala*, *Don Prodr.* 65. *Tetradenia lanuginosa*, *Nees in Wall. Pl. As. Rar.* ii. 64. *L. ? Cuipala*, *Nees and Meissn.*

Outer HIMALAYA; from Kashmir, alt. 3000 ft., to Sikkim, alt. 6000 ft. (very rare in Garwhal). KHASIA MTS., *Herb. Griffith.*

A small tree, terminal buds often 1 in. long. Leaves variable in size, young densely clothed with long soft shining silky hairs, often 8–10 in a terminal whorl; basal nerves usually produced far beyond the middle, others 3–4 pair; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. Umbels in clusters nearly 1 in. diam., 4-fld., male fl. shortly pedicelled, fem. longer pedicelled. Filaments of inner stamen with long-pedicelled glands. Fruit $\frac{1}{2}$ in. long acute at both ends, pedicel thickened at the top but not swollen upwards.—I think this is certainly *Don's Tetr. Cuipala*.

62. **L. fuscata**, *Thwaites Enum.* 258; leaves 3–4 in. alternate and whorled coriaceous elliptic acuminate triple-nerved, beneath white or pale brown with appressed hairs at length glaucous, bracts and flowers villously silky or tomentose, fruit globose on the much-thickened funnel-shaped perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 221.

CEYLON; Central Province, alt. 6–8000 ft., *Walker, &c.*

A tree, 20 ft.; branchlets rusty-tomentose. Leaves $1\frac{1}{2}$ –2 in. broad, smooth above, youngest densely clothed with silky hairs; petiole $\frac{1}{2}$ –1 in. Clusters of male fl. $\frac{1}{2}$ in. broad; flowers shortly pedicelled. Filaments laxly hairy; glands of inner subsessile. Fruit $\frac{1}{2}$ in. diam., pedicel $\frac{1}{2}$ –1 in. long.—*Beddome* (*Forest Manual*) regards this, *L. orbicularis* and *ambigua* as vars. of *L. zeylanica*, but to me they appear all very distinct.

63. **L. zeylanica**, *C. & Fr. Nees in Amæn. Bot. Bonn. Fasc.* i. 58, t. 5, *ex Nees Syst. Laurin.* 626 (*ceylanica*); quite glabrous or branchlets and petioles faintly puberulous, leaves alternate 3–5 in. elliptic- or oblong-lanceolate obtusely or acutely acuminate triple-nerved with 1–3 pairs of nerves above the middle glaucous or not beneath, bracts and flowers silky, fruit subglobose or oblong seated on a disciform perianth-tube with a thickened pedicel. *Meissn. in DC. Prodr.* xv. 1. 226; *Blume Mus. Bot.* i. 346; *Brand. For. Fl.* 382; *Dalz. & Gibs. Bomb. Fl.* 223; *Gamble Man. Ind. Timb.* 311; *Thwaites Enum.* 257; *Beddome Fl. Sylv.* t. 294; *Wight Ic.* t. 132 and 1844. *L. oblonga*, *Nees Syst. Laurin.* 678; *Wight Ic.* t. 1845. *L. striolata*, *Blume l. c.* 347; *Meissn. l. c.* 223. *L. foliosa*, *Nees l. c.* 622; *Meissn. l. c.* 222 (*excl. var. β.*); *Kurz For. Fl.* ii. 306. *L. furfuracea*, *Nees l. c.* 625; *Blume l. c.* 347; *Miquel Fl. Ind. Bat.* i. 975. *L. scrobiculata*, *Meissn. l. c.* 233. *L. trinervia*, *Juss. in Diet. Sc. Nat.* xxvii. 79. *Tetradenia ceylanica*, *furfuracea* & *foliosa*, *Nees in Wall. Pl. As. Rar.* iii. 64 and iii. 30. *Tetranthera foliosa*, *pulcherrima (in part) & furfuracea*, *Wall. Cat.* 2563,

2567, 2568. *Laurus Cassia*, Linn. ex Wight in Hook. Journ. Bot. ii. (1840) 336. *L. involucrata*, Vahl in Herb. Juss. ex Lamk. Dict. iii. 445; Roxb. Cor. Pl. ii. 46, t. 187. *L. zeylanica*, &c., Herm. Mus. Zeyl. 26.

BHOTAN and the KHASIA Mts., Griffith. SILHET, Wallich. CHITTAGONG, Pegu and Tenasserim, ascending to 7000 ft., and Martaban, Kurz. MALACCA, Main-gay; on Mt. Ophir and in littoral woods at Tangong cli, Griffith. PENANG, Wallich. DECCAN PENINSULA; on the Western Ghats from the Concan southwards, and from Quilon on the coast, Wight, ascending to 7000 ft. on the Nilghiris. COROMANDEL, on the coast hills, Roxburgh. CEYLON, ascending to 6000 ft.—DISTRIB. Sumatra, Java.

A small tree, variable as to foliage. Leaves often caudate-acuminate, 7 by $3\frac{1}{2}$ in. the largest specimens from Courtallam and Sumatra (*L. latifolia*, Blume), smooth above or beautifully reticulated with minute impressions on one or both surfaces wholly or in part; petiole $\frac{1}{2}$ –2 in. long. Umbels 4–5 fld. in all the specimens I have examined, and as figured by Roxburgh (6–12 fld., Brandis, by error I suspect). Fruit globose and subglobose, $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., or oblong and $\frac{1}{2}$ – $\frac{2}{3}$ in. long; pedicel much thickened, $\frac{1}{3}$ – $\frac{2}{3}$ in. long.—I am in doubt as to there being one or two species included in the above: one has globose fruit, mammillate at the top, as figured by Roxburgh, and in Wight's Icones, t. 132, from Ceylon, and his *L. oblonga*, t. 1845, from Courtallam, and which I have seen in specimens from Canara, the Nilghiris and Malacca; the other species with much larger oblong fruit, rounded at the top, as figured by Wight also as *L. zeylanica* at t. 1844, for which he gives no precise locality (beyond that it is a native of Ceylon, Martaban and the western slopes of the Nilghiris), and as figured by Beddome, t. 294, and of which I have seen specimens from the Concan? (Herb. Dalzell). Brandis describes the fruit of *zeylanica* as globose but occasionally ovoid, and they are oblong in Nees' description of *zeylanica*, *furfuracea* and *oblonga*, and Meissner's of *foliosa* var. *cæsia*. Kurz describes the Burman *foliosa* as having oblong fruit; and Meissner his *zeylanica* var. *venosa* as "ovali-globosa." Unfortunately I find no fruit amongst the many Ceylon specimens that I have examined.—With regard to the characters ascribed by authors to *furfuracea*, *oblonga*, *serobiculata*, *foliosa* and *pulcherrima*, I find nothing in these whereby to distinguish them from *zeylanica*; nor are Meissner's five varieties of the latter at all fixed. For the distinctive characters of the too-closely allied *L. umbrosa*, I must refer to the notes under that species.

64. *L. umbrosa*, Nees Syst. Laurin. 623 (Tetranthera); branchlets slender pubescent, leaves 2–5 in. alternate elliptic or oblong-lanceolate caudate-acuminate triple-nerved below and with usually 2–4 pair of strong nerves above the middle glaucous or not beneath, fruit globose on a very slightly enlarged perianth-tube with a slender pedicel. Meissn. in DC. Prodr. xv. 1. 223. *L. consimilis*, Nees Syst. 628 (excl. syn. *Laurus involucrata*); Meissn. l. c. 223; Gamble Man. Ind. Timb. 311. Tetradenia umbrosa and *T. consimilis*, Nees in Wall. Pl. As. Rar. ii. 64 and iii. 30 (excl. var. β). Tetranthera umbrosa, Wall. Cat. 2564, and pulcherrima? 2567 B. *T. pallens*, Don Prodr. 66.

TEMPERATE and SUBTROPICAL HIMALAYA; Kashmir and Chumba, alt. 3–5000 ft., Clarke; Simla and Kumaon, alt. 6–7000 ft.; Nepal, Wallich. Sikkim, alt. 7000 ft., KHASIA Mts., alt. 5–6000 ft.—DISTRIB. Munnipore.

Habit and characters of *L. zeylanica*, but usually more slender, with more caudate leaves, and best distinguished by the longer more slender fruiting-pedicels with a smaller dilated perianth-tube under the fruit. There are three forms which I have endeavoured to characterize below, of which the larger leaved Khasia may be the transition to *zeylanica*, with which Brandis unites both *L. umbrosa* and *consimilis*, probably rightly. Gamble, however, keeps them distinct. *L. consimilis* was founded by Nees on Wallich's flowering specimen of *pulcherrima*? (No. 2567 B), which he identified doubtfully with Roxburgh's Coromandel *Laurus involucrata*, assuming that they were from the same mountains; and in so far as that Roxburgh figures many pairs of nerves above the basal, he had some reason for his assumption; but in other respects,

as in locality, Roxburgh's *involucrata* is better referred to *zeylanica*. Leaves with transversely striolate nervules occur in all forms.

L. umbrosa proper; leaves small elliptic rarely 3 by $\frac{2}{3}$ –1 in., nerves 2–3 pair above the basal, fruit globose. *L. umbrosa* β . khasiana, *Meissn. in part.*—Khasia Mts., alt. 5–7000 ft.

Var. *impunctata*; leaves larger broader 3–6 by $1\frac{1}{2}$ –2 $\frac{1}{2}$ in. *L. umbrosa* β . khasiana, *Meissn. in part.*, and *L. foliosa* var. *impunctata*, *Meissn.*, with oblong fruit, from Khasia, alt. 5–7000 ft., and *L. striolata*, *Meissn.*, with globose fruit, from Sikkiin, alt. 7000 ft.

Var. *consimilis*; leaves more membranous oblong-lanceolate 3–5 by 1–1 $\frac{1}{2}$ in. often more glaucous beneath with usually many pairs of nerves above the basal, fruit globose.—Kashmir to Nepal.—There is a good specimen of this in Herb. Hooker, received from Wallich in 1821, but it is not in the Wallichian Herbarium of the Linnæan Society.

65. **L. Mannii**, *King in Herb. Calcutt.*; branches slender and petioles and pedicels pubescent, leaves scattered 2–3 in. triple-nerved elliptic-lanceolate obtusely caudate-acuminate minutely impressed punctate on both surfaces nerves beneath very slender, fruiting clusters sessile, fruit minute globose mucronate seated on the remains of the unaltered perianth.

KHASIA or JYNTEA HILLS, *G. Mann.*

The small leaves with faint nerves and small mucronate fruit about $\frac{1}{2}$ in. diam. well distinguish this species, which may be a *Litsæa* as Dr. King has named it, but without bracts and flowers it is impossible to say that it is not an *Actinodaphne* or *Lindera*.

DOUBTFUL SPECIES.

LITSÆA? species, from Upper Assam, Mishmi Hills at Choonpara, *Griffith*. Leaves only; these resemble *L. Wallichii* in form, in the bright red-brown coriaceous shining surfaces covered with fine reticulations, but differ in having 20–30 pairs of nerves; they are 12–18 by 5–9 in., oblong, subacute or acuminate, shortly petioled, and as well as the branches perfectly glabrous.

L. VELUTINA, *Blume Mus. Bot. i. 376; Meissn. in DC. Prodr. xiv. 1. 181*; from India, *Heyne*.—It is impossible from the meagre description to say what this may be.

LITSÆA *rugosa*, *Kurz in Flora 1872, 171* (*Tetranthera? ochrascens, Miquel Fl. Ind. Bat. Suppl. i. 146, 363. Sideroxylon? rugosum, Wall. Cat. 4158. S. Wallichianum, G. Don Gen. Syst. iv. 28; DC. Prodr. viii. 185*), from Penang.—Wallich's specimens have neither flower nor fruit, and do not resemble any *Litsæa* known to me. *Miquel's Tetranthera? ochrascens* is a Sumatran plant described from specimens without flower or fruit. Wallich's *S. ? rugosum* was overlooked when the genus was worked up for Vol. III. of this Flora.

LEPIDADENIA *Wightiana*, *Nees Syst. Laurin. 583; Wight Ic. t. 1837. Tetranthera Roxburghii, Hassk. Pl. Jav. 243, excl. syn. (fid. Miquel)*.—This is correctly referred by Meissner to Blume's (not Persoon's) *L. sebifera* (*Cylicodaphne sebifera*, *Blume in DC. Prodr. xv. 1. 202*). Wight's figure is taken from a single bad specimen without locality, and it so precisely accords with Javanese ones, that I cannot without further evidence believe it to be from the Nilghiris, where Wight supposes he once gathered it, but where neither he nor any other collector has since found it.

LAURUS *umbellata*, *Ham. in Don Prodr. 64*, from Nepal.—Meissner (*in DC. Prodr. xv. 1. 258*) doubtfully suggests this being *L. tomentosa* or *laurifolia* (*sebifera*, Pers.), but the description is far too meagre to admit of any identification. The anthers should be 2-celled, for Don keeps it in *Laurus*.

12. DODECADENIA, *Nees*.

Evergreen trees. Leaves scattered, coriaceous, penninerved; buds

perulate. *Flowers* 2-sexual, subsolitary or 2-3 together, subsessile or panicled and pedicelled, each with 4-5 imbricating bracts. *Perianth-tube* short; segments 6-9, subequal, spreading. Perfect *stamens* 10-15; filaments slender, of 1st and 2nd series eglandular, of 3rd and 4th 2-glandular; anthers all 4-celled, introrse. *Fruit* seated on the dilated thick flattish perianth-tube, stoutly pedicelled.

1. **D. grandiflora**, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 588; branchlets and young leaves silky-tomentose, leaves elliptic-lanceolate acuminate, flowers subsolitary, ovary hirsute. *Meissn. in DC. Prodr.* xv. 1. 210; *Brandis For. Fl.* 381; *Kurz For. Fl.* ii. 304. *Tetranthera grandiflora*, *Wall. Cat.* 2544. ? *Laurus macrophylla*, *Don Prodr.* 64.

TEMPERATE HIMALAYA; Kumaon, alt. 8000 ft., *Blinkworth*, &c. BURMA, on the Khakyen Hills, *Kurz. Nepal, Wallich.*

Branches rugged, shoots subsilky tomentose. *Leaves* 3-4 in. (rarely 6-8), thinly coriaceous, minutely reticulate on both surfaces, opaque beneath; nerves 6-8 pair, very slender; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in., slender, young tomentose. *Flowers* $\frac{1}{2}$ in. diam.; pedicels very short, covered with the scars of bracts which are oblong silky $\frac{1}{2}$ in. long. *Perianth-segments* oblong, obtuse, hoary within. *Filaments* slender, exserted, villous. *Ovary* hirsute; stigma oblique, lobulate. *Fruit* $\frac{1}{2}$ in. long, ellipsoid; peduncle stout, $\frac{1}{4}$ in.; perianth-tube discoid, $\frac{1}{4}$ in. diam., entire.—*Meissner* (in *DC. Prodr.* xv. 1. 258) suggests this being *Don's Laurus macrophylla*, but *Don's* description is too meagre to admit of any identification.

2. **D. Griffithii**, *Hook. f.*; branchlets glabrous, leaves elliptic-lanceolate acuminate, flowers subsolitary, ovary glabrous, style hirsute.

BHUTAN, *Griffith (Kew Distrib.* 4312).

Very similar to *D. grandiflora*, but the branchlets and ovary are quite glabrous, and the leaves much more strongly reticulate between the nerves beneath. I have seen no fruit.—*Bracts* 7 to each flower. *Sepals* 6, coriaceous, oblong, obtuse, silky without, glabrous within; tube turbinate. *Stamens* 10, filaments all villous; 4 of the longer eglandular; 2 of the longer 2-glandular; 4 short ones 2-glandular.

3. **D. ? paniculata**, *Hook. f.*; quite glabrous, leaves elliptic-ovate or oblong acute or acuminate coriaceous, flowers in axillary panicles long-pedicelled, ovary glabrous. *Tetranthera chartacea*, *Meissn. in DC. Prodr.* xv. 1. 186 (the Sikkim plant only).

SIKKIM HIMALAYA, *J. D. H.*; at Mik, alt. 3000 ft., *Clarke*. BHUTAN; in woods at Sasee, *Griffith*.—DISTRIB. Munnipore.

A small tree, 40 ft. (*Clarke*); branches quite smooth and glabrous, rather slender. *Leaves* 5-9 by 2-2 $\frac{1}{2}$ in., coriaceous, pale brown and rather shining above, beneath more or less glaucous or white, base acute cuneate or rounded; nerves 5-10 pairs, reddish, transverse nervules and reticulations distinct; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., rather stout. *Panicles* 1 $\frac{1}{2}$ -2 in. long, axillary, spreading; branches stiff spreading with often 3 terminal flowers; pedicels $\frac{1}{2}$ in., stiff, thickened at the tip; flowers $\frac{1}{2}$ in. diam., apparently 2-sexual. *Sepals* rounded oblong, glabrous, spreading and recurved, connate at the base and separating together early from the pedicel, hispid at the base within. *Stamens* 8-10, filaments and anthers hispidulous, alternate ones shorter, all shorter than the sepals; anthers oblong, 4-celled, introrse. *Staminodes* about 20. *Fruit* 1-1 $\frac{1}{2}$ in. long, clavately obovoid, $\frac{1}{2}$ - $\frac{3}{4}$ in. broad below the rounded top; pedicel thickened into the obconic truncate calyx-tube, which is about $\frac{1}{2}$ in. diam., drooping.—A very curious plant, which I hesitatingly put into *Dodecaenia*. *Meissner* included it under *Tetranthera*, and in *Herb. Hook.* has labelled it *T. chartacea*, *Wall. ?* *β. areolata*. The bracts are evidently caducous, for all are gone. *Griffith* in his *Itinerary Notes*, p. 113 (n. 404), calls it a *Tetranthera*, and describes it as a large tree. In the

absence of bracts it is not possible to say it is not a *Tetranthera*, but it resembles no other, and the flowers are quite like those of a *Dodecadenia*.

13. **LINDERA**, Thunb.

Shrubs or trees, often deciduous. *Leaves* alternate or subopposite, penni- or 3-5-nerved; buds perulate or naked. *Involucres* 4-6- or more-fl., sessile or pedicelled, fascicled or racemose; bracts 2-5. *Flowers* diœcious, pedicelled, umbellate or capitate. *Perianth-tube* very short; segments 7-9, subequal, small, petaloid. *Stamens* usually 9, 3-seriate, filaments narrow, of 1st and 2nd series eglandular, of 3rd (rarely of 2nd) 2-glandular; staminodes in fl. ♀ 9; anthers 2-celled, all introrse. *Fruit* globose or ovoid, seated on the unaltered or disciform entire or 6-toothed perianth-tube.—Species about 60, Tropical and Eastern Asia and N. America.

I follow Bentham (in Gen. Plant.) in bringing together under one genus all the Indian 1-celled *Litseeaceous* plants, and have for the most part arranged them under the sections he has proposed. I expect, however, that when more complete specimens of this group are available, several of the genera now included under *Lindera* will be restored much upon the lines I here indicate as sections.

Sect. I. **Aperula**. *Leaves* persistent, penninerved. *Umbels* long-pedicelled; bracts 4, involucriform, 6-12-fl. *Stamens* 9.

1. **L. assamica**, Kurz For. Fl. ii. 308; branchlets and leaves beneath rusty- or tawny-hirsute and pubescent, leaves persistent 4-6 in. lanceolate or elliptic-lanceolate acuminate penninerved, umbels 6-9-fl., pedicels slender solitary or fascicled on a short common peduncle, bracts 4 glabrous, fruit subglobose. *Aperula assamica*, Meissn. in DC. Prodr. xv. 1. 240, in part. *A. Meissneri*, Herb. Calcutt.

EASTERN HIMALAYA; Bhotan, Griffith (*Kew Distrib.* 4316); Sikkim, alt. 7-9000 ft., J. D. H., &c. MARTABAN HILLS, on the Nettoung, Kurz.

A small tree or shrub, 10-30 ft.; shoots finely pubescent. *Leaves* 1-2 in. diam., coriaceous, smooth above with impressed nerves, beneath with 6-10 pairs of strong nerves cross-nervules and reticulation, base very acute; petiole $\frac{1}{4}$ - $\frac{1}{3}$ in. *Umbels*, male about $\frac{3}{4}$ in. diam. when in flower; pedicel $\frac{1}{2}$ -1 in., very slender, nearly glabrous; flowers on slender silky pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in.; fem. umbels smaller with shorter pedicels and shorter pedicelled flowers; bracts hemispheric. *Sepals* 6, subequal. *Stamens* 9, filaments hairy, 3-inner 2-glandular. *Fruit* nearly $\frac{1}{2}$ in. long.—Foliage a good deal like that of *Litsæa elongata*.

2. **L. Meissneri**, King mss.; glabrous except the silky inflorescence, leaves persistent 2-3 in. ovate or ovate-lanceolate caudate-acuminate with 5-8 pair of very slender nerves, umbels about 9-fl., pedicels very slender racemed on a slender common peduncle, bracts 4 membranous. *Aperula assamica*, Meissn. in DC. Prodr. xiii. 1. 240, in part.

ASSAM; on the Nuku Hills, Simons.

Closely allied to *L. Meissneriana*, but the branchlets are smooth and bark as in *L. oxyphylla*, the leaves are glabrous, much smaller, more ovate, caudate-acuminate and hardly reticulate beneath, the petioles more slender and the umbels smaller.—The specimen is a solitary one in male fl. Meissner is mistaken in uniting it with Griffith's 1171, and giving Jenkins as its collector. It is one of several curious plants found by Simons in the Nuku Hills, where no one has since collected that I know of. King (in Herb. Calcutt.) observed that Meissner has included two species under his *A. assamica*, and suggested the name of *Meissneri* for one of them.

3. **L. malaccensis**, *Hook. f.*; glabrous except the sparsely pubescent inflorescence, leaves 3-5 in. coriaceous broadly ovate or elliptic-ovate or lanceolate shortly acuminate shining above with 4-6 pair of impressed nerves which are strong beneath with faint cross-nervules, umbels 4-9-fl. small very numerous, pedicels clustered on a short stout common peduncle, bracts 4, fruit globose. *Tetranthera Griffithii*, *Meissn. in DC. Prodr.* xv. 1. 191.

MALACCA, *Griffith (Kew Distrib.* 4297), and Singapore, *Maingay (Kew Distrib.* 1257, 1272).—DISTRIB. Borneo.

Branches black, terete, smooth. *Leaves* 2-3 in. broad, dark brown, paler and opaque beneath, base acute or cuneate; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Umbels* very numerous, unexpanded $\frac{1}{2}$ in. diam., on rather stout pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in. long; bracts hemispheric, coriaceous; flowers villous. *Sepals* unequal. *Stamens* 9, villous at the base. *Fruit* $\frac{1}{2}$ in. diam.—I have seen many specimens of both sexes, but none with expanded flowers.

4. **L. latifolia**, *Hook. f.*; branches leaves beneath and umbels densely grey-tomentose, leaves persistent 5-8 in. obovate oblong or broadly oblanceolate subacute or acuminate with 10-12 pair of nearly straight nerves deeply sunk above, umbels 10-12-fl. solitary clustered or fascicled on a very short peduncle, bracts 4, fruit globose small.

KHASIA MTS., alt. 5-6000 ft., at Nunklow, Myrang and Pomrang, *Griffith (Kew Distrib.* 4321), *J. D. H. & T. T. Nymai, Clarke.*

A small tree. *Leaves* membranous, 3-5 in. diam., reticulate beneath with cross-nervules, base acute; petiole tomentose, $\frac{1}{4}$ - $\frac{1}{2}$ in. *Umbels* unexpanded $\frac{1}{2}$ in. diam. on rather stout tomentose pedicels; bracts hemispheric, tomentose. *Sepals* 6, broad. *Stamens* 9, filaments hairy. *Fruit* the size of a pea.—Some large-leaved specimens have the nerves more arched.

5. **L. oxyphylla**, *Benth. in Gen. Pl.* iii. 163; glabrous except the hoary umbels, leaves 3-4 in. elliptic-lanceolate acuminate subglaucous beneath penninerved, nerves very obscure, umbels 9-14-fl. in subsessile clusters shortly pedicelled, bracts 4. *Aperula oxyphylla*, *Meissn. in DC. Prodr.* xv. 1. 240. *Daphnidium oxyphyllum*, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 618: *Tetranthera oxyphylla*, *Wall. Cat.* 2547.

PENANG, *Porter.*

Branches stout, black when dry, smooth, quite glabrous. *Leaves* rather coriaceous, 1-1 $\frac{1}{2}$ in. broad, smooth above with about 12 pair of very slender raised nerves which are with difficulty seen beneath, base acute; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Umbels*; male, unexpanded, $\frac{1}{2}$ in. diam.; bracts hemispheric. *Sepals* 4-6, unequal. *Stamens* 9. *Fruit* unknown.—Wallich's specimens are the only ones seen; it approaches *L. citriodora* of China, and very much resembles *L. Kingii*.

Sect. II. **Polyadenia**. *Leaves* persistent (except perhaps *L. venosa*), penninerved. *Umbels* sessile or subsessile. *Bracts* 4-8, involucriform or imbricate. *Stamens* 9-12. § POLYADENIA & CEPHALODAPHNE, *Blume & Gen. Plant.*

6. **L. reticulata**, *Benth. in Gen. Plant.* iii. 164; branchlets robust and leaves beneath and umbels densely rusty-tomentose, leaves persistent 7-10 in. very coriaceous obovate oblong or oblanceolate-oblong obtuse or acute, nerves 10-15 pair very strong beneath with strong close cross-nervules, umbels very small clustered sessile 4-9-fl., bracts 4, fruit oblong. *Polyadenia reticulata*, *Nees in Wall. Pl. As. Rar.* ii. 61, and *Syst. Laurin.* 572; *Meissn. in DC. Prodr.* xv. 1. 232. *Tetranthera reticulata*, *Ham. in Wall. Cat.* 2551.

ASSAM; at Goalpara, Wallich, Griffith (*Polyadenia grandis*, *Kew Distrib.* 4278). SILHET, *De Silva*.

Branches very stout, woody, pale, furrowed. *Leaves* brown when dry, very variable in form and breadth, $2\frac{1}{2}$ –4 in. diam., rather shining above with slender sunk nerves, base acute; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., very stout, tomentose. *Umbels* $\frac{1}{2}$ in. diam., bracts coriaceous concave; flowers minute, shortly pedicelled, hirsute. *Sepals* 6, unequal. *Stamens* 6–12, filaments short, villous, most or all with stipitate glands. *Fruit* ellipsoid or oblong, $\frac{1}{2}$ in. long, smooth, shortly pedicelled.

7. **L. venosa**, *Benth. in Gen. Plant.* iii. 164; branchlets stout and leaves glabrous, leaves 6–10 in. long-petioled narrowly elliptic-lanceolate shining above, nerves 12–15 pair rather strong beneath with distant reticulations, umbels 15-fld. very large sessile or stoutly pedicelled clustered and at first enclosed in many broad imbricate hard rounded scales, bracts 7 coriaceous pubescent. *Daphnidium venosum*, *Meissn. in DC. Prodr.* xv. 1. 231. *Tetranthera*, *Griff. Itin. Notes* 144 n. 692, and *Notul.* iv. 355, and *Ic. Pl. Asiat.* iv. t. 353.

BHUTAN; near Oongar Bridge, alt. 6000 ft., Griffith (*Kew Distrib.* 4308).

A medium-sized tree, nearly leafless in winter, Griffith; branches stout, pale, furrowed. *Leaves* towards the ends of the branches, spreading and deflexed, rather membranous, brown above, with slender impressed nerves, paler beneath; base acute; petiole 1–1½ in., slender. *Buds* enclosing umbels $\frac{1}{2}$ – $\frac{3}{4}$ in. long, ovoid, axillary and on the branches, solitary or 2–3 together. *Umbels* nearly 1 in. diam.; bracts concave, coriaceous, pubescent; flowers villously silky, shortly pedicelled. *Sepals* 6–8, unequal. *Stamens* 9–12, filaments villous, 3 inner or more with one or two long-pedicelled cup-shaped glands; sometimes of 12 stamens 6 are eglandular, 4 2-glandular and 2 1-glandular. *Fruit* unknown.

8. **L. bifaria**, *Benth. in Gen. Plant.* iii. 164; branchlets and leaves beneath finely brown-tomentose or villous, leaves persistent 1½–6 in. pale brown coriaceous shortly petioled elliptic ovate-lanceolate acuminate, nerves 5–10 pair strong beneath with faint or strong cross-nervules, umbels small sessile 6–10-fld. solitary or clustered, bracts 6–8 imbricate, fruit small globose. *Daphnidium bifarium*, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 616; *Meissn. in DC. Prodr.* xv. 1. 231; *Brand. For. Fl.* 383. *Tetranthera bifaria*, *Wall. Cat.* 2530. *Laurus* *Nasusua*, *Don Prodr.* 64.

SUBTROPICAL HIMALAYA; Kumaon, alt. 5000 ft., *Blinkworth, Strachey & Winterbottom*. NEPAL, Wallich. UPPER ASSAM, Mishmi Hills, Griffith. KHASIA Mts., alt. 3–4000 ft., Wallich, &c.—DISTRIB. Yunnan, China, Munnipore.

A small tree with very pale-brown branches and foliage when dry; branches rather stout. *Leaves* very variable in size and amount of hairiness, nerves and cross-nervules beneath very strong and midrib often villous, above smooth and minutely impressed-punctate; base acute or cuneate, rarely obtuse; buds scaly, youngest leaves densely clothed with fulvous long shining silky wool; petiole $\frac{1}{2}$ in., very stout. *Umbels* solitary or clustered, globose, $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. before opening; bracts rounded, coriaceous, concave, brown, more or less pubescent; flowers very small, axillary in the upper bracts, shortly pedicelled, pedicel and perianth-tube velvety. *Sepals* 6, membranous, subequal. *Stamens* 9, short, filaments glabrous. *Ovary* glabrous, with a stout style and discoid stigma. *Fruit* $\frac{1}{2}$ in. diam., seated on the very small shallow cup-shaped perianth-tube.—Griffith's 2464 from Bhutan referred to *bifaria* by Meissner is not that plant; it has deciduous leaves and different branches and flowers. The specific name *bisona* quoted by Nees as that of Wall. Cat. 2550 is simply a misreading of *bifaria* which is indistinctly written.

Sect. III. **Daphnidium**. *Leaves* persistent, triple-nerved.

9. **L. caudata**, *Benth. in Gen. Plant.* iii. 164; branchlets slender and

young leaves fulvous- or rusty-hairy or tomentose, leaves persistent 3-4 in. ovate- or elliptic-lanceolate caudate-acuminate triple-nerved almost to the tip, flowers minute in very short subglobose solitary or clustered spikes bracteate and 2-bracteolate, bracteoles large the pair enclosing single flowers, fruit globose seated on the 6-cleft perianth-tube. *Daphnidium caudatum*, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 608; *Meissn. in DC. Prodr.* xv. 1. 230; *Kurz For. Fl.* ii. 307. *Tetranthera caudata*, *Wall. Cat.* 2566.

KHASIA MTS., alt. 4-5000 ft., *Wallich, Griffith, &c.* MARTABAN and TENASERIM, about 6000 ft., *Kurz.*

A small slender tree. *Leaves* brown when dry, subglaucous beneath with strong nerves and cross-nervules, thinly coriaceous, opaque above, base subacute; petiole slender, $\frac{1}{2}$ in. *Flowers* distinctly spicate on a very short tomentose rachis, each sessile in the axil of a small bract and enclosed in two concave pubescent rather thin bracteoles; flower and bracteole about $\frac{1}{2}$ in. long. *Perianth* villous within and without at the base. *Sepals* 6, membranous, subequal. *Stamens* 9, villous, 3 inner 2-glandular (in the female 6 short filaments, each with 2 very large glands). *Ovary* glabrous with a stout style and very large discoid stigma. *Fruit* $\frac{1}{4}$ in. diam.—The single flowers being bracteate recalls *Actinodaphne sikkimensis*.

10. **L. pulcherrima**, *Benth. in Gen. Plant.* iii. 164; glabrous except the silky buds, leaves persistent 4-5 in. elliptic-oblong -ovate or -lanceolate caudate-acuminate triple-nerved pale or glaucous beneath, umbels 5-6-fld. enclosed in 4-6 large concave imbricating deciduous bracts, fruit ellipsoid. *Daphnidium pulcherrimum*, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 610; *Meissn. in DC. Prodr.* xv. 1. 229; *Brand. For. Fl.* 383; *Kurz For. Fl.* ii. 306; *Gamble Man. Ind. Timb.* 312.

TEMPERATE HIMALAYA; from Kumaon, alt. 5-8000 ft., to Sikkim and Bhotan, alt. 4-9000 ft. KHASIA MTS., alt. 5-6000 ft. MARTABAN; on hills ascending to 6000 ft., *Kurz.*—DISTRIB. Munnipore.

A large tree; branchlets hoary. *Leaves* membranous or thinly coriaceous, greenish when dry, minutely reticulate above with 3 slender raised nerves, beneath finely reticulate, caudate tip often 1 in. long and very slender; petiole slender, $\frac{1}{2}$ - $\frac{3}{4}$ in. *Clusters* quite sessile, globose; bracts pale, rather thin, concave, subsilky, outer smaller; flowers on short silky-tomentose pedicels; perianth silky. *Sepals* 6, oblong, membranous, equal or subequal. *Stamens* 9, filaments short, nearly glabrous; of female reduced to 2 glandular filaments. *Ovary* and style pubescent; stigma very large. *Fruit* $\frac{1}{2}$ in. long; perianth wholly deciduous, or rarely fragments remain; pedicel slender, $\frac{1}{2}$ - $\frac{3}{4}$ in., not thickened at the tip.

11. **L. melastomacea**, *Benth. in Gen. Plant.* iii. 164; quite glabrous, leaves persistent 2-3 in. coriaceous obovate- or oblanceolate-oblong shortly obtusely acuminate triple-nerved not glaucous beneath, umbels 3-5-fld. sessile solitary or clustered, bracts 4, fruit ellipsoid. *Daphnidium melastomaceum*, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 607; *Meissn. in DC. Prodr.* xv. 1. 228. *Laurus cuspidata*, *Don Prodr.* 64.

A shrub or small tree, with stiff erect leafy branches. *Leaves* coriaceous, greenish or brown when dry, smooth above with 3 strong nerves and indistinct nervules, the latter very slender and indistinct beneath, base narrowed into the very short ($\frac{1}{2}$ - $\frac{3}{4}$ in.) petiole. *Umbels* globose in bud, usually crowded and sessile in the leaf axils, sometimes very shortly stoutly pedicelled; bracts very coriaceous, hemispheric, glabrous; flowers on villously silky pedicels, villous within. *Sepals* 6, equal or unequal. *Stamens* 9, filaments hairy, 3 inner 2-glandular. *Ovary* not seen. *Fruit* $\frac{1}{2}$ in. long, seated on the persistent or broken up hardly changed perianth-tube; pedicel $\frac{1}{2}$ - $\frac{3}{4}$ in.

Sect. IV. **Sassafrimorpha**, *Benth.* *Leaves* deciduous, triple- or quintuple-nerved.

12. **L. heterophylla**, *Meissn. in DC. Prodr.* xv. 1. 246; branches robust, shoots and leaves beneath rusty-tomentose, leaves deciduous 2-4 in. entire or 3-lobed at the tip, old coriaceous orbicular ovate or oblong obtuse or subacute quintuple-nerved at the rounded or cordate base, umbels subsessile many-fld., flowers in the axils of large imbricating deciduous villous membranous bracts, fruit ellipsoid. Benzoin sericeum and *Lindera triloba*?, *Herb. Ind. Or. H. f. & T.* *Daphnidium bifarium* in part, *Meissn. in DC. l. c.* 231 (not of *Nees*). *Hamamelidea*, *Griff. Itin. Notes*, 147.

EASTERN TEMPERATE HIMALAYA; Sikkim, alt. 8-10,000 ft., *J. D. H.* Bhotan; at Oongar, alt. 9-10,000 ft., *Griffith*.

A shrub or small tree, with flexuous branches, flowering when leafless; buds clothed with imbricate scales. *Leaves* 2-4 in. broad, old brown when dry; above rather shining with sunk nerves and reticulations, beneath with very strong nerves; lobes if present triangular, subacute; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., stout. *Umbels* (or contracted spikes) $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., with 3-5 very coriaceous imbricating scales at the base; each flower in the axil of a subspathulate or obovate-oblong concave bract that is villous with long hairs at the back; pedicels short, villous, as is the base of the perianth. *Sepals* linear-oblong, subsilky hairy. *Stamens* 9, filaments very short, glabrous; 3 or more 2-glandular. *Fruit* immature.

13. **L. Neesiana**, *Benth. in Gen. Plant.* iii. 164; quite glabrous, leaves deciduous 3-7 in. membranous ovate acute or acuminate triple-nerved at the cuneate or cordate base, umbels solitary or clustered pedicelled 5-7-fld., bracts 4 membranous glabrous, fruit small globose. *Kurz For. Fl.* ii. 309. *Aperula Neesiana*, *Blume Mus. Bot.* i. 366; *Meissn. in DC. Prodr.* xv. 1. 241. Benzoin *Neesianum*, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 498. *Tetranthera Neesiana*, *Wall. Cat.* 2538. *T. prunifolia*, *Wall. mss.* ? *Laurus macrophylla*, *Don Prodr.* 64; *Meissn. l. c.* 258.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 6-8000 ft., *J. D. H.*

A very spicy tree; shoots terete, smooth, usually quite black when dry, often very stout. *Leaves* $1\frac{1}{2}$ -4 $\frac{1}{2}$ in. diam., smooth and reticulated above when dry, more or less glaucous beneath with 4-6 pairs of nerves besides the basal which do not reach the middle of the leaf, and slender distant reticulated ones. *Umbels* unopened, globose, $\frac{1}{2}$ in. diam., on slender pedicels $\frac{1}{2}$ - $\frac{1}{2}$ in.; outer bracts hemispheric, inner narrower; flowers on tomentose pedicels, $\frac{1}{2}$ in. diam., green. *Sepals* orbicular, nearly glabrous, very membranous. *Stamens* 9, filaments short, glabrous, inner 2-glandular. *Fruit* $\frac{1}{2}$ in. diam., seated on the unaltered perianth with fragments of the sepals.—This has much the habit of *L. oxyphylla* and *Litsæa polyantha*.

Var. ? *Griffithii*; bark of branchlets quite white, umbels racemose on a short slender peduncle.—Mishmi Mts., *Griffith*.

SPECIES OF UNDETERMINED SECTION.

14. **L. bootanica**, *Meissn. in DC. Prodr.* xv. 1. 245; branches stout pale grey deeply grooved (by contraction of the bark), annual shoots herbaceous black when dry, leaves (young) scattered deciduous membranous 3-5 in. penninerved lanceolate acuminate densely softly tomentose beneath narrowed into the $\frac{1}{2}$ in. slender petiole, buds ovoid large with very broad densely silky scales, umbels of fem. fl. on a stout glabrous $\frac{1}{2}$ in. peduncle, flowers 8-10 on stout villously silky or tomentose pedicels, perianth-tube campanulate villous, lobes 6 or more unequal oblong erect glabrous, staminodes on the top of the tube narrow spathulate exerted slightly hairy, some with pedicelled glands, ovary ovoid sunk in the perianth-tube, stigma sessile?.

BHOTAN, *Griffith* (919 a) (*Kew Distrib.* 4325).—A few very imperfect male flowers are scattered among the females. They are in a broken condition, have a very short perianth-tube, and short filaments, and 2-celled oblong anthers.

15. **L. Griffithii**, Meissn. in DC. Prodr. xv. 1. 245; branches slender woody glabrous, leaves much too young for description $\frac{1}{4}$ – $\frac{1}{2}$ in. long deciduous penninerved lanceolate acute silky, female fl. white odorous in very small axillary subsessile nodding clusters very shortly pedicelled and pedicels silky tomentose, perianth $\frac{1}{2}$ in. diam., tube very short obconic, sepals 6 broad glabrous, staminodes very short with large glands glabrous, ovary glabrous, style short, stigma discoid.

BHOTAN, above Tongsa, alt. 8500 ft., Griffith (Kew Distrib. 4334):—Griffith describes the flowers and bracts as white.

16. **L. ? sikkimensis**, Meissn. in DC. Prodr. xv. 1. 245; a bush 15 ft. high, branchlets woody rugose, shoots inflorescence and young leaves beneath clothed with long golden red villous hairs, leaves (young) 2–2½ in. scattered deciduous penninerved membranous obovate-oblong narrowed into a short petiole, tip rounded, nerves 6–8 pair very slender, umbels subsessile few-fl., fem. fl. very shortly pedicelled, perianth-tube short, sepals 6 orbicular, staminodes very short almost reduced to glands, ovary ovoid glabrous, style short, stigma small.

SIKKIM HIMALAYA; Lachen, alt. 11–12,000 ft., J. D. H.—This is quite unlike any other species of *Lindera*. The adult leaves probably differ a good deal from the young here described.

17. **Daphnidium argenteum**, Kurz For. Fl. ii. 307; a deciduous tree, shoots silvery silky hairy, leaves 3½–6½ in. lanceolate to broad-lanceolate acuminate at both ends firmly membranous glabrous above appressed silvery-pubescent beneath penninerved laxly reticulate on both surfaces, petiole glabrescent or silvery-pubescent $\frac{1}{4}$ – $\frac{1}{2}$ in., flowers on very short tomentose pedicels forming a short densely tomentose raceme involucre by pubescent concave bracts at the base, perianth appressed pubescent filaments almost glabrous, anthers 2-celled. (Description from Kurz.)

MARTABAN and Eastern slopes of the PEGU Yomah, Kurz.

18. **Daphnidium lancifolium**, Thwaites Enum. 257; Meissn. in DC. Prodr. xv. 1. 229; “a tree young parts and inflorescence fulvous silky, leaves (5–7) more or less crowded at the ends of the branches 2–3½ by $\frac{1}{4}$ – $\frac{1}{2}$ in. lanceolate acutely acuminate smooth or minutely rugulose above white and pruinose beneath triple-nerved, base acute, lateral nerves hardly reaching the middle of the leaf, petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., buds (umbels) 3–4-fl. with 4 scales sessile on the branches below the leaves, flowers subsessile $\frac{1}{6}$ in. long.” Thwaites.

CEYLON; Central Province, Hapootelle district, Thwaites.

Of this its author says it is apparently near *D. melastomaceum*, but the few leaves I have seen do not bear this out; he says that he has seen only a single specimen mixed with *Actinodaphne stenophylla*, which it greatly resembles. The anthers are not described, and I suspect that if 4-celled this is a *Litsæa*, and that the 4 scales are the involucre bracts. On the specimen sent to Kew Thwaites says that he has seen neither flower nor fruit.

14. **CASSYTHA**, Linn.

Filiform twining parasites, adhering to their hosts by suckers. Leaves minute scales, or 0. Flowers minute, 2-sexual or dimorphic? spiked capitate or racemose, 3-bracteolate. Perianth-tube short and globose or (often in the same species) as long as the limb and turbinate; segments 6, 3 outer smaller. Perfect stamens 9, filaments of 1st series eglandular with 2-celled

introrse anthers, of the 2nd similar or stamens reduced to staminodes, of the 3rd 2-glandular with extrorse 2-celled anthers. *Fruit* enclosed in the succulent perianth-tube, crowned by its limb. *Cotyledons* at length confluent.—Species about 15, Australian, with a few S. African and one widely distributed.

1. **C. filiformis**, Linn. *Sp. Pl.* 35; quite glabrous, or young parts puberulous, stems slender, flowers sessile in lax or dense lateral spikes, perianth twice the length of the rounded ciliate bracteoles, outer sepals rounded ciliate, inner oblong, fruit globose smooth (not ribbed). *Nees Syst. Laurin.* 642; *Meissn. in DC. Prodr.* xv. 1. 255; *Wight Ic.* t. 1847; *Wall. Cat.* 2608 and 7534; *Roxb. Fl. Ind.* ii. 314; *Dalz. & Gibs. Bomb. Fl.* 223 *Griff. Notul.* iv. 353; *Hook. Fl. Exot.* t. 167; *Benth. Fl. Austral.* v. 311. *C. americana* and *C. guineensis*, *Meissn. in DC. l. c.* 311.—*Rheede Hort. Mal.* vii. t. 44.

From BANDA to BENGAL, SILHET? and CHITTAGONG, and southward to TRAVANCORE and CEYLON. PENANG, *Wallich*. MALACCA, *Griffith*.—DISTRIB. Arabia, Mascarene Island, Tropical E. Asia and islands, Australia, Polynesia, Tropical Africa and America.

Forming a web of leafless cords over bushes. *Spikes* $\frac{1}{2}$ –2 in.; flowers $\frac{1}{2}$ in., white, rather distant; bracts rounded, ciliate. *Perianth-segments*, outer small, rounded, ciliate; inner much longer, ovate. *Fruit* glabrous, the size of a pea, crowned by the perianth-lobes.

2. **C. capillaris**, *Meissn. in DC. Prodr.* xv. 1. 252; quite glabrous, stems capillary, flowers few in very small peduncled heads, bracts minute acute, sepals ovate obtuse inner rather the longest.

CEYLON, *Thwaites*.—DISTRIB. Borneo.

A much more slender plant than *C. filiformis*, forming hair-like masses of considerable length.

15. **HERNANDIA**, Linn.

Evergreen trees. *Leaves* alternate, ovate or peltate, 3–7-nerved. *Flowers* monoecious, 3-nately involucrate at the ends of the branches of a lax panicle, pedicelled, centre flower ♀ with a cupular involucre at its base, lateral ♂; bracts of involucre 4–5, subvalvate in bud. *Perianth-segments* in 2 valvate series, 3–6 in ♂ fl., 4–8 in ♀ fl. *Stamens* as many as and opposite to the outer perianth-segments, filaments 1–2- or e-glandular; anthers 2-celled, extrorse; staminodes 4–5 in fl. ♀. *Ovary* inferior; style short, stigma dilated toothed or lobed. *Fruit* enclosed in the enlarged involucre. *Seed* globose or ovoid, testa thick hard ribbed; embryo thick, lobed and ruminant.—Species 8, tropical.

H. peltata, *Meissn. in DC. Prodr.* xv. 1. 263; leaves rounded-ovate obtuse or acute peltate, flowers in hoary long-peduncled corymbs, filaments 2-glandular, fruit ovoid 8-ribbed. *Kurz For. Fl.* ii. 309; *Beddome Fl. Sylvat.* t. 300; *Benth. Fl. Austral.* v. 314; *Seem. Fl. Vit.* 205, t. 32. *H. Sonora*, Linn. *in part*; *Wight Ic.* t. 1855; *Thwaites Enum.* 258; *Wall. Cat.* 7811.

SINGAPORE, *Wallich*. ANDAMAN ISLANDS, *Herb. Calcutt.* CEYLON; on the sea-shore.—DISTRIB. Malay Archipelago, N. Australia, Pacific Islands, E. Africa, Madagascar.

A tree; branchlets stout, smooth, wood soft. *Leaves* 6–12 in., rather coriaceous, 5–9-nerved; petiole as long, stout. *Corymbs* 4–10 in. broad; flowers clustered, middle one of the three female with sometimes a few males below it. *Male fl.* $\frac{1}{2}$ in. diam.; segments 6, hoary, 2-seriate; filaments short. *Female fl.* smaller; involucre

cupular, $\frac{1}{10}$ in. long, in fruit greatly enlarged and enclosing the drupe; perianth-tube adnate to the ovary, segments 8, narrow; glands 4, subglobose; style villous, thickened upwards, deciduous with the perianth-lobes, stigma dilated irregularly lobed. *Fruit* enclosed in the involucre, except at the apex, together $1\frac{1}{2}$ in. diam. *Seed* hard.—I suspect that this may prove to be only a variety of the American *H. Sonora*, Linn.

Whilst this sheet was passing through the press, Mr. C. Curtis has sent from Penang flowering specimens of a plant with the habit and foliage of an *Endiandra*, but having 6 very short broad thick sessile anthers, opposite to each of which is a broad but rather longer villous staminode, which is closely appressed to the ovoid glabrous ovary. Each broad thick square anther has two small extrorse circular pores closed by caducous valves.—It is no doubt a new and very singular genus, allied to *Endiandra*, which may bear the name of *Micropora Curtisii*, in allusion to the pore-like cells of the six anthers.

ORDER CXXIX. PROTEACEÆ.

Trees or shrubs, rarely herbs. *Leaves* alternate or scattered, rarely sub-opposite or whorled, mostly hard, entire toothed or pinnatisect, exstipulate. *Inflorescence* various. *Flowers* 2-sexual. *Perianth* inferior, often irregular, segments 4 at first valvately cohering in a cylindric tube gibbous at the base, with free recurved tips. *Stamens* 4, shorter than and inserted on the segments; anthers erect, adnate to the filaments, 2-celled, introrse. *Hypogynous glands* or scales 4, free or connate, alternating with the stamens, or 0. *Ovary* 1-celled, often oblique; style terminal, tip thickened, stigma terminal or lateral. *Ovules* solitary or geminate or many 2-seriate. *Fruit* various. *Seed* exalbuminous; cotyledons compressed or fleshy, often unequal; radicle short inferior or lateral.—Genera 50, species about 950, chiefly Australian and S. African, none N. American, European or N. Asiatic.

1. HELICIA, Lour.

Trees or shrubs. *Leaves* alternate, entire or toothed. *Flowers* in terminal and axillary racemes, 2-sexual. *Perianth* regular, tube slender; limb narrow, straight, segments at length revolute. *Anthers* oblong, connective produced. *Hypog. scales* free, or confluent in a cup-shaped or annular disk. *Ovary* sessile; style slender, stigma terminal; ovules 2, basal or lateral, ascending. *Nut* hard, globose. *Seeds* subglobose, or 2 hemispheric.—Species 25, Tropical Asia and Australia.

* Racemes glabrous.

† *Leaves* narrowed at the base into a distinct petiole.

1. *H. erratica*, Hook. f.; quite glabrous, leaves 4-7 in. cuneate-obovate or -oblong to oblanceolate or elliptic-lanceolate acute or obtuse entire or coarsely serrate narrowed into a short petiole, racemes glabrous, hypog. scales more or less connate, ovary glabrous, fruit 1-1½ in. diam. obliquely globose or depressed umbonate. *H. cochinchinensis*, Kurz For. Fl. ii. 311, and Meissn. in DC. Prodr. xiv. 442 (the Assam plant only). *H. robusta*, Herb. Ind. Or. H. f. & T.

SIKKIM HIMALAYA, alt. 2-6000 ft., J. D. H. KHASIA Mts., common. MARTABAN, alt. 5-7000 ft., Kurz, Parish.

A small tree. *Leaves* 2-4 in. broad, coriaceous, shining above, nerves 7-12 pair; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. long. *Racemes* 6-9 in. *Perianth* pale yellowish, slender, $1\frac{1}{2}$ in. long when unexpanded. *Hypog. glands* obtuse. *Fruit* usually very oblique, base abruptly narrowed. *Cotyledons* turning a bright red when cut.—This is no doubt the Assam *H. cochinchinensis* of Meissner, and Kurz's plant of that name; it differs from Lourero's

H. cochinchinensis (which this author describes as having a small ovate drupe with a longitudinal furrow) in the very large broad fruit, and in being a mountain plant.—I suspect that the "Pundua Mt." (Khasia Mts.) specimens of *H. attenuata* of Wall. Cat. 1040/2 are this, but without fruit it is impossible to say.

2. *H. attenuata*, Blume in *Ann. Sc. Nat. Ser. 2. i.* 216; quite glabrous, leaves 3–6 in. elliptic-oblong acute at both ends narrowed into a short petiole entire or obscurely serrate, racemes quite glabrous, hypog. scales connate, ovary glabrous, fruit 2 in. long ovoid narrowed at both ends obtusely 6-angled. *Bennet Pl. Rar. Jav.* 83; *Meissn. in DC. Prodr.* xiv. 439. *Rhopala attenuata*, Jack *Mal. Misc.* i. No. 2. 10; *Wall. Cat.* 1040. *R. racemosa*, Roxb. *mss.*

PENANG, Jack. ? KHASIA MTS., De Silva.

This is not distinguishable from *H. erratica* except by the fruit.

3. *H. nilagirica*, Beddome in *Madr. Journ. Lit. and Sc.* 1864, with figure, and *For. Man.* 1878; quite glabrous, leaves broadly ovate elliptic or lanceolate acute base narrowed into the petiole coarsely acutely toothed submembranous, racemes shorter than the leaves, fruit spherical $\frac{1}{2}$ in. diam.

NILGHIRI HILLS; on Western slopes, alt. 3–4000 ft., Beddome.

This again closely resembles *H. erratica* and *attenuata*, but differs in the fruit, which from Beddome's observations is spherical and very small.—It is remarkable that no specimens of this exist in the collections of Wight or any other of the numerous collectors in the Nilghiris but Beddome's, and I have seen none.

4. *H. ceylanica*, Gardn. in *Calc. Journ. Nat. Hist.* vii. 453; quite glabrous, leaves 3–4 in. obovate-oblong obtuse or tip rounded quite entire narrowed into a petiole, racemes and ovaries quite glabrous, hypog. scales distinct tips subacute, fruit ovoid narrowed at both ends about 1 in. long. *Meissn. in DC. Prodr.* xiv. 438 (zeylanica); *Thwaites Enum.* 250; *Beddome For. Man.* 178.

CEYLON; in the Central Province, alt. 2–4000 ft., Gardner, Thwaites.

A middling-sized tree. Leaves $1\frac{1}{2}$ –2 in. broad; petiole $\frac{1}{2}$ in. Panicle with a purple rachis. Perianth pale yellow, unopened 1 in. long. Fruit (not seen by me) the size of a hazel-nut, black-purple.—This again is very near *H. attenuata*.

5. *H. petiolaris*, Bennet *Plant. Rar. Jav.* 84; quite glabrous, leaves 5–7 in. broadly oblong or broadly cuneately obovate obtuse or subacute quite entire, base suddenly narrowed and decurrent on the long petiole. *Meissn. in DC. Prodr.* xiv. 438. *Rhopala maluccana*, Jack *Mal. Misc.* i. No. 2. 10 (not of Brown); *Wall. Cat.* 1041.

SINGAPORE, Wallich. (Cult. in Penang, Jack.)

Leaves 5–6 by 3–3 $\frac{1}{2}$ in., firmly coriaceous; nerves spreading; petiole $1\frac{1}{2}$ in. Racemes longer than the leaves. Flowers 1 in. long.—Very distinct from any of the preceding species.

6. *H. terminalis*, Kurz *For. Fl.* ii. 312; glabrous or nearly so, leaves obversely oblong retuse with a mucro, base acuminate and tapering into a long slender petiole entire or somewhat waved, raceme at the end of the branchlets slender glabrous much longer than the leaves.

AVA; on the Kakhien Hills, Kurz.

I have seen no specimens of this, which from Kurz's description must be near *H. petiolaris*, and differs from its congener in the terminal raceme; the leaves are 3–5 in. long, the petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., and the flowers about $\frac{1}{2}$ in.

†† Leaves sessile or subsessile base obtuse or retuse.

7. **H. robusta**, Wall. Cat. 2702; quite glabrous, leaves obovate-oblong narrowed towards the rounded or obtuse base, obtuse or obtusely acuminate coarsely serrate, hypog. scales more or less connate, fruit obliquely globose apiculate abruptly narrowed into a short stipes. *Bennet Pl. Rar. Jav.* 83; *Meissn. in DC. Prodr.* xiv. 440; *Kurz For. Fl.* ii. 311. *H. macrophylla*, Wall. Cat. 3661. *H. castaneæfolia*, *Meissn. in DC. Prodr.* xiv. 441. *H. javanica*, *Blume in Ann. Sc. Nat. Ser. 2. i.* 217; *Bennet l. c.* 83, t. 18; *Meissn. l. c.* 440. *Helittophyllum javanicum*, *Blume Bijl.* 652. *Rhopala robusta*, *Roxb. Fl. Ind.* i. 363, and *Ed. Carey & Wall.* i. 366; *Wight Ic.* t. 191. *R. glabrata*, Wall. Cat. 1039.

ASSAM and KHASIA MTS., *Roxburgh, Wallich, Griffith.* MARTABAN and TENASSERIM, on the hills, alt. 2-4000 ft. MALACCA, *Griffith, Cumming, Maingay.*—DISTRIB. Java, Sumatra.

A small tree, branches robust. Leaves 8-12 in. by 3-5 in., very coriaceous, nerves strong beneath, serrated to the base or not; petiole 0 or very short and stout. Racemes shorter or longer than the leaves, sometimes 1 foot long. Flowers $\frac{1}{2}$ -1 in. long in bud. Fruit 1 in. diam., obscurely ribbed when dry.—*Meissner's H. castaneæfolia* was founded on specimens wrongly ticketed as from the Philippines. *Bennet* distinguished *H. javanica* by the hypogynous scales being free, but as *Kurz* describes those of *robusta* as all connate or "one or a few free," this character will not hold, and I can find no other.

8. **H. travancorica**, *Beddome mss.*; quite glabrous, leaves subsessile obovate-oblong obtusely acuminate distantly serrate base obtuse, racemes shorter than the leaves, fruit globose apiculate base rounded. *H. robusta*, *Beddome For. Fl.* t. 301 (*excl. syn.*).

SOUTH DECCAN; hills of Travancore and Tinnevely, at about 4000 ft. elevation, *Beddome.*

This resembles *H. robusta* in the form of the leaf, which is however smaller and more coriaceous; it differs in the short racemes 3 in. long, and notably in the quite globose perfectly smooth apiculate fruit, not at all stipitate but rounded at the base, and only $\frac{3}{4}$ in. diam.

** *Rachis of the raceme pubescent, tomentose or villous.*

9. **H. excelsa**, *Blume in Ann. Sc. Nat. Ser. 2. i.* 219; shoots rusty-tomentose, leaves oblanceolate or cuneately obovate obtusely acuminate quite entire or coarsely serrate narrowed into the rather slender petiole glabrous, racemes and flowers rusty-villous, ovary villous, fruit small, smooth. *Bennet Plant. Jav. Rar.* 84; *Meissn. in DC. Prodr.* xiv. 441; *Kurz For. Fl.* ii. 312. *H. salicifolia*, *Presl Epimel.* 247; *Meissn. l. c.* 439; *Kurz l. c.* *Rhopala excelsa*, *Roxb. Fl. Ind.* i. 363, and *Ed. Carey & Wall.* i. 365; *Wall. Cat.* 1038; *Wight Ic.* t. 190.

SILHET, *Roxburgh.* KHASIA MTS., alt. 3-5000 ft., *J. D. H. & T. T.* CHITTAGONG and TENASSERIM, *Helfer, &c.*—DISTRIB. Cambogia.

A large tree. Leaves 4-6 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., coriaceous, yellow green when dry; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. Racemes axillary and terminal, about equalling the leaves, more or less villous. Flowers 2-5-nate, yellowish green, $\frac{1}{2}$ - $\frac{3}{4}$ in. long in bud. Fruit (in Malaccan specimens) obliquely ovoid, obtuse, smooth, $\frac{1}{2}$ in. long when dry. *Presl's H. salicifolia* from Helfer (*Kew Distrib.* 4366) seems in no way different, except in the connate scales. *H. loranthoides*, *Presl*, from the Philippines, is possibly the same species. Malaccan specimens have nearly glabrescent flowers.

10. **H. pyrrhobotrya**, *Kurz in Journ. As. Soc. Beng.* 1873, ii. 303, and *For. Fl.* ii. 312; shoots rusty-villous, leaves oblanceolate narrowed into the very stout petiole acuminate coarsely serrate, glabrous or with the midrib beneath rusty-pubescent, racemes very long stout and flowers rusty-villous, ovary glabrous.

MARTABAN HILLS, alt. 4000 ft., *Brandis, Kurz.*

Branches very robust. *Leaves* 12-14 by 3-3½ in.; petiole ¾ in. *Racemes* as long as the leaves, rachis very stout, flowers 1-1½ in. long (*Kurz*) solitary or 2-3-nate; pedicels stout, villous; style 1½ in. *Fruit* unknown.—A very distinct species. *Kurz* describes the leaves as "narrowed towards the obtuse base;" but they are quite acute in our (solitary) specimen from *Kurz*.

ORDER CXXX. THYMELÆACEÆ.

Shrubs or trees, rarely herbs, with tough fibrous inner bark. *Leaves* alternate or opposite, simple, quite entire. *Flowers* usually 2-sexual, axillary or terminal, in heads umbels clusters spikes or racemes. *Perianth* regular, tubular or campanulate, 4-5-lobed, imbricate in bud, often with 1-2 scales at the base. *Stamens* 2, or as many or twice as many as the lobes; anthers 2-celled. *Disk* annular, cupular or of scales. *Ovary* superior, 1- rarely 2-celled (4-5-celled in *Gonystylus*); style short or long, terminal or eccentric, stigma capitate; ovules solitary or one in each cell, pendulous from near the top of the cell, anatropous. *Fruit* indehiscent (capsular in *Aquilarinæ*). *Seed* pendulous or lateral, albumen fleshy or 0; embryo straight, radicle superior.—Genera nearly 40, species 360, temperate and tropical.

TRIBE I. **Euthymeleæ.** *Ovary* 1-celled, 1-ovuled. *Fruit* indehiscent.

* *Perianth* without scales. *Stamens* as many and opposite the perianth-lobes or twice as many. *Flowers* 4-nerved.

† *Perianth* not circumsiss in fruit.

Perianth-tube cylindric. Style 0. Disk 0	1. DAPHNE.
Perianth urceolate. Style short. Disk 0 or minute . . .	2. THYMELÆA.
Perianth-tube cylindric. Style long, stigma linear . . .	3. EDGEWORTHIA.
Perianth-tube cylindric. Style short, stigma large . . .	4. WIKSTRØMIA.

†† *Perianth* circumsiss after flowering.

Shrubs, leaves flat	5. STELLERA.
Annuals, leaves linear	6. DIARTHRON.

** *Perianth* with scales above the stamens. *Flowers* 5-nerved.

Fruiting perianth circumsiss; pericarp thin	7. LASIOSIPHON.
Fruiting perianth not circumsiss; pericarp thick	8. LINOSTOMA.

TRIBE II. **Phaleriæ.** *Ovary* 2-celled; cells 1-ovuled. *Fruit* indehiscent.

Flowers sessile. *Stamens* exerted 9. PHALERIA.

TRIBE III. **Aquillariæ.** *Ovary* 2-celled; cells 1-ovuled. *Fruit* a loculicidal capsule.

Perianth-tube cylindric. Stamens 5	10. GYBINOPS.
Perianth campanulate. Stamens 10	11. AQUILARIA.

Anomalous genus. *Ovary* 4-5-celled. GONYSTYLUS.

1. **DAPHNE**, Linn.

Shrubs or small trees. *Leaves* alternate. *Flowers* in terminal or lateral sessile or peduncled heads or clusters. *Perianth* tubular, lobes 4, spreading; scales 0. *Stamens* 8, 2-seriate, subsessile; anthers dorsifixed. *Ovary* 1-celled; style very short or 0. *Fruit* coriaceous or fleshy. *Testa* crustaceous.—Species about 80, Europe, N. Africa, Temp. Asia.

1. **D. oleoides**, Schreb.; Boiss. *Fl. Orient.* iv. 1047; leaves 1–2½ in. obovate oblanceolate or linear-lanceolate obtuse acute or mucronate sparsely hairy or glabrate, flowers in terminal sessile or subsessile clusters ebracteate, perianth silky. Meissn. in *DC. Prodr.* xiv. 533; *Jaub. & Sp. Ill. Pl. Or.* t. 305. *D. mucronata*, Royle *Ill.* 322, t. 81, f. 2; *DC. l. c.* 536; *Brand. For. Fl.* 384; *Gamble Man. Ind. Timb.* 315. *D. coriacea*, Royle *l. c.* 321. *D. buxifolia*, Vahl *Symb.* i. 29; *Sibth. Fl. Græc.* t. 357; *Jaub. & Sp. l. c.* 306. *D. acuminata*, Boiss. & Hoh. *Diagn. Ser.* 1. xii. 103; Boiss. *Fl. Orient.* iv. 1048. ? *D. cashemireana*, Meissn. *l. c.* 535.

WESTERN HIMALAYA; from Garwhal westwards to Murree and the Suliman Range, alt. 3–9000 ft.—DISTRIB. Afghanistan and westwards to Italy.

A small much-branched shrub; branches green brown or purple, pubescent or glabrate. *Leaves* very variable, sessile, coriaceous. *Flowers* white or tinged with pink, about ½ in. long; lobes ovate or lanceolate, very variable in length. *Ovary* pubescent. *Fruit* dry or rather fleshy, ¼–½ in. long, ellipsoid, orange or scarlet.

2. **D. cannabina**, Wall. in *Asiat. Research.* xiii. 315, t. 7, 8, and *Cat.* 1045 (not of Loureiro); leaves 2–4 in. oblanceolate or linear-lanceolate or elliptic obtuse or obtusely acuminate glabrous, flowers in terminal and lateral sessile bracteate heads, perianth-tube cylindric pubescent. Griff. *Notul.* iv. 370. *D. papyracea*, Wall. ex Steud. *Nomencl.* 483; Meissn. in *Denkschr. Regensb. Bot. Gesell.* iii. 282, and in *DC. Prodr.* xiv. 537; *Dene. in Jacq. Voy. Bot.* 143, t. 148; *Brand. For. Fl.* 386; *Gamble Man. Ind. Timb.* 315; *Madden in Journ. As. Soc. Beng.* xviii. 610. *D. odora* & *Bholua*, Don *Prodr.* 68. *D. papyrifera*, Ham. mss.

TEMPERATE HIMALAYA; from Chamba to Bhotan, alt. 5–7000 ft. in the west, and 6–10,000 in the east. KHASIA Mts., alt. 3–6000 ft.

A shrub, 7–8 ft.; branches glabrous, except the youngest, leafy at the tips. *Leaves* thinly coriaceous, nerves faint; petiole very short. *Flowers* white purple or yellowish, very sweet; bracts oblong or lanceolate. *Perianth* ½ in., tube rather slender; lobes broad or narrow, ovate, acute. *Fruit* ovoid, succulent, red or orange.—Possibly two species are included here. Small alpine states 6–8 in. high from Sikkim have broadly elliptic-ovate hard reticulated leaves ½–1 in. long, and dark brown when dry; the stems are buried in the ground with the few leaves and small greenish-white flowers exerted.—Finding no authority for Steudel having attributed the name of *D. papyracea* to Wallich, I have taken for it that of *D. cannabina* which Wallich did give it, though under the erroneous impression that it was Loureiro's plant of that name (which is *Wikstrœmia indica*).

3. **D. involucrata**, Wall. in *Asiat. Research.* xiii. t. 6, and *Cat.* 1050; leaves 3–6 in. oblong-lanceolate acuminate glabrous, flowers in long-peduncled axillary involucre heads, perianth ¾–1 in. silkily villous. *D. Wallichii*, Meissn. in *DC. Prodr.* xiv. 2. 540. *Eriosolena Wallichii*, Meissn. *Gen.* ii. 242. *Scopolia involucrata*, C. A. Mey. in *Bull. Imp. Acad. Sc. St. Petersb.* 1843, 357. *D. longifolia*, Meissn. in *Regensb. Denkschr.* iii. 285; *DC. l. c.*—*Daphne* sp. Griff. *Notul.* iv. 370, and *l. c. Pl. Asiat.* t. 538.

SIKKIM HIMALAYA, alt. 6000 ft., J. D. H. & T. T. KHASIA Mts., alt. 4–6000 ft.,

common. Patkoye Mts. in UPPER ASSAM, *Griffith*. TENASSERIM Mts., alt. 4-5000 ft., *Parish*, &c.

A tall lax shrub, often 20 ft. high; branches 'glabrous, except the tips. *Leaves* narrowed at both ends, pale beneath, thin; nerves very many, slender, arching; petiole $\frac{1}{8}$ in. *Heads* few- or many-fl.; peduncles solitary or fascicled, filiform, $\frac{1}{4}$ -4 in. long, glabrous or villous, bracteolate at the base; involucre bracts 2, boat-shaped, obtuse, silky; flowers white, scented, limb flesh-coloured. *Perianth* villously silky; lobes ovate, acuminate, much shorter than the tube. *Fruit* ovoid, $\frac{1}{2}$ in. long, black.

4. ***D. pendula***, *Sm. Ic. Ined.* ii. 34*, t. 34; leaves 3-5 in. oblong-lanceolate acuminate glabrous, flowers in long-peduncled axillary involucre heads, perianth $\frac{1}{4}$ - $\frac{1}{2}$ in. silkily villous. *Meissn. in DC. Prodr.* xiv. 2. 540; *Miq. Fl. Ind. Bat.* i. pt. 1, 877. *D. montana*, *Meissn. in Regensb. Denkschr.* iii. 284. *Erisolena montana*, *Blume Bijdr.* 651; *Meissn. in DC. l. c.*

BURMA; on the hills between Nattoung and Moulmein, *Parish*.—DISTRIB. Java, Sumatra.

Very similar to *D. involucreata*, but smaller in all its parts, and with the flower smaller in proportion to the leaves. It may be only a variety.

2. THYMELÆA, *Endl.*

Herbs shrubs or undershrubs, rarely annual. *Leaves* scattered, usually small, narrow. *Flowers* small, 2-sexual or polygamous, axillary, sessile; bracts small. *Perianth* urceolate or males rarely tubular; lobes 4, spreading; scales 0. *Disk* minute annulate. *Stamens* 8, 2-seriate; anthers subsessile. *Ovary* subsessile, 1-celled, style very short, stigma capitate. *Fruit* dry, included in the perianth or wholly naked, pericarp membranous. *Testa* crustaceous, albumen scanty or 0.—Species 20, Mediterranean region to E. Asia.

T. arvensis, *Lamk. Fl. Franc.* iii. 218, and *Ill.* t. 293; annual, very slender, glabrous or sparsely pubescent, stem strict erect leafy, leaves sessile linear-lanceolate, flowers axillary sessile minute. *Meissn. in DC. Prodr.* xiv. 1. 551. *Lygia Passerina*, *Fasan. in Act. Acad. Neap.* 1787, 235; *Boiss. Fl. Orient.* iv. 1052. *Passerina annua*, *Wikstr. in Act. Holm.* 1818, 320; *Nees Gen. Fl. Germ.* iii. t. 47. *Stellera Passerina*, *Linn. Sp. Pl.* 559; *Jacq. Ic. Rar.* i. t. 68; *Reichb. Ic. Fl. Germ.* xi. 12, t. 550; *Gärtn. Fruct.* i. 186, t. 39, f. 2. *P. diarthronoides*, *Griff. Notul.* iv. 365, and *Ic. Pl. Asiat.* t. 534.

UPPER PANJAB; plains below Jummoo, *Thomson*. KASHMIR, Ramoo, alt. 6000 ft., *Clarke*.—DISTRIB. Afghanistan and westward to France and N. Africa.

Stem 8-18 in., sparingly branched, branches erect. *Leaves* $\frac{1}{2}$ - $\frac{1}{2}$ in., suberect, acuminate. *Flowers* $\frac{1}{10}$ in., hermaphrodite, in all the axils, and forming long leafy very slender spikes. *Perianth* appressed-pubescent; lobes ovate, obtuse, erect, very short. *Fruit* $\frac{1}{16}$ - $\frac{1}{8}$ in. long, ovoid, narrowed upwards.

3. EDGEWORTHIA, *Meissn.*

Shrubs. *Leaves* scattered. *Flowers* capitate, 2-sexual, in sessile or peduncled axillary heads; bracts involucreform or 0. *Perianth-tube* cylindric; lobes 4, spreading; scales 0. *Stamens* 8, 2-seriate; anthers subsessile. *Disk* annular, lobulate. *Ovary* sessile, villous, 1-celled; stigma elongate, cylindric. *Fruit* included in the base of the perianth, pericarp coriaceous. *Testa* crustaceous.

E. Gardneri, Meissn. in *Denkschr. Regensb. Bot. Gesellsch.* iii. 280, t. 6, and in *DC. Prodr.* xiv. 2. 543. *E. chrysantha*, Lindl. in *Journ. Hort. Soc.* i. 148, and *Bot. Reg.* 1847, t. 48; Meissn. in *DC. l. c.*; *Fl. des Serres*, t. 289. *E. papyrifera*, Zucc. in *Abhandl. Math. Phys. Kl. Bair. Acad.* iv. 3. 199; *Daphne Gardneri*, Wall. in *As. Research.* xiii. 388, t. 9, and *Cat.* 1044; *Don Prodr.* 69. *D. papyrifera*, Sieb. in *Act. Batav.* xii. 24.

CENTRAL and EASTERN HIMALAYA; Nepal, Wallich. Sikkim, alt. 5-7000 ft., J. D. H., &c. BHOTAN, Griffith.—DISTRIB. China, Japan.

A large much-branched bush, with stout branches. *Leaves* 3-5 in., elliptic-lanceolate, acuminate, glabrous above, pubescent or silky beneath; petiole $\frac{1}{4}$ in. *Peduncle* 0-1 in., stout, decurved, silky; heads 1-2 in. diam., naked at the base or surrounded with short linear silky bracts. *Flowers* densely crowded, golden yellow, sweet-scented. *Perianth* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, densely silky; lobes short, broadly ovate or rounded.—I find no character whereby to distinguish the Chinese and Japanese plant from the Himalayan.

4. WIKSTROMIA, Endl.

Trees or shrubs. *Leaves* opposite, rarely alternate. *Flowers* 2-sexual, in terminal racemes or spikes, ebracteate. *Perianth-tube* elongate; lobes 4, spreading. *Stamens* 8, 2-seriate, filaments short. *Disk* of 1-4 scales. *Ovary* villous, 1-celled; style short, stigma large globose. *Fruit* fleshy and naked, or more dry and included in the base of the perianth. *Testa* crustaceous, albumen sparing or 0.—Species about 20, Tropical and E. Asia, Australia, Pacific.

1. **W. indica**, C. A. Mey., var. *viridiflora*; glabrous, leaves subopposite $\frac{1}{2}$ -1 in. oblong or obovate-oblong tip rounded base cuneate, flowers in terminal subsessile fascicles, perianth nearly glabrous, lobes short obtuse. *W. viridiflora*, Meissn. in *Denkschr. Regensb. Bot. Gesellsch.* iii. 286, and in *DC. Prodr.* xiv. 2. 546; *Benth. Fl. Hongk.* 297. *Daphne viridiflora*, Wall. *Cat.* 1049. *Diplomorpha*? *viridiflora*, C. A. Mey. in *Bull. Imp. Acad. Sc. St. Petersb.* 1843, 358.

CHITTAGONG, J. D. H. & T. T. TENASSERIM; at Mergui, Griffith. SINGAPORE, Lobb.—DISTRIB. China, Mauritius (naturalized), Philippines.

A shrub. *Leaves* 1-1 $\frac{1}{2}$ in., thinly coriaceous, brown when dry, nerves numerous, very slender. *Flowers* few in a cluster, ebracteate. *Perianth* $\frac{1}{2}$ in. long, glabrous, greenish yellow. *Disk-scales* usually united in pairs. *Fruit* $\frac{1}{4}$ in. long, ovoid, scarlet.—This appears to be nothing but a short-leaved form of the common N. and S. Pacific Island and Malayan *W. indica*, which finds its western limit in the Bay of Bengal, and with which it is united by *Bentham* in the Australian Flora (vi. 37).

2. **W. canescens**, Meissn. in *Denkschr. Regensb. Bot. Gesellsch.* iii. 288, and in *DC. Prodr.* xiv. 2. 547; branchlets and inflorescence silkily pubescent, leaves alternate and opposite oblong-lanceolate acute usually glabrous above and pubescent beneath, peduncles axillary and terminal few-fld., perianth-lobes short obtuse. *Dcne. in Jacquem. Voy. Bot.* 145. *W. salicifolia*, *Dcne. in Ann. Sc. Nat. Ser.* 2. xx. 50, and in *Jacquem. Voy. Bot.* 144*, t. 149; Meissn. in *DC. l. c.* 546. *W. chamædaphne* and *W. inamœna*, Meissn. in *DC. l. c.* *W. virgata*, Meissn. *l. c.* 289, and in *DC. l. c.*; *Beddome For. Man.* 178, t. 25, f. 4. *Daphne canescens* & *virgata*, Wall. *Cat.* 1046, 1047. *D. sericea*, *Don Prodr.* 69. *D. inamœna*, *Gardn. in Calc. Journ. Nat. Hist.* vii. 454. *D. oppositifolia*, *Ham. mss.* *Diplomorpha canescens* & *virgata*, C. A. Mey. in *Bull. Imp. Acad. Sc. St. Petersb.* 1843, 358.

TEMPERATE HIMALAYA; from Kumaon to Central Nepal, alt. 5-9000 ft. KHASIA MTS., alt. 5-6000 ft. UPPER ASSAM, on the Patkoye Mts., Griffith

CEYLON; Central Province, alt. 6-8000 ft., *Walker, &c.*—DISTRIB. Afghanistan, N. China.

A small shrub, 1-3 ft. *Leaves* 1-3 in., thin, variable in breadth, sometimes faintly pubescent above and glabrous beneath, base cuneate; petiole $\frac{1}{8}$ in., with often a minute white bud in the axil. *Peduncle* slender, silky, rarely $\frac{1}{2}$ in.; flowers often at length spicate or even cymose. *Perianth* $\frac{1}{4}$ - $\frac{1}{2}$ in. long. *Disk-scales* linear. *Fruit* $\frac{1}{4}$ in. long, narrowly ovoid, silky; pericarp black, thin. *Embryo* large, in a thin layer of albumen, cotyledons flat oblong, radicle half its length.—Most of the species included here under *W. canescens* are founded on the cohesion or freedom of the hypogynous scales, which organs vary greatly in this and other genera of the Order. It is remarkable that this genus should not occur in the Nilghiris.

5. *STELLERA*, Linn.

Herbs undershrubs or shrubs. *Leaves* alternate. *Flowers* 2-sexual, in terminal sessile heads or spikes. *Perianth-tube* cylindric, at length circumsciss above the ovary; lobes 4, rarely 5, spreading; scales 0. *Stamens* 8, rarely 10, 2-seriate; anthers subsessile. *Disk* produced on one side into a lanceolate or linear blade. *Ovary* subsessile, 1-celled; style short, stigma capitate. *Fruit* dry, included in the base of the perianth, pericarp membranous.—Species about 6, Central and W. Asia.

S. Chamæjasme, Linn. *Amœn. Acad.* i. 400; a glabrous herb, stems erect simple leafy, leaves sessile elliptic-lanceolate acute or acuminate, heads involucrate. *Meissn. in DC. Prodr.* xiv. 2. 549. *S. hypericifolia*, *Endl. Gen. Suppl.* 4. ii. 63; *Meissn. l. c.* *S. concinna*, *Edgew. in Trans. Linn. Soc.* xx. 88; *Meissn. l. c.* *S. altaica*, *Thieb. in Pers. Synops.* i. 436; *Meissn. l. c.* *Passerina Stelleri*, *Wikstr. in Act. Holm.* 1818, 321. *P. racemosa*, *Wikstr. l. c.* 320; *Ledeb. Ic. Pl. Ross.* t. 374. *Wikstrœmia* ? *hypericifolia*, *Meissn. in Denksch. Regensb. Bot. Gesellsch.* iii. 287*. *Septas hypericifolia*, *Wall. Cat.* 1048.

WESTERN HIMALAYA; Kumaon and Garwhal, alt. 10-11,000 ft., *Wallich, &c.*—DISTRIB. Westward to the Caucasus, N. and Central Asia.

Rootstock long, woody; stems quite simple, rather stout, 6-10 in. high. *Leaves* opposite and alternate, $\frac{1}{2}$ -1 in., thin, veined, base rounded or cuneate, involucre like the cauline. *Flowers* in a sessile head, sweet-scented, yellow. *Perianth* $\frac{1}{4}$ - $\frac{1}{2}$ in. long, glabrous, tube slender; lobes very short, oblong.

6. *DIARTHRON*, Turcz.

Slender annuals. *Leaves* scattered, linear. *Flowers* minute, 2-sexual, in lax terminal racemes, ebracteate. *Perianth-tube* slender or urceolate, constricted and circumsciss above the ovary; lobes 4, spreading; scales 0. *Stamens* 8, 2-seriate; anthers subsessile. *Disk* 0. *Ovary* subsessile, glabrous, 1-celled; style short, stigma ovoid subclavate. *Fruit* dry, enclosed in the membranous base of the perianth, pericarp membranous. *Testa* crustaceous; albumen sparing or 0.—Species 2, Persia and Central Asia.

D. vesiculosum, *Fisch. & Mey. in Bull. Soc. Imp. Mosc.* 1839, 170; annual, slender, erect, leafy, leaves sessile linear obtuse or subacute, perianth-tube with 8 ridges, stamens 8. *Meissn. in DC. Prodr.* xiv. 2. 558; *Boiss. Fl. Orient.* iv. 1054. *D. carinatum*, *Jaub. & Sp. Ill. Pl. Or.* t. 105. *Passerina costata*, *Griff. Notul.* iv. 367, and *Ic. Pl. Asiat.* t. 535.

The PANJAB; Peshawur, *Vicary*. WESTERN TIBET; Iskardo, alt. 9000 ft., *Clarke*.—DISTRIB. Soongaria, Afghanistan, Persia.

A slender annual, 6-12 in., usually copiously dichotomously branched. *Leaves* $\frac{1}{2}$ - $\frac{2}{3}$ in., nerveless, rather glaucous. *Racemes* very slender, flowering $\frac{1}{2}$ in. long, fruiting 1 in.; flowers very shortly pedicelled. *Perianth* $\frac{1}{2}$ in. long, tube very slender, lobes short. Lower *anthers* smaller than the upper. *Fruit* $\frac{1}{2}$ - $\frac{1}{3}$ in. long, narrowly ovoid, perianth-tube membranous (vesicular when the fruit does not ripen).

7. LASIOSIPHON, Fresen.

Silky shrubs. *Leaves* opposite or scattered. *Flowers* 2-sexual, in dense heads with broad bracts. *Perianth-tube* cylindric, circumsciss above the ovary; lobes 5, spreading; scales above the stamens 5-10. *Stamens* 10, upper or all shortly exserted; anthers oblong or linear. *Disk* 0 or short, annulate. *Ovary* sessile, 1-celled; style filiform, stigma capitate. *Fruit* small, dry, included in the base of the perianth, pericarp membranous. *Testa* crustaceous; albumen scanty or 0.—Species about 25, Trop. and S. African and Trop. Asiatic.

L. eriocephalus, Dene. in Jacquem. Voy. Bot. 148; leaves subsessile from oblong to linear-oblong -lanceolate or oblanceolate acute glabrous or silky beneath, heads globose shortly peduncled, bracts hoary deciduous, perianth densely villous with long silky hairs. *Meissn. in DC. Prodr.* xiv. 2. 597; *Thwaites Enum.* 250; *Beddome For. Man.* 179, t. 25, f. 2. *L. speciosus*, Dene. l. c. 147, t. 150; *Meissn. in DC. l. c.* 598; *Dalz. & Gibs. Bomb. Fl.* 221. *L. sisparensis*, Hugelii? and insularis, *Meissn. in DC. l. c.* *L. Metzianus*, *Miq. Analect. Bot.* ii. 3, t. 1. *Daphne eriocephala*, *Wall. Cat.* 1051. *Lachnæa eriocephala*, *Heyne mss.* *Gnidia eriocephala*, *Meissn. in Regensb. Denkschr.* iii. 292; *Wight Ic.* t. 1859. *G. sisparensis*, *Gardn. in Calc. Journ. Nat. Hist.* 1; *Wight Ic.* t. 1860; *G. insularis*, *Gardn. l. c.* *G. monticola*, *Miq. in Flora* 1849, 557.

DECCAN PENINSULA; on the Ghats from the Concan southwards, ascending to 7000 ft. on the Nilghiris. CEYLON, ascending to 4000 ft.

A small tree or large much-branched bush, with much of the habit of *Edgeworthia Gardneri*; branchlets usually purplish. *Leaves* 2-3 by $\frac{3}{4}$ -1 in., not coriaceous, narrowed from the middle or above it to the rounded base, nerves very slender and oblique. *Heads* 1-2 in. diam.; involucre bracts oblong, acute, silky, shorter than the flowers, which are very numerous, densely packed and thickly clothed with white or buff long silky villous hairs. *Perianth* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, yellow; tube slender; lobes 4-5, oblong, obtuse; scales at its mouth very variable, oblong obcordate or 2-fid. —I can find no valid characters whereby to distinguish the 5 species here brought together, for which Decaisne and Meissner rely chiefly on the shape of the perianth-scales, and Thwaites has united both *speciosus* and *zeylanicus* with *eriocephalus*. The scales are described as minute obovate and notched in *L. eriocephalus*; obcordate in *L. sisparensis*; linear and bifid in *L. speciosus*; linear and entire in *L. Metzianus*, and small linear and fleshy in *L. insularis*. Wight further characterizes *L. sisparensis* by the tawny brown heads. *L. Hugelii*, Meissn., said to be from the Himalaya, is probably founded on an erroneously ticketed plant, for no species of the genus is known from that region, and Hugel collected in the Nilghiris; Decaisne indeed referred Hugel's plant doubtfully to *L. eriocephalus* itself. Beddome confirms this view of the species thus brought under one.

8. LINOSTOMA, Wall.

Shrubs sometimes climbing. *Leaves* opposite or subopposite. *Flowers* 2-sexual, in small paniced cymes; bracts 2, on the peduncle, at length greatly enlarged and membranous. *Perianth-tube* cylindric, base at length turgid, lobes 5, spreading; scales above the stamens 10, free or connate in

pairs. *Stamens* 10, filaments filiform, exserted; anthers ovoid or oblong. *Disk* 0. *Ovary* sessile, 1-celled; style filiform, stigma penicillate. *Fruit* ovoid, included or not in the inflated base of the perianth, pericarp dry corky or crustaceous. *Testa* membranous, albumen 0.—Species 5 or 6, Indian and Brazilian.

1. ***L. pauciflorum***, *Griff. in Calc. Journ. Nat. Hist.* iv. 234, *in note*; quite glabrous, leaves 1-1½ in. very shortly petioled elliptic or obovate apiculate, peduncle slender 1-2 fld., perianth glabrous, tube slender. *Meissn. in DC. Prodr.* xiv. 2. 600; *Kurz in Journ. As. Soc. Beng.* 1870, ii. 83, and *For. Fl.* ii. 334. *Psilæa dalbergioides*, *Miquel Fl. Ind. Bat. Suppl.* 355.

TENASSERIM; in the Pine forests of Martaban, alt. 3-4000 ft., *Kurz*. SINGAPORE, *Griffith, Maingay*.—DISTRIB. Sumatra.

An erect shrub, 4-6 ft.; branches long, slender, black when dry. *Leaves* thin rather glaucous beneath; nerves very numerous, spreading, parallel, slender; petiole $\frac{1}{16}$ in. *Peduncle* filiform, 1-2 in.; bracts leaf-like, but thinner, white, translucent; flowers few, nodding, greenish-white; pedicel short, slender. *Perianth* $\frac{3}{4}$ in. long, very slender; lobes linear-oblong; scales clavate. *Fruit* $\frac{1}{2}$ in. long, excluding the persistent perianth-lobes, quite glabrous, ellipsoid but narrowed above and below, perianth-tube with 10 slender ridges; pedicel swollen at the tip, pericarp coriaceous.

2. ***L. decandrum***, *Wall. Cat.* 4203; quite glabrous, leaves 2-3 in. petioled oblong or oblong-lanceolate acuminate, peduncle many-fld., perianth glabrous, tube ovoid. *Meissn. in DC. Prodr.* xiv. 1. 599; *Kurz in Journ. As. Soc. Beng.* 1870, ii. 83, and *For. Fl.* ii. 334; *Griff. Notul.* iv. 372. *Nectandra decandra*, *Roxb. Fl. Ind.* ii. 425.

SILHET, *Roxburgh*. CHITTAGONG, at Seetakoond, *J. D. H. & T. T.* TENASSERIM, *Kurz*.

An erect evergreen shrub; branches slender, dark, speckled with white. *Leaves* coriaceous, red-brown when dry, sometimes caudate-acuminate; nerves exceedingly slender and numerous; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in. *Peduncle* 2-3 in., rather stout, 6-10 fld.; bracts sessile, oblong, obtuse or acute, smaller than the leaves. *Flowers* umbellate, greenish-white, fragrant; pedicels $\frac{1}{4}$ in. long, jointed in the middle under the flower. *Perianth-tube* quite glabrous, $\frac{1}{4}$ in. long; lobes linear, as long as the tube; scales erect, clavate. *Fruit* $\frac{1}{2}$ in. long, broadly ellipsoid, acute above and below, perianth-tube sparingly silkily villous.

3. ***L. scandens***, *Kurz in Journ. As. Soc. Beng.* 1870, ii. 83, and *For. Fl.* ii. 334; finely rusty-tomentose, leaves 2-3 in. petioled broadly oblong or elliptic, tip rounded or retuse, flowers in paniced peduncled heads or umbels. *Enkleia malaccensis*, *Griff. in Calc. Journ. Nat. Hist.* iv. 234 *in note*, and *Notul.* iv. 363. *L. siamense*, *Kurz in Journ. As. Soc. Beng.* 1870, ii. 83, and *For. Fl.* ii. 334. *Lasiosiphon scandens*, *Endl. Gen. Pl. Suppl.* iv. pt. 2, 67; *Meissn. in DC. Prodr.* xiv. 2. 598.

PEGU and TENASSERIM, *Kurz*. MALACCA, *Griffith*. SINGAPORE, *Schomburgk, Maingay*.

A lax climbing shrub with long decurved branches. *Leaves* sometimes acute at the top and subcordate at the base, coriaceous, nearly glabrous except the midrib above, nerves arched; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Peduncles* stout, fruiting 1-3 in. long; bracts leaf-like, but thinner. *Flowers* imbricate, rusty-pubescent, greenish-brown. *Perianth-tube* cylindric; lobes 5, ovate; scales white, petaloid. *Fruit* nearly $\frac{1}{2}$ in. long, subglobose, on a short stout pedicel, ribbed, often bearing at its base the split perianth-tube, tip conical, glabrous, marked by two opposite whitish-yellow lines.—My specimens have no flowers, and the description is taken from Griffith. I have seen no Tenasserim specimens. *Kurz's L. siamense* is identical with *scandens*.

9. **PHALERIA**, Jack.

Trees. *Leaves* opposite. *Flowers* 2-sexual, in terminal or lateral sessile heads; bracts involucriform, leafy, deciduous. *Perianth-tube* elongate; lobes 4-6, spreading; scales 0. *Stamens* 8-12, 2-seriate, exserted, filaments filiform; anthers small. *Disk* cupular or annulate. *Ovary* 2-celled; style filiform, stigma capitate. *Drupe* naked, succulent or fleshy, endocarp coriaceous or hard, 1-2-celled. *Testa* thin; albumen 0.—Species about 8, Eastern Asiatic, Malayan and Australian.

P. cauliflora, Benth. in Gen. Pl. iii. 199; quite glabrous, leaves 6-9 in. shortly petioled oblong-lanceolate or oblanceolate caudate-acuminate base acute, flowers in subsessile heads on the sides of the branches, perianth glabrous, margins of lobes pubescent. *Beddome For. Man.* 180, t. 25, f. 5. *Drymispermum cauliflorum*, Thwaites Enum. 251.

CEYLON; in the Pasdoon Corle, Thwaites.

A small elegant tree, with long subpendulous branches. *Leaves* shining, green, rather membranous, base acute; nerves very slender, 8-10 pair, rather arched; petiole $\frac{1}{2}$ in. *Perianth* $\frac{3}{4}$ in. long, tube slender, lobes rounded. *Fruit* $\frac{3}{4}$ in. long, almost as broad, obliquely obovoid or turgid, subacute, narrowed into a short stipes, fleshy, red.

10. **GYRINOPS**, Gærtn.

Trees. *Leaves* alternate, shining. *Flowers* 2-sexual, in terminal subpanicked umbels, ebracteate. *Perianth-tube* slender; lobes 5, spreading; scales above the stamens connate in a ring. *Stamens* 5; anthers subsessile, connective very thick. *Disk* 0. *Ovary* long-stalked, 2-celled; style subulate, stigma ovoid. *Capsule* stipitate, compressed, loculicidally 2-valved. *Seeds* ovoid, with a long tail-like appendage, testa crustaceous, inner coat thick, albumen 0.—Species 2, a South Indian and Moluccan.

G. Walla, Gærtn. *Fruct.* ii. 276, t. 140; glabrous except the silky shoots and young foliage, leaves oblong or elliptic caudate-acuminate, nerves very slender. *Meissn. in DC. Prodr.* xiv. 602; *Hook. Ic. Pl.* t. 5; *Wight Ic.* t. 1850; *Bedd. Fl. Sylv.* t. 303.

CEYLON, common in the warmer parts.

A tree with slender branches and yellowish foliage of a light brown when dry. *Leaves* 2-3 in., very variable in breadth, base acute; nerves mere striations, transverse, very closely placed; petiole very short. *Umbels* few-fl'd., very shortly peduncled. *Perianth* $\frac{3}{4}$ in. long; tube slender, acute at the base; lobes very short, rounded, pubescent within.—In Gen. Plant. iii. 200, this is erroneously said to be a native of the Indian Peninsula.

11. **AQUILARIA**, Lamk.

Trees. *Leaves* alternate; nerves slender, parallel. *Flowers* 2-sexual, in axillary and terminal peduncled or subsessile umbellules, ebracteate. *Perianth* campanulate; lobes 5, broad, spreading; scales above the stamens 5, hairy, connate at the base. *Stamens* 10; anthers subsessile, oblong; connective broad. *Disk* 0. *Ovary* subsessile, villous, perfectly or imperfectly 2-celled; stigma large, subsessile. *Capsule* compressed, oblanceolate or obovate, loculicidal; pericarp coriaceous or hard and woody. *Seeds* of *Gyrinops*.—Species 2 or 3, E. Asiatic, Malayan and Chinese.

1. **A. Agallocha**, Roxb. *Cat.* 33, and *Fl. Ind.* ii. 422; nearly glabrous

except the silky shoots, leaves petioled linear-oblong or lanceolate or oblanceolate caudate-acuminate, fruit $1\frac{1}{2}$ –2 in. oblanceolate acuminate thinly coriaceous glabrous. *DC. Prodr.* ii. 59; *Meissn. in DC. l. c.* xiv. 2. 601; *Wall. Cat.* 7250; *Roxb. & Coleb. in Trans. Linn. Soc.* xxi. 199, t. 21; *Royle Ill.* 173, t. 36, f. 1; *Kurz For. Fl.* ii. 335; *Miquel Fl. Ind. Bat.* i. pt. 1, 882; ? *Griff. Notul.* iv. 358.—*Gyrinopsis* species *Assamica*, *Benth. in Gen. Pl.* iii. 200.

EASTERN HIMALAYA; Bhotan, *Griffith*. ASSAM, *Hamilton*. KHASIA MTS., SILHET and TIPPERA HILLS, *Roxburgh*, &c. MARTABAN HILLS, *Kurz*.

A large evergreen tree. *Leaves* 2–3½ in., thinly coriaceous, shining, sometimes subsilky on the nerves beneath, nerves very many and faint; petiole $\frac{1}{10}$ in. *Umbels* very many-fl., sessile or shortly peduncled, silky; flowers white, about equalling their pedicels or shorter. *Perianth* persistent in fruit, $\frac{1}{4}$ – $\frac{1}{2}$ in. broad and long, silky without, densely villous within; lobes rounded, ovate, equalling the turgid turbinate tube; scales villous.—I have seen no Martaban specimens, which are described by *Kurz* as having obovate-cuneate densely tomentose capsules. The figure in the Linnæan Transactions represents a short broad thick capsule, quite like that of *A. malaccensis*, and very different from those of the Bhotan and Khasian *A. Agallocha*. *Griffith* does not describe the fruit, and I am hence in doubt whether the plant of the *Notulæ* is this or *malaccensis*; he gives Mergui as a habitat, whence I have seen no specimens.—Eagle or Aloe-wood; Aggur, *Beng.*

2. ***A. malaccensis***, *Lamk. Dict.* i. 49, and *Ill.* t. 356; glabrous except the silky shoots, leaves oblong-lanceolate shortly obtusely caudate-acuminate, fruit 1 in. broadly obovoid very thick and woody when ripe. *DC. Prodr.* ii. 59; *Meissn. in DC. l. c.* xiv. 2. 601, *excl. citat. of Benth.*; *Dict. Sc. Nat.* t. 248; *Kurz For. Fl.* ii. 236. *A. ovata*, *Cav. Diss.* vii. 377, t. 224.—*Rumph. Amb.* ii. 34, t. 10.

MALACCA, *Griffith*, *Maingay*. TENASSERIM ? *Kurz*.—DISTRIB. Malay Islands.

Very similar to *A. Agallocha* in foliage, which is however rather smaller, and it differs in the much smaller flowers and short broad woody capsule, the valves of which are $\frac{1}{4}$ inch thick at the suture.—The Honble. C. Smith sends from Perak, under the name of Kaya tang Karus, the foliage of what may be another species, the leaves being much broader, with much longer acuminate tail-like points; it produces Garu, (Taras Gharu, *Griffith*), the name given to the wood of *A. malaccensis*.

ANOMALOUS GENUS (referable to TILIACEÆ.)

GYNSTYLUS, *Teijsm. & Binnend.*

Lofty trees, inner bark not tenacious. *Leaves* alternate, rigid, many-nerved, glabrous. *Flowers* small, bisexual, in axillary and terminal peduncled spicate umbels. *Perianth* short, cup-shaped, 5-cleft, thickly coriaceous, hirsute within, persistent, with a ring of setaceous incurved processes at the base. *Stamens* very numerous, at the base of the perianth, filaments very short; anthers basifixed, elongate, 2-celled, dehiscing lengthwise. *Ovary* 4–6-celled; style filiform, deflexed, stigma clavate 2-lobed; ovules solitary in each cell, pendulous, anatropous. *Fruit* subglobose, 2–5-angled or furrowed, pericarp very thick. *Seeds* pendulous, oblong, curved, exalbuminous.—Species 3 or 4, Malayan.

G. Maingayi, *Hook. f.*; leaves 4–5 in. shortly petioled elliptic-oblong acuminate glabrous base rounded, perianth $\frac{1}{4}$ in. diam., fruit ellipsoid 1–1½ in. long obtuse, unequally 2–4-valved, 6-celled with 3 or more cells abortive.

MALACCA, *Maingay* (*Kew Distrib.* 1441).

A tree, branches woody with black wrinkled bark, the young ones and those of the inflorescence finely grey-pubescent. *Leaves* $1\frac{1}{2}$ –2 in. diam., quite glabrous and rather shining above, faintly pubescent on the stout midrib beneath, dark brown when dry; nerves very numerous, parallel and prominent beneath; petiole $\frac{1}{2}$ in. *Inflorescence* apparently forming a narrow erect woody panicle 4–6 in. long with short stout branches. *Fruit* (unripe) smooth, seated on the perianth, the lobes of which are revolute; valves with walls $\frac{1}{2}$ in. thick, formed of transverse woody fibres; pedicel $\frac{1}{2}$ – $\frac{3}{4}$ in. long. *Seeds* (quite unripe) $\frac{1}{2}$ – $\frac{3}{4}$ in. long, semicircular, quite flat.—This differs from the Javan *G. Miquelianus*, Teijsm. & Binn. (in Bot. Zeit. 1862, 265, Miquel Ann. Mus. Lugd. Bat. i. 132, f. 4), in the much smaller flower and fruit. *G. bancanus* again has flowers very much smaller than in *G. Maingayi*. For the reference of this genus to *Tiliaceæ* see Baillon, Hist. Pl. vi. 122, and Adansonia, xi. 327.

ORDER CXXXI. ELÆAGNACEÆ.

Shrubs or trees, with copious silvery or brown scales. *Leaves* alternate or opposite, quite entire, exstipulate. *Flowers* small, regular, 1–2-sexual, in axillary fascicles or cymes, white or yellow. *Perianth* in the 2-sexual and female fl. tubular, 2–6-cleft, in the male of *Hippophæe* of 2 membranous sepals. *Stamens* adnate to the perianth-tube, in the male fl. twice as many as the lobes, in the 2-sexual as many as the lobes and opposite them. *Ovary* free, 1-celled; style filiform, stigma lateral; ovule 1, basal, erect, anatropous. *Fruit* indehiscent, enclosed in the perianth-tube. *Seed* ascending, albumen 0 or scanty; embryo straight, axile, cotyledons thick, radicle inferior.—Genera 3, species 16, North Temp. and Tropical regions.

Perianth 4-fid 1. ELÆAGNUS.
Perianth of ♂ 2-partite, membranous, of ♀ 2-fid 2. HIPPOPHÆE.

1. ELÆAGNUS, Linn.

Perianth-tube oblong or globose, constricted above the ovary; limb valvately 4-cleft, deciduous. *Stamens* 4, on the mouth of the corolla. *Style* linear, included, stigma lateral.—Species about 12.

1. *E. hortensis*, *M. Bieb. Fl. Taur. Cauc.* ii. 112; arboreous, branches dark brown, leaves deciduous ovate-oblong or linear-oblong silvery beneath, flowers 1–3-nate, fruit ellipsoid-oblong, endocarp thick bony. *Schlecht. in DC. Prodr.* xiv. 609; *Boiss. Fl. Orient.* iv. 1056; *Brand. For. Fl.* 389. *E. angustifolia*, *Linn.*; *Reichb. Ic. Fl. Germ.* xi. t. 549; *Sibth. Fl. Græc.* t. 152; *Bot. Reg.* t. 1156. *E. orientalis*, *Linn. Mant.* 41; *Pall. Fl. Ross.* i. 11, t. 5. *E. Moorcroftii*, *Wall. Cat.* 4031; *Schlecht. in DC. l. c.* 610.

WESTERN TIBET, alt. 5–10,500 ft., *Moorcroft, Thomson, &c.* WESTERN HIMALAYA, alt. 6–7000 ft., *Edgeworth*.—DISTRIB. Westwards to Spain, Western and Central Asia to China.

A tree, 12–30 ft. high, often spinous, young silvery. *Leaves* 1–3 in., obtuse, nerves faint; petiole $\frac{1}{2}$ in. *Flowers* pedicelled, yellow, fragrant. *Perianth* $\frac{1}{2}$ – $\frac{1}{4}$ in. long, silvery, campanulate above, teeth triangular-ovate. *Style* glabrous. *Fruit* $\frac{1}{4}$ in. long, red, dry or fleshy.

2. *E. umbellata*, *Thunb. Fl. Jap.* 66, t. 14; shrubby, leaves deciduous oblong-lanceolate silvery beneath, flowers clustered, fruit small ellipsoid and contracted at both ends or subglobose, endocarp coriaceous ribbed woolly within. *Schlecht. in DC. Prodr.* xiv. 614; *Maximov. Diagn. Dec.* viii. 560; *Brand. For. Fl.* 391; *Gamble Man. Ind. Timb.* 318. *E.*

parvifolia, *Wall. Cat.* 4026; *Royle Ill.* 323, t. 81, f. 1; *Bot. Reg.* xxix. t. 51. *E. reflexa*, *Dene. & Morren in Ann. de Hort. Paris*, 1841.

TEMPERATE HIMALAYA; from Kashmir to Nepal, alt. 3-10,000 ft.—DISTRIB. Affghanistan, N. China, Japan.

Branches often thorny, not so dark as *E. hortensis*. *Leaves* 1-2½ in., obtuse, glabrous or sparsely pubescent above, nerves obscure; petiole ¼ in. *Flowers* pedicelled, appearing with the leaves, white, fragrant. *Perianth* ¼ in., silvery, tube slender, narrowly funnel-shaped, teeth broadly triangular-ovate. *Fruit* ½ in. long, succulent.—I follow Maximovicz in referring *E. reflexa* to this, but the only specimen so called that I have seen is from Thuret's garden (Antibes) and is *E. latifolia*.

3. *E. pyriformis*, *Hook. f.*; shrubby, leaves persistent? oblong or elliptic subsilvery beneath, flowers clustered, fruit very small very shortly pedicelled pyriform acute at both ends, endocarp crustaceous smooth glabrous within.

UPPER ASSAM; Mishmi Hills, or the Lohits near Koondilak, *Griffith*.

Branches brown, none silvery, obscurely scaly. *Leaves* 2-3 in., obtuse or subacute, rusty-brown above when dry, young only silvery beneath, older discoloured; petiole ¼-½ in. *Flowers* not seen. *Fruit* ¼-½ in. long, turgid, clothed with appressed brown hardly shining scales, turbinate narrowed below; top mammillate or beaked.—The fruit is quite unlike that of any other species.

4. *E. latifolia*, *Linn. Sp. Pl. Ed.* 2, 177 (*excl. syn.*); shrubby, erect or scandent, leaves ovate oblong elliptic or almost rounded obtuse or acute, silvery or rusty beneath, flowers usually many in a cluster, fruit large linear-oblong, endocarp coriaceous ribbed woolly within. *Schlecht. in DC. Prodr.* xiv. 610; *Maximov. Diagn.* viii. 560; *Brand. For. Fl.* 390, t. 46; *Wight Ic.* t. 1856; *Wall. Cat.* 4028; *Gamble Man. Ind. Timb.* 317; *Beddome, Fl. Sylv.* t. 180; *Thwaites Enum.* 252 (*excl. syn. parvifolia*). *E. conferta*, *Roxb. Fl. Ind.* i. 440, and *Ed. Carey & Wall.* i. 460; *Kurz For. Fl.* ii. 331. *E. arborea*, *Roxb. l. c.* 441, and *Ed. Carey & Wall.* 461; *Schlecht. l. c.* 611; *Wall. Cat.* 4027; *Don Prodr.* 67. *E. armata*, *Ham. mss.* *E. ferruginea*, *A. Rich. Monogr. Elæagn.* 387, 404; *Schlecht. l. c.* 610; *Wall. Cat.* 4029. *E. Thwaitesii* & *Wallichiana*, *Schlecht. l. c.* 611, 612. *E. Kologa*, *Schlecht. l. c.*; *Dalz. & Gibs. Bomb. Fl.* 224. *E. elliptica*, *Herb. Heyne*. *E. Simoni*, *Hort.*

SUBTROPICAL and TEMPERATE HIMALAYA; from Kumaon, alt. 2-7000 ft., to Sikkim, alt. 5-8000 ft.; Bhutan and the Mishmi Hills. KHASIA MTS., alt. 0-5500 ft. BENGAL, at Comilla, *Clarke*. CHITTAGONG, *J. D. H. & T. T.* TENASSERIM, *Griffith*. PENANG, *Maingay*. DECCAN PENINSULA; from the Concan southwards, ascending to 7000 ft. CEYLON, ascending to 5000 ft.—DISTRIB. Burma, Malay Islands, China.

A bush small tree or climber, very variable in habit, trunk sometimes 6 in. diam.; branches often spinescent. *Leaves* 4-5 in., very variable, thin or coriaceous, from almost rounded to elliptic-lanceolate, obtuse acute or acuminate, silvery or bright rusty-red beneath; petiole ¼-½ in. *Flowers* often very numerous, pedicel lengthening in fruit. *Perianth* campanulate, lobes very broad. *Fruit* ¾-1½ in. long, elliptic-oblong, fleshy, red, acid, ribs 8, strong.—Roxburgh figures the flowers as white; they are of a pale yellow, but probably vary.

2. HIPPOPHAE, *Linn.*

Dioecious shrubs or small trees, often spinescent. *Leaves* alternate, narrow. MALE FL. in axillary clusters, bracts deciduous. *Perianth-segments* 2, opposite. *Stamens* 4. FEMALE FL. solitary. *Perianth* tubular, 2-dentate. *Fruit* a membranous utricle enclosed in the succulent perianth.

Seed oblong, testa crustaceous, shining, albumen scanty.—Species 2, Europe and N. Asia.

1. **H. rhamnoides**, Linn.;—*Schlecht. in DC. Prodr.* xiv. 607, and in *Linnaea* xxxii. 296; leaves from obovate to linear-oblong, not tomentose, clothed beneath with short silvery or rusty circular scales. *Boiss. Fl. Orient.* iv. 1055; *Reichb. Ic. Fl. Germ.* t. 549; *Brand. For. Fl.* 388; *Gamble Man. Ind. Timbers*, 317. *H. tibetana*, *Schlecht. in Linnaea* l. c.

NORTH-WESTERN HIMALAYA; in the beds of streams of the inner drier ranges, from Kumaon westwards, alt. 7000–12,000 ft. WESTERN TIBET, ascending to 15,000 ft. —DISTRIB. Affghanistan and westwards to N. and Middle Europe, N. and Central Asia.

A thorny shrub or small tree, with rigid branches and silvery twigs and leaves. *Leaves* $\frac{1}{2}$ –2 in., narrowed into the short petiole, above sparsely scaly when young, green and glabrous in age, beneath clothed with circular toothed scales. *Flowers* on the old wood; male minute; perianth-segments oblong; filaments short. *Fruit* in diam., oblong or globose, orange yellow or scarlet.—Excessively variable in habit, and in the density of the foliage, and the breadth and shape of the leaves.

2. **H. salicifolia**, *Don Prodr.* 68; leaves linear-lanceolate densely clothed beneath with white or rusty stellate hairs and some circular scales. *Schlecht. in DC. Prodr.* xiv. 607, and in *Linnaea* xxxii. 295; *Brand. For. Fl.* 387. *H. conferta*, *Wall. Cat.* 4032; *Royle Ill.* 323.

TEMPERATE HIMALAYA, from Jamu to Sikkim, alt. 5–10,000 ft.

A willow-like shrub, 10–20 ft., with lateral thorns. *Leaves* 2–4 in., dull green and glabrous or pubescent above, margins usually recurved, midrib often rusty red. *Flower* as in *H. rhamnoides*, but fruit smaller (always?).—Different as this plant looks in its ordinary condition from *H. rhamnoides*, I expect that it will prove a form of that plant due to the moister climate which it affects.

ORDER CXXXII. LORANTHACEÆ.

Parasitic evergreen shrubs. *Leaves* usually opposite, entire, exstipulate, sometimes absent. *Flowers* 1–2-sexual, racemed spicate or fascicled, usually bracteate and often 2-bracteolate. *Calyx* adnate to the ovary, limb truncate or 0, rarely toothed. *Petals* 4–8, free or connate, valvate in bud. *Stamens* equal to and opposite the corolla-lobes, usually inserted on them. *Ovary* inferior, 1-celled; style short or long, stigma simple; ovule 1, erect, adnate all round to the walls of the ovary. *Fruit* a 1-seeded berry or drupe. *Seed* adnate to the pericarp, albumen fleshy; embryo straight, radicle superior.—Genera 13, native of tropical and a few of temperate countries; species about 500.

Flowers 2-sexual 1. LORANTHUS.

Flower 1-sexual.

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|---|-------------------|
| Anthers adnate to the petals, opening by pores | 2. VISCUM. |
| Anthers on the middle of the petals, dehiscing transversely | 3. ARCEUTHOBIMUM. |
| Anthers at the base of the petals, many-celled | 4. NOTOTRICHOS. |
| Anthers at the base of the petals, 2-celled | 5. GINALLOA. |

1. LORANTHUS, Linn.

Leaves opposite or alternate. *Flowers* 2-sexual. *Petals* free or more or less connate into a tubular corolla with spreading tips. *Stamens* inserted on the petals, anthers adnate or versatile, cells parallel.—Species about 350, mostly tropical.

SECT. I. **Euloranthus**. *Flowers* small, under $\frac{1}{4}$ in.; bract scale-like or hollow; bracteoles 0. *Petals* 4-6, free. *Anthers* ovate or oblong, base obtuse, cells unequal or one suppressed.

1. **L. odoratus**, Wall. in Roeb. *Fl. Ind. Ed. Carey & Wall.* ii. 215, and *Cat.* 505; quite glabrous, leaves subopposite elliptic or lanceolate, flowers minute opposite or fascicled on axillary spikes, petals 6 free. *Don Prodr.* 143; *DC. Prodr.* iv. 294. *L. hexapetalus*, Ham. mss.

NEPAL, Wallich; E. Nepal and Sikkim, alt. 7000 ft., J. D. H. Khasia Mts. on oaks, alt. 5-6000 ft., Griffith, J. D. H. & T. T. (*Loranth.* 27, 28).

Bushy, bark dark. *Leaves* 3-5 in., fleshy, narrowed into a petiole, often falcate, penninerved, nerves slender. *Spikes* 1-2½ in., strict, solitary or fascicled; flowers $\frac{1}{4}$ - $\frac{1}{2}$ in., yellowish, sweet-scented. *Ovary* with the base sunk in the rachis; calyx-limb short; style very stout, stigma capitate. *Petals* spatulate, $\frac{1}{2}$ in. long; buds clavate. *Fruit* ellipsoid, glabrous.

2. **L. Lobbii**, Hook. f.; leaves opposite sessile ovate-lanceolate from a rounded or acute base glabrous, flowers minute sessile fascicled in small sessile clusters, calyx rusty-tomentose, petals 4 free puberulous.

PENANG, Lobb, Maingay (*Kew Distrib.* 695/2), Curtis.

Branches terete; bark pale, obscurely puberulous. *Leaves* 2½-4 in., thickly coriaceous, almost nerveless, obtusely acuminate, minutely impressed-punctate through the contraction of the tissues on both surfaces which are similar. *Flowers* sometimes 1-sexual; clusters 6-20-fl., $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. *Petals* $\frac{1}{6}$ in. long, linear, obtuse, puberulous, free; buds oblong, tip rounded. *Ovary* globose; calyx-limb shortly tubular. *Style* clavate, stigma obtuse. *Fruit* $\frac{1}{6}$ in. long, puberulous, ellipsoid.—This is the plant referred to in *Gen. Plant.* iii. 208 as from Moulmein, and possibly *L. axanthus*, Korth. The Moulmein habitat is an error; there are 3 specimens of it in the Kew Herbarium, all from Lobb, and all bear his number 338: of these one is stated to be from Java, a second from Penang, and a third from Moulmein. As, however, Maingay's specimens are from Penang, so no doubt are all the others. It differs from the Sumatran *L. axanthus*, Korth. (*Miq. Fl. Ind. Bat. i.* 1. 834), in the subsessile leaves and other characters. There are very imperfect specimens of probably this species from Borneo (Beccari, 2378).

3. **L. nodiflorus**, Thwaites *Enum. Fl. Ceyl.* 134; leaves opposite petioled elliptic acute or acuminate glabrous, flowers small sessile fascicled in sessile clusters, calyx rusty-tomentose, petals 4 free glabrous.

CEYLON, Walker; in forests of the Ambagamowa District, Thwaites.

Branches terete, thickly lenticellate. *Leaves* 2½-3 in., thickly coriaceous, almost nerveless, tissue contracted as in *L. Lobbii*. *Flowers* in small clusters. *Ovary* globose. *Style* filiform, stigma hemispheric; calyx-limb short, dilated. *Petals* $\frac{1}{2}$ in. long, linear, obtuse, quite glabrous; buds linear, tip obtuse.

SECT. II. **Phœnicanthemum**. *Flowers* small, not 1 in. long, spicate or racemose, 2-sexual; bract scale-like, bracteoles 0. *Corolla* lobes or segments 4-5, reflexed symmetrically; buds often clavate at the tip. *Anthers* oblong, erect, continuous with the filament, 2-celled. PHÆNICANTHEMUM (*Gen.*), Miquel.

* *Racemes or spikes very many-fl., quite glabrous.*

4. **L. Wallichianus**, Schultz. *Syst.* vii. 100; quite glabrous, leaves opposite and alternate petioled elliptic obtuse penninerved, racemes slender fascicled shorter than the leaves, flowers $\frac{1}{4}$ in. 4-merous, glabrous, buds straight subcylindric obtuse, ovary smooth. *DC. Prodr.* xvi. 294; *Wight*

l. t. 143; *Wight & Arn. Prodr.* 381; *Dalz. & Gibs. Bomb. Fl.* 109. *L. polystachyus*, *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 217; *Wall. Cat.* 509. *L. terrestris & tetrandrus*, *Heyne mss.*

DECCAN PENINSULA; on the Western Ghats, from the Concan southwards.

Branches terete, bark pale, dotted. *Leaves* $2\frac{1}{2}$ –4 in., very coriaceous, base acute, nerves slender; petiole $\frac{1}{2}$ in., stout. *Racemes* 1–3 in., suberect; pedicels $\frac{1}{8}$ – $\frac{1}{6}$ in.; bract concave, gibbous. *Flower* erect, then spreading, pale red. *Ovary* globose; calyx-limb annular. *Corolla* 4-cleft; style slender, stigma capitate. *Fruit* $\frac{1}{2}$ in., ovoid, rugose.

5. ***L. intermedius***, *Wight mss.*; quite glabrous, leaves opposite and alternate petioled elliptic or broadly ovate obtuse penninerved, racemes rather stout solitary or fascicled shorter than the leaves, flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. 4-merous glabrous, buds curved subcylindric, ovary smooth. *L. Blumeanus*, *Wight mss. in part.*

DECCAN PENINSULA; Shevaggerry Hills and Khalsa Range, alt. 3500 ft., *Wight (Kew Distrib.* 1234). Nilghiri and Kurg Mts., *G. Thomson (Loranth.* 37, *Herb. H. f. & T.)*.

Very near *L. Wallichianus*, and perhaps a large state of that plant, but the leaves are larger and broader, the racemes more robust, and flowers much larger. It is intermediate between *R. Wallichianus* and *R. obtusatus*.

6. ***L. obtusatus***, *Wall. Cat.* 526; glabrous, leaves subopposite long-petioled ovate or elliptic obtuse penninerved, racemes solitary stout shorter than the leaves, flowers $\frac{3}{4}$ –1 in. 4-merous glabrous, buds 4-angled, ovary rugulose. *Wight & Arn. Prodr.* 381; *Dalz. & Gibs. Bomb. Fl.* 109. *L. Blumeanus*, *Wight mss. in part.*

DECCAN PENINSULA; on the Ghats from the Concan southwards.

Branches robust, lenticellate, bark pale. *Leaves* 3–5 in., sometimes $3\frac{1}{2}$ in. diam., very coriaceous, nerves slender; petiole $\frac{3}{4}$ –1 in. *Racemes* strict, erect; flowers crowded or scattered; pedicels $\frac{1}{8}$ – $\frac{1}{4}$ in. *Ovary* ovoid; calyx angular. *Corolla* not swollen at the base. *Style* slender, stigma capitate. *Fruit* ovoid, closely rugulose. —The petiole is much longer in this than in *Wallichianus* and *intermedius*.

7. ***L. pulcher***, *DC. Prodr.* iv. 295; quite glabrous, leaves opposite and alternate shortly petioled oblong- or ovate-lanceolate acuminate penninerved, spikes or racemes subterminal solitary or fascicled, rachis very robust, flowers $\frac{1}{4}$ in. 5-merous glabrous, buds straight constricted in the middle obtuse terete. *L. speciosus*, *Wall. Cat.* 518. *L. coccineus*, *Hook Bot. Misc.* t. 58 (not of p. 278). *Dendrophthoe pulcher*, *Miq. Fl. Ind. Bat. i.* pt. 1, 821.

PENANG, *Porter, Phillips.*

Branches robust, terete; bark pale, smooth. *Leaves* 5–7 in., very coriaceous, pale and shining above, nerves faint spreading; petiole $\frac{1}{2}$ in., very robust. *Racemes* or spikes strict, rather dense-fld. to the base, rachis stout, terete, pedicels $\frac{1}{8}$ – $\frac{1}{6}$ in., stout; flowers erecto-patent, red; bract boat-shaped. *Ovary* short; calyx-limb annular. *Corolla-base* rather inflated, terete, tip 5-cleft. *Style* rather stout, stigma hardly capitate. —I think the figure in *Bot. Misc.* given as of *L. coccineus* undoubtedly is a 4-merous form of *L. pulcher*.

8. ***L. Parishii***, *Hook. f.*; glabrous, leaves subopposite petioled linear-lanceolate acuminate penninerved, spikes terminal longer than the leaves strict very robust, flowers $\frac{1}{4}$ in. 4–5-merous hoary, buds terete obtuse.

TENASSERIM; on Donnatonung, alt. 2000 ft., *Parish.*

Branches very stout; bark black, smooth, shining. *Leaves* 5–7 by 1–1 $\frac{1}{4}$ in.

very coriaceous, smooth and shining, and probably flaccid when fresh; nerves many, horizontal, very obscure; base narrowed into a stout petiole $\frac{1}{4}$ in. *Spike* erect, many-fld.; rachis very stout, naked towards the base; flowers erecto-patent, scarlet, quite sessile; bract boat-shaped; calyx subglobose, limb obsolete. *Corolla* 4-5-cleft to the middle; bud more swollen at the top than the base. *Style* stout, stigma capitate.—A very distinct plant.

9. ***L. ensifolius***, *Thwaites Enum.* 134; quite glabrous, leaves sub-opposite petioled narrowly falcately lanceolate acuminate 3-7-nerved, nerves parallel, racemes axillary and terminal slender equalling the leaves or shorter, pedicels slender, bracteole minute.

CEYLON; at Ratnapoora, alt. 1000 ft., *Thwaites*.

Branches black and opaque when dry. *Leaves* 3-5 by 1-1 $\frac{1}{2}$ in., thinly coriaceous, opaque, dark brown when dry, narrowed into a petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Racemes* solitary or 2 together, erect; pedicels $\frac{1}{2}$ in. *Ovary* ellipsoid; calyx-limb annular. *Corolla* unknown. *Style* filiform, $\frac{3}{4}$ in.; stigma capitate.—The parallel nerves at once distinguish this species.

10. ***L. pentapetalus***, *Roxb. Fl. Ind.* i. 553; ii. 211, and *Ed. Carey & Wall.* ii. 290; quite glabrous, leaves opposite and alternate petioled ovate or elliptic acute or acuminate penninerved, spikes axillary erect strict stout longer than the leaves, flowers $\frac{1}{4}$ in. 4-5-merous glabrous base suddenly inflated and 5-angled, style jointed at the middle. *DC. Prodr.* iv. 295; *Wall. Pl. As. Rar.* iii. t. 225, and *Cat.* 503; *Kurz For. Fl.* ii. 322; *Griff. Notul.* iv. 617, and *lc. Pl. Asiat.* t. 624, 625; *Blume Fl. Jav. Loranth.* 39, t. 14, and 23 A. *L. polycarpus*, *Wall. Cat.* 540. *L. erythrostachyus*, *Wall. mss.* *Phœnicanthemum pentapetalum*, *Miq. Fl. Ind. Bat.* i. pt. 1, 823. *Dendrophthoe pentapetala*, *G. Don Gen. Syst.* iii. 419.

NEPAL, *Wallich, J. D. H.*, and from ASSAM, SILHET and CACHAR to MALACCA, PENANG and SINGAPORE, *Maingay (Kew Distrib.* 691, 692).—DISTRIB. Ava, Yunan, Java, Sumatra, Borneo.

Branches stout, terete; bark dark, smooth. *Leaves* 2-4 in., coriaceous, dark brown or black when dry, nerves very faint; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in., rather slender. *Spikes* solitary and in pairs, dense- or lax-fld.; rachis very stout, naked below; flowers erect, then spreading, quite sessile; bracteole ovate, ciliate. *Ovary* terete, shortly cylindric; calyx-limb annular, obscurely toothed. *Corolla-lobes* reflexed from the middle; bud constricted in middle, tip clavate. *Style* slender above the joint, stigma capitate. *Fruit* ellipsoid, truncate.—The style of this species is very characteristic, the lower part where embraced by the corolla-tube being 5-angled.

** *Racemes or spikes very many-flowered, pubescent or tomentose.*

11. ***L. coccineus***, *Jack in Mal. Misc.* i. 8, and in *Hook. Bot. Misc.* i. 278 (*excl.* t. 58); rusty-tomentose, leaves opposite and alternate petioled ovate or ovate-lanceolate acute or acuminate base rounded or cordate, spikes or racemes axillary strict erect, pedicels very short, corolla $\frac{1}{2}$ in. 4-cleft straight, base rather swollen and 4-angled, fruit ovoid long-necked. *Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 215; *DC. Prodr.* iv. 296; *Griff. Notul.* iv. 620, and *lc. Pl. Asiat.* t. 626. *L. racemiferus*, *Wall. Cat.* 539. *Phœnicanthemum coccineum* & *Bennetianum*, *Miq. Fl. Ind. Bat.* i. pt. 1, 825, 826. *Dendrophthoe coccinea*, *G. Don Gen. Syst.* iii. 419.

CACHAR, *Keenan*. PEGU, *McClelland*. TENASSERIM, *Wallich*, &c. MALACCA, *Griffith (Kew Distrib.* 2718). SINGAPORE, *Jack*.—DISTRIB. Ava, Barilla, Borneo.

Branches long, terete, stout, lenticellate; bark pale. *Leaves* 3-6 in., very coriaceous, variable in size and shape, nerves very faint; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Spikes or racemes* very variable in length; rachis stout; pedicels very short and stout; bracteole

gibbously boat-shaped; flowers scarlet. *Ovary* ovoid, narrowed below the cupular 4-toothed calyx-limb. *Corolla-segments* spreading, narrow. *Style* slender, stigma capitate. *Fruit* flagon-shaped, neck crowned by the 4-toothed calyx.—It is curious that Jack does not describe the inflorescence of his *L. coccineus* as being pubescent. —Under *L. pulcher* I have referred to the figure given in the Bot. Misc. as *L. coccineus*.

12. ***L. Hookerianus***, *Wight & Arn. Prodr.* 381; young leaves and inflorescence mealy or rusty-pubescent, leaves subopposite petioled oblong- or elliptic-ovate or lanceolate obtuse or subacute penninerved, spikes axillary strict erect about equalling the leaves, flowers $\frac{1}{4}$ in. puberulous 4-merous, buds subterete, ovary depressed-globose, calyx-limb 4-lobed. *Thwaites Enum.* 134.

DECCAN PENINSULA; at Courtallam, *Wight*. CEYLON; Batticaloa, *Gardner*; Central Province, *Thwaites*.

Branches terete, lenticellate, bark dark. *Leaves* 2-3 in., coriaceous, dark brown when dry, nerves very faint, base acute; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., rather slender. *Spikes* solitary or in pairs; rachis stout, pitted by the flowers; bracteole small, orbicular. *Ovary* oblate; calyx-limb dilated. *Corolla* orange-red, segments linear; buds straight, slightly swollen at the base. *Style* stout, stigma capitate. *Fruit* small, globose, crowned with the cupular calyx.

13. ***L. Wightii***, *Hook. f.*; young leaves and flowers mealy or puberulous, leaves opposite and alternate small petioled elliptic obtuse, spikes rather shorter than the leaves strict erect, flowers $\frac{1}{6}$ in. 4-merous, buds terete base not swollen, calyx-limb entire, ovary globose. *L. Arnottianus*, *Wight mss. (not of Korthals)*.

DECCAN PENINSULA; at Courtallam, *Wight*.

A small shrub; branches rather slender, terete, pale, bark rough. *Leaves* 1-1½ in., dark when dry, coriaceous, base acute; nerves slender, lower 2-3 pair nearly parallel to the margin; petiole $\frac{1}{6}$ – $\frac{1}{4}$ in., rather slender. *Spikes* solitary or in pairs; rachis stout; bracteole orbicular and ovary and corolla clothed with a mealy scurf. *Corolla-tube* straight, base not inflated; segments long, connate, linear-spathulate. *Style* slender, lengthening after flowering, stigma capitate.

*** *Spikes or racemes with 1-2 pairs of flowers.*

14. ***L. ligustrinus***, *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 219, and *Cat.* 513; young parts and flowers rusty-pubescent, leaves opposite and alternate petioled lanceolate obtuse or acute penninerved, racemes axillary very short with 1-2 pairs of flowers, flowers $\frac{1}{4}$ in. 4-merous, buds subterete base swollen 4-angled, calyx-limb entire. *DC. Prodr.* iv. 294; *Don Prodr.* 143; *Brand. For. Fl.* 395.

TROPICAL HIMALAYA, from Kumaon to Sikkim, alt. 2-4000 ft. CHITTAGONG, *J. D. H. & T. T.*

Apparently terrestrial (Brandis), a root parasite? *Branches* stout, terete, closely lenticellate, bark pale. *Leaves* 1½-2½ in., brown or black when dry, very coriaceous, nerves obscure, base acute; petiole $\frac{1}{6}$ – $\frac{1}{4}$ in. *Racemes* single or in pairs, spreading, $\frac{1}{2}$ -1 in. long; rachis rigid, glabrous; flowers very shortly pedicelled; bracteole rather large, orbicular. *Ovary* urceolate; calyx-limb short. *Corolla-segments* reflexed from the middle, pink or scarlet, linear; bud straight, obtuse. *Style* slender, stigma capitate.—The parasitism of this and the following should be examined.

15. ***L. terrestris***, *Hook. f.*; quite glabrous, leaves opposite and alternate petioled lanceolate obtuse or acute penninerved, racemes axillary short or long with 1-2 pairs of flowers, flowers $\frac{1}{3}$ in. 4-merous, buds sub-

terete base swollen 4-angled, calyx-limb entire. *L. ligustrinus*, *Herb. Ind. Or. H. f. & T. in part.*

KHASIA MTS., alt. 1-3000 ft. *J. D. H. & T. T.*

Very similar to *L. ligustrinus*, and always growing from the ground, and hence probably a root parasite, quite glabrous, leaves thinner with more distinct nerves, racemes sometimes 2 in. long.—Dr. Thomson and I gathered this plant at seven or eight places at various localities all over the Khasia Mts., and never found it attached to an aerial tree-branch. It either replaces *L. ligustrinus* or is a remarkable form of that plant. I find no traces of ferruginous pubescence on it.

SECT. III. **Heteranthus**. *Flowers* 1-1½ in., axillary, cymose or racemose; bract scale-like; bracteoles 0. *Petals* 4-6, free; buds straight or incurved, tip not clavate. *Anthers* very slender, continuous with the filament, 2-celled.

16. ***L. heteranthus***, *Wall. Cat.* 537; very robust, nearly glabrous, leaves alternate shortly petioled elliptic or oblong-lanceolate or linear obtuse or subacute thickly coriaceous penninerved and striolate, racemes longer than the leaves very stout curved sparse-fl., pedicels very stout, ovary cylindric, buds 1-1½ in. curved slender acute, petals 6. *DC. Prodr.* v. 306. *L. eleutheropetalus*, *Kurz in Journ. As. Soc.* 1871, ii. 64, and *For. Flor.* ii. 321. *Dendrophthoe macrocalyx*, *Miq. Fl. Ind. Bat.* i. pt. 1, 821.

BURMA; Martaban, *Wallich, Brandis*.—DISTRIB. Java, Borneo.

Branches terete; bark smooth, dark. *Leaves* 3-5 in., very variable in breadth, pale yellow-brown when dry, nerves very obscure, base acute, narrowed into the very stout petiole ¼-½ in. *Racemes* solitary or in pairs, 3-5 in., rachis and pedicels very stout; bract orbicular, concave. *Calyx* ¼ in. narrow, limb cupular entire. *Corolla*-buds slender, linear, red; segments very slender. *Anthers* twice as long as the filament. *Style* filiform, stigma simple.—*Kurz* describes the flowers as at first minutely puberulous.

SECT. IV. **Cichlanthus**. *Flowers* in axillary fascicles, rarely racemose, usually scurfily or mealy-tomentose; bract scale-like; bracteoles 0. *Calyx* hardly produced above the ovary. *Corolla* long, curved, scurfy, 4-rarely 5-lobed, and deeply cleft behind. *Anthers* narrow, cells indistinct. *Fruit* clavate turbinate or pyriform, except *L. vestitus*.

* *Leaves mealy or scurfy on both surfaces, rarely glabrescent. Fruit pyriform or clavate.*

17. ***L. scurrula***, *Linn.*;—*Kurz For. Fl.* ii. 319; young shoots and inflorescence covered with short soft white or rusty tomentum, leaves opposite petioled or sessile ovate elliptic oblong cordate or obovate obtuse or subacute penninerved glabrous or tomentose beneath, flowers in axillary very short subracemose fascicles pedicelled, ovary pyriform, corolla 1 in. very slender usually curved terete, tube split, lobes 4 short, bud terete, tip subclavate acute or obtuse, berry pyriform tomentose.

Throughout INDIA; from the Sikkim Himalaya and Bengal southwards to Singapore; and from Behar, Central India and the Concan, southwards to Travancore and Ceylon.

A large bush, very variable in amount of pubescence, form and size of leaves, and in inflorescence; bark smooth or lenticellate, usually pale. *Leaves* rarely exceeding 3 in., coriaceous; nerves slender; petiole rarely ¾ in. *Inflorescence* if racemose rarely ½ in. long; pedicels long or short. *Ovary* with the base often lengthening into a pedicel as the fruit ripens; calyx-limb very short, entire. *Corolla* variable in length, ½-1 in., very slender, buff or pink, lobes acute. *Filaments* short. *Style*

filiform, sometimes obscurely jointed a little way below the tip (opposite the base of the corolla-lobes), stigma minute. *Fruit* $\frac{1}{4}$ in.—I am in doubt as to whether all the following varieties are really referable to one species, and whether, if so, some others should not be included under it. Kurz, who was the first to bring *L. obtectus* and *grandiflorus* under *L. Scurrula*, confines the type plant to a form with solitary or twin flowers; but this is obviously an abnormal condition, and his *Scurrula proper* does not appear to be distinguishable from his var. *buddleioides*, which I take to be the common and typical form of the species. I have refrained from quoting any Malayan Archipelago species as synonymous, but I suspect that several of these, as *L. obovatus*, *L. sphenoideus*, and *L. repandus*, all of Blume, are referable to *L. Scurrula*.

L. Scurrula proper; leaves petioled from oblong to obovate and rounded or cordate obtuse young clothed on both surfaces and old beneath with pale appressed tomentum, flowers fasciated rusty or grey. *L. Scurrula*, *DC. Prodr.* iv. 301; *Roxb. Cor. Pl.* ii. t. 140; *Fl. Ind.* i. 550 and ii. 186, and *Ed. Carey & Wall.* ii. 206; *Wall. Cat.* 6867 (*specimens very bad, perhaps a mixture*). *L. buddleioides*, *Desrouss. in Lamk. Encycl.* iii. 600; *DC. l. c.* 302; *Wight & Arn. Prodr.* 383; *Dalz. & Gibs. Bomb. Fl.* 110. *L. Heyneanus*, *Wall. Cat.* 528. *L. Heynii*, *DC. l. c.* 300. *L. pyrifolius*, *Wall. Cat.* 6869. *L. cinnamomeus*, *Wall. Cat.* 527; *DC. l. c.* 300.—*Loranth* No. 19, *Herb. Ind. Or. H. f. & T.*—Sikkim Himalaya, alt. 3–6000 ft., *J. D. H., Clarke.* Assam, Silhet and the Khasia Mts., alt. 3–6000 ft., *Wallich, Griffith (Kew Distrib.* 2728). Tenasserim, *Helfer (Kew Distrib.* 2728). Malacca, *Griffith.* Deccan Peninsula, from the Ganges to Travancore, abundant. Ceylon, ascending to 4000 ft.

Var. *bengalensis*; leaves sessile or subsessile ovate glabrous when mature, flowers fasciated rustily tomentose, corolla $\frac{1}{2}$ – $\frac{2}{3}$ in. curved less slender pale buff. *Loranth.* No. 23, *Herb. Ind. Or. H. f. & T.*—Assam, Khasia Mts. and Silhet, *Griffith (Kew Distrib.* 2722, 2734), *J. D. H. & T. T. Dacca, Clarke.* Noakoly, *J. D. H. & T. T.*

Var. *obsecta*, *Kurz For. Fl.* ii. 319; leaves shortly petioled glabrous when mature, petiole very short, flowers racemose scurfily and rustily tomentose $\frac{3}{4}$ in. long, corolla very slender. *L. obtectus*, *Wall. Cat.* 534. *L. concavifolius*, *Griff. Notul.* iv. 615.—*Ava, Wallich.* Malacca, *Griffith.*

Var. *lævigata*; like var. *obsecta*, but petiole longer, and flowers less scurfily tomentose. *L. rufidulus & lævigatus*, *Wall. Cat.* 535, 536; *DC. l. c.* 302.—Tenasserim, *Wallich, Helfer (Kew Distrib.* 2715, 2731). Malacca, *Griffith.*—Very near var. *graciliflora*.

Var. *graciliflora*, *Kurz l. c.* 319; leaves elliptic adult glabrous, petiole $\frac{1}{4}$ in., flowers $\frac{1}{2}$ –1 in. in short racemes very slender much curved hoary with pale or dark pubescence. *L. graciliflorus*, *Wall. Cat.* 521; *DC. l. c.* 300. *L. obovatus*, *Blume Bijl.* 663, and *Fl. Jav. Loranth.* t. 9. *Dendrophthoe obovata*, *Miquel Fl. Ind. Bat.* i. 1. 817.—Sikkim, alt. 2000 ft., *J. D. H.* Bhotan, *Griffith.* Assam and Silhet, *Wallich, Griffith (Kew Distrib.* 2714). Chittagong, *J. D. H. & T. T.* Also Timor.

18. *L. cordifolius*, *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 223, and *Cat.* 517; branches and leaves on both surfaces (except in age) clothed with white or tawny appressed tomentum, leaves opposite usually large rather long-petioled orbicular or very broadly ovate base rounded or cordate, tip obtuse or rounded, flowers $\frac{3}{4}$ –1 in. fasciated on a short peduncle pedicelled densely rufous or white-tomentose, tip of bud very acute, ovary pyriform, corolla slender curved terete, tube split, lobes 4 short acute, berry pyriform tomentose. *DC. Prodr.* iv. 302; *Don Prodr.* 143; *Brand. For. Fl.* 396. *L. buddleioides*, *Thwaites Enum. in part*, 136.

SUBTROPICAL HIMALAYA, alt. 1–5000 ft.; from Kashmir, *Brandis*, and Garwhal, *Falconer*, to Nepal, *Wallich.* CENTRAL INDIA, at Hazaribagh, *Vicary.* NILGIRI HILLS, *Wight*, at Goodaloor, alt. 4000 ft., *Clarke.* CEYLON, *Thwaites.*

This is hardly more than a variety of *L. Scurrula*, differing in its greater size, more rounded and cordate leaves and the copious white tomentum, which gives it a

very different aspect from the ordinary state of *L. scurrula*, of which Wight and Arnott indeed suggest its being a variety. The Ceylon specimens are beautifully white.

19. ***L. ferrugineus*, Roxb. Fl. Ind. i. 551, ii. 188 (*ferruginosus*), and Ed. Carey & Wall. ii. 207**; branchlets and leaves beneath clothed with close rusty scurfy tomentum, leaves opposite shortly petioled elliptic obtuse glabrous above base rounded, flowers $\frac{1}{2}$ –1 in. in axillary sessile or shortly peduncled fascicles pedicelled densely rusty villous, calyx turbinate, limb entire, corolla slender terete, tube split, lobes 4, fruit pyriform villous. *DC. Prodr.* iv. 299; *Wall. Cat.* 500; *Jack in Mal. Misc.* i. 9, and in *Hook. Bot. Misc.* i. 279, t. 59. *L. Schultesii*, *Blume in DC. l. c.* 300, and *Fl. Jav. Loranth.* t. 2. *L. Oortianus*, *Korth, fid. Herb. Hort. Calcutt.* *Dendrophthoe ferruginea*, *G. Don Gen. Syst.* iii. 420; *Miquel Fl. Ind. Bat. i.* 1. 812. *D. Oortiana*, *Miquel l. c.* 813.

PENANG and SINGAPORE; *Roxburgh, Wallich, Phillips, &c.* MALACCA, *Griffith (Kew Distrib.* 2727), *Maingay (Kew Distrib.* 686).—DISTRIB. Java, Sumatra.

Branches terete; bark smooth, dark or grey, minutely lenticellate. *Leaves* $1\frac{1}{2}$ –4 in., very uniform in shape, coriaceous, dark brown or black above when dry, nerves faint; petiole $\frac{1}{2}$ – $\frac{1}{3}$ in., villous. *Fascicles of flowers* solitary or clustered, very variable in length, differing from all states of *L. scurrula* in the thick tomentum and less pyriform ovary. *Corolla* when fresh green within, rufous externally.

20. ***L. rhopalocarpus*, Kurz in Journ. As. Soc. 1871, ii. 62, and For. Fl. ii. 319**; branches slender and branchlets leaves beneath and inflorescence scurfily tomentose, leaves small opposite and alternate shortly petioled obovate or cuneate glabrate above, flowers in axillary sessile or shortly peduncled fascicles pedicelled tawny scurfily tomentose, calyx oblong, limb truncate, corolla $\frac{1}{2}$ in., tube very slender terete curved split 4-lobed, fruit elongate narrowly clavate truncate, base with a thickened ring. *L. cuneatus*, *Wall. Cat.* 541; *DC. Prodr.* iv. 301, *excl. syn.* ? *L. fuscus*, *Blume Bijl.* 660, and *Fl. Jav. Loranth.* 28, t. 7. *Dendrophthoe fusca*, *Miquel Fl. Ind. Bat. i.* 1. 814.

PEGU and ARRACAN, *Kurz*. MARTABAN, *Wallich*; at Moulmein, *Griffith (Kew Distrib.* 2732).—DISTRIB. Java?

A small shrub, 1–2 ft.; branches terete; bark dark, minutely lenticellate, of shoots rufous. *Leaves* 1–2 in., young tawny on both surfaces old glabrous on both, base narrowed into the very short petiole, tip rounded, nerves few ascending. *Flowers* few, “whitish, $\frac{1}{2}$ – $\frac{3}{4}$ in., somewhat lepidote;” bract minute. *Fruit* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, gradually narrowed from the truncate tip to the base, which has an annular thickening immediately above the bract, terete, scurfy.—The very remarkable fruit at once distinguishes this species, of which I have seen no corolla.

21. ***L. malaccensis*, Hook. f.**; branches slender, branchlets and inflorescence rusty and scurfily pubescent, leaves small opposite on slender petioles elliptic obtuse quite glabrous, flowers $\frac{1}{2}$ in. in axillary fascicles of 2 or more very shortly pedicelled, calyx-tube pyriform, limb truncate contracted, corolla-tube very slender terete split in front, lobes 4 acute, fruit subcapitately clavate contracted into a very slender pedicel.

MALACCA, *Griffith*.

Apparently a small shrub; branches terete, closely lenticellate. *Leaves* $1\frac{1}{2}$ in., thinly coriaceous, very dark brown when dry, almost shining above, nerves faint spreading; petiole $\frac{1}{4}$ – $\frac{1}{3}$ in., very slender for the genus. *Flowers* dark rusty brown when dry; bract minute. *Corolla-lobes* very short, acute. *Fruit* as long as the corolla, consisting of a short ellipsoid head suddenly contracted into a long slender pedicel which is not thickened at the base, scurfily pubescent.—The fruit of this

also is very characteristic. The only specimens I have seen are Griffith's, and they were communicated to Dr. Gardner in Ceylon.

22. **L. thelocarpus**, *Hook. f.*; branchlets and leaves beneath clothed with very fine cinnamon or tawny scurfy stellate tomentum, leaves opposite petioled oblong or ovate-oblong obtuse glabrous above, flowers fascicled on short axillary peduncles pedicelled, fruit clavate papillose contracted into a pedicel with an annular thickened base. *Loranthus* No. 6, *Herb. Ind. Or. H. f. & T.*

CHITTAGONG; at Kazi ke hat, *J. D. H. & T. T.*

Branches stout, terete, sparsely lenticellate, bark grey. *Leaves* $1\frac{1}{2}$ –3 in., rigidly coriaceous, dark brown and opaque above, nerves most obscure, base rounded; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* not seen; bracts very minute. *Fruit* $\frac{1}{2}$ in. long, subumbellate, inserted on pedicels half their length, puberulous and bearing naked orbicular pustule-like tubercles, tip rounded.—A peculiar species, not easily distinguished by words from *L. scurrula*, except by the very different fruit, which bears papillæ something like a *Boerhavia*; the leaves also are much more rigid than *L. scurrula*.

23. **L. pulverulentus**, *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* 221, and *Cut.* 515; branchlets and young leaves clothed with flocculent white fugacious mealy tomentum, leaves often large opposite long-petioled broadly ovate or ovate-oblong glabrous acute or obtuse, nerves distinct, flowers 1 in. in solitary or fascicled racemes long-pedicelled scurfily white-tomentose, calyx-limb 0, corolla slender curved, tube terete split, lobes 4 narrow, fruit clavate mealy. *DC. Prodr.* iv. 301; *Brand. For. Fl.* 396; *Kurz For. Fl.* ii. 318. *L. carnosus*, *Wall. Cat.* 552. *L. leptanthus*, *Wall. Cat.* 553 (*excl. B.*).

SUBTROPICAL HIMALAYA, alt. 2–4000 ft., from Garwhal to Bhotan. PEGU and AVA, *Kurz.* CENTRAL PROVINCES, *Brandis.* The CONCAN, *Stocks.*

Branches robust, terete, usually closely lenticellate; bark dark grey. *Leaves* very variable in size, 2–8 in. (much smaller in var. *leptanthus*), dark brown when dry; nerves arching, much stronger than in its allies; petiole $\frac{1}{3}$ –1 in. *Racemes* $\frac{1}{2}$ –2 $\frac{1}{2}$ in.; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in.; bract minute; flowers green when fresh, white or cream-coloured when dry. *Ovary* pyriform, top contracted. *Style* very slender, stigma minute ovoid. *Fruit* "large, club-shaped," *Kurz.*

Var. *leptanthus*; leaves smaller 1–2 in. elliptic or orbicular very coriaceous nerves obscure, corolla $1\frac{1}{2}$ in. *L. leptanthus*, *DC. l. c.* 299. *L. leptanthus*, *Wall., B. rotundifolia*, *Cat.* 533 B.—AVA, *Wallich.*

** *Leaves glabrous or nearly so. Fruit turbinate.*

24. **L. umbellifer**, *Schultz Syst.* vii. 97; youngest parts rusty-pubescent, leaves opposite and alternate petioled oblong obtuse or acute glabrous, flowers 1–1 $\frac{1}{2}$ in. umbelled or fascicled rarely subracemose on short axillary peduncles young hoary, corolla-tube slender curved, lobes 4 short, fruit turbinate. *DC. Prodr.* iv. 301. *L. umbellatus*, *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 222, and *Cat.* 516; *Don Prodr.* 143.—*Loranth.* No. 72, *Herb. Ind. Or. H. f. & T.*

TEMPERATE and SUBTROPICAL HIMALAYA, from Nepal to Bhotan, alt. 2–5000 ft., *Wallich, &c.* KHASIA Mts., alt. 4–6000 ft., common.

Branches rather stout, grey, lenticellate. *Leaves* 3–4 in., subacute at both ends, coriaceous, nerves distinct, brownish when dry; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Inflorescence* variable, flowers sometimes fascicled on the branches without a common peduncle, at others subracemose, but with the raceme never more than $\frac{1}{2}$ in.; bract small. *Calyx-tube* minute, ovoid or obovoid, rusty-pubescent; limb very short, obscurely 4-toothed. *Corolla* exceedingly slender in bud, with a clavate obtuse or subacute tip;

tube slightly swollen in flower; lobes not $\frac{1}{4}$ the length of the tube. *Filaments* shorter than the anther. *Stigma* capitate. *Fruit* $\frac{1}{2}$ in., turbinate obovate with a broad subtruncate top.—Brandis says there is no bract, but small bracteoles at the base of the ovary. I think this is a mistake.

Var. *clavigera*; flowers perfectly glabrous. *L. clavigerus*, *Wall. Cat.* 6873. ? *L. clavatus*, *Roxb. Fl. Ind.* i. 553, ii. 189, and *Ed. Carey & Wall.* ii. 210. *L. Corynitis*, *Spreng. Cur. Post.* 140; *DC. l. c.* 317.—Sillhet, *De Silva & Gomez*.—Wallich's specimens are the only ones I have seen.

25. ***L. elatus***, *Edgew. in Trans. Linn. Soc.* xx. 58; youngest buds rusty-pubescent, leaves opposite and alternate large long-petioled broadly ovate base rounded or subcordate glabrous, flowers 1–1 $\frac{1}{2}$ in. umbelled or fascicled on short axillary peduncles rarely subracemose young hoary, corolla-tube narrow curved split, lobes short linear-spathulate, fruit turbinate. *L. umbellifer*, *Brand. For. Fl.* 397.

TEMPERATE HIMALAYA, alt. 5–10,000 ft.; from Simla, *Royle, Edgeworth, &c.*, to Bhotan, *Griffith*.

Very near indeed to *L. umbellifer*, but the bark is almost black when dry, the leaves much larger, more coriaceous, of a very different shape and long-petioled, the calyx broader and more truncate, and the tube of the corolla is much less slender in bud; it is further remarkable for the elevation it inhabits.

*** *Leaves tomentose. Fruit ellipsoid.*

26. ***L. vestitus***, *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 218, and *Cat.* 511; branchlets petioles and leaves beneath clothed with soft appressed buff or pale rufous tomentum, leaves opposite petioled oblong or ovate or linear-oblong obtuse glabrous above base acute, flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. in axillary sessile or peduncled fascicles pedicelled rufous-villous, calyx-limb truncate, corolla terete, buds with rounded clavate tips, tube split, lobes 4 obtuse, fruit ellipsoid at length glabrous. *DC. Prodr.* iv. 302; *Don Prodr.* 143; *Brand. For. Fl.* 396; *Gamble Man. Ind. Timb.* 320.

SUBTROPICAL and WESTERN HIMALAYA, alt. 5–7000 ft., from Garwhal to Nepal. KHASIA MTS., alt. 4–6000 ft., *Griffith, J. D. H. & T. T.*

A large shrub (erect on oak trees in the Khasia Mts.); branches stout, terete; bark dark, sparsely lenticellate. *Leaves* 2 $\frac{1}{2}$ –4 in., very coriaceous, often bullate, and with recurved margins, pale greenish and shining above, nerves faint; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Fascicles of flowers* solitary or clustered, usually peduncled; flowers smaller than in *L. ferrugineus*. *Corolla-lobes* very short, obtuse. *Fruit* $\frac{1}{2}$ – $\frac{3}{4}$ in. long.—A very distinct species, differing in its fruit from the others of this section.

SECT. V. ***Dendrophthoe***. *Flowers* in axillary clusters or racemes, often mealy; bract scale-like; bracteoles 0. *Calyx* usually produced into a toothed tube above the ovary. *Corolla* long or short, tube often gibbously inflated, straight or incurved, usually split at the back, 5- rarely 4-lobed. *Anthers* narrow, cells indistinct. *Fruit* ovoid or oblong (pyriform in *L. Stocksii*).

* *Flowers pubescent tomentose or villous.*

27. ***L. tomentosus***, *Heyne in Roth Nov. Sp.* 191; branches and leaves beneath rusty-tomentose, leaves all alternate petioled oblong or obovate-oblong obtuse penninerved, bract rarely exceeding the 5-toothed calyx, flowers $\frac{1}{2}$ in. in axillary sessile or shortly peduncled fascicles pedicelled densely rusty-villous with hispid hairs, corolla curved, tube terete split, lobes 5 oblong. *L. bracteatus*, *DC. Prodr.* iv. 306, *in part.* *L. tomentosus*,

var. lanuginosus, *Thwaites Enum.* 135. *L. Candolleanus*, *Hohenack. Pl. Ind. Or.* No. 514 a.—*Loranth.* No. 9, *Herb. Ind. Or. H. f. & T.*

NILGHIRI and PULNEY MTS., *Heyne, Wight, Schmidt, &c.* CEYLON, alt. 3–5000 ft., *Thwaites* (C. P. 2492).

Branches stout, dark grey, terete. *Leaves* 1–1½ in., tip rounded, rarely 3-nerved at the base, glabrous, black and opaque above when dry; petiole ½–¾ in. *Fascicles* few-fl., solitary or clustered, peduncle rarely ½ in. *Ovary* short. *Corolla-tube* terete, curved, split to the middle, not inflated or gibbous. *Filaments* short, anthers oblong. *Style* filiform, stigma capitate.—I have regarded this as *Heyne's tomentosus*, in contradistinction to his *bracteatus*, agreeing as it does with *Roth's* character, except in that the pubescence is rusty red and not grey. *Roth* describes the bract as only 2 lines long, whereas in *Heyne's bracteatus* it reaches ½ in.: this is, however, a very variable organ in both species. *Thwaites' var. normalis* (C. P. 1642) is very unlike the normal peninsular forms; it has elliptic-oblong green leaves 3–3½ in. long, with subsilky pubescence beneath, dense clusters of sessile flowers, and less villous flowers.

28. **L. bracteatus**, *Heyne in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 220; branches inflorescence and young leaves beneath clothed with thin soft grey or buff tomentum, leaves all alternate petioled orbicular or cuneate-obovate penninerved, bract (sometimes 2) much longer than the 5-toothed calyx, flowers ¾–1 in. in axillary peduncled fascicles pedicelled, corolla curved, tube gibbously inflated in the middle, lobes 5 linear. *DC. Prodr.* iv. 306 (*excl. syn. tomentosus*); *Wall. Cat.* 510; *Wight & Arn. Prodr.* 385 (*excl. syn. Roth, &c.*). *L. tomentosus*, *Wight Ic.* t. 378. *L. Heyneanus*, *Schult. Syst.* 106.

SOUTH DECCAN PENINSULA; on the Nilghiris, &c., *Heyne, &c.*

Rootstock creeping, branches slender. *Leaves* ½–1 in., grey when dry, rarely cuneately obovate, glabrous or grey-pubescent or tomentose; petiole slender, ⅙–¼ in. *Bracts* oblong, often 3 times as long as the 5-toothed calyx. *Flowers* much longer than in *L. tomentosus*, not villous, more appressedly grey-pubescent, tube more slender though gibbously swollen in the middle; lobes very narrow. *Fruit* ½ in., elliptic-oblong, puberulous.

Var. angustifolia; clothed with thin ashy tomentum, leaves narrowly obovate-cuneate, bracts very narrow, flowers smaller. *L. montanus, var. longifolius, Wight in Wall. Herb.* (6866 in part).—*Pulney Mts., Wight.*—Though very dissimilar in foliage, I find no character whereby to distinguish this specifically.

29. **L. Stocksii**, *Hook. f.*; leaves small opposite clothed with buff mealy pubescence sessile or subsessile oblong or orbicular rounded at both ends or base cordate, flowers solitary axillary sessile, bracts as long as the calyx oblong obtuse, fruit small pyriform tomentose. *Loranth.* No. 15, *Herb. Ind. Or. H. f. & T.*

The CONCAN, *Stocks.*

Branches slender, bark grey, not lenticellate, young mealy like the foliage. *Leaves* ½–1 in., mealy on both surfaces; nerves few, obscure. *Fruit* (young) ¼–½ in. long; tip rounded; calyx-limb not produced, truncate.—Apparently a very distinct species near *L. bracteatus*, but with sessile leaves and pyriform fruit like that of a *Cyclanthus*, to which section perhaps it should be referred.

30. **L. recurvus**, *Wall. in DC. Prodr.* iv. 299, and *Cat.* 525; branches and young leaves clothed with buff or grey pubescence, leaves all alternate obovate-cuneate glabrous or ashy-pubescent beneath, 3-nerved at the base, bract shorter than the 5-toothed calyx, flowers ¾ in. in numerous axillary sessile tomentose fascicles pedicelled, corolla usually strongly curve l. tube split gibbously inflated below the middle, lobes 5 linear-oblong. *Wight*

& *Arn. Prodr.* 383. *L. Candolleanus*, *Wight & Arn. l. c.* 385; *Wight. Ic.* t. 305.

NILGHIRI MTS., *Noton, Wight, &c.*

Branches usually very stout, sparsely lenticellate; bark black. *Leaves* $\frac{3}{4}$ –2 in., usually very coriaceous, dark and opaque above, nerves few; petiole $\frac{1}{8}$ – $\frac{1}{2}$ in. *Fascicles* usually many and dense-flid.; flowers very shortly pedicelled; corolla stouter than in *L. bracteatus*, often curved in a semicircle, but sometimes straight.

** *Flowers at length glabrous.*

31. ***L. cuneatus***, *Heyne in Roth Nov. Sp.* 193; glabrous except the youngest buds, leaves small all alternate petioled obovate-cuneate tip rounded or retuse base 3-nerved, bract small acute much shorter than the 5-toothed calyx, flowers $\frac{3}{4}$ –1 $\frac{1}{4}$ in. in subsessile axillary fascicles pedicelled, corolla-tube split slightly gibbously inflated above the middle, lobes 5 linear, fruit oblong. *Wight & Arn. Prodr.* 385; *Thwaites Enum.* 135 (*excl. var. β*). *L. lobeliæflorus*, *DC. Prodr.* iv. 403. *L. goodeniæflorus*, *DC. l. c.*; *Wight & Arn. l. c.* *L. montanus*, *Wight in Wall. Cat.* 6866.

DECCAN PENINSULA; from the Concan southwards. CEYLON, abundant.

Branches not robust, bark grey. *Leaves* $\frac{1}{2}$ –1 $\frac{1}{2}$ in., very variable in width, narrowed into the short petiole, nerves few. *Fascicles of flowers* rarely peduncled; flowers very variable in size, shortly pedicelled. *Calyx* hoary. *Corolla* very slender, straight or curved. *Fruit* $\frac{1}{2}$ in., oblong, surmounted by the cupular toothed calyx.—I have seen no authentic specimens of *L. goodeniæflorus* and *lobeliæflorus*.

32. ***L. sclerophyllus***, *Thwaites Enum.* 135; glabrous except the flower and leaf-buds, leaves all alternate very shortly petioled very coriaceous obovate or cuneate-obovate 3-nerved, bract shorter than the 5-toothed calyx, flowers 1 in. in axillary sessile or very shortly peduncled fascicles pedicelled, corolla-tube nearly straight split slightly swollen about the middle, lobes 5 linear, fruit oblong glabrous.

CEYLON; Central Province, ascending to 7000 ft., *Walker, &c.*

Very much more robust than *L. cuneatus*, with much larger broader thickly coriaceous leaves 1 $\frac{1}{2}$ –2 in. long. *Calyx* pubescent.

33. ? ***L. ligulatus***, *Thwaites Enum.* 135; leaves petioled glabrous linear or oblong base acute tip rounded nerveless, racemes glabrous few-flid. equalling or shorter than the leaves, bract minute, flowers 1 in., calyx obscurely toothed, corolla glabrous, lobes 5 linear-spathulate acute.

CEYLON; at Jaffna and Calpentyne, *Gardner*.

Branches terete. *Leaves* $\frac{3}{4}$ –2 in.; petiole $\frac{1}{12}$ – $\frac{1}{6}$ in.—I have nothing to add to the above meagre description taken from Thwaites, the specimens I have seen being very imperfect.

34. ***L. suborbicularis***, *Thwaites Enum.* 134; young shoots and flower-buds scurfily pubescent, leaves all alternate petioled very coriaceous orbicular or orbicular-obovate 3-nerved, bract smaller than the sharply 5-toothed pubescent calyx, flowers 1 in. racemose, corolla straight or curved, tube split gibbously inflated below the middle, lobes 5 linear, fruit oblong glabrous.

CEYLON; in elevated parts of the Island, *Walker, &c.*

Habit of *L. sclerophyllus*, but leaves more rounded, petiole longer, sometimes $\frac{1}{2}$ in. long, and flowers in racemes $\frac{1}{2}$ –1 in. long.

35. ***L. longiflorus***, *Desrouss. in Lamk. Encycl.* iii. 498; quite glabrous

throughout (racemes rarely puberulous), leaves alternate or opposite sessile or petioled orbicular oblong elliptic or linear obtuse thickly coriaceous, flowers 1-2½ in. in, axillary and supra-axillary racemes secund erect pedicelled, calyx-limb cupular truncate entire, corolla slender curved split slightly dilated above the middle, lobes 5 short linear-oblong, fruit oblong. *DC. Prodr.* iv. 304; *Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 217; *Wight & Arn. Prodr.* 384; *Roxb. Cor. Pl.* t. 139; *Grah. Cat. Bomb. Pl.* 86; *Dalz. & Gibs. Bomb. Fl.* 110; *Brandis For. Fl.* 397; *Kurz For. Fl.* 321; *Thwaites Enum.* 134; *Wall. Cat.* 507; *Wight Ic.* t. 302; *Gamble Man. Ind. Timb.* 320. *L. bicolor*, *Roxb. Fl. Ind.* i. 548, ii. 185, and *Ed. Carey & Wall.* ii. 205, and *Cor. Pl.* t. 139; *Wall. Cat.* 499. *L. Koenigianus*, *Agardh in Schult. Syst.* vii. 108; *DC. l. c.* 307. *L. Wightianus*, *Wall. Cat.* 6872. *L. imbricatus* and *L. lineatus*, *Edgew. in Trans. Linn Soc.* xx. 59.—*Rheede Hort. Mal.* x. t. 4.

TROPICAL and TEMPERATE HIMALAYA, alt. 3-7500 ft., from Jamu to Bhotan. GANGEIC PLAINS, from Oude eastward to ASSAM, and southward on plains and hills throughout both Peninsulas to TRAVANCORE and MALACCA. CEYLON, in the warm parts of the Island.

A large bush; branches terete, usually smooth, dark or light grey, lenticellate or not. *Leaves* 3-10 by ½-5 in., infinitely variable in shape and veining, opaque and dark brown when dry; petiole stout, ¼-½ in. *Racemes* 1-4 in., solitary or fascicled, stout or slender, usually upcurved with upcurving flowers of variable length; bract orbicular, cupular; pedicels stout or slender. *Calyx* hoary in Ceylon specimens, limb quite entire. *Corolla* pink or red, with often green lobes, lower half of tube very narrow, reflexed part of the lobes ⅙-¼ the length of the tube. *Filaments* shorter than the anthers, often glandular. *Stigma* capitate. *Fruit* ½ in., smooth, crowned with the cupular calyx.—Of the many forms of this common and variable plant the following are the most remarkable.

Var. falcata, *Kurz For. Fl.* ii. 321; leaves linear 4-6 by ¼-½ in. often falcate, flowers ¾-1 in., calyx glabrous or white and scurfy. *L. falcatus*, *Linn. f. Suppl.* 211; *DC. l. c.* 305; *Wall. Cat.* 519. *L. Wightianus*, *Wall. Cat.* 6872, in part. *L. longiflorus* γ, *Wight & Arn. l. c.*—Deccan Peninsula and Ceylon.—The name of this variety is much the earliest for the species, but is very inapplicable, and has hence been put aside by general consent.

Var. amplexifolia, *Thwaites Enum.* 134; leaves large sessile 4-7 in. diam. orbicular- or oblong-cordate amplexicaul. *L. amplexifolius*, *DC. l. c.*; *Wight & Arn. l. c.*; *Grah. Cat. Bomb. Pl.* 86. *L. amplexicaulis*, *Wall. Cat.* 520.—Deccan Peninsula and Ceylon.—Inflorescence often terminal.

Var. pubescens; peduncle pedicels calyx and corolla in bud pubescent.—Deccan Peninsula.

36. ***L. lonchiphyllus***, *Thwaites Enum.* 418; very robust, quite glabrous, leaves opposite and alternate subsessile very coriaceous ovate acute or acuminate strongly penninerved bullate, bract minute, flowers 1½ in. in shortly peduncled fascicles pedicelled, calyx-limb entire, corolla-tube very slender below gibbously inflated above the middle split nearly to the base, lobes 5 linear much shorter than the tube, fruit ovoid.

CEYLON; in the Ambagamowa District, *Thwaites*.

Branches very thick, terete, bark pale smooth or lenticellate. *Leaves* 4-6 by 1½-2½ in., pale brown when dry, margin recurved, base rounded or subcordate, nerves many arching deeply sunk and anastomosing; petiole ⅙-¼ in., very stout. *Flowers* few in a fascicle. *Calyx* small, bract subacute. *Corolla* slightly curved. *Style* slender, stigma capitate. *Fruit* ½ in. long.—The strongly nerved and bullate leaves of the only specimen I have seen are marked characters.

37. ***L. elegans***, *Wall. in DC. Prodr.* iv. 304, and *Cat.* 530; very robust, glabrous, leaves opposite and alternate very shortly petioled elliptic

or narrow-oblong obtuse very thickly coriaceous, flowers 1-1½ in. in very short axillary racemes stoutly pedicelled, bract cupular, ovary oblong, calyx-limb cupular obscurely 5-toothed, corolla slender curved, tube split dilated above the middle, lobes 5 linear one-fourth the length of the tube.

BERMA; on the Irawaddy near Yenangeun, Wallich.

Branches terete, smooth, bark grey. *Leaves* 2½-3 in., narrowed into the petiole, dark brown and opaque when dry, with undulate margins; nerves few, faint, very oblique. *Racemes* ½-¾ in., robust, 4-6-fld., peduncle pedicels and calyx hoary; corolla glabrous, scarlet?—I have seen only Wallich's insufficient specimens; it is possibly a form of *L. longiflorus*. A somewhat similar plant from Pegu (M'Lelland) has broader leaves, with smaller flowers and quite glabrous racemes.

38. ***L. elasticus***, Desrouss. in Lamk. *Encycl.* iii. 599; quite glabrous, leaves all opposite sessile very thickly coriaceous from orbicular to elliptic or oblong obtuse 3-5-nerved, flowers 1 in. in axillary fascicles sessile, bract minute, calyx-limb cupular entire, corolla-tube funnel-shaped split, lobes 5 filiform spirally coiled much longer than the tube. *DC. Prodr.* iv. 306; *Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 217; *Wall. Cat.* 508; *Dalz. & Gibs. Bomb. Fl.* 109; *Wight Ic.* t. 343. *L. Euphorbiæ*, *Wight Ic.* t. 1063.—*Rheede Hort. Mal.* x. t. 3.

DECCAN PENINSULA; Vingorla, &c., in the Concan, Dalzell, Ritchie; Malabar, the Nilgiri and Pulney Mts., Wight.

Branches dichotomous, stout, terete, smooth, pale brown, lenticels few. *Leaves* very variable, 1½-4 in., pale brown on both surfaces when dry, base acute. *Flowers* quite glabrous and sessile; ovary minute. *Corolla-tube* rather swollen below. *Filaments* very long, spirally coiled like the corolla-lobes; anthers long, as narrow as the filament. *Style* very long, stigma fusiform. *Fruit* ovoid, red, "the size of a small bean," Wight.—I do not find any difference between *L. Euphorbiæ* and *elasticus*; the corolla-tube is split in both, though Wight does not observe this in *L. Euphorbiæ*, which has smaller rounder leaves than the type. This is one of the few Indian species with flowers absolutely sessile on the branches.

39. ***L. pentandrus***, Linn. *Mant.* 63; leaves rarely opposite petioled elliptic-oblong or -lanceolate rarely obovate obtuse or acute, flowers ¾ in. in densely scurfy axillary very short racemes, bract cupular, calyx-limb 5-toothed, corolla straight, tube dilated below equally 5-cleft to the middle, lobes linear acute, fruit oblong-ovoid. *DC. Prodr.* iv. 305; *Kurz For. Fl.* ii. 320; *Wall. Cat.* 514; *Blume Fl. Jav. Loranth.* 33, t. 10. *L. farinosus*, Desr. in Lamk. *Encycl.* iii. 597; *Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 221; *Wall. Cat.* 514; *Griff. Notul.* iv. 616, and *Ic. Pl. Asiat.* t. 620, f. 1, 2. *L. rigidus*, contractus, & Finlaysonianus, *Wall. Cat.* 531, 6864, 6871. *Dendrophthoe pentandra* & *farinosa*, *Miquel Fl. Ind. Bat.* i. pt. 1, 818, 819. *Elytranthe farinosa*, *G. Don Gen. Syst.* iv. 427.

SILHET, Wallich. CHITTAGONG, J. D. H. & T. T. PEGU, Kurz. TENASSERIM, Wallich. MALACCA, Griffith (*L. elasticus*, *Kew Distrib.* 2723), &c. SINGAPORE, Lobb. PENANG, Wallich, Phillips.—DISTRIB. Sumatra, Java, Borneo.

Branches rather stout, terete, grey. *Leaves* 2-6 in., dark brown or almost black when dry, thickly coriaceous, nerves faint; petiole ¼-½ in. *Racemes* solitary or fascicled, few- or many-fld.; flowers usually crowded; pedicels short, stout; bract rather large; buds cylindric, not clavate at the tip. *Corolla* not split, reflexed portion of lobes half the length of the tube. *Style* stout, stigma capitate. *Fruit* ½ in., crowned by the cupular unequally 5-lobed calyx-limb.

40. ***L. neelgherrensis***, Wight & Arn. *Prodr.* 382; very robust, quite glabrous, leaves opposite and alternate thickly coriaceous oblong orbicular elliptic or oblong-lanceolate obtuse penni- or few-nerved, bract minute,

flowers 1 in. in sessile or peduncled axillary fascicles sessile or pedicelled, calyx-limb entire, corolla-tube rather inflated, lobes 5 linear much longer than the tube reflexed above the middle, fruit oblong. *Wight Ic.* t. 1020, and *Spic. Neilgherr.* t. 88; *Thwaites Enum.* 134; *Zenk. Plant. Ind.* t. 17.

NILGHIRI HILLS; ascending to 7000 ft., *Wight, &c.* CEYLON; Central Province, alt. 1-7000 ft., *Walker, &c.*

Branches very stout, terete, smooth, or minutely cracked, not lenticellate. *Leaves* 3-6 in. by $1\frac{1}{2}$ -4 in., narrowed into the petiole, dark brown above and beneath; nerves very few, raised on both surfaces; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., very stout. *Flowers* fasciated on the nodes of the axils, sessile and peduncled together; bract variable; pedicels very short or 0. *Calyx* minute, ellipsoid or globose, limb cupular, margin thin hardly lobed. *Corolla-tube* very slender in bud, in flower straight, not split, lobes sometimes all free, at others one or two are combined for half their length. *Filaments* short, anthers long. *Style* filiform, stigma capitate. *Fruit* $\frac{1}{2}$ in., smooth.—The nervation varies much. Thwaites suggests that this may be a variety of *L. elasticus*, but it is very different.

Var. ? *Clarkei*; flowers smaller $\frac{3}{4}$ in. corolla-lobes equal shorter more spatulate reflexed portion about $\frac{1}{8}$ in.—Ootamacund, alt. 7000 ft., *Clarke*.—Amongst the very numerous specimens of *L. neelgherrensis* that I have examined, none have such short and spatulate corolla-lobes as this.

41. ***L. memecylifolius***, *Wight & Arn. Prodr.* 383; quite glabrous, leaves opposite and alternate petioled narrowly oblong or elliptic obtuse thickly coriaceous, flowers 1- $1\frac{1}{2}$ in. umbelled on short stout axillary peduncles erect pedicelled, ovary cylindric-oblong, calyx-limb cupular obtusely 5-toothed or truncate, corolla straight, tube 5-angled split slightly inflated above the middle, lobes 5 linear-lanceolate acuminate as long as the tube or longer, fruit oblong or pyriform.

NILGHIRI HILLS, alt. 8000 ft., *Wight, Schmidt, &c.*

Branches stout, terete, brown. *Leaves* 1-3 in., dark brown and smooth when dry, narrowed into the very short petiole, flat, nerves faint, oblique. *Umbels* solitary or fasciated; peduncle and pedicels very stout, $\frac{1}{4}$ - $\frac{1}{2}$ in.; bracts orbicular, very coriaceous. *Ovary* broad at the top, calyx-limb short. *Corolla* scarlet, strict, erect, acute in bud, lobes reflexed for about half their length. *Filaments* much shorter than the anthers. *Stigma* capitate. *Fruit* $\frac{1}{2}$ in., smooth, crowned by the cupular calyx-limb.—Closely allied to *L. neelgherrensis*, but the leaves are smaller, flowers umbelled and fewer and larger, corolla not dilated at the base, and the calyx obtusely toothed.

42. ***L. sarcophyllus***, *Wall. in Wight & Arn. Prodr.* 384, and *Cat.* 6863; very stout, quite glabrous, leaves large alternate and opposite shortly petioled, elliptic oblong or orbicular very thickly coriaceous obtuse, flowers 1- $1\frac{1}{2}$ in. in short many-fld. racemes, calyx-limb cupular obtusely unequally lobulate, corolla curved; tube narrow split dilated towards the base, lobes 5 linear slender much longer than the tube. *L. carnosus*, *Herb. Wight*.

NILGHIRI Mts.; at Cumbum on a *Ficus*, *Wight*.

Habit of the large-leaved states of *L. longiflorus* with oblique nerves, but leaves much thicker, calyx-limb distinctly lobulate, and corolla-tube dilated below. *Wight's* specimens are the only ones I have seen.

43. ***L. crassus***, *Hook. f.*; very stout, leaves large alternate petioled very thickly coriaceous elliptic or oblong obtuse, flowers $\frac{3}{4}$ in. in small axillary subsessile racemes densely furfuraceous pedicelled, calyx-limb cupular quite entire, corolla straight funnel-shaped not split, equally cleft to below the middle into 5-6 lobes with long reflexed linear tips, fruit ovoid-oblong. *L. retusus*, *Wall. Cat.* 504, *in part*.

SINGAPORE, Wallich.

Branches terete, grey, densely leucicellate. *Leaves* 3-7 by $1\frac{1}{2}$ -4 in., dark brown and opaque when dry on both surfaces; nerves broad, distinct; petiole very stout, $\frac{1}{4}$ in. *Racemes* $\frac{1}{2}$ in.; pedicels very short; bracts orbicular, cupular. *Calyx-tube* globose, limb truncate. *Corolla-lobes* linear from a cuneate base, reflexed for half their length. *Anthers* linear, longer than the filament. *Stigma* capitate. *Fruit* (young) $\frac{1}{2}$ in. long, crowned with the cupular calyx-limb.—I have seen only Wallich's specimens of this very fine species which are attached to two sheets with *L. retusus*, Jack, from which they differ entirely in habit, in the texture form and colour of the leaves, and in the unibracteate and scurfy much shorter flowers. The specimens of *L. retusus* are flowerless.

Sect. VI. **Tolypanthus**. *Flowers* in involucrate fascicles, 1-bracteate, ebracteolate; bracts much broader than the flowers, free or connate into a bell-shaped involucre.

44. **L. involucratus**, *Rowb. Fl. Ind.* i. 552, ii. 188, and *Ed. Carey & Wall.* ii. 208; puberulous, leaves opposite and alternate long-petioled elliptic ovate or cordate obtuse, involucre of 4 ovate free bracts in a whorl equalling the 4 laxly villous sessile flowers, calyx-limb 4-lobed, corolla $\frac{1}{2}$ in., tube straight cleft to the middle into 5 linear lobes with recurved tips. *DC. Prodr.* iv. 298; *Wall. Cat.* 501; *Griff. Notul.* iv. 632.

SIKKIM HIMALAYA, alt. 2-3000 ft., *J. D. H., Clarke*. ASSAM, CACHAR, SILHET and KHASIA MTS., *Wallich, Griffith, &c.*

Branches slender, young tomentose, old woody terete with dark-brown smooth bark and large lenticels. *Leaves* 4-7 in., thin, almost membranous, base acute, nerves very slender; petiole $\frac{1}{2}$ -1 in. *Clusters of flowers* solitary or fascicled, sessile or shortly peduncled; bracts leafy, $\frac{1}{2}$ in. *Calyx-tube* oblong, limb cleft to the base. *Corolla-tube* rather inflated below, lobes recurved for about half their length. *Filaments* shorter than the oblong-linear anthers. *Style* very stout, stigma large, capitate, obscurely lobed. The var. *hebecladus*, Wall., has no characters that I can recognize.

45. **L. Gardneri**, *Thwaites Enum.* 133; very stout, glabrous, leaves opposite and alternate petioled ovate or oblong obtuse, involucre of 5-6 ovate free bracts in a whorl much shorter than the 5-6 glabrous sessile flowers, calyx-limb truncate, corolla $\frac{3}{4}$ in., tube straight cleft into 5 linear-oblong lobes recurved above the middle.

CEYLON; at Hantani, alt. 3000 ft., *Gardner*.

Branches very stout; bark smooth, red-brown, lenticels few. *Leaves* 3-4 in., coriaceous, greenish-brown above, red-brown beneath; midrib strong, nerves slender; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Clusters of flowers* sessile on the branches; bracts $\frac{1}{4}$ - $\frac{1}{2}$ in., obtuse, nerves reticulate. *Ovary* very short; calyx-limb annular, thickened. *Corolla-tube* straight, glabrous, not dilated, sometimes bilabiate, lobes $\frac{1}{4}$ the length of the tube. *Filaments* subulate, as long as the linear-oblong caducous anthers; stigma capitate. *Fruit* (young), ellipsoid.

46. **L. lageniferus**, *Wight Ic.* t. 306; glabrous, leaves opposite or alternate shortly petioled orbicular or oblong base rounded acute or cordate, involucre large bell-shaped 5-lobed of 5 connate bracts much shorter than the 5 glabrous or hoary sessile flowers, calyx-limb 5-toothed, corolla $1\frac{1}{2}$ -2 in., lobes 5 very short oblong-lanceolate. *Grah. Cat. Bomb. Pl.* 86; *Dalz. & Gibs. Bomb. Fl.* 110; *Hook. Ic. Pl.* t. 229, 230.

Hills of the CONCAN, *Graham, Law*. MALABAR, *Wight*.

Branches stout or slender; bark dark brown, smooth, lenticels few large. *Leaves* 3-4 in., rather thin, and shining above, with short petioles and cordate or rounded bases in Malabar specimens, more oblong and coriaceous with acute bases in Concan

ones; petiole $\frac{1}{6}$ – $\frac{1}{3}$ in. *Involucres* 1–1½ in., shortly peduncled; lobes short, unequal, triangular-ovate; flowers subsessile. *Ovary* very short, quite glabrous. *Calyx-limb* minute, sharply toothed. *Corolla* narrow, straight, slightly dilated in the middle, suddenly contracted at the base of the lobes, which are $\frac{1}{4}$ the length of the tube. *Filaments* subulate; anthers linear-oblong, caducous. *Stigma* capitate.

Sect. VII. **Macrosolen.** *Flowers* large, racemose or subspicate, bracteate and 1–2-bracteolate; bract small, shorter than the ovary; bracteoles often connate in a cup. *Corolla* 5–6-cleft.

47. **L. retusus**, *Jack in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 212; quite glabrous, leaves opposite and alternate shortly petioled obovate elliptic orbicular or cuneate very thickly coriaceous obtuse or retuse, bract and bracteoles minute, flowers in very short axillary few-fl. racemes, calyx-limb obsolete, corolla straight tube slightly dilated cleft to the middle into 5 linear-lanceolate lobes. *DC. Prodr.* iv. 296; *Wall. Cat.* 504, in part. *Macrosolen retusus*, *Miq. Fl. Ind. Bat.* i. pt. 1, 828. *Elytranthe retusa*, *G. Don Gen. Syst.* iii. 425.

SINGAPORE, *Jack, Wallich, &c.* MALACCA, *Griffith, Cuming, &c.*—DISTRIB. Java, Borneo.

Branches stout, terete, brown. *Leaves* 3–4 by 1–4 in., sometimes obcordate, pale greenish above and shining a little when dry, pale brown beneath; midrib stout, nerves slender; petiole very stout, $\frac{1}{6}$ – $\frac{1}{3}$ in. *Racemes* $\frac{1}{2}$ in., peduncle and pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., spreading, quite glabrous. *Ovary* ovoid. *Corolla* not split dorsally, pale rose; lobes rather shorter than the tube. *Anthers* very slender, longer than the filament. *Stigma* capitate. *Fruit* globosely ovoid.

48. **L. trigonus**, *Wight & Arn. Prodr.* 386; quite glabrous, branchlets very robust triquetrous, leaves very large thickly coriaceous opposite or whorled in threes broadly elliptic obtuse, flowers in short axillary and cauline racemes or cymes, bracts connate in a small cup, calyx-limb cupular truncate, corolla-bud $\frac{1}{2}$ in. terete clavate 5-merous.

TRAVANCORE; at Quilon, *Wight.* SOUTH CANAN; Belgaum, on the highest point of the N. E. Hills, *Ritchie.* N. CANARA, *Talbot.*

Branches terete, as thick as the middle finger; branchlets with the flat or concave faces $\frac{1}{2}$ in. broad, smooth. *Leaves* 4–6 in., often as broad, brown and opaque when dry, base acute or rounded, nerves distinct; petiole very stout, $\frac{1}{2}$ – $\frac{3}{4}$ in. *Flowers* in clustered cymes or racemes, 1–1½ in.; peduncle and pedicels very stout, angled when dry; bracts forming a shallow oblique cup. *Fruit* $\frac{1}{2}$ in., ellipsoid, crowned by the cupular calyx-limb.—A very remarkable species, of which flowers are much wanted; the two localities assigned to this species are so widely apart in position and otherwise as to require confirmation; possibly two species are hence indicated.

49. **L. Brandisianus**, *Kurz in Journ. As. Soc.* 1871, ii. 63, and *For. Fl.* ii. 317; quite glabrous, leaves subopposite petioled elliptic-lanceolate caudate-acuminate, flowers 1–1½ in. in short axillary racemes or cymes, bract and bracteoles connate below acute, calyx-limb truncate, corolla straight 6-angled in bud, tube urceolate below cleft to the middle into 6 linear reflexed lobes.

MARTABAN HILLS, alt. 3000 ft., *Brandis.* MOULMEIN, *Parish.*

Branches terete, bark pale. *Leaves* 3–7 in., firmly coriaceous, base acuminate, greenish when dry and shining above, yellowish brown beneath, midrib strong, nerves very faint; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in. *Flowers* “usually in a 1–2-fl. raceme terminated by a cyme of 3–4 flowers,” *Kurz*; peduncle and pedicels very stout; corolla-tube rather stout in bud, with a ridge at the base of the lobes; buds stout, glabrous, clavate above the middle, very coriaceous.

50. **L. hypoglaucus**, *Kurz in Journ. As. Soc.* 1872, ii. 309, and *For. Fl.* ii. 318; quite glabrous, leaves subopposite lanceolate or elliptic-lanceolate acuminate glaucous beneath, flowers $1\frac{1}{4}$ – $1\frac{3}{4}$ in. 2–3-nate on short crowded axillary peduncles, bract and bracteoles minute connate below, calyx cylindric limb entire truncate, corolla-tube curved slightly dilated below deeply 6-cleft, lobes linear.

Drier hill forests of MARTABAN, alt. 5–6000 ft., *Kurz*.

Leaves $2\frac{1}{2}$ –3 in., tapering into the short petiole, nerves obscure. *Flowers* bright crimson; bract and bracteoles triangular-ovate.—Character from *Kurz*; I have seen no specimens.

51. **L. formosus**, *Blume Bijl.* 660; and *Fl. Javæ, Loranth.* t. 15; glabrous, leaves subopposite ovate to elliptic-oblong acuminate or cuspidate shining on both surfaces, flowers 2–3 in. in few-fl. hoary axillary cymes, bract and bracteoles minute, calyx-limb obscurely toothed, corolla-tube very long subinflated, lobes 6 linear. *DC. Prodr.* iv. 297; *Kurz For. Fl.* ii. 317. *Macrosolen formosus*, *Miquel Fl. Ind. Bat.* i. pt. 1, 827. *Elytranthe formosa*, *Don Gen. Syst.* iii. 426.

BURMA; “in Tenasserim?” *Kurz*.—DISTRIB. Java.

Branches terete or obscurely 4-angled. *Leaves* 4–6 in., coriaceous, base obtuse or acute, nerves obscure; petiole very short, thick. *Flowers* crimson, pedicelled; bract and bracteoles 3-gonous. *Ovary* oblong. *Corolla-tube* a little curved, lobes greenish. *Anthers* linear.—I have seen no Indian specimens; the description is from *Kurz*.

52. **L. ampullaceus**, *Roxb. Fl. Ind.* ii. 189, and *Ed. Carey & Wall.* ii. 209; quite glabrous, leaves all opposite petioled elliptic-ovate oblong or lanceolate subacute or acuminate polished above, nerves distinct, flowers $3-7\frac{1}{2}$ in. in short axillary glabrous racemes, calyx-limb entire, corolla-tube oblong 6-angled inflated below, lobes 6 linear-spathulate as long as the tube, fruit ellipsoid. *DC. Prodr.* iv. 296; *Kurz For. Fl.* ii. 316; *Wall. Cat.* 502. *L. pallens & carinatus*, *Wall. Cat.* 523, 529; *DC. l. c.* 296, 297. *Macrosolen*? *pallens*, *Miq. Fl. Ind. Bat.* i. pt. 1, 831.

From BENGAL, ASSAM and the KHASIA Mts. to PENANG, MALACCA and SINGAPORE.

Branches stout or slender, pale; bark smooth or lenticellate. *Leaves* 3–5 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., very coriaceous, base acute rarely rounded, nerves spreading; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in. *Racemes* very variable, with 3–6 pairs of flowers and a terminal one; peduncle solitary or few in a cluster, rarely 1 in. long; pedicels $0-\frac{1}{8}$ in.; bract sometimes half the length of the ovary; bracteoles smaller, connate. *Corolla* greenish yellow; bud straight, bottle-shaped, with prominent angular shoulders. *Fruit* “long oval smooth yellow the size of a currant,” *Roxb.*—I have difficulty in distinguishing this from the following; some Mergui specimens have large leaves rounded at the base of a golden colour when dry. Some Malaccan ones have longer and very slender peduncles and pedicels. There is no named specimen of *L. carinatus* in Wallich’s Herbarium, but good ones were distributed to Hooker and Bentham; they do not differ at all from *ampullaceus*.

53. **L. globosus**, *Roxb. Fl. Ind.* i. 550, ii. 187, and *Ed. Carey & Wall.* ii. 206 (*excl. cit. Rheede*); quite glabrous, leaves all opposite (rarely alternate or 3-nately whorled) petioled elliptic-lanceolate subacute or acuminate, nerves very obscure, flowers 3–7 in axillary glabrous racemes pedicelled $\frac{1}{2}$ – $\frac{3}{4}$ in., calyx-limb entire, corolla-tube oblong 5–6-angled inflated, lobes 5–6 linear-spathulate as long as the tube, fruit globose. *DC. Prodr.* iv. 297; *Kurz For. Fl.* ii. 315; *Wall. Cat.* 6870. *L. subglobosus*, *Wall. Cat.* 538; *DC. l. c.* 297; *Kurz l. c.* 316. *L. oleoides*, *DC. l. c.* *L. olei-*

folius, *Wall. Cat.* 524. *L. viridiflorus*, *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 219; *Wall. Cat.* 512. *L. sphærocarpus*, *Blume Bijl.* 661, and *Fl. Jav. Loranth.* t. 17; *DC. l. c.* 297. *Macrosolen sphærocarpus & oleoides*, *Miq. Fl. Ind. Bat.* i. 1. 830, 831. *Elytranthe sphæroidea*, *Don Gard. Dict.* iv. 127.

TROPICAL HIMALAYA; Nepal, *Wallich*. Sikkim, alt. 1-4000 ft., *J. D. H. BENGAL, CACHAR, KHASIA MTS., PEGU, PENANG and MALACCA.*—DISTRIB. Java.

I very much doubt this being anything but a form of *L. ampullaceus*, from which it differs in the narrower nerveless leaves and (according to description) in the globose fruit. Indeed Roxburgh's own specimens (in *Herb. Bentham*) do not agree with his drawing or description, and are certainly *L. ampullaceus*. Roxburgh describes the flowers as greenish orange, but his figure represents them with a pink corolla-tube and yellow lobes. Kurz says greenish orange with yellow tips, as does Clarke. Kurz says that the nerves become visible in a dry state. The Plate of Rheede (x. t. 5) quoted by Roxburgh and others for *L. globosus* cannot belong to that plant, which is not a native of Malabar; it is too rude for determination.

Sect. VIII. **Elytranthe.** Flowers few, large, crowded, decussately arranged on very short spikes which are sessile, or terminate very stout axillary peduncles. Bracts and bracteoles subequal, large, coriaceous, at length deciduous. Calyx-limb tubular, truncate, quite entire. Corolla tubular or funnel-shaped, 5-6-cleft.

* Bracts and bracteoles orbicular, shorter than the calyx.

54. ***L. loniceroides***, *Linn. Sp. Pl. Ed.* 2. 473 (excl. syn. *Pluk.*); quite glabrous, leaves all opposite petioled oblong-ovate or -lanceolate acuminate, spikes few-fl. terminating short stout axillary peduncles, bract and bracteoles orbicular sheathing the base of the ovary, corolla 1-2 in. narrowly funnel-shaped curved, lobes 5-6 linear-oblong or -spathulate. *DC. Prodr.* iv. 299; *Roxb. Fl. Ind. Ed. Carey & Wall.* 216; *Wight & Arn. Prodr.* 382; *Wight Ic.* t. 303; *Dalz. & Gibs. Bomb. Fl.* 110; *Thwaites Enum.* 133; *Wall. Cat.* 506 A. *L. umbellatus*, *Heyne in Roth Nov. Sp.* 192; *DC. l. c.* 316. *L. macrophyllus*, *Zenk. Pl. Ind.* t. 16.

DECCAN PENINSULA; from the Concan to Travancore, ascending to 6000 ft. in the Nilghiris. CEYLON, in the Central Province, alt. 4-7000 ft.

Branches stout, terete; bark pale, warted. Leaves 2-5 by $1\frac{1}{2}$ -2 in., thickly coriaceous, nerves spreading; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. Peduncles solitary or crowded, very robust, $\frac{1}{2}$ - $\frac{1}{2}$ in. long, 2-6 fl.; bracts shorter than the ovary, very coriaceous, obtuse or subacute, keeled. Calyx-tube twice as long as the ovary, truncate, cylindric, quite entire. Corolla red, thickly coriaceous, very variable in length, split $\frac{1}{2}$ way down. Anthers slender, multilocellate. Fruit ellipsoid.—*L. coriaceus*, *Desv.* in *Lam. Encycl.* iii. 597 (cited under this by De Candolle and others), is quite another plant, a native of Bourbon.

55. ***L. capitellatus***, *Wight & Arn. Prodr.* 382; quite glabrous, leaves all opposite petioled oblong-ovate or lanceolate acuminate, spikes subsessile or on very short stout axillary peduncles, bracts and bracteoles orbicular sheathing the base of the ovary, corolla $\frac{1}{4}$ - $\frac{3}{4}$ in. usually straight funnel-shaped cleft to or below the middle into 5-6 linear or spatulate lobes. *Wight Ic.* t. 304; *Dalz. & Gibs. Bomb. Fl.* 109; *Thwaites Enum.* 133. *L. ampullaceus*, *Wall. Cat.* 506 B.

DECCAN PENINSULA; from the Concan southwards. CEYLON, ascending to 3000 ft.

Thwaites suspects this to be a variety of *L. loniceroides*, and he is probably

right, for except the short straight corolla and usually very short peduncle of the flower, I find little to distinguish it.

56. **L. psilanthus**, *Hook. f.*; quite glabrous, robust, leaves all opposite petioled ovate-oblong or -lanceolate acute or acuminate, spikes few-fl. terminating long stout axillary peduncles, bracts decussately opposite and bracteoles orbicular sheathing the base of the ovary, corolla 1-1½ in. very slender curved tubular, lobes 6 very slender. *Loranth.* No. 71, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA and Mishmi Hills, *Griffith.* KHASIA Mts., alt. 4-6000 ft., *Griffith, &c.*

Very near *L. loniceroides*, and perhaps a form of that plant, but more robust, with usually larger longer-petioled leaves, longer peduncles often 1 in. long, and very slender corollas bright red with yellow almost filiform lobes.

**** Bract and bracteoles oblong, longer than the calyx.**

57. **L. albidus**, *Blume Bijl.* 665; quite glabrous, leaves all opposite petioled ovate or oblong obtuse, spikes 2-6-fl. terminating stout axillary peduncles, bracts oblong twice as long as the calyx, corolla 1-1½ in. tubular curved, lobes 5-6 short oblong. *DC. Prodr.* iv. 299. *L. leucosiphon*, *Griff.* *Notul.* iv. 623, and *l.c. Pl. Asiat.* t. 619-623. *Elytranthe albida*, *Blume Fl. Jav.* t. 22; *Miquel Fl. Ind. Bat.* i. pt. 1, 832.

TENASSERIM; at Mergui, *Griffith.* MALACCA, *Griffith, Maingay.*—DISTRIB. Java, Sumatra, Borneo.

A large shrub, branches terete, bark pale. *Leaves* 2-3 by 1-1½ in., moderately coriaceous, rarely cordate, nerves many spreading; petiole ½-¾ in., rather slender. *Peduncles* ½-¾ in., solitary or fascicled; bracts ¼ in. long, very coriaceous, concave, keeled, obtuse or subacute; bracteoles as long, opposite, narrower. *Calyx-tube* short, truncate, quite entire. *Corolla* constricted above the ovary, then rather swollen, mouth constricted, white, with pale pink limb. *Filaments* subulate.

58. **L. Maingayi**, *Hook. f.*; branchlets and inflorescence rusty-pubescent, leaves opposite shortly petioled elliptic or obovate obtuse, flowers capitate decussately inserted on a short stout sessile rachis and concealed by the obtuse bracts, corolla ¼ in. quite glabrous funnel-shaped regularly cleft into 6 linear recurved lobes longer than the tube.

MALACCA, *Maingay.*

Branches terete, smooth, as thick as a duck's quill, without lenticels; nodes distant, thickened. *Leaves* 2-3 in., coriaceous, midrib strong beneath, nerves very slender, base acute; petiole ¼ in., slender. *Inflorescence* of scurfy heads sessile at the nodes, solitary or fascicled, about ¾ in. long, formed of about 4 pairs of decussate broadly oblong obtuse caducous imbricating bracts, each at the base of a perfectly glabrous sessile flower; rachis of the inflorescence very stout, 4-sided, deeply excavated opposite the flowers. *Ovary* very short; calyx-limb cupular. *Corolla* coriaceous, lobes spreading. *Filaments* linear, anthers oblong. *Stigma* capitate.—The specimen is a solitary one; so allowances must be made for the description. It is closely allied to *L. Arnottianus*, Korth, of Sumatra, which has acute bracts.

DOUBTFUL AND EXCLUDED SPECIES.

L. BIFLORUS, *Desrouss. in Lamk. Encycl.* iii. 600; *DC. Prodr.* iv. 302; *Wight & Arn. Prodr.* 386, is probably one of the forms of *L. Scurrula*.

L. CORIACEUS, *Desrouss.*, which is cited by authors as a synonym of *L. loniceroides*, L., is a very different plant, a native of Bourbon.

L. ? FIRMUS, *Wall. Cat.* 6874, is *Henslowia umbellata*, Bl.

L. KANNELI, *Schult. Syst. Veg.* vii. 153; *Wight & Arn. Prodr.* 387; *Rheede Hort. Mal.* x. t. 5, is undeterminable.

L. LAMBERTIANUS, *Schult. Syst.* vii. 118; *DC. Prodr.* iv. 317, is probably *L. pentapetalus*, *Roxb.*, if from Nepal, which is doubtful.

L. MITCHELII, *Wall. Cat.* 6865, from Madras, is an *Olar*, probably *O. Wightiana*.

L. OBOVATUS, *Griff. Notul.* iv. 622, from Malacca, is apparently near *L. globosus*, differing in the cuneate-obovate leaves.

L. PUNICEUS, *Wall. Cat.* 522, from Penang, consists of a few detached alternate lanceolate finely acuminate coriaceous leaves, and a few detached small ellipsoid fruits: it is undeterminable. Wallich says it is like his *L. erythrostachys* (*L. pentandrus*, *L.*) of Nepal.

L. RUGULOSUS, *Heyne in Roth Nov. Sp.* 194; *DC. Prodr.* iv. 317; *Wight & Arn. Prodr.* 386, from the Deccan, is undeterminable. It is no doubt a *Cichlanthus*.

L. SERRULATUS, *Roxb. in Steud. Nomencl.* Nothing is known of this.

L. SIAMENSIS, *Kurz For. Fl.* ii. 320, is a Siam plant allied to *L. pentandrus*.

L. TURBINATUS, *DC. Prodr.* iv. 305; *Wight & Arn. Prodr.* 386, from the Nilghiris, is altogether doubtful. Wight and Arnott say that but for the calyx being unequally 4-cleft, it would be referred to a glabrous var. of *L. buddleioides*, *Desr. (Scurrula, L.)*.

L. VISCIFOLIUS? *Wight in Wall. Cat.* 6865, is in too imperfect a state for determination. It was communicated by Wight to Wallich, and is probably *L. recurvus*, *Wall.* I find nothing more like it amongst Wight's plants. The exact locality is Cumbum in the Nilghiris, Jany, 1827.

2. **VISCUM**, *Linn.*

Leaves opposite, often reduced to scales. *Flowers* unisexual, small or minute, solitary or fascicled in the axils of the leaves or at the nodes of the branches, rarely terminal. *Perianth-tube* of the male solid, of the female adnate to the ovary; limb 3-4-partite, segments usually deciduous. *Anthers* broad, sessile, adnate to the perianth-lobes, opening by many pores. *Ovary* inferior; stigma sessile or subsessile, large, pulvinate. *Fruit* succulent, pericarp full of viscid matter. *Embryo* in fleshy albumen, solitary or 2 in each seed.—Species about 30, temperate and tropical.

* *Branches* dichotomous, leafy, or the lower whorled. *Flowers* fascicled, terminal in the forks of the branches. *Perianth-lobes* deciduous.

1. **V. album**, *Linn. Sp. Pl.* 1023; branches terete, leaves obovate-cuneate tip rounded, flowers in sessile or shortly peduncled cup-shaped bracts. *Boiss. Fl. Orient.* iv. 1068; *DC. Prodr.* iv. 278; *Brand. For. Fl.* 392; *Kurz For. Fl.* ii. 323. *V. stellatum*, *Don Prodr.* 142; *DC. l. c.*; *Wall. Cat.* 490.

TEMPERATE HIMALAYA; from Kashmir to Nepal, alt. 3-7000 ft.—DISTRIB. Westward to the Atlantic, N. Asia to Japan.

A large green bush, branches jointed. *Leaves* sessile, very coriaceous, flat, 1-2 in. long, broad or narrow, obscurely 3-5-nerved. *Flowers* diœcious, sessile, 3-5 in a cluster, bracts concave. *Perianth-segments* 3-4, triangular, thick, acute, deciduous. *Fruit* white, $\frac{1}{4}$ - $\frac{1}{3}$ in. long, ellipsoid.—Mistletoe.

** *Branches* dichotomous leafy (or leaves 0 in *V. ramosissimum*). *Flowers* in axillary sessile or peduncled fascicles. *Perianth-lobes* deciduous.

2. **V. monoicum**, *Roxb. Fl. Ind.* iii. 763; branches terete, leaves shortly petioled obliquely ovate or falcate acute or acuminate 3-5-nerved, flowers monœcious in axillary sessile or shortly peduncled fascicles, bracts cuspidate, fruit oblong. *DC. Prodr.* iv. 278; *Brandis For. Fl.* 393; *Kurz For. Fl.* ii. 324; *Wight & Arn. Prodr.* 379 (under *V. orientale*); *Griff. Notul.* iv. 637, and *lc. Pl. Asiat.* t. 631. *V. falcatum*, *Wall. Cat.* 492; *DC. l. c.* *V. benghalensis*, *Roxb. mss.* ? *V. confertum*, *Roxb. l. c.*

SIKKIM HIMALAYA, alt. 2-4000 ft., *J. D. H.* KHASIA MTS., alt. 0-3000 ft., *Wallich, &c.* GANGES DELTA, *Roxburgh.* OUDE, *Vicary.* MARTABAN and TENASERIM, *Kurz.* NILGHIRI or KURG HILLS, *G. Thomson.*

A large shrub. *Leaves* rather thin, 1-5 in. long, very variable in breadth, nerves often strong. *Flowers* 1-3, minute, greenish, the lateral usually female, central male or absent, sometimes appearing spicate from terminating leafless shoots. *Perianth-segments* 4, triangular-oblong. *Fruit* the size of a pea truncate smooth "yellowish," *Kurz*, "blackish brown," *Brandis*.—Much of the above description is taken from *Kurz*. I follow *Wight* and *Arnott* in regarding *Roxburgh's V. confertum* from Silhet as probably the same.

Var. ? *Edgeworthii*; branches more robust, leaves very thickly coriaceous sometimes $2\frac{1}{2}$ in. broad and 7-nerved.—Banda, on *Zizyphus*, *Edgeworth*.—This may be a different species.

3. **V. verruculosum**, *Wight & Arn. Prodr.* 379; branches terete opposite and whorled, leaves petioled obovate oblong or rounded obtuse or acute base cuneate 3-5-nerved, peduncles axillary 3-fld., flowers monœcious, fruit linear-oblong warted. *V. monoicum* ? *Wight in Wall. Cat.* 6875.

DECCAN PENINSULA; on the Dindygul Hills, alt. 2500 ft., *Wight*.

Branches rather slender, terete, branchlets angular. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., black when dry, not thickly coriaceous. *Flowers* as in *V. orientale*, of which it is (as suggested by *Wight* and *Arnott*) perhaps a variety, but according to *Wight* the fruit is very different, being long slender and warted. *Thwaites* unites it with *orientale*, but gives no reason.

4. **V. orientale**, *Willd. Sp. Pl.* iv. 737; branches terete or angled and grooved opposite and whorled, leaves petioled from obovate to elliptic oblong and linear oblong obtuse 3-5-nerved, base narrowed or rounded, flowers few or many in sessile or peduncled clusters monœcious, fruit globose smooth. *DC. Prodr.* iv. 278; *Wight & Arn. Prodr.* 324; *Brand. For. Fl.* 393; *Kurz For. Fl.* ii. 324; *Blume Fl. Jav. Loranth.* t. 24, 25; *Benth. Fl. Austral.* iii. 396; *Miquel Fl. Ind. Bat.* i. pt. 1, 804; *Wall. Cat.* 491. *V. verticillatum*, *Roxb. Fl. Ind.* iii. 764. *V. Heyneanum*, *DC. l. c.* *V. indicum*, *Rottl. mss.*

BENGAL, BEHAR, and CHITTAGONG, and thence southward to SINGAPORE and TRAVANCORE. CEYLON; Central Province, ascending to 7000 ft.—DISTRIB. Malay Islands, China, New Guinea, Australia.

A rather large much-branched shrub, black or brown when dry; branches often very slender, branchlets angular. *Leaves* rarely more than 1 in., often unequal. *Flowers* minute, rarely more than 5. *Flowers* as in *V. foliatum*, but perianth usually 3-cleft. *Fruit* the size of a pea (*Kurz*), "purple, copiously minutely dotted," *W. & A.*—I cannot distinguish between specimens with deeply grooved and angled branches, and those with terete ones, there are so many intermediates.

5. **V. orbiculatum**, *Wight Ic.* t. 1016, and *Spec. Nilgherr.* t. 86; branches and branchlets acutely angled and deeply grooved, leaves petioled elliptic oblong or rounded much waved obtuse 3-5-nerved, flowers 3-5 in sessile or peduncled axillary clusters, fruit oblong rounded at both ends.

NILGHIRI HILLS, *Wight, Herb. Hohenack.*

I doubt this being anything but a form of *V. orientale* with the main branches angled and grooved and leaves much waved.

6. ***V. ovalifolium***, *Wall. Cat.* 489; branches stout terete, leaves petioled very coriaceous elliptic or oblong rarely ovate obtuse 3-5-nerved, flowers dioecious ? crowded in axillary sometimes spicate clusters, perianth 4-lobed, fruit oblong-ovoid *DC. Prodr.* iv. 278; *Kurz For. Fl.* ii. 325. *V. obtusatum*, *Wall. Cat.* 494; *DC. l. c.*

TENASSERIM, *Griffith, Lobb, &c.* ANDAMAN ISLANDS, *Kurz. MALACCA, Griffith (Kew Distrib.* 2739), *Maingay (Kew Distrib.* 696). PENANG, *Wallich.*—DISTRIB. China, Ava.

This resembles a very large stout form of *V. orientale* with larger very thickly coriaceous leaves 2-4½ in. long, and more numerous flowers clustered at the axils and nodes. *Perianth* 4-merous.—*V. ovalifolium* (and *V. obtusatum*) are reduced to varieties of *V. orientale* by Miquel, *Fl. Ind. Bat.* i. pt. 1, 805, perhaps correctly.

7. ***V. capitellatum***, *Sm. in Rees Cycl.* xxxvii; dwarf, branches short terete very stout, leaves shortly petioled ovate obovate spatulate or orbicular concave above obscurely 3-nerved tip rounded base cuneate upper smaller linear-oblong, flowers 3-6 terminating solitary fascicled or whorled peduncles, fruit ovoid. *DC. Prodr.* iv. 279; *Wight & Arn. Prodr.* 330. *V. mangiferæ*, *Wight in Wall. Cat.* 6878. *V. verticillatum*, *Herb. Rottl.*

DECCAN PENINSULA; from Canara at Sindolé, *Ritchie*, southwards. CEYLON, common, *Thwaites*.

A small species, forming much-branched tufts 6-10 in. long and broad, often parasitic on other *Loranthaceæ*. *Leaves* ¼-1 in. long, and often as broad, apparently sometimes wanting. *Peduncles* very variable in length, ½ in. or less; bracts rounded.

8. ***V. ramosissimum***, *Wall. Cat.* 6876; branches terete very long and slender, leaves 0 or very few sessile petioled obovate or linear-oblong or -cuneate tip rounded base cuneate obscurely 3-nerved, flowers 1-3, minute sessile, fruit subglobose minute. *Wight & Arn. Prodr.* 380.

DECCAN PENINSULA; on the Ghats and low grounds, from the Concan southwards. ? SINGAPORE, *Murton*. CEYLON; on *Rhododendron* at Maturata, *Trimen*.

Branches 10-18 in. long, striate; internodes 1-2 in. long, nodes hardly swollen, not contracted. *Leaves* 1 in., coriaceous, only one or two pairs at the bases of the main branches in a few specimens, the majority are leafless.—It is not easy to distinguish some specimens of this from *V. angulatum*. The Singapore specimens are imperfect; if not *ramosissimum*, they are probably an undescribed species.

*** *Leafless. Perianth-lobes deciduous.*

9. ***V. angulatum***, *Heyne mss.*; *DC. Prodr.* iv. 283; leafless, branches angled long and slender nodes not swollen or contracted, flowers very minute sessile solitary or whorled at the nodes, perianth-lobes deciduous. *Wight & Arn. Prodr.* 380; *Dalz. & Gibs. Bomb. Fl.* 110; *Benth. Fl. Austral.* iii. 396; *Miquel Fl. Ind. Bat.* i. pt. 1, 806; *Wall. Cat.* 497. *V. attenuatum*, *Herb. Hohen.* n. 1478. *V. ramosissimum*, *Wight Ic.* t. 1017.

DECCAN PENINSULA; on the Ghats and low grounds, from the Concan southwards. —DISTRIB. Java, Australia.

Habit of *V. ramosissimum*, but never so slender as that sometimes is, and always leafless as far as is known; main stem terete, branches acutely 4-angled or (when dry) many-angled below.

10. **V. articulatum**, *Burm. Fl. Ind.* 311; leafless, branches flattened, internodes 1–2 in. striate and furrowed when dry contracted at the nodes, flowers very minute fasciated in cup-shaped bracts at the tops of the internodes, perianth-lobes deciduous. *DC. Prodr.* iv. 284; *Miquel Fl. Ind. Bat.* i. pt. 1, 806; *Kurz For. Fl.* ii. 325. *V. attenuatum*, *DC. l. c.*; *Wight & Arn. Prodr.* 380; *Brand. For. Fl.* 394. *V. moniliforme*, *Blume Bijl.* 667, and *Fl. Jav. Loranth.* t. 25 B; *DC. l. c.* *V. fragile*, *Wall. Cat.* 498. *V. compressum*, *Poir. Encycl. Suppl.* ii. 861; *DC. l. c.*; *Blume Fl. Jav. Loranth.* t. 24. *V. fragile*, *Wall. mss. in DC. l. c.* *V. aphyllum*, *Griff. Notul.* iv. 634, and *l.c. Pl. Asiat.* t. 630.

SUBTROPICAL HIMALAYA; from Chamba, ascending to 3000 ft., eastward to Sikkim. ASSAM, MISHMI and the KHASIA MTS., ascending to 6000 ft., and southward to TRAVANCORE, MALACCA and CEYLON.—DISTRIB. Malay Islands.

A pendulous much di-tri-chotomously branched green shrub, yellow or black when dry; internodes very variable in length and breadth, 1–2 by $\frac{1}{10}$ – $\frac{1}{3}$ in. Flowers few or numerous in the cup-shaped bracts, 3–4-merous, arranged in depressed 3-fl. spikes, of which the lateral flowers are usually male; males with reflexed perianth-lobes; females bibracteolate with erect deciduous perianth-lobes. Fruit subglobose, yellow, smooth.—I think there can be no doubt of this common plant being Burmann's *V. articulatum* and Blume's *V. moniliforme*, which latter name is usually given to *V. japonicum*. There are two states of it.

V. ARTICULATUM proper; more slender, internodes rarely $\frac{1}{3}$ in. broad.

Var. *dichotoma*, *Kurz For. Fl.* ii. 325; much stouter, internodes thicker and broader often $\frac{1}{2}$ in. broad. *V. dichotomum*, *Don Prodr.* 147; *DC. Prodr.* iv. 284. *V. elongatum*, *Wall. Cat.* 495; *DC. l. c.* *V. nepalense*, *Spreng. Syst., Cur. Post.* 47. *V. opuntioides*, *Roxb. Fl. Ind.* iii. 764; *Wall. Cat.* 496. *Viscum* sp., *Griff. Notul.* iv. 636, and *l.c. Pl. Asiat.* t. 632.—Common in the Himalaya, Khasia Mts., the higher hills of Pegu, and the Deccan Peninsula.—Harvey (*Fl. Cap.* ii. 581) gives this as a native of South Africa, but describes the fruit as mostly warted, which is not the case in the Indian plant.

**** Leafless. Perianth-lobes persistent.

11. **V. japonicum**, *Thunb. in Trans. Linn. Soc.* ii. 329; a small tufted leafless species, branches flattened contracted at the nodes, internodes $\frac{1}{4}$ –1 in. long, flowers very minute fasciated in cup-shaped bracts at the tips of the internodes, perianth-lobes persistent. *DC. Prodr.* iv. 283. *V. Opuntia*, *Thunb. Fl. Jap.* 64. *V. articulatum*, *Miquel Prol. Fl. Jap.* 297; *Frack. & Sav. Enum. Pl. Jap.* i. 406; *Maxim. Diagn.* xx. 616; *Benth. Fl. Hongk.* 141, and *Fl. Austral.* iii. 396. *V. tænioides*, *Comm. in Thou. Mel. Obs.* 43; *DC. l. c.* 283; *Baker Fl. Maurit.* 135. *V. moniliforme*, *Wight & Arn. Prodr.* 380; *Wight l.c. t.* 1018, and *Spic. Neelgherr.* t. 87; *Kurz For. Fl.* ii. 325 (not of Blume). *V. articulatum*, *Brand. For. Fl.* 393. *V. Wightianum*, *Wall. Cat.* 6877 (not of Wight & Arn.).

TEMPERATE HIMALAYA; from Murree to Kumaon, alt. 5–7000 ft. KHASIA MTS., alt. 4–5000 ft. MALACCA, on Mt. Ophir. NILGHIRI MTS., ascending to 7000 ft. *Wight, &c.* CEYLON, in the most elevated parts of the Central Province.—DISTRIB. Mauritius, China, Japan, Australia.

Much smaller than *V. articulatum*, erect, rarely 6 in. high, usually densely tufted, very variable in the breadth of the internodes. Inflorescence as in *V. articulatum*, but perianth-segments (3–4) persistent. Fruit $\frac{1}{10}$ in. long, ellipsoid.—This very distinct species is usually referred to the Javanese *V. moniliforme*, Blume. Of this last I have seen no authentic specimens, but its author describes it as abundant at Bintenzorg, where *V. japonicum* is not likely to be found. I have seen no Javanese specimens of *V. japonicum*, and it is not described in Miquel's Flora. Miquel, rightly no doubt, refers Blume's *moniliforme* to *articulatum*, which is very common in Java. Wallich's No. 6877 consists of several fragments of this, but there has been accidentally fastened on the same sheet a scrap apparently of *V. orientale*.

Var. *coraloides*, Wight Ic. t. 1019; diœcious, branchlets narrower, all female.—Nilgiri Hills, abundant, *Wight* (who states that he has never found male flowers).

DOUBTFUL AND EXCLUDED SPECIES.

V. GROSSUM, *Wight in Wight & Arn. Prodr.* 380; *Wall. Cat.* 6879.—Wight and Wallich's plants consist of nothing but fragments of branches resembling those of *V. album*. The flowers are described as fasciated at the nodes, but there are none in the specimens. It is a native of the Dindygul Hills in the Southern Carnatic.

V. ? HETERANTHUM, *Wall. Cat.* 488; *DC. Prodr.* iv. 279 (*V. latifolium*, *Hum. in Don Prodr.* 142. *V. platyphyllum*, *Spreng. Cur. Post.* 47; *DC. l. c.*), is *Henslowia heterantha*, *Hook. f. & Thoms.*

V. WALLICHIANUM, *Wight & Arn. Prodr.* 379 (*excl. syn. V. Wightianum*); stem and branches terete, whorled opposite or dichotomously, nodes swollen leaves 2–2½ in. flat very stoutly petioled very thick and coriaceous oblong obscurely 3-nerved base cuneate, flowers unknown.—There is a scrap of this in Wight's Herbarium without locality; it a good deal resembles *V. album*, but is, I think, distinct. There are also fragments of it in Wallich's Herbarium, fastened on the sheet with *V. Wightianum*, Wight & Arn. (not Wallich), and numbered 491, which is *V. orientale*, a very different plant.

V. WIGHTIANUM, *Wight & Arn. Prodr.* 380 (*not of Wallich*); stem and branches terete whorled or dichotomous, nodes thickened, leaves 2–2½ in. very coriaceous subsessile broadly elliptic rounded at both ends tip rounded grey and opaque when dry nerves very obscure, flowers unknown.—Apparently a very distinct species, of which there are fragments in Wight's Herbarium without locality, and in Wallich's mixed with *V. Wallichianum*.

2. **ARCEUTHOBIUM**, *Rich.*

Minute green leafless parasites, with the leaves reduced to opposite scales in which the very minute ebracteolate diœcious? solitary flowers are sunk. *Perianth* as in *Viscum*, but 2–5-partite, and always persistent. *Anthers* globose, bursting transversely.—Species 5–6, S. Europe, W. Asia, N America.

A. minutissimum, *Hook. f.*; stem none but the inconspicuous stock that ramifies within the bark and which the minute branches perforate but scarcely rise above the surface, appearing as a 2-lipped cup, male fl. sessile in the cup 3–5-partite, fem. fl. pedicelled.

KUMAON HIMALAYA, alt. 10,700 ft., on *Pinus excelsa*, *Duthie*.
The most minute dicotyledonous plant that I can call to mind.

3. **NOTOTHIXOS**, *Oliv.*

Dichotomously branched parasitic hoary or tomentose shrubs. *Leaves* opposite, flat, coriaceous. *Flowers* minute, monœcious, in unisexual heads, or spikes, like those of *Viscum*, but the subsessile anthers are broad, erect, many-celled and lobulate? and dehisce by pores or a transverse slit at the apex.—Species 4, a Cingalese and three Australian.

N. floccosus, *Oliv. in Journ. Linn. Soc. Lond.* vii. 104; densely woolly tomentose, branched, leaves orbicular or broadly ovate obtuse, flowers spicate, anthers bursting by many pores. *Viscum floccosum*, *Thwaites Enum.* 418.

CEYLON; in the Ambagamowa and Ratnapoora Districts, *Thwaites*.

Much branched; branches slender, young tomentose. *Leaves* ½–¾ in. long,

petioled, ovate, 3-nerved and transversely veined, coriaceous, glabrous above with sunk nerves, beneath densely clothed with ochreous woolly tomentum; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in., woolly. *Flowers* few, terminal in short spikes. *Anthers* 8-celled and lobed. *Perianth-lobes* 3–4, triangular, acute, persistent. *Style* very short, conical. *Fruit* ovoid, white, $\frac{1}{2}$ in. long.—Hardly generically separable from *Viscum*, but the habit and woolliness are those of *Notothixos*.

4. **GINALLOA**, Korth.

Parasitic very slender glabrous shrubs, with the habit of the leafy *Viscums*, but the flowers are spicate, the branches have usually a thickening at the base like a sheath, and the anthers are didymous 2-celled and open by slits lengthwise.—Species 4, Malayan.

* *Flowers in a cupular bract.*

1. **G. Helferi**, *Kurz For. Fl.* ii. 326; leaves linear-cuneate $\frac{1}{2}$ – $\frac{2}{3}$ in. diam. tip rounded or emarginate 5-nerved. *Viscum Helferi*, *Presl Epimel. Bot.* 256.

TENASSERIM, *Helfer*.

Leaves 3–4 in., tapering to the sessile base, thinly coriaceous. *Spikes* 1–2 in., terminal or in the forks, very slender. *Flowers* minute; perianth-segments 3, triangular, acute. *Anthers* large, sessile.

2. **G. spathulifolia**, *Oliv. in Journ. Linn. Soc.* vii. 103; leaves linear or narrowly linear-spathulate $\frac{1}{2}$ – $\frac{1}{3}$ in diam. nerves very obscure. *Viscum spathulifolium*, *Thwaites Enum.* 136.

CEYLON; on Adams Peak, *Gardner, Thwaites*.

Leaves 2–3 in., tapering to the sessile base, thinly coriaceous, tip obtuse or retuse. *Spikes* 1–2 in., terminal and in the forks, very slender. *Perianth-segments* 3, triangular, at length deciduous. *Ovary* narrowly oblong. *Fruit* ellipsoid, nearly $\frac{1}{2}$ in. long.

** *Flowers sunk in the fleshy rachis of the spike.*

3. **G. andamanica**, *Kurz in Journ. As. Soc. Beng.* 1872, ii. 309, and *For. Fl.* ii. 326; leaves thickly coriaceous petioled obovate or obovate-oblong obscurely 3–5-nerved.

SOUTH ANDAMAN ISLAND, *Kurz*.

A rather large parasite; stem terete, dichotomously branched. *Leaves* $1\frac{1}{2}$ –2 in. long, tip rounded; petiole very short, stout, flat. *Spikes* 1–4 in., robust, terminal and in the forks. *Flowers* minute, clustered, diœious?, surrounded with a thin dilatation of the rachis; perianth-segments 3, triangular. *Fruit* (unripe) elongate.—I have seen no specimens.

ORDER CXXXIII. **SANTALACEÆ.**

Trees shrubs or herbs. *Leaves* alternate or opposite, quite entire, sometimes scale-like or 0, exstipulate, nerves inconspicuous. *Inflorescence* various; flowers inconspicuous, green, usually bracteate and bracteolate, regular, 1–2-sexual. *Perianth* superior or inferior, 3–8-toothed lobed or -partite; lobes with often a tuft of hair behind the anthers. *Stamens* 3–6, inserted on the lobes above rarely on the base of the perianth and opposite them; anthers 2-celled. *Disk* various, epigynous or perigynous. *Ovary* inferior (superior in *Champercia*), 1-celled; style usually short, stigma entire or 3–6-lobed;

ovules 2-3, adnate to, or pendulous from, a central column (solitary and basal in *Champereia*). *Fruit* a nut or drupe. *Seed* globose or ovoid; testa thin or obsolete; albumen copious, fleshy; embryo usually terete.—Genera 28, species 220, temperate and tropical.

TRIBE I. **Thesiæ**. *Perianth* $\frac{1}{2}$ -superior, tube adnate to the base of the ovary, and usually produced above it. *Disk* 0. *Fruit* a very small nut.

Flowers spicate 1. THESIUM.

TRIBE II. **Osyrideæ**. *Perianth* superior, tube adnate to the ovary, not produced above it. *Fruit* a drupe.

* *Anther-cells distinct, parallel.*

Stamens with interposed processes. Leaves alternate 2. PIRULARIA.
Stamens with interposed processes. Leaves opposite 3. SANTALUM.
Stamens without interposed processes. Leaves alternate 4. OSTRIS.

** *Anther-cells divergent or confluent.*

Parasitic shrubs. Flowers minute, cymose or fascicled 5. HENSLOVIA.
Leaves alternate. Filaments 2-fid 6. SCLEROPYRUM.
Small leafless parasitic shrubs 7. PHACELLARIA.

TRIBE III. **Anthoboleæ**. *Perianth* inferior, 3-4-partite. *Ovary* superior or immersed in the disk. *Ovule* 1, erect.

Flowers in slender axillary panicles, very minute 8. CHAMPEREIA.

1. THESIUM, Linn.

Slender perennial herbaceous root-parasites, rarely annual or shrubby. *Leaves* alternate, narrow, decurrent, 1-3-nerved. *Flowers* minute, greenish, solitary and axillary or in 2-chotomous cymes, 2-sexual. *Perianth* adnate to the ovary, tube produced above it; lobes 5, rarely 4, with a tuft of hair on the face. *Stamens* 5-4, inserted at the base of perianth-lobes, included. *Ovary* inferior; style short or long, stigma capitate or lobulate; ovules 2-3, pendulous from a basal free often flexuous or crumpled column. *Fruit* a sinuate drupe or nut, often ribbed. *Embryo* terete.—Species about 100, temperate and tropical; all but 2 Brazilian species are natives of the Old World.

I have no sufficient materials for discriminating the Himálayan plants of this most troublesome genus, which I provisionally include under *T. himalense*, itself probably a widely distributed W. and N. Asiatic plant, possibly also European.

1. **T. himalense**, Royle Ill. 322; stems procumbent or suberect very slender, leaves bracts and bracteoles linear, nut ellipsoid or globose its nerves rather faint crowned by the narrower perianth-tube with linear incurved lobes. *Edgeworth in Trans. Linn. Soc. xx. 88; A. DC. Prodr. xiv. 645.* *T. multicaule*, Herb. Ind. Or. H. f. & T., ? of Ledeb.

WESTERN HIMALAYA; from the Chenab Valley to Kumaon, alt. 5-7000 ft., Royle, &c.

Very closely allied to *T. multicaule*, but very much more slender, and usually procumbent. *Stem* 6-18 in. *Leaves* scattered, 1-2 by $\frac{1}{10}$ - $\frac{1}{8}$ in., 1-nerved. *Perianth* glabrous; lobes bearded within, obtuse. *Style* often exserted, stigma capitate.

Nut $\frac{1}{8}$ in., with faint but distinct raised nerves and reticulations.—There appear to be several varieties of this plant, approaching *T. divaricatum*, *T. montanum*, and various other Oriental and Siberian species, which should probably all be united, for their characters are very vague.

Var. ? 1; perianth-lobes much shorter broadly ovate, nut more globose.—Garwhal, on the Niti Pass, alt. 11,500 ft., *Strachey & Winterbottom*. Tibet, *Heyde*.—A more alpine plant than *T. himalense* proper, and possibly *T. altaianicum*, Kar. & Kir.

Var. ? 2; stems slender straggling and much branched, the branches divaricate, leaves very much more slender, flowers minute.—North-West Himalaya, at Vatar, *Brandis*; Garwhal, *Strachey & Winterbottom* (*Thesium* 2).

Var. ? 3 ? *pachyrhiza*; stems very numerous procumbent from (in the Tibetan specimens) a stout woody rootstock as thick as the little finger, leaves slender, fruit (in Sikkim specimens) ellipsoid or depressed globose crowned with linear incurved perianth-lobes.—Heights above Kibas, *Thomson*. Sikkim, at Tungu, alt. 11–12,000 ft., *J. D. H.*—I think this is nothing but a state of *T. himalense*, with a very old rootstock; the form of the nut is so variable as to afford no distinctive character, and its nervation is that of the other forms included under *himalense*.

2. ***T. Wightianum***, *Wall. Cat.* 4037; stems numerous branching from the base procumbent leafy, leaves very many uniform linear-lanceolate acute tips often bleached, bract and bracteoles hardly longer than the globose reticulated 10-nerved nut which is crowned by the short incurved perianth-lobes. *A. DC. Prodr.* xiv. 647; *Wight Ic.* 1852 (*exclude fig. of anthers*). *T. nilagiricum*, *Miquel in Analect. Mel.* iii. 15, and in *Hohenack. Pl. Ind. Or. No.* 973.

NILGHIRI HILLS, *Wight, &c.* Conoor, alt. 7–7500 ft., *Clarke*.—DISTRIB. Abyssinia ?

Branches straggling, sometimes a foot long. Leaves $\frac{1}{4}$ – $\frac{1}{2}$ by $\frac{1}{2}$ in., almost acuminate, rather fleshy. Flowers axillary, solitary or 2-nate, minute, sessile. Stamens glabrous. Style short, stigma capitate. Nut $\frac{1}{10}$ in. diam., with prominent longitudinal nerves and impressed reticulations.

DOUBTFUL SPECIES.

Thesium sp. ? from Murgulla, in the Salt Range, *Vicary*.—Apparently a tall very slender erect species, with long branches, scattered leaves, and the inflorescence and flowers of the common forms of *P. himalense*. It is perhaps *T. multicaule*, *Ledeb.*

2. **PYRULARIA**, *Michaux.*

Trees or shrubs. Leaves alternate, deciduous, membranous. Flowers polygamous, axillary or in terminal cymes, bracteolate. Perianth-tube solid in the male, in the fem. adnate to the ovary; lobes 5, valvate, hairy on the face. Stamens 5, inserted at the bases of the perianth-lobes with the anthers adhering to the hairs. Disk of scales between the stamens. Ovary inferior; style columnar, stigma capitate; ovules 2–3, pendulous from a free short straight basal column. Drupe large, pyriform, obovoid or globose. Seed globose; embryo short, subterete, near the top of the albumen.—Species 2, a Himalayan and N. American.

P. edulis, *A. DC. Prodr.* xiv. 628; leaves ovate oblong or elliptic-oblong acuminate young with long hairs beneath, male fl. in hirsutely tomentose panicles, fem. solitary, fruit pyriform. *Sphærocarya edulis*, *Wall. Cat.* 4033, and in *Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 371, and *Tent. Fl. Nep.* 19, t. 10, copied in *Wight Ic.* t. 255; *Gamble Man. Ind. Timb.* 320. *S. vestita*, *Wall. C.t.* 7207.

CENTRAL AND EASTERN TROPICAL HIMALAYA; Nepal, *Wallich*. Sikkim, alt.

4-5000 ft., *J. D. H.* Mishmi Hills, in Upper Assam, *Griffith*. KHASIA MTS., alt. 4-5000 ft., *Wallich*, &c.

A large or small thorny deciduous leaved tree; branches stout, youngest villous; buds large, of pale broad silky rounded imbricating scales. *Leaves* 3-7 in., rather fleshy, rarely obovate-oblong, quite entire; nerves few, very oblique, sunk above, very prominent beneath, petiole $\frac{3}{4}$ - $\frac{1}{2}$ in. *Male racemes* 1-3 in., terminal and axillary; flowers pedicelled, about $\frac{1}{8}$ in. diam., ebracteate. *Perianth-lobes* triangular, acute. *Fl. fem.* *Ovary* clavate, pubescent; style short. *Drupe* $1\frac{1}{2}$ -2 in. long, narrowed into the stout peduncle, crowned with the perianth-lobes; epicarp tough; sarcocarp glutinous, traversed by vessels; endocarp globose.

3. **SANTALUM**, Linn.

Glabrous trees or shrubs. *Leaves* opposite, rarely alternate, coriaceous. *Flowers* axillary or in terminal trichotomous paniculate cymes, 2-sexual; bracts minute. *Perianth-tube* adnate to the base of the ovary, campanulate or ovoid; lobes 4, rarely 5, valvate, with a tuft of hair on the face. *Stamens* 5-4, short, united at the bases of the lobes. *Disk* of scales between the stamens. *Ovary* at first free, at length half-inferior; style elongate, stigma 2-3-lobed; ovules 2-3, inserted below the summit of a long acuminate central free column, reflexed. *Drupe* subglobose, top annulate by the deciduous perianth. *Seed* subglobose; embryo terete, slender.—Species about 8, Indian, Malayan, Australian and Pacific.

S. album, Linn. *Sp. Pl.* 497; leaves elliptic-ovate or ovate-lanceolate acute or subacute base acute, panicles terminal and lateral, pedicels about equalling the perianth-tube. *A. DC. Prodr.* xiv. 683; *Roxb. Fl. Ind.* i. 442, and *Ed. Carey & Wall.* i. 462; *Grah. Cat. Bomb. Pl.* 177; *Dalz. & Gibs. Bomb. Fl.* 224; *Brand. For. Fl.* 398; *Kurz For. Fl.* ii. 329; *Beddome Fl. Sylv.* t. 256; *Gamble Man. Ind. Timb.* 321; *Dict. Sc. Nat.* t. 5 (*except the hairs*), copied in *Spack Hist. Veg.* t. 25; *Hayne Arnz. Gewachs.* x. t. 1; *Bentl. & Trimen Med. Pl.* iii. t. 292; *Griffith in Trans. Linn. Soc.* xviii. 59, t. 1-3; *Bot. Mag.* t. 3235. *S. myrtifolium*, *Roxb. Fl. Ind.* i. 444, and *Ed. Carey & Roxb.* i. 464. *S. verum*, Linn. *Mat. Med.* 102. *Sirium myrtifolium*, *Roxb. Cor. Pl.* i. t. 2; *Fleming in As. Research.* xi. 181 (Syrium). *Santalum album*, *Rumph. Amb.* ii. 42, t. 11.—Chandana, *Jones in As. Research.* iv. 253.

DECCAN PENINSULA; from near Poona on the west and Midnapoor on the east, southwards, on dry hills, ascending to 3000 ft.; cultivated elsewhere.

A small evergreen glabrous tree. *Leaves* opposite, $1\frac{1}{2}$ -2 in. long, pale brown when dry, thin, narrowed into a slender petiole $\frac{1}{2}$ - $\frac{1}{4}$ in., glaucous beneath; nerves faint. *Racemes* much shorter than the leaves, pedicels opposite; flowers $\frac{1}{8}$ in. diam., at first straw-cold, then blood-red, inodorous even when bruised. *Drupe* globose, size of a cherry, black when ripe, flesh juicy; endocarp hard, with 3 short ribs from the tip downwards.—The *S. myrtifolium* of the Cocon with narrower undulate leaves and less scented wood is regarded by Roxburgh as a very distinct species, and by De Candolle as a variety. Brandis, however, unites them, and I follow him as the latest Indian authority. Roxburgh's dried specimens show no character.

4. **OSYRIS**, Linn.

Glabrous shrubs; branches angular. *Leaves* alternate. *Flowers* small, axillary, solitary or cymose, polygamous. *Perianth-tube* solid in the male fl., in the fem. adnate to the ovary; lobes 3-4, triangular, valvate, with a tuft of hair on the face. *Stamens* 4-5, short, inserted at the base of the lobes; anther-cells separate. *Disk* angled between the stamens. *Ovary*

inferior; style short or long, stigma 3-4-fld.; ovules 2-4, pendulous from a short stout central placenta. *Drupe* globose or ovoid. *Seed* globose; embryo terete or with cotyledons dilated.—Species 5 or 6, S. European, African and Indian.

O. arborea, *Wall. Cat.* 4035; leaves subsessile elliptic-lanceolate-oblong or -obovate mucronate acute or acuminate base acute, male cymes in axillary peduncled clusters umbels racemes or fascicles, fem. subsolitary (1-3) on long slender pedicels, drupe subglobose. *A. DC. Prodr.* xiv. 633; *Brand. For. Fl.* 399. *O. Wightiana*, *Wall. Cat.* 4036; *Wight Ic.* t. 1853; *Grah. Cat. Bomb. Pl.* 177; *Dalz. & Gibs. Bomb. Fl.* 223; *A. DC. l. c.*

SUBTROPICAL HIMALAYA; from Simla to Bhotan (exclusive of Sikkim), ascending to 7000 ft. DECCAN PENINSULA; on the Ghats, from the Concan southwards. CEYLON; in the Central Province, alt. 4-6000 ft.

A glabrous (except var. *B*) shrub or small tree, black when dry; branches acutely angled, tips puberulous. *Leaves* 1-2 rarely 3 in. long, very variable in breadth, thickly coriaceous, midrib and nerves prominent beneath, or the latter faint. *Flowers* very minute. *Drupe* yellow, $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.

Var. *puberula*, branchlets and leaves beneath finely puberulous.—Nilghiri Hills, *Jerdon*; at Conoor, alt. 6000 ft., *Beddome*. Central Province, *Thompson (Brandis)*.—I have not seen specimens of this variety from the Central Province. The Sindh? plant (no doubt from Beluchistan) collected by Stocks, cited as the same by Brandis, appears to me to be a very different species.

5. **HENSLOVIA**, *Blume*.

Parasitic shrubs with spreading, erect or twining branches. *Leaves* alternate, thickish. *Flowers* very minute, monœcious or diœcious, axillary or the females with stamens; males subracemose or capitate; fem. solitary or few and clustered. *Perianth-tube* of male 0, of fem. adnate to the ovary globose ovoid or oblong; lobes 5-6, valvate. *Stamens* 5 or 6, inserted at the base or middle of the lobes, short, 0, or reduced to staminodes in the female fl.; anthers didymous, with a few long soft hairs at the back. *Disk* concave or convex. *Ovary* inferior; stigma subsessile, discoid or lobed; ovules 2-3, pendulous from the top of a stout central column. *Drupe* ovoid, obovoid, ellipsoid or subglobose; inner wall of hard endocarp protruded as 5-10 hard vertical plates into deep fissures of the stellately lobed seed. *Embryo* linear.—Species about 12, Indian, Malayan and Chinese.

The characters of the 12 species described in the Prodrômus, and which are chiefly taken from Blume (*Mus. Bot. Lugd. Bat.* i. 243), are utterly insufficient, and from the imperfection of specimens I am at a loss to identify the Indian satisfactorily with the Archipelagan species. *H. heterantha*, *Vidal Sinops. Fam. y. Gen. Plant. Filip.* t. 82, F, is *Exocarpus latifolia*, Br.

1. **H. granulata**, *Hook. f. & Thoms. Herb. Ind. Or.*; branches pustulate, flowers sessile on the top of very short clustered peduncles which are clothed with imbricating rounded bracts, the 4-5 upper of which form a spreading involucre, males numerous, females 1 or few, fruit small obovoid, pyrene 5-furrowed. *A. DC. Prodr.* xiv. 632; *Kurz For. Fl.* ii. 328.

EASTERN HIMALAYA; Sikkim and Bhotan, alt. 4-7000 ft., *Griffith (Kew Distrib.* 4389), *J. D. H.* KHASIA MTS., alt. 5-6000 ft., *J. D. H. & T. T.*

A small parasitic shrub, with erect and spreading stout branches. *Leaves* 1-2 in. long, from obovate to roundly spatulate, contracted into a distinct petiole, 5-9-nerved. *Clusters of peduncles* very numerous, $\frac{1}{16}$ - $\frac{1}{4}$ in. long; bracts with membranous subciliate margins, upper largest. *Flowers* quite sessile; perianth 5-lobed;

females without stamens. *Stigma* pulvinate, sessile, obscurely lobed.—I find no difference between *A. De Candolle's* var. *Sikkimensis* and the Khasia plant. The bracts are not more than half a line long (about $\frac{1}{4}$ in.).

2. **H. heterantha**, *Hook. f. & Thoms. in Herb. Ind. Or.*; branches smooth or sparingly pustulate, flowers sessile on the top of very short solitary or clustered peduncles which are bracteate at the base and tip only, the bracts at the tip forming a spreading involucre, males numerous, females 1 or few, fruit small elliptic-oblong, pyrene 5-6-furrowed. *A. DC. Prodr.* xiv. 632 (*excl. syn. H. frutescens*); *Kurz For. Fl.* ii. 323. ? *H. umbellata*, *Blume Mus. Bot.* i. 243; *A. DC. l. c.* 630. *Viscum* ? *heteranthum*, *Wall. Cat.* 488; *DC. Prodr.* iv. 279. *V. latifolium*, *Ham. in Don Prodr.* 142; *DC. l. c.* *V. platyphyllum*, *Spreng. Cur. Post.* 47.

CENTRAL and EASTERN HIMALAYA; Nepal, *Hamilton, Wallich*. SIKKIM, alt. 2-5000 ft., *J. D. H.* ? PEGU and MARTABAN, alt. 4-7000 ft., *Kurz*.—DISTRIB. ? Java.

A small parasitic shrub, with erect and spreading rough usually pale-brown branches, often minutely pustular. *Leaves* very variable, elliptic ovate or rounded, 1-4 in. long, sometimes as broad and orbicular, 5-9-nerved, narrowed into the petiole. *Flowers* about the size of *H. granulata*; females without or with very imperfect stamens; stigma very shortly 5-lobed, subsessile. *Fruit* red, tasting of *Pyrus aucuparia* in Sikkim ($\frac{1}{2}$ in. long and less); yellow in the Martaban plant, *Kurz*.—*Kurz* describes two varieties from Martaban, *heterantha* proper, with 5-merous sessile or subsessile flowers, and *coriacea* with 6-merous shortly pedicelled flowers. The Hong Kong *H. frutescens*, Benth., united with *heterantha* by *A. DC.*, is, I think, different, having fewer nerves, a much larger fruit, and pedicelled male flowers: it is described as terrestrial.

Var. ? *sessiliflora*; flowers quite sessile.—Khasia Mts., on Oaks near Nowgong.

3. **H. Lobbiana**, *A. DC. Prodr.* xiv. 631; branches terete twining smooth or faintly granulate, male flowers very minute few spicate, towards the tips of short strict clustered peduncles which are bracteate only at the base and under each flower, females on short fascicled bracteate pedicels, fruit globose or shortly oblong, pyrene nearly smooth obscurely 5-7-furrowed, stigma stellately 5-lobed.

PENANG, *Lobb.*; on the top of Government Hill, *Maingay (Kew Distrib. No. 1315)*, *Curtis*. MALACCA, *Griffith, Maingay (Kew Distrib. 1313)*.

A creeper according to *Maingay*, some of the branches of whose specimens are twining. *Leaves* from obovate-spathulate to orbicular, very coriaceous, dark brown when dry. *Peduncles* of male spikes $\frac{1}{2}$ – $\frac{3}{4}$ in. long; flowers sessile or very shortly pedicelled, $\frac{1}{30}$ in. diam., subglobose. *Pedicels* of female $\frac{1}{4}$ – $\frac{1}{2}$ in. long, bracts very minute in both sexes. *Perianth-tube* of female longer than the pedicel; lobes 5, each with a stamen.—I have described this from *Lobb's* specimens (No. 334), which are from Penang (not Singapore), as are those of *Maingay* and *Curtis*. I do not find the leaves to be punctato-verrucose beneath as described by *A. De Candolle*, nor the perianth-lobes as pilose.

4. **H. varians**, *Blume Mus. Bot. Lugd. Bat.* i. 244, t. 43; branches terete, twining nearly smooth, male fl. racemose or clustered on stout peduncles which are bracteate at the base and under each flower, females fascicled pedicelled, fruit shortly ellipsoid, endocarp 5-furrowed and rugose. *A. DC. Prodr.* xiv. 631. ? *H. philippinensis*, *A. DC. l. c.* *Dendrotrophe varians*, *Miq. Fl. Ind. Bat.* i. 780.

TENASSERIM; Mergui, *Griffith (Kew Distrib. 4390, 4392)*. MALACCA, *Maingay (Kew Distrib. 1316/2)*, ? *Cuming (No. 2255)*.—DISTRIB. Borneo.

Very closely allied to *H. Lobbiana*, but the leaves are much paler when dry, with

usually a more slender petiole, the male flowers are larger and more racemose, i. e. longer pedicelled, and the common peduncle is longer; the females also are longer pedicelled, and have longer bracts, the stigma is very obscurely lobed, not stellately rayed as in *Lobbiana*. The female flowers of the Tenasserim specimens have very minute imperfect anthers, those of Borneo, as figured by Blume, have perfect ones. The Malacca plant of Cuming described by A. De Candolle as *H. philippinensis*, is from Malacca; it has very slender male racemes, and may be Blume's *H. spicata*, which according to De Candolle differs in the 6-merous perianth (a character of no value) and glandular flowers. My Bornean specimens of *varians* are very insufficient. Maingay's has leaves 4 by 2-3 in.

5. *H. buxifolia*, Blume *Mus. Bot. Lugd. Bat.* i. 244; branches smooth terete spreading and twining, flowers minute bisexual on short simple pedicels or sessile on branched few-fl'd. very short peduncles which are 2-4-bracteate under the flower, fruit minute globose 4-6-furrowed and rugose, stigma discoid lobed subsessile. *A. DC. Prodr.* xiv. 631. *Dendrotrophe buxifolia*, Miquel *Fl. Ind. Bat.* i. 781. *Osyris rotundata*, Griff. *Notul.* iv. 742, and *Ic. Pl. Asiatic.* t. 627, f. 11.

MALACCA; in littoral woods, Griffith (*Kew Distrib.* 4391), Cuming (No. 2366).—
DISTRIB. BORNEO.

Habit of *H. Lobbiana*, but the flowers are in much shorter branched peduncles, apparently all hermaphrodite, with very small lobes, the fruit is not $\frac{1}{4}$ in. diam., and the stigma more shortly lobed. Griffith describes the ovules as 5.

DOUBTFUL SPECIES.

H. ERYTHROCARPA, Kurz in *Trimen Journ. Bot.* xiii. (1875) 329; branches striate, leaves oval or oval-oblong narrowed into a broad petiole 3-nerved very obtuse $1\frac{1}{2}$ -2 $\frac{1}{2}$ in. long coriaceous opaque glabrous, veins distinct above invisible beneath, fruits 1-4 in the leaf axils subelliptic-globose size of a large pea orange yellow smooth shortly stipitate.—On trees in woods of Kamorta, Tenasserim, Kurz.

HENSLOVIA sp., Tenasserim or Andamans, Helfer (*Kew Distrib.* 4393); leaves rounded 3-5-nerved, petiole short broad, fruit subglobose $\frac{1}{4}$ in. long, endocarp rugose.

HENSLOVIA sp., Mt. Ophir, Malacca, Maingay (*Kew Distrib.* 1314); leaves very coriaceous broadly oblong, petiole short stout, fruit globose $\frac{1}{4}$ in. long stipitate smooth or nearly so, with many locelli.

6. *SCLEROPYRUM*, Arnott.

Trees, often spiny. *Leaves* alternate, coriaceous. *Flowers* in short catkin-like spikes at the leafless nodes, polygamous. *Perianth-tube* of male solid, of fem. adnate to the ovary; lobes 5, valvate or subimbricate. *Stamens* 5, inserted at the bases of the lobes short, filaments 2-fid; anther-cells separate, dehiscing transversely. *Disk* annular. *Ovary* inferior; style short, stout, stigma large peltate; ovules 3, pendulous from the top of a central column. *Drupe* pyriform, pedicelled. *Seed* subglobose; embryo terete.—Species 2, Indian.

1. *S. Wallichianum*, Arn. in *Jard. Mag. Zool. & Bot.* ii. (1858) 550; a spinous glabrous tree except the finely tomentose inflorescence, leaves elliptic ovate or oblong obtuse, perianth-lobes imbricate. *Wight Ic.* t. 241. *Sphærocarya Wallichiana*, Wight & Arn. in *Ed. Phil. Journ.* xv. (1832) 180. *Pyrularia Wallichiana* and *P. ceylanica*, *A. DC. Prodr.* xiv. 629; *Beddome For. Fl.* t. 304. ? *Champerea Perrottetiana*, Baill. *Adans.* iii. 125.—*Rhede Hort. Mal.* iv. t. 18 (fem.), and vii. t. 30 (male).

DECCAN PENINSULA; on the Western Ghats, from the Concan southwards, as-

ending to 5000 ft. in Coorg. CEYLON, in the Central Province, alt. 4-6000 ft., Walker, &c.

Branches very stout and woody, bark pale. *Leaves* 3-6 in., penninerved, and 3-nerved at the base, which is sometimes cordate; petiole $\frac{1}{2}$ in. *Racemes* 1-2 in. long, the rachis and peduncle stout, of female thickening much after flowering; bracts minute; flowers reddish. *Perianth* $\frac{1}{10}$ in. diam.; segments ovate, subacute, distinctly imbricate, with one outer, all with a tuft of hairs behind the stamens. *Fruit* 1 in. long including the very stout pedicel, crowned with the persistent perianth.—Wight figures the leaves as sometimes cordate, upon which A. De Candolle founds his var. *Bertii*, quoting under it "*S. Wallichianum*, *Bertie in Wight Ic.* t. 241;" but Wight quotes Arnott as the author both of the genus and species, and I do not find any reference to the name Bertie in Wight or elsewhere. I have referred with doubt Baillon's *Champereia Perrottetiana* to this plant, of which it may be an unarmed flowering specimen with an occasionally 4-merous flower.

2. **S. Maingayi**, Hook. f.; unarmed (always?) glabrous, except the finely tomentose inflorescence, leaves oblong or ovate obtuse, perianth-lobes valvate. ? *Pyrularia moschifera*, A. DC.; *Benth. in Gen. Plant.* iii. 228.

MALACCA; *Maingay*.

"A medium-sized tree," *Maingay*, resembling *S. Wallichianum* in habit and foliage, but the branches are unarmed, the flowers smaller, and the perianth-segments strongly valvate. Bentham in *Gen. Plant.* refers this doubtfully to *Sphærocarya moschifera*, Blume Mus. Bot. i. 245 (*Pyrularia moschifera*, A. DC.), a plant I have not seen, but which is described as having leaves acuminate and pubescent beneath, and in which the stamens are not described as bifid. *P. moschifera* is more probably a true *Sphærocarya*.—I have seen no fem. fl. or fruit of *Maingay's* plant.

DOUBTFUL AND EXCLUDED SPECIES.

SPHÆROCARYA LEPROSA, Dalzell, is *Strombosia ceylanica*; see Vol. I. 579.

7. PHACELLARIA, Benth.

Small leafless parasitic shrubs, stems fascicled. *Flowers* minute, scattered on the branches, solitary or fascicled, sessile or sunk in the branch, ebracteate, monœcious. *Perianth-tube* of male solid, of fem. adnate to the ovary; lobes 4-8, short, valvate. *Stamens* 4 or 5, inserted on the bases of the lobes, filament short thick; anther-cells diverging below. *Disk* flat. *Ovary* inferior; style short, stout, stigma entire or 3-lobed; ovules 3, pendulous from and appressed to the top of a conical central column. *Fruit* unknown.—Species 3, Indian.

The species of this genus should be described from specimens in a living state, or preserved in spirits.

1. **P. rigidula**, Benth. in *Gen. Plant.* iii. 229; quite glabrous, stems rigid terete crowded in a tuft on a small stock simple or sparingly branched, perianth 4-5-cleft.

TENASSERIM; at Mergui, parasitic on a *Loranthus*, Griffith (*Kew Distrib.* 2745).

Stems 4-6 inches long, strict, rather slender; branches alternate, ascending, short. *Flowers* scattered along the branches, $\frac{1}{10}$ in. diam.; males subglobose, lobes broadly triangular; females with a longer tube.

2. **P. compressa**, Benth. in *Gen. Plant.* iii. 229; stems very stout scaberulously puberulous quite simple, perianth 5-8-cleft.

TENASSERIM; at Moulmein, Parish.

Stems fewer from the stock than in *P. rigidula*, and quite simple, much stouter, flowering almost from the base, when dry $\frac{1}{2}$ in. diam., described by Bentham as com-

pressed, but fresh specimens are necessary to confirm this. *Flowers* smaller even than in *P. rigidula*, with the lobes often cleft to the base.

3. **P. Wattii**, *Hook. f.*; hoary, stems much branched, branches stout, flowers clustered, perianth 5-cleft.

MANIPUR; on the mountains, alt. 7500 ft., *Watt*, growing on *Loranthus*.

Stems 4–8 in. long, about $\frac{1}{2}$ in. diam., flexuous. *Flowers* larger than in the two former species, sometimes crowded in globose masses, hoary.

8. **CHAMPEREIA**, *Griff.*

Glabrous shrubs or small trees. *Leaves* alternate. *Flowers* minute, in 3–5-fld. axillary paniced cymes, 2-sexual (always ?); bracts minute or 0. *Perianth* inferior; segments 5, valvate. *Stamens* 5, perigynous, filaments longer than the perianth, filiform; anther-cells parallel. *Disk* shortly 5-lobed between the stamens. *Ovary* superior, half immersed in the disk; stigma sessile, broad; ovule solitary, erect in the centre of the cell. *Drupe* ellipsoid, pedicelled. *Seed* conform to the drupe; embryo terete, radicle superior clavate.—Species 1 or 2, Malayan.

C. Griffithiana, *Planch. in Herb. Hook.*; leaves oblong or oblong-lanceolate acute or acuminate, male panicles very slender often exceeding the leaves. *Kurz For. Fl.* ii. 330 (*Griffithii*).—*Champereia*, *Griff. in Calc. Journ. Nat. Hist.* iv. 237.

TENASSERIM, and the ANDAMAN ISLANDS, *Griffith* (*Kew Distrib.* 438S), &c. MALACCA and PENANG, *Griffith*, *Maingay* (*Kew Distrib.* 375, 1316).

A small tree; branches slender, bark very pale. *Leaves* 3–6 in., coriaceous, ovate-oblong or lanceolate, very pale when dry, nerves slender; petiole $\frac{1}{4}$ in. *Male panicles* almost thread-like; flowers pedicelled, $\frac{1}{2}$ in. diam. *Fruiting panicles* with stout branches. *Drupe* $\frac{1}{2}$ in. long, bright red, very shortly stoutly pedicelled, quite smooth, tip rounded.—*Opilia manillana* and *Cumingiana* of Baillon (*Adansonia*, iii. 125), are very closely allied plants.

ORDER CXXXIV. **BALANOPHOREÆ.**

Low fleshy leafless or scaly brown, reddish or yellow root-parasites, without stomates. *Flowers* monœcious or diœcious, small or minute, crowded on spadix-like peduncled heads or cones; peduncles very stout, simple, annual or arising from an amorphous tuberous or a branching annual or perennial rootstock. **MALE FL.** *Perianth* 0, or of 3–8-valvate lobes. *Stamens* 1–2 in the naked flowers; in the flowers with a perianth as many as its lobes and opposite them or more, filaments 0, or fleshy, free or connate in a column or tube; anthers free or connate, 2-many-celled, opening by pores or valves, or bursting irregularly. **FEM. FL.** *Perianth* 0, or confluent with the ovary; limb 0, or minutely toothed. *Ovary* 1–3-celled; styles 1–2 or 0, stigmas simple or capitellate, rarely pulvinate and sessile; ovule 1 in each cell, usually pendulous from the top, anatropous or atropous, naked or with a single integument, or reduced to an embryo-sac. *Fruit* minute, crustaceous or coriaceous, 1-seeded. *Seed* usually adherent to the pericarp, testa very thin or 0 rarely thick, albumen densely granular and oily, rarely floury; embryo most minute, undivided.—Genera 14; species about 40, tropical or subtropical.

TRIBE. Eubalanophoreæ. *Perianth* of male fl. 3–6-lobed, of female 0. *Stamens* connate in a column. *Style* 1.

1. **BALANOPHORA.**

TRIBE. **Helosidææ**. *Perianth* of male entire or 3-lobed; of female confluent with the ovary, limb 2-lipped. *Styles* 2.

2. RHOPALOCNEMIS.

1. **BALANOPHORA**, *Forst.*

Glabrous fleshy herbs, with a tuberous rootstock warted with lenticels abounding in a waxy secretion. *Peduncles* bursting through the rootstock, which forms an irregularly toothed or lobed ring or short sheath at its base. *Flowers* minute, intermixed with clavate cellular bodies (bracteoles), monœcious or diœcious. MALE FL. *Perianth* of 2-6 valvate lobes. *Stamens* 2-∞, filaments 0, or connate in a solid column; anthers free or connate. FEM. FL. *Perianth* 0. *Ovary* ellipsoid, compressed, 1-celled, narrowed into a slender style, stigma terminal; ovule 1, pendulous. *Fruit* minute, crustaceous. *Seed* globose, adhering to the pericarp, albumen oily; embryo subglobose, of 2-3-cells.—Species about 12, Eastern Asiatic, Australian and Polynesian.

* *Scales of the peduncle forming an involucre. Anthers as the perianth-lobes.*

1. **B. involucrata**, *Hook. f. in Trans. Linn. Soc.* xxii. 30 and 44, t. 4-7; involucre of 2-4 scales connate to the middle, heads ovoid or globose. *Eichler in DC. Prodr.* xvii. 144.

TEMPERATE HIMALAYA, on the roots of various trees; Simla, alt. 6000 ft., *Thomson*; Sikkim, alt. 7-10,000 ft., *J. D. H.*

Rootstock tuberous, lobed, 3-4 in. diam. *Peduncles* stout or slender, 1-6 in. long, cylindric or compressed, rarely fascicled, involucred about the middle. *Male fl.* with the tube of the perianth sunk in cavities of the heads, usually 3-merous. *Anthers* transversely oblong, bursting by transverse apical slits. *Fem. fl.* sometimes clustered round a clavate bracteole.—In Sikkim I distinguished four forms of this.

a. *rubra*; peduncles and ovoid 2-sexual heads red.

β. *flava*; peduncles and usually unisexual heads yellow.

γ. *gracilis*; peduncles long and slender, and small unisexual heads yellow.

δ. *Cathcartii*; peduncles stout and (unisexual) heads white or yellow.

** *Scales of the peduncle scattered or imbricate. Anthers as many as the perianth-lobes.*

2. **B. dioica**, *Brown in Wall. Cat.* 7246, and in *Trans. Linn. Soc.* xiii. 227, in note; rootstock tuberous lobed or branched, scales of peduncle imbricate; heads cylindric usually 1-sexual. *Hook. f. in Trans. Linn. Soc.* xxii. 30 and 45; *Eichler in DC. Prodr.* xvii. 145; *Royle Ill.* 330, t. 99 (78) a. *B. elongata*, *Scholt. & Endl. Melet.* xiii. in part (not of *Blume*); *Fawcett in Journ. Linn. Soc. ined.* *B. Burmanniana*, affinis, *alveolata & picta*, *Griff. in Trans. Linn. Soc.* xx. 93, 94, t. 3-6.

TROPICAL and SUBTROPICAL HIMALAYA; on roots of various trees, from Nepal to Mishmi, alt. 3-7000 ft., abundant. KHASIA MTS., alt. 4-6000 ft. BURMA, *Griffith*.

Rootstock a few inches to a foot in diameter. *Peduncles* 1-12 in., stout; scales laxly or densely imbricate, and heads white brown yellow or blood-red. *Heads* 1-3 in. long, cylindric ovoid or conoidal, females with sometimes a few male flowers at the base. *Perianth-lobes* 3-6. *Staminal column* short or long; anthers bursting by curved slits.—A very variable plant.

3. **B. indica**, *Wall. Cat.* 7247; rootstock tuberous lobed, scales of

peduncle scattered, heads obovoid or subglobose usually 1-sexual. *Weddel in Ann. Sc. Nat. Ser. 3*, xiv. 167, t. 9, f. 11–22; *Hook. f. in Trans. Linn. Soc.* xxii. 30 and 46; *Eichler in DC. Prodr.* xvii. 145; *Fawcett in Journ. Linn. Soc. ined.* *B. picta*, *Miquel, Pl. Hohen.* 1272. *B. gigantea*, *Wall. Cat.* 7249. *B. typhina*, *Wall. Cat.* 7248/3. *B. elongata* in part, *Hook. f. l. c.* *Langsdorffia indica*, *Arn. in Hook. Ic. Pl.* t. 205, 206, and in *Ann. Nat. Hist.* ii. 36.

DECCAN PENINSULA; Nilghiri Mts., *Wight*. CEYLON, *Thwaites*, &c.

Rootstock very variable in size, often very large. *Peduncles* 3–12 in. high, stout (sometimes 1 in. diam.) or slender, and heads rosy, pale red brown or purplish. *Flowers* usually diœcious. *Perianth* 4–6-lobed.—*Eichler* has referred the Nilghiri specimen which I had assumed to be *B. elongata* to a var. (*B. minor*) of *B. indica*, on account of its having only as many anther-cells as perianth-lobes, whilst *B. elongata* has more (the number is not given for either species), and the anthers opening by longitudinal slits. Mr. *Fawcett* informs me that *B. gigantea* may differ from *B. indica* in the rootstock being tessellate rather than warted, and devoid of pustules.

4. ***B. Thwaitesii***, *Eichler in DC. Prodr.* xvii. 146; rootstock small, peduncle a foot high clothed with oblong scales 1–2 in. long, scales imbricate oblong lacerate, male head ovoid. *Fawcett in Journ. Linn. Soc. ined.* *B. indica*, *Thwaites*, mss.

CEYLON; *Thwaites*.

Known only from a drawing in the Kew collection sent by Dr. *Thwaites*, and which represents either a gigantic male specimen of *B. indica* or a different species. The whole plant is of a dirty-yellow colour, the perianth nearly $\frac{1}{2}$ in. diam., and the oblong head of anthers $\frac{1}{2}$ in. long.

*** *Scales of peduncle imbricate. Anther-cells* 20–60.

5. ***B. polyandra***, *Griff. in Trans. Linn. Soc.* xx. 94, t. 7; rootstock tuberos lobed, male heads cylindric, female ovoid or oblong. *Hook. f. in Trans. Linn. Soc.* xxii. 30 and 47; *Fawcett in Journ. Linn. Soc. ined.* *B. typhina*, *Wall. Cat.* 7248 A, B.

SIKKIM HIMALAYA; on roots of trees, alt. 4–6000 ft., *J. D. H.* KHASIA MTS. *Wallich, Griffith*, &c.

General habit colour and female flowers of *B. involucrata*, differing in the many-celled head of anthers; the male flowers are the largest of the genus.

2. RHOPALOCNEMIS, *Jungh.*

A very stout glabrous diœcious fleshy herb, with a large tuberos warted lobed rootstock. *Peduncles* many, very stout, bursting through the rootstock, which forms a warted coriaceous irregularly lobed tube round their base. *Heads* cylindric; flowers at first concealed under hexagonal connate peltate bracts, intermixed with dense masses of filiform cellular processes (bracteoles or imperfect flowers). MALE FL. *Perianth* campanulate or funnel-shaped adnate below to the base of the staminal column; mouth entire. *Stamens* 3; filaments connate in a long exserted column; anthers connate, 2–4-celled, irregularly bursting at the top. FEM. FL. *Perianth* confluent with the walls of the ovary, ellipsoid, compressed; limb very short, 2-lipped; styles 2, slender; ovule 1, pendulous. *Fruit* linear or ovate-oblong, turgid. *Seed* filling the cavity of the pericarp, consisting “of a very large horny embryo covered with a unicellular layer of endosperm,” *Hoffmeister*

R. phalloides, *Jungh. in Nov. Act. Acad. Nat. Cur.* xviii. Suppl. 1. 233; *Gæppert l. c.* xxii. 1. 148, t. 11-15; *Hook. f. in Trans. Linn. Soc.* xxii. 52, t. 12; *Eichler in DC. Prodr.* xvii. 138. *Phæocordylis areolata*, *Griff. in Trans. Linn. Soc.* xx. 100, t. 8.

EASTERN NEPALESE and SIKKIM HIMALAYA; on roots of trees, alt. 6-8000 ft., *J. D. H. KHASIA MTS.*, alt. 5-6000 ft., *Griffith, &c.*—DISTRIB. Java.

Rootstock from the size of a pigeon's egg to that of a man's head, hard and rough, perennial; sheaths at the base of the peduncles short, $\frac{1}{2}$ -1 in. diam. *Peduncles* 1-4 in. long, 2 in. diam. or less, (and heads) pale brown, cylindric, smooth or of the male warted with scattered deformed bracts. *Heads* 3-8 in. long by 2-3 diam., the females most elongate; bracts $\frac{1}{2}$ in. diam., formed of peltate stipitate truncate 6-sided pyramids, cohering by their edges and falling away in masses. *Male flowers* with the staminal column $\frac{1}{2}$ -1 in. long, projecting far beyond the dense velvety mass of filaments. *Female fl.* most minute; styles bent down beneath the bracts, projecting as minute hairs when released.—The germination of this genus and of *Balanophora* should be studied, for the structure of their seeds is very obscure.

ORDER CXXXV. EUPHORBIACEÆ.

Herbs shrubs or trees, often with milky juice. *Leaves* alternate or opposite, rarely divided or compound, usually stipitate. *Inflorescence* various; flowers usually small, often minute, always unisexual (in *Euphorbia* consisting of single naked stamens in a perianth-like involucre, surrounding a solitary pistil). *Perianth* simple and calycine, rarely petioled, often wanting in one or both sexes, rarely double, with the inner of 4-5 minute petals. *Stamens* various; anthers 2-celled, often didymous. *Ovary* superior, of 3, rarely more, or 2 carpels, more or less united together; styles as many as the carpels, free or united, entire or divided, stigmatic surface usually on the inner face of the styles or style-arms; ovules 1-2 in each carpel, pendulous from the inner angle of the cell, funicle often thickened. *Fruit* either a capsule of 2-valved 1-2-seeded cocci separating from a persistent axis, or a drupe with 1-3 cells, or of one or more combined nuts. *Seed* laterally attached at or above the middle of the cell, with or without an aril or thickening at the hilum. *Embryo* straight, in a fleshy albumen, with flat cotyledons and a superior radicle, very rarely exalbuminous with fleshy cotyledons.—Genera 200; species about 3000, chiefly tropical; very rare in cold countries.

Various ornamental species of this Order are frequent in Indian gardens, especially *Pedilanthus tithymaloides*, Poit. (*Kurz For. Fl.* ii. 418; *Dalz. & Gibs. Bomb. Fl. Suppl.* 76), a West Indian succulent shrub allied to *Euphorbia*, but with a scarlet slipper-shaped involucre, which is much cultivated in native gardens and planted in hedges; and various species of *Croton* with mottled green yellow and red leaves, and the scarlet bracted *Poinsettia pulcherrima*, which is a true *Euphorbia*. The American *E. geniculata*, Orteg. (*E. prunifolia*, Jacq., Wall. Cat. 7690), is both cultivated in gardens, and has been found apparently wild, but no doubt as an escape, in the Sutlej Valley. Others cultivated for useful purposes and occasionally found apparently wild are the castor-oil plant, *Ricinus communis*, Linn., and *Erecaria sebifera*, Müller, both now so well naturalized in India, that I have introduced them into the Flora; as also the candle nut, *Aleurites triloba*, Forst., a tree, native of the Pacific Islands, with oily albuminous seeds, that are used both as an illuminant and in cookery. The *Manihot utilisima*, Pohl (*Kurz For. Fl.* ii. 402), a South American tall herbaceous plant, with a tuberous root which yields Cassava bread and Tapioca, appears to me to have no claim to be introduced into the Flora, though cultivated here and there.

Besides the species described in this work, there are at least a score, principally Malayan, which from want of male or of female flowers or of fruit I cannot refer to their genera, and no inconsiderable number of species, known as to their genera and probably undescribed, but which for the same reason I do not think it expedient to introduce.

SERIES I. Cells of ovary 2-ovuled.

TRIBE I. **Euphorbiæ**. *Flowers* monœcious; males numerous, consisting each of a solitary pedicelled stamen, many of which surround a single female, which consists of a solitary pedicelled tricarpellary pistil; all enclosed in a calyx-like involucre. *Raphe* of ovule ventral.

Trees herbs or shrubs with milky juice 1. EUPHORBIA.

TRIBE II. **Buxæ**. *Flowers* monœcious (in the Indian genera). MALE FL. *Sepals* 4, imbricate. *Petals* 0. *Stamens* opposite the sepals or numerous. FEM. FL. *Sepals* 4 or 6. *Ovary* 2-3-celled; cells 2-ovuled. *Raphe* of ovule dorsal.

Leaves alternate 2. SARCOCOCCA.

Leaves opposite 3. BUXUS.

TRIBE III. **Phyllanthæ**. *Sepals* 1-2-seriate. *Petals* minute or 0. *Stamens* 1-2-seriate; outer series opposite the sepals, or all in the centre of the flower. *Ovary* 2-many-celled, cells 2-ovuled. *Raphe* of ovule ventral.—Inflorescence axillary or lateral.

* Leaves alternate, undivided, quite entire. Petals present. Stamens 3-6.—Male flowers in axillary fascicles or solitary.

† *Calyx* valvate. *Filaments* united in a column.

Ovary 2-celled. Fruit a drupe 4. BRIDELIA.

Ovary 3-celled. Fruit capsular 5. CLEISTANTHUS.

†† *Calyx* imbricate. *Filaments* free.

Trees or stout shrubs. Flowers large. Male disk 5-lobed.

Cotyledons crumpled 6. ACTEPHILA.

Herbs or slender shrubs. Flowers small. Male disk of

10 glands. Cotyledons flat 7. ANDRACHNE.

Slender shrubs. Flowers small. Male disk of 10 linear

scales 8. HEXAKESTRA.

** Leaves alternate (rarely subopposite), undivided, quite entire. Sepals imbricate. Styles, or their arms, slender (except *Glochidion*). Petals 0. Stamens 3 or more.—Male fl. in axillary fascicles or solitary.

† Fruit dry, capsular, of 3 or more 2-valved cocci. (See also 12. FLUEGGEA).

A herb. Male sepals thick with white margins. Styles

small in the excavated top of the ovary 9. AGYNEIA.

Herbs, shrubs or trees. Sepals 4-6. Disk present in

both sexes. Styles terminal, free or united below . 10. PHYLLANTHUS.

- Shrubs or trees. Calyx 4-6-lobed -toothed or -partite. Disk 0 in either sex. Styles confluent in a long or short head cone or column 11. GLOCHIDION.
- Shrubs. Calyx of 2 large and 3 minute sepals. Disk 0 in either sex. Styles 3 slender simple 11. GLOCHIDION.
§ Glochidiopsis.

†† *Fruit a berry or of 3-6 cocci enclosed in a fleshy or dry indehiscent rarely 6-valved epicarp.*

- Shrubs. Flowers dioecious. Sepals 5. Stamens 3-5. Styles elongate. Fruit fleshy or dry, with 6 cocci . . . 12. FLUEGGEA.
- Slender shrubs. Sepals and stamens 4-6. Fruit a berry, with 6-12 crustaceous seeds 10. PHYLLANTHUS.
§ Kirganelia.
- Trees. Sepals and stamens 4. Fruit fleshy with a bony 3-4-celled putamen 10. PHYLLANTHUS.
§ Cicca.
- Trees. Sepals 5-6. Stamens 3. Fruit fleshy with 3-4 bony hardly deliscent cocci 10. PHYLLANTHUS.
§ Emblica.

- Shrubs or trees. Male calyx turbinate or hemispheric, lobes minute inflected. Anthers 3. Fruit dry or fleshy with 3-6 indehiscent cocci 13. BREYNIA.
- Slender shrubs. Calyx of male rotate or disciform, mouth minute 6-lobed. Stamens 3. Fruit dry or fleshy with 6 indehiscent cocci 14. SATROPUS.

*** Leaves alternate, undivided, entire or serrulate. Sepals imbricate. Petals 0. Stamens few or many. Styles or stigmas 2-3, dilated. Fruit a drupe.—Trees or shrubs. Male fl. in axillary fascicles or solitary.

- Stamens 2-3. Ovary 2-3-celled. Drupe 1-celled . . . 15. PUTRANJIVA.
- Stamens 8 or more. Ovary 1(-3)-celled. Drupe 1-celled 16. HEMICYCLIA.
- Stamens 4 or more. Ovary 2-4-celled. Drupe 2-4-seeded 17. CYCLOSTEMON.

**** Leaves opposite or subwhorled, undivided, quite entire. Sepals imbricate. Petals 0. Fruit capsular, of 2-valved cocci.—Male fl. in axillary cymes or panicles.

- Leaves all opposite. Sepals 4-6. Stamens 4 18. CHORIOPHYLLUM.
- Leaves whorled. Sepals 5-6. Stamens 5-10. 19. MISCHODON.

***** Trees. Leaves alternate, trifoliate. Sepals imbricate. Petals 0. Fruit a berry.—Flowers panicled.

- Sepals 5, imbricate. Stamens 5 20. BISCHOFIA.

***** Trees and shrubs. Leaves alternate, quite entire. Styles or stigmas usually very minute. Fruit various.—Male fl. in axillary spikes racemes or panicles.

† *Male sepals imbricate. Fruit indehiscent or tardily dehiscent.*

- Male fl. most minute in dense-fld. catkin-like spikes. Stamens 2-5. Ovary 2-celled. Stigmas 2-4-fld. . . 21. APOROSA.
- Male fl. racemose. Stamens 5-18, anthers sessile. Ovary 2-celled. Drupe 1-seeded 22. DAPHNIPHYLLUM.
- Male fl. minute, spicate or racemose. Stamens 2-5. Ovary 1-2-celled. Drupe small rugose usually compressed . 23. ANTIDFESMA.
- Male fl. panicled. Stamens 4-5. Fruit 1-celled, 4-valved 24. SCORTECHINIA.

Male fl. spicate or racemose. Stamens 4-8. Ovary 2-3-celled. Fruit dry or coriaceous, large, 2-3-celled. Seeds arillate 25. *BACCAUREA*.

†† *Male sepals valvate. Fruit of 2-3 laterally flattened cocci.*

Stamens 4-5. Cocci separating from a columella . . . 26. *HYMENOCARDIA*.

SERIES II. Cells of ovary 1-ovuled.

Tribe IV. **Galearieæ.** *Perianth* double, of calyx and corolla. *Stamens* 4-10; filaments free. *Ovary* 1-3-celled; cells 1-ovuled. *Fruit* a small drupe.

Flowers in terminal racemes. Petals valvate. Stamens 10 . 27. *GALEARIA*.

Flowers in axillary panicles. Petals imbricate. Stamens 5-10 28. *MICRODESMIS*.

Flowers in axillary cymes. Petals valvate. Stamens 4-5 . 29. *PLATYSTIGMA*.

Tribe V. **Crotonææ.** *Perianth* single, or of the male, or of both sexes, double. *Stamens* 1-2-seriate, outer series alternate with the sepals or central in the flower. *Ovary* 2-3-celled, cells 1-ovuled.—Inflorescence terminal or axillary.

Subtribe 1. **JATROPHEÆ.** Flowers in terminal 2-3-chotomous cymes; cymes unisexual, or with the central flower female, petaliferous except *Elateriospermum*.

Leaves entire, penninerved. Petals 0. Stamens 10-18 . 30. *ELATERIOSPERMUM*.

Leaves digitately nerved or lobed. Stamens many. Fruit capsular 31. *JATROPHA*.

Leaves penninerved. Stamens many. Fruit capsular . . 32. *TRITAXIS*.

Leaves digitately nerved. Stamens 8-20. Fruit a drupe . 33. *ALEURITES*.

Subtribe 2. **EUCROTONÆÆ.** Flowers in terminal androgynous spikes or racemes, males petaliferous, females often apetalous. Filaments inflexed in bud with the anthers reversed.

Petals usually villous. Capsule of 3 cocci 34. *CROTON*.

Subtribe 3. **CHROZOPHOREÆ.** Flowers in axillary (rarely terminal) spikes racemes or panicles, males petaliferous, females often apetalous. Filaments straight in bud, or tips inflexed and anthers erect.

* Sepals imbricate. Petals united. Fruit a drupe.

Panicles subterminal. Leaves entire, 5-9-nerved . . . 35. *GIVOTIA*.

** Calyx imbricate, truncate lobed or toothed, or of free sepals. Petals free. Fruit capsular.

† *Sepals not enlarged or leafy in fruit.*

Stamens 3-5, in a column. Styles 2-fid 36. *TRIGONOSTEMON*.

Stamens 12-15, in a column. Flowers in axillary clusters. 37. *TRIGONOPLEURA*.

Stamens 15-30, free. Styles slender, entire *37. *CODIÆUM*.

Stamens 15-30, free. Styles 2-fid 38. *OSTODES*.

†† *Sepals enlarged and leafy in fruit.*

Male and fem. fl. petaliferous. Sepals 4-5, free . . . 39. *BLACHIA*.

- Fem. fl. apetalous. Male calyx shortly toothed 40. DIMORPHOCALYX.
 Fem. fl. apetalous. Sepals 4-5. Pistillode very long,
 filiform 41. ERISMANTHUS.

*** Sepals valvate. Petals free. Fruit capsular.

- Glabrous shrubs. Petals 4-8. Anther-cells pendulous 42. AGROSTISTACHYS.
 Stellately tomentose trees. Anther-cells connate. Styles
 entire 43. SUMBAVIA.
 Stellately tomentose herbs or shrubs. Anther-cells connate. .
 Styles bifid 44. CHROZOPHORA.

Subtribe 4. ACALYPHEÆ. Flowers in axillary rarely terminal spikes
 racemes or panicles, apetalous. Calyx of male closed in bud, usually
 membranous, oblong globose or ovoid, and splitting valvately into 3-5 concave
 sepals. Petals 0. Styles usually long, entire bifid multifid or papilloso
 fimbriate. Fruit capsular, very rarely drupaceous.

* Filaments free; anthers erect, 2-celled, cells united by their base
 only.

- Styles undivided 45. CLAOXYLON.
 Styles very long fimbriate or lacerate. Female fl. in large
 bracts 46. ACALYPHA.

** Filaments free; anthers 2-celled or 4-locellate; cells oblong or
 globose, laterally attached by a narrow or broad connective.

† *Stamens* 4 (or more in *Alchornea*); *anthers* 2-celled.

- Filaments slender, anther-cells globose. Styles plumose 47. ADENOCHLENA.
 Filaments very short, anther-cells diverging downwards 48. CŒLODEPAS.
 Filaments slender, anther-cells oblong parallel 49. ALCHORNEA.

†† *Stamens* very numerous; *anthers* 2-celled.

- Leaves alternate. Anther-cells pendulous. Fruit fleshy 50. PODADENIA.
 Leaves opposite. Anther-cells parallel. Fruit fleshy or
 capsular 51. TREWIA.
 Leaves alternate. Anther-cells parallel. Fruit of 3-angled
 or -horned cocci 52. COCCOCERAS.
 Leaves opposite. Stamens surrounding a naked receptacle. .
 Anther-cells parallel contiguous 53. CŒLODISCUS.
 Leaves opposite or alternate. Stamens very many, central
 in the flower; anther-cells usually globose, adnate to
 the often broad connective 54. MALLOTUS.

††† *Stamens* one, few or many; *anthers* 3-4-locellate.

- Styles very long, 2-fid. Anther-cells globose. Fruit
 capsular 55. CLEIDION.
 Styles entire. Anther-cells subglobose. Fruit capsular 56. MACARANGA.
 Styles entire. Anther-cells oblong, superposed. Fruit
 very large, indehiscent 57. PRYCHOPYXIS.

*** Filaments variously connate in bundles.

- Male and fem. fl. in axillary spikes. Staminal bundles in-
 definite. Capsule unarmed 58. HOMONOIA.
 Male fl. in axillary racemes, fem. solitary. Staminal bundles
 indefinite. Capsule setose 59. LASIOCOCCA.
 Male fl. in axillary racemes. Staminal bundles definite 60. POLYDRAGMA.

Flowers in terminal panicles. Staminal bundles indefinite. *60. RICINUS.

Subtribe 5. GELONIEÆ. Flowers in axillary or leaf-opposed clusters, rarely paniced or racemed, apetalous. Sepals of male imbricate or calyx shortly toothed. Stamens numerous, central in the flower. Fruit dehiscent or tardily dehiscent.

- Male fl. racemed. Calyx 4-toothed. Styles flat. Fruit indehiscent 61. ENDOSPERMUM.
 Male fl. fascicled. Sepals 5. Fruit smooth, indehiscent 62. GELONIUM.
 Male fl. fascicled. Sepals 4-5. Capsule echinate or hispid, 3-coccous 63. CHÆTOCARPUS.
 Male fl. in paniced cymes. Sepals 4-5. Capsule of 3 2-valved cocci 64. BALIOSPERMUM.

Subtribe 6. PLUKENETIÆ. Flowers in axillary spikes or racemes, apetalous. Male calyx valvate. Styles connate. Fruit capsular.—Leaves alternate in all.

† *Erect shrub. Filaments inflexed in bud.*

Spikes androgynous. Fem. calyx at length foliaceous . . . 65. EPIPRINUS.

†† *Twining shrubs. Filaments straight in bud.*

- Racemes androgynous. Male calyx 4-5-partite. Stamens 8-30. Style-column globose or cylindric 66. PLUKENETIA.
 Racemes androgynous. Male calyx 3-5-partite. Stamens 1-3. Styles spreading above 67. TRAGIA.
 Racemes androgynous. Male calyx 3-lobed. Stamens 3. Style-column fleshy 68. CNESMONE.
 Racemes unisexual. Male calyx 3-lobed. Stamens 3. Style-column globose 3-cleft 69. MEGISTOSTIGMA.
 Racemes androgynous. Male calyx 4-6-partite. Stamens 20-30. Style-column stout or slender 70. DALECHAMPIA.

Tribe VI. **Hippomanæ.** *Perianth* single. *Calyx* of male minute and open in bud, or obsolete.—Trees or shrubs (except *Sebastiania*).

- Racemes axillary. Male calyx compressed, 2-fid. Stamens 12-15 71. PIMELEODENDRON.
 Racemes terminal. Male calyx compressed, 2-partite. Stamens 6-50 *71. HOMALANTHUS.
 Racemes terminal. Male calyx terete, 2-3-lobed. Stamens 3 72. SAPIUM.
 Racemes lateral or terminal. Calyx terete, 3 partite. Stamens 3 73. EXCÆCARIA.
 Annual. Racemes axillary and terminal 74. SEBASTIANIA.

GENERA OF DOUBTFUL AFFINITY.

75. LOPHOPYXIS. 76. BOTRYOPHORA.

1. **EUPHORBIA**, Linn.

Herbs or shrubs of various habit with copious milky juice. *Inflorescence* of many male and one female flower in a small 4-5-lobed turbinate or campanulate perianth-like involucre; lobes with thick glands at the sinuses; glands with often a petal-like spreading white or coloured limb. MALE fl.

a pedicelled stamen without floral envelopes of any kind; anther-cells usually globose. FEM. fl. a solitary pedicelled 3-celled 3-ovuled ovary, in the centre of the involucre, also without envelopes; styles 3, free or combined, simple or 2-fid. Capsule of 3 2-valved cocci separating elastically from a columella and dehiscing ventrally or both ventrally and dorsally. *Cotyledons* broad, flat.—Species about 600, in all climates but the very cold.

The species of the *Anisophyllum* section of this genus have been indefinitely multiplied, and require revision with the view of testing the constancy of the characters by which so many of the New World species which to the eye are undistinguishable from Old World ones are distinguished. Important differences do occur in the sculpturing of their seeds and in the size and form of the limb of the involucre glands, but I suspect that these have been much exaggerated, for in so far as the Indian species show, they are variable. Several species founded by Boissier on solitary unnamed specimens of Heyne's seen in the Herbaria of Vienna, St. Petersburg, &c., and not compared with those of other Herbaria, are little likely to be good. Various specific names usually attributed to Roth, because the species which bear them were described by him in his "*Novæ Plantarum Species*," are really to be attributed to Heyne, as stated by Roth himself under each. Heyne was not a mere collector, but an excellent botanist.

The section *Euphorbium* again must be carefully revised with living specimens; it is impossible to frame specific characters of succulent plants from dried ones, or even to determine what are species and what varieties.

It is unfortunate that Boissier omitted to consult the Wallichian Herbarium at the Linnæan Society when monographing the genus for De Candolle's *Prodromus*; and still more so that several species of the *Anisophyllum* section have been so mixed in that fine Herbarium that it is difficult to quote their numbers with accuracy.

There are very few Euphorbiaceæ in Wight's own Herbarium which he presented to Kew. They were probably lent elsewhere for description and never returned.

SECT. I. ANISOPHYLLUM. Herbs, rarely shrubby below, prostrate or ascending. *Leaves* all opposite, oblique or unequal at the base, stipulate or connected by a stipular line. *Involucres* solitary or cymose; glands 4-5, usually furnished with a membranous petaloid limb.

1. ELEGANTES. Usually erect dichotomously branching herbs, with leaves $\frac{1}{2}$ to 2 in. long. *Involucres* axillary, solitary, or 2-3 together; limb of gland conspicuous, often large.—Sp. 1-8.

2. HYPERICIFOLIÆ. Erect or decumbent branching herbs or shrubs, with leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. long or thereabouts. *Involucres* in axillary and subterminal cymes or crowded in the uppermost leaves, rarely of only 2-3 flowers; limb of gland usually conspicuous though small.—Sp. 9-16.

3. CHAMÆSYCÆ. Prostrate, rarely erect plants, with leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. long, rarely more. *Involucres* solitary, or in very short subsessile cymes, usually crowded along one side of the stem, or of short lateral branches; limb of gland of involucre obscure or 0, except *E. burmanica*.—Sp. 17-21.

SECT. II. EUPHORBIIUM. Shrubs or trees (except 6. *Rhizanthium*) with fleshy terete ribbed angled or flattened stems and branches. *Leaves* 0, or alternate, or the upper opposite; stipules 0, or glandular or of prickles. *Involucres* axillary or terminal; or in the forks, often sessile, rarely cymose, glands without a petaloid limb.

4. TIRUCALLI. Erect shrubs or trees, with unarmed angled compressed or terete branches, leafless or with opposite alternate or fasciated leaves.—Sp. 22-23.

5. DIACANTHIUM. Erect shrubs or trees, with stout angled ribbed or winged branches that are crenate or nodose at the angles or wings, and there provided with 2 or 3 stipular prickles.—Sp. 24-29.

6. RHIZANTHIUM. Stem reduced to a fleshy tuber with short unarmed branches, and cymose rarely solitary involucres.—Sp. 30-31.

SECT. III. TITHYMALUS. Herbs, rarely shrubby below, usually erect, branches terete, not fleshy. *Leaves* alternate, upper (rarely all) opposite, exstipulate. *Involucres* in terminal or axillary cymose umbels radiating in threes; glands without a petaloid limb.

7. GALABHÆUS. Involucral glands transversely oblong with rounded margins.—Sp.—32-48.

8. ESULA. Involucral glands truncate retuse or 2-cornute.—Sp. 49-54.

1. ELEGANTES (see p. 245).

* *Floral leaves distichous, secund, imbricating and concealing the involucres.*

1. **E. pycnostegia**, Boiss. Cent. Euph. 9, and in DC. Prodr. xv. ii. 18; annual, erect, glabrous, leaves opposite oblong obtuse or cuspidate subserrulate, floral distichously imbricating broadly ovate-cordate or orbicular, involucres subsolitary glabrous, lobes toothed, limb of glands large obliquely obovate entire, cocci obtusely keeled glabrous or puberulous, seeds with sinuous furrows or flattened tubercles.

WESTERN GHATS; from the Concan to the Nilghiris, Perrottet, Law, &c.

A rather slender dichotomously branched herb, 1-2 feet high. *Leaves* 1-1½ in. long, thin, glabrous, except a few scattered long hairs at the axils and near them, nerves very obscure; floral collected in an oblong head; stipules minute, fimbriate. *Involucres* turbinate, hairy within. *Styles* short, 2-lobed. *Seeds* obtusely 4-angled, greenish, powdery, sometimes very obscurely furrowed.—Boissier's var. *laxa*, named by him *E. oligantha* in Hook. I think is certainly his *E. erythroclada*, under which I have described it.

2. **E. zorniioides**, Boiss. in DC. Prodr. xv. ii. 19; annual, erect, glabrous, leaves opposite cordately linear-oblong obtuse or mucronate serrulate, floral distichously imbricating broadly ovate cordate, involucres subsolitary glabrous, lobes fimbriate, limb of glands large entire rosy, cocci obtusely angled glabrous, seeds smooth or papillose.

The CONCAN, Law, Stocks, &c.

Habit and general character of *E. pycnostegia*, of which it is probably a variety with narrower cauline and smaller floral leaves; the seeds are of the same form, powdery surface and colour, but without traces of sinuous furrows.

3. **E. elegans**, Spreng. Syst. iii. 794; annual, erect, clothed with long soft spreading hairs, leaves opposite broadly obliquely oblong elliptic or ovate-cordate obtuse serrulate towards the tips, floral broader distichously imbricating reticulate, involucres few hirsute, limb of glands large sinuate rosy, cocci globose pubescent, seeds grooved cross-wise and granulate. Boiss. in DC. Prodr. xv. ii. 19. *E. variegata*, Heyne in Roth Nov. Sp. 225. *E. platylepis*, Dcne. in Jacquem. Voy. Bot. 156, t. 157. *E. strobilifera*, Dulz. in Hook. Kew Journ. Bot. iii. (1851) 229; Dalz. & Gibs. Bomb. Fl. 226. ? *E. dichotoma*, Roxb. Fl. Ind. ii. 471.

DECCAN PENINSULA, Heyne. MALWA, Edgeworth. WESTERN BERAR, a weed of cultivation. The CONCAN; on naked rocks, Law, Stocks, &c.

Stem 1-2 ft., dichotomously branched. *Leaves* crowded or in distant pairs, ¾-1 in. long, subsessile; floral variable, often obovate, reticulate; stipules minute, setaceous. *Involucres* turbinate, pubescent without and within; lobes obovate; limb of glands very conspicuous. *Styles* elongate, 2-fid.—Boissier's var. *laxa*, with the upper leaves not imbricate, is probably a form growing in shade.

4. **E. cristata**, Heyne in Roth Nov. Sp. 226; annual, prostrate or ascending clothed with long flexuous hairs, leaves opposite obliquely ovate-cordate obtuse serrulate, floral distichously imbricate in a rounded head, involucre subsolitary pubescent, limb of glands pectinately laciniate and fimbriate, cocci globose, seeds with 3 or 4 parallel furrows. Boiss. in DC. Prodr. xv. ii. 19. *E. fimbriata*, Heyne in Roth l. c. 227; Boiss. l. c., and Euphorb. Ic. t. 8; Thwaites Enum. 269; Wall. Cat. 7693. *E. capitata*, Ham. in Wall. Cat. 7708 A.—Wall. Cat. 7707 A.

DECCAN PENINSULA, Heyne; Madras, Shuter; Vellore, Griffith; Palamcottah, Wight. CENTRAL INDIA; Mandoo, alt. 4000 ft., Edgeworth. AYA, Wallich. CEYLON; Batticaloa district, Thwaites.

Stems slender, 6–10 in., often dichotomously branched. Leaves $\frac{1}{2}$ – $\frac{3}{4}$ in., subsessile, membranous; stipules short, subulate. Involucres subsessile, $\frac{1}{6}$ in. diam., hairy, throat ciliate, lobes linear-lanceolate.—I find no characters whereby to separate *E. fimbriata* from *E. cristata*. Boissier, who says that they are very closely allied, distinguishes *cristata* by its slender prostrate stems, heads of floral leaves only half the size, and seeds smooth between the furrows. He regards Roth's *cristata* β . *major* as the type of his *fimbriata*, and refers Roth's *fimbriata* to a variety (*laxa*), distinguished by its upper leaves not being imbricate.

** *Floral leaves not distichously imbricating.*

5. **E. longistyla**, Boiss. Cent. Euphorb. 9, and in DC. Prodr. xv. ii. 20; annual, glabrous, erect, much branched, leaves opposite elliptic or oblong obtuse distantly serrulate, floral gradually smaller, invols. pedicelled, limb of glands cleft to the base into 7–9 bristles, cocci glabrous keeled, seeds with 3 or 4 parallel furrows. *E. elegans*, Heyne in Wall. Cat. 7713.

DECCAN PENINSULA, Heyne in Herb. Petrop. & Wallich.

Stems a foot high, flexuous, dichotomously much branched; branches capillary. Leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. long, membranous, apiculate; stipules lanceolate, toothed. Involucres as long as their pedicels, glabrous below, velvety under the glands; lobes deeply fimbriate. Styles (not seen by me) very long, undivided. Capsule long-stalked.—I have seen only very imperfect specimens of this plant in Wallich's Herbarium, and have taken its characters chiefly from Boissier, who says that it probably assumes a form with imbricate floral leaves.

6. **E. notoptera**, Boiss. in DC. Prodr. xv. ii. 26; annual, erect or ascending, glabrous, leaves often deflexed in very distant opposite pairs coriaceous linear-oblong obtuse mucronate margin often recurved serrulate involucre 1–3 terminal between a pair of linear acute floral leaves pedicelled campanulate lobes fimbriate, limb of glands rather large repand, cocci with two distant dorsal narrow wings, seeds rugulose.

The CONCAN and CANARA, Law, Stocks, &c., in cultivated fields.

Habit of *E. erythroclada*, 12–15 in. high; stems 8–12 in. Leaves $\frac{3}{4}$ –1½ in. long, narrow, nerveless; stipules very short and broad. Involucres rather large, $\frac{1}{2}$ in. long; glands transversely oblong. Capsule depressed-globose, rather rough, about $\frac{1}{10}$ in. diam.—A very distinct species, easily recognized by the 2-winged cocci.

7. **E. erythroclada**, Boiss. in DC. Prodr. xv. ii. 25; quite glabrous, stem tall erect dichotomously branched firm red-brown, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. in distant opposite pairs obliquely oblong or obovate or elliptic-oblong serrulate tip rounded, involucre axillary solitary turbinate red, lobes short, limb of glands small narrow rosy, capsule depressed, cocci acutely keeled, seeds with 2–3 obsolete transverse ridges. ? *E. pycnostegia*, var. *laxa*, Boiss. l. c. 18.

The CONCAN ? *Hugel, Stocks*.

Stem 1-2 ft., terete, polished; branches ascending. *Leaves* rather membranous very shortly petioled; base not cordate, very unequal but hardly auricled on one side. —My specimens are very imperfect, and without fruit, from the immense collections of Stocks made by himself, Law, and others in the Concan, Canara, and Malabar, but without precise locality. They are labelled by Boissier *E. n. sp., oliganthæ affinis?* and are, I think, clearly his *E. erythroclada*, as is also his *E. pycnostegia* var. *laxa*.

8. ***E. coccinea***, *Roth Nov. Gen. & Sp.* 228; more or less clothed with soft white villous hairs, stems slender purple, leaves in scattered opposite pairs obliquely broadly elliptic or obovate-oblong quite entire tip rounded base broadly auricled on one side, involucre 1 or few in the axils of the crowded small orbicular terminal leaves, lobes long ciliate, limb of 2 glands large pink, cocci compressed keeled woolly membranous. *Boiss. in DC. Prodr.* xv. ii. 37.

The DECCAN PENINSULA; Ahmednuggur, *Hugel*. The CONCAN, *Stocks*.

Root woody, apparently perennial. *Stems* 4-8 in., rigid, slender, angularly flexuous, very brittle. *Leaves* sessile, rather coriaceous, very oblique, sometimes retuse; stipules linear-lanceolate, villous. *Involucres* in villous leafy subglobose heads, $\frac{1}{2}$ in. diam., with very conspicuous crenate rosy-purple limbs to two of the glands, and very small ones to the other two glands. *Styles* slender but not long. *Capsule* $\frac{1}{10}$ in. long. —Probably this should be placed next to *E. cristata*.

2. HYPERICIFOLLE (see p. 245).

9. ***E. Wightiana***, *Hook. f.*; perennial, shrubby?, branches spreading slender, leaves 2-4 in. opposite in distant pairs petioled linear oblong or obovate-oblong entire or serrulate, involucre linear or obovate, involucre solitary axillary or in very short axillary cymes minute puberulous, lobes minute ciliate, capsules oblong puberulous, seeds oblong bluish smooth with a furrow on one side.—*Euphorb., Wall. Cat.* 7692.

DECCAN PENINSULA; Madras, *Wight in Herb. Wall.*, and *lc. in Herb. Kew*.

Branches woody, terete, as thick as a crow-quill. *Leaves* very variable, some 2-2½ by $\frac{1}{2}$ in., quite linear and serrulate, others oblong 2½ by $\frac{1}{2}$ -¾ in., others 1½ by $\frac{3}{4}$ in., rounded at the tip and narrowed at the base into a distinct slender petiole; involucre, some 1 in. and linear, others $\frac{1}{2}$ in. and broadly obovate. *Involucre* almost hemispherical, sessile; glands transversely oblong, unwinged; lobes very small. *Styles* short, free, 2-fid, erect. *Capsule* very shortly pedicelled, $\frac{1}{2}$ in. long, not deeply lobed, top rounded, pale, quite smooth. *Seeds* rather mottled.—My only materials for this very curious species are bad specimens in *Herb. Wallich*, and a drawing marked "Madras R. W. 416." The latter represents all the leaves serrulate and all the upper linear and acute. It is evidently near *E. Atoto*.

10. ***E. Atoto***, *Forst. Prodr.* n. 207; glabrous, stem stout swollen at the nodes erect ascending or decumbent, leaves opposite oblong or linear-oblong obtuse quite entire, base unequally rounded or cordate, involucre axillary or in leafy terminal corymbose cymes, glands oblong margined, capsule glabrous, seeds smooth. *Boiss. in DC. Prodr.* xv. ii. 12; *Baill. Adans.* vi. 282; *Benth. Fl. Austral.* vi. 46. *E. halophila*, *Miquel Anal. Bot.* iii. 16; *Boiss. l. c.* 13. *E. pallens*, *Dillw. Rev. Hort. Mal.* 55. *E. articulata*, *Dennst. Schlüss. Hort. Mal.* 37. *E. lævis*, *Poir. Suppl.* ii. 612; *Boiss. l. c.* 13. *E. lævigata*, *Vahl Symb.* ii. 54. *E. lævigata?* *Wall. Cat.* 7705. *E. bifida*, *Thwaites Enum.* 269 (not of *Hook. & Arn.*).—*Euphorb., Wall. Cat.* 7697.—*Rheed. Hort. Mal.* t. 58.

MALABAR COAST, from Canara southwards, *Wight*, &c. PERAK; *Scortechini*.

ANDAMAN ISLANDS, *Kurz*. MALACCA, *Griffith*, *Maingay*. CEYLON, *Walker*, *Thwaites*.—DISTRIB. Malay Archipelago, China, Australia, Pacific Islands.

A dwarf seaside shrub (sometimes climbing?); root stout, long; stems rigid, polished, erect inclined or prostrate, branching upwards, rarely as thick as a goose-quill. *Leaves* subsessile, $\frac{3}{4}$ –1½ in., coriaceous, longer or shorter than the internodes; stipules minute, fimbriate. *Involucres* turbinate, glabrous; lobes triangular; glands with a very minute limb or margin. *Styles* short, 2-fid. *Capsule* glabrous; cocci hardly keeled. *Seeds* nearly globose.

11. ***E. linearifolia***, *Roth Nov. Sp.* 224; quite glabrous, glaucous, stems decumbent, leaves 1 in. opposite and secund subimbricate very coriaceous obliquely linear obtuse or acute quite entire lower in distant pairs ovate, involucres few subcorymbose towards the tips of the branches or solitary and axillary, lobes triangular-ovate hairy, limb of glands large obovate white, styles short, capsule glabrous. *Boiss. in DC. Prodr.* xv. ii. 33. *E. linearis*, *Heyne in Wall. Cat.* 7712.

DECCAN PENINSULA, *Heyne*.

A very remarkable species, quite unlike any other, of which I have seen only fragments in Wallich's Herbarium, and can add little to the descriptions of Roth and Boissier. The branches appear to be stout, curved, and swollen at the nodes as in *E. Atoto*; the leaves are almost fleshy, with a stout midrib; their arrangement resembles that of the leaflets of a pinnate leaf.

12. ***E. hypericifolia***, *Linn. Hort. Cliff.* 198; annual, glabrous or sparsely pubescent, erect ascending or decumbent, leaves opposite obliquely broadly or narrowly oblong obtuse serrulate, nerves distinct, base rounded or cordate, involucres minute in axillary and terminal usually peduncled and many-fid. cymes with many subulate bracts often subtended by 2 floral leaves rarely solitary entire glabrous, lobes lanceolate ciliate, limb smaller or larger than the gland usually rounded and white, styles very short, cocci hardly keeled glabrous or hispid, seeds smooth or with broad shallow transverse pits. *Boiss. in DC. Prodr.* xv. ii. 23; *Hook. Erot. Fl.* i. t. 36; *Thwaites Enum.* 268; *Benth. Fl. Hongk.* 301. *E. indica*, *Lamk. Dict.* ii. 423; *Boiss. l. c.*, and *Fl. Orient.* iv. 1086; *Wall. Cat.* 7711, excl. C. *E. cassioides*, *Presl Bot. Bemerk.* 119. *E. decumbens*, *Willd. Suppl.* 27. *E. androsæmoides*, *Dennst. Schlüss. Hort. Mal.* 36. *E. parviflora*, *Linn. Syst. Ed.* x. 1047; *Roxb. Fl. Ind.* ii. 472; *Boiss. in DC. l. c.* 22; *Grah. Cat. Bomb. Pl.* 179; *Dalz. & Gibs. Bomb. Fl.* 227. *E. papilligera*, *Boiss. Cent. Euph.* 8. ? *E. bracteolaris*, *Boiss. in DC. l. c.* 22.—*Burm. Thes. Zeyl.* 224, t. 105, f. 2.—*Euphorb., Wall. Cat.* 7686.—*Rheede Hort. Mal.* x. t. 51.

Common throughout the hotter parts of INDIA, from the Panjab, ascending to 4000 ft. in the Himalaya, to the Southern Deccan, Malacca and CEYLON.—DISTRIB. Tropics of both hemispheres, except Australia and the Pacific Islands.

A rather slender, rarely stout, annual, 6–12 in. high, of various habit. *Leaves*, $\frac{1}{2}$ –1 in., rarely more or less, not coriaceous, more or less serrulate on all the margins except towards the base; stipules minute, setaceous, lacerate, or 0. *Involucres* very minute, turbinate, glabrous, with quite entire minute bracts at the base of the pedicel; glands very shortly stipitate, lobes usually projecting above the glands; limb of the latter white or pale pink, always small, but very variable in size, sometimes 0. *Capsule* subglobose; cocci more or less pubescent or glabrous. *Seeds* with a thin mucous coat, bluish when dry, very variable as to the amount and depth of the shallow depressions on the faces which are often obsolete.—After a very careful examination of numerous specimens, I cannot separate *E. indica* from *E. hypericifolia*, as indeed was the opinion of Bentham, Engelmann and Thwaites. The latter author quite correctly identifies with it Burmann's t. 105 f. 2, which is the authority for Linnæus' *E. parviflora*, and of which Roxburgh's excellent figure differs in no respect from *hypericifolia* and *indica*. Wallich's No. 7686, from Nepal, is a very

tall and stout form 16 in. high, of which there are specimens gathered on the banks of the Chenab by Thomson. As I am not so convinced of Linnaeus' *parviflora* being the same species as *hypericifolia* or *indica*, I shall give Boissier's diagnostic character of all the species that I have here brought together, leaving it to Indian botanists to test their value.

1. *E. HYPERICIFOLIA*; glabrous, erect, leaves oblong or oblong-lanceolate from a subcordate or rounded base, stipules lanceolate fimbriolate, involucre lobes lanceolate, mouth hirtulous, glands rounded much smaller than their rounded white limb, capsule glabrous, seeds unequally scrobiculate and rugose.—Not Asiatic according to Boissier.

2. *E. INDICA*; sparsely puberulous, stem ascending or decumbent, leaves obovate obtuse from a rounded base, stipules setaceous ciliate from a broad base, involucre glabrous within and without, lobes triangular fimbriolate, glands ovate as broad or broader than their ovate-rounded limb, capsule appressedly hairy, seed with 5-6 transverse broken furrows.—Asiatic and African.

3. *E. PARVIFLORA*; stem ascending minutely crisplously hairy, leaves elliptic-oblong obtuse from an unequal base, cymes subsessile, involucre campanulate, throat ciliate, lobes triangular or lanceolate, limb of rounded glands large orbicular obovate, capsule appressed-hairy, cocci keeled, seed papillose.—Ceylon, Java, Pegu, Burma.

4. *E. BRACTEOLARIS*; stems slenderly filiform dichotomous with spreading hairs, leaves ovate obtuse from a rounded base, tip repand pale and appressedly hairy beneath, stipules very short triangular-lanceolate, floral leaves (bracts) numerous minute, involucre hairy within, lobes lanceolate hairy, glands minute orbicular as broad or narrower than the white roundish limb, cocci rounded hairy, seeds smooth except the outer faces which have 1 or 2 subtransverse and obsolete furrows.—India, *Jacquemont*; Nilghiris, *Perrottet*.—Differs from *parviflora* in the inconspicuous furrows of the seed and slenderness of the branches.

13. *E. Emodi*, *Hook. f.*; annual, quite glabrous or sparsely hairy, stems straggling from the root, branches divaricate, leaves in rather distant pairs opposite coriaceous obliquely oblong or linear-oblong obtuse serrate or subserrate, involucre subsolitary subsessile chiefly in the axils of crowded terminal leaves glabrous lobes lanceolate, limb of all 4 glands conspicuous broad white or rosy sinuate, styles slender, capsule glabrous obtusely keeled, seeds obtusely angled rough with faint tubercles. *E. indica*, *Aitch. & Hemsl. in Journ. Linn. Soc.* xix. 185.

WESTERN HIMALAYA; Simla, Kulu, Chamba and Lahul, alt. 4000-4500 ft., *Edgeworth, Clarke, Ellis, Jaeschke*; Iskardo, alt. 6-7000 ft., *C. B. Clarke*.—DISTRIB. Afghanistan.

Stems rather stout, 4-10 in. long, rather sparsely leafy, often purplish, hairs if present long flexuous. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., pale green, sometimes with a broad purple blotch on the upper surface, glabrous or sparsely hairy beneath; base almost auricled on one side; nerves obscure; stipules fimbriate. *Involucres* about $\frac{1}{16}$ in. long, campanulate, glabrous, shortly pedicelled; gland purplish, contrasting with its pale rose or white limb. *Styles* half the length of the capsule or more, flexuous. *Capsule* about $\frac{1}{16}$ in. diam., shortly pedicelled. *Seed* mucose.—Similar to states of *E. hypericifolia*, but very different in the subsolitary much larger involucre with much larger limbs, long slender styles, and much larger capsule. Possibly *E. hispida*, Boiss. (see end of genus).

14. *E. pilulifera*, *Linn. Amæn. Acad.* iii. 114; annual, erect or ascending, hispid with copious crisped hairs, leaves opposite elliptic-oblong obovate or oblong-lanceolate acute toothed or serrulate, nerves distinct, floral minute, involucre numerous in axillary and terminal dense-fld. sessile or peduncled cymes minute pubescent, limb of glands very narrow or obsolete, cocci compressed keeled pubescent, seeds pale brown acutely angled transversely shallowly rugulose. *Boiss. in DC. Prodr.* xv. ii. 21; *Jacq. Icon.*

t. 478. *E. hirta*, Linn. l. c.; *Rowb. Fl. Ind.* ii. 472; *Jacq. Collect.* v. t. 11, f. 1; *Grah. Cat. Bomb. Pl.* 179; *Dulz. & Gibs. Bomb. Fl.* 227; *Benth. Fl. Austral.* vi. 51, and *Fl. Hongk.* 302. *E. capitata*, Wall. *Cat.* 7708, B to F.—*Burm. Thes. Zeyl.* t. 104 and 105, f. 1.—*Wall. Cat.* 7707 B.

Throughout the hotter parts of INDIA from the Punjab eastwards and southwards to CEYLON and SINGAPORE.—DISTRIB. All tropical and subtropical countries.

Stem and branches 1–2 ft. *Leaves* very shortly petioled, $\frac{3}{4}$ –1½ in. long, base usually narrow and obliquely cordate; stipules minute, linear; petiole distinct. *Involucres* about $\frac{3}{10}$ in.; glands small, globose, without a perceptible limb. *Capsule* $\frac{1}{4}$ in. diam., appressedly or patently hairy. *Seeds* ovoid.—The acute leaves, hispid hairiness, and small fruit render this species easily recognizable.

15. *E. rosea*, Retz. *Obs.* iv. 26; perennial, glabrous or sparsely hairy, stems prostrate flexuous, leaves opposite coriaceous obliquely obovate or linear-spathulate tip rounded crenulate, involucre solitary or few in small leafy axillary and terminal sessile cymes towards the ends of the branches, lobes 3–5-fid, limb of 2 upper glands large obliquely oblong or rounded, of 2 lower very narrow, styles very slender, cocci obtusely keeled, seed rugose. *Boiss. Euphorb. Ic.* t. 21, and in *DC. Prodr.* xv. ii. 50; *Thwaites Enum.* 269. *E. thymifolia*, Wall. *Cat.* 7710 D. *E. indica*, Wall. *Cat.* 7711 C. *E. parviflora* & *satureioides*, Lamk. *Dict.* ii. 424. ? *E. auricularia*, *Boiss. Cent. Euphorb.* 17, and in *DC. l. c.* 50.

DECCAN PENINSULA, from the Carnatic to Tranquebar, on the coast, Rottler, &c. CEYLON; common near the sea.—DISTRIB. Afghanistan.

Root long and stout; stems brittle, 4–8 in. long; branches straggling, firm, loosely leafy. *Leaves* $\frac{1}{3}$ – $\frac{2}{3}$ in. long, lower distant, upper more crowded often subquarrose, rarely truncate; stipules minute, triangular, fimbriate. *Involucre* $\frac{1}{10}$ – $\frac{1}{8}$ in. diam., subcampanulate; lobes triangular ovate, acute; glands suborbicular, often deep purple, limb rosy very conspicuous; styles deeply bifid. *Cocci* very minutely rough.—Boissier's figure of this is very unsatisfactory as regards habit. I can find no character whereby to distinguish his *E. auricularia*, which he says differs from *E. rosea* in being glabrous, with the floral leaves not imbricate, nor narrowed, in the smooth capsule and involucre, and in the styles spatulate at the tip. It is described from a specimen of Heyne's in the St. Petersburg Herbarium.

16. *E. corrigioloides*, Boiss. *Cent. Euphorb.* 11, and in *DC. Prodr.* xv. ii. 32; perennial, glabrous or papilloso-pubescent, stems stout prostrate and ascending leafy, leaves opposite $\frac{1}{4}$ to $\frac{1}{2}$ in. coriaceous orbicular to obliquely oblong serrulate tip rounded, involucre turbinate crowded in small subsessile axillary and terminal often capitate cymes or leafy heads, limb of gland (when present) white lobed, styles usually slender, cocci obtusely keeled, seed smooth. ? *E. disticha*, Engelm. in *Herb. Vind. ex Boiss. in DC. l. c.*

DECCAN PENINSULA, Heyne; Maïsoor and the Carnatic, Wight, &c.

Root stout, crowned with a short stock; branches long and flexuous, 4–10 in., pale, usually much stouter than in other species of this section. *Leaves* distichously spreading, thickly coriaceous, base rounded or obliquely cordate; petiole short, thick; stipules short, triangular, lacerate. *Cymes* leafy at the base. *Involucres* turbinate, $\frac{1}{4}$ in. diam., shortly pedicelled; lobes broad and cleft to the base into many bristles; limb when present often broader than the gland and very conspicuous. *Styles* more slender than in others of the section, but this character seems variable. *Capsule* $\frac{1}{4}$ in. diam.—Except by its stout habit, perennial root and longer styles, it is not easy to distinguish some states of this from some of *E. hypericifolia*. Between *E. disticha* and *corrigioloides*, as distinguished by Boissier, I can find no good diagnosis. Of the former he says, "Very closely allied to *E. corrigioloides*, but appearing to differ in the very short internodes, short styles, &c.," characters which I find applicable to specimens of the latter.

3. CHAMÆSYCEÆ (see p. 245).

17. ***E. thymifolia***, *Burm. Fl. Ind.* 2, and *Thes. Zeylan.* t. 105, f. 2; annual, more or less hispidly pubescent, branches prostrate, leaves opposite $\frac{1}{2}$ – $\frac{1}{3}$ in. petioled obliquely oblong obtuse crenulate glabrous or pubescent beneath, stipules elongate, involucre sub solitary very minute axillary especially in the crowded terminal branchlets, lobes short ciliate, glands very minute stipitate with a minute limb or 0, capsules erect obtusely keeled pubescent, seeds with 5–6 shallow transverse furrows. *Boiss. in DC. Prodr.* xv. ii. 47, and *Fl. Orient.* iv. 1089; *Lamk. Dict.* ii. 423; *Roxb. Fl. Ind.* ii. 473; *Dalz. & Gibs. Bomb. Fl.* 227; *Benth. Fl. Hongk.* 302; *Wall. Cat.* 7710, in part. *E. Burmanniana*, *J. Gay in Webb. Phyt. Canar.* iii. 239; *Thwaites Enum.* 269. *E. prostrata*, *Grah. Cat. Bomb. Pl.* 179 (not of Aiton). *E. rubicunda*, *Blume Cat. Hort. Bogor.* 73. *E. foliata*, *Hamill. ex Dillw. Rev. Hort. Malab.* 52. *E. maculata*, *Aubl. Pl. Guian.* i. 479. ? *E. prostrata*, *Grah. Cat. Bomb. Pl.* 179. *Anisophyllum thymifolium* & *Burmannianum*, *Klotzsch & Garcke in Bot. Reise Pr. Wald.* 25.—*Rheede Hort. Mal.* x. t. 33.

Throughout INDIA and CEYLON in the plains and lower hills, ascending in Kashmir to 5500 ft.—DISTRIB. All hot countries except Australia.

Usually a much-branched prostrate plant, with many short leafy stems spreading from the root. Leaves distichously spreading, rather thick, base obliquely truncate; stipules fimbriate with a long point. Involucres $\frac{1}{30}$ in. long, turbinate, pubescent; glands stipitate, limb obscurely lobed. Capsule $\frac{3}{50}$ in. broad, shortly stipitate, erect from an early stage.

18. ***E. granulata***, *Forsk. Fl. Æg. Arab.* 94; perennial?, hispidly villous, stems many prostrate from the root leafy, leaves opposite $\frac{1}{10}$ – $\frac{1}{8}$ in. obliquely obovate oblong-obovate or rounded quite entire tip rounded or retuse, involucre axillary sub solitary hairy, limb of gland 0 or minute, styles minute, cocci hirsute not keeled, seeds faintly pitted. *Vahl Symb.* ii. 54; *Boiss. in DC. Prodr.* xv. ii. 33, and *Fl. Orient.* iv. 1087. *E. Forskalii*, var. β and γ , *J. Gay in Webb. Phyt. Canar.* iii. 242. *E. fragilis*, *Decne. in Ann. Sc. Nat. Ser. 2* (1834), 241. *E. arillata*, *Edgew. in Journ. As. Soc. Beng.* xvi. 1218; *T. Anders. Flor. Aden. in Journ. Linn. Soc.* 34. *E. villosa*, *Herb. Royle.* ? *E. ægyptiaca*, var. *indica*, *Boiss. in DC. l. c.* 35. *E. thymifolia*, *Wall. Cat.* 7710 *E. Anisophyllum Forskalii*, *Klotzsch & Garcke in Bot. Reise Pr. Wald. Bot.* 25.

THE PANJAB PLAINS and ROHILKUND, *Royle, &c.* MALWA, *Edgeworth.* SCIND, *Stocks, Perry.*—DISTRIB. Afghanistan, Arabia, Egypt, Canaries.

Root in old plants crowned by a short rootstock; branches spreading and straggling from the root, 3–6 in., very brittle. Leaves spreading distichously, villous on both surfaces, the largest $\frac{1}{8}$ in. long, opaque, coriaceous, base narrow or cordate; stipules minute, ciliolate. Involucres very minute, axillary and on short leafy branchlets, subsessile, turbinate; lobes short, obtuse, ciliate; glands usually without a limb. Capsule $\frac{1}{30}$ in. diam., cocci rounded at the back. Seed with a thickly mucous testa.—The Scind specimens are less hirsute than the Panjab ones. Boissier describes this as annual, but I think it is certainly a perennial. I find no specimen of Boissier's *E. ægyptiaca* var. *indica* in Herb. Kew, where its author states there is a specimen from Bombay, but I suspect that the plant alluded to is *E. granulata*.

19. ***E. microphylla***, *Heyne in Roth Nov. Sp.* 229; annual, quite glabrous or sparsely hairy, stems very many prostrate and spreading from the root leafy, leaves opposite $\frac{1}{2}$ – $\frac{1}{4}$ in. very short obliquely oblong rounded-oblong or subquadrate tip rounded truncate or retuse and more or less

toothed, involucre subsolitary axillary glabrous, glands with a very small sinuately-lobed limb, styles very short, cocci obtusely keeled glabrous, seeds smooth. *E. serpens*, δ , *Engelm. mss.*; *Boiss. in DC. Prodr.* xv. ii. 30. *E. Heyneana*, *Spreng. Syst.* iii. 791. ? *E. Heyneana*, *Boiss. in DC. l. c.* 35, in part. *E. orbiculata*, *Miquel Fl. Ind. Bat.* i. 421. *E. Wallichiana*, *Boiss. mss.* *E. thymifolia*, *Wall. Cat.* 7710, in part. *E. uniflora*, *Dalz. & Gibs. Bomb. Fl.* 227. ? *E. Chamæsyce*, *Roth. Fl. Ind.* ii. 473.

BENGAL and BEHAR, *J. D. H. & T. T.*, &c.; at Benares, *Madden*. BANDA, *Edgeworth*. The CONCAN, *Law, Stocks*. MADRAS, near the city, *G. Thomson*. TENASSERIM, *Helper*.—DISTRIB. Java.

Stems very slender and much distichously branched, spreading in a whorl from the root, 4–10 in. long, whitish, brittle. *Leaves* always small, coriaceous and opaque, sometimes as broad as long, spreading at right angles, if toothed only at the broad end, nerveless; stipules minute, triangular, 2-partite or laciniately toothed. *Involucre*s very numerous from the base to the tips of the stems and branches, minute, campanulate, very shortly pedicelled; bracts at the base of the pedicels subulate; lobes triangular, acute, nearly entire; glands very shortly stipitate. *Capsule* shortly pedicelled, $\frac{1}{16}$ in. diam. *Seeds* bluish, when wet mucose.—Very similar to *E. Chamæsyce*, but with perfectly smooth seeds. It is certainly very near indeed to the *E. serpens*, Kunth, of N. America and the West Indies, but differs in the minute stipules and the more entire leaves. Roth describes the larger leaves as being only 1–1½ line long, but the average in our specimen is 2–3 lines.—As stated under the following species, I suspect that Boissier's *E. Heyneana* is made up of Heyne's specimen of this species and the North-West Indian ones of Thomson, &c., which I have described as *E. Clarkeana*.

Var. *galioides*; more straggling, leaves $\frac{1}{2}$ in. diam. *E. galioides*, *Boiss. l. c.* 36. *E. thymifolia*, *Wall. Cat.* 7710 H, in part.—Banks of the Irawaddy at Segain, *Wallich*.—This is, I think, certainly referable to *microphylla*, and is hardly even a variety of it.

20. ***E. Clarkeana***, *Hook. f.*; glabrous, stems filiform many prostrate and spreading from an annual root rarely subsimple and erect, leaves opposite $\frac{1}{8}$ – $\frac{1}{4}$ in. obliquely linear-oblong entire or toothed at the rounded tip, involucre axillary chiefly towards the tips of lateral branches minute glabrous, lobes lanceolate toothed longer than the glands which are wholly or almost without a limb, cocci quite glabrous keeled, seeds obscurely transversely rugose. *E. granulata*, *Herb. Royle*. *E. Heyneana*, *Boiss. in DC. Prodr.* xv. ii. 35, in part.

NORTH-WEST INDIA, *Royle*; from Delhi, *Clarke*, westwards to Lahore, *Edgeworth, Thomson*, &c. SCIND, *Stocks*.

Stems very slender, crowded from the root, a span long and under; branches divaricating, pale, rather leafy, often with a few scattered hairs towards the tips. *Leaves* coriaceous, in typical specimens crowded towards the ends of short branchlets, distichously spreading, base almost auricled on one side; petiole very short; stipules rather large, setaceous from a broad toothed base. *Involucre*s $\frac{1}{10}$ in. long, campanulate. *Styles* very short. *Capsule* $\frac{1}{8}$ in. broad. *Seeds* acutely 4-angled.

I advance this as an undescribed species with great hesitation. It is undoubtedly the "Panjab, Lahore and Ferozepore" plant included under his *E. Heyneana* by Boissier (who has named some of the specimens *E. sanguinea*, others *E. Heyneana*), but I have seen no Deccan specimens, and I doubt its being the plant of Heyne seen by Boissier in the St. Petersburg Herbarium, and which I suppose is *E. microphylla*. Nor do I find the white sub-3-lobed limb of the gland described by Boissier. It is very near *E. microphylla*, differing in the long narrow leaves and locality, and more closely resembles *E. sanguinea*, Hochst. and Steud., of Abyssinia, but that plant has a distinct limb to the glands and large reflexed styles cleft nearly to the base. It is no doubt the Indian plant alluded to by Engelmann under *E. prostrata* (Torrey Bot. Mex. Bound. Exped. 187) as identical with that species, which, however, differs

in the broad rounded fimbriate lobes of the involucre and distinct limb of the gland. Of Boissier's var. *scindica* the specimens are wretched. I have seen no Mauritian specimens of this.

Var. *erecta*; stem simple or branched from the base erect, leaves longer sometimes $\frac{1}{2}$ in. long, involucre sometimes in distant axils. E. uniflora, *Roxb.* (*Edgew. mss.*)—Probably a state drawn up in long grass.

21. **E. burmanica**, *Hook. f. in Ic. Plant.* t. 1548; annual, quite glabrous, stems many very slender spreading from the root prostrate, leaves $\frac{1}{6}$ – $\frac{1}{4}$ in. opposite in rather distant pairs petioled obliquely linear subacute subspinulose serrate, involucre minute axillary subsolitary, lobes fimbriate, glands narrower than the rounded limb, capsules minute glabrous, cocci acutely keeled, seeds acutely 3-gonous faces obscurely undulate. E. thymifolia, *Wall. Cat.* 7710 H, in part.

BURMA; banks of the Irawaddy at Segain, *Wallich*.

Root slender, giving off numerous rather rigid dichotomously branching filiform stems 4–6 in. long. Leaves very uniform, coriaceous, base obliquely rounded; margins recurved when dry, more spinulose serrate than in any species of the section; stipules setaceous and lacerate. Involucre about $\frac{1}{20}$ in. long, pedicelled, campanulate, quite glabrous; lobes narrow, often longer than the glands, serrate or lacerate; glands transversely oblong with a semilunar or almost semicircular limb that is broader than itself. Styles short, 2-fid. Capsule about $\frac{1}{15}$ in. diam., quite glabrous, nodding; pedicel very long, slender.—A very distinct species, easily known by the minute narrow coriaceous sharply serrate leaves. The limb of the gland is, though small, larger in proportion than in its allies.

4. TIRUCALLI (see p. 245).

E. TIRUCALLI, *Linn. Hort. Cliff.* 197; an erect unarmed shrub or tree, branches spreading cylindric scattered whorled or clustered, leaves 0 or few small linear-oblong, involucre shortly pedicelled clustered in the forks of the smaller branches, glands peltate, cocci compressed velvety, seeds ovoid smooth. *Boiss. in DC. Prodr.* xv. ii. 96; *Roxb. Fl. Ind.* ii. 470; *Brand. For. Fl.* 439; *Kurz For. Fl.* ii. 417; *Grah. Cat. Bomb. Pl.* 179; *Dalz. & Gibs. Bomb. Fl. Suppl.* 76; *Thwaites Enum.* 268; *Benth. Fl. Hongk.* 301; *Wall. Cat.* 7687. E. viminalis, *Mill. Dict. Ed.* i. 15. E. rhipsaloides, *Lemaire Ill. Hortie.* 1857. *Misc.* 72.—Tiru-calli, *Ham. in Trans. Linn. Soc.* xiv. 286.—*Rheede Hort. Mal.* ii. t. 44.

Naturalized in BENGAL, the DECCAN PENINSULA and CEYLON. Cultivated in N.-W. INDIA, BURMA and the EASTERN PENINSULA.—DISTRIB. A native of Africa.

A small tree, 12–20 ft., trunk 6–10 in. diam., green, cylindric, densely branched above; bark brown, cracked; branches slender like stout rushes, becoming as thick as the little finger. Leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. caducous, obtuse, flaccid, pubescent at length glabrous. Involucre chiefly female, small, $\frac{1}{15}$ in. long, turbinate, subsessile with 2 small leaves at the base of the pedicel; lobes short hairy, glands transversely ovate, punctate; bracteoles very numerous lacerate. Styles short, recurved, 2-lobed, stigmas capitate. Capsule $\frac{1}{4}$ in., dark brown.—Hamilton (*Trans. Linn. Soc.* l. c.) regards this plant as a comparatively recent introduction into India from Africa.

22. **E. epiphylloides**, *Kurz For. Flor.* ii. 416; an erect unarmed fleshy small tree, branches jointed flattened with thick crenate wings, leaves subsessile obovate glabrous tip rounded or retuse, involucre in shortly peduncled dichotomous glabrous cymes in the crenatures of the branches, capsules glabrous.

SOUTH ANDAMAN ISLAND; on the rocky coast of Escape Bay, *Kurz*.

A tree, 12–15 ft.; branches 2–3 in. diam. *Leaves* deciduous, very shortly petioled, glossy, base obtuse; lateral nerves obsolete. *Cymes* of involucre inserted at the scars of fallen leaves. *Capsules* deeply 3-lobed, of the size and shape of those of *E. nereifolia*.—Description from Kurz. The habit is that of the following section. I have seen only dried flowerless branches.

5. DIACANTHIUM (see p. 245).

23. *E. nereifolia*, Linn. *Hort. Cliff.* 196 *in part*; a small erect fleshy glabrous tree, branches jointed cylindric or obscurely 5-angled with short sharp stipular thorns arising from thick tubercles, leaves subterminal fleshy obovate oblong or subspathulately obovate acute, involucre in small stout dichotomous short-peduncled cymes from the sinuses, hemispheric smooth, styles connate high up undivided, cocci compressed glabrous. *DC. Plant. Grasses* ii. t. 46; *Boiss. in DC. Prodr.* xv. ii. 79, and *Fl. Orient.* iv. 1090; *Grah. Cat. Bomb. Pl.* 178; *Dalz. & Gibs. Bomb. Fl.* 226; *Brand. For. Fl.* 439; *Kurz For. Fl.* ii. 416; *Beddome Forester's Man.* 216; *Wall. Cat.* 7689. *E. ligularia*, Roxb. *Fl. Ind.* ii. 465; *Ham. in Trans. Linn. Soc.* xiv. 285.—*Burm. Thes. Zeyl.* 96.—*Rumph. Herb. Amb.* iv. t. 40.

DECCAN PENINSULA; common in rocky places; cultivated in BENGAL and elsewhere in native villages. Cultivated and probably wild also in BURMA, Kurz. Cultivated only in Ceylon.—DISTRIB. Beluchistan, Malay Islands.

A shrub or small tree, 15–20 ft. *Branches* $\frac{1}{2}$ in. diam. and upwards, with the subconfluent tubercles in 5 irregular rows. *Leaves* deciduous, 6–12 in. long, terminal on the branches, waved, narrowed into a very short petiole; stipular thorns solitary or in pairs, $\frac{1}{3}$ – $\frac{1}{2}$ in. long. *Involucre* yellowish, the lateral ones of the cymes shortly thickly pedicelled, central sessile; lobes large, erect, roundish, cordate, fimbriate; glands transversely oblong; bracteoles most abundant, fimbriate. *Stigmas* capitate. *Capsule* about $\frac{1}{2}$ in. broad, deeply 3-lobed.—Kurz describes the involucre that are in the forks of the cymes as sessile, and usually entirely male. I follow Boissier in referring Roxburgh's *E. ligularia* to *E. nereifolia*, and his *nereifolia* to *Nivulia*.

24. *E. Nivulia*, Ham. in *Trans. Linn. Soc.* xiv. 286; an erect fleshy glabrous tree, branches subcylindric with pairs of sharp stipular spines arising from low tubercles, leaves alternate linear- or obovate-oblong fleshy glabrous tip rounded, involucre 3-nate forming small short-peduncled cymes from above the leaf scars on the tubercles hemispheric smooth, styles connate to the middle undivided, cocci compressed glabrous. *Boiss. in DC. Prodr.* xv. ii. 79; *Wight Ic.* t. 1862; *Dalz. & Gibs. Bomb. Fl.* 225; *Brand. For. Fl.* 439; *Kurz For. Fl.* ii. 417; *Beddome Forester's Man.* 216; *Wavra, Bot. It. Pr. S. Cob.* 45. *E. nereifolia*, Roxb. *Fl. Ind.* ii. 467; *E. varians*, Haw. *Succ. Pl.* 130; *Grah. Cat. Bomb. Pl.* 179. ? *E. antiquorum*, Wall. *Cat.* 7688.—*Rheede Hort. Mal.* ii. t. 43.

NORTH-WEST HIMALAYA; on dry rocky hills. GUZERAT, the DECCAN PENINSULA and SCIND, Wight, &c. PEGU and BURMA, in dry forests, Kurz.—DISTRIB. Madagascar?

A large shrub or tree, 20–25 ft.; branches whorled; tubercles arranged in a spiral, distant, conical, truncate. *Leaves* 6–12 in., deciduous, nerveless, midrib stout beneath. *Involucre* 3 together in a short cyme with a minute serrulate bract at their base, lateral peduncled 2-sexual, central sessile, male; lobes large, erect, ovate, fimbriate; glands transversely oblong; bracteoles most abundant, fimbriate. *Stigmas* capitate. *Capsule* about $\frac{1}{4}$ in. broad. *Seeds* smooth.

25. *E. antiquorum*, Linn. *Hort. Cliff.* 196; an erect fleshy glabrous

tree, branches terete or obscurely 3-6-angled, branchlets with 3-5 thick sinuate wings and a pair of sharp stipular thorns in the sinuses, leaves few small from the sides of the wings fleshy obovate-oblong tip rounded, involucre 3-nate forming short-peduncled cymes in the sinuses, styles free 2-lobed, cocci compressed glabrous. *Boiss. in DC. Prodr.* xv. ii. 81; *Roxb. Fl. Ind.* ii. 468; *Grah. Cat. Bomb. Pl.* 179; *Dalz. & Gibs. Bomb. Fl.* 226; *Brand. For. Fl.* 438; *Kurz For. Fl.* ii. 416; *Beddome Forester's Man.* 217; *Wight Ic.* t. 897. ? *E. arborescens, Roxb. l. c.—Rheede Hort. Mal.* ii. t. 42.—*Euphorb., Wall. Cat.* 7704 A, C.

Throughout the hotter parts of INDIA and CEYLON, in dry places, ascending to 2000 ft.; also cultivated for hedges.

A polymorphous plant, *Wight*; attaining 25 ft., *Kurz.*; branches 5-6 in. broad, wings repand-sinuate. *Leaves* few, small, deciduous, almost nerveless, shortly petioled. *Cymes* rarely compound; bracts opposite, "obovate" (*Kurz*). *Involucres* hemispherical, nearly $\frac{1}{2}$ in. broad, yellow, the lateral ones on the cyme shortly thickly pedicelled, the central sessile, female; bracteoles abundant, fimbriate. *Fruit* $\frac{1}{2}$ in. diam.—*Wight* refers the plant he figures of this species to a var. *polygona*, and represents the bracts as triangular ovate and acute, and the cymes as lax with long peduncles and pedicels.

26. ***E. tortilis***, *Rottler, ex Wight Ic.* t. 898; an erect fleshy glabrous shrub, branches broad jointed 3-4-angled and spirally twisted, angles compressed lobulate with a pair of stout stipular spines on the lobes, leaves?, involucre 3-nate very shortly stoutly peduncled forming small clusters in the sinuses campanulate lobes glabrous, styles very short connate at the base, cocci not compressed. *Boiss. in DC. Prodr.* xv. ii. 81; *Brand. For. Fl.* 439.—*Euphorb. Wall. Cat.* 7704 B.

DECCAN PENINSULA; Madras and the Coromandel coast. CEYLON, *Thwaites*.

A shrub; branches 2-3 in. broad; spines $\frac{1}{2}$ in. long. *Leaves* not described. *Cymes* of 3 subsessile green involucre each about $\frac{1}{4}$ in. diam.; bracts minute ovate, acute. *Involucre* green with fimbriate lobes and large glands; bracteoles very abundant, fimbriate. *Styles* subspathulate, emarginate. *Fruit* $\frac{1}{2}$ in. diam.; cocci keeled.—*Wight's* figure of this differs from that of *E. antiquorum* in the short crowded cymes, glabrous involucre lobes, rounded cocci, and stouter 2-lobed styles. As with all the other species of this section, careful comparison of these characters is much wanted. *Thwaites* suggests its being a var. of *E. antiquorum*.

27. ***E. trigona***, *Haworth Succ. Pl.* 127; an erect glabrous fleshy shrub, branches 3-5-winged, sinus between the wings acute, wings lobulate with one or two pairs of stout stipular spines on the lobes, leaves from the sides of the wings petioled obovate-spathulate fleshy, tips rounded or mucronate, cymes solitary in the sinuses very shortly peduncled, involucre 3 hemispheric, lobes cuneiform fimbriate, styles connate below undivided, cocci compressed glabrous. *Boiss. in DC. Prodr.* xv. ii. 82; *Brand. For. Fl.* 438; *Roxb. Fl. Ind.* ii. 468; *Wight Ic.* t. 1863. *E. antiquorum*, var. β , *Linn. Sp. Pl.* 646. *E. Cattimandoo, W. Elliot in Wight Ic.* t. 1993; *Boiss. l. c.* 83; *Brandis, l. c.*

Dry rocky hills in the DECCAN, and probably other parts of India. ANDAMAN ISLANDS, *Kurz*.—DISTRIB. Moluccas.

The following description is from Roxburgh of specimens brought from the Moluccas:—*Stem* 6-7 ft., branches ascending, usually 3-gonous. *Leaves* 1-2 by $\frac{1}{2}$ - $\frac{3}{4}$ in., solitary from between the spines, deep green above, paler beneath. *Cymes* from the sinuses generally of 3 involucre, the central sessile with 5 fascicles of male fl. only; lateral pedicelled with one female and five male fl. *Involucre lobes* rounded, jagged; scales (bracteoles) numerous, multifid. *Styles* combined to the middle.

Wight remarks of his *E. Cattimandoo*, that it is so like *E. trigona* that he would

not have introduced it into his *Icones*, but for the gum it yields. His description of it differs from *trigona* only in the branches being 5-angled; but the figure further differs in the more remote protuberance of the branches, in the much smaller involucres, in the few stamens, and in the involucre lobes though fimbriate not being further cleft into lobes; he further figures the ovary of *trigona* as furnished with a cleft calyculus, which is noteworthy. The number of stamens no doubt varies, for Wight observes that in Cattimandoo sometimes the outer involucres of the cyme are male, sometimes the inner, and that *trigona* occasionally produces branches with solitary male involucres.

28. **E. Royleana**, Boiss. in *DC. Prodr.* xv. ii. 83; an erect glabrous fleshy shrub, branches with 5-7 broad flat faces and as many short thick obtuse undulate not lobulate wings with a pair of stipular thorns on their margins, leaves not described, involucres 3-4 in a contracted sessile cyme hemispheric, lobes cuneate fimbriate, styles free to the base?, cocci compressed glabrous. *Brand. For. Fl.* 438; *Gamble Man. Ind. Timb.* 368. *E. pentagona*, *Royle Ill.* 329, t. 82, f. 1 (*not of Haworth*).

OUTER HIMALAYA, in dry hilly tracts from Kumaon to the Jhelum, *Royle*, *Brandis*, ascending to 6000 ft. SALT RANGE, *Aitchison*.

Attains 16 ft. in height and a girth of 6 ft. Branches in *Royle's* figure 3 inches in diameter, with flat spaces between the wings. Involucres $\frac{1}{2}$ in. diam., yellow-green, hemispheric. Capsules $\frac{3}{4}$ in. diam.—*Royle's* figure is unsatisfactory as to the styles. *Brandis* says it is probably the species of the dry hills near Jeypūr which furnishes a great part of the fuel of that city. *Boissier*, who has never seen this, points out that the only character whereby *Royle's* figure enables him to distinguish it from *Wight's* plate of Cattimandoo, which species also he has not seen, are the broad flat spaces between the wings.

6. RHIZANTHIUM (see p. 245).

29. **E. sessiliflora**, *Roxb. Fl. Ind.* ii. 471; a dwarf glabrous fleshy shrub or herb, root large tuberous, stem erect terete, leaves terminal deciduous subsessile oblong or ovate- or obovate-oblong obtuse quite entire, involucres 1-3 sessile at the scars of fallen leaves minute campanulate, lobes fimbriate, styles short almost free undivided. *Boiss. in DC. Prodr.* xv. ii. 76; *Kurz For. Fl.* ii. 415.

PEGU, *Carey*, *Kurz*.

Root an irregular tuber, as large as a large potato; stem 1 ft., simple. Leaves 1-3 in., smooth, fleshy, nearly nerveless; stipular glands minute. Involucres reddish, solitary or the two lateral rudimentary; lobes rounded-ovate, pectinate; glands transversely oblong. Ovary glabrous; styles crimson.

30. **E. fusiformis**, *Ham. in Don Prodr.* 62; a dwarf glabrous herb with a long stout cylindric rootstock, leaves all radical 6-8 in. subsessile obovate or oblanceolate, cymes from the crown of the rootstock after the leaves very variable in length dichotomous, bracts ovate or the upper or all truncate and 3-fid, involucres subsessile or in long or short peduncles hemispheric, styles combined to the middle, cocci compressed. *Boiss. in DC. Prodr.* xv. ii. 93. *E. acaulis*, *Roxb. Fl. Ind.* ii. 472; *Boiss. l. c.*; *Grah. Cat. Bomb. Pl.* 179; *Dalz. & Gibs. Bomb. Fl.* 226. *E. nana*, *Royle Ill.* 329, t. 82, f. 2; *Boiss. l. c.* 94; *Wall. Cat.* 7703.

TROPICAL HIMALAYA; Kumaon, *Royle*; Nepal, *Hamilton*; Oudh, *Thomson* BENGAL, *Roxburgh*. The CONCAN, on the Bababoodan Hills, *Graham*, &c.

Rootstock 6-10 in. long, buried in the ground, $1\frac{1}{2}$ in. or less in diam., brown, smooth except at the scarred apex. Leaves acute or obtuse, fleshy, nerveless. Cymes 6 in. long and less, with long peduncled involucres or very short in *nana*, with short peduncles of the involucres. Involucres about $\frac{1}{2}$ in. diam., greenish; lobes spatulate

fimbriate. *Capsule* $\frac{1}{2}$ in. diam., pedicel $\frac{1}{2}$ in. long or less, sometimes very short. *Seeds* broadly obliquely ovoid, subacute, smooth.—Unlike as Royle's *nana* is to Roxburgh's figure of *acaulis*, I am convinced that these are merely forms of one, the length of the cyme probably depending on the moisture of the soil, and whether produced in open ground or amongst herbage. The Concan specimens are intermediate.

7. GALARRHÆUS (p. 246).

* *Perennial herbs. Capsules smooth* (see also *E. pilosa* and *khasyana*).

31. ***E. himalayensis***, Boiss. in DC. *Prodr.* xv. ii. 113 (? of Klotzsch); erect, glabrous or pubescent above, leaves 1-2 in. alternate sessile elliptic or linear-oblong obtuse, nerves obscure spreading, involucre 4 orbicular or rhombic-ovate, rays few short, involucre campanulate hairy within, lobes rounded tomentose, styles stout united below the middle, capsule $\frac{1}{2}$ in. diam. and seeds quite smooth. ? *E. himalayensis*, Klotzsch in Bot. Reise Pr. Wald. 115. *Tithymalus himalayensis*, Kl. l. c. t. 20.

TEMPERATE HIMALAYA (*Hoffmeister* ?); Sikkim, alt. 10-13,000 ft., J. D. H., &c.

Stems 6-10 in. from a perennial stock, rather succulent, simple or sparingly branched, base scaly. *Leaves* rather coriaceous. *Involucres* $\frac{1}{2}$ in. diam., hidden by the involucre leaves; glands large, transversely oblong. *Capsule* shortly stipitate, cocci rounded. *Seeds* $\frac{1}{2}$ in. long, short broadly oblong, and very smooth; caruncle peltate.—The stout styles distinguish this from the smooth-fruited forms of *E. pilosa* and *sikkimensis*. Klotzsch's figure of *E. himalayensis* represents a miserable specimen of a *Euphorbia* without fruit, which it is impossible to identify; it has minute involucre with obscurely ciliate lobes.

32. ***E. Wallichii***, Hook. f.; tall, erect, stem pubescent above, leaves 3-5 in. alternate sessile linear- or elliptic-oblong or -obovate acute, nerves many spreading, involucre 3-4 large rounded or rhombic-ovate acute, rays few short, involucre hemispheric hispid lobes broad margins woolly, styles slender united to the middle 2-fid, capsule $\frac{1}{2}$ in. diam. and seeds smooth. *E. involucrata*, Wall. Cat. 7696 A, B (excl. loc. Silhet), (not of *E. Meyer*).—*Euphorbia*, No. 330, Aitchison in Journ. Linn. Soc. xviii. 93.

WESTERN and CENTRAL HIMALAYA; Nepal, Wallich; Kashmir, Chamba and Jamu, Aitchison, Thomson, &c.—DISTRICT. Kurram Valley, Afghanistan, alt. 10-12,000 ft.

Stems 1-2 ft. from a perennial stock, simple or sparingly divided above. *Leaves* membranous, sparsely hairy especially on the broad midrib above and beneath; involucre $1\frac{1}{2}$ in. diam. *Involucres* $\frac{1}{2}$ in. diam.; lobes very broad, rounded; glands large reniform. *Capsule* depressed globose; cocci woody; pedicel very short. *Seeds* $\frac{1}{2}$ in. long, globosely oblong very smooth, grey-blue; caruncle minute.—A large species distinguished from all other Indian ones by the large involucre, capsules and seeds. There are two sheets of it in Herb. Wallich, one, A, from Gossainthan (indicating that it was procured by Wallich's native collectors at some elevation in Nepal towards the snowy ranges); the other, B, is stated in the lithographed catalogue to be from Silhet, but this in the original ticket is queried, and is doubtless an error, for the specimens are identical with those under A. The Western Himalayan specimens seem the same species, but it has not been collected between central Nepal and Jamu. Aitchison describes it as a very handsome species growing in large tufts.

33. ***E. Jacquemontii***, Boiss. in DC. *Prodr.* xv. ii. 113; stem simple or crisply puberulous, leaves 2-2 $\frac{1}{2}$ in. subpetiolate lanceolate subacute glabrous, floral 3 ovate obtuse, umbel-rays 5 very short, involucre campanulate hirsute without velvety within, lobes elongate ciliate, styles rather long, capsule small and seeds smooth.

WESTERN HIMALAYA, *Jacquemont*.

Rootstock as thick as the thumb, cylindric, rather fleshy; stems $1\frac{1}{2}$ ft. *Leaves* often reddish, base narrowed, beautifully nerved. *Involucral glands* stipitate, margins crisply undulate. *Styles* shortly 2-fid, connate $\frac{1}{3}$ of their length. *Capsule* microscopically granulate.—Of this and its variety I have seen no specimen; there is nothing in the description to distinguish it from a smooth-fruited *E. pilosa*.

VAR. *β. lasiocarpa*; young capsule hirtellous.—N.W. Himalaya, *Jacquemont*. Kashmir (Pir Panjab) and Western Tibet; Iskardo, *Hugel*.

34. *E. sikkimensis*, *Boiss. in DC. Prodr.* xv. ii. 113; quite glabrous, leaves $2\frac{1}{2}$ –4 in. petioled linear-oblong or -lanceolate acute, nerves ascending obscure, floral whorled and 3–4 involucral ovate-oblong obtuse, involucre hemispheric glabrous without hirsute within, lobes ovate ciliate, styles very slender connate to the middle, capsule $\frac{1}{6}$ in. diam. smooth, seeds smooth.—*Euphorb., Griff. Itin. Notes*, p. 148, No. 713.

SIKKIM HIMALAYA; in the inner valleys, alt. 8–10,000 ft., *J. D. H.* BHOTAN, at Lammoo, *Griffith*.

Stems 3 to 4 ft. from a woody rootstock, stout, but not woody, branched above. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, thinly coriaceous, narrowed into a distinct but short petiole. *Rays* several, often compound; invol. leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. broad, yellow. *Involucres* $\frac{1}{2}$ in. diam.; glands transversely oblong. *Styles* very shortly 2-fid. *Capsule* $\frac{1}{4}$ in. diam.; pedicel about as long; cocci globose. *Seeds* $\frac{1}{10}$ in. diam., nearly globose; caruncle small.—The leaves narrowed into a slender petiole and short involucre distinguish this from *E. longifolia*.

35. *E. Griffithii*, *Hook. f.*; tall, quite glabrous, stem branched above, leaves 2–3 in. sessile linear acute or apiculate, nerves many obscure, floral similar, involucral 3–4 small ovate red, base acute, involucre small campanulate glabrous without villous within, lobes small orbicular villous, styles stout united above the middle, capsule small and seeds smooth. *E. sikkimensis*, *Boiss. in DC. Prodr.* xv. ii. 113 (*the Bhotan plant, Griffith 963, only*).

BHOTAN HIMALAYA; at Woolooka, alt. 7–8500 ft., *Griffith*.

Stems from a perennial stock, stout, but not woody, 2–3 ft.; branches slender. *Leaves* rather membranous, $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., narrowed into a very short petiole, nearly black when dry; involucral scarlet or orange-red, $\frac{1}{4}$ – $\frac{1}{2}$ in. *Rays* 8–12, slender, about equalling the floral leaves or longer. *Involucres* much smaller than in *sikkimensis*; glands large, reniform. *Capsule* rather woody. *Seeds* not seen.—*Boissier* (quoting *Griffith's* No. 963) confounded this very distinct species with *E. sikkimensis*. The scarlet colour of the involucral leaves is evident in the dried specimens.

36. *E. Stracheyi*, *Boiss. in DC. Prodr.* xv. ii. 114; stems many straggling from the rootstock branching prostrate or ascending pubescent. leaves $\frac{1}{4}$ – $\frac{3}{4}$ in. sessile obovate obtuse, involucral 2–4 broadly obovate, umbels solitary peduncled terminating the flowering branches, involucre hemispheric, lobes ciliate, styles short nearly free, capsule globose pubescent or minutely granulate, seeds smooth mottled.—*Euphorb. Wall. Cat.* 7685 and 7695 (*the 4 small specimens*).

ALPINE HIMALAYA; Nepal, *Wallich*; Kumaon, alt. 12–15,000 ft., *Strachey & Winterbottom* (*Euphorb. n.* 5, 17, 19, 20); Garwhal, alt. 10–12,000 ft., *Duthie*; Sikkim, alt. 12–16,000 ft., *J. D. H.*; Bhotan, *Griffith*.

Rootstock often long, stout, woody. *Involucres* $\frac{1}{10}$ – $\frac{1}{2}$ in. diam., hairy within; lobes often large; glands reniform. *Styles* rather long, nearly free (connate to beyond the middle, *Boissier*). *Capsule*, $\frac{1}{2}$ in. diam., not deeply lobed; pedicel very short. *Seeds* oblong, caruncle minute.—This varies excessively in size according to soil and exposure. The umbels are almost invariably solitary, but there are indications of

several rays being sometimes formed. Wallich's specimens have very slender much-branched stems, a foot long, with rather membranous black leaves; Strachey's have stout branches, 1-4 in., and coriaceous leaves sometimes secund on prostrate flowerless branches; Sikkim ones are intermediate between the above, and have often ciliate leaves; Griffith's are very small indeed, with stout simple stems less than an inch high, and leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. long.

Var. ? *radiata*; glabrous stems very many, 3 in. erect pubescent, flowering longer simple nearly leafless with 3-5 long-peduncled umbels, leaves $\frac{1}{2}$ in. elliptic-oblong glabrous.—Garwhal, at Ramni, *Strach. & Wint. (Euphorb. n. 16)*.—A solitary specimen without fruit.

37. *E. tibetica*, Boiss. in *DC. Prodr.* xv. ii. 114; quite glabrous, stems many suberect or straggling from the woody rootstock, cauline leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. alternate sessile linear- or subcuneate- or spathulate-oblong tip rounded or truncate retuse or toothed, floral opposite and involucre similar, involucre axillary and in the forks very short turbinate glabrous within, lobes small ovate, styles short stout, capsule and seeds quite smooth.

WESTERN TIBET; Laptal (North of Kumaon), alt. 15,000 ft., *Strachey & Winterbottom* (No. 6); Piti, alt. 13,000 ft., *Thomson*; Karakoram, alt. 10,700 ft., *Clarke*.—DISTRIB. Kashgar.

Rootstock sometimes as long and thick as the middle finger. Stems 6-12 in., dichotomously branched, and foliage pale rather succulent. Leaves $\frac{1}{4}$ in. diam. or less, sometimes with the sides quite parallel, toothed of tips very variable. Involucres $\frac{1}{2}$ in. broad; glands large, transversely oblong; lobes entire, lobulate or toothed (ciliate, *Boissier*). Capsule shortly stipitate (pedicel long, *Boissier*), $\frac{3}{8}$ - $\frac{1}{2}$ in. diam., pale green, furrows not deep between the oblong cocci. Seeds oblong-obovoid, caruncle rather large conic.

38. *E. Thomsoniana*, Boiss. in *DC. Prodr.* xv. ii. 113; quite glabrous, stem simple sparingly leafy, leaves $\frac{3}{4}$ -1 $\frac{1}{2}$ in. sessile elliptic or ovate obtuse or subacute, nerves few obscure ascending, floral broader, involucre 2 sub-orbicular, involucre campanulate glabrous without, with 4 hairy lines within, lobes short fimbriate, styles long slender, capsules large oblong and seeds smooth.

WESTERN TIBET; Leh, alt. 10-12,000 ft., *Thomson*; Gilgit, *Gill*.

Stems a foot high from a stout perennial stock, unbranched, scaly at the base. Leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, coriaceous, dull yellow when dry, upper and under surfaces alike. Rays 3-6, longer than the floral leaves. Involucres $\frac{1}{2}$ in. broad; lobes small; glands substipitate, transversely oblong. Capsule shortly stipitate, $\frac{1}{2}$ in. long, $\frac{1}{4}$ in. diam.; cocci not separate by a deep sulcus, oblong. Seed pale oblong, $\frac{1}{2}$ in. long, quite smooth; caruncle small, peltate.—A very distinct species.

** *Perennial herbs. Capsules usually warted. Seeds smooth.* (Capsule often smooth in *E. pilosa* and *khasiana*.)

39. *E. pilosa*, Linn. *Sp. Pl.* 460; tall, glabrous or pubescent, stems erect branched above, leaves alternate sessile or subsessile membranous from linear to oblong acute or obtuse, nerves slender spreading, involucre rounded or broadly ovate and acute, rays long or short, involucre campanulate villous within, styles long slender connate below the middle, capsule small smooth or warted glabrous or puberulous, seeds smooth. Boiss. in *DC. Prodr.* xv. ii. 116, and *Fl. Orient.* iv. 1096; *Reichb. Ic. Fl. Germ.* v. t. 138, 139, and *Ic. Crit.* ii. t. 145. *E. procera*, *M. Bieb. Fl. Taur. Cauc.* 378; *Reichb. Cent.* ii. t. 270.—*Euphorb.* No. 7, 9, 10, *Herb. Strachey & Winterbottom*.

WESTERN HIMALAYA; from Garwhal westward to Murree.—DISTRIB. Soongaria, Eastern Siberia and westward to the Atlantic.

Stems many from the rootstock, 1-3 ft., leafy. *Leaves* rarely more than $\frac{1}{2}$ in. broad, sometimes minutely serrulate towards the tip or along the whole margin; nerves numerous but obscure; involucrel bright yellow, always orbicular but sometimes pointed at the tip and with an acute base. *Rays* 5-9, long or short. *Involucres* about $\frac{1}{2}$ in. diam., often hairy without; glands reniform; pedicel short. *Styles* often nearly as long as the capsule, but variable in length. *Capsule* $\frac{1}{4}$ in. diam., subglobose. *Seeds* $\frac{1}{16}$ in. long, broadly oblong-ovoid; caruncle small, flat.—After a very careful examination I am unable to regard *E. cognata* as anything but a form of *E. pilosa*, with the warts of the capsule usually, but not always, more developed. Boissier describes that of *pilosa* as smooth or sparsely and minutely tubercled. *E. cornigera*, which he separates from *cognata* by the serrulate leaves, in this respect differs from that plant as his own var. *trigonocarpa* of *pilosa* does from true *pilosa*. As to Royle's *E. cashmeriana*, it is impossible to refer so wretched a figure with certainty to any one species, but I have little doubt about its being this. Boissier's locality for *cognata* of "Nubra (Edgeworth)" is a misreading; it is not a Tibetan plant.

E. pilosa proper; capsule smooth or minutely warted.—I find specimens with this character mixed with the following.

Var. *cognata*; rays often numerous, capsule with few or many small depressed or larger conical warts. *E. cognata*, Boiss. in *DC. Prodr.* xv. ii. 120. *E. consanguinea*, Klotzsch in *Bot. Reis. Pr. Wald.* t. 19. *Tithymalus cognatus*, Klotzsch l. c., p. 66. ? *E. cashmeriana*, Royle *Ill.* 329, t. 82, f. 4; Boiss. l. c.

Var. *cornigera*; leaves finely serrulate, capsule with conical warts. *E. cornigera*, Boiss. l. c. 122.—Kashmir, alt. 6500-8500, Jacquemont, &c.; Murree, Fleming, &c.; Kulu, Edgeworth.

Var. *myrtifolia*; stems short decumbent or ascending, leaves $\frac{1}{2}$ -1 in. elliptic acute faintly serrulate. *E. myrtifolia*, Edgew. mss.—Kulu, Edgeworth.

40. ***E. Edgeworthii***, Boiss. in *DC. Prodr.* xv. ii. 120; tall, robust, quite glabrous, leaves 2-3 in. sessile membranous oblong obtuse or acute base rounded, floral broadly ovate, involucrel 3-4 orbicular, involucres small campanulate villous within, lobes ovate ciliate, capsule $\frac{1}{4}$ in. diam. warted, seeds rugose.

WESTERN HIMALAYA; Kumaon, above Leetee, Edgeworth.

I suspect that this is only a state of *E. pilosa* with broader leaves rounded at the base. The specimen is a solitary one in fruit, having only one capsule, of the form and size of *E. pilosa*. The only ripe seed is rugose, but it may be in a diseased condition; the caruncle is minute and peltate.

41. ***E. micractina***, Boiss. in *DC. Prodr.* xv. ii. 127; perennial, shortly sparsely hairy, stems short erect, leaves minute alternate sessile uppermost largest $\frac{1}{2}$ in. elliptic-oblong obtuse remotely crenulate floral equalling the rays, involucrel 3 ovate obtuse, involucre campanulate lobes ovate subciliate, capsule depressed warted, seeds obsoletely granulate.

KASHMIR, on Pir Panjal; Jacquemont, in birch woods.

Root vertical, cylindric. *Stems* 6-8 in. *Leaves* gradually larger upwards, largest $\frac{1}{4}$ in. broad; involucrel $1\frac{1}{2}$ lines long. *Rays* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Styles* connate at the base, 2-fid. *Capsule* depressed-globose, warts conical. *Seed* $1\frac{1}{2}$ line diam., ovoid, caruncle depressed.—I have seen no specimens. Boissier, who likens it to a very diminutive form of *E. Apios* or *dulcis*, does not describe the glands of the involucre, but puts it in the same section as *cognata* (*pilosa*).

42. ***E. longifolia***, Don *Prodr.* 62; tall, glabrous or sparsely hairy, leaves 1-4 in. coriaceous sessile linear-oblong obtuse or acute nerves obsolete, involucrel 3-4 orbicular or broadly ovate and apiculate, rays few short, involucres campanulate villous within, lobes rounded villous, styles long slender deeply 2-fid connate below the middle, capsule $\frac{1}{4}$ in. diam. covered obscurely and sparsely with conical warts, seeds smooth. Boiss. in *DC.*

Prodr. xv. ii. 120.—*Euphorb. Wall. Cat.* 7694 A and 7695 (the central specimen).

NEPAL, *Hamilton*, at Thoukote, *Wallich*.

I fear that this is only another form of *E. pilosa*, with more coriaceous leaves. *Capsule* rather broader than long, shortly stipitate, sulci deep between the globose cocci. *Seeds* $\frac{1}{10}$ in. long, broadly obovoid, pale; caruncle small.—*Strachey and Winterbottom's* No. 10, referred here by *Boissier*, is, I think, clearly *E. pilosa*, var. *cognata*.

43. ***E. khasyana***, *Boiss. in DC. Prodr.* xv. ii. 120 and 1266; erect, quite glabrous, stems stout sparingly branched above, leaves 1-2 in. sessile coriaceous elliptic-lanceolate obtuse nerves very obscure, involucrel 2-3 orbicular or broadly ovate and apiculate, rays few stout, involucre hemispheric villous within, styles stout united to the middle obscurely 2-fid, capsule $\frac{1}{2}$ in. diam. smooth or warted, seeds smooth.

KHASIA Mts.; alt. 5-6000 ft., *Griffith (Kew Distrib.* 4693, by error named *E. fimbriata*, *Wall.*), *J. D. H. & T. T.*, &c.

This again I suspect may prove a variety of *E. pilosa*. It differs from *E. longifolia*, which it is very near, in the shorter stems, stouter habit, shorter broader rather more acute leaves, and obscurely 2-fid styles. The capsule and seeds are exactly as in *sikkimensis*.—The name *fimbriata*, *Wall.*, applied to specimens of this distributed from Herb. Griffith, was inadvertently attached by *Boissier* to specimens of this plant in the Kew Herbarium, and cited as such in the *Prodromus* (p. 1266).

*** *Annuals. Capsule smooth. Seeds pitted* (unknown in *E. peltata*).

44. ***E. helioscopia***, *Linn. Sp. Pl.* 459; annual, erect, dichotomously branched above, leaves alternate shortly petioled obovate or spatulate serrulate, floral similar, involucrel orbicular or oblong rays about 5, involucre turbinate lobes oblong glands fimbriate, capsule smooth globose, seeds deeply reticulately pitted. *Fl. Dan.* t. 725; *Reichb. Ic. Fl. Germ.* v. t. 132 and 4754; *Boiss. in DC. Prodr.* xv. ii. 136, and *Fl. Orient.* iv. 1107.

The PANJAB and WESTERN HIMALAYA, in fields; introduced into the Nilghiris.—*DISTRIB.* Afghanistan and westward to the Atlantic, Japan; introduced elsewhere.

Stem often very stout and copiously umbellately or dichotomously branched above with divaricate branches. *Leaves* 2 in. long and under, membranous; floral large; involucrel 2-4, small. *Involucre* $\frac{1}{10}$ in. diam., glabrous; lobes small; glands reniform. *Capsule* $\frac{1}{2}$ in. diam.; cocci rounded at the back. *Seed* turgidly oblong, or subglobose.—*Boissier* describes the seed as acute and compressed, which I cannot confirm.

45. ***E. peltata***, *Roxb. Fl. Ind.* ii. 474; annual, erect, quite glabrous branched from below, leaves alternate sessile subspathulately oblanceolate acute serrate upper larger, floral 5 oblanceolate, involucrel 3-4 elliptic acute at both ends, involucre minute campanulate with 3 villous lines within, glands peltate reniform, stamens few, styles free shortly 2-fid, capsule smooth. *Boiss. in DC. Prodr.* xv. ii. 137.

Interior of the COROMANDEL coast, *Roxburgh*.

A foot high; branches curved upwards. *Leaves*, lower $\frac{3}{4}$, upper and floral $1\frac{1}{2}$ in., all strongly nerved; involucrel "oblong to cordate," *Roxb.* *Rays* very slender, 3-4 in. *Involucre* greenish yellow with purple glands; lobes narrow, ciliate. *Capsule* globose, scarcely any angle to be seen.—The above description is from *Roxburgh's Flora Indica*, and his unpublished drawing at Kew. It is described from plants grown in the Calcutta Gardens raised from seeds sent from Coromandel.

8. ESULA (sec p. 247).

* *Annuals.*

46. ***E. dracunculoides***, *Lamk. Encycl.* ii. 428; annual, glabrous,

stems erect many from the root leafy, leaves sessile linear-lanceolate subacute base acute rarely rounded or subcordate, involucre 2 broader at the base, involucre turbinate, lobes ovate ciliate, glands semilunate, styles short free, capsule smooth, seeds oblong leprous. *Boiss. in DC. Prodr.* xv. ii. 139, and *Ic. Euphorb.* t. 91; *Roxb. Fl. Ind.* ii. 474. *E. lanceolata*, *Heyne in Roth Nov. Sp.* 230; *Spreng. Syst.* iii. 791. *E. uniflora*, *Wall. Cat.* 7700, and *Herb. Royle (not of Fl. Ind.)*.

From the PANJAB to BEHAR in the plains and low hills, and southward to CANARA and COROMANDEL.—DISTRIB. Westwards to Arabia and Trop. Africa.

Stems 12–18 in. high, often excessively branched dichotomously, branches divaricate. *Leaves* 1–1½ in. long; involucre shorter. *Involucres* solitary, hairy within. *Capsule* ½–¾ in. diam., hardly depressed. *Seeds* oblong, with a white tuberculate testa.—Roth describes the margins of the leaves as scabrous.

47. **E. Maddeni**, *Boiss. in DC. Prodr.* xv. ii. 141; annual, quite glabrous, branched from the base, leaves ½–1 in. alternate sessile obovate-spathulate tip rounded base acute, floral longer opposite, involucre ovate oblong obtuse, involucre subsessile turbinate, lobes triangular 2-fid, glands semilunate 2-cornute, styles nearly free 2-fid, capsule smooth, seeds oblong obscurely ribbed smooth.—*Euphorb.* No. 15, *Herb. Strachey & Winterbottom*.

WESTERN HIMALAYA; from Kumaon to Murree, alt. 5–9000 ft., *Madden, &c.*

Whole plant 4–10 in. high, very variable in amount of branching, pale green, branches sometimes dichotomously divaricate. *Leaves* membranous, always narrowed at the base, sometimes retuse at the apex, nerves very slender. *Involucres* solitary in the forks of the flowering branches, or the axils of their opposite leaves, sometimes in rayed umbels; ¼ in. diam., glabrous. *Capsule* thin, longer than broad, sulci deep between the oblong cocci, pale, ½ in. diam.; pedicel very short. *Seeds* ½ in. long, oblong, top rounded, caruncle orbicular.

48. **E. falcata**, *Linn. Sp. Pl.* 456; annual, dwarf, glabrous, stems erect dichotomously divaricately branched, leaves sessile oblong-obovate or linear cuspidately acuminate, floral 2–4 and involucre broader oblong or the involucre cordate cuspidately caudately acuminate, involucre minute turbinate lobes fimbriate glands semilunate, styles free, capsule small ovoid, cocci keeled, seeds transversely furrowed. *Boiss. in DC. Prodr.* xv. ii. 140, and *Fl. Orient.* iv. 1111; *Jacq. Fl. Austr.* ii. t. 121; *Reichb. Ic. Fl. Germ.* v. t. 141.

The PANJAB, at Rawul Pindee, *Aitchison*. GILGIT, *Giles*.—DISTRIB. Afghanistan and westward to Arabia, Mid. and South Europe and N. Africa.

A small annual, 6–12 in. high, with pale rigid stems and branches. *Leaves* 1 in. and less, floral and involucre sometimes serrulate. *Involucres* glabrous, hidden by the floral leaves, glands minute. *Capsule* ¼ in. long, thin. *Seeds* pale, compressed and obscurely 3-sided, ecarunculate.—I have seen only a single Indian specimen from the Panjab in a young state, and another from Gilgit, but the characteristic cuspidate leaves of the species are unmistakable. Dr. Aitchison's note says that it is common.

49. **E. Rothiana**, *Spreng. Syst.* iii. 796; annual or perennial, erect, glabrous, glaucous, stem copiously branched above, leaves alternate linear-lanceolate or oblanceolate base acute, floral sessile ovate or oblong-lanceolate acute, involucre 2–3 triangular-ovate or ovate-cordate mucronate, involucre shortly campanulate lobes toothed and mouth villous glands semilunate 2-horned, styles free 2-fid, capsule smooth, seeds oblong bluish. *Boiss. in DC. Prodr.* xv. ii. 156; *Wight Ic.* t. 1864; *Dalz. & Gibs. Bomb. Fl.* 226;

Wawra Bot. It. Pr. S. Cob. 44. *E. glauca*, *Roxb. Fl. Ind.* ii. 473. ? *E. segetalis*, *Grak. Cat. Bomb. Pl.* 179 (not of Willd.). *E. oreophila*, *Miquel Analect. Bot.* iii. 17; *Boiss l. c.* *E. Wightiana*, *Boiss. Cent. Euphorb.* 37. *E. graminea*, *König in Herb. Vind.* *E. divergens*, *Klotzsch in Reise Pr. Wald. Bot.* t. 18. *E. læta*, *Heyne in Roth Nov. Sp.* 230. *E. lanceolaria*, *Herb. Heyne*, and *E. linifolia*, *Herb. Russell*, in *Wall. Cat.* 7691. *Tithymalus divergens*, *Klotzsch l. c.* 114.

Hills of CENTRAL INDIA and the DECCAN PENINSULA, from Banda, *Edgeworth*, southwards, alt. 4–6000 ft. CEYLON; common up to 7000 ft., *Thwaites*.

Stems usually stout, sometimes profusely dichotomously branched above, the branches bearing pairs of involucrel leaves. *Leaves* 2–5 by $\frac{1}{4}$ – $\frac{1}{2}$ in., coriaceous or membranous, sometimes acuminate, nerves diverging, very obscure, floral and involucrel shorter, very variable. *Rays* few or many. *Involucres* $\frac{1}{10}$ in. diam., glabrous or hairy without, villous within; lobes variable, short; bracteoles very few. *Filaments* hairy. *Capsule* $\frac{1}{2}$ – $\frac{1}{3}$ in. diam., glabrous or hairy, quite smooth; pedicels long or short, deeply lobed. *Seeds* subglobose pale and imperfect, or broadly oblong or obovoid, brown-black or bluish, quite smooth; caruncle very small.—*Boissier* distinguishes *E. oreophila* from *Rothiana* by being taller, with leaves narrower at the base, umbels with more rays, involucrel lobes truncate, and glabrous capsules, none of which characters appear to me to hold good, the organs to which they refer being extremely variable. The infertile seeds which occur in most of the specimens are larger than the fertile, and more globose, with no perceptible caruncle. This species is described as annual, and so are many specimens, but others appear as if from a perennial stock. *Klotzsch's E. divergens* is stated to be a native of the Himalaya, where *E. Rothiana* has not been found by others. I follow *Boissier* in referring it to the latter species.

Var. *β, pubescens*, *Boiss. l. c.*; branchlets and leaves more or less pubescent.—*Canara*, near *Mercara*, *Hohenacker, Pl. Ind. Or.* No. 807.

** *Perennials* (see also 49. *E. Rothiana*).

50. *E. kanaorica*, *Boiss. in DC. Prodr.* xv. ii. 154; perennial, quite glabrous, stems very many from the rootstock decumbent much branched naked below, leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. alternate coriaceous obovate-spathulate, floral opposite similar, involucrel in the axils of 2 opposite orbicular leaves shortly pedicelled campanulate glabrous within, lobes triangular small, glands large 2-cornute, styles quite free 2-fid at the very tips only, capsule smooth, seeds oblong smooth.

WESTERN HIMALAYA; *Kunawar* on the ascent to the *Runang Pass*, alt. 15,000 ft. ? *Thomson*.

Rootstock slender? *Stems* 6–10 in., flaccid, flexuous. *Leaves* yellowish when dry, always narrowed at the base except the upper involucrel; costa and nerves invisible. *Involucres* $\frac{1}{12}$ in. diam. *Capsules* $\frac{1}{8}$ in. diam., pale. *Seeds* exactly as in *E. Maddenii*.—This a good deal resembles a very small *E. Maddenii*, but it has certainly a perennial stock, the leaves are coriaceous or fleshy, the styles short quite free and hardly 2-fid.

51. *E. prolifera*, *Ham. in Don Prodr.* 62; quite glabrous, stems many from a stout rootstock, erect subsimple, leaves 1–3 in. very coriaceous narrow linear to linear-oblong or -spathulate obtuse or acute, floral 4 elliptic obtuse, involucrel 2–4 rounded, involucrel shortly campanulate lobes triangular fimbriate glands peltate very variable, styles short stout revolute deeply 2-fid, capsule broad smooth, seeds globose smooth. *E. nepalensis*, *Boiss. in DC. Prodr.* xv. ii. 157. *E. cuneifolia*, *Roxb. Fl. Ind.* ii. 471; *Wall. Cat.* 7701.—*Euphorb.*, *Wall. Cat.* 7698, 7699.

CENTRAL and WESTERN HIMALAYA; from *Nepal* to *Kashmir*, ascending to

6000 ft.; also in the plains or rocky hills from Oudh to the Panjab.—DISTRIB. Yunan.

Stems 6–12 in., stout, often with proliferous shoots of very narrow acute leaves; stock as thick as the thumb. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, base acute or rounded, quite entire, upper or floral rarely oblong or ovate, nerves 3 very slender. *Involucres* $\frac{1}{2}$ in. diam., glabrous without and within; lobes acute; glands stipitate, peltate reniform or semilunate and 2-horned, or transversely oblong, entire or irregularly toothed; bracteoles numerous. *Styles* connate below the middle. *Capsule* $\frac{3}{4}$ – $\frac{1}{2}$ in. diam., long pedicelled, rather depressed. *Seed* mottled or not, ecarunculate.

52. ***E. thyrsoidea***, Boiss. in *DC. Prodr.* xv. ii. 164; glabrous, tall, stem grooved with many short branches from the axils upper with 6–10 twin 2-fid rays forming a thyrses, leaves rhombic-oblong from a narrow base subacute remotely denticulate much veined beneath, of the sterile branches narrowly linear, floral orbicular-ovate obtuse, involucre short lobes large ciliate, styles rather long connate to the middle.

NORTH-WEST HIMALAYA, Jacquemont.

Stem 3 ft. *Leaves* 3 by 1 in., upper smaller, membranous. *Thyrse* terminal, 6–8 in. long, reddish in flower. *Involucres* turbinate hemispheric, lobes truncate or retuse; glands with converging horns. *Styles* 2-lobed, tips thickened. *Capsule* unknown.—I have seen no specimens. Boissier, who places it in the same section as *E. Rothiana*, describes it as allied to *E. agraria*, M. Bieb., of Asia Minor, and *E. iberica*, Boiss., of Persia, &c., and as being remarkable for the distinctly veined leaves. It seems to have the denticulate leaves of *E. pilosa* var. *cornigera*, and the shoots with very narrow leaves of *E. prolifera*.

DOUBTFUL SPECIES.

E. ANGUSTIFOLIA, Ham. in *Don Prodr.* 62; perennial, stem 1 foot erect branched subvillous, umbels trifid, leaves scattered linear obtuse glabrous, involucre subsessile, glands bicornute.—Nepal, at Norcotera, Hamilton. Boissier (in *DC.* p. 177) suggests this being *E. Rothiana*, which is not a Nepal species and is usually glabrous.

E. (Chamæsyceæ) HISPIDA, Boiss. *Cent. Euphorb.* 8, and in *DC. Prodr.* xv. ii. 27; annual, softly hispid, stems decumbent or prostrate, leaves subsessile elliptic obtuse tip sharply serrulate base rounded, the larger $\frac{1}{2}$ in., involucre solitary forming short leafy axillary racemes turbinate glabrous, throat with a white beard, lobes ovate, glands transversely ovate as broad as their white or rosy obtusely 2–3-lobed limb, styles short 2-fid, cocci sparsely hairy acutely keeled, seed white, transversely tuberculately rugose. *E. calliadena*, Engelm. *mss.*—India, Wallich. n. 325, and 207 in *Herb. Kew.* Himalaya, Jacquemont; Kashmir, at Pir Pundjal, Hugel.—I find no plant answering to these numbers in *Kew. Herbarium*, nor do I find them cited in Wallich's *Herbarium*. Boissier places it next to *E. coccinea*. Can it be *E. Emodi*, p. 250?

E. (Chamæsyceæ) NILAGHIRICA, Miquel *Analect. Bot.* iii. 17, and in *Hohenack. Herb. Ind. Or.* No. 1128; perennial?, much branched from the base, branches 8–12 in. red-brown stout angled when dry leafy, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. sessile coriaceous broadly obliquely oblong obscurely crenulate tip rounded minutely toothed or not, nerves very obscure, stipules subulate glabrous, involucre sessile and shortly pedicelled $\frac{1}{10}$ in. diam. glabrous lobes subulate longer than the oblong glands which have no limb, capsule shortly pedicelled trigonously 3-lobed, cocci sharply keeled, styles very short, seeds smooth bare. *E. sanguinea*, γ *nilaghirica*, Boiss. in *DC. Prodr.* xv. ii. 35.—Nilghiri Mts., Metz.

A doubtful plant, resembling some varieties of *E. corrigioloides*, but differing from that in the less thick leaves, solitary involucre, larger capsules and shorter styles. Boissier refers it to *E. sanguinea*, Hochst., as var. *nilaghirica*, but it is quite unlike that plant. Engelm. (in Torrey, Bot. Mex. Bound. Survey, 187) refers it to *E. inaequilatera*, Sonder (in *Linnaea* xxiii. 105), a Natal plant, referred as a variety (*natalensis*) to *sanguinea* by Boissier.

E. PEPLUS, Linn.; *Wall. Cat.* 7706, from Roxburgh, is a specimen of the true plant, no doubt introduced into India.

E. PROSTRATA, *Ait. Hort. Kew*, ii. 139.—Engelmann (in Torrey, *Bot. Mex. Bound. Exped.*) says of this American species, that it is found in India; but I have seen no specimen, nor does Boissier, who figures it well (*Euphorb. Ic.* t. 17), mention it as Indian. It is a native of W. Africa and the Mauritius. It closely resembles *E. microphylla*, differing in the ciliate keel of the cocci.

E. PRUNIFOLIA, *Jacq. Hort. Schœnb.* iii. t. 277; *Wall. Cat.* 7690, from the Calcutta Bot. Garden, is an American plant (*E. geniculata*, *Ortega*; *Boiss. in DC. Prodr.* xv. ii. 72).

E. PYRIFOLIA, *Lamk. Dict.* ii. 419; *Wail. Cat.* 7084, from the Calcutta Bot. Garden, is a native of Mauritius.

E. (Anisophyllum) TENTIS, *Ham. in Don Prodr.* 62; annual, stems decumbent much dichotomously branched pubescent, leaves opposite petioled entire ovate-oblong obtuse pubescent beneath, floral lanceolate acute, limb of the glands entire rounded, capsule trigonous pubescent.—Nepal, at Bassaria, *Hamilton*.

E. (Anisophyllum) UNIFLORA, *Roxb. Fl. Ind.* ii. 473; annual, stems diffuse, dichotomous, filiform, leaves sublinear, base obliquely cordate tip serrulate, involucre solitary, capsule glabrous.—Frequent in fields, *Roxburgh*. Dalzell's plant of this name (*Bomb. Fl.* 227) is *E. microphylla*, *Heyne*.

2. **SARCOCOCCA**, *Lindl.*

Evergreen glabrous shrubs. *Leaves* alternate, coriaceous, quite entire, penni- or triple-nerved. *Flowers* in short axillary racemes, monœcious, apetalous, bracteate. *Disk* 0. *MALE FL.* *Sepals* 4, 2-seriate, imbricate. *Stamens* as many and opposite them, free; anthers dorsifixed, oblong, at length recurved. *FEM. FL.* *Sepals* 4 or 6, as in the male. *Ovary* 2-3-celled; styles short, erect, entire, at length recurved; ovules 2 in each cell, raphe dorsal. *Fruit* indehiscent, coriaceous or fleshy, endocarp hard. *Seeds* 1-2, testa membranous, albumen fleshy; cotyledons broad.—Species 2-3, Indian and Malayan.

S. pruniformis, *Lindl. Bot. Reg.* t. 1012: leaves from broadly elliptic to ovate-lanceolate acuminate, fruit ellipsoid or globose. *S. saligna*, *Muell. Arg. in DC. Prodr.* xvi. 1. 11; *Beddome Forester's Man.* 217; *Gamble Man. Ind. Timb.* 371. *S. triplinervis*, *Wight Ic.* t. 1877. *S. sumatrana*, *Blume Mus. Bot.* ii. 191. *S. salicifolia*, *Baill. Monogr. Bur.* 49. *Buxus saligna*, *Don Prodr.* 63. *B. coriaceus*, *Spreng. Syst.* iv. 314. *Pachysandra* ? *coriacea*, *Hook. Exot. Fl.* t. 148. *Tricera nepalensis*, *Wall. Cat.* 7979 A, B, C, D. *Lepidopelma podocarpifolia*, *Klotzsch in Reise Pr. Wald. Bot.* 118, t. 22. *Myrica canarensis*, *Miquel in Herb. Hohenack.* M. *triplinervis*, *Miq. l.c.* No. 484.

TEMPERATE HIMALAYA; from Murree to Bhotan, alt. 5-9000 ft., *Wallich*, &c. KHASIA Mts. and MUNIPORE, alt. 4-6000 ft. DECCAN PENINSULA; on the Western Ghats from Canara southwards. CEYLON, alt. 5-8000 ft.—DISTRIB. Afghanistan, Sumatra.

A handsome shrub; branches green, terete. *Leaves* and their nervation very variable, 1-5 in. long, sometimes caudate-acuminate, base acute or rounded; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Racemes* lax- or dense-flid., $\frac{1}{2}$ - $\frac{2}{3}$ in. long, female fl. below the males; pedicels of the male bracteate and usually 2-bracteolate; bracts very variable in number, of the fem. fl. more numerous, decussate. *Flowers* yellow, $\frac{1}{2}$ in. long. *Sepals* oblong, obtuse. *Stamens* twice as long. *Fruit* very variable in size and shape, rarely $\frac{1}{2}$ in. long, purple.—After a long study I am obliged (following *Herb. Wallich*) to unite all the Indian forms under one species. I recognize the following principal varieties.

S. PRUNIFORMIS PROPER; leaves lanceolate caudate-acuminate triple-nerved, fruit ellipsoid.—Himalaya and Western Ghats.

VAR. *brevifolia*; leaves smaller ovate obtusely acuminate usually triple-nerved, racemes short, male pedicels ebracteolate. S. *saligna* & *brevifolia*, *Mueller Arg. l. c.* 12.—Ceylon.

VAR. *zeylanica*; leaves usually triple-nerved, male pedicels 4-bracteolate, styles sharply recurved, fruit shortly ellipsoid. S. *pruniformis*, *Thwaites Enum.* 290 in part. S. *zeylanica*, *Baill. Monogr. Bux.* 52; *Muell. Arg. l. c.*—Ceylon.

VAR. *Hookeriana*; leaves narrower lanceolate or linear-lanceolate usually pinninerved, fruit globose. S. *Hookeriana*, *Baill. Monogr. Bux.* 53; *Muell. l. c.* 13. *Tricera nepalensis*, *Wall. Cat.* 7979 A (in part).—Himalaya (attaining 9000 ft. in Sikkim), Afghanistan.—Klotzsch's *Lepidopelma*, and Mueller's *saligna* β, are intermediate between *pruniformis proper* and *Hookeriana*.

3. **BUXUS**, Linn.

Evergreen glabrous shrubs or trees. *Leaves* opposite, coriaceous, pinninerved, quite entire. *Flowers* in dense very short erect axillary racemes, monœcious, bracteate, apetalous. *Disk* 0. MALE FL. *Sepals* 4 in 2 series, imbricate. *Stamens* as many and opposite them, free; anthers dorsifixed, oblong, at length recurved. FEM. FL. *Sepals* 6, 2 outer much smaller, imbricate. *Ovary* 3-celled; styles 3, short, thick, often distant; ovules 2 in each cell, raphe dorsal. *Capsule* ovoid, crowned by the persistent styles, loculicidally 3-valved, valves bearing the split styles, endocarp splitting away from the coriaceous exocarp. *Seeds* oblong, testa black shining, albumen fleshy; cotyledons narrow, oblong.—Species about 20, temperate and tropical.

B. sempervirens, Linn.; *Boiss. Fl. Orient.* iv. 144; leaves oblong linear-oblong or lanceolate tip obtuse rounded or retuse, flowers sessile, capsule 3-horned. *Reichb. Ic. Fl. Germ.* t. 153; *Benth. Fl. Hongk.* 315; *Ledeb. Fl. Ross.* iii. 583; *Gamble Man. Ind. Timb.* 369. B. *Wallichiana*, *Baill. Monogr. Bux.* 63; *Muell. Arg. in DC. Prodr.* xvi. 1. 18. B. *emarginata*, *Herb. Royle*. B. *sempervirens*, var. *arboorea*, *Wall. mss.* B. *longifolia*, *Jacquem. Journ.*—*Buxus*, *Wall. Cat.* 7978.

TEMPERATE HIMALAYA; from Kumaon to Simla, alt. 5–9000 ft.; Bhotan, alt. 5–9000 ft., *Griffith*. PANJAB, on the Salt range, &c., *Aitchison, Fleming*.—DISTRIB. Westwards to N. Africa and Britain, and northwards in W. Siberia, Turkestan, China and Japan.

A small much-branched bush or tree; buds and edges of young leaves puberulous. *Leaves* very variable in form and size, about 1–2 in. long in the Himalayan form; petiole very short. *Racemes* few-fl., fascicled, terminal flowers female. *Sepals* obtuse. *Stamens* far exserted, filaments very stout; anthers 3 times as long as broad. *Styles* equalling the ovary. *Capsule* $\frac{1}{2}$ in. long, ovoid, wrinkled. *Seeds* black.—The distribution is curious, not extending to Nepal or Sikkim, though found in Kumaon and Bhotan; and being absent in N. Asia between W. Siberia and China.

VAR. *microphylla*; dwarf, leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. elliptic or subspathulate. B. *japonica*, var. *microphylla*, *Muell. Arg. in DC. Prodr.* xvi. 1. 20.—Kumaon, on dry rocks, alt. 11,000–12,000 ft., *Duthie*.

4. **BRIDELIA**, Willd.

Shrubs or trees. *Leaves* alternate, quite entire, sometimes with strong straight nerves and cross-nervules. *Flowers* small or minute, in axillary or spicate clusters, monœcious or diœcious, bracteate, sessile or very shortly pedicelled. *Calyx* 5(4–6)-cleft; lobes valvate. *Petals* much smaller than the calyx-lobes. *Disk* broad, of the male pulvinate or adnate to the calyx-

tube; of the female with the centre conical, membranous, truncate, often enclosing the young ovary. *Stamens* 5; filaments united below in a column which bears a terminal pistillode, free above and spreading; anther-cells parallel. *Ovary* 2- rarely 3-celled, glabrous; styles 2, forked; ovules 2 in each cell. *Drupe* small, with 1-2 usually 1-seeded cocci or pyrenes. *Albumen* fleshy or membranous; cotyledons thin or fleshy.—Species about 30, Tropical African, Asiatic and Australian.

* Nerves 8-20 (rarely fewer than 12) pair.

1. **B. retusa**, *Spreng. Syst. Veg.* iii. 48; shoots and leaves beneath glabrous or tomentose, leaves rigidly coriaceous elliptic oblong ovate or obovate tip acute obtuse or rounded, base acute obtuse or cordate, nerves 15-20 pairs strong straight parallel, flowers diœcious in axillary or spicate clusters sessile or pedicelled glabrous or pubescent, calyx-lobes ovate acute, petals of male orbicular crenate, of fem. subspathulate, fruit globose seated on the hardly enlarged calyx. *Muell. Arg. in DC. Prodr.* xv. 1.493; *Baill. Etudes Gen. Euphorb.* t. 25, fig. 25-34; *Thwaites Enum.* 279; *Brand. For. Fl.* 449, t. 55; *Kurz For. Fl.* ii. 368; *Gamble Man. Ind. Timb.* 356; *Beddome Fl. Sylvat.* t. 260. *B. amœna*, *Wall. ex Baill. l.c.* (fid. *Muell.*). *B. montana*, *Wall. Cat.* 7879 (*in part*); *Baill. l.c.* 553; *Grah. Cat. Bomb. Pl.* 184; *Dalz. & Gibs. Bomb. Fl.* 233. *B. spinosa*, *Roxb. Fl. Ind.* iii. 735; *Wall. Cat.* 7883 *B. in part*; *Grah. l.c.* 184. *Cluytia retusa*, *Linn. Sp. Pl.* 1042. *C. spinosa*, *Willd. in Roxb. Cor. Pl.* ii. 38, t. 172. *Andrachne Doonkyboisca*, *Herb. Heyne*; *Wall. Cat. sub* 7879.—*Rheede Hort. Mal.* ii. t. 16.

Throughout the hotter parts of INDIA, along the foot of the Himalaya from Kashmir to Mishmi, ascending to 3500 ft., and thence southward to BURMA, MALACCA, TRAVANCOR and CEYLON.

A deciduous-leaved large shrub, or a tree 50-60 ft.; young spinous. *Leaves* 3-5 in., base rarely acute, glabrous above, glaucous and glaucous beneath, or finely pubescent; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Bracts* small, obtuse, villous. *Flowers* in clusters of about $\frac{1}{4}$ in. diam., both axillary and in long spikes, pubescent or glabrous, of which the males are very slender. *Calyx* $\frac{1}{2}$ in. diam., tube pubescent, lobes usually glabrous. *Disk* of male pulvinate, of fem. enclosing the young ovary. *Fruit* size of a pea, purple-black, cocci dehiscing.—Mueller makes three varieties, of which the third is the most distinct. I add a fourth. Of Wallich's *B. amœna* I have seen no specimens; Baillon took it up from a plant so named on Wallich's authority in Gaudichaud's herbarium, and presumably procured in Calcutta; he says it is very near *B. retusa*, and Mueller, who, I assume, examined it, united it with that plant. Kurz's *amœna* is *B. birmanica*.

B. RETUSA PROPER; spikes sometimes a foot long, slightly pubescent.

VAR. squamosa; flowers axillary or in short tomentose spikes.

VAR. Roxburghiana; branchlets and leaves beneath densely tomentose, leaves smaller oblong tip rounded pale when dry. *B. crenulata*, *Roxb. Fl. Ind.* iii. 734; *Wall. Cat.* 7880.—Chiefly in the Deccan Peninsula.

VAR. glauca; quite glabrous, leaves as in var. *Roxburghiana*, but quite glabrous and very glaucous beneath.—Deccan Peninsula.

2. **B. Moonii**, *Thwaites Enum.* 279; branchlets glabrous or pubescent, leaves large coriaceous elliptic-oblong or obovate tip acute obtuse or rounded, reticulate above puberulous beneath, nerves 12-14 pair strong slightly arched with strong cross-nervules, flowers monœcious? minute in small axillary clusters sessile glabrous, calyx-lobes ovate-lanceolate, petals of male orbicular irregularly lobed, of fem. oblong, fruit ellipsoid acute at both ends seated on the unaltered calyx. *Mueller Arg. in DC. Prodr.* xv. ii. 497;

Beddome Forest. Man. 201. *B. retusa*, *Baill. Etudes Gen. Euphorb.* 584. *Cluytia retusa*, *Moon Cat.* 71.

CEYLON; common up to 2000 ft. *Thwaites*.

Branches stout. *Leaves* 5–10 by 2–4 in., not glaucous beneath; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., stout. *Bracts* and *flowers* as in *B. retusa*, from which it differs in the fewer arched nerves, monœcious smaller flowers and ellipsoid fruit acute at both ends.

3. *B. montana*, *Willd. Sp. Pl.* iv. 978; nearly glabrous, leaves membranous obovate-oblong or broadly obovate obtuse acute or abruptly mucronate shining above, nerves 8–15 pair slightly arched, flowers monœcious in small dense axillary clusters sessile or shortly pedicelled glabrous, calyx-lobes triangular-ovate, petals broadly ovate entire, fruit globose seated on the unaltered calyx. *Muell. Arg. in DC. Prodr.* xv. 1. 500; *Roxb. Fl. Ind.* iii. 735; *Wall. Cat.* 7879 (in part); *Beddome Forester's Man.* 202; *Brand. For. Fl.* 450; *Gamble Man. Ind. Timb.* 357. *Cluytia montana*, *Roxb. Cor. Pl.* ii. 38, t. 171.

Along the foot-hills of the HIMALAYA, ascending to 3000 ft. and to 6000 ft. in Sikkim, from the Panjab to Bhotan. KHASIA MTS., alt. 2–4000 ft. BEHAR, on Parasnath, *J. D. H. COROMANDEL (Roxburgh)*.

A low tree; trunk short; branchlets often pustulate. *Leaves* 4–7 by 2–4 in., usually broadly obovate, rarely elliptic and acute, shining above, paler beneath, margin undulate, base almost always acute; nerves and cross-nervules rather strong; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Bracts* many, very short, pubescent. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. *Ovary* enclosed in the disk; styles 2, 2-fid. *Fruit* the size of a pea.—There are two forms, one with leaves very shining above and narrowed base, nerves 8–12 pair slender; the other has leaves more like *retusa*, more oblong, nerves 10–15 pair stronger.

4. *B. burmanica*, *Hook. f.*; quite glabrous, branches slender, leaves membranous broadly elliptic or obovate-oblong obtuse margins undulate base obtuse or rounded shining and finely reticulate above paler beneath, nerves 12–20 pair slender nearly straight, flowers monœcious in small axillary clusters shortly pedicelled glabrous, calyx-lobes ovate-lanceolate, petals of male obovate retuse, of fem. larger oblong, fruit globose. *B. amœna*, *Kurz For. Fl.* ii. 368 (not of *Wallich*). *Cluytia*, *Wall. Cat.* 7888.

BURMA (*Hort. Bot. Calc.*), *Wallich*; Ava, *Kurz*.

Branches smooth. *Leaves* 4–7 by 2–4 in., hardly glaucous beneath; petiole very short, $\frac{1}{4}$ in., glabrous. *Bracts* short, membranous. *Calyx* $\frac{1}{4}$ in. diam. *Fruit* not seen.—This is the plant referred by *Kurz* to *Wallich's B. amœna* (see under *B. retusa*); he describes the male fl. as greenish, the fem. crimson, the petals rosy, and fruit globose as large as a pea, sappy, purplish black.

5. *B. assamica*, *Hook. f.*; branches sparsely tomentose, leaves large membranous oblong obovate or elliptic-lanceolate acuminate finely reticulate and glabrous except the midrib above, minutely puberulous beneath, nerves 15–20 pairs slightly arched and cross-nervules slender, flowers monœcious in minute axillary clusters sessile pubescent or glabrate, calyx-lobes ovate-lanceolate, petals of male rounded crenate of fem. larger elliptic entire, fruit ovoid acuminate seated on the unaltered calyx. *B. chartacea*, *Kurz in Herb. Calcutt.* (not of *Wallich*). *Cleistanthus oblongifolius*, *Muell. Arg. in DC. Prodr.* xv. 1. 506 (*Griffith's plant only*).

ASAM, *Griffith, Masters*; Mishmi Hills, *Griffith (Kew Distrib.* 4890); Nowgong, *Sinns. SILUET (Roxburgh)*.

Branches rather slender, pale, sparsely tomentose. *Leaves* 6–12 by 3–4 in., green on both surfaces, paler beneath, beautifully reticulated; hairs beneath microscopic, base subacute or rounded, margin subundulate; petiole $\frac{1}{2}$ in.; stipules on

terminal buds only, subulate. *Clusters of flowers* $\frac{1}{4}$ in. diam.; bracts minute, densely imbricate, pubescent, shorter than the flowers. *Perianth* $\frac{1}{2}$ in. diam., lobes subacute. *Disk* of male flat, of fem. flat raised in the middle into a truncate cone embracing the ovary. *Styles* 2, 2-fid. *Fruit* nearly 1 in. long, smooth, pericarp thin.

** Nerves 5-12 pair, rarely more, more or less arched, rarely straight.

† *Leaves* more or less pubescent or tomentose beneath.

6. **B. stipularis**, *Blume Bijl.* 597: subscandent, shoots pubescent or tomentose, leaves subcoriaceous elliptic obovate or orbicular-oblong obtuse or acute base rounded or cordate shortly tomentose beneath, nerves 6-9 pair spreading slender slightly arched, flowers monœcious in small axillary clusters or long spikes often subtended by long stipular bracts males sessile fem. pedicelled pubescent or glabrate, petals orbicular, fruit oblong seated on the enlarged calyx. *Muell. Arg. in DC. Prodr.* xv. ii. 499; *Brand. For. Fl.* ii. 449; *Kurz For. Fl.* ii. 369; *Beddome Forster's Man.* 201; *Miquel Fl. Ind. Bat.* i. ii. 364, and *Suppl.* 445. *B. scandens*, *Willd. Sp. Pl.* iv. 979; *Roxb. Fl. Ind.* iii. 736; *Grah. Cat. Bomb. Pl.* 184; *Dolz. & Gibs. Bomb. Fl.* 233; *Wall. Cat.* 7878 (excl. E). *B. retusa*, *A. Juss. Tent. Euphorb.* 27. t. 7, f. 22. *B. Zollingeri*, *Miquel l. c.* 364. *Cluytia scandens*, *Roxb. Cor. Pl.* ii. 39, t. 173. *C. stipularis*, *Linn. Mant.* 127. *Zizyphus racemosus*, *Wall. Cat.* 7878 D.—*Rheede Hort. Mal.* ii. t. 16.

Throughout the hotter parts of INDIA, along the foot-hills of the Himalaya from Kashmir to Bhotan, and southward to Travancor, Malacca and Penang. CEYLON; below Alagale, *Ferguson*.—DISTRIB. Malay Islands, Philippines, Tropical Africa.

A large more or less scandent evergreen shrub, branches straight or flexuous, usually fulvous-tomentose. *Leaves* 2-8 by $\frac{1}{2}$ -5 in., margins sometimes undulate or repand, glabrous or puberulous above, rarely acuminate; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., stout, tomentose. *Clusters of flowers* green in often very long and paniced spikes; bracts tomentose; the stipular leaves are ovate-lanceolate, sometimes much longer than the flowers. *Calyx* $\frac{1}{2}$ in. diam.; lobes lanceolate, acuminate. *Petals* alike in both sexes. *Disk* of male pulvinate, of fem. urceolate, with a ring of bristles at the base within. *Styles* with long slender arms. *Fruit* nearly $\frac{1}{2}$ in. long, obtuse, bluish-black, smooth; calyx $\frac{1}{2}$ in. diam.—I find no specimens of Wallich's Q from Nepal in his herbarium. The only Ceylon specimen that I have seen has very small flowers, it is not in fruit. Maingay describes the albumen of the immature fruit as fleshy, and adds that in the mature it probably becomes absorbed; the calyx as olive-yellow spotted with red. Wallich's n. 7878 E, from Herb. Madras, is a different species, which I fail to identify in its imperfect state.

7. **B. pubescens**, *Kurz For. Fl.* ii. 367; an erect tree, branchlets and leaves beneath tawny pubescent, leaves membranous elliptic-obovate or -oblong acute or acuminate base acute or rounded, nerves 10-12 pair arched slender, flowers monœcious in small axillary and spicate clusters sessile and shortly pedicelled pubescent, calyx-lobes lanceolate, petals of male broadly flabelliform 3-lobed, of fem. obovate fleshy, fruit oblong obtuse seated on the unaltered calyx. *Cleistanthus oblongifolius*, *var. a* scaber, *Muell. Arg. in DC. Prodr.* xv. ii. 506 (*the Sikkim plant*).

TROPICAL EASTERN NEPAL and SIKKIM; in hot valleys from the Terai to alt. 5000 ft., *J. D. H.*, &c. PEGU; on the Eastern slopes, *Kurz*.

An evergreen tree, 20-50 ft. *Leaves* 3-8 by $\frac{1}{2}$ -4 $\frac{1}{2}$ in., midrib and nerves very slender; petiole $\frac{1}{2}$ in., slender. *Clusters of flowers* $\frac{1}{2}$ in. diam.; bracts short; flowers white with a deep yellow disk. *Calyx* $\frac{1}{2}$ in. diam. *Disk* of male pulvinate, of fem. conical enclosing the ovary, mouth laciniate. *Fruit* $\frac{3}{4}$ -1 in. long, blue-black, apiculate.

8. **B. tomentosa**, *Blume Bijl.* 597; branches slender rusty-pubescent or glabrate, leaves small thin lanceolate or linear-lanceolate acute or obtuse beneath glaucous and finely pubescent, nerves 7-12 pairs nearly straight, flowers monœcious in very small axillary and spicate clusters sessile or fem. stoutly pedicelled glabrous, calyx-lobes ovate, petals of male retuse, of fem. rounded or crenate, fruit small globose seated on the unaltered calyx. *Mucll. Arg. in DC. Prodr.* xv. ii. 501; *Kurz For. Fl.* ii. 367; *Gamble Man. Ind. Timb.* 357; *Wall. Cat.* 7874; *Miquel Fl. Ind. Bat.* i. ii. 364, and *Suppl.* 445; *Benth. Fl. Hongk.* 309, and *Fl. Austral.* vi. 120. *B. Loureirii*, *Hook. & Arn. Bot. Beech. Voy.* 211 (excl. syn. *Lour.*). *B. rhamnoides*, *Griff. Notul.* iv. 480. ? *B. lanceifolia*, *Roxb. Fl. Ind.* iii. 737. *B. lancifolia*, *Ham. in Wall. Cat.* 7884. *Amanoa tomentosa*, *Baill. Adans.* vi. 336.—*Wall. Cat.* 7944.

TROPICAL SIKKIM HIMALAYA, *J. D. H.*; ASSAM, KHASIA MTS., SILHET, and southwards to the ANDAMAN ISLANDS, PERAK, PENANG and MALACCA.—DISTRIB. Malay Islands, China, Philippines, N. Australia.

A shrub or small evergreen tree. *Leaves* 1-3 rarely 4 in., undulate, above glabrous or obscurely pubescent, sometimes reddish-glaucous beneath and soon glabrous; petiole $\frac{1}{2}$ – $\frac{3}{8}$ in. *Clusters* of 5-6-fid flowers very small in very slender leafy or leafless spikes; bracts minute, villous, stipular if present subulate. *Calyx* $\frac{1}{12}$ – $\frac{1}{10}$ in. diam.; lobes acute, bearded below the tip within. *Petals* variable. *Disk* of male pulvinate, of fem. short annular. *Styles* 2, 5-fid to the middle, short, arms recurved. *Disk* with a conical centre embracing the ovary. *Fruit* $\frac{1}{2}$ – $\frac{1}{3}$ in. diam., blue-black.—*Mueller* has a var. *trichadenia* from the Australian plaut, with the fem. disk hairy within; *Bentham* does not notice this character. According to *Roxburgh* this species is diœcious; *Clarke* says monœcious.

9. **B. pustulata**, *Hook. f.*; branches very stout pustulate, leaves thinly coriaceous elliptic or oblong acute glabrous above sparsely pubescent beneath base usually rounded or cordate, nerves 6-9 pair strong with strong rather distant cross-nervules, flowers very many in dense globose axillary clusters monœcious glabrous, calyx-lobes triangular-ovate, petals of fem. very minute, fruit globose stipitate on the unaltered calyx.

MALACCA, *Griffith (Kew Distrib.* 4883) and *Maingay* (1371). PERAK; at Goping, *King's Collector*.

Branches woody, bark brown. *Leaves* 4-7 by 2-4½ in., rather abruptly acute or acuminate, dark brown on both surfaces, more sooty beneath when dry, base rarely acute; petiole $\frac{1}{2}$ – $\frac{1}{3}$ in., shrivelled, glabrous, black. *Clusters* $\frac{1}{2}$ in. diam.; bracts minute, rather scarious, short, obtuse or truncate, brown, sparingly hairy. *Calyx* $\frac{1}{10}$ in. diam., rigid, not much exceeding the bracts. *Ovary* ovoid; styles 2, forked at the tip.—I find no male fl. *Maingay* describes these as having scale-like emarginate petals, a disk lining the calyx-tube, and a conical pistillode.

10. **B. dasycalyx**, *Kurz For. Fl.* ii. 369; branches rusty-tomentose, leaves obovate or oblong subacute or acuminate pubescent beneath, base obtuse or rounded, nerves 6-10 pair, cross-nervules strong, petiole stout, flowers minute numerous in globose axillary clusters, calyx of fem. tomentose unaltered in fruit glabrous within, disk with a ring of bristles round the base of the ovary, petals linear-obovate, fruit ellipsoid.

PEGU and BURMA; in dry forests, *Kurz*.

Branches rather stout, and leaves above dark when dry. *Leaves* rather thin in *dasycalyx* proper, 5-7 in. long, acuminate, contracted at the rounded base and rather glaucous beneath; in var. *aridicola*, *Kurz*, 3-4 in. long, oblong, obtuse or subacute, thicker; nerves nearly straight; petiole $\frac{1}{10}$ – $\frac{1}{8}$ in. *Fruit* $\frac{1}{3}$ – $\frac{1}{2}$ in. long.—*Kurz* describes *dasycalyx* proper as a climber, and var. *aridicola* as more or less erect.

†† *Leaves* glabrous.

11. **B. Hamiltoniana**, *Wall. Cat.* 7882; nearly glabrous, leaves

coriaceous small rhombic-obovate or -oblong or lanceolate obtuse repand or repandly toothed glabrous or obscurely pubescent beneath, nerves 6-9 pair nearly straight, flowers in minute axillary and spicate clusters glabrous, calyx-lobes ovate-lanceolate, petals of male rounded angled, of fem. ovate, fruit subglobose seated on the unaltered calyx. *Muell. Arg. in Linnæa* xxxiv. 77, and in *DC. Prodr.* xv. ii. 500; *Beddome Forester's Man.* 202.

BEHAR, at Monghir, *Wallich*; Kymaor Hills, *J. D. H.* The CONCAN GHATS, *Law, Stocks, &c.*

A straggling shrub. *Leaves* $1\frac{1}{2}$ - $2\frac{1}{2}$ in., finely reticulated on both surfaces, pale yellowish when dry, base cuneate, tip often suddenly narrowed into an obtuse point; nerves distant, strong; petiole $\frac{1}{2}$ in. *Clusters of flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; bracts minute, villous except the stipular. *Calyx* $\frac{1}{2}$ in. diam. *Fruit* $\frac{1}{4}$ in. diam.

12. **B. Kurzii**, *Hook. f.*; glabrous, leaves 4-5 in. oblong obtuse base rounded glabrous and glaucous beneath, nerves 10-12 pair slender nearly straight, fem. fl. minute sessile, calyx not accrescent, petals obovate, fruit small globose.

NICOBAR ISLANDS; Kamorta, *Kurz*.

Branches rather slender, black when dry. *Leaves* rather thin, blackish brown above when dry, margin obscurely sinuate, cross-nervules slender; petiole $\frac{1}{2}$ in. *Calyx* of fruit $\frac{1}{2}$ in. diam.; lobes triangular, acute. *Fruit* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.—I am indebted to Dr. King for a specimen of this very distinct species, which is named *B. glauca*, Blume, by Kurz; but that species is described as having rusty-pubescent branches and elliptic-lanceolate acuminate leaves with pubescent nerves beneath.

13. **B. penangiana**, *Hook. f.*; quite glabrous, branches slender pustular, leaves membranous broadly elliptic abruptly acuminate reticulated pale beneath, nerves 6-9 pair slender spreading arched, petiole slender, flowers minute in small axillary clusters sessile and pedicelled monœcious pubescent, calyx-lobes ovate, petals broad crenate or lobulate, disk of male fl. saucer-shaped, of fem. annular, fruit small ellipsoid apiculate.

PENANG; on Government Hill, *Curtis*.

Branches pale. *Leaves* 3-5 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., green above when dry, prominently but not closely reticulate, pubescent on the midrib beneath; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Clusters of flowers* $\frac{1}{2}$ - $\frac{1}{4}$ in. diam.; bracts very small, ovate, subacute, pubescent; male fl. first appearing, pedicelled. *Calyx* $\frac{1}{10}$ in. diam., densely pubescent. *Petals* scale-like, variable. *Pistillode* notched at the tip. *Styles* 2, 2-fid. *Fruit* $\frac{1}{4}$ in. long.—Leaves a good deal like *B. burmanica*, but with much fewer nerves.

14. **B. Griffithi**, *Hook. f.*; nearly glabrous, scandent, leaves 3-4 in. elliptic-oblong acuminate base rounded brown when dry minutely puberulous beneath, nerves 5-7 pair arched, transverse veins faint, bracts minute tomentose, fem. flowers in small globose axillary clusters sessile, calyx-lobes ovate acuminate glabrous tube villous, petals minute entire, ovary ovoid, styles 2-4 clavellate, fruit globose seated on the unaltered calyx. *B. ovata*, *Kurz For. Fl.* ii. 368 (*not of Dcne.*).

SOUTH ANDAMANS, *Kurz*; MALACCA, *Griffith* (*Kew Distrib.* 4883).

A scandent shrub with long brachiate branches (*Griffith*), branchlets puberulous. *Leaves* 1-2 in. broad, thinly coriaceous, dark brown when dry, rather shining above, opaque beneath, nerves very slender, cross-nervules faint; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Clusters of flowers* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.; bracts mere rings round the bases of the flowers. *Calyx* of fem. $\frac{3}{8}$ in. diam. *Petals* elliptic. *Disk* conical with a torn mouth. *Styles* quite free.—This, which is referred by Kurz to Decaisne's Timor *B. ovata*, differs entirely from that plant in the few nerves of the leaf.

15. **B. minutiflora**, *Hook. f.*; nearly glabrous, branches pustulate, leaves membranous 2-3 in. elliptic or elliptic-oblong acuminate base acute, nerves 7-9 pair very slender arched, petiole slender, flowers monœcious in small dense axillary and spicate heads very minute pubescent, calyx-lobes ovate obtuse, petals oblong entire, disk of fem. depressed, ovary rhombic with one long bifid style, fruit ellipsoid seated on the unaltered calyx.

TENASSERIM, at Mergui, *Griffith.*—DISTRIB. Celebes, *Riedel*; Borneo (*Beccari* No. 2837, *Motley, Barber*).

Branches divaricate, bark pale, flowering shoots black when dry, quite smooth. *Leaves* brown when dry, paler beneath, cross-nervules very faint; petiole $\frac{1}{4}$ in. *Clusters of flowers* $\frac{1}{2}$ in. diam.; bracts minute, villous. *Calyx* $\frac{1}{2}$ in. diam., finely tomentose. *Disk* of fem. flower pulvinate. *Ovary* quite included in the disk, narrowed suddenly into the very stout style which is bifid for half-way, stigmas capitellate. *Fruit* (in Bornean specimens) $\frac{1}{2}$ in. long, apiculate.—A very remarkable species on account of the solitary style. The specimens were mixed with those of *B. Maingayi* under Griffith No. 867, the leaves being similar in colour and form. The male fl. are too young for description. The fruit is described from Bornean specimens, in which the leaves are sometimes rounded at the base with 12 pairs of nerves.

SPECIES OF WHICH THE MALE FLOWERS ALONE ARE KNOWN.
(Possibly *Cleistanthi*.)

16. **B. rufa**, *Hook. f.*; branches rather stout densely rusty-tomentose or villous, leaves 5-7 in. oblong or obovate-oblong cuspidately acuminate base rounded rusty-pubescent beneath, nerves 6-10 pair strong arched, cross-nervules numerous straight, petiole short stout, male fl. sessile in dense small globose axillary heads of bracts, calyx glabrous lobes ovate-lanceolate, petals obcuneate or quadrate crenate.

PENANG, *King's Collector*.

A shrub, 8-12 ft. *Leaves* thin but hardly membranous, dull green and opaque above, young floccosely rusty tomentose above; petiole $\frac{1}{10}$ in.

17. **B. cinnamomea**, *Hook. f.*; branchlets petioles and leaves beneath cinnamomeously tomentose, leaves 2-6 in. elliptic-oblong or lanceolate cuspidate or caudate-acuminate base acute or cuneate, nerves 5-7 pair rather strong beneath, cross-nervules numerous slender, male fl. small sessile and pedicelled in axillary clusters or on short lateral branchlets, calyx quite glabrous lobes ovate or ovate-lanceolate, petals obovate, disk thick.

PERAK, *Scortechini*; Kinla, *King's Collector*.

A thorny shrubby creeper, 10-15 ft.; branches woody, bark pale. *Leaves* membranous or thinly coriaceous; petiole $\frac{3}{8}$ - $\frac{1}{2}$ in., rather slender. *Bracts* woolly; calyx $\frac{1}{2}$ in. diam., pedicel sometimes as long as the calyx; disk very broad, margin subentire; pistillode glabrous.—Near *B. rufa*, but leaves membranous cuspidate or acuminate with the base acute, and nerves hardly arched. There are very small thorns on the larger branches.

18. **B. Curtisii**, *Hook. f.*; quite glabrous, leaves 2-3 in. oblong rounded at both ends glaucous beneath, nerves 6-10 pair very slender, male flowers minute sessile in small axillary clusters, bracts very small ciliolate, calyx glabrous lobes triangular-ovate, petals spathulate notched or emarginate, pistillode glabrous.

PENANG; at Tulloh Bahang, *Curtis*.

Branches rigid, divaricate, slender, blackish when dry. *Leaves* rigid, grey-brown when dry; cross-nervules beneath reticulate more or less; petiole $\frac{1}{2}$ in., slender. *Male fl.* $\frac{1}{10}$ in. diam.

DOUBTFUL AND EXCLUDED SPECIES.

B. ALNIFOLIA, *Griff. Notul.* iv. 481; *Muell. Arg. in DC. Prodr.* xv. ii. 502; branches rusty pubescent, leaves oblong obovate obtuse base subcordate pubescent, flowers monœcious in the same clusters, calyx green with blood-red spots, petals repand-sinuate.—Tenasserim, at Mergui, in wet places, *Griffith*.—Possibly *B. stipularis* (which the spotted flowers resemble), but Griffith does not say whether the calyx of *alnifolia* is glabrous or pubescent.

B. OVATA, *Dene. in Nouv. Ann. Mus.* iii. 484; shoots and all parts glabrous, leaves petioled coriaceous oblong or elliptic-oblong obtuse mucronate or apiculate base acute or obtuse pale beneath, nerves 10–20 pairs, flowers minute in dense axillary clusters glabrous, males shortly pedicelled, fem. sessile, disk cup-shaped, fruit globose seated on the unaltered calyx. *Miquel Fl. Ind. Bat.* i. ii. 364. *B. ovata*, *β. acutifolia*, and *γ. genuina*, *Muell. Arg. in DC. Prodr.* xv. ii. 495.—Burma, at Melloon, *Wallich*. Malacca, *Herb. DC.* Tenasserim and Andaman Islands, *Helfer* (No 4884), all according to Mueller.—I fail to identify this amongst Helfer's or Wallich's plants. Kurz's *B. ovata* is a different plant (*B. Griffithii*, p. 272). Dr. King has sent me a specimen of *B. ovata*, *Dene.*, procured by Kurz from the Binte-zorg Botanical Gardens, which agrees with the above description, except in having only 6–9 pair of nerves. Dr. King further informs me that there is no Andaman specimen of it in the Calcutta herbarium, where Kurz has given that name (*B. ovata*, *Dene.*) to Griffith's and Maingay's specimens of *B. pustulata*.

B. SINICA, *Grah. Cat. Bomb. Pl.* 179, described as capsular, is probably *Cleistanthus malabaricus*.

B. URTICOIDES, *Griff. Notul.* iv. 481; *Muell. Arg. l. c.*: branches warted, leaves lanceolate acuminate subentire dark green and shining above subglaucous and very shortly pubescent beneath, stipules linear membranous brown caducous, clusters axillary, or inflorescence naked, flowers numerous minute monœcious in the same cluster odour of Heliotrope, calyx pubescent outside, petals ovate entire or toothed.—Tenasserim; shores of Madama Island, *Griffith*.—Probably *B. tomentosa*.

5. **CLEISTANTHUS**, *Hook. f.*

Trees or shrubs. *Leaves* alternate, bifarious, quite entire. *Flowers* small or minute, in axillary clusters and spikes, monœcious, sessile or the females pedicelled. *Calyx* 5(4–6)-cleft; lobes valvate. *Petals* as many, minute. *Disk* of the male flat or pulvinate; of the female conical or turbinate, more or less enclosing the young ovary. *Stamens* 5, filaments united in a column in the centre of the disk, and bearing a pyramidal or 3-lobed pistillode, free above and spreading; anther-cells parallel. *Ovary* 3-celled, usually clothed with long hairs; styles 3, free, bifid; ovules 2 in each cell. *Capsule* sessile or stipitate, subglobose or depressed, of 3 2-valved cocci. *Seeds* without aril or caruncle; albumen copious or scanty; cotyledons thin or fleshy, often folded.—Species about 30, Tropical Indian, Malayan and African.

* *Ovary quite glabrous.*

1. *C. collinus*, *Benth. in Gen. Plant.* iii. 268; leaves coriaceous orbicular broadly obovate or elliptic tip rounded or retuse glaucous beneath, nerves 5–8 pair spreading very slender. flowers in small axillary and shortly spicate clusters silkily villous, calyx-lobes ovate-lanceolate, petals narrow, ovary glabrous, styles free clavellate, capsule large obscurely 3-lobed. *Bridelia collina*, *Hook. & Arn. Bot. Beech. Voy.* 211; *Wall. Cat.* 7877. *Amanoa collina*, *Baill. Etudes Gen. Euphorb.* 582; *Thwaites Enum.* 280. *Lebidieropsis collina*, *Muell. Arg. in Linnaea* xxxii. 80. *L. orbicularis*,

Muell. Arg. in DC. Prodr. xv. ii. 509; *Brand. For. Fl.* 450; *Gamble Man. Ind. Timb.* 358; *Beddome Forester's Man.* 203, t. 23, fig. 5. *Cluytia collina*, *Roxb. Cor. Pl.* ii. 37, t. 169, and *Fl. Ind.* iii. 732; *Wall. Cat.* 7890. *C. retusa* & *patula*, *Herb. Wight.* *Andrachne orbiculata*, *Roth Nov. Sp.* 364. *A. Cadishan*, *Roxb. mss.* *Embllica Palasis*, *Herb. Ham.*

Dry hills in various parts of INDIA from SIMLA to BEHAR, and southward to Central India, and the DECCAN PENINSULA. CEYLON; at Colonna Corle, rare, *Thwaites*.

A small tree with very hard wood and spreading rigid twiggy smooth or pustulate branches. *Leaves* $1\frac{1}{2}$ –4 by $1\frac{1}{2}$ –3 in., pale when dry, loosely reticulate, young membranous and faintly pubescent beneath, old hard, base rounded or cordate; petiole $\frac{1}{2}$ in., slender. *Clusters* 3–6-flid.; bracts minute, villous. *Calyx* $\frac{1}{4}$ in. diam. *Petals* fleshy, always narrow, incurved. *Disk* of male pulvinate, of fem. conical with a thick margin. *Ovary* globose; styles thick, quite free; stigmas fleshy, lobed. *Capsule* $\frac{3}{4}$ in. diam., sessile, woody, rounded-3-gonous, top not lobed, dark brown shining and wrinkled when dry. *Seeds* $\frac{1}{2}$ in. diam., globose, chestnut-brown; albumen scanty.—The genus *Lebidieropsis* should probably be restored; the globose seeds differ wholly from those of any other *Cleistanthus*. The fruit in Roxburgh's figure is much too oblong.

2. **C. chartaceus**, *Muell. Arg. in DC. Prodr.* xv. ii. 507; shoots and flowering branches rusty-tomentose, leaves 5–8 in. coriaceous elliptic-lanceolate obtusely acuminate subsilvery beneath base acute, nerves 8–10 pair slender, flowers few in small axillary and short spicate clusters sessile glabrous, calyx-lobes ovate acute, petals cuneate lobed, ovary glabrous, capsule stipitate. *C. oblongifolius*, *Brand. For. Fl.* 451; *Muell. Arg. l. c.* (in part). *Amanoa chartacea*, *Baill. Etudes Gen. Euphorb.* 582. *Bridelia chartacea*, *Wall. Cat.* 7881. *B. oblongifolia*, *Hook. & Arn. Bot. Beech. Voy.* 202. *Cluytia oblongifolia*, *Roxb. Fl. Ind.* iii. 730; *Wall. Cat.* 7887.

SILHET, *Roxburgh, Griffith, &c.* ? Andaman Islands, *Kurz.*—DISTRIB. ? Java.

A small spreading tree, branches pale, glabrous except the shoots. *Leaves* $1\frac{1}{2}$ –3 in. broad, reticulated above by the cross-nervules, beneath appressedly hairy, at length glabrous, base narrowed into a short stout petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. long. *Clusters* 3–6 flid., often in short decurved stout rusty-tomentose spikes; bracts short, obtuse, rusty villous. *Calyx* $\frac{1}{10}$ in. diam. *Capsule* $\frac{1}{2}$ in. long and broad, stipitate, woody, laterally 3-lobed, lobes somewhat compressed; stipes $\frac{1}{2}$ in. long, clothed with the disk, expanding under the cocci into the woody acutely 5-angled base of the columella $\frac{1}{2}$ in. diam. *Seeds* oblong, 3-gonous, faces undulate.—The Javan and the Andaman Island specimens resemble the Indian in foliage, but want flower and fruit.

3. **C. stenophyllus**, *Kurz For. Fl.* ii. 370; quite glabrous, leaves chartaceous 3–4 in. linear-lanceolate long and thinly acuminate paler beneath, base acute, petiole $\frac{1}{2}$ in., flowers minute few sessile in small axillary clusters, bracts ciliate, calyx slightly appressed hairy, ovary sessile glabrous.

TENASSERIM OR ANDAMAN ISLANDS (*Kurz*).

I know of this only by the above description taken from *Kurz*. It is probably a plant of Helfer's, whose Andaman and Tenasserim collections were not separated; but for the hirsute ovary I should have referred my *C. lanceolatus* to this.

4. **C. myrianthus**, *Kurz For. Fl.* ii. 370; branches stout and leaves beneath finely fulvous-tomentose, leaves 6–9 in. coriaceous narrowly linear-lanceolate acuminate base acute, nerves 16–20 pairs arched, flowers many in dense axillary clusters glabrous sessile, calyx-lobes ovate acute, petals broadly flabellate crenate, ovary glabrous, capsule stipitate. *Gamble Man. Ind. Timb.* 357.

MALAY PENINSULA; from Pegu to Tenasserim and the Andamans, frequent *Kurz.*—DISTRIB. Java, Borneo, Philippines.

An evergreen tree, 40–50 ft. *Leaves* sometimes 1 ft. long, $1\frac{1}{2}$ – $2\frac{1}{2}$ in. broad, smooth and shining above, cross-venules faint; petiole $\frac{1}{2}$ – $\frac{1}{4}$ in., stout. *Clusters* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam.; bracts obtuse, short, densely villous. *Calyx* $\frac{1}{2}$ in. diam. *Petals* fan-shaped, broader than long, with flabellate nerves. *Disk* of fem. membranous, at length 5-lobed. *Ovary* globose; styles very short. *Capsule* immature, distinctly stipitate.—In the Malay Island this species varies greatly in the form of the leaves and in the amount of pubescence beneath.

** Ovary villous, hirsute, or clothed with rigid hairs.

† *Flowers glabrous* (except fem. of *C. membranaceus*).

5. ***C. malabaricus***, Muell. Arg. in DC. Prodr. xv. ii. 508; branchlets densely villous, leaves oblanceolate acuminate or caudate glaucous and sparsely villous beneath, nerves 8–10 pair arched, stipules long setaceous-lanceolate, flowers few in axillary clusters subsessile glabrous, calyx-lobes narrowly lanceolate, petals obovate-spathulate, ovary hirsute with erect stiff hairs, capsule sparsely hairy. *Beddome Forester's Man.* 203. *Lebiodiera malabarica*, Muell. Arg. in *Linnaea* xxxii. 81.

The CONCAN; on the banks of the Shirawah, Law, Stocks, &c.

Branches slender. *Leaves* 3–6 by 1 – $1\frac{1}{2}$ in., very pale when dry, whitish beneath, sparsely hairy above, base acute; petiole $\frac{1}{4}$ in., tomentose. *Calyx* of fem. $\frac{1}{2}$ in. diam., very shortly pedicelled. *Disk* lobed. *Capsule* $\frac{1}{2}$ in. diam., sessile, deeply 3-lobed at the top and sides, sparsely hairy. *Seeds* oblong, 3-gonous, rugose.—Closely allied to *C. Maingayi*, but the flowers are quite glabrous.

6. ***C. acuminatus***, Muell. Arg. in DC. Prodr. xv. ii. 508; quite glabrous, leaves membranous ovate or elliptic long-caudate acuminate reticulate, nerves 5–10 pair very slender arched, flowers in very small axillary clusters glabrous, calyx-lobes triangular-ovate, petals obovate crenate or lobed, ovary hirsute with erect hairs, capsule small sessile glabrous. *Amanoa acuminata*, *Beddome Forester's Man.* iv. 203; *Thwaites Enum. Addend.* 428.

CEYLON; Colombo and the Galle district, Walker, Thwaites.

Branches very slender. *Leaves* 3–5 by 1 – $2\frac{1}{2}$ in., pale green, very thin and undulate when dry, shining on both surfaces, base rounded or acute; petiole very short, $\frac{1}{8}$ – $\frac{1}{6}$ in. *Clusters* $\frac{1}{2}$ in. diam.; bracts minute, puberulous. *Calyx* $\frac{1}{12}$ – $\frac{1}{10}$ in. diam. *Petals* variable. *Disk* of male lining the calyx-tube, of fem. urceolate. *Ovary* globose; styles 3, slender, bifid, stigmas small. *Capsule* $\frac{1}{2}$ in. broad, not so long, deeply 3-lobed at top and sides, crustaceous. *Seeds* unripe.—Perhaps a variety of *C. patulus*.

7. ***C. heterophyllus***, Hook. f.; quite glabrous, leaves coriaceous of two forms, larger on the branches 4–6 in. elliptic or elliptic-lanceolate caudate-acuminate, nerves 4–5 pair slender, smaller on the spikes $\frac{1}{4}$ – $\frac{1}{2}$ in. lanceolate, flowers minute in very small clusters in very slender axillary and terminal paniced flexuous rigid spikes glabrous sessile, calyx-lobes of male ovate of fem. obtuse, petals narrow, ovary hirsute with long erect hairs.

MALACCA, Maingay (*Kew Distrib.* 1372).

Branches rather slender, quite smooth. *Leaves* greyish green when dry, smooth on both surfaces, base acute, reticulations faint; petiole $\frac{1}{4}$ in. *Clusters* $\frac{1}{10}$ – $\frac{1}{8}$ in. diam. in spikes 4–8 in. long, with or without a small leaf at their base; bracts minute, ovate, acute, slightly hairy. *Calyx* about $\frac{1}{10}$ in. diam. *Petals* narrow but enlarged upwards, truncate or retuse. *Disk* of male pulvinate, of fem. urceolate. *Pistillode* 3-toothed. *Styles* 3, 2-fid.

8. *C. lævis*, *Hook. f.*; quite glabrous, leaves 3-5 in. coriaceous ovate or ovate- or elliptic-lanceolate base acute or rounded faintly reticulate beneath, nerves 6-10 pair very slender, flowers solitary or few together axillary or in slender axillary spikes quite glabrous, calyx-lobes ovate-lanceolate, petals obovate truncately retuse, disk of male cupular lining the calyx-tube, fruit (young) sessile hairy.

SINGAPORE; jungle behind the Botanical Gardens, *Murton*.

A small tree, 15-20 ft.; branches smooth, woody, but slender, terete. *Leaves* $1\frac{1}{2}$ -2 $\frac{1}{2}$ in. diam., pale grey above when dry, pale brown beneath, quite smooth; petiole $\frac{1}{6}$ - $\frac{1}{4}$ in. *Flowers* very few seen; bracts very small, ovate or rounded, slightly ciliate. *Calyx* of male $\frac{1}{2}$ in. diam. *Disk* with a raised obscurely crenate border. *Staminal column* slender; pistillode short, stout, cylindric, truncate. *Young fruit* deeply 3-lobed at the top, sparsely hairy.—Better specimens of this very distinct species are much wanted.

9. *C. malaccensis*, *Hook. f.*; quite glabrous except the flowering shoots, leaves 3-6 in. coriaceous elliptic-oblong or lanceolate obtusely subcaudate acuminate, base acute, nerves 4-6 pair slender, flowers minute in small villous axillary and paniculately spiked clusters glabrous, calyx-lobes of male ovate of fem. lanceolate, petals of male spatulate of fem. rounded, ovary with a few long erect caducous hairs, styles simple.

MALACCA, *Maingay* (*Kew Distrib.* 1873).

Habit of *C. chartaceus*; branches stout; bark pale. *Leaves* dark brown when dry, paler beneath, very smooth on both surfaces, cross-nervules very faint, base suddenly narrowed and shortly produced on the very short petiole. *Clusters* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; spikes stout, often recurved, forming terminal panicles a foot long and less with a leaf here and there; bracts rusty-villous. *Calyx* $\frac{1}{12}$ in. diam., fem. rather the largest, with much narrower apparently deciduous lobes (they easily break away from the flowers). *Disk* of male pulvinate, of fem. tubular. *Filaments* very short. *Pistillode* conical. *Ovary* elongate ovoid; styles apparently not 2-fid.

10. *C. lancifolius*, *Hook. f.*; branches and leaves glabrous, leaves 4-5 in. elliptic-lanceolate very finely acuminate base acute, nerves 12-15 pair very slender, fem. fl. solitary or few together axillary clothed at the base with pubescent bracts, calyx glabrous lobes lanceolate acuminate, petals spatulate entire claw rather long, ovary hirsute.

TENASSERIM, *Helper* (*Kew Distrib.* 4875).

Branches slender, terete; tips pubescent. *Leaves* spreading, $\frac{3}{4}$ -1 $\frac{1}{4}$ in. diam., thinly coriaceous, nerves slender, tapering point nearly 1 in. long; petiole $\frac{1}{4}$ in. *Flowers* (unexpanded) $\frac{1}{2}$ in. long. *Petals* nearly half as long as the calyx. *Ovary* subglobose, enclosed in the disk; styles 2-lobed at the tip.—Can this be *Kurz's C. stenophyllus*? if so, the ovary of that plant is erroneously described as glabrous.

11. *C. gracilis*, *Hook. f.*; quite glabrous, branches very slender, leaves $1\frac{1}{2}$ -2 in. elliptic-ovate obtusely caudate base acute, nerves 5-7 pair very faint, flowers few in axillary clusters and spikes glabrous, calyx-lobes lanceolate, petals of male very minute linear of fem. elliptic, ovary hirsute enclosed in the membranous elongate 5-partite disk, capsule sessile quite glabrous.

PERAK, *Scortechini*. QUEDAH; *King's Collector*.

A much-branched tree, 18-25 ft.; branchlets divaricate, ultimate almost filiform. *Leaves* rather coriaceous, pale when dry, sometimes a little glaucous beneath, nerves very obscure; petiole $\frac{1}{2}$ in., very slender; stipules short ovate. *Flowers* $\frac{1}{10}$ in. diam., male and fem. together; bracts minute, ciliate. *Pistillode* tomentose. *Disk-lobes* of fem. with truncate tips, together forming a membranous cone. *Capsule* about $\frac{1}{2}$ in. long.—A very distinct species, allied to *C. heterophyllus* and *patulus*.

12. **C. decurrens**, *Hook. f.*: glabrous except the tomentose flowering branchlets and bracts, leaves 3-7 in. rather thin elliptic-oblong-obovate obtuse or obtusely acuminate quite glabrous base decurrent on the petiole, nerves 5-7 pair very slender, flowers few sessile in axillary clusters or in short lateral naked or small-leaved branchlets, fem. calyx quite glabrous lobes lanceolate, disk very short shortly lobed, petals elliptic, ovary hirsute with erect hairs.

PERAK, *Scortechini*; Gopong, *King's Collector*.

A small tree, 10-12 ft. (at Gopong), branches rather slender, pale, glabrous, branchlets rusty-tomentose. *Leaves* variable in size and shape, sometimes $2\frac{3}{4}$ in. broad, greenish above, reddish beneath, base always very acute and narrowed into or decurrent on the petiole which is $\frac{1}{2}$ - $\frac{1}{4}$ in.; stipules minute; small leaves on the flowering branchlets obtuse or acute, pubescent beneath. *Flowering* branchlets $\frac{1}{2}$ -2 in., spreading and decurved; bracts rusty woolly almost concealing the flowers. *Calyx* about $\frac{1}{2}$ in. diam., fem. alone seen. *Styles* 3, shortly 2-fid. *Fruit* not seen.

13. **C. macrophyllus**, *Hook. f.*; quite glabrous, leaves 8-12 in. thinly coriaceous oblong-ovate obtusely cuspidate base narrowed into the short petiole, fem. fl. sessile in axillary clusters, bracts very minute ciliate, calyx glabrous lobes ovate, petals subquadrate crenate, disk crenulate with an erect truncate tube enclosing the strigosely hispid ovary.

PERAK, *Scortechini*.

Branches rather stout. *Leaves* 3-5 in. diam., narrowed from above the middle to the acuminate base, smooth and rather shining on both surfaces, midrib raised above; nerves 7-8 pair, arched, cross-nervules reticulate; petiole $\frac{1}{2}$ in., rather stout. *Flowers* exerted, buds subglobose; calyx $\frac{1}{2}$ in. diam., thickly coriaceous; lobes broad, tubular sheath of ovary truncate, toothed, at length 5-cleft. *Styles* 3, 2-fid, arms flabelliform.

14. **C. membranaceus**, *Hook. f.*; branches slender flowering pubescent, leaves 2-4 in. very membranous glabrous elliptic or oblong or oblong-lanceolate obtusely acuminate or caudate glaucous beneath, nerves 10-15 pairs very slender, stipules long acicular persistent, flowers subsessile minute, calyx-lobes ovate male nearly glabrous fem. hirsute, capsule small sessile deeply 3-lobed hirsute.

PERAK; Larut, *King's Collector*.

A tree, 15-20 ft. *Leaves* very pale when dry, sometimes narrowed to the base, which is rounded or subacute, petiole $\frac{1}{2}$ in., young tomentose; stipules rigid, sometimes $\frac{1}{4}$ in. long. *Calyx* $\frac{1}{2}$ in. diam., of fem. with a villous ring at the base of the capsule. *Petals* of male obcuneate, of fem. rhomboid. *Disk* of fem. a crenulate cup at the base of the ovary. *Capsule* $\frac{1}{2}$ in. long; cocci oblong.

†† *Flowers more or less pubescent* (see also *C. membranaceus*).

15. **C. hirsutulus**, *Hook. f.*; branches slender hirsutely tomentose with spreading hairs, leaves 4-7 in. membranous obovate-oblong obtusely caudate base rounded pubescent beneath and glaucous, nerves 11-15 pair, flowers in axillary clusters subsessile minute, calyx of both sexes villous lobes ovate, petals of male flabellate 2-partite crenate, capsule sessile deeply 3-lobed pubescent.

PERAK, *Scortechini*, *King's Collector*.

A tree, 30-40 ft. *Leaves* greenish when dry, nerves strong beneath, petiole very short, stout, and midrib beneath tomentose; stipules $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in. diam., of fem glabrous within under the capsule. *Disk* of male crenulate. *Capsule* $\frac{1}{2}$ in. long, "waxy, red."—Allied to *C. membranaceus*, but a much larger species.

16. **C. patulus**, Muell. Arg. in DC. Prodr. xv. ii. 505; glabrous, leaves 1-3 in. thinly coriaceous ovate to lanceolate obtusely acuminate or caudate finely reticulate base acute or rounded, nerves 5-8 pair very slender, clusters minute axillary and in slender axillary or terminal simple spikes, calyx sparsely appressedly hairy, lobes ovate acute, petals orbicular clawed crenulate, ovary hirsute with long erect hairs, capsule small sessile. *Beddome Forester's Man.* 203, t. xxiii. f. iv. 1-11 and 21. *Amanoa indica*, Wight Ic. t. 1911. *A. patula*, Thwaites Enum. 280 (acuminata in part), and *A. indica* f. minor, Thwaites l. c. 428. *Bridelia patula*, Hook. & Arn. Bot. Beech. Voy. 212. *Lebidiera patula*, Muell. Arg. in Linnæa xxxii. 21. *Cluytia patula*, Roxb. Cor. Pl. ii. 37, t. 170, and Fl. Ind. iii. 783.

DECCAN PENINSULA; Courtallam, in mountain jungles, Wight. CEYLON; common in the warmer parts of the island.

A tree with long horizontal dense branches; branchlets very slender, quite smooth, the tips only sometimes puberulous. Leaves 2-3½ in., variable in width, flatter, more rigid and usually narrower than in *C. acuminatus*, dull grey or brownish when dry, alike on both surfaces, the caudate end sometimes short and obtuse. Flowers yellow, as in *C. acuminatus*. Styles 2-fid to the middle. Capsule (in Peninsular specimens) ½ in. broad and long, deeply 3-lobed, dark brown, quite smooth, slightly hairy, subtended by the disk. Seeds (in Ceylon specimens) ½ in. long, broadly obovoid, plano-convex, smooth with rounded sides and top and a ventral hilum.—This should perhaps include *C. acuminatus*, which has axillary quite glabrous flowers. Mueller describes the capsule as at length rough with tubercles, but I do not find it so. The Peninsular specimens have less caudate leaves than the Cingalese. Roxburgh figures the petals of the male as orbicular and crenate.

17. **C. pallidus**, Muell. Arg. in DC. Prodr. xv. ii. 508; branches slender and young leaves and petioles and midrib beneath pubescent, leaves small elliptic or oblong-lanceolate acute acuminate or caudate base acute, nerves 6-10 pairs spreading, flowers in small axillary clusters which are rarely spicate sessile and pedicelled tomentose, calyx-lobes ovate-lanceolate, petals obovate, ovary densely villous, styles subentire, capsule small sessile. *Beddome Forester's Man.* 20. *Amanoa pallida*, Thwaites Enum. 280. *Lebidiera pallida*, Muell. Arg. in Linnæa xxxii. 80.

CEYLON; near Kandy, Thwaites.

Branches very leafy, bark pale. Leaves 1-2½ in. (rarely 5-6½ in.), pale when dry, rather membranous, midrib beneath strong, nerves slender, nervules reticulated; petiole ⅓-½ in.; stipules small, subulate. Clusters 2-5 fld.; bracts very minute, except the stipular; flowers 5-6-merous. Calyx ½ in. diam., thickly tomentose externally. Disk of male cupular, crenate, of fem. membranous. Ovary globose; styles very shortly 2-fid. Pistillode large, 3-notched. Capsule ½ in. diam., not deeply 3-lobed, sparsely hairy. Seeds not ripe.

VAR. *subglauca*, Trimen, Syst. Cat. Pl. Ceyl. 78; leaves subglaucous beneath. *C. subglauca*, Thw. mss.

18. **C. robustus**, Muell. Arg. in DC. Prodr. xv. ii. 504; glabrous, leaves 3-5 in. coriaceous elliptic-oblong or lanceolate acuminate faintly reticulate base acute, nerves 5-6 pair very slender, stipules minute, flowers few sessile in small axillary and spicate clusters sparsely pubescent with appressed hairs, calyx-lobes of male ovate-oblong, petals minute oblong hairy. *Beddome Forester's Man.* 202. *Amanoa indica*, Thwaites Enum. Addend. 428 (excl. syn. Wight).

CEYLON, in the hotter parts of the island.

Habit of *C. malaccanus*; branches and flowering spikes quite black when dry. Leaves dark brown, shining and faintly reticulate on both surfaces, young quite

glabrous. *Spikes* axillary, more or less recurved, rather shorter than the leaves; clusters 2-3 fld.; bracts very short, nearly glabrous, large rounded concave, smaller oblong; flowers 4-5-merous. *Calyx* $\frac{1}{2}$ in. diam.; lobes obtuse. *Disk* cupular. *Staminal column* short with a large obtuse hairy pistillode. *Fem. fl.* and *fruit* wanting.

19. **C. ferrugineus**, Muell. Arg. in DC. Prodr. xv. ii. 507; glabrous except the inflorescence, leaves 4-6 in. coriaceous elliptic or oblong-lanceolate caudate-acuminate base acute or obtuse, nerves 3-5 pair very strong beneath, flowers solitary or few in a cluster or axillary and in very short axillary spikes pedicelled rusty-tomentose, calyx-lobes oblong-ovate subacute, petals deeply irregularly acutely lobed, ovary densely tomentose, capsule shortly stipitate rusty-tomentose. *Beddome Forester's Man.* 203. *Amanoa ferruginea*, *Thwaites Enum.* 280; *Baill. Etudes Gen. Euphorb.* 50, t. 27, f. 1-4.

CEYLON; in the Central Province, ascending to 3000 ft., *Thwaites*.

Branches quite glabrous except the tips. *Leaves* greyish green when dry, pale beneath, lower nerves very long, cross-nervules faint; petiole $\frac{1}{6}$ - $\frac{1}{4}$ in., glabrous. *Flowers* 2-5 in a cluster or solitary; pedicels sometimes as long as the calyx; bracts very minute, rusty tomentose. *Calyx* $\frac{1}{10}$ in. diam., lobes obtuse. *Petals* very irregular. *Staminal column* short; pistillode prismatic with pubescent angles, truncate. *Disk* of male pulvinate. *Capsule* $\frac{1}{2}$ in. long, deeply 4-lobed; pedicel stout.

20. **C. nitidus**, Hook. f.; branches and petioles finely tomentose, leaves membranous glabrous oblong-lanceolate or oblanceolate caudate-acuminate margins undulate base rounded or caudate shiny above paler or glaucous beneath, nerves 8-12 pair very slender, flowers few in small axillary clusters sessile densely tomentose, calyx-lobes ovate acute, petals of male flabelliform crenate of fem. obovate, ovary densely hirsute with erect hairs, styles 3 slender bifid to the middle.

MALAY PENINSULA; Singapore, *Lobb*. PENANG, *Curtis*.

Branches very slender. *Leaves* 3-4 by 1-1 $\frac{1}{2}$ in., greyish green when dry, and polished above, faintly reticulated beneath; petiole very short, $\frac{1}{12}$ in. *Clusters* 2-4 fld.; bracts very short, villous. *Calyx* of fem. cleft half-way down. *Disk* of male broad plane, of fem. cupular at length 5-lobed. *Ovary* globose; styles 2-fid to the middle.—The Singapore specimen is a female, the Penang a male.

21. **C. Helferi**, Hook. f.; branches and leaves beneath fulvous-tomentose, leaves linear-oblong acute or subacute sparsely pubescent above strongly reticulate beneath, nerves 6-10 pair spreading and arched, stipular bracts setaceous longer or shorter than the flowers, flowers few in axillary clusters tomentose sessile, calyx-lobes ovate-lanceolate, petals of male broadly ovate sessile of female rhombic-ovate obscurely toothed, ovary densely hispid with long stiff hairs.

TENASSERIM, *Helfer* (*Kew Distrib.* 4886); Mergui, *Griffith*.

Branches fulvous-tomentose. *Leaves* thinly coriaceous, 2-5 by $\frac{1}{2}$ -1 $\frac{1}{2}$ in., pale grey-brown when dry, base subacute or rounded; petiole $\frac{1}{2}$ in., tomentose. *Male* and *fem. flowers* similar, nearly $\frac{1}{2}$ in. diam., glabrous within, fulvous-tomentose without. *Disk* of male adnate to the perianth-tube, of the fem. erect, 5-lobed, thin. *Staminal column* with a 3-lobed top. *Styles* 3, long, 2-fid. *Capsule* $\frac{1}{4}$ - $\frac{1}{2}$ in. long, sessile, shortly oblong, hairy.

22. **C. Maingayi**, Hook. f.; branches and young leaves softly rusty-tomentose, leaves pale elliptic or obovate-oblong caudate-acuminate reticulate and finely pubescent beneath, nerves 6-8 pair arching, flowers few in axillary clusters sessile hirsute, calyx-lobes lanceolate finely acuminate, petals obovate subentire, ovary densely hirsute with long erect hairs, styles 3 2-fid.

MALACCA, *Maingay* (*Kew Distrib.* 1874).

Branches slender, smooth. *Leaves* 3-5 by 1-2 in., glabrous above, subglaucous beneath, with raised reticulating venules between the nerves, tip often suddenly acuminate to a point $\frac{1}{2}$ in. long, base rounded or subcordate; petiole very short indeed. *Calyx* about $\frac{1}{2}$ in. diam., longer than the lanceolate bracts; lobes with long points. *Disk* of male lining the calyx-tube, of fem. membranous, urceolate. *Staminal column* long. *Fruit* not seen.—This much resembles *C. malabaricus*, differing in the tomentose flowers.

23. ***C. podocarpus***, *Hook. f.*; a tree 50-70 ft., branchlets and petioles rusty-tomentose, leaves 5-10 in. subglaucous thinly coriaceous oblong or linear-oblong acuminate base cordate, midrib sunk above, nerves 8-10 pair very strong and arched beneath, petiole $\frac{1}{2}$ in. stout, fem. calyx villously tomentose, lobes triangular, petals cuneate, disk with a broad membranous crenulate margin, capsule stoutly stipitate $\frac{1}{3}$ - $\frac{1}{2}$ in. diam. broader than long deeply 3-lobed densely rusty-villous.

PERAK; at Larut, *King's Collector*.

A very distinct species, with the base of the leaf cordate.

SPECIES OF WHICH THE CAPSULE IS GLABROUS, BUT THE OVARY IS UNKNOWN.

24. ***C. stipulatus***, *Hook. f.*; a tree 20-30 ft.; branchlets pubescent, leaves membranous 3-5 in. glabrous oblanceolate-oblong subcaudately acuminate glaucous beneath base rounded, midrib raised above, nerves 10-12 pair very slender, petiole $\frac{1}{10}$ in., stipules rigid acicular $\frac{1}{4}$ - $\frac{1}{2}$ in., capsule $\frac{1}{2}$ in. diam. sessile subglobose 3-lobed quite smooth glabrous.

PERAK; at Larut, *King's Collector*.

25. ***C. ellipticus***, *Hook. f.*; a tree 30-40 ft., shoots and young petioles rusty or black-tomentose, leaves 3-4 in. coriaceous glabrous elliptic obtusely or acutely acuminate base acute above finely reticulate, midrib strong beneath slender above, nerves 7-8 pairs slender arched, cross-nervules very slender, petiole $\frac{1}{2}$ - $\frac{1}{4}$ in. stout, fem. fl. sessile in rather large tufts of rusty-villous bracts, capsule stoutly stipitate $\frac{1}{2}$ in. diam. subglobose deeply 3-lobed quite glabrous minutely wrinkled.

PERAK; usually near water at Larut, *King's Collector*.

This resembles closely *C. chartaceus*, Muell.

26. ***C. parvifolius***, *Hook. f.*; a small tree 30-40 ft., quite glabrous, branchlets short, leaves 2-3 in. rather membranous elliptic-lanceolate obtusely subacuminate pale when dry with undulate margins base rounded, midrib sunk above, nerves 10-12 very obscure widely spreading, fem. fl. sessile solitary?, bracts very minute, calyx-lobes ovate lanceolate, capsule sessile $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. subglobose 3-lobed quite glabrous.

PERAK; on the tops of limestone hills, alt. 300-1000 ft., *King's Collector*.

27. ***C. pedicellatus***, *Hook. f.*; quite glabrous, leaves $1\frac{1}{2}$ -4 in. coriaceous broadly elliptic or elliptic-oblong obtusely caudate base acute shining above, nerves 3-4 pair very faint, flowers in axillary panicles on long stout pedicels much longer than the calyx perfectly glabrous, calyx-lobes ovate, petals of male cuneate toothed, capsula quite glabrous.

PENANG, *Curtis, Hullett*.

Branches woody, bark pale, smooth. *Leaves* very finely reticulate on both surfaces, otherwise very smooth, margins recurved when dry, petiole $\frac{1}{10}$ - $\frac{1}{8}$ in. *Pedicels* $\frac{1}{4}$ - $\frac{1}{2}$ in., buds of male ellipsoid $\frac{1}{2}$ in. long, bracts very minute glabrous; calyx $\frac{1}{2}$ in.

diam.; lobes 4-5, very thick; pistillode glabrous. *Capsule* about $\frac{1}{3}$ in. long, on a stout pedicel $\frac{1}{2}$ - $\frac{2}{3}$ in. long.

IMPERFECTLY KNOWN AND EXCLUDED SPECIES.

C. OBLONGIFOLIUS, *Muell. Arg. in DC. Prodr.* xv. ii. 506, is a mixture. Of its two varieties, *α. scaber* consists of *Bridelia pubescens*, Kurz (the Sikkim plant), and *B. assamica*, H. f. (Griffith's 4890). *β. genuina* is *Cleistanthus chartaceus*, *Muell.*

C. STIPULARIS, *Muell. Arg. in DC. Prodr.* xv. ii. 508; shoots pubescent, leaves ovate or ovate-oblong base obtuse or subcordate glabrous above grey-tomentose beneath, stipules long lanceolate acuminate, male fl. pedicelled in small axillary clusters, calyx-lobes ovate pubescent, petals clawed obovate plaited puberulous, disk low crenate, male fl. and fruit unknown. *Beddome Forester's Man.* 203. *Lebidiera stipularis*, *Muell. Arg. in Linnæa* xxxii. 81. *Bridelia stipularis*, *Hook. & Arn. Bot. Beech. Voy.* 211 (not of Linn.).—Nilghiri Mts., *Hohenacker* (n. 1551).—I know nothing of this plant, and I do not understand how it is identified with the *B. stipularis* of Hook. and Arn.

WALL. CAT. 8006, from Penang, in leaf only is probably a *Cleistanthus*; it has slender tomentose branches, and short broadly elliptic leaves 3-4 by $\frac{1}{2}$ -2 in., with cuspidate tips.

6. *ACTEPHILA*, *Blume.*

Trees or shrubs. *Leaves* alternate, usually large, quite entire; stipules deciduous. *Flowers* in axillary clusters, mono- or di-œcious, petaliferous or not. *MALE FL.* *Sepals* 5-6, subequal or the inner larger, imbricate. *Petals* as many, much smaller, inserted under the 5-lobed disk, or 0. *Stamens* 3-6, on the disk, filaments free or nearly so; anther-cells parallel. *Pistillode* 3-cleft. *FEM. FL.* *Perianth* of the male. *Ovary* sessile on the 5-lobed disk, 3-celled; styles short, free or connate at the base, entire or 2-fid; ovules 2 in each cell. *Capsule* hard, loculicidal or of 3 2-valved cocci. *Seeds* usually solitary in the cocci, large, 3-gonous, aril or caruncle 0, testa brittle, very thin, albumen scanty or 0; cotyledons fleshy, folded or crumpled together.—Reputed species about 10, Malayan and Australian.

Mueller's sections "Monœcious" and "Diœcious" are annulled by *Kurz's* observation, that *puberula* is either; and the distinctions drawn from the form of the sepals and petals are not reliable. The glands at the base of the fem. sepals are probably present in all the species.

1. *A. excelsa*, *Muell. Arg. in Linnæa* xxxii. 78, and in *DC. Prodr.* xv. ii. 222; glabrous or with the shoots and young leaves beneath minutely puberulous, leaves 3-8 in. long- or short-petioled linear-oblong to elliptic-lanceolate or -obovate acute acuminate or cuspidate, base acute, sepals oblong, petals narrow. *Beddome Forester's Man.* 189, t. 23, f. 3. *A. neilgherrensis*, *Wight Ic. t.* 1910. *Anomospermum excelsum*, *Dalz. in Hook. Kew Journ. Bot.* iii. (1851) 228; *Dalz. & Gibs. Bomb. Fl.* 233. *Croton lævigatum*, *Wall. Cat.* 7749 (not 7735).

UPPER ASSAM; Mishmi Hills, *Griffith (Kew Distrib.* 4892). SILHET, the KHASIA MTS. and CHITTAGONG. ANDAMAN ISLANDS, *Kurz.* DECCAN PENINSULA; on the Western Ghats, from the Concan to Travancore, ascending to 5500 ft. CEYLON, ascending to 2000 ft.—DISTRIB. Java.

A small evergreen shrub, 4-8 feet, or a tree. *Leaves* hardly coriaceous, greenish or yellowish when dry, nerves 6-12 pairs arched, surfaces subsimilar, petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Flowers* male and fem. in the same cluster or not; males several, shortly pedicelled;

fem. clustered or solitary; pedicel slender, $\frac{1}{2}$ –2 in. long. *Sepals* variable in length, obtuse, apiculate or truncate. *Petals* very variable. *Ovary* globose, 3-lobed; styles 3, 2-fid, lobes recurved. *Capsule* $\frac{3}{4}$ to $1\frac{1}{2}$ in. diam., broader than long, 3-lobed, minutely wrinkled when dry; cocci woody, dorsally rounded. *Seeds* $\frac{1}{2}$ in. long, obtusely trigonous, dorsally rounded, broader than long; testa very thin, fragile, brown.—The Indian species retained by Mueller are the following. Having no-flowering specimens, I am unable to distinguish them, and suspect they are all forms of one.

A. ZEYLANICA, *Muell. Arg. in Linnæa* xxxii. 77, and in *DC. l. c.* 221; diœcious, petals of male broadly rhombic-obovate base cuneate, of fem. short cuneate-obovate flabellately dilated truncate emarginate, filaments free. A. neilgherrensis, *Thwaites Enum.* 280 (*excl. syn.*). *Savia zeylanica*, *Baill. Etudes Gen. Euphorb.* 571.—Ceylon.

A. THOMSONI, *Muell. Arg. in Linnæa* xxxiv. 65, and in *DC. l. c.* 222; diœcious, sepals of fem. linear-lanceolate acute with a series of basal glands, petals linear-lanceolate rigid entire about 3 times shorter than the sepals.—Mysore and the Carnatic, G. Thomson.

A. JAVANICA, *Miquel Fl. Ind. Bat.* i. ii. 356; monœcious, sepals coriaceous, petals of male broadly rhombic-obovate cuneately narrowed at the base, of fem. short cuneate-obovate truncate emarginate, filaments connate at the base, capsules large. *Muell. Arg. in DC. l. c.* 222; *Kurz For. Fl.* ii. 340. A. bantamensis, *Miq. l. c.* *Savia Actephila*, *Hassk. Cat. Hort. Bogor.* 243.—Singapore, *Wallich* (Cat. 8016), Andaman Islands, Java.

A. EXCELSA, *Muell. Arg. l. c.*; monœcious, leaves from linear-oblong to elliptic or lanceolate; sepals submembranous suborbicular tip rounded with brown edges, petals oblong-obovate subentire, capsule large, testa membranous. (See citations under the species.)—Assam, the Khasia Mts. and Silhet.

2. **A. puberula**, *Kurz For. Fl.* ii. 341; shoots and nerves of leaves beneath minutely pubescent or glabrescent, leaves long-petioled obovate or oblong obtuse or obtusely acuminate base rounded or cordate.

ANDAMAN ISLANDS, *Kurz*.

An evergreen shrub, 4–8 ft. (*Kurz*). *Leaves* 4–7 in., hardly coriaceous, glabrous above, nerves beneath puberulous. *Flowers* monœcious or diœcious, orange-colored. *Calyx* coriaceous. *Capsules*, as in *A. excelsa*, wrinkled.—The base of the leaf and long petioles at once distinguish this species from all the forms of *A. excelsa*. I have seen no flowers.

7. **ANDRACHNE**, *Linn.*

(& 8. **HEXAKISTRA**, *Hook. f.*)

Herbs, undershrubs, or slender shrubs. *Leaves* usually small, alternate, membranous, quite entire. *Flowers* small, monœcious, pedicelled; males clustered in the axils, females solitary. MALE FL. *Calyx* 5–6-lobed or -partite. *Petals* 5–6, small or 0. *Disk-glands* as many, or twice as many. *Stamens* 5–6, alternate with the petals; anthers erect, cells parallel. *Pistillode* small. FEM. FL. *Calyx* larger. *Petals* minute or 0. *Ovary* 3-celled; styles short 2-fid or -partite; ovules 2 in each cell. *Capsule* of 3 2-valved cocci. *Seeds* curved, rugose, estrophiolate, albumen fleshy; embryo curved, cotyledons broad flat.—Species about 10, variously dispersed.

When the clavis of the Indian genera of Euphorbiaceæ was prepared, I had determined to propose for the last two species of this genus a separate one under the name of *Hexakistra* (in allusion to the needle-like style) but on reconsideration I have considered it best to postpone the dismemberment of *Andrachne*, which contains different types of structure, till all the species now included under it could be studied in detail.

1. **A. cordifolia**, *Muell. Arg. in DC. Prodr.* xv. ii. 234; shrubby,

leaves petioled ovate or oblong obtuse or mucronate softly hairy beneath, sepals connate below obovate, petals spatulate keeled, disk-glands membranous 2-partite. *Brand. For. Fl.* 456; *Gamble Man. Ind. Timb.* 349. *A. Decaisneana*, *Baill. Etudes Gen. Euphorb.* 577. *Leptopus cordifolius*, *Dcne. in Jacquem. Voy. Bot.* 155, t. 156. *Phyllanthus cordifolius*, *Wall. Cat.* 7913, and 7930 in part. *P. Hoffmeisteri*, *Klotzsch in Bot. Reise Pr. Waldem.* 117, t. 24. *P. glauca*, *Wall. Cat.* 7927 B, in part.—*Wall. Cat.* 7929.

CENTRAL and WESTERN TEMPERATE HIMALAYA, alt. 5–8000 ft., from Nepal *Wallich*, westwards to Murree, *Fleming*.—DISTRIB. Afghanistan.

A small shrub; branches slender. *Leaves* 1–2 in., pale when dry, nerves very slender; petiole $\frac{1}{4}$ – $\frac{3}{8}$ in. *Flowers* $\frac{1}{2}$ in. diam.; pedicels capillary, $\frac{1}{2}$ – $1\frac{1}{2}$ in. *Calyx* enlarged in fruit, acute. *Fruit* $\frac{1}{4}$ in. diam., depressed globose. *Seeds* broadly trigonous, dorsally rounded.—The leaves are very variable, rarely cordate, and I suspect that it may prove a form of *A. chinensis*, Bunge.—There is no No. 7929 in *Wallich's* printed List. In his Herbarium in the Linn. Soc. Rooms, that number is written in pencil on a sheet of this plant, which has also the misplaced ticket of 7930 (*Phyllanthus tetrandrus*).

2. ***A. telephioides***, *Linn. Sp. Pl.* 1014; prostrate, glabrous, glaucous, leaves sessile elliptic or obovate subacute, sepals free rounded or rhombic, petals lanceolate, disk-glands membranous 2-lobed. *Muell. Arg. in DC. Prodr.* xv. ii. 235; *Boiss. Fl. Orient.* iv. 1138; *Sibthorp Fl. Græc.* x. t. 953; *Reichb. Ic. Fl. Germ.* v. t. 153. *A. rotundifolia*, *C. A. Meyer in Eichw. Pl. Carp.* 18, t. 20.

The PANJAB; on the Salt Range, *Fleming*; near the Jhelum, *Aitchison*.—DISTRIB. Afghanistan and westwards to Spain and the Cape de Verd Islands.

Root woody; stems very many, 8–12 in., slender, leafy, flowering throughout their length. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., coriaceous, nerves obscure. *Flowers* $\frac{1}{10}$ in. diam., pedicels usually shorter than the leaves. *Capsules* depressed globose, $\frac{1}{10}$ – $\frac{1}{8}$ in. diam.

3. ***A. aspera***, *Spreng. Syst. Veg.* iii. 884; prostrate, glaucous and papillosely pubescent, leaves orbicular-cordate or broadly reniform rounded or retuse, sepals free lanceolate obtuse ciliolate, petals rhombic subentire, disk-glands fleshy, of the male peltate incised. *Muell. Arg. in DC. Prodr.* xv. ii. 236; *Boiss. Fl. Orient.* iv. 1138.

SCIND, *Stocks*.—DISTRIB., Persia, Arabia, Trop. Africa.

A small undershrub, with woody root, short rootstock, and very many filiform prostrate stems 6–10 in. long, rarely nearly glabrous, pale green when dry. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in. broad, rather membranous, upper sessile; petiole of lower very slender, as long as the blade. *Flowers* $\frac{1}{10}$ in. diam.; pedicel as long as the petiole. *Fruit* $\frac{1}{8}$ in. diam., membranous.

4. ***A. fruticosa***, *Dcne. in Nouv. Ann. Mus.* iii. 484; sparsely hairy, branches terete, leaves elliptic-lanceolate acuminate at both ends, ovary hispid. *Muell. Arg. in DC. Prodr.* xv. ii. 235.

PERAK; at Larut, *King's Collector*.—DISTRIB. Timor-Laut, Java.

A small erect shrub, 1–2 ft., everywhere except the leaves above sparsely pubescent with long appressed hairs; branches slender, divaricate. *Leaves* 2–3 in., very thin, pale green; nerves 3–5 pair, extremely slender, ascending; stipules small, lanceolate, deciduous. *Male fl.* $\frac{1}{10}$ in. diam.; pedicel a little longer, hairy; bracts at the axils minute; sepals membranous, obtuse, hairy at the back, sometimes subspatulate; petals spatulately obovate, 1-nerved; disk-glands rather fleshy, linear, in pairs opposite the sepals; filaments narrowed from the base upwards; pistillode not half their length. *Fem. fl.* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam.; sepals unequal, hairy on both surfaces. *Capsule* $\frac{1}{8}$ in. diam.;

epicarp separating; seeds transversely wrinkled.—The Timor Laut specimen so closely resembles this, that I think they must be co-specific, though I find no petals in their few flowers.

5. **A. Clarkel**, *Hook. f.*; sparsely hairy, branches acutely angled, leaves ovate-lanceolate acuminate base rounded, ovary glabrous.

MUNNIPORE; on Kohima, alt. 4700 ft., *Clarke*.

A slender erect shrub, 18 in. high; branches green with slender ribs at the angles. *Leaves* 2–2½ in., pale green, laxly hairy beneath; petiole ¼–½ in., pubescent. *Male fl.* ½ in. diam.; pedicel capillary, ¼–½ in.; sepals oblong, obtuse, rather fleshy, hairy externally; petals ½ as long as the sepals; disk-scales linear, in pairs opposite the sepals with a gland between the bases of each pair, about as long as the petals. *Stamens* erect; pistillode 0? *Fem. fl.* ½ in. diam.; pedicel ¾–1 in.; sepals ovate-lanceolate, acute, 3-nerved, green; disk-scales as in the male; ovary quite glabrous. *Capsule* 3-lobed, depressed, smooth, glabrous, about ½ in. diam.; seeds turgidly trigonous, smooth.

9. **AGYNEIA**, *Vent.*

Annual or perennial glabrous herbs; stems diffuse, often angled or compressed. *Leaves* small, alternate, quite entire. *Flowers* minute, monœcious, apetalous; males in axillary clusters; females solitary, largest; bracts often numerous, stipule-like. **MALE FL.** *Sepals* 6, gland-dotted, thickened all but the white margins. *Disk* 6-lobed. *Stamens* 3, central; anthers subsessile on the connate filaments; cells parallel, extrorse. *Pistillode* 0. **FEM. FL.** *Disk* 0. *Sepals* acute, not margined. *Ovary* ovoid, 3-celled, truncate; styles very short, 2-fid, sunk in the top of the ovary. *Ovules* 2 in each cell. *Capsule* splitting into 3 2-valved cocci. *Seeds* slender, curved, hilum long, albumen fleshy; embryo curved, cotyledons broad flat.—Species 2, Indian, Malayan, and Mascarene.

A. bacciformis, *A. Juss. Tent. Euphorb.* 24; leaves fleshy sessile oblong obovate or rounded to linear-lanceolate acute or acuminate obtuse glaucous. *Muell. Arg. in DC. Prodr.* xv. ii. 238; *Wight Ic.* t. 1893; *Miguel Fl. Ind. Bat.* i. 2. 367. *A. impubes*, *Vent. Hort. Cels.* 23, t. 23; *A. Juss. l. c.* 109, t. 6, f. 19; *Baill. Etudes Gen. Euphorb.* t. 24, f. 10–14. *A. phyllanthoides*, *Spreng. Syst.* iii. 19. *Phyllanthus bacciformis*, *Linn. Syst. Ed.* 13, 707; *Roxb. Fl. Ind.* iii. 661; *Wall. Cat.* 7896. *P. racemosus*, *Linn. Suppl.* 415. *P. anceps* & *rotundifolius*, *Herb. Madr. Diplomorpha herbacea*, *Griff. Notul.* iv. 479. *Emblia racemosa*, *Spreng. Syst.* iii. 20.

BENGAL, *Griffith, Clarke*. COROMANDEL COAST, in grassy pastures, *Roxburgh*, &c. CEYLON, near the sea.—**DISTRIB.** Java, Mauritius.

Annual or biennial. *Stems* 6–18 in., laxly branched, angular, green. *Leaves* rarely ¾ in. long, nerveless; stipules minute, ovate or lanceolate, acute. *Flowers* shortly pedicelled, males ⅙ in., fem. ⅙–⅙ in. diam. *Sepals* broadly ovate, acuminate, studded with immersed glands, persistent. *Ovary* broadly ovoid, obtuse; style with 2 recurved arms, stigmas acute. *Capsule* ½ in. long, globosely ovoid, obtuse, nearly terete.—I have seen no specimen of the Javanese *A. affinis*, *Kurz (DC. l. c. 239)*; the only Javanese species known to me is *bacciformis*, collected by *Horsfield*. *Roxburgh* describes the male sepals as laciniate.

10. **PHYLLANTHUS**, *Linn.*

(See also 11. **GLOCHIDION**.)

Herbs, trees or shrubs. *Leaves* bifarious or distichous, alternate, quite

entire. *Flowers* small, monœcious, usually in axillary clusters, apetalous. *Disk* various, rarely 0. *MALE FL.* *Sepals* 4-6, imbricate in 2 series. *Disk-glands* various (0 in ♂ of *Emblica*). *Stamens* 3-5 in the centre of the flower, filaments free or connate; anthers 2-celled, oblong or didymous, rarely reniform, cells parallel or diverging, slits extrorse vertical or transverse by the confluence of the cells. *Pistillode* 0 (or minute in Sect. *Reidia*). *FEM. FL.* *Sepals* of the male (or more in *Reidia*). *Ovary* 3- or more-celled; styles free or connate, usually 2-fid with slender arms, rarely dilated; ovules 2 in each cell. *Fruit* of 3 or more crustaceous or coriaceous rarely bony 2-valved cocci, with or without a separable coriaceous rarely fleshy epicarp (in Sect. *Kirganelia* a berry, in Sect. *Cicca* a drupe). *Seeds* 3-gonous, estrophiolate, testa crustaceous, albumen fleshy; cotyledons flat or flexuous. —Species about 350, of all warm countries.

Under 11. GLOCHIDION I have given my reasons for retaining the genus of that name, which is regarded by many botanists as a section of *Phyllanthus*. I think that *Kirganelia* may, possibly constitute a distinct genus, characterized by the baccate fruit with superposed seeds and a crustaceous testa; and perhaps *Flueggeopsis* another.

KEY TO THE SECTIONS.

Sect. I. PELTANDRA. Herbs or undershrubs. *Leaves* membranous. *Flowers* long-(fem. very long-)pedicelled. *Sepals* 5 or 6 in both sexes. *Stamens* 5, filaments connate in a slender column: anthers erect, slits vertical, connective not produced. *Ovary* 3-celled; styles 3, minute, 2-partite. *Capsule* of 3 coriaceous or crustaceous cocci.

Sect. II. KIRGANELIA. Shrubs. *Leaves* distichous, usually petioled. *Sepals* 4-6 in both sexes. *Stamens* 5, in 2 series, filaments free, or of the outer series free, of the inner connate; anthers erect, slits vertical, connective not produced. *Styles* very minute, 2-fid. *Fruit* a 4-8-celled berry. *Seeds* 2 in each cell superposed, the upper pendulous from the top of the cavity, the lower from the middle; testa ? hard often rugose.

Sect. III. FLUEGGEOPSIS. A shrub. *Leaves* distichous, shortly petioled. *Sepals* 5-6 in both sexes. *Stamens* 5, filaments free; anthers erect, slits vertical, connective not produced. *Styles* 3, long, slender, quite entire, united at the base. *Fruit* a 3-celled, 3-seeded berry; testa crustaceous.

Sect. IV. EMBLICA. Trees. *Leaves* very small, closely pinnately set on the slender branchlets. *Male flowers* with no disk. *Sepals* 5-6 in both sexes. *Stamens* 3, filaments united in a column; anthers erect, slits vertical, connective produced. *Styles* 3, united below, each twice 2-fid. *Fruit* large, fleshy, with 3 bony 2-valved cocci.

Sect. V. PARAPHYLLANTHUS. Herbs or shrubs. *Leaves* various. *Sepals* 5-6 in both sexes. *Stamens* 3, filaments united in a short or long column; anthers erect, slits vertical, connective usually produced. *Styles* 3, free or connate below, 2-fid. *Capsule* of 3 crustaceous 2-valved cocci.

Sect. VI. EUPHYLLANTHUS. Herbs or shrubs. *Leaves* various. *Sepals* 5-6 in both sexes. *Stamens* 3, filaments more or less united, rarely free and recurved; anthers didymous or reniform, cells subglobose, slits very short, cells sometimes confluent when the dehiscence appears transverse. *Styles* 3, free or connate below, 2-fid. *Capsule* of 3 crustaceous or thin 2-valved cocci.

Sect. VII. REIDIA. Herbs or shrubs. *Leaves* various. *Sepals* often

toothed or lacerate, of male fl. 4, of fem. 4 or 6. *Stamens* 2-4; anthers didymous or reniform, sessile around a minute pistillode on the top of a slender or short column, horizontal, cells often confluent, slits transverse. *Styles* 3, 2-fid or 2-partite. *Capsule* of 3 thinly crustaceous 2-valved cocci.

Sect. VIII. CICCÆ. A tree. *Sepals* 4 (rarely 5-6) in both sexes. *Stamens* 4, filaments free; anthers oblong, erect, slits vertical. *Styles* 4, free. *Fruit* fleshy, with a 3-4-celled bony endocarp.

Sect. IX. PROSORUS. Dioecious trees. *Leaves* deciduous. *Sepals* 4 in both sexes. *Stamens* 4, filaments free; anthers erect, slits vertical. *Styles* 3, free, 2-fid. *Fruit* large, epicarp thin, dry, bursting irregularly, enclosing 3 thin walled 2-valved cocci.

Sect. I. PELTANDRA (see p. 286).

1. **P. longipes**, *Muell. Arg. in Linnæa* xxxii. 10, and in *DC. Prodr.* xv. ii. 341; quite glabrous, leaves shortly petioled 3-5 in. very membranous ovate-lanceolate finely acuminate, fem. pedicels very long axillary, capsule small dry. *Peltandra longipes*, *Wight Ic. t.* 1891. *Croton pedunculatus*, *Wall. Cat.* 7767.

MALABAR; Mont. Mamettori, *Herb. Madr.*; at Quilon, *Wight*.

Shrubby?; bark white; branches long, terete, slender. *Leaves* undulate, base acute or rounded, subglaucous beneath; nerves 6-8 pair, very slender; petiole $\frac{1}{2}$ - $\frac{1}{4}$ in., slender; stipules ovate, ciliate, caducous. *Peduncles* of fem. fl. $\frac{1}{2}$ - $\frac{1}{3}$ in., clothed with tetrastichously imbricating ovate fimbriate bracts; male pedicels $\frac{1}{2}$, fem. 2-3 in. *Male calyx* $\frac{1}{12}$, fem. $\frac{1}{8}$ in. diam.; sepals 5, rounded. *Disk* of both sexes orbicular. *Capsule* $\frac{1}{4}$ in. diam., globose; cocci thinly crustaceous. *Seeds* (in *Wight's* figure) pyriform.

2. **P. macropus**, *Hook. f.*; quite glabrous, leaves long petioled 3-5 in. very membranous ovate- or oblong-lanceolate finely acuminate, fem. pedicels very long axillary, capsule small dry.

UPPER ASSAM; in the Mishmee Hills, *Griffith (Kew Distrib.* 4811).

Habit of *P. longipes*, but at once distinguished by the petiole 1-3 in. long.—The specimens are in fruit only, which appears to be like that of *P. longipes*. The leaf margins are crisply undulate, as if crenate.

3. **P. suberosus**, *Wight in Wall. Cat.* 7910; branches very slender and petioles crisply puberulous, leaves 1-2 in. very membranous elliptic acute at both ends, fem. pedicels long capillary, capsule minute. *Muell. Arg. in Linnæa* xxxii. 10, and in *DC. Prodr.* xv. ii. 341. *Andrachne fruticosa* & *Tragia glabrata*, *Heyne in Herb. Rottler.*

The DECCAN PENINSULA, *Wight*; Samulcotta, *Heyne*.

Stem very slender, woody, terete; bark at the base corky; branches flexuous, with a leaf at each flexure. *Leaves* almost hyaline, green; nerves 4-6 pair, extremely slender; petiole $\frac{1}{12}$ - $\frac{1}{10}$ in.; stipules ovate-subulate. *Pedicels* axillary solitary or from a very short peduncle clothed with subulate bracts, male $\frac{1}{10}$ in., fem. $\frac{3}{4}$ -1 in. *Male fl.* $\frac{1}{10}$ in. diam., fem. larger; sepals rounded. *Filaments* united nearly to the top. *Capsule* $\frac{1}{10}$ in. diam., cocci thinly crustaceous.

4. **P. Thwaitesianus**, *Muell. Arg. in DC. Prodr.* xv. ii. 341; quite glabrous, leaves 1-2 in. very shortly petioled membranous elliptic subacute base acute, fem. pedicels capillary, capsule minute. *P. Peltandra*, *Muell. Arg. l. c.* *Peltandra flexuosa*, *Thwaites Enum.* 281. *P. parvifolia*, *Wight Ic. t.* 1892.

CEYLON; at Minnery, not common, *Thwaites*.

Stem shrubby below, much branched above, branches slender angular. *Leaves* bright glaucous-green often marbled with white, very thin; nerves 4-5 pair, extremely slender; petiole $\frac{1}{10}$ - $\frac{1}{8}$ in.; stipules subulate. *Pedicels* axillary or from a very short peduncle clothed with ovate fimbriate bracts, male $\frac{1}{8}$ in., fem. $\frac{1}{2}$ - $\frac{3}{4}$ in. *Male fl.* $\frac{1}{30}$ in. diam., fem. larger; sepals rounded. *Filaments* united to the middle. *Style-arms* capitellate. *Capsule* $\frac{1}{2}$ in. diam.—I have little doubt but that Wight's *Peltandra parvifolia*, of which he had lost the locality, is from Ceylon, and is the *Phyll. Thwaitesianus*, Muell., in which I find the filaments free from the middle upwards.

Sect. II. KIRGANELIA (see p. 286).

5. **P. reticulatus**, *Poir. Encycl.* v. 298; glabrous pubescent or tomentose, branches smooth or tuberculate, leaves 1-2 in. oblong or elliptic tip rounded obtuse or acute, flowers axillary and subracemose on slender branches, 3 inner filaments connate, ovary globose 5-8-celled, stigmas 3 distant very minute 2-lobed, fruit coriaceous or fleshy 8-16-seeded. *Muell. Arg. in DC. Prodr.* xv. ii. 344; *Brand. For.* Fl. 453; *Beddome Forester's Man.* 190; *Gamble Man. Ind. Timb.* 353. *P. microcarpus*, *Muell. Arg. in Linnæa* xxxii. 51, and in *DC. l. c.* 343. *P. multiflorus*, *Willd. Sp. Pl.* iv. 581; *Roxb. Fl. Ind.* iii. 664 (not of *Roxb. Icon.*); *Grah. Cat. Bomb. Pl.* 180; *Wall. Cat.* 7921. *P. Kirganelia*, *Herb. Ham.* and *Roxb.* *P. dalbergioides* & *myrtifolius*, *Wall. Cat.* 7934 and 7940. *P. Wightianus*, *Wall. Cat.* 7919. *P. griseus*, *Wall. Cat.* 7918 A (in part). *P. Prieurianus*, *Muell. Arg. in Linnæa* xxxii. 12. *P. Chamissonis*, *Klotzsch in Nov. Acad. Nat. Cur.* xix. *Suppl.* i. 420. *P. sinensis*, *Muell. Arg. in Linnæa l. c.* 12. *P. puberulus*, *Miquel in Herb. Hohenack.* No. 728. *P. pentandrus*, *Herb. Roxb.* *P. virosus*, *Wall. Cat.* 7928 D. *P. spinosceus*, *Wall. mss.* *Anisonema reticulatum*, *A. Juss. Tent. Euphorb.* 19 t. 4, f. 1. *A. multiflorum*, *Wight Ic.* t. 1899; *Dalz. & Gibs. Bomb. Fl.* 234. *A. Zollingeri*, *Miquel Fl. Ind. Bat.* i. ii. 375, and *Suppl.* 449. *A. dubium*, *Blume Bijl.* 589; *Dcne. in Nouv. Ann. Mus.* iii. 481; *Miquel l. c.* 375. *A. intermedium* & *eglandulosum*, *Dcne. l. c.* 482; *Miquel l. c.* *Kirganelia reticulata*, *multiflora*, *intermedia*, *Wightiana*, *puberula*, *dubia*, *sinensis* & *eglandulosa*, *Baill. Etudes Gen. Euphorb.* 613, 614. *K. Prieuriana*, *Baill. Rec. Obs.* i. 82. *K. multiflora*, *Thwaites Enum.* 282. *Cicca reticulata*, *Kurz For. Fl.* ii. 354. *C. decandra*, *Blanco Fl. Philipp.* 487. *C. microcarpa*, *Benth. Fl. Hongk.* 312; *Kurz For. Fl.* ii. 355. *Rhamnus zeylanicus*, *Burm. Thes. Zeyl.* 198, t. 88.

Throughout TROPICAL INDIA; in the plains from Scind, Behar, Rohilkund, Sikkim and Assam, to Travancore, Malacca, Perak, the Andaman Islands, Burma and CEYLON. —DISTRIB. Tropical Africa, China, and the Malay Islands.

A large often scandent shrub; branchlets slender. *Leaves* thin, sometimes rather stiff, variable in size and form, base rounded acute or subcordate; nerves 6-8 pair, slender; petiole $\frac{1}{12}$ - $\frac{1}{8}$ in.; stipules ovate-subulate, entire. *Flowers* male and fem. subequal, about $\frac{1}{10}$ in. diam.; pedicels about $\frac{1}{4}$ in. *Sepals* 5-6, rounded. *Disk-glands* variable. *Ovary* usually much exserted. *Fruit* $\frac{1}{8}$ - $\frac{1}{6}$ in. diam., subgranulate. *Fruit* often racemose on the slender leafless branches. *Seeds* irregularly trigonous, testa crustaceous granulate punctulate.—The pubescent state, though the less common one, occurs throughout the range of the species. I can find no characters whereby to distinguish *P. microcarpus* from *reticulatus*; the lenticellate branches occur in both, those with globose and depressed-globose fruits.

Sect. III. FLUEGGEOPSIS (see p. 286).

6. **P. glaucus**, *Wall. Cat.* 7927 A; quite glabrous, leaves 1-1½ in.

shortly petioled membranous elliptic or oblong acute obtuse or apiculate, flowers diœcious axillary pedicelled, pedicel clavate at the tip, sepals of both sexes broadly oblong, berry small globose. *Muell. Arg. in Linnæa* xxxii. 14. *P. fueggeiformis*, *Muell. Arg. in DC. Prodr.* xv. ii. 349. *P. griseus*, *Wall. Cat.* 7918 A *in part*.

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*. Sikkim, *J. D. H.*, *Kurz*, &c. BHOTAN, *Griffith*. KHASIA HILLS, on Shillong, alt. 4–5000 ft., *J. D. H.* & *T. T.*, *Clarke*.—DISTRIB. China.

A shrub with terete divaricate branches and very slender branchlets. *Leaves* blackish when dry, very thin, subglaucous beneath, base acute; nerves 8–10 pair, very slender; petiole $\frac{1}{12}$ – $\frac{1}{10}$ in., very slender; stipules narrow, membranous. *Flowers* $\frac{1}{12}$ – $\frac{1}{10}$ in. diam., solitary or fascicled; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in. *Disk* of male 6 globose glands; of fem. a very inconspicuous ring. *Ovary* ovoid; styles exserted, more or less connate at the base. *Fruit* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., usually purple, styles persistent.—This closely resembles *P. reticulatus* in habit, but is easily distinguished by the long simple styles, free stamens, and clavate tip of the fem. pedicel. The Chinese specimens are from the Province of Kiu Kiang (Maries); they have rather longer styles.

Sect. IV. EMBLICA (see p. 286).

7. ***P. Emblica***, *Linn. Sp. Pl.* 982; a large tree, branchlets glabrous or finely pubescent, leaves $\frac{3}{4}$ – $\frac{1}{2}$ in. distichously close-set subsessile linear-oblong obtuse, flowers densely fascicled along the branchlets males pedicelled, fem. few subsessile, anthers free, stigmas very large twice 2-fid, fruit depressed-globose $\frac{1}{2}$ in. fleshy. *Muell. Arg. in DC. Prodr.* xv. ii. 352; *Roxb. Fl. Ind.* iii. 671; *Wall. Cat.* 7903; *Brand. For. Fl.* 454, t. 52; *Grah. Cat. Bomb. Pl.* 180; *Gamble Man. Ind. Timb.* 351; *Beddome Flor. Sylcat.* t. 258; *Benth. Fl. Hongk.* 312; *Baill. Etudes Gen. Euphorb.* 627, t. 24, f. 20–24; *Lodd. Bot. Cab. t.* 548. ? *P. taxifolius*, *Don Prodr.* 63. *P. glomeratus*, *Herb. Roxb.* *Emblica officinalis*, *Gärtn. Fruct.* ii. 122, t. 108; *Wight Ic. t.* 1896; *Dalz. & Gibs. Bomb. Fl.* 235; *A. Juss. Tent. Euphorb.* 108, t. 5, f. 15. *Cicca Emblica*, *Kurz For. Fl.* ii. 352. *Dichelastina nodicaulis*, *Hance in Walp. Ann.* iii. 367.—*Rheede Hort. Mal.* i. t. 38.

Throughout TROPICAL INDIA, wild or planted, from the base of the Himalaya, from Jummoo eastwards, and southwards to CEYLON and MALACCA.—DISTRIB. Malay Islands, China.

A deciduous tree; bark flaking conchoidally; branchlets slender, pubescent. *Leaves* equal and symmetrically set, like the leaflets of a pinnate leaf, glabrous or puberulous beneath; stipules scarious, lacerate. *Flowers* yellow, racemed on the branches. *Sepals* 5–6, obovate-oblong. *Staminal column* short. *Disk* of male obsolete, of fem. a lacerate cup. *Ovary* globose; styles connate at the base; arms recurved, very large, dilated and twice branched. *Fruit* obscurely 6-lobed.

8. ***P. albizzioides***, *Hook. f.*; a tree, branchlets puberulous, leaves 1 by $\frac{1}{2}$ in. distichously close-set subsessile oblong or elliptic rarely orbicular glabrous glaucous beneath, flowers minute subracemose, males pedicelled, fem. subsessile, styles 2-cleft lobes broad entire, fruit globose 1 in. diam. fleshy. *P. pubescens*, *Wall. mss.* *Cicca albizzioides*, *Kurz For. Fl.* ii. 352.

BURMA; at Prome, *Wallich*. PEGU; up to 2000 ft., *Kurz*, *Brandis*.

Branches very slender, pubescent. *Leaves* 1 by $\frac{1}{2}$ in. or smaller, rounded at both ends; nerves 7–10 pair, very slender. *Cocci* bony, with a long pungent apex.

9. ***P. pomiferus***, *Hook. f.*; a shrub or tree, branchlets pubescent, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. long distichously close-set subsessile narrowly linear coriaceous acute or obtuse glabrous margins subreflexed, flowers subracemose, rachis pubescent,

staminal column slender, styles robust 2-lobed lobes short broad 3-crenulate, fruit 1 in. diam. globose fleshy. *Cicca macrocarpa*, *Kurz For. Fl.* ii. 352.

Pegu and Prome districts of BURMA, *Kurz*.

I have seen no specimens of this, which with the leaves of *P. Emblica* differs, according to *Kurz*, in the wrinkled fissured bark, the styles, and large fruit.

' 10. ***P. pectinatus***, *Hook. f.*; branchlets scurfily tomentose, leaves $\frac{1}{2}$ in. distichously close-set linear-oblong obtuse coriaceous incurved when dry with recurved margins nerveless, fruit turbinate $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{3}$ – $\frac{1}{2}$ in. *P. Emblica*, *Wall. Cat.* 7903 G.

PERAK, *King's Collector*; SINGAPORE, *Wallich*; MALACCA, *Griffith* (*Kew Distrib.* 4799), *Maingay* (*Kew Distrib.* 1352).

Very similar to *P. Emblica*, but differing in the scurfy rusty branchlets and form of the fruit.

Sect. V. PARAPHYLLANTHUS (see p. 286).

* *Shrubs or trees.*

11. ***P. polyphyllus***, *Willd. Sp. Pl.* xiv. 586; shrubby, quite glabrous, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. sessile linear-oblong obtuse or apiculate, nerves very distinct, flowers pedicelled subsolitary, anthers subsessile on a very short column free, style stout with 3 2-fid arms, fruit small 3-lobed epicarp thin, cocci subglobose crustaceous, seeds remotely foveolate. *Muell. Arg. in DC. Prodr.* xv. ii. 352; *Beddome Forester's Man.* 190 (*excl. some syns.*); *Wight Ic.* t. 1895. *P. racemosus* & *polyphyllus*, *Herb. Heyne in Wall. Cat.* 7902. *P. emblicoides*, *Muell. Arg. in Linnæa* xxxii. 15, and in *DC. l. c.* 353.

DECCAN PENINSULA, *Klein, Heyne*; in subalpine jungles, common towards the eastern slopes of the Nilghiris, *Wight*. CEYLON; common in the north part of the island.

Branches terete, strict. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, base rounded or subcordate, nerves 6–8 pair; stipules ovate-lanceolate, entire. *Male fl.* $\frac{1}{10}$ in. diam; sepals 6, oblong; disk-glands fleshy; anthers not apiculate. *Fem. fl.* twice as large, disk annular. *Fruit* $\frac{1}{2}$ in. diam., depressed. *Seeds* flat on the opposed faces, convex on the other.—There is some confusion about this plant. *Wight* figures the styles as free and sessile, and the anthers as cohering and crowned with a prolonged connective, none of which characters do I find. *Mueller* describes the styler column as slender, with 3 long slender 2-fid arms, and the anthers as shortly apiculate. I find the styler column long and stout, and the anthers hardly apiculate and quite free. *Mueller* further cites Nepal as a habitat, and *Don's P. taxifolius* as a synonym, which plant has pubescent branches, and is, I should think, *P. Emblica*. I find no difference between *Mueller's P. emblicoides* and *polyphyllus*. *Dalzell's P. polyphyllus* is no doubt *Mueller's P. Lawii*. *Beddome* erroneously unites *P. Lawii* with *polyphyllus*.

12. ***P. Lawii***, *Grah. Cat. Bomb. Pl.* 181; shrubby, quite glabrous, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. very shortly petioled linear-oblong obtuse or apiculate, nerves very obscure, flowers subsessile, anthers free stipitate, styles 3 very short 2-lobed, fruit small 3-lobed, cocci subglobose crustaceous. *Muell. Arg. in DC. Prodr.* xv. ii. 353. *P. spinulosus*, *Herb. Heyne, Wall. Cat.* 7897 A. ? *P. polyphyllus*, *Dalz. & Gibs. Bomb. Fl.* 234. *P. juniperinoides*, *Muell. Arg. in Linnæa* xxxii. 18, and in *DC. l. c.* 358.

BEHAR; on the banks of the Soane, *J. D. H.* DECCAN PENINSULA, from the Concan and Belgaum to the Wynaad, *Law, Stocks, &c.*

A shrub; branches usually grooved, branchlets sometimes faintly puberulous. *Leaves* half as broad as long or narrower, base rounded or cordate; stipules minute, setaceous. *Male and fem. fl.* $\frac{1}{10}$ – $\frac{1}{8}$ in. diam.; sepals 6, oblong, obtuse or subacute.

Seeds not seen.—Mueller describes the styles of *P. Lawii* as connate for nearly $\frac{1}{2}$ their length, but they are free, very short, with very short thick lobes, as he has correctly described them under *P. juniperinoides*.

13. ***P. hakgalensis***, *Thwaites mss. in Trimen Syst. Cat. Plant. Ceyl.* 80; shrubby, quite glabrous, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. sessile oblanceolate or linear-oblong acute coriaceous nerves very obscure, pedicels capillary longer than the leaves, flowers axillary solitary males $\frac{1}{4}$ fem. $\frac{1}{2}$ in. diam., anthers free broadly oblong obtuse column slender, styles spreading cleft to the middle, capsule globose smooth enclosed in the enlarged sepals.

CEYLON; at Hakgalle, *Thwaites*.

Branches terete, woody, scarred. *Leaves* scattered round the branches, close set. *Sepals* of both sexes broadly oblong, membranous. *Disk* of male of 6 rounded glands, of fem. a thick cushion. *Capsule* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam.—I have seen only one small specimen.

14. ***P. nemorum***, *Russell in Wall. Cat.* 7897 B; shrubby, quite glabrous, leaves $\frac{1}{2}$ in. sessile linear-oblong apiculate nerves distinct, flowers axillary solitary shortly pedicelled, staminal column equalling the connate obtuse anthers, styles long slender connate at the base with capitate notched tips. *Muell. Arg. in Linnæa* xxxiv. 70, and in *DC. Prodr.* xv. ii. 358.

The DECCAN? *Kœnig, in Herb. Russell.*

Branches terete, leafy branchlets 2 in., very slender, horizontal. *Leaves* $\frac{1}{2}$ in. broad, coriaceous, brown when dry, nerves 5–6 pair; stipules subulate. *Male fl.* $\frac{1}{12}$ in. diam.; pedicels capillary, about equalling the sepals; sepals oblong; fem. fl. $\frac{1}{8}$ in. diam., pedicel stouter, shorter than the narrower sepals; disk annular. *Ovary* globose, glabrous, shorter than the erect recurved styles.—The styles are very peculiar. Wallich's specimen is a solitary one, without fruit. On the back of the sheet is written, "*Phyllanthus nemorum*, fruticosus foliis bifariis simpliciter pinnatis, pinnis linearibus, fructu baccato exsucco tricocco parvo, ex spec. Kœn."

15. ***P. bæobotryoides***, *Wall. Cat.* 7942; shrubby, quite glabrous, leaves 2–4 in. sessile ovate- or oblong-lanceolate acute acuminate or caudate, flowers in slender axillary spikes or racemes, sepals of male 5–6 orbicular of fem. oblong-lanceolate obtuse, anthers erect large acute free terminating the staminal column, styler column long straight. *Muell. Arg. in Linnæa* xxxii. 15, and in *DC. Prodr.* xv. ii. 354; *Kurz For. Fl.* ii. 348.

SILHET, *Wallich, Griffith.* TENASSERIM, *Helfer.*

Branches woody, terete; branchlets long, slender, compressed and angled. *Leaves* thinly coriaceous, brown when dry, shining above; nerves 6–8 pairs, slender; petiole minute or 0; stipules minute. *Racemes* or spikes solitary or 2-nate, very slender, shorter than the leaves; bracts minute; flowers solitary or clustered; males shortly pedicelled, $\frac{1}{16}$ in. diam., with spreading sepals, and disk of 5–6 glands; fem. larger, with erect narrower sepals and an obscure disk. *Anthers* as long as or longer than the column of filaments, lanceolate; connective produced, acute. *Styler column* as long as the ovary, longer than the 2-partite recurved lobes which are linear-clavellate. *Fruit* not seen, but described by Kurz as a more or less woody capsule.

16. ***P. columnaris***, *Muell. Arg. in Linnæa* xxxii. 15, and in *DC. Prodr.* xv. ii. 334; a tree, branchlets finely tomentose, leaves 1–2 in. elliptic or oblong obtuse or apiculate, flowers densely clustered in leafless terminal racemes, sepals of male oblong glabrous of fem. ovate tomentose, anthers minute obtuse terminating a very long slender column, styler column short. *Kurz For. Fl.* ii. 347. *P. tetrandrus*, *Roxb. ?*, *Wall. Cat.* 7930.

PEGU to TENASSERIM, *Wallich, Griffith, Helfer.*

A deciduous tree, 20-25 ft.; branchlets long, slender, terete. *Leaves* thin, dull brown when dry, glaucous and puberulous beneath and rarely above, base rounded; nerves 5-7 pairs, slender; petiole $\frac{1}{2}$ in.; stipules minute. *Racemes* (leafless tips of branches) 6-8 in., erect; male fl. $\frac{1}{2}$ in. diam. on capillary pedicels, with spreading sepals and minute disk-glands; fem. larger, shortly stoutly pedicelled, with short broad erect sepals, and an unecolate disk. *Staminal column* far exserted; anther-cells short, separate, closely adnate to the top of the column, surrounding a minute 3-lobed pistilode. *Ovary* glabrous. *Capsule* $\frac{1}{2}$ in. diam., depressed, black.

17. **P. frondosus**, Wall. Cat. 7932; shrubby, glabrous or branchlets puberulous, leaves $1\frac{1}{2}$ -2 in. subsessile oblong or ovate-oblong acute or acuminate, flowers in minute axillary clusters very shortly pedicelled glabrous, anthers erect acute free terminating a very short column, styles free sessile 2-partite segments linear. Muell. Arg. in *Linnaea* xxxii. 17. Glochidion frondosus, Baill. Etudes Gen. Euphorb. 637. ? P. oxyphyllus, Miguel Fl. Ind. Bot. Suppl. 448; Muell. Arg. in DC. Prodr. xv. ii. 356. P. acutus, Wall. Cat. 7931, 7945.

PENANG, Wallich, Curtis. PERAK, King's Collector.—DISTRIB. ? Sumatra.

A shrub, 4-6 ft. in Perak; branches woody, with pale bark; branchlets long, slender, erect, tips angular. *Leaves* membranous, variable in size, dark brown above when dry, paler beneath, base cuncate rounded or subcordate; nerves 5-9 pairs; stipules minute. *Flowers* $\frac{1}{2}$ in. diam.; pedicel not longer than the perianth. *Sepals* of both sexes broadly oblong. *Connectives* produced, acute. *Disk* of male of minute glands. *Ovary* globose, glabrous, styles reflexed on its crown. *Fruit* not seen.—In the absence of flowering specimens of *P. oxyphyllus*, Miq., I hesitate to unite it with this. The leaves of *oxyphyllus* are larger, 2-3 in. long, with more nerves, but this alone would not separate it specifically.

18. **P. Kunstleri**, Hook. f.; branchlets very slender angular puberulous, leaves 2-2 $\frac{1}{2}$ in. subsessile ovate-lanceolate acuminate, flowers sessile in minute axillary clusters glabrous, anthers erect subsessile, ovary tomentose, styles 3 cleft to the middle arms diverging.

PENANG; alt. 800-1000 ft., King's Collector (Kunstler).

A bushy tree, 20 ft. *Leaves* membranous, base rounded, nerves 8-10 pairs very faint; stipules minute. *Flowers* $\frac{1}{3}$ in. diam. *Sepals* of both sexes oblong. *Connectives* not produced. *Disk-glands* of male 2-lobed. *Styles* erect and spreading.

19. **P. coriaceus**, Wall. Cat. 7946; quite glabrous, leaves 3 in. subsessile elliptic-oblong acute coriaceous, male flowers minute in axillary clusters glabrous, anthers erect subsessile, stylar column elongate, 3 arms reflexed. P. pachyphyllus, Muell. Arg. in DC. Prodr. xv. ii. 353.

SINGAPORE, Wallich.

Shrubby. *Leaves* unequal-sided with broadly rounded often decurved points, base contracted and very narrowly cordate, dark brown when dry and opaque, nerves 6-8 pairs, slender, cross-nervules indistinct; petiole $\frac{1}{10}$ in. *Sepals* ovate, obtuse. *Flowers* $\frac{1}{6}$ in. diam.; outer sepals oblong, inner more ovate. *Stamens* lanceolate, filaments very short. *Disk-glands* of male 2, crenate. *Ovary* globose; style columnar.—The specimens are very insufficient.

** Herbs.

20. **P. maderaspatensis**, Linn. Sp. Pl. 982; quite glabrous, leaves scattered $\frac{1}{4}$ -1 in. subsessile narrowly or broadly cuneately obovate glaucous beneath, stipules peltate, flowers axillary males very minute subsessile fem. very shortly pedicelled, sepals broad green with white margins, styles free minute 2-lobed, seeds striated in rough lines. Muell. Arg. in *Linnaea* xxxii. 19, and in DC. Prodr. xv. ii. 362; Rosb. Fl. Ind. iii.

654; *Wight Ic.* t. 1895, f. 3; *Grah. Cat. Bomb. Pl.* 180; *Dalz. & Gibs. Bomb. Fl.* 233; *Benth. Fl. Hongk.* 311, and *Fl. Austral.* vi. 103. *P. andrachnoides*, *Willd. Sp. Pl.* iv. 575. *P. obcordatus*, *Willd. Enum. Hort. Berol. Suppl.* 65; *Roxb. Fl. Ind.* iii. 656; *Wall. Cat.* 7906. *P. javanicus*, *Poir.*; *Spreng. Syst.* iii. 21. *P. anceps*, *Herb. Heyne*. *P. linearis*, *Herb. Madr.* *P. malabaricus*, *Herb. Niruri*, *Wall. Cat.* 7894.

Drier parts of INDIA; from BANDA, *Edgeworth*, throughout the DECCAN PENINSULA to CEYLON.—DISTRIB. Trop. Africa, Arabia, Java, China, Australia.

Very variable in habit, erect or decumbent below; stems low and herbaceous or erect, slender, woody with spreading branches and sometimes? a woody perennial stock. *Leaves* from $\frac{1}{2}$ in. and cuneate or almost obcordate to $1\frac{1}{2}$ in., and narrowly oblong-cuneate; nerves few, slanting; petiole minute; stipules lanceolate membranous. *Male fl.* $\frac{1}{20}$ in. diam., usually fascicled with one much larger fem.; *fem.* $\frac{1}{10}$ in. diam. in fruit. *Sepals* rounded or obcuneate. *Disk* of glands in both sexes. *Anthers* almost sessile on the column, erect, apiculate. *Fruit* dry, $\frac{1}{2}$ in. diam., globose.—Mueller distinguishes four varieties by the size and form of the leaves, but they pass into one another. Roxburgh describes his *obcordatus* as suffruticose; it is a tall slender form with woody stems and long branches.

21. **P. Rheedii**, *Wight Ic.* t. 1895, f. 1; annual, quite glabrous, leaves 1-1 $\frac{1}{4}$ in. subsessile elliptic or subovate apiculate, stipules not peltate, flowers axillary males very minute fem. larger longer pedicelled, sepals oblong green with narrow white margins, filaments free above, styles short 2-partite, seeds remotely striated. *Muell. Arg. in DC. Prodr.* xv. ii. 363. *P. flaccidus*, *Thwaites Enum.* 283.

NILGHIRI HILLS, *Wight*; alt. 6000 ft., *Clarke*. CEYLON; in the Central Province, alt. 4-7000 ft.

Diffusely branched from the base and above, $\frac{1}{2}$ -3 ft. high; branches terete. *Leaves* membranous, dark brown when dry, not glaucous beneath, nerves very faint; petiole $\frac{1}{8}$ in.; stipules lanceolate. *Flowers* a few males on short capillary pedicels, and one fem. on a longer stouter pedicel, the latter in fruit $\frac{1}{2}$ in. diam. *Sepals* oblong. *Disk-glands* of male large, lobulate; of fem. linear, quite distinct. *Filaments* free above and spreading; anthers globose, not apiculate. *Styles* slender. *Capsule* $\frac{1}{2}$ in. diam., globose, hardly 3-lobed, almost membranous. *Seeds* with rather distant longitudinal very slender ridges and minute cross-lines.—Wight's figure is not accurate, nor does it accord with his specimens; the filaments are quite free, and diverge above; the fem. disk is not cupular, as figured by him and described by Mueller, but of linear glands; and the fem. pedicel is much too long. Wight suggests this being Rheede's *Niruri*, which Mueller rightly doubts. Rheede is not likely to have had a Nilghiri or Ceylon plant.

22. **P. urinaria**, *Linn. Sp. Pl.* 982; annual, rarely perennial, glabrous or nearly so, stem and branches angled, leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. sessile distichously imbricate oblong or linear-oblong tip rounded or apiculate, stipules peltate, flowers very minute axillary subsessile, sepals ciliolate, filaments very short free, ovary densely granulate, styles short free 2-fid, fruit echinate, seeds transversely furrowed. *Muell. Arg. in Linnæa* xxxii. 19, and in *DC. Prodr.* xv. ii. 364; *Roxb. Fl. Ind.* iii. 660; *Wall. Cat.* 7893; *Grah. Cat. Bomb. Pl.* 180; *Benth. Fl. Hongk.* 310, and *Fl. Austral.* vi. 102. *P. leprocarpus*, *Wight Ic.* t. 1895, f. 4. *P. alatus*, *Blume Bijl.* 594. *P. cantoniensis*, *Hornem. Hort. Haffn.* 910. *P. mucronatus* & *racemosus*, *Herb. Heyne*. *P. muricatus* & *P. polyphyllus*, *Herb. Madr.* *P. echinatus*, *Herb. Ham.*—*Rheede Hort. Mal.* x. 16.

Throughout INDIA; from the PANJAB to ASSAM, BURMA, MALACCA, PENANG, and CEYLON.—DISTRIB. Tropics generally.

A low or tall diffusely branched erect or decumbent herb (becoming perennial in some soils, *Roxb.*); branches at the angles and often the margins of the leaves and sepals minutely hispid. *Leaves* very variable in size, glaucous beneath; stipular lanceolate. *Flowers* $\frac{1}{10}$ in. diam., or the males smaller, very shortly pedicelled; fem. perianth in fruit $\frac{1}{12}$ in. diam. *Sepals* green, of the males orbicular; fem. oblong. *Disk* of male of glands; of female narrow, entire, lobed. *Filaments* very shortly united, anthers erect, didymous not apiculate. *Styles* with hooked arms. *Fruit* $\frac{1}{10}$ in. diam., echinate.—Wight represents the filaments as wholly connate and the anthers as erect, apiculate, which I do not find to be so.

Var. *Hookeri*; taller and larger in all its parts, 1–1½ ft. high, stem terete with simple long erect angled branches, filaments wholly connate. *P. Hookeri*, *Muell. Arg. in Linnæa l. c.*, and in *DC. l. c.* 366.—Khasia Mts., alt. 2–4000 ft., *Griffith (Kew Distrib.* 4805), *J. D. H. & T. T.*

Sect. VI. EUPHYLLANTHUS (see p. 286).

* Stipules semisagittate or peltate.

23. **P. Griffithii**, *Muell. Arg. in Linnæa* xxxii. 27, and in *DC. Prodr.* xv. ii. 384; shrubby, quite glabrous, leaves scattered $\frac{3}{4}$ – $\frac{1}{2}$ in. subsessile elliptic or oblong acute or obtuse glaucous beneath, stipules peltate lacerate, flowers long pedicelled axillary, filaments free or united in a long or short column, anthers globose, styles very long connate to the middle arms long very slender recurved, seeds smooth.

KHASIA HILLS; at Mamloo, *Griffith, Clarke, &c. (Kew Distrib.* 4822). MUNNIPORE, *Watt*.

Much branched, branches woody angled. *Leaves* hardly distichously imbricating towards the tops of the branches, rather coriaceous, base acute, nerves 6–8 pair, distinct beneath. *Male fl.* $\frac{1}{10}$ in. diam., pedicels capillary, sepals rounded; fem. larger, pedicels $\frac{1}{2}$ in., sepals oblong reflexed in fruit. *Disk* of male of small glands, of fem. annular lobed. *Stamens* recurved; anthers globose. *Ovary* globose; styles 3 times as long, arms capillary recurved. *Capsule* $\frac{1}{2}$ in. diam., depressed globose, obscurely lobed, smooth.—There is some error in Mueller's description. The plant is not dioecious, and the fem. pedicels are shorter than the leaves. The anthers when upon a very elongate staminal column are, I think, imperfect.

24. **P. parvifolius**, *Ham. in Don Prodr.* 63; shrubby, nearly glabrous, branches very slender, leaves $\frac{1}{4}$ – $\frac{1}{3}$ in. distichously imbricate sessile elliptic or subuneately obovate tip rounded glaucous beneath, stipules hastate, flowers minute subsolitary axillary very shortly pedicelled, filaments free, styles sessile short 2-partite arms slender, seeds smooth. *Muell. Arg. in DC. Prodr.* xv. ii. 385. *P. juniperinus*, *Wall. Cat.* 7901; *Muell. in Linnæa* xxxii. 28. *P. prætervisus*, *Muell. Arg. in Linnæa*, and in *DC. ll. c.*

TEMPERATE HIMALAYA; from Jamu and Kumaon, alt. 5–6000 ft., to Bhotan. KHASIA MTS., alt. 4–5000 ft., *Griffith, &c.*

A shrub, 6–8 ft., bark pale; ultimate branchlets capillary, short. *Leaves* membranous; nerves 3–4 pair, very faint; stipules very minute, subulate. *Male fl.* $\frac{2}{10}$ in. diam., pedicels rather longer; sepals rounded; fem. twice as large, subsessile or longer pedicelled, sepals oblong. *Disk* of male of glands; of fem. annular, crenate. *Filaments* short, spreading; anthers didymous. *Ovary* globose, styles variable in length. *Capsule* $\frac{1}{2}$ in. diam., globose, obscurely lobed, crustaceous, smooth. *Seeds* minutely mottled with brown.—Wallich's 7901 A is from the Calcutta Garden, and accords with those from the habitats cited above, but his B from Nepal has longer acicular stipules on the branchlets.

25. **P. Roeperianus**, *Wall. Cat.* 7904; a rigid shrub, branches

ribbed erect, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. shortly petioled coriaceous elliptic linear- or obovate-oblong obtuse or acute margins recurved, stipules broad peltate, male fl. shortly fem. longer-pedicelled, filaments connate to the middle, anthers didymous, disk of fem. broad 6-lobed, styles reflexed 2-partite, capsule minute, seeds rugulose. *Muell. Arg. in Linnæa* xxxii. 28, and in *DC. Prodr.* xv. ii. 385.

KHASIA Mts., alt. 5–6000 ft., *Wallich, &c.* MUNNIPORE, *Watt.*

A small shrub, with erect leafy densely fascicled rigid woody branches, and slender grooved branchlets. *Leaves* dense, suberect, glaucous beneath, pale greenish when dry; base cordate or rounded; nerves 5–6 pair, faint beneath; petiole $\frac{1}{10}$ in., stout; stipules membranous. *Flowers* from tufts of fimbriate bracts, males $\frac{1}{10}$ in. diam., on very short pedicels; fem. $\frac{1}{10}$ in., fruiting $\frac{1}{12}$ in. diam., spreading. *Sepals* 5 or 6, broadly oblong. *Disk* of male of glands; of fem. broad, expanded, lobes broad emarginate. *Style-arms* slender, straight. *Capsule* $\frac{1}{12}$ – $\frac{1}{10}$ in. diam., depressed globose, crustaceous, faintly 3-lobed. *Seeds* transversely rugulose on the back, striated in a radiating manner on the sides.—I find no means of distinguishing *Mueller's var. genuinus* and *parvifolius*.

26. **P. simplex**, *Retz. Obs.* v. 29; annual or suffruticose, quite glabrous, branches compressed, leaves distichous $\frac{1}{3}$ –1 in. subsessile from linear to oblong-obovate elliptic and rounded obtuse acute or apiculate, stipules peltate subsagittate, fem. flowers on short or long pedicels, filaments free, anthers didymous, ovary smooth or pubescent granular, styles short free reflexed arms recurved, capsule minute smooth or sparsely echinate, seeds minutely tubercled. *Muell. Arg. in DC. Prodr.* xv. ii. 391.

Throughout INDIA, in the plains and low hills from Kumaon to Assam and southward to TRAVANCOR, MALACCA and CEYLON, ascending the hills to 6000 ft.—DISTRIB. Malay Islands, China, Mongolia, Pacific Islands.

Stem either woody below with strict erect slender flattened leafy branches, or erect with spreading branches, and 3 ft. high; or a low dwarf bush with fascicled terete branches and compressed branchlets. *Leaves* sometimes distichously imbricating towards the ends of the branchlets, rather coriaceous and glaucous beneath; petiole minute or 0; stipules very variable, entire or toothed or fimbriate. *Flowers* often 3-nate 2 males and 1 female, or more frequently the females solitary in the upper axils; males very minute, $\frac{1}{30}$ in. diam., pedicel capillary $\frac{1}{12}$ – $\frac{1}{10}$ in.; fem. on much longer stouter pedicels shorter or longer than the leaves. *Sepals* broadly oblong, fem. slightly enlarged in fruit. *Disk* of male of large rounded glands, of fem. annular. *Styles* variable in length. *Capsule* $\frac{1}{12}$ – $\frac{1}{10}$ in. diam.; depressed globose, smooth, crustaceous. *Seeds* $\frac{1}{12}$ in. long, covered loosely with minute tubercles in irregular lines.—A most variable plant, of which *Mueller* has established four Indian varieties, differing greatly in their extreme forms, but connected by innumerable intermediates. To these I add, as a fifth, his *P. Miquelianus*.

P. SIMPLEX PROPER; stems many from a woody stock erect or ascending curved or strict flattened, leaves usually narrow and long sometimes $1\frac{1}{2}$ in., fem. pedicels shorter than the leaves. *P. simplex*, *Roxb. Fl. Ind.* iii. 654; *Wall. Cat.* 7898 (excl. part of D); *Dalz. & Gibs. Bomb. Fl.* 234. *P. anceps*, *Heyne in Vahl Symb.* ii. 95. *P. virgatus*, *Herb. Madr.* *P. depressus*, *Herb. Russel.* *P. simplex*, *var. genuinus*, *Muell. l. c.*

VAR. oblongifolia, *Muell. Arg. in Linnæa* xxxii. 32, and in *DC. l. c.*; stem erect diffusely branched, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. long elliptic-oblong subacute, fem. pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. *Macraea oblongifolia*, *Wight Ic.* t. 1902, f. 1. ? *Melanthesa rupestris*, *Miquel Fl. Ind. Bat.* i. ii. 371.—Deccan Peninsula and Ceylon.—I can hardly distinguish this from *var. Gardneriana*. I have seen no specimens of *Miquel's Melanthesa rupestris*.

Var. Gardneriana, *Muell. Arg. in Linnæa l. c.*, and in *DC. l. c.* 392; usually glabrous, branches very long and slender from a short stock, branchlets angular hardly compressed, leaves from linear to broadly oblong, male fl. often fascicled, styles slender, capsule smooth. *P. Gardneri*, *Thwaites Enum.* 282. *P. Gardnerianus*, *Baill. Etudes*

Gen. Euphorb. 628. *P. Miquelianus*, *Muell. Arg. ll. c.* *P. fruticosus*, *Herb. Heyne*, *Wall. Cat.* 7899 A. *P. debilis*, *Wight mss.* *P. marginatus*, *Herb. Heyne*. *P. depressus*, *Herb. Russell*. *P. patens*, *Miquel in Herb. Hohenack.* No. 1130. *Macraea Gardneriana* & *ovalifolia*, *Wight Ic. t.* 1902, f. 3 and 4.—The Deccan Peninsula and Ceylon, on the hills, alt. 3–6000 ft.—This is perhaps a different species; it is a taller, larger, more branched plant with longer hardly compressed branches, usually fascicled flowers and longer fem. pedicels and style-arms. It seems to be a hill plant.

Var. *pubescens*; characters of var. *Gardneriana*, but whole plant more or less pubescent.—Ceylon, on the hills.

27. **P. Macraei**, *Muell. Arg. in Linnæa* xxxii. 29, and in *DC. Prodr.* xv. ii. 393; shrubby, quite glabrous, leaves 1–1½ in. subsessile broadly elliptic or oblong apiculate rounded at both ends, stipules subsagittate peltate, male fl. clustered shortly pedicelled, fem. pedicels equalling the leaves, filaments free, anthers didymous, ovary pubescent, styles free reflexed, seeds minutely tubercled on the back. *Macraea Rheedii*, *Wight Ic. t.* 1901.

TRAVANCORE; Pulney Mts., *Wight*.

I have seen no specimens of this, which may be a large-leaved form of *P. simplex*.

** Stipules simple, not peltately attached or semisagittate.

† Shrubs.

28. **P. myrtifolius**, *Moon Cat. Ceyl. Pl.* 65; a rigid shrub, branchlets suberect tips puberulous, leaves ½–⅓ in. shortly petioled coriaceous linear-oblong or oblanceolate-oblong obtuse or acute base narrowed cordate, stipules minute broad, pedicels slender fem. often equalling the leaves, filaments connate to the middle, anthers didymous, styles short reflexed arms recurved, capsule small, seeds minutely reticulate on the back. *Muell. Arg. in DC. Prodr.* xv. ii. 396; *Baill. Etudes Gen. Euphorb.* 628; *Thwaites Enum.* 283. *Macraea myrtifolia*, *Wight Ic. t.* 1902, f. 2.

CEYLON; on banks of rivers up to 1800 ft.

A small shrub, with the habit of *P. Roeperianus*, but the branchlets are puberulous and terete, the leaves narrower, not glaucous beneath, with the margins not or hardly recurved, the very faint nerves are nearly horizontal, and the stipules minute. *Flowers* ⅓–⅓ in. diam., often clustered; pedicels capillary, of both sexes very unequal in length, sometimes equalling the leaves. *Sepals* broadly oblong, thick; of fem. slightly enlarged in fruit and spreading. *Disk* of male of very large tubercled glands; of fem. an almost entire cup. *Capsule* depressed-globose, slightly 3-lobed, crustaceous. *Seeds* beautifully reticulated.

29. **P. Leschenaultii**, *Muell. Arg. in Linnæa* xxxii. 37, and in *DC. Prodr.* xv. ii. 398; shrubby, very slender, quite glabrous, leaves 1 in. petioled membranous elliptic-oblong obtuse base acute, nerves 6–8 pair distinct, pedicels much shorter than the leaves, filaments free, anthers didymous, styles short reflexed arms recurved, capsule minute, seeds ribbed.

KHASIA MTS.; at Knullung Rock, alt. 5000 ft., *J. D. H. & T. T. (Phyllanth. 22, Herb. I. O., Hf. & T.)*. NILGHIRI HILLS, *Perrottet, Foulkes*.

A shrub, 6–8 ft. *Leaves* very thin, dull green above when dry, glaucous beneath, nerves distinct on both surfaces; petiole ⅓–⅓ in., very slender; stipules lanceolate, nerves distinct on both surfaces; petiole ⅓–⅓ in., very slender; stipules lanceolate. *Male fl.* often 3-nate, very shortly pedicelled, ⅓ in. diam.; *sepals* oblong; *disk-glands* large. *Fem. fl.* ⅓ in.; *pedicel* ¼ in.; *sepals* slightly enlarged but not reflexed in fruit; *styles* short, reflexed, arms recurved. *Capsule* ⅓ in. globose, smooth, coriaceous. *Seeds* with distant very slender ribs.—Mueller describes the filaments as

connate for $\frac{1}{2}$ to $\frac{3}{4}$ their length; I find them free, but in dried flowers of such excessive minuteness it is impossible to be precise. Mueller gives Khasia, 2-5000 ft., as the habitat of my specimens, but I suspect some mistake as to the 2000, for I found it only at Kullung Rock; it was perhaps confounded with the following in the distribution.

30. **P. missionis**, *Hook. f.*; shrubby, quite glabrous, branches very slender, leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. petioled very membranous elliptic acute at both ends or obovate obtuse or apiculate, stipules ovate oblong obtuse, flowers clustered or the fem. solitary pedicelled, sepals broad with broad white margins, filaments united $\frac{3}{4}$ way up recurved, anthers reniform, styles erect and recurved arms slender, capsule very small. *P. tenellus*, *Wall. Cat.* 7892 A and B in part.

DECCAN PENINSULA, *Heyne in Herb. Wallich.*

Stem strict, erect, terete, slender, stiff, leafy, branches ascending. *Leaves* $\frac{1}{2}$ in. broad, very thin, hardly glaucous beneath; nerves 4-5 pair, spreading; petiole slender, $\frac{1}{10}$ - $\frac{1}{8}$ in.; stipules brown when dry, inserted by a broad base. *Flowers* $\frac{1}{10}$ - $\frac{1}{8}$ in. diam., males on unequal pedicels $\frac{1}{10}$ - $\frac{1}{8}$ in., of fem. $\frac{1}{8}$ in., fruiting $\frac{1}{8}$ in. diam., spreading; sepals thin, obtuse. *Disk* of male of large entire peltate glands, of fem. broadly lobed; anthers dehiscing across the top. *Styles* connate at the very base. *Capsule* $\frac{1}{8}$ in. diam., smooth, depressed globose, obscurely lobed. *Seeds* not seen.—A very distinct species in the obtuse stipules, clustered flowers and longer styles not reflexed on the ovary, but rising up.

31. **P. Clarkei**, *Hook. f.*; shrubby, branches woody, branchlets scaberulous, leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. petioled firm cuneate obovate or orbiculate tip rounded on retuse, nerves distinct, stipules membranous fimbriate, flowers subsolitary, pedicels of male short of fem. almost equalling the leaves, filaments very short recurved, anthers didymous cells separate, styles free reflexed, arms incurved.

SIKKIM HIMALAYA, *J. D. H.*; at Catsuperri, alt. 6000 ft., *Clarke*. UPPER ASSAM, *Griffith (Kew Distrib.* 4801).

A rigid shrub; branches spreading; branchlets grooved, stiff, angles rough. *Leaves* green when dry, paler beneath; nerves 3-4 pair, slender; petiole slender, $\frac{1}{10}$ in. *Flowers* arising from minute clusters of bracts, $\frac{1}{10}$ in. diam.; pedicels of male $\frac{1}{10}$ in. and upwards, of fem. $\frac{1}{8}$ - $\frac{1}{4}$ in. *Sepals* broadly oblong, rather thick. *Disk* of male of peltate entire glands, of fem. cupular obscurely lobed. *Ovary* globose; styles rather large, arms cylindric long but not slender.—Very distinct from all others. I found a similar species in Sikkim, but with sessile exactly elliptic leaves, but out of flower and fruit; Griffith has also, in bad state, what I take to be my Sikkim plant from Upper Assam and the Khasia Mts.

32. **P. brevipes**, *Hook. f.*; shrubby, quite glabrous, branches rigid leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. petioled elliptic or obovate-oblong subacute or obtuse, nerves distinct, stipules membranous fimbriate, flowers very shortly pedicelled from tufts of fimbriate bracts, filaments connate at the base, anthers didymous, styles minute reflexed 2-lobed, capsule minute, seeds striated.

UPPER ASSAM; Mishmi Hills, *Griffith (Anisonema, Kew Distrib.* 4821).

A scraggy shrub, *Griff.*; branches spreading, bark brown, rather densely leafy. *Leaves* pale grey green when dry, hardly paler beneath, thinly coriaceous, base acute, nerves distinct on both surfaces; petiole $\frac{1}{10}$ in.; stipules broadly ovate. *Flowers* in all the axils, usually solitary or a male and female together, $\frac{1}{10}$ in. diam.; pedicels of male about as long, of fem. rather longer. *Sepals* of male broadly obovate, of fem. narrower, not enlarged, nor reflexed in fruit. *Disk* of male of orbicular glands, of fem. deeply broadly 6-lobed. *Capsule* $\frac{1}{10}$ in. diam., depressed-globose, 3-lobed, quite smooth. *Seeds* with 5 dorsal striæ, each of a series of hardly raised minute transverse dots.

†† *Herbs*.

33. **P. pendulus**, *Roxb. Fl. Ind.* iii. 663; biennial, suffruticose, erect, quite glabrous, branchlets filiform very long drooping, leaves $\frac{1}{2}$ in. distichous subsessile narrowly elliptic-lanceolate acute, flowers axillary very shortly pedicelled springing from short peduncles clothed with decussately imbricating entire bracts, anthers 3, filaments united above the middle, styles reflexed arms recurved.

BENGAL; very rare, *Roxburgh*.

Stem 2-3 ft., branches twiggy. *Leaves* with red margins. Bracteate peduncles when fully grown half as long as the leaves; bracts white, acute, membranous. *Sepals* broadly ovate, acute, of female hardly enlarged and not reflexed in fruit. *Disk* of male broad, 6-lobed, of fem. crenate. *Capsule* $\frac{1}{10}$ in. depressed globose.—A remarkable plant, described from Roxburgh's Flora and his drawing at Kew. He states that the flowers are altogether like those of *P. Niruri*, but his figure of the sepals is very different, as are the anthers. Mueller, probably by an oversight, says he has seen specimens.

34. **P. Niruri**, *Linn. Sp. Pl.* 981; annual, quite glabrous, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. membranous subsessile elliptic-obovate oblong or linear tip rounded obtuse or acute, nerves few obscure, flowers minute shortly pedicelled, sepals 5-6, of male orbicular, anthers 3 sessile on a short column didymous, styles minute very short free 2-lobed, capsule minute, seeds with equal slender ribs and transverse striæ. *Muell. Arg. in Linnæa* xxxii. 43, and in *DC. Prodr.* xv. ii. 406; *Roxb. Fl. Ind.* iii. 659; *Grah. Cat. Bomb. Pl.* 180; *Dalz. & Gibs. Bomb. Fl.* 234; *Thwaites Enum.* 282; *Wall. Cat.* 7895 (excl. part of A); *Wight Ic.* t. 1894. *P. urinaria*, *Herb. Russ.* *P. Lonphali*, *Herb. Madr.* *P. polyphyllus*, *Herb. Wight.* *Nymphanthus Niruri*, *Lour. Fl. Coch.* 545.—*Burm. Fl. Zeyl.* t. 93.—*Rheede Hort. Mal.* x. t. 15.

Throughout the hotter parts of India; from the PANJAB to ASSAM, and southward to TRAVANCOR, MALACCA and CEYLON, ascending the hills to 3000 ft.—DISTRIB. Tropics generally, except Australia.

A weed, 6-18 in. high, branched from the base, with an erect stem naked below, and slender leafy angular branches above. *Leaves* variable, pale green, often distichously imbricating, glaucous beneath; petiole minute; stipules subulate. *Flowers* very numerous, males solitary and 2-nate $\frac{1}{10}$ in. diam., almost sessile; fem. $\frac{1}{15}$ in. diam. *Sepals* of male orbicular, of fem. narrowly obovate-oblong with broad white margins, not enlarged in fruit, spreading, not reflexed. *Disk* of male of minute glands; of fem. annular, lobed. *Capsule* $\frac{1}{10}$ – $\frac{1}{12}$ in. diam., depressed-globose, smooth, hardly lobed, thinly crustaceous. *Seeds* with equal parallel slender ribs and faint cross striæ.—As Mueller observes, Thomson's specimens (from Moradabad) have hirtellous tips of the branchlets; this is just as in *P. urinaria* and *scabrifolius*.

35. **P. nanus**, *Hook. f.*; annual, quite glabrous, stems rigid short prostrate or ascending, leaves $\frac{1}{2}$ in. petioled oblong obtuse, nerves obscure, flowers very minute shortly pedicelled, sepals ovate-oblong outer acute, anthers sessile on a short column didymous, styles minute free reflexed very short, capsules minute, seeds with strong parallel and transverse ribs.

BURMA; at Tsegau, *Griffith*.

Root stout, tortuous, woody. *Stem* or branches 4-8 in., with spreading and recurved leafy slender branchlets. *Leaves* the smallest of Indian species, rather coriaceous, base rounded; nerves 3-4 pair, obscure; petiole minute; stipules minute, subulate. *Flowers* very minute; males $\frac{1}{10}$ in. diam., fem. $\frac{1}{10}$ with a thickened pedicel about as long, in fruit $\frac{1}{12}$ in. diam., and not reflexed. *Sepals* 5-6, coriaceous, with pale margins. *Disk* in both sexes of glands; glands of male pedicelled; of fem. larger, erect. *Styles* thick, 2-lobed. *Capsule* $\frac{1}{10}$ in. diam., globose, smooth, crustaceous.

Seeds much more strongly ribbed than in its allies.—This resembles a minute rigid branched *Niruri*, and has similar styles, but is smaller in all its parts with differently ribbed seeds.

36. ***P. debilis***, *Herb. Ham.*; annual, quite glabrous, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. very membranous elliptic or obovate obtuse or acute, nerves 4–5 pair very obscure, pedicels much shorter than the leaves, sepals with broad membranous margins, filaments very short free, anthers didymous, styles short reflexed arms recurved, capsule minute, seeds ribbed. *P. tenellus*, *Wall. Cat.* 7892 G.

NORTH-WEST INDIA, *Royle*. SIKKIM and BHOTAN HIMALAYA, alt. 1–3000 ft., *Griffith*, &c. BEHAR and HAZARIBAGH, *Hamilton*, *Clarke*. ASSAM and KHASIA MTS., *Jenkins*, &c., alt. 2–4000 ft., *J. D. H. & T. T.* DECCAN PENINSULA, *Herb. G. Thomson*.—DISTRIB. Trop. Africa.

An erect very slender herb, 1–3 ft. high; stem terete, naked below, branched above, branches slender. *Leaves* pale green when dry, glaucous beneath, base usually acute; petiole $\frac{1}{2}$ in. and less; stipules membranous, lanceolate. *Male fl.* $\frac{1}{10}$ in. diam., very shortly pedicelled; sepals obovate-oblong; disk-glands stellately lobed; filaments recurved. *Fem. fl.* $\frac{1}{2}$ in. diam., fruiting $\frac{1}{2}$ in. diam.; sepals as in the male, but much larger, spreading in fruit. *Capsule* $\frac{1}{10}$ in. diam., coriaceous. *Seeds* with irregular slender ribs.—Near *P. Leschenaultii*, but a much more slender and annual plant with smaller leaves, few faint nerves and much larger fem. flowers. Much nearer *P. Niruri*, but the leaves, fruit and flowers are much larger, the ribs of the seed irregular, the style-arms longer and recurved, and the disk-glands of the male lobulate.—The true *P. tenellus* is a Mauritian plant, cultivated in Calcutta, and is Wallich's 7892 A, the left-hand specimen only, and is pentandrous. It is figured in *Hook. Ic. Plant.* t. 1569.

37. ***P. rotundifolius***, *Klein in Willd. Sp. Pl.* iv. 584; annual, quite glabrous, stems many rigid ascending from the woody root branched, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. subsessile coriaceous orbicular or broadly obovate tip rounded or apiculate nerves obsolete, flowers minute males sessile fem. very shortly pedicelled, anthers subsessile reniform, styles minute free 2-lobed, seeds with equal slender ribs and cross striæ. *Muell. Arg. in Linnea* xxxii. 43, and in *DC. Prodr.* xv. ii. 405. *P. bacciformis* & *rotundifolius*, *Herb. Madr.*; *Wall. Cat.* 7896 B. *P. Niruri*, *Wall. Cat.* 7895 A (*in part*). *P. tenellus*, *Wall. Cat.* 7892 A (*in part*), C.

DECCAN PENINSULA, *Klein*; Coromandel coast, *Roxburgh*, *Wight*, &c. CEYLON, at Ballicaloa, *Gardner*.—DISTRIB. Arabia, Trop. Africa.

Stems many, 6–24 ft., stiff, terete; branchlets compressed or angular, angles sometimes minutely hirtellous. *Leaves* pale when dry, glaucous beneath; petiole minute; stipules minute, subulate. *Male fl.* $\frac{1}{30}$ in. diam., very shortly pedicelled; fem. $\frac{1}{2}$ in.; fruiting $\frac{1}{2}$ in. diam., spreading; pedicel stout, not half as long as the leaf. *Sepals* oblong-obovate, with a broad white margin. *Disk* of male of minute glands, of fem. annular. *Capsule* $\frac{1}{10}$ – $\frac{1}{12}$ in. diam., depressed-globose, smooth, scarcely lobed.—Mueller gives *Assam* as a locality, but the specimen so marked from Col. Jenkins is probably from the Calcutta Gardens.

38. ***P. scabrifolius***, *Hook. f.*; annual, erect, stem and branches angular and leaves beneath scaberulous, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. subsessile broadly elliptic or obovate tip rounded nerves distinct, flowers very shortly pedicelled, stipules lanceolate serrate, filaments short united to the middle tips recurved, anthers reniform, styles free short reflexed arms recurved, capsule smooth, seeds with 7–9 dorsal ribs and faint transverse striæ.

The CONCAN, *Stocks*.

A leafy herb, 6–10 in., copiously branched from the base and upwards; stem

and primary branches stout, ultimate short, all angled; the angles as well as the leaves beneath hispidulous with white hairs. *Leaves* pale when dry, rather thick, nerves 4-5 pair distinct on both surfaces; petiole minute; stipules white, membranous, lanceolate. *Male fl.* $\frac{1}{10}$ in. diam., fem. rather larger, pedicels of both $\frac{1}{10}$ - $\frac{1}{12}$ in. *Sepals* oblong obtuse with broad white margins; fem. a little enlarged and reflexed after fruiting. *Disk* of male of rounded glands; of fem. a low crenate cup; anther-cells at length confluent. *Capsule* $\frac{1}{4}$ in., depressed globose, 3-lobed, minutely granulate. *Seeds* very broad, sides with concentric ribs.—A very distinct plant, near *P. Niruri*, but with scaberulous branches and leaves, much larger flower and fruit, reflexed sepals after fruiting, and very different seeds.

Sect. VII. REIDIA (see p. 286).

* *Leaves* 2-5 in. *Sepals* entire or lacerate. *Ovary* glabrous, smooth.

39. **P. elegans**, *Wall. Cat.* 7926; shrubby, quite glabrous, leaves 3-4 in. ovate- or oblong-lanceolate finely acuminate, male fl. shortly pedicelled in clusters on the branches, fem. in terminal racemes, sepals of male 4 of fem. 6 all lacerate, fruit smooth. *Muell. Arg. in Linnæa* xxxii. 46, and in *DC. Prodr.* xv. ii. 420.

TENASSERIM; at Moolmayne, Mergui and Amherst, *Wallich*, &c.

Branches terete. *Leaves* coriaceous, glaucous or brown beneath, base acute or rounded, margins recurved; nerves 5-6 pair, very faint; petiole $\frac{1}{12}$ in.; stipules subulate. *Male fl.* $\frac{1}{20}$ in. diam., densely clustered; pedicels $\frac{1}{10}$ - $\frac{1}{12}$ in., capillary; sepals 4, fimbriate; glands cup-shaped; anthers 2, didymous. *Fem. fl.* solitary in the axils of lanceolate bracts forming a terminal distichous raceme; flowering pedicels $\frac{1}{4}$ in., fruiting 1-1 $\frac{1}{2}$ in.; sepals 6, unequal, lacerate, equalling the male in flower, fruiting much enlarged. *Fruit* $\frac{1}{2}$ in. diam. or more; cocci coriaceous. *Seeds* $\frac{1}{4}$ in. long, finely transversely striolate.

40. **P. Baillonianus**, *Muell. Arg. in Linnæa* xxxii. 47, and in *DC. Prodr.* xv. ii. 422; shrubby, quite glabrous, leaves 1 $\frac{1}{2}$ -2 in. ovate acuminate pale beneath, male fl. axillary long-pedicelled solitary or few together, fem. axillary and in terminal racemes, sepals entire, fruit smooth. Epistylum cordifolium, *Baill. Etudes Gen. Euphorb.* 648. *E. latifolium*, *Thwaites Enum.* 283 (excl. syn.).

CEYLON; Central Province, alt. 2-4000 ft., *Gardner*, *Thwaites*.

A bush, 3-4 ft., branches terete. *Leaves* membranous, green when dry, base unequal rounded rarely subcordate, often marbled with broad white or brown beneath; nerves 10-12 pair, very spreading; petiole $\frac{1}{12}$ in.; stipules minute, subulate. *Male fl.* $\frac{1}{8}$ in. diam.; pedicels capillary, $\frac{1}{8}$ - $\frac{1}{4}$ in.; sepals 4, orbicular, entire; disk of 2 very large dilated reniform fleshy tuberculate lobes; anthers forming 2-lipped ends of a fleshy cross. *Fem. fl.* much smaller, axillary or from an axillary short bracteate peduncle; sepals concave, entire, much enlarged in fruit; disk large, dilated, fleshy, convex, tubercled, 6-lobed; styles short, cleft to the base into slender segments. *Fruit* $\frac{1}{4}$ in. long. *Seeds* $\frac{1}{8}$ in. long.—The disk is very remarkable. This is certainly not the Travancore plant figured by Wight (*Ic. t.* 1904, f. 3 (2 in text) as *Reidia latifolia*.

41. **P. Roxburghii**, *Muell. Arg. in Linnæa* xxxii. 47, and in *DC. Prodr.* xv. ii. 420; shrubby, branches crisply puberulous, leaves glabrous 1 $\frac{1}{2}$ -3 $\frac{1}{2}$ in. lanceolate subacute or acuminate, male and fem. fl. densely fasciated in the axils or on the branchlets, pedicels of both capillary, sepals of male pectinately fimbriate of fem. serrate, ovary smooth. *P. tetrandrus*, *Roxb. Fl. Ind.* iii. 674; *Wall. Cat.* 7936. Epistylum *Roxburghii*, *Baill. Etudes Gen. Euphorb.* 648.

SILHET, Roxburgh, Wallich.

Branches slender, terete, rusty-puberulous. *Leaves* thinly coriaceous, green when dry above, pale beneath, base rounded or cuneate; nerves 7-10 pair, very faint; petiole $\frac{1}{2}$ in.; stipules subulate, caducous. *Flowers* very numerous in the clusters, red, males $\frac{1}{16}$ in. diam., with pedicels $\frac{1}{4}$ in., females towards the ends of the branchlets, $\frac{1}{10}$ in. diam., pedicels stouter. *Disk-glands* of male reniform, of fem. larger 2-lobed. *Fruit* $\frac{1}{4}$ in. diam., depressed, deeply 3-lobed, cocci thinly crustaceous.

42. **P. acutus**, *Wull. Cat.* 7931; shrubby, quite glabrous, leaves $1\frac{1}{2}$ -2 in. obliquely ovate acute unequal-sided, male fl. from short bracteate peduncles solitary axillary, fem. in terminal racemes, sepals of male 4 of fem. 6 of both ovate obtuse entire, disk of both sexes orbicular deeply lobed, ovary glabrous. *Muell. Arg. in Linnæa* xxxii. 75, and in *DC. Prodr.* xv. ii. 423.

PENANG? Finlayson.

Branches smooth, terete; branchlets very slender, long, ascending. *Leaves* thinly coriaceous when dry, dark greenish-brown above, pale brown beneath; nerves 6-8 pair, very faint; petiole and stipules minute. *Male fl.* $\frac{1}{8}$ in. diam.; pedicel capillary, $\frac{1}{8}$ in., bracteate, peduncle $\frac{1}{10}$ in.; sepals membranous, fruiting about $\frac{1}{4}$ in. long. *Fem. fl.* and fruit not seen.—Wallich's solitary specimen is in a very imperfect state. Mueller gives Penang as the locality, but Wallich's ticket gives only "Herb. Finlayson."

43. **P. macrocalyx**, *Muell. Arg. in Linnæa* xxxii. 43, and in *DC. Prodr.* xv. ii. 423; shrubby, quite glabrous, leaves $1\frac{1}{2}$ -3 in. elliptic or oblong acute, flowers very large axillary solitary, sepals entire of fem. greatly enlarged in fruit, ovary glabrous. ? *Reidia latifolia*, *Wight Ic.* t. 1904, f. 2 (by error 3, see text).

DECCAN PENINSULA; Shevagherry Hills, *Wight*; Bababoodan Hills, *Law*.

Much branched, branches terete. *Leaves* spreading, thinly coriaceous, more or less glaucous beneath, base rounded; nerves 6-8 pair, very slender; petiole $\frac{1}{2}$ in.; stipules lanceolate, caducous. *Male fl.* in the lower axils, $\frac{1}{4}$ in. diam.; pedicels $\frac{1}{2}$ in., slender; sepals broadly oblong; disk greatly dilated, 4-lobed, fleshy, tuberculate. *Fem. fl.* $\frac{1}{2}$ in. diam., pedicels $\frac{3}{4}$ in., thickened upwards; sepals orbicular-oblong; disk broadly saucer-shaped, fleshy, granular; styles reflexed, 2-fid to the middle. *Fruiting sepals* $\frac{3}{4}$ by $\frac{1}{2}$ in. *Fruit* not seen ripe. The disk is of the same character as *P. Baillonianus*.

44. **P. gomphocarpus**, *Hook. f.*; shrubby, branchlets and petioles scurfily rusty-pubescent, leaves 1-4 in. obliquely ovate or ovate-lanceolate acuminate base acute or cuneate sides very unequal, male fl. minute panicled pedicels short capillary sepals ovate fimbriate, fem. large solitary very long pedicelled, sepals denticulate, capsule 1 in. long subglobose 3-lobed lobes inflated.

PERAK, *Scortechini*, *King's Collector*.

A shrub, 6 ft.; branchlets long, slender. *Leaves* membranous, quite glabrous; nerves 6-8 pair, very slender; petiole $\frac{1}{2}$ in. *Male fl.* $\frac{1}{10}$ - $\frac{1}{8}$ in. diam.; pedicel $\frac{1}{10}$ - $\frac{1}{8}$ in. *Fem. fl.* $\frac{1}{8}$ in. diam.; pedicel $1\frac{1}{2}$ -2 in.; stigmas minute. *Seeds* small for the size of the capsule, $\frac{1}{4}$ in. long, curved, trigonous; testa pale brown, transversely rugose.—Nearly allied to the Sumatran *P. gracilipes*, *Muell.*, but the leaves, pedicels and ovary are glabrous.

** Leaves $\frac{1}{4}$ - $1\frac{1}{2}$ in., pinnately arranged.

† Ovary and fruit glabrous, smooth. *Sepals* toothed or lacinate, except in *P. longistylus*.

45. **P. pulcher**, *Wall. Cat.* 7908; leafing branches pubescent on one

side, leaves $\frac{1}{2}$ in. glaucous erect imbricating obliquely obovate-oblong acute or apiculate, flowers solitary, male and fem. subequal, pedicels capillary, sepals lacinate, ovary smooth. *Muell. Arg. in Linnæa* xxxii. 49, and in *DC. Prodr.* xv. ii. 421. *P. pallidifolius*, *Muell. Arg. in DC. l. c.* 424. *P. Zollingeri*, *Muell. Arg. in Linnæa l. c.* 47. *P. pallidus*, *Muell. Arg. in DC. l. c.* 283 (under *Zollingeri*). *Epistylum pulchrum* & glaucescens, *Baill. Etudes Gen. Euphorb.* 648. *Reidia glaucescens*, *Miquel Fl. Ind. Bat.* i. ii. 374; *Hook. Bot. Mag. t.* 5437. *Eriococcus glaucescens*, *Morr. & Zoll. mss.*

MALACCA, *Griffith*, *Maingay*. SINGAPORE, *Murton*, &c. PENANG, *Wallich*, *Curtis*.—DISTRIB. Siam, Java.

Branches very stout, strict, terete, branchlets slender. *Leaves* subsecund, margins somewhat thickened, nerves very obscure; stipules ovate-lanceolate, some with long flexuous points. *Pedicels* $\frac{1}{2}$ –1 in., males in the lower axils. *Flowers* $\frac{1}{2}$ in. diam., white with a purple eye; sepals deeply lacerate. *Disk* of male of 4 reniform glands, of fem. thick annular crenate; styles cleft to the base into 2 filiform segments. *Fruit* not seen.

46. ***P. longiflorus***, *Heyne in Wall. Cat.* 7905; shrubby, quite glabrous, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. obliquely oblong or obovate-oblong subacute or apiculate, flowers subsolitary, pedicels slender, sepals entire of male ovate-oblong of fem. lanceolate obtuse, staminal column long slender, ovary smooth. *P. Heyneanus*, *Muell. Arg. in Linnæa* xxxii. 49. *P. nephradenius*, *Muell. Arg. in DC. Prodr.* xv. ii. 423. *P. tenellus*, *Wall. Cat.* 7892 B. *Epistylum phyllanthoides*, *Baill. Etudes Gen. Euphorb.* 648. ? *Reidia ovalifolia*, *Wight Ic.* 1904, f. 3 (by error 2 in text).

DECCAN PENINSULA, *Heyne*. Travancore, at Courtallam, *Wight*.

Branchlets slender, spreading. *Leaves* spreading, unequal-sided, pale brown when dry, glaucous beneath; nerves very faint; petiole minute; stipules very minute. *Male fl.* $\frac{1}{2}$ in. diam.; pedicel rather longer, capillary; sepals membranous. *Fem. fl.* $\frac{1}{2}$ in. diam.; pedicels stouter, $\frac{1}{2}$ in.; disk small; styles divided to the base into slender arms. *Fruit* $\frac{1}{2}$ in. long, smooth.—*Heyne's* name of *longiflorus*, in allusion to the narrow fem. sepals, which are conspicuously elongate when reflexed from the fruit, is unobjectionable. *Mueller* has referred *Wight's Reidia ovalifolia* to this, but the leaves on the branch figured are not only (as *Wight* observes) too small, but far too narrow; the separate leaf at fig. 8 is more acuminate, but the petiole is much too long; the ovary does not taper into the styles, and the male disk is annular and 4-lobed, not of separate glands removed from the staminal column as in its allies. More specimens are required to clear up this point.

47. ***P. anabaptizatus***, *Muell. Arg. in DC. Prodr.* xv. ii. 421; leafing branches obscurely puberulous, leaves $\frac{1}{2}$ in. sessile erect imbricating obliquely oblong obtuse or apiculate, flowers axillary solitary, males on short fem. on long pedicels, sepals of male orbicular subentire of fem. broadly ovate irregularly toothed, anthers with transverse dehiscence, ovary smooth. *P. zeylanicus*, *Muell. in Linnæa* xxxii. 49. *Reidia polyphylla*, *Wight Ic. t.* 1904, f. 4. *Epistylum polyphyllum*, *Thwaites Enum.* 283. *E. zeylanicum*, *Baill. Etudes Gen. Euphorb.* 648.

CEYLON; Adams Peak, alt. 5000 ft., *Thwaites*.

A low shrub. *Branches* stout, strict, terete; branchlets slender, jointed on the branch. *Leaves* sometimes somewhat falcate, nerves obscure; stipules entire, minute, ovate-lanceolate. *Male fl.* $\frac{1}{8}$ in. diam., pedicels $\frac{1}{2}$ in., disk of 4 glands; fem. $\frac{1}{2}$ in. diam., pedicels $\frac{1}{2}$ in., disk annular, crenate. *Styles* cleft to the base into 2 slender segments. *Fruit* $\frac{1}{2}$ in. diam., quite smooth.

48. ***P. fimbriatus***, *Muell. Arg. in Linnæa* xxxii. 47, and in *DC.*

Prodr. xv. ii. 422; quite glabrous, leaves spreading 1-1½ in. ovate acuminate, flowers all in axillary clusters male and female together, sepals lacerately toothed, anthers with transverse dehiscence, ovary smooth. *Reidia fimbrata*, *Wight Ic.* t. 1904, f. 1.

NILGHIRI HILLS; on the western slopes, *Wight*.

Quite glabrous. *Leaves* 1½-2 by ½-¾ in., base obtuse, minutely pellucid-punctate, reticulately veined; stipules of the branches triangular ovate scarious brown, of the branchlets triangular-lanceolate longer acuminate. *Pedicels* of the male fl. half as long as the leaves. Outer sepals of the female not entire as in *Wight's* figure, but hardly less lacerately toothed than the outer. *Male disk* of orbicular glands; fem. an entire cup. *Styles* erect.—I do not recognize this plant in *Wight's* Herbarium (in *Herb. Hook.*), where *Mueller* states that he saw it; he says the habit is that of *P. Bailonianus*, but that the leaves are hardly inaequilateral, and the sepals are not entire.

49. **P. oreophilus**, *Muell. Arg. in Linnæa* xxxii. 49, and in *DC. Prodr.* xv. ii. 421; shrubby, quite glabrous, leaves ¼-½ in. broadly unequally oblong very unequal-sided subacute or apiculate, flowers axillary subsolitary, males minute pedicels equalling the leaves, anthers with transverse slits, fem. larger pedicels much exceeding the leaves, sepals of males 4 of fem. 6 all broad irregularly toothed, disk of male of 4 glands, of fem. urceolate, ovary and fruit smooth. *Epistylum montanum*, *Thwaites Enum.* 283.

CEYLON; Central Province, Horton Plains, alt. 6-7000 ft., *Gardner, Thwaites*.

Branches long, slender, terete, smooth; branchlets very slender. *Leaves* very membranous, dark brown when dry, base acute or rounded; nerves 5-6 pair, very faint; petiole and subulate stipules minute. *Male fl.* ⅙ in. diam., of fem. larger. *Fruit* ½ in. diam.; cocci thinly crustaceous.—Closely resembles *P. affinis*, differing in the smooth fruit. The specimens are very indifferent.

†† *Fruit hirsute tubercled or scabrid.*

50. **P. Wightianus**, *Muell. Arg. in Linnæa* xxxii. 47, and in *DC. Prodr.* xv. ii. 425; shrubby, branchlets and leaves beneath tomentose, leaves ½-1 in. close-set drooping obliquely oblong acute or apiculate, flowers solitary axillary pubescent, males minute shortly pedicelled fem. long-pedicelled, sepals entire ciliate, disk of separate glands in both sexes, anthers ovary and fruit scurfily scabrid. *P. obliquus*, *Wall. Cat.* 7947. *Reidia floribunda*, *Wight Ic.* t. 1903. *Bradleia obliqua*, *Herb. Wight*.

NILGHIRI and PUNEY HILLS, *Wight, Perrottet*.

Branches terete, scarred; branchlets long, spreading and upcurved. *Leaves* membranous, unequal-sided, pale green when dry, paler or glaucous beneath, puberulous above, base rounded or cuneate, rarely subcordate; nerves 5-6 pair, very obscure; petiole and stipules minute. *Male fl.* ⅙ in. diam., pedicel ¼ in., capillary; sepals 4, lanceolate, ciliate; disk-glands truncate. *Fem. fl.* ½ in. diam.; pedicels ¾ in., slender; sepals lanceolate, obtuse; disk-glands cuneate, 2-lobed; ovary pubescent; styles cleft to the base in two slender arms. *Capsule* ½ in. diam., subsquamosely hirsute with rusty short unequal bristles, cocci crustaceous. *Seeds* smooth.—*Wight* describes the flowers as fascicled, but figures them, as I find them, solitary.

51. **P. cinereus**, *Muell. Arg. in Linnæa* xxxii. 48, and in *DC. Prodr.* xv. ii. 425; shrubby, branchlets tomentose, leaves ½-¾ in. broadly obliquely oblong unequal-sided or orbicular acute or apiculate pubescent beneath sparsely above, flowers solitary axillary, pedicels of male shorter of fem. longer than the leaves, sepals ovate entire, ovary hairy, capsule rough with minute tubercles. *Epistylum floribundum*, *Thwaites Enum.* 283 (in part, excl. *syns.*).

CEYLON; Central Province, alt. 3-5000 ft., *Thwaites* (C.P. 2531).

Branches slender, smooth, terete; branchlets upcurved, finely tomentose. *Leaves* as in *P. Wightianus*, but less pubescent beneath, almost black above when dry and glaucous beneath; nerves 5-6 pair, very faint; petiole minute; stipules ovate-lanceolate. *Male fl.* $\frac{1}{10}$ in. diam.; pedicel $\frac{1}{2}$ in., capillary; sepals membranous, ovate-oblong, ciliate; disk-glands very large concave stipitate. *Fem. fl.* larger; sepals glabrous. *Fruit* about $\frac{1}{2}$ in. long; cocci thinly crustaceous. *Seeds* quite smooth.

52. **P. affinis**, *Muell. Arg. in Linnæa* xxxii. 48, and in *DC. Prodr.* xv. ii. 425; shrubby, quite glabrous, leaves $\frac{3}{4}$ -1 in. obliquely oblong acute or apiculate, flowers solitary axillary glabrous, males minute shortly pedicelled, sepals rounded obscurely toothed, disk-glands of male large lobulate, ovary and fruit densely hirsute with rough hairs. *Epistylum floribundum*, *Thwaites Enum.* 283 (in part).

CEYLON; Central Province, alt. 3-5000 ft.

Very similar in habit, foliage and flowers to *P. Wightianus*, but the fruit is densely clothed with much longer rough hairs.

53. **P. Hamiltonianus**, *Muell. Arg. in Linnæa* xxxiv. 75, and in *DC. Prodr.* xv. ii. 424; shrubby, slender, branchlets and leaves beneath puberulous, leaves 1-1 $\frac{1}{2}$ in. elliptic or broadly ovate obtuse or acute membranous glaucous beneath, male fl. small long-pedicelled in axillary fascicles, fem. on longer pedicels axillary and in terminal racemes, sepals pubescent at the back male 4 fem. 6 all fimbriate, fruit scabridly hispid. *P. sikkimensis*, *Muell. Arg. in Linnæa* xxxii. 48, and in *DC. l. c.* 425. *Agyneia tetrandra*, *Ham. in Trans. Linn. Soc.* xv. 125; *Wall. Cat.* 7951.

ASSAM, *Hamilton*. SIKKIM HIMALAYA, alt. 1-2000 ft., *J. D. H., Clarke*.

A small bush, branches terete. *Leaves* very membranous, pale green when dry, paler beneath, base cuneate or rounded, nerves 5-7 pair very faint; petiole $\frac{1}{2}$ in.; stipules ovate and subulate, caducous. *Male fl.* $\frac{1}{10}$ in. diam.; pedicels capillary $\frac{1}{10}$ - $\frac{1}{8}$ in., springing from minute clusters of bracts; sepals rounded, deeply toothed; disk dilated, deeply 4-lobed; staminal column very short. *Fem. fl.* $\frac{1}{8}$ in. diam.; pedicel very slender, longer than the leaves, curved. *Sepals* less deeply toothed than in the male, hardly enlarged in fruit; disk saucer-shaped; ovary 4-celled; styles 4, subulate, erect. *Fruit* $\frac{1}{8}$ in. diam., globose, rufous with rough hairs; cocci crustaceous.—*Mueller* describes the sepals of the fem. as entire, but I find them strongly toothed.

Sect. VIII. CICCÆ (see p. 287).

54. **P. distichus**, *Muell. Arg. in DC. Prodr.* xv. ii. 413; a tree, quite glabrous, with very robust branches and slender leafy branchlets, leaves pinnately distichous 2-3 in. petioled obliquely ovate acute, flowers minute densely clustered, clusters axillary or in slender racemes from the thick branches shortly pedicelled. *Beddome Forester's Man.* 191. *P. Cheremila*, *Roxb. Hort. Beng.* 114. *P. longifolius*, *Jacq. Hort. Schænbr.* ii. 36, t. 194; *Roxb. Fl. Ind.* iii. 672. *P. Cicca*, *Muell. Arg. in Linnæa* xxxii. 50. *P. tetrandrus*, *Wall. Cat.* 7930. *Cicca disticha*, *Linn. Mant.* 124; *Lamk. Ill.* ii. t. 757, f. 1; *Grah. Cat. Bomb. Pl.* 180; *Dalz. & Gibs. Bomb. Fl. Suppl.* 78; *Kurz For. Fl.* ii. 353.—*Rheede Hort. Mal.* iii. t. 47, 48.

In Gardens throughout INDIA.—DISTRIB. Malay Islands, Madagascar.

A deciduous tree, 20-30 ft.; branches as thick as the finger; bark very rough, grey; leafy branchlets 1-2 ft., terete below, angular above. *Leaves* rather membranous; pale beneath, base usually rounded; nerves 5-8 pair, arched; petiole $\frac{1}{2}$ in.; stipules toothed. *Flowers* most densely clustered, $\frac{1}{16}$ in. diam., occasionally 2-sexual, sometimes 3-4-merous; pedicels capillary, $\frac{1}{4}$ - $\frac{1}{2}$ in. *Sepals* orbicular. *Disk* of male

of large glands; of fem. annular, crenate. *Stamens* recurved; anthers shortly oblong, slits lateral. *Ovary* ovoid, styles reflexed from the contracted top 2-partite, arms subulate, acute. *Fruit* globose, fleshy, acid, "3-4-lobed, generally 6-8-grooved, nut 3-4-parted, parts 1-celled, 1-seeded," *Roxb.*—I have not seen the fruit. *Mueller* describes it as at length a 4-coccous capsule, *Kurz* as sappy with a 3-4-celled putamen.

Sect. IX. PROSORUS (see p. 287).

55. **P. indicus**, *Muell. Arg. in Linnæa* xxxii. 52, and in *DC. Prodr.* xv. ii. 417; quite glabrous, leaves oblong or elliptic obtuse or acute at both ends or broadly oblong and obtuse, male fl. $\frac{1}{10}$ in. diam., stamens short broad, fruit $\frac{1}{2}$ in. diam. *Beddome Forester's Man.* 191. *Prosurus indica*, *Dalz. in Hook. Journ. Bot.* iv. (1852) 346; *Dalz. & Gibs. Bomb. Fl.* 236; *Thwaites in Hook. Journ. Bot.* vi. (1854) 299, t. 10 C, fig. 3-6, and viii. (1856) 272. and *Enum.* 281. *P. Stocksii*, *Muell. Arg. in Linnæa* l. c. 51, and in *DC. l. c. P. anomalus*, *Muell. Arg. in Linnæa* xxxii. 52, and in *DC. l. c.* 418. *P. hysternanthus*, *Muell. Arg. in Linnæa* xxxii. 52. *Cicca anomala*, *Baill. Etudes Gen. Euphorb.* 619. *Flueggea major*, *Baill. l. c.* 593, and *Rec. Obs. Bot.* ii. 42. *Securinea hysternantha*, *Boj. Hort. Mauris.* 278. *Bridelia Berryana*, *Wall. Cat.* 7876, 7960.

DECCAN PENINSULA; Courtallam, *Berry*; on the Ghats of Concan and Canara Stocks, &c. CEYLON, common in the central and southern forests, *Thwaites*.

A deciduous tree, 30-40 ft.; branches terete, with white spots. *Leaves* membranous, 2½-6 by 1½-3 in., distichous, very variable in shape, sometimes acuminate, glaucous, nerves 6-10 pair; petiole $\frac{1}{4}$ in.; stipules lanceolate, subserrate. *Male fl.* fasciated in the axils and on the branches, green; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in., capillary; fem. larger, solitary or fasciated, pedicel $\frac{1}{2}$ -1 in., stout. *Sepals* 4, rarely 5; 2 outer largest. *Disk* of male large, of fem. very narrow. *Anthers* subsessile on exerted filaments. *Fruit* depressed spherical, obtusely trigonous, epicarp brown; cocci white, thin. *Seeds* blue.—I do not know what authority *Mueller* has for implying that *Wallich's* specimens are from Madagascar; his No. 7876 is introduced into the Calcutta Garden from Courtallam by Dr. *Berry*, and his No. 7960 is simply marked as from the Calcutta Garden. The plant no doubt extends from Canara to Ceylon. *Mueller* cites *Wallich's Bridelia Berryana* under both *P. anomalus* and *cyanospermus*. Possibly *P. discoideus* of Tropical Africa is a form with smaller fruit.

56. **P. cyanospermus**, *Muell. Arg. in Linnæa* xxxii. 51, and in *DC. Prodr.* xv. ii. 416 (excl. citations of *Wallich*), quite glabrous, leaves elliptic-lanceolate acute at both ends, male fl. $\frac{1}{4}$ in. diam., stamens long linear, fruit $\frac{1}{2}$ in. diam. *Beddome Forester's Man.* 191. *Prosurus cyanosperma*, *Thwaites Enum.* 281. *P. Gærtneri*, *Thwaites in Hook. Journ. Bot.* viii. (1856) 272. *P. indicus*, *Thwaites l. c.* (1854) t. 10 C, figs. 1, 2, 7-10. *Cicca Gærtneriana*, *Thwaites in Baill. Etudes Gen. Euphorb.* 619. *Zygospermum zeylanicum*, *Thwaites ex Baill. l. c.* 620, t. 27, f. 11. *Croton* ? *cyanospermus*, *Gærtner. Fruct.* ii. 120, t. 107.

CEYLON; in the Ambagamowa and Ratnapoor districts, *Thwaites*.

Very like *P. indicus*, but with larger flowers and fruit. The seeds are of a brilliant metallic blue.—*Mueller* has repeated under this species the citations of *Wallich* which are introduced under his *P. anomalus*; he probably (rightly) intended to refer *Wallich's Bridelia Berryana* to *P. indicus*, but accidentally introduced it under *P. cyanospermus*.

11. **GLOCHIDION**, *Forst.*

Evergreen trees or shrubs. *Leaves* alternate, bifarious, shortly petioled, quite entire. *Flowers* small, in axillary clusters, monœcious or diœcious,

apetalous, eglandular (without disk-scales or glands). MALE FL. *Sepals* 6, rarely 5, spreading in 2 series, imbricate. *Anthers* 3-8, connate in an ellipsoid or oblong sessile column with linear cells, dehiscence extrorse, connective produced into separate points or connate in an umbonate head. *Pistillode* 0, or very rarely minute and hidden between the anthers. FEM. FL. *Calyx* usually of 6 short imbricate sepals, or shortly tubular and unequally toothed or cleft. *Ovary* 3-15-celled; styles connate in a globose columnar conical or subclavate column lobed or toothed at the tip, or 3 slender free in § *Glochidiopsis*, sometimes obscure or confluent with the top of the ovary, usually lengthening during or after the flowering; ovules 2 in each cell. *Capsule* of 3 or more 2-valved cocci, often with twice as many lobes as cells, globose or orbicular and depressed or intruded at the base and top, crowned by the often enlarged style; cocci coriaceous or crustaceous, epicarp separable or not. *Seeds* hemispherical or laterally compressed, testa crustaceous with often a succulent coat, albumen fleshy; cotyledons flat.—Species about 120, tropical and chiefly Asiatic.

I find it is inexpedient to follow Mueller (in DC. Prodr. xv. ii. 278) and Bentham (Gen. Plant. iii. 272) in reducing *Glochidion* to a section of *Phyllanthus*, from which it differs in the total absence of a disk, in habit, and in the singular modification of its styles and stigmas. Further, by keeping it distinct I comply with the wishes of Indian Botanists, whose opinion it is of importance to consult in regard to the nomenclature of so very large and universally distributed an Indian genus. The only deviation in any Indian species from the stylar characters of *Glochidion* as here limited occurs in the small section *Glochidiopsis* of Mueller, on which Blume founded the genus *Glochidionopsis*, and in which the styles are filiform and nearly free.

I add with regret, that my long and laborious study of the Indian species has resulted in their very unsatisfactory limitation and disposition. Mueller's primary division of *Glochidion* proper, based on the number of anthers, whether 3 or more, is a purely artificial one, and followed here only because I have detected no other so generally recognizable. The form of the style offers a far better character, but is very difficult of application, because of its minuteness and deceptive nature, owing to the great changes which it undergoes during its rapid development after flowering. I would urge on Indian botanists a study of this organ in living specimens, and the making careful drawings of it in all stages of growth, particularly observing the period of impregnation. Lastly, I have to acknowledge my frequent inability to identify the Indian species with the described Malayan Archipelago ones, from want of good materials of the latter and the vagueness of their descriptions. The form of the capsule, globose, or orbicular with depressed base or crown, is a guide to affinities, though often an obscure one. The female calyx, toothed or partite into sepals, is also, I think, a good character, but it is not, when minute, easily observed in dried specimens. I have to acknowledge gratefully the loan of specimens from the Directors of the Botanical Gardens of Calcutta and Ceylon, which have helped me much.

KEY TO THE INDIAN SPECIES.

Sect. 1. GLOCHIDION PROPER. *Styles* confluent into a cone or column which is lobed toothed or notched at the tip.

A. *Anthers* 4 or more. See also 28. *obscurum*, 38. *assamicum*, and 55. *villicaule* (sometimes 3 in 16. *fagifolium* and 17. *brachylobum*).

* *Female calyx* of 5-6 distinct sepals.

† Capsule depressed-globose, distinctly lobed, base and apex intruded.

• § *Ovary* 8-12-celled; style a very broad shallow cone, with a hollowed vertex.—Sp. 1-3.

§§ *Ovary* 4-8-celled: style conical from a very broad base, as long as or longer than the ovary.—Sp. 4-7.

§§§ Ovary 3-8-celled; style cylindric linear or subclavate.—Sp. 8-10.

†† Capsule globose or depressed, terete or very obscurely lobed or angled, not deeply intruded at the base and apex.—Sp. 11-15.

** *Female calyx* 4-6-lobed or -toothed, usually unequally. *Style* globose, small.—Sp. 16-19.

B. *Anthers* 3, rarely 4 or 5 in 28. *obscurum*, and 38. *assamicum*, and 55. *villicaule* (see also 16. *fagifolium* and 17. *brachylobum*).

* *Female calyx* unequally 4-6-lobed or toothed. Capsule in all depressed-globose, lobed, and intruded at the crown.

† Style in the flower globose.—Sp. 20-24.

†† Style cylindric conical or clavate.—Sp. 25-27.

** *Female calyx* of 6 free sepals.

† Capsule globose or depressed-globose, faintly angled or lobed, not deeply intruded at base and apex.—Sp. 28, 29.

†† Capsule depressed globose, deeply lobed, intruded at the base and apex.

§ Style in flower globose or broadly conic, broader than the ovary (doubtful in 32. *desmocarpum*).—Sp. 30-33.

§§ Style in flower very minute.—Sp. 34-36.

§§§ Style in flower short, columnar or clavate, not much exceeding the sepals.

¶ Leaves usually quite glabrous.—Sp. 37-43.

¶¶ Leaves usually pubescent or tomentose beneath.—Sp. 44-47.

§§§§ Style in flower greatly exceeding the sepals.—Sp. 48-55.

Sect. II. GLOCHIDIOPSIS. *Styles* 3, filiform. *Female sepals* very unequal, 2 very much the largest.—Sp. 56-58.

1. **G. multiloculare**, Muell. Arg. in *Linnaea* xxxii. 59; glabrous or puberulous, leaves 3-5 in. oblong linear-oblong or obovate glaucously purplish beneath, nerves strong, male fl. small shortly pedicelled, anthers 4-12, fem. fl. large stoutly pedicelled, sepals 8-12 broad spreading and revolute, style a flattened glabrous cone with a hollowed top crowning the depressed 10-15-celled glabrous or villous ovary, capsule very large depressed 10-15-lobed. *Kurz For. Fl.* ii. 343. *Phyllanthus multilocularis*, Muell. Arg. in *Flora* (1865) 370, and in *DC. Prodr.* xv. ii. 279. *Bradleia multilocularis*, *Spreng. Syst.* iii. 19; *Roxb. Fl. Ind.* iii. 696; *Wall. Cat.* 7864. *B. pubera*, *Roxb.*, *Wall. Cat.* 7870. *B. nitida*, *Wall. Cat.* 7867. *B. philippinensis*, *Ham.*, *Wall. Cat.* 7871 in part. *Agyneia multilocularis*, *Willd. in Neue Schrift. Gesselch. Naturf. Freund.* iv. (1803) 206, and *Sp. Pl.* iv. 509. *A. pubera*, *Herb. Madr.*

The GANGETIC PLAIN from OUDH, N. Behar, and the Sikkim Terai, eastwards to ASSAM, SILHET and UPPEE BURMA, and southwards to the CIRCARS.

An evergreen tree, with usually drooping branches and angular branchlets. *Leaves* thinly coriaceous, obtuse or subacute, apiculate, often green or yellow above when dry, beneath brown purplish or glaucous; nerves 5-8 pair, and numerous straight, cross-nerves raised beneath, and usually distinct also in the upper surface; petiole $\frac{1}{10}$ in., stout; stipules triangular-ovate, cuspidate. *Male fl.*; pedicels stout, $\frac{1}{4}$ in.; perianth $\frac{1}{2}$ in. diam.; sepals oblong; anthers adnate to the middle, connectives very short. *Fem. fl.* stoutly pedicelled, $\frac{1}{4}$ in. diam.; style low, broad, rayed with slight furrows. *Capsules* orbicular, stoutly pedicelled, $\frac{3}{4}$ -1 in. diam., the sunk apex occupied by a concave rayed adnate disk which is the remains of the style; epicarp thin reddish separating from the coriaceous cocci, which again usually fall away from the compressed seeds that persist on the axis, and have a fleshy orange-red coat.

2. **G. littorale**, *Blume Bijdr.* 585; quite glabrous, leaves 2-3 in. coriaceous orbicular or broadly obovate tip rounded, male fl. shortly pedicelled, sepals elliptic, anthers 5-6, fem. fl. larger subsessile stoutly pedicelled, sepals very broad, ovary 10-12-celled subglobose glabrous or pubescent gradually narrowed into the broad short conical truncate crenulate style, capsule large orbicular depressed 10-14-lobed with the minute conical style on the flat or depressed apex. *Beddome Forester's Man.* 191; *Miquel Fl. Ind. Bat.* i. ii. 377, and *Suppl.* 449. *Phyllanthus littoralis*, *Muell. Arg. in Flora* xlviii (1865) 370, and in *DC. Prodr.* xv. ii. 280. *Bradleya littorea*, *Steud. Nomencl.* 222. *B. obtusa*, *Wall. Cat.* 7869. *Agyneia impubes*, *Herb. Madr.?* — *Wall. Cat.* 7990 in part.

MALABAR; near the coast, *Beddome*. CEYLON, *Wight*.—DISTRIB. Sumatra, Java, Borneo.

A small tree (*Beddome*). *Leaves* 2-3 by 2-2½ in., very pale above when dry and brown beneath, base acute or rounded; nerves 6-8 pairs, very spreading, not very strong, cross-nervules few reticulating; petiole ½-¾ in., very stout; stipules triangular. *Male peduncles* ½ in.; anthers narrow, connectives long, acute, free. *Fem. fl.* ½ in. diam.; pedicels as long or longer; sepals recurved. *Capsule* ¾-¾ in. diam., base not intruded.

3. **G. coccineum**, *Muell. Arg. in Linnæa* xxxii. 60; branchlets angular puberulous or tomentose, leaves 5-7 in. coriaceous ovate oblong or elliptic-oblong or lanceolate brown beneath, nerves strong, male fl. long-pedicelled, sepals obovate-oblong erect, anthers 5-6, fem. densely clustered sessile, sepals broadly ovate, style globosely conical with a crenulate hollowed tip broader than the short villous 8-12-celled ovary, capsule large sessile orbicular much depressed 16-20-lobed, style minute in the deeply sunk top. *Phyllanthus coccineus*, *Muell. Arg. in Flora* xlviii. (1865) 370, and in *DC. Prodr.* xxv. ii. 280; *Kurz For. Fl.* ii. 342. *Bradleya coccinea*, *Wall. Cat.* 7868. *Agyneia coccinea*, *Ham. in Symes' Embassy*, 479, with figure.—*Wall. Cat.* 7865.

BURMA, and from Pegu to Tenasserim, *Wallich, Griffith (Kew Distrib.* 4880), *Helper (Kew Distrib.* 4859, 4881, 4863), &c.

An evergreen shrub or tree, 25-30 ft. *Leaves* variable in shape, and colour when dry, sometimes very pale almost white above, and faintly rusty or bluish beneath, young pubescent beneath, base acute or rounded; nerves 6-8 pair; petiole ⅓ in.; stipules subulate. *Flowers* more or less pubescent, males ½ in. diam., pedicels capillary, connectives very short; fem. minute. *Capsule* ½-1 in. diam., pale reddish, coriaceous, glabrous or puberulous, pericarp, &c., as in *G. multiloculare*. *Seeds* compressed, with a scarlet-fleshy coat.

4. **G. lanceolarium**, *Dalz. in Bomb. Fl.* 235; glabrous, branchlets angular, leaves 3-6 in. coriaceous elliptic-oblong or lanceolate acuminate base acute, male fl. large long-pedicelled, anthers 4-6, fem. fl. few sessile or shortly pedicelled, sepals broad, style broadly conic truncate tomentose 5-6-cleft gradually dilated into the 6-8-celled villous ovary, capsule large orbicular depressed 6-8-lobed hoary. *Muell. Arg. in Linnæa* xxxii. 60; *Kurz For. Fl.* ii. 343; *Beddome Forester's Man.* 192. *Phyllanthus lanceolarius*, *Muell. Arg. in Flora* xlviii. (1865), and in *DC. Prodr.* xv. ii. 282; *Brand. For. Fl.* 453. *Glochisandra acuminata*, *Wight Ic.* t. 1905. *Bradleya lanceolaria*, *Roxb. Fl. Ind.* iii. 697; *Wall. Cat.* 7855 (excl. C).—*Wall. Cat.* 7993.

NORTH-WEST INDIA, *Royle*, and from NEPAL eastwards to ASSAM?, SILHET and CHITTAGONG.

A tree, 25-30 ft. *Leaves* usually glossy and pale or greenish above when dry, with the nerves distinct, beneath also pale with 6-10 pairs of slender raised nerves and

obscure nervules, base decurrent on the stout petiole which is $\frac{1}{4}$ – $\frac{3}{4}$ in. long; stipules triangular, acuminate. *Male fl.* $\frac{1}{2}$ in. diam. and less; pedicels $\frac{3}{4}$ in. and under; sepals linear-oblong; connectives long, acute. *Fem. fl.* much smaller; sepals unequal, rigid, lanceolate, acute; style shortly exserted. *Capsules* $\frac{3}{8}$ – $\frac{1}{2}$ in. diam., pale: *Seeds* often persistent on the axis.—The monstrous flowers mentioned by Mueller are males on long stout pedicels thickened upwards into a solid turbinate body crowned with six obtuse barded perianth-lobes, within this is a conical styliform body to the face of which abortive anthers are adnate. Similar monstrous flowers occur in *P. sphaerogynum* and others.

5. **G. calocarpum**, *Kurz For. Fl.* ii. 343; quite glabrous, branchlets stout, leaves 4–7 in. subcoriaceous from broadly obliquely ovate or oblong to lanceolate acute or acuminate, base very unequal, flowers all pedicelled, male sepals linear-oblong recurved, anthers 4–6, fem. sepals 5 ovate acute, ovary 4–5-celled glabrous narrowed into the conical shortly exserted 5-toothed style, capsule orbicular much depressed 8–10-lobed glabrous, with a long strong style in the smaller top.

ANDAMAN ISLANDS, in the beach forests, and NICOBAR ISLANDS, *Kurz*.

A small evergreen tree, 20–25 ft. *Leaves* very broad, dark brown when dry, base acute or rounded; nerves 6–8 pair; petiole $\frac{1}{2}$ in., very stout; stipules triangular, cuspidate. *Male fl.* on stout sometimes very short pedicels, $\frac{1}{2}$ in., $\frac{1}{2}$ in. diam. *Fem. fl.* few in a cluster, on rather shorter stouter pedicels. *Capsules* about $\frac{1}{2}$ in. diam., purple.—I have seen only Nicobar specimens.

6. **G. goniocarpum**, *Hook f.*; glabrous except the flowers and fruit, leaves 4–5 in. coriaceous elliptic-oblong acuminate or acute base unequal acute, flowers sometimes clustered on a short peduncle all (male shortly) pedicelled, outer sepals hispid inner smaller glabrous, anthers 5, fem. fl. stoutly pedicelled, sepals broadly ovate obtuse hispid, style stout short conico-columnar pubescent 3–6 cleft base narrower than the globose villous 5–6-celled ovary. capsule subglobose pubescent 5-lobed, lobes keeled, style columnar on the flat or depressed apex.

SINGAPORE; *King's Collector*.

A tree, 20–30 ft.; branchlets rather stout, slightly angled. *Leaves* rigid when dry, pale greenish above with the nerves distinct, brown beneath with raised slender nerves and faint cross-nervules; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; stipules triangular-ovate. *Male fl.* $\frac{1}{2}$ in. diam.; outer sepals broadly oblong, inner more spatulate, connectives short. *Fem. fl.* in stout pubescent pedicels, $\frac{1}{2}$ – $\frac{3}{4}$ in.; perianth coriaceous, nearly $\frac{1}{2}$ in. diam. *Capsules* $\frac{1}{2}$ in. diam. and less, base not intruded.

7. **G. tomentosum**, *Dalzell in Hook. Journ. Bot.* iii. (1853) 38; branches leaves beneath and flowers finely white tomentose, leaves 3–6 in. elliptic- or ovate-oblong pale bluish grey beneath, base acute rounded or cordate, flowers all on short stout decurved pedicels, sepals of both sexes unequal broad tomentose or the inner glabrous, anthers 5–7, style stout conical tip 4–5-cleft dilated into the 4–5-celled tomentose or glabrate ovary, capsule much depressed obscurely 10–12-lobed pubescent, style minute conical. *Beddome Forester's Man.* 192. *Phyllanthus tomentosus*, *Muell. Arg. in Flora* xlviii. (1865) 371, and in *DC. Prodr.* xv. ii. 283.

NORTH CANARA, *Metz, Stocks, &c.*

Dalzell describes this as a small strict shrub 3–4 ft. high with flexuous branches, leaves 2–4 by 1–1 $\frac{1}{2}$ in., and 4 irregular female sepals toothed or lacerate at the tip; he gives no description of the fruit. This latter I appear to have in specimens sent to Kew both by Dr. Stocks and Mr. W. A. Talbot, but as these specimens differ somewhat from Mr. Dalzell's, I shall give their individual characters.

G. TOMENTOSUM PROPER; a shrub 3-4 ft., leaves 3-4 in. elliptic-oblong base rounded or acute, sepals of fem. fl. $\frac{1}{8}$ - $\frac{1}{4}$ in. rather narrowly oblong, ovary and style sparingly pubescent, capsule unknown.—Canara, *Dalzell*.

Var. **G. TALBOTI**; a small tree, branches much more robust, leaves more coriaceous and more pubescent beneath 5-7 in. elliptic-ovate or -oblong base rounded or cordate, fem. fl. larger, sepals broader, ovary and style densely tomentose, capsule $\frac{1}{2}$ in. diam. (&c. as in specific character).—North Canara, *Stocks*; Yellapore, *Talbot*.

8. **G. desmogyne**, *Hook. f.*; branchlets leaves beneath and inflorescence tomentose, leaves 3-5 in. oblong or oblong-lanceolate acuminate, nerves very slender, male fl. very small shortly pedicelled, sepals elliptic, anthers 4-5, fem. sessile in dense globose tomentose clusters, style exserted obconico-clavate 6-toothed villous twice as long as the lanceolate acute sepals base narrower than the globose villous 6-celled ovary.

TENASSERIM, *Helper (Kew Distrib. 4867 and 4878)*? on Moolyet, at 6000 ft., *Gallatly (in Herb. Hort. Calcut.)*.

Branchlets rather stout. *Leaves* firm, hardly coriaceous, brown when dry, base acute, pubescence rather fulvous; nerves 8-10 pair, raised beneath, cross-nervules slender; petiole $\frac{1}{2}$ - $\frac{1}{4}$ in.; stipules subulate. *Male pedicel* $\frac{1}{4}$ in., perianth $\frac{1}{10}$ in. diam., sparsely tomentose, connectives very short. *Fem. fl.* with style $\frac{1}{2}$ in. long. (*Capsules*, in the Moolyet specimens, rather deeply 6-lobed, $\frac{1}{2}$ in. diam., hoary, style in the deeply sunk top minute. *Seeds* with hemispheric backs and small flat sides).—This in foliage, &c., closely resembles *G. Wallichianum*, but the fem. fl. are very different.

9. **G. Gamblei**, *Hook. f.*; quite glabrous except the ovary, leaves 4-6 in. lanceolate acuminate base acute, male fl. clustered, anthers 4-5, fem. sessile in dense clusters, sepals oblong inner much smaller, style twice as long as the sepals stout clavate truncate top 4-5-lobed glabrous suddenly contracted above the depressed tomentose ovary, capsule large sessile depressed 4-5-lobed glabrous, style very short sunk in the depressed vertex. *Phyllanthus Jussieuanus in part, Muell. Arg. in DC. Prodr. xv. ii. 304 (the Sikkim plant)*.

Lower hills and Terai of the SIKKIM HIMALAYA, *J. D. H., Gamble*.

Branches rather slender, terete, branchlets angled. *Leaves* 4-5 in., chartaceous, greenish and rather shining above, brownish beneath, base unequal-sided acute; nerves very slender indeed, nervules inconspicuous; petiole very short. *Male fl.* $\frac{1}{10}$ in. diam.; sepals oblong, obtuse; connectives short, acute. *Fem. fl.* sepals obtuse or subacute, erect; inner smaller; style at first globose, soon lengthening. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., pericarp very thin; style globose or oblong, not exserted, 4-5-lobed. *Seeds* obtusely trigonous.

10. **G. insulare**, *Hook. f.*; branchlets very slender tomentose, leaves 2-3 in. thin elliptic-lanceolate acuminate glabrous except the midrib beneath glaucous beneath, nerves very slender, male fl. pedicelled, sepals linear-oblong nearly glabrous, anthers 4-6, fem. minute shortly pedicelled, sepals very short tomentose on both surfaces, style exserted short columnar 3-fid glabrous narrower than the globose villous 3-celled ovary. *Bridelia glauca, Blume? Wall. Cat. 7875*.

PENANG, *Wallich*.

Branchlets long, pubescence rufous. *Leaves* dark brown above when dry, base acute or rounded, nerves 6-8 pair, cross-nervules faint; petiole $\frac{1}{10}$ - $\frac{1}{8}$ in., slender; stipules subulate. *Male pedicels* capillary, $\frac{1}{2}$ - $\frac{1}{2}$ in.; perianth $\frac{1}{8}$ - $\frac{1}{6}$ in. diam.; outer sepals sparsely pubescent, inner smaller glabrous; connectives obtuse. *Fem. fl.* much smaller, in very small tomentose clusters. *Capsules* not seen.—A very distinct species, not taken up by *Mueller*.

11. **G. zeylanicum**, *A. Juss. Tent. Euphorb. 107, t. 3*; glabrous or

more or less pubescent or tomentose, leaves 4-8 in. coriaceous elliptic-oblong or oblong-lanceolate obtuse or obtusely cuspidate base rounded or cordate, male and fem. fl. in the same subsessile or peduncled clusters, sepals of both sexes short, anthers 5-6, style very short stout conical 6-8-toothed dilated into the globose 4-7-celled ovary, capsule shortly peduncled depressed rarely quite spherical globose terete or obscurely 8-14-angled or lobed tipped with the short conic style. *Thwaites Enum.* 235; *Beddome Forester's Man.* 192. *G. obliquum*, *Dcne. Herb. Timor.* 481; *Miquel. l. c. i. ii.* 377. *Bradleia zeylanica*, *Gærtn. Fruct.* ii. 128, t. 109. *B. obliqua*, *Spreng. Syst.* iii. 19; *Wall. Cat.* 7863 A to E. *B. mollis*, *Wall. Cat.* 7858 (not 7859). *Phyllanthus zeylanicus* & *obliquus*, *Muell. Arg. in DC. Prodr.* xv. ii. 281 and 284. *Agyneia obliqua*, *Willd. Sp. Pl.* iv. 696; *Wall. Cat.* 7863 C, D. *A. flexuosa*, *Herb. Heyne.*—*Wall. Cat.* 7856.

The DECCAN PENINSULA from the Concan and the Circars southwards. ASSAM, SILHET and the MALAY PENINSULA, southwards to Malacca and Singapore, *Maingay*, &c. (*Kew Distrib.* 1357). CEYLON; in the central and southern parts of the island.—DISTRIB. Malay Islands.

A small tree; branchlets rather stout. *Leaves* drying green or brown, sometimes shining above, base often very unequal-sided; nerves 9-14 pairs, strong beneath; petiole stout, $\frac{1}{8}$ – $\frac{1}{2}$ in.; stipules subulate or falcately-lanceolate. *Flowers* in axillary clusters or on short stout axillary or supra-axillary peduncles, females often most numerous in the clusters. *Capsule* $\frac{1}{3}$ – $\frac{2}{3}$ in. diam. or rather more, glabrous or pubescent; epicarp often deciduous in narrow elliptic-lanceolate valves.—A very variable plant, to which I think the following are referable.

G. BAACANUM, *Miquel Fl. Ind. Bat. Suppl.* 449 (*Kurz For. Fl.* ii. 347); branches and leaves beneath densely rusty tomentose, ovary and style tomentose.—Malacca, Andaman Islands, &c.

G. NITIDUM, *Dalz. & Gibs. Bomb. Fl.* 235; *Muell. Arg. in Linnæa* xxxii. (1862) 60; *Beddome Forester's Man.* 192; quite glabrous, leaves shining above, flower-clusters usually in supra-axillary peduncles. *G. canaranum*, *Miquel Plant. Hohenack.* No. 743 a. *G. canarum*, *Beddome Forester's Man.* 192. *Phyllanthus nitidus*, *Muell. Arg. in Flora* xlviii. 371, and in *DC. l. c.* 282. *P. canaranus*, *Muell. Arg. l. c.* 371, and in *DC. l. c.* 284. *Bradleia nitida*, *Roxb. Fl. Ind.* iii. 699.—The Concan, Canara, Mysore and the Circars.—I think this is only a perfectly glabrous state of *zeylanicum*. *Wallich's Bradleia*, No. 7856, from Silhet, without fruit, is probably only a very large glabrous form of this; the flower peduncles arise from above the leaf axils.

12. *G. hirsutum*, *Muell. Arg. in Linnæa* xxxii. 61; branches petioles and leaves beneath densely softly white- or rusty-tomentose, flower clusters usually in supra-axillary peduncles. *Bradleia hirsuta*, *Roxb. Fl. Ind.* iii. 699; *Wall. Cat.* 7861 B; *Baill. Etudes Gen. Euphorb.* 638. *B. mollis*, *Wall. Cat.* 7859. *Phyllanthus hirsutus*, *Muell. Arg. in Flora* xlviii. 371, and in *DC. Prodr.* xv. ii. 283.

The SIKKIM TERAI and ASSAM to CHITTAGONG and PENANG, *Roxburgh*.

First described by *Roxburgh* from Calcutta Garden specimens said to have been from Penang, but *Wallich* says it is from China. *Mueller* must have seen imperfect specimens, for the male pedicels are very slender and far longer than the petioles, and the branches are far from "obscurely" puberulous. Following *Roxburgh*, he describes the capsule as six-seeded, which is, I suspect, a lapsus for 6-celled. *Baillon* describes the ovary as many-celled. *Wallich* has two plants called *B. mollis*, namely 7858, which has leaves glabrous beneath, and is, I think, *G. zeylanicum*, and 7859, which has narrower leaves pubescent beneath, and is *G. hirsutum*.

13. *G. Helferi*, *Hook. f.*; quite glabrous except the flowers, leaves 4-6 in. ovate or oblong-lanceolate obtuse apiculate, nerves slender, male fl. shortly pedicelled small, sepals broadly ovate, anthers 5, fem. numerous

clustered all pedicelled ovate, style twice as long as the sepals rather slender clavate tip 5-6-lobed, glabrous base narrower than the globose 5-celled glabrous ovary, capsule small globose terete. *G. subscandens*, *Kurz For. Fl.* ii. 344 (*not of Zollinger*). *Phyllanthus Helferi*, *Muell. Arg. in Flora* lxviii. 372, and in *DC. Prodr.* xv. ii. 286.

TENASFERIM, Helfer (Kew Distrib. 4874, 4879).

Branchlets black when dry, obscurely angled. *Leaves* brown when dry, rather thin; nerves 6-10 pair, raised beneath, cross-nervules distinct, often reticulate; petiole rather long, $\frac{1}{2}$ - $\frac{1}{4}$ in.; stipules triangular, cuspidate. *Male pedicels* $\frac{1}{2}$ - $\frac{1}{3}$ in.; perianth $\frac{1}{2}$ in. diam.; connectives short, acute. *Fem. pedicels* $\frac{1}{2}$ in.; sepals ovate-lanceolate, acute, erect. *Capsule* $\frac{1}{2}$ in. diam., obscurely ribbed, style minute. *Seeds* ovoidly trigonous.

14. *G. brunneum*, *Hook. f.*; glabrous, branchlets stout angular, leaves (for the genus) long-petioled 4-6 in. thinly coriaceous oblong and cuspidate or oblong-lanceolate and acuminate, nerves slender, flowers minute crowded on the bracteolate ends of a stout peduncle, males shortly pedicelled, sepals unequal thick oblong obtuse, anthers 5-6, fem. subsessile, style stout cylindric-clavate glabrous 5-toothed twice as long as the ovate-oblong sepals base narrower than the villous 4-6-celled ovary, capsule globose or slightly depressed obscurely 4-6-lobed tipped with stiff cylindric style.

MALACCA, Maingay (Kew Distrib. 1358). SINGAPORE, T. Anderson (Herb. Hort. Bot. Calc.).

Branchlets rigid. *Leaves* of a fine light red-brown when dry, base obtuse or subacute; nerves 6-10 pair, very slender, but raised beneath, cross-nervules distant, faint; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules triangular, coriaceous. *Peduncles* $\frac{1}{2}$ in., stiff; bracteoles minute; pedicels $\frac{1}{2}$ in. *Male perianth* $\frac{1}{10}$ in. diam.; connectives small, obtuse. *Fem. perianth* petaloid, about as large; pedicel lengthening in fruit. *Capsule* $\frac{1}{2}$ - $\frac{1}{3}$ in. diam., pericarp thick, valves 2-partite.—Habit of *G. zeylanicum*, from which the longer petioles distinguish it.

15. *G. oblatum*, *Hook. f.*; branches finely tomentose, leaves oblong or oblong-lanceolate obtuse or acute glaucous and glabrous or sparsely pubescent beneath, male pubescent, sepals obovate or subspathulate, anthers 4-6, fem. fl. subsessile minute, sepals short tomentose on both surfaces, style short stout conic and 4-5-celled ovary densely tomentose, capsule shortly pedicelled orbicular very depressed obscurely-lobed pubescent crown not intruded tipped by the minute style.

SIKKIM HIMALAYA, Herb. Griffith (Kew Distrib. 4853). TERAI, J. D. H. CACHAB, Keenan.

A low leafy tree; branches long, slender. *Leaves* 2-4 in., bases equal or subequal, rounded or subacute, brown when dry, quite glabrous in Cachar specimens; nerves very slender, nervules obscure; petiole short, pubescent; stipules slender. *Male fl.*; outer sepals obovate, inner narrower more spathulate; connectives free. *Fem. fl.* inconspicuous, minute; sepals obtuse. *Capsule* $\frac{1}{2}$ - $\frac{2}{3}$ in. diam., nearly terete, twice as broad as long.—A very distinct species.

16. *G. fagifolium*, *Miquel Plant. Hohenack*, No. 1465; quite glabrous, branchlets angular, leaves 2-3 in. thin obliquely ovate-lanceolate acuminate rather shining on both surfaces, nerves and reticulations strong, male fl. numerous in a cluster long-pedicelled, sepals broad, anthers 3-4, fem. fl. subsessile in dense capitate clusters, calyx shortly 6-lobed, style globosely 4-6-lobed much larger and broader than the very short glabrous 4-6-celled ovary, capsule orbicular depressed smooth. *Beddome Forester's Man.* 193. *Phyllanthus fagifolius*, *var. concolor*, *Muell. Arg. in Flora* xlviii. 373, and in *DC. Prodr.* xv. ii. 288.

NILGHIRI HILLS, Metz. (CHITTAGONG?), PEGU and TENASSERIM, Kurz, Helfer (Kew Distrib. 4862).

Branchlets very smooth, angular and grooved. *Leaves* greenish or brown when dry, polished, base very acute and decurrent on the petiole; nerves 6-8 pair, distinct on the upper surface, raised on the lower; petiole $\frac{1}{10}$ - $\frac{1}{8}$ in.; stipules triangular. *Male fl.* $\frac{1}{2}$ in. diam., pedicels $\frac{1}{2}$ in. or less, glabrous or puberulous; sepals obovate; connectives acute. *Fem. fl.* very much smaller, shortly stoutly pedicelled; sepals minute, very broadly ovate, acute or obtuse, margins translucent; style exserted, larger than all the rest of the flower, glabrous, tumid, ovarian cells hidden under the style.—I have seen no capsule, which Kurz describes (from Tenasserim specimens) as smooth and 3-4-coccous. I have described this, which is Mueller's var. *concolor*, from Metz and Hohenacker's specimens. I cannot identify any of my Chittagong plants with it, as Mueller does; nor have I seen his var. *casius* from the Nilgberies, for which he gives no further distinctive character than that the branchlets are "superne intense casii," and leaves paler above.

17. **G. brachylobum**, Muell. Arg. in *Linnæa* xxxii. 62; robust, quite glabrous, leaves 4-6 in. thickly coriaceous oblong or ovate-oblong obtuse or obtusely acuminate, nerves few faint, flowers all shortly pedicelled, anthers 3-4, fem. fl. very shortly pedicelled, calyx cupular unequally 4-6-lobed, ovary obovoidly globose 4-8-lobed with 4-8 basal cells quite glabrous, capsule depressed-globose obscurely 3-5-lobed with a very large globose style. *Beddome Forester's Man.* 192. *G. coriaceum*, Thwaites Enum. 285 in part. *Phyllanthus brachylobus*, Muell. Arg. in DC. Prodr. xv. ii. 288.

CEYLON; in the Central Province, alt. 3-4000 ft., Thwaites (C.P. 3016).

Branchlets woody, bark very pale. *Leaves* the thickest of any Indian species, green or brown above, brown beneath, base acute or rounded; nerves 3-5 pair, very faint, nervules 0; petiole long for the genus, $\frac{1}{4}$ - $\frac{1}{2}$ in., very stout; stipules triangular-lanceolate. *Flowers* few in a cluster, very coriaceous, male and fem. together. *Male pedicel* not much longer than the perianth (perhaps not evolute); sepals oblong, very coriaceous; connectives as long as the cells. *Fem. fl.* with spreading rounded calyx-lobes. *Capsule* $\frac{1}{2}$ in. diam., pericarp thick, red-brown when dry.

18. **G. macrostigma**, Hook. f.; glabrous, branches slender, leaves elliptic-oblong subacute thin very glaucous beneath, male fl. shortly pedicelled, sepals quite glabrous oblong, anthers 5, fem. fl. shortly pedicelled minute, calyx 6-lobed pubescent, style very large globose 5-6-cleft suddenly contracted into a very short pubescent base which is narrower than the 5-6-celled globose nearly glabrous ovary.

PENANG; at Penara Bukit, Curtis.

Branches elongate, terete, black when dry. *Leaves* 3-4 in., membranous, almost black above when dry, beneath white, base usually very unequal, one side rounded the other acute; nerves 5-6 pairs, very slender, nervules hardly any; petiole short, slender; stipules minute, triangular. *Male fl.* generally fewer than the fem., $\frac{1}{2}$ in. diam.; sepals subequal. *Fem. pedicels* short, slender, erect; calyx-lobes triangular-ovate, sparsely pubescent; stigma exserted, much larger than the perianth, lobes erect obtuse. *Fruit* unknown.—A very remarkable species with a peculiar stigma, not unlike that of the genus *Megististigma* (of this Order). The habit and foliage are those of *P. glaucifolius*, Wall.

19. **G. sclerophyllum**, Hook. f.; branchlets robust and leaves beneath and inflorescence rusty-tomentose or pubescent, leaves 3-6 in. stiffly coriaceous broadly ovate or oblong acute or cuspidately acuminate base broadly rounded or cordate, nerves very strong, flowers minute all hispid and pedicelled, male sepals oblong, anthers 5, style subcylindric 3-4-toothed hispid twice as long as the tubular obtusely irregularly toothed calyx base narrower than the hispid or glabrous ovary, capsule pedicelled

small depressed obscurely 4-5-lobed, style short conical. *Wall. Cat.* 7878 in part, and 7877 in part (in *Herbs. Benth. & Hook.*).

MALACCA, *Griffith* (*Kew Distrib.* 4845).

Leaves 2-3 in., broad, rigid and pale above when dry, grey-brown beneath, glabrous above with pubescent midrib; nerves 8-12 pair, spreading, much raised beneath, cross-nervules rather distant; petiole very short and stout; stipules oblong, hard. *Male fl.* $\frac{1}{8}$ in. diam., pedicel $\frac{1}{8}$ - $\frac{1}{4}$ in., connectives acute. *Fem. fl.* on stouter pedicels, $\frac{1}{10}$ in. long including the style, very hispid as are the pedicels; calyx-teeth very short. *Capsule* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., nearly terete.—The specimens are not very good, and I find none in Wallich's Herbarium in the Linnæan Society's Rooms: I have seen too few fem. fl. to be confident as to their description. None of the other species are at all like it. The flowers are sometimes inserted on a very short peduncle. Near *G. zeylanicum* in many respects, but the stipules differ and the capsule is much intruded at the base and apex.

20. **G. Hohenackeri**, *Beddome Forester's Man.* 193; everywhere glabrous, leaves 2-4 in. thin elliptic- or ovate-lanceolate acutely or obtusely acuminate base acute, male fl. long-pedicelled, anthers 3, fem. sessile in capitate clusters, fem. calyx unequally 4-6-toothed, style broadly tumidly conical, concealing the glabrous 8-lobed ovary, capsule subsessile much depressed 6-8-lobed with a large globose smooth minutely 3-4-toothed style in the sunk top. *Phyllanthus Hohenackeri*, *Muell. Arg. in Flora* xlviii. 373, and in *DC. Prodr.* xv. ii. 288. *Bradleia lanceolaria*, *Wall. Cat.* 7855 C.

The CONCAN and CANABA; on the Bababoodan Hills and in woods at Mercara, &c., *Heyne*, &c. The CONCAN, very common, *Gibson* (*Herb. Ind. Or., Hf. & T.* Nos. 33 & 41).

A tree, 12 ft. high; branches slender. *Leaves* usually dark brown when dry; nerves very slender, usually not raised, cross-nervules faint; petiole $\frac{1}{10}$ - $\frac{1}{8}$ in.; stipules broadly triangular. *Male fl.* $\frac{1}{8}$ - $\frac{1}{4}$ in. diam.; sepals linear-oblong; connectives half the length of the anther-cells, acute. *Fem. fl.* minute; calyx cup-shaped, lobes or teeth if few broad, rounded or subacute. *Capsule* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., quite smooth, black, rather thinly crustaceous, style with rather raised margins, about $\frac{1}{2}$ the diameter of the capsule.—Near *G. fagifolium*, but the calyx differs.

21. **G. Ralphii**, *Hook. f.*; quite glabrous, branches slender, leaves 2-3 in. elliptic-lanceolate acuminate base acute, male fl. on slender pedicels, sepals linear-oblong, anthers 3, fem. fl. few minute sessile, calyx cupular unequally obtusely toothed glabrous, style subglobose or obovoid 4-5-lobed at the top broader than the very short villous 3-6-celled ovary, capsule subsessile depressed smooth faintly 3-6-lobed, style slightly sunk globose or shortly clavate.

The CONCAN; Mahableshwar Hills, *Ralph*. N. CANABA, near the Falls of Gair soppa, *Talbot*. TINNIVELY, *Beddome*.

Branches and leaves pale brown when dry. *Leaves* not shining, thinly coriaceous, base usually unequal-sided and narrowed into the rather long (for the genus) petiole; nerves 8-12 pair, very slender, nervules indistinct; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in.; stipules triangular. *Male fl.* $\frac{1}{8}$ in. diam.; connectives obtuse. *Fem. fl.* very inconspicuous; style very much larger than the ovary. *Capsules* $\frac{1}{2}$ in. diam., crustaceous, crown very slightly sunk. *Seeds* hemispheric, red.—I assume the fruiting specimens collected by Mr. Talbot to be conspecific with *Ralphii*, which bear only male and fem. flowers. The plant much resembles in foliage and colour var. *Wightiana* of *G. ellipticum*, but the fem. calyx and ovary are altogether different.

22. **G. Johnstonei**, *Hook. f.*; branchlets tomentose, leaves 4-5 in. thin oblong or linear-oblong obtuse or obtusely acuminate glabrous or sparsely pubescent beneath, male fl. pedicelled, sepals nearly glabrous,

anthers 3, fem. minute sessile densely clustered, calyx turbinate pubescent irregularly 4-6-lobed or -toothed, style subglobose obscurely 4-5-lobed glabrous or puberulous broader than the pubescent or glabrous turbinate 4-5-celled ovary.

The DECCAN PENINSULA; Cochin, *Johnstone*. ? CANARA, *Herb. Stocks*.

Branches slender, terete, from densely ashy-tomentose to pubescent. *Leaves* dark brown when dry, very uniform in shape; base subequal, cuneate or obtuse; nerves 6-8 pair, very slender, cross-nervules mere lines; petiole $\frac{1}{10}$ - $\frac{1}{8}$ in., slender, pubescent; stipules subulate-lanceolate from a broad base. *Male fl.* $\frac{1}{4}$ in. diam., nearly glabrous, outer sepals obovate-oblong, inner narrower more spatulate; connectives short. *Fem. fl.* in clusters, $\frac{1}{4}$ in. diam.; calyx-lobes variable in length; style rather depressed-globose, not narrowed into the ovary. *Capsule* unknown.

23. **G. nubigenum**, *Hook. f.*; branches and petioles pubescent, leaves 4-5 in. thin ovate or oblong acuminate glabrous above sparsely shortly hairy beneath with very strong nerves, male fl. shortly pedicelled sparsely pubescent, sepals oblong, anthers 3, fem. fl. subsessile in minute clusters, sepals very short acute spreading, ovary a very broad depressed 5-6-angled glabrous cone 10-12-celled at the very base, capsule shortly stoutly pedicelled depressed pubescent 10-12-lobed top deeply sunk with a large flattened orbicular 6-10-lobulate style.

SIKKIM HIMALAYA, alt. 5-7000 ft.; at Darjeeling, &c., *J. D. H., Clarke*.

A tree, 60 ft.; branchlets slender, pubescence pale; tips tomentose. *Leaves* greenish when dry, especially beneath, with 6-8 pair of arched nerves conspicuous above and raised beneath, cross-nervules irregularly anastomosing; base subequal, rounded acute or subcordate; petiole $\frac{1}{8}$ in., slender; stipules triangular. *Male fl.*; outer sepals and pedicels puberulous, inner glabrous; connective free, short. *Fem. fl.* very minute, pedicels short stout; ovary so broad that the hispidulous sepals are very spreading, cells in its narrowed concave base. *Capsule* $\frac{1}{2}$ in. diam., pericarp thinly crustaceous. *Seeds* ovoidly globose, pointed, red.—A very distinct species, inhabiting a higher elevation than any other of the genus.

24. **G. Wallichianum**, *Muell. Arg. in Linnæa* xxxii. 67; branchlets slender and flowers hoary-pubescent, leaves 2-3 in. thin elliptic-oblong obtuse or acute sparsely pubescent beneath, flowers small, anthers 3, fem. very numerous and minute sessile in globose or extended clusters, calyx-lobes very short triangular, style turgidly columnar or clavate cleft into 3-4 broad apiculate lobes, ovary 3-4-celled. *Phyllanthus Wallichianus*, *Muell. Arg. in DC. Prodr.* xv. ii. 309. *Bridelia heterantha*, *Wall. Cat.* 7873; *Baill. Etudes Gen. Euphorb.* 638 (*heteranthera*).

PENANG, *Wallich*.

Branchlets terete. *Leaves* brown when dry, base subequal, acute; nerves 6-8 pair, raised, slender; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in., slender; stipules subulate. *Male fl.* from the clusters of fem., pedicel $\frac{1}{4}$ - $\frac{1}{2}$ in. very slender hoary; sepals linear-oblong, connectives rather long. *Fem. fl.* $\frac{1}{20}$ in.; calyx-lobes not half the length of the stout short glabrous or hoary style, which is somewhat contracted over the ovary. *Capsule* unknown.—The fem. fl. are extremely minute.

25. **G. pycnocarpum**, *Beddome Forester's Man.* 194; everywhere glabrous, leaves 2-3 in. coriaceous elliptic oblong or oblong-lanceolate acute or acuminate base rounded and often very unequal-sided, male fl. shortly stoutly pedicelled, anthers 3, fem. sessile few in a cluster, calyx turbinate unequally 5-6-toothed or -lobed, style very stout columnar or subacute contracted at the base 3-5-cleft glabrous twice as long as the calyx, ovary glabrous 3-5-celled, capsule small glabrous depressed 3-6-lobed, style very

stout. *G. coriaceum*, *Thwaites Enum.* 285 (*in part*). *Phyllanthus pycnocarpus*, *Muell. Arg. in DC. Prodr.* xv. ii. 304.

CEYLON; Central Province, *Gardner, Thwaites* (No. 2560).

A small tree; branchlets rather stout, angular. *Leaves* dark brown when dry, often falcate, rarely greenish above; nerves 8–10 pair, slender, spreading, and hardly raised beneath; petiole $\frac{1}{10}$ in.; stipules small, triangular. *Male pedicel* $\frac{1}{10}$ in. (perhaps not fully lengthened); sepals oblong; connectives half as long as the cells. *Fem. fl.* coriaceous; ovary not very distinct from the style-base. *Capsules* $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., quite smooth.—Mueller distinguishes this from *G. coriaceum* by the much smaller less coriaceous and unequal-based leaves, as well as by the fem. calyx, which is cleft to the middle but not below it into ovate acute lobes. It is very closely indeed allied to *G. Candolleianum*, and may prove to be a var. of that plant.

Var. *elliptica*; leaves elliptic obtuse base narrowed into the petiole, capsule $\frac{1}{3}$ – $\frac{1}{2}$ in. diam.—Ceylon, Thwaites (No. 2560).—This is the supposed abnormal state of *G. Jussieuianum* alluded to by Thwaites (*Enum.* 286).

26. ***G. arboreum***, *Wight Ic.* t. 1907; branchlets and petioles finely pubescent, leaves 4–6 in. ovate-oblong or -lanceolate acuminate reticulately nerved beneath, male and fem. flowers very shortly pedicelled, male sepals oblong, anthers 3, connectives long subulate, fem. calyx tubular unequally 6-toothed, style very stout columnar glabrous with the 4–6 ovarian cells at its very base, lobes 4–6 stout spreading obtuse, capsule large obscurely 4–6-lobed crowned with the stout long 4–6-lobed style. *Beddome Forester's Man.* 193. *Phyllanthus arboreus*, *Muell. Arg. in DC. Prodr.* xv. ii. 303.

NILGHERRY and SHEVAGHERY HILLS; at Chispaury and Nadorputta, *Wight (Kew Distrib.* 2579, 2580), *Gardner*.

Branchlets rather slender, fuscously pubescent. *Leaves* rather thin, glabrous on both surfaces, base rounded or acute, pale or brown when dry; nerves slender, raised, nervules strongly reticulated; petiole $\frac{1}{10}$ – $\frac{1}{8}$ in.; stipules triangular. *Male fl.* $\frac{1}{4}$ in. diam., pedicel about as long; connectives $\frac{1}{3}$ as long as the anther-cells. *Fem. fl.* larger, together with the exerted top of the style $\frac{1}{4}$ in. long; calyx rather swollen at the base, very coriaceous; ovary quite merged in the contracted base of the great style. *Capsule* $\frac{2}{3}$ in. diam., not much depressed, quite glabrous. *Seeds* large, $\frac{1}{3}$ in. long, trigonous, red.

27. ***G. neilgherrense***, *Wight Ic.* v. ii. 29; glabrous or minutely hoary, leaves 3–5 in. coriaceous often falcately elliptic or ovate-lanceolate obtuse or obtusely acuminate, male fl. stoutly pedicelled, sepals linear-oblong, anthers 3, connectives long, fem. fl. few large subsessile, calyx turbinate unequally 3–4-toothed, style very stout shortly clavate truncate with 4–6 large lobes and the 4–6 minute ovarian cells in its base, capsule sessile much depressed 4–6-lobed crowned with the large short lobulate style. *G. Perottettianum*, *Beddome Forester's Man.* 194. *Lobocarpus Candolleanus*, *Wight & Arn. Prodr.* 7; *Muell. Arg. in DC. Prodr.* xv. ii. 1254. *Phyllanthus neilgherrensis*, *Muell. Arg. in DC. l. c.* 303. *P. Perottettianus*, *Muell. Arg. in Linnæa* xxxiv. 69, and in *DC. l. c.* 307.—*Wight Cat.* 944.

NILGHIRI HILLS; at Nadorputtah, &c., *Wight (Kew Distrib.* 2662); Conoor, &c., alt. 7000 ft., *Clarke*.

A small tree, 12 ft. *Leaves* black when dry, or greenish above in fruit, 1–1 $\frac{1}{2}$ rarely 2 in. broad, base usually acute; nerves 6–10 pair, slender, cross-nervules faint or strong; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., quite glabrous; stipules triangular-lanceolate. *Flowers* of both sexes large for the genus; male fl. $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., on pedicels as long; sepals linear-oblong, rather thick; connectives as long as the anthers. *Fem. fl.* $\frac{1}{2}$ in. long; calyx very coriaceous, puberulous, teeth obtuse very unequal; style half exerted, lobes rather spreading into a 4–6 rayed crown. *Capsules* often as it were spicate on

short lateral and terminal leafless branchlets, $\frac{1}{2}$ – $\frac{1}{2}$ in. diam., puberulous, pericarp thick, cocci thin; style very large, half exserted. *Seeds* rather large and broad.—Mueller's description of *Phyllanthus Perotettianus* agrees so well with this, that, coming as it does from the same locality, I do not hesitate to include it as a synonym.

28. **G. obscurum**, *Blume Bijl.* 585; finely tomentose, branchlets long slender, leaves bifarious 2–3 in. oblong obtuse or subacute ashy beneath, male fl. clustered shortly pedicelled, anthers 3 rarely 4–5, fem. subsolitary pedicels lengthening much in fruit, fem. sepals tomentose, ovary globose 6–7-celled and as well as the columnar truncate 5–6-toothed style densely tomentose, capsule globose terete not lobed tip contracted, style truncate. *Miquel Fl. Ind. Bat. i. ii.* 377. *G. Roxburghianum*, *Muell. Arg. in Linnæi xxxii.* 61. *G. distichum*, *Hance in Ann. Sc. Nat. Ser. 4, xviii.* 228. *Phyllanthus obscurus*, *Willd. Sp. Pl. iv.* 581; *Muell. Arg. in DC. Prodr. xv. ii.* 287. *Bradleia pinnata*, *Roxb. Fl. Ind. iii.* 700; *Wall. Cat.* 7866. *Agyneia* ? *pinnata*, *Miquel l. c.* 368.

PENANG, *Wallich*. PERAK, *King's Collector*.—DISTRIB. Sumatra, Java, China.

A shrub, 15 ft., or (in Perak) tree, 30–40 ft. *Leaves* of uniform size and at equal distances along the branches which are 12–18 in. long, rather coriaceous, pale opaque and puberulous above, upper base rounded, lower narrow acute; nerves slender; petiole $\frac{1}{10}$ in. *Sepals* of male oblong, obtuse, outer tomentose; anthers in a globose small column. *Fem. fl.* solitary amongst the males; sepals short, recurved. *Capsule* $\frac{1}{2}$ in. diam., finely tomentose, obscurely 12–14-angled or ribbed, tipped by the lobed style; pedicel slender, pubescent, $\frac{1}{2}$ – $\frac{3}{4}$ in.; pericarp thick, almost woody. *Seeds* much compressed laterally.

29. **G. perakense**, *Hook. f.*; nearly glabrous, leaves 3–4 in. oblong-lanceolate acute quite glabrous, nerves very faint ascending, petiole slender, male fl. clustered shortly pedicelled, sepals broadly oblong glabrous, anthers 3, fem. fl. few shortly pedicelled, sepals of the male, ovary and short columnar round-topped, style densely tomentose, capsule pedicelled depressed globose 3-celled nearly glabrous very obscurely 6-lobed, style minute.

PERAK; at South Balang, *King's Collector*.

Branches very sparsely puberulous or glabrous, slender. *Leaves* thinly coriaceous, greenish above, brown beneath, hardly shining; base acute, unequal; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in. *Male fl.* about $\frac{1}{10}$ in. diam.; pedicels $\frac{1}{8}$ – $\frac{1}{4}$ in. *Fem. fl.* solitary amongst the males; style villous to the tip. *Capsule* $\frac{1}{2}$ in. diam. when ripe, almost terete, pericarp thick, with obscure raised lines at the sutures.

30. **G. sphærogynum**, *Kurz For. Fl. ii.* 346; everywhere glabrous, leaves 4–12 in. coriaceous lanceolate or ovate-lanceolate acuminate base acute, male fl. small pedicelled, sepals elliptic, anthers 3, connectives short, fem. densely clustered subsessile, sepals orbicular, ovary turbinate glabrous 4–6-celled, crowned by the subglobose entire style, capsule subsessile much depressed deeply 8–12-lobed with the large globose style in the depressed apex. *Phyllanthus sphærogynus*, *Muell. Arg. in Flora xlviii.* (1865) 375, and in *DC. Prodr. xv. ii.* 293. *P. fagifolius* a, *Muell. in DC. l. c.* 288 (*the Chittagong plant*). *Bradleia lanceolaria*, *Wall. Cat.* 7855 D.

EASTERN TROPICAL HIMALAYA; Sikkim, *Clarke*; Bhotan, *Griffith* (*Kew Distrib.* 4832/1). CHITTAGONG, *J. D. H. & T. T.* BURMA; from Pegu to Tenasserim, *Wallich*, &c.

A small tree with weeping branches, bark pale. *Leaves* very long and narrow, attaining 14 by 2 in., but sometimes only 4 by 1½ in., smooth and often green when dry above, nerves slender; petiole stout, $\frac{1}{8}$ – $\frac{1}{4}$ in.; stipules short, triangular. *Capsule* $\frac{1}{2}$ in. diam., shortly stoutly pedicelled, smooth, furrows extending to the large globose style.—Disseised flowers occur as enlarged woody turbinate bodies surmounted by 6

incurved rigid calyx-lobes, surrounding a central cone to which 3 imperfect anthers are adnate throughout their length. Similar malformed flowers occur in other species.

31. **G. nanogynum**, *Hook. f.*; quite glabrous, leaves 2-3 in. elliptic-oblong or -lanceolate obtusely acuminate shining, flowers minute, males shortly pedicelled, anthers 3, fem. sessile in dense axillary clusters, sepals oblong obtuse, ovary minute villous 3-celled covered by the depressed turbinate obscurely 3-gonous style, capsule very small globose 3-6-lobed 3-celled rusty-pubescent, style globose. *Phyllanthus nanogynus*, *Muell. Arg. in Flora* xlviii. (1865) 376, and in *DC. Prodr.* xv. ii. 293. *Bradleya lanceolaria*, *Wall. Cat.* 7855 K; *Baill. Etudes Gen. Euphorb.* 638.—*Wall. Cat.* 8003 D.

PENANG, *Wallich*. PERAK, *Wray*; at Goping, *King's Collector*. MALACCA, *Griffith*, *Maingay* (*Kew Distrib.* 1359).

A large tree (*Wray*), branches terete and angular, glabrous to the tips. *Leaves* thin, dark red-brown on both surfaces when dry, base acute or cuneate; nerves very slender, suberect; petiole $\frac{1}{10}$ — $\frac{1}{8}$ in.; stipules subulate from a triangular base. *Flowers* very small in axillary clusters; connectives short, obtuse. *Fem. fl.* depressed; sepals very minute, leaving the broad style exposed. *Capsule* $\frac{1}{8}$ — $\frac{1}{4}$ in. diam., lobes rounded, not ribbed.—The bark is used for tanning (*Wray*).

32. **G. desmocarpm**, *Hook. f.*; branchlets pubescent, leaves 3-6 in. elliptic-oblong obtuse or subacute sparsely pubescent on the nerves beneath, male fl. minute in axillary clusters, anthers 3, fem. fl. sessile, sepals un- minute, style a depressed fleshy 3-grooved cone capping and nearly as broad as the pubescent ovary, capsules very small in dense clusters pedicelled much depressed deeply 6-lobed hoary, style very short erect lobulate.

PENANG, *Herb. Hook.* PERAK, in dense jungles, *Wray, King's Collector*.

A tree, 50-70 ft. (in Perak). *Leaves* rather coriaceous, dark brown when dry, somewhat shining above, base subacute; nerves slender, raised, ascending; petiole $\frac{1}{6}$ in.; stipules not seen. *Flowers* pubescent. *Capsules* 8-10 in a cluster, subsessile, $\frac{1}{4}$ in. diam. or less.—I am doubtful about the affinities of this species.

33. **G. Thomsoni**, *Hook. f.*; everywhere glabrous, leaves 2-4 in. elliptic or oblong acute or obtuse very glaucous beneath, male fl. few minute, anthers 3, fem. fl. numerous fascicled all very long pedicelled, sepals very minute, style a depressed fleshy 3-grooved cone capping and nearly as broad as the low 3-lobed ovary, capsules on rigid slender pedicels small depressed 3-4-celled and lobed or obscurely 6-8-lobed, sunken top with a globose rugose style or a very depressed smooth cone. *Phyllanthus Thomsoni*, *Muell. Arg. in Flora* xlviii. (1865) 375, and in *DC. Prodr.* xv. ii. 293; *Gamble Man. Ind. Timb.* 352.

KHASIA MTS., alt. 3-4000 ft., *Griffith* (*Kew Distrib.* 4846), *J. D. H. & T. T.*, &c.

A small tree, branches slender. *Leaves* very uniform, green above and bluish beneath when dry; nerves 6-8 pair, capillary, nervules very faint reticulate; petiole $\frac{1}{6}$ in. *Male fl.* rare, scattered amongst the fem., pedicel very short; sepals elliptic; connectives short. *Fem. fl.* very numerous, $\frac{1}{10}$ in. diam.; pedicels slender but rigid, of uniform length; sepals very minute, acute; style fleshy, obscurely trigonous with a tricrural furrow at the apex. *Capsules* $\frac{1}{8}$ in. diam., very smooth, black when dry, impressed at the top and base, thinly crustaceous; lobes rounded with a mesial furrow; style sometimes persistent as a globose fleshy body, at others altogether disappearing, when the disk of the capsule is occupied by a low smooth cone with 3 minute points.—The variable nature of the fruiting style throws doubt on the value of this organ as a guide to other species: this is a very distinct one and easily recognized by the clusters of long-pedicelled fem. fl. and the styles.

34. **G. lævigatum**, *Hook. f.*; quite glabrous, branchlets very slender angled, leaves 1-1½ in. obliquely elliptic- or ovate-oblong obtusely or acutely acuminate subglaucous beneath, nerves very faint, flowers all fascicled very minute, anthers 3, ovary glabrous globose 5-celled, style of 4-6 minute points, capsule small shortly pedicelled orbicular depressed 10-lobed crown deeply sunk, style very minute. *Bradleya lævigata*, *Wall. Cat.* 7853. *Phyllanthus lævigatus*, *Muell. Arg. in Flora* xlviii. (1865) 374, and in *DC. Prodr.* xv. ii. 289.

TENASSERIM, *Helper (Kew Distrib.* 4844). PERAK, *King's Collector*. PENANG, *Wallich, Curtis, &c.* MALACCA, *Griffith (Kew Distrib.* 4844, 4860, 4855). SINGAPORE, *Schomburgk, Hullett.*

Branches smooth, terete, branchlets filiform, glabrous to the tips. *Leaves* greenish above, shining, base equal or one side rounded the other acute; petiole slender; stipules minute, triangular. *Male fl.* $\frac{1}{16}$ - $\frac{1}{12}$ in. diam., pedicels slender; sepals linear oblong. *Sepals* of fem. oblong, obtuse. *Capsules* $\frac{1}{2}$ in. diam., minutely dotted.

35. **G. microbotrys**, *Hook. f.*; perfectly glabrous, leaves 2-3 in. elliptic- or ovate-oblong subacute or obtusely cuspidate nerves very slender, flowers in peduncled cymes very shortly pedicelled, males very minute, anthers 3, ovary globose glabrous 3-celled, style obscure with 4-6 points, capsule very small depressed turbinate globose faintly 3- or 6-lobed glabrous, style of 4-5 minute projections.

MALAY PENINSULA; Perak, Singapore, &c., *King's Collector*.

A tree, 30-50 ft. (Perak); branches spreading and pendulous; branchlets slender, angular; whole plant black when dry. *Leaves* thinly coriaceous, rather shining on both surfaces, nerves 6-8 pair; petiole slender, $\frac{1}{8}$ - $\frac{1}{4}$ in.; stipules minute, broad. *Flowers* on slender axillary peduncles $\frac{1}{2}$ - $\frac{3}{4}$ in. long and branched at the top; male and fem. mixed and all pedicelled, males most shortly. *Male fl.* $\frac{1}{20}$ in. long; outer sepals broadly ovate, inner almost rounded; anther-column rather broad, connectives obtuse. *Fem. calyx* as in the male; ovary with a very inconspicuous style. *Capsule* $\frac{1}{8}$ - $\frac{1}{4}$ in. diam., 6-ribbed, black, top slightly depressed.

36. **G. malabaricum**, *Beddome Forester's Man.* 194; nearly glabrous except the flowers, leaves 3-4 in. elliptic-oblong or lanceolate acuminate, male fl. long pedicelled, sepals sublinear, anthers 3, fem. minute sessile in dense clusters. sepals 6 linear-oblong obtuse pubescent or glabrous, style between columnar and conic gradually swelling into the globose 3-5-celled ovary both tomentose tip truncate 4-7-toothed, capsules shortly pedicelled depressed obscurely 3-5-lobed puberulous, style very minute conical. *Phyllanthus malabaricus*, *Muell. Arg. in Linnæa* xxxiv. 69, and in *DC. Prodr.* xv. ii. 305.

WESTERN GHATS; from the Concan to the Nilghiri Hills (*Herb. Ind. Or., H. f. & T.* No. 40, 42, 43).

Branches slender, sometimes slightly pubescent. *Leaves* rather coriaceous when the plant is in fruit, greenish when dry with rather strong nerves, thinner and brown when in flower, base acute or obtuse; petiole $\frac{1}{10}$ in.; stipules subulate. *Male fl.* from the tufts of female, $\frac{1}{10}$ to $\frac{1}{8}$ in. diam.; pedicel very slender; anthers free, connectives rather long, subulate. *Fem. fl.* minute; sepals erect or tips recurved. *Capsule* $\frac{1}{2}$ - $\frac{1}{3}$ in. diam., not deeply sunk at the top, lobes broad, with a faint mesial furrow, crustaceous.—Very near *G. ellipticum*.

37. **G. assamicum**, *Hook. f.*; branches and leaves quite glabrous, leaves 4-6 in. elliptic-ovate-oblong or lanceolate subcaudate-acuminate brownish purple beneath base usually acute nerves firm, male fl. long-pedicelled glabrous, sepals narrow, anthers 3(-5), fem. densely clustered

subsessile, sepals linear-oblong, style very short columnar, ovary globose glabrous or pubescent, capsules small densely clustered sessile depressed faintly 4-lobed, tipped with the minute style glabrous or puberulous. *Phyllanthus assamicus*, *Muell. in Flora* xlviii. (1865) 378, and in *DC. Prodr.* xv. ii. 297. *P. Andersonii*, *Muell. Arg. in Flora* lv. (1872) 3 (*fide King*).

WESTERN HIMALAYA; Kumaon, *Edgeworth*. BENGAL; at Dacca, *Clarke*. Foot hills and low valleys of the HIMALAYA from Sikkim eastwards to UPPER ASSAM, CACHAR and CHITTAGONG. *Jenkins, Griffith (Kew Distrib.* 4848, 4871, 4873, 4882), &c. UPPER BURMA, *Griffith*.

An unbrageous small tree, youngest shoots glabrous. *Leaves* rather coriaceous, always di-coloured, smooth above, nerves and cross-nervules raised beneath; petiole $\frac{1}{10}$ in., stout; stipules subulate from a triangular-lanceolate base. *Male fl.* $\frac{1}{8}$ in. diam., clustered; pedicels capillary. $\frac{1}{2}$ – $\frac{3}{4}$ in.; sepals somewhat dilated upwards; connectives large, acute. *Fem. fl.* minute, very many in a cluster; pedicels very short and sepals and ovary glabrous or puberulous. *Capsules* often forming clusters along all the axils of the branchlets, sessile or on short slender pedicels, $\frac{1}{2}$ in. diam., quite smooth and usually glabrous, obtusely 4- rarely 3- or 5-angled and celled; pericarp thin, crustaceous. *Seeds* hemispheric, red.—A common N.E. Indian species, easily recognized amongst the glabrous ones by the small usually obscurely 4-lobed thin walled capsules with a minute style in their hardly depressed top. *Leaves* rarely 7 by 4 in. in Daccan specimens.—Specimens of *Andersonii* from the Calcutta Herbarium are identical with *assanicum*. *Mueller* describes the anthers as 3–5, but I find only 3.

38. **G. Daltoni**, *Kurz For. Fl.* ii. 344; quite glabrous, branches slender, leaves coriaceous 2–4 in. lanceolate or oblong-lanceolate acuminate shining above purplish brown beneath, base acute, male fl. sessile, sepals ovate-oblong silky within, anthers 3, fem. clustered sessile, ovary globose 4–6-celled pubescent soon glabrous, style exerted stout slightly clavate tip with 4–6 rounded lobes, capsules subsessile depressed 8–10-lobed, style stout clavate lobed deciduous. *Beddome Forester's Man.* 195. *Phyllanthus Daltoni*, *Muell. Arg. in Flora*, and in *DC. Prodr.* xv. ii. 310.

SIKKIM HIMALAYA, at the foot hills, *J. D. H., King*. BURMA, *Wallich*. TEXAS—SEKIM, at Mergui, and PEGU, *Griffith*, *Kurz*—DISTRIB. Yunnan, *J. Anderson*.

A deciduous small tree or shrub (*Kurz*). *Leaves* brown on both surfaces when dry, or green above, smooth; nerves very slender, raised; petiole $\frac{1}{10}$ in.; stipules ovate, acute. *Fem. sepals* quite glabrous without, a little pubescent within; inner smaller, sub-patulate. *Style* glabrous or tomentose below. *Capsules* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., reddish brown, lobes smooth; pericarp very thin.—*Mueller* gives the Nilgiri Mountains as a locality for this, but I have seen no specimens.

39. **G. rigidum**, *Muell. Arg. in Linnæa* xxxii. 67; quite glabrous, leaves 3–4 in. coriaceous elliptic-oblong or lanceolate base acute, male fl. small, sepals glabrous, anthers 3, fem. all pedicelled few in a cluster, sepals oblong pubescent within below the middle, style a little longer than the sepals shortly columnar or funisiform 3–4-cleft constricted above the globose glabrous 3–4-celled ovary, capsule depressed-globose smooth 6–8-lobed crowned by the short stout exerted style. *G. Jussieuanum*, *Thwaites Enum.* 285 (*excl. C.P.* 2560); *Muell. Arg. l. c.* 67; *Beddome Forester's Man.* 194. *G. Thwaitesii*, *Muell. Arg. l. c.* 66. *Gynon rigidum*, *A. Juss. Tent. Euphorb.* 107, t. 3, f. 9. *G. triandrum*, *Wight & Arn. in Wight Ic. t.* 1908. *G. Jussieuanum*, *Wight in text*, v. ii. 29. ? *Phyllanthus stellatus*, *Retz Obs.* v. 29; *Muell. Arg. in DC. Prodr.* xv. ii. 305. *P. Jussieuanus*, *Muell. Arg. in DC. l. c.* 304.

CEYLON; ascending to 4000 ft., *Kœnig*, &c.

Branchlets rather slender, not flexuous, angled. *Leaves* rarely 2 in. broad, dark brown or black when dry; nerves 6-8 pairs, very slender, cross-nervules faint reticulate; petiole $\frac{1}{10}$ - $\frac{1}{8}$ in., stipules triangular. *Male pedicels* slender, $\frac{1}{4}$ - $\frac{1}{2}$ in.; sepals linear-oblong; connectives rather long. *Fem. pedicel* $\frac{1}{10}$ - $\frac{1}{8}$ in., about as long as the flower, thickened upwards; style about twice as long as the perianth, tip contracted till the lobes spread. *Capsule* very variable in size, $\frac{1}{2}$ - $\frac{1}{4}$ in. diam., rather deeply lobed.—I doubt this being the plant which Retz called *P. stellatus*, a name in no way applicable to this, but very much so to some other Ceylon species, in which the long styles spreading from the axils of the leaves have a stellate appearance. As Thwaites truly observes, Retz's description is far too imperfect for even the approximate identification of his *stellatus*. Mueller unites a Sikkim plant of mine with this, but I do not recognize it.

40. **G. coriaceum**, *Thwaites Enum.* 285; quite glabrous, leaves 2-4 in. coriaceous elliptic-oblong or almost orbicular obtuse nerves raised and reticulate beneath, male fl. shortly pedicelled, anthers 3 connectives long, fem. sessile densely clustered, style cylindric stout glabrous top 3-lobed about twice as long as the oblong free sepals, base narrower than the globose glabrous 3-celled ovary, capsule depressed 6-lobed glabrous with the cylindric style in its sunken top. *Beddome Forester's Flor.* 194.

CEYLON; alt. 3-4000 ft., *Walker, Thwaites*.

Branchlets flexuous, rather stout, angled. *Leaves* usually of a rich red brown beneath when dry; nerves 4-5 pair, cross-nervules reticulated; petiole very short; stipules triangular. *Male and fem. fl.* generally in separate clusters; male pedicels $\frac{1}{6}$ - $\frac{1}{4}$ in.; sepals coriaceous; connectives nearly as long as the cells. *Fem. fl.* sepals free to the base, coriaceous; style often slightly curved. *Capsule* $\frac{1}{2}$ in. diam., black when dry; lobes 3, rounded, each slightly again lobed.

41. **G. ellipticum**, *Wight Ic.* t. 1906; everywhere quite glabrous or fem. fl. and fruit sparsely pubescent, leaves 3-5 in. coriaceous elliptic-oblong or lanceolate acute or acuminate often unequal-sided base acute, male pedicels rather short, sepals linear-oblong, anthers 3, fem. fl. sessile capitate clustered, sepals oblong obtuse or subacute, style short stout conical glabrous 6-toothed narrower than the globose tomentose 4-6-celled ovary, capsule very shortly pedicelled depressed obscurely 4-6-lobed glabrous or puberulous. *G. diversifolium*, *Beddome Forester's Man.* 193. *Phyllanthus diversifolius*, var. β . longifolia, *Muell. Arg. in Flora* xlviii. (1865) 378, and in *DC. Prodr.* xv. ii. 298.

SOUTH CANAN, *Law*. MALABAR, *Wight (Kew Distrib.* 2576 and 2663).

A shrub; branchlets slender, angled. *Leaves* variable, sometimes very unequal-sided, narrowed into the short glabrous petiole; nerves slender, raised beneath, cross-nervules very obscure; stipules triangular-hastate, often falcate. *Male pedicels* very slender, always glabrous, as are the flowers. *Male fl.* minute black when dry.—*Capsule* $\frac{1}{2}$ in. diam., pubescent in Wight's figure.—Very near *G. malabaricum*, if not a variety of that plant. I find no difference in the styles. *G. ellipticum* has broader stipules, shorter fem. sepals, longer connectives, and larger fruit.

VAR. *Wightiana*; leaves smaller 3 by $\frac{3}{4}$ in. caudate-acuminate, stipules subulate. *P. diversifolia*, var., and *Wightiana*, *Muell. Arg. l. c.* *G. diversifolium*, β . *Wightiana*, *Beddome Forester's Man.* 193. *Bradleya Wightiana*, *Wall. Cat.* 7862.

42. **G. glaucifolium**, *Muell. Arg. in Linnæa* xxxiv. 65; branchlets very slender and leaves quite glabrous, leaves $2\frac{1}{2}$ - $3\frac{1}{2}$ in. elliptic or elliptic-ovate or -oblong acuminate base very unequal, petiole slender, flower very minute, male shortly pedicelled glabrous, anthers 3, fem. sub sessile, sepals hispid, style conical obtuse glabrous longer than the puberulous ovary, capsule depressed turbinate 3-4-angled glabrous crown flat. *Kurz For. Fl.*

ii. 345. *Phyllanthus glaucifolius*, *Wall. Cat.* 7923; *Muell. Arg. in Flora* xlviii. (1865) 378, and in *DC. Prodr.* xv. ii. 298.

TENASSERIM; at Martaban, *Wallich*; Mergui, *Griffith*.

Branches terete, smooth; branchlets long, glabrous to the tips. *Leaves* thin, dark above when dry, dirty white beneath, upper base rounded, lower acute; nerves 8-10 pair, exceedingly slender, cross-nervules faint; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules triangular. *Flowers* in minute axillary clusters; male $\frac{1}{2}$ in. diam., pedicels as long; sepals of both sexes oblong, obtuse; fem. fl. $\frac{1}{10}$ in. long, including the exserted style.—I have seen no capsules, and there is neither flower nor fruit in Wallich's specimens, which are the only ones mentioned by Mueller, who, however, describes the capsules as above; as does Kurz, who adds that they are $\frac{1}{2}$ - $\frac{1}{4}$ in. diam., and sometimes pruinose. Kurz further describes the sepals of both sexes as smooth, but they are hispid in Griffith's specimens (a character of no moment in the genus). The style at length becomes twice the length of the sepals. In Wallich's specimens the branches are very glaucous. It resembles 18. *G. megastigma*.

43. *G. andamanicum*, *Kurz For. Fl.* ii. 346; glabrous except the puberulous flowers, branchlets angular and compressed, leaves 3-4 in. thin orbicular ovate or broadly elliptic-oblong glaucous beneath, male fl. small on short slender pedicels, sepals oblong obtuse puberulous, anthers 3, fem. fl. minute clustered sessile, style thick conical truncate nearly as broad as the tomentose 4-6-celled ovary tip 5-6-lobed, capsule large much depressed strongly 8-12-lobed hispidly pubescent, style very small conical sunk in the intruded crown.

SOUTH ANDAMAN ISLANDS; rare, *Kurz*.

An evergreen tree; branchlets long, stout, and leaves grey-black when dry. *Leaves* very glaucous beneath, base rounded or suddenly acute; nerves 5-7 pair, very slender, arched, nervules few distant; petiole $\frac{1}{2}$ in., rather slender; stipules subulate. *Male pedicels* $\frac{1}{4}$ in.; perianth $\frac{1}{10}$ in. diam.; connectives acute. *Capsules* sessile, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., thinly crustaceous, crown sunk. *Seeds* large, red, irregularly trigonously ovoid.

44. *G. velutinum*, *Wight Ic.* t. 1907/2; branches petioles leaves beneath and inflorescence more or less (sometimes densely) pubescent or tomentose, leaves 2-5 in. from orbicular to ovate elliptic or oblong obtuse or subacute rarely narrower and acuminate, male fl. shortly pedicelled, sepals sparsely hairy, anthers 3, fem. subsessile or very shortly pedicelled, sepals oblong, style stout enlarged at the truncate toothed tip and 4-7-celled ovary tomentose, capsule depressed globose 4-7-celled and lobed pubescent, style short in the depressed top. *Beddome Forester's Man.* 195. *Phyllanthus velutinus*, *Muell. Arg. in DC. Prodr.* xvi. ii. 309. *P. nepalensis*, *Muell. Arg. in Flora* xlviii. (1865) 375, and in *DC. l.c.* 291; *Brandis For. Fl.* 453. *Kurz For. Fl.* ii. 344. *Bradleia ovata*, *Wall. Cat.* 7852; *Baill. Etudes Gen. Euphorb.* 638.

Hot valleys of the HIMALAYA; from Kashmir, *Clarke*, eastwards to BURMA and the KHASTA MTS., alt. 3000 ft., *Griffith*, &c. DECCAN PENINSULA from the Concan to the Nilghiri Hills.

A small tree, 20-30 ft., very variable as to the pubescence of the branches and leaves. Those in western and southern examples are clothed with white or tawny tomentum, in eastern ones they are much more glabrous. *Leaves* rather coriaceous or thin, puberulous or glabrate above; nerves rather strong beneath, as are often the cross-nervules; petiole $\frac{1}{10}$ - $\frac{1}{2}$ in., stout; stipules triangular. *Male fl.* $\frac{1}{10}$ - $\frac{1}{2}$ in. diam.; sepals oblong; connectives short. *Fem. fl.* usually densely clustered; sepals of the male; style variously toothed, tip glabrous. *Capsule* variable, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.—The eastern form might be regarded as a variety with more glabrous leaves and smaller flowers, approaching closely to *G. Heyteanu* in habit and foliage, and specimens may be found to unite these species. Wallich's examples of *B. ovata* are in a very

young state, in which I think that the styles are either undeveloped or arrested in development, whence Mueller's reference of it to a section with depressed or deplanate styles.

45. **G. Heyneanum**, *Wight Ic.* v. ii. 29 and t. 1908 (*right-hand figure*); branchlets slender tomentose, leaves 2-5 in. thin elliptic or oblong obtuse acute or cuspidate sparsely pubescent beneath, male fl. small shortly pedicelled, anthers 3, fem. longer pedicelled clustered, sepals narrow subacute, style slender exerted clavate truncate pubescent narrower than the pubescent 4-5-celled ovary, capsules pedicelled depressed 8-12-lobed 1-5-celled glabrous or puberulous, style very short. *Beddome Forester's Man.* 195. Gynoon Heyneanum, *Wight & Arn. in Dietr. Synops.* v. 388. *Phyllanthus Heyneanus*, *Muell. Arg. in DC. Prodr.* xv. ii. 311.

LOWER BENGAL, from the foot of the SIKKIM and BHOTAN HIMALAYA southwards to the CIRCARS.

A tree, 30-40 ft. *Leaves* almost membranous, brown when dry, base acute, above glabrous except the midrib; nerves slender, tomentose beneath, nervules distinct; petiole $\frac{1}{10}$ in., tomentose; stipules triangular. *Male pedicels* $\frac{1}{10}$ - $\frac{1}{8}$ in., and linear-oblong sepals hoary-pubescent. *Fem. pedicels* slender, as long as the flower or longer; style when fully developed twice the length of the perianth, base hardly contracted. *Capsules* $\frac{1}{8}$ in. diam., at length glabrous.—Very near to states of *G. velutinum*, but more slender, with less tomentose leaves, much more slender styles, and smaller flowers and seeds. The leaves of both seem to be caducous in drying.

46. **G. acuminatum**, *Muell. Arg. in Linnæa* xxxii. 68; branches long slender and leaves beneath hoary-pubescent, leaves 4-6 in. lanceolate acuminate glaucous beneath, flowers all pedicelled, fem. densely fascicled, sepals very unequal, anthers 3, style clavate truncate 4-6-lobed puberulous twice as long as the sepals, capsule very small long-pedicelled depressed deeply 4-6-lobed hoary, style minute in the deeply sunk top. *Briedelia acuminata*, *Wall. Cat.* 7885. *Phyllanthus bicolor*, *Muell. Arg. in DC. Prodr.* xv. ii. 311; *Brandis For. Fl.* 453; *Gamble Man. Ind. Timb.* 353.

NEPAL, *Wallich*; Sikkim, alt. 5-7000 ft., *J. D. H.*, &c. KHASIA Mts., alt. 4-6000 ft., *Griffith*, &c.

An evergreen tree; branchlets often 2 ft. long, drooping, tips tomentose. *Leaves* glabrous above except the midrib and greenish when dry, grey-white beneath with strong slanting nerves, nervules few faint; petiole very short, pubescent; stipules triangular-ovate, acuminate. *Male fl.* small, nearly glabrous; sepals obovate; connectives umbonate. *Capsules* $\frac{1}{4}$ - $\frac{1}{3}$ in. diam., lobes subglobose.—A very well marked species.

47. **G. superbum**, *Baill. Etudes Gen. Euphorb.* 638; branchlets very stout and leaves beneath and inflorescence densely tomentose. leaves 3-10 in. thickly coriaceous orbicular elliptic or ovate-oblong tip rounded or cuspidate and obtuse base broadly rounded or cordate, nerves very strong, flowers small very densely clustered on stout peduncles, male on long capillary pedicels, sepals linear-oblong, anthers 3, fem. sessile or shortly pedicelled, sepals oblong hispid, ovary 3-celled and style together forming a short hispid cone 3-cleft at the top about twice as long as the sepals, capsules pedicelled very small obtusely 3-lobed pubescent. *Muell. Arg. in Linnæa* xxxii. 64. *Phyllanthus superbus*, *Muell. Arg. in Flora* xlviii. (1865) 375, and in *DC. Prodr.* xv. ii. 292. *G. dasyphyllum*, *Miquel Fl. Ind. Bat. Suppl.* 451. *Bradleya Finlaysoniana*, *Wall. Cat.* 7860.

PENANG, *Wallich, Maingay* (*Kew Distrib.* 1349, 2521). PERAK, *Scortechini, King's Collector*. MALACCA, *Hervey*. SINGAPORE, *Schomburgk, &c.*—DISTRIB. Borneo, Java.

A tree, 30–40 ft.: branchlets as thick as a swan's quill. *Leaves* on Singapore specimens rounded, $2\frac{1}{2}$ – $3\frac{1}{2}$ by $2\frac{1}{2}$ –3 in., in others longer and 3–4 in. diam., dull greenish brown or grey when dry and very rigid, scaberulous above with imperfect nerves, beneath thickly softly tomentose with 6–12 pairs of very strong arched spreading nerves and reticulate cross-nerves; petiole very short and thick; stipules long, slender, subulate from a triangular base. *Peduncles* $\frac{1}{2}$ in., stout. *Male pedicels* $\frac{1}{2}$ – $\frac{3}{4}$ in., very many, capillary; perianth $\frac{1}{8}$ in. diam.; connectives acute. *Fem. fl.* minute. *Capsules* $\frac{1}{8}$ – $\frac{1}{2}$ in., pericarp and cocci very thin.

48. **G. leiostylum**, *Kurz For. Fl.* ii. 345; branchlets slender and glabrous or hispidulous, leaves 2–3 in. thin ovate elliptic oblong or oblong-lanceolate rather abruptly narrowed to an obtuse or acuminate point glabrous, male fl. long pedicelled, anthers 3, fem. fl. solitary or few and clustered minute sessile, sepals oblong obtuse, ovary 3-celled villous, style exerted glabrous narrowly conical tip acutely 3-cleft, capsule small sessile or shortly pedicelled depressed 6-lobed hoary, style very minute. *Bradleya coronata*, *Wall. Cat.* 7854 (the Singapore plant).

PEGU to TENASSERIM, ascending to 4000 ft., *Helper* (*Kew Distrib.* 4861), *Griffith* (*Kew Distrib.* 4854), *M'Lelland, Kurz, &c.* MALACCA, *Griffith* (*Kew Distrib.* 4844, 4877). SINGAPORE, *Wallich*.

An evergreen shrub or small tree. *Leaves* dark brown when dry, shining above and sometimes on both surfaces, base rounded or very unequal-sided, one side acute the other rounded; petiole slender, $\frac{1}{10}$ – $\frac{1}{8}$ in.; stipules subulate from a triangular base. *Male pedicels* glabrous or pubescent, $\frac{1}{4}$ – $\frac{1}{2}$ in.; sepals linear-oblong; connectives rather long, acute, glabrous or hispidulous. *Fem. sepals* lanceolate, acute, glabrous or puberulous. *Capsule* $\frac{1}{2}$ in. diam., crustaceous. *Seeds* hemispheric.—*Kurz* describes the leaves beneath petioles and midrib as pubescent. This is not so in a specimen named by himself, in which the leaves are very like those of *G. levigatum*.

49. **G. khasicum**, *Hook. f.*; everywhere quite glabrous, leaves 3–4 in. rigid elliptic acuminate, male fl. few, sepals lanceolate obtuse, anthers 3, fem. few clustered subsessile, sepals ovate-oblong subacute very unequal, style 2–3 times as long as the sepals subcylindric 3-grooved acutely unequally 2–3-toothed gradually dilated into the glabrous ovary, capsule very shortly pedicelled depressed 3–6-lobed quite glabrous, style as long stout deciduous. *Phyllanthus khasicus*, *Muell. Arg. in DC. Prodr.* xv. ii. 311.

SIKKIM HIMALAYA, alt. 4000 ft., *J. D. H., &c.* KHASIA HILLS, *Griffith* (*Kew Distrib.* 4357, 4851), &c.

An umbrageous dark green tree, 50 ft., branches woody, branchlets angled. *Leaves* when dry pale above, grey brown beneath, base acute and decurrent on the short stout petiole; nerves 5–6 pair, slender, arched; stipules triangular-ovate. *Male fl.* shortly pedicelled; connectives umbonate. *Fem. sepals* erect, coriaceous. *Capsule* $\frac{1}{2}$ in. diam., lobes rounded. *Seeds* hemispheric.—The style is hardly ever clavate.

50. **G. nemorale**, *Thwaites Enum.* 286; usually quite glabrous or nearly so, leaves 4–7 in. very coriaceous lanceolate or oblong-lanceolate acuminate base acute or rounded, nerves 3–4 pairs very obliquely ascending, male fl. shortly pedicelled, anthers 3, connectives very long, fem. fl. densely clustered subsessile or pedicelled glabrous or pubescent, sepals narrowly oblong, style stout columnar slightly curved 3-fid glabrous 3–4 times longer than the narrowly oblong sepals, base contracted above the globose 3–4-celled glabrous ovary. *Beddome Forester's Man.* 195. *Phyllanthus nemoralis*, *Muell. Arg. in DC. Prodr.* xv. ii. 312.

CEYLON, Walker; Pasdun Corle, Thwaites.

Branchlets stout, not flexuous, terete, smooth, sometimes shortly hairy. *Leaves* very smooth, greenish brown when dry; nerves 4-5 pair, very slender, ascending, lower almost parallel to the margin, nervules indistinct; petiole very short and stout; stipules triangular. *Flowers* male and fem. together in rather dense clusters, from which the long stout styles spread stellately. *Male pedicel* $\frac{1}{2}$ - $\frac{1}{4}$ in.; sepals broad; connectives lanceolate, as long as the cells. *Fem. sepals* free to the base; style $\frac{1}{2}$ in. long, sometimes slightly thickened upwards. *Capsule* unknown.—The glabrous long acuminate leaves with very slanting nerves seem characteristic of this species.

51. **G. Moonii**, Thwaites Enum. 286 (excl. syn.); branchlets leaves beneath and inflorescence tomentose or villous, leaves 4-8 in. coriaceous elliptic-lanceolate or oblong acuminate or caudate base rounded or acute, nerves 6-8 pairs, male fl. shortly pedicelled, anthers 3, connectives long, fem. very numerous sessile or pedicelled densely clustered hispid, style clavate twice or thrice as long as the linear sepals pubescent 3-cleft rather narrower than the globose pubescent or glabrate 3-celled ovary, capsule globose slightly depressed and 6-lobed tipped with short hirsute pubescent or glabrate style. *G. glaucogynum*, Beddome Forester's Man. 195. *Phyllanthus Moonii*, Muell. Arg. in DC. Prodr. xv. ii. 312. *P. pubescens*, Moon Cat. 65. *P. glaucogynus*, Muell. Arg. in DC. Prodr. xv. ii. 312.

CEYLON, Walker, Gardner, Thwaites (n. 2150).

A shrub or small tree; branchlets rather stout, flexuous. *Leaves* 2-3 $\frac{1}{2}$ in. broad, not black or brown when dry, puberulous or glabrate above, rarely so beneath; nerves 8-10 pair, usually strong beneath; petiole $\frac{1}{2}$ in., very stout; stipules oblong-lanceolate. *Male fl.* few in the clusters of fem.; connectives as long as the cells. *Fem. fl.* with the styles $\frac{1}{2}$ in. long; sepals free nearly to the base, hispid. *Capsule* $\frac{3}{4}$ - $\frac{1}{2}$ in. diam.—This is clearly Mueller's *P. glaucogynus*, both according to the number he quotes (C.P. 2150) and his description of foliage and style, which latter is clavate also in Thwaites' description.

52. **G. montanum**, Thwaites Enum. 286; branches and inflorescence hispidly tomentose, leaves 1 $\frac{1}{2}$ -3 in. ovate broadly oblong or oblong-lanceolate obtuse or cuspidate beneath more or less tomentose or glabrate, base oblique rounded or subacute, male fl. pedicelled, stamens 3, connectives very long, fem. fl. sessile, style long, cylindric or subclavate more or less hairy, 3-toothed, capsule depressed globose 3-celled 6-lobed glabrous. *Phyllanthus symplocoides*, Muell. Arg. in DC. Prodr. xv. ii. 311. *G. symplocoides*, Beddome Forester's Flor. 195.

CEYLON; in the Central Province, alt. 4-6000 ft., Thwaites.

A tree, 15-20 ft. *Leaves* very coriaceous, nerves few strong beneath, stipules triangular lanceolate. *Fem. sepals* narrow; style straight slender, 3-4 times as long as the sepals, narrower at the base than the globose pubescent ovary. *Capsule* rather deeply lobed.—Thwaites describes this as closely allied to *G. Moonii*, but more arboreous with the leaves not acuminate and capsule glabrous.

53. **G. Gardneri**, Thwaites Enum. 286; branches glabrous or with the inflorescence hispidly tomentose, leaves 2-3 in. orbicular oblong elliptic acute or cuspidately acuminate base acute, male fl. shortly pedicelled, anthers 3, fem. sessile few in a cluster, style very slender glabrous 3-toothed thrice as long as the narrow sepals and narrower than the globose 3-celled ovary, capsule glabrous depressed 3-lobed. *G. leptogynum*, Beddome Forester's Man. 195. *Phyllanthus leptogynus*, Muell. Arg. in DC. Prodr. xv. ii. 312.

CEYLON; Central Province, Walker, Gardner.

A small tree; branchlets slender, flexuous, angled. *Leaves* dark brown when dry, hardly coriaceous; nerves 4–5 pair, hardly raised beneath; petiole $\frac{1}{10}$ – $\frac{1}{8}$ in.; stipules small, ciliate. *Male pedicels* $\frac{1}{4}$ in., and linear sepals hispid; connectives nearly as long as the anthers. *Fem. calyx* tubular at the base.

VAR. β ., *Thwaites l. c.*; leaves narrower and longer elliptic-lanceolate finely acuminate very pale brown when dry, nerves 6–8 pair, fem. fl. sometimes pedicelled sparsely hispid or glabrous.—Reigam Corle, *Thwaites*.—This looks very different, but I expect Thwaites is right in regarding it as a variety.

54. **G. coronatum**, *Hook. f.*; branches hirsutely tomentose, leaves 3–5 in. subsessile membranous elliptic-oblong acuminate sparsely hirsute beneath, male fl. minute pedicelled hispid, stamens 3, connectives umbonate, fem. fl. few sessile in dense axillary clusters, ovary villous, style slender cylindric 2–3 times as long as the lanceolate acute tomentose sepals acutely 3-cleft glabrous above, capsule subsessile 3–6-lobed hoary-tomentose. *Bradleya coronata*, *Wall. Cat. 7857* (not *B. coronata*, No. 7854, from Singapore). *Phyllanthus penangensis*, *Muell. Arg. in DC. Prodr. xv. ii. 310*.

TENASSERIM; at Mergui, *Griffith (Kew Distrib. 4854)*. PENANG, *Wallich, Curtis, &c.* PERAK; in rocky places, *King's Collector*.

A shrub (in Perak 8–12 ft.); branches slender. *Leaves* equal or unequal at the base, dull grey on both surfaces, nerves slender; petiole not $\frac{1}{10}$ in. *Capsule* $\frac{1}{2}$ in. diam., depressed, top sunk, style deciduous.

55. **G. villicaule**, *Hook. f.*; branchlets hirsutely tomentose with spreading rusty hairs, leaves 3–5 in. thin ovate elliptic or oblong obtuse acute or acuminate softly hairy and strongly reticulately nerved beneath, male fl. few, pedicels and lanceolate sepals hispid, anthers 3–5 large, fem. fl. minute sessile, ovary pubescent 3–4-celled, style much longer than the perianth subcylindric hispid subacutely 2–3-toothed, capsule subsessile depressed 6–8-lobed densely hirsute, style as long columnar acutely toothed deciduous.

UPPER BURMA; towards the silver mines, *Griffith (Kew Distrib. 4842)*. PERAK, *Scortechini*.—DISTRIB. Yunnan.

Branchlets flexuous, hairs rufous. *Leaves* very variable in size and shape, brown when dry, sometimes only 1 in. and very broadly elliptic, base subequal, acute, rounded or subcordate; nerves 6–10 pair, strong, as are the cross-nervules; petiole very short, villous; stipules subulate. *Male fl.* shortly hispidly pedicelled; anthers half as long as the sepals, connectives large free. *Fem. fl.* inconspicuous; sepals narrow; style rather slender, a little swollen above the middle and narrowed to the top. *Capsule* $\frac{1}{2}$ in. diam., not deeply lobed, top hardly depressed, style usually leaving a minute rustily hairy base.—The specimens are not very good.

Sect. II. GLOCHIDIOPSIS (see p. 307).

56. **G. sericeum**, *Hook. f.*; branchlets leaves beneath and flowers pubescent, leaves 2–3 in. linear-oblong obtuse base rounded or cordate puberulous above glaucous beneath, flowers all pedicelled. male sepals 6 outer spreading, anthers 3, fem. sepals 2–3, ovary globose villous 3-celled, styles 3 slender villous tips 2-fid, capsule depressed 3-lobed densely villous. *Phyllanthus sericeus*, *Muell. Arg. in DC. Prodr. xv. ii. 314*. *Glochidionopsis sericea*, *Blume Bijdr. 588*; *Miquel Fl. Ind. Bat. i. ii. 375*; *Baill. Etudes Gen. Euphorb. 639, t. 27, f. 16, 17*.

PERAK, *Scortechini, Wray, &c.* MALACCA, *Griffith (Kew Distrib. 4866)*. SINGAPORE, *Hullett*.

A bush or small tree; branches pendulous. *Leaves* bifariously rather close-set and uniform, dull greyish green above when dry, pale beneath; nerves 10-12 pair and cross-nervules raised beneath; petiole $\frac{1}{2}$ in.; stipules ovate. *Male pedicels* $\frac{1}{2}$ in., perianth $\frac{1}{2}$ in. diam., connectives short obtuse. *Fem. fl.* minute, sepals obtuse. *Capsules* $\frac{1}{4}$ - $\frac{1}{3}$ in. diam. *Seeds* nearly hemispheric.—Griffith in a note describes the fem. perianth as of 3 outer minute sepals and 3 inner larger.

57. **G. dasystylum**, Kurz *For. Fl.* ii. 344; branchlets and leaves beneath softly tomentose, leaves 2-3 in. thin ovate acuminate base obtuse or rounded, fem. fl. long pedicelled subumbellately fascicled, styles 3 filiform hairy, capsules fascicled pedicels slender depressed 3-4-celled 6-8-lobed tomentose with spreading hairs.

MARTABAN; in forests east of Tounghoo, ascending to 3500 ft., Kurz.

An evergreen tree, 15-20 ft.; branchlets slender, terete, almost hirsute with rusty hairs. *Leaves* pubescent or glabrate; nerves 5-7 pair, very slender, arched, cross-nervules distant; petiole $\frac{1}{10}$ in., tomentose; stipules minute, subulate. *Flowers* unknown. *Capsules* $\frac{1}{4}$ - $\frac{1}{3}$ in. diam.; styles inconspicuous, united at the base only.

IMPERFECTLY KNOWN AND DOUBTFUL SPECIES.

58. **G. mishmiense**, Hook. f.; branches stout and leaves beneath and inflorescence densely brown-tomentose, leaves 6-8 in. coriaceous oblong obtuse or subacute base acute glabrous above except the costa, nerves and cross-nervules strong beneath, capsules clustered pedicelled much depressed 4-8-celled 8-10-lobed densely hoary-tomentose, stigma subglobose or very shortly conic sunk in an apical depression, seeds hemispheric red.

UPPER ASSAM; on the Mishmi Hills, Griffith (*Kew Distrib.* 4843).

This has the habit of *G. zeylanicum*, from the tomentose varieties of which it differs by the greatly depressed capsules clothed with white tomentum and the small obtuse stigma in its small apex. The capsules are nearly $\frac{1}{2}$ in. diam., and the seeds $\frac{1}{2}$ in.

59. **G. Curtisii**, Hook. f.; branchlets petioles and leaves beneath pubescent, leaves 5-7 by $1\frac{1}{2}$ -2 in. linear-oblong base very unequal-sided, nerves 8-10 pair pubescent above very strong beneath, male fl. small clustered pedicels very slender, anthers 3, connectives very short.

PENANG; Cooley Lines on Government Hill, Curtis (No. 670).

This appears very distinct from all the preceding species.

PHYLLANTHUS ASPERUS, Muell. Arg. in *Flora* xlviii. (1865) 377, and in *DC. Prodr.* xv. ii. 297; branchlets hispidulous and obscurely fulvous tomentose, leaves 2½-3½ by 1½ in. elliptic ovate or obovate tip rounded mucronulate pubescent on both surfaces and rough with subtuberculate white hairs, midrib and nerves prominent paler than the interspaces and beautifully reticulated, pedicels of both sexes short, of male pubescent of fem. very short tomentose, fem. sepals oblong-obovate subacute pubescent on both surfaces, ovary globose 4-celled subtomentose, style subcylindric pubescent twice or thrice as long as and about as broad as the ovary. *Beddome Forester's Man.* 193.—Malabar and Concan, Stocks, *Law in "Herb. Ind. Or., H. f. & T."* (Mueller Arg.).—I fail to recognize this.

PHYLLANTHUS SILHETICUS, Muell. Arg. in *Flora* l. c. 378, and in *DC l. c.*; branchlets rather stout tomentose with black yellow or rufous hairs, leaves 3½-4½ by 2-2½ in. elliptic oblong shortly acute margined with a yellowish line base obtuse or subcordate, nerves above and beneath softly yellowish pubescent, pedicels all very short globose 4-celled obscurely tomentose, style conical scarcely longer than the ovary, capsule $\frac{3}{10}$ in. diam. depressed small pubescent deeply 6-grooved.—Silhet, J. D. Hooker (Mueller Arg.).—I do not recognize this. Muell. says that the yellow marginal line of the leaves resembles that of *G. zeylanicum*.

12. **FLUEGGIA**, Willd.

Unarmed or spinescent shrubs. *Leaves* small, alternate, distichous, quite entire. *Flowers* minute, axillary, pedicelled, diœcious, apetalous; males numerous, clustered; females subsolitary. MALE FL. *Sepals* 5, subpetaloid, imbricate. *Stamens* 5, or fewer, alternating with as many disk-glands; filaments free; anthers erect, cells parallel. *Pistillode* large. 2-3-fid. FEM. FL. *Calyx* of the male. *Disk* annular, toothed. *Ovary* 1-3-celled; styles recurved, united below, elongate, entire, notched or 2-fid, ovules 2 in each cell. *Fruit* globose, coriaceous, or with a fleshy epicarp, bursting irregularly or into distinct 2-valved cocci. *Seeds* triquetrous, dorsally convex, ventrally acute, testa crustaceous, albumen scanty; embryo curved, cotyledons broad flat.—Species about 6 in the tropics of the Old World.

The large pistillode of the male fl., and the usually long recurved styles united below into an erect column of the female, are the best characters for this genus.

1. **F. microcarpa**, *Blume Bijl.* 580; glabrous, unarmed, branchlets slender angled and compressed, leaves elliptic ovate obovate or orbicular loosely reticulated beneath. *F. melanthesoides*, *F. Muell. in Trans. Bot. Soc. Edinb.* vii. 490. *F. leucopyrus*, *Dulz. & Gibs. Bomb. Fl.* 236 (not of Willd.). *F. virosa*, *Baill. Etudes Gen. Euphorb.* 593, t. 26, f. 39-43 (not of DC.); *Wall. Cat.* 7928. *F. leucophylla*, *Wall. Cat.* 7916. *F. angulata*, *Baill. Rec. Obs.* i. 80. *F. obovata*, *Herb. Ham.* *F. elliptica*, *Herb. Ham.* *Securinea obovata*, *Muell. Arg. in DC. Prodr.* xv. ii. 449; *Brand. For. Fl.* 455; *Gamble Man. Ind. Timb.* 354; *Beddome Forester's Man.* 197; *Benth. Fl. Austral.* vi. 115. *S. leucopyrus*, *Brand. For. Fl.* 456, t. 54 in part. *Phyllanthus obtusus*, *Schrank in Flora Ratisb. Syllog.* ii. 65; *Wall. Cat.* 7941. *P. Wightianus*, *Muell. Arg. in Linnæa* xxxii. 6 (not 47), and in *DC. l. c.* 334 (not 425); *Grah. Cat. Bomb. Pl.* 180. *P. lucidus*, *Hort. ex Steud. Nomencl.* *P. virosus*, *Roxb. in Willd. Sp. Pl.* iv. 578, and in *Fl. Ind.* iii. 659; *Wall. Cat.* 7928 A, B (C in part), E. *P. griseus*, *Wall. Cat.* 7918 A in part. *P. leucophyllus*, *Herb. Strachey & Winterb.* *P. retusus*, *Roxb. l. c.* 657. *P. glaucus*, *Wall. Cat.* 7927 B. *P. rotundatus*, *Herb. Wight.* *Leptonema melanthesioides*, *F. Muell. in Hook. Journ. Bot.* ix. (1857) 17. *Cicca obovata*, *Kurz For. Fl.* ii. 354. *C. pentandra*, *Blanco Fl. Philipp.* 486. *Chorizandra pinnata*, *Wight Ic.* t. 1994. *Xylophylla obovata*, *Willd. Enum. Hort. Berol.* 229. *Bessera inermis*, *Spreng. Pugill.* ii. 90. *Drypetes bengalensis*, *Spreng. Syst.* iii. 902. *Bradleia dioica*, *Vahl mss.*—*Wall. Cat.* 7948.

Throughout INDIA; from Kashmir ascending the Himalaya to 5000 ft., to Bhotau, and Assam and southwards to Malacca and Travancore. SCIND, *Stocks. CEYLON, Kelaart.*—DISTRIB. China, Malay Islands, Australia, Trop. Africa.

A deciduous-leave large shrub or small tree (*Kurz*). *Leaves* very variable, thin, 1-3 in. long, subglauous beneath, tip rounded, obtuse, acute or rarely retuse; nerves 5-7 pairs, very slender; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in., slender. *Flowers* usually in very dense fascicles from a crowd of minute bracts, $\frac{1}{12}$ - $\frac{1}{10}$ in. diam.; pedicels $\frac{1}{8}$ - $\frac{1}{2}$ in., capillary, females the longest. *Sepals* rounded or oblong, concave. *Stamens* 3-5 alternately with glands usually far exserted, filaments sometimes very long, all free to the base. *Pistillodes* 3, united at the base, slender, erect, with recurved simple or lobulate tips, rarely 2 or 0. *Ovary* ovoid, on an annular disk; styles 3, bifid. *Fruit* globose, of two sizes, mostly minute $\frac{1}{8}$ - $\frac{1}{2}$ in. diam. with a dry pericarp, a few $\frac{1}{2}$ in. diam. white with a fleshy pericarp. *Seeds* 3-6, minutely punctate.

2. **F. leucopyrus**, *Willd. Sp. Pl.* iv. 757; a glabrous woody tortuous bush, branchlets stout ending in spines, leaves obovate obcordate or orbicu-

lar. *A. Juss. Tent. Euphorb.* 106, t. 2, f. 7 A; *Wight Ic.* t. 1875; *Thwaites Enum.* 231. *F. xerocarpa*, *A. Juss. l. c.* t. 2, f. 7 B. *F. virosa*, *Dalz. & Gibs. Bomb. Fl.* 236. *F. Wallichiana*, *Baill. Etudes Gen. Euphorb.* 592. *Securinega Leucopyrus*, *Muell. Arg. in DC. Prodr.* xv. ii. 451; *Brand. For. Fl.* 456, t. 54 (in part); *Beddome Forester's Man.* 197, t. 24, f. 4 and 1-6; *Gamble Man. Ind. Timb.* 354. *S. virosa*, *Baill. Adans.* vi. 334. *Cicca Leucopyrus*, *Kurz For. Fl.* ii. 353. *Phyllanthus albicans*, *Wall. Cat.* 7937. *P. Leucopyrus*, *Kæn. mss. in Roxb. Fl. Ind.* iii. 658; *Wall. Cat.* 7938. *P. Lucena*, *Heyne mss.* *Xylophylla Lucena*, *Roth Nov. Sp.* 185.

The PANJAB PLAIN, *Duthie*. DECCAN PENINSULA, from Canara southwards. BURMA, *Griffith*. CEYLON, abundant.

This differs from *F. microcarpa* more in habit and foliage than in flowers or fruit; the leaves are smaller, broader, and more rigid, rarely 1 in. long, with longer petioles, the nerves less distinct, the flowers even smaller, the fruit identical. Mueller describes the styles as entire, and they are so represented by Wight, but they are usually 2-fid, as in Brandis' figure.

DOUBTFUL SPECIES.

F. PHYLLANTHOIDES, *Baill. Etudes Gen. Euphorb.* 592; *Muell. Arg. in DC. Prodr.* xv. ii. 452; an altogether doubtful plant, said by Baillon to differ from the Dahurian (*Securinega ramiflora*, *Muell. Arg. l. c.* 449) in the leaves not being entire, and to have been collected in the Himalaya by Strachey and Winterbottom, and to exist in the Paris Museum; where, however, Mueller searched for it fruitlessly.

13. BREYNIA, Forst.

Shrubs or small trees. *Leaves* small, alternate, petioled, quite entire, often distichous. *Flowers* minute, axillary, monœcious. *Petals* and *Disk* 0. MALE FL. *Calyx* turbinate or hemispheric, truncate, rim of the tube often much thickened and lobulate opposite the minute lobes which are inflexed and rounded. *Stamens* 3, filaments united into a column; anthers adnate to the whole length of the column very slender, cells linear parallel distinct. *Pistillode* 0. FEM. FL. *Calyx* coriaceous, hemispheric turbinate campanulate or rotate, broadly shortly 6-lobed, fruiting often greatly enlarged and disciform. *Staminodes* 0. *Ovary* globose or truncate or depressed at the top, fleshy above, 3-celled; styles 3, sessile or united in a short column, 2-fid or 2-lobed; or stigmas 3, minute simple immersed in a cavity at the top of the ovary; ovules 2 in each cell. *Fruit* more or less succulent, globose or depressed, indehiscent or with a 6-valved pericarp, and 3-6 trigonous imperforate indehiscent cocci. *Seeds* with a membranous testa and fleshy albumen, ecarunculate; cotyledons broad, radicle long.—Species about 12, Tropical Asia, Africa and Pacific Islands.

* *Calyx* of female greatly enlarged in fruit.

1. *B. patens*, *Benth. in Gen. Plant.* iii. 277; quite glabrous, leaves membranous elliptic oblong or ovate obtuse or subacute, style exserted with 3 2-fid arms, fruit depressed 6-12-seeded seated on the greatly enlarged calyx. *Melanthesopsis patens*, *Muell. Arg. in DC. Prodr.* xv. ii. 437; *Kurz For. Fl.* ii. 348; *Beddome Forester's Man.* 196. *M. variabilis*, *Muell. Arg. in Linnæa* xxii. 75. *Melanthesa obliqua*, *Wight Ic.* t. 1898. *M. turbinate*, *Wight Ic.* t. 1897; *Dalz. & Gibs. Bomb. Fl.* 234. *Phyllanthus patens*, *Roxb. Fl. Ind.* iii. 667; *Wall. Cat.* 7911. *P. turbinatus*, *Kæn. mss. in Roxb. l. c.* 666; *Grah. Cat. Bomb. Pl.* 180. *P. suffultus*, *Wall. Cat.* 7939. *P. retusus*, *Dennst. in Dillw. Rev. Hort. Mal.* 24. *P. Naviruli*, *Miquel Plant. Hohenack*, No. 1556. *P. pomaceus*, *Moon Cat. Ceyl. Pl.* 65.

P. glaucifolius, Wall. mss. *P. rhamnifolius*, Herb. Heyne. *P. virosus*, Herb. Wight. *P. cernuus*, Herb. Ham.—Rheede Hort. Mal. v. t. 43.

TROPICAL HIMALAYA; from Nepal to Mishmi, ASSAM, the KHASIA MTS., SILHET, CHITTAGONG, MUNNIPORE and BURMA. The DECCAN PENINSULA, from the Concan and Orissa southwards. CEYLON; ascending to 3000 ft.

An erect tree (*Roxb.*); a shrub 3-6 ft. (*Kurz*) with spreading branches. Leaves distichous, $\frac{1}{2}$ -1 in. long, rather glaucous beneath, brown when dry; nerves 3-5 pair, raised, nervules lax; petiole $\frac{1}{10}$ - $\frac{1}{4}$ in.; stipules minute, acute. Male fl. $\frac{1}{12}$ - $\frac{1}{10}$ in., drooping, pedicels capillary. Calyx turbinate or campanulate, thickened rim of tube crenate. Staminal column produced beyond the anthers. Fem. fl. $\frac{1}{10}$ - $\frac{1}{8}$ in. diam., shorter pedicelled. Calyx broadly funnel-shaped, often exceeding the fruit; lobes reniform, apiculate. Ovary truncate; style very stout, with 3 short forked arms. Fruit $\frac{1}{2}$ - $\frac{2}{3}$ in. broad. Seeds with the ventral edge entire.

2. *B. angustifolia*, Hook. f.; quite glabrous, leaves oblong or linear-oblong tip rounded base unequal, flowers shortly pedicelled, male calyx campanulate, outer margin of tube raised 6-lobed lobes usually retuse or emarginate, fem. broadly funnel-shaped with 6 broad rounded apiculate lobes, fruit small depressed globose seated on the much enlarged calyx.

PEGU; at Rangoon, M'Lelland. TENASSERIM, at Mergui, Griffith; Moulmein, Parish. PERAK, King's Collector.

A shrub; branches and branchlets terete. Leaves $\frac{3}{4}$ -1 by $\frac{1}{4}$ - $\frac{1}{3}$ in., rather membranous, close set distichously on the branchlets, paler or glaucous beneath; petiole $\frac{1}{12}$ - $\frac{1}{10}$ in.; stipules very minute. Flowers solitary or clustered, very minute, pedicels usually rather longer than the calyx, slender. Male calyx $\frac{1}{10}$ - $\frac{1}{12}$ in.; fem. $\frac{1}{10}$ - $\frac{1}{8}$. Staminal column truncate. Ovary turbinate, sides grooved; style very stout, with 3 short recurved 2-lobed arms. Fruit $\frac{1}{4}$ in. diam. Seeds with the ventral edge acute entire.

3. *B. coronata*, Hook. f.; quite glabrous, leaves ovate obtuse glaucous beneath, flowers solitary very shortly pedicelled, male calyx hemispheric outer margin of tube obtusely toothed, fem. broadly infundibular, ovary included broadly cuneiform truncate top concave with 3 minute central stigmas very globose crowned with a raised ring seated on the enlarged patelliform calyx.

PERAK, King's Collector.

A small tree, 10-20 ft.; branchlets compressed and leaves above black when dry. Leaves $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., membranous, nerves 5-6 pair, very slender; petiole $\frac{1}{2}$ in., slender, stipules minute subulate. Male fl. $\frac{1}{10}$ in. diam.; mouth very minute; pedicel slender; fem. fl. $\frac{1}{4}$ in. long, pedicel stouter. Fruit globose, $\frac{1}{2}$ in. diam., red, epicarp thin, endocarp coriaceous 6-valved; cocci 6, trigonous; enlarged calyx $\frac{1}{4}$ in. diam.

** Calyx of female slightly enlarged in fruit.

4. *B. rhamnoides*, Muell. Arg. in DC. Prodr. xv. ii. 440 (excl. vars. a., γ.); shrubby, quite glabrous, leaves shortly petioled membranous elliptic ovate or rounded obtuse or subacute, flowers on short pedicels, calyx of male turbinate or subcampanulate mouth of tube entire or obscurely lobed, of fem. hemispheric shortly 6-lobed, ovary truncate, fruit small globose seated on the small slightly enlarged calyx. Brand. For. Fl. 455; Kurz For. Fl. ii. 350; Beddome Forester's Man. 196 (t. xxiv. f. 2, by error named Melanthesopsis petens). *B. oblongifolia*, Muell. Arg. l. c. 400 (the Penang plant only). *Melanthesa rhamnoides*, Wight Ic. t. 1898; Miquel Fl. Ind. Bat. i. ii. 370; Thwaites Enum. 285. *Phyllanthus rhamnoides*, Willd. Sp. Pl. iv. 580 (not of Roxb.). *P. Vitis-idæa*, Roxb. Fl. Ind. iii. 665. *P. tristis*, A. Juss. Tent. Euphorb. 108, t. 5, f. 16. *P. sepiarius*, Roxb. mss.; Wall. Cat.

7914. *P. cinerascens*, Wall. Cat. 7915 C. *P. virosus*, Herb. Wight in Wall. Cat. 7939 C. *P. oblongifolius*, Dennst. in Dillw. Rev. Hort. Mal. 24. *P. tinctorius*, Vahl mss. (ex Baill.).

Throughout TROPICAL INDIA; from OUDH, Hamilton, and BANDA, Edgeworth, eastwards to UPPER ASSAM and BURMA, and southwards to TRAVANCORE, MALACCA, SINGAPORE and CEYLON.—DISTRIB. China, Malay Islands, Philippines.

A shrub or small tree; branches horizontal, flexuous, bifarious. Leaves $\frac{3}{4}$ –1 in., dark brown or black when dry, pale beneath; petiole $\frac{1}{10}$ in.; stipules minute. Flowers often diœcious?, $\frac{1}{10}$ – $\frac{1}{12}$ in. long; pedicels usually decurved, variable in length. Staminal column truncate. Ovary exserted; styles very obscure. Fruit $\frac{1}{4}$ in. diam., red, succulent. Seeds $\frac{1}{2}$ in. long; testa imperforate except at the very base.—Very near *B. cernua* of the Malay Archipelago, but the fem. calyx is much smaller. Edgeworth's Banda specimens have not blackened in drying. Mueller and others describe the male fl. as springing from minute branchlets densely clothed with bracts, but this is only occasionally the case.

5. **B. discigera**, Muell. Arg. in DC. Prodr. xv. ii. 440; finely tomentose, leaves shortly petioled elliptic rounded or ovate acute or subacute, flowers solitary very shortly pedicelled, male calyx turbinate or hemispheric outer margin of tube entire, fem. rotate shortly 6-lobed pubescent all over, ovary turbinate stigmas minute, fruit seated on the slightly enlarged pubescent calyx crowned with a raised ring. *B. rhamnoides*, γ. pubescens, Muell. Arg. l. c. 441. *Phyllanthus pubescens*, Wall. Cat. 7917 A, B.

PENANG, Wallich, Curtis. SINGAPORE, Jaeger, Cantley.—DISTRIB. Siam.

Branches and branchlets terete. Leaves $\frac{3}{4}$ –1 $\frac{1}{2}$ in., thinly coriaceous, black above when dry, beneath paler or glaucous, sparsely pubescent above, shortly tomentose beneath; nerves 4–6 pair; petiole $\frac{1}{12}$ – $\frac{1}{10}$ in. Flowers subsolitary, minute; males, $\frac{1}{10}$ in. long, about as long as their pedicels; tube pubescent, teeth inflexed glabrous; fem. subsessile, $\frac{1}{2}$ in. diam., lobes very shallow, apiculate. Staminal column fusiform, truncate. Ovary with a convex top. Fruit globose, $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., coriaceous; cocci with a small basal hole. Seeds $\frac{1}{2}$ in. long.—Wallich's 7917 C is a very different plant, with rounded subcordate leaves, from Burma (Kayouk Talong); it is neither in flower nor fruit.

6. **B. reclinata**, Hook. f.; quite glabrous, branches long divaricate, leaves shortly petioled coriaceous elliptic ovate subacute very glaucous beneath, flowers shortly pedicelled, calyx of male hemispheric thickened mouth of tube 6-crenate, of fem. turbinate shortly 6-lobed, ovary truncate, fruit small seated on the small calyx. *B. rhamnoides*, var. hypoglauca, Muell. Arg. in Linnaea xxxii. 73, and in DC. Prodr. xv. ii. 440. *B. racemosa*, Muell. Arg. in DC. l. c. 441 in part. *Melanthesa reclinata*, Muell. Arg. in Linnaea l. c. 74. *Phyllanthus reclinatus*, Roxb. Fl. Ind. iii. 669.

SINGAPORE and MALACCA, Griffith (Kew Distrib. 4813, Maingay 1356), &c.—DISTRIB. Sumatra, Java.

A subsucculent shrub, black when dry, branches and long branchlets terete, decurved. Leaves 1–1 $\frac{1}{2}$ in.; nerves 4–6 pairs; petiole $\frac{1}{12}$ – $\frac{1}{10}$ in.; stipules minute. Flowers yellow, on short usually decurved pedicels; males $\frac{1}{10}$ in. long, mouth contracted; fem. rather larger, broadly funnel-shaped. Staminal column truncate. Ovary exserted, truncate, stigmas minute. Fruit $\frac{1}{4}$ in. diam., globose, depressed, red. Seeds $\frac{1}{10}$ in. long, with a triangular basal ventral cavity.—Mueller's *B. racemosa* is a mixture; it contains Zollinger's No. 177 from Java, which is undoubtedly *B. reclinata*, and I hence assume that the Singapore plant referred to *racemosa* is also *reclinata*; but Zollinger's No. 176, with a much smaller fruit and a much enlarged calyx, is quite a different species, possibly *B. virgata*. Mueller has, in DC. Prodr., erroneously referred Roxburgh's *P. reclinatus* to the Chinese *Breynia* (*Melanthesopsis*) *fruticosa* (*Melanthesa chinensis*, Blume), together with Wallich's No. 7925, which is a third plant from Siam.

DOUBTFUL SPECIES.

B. PANICULATA, *Spreng. Pugill.* ii. 93; *Muell. Arg. in DC. Prodr.* xv. ii. 442, a plant with 5 glandular-cripsed stigmas, cannot be of this genus. The only locality given is Mountains of India.

Melanthesopsis fruticosa, *Kurz For. Fl.* ii. 349, cannot well be Mueller's plant of this name, which has terete branches, and has not been found elsewhere in India. Kurz's plant grows in dry hill forests of Martaban at 2500–4000 ft. elevation.

Breynia sp. ? from Bamo in Burma, *Griffith (Kew Distrib.* 4818), a fragment of a plant resembling a *B. reclinata* with 6 erect conical styles ? surrounding the truncate top of the ovary. A somewhat similar plant from the Calcutta Bot. Garden has 3 erect bifid styles from the truncate top of the ovary; it is a mere fragment. The leaves resemble those of *B. coronata*.

14. **SAUROPUS**, *Blume*.

Small shrubs or undershrubs. *Leaves* alternate, distichous, membranous, quite entire; stipules minute. *Flowers* minute, axillary, monœcious, apetalous, solitary or clustered. **MALE FL.** *Calyx* disciform, urceolate or turbinate, 6-lobed or -cleft, mouth very small, with superficial thickenings that meet around the stamens. *Stamens* 3, filaments combined in a very short truncate 3-gonous column, anthers sessile on the angles of the column; cells linear or subglobose, parallel, extrorse. *Pistillode* 0. **FEM. FL.** *Calyx* 6-cleft, persistent, accrescent. *Ovary* ovoid or globose, top rounded or concave, 3-celled; styles 3, sessile, depressed, spreading, with 3 recurved or incurved arms; ovules 2 in each cell. *Fruit* globose or depressed, epicarp fleshy or coriaceous, 6-valved or rupturing irregularly, containing 6 indehiscent 3-gonous crustaceous or bony cocci. *Albumen* fleshy; cotyledons broad, flat.—Species about 20, Indian and Malayan.

Sect. I. **EUSAUROPUS**, *Muell. Arg.* *Styles* apical or subapical. *Leaves* $1\frac{1}{2}$ –4 in. long.

* *Leaves penninerved*.

1. **S. albicans**, *Blume Bijl.* 596; quite glabrous, branchlets angular, leaves very shortly petioled ovate-oblong obtuse or acute penninerved, male calyx disciform 6-lobed, lobes broad, fruit sessile white $\frac{3}{4}$ in. diam., epicarp fleshy bursting irregularly, cocci with a broad ventral hollow. *Muell. Arg. in DC. Prodr.* xv. ii. 240; *Baill. Etudes Gen. Euphorb.* 635, t. 27, f. 19, 20; *Kurz For. Fl.* ii. 349; *Miquel Fl. Ind. Bat.* i. ii. 366; *Hassk. Hort. Bogor.* ed. 2, 49. *S. indicus*, *Wight Ic. t.* 1952; *Miquel l. c.*; *Hassk. l. c.* 51. *S. Gardnerianus*, *Wight Ic. t.* 1951; *Thwaites Enum.* 284. *S. zeylanicus*, *Wight Ic. t.* 1952. *Agyneia ovata*, *Miquel l. c.* 367. *Phyllanthus strictus*, *Rorb. Fl. Ind.* iii. 670; *Wall. Cat.* 7933. *Cluytia androgyna*, *Linn. Mantiss.* 128.

SIKKIM HIMALAYA; hot valleys, *J. D. H. SILHET* and the **KHASIA HILLS** and Burma, *Wallich, &c.*, to **TENASSERIM**, **MAIACCA** and **PENANG**. **TRAVANCORE**, *Wight*. **CEYLON**; Central Province, ascending to 4000 ft.—**DISTRIB.** Java, Philippines.

An erect undershrub, with often a slender simple stem umbellately branched at the top; stem and branches terete, green. *Leaves* $1\frac{1}{2}$ –3 in., glaucous beneath; petiole $\frac{1}{10}$ in., slender; stipules persistent. *Flowers* small, males $\frac{1}{8}$ – $\frac{1}{4}$ in. diam., greenish red; pedicels capillary. *Calyx-lobes* of fem. broad, obtuse, emarginate or 2-lobed, rather enlarged in fruit. *Fruit* with a fleshy epicarp; cocci $\frac{1}{4}$ in. long.—Odour of the whole dried plant like celery. Mueller describes the fruit as stipitate, but it is quite sessile; possibly he took *S. stipitatus* for the same species. I can hardly recognize Mueller's two varieties (*Linnaea* xxii. 72, and *DC. l. c.*), *Gardneriana*

and *zeylanica*; none of Thwaites' or Gardner's specimens have "acutely acuminate leaves," and I find nothing answering to the acute calyx-lobes of *zeylanicus* figured by Wight. The fleshy aril of some authors is the remains of the septa between the seeds.

2. ***S. retroversus***, *Wight Ic. t.* 1951; leaves of *S. albicans*, male calyx reflected on the pedicel in an urceolate form mouth 6-toothed, fem. discoid with 3 outer rounded lobes and 3 inner smaller subacute ones, fruit 1 in. white pyriform. *Thwaites Enum.* 284; *Muell. Arg. in DC. Prodr.* xv. ii. 241.

CEYLON; Central Province, alt. 4000 ft., *Walker, Thwaites*, &c.

The specimens do not enable me to add anything to the above description; they are in male fl. only, and appear abnormal. The fruit differs wholly from that of *albicans*.

3. ***S. assimilis***, *Thwaites Enum.* 284; leaves of *S. albicans*, male calyx of 6 narrow cylindric incurved obtuse segments. *Muell. Arg. in DC. Prodr.* xv. 1. 242.

CEYLON; Central Province, alt. 3000 ft., *Thwaites*.

Male flowers alone are known of this curious species.

4. ***S. stipitatus***, *Hook. f.*; quite glabrous, branches terete, leaves very shortly petioled ovate-lanceolate acuminate penninerved, fem. calyx 6-partite, lobes narrow, fruit globose stipitate, epicarp crustaceous splitting stellately into 6 valves, cocci closed with a very small basal ventral notch.

SIKKIM HIMALAYA; Darjeeling (*Herb. Griffith*).

Leaves 2-3½ by ¾-1 in., base rounded or cuneate; petiole ⅛ in. *Calyx* not or but little enlarged in fruit, 5-partite, segments linear-oblong, obtuse. *Fruit* ½ in. diam., globose; peduncle ½ in.—Distinguished from *S. albicans* by the longer differently-shaped leaves, calyx and fruit. I have seen no male flowers. The female flower is unlike that of the genus.

5. ***S. oblongifolius***, *Hook. f.*; quite glabrous, branchlets terete, leaves very shortly petioled oblong or linear-oblong obtuse penninerved, calyx disciform 6-lobed, lobes rounded or reniform, fruit depressed globose sessile, epicarp thin crustaceous subvalvular, cocci with a broad ventral hollow.

UPPER ASSAM, *Masters*; Dailoon in the Mishmi Hills, *Griffith (Kew Distrib.* 4821).

Branchlets slender. *Leaves* 2½-3 in., dark green, very membranous, base acute; petiole ⅛ in. *Fruit* obscurely 6-lobed; peduncle ½ in. *Seeds* ¼-½ in. long, as in *S. albicans*.—Near *S. albicans*, but the branchlets are terete, the leaves have parallel sides and are not narrowed towards the tip, and the fruit is smaller, ½-¾ in. diam., depressed and 6-furrowed, not fleshy, the cocci ⅝ in. long.

6. ***S. lanceolatus***, *Hook. f.*; quite glabrous, branches terete, leaves very shortly petioled lanceolate acuminate penninerved, calyx 6-partite, segments oblong, fruit globose sessile, epicarp thin bursting irregularly, cocci with a very small basal ventral perforation.

UPPER ASSAM; Mishmi Hills, *Griffith (Kew Distrib.* 4825).

Leaves 3-4½ by 1 in., base rounded or cuneate. *Calyx* not much enlarged in fruit, segments oblong-obovate, revolute. *Fruit* ½ in. diam., smooth, not lobed; epicarp thinly crustaceous; cocci ½ in. long.

7. ***S. macrophyllus***, *Hook. f.*; quite glabrous, shrubby, branches terete, leaves very shortly petioled 4-8 in. ovate-lanceolate acuminate penninerved, fem. calyx deeply 5-lobed, lobes obovate-spathulate, fruit large

depressed-globose sessile, epicarp thinly crustaceous stellately 6-valved, cocci with a large ventral hollow.

UPPER ASSAM; Mishmi Hills at Lae pane and Yen, *Griffith* (*Kew Distrib.* 4834).

A shrub, 10 ft. *Leaves* 1-4½ in. broad; petiole ½ in. *Calyx-lobes* in fruit a little enlarged, thick, with rounded thickened and apparently carunculated tips. *Fruit* ¾ in. diam., white or flesh-coloured (*Griffith*); peduncle 1-2 in.; cocci ½ in. long.

8. ***S. forcipatus***, *Hook. f.*; quite glabrous, leaves 3-5 in. membranous penninerved elliptic or oblong lanceolate acuminate base acute, male fl. disciform, lobes minute in the centre of the disk, fem. fl. much larger sepals 6 oblong spreading and recurved, ovary oblong, styles or stigmas 3 terminal depressed divided into 2 incurved arms like forceps.

PERAK, *Scortechini*.

Branchlets stout, compressed, black when dry. *Leaves* very thin, 1½-2 in. diam., base acute, nerves 7-8 pairs very slender, cross-nervules obscure, petiole ⅓ in. slender. *Male fl.* in the axils of minute imbricating bracteoles shortly pedicelled, ¼-½ in. diam., concave or nearly flat, very obscurely 6-lobed; anthers oblong. *Fem. fl.* ½ in. diam., in the same axil with the male; pedicel short, very stout; sepals coriaceous, tip rounded.

**** *Leaves triple-nerved.***

9. ***S. trinervius***, *Muell. Arg. in Linnæa* xxxii. 72, and in *DC. Prodr.* xv. ii. 242; shrubby, quite glabrous, branches angled, leaves very shortly petioled ovate or lanceolate acuminate triple-nerved, lobes of male calyx narrow of fem. broad, fruit globose sessile, epicarp thinly crustaceous stellately 6-valved, cocci with a large ventral hollow. *Phyllanthus trinervius*, *Wall. Cat.* 7922.

SIKKIM HIMALAYA; in the Teesta Valley, *Clarke*. SILHET, CACHAR and the KHASIA MTS., ascending to 4000 ft., *Griffith*, &c.

A shrub or bushy tree, 12 ft. *Leaves* 3-5 in., base cuneate or rounded, nerves very slender; petiole ⅓ in.; stipules ½ in., subulate. *Male fl.* usually racemed on short axillary peduncles, clothed with minute bracts, pedicel capillary, fem. solitary, both varying from ½ to ¾ in. diam. *Calyx* enlarging but not equaling the fruit in breadth, sepals obovate-oblong. *Fruit* 1 in. diam.; cocci ½ in. long.—*Clarke* describes the male calyx as imbricate, incurved, and the fem. as of 3 broad sepals and 3 narrower, and 6 yellow glands.

10. ***S. repandus***, *Muell. Arg. in Flora* lv. (1872) 2; glabrous, branches compressed and angular, leaves 3-nerved ovate-lanceolate, flowers in bracteate racemes, male calyx orbicular convex obsoletely 6-lobed, 3 outer fem. sepals triangular ovate obtuse base contracted inner half as long elliptic obtuse, ovary truncate, styles margined.

SIKKIM HIMALAYA; Nohore, alt. 2400-4000 ft., *T. Anderson in Herb. Berol.*

Branchlets and fem. pedicels shortly papillosely hirtellous. *Leaves* 2-4 in., firmly membranous, base acute, rufescent beneath; nerves slender, basal about half the length of the leaf; petiole ⅓-⅓ in., stipules ½-½ in. *Fruit* unknown.—*Mueller* observes that the habit is entirely that of *S. trinervius*, but that the leaves are more shortly 3-nerved, and male flower altogether different. I have seen no specimens. Can it be a form of *S. albicans*? which has occasionally the lowest pair of nerves rather longer than the others.

Sect. II. CERATOGYNUM. *Styles* at the circumference of broad concave top of the low truncate ovary. *Leaves* ½-1 in.

11. **S. quadrangularis**, *Muell. Arg. in Linnæa* xxxii. 72, and in *DC. Prodr.* xv. ii. 242; a dwarf glabrous shrub, branchlets angled, leaves very shortly petioled elliptic or broadly ovate or obovate obtuse or subacute penninerved, sepals of male tongue-shaped obtuse, of fem. rounded or broader than long, fruit globose, epicarp thin bursting more or less stellately, cocci with a basal ventral depression on each side of which is a tooth. ? *Kurz For. Fl.* ii. 530. *S. Ceratogynum*, *Baill. Etudes Gen. Euphorb.* 635 (*excl. citation of Wight & Thwaites*); *Muell. Arg. in DC. l. c.* 243 (*excl. many citations*). *Phyllanthus rhamnoides*, *Roxb. Fl. Ind.* iii. 663 (*not of Willd.*). *P. quadrangularis*, *Willd. Sp. Pl.* iv. 585. *P. Myrtillus*, *Ham. mss.* *P. tenellus*, *Wall. Cat.* 7892 A (*the large specimen only*). *P. Leschenaultii*, *β. tenella*, *Muell. Arg. in Linnæa* xxxii. 37. ? *Ceratogynum rhamnoides*, *Wight Ic. t.* 1900; *Dalz. & Gibs. Bomb. Fl.* 234.

NORTHERN BEHAB; at Monghyr, *Hamilton*. COROMANDEL COAST, in cultivated fields, *Roxburgh*. The CONCAN and MYSORE, *Klein, Dalzell, &c.* ? BURMA; common, *Kurz*.

Plant about a foot high, with many slender leafy terete branches, the shoots alone being angled. *Leaves* $\frac{1}{2}$ by $\frac{1}{3}$ in., or broader, thin, nerves 4 or 5 pair, margins and those of the fem. sepals most minutely rough; petiole $\frac{1}{12}$ – $\frac{1}{10}$ in., very slender; stipules minute, ovate-lanceolate. *Flowers* shortly pedicelled, solitary or male and female from the same axil (or the males long-pedicelled and in racemes from the lower axils, *Roxburgh*), male very minute, $\frac{1}{15}$ in. diam., fem. $\frac{1}{8}$ in. *Styles* very short, on the margin of a crenulate ridge that bounds the broad very concave top of the ovary; arms subulate, recurved, eventually immersed in the top of the fruit. *Fruit* $\frac{1}{8}$ in. diam., depressed-globose, narrower than the enlarged calyx. *Seeds* $\frac{1}{10}$ in. long; albumen scanty.—There has been confusion in respect of this plant, which is undoubtedly *Roxburgh's Phyll. rhamnoides* and the *Ceratogynum rhamnoides* of Dalzell and Gibson. Wight's figure of *Ceratogynum* is so unsatisfactory, and differs so much in the broadly ovate acute leaves, the large male flowers with lanceolate acuminate sepals, and fem. with acute ciliolate sepals, that I have queried its identity. *S. quadrangularis* is apparently a very rare plant. Mueller states that specimens are in *Herb. Hook.* from Wight, but I find none. The only ones I have seen are Wallich's single specimen on sheet 7092 A, from *Herb. Hamilton*; another in *Hamilton's Herbarium* (in *Edinburgh Botanical Gardens*), both from Monghyr, and Dalzell's from the Concan. Of the synonyms, &c., cited by Mueller under *S. Ceratogynum*, Wallich's 7892 B, cited as *P. Leschenaultii*, *β. tenella*, is a mixture of several species of *Phyllanthus*; *P. rotundifolius*, No. 7892 D of Wallich, is, I think, a barren specimen of *Breynia patens*; and *P. bacciformis*, No. 7909, is *Sauropus pubescens*. Baillon erroneously cites Wight as authority for referring *Ceratogynum* to *Sauropus*. I have seen no Burmese specimens; Kurz has a variety *pubescens* which may be the following, and probably his Burmese *S. quadrangularis* (*S. rhamnoides*) is *S. brevipes*.

12. **S. pubescens**, *Hook. f.*; branches compressed and leaves on both surfaces finely tomentose, leaves small very shortly petioled elliptic subacute, calyx-lobes externally tomentose, of the male cuneately quadrate retuse, of fem. rounded. *Phyllanthus bacciformis*, *Herb. Ham. in Wall. Cat.* 7909.

EASTERN HIMALAYA, and along its base; the Morung, *Hamilton*; Siligoree, at the foot of the Sikkim Hills, *Clarke*.

Branches slender, strict, obscurely 2-winged here and there. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., membranous, nerves 3 pairs; petiole $\frac{1}{12}$ in.; stipules minute. *Flowers* $\frac{1}{12}$ – $\frac{1}{10}$ in. diam., solitary red; pedicels $\frac{1}{8}$ in., very slender.—*Hamilton*, in a ticket attached to the specimen in Wallich's Herbarium, queries this being *P. bacciformis*, which mark of doubt is omitted in *Wall. Cat.*

13. **S. brevipes**, *Muell. Arg. in Linnæa* xxxii. 73, and in *DC. Prodr.* xv. ii. 242; quite glabrous, branchlets filiform angular, leaves shortly

petioled broadly elliptic glaucous beneath, flowers racemed on a densely bracteate peduncle, male calyx shortly 6-lobed, lobes retuse, glands large, fem. sepals obovate.—*Wall. Cat.* 7918 B.

BURMA; at Prome, *Wallich*.

Habit and leaves of *S. quadrangularis*, but the latter glaucous beneath, branchlets much more slender, and male calyx very different.

14. ***S. compressus***, *Muell. Arg. in Linnæa* xxxii. 73, and in *DC. Prodr.* xv. ii. 243; shrubby, much branched, quite glabrous, branchlets angled and compressed. leaves very shortly petioled elliptic or broadly oblong obtuse or apiculate penninerved, flowers very minute, calyx of both sexes with 6 short broad retuse or obreniform lobes, fruit pisiform sessile, epicarp thin bursting irregularly, cocci with a minute basal ventral perforation. *Kurz For. Fl.* ii. 350.

CENTRAL AND EASTERN HIMALAYA; Nepal, *Hamilton*; Sikkim, on the lower hills, *J. D. H.*, &c.; Bhotan, *Griffith*. MARTABAN; in the Eng forests. *Kurz*.

A deciduous-leaved tree or large shrub; branches flattened, branchlets very slender. *Leaves* 1 in. and under, brown when dry, nerves 2-3 pair; petiole $\frac{1}{2}$ in.; stipules minute. *Flowers* dark red, solitary or few together, males $\frac{1}{20}$ — $\frac{1}{10}$ in. diam.; fem. much larger, hardly enlarged in fruit; lobes of male very variable, sometimes with the truncate ends terminating at each angle in a recurved horn. *Styles* distant as in *S. quadrangularis*. *Fruit* $\frac{1}{2}$ — $\frac{3}{4}$ in. diam.; cocci $\frac{1}{2}$ in. long.—I have seen no Martaban specimens of this.

15. ***S. rigidus***, *Thwaites Enum.* 284; shrubby, quite glabrous, branchlets acutely angled, leaves $\frac{1}{2}$ — $\frac{3}{4}$ in. very shortly petioled elliptic rounded or subobovate obtuse or apiculate, flowers minute, male racemed on a bracteate peduncle, calyx discoid papillose within with short retuse lobes, fem. of obovoid obtuse sepals, styles erect sunk in the concave top of the ovary, fruit very small ovoid. *Muell. Arg. in DC. Prodr.* xv. ii. 243.

CEYLON; common in the hot drier parts of the island, *Thwaites*.

A small shrub, 1-2 ft. *Leaves* black-green above when fresh, with white in the middle, dark brown when dry. *Male flowers* solitary (or appearing one at a time), from a short axillary peduncle that is densely clothed with sinuate bracts, yellow-green, $\frac{1}{2}$ in. diam.; fem. $\frac{1}{2}$ — $\frac{3}{4}$ in. diam. *Capsule* $\frac{1}{2}$ in. long.—I have very indifferent specimens, in male fl. only. *Thwaites* remarks that the ovary resembles that of *Agaveia*. I have no doubt as to its being a *Ceratogynum*, and very near to *S. quadrangularis*.

15. PUTRANJIVA, Wall.

Trees. *Leaves* alternate, evergreen, quite entire or serrulate, penninerved and reticulate. *Flowers* axillary, pedicelled, mono- or di-œcious, apetalous; males clustered, fem. subsolitary; disk 0. MALE FL. *Calyx* unequally 3-6-lobed or partite, imbricate. *Stamens* 2-4 in the centre of the flower, filaments free or subconnate; anthers erect, cells parallel. *Pistillode* 0. FEM. FL. *Calyx* of the male. *Ovary* ovoid, 2-3-celled; styles short, spreading, dilated into broad fleshy arms; ovules 2 in each cell. *Drupe* ovoid or globose; endocarp hard, 1-celled, 1-seeded. *Seed* ovoid, testa crustaceous, albumen fleshy, cotyledons broad flat.—Species 2, Indian.

1. ***P. Roxburghii***, *Wall. Tent. Fl. Nep.* 61, and *Cat.* 6814; nearly glabrous, leaves obliquely ovate or ovate-lanceolate serrulate, sepals of male 3-5, of fem. 5-6, stamens 1-3. *Muell. Arg. in DC. Prodr.* xv. ii. 443; *Royle Ill.* 347, t. 83 bis; *Wight Ic.* t. 1876; *Brand. For. Fl.* 451, t. 53; *Kurz For. Fl.* ii. 366; *Gamble Man. Ind. Timb.* 353; *Beddome Flor. Sylvat.* t. 275;

Dalz. & Gibs. Bomb. Fl. 236; *Endl. Ic. Gen.* t. 19. *P. sphærocarpa* & *amblyocarpa*, *Muell. Arg. l. c.* 443, 444. *Nageia Putranjiva*, *Roxb. Fl. Ind.* iii. 766.—*Wall. Cat.* 7889.—*Rheede Hort. Mal.* vii. t. 59.

Throughout TROPICAL INDIA, wild and cultivated, from the lower Himalaya in Kumaon, eastwards and southwards to Pegu and CEYLON.

A moderate-sized evergreen tree, shoots pubescent. *Leaves* 2–3 in., obtuse, acute or acuminate. *Flowers* small, yellow; males in dense axillary clusters, shortly pedicelled; fem. solitary or in pairs, sepals minute, pedicels $\frac{1}{2}$ –1 in. pubescent. *Filaments* more or less connate. *Ovary* tomentose, stigmas 3, cuneately semi-lunar. *Fruit* from globose to ovoid, size of a cherry or smaller, white-tomentose; putamen hard, wrinkled.

2. ***P. zeylanica***, *Muell. Arg. in DC. Prodr.* xv. ii. 444; quite glabrous, leaves lanceolate acuminate gland-dotted beneath, sepals of male 2 of fem. 4, stamens 2. *Beddome Forester's Man.* 197, and *Fl. Sylvat.* t. 275 (the lower left-hand compartment). *Palenga zeylanica*, *Thwaites in Hook. Journ. Bot.* viii. (1856) 271, t. 7 C, and *Enum.* 287; *Baill. Etudes Gen. Euphorb.* 649.

CEYLON; at Ambagamowa, alt. 2000 ft., *Thwaites*.

A glabrous tree, 20–40 ft.; branches terete. *Leaves* 3–5 by 1–1 $\frac{1}{2}$ in., oblique, shining; petiole $\frac{1}{2}$ in., rugulose; stipules minute. *Flowers* white, $\frac{1}{2}$ in. long; pedicels about as long. *Fruit* $\frac{1}{2}$ in. long, tomentose.

16. **HEMICYCLIA**, *Wight & Arn.*

Trees or shrubs. *Leaves* evergreen, alternate, petioled, quite entire, base usually very unequal. *Flowers* small, pedicelled, diœcious, apetalous; males clustered at the axils or nodes; females subsolitary. **MALE FL.** *Sepals* 4–5, imbricate, inner usually larger and subpetaloid. *Stamens* 4–23, inserted round an orbicular disk, filaments free; anthers erect, cells parallel. *Pistillode* 0. **FEM. FL.** *Calyx* of the male. *Disk* flat, annular. *Ovary* obliquely ovoid, 1-(rarely 2-)celled; stigmas 1, rarely 2, sessile, or on a short style, broadly reniform, flabelliform, orbicular; ovules 2 in each cell. *Fruit* ovoid, oblong, pyriform or globose, endocarp hard. *Seeds* oblong, grooved on one face, arilled; albumen fleshy; cotyledons broad, flat.—Species 9, Indian, Malayan and Australian.

* *Fruit* globose, terete; endocarp bony.

1. ***H. sepiaria***, *Wight & Arn. in Edinb. New Phil. Journ.* xiv. 297; nearly glabrous, leaves very coriaceous broadly elliptic or oblong tip rounded obtuse or retuse entire or repand-toothed, base rounded or cordate, stamens 8–10, fruit small pisiform. *Muell. Arg. in DC. Prodr.* xv. ii. 487; *Wight Ic.* t. 1872; *Dalz. & Gibs. Bomb. Fl.* 229; *Beddome Forester's Man.* 198; *Thwaites in Hook. Journ. Bot.* (1855) 271, and *Enum.* 287; *Baill. Etudes Gen. Euphorb.* t. 27, f. 7, 8. *Periplexis*, *Wall. Cat.* 8022. *P. rigida*, *Wall. mss.*

DECCAN PENINSULA; from the Concan southwards, ascending to 3000 ft CEYLON; from the sea coast to 1500 ft.

A rigid, much-branched shrub, 6–9 ft.; shoots puberulous. *Leaves* 1 $\frac{1}{2}$ –3 $\frac{1}{2}$ in., hard and almost shining when old, pale brown when dry, nerves very faint; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* villous; male $\frac{1}{2}$ in. diam., in axillary bracteolate clusters, or lengthening into short racemes, pedicels $\frac{1}{3}$ – $\frac{1}{2}$ in., filiform; fem. subsessile, with the pubescent pedicels elongating in fruit. *Sepals* 4, broad. *Stamens* 6–8, inserted round a cupular disk with a waved margin; filaments slender, exerted. *Ovary* 1–2-celled; stigma peltate, orbicular, or semicircular. *Fruit* $\frac{1}{2}$ in. diam., one-seeded,

endocarp bony.—The Australian plant referred to this by Bentham (of which that author had not seen fruiting specimens) differs wholly in the much smaller flower, smaller ellipsoid fruit, and other characters.

** *Fruit ellipsoid or obovoid.*

2. **H. lanceolata**, *Thwaites Enum.* 287; branchlets tomentose, leaves ovate or lanceolate very obtusely subcaudately acuminate glabrous or the midrib pubescent beneath, flowers puberulous, pedicels very short, stamens 10–16, ovary glabrous, stigma flabelliform, fruit narrowly ellipsoid. *Muell. Arg. in DC. Prodr.* xv. ii. 487; *Beddome Forester's Man.* 199.

CEYLON; at Caltura, *Thwaites*.

A tree; branches slender. *Leaves* 1–3 in., distichous, thinly coriaceous, green when dry, both surfaces alike reticulated, margin sometimes faintly repand, midrib strong, nerves very slender; petiole $\frac{1}{10}$ – $\frac{1}{8}$ in., pubescent. *Flower* $\frac{1}{8}$ in. diam., male pedicels $\frac{1}{12}$ in., fem. rather longer. *Sepals* broadly oblong. *Stigma* flabelliform, sessile or on a short stout style. *Fruit* $\frac{2}{3}$ in. long, red; tip oblique, sometimes incurved with a lateral stigma; endocarp coriaceous, crested and reticulate.

3. **H. Gardneri**, *Thwaites in Hook. Journ. Bot.* viii. (1855) 271, and *Enum.* 287; branchlets tomentose, leaves lanceolate or oblong tip rounded obtuse or subacute entire or obscurely repand-toothed glabrous or sparsely pubescent on the midrib beneath, flowers tomentose, pedicels short, stamens 20–25, ovary obovoid gibbous, fruit broadly ellipsoid. *Muell. Arg. in DC. Prodr.* xv. ii. 488; *Baill. Gen. Euphorb.* t. 27, f. 8; *Beddome Forester's Man.* 199.

CEYLON; from the sea coast to 1500 ft. common.

Very near *H. lanceolata*, but the leaves are smaller, more coriaceous, not suddenly narrowed to the tip, more crenate, the pedicels longer, flowers rather larger more tomentose, stamens more numerous, and the fruit very different, $\frac{1}{2}$ in. long, apparently flattened, sometimes obovoid. *Male fl.* $\frac{1}{4}$ in. diam.; sepals orbicular, concave, pubescent on both surfaces; central disk small, pubescent. *Stigma* reniform on a short style.

4. **H. sumatrana**, *Muell. Arg. in DC. Prodr.* xv. ii. 488; quite glabrous, leaves oblong or oblong-lanceolate obtusely acuminate entire or repand crenate glossy reticulately veined, flowers 1–3 puberulous, stigma flabelliform, fruit small 1-seeded broadly ellipsoid rounded at both ends or base truncate smooth keeled on one side. *Kurz For. Fl.* ii. 365. *Anaua sumatrana*, *Miq. Fl. Ind. Bat. Suppl.* 410.

BURMA; in tropical swamp forests of Martaban and the Irawaddi, and ANDAMAN ISLANDS, *Kurz*.—DISTRIB. Java, Sumatra.

An evergreen tree, 30–50 ft. *Leaves* 3–4 in., rigid, but thinly coriaceous; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* small, yellow green, and pedicels puberulous. *Sepals* $\frac{1}{10}$ in. long. *Ovary* glabrous. *Fruit* $\frac{1}{2}$ in. long.—I have seen no Burmese specimens, nor flowers or fruit of Andaman or others.

5. **H. andamanica**, *Kurz For. Fl.* ii. 365; nearly glabrous, leaves oblong-ovate to lanceolate caudate acuminate entire or repand-crenate minutely reticulate, flowers 1–2 puberulous, stamens many, fruit ellipsoid or obovoid shortly peduncled terete, putamen semiterete coriaceous.

ANDAMAN ISLANDS; marshy places near the coast, *Kurz*.

An evergreen tree, 40–50 ft.; bark white. *Leaves* 3–3½ in., thinly coriaceous, rather rigid, puberulous when young, base unequal; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Flowers* rather large, puberulous; pedicels $\frac{1}{12}$ – $\frac{1}{10}$ in., hairy. *Sepals* rounded, concave, 2 inner

thinner. *Drupe* over $\frac{1}{2}$ in.; peduncle $\frac{1}{6}$ – $\frac{1}{4}$ in., usually deflexed.—I have seen only an indifferent specimen, the leaves of which are almost entire.

6. **H. venusta**, *Thwaites in Hook. Journ. Bot.* viii. (1855) 272; branchlets glabrous, leaves elliptic or oblong obtuse or acuminate quite glabrous base often oblique, flowers finely tomentose, males clustered, fem. long-pedicelled, stamens 5–8, stigma disciform, fruit obovoid pericarp very thick. *Muell. Arg. in DC. Prodr.* xv. ii. 488; *Dalz. & Gibs. Bomb. Fl.* 229; *Beddome Forester's Man.* 198. *Astylis venusta*, *Wight Ic.* t. 1922.—*Wall. Cat.* 8007.

DECCAN PENINSULA; from Canara to the Nilghiris and S. Tinnevely, ascending to 4000 ft., *Heyne, Wight, Stocks, &c.*

A tree; branches rather stout. *Leaves* 3–5 in., very coriaceous, shining above, quite entire, base acute or cuneate, coarsely reticulated beneath, nerves many and slender; petiole $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in. diam.; male pedicels $\frac{1}{2}$ in., fem. 1–2½ in. *Fruit* $\frac{3}{4}$ –1 in., sometimes gibbous, at the top crowned with the pulvinate stigma; pericarp thick and hard when dry.—*Dalzell* (in a letter) observes that the ovary is 1- or 2-celled, that when 1-celled the stigma is an entire disk, and not unilateral, when 2-celled the stigma is double; also that the 2 ovules in each cell are so closely packed as to appear like one.

7. **H. elata**, *Beddome Fl. Sylvat.* t. 279; glabrous, leaves lanceolate acuminate, male flowers in few-fl. axillary fascicles, pedicels slender, sepals oblong pubescent on both surfaces, stamens 8–12, ovary 1-celled, stigmas sessile disciform, fruit long pedicelled pyriform pericarp very thick.

DECCAN PENINSULA; in the Wynaad, Anamalay and Tinnevely forests, alt. 3000 ft., *Beddome*.

A large tree, 90–100 ft. *Leaves* 4–5 by 1½–2 in., quite entire, shining on both surfaces; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in. *Male fl.* 4–5 in a cluster; pedicels $\frac{1}{2}$ –1 in.; flowers $\frac{1}{2}$ in. diam. *Fem. fl.* solitary, rather larger than the male; pedicel elongating in fruit. *Disk* annular. *Fruit* $\frac{3}{4}$ –1 in. long.—*Beddome* distinguishes this from *H. venusta* by its being a very large tree with less coriaceous leaves. My specimens do not enable me to distinguish it from that plant.

8. **H. Wightii**, *Hook. f.*; nearly glabrous, leaves elliptic- or oblong-lanceolate obtusely taper-pointed many-nerved and finely reticulate entire or obscurely crenate, base acute unequal-sided, flowers axillary shortly pedicelled solitary or 2–3 together, sepals 4–7 oblong and pedicels fulvous-tomentose, disk orbicular pubescent, stamens 6–10, fruit on a short stout pedicel ovoid puberulous, pericarp thick, stigma reniform.

DECCAN PENINSULA; Nilghiri Hills, *Wight*.

Habit of *H. venusta*, but the leaves are uniformly narrower, thinner, more finely reticulate, and the pedicels are shorter than the fruit, which is $\frac{3}{4}$ in. long and subacute.

17. CYCLOSTEMON, *Blume*.

Trees. *Leaves* alternate, quite entire or crenulate, base often unequal-sided. *Flowers* axillary, diœcious, apetalous, all racemed or clustered and pedicelled. MALE FL. *Sepals* 4–6, broad, imbricate (buds globose). *Stamens* few or many, inserted round a flattened or depressed disk; filaments short free; anthers erect, cells parallel. *Pistillode* 0 or minute. FEM. FL. *Calyx* of the male. *Disk* annular or 0. *Ovary* 2–4-celled, styles elongate or 0, stigmas dilated fleshy or connate into a peltate disk; ovules 2 in each cell. *Fruit* subglobose or ovoid, indehiscent; pericarp thick, hardened, 2-celled. *Seeds* solitary in the cells, albumen fleshy; cotyledons broad, flat.—Species about 18, Tropical Indian, Malayan and African.

Sect. 1. *STENOGYNIUM*, Muell. Arg. *Flowers* axillary. *Sepals* 4. *Stamens* 6-8. *Disk* of male fl. flat or tumid. *Ovary* 2-celled; styles elongate, slender; stigma peltate.

1. **C. indicus**, Muell. Arg. in *Linnaea* xxxii. 81, and in *DC. Prodr.* xv. ii. 481 (excl. *Malabar and Concan*); leaves obliquely ovate or oblong-lanceolate obtusely caudate-acuminate base very unequal, nerves very faint, flowers axillary small males subsolitary and slender pedicels quite glabrous, stamens 4-6 around a flat disk.

KHASIA Mts., Griffith (*Kew Distrib.* 4736); below Churra, J. D. H. & T.

A tree. *Leaves* 3-5 in., almost membranous; green when dry, nerves 10-12 pair, very slender; petiole $\frac{1}{10}$ in. *Male fl.* $\frac{1}{10}$ in. diam., yellow, laterally compressed. *Sepals* 4, almost orbicular, concave, ciliate. *Disk* 2-lobed. *Stamens* included; anther-slits introrse. "Ovary silky; styles slender, tips dilated," Muell.—Griffith's specimens have leaves 3 by 1 in.; mine are much broader, 5 by 2 in. I have seen no fem. fl. or fruit. Mueller gives *Malabar and Concan*, Hook. and Thoms., as localities, but there must be some error here.

2. **C. lancifolius**, Hook. f.; leaves lanceolate caudate-acuminate base very unequal with thickened margins, nerves strong, flowers of both sexes in axillary pubescent racemes, stamens 7 or 8 round a fleshy disk, styles 2 slender.

SIKKIM HIMALAYA, alt. 4-5000 ft., J. D. H. & T. T. Khasia Mts., alt. 3-5000 ft., Griffith (*Kew Distrib.* 4738), J. D. H. & T. T.

A tree; branches long, slender. *Leaves* 4-6 in., coriaceous, pale green when dry, the thickened cartilaginous margin extending $\frac{1}{2}$ -1 in. upwards from the petiole (sometimes obscure), base very acute; nerves 6-8 pair, slender but very distinct and raised on both surfaces; petiole $\frac{1}{2}$ in. *Flowering branchlets* in a young state enclosed in imbricating rigidly coriaceous distichous ciliate scales, forming lance-shaped buds $\frac{1}{2}$ in. long. *Racemes* few-fl., more or less pubescent. *Flowers*, male $\frac{1}{2}$ - $\frac{1}{4}$ in. diam., fem. $\frac{1}{2}$ in. *Sepals* oblong, pubescent and ciliate. *Disk* of male hemispheric, entire, pubescent. *Stamens* equalling the sepals, slits introrse. *Ovary* globose, 2-celled, densely tomentose; styles 2, slender, spreading, sigmoid, stigma entire peltate cordate. *Fruit* 1 in., ellipsoid, pericarp thick, endocarp papery.

3. **C. Griffithii**, Hook. f.; leaves membranous elliptic-lanceolate acuminate base quite equal, nerves very slender, young fruit long pedicelled ellipsoid abruptly beaked scurfy, styles 2 slender.

UPPER ASSAM; Mishmi Hills, Griffith (*Kew Distrib.* 4738).

Branches very slender. *Leaves* 6 by 2 in., green when dry, nerves 6-7 pair; petiole $\frac{1}{2}$ in. *Young fruit* $\frac{1}{2}$ in.; styles slender, crowning the beak, stigma peltate; peduncle $1\frac{1}{2}$ in., glabrous.—Apparently a very distinct species, of which I have specimens in young fruit only.

Sect. 2. *EUCYCLOSTEMON*, Muell. Arg. *Stamens* numerous. *Stigmas* 2, sessile, large, broad, 2-lobed.

* *Flowers all or mostly from the old wood.*

4. **C. macrophyllus**, Blume *Bijd.* 598; leaves 5-9 in. oblong to elliptic-lanceolate obtusely acuminate base usually very unequal, nerves 6-8 pair, flowers large pubescent or tomentose, disk villous, stamens very many. Muell. Arg. in *DC. Prodr.* xv. ii. 482.

MALACCA, Maingay (*Kew Distrib.* 1435). ANDAMAN ISLANDS, Kurz. COORG, Beddome. CEYLON; Central Province, alt. 3000 ft.—DISTRIB. Java.

An evergreen tree, 30-40 ft., with rigid branches, Kurz. *Leaves* coriaceous, quite entire, pale brown when dry, smooth above, highly reticulated beneath, base cuneate

rounded or subcordate; nerves 6-8 pair, strong beneath; petiole $\frac{1}{4}$ in., very stout. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., sessile or pedicelled. *Sepals* 4 or 5, rounded, concave, more or less pubescent or glabrate. *Disk* concave. *Filaments* free or connate. *Stigmas* reniform. *Fruit* subglobose, $\frac{3}{4}$ -1 in. diam., pubescent, yellow, tomentose or strigose.

—There are three varieties, or possibly species, namely—

1. *zeylanica*; male and fem. fl. peduncled, $\frac{2}{3}$ in. diam. *C. zeylanicus*, *Baill. Etudes Gen. Euphorb.* 562; *Thwaites Enum.* 286. *Sphragidia zeylanica*, *Thwaites in Hook Journ. Bot.* vii. (1855) 270, t. 10.—Ceylon.

2. *malaccensis*, male and fem. fl. peduncled, $\frac{1}{2}$ - $\frac{1}{2}$ in. diam. ? *C. macrophyllus*, *Kurz For. Fl.* ii. 364.—Malacca, *Maingay (Kew Distrib.* 1430, 1435, 3349), Andaman Islands.

3. *peninsularis*; male and fem. fl. sessile, $\frac{2}{3}$ in. diam. *C. macrophyllus*, *Beddome Fl. Sylvat.* t. 278.—Coorg, Western Circars, *Brandis*.

5. *C. longifolius*, *Blume Bijl.* 598; leaves 1-2 ft. linear-oblong obtuse very unequal-sided base unequally cordate, nerves 20-30 pairs, flowers large glabrous, stamens very many, disk glabrous flat. *Muell. Arg. in DC. Prodr.* xv. l. 482; *Baill. Etudes Gen. Euphorb.* 562, t. 23, f. 22-25.

PERAK; in rocky places, *King's Collector*. PENANG and MALACCA, *Maingay (Kew Distrib.* 1453).—DISTRIB. Java.

A tree, 60-80 ft. in Perak. *Leaves* 4-10 in. broad, very coriaceous, brown when dry, loosely reticulate on both surfaces, nerves spreading; petiole very short, immensely thick. *Male fl.* very numerous in a cluster, very shortly pedicelled, $\frac{1}{2}$ in. diam. *Sepals* 5, glabrous within and without. *Stamens* numerous round a flat disk. *Stigmas* 3, cuneate 2-fid. *Fruit* 2-2 $\frac{1}{2}$ in. diam., globose, obscurely trigonous, bright orange, slightly tomentose, 3-celled.

6. *C. malabaricus*, *Beddome Forester's Man.* 199; branchlets and pedicels golden tomentose, leaves 8-9 by 2 $\frac{1}{2}$ in. oblong membranous quite entire subcuspidate tomentose on both surfaces when young at length glabrous except the hairy costa, base unequal, nerves 7-10 pairs, petiole $\frac{1}{4}$ in., male fl. fascicled on the old branches, sepals 4 golden tomentose, stamens very many, disk cupular, fruit on the older branches solitary 1 by $\frac{3}{4}$ in. tomentose, pedicel $\frac{1}{2}$ in., stigmas 2 reniform.

SOUTH DECCAN; Tinnevely Ghats, alt. 3-4000 ft., *Beddome*.

A large tree.—I have not seen this species; the characters are taken from *Beddome's* description.

7. *C. confertiflorus*, *Hook. f.*; quite glabrous, leaves coriaceous oblong obtusely acuminate reticulate on both surfaces, nerves 5-8 pairs very slender, male fl. $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. in dense clusters on the old wood, stamens many, disk depressed-funnel-shaped glabrous radiately ribbed and with a membranous lobed border.

NORTH CANARA; in evergreen forests at Katgal, *W. A. Talbot*.

A large tree; branches stout, woody, with pale bark. *Leaves* 4-9 in., dull greenish on both surfaces when dry, rather shiny above, base equal or unequal, margins undulate; petiole stout, $\frac{1}{2}$ - $\frac{1}{2}$ in. *Male fl.* in globose clusters $\frac{1}{2}$ in. diam., sessile or shortly pedicelled, quite glabrous. *Sepals* 5, orbicular, concave, coriaceous. *Stamens* about 20, outside the disk, filaments stout; anthers large, not apiculate. *Pistillode* minute, conical. *Fem. fl.* and *fruit* not seen.—The depressed ribbed disk lining the calyx-tube and its subpetaloid border are very remarkable characters.

** *Flowers axillary (see also C. ellipticus)*.

8. *C. eglandulosus*, *Kurz For. Fl.* ii. 364; glabrous except the fem. flowers, leaves broadly elliptic or ovate-oblong abruptly obtusely caudate.

acuminate, fem. flowers 1-3 together long-pedicelled axillary tomentose, ovary tomentose 2-celled, stigmas dilated triangular. *Hopea eglandulosa*, *Roxb. Fl. Ind.* ii. 611. *Sarcostigma eglandulosum*, *Wall. mss.*—*Wall. Cat.* 7994.

TIPPERA, *Roxburgh*. ARRACAN; in forests rare, *Kurz*. CHITTAGONG; at Seeta-koon, *J. D. H. & T. T.*

An evergreen tree, 40-50 ft., *Kurz*; branches pendulous, slender. *Leaves* 2-3 by 1-1½ in., thinly coriaceous, pale when dry, reticulate on both surfaces, base unequal, nerves 5-6 pair; petiole slender, ¼-½ in. *Flowers*, male glabrous; fem. ¼ in. diam., solitary or few, axillary, pedicels puberulous. *Ovary* velvety-pubescent; stigmas cuneate, crenate.—I have seen neither fem. flower nor fruit, nor any Burmese specimens, and I am hence uncertain as to *Kurz*'s plant being *Wallich*'s, which are all from the Calcutta Gardens; his description differs from it in the much smaller leaves 1½-2 in. long.

9. *C. subsessilis*, *Kurz For. Fl.* ii. 364; glabrous except the pubescent inflorescence, leaves oblong to elliptic-oblong or oblong-lanceolate subacute or acuminate, flowers small very shortly pedicelled, ovary pubescent 2-celled, fruit ellipsoid slightly 4-lobed puberulous, stigmas minute.

CHITTAGONG, ARRACAN and MARTABAN, *Kurz*.

An evergreen tree, 25-30 ft.; branches slender. *Leaves* 4-6 in., chartaceous; nerves 10-12 pair, very slender, laxly reticulate, margins waved or subcrenate; petiole ¼ in. *Flowers* clustered, ½ in. diam., subsessile, axillary and at the scars of fallen leaves. *Sepals* orbicular, concave. *Stigmas* 2 or 3, triangular. *Fruit* ¾-¾ in. long, obscurely 4-lobed, shortly beaked, orange-coloured; peduncle thickened, ⅞ in.—I have seen only one authentic specimen, and that in fruit, sent by Dr. King, which differs from *Kurz*'s description in the more lanceolate acuminate leaves.

10. *C. assamicus*, *Hook. f.*; glabrous except the inflorescence, leaves elliptic oblong or linear-oblong tip rounded obtuse or subacute, fruits very shortly pedicelled small axillary clustered rusty-tomentose tip rounded, stigmas minute.

SIKKIM TERAI, *Gamble*. ASSAM, *Simons, Griffith*. KHASIA HILLS; at Now-gong, *Clarke*.

Leaves 3-5 in., shining and reticulate on both surfaces, base acute equal or unequal, margin undulate or repand; nerves 10-12 pair, very slender; petiole ¼ in. *Fruit* immature, ¾ in diam., globose or very broadly ellipsoid, apparently terete; stigmas very obscure.

11. *C. ellipticus*, *Hook. f.*; glabrous except the hoary flowers, leaves membranous elliptic obtusely acuminate base subacute unequal, nerves 8-10 pair very slender, male flowers ½ in. diam. axillary and on the branches solitary or few together shortly pedicelled, sepals broadly oblong, stamens about 20 surrounding a small orbicular disk.

TENASSERIM OF ANDAMAN ISLANDS, *Helfer* (*Kew Distrib.* 4962).

Branches slender. *Leaves* 4-5 in., dull brown above, lighter beneath, midrib slender, nerves filiform; petiole ½-¾ in., slender. *Male fl.* globose; pedicels shorter than the calyx, slender. *Sepals* broadly oblong, concave. *Stamens* with large oblong obtuse anthers as long as the filament. *Fem. fl.* and *fruit* unknown.

12. *C. nervosus*, *Hook. f.*; branchlets tomentose, leaves oblong-lanceolate caudate-acuminate entire glabrous except the midrib beneath, nerves very strong beneath deeply sunk above, flowers in sessile axillary clusters, sepals 4 fulvous tomentose, stamens very many disk deeply sunk villous, ovary fulvous tomentose, stigmas semicircular.

PERAK, *Scortechini*.

Branches with pale bark. *Leaves* 8-12 in., thinly coriaceous, base rounded on one

side acute on the other; nerves 12-15 pairs, cross-nervules few, raised; petiole $\frac{1}{4}$ in., stout. *Flowers* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. *Sepals* orbicular.

13. **C. Helferl**, *Hook. f.*; quite glabrous except the inflorescence, leaves coriaceous elliptic-lanceolate acuminate or caudate entire or repand serrate base equal acute or rounded, male fl. few sessile on a short stout axillary peduncle, fruit unripe long-peduncled obovoid finely pubescent, stigmas very large dilated.

TENASSERIM or ANDAMAN ISLANDS, *Helfer* (*Kew Distrib.* 214).

Branches rather slender. *Leaves* 3-5 by $1\frac{1}{2}$ -2 in., pale brown when dry, shining above, nerves many pair, very slender, hardly distinguishable above from the prominent lax reticulations; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* very immature, peduncle $\frac{1}{4}$ in., stout, pubescent. *Sepals* 4, orbicular. *Stamens* many; anthers extrorse. *Fruit* (young) $\frac{1}{2}$ in. long.—The large stigma at once distinguishes this from *C. subsessilis* and *assamicus*. Male flowers not seen.

14. **C. Curtisii**, *Hook. f.*; quite glabrous, leaves elliptic-lanceolate acuminate very shortly petioled base acute, midrib and nerves prominent above, nerves 8-10 pair very prominent beneath, cross-nervules finely reticulate, fem. fl. solitary axillary very shortly pedicelled, calyx patelliform glabrous fringed with coarse hairs, young fruit glabrous pericarp thin, stigmas 2 small hemispheric.

PENANG; alt. 2500 ft., *Curtis*.

A small tree, branches slender, bark nearly white. *Leaves* 6-10 by $1\frac{1}{2}$ -2 in., thinly coriaceous dark green when dry on both surfaces, nerves arched, lower ascending; petiole $\frac{1}{10}$ in., stout. *Young fruit* $\frac{1}{2}$ in. diam., 2-celled; cells 2-ovuled; pedicel $\frac{1}{12}$ in., bracteate at the base.

IMPERFECTLY KNOWN SPECIES.

15. **C. leiocarpus**, *Kurz in Trimen Journ. Bot. N. S.* iv. (1875) 330; a tree 30-40 ft., leaves 4-6 in. subsessile glabrous chartaceous elliptic or linear-oblong subacute or obtusely acuminate, base subequal, dark green when dry, nerves 6-10 pairs hardly distinguishable from the reticulations, petiole $\frac{1}{10}$ in., fruit axillary solitary ellipsoid or subglobose $\frac{3}{4}$ in. diam. glabrous obscurely 2-3-lobed 2-celled 2-seeded top rounded, stigmas minute.

NICOBAR ISLANDS; Kamorta, *Kurz*.

16. **C. calocarpus**, *Hook. f.*; glabrous, leaves oblong-lanceolate acuminate base usually very unequal-sided, fruit from the old wood large globose hoary, stigmas 2 cuneate. *Aporosa calocarpa*, *Kurz mss.*

SOUTH ANDAMAN ISLANDS, *Kurz*.

Branches (in fruiting specimen) very stout, woody. *Leaves* 6-9 by 2-4 in., coriaceous, dull green above when dry, paler beneath, base on one side rounded, on the other very acute; nerves 6-8 pair, very slender; petiole stout, $\frac{1}{4}$ - $\frac{1}{2}$ in.—Received from the Calcutta Gardens in 1867 under the above name of *Aporosa calocarpa*, but not described in *Kurz's Forest Flora* published in 1877. I have seen no flowers; the fruits are inserted on tubercles of the very stout branches far below the leaves.

18. CHORIOPHYLLUM, Benth.

A glabrous tree. *Leaves* opposite, coriaceous, quite entire. *Flowers* small, axillary, diœcious, apetalous; males in racemose cymes; fem. few, in sessile spikes; disk 0. MALE FL. *Sepals* 4-6 membranous, broadly oblong, imbricate. *Stamens* 4, opposite the sepals, inserted round a conical disk on

rudimentary ovary, filaments free, exserted; anthers stout, dorsifixed; cells extrorse, parallel. FEM. FL. *Sepals* 4, broad, fleshy, embracing the ovary, imbricate. *Ovary* 3-celled; styles free, erect, thick, obtuse, undivided; ovules 2 in each cell. *Capsule* of 3 2-valved cocci leaving a central column. *Seeds* oblong; testa crustaceous shining, albumen fleshy; cotyledons broad, flat.

C. malayanum, Benth. in Hook. Ic. Pl. t. 1280.—Wall. Cat. 7975.

MALAYA PENINSULA; Penang, Maingay; Singapore, Wallich; Malacca, Griffith, Maingay (*Kew Distrib.* 1404).

A tall tree; branchlets stout, woody, terminal buds pubescent. *Leaves* sub-terminal, 4–6 in., from oblong to linear-oblong or nearly obovate, obtuse, narrowed at the base into the stout petiole, subglaucons beneath; midrib stout beneath; nerves many, slender, reticulate; petiole $\frac{1}{2}$ in. *Male cymes* clustered, with the stout peduncle 1–1 $\frac{1}{2}$ in. long; branches short, flowers $\frac{1}{10}$ in. diam., clustered, sessile or pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in.; buds globose, glabrous. *Stamens* as long as the sepals. *Fem. sepals* acute. *Capsule* about $\frac{3}{4}$ in. diam., epicarp separating from the thickly crustaceous cocci.

19. MISCHODON, Thwaites.

A tree. *Leaves* whorled, long, coriaceous, quite entire, penninerved. *Flowers* in short axillary panicles, diœcious, apetalous. MALE FL. in panicked heads. *Sepals* 5–8, often unequal, imbricate. *Disk* 0. *Stamens* 5–10, opposite the sepals, exserted, filaments free, filiform, rough; anthers ovate, dorsifixed, cells parallel, slits extrorse. *Pistillode* 3-lobed. FEM. FL. *Disk* annular. *Ovary* 3–4-celled; styles short, spreading, flat, obovate; ovules 2 in each cell. *Capsule* deeply lobed, of 3 2-valved cocci. *Seeds* 1–2 in each coccus, testa crustaceous shining; albumen fleshy; cotyledons broad, flat.

M. zeylanicus, Thwaites in Hook. Kew Journ. vi. (1854) 300, t. 10 B, and Enum. 275; Muell. Arg. in DC. Prodr. xv. ii. 1124; Beddome Fl. Sylv. t. 290.

CEYLON; near Galle and Kandy, Walker, Gardner, Thwaites. DECCAN PENINSULA; on the Tinnevely Hills, Beddome.

A very handsome evergreen tree, 30–40 ft.; branches terete, branchlets subtetragonous, hoary-pubescent. *Leaves* coriaceous, rigid, 3–4 in a whorl, 4–14 by 1–5 in., oblong or linear-oblong, minutely strongly reticulate, base narrowed obtuse or subcordate; petiole $\frac{1}{2}$ –3 in., stout; stipules 2, minute. *Male fl.* numerous, in axillary bracteate pubescent panicles shorter than the leaves, reddish-yellow, $\frac{1}{2}$ – $\frac{1}{4}$ in. long; sepals lanceolate, acuminate. *Capsule* $\frac{1}{2}$ in. broad, smooth, glabrous, cocci obtusely keeled on the back. *Seeds* smooth, brown, $\frac{1}{3}$ in. long.—Beddome's specimens are not in flower or fruit.

20. BISCHOFIA, Blume.

A glabrous tree. *Leaves* alternate, 3-foliolate; leaflets often crenate. *Flowers* in axillary or lateral panicked racemes, minute, diœcious, apetalous; males scattered or clustered, females longer pedicelled. MALE FL. *Sepals* 5, concave, obtuse, imbricate, concealing the anthers. *Disk* 0. *Stamens* 5, filaments short; anthers large, cells parallel. *Pistillode* short, broad. FEM. FL. *Sepals* ovate, caducous. *Staminodes* 5, small, or 0. *Ovary* exserted, 3–4-celled; styles long, linear, stout, entire; ovules 2 in each cell. *Fruit* globose, fleshy, with 3–4 cells lined with a parchment-like 2-valved endocarp. *Seeds* turgidly oblong, testa fibro-crustaceous, albumen fleshy; cotyledons broad flat, radicle straight elongate.

B. javanica, *Blume Bijdr.* 1168; *Muell. Arg. in DC. Prodr.* xv. ii. 478; *Brand. For. Fl.* 446; *Kurz For. Fl.* ii. 355; *Beddome Sylv. Madr.* t. 259; *Gamble Man. Ind. Timb.* 355; *Miquel Fl. Ind. Bat.* i. ii. 363, and *Suppl.* 444. *B. trifoliata*, *Hook. Ic. Pl.* t. 844. *B. Roeperiana*, *Dcne. in Jacquem. Voy. Bot.* 153; *Baill. Gen. Euphorb.* t. 26, f. 25-52. *B. Cumingiana* & *B. Toui*, *Dcne. l. c.* *B. oblongifolia*, *Dcne. l. c.* t. 154. *Stylo-discus trifolius*, *Bennet Plant. Jar. Rar.* 133, t. 29; *Dalz. & Gibs. Bomb. Fl.* 235. *Microelus Roeperianus*, *Wight & Arn. in Edinb. New Phil. Journ.* xiv. 298; *Wight Ic. t.* 1880. *Andrachne trifoliata*, *Roxb. Fl. Ind.* iii. 728. *A. apetala*, *Roxb. mss.*; *Wall. Cat.* 7956. *Phyllanthus* ? *gymnanthus*, *Baill. Rec. Obs. Bot.* ii. 240 (fid. Muell).

TROPICAL HIMALAYA, from Kumaon eastwards, and from ASSAM southwards, to TENASSERIM. DECCAN PENINSULA; on the Western Ghats from Canara southwards to the Nilgiri Hills. (Absent from Ceylon).—DISTRIB. Malay and Pacific Islands.

A round-headed more or less deciduous-leaved quite glabrous tree, 30-40 ft.; bark smooth. *Leaves* very variable; petiole 1-6 in.; leaflets 3-5 in., from ovate to oblong-lanceolate, acuminate, repand-toothed, petiolules $\frac{1}{2}$ - $\frac{3}{4}$ in. *Panicles* very slender, flowers green, males minute on short slender pedicels, fem. $\frac{1}{2}$ in. diam. on stout pedicels. *Fruit* fleshy, on long thickened pedicels, smooth, size of a pea, blue black. *Seeds* smooth, shining, testa splitting longitudinally, dark brown.—*Kurz* describes the fleshy fruit as almost indehiscent and containing a crustaceous 3-4-coccous capsule (implying a dehiscence within). *Wight*, and *Hook. Ic. Pl.*, figure a 3-celled fleshy fruit and 3 seeds with thick testas. *Mueller* describes a 3-coccous parchment-like endocarp, and says nothing of the testa.

21. **APOROSA**, *Blume*.

Trees. *Leaves* alternate, quite entire, rarely sinuate-toothed, penninerved. *Flowers* minute, dioecious, rarely monœcious, apetalous; males most minute in axillary catkin-like spikes; fem. sessile or shortly pedicelled in very short bracteate spikes. MALE FL. *Sepals* 4 (3-6), membranous, imbricate. *Stamens* 1-5 in the centre of the flower, filaments capillary; anthers didymous. *Pistillode* minute or 0. FEM. FL. *Sepals* of the male, but larger. *Ovary* 2-(rarely 3)-celled; stigmas small, plumose, short, spreading or recurved, simple or 2-4-cleft, rarely elongate and 2-partite; ovules 2 in each cell. *Fruit* globose, ellipsoid or ovoid, bursting irregularly, or partially 2-4-valved from the base upwards, epicarp thin or thick and spongy or fleshy, endocarp thin, often separable; cells glabrous or hairy within, especially on the septum. *Seeds* oblong or suborbicular, usually plano-convex, albumen fleshy; cotyledons broad, flat.—Species 30-40, Tropical Asiatic and Malayan.

Series I. STIPULES SMALL, DECIDUOUS.

* *Ovary* pubescent or tomentose (unknown in *A. petiolata*).

† *Leaves* more or less tomentose beneath (or glabrous in *A. microcalyx*). Female flowers and fruit sessile.

1. **A. villosa**, *Baill. Gen. Euphorb.* 645; branchlets petioles and leaves beneath softly tomentose, leaves large from broadly oblong to elliptic-obovate obtuse quite entire, bracts of male spikes broadly ovate acute hirsute, fem. fl. sessile, ovary villous, stigmas long 2-partite plumose, fruit ovoid apiculate tawny-tomentose. *Muell. Arg. in DC. Prodr.* xv. ii. 471; *Kurz For. Fl.* ii. 361. *Scepa villosa*, *Lindl. Nat. Syst. Bot. Ed.* 2, 441 (male

and fem. fl. transposed), and *Veg. Kingd.* 283, with woodcut. *Lepidostachys* ? villosa, *Wall. Cat.* 7298.

PEGU and TENASSERIM, in open forests, *Wallich, M'Lelland, Helfer* (*Kew Distrib.* 4953, 4954).—DISTRIB. Cochin China.

A deciduous-leaved tree, 20–30 ft.; branchlets stout. *Leaves* 4–10 in., coriaceous, glabrous above except the nerves, base subcordate, rounded or acute; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., stout. *Male spikes* clustered, $\frac{1}{2}$ – $\frac{3}{4}$ in. long; fem. subsolitary sessile, very short, oblong; bracts concave, ciliate. *Sepals* of male 3–5, oblanceolate, acuminate, pubescent. *Stamens* 2–5, exerted. *Ovary* rusty villous. *Fruit* size of a large pea, orange-coloured, usually 1-celled and 1-seeded.—The description of the fruit is from Kurz.

2. *A. scifolia*, *Baill. Adans.* xi. 177; branches stout and leaves beneath rusty villous, leaves 6–9 by 3–4 in. thickly coriaceous elliptic or oblong acute or acuminate obscurely sinuate-toothed pale when dry, fem. fl. sessile, stigmas depressed broad 2-partite plumose, fruit globose, pericarp not very thick, cells glabrous within.—*Wall. Cat.* 8017.

PENANG, *Wallich, Maingay* (*Kew Distrib.* 1498). PERAK, *King's Collector*.—DISTRIB. Cambogia.

Branches as thick as a goose-quill. *Leaves* rather rugose above, hardly shining, midrib above tomentose; nerves 10–12 pair, strong beneath with reticulating nervules; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., stout. *Ovary* globose, villous; stigmas 4, very large and broad, 2-partite. *Fruit* globose, $\frac{3}{4}$ –1 in. diam., 2-celled, crowned with the radiating sessile stigmatic lobes. *Seeds* suborbicular, plano-convex.

3. *A. microcalyx*, *Hassk. in Bull. Bot. Soc. France* vi. (1859) 714; branchlets pubescent or tomentose, leaves coriaceous 3–6 in. elliptic ovate or oblong obtuse or obtusely acuminate base acute or cuneate entire or sinuate-toothed glabrous or pubescent beneath, nerves 6–8 pairs strong arched and meeting in large loops, fem. flowers sessile on very short spikes, ovary hirsute, stigmas short recurved 2-partite, fruit ellipsoid or broadly fusiform pubescent, top rounded base contracted, cells sparsely hairy within. *A. microcalyx*, a. genuina, *Muell. Arg. in DC. Prodr.* xv. ii. 471. *A. aurita*, *Miquel Fl. Ind. Bat. i. ii.* 431 (excl. syn. *Tul.*). *A. Cumingiana*, *Baill. Rev. Gen. Euphorb.* 645. *Leiocarpus serratus*, *Hassk. Cat. Hort. Bogor.* 196. *Tetractinostigma microcalyx*, *Hassk. Cat. Hort. Bogor. Ed. nov.* 55; *Miquel l. c.* 362.

PERAK; at Goping, *King's Collector*. MALACCA, *Griffith* (*Kew Distrib.* 4958) and *Maingay* (*Kew Distrib.* 1417).—DISTRIB. Malay Islands, China.

A small tree. *Leaves* rather shining on both surfaces, yellow when dry; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., often pubescent and minutely stipellate at the top. *Male sepals* 3–4, very irregular, glabrous. *Stamens* 1 or more. *Fruit* $\frac{1}{3}$ – $\frac{1}{2}$ in. long; pericarp rather thin.

†† Leaves glabrous or nearly so (see also 3. *A. microcalyx*). Female flowers sessile.

§ *Fruit* globose or nearly so (sometimes ovoid in *A. villosula*).

4. *A. macrophylla*, *Muell. Arg. in DC. Prodr.* xv. ii. 470; quite glabrous except the spikes, leaves very large long-petioled ovate or ovate-oblong base deeply cordate, bracts of male and fem. fl. very broad glabrous ciliate, fem. fl. sessile, ovary villous, fruit subglobose velvety. *Kurz For. Fl.* ii. 361. *Lepidostachys macrophylla*, *Tulasne in Ann. Sc. Nat. Ser. 3*, xv. (1851) 253.

BURMA, *Wallich*. PEGU to TENASSERIM, *Kurz, M'Lelland*.

A deciduous-leaved tree, 20–25 ft.; branches very stout. *Leaves* 1–2 by $\frac{1}{2}$ –1 ft., thinly coriaceous, obtuse or subacute, with vesicular dots beneath; nerves 10–12 pair;

petiole stout, 2-4 in. *Male catkins* 1-2 in.; *fem.* very short, with smaller narrower tomentose bracts. *Sepals* of male narrowly spatulate, of *fem.* oblong. *Stamens* 2. *Ovary* obovoid-oblong, rusty-tomentose. *Fruit* the size of a large pea, yellow, 2-celled, 2-seeded.—The fruit is described from Kurz; the stigmas are undescribed.

5. **A. nigricans**, *Hook. f.*; nearly glabrous except the tips of the shoots, bark pale, leaves coriaceous oblong or elliptic-oblong acuminate base obtuse rounded or cordate brown when dry above, beneath blackish olive-green with a few hairs when young on the midrib, petiole $\frac{1}{2}$ in. stout, fruit globose $\frac{1}{2}$ in. diam. nearly glabrous yellow black when dry, epicarp very thick with 2 or 4 lines of dehiscence, stigmas 2 short depressed 2-partite, septum hairy.

PERAK; at Larut, *King's Collector*.

A small tree, 20-30 ft. *Leaves* 6-12 in., nerves 8-10 pair, very strong beneath, cross-nervules strong or slender.

6. **A. globifera**, *Hook. f.*; branches slender and petioles and midrib above rusty-tomentose, leaves 3-4 in. thinly coriaceous elliptic-oblong or -oblanceolate obtusely acuminate base acute or rounded laxly tomentose beneath, nerves 6-8 pair very strong meeting in large loops, petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., *fem. fl.* sessile axillary, fruit globose pubescent, stigmas small depressed 4-lobed?, cells glabrous within.

PERAK, *Scortechini, King's Collector*.

A small tree, 20-30 ft., crown spreading. *Leaves* green when dry, pale beneath. *Fruit* $\frac{3}{4}$ in. diam., yellow and red (red brown when dry), epicarp rather thick, endocarp thin. *Seed* orbicular, plano-convex.

7. **A. villosula**, *Kurz For. Fl.* ii. 362; glabrous except the shoots and spikes, leaves long-petioled oblong to obovate-oblong or -lanceolate obtuse acute or subacuminate base obtuse or acute, *fem. fl.* sessile, ovary globose densely villous, stigmas short shortly 2-fid., fruit globose or turgidly ovoid hirsute or glabrate apiculate, pericarp thin, cells hairy within.

PEGU to TENASSERIM and the ANDAMAN ISLANDS, *Griffith, Helfer (Kew Distrib.* 4951), &c.

An evergreen tree, 25-30 ft.; shoots appressed-pubescent, soon glabrous. *Leaves* 3-6 in., shining, membranous; nerves 5-8 pairs, slender; petiole $\frac{3}{4}$ -1 $\frac{1}{4}$ in., thickened at the tip. *Fem. spikes* with crowded glabrous ciliate bracts. *Fruit* sometimes ellipsoid.—Near *A. Roxburghii*, but the ovary is densely clothed, and the fruit globose.

8. **A. latifolia**, *Thwaites Enum.* 288; glabrous, leaves thickly coriaceous obovate or broadly elliptic obtuse base rounded or subcordate, bracts ciliate, *fem. fl.* sessile, ovary hairy stigmas reflexed 2-fid., fruit large broadly ovoid subacute glabrous, pericarp very thick fleshy, cells villous within, stigmas depressed recurved 3-partite lobes 2-fid. *Muell. Arg. in DC. Prodr.* xv. ii. 470; *Beddome Forester's Man.* 199. *Agyneia latifolia*, *Moon Cat. Ceyl. Pl.* 65.

CEYLON; south part of the island, *Thwaites*.

A medium-sized tree; branches stout. *Leaves* 5-6 by 3-4 in., shining above, midrib stout; nerves 5-8 pairs, slender; petiole $\frac{3}{4}$ -1 in., very stout. *Fruit* $\frac{3}{4}$ -1 in. long, pericarp as thick as the cavity, at length 4-valved at the base.—I have seen no flowers.

§§ *Fruit ovoid or ellipsoid (see also A. villosula).*

9. **A. Roxburghii**, *Baill. Etudes Gen. Euphorb.* 645; nearly glabrous except the inflorescence, leaves oblong or oblong-lanceolate acuminate

entire or obscurely sinuate-toothed, bracts of male and fem. fl. broad glabrous ciliate, fem. fl. sessile, ovary thinly hirsute, stigmas very short 2-fid, fruit ovoid-oblong nearly glabrous, pericarp thin, septum hairy. *Kurz For. Fl.* ii. 362. *A. dioica*, *Muell. Arg. in DC. Prodr.* xv. ii. 472. *Lepidostachys Roxburghii*, *Wall. Cat.* 6816. *Alnus dioica*, *Roxb. Fl. Ind.* iii. 580. *A. integrifolia*, *Roxb. mss.—Wall. Cat.* 7991.

SIKKIM HIMALAYA; in tropical valleys, *J. D. H. ASSAM*, *Jenkins*. The KHASIA HILLS, SILHET, CACHAR, and southwards to TENASSERIM, *Wallich*, *Kurz*, &c.

An evergreen tree, 20–30 ft.; tips of branches glabrous or pubescent. *Leaves* 3–5 in., thinly coriaceous, sometimes caudate-acuminate, base acuminate cuneate or rounded; nerves 5–7 pairs, slender, sometimes puberulous beneath; petiole $\frac{1}{4}$ – $\frac{2}{3}$ in., sometimes minutely 2-stipellate. *Male spikes* 1 in., solitary or clustered; bracts rather longer; fem. shorter. *Sepals* pubescent. *Fruit* $\frac{1}{2}$ – $\frac{1}{3}$ in. long.—The Chittagong plant referred to *A. Roxburghii* by Mueller has glabrous ovaries and is *A. aurea*.

10. *A. oblonga*, *Muell. Arg. in Linnæa* xxxii. 78, and in *DC. Prodr.* xv. ii. 472; glabrous, leaves elliptic-oblong obtuse or subacute entire base acute or rounded, bracts of male and fem. fl. glabrous ciliate, fem. fl. sessile, ovary silky, stigmas cleft to the middle arms long reflexed, fruit small ellipsoid contracted into a short beak with 2 recurved plumose stigmas, base hairy, pericarp thin, septum hairy. *Lepidostachys* ? *oblonga*, *Wall. Cat.* 7299.

BURMA; at Amherst, *Wallich* (a solitary specimen).

Shoots glabrous. *Leaves* 3–5 in., thinly coriaceous, nerves 6–7 pair slender, base sometimes almost cordate; petiole $\frac{1}{2}$ – $\frac{2}{3}$ in., slender. *Fem. spikes* $\frac{1}{4}$ – $\frac{1}{2}$ in., rusty-tomentose, bracts sparsely pubescent. *Fruit* $\frac{1}{2}$ – $\frac{1}{3}$ in. long, nearly black when dry.—Possibly referable to *A. Roxburghii*.

11. *A. Clellandii*, *Hook. f.*; glabrous, leaves lanceolate acuminate base cuneate, petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., fruit sessile ovoidly globose shortly beaked puberulous, pericarp very thin fragile, cells sparsely hairy, stigmas 2 very short recurved.

PEGU; at Rangoon, *M'Lelland*.

Branches rather slender, glabrous. *Leaves* 5–6 in., thinly coriaceous, pale when dry, rather shining above; nerves 8–10 pairs, very slender, arched and spreading, cross-nervules reticulate; petiole slender. *Fruit* $\frac{1}{2}$ – $\frac{1}{3}$ in. long, pericarp very thin and endocarp papery.

12. *A. Maingayi*, *Hook. f.*; branches slender, leaves small glabrous elliptic-oblong or obovate caudate-acuminate base acute, midrib beneath hairy or glabrate, bracts tomentose, fem. fl. sessile, ovary densely villous, stigmas very short 2-cleft fimbriate, fruit ellipsoid or subfusiform, pericarp thin, cells glabrous within.

MALACCA, *Maingay* (*Kew Distrib.* 1418). SINGAPORE, *Cantley*.

Branches dark when dry, branchlets pubescent. *Leaves* 2–3 in., membranous, dull green when dry; nerves 5–7 pairs, rather strong; petiole $\frac{1}{2}$ – $\frac{1}{3}$ in. *Male spikes* $\frac{1}{2}$ in.; fem. so short that the flowers appear to be capitate. *Sepals* 4, hirsute. *Stamens* 2. *Fruit* $\frac{1}{2}$ in. long, subacute at both ends; at length 4-valved at the base.—The leaves of this and of *A. Planchoniana* are the smallest of the Indian species. *Maingay* remarks that the seed is imbedded in yellow pulp, and the testa osseous.

13. *A. acuminata*, *Thwaites Enum.* 288; glabrous, leaves elliptic-lanceolate caudate-acuminate base acuminate, male spikes stout, bracts villous, sepals ciliate, fem. fl. sessile, ovary hirsute, stigmas 3 large recurved 2-fid, fruit turgidly ovoid acute hairy, pericarp very fleshy, cells glabrous

within. *Muell. Arg. in DC. Prodr.* xv. ii. 473; *Beddome Forester's Man.* 199.

TINNEVELLY, *Beddome*. CEYLON; alt. 2-3000 ft., *Thwaites*.

A small sparingly-branched tree, branches very slender and all parts but the bracts quite glabrous. *Leaves* $1\frac{1}{2}$ -5 in., membranous, pale when dry, tip obtuse or acute, base tapering into the slender petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. long, margin obscurely undulate; nerves 6-7 pair, arched, cross-nervules loosely reticulate. *Male spikes* $\frac{1}{2}$ in.; bracts ciliate; sepals 3; stamens 2. *Fem. spikes* usually 1-fl. *Ovary* 3-celled, silkily hairy, and fruit $\frac{2}{3}$ in. long, usually 3-seeded.—In *Beddome's* specimens the pericarp is much thinner than in the Ceylon ones.

14. **A. microstachya**, *Muell. Arg. in DC. Prodr.* xv. ii. 474; branches slender, shoots and young petioles pubescent, leaves shortly petioled ovate or lanceolate obtusely caudate-acuminate base acute, fem. fl. sessile subcapitate, ovary densely rusty-villous, stigmas short broad plumose, fruit very small globosely ovoid glabrous, pericarp very thin, cells glabrous. *A. Tulasneana*, *Baill. Etudes Gen. Euphorb.* 645. *Scepa microstachya*, *Tulasne in Ann. Sc. Nat. Ser. 3, xv.* (1851) 255. ? *S. stipulacea*, *Lindl. Nat. Syst. Bot. Ed. 2*, 441. *Lepidostachys Griffithiana*, *Planch. mss.*—*Wall. Cat.* 7985.

BURMA; at Amherst, *Wallich*. TENASSERIM; at Mergui, *Griffith*.

Branches smooth, black when dry. *Leaves* 5-7 in., membranous, dull green when dry; margin entire or subrepand; nerves 8-10 pairs slender, nervules very faint; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Fem. spikes* in small clusters. *Fruit* $\frac{1}{4}$ - $\frac{1}{2}$ in. long, smooth.—Closely allied to *A. Maingayi*, but the leaves are much broader and longer, nerves fewer and fainter, and the fruit is black when dry and much smaller. *Kurz's A. microstachys* is *A. aunea*, having a glabrous ovary.

15. **A. glabrifolia**, *Kurz in Trimen's Journ. Bot. N. S.* iv. (1873) 330; branches very robust, shoots tomentose, leaves 3-5 in. coriaceous elliptic-ovate obtuse or subacute base acute smooth above sparsely hairy beneath and with minute hairy tufts at the base on each side, nerves 7-8 pairs, petiole $\frac{1}{2}$ in., fem. fl. sessile, fruit $\frac{2}{3}$ in. long ellipsoid subacute finely pubescent 4-valved at the base, stigmas 2 short stout recurved, pericarp thin, septum hairy.

NICOBAR ISLANDS; Kamorta, common in dry grassy places, *Kurz*.

Kurz (possibly by misprint) gives the size of the fruit as $1\frac{1}{2}$ in. The only specimen of this which I have seen has stout woody branches, from which it appears as if the habit of the plant was scraggy, with short leafing shoots. *Leaves* greenish and reticulate above, glabrous and pale brown beneath; petiole $\frac{1}{2}$ in., pubescent.

††† *Leaves* glabrous or nearly so. *Fem. fl.* pedicelled.

16. **A. Lindleyana**, *Baill. Etudes Gen. Euphorb.* 645; glabrous, leaves oblong ovate or ovate-lanceolate acute, base acute rounded or subcordate, stipules large hairy, bracts glabrous ciliate, fem. fl. shortly pedicelled, ovary silky-pubescent, stigmas short 2-3-partite arms hardly plumose, fruit pedicelled globose cuspidate or very broadly ellipsoid, pericarp thin, septum villous. *Muell. Arg. in DC. Prodr.* xv. ii. 473; *Thwaites Enum.* 288; *Beddome Flor. Sylvat.* t. 286. *A. affinis*, *Baill. l. c.* *A. sphaerocarpa*, *Muell. Arg. in Flora* xlvi. (1864) 529, and in *DC. l. c.* *Scepa Lindleyana*, *Wight Ic.* t. 361; *Dalz. & Gibs. Bomb. Fl.* 236.

THE DECCAN PENINSULA; from the Concan southwards. CEYLON, abundant.

A much-branched evergreen tree. *Leaves* 4-6 in., thin or coriaceous, smooth above; nerves 8-10 pairs; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., rather stout. *Male spikes* 1 in. or less, rather stout; sepals 4-6, ciliate; stamens 2-3. *Ovary* fusiform, distinctly pedicelled,

2-3-celled. *Fruit* $\frac{1}{2}$ – $\frac{1}{3}$ in. diam., quite globose, smooth, abruptly tipped by a very short style; pedicel half its diameter in length, tomentose.

17. **A. nervosa**, *Hook. f.*; quite glabrous, leaves 4-7 in. coriaceous oblong obtuse or obtusely acuminate base rounded or cuneate with 6-8 pair of very strong nerves and strong reticulating cross-nervules, petiole $\frac{3}{4}$ –1 in. stout, male spikes $\frac{1}{2}$ – $\frac{3}{4}$ in. clustered, fruit shortly pedicelled globose puberulous, stigmas depressed each 4-partite, pericarp thick, cells glabrous within.

MALACCA, *Maingay* (*Kew Distrib.* 1365).

Branches rather stout, black when dry. *Leaves* variable, 2-4 in. in breadth, pale greenish when dry and smooth above, pale brown beneath. *Sepals of male* 4, ovate, tomentose; filaments short. *Fruit* $\frac{1}{2}$ in. diam.

** *Ovary* glabrous. *Fruit* sessile on the spike.

† *Fruit* globose.

18. **A. microsphaera**, *Hook. f.*; glabrous, leaves coriaceous lanceolate caudate-acuminate shining above with the midrib raised, reticulate beneath with 6-8 pairs of very slender arched nerves, fem. fl. sessile, ovary glabrous, fruit $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. spherical smooth glabrous, stigmas 2 very short 2-cleft, pericarp thick, septum hairy.

PERAK, *Scortechini*, *King's Collector*.

A shrub 10-15 ft. or tree 30-40 ft.; branches rather slender, bark pale. *Leaves* 4-6 in., greenish or yellowish when dry, grey beneath; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Fem. spikes* often clustered, very short, $\frac{1}{2}$ – $\frac{3}{4}$ in.; rachis tomentose, bracts crowded. *Fruit* yellow (black when dry), indehiscent. *Seed* orbicular, compressed, plano-convex, "with a thin fleshy pale-red coat" (*Kunstler*).

†† *Fruit* ellipsoid or ovoid.

19. **A. Planchoniana**, *Baill. Etudes Gen. Euphorb.* 645 (*Planchiana*); glabrous, or the shoots puberulous, leaves small shortly petioled lanceolate caudate-acuminate base rounded or acute, nerves very obscure, bracts and sepals glabrous, fem. fl. sessile, ovary fusiform glabrous, fruit small ellipsoid beaked by the 2-fid styles glabrous, pericarp very thin, septum hairy. *Muell. Arg. in DC. Prodr.* xv. ii. 475. *A. lanceolata*, *Kurz For. Fl.* ii. 363 (not of *Thwaites*). *Lepidostachys parviflora*, *Planch. mss.*

TENASSERIM; at Mergui, *Griffith, Helfer* (*Kew Distrib.* 4956). PERAK, *King's Collector*.

A small evergreen tree. *Leaves* 2-3 in., hardly coriaceous, pale yellowish green when dry on both surfaces; nerves 6-8 pairs, extremely slender; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., very slender. *Male spikes* 1 in. and less; sepals orbicular; stamens 2. *Fem. spike* very short indeed. *Fruit* $\frac{1}{4}$ – $\frac{1}{2}$ in. long.

20. **A. Wallichii**, *Hook. f.*; quite glabrous, leaves oblong lanceolate or linear-lanceolate obtusely acuminate base acute or rounded, male bracts and sepals tomentose, fem. fl. sessile, ovary fusiform glabrous, fruit ellipsoid beaked by the base of the rather long plumose 2-partite stigmas, pericarp thick, cells very hairy within. *Lepidostachys Roxburghii*, *Herb. Ind. Or., H. f. & T.—Wall. Cat.* 8019.

SILHET and the KHASIA HILLS, *Wallich, &c.* CHITTAGONG; at Seetakoond, *J. D. H. & T. T.* MOULMEIN, on Thyong Guyung, *Lobb*.

A large tree; branches rather stout. *Leaves* 3-8 in., rather coriaceous, pale green and rather shining when dry, base rarely cordate; nerves 5-7 pair, very

slender, petiole $\frac{1}{2}$ –1 in. *Male spikes* 1–1 $\frac{1}{2}$ in., rather stout; sepals 4; stamens 2. *Ovary* slender, narrowed at both ends; styles rather slender. *Fruit* $\frac{1}{2}$ in. long.

21. **A. aurea**, *Hook. f.*; quite glabrous, leaves long-petioled coriaceous elliptic-oblong or -lanceolate obtusely acuminate, base acute or obtuse golden-green or -yellow when dry, male spikes clustered. bracts glabrous, fem. fl. sessile, ovary flask-shaped glabrous, styles long 2-fid fringed, fruit globose glabrous. pericarp thick, cells glabrous within. *A. microstachya*, *Kurz For. Fl. ii.* 363 (*not of Mueller*).

CHITTAGONG and AVA to TENASSERIM, ascending to 4000 ft., *Kurz. PERAK, Herb. Hort. Calcutt. MALACCA, Griffith (Kew Distrib.* 4959).

An evergreen tree, 20–30 ft.; branches pale. *Leaves* 3–6 in., shining above, paler beneath; nerves 5–6 pair, very slender; petiole $\frac{1}{2}$ –1 in., rather slender. *Male spikes* $\frac{1}{2}$ –1 $\frac{1}{2}$ in.; bracts membranous, glabrous; sepals rounded, glandular. *Fruit* $\frac{1}{2}$ in. diam., yellowish, crowned by the rather large thickly fringed stigmas, 2-valved at the base, 2-celled, 2-seeded. *Seeds* orbicular, plano-convex, grooved on the ventral face, as if formed of 2-connate seeds.—The fine golden hue of the dried leaves is characteristic of this species, which approaches *A. Wallichii*, and is well likened by *Kurz* to the colour of a *Symplocos*. I have seen no fem. flowers, the characters of which are taken from *Kurz's* description of his *A. microstachya*, which is certainly this, and not that plant of *Mueller*; nor have I seen any Tenasserim, Avan or Chittagong specimens, and hence my identification of the Perak and Malaccan plant with that of *Kurz* may be erroneous.

22. **A. lanceolata**, *Thwaites Enum.* 288; glabrous, leaves lanceolate or linear-lanceolate caudate-acuminate base acute, male bracts glabrous ciliate, fem. fl. sessile, ovary glabrous, stigmas 2 very minute entire together forming a 2-lobed disk, fruit small ovoid obtuse or subspherical. *Muell. Arg. in DC. Prodr.* xv. ii. 475 *in part*; *Beddome Forester's Man.* 199. *Lepidostachys lanceolata*, *Tulasne in Ann. Sc. Nat. Ser. 3, xv.* 253.

CEYLON; very common.

A small evergreen tree, everywhere except the ciliate bracts glabrous. *Leaves* 3–4 in., membranous, caudate tip very long, green or yellowish when dry, base acute; nerves 5–6 pair, arched, cross-nervules reticulate; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in., slender. *Male spikes* $\frac{1}{2}$ – $\frac{1}{2}$ in.; bracts, clawed; sepals 4–5; stamens 4. *Fem. spikes* very short. *Ovary* ovoid. *Fruit* (from *Thwaites's* description) the size of a pea. *Seeds* with a fleshy outer coat.—*Mueller* describes the ovary as scabrid, the stamens as 2, and leaves as sometimes repand-denticulate, which makes me suspect that these characters are taken from a Bornean plant which he refers to this species. The plant of *Helfer's* referred here is *A. Planchoniana* (as is *Kurz's A. lanceolata*), the Malaccan (*Griffith's* 4959) is *A. aurea*. I have seen no ripe fruit of this.

23. **A. fusiformis**, *Thwaites Enum.* 288; glabrous, leaves oblong or obovate-oblong or orbicular acute obtuse or retuse rarely acuminate, base cuneate or rounded, bracts glabrous ciliate, fem. fl. sessile, ovary glabrous, stigma 2–3-partite short recurved, fruit fusiform glabrous, pericarp thin, cells hairy within. *Muell. Arg. in DC. Prodr.* xv. ii. 471; *Beddome Forester's Man.* 199. *A. Thwaitesii*, *Baill. Etudes Gen. Euphorb.* 645. *Lepidostachys grandifolia*, *Planch. mss.*

CEYLON; in the Central Province, alt. 5000 ft., *Walker, Thwaites*.

A tree, branches stout. *Leaves* 4–8 in., very coriaceous, shining above, base sometimes cordate; nerves 5–7 pair, slender; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in., usually stout, but sometimes much lengthened. *Male spikes* 1–1 $\frac{1}{2}$ in., very stout. *Fem. fl.* crowded. *Fruit* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, beaked, base acute. *Seed* oblong, plano-convex.—*Mueller* has overlooked *Thwaites's* description of the ovary, and placed this species in a section in which that organ is clothed. *Thwaites* says that it resembles *A. latifolia* generally, differing in the form of the much less fleshy fruit.

Series II. *Stipules* large, persistent, lunate or falcate.

24. **A. lunata**, *Benth. in Gen. Plant.* iii. 282; branches robust pubescent, leaves 8-12 in. linear-oblong base cordate shining above with deeply impressed nerves, tomentose beneath especially on the midrib and very strong nerves, stipules large lunate, fem. spikes densely tomentose, stigmas 3-4 very stout 2-fid. *Antidesma lunatum*, *Miquel Fl. Ind. Bat. Suppl.* 467; *Muell. Arg. in DC. Prodr.* xv. ii. 251. ? *A. coriaceum*, *Blume, ex Hasskarl in Herb.*

PENANG, (*Ic. in Herb. Kew.*) PERAK; on low hills, *King's Collector*.—DISTRIB. Sumatra, ? Java.

A tree, 50 ft. *Leaves* 3 in. broad, very coriaceous; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., very stout; stipules $\frac{1}{2}$ – $\frac{3}{4}$ in. long. *Fem. spikes* short; flowers sessile; sepals 5-6, linear-oblong, obtuse, tomentose.—The Perak specimens are imperfect, and in fem. fl. only. It may not be Miquel's plant, which is described as having leaves with a few marginal glands near the base and subentire stigmas. A closely allied Bornean species (Beccari No. 1213) has shorter broader tomentose styles; its fruit is ovoid, $\frac{3}{4}$ in. long, 3-celled with 3 apical beaks. Bentham no doubt rightly refers Miquel's *Antidesma lunatum* to *Aporosa*, but is mistaken in uniting with it Maingay's plant, which is the following. In a drawing of this species (in Kew Library) the fruit is represented as of the size of a small pea, globose, yellow and red, and the styles as long and rounded.

25. **A. Benthamiana**, *Hook. f. in Ic. Plant.* t. 1583; quite glabrous, leaves 8-18 by 3-5 in. subsessile linear-oblong acuminate or caudate base narrowed cordate, stipules large lunate, fruiting spikes 1 in. long, fruit ellipsoid 3-celled, cells glabrous within.

? SINGAPORE, *Cantley*.

Branches stout. *Leaves* coriaceous; nerves 12-16 pairs, very strong beneath; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., stout; stipules coriaceous. *Male spikes* cylindric, obtuse; rachis very stout; sepals 4, ovate; stamens 2, anther-cells pendulous. *Fruit* $\frac{1}{2}$ – $\frac{3}{4}$ in. long.—Very different from *A. lunatum*, being perfectly glabrous, and in the much shorter petioles. The anthers are nearly as in *Antidesma*. The Singapore plant has longer petioles and more membranous leaves broader upwards.

26. **A. falcifera**, *Hook. f.*; branchlets petioles and stipules tomentose, leaves coriaceous elliptic- or linear-oblong acuminate sparsely hairy beneath, base rounded or subcordate, nerves 7-9 pair strong, stipules persistent sickle-shaped coriaceous, male spikes $\frac{1}{2}$ – $\frac{3}{4}$ in. sessile clustered.

PERAK, *King's Collector*.

A tree, 40-60 ft. *Leaves* 3-5 by $1\frac{1}{2}$ – $1\frac{3}{4}$ in., above almost shining reticulate and with the nerves distinct, beneath brownish, cross-nervules slender; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., stout; stipules about as long, margins recurved.

SPECIES OF WHICH THE FRUIT IS UNKNOWN.

27. **A. stellifera**, *Hook. f.*; quite glabrous, leaves 8-10 in. thinly coriaceous oblong cuspidately acuminate base rounded or acute smooth above with raised midrib, nerves 10-13 pairs arched, cross-nervules reticulate, petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., male spikes slender sessile and peduncled, fem. spikes glabrous, flowers pedicelled, ovary glabrous 3-celled, stigmas connate in a 6-rayed disk.

PENANG, alt. 1500-1800 ft., and PERAK, at Larut, *King's Collector*.

A tree 10-15 ft. in Penang, 25-30 in Perak; branchlets very smooth with large stipular scars. *Leaves* 3-4 in. diam., sometimes polished above. *Male fl.* pubescent; sepals 4; stamens 2, short. *Rachis* of fem. spikes $\frac{1}{2}$ – $\frac{3}{4}$ in. long, few-fid.; bracts

few; pedicel $\frac{1}{2}$ in., glabrous. Ovary oblong, crowned with a stigma as broad as itself, cells 2-ovuled.—I have seen no ripe fruit.

28. **A. Griffithii**, Hook. f.; glabrous, leaves oblong or obovate-oblong acuminate base rounded or acute, male and fem. spikes clustered, bracts tomentose, fem. fl. sessile, ovary ovoid glabrous, stigmas minute recurved.

MALACCA, Griffith (Kew Distrib. 4955).

Branches rather stout, pale. Leaves 3-5 in., thickly coriaceous, shining on both surfaces; nerves 6-8 pairs, very slender; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., stout. Spikes of both sexes $\frac{1}{2}$ in., simple or racemose, rusty-tomentose. Ovary minute, style very short, 2-fid; stigmas smooth, grooved on the faces. Fruit unknown.—The leaves are those of *A. Roxburghii* and *villosula*, from which the tomentose bracts distinguish it.

APOROSA sp.? A species in Griffith's collection from his journey to Burma resembles *A. acuminata*, and no other, but is too imperfect for description.

22. DAPHNIPHYLLUM, Blume.

Small glabrous evergreen trees with robust branches leafy at the tips. Leaves alternate, long-petioled, quite entire, penninerved, usually glaucous beneath. Flowers in axillary racemes, diœcious, apetalous. MALE FL. Sepals 3-8, small, or calyx 4-toothed or discoid. Stamens 5-18, filaments short free or 0; anthers large, erect, often apiculate; cells parallel, dehiscing laterally. Pistillode 0. FEM. FL. Calyx of the male. Disk 0, or of 4-6 scales or glands. Ovary imperfectly 2-celled; styles or stigmas short, distinct, thick, recurved, entire; ovules 2 in each cell. Drupe oblong, usually 1-seeded. Seed with a membranous testa, albumen thick fleshy; embryo small, cotyledons narrow ovate or oblong.—Species 11, Tropical Asiatic and Malayan.

1. **D. majus**, Muell. Arg. in *Linnæa* xxxiv. 76, and in DC. Prodr. xvi. i. 2; leaves long-petioled elliptic acute or acuminate, flowers subcorymbose, stamens 8, anthers laterally compressed not apiculate. Ricinus furfuraceus, Wall. Cat. 7805 (in part).

BURMA; near Amherst, Wallich.

Leaves 8-12 by 4-6 in., very glaucous beneath; petiole 3-6 in. Male corymbs many-fid., flowers long-pedicelled. Sepals of male triangular-ovate, acute. Fem. flower and fruit unknown.—Very nearly allied to *D. laurinum*, but the male calyx is deeply divided and the inflorescence corymbose. This being under *Ricinus furfuraceus* in Herb. Wallich is due to an accidental misplacement of tickets.

2. **D. laurinum**, Baill. Gen. Euphorb. 565, t. 21, f. 25-27; leaves long-petioled linear-oblong or lanceolate acuminate or acute, calyx of fem. unequally 4-lobed or -toothed persistent, stamens 7-10, anthers laterally compressed not apiculate. Muell. Arg. in DC. Prodr. xvi. i. 4. Gyandra laurina, Wall. Cat. 8020. Goughia laurina, Benth. in Hook. Kew Journ. vi. (1854) 9. G. Griffithiana, Wight Ic. v. p. 22.

PERAK, Scortechini. MALACCA, Griffith (Kew Distrib. 4915, 4916), Maingay (Kew Distrib. 1419). SINGAPORE, Wallich.—DISTRIB. Sumatra, Java.

A shrub (Griffith); branches robust. Leaves 6-10 in.; base rounded or broadly cordate, more rarely acute, glaucous or not beneath; petiole 2-5 in. Racemes 2-3 in. Calyx of male disciform; lobes triangular, acute. Fruit $\frac{1}{2}$ - $\frac{1}{4}$ in., subacute, smaller in Singapore specimens.

3. **D. glaucescens**, Blume Bijl. 1153; leaves elliptic- or oblong-obovate tip rounded or obtuse rarely acute, flowers racemose, sepals of fem.

minute deciduous, stamens 7-10, anthers dorsally compressed, apiculate. *Muell. Arg. in DC. Prodr.* xvi. i. 3; *Beddome Fl. Sylvat.* t. 88; *Miguel Fl. Ind. Bat.* i. ii. 431, and *Suppl.* 472. *D. Roxburghii*, *Baill. Gen. Euphorb.* 565 (excl. syn. *Roxb.*); *Benth. Fl. Hongk.* 316. *Goughia neilgherrensis*, *Wight Ic.* t. 1878-9.

NILGHIRI and PULNEY MTS., common, *Wight*, &c. CEYLON; Central Province, alt. 4-6000 ft.—DISTRIB. Corea, Java.

A small tree. *Leaves* 2-4 in.; base acute, under-surface glaucous or not; petiole $\frac{1}{2}$ -2 in. *Racemes* 1-1 $\frac{1}{2}$ in. *Fruit* ellipsoid about $\frac{1}{2}$ in. long, subrugose when dry, tip rounded.—The var. *concolor* of Mueller is not tenable; the under-surface of the leaf is sometimes glaucous in the Ceylon specimens, and sometimes not in the continental.

4. ***D. himalayense***, *Muell. Arg. in DC. Prodr.* xvi. i. 4; leaves elliptic linear-oblong oblong-lanceolate or oblanceolate acute or acuminate, flowers racemed, sepals of fem. deciduous, stamens 5, anthers dorsally compressed apiculate. *D. Benthami*, *Baill. Gen. Euphorb.* 565. *Goughia himalensis*, *Benth. in Hook. Kew Journ.* vi. (1854) 9.—*Wall. Cat.* 8020.

TEMPERATE HIMALAYA from Kumaon to Mishmi, alt. 4-6000 ft., and Sikkim, alt. 4-9000 ft., *Griffith*, &c. KHASIA MTS., alt. 4-6000 ft. ? TENASSERIM, on Moolyat, alt. 6500 ft., *Beddome*.

A small tree, branches robust. *Leaves* 4-10 in., base acute, very rarely rounded or cordate, glaucous beneath; petiole 1-2 $\frac{1}{2}$ in. *Racemes* 1-3 in. *Fruit* $\frac{1}{2}$ - $\frac{2}{3}$ in., ellipsoid, slightly tubercled when dry, tip rounded.—The Tenasserim specimen is a female in imperfect condition; the leaves are very dark-coloured on both surfaces and not glaucous beneath; the ovaries are quite like those of *D. himalayense*.—Wallich's 8001, from the Snowy Mts., is stated to be from Herb. Heyne, which is probably an error (for Herb. Hamilton).

SPECIES OF WHICH THE FLOWERS ARE UNKNOWN.

5. ***D. Kingii***, *Hook. f.*; a tree 30-40 ft., leaves 8-10 in. rather membranous elliptic-oblong obtusely cuspidate subglaucous beneath, base acute, nerves about 10 pair with slender cross-nervules which are not reticulate, petiole 1-1 $\frac{1}{2}$ in., fruiting raceme 1-1 $\frac{1}{2}$ in., fruit $\frac{1}{2}$ - $\frac{1}{3}$ in. long ellipsoid smooth top rounded, pedicel $\frac{1}{4}$ - $\frac{1}{3}$ in.

PERAK; *Scortechini*, and *King's Collector*, in low grounds.

6. ***D. lancifolium***, *Hook. f.*; a tree 40-60 ft., leaves 4-6 in. coriaceous lanceolate or elliptic-lanceolate acuminate at both ends hardly glaucous beneath, nerves reticulate on both surfaces, petiole 1-1 $\frac{1}{2}$ in., fruiting racemes 1-4 in., fruit $\frac{1}{2}$ in. long ellipsoid rounded at both ends rugose, pedicel $\frac{1}{4}$ - $\frac{1}{3}$ in.

PERAK; alt. 4500-4600 ft., *King's Collector*.

7. ***D. Scortechinii***, *Hook. f.*; a tree 10-15 ft., leaves 3-4 in. coriaceous oblong or obovate-oblong obtuse or subacute base acute glaucous beneath, nerves reticulate on both surfaces, petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., fruiting racemes 2-3 in., fruit $\frac{1}{3}$ - $\frac{1}{2}$ in. gibbously ovoid subacute smooth, pedicel $\frac{1}{4}$ - $\frac{1}{2}$ in.

PERAK; alt. 3000-4000 ft., *Scortechini*, *King's Collector*.

23. ANTIDESMA, Linn.

Trees or shrubs. *Leaves* alternate, quite entire, stipulate. *Flowers* small or minute, in slender axillary or terminal simple or paniced spikes or racemes, diœcious, apetalous. MALE FL. *Calyx* 3-5- rarely 6-8-toothed

-lobed or -partite. *Disk* entire or lobed. *Stamens* 2-5, rarely more, inserted on or around the disk, often irregularly, inflexed in bud; anthers lunate or didymous, connective thickened; cells globose, approximate or distant. *Pistillode* minute, clavate or globose or 0, rarely 2-fid, glabrous or hairy. **FEM. FL.** *Calyx* of the male. *Disk* usually annular or pulvinate. *Ovary* 1- (rarely more-)celled; stigmas 2-4, usually short, 2-fid or 2-partite; ovules 2, pendulous. *Fruit* a small more or less compressed drupe, crowned with the sublateral or terminal stigmas. *Seed* small, albumen fleshy; cotyledons broad, flat.—Species about 60, Tropical Asia, Africa, Australia and the Pacific.

Owing to the minuteness of the flowers, and the frequent impossibility of matching the sexes of Herbarium specimens, I am unable to limit and define the forms of this most difficult genus with much confidence. Comparatively few of Wallich's specimens were examined by Tulasne or Mueller, who are the chief authorities for the Indian species. I expect several of these which are not hitherto identified with previously (often imperfectly) described Malay Island ones, will prove to be the same with them. The stipules, the length of the pedicels of the male flowers, the size and form of the bracts, and the depth of the calyx-lobes are all variable. In De Candolle's *Prodromus* too much importance is attached to the number of stamens and the division of the calyx, whether as to depth or number of lobes, as affording sectional characters; and I am not satisfied with the more restricted use I have made of the same modifications of the calyx. The fruit may probably prove to afford the best sectional characters.

Series I. *Leaves* very large, 10-18 in. long. *Fruit* large, $\frac{1}{2}$ -1 in. long. See also 23. *acuminatum*, and 24. *martabanicum*).

1. **A. longipes**, *Hook. f.*; branches slender and leaves puberulous beneath, leaves 10-12 in. oblong-obovate base rounded or cordate, nerves 15-20 pairs, fem. racemes very long slender simple pubescent flowering erect fruiting pendulous, fem. fl. minute pedicels very short greatly lengthened in fruit, ovary tomentose, fruit $\frac{1}{2}$ in. obliquely ovoid flat rugose, stigmas very minute subterminal.

PERAK, *King's Collector*.

A shrub or tree with a simple stem; branches whitish and petioles and pedicels midrib above and nerves beneath finely pubescent. *Leaves* membranous, 3-6 in. broad, nerves 15-20 pairs; petiole stout, $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules not seen. *Racemes* peduncled; pedicels filiform, $\frac{1}{4}$ - $\frac{1}{2}$ in.; bracts very minute. *Fem. fl.* $\frac{1}{2}$ in.; sepals 4, ovate, acute; stigmas acute, spreading; disk glabrous. *Fruit* bright red, margins very acute, faces puberulous deeply impressed, pericarp thin.—I assume the flowering and fruiting specimens to be conspecific, and that the pedicels lengthen as described, but I have seen only flowering and fruiting individuals (apparently of the same species).

2. **A. pachystachys**, *Hook. f.*; glabrous, or nearly so, branches stout, leaves 12-18 in. obovate- or linear-lanceolate cuspidately acuminate base narrowed acute or rounded, nerves 17-20 pairs slender, petiole very stout, stipules large foliaceous, spikes solitary simple, male filiform, flowers sessile pubescent, fruiting female erect very stout, fruit $\frac{3}{4}$ in. very shortly pedicelled obliquely ovoid compressed reticulate, stigmas very minute subterminal.—*Antidesma*? *Wall. Cat.* 8569.

PENANG, *Wallich*. PERAK; at Larut, *King's Collector*.

A shrub, 6-8 ft.; branches as thick as a swan's quill, bark white. *Leaves* membranous, 4-6 in. diam., quite glabrous on both surfaces; petiole $\frac{1}{2}$ -1 in.; stipules $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., obliquely lanceolate, acuminate, many-nerved. *Male spikes* 10-12 in., pendulous, glabrous; bracts very small; flowers $\frac{1}{2}$ in. broad; calyx cupular obtusely 4-6-lobed to the middle; stamens 4-5, short; disk hirsute; pistillode clavate.

Fruiting racemes as long as the leaves, strict, as thick as a crow-quill; fruits spreading, pedicel $\frac{1}{10}$ in.; calyx small, acutely 6-lobed, nearly glabrous; disk glabrous.

3. *A. pendulum*, *Hook. f.*; glabrous, branches stout, leaves 10–14 in. membranous oblong-lanceolate or oblanceolate cuspidately acuminate or caudate base acute, nerves 10–14 pairs very slender, petiole very stout, spikes solitary simple very slender, fruiting pendulous equalling the leaves, flowers of both sexes sessile, sepals 4–6 orbicular hairy, disk glabrous 5-lobed, ovary gibbously decurved glabrous, stigmas very short, fruit $\frac{1}{2}$ in. shortly pedicelled broadly ovoid compressed rugose tip rounded stigmas terminal.

PERAK, *Scortechini*.

A shrub, 6–12 ft.; branches as thick as a swan's quill; bark whitish. *Leaves* brown beneath when dry; petiole $\frac{1}{4}$ – $\frac{3}{4}$ in. *Male fl.* rather scattered; stamens 5, stout; pistillode clavate, lobulate at the top. *Fem. fl.* $\frac{1}{12}$ in.; sepals very short; disk glabrous. *Fruiting racemes* as long as the leaves; pedicels slender, $\frac{1}{10}$ in.; calyx obtusely 6-lobed. *Fruit* with acute margins, quite glabrous.—Closely allied to a Bornean species (Beccari No. 1300), which has a glabrous shortly lobed fem. calyx, and a few bristles on the fem. disk.

4. *A. Kingii*, *Hook. f.*; branchlets petioles nerves beneath and spikes densely rusty-tomentose, leaves 10–12 in. subsessile oblong or broadly obovate-oblong cuspidately acuminate base rounded or cordate, nerves 16–20 pair strong beneath, male spikes subpanicked, peduncle bracteate, flowers sessile, fem. spikes short stout erect, flowers subsessile, ovary densely tomentose, fruiting spikes very stout, fruit $\frac{1}{2}$ in. subsessile falcately ovoid deeply reticulate pubescent styles terminal.

PERAK; at Goping and Larut, *King's Collector*.

A stout shrub or small tree, 25 ft.; branches very stout. *Leaves* rather coriaceous, 3–6 in. broad, more or less rusty-pubescent all over beneath; nerves spreading, close-set; petiole very stout, $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules $\frac{1}{2}$ –1 in., rigid, lanceolate. *Male spikes* erect, 4–6 in., with lanceolate stipular bracts at the base of the common peduncle; floral bracts very minute; sepals 5, free, hairy; stamens 5, rather short; disk tumid, glabrous; pistillode short. *Fem. spikes* 4–6 in., erect in flower, decurved in fruit; bracts obscure; sepals about 4, ovate, acute; disk with a few bristles.

Series II. *Leaves* 2–10 in. long, rarely more. *Fruit* $\frac{1}{4}$ – $\frac{1}{2}$ in. long.

* Ovary tomentose or pubescent (sometimes glabrate in *A. alatum* & *leucocladon*).

5. *A. velutinsum*, *Blume Bijl.* 1125; densely tomentose, leaves 5–8 in. oblong or oblong-lanceolate acuminate, petiole very short, male fl. sessile or very shortly pedicelled, bracts linear or lanceolate, calyx villous 5–8-partite, stamens 5–8, ovary obliquely globose tomentose, style sublateral stigmas long recurved forked, fruit pedicelled obliquely globose $\frac{1}{2}$ in. diam. *Muell. Arg. in DC. Prodr.* xv. ii. 248; *Kurz For. Fl.* ii. 359; *Miquel Fl. Ind. Bat.* i. ii. 428. *A. tomentosum*, *Blume ex Miquel l. c.* 427, t. 26. *A. attenuatum*, *Wall. Cat.* 7286; *Tulasne in Ann. Sc. Nat. Ser.* 3, xv. (1851) 235. *A. molle*, *Wall. Cat.* 7287; *Muell. Arg. l. c.*—*Antidesmea*, *Wall. Cat.* 8582, 8577 *in part*.

PEGU to TENASSERIM, and BURMA, *Wallich, Griffith, Helfer* (*Kew Distrib.* 4946, 4947), &c. PENANG, *Porter, Curtis*. SINGAPORE, *Hullett*.—DISTRIB. Java.

An evergreen tree, 25–30 ft. *Leaves* hardly coriaceous, variable in amount of pubescence, base narrowed or obtuse, rarely cordate, nerves 10–15 pairs; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in.; stipules from ovate to linear-lanceolate. *Spikes* or racemes subsolitary,

stout for the genus, peduncle bracteate; lower floral bracts frequently exerted and recurved. *Sepals* lanceolate, villous, very unequal. *Disk* of male minute, tumid, lobed; pistillode clavate, hairy; of fem. cupular, slightly hairy. *Style* distinct.—Wallich's *A. attenuatum* and *A. molle* are the two sexes of this species; his Penang specimens (Porter's) are more densely tomentose, beneath especially, than the others.

VAR. *lanceifolia*; leaves elliptic-lanceolate acuminate.—Penang, *Curtis*.

VAR. *orthogyne*; ovary ellipsoid quite straight, stigmas terminal.—Malacca, *Griffith* (*Kew Distrib.* 4928).

6. **A. Helferi**, *Hook. f.*; branches and leaves glabrous, leaves 4-7 in. elliptic or elliptic-oblong obtuse base acute nerves slender, fem. spike stout pubescent, flowers sessile, bracts subulate, calyx 5-partite, ovary obliquely globose tomentose, stigmas 2 stout 2-lobed or partite terminal.

TENASSERIM (or Andaman Islands), *Helfer* (*Kew Distrib.* 4942).

Leaves coriaceous, perfectly glabrous on both surfaces; nerves 8-10 pair, arching; petiole $\frac{1}{2}$ in., very stout, and the linear stipules glabrous. *Spike* terminal, $1\frac{1}{2}$ in.; rachis stout. *Sepals* linear-oblong, obtuse. *Disk* of fem. cupular, hairy.—I have seen only one specimen of this very distinct-looking species. The leaves may hence be found to vary a good deal from the above diagnosis. A Perak species (*Herb. Calcutt.*, No. 4056) in fruit only may be the same; its spike is 2-3 in., rather stout, quite simple, the fruit shortly pedicelled $\frac{1}{2}$ in. long broadly ellipsoid turgid top rounded with very minute subterminal stigmas.

7. **A. Ghaesembilla**, *Gartn. Fruct.* i. 189, t. 39; tomentose or glabrous, leaves orbicular obovate or oblong obtuse, spikes paniced, flowers sessile, calyx 5-7-partite, disk 5-partite pubescent, stamens 4-7, ovary pubescent, fruit $\frac{1}{2}$ in. subglobose, stigmas terminal minute recurved. *Muell. Arg. in DC. Prodr.* xv. ii. 251; *Tulasne in Ann. Sc. Nat. Ser. 3*, xv. (1851) 238; *Brand. For. Fl.* 446; *Kurz For. Fl.* 358; *Grah. Cat. Bomb. Pl.* 186; *Dalz. & Gibs. Bomb. Fl.* 236; *Gamble Man. Ind. Timb.* 349; *Beddome Forester's Man.* 200. *A. paniculatum*, *Roxb. Fl. Ind.* iii. 770; *Ham. in Trans. Linn. Soc.* xvii. 246; *Wight Ic.* t. 820; *Dalz. & Gibs. Bomb. Fl.* 237; *Tulasne l. c.* 228; *Wall. Cat.* 7280. *A. pubescens*, *Roxb. Cor. Pl.* ii. 35, t. 167, and *Fl. Ind.* iii. 770; *Wight Ic.* t. 821; *Grah. Cat. Bomb. Pl.* 186; *Dalz. & Gibs. l. c.*; *Wall. Cat.* 8567; *Blume Bijdr.* 1123; *Miquel Fl. Ind. Bat.* i. i. 426. *A. acidum*, *Retz Obs.* v. 30 (*ex Herb. Rottler*). *A. sylvestre*, *Jamk. Dict.* i. 207 (*ex Willd. mss. in Herb. Rottler*).—*Antidesma*, *Wall. Cat.* 5880.

TROPICAL HIMALAYA; from Simla to Bhotan and southward to CEYLON, SINGAPORE, PERAK and PENANG.—DISTRIB. Malay Islands, China, Australia?, Africa.

A small tree; branches, spikes, petioles, and often the leaves beneath rusty-tomentose. *Leaves* 2-3 in., rarely more or less, base rounded or cordate, tip rounded, rarely subacute or retuse, nerves 5-6 pairs; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Spikes* rather slender; bracts minute; male fl. clustered. *Fruit* subglobose (when fresh).

8. **A. Roxburghii**, *Wall. Cat.* 7283; villously tomentose, leaves 6-10 in. subsessile obovate-oblong caudate-acuminate, spikes very long and stout subsimple, bracts minute, flowers of both sexes sessile, calyx 3-4-partite, stamens 3-4, fem. disk hairy, ovary straight tomentose, stigmas very short terminal, fruit $\frac{1}{2}$ in. long subsessile ovoid or ellipsoid subcompressed, stigmas minute sublateral. *Tulasne in Ann. Sc. Nat. Ser. 3*, xv. (1851) 234; *Muell. Arg. in DC. Prodr.* xv. ii. 261. *Stilago tomentosa*, *Roxb. Fl. Ind.* iii. 757; *Wight Ic.* t. 767, 768.

·SILHET, *Wallich*. ASSAM, *Griffith*.

Young branches and leaves densely rusty villous. *Leaves* 3-4 in. broad, often unequal at the rounded base, flat or bullate above; nerves 8-10 pair, spreading; petiole $\frac{1}{2}$ in. or less; stipules linear. *Spikes* 4-6 in., sometimes subpanicked, peduncle bracteate; rachis stout, densely tomentose. *Calyx-lobes* rounded, villous. *Disk* of male glabrous. *Pistillode* subglobose.

9. **A. alatum**, *Hook. f.*; glabrous, branches white, tips puberulous, leaves 3-5 in. shortly petioled elliptic-oblong or -oblanceolate abruptly cuspidate or subcaudate base acute, stipules large orbicular-ovate acute persistent, spikes short, male fl. sessile, sepals 5 hirsute, disk pulvinate glabrous, stamens 5, fem. fl. subsessile, ovary pubescent or glabrate, disk very large pulvinate glabrous, fruit $\frac{1}{2}$ in. shortly pedicelled turgidly ovoid shortly beaked, stigmas subterminal minute conic.—*Antidesma*, *Wall. Cat.* 8583.

PERAK; Larut, alt. 1-3000 ft., *King's Collector*; Waterfall Hill, *Wray*. SINGAPORE, *Wallich*. MALACCA, *Griffith* (*Kew Distrib.*, No. 4941).

A small tree, shoots puberulous. *Leaves* thin or subcoriaceous, midrib glabrous or puberulous beneath; nerves 8-10 pairs, very faint; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in.; stipules $\frac{1}{2}$ - $\frac{1}{2}$ in., coriaceous. *Spikes* $\frac{1}{2}$ - $\frac{3}{4}$ in., males paniced; flowers very minute, rachis puberulous; stamens short; pistillode minute, sunk in the disk. *Disk* of fem. fl. often exceeding the calyx in width.—The remarkable stipules and very large fem. disk are conspicuous characters. The stipules a good deal resemble those of the Sumatran *A. neurocarpum*, which has tomentose branches and strong nerves.

10. **A. leucocladon**, *Hook. f.*; glabrous, branchlets slender white, leaves 5-7 in. membranous oblanceolate or oblong caudate-acuminate base acute or obtuse, petiole short, stipules filiform, male spikes paniced very slender tomentose, flowers sessile very minute, calyx 4-lobed, disk tomentose, fem. fl. subsessile, ovary tomentose or glabrate, stigmas long recurved, disk glabrous or ciliolate, fruit $\frac{1}{2}$ in. very shortly pedicelled broadly gibbously ovoid compressed beaked, stigmas large. *A. Bunius*, *Wall. Cat.* 7282 A (*the right-hand specimen*).

PENANG, *Wallich*. PERAK, *Scortechini*; at Sunga Ryah, *King's Collector*.

A small tree; shoots puberulous. *Leaves* membranous, drying brown; midrib glabrous or puberulous beneath; nerves 10-12 pairs, very slender; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in. *Male spikes* seen only in Penang specimens; bracts minute; calyx obtusely lobed below the middle; disk small, 4-lobed; pistillode columnar.—A very similar species in fem. flower only, from Perak (Calcutta Herbarium, No. 3845), has longer female peduncles and shorter stigmas.

** Ovary glabrous (see also *A. alatum* & *leucocladon*).

† *Male flowers* sessile or nearly so. *Calyx* not deeply lobed.

11. **A. Bunius**, *Spreng. Syst. Veg.* i. 826; shoots tomentose, leaves elliptic-oblong lanceolate obovate or oblanceolate glabrous shining above, petiole short, spikes simple or paniced stout pubescent villous or tomentose, bracts minute ovate, male fl. sessile or subsessile, calyx cupular shortly 4-lobed, disk glabrous, stamens 3, fruit shortly pedicelled $\frac{1}{2}$ - $\frac{1}{4}$ in. elliptic, stigmas 3-4 very short terminal. *Muell. Arg. in DC. Prodr.* xv. i. 262; *Blume Bijdr.* 1122; *Presl Epimel.* 234; *Tulasne in Ann. Sc. Nat. Ser. 3*, xv. (1851) 186; *Miquel Fl. Ind. Bat.* i. ii. 423; *Wight Ic.* t. 819; *Kurz For. Fl.* ii. 358; *Beddome Forester's Man.* 200, t. 24, f. 3; *Wall. Cat.* 7282 (*except A and part of B*); *Thwaites Enum.* 289. *A. Thwaitesianum*, *Muell. Arg. l. c.* 263. *A. glabrum* & *floribundum*, *Tulasne l. c.* 188, 189. *A. sylvestre*, *Lamk. Dict.* i. 207. *A. ciliatum*, *Presl l. c.* 235 *Stilago Bunius*, *Linn. Mant.*

122; *Roxb. Fl. Ind.* iii. 758.—*Rheede Hort. Mal.* v. t. 26.—*Antidesma*, *Wall. Cat.* 8570 A, 8574.

Throughout the hotter parts of INDIA, from the Nepal and Sikkim Terai and Assam, southwards to Singapore and Penang; and from Parusnath in Behar to CEYLON. *Griffith (Kew Distrib.* 4933, 4934).—DISTRIB. Malay Islands.

A small evergreen tree. *Leaves* very variable, 3–6 by $1\frac{1}{2}$ –2 $\frac{1}{2}$ in., obtuse, acute or acuminate; base acute; nerves 10–12 pairs, arched; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules ovate-cordate (Kurz), deciduous. *Spikes* often 4–5 in. long, slightly rusty-tomentose; flowers rather large for the genus; fem. shortly pedicelled. *Calyx* of male very short, lobing very various in depth; of fem. shortly tubular, truncate. *Disk* of male lobed, of fem. cupular.—Of Thwaites' var. β ., from Caltura, which he distinguishes by the firmer leaves and more delicate less pubescent inflorescence, I have only seen fruiting specimens, which I cannot distinguish from *A. Bunius*. Mueller, who regards it as a different species (*A. Thwaitesianum*), relies on the minute bracts, deeper-lobed calyx and rusty-hairy disk; but as there are no male flowers on Thwaites' specimens, I cannot verify these characters.

12. ***A. Alexiteria***, *Linn. Sp. Pl.* 1027; nearly glabrous, leaves 1–3 in. subsessile from oblong or lanceolate to orbicular-ovate or -obovate obtuse acute or acuminate shining above, spikes simple or paniced slender pubescent, bracts minute, male fl. quite sessile, calyx very minute 3–4-lobed, disk glabrous, stamens 3, fruit $\frac{1}{4}$ in. diam. gibbously orbicular turgid, stigmas very short sublateral. *A. zeylanicum*, *Lamk. Encycl.* i. 207; *Muell. Arg. in DC. Prodr.* xv. ii. 256; *Tulasne in Ann. Sc. Nat. Ser.* 3, xv. (1851) 209.—*Antidesma*, *Wall. Cat.* 8568.—*Burm. Thes. Zeyl.* 22, t. 10.

SOUTHERN DECCAN PENINSULA, *Heyne, &c.* CEYLON, common.

Much branched, rather slender. *Leaves* very variable in form, the smallest of the Indian species, brown when dry, reticulate and shining on both surfaces, coriaceous, nerves usually very slender and obscure; petiole rarely $\frac{1}{12}$ in. *Spikes* 1–1 $\frac{1}{2}$ in.; bracts short, broad; fem. fl. very shortly pedicelled; calyx 4-lobed.

13. ***A. brunneum***, *Hook. f.*; nearly glabrous, leaves 2 $\frac{1}{2}$ –3 $\frac{1}{2}$ in. long-petioled coriaceous dark brown and opaque when dry elliptic obtuse or obtusely acuminate base acute, male spikes short branched pubescent, bracts oblong, flowers quite sessile, calyx shortly cup-shaped lobed to the middle, stamens 5 seated on the tumid glabrous disk, pistillode large often with two recurved stigmas.

CEYLON, *Thwaites (C.P.* 2208 and 2535 *in part).*

Branches stout, shoots finely pubescent. *Leaves* very dark brown, hardly shining above, quite glabrous; nerves 4–6 pair, very slender; petiole slender, $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules small. *Spikes* $\frac{1}{2}$ – $\frac{3}{4}$ in., rather stout. *Calyx-lobes* rounded, hairy and ciliate. *Pistillode* a small well-developed ovary, and stigmas, quite glabrous. Fem. fl. and fruit unknown.—This differs from *A. pyriformis* in the larger broader more coriaceous brown leaves, with fewer nerves, and longer petioles; also in the more pubescent stouter spikes, quite sessile flowers, deeper-cleft calyx, and remarkably developed pistillode. *Fruit* not seen.

†† *Male flowers sessile or very shortly pedicelled. Calyx deeply 4-lobed or -partite.*

14. ***A. fallax***, *Muell. Arg. in Linnæa* xxxiv. 68, and in *DC. Prodr.* xv. ii. 253; glabrous, leaves 4–7 in. petioled coriaceous oblong or ovate-oblong acute or acuminate shining above, spikes simple and paniced rusty-tomentose, flowers sessile, male calyx 4–5-lobed or -partite, stamens 3–4, disk cupular lobed and subglobose, ovary glabrous, fruit very shortly pedicelled $\frac{1}{4}$ in. diam. orbicular compressed, stigmas subterminal. *A. coriaceum*,

Tulasne in Ann. Sc. Nat. Ser. 3, xv. (1851) 204.—*Antidesma*, Wall. Cat. 8584, 9101.

PENANG, Porter, &c. MALACCA, Maingay. PERAK, Wray, King's Collector. SINGAPORE, at Johore, Cantley.

A tree?, 30–70 ft. in Perak; branches pale, tips alone rusty-pubescent. Leaves rarely ovate, base acute or rounded, nerves 8–10 pair; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., quite glabrous in age. Spikes 1–2½ in., bracts minute, oblong. Sepals rounded or oblong, villous. Filaments rather short. Pistillode clavate. Ovary and Disk glabrous or very minutely puberulous; stigmas very short, thick, suberect. Fruiting racemes stout. —Very near *A. Bunius*, if not a form of it. Under *A. Moritzii* I have indicated Mueller's erroneous citations of Wallich's numbers cited under his *A. coriaceum*.

15. ***A. nigricans***, Tulasne in *Ann. Sc. Nat. Ser. 3, xv. (1851) 224*; branches petioles and spikes densely tomentose, leaves shortly petioled 4–7 in. elliptic oblong or oblong-lanceolate acuminate glabrous except on the midrib above and beneath, spikes or racemes short simple or paniced, flowers sessile or shortly pedicelled, calyx 4-partite, stamens 4 inserted on the large hemispheric glabrous disk, ovary glabrous on a large glabrous disk, stigmas rather long recurved terminal. Muell. Arg. in DC. Prodr. xvi. ii. 258. *A. flexuosum*, Tulasne l. c.; Muell. Arg. l. c. 263. *A. Bunius*, Wall. Cat. 7282 A (the upper specimen).—*Antidesma*, Wall. Cat. 8575.

ASSAM, Jenkins. SILHET, Wallich, J. D. H. & T. T.

Leaves greyish brown when dry, sometimes caudate-acuminate, base acute or obtuse; nerves 6–12 pair, strong beneath and forming strong intra-marginal arches; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., shorter than the stipules. Bracts minute. Sepals glabrous or sparsely villous, broadly ovate, spreading. Stamens inserted on the rounded sides of the disk. Pistillode conical, glabrous, but sometimes large and 2-fid like a minute ovary.—Tulasne's *A. nigricans* and *flexuosum* are the same, and Wallich's No. 8575 is quoted for both; the large hemispheric male disk is very characteristic. My own Silhet specimens have longer leaves than Wallich's; Mueller refers Willdenow's *A. Alexiteria* to this. See No. 27, p. 365.

16. ***A. cuspidatum***, Muell. Arg. in *Linnæa* xxxiv. 67, and in DC. Prodr. xv. ii. 252; shoots petioles and spikes finely pubescent, leaves long-petioled 5–7 in. oblong-lanceolate caudate-acuminate glabrous shining on both surfaces, petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., spikes racemose, male fl. sessile, bracts as long as the flowers, calyx 4–5-partite, disk pubescent, stamens 3, fem. fl. subsessile, disk villous, ovary glabrous, stigmas conical erect, fruit $\frac{1}{2}$ in. obliquely orbicular compressed, stigmas minute sublateral. ? *A. rotatum*, Muell. in DC. l. c. 256.

MALACCA; at Ching, Griffith (*A. pubescens*, Kew Distrib., No. 4823), Maingay (Kew Distrib., No. 1341). SINGAPORE, Cantley, King's Collector. ? TENASSERIM, Griffith (Kew Distrib. 4927), Helfer.

A tree, branches glabrous. Leaves thinly coriaceous, dark above when dry; base rounded or acute; nerves 8–10 pairs, prominent beneath, arched; stipules ovate-lanceolate, caducous. Spikes slender, 1½–3 in., with stipular bracts at their base and on the pedicels, bracts narrow. Sepals villous, of males rounded, of fem. ovate acute. Disk of male lobed, pistillode subglobose, of fem. cupular. Fruiting racemes very slender, pedicels $\frac{1}{2}$ in., slender.—The long petioles and villous fem. disk are good characters for separating this species from its allies. From Mueller's description and locality of *A. rotatum*, I think his plant must be conspecific with *A. cuspidatum*. There are in the Calcutta Herbarium from Perak (Scortechini and King's Collector, Nos. 2314 and 3464) male specimens of a species precisely resembling this in habit, long petiole, leaves and paniced spikes, but the flowers are smaller and the disk glabrous.

17. ***A. fruticulosum***, Kurz For. Fl. ii. 359; branchlets leaves

beneath and spikes villously tomentose, leaves $1-1\frac{1}{2}$ in. subsessile obovate-oblong or lanceolate obtuse acuminate or obtusely mucronate, spikes short solitary or paniced, male fl. sessile, sepals 4 rounded subacute tomentose, stamens 2-3 inserted at the base of the hemispheric glabrous disk, ovary glabrous, fruit $\frac{1}{2}-\frac{3}{4}$ in. long, obliquely ovoid, stigmas terminal simple.

PEGU; in the sandy soil of tidal forests near the station, Kurz.

A small branched shrub, 2-4 ft. Leaves small, yellow brown when dry, sometimes retuse; base acute; petiole $\frac{1}{4}$ in.; stipules subulate. Flowers minute; bracts minute, ovate-lanceolate. Pistillode globose, glabrous.—I have seen only young specimens with male flower.

18. **A. velutinum**, Tulasne in *Ann. Sc. Nat. Ser. 3*, xv. (1851) 223 (in part); branches very short petioles leaves beneath and spikes tomentose, leaves 3-5 in. elliptic oblong or oblong-lanceolate acuminate, spikes solitary or paniced, male fl. sessile, sepals 3-4 orbicular villous, stamens 3-4 inserted within the glabrous lobed disk, ovary glabrous, stigmas short terminal. Muell. Arg. in *DC. Prodr.* xv. ii. 258; Kurz For. Fl. ii. 359. Antidesma, Wall. Cat. 8577 in part.

PEGU, TENASSERIM and BURMA, Wallich, Griffith (*Kew Distrib.* 4927), Helfer (*Kew Distrib.* 6945), &c.

An evergreen tree, 25-30 ft. Leaves more or less pubescent on both surfaces or glabrous above, dark brown when dry; stipules lanceolate. Disk of male sometimes stipitate; pistillode columnar, hairy. Very young fruits, which are shortly pedicelled, only seen.—Tulasne's *A. velutinum* is a mixture of this and *velutinum*, which occur on the same sheet of Wallich's herbarium. The character which Kurz gives of ovary pubescent is, I think, an error. The number of Wallich 1701, cited by Tulasne, is not that of Wallich's Catalogue, where 1701 is a *Polygonum*.

††† Male flowers pedicelled. Calyx 3-4-lobed above the middle or toothed.

19. **A. diandrum**, Roth Nov. Sp. 369; glabrous or the shoots pubescent, leaves obovate-oblong -elliptic or -lanceolate very shortly petioled not polished, racemes very slender usually branched quite glabrous, flowers all pedicelled, calyx spreading obtusely 4-lobed or -toothed, stamens 2 rarely 3 at the base of the small glabrous lobed disk, fruit $\frac{1}{2}-\frac{3}{4}$ in. long ovoid acute, stigmas minute terminal. Muell. Arg. in *DC. Prodr.* xv. ii. 266; Brand. For. Fl. 447; Kurz For. Fl. 360; Gamble Man. Ind. Timb. 350; Dalz. & Gibs. Bomb. Fl. 237; Beddome Forester's Man. 200. A. sylvestre, Wall. Cat. 7281. A. lanceolarium, Wall. Cat. 7284; Wight Ic. t. 766; Thwaites Enum. 289. A. lanceolatum, a. Walkeri, Tulasne in *Ann. Sc. Nat. Ser. 3*, xv. (1851) 195; Muell. Arg. l. c. 266; Beddome Forester's Man. 201. A. Wallichianum, Presl Epimel. 235. A. parviflorum, Herb. Ham. Stilago diandra, Roxb. Cor. Pl. ii. t. 166, and Fl. Ind. iii. 759. S. lanceolaria, Roxb. Fl. Ind. iii. 760.—Antidesma, Wall. Cat. 7285, 8579.

TROPICAL HIMALAYA, from Garwhal eastwards, and southwards to TRAVANCORE and TENASSERIM. CEYLON, ascending to 1500 ft.

A bush or small tree, shoots glabrous or rusty-pubescent. Leaves very variable, obtuse acute or acuminate, the longest 5 by 1 in., the largest 5 by 2 in., the smallest 1 by $\frac{3}{4}$ in., thin in texture, rarely slightly pubescent beneath, yellowish green when dry, base always acute, nerves faint; petiole $\frac{1}{10}-\frac{1}{4}$ in.; stipules slender. Racemes always quite glabrous; bracts short, oblong, obtuse, glabrous, lowest often the longest. Flowers minute, a few here and there sessile. Disk lobed and quite glabrous (described as appressed pubescent by authors).—The varieties proposed by Tulasne and retained by Mueller (*ovata*, *genuina*, *lanceolata* and *parvifolia*) are untenable with any approach to definiteness. Thwaites mentions a Cingalese form with leaves at

times only $\frac{1}{8}$ in. broad. The only male Ceylon specimen of *diandrum* that I have seen is uniformly triandrous. Walker's specimens of this in Herb. Hook. are accompanied with detached fruits of a much larger size than those of *A. diandrum*, and which I suspect belong to *A. Alexiteria*.

20. *A. pyrifolium*, Muell. Arg. in *Linnæa* xxxiv. 68, and in *DC. Prodr.* xv. ii. 265; nearly glabrous, leaves 2-4 in. long-petioled elliptic-oblong or -lanceolate caudate-acuminate shining above base acute, racemes slender simple or branched puberulous, male fl. shortly pedicelled scattered, bracts short broad, calyx cup-shaped 4-5-lobed, stamens 3-5 seated on the tumid glabrous disk, fruit subspherical, stigmas minute terminal. *Beddome Forester's Man.* 200. *A. montanum*, *Thwaites Enum.* 288.

CEYLON; Central Province, alt. 3-6000 ft., Walker, &c.

Habit of *A. Alexiteria*, but larger, and at once distinguishable by the longer rather slender petioles, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, and larger fruit. The flowers are always pedicelled enough to place it in this group. The tumid disk of the male fl. often rises high above the calyx, and the pistillode is minute and glabrous.

21. *A. Moritzii*, Muell. Arg. in *Linnæa* xxxiv. 67, and in *DC. Prodr.* xv. ii. 252; branchlets petioles midrib above and spikes finely tomentose, leaves 5-10 in. oblong elliptic- or obovate-lanceolate acuminate base acute or rounded, spikes very slender paniced glabrous, male fl. minute pedicelled, calyx 4-5-lobed, stamens 4-5, disk pubescent, fem. fl. pedicelled, ovary glabrous, fruit $\frac{1}{2}$ - $\frac{1}{4}$ in. pedicelled subglobose acute, stigmas very short terminal. *A. pubescens*, *Moritzii* in *Zoll. Verzeichn.* 73; *Miquel Fl. Ind. Bat.* i. ii. 426, not of Roxb. *A. pubescens*, var. *Moritzii*, *Tulasne in Ann. Sc. Nat. Ser. 3*, xv. (1851) 215. *A. minus*, *Blume?*, *Wall. Cat.* 7288. *A. leptocladum*, β . genuinum, Muell. Arg. l. c. 253. *A. leptocladum*, *Tulasne l. c.* 199. *A. Alexiteria*, *Presl Epimel.* 234 (not of Gaertn.).

TENASSERIM; at Mergui, Griffith and Helfer (*Kew Distrib.* 4926). PENANG, *Porter*. PERAK, *Scortechini*, *King's Collector*. MALACCA, Griffith (*Kew Distrib.* 4935).—DISTRIB. Sumatra, Java, Borneo, Philippine Islands.

A tree, 12-20 ft., bark of branches grey, lenticellate. Leaves very variable, usually broadest above the middle, largest 8 by 4 in., smaller 5 by 2 in., membranous, pale green, beneath rather shining and glabrous or faintly pubescent on the 8-10 pairs of raised nerves; petiole $\frac{1}{2}$ - $\frac{1}{4}$ in.; stipules small, subulate or lanceolate. Male spikes 3-6 in., forming effuse panicles; rachis very slender; flowers nearly glabrous, scattered; bracts very minute; pistillode globose. Fem. racemes fewer, shorter; fruiting very slender; pedicels $\frac{1}{2}$ - $\frac{1}{4}$ in. Fruiting panicles widely spreading.—I am very much puzzled with this plant, which is, I suspect, one of the commonest Malayan *Antidesmas*, and is variously named in Herbaria. Tulasne and Mueller refer Wallich's "7288 A" (there is no A in Herb. Wallich) to *A. coriaceum*, which from the description and the other number cited, 8584 (misprinted 8548), is *A. fallax*. In habit, foliage, and small fruit *A. Moritzii* resembles *A. cuspidatum*, from which its short petioles at once distinguish it, and *A. oblongifolium*, which differs in the tomentose panicle, and *acuminatum*, which has longer pedicelled male fl. and the midrib tomentose above, and *A. Menasu*, which has much larger flowers, a deeply lobed calyx and acute fem. sepals.

22. *A. khasianum*, Hook. .; nearly glabrous, leaves subsessile 3-6 in. from elliptic lanceolate to narrowly oblong-lanceolate acuminate or caudate midrib above glabrous, male racemes short slender solitary or paniced, male fl. pedicelled, calyx cupular shortly 3-4-lobed, stamens 2-4 inserted on the tumid glabrous entire or lobed disk, ovary glabrous, fruit $\frac{1}{2}$ in. long gibbously orbicular or elliptic acute, stigmas terminal or sub-terminal. *A. lanceolatum*, *Herb. H. f. & T.*—*Antidesma*, *Wall. Cat.* 8570 ? B and 8573.

ASSAM, *Hamilton, &c.*; on the Duphla Hills, *Booth*. KHASIA MTS., *Wallich, &c.*, *Griffith* (*Kew Distrib.* 4929); common at 3-4000 ft., *J. D. H. & T. T.*

Branches with whitish bark; branchlets sparingly pubescent. Leaves very variable, smaller 2-3 in. and elliptic, larger 5-7 in. and lanceolate or linear oblong, greenish when dry, base acute; nerves arched, slender; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in.; stipules narrow, lanceolate. Racemes much shorter and with shorter pedicels than in *A. acuminatum*; peduncle with lanceolate stipular bracts; floral bracts ovate. Male fl. glabrous. Disk sometimes exerted, and hardly lobed; pistillode small. Fruit large, tipped by the 2-3 rigid bases of the stigmas.—The glabrous midrib of the upper surface of the leaf, short racemes and pedicels, and cupular shortly lobed calyx distinguish this from *A. acuminatum*, and the narrow leaves and not tomentose branches and terminal stigmas from *A. assamicum*, of which it has the simple female racemes and large oblique fruit. Can this be Mueller's *A. oblongatum*? (see p. 365,) which he describes from a specimen in the Berlin Herbarium as having the fruit ellipsoid obtuse at both ends with a stigmatiferous notch half-way between the base and apex.

††† Male fl. pedicelled. Calyx 3-4-partite.

23. ***A. acuminatum***, *Wall. mss. in Wight Ic.* t. 1991; branchlets finely pubescent, leaves 3-12 in. shortly petioled obovate-oblong or -elliptic or lanceolate caudate or acuminate above shining with the midrib tomentose, male racemes long and very slender in branched pubescent panicles, flowers minute long-pedicelled, sepals 4 broadly ovate, stamens 3-4 inserted between the lobes of the glabrous disk, ovary glabrous, fruit in large wide spreading panicles $\frac{1}{2}$ in. long ellipsoid acuminate with a distinct terminal style. *Muell. Arg. in DC. Prodr.* xv. ii. 268; *Beddome Forester's Man.* 201. *A. refractum* and *A. Menasu* (in part), *Muell. Arg. l. c.* 257. *A. simile*, *Muell. Arg. l. c.* 259. *A. pubescens*, *Tul.?*, *Herb. Ind. Or. H. f. & T.* A. *Bunius*, *Wall. Cat.* 7282 B (the right-hand specimen). *A. zeylanicum Ham. in Wall. Cat.* 8572. ? *A. Menasu*, *Gamble Man. Ind. Timb.* 350. *A. macrophyllum*, *Wall. mss.*

SIKKIM HIMALAYA, ascending to 2000 ft., common, *Griffith* (*Kew Distrib.* 4931), &c. ASSAM, *Masters*. KHASIA MTS., and SILHET, ascending to 4000 ft., *Wallich, &c.*

A large shrub. Leaves rather thin, often very large and 4 in. broad; base acute or rounded; nerves 8-15 pair, very slender; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in.; stipules much longer, linear or lanceolate. Racemes often several inches long, with wide spreading branches; bracts lanceolate; pedicels many times longer than the calyx. Disk variable, usually lobed, but sometimes hemispheric; pistillode columnar or short and 2-3 lobed, or developed into an imperfect ovary. Fruit tipped with a very short slender style and minute stigmas.—Habit and foliage of *A. Menasu*, and possibly not specifically different, but the racemes are much more slender, the branches not so tomentose, and the pedicels much longer. The fruit is similar but smaller, with a more distinct style. I have restored Wallich's name as authority for this, a specimen in the Kew Herbarium from the Calcutta Garden being labelled *acuminatum*. Wight's figure is taken from cultivated specimens in which the flowers appear to be occasionally hermaphrodite. A Sikkim fruiting specimen of this or an allied species from Clarke has densely tomentose branches and racemes.

24. ***A. martabanicum***, *Presl Epimel.* 232; branches petioles nerves of leaves beneath and panicles tomentose, leaves 4-11 in. shortly petioled linear-oblong acuminate, stipules large oblong-lanceolate, racemes paniced, male fl. pedicelled, calyx 3-4-partite, stamens 3-4, disk glabrous, ovary glabrous, fruiting racemes in open panicles, fruit $\frac{1}{2}$ - $\frac{3}{4}$ in. long globose or ellipsoid top rounded, stigmas minute sessile terminal. *Muell. Arg. in DC. Prodr.* xv. ii. 261; *Kurz For. Fl.* ii. 358. *A. oblongifolium*, var. *Wallichii*, *Tulasne in Ann. Sc. Nat. Ser.* 3, xv. (1851) 221; *Muell. Arg. l. c.* 264. *A.*

Menasu, *Kurz For. Fl.* ii. 360 (not of Miquel). *A. oblongum*, *Wall. mss.*—*Antidesma*, *Wall. Cat.* 8578.

PEGU to TENASSERIM, and the ANDAMAN ISLANDS, *Wallich, Griffith, Helfer* (*Kew Distrib.* 4947).—DISTRIB. Java?

Branches velvety-tomentose. *Leaves* thin, glabrous above except the midrib, beneath between the 10–16 pair of pubescent nerves glabrous or puberulous; petiole stout, $\frac{1}{8}$ – $\frac{1}{4}$ in.; stipules on young shoots $\frac{1}{4}$ – $\frac{1}{2}$ in. from subulate to broadly oblong or ovate, acuminate. *Male sepals* rounded. *Pistillode* short, columnar, glabrous. *Fruiting pedicels* $\frac{1}{2}$ in. or shorter.—*Wallich's* No. 1982 cited by *Tulasne* is not that of his Catalogue, but an MSS. one on a ticket inscribed *A. oblongum*. I have no doubt as to this being *Kurz's A. Menasu*, from which *martabanicum* differs in the tomentose branches and panicle, &c.

25. ***A. Menasu***, *Miquel Plant. Exsicc. Hohenack.*, No. 104; branchlets and petioles tomentose or pubescent, leaves 4–6 in. glabrous shortly petioled elliptic oblong or lanceolate acuminate or caudate shining beneath, spikes or racemes pubescent solitary or sparingly paniced, male and fem. fl. sessile or very shortly pedicelled, calyx 3–4-partite, stamens 3–4 inserted between the lobes of the small glabrous disk, ovary glabrous, fruit $\frac{1}{6}$ – $\frac{1}{4}$ in. long ovoid or ellipsoid acute, stigmas short terminal. *Muell. Arg. in DC. Prodr.* xv. ii. 257 (the *Canara* plant only). *A. Bunius*, *Miquel l. c.* No. 459 a, and *Wall. Cat.* 7282 F. *A. pubescens*, *Roxb.*, β . *Menasu*, *Tulasne in Ann. Sc. Nat. Ser. 3*, xv. (1852) 215. *A. lanceolatum*, *Dalz. & Gibs. Bomb. Fl.* 237. *A. pubescens*, *Herb. Ind. Or. H. f. & T.* (from Madras). ? *A. Alexiteria*, *Gertn. Fruct.* i. 188, t. 39. ? *A. acidum*, *Retz Obs.* v. 30.—*Antidesma*, *Wall. Cat.* 8571.

DECCAN PENINSULA, from the Concan and Circars southwards, *Heyne, &c.*, *Wight* (*Kew Distrib.* 2654).

Habit of *A. Moritzii*, and very like it in foliage. *Leaves* sometimes narrow and 8 by 3 in., base rounded or acute; midrib sometimes puberulous beneath; nerves 6–10 pairs, arched; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in., glabrous or puberulous; stipules lanceolate. *Spikes or racemes* usually long; bracts very small, acute; flowers larger than in *A. Moritzii*, rachis much stouter. *Calyx-lobes* rounded, of the fem. often very acute. *Pistillode* columnar, glabrous. *Disk* of female sometimes bearing staminodes.—The common plant of the Deccan Peninsula. The Khasian and Sikkim plant brought under this by *Mueller* is *A. acuminatum*, differing in the more glabrous branches, and very slender racemes with longer pedicels. Probably *A. acidum*, *Retz*, belongs to this; it is a plant of *Koenig's* described as having obovate leaves, solitary spikes, and a 5-toothed calyx. *A. Menasu* is no doubt the species alluded to by *Wight* under *A. acuminatum* as occurring in Malabar, and may be a form of that plant. What *Gartner's A. Alexiteria* is cannot be determined from his figure or description, and he gives no locality for it; the fruit exactly accords with this species.

Var. *linearifolia*; leaves 3–5 by $\frac{1}{4}$ – $1\frac{1}{2}$ in. linear-oblong shining on both surfaces.—*Canara, Dalzell, Talbot.*

IMPERFECTLY KNOWN SPECIES.

26. ***A. andamanicum***, *Hook. f.*; branches woody glabrous, leaves 3–5 in. quite glabrous membranous shortly petioled cuspidately acuminate base acute, petiole slender, male spikes solitary very slender pubescent, male fl. quite sessile, sepals 4 rounded hirsute on both surfaces, stamens 3, disk villous, pistillode clavate 3-fid.

SOUTH ANDAMAN ISLANDS, *Kurz*.

Apparently a scraggy shrub much branched. *Leaves* uniformly brown on both surfaces when dry, very thin, nerves 6–8 pair extremely slender; petiole $\frac{1}{2}$ in., glabrous.

Male spikes 3-4 in.; flowers minute, scattered.—This resembles no other Indian species.

27. *A. nigricans* ? (p. 360); branches densely tomentose, leaves 4-6 in. shortly petioled oblong obovate-oblong or lanceolate or narrowly linear oblong abruptly acuminate or caudate midrib above pubescent, male fl. pedicelled, calyx 4-partite, disk glabrous tumid, fem. racemes terminal and axillary subsimple short stout, rachis pubescent, calyx deeply 4-lobed, fruit large gibbously suborbicular turgid top rounded, stigma sublateral. *A. nigricans*, in part, *Herb. Ind. Or. H. f. & T.*

ASSAM, *Masters, Herb. Griffith* (*Kew Distrib.*, Nos. 4930, 4937, 4943). SILHET and KHASIA MTS., alt. 0-3000 ft., *J. D. H. & T. T.* CACHAR, at Shapore, *Keenan*.

A shrub. Leaves most variable, thin, the extreme forms are 3-4 by 1½-2 in., broadly obovate-oblong, abruptly obtusely acuminate, and 6-8 by 1-1½ in., with finely cordate tips, narrowly linear oblong (I have gathered both in Khasia); nerves 8-10 pair, very slender; petiole $\frac{1}{10}$ - $\frac{1}{8}$ in., tomentose; stipules not seen. *Fruiting racemes* 1-1½ in. long. *Fruit* about $\frac{1}{2}$ in. diam.—This has the large oblique fruit of *A. khasianum*, from which it differs in the tomentose branches, foliage, and midrib tomentose above; it is probably the fruiting state of *A. nigricans*.

28. *A. comptum*, *Tulasne in Ann. Sc. Nat. Ser. 3*, xv. (1851) 190; shoots puberulous, leaves 2-3 in. lanceolate long-acuminate base narrowed shining above, spikes short simple or branched, flowers sessile or very shortly pedicelled, bracts minute ovate acute, calyx 3-toothed rusty-tomentose, disk glabrous entire, ovary glabrous above below fulvous pubescent, drupe globose, stigmas terminal. *Muell. Arg. in DC. Prodr.* xv. ii. 263.

DECCAN PENINSULA, on the Cottalam (Courtallam?) Mts., *Leschenault*.

The above description is taken from Tulasne, who says of it that it is a shrub 6-12 ft. high, with small narrow fulvous pubescent stipules not longer than the petioles, and a very minute calyx, and that Thwaites (*Enum.* 289) has wrongly united it with *A. Bunius*. I have seen no Indian species with the lower part of the ovary pubescent. The habitat is that of a flowerless specimen of Heyne in *Herb. Rottler*, and which I suppose is *A. Menasu*.

29. *A. oblongatum*, *Muell. Arg. in DC. Prodr.* xv. ii. 254; branches obscurely pubescent, leaves 4½-7 by 1-2 in. shortly petioled linear-lanceolate cuspidately acuminate rigidly membranous glabrous, petiole $\frac{1}{2}$ in. rather shining, stipules lanceolate-subulate equalling the petioles, racemes very slender paniced with stipular bracts at their bases, bracts linear-lanceolate, male fl. minute long-pedicelled, calyx 3-4-lobed below the middle lobes orbicular-ovate, disk thick glabrous, stamens 4-5, pistillode subcylindric glabrous, fruit $\frac{1}{2}$ by $\frac{1}{3}$ in. ellipsoid obtuse at both ends with a lateral stigma-tiferous notch half-way between the middle and tip.

KHASIA MTS., *J. D. H. & T. T.*

I cannot find any plant answering to this description amongst Thomson's and my Indian collections. In most characters it agrees with *A. acuminatum*, but that of the stigma being placed in a notch of the fruit half-way between the base and apex is one I have not met with in any species of *Antidesma*. See also 22. *A. khasianum*.

30. *A. perserrula*, *Kurz in Trimen's Journ. Bot.* iv. (1875) 330; branchlets rusty-hirsute, leaves 6-10 in. from oblong-lanceolate to obovate-oblong acuminate or mucronate, nerves beneath hirsute, spikes simple, male fl. minute sessile, sepals 3-5 acute, stamens 3-5, ovary yellow tomentose stigma terminal.

NICOBAE ISLANDS; forests of Kaimorta, *Kurz*.

A tree, 25 30 ft. *Leaves* chartaceous; petiole stout, minute, $\frac{1}{4}$ – $\frac{1}{2}$ in. *Fruit* falcately ovate, $\frac{1}{2}$ in. long, compressed.—Description from Kurz, who likens the plant to *A. punctulatum*, Miquel; I have seen no specimens.

31. **A. salicifolium**, Miquel *Fl. Ind. Bat. Suppl.* 467? (not of Presl); branchlets slender finely pubescent, leaves 3–5 by $\frac{1}{2}$ – $\frac{3}{4}$ in. shortly petioled linear-lanceolate acuminate quite glabrous, fruiting racemes slender axillary and in short terminal branches, bracts minute subulate, fruit $\frac{1}{2}$ in. long ellipsoid hardly compressed rugose, style distinct short terminal, stigmas minute.

PERAK; on the Pluss river, Wray.—DISTRIB. Sumatra.

A small tree. *Leaves* thin, greenish when dry, base very acute, midrib pubescent above, nerves very slender; petiole $\frac{1}{2}$ in.; stipules narrowly lanceolate. *Fruiting spikes* erect, 1–3 in.; bracts very minute, subulate; calyx very minute, lobes 5 membranous; disk thick, glabrous. *Fruit* shortly pedicelled.—The Perak and Sumatran specimens are flowerless. This differs from the description of *A. salicifolium* in the Prodrômus in the fruit being ellipsoid and straight, not subobliquely ovoid, and in the perfectly glabrous petioles and midribs.

32. **A. Wattii**, Hook. f.; nearly glabrous, leaves subsessile 2–3 by $\frac{1}{4}$ – $\frac{1}{2}$ in. coriaceous narrowly linear-lanceolate acuminate glossy above margins recurved, racemes small slender axillary and in terminal panicles, male fl. minute pedicelled, calyx cupular unequally 4-lobed, stamens 3–4 at the base of the small glabrous deeply lobed disk.

MUNIPUR, Watt.

Branches very stout, woody, densely leafy, bark dark; branchlets and young parts pubescent. *Leaves* dull brown when dry, remarkably stiff, paler beneath, with very slender ascending distant nerves; petiole hardly any; stipules small, subulate. *Racemes* $\frac{1}{2}$ –1 in., numerous; bracts ovate or lanceolate, as long as the pedicels. *Disk* lobed to nearly the base; pistillode minute, glabrous.—Quite unlike any other species. In foliage it is almost identical with a Bornean species (Beccari No. 3831), which however differs in the flowers being quite sessile and their structure.

24. SCORTECHINIA, Hook. f.

Trees. *Leaves* alternate, coriaceous, entire or subserrate, penninerved, petiole thickened at the apex. *Flowers* minute, diœcious, in lax axillary and subterminal panicles, shortly pedicelled, apetalous. MALE FL. *Sepals* 4–5, rounded, imbricate. *Stamens* 4–5, alternating with as many minute hairy disk-glands; filaments stout, free; anthers broad, cells diverging a little, adnate to the connective, dehiscence introrse. *Pistillode* short, 3-lobed, hairy. FEM. FL. *Sepals* 4, imbricate. *Ovary* 2–3-celled?; stigmas 4, very minute; ovules (? 1 or 2), pendulous from the top of the cells. *Fruit* a 1-celled elliptic-oblong thinly crustaceous hoary-white capsule, dehiscing by 4 free deciduous elliptic-lanceolate valves. *Seed* solitary, elliptic-oblong, compressed, pendulous, testa thin crustaceous, albumen rather scanty firm; cotyledons amygdaloid, oblong, rounded at both ends, compressed; radicle minute, superior.—Species 3 or 4, Malayan and a Papuan.

1. **S. Kingii**, Hook. f.; leaves eglandular at the base.

PERAK, King's Collector. MALACCA, Griffith (*Kew Distrib.* 5030), Maingay (*Kew Distrib.* 1434).—DISTRIB. Borneo (Beccari 1164).

A tree 40–60 ft. high in Perak. *Branchlets* woody; tips and leaf-buds puberulous. *Leaves* 4–7 in., dark chestnut-brown when dry, elliptic or cuneate-obovate, obtuse acute or cuspidately acuminate, base very acute, serratures obtuse glandular, rather

shiny above; nerves 6-8 pair, arched, anastomosing, slightly raised above, more so beneath; petiole $\frac{1}{2}$ -1 in.; stipules small, lanceolate. *Panicles* shortly peduncled, hoary, 2-6 in. long, branches spreading. *Male fl.* $\frac{1}{12}$ in. diam.; sepals tumid on the back. *Stamens* included; anthers basifixed. *Fruit* erect, 1-1 $\frac{1}{2}$ in. long, stoutly very shortly pedicelled, clothed with an appressed white tomentum. *Seed* rounded at both ends, pendulous from a spermatophore that is longitudinally attached to the walls of the cavity from its apex for $\frac{1}{2}$ way down, eventually free below; albumen forming a dense covering of the embryo.—The spermatophore consists of the remains of the axis and septa, and bears at the top opposite to the insertion of the seed (that next to the wall of the capsule) a minute ovule. The position of the undeveloped ovule may indicate its having been solitary in a normally 2-(or 3-)celled ovary, of which the remains of the septa and axis form the column from which the seed is suspended.

2. *S. nicobarica*, *Hook. f.*; leaves with 2 prominent glands above at the insertion of the petiole.

NICOBAR ISLANDS; *Novara Expedition* (in *Herb. Hort. Bot. Calcutt.*).

Leaf elliptic, 6 by 3 in., sinuate serrate, nerves about 8 pair; petiole 1 $\frac{1}{2}$ in., slender. *Capsule* 1 in., as in *S. Kingii*.—I am indebted to Dr. King for a fruit and leaf of this very distinct species.

25. *BACCAUREA*, *Lour.*

Evergreen trees. *Leaves* alternate, entire, rarely crenate-serrate, penninerved. *Flowers* in simple or compound spiciform racemes or racemiform panicles, diœcious, rarely monœcious, apetalous; males usually very minute, hoary or tomentose. *Disk* 0, or of obscure glands in the male fl. *MALE FL.* *Sepals* 4-5, usually unequal, imbricate. *Stamens* 4-8, filaments short free; anthers small, didymous. *Pistillode* pubescent, orbicular, sessile or stipitate, rarely an irregular cleft column. *FEM. FL.* *Sepals* 4-6, linear or oblong, much larger than in the male. *Ovary* 2-5-celled, ovoid or globose; stigmas 2-5, small, sessile, free or connate into a short style, 2-lobed or -cleft, arms broad or subulate, papillose, rarely united into one peltate stigma; ovules 2 in each cell. *Fruit* ovoid globose obovoid or fusiform, 2-4-celled; pericarp thick or thin, coriaceous crustaceous or woody, tardily loculicidally dehiscent. *Seeds* broad, usually dorsally compressed or flattened, testa with a thick fleshy coat (aril?); albumen fleshy or hard; cotyledons broad, flat.—Species about 30, Tropical Asiatic, African and Polynesian.

The species of this genus are most difficult of discrimination, owing to the necessity of having for this purpose flowers of both sexes and also ripe fruit, and because in foliage very different species resemble one another. The male inflorescence appears to me to afford the best sectional characters, but it may have to yield to carpological ones, when the fruits are better known. The male flowers of individual species are very inconstant as to number and form of sepals, and number of stamens. The disk-glands, when present, are too minute and, I think, variable as to presence or absence, to afford aid in the Indian species; nor do I find the anthers truly extrorse in any, the slits being more or less lateral when not truly-introrse. In this as in so many other genera, I am rarely able to identify the Indian species with the Malayan, from want of good specimens of the latter. I am greatly indebted to Dr. King for the loan of the extensive collection of *Baccaurea* of the Calcutta Herbarium, without which I could not have completed even this imperfect sketch of the Indian species.

Series I. *Male racemes* simple or nearly so; bracts very minute at the base of the simple clusters of flowers.

1. *B. courtallensis*, *Muell. Arg. in DC. Prodr.* xv. ii. 459; glabrous.

brous, leaves oblanceolate or obovate obtusely acuminate base acute, male racemes tufted strict quite simple, bracts very minute ovate acute, flowers $\frac{1}{5}$ in. diam. very sparsely hoary, sepals 4 subequal rounded, stamens 4-6, fem. spikes 6-8 in., flowers $\frac{1}{2}$ in. diam. sessile, sepals 5 nearly glabrous small broadly ovate, ovary subglobose hirsute, stigmas 3 very small sessile. *B. sapida*, *Beddome Fl. Sylvat.* t. 280. *Pierardia courtallensis*, *Wight Ic.* t. 1912.—*Pierardia*, *Wall. Cat.* 8077.

TRAVANCORE, *Heyne*; Anamallay Hills, *Wight*, *Beddome*.

A middling-sized tree; shoots and young petioles sparsely pubescent. *Leaves* 5-7 by 2-3 in., thin; nerves 5-7 pairs; petiole 1-1½ in. *Male racemes* in large clusters from the trunk and subsolitary on the branches.—An imperfectly known plant, considered by *Beddome* as the same with *B. sapida*, but differing altogether in the male racemes; and in the small sessile fem. flowers, if I am right in referring to this a specimen from the Anamallay Hills collected by *Beddome*, and named by him *B. macrostachys* (and which was lent to me from the Calcutta Herbarium). The male flowers described above are from *Heyne* (in *Herb. Wallich*) and from *Wight*. *Beddome* says that this species is most abundant in all moist forests of the Western Ghats from Canara to South Travancore; but it is curious that except the Anamallay specimens of this, neither the *Wallichian*, *Kew* or *Calcutta Herbaria* have a specimen of any *Baccaurea* from the Deccan Peninsula.

2. *B. lanceolata*, *Muell. Arg. in DC. Prodr.* xv. ii. 457; glabrous, leaves oblong or oblong-lanceolate obtusely acuminate base obtuse acute or cordate finely reticulate on both surfaces, nerves 10-12 pairs, male racemes simple in cauline tufts 6-8 in. slender flexuous glabrous, bracts very minute, flowers $\frac{1}{2}$ in. diam., sepals subequal glabrous without tomentose on the margins and within, stamens 4 with interposed glands. *Hedycarpus lanceolatus*, *Miquel Fl. Ind. Bat. i. ii.* 359. *H. cauliflora*, *Hassk. ex Miquel in Herb. Kew.* *Adenocrepis lanceolata*, *Muell. Arg. in Linnœa* xxxii. 82.

PERAK, *King's Collector*.—DISTRIB. Sumatra, Java, Borneo.

A tree, 20 ft.; bark pale. *Leaves* 8-12 by 3½-6 in., thinly leathery, very pale green when dry and rather shining; petiole 1½-5 in., very stout; stipules silkily pubescent. *Male racemes* pale; bracts broadly ovate; flowers rather long-pedicelled. *Fem. racemes* in Borneo specimens 6-10 in. long; flowers shortly pedicelled; sepals oblong-spathulate, nearly glabrous; ovary (4-5-celled, *Mueller*) subglobose, strigose; stigmas sessile, peltate. *Fruit* in Borneo specimens about 2 in. long, ellipsoid, glabrous. *Seeds* dorsally sulcate.

3. *B. Scortechinii*, *Hook. f.*; branchlets hirsute, leaves shortly petioled membranous subrhombic-obovate cuspidate base very acute, nerves 7-8 pairs very slender, racemes from the branches, male very slender simple white tomentose, bracts minute at the base of the flower clusters, fem. racemes slender, pedicels slender, sepals long very narrow hoary, ovary ovoid silky contracted into a stout style with 3 recurved 2-fid stigmas.

PERAK, *Scortechinii*.

Leaves terminating short branches, 5-6 in., very thin; petiole $\frac{1}{2}$ -1 in., and midrib sometimes sparsely hairy. *Male fl.* $\frac{1}{3}$ in. diam., very shortly pedicelled; sepals 4-5; stamens as many; pistillode small. *Fem. racemes* 4-6 in.; pedicels minutely bracteate at the base, jointed about the middle; sepals $\frac{1}{2}$ in. long; ovary 6-ribbed or grooved when dry.

4. *B. parviflora*, *Muell. Arg. in DC. Prodr.* xv. ii. 462 (*in part*); glabrous, leaves elliptic-lanceolate or oblanceolate obtusely acuminate or caudate base acute, nerves 4-5 pairs, male racemes very slender hoary bracts very minute, fem. racemes tufted, pedicels very short, sepals linear-oblong nearly glabrous, ovary ovoid silky contracted into a short neck or style with

3 large recurved stigmas, fruit small fusiform, pericarp thick. *Kurz For. Fl.* ii. 357. *B. affinis*, *Muell. l. c.* *Pierardia parviflora*, *Muell. Arg. in Linnæa* xxxii. 82.—*Wall. Cat.* 7759 B.

TENASSERIM, *Wallich, Helfer.* PENANG, *Curtis.* PERAK, *King's Collector.* MALACCA, *Hervey, Maingay (Kew Distrib.* 1364, 1368). SINGAPORE, *Hullett.*—DISTRIB. Sumatra (*Beccari* No. 896).

A small tree, 15–25 ft. (in Perak); branches slender. *Leaves* variable in form, 2–5 by 2–3½ in., rather thin; petiole ½–1½ in.; stipules lanceolate, ciliate and usually pubescent on the back. *Male racemes* from both the old wood and young branches, 2–4 in.; flowers ⅔ in. diam.; sepals 4–5, broad; stamens 4–8; pistillode orbicular. *Fem. racemes* in tufts from the old wood (near the root in Perak specimens), 3–6 in.; pedicels bracteate at the base, jointed above the middle; sepals ½ in. long, obtuse, hoary and white within. *Fruit* ⅔–¾ in. long, fusiform or narrowly ellipsoid, narrowed at both ends, 3-celled, pericarp thick corky rugose and obscurely angled when dry, endocarp not separable nor thickened, smooth within. *Seed* ½ in., oblong-lanceolate, acute, with a shallow dorsal groove.—This is *Mueller's Pierardia parviflora*, described from *Wallich's* male specimen. In the *Prodromus* a Bornean plant (*Motley* No. 757) with broken remains of fem. fl. is united with it, and may or may not be conspecific.—*Motley's* and *Barber's* No. 80 from Borneo (in *Herb. Hook.*) may be the same. I trust I am right in referring the fusiform fruited species to this, but I have no authority for so doing beyond the fact that both sexes are common and found at most of the same localities, and that the foliage of the two is uniformly alike.

Series II. *Male racemes* with short few-fl. lateral branches to which the bract is adnate and produced beyond the sessile flowers as a short claw with 2 lateral bracteoles. *Fem. racemes* ebracteate, except at the joint of the pedicel.

5. **B. polyneura**, *Hook. f.*; shoots petioles and leaves beneath pubescent, leaves oblong obtuse or subacute base cordate, nerves 10–14 pairs, male racemes on the branches very short, flowers sessile on the bracteate tips of the short side branches hoary-tomentose, fem. racemes very long ebracteate, ovary globose, stigmas subulate recurved, fruit ellipsoid, pericarp rather thin, seeds orbicular.

MALACCA, *Griffith (Kew Distrib.* 4910), *Maingay (Kew Distrib.* 1421). PERAK, *King's Collector.*

A tree, 60–80 ft. (in Perak). *Leaves* 2–6 in., yellowish when dry, coriaceous, sometimes subfalcate, nerves and numerous cross-nervules very strong beneath; petiole rather slender, ⅔–1½ in. *Male racemes* 1–2 in., clustered; flowers ⅔ in. diam.; sepals 4–5, very unequal; stamens 4–5; pistillode orbicular. *Fem. racemes* 8–12 in.; pedicels ½ in., jointed beneath the flower; sepals ½ in. long, ovate or oblong, very unequal; stigmas not like those of any other Indian species I have seen. *Fruit* about 1 in. long, erect on the spreading pedicel. *Seed* obtuse at both ends.

6. **B. macrophylla**, *Muell. Arg. in DC. Prodr.* xv. ii. 460; glabrous except the pubescent racemes, leaves 6–12 in. long-petioled very coriaceous elliptic- or obovate-oblong cuspidate or acuminate, nerves 10–12 pairs very strong beneath, stipules large broad coriaceous, male racemes 2–3 in. catkin-like, flowers sessile on the bracteate tips of the branchlets, fem. stout, sepals small, ovary globose hoary-tomentose, stigmas 3 small broad 2-lobed depressed, fruit small ellipsoid or globose glabrous 2-celled, seeds flat sub-orbicular testa wrinkled. *Pierardia macrophylla*, *Muell. Arg. in Flora* xlvii. (1864) 516.

PENANG, *Phillips.* PERAK, *King's Collector.*—DISTRIB. Borneo:

A tree, 60–80 ft. (in Perak), (a climber, *Phillips.*) *Leaves* very variable in size, smooth dark brown and shining above, rich red-brown beneath when dry, cross-

nervules faint, base acute cuneate or rounded; petiole 2-3 in., stout; stipules (as in *B. Griffithii*) oblong, base obliquely auricled, often persistent and recurved. *Male racemes* subsessile or peduncled; side branchlets incurved, bracteate and 2-bracteolate at the tip, flower $\frac{1}{10}$ in. diam.; sepals subequal, rounded; stamens 4; pistillode very small. *Fem. fl.* $\frac{1}{10}$ in. long; sepals oblong, obtuse. *Fruit* $\frac{1}{2}$ - $\frac{2}{3}$ in. long or broad, bluish green speckled with white.—The confluence of the bract of the male fl. with the branchlet of the raceme is as described in *B. sumatrana*, where however the flowers are solitary. In the fem. raceme the bract is suppressed.

7. *B. minor*, *Hook. f.*; branches slender, leaves 2-3 in. ovate or ovate-lanceolate caudate-acuminate glabrous base acuminate, nerves 4-5 pairs forming strong intra-marginal loops, petiole slender $\frac{1}{4}$ - $\frac{1}{6}$ as long as the blade, racemes on the branches, males $\frac{1}{2}$ -1 in. yellow tomentose, male fl. ternately sessile on the bracteate tips of the branchlets, fruiting racemes slender, rachis ebracteate, fruit globose pubescent smooth, pericarp thin.

PERAK, *King's Collector*, *Scortechini*.

A tree, 20-30 ft.; shoots finely pubescent. *Leaves* thinly coriaceous, yellow when dry, greener beneath, strongly reticulate between the nerves. *Male racemes* peduncled, dense-fl.; flowers $\frac{1}{10}$ in., sessile on very short side branches with a persistent bract produced beyond these and 2 bracteoles. *Fem. racemes* 6-10 in., slender, brown-tomentose, ebracteate; pedicels very short, jointed and obscurely dilated in the middle, as if with a suppressed bract; sepals $\frac{1}{2}$ in., oblong, obtuse, tomentose; ovary globose, densely tomentose; stigmas sessile, spreading, 2-fid with recurved hardly papillose subulate arms which are tomentose at the back. *Fruiting racemes* on the older wood, 6-10 in.; pedicels $\frac{1}{4}$ in., jointed about the middle. *Fruit* $\frac{3}{4}$ - $\frac{1}{2}$ in. diam., tipped with 3 minute broad 2-lobed stigmas, pericarp thin with a thin smooth endocarp. *Seed* orbicular, flat.

8. *B. Maingayi*, *Hook. f.*; branchlets hoary-pubescent or glabrous, leaves quite glabrous coriaceous long-petioled broadly ovate or oblong obtusely cuspidate or acuminate base usually broadly rounded or subcordate, nerves 7-10 pairs with slender cross-nervules, male racemes from the young branches rusty-tomentose, bracts small broad adnate to the short branchlets that bear the flower clusters, fruiting racemes from the older wood rather slender, pedicels bracteate above the middle, fruit globose very finely rusty-tomentose 3-celled obscurely 3-ridged, styles minute 2-lobed depressed, pericarp very thin, cells hairy within, seeds flat, orbicular-ovate.

MALACCA, *Maingay* (*Kew Distrib.* 1415). PERAK, (*King's Collector*.)

A tree, 25-30 ft. (in Perak), branches woody. *Leaves* 7-10 by 3-5 in., yellowish when dry, above smooth often shining, greenish or red-brown beneath, nerves slender; petiole $\frac{1}{3}$ - $\frac{1}{2}$ the length of the blade. *Male racemes* 2-3 in.; flowers subsessile, $\frac{1}{15}$ in. diam.; sepals 4-6, very unequal; stamens 5-6; pistillode obscure. *Fruit* $\frac{3}{4}$ in. diam., like that of *B. minor*; epicarp separating from a very thin coriaceous endocarp, the walls of which within, and the membranous septa, are clothed with long lax hairs.—This is the only species in which I have observed the cells of the fruit to be (as in so many *Aporosa*) hairy within; but it probably is so in others.

Series III. *Male racemes* with short branched many-fl. lateral branches; bracts if present on the rachis, or if on the branches caducous.

* *Bracts on the rachis* 0, or small ovate or lanceolate much shorter than the flower clusters.

9. *B. flaccida*, *Muell. Arg. in DC. Prodr.* xv. ii. 459; shoots sparsely hairy, leaves glabrous 6-8 in. elliptic-lanceolate oblanceolate or obovate acute caudate or acuminate base acute, nerves 6-7 pairs, male racemes 1-2 in. tomentose, bracts ovate shorter than the clusters of flowers, flowers sub-

sessile, stamens 6-8, fruiting racemes slender, pedicels bracteate in the middle, young fruit ovoid puberulous and hairy contracted into a short style with 3 broad 2-lobed depressed stigmas. *Pierardia flaccida*, *Wall. Cat.* 8074.

BURMA, *Wallich*. TENASSERIM, *Helfer* (*Kew Distrib.* 4907), *Beddome*.

Habit and foliage of *B. sapida*, differing in the shorter very deciduous male bracts, and in the bracts of the female not being at the base of the pedicel, but upon it.—An imperfectly known species.

10. **B. Griffithii**, *Hook. f.*; shoots sparsely stellate pubescent or glabrous, leaves long-petioled elliptic-oblong or -lanceolate cuspidately acuminate base acute, nerves 6-8 pairs, stipules large oblong, male panicles 3-4 in., bracts small obtuse much shorter than the peduncles of the many-fld. lateral branchlets, fem. racemes short, bracts broadly ovate acute at the jointed base of the tomentose pedicels, sepals small, fruit 1-1½ in. diam. long pedicelled depressed globose rugose, pericarp very thick.

MALACCA, *Griffith*. PERAK, *King's Collector*.

A tree, 50-60 ft. (in Perak); branches petioles and often leaves above black when dry. *Leaves* 8-12 in., thinly coriaceous, not shining, red-brown or pale beneath; nerves strong, cross-nervules slender, reticulations large; petiole rather slender, equalling ¼-½ of the blade; stipules ½ in. black, obtuse, like those of *B. macrophylla*. *Male racemes* much more compound than usual, rachis slender; lateral branches much divided; bracts often on the branchlets, caducous. *Fem. racemes* 2-3 in., rachis stout; pedicels ½ in., stout; sepals ⅓ in., obtuse; ovary ovoid, densely tomentose, narrowed into a very short style with 3 recurved plumose stigmas. *Pedicel* of fruit ¼-¾ in., woody, very stout. *Fruit* sparsely pubescent or glabrate, pericarp ¼ in. thick. *Seeds* not in a state for description.—The male flowers are described from a Malaccan specimen of Griffith.

11. **B. Motleyana**, *Muell. Arg. in DC. Prodr.* xv. ii. 461; branches robust, shoots petioles and leaves beneath finely tomentose, leaves large thinly coriaceous elliptic-oblong subacute, base narrow subcordate, nerves 12-16 pairs, male racemes on the branches tomentose very slender, bracts on the rachis minute lanceolate, lateral branches many-fld. *Pierardia Motleyana*, *Muell. Arg. in Flora* xlvii. (1864) 516.

PERAK, *King's Collector*.—DISTRIB. Borneo.

A tree, 60-80 ft. (in Perak); branchlets as thick as the little finger. *Leaves* 8-12 in., smooth above, greenish beneath with rusty pubescence on the nerves; petiole 2-3 in., stout.—*Motley* describes the fruit as having a thin yellow skin, and the seeds, which are much esteemed, as surrounded by a juicy pulp, pleasant and sweet, but containing also an estense acid. This species much resembles in foliage and fruit the plate (t. iv.) of a *Baccaurea* in "Marsden's Sumatra," alluded to under the description of the *Lanseh* (Ed. 3, p. 101) as the *Rambe*.

** *Bracts on the rachis lanceolate, all or the lowest in the racemes longer than the clusters of flowers.*

12. **B. sapida**, *Muell. Arg. in DC. Prodr.* xv. ii. 459; leaves glabrous elliptic-lanceolate oblanceolate or obovate acuminate base narrowed into the petiole, nerves 5-6 pairs, male panicles 2-3 in., bracts lanceolate usually much longer than the flowering-clusters hirsute, fem. racemes very long, fem. pedicel bracteate at the base, sepals linear-oblong ½ in. long, ovary 3-celled strigosely tomentose, stigmas sessile broad depressed 2-lobed, fruit subglobose or ellipsoid and contracted at the apex, pericarp coriaceous fleshy, seeds flat with a smooth testa and thick fleshy covering. *Kurz For. Fl.* ii. 356. *B. macrostachya*, *Wight Ic.* t. 1913. *B. propinqua*, *Muell. Arg. l. c.*

463. *Pierardia sapida*, Roxb. *Fl. Ind.* ii. 254; *Wall. Cat.* 8072.—*Wall. Cat.* 7758, 7761, 8071.

Base of the EASTERN HIMALAYA, *J. D. H., Clarke*. ASSAM, Hamilton. SILHET, BURMA, the MALAY PENINSULA and ANDAMAN ISLANDS, wild or cultivated.—DISTRIB. Malay Archipelago.

An evergreen tree, 40-50 ft., shoots subtriglosely pubescent. *Leaves* 4-8 in., rather membranous; petiole 1-1½ in. *Male racemes* usually on the branches or trunk, fem. lower down, or on the trunk, both tomentose. *Male fl.* about ½ in. diam., on very short lateral branches; sepals 4-5, unequal; stamens 4-8. *Fem.* sepals ½-1 in. long. *Fruit* ¾-1 in. diam., yellow, puberulous; endocarp not separable, smooth within. *Seeds* orbicular, fleshy coat rose-coloured.—I find no characters whereby to distinguish *B. propinqua* from *sapida*, which appears to be a commonly cultivated tree in India, but to be also truly wild in the Sikkim Terai (*Clarke*) and Khasia Hills. The detached pyriform fruits distributed by Wallich with his No. 8071 do not, I think, belong to this species.

13. *B. brevipes*, *Hook. f.*; branchlets robust and leaves beneath pubescent or tomentose, leaves large thinly coriaceous obovate-oblong narrowed into the petiole subacute or acuminate, nerves about 12 pairs very strong beneath ascending and slightly arched, male racemes on the branches very long and slender hoary-pubescent, bracts linear-lanceolate lower longer than the clusters of flowers, fem. spikes from the trunk and branches stout tomentose, flowers sessile, sepals ½ in., ovary ovoid villously strigose, stigmas short broad depressed 2-lobed, fruit subglobose 3-celled, seed compressed beaked smooth.

PERAK, *King's Collector, Wray, Scortechini*. MALACCA, *Griffith* (*Kew Distrib.* 4908, 4909), *Maingay* (*Kew Distrib.* 1366, 1367, 1405).—DISTRIB. Borneo.

A small tree (in Perak); branchlets as thick as the little finger. *Leaves* 8-14 by 4-6 in., from sparsely pilose with scattered hairs to tomentose beneath; base acute obtuse or cordate; petiole 1-3 in., very stout. *Male racemes* with short lateral 2-3-fld. branches; flowers ¼-½ in. diam; sepals 4-5, unequal; stamens 4-8. *Fem. spikes* 6-10 in., stout. *Fruit* ½-1 in. diam., pubescent, cream-coloured, or waxy white. *Seeds* ¼-½ in. long, contracted rather suddenly into a beak; aril light blue.

*** *Bracts large, broad, concave, enclosing the clusters of flowers, deciduous.*

14. *B. bracteata*, *Muell. Arg. in DC. Prodr.* xv. ii. 466; shoots petioles nerves beneath and spikes rusty-pubescent or tomentose, leaves long-petioled coriaceous elliptic-oblong -ovate or -lanceolate acuminate or acute, with 5-7 pairs of strong nerves and black dots beneath, inflorescence of both sexes on the young branches 1-3 in., bracts of male panicle broadly ovate concave exceeding the clusters of flowers, ovary villous ovoid contracted into a short style with 3 suberect 2-fid stigmas, fruit globose, pericarp very thick 3-valved. *Pierardia dulcis*, *Wall. Cat.* 8075 (*not of Jack*). *Sapium sterculiacum*, *Wall. Cat.* 7974.—*Wall. Cat.* 7834.

PERAK, *Scortechini, King's Collector, &c.* MALACCA and SINGAPORE, *Griffith* (*Kew Distrib.* 4900, 4899), *Maingay* (*Kew Distrib.* 1362, 1390).—DISTRIB. Borneo.

A tree, 30-60 ft. in Perak; branches terete, smooth, red brown. *Leaves* from 3 by 1-1½ in. to 7 by 4 in., base rounded or acute, dark brown above when dry, usually reddish beneath with black glands, and strong nerves; petiole equalling ¼-¾ the length of the blade. *Male panicles* 2-3 in.; branches rather long and distant, at first sheathed in the often opposite imbricating bracts, which are ½-¾ in. long obtuse and tomentose. *Male flowers* ¼-½ in. diam.; sepals 3-5, oblong, very unequal; stamens 4-6; pistillode columnar. *Fem. racemes* lax-fld.; sepals ½ in. long, linear-

oblong, obtuse. *Fruit* $\frac{3}{8}$ –1 in. diam., obscurely 3-gonous, loculicidal, pericarp very thick; endocarp not separating, walls smooth within.—This cannot be Jack's *B. dulcis*.

15. *B. reticulata*, *Hook. f.*; shoots petioles and nerves beneath finely yellow-tomentose or hoary, leaves long-petioled coriaceous elliptic-oblong or elliptic acuminate or cuspidate not dotted beneath base acute pale beneath with 8–12 pairs of strong nerves, nervules strongly reticulated, male racemes on the branches stout finely tomentose, bracts broadly ovate cucullate longer than the short lateral branches and flower-clusters.

PERAK, *Scortechini, King's Collector*. MALACCA, *Griffith (Kew Distrib.* 4899), *Maingay (Kew Distrib.* 1360, 1360/2, 1365), *Hervey*.—DISTRIB. Sumatra.

Habit of *B. bracteata*, but leaves much paler, often yellow beneath, with very strong reticulations and no black dots. In the Calcutta Herbarium this bears three names, *B. costulata* (from Malacca), *B. pubera* (from Banca), and *B. bracteata* (without locality). *B. costulata* (of which I have seen authentic specimens) has few nerves and leaves nearly smooth beneath between them. *B. pubera* is a doubtful *Baccaurea* with stellate tomentose parts; and *B. bracteata* is described above.

16. *B. latifolia*, *King in Herb. Calcutt.*; branches and petioles sub-stellately puberulous, leaves long-petioled coriaceous elliptic or elliptic-oblong cuspidate or acute tomentose with soft hairs beneath and 10–12 pairs of very strong nerves, male panicles hoary-pubescent, bracts broadly ovate acuminate longer or equalling the flower clusters, fruiting racemes from the old wood stout, pedicels bracteate above the base jointed at the top, fruit globose smooth finely pubescent tipped with a short style 3-celled, pericarp very thick spongy.

PERAK, *King's Collector*.

A tree, 50–60 ft.; branches stout. *Leaves* 6–8 by 3–5 in., or more oblong and 6–7 by 3–3½ in., dark red brown above when dry, paler beneath, base acute or obtuse, petiole rather stout, $\frac{1}{2}$ or $\frac{1}{3}$ the length of the blade. *Male panicles* from the youngest branches, 2–4 in.; bracts $\frac{1}{2}$ in. long, concave, hoary, caducous; flowers $\frac{1}{10}$ in. diam.; sepals 4–5, broad; stamens as many; pistillode low, tumid. *Fruiting racemes* 6–8 in.; rachis hoary-pubescent, as thick as a duck's quill; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. long, woody, with 2–3 broad short bracteoles, distinctly jointed below the calyx. *Fruit* $\frac{3}{8}$ – $\frac{1}{2}$ in. diam., with the short obtuse calyx-lobes at the base.

SPECIES OF WHICH THE MALE FLOWERS ALONE ARE KNOWN.

17. *Baccaurea* sp. A; branches slender black when dry glabrous to the tips, leaves 3–5 in. membranous elliptic subcaudately acuminate base very acute, nerves 4–6 pairs very slender, nervules obscure, petiole 1–2 in. very slender, male racemes on the branches very short $\frac{3}{4}$ –1 in. decurved densely tomentose, bracts obtuse small adnate to the very short 2–3-fld. side branches, sepals and stamens 4, pistillode depressed orbicular.

PENANG, *King's Collector* (No. 1589).

18. *Baccaurea* sp. B; leaves glabrous 6–9 in. elliptic oblong or lanceolate acuminate base acute, nerves 5–6 pairs, petiole 2–2½ in., male racemes from the branches 4–6 in. long by $\frac{3}{4}$ in. broad finely tomentose, bracts on the slender rachis $\frac{1}{4}$ in. oblong acute or obtuse caducous shorter than the side branches, which bear many cymes of minute flowers $\frac{1}{10}$ in. diam., bracteoles on the branchlets minute persistent, sepals 5–6 unequal, anthers 5–7 sessile round the subclavate truncate pistillode.

PERAK, *King's Collector* (No. 3266).

19. **Baccaurea** sp. C; a tree 40-60 ft., leaves glabrous 8-12 in. coriaceous elliptic obtusely acuminate base acute, nerves 9-10 pairs strong beneath, petiole $1\frac{1}{2}$ -3 in. stout, male racemes on the branches $1\frac{1}{2}$ -2 in. finely tomentose, rachis stout, bracts $\frac{1}{6}$ - $\frac{1}{4}$ in. longer than the clusters of flowers ovate-oblong obtuse concave glabrous caducous, flowers $\frac{3}{8}$ - $\frac{1}{10}$ in. diam. in very short branched lateral cymes, sepals 4-5 very unequal, anthers minute filaments slender, pistillode lobed unequally.

PERAK, alt. 2500-3000 ft., *King's Collector* (No. 7368).

20. **Baccaurea** sp. D; branches petioles and leaves beneath and racemes brown tomentose, leaves coriaceous 5-8 in. oblong obtusely cuspidate base rounded or cordate, nerves 10-12 pairs strong beneath with close-set cross-nervules, petiole stout $\frac{1}{2}$ - $\frac{1}{4}$ in., stipules broad tomentose, male racemes on the branches 4-6 in., bracts on the rachis lanceolate shorter than the short 3-4-fld. lateral branches.

MALACCA, *Griffith* (*Kew Distrib.* 4905, 4909?); "Rambehootan," *Griffith*.

SPECIES OF WHICH THE FEM. FLOWER OR FRUIT ALONE IS KNOWN.

21. **B. Wrayi**, *King in Herb. Calcutt.*; a tree 60-80 ft., young branches and petioles hirsute, leaves 5-7 in. membranous elliptic-lanceolate or oblanceolate acuminate base very acute, beneath glabrous or with sparsely hairy midrib and 7-9 pairs of slender nerves and reticulate cross-nervules, petiole 1-2 in., stipules broadly ovate villous, fem. flowering racemes villously tomentose rather stout, pedicels very short bracteate at the base, sepals $\frac{1}{8}$ in. linear-oblong obtuse tomentose caducous, ovary ovoid hirsute, stigmas 3 depressed sessile 2-lobed, fruiting racemes 6-12 in. stout tomentose, pedicel $\frac{1}{10}$ - $\frac{1}{4}$ in. jointed in the middle, fruit 1-1 $\frac{1}{2}$ in. long ellipsoid or subovoid granulate bright red glabrous or puberulous 3-celled, pericarp thick, endocarp not separating smooth within, seeds 1 $\frac{1}{2}$ in. long ovate acute compressed.

PERAK, *Wray*, *King's Collector*.

22. **B. malayana**, *King in Herb. Calcutt.*; a tree 60-80 ft., branches very stout, leaves 6-10 in. coriaceous glabrous pale broadly elliptic-oblong or lanceolate obtuse entire or crenate-serrate base acute or rounded, nerves 7-10 pairs arched slender, petiole 1-2 in., fruiting racemes short woody, pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in. stout woody jointed about the middle or inarticulate, fruit very large 2 in. long ellipsoid or subglobose obovoid softly appressedly white tomentose 2-3-celled, tip rounded with a minute style and 3 recurved 2-fid stigmas, pericarp very thick $\frac{1}{4}$ - $\frac{1}{2}$ in., endocarp hard and coriaceous smooth within sometimes separating, seeds large 1 in. long orbicular in the 2-celled fruit subtrigonously oblong in the 3-celled thick compressed smooth not furrowed. *Hedycarpus malayanus*, *Jack. in Trans. Linn. Soc.* xix. 118.

PERAK, *King's Collector*. MALACCA, *Maingay* (*Kew Distrib.* 1363).—DISTRIB. Sumatra.

The Malaccan specimens have much narrower leaves, with acute bases and slanting nerves, than the Perak ones, which are broad and agree well with Jack's description of the Sumatran plant. Jack's character of the flowers is imperfect; he does not describe the bracts nor distinguish the sexes; he says the perianth is 4 or 5-partite, stamens 4 or 5, ovary 3- or 4-celled, stigmas 3 or 4. The bracts he describes as small broad and on the pedicel below its subdivision; this presumably applies to the fem. flower. It is the only species with distinctly serrate leaves, though this is not constant.

23. **B. Wallichii**, *Hook. f.*; a tree 30–40 ft., glabrous, leaves 5–6 in. thinly coriaceous pale elliptic-lanceolate or oblanceolate obtusely often caudately acuminate, base very acute, nerves 5–7 pairs and cross-nervules slender, petiole slender usually $\frac{1}{3}$ – $\frac{1}{4}$ of the length of the blade, fruiting racemes from the old and young branches pubescent, bracts obscure or 0, pedicels $\frac{1}{2}$ in. rather slender jointed about the middle, sepals caducous, fruit $\frac{3}{4}$ –1 in. diam. trigonously globose scarlet puberulous 3-celled, top rounded with a short style and 3 minute stigmas, pericarp thick corky, endocarp not separating pale red-brown within, seeds oblong or obovate acute compressed but turgid. *Pierardia?* *Wall. Cat.* 8073.

PENANG, *Wallich*. PERAK, *Scortechini, King's Collector*.

B. WALLICHII, *var. ?*, leaves of *B. Wallichii*, flowering fem. racemes 1–2 in. very slender pubescent, pedicels very short bracteate at the base bracts very broad short, sepals $\frac{1}{4}$ in. linear-oblong obtuse very finely pubescent, ovary ellipsoid densely tomentose 3-celled, stigma sessile peltate obscurely 3-lobed densely papillose, fruit as in *B. Wallichii*, but pale yellowish brown when dry minutely granulate and stigma sessile.

MALACCA, Maingay (*Kew Distrib.* 1365, *flower*, and 1368, *fruit*).

24. **B. macrocarpa**, *Muell. Arg. in DC. Prodr.* xv. ii. 459? quite glabrous, bark of branches white, leaves 5–7 in. coriaceous oblong or obovate-oblong abruptly obtusely caudately cuspidate grey brown and shining above, dark red-brown beneath with 6–8 pairs of strong nerves and cross-nervules, base narrow obtuse or subcordate, petiole 1–1 $\frac{1}{2}$ in. black when dry, fem. flowering racemes from the branches 3–6 in. nearly glabrous stout black when dry, pedicels $\frac{1}{2}$ in. stout recurved jointed about the middle, very obscurely bracteate at the base and short rounded sepals glabrous, ovary broadly ovoid laterally 3-lobed contracted into a stout style with 3 large recurved plumose stigmas quite glabrous.

MALACCA, *Griffith* (*Kew Distrib.* 4903).—Closely resembles a Sumatran specimen marked *B. macrocarpa*, Miquel, in the Calcutta Herbarium, but which differs from Mueller's description of that plant in the glabrous branches petioles and leaf-nerves beneath, and in the fruit being globose and not at all ellipsoid.

25. **Baccaurea** sp. E; a tree 30–60 ft., glabrous, leaves 4–6 in. coriaceous elliptic- or obovate-oblong obtuse or subacute, base rounded or acute yellowish above when dry and greenish beneath, nerves 10–12 pairs very strong beneath, nervules strongly reticulate, petiole $\frac{1}{4}$ – $\frac{1}{3}$ the length of the blade, fruiting racemes from the old branches 4–8 in. slender pubescent, pedicels $\frac{1}{2}$ in. jointed about the middle ebracteate or with a very minute bract at the joint tomentose as well as the short obtuse sepals, fruit $\frac{1}{2}$ – $\frac{3}{4}$ in. turgidly ellipsoid or globose contracted into a very short beak with 3 very minute recurved 2-fid stigmas obscurely 3-ridged puberulous and obscurely wrinkled, pericarp very thin, endocarp not separable pale brown within, seeds $\frac{1}{3}$ in. long orbicular-ovate smooth compressed slightly pointed.

PERAK, *King's Collector* (No. 6240 and 6860).

26. **Baccaurea** sp. F; branchlets and petioles scurfily tomentose, leaves 4–6 in. coriaceous oblong acute or acuminate base subacute smooth above, softly tomentose beneath, nerves 6–7 pairs very strong beneath and forming intra-marginal arches red brown when dry, young with minute marginal tufts of hairs, fem. sepals very short ovate, stigmas minute sessile 2-fid, fruit 1 in. diam. very shortly pedicelled on a very short stout peduncle

depressed-globose 3-celled obscurely 3-lobed smooth rusty-puberulous, pericarp rather thick, seeds $\frac{1}{2}$ in. long broadly ellipsoid compressed smooth.

PERAK, *Scortechini*.—This in Herb. Calcutta is named *B. macrocarpa*, Muell., but it does not agree with the description of that species.

27. *Baccaurea* sp. G; branchlets petioles and leaves beneath tomentose, leaves 5–6 in. coriaceous elliptic acute or acuminate base acute or obtuse shining above, nerves 6–8 pairs very strong beneath, petiole equalling $\frac{1}{4}$ – $\frac{1}{2}$ of the blade, fruiting racemes 1–3 in. very stout tomentose, fruit subsessile $\frac{3}{4}$ –1 in. long obovoidly pyriform terete 3-celled smooth finely puberulous, pedicel bracteate at the base, top rounded, stigmas 3 short depressed 2-fid, arms short recurved, pericarp thick glabrous within, seed as in sp. 26.

MALACCA, *Griffith* (*Kew Distrib.* 4901), *Maingay* (*Kew Distrib.* 1361).—Perhaps a variety of 26.

28. *Baccaurea* sp. H; a small shrub or tree 10–15 ft., branches slender with pure white bark, leaves 3–5 in. rather membranous elliptic-lanceolate obtuse, base very acute, nerves 5–6 pairs very slender and nervules faintly reticulate, petiole $\frac{1}{4}$ – $\frac{3}{4}$ in., fruiting racemes very short from the branches 1–2 in. slender glabrous, pedicels $\frac{1}{10}$ in. ebracteate tomentose jointed about the middle, sepals caducous, fruit $\frac{1}{3}$ in. turgidly ellipsoid rarely globose obscurely puberulous and wrinkled 2-celled base rather contracted top rounded with a very short style and 3 minute stigmas, pericarp very thin, endocarp not separable pale red-brown within, seeds $\frac{1}{4}$ in. obovoidly orbicular compressed smooth, umbonate at the lower end.

PERAK, *King's Collector* (No. 7213).—Closely resembles a fruiting Javanese specimen of *B. javanica*, Muell., from Teysmann, which differs in not having white bark, and in there being minute subulate bracts at the base of the pedicels. Also resembles a plant named *B. acuminata*, Muell., from the Nicobar Islands in the Calcutta Herbarium, but neither has that white bark. The Bornean plant, Motley n. 579, referred by Mueller to *B. javanica* is, I think, quite different from all the above.

29. *Baccaurea* ? *symplocoides*, *Hook. f.*; quite glabrous, branches slender, leaves 4–5 in. membranous ovate-lanceolate caudate-acuminate penninerved, nerves 6–7 pairs slender, petiole slender, fem. racemes axillary on the young branches rather longer than the petioles, rachis and peduncle puberulous, bracts minute broad membranous, sepals 4–5 minute broad, ovary ovoid oblong compressed truncate, stigmas 2 very short, fruit $\frac{1}{2}$ in. long ellipsoid or ovoid smooth, epicarp thin, endocarp papery.

PERAK, *Scortechini*; Larut and Goping, *King's Collector*.

A tree, 30–40 ft.; branchlets smooth, often dark purple. *Leaves* greenish when dry and margins undulate, base cuneate or acute; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Fem. racemes* 1–1 $\frac{1}{2}$ in.; pedicels $\frac{1}{10}$ in., of fruit $\frac{1}{4}$ – $\frac{1}{2}$ in. *Calyx* very minute, not enlarged in fruit. *Fruit* yellow, endocarp and septum glabrous within. *Seeds* oblong with a thin fleshy coat.

PIERARDIA, *Wall. Cat.* 7906, from Singapore, is not of this genus, and is undeterminable.

HYMENOCARDIA, *Wall.*

Shrubs or trees. *Leaves* alternate, quite entire, and triple-nerved at the base or penninerved. *Flowers* dioecious, apetalous; males solitary in the bracts of a catkin-like lateral spike, females in short axillary or lateral racemes; bracts often foliaceous in fruit. *Disk* 0. MALE FL. *Calyx* membranous,

irregularly 4-6-lobed or -partite. *Stamens* 4-6, filaments included, free or united below in a column; anthers large, at first reflexed, then horizontal, cells parallel. *Pistillode* small or equalling the filaments. FEM. FL. *Sepals* narrow, free, caducous. *Ovary* 2-celled, flattened at right angles to the plane of the septum; styles long, subterete, entire, papillose all over; ovules 2 in each cell. *Capsule* flat, of 2 compressed very broad wing-like cocci, separating from a central axis; pericarp crustaceous; endocarp membranous. *Seeds* usually solitary in the cocci, flat, testa thin, albumen not copious; cotyledons very thin, broad, flat; radicle long.—Species 5, Tropical Indian, Malayan and African.

H. punctata, Wall. Cat. 3549; shoots and leaves beneath pubescent and lepidote, leaves ovate or oblong obtuse or acute, male spikes lepidote. H. Wallichii, Tulasne in Ann. Sc. Nat. Ser. 3, xv. (1851) 256; Muell. Arg. in DC. Prodr. xv. ii. 476; Kurz For. Fl. ii. 394. Samaropyxis elliptica, Miquel Fl. Ind. Bat. Suppl. 465.

TENASSERIM, and BURMA, Wallich, &c. ? UPPER ASSAM; Mishmi, Griffith.

A deciduous shrub or small tree; branches woody, terete. *Leaves* 1-3 in., coriaceous, elliptic, obtuse acute or acuminate, polished above, pubescent and densely glandular beneath, costa with 3-5 pairs of straight nerves; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Male spikes* $\frac{1}{2}$ in., 1-3 together, yellow, puberulous and clothed with large glands, flowers very minute; bracts peltate, pedicelled. *Ovary* ellipsoid, compressed. *Capsule* very broadly obcordate, or transversely oblong, broader than long, $\frac{3}{8}$ in. diam., reticulately veined and with an intra-marginal vein; epicarp thin, endocarp papery shining within. *Seed* rounded, quite flat.—The fruit is not winged, as described, the cavity corresponding with the superficies. The Mishmi ticket may be an error for Burma.

27. GALEARIA, Zoll. & Moritz.

Glabrous or pubescent slender small trees or shrubs. *Leaves* alternate, shortly petioled, quite entire, penninerved, base usually unequal-sided. *Flowers* small or minute, in very long slender terminal racemes, diœcious; bracts minute or 0, rarely long and very slender; males fascicled, fem. usually solitary. *Disk* 0, or obscure in the male. MALE FL. *Calyx* 5-toothed or -partite. *Petals* 5, short, very concave, with inflexed margins and tips, induplicate-valvate, keeled down the middle within. *Stamens* 10, filaments very short, the antipetalous shortest; anthers didymous, glabrous or hispid. *Pistillode* usually hirsute. FEM. FL. *Calyx* and *petals* of the male. *Ovary* 2-3-celled; styles short, slender, 2-partite; ovules 1 in each cell. *Fruit* small, transversely oblong or very broadly obcuneate cuneate or subreniform, rarely large and globose, endocarp hard 1-2-celled. *Seeds* conform to the cells, compressed, testa membranous, albumen fleshy; cotyledons broad, flat.—Species 12 to 15, Malayan.

The Herbarium materials for this genus are very incomplete indeed. The foliage is uniform throughout, or nearly so. The sections founded by Mueller on the petals being hooded only at the apex and on these being hooded throughout their length are not tenable. The pistillode is, I think, a very variable organ. *G. Maingayi* differs much from the other species in the fruit, and may prove generically distinct.

* *Anther-cells glabrous, filaments and tip of connectives tomentose.*

1. **G. Maingayi**, Hook. f.; leaves oblong obtuse, racemes stout, pedicels longer than the male flowers, calyx cupular 5-toothed, petals puberulous margins and midrib within tomentose, fruit subglobose 1 in. diam.

MALACCA, Maingay (Kew Distrib. 1412 and 1412/2).

Glabrous; branchlets rather stout. *Leaves* 6–8 in., coriaceous, dark brown when dry, base rounded or broadly cuneate; nerves 10–14 pairs, very spreading, slender; petiole $\frac{1}{8}$ – $\frac{1}{4}$ in. *Racemes* 6–8 in.; bracts 0; pedicels $\frac{1}{2}$ – $\frac{1}{4}$ in.; flowers longer than in the other species. *Pistillode* columnar, truncate, tomentose. *Fruit* immature, “fleshy, capsular, rugose, pale green with 3 longitudinal alæ extending from the apex to the base, 2–3-locular,” *Maingay mss.*—Possibly generically distinct from *Galearia*.

** *Anther-cells hispid, filaments glabrous or pubescent.*

2. **G. fulva**, Muell. *Arg. in Linnæa* xxxiv. 205, and in *DC. Prodr.* xv. ii. 1037 (*Bennettia*); branchlets and racemes rusty-tomentose, leaves elliptic-lanceolate acuminate sparsely pubescent at length glabrous beneath, male flowers shortly pedicelled, margins of petals ciliate, anthers hispid, filaments glabrous. *Cremostachys fulva*, *Tulasne in Ann. Sc. Nat. Ser. 3*, xv. (1851) 262.—*Bennettia*, *Wall. Cat.* 8585 C (*in part*).

PENANG, Wallich, Phillips, &c.

Shoots densely rusty tomentose. *Leaves* 4–8 in., yellowish especially beneath when dry, base acute, rarely elliptic with a rounded base, nerves 7–10 pairs; petiole $\frac{1}{2}$ in., pubescent. *Racemes* a foot long and less, slender; bracts minute, or the lowest subulate; male fl. subglobose, $\frac{1}{2}$ in. diam.; pedicels rather longer. *Petals* orbicular. *Pistillode* short, subclavate, with a rounded hispid top. *Ovary* densely fulvous tomentose. *Young fruit* transversely oblong, velvety with pale tomentum.

3. **G. pedicellata**, Br. in *Bennett Fl. Jav.* 251 (*Bennettia*); branchlets and racemes puberulous, leaves elliptic or obovate-oblong or narrowly oblong or lanceolate acuminate glabrous or puberulous beneath, male pedicels much longer than the flowers, petals very broad glabrous margins ciliate, filaments and anthers hispid. *Bennettia pedicellata*, Muell. *Arg. in DC. Prodr.* xv. ii. 1039.—*Bennettia*, *Wall. Cat.* 8585 (*in part*).

PENANG, Wallich, Phillips.

A small tree, 10 ft. *Leaves* 6–12 in., and petioles very much as in *G. fulva*. *Male racemes* 12–16 in., slender; bracts minute, subulate; pedicels $\frac{1}{10}$ – $\frac{1}{4}$ in.; flowers $\frac{1}{10}$ – $\frac{1}{8}$ in. diam., depressed.

4. **G. Helferi**, Hook. f.; branchlets and racemes finely tomentose, leaves narrowly oblong or elliptic or oblanceolate acuminate glabrous beneath, flowers subsessile minute, petals wholly glabrous, anther-cells hispidly ciliate filaments glabrous. *G. Wallichii*, *Kurz For. Fl.* ii. 407.

TENASSERIM, *Helfer* (*Kew Distrib.* 4968), *Kurz*.

Branchlets and racemes, when dry, almost black with very fine pubescence. *Leaves* 8–12 by $2\frac{1}{2}$ – $3\frac{1}{2}$ in., rather membranous, narrower than in other Indian species, with fewer (6–8 pairs) nerves for their length; petiole longer, $\frac{1}{2}$ in., and costa beneath dark and pubescent. *Male racemes* 12 in.; bracts 0 or obscure; flowers $\frac{1}{2}$ – $\frac{1}{4}$ in., subglobose. *Filaments* very short, glabrous. *Pistillode* conical, glabrous.—This from his description is evidently *Kurz's Wallichii*; he describes the fruit as (according to Brandis) “the size of a prune, blue and pruinous, broader than long, the stone unequally wrinkled.”

5. **G. Jackiana**, Br. in *Bennett Fl. Jav.* 251 (*Bennettia*); branchlets and racemes finely pubescent, leaves elliptic-lanceolate or oblanceolate acuminate glabrous or puberulous beneath, flowers subsessile very minute, margins of petals ciliate, anthers hispid.—*Bennettia*, *Wall. Cat.* 8585 A. *Limonia leptostachya*, *Jack mss.*

PENANG, *Jack*.

This has the foliage of *G. fulva*, and the minute flowers of *G. Helferi*.

6. **G. subulata**, Muell. Arg. in DC. Prodr. xv. ii. 1039 (*Bennettia*); branchlets petioles and rachis of racemes rusty-pubescent, leaves elliptic or oblong-obovate cuspidately acuminate yellow-green puberulous on the costa and nerves beneath, bracts erect subulate, flowers subsessile, sepals rounded, margins of petals ciliate, filaments and anthers hispid.

PENANG (in Herb. Sonder from Herb. Lindley). ? PERAK (Herb. Hort. Calcutt., No. 840 and 2684).

I have seen no Penang specimens of this, which must be very near *G. Jackiana*, differing in the long bracts. The Perak specimens, which I doubtfully refer to it, have green leaves, 7-12 by $2\frac{1}{2}$ -5 in., with acute or rounded bases and 5-5 pairs of very strong nerves beneath; they are not in flower, but one (No. 2684) has fruit $\frac{1}{2}$ in. broad by $\frac{1}{2}$ long, very broadly wedge-shaped with rounded angles and a truncate broad base, densely clothed with a pale tomentum. The bracts seem early deciduous.

*** *Anthers and filaments quite glabrous.*

7. **G. Lipdleyana**, Muell. Arg. in Linnæa xxxiv. 205, and in DC. Prodr. xv. ii. 1037; branchlets and leaf-nerves beneath and racemes finely fulvous tomentose, leaves ovate elliptic or oblong acuminate, male racemes strict, flowers small very shortly pedicelled, petals and stamens quite glabrous, pistillode with a truncate hispid dilated top.—*Bennettia*, Wall. Cat. 8585 C (in part).

PENANG, Wallich, Porter; on West Hill, alt. 2500 ft., Curtis.

Leaves 6-7 in., rather coriaceous, base acute or rounded; nerves 6-8 pairs, rather strong beneath; petiole $\frac{1}{4}$ in. Racemes apparently erect, 6-10 in.; bracts 0 or obscure, pedicels shorter than the flowers which are not $\frac{1}{12}$ in. diam.; petals rounded with a few cilia on the tips.

8. **G. affinis**, Br. in Bennett Fl. Jav. 251 (*Bennettia*); branchlets leaves beneath and racemes finely pubescent, leaves elliptic oblong or lanceolate acuminate puberulous beneath, male racemes erect, flowers very shortly pedicelled, petals and stamens quite glabrous. *Bennettia affinis*, Muell. Arg. in DC. Prodr. xv. ii. 1037.—*Bennettia*, Wall. Cat. 8585 B.

SINGAPORE, Cantley. MALACCA, Mt. Ophir, Griffith (Kew Distrib. 4966). Maingay (Kew Distrib. 1411).—DISTRIB. ? Siam, Finlayson.

Leaves rather coriaceous, 5-8 by $1\frac{1}{2}$ -3 in.; nerves 6-8 pair, strong beneath; petiole very short, $\frac{1}{10}$ in., stout. Male racemes 4-5 in. (2 ft. in the Singapore specimens), rachis faintly pubescent or tomentose; flowers $\frac{1}{12}$ in. diam., almost sessile. Fruit transversely oblong, pubescent, $\frac{1}{2}$ in. diam. when dry.—I am doubtful as to all the specimens from the above localities being referable to one species; they present the following differences:—

1. Wallich's No. 8585 B, in part, which is from Herb. Finlayson and is probably Siamese (not Penang as stated by Mueller), has oblong-lanceolate leaves 5-8 by $1\frac{1}{2}$ -2 in., with acute bases, male racemes 4 in. long, and a short columnar hairy pistillode.

2. Cantley's Singapore plant has leaves as in No. 1, racemes 2 ft. long, and a pistillode with few hairs below and a dilated glabrous top.—A fruiting specimen from Malacca, Maingay, has a similarly elongate raceme, but the leaves are more like those of No. 1.

3. Griffith's from Mt. Ophir and a Malaccan fruiting specimen from Maingay have leaves 5-7 by $2\frac{1}{4}$ -3 in. with rounded or even subcordate bases, racemes of No. 1, and a stout columnar villous pistillode.

9. **G. Wallichii**, Br. in Bennett Fl. Jav. 251 (*Bennettia*); branchlets leaves and racemes glabrous, leaves oblong elliptic or elliptic-lanceolate

acuminate, petiole short but slender, pedicels of male fl. shorter or longer than the flowers, petals and stamens glabrous. *Bennettia Wallichii*, Muell. Arg. in DC. Prodr. xv. ii. 1038.—*Bennettia*, Wall. Cat. 8585 E.

TENASSERIM; at Tavoy, Gomez, Helfer, Lobb.—SINGAPORE, Hallett.

A tree. Leaves 5–7 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., base usually acute (in our species $4\frac{1}{2}$ by $2\frac{1}{2}$ with rounded base), nerves 6–7 pairs; petiole $\frac{1}{10}$ – $\frac{1}{8}$ in., much more slender than in the other species. Male racemes 6–12 in.; bracts 0 or minute, subulate; flowers $\frac{1}{12}$ – $\frac{1}{10}$ in. diam. Petals quite naked at the margin and tips. Pistillode short, tomentose, conic or with a dilated top.—Mueller describes the fruit as $\frac{1}{4}$ in. broad and $\frac{1}{10}$ long and rugose, but as there are no fruits in Wallich's specimens and he does not allude to any others, those he described may belong to another species. Kurz's *Wallichii* is *G. Helferi*, having tomentose branches, petioles and racemes.

10. *G. phlebocarpa*, Br. in Bennett Fl. Jav. 251 (*Bennettia*); leaves elliptic- or oblong-lanceolate acuminate quite glabrous, male flowers very minute subsessile, petals narrow glabrous except the ciliate tips, filaments and anthers quite glabrous, fruit transversely oblong tessellately rugose. *Bennettia phlebocarpa*, Muell. Arg. in DC. Prodr. xv. ii. 1038.—*Bennettia*, Wall. Cat. 8585 D.

SINGAPORE, Wallich. ? TENASSERIM, Helfer.

Branchlets glabrous, or with puberulous tips. Leaves 6–12 in., acute or obtuse; nerves 8–10 pairs, strong beneath; petiole $\frac{1}{10}$ in., glabrous or puberulous. Male racemes 6–12 in., pubescent or tomentose; bracts very minute, crowded, villous; flowers $\frac{1}{12}$ in. diam. Petals narrower than usual in the genus, tips hispid with deciduous hairs. Stamens very short. Pistillode obconic, glabrous, with a truncate villous top. Fruit $\frac{1}{2}$ in. diam., broadly wedge-shaped.—The Tenasserim specimen, a solitary one in flower only, has shorter broader leaves $4\frac{1}{2}$ by $2\frac{1}{2}$ in. with only 4 pairs of nerves, and a more tomentose rachis of the raceme and calyx; without fruit it cannot be identified.—I refrain from citing (after Mueller) the Sumatran *G. sumatrana*, *elliptica* and *angustifolia*, Miquel.

IMPERFECTLY KNOWN SPECIES.

BENNETTIA Finlaysonian, Br. in Bennett Fl. Jav. 251; Muell. Arg. in DC. Prodr. xv. ii. 1039). Wallich's specimens (No. 8585 B) have neither flower nor fruit, nor have they any locality assigned to them in Wallich's printed Catalogue. In the Flora Javæ they are said to have been collected in Penang by Finlayson. It is described as having pubescent branchlets and glabrous petals and stamens. Mueller suggests its being the Sumatran *G. splendens*.

28. *MICRODESMIS*, Planch.

Slender shrubs. Leaves alternate, entire or toothed, penninerved. Flowers minute, in axillary clusters, dioecious; males numerous, fem. few. MALE FL. Sepals 5 (4–6 ?), imbricate. Petals small, twisted and imbricate. Stamens 5, or 10 and 2-seriate, inserted on a fleshy receptacle, filaments free; anthers erect, cells subparallel. Pistillode columnar, ovoid or 3-fid. FEM. FL. Perianth of the male. Ovary fleshy, minutely 2–3-celled at the base; styles short, 2-partite or lacrate; ovules 1 in each cell. Drupe fleshy; putamen bony, rugged. Seeds broadly ovoid, testa membranous, albumen fleshy; cotyledons ovate, flat.—Species 2, tropical, an Asiatic and an African.

M. caseariæfolia, Planch. in Hook. Ic. Pl. under t. 758; leaves elliptic-lanceolate caudate-acuminate entire or obscurely toothed, stamens 10 in 2 series, ovary 2-celled. Muell. Arg. in DC. Prodr. xv. ii. 1041; Kurz For. Fl. ii. 408.—Wall. Cat. 7987, 9077.

TENASSERIM, *Helper, &c.* PERAK, *King's Collector.* PENANG, *Wallich, &c.* MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1424, 1454).—DISTRIB. Borneo, South China.

A small evergreen tree; branchlets and youngest leaves puberulous. *Leaves* 2-6 in., often subfalcate, glabrous, glossy, base very acute, minutely pellucid-punctate; petiole $\frac{1}{2}$ in. *Flowers* very shortly pedicelled, puberulous. *Sepals* elliptic-ovate. *Petals* orbicular, concave. *Stamens* alternately shorter, connective apiculate. *Styles* reflexed. *Fruit* $\frac{1}{6}$ - $\frac{1}{4}$ in. diam., globose, 2-celled, bright red.—Wallich's No. 7987 is stated to be from Silhet, but this is no doubt an error.

29. **PLATYSTIGMA**, *Brown.*

A tree? with rusty-pubescent shoots and inflorescence. *Leaves* alternate, coriaceous, quite entire, penninerved; stipules? *Flowers* in short axillary panicles, sessile or very shortly pedicelled, diœcious. *Disk* 0. **MALE FL.** bracteate and 2-bracteolate. *Sepals* 4-5, unequal, imbricate. *Petals* 4-5, ovate, acute, valvate. *Stamens* 4-5, filaments very short; anthers large, cells oblong parallel, slits subextrorse. *Pistillode* 0. **FEM. FL.** 1-bracteate. *Sepals* 5, broadly ovate, imbricate, 2 interior. *Ovary* cylindric, pubescent, 1-celled; stigma very broad, sessile, disciform, quite entire; ovule 1, pendulous from the top of the cell, linear, without an obturator.

P. myristiceum, *Brown in Wall. Cat.* 7523 (*fem. plant*); *Hook. Ic. Pl.* t. 1707.—*Myristicea*, *Wall. Cat.* 9017 (*male plant*).

SILHET, *W. Gomez.*

Branches woody, terete, black when dry, hoary. *Leaves* 5-7 by 2-3 $\frac{1}{2}$ in., elliptic or elliptic oblong, acute or acuminate, base acute or obtuse, glabrous above, beneath hoary pale brown; nerves 10-12 pairs, slender, nervules obscure; petiole $\frac{3}{4}$ -1 in. *Male panicles* 1-3 in., sessile, rachis and branches stout; buds globose; flowers $\frac{1}{2}$ in. diam., crowded on the tomentose branches; sepals hispidly pubescent, much shorter than the corolla; petals glabrous or with a few very minute stellate hairs; anthers opposite the petals and nearly as large. *Fem. panicles* much shorter and fewer-flid. than the male; flowers on very stout pedicels, which are 1-bracteate at the base; sepals $\frac{1}{2}$ in. long; ovary rusty-tomentose with very thick walls and a narrow central cell; stigma broader than the body of the ovary, black when dry; ovule linear.—I am not certain that this is an Euphorbiaceous plant. Benthams, who has noted that it has 2 ovules but one sometimes abortive (I find but one in the many specimens examined), has suggested (*Gen. Plant.* iii. 283) that it may be a *Baccaurea*, from which the 1-celled ovary, linear ovule, stigma, and absence of a thickening or joint at the apex of the petiole at once distinguish it. I find no trace of stipules.

30. **ELATERIOSPERMUM**, *Blume.*

A handsome glabrous tree. *Leaves* alternate, jointed on to the 2-glandular long petiole, quite entire, penninerved, reticulate. *Flowers* in ditrichotomous panicked cymes, monœcious, apetalous, central of each cyme a sessile female. **MALE FL.** *Sepals* 4-6, broad, imbricate. *Stamens* 10-20 or more, on a villous receptacle, filaments very short, free; anthers linear-oblong, erect, cells adnate, parallel, connective gland-tipped. *Pistillode* minute or 0. **FEM. FL.** *Sepals* 6, imbricate, caducous. *Disk* elevated, pubescent. *Staminodes* many, within the disk. *Ovary* ovoid, tapering into a short thick style, 2-4-celled; stigmas 3, dilated, crescent-shaped; ovules 1 in each cell, obturator large. *Capsule* large, of 2 2-valved cocci with a thin fleshy exocarp, and bony endocarp. *Seeds* large, oblong, testa crustaceous shining, albumen? thin papery; cotyledons plano-convex, fleshy, radicle very short.

E. Tapos, *Blume Bijl.* ii. 621; *Muell. Arg. in DC. Prodr.* xv. ii. 1131; *Miquel Fl. Ind. Bat.* i. ii. 412, and *Suppl.* 460; *Hook. Ic. Pl.* t. 1294.

PERAK, *Scortechini*. MALACCA, *Gaudichaud, Griffith* (*Kew Distrib.* 4960), *Mainingay* (*Kew Distrib.* 1440), &c.—DISTRIB. Sumatra, Java.

A lofty evergreen ? tree, 60–80 ft.; branchlets robust. *Leaves* 4–8 in., coriaceous, oblong or linear-oblong, obtusely acuminate, base acute, nerves 12–16 pairs; petiole $1\frac{1}{2}$ –2 in., slender. *Panicles* in the uppermost axils, peduncle stout, $1\frac{1}{2}$ –3 in., branches and pedicels short. *Male fl.* $\frac{1}{6}$ in. diam.; *fem.* $\frac{1}{3}$ in. *Sepals* oblong. *Ovary* ovoid, pubescent. *Capsule* 2 in. long, oblong, smooth. *Seeds* $1\frac{1}{4}$ in. long, oblong, chestnut-brown, subtrigonal with rounded top base and sides, and an obscure dorsal and ventral ridge; testa white and veined within.

31. **JATROPHA**, Linn.

Herbs shrubs or trees, often glandular and prickly. *Leaves* alternate, entire or digitately lobed or partite; stipules often ciliate. *Flowers* in terminal cymes, monœcious, the central in the cyme or its forks usually female, often petaliferous. **MALE FL.** *Sepals* 5, imbricate, often petaloid. *Petals* 5, contorted, free or connate. *Disk* entire or of 5 glands. *Stamens* many, filaments of all or the interior only, connate; anthers erect. *Pistillode* 0. **FEM. FL.** *Perianth* of the male. *Ovary* 2–4-celled; styles connate below, 2-fid, lobes entire or 2-lobed; ovules 1 in each cell. *Capsule* of 2–4 2-valved cocci, endocarp crustaceous or bony. *Seeds* ovoid or oblong, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species about 70, chiefly American.

* *Petals free or nearly so.*

1. **J. glandulifera**, *Rowb. Fl. Ind.* iii. 688; glabrous, leaves simple and ovate or 3–5-lobed below the middle base cordate, lobes ciliate with long-stipitate glands, stipules long capillary lacinate, and cymes glandular, bracts setose and glandular, sepals entire, stamens 8. *Muell. Arg. in DC. Prodr.* xv. ii. 1084; *Wall. Cat.* 7802; *Kurz For. Fl.* ii. 403; *Dalz. & Gibs. Bomb. Fl.* 229. *J. glauca*, *Vahl Symb.* i. 78; *Thwaites Enum.* 277.

DECCAN PENINSULA from the Concan southwards. CEYLON; at Damboul, *Gardner*.—DISTRIB. Tropical Africa.

A small evergreen tree, 4–8 ft., trunk stout. *Leaves* 3–5 in. long and broad, sub-peltate; lobes acute, sometimes toothed; petiole 2–3 in., smooth or with simple or branched capillary glandular hairs. *Flowers* greenish yellow, in glandular corymbose cymes. *Sepals* glabrous or glandular-ciliate, male obtuse, fem. acuminate. *Petals* united at the base only. *Ovary* glabrous. *Capsule* size of a cherry, slightly 6-lobed.—I have seen only Deccan specimens.

2. **J. nana**, *Dalz. & Gibs. Bomb. Fl.* 229; dwarf, glabrous, leaves entire or 3-lobed base cuneate, lobes entire, petiole very short stout, bracts and flowers glabrous, sepals entire. *Muell. Arg. in DC. Prodr.* xv. ii. 1083.

The CONCAN; stony places near Poona, Bombay, &c., *Dalzell, &c.*

A small sparingly branched shrub, 1–2 ft. *Leaves* broadly cuneate, 3–5 in. diam., lobes broad, acute; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; stipules not seen. *Styles* slender, stigmas capitate.—The specimens are not in a very good state. This and the following are dwarfs of African type.

3. **J. heterophylla**, *Heyne mss.*; dwarf, glabrous, eglandular, stems simple, leaves petioled simple and cordate or 3–5-lobed below the middle,

lobes quite entire, stipules capillary, bracts and sepals entire.—*Wall. Cat.* 7803 (*the upper specimen*).

DECCAN PENINSULA; Hyderabad, *Heyne*; Madras, *Shuter*; Northern Circars, in cultivated ground, *Wight*.

Stems 4–6 in. from a tuberous rootstock, stout, subsimple, terete. *Leaves* 1–3 in. diam., rather thick, very variable in form, glaucous beneath, base cuneate, petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., stout. *Flowers* very small. *Capsule* $\frac{3}{4}$ in. long.—*Wallich's* solitary specimen, received from *Wight*, has quite simple ovate or oblong-ovate cordate acuminate leaves; those of *Heyne*, &c., are lobed.

J. GOSSYPIFOLIA, *Linn. Sp. Pl.* 1006; shrubby, leaves 3–5-lobed or -partite, lobes glandular-serrulate, petiole with branched glandular paleæ or hairs, stipules capillary multifid glandular, bracts and entire sepals glandular-ciliate, stamens 10–12 monadelphous. *Muell. Arg. in DC. Prodr.* xv. ii. 1086; *Bot. Reg. t.* 746; *Jacq. Ic. t.* 633.

BENGAL, *Clarke*. SINGAPORE, *Maingay* (cultivated or an escape).—DISTRIB. Native of Brazil.

A shrub or herb, glabrous or with the inflorescence and leaves pubescent. *Leaves* 2–4 in. diam., lobes broadest in the middle; petiole 2–4 in. *Male sepals* ovate, acute; petals purple or red. *Capsule* ovoid, 3-lobed.

J. MULTIFIDA, *Linn. Sp. Pl.* 1006; glabrous, leaves long-petioled orbicular palmately cut into many narrow entire or lobulate caudate-acuminate segments, stipules capillary multifid eglandular, bracts and entire sepals glabrous, disk of fem. fl. urceolate. *Muell. Arg. in DC. Prodr.* xv. ii. 1089; *Wall. Cat.* 7801; *Salisb. Hort. Paradis. t.* 91.

Cultivated and naturalized in various parts of INDIA.—DISTRIB. Native of South America.

A large shrub or small tree. *Leaves* 3–5 in. diam., glaucous beneath; petiole about as long. *Cymes* long-peduncled; flowers scarlet; anthers linear.

**** *Petals cohering to the middle or above it.***

4. *J. WIGHTIANA*, *Muell. Arg. in DC. Prodr.* xv. ii. 1080; pubescent, eglandular, leaves peltate orbicular or ovate entire or roundly 5–7-lobed lobes obtuse entire, bracts and sepals entire, corolla-tube of male villous within, ovary and styles pubescent. *J. peltata*, *Wight Ic. t.* 1169 (*J. villosa in text*). *J. Curcas*, *Wall. Cat.* 7799 D (*in part*).

The DECCAN PENINSULA; in dry stony jungles near Coimbatore, *Wight*.

A low branching shrub, shoots rusty-villous. *Leaves* 4–6 in. diam., tomentose beneath; petiole as long; stipules unknown. *Cymes* corymbose; peduncle stout; flowers pale yellow. *Calyx-lobes* lanceolate. *Corolla* salver-shaped, $\frac{1}{4}$ in. diam., lobes ovate-oblong. *Styles* united in a slender column; stigmas 2-partite. *Capsule* 1 in. long, globosely oblong.—I have seen leaves only.

J. CURCAS, *Linn. Sp. Pl.* 1006; glabrous except the shoots, leaves long-petioled not peltate orbicular-cordate entire or 3–5-lobed or -angled, cymes glabrous or pubescent, corolla-tube of male villous within, ovary and styles glabrous. *Muell. Arg. in DC. Prodr.* xv. ii. 1080; *Roxb. Fl. Ind.* iii. 686; *Brand. For. Fl.* 442; *Kurz For. Fl.* ii. 403; *Gamble Man. Ind. Timb.* 365; *Grah. Cat. Bomb. Pl.* 183; *Dalz. & Gibs. Bomb. Fl.* 77; *Jacq. Hort. Vind.* iii. 36, t. 63; *A. Juss. Tent. Euphorb. t.* 11, p. 34 A; *Wall. Cat.* 7803 (*in part*) and 7799 (*except part of D*). *J. moluccana*, *Herb. Russ.*

Throughout INDIA and CEYLON, common near villages, cultivated and naturalized.—DISTRIB. Throughout the tropics.

A large shrub or small evergreen tree. *Leaves* 4-6 in. diam.; lobes obtuse or acute, quite entire; petiole as long as the blade. *Flowers* yellow. *Capsule* 1-1½ in. —Poison, physic or purging-nut.

32. **TRITAXIS**, Baill.

Trees or shrubs. *Leaves* alternate, entire or toothed, penninerved. *Flowers* in terminal dichotomous cymes, monœcious, with the central one of each cyme female subsessile, surrounded by many pedicelled males, or diœcious? **MALE FL.** *Calyx* 5-fid. *Petals* 5, longer than the calyx. *Disk* of 5 glands. *Stamens* in 2-3 whorls, the inner or all forming a central column; anthers of the outer whorl erect, of the inner horizontal, cells parallel, slits introrse. *Pistillode* 0. **FEM. FL.** *Calyx* of the male. *Ovary* 3-celled; styles 2-fid. *Capsule* of 3 2-valved cocci.—Species 3 or 4, Indian and Malayan.

In *Genera Plantarum*, iii. 392, the calyx is, by misprint, described as 3-fid, and for *Antitaxis* read *Anisotaxis*.

T. ? Beddomei, Benth. in *Journ. Linn. Soc.* xvii. 221; quite glabrous, leaves ovate or ovate-oblong entire or subsinuately toothed, cymes peduncled all male, stamens 8, filaments of the 2 or 3 inner combined in a slender column, of the outer free forming a whorl at the base of the column.

TRAVANCORE; at the foot of the Tinnevely Ghats, *Beddome*.

Branchlets slender, terete. *Leaves* 3-4 in., thinly coriaceous, obtuse or acute, base rounded, pale beneath; nerves 10-12 pair, very slender, hardly stronger beneath than the nervules; petiole ¼-½ in. *Cymes* terminal, branched, peduncles and pedicels slender. *Flowers* ½ in. diam. *Calyx* obtusely 4-lobed. *Petals* much longer, oblong. *Disk-glands* large. *Filaments* slender; anthers broadly oblong, slits lateral.—A very obscure plant, unlike in habit to *T. Cumingii*, and with no fem. flowers in the male cymes, hence perhaps not a *Tritaxis*. The Andaman Island (Port Mouat) plant referred doubtfully to *Tritaxis* by Bentham (l. c.) has quite entire leaves with three strong basal nerves, and 5 to 6 pair of pinnate ones, and an exceedingly slender panicle; it is referred to *Trigonostemon* by Kurz.

33. **ALEURITES**, Forst.

Trees with simple or stellate pubescence. *Leaves* alternate, long-petioled, broad, entire or 3-7-lobed, 3-7-nerved from the base, petiole 2-glandular at the top. *Flowers* in lax terminal paniced cymes, mono- diœcious. **MALE FL.** *Calyx* subglobose, bursting into 2-3-valvate lobes. *Petals* 5, longer. *Stamens* 8-20, on a conical receptacle, 5 outer opposite the petals, alternating with small glands, filaments free; anthers erect, adnate, cells parallel. *Pistillode* 0. **FEM. FL.** *Perianth* of the male. *Disk* obscure or of glands alternating with the petals. *Ovary* 2-5-celled; styles with 2 linear stout arms; ovules 1 in each cell. *Drupe* large; putamen hard, 1-5-celled. *Seeds* with a thick woody testa, albumen thick hard; embryo straight, cotyledons broad flat.—Species 3, Asiatic and Pacific.

A. cordata, Muell. (*Dryandra oleifera*, Wall. Cat. 7958), a native of China and Japan, with broadly ovate-cordate acuminate leaves, and with anthers reflexed after flowering, is cultivated at Singapore, and elsewhere in India, but very rarely.

A. moluccana, Willd. *Sp. Pl.* iv. 590; shoots and young leaves stellately puberulous or tomentose, leaves long-petioled polymorphous ovate to lanceolate or broadly rhomboid and obtusely or acutely 3-7-lobed base obtuse or truncate, calyx velvety, petals obovate-oblong bearded within,

anthers erect, ovary 2-celled hispid. *Muell. Arg. in DC. Prodr.* xv. ii. 723; *Kurz For. Fl.* 377; *Bedd. Sylv. Madr.* t. 276; *Benth. Fl. Hongk.* vi. 128. *A. triloba*, *Forst. Char. Gen.* 112, t. 56; *Lamk. Ill.* t. 791; *Willd. l. c.*; *Roxb. Fl. Ind.* iii. 629; *Grah. Cat. Bomb. Pl.* 181; *Dalz. & Gibs. Bomb. Fl. Suppl.* 76; *Miquel Fl. Ind. Bat.* i. ii. 385; *Wall. Cat.* 7850. *A. ambinux*, *Pers. Syn.* 587; *A. Juss. Tent. Euphorb.* t. 12. *A. cordifolia*, *Steud. Nomencl.* 49. *Camirium cordifolium*, *Gärtner. Fruct.* ii. 195. *Jatropha moluccana*, *Linn. Sp. Pl.* 1006.—*Camirium*, *Rumph. Amb.* ii. 180, t. 58.

Occurs in various parts of INDIA, especially the Malayan Peninsula, *Griffith (Kew Distrib.* 4795), *Maingay (Kew Distrib.* 1384). Wild in the Wynaad, but probably escaped from cultivation, *Beddome*.—DISTRIB. Native of the Malay? and Pacific Islands.

An evergreen tree, 40–60 ft. *Leaves* crowded at the ends of the branches, 4–12 in. long; petiole 2–2½ in., pubescent. *Cymes* tomentose; flowers white, shortly pedicelled. *Calyx* usually splitting into three lobes or segments, ⅓ in. long. *Petals* ¼ in. *Stamens* 15–20, on hairy receptacle, filaments hairy, short. *Fruit* 2–2½ in. diam., subglobose, fleshy, smooth, olive-coloured, containing 1 or 2 large, hard seeds with a furrowed testa.

34. CROTON, Linn.

Trees or shrubs, rarely herbs. *Leaves* alternate, rarely opposite or whorled, 2-glandular at the base. *Flowers* solitary or clustered on the rachis of a terminal raceme with small bracts, monœcious, rarely diœcious. MALE FL. *Calyx* 5-(4–6)-partite, imbricate or subvalvate. *Petals* as many as and equalling or shorter than the sepals. *Disk-glands* as many, opposite the sepals. *Stamens* indefinite, inserted on a hairy receptacle, filaments free inflexed in bud then erect; anthers adnate, cells parallel. *Pistillode* 0. FEM. FL. *Sepals* usually more ovate than in male, rarely accrescent in fruit. *Petals* smaller or 0. *Disk* annular or of glands. *Ovary* 3-(2–4)-celled; styles usually long and slender, 2–4-cleft; ovules 1 in each cell. *Capsule* subequally 6-valved or of 3 deciduous 2-valved cocci. *Seeds* smooth, caruncle small, testa crustaceous, albumen copious; cotyledons broad.—Species uncertain (500 described), in all hot countries.

The Indian species are all referable to Mueller's section *Eucroton*, described as having the sepals equal (though often unequal in both sexes), the receptacle of the male fl. villous, and the petals distinct in the male fl. but minute or wanting in the female.

A. *Ovary* lepidote or stellately tomentose.

* *Inflorescence* lepidote. (See also *C. lævifolius* and *Griffithii*.)

† *Leaves* densely lepidote beneath, or on both surfaces.

1. **C. argyrateus**, *Blume Bijdr.* 602; leaves elliptic or ovate-lanceolate acuminate silvery or rufous-lepidote beneath penninerved, racemes long lepidote, stamens 10–12, ovary lepidote, styles slender 2-partite, capsule globose rusty-pubescent. *Muell. Arg. in DC. Prodr.* xv. ii. 526; *Miquel Fl. Ind. Bat.* i. ii. 380; *Kurz For. Fl.* ii. 372; *Gamble Man. Ind. Timb.* 359. *C. bicolor*, *Roxb. Fl. Ind.* iii. 680.

MARTABAN to TENASSERIM, *Kurz*. PERAK, *Scortechini*, *King's Collector*. MALACCA, *Griffith*, *Maingay*. PENANG, *Curtis*.—DISTRIB. Sumatra, Java, Borneo.

An evergreen tree; branchlets lepidote. *Leaves* 4–7 in., thinly coriaceous, base minutely cordate; petiole ½–1½ in. *Racemes* 4–6 in.; male fl. shortly pedicelled; fem. larger, stouter pedicelled. *Sepals* of fem. linear-oblong, lepidote, glabrous within. *Petals* and stamens villous. *Capsule* ½ in. diam., hardly lobed. *Seed*

broadly obtusely 3-gonous, with a broad convex nearly smooth polished back.—I have seen no Tenasserim specimens.

2. **C. reticulatus**, *Heyne in Wall. Cat.* 7724 B in part; branchlets leaves beneath and inflorescence silvery lepidote, leaves ovate or elliptic-lanceolate acuminate quite entire shortly 3-nerved at the base, racemes few-fl., sepals of fem. linear-oblong accrescent, stamens 15–18, ovary stellately lepidote, style-arms divided, capsule $\frac{1}{2}$ in. long broadly oblong. *Muell. Arg. in DC. Prodr.* xv. ii. 580. *C. hypoleucus*, *Dalz. in Hook. Kew Journ.* iii. (1851) 123; *Dalz. & Gibs. Bomb. Fl.* 231; *Thwaites Enum.* 276. *C. zeylanicus*, *Muell. Arg. in Linnæa* xxxiv. 107, and in *DC. l. c.* 581.

DECCAN PENINSULA, from the Concan southwards, *Heyne, &c.* CEYLON; Central Province, *Thwaites*.

A shrub; branches slender, terete. *Leaves* opposite and alternate, 4–10 in., smooth and glabrous above, base acute or rounded; petiole $\frac{1}{2}$ –1 $\frac{1}{2}$ in., rusty lepidote. *Racemes* shorter than the leaves. *Sepals* of male oblong, margins woolly, twice as large as the woolly oblong petals. *Stamens* glabrous except at the villous base. *Sepals* of fem. sometimes $\frac{1}{2}$ in. long in fruit. *Ovary* globose; scales stellate, red-brown; styles very variable, usually 2-partite with long slender unequally 2-fid arms, in Wallich's specimen very large and flabellately multipartite from a cuneate base. *Capsule* stellately lepidote.—I find no character whereby to separate Mueller's *C. zeylanicus*; the fem. sepals enlarge in all the forms, and though largest in the Ceylon specimen are not otherwise different; the styles are too variable to found a character upon, and I find no difference in the capsule.

3. **C. malabaricus**, *Beddome Icones*, t. 171, and *Forester's Man.* 204; branchlets leaves beneath and inflorescence silvery lepidote, leaves ovate or rhombic-ovate acuminate quite entire sub-3-plinerved sparsely stellately lepidote above, racemes few-fl., sepals of fem. ovate-oblong villous at the base within, stamens 10–12 villous below with long silky hairs, ovary stellately lepidote, style-arms long slender, tips 2-lobed, capsule obovoid lepidote.

MALABAR; common in western forests, ascending to 4000 ft., *Beddome*.

A tree, 20–30 ft. *Leaves* 2–6 in. long; petiole 1–2 in. *Racemes* solitary or clustered, 1–2 in. *Petals* of male woolly, much smaller than the sepals; of fem. 0. *Capsule* about 1 in. long.—Closely allied to *C. reticulatus*, but the leaves are much broader, female calyx less deeply divided and lobes much shorter; male calyx with long silky hairs at the base, as also have the filaments and petals.

4. **C. scabiosus**, *Beddome Fl. Sylvat.* t. 283; branchlets leaves on both surfaces and inflorescence clothed with subsilvery lepidote scales, leaves ovate- or orbicular-cordate obtuse or acute crenate-serrate 3–5-plinerved at the base, raceme short stout, stamens 10–12 quite glabrous, ovary densely lepidote, styles 2-partite arms very long and slender, capsule subglobose 3-lobed.

TRAVANCORE; on the Nullay Mallay Hills, Kurnoul, alt. 2–3000 ft., *Beddome*.

A small tree; branches brown when dry; branchlets stout, much shrunk when dry, greenish or silvery lepidote as are the leaves. *Leaves* 2–4 $\frac{1}{2}$ by 1 $\frac{1}{4}$ –3 in., coriaceous, alike on both surfaces, nerves 1 or 2 pair above the basal; petiole rather shorter than the blade, stout. *Racemes* 1–4 in.; rachis and pedicels very stout. *Sepals* of male short; petals narrowly spatulate, deeply fringed. *Ovary* globose. *Capsule* $\frac{1}{2}$ in. long, rather longer than broad.

†† *Leaves* glabrous when old.

5. **C. oblongifolius**, *Roxb. Fl. Ind.* iii. 685; shoots and young

leaves and inflorescence lepidote, leaves oblong elliptic-oblong or -ovate or -lanceolate acute more or less repand-toothed or serrate penninerved old quite glabrous, base acute or obtuse, racemes elongate, sepals lepidote, stamens 10-12 woolly below, styles 2-partite slender, capsules globose $\frac{1}{2}$ in. diam. lepidote. *Muell. Arg. in DC. Prodr.* xv. ii. 573; *Brand. For. Fl.* 440; *Kurz For. Fl.* ii. 373; *Dalz. & Gibs. Bomb. Fl.* 231; *Beddome Forester's Man.* 204; *Thwaites Enum.* 276. E. *elæocarpifolius* & *lævigatus*, *Wall. Cat.* 7734, 7735. C. *Boragatch*, *Roxb. mss.* C. *Dudia*, *Herb. Ham.* C. *Jouffra*, *Miquel Plant. Hohenack.*, No. 832.—*Wall. Cat.* 7739 (*in part*).

BENGAL, SILHET, BEHAR, CENTRAL INDIA, the DECCAN PENINSULA, MARTABAN and BURMA. CEYLON; in hot dry places.

A small deciduous tree; branches rather stout. *Leaves* 6-12 in., rather coriaceous, sometimes 4 in. broad, very pale green when dry; nerves 12-16 pairs, slender; petiole very variable, $\frac{1}{2}$ -2 $\frac{1}{2}$ in., rather slender. *Racemes* often fasciated, erect; pedicels long or short. *Sepals* of male broadly oblong; petals as long as the sepals, woolly; disk-glands 5, rounded; stamens 12, glabrous. *Sepals* of fem. oblong; petals small, linear, ciliate; disk depressed. *Ovary* oblong, 3-gonous, lepidote. *Capsule* $\frac{1}{2}$ in. diam., globosely 3-lobed, scaberulously lepidote, top depressed.—*C. Wallichianus*, which resembles this, differs in not being lepidote.

6. **C. Jouffra**, *Roxb. Fl. Ind.* iii. 685; inflorescence lepidote, leaves elliptic- or linear- or obovate-lanceolate acuminate quite entire or remotely repand-serrate penninerved old quite glabrous, base very acute, racemes elongate, sepals stellately lepidote, stamens 12 filaments villous, styles 2-partite slender, capsules 1-1 $\frac{1}{2}$ in. ovoid lepidote. *Muell. Arg. in DC. Prodr.* xv. ii. 519; *Kurz For. Fl.* ii. 373. C. *persimilis*, *Muell. l. c.* 619 (*Wallich's, plant only*). C. *oblongifolius* *Ham. in Wall. Cat.* 7718 D.

SILHET, *Roxburgh*; at Terrya Ghat, *J. D. H. & T. T., Clarke*. SEEBAGUR, *Clarke*. PEGU and MARTABAN, *Kurz*. UPPER BURMA, near the Silver Mines *Griffith*.

A shrub very similar to *C. oblongifolius*, but the leaves are shorter petioled, narrower, more acuminate and less serrate or toothed, and the capsule is very different.—I have seen only Silhet and Clarke's and Griffith's Burmese specimens; the capsules in the latter are terete, very obscurely 3-lobed, and the seeds oblong, as described by Kurz.—Mueller's *C. persimilis*, *a. genuina*, is a mixture of this with *C. oblongifolius* from Khasia, Assam, and Ceylon. His *β. glabrata*, from Rawak, is probably something very different.

7. **C. robustus**, *Kurz For. Fl.* ii. 372; leaves coriaceous elliptic or elliptic-oblong obtuse or subacute sparsely lepidote beneath penninerved, fem. spikes robust and subsessile flowers lepidote, styles slender 2-fid. *Croton*, *Wall. Cat.* 7737. ? *C. oblongifolius*, *Wall. Cat.* 7736.

PEGU to TENASSERIM, *Kurz*. Moolmayin, *Wallich*.

A small tree; branchlets very robust, rusty-scaly. *Leaves* 1 $\frac{1}{2}$ -8 in., dull greenish grey or brown when dry, pale but not shining beneath; nerves very slender; petiole $\frac{1}{2}$ -2 in., robust. *Male fl.* much larger than in *C. argyratus*; petals very small, linear, ciliate. *Sepals* of fem. fl. broadly ovate, obtuse; disk obscure. *Ovary* coppery-lepidote. *Capsule* ovoid-globose, 3-coccous, 6-grooved, size of a large pea, obscurely scaly and tubercled.—The specimens are very indifferent, and the description is chiefly from Kurz. I take Wallich's 7736, from Tavoy, to be a male specimen of this with very slender spikes and pedicelled flowers; it differs from *C. oblongifolius* in the entire obtuse leaves.

** Inflorescence stellately tomentose or glabrous (not lepidote except sparsely in *C. lævifolius* and *Griffithii*).

† Leaves 3-5-plinerved at the base, more or less stellately pubescent or tomentose on both surfaces.

8. *C. aromaticus*, Linn. *Sp. Pl.* 1005; branches and leaves scaberulous or tomentose with stellate hairs, leaves long-petioled ovate- or orbicular-cordate acute or acuminate denticulate 3-plinerved, racemes elongate softly tomentose, stamens about 20, ovary stellately hispid, styles short 2-5-partite, capsule $\frac{3}{8}$ in. subglobose stellately scabrid. *Vahl Symb.* ii. 98; *Geisel Monogr. Croton.* 21; *Wall. Cat.* 7773 B, C; *Beddome Forester's Man.* 204. *C. aromaticus* & *lacciferus*, *Muell. Arg. in DC. Prodr.* xv. 1, 588. *C. lacciferus*, Linn. *l. c.*; *Wight Ic. t.* 1915; *Gärtn. Fruct.* ii. t. 107. *C. tiliaefolius*, β . *aromatica*, *Lamk. Encycl.* ii. 206. *Aleurites laccifera*, *Willd. Sp. Pl.* iv. 590.—*Burm. Thes. Zeyl.* 201, t. 91.

The DECCAN PENINSULA; from the Concan southwards. CEYLON, common.

An aromatic shrub or small tree, usually grey when dry. *Leaves* 2-4 by 1-3 in., usually scabrid above and softer pubescent beneath; nerves 2-6 pair above the basal; glands subsessile; petiole $\frac{1}{2}$ -1 in., stout, pubescent. *Racemes* 4-6 in. *Male fl.* with woolly petals as long as the sepals; stamens short; receptacle densely villous; disk-glands small. *Fem. fl.* remote, stoutly pedicelled, thickly tomentose; sepals short, broad; disk hairy; petals minute, filiform, ciliate. *Capsule* obscurely lobed. *Seeds* broadly oblong, dorsally rugose, opaque.—Near *C. caudatus*, but the leaves are less toothed, the racemes more woolly, the styles much shorter, usually many-lobed and hardly exerted, and the capsule much smaller. I find no difference between *C. lacciferus* and *aromaticus*, nor does Beddome, who would include under this *C. caudatus*, *Moonii* and *nigro-viridis*. Thwaites distinguishes *aromaticus* from *lacciferus* by the longer weaker branches, less hairy leaves often more openly cordate, and the larger longer capsules with scattered stellate hairs.—*C. Moonii* appears to differ in the penninerved leaves.

9. *C. caudatus*, *Geisel Croton. Monogr.* 73; branches and racemes scurfily stellately hairy, leaves from ovate- to orbicular-cordate acute or acuminate irregularly toothed scaberulous above scabrid or softly pubescent with stellate hairs beneath 3-5-plinerved, racemes very long slender, stamens 18-30 filaments silkily hairy below, ovary stellately woolly, styles 2-partite arms very long slender hairy below, capsule large globose or broadly oblong terete woody. *Muell. Arg. in DC. Prodr.* xv. ii. 599; (*excl. γ.*); *Kurz For. Fl.* ii. 375; *Gamble Man. Ind. Timb.* 359. *C. denticulatus*, *Blume Bijdr.* ii. 603. *C. drupaceus*, *Roxb. Fl. Ind.* iii. 683; *Wall. Cat.* 7720 A, C, 7721. *Tigilium hispidum*, *Klotzsch.*—*Wall. Cat.* 7726, ? 7769, 7826 E.

EASTERN HIMALAYAS; Sikkim, *J. D. H.*, and Bhotan, *Griffith.* ASSAM, BENGAL and SILHET to the DECCAN and MALACCA. CEYLON; north part of the island.—DISTRIB. Java, Philippines.

A more or less scandent shrub, branches stout or slender, scurfily scabrid. *Leaves* very variable, smaller 1-3 in. ovate-cordate, larger 4-7 in. orbicular-cordate, margin denticulate or rather coarsely toothed, often with a gland at the sinus, or the teeth glandular, upper surface smooth or scaberulous, lower scabrid or tomentose, nerves 2-3 pair above the basal, pubescent above; glands minute (long-pedicelled in some Ceylon specimens); petiole 1-2 in., scabrid. *Racemes* solitary, terminal, 4-10 in.; bracts subulate or 0; pedicels long or short. *Male fl.* tomentose; petals as long as the sepals, woolly; disk-glands minute; receptacle villous with white hairs; stamens often far exerted. *Fem. fl.*; sepals ovate, subacute, scabrid; petals very minute, subulate, long-ciliate; disk low, hirsute. *Capsules* $\frac{3}{8}$ -1 in. long or broad, terete or with 6 slender ridges, densely rusty scabridly pubescent, 6-valved from the top downwards. *Seed* very variable, dorsally compressed, slightly rugose.—The variable fruit is a remarkable character of this plant. I recognize the following

forms, to which may be added Kurz's *genuina*, with capsules the size of a bullet or larger and glabrous seeds; and var. *minor* with capsules the size of a large pea or small cherry and unripe seeds sprinkled with stellate hairs.

Wallich's No. 7762 from Singapore is referred to *C. caudatus* by Mueller, but if the unattached capsule belongs to it, its thin crustaceous texture is very different, the leaves too are much larger and more coriaceous; it is in a very bad state.—Roxburgh in describing the fruit alludes to two varieties, of which the larger has 3-nerved cotyledons.

Var. 1. *hispida*; leaves large rounded cordate, capsule globose $\frac{2}{3}$ in. diam. stellately hispid, seeds $\frac{1}{2}$ in.

Var. 2. *ruminata*; leaves large rounded cordate, capsule globose or broadly oblong $\frac{3}{4}$ –1 in. long or broad, seeds broadly oblong, finely rusty scaberulous, endocarp woody recurved, seeds $\frac{1}{2}$ in. long longitudinally obscurely furrowed covered with scattered stellate hairs.—Sikkim and Khasia Mts.

Var. 3. *globosa*; leaves as in 2, fruit globose endocarp quite smooth, seeds $\frac{1}{4}$ in. long.

Var. 4. *tomentosa*; leaves ovate softly tomentose beneath acutely toothed with often a cup-shaped gland at every tooth on the under surface.—Silhet (Wall. Cat. 7838), Assam, Griffith.

Var. 5. *malaccana*; leaves smaller usually ovate-cordate base rounded acuminate sharply toothed, capsule $\frac{3}{4}$ –1 in. globose or broadly oblong with 6 low ribs finely rusty-pubescent, endocarp woody smooth, seeds very broad $\frac{1}{2}$ in. long, retuse at both ends, and with a dorsal shallow furrow.—Mergui and Malacca, Griffith (Kew Distrib. 4775); Maingay (1376).

10. **C. tomentosus**, Muell. Arg. in *Linnaea* xxxiv. 107, and in DC. Prodr. xv. ii. 588; all parts thickly clothed with stellate tomentum, leaves coriaceous ovate or oblong acute entire or denticulate 3-plinerved, racemes short few-fl., bracts long glandular, stamens about 25 glabrous, styles 2-partite arms slender 2-fl., ovary densely stellately hispid. *C. chinensis*, Benth. Fl. Hongk. 309. *C. chrozophoroides*, Kurz mss. *C. crassifolius*, Geisel Croton. Monogr. 19. *Tridesmis tomentosa*, Lour. Fl. Coch. ii. 707.

PEGU, Kurz.—DISTRIB. South China.

Stems or branches 6–10 in. high, apparently erect from a prostrate woody rootstock, stiff, terete. Leaves few, 2–3 in., rigid; nerves 4–5 pair above the basal, strong beneath; petiole $\frac{1}{2}$ –1 in., very stout. Racemes 2–4 in.; glands of bracts long-stipitate. Sepals ovate, nearly glabrous within. Petals of male as long, oblong, margins woolly. Young capsule $\frac{1}{2}$ in., terete? densely stellately hispid.

11. **C. caelococcus**, Kurz For. Fl. ii. 377; shrubby, all parts scaberulous with stellate hairs, leaves broadly ovate or elliptic-ovate acute entire or denticulate 3-plinerved at the rounded base, racemes slender, bracts minute, sepals hispid, ovary stellately hispid, styles 2-partite slender hairy, capsule small deeply 3-lobed tuberculate and stellately hispid.

PEGU, McClelland; at Rangoon, Kurz.

A rigid shrub, branches terete. Leaves 2–3 in., basal nerves extending beyond the middle; glands stipitate; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. Racemes 1–2 in.; male fl. not seen. Sepals not accrescent. Capsules $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., broader than long, 3-lobed at top and sides, lobes spreading. Seeds broadly ovoid, arillate, smooth, brown.—The specimens are indifferent.

12. **C. birmanicus**, Muell. Arg. in *Linnaea* xxxiv. 112, and in DC. Prodr. xv. ii. 601; branches scabrid with stellate hairs, leaves coriaceous orbicularly ovate-cordate acuminate finely gland-toothed minutely stellately pubescent on both surfaces strongly 3–5-plinerved at the base, racemes solitary stout terminal, fem. sepals ovate-lanceolate acuminate, stamens

about 15 glabrous, ovary densely stellate-tomentose, styles 2-partite slender. *C. drupaceus* ?, *Wall. Cat.* 7744, and *C. aromaticus*, 7773 A.

BURMA; on the Irawaddy at Taong-dong, *Wallich*. PEGU, *McClelland*.

Branches woody, bark pale. *Leaves* 3-5 in., yellow-brown when dry, base very broadly cordate; nerves 5-6 pair above the basal, strong beneath; glands cup-shaped, sessile; petiole 1-1½ in., stout. *Capsules* "large, depressed-globose, inflated, rigidly chartaceous. *Seeds* smooth," *Mueller*.—There are no capsules in *Wallich's* Herbarium, and I have seen none.

†† Leaves penninerved, not or obscurely 3-nerved at the base; mature usually quite glabrous above (or scaberulous in *C. Moonii*).

§ *Inflorescence tomentose or stellately pubescent.*

13. ***C. Wallichii***, *Muell. Arg. in Linnæa* xxxiv. 118, and in *DC. Prodr.* xv. ii. 623; shoots and young leaves softly stellate-pubescent, leaves obovate oblanceolate or elliptic acuminate subserrate glabrous or softly puberulous beneath base narrowed acute or narrowly cordate nerves 6-12 pair, racemes fascicled finely tomentose, stamens 10-12 hairy below, ovary stellately pubescent, styles slender 2-partite, capsule small 3-lobed puberulous. *Kurz For. Fl.* ii. 373.—*Croton* sp., *Wall. Cat.* 7729, 7730, 7733, 7739 (in part).

BURMA, *Wallich*. PEGU, to TENASSERIM, *Griffith, Kurz*.

A small deciduous tree. *Leaves* 3-10 by 1½-3 in., yellow when dry, quite glabrous above, base often produced, glands depressed; petiole 1-1½ in., scaberulous. *Racemes* 4-8 in., slender. *Sepals* tomentose. *Disk* of fem. fl. obscure. *Styles* shorter than in many species. *Capsule* the size of a pea. *Seeds* ½ in. long.—I have seen no fruit, and described it from *Kurz* and *Mueller*. The latter describes the habit and inflorescence as of *C. caudatus*, but this must be a lapsus, possibly for *oblongifolius*. The fem. fl. have petals which it greatly resembles, but differs in the inflorescence not being lepidote.

14. ***C. sublyratus***, *Kurz For. Fl.* ii. 374; shoots rusty-scurfy, leaves very shortly petioled obovate to almost lyrate oblong obtuse or acuminate repand-serrulate beneath glabrous or with scabrous nerves, racemes stellate-tomentose, stamens 15-20 glabrous, ovary densely stellate-tomentose, styles short 2-partite, capsules small 3-lobed crustaceous sparsely pubescent.

Maritime forests of the ANDAMAN ISLANDS, *Kurz*. ? MOULMEIN, *Falconer*.

A deciduous shrub.—The only authentically named specimen I have seen of this is in a very young state; the branches are stout; the leaves 6-8 in. long, dark brown, acuminate, subentire, glabrous on both surfaces, cordate at the narrowed base; the petiole stout, ¼-½ in. long, and the inflorescence too young for examination. Others also collected by *Kurz* in the Andamans, but unnamed, have membranous serrulate pale-brown leaves, and scaberulous old fruiting racemes; the foliar glands are either sessile or shortly stipitate, capsules ½ in. diam., and seeds subglobose smooth and mottled. A very similar plant from Moulmein in bad state, collected by *Falconer*, has decandrous male flowers with filaments villous below, and a shortly villous receptacle. The narrowing of the leaves above the base is characteristic of this species.

15. ***C. Moonii***, *Thwaites Enum.* 276; branches and leaves beneath stellately scabrid, leaves oblong or linear-oblong acuminate subserrulate smooth or scaberulous above penninerved base rounded or unequally cordate, racemes tomentose, stamens 10-16, ovary stellately hispid, styles 2-5-partite, capsule ¼-⅓ in. diam. depressed-globose scurfy and tubercled. *Muell. Arg. in DC. Prodr.* xv. ii. 590. *C. punctatus*, *Moon Cat.*

CEYLON; at Caltura, Moon, Thwaites.

A small tree; branchlets woody. *Leaves* 3-6 in., rather coriaceous, very dark above when dry, greyish beneath; nerves 7-12 pairs, slender, spreading; glands minute; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., scabrid. *Sepals* obtuse, stellate-tomentose. *Disk* of male obscure, of fem. small annular.—The specimens are in a young state, and I have seen no fruit. Beddome regards it as a var. of *C. aromaticus*, from which Thwaites' specimens differ in the longer narrower penninerved leaves. The styles are as in *aromaticus*.

16. **C. erythrostachys**, Hook. f.; branches young leaves petioles and racemes rusty stellately scabrid, leaves ovate oblong or linear-oblong acuminate subserrulate penninerved smooth and shining above scabrid beneath, racemes short stout, stamens about 12 glabrous, ovary depressed stellate hispid, styles very slender 2-partite, capsule $\frac{1}{3}$ - $\frac{1}{2}$ in. diam. globose scabrid.

MALACCA, Cuming (No. 2393), Griffith (Kew. Distrib. 4777), Lobb.

Leaves coriaceous, 3-8 by 1-2 $\frac{1}{2}$ in., base subacute rounded or subcordate; nerves 8-12 pair, slender, spreading; glands sessile; petiole $\frac{1}{2}$ -1 $\frac{1}{4}$ in., stout, rusty. *Racemes* 1-2 $\frac{1}{2}$ in.; flowers rather large; males tomentose, fem. more hispid; sepals glabrous within. *Petals* of male oblong, of fem. subulate. *Capsule* crustaceous.

17. **C. rhodostachyus**, Muell. Arg. in *Linnaea* xxxiv. 108, and in DC. Prodr. xv. ii. 590; shoots and young leaves beneath stellately puberulous, leaves long-petioled elliptic or elliptic-oblong obtuse or subacute crenulate penninerved base acute, young racemes fascicled rusty-tomentose, stamens 10-12. *C. denticulatus*, Wall. Cat. 7731.—Wall. Cat. 7739 in part.

BURMA; at Taong-dong and Sejavi, Wallich.

Branches woody, stout, bark grey. *Leaves* coriaceous, 4-7 in., variable in width, dull greenish when dry, base contracted and sometimes very narrowly cordate; nerves 8-10 pair, very slender; glands minute; petiole 1-2 $\frac{1}{2}$ in., terete, puberulous. *Racemes* too young for description.—A very imperfectly known plant.

§§ *Inflorescence glabrous or nearly so.*

18. **C. lævifolius**, Blume Bijl. 603; glabrous, leaves elliptic or elliptic-lanceolate or oblong acuminate subserrate penninerved base usually acute, racemes rather short, flowers small males filled with silvery wool, stamens about 10, disk of fem. of 5 large glands, ovary globose stellately hispid and with lepidote scales, styles 2-partite, capsule $\frac{1}{4}$ in. diam. depressed globose smooth and shining. Muell. Arg. in DC. Prodr. xv. ii. 619. *C. diadenus*, Miquel Fl. Ind. Bat. Suppl. 451.—Wall. Cat. 7719.

KHASIA Mts., alt. 3-4000 ft., Wallich, &c.—DISTRIB. Mts. of Java, Sumatra.

A small tree, very young shoots and leaves sparsely stellately lepidote. *Leaves* 2-4 in., membranous, green when dry, nerves 8-12 pair; glands small, at length stipitate; petiole $\frac{1}{2}$ -1 $\frac{1}{4}$ in., very slender. *Racemes* 2-4 in., sometimes with a few scattered stellate scales; bracts lanceolate; flowers often 2-3 together seated on small pulvini of the rachis, males appearing as if stuffed with the stellately woolly hairs of the receptacle. *Sepals* of male bearded at the tip; of fem. ovate, acute, recurved, quite glabrous. *Filaments* glabrous. *Styles* rather short. *Capsule* crustaceous, with no stellate hairs or scales.—I have seen no Javanese or Sumatran specimens, and take the identifications from Mueller. The similarity of this to *C. Klotzschianus* has led to these species being indiscriminately numbered in the distribution of Wallich's plants. *C. argutus*, cited under *lævifolius* by Mueller, is *C. Klotzschianus*. The Philippine Island *C. leiophyllus*, Muell. (*Tigilium Cumingii*, Klotzsch), is very near *C. lævifolius*, but the ovary is lepidote and the fruit is wanting.

19. **C. Griffithii**, *Hook. f.*; quite glabrous, leaves elliptic or oblong obtuse or acuminate entire or obscurely subsinuate-serrate penninerved shining above, racemes elongate glabrous or sparsely lepidote, flowers small solitary, males filled with silvery wool, stamens 8-15, disk of fem. of 5 large glands, ovary depressed 3-lobed stellately tomentose and white with lepidote scales, styles 2-partite, capsule $\frac{1}{3}$ in. diam. depressed 3-lobed sparsely lepidote smooth.—*Wall. Cat.* 7754, 7967.

MALACCA, *Griffith* (*Kew Distrib.* 4778, 4781), *Maingay* (*Kew Distrib.* 1406). SINGAPORE, *Wallich*, &c. PERAK, *Scortechini*, *King's Collector*.

Branchlets with pale bark. *Leaves* 4-8 in., rather coriaceous, very smooth, yellow brown when dry, base rounded or acute; nerves 8-12 pair, spreading, very slender; glands minute, sessile; petiole 1-2 $\frac{1}{2}$ in., terete. *Racemes* 4-8 in., rachis thickening in age; sepals of fem. ovate, subacute, tips bearded. *Capsule* not shining, with globose lobes. *Seeds* subglobose.—*Griffith's* and some of the Perak specimens have obtuse leaves with rounded bases; in *Maingay's* they are more acute, and the racemes more slender; in the Singapore ones the racemes are much shorter and sparsely lepidote; hence there may be more than one species under the above description. A solitary specimen of *Griffith's* from Malacca (*Kew Distrib.* 4779) has the very slender racemes of *C. lœvifolius* and lepidote ovaries.—It is possible that this is the true *lœvifolius* of Blume; and if so, the Khasian plant so called should bear the name of *khasianus*.

20. **C. Gibsonianus**, *Nimmo in Grah. Cat. Bomb. Pl.* 251; quite glabrous, leaves membranous elliptic oblong or linear-oblong caudate-acuminate penninerved and 3-nerved at the obtuse or rounded base, racemes very long and slender, sepals membranous, disk of male of 5 large glands, stamens 10, ovary stellate-tomentose, styles very long 2-partite, capsule $\frac{1}{2}$ in. diam. 3-lobed stellately hairy. *Muell. Arg. in DC. Prodr.* xv. ii. 692; *Dalz. & Gibs. Bomb. Fl.* 232.

CANARA, *Gibson*, *Law*; common in moist forests on the Ghats to the south, *Talbot*.

A shrub; branches slender, smooth, young shoots and leaves sparing stellate pubescent. *Leaves* 3-8 by 1-4 in., green or yellowish when dry; nerves 8-10 pairs, very slender; glands minute, stipitate; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., terete. *Racemes* 6-10 in.; flowers distant, solitary or fascicled, bracts small. *Receptacle* of male very small, woolly. *Disk* of fem. saucer-shaped. *Styles* very long, recurved. *Capsule* crustaceous. *Seeds* broadly oblong, smooth, shining.

21. **C. Klotzschianus**, *Wight Ic. t.* 1914; glabrous except the stellately lepidote youngest shoots, leaves small membranous elliptic-oblong acute entire or serrulate penninerved and 3-nerved at the base, racemes short very slender, sepals membranous, disk of male and fem. of 5 large glands, petals of fem. subulate, stamens about 10-12, ovary stellate-tomentose, styles long 2-partite, capsule depressed 3-lobed. *Thwaites Enum.* 276; *Beddome Forester's Man.* 204. *C. Thwaitesianus*, *Muell. Arg. in Linnæa* xxxiv. 116, and in *DC. Prodr.* xv. ii. 621. *C. caudatus*, *γ.*, *Muell. l. c.* *C. argutus*, *Heyne*, & *umbellatus*, *Heyne in Wall. Cat.* 7768. *Tigium punctulatum*, *Klotzsch in Hayne Arzneik-Gewachs. ined.*—*Wall. Cat.* 7750 (one specimen).

DECCAN PENINSULA; Nilghiri Hills, *Foulkes*; Travancore, *Heyne*, *Wight*. CEYLON, not uncommon.

A small tree or bush; branches slender, pale. *Leaves* 1-2 in., small and membranous for the genus, pellucid-punctate, base acute; nerves 6-8 pair, very slender; glands minute, sessile; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., very slender. *Racemes* 1-3 in.; bracts subulate; male fl. long-pedicelled; sepals and petals translucently gland-dotted; disk-glands very large; receptacle very small; stamens hairy below. *Disk* 5-lobed in

both sexes. *Sepals* of fem. ovate, acute; petals subulate, hairy; styles very long, divided $\frac{2}{3}$ way down. *Capsule* "at length glabrous," *Thwaites*.—This is undoubtedly, as Beddome has pointed out, Wight's *Klotzschianus*, and is well figured by him. Wight compares it with *C. Tiglium*, from which it differs widely in the elliptic leaves and nerves. I have seen no ripe fruit.

22. **C. ardisioides**, *Hook. f.*; robust, quite glabrous, leaves oblong or linear- or obovate-oblong obtuse crenate penninerved base acute, racemes very slender, flowers small scattered, disk of male obscure of fem. 5-lobed, stamens about 12, ovary depressed stellate-tomentose, styles 2-partite, capsule very small globose smooth.

MALACCA, *Griffith* (*Kew Distrib.* 4783).—DISTRIB. Borneo.

Branches stout. *Leaves* 2-4 in., rather coriaceous, tawny yellow when dry; nerves 6-10 pairs, very slender; glands petiolar, small; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., stout, terete. *Racemes* 3-5 in., flexuous; bracts minute; flowers scattered. *Sepals* glabrous, of male with bearded tips; of fem. ovate, obtuse. *Capsule* (one only seen) $\frac{1}{8}$ in. diam., terete.

††† *Leaves strongly triple-nerved, glabrous or nearly so.*

23. **C. Tiglium**, *Linn. Sp. Pl.* p. 1004; youngest shoots sparsely stellately hairy, leaves long-petioled membranous glabrous ovate acuminate serrate 3-5-plinerved, rachis of racemes and small flowers glabrous, fem. stellately hairy, stamens 15-20, ovary stellately hispid, styles slender 2-partite, capsule large oblong 3-lobed, pericarp thin glabrous or slightly hispid. *Muell. Arg. in DC. Prodr.* xv. ii. 600; *Rorb. Fl. Ind.* 632; *Kurz For. Fl.* ii. 374; *Grah. Cat. Bomb. Pl.* 181; *Wall. Cat.* 7722; *Blume Bijdr.* ii. 602; *Klotzsch in Hayne Arzneigew.* xiv. t. 3; *Marchand in Baill. Rec. Obs. Bot.* i. 232-245, t. 9, 10; *Bentl. & Trimen Med. Pl.* iii. t. 239. *C. Jamalgotia*, *Ham. in Trans. Linn. Soc.* xiv. 258. *C. Parana* (*Parona in Wall. Cat. l. c.*), *Ham. l. c.* 259; *Muell. Arg. l. c.* 623 (*Paranae*). *Tiglium officinale*, *Klotzsch in Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. 418.—*Burm. Fl. Zeyl.* t. 90.—*Rheede Hort. Mal.* ii. t. 33.

BENGAL, ASSAM, and southward to MALACCA, BURMA, and CEYLON, naturalized or cultivated.—DISTRIB. China, Malay Islands.

A small evergreen tree. *Leaves* 2-4 in., yellowish when dry, rarely elliptic or oblong, sometimes glandular beneath; nerves 2-3 pair above the basal; glands minute, sessile; petiole 1-2 in., slender. *Racemes* 2-3 in.; bracts subulate. *Male fl.*; pedicels stellately hairy; sepals nearly glabrous, tips bearded; petals narrow, woolly-edged; stamens glabrous, receptacle villous; disk-glands 5, small. *Fem. fl.*; sepals villous at the base within; petals 0; disk obscure, annular; ovary oblong. *Capsule* $\frac{1}{2}$ -1 in. long, white, turbinate obovoid, obtusely trigonous. *Seed* $\frac{1}{4}$ - $\frac{1}{2}$ in., oblong, obtusely trigonous, pale.—I find no characters whereby to distinguish Hamilton's *C. Parana* from *Tiglium*; Mueller is mistaken in supposing that Wallich's 7722 B is not Hamilton's plant; the specimen is Hamilton's own from Goyalpara in Kamrup (Assam), and is so named by himself.

24. **C. nigro-viridis**, *Thwaites Enum.* 276; shoots racemes and young leaves beneath sparsely stellately pubescent, leaves coriaceous broadly ovate or ovate-lanceolate acuminate serrulate base strongly 3-nerved, racemes short stout, ovary stellately hispid, styles long 2-partite, fruit small subglobose 3-lobed woody scabrid and sparsely stellate. *Muell. Arg. in DC. Prodr.* xv. ii. 601; *Wawra Bot. It. Pr. Sax. Cob.* 37.

CEYLON; Central Province, alt. 5000 ft., *Thwaites*.

A small tree; branches very stout, smooth. *Leaves* 3-5 in., leathery, greenish when dry, quite smooth on both surfaces, base rounded; nerves 1-3 pair above the

basal; glands rather large, subsessile; petiole 1-2 in., stout, terete. *Racemes* 2-3 in.; pedicels very short, stout; bracts minute. *Sepals* of fem. stellate externally, glabrous within except the villous base; disk annular, 5-lobed; petals minute, subulate, with long hairs; styles rather stout. *Capsule* $\frac{1}{2}$ in. long, rather longer than broad, top depressed. *Seeds* unripe.—I have seen no male flowers, nor the lanceolate leaves described by Thwaites. Beddome is disposed to regard this as a form of *C. aromaticus*, but it appears to me entirely different, with the leaves of *C. Tiglium*, but very thick.

25. **C. flocculosus**, *Kurz For. Fl.* ii. 375; shoots and leaves beneath with soft woolly tomentum, leaves broadly ovate-cordate acute crenate strongly 3-5-plinerved, capsules in terminal racemes subglobose softly tomentose, seeds elliptic-oblong.—*Wall. Cat.* 7743.

PEGU and BURMA; in the swamp forests of the Irrawaddi, *Kurz*; hills opposite Paghamew, *Wallich*.

A tree; branches stout, woody; bark pale. *Leaves* 2-3 in. long and broad, pale when dry, smooth above, at length glabrous beneath; nerves 3-4 pair above the basal, glands minute; petiole $\frac{1}{2}$ -1 in., rather slender. *Capsule* obscurely lobed. *Seeds* $\frac{1}{4}$ in., smooth, subterete or plano-convex.—A very distinct species, but in an incomplete state.

B. *Ovary* glabrous, styles united in a short column. *Sepals* greatly enlarged and foliaceous in fruit.

26. **C. Lawianus**, *Nimmo in Gragh. Cat. Bomb. Pl.* 251; young leaves finely softly stellately hairy, leaves shortly petioled broadly ovate caudate-acuminate quite entire strongly 3-nerved, racemes short few-fl., male fl. large membranous, stamens about 20, sepals of fem. large oblong glabrous, ovary oblong glabrous 3-lobed, styles 3 united below very stout recurved, capsule large rugose glabrous. *Dalz. & Gibs. Bomb. Fl.* 232. *Trigonostemon Lawianus*, *Muell. Arg. in Linnæa* xxxiv. 212, and in *DC. Prodr.* xv. ii. 1105 (in part).

CANARA; on the Bababoodan Hills, *Gibson, Law, Dalzell*.

Branches slender, terete, smooth. *Leaves* 3-5 in., thinly coriaceous, base rounded, greenish when dry; nerves 2-3 pair above the basal; glands minute; petiole $\frac{1}{2}$ in., terete. *Racemes* very slender; bracts 0. *Male fl.* 3-5, $\frac{1}{3}$ in. diam.; pedicels capillary; sepals ovate, obtuse, gland-dotted, sparsely stellately hairy; petals larger, oblong, fimbriate; stamens short; disk of 5 large glands. *Fem. fl.* few, $\frac{1}{2}$ in. long; pedicel as long, very stout, erect; disk annular; styles recurved 2-lobed, lobes 2-fid. *Capsule* $\frac{2}{3}$ in. diam., shorter than the leafy green sepals, thickly crustaceous. *Seeds* $\frac{3}{8}$ - $\frac{1}{2}$ in. long, oblong, striately mottled brown and white.—The female calyx resembles that of a *Trigonostemon*, whence Mueller's reference of this to his *T. Lawianus* (*Dimorphocalyx glabellus*, Thw.).

27. **C. chlorocalyx**, *Wall. Cat.* 8001; quite glabrous, leaves linear-lanceolate caudate-acuminate subserrulate penninerved, racemes cymose very slender, male fl. membranous, stamens 12-15 fem. subsolitary, sepals oblong foliaceous, ovary oblong glabrous 3-lobed, styles 3 united below very stout recurved 2-lobed. *Muell. Arg. in DC. Prodr.* xv. ii. 590.

SILHET, *Wallich*.

Branches stout, woody, bark pale. *Leaves* 5-9 in., ochreous yellow when dry, pale beneath, base narrowed into the petiole; nerves 10-15 pair, very slender; glands minute; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Racemes* shorter than the leaves. *Male fl.* $\frac{1}{3}$ in. diam.; sepals and petals obtuse, undulate, tipped with hairs; disk-glands 0; receptacle small, villous. *Fem. fl.* shortly pedicelled; sepals oblong, $\frac{1}{4}$ in. long, green, tip rounded; petals subulate; disk 0; ovary shortly stipitate; styles very stout, recurved, once or twice 2-fid.—Habit of *C. oblongifolius*.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

C. CARDIOSPERMUS, *Gærtn. Fruct.* ii. 120, t. 107; *Geisel Croton. Monog.* 77; *Muell. Arg. in DC. Prodr.* xv. ii. 695.—Ceylon.—Mueller remarks that the absence of a caruncle excludes this from *Croton*. It is impossible to say what it is; possibly a *Phyllanthus*.

C. RAMIFLORUS, *Grah. Cat. Bomb. Pl.* 182; *Muell. Arg. l. c.* 693; "a small tree, leaves alternate petioled oblong-ovate subglaucous beneath, flowers small white growing on the naked branches, capsules size of a large pea half and in the scarious 5-winged calyx, sparsely hairy."—The Concan; near K *Gibson*.—I have not recognized this plant.

C. RHEDEI, *Grah. Cat. Bomb. Pl.* 182; *Muell. Arg. l. c.* 693; "an erect suffruticose plant 2-3 feet high, flowers in terminal spikes." *Croton Gibsonii*, *Grah. l. c.*—*Rheede Hort. Mal.* x. 83.—It is impossible to say what *C. Rheedei* is; Mueller unites with it Graham's *C. Gibsonii*, which Graham says much resembles Rheede's t. x. f. 83, and should probably be referred to it. It is also a suffruticose species, and has petioled cordate serrate leaves. *C. Rheedei* is a native of Tull Ghat, Salsette and Jowaur, *C. Gibsonii* of the northern peaks of the Deccan, *D. Gibson*. Local botanists must rediscover both.

C. TABACIFOLIUS, *Geisel Croton. Monog.* 26; *Muell. Arg. l. c.* 696, is undeterminable by the description. Mueller observes that from its simple hairs it cannot be a *Croton*, and that it may be *Claoxylon indicus*.

35. **GIVOTIA**, Griff.

A small stellately tomentose tree. *Leaves* alternate, rounded, and cordate, sinuate-toothed, base 5-9-nerved. *Flowers* in axillary and subterminal racemed or paniced cymes, diœcious. *Disk* entire or lobed. **MALE FL.** *Sepals* 5, broad, unequal, imbricate. *Petals* 5, longer, cohering in a globose 5-lobed corolla. *Disk* of orbicular glands. *Stamens* 13-25, crowded on a woolly receptacle, filaments connate below, erect; anthers ovate, dorsifixed, cells parallel. *Pistillode* 0. **FEM. FL.** *Perianth* of the male. *Disk* cupular. *Ovary* 2-3-celled; styles short, spreading, 2-fid; ovules 1 in each cell. *Drupe* subglobose; putamen crustaceous, 1-celled, 1-seeded. *Seed* globose or ellipsoid, testa bony, albumen fleshy; cotyledons broad, flat.

G. rottleriformis, *Griff. in Calc. Journ. Nat. Hist.* iv. 388; *Muell. Arg. in DC. Prodr.* xv. ii. 1112; *Baill. Etudes Gen. Euphorb.* 389; *Wight Ic.* t. 1889; *Brand. For. Fl.* 442; *Gamble Man. Ind. Timb.* 365; *Dalz. & Gibs. Bomb. Fl.* 228; *Beddome Fl. Sylvat.* t. 285. *Govania nivea*, *Wall. Cat.* 7851.—*Wall. Cat.* 7819 A, C.

DECCAN PENINSULA; common in the central ranges of the Ghats from Dharwar and Bellary southwards, *Wight*, &c. CEYLON; in the drier parts of the island.

A small tree; branches stout, wood soft. *Leaves* attaining 10 in. long and broad, coriaceous, hoary above, beneath white with dense appressed wool; nerves 5-7, basal, with several pairs above them; petiole stout, 4-6 in., woolly, with sometimes a few glands. *Panicles* 4-8 in. long; cymes dense or lax-fl'd.; bracts filiform; pedicels jointed. *Male fl.* $\frac{1}{8}$ in. diam., fem. $\frac{1}{4}$ in.; sepals stellately tomentose, shorter than or equalling the oblong glabrous petals; filaments hairy below. *Fem. fl.*; ovary globose, stellately hairy. *Drupe* $\frac{1}{4}$ -1 in. diam., hoary. *Seed* smooth.

36. **TRIGONOSTEMON**, Blume.

Evergreen trees or shrubs. *Leaves* alternate, penninerved. *Flowers* in axillary or terminal spikes racemes or cymes, monœcious. **MALE FL.** *Sepals* 5, imbricate. *Petals* 5. *Disk* of 5 glands, often united in a lobed cup.

Stamens 3 or 5; anthers sessile, or filaments united in a column with free spreading tips; anthers erect or horizontal, cells united by their bases, each cell with an often thick crested connective, extrorse. *Pistillode* 0. *FEM. FL.* *Perianth* of the male, or petals 0. *Disk* usually entire. *Ovary* 3-celled; styles 2-fid or twice 2-fid, rarely entire; ovules 1 in each cell. *Capsule* of 3 2-valved cocci. *Seeds* ovoid or globose, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species 15 or more, Indian and Malayan.

The following sections are those proposed in *Genera Plantarum*, iii. 298. They are not natural, the species with long petioles thickened at the tip differing in habit from the rest, and resembling *Ostodes*. Sect. *Pycnanthera* appears generically distinct, but I should hesitate to separate it before having studied the whole genus thoroughly. (Under *Trigonostemon* in *Gen. Plant.* l. c. for *Cheilosiosopsis* read *Cheilosopsis*, and for *Antitaxis* read *Anisotaxis*.)—Wall. Cat. 8018, from Penang, is possibly a *Trigonostemon*, but is in too imperfect a state for determination.

Sect. I. EUTRIGONOSTEMON. *Racemes* axillary. *Anthers* 3, on a column, erect or horizontal, 2-partite; cells connected at the base only.

1. **T. longifolius**, Baill. *Etudes Gen. Euphorb.* 341, t. 11, f. 12; leaves subsessile 8–18 in. oblanceolate acuminate, panicles or racemes axillary long spiciform hispid and pubescent, capsule hispid, styles shortly 2-lobed. Muell. Arg. in *DC. Prodr.* xv. ii. 1108; *Kurz For. Fl.* ii. 406. *Croton longifolius*, Wall. Cat. 7717. ? *Athroisma dentatum*, Griff. *Notul.* iv. 478, and *l.c. Plant. Asiat.* t. 585, f. 4.

From TENASSERIM and PENANG to SINGAPORE, Wallich, &c.

A small tree or shrub; shoots with golden hairs. *Leaves* 2–4 in. broad, narrowed into the very short petiole; nerves 15–20 pair, very slender, margin entire or with few distant glandular teeth. *Racemes* rigid, rachis angled; bracts subulate. *Male fl.* about $\frac{1}{4}$ in. diam.; sepals broad, hispid, one much the largest; petals obovate-oblong, red; anther-cells acute, connective hardly thickened. *Capsule* $\frac{1}{2}$ in. diam., equalling the stout pedicel, tridymous, densely hispid. *Seeds* minute.—The Tenasserim specimens have the broadest leaves, and those of one of Wallich's specimens are rounded at the narrow base, with a short distinct petiole.

2. **T. heteranthus**, Wight *l.c.* t. 1890; glabrous, leaves very long-petioled 5–10 in. elliptic-lanceolate caudate-acuminate entire or serrate, panicles axillary very slender, pedicels capillary, styles shortly 2-lobed, capsule glabrous. Muell. Arg. in *DC. Prodr.* xv. ii. 1109; *Kurz For. Fl.* ii. 406. ? *Athroisma serratum*, Griff. *Notul.* iv. 477, and *l.c. Plant. Asiat.* t. 585, f. 9.

TENASSERIM; at Mergui, Griffith.

Shrubby or arboreal (a tree 28 ft., Griffith); shoots tawny-pubescent. *Leaves* 2–3½ in. broad, membranous, base acute 2-glandular, teeth gland-tipped; nerves 10–15 pair, slender, arched; petiole 1–5 in., very slender, tip swollen. *Panicles* 5–6 in.; bracts minute; pedicels simple and branched. *Male fl.* $\frac{1}{2}$ in. diam.; sepals rounded, unequal, membranous, ciliate; petals twice as long, rounded; disk-glands large, ascending; staminal column stout; anthers 3, forming a star of 6 obtuse points, each being horseshoe-shaped with a cell on each arm opening downwards. *Sepals* of fem. fl. ovate, gland-ciliate; petals as long; disk of the male; ovary glabrous. *Capsule* $\frac{1}{2}$ in. diam., tridymous, crustaceous, glabrous. *Seeds* subglobose, pale.

3. **T. malaccanus**, Muell. Arg. in *Flora* (1864) 482, and in *DC. Prodr.* xv. ii. 1110; glabrous, leaves long-petioled 3–12 in. lanceolate long-acuminate entire or crenate-serrate, racemes or spikes axillary very long slender puberulous, ovary silky, styles 2-partite.

MALACCA, *Griffith* (*Kew Distrib.* 4782).

Branches stout, woody. *Leaves* 1-2½ in. broad, base obtuse or rounded; nerves 15-20 pairs, arched; petiole 1-4 in., thickened at the tip. *Male spikes* and fem. racemes rigid, angular, glabrous or puberulous; bracts minute. *Male fl.* minute, ½ in long, clustered; fem. larger, ½ in long, subsolitary, stoutly pedicelled; sepals of male coriaceous, pubescent, of fem. oblong, erect; petals of male broadly obovate, of fem. minute or 0; connective of anthers papillose, cells parallel, united at the base only. *Capsule* unknown.

4. **T. lætus**, *Baill. Etudes Gen. Euphorb.* 341 (*excl. syn.*); glabrous, leaves long-petioled 4-6 in. oblong to oblong-lanceolate obtusely repand-toothed base obtuse, racemes axillary elongate spiciform, pedicels very short, ovary silky, styles 2-fid to the middle, capsule glabrous. *Muell. Arg. in DC. Prodr.* xv. ii. 1109 (*excl. syn. Croton lætus*); *Kurz For. Fl.* ii. 406.—*Wall. Cat.* 7740 B.

BURMA, at Amherst, *Wallich*; UPPER TENASSERIM, *Kurz*.

A shrub; buds tawny-pubescent. *Leaves* 2-3 in. broad, nerves 10-12 pairs; petiole 1-1½ in., thickened at the tip. *Racemes* rather robust, bracts minute. *Sepals* appressed-pubescent, of the fem. ovate-lanceolate ciliate; petals puberulous. *Capsule* ½-½ in. diam., depressed, tridymous. *Seeds* subglobose, marbled.—I have not seen a good flowering specimen, and have taken the description partly from *Kurz*. *Baillon* erred in citing for this plant *Wallich's Croton lætus*, which is his No. 7738, and a *Mallotus*. Of *Wallich's* 7740 there are three sheets in his Herbarium, of which two, both marked A, consist of *Claosylon Wallichii* and scraps of what I think is *Trigonostemon indicus*; the third, marked B, is *T. lætus* of *Baillon*; it bears the mss. name of *Acalypha atropurpurea*, *Wall.*, which was evidently intended for the *Claosylon*, some leaves of which have retained a red-purple hue.

5. **T. semperflorens**, *Muell. Arg. in DC. Prodr.* xv. ii. 1110; branches hispid, leaves very shortly petioled 5-10 in. oblanceolate from a narrow cordate base pubescent beneath, racemes very short subsessile, pedicels short stout, ovary hispid, styles 2-fid to the middle, capsules subsessile hispid. *T. Hookerianus*, *Muell. l. c.* 1109. *Sylvæa Hookeriana*, *Baill. Etudes Gen. Euphorb.* 342. *S. semperflorens*, *Hook. & Arn. Bot. Beech. Voy.* 211. *Cluytia semperflorens*, *Roxb. Fl. Ind.* iii. 740. *Agyneia ciliata*, *Wall. Cat.* 7952.—*Wall. Cat.* 8004.

ASSAM, SILHET and CACHAR, *Hamilton, &c.*

A small shrub; branches rather stout. *Leaves* 1-3 in. broad, very dark when dry, membranous, panduriformly constricted above the base, obscurely serrulate and ciliate; nerves 15-25 pair; slender, spreading, and midrib tomentose; petiole ¼-½ in., very stout, tomentose. *Racemes* inconspicuous, axillary and from the branches. *Male fl.* many, purple; fem. fewer, larger, ⅓ in. diam., green; sepals unequal, oblong, hispid; petals orbicular; disk and anthers as in *T. heteranthus*. *Capsule* ½-½ in. diam., 3-lobed, thinly crustaceous.—*Roxburgh* describes the fem. fl. as apetalous in *semperflorens*, and *Mueller* as obovate in *Hookerianus*.

6. **T. villosus**, *Hook. f.*; branchlets leaves beneath and inflorescence villously rusty-tomentose, leaves thin oblanceolate from a narrow rounded or subcordate base finely acuminate, racemes long-peduncled, anthers 3, ovary villously hispid, styles divided to the base.

PERAK, *King's Collector*.

Leaves 4-7 by 1½-2 in., brown when dry, membranous, sometimes a little contracted above the base and subpanduriform, pubescent above, at length glabrate, entire or very obscurely toothed; nerves 9-14 pairs, slender, spreading; petiole ¼-1 in. *Peduncles* slender, nearly as long as the leaves; bracts leafy, lanceolate, ¼-½ in. long; pedicels as long or longer. *Male fl.* ¼ in. diam.; sepals oblong, villous;

petals obovate-oblong; disk-glands erect; anthers discrete, cells with crested connectives. *Fem. fl.* $\frac{1}{2}$ in. diam.; sepals lanceolate, villous; ovary globose; style-arms filiform.

Sect. II. TELGYNE. Characters of *Eutrigonostemon*, but anthers 5.

7. **T. indicus**, Muell. *Arg. in DC. Prodr.* xv. ii. 1107 (excl. syn. *Croton lævigatus*); quite glabrous, leaves long-petioled elliptic lanceolate or oblanceolate acuminate glaucous or not beneath, racemes lax-fl., anthers 5, ovary tomentose, styles 2-partite. Telogyne indica, Baill. *Etudes Gen. Euphorb.* 328. Enchidium verticillatum, Jack in *Mal. Misc.* ii. vii. 89.—Wall. *Cat.* 7740 A in part, 7849, 7997.

PENANG, Wallich, &c. PERAK, Herb. Hort. Bot. Calc.—DISTRIB. Sumatra.

Branches slender, bark pale. Leaves subverticillate at the ends of the branches, $1\frac{1}{2}$ –2 in. broad, usually pale ochreous beneath, margin rarely with a few minute distant gland-tipped teeth, base usually acute; nerves 15–20 pairs, very slender; petiole 2–4 in., sometimes as long as the blade, very slender. Racemes 2–3 in., slender, quite glabrous, the uppermost flower female about $\frac{1}{4}$ in. diam., males much smaller; sepals nearly orbicular, glabrous; petiole larger. Capsule (immature) hoary.—Baillon, followed by Mueller, erroneously cites as a synonym Wallich's *Croton lævigatus*, which is a different plant.

Sect. III. PYCNANTHERA. Racemes or spikes terminal. Anthers 3 sessile on a short column, cells adnate to the greatly thickened connective.

8. **T. diplopetalus**, Thwaites *Enum.* 277; nearly glabrous, leaves 6–9 in. shortly petioled elliptic lanceolate or oblanceolate obtusely acuminate remotely denticulate, racemes terminal sessile elongate puberulous, male fl. minute clustered shortly pedicelled, anthers 3, fem. solitary longer pedicelled, ovary pubescent, styles short twice bifid, capsule pubescent. Muell. *Arg. in DC. Prodr.* xv. ii. 1108; *Beddome Forester's Man.* 212.

CEYLON; in the Regam Corle, Thwaites.

A shrub or small tree, young parts puberulous. Leaves $1\frac{1}{2}$ –2½ in. broad, dark brown and opaque when dry, toothlets glandular, base very acute; nerves 20–30 pair, slender, nearly horizontal; petiole $\frac{1}{2}$ –1 in., channelled above. Male spike with a stout rachis; flowers $\frac{1}{10}$ in. diam.; bracts very short; fem. fl. on pedicels $\frac{1}{2}$ in. long; sepals oblong; petals larger, 2-fid, lobes rounded sinuously laciniate; anthers sessile, cells diverging from the top of an almost globose connective. Capsule 3-lobed, globose, smooth, $\frac{1}{2}$ in. diam.—Thwaites describes the capsule as 2 in. diam., possibly a typographical error for $\frac{1}{2}$ – $\frac{3}{4}$. I have seen but one specimen and no fem. flowers.

9. **T. nemoralis**, Thwaites *Enum.* 277; nearly glabrous, leaves 3–7 in. very shortly petioled elliptic-oblong or lanceolate obtuse sinuate-toothed, racemes terminal stout shorter or longer than the leaves silkily pubescent, male fl. clustered shortly pedicelled, fem. solitary longer pedicelled, ovary hispid, styles very short and broad, capsule muricate and hairy. Muell. *Arg. in DC. Prodr.* xv. ii. 1108; *Beddome Ic. Plant.* t. 183, and *Forester's Man.* 213.

TRAVANCORE; on the Tinnevely Hills, alt. 2400 ft., *Beddome*. CEYLON; Central Province, alt. 2000 ft., Thwaites.

A shrub or small tree; young parts silkily hairy. Leaves 1–2 in. broad, crowded at the ends of the branches, green when dry, rather coriaceous; nerves 10–12 pairs, slender, arched; base narrowed into the short stout channelled petiole which is often 2-glandular at the top. Racemes with a stout rachis, bracts subulate, lower $\frac{1}{10}$ in. long and more. Flowers red, males $\frac{1}{4}$ in. diam., fem. $\frac{1}{2}$ in.; sepals very unequal, with pubescent backs and slender tips, the three largest nearly orbicular; petals larger,

oblong; anthers sessile, cells subparallel on a globose connective. *Capsule* $\frac{1}{4}$ – $\frac{3}{4}$ in. diam., deeply 3-lobed at the top, less so at the sides, thickly crustaceous. *Seeds* globose.

37. **TRIGONOPLEURA**, *Hook. f.*

A shrub or tree. *Leaves* alternate, shortly petioled, oblong, quite entire, glabrous, penninerved. *Flowers* diœcious?, small, in clusters in the leaf axils or on the branches, apetalous. **MALE FL.** *Sepals* 5, broadly oblong, coriaceous, broadly imbricate. *Petals* rather longer, obovate, villous on both surfaces. *Disk* of 5 large glands, round the base of the staminal column. *Stamens* about 8, filaments united in a column, tips free; anthers oblong, extrorse, cells adnate to the villous connective. *Pistillode* of 3 subulate processes terminating the column. **FEM. FL.** unknown. *Capsule* small, 3-lobed, hoary; epicarp separable, wrinkled; cocci bony, separating from a columella with 3 hyaline wings. *Seeds* solitary in the cells, broadly oblong, dorsally compressed, testa black, polished; aril large, pale.

T. malayana, *Hook. f.*

PERAK, *Scortechini* (*Herb. Perak.* 738, 2056). MALACCA, *Maingay* (*Kew Distrib.* 1452).

Branches woody, stout or slender, branchlets puberulous, tips tomentose. *Leaves* 4–6 in. by $1\frac{1}{2}$ – $2\frac{1}{2}$ in., sometimes linear-oblong, coriaceous or thin, brown when dry, obtusely cuspidate or subcaudate, base acute obtuse or rounded; nerves 8–10 pair, rather strong beneath, cross-nervules faint; midrib sometimes puberulous; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; stipules minute, ovate-oblong, pubescent. *Flowers* in numerous clusters of 3 or more along the branches, hoary; males about $\frac{1}{4}$ in. diam. when spread open; pedicels short, stout, tomentose; bracts 0; sepals obtuse, unequal; petals small, when dry clothed with rufous hairs, sometimes notched at the tip or side, coriaceous. *Staminal column* included, rusty villous. *Ovules* (undeveloped seeds) solitary in the cells, with a broad fleshy? obturator. *Capsule* about $\frac{1}{4}$ in. diam. *Seeds* attached to a thickened placenta.—This genus differs from *Trigonostemon* in the anthers being seated on a central column terminating in a 3-cleft pistillode, and entirely in habit and inflorescence.

37*. **CODIÆUM**, *Juss.*

Glabrous shrubs or trees. *Leaves* alternate, quite entire, penninerved. *Flowers* monœcious, in usually unisexual racemes, rarely a female at the base of the male racemes; males small, fascicled, fem. solitary. **MALE FL.** *Sepals* or calyx-lobes 3–6, membranous, imbricate. *Petals* small, alternating with disk-glands. *Stamens* 15–30, free, crowded on a low receptacle; anthers erect, cells on the margins of a large connective, tips at length confluent. *Pistillode* 0. **FEM. FL.** *Calyx* 5-lobed. *Petals* 0. *Disk* subentire. *Ovary* 3-celled; styles entire, elongate, slender, recurved; ovules 1 in each cell. *Capsule* globose, of 3 2-valved parchment-like cocci. *Seeds* shining, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species about 4, Malayan, Australian and Pacific.

C. variegatum, *Blume Bijl.* 606; leaves very variable from oblong to narrowly linear often variegated green and yellow, racemes long axillary. *Muell. Arg. in DC. Prodr.* xv. ii. 1119; *Kurz For. Fl.* ii. 405. *C. pictum*, *Hook. Bot. Mag. t.* 3051. *Croton bractiferus*, *Roxb. Fl. Ind.* iii. 680. *C. variegatus*, *Linn. Sp. Pl. Ed.* 3, 1424. *C. pictus*, *Wall. Cat.* 7714.—*Rheede Hort. Mal.* vi. t. 61.

In gardens, &c., throughout INDIA, especially in the Eastern Provinces; native of the Molucca Islands.

An evergreen shrub. *Leaves* 2-10 in. long, often waved and infinitely variable in form and colouring.

38. **OSTODES**, *Blume.*

Trees or shrubs. *Leaves* alternate, broad, toothed or entire, penninerved, rarely triple-nerved at the base, which is 2-glandular or not. *Flowers* in lax terminal and lateral paniced racemes, rarely in axillary fascicles, mono- or di-œcious; males fascicled or cymose, fem. in separate racemes or solitary in the male cymes. **MALE FL.** *Sepals* 5, broad, unequal, imbricate. *Petals* 5-6, longer. *Disk* of 5 glands or 0. *Stamens* 8-30, inserted on a convex or columnar receptacle; anthers dorsifixed, of the inner series often horizontal, cells introrsely adnate to the broad connective, rarely extrorse, parallel or divergent. *Pistillode* 0. **FEM. FL.** *Perianth* of the male. *Ovary* 3-celled; styles short, 2-cleft, ovules 1 in each cell. *Capsule* subglobose, 6-ribbed, endocarp almost bony, at length breaking up into 3 2-valved cocci. *Seeds* ovoid, testa crustaceous (? pulpy when fresh), albumen fleshy; cotyledons broad, flat.—Species 6-8, Indian and Malayan.

As above defined, *Ostodes* is a heterogeneous assemblage of trees and shrubs with simple leaves, unisexual flowers, a double perianth of 5-6 imbricate sepals, as many petals, and 8 or more free stamens on a central receptacle.

1. **O. zeylanica**, *Muell. Arg. in Linnæa* xxxiv. 214, and in *DC. Prodr.* xv. ii. 1114; leaves elliptic-oblong or -lanceolate obtuse acute or acuminate crenate-serrate all penninerved longer than the petiole, flowers in large branched finely scurfily tomentose panicles, petals elliptic. *Beddome Fl. Sylvat.* t. 274. *Desmostemon zeylanicus*, *Thwaites Enum.* 278; *Beddome in Trans. Linn. Soc.* xxv. 225, t. 27.

TRAVANCORE; on the Anamallay Hills, alt. 2-3000 ft., *Beddome*. CEYLON; common in the drier parts of the island; ascending to 4000 ft.

A tree, young parts scurfily pubescent; branchlets robust. *Leaves* 6-12 by 2-4 in., coriaceous, brown when dry, serratures glandular; petiole stout, 1-5 in., terete. *Panicles* 6-12 in., pendulous; branches spiciform, strict; bracts short; flowers fascicled, sessile or very shortly pedicelled, $\frac{1}{2}$ in. diam. *Male fl.*; sepals rounded; petals longer, erect and recurved; stamens about 15, 5 free, 10 with filaments united below. *Fem. fl.*; disk annular, strigose within; ovary subglobose, strigose; styles cuneate, 2-fid. *Capsule* $1\frac{1}{2}$ in. diam. or less, hoary.—*Thwaites* describes this as a very variable plant. Some branches bear, instead of flowers, short $\frac{1}{10}$ -1 in. long spikelets clothed with subconfluent bracts.

VAR. minor, *Thwaites l. c.*; subarborescens or shrubby, smaller in all its parts, leaves sometimes narrowly lanceolate, branches of panicles very slender, flowers $\frac{1}{2}$ in. diam., capsule $1\frac{1}{2}$ in. diam. *O. minor*, *Muell. Arg. in Linnæa* and *DC. l. c.* *Trigonostemon zeylanicus*, *Muell. Arg. in Linnæa l. c.* 213, and in *DC. l. c.* 1106; *Beddome Forester's Man.* 212. *Tritaxis zeylanica*, *Muell. Arg. in Flora* 47 (1864) 482.

2. **O. paniculata**, *Blume Bijl.* 620; leaves ovate acuminate or caudate serrate equalling or longer than the petiole, base triple-nerved, flowers in short or long branched glabrous panicles, petals broad glabrous within. *Miquel Fl. Ind. Bat.* i. ii. 384; *Muell. Arg. in DC. Prodr.* xv. ii. 1115; *Kurz For. Fl.* ii. 404.

SIKKIM HIMALAYA, in tropical valleys, and ascending to 5000 ft., *J. D. H. & T. T.*, &c. BHOTAN, *Griffith*. SILHET, at Terrya Ghat, *J. D. H. & T. T.* MARTABAN, *Kurz*.—DISTRIB. Java.

A tree, shoots pubescent; branches very stout, bark white. *Leaves* 8-12 by 4-7 in., thickly coriaceous, 2-glandular at the base; petiole 2-10 in. *Panicles*

8-12 in.; bracts minute; flowers $\frac{1}{2}$ in. diam., pedicelled. *Sepals* unequal, concave. *Petals* unequal, very shortly clawed. *Disk-glands* of male large; receptacle convex, villous. *Stamens* about 20, filaments villous at the base; anthers erect, introrse. *Capsule* $1\frac{1}{2}$ in. long, subglobose, 3-lobed, rather rough, valves thickly crustaceous or woody. *Seeds* globose, 1 in. diam., brown and mottled, smooth.—The leaves are distinctly triple-nerved at the base; the other nerves are very rarely hairy at the axils; the petals are not hairy at the base.

3. *O. appendiculata*, Hook. f.; leaves subsessile 1-2 ft. linear-oblong all penninerved glabrous quite entire, racemes from the lower part of the stem tomentose stout; petals broad villous at the back and furnished towards the base within with 2 waved transverse appendages.

PERAK; at Larut, alt. 500-1000 ft., King's Collector.

A leafy tree, 40-60 ft. *Leaves* coriaceous, 6 in. broad, green when dry, shining above, base acute; nerves 12-15 pair, arched, strong beneath; petiole $\frac{1}{2}$ in., very stout. *Racemes* white-tomentose, branches stout, 6-8 in.; male fl. in short 3-5-fl. branches; bracts short, pedicels equalling the calyx or shorter. *Male calyx* of 5 broad rounded very coriaceous imbricate hoary sepals, glabrous within. *Petals* longer than the sepals, erect with recurved tips, thick; the long white hairs on the back occupy a broad round area below the middle; villous in front below the appendages. *Disk* 0. *Stamens* 8, in the centre of the flower; filaments free, clothed with long silky hairs; anthers broad, introrse. *Fem. fl.* and *fruit* unknown.—This may form a distinct genus when the fem. fl. and fruit are known.

4. *O. Helferi*, Muell. Arg. in *Linnæa* xxxiv. 215, and in *DC. Prodr.* xv. ii. 1115; leaves bifarious 8-9 in. glabrous oblong or obovate-lanceolate cuspidately acuminate quite entire, petiole very short, flowers very small fasciated in the axils. *Kurz For. Fl.* 404.

TENASSERIM; at Moulmein, Helfer.

Branches densely lenticellate. *Leaves* 3-4 in. broad, thin, base rounded, eglandular, midrib rough beneath; nerves 10-14 pair, arched, rather slender; petiole $\frac{1}{2}$ in., very stout. *Male fl.* on short stout pedicels shorter than the petiole and with many bracts at the base. *Sepals* and *petals* 5-6 each, externally finely pubescent, both concave and very coriaceous, $\frac{1}{5}$ in. long. *Stamens* in a hemispheric mass, very numerous and densely packed; anthers short, adnate to the broad filament, 2-celled, extrorse.—The habit of this is entirely different from any of the preceding, and is likened by Mueller to a *Gelonium*, but the leaves are much larger. The specimens seen by him are probably more advanced than the Kew ones, for he describes the receptacle as hairy, and the bracts as distichous.

5. *O. muricata*, Hook. f.; quite glabrous, leaves long-petioled, elliptic-oblong or lanceolate acuminate entire or serrate penninerved base acute, male fl. long-pedicelled in short cymes, calyx obtusely 5-lobed, petals oblong smooth within, stamens 20-30, fem. solitary, capsule trigonously globose on a stout woody peduncle echinate.

PERAK; at Larut, King's Collector.

A small tree, 10-20 ft.; branchlets woody, bark pale. *Leaves* 6-10 by 3-4 in., coriaceous; nerves 10-12 pair, basal pair inconspicuous, cross-nerves very faint; petiole $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., rather slender, 2-grooved above. *Male cymes* axillary and on the old wood, about 1 in. long; pedicels $\frac{1}{2}$ -1 in., slender, irregularly fascicled on the short rachis; bracts small, ovate; flowers white, black when dry; calyx-lobes rounded; petals oblong; stamens short, subequal, anthers introrse. *Capsule* about $\frac{3}{4}$ in. diam.; peduncle $\frac{1}{2}$ -1 in. long; pericarp of valves black, echinate, thin; cocci rather thick, grey. *Seeds* upwards of $\frac{1}{2}$ in. long, ellipsoid, smooth, brown.

VAR. ? *minor*; leaves smaller 4-7 in. thinner more ovate-lanceolate with much

fainter nerves pale glaucous brown when dry, petiole shorter $\frac{1}{2}$ -1 in. long slender, rachis of cymes shorter, fem. fl. and capsule unknown.—Penang, *King's Collector*, *Curtis* (No. 811). Singapore, *Lobb* (No. 304).

39. **BLACHIA**, *Baill.*

Glabrous shrubs. *Leaves* alternate, or opposite or the upper subopposite, membranous, quite entire, eglandular, penninerved. *Flowers* monœcious or subdiœcious; males terminal subumbellate or racemose with filiform peduncle and pedicels, fem. solitary or fascicled, pedicels thickened above. MALE FL. *Sepals* 4-5, concave, membranous, imbricate. *Petals* 4-5, small, rounded, hyaline. *Disk-glands* scale-like, alternating with the petals. *Stamens* 10-20, on a convex receptacle, filaments free; anthers ovate, cells on the margin of the connective, tips at length confluent. *Pistillode* 0. FEM. FL. *Sepals* accrescent. *Petals* 0. *Disk* obscure or annular. *Ovary* 3-4-celled; styles filiform, 2-partite, recurved or revolute; ovules 1 in each cell. *Capsule* of 3 2-valved cocci. *Seeds* oblong, estrophiolate, testa crustaceous shining, albumen fleshy; cotyledons broad, flat.—Species 5 or 6, South Indian, Ceylon and one Chinese.

1. **B. umbellata**, *Baill. Etudes Gen. Euphorb.* 387, t. 19, f. 18-20; leaves very shortly petioled elliptic-subrhombic or oblong, male flowers umbelled, fruiting sepals slightly enlarged spreading obtuse persistent. *Benth. in Journ. Linn. Soc.* xvii. 226; *Thwaites Enum.* 277. *Croton umbellatus*, *Willd. Sp. Pl.* iv. 545; *Wall. Cat.* 7765. *Codiaeum umbellatum*, *Muell. Arg. in DC. Prodr.* xv. ii. 1118; *Beddome Forester's Man.* 213, t. 23, f. 6.

TRAVANCORE, *Klein, Wight*. CEYLON; common in the south of the island, especially near the sea.

A shrub. *Leaves* 4-7 in. by $1\frac{1}{2}$ -3 in., broadest at or above the middle, cuspidately acuminate, much narrowed at the base; nerves 8-10 pair, very slender, nearly straight; petiole $\frac{1}{10}$ - $\frac{1}{4}$ in. *Male fl.* 8-10, on a capillary peduncle 1-3 in.; pedicels $\frac{1}{10}$ - $\frac{1}{2}$ in.; buds globose; perianth $\frac{1}{4}$ in. diam. *Fem. fl.* 1-4, on a rigid erect slender peduncle 1-2 in. long; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in., thickened upwards; perianth $\frac{1}{2}$ in. diam., in fruit $\frac{1}{2}$ in. *Capsule* $\frac{2}{3}$ in. diam., smooth, deeply 3-lobed. *Seeds* $\frac{1}{2}$ in. long, oblong, shining, mottled.—There is a tendency to an enlargement of the female sepals.

2. **B. reflexa**, *Benth. in Journ. Linn. Soc.* xvii. 226; leaves petioled subrhombic or elliptic obtuse cuspidate or obtusely acuminate, male flowers umbelled, fruiting sepals slightly enlarged acute spreading or reflexed persistent.

NILGHIRI MTS., *Herb. G. Thomson.*

Very closely allied to *B. umbellata*, but the leaves are usually much smaller, 2-3 by $1-1\frac{1}{2}$ in., the petioles longer, $\frac{1}{4}$ - $\frac{1}{2}$ in., and the fruiting sepals more acute. The fruiting sepals are spreading as in *umbellata* or reflexed. *Seeds* $\frac{1}{2}$ in. long, oblong, smooth, polished, mottled with brown.

3. **B. calycina**, *Benth. in Journ. Linn. Soc.* xvii. 226; leaves sessile elliptic-rhombic or -lanceolate obtuse or obtusely acuminate, male fl. racemose, fruiting sepals much enlarged oblong obtuse or lanceolate acuminate persistent. *Croton umbellatus*, *Wight Ic.* t. 1874; *Wall. Cat.* 7770, 7776, 8013.

The DECCAN PENINSULA, *Klein, Heyne (Herb. Rottler)*. TRAVANCORE, at Courtallam, *Wight*. NILGHIRI MTS. (*Herb. G. Thomson*).

This has the subsessile leaves of *B. umbellata*, and even smaller leaves than *B. reflexa*; it differs from both in the enlarged fruiting sepals, which are $\frac{1}{2}$ – $\frac{2}{3}$ in. long.—The specimens in Rottler's Herbarium (from Heyne) are marked from Ceylon.

4. **B. denudata**, *Benth. in Journ. Linn. Soc. xvii. 226*; leaves petioled elliptic oblong lanceolate or ovate obtuse acute or acuminate, male fl. racemose, fem. shortly peduncled, calyx deciduous after flowering. *Croton umbellatum*, *Dalz. & Gibs. Bomb. Fl. 231 (excl. syn.)*.

The CONCAN and N. CANARA, *Ritchie, Stocks, Dalzell, Talbot, &c.*

A shrub or small tree. *Leaves* very variable, 3–5 by 1–2 $\frac{1}{2}$ in.; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in. *Fem. fl.* at the base of the racemes. *Fruit* variable in size, $\frac{1}{2}$ – $\frac{1}{2}$ in. long, peduncles $\frac{1}{2}$ – $\frac{1}{2}$ in.

5. **B. andamanica**, *Hook. f.*; leaves elliptic or obovate obtusely acuminate, male fl. subumbellately corymbose, fem. corymbs subsessile, flowers very shortly pedicelled. *Codiaeum andamanicum*, *Kurz For. Fl. ii. 405*. Dimorphocalyx andamanicus, *Benth. in Gen. Pl. iii. 302*.

ANDAMAN ISLANDS, in tropical forests common, *Kurz*.

A large evergreen shrub, everywhere glabrous. *Leaves* 3–6 in., base acute or obtuse, chartaceous, entire or subsinuate; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. *Male fl.* as in *B. umbellata*, fem. rather larger, both terminating young often axillary shoots. *Sepals* glabrous, of male rounded, of fem. ovate acute. *Petals* of male small; glands large, trigonous, truncate, fleshy. *Stamens* in several series. *Ovary* appressed hirsute; styles very long, 2-cleft. *Capsule* size of a small cherry, globose, 3-coccous, woody-coriaceous, roughish; peduncle nodding, thickened upwards. *Seeds* ovoid-elliptic, silky grey, variegated.—Description chiefly from *Kurz*.

40. DIMORPHOCALYX, *Thw.*

Glabrous trees. *Leaves* alternate, quite entire, coriaceous, penninerved. *Flowers* in axillary or terminal peduncled few-fl. racemes, or the fem. sub-solitary, diœcious. MALE FL. *Calyx* cupular, or 5-partite, 5-toothed or lobed, open in bud. *Petals* 5, longer and broader. *Disk-glands* 5, alternate with the petals. *Stamens* 10–20, on a short columnar receptacle, filaments stout, free or the inner connate; anthers dorsifixed or innate; cells adnate to thick connective, parallel or divergent. *Pistillode* 0. FEM. FL. *Sepals* 5, imbricate, enlarging greatly in fruit. *Petals* 5. *Ovary* 3-celled; styles erect, 2-fid; ovules 1 in each cell. *Capsule* of 3 2-valved crustaceous cocci. *Seeds* ovoid, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species 3–4, South Indian and Malayan.

1. **D. glabellus**, *Thwaites Enum. 278*; leaves 2–3 in. elliptic-ovate-oblong or lanceolate obtuse or subacute, stamens about 10, ovary strigose, fruiting perianth $\frac{1}{2}$ –1 $\frac{1}{4}$ in. diam., segments broadly oblong or obovate. *Trigonostemon Lawianus*, *Muell. Arg. in DC. Prodr. xv. ii. 1105 (the Ceylon plant only)*. *Croton glabellus*, *Heyne in Wall. Cat. 8012*.—*Wall. Cat. 8010 and 7750 in part*.

DECCAN PENINSULA, *Heyne, Wight*. CEYLON; common in the drier parts of the island, *Thwaites*.

A small tree. *Leaves* red brown beneath when dry, base acute obtuse or rounded; nerves many, very slender; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in. *Male cymes* erect; flowers $\frac{1}{4}$ in. diam., shortly pedicelled; central stamens united in a slender column with 5 free ones at its base. *Fem. flowers* long pedicelled; pedicels with few small obtuse bracts. *Petals*

of both sexes oblong, of the males longer than the sepals, of the fem. shorter. *Capsule* $\frac{1}{2}$ – $\frac{1}{2}$ in. diam., slightly hairy. *Seeds* $\frac{1}{2}$ in. long, oblong, mottled.—I have examined many female plants of this species from both Ceylon and the Peninsula, but have seen no males. *Croton Lawianus*, Nimmo, referred here by Mueller, is a true *Croton*. I do not know what "Falconer 1255," cited by Mueller, refers to.

2. **D. Lawianus**, *Hook. f.*; leaves 4–8 in. elliptic-ovate-oblong or lanceolate obtuse or obtusely acuminate, stamens about 15, ovary strigose, fruiting perianth 1–2 in. diam., segments oblong or lanceolate very unequal. *D. glabellus*, *Beddome in Trans. Linn. Soc.* xxv. 225, t. 26 (except figs. 10–12). *Trigonostemon Lawianus*, *Muell. Arg. in Linnæa* xxxiv. 212, and in *DC. Prodr.* xv. ii. 1106 (the Concan plant only); *Beddome Fl. Sylvat.* t. 275 (excl. syn.).

THE CONCAN, *Law, Stocks, &c.* TRAVANCORE; on the Anamallay Hills, alt. 3–4000 ft., *Beddome*.

I advance this as a species distinct from *D. glabellus* with hesitation; it differs from that plant in the much larger more membranous leaves with longer petioles, the more numerous stamens, the usually much narrower and longer very unequal fruiting sepals, and the fruit and seeds which are almost double the size. The plate of the Anamallay plant given by Beddome in the *Linnean Transactions* agrees with *Lawianus* except in the fruiting sepals being in every instance equal, which they rarely are; and in the figures 10, 11, 12 of the male flower, which, if correct, indicate a widely different species, for the sepals are represented as free almost to the base, oblong with a rounded dorsal gibbosity, and the corolla as having a broad entire tube and 5 small recurved lobes; the male disk also is represented as glabrous. Figs. 14 and 15, which are stated to be abnormal male flowers of Concan specimens, precisely accord with normal ones of *D. Lawianus*, except that the receptacle is glabrous. I suspect that the calyx of figs. 10 and 12 is taken from a fem. flower, that fig. 12 is erroneous, and that the hairs on the receptacles of figs. 12 and 15 were overlooked. Beddome's male and female specimens of the Anamallay plant in all respects agree with Concan ones.

3. **D. malayanus**, *Hook. f.*; leaves 3–5 in. elliptic or elliptic-oblong obtusely acuminate, stamens about 10, ovary glabrous, fruiting perianth about 1 in. diam., sepals broadly oblong subequal.

MALACCA, *Griffith (Kew Distrib.* 4785). PENANG, *Curtis, King's Collector.*—DISTRIB. Borneo.

A shrub, 10–15 ft. *Branchlets* slender, bark white. *Leaves* rather membranous, base acute or obtuse, nerves many pairs very slender; petiole $\frac{1}{4}$ in. *Male fl.* in slender branched cymes; calyx with 5 short obtuse teeth; central stamens united in a slender column with 5 free ones at their base; disk of large glands; receptacle glabrous. *Capsule* $\frac{1}{2}$ in. diam., deeply 3-lobed, quite glabrous. *Seeds* subglobose, dark, mottled.—Kurz's *Codiaeum andamanicum*, which Bentham by oversight (*Gen. Plant.* iii. 302) referred to this species, is a *Blachia*.

4. **D. capillipes**, *Hook. f.*; leaves 6–10 in. oblanceolate from a contracted obtuse base acuminate obscurely serrate, petiole short, fruiting racemes elongate capillary naked few-fl., bracts foliaceous, fruiting perianth $1\frac{1}{2}$ in. diam., sepals lanceolate acuminate very unequal.

SINGAPORE, *Lobb*.

Quite glabrous; branches slender; tips and stipules strigose with yellow hairs. *Leaves* 2–3 in. broad, membranous, brown when dry; base minutely cordate; nerves 10–12 pair, very slender, flexuous, cross-nervules very faint reticulate; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in.; stipules subulate-lanceolate. *Fruiting racemes* axillary, 4–6 in.; bracts oblong, $\frac{1}{2}$ – $\frac{2}{3}$ in.

long; pedicels as long, thickened and angular above. *Fruiting sepals* 1-nerved, larger oblong-lanceolate. *Capsule* $\frac{1}{2}$ in. diam., hoary, cocci globose smooth thinly crustaceous. *Seeds* subglobose, polished, mottled.

5. **D. Kunstleri**, *King mss.*; leaves 2-3 in. elliptic-oblong obtuse quite entire whitish beneath base acute, male cymes subterminal short, stamens about 13.

PENANG, *King's Collector*.

A shrub, 10-15 ft., quite glabrous, much branched, branches slender. *Leaves* $\frac{1}{2}$ -1 in. broad, thin, brown above when dry, nerves many very slender; petiole $\frac{1}{4}$ in.; stipules triangular-ovate. *Cymes* of male fl. 1 in., 6-8-fl., quite glabrous, leafy towards the base; bracts minute; pedicels $\frac{1}{10}$ - $\frac{1}{8}$ in. *Flowers* campanulate, white, $\frac{1}{2}$ in. broad; calyx cupular, broadly 5-toothed; petals oblong; glands large; stamens 5 at the base of the column, and 8 at the top.

41. **ERISMANTHUS**, *Wall.*

Subscandent shrubs. *Leaves* subsessile, opposite, bifarious, oblong, base on one side cordate, penninerved; stipules rigid. *Flowers* axillary, monœcious, males on long capillary pedicels arising from the bracts of a short subsessile axillary cone, petaliferous, females solitary in separate axils long pedicelled, apetalous. *Disk* 0. **MALE FL.** *Sepals* 4-5, oblong, reflexed, imbricate? *Petals* half the size, narrower. *Stamens* about 12, inserted on a conical hairy receptacle, that terminates in a very long capillary *pistillode*; filaments very short; anthers large, broadly didymous, compressed; cells dehiscing along the top and margins. **FEM. FL.** *Sepals* 5, elliptic-oblong, large, unequal, foliaceous, enlarging in fruit. *Ovary* 3-lobed, 3-celled, hispid; styles very long, united below, 2-partite, arms filiform hispid; ovule 1 in each cell. *Capsule* of 3 crustaceous subglobose hispid cocci. *Seeds* globose.—Species 2, the following and a Chinese one.

E. obliqua, *Wall. Cat.* 8011; *Muell. Arg. in DC. Prodr.* xv. ii. 1138; *Baill. Etudes Gen. Euphorb.* 669.

PENANG, *Wallich*. PERAK, *King's Collector*.—DISTRIB. Borneo (*Beccari* No. 769 and 632).

A sparsely hairy shrub; branches slender, terete, woody. *Leaves* 5-7 in., thinly coriaceous, green when dry, obtuse or obtusely acuminate, 10-12-nerved, obscurely crenate, lower base rounded, upper very narrow; petiole $\frac{1}{10}$ in., often bright red; stipules $\frac{1}{2}$ in., lanceolate, green, persistent. *Cones* of bracts of male fl. $\frac{1}{2}$ - $\frac{1}{4}$ in., usually reflexed, and concealed under the leaf-bases; bracts subulate, most densely imbricate, hispid; male fl. $\frac{1}{8}$ in. diam., very numerous, forming a tangled mass of hairy capillary pedicels $\frac{3}{4}$ in. long; sepals and petals membranous; pistillode $\frac{1}{2}$ in., as slender as the pedicels, sparsely hairy, terminated by two narrow lamellæ. *Fem. pedicel* 2-6 in., stiff, strigose, with a few minute bracts; perianth $\frac{1}{2}$ -1 in. diam.; sepals rigid, 1-nerved, mucronate, obscurely serrate. *Ovary* minute, styles $\frac{1}{2}$ in. long; ovule with a 2-fid obturator. *Capsule* about $\frac{1}{2}$ in. diam., epicarp not separating. *Seed* mottled.—I am indebted to Dr. King for notes and materials enabling me to complete the description of this curious genus, of which a Chinese species is figured in the "Icones Plantarum" (t. 1578).

42. **AGROSTISTACHYS**, *Dalz.*

Glabrous shrubs. *Leaves* alternate, coriaceous, usually very long, often subsessile, entire, serrate or sinuate. *Flowers* in axillary or supra-axillary

bracteate racemes or spikes, diœcious; males few or many within each bract; fem. solitary, longer pedicelled. MALE FL. *Calyx* globose, splitting into 2-5-valvate lobes. *Petals* 8, shorter. *Disk-glands* very large, alternate with the petals. *Stamens* 8-13, on a convex receptacle, filaments nearly free, tips subulate; anthers versatile, cells pendulous from the thickened connective. *Pistillode* 2-3-fid or 0. FEM. FL. *Calyx* 5-6-fid. *Petals* longer, caducous. *Ovary* 3-celled; styles short, thick, spreading, entire or 2-fid; ovules 1 in each cell. *Capsule* of 3 2-valved crustaceous cocci, or subfleshy. *Seeds* globose, testa crustaceous shining, albumen fleshy; cotyledons broad, flat.—Species 6 or 8, Tropical Indian and African.

Sect. I. EUAGROSTISTACHYS. *Bracts* of male 1-3-fid., glumaceous, densely imbricate, on short small axillary or supra-axillary spikes.

1. **A. indica**, *Dalz. in Hook. Kew Journ. Bot.* ii. (1850) 41; leaves petioled elliptic-oblong or -lanceolate acute acutely serrate, base very acute, spikes supra-axillary very short subdistichous, bracts 1-fid., ovary glabrous. *Muell. Arg. in DC. Prodr.* xv. ii. 726 (excl. var. β .); *Dalz. & Gibs. Bomb. Fl.* 232; *Thwaites Enum.* 279; *Beddome For. Man.* 205.—*Wall. Cat.* 7452.

The DECCAN PENINSULA, on the Western Ghats, from the Concan southward. CEYLON; in the Central Province, alt. 1-2000 ft., *Walker, &c.*

A shrub, 5-6 ft.; branches stout, leafy. *Leaves* 4-12 by $1\frac{1}{2}$ -4 in., coriaceous, reticulate on both surfaces; teeth incurved, spinulose; nerves 10-15 pair; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Male spikes* usually shorter than the petioles; bracts broadly ovate, ciliate; bracteoles 2, linear; pedicels very short; sepals membranous, ovate, sparsely hairy; petals 5-8, rounded or subquadrate, white; disk-glands very large; stamens 5-13, with sometimes a few fleshy filaments intermixed. *Capsule* $\frac{2}{3}$ in. diam., tridymous; cocci woody, globose.

2. **A. Gaudichaudi**, *Muell. Arg. in Linnaea* xxxiv. 144 and in *DC. Prodr.* xv. ii. 725; leaves petioled oblanceolate acuminate obtusely sinuate-serrate base very acute, spikes infra-axillary very short terete, bracts 1-fid. *Sarcoclinium Gaudichaudi*, *Baill. Etudes Gen. Euphorb.* 320. *A. indica*, var. *longifolia*, *Muell. Arg. in DC. l. c.* 726. *A. longifolia*, *Kurz For. Fl.* ii. 377.

PENANG, *Gaudichaud, &c.* TENASSERIM (or Andaman Islands), *Helfer (Kew Distrib.* 4921).

Very like *A. indica*, but the leaves in Helfer's plant are longer, narrower, more acuminate, with shorter petioles and with fewer very shallow obtuse teeth.—I have seen no Penang specimens, and the flowers of Helfer's are too young for examination.

3. **A. Maingayi**, *Hook. f.*; leaves sessile oblanceolate acuminate quite entire, spikes supra-axillary, bracts pubescent.

MALACCA, *Maingay*.

Branches as thick as the little finger. *Leaves* 12-14 by 3-3 $\frac{1}{2}$ in., thinly coriaceous, tapering down to their insertion, nerves about 12 pair. *Capsule* about $\frac{3}{4}$ in. diam.; cocci crustaceous, hoary. *Seeds* $\frac{1}{2}$ in. diam.—I have seen only leaves, very young spikes and fruits of this species.

^Sect. II. SARCOCLINIUM. *Bracts* remote on a long rachis. *Male fl.* many under each bract.

4. **A. Hookeri**, *Benth. Gen. Pl.* iii. 303; leaves very large sessile

oblanceolate acuminate many-nerved entire or denticulate, stipules very long, fem. racemes 1-2 ft., pedicels solitary long, fruit subbaccate. *Sarcoclinium Hookeri*, *Thwaites Enum.* 279; *Baill. Etudes Gen. Euphorb.* 310, t. 11, f. 17, 18; *Muell. Arg. in DC. Prodr.* xv. ii. 727; *Beddome Forester's Man.* 206.

CEYLON; in the Ratnapoora district, *Thwaites*.

A moderate-sized tree; branchlets as thick as the middle finger. Leaves thinly coriaceous, 2-3 ft. by 5-8 in.; base narrowed almost to the insertion; nerves 40-50 pair, spreading, nearly straight; petiole very stout, $\frac{1}{4}$ - $\frac{3}{4}$ in.; stipules 1-3 $\frac{1}{2}$ in., subulate from a base $\frac{3}{4}$ in. broad, rigid, striate, brown. Fem. racemes slender, quite glabrous, flowers distant; pedicels $\frac{1}{2}$ -1 in., jointed about the middle; sepals minute, triangular; petals?; ovary obtusely 3-gonous, minutely tomentose; style short, thick, 3-fid from the middle, branches emarginate. Capsule 1 in. diam., glabrous; cocci rounded. Seeds $\frac{1}{4}$ in. diam.—Male fl. unknown.

5. ***A. longifolia***, *Benth. in Gen. Pl.* iii. 303; leaves very coriaceous subsessile from cuneate-obovate to narrowly oblanceolate obtuse or obtusely acuminate quite entire, racemes much shorter than the leaves and flowers quite glabrous, bracts many-fld., pedicels of fem. fl. very short, ovary pubescent. *Sarcoclinium longifolium*, *Wight Ic.* t. 1887-8; *Muell. Arg. in DC. Prodr.* xv. ii. 727; *Thwaites Enum.* 279; *Beddome Forester's Man.* 205, t. 23, f. 1.

CANARA, NILGHIRI and TRAVANCORE HILLS; in mountain woods facing the west, *Wight*, &c. CEYLON; in the Central Province, alt. 4-6000 ft., *Macrae*, &c.

A large shrub; branchlets very stout. Leaves, smaller 3-7 by 1-3 $\frac{1}{2}$ in., larger 12-16 by 2-3 in., nerves 10-18 pair, not reticulate; stipules $\frac{1}{2}$ - $\frac{3}{4}$ in., subulate from a broad base. Male racemes stout; fem. slender, rarely minutely puberulous; bracts broadly ovate, minutely gland-toothed. Sepals of male 2-3, membranous, glabrous; of fem. 5, ovate, acute. Petals 5, rounded. Disk-glands very large. Stamens 5-10. Pistillode 2-3-cleft. Capsule $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., very shortly pedicelled, tridymous; cocci globose, smooth, crustaceous.

VAR. *malayana*; racemes as long as the leaves, rachis and flowers puberulous.—Malacca, *Griffith (Kew Distrib.* 4739), *Maingay (Kew Distrib.* 1407). Singapore and Penang, *Wallich* (No. 7717 in Herb. Benth.), &c.—A Bornean plant (*Beccari* No. 3117) is, I think, the same as this; it has, however, broader leaves and straighter nerves.

VAR. *latifolia*; leaves 12-18 by 3-6 in., nerves fewer more horizontal, racemes much shorter than the leaves quite glabrous.—Perak, *Scortechini* and *King's Collector*.

6. ***A. filipendula***, *Hook. f.*; leaves petioled membranous oblanceolate acuminate quite entire, male racemes filiform, bracts distant 5-6-fld. fem. fl. long-pedicelled, ovary glabrous.

PERAK; at Larut, *King's Collector*. SINGAPORE, *Hullett*.

A tree. 40-60 ft. (in Perak), branches stout. Leaves 12-20 by 3 $\frac{1}{2}$ -5 in., bright green and glossy on both surfaces; nerves 15-20 pair, arched; petiole 1-2 in., narrowly winged. Male racemes 6-10 in., quite glabrous; bracts $\frac{1}{2}$ in. long, almost rounded when spread out, smooth; pedicels exceeding the bracts, capillary; flowers minute; sepals obovate-oblong; petals hyaline; disk-glands 4-5, orange-cold; stamens 8-9, filaments very long and slender, the alternate ones dilated at the base; pistillode 0. Fem. racemes numerous, often fascicled above the leaf-axils, 4-6 in. long, very slender; bracts oblong, obtuse, 1-fld.; pedicels $\frac{1}{4}$ -1 in.; sepals 4, membranous; disk orange, thick, crenulate; staminodes filiform. Ovary 3-lobed; styles entire.—Though the male specimens are from Perak and the fem. from Singapore, I

find no reason to doubt their belonging to one species, and that a very elegant one.

43. **SUMBAVIA**, Baill.

Trees with stellate pubescence. *Leaves* alternate, broad, 3-nerved, quite or subentire. *Flowers* in axillary spiciform racemes, monœcious; males clustered, subsessile; fem. solitary amongst the males, pedicelled. **MALE FL.** *Calyx* globose, membranous, splitting into valvate lobes. *Petals* 4-5, short. *Stamens* many, on a convex eglandular receptacle, filaments free; anthers oblong, erect, dorsifixed, cells parallel. *Pistillode* 0. **FEM. FL.** *Calyx* 5-fid, lobes narrow, imbricate. *Petals* minute or 0. *Ovary* 3-celled; styles recurved, entire; ovules 1 in each cell. *Capsule* of 2 2-valved cocci.—Species 3, Malayan.

Differs from *Mallotus* only in having petals.

S. macrophylla, Muell. Arg. in *Flora*, 1861, 482, and in *DC. Prodr.* xv. ii. 727; leaves narrowly peltate ovate-oblong or -lanceolate acuminate sides rounded or angled base contracted or rounded 2-glandular. *Kurz For. Fl.* 376.

UPPER BURMA; near the Serpentine Mines, Griffith. PEGU to TENASSERIM, in forests, Kurz.

An evergreen tree, 25-35 ft.; shoots, petioles, leaves beneath and racemes whitish with scurfy tomentum. *Leaves* 6-12 in., thinly coriaceous, glabrous above, nerves 6-8 pairs above the basal, transverse nervules distant; petiole 2-3½ in., tip rather thickened. *Racemes* shorter than the leaves, pendulous; flowers ½-¾ in. diam. in bud. *Sepals* 4, unequal, larger orbicular, concave, tawny, stellate-tomentose. *Petals* of the male rounded, shorter than the stamens, hyaline. *Disk* of fem. urceolate. *Stamens* about 70 on a sparingly pubescent receptacle; filaments very short, slender; anthers longer, linear-oblong. *Ovary* ovoid-oblong, acuminate, densely stellately tomentose; styles erect, spreading.—I have seen Griffith's specimens, which are in male fl. (bud); the description of the female is from Kurz. The anthers are dorsifixed though far down, not basifixed as described by Kurz in his plant.

44. **CHROZOPHORA**, Neck.

Diffuse, densely hispid or stellately tomentose herbs or undershrubs. *Leaves* alternate, sinuate-toothed or lobed, wavy or plaited, 2-glandular at the base. *Flowers* in sessile axillary bracteate racemes, monœcious; bracts 1-fid.; males crowded in the upper part of the raceme; fem. solitary, pedicelled. **MALE FL.** *Calyx* globose or ovoid, splitting into 5 valvate segments. *Petals* 5, short. *Disk* obscure. *Stamens* 5-15, filaments connate below in one or more whorls; anthers oblong, cells contiguous, parallel. *Pistillode* 0. **FEM. FL.** *Sepals* narrow. *Petals* narrow or 0. *Disk-glands* short, broad. *Ovary* 3-celled; styles erect or spreading, 2-fid; ovules 1 in each cell. *Capsule* of 3 hispid tomentose or scaly subfleshy 2-valved cocci. *Seeds* estrophiolate, testa shining, albumen fleshy; cotyledons broad, flat.—Species 4-6, Mediterranean, Asiatic and African.

1. **C. tinctoria**, A. Juss. *Tent. Euphorb.* 28, t. 7, f. 25; annual, prostrate, leaves 1½-2½ in. long petioled from ovate and sinuate-toothed or entire to rounded and obtusely lobed, ovaries and capsules stellately tomentose and clothed with silvery scales. *Muell. Arg. in DC. Prodr.* xv. ii. 748;

Boiss. Fl. Orient. iv. 1140; *Reichb. Ic. Fl. Germ.* t. 152; *Sibth. Fl. Grac.* t. 950.

The PANJAB, Thomson, Edgeworth; Salt Range, Aitchison. SCINDE and the DECCAN, Stocks.—DISTRIB. Afghanistan and eastward to the Mediterranean region.

Whole plant softly clothed with stellate tomentum. Root stout; branches 6–10 in. Leaves thick, softly tomentose on both surfaces; petiole often 3 in. Racemes short, lengthening in fruit; male fl. numerous; pedicels of fem. at length decurved and sometimes 3 in. long in fruit. Stamens 5–20. Capsules $\frac{1}{2}$ in. diam.—Boissier refers Griffith's Afghan plant to *C. verbascofolia*, which hardly differs, and is regarded as a variety by Mueller; it has thicker tomentum.

2. *C. obliqua*, A. Juss. Tent. Euphorb. 28; shrubby, erect or sub-erect, thickly stellate-tomentose, leaves usually about equalling the petioles or longer ovate sinuate-toothed, ovaries and capsules stellately tomentose and with silvery scales. *C. tinctoria*, Muell. Arg. in DC. Prodr. xv. ii. 749; *Boiss. Fl. Orient.* iv. 1141. *C. oblongifolia*, A. Juss. l. c. *Croton obliquus*, Vahl Symb. i. 78; *Geisel. Monogr. Croton*. 71. *C. oblongifolius*, Del. Fl. Egypt. 139, t. 51, f. 1. *C. argenteus*, Forsk. Cat. Pl. Egypt. 75. *C. tinctorium*, Wall. Cat. 7716 G.

HINDOSTAN, Wallich. KASHMIR, Thomson, &c.; the PANJAB, at Ferozepore, Thomson. SCINDE, Stocks.—DISTRIB. Arabia, N. Africa.

A taller more bushy plant than *C. tinctoria*, described as perennial by Mueller and Boissier, but the Panjab specimens are annual, as are others from Egypt, &c. The stamens are 5 in the Ferozepore plant. In Wallich's the lower petioles are twice as long as the leaf-blade and stamens 3–4. Schweinfurth's *C. obliqua* (Plant. Nilot. 10, t. 3), quoted under *obliqua* by Boissier, is not the true plant, being represented without stellate scales on the capsule.

3. *C. plicata*, A. Juss. Tent. Euphorb. 28; annual, prostrate or ascending, leaves 2–5 in. broad subscabridly tomentose above, petiole equalling or exceeding the blade, from ovate and sinuate-toothed or entire to broadly rounded and lobed, ovary and capsule densely stellate-tomentose without silvery scales. Muell. Arg. in DC. Prodr. xv. ii. 747; *Boiss. Fl. Orient.* iv. 1140; *Dalz. & Gibs. Bomb. Fl.* 232. *C. Rottleri*, A. Juss. l. c.; *Spreng. Syst.* iii. 850; *Thwaites Enum.* 443. *Croton plicatus*, Vahl Symb. i. 75; *Geisel. Croton Monogr.* 70; *Roxb. Fl. Ind.* iii. 681. *C. Rottleri*, *Geisel.* l. c. 54. *C. asper*, Kæn. mss. *C. tinctorius*, Wall. Cat. 7716. (except G). *C. moluccanus*, Willd. Sp. Pl. iv. 551. *C. Burmanni*, Spreng. l. c. 851. *C. tinctorius* & *C. hastatus*, Burm. Fl. Ind. 304 t. 62, f. 1 and 305, t. 63, f. 1. *C. polycarpus*, Hort. Calcutt.

Throughout INDIA, from the PANJAB to TRAVANCORE, and from BENGAL to PEGU and BURMA. CEYLON; near Trincomalee, Glenie.—DISTRIB. Westward to Spain and N. Africa.

The larger states of this are to be distinguished from *C. tinctoria* by the rather scabrid upper surface of the leaves, and especially the absence of fringed scales on the ovary and capsule; in other respects it simulates the varieties of that plant. The smallest states again look exceedingly different in habit, size of leaf, colour, and especially in the shorter fewer-flowered racemes and small capsules. I am quite unable to follow Mueller in respect of his reference of the older figures and descriptions to the three varieties he has established. Burmann's, Vahl's and Geisel's descriptions are far too vague, and the figures of the former too inexact for determination. The following are the three prevalent Indian forms. I have seen no specimens from the Moluccas or Malay Islands, or from any country S. or E. from Burma. The Malaccan habitat attributed by Mueller to Klein is probably an error for Malabar.

1. Leaves large 2-4 in., leathery, rounded with a rather truncate base slightly lobed often rugose or plaited, petiole long, racemes many-fl., fruiting peduncle often 2-3 in., capsule $\frac{1}{2}$ in. diam. *C. plicata*, Dalz., Boissier. *Croton plicatus*, Roxb. *C. Rottleri*, Thwaites.

2. Leaves less thick and less tomentose ovate entire or repand toothed, petioles shorter.

3. Leaves $\frac{1}{2}$ -1 in., rounded deeply bullate together with the branches often densely tomentose or woolly sometimes deep green, racemes shorter fewer-fl., capsules smaller their pedicel never greatly lengthened. *C. prostrata*, Dalz., in Dalz. & Gibs. Bomb. Fl. 233.—This, which often grows completely appressed to the ground, is regarded by Dalzell as a very distinct species, occurring commonly in dried up water holes.

45. **CLAOXYLON**, A. Juss.

Evergreen trees or shrubs, rarely herbs. *Leaves* alternate, usually long-petioled, and oblong, entire or sinuate-toothed, penninerved (3-plinerved in one Indian species). *Flowers* small or minute, in axillary or lateral spikes or racemes, usually dioecious. MALE FL. *Calyx* subglobose, of 3-4 valvate segments. *Petals* 0. *Disk* 0. *Stamens* many, rarely few, inserted on or around a central receptacle often intermixed with glands or long linear ciliate scales; filaments free; anthers erect; cells distinct, connate at the base only, quite free above and erect, dehiscence extrorse. *Pistillode* 0. FEM. FL. *Calyx* of the male. *Disk* 0 or of 3 petal-like hypogynous scales alternate with the carpels. *Ovary* 3-celled; styles short, rarely long, entire, spreading, fringed; ovules 1 in each cell. *Capsule* of 3 2-valved cocci, or coriaceous and indehiscent. *Seeds* subglobose, arillate or not, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species about 40, native of the tropics of the Old World.

The discovery of frutescent species of *Claoxylon* with the hypogynous male scales (petals?) of *Micrococca* requires the suppression of the latter genus, the only other character for which is its being an annual. Mueller describes the seeds of *Claoxylon* as enclosed in an often coloured lax epidermis, Kurz as having a pure white or scarlet axil. The genus will require revision when fuller and better materials than those here described from are forthcoming.

Sect. I. *Fem. fl.* without hypogynous scales. *Stamens* central in the male fl. (See *C. hirsutum* in Sect. III.)

* *Filaments intermixed with ciliate filiform scales.*

1. **C. indicum**, Hassk. *Hort. Bogor.* 235; robust, leaves long-petioled from elliptic to broadly orbicular-ovate sinuate-toothed tomentose pubescent hoary or subglabrous, racemes 4-6 in., flowers shortly pedicelled, stamens 20-30, mixed with copious filiform villous scales, capsules small $\frac{1}{2}$ in. diam. trigonously 3-lobed, seeds $\frac{1}{2}$ in. diam. *Muell. in DC. Prodr.* xv. ii. 782; *Miquel Fl. Ind. Bat.* i. ii. 386. *C. macrophyllum*, Hassk. *Pl. Jav. Rar.* 249. *C. spiciflorum*, Baill. *Rec. Obs. Bot.* i. 285 (excl. syn.). *C. parviflorum*, Hook. & Arn. *Bot. Beech. Voy.* 212 (excl. syn.); *Benth. Fl. Hongk.* 305 (not of Juss.). *Erythrochilus indicus*, Reinw. in *Blume Bijdr.* 615. *E. mollis*, Blume l. c.—*Wall. Cat.* 7842.

MADRAS PENINSULA, *Wight in Herb. Wall.* TENASSEEIM; at Mergui, *Griffith.* BURMA and PENANG, *Wallich.* SINGAPORE, *Schomburgk.*—DISTRIB. Malay Islands, China.

A large shrub or small tree; branches stout, soft, pubescent or softly tomentose. *Leaves* in the broad form 6-10 by 4-6 in., in the narrower 6-8 by 3-4 in., base

acute obtuse rounded or subcordate, eglandular; petiole 3-5 in. *Racemes* hoary-tomentose; males longest with scattered clusters of subsessile flowers; female with solitary pedicelled flowers. *Capsules* tomentose, depressed; cocci keeled. *Seeds* (ripe?) rugose.—The more glabrous narrower-leaved forms look very different from the very broad tomentose ones (Mueller's var. *β.*), but in the Malay Islands both accompany the same very marked capsule, which is quite unlike that of any other species.

2. **C. longifolium**, Muell. Arg. in DC. Prodr. xv. ii. 781 (in part); leaves long-petioled elliptic-oblong or lanceolate quite glabrous base acute sinuate-toothed or entire, racemes 4-6 in., flowers pedicelled, stamens 40-50, receptacle with long villous scales, fruit $\frac{3}{4}$ in. diam. with 3 globose rugose cocci, seeds $\frac{1}{4}$ in. diam. smooth. *Erythrochilus longifolius*, Blume Bijdr. 616.—Wall. Cat. 7715 B.

PENANG, Wallich, Curtis, Maingay (Kew Distrib. 1408). SINGAPORE, Hallett. —DISTRIB. JAVA. Sumatra (Beccari No. 540).

An evergreen shrub or small tree, 4-10 ft. (Kurz); stem hollow; shoots pubescent. *Leaves* 3-6 in., green when dry, puberulous beneath; petiole 2-5 in. *Racemes* hoary, 2-3 in.; flowers $\frac{1}{2}$ in. diam. *Fruit* apparently bursting irregularly tridymous, hoary without, silky within.—The Calcutta Garden plant is, I think, rightly referred to this by Mueller, but is, I suspect, from Penang, and not from the Khasia Mts. On the other hand, the Khasia plant of Thomson's and my collection, also referred here by Mueller, is *C. khasiana*, differing in the very short scales amongst the stamens. I have seen no Javan specimens of *C. longifolium*. The Indian plant differs from *C. indicum* in the fruit and seed. The following varieties may be distinct species.

C. LONGIFOLIUM proper; racemes 4-8 in., flowers sessile or shortly pedicelled.—Penang (Wall. Cat. 7715 B).

Var. *brachystachys*; more glabrous, racemes 2-3 in., pedicels longer more slender $\frac{1}{4}$ in. long.—Penang, Curtis; Singapore, Hallett.

** *Filaments mixed with very small scales, or scales 0.*

3. **C. khasianum**, Hook. f.; leaves long-petioled elliptic- or oblong-lanceolate acuminate obscurely sinuate-toothed glabrous, racemes 1-3 in. hoary, flowers minute sessile, stamens about 50, receptacle with minute scales or glands, fruit of 1-3 globose membranous hoary carpels $\frac{1}{2}$ in. diam., seed $\frac{1}{4}$ in. diam. *C. longifolium*, *β. glabrum*, Muell. in DC. Prodr. xv. ii. 781 (the Khasian plant only).

ASSAM, SILHET, CACHAR and the KHASIA Mts., Griffith, Wallich, J. D. H. & T. T.

Habit and foliage of *C. indicum* and *longifolium*, but differing from the former in the fruit and seed, and from both in the small male flowers, $\frac{1}{10}$ in. diam., and the minute scales and glands of the receptacle.

Var. ? *serrulata*; leaves serrulate, racemes 6-10 in.—Garrow Hills, Simons.

4. **C. Wallichianum**, Muell. Arg. in DC. Prodr. xv. ii. 781; leaves shortly petioled oblanceolate or subcuneately obovate acuminate base very narrow sinuate serrulate, racemes 1-2 in. slender few-fl., stamens about 30, scales of receptacle few minute, fruit $\frac{3}{4}$ in. diam. 3-lobed, seed $\frac{1}{4}$ in. diam.—Wall. Cat. 7740 A.

MALAGA PENINSULA; Penang, Porter, Curtis; PERAK, ascending to 4000 ft., King's Collector.

Branches rather slender, terete, and petioles pubescent. *Leaves* 6-10 by $1\frac{1}{2}$ -3 in., membranous, pubescent beneath; petiole $\frac{1}{2}$ -1 in., slender. *Racemes* pubescent, flowers minute fascicled. *Fruit* pedicelled, nearly glabrous, pericarp thinly crustaceous glabrous within. *Seeds* $\frac{1}{4}$ in. diam., subglobose, pointed, rugose.

Sect. II. *Fem. fl.* without hypogynous scales. *Anthers* sessile in several series around the margin of a flat naked receptacle.

5. **C. anomalum**, *Hook. f.*; leaves long-petioled oblong-lanceolate acuminate subserrate glabrous base very acute 2-glandular, racemes very short dense-fl.

TRAVANCORE; at Courtallam, *Wight*.

Branches slender, terete, glabrous. *Leaves* 4-6 in., membranous; petiole $\frac{1}{2}$ -2 in., very slender. *Male and fem. racemes* $\frac{1}{2}$ - $\frac{3}{4}$ in., very shortly peduncled; flowers $\frac{1}{8}$ in. diam., submentose. *Anthers* very numerous, quite sessile, imbricating; cells short, diverging, truncate when dehiscent. *Ovary* tomentose.—I have only one male and one fem. specimen of this singular species.

Sect. III. *Fem. fl.* with 3 ligulate or oblong hypogynous scales alternating with the carpels. *Racemes* very slender in all. MICROCOCCA, *Benth*

6. **C. Mercurialis**, *Thwaites Enum.* 271; annual, herbaceous, nearly glabrous, leaves ovate obtuse crenate, racemes numerous capillary glabrous, stamens few or many, ovary hirsute with 3 linear scales. *Muell. Arg. in DC. Prodr.* xv. ii. 790. *Mercurialis alternifolia*, *Desv. in Lamk. Encycl.* iv. 120; *Baill. Etudes Gen. Euphorb.* 490, and *Rec. Obs. Bot.* i. 76; *Grah. Cat. Bomb. Pl.* 186. *Microstachys Mercurialis*, *Benth. in Hook. Niger Flora* 503; *Dalz. & Gibs. Bomb. Fl.* 227. *Tragia Mercurialis*, *Linn. Sp. Pl. Ed.* 3, 1391 (excl. var. β . and syns.); *Roxb. Fl. Ind.* iii. 576; *Wall. Cat.* 7790.—*Plukenet Iconogr.* t. 205, f. 4.

BEHAR; at Monghir, *Wallich*. THE DECCAN PENINSULA, in cultivated ground common. BURMA, *Wallich*. CEYLON; very common.—DISTRIB. Arabia and Tropical Africa.

Stem 6-24 in., stout or slender, soft, pale, often much branched, minutely pubescent with soft long hairs. *Leaves* 1-1 $\frac{1}{2}$ in.; base acute or obtuse, rarely cordate; nerves 4-5 pair, slender; petiole $\frac{1}{3}$ - $\frac{1}{2}$ in., very slender. *Racemes* equalling or exceeding the leaves; bracts very remote; flowers short- or long-pedicelled, fem. usually solitary with several males. *Sepals* glabrous. *Stamens* very variable in number, rarely only 3, often 5-10, sometimes very numerous in a globose mass in a nearly naked receptacle; anthers nearly sessile, cells short, dehiscence extrorse. *Fem. fl.* about $\frac{1}{12}$ in. diam. *Capsule* $\frac{1}{8}$ in. diam., glabrous or sparsely hairy, tridymous, depressed; stigmas very short, fimbriate; cocci globose, thinly crustaceous. *Seeds* pale brown, deeply foveolate.

7. **C. oligandrum**, *Muell. Arg. in Linnæa* xxxiv. 104, and in *DC. Prodr.* xv. ii. 784; shrubby, nearly glabrous, leaves long-petioled from ovate- to linear-lanceolate entire or serrate acuminate, racemes filiform longer than the leaves, flowers minute males arising from distant minute spikelets of imbricating bracteoles, stamens 5-18, ovary silky with 3 linear hypogynous scales. *C. longifolium*, *Baill. Etudes Gen. Euphorb.* 493 (in part); *Thwaites Enum.* 271 (excl. syn. *Blume*).

CEYLON; in the Central Province, ascending to 5000 ft.

A branching shrub, branches and petioles rarely pubescent. *Leaves* 3-8 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., rather membranous, very rarely puberulous beneath; base obscurely 2-glandular, acute, rarely obtuse; nerves suberect; petiole 1-2 $\frac{1}{2}$ in. *Racemes* solitary, curved or flexuous; spikelets very distant, $\frac{1}{12}$ - $\frac{1}{10}$ in. long; pedicels about as long or less. *Filaments* short, mixed with stipitate radiating glands. *Capsule* very small; cocci globose.—*Mueller* distinguishes as a variety a form with leaves obtuse at the base and few (5-8) stamens, but acute and obtuse based leaves occur on the same specimen, and the number of stamens varies excessively.

8. **C. Wightii**, *Hook. f.*; shrubby, sparsely softly hispid, leaves ovate- or oblong-lanceolate obtuse subentire or crenate, racemes numerous filiform flexuous hairy, stamens 6-9 subsessile, ovary hispid with 3 ligulate and very short fimbriate styles.—*Wall. Cat.* 7747.

TRAVANCORE; at Courtallam, *Wight*; Tinnevely Hills, *Beddome*.

Branches terete, slender, woody, younger together with the petioles and racemes laxly clothed with soft tawny hairs. *Leaves* 2-3 in., membranous, base acute; nerves 4-6 pair, very slender, midrib often fulvous-hairy beneath; petiole $\frac{1}{2}$ -1 in., slender. *Racemes* numerous, 1-2 in. long; bracts minute, lanceolate, villous; male fl. with globose hairy buds $\frac{1}{20}$ - $\frac{1}{16}$ in. diam., on capillary pedicels as long. *Stamens* mixed with a few unequal hyaline scales. *Capsule* about $\frac{1}{2}$ in. diam., 3-lobed, hispid, cocci thinly crustaceous. *Seeds* globose, smooth, dotted with shallow white pits.

9. **C. Beddomei**, *Hook. f.*; quite glabrous, leaves elliptic-lanceolate acuminate entire or coarsely serrate, racemes filiform strict, males with very distant bracts each containing a short spikelet of densely imbricating bracteoles from the axils of which the pedicelled male fl. arise, stamens 15-20, anther-cells linear, ovary glabrous with 3 ligulate scales and long fimbriate styles.

TRAVANCORE; on the Anamallay Hills, *Beddome*.

Branches terete, slender, woody, youngest shoots hispid. *Leaves* 4-6 in., membranous, base acute; nerves 8-10 pairs, very slender; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in., slender. *Racemes* long-peduncled; bracts minute, lanceolate; spikelets $\frac{1}{10}$ - $\frac{1}{8}$ in. long; bracteoles lanceolate, green, ciliolate. *Stamens* without scales or glands; anthers subsessile, cells much longer than in the other species, quite free except at the very base. *Capsule* $\frac{1}{2}$ in. diam., glabrous, cocci thinly crustaceous. *Seeds* foveolate.

10. **C. hirsutum**, *Hook. f.*; shrubby, villously hirsute with tawny hairs, leaves lanceolate acuminate subcrenate villous on both surfaces, stamens about 8, anthers short.

TRAVANCORE; on the Tinnevely Hills, *Beddome*.

Branches rather stout, terete, woody. *Leaves* 3-5 in., villous on both surfaces, with dense softer longer hairs beneath; nerves 4-6 pair; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Racemes* 2-3 in. long, filiform, clothed with soft spreading hairs; bracts distant, with clusters of minute shortly pedicelled male flowers. *Calyx* 3-4 lobed, filaments longer than the anthers.—I have seen but one specimen, a male.

IMPERFECTLY KNOWN SPECIES.

11. **C. longipetiolatum**, *Kurz For. Fl.* ii. 396; leaves 4-8 in. long-petioled elliptic- to ovate-oblong shortly finely acuminate subcrenate or toothed base acute obtuse or subcordate slightly pubescent beneath, petiole 3-5 in., racemes hispid, capsules deeply 3-lobed hirsute with soft prickles, cocci the size of a pea.

PEGU, MARTABAN and the ANDAMAN ISLANDS, *Kurz*.

A shrub or small tree, 8-15 ft.; stem fistulose; shoots appressed-pubescent.—I have seen only imperfect specimens in young flower; they resemble *C. longifolium* except in the fruit.

12. **C. leucocarpum**, *Kurz For. Fl.* ii. 396; leaves broadly ovate obtusely acuminate a foot long and almost as broad 3-5-nerved at the rounded or subcordate base repand-toothed scabrid above stellate-pubescent beneath, petiole 3-8 in., racemes stellate-tomentose, capsules the size of a cherry 2-4-lobed fleshy-coriaceous softly stellately hispid, seeds ovoid-globose smooth $\frac{1}{2}$ in. diam. enveloped in a white aril.

Forests of PEGU, *Kurz*.

An evergreen meagre low shrub, 3-4 ft.; stem very stout, fistular; shoots stellate-pubescent. *Leaves* eglandular at the base.—The only specimen I have seen is in fruit; the three strong long spreading basal nerves are quite unlike any Indian species of the genus. The fruiting raceme is very short, the fruit pedicelled, and the seeds remain attached to the axis of the fruit after the fall of the crustaceous stellately woolly valves.

13. *Claoxylon* sp.; leaves long and stoutly petioled 10-12 by 2-4 in. oblong acuminate subentire glabrous above sparsely pubescent beneath base acute eglandular, petiole 2-3 in., young racemes very short, stamens 60-70 filaments short, anthers long for the genus, receptacle glabrous.

PERAK, on Larut Peak, alt. 2-2500 ft., *Herb. Hort. Bot. Calc.* (No. 2177).

A shrub, 3-6 ft.—Possibly a variety of *C. longipetiolatum*, but the flowers are much larger.

14. *Claoxylon* sp.; leaves 5-6 by 2-2½ in. membranous oblong acuminate scaberulous on both surfaces subserrate base acute 2-glandular, petiole ½-1 in., fruit about ½ in. diam. 3-lobed hoary crustaceous.

Tinnevely Hills, *Beddome*.

15. *Claoxylon* sp.; stem very stout, shoots hoary, leaves very large 12-16 by 5-7 in. oblong acute or obtuse quite entire or sinuate-serrate base broad rounded or subcordate eglandular, nerves very spreading scaberulous above nearly glabrous beneath, petiole 6-10 in. stout, racemes peduncled, hoary, flowers (very young) minute.

CACHAB, *Keenan*. PEGU, *Kurz*.

A very large robust species, possibly a form of *C. khasianum*.

46. *ACALYPHA*, Linn.

Herbs, shrubs or trees. *Leaves* alternate, toothed or crenate, rarely entire, penninerved or 3-5-plinerved. *Flowers* minute, in axillary or terminal racemes, or females 1-2 in a peduncled solitary bract, monœcious, rarely diœcious, apetalous; males very minute, ebracteate; fem. at the base of the male spike, or in separate spikes, often at the base of large accrescent leafy bracts. MALE FL. Disk 0. *Calyx* membranous, splitting into 4 valvate sepals. *Stamens* many, often 8, on a convex receptacle, filaments free; anther-cells divaricate, often twisted or flexuous. *Pistillode* 0. FEM. FL. *Sepals* 3-4, imbricate, often minute. *Ovary* 3-celled; styles filiform, often very long and laciniated or fimbriate; ovules 1 in each cell. *Capsule* of 3 minute 2-valved crustaceous cocci. *Seeds* subglobose, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species upwards of 220, tropical and subtropical.

* *Fem. bracts solitary, very large, 2-flowered.*

1. *A. Dalzellii*, *Hook. f.*; shrubby, glabrous, leaves long-petioled ovate obtuse base cuneate obscurely crenate, bract very large orbicular-reniform 2-fld., peduncle capillary.

The CONCAN?, *Dalzell*.

Much branched, branches terete, bark brown. *Leaves* 2-3 in., membranous, 3-5-plinerved, nerves very slender; petiole ¾-1 in., very slender. *Bracts* (female flowering) ¼-½ in. diam., quite entire; peduncles ½-1 in.; sepals lanceolate, ciliate; ovary glabrous, 3-4-celled; styles pectinately laciniated, ¼ in. long.—A very remarkable

species, of which there are fem. specimens and a good drawing in Dalzell's Herbarium, but without locality. In the drawing two specimens are represented, one with androgynous spikes, each consisting of one female bract, and a very slender rachis with minute male flowers; the other is wholly female, and bears solitary axillary long-peduncled fem. bracts.

** *Fem. spikes* with many bracts.

2. ***A. paniculata***, *Miquel Fl. Ind. Bat.* i. ii. 406; leaves long-petioled ovate acuminate, male fl. in axillary filiform long spikes, fem. fl. in axillary and terminal racemes or panicles, bracts minute not enlarged in fruit. *Muell. Arg. in DC. Prodr.* xv. ii. 802. *A. racemosa*, *Heyne in Wall. Cat.* 7784; *Baill. Etudes Gen. Euphorb.* 443. *A. Wallichiana*, *Thwaites Enum.* 271. *A. filiformis*, *Heyne mss.*—*Rheede Hort. Mal.* x. t. 83.

DECCAN PENINSULA; from Malabar southward. CEYLON; ascending to 3000 ft. —DISTRIB. Java, Trop. Africa.

An undershrub or herb, finely pubescent. *Leaves* 2-6 in., coarsely unequally crenate-serrate; petiole 1-4 in. *Male spikes* solitary, 2-6 in., dense-fl.; fem. racemes or panicles capillary; bracts scattered, 3-fl., ovate, obtuse, shorter than the pedicels. *Sepals* of fem. gland-ciliate, ovate-lanceolate, at length reflexed. *Capsule* $\frac{1}{2}$ in. diam., 3-lobed, glandular; styles 3-7-partite. *Seeds* reticulately pitted.—Mueller points out that Heyne's unpublished name of *racemosa*, as taken up by Baillon, is the oldest, but not applicable.—Mueller has described as forma *depauperata* (Linnæa xxxiv. 8) a starved state from the Nilghiries with weak reduced axillary male and female inflorescence.

3. ***A. fruticosa***, *Forsk. Fl. Æg. Arab.* 161; shrubby, stem glabrous, leaves ovate acute or subacute crenate glabrous and glandular beneath, spikes axillary short, bracts of fem. few lax 1-fl. many-toothed, enlarged in fruit. *Muell. Arg. in DC. Prodr.* xv. ii. 822; *Kurz For. Fl.* ii. 397. *A. betulina*, *Retz. Obs.* v. 30; *Thwaites Enum.* 271. *A. amentacea*, *Rorb. Fl. Ind.* iii. 676. *A. capitata*, *Wall. Cat.* 7783 B.

DECCAN PENINSULA, *Heyne*, &c. PEGU, MARTABAN and AYA, *Kurz*. CEYLON, *Thwaites*, &c.—DISTRIB. Arabia, Trop. Africa.

A strong-smelling shrub, more or less covered with yellow waxy glands; shoots and spikes pubescent. *Leaves* 1-3 in., crenate, obtuse or subacute, base usually acute; petiole much shorter than the limb. *Spikes* $\frac{1}{2}$ -1 in., solitary, bracteate and 2-bractolate, usually male with a few fem. fl. at the base. *Sepals* of male pubescent. *Ovary* hairy and glandular; styles with filiform arms. *Capsules* tomentose. *Seeds* smooth.—Habit of *A. alnifolia*, but the stems and leaves beneath are glabrous, and the latter more or less glandular. I have seen no Burmese specimens. Large specimens apparently of this species in male flower only, from the sea coast, Tinnevely, Wight (Kew Distrib. 2619), have leaves 3 in. long, deeply crenate, the young only glandular beneath.

4. ***A. alnifolia***, *Klein mss.*; *Willd. Sp. Pl.* iv. 525; shrubby, stems pubescent and often ciliate with long deciduous hairs, leaves ovate acute serrate pubescent above and usually tomentose beneath, male spikes axillary slender dense-fl., fem. terminal sessile capitate, bracts 1-fl. 6-9-toothed longer than the flowers, styles very long fimbriate or plumose with short capillary branches. *Muell. Arg. in DC. Prodr.* xv. ii. 843; *Baill. Etudes Gen. Euphorb.* 442; *Wall. Cat.* 7782; *Wight in Hook. Comp. Bot. Mag.* ii. t. 29. *A. capitata*, *Willd. & Muell. ll. c. Wall. Cat.* 7783 A.

The DECCAN PENINSULA; common, *Heyne*, &c.

A small shrub, eglandular. *Leaves* 1-2 in., sometimes almost orbicular, base rounded or subcordate variable in hairiness; petiole rarely half the length of the blade. *Male spikes* 1-3 in.; fem. of few obtusely lobed imbricating bracts. *Sepals*

of male pubescent. *Capsule* hispid. *Seeds* subglobose.—I can find no good characters whereby to separate *capitata* from *alnifolia*. Mueller distinguishes the latter by the longer petioles and deeper lobed bracts.

5. **A. indica**, Linn. *Sp. Pl.* 1003; herbaceous, pubescent, leaves long-petioled ovate or rhombic-ovate crenate-serrate, spikes all axillary androgynous elongate, male fl. few minute terminal, bracts many distant large broad 3-5-fld. truncate crenate much larger than the capsules. *Muell. Arg. in DC. Prodr.* xv. ii. 868; *Roxb. Fl. Ind.* iii. 675; *Wight Ic.* t. 877; *Grah. Cat. Bomb. Pl.* 186; *Dalz. & Gibs. Bomb. Fl.* 228. *A. spicata*. *Forsk. Fl. Æg. Arab.* 160. *A. ciliata* & *A. canescens*, *Wall. Cat.* 7779 and 7785.

Hotter parts of INDIA from Behar eastwards to Assam and southwards to Singapore and Burma; and from the Concan to Travancore. CEYLON, common in fields.—DISTRIB. westwards to Tropical Africa, and eastwards to Timor and the Philippines.

Annual, 1-3 ft. *Leaves* 1-2 in., acute or obtuse, base cuneate entire; petiole slender, often longer than the blade. *Spikes* 1-3 in., slender, erect; bracts $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., cuneiform, many-nerved. *Ovary* hispid. *Capsules* quite concealed by the bract, often only 1-seeded, hispid. *Seed* ovoid, acute, smooth.

6. **A. brachystachya**, Hornem. *Hort. Hafn.* 909; herbaceous, flaccid, nearly glabrous, leaves long-petioled ovate or ovate-cordate subacute crenate-serrate, spikes all axillary sessile very short androgynous, male fl. very few terminal minute, fem. bracts few 2-3-fld. crowded at the base of the spike very large cut into 3 linear spreading 1-nerved obtuse lobes, styles pectinately lacinate. *Muell. Arg. in DC. Prodr.* xv. ii. 870. *A. conferta*, *Roxb. Fl. Ind.* iii. 677. *A. calyciformis*, *Herb. Wight*, and *A. fissa*, *Herb. Madr.*, *Wall. Cat.* 7786. *Tragia tenuis*, *Herb. Madr.*; *Wall. Cat.* 7787.

TEMPERATE HIMALAYA, alt. 4-8000 ft.; from Kashmir to Nepal, *Wallich*, &c. The KHASIA Mts., alt. 4000 ft., *J. D. H. & T. T.* DECCAN PENINSULA, from Canara southwards. CEYLON, *Walker*.—DISTRIB. Java, Trop. Africa.

A flaccid annual, 6-12 in. *Leaves* 1-3 in., membranous, acute obtuse or acuminate; petiole often longer than the blade. *Bracts* forming axillary clusters, each $\frac{1}{4}$ - $\frac{1}{2}$ in. long; lateral segments shorter, all spreading. *Male flowers* in minute clusters on the very short filiform apex of the spike. *Capsules* hispid, quite concealed in the large green bracts. *Seeds* subglobose, nearly smooth.

7. **A. malabarica**, *Muell. Arg. in Linnæa* xxxiv. 42, and in *DC. Prodr.* xv. ii. 871; herbaceous, flaccid, stem pubescent, leaves long-petioled ovate subacute subserrate, spikes all axillary sessile short androgynous, male fl. very few terminal minute, bracts 3-7 alternate 2-5-fld. glabrous many-toothed and bordered with slender gland-tipped hairs rather longer than the capsules. *A. hispida*, *Heyne in Herb. Rottler*.

DECCAN PENINSULA, *Heyne, Law*.

A rather stout leafy annual, 4-6 in.; stem stout. *Leaves* $1\frac{1}{2}$ -2 in., base cuneate, glabrous; petiole longer than the blade. *Spikes* $\frac{1}{2}$ in., male portion with few minute glabrous flowers. *Bracts* $\frac{1}{2}$ in. broad, separated by short intervals. *Seeds* globosely ovoid, obscurely granulate.—The more entire leaves, shorter sessile spikes, and deeper glabrous 2-3-fld. bracts distinguish this from *A. lanceolata*.

8. **A. fallax**, *Muell. Arg. in Linnæa* xxxiv. 43, and in *DC. Prodr.* xv. ii. 872; herbaceous, leaves long or short-petioled from rhombic- or orbicular-ovate to ovate-lanceolate obtuse or acute crenate-serrate, spikes all

axillary sessile or peduncled androgynous, male fl. few terminal minute, bracts many dense or remote 1-fl. hispid many-toothed often bordered with gland-tipped hairs rather shorter than the capsules. *A. lanceolata*, Willd. *Sp. Pl.* iv. 524. *A. Wightiana*, Muell. *Arg. II. c.* *A. hispida*, Herb. *Wight and Thwaites Enum.* 271. *A. ciliata* & *lanceolata*, Herb. *Heyne in Wall. Cat.* 7780. *A. flexuosa*, Herb. *Wight*. *A. virginiana*, Herb. *Russell in Wall. Cat.* 7779 G. *A. corchorifolia*, *Vahl mss. in Baill. Etudes Gen. Euphorb.* 443. *A. boehmerioides*, *Miquel Fl. Ind. Bat. Suppl.* 459. *A. albicans*, *floribunda*, *villosa* & *collina*, *Heyne mss. in Herb. Rottler.*—*Wall. Cat.* 7778.

The DECCAN PENINSULA; from Mysore and the Circars southward, common, *Klein, Heyne, &c.* BURMA, at Melloon, *Wallich*. CEYLON, common. DISTRIB. Sumatra, Java, &c.

Annual, 6–18 in. high, usually branched from the base, flaccid or rather rigid, more or less pubescent and with sometimes long deciduous hairs on the stem as in *A. alnifolia*. *Leaves* very variable, 1–4 in., membranous; petiole shorter or longer than the limb. *Spikes* 1–5 in.; male fl. in a minute head concealed by the uppermost bracts, or produced into a minute spike; bracts $\frac{1}{2}$ – $\frac{1}{3}$ in. diam., always 1-fl., 9–12-toothed. *Capsule* hispid, styles rather short, laciniate. *Seeds* globosely ovoid, nearly smooth.—I am very doubtful as to the name this species should bear; it is a most variable plant, and I am sure that all the synonyms quoted above belong to it. The three extreme forms are (1) a short robust state, with small elliptic leaves not above 1 in. long with the blade longer than the petiole; (2) a common form with broad leaves and elongate long-peduncled lax-fl. spikes, and (3) an often more lanceolate-leaved form with shorter sessile dense-fl. spikes. The flowers and fruit are the same in all.

9. *A. ciliata*, *Forsk. Fl. Æg. Arab.* 162; herbaceous, leaves long-petioled ovate or ovate-lanceolate acuminate serrate, spikes all axillary sessile short androgynous, male fl. few minute terminal, bracts crowded 1–2-fl. longer than the capsules with many nerves ending in long subulate hispid teeth. *Muell. Arg. in Jinnæa xxxiv.* 44, and in *DC. Prodr.* xv. ii. 873; *Roxb. Fl. Ind.* iii. 676; *Wight & Arn. in Ann. Nat. Hist.* ii. (1839) 111, t. 5; *Dalz. & Gibs. Bomb. Fl.* 228; *Thwaites Enum.* 271 (excl. syn.). *A. fimbriata*, *Schum. Beskr.* 409; *Baill. Rec. Obs. Bot.* i. 272. *A. ciliata*, *Herb. Heyne*, and *A. rubra*, *Herb. Wight*, in *Wall. Cat.* 7781.

WESTERN HIMALAYA, alt. 3–6000 ft., from Kashmir to Garwhal. BANDA, *Edgeworth*. The DECCAN PENINSULA, from the Concan southwards. CEYLON, not uncommon.—DISTRIB. Arabia, Tropical Africa.

Annual, 1–2 ft., rather stout, glabrous or pubescent. *Leaves* 2–3 in., sometimes caudate-acuminate, base cuneate or rounded; petiole usually longer than the blade. *Spikes* rarely 1 in. long; bracts (like the calyx of a Labiate plant) hispid or glabrous, pale, teeth as long as the limb. *Ovary* sparsely hispid. *Capsule* glabrous; cocci very thin, white, glabrous, twisted after deliscescence. *Seeds* globosely ovoid, nearly smooth.

DOUBTFUL AND EXCLUDED SPECIES.

A. HISPIDA, *Burm. Fl. Ind.* 303, t. 61, f. 1; *Muell. in DC. Prodr.* xv. ii. 815 (*Caturus spiciflorus*, *Roxb. Fl. Ind.* iii. 760), with very long spikes, minute bracts, and very long styles, is a garden plant only in India.

A. CYLINDRICA, *Roxb. Fl. Ind.* iii. 628, is doubtfully referred by Mueller (in *DC. l. c.* 880) to the Brazilian *A. Poiretii*, Spr.

47. *ADENOCHLÆNA*, *Baill.*

Trees or shrubs, glabrous or stellately tomentose. *Leaves* alternate,

penni- or tripli-nerved, quite entire. *Flowers* in terminal or axillary spiciform racemes, or capitate, monœcious, males many clustered, females few, at the base of the spike. *Disk* 0. *MALE FL.* globose in bud. *Sepals* 4-6, valvate. *Stamens* 4-6, filaments free, exserted; anthers dorsifixed, versatile; cells adnate to the thick connective, parallel. *Pistillode* columnar. *FEM. FL.* *Sepals* 5-8, narrow, very unequal, sometimes accrescent and pinnatisect. *Ovary* 3-celled; styles long, connate below, spreading and bifid above with recurved plumosely papillose multifid arms; ovules 1 in each cell. *Capsule* of 3 2-valved cocci. *Seeds* estrophiolate, subglobose, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species 4 or 5, Indian and Malayan.

SECT. I. *Leaves* penninerved. *Fruiting calyx* unaltered. SYMPHYLLIA, *Baill.*

1. **A. silhetiana**, *Benth. in Gen. Pl.* iii. 308; leaves crowded at the ends of the branches, subpanduriformly oblanceolate acuminate from a contracted cordate base, spikes terminal interrupted, flowers densely clustered sessile on short lateral thickened branchlets glabrous. *Symphyllia silhetiana*, *Baill. Etudes Gen. Euphorb.* 474, t. 11, f. 6, 7; *Muell. Arg. in DC. Prodr.* xv. ii. 764. *Cluytia semperflorens*, *Wall. mss. (not Roxb.)*.—*Wall. Cat.* 9095.

KHASIA MTS., *Wallich, Griffith.*

Branches stout, woody, finely stellate tomentose, as are the petioles and rachis of the racemes. *Leaves* 6-10 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., thinly coriaceous, contracted above the 2-auricled base; midrib and 12-15 pairs of arched anastomosing nerves very prominent beneath; petiole $\frac{1}{10}$ - $\frac{1}{8}$ in., very stout. *Racemes* stout, erect, 2-6 in. long; rachis quite naked between the clusters of flowers; bracteoles minute, pubescent; flowers $\frac{1}{10}$ in. diam; sepals 4, ovate; disk with a few hairs; pistillode small. *Ovary* stellately tomentose; styles united below in a column, arms pubescent. *Capsule* unknown.

Var. *trichantha*, *Muell. l. c.*; flowers smaller stellately tomentose. *Kurz For. Fl.* ii. 378.—Tenasserim, *Helfer*.—Possibly a different species, but the specimen is too imperfect.

2. **A. indica**, *Beddome mss.*; leaves short- or long-petioled elliptic or oblong obtuse, spikes lateral and terminal interrupted, flowers densely clustered scurfily puberulous. *Cephalocroton indicum*, *Beddome Fl. Sylvat.* t. 261. *Symphyllia mallotiformis*, *Muell. Arg. in Linnæa* xxxiv. 156, and in *DC. Prodr.* xv. ii. 764.

DECCAN PENINSULA; on the Ghats from Canara to Travancore.

A large tree, branchlets puberulous. *Leaves* 3-7 in., greenish or pale brown when dry, rather shining above, tip often narrowed but obtuse, base rounded or narrowly cordate at the petiole; nerves 8 pair, strong beneath; petiole very variable in length, $\frac{1}{2}$ -4 in., rather thickened at the top. *Spikes* 2-6 in.; bracts minute; male buds globose, $\frac{1}{10}$ in. diam.; stamens 4-5, large, exserted. *Fem. fl.* very rare, at the base of the spikes; sepals lanceolate, unequal, tomentose; ovary and style tomentose, the latter stout and often much longer than the sepals; stigmas twice-forked, fimbriately papillose. *Capsule* subglobose, slightly scabrous, $\frac{3}{4}$ in. diam.—Some specimens of this were distributed under "*Herb. Ind. Or.*, *Claoxylon*, 14," and its resemblance to *Mallotus* is singular. It is also singular that no specimens occur in Wight's Herbarium, and that it has not been found in the Nilghiri Hills; the "*Herb. Ind. Or.* H. f. & T." specimens, obtained by G. Thomson's collectors in the Nilghiri and Karg, are hence no doubt from the latter country.

SECT. II. *Fruiting calyx* accrescent, pectinately laciniate. CENTRO-STYLIS, *Baill.*

3. **A. zeylanica**, *Thwaites Enum.* 270; branches leaves beneath and racemes finely stellate-tomentose, leaves subdeltoïdly ovate or lanceolate acuminate from a truncate or subcordate 3-plinerved base, male fl. in peduncled heads. *Cephalocroton zeylanicus*, *Baill. Rec. Obs. Bot.* 5, 148; *Muell. Arg. in DC. Prodr.* xv. ii. 763. *Beddome Forester's Man.* 206. *Centrostylis zeylanica*, *Baill. Etudes Gen. Euphorb.* 470, t. 2, f. 28, 29.

CEYLON; Central Province, alt. 4-5000 ft., *Thwaites*.

A suberect shrub; branches slender. *Leaves* membranous, 3-7 by 1-3 in., brown when dry, pale beneath; nerves 5-8 pairs above the basal, slender; petiole $\frac{1}{2}$ -1 in., slender; stipules minute, subreniform. *Male fl.* $\frac{1}{10}$ in. diam., tomentose; sepals 4-5, rarely 2, obtuse; filaments very stout; anthers large; pistillode pubescent below. *Fem. fl.* larger than the males; sepals 5-6, flowering lobulate at the base, fruiting nearly 1 in. long with filiform purple gland-tipped segments; ovary tomentose, 3-lobed; styles very large, much branched, branches clothed with long papillæ. *Capsule* depressed, cocci rounded. *Seeds* subspheric, $\frac{1}{2}$ in. diam., brown marbled with black. —I should be disposed to keep up Baillon's genus *Centrostylis* in a revision of the Order.

EXCLUDED SPECIES.

A. LEUCOCEPHALA, *Baill. Etudes Gen. Euphorb.* 473. *Cephalocroton leucocephalus*, *Muell. Arg. in DC.* xv. ii. 762; *Beddome Forester's Man.* 206, is a Madagascar plant, erroneously also ascribed to Ceylon.

48. **CÆLODEPAS**, *Hassk.*

Trees. *Leaves* alternate, oblong, entire or toothed, penninerved. *Flowers* in axillary spicate clusters, monœcious or diœcious, apetalous; fem. few at the base of the spike. *Disk* 0. **MALE FL.** *Calyx* globose, splitting into 3-4 valvate segments. *Stamens* 4-8, filaments cuneately dilated from the base upwards, free or connate at the very base; anthers terminal, didymous, cells pendulous or spreading from the connective, introrse. *Pistillode* minute, protruded. **FEM. FL.** *Calyx* cupular, embracing the ovary, often enlarged in fruit; lobes 4-10, imbricate. *Ovary* 3-celled; styles spreading, flattened, 2-multifid, lobes toothed or lacerate; ovules 1 in each cell. *Capsule* of 3 2-valved stellately-pubescent cocci. *Seeds* subglobose, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species 3, South Indian and Malayan.

1. **C. Wallichianum**, *Benth. in Hook. Ic. Pl.* t. 1288; branchlets glabrous, leaves subsessile broadly oblong-lanceolate quite entire or subentire glabrous base cordate, spikes interrupted tomentose upper androgynous lower short female, anther-cells pendulous introrse, styles dilated. —*Wall. Cat.* 9098.

PENANG, *Porter*.

A tree; branches glabrous, tips of shoots and petioles puberulous. *Leaves* 6-10 in., coriaceous, shining, red-brown when dry, sometimes obscurely crenate near the apex, nerves 12-14 pairs arched, reticulate; petiole very short and thick or 0; stipules small, subulate. *Spikes* short, white-tomentose; male fl. minute, globose, clustered; fem. few, solitary in small bracts. *Filaments* united at the base, dilated upwards and suddenly contracted at the tip; anther-cells small, diverging. *Pistillode* thick, truncate. *Fem. calyx* tomentose, lobes short; styles thick, much larger than the ovary, multifid, lobes papilloso fringed.

2. **C. calycinum**, *Beddome Fl. Sylvat.* t. 320, and *Forester's Man.* 207; branchlets furfuraceously pubescent, leaves subsessile elliptic or linear-oblong acuminate crenate-serrate, spikes scurfily pubescent, fem. calyx much enlarged in fruit, styles 2-fid lacerate.

TINNEVELLY HILLS; in forests, alt. 2000 ft., *Beddome*.

A tree. *Leaves* 5-7 in., thinly coriaceous, greenish when dry, base acute or contracted and subcordate; petiole rarely $\frac{1}{2}$ in., scurty; stipules subulate, lacerate. *Male spikes* 4-5 in. long, slender. *Sepals* 4. *Stamens* 4-5; filaments dilated upwards with angular shoulders, connate below and aduate to the pistillode; anther-cells divaricate. *Fem. racemes* short, few-fl'd. *Sepals* 5, concave, tomentose. *Ovary* pubescent. *Capsule* $\frac{1}{2}$ in. diam., 3-lobed, stellately pubescent, fruiting broadly ovate.

3. **C. ferrugineum**; branches petioles and capsules rusty-tomentose, leaves petioled linear-oblong obtusely acuminate quite entire base rounded fem. calyx closely embracing the young globose fruit.

MALACCA, *Griffith* (*Kew Distrib.* 5017).

Leaves 3-4 by 1-1 $\frac{1}{2}$ in., thin but stiff, dark brown and almost shining above when dry, with the nerves all raised, beneath a little pubescent, red-brown with 10-12 pairs of raised nerves and parallel cross-nervules; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Racemes* very short. *Male fl.* very minute; sepals 5, broad, villous; stamens with very short stout filaments greatly thickened in the middle; anther-cells ovoid, pendulous, diverging; pistillode broadly conical. *Fem. calyx* very thick, globose, densely stellate tomentose, valvately 3-lobed, crowned with the large densely branched corolliform stigmas.

4. **C. ? longifolium**, *Hook. f.*; branchlets petioles and spikes tomentose, leaves very shortly petioled linear-lanceolate acuminate subserrate strongly reticulate beneath, male fl. in small clusters on axillary peduncles, calyx stellately pubescent cup-shaped valvately 3-5-lobed, stamens 4-5, filaments connate below in a fleshy cup, free part triangular, anthers didymous horizontal.

PERAK; at Larut, *King's Collector*.

A tree, 20-30 ft. *Leaves* 6-10 by 1-1 $\frac{1}{2}$ in., thinly coriaceous, base rounded; nerves 12-16 pairs, raised on both surfaces, strong beneath with strong cross-nervules; petiole stout, $\frac{1}{2}$ - $\frac{3}{4}$ in.; stipules very slender. *Spikes* 1-3 in., rachis stout; flowers very minute, ebracteate.

49. **ALCHORNEA**, Swartz.

Trees or shrubs, more or less pubescent. *Leaves* alternate, entire or toothed, 3-5-pli- or penni-nerved, sometimes stipellate and usually glandular at the base above. *Flowers* small, clustered on simple or paniced terminal spikes or racemes, diœcious or monœcious, apetalous; bracts minute. *Disk* usually 0. **MALE FL.** *Calyx* globose, splitting into 2-4 valvate segments. *Stamens* 6-8 or indefinite, filaments free or connate at the base; anthers dorsifixed, cells parallel or diverging. *Pistillode* 0. **FEM. FL.** *Sepals* 3-6, imbricate. *Ovary* 2-3- rarely 4-celled; styles distinct, often very long, linear, entire, 2-fl'd or sparingly lobed; ovules 1 in each cell. *Capsule* of 2-3 2-valved crustaceous cocci. *Seeds* subglobose, estrophiolate, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species about 30, tropical.

Sect. I. **STIPELLARIA**. *Leaves* triple-nerved, stipellate. *Female sepals* 5-8. *Disk* 0. *Stamens* 7-8. *Styles* filiform.

1. **A. mollis**, *Muell. Arg. in Linnæa* xxxiv. 168, and in *DC. Prodr.* xv. ii. 902; pubescent or tomentose, leaves long-petioled orbicular or broadly ovate cuspidate dentate or serrate pellucidly dotted, base rounded or cordate, ovary tomentose, capsules globose faintly 3-lobed smooth densely pubescent, seeds as broad as long dorsally compressed rugose. *Stipellaria mollis*,

Benth. in Hook. Journ. Bot. vi. (1854) 3. Rottlera mollissima, Wall. Cat. 7825. Sapium cordifolium, Roxb. Fl. Ind. iii. 693.

CENTRAL and EASTERN HIMALAYA, in hot valleys; Nipal, *Wallich*; Sikkim, *Clarke*. Assam, *Masters*. The CIRCARS, *Roxburgh*.

A small tree; branches woody; branchlets petioles leaves beneath and racemes finely pubescent or tomentose. *Leaves* 4-6 in. diam., with usually large glands at the base above; petioles stout, 2-6 in., terete; stipules small, subulate; stipellæ $\frac{1}{2}$ in. *Male racemes* 4-6 in., very slender, pubescent; buds $\frac{1}{12}$ in. diam., globose, glabrous, grooved between the anthers; calyx membranous, glabrous, usually bursting irregularly. *Fem. racemes* 4-6 in., bracts small; base of calyx eglandular; sepals $\frac{1}{2}$ in., lanceolate, pubescent; ovary tomentose, styles free nearly to the base. *Capsules* $\frac{1}{2}$ in. diam.—I have seen no specimens from the Circars, and have no means of verifying the citation of Roxburgh's *Sapium cordifolium*.

2. **A. villosa**, *Muell. Arg. in Linnæa xxxiv. 168*, and in *DC. Prodr. xv. ii. 902*; pubescent or tomentose, leaves short-petioled ovate acuminate serrulate pellucidly dotted, base rounded cuneate or cordate, bracts and sepals narrowly lanceolate hispidly hairy all over, styles twice as long or more than the pubescent ovary, capsules globose faintly 3-lobed rather rough or smooth glabrous or puberulous, seeds nearly as broad as long dorsally compressed tubercled. *A. Zollingeri, Hassk. Hort. Bogor. Ed. ii. 37. Stipellaria villosa, Benth. in Hook. Journ. Bot. vi. (1854) 4. Aparisthium sumatranum, Reichb. f. et Zoll. in Retzia 37. Bleekeria Zollingeri, Miquel Fl. Ind. Bat. i. ii. 407.*

MALACCA, *Cuming, Griffith, &c. (Kew Distrib. 4749), Maingay (Kew Distrib. 1379)*. PERAK, *Scortechini, Wray, &c.*—DISTRIB. Sumatra, Java.

Branchlets and racemes pubescent, tomentose, or villous with spreading hairs. *Leaves* 4-6 in. broad, with or without basal glands; petiole 1-2 in.; stipellæ $\frac{1}{4}$ in. *Male racemes* slender, pubescent; buds $\frac{1}{10}$ in. diam., subglobose, hispid; flowers very minute; sepals 2-3, stamens 8. *Fem. fl.* including the capillary styles $\frac{1}{2}$ - $\frac{3}{4}$ in.; sepals and bracts together about 12, very unequal; ovary glabrous. *Capsule* size of a pea.

Var. glabrata; leaves glabrous beneath.—Penang, *Curtis*.

Var. ? latisejala; leaves pubescent on the nerves beneath only, sepals and bracts ovate obtuse or acute coarsely ciliate closely imbricate, styles shorter stouter.—Tenasserim, *Helger (Kew Distrib. 4752)*.—Probably a different species.

3. **A. discolor**, *Hook. f.*; branchlets petioles and racemes finely pubescent, leaves elliptic-lanceolate acuminate serrate nearly glabrous not pellucidly dotted red-purple beneath, ovary sparsely pubescent, styles united form $\frac{1}{3}$ their length.—*Wall. Cat. 7777.*

PENANG, *Wallich, Walker*; on Gool Hill, *Curtis*.

Branches woody. *Leaves* 4-6 in., base narrowed, green and glabrous above with usually basal glands, beneath a fine vinous purple; nerves 6-7 pairs above the basal, slender, pubescent, cross-nervules raised; petiole 2-5 in., very slender; stipules filiform; stipellæ narrow. *Male racemes* 2-4 in., slender; buds $\frac{2}{10}$ in. diam., hispid. *Fem. racemes* slender; bracts subulate; calyx-base glandular; sepals $\frac{1}{2}$ in. long, subulate, unequal; ovary glabrous with the style $\frac{1}{2}$ in. long.—*Wallich's* specimens have thicker opaque leaves, in which I do not see the pellucid glands.

4. **A. tiliæfolia**, *Muell. Arg. in Linnæa xxxiv. 168*, and in *DC. Prodr. xv. ii. 903*; branches petioles and racemes finely pubescent, leaves long petioled from broadly ovate to orbicular cuspidately acuminate or caudate dentate or serrate most minutely pellucidly dotted, ovary pubescent, styles equalling the oblong or subglobose tubercled capsules, seeds obovoid-oblong nearly smooth. *Kurz For. Fl. ii. 386. Stipellaria tiliæfolia, Benth*

in *Hook. Journ. Bot.* vi. (1854) 4. *Croton Chiamala*, *Wall. Cat.* 7775.—*Wall. Cat.* 7829, 7995.

SIKKIM HIMALAYA; at the foot of the hills, *J. D. H., Clarke*. BHOTAN, *Griffith*. ASSAM, the KHASIA MTS. and SILHET, *Wallich*, &c. TENASSERIM and ANDAMAN ISLANDS, *Kurz*.

An evergreen shrub; branches rather slender, terete, woody; branchlets sometimes tomentose. *Leaves* 6–10 in. broad, thin, base cuneate, rounded or cordate, pellucid glands very minute; base glandular or not; nerves pubescent; petiole slender, 2–4 in.; stipules filiform; stipellæ subulate or 0. *Male racemes* very slender, 4–6 in., sparsely pubescent; buds globose, $\frac{1}{2}$ in. diam., glabrous; calyx membranous, often bursting irregularly. *Fem. fl.* shortly pedicelled; calyx-base eglandular; sepals subulate-lanceolate, $\frac{3}{8}$ in. long; ovary minutely tubercled; styles free to the base. *Capsules* $\frac{1}{2}$ – $\frac{2}{3}$ in. long, very shortly pedicelled, 3-lobed, puberulous, green with purple tubercles.

Sect. II. CLADODES, *Muell. Arg.* *Leaves* penninerved, estipellate. *Female sepals* 4–6. *Stamens* 3–8. *Styles* shorter, flattened and lobed.

5. ***A. rugosa***, *Muell. Arg.* in *Linnaea* xxxiv. 170, and in *DC. Prodr.* xv. ii. 905; glabrous, leaves petioled or sessile oblong-lanceolate or oblanceolate acuminate gland-serrate, male racemes paniced rigid slender, stamens 5–8 few stout, styles very stout united in a short column at the base, tips dilated entire or cleft, capsules tridymous glabrous. *Kurz For. Fl.* ii. 385. *A. javensis*, *Muell. Arg. ll. c.* *Aparisthium javense*, *Hassk. Hort. Bogor.* 235. *Conceveibum javanense*, *Blume Bijd.* 614. *C. latifolium*, *Zipp. in Linnaea* xv. 349. *Adelia glandulosa*, *Blanco Fl. Filip.* 814.—*Wall. Cat.* 7732, 7792.

BURMA; at Amherst, *Wallich*. ANDAMAN ISLANDS, *Kurz*. MALACCA, *Griffith* (*Kew Distrib.* 4730, 4780), *Maingay* (1409).—DISTRIB. Eastward to China, the Malay Archipelago and Bouton Straits.

An undershrub (*Maingay*). *Branches* woody, terete, tips sparsely pubescent. *Leaves* 6–10 by 2–3 in., thinly coriaceous, puberulous on the midrib beneath, very obscurely and minutely pellucidly dotted; base contracted, sometimes subcordate; nerves 8–10 pair, slender, as are the cross-nervules beneath; petiole 0–1 in.; stipules subulate. *Male spikes* 4–8 in., strict; flowers minute, in distant clusters; sepals 3–4. *Fem. spikes* shorter, stouter; flowers very shortly pedicelled; bracts minute, 2-glandular; sepals 6, broad, base subcordate; disk thick; ovary 3-lobed, puberulous; style short, stout, arms twice as long as the rest of the ovary, thick, flattened and sparingly cleft. *Capsule* the size of a pea.—*Maingay* describes the style-arms as either entire or cleft.

DOUBTFUL SPECIES.

6. ***Alchornea*** sp. ?; densely white-tomentose, leaves estipellate 2–3 in. oblong obtuse or subacute penninerved denticulate not pellucid-dotted base triple-nerved, petiole 1–1½ in. slender, spikes terminal as long as the leaves, bracts minute, sepals $\frac{1}{4}$ in. narrowly oblong closely imbricate, ovary pubescent 3-celled, style stout, stigmas 3 long revolute.—Perak, *Scortechini*.

The fem. spikes resemble the catkin of a willow, the flowers resembling willow pistils. The specimens are in a very young state, and in fem. fl. only. The plant is very unlike anything I know, and I hope it may be recognized by the above diagnosis.

50. **PODADENIA**, *Thwaites*,

A large villous tree. *Leaves* alternate, broad, quite entire, penninerved. *Flowers* in terminal tomentose bracteate glandular paniculate racemes, diœcious, apetalous; males clustered; fem. subsolitary. *Disk* 0. MALE FL.

Calyx glandular, ovoid or globose, acuminate, splitting into 3-4-valvate segments. *Stamens* many, in a convex receptacle, filaments free, mixed with glands; anther-cells distinct, pendulous from a projecting acuminate connective. *Pistillode* 0. FEM. FL. *Sepals* 4-5, imbricate. *Staminodes* subulate. *Ovary* 3-celled; styles very large, long, recurved, entire, papillose on the inner surface; ovules 1 in each cell. *Fruit* subglobose, fleshy, indehiscent, covered with sessile or stipitate glands. *Seeds* large, oblong, testa bony, aril large white fleshy, albumen copious; cotyledons flat.

P. sapida, *Thwaites Enum.* 274. *P. Thwaitesii*, *Muell. Arg. in DC. Prodr.* xv. ii: 791. *Rottlera Thwaitesii*, *Baill. Etudes Gen. Euphorb.* 426; *Beddome Fl. Sylvat.* t. 282.

CEYLON; at Ambagamowa and near Ratnapoora, *Thwaites*.

A tall tree; shoots and panicles tawny villously tomentose. *Leaves* 5-10 by 2½-5 in., coriaceous, dark brown when dry (as is the whole plant), obovate, abruptly acuminate, hairy beneath, midrib above tomentose, base narrowed; nerves 10-12 pair, spreading; petiole ¾-2 in., terete, tomentose. *Panicles* large, spreading, tomentose, and with many red long-stipitate glands. *Flowers* red, males ¼ in. diam. *Ovary* globose, tomentose; styles long, stout, twisted. *Fruit* reddish, subspherical, 1½ in. diam., clothed with long fleshy projections terminating in peltate discoid glands. *Seeds* ¾ in. long, brown.

51. TREWIA, Linn.

Trees, soft-wooded. *Leaves* opposite, broadly ovate- or orbicular-cordate, quite entire, 3-5-plinerved. *Flowers* rather large, developed before the leaves, dioecious, apetalous; males in lax lateral bracteate racemes, one in each bract; fem. solitary on a long peduncle, or racemose. *Disk* 0. MALE FL. *Calyx* globose, splitting into 3-4 broad concave often reflexed segments. *Stamens* numerous, on a convex receptacle, filaments free; anthers dorsifixed, oblong, cells contiguous parallel. *Pistillode* 0. FEM. FL. *Sepals* 3-5, broad, imbricate, caducous. *Ovary* 2-4-celled; styles connate below, very long, terete, entire, papillose all over; ovules 1 in each cell. *Fruit* 2-4-celled, fleshy, indehiscent or loculicidal, endocarp crustaceous. *Seeds* ovoid, testa hard, albumen fleshy; cotyledons broad, flat.—Species 2, Indian.

1. **T. nudiflora**, Linn. *Sp. Pl. Ed.* 3, *Append.* 1661; fem. fl. solitary or few long-peduncled, fruit globose 1-1½ in. diam., pericarp very thick. *Muell. Arg. in DC. Prodr.* xv. ii. 953; *Roxb. Fl. Ind.* iii. 837; *Wight Ic.* t. 1870-1 (*excl. fem. fl.*); *Baill. Etudes Gen. Euphorb.* t. 18, f. 18-23; *Brand. For. Fl.* 443; *Kurz For. Fl.* ii. 379; *Gamble Man. Ind. Timb.* 359; *Grah. Cat. Bomb. Pl.* 185; *Dalz. & Gibs. Bomb. Fl.* 231; *Wall. Cat.* 7816, 7817. *T. macrophylla*, *Roth Nov. Sp.* 373. *T. macrostachya*, *Klotzsch in Bot. Reise Pr. Wald.* 117, t. 23. *Rottlera indica*, *Willd. in Götting. Diar. Hist. Nat.* i. 8, t. 3; *A. Juss. Tent. Euphorb.* t. 9, f. 29 C; *Wall. Cat.* 7837. *Tetragastris ossea*, *Gærtn. Fruct.* ii. 130, t. 109, f. 5.—*Rheede Hort. Mal.* i. t. 42.

Common in the hotter parts of India from Kumaon southward, and eastward to ASSAM, MALACCA and CEYLON.—DISTRIB. Sumatra, Java.

A large deciduous tree, more or less tomentose or woolly, shoots and sometimes leaves beneath and inflorescence clothed with flocculent cottony wool, at others nearly glabrous. *Leaves* 4-6 in. long and often as broad, variable in proportion of length to breadth, membranous, base rounded or cordate; petiole 1-3 in. *Male racemes* 3-8 in.; flowers ½-¾ in. diam.; pedicels slender, as long or longer. *Fem. fl.* usually solitary, peduncle sometimes 4 in. long; ovary densely lanate; styles ½-¾ in. long. *Fruit* almost woody.—There are, I think, two varieties of this, both common,

one much more densely cottony than the other. There is also a small leaved state.

2. **T. polycarpa**, *Benth. in Gen. Plant.* iii. 319; fem. fl. in short racemes, fruit ovoid or subglobose $\frac{1}{2}$ in. diam., pericarp thin. *T. nudiflora*, *Wight Ic. t.* 1871 (*the fem. fl. only*); *Beddome Fl. Sylvat. t.* 281.

The CONCAN, *Law, Stocks, &c.*

Leaves subopposite, of the form of *T. nudiflora*, but faintly puberulous beneath, sometimes 8 in. diam.; petiole very slender. *Fem. racemes* many-fl. *Ovary* 2-celled; styles $\frac{1}{2}$ — $\frac{3}{4}$ in. long. *Fruiting racemes* 2–3 in.; pedicels about $\frac{1}{4}$ in. *Fruit* $\frac{1}{2}$ in. diam., densely finely tomentose; pericarp crustaceous, loculicidal.

THE FOLLOWING SPECIES ARE ALTOGETHER DOUBTFUL.

T. DISCOLOR, *Smith in Rees Cyclop.* xxvi.; leaves ovate entire minutely densely tomentose, minutely punctate above white beneath, panicles terminal, male calyx villous. *Muell. Arg. in DC. Prodr.* xv. ii. 954.—*E. Indies?*—*Mueller* suggests this being *Mallotus Apelta* or *M. paniculatus*.

T. HERNANDIFOLIA, *Roth Nov. Sp.* 374, is probably *Macaranga indica*, *Wight*.

T. RUSCIFLORA, *Heyne in Roth Nov. Sp.* 374. This is undeterminable generically by the description. *Mueller, Arg.* (in *DC. Prodr.* xv. ii. 954), suggests it being a *Mallotus*.

52. COCCOCERAS, Miquel.

Trees. *Leaves* alternate, entire or toothed, 3-plinerved. *Flowers* in axillary and terminal racemes, dioecious, apetalous; males clustered, subsessile; fem. lax, pedicelled. *Disk* 0. *MALE FL. Calyx* globose, splitting into 3–6 valvate sepals. *Stamens* 15–20, on a convex receptacle, filaments free; anthers dorsifixed, cells distinct parallel. *Pistillode* 0. *FEM. FL. Sepals* 5, lanceolate, imbricate. *Ovary* 3-celled; styles spreading, hispid; ovules 1 in each cell. *Capsule* hard, depressed, the ribbed angles sometimes horned or produced horizontally, at length loculicidally 3-valved. *Seeds* subglobose or compressed, estrophiolate, testa smooth crustaceous.—Species 3, Malayan.

In a Bornean species apparently of this genus (*Beccari 2502*) the leaves are not triple-nerved.

1. **C. muticum**, *Muell. Arg. in Flora* 1864, 470, and in *DC. Prodr.* xv. ii. 950; quite glabrous, leaves long-petioled elliptic- or cuneate-oblong obtusely acuminate quite entire, nerves 5–7 pairs above the basal, fruiting racemes short, fruit shortly pedicelled triquetrous.

MALACCA, *Griffith (Kew Distrib.* 4770).

Branches woody. *Leaves* 5–6 in., pale grey when dry, most minutely gland-dotted beneath, base minutely cordate; petiole 2–2½ in. *Fruiting racemes* (in the solitary specimen) 1½ in., pedicels $\frac{1}{4}$ in. *Fruit* (immature) 1 in. long, lobes compressed, acutely keeled, broader than long; top broadly rounded or truncate with a very short style.—*Griffith* in a note says the sepals are 6 reflexed.

Var. ? pedicellata; leaves with 3–4 nerves above the basal, fruiting racemes 8–12 in., pedicels 1 in.—*Malacca, Griffith (Kew Distrib.* 4789).—The leaves are almost identical with those of *C. muticum*, but the racemes so very different that I expect this will prove a distinct species, which may be called *C. pedicellatum*. It is in very young fruit only.

2. **C. plicatum**, *Muell. Arg. in Flora* 1864, 539, and in *DC. Prodr.* xv. ii. 950; shoots racemes and young leaves beneath finely tomentose, leaves shortly petioled elliptic or oblong obtusely acuminate crenate,

racemes equalling or longer than the leaves, flowers shortly pedicelled. *Benth. in Journ. Linn. Soc.* xvii. 217. *Hymenocardia plicata*, *Kurz For. Fl.* ii. 395.

From PEGU to TENASSERIM; in swamp-forests, M'Clelland, &c.

A tree. *Leaves* 4-6 in., dark brown when dry, most minutely gland-dotted beneath, base rounded or subcordate, nerves 4-6 pair above the basal. *Racemes* slender. *Male fl.* $\frac{1}{4}$ in. diam., clustered, shortly pedicelled; sepals membranous, concave, glabrous; stamens very numerous in a globose mass, filaments very short. *Fem fl.* larger, pedicelled; sepals minute, subulate, ciliate; ovary 3-gonous; styles 2-3 fimbriate. *Fruit* not seen.

53. CÆLODISCUS, Baill.

Shrubs or small trees with stellate pubescence. *Leaves* opposite, or alternate by the suppression of one, broadly ovate or orbicular, often long-petioled, 3-7-plinerved. *Flowers* bracteate in axillary spikes or racemes, small, dioecious, apetalous; males clustered in the bracts, fem. solitary. *Disk* 0. *MALE FL.* *Sepals* 3, valvate. *Stamens* 20 or more, surrounding a naked central receptacle, filaments free; anthers small, oblong, erect, cells parallel, introrse. *Pistillode* 0. *FEM. FL.* *Sepals* 3, narrow. *Ovary* 2-5-celled; styles stout, erect, entire; ovules 1 in each cell. *Capsule* of 3 tomentose or spinous 2-valved cocci, separating from a central axil. *Seeds* subglobose; testa crustaceous, albumen fleshy, cotyledons broad flat.—Species 5 or 6, Indian and Malayan.

Differs from *Mallotus* in the stamens surrounding a naked disk and the usually oblong anthers with the cells contiguous.

1. *C. montanus*, *Muell. Arg. in DC. Prodr.* xv. ii. 759; softly tomentose, leaves opposite or subopposite long-petioled 3-7-plinerved ovate-cordate or oblong-lanceolate acuminate sinuate-toothed minutely glandular beneath, male spikes and fem. racemes short stout, stamens in one series, filaments long villous, capsule smooth tridymous densely stellate-tomentose. *Croton montanus*, *Wall. Cat.* 7723 B. *Ricinus dioicus*, *Wall. Cat.* 7823; *Baill. Etudes Gen. Euphorb.* 294.

PENANG, Wallich, Porter, &c.

A shrub or small tree, 18-25 ft.; branches terete. *Leaves* in rather remote unequal pairs, or with one of the pairs replaced by a branch or raceme, rather thin, dull greenish when dry; the broadest ovate-cordate, 7 by 4 in., narrowest 8 by $2\frac{1}{2}$ in., base rounded cuneate or cordate, upper surface scaberulously tomentose; petiole stout, 1-3 in. *Racemes* axillary or supra-axillary or nearly leaf-opposed; males 3-5 in.; bracts minute; flowers in remote clusters of 2-3, subsessile, ovoid in bud, about $\frac{1}{2}$ in. long; sepals 3, unequal, ovate lanceolate; stamens about 25, filaments slender, quite free to the base, anthers didymous, connective inconspicuous in fruit globose at the back of the anther; central receptacle orbicular, nearly flat. *Fem. racemes* more robust; sepals 3, tomentose. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., depressed, cocci globose. *Seeds* globose, smooth.—Thwaites, while referring this to his *Rottlera eriocarpa*, remarks of it that it differs in the hairy filaments.

2. *C. lappaceus*, *Kurz For. Fl.* ii. 393; densely furfuraceously tomentose, leaves opposite 4-8 in. ovate or broadly oblong entire or obscurely lobed and denticulate, racemes short axillary, bracts linear, ovary 3-4-celled, stamens crowded on the receptacle, filaments glabrous short, capsules sessile clothed with long soft villous filaments. *Mallotus lappaceus*, *Muell. Arg. in DC. Prodr.* xv. ii. 957. *Croton lætus*, *Wall. Cat.* 7738. *Rottlera lappacea*, *Wall. Cat.* 7845.

BERMA; at Segain and Yenangbur, *Wallich, Griffith*.—DISTRIB. Yunan.

A shrub; branches very stout, herbaceous. *Leaves* obtuse or acute, base obtuse or rounded, above pubescent, at length scaberulous; nerves 4-6 pair above the basal, nearly straight and reticulated, cross-nervules all very strong; petiole 2-3 in., stout; stipules linear. *Male racemes* 3-4 in., peduncled; bracts subulate; flowers 1-3 in. diam., stellately villous, sepals acute; stamens very numerous, mixed with long hairs; anthers orbicular, connectives broad, cells touching above and below. *Fem. spikes* short, dense-fld. *Capsule* about $\frac{3}{4}$ in. diam., cocci thin. *Seeds* small, smooth.—Kurz describes the leaves as having occasionally an acute lobe on each side.

3. **C. hirsutulus**, *Kurz For. Fl.* ii. 393; branchlets hispid, leaves very long petioled orbicular-cordate entire or repand-toothed 5-7-plinerved sparingly hispid on both surfaces with long white scattered hairs, male spikes short sessile dense-fld., flowers tawny tomentose, stamens surrounding a central area. *Mallotus longipes*, *Muell. Arg. in Linnæa* xxxiv. 193, and in *DC. Prodr.* xv. ii. 969.

PEGU; from Prome, *Wallich*, to Irawaddi, *Kurz*.

A low simple-stemmed deciduous-leaved shrub or undershrub, branchlets compressed. *Leaves* 5-7 in. diam., thinly coriaceous, sparingly and obscurely gland-dotted beneath; nerves 3-4 pair above the basal, very strong beneath with strong cross-nervules and reticulations; petiole 1 foot, stout, hispid. *Male spikes* $\frac{1}{2}$ in.; buds globose; stamens very many.—Description chiefly from Kurz.

4. **C. glabriusculus**, *Kurz For. Fl.* ii. 393; branchlets slender puberulous, leaves glabrous broadly elliptic rarely ovate subentire 3-plinerved base rounded or cordate eglandular, male spikes very short oblong or globose, flowers tawny-tomentose, stamens surrounding a central area.

PEGU and MARTABAN, *Kurz*.

A small deciduous-leaved shrub; branchlets compressed. *Leaves* 3-6 by 2-5 in., thinly coriaceous, rarely ovate-lanceolate, glabrous on both surfaces except the midrib above when young (sparingly hirsute beneath, *Kurz*); nerves slender; petiole 1-4 in., stellately pubescent, at length glabrous; stipules setaceous. *Sepals* glabrous within and orange-coloured. *Stamens* very numerous.—Description chiefly from Kurz.

5. **C. longipes**, *Kurz For. Fl.* ii. 393; branchlets pubescent, leaves very long-petioled from orbicular to elliptic-obovate cordate 5-9-plinerved entire or sinuate crenate glabrous above and beneath except the stellately pubescent at length glabrous nerves eglandular, petiole tomentose, racemes pubescent, flowers long pedicelled tawny-tomentose, ovary 2-3-celled, capsules very long pedicelled tridymous shortly muricate.

PEGU to MARTABAN and AYA, *Kurz*.

A low deciduous-leaved shrub, 1-2 ft., rootstock stout strong, shoots densely pubescent, branchlets compressed. *Leaves* 3-4 in. long and often as broad, membranous, young stellately pubescent, nerves slender; petiole $\frac{1}{2}$ -3 in. *Racemes* axillary or from the base of the stem, or supra-axillary; flowers orange-yellow; pedicels 1-3 in., pubescent; stamens very numerous, glabrous; ovary muricate and stellately hispid; stigmas sessile, crimson, papillose. *Capsules* $\frac{1}{2}$ in. diam., peduncle stout 2-4 in.; cocci thickly crustaceous, densely stellately hispid. *Seeds* subspherical, brown, opaque, aril white fleshy.—Description chiefly from Kurz. The short petioles, and absence of long hairs on the leaf and inflorescence distinguish this at once from *hirsutulus*, which is *Mueller's Mallotus longipes*.

DOUBTFUL SPECIES.

C. SPECIOSUS, *Muell. Arg. in Linnæa* xxxiv. 154, and in *DC. Prodr.* xv. ii. 758; branches and petioles flocculently tomentose, leaves alternate $4\frac{1}{2}$ -7 $\frac{1}{2}$ in. membranous

peltate orbicular-ovate cuspidate entire or 3-lobed denticulate softly appressed-tomentose and ashy-white beneath, petiole as long as the limb, racemes elongate bisexual white-tomentose, bracts sublinear, pedicels very short, fem. calyx thrice as large as the male very unequally 3-5-fid, stamens about 60, filaments long, connectives thick papillose, central receptacle broad naked, ovary ellipsoid pubescent, styles papillose within.—East Indies (*Herb. Lenormand*).—Description from Mueller. From the peltate limb this may be sought amongst *Malloti*. Mueller says it is something like *M. barbatus*, but that it wants a fem. disk, that the male has an intrastaminal disk, and that the ovary is not softly echinate.

C. THUNBERGIANUS, *Muell. Arg. in DC. l. c.* 758; *Beddome Forester's Man.* 206; branchlets glabrous, young compressed angled and rusty-pubescent, leaves opposite not peltate in very unequally petioled pairs ovate cuspidate or acuminate base rounded contracted or subcordate entire crenulate or repand-toothed glabrous above beneath glandular-dotted and with the nerves roughly puberulous, stipules small subulate, petiole 6-10 times shorter than the limb, racemes slender long-peduncled rusty puberulous shorter than the leaves, bracts short few-fld., male fl. sub-ellipsoid $\frac{1}{2}$ in. long, stamens about 100 polyadelphous, connective apiculate glandular, central naked area broad.—Ceylon, *Herb. Thunberg*.—Habit of *Mallotus eriocarpus*, but more robust and polyandrous. *Mueller l. c.* It is unknown to Thwaites.

53. MALLOTUS, *Lour.*

Trees or shrubs. *Leaves* opposite or alternate, entire toothed or 3-lobed penninerved or 3-7-plinerved, peltate or not, often glandular-dotted beneath, and sometimes with glandular areas at the base above. *Flowers* small or minute, diœcious or monœcious, in axillary or terminal simple or panicked spikes or racemes, apetalous; males clustered, fem. solitary in the bracts. *Disk* usually 0. *MALE FL. Calyx* globose or ovoid, valvately 3-5-partite. *Stamens* 20-30 or more, crowded on a central flat or convex receptacle, filaments free; anthers small, dorsifixed, cells globose or shortly oblong parallel adnate to and often widely separated by the thickened connective. *Pistillode* 0 or very minute. *FEM. FL. Calyx* spathaceous or valvately 3-6-lobed or -partite. *Ovary* 2-4-celled; styles free or connate below, spreading or recurved, entire plumose or papillose; ovules 1 in each cell. *Capsule* of 2-3, rarely 4, 2-valved smooth tubercled echinate spinous or paleaceous cocci. *Seeds* ovoid oblong or globose, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species about 70 in the tropics of the Old World.

It is very difficult to arrange the species of this genus in a natural manner, and the following attempt will require modification when the species are better known.

Sect. I. BLUMEODENDRON. *Disk* glandular in both sexes. *Seeds* with a thick fleshy coat.

1. *M. Kurzii*, *Hook. f.*; quite glabrous, leaves very coriaceous ternately whorled triple-nerved elliptic or subcordate obtusely cuspidate, male cymes very short fasciated not viscid, buds globose. Blumeodendron Tokbrai, *Kurz For. Fl.* ii. 391 (not of Mueller).

ANDAMAN ISLANDS, *Helper* (*Kew Distrib.* 5010), *Kurz.* ? PERAK, *King's Collector*.

An evergreen tree, 40-60 ft. *Leaves* 6-10 by 3-6 in., pale brown when dry and very rigid, base rounded or subacute; nerves 4-6 pair above the basal, very strong beneath, diverging in the Perak specimens, nearly straight in the Andaman ones, cross-nervules very faint; petiole $1\frac{1}{2}$ -2 in., very stout, swollen at the base and top. *Male cymes* $\frac{1}{2}$ - $\frac{3}{4}$ in., with a very short stout peduncle; pedicels as long. *Perianth* $\frac{1}{2}$ in. diam., 2-3-valved; receptacle convex, covered with tumid glands between the filaments. *Stamens* 20-30; anthers nearly orbicular, connective rather broad, slits

nearly lateral.—I have seen no fem. fl. or fruit of this apparently very distinct species, which differs from *M. Tokbrai* in the much larger thickly coriaceous leaves, short not viscid male cymes, very much larger male flowers and globose perianth. Kurz describes the capsule as almost globose, 2-3-coccous, about 1-1½ in. diam., brown, glossy, fibrous-woody; and seeds as purple, covered with a thick spurious aril. The Perak plant has shorter petioles, larger leaves with 6 pairs of nerves above the basal, and larger flowers than the Tenasserim ones, and may be a different species.

Sect. II. EUMALLOTUS. Disk 0, or if present annular or cupular. Seeds without a fleshy coat.

A. Capsules echinate, tubercled, or clothed with soft spines or bristles. (Capsule unknown in 20. *leptostachyus*, 21. *Clellandii*, 22. *filiformis*, 23. *puberulus*, 24. *bracteatus*, and 34. *Kingii*.)

* Leaves 4-14 in. broad, broadly triangular-ovate orbicular or -rhombic, 3-5-plinerved, tomentose beneath. Racemes or panicles much longer than the leaves.

2. *M. barbatus*, Muell. Arg. in *Linnæa* xxxiv. 184, and in *DC. Prodr.* xv. ii. 957; branches petioles and racemes softly flocculently woolly, leaves alternate very large peltate suborbicular palmatinerved shortly 3-lobed densely white stellate-tomentose, racemes terminal elongate, male calyx unequally 4-5-toothed, fem. 4-cleft, capsule globose densely clothed with layers of stellate hairs. *Kurz For. Fl.* ii. 381; *Beddome Forester's Man.* 208. *Rottlera barbata*, *Wall. Cat.* 7822; *Baill. Gen. Euphorb.* 423.—*Wall. Cat.* 7820.

UPPER TENASSERIM, *Kurz*; Amherst, *Wallich*. PERAK, *King's Collector*, *Wray* SINGAPORE, *Lobb*. PENANG, *Wallich*. NILGHIRI MTS.?, *Noton*. The CONCAN, *Stocks*.—DISTRIB. JAVA.

A low shrub (*Kurz*); branchlets very robust. Leaves 8-14 in. diam., dark brown or green above when dry and tomentose or flocculent when young, beneath nearly white, with 9-11 basal, and several pairs of lateral much raised nerves and many nervules; lobes acute. Racemes 6-10 in.; peduncle and rachis stout; bracts thick, obtuse; male fl. ½ in. broad; fem. as long; calyx short 4-cleft. Capsules ¾ in. diam. Seeds ½ in. long, broadly oblong, black, opaque.

3. *M. Roxburghianus*, Muell. Arg. in *Linnæa* xxxiv. 186, and in *DC. Prodr.* xv. ii. 962; stellately pubescent or tomentose, leaves large alternate long-petioled 7-9-nerved peltate orbicular or triangular-ovate acuminate or caudate subentire or toothed, racemes stout longer than the leaves, capsules 3-lobed hairy and prickly. *Kurz For. Fl.* ii. 383; *Gamble Man. Ind. Timb.* 361. *Rottlera peltata*, *Roxb. Fl. Ind.* iii. 828; *Wight Ic.* t. 1873; *Wall. Cat.* 7823.

SIKKIM HIMALAYA; alt. 2000 ft., *Clarke*. ASSAM, the KHASIA Mts., SILHET, SILLHOK, MUNNIPORE, CHITTAGONG and MARTABAN, *Roxburgh*, &c.

An evergreen tree or shrub; branchlets rather stout. Leaves rather thin, 4-7 in. diam., simply pubescent above, glandular and softly stellate-pubescent beneath; nerves 4-5 pairs above the basal; basal glands minute; petiole as long as the blade; stipules linear-lanceolate. Racemes as long or longer than the leaves, terminal, erect; bracts lanceolate; male fl. ½ in. diam., buds globose, pubescent. Fem. calyx irregularly split, segments lanceolate. Capsule ½ in. diam.; cocci thickly crustaceous, shortly aculeate. Seeds subglobose, smooth.

4. *M. nepalensis*, Muell. Arg. in *Linnæa* xxxiv. 188; branches robust, leaves beneath and inflorescence shortly white- or rusty-tomentose,

leaves opposite or alternate long-petioled broadly or orbicular ovate finely acuminate, base 3-nerved, male racemes elongate very stout, flowers large, fem. racemes shorter, capsules thin tomentose and shaggy with long soft flexuous stellately tomentose spines. *M. oreophilus*, *Muell. Arg. in Linnæa* xxxiv. 188, and in *DC. Prodr.* xv. ii. 964; *Gamble Man. Ind. Timb.* 362.—*Wall. Cat.* 7824.

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 5–7000 ft., *J. D. H.*, &c. KHASIA MTS., alt. 4–5000 ft., *J. D. H. & T. T.*

A small tree. *Leaves* 3–8 in. diam., thinly coriaceous, glabrous above except when young, quite entire; base truncate, rarely subcordate, or acute in young leaves; colour of pubescence very variable, nerves and nervules strong. *Male racemes* 6–12 in.; bracts lanceolate; flowers $\frac{1}{2}$ in. diam., globose in bud; stamens very numerous. *Fem. racemes* very stout, especially in fruit; pedicels short, stout; sepals narrow; ovary shaggy with short tomentose processes. *Capsules* densely crowded, $\frac{1}{2}$ in. diam., crinite; cocci very thin. *Seeds* $\frac{1}{8}$ in. long, subhemispheric, black, opaque.

5. *M. albus*, *Muell. Arg. in Linnæa* xxxiv. 188, and in *DC. Prodr.* xv. ii. 965; branches leaves beneath and inflorescence appressedly stellately or scurfily white or rusty-tomentose, leaves alternate broadly ovate or orbicular or triangular-ovate acuminate entire or with shallow lobes rarely sinuate-toothed, base 3–5-nerved rounded and narrowly peltate or truncate rarely acute, flowers in axillary and terminal pyramidal panicles, males globose, fem. calyx 4–5-lobed, capsule 3–4-coccous muricate and with short soft white tomentose processes. *Brandis For. Fl.* 444; *Gamble Man. Ind. Timb.* 361; *Beddome Forester's Man.* 208. *M. tetracoccus*, *Kurz For. Fl.* ii. 383. *Rottlera alba* & *tetracocca*, *Roxb. Fl. Ind.* iii. 829, 826. *R. mappoides*, *Dalz. in Hook. Journ. Bot.* iii. (1851) 122; *Dalz. & Gibs. Bomb. Fl.* 230. *R. peltata*, *Wight Ic. t.* 1873. *R. paniculata*, *Wall. Cat.* 7812.—*Wall. Cat.* 7818 B, C, E.

SIKKIM HIMALAYA; ascending to 3000 ft., *J. D. H.*, &c. BENGAL, ASSAM and southward to CHITTAGONG.

A small evergreen tree, 30–40 ft.; branchlets rather stout. *Leaves* 4–6, rarely 12 in. diam., young densely rusty-tomentose, sometimes coriaceous, base with 2 glands; petiole 3–8 in.; stipules minute. *Male panicles* with long rather slender branches, fem. shorter stouter. *Flowers* diœcious; male buds globose $\frac{1}{2}$ – $\frac{3}{8}$ in. diam., calyx 4–5 partite, fem. calyx hemispheric. *Capsule* $\frac{1}{2}$ – $\frac{3}{8}$ in. diam., globose, white, usually 4- rarely 5-coccous. *Seed* black, shining.—I have not given the Penang locality to this plant, and I suspect that Roxburgh is in error in doing so.

VAR. occidentalis; fem. panicles larger and more effuse, capsules with longer and denser processes.—Deccan Peninsula, on the Ghats from the Concan southwards. Ceylon, common.

6. *M. macrostachyus*, *Muell. Arg. in DC. Prodr.* xv. ii. 963; branches petioles leaves beneath and inflorescence shortly whitish or rusty-tomentose, leaves large usually alternate long-petioled orbicular- or triangular-cordate acuminate entire or remotely sinuate-toothed, base rounded or transverse 5-nerved sometimes slightly peltate, racemes spiciform very long, male branched at the base, male fl. small globose, fem. larger subcylindric cleft and 5-fid, capsules subglobose densely spinous, spines concealed by a thick soft stellate wool. *Rottlera macrostachya*, *Miquel Fl. Ind. Bat. Suppl.* 454.

PERAK; *King's Collector*. MALACCA, *Griffith*, *Maingay* (*Kew Distrib.* 1381).—DISTRIB. Java, Sumatra, Borneo.

A small tree; branches stout. *Leaves* rather coriaceous, 3-6 in. diam., eglandular, young clothed on both surfaces thickly with rusty pubescence; nerves very strong beneath; petiole 4-8 in., stout. *Spikes* axillary; male 8-16 in., rather slender; flowers subsessile, $\frac{1}{8}$ in. diam.; stamens very numerous; fem. with occasionally a few male flowers, calyx $\frac{1}{2}$ in. long, shortly tubular. *Fruiting raceme* sometimes 18 in. long. *Capsule* $\frac{1}{2}$ - $\frac{3}{8}$ in. diam., obscurely trigonous. *Seeds* in Bornean specimens subglobose, $\frac{1}{2}$ in. long, smooth; in Malacca (immature) smaller, black, opaque, as in *M. barbatus*.

7. *M. ricinoides*, Muell. Arg. in *Linnaea* xxxiv. 189, and in DC. *Prodr.* xv. ii. 963; young parts clothed with floccose fugacious tomentum, leaves alternate long-petioled ovate to orbicular-ovate cordate or peltate entire or remotely denticulate, glabrous above tomentose beneath, flowers small tomentose in simple or compound axillary and terminal spikes, bracts minute, fem. calyx 4-5-cleft, ovary villous echinate, capsule 3-4-coccous size of a cherry densely clothed with stellately scurfy long soft subulate bristles, seeds globose black slightly tubercled. *Kurz For. Fl.* ii. 382. *Rottlera ricinoides*, A. Juss. *Tent. Euphorb.* 33, t. 9, f. 29 A. R. Zippelii, Hassk. *Hort. Bogor.* 238. Adisca Zippelii, Blume *Bijd.* 611. R. peltata, Miquel *Fl. Ind. Bat.* i. ii. 395 (not Roxb.). Mappa Zippelii, Zoll. & Morr. *Verz.* 17. Adelia barbata, Blanco *Fl. Filip.* Ed. 2, 561. A. Bernardia, Ed. 1, 814. *Croton ricinoides*, Pers. *Encheir.* ii. 586. C. mollissima, Geisel. *Monog. Croton*. 73. *Crozophora mollissima*, Spreng. *Syst.* iii. 851.

UPPER TENASSERIM, Kurz.—DISTRIB. China, Philippines.

An evergreen shrub. *Leaves* 5-6 in. long and broad, thickly membranous, base 5-nerved; petiole 2-4 in., scurfily tomentose.—I have seen no Tenasserim specimens of this species, which is readily distinguished by the dense clothing of soft spines on the capsule.

8. *M. cochinchinensis*, Lour. *Fl. Coch.* 635; branches leaves beneath and inflorescence appressedly white- or rusty-tomentose, leaves alternate orbicular or deltoidly ovate caudate-acuminate entire or 3-lobed, base usually cuneate 5-nerved, nerves peltate, flowers in effuse slender panicles, males globose, fem. calyx 3-4-partite, capsule 3-coccous clothed densely with long white squarrose tomentose processes. M. paniculatus, Muell. Arg. in *Linnaea* xxxiv. 189, and in DC. *Prodr.* xv. ii. 965; *Kurz For. Fl.* ii. 383. *Rottlera paniculata*, A. Juss. *Tent. Euphorb.* 33; Benth. *Fl. Hongk.* 307; Wall. *Cat.* 7818. *Croton paniculatus*, Lamk. *Encycl.* ii. 207. *Echinus trisulcus*, Lour. l. c. 633 (excl. syn.). Mappa cochinchinensis, Spreng. *Syst. Veg.* iii. 878. *Trewia tricuspidata*, Willd. *Sp. Pl.* iv. 834.—Wall. *Cat.* 7821.

PEGU and TENASSERIM, Wallich, Helfer, &c. PENANG, PERAK, SINGAPORE and MALACCA, Wallich, &c.—DISTRIB. Malay Islands, China.

A tree much resembling in habit *M. albus*, but branches more slender, leaves smaller, nerves peltate, more membranous with longer points and usually a cuneate base, panicles much more slender, flower and fruit smaller, fem. calyx 3-4-partite, and capsule squarrose with long processes.—I maintain Loureiro's name of *cochinchinensis* for this species, which is the monotype of his genus, and should never have been superseded. From Loureiro's description I doubt his *Echinus sulcatus* being the same plant; but I assume that Mueller, whom I follow, had good reasons for so disposing of it.

** *Leaves* elliptic, oblong, or obovate-oblong, tripli- or penni-nerved. *Spikes* or *racemes* usually simple and shorter than the leaves (longer in *M. leptostachyus* and a few others).

† Female calyx spathaceous.

9. **M. acuminatus**, Muell. Arg. in *Linnæa* xxxiv. 187, and in *DC. Prodr.* xv. ii. 966; branchlets hoary or glabrous, leaves opposite and alternate long petioled peltate oblong caudate-acuminate entire or repand-toothed obscurely glandular beneath, base peltate 5-7-nerved rounded or cordate, male racemes slender, buds ovoid, fem. calyx spathaceous pubescent, ovary strigose and echinate, style very long stout, capsule tridymous glandular hispid and clothed with short pubescent spines. ? *M. acuminatus*, Kurz For. Fl. ii. 383.

TENASSERIM; at Mergui, Griffith (*Kew Distrib.* 4758). ANDAMAN ISLANDS, KURZ, PERAK, King's Collector. MALACCA, Maingay (*Kew Distrib.* 1446).—DISTRIB. Sumatra.

An evergreen tree, variable in pubescence; branchlets terete. *Leaves* 3-8 in. rather thin, almost membranous, midrib and 8-10 pair of nerves beneath hairy, cross-nervules faint or strong; petiole 1-3 in. *Male racemes* (in Andaman specimens) 2-3 in.; flowers minute, glabrous, in crowded clusters; buds ovoid, acute, $\frac{1}{12}$ in. long; stamens about 30, filaments free or connate, anther-cells separated by a truncate thick warted connective. *Fem. racemes* larger than the males, stouter; bracts lanceolate, caducous; calyx obliquely urceolate, entire or 2-3-cleft, deciduous; style very stout, puberulous or glabrate, stigmas rather short. *Capsule* (in Perak specimens) $\frac{1}{2}$ in. diam.; cocci globose.—The Perak specimens have more hoary branchlets, petioles and fem. racemes than the Malaccan. I refer this to *M. acuminatus*, of which Mueller says stamens 60, rather than to the Sumatran *M. longifolius*, in which he states them to be (as they are in this) about 27-30; he further adds under *longifolius* that it is extremely like *acuminatus*, but that besides the number of stamens it differs in the rather longer and slender spines of the capsule, and in the shorter style. Kurz says of his *acuminatus* that it is frequent in the Andamans, and that the leaves are either peltate or cordate, but I have seen no specimens from thence. I have not cited the synonyms of *M. acuminatus* given by Mueller, feeling doubtful about the species.

10. ? **M. Helferi**, Muell. Arg. in *Linnæa* xxxiv. 190, and in *DC. Prodr.* xv. ii. 968; branchlets young petioles and racemes sparsely stellate-pubescent, leaves nearly glabrous alternate long-petioled ovate- or linear-oblong caudate-acuminate sinuate-toothed obscurely glandular beneath base rounded or subcordate not peltate 3-5-plinerved, male racemes slender, buds minute obovoid nearly glabrous, fem. racemes elongate, calyx spathaceous, ovary clothed with short stout soft spines, style twice as long as the stigmas. ? Kurz For. Fl. ii. 384.

TENASSERIM; Koloukhin Island in the Saluen River, Helfer (*in Herb. DC.*); Mergui, Helfer (*Kew Distrib.* 4731). MALACCA, Maingay (*Kew Distrib.* 1446).

Branches slender, but woody, tips and racemes sparsely glandular. *Leaves* 3-6 in., rather membranous, greenish when dry; nerves very slender, 6-8 pair above the short basal, often pubescent beneath; basal glands 0; petiole 1- $\frac{1}{2}$ in. *Male racemes* filiform; bracts minute, 2-4-fl.; flowers $\frac{1}{10}$ in. diam.; sepals 3-5, lanceolate; stamens about 20; anther-cells separated by the truncate tubercled connective, which sometimes is produced above them. *Fem. racemes* 6-8 in., many-fl.; calyx spathaceous; ovary pubescent and clothed with soft turgid nearly glabrous spines; style stout, twice as long as the short recurved papillose stigmas.—The male flowers are described from Mergui and the fem. from Malaccan specimens. It is possible that they may not be conspecific. Kurz says of *Helferi* that it is very common all over Burma from Pegu to Tenasserim and the Andamans, but I have seen only Helfer's male specimens, and as he described the style as short, I doubtfully quote him. It differs from *acuminatus* chiefly in the not peltate leaves and ovary not being densely hispid.

11. **M. Porterianus**, Muell. Arg. in *Linnæa* xxxiv. 185, and in *DC. Prodr.* xv. ii. 960; branchlets petioles and racemes puberulous, leaves alternate long-petioled not peltate oblong-lanceolate caudate-acuminate penninerved sinuate-crenate or entire, racemes slender, males shorter than the fem., fem. calyx spathaceous, ovary and capsule echinate, style elongate with long recurved stigmas.—Euphorb., *Wall. Cat.* 8000, 9093, 9094.

PENANG, Porter, Curtis.

Leaves 4-7 in., membranous or thinly coriaceous, base contracted subcordate, glabrous above, minutely glandular, glabrous or slightly hairy beneath; nerves 6-10 pair, slender, basal very short; petiole 1-2 in., very slender, sometimes hairy. Racemes shorter than the leaves, strict; male fl. in distant clusters, $\frac{1}{16}$ in. diam., ovoid; calyx membranous, nearly glabrous, stamens about 30, anther-cells parallel, rather distant. Fem. fl. shortly pedicelled; bracts concave; perianth minute; styles very large, recurved, united below. Capsule about $\frac{1}{2}$ in. diam.; cocci thickly crustaceous, shortly aculeate. Seeds broadly oblong, smooth.—Wallich's No. 8000 is said to be from Silhet, but this is an obvious mistake; the specimens evidently are a portion of the Penang collection.

12. **M. floribundus**, Muell. Arg. in *Linnæa* xxxiv. 187, and in *DC. Prodr.* xv. ii. 962; leaves long-petioled alternate peltate orbicular or orbicular-ovate acute glaucous beneath base 7-9-nerved, racemes axillary slender, calyx spathaceous, ovary clothed with long soft white tomentose spines, capsule 3-dymous glandular and covered with long scattered flexuous slender prickles. M. amentiformis, Muell. Arg. in *Flora* xlvii. (1864), 468, and in *DC. l. c.* Rottlera floribunda, Hassk. *Hort. Boгор.* 238; *Baill. Etudes Gen. Euphorb.* 426; *Miquel Fl. Ind. Bat.* i. ii. 393. Adisca floribunda, *Blume Bijl.* 610. Mappa floribunda, *Zoll. & Morr. Verz.* 17. Ricinus Tanarius, *Lour. Fl. Coch.* 580.

TENASSERIM; at Mergui, Griffith (*Kew Distrib.* 476?). PERAK, King's Collector. MALACCA, Griffith.—DISTRIB. Cochin China, Java, Borneo, Celebes, Samoa.

A tree, 20-30 ft.; branches slender, nearly glabrous. Leaves membranous, quite entire, base with tomentose glands in the axils; nerves all slender, cross-nervules distinct, glands beneath scattered; petiole 2-3½ in., very slender. Male spikes 3-4 in.; flowers crowded, $\frac{1}{2}$ in. diam.; stamens 40-50, puberulous. Fem. racemes elongate. Capsules $\frac{1}{2}$ in. diam.; cocci loose, thickly crustaceous, pubescent; styles shortly united.

†† Female calyx 3-6-partite (unl own in several species).

a. Leaves 3- rarely 7-9-plinerved at the base.

13. **M. eriocarpus**, Muell. Arg. in *Linnæa* xxxiv. 185, and in *DC. Prodr.* xv. ii. 959; branchlets and racemes rusty-tomentose, leaves opposite elliptic oblong or ovate obtuse base 3-plinerved rounded or subcordate stellately puberulous above more so and minutely glandular beneath, spikes slender, flowers small clustered, capsule globose 3-coccos clothed with soft hairy filaments. *Beddome Forester's Man.* 203. Rottlera eriocarpa, *Thwaites Enum.* 273 (excl. syn. Wight).

CEYLON; in the hot drier parts of the island, Walker, Thwaites.

A shrub; branchlets rather slender. Leaves 3-4 in., hardly coriaceous; nerves 3-4 pair above the basal, cross-nervules and reticulations copious; petiole $\frac{1}{2}$ -2 in., slender. Male fl. conic in bud, $\frac{1}{2}$ in. long; stamens very numerous, filaments smooth scabrid or hairy. Fem. fl. Ovary surrounded with numerous staminodes; styles 3, very plumose.—I have seen no fem. fl. or fruit.

14. **M. subpeltatus**, *Muell. Arg. in Linnæa* xxxiv. 189, and in *DC. Prodr.* xv. ii. 968; nearly glabrous, leaves alternate long petioled with very long caudate tips puberulous beneath, base rounded or minutely cordate 3-plinerved, male fl. in sessile fascicles on the branches, fem. sessile axillary, calyx 5-partite, styles very long and slender, capsule clothed with very long squarrose tomentose processes. *Adisca subpeltata*, *Blume Bijl.* 610. *Rottlera subpeltata*, *Baill. Etudes Gen. Euphorb.* 433; *Miquel Fl. Ind. Bat.* i. ii. 394. *R. rhynchophylla*, *Miquel l. c. Suppl.* 454. *Mappa acuminatissima*, *Zipp. ex Spanoghe in Linnæa* xv. 349.—*Wall. Cat.* 7755.

PENANG, *Porter*. PERAK, *King's Collector*, *Scortechini*. MALACCA, *Griffith* (*Kew Distrib.* 4759), *Maingay* (*Kew Distrib.* 1410).—DISTRIB. Sumatra, Java.

Branches terete, very smooth, tips puberulous. *Leaves* 6–12 by 2–4 in., thin, greenish when dry, nerves 3–5 pair above the basal and cross-nervules strong and puberulous beneath; petiole 3–5 in., slender; stipules lanceolate. *Male fl.* shortly pedicelled, globose, $\frac{1}{8}$ in. diam.; sepals 4, broad, densely pubescent; stamens very numerous, connective rather broad, not produced. *Fem. fl.* subsessile, $\frac{1}{2}$ in. diam.; sepals 6, lanceolate pubescent on both surfaces, ovary clothed with hispid spines, styles $\frac{1}{2}$ in. long, flexuous. *Capsule* depressed, 1 in. diam., 3-lobed; spinous processes rather rigid, $\frac{1}{2}$ in. long. *Seeds* $\frac{1}{2}$ in. diam., globose, smooth.—Mueller describes the leaves as *subpeltate*, but I should not so call them.

15. **M. Griffithianus**, *Hook. f.*; glabrous except the hispidulous viscidly glandular inflorescence, leaves opposite and alternate long-petioled subtripplinerved oblong or elliptic-oblong cuspidately acuminate quite entire eglandular beneath, racemes leaf-opposed, males of paniced spikes, fem. simple, fem. sepals 6–9 very irregular lanceolate, ovary hispid and clothed with stipitate capitate glands, styles 3 sessile long slender, capsule hispid clothed with long glandular viscid and hirtellous spines. *Diplochlamys Griffithianus*, *Muell. Arg. in Flora* xlvii. (1864) 539, and in *DC. Prodr.* xv. ii. 1024.

PERAK; at Larut, *King's Collector*. MALACCA, *Griffith* (*Kew Distrib.* 4961) and *Maingay* (*Kew Distrib.* 1432 and 1450).

A shrub (in Perak) 6–8 ft.; branches woody, terete, smooth or viscidly glandular; nodes swollen. *Leaves* 6–10 by 2½–4½ in., coriaceous, greenish when dry, quite glabrous, or with a few bristles on the midrib beneath, base broad and rounded or narrowed and obtuse 2-glandular and minutely peltate; nerves 10–12 pair, basal opposite often obscure, short and intramarginal, cross-nervules rather distant; petiole 1½–3 in., rigid, terete, swollen at the top. *Male panicles* 4–5 in., flowers $\frac{1}{2}$ in. diam.; bracts acute, buds globose, pubescent; sepals 3, receptacle conoid; stamens very many, anthers didymous, connective swollen at the back, inconspicuous in front. *Fem. fl.* pedicelled; pedicel hispid with very long bristles; perianth $\frac{1}{2}$ in. diam.; sepals lanceolate, very unequal and unequally inserted, hispidulous; ovary with a ring of spreading hairs at its base on the receptacle; styles subulate, hispid and rugulose; stipitate globose glands? of ovary quite smooth. *Capsule* 3-coccos, about $\frac{3}{4}$ in. diam., cocci woody.

16. **M. Wrayi**, *King mss.*; quite glabrous, leaves opposite very long-petioled triple-nerved coriaceous elliptic- or oblong-lanceolate cuspidately caudate quite entire obscurely glandular beneath base acute 2-glandular. style short stout, capsule tridymous appressedly tomentose and echinate with short tomentose spines.

PERAK; at Larut, *Wray, King's Collector*.

A tree, 60–80 ft.; branches woody, terete, smooth. *Leaves* in distant pairs, 6–10 by 2–2½ in., thinly coriaceous, drying green, paler beneath; nerves 5–6 pair above the submarginal basal, cross-nervules rather distant strong; petiole 2–5 in., slender, firm, swollen at the base and top. *Fem.* fruiting racemes axillary, shorter

than the petiole, hoary with deciduous stellate pubescence. *Capsule* 1 in. diam., yellow, carpels hemispheric, spines $\frac{1}{4}$ in. long. *Seeds* $\frac{1}{2}$ in. diam., globose, smooth, mottled.

17. **M. lancifolius**, *Hook. f.*; glabrous except the stellately tomentose buds and racemes, leaves thinly coriaceous alternate long-petioled triplinerved lanceolate acuminate quite entire eglandular beneath, racemes very slender shorter than the leaves, male clusters few-fl., bracts longer than the globosely ovoid rusty-tomentose buds, style very short, capsule tridymous hoary glandular and with a few short slender spikes.

PENANG; on Government Hill, *Maingay* (*Kew Distrib.* 1451), *Curtis*.

A tree, about 20 ft.; branches slender, woody; tips of branchlets and racemes stellately tomentose. *Leaves* 5-9 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., brown beneath when dry, base eglandular acute or rounded; nerves 3-5 pair above the basal which do not reach the middle, very slanting, strong beneath, cross-nerves few; petiole 1- $2\frac{1}{2}$ in., slender, stiff; stipules ovate-lanceolate. *Racemes* 1- $1\frac{1}{2}$ in., axillary, fem. with male fl. below, bracts lanceolate; buds of male $\frac{1}{10}$ in.; sepals 3, ovate; stamens 50-60, anther-cells subglobose, connective rather narrow. *Capsule* $\frac{3}{4}$ in. diam.; cocci globose, thinly crustaceous, epicarp not separating. *Seeds* globose, smooth.

18. **M. decipiens**, *Muell. Arg. in Linnæa* xxxiv. 194, and in *DC. Prodr.* xv. ii. 977; branchlets racemes and often leaves beneath softly tomentose rarely glabrate, leaves opposite shortly petioled tripli- and penninerved subrhombic-ovate oblong or obovate obtusely caudate repand-toothed minutely glandular beneath, racemes elongate, stamens surrounding a minute pistillode, capsule small 3-dymous pubescent glandular and sparsely tubercled. *Kurz For. Fl.* ii. 381. *Cœlodiscus eriocarpoides*, *Kurz l. c.* 392. — *Wall. Cat.* 7725 and 8009.

BURMA; at Attran, *Wallich*; Moulmein, *Parish*.

A shrub; branches woody, branchlets and petioles often velvety. *Leaves* in unequal pairs, larger 5-10 by 2-5 in., smaller not half that size, rather coriaceous, greenish when dry, base rounded broad or narrow, often 2-glandular, glabrous above, velvety pubescent beneath or glabrate or quite glabrous; nerves 6-8 pair above the basal which are intramarginal; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in., stout; stipules oblong, pubescent, caducous. *Male racemes* 3-6 in.; bracts minute; flowers subsessile, $\frac{1}{4}$ in. diam.; sepals 3, broadly lanceolate, membranous; stamens 20-40, connective small; pistillode minute, columnar. *Fem. racemes* much stouter; pedicels very short, hirsute; sepals 3-4, like the males; ovary hirsute and tubercled; style very short; stigmas plumose, short. *Capsule* $\frac{1}{2}$ in. diam.—A specimen in Griffith's Herbarium from the Calcutta Bot. Garden, marked "*Croton urophyllum*," has leaves glabrous beneath. *Kurz* had no specimens of *M. decipiens*, the description of which he takes from *Mueller*. Of his *Cœlodiscus eriocarpoides* he had seen no fem. flower or fruit, but as he has attached this name to *Parish's* specimen of *M. decipiens* in the Calcutta Herbarium, I regard it as a synonym of the latter plant.

19. **M. Wallichianus**, *Muell. Arg. in Linnæa* xxxiv. 196, and in *DC. Prodr.* xv. ii. 980; branchlets and racemes scurfily pubescent, leaves long-petioled alternate and opposite elliptic-oblong obtuse or acuminate crenate-serrate mature glabrous triple-nerved, racemes spiciform slender longer than the leaves, male fl. globose apiculate. *M. eriocarpoides*, *Muell. Arg. in DC. Prodr. l. c.* 959. *Croton castaneifolium*, *Wall. Cat.* 7760.—*Croton*, *Wall. Cat.* 7728.

PEGU; at Rangoon, *M'Clelland*. Attran River, *Wallich*. TENASSERIM, *Helfer* (*Kew Distrib.* 4963). MERGUI, *Griffith*.

Branches woody, branchlets slender. *Leaves* 4-6 in., old coriaceous and brown when dry, and quite glabrous, densely most minutely glandular beneath, tip some-

times rounded, base rounded; nerves 4-7 pair above the basal, cross-nervules distinct reticulations obscure; petiole $1\frac{1}{2}$ -2 in., slender. *Racemes* longer than the leaves; bracts ovate; male fl. $\frac{1}{10}$ in. diam.; calyx membranous, nearly glabrous; stamens about 30.—*Fem. fl.* and *fruit* unknown.—Mueller's *M. eriocarpoides* is founded on young leaves of *Wallichianus*.

20. **M. leptostachyus**, *Hook. f.*; branches very slender and petioles leaves beneath and inflorescence softly tomentose, leaves alternate or uppermost pair opposite thin triplinerved elliptic- or oblong-lanceolate acuminate glandular beneath, base acute, male spikes terminal very long interrupted, flowers globose capitate.

TENASSERIM, King's Island in the Mergui Archipelago, *Helper* (*Kew Distrib.* 4729).

Branchlets terete, scurfily tomentose with long hairs intermixed. *Leaves* 4-10 by 2-3 $\frac{1}{2}$ in., almost membranous, pale greenish brown when dry, glabrous above except on the midrib, nerves 4-6 pair above the basal, slender and as well as the cross-nervules raised and hairy; glands minute, scattered, yellow; petiole of upper leaves short, of lower 1-2 $\frac{1}{2}$ in.; stipules lanceolate, tomentose. *Spike* 6-12 in., slender; bracts shorter than the globose flowers, which are sessile and $\frac{1}{10}$ in. diam. *Calyx* unequally 3-partite, segments broad glabrous within. *Stamens* about 80, anther-cells subglobose, separated widely by the truncate connective.—*Fem. fl.* and *fruit* unknown.

21. **M. Clellandii**, *Hook. f.*; branchlets petioles leaves beneath and inflorescence stellately tomentose, leaves opposite long-petioled triple-nerved linear-oblong from a cordate base obtuse strongly nerved and reticulated but eglandular beneath, male spikes short axillary, bracts subulate, flowers globose, calyx splitting irregularly, stamens very numerous, anther-cells oblong adnate to the truncate connective.

PEGU; at Rangoon, *M. Clelland*.

Branches terete, smooth. *Leaves* 3-5 in., firm but not coriaceous, dark brown when dry, paler and sparsely pubescent beneath, glabrous except when young and on the midrib above, nerves 3-4 pair above the basal, cross-nervules and reticulations much raised beneath; petiole $\frac{1}{2}$ -2 in.; stipules subulate, tomentose. *Male spikes* $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; flowers globose, $\frac{1}{2}$ in. diam., densely tomentose.

22. **M. filiformis**, *Hook. f.*; branchlets slender and petioles stellately pubescent or glabrate, leaves opposite and subopposite rather membranous penninerved elliptic or elliptic-oblong obtusely caudate base rounded or cuneate usually 2-glandular above, beneath eglandular but minutely pelucid-punctate, male racemes very long and slender pubescent, bracts minute setaceous much shorter than the globose pubescent buds.

TENASSERIM, *Helper* (*Kew Distrib.* 4732), *Griffith*.

Branches slender, woody; branchlets compressed. *Leaves* 4-7 in., dull brownish green when dry, thin, nerves 7-10 pair very prominent beneath and forming intramarginal strong arches, base above eglandular; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in., rather slender. *Male racemes* axillary and subterminal, 4-6 in.; flowers in rather distant small clusters; buds about $\frac{1}{10}$ in. diam.; stamens sparsely pubescent and glandular; sepals very broadly ovate; stamens very numerous, small; anther-cells globose with a thick connective.—This closely resembles *M. bracteatus* in habit and foliage, but the bracts and flowers are quite different.

23. **M. puberulus**, *Hook. f.*; branches petioles leaf-nerves beneath and racemes puberulous, leaves membranous alternate long-petioled caudate-acuminate sinuate-toothed minutely glandular beneath, base contracted deeply cordate 7-9-plinerved, male racemes slender, clusters many-fld., buds ovoid nearly glabrous.

PERAK, Scortechini.

Youngest shoots fulvous-tomentose. *Leaves* 5-7 in., with long slender tips, greenish when dry, glabrous above, base eglandular; nerves 8-10 pair above the basal, substellately puberulous, strong beneath, cross-nervules distant; petiole 2-3 in., terete. *Racemes* axillary, shorter than the leaves; bracts minute; flowers 10-20 in a cluster; buds $\frac{1}{10}$ in. long; sepals usually 3, membranous, very sparsely stellately hairy and glandular; stamens 60-70; anther-cells globose, separated by the connective which is not produced.—Differs from *M. Helferi* in the much larger leaves and flowers and very numerous stamens.

24. *M. bracteatus*, Hook. f.; shoots and racemes stellately pubescent, leaves opposite and subopposite membranous triple-nerved elliptic-oblong obtusely subcaudate acuminate sinuately subserrate obscurely glandular beneath base subacute, male racemes slender stellately pubescent shorter than the leaves, clusters few-fl., bracts lanceolate longer than the ovoid buds both densely subsilkily tomentose.

PERAK, Scortechini.

Branchlets compressed when dry. *Leaves* 5-7 by 2-3 in., very thin in texture, glabrous on both surfaces, with no pellucid glands, dull greenish when dry, base narrow with obscure glandular areas; nerves 6-9 pairs above the basal, slender but strong beneath, cross-nervules distinct distant; petiole 1-1½ in.; stipules ovate lanceolate, pubescent. *Male racemes* 2-3 in.; bracts lanceolate, buds fulvous tomentose $\frac{1}{12}$ in. long; sepals 3, ovate; stamens 30-40, anther-cells globose separated by a broad sometimes produced connective.

b. *Leaves penninerved, not or very obscurely 3-plinerved.*

25. *M. anisophyllus*, Hook. f.; sparsely pubescent, leaves subsessile opposite in very unequal pairs penninerved eglandular beneath, larger of each pair 6-8 in. elliptic lanceolate or oblanceolate acuminate smaller orbicular-ovate or -cordate, racemes very short few-fl., sepals of both sexes 3 lanceolate, ovary spinescent, styles elongate subplumose, capsule muricate.

MALACCA, Maingay (Kew Distrib. 1413).—**DISTRIB.** Borneo (*Motley*).

Branches terete woody, branchlets compressed simply hairy. *Leaves* rather thin, red brown and rather shining when dry, sometimes subfalcate, entire or subsinuate-toothed, glabrous or sparsely hairy on the midrib beneath, base very contracted but rounded; nerves 10-15 pair, cross-nervules very slender; petiole very short, stout, densely velvety-tomentose; stipules $\frac{1}{2}$ in., subulate-lanceolate, rigid, persistent. *Male racemes* $\frac{1}{2}$ -1 in., filiform, bracts minute, flowers $\frac{1}{2}$ in. diam., on slender pedicels; sepals membranous, glabrous; stamens 15-20, connective broad fleshy carunculate. *Fem. fl.* few, on very short racemes; sepals pubescent; ovary clothed with appressed erect hispidulous spines; style 0; stigmas very long, slender, almost feathery nearly all over.—Maingay describes the male perianth as unequally 2-cleft.

26. *M. muricatus*, Beddome Forester's Man. 208 (not of Muell. Arg.); quite glabrous, leaves opposite shortly petioled penninerved rhombic-lanceolate obtuse or obtusely narrowed at both ends entire or sinuate-toothed minutely glandular beneath nerves 6-8 pairs, male racemes and buds glabrous slightly glandular, males short, fem. elongate, ovary with a few conical glabrous tubercles, capsule tridymous, cocci with two rows of tubercles. *Claoxylon muricatum*, *Wight Ic.* 1886. *Croton muricatum*, *Heyne in Wall. Cat.* 7751. ? *Axenfeldia intermedia*, *Baill. Etudes Gen. Euphorb.* 419.

MYSORE, Heyne. TRAVANCORE, at Courtallam, Wight (Kew Distrib. 2672).

A tree, branches terete, branchlets compressed. *Leaves* 2-5 in., coriaceous, shining above; base with often two spots; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in.; stipules oblong, glabrous.

Male spikes 1-2 in., slender; flowers few in the very short rounded bracts; buds ovoid, $\frac{1}{2}$ in. long; sepals 4; stamens 30-40, anther-cells oblong not separated at the top by a truncate connective (as in *Lawii*). *Fem. racemes* 4-6 in., slender; bracts as in the male; flowers remote; sepals 6, lanceolate, glabrous; ovary glandular; style very short or 0.—I have not seen the capsule, which Wight describes and figures. The quite glabrous branchlets and 2-seriate tubercles of the cocci distinguish this species. Heyne's authentically named specimens in Rottler's and Wallich's Herbaria prove that this, and not *M. stenanthus*, is the *Croton muricatus* of Heyne. *M. muricatus* of Mueller (in DC. l.c. 972) is a mixture of the Ceylon *M. Walkeræ*, the *Claoxylon muricatum* of Wight, the Philippine Cuning 1170 ð., the Javan Zolling, 3804, and a plant cited from the Hookerian Herbarium as Falconer n. 1352 (of which latter I find no specimen in Herb. Hook.). Of all these Wight's figure alone represents Heyne's *Croton muricatum*. Beddome erroneously gives Wight as the author for *Croton muricatum* being put into *Mallotus*, for Wight refers it to *Claoxylon*. Beddome, following Mueller, refers to his *M. muricatus* (which, as stated above, includes this and others) Baillon's *Axenfeldia intermedia*, which may be *M. Walkeræ* or *stenanthus*.

27. *M. Walkeræ*, Hook. f.; branchlets and spikes tomentose or pubescent and glandular, leaves opposite long- or short-petioled penninerved rhombic-ovate-obovate or -lanceolate obtusely acuminate or caudate sinuate-toothed minutely glandular beneath, base acute, nerves 6-10 pair, male racemes short, bracts large, flowers glandular, fem. racemes elongate, capsule tridymous glandular and clothed with long soft spines. *M. muricatus*, Muell. Arg. in DC. Prodr. xv. ii. 972 (the Ceylon plant only). Rottlera muricata, Thwaites Enum. 273 (excl. syn.).

CEYLON, Walker, &c.; Central Province, ascending to 4000 ft., Thwaites (C.P. 2108).

A small tree, branches terete, branchlets compressed. Leaves 3-8 by 2-3½ in., hardly coriaceous, pale greenish when dry, tip often broadly and obtusely caudate, base very acute or cuneate, quite glabrous; petiole $\frac{1}{2}$ -1 in.; stipules ovate-oblong or -lanceolate, pubescent. *Male racemes* stout or slender, 1-2 in.; bracts broad, concave, often as long as the flowers; buds $\frac{1}{10}$ - $\frac{1}{8}$ in., ovoidly globose; sepals 3-4, tomentose; stamens about 30, anther-cells oblong not separated by a truncate connective. *Fem. racemes* slender, pubescent or pilose; flowers few, distant; sepals 3, lanceolate, and pedicels tomentose; ovary densely echinate; style very short. *Capsule* $\frac{1}{2}$ in. diam., yellowish from the copious glands; cocci puberulous, as are the spines.

Var. *laxiflora*; male racemes with capillary pedicels $\frac{1}{10}$ in. long.—Ceylon, Walker.

28. *M. stenanthus*, Muell. Arg. in Linnæa xxxiv. 191, and in DC. Prodr. xv. ii. 972; nearly glabrous except the resinous and puberulous branchlets and inflorescence, leaves opposite very shortly petioled elliptic- or ovate-lanceolate obtusely acuminate or caudate entire or sinuate-toothed minutely glandular beneath penninerved, nerves 5-6 pair, racemes short, male buds ovoid, fem. narrowly oblong, capsule tridymous glandular and with scattered short conical tubercles.

CANARA; at Tulliwally, Ritchie; Jellapore, Talbot.

A small tree, branches red-brown, branchlets compressed. Leaves 3-6 in., rather coriaceous, tapering from the middle to both ends, pale greenish-yellow when dry, and shining, with 3-4 black spots above the acute base; nerves raised beneath, as are the cross-nerves and reticulations; petiole $\frac{1}{2}$ -to $\frac{1}{4}$ in., of young leaves resinous. *Racemes* $\frac{1}{2}$ - $\frac{1}{4}$ in., axillary and terminal, very slender; bracts acute; flowers clustered, subsessile; buds $\frac{1}{10}$ in. long; sepals 3; stamens 18-20; anther-cells oblong, tips separated by a broad connective. *Fem.* solitary in the bracts; sepals 3, lanceolate. *Capsule* $\frac{1}{2}$ in. diam., yellow from the glands, cocci rounded.

Seeds globose, smooth, polished.—Very near *M. muricatus*, but the shoots and spikes are pubescent and far more glandular, and the male buds narrower.

29. **M. Lawii**, *Muell. Arg. in Linnæa* xxxiv. 192, and in *DC. Prodr.* xv. ii. 975; branchlets petioles and inflorescence pubescent, leaves opposite shortly petioled elliptic-lanceolate or oblanceolate obtusely acuminate penninerved nerves 5-6 pair entire or repand-toothed minutely glandular beneath, racemes very slender few-fl., fem. 1-3 fl., capsules tomentose glandular and densely clothed with long villous filaments; styles sessile. *Beddome Forester's Man.* 209. *M. aureo-punctatus*, *Muell. Arg. in DC. l. c.* 973; *Beddome Forester's Man.* 209. *Rottlera aureo-punctata*, *Dalz. in Hook. Journ. Bot.* iii. (1851) 122; *Dalz. & Gibs. Bomb. Fl.* 230.

The CONCAN and CANARA, *Law, Stocks, &c.* COCHIN, *Johnstone.*

Branches terete, branchlets much compressed, finely pubescent. *Leaves* 4-8 by $1\frac{1}{2}$ - $3\frac{1}{2}$ in., rather coriaceous, pale when dry, young thin shining above and glabrous, midrib and rather slender nerves puberulous beneath, base acute obtuse or rounded; petiole $\frac{1}{4}$ - $\frac{2}{3}$ in.; stipules lanceolate, villous. *Male racemes* shorter than the leaves; bracts small; flowers few, solitary or in distant clusters, sessile or pedicelled, $\frac{1}{2}$ in. diam. when expanded, buds globose; sepals 3-4, broad, villous; stamens about 50, anther-cells short, separated throughout by the broad truncate connective. *Fem.* subspathaceous, splitting into 4-6 lanceolate, unequal, villous segments. *Capsule* $\frac{3}{4}$ in. diam., 3-4-coccos; styles 3-4, appressed to the fruit, plumose. *Seeds* subglobose, smooth, polished.

30. **M. Beddomei**, *Hook. f.*; glabrous except the branchlets and inflorescence, leaves opposite short- or long-petioled penninerved ovate or oblong obtusely caudate-acuminate entire or subentire minutely glandular beneath, nerves 6-8-pair, racemes very slender, male pedicels as long as the ellipsoid acute buds, fem. buds linear-oblong, ovary echinate, style distinct, capsule tridymous glandular stellately pubescent and clothed with long soft spines. *M. muricatus*, *Beddome Forester's Man.* 209 *in part.*

TRAVANCORE, at Courtallam, *Wight*; Anamallay Hills, alt. 4000 ft., *Beddome.*

Branches smooth, terete, branchlets compressed. *Leaves* 5-7 in., thinly coriaceous, not at all rhombic, base rounded or obtuse; nerves arched and cross-nervules strong beneath; petiole $\frac{1}{2}$ -2 in.; stipules ovate-lanceolate, pubescent. *Male racemes* 2-5 in., lax-flowered; bracts very short, obtuse; buds $\frac{1}{10}$ in.; sepals 3, membranous, glabrous or puberulous; stamens about 25, anthers large, cells separated by a very narrow connective. *Fem. racemes* few- and distant-flowered; sepals 6, free or some connate, $\frac{1}{3}$ in. long, lanceolate, membranous. *Capsule* $\frac{3}{4}$ in. diam.—Differs from *Walkeræ* in the oblong or ovate leaves with no trace of being rhombic, small bracts, and stellately tomentose larger fruit. *Beddome* no doubt includes this under his *muricatus*.

31. **M. khasianus**, *Hook. f.*; glabrous except the tomentose inflorescence, leaves opposite shortly petioled penninerved elliptic-ovate-oblong or lanceolate entire or sinuate-toothed caudate-acuminate eglandular beneath, base rounded or broadly cuneate, male racemes many-fl. buds globose, fem. long slender, capsules long-pedicelled tridymous pubescent and clothed with slender prickles. *Claoxylon* No. 10, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., *Griffith*; near Churra, alt. 3-4000 ft., *J. D. H. & T. T.*

A small tree; branchlets woody, tips and petioles stellately pubescent. *Leaves* 4-10 by 2- $3\frac{1}{2}$ in., thinly coriaceous, pale when dry and alike on both surfaces, base with 2-3 glands above; nerves 6-9 pair, slender, cross-nervules distant faint; petiole $\frac{1}{4}$ - $\frac{3}{4}$ in., rarely more; stipules triangular-lanceolate. *Male racemes* 3-6 in., sessile, scurfily stellately-tomentose; bracts very short and broad; flowers clustered, sessile and shortly pedicelled, $\frac{1}{3}$ in. diam.; calyx tomentose, unequally 3-cleft; stamens

40-50, filaments free, anther-cells reniform free above and below. *Fruiting racemes* slender, 6-8 in., pedicels $\frac{3}{4}$ in. *Capsule* $\frac{3}{4}$ in. diam., cocci rather thick and woody, epicarp not separating. *Seeds* $\frac{1}{2}$ in. long, subglobose, rather longer than broad, smooth, brown.

32. **M. polyneurus**, *Hook. f.*; nearly glabrous, branchlets slender leaves alternate petioled penninerved very membranous elliptic oblong or oblong-lanceolate cuspidately caudate-acuminate sinuate-toothed pellucid-punctate but eglandular and shining beneath, nerves 10-12 pair, fem. racemes very slender 1-2 fld., fem. sepals 6, ovary tomentose and clothed with hispid spines, style very short, stigmas 2 plumose recurved.

TENASSERIM, *Helper* (*Kew Distrib.* 4764).

Branchlets smooth, tips faintly hoary, as are the young petioles and midrib beneath. *Leaves* 5-8 by $2\frac{1}{2}$ -4 in., very thin, greenish above when dry, brown beneath, with a few basal glands on the short lowest nerves; base acute or subacute, with no superficial glands above; nerves and distant cross-nervules very slender; petiole 1-1 $\frac{1}{2}$ in., slender. *Fem. racemes* 2-3 in., 1-2 fld.; flowers pedicelled; sepals lanceolate.—The specimens are scanty, in very young fruit only, which is $\frac{1}{4}$ in. diam. They resemble no other species. The leaves, though pellucid-punctate, have no superficial glands beneath.

33. **M. andamanicus**, *Hook. f.*; nearly glabrous, branchlets flattened, leaves opposite very shortly petioled penninerved elliptic-oblong obtusely acuminate entire or sinuate-toothed base acute minutely glandular beneath, nerves 12-14 pair, male spikes very short terminal and axillary glandular, bracts broadly ovate, flowers globose. *M. muricatus*, *Kurz For. Fl.* ii. 384 (*excl. syn.*); *Gamble Man. Ind. Timb.* 362.

S. ANDAMAN ISLANDS, *Kurz*.

Branches stout, terete, smooth, branchlets strongly compressed, tips and very young leaves covered with golden glands. *Leaves* $3\frac{1}{2}$ -7 by 2-4 in., firm, greenish brown when dry, base eglandular; nerves 12-14 pair, and cross-nervules slender, arched; petiole $\frac{1}{2}$ -1 in., rather stout; stipules broadly ovate, glabrous. *Spikes* $\frac{1}{2}$ -1 in., sessile, dense-fld. *Male fl.* globose, $\frac{1}{10}$ in. diam.; calyx 3-partite, glandular; stamens about 30, anther-cells separated by a rather narrow connective, shortly oblong or rounded, sometimes divaricate below.—A female specimen bears what I take to be the very slender terminal peduncle, 1 in. long, of a capsule that has fallen away. This differs remarkably from the Deccan *M. muricatus* in its much larger size, large broad leaves with no tendency to the rhombic form, and especially in the numerous pairs of nerves. *Kurz* describes the ovary as densely golden glandular and muricate; the capsule as golden glandular shortly sparingly muricate, and the cocci the size of a pea.

34. **M. Kingii**, *Hook. f.*; branchlets petioles leaves beneath and panicles softly white-tomentose, leaves alternate penninerved narrowly elliptic-oblong caudate-acuminate entire eglandular beneath, male flowers subsessile in long slender sparingly branched leaf-opposed panicles, sepals 3 tomentose, stamens very numerous.

PERAK, alt. 2000-2500 ft., *King's Collector*.

A tree, 40-50 ft., branches terete smooth. *Leaves* distant, 8-10 by $2\frac{1}{2}$ -3 $\frac{1}{2}$ in., rather thin, pale green when dry and glabrous above, whiter beneath, base broadly cuneate eglandular; nerves 12-16 pair, strong beneath, with rather distant regular cross-nervules; petiole 1-1 $\frac{1}{2}$ in., stout, terete, swollen at base and top; stipules oblong-lanceolate, tomentose. *Male panicles* 6-8 in., peduncled, one opposite each of the upper leaves; branches very slender, flowers $\frac{1}{4}$ in. diam., in the axils of minute broad bracts, pedicels $\frac{1}{16}$ in.; sepals unequal; stamens very numerous, anther-cells separated by the broad truncate connective which is often produced beyond them.

B. Capsules smooth. Leaves triple-nerved in all. (See also the species mentioned under A.)

35. **M. penangensis**, Muell. Arg. in *Linnæa* xxxiv. 186, and in *DC. Prodr.* xv. ii. 961; quite glabrous, leaves opposite coriaceous pinnately jointed at the petiole oblong-lanceolate polished cuspidate quite entire eglandular beneath base acute, male spikes short puberulous, fem. laxly clothed with long spreading hairs, styles free slender, capsules 3-dymous villous and bristly. Antidesm.?, Wall. Cat. 8576.—Euphorb., Wall. Cat. 9092.

PENANG, Porter, Curtis. MALACCA, Maingay (*Kew Distrib.* 1444). PERAK, King's Collector.

Branches woody. Leaves 4-6 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., brown when dry and usually polished above, base acute, obscurely glandular beneath with 6-10 pairs of strong nerves besides a very obscure basal pair that are very short and close to the margin, cross-nervules obscure; petiole 1-1 $\frac{1}{2}$ in., slender. Male racemes 1-2 in., rather stout; bracts short, triangular, acute; buds globose, $\frac{1}{10}$ in. diam., puberulous; stamens about 50, connective broad glandular. Fem. racemes remarkable for the white hairs $\frac{1}{2}$ in. long on the slender rachis and on the rigid bristle-like spines of the fruit. Sepals 6, lanceolate. Capsule $\frac{1}{2}$ in. diam., 3-lobed, villous between the spines; styles connate at the base.—The Malaccan specimens have more nerves than the Penang.

36. **M. rhamnifolius**, Muell. Arg. in *Linnæa* xxxiv. 196, and in *DC. Prodr.* xv. ii. 979; branchlets petioles and inflorescence finely pubescent or tomentose, leaves opposite and alternate oblong or oblong-lanceolate acuminate beneath minutely glandular strongly triple-nerved and reticulate, base 2-glandular rounded or subacute, male spikes equalling or exceeding the leaves, flowers clustered globose, capsules small tridymous unarmed stellately tomentose. *Croton rhamnifolius*, Willd. in *Nov. Act. Nat. Cur. M. micranthus*, Muell. Arg. in *Linnæa* l. c. 191, and in *DC. l. c.* 971; *Beddome Forster's Man.* 209. *M. zeylanicus*, Muell. Arg. in *Linnæa* l. c. 195, and in *DC. l. c.* 977; *Beddome l. c.* 210. *Rottlera oppositifolia*, *Thwaites Enum.* 273 (*excl. syn.*). *A. nervosus*, *Rottl. & Willd. in Neue Schrift. Gesellsch. Naturf. Freund. Berl.* (1803) iv. 190. *C. reticulatus*, Willd. *Sp. Pl.* iv. 545; Wall. Cat. 7724 A.

DECCAN PENINSULA; Trincomalee, Heyne; Courtallam, Wight. CEYLON; common up to 2000 ft., Moon, Gardner, &c.

A tree; branches terete, smooth. Leaves 3-6 in., firm, but not coriaceous, entire or obscurely toothed, red brown when dry, subglaucous and puberulous beneath, glands very minute, two basal often obscure; nerves 4-5 pair above the basal and cross-nervules all strong and raised beneath; petiole $\frac{1}{2}$ -3 in. Male spikes slender; bracts minute; flowers globose, $\frac{1}{2}$ in. diam.; calyx 4-partite; stamens 40-50, anther-cells subglobose, separated by a thick truncate connective. Fem. spikes long, many-flid., twice or thrice as long as the leaves; calyx 2-3-partite; stigmas short, thick.—I have seen no fem. fl. or fruit. Wight's specimens are in male fl., and have leaves rather glaucous and puberulous beneath; the Trincomalee one is so named by Heyne in Rottler's Herb. In Wall. Cat., Herb. Heyne is cited both under this and *M. atrovirens*. The citation of "Nov. Act." for *Crot. rhamnifolius* is from the *Neue Schrift*, and is not verifiable.

Var. ? *ovatifolia*; leaves much smaller ovate acuminate base broad rounded, nerves 2-3 pairs above the basal.—Ceylon; at Balangoda, Thwaites (*C.P.* 196).

37. **M. atrovirens**, Muell. Arg. in *Linnæa* xxxiv. 195, and in *DC. Prodr.* xv. ii. 978; glabrous except the sparsely pubescent racemes, leaves rather shortly petioled alternate triple-nerved at the acute base elliptic or

obovate obtuse or acute entire minutely glandular beneath, racemes slender shorter or longer than the leaves, ovary 2-celled rusty-pubescent and scaly, styles sessile. *Beddome Forester's Man.* 210. *Croton atrovirens*, *Herb. Madr.*, and *C. coccineus*, *Wall. Cat.* 7771.

DECCAN PENINSULA; from Cochin, *Johnstone*, to Travancore, *Heyne*, *Beddome*. *Branchlets* glabrous, except the rusty-pubescent tips. *Leaves* 3-5 in., brown when dry, especially beneath, nerves 5-7 pair above the rather short basal, cross-nervules faint; petiole $\frac{1}{2}$ -1 in. *Racemes* 3-6 in., simple; flowers rather long-pedicelled; bracts minute; male fl. about $\frac{1}{16}$ in. diam., buds globose; sepals membranous, sparsely glandular. *Fem. racemes* shorter; pedicels as long as the 4-5 ovate unequal acute scurfy sepals. *Fruit* unknown.

38. **M. fuscescens**, *Muell. Arg. in Linnæa* xxxiv. 195, and in *DC. Prodr.* xv. ii. 978; glabrous except the glandular rusty-pubescent inflorescence, leaves opposite petioled elliptic elliptic-oblong or obovate acute or obtusely acuminate very minutely glandular beneath pinnate and obscurely triple-nerved, base subacute, racemes shorter than the leaves, ovary 3-celled glandular, style very short, capsule tridymous unarmed glandular. *Beddome Forester's Man.* 210. *Rottlera fuscescens*, *Thwaites Enum.* 273.

CEYLON; not uncommon up to 2000 ft., *Walker*, &c.

A small tree; branches smooth, terete; branchlets slender, compressed, glabrous. *Leaves* 3-5 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., thinly coriaceous, sometimes shining on the upper or both surfaces, brown when dry, paler beneath, base obscurely 2-glandular, rarely rounded; nerves 5-6 pair, arched; petiole $\frac{1}{2}$ -1 in. *Male racemes* 2-3 in., subsessile, flowers $\frac{1}{2}$ in. diam.; buds ovoid, acute; pedicels as long as the calyx; sepals 4, unequal; stamens 20-40, anther-cells not separated at the top by a truncate connective. *Fem. racemes* stout, about as long as the males; flowers $\frac{1}{2}$ in. diam.; calyx 3-5-cleft, acute. *Ovary* densely glandular, styles 3-4 short. *Capsule* about $\frac{1}{2}$ in. diam.; cocci subglobose.

39. **M. leucodermis**, *Hook. f.*; glabrous except the racemes, branches woody bark white, leaves alternate long-petioled triple-nerved elliptic or obovate entire minutely glandular beneath, racemes elongate, capsule tridymous unarmed smooth.

MALACCA, *Maingay (Kew Distrib.* 1433).

Upper branches sometimes as thick as a swan's quill, very white. *Leaves* 6-10 in. by 3-5 in., more or less coriaceous, brown beneath, base rounded 2-3-glandular, nerves 5-6 pair above the basal, which extend beyond the middle, cross-nervules strong beneath; petiole 1-3 in. *Racemes* axillary and from the naked branches, stellately pubescent, males 4-6 in. slender, fem. longer in fruit; bracts minute. *Male fl.* nearly $\frac{1}{2}$ in. diam., clustered; pedicels slender; buds large, $\frac{1}{2}$ in. diam., globose; sepals 4, broad, membranous, glandular, glabrous; stamens 40-50, anther-cells oblong, globose, almost connate with a very narrow connective or separated by a broader one. *Capsules* on stout pedicels 1-1 $\frac{1}{2}$ in. long, about 1 in. diam., cocci rounded, rather woody, epicarp not separating. *Seeds* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., subglobose, smooth, polished, brownish.

40. **M. distans**, *Muell. Arg. in Linnæa* xxxiv. 194, and in *DC. Prodr.* xv. ii. 976; branches petioles leaves beneath and inflorescence scurfily stellate-tomentose, leaves opposite long-petioled triplinerved ovate orbicular-ovate or oblong acuminate entire or obscurely sinuate eglandular beneath, racemes few-fl., males short, fem. elongate in fruit, ovary tomentose, styles 5, capsule tridymous unarmed densely stellate-tomentose. *Beddome Forester's Man.* 209.

SOUTHERN DECCAN, *Heyne*; Travancore, *Wight*; Tinnevely Hills, *Beddome* CEYLON, *Heyne*.

Branches terete, pubescent, yellowish. *Leaves* in distant pairs, 6-10 by 3-5 in., very variable in form, thin or the older coriaceous, glabrous above, brown-tomentose beneath, with 3-4 pairs of nerves above the long basal and strong distant cross-nervules, base minutely peltate cuneate rounded or cordate with 2 or more variously disposed minute basal glands above; petiole 2-3 in. *Racemes* axillary; male 2-3 in.; expanded flowers $\frac{1}{4}$ in. diam., buds globose; sepals 3; stamens very numerous, filaments free, anther-cells oblong, connective obscure. *Fem. racemes* 4-5 in., slender, fruiting pedicels $\frac{1}{2}$ -1 in.; sepals 3; styles (or stigmas) rather short. *Capsule* $\frac{1}{3}$ in. diam., yellow; cocci globose. *Seeds* globose, smooth.—Good specimens of this are in Rottler's herbarium from Heyne with his ticket written "*Croton distans* sub., Trincomom., Zeylon, 1796." Mueller Arg. refers Wallich's 7772 A to it, but not B; they are, however, clearly the same species.

41. **M. repandus**, Muell. Arg. in *Linnæa* xxxiv. 197, and in *DC. Prodr.* xv. ii. 981; tawnily stellately pubescent or tomentose, leaves alternate long-petioled triplinerved broadly rhombic-ovate acuminate entire or repand-toothed glandular on both surfaces, male racemes often panicked flowers large, fem. axillary, capsules didymous stellately tomentose, seeds black. *Brand. For.* Fl. 444; *Kurz For.* Fl. ii. 380; *Gamble Man. Ind. Timb.* 361; *Beddome Forester's Man.* 210. *Rottlera tricoeca*, *Roxb. Fl. Ind.* iii. 829; *Dalz. & Gibs. Bomb. Fl.* 230. *R. rhombifolia*, *Thwaites Enum.* 272. *R. dioica*, *Baill. Etudes Gen. Euphorb.* 423; *Wall. Cat.* 7826 C $\frac{1}{2}$, D $\frac{1}{3}$, E, F. *R. viscida*, *Blume Bijl.* 608. *R. scabrifolia*, *A. Juss. Tent. Euphorb.* iii. t. 9, f. 29 B; *Reichb. f. & Zoll. in Linnæa* xxviii. 319. *R. trinervis*, *Zipp. in Linnæa* xv. 348. *R. ? cordifolia*, *Benth. Fl. Hongk.* 307. *R. paniculata*, *Wall. Cat.* 7818 D in part. *Croton repandus*, *Willd. in Neue Schrift. Naturf. Freund. Berlin* iv. 206. *C. rhombifolius*, *Willd. Sp. Pl.* iv. 555. *C. lacciferus* & *bacciferus*, *Wall. Cat.* 7774, 7826 A, B, C, D.

Throughout India, from the TROPICAL HIMALAYA in Bhotan to ASSAM and southwards to TRAVANCORE and CEYLON in the west, and to PENANG and PERAK in the east.—DISTRIB. China, Malay Islands, New Caledonia.

A large scandent shrub or tree, trunk sometimes 60-80 ft. long; branchlets woody, scurfily tomentose. *Leaves* 2-3 in., rarely with 2-3 lateral lobes, smooth or scaberulously stellate above, often softly tomentose beneath, base cuneate, nerves 3 pair above the long basal; petiole 1-2 in. *Male panicles* sometimes 5-6 in. long; flowers rather long pedicelled, $\frac{1}{4}$ - $\frac{1}{3}$ in. diam.; sepals ovate, glandular; stamens 50-60, anther-cells oblong, connective inconspicuous. *Fem. racemes* simple or branched; sepals as in the male; ovary tomentose, always 2-celled; style 0; stigmas plumose. *Capsule* $\frac{1}{2}$ in. across the two globose glandular carpels; cocci crustaceous thin, epicarp not separating. *Seeds* opaque, subglobose.

42. **M. philippinensis**, Muell. Arg. in *Linnæa* xxxiv. 196, and in *DC. Prodr.* xv. ii. 981; branchlets and young leaves and inflorescence rusty or tawny pubescent, leaves alternate petioled triple-nerved ovate to ovate- or obovate-oblong or -lanceolate acuminate entire or sinuate-toothed, glabrous above, beneath subglaucous puberulous and covered with scarlet glands, spikes terminal solitary or paniced, ovary with crimson glands, stigmas 3 sessile, capsules tridymous unarmed pulverulent, seeds black. *Brand. For.* Fl. 444; *Kurz For.* Fl. ii. 381; *Gamble Man. Ind. Timb.* 361; *Beddome Fl. Sylvat.* t. 289; *Benth. & Trim. Med. Pl.* iv. t. 236. *Rottlera tinctoria*, *Roxb. Cor. Pl.* ii. 36, t. 163, and *Fl. Ind.* iii. 827; *Wall. Cat.* 7832; *Grah. Cat. Bomb. Pl.* 184; *Dalz. & Gibs. Bomb. Fl.* 230; *A. Juss. Tent. Euphorb.* 83; *Benth. Fl. Hongk.* 307; *Miquel Fl. Ind. Bat. Suppl.* 454. *R. aurantiaca*, *Hook. & Arn. Bot. Beech. Voy.* 270. *R. affinis*, *Hassk. in Flora* 1844, *Beibl.* ii. 41. *R. montana* & *mollis*, *Wall. Cat.* 7833 and 7839. *Croton philippensis*, *Lamk. Encycl.* ii. 203. *C. punctatus*, *Retz. Obs.* v. 30. *C. coc-*

cineus, *Vahl Symb.* ii. 97. *C. montanus*, *Willd. Sp. Pl.* iv. 545; *Wall. Cat.* 7723 A. *C. distans*, *Wall. Cat.* 7792 A in part, and B. *C. cascarilloides*, *Rauesch. ex Steud. Nomencl.* i. 416.—*Wall. Cat.* 7844.—*Rheede Hort. Mal.* v. t. 21, 24.

Throughout TROPICAL INDIA, along the foot of the Himalaya from Kashmir eastwards, all over Bengal and Burma, Singapore and the Andaman Islands, and from Ceind southwards to CEYLON.—DISTRIB. China, Malay Islands, Australia.

A small evergreen tree, 25–30 ft.; branches rather slender. *Leaves* 3–5 in., variable in form, glabrous or nearly so above, base narrowed, acute or obtuse; nerves 4–7 pairs above the basal; petiole 1–2 in. *Flowers* in stiff spikes, small, sessile or subsessile, males clustered, fem. solitary. *Capsules* about $\frac{1}{3}$ – $\frac{1}{2}$ in. diam., covered with crimson powder. *Seeds* globose, smooth, black.

DOUBTFUL AND EXCLUDED SPECIES.

43. **M. ? Caput-Medusæ**, *Hook. f.*; a large tree (in Perak), branches petioles leaves beneath and racemes densely rusty-tomentose or villous, leaves 6–18 in. coriaceous oblong or elongate obovate-oblong obtuse base obtuse or subacute 2-glandular above penninerved, nerves 10–12 pairs strong beneath with strong cross-nervules and reticulate interspaces, petiole $\frac{1}{2}$ –1 in. stout, fem. racemes 1–1 $\frac{1}{2}$ in. very stout, flowers very shortly stoutly pedicelled, sepals 5 ovate subacute, disk annular villous, ovary ovoid contracted into a short stout style with 3 recurved entire stigmas 3–4-celled densely clothed with close-set long rigid hairs, fruit 1 $\frac{1}{2}$ –2 in. diam. globose indehiscent densely clothed with long soft villous spines, pericarp thin crustaceous, seeds broad $\frac{3}{4}$ in. long dorsally compressed suborbicular, testa smooth crustaceous.

PERAK, *King's Collector*. MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1426, 1443, 1445).

I am doubtful as to the genus of this fine plant. Maingay describes the tree as small, and hairs of the fruit as stinging, and the seeds as arillate.

44. **M. ? Kunstleri**, *King in Herb. Calcutt.*; quite glabrous except the inflorescence, leaves 8–12 in. alternate long petioled coriaceous penninerved elliptic-lanceolate acute or acuminate subserrate or serrate eglandular base decurrent, male fl. in sessile bracteate clusters on the divaricating rigid branches of a large spreading sessile panicle, buds lanceolate, sepals glumaceous and broadly ovate coriaceous, bracts more or less subsilicily pubescent, margins ciliate.

PERAK, *Scortechini, Kunstler* (*King's Collector*).

A tree, 40–60 ft.; branchlets woody, pale. *Leaves* smooth, very pale green or yellowish above when dry, with a very strong midrib, yellowish green beneath; nerves 15–20 pairs, spreading, strong but slender, nervules faint reticulate; petiole 1–3 in., strong but not thick. *Panicles* axillary, 6–10 in. long and as broad; rachis and branches slender but very stiff, finely but not stellately pubescent, at length glabrate; clusters of flowers rather distant, $\frac{1}{4}$ in. diam., 4–6 fld.; buds $\frac{1}{10}$ in. long, twice as long as the bracts, rigid, acute, pale brown; stamens 20–30, filaments slender, anthers didymous, cells usually separated by the thick connective.—A very distinct and handsome plant, of a totally different habit from any *Mallotus*, and which I can hardly doubt is generically distinct; and if so, Dr. King proposes the name *Kunstlera glumacea*, after his collector who has procured so many new and interesting plants in Perak.

45. **M. ? vernicosus**, *Hook. f.*; quite glabrous, leaves alternate long petioled rigidly coriaceous elliptic-ovate obtusely acuminate highly polished above eglandular beneath, penni- and obscurely tripli-nerved, male racemes or panicles axillary solitary and in pairs ebracteate, flowers long pedicelled, buds globose, sepals 4, stamens 30–40, connective narrow.

SINGAPORE, Botanical Garden, *Cantley*.

Branches stout, woody, terete, quite smooth, brown. *Leaves* 3-4½ in., dull olive-green when dry above and brilliantly polished as if varnished, margin thin with a broad yellow border, base acute or rounded, nerves 6-8 pair including the intra-marginal basal pair, strong beneath, cross-nervules slender; petiole 1-1½ in., slender, terete, rigid. *Male racemes* stout, about as long as the leaves or longer, sometimes paniculately branched; pedicels ½-¾ in. long, stout; buds ½ in. diam.; sepals coriaceous.—A remarkable plant, quite unlike any species of *Mallotus* known to me. The specimen bears a ticket inscribed Kaya Karangi, but it does not appear whether this is the name of a place or of the plant.

M. MOLLESCANS, Linn.; Muell. *Arg. in DC. Prodr.* xvii. 958, is an Amboyna species (*Wall. Cat.* 7827 B in part), cultivated in the Calcutta Bot. Garden. *Beddome* (*Forester's Man.*) gives S. Arcot as a locality for it, but without authority.

55. **CLEIDION**, Blume.

Glabrous trees. *Leaves* alternate, usually sinuate-toothed, penninerved. *Flowers* small, monœcious or diœcious; males in long axillary racemes; fem. 1-2 on a long axillary peduncle. *MALE FL.* *Calyx* globose, splitting into 3-4 valvate segments. *Stamens* over 20, in a globose mass on a conical receptacle; filaments free; anthers dorsifixed, 4-celled, or the 2 cells transversely didymous on the margins of a broad connective. *Pistillode* 0. *FEM. FL.* *Sepals* 3-5, imbricate. *Ovary* 2-3-celled; styles 2-3-fid, united below, arms long filiform; cells 1-ovuled. *Capsule* of 1-3 2-valved cocci. *Seeds* subglobose, testa coriaceous, albumen fleshy; cotyledons broad, flat.—Species about 13, tropical.

1. **C. javanicum**, Blume *Bijd.* 613; leaves long-petioled elliptic to oblong or elliptic-lanceolate acute or acuminate sinuate-toothed or entire, male fl. racemose on slender pedicels, fruit tridymous cocci globose smooth. Muell. *Arg. in DC. Prodr.* xv. ii. 987; *Thwaites Enum.* 272; *Kurz For. Fl.* 390; *Beddome Sylv. Madr.* t. 272; *Baill. Etudes Gen. Euphorb.* t. 9, f. 3-5. *Lasiostyles salicifolia*, Presl *Bot. Bemerk.* 149. *Rottlera urandra*, Dalz. in *Hook. Journ. Bot.* iii. (1851) 229; Dalz. & Gibs. *Bomb. Fl.* 230.—*Wall. Cat.* 7718, A, B, C, 7742, 7753, 7759 A.

SIKKIM HIMALAYA, alt. 2-4000 ft., and KHASIA MTS. to MUNNIPORE, BURMA, TENASSERIM, PENANG and the ANDAMAN ISLANDS; and from the CONCAN to TRAVANCORE. CEYLON; Central Province.—DISTRIB. Java.

An evergreen tree. *Leaves* 4-8 by 1½-4½ in., coriaceous, green when dry, base acute, nerves 6-10 pair; petiole 1-3 in., slender. *Racemes* 3-8 in., pubescent or almost glabrous; bracts minute; male fl. ½ in. diam., sessile and pedicelled; fem. solitary on long thickened pedicels; sepals minute; ovary 3-lobed, style and stigmas ¾ in. long. *Capsule* 1-1½ in. diam., on a peduncle 2-4 in. long. *Seeds* ½-¾ in. diam., globose, smooth, mottled or not.

2. **C. nitidum**, Thw. ex Kurz *For. Fl.* ii. 391; leaves very shortly petioled broadly to elliptically lanceolate acuminate at both ends sinuate-toothed above the middle, male fl. sessile in small clusters on a long slender spike. *Mallotus nitidus*, Muell. *Arg. in DC. Prodr.* xv. ii. 979.

• SOUTH ANDAMAN ISLANDS, rare, Kurz. CEYLON, Gardner, Walker, &c.

A small evergreen tree. *Leaves* 2-3½ in., thinly coriaceous, brownish when dry, glossy; petiole ½-¾ in. *Spike* equalling or exceeding the leaves. *Calyx* glabrous, globose in bud.—An imperfectly known plant, of which I have seen no Andaman Island specimens, and of which the description is taken from Kurz. I have, however, a Ceylon *Cleidion* collected by Gardner, in female flower, that agrees with Kurz's description; the leaves are elliptic or obovate-oblong, dark brown above, paler

beneath, polished on both surfaces; the female pedicel is about 1 in., the ovary tomentose, and the styles free nearly to the base.

56. **MACARANGA**, Thouars.

Trees or shrubs. *Leaves* alternate, often large and peltate, entire or lobed, more or less glandular beneath, 3-5-plinerved. *Flowers* in axillary racemes or branched panicles, usually dioecious, apetalous; males many, clustered; fem. one or few under each bract; bracts often large, entire or toothed. MALE FL. minute. *Calyx* globose or obovoid; sepals 3-4, valvate. *Stamens* one or more, central; filaments flexuous; anthers 3-4-locellate, cells more or less 2-valved. *Pistillode* 0. FEM. FL. *Calyx* 2-4-lobed or toothed. *Ovary* 1-6-celled; styles entire, long or short; cells 1-ovuled. *Capsules* small, of 1-5 2-valved naked or armed cocci, often glandular or with a waxy coat. *Seeds* globose, testa crustaceous or osseous, albumen fleshy; cotyledons broad, flat.—Species about 80, in the tropics of the Old World.

Series I. *Male* and *fem. fl.* in branched panicles (except the fem. of *M. trichocarpa*). *Ovary* 1-3-celled; styles free, short, recurved or reflexed.

* Floral bracts of male panicles very small, not concealing the clusters of flowers.

† *Leaves* not peltate.

1. ***M. pustulata***, King in *Herb. Calcutt.*; leaves orbicular ovate or subdeltoid acuminate nearly glabrous not or hardly peltate triple-nerved, panicles short hoary, stamens 20, styles very short, capsules 2-lobed tomentose, cocci with two large dorsal viscidly glandular patches.

TROPICAL HIMALAYA; Kumaon, alt. 4-5000 ft., Duthie. SIKKIM; alt. 2-4500 ft., King, Clarke.

Branches rather glaucous, tips rusty-pubescent. *Leaves* 3-6 in. broad, base truncate or subcordate, yellowish beneath, 2-glandular above at the petiole; basal nerves 5, lowest pair very short, lateral nerves 6-8 pair; petiole 3-4 in., hoary; stipules large, ovate-lanceolate, upper recurved or revolute. *Male panicles* 2-3 in.; bracts very minute; flowers $\frac{1}{20}$ in. diam., pubescent and glandular. *Fruiting panicles* 2-3 in.; calyx 4-lobed, circumsciss; stigmas lingulate, recurved. *Capsules* $\frac{1}{2}$ in. diam., 2-valved across the cocci, which do not separate, pericarp thin. *Seeds* globose, nearly black, hilum large.

2. ***M. gmelinæfolia***, King in *Herb. Calcutt.*; leaves membranous subrhombic-ovate acuminate glabrous not peltate subglaucous beneath triple-nerved, base cuneate, male panicles hoary, stamens about 20.

SIKKIM HIMALAYA; at Kursiong, alt. 4500 ft., Kurz.

Branchlets and petioles glaucous, tips of branches rusty-pubescent. *Leaves* 4-5 in. broad and rather longer, grey-brown beneath, triple-nerved at base with sometimes a short intramarginal pair, lateral nerves 6-8 pair, very slender, glands inconspicuous, basal 0; petiole 3-5 in.; stipules large, ovate-lanceolate, revolute. *Male panicles* 2-3 in.; bracts very minute; flowers $\frac{1}{20}$ in. diam., pubescent and glandular. —I have seen but one specimen of this, kindly communicated by Dr. King, which appears to be distinct from *M. pustulata* in the less broad very membranous leaves, with broadly cuneate bases, faint nerves, and glaucous petioles.

3. ***M. Gamblei***, Hook. f.; leaves oblong-lanceolate acuminate glabrous penninerved, male panicles slender pubescent, stamens 15-20, stipules minute subulate.

SIKKIM TERAI; at Dalkathar, Gamble.

A small tree, branchlets not very stout, woody, glabrous. Leaves 3-5 by $1\frac{1}{2}$ -2 in., very obscurely sinuate-crenate, thinly coriaceous, base rounded shortly and obscurely triple-nerved with 2 glands above the base, glands of under surface very obscure and sunk in the tissue of the leaf, but on some leaves there are very conspicuous large circular black glands; nerves 10-12 pair, very slender; petiole $\frac{1}{2}$ -1 in., very slender; stipules at the tips of the branches, minute. Male panicles subtomentosely pubescent; flowers $\frac{1}{20}$ in. diam., pubescent and glandular.—I have seen only male flowers of this very distinct plant, which differs in habit and altogether in stipules from the two preceding. In stipules it resembles the group with *M. javanica*.

†† *Leaves deltoid-ovate, peltate, entire.*

4. ***M. denticulata***, Muell. Arg. in DC. Prodr. xv. ii. 1000; leaves deltoid-ovate acuminate or obtuse base rounded or truncate peltate or cordate 9-13-nerved glabrous or puberulous beneath, male panicles slender, bracts minute, stamens 6-30, styles very short, capsule small didymous more or less clothed with waxy glands. Kurz For. Fl. ii. 287; Gamble Man. Ind. Timb. 363. *M. gummiflora*, Muell. Arg. in DC. l. c. *Mappa denticulata*, Blume Bijl. 625; Miquel Fl. Ind. Bat. i. ii. 403. *M. gummiflora*, Miquel l. c., Suppl. 458. *M. truncata*, Muell. Arg. in Linnœa xxxiv. 198. *M. Wallichii*, Baill. Etudes Gen. Euphorb. 430. *M. paniculata*, Wall. Cat. 7810 H, I.

SIKKIM HIMALAYA, alt. 3-5000 ft., J. D. H., &c. ASSAM and the KHASIA MTS., ascending to 3000 ft., Wallich, &c. From CHITTAGONG to TENASSERIM, common. PERAK; at Goping, King's Collector.—DISTRIB. Sumatra, Java.

A small evergreen tree; young parts rusty-tomentose; branches and petioles at length hoary and rather glaucous. Leaves 4-12 in. diam., thinly coriaceous, rather longer than broad, base truncate with 2 glands above, glands beneath dense; nerves 6 or more pairs above the basal, strong beneath; petiole 2-4 in.; stipules small, ovate-lanceolate, tomentose, fugacious. Male panicles 4-6 in., hoary, with very slender rachis, horizontal branches, and minute clusters of globose glandular and pubescent flowers; bracts small, sometimes expanding into an elliptic tomentose lamina; sepals 2-3, hemispheric. Fem. panicles smaller than the males; calyx 3-4 lobed; stigmas very short, linguiform, recurved. Capsules $\frac{1}{4}$ in. diam., didymous, black, with yellow glands. Seeds globose, black.—Mueller describes the leaves as eglandular, probably through inadvertence. I find no difference between the Indian plants named *denticulata* and *gummiflora*, or their distribution, but I have seen no typical specimen of the former, which was described from a Javan plant, or of the latter which is a Sumatran one. Gamble gives Darjeeling alt. 5000 ft. as a locality for both.

5. ***M. indica***, Wight Ic. t. 1883 and 1949, f. 2; leaves orbicular-ovate cuspidately acuminate or acute entire or toothed broadly peltate palmatinerved, male panicle large broad, branches zigzag, bracts minute or with a large elliptic glandular appendage, stamens 3-8, ovary 1-(rarely 2-)celled, styles subulate, capsule small globose or didymous glandular. Muell. Arg. in DC. Prodr. xv. ii. 1009; Kurz For. Flor. ii. 387; Gamble Man. Ind. Timb. 363; Beddome Flor. Sylvat. t. 287 right-hand figure, and Forester's Man. 211. *M. flexuosa*, Wight Ic. t. 1909, f. iii. ? *Trewia hernandifolia*, Roth Nov. Sp. 374.

EASTERN HIMALAYA; Sikkim, alt. 3000 ft., King. MISHMI HILLS, Griffith KHASIA MTS., alt. 2-4000 ft., J. D. H. & T. T., &c. DECCAN PENINSULA; from the Concan southwards, on the Western Ghats. ANDAMAN ISLANDS, Kurz. CEYLON, abundant up to 4000 ft., Thwaites.

A tree, 50-60 ft.; branchlets very robust, glaucous, tips and young leaves rusty-tomentose or flocculent. Leaves 6-8 in. diam., membranous or coriaceous, above smooth and glabrous except the pubescent nerves; base rounded, 2-glandular above,

beneath puberulous or softly tomentose and gland-dotted, with 6-8 pairs of nerves above the basal, and cross-nervules; petiole 6-12 in., glabrous, glaucous; stipules broadly ovate, acuminate, recurved. *Male panicles* with a glaucous peduncle and rusty-tomentose branches; clusters of flowers remote; floral bracts very broad, concave, or broader and flat, not concealing the flowers; glandular appendages $\frac{1}{2}$ - $\frac{1}{6}$ in. long; flowers $\frac{1}{10}$ in. diam.; sepals obovate, membranous, pubescent. *Fem. panicles* smaller, bracts glandular; flowers pedicelled; calyx 4-cleft; styles equalling the globose glabrous waxy ovary. *Capsule* very small, rarely didymous.—Ceylon specimens have normally didymous very small capsules, with the central axis often persistent as an elliptic disk. Wight's *M. flexuosa*, of which no specimen exists, is, I think, only *M. indica* with larger bracts of the male fl. than usual.

6. *M. perakensis*, Hook. f.; leaves 3-4 in. diam. deltoid-ovate cuspidate base rounded peltate palmately 7-9-nerved minutely hoary beneath, male panicles very slender subtomentose, stamens 10-12, styles short recurved, capsules small didymous clothed with waxy glands.

PERAK, Scortechini.

Branchlets woody, puberulous, not glaucous, tips and young leaves rusty-tomentose. *Leaves* much smaller than in *M. indica*, membranous, glabrous and brown above with 2-3 glands at the base above, pale beneath, with 8-10 pair of nerves above the basal; petiole 2-3 in. hoary; stipules small, subulate, rusty-tomentose. *Male panicles* like those of *M. denticulata*, but smaller; bracts at the base of the branches lanceolate, floral very minute, rounded; flowers $\frac{1}{30}$ in. diam.; sepals 3-4, pubescent, hardly glandular. *Fruiting racemes* 1-1½ in. *Capsule* $\frac{1}{2}$ in. diam.

** Floral bracts of male large, often toothed, concealing clusters of flowers.

† *Leaves peltate entire*. (See also *M. megalophylla*.)

7. *M. Tanarius*, Muell. Arg. in DC. Prodr. xv. ii. 997; leaves broadly peltate ovate or deltoid or orbicular-ovate acuminate or cuspidate sinuate-toothed, base rounded or cordate palmately nerved glabrous pubescent or tomentose beneath, bracts small toothed or pectinate, stamens 5-6, fem. fl. loosely paniced or racemed, styles slender subulate, capsules 2-3-lobed sparingly softly prickly. *Kurz For. Fl.* ii. 388. *M. molliuscula*, *Kurz mss.* Mappa Tanarius & tomentosa, *Blume Bijl.* 624; *Zolling. in Linnæa* xxviii. 307. *M. Tanaria*, *Spreng. Syst.* iii. 878; *Miquel Fl. Ind. Bat.* i. ii. 401; *Benth. Fl. Hongk.* 304. *M. glabra*, *A. Juss. Tent. Euphorb.* t. 14, f. 44. *M. moluccana*, *Wight Ic.* t. 816 (*excl. syn.*); *Benth. in Hook. Journ. Bot.* ii. (1843) 233; *Miquel Fl. Ind. Bat. Suppl.* 456. *Rottlera Tanaria* & tomentosa, *Hassk. Cat. Hort. Bogor.* 238. *R. integrifolia*, *Herb. Ham.* *Ricinus Tanarius*, *Linn. Sp. Pl. Ed.* ii. 1430. *R. Mappa*, *Roxb. Fl. Ind.* iii. 690. *Croton lacciferus*, *Blanco Flor. Filip. Ed.* ii. 517 (*not of Linn.*).—*Wall. Cat.* 7810, E, F.

ANDAMAN ISLANDS, *Kurz*. PERAK, *Wray*. MALACCA, *Maingay*.—DISTRIB. Malay Archipelago.

A small tree; branchlets stout, glaucous, tips and young leaves softly pubescent. *Leaves* 6-24 in. long, sometimes as broad, membranous, glabrous or puberulous above or on both surfaces, glandular or not above at the insertion of the petiole; nerves 6-8 pair above the basal, strong beneath; petiole 4-8 in., glaucous; stipules $\frac{1}{2}$ in. long, broadly ovate-lanceolate, acuminate, scarious, back pubescent. *Male panicles* long-peduncled, slender, branched; bracts $\frac{1}{2}$ - $\frac{1}{3}$ in., acute, eglandular, rarely entire; flowers $\frac{1}{20}$ in. diam.; sepals 3-4, membranous, glabrous. *Fem. fl.* in usually simply paniced spikes or racemes. *Ovary* hispid; styles larger than the carpels. *Capsule* size of a large pea, clothed with waxy glands. *Seeds* globose, rough.—*Roxburgh*

describes 2 or 3 glands as present in the smallest superior nerves of his *R. Mappa*, the stipules as acute cordate and reniform, and the male sepals as 2.

8. **M. Roxburghii**, *Wight Ic.* t. 1949. f. 4, and v. ii. 23; leaves deltoid- or rhombic-ovate or orbicular broadly peltate cuspidate palmatinerved entire or minutely toothed, bracts broad toothed, stamens 2-5, ovary 1-celled, style lateral large sessile peltate pulvinate, capsule globose glandular with the persistent stigma on one side. *Dalz. & Gibs. Bomb. Fl.* 228. *M. Wightiana*, *Baill. Etudes Gen. Euphorb.* 432. *M. tomentosa*, *Wight l. c.* t. 1949. f. 1, and v. ii. 23; *Beddome Fl. Sylrat.* t. 287. *Mappa* ? peltata, *Wight Ic.* t. 817; *Beddome Forestor's Man.* 211. *Osyris* ? peltata, *Rorb. Fl. Ind.* iii. 755.—*Wall. Cat.* 7810 A—D, G, K.

THE DECCAN PENINSULA; in the Circars and on the Ghats, from the Concan to Travancore. CEYLON, abundant up to 3000 ft.

A small resinous tree; branchlets very stout, glaucous, tips rusty-tomentose. *Leaves* 5-8 in. diam., coriaceous or thin, glabrous above except the pubescent nerves, and eglandular at the rounded base, beneath finely pubescent or glabrate and gland-dotted with 6-8 pairs of strong nerves above the basal, and strong cross-nervules; petiole 3-6 in., glabrous or puberulous; stipules ovate- or oblong-lanceolate, not broad, tomentose. *Panicles* densely rusty-tomentose, or the branches nearly glabrous; bracts at the axils and bases of the terminal branches very broad and often veined, floral hemispheric; flowers $\frac{1}{10}$ in. diam. *Fem. panicles* simpler, branches racemose with larger bracts; calyx-limb obsolete; ovary densely glandular, glabrous or puberulous; stigma sessile often embracing one side of the ovary, thickly papillose. *Capsule* globose, $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. *Seed* globose; testa brown, crustaceous, rough.—*Wight's* figure of *M. Roxburghii*, t. 1949, f. iv., is a reproduction of the right-hand figure of his t. 817, which is itself a copy of Roxburgh's drawing of *Osyris* ? peltata. Of this the figure in question is intended to represent a portion of a male panicle; it is very badly done.

9. **M. Curtisii**, *Hook. f.*; branchlets petioles leaves beneath and panicles densely rusty-tomentose, leaves broadly peltate orbicular-ovate acuminate sinuate-toothed palmatinerved, male panicles long laxly branched, bracts cymbiform acuminate entire, flowers very glandular, stamens 2-3.

PENANG; on the West Hill, alt. 2000 ft., *Curtis*.

A tree of medium size, branchlets woody. *Leaves* 6-10 in. long and nearly as broad, thinly coriaceous, glabrous above and eglandular at the insertion of the petiole; nerves 4-5 pair above the basal, strong beneath; petiole 5-7 in., stout. *Male panicles* as long as the petioles or longer; bracts $\frac{1}{4}$ in. and less; flowers $\frac{1}{10}$ in., covered with large glands.

†† *Leaves peltate, lobed.*

10. **M. hypoleuca**, *Muell. Arg. in DC. Prodr.* xv. ii. 992; branches petioles leaves beneath and branches of inflorescence milkily glaucous, leaves peltate palmatinerved broader than long deeply 3-lobed, lobes divergent ovate-oblong acuminate, male panicles long and long-peduncled, bracts toothed, stamen 1. styles very short, capsule 3-lobed, cocci each with two glandular lines. *Mappa* ? hypoleuca, *Reichb. f. & Zoll. Rottler.* 30; *Zolling. in Linnæa* xxviii. 309; *Miquel Fl. Ind. Bat.* i. ii. 404, and *Suppl.* 458. *Ricinus inermis*, *Wall. Cat.* 7806.

PENANG, *Wallich*. MALACCA, *Griffith*.—DISTRIB. Sumatra, Borneo.

Branches stout. *Leaves* 8-10 in. across the lateral lobes, coriaceous, clothed beneath with a white waxy secretion obscuring the glands, base rounded or subcordate, 2-3-glandular above, lobes entire or with shallow teeth, each with 6-8 pairs

of stout nerves; petiole 4-7 in.; stipules broad. *Male panicles* longer than the leaves; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in. long, broadly ovate, finely rusty-tomentose; flowers $\frac{1}{10}$ in. diam.; sepals 3, membranous, papillose; filament stout; anther 4-locellate. *Fem. panicles* shorter; calyx cupular, toothed; ovary glabrous; styles subulate. *Capsule* $\frac{1}{2}$ in. diam., rather depressed. *Seeds* impressed-punctate.—Mueller describes the fem. fl. as sometimes diandrous, no doubt an oversight for the male. I have not seen the stipules, which are deciduous in my specimens.

11. **M. megalophylla**, Muell. Arg. in DC. Prodr. xv. ii. 995; branches petioles leaves beneath and panicles densely rusty pubescent or tomentose, leaves very large and coriaceous broadly peltate orbicular-ovate obtusely 3-lobed rugose and reticulately nerved beneath, lobes short rounded or obsolete, male and fem. panicles much branched peduncled, floral bracts of male broad pectinately toothed, stamens 1-3, ovary 2-celled, styles very short united at the base, capsules didymous glandular. *M. rugosa*, Muell. l. c. *Mappa megalophylla & rugosa*, Muell. Arg. in Flora 1864, 467. *Tragia rugosa*, Wall. Cat. 7807.

MALACCA, Griffith. PERAK, at Goping, King's Collector.—DISTRIB. Borneo.

A tree, 40 ft. in Goping; branches woody but with large pith, puberulous. *Leaves* 12-18 in. long, above pubescent when young, when old glabrous except the nerves, truncate or cordate at the eglandular base above, beneath dark brown with 5-6 pairs of strong nerves cross-nervules and close deep reticulations concealing the glands; lobes entire, toothed or sinuately lobulate; petiole 1-2 ft., hoary, very stout; stipules very large, oblong, erect. *Male panicles* 6-10 in., branches rather slender; floral bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., rhomboid, eglandular; flowers $\frac{1}{10}$ in. diam., tomentose; sepals 3, ovate; stamens short; anthers 4-locellate. *Fem. panicles* broad; sepals 4. *Capsules* $\frac{1}{2}$ in. diam.; cocci globose, crustaceous, puberulous, and glandular. *Seeds* subcompressed globose, testa uneven thick.—Probably this does not differ from the *M. gigantea*, Muell., of Sumatra.

12. **M. Maingayi**, Hook. f.; branches glaucous and petioles and main branches of panicles glabrous, leaves broadly peltate very coriaceous rounded or broader than long in outline 3-lobed to or above the middle beneath rusty-tomentose and closely deeply reticulate, lobes short divergent acuminate, male panicles subsessile much branched, floral bracts brown-tomentose broadly ovate acuminate deeply serrate, sepals 2-4 concave densely tomentose, stamens 2.

MALACCA, Maingay (*Kew Distrib.* 1391). PERAK, King's Collector.

A tree, 30-40 ft. in Perak; branches glabrous to the tips. *Leaves* 5-7 in. diam., dark brown when dry and glabrous, when young rustily hoary above and eglandular at the rounded concave base; lobes broad, entire or obscurely toothed, beneath finely densely tomentose on the nerves and nervules which are so close that the glands are obliterated; petiole 3-4 in.; stipules very broad, membranous, spreading, not recurved, deciduous. *Male panicles* 6 in. long and almost as broad, branches spreading and rachis slender; floral bracts $\frac{1}{10}$ - $\frac{1}{2}$ in. long, 5-6-fld., those at the axils longer more acute entire; flowers $\frac{1}{10}$ in. diam.; sepals rounded, glandular and tomentose.

13. **M. Hosel**, King in Herb. Calcutt.; branches glaucous and petioles and branches of panicle glabrous, leaves peltate or deeply cordate at the base coriaceous broader than long 3-lobed to or below the middle puberulous beneath and hairy on the nerves, lobes broad divergent cuspidate, male panicle very long-peduncled, bracts tomentose pectinately-toothed, fem. panicle much shorter, bracts entire, ovary 1-2-celled waxy glabrous, styles very short.

MALACCA, Griffith. PERAK, King's Collector, Scortechini.

A tree, 30–40 ft.; branches stout, glabrous to the tips. *Leaves* 8–12 in. across the lateral lobes, dark brown above, eglandular at the concave cordate base, beneath paler with strong nerves and slender cross-nervules which bear long spreading straight hairs, glands invisible; lobes very broad, distantly minutely toothed; petiole 3–5 in.; stipules very large, reniform, glabrous, reflexed but not revolute. *Male panicle* 12–14 in.; bracts at the axils glabrous, floral $\frac{1}{2}$ in. long, 5–6-fld.; flowers $\frac{1}{10}$ in.; sepals membranous, pubescent, eglandular. *Fem panicle* much shorter, with shorter stouter branches; flowers shortly pedicelled; calyx 3–4-lobed; ovary clothed with yellow waxy glands.

††† *Leaves not peltate, triple-nerved, deltoid-ovate, not lobed.*

14. **M. minutiflora**, Muell. Arg. in *Flora* (1864) 466, and in *DC. Prodr.* xv. ii. 1012; branchlets leaves beneath and panicles finely tomentose, leaves deltoid-ovate from a broadly cuneate base caudate-acuminate denticulate, male panicles sessile shorter than the petioles, bracts ovate pectinately toothed villous eglandular, flowers villous, stamens 2. *Kurz For. Fl.* ii. 388. *M. Helfer*, Muell. Arg. in *DC. l. c.* 1004.

TENASSERIM, *Helfer*.

A shrub (*Kurz*); branches slender, terete; pubescence fulvous. *Leaves* 4–6 by 3–4 in., rather membranous, above greyish and minutely stellately pubescent, with pubescent nerves and eglandular base; beneath glandular, with 4–5 pair of slender nerves above the basal and slender cross-nervules and reticulations; petiole $1\frac{1}{2}$ –2 in.; stipules lanceolate, tomentose. *Male panicles* with very slender rachis and branches; floral bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., eglandular; flowers $\frac{1}{10}$ in.; sepals villous, cuneate.—The leaves of Mueller's *M. Helfer* are rather more tomentose beneath than of *M. minutiflora*, but I find no other difference. Perhaps this is only a state of the following; the fruit is unknown.

15. **M. trichocarpa**, Muell. Arg. in *DC. Prodr.* xv. ii. 1003; branchlets leaves beneath and panicles finely tomentose, leaves ovate or deltoid-ovate acuminate denticulate scaberulous above, panicles very short, bracts large ovate pectinately toothed glandular and villous within, fem. panicles few-fld., Capsule 2-lobed clothed with soft bristly white prickles. *Mappa trichocarpa*, Reichb. & Zoll. *Rottler*. 8; *Zolling. in Linnæa* xxviii. 307; *Miquel Fl. Ind. Bat.* i. ii. 402. *M. Zollingeri*, *Miquel l. c. Suppl.* 457. *M. borneensis*, Muell. Arg. in *DC. l. c.*—*Wall. Cat.* 7831.

PERAK, *Scortechini*. SINGAPORE, *Wallich, Hullett, King's Collector*. MALACCA, *Seemann*.—DISTRIB. Sumatra, Malay Islands, Cochin China.

Branches rather slender, terete; tips and young leaves villous. *Leaves* 4–6 by 2–3½ in., rather rigid, above greyish, puberulous on the nerves and stellately scaberulous between them and sometimes 2-glandular at the petiole, beneath yellowish or brown, glandular and simply pubescent; petiole velvety, 1–2½ in.; stipules lanceolate, villous. *Male panicles* 1–1½ in., subsessile, rachis and short branches sessile; floral bracts ½ in. long, membranous, veined, gland-dotted, with a villous pad at the base within in my specimen. *Fem. fl.* 2–3, subsessile at the top of a short peduncle; calyx elongate urceolate, acutely 4–5-fld; styles small. *Capsule* ½ in. across the cocci, which are thinly crustaceous. *Seeds* globose, black, rugose.—I have seen no flowers. Mueller describes the stipules as broad and obtuse. The simple fem. inflorescence is that of the following section.

†††† *Leaves not peltate, ovate or oblong.*

16. **M. populifolia**, Muell. Arg. in *DC. Prodr.* xv. ii. 1006; nearly glabrous, leaves long-petioled ovate or ovate-oblong acuminate quite entire brown and glaucous beneath, male panicles very short and shortly peduncled, bracts small very broad toothed acuminate glandular; flowers glabrous,

stamens 1-2, styles very short, capsules small didymous covered with waxy glands. *Kurz For. Fl.* ii. 389. *Mappa populifolia*, *Muell. Arg. in Linnæa* xxxiv. 198. *Pachystemon populifolius*, *Miquel Fl. Ind. Bat. Suppl.* 462.—*Wall. Cat.* 7813.

PENANG, *Wallich.* MALACCA, *Griffith, Maingay.* ANDAMAN ISLANDS, *Kurz.*—DISTRIB. Sumatra, Borneo.

A small evergreen tree; branches rather slender, terete, tips quite glabrous or puberulous. *Leaves* 3-5 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., membranous, brown above when dry, base eglandular rounded, beneath of a dark yellow-brown colour, triple-nerved and with 6-8 pair of slender nerves above the basal, cross-nervules very faint; petiole 1-3 in., very slender; stipules lanceolate. *Male panicles* shorter than the petioles; branches short; bracts at the axils obtuse, hoary, floral concave glabrous; flowers $\frac{1}{8}$ in. diam.; sepals broad; anthers 4-locellate. *Capsule* $\frac{1}{2}$ in. diam., yellow from the glands. *Seeds* globose, rough.—*Kurz* describes the cocci as sparingly and minutely tubercled.

17. **M. javanica**, *Muell. Arg. in DC. Prodr.* xv. ii. 1004; shoots and panicles rusty-tomentose, leaves long-petioled ovate-lanceolate from a broadly cuneate base acuminate entire strongly tripli- and penni-nerved, panicles elongate subsessile, bracts of male broadly ovate pectinately serrate and glandular, sepals 2-3 very broad glabrous, stamens 2-3, stigmas large reflexed lobed, capsule minute 2-lobed densely glandular. *Wawra It. Pr. Sax. Cob. Bot.* 48. *Mappa javanica*, *Blume Bijdr.* 625; *Zolling. in Linnæa* xxviii. 308. *M. bancana*, *Miquel Fl. Ind. Bat. Suppl.* 458. *Rottlera javanica*, *Hassk. in Cat. Hort. Bogor.* 238; *Miquel l. c. i. ii.* 403. *R. montana*, *Heyne mss.*—*Wall. Cat.* 7835.

PENANG? and SINGAPORE, *Wallich.* MALACCA, *Griffith (Kew Distrib.* 4725), *Hervy.*—DISTRIB. Java.

Branches stout, woody, terete, black, sparsely pubescent towards the tips which and the youngest leaves are red with scurfy stellate pubescence. *Leaves* 5-7 by $1\frac{1}{2}$ -3 in., coriaceous, above smooth biglandular and minutely cordate with incurved margins at the very base, beneath red-brown with 6-7 pair of very strong nerves above the bases, and close strong cross-nerves, glands pitted; petiole 1-2½ in.; stipules variable, linear or lanceolate from a broad base. *Male panicles* 6-8 in., rachis and branches slender; floral bracts very broad, $\frac{1}{2}$ in. long; flowers $\frac{1}{10}$ in. diam.; sepals orbicular, concave. *Fem. panicles* as long but less branched than the male; bracts shorter; calyx 4-lobed; styles fleshy. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., black when dry. *Seeds* $\frac{1}{10}$ in. diam., globose, nearly smooth, black.—*Mueller* describes the capsule of the Javan plant as covered with soft green prickles. The bracts of the Peninsular specimen are larger than in the Javan.

Series II. *Male fl.* in branched panicles, fem. subcapitate on a stout short peduncle. *Ovary* 3-5-celled, styles united below into a short often thickened crown to the ovary. *Leaves* peltate and often lobed.—The species are all very imperfectly known. (See also *M. trichocarpa*.)

18. **M. Kingii**, *Hook. f.*; quite glabrous, leaves very large rather membranous broadly peltate palmatinerved 5-lobed eglandular beneath, base rounded and sinuately angled, lobes ovate-lanceolate acuminate sinuate-toothed midlobe much the longest, fruiting racemes very short shortly and very stoutly peduncled, capsules large depressed slightly 4-5-lobed hoary, stigmas 4-5 slender erect combined at the base.

MALAY PENINSULA; Jaffaria at Johore, *King's Collector.*

A small tree; branches glaucous, smooth, fistular. *Leaf* 20 in. long by 24 across the lateral lobes, above smooth, eglandular on both surfaces, greenish when dry, longer lateral lobes 10 by 3 in., midlobe 12 by 5 in., 9-nerved from the base, with 12-15 pair

of nerves on the midlobe, cross-nervules slender; petiole 12 in., stout, soft, terete, swollen at the fleshy base which is much contracted when dry; stipules on the stem free, 1 in. long, lanceolate, acuminate, reflexed, and with the margins recurved. *Capsules* shortly pedicelled, forming a head $1\frac{1}{2}$ in. diam., at the end of a very stout smooth axillary peduncle $1-1\frac{1}{2}$ in. long; each capsule $\frac{1}{2}$ in. diam., very obscurely tubercled and with 2 glandular patches on each carpel; styles persistent, $\frac{1}{4}$ in. long, pericarp very thin. *Seeds* subglobose, compressed laterally towards the hilum, pale brown, opaque, nearly smooth; testa thin, crustaceous.—A very remarkable species.

19. **M. Griffithiana**, Muell. Arg. in DC. Prodr. xv. ii. 993; quite glabrous except the panicles, leaves broadly peltate palmatinerved orbicular or obovate from a rounded base quite glabrous subglaucous beneath shortly 3-lobed above the middle, lobes triangular acute, male panicles long-peduncled, floral bracts short concave cuspidate entire or obscurely toothed rusty tomentose, sepals tomentose and glandular, stamens 3-4, fem. panicles shorter flowers 3-nate, styles short stout connate into a short tumid crown. *Mappa triloba*, Muell. Arg. in Flora 1864, 466.

MALACCA, Griffith. PERAK, Scortechini; Goping, King's Collector.

A medium-sized tree in Perak; branches smooth, terete, fistular, glaucous, glabrous to the tips. *Leaves* 6-10 by 5-9 in., usually narrowed at the rounded eglandular base, thinly coriaceous, yellowish when dry, smooth on both surfaces, above obscurely glandular, beneath with 6-7 pairs of nerves above the basal and faint cross-nervules, lobes suberect, entire or remotely denticulate, sinus rounded. *Male panicles* 6-10 in.; peduncle and branches glabrous or tomentose; bracts at the axils $\frac{1}{2}$ in., lanceolate, caducous; floral bracts closely imbricating, forming ovoid heads $\frac{1}{2}$ in. long; flowers $\frac{1}{10}$ in. diam.; sepals orbicular, glandular. *Fem. panicles* much stouter, more tomentose, with the flowers usually at the ends of the branches and sessile; calyx cupular 3-lobed, ovary 3-5 celled, carpels glandular towards the base; styles thick, subulate, erect or recurved, forming a tumid crown to the ovary.

20. **M. triloba**, Muell. Arg. in DC. Prodr. xv. ii. 989; leaves large deeply peltate palmatinerved 3-lobed from a broad rounded base glandular toothed, lobes oblong-ovate acuminate lateral ascending midlobe longest, reticulate above beneath obscurely glandular and puberulous on the nerves, male panicles subsessile, bracts small concave, fem. fl. few capitate on a short axillary very stout peduncle, ovary 5-celled, styles 5 short erect acute combined below into a tumid crown, capsule depressed, cocci produced at the back into blunt cones. *Pachystemon trilobus*, Blume Bijl. 626; Wight Ic. t. 1949, f. 5; Baill. Etudes Gen. Euphorb. t. 20, f. 38-41; Muell. Arg. in Mem. Soc. Phys. Hist. Nat. Genev. xvii. ii. 454 with analysis. *Ricinus trilobus*, Reinw. in Blume Cat. 108.—Wall. Cat. 7809.

PENANG, Wallich. PERAK and GOENONG, Scortechini, King's Collector. SINGAPORE, Cantley.—DISTRIB. Sumatra, Java, Borneo.

Branches as thick as the little finger, terete, smooth. *Leaves* 8-12 in. either way, or narrower than broad, margin rather wavy, glands large terminating the short teeth, above opaque not smooth, beneath brownish, nearly glabrous; midlobe with often 16-20 pairs of nerves; petiole 6 in., stout, terete, puberulous; stipules much broader than long, recurved or revolute. *Male panicles* stoutly peduncled, branches tomentose; flowering bracts $\frac{1}{2}$ in. long; flowers $\frac{1}{10}$ in. diam.; sepals obcordate, papillose. *Fem. peduncle* $1\frac{1}{2}$ in., with the scar of a bract at the middle; flowers 6-10, quite sessile (bracts all fallen away); calyx 4-lobed, tomentose; ovary tomentose at the base, above it covered with yellow waxy glands. *Capsule* (unripe) $\frac{1}{2}$ in. diam., crown nearly flat.—I have seen only two leaves and young fruit of this fine species.

21. **M. Hullettii**, King in Herb. Calcutt.; glabrous, leaves oblong-or

ovate-lanceolate from a rounded peltate base entire caudate-acuminate sinuate-dentate minutely glandular beneath, fem. fl. few capitate on an axillary short very stout peduncle, ovary 4-5-celled, styles 5 short acute connate into a subglobose base, capsule depressed, cocci produced into conical horns.

PERAK, *King's Collector*.

A small tree; branchlets as thick as a goose-quill, terete, hollow, glabrous or with a few scattered hairs. *Leaves* 5-7 by 2-3 in., broadest opposite the insertion of the petiole, thinly coriaceous, above rather shining and reticulate, eglandular at the 7-nerved base, beneath opaque, paler, with 8-10 pairs of slender nerves above the basal and slender cross-nervules; petiole 3-4 in., very slender; stipules not seen. *Peduncle* of fem. fl. 1 in., very stout; calyx 4-lobed. *Capsules* bluish, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., hemispheric below, horns glandular.

Series III. *Male* and *fem. fl.* racemose, or fem. subsolitary. *Styles* very long and slender. *Leaves* narrow, not peltate.

22. **M. digyna**, *Muell. Arg. in DC. Prodr.* xv. ii. 1007; nearly glabrous, leaves long-petioled elliptic- or oblong-lanceolate from a rounded base caudate-acuminate obscurely crenulate copiously glandular beneath, racemes very slender, bracts of male very minute, stamens 10-12, capsules racemose compressed didymous. *Beddome Forester's Man.* 211. *Rottlera digyna*, *Thwaites Enum.* 273. *Mappa digyna*, *Muell. Arg. in Linnæa* xxxiv. 198. *Claoxylon digynum*, *Wight Ic.* t. 1884.

CEYLON; at Caltura, &c., *Moon, Walker, &c.*

A small tree; branchlets slender, terete, smooth, tips glandular. *Leaves* 5-8 by $1\frac{1}{2}$ -2 in., thinly coriaceous, shortly triple-nerved and 2-glandular at the very base above; nerves 8-15 pair above the basal, very slender; petiole 1-3 in., very slender; stipules on the terminal buds only $\frac{1}{2}$ in., needle-shaped. *Male racemes* 3-4 in., quite simple; bracts subulate or 0; male fl. $\frac{1}{2}$ in. diam., buds globose; sepals 3, orbicular, glandular. *Fem. racemes* longer; sepals 4, very unequal; stigmas filiform, $\frac{1}{2}$ in. long. *Capsules* $\frac{1}{2}$ in. diam.; cocci quite smooth, thinly crustaceous. *Seeds* globose, brown, shining.

23. **M. Lowii**, *King in Herb. Calcutt.*; glabrous except the inflorescence, leaves long-petioled elliptic-oblong or lanceolate acuminate (sometimes obtusely) coriaceous penninerved minutely glandular beneath, male racemes sessile slender pubescent, bracts small concave, stamens 15-20, capsules 1-3 terminating a long peduncle with a foliaceous bract didymous spinous.—*Wall. Cat.* 7996 (*flowers monstrous*) and 9100.

PENANG, *Wallich*; on Goot Hill, *Curtis*. PERAK, *King's Collector*. SINGAPORE, *Cantley*.

A small tree; branches woody, terete, glabrous or nearly so to the tips. *Leaves* 4-7 by 1-2 in., pale when dry, and rather shining above, margins with obscure distant glands, tips long or short, cordate at the very narrow 2-glandular base; nerves 12-14 pair, very slender, cross-nervules faint; petiole 1-3 in., very slender; stipules rigid, subulate, $\frac{1}{2}$ in. long. *Male racemes* sometimes as long as the leaves; bracts tomentose, shorter than the flowers, concave, acute; flowers $\frac{1}{10}$ - $\frac{1}{8}$ in. diam., glandular and hispidulous; sepals orbicular. *Peduncle* of fem. fl. 2-3 in., stout, stiff, erect, pubescent; flowers 1-9 near the end of the peduncle; bract $\frac{1}{2}$ in. long and broad, orbicular, toothed, acute; sepals 6, lanceolate; ovary spinous; styles long, filiform. *Capsules* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., puberulous; cocci globose, thickly crustaceous. *Seeds* globose, brown, polished.—The Singapore plant is not in a good state, the stipules are extremely slender.

24. **M. Brandisii**, *King in Herb. Calcutt.*; glabrous, leaves shortly

petioled elliptic-lanceolate acuminate or caudate penninerved with scattered black glands beneath, fem. bracts large leafy, capsules didymous glandular smooth or with a few soft prickles.

TENASSERIM, on Moolyet, alt. 2-6000 ft., *Beddome, Gallatly*.

A tree, 20 ft.; branchlets slender, woody, terete, tips glandular. *Leaves* thinly coriaceous, 4-6 by 1-2 in., margins eglandular, base acute or rounded minutely cordate eglandular; nerves 8-10 pairs, very slender; petiole $\frac{1}{2}$ -1 in., slender, often viscid; stipules minute, setaceous. *Peduncles* of fem. fl. 2-4 in., very slender, 1-2-fld., erect, leafy; bracts $\frac{1}{2}$ -1 $\frac{1}{2}$ in., broadly ovate to lanceolate; sepals 4; styles filiform, about as long as the cocci. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; cocci globose, rather compressed, crustaceous. *Seeds* globose, smooth, brown.

IMPERFECTLY KNOWN, DOUBTFUL AND EXCLUDED SPECIES.

M. DEPRESSA, *Muell. Arg. in DC. Prodr.* xv. ii. 989, is a Javan and Bornean plant; Ceylon is given as a locality to a specimen in Thunberg's Herbarium at Upsala, but there is no confirmation of it.

M. INVOLUCRATA, *Muell. Arg. l. c.* 1011, from Bengal (Leschenhault), is no doubt a garden plant, and is Wallich's No. 4621 from the Calcutta Garden. I believe it to be a native of the Moluccas.

M. SP.? Chittagong (*Hook. f. & T., Clarke*); a small tree, branches slender glaucous quite glabrous, leaves narrowly peltate ovate acuminate glaucous beneath base rounded eglandular, nerves 8-10 pair very slender, petiole as long as the blade.

M. MEMBRANACEA, *Kurz For. Fl.* ii. 389; an erect subsimple shrub, leaves long-petioled membranous hardly peltate entire and ovate lanceolate caudate acuminate or broadly ovate and entire or with 2-3 caudate lobes minutely gland-dotted, margins minutely toothed above minutely scaberulous beneath pubescent, base cuneate or truncate, nerves very slender, petiole 2-3 in. very slender, male fl. unknown, fem. 1-3, sepals at the top of a slender peduncle with a lacerate puberulous leafy bract, calyx ureolate embracing the style base, ovary hirsute and glandular, styles $\frac{1}{2}$ in. filiform glabrous, capsule 2-coccos 2-lobed, cocci size of a small pea powdered with red glands and loosely covered with filiform flexuous smooth bristles, seeds spherica brown smooth glabrous.—Pegu, Ava and Martaban, alt. 4-6000 ft., *Kurz*. Yunnan, *J. Anderson*.—I am indebted to Dr. King for specimens.

M. JAVANICA, var. *moutana*, *Wawra, Bot. It. Pr. Sax. Cob.* 48.—I am unable to identify this.

57. **PTYCHOPYXIS**, *Miquel*.

A tree with densely tomentose very stout branchlets petioles and inflorescence; hairs simple. *Leaves* crowded at the ends of the branchlets, alternate, very coriaceous, oblanceolate, acuminate, entire, penninerved; petiole very short. *Flowers* axillary, diœcious?, crowded and surrounded with densely tomentose thick lanceolate bracts; males spicate, fem. capitate. **MALE FL.** *Sepals* 4-5, subequal, thick, valvate. *Disk* 0. *Stamens* very numerous, in a globose head on a convex hairy receptacle; filaments flexuous, filiform, with subulate tips; anthers broadly oblong, flat, cells 4 in superposed pairs on each side of the broad connective, which is produced beyond them into a broad acute triangular point, two upper cells oblong, two lower much smaller, testicular, slits of all introrse longitudinally; pollen very minute. *Pistillode* 0. **FEM. FL.** *Sepals* 6, lanceolate, thick, unequal or subequal, persistent. *Ovary* 3-celled, and elongate style villosly tomentose; stigmas or style-arms 3; short, recurved, entire, hispidly

papillose on the inner surface; cells 1-ovuled. *Fruit* large, broadly ovoid, densely velvety, suddenly tapering into a long stout velvety beak or style; pericarp with 6 thick raised ribs, wrinkled transversely.

P. costata, Miquel *Fl. Ind. Bat. Suppl.* 402; *Hook. Ic. Pl.* t. 1703.

PERAK, Scortechini, *King's Collector*. MALACCA, Griffith (*Kew Distrib.* 5031). MAINGAY (*K. D.* 1442).—DISTRIB. Sumatra.

A tree, 30–70 ft., branchlets woody. *Leaves* 6–12 in., base contracted rounded or subcordate, above glabrous except sometimes the midrib, beneath more or less rusty-tomentose; nerves 15–20 pair, cross-nervules impressed above, much raised beneath; petiole $\frac{1}{2}$ to $\frac{1}{4}$ in.; stipules subulate. *Male spikes* 3–5 in., very stout and as well as the flowers densely brown velvety; flowers shorter than the bracts, solitary or clustered, sessile or shortly stoutly pedicelled, globose in bud, expanded about $\frac{1}{2}$ in. diam.; sepals broadly elliptic or oblong, leathery, glabrous within; stamens 100 or more, contorted in bud, glabrous. *Clusters of fem. fl.* $\frac{1}{2}$ in. diam., covered with lanceolate velvety bracts like those of the male; sepals about $\frac{1}{2}$ in. long. *Fruit* 1–1 $\frac{1}{2}$ in. diam.; pericarp thin except at the thick wavy close-set ridges; endocarp thin. *Seeds* immature.—I refer this with little hesitation to Miquel's *Ptychopyxis*, of which its author had very imperfect specimens. It agrees in the foliage with his description and with a slight sketch made by Professor Oliver from the type specimen lent to Kew from Leyden, when the *Tiliaceæ* (to which the genus was doubtfully referred by Miquel) were being examined for the "Genera Plantarum."

58. HOMONOIA, Lour.

Rigid shrubs. *Leaves* alternate, narrow, or short and toothed, glandular-lepidote. *Flowers* in many- or few-fl. axillary spikes, or from the old wood, usually diœcious, apetalous. *Disk* 0. **MALE FL.** *Calyx* globose, splitting into 3 valvate segments. *Stamens* numerous, in a dense globose head of branched filaments and anthers; anther-cells subglobose, divaricate, sessile on the filament, connective obscure. *Pistillode* 0. **FEM FL.** *Sepals* 5–8, narrow, unequal, imbricate, caducous. *Ovary* 3-celled; styles spreading, entire, papillose; cells 1-ovuled. *Capsule* small, of 3 smooth 2-valved cocci. *Seeds* ovoid, testa crustaceous, hard, with a thin fleshy coat, albumen fleshy; tyledons broad, flat.—Species 3 or 4, Malayan.

1. **H. riparia**, Lour. *Fl. Coch.* 637; leaves linear-oblong or -lanceolate quite entire or serrulate towards the tip densely glandular beneath, spikes long slender. *Muell. Arg. in Linnæa* xxxiv. 200, and in *DC. Prodr.* xv. ii. 1023; *Brand. For. Fl.* 401; *Kurz For. Fl.* ii. 401; *Gamble Man. Ind. Timb.* 364; *Beddome Fl. Sylv.* t. 212. *Adelia neriifolia*, *Roth Nov. Sp.* 375; *Roxb. Fl. Ind.* iii. 849; *Wight Ic.* t. 1808; *Grah. Cat. Bomb. Pl.* 185; *Dalz. & Gibs. Bomb. Fl.* 231. *Ricinus salicinus*, *Hassk. Pl. Jav. Rar.* 264. *Spathiostemon salicinus*, *Hassk. Hort. Bogor. Ed. Nov.* 41. *S. javense*, *Blume Bijl.* 622; *Thwaites Enum.* 273 (not of Bl.). *Hematospermum salicinum*, *Baill. Etudes Gen. Euphorb.* 293. *H. neriifolium* & *riparium*, *Wall. Cat.* 7953, 7955. *Croton salicifolius*, *Geisel. Croton. Monogr.* 6.

Rocky river banks. SIKKIM HIMALAYA, alt. 1–2000 ft., *J. D. H.* ASSAM and the KHASIA HILLS and southward to BURMA, TENASSERIM and the ANDAMAN ISLANDS, and BUNDEKUND, *Edgeworth*. DECCAN PENINSULA, from the Concan southward. CEYLON, common.—DISTRIB. JAVA.

A rigid evergreen shrub; branches terete and leaves beneath glabrous or pubescent. *Leaves* erect, 2 $\frac{1}{2}$ –7 in., hard when dry and red-brown beneath, obtuse acute or acumi-

nate, base acute or rounded; nerves 10–30 pairs; petiole $\frac{1}{10}$ – $\frac{1}{4}$ in. *Spikes* 2–5 in.; flowers quite sessile, males $\frac{1}{4}$ in. diam.; rachis pubescent; bracts acuminate. *Sepals* of male oblong, glabrous, of fem. ovate-lanceolate, pubescent. *Ovary* pubescent. *Capsule* $\frac{1}{2}$ in. diam., globose, tomentose, smooth or sparingly tubercled.

2. **H. retusa**, Muell. Arg. in *Linnaea* xxxiv. 200, and in DC. *Prodr.* xv. ii. 1022; leaves obovate or cuneate-obovate or oblanceolate entire or toothed towards the tip sparsely glandular beneath, spikes short stout. *Brandis For. Fl.* 445; *Grah. Cat. Bomb. Pl.* 185; *Dalz. & Gibs. Bomb. Fl.* 231; *Beddome Forester's Mun.* 212. *Adelia retusa*, Wight *Ic. t.* 1869. *A. cuneata*, and *Hæmatospermum cuneatum*, Wall. *Cat.* 7954.

In river beds, DECCAN PENINSULA, from the Concan to the Nilghiris.

A small rigid glabrous shrub, with stout woody branches. *Leaves* 1–2 in., rigidly coriaceous, narrowed from above the middle to the acute base, tip rounded or retuse often mucronate; nerves 6–10 pairs; petiole very short. *Spikes* $\frac{1}{2}$ –1 in., bracts subulate, rachis glabrous; flowers minute. *Sepals* of male glabrous, of fem. pubescent. *Capsules* $\frac{1}{10}$ – $\frac{1}{6}$ in. diam., hoary.

59. **LASIOCOCCA**, Hook. f.

A small tree. *Leaves* alternate or subternately whorled, shortly petioled, narrow, quite entire, penninerved, eglandular. *Flowers* monœcious, apetalous; males in axillary racemes; fem. solitary, in the upper axils pedicelled. **MALE FL.** *Calyx* globose, splitting into 3 valvate concave segments. *Disk* 0. *Stamens* very many, in a dense globose head of branched filaments bearing many anthers; anther-cells globose, divaricate, connective arching over the top and sides of the cells. *Pistillode* 0. **FEM. FL.** *Sepals* 5–7, unequal, imbricate, glandular and pubescent, persistent and enlarged in fruit. *Ovary* 3-celled; styles 3, filiform, combined in a column below; cells 1-ovuled. *Capsule* of 3 cocci, densely clothed with rigid hispidly setose paleæ.

A remarkable genus, differing from *Homonoia* in the inflorescence, persistent fem. sepals enlarged in fruit, and the capsule densely clothed with rigid setose paleæ.

L. symphillifolia, Hook. f. *Ic. Plant. t.* 1587. *Homonoia symphillifolia*, Kurz in *Gamble Man. Ind. Timb.* 364.

SIKKIM TERAI, Gamble (and cult. in Calcutta Bot. Garden).

A moderate tree (Gamble). *Branchlets* terete with white bark; shoots pubescent. *Leaves* 3–6 by 1–1½ in., panduriformly lanceolate, acuminate, contracted above the narrow cordate base, smooth, glabrous, green when dry; nerves 8–10 pair, slender, arched; petiole $\frac{1}{10}$ – $\frac{1}{4}$ in., pubescent. *Male racemes* pendulous, many-fl.; rachis pubescent; bracts rounded, concave, pubescent; flowers shortly pedicelled, $\frac{1}{4}$ in. diam., or smaller. *Sepals* orbicular, membranous, finely pubescent. *Stamens* effuse, anthers minute. *Fem. flowers* erect, on hispid glandular bracteolate pedicels $\frac{1}{2}$ in. long. *Sepals* irregularly placed, 2–3 inner much smaller than the others, outermost broadly ovate, the others ovate-lanceolate, all glandular on the back and with the margins with long simple and shorter gland-tipped hairs. *Disk* obscure or 0. *Ovary* subglobose, 3-lobed, pubescent; styles long, erect, connate below in a stout column, with three slender erect arms. *Capsule* (immature) $\frac{1}{2}$ in. diam., depressed, seated on the enlarged spreading linear-oblong acuminate glandular sepals.—The native specimens are male, with flowers as described; the Calcutta Garden ones have much smaller male flowers.

60. **POLYDRAGMA**, Hook. f.

A shrub or small tree? *Leaves* alternate, elliptic-oblong or -obovate

cuspidately caudate or acuminate, penninerved, eglandular. *Flowers* small in axillary racemes, diœcious, apetalous. *Disk* 0. *MALE FL.* globose in bud. *Sepals* 3, broad, concave, valvate. *Stamens* very many, filaments combined below in 6 bundles, each bundle branching out at the top into a globose mass of stipitate didymous anthers, connective arching over the top of both cells. *Pistillode* 0. *FEM. FL.* *Sepals* 5, unequal, lanceolate, erect. *Ovary* globose, granulate and hispid; styles 3, elongate, subulate, erect, papillose on the inner surface, ovules 1 in each cell. *Fruit*?

P. mallotiformis, *Hook. f.*

MALAY PENINSULA; Perak, *Scortechini*.

Branches slender, terete, woody, branchlets and racemes finely pubescent. *Leaves* 6-9 in., membranous, green when dry, base acute or cuneate; nerves 5-6 pairs, with a very short basal marginal pair, all and the midrib very slender, cross-nervules distant; petiole $1\frac{1}{2}$ -2 in., slender, hoary; stipules small, subulate. *Male racemes* spiciform, solitary but numerous, 1-3 in., erect; pedicels short, 3-bracteate; bracts minute, ovate, acute; buds $\frac{1}{2}$ in. diam.; sepals membranous, nearly glabrous, obtuse, 3-nerved; filaments in 6 (rarely more) bundles, branching irregularly from below the middle; anthers innumerable, cells connate, connective forking at the top and arching over each cell but quite inconspicuous between them. *Fem. racemes* 3-4 in., slender, erect, lax-flid. to the base; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in., 3-bracteolate at the base; sepals $\frac{10}{16}$ in., pubescent and ciliate; ovary covered with minute rounded tubercles and also sparsely hairy; styles about twice as long as the sepals.

60*. **RICINUS**, *Linn.*

A tall glabrous annual, sometimes shrubby or subarborescent. *Leaves* alternate, broad, palmately 7-many-lobed, serrate. *Flowers* large, in terminal subpanicked racemes, monœcious, apetalous, upper male crowded, lower female. *Disk* 0. *MALE FL.* *Calyx* membranous, splitting into 3-5 valvate segments. *Stamens* very many, filaments crowded variously connate or in branching clusters; anther-cells distinct, distant, subglobose, divergent. *Pistillode* 0. *FEM. FL.* *Calyx* spathaceous, caducous. *Ovary* 3-celled; styles short or long, spreading, often very large, entire 2-fid or 2-partite, feathery or papillose; cells 1-ovuled. *Capsule* of 3 2-valved cocci. *Seeds* oblong, testa crustaceous, albumen fleshy; cotyledons broad, flat.

R. communis, *Linn. Sp. Pl.* 1007; *Muell. Arg. in DC. Prodr.* xv. ii. 1017; *Roxb. Fl. Ind.* iii. 689; *Brand. For. Fl.* 445; *Kurz For. Fl.* ii. 400; *Grah. Cat. Bomb. Pl.* 183; *Dalz. & Gibs. Bomb. Fl. Suppl.* 78; *Gamble Man. Ind. Timb.* 363; *Sibth. Flor. Græc. x. t.* 952; *Hayne Arzneigew. x. t.* 48; *Schkuhr Handb. t.* 312; *Benth. & Trim. Med. Pl. iv. t.* 237; *Gært. Fruct. t.* 107; *Baill. Etudes Gen. Euphorb. t.* 10. 11; *Bot. Mag. t.* 2209. *R. inermis*, *Jacq. Ic. Rar. i. t.* 195. *R. lividus*, *Jacq. Ic. Rar. i. t.* 196; *Schkuhr Handb. t.* 312; *Reichb. Hort. Bot. t.* 153. *R. speciosus*, *Burm. Fl. Ind.* 307, t. 63, f. 2. *R. spectabilis*, *Blume Bijl.* 623. *R. viridis*, *Willd. Hort. Berol. t.* 49. *Croton spinosus*, *Linn. Sp. Pl.* 1005.—*Wall. Cat.* 7804.—*Rheede Hort. Mal.* ii. t. 32.

Cultivated throughout INDIA and naturalized near habitations.—DISTRIB. Tropics generally, probably indigenous in Africa.

An evergreen bush or small tree; shoots and panicles glaucous. *Leaves* green or reddish, 1-2 ft. diam., membranous, lobes from oblong to linear acute or acuminate, gland-serrated; petiole 4-12 in. *Racemes* stout, erect. *Male fl.* $\frac{1}{2}$ in. diam.; *fem.*

calyx nearly as long; styles often highly coloured. *Capsule* $\frac{1}{2}$ –1 in. long, globose, oblong, smooth or echinate. *Seeds* oblong, smooth, mottled.

61. **ENDOSPERMUM**, *Benth.*

Trees. *Leaves* alternate, coriaceous, rounded, ovate-cordate, often subpeltate, entire, 3–5-plinerved. *Flowers* small, in axillary long simple spikes or racemes, diœcious, apetalous; males clustered, subsessile on the rachis; fem. solitary in the bracts. **MALE FL.** *Calyx* globose, shortly unequally subvalvately 4-toothed. *Stamens* 6–10, on a convex or conic receptacle, filaments short; anthers didymous, equally 4-locellate and -valved. *Pistillode* 0, or minute. **FEM. FL.** *Calyx* 5-toothed. *Ovary* 2–3-celled; styles connate, forming a flat spreading entire or 3-lobed disk; cells 1-ovuled. *Fruit* globose or indehiscent 2–3-lobed, endocarp crustaceous, columella 0. *Seeds* globose, testa reticulately rugose; embryo ?—Species 3–4, Malayan and Chinese.

1. ***E. malaccense***, *Muell. Arg. in Flora* xlvii. (1864), 469, and in *DC. Prodr.* xv. ii. 1132; leaves orbicular-ovate, obtuse or acute, above glabrous or puberulous, beneath hoary and studded with minute glands, base rounded or subcordate eglandular, fruit stellately hoary.

PENANG, PERAK, SINGAPORE and MALACCA, *Griffith, &c.*

A tree; branchlets stout, pubescent or furfuraceous. *Leaves* 4–6 in., coriaceous, pale grey when dry above, yellowish or pale brown beneath, base cuneate rounded or subcordate; nerves 3–4 pair above the basal strong as are the cross-nervules and reticulations; petiole 3–5 in. *Racemes* 3–4 in., slender, hoary, flower-clusters scattered; male fl. $\frac{1}{2}$ in., sessile; fem. pedicelled. *Fruit* $\frac{1}{2}$ in. diam., globose or didymous, pericarp thin, wrinkled when dry, yellow, densely minutely glandular.

2. ***E. perakense***, *King in Herb. Calcutt.*; nearly glabrous, leaves broadly ovate-cordate glabrous above, base eglandular, fruit viscid.

PERAK; at Larut, *King's Collector*.

A tree, 80 ft., resembling *E. malaccense*, but the branchlets are much more slender and quite glabrous, leaves smaller (3–5 in. long), petiole more slender, fruiting racemes shorter (3 in. long), quite glabrous, and fruit clothed with a viscid secretion.

3. ***E. chinense* ?** *Benth. Fl. Hongk.* 304; leaves broadly ovate obtuse base truncate with 2 large glands beneath at the insertion of the petiole.—*Wall. Cat.* 7846.

PERAK, *Scortechini*. SINGAPORE, *Wallich*.

The specimens are very imperfect, but agree with the Chinese plant in form and the large tumid yellow glands at the base of the leaf.—A similar plant is in the Kew Herbarium, from Palembang in Java. *Wallich's* specimens are in leaf only.

62. **GELONIUM**, *Roxb.*

Evergreen glabrous shrubs or small trees; branches with stipular lines at the nodes. *Leaves* alternate, rarely opposite, pellucid-punctate, entire or serrate; stipules connate, sheathing, caducous. *Flowers* small, in sessile or shortly pedicelled axillary clusters, diœcious, apetalous. **MALE FL.** *Sepals* 5, orbicular, concave, imbricate. *Disk* obsolete. *Stamens* 10–60, crowded on a convex receptacle, filaments filiform; anthers oblong, dorsifixed; cells

parallel, introrse. *Pistillode* 0. FEM. FL. *Sepals* 5-6, narrower than in the males, imbricate. *Disk* cupular; rarely enlarged and bearing staminodes. *Ovary* 2-4-celled; styles minute, reniform, semi-lunate or 2-fid, depressed; cells 1-ovuled. *Fruit* globose, 3-4-gonous or 2-4-lobed, fleshy coriaceous or crustaceous, tardily dehiscent. *Seeds* subglobose, arillate, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species 15, Tropical Asian and African.

1. ***G. multiflorum***, *A. Juss. Tent. Euphorb.* iii. t. 10. f. 31 A; leaves 3-7 in. oblong or oblong-lanceolate obtuse acute or acuminate, male fl. $\frac{1}{2}$ in. diam., stamens 40-60, fruit $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. globose obscurely 3-lobed, pericarp very thick fleshy. *Muell. Arg. in DC. Prodr.* xv. ii. 1127; *Kurz For. Fl.* ii. 409. *G. fasciculatum*, *Roxb. Fl. Ind.* iii. 832; *Hook. Bot. Mag.* t. 3231. *Suregada glabra*, *Roxb. mss.* *S. multiflora*, *Baill. Etudes Gen. Euphorb.* 396. *S. bilocularis*, *Wall. Cat.* 7981 B (in part), *C. Rottilera fasciculata & congesta*, *Herb. Ham.*—*Wall. Cat.* 7980 B (one sheet) and 7982.

BENGAL and the CIRCARS, *Roxburgh*, and northward to the foot of SIKKIM HIMALAYA. *J. D. H.* From CHITTAGONG to TENASSERIM and MALACCA, UPPER and LOWER BURMA.—DISTRIB. Siam, China, Malay Islands.

A tree, 30-40 ft., quite glabrous. *Leaves* bright green, coriaceous, narrowed at the acute base; petiole very short. *Flowers* sometimes subracemose, yellow, odorous, males in clusters or peduncled cymes; receptacle glandular. *Stiles* short, papillose, obcordate or 2-cleft with the arms 2-fid. *Fruit* rough, with a very thick pericarp enclosing 3 crustaceous 2-valved cocci. *Seeds* $\frac{1}{2}$ in. diam., subglobose, testa with broad shallow pits.—The minute styles are very variable, usually obcordate, but sometimes with short subulate papillose arms. In a cultivated specimen (Hort. Liverpool) the fem. disk is greatly enlarged and pitted and bearing a few slender filaments. This and the two following species are mixed in Wallich's Herbarium, where his 7981 A is *G. bifarium*; B consists of *multiflorum* (*Rottlera fasciculata* and *congesta*, *Herb. Ham.*), together with *G. lanceolatum* and *bifarium* (*Rottlera lanceolata* and *bifaria*, *Herb. Ham.*); C is *multiflorum*.

2. ***G. lanceolatum***, *Willd. Sp. Pl.* iv. 832; leaves 3-5 in. from obovate-oblong to elliptic elliptic-lanceolate or oblanceolate obtuse acute or acuminate entire or more or less acutely serrate, male fl. $\frac{1}{2}$ - $\frac{1}{4}$ in. diam., stamens 20-40, capsule $\frac{1}{3}$ - $\frac{1}{2}$ in. diam. 3-lobed, cocci keeled. *Muell. Arg. in DC. Prodr.* xv. ii. 1127; *Roxb. Fl. Ind.* iii. 831; *Wight Ic.* t. 1867; *Wall. Cat.* 7983; *Beddome Forester's Man.* 214 (excl. syn.); *Gamble Man. Ind. Timb.* xxix.; *Thwaites Enum.* 274 (excl. syn.). *G. bifarium*, *Herb. Wight.* *G. angustifolium*, *Muell. l. c.* 1128. *Suregada angustifolia*, *Baill. Etudes Gen. Euphorb.* 396.

The DECCAN PENINSULA, *Heyne*; Naggur Hills, *Wight*; Cochin, *Johnson*. CEYLON; common, ascending to 4000 ft.

A small evergreen tree. *Leaves* extremely variable, usually much smaller than in *G. multiflorum*, and more often serrated, sometimes spinulosely so. *Flowers* smaller, sometimes in short racemes of which the rachis is covered with imbricating bracteoles. *Capsules* rough; cocci crustaceous. *Seeds* globose, $\frac{3}{8}$ - $\frac{1}{2}$ in. diam., testa with large shallow pits.—*Roxburgh*, I think, describes under this the fruit of *G. multiflorum*. The varieties proposed by *Mueller* (*elliptica*, *lanceolata* and *spatulata*) all run into one another. The specific name is not very appropriate, truly lanceolate leaves being exceptional. *Thwaites*, under this species, says that he is disposed to refer all the Indian species to varieties of one.

3. ***G. bifarium***, *Roxb. Fl. Ind.* iii. 830; leaves 5-6 in. elliptic-oblong or lanceolate acute or acuminate, male fl. $\frac{1}{2}$ - $\frac{1}{4}$ in. diam. in sessile fascicles,

stamens 12-20, capsule $\frac{1}{2}$ in. diam. deeply 2- rarely 3-lobed. *Muell. Arg. in DC. Prodr.* xv. ii. 1128; *Kurz For. Fl.* ii. 410. *Suregada bilocularis*, *Roxb., Wall. Cat.* 7981 A, B (in part). *S. dicocca*, *Roxb. mss.*—*Wall. Cat.* 7980 (in part).

PENANG, *Wallich, &c.* ANDAMAN ISLANDS, *Kurz.* PERAK, *Herb. Hort. Bot. Calc.*—DISTRIB. Malay Islands.

Habit and foliage of *G. multiflorum*, but the flowers are much smaller, always in sessile fascicles, longer pedicelled, and the capsule is like that of *G. lanceolatum*.—Specimens of this in the Kew Herbarium are named by Roxburgh *G. bifarium* and *Sarugada dicocca*, but whether it is the *G. bifarium* of that botanist's *Flora Indica* is rather doubtful; for he describes the latter (from garden specimens the locality of which he did not know) as having a fleshy yellow always 2-lobed capsule, of which fleshiness there is no sign in his specimens. *Kurz* describes the fruit as fleshy-coriaceous, the size of a large pea, rarely 3-coccos.

4. ***G. glomerulatum***, *Hassk. Hort. Bogor.* 237; leaves 2-3 in. elliptic-oblong or -obovate shining tip rounded nerves faint, male flowers $\frac{1}{2}$ in. diam. very shortly pedicelled, stamens 20-40, capsule $\frac{1}{2}$ in. diam. globose 3-celled smooth. *Muell. Arg. in DC. Prodr.* xv. ii. 1128. *G. obtusum*, *Miquel Fl. Ind. Bat. Suppl.* 4:2. *Erythrocarpus glomerulatus*, *Blume Bijl.* 605. *Suregada glomerulata*, *Baill. Etudes Gen. Euphorb.* 396.

MALACCA, *Griffith, Hervey.* PENANG, *Curtis.* PERAK, *Herb. Hort. Bot. Calc.*—DISTRIB. Malay and Philippine Islands.

A small robust much-branched species distinguished by its small flowers, always round-topped very shining yellow leaves, very faint nerves, and globose capsules, which show no sign of dehiscence.—The Penang specimens are not in fruit, but I think they belong to this species.

63. **CHÆTOCARPUS**, *Thwaites.*

Shrubs or trees with the habit of *Glochidion*. Leaves alternate, quite entire, penninerved, coriaceous. Flowers small, in axillary clusters, dioecious, apetalous. Disk entire or 4-10-lobed. MALE FL. *Sepals* 4-5, imbricate. *Stamens* 5-20, filaments combined below in a slender column, spreading above; anthers oblong, dorsifixed, cells parallel. *Pistillode* crowning the staminal column, 3-fid, villous. FEM. FL. *Calyx* of the male. *Ovary* 3-celled; styles distinct, incurved, 2-partite; cells 1-ovuled. *Capsule* subglobose, of 3 echinate or tubercled 2-valved cocci, endocarp hard. *Seeds* ovoid or subglobose, caruncle large coloured 2-lobed, testa crustaceous black shining, albumen fleshy; cotyledons flat, broad.—Species about 8, Indian, Malayan and American.

1. ***C. castanocarpus***, *Thwaites Enum.* 275; glabrous, leaves ovate or elliptic- or ovate-oblong acuminate polished, capsules subglobose or oblong densely clothed with long rigid bristles. *Muell. Arg. in DC. Prodr.* xv. ii. 1122 (*castaneacarpus*); *Kurz For. Fl.* 409; *Gamble Man. Ind. Timb.* 366; *Beddome Fl. Sylvat.* t. 284, f. 1-10. *C. pungens*, *Thwaites in Hook. Journ. Bot.* vi. (1854) 301 (in part), t. 10 A, f. 2-4. *Adelia castanicarpa*, *Roxb. Fl. Ind.* iii. 848; *Wall. Cat.* 7984. *Bradleia* ? coriacea, *Wall. Cat.* 7872. *Regnaldia myrtioides*, *Baill. Adans.* i. 187. *Casearia* ? coriacea, *Wall. Cat.* 7196.—*Wall. Cat.* 7891, 7988.

From SILHET and CHITTAGONG to MALACCA, PENANG and the ANDAMAN ISLANDS, *Roxburgh, Wallich, &c.* CEYLON, in the Ratnapoora and Ambagamowa districts.

An evergreen tree; branches and leaves quite glabrous. Leaves 2-8 in., coria-

ceous, dark brown when dry, base acute; nerves 8-12 pairs, arched, very slender; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., stout or rather slender; stipules obliquely oblong-lanceolate. *Flowers* $\frac{1}{8}$ in. diam., in globose clusters. *Sepals* rounded, concave. *Stamens* 8. *Capsule* $\frac{3}{4}$ –1 in. long; bristles tawny yellow. *Seeds* black shining, caruncle 2-lobed fleshy crimson. Thwaites (Enum. l. c.) cites fig. 1 of the plate in the Journal of Botany as representing the male fl. of *C. castanocarpus*, but it appears to me to belong to *coriaceus*.

2. ***C. pubescens***, Hook. f.; branches petioles and leaves beneath hirsutely tomentose, leaves very coriaceous oblong or linear-oblong acuminate opaque, capsules subglobose densely clothed with long rigid bristles. *C. castanocarpus*, var. *pubescens*, Thwaites Enum. 275.

CEYLON; at Pasdun Corle, Thwaites.

This, which is placed under *C. castanocarpus* by Thwaites, seems to me entirely different, in the much stouter and very hirsute branches and leaves beneath, the much larger very coriaceous leaves 8-10 by 3-4 in., and more minute sessile tomentose flowers, narrower sepals, and shorter tomentose staminal column.

3. ***C. coriaceus***, Thwaites Enum. 275; glabrous, leaves very coriaceous elliptic acuminate at both ends, capsule ellipsoid tubercled. Muell. Arg. in DC. Prodr. xv. ii. 1122; Beddome Forester's Man. 214, and Fl. Sylvat. t. 284, f. 11-14. *C. pungens*, Thwaites in Hook. Journ. Bot. vi. (1854) 301 (in part), t. 10 A, f. 6-9.

CEYLON; with *C. castanocarpus*.

A moderate-sized tree. Leaves 3-6 in., base acute and produced on the very short stout petiole; nerves 5-7 pair, slender. Flowers tomentose. Sepals oblong. Filaments hairy. Capsule obscurely 6-angled, $\frac{3}{4}$ in. long, woody.

64. **BALIOSPERMUM**, Blume.

Erect shrubs. Leaves alternate, sinuate-toothed or lobed, penninerved or 3-5-plinerved at the 2-glandular base. Flowers small, monœcious or diœcious, paniced or racemed, apetalous. MALE FL. globose. Sepals 4-6, membranous, orbicular, concave, imbricate. Disk of 4-6 glands. Stamens 10-30, on a small receptacle, filaments free or a few connate; anthers terminal, cells adnate for their whole length to the broad connective (nearly free in *B. malayanum*), slits lateral, at first introrse. Pistillode 0 (or 3 in *B. malayanum*). FEM. FL. Sepals 5-6, lanceolate, entire or toothed, sometimes accrescent in fruit. Disk entire. Ovary 3-celled, styles rather long, stout, 2-fid or 2-partite, stigmatic surfaces smooth (not fimbriate); cells 1-ovuled. Capsule of 3 2-valved crustaceous cocci. Seeds ovoid, testa crustaceous, albumen fleshy; cotyledons flat, broad.—Species 6, Indian, one of them Malayan.

The smaller species a good deal resemble *Claoxylon*, but the anthers at once distinguish them. Kurz's *B. reidioides* (For. Fl. ii. 411), from Siam, belongs to a very different genus; it has 5 petals and 3 anthers crowning a column, which is seated in a cupular disk.

1. ***B. axillare***, Blume Bijl. 604; monœcious, stem stout, leaves sinuate-toothed upper small lanceolate lower large oblong ovate or rounded entire or palmately 3-5-lobed 3-5-plinerved, flowers in numerous axillary racemes, fruiting calyx not accrescent, ovary densely strigose, capsule large, seeds oblong. *B. polyandrum*, Wight Ic. t. 1885; Dalz. & Gibs. Bomb. Fl. 232. *B. indicum*, Dcne. in Jacquem. Voy. Bot. 154, t. 155. *B. Moritzianum*, Baill. Etudes Gen. Euphorb. 395. *B. angulare*, Dcne. mss. (fid. Baill.).

B. montanum, Muell. Arg. in DC. Prodr. ii. 1125; Kurz For. Fl. ii. 410. *Jatropha montana*, Willd. Sp. Pl. iv. 563. *Rottlera suffruticosa*, Wall. Cat. 7743. *Ricinus montanus*, Wall. Cat. 7727. *Croton polyandrus*, Roxb. Fl. Ind. iii. 682. *C. solanifolius*, Geisel. Monogr. Croton. 74.—Wall. Cat. 7763.

TROPICAL and SUBTROPICAL HIMALAYA; from Kashmir, alt. 2-3000 ft., Thomson, to Bhotan, Griffith. FROM ASSAM and the KHASIA MTS. to CHITTAGONG, PEGU, TENASSERIM, BURMA and PENANG. DECCAN PENINSULA; from Behar and the Concan to Travancore (not recorded from Ceylon).—DISTRIB. Java, Siam.

A stout subherbaceous leafy shrub, 3-6 ft., branching from the root, nearly glabrous except the shoots and sometimes the leaves beneath. Leaves, upper 2-3 in., lower 6-12 in., and sometimes as broad, biglandular at the base, rigid, strongly veined, base acute obtuse or cordate; petiole stout, of upper leaves short, of lower sometimes as long as the blade; stipules of 2 glands. Racemes $\frac{1}{8}$ in., interrupted, all male or with a few fem. below; bracts small. Male fl. $\frac{1}{8}$ in. diam.; sepals 4-5, membranous, orbicular, concave. Disk-glands soft, lobulate; stamens 15-20; anthers broad, subreniform, cells subconfluent at the tips. Fem. fl. subsessile; sepals 5, ovate, acute, toothed; disk short, cupular, crenate; ovary 2-3-lobed; styles stout, smooth, deeply bifid, arms recurved. Capsule $\frac{1}{4}$ – $\frac{1}{2}$ in. long, obovoidly 3-dymous; cocci oblong, crustaceous, sparsely strigose or glabrous. Seeds $\frac{1}{4}$ in. long, oblong, smooth, mottled.

2. *B. sinuatum*, Muell. Arg. in Flora xlvii. (1864) 470, and in DC. Prodr. xv. ii. 1125; dioecious, stem stout, leaves shortly petioled linear or obovate-oblong sinuate-toothed acuminate often subpinnatifid lobed above the middle with spreading or recurved triangular acuminate lobes, male racemes narrow longer than the leaves, fruiting calyx accrescent, ovary glabrous.

UPPER ASSAM; Mishmi and Patkoye Hills, alt. 4000 ft., Griffith (Kew Distrib. 4740).

A shrub, 6 ft. Leaves 6-8 by $1\frac{1}{2}$ –3 in., glabrous, base narrowed acute or rounded, 2-glandular, upper sessile, lower with petioles 1-2 in. Racemes interrupted; male fl. $\frac{1}{8}$ in. diam.; sepals and glands as in *B. axillare*; stamens 20; fem. sepals 5, ovate-lanceolate, unequal, glabrous; ovary smooth. Fruit not seen.

3. *B. calycinum*, Muell. Arg. in Flora xlvii. (1864) 470, and in DC. Prodr. xv. ii. 1126; dioecious, branches petioles and panicles finely pubescent, leaves long-petioled oblong acuminate sinuate-toothed or serrate, male panicles longer than the leaves copiously branched, fruiting calyx accrescent, ovary strigose.

UPPER ASSAM; in the Mishmi Hills, Griffith (Kew Distrib. 4744).

Habit of *B. sinuatum*, branches reddish yellow when dry. Leaves 6-10 by $2\frac{1}{2}$ – $3\frac{1}{2}$ in., glabrous except the finely pubescent nerves beneath; base acute or rounded, 2-glandular or 2-auriculate; petiole 2-4 in. Male panicles erect, long-peduncled, with slender erect alternate and fascicled branches; bracts minute or 0; male fl. $\frac{1}{8}$ in. diam.; sepals orbicular, concave, membranous; disk-glands fleshy; stamens 20, filaments sometimes connate. Fem. panicles shorter, corymbiform, with short fewer-fl. branches and leafy bracts; flowers $\frac{1}{4}$ in. diam., stoutly pedicelled; sepals 5, linear-lanceolate, $\frac{1}{2}$ in. long in fruit. Capsule 1-3 in diam., of 3 globose cocci.

4. *B. micranthum*, Muell. Arg. in Linnæa xxxiv. 215, and in DC. Prodr. xv. ii. 1126; dioecious, branches slender and petioles and racemes finely pubescent, leaves long-petioled membranous oblong or lanceolate acuminate sinuate-toothed, male panicles contracted very slender equalling or exceeding the leaves, fruiting calyx small, ovary glabrous.—Wall. Cat. 7715 A.

KHASIA MTS., alt. 3-4000 ft., *Wallich, Griffith, &c.*

A slender bush. *Leaves* 4-8 by 1-2½ in., pale green when dry, base acute or rounded, 2-glandular; nerves 15-20 pairs, very slender; petiole 1-3 in. *Male panicles* sometimes 1 ft., and glabrous; flowers ⅓ in. diam., on capillary pedicels; sepals orbicular, hyaline; disk-glands fleshy; stamens about 16. *Fem. panicles* shorter, simpler, much fewer-fl'd.; flowers ⅓ in. diam., longer and stouter pedicelled; fruiting pedicels often 1-1½ in.; sepals 5, ovate-lanceolate. *Capsule* subglobose, ⅓ in. diam., 3-dymous, smooth.

5. ***B. corymbiferum***, *Hook. f.*; diœcious, branches finely pubescent, leaves long-petioled membranous elliptic-oblong acuminate sinuate-serrate or subentire, male panicles very long peduncled, flowers in short corymbiform clusters.

EASTERN NEPAL AND SIKKIM; alt. 4-5000 ft., *J. D. H., Clarke, King.*

Stem 6-8 ft., slender, naked, simple or sparingly branched. *Leaves* 6-8 by 2½-3½ in.; base rounded, 2-glandular; costa pubescent; nerves 8-10 pairs; petiole 1-3 in., slender. *Male panicles* much longer than the leaves; peduncle very long, naked; corymbose clusters ½-¾ in., 6-10-fl'd.; flowers ⅓ in. diam., pedicelled; sepals 5-6, membranous; disk-glands fleshy; stamens about 20, filaments sometimes connate. *Fruit* unknown.

6. ***B. malayanum***, *Hook. f.*; diœcious, leaves long-petioled elliptic-oblong rounded at both ends entire or sinuate-toothed penninerved, male flowers monœcious minute in pubescent axillary and terminal panicles, sepals 5 rounded toothed, stamens 10, anthers hispid, pistillodes 3.

MALACCA, *Maingay* (*Kew Distrib.* 1455).—DISTRIB. Borneo.

Branches woody, black when dry. *Leaves* 3-5 by 2-2½ in., coriaceous, brown when dry; nerves 6-8 pair, sometimes obtuse, often glandular; petiole 1-1½ in.; stipules of large glands. *Panicles* much shorter than the leaves, contracted; bracts minute, subulate; male flowers ⅓ in. diam., very shortly pedicelled. *Sepals* rounded. *Disk-glands* rounded, villous. *Stamens* on a convex villous receptacle; filaments short, subulate; anther-cells oblong, free except at the top where they meet on the connective. *Pistillodes* subulate, villous.—Perhaps a distinct genus, differing from the other described species of *Baliospermum* in the fewer stamens, convex receptacle, discrete anther-cells, and pistillodes. The female fl. and fruit are unknown.

EXCLUDED SPECIES.

BALIOSPERMUM, *Griffith*, Mishmi Mts., alt. 5-5500 ft. (*Kew Distrib.* 4741); a small tree, leaves 6-8 by 2½-3½ in., thin, elliptic-oblong, cuspidately acuminate, quite entire, base triple-nerved, petiole 2-3 in.; male fl. minute, on slender axillary pubescent panicles, shortly pedicelled; calyx subturbinate with 4 short rounded ciliolate lobes; petiole 0; anthers 4 half exserted subsessile round a clavate pistillode, cells oblong, erect, united at the base only.—No doubt an undescribed genus, but without fem. fl. or fruit I hesitate to name it. The habit is somewhat that of a *Baliospermum*, but the male fl. are widely different.

65. **EPIPRINUS**, *Griff.*

A small tree or shrub. *Leaves* alternate, large, long-petioled, entire, penninerved; floral crowded, subsessile. *Flowers* in stout axillary spiciform androgynous racemes, apetalous; males crowded, subsessile; fem. in the lower part, scattered. **MALE FL.** *Calyx* globose, membranous, valvately 2-4-lobed. *Stamens* 5-15, filaments free, tips slender abruptly inflexed; anthers large, oblong, dorsifixed, erect in bud, cells parallel. *Pistillode* thick, 3-lobed. **FEM. FL.** on pedicels greatly thickening and lengthening after flowering. *Sepals* 5-6, enlarged in fruit, lanceolate, alternating with

as many minute naked or 2-glandular thick scales (or involucre bracts). *Ovary* short, 3-celled; styles 3, connate in a long stout column, tips spreading 2-fid. and subpalmately lobed; ovules 1 in each cell. *Capsule* large, of 2-3-subglobose 2-valved cocci. *Seeds* subglobose, testa crustaceous.

E. malayanus, Griff. *Notul.* iv. 487; Muell. *Arg. in DC. Prodr.* xv. ii. 1024.

MALACCA, Griffith (*Kew Distrib.* 4787), Maingay (*K. D.* 1393). PERAK, Scortechini, King's Collector.

A shrub or tree, sometimes 30 ft.; branchlets very stout, puberulous. *Leaves* 8-14 by 4-6 in., thinly coriaceous, smooth, greenish or brownish when dry, oblong-ovate, long-acuminate, base obtuse or cordate; nerves 9-12 pair, slender but much raised, as are the nervules; petiole 3-5 in., terete, tip swollen; stipules not seen. *Racemes* 2-6 in., simple or branched below, hoary-tomentose; rachis very stout; bracts small. *Male* sepals rounded, glabrous within. *Ovary* deeply 3-lobed and stout style densely stellate-tomentose. *Capsule* 1 in. diam., hoary, valves woody; pedicel stout, 1-1½ in. long; fruiting sepals 1½-2 in. long, pubescent on both surfaces, midrib and nerves strong. *Seeds* ¾ in. diam.

66. **PLUKENETIA**, Linn.

Twining shrubs or undershrubs. *Leaves* alternate, often cordate, 3-5-plinerved, entire or toothed. *Flowers* in axillary lateral or leaf-opposed androgynous racemes, apetalous; males usually minute, fascicled; females lower on the raceme. *Disk* 0. *MALE FL.* *Sepals* 4-5, valvate. *Stamens* 8-30, on a prominent receptacle, filaments short free; anthers erect, cells globose or didymous, parallel or diverging. *Pistillode* 0, or filiform, capitelate. *FEM. FL.* *Sepals* imbricate. *Ovary* 3-4-celled; styles connate in a fleshy globose mass or cylindric toothed or lobed column; cells 1-ovuled. *Capsule* subglobose or depressed, dry or fleshy, of 3-4 2-valved cocci. *Seeds* globose, sometimes 3-ribbed on one side, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species about 12, tropical, chiefly American.

P. corniculata, Smith in *Nov. Act. Upsal.* vi. 4; nearly glabrous, leaves oblong from a truncately cordate base caudate-acuminate toothed, sepals 5, stamens 8, ovary 4-celled, style column obovoid, capsule greatly depressed of 4 stellately spreading granulate cocci, each produced outwards into a vertical green linear obtuse wing. Muell. *Arg. in DC. Prodr.* xv. ii. 773. *Pterococcus glaberrimus*, Hassk. in *Flora* 1842, *Beibl.* ii. 41. *Hedraio-stylus corniculatus*, Hassk. *Cat. Hort. Bogor.* 234. *Sajorium corniculatum*, Baill. *Etudes Gen. Euphorb.* 484.

SIKKIM HIMALAYA, alt. 2000 ft., Clarke. UPPER ASSAM, Jenkins, Griffith. TENASSERIM and MALACCA, Griffith (*Kew Distrib.* 4716).—DISTRIB. Java.

Stem slender, tips of shoots and often the petioles appressed puberulous. *Leaves* 3-8 in., membranous; petiole 1-3 in., 2-glandular at the apex. *Male* racemes 1-1½ in., very slender, glabrous; bracts lanceolate, 3-fid., shorter than the pedicels; calyx globose, ⅓ in. diam. *Fem. fl.* ½ in. diam.; sepals lanceolate. *Capsule* 1½ in. diam., crown nearly flat, wings nearly as long as the nucleus. *Seeds* ½-½ in. diam., turbidly lenticular with a sharp keel all round; testa crustaceous, pale, mottled with brown.

67. **TRAGIA**, Linn.

Perennial, usually climbing or twining herbs, hispid with stinging hairs. *Leaves* alternate, simple or palmately 3-lobed, serrate, base often cordate, 3-5-plinerved. *Flowers* monœcious in terminal axillary and leaf-opposed

androgynous racemes, apetalous; males superior in the raceme; fem. few, inferior. MALE FL. *Calyx* globose or obovoid, valvately 3-5-partite. *Disk* 0, or obscure. *Stamens* 1-3, rarely many, filaments free or connate; anthers ovate or oblong, cells contiguous parallel. *Pistillode* 0, or minute. FEM. FL. *Sepals* 6 (rarely more or fewer), imbricate, entire or pinnatifid, often enlarged hardening and stellately spreading in fruit. *Ovary* 3-celled; styles united below in a column, then free spreading and entire; cells 1-ovuled. *Capsule* of 3 2-valved cocci, endocarp crustaceous. *Seeds* globose, estrophiolate, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species about 50, chiefly tropical.

1. **T. involucrata**, *Linn. Sp. Pl.* 980; more or less pubescent hispid or tomentose and with scattered stinging bristles, rarely almost glabrous, leaves from linear-oblong to broadly ovate-cordate acuminate serrate, and from entire to deeply 3-fid or tripartite with irregularly serrate or subpinnatifid lobes, racemes hispid or glabrous, fruiting sepals rigid stellately spreading oblong pinnatifid rarely subentire, ovary hispid, seeds mottled with a broad tumid chalaza. *Muell. Arg. in DC. Prodr.* xv. ii. 943. *Kurz For. Fl.* ii. 398; *Grah. Cat. Bomb. Pl.* 186; *Dalz. & Gibs. Bomb. Fl.* 228.

Throughout INDIA, from the Panjab and lower Himalaya of Kumaon, eastward to Assam and southward to BURMA, TRAVANCORE and CEYLON.—DISTRIB. China.

An evergreen twiner. *Leaves* 1-4 in., membranous, protean in form and indumentum; petiole long or short. *Racemes* 1-2 in., slender; bracts small or minute. *Male fl.* minute, shortly pedicelled; sepals and stamens 3; pistillode 3-fid. *Fem. fl.* strigosely hispid, fruiting $\frac{3}{4}$ in. diam. *Style-column* very variable in length. *Capsule* $\frac{1}{2}$ in. diam., hispid or strigosely tomentose or nearly glabrous. *Seeds* obscurely hoary.—It is impossible to define the varieties of this most variable plant. The following are the principal forms.

T. INVOLUCRATA PROPER; coarsely strigosely hispid, leaves ovate or lanceolate acuminate coarsely toothed or serrate. *Var. a.* Rheediana, δ . genuina, and γ . hispidula, *Muell. l. c.* T. hispida, *Willd. Sp. Pl.* iv. 323.—*Burm. Fl. Zeyl.* 202, t. 92; *Rheede Hort. Mal.* ii. t. 39; *Wall. Cat.* 7791 B, C, D.

Var. cordata, *Muell. l. c.*; leaves (often broadly) ovate-cordate coarsely serrate cuspidately acuminate. T. cordata, *Heyne in Wall. Cat.* 7791 A. *Var. montana*, *Thwaites Enum.* 270. T. montana, *Muell. Arg. l. c.* 904.

Var. angustifolia; leaves narrowly linear- or oblong-lanceolate base contracted cordate.

Var. cannabina; leaves all palmately 3-partite with narrow toothed or pinnatifid lobes. *Var. e.* intermedia and ζ . cannabina, *Muell. Arg. l. c.* T. cannabina, *Linn. Suppl.* 415; *A. Juss. Tent. Euphorb.* t. 15, 49 B; *Wall. Cat.* 7715. T. hispida, *Herb. Russell.* *Croton hastatus & urens*, *Linn. Syst. Ed.* 13, 722.

2. **T. bicolor**, *Miquel in Linnæa* (1853) 22, and *Plant. Hohenack.* No. 1552; branches villously hirsute, leaves shortly petioled ovate-cordate acuminate serrate tomentose on both surfaces, racemes rather stout, bracts very long lanceolate, fem. sepals strigose entire, capsule tomentose and setose. T. Miqueliana, *var. bicolor*, *Muell. Arg. in DC. Prodr.* xv. ii. 943 (*excl. Metz.* No. 755).

NILGHIRI HILLS, *Wight, &c.*; at Conoor, alt. 5000 ft., *Clarke.*

Resembles some tomentose forms of *T. involucrata*, but the bracts of the racemes are fully $\frac{1}{2}$ in. long, the flowers larger, the fruiting calyx much smaller, $\frac{1}{2}$ in. diam., the sepals entire, hirsute within, and wanting the rigid woody midrib. It is a mountain plant, often but not always pulverously or rustily villous when dry.—*Mueller's T. Miqueliana* *var. bicolor* consists of this, and of *Hohenacker's* No. 755, which is a native of Canara (not as *Mueller* supposes, the Nilghiris), and which is *T. involucrata*.

3. **T. burmanica**, *Kurz For. Fl.* ii. 399; nearly glabrous, leaves broadly ovate abruptly acuminate subserrate base sinuate-cordate, fruiting sepals broadly ovate acute, stigma appressed to the hirsute woody capsules.

MARTABAN; east of Tounghoo, in forests, *Kurz*.

A large twining shrub, young parts appressed puberulous. *Leaves* 2-5 in., sparsely setose above; petiole 1-3 in. *Racemes* 2-6 in., puberulous. *Fruiting sepals* nearly 1 in. long, leafy. *Capsule* of 3 cocci each as large as a pea. *Seeds* velvety, mottled.

68. **CNESMONE**, *Blume*.

A climbing villous shrub. *Leaves* alternate, oblong from a broadly cordate base, toothed, 3-5-nerved and penninerved; stipules broad, persistent. *Flowers* monœcious, in terminal or leaf-opposed androgynous racemes, apetalous; upper male, lower fem. 2-bracteolate. *Disk* 0. **MALE FL.** *Calyx* globose, valvately splitting in 3 broad lobes. *Stamens* 3, alternate with the lobes, hardly exerted, filaments stout free; anthers dorsifixed, connective thick produced into a reflexed lamina, cells separate subparallel. *Pistillode* obscure or 0. **FEM. FL.** *Sepals* 3, enlarging in fruit. *Ovary* short, 3-celled, strigose; styles or stigmatic lobes 3, fleshy, united at the base in a fleshy mass, incurved, fimbriate within; cells 1-ovuled. *Seeds* globose, testa crustaceous with a fleshy coat, albumen fleshy; cotyledons broad, flat.

C. javanica, *Blume Bijl.* 630 (by misprint CNESMOSA); *Muell. in DC. Prodr.* xv. ii. 926; *Kurz For. Fl.* ii. 399; *Baill. Etudes Gen. Euphorb.* 458, t. 4, f. 14-17. *Tragia hastata*, *Reinw. in Hassk. Pl. Rar.* 245. *T. rugosa*, *Wall. Cat.* 7794. *T. macrophylla*, *Wall. Cat.* 7793.—*Wall. Cat.* 7788.

SILHET, *Wallich*. KHASIA MTS., *J. D. H. & T. T.* MISHMI HILLS, in UPPER ASSAM, *Griffith*. BENGAL; at Dacca, *Clarke*. MALAY PENINSULA and BURMA, from Pegu to Malacca and Penang, *Wallich*, &c.—DISTRIB. Java, Sumatra.

Evergreen, densely villously tomentose; branches stout. *Leaves* 3-5 in., oblong or obovate-cordate, acuminate, tomentose on both surfaces; nerves 4-5 pair above the basal, nervules reticulate; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in., stout; stipules broadly ovate, acute. *Racemes* pubescent or tomentose, 1 in. long; bracts deciduous; male fl. $\frac{1}{4}$ in. diam., pedicelled; fem. larger, subsessile; sepals velvety, broad, $\frac{1}{2}$ - $\frac{1}{2}$ in. long, fruiting as long as the capsule, rhomboid-ovate, entire or crenate. *Capsule* hispid, of 3 cocci each as large as a small pea. *Cocci* velvety. *Seeds* with a mottled testa.

69. **MEGISTOSTIGMA**, *Hook. f.*

A nearly glabrous twiner. *Leaves* alternate, petioled, elliptic, cuspidately acuminate, quite entire, triple-nerved. *Flowers* monœcious, in small axillary unisexual racemes, apetalous; males minute, fem. small. **MALE FL.** *Calyx* ovoid, 3-lobed to below the middle; tube obconic, lined with a thickened disk; lobes ovate, obtuse, valvate. *Stamens* 3, erect in the centre of the flower, filaments short thick; anthers triangular-ovate, obtuse, base intruded; cells narrow, adnate to the face of the thick connective, slits introrse. *Pistillode* 0. **FEM. FL.** *Calyx* of 5 linear-lanceolate sepals, rather enlarged in fruit. *Disk* 0. *Ovary* tridymous, depressed, densely hirsute, 3-celled; style column very large, globose, contracted at the base, fleshy, smooth, 3-lobed to the middle, lobes rounded connivent; cells 1-ovuled. *Capsule* depressed, tridymous, appressed-pubescent, of 3 2-valved woody cocci. *Seeds* globose, testa mottled.

M. malaccense, Hook. f. *Ic. Plant. t. 1592.*MALACCA, *Maingay* (*Kew Distrib.* 1423). SINGAPORE, *Lobb.*

Stem about as thick as a crow-quill, terete, smooth, pubescent, as are the petioles young leaves and racemes. *Leaves* 4-6 by 2-2½ in., thinly coriaceous, base sub-acute or rounded, pale greenish when dry, nerves 2-3 pair above the basal, transverse nervules slender; petiole ½-1 in., slender. *Racemes*, male 1-3 in., very slender, fem. shorter stouter; bracts minute; male fl. $\frac{1}{3}$ in. long, fem. $\frac{1}{6}$ in. *Calyx* of male sparsely hairy, of the female more hairy; anthers broadly trigonous in section, with the angle on the inner face; so that all three anthers meet by their adjacent faces. *Styles* united in a globose 3-fid mass much larger than the body of the ovary, on which it is sessile; lobes smooth within, not papillose. *Capsule* ½-¾ in. diam.—Allied to *Sphærostylis*, Baill., of Madagascar, which differs in the stamens.

70. **DALECHAMPIA**, Linn.

Shrubs or undershrubs, often twining. *Leaves* alternate, entire or 3-5-lobed or -foliolate, usually 3-7-plinerved. *Flowers* monœcious, apetalous, in axillary androgynous sessile or peduncled racemes or heads, often mixed with sterile deformed flowers, involucrate; involucre of two often large and coloured entire or 3-fid bracts, with a whorl of small outer ones at their base; upper or inner floral bracts male, 3- or more-fid., lower or outer female. *Disk* 0. **MALE FL.** *Sepals* 4-6, membranous, valvate. *Stamens* 20-30, on a convex receptacle, filaments free or connate; anthers erect, often didymous, cells contiguous, parallel. *Pistillode* 0. **FEM. FL.** *Sepals* 5-12, usually pinnatifidly fimbriate or lacerate, imbricate. *Ovary* 3-4-celled; styles connate in a fleshy slender or stout column, with an obtuse dilated or lobed stigma; cells 1-ovuled. *Capsule* deeply lobed, splitting into 3-4 2-valved cocci, endocarp hardened. *Seeds* globose or ellipsoid, estrophiolate, albumen fleshy; cotyledons broad, flat.—Species about 60, all tropical, chiefly American.

1. **D. indica**, *Wight Ic. t. 1882*; leaves 3-foliolate, leaflets serrate, bracts acutely 3-lobed, toothed, floral bracts 3-lobed, fem. sepals pinnatifidly lacinate segments subulate tips glandular. *Muell. Arg. in DC. Prodr.* xv. ii. 1241. *D. coromandeliana*, *Heyne in Wall. Cat.* 7798. *D. bidentata*, *Thwaites Enum.* 270 (*excl. syn.*). *D. ternata*, *a. zeylanica*, *Muell. Arg. l. c.*

DECCAN PENINSULA; Coromandel, *Heyne*; Dindygul Hills, *Wight*. CEYLON, at Gonagama, *Thwaites*.

A slender twiner, finely pubescent except on the leaves above. *Leaflets* 2-3 in., membranous, very shortly petiolulate, acuminate, terminal elliptic ovate, lateral with the outer base enlarged rounded and sometimes lobulate; petiole ½-3 in., very slender; stipules and stipellæ lanceolate. *Involucral bracts* 1 in. and less, yellow. *Flowers* surrounded by many broad fleshy scales (deformed flowers). *Sepals* of fem. 8-12, slender, rigid, ciliate. *Ovary* pubescent; style slender, stigma subcupular. *Capsule* ½ in. diam. *Seeds* globose, mottled.—I can find no difference between the Ceylon and Deccan plant. *Mueller* puts *indica* into a section with petiolulate leaflets, and *ternata* into another with sessile ones, but the Ceylon specimens have the longest petiolules.

2. **D. velutina**, *Wight Ic. t. 1881*; leaves deeply 3-lobed tomentose beneath, lobes ovate-oblong serrate, the lateral spreading, peduncle shorter than the leaves, involucral bracts 3-fid ovate-cordate serrulate, fem. bracts entire, sepals of fem. 8-10 pinnatifid hirsute. *D. scandens*, *var. ζ. velutina*, *Muell. Arg. in DC. Prodr.* xv. ii. 1245.

NILGHIRI HILLS, *Wight, Gardner*; at Conoor, alt. 5000 ft., *Clarke*.

An evergreen twiner; shoots pubescent. *Leaves* 2-4 in., base cordate 3-5-pinnerved, segments lanceolate; petiole 1-2 in. *Peduncle* spuriously axillary, 2-3 in., puberulous.—I do not venture to follow Mueller in regarding this plant, which is confined to considerable elevations in the Nilghiri Hills, as the same with the *D. scandens*, which is found nowhere out of South America. Specimens in fruit are wanted to confirm such an identification.

3. **D. Kurzii**, *Hook. f.*; leaves 3-lobed to or below the middle sparsely pubescent beneath, lobes lanceolate subserrate lateral erect, peduncles equalling the leaves, involucre bracts 3-lobed entire, sepals of fem. 8-10 filiform hispid pinnatifid segments filiform. *D. scandens*, *Kurz For. Fl.* 400 (not of *Linn.*).

RANGOON; at Pegu, *McClelland, Kurz*. TENASSERIM; at Moulmain, *Lobb*.

Stems and petioles sparsely softly hairy. *Leaves* 4-5 in., base cordate, lobes acuminate; petiole shorter than the blade; stipules oblong-lanceolate. *Peduncles* 3-5 in.; involucre bracts like the leaves, with narrow or broad lobes. *Male sepals* 4; fem. 5-8. *Ovary* scabrid, style $\frac{1}{2}$ in. long. *Fruiting calyx* 1 in. diam. *Capsule* of 4 globose cocci. *Seeds* globose, mottled.

71. PIMELEODENDRON, Hassk.

Glabrous trees or shrubs. *Leaves* alternate, crowded at the ends of the branches, quite entire, coriaceous, penninerved; petioles very unequal, tumid at the top. *Flowers* in simple or branched lateral and very short axillary racemes, dioecious ♀, apetalous; pedicels rigid; bracts caducous. MALE FL. *Calyx* saucer-shaped, of 2 very short broad coriaceous compressed and appressed imbricating lobes. *Disk* 0. *Stamens* 12-15, in one series within the margin of the perianth, filaments short, fleshy; anthers terminal, broad, truncate; cells adnate, widely diverging, extrorse. *Pistillode* 0. FEM. FL. and fruit unknown.—Species 2 or 3, Malayan.

P. Griffithianus, *Benth. in Gen. Plant.* iii. 331; glabrous, leaves long-petioled elliptic-ovate caudate-acuminate sinuate-serrate, base acute. Stomatocalyx *Griffithianus*, *Muell. Arg. in DC. Prodr.* xv. ii. 1142 in part.

MALACCA, *Griffith, Maingay (Kew Distrib.* 1400).

Branches robust, woody. *Leaves* 3-5 in., dark brown when dry, nerves 4-5 pairs arched; petiole $\frac{1}{2}$ -2 in., very slender, terete, swollen at the top. *Racemes* solitary or crowded, black when dry, $\frac{1}{2}$ - $\frac{3}{4}$ in., rachis and pedicels very stout; bracts, small, broad, obtuse. *Perianth* $\frac{1}{4}$ in. diam., coriaceous or fleshy, lips very short. *Stamens* shorter than the calyx-lobes.—Bentham rightly points out that the Bornean plant of Barber (also Beccari, No. 293) is a different species; it has more obovate and more obtuse entire leaves with more nerves.

71*. HOMALANTHUS, A. Juss.

Glabrous trees or shrubs. *Leaves* alternate, broad, entire, often glaucous or hoary beneath, penninerved; stipules deciduous. *Flowers* small, monœcious, in terminal androgynous racemes, apetalous; males many in each bract; fem. at the base of the raceme, few or solitary in each bract, or solitary at the ends of the branches. *Disk* 0. MALE FL. *Calyx* short, compressed, of two flat appressed sepals. *Stamens* 6-50, rarely fewer, filaments very short; anthers exerted, cells short divaricate 2-valved at the top. *Pistillode* 0. FEM. FL. *Calyx* terete, 2-3-fld. *Ovary* 2-3-celled;

styles linear, divergent, entire; ovules 1 in each cell. *Capsule* didymous, fleshy, indehiscent or tardily splitting into 2 2-valved cocci. *Seeds* ovoid, with a fleshy aril, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species 7–8, Malayan, Pacific and Australian.

H. POPULIFOLIUS, *Grahn. in New Edinb. Journ. Sc.* 1827, and in *Bot. Mag.* t. 2780 (*Omalanthus*); leaves broadly rhombic- or triangular-ovate acuminate, bracts 3–6-fld. very short broadly toothed, male sepals subequal base dilated 2-glandular, stamens 6–10. *Carumbium populneum*, *Muell. Arg. in DC. Prodr.* xv. ii. 1144. *C. populifolium*, *Reinw. in Blume Cat. Hort. Bogor.* 105, ex *Miquel Fl. Ind. Bat.* i. ii. 414; *Benth. Fl. Austral.* vi. 150. *Omalanthus Leschenaultianus*, *A. Juss. Tent. Euph.* 50, t. 16, f. 53.—*Wall. Cat.* 7972 G.

PENANG, *Wallich*. CEYLON, *Dahl* (*Muell. Arg. l. c.*).—DISTRIB. Malay and Pacific Islands, Australia.

A small tree. *Leaves* 2–4 in., membranous, penninerved, more or less glaucous and often reddish beneath; petiole as long, very slender; stipules $\frac{1}{2}$ –1 in., lanceolate. *Racemes* 1–4 in. *Flowers* $\frac{1}{12}$ in. diam. *Calyx-lobes* unequal. *Stamens* 6, or fewer. *Capsule* $\frac{1}{4}$ –3 in. diam., glaucous, didymous, tardily dehiscing. *Seeds* half enveloped in the aril.—The only Indian specimen that I have seen is one sheet (9) of *Wallich's* Herbarium from Penang, under *Stillingia sebifera*. It may be introduced into that island; and yet so common a Malayan plant may be expected to occur in British India. The Ceylon habitat is probably an erroneous one.

72. SAPIUM, P. Br.

Trees and shrubs. *Leaves* alternate, entire, serrate or toothed, penninerved; petiole often 2-glandular at the top. *Flowers* in terminal simple or paniced spikes or racemes, monœcious (always?), apetalous; males several in each bract; females in the lower part of the spike, or in separate spikes, solitary in the bracts. *Disk* 0. MALE FL. *Calyx* membranous, shortly 2–3-lobed or toothed, or split to the base into 2–3 valvate sepals. *Stamens* 2–3, filaments free; anther-cells ovoid, distinct, contiguous, parallel. *Pistillode* 0. FEM. FL. *Calyx* 3-fid or -partite. *Ovary* 2–3-celled; styles free or connate at the base, spreading and recurved, undivided, cells 1-ovuled. *Capsule* crustaceous, fleshy or pulpy, rarely woody, at length loculicidally (not elastically) 3-valved. *Seeds* globose, estrophio-late, usually long-persistent on the columella, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species 25, all tropical.

Sect. I. TRIADICA. *Spikes* androgynous. *Fruit* baccate or cocci deciduous from a broadly 3-winged persistent columella.

1. **S. discolor**, *Muell. Arg. in Linnæa* xxxii. 121; branchlets and leaves beneath glaucous, leaves long-petioled elliptic acute or acuminate quite entire glaucous beneath, racemes simple terminal solitary, fruit globose capsular. *Stillingia discolor*, *Champ. in Hook. Kew Journ. Bot.* vi. (1854) 1; *Benth. Fl. Hongk.* 303. *Excœcaria discolor*, *Muell. in DC. Prodr.* xv. ii. 1210.

MALACCA, *Griffith*. SINGAPORE, *Maingay*.—DISTRIB. China.

A glabrous glaucous shrub or small tree. *Leaves* 2–2½ in., base acute; nerves 10–12 pair, very faint, nearly transverse; petiole $\frac{1}{2}$ –1 in., very slender, 1–2-glandular at the tip. *Spikes* 1–2½ in., dense-fld. as in *S. sebiferum*. *Styles* very short, pointed on the top of the ovary. *Capsule* $\frac{1}{2}$ in., globose.

2. *S. eugeniaefolium*, *Ham. in Wall. Cat.* 7970; branchlets glaucous, leaves long-petioled ovate or elliptic acute or subacute quite entire not glaucous beneath, racemes simple terminal solitary, fruit capsular obtuse. *S. Hookeri*, *Herb. Hort. Bot. Calcutt.*

TROPICAL HIMALAYA; from Kumaon, alt. 3-4000 ft., *Duthie*, to Sikkim, *King*. ASSAM; at Goyalpara, *Hamilton*. KHASIA MTS., alt. 4000 ft., *J. D. H. & T. T.*

A glabrous glaucous tree. *Leaves* 3-4 in., base acute; nerves 6-10 pairs, very slender, arched; petiole $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., very slender, 2-glandular at or below the tip (the glands are rarely on the blade itself). *Spikes* 3-4 in., dense-fl. *Styles* jointed on to the top of the ovary. *Capsules* $\frac{1}{2}$ - $\frac{1}{2}$ in. diam., globose, wings of columella thick, horned at the outer angle; cocci very thick, woody. *Seeds* globose.—Perhaps not distinct from *S. discolor*. The ticket attached to Wallich's 7965 D, from "Sirmore, ?? W. S. Webb, ?" is probably intended for this plant, though represented by a fruiting specimen of *S. baccatum* which has never been found so far west as Sirmore.

3. *S. baccatum*, *Roxb. Fl. Ind.* iii. 694; branches glaucous, leaves long-petioled ovate or ovate-lanceolate acuminate quite entire glaucous beneath, petiole glandular or not, racemes spiciform in terminal panicles with conglobate glands on the rachis between the flowers, male fl. very minute, calyx irregularly toothed, fem. 3-fid, fruit baccate. *Wight Ic.* t. 1950, f. 2 (*S. populifolium* on plate). *S. populifolium*, *Wall. Cat.* 7966. *S. Daidece* & *S. hexandrum*, *Ham. in Wall. Cat.* 7965 (excl. D). *Excœcaria baccata*, *Muell. Arg. in DC. Prodr.* xv. ii. 1211; *Brand. For. Fl.* 441; *Gamble Man. Ind. Timb.* 367. *E. affinis*, *Griff. Notul.* iv. 486; *Muell. Arg. l. c.* 1223. *Carumbium baccatum*, *Kurz For. Fl.* ii. 412. *Stillingia paniculata*, *Miquel Fl. Ind. Bat.* i. i. 461.

SIKKIM HIMALAYA, *Clarke*, *Gamble*. ASSAM, SILHET and the KHASIA MTS., *Roxburgh*, *Wallich*, &c. CHITTAGONG, *J. D. H. & T. T.* BURMA, *Wallich*. PENANG, *Curtis*. MALACCA, *Griffith*.—DISTRIB. Sumatra.

A glabrous evergreen tree. *Leaves* 3-8 in., tips very slender; nerves 6-10 pair, very slender; petiole 1-3 in. *Racemes* 3-4 in., in a spreading panicle, very slender; bracts very short. *Male fl.* $\frac{1}{10}$ in. diam., pedicels capillary $\frac{1}{16}$ in.; stamens 2, included. *Fem. fl.* subsessile; style very short; stigmas revolute. *Fruit* $\frac{1}{2}$ - $\frac{1}{2}$ in. diam., globose.—Wallich's No. 7973 from Singapore with leaves linear oblong and petioles 2-3 in. may be this, but it is a mere shoot.—I have no doubt as to this being Griffith's *Excœcaria affinis*, in the description of which *inferius* should be *inferne*.

S. SEBIFERUM, *Roxb. Fl. Ind.* iii. 693; leaves long-petioled ovate orbicular-ovate or subrhombic quite entire finely acuminate glaucous beneath, racemes simple terminal solitary, fruit capsular subacute. *Muell. Arg. in Linnæa* xxxii. 121; *Grah. Cat. Bomb. Pl.* 181; *Dalz. & Gibs. Bomb. Fl. Suppl.* 77. *Excœcaria sebifera*, *Muell. Arg. in DC. Prodr.* xv. ii. 1210; *Brand. For. Fl.* 44; *Gamble Man. Ind. Timb.* 366; *Wall. Cat.* 7972 (excl. G). *Stillingia sebifera*, *Michaux Fl. Bor. Am.* ii. 213; *Miquel Fl. Ind. Bat.* i. ii. 64; *Benth Fl. Hongk.* 302. *S. sinensis*, *Baill. Etudes Gen. Euphorb.* 512, t. 7, f. 26-30. *Stillingfleetia sebifera*, *Bojer Hort. Mauriti.* 284. *Carumbium sebiferum*, *Kurz For. Fl.* ii. 412. *Croton sebiferus*, *Linn. Sp. Pl. Ed.* 3, 1425.

Cultivated in various parts of INDIA; and elsewhere in warm countries.—A native of China.

A small glabrous tree. *Leaves* $1\frac{1}{2}$ -2 in., sometimes broader than long; nerves 6-10 pair, very slender, almost transverse; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in., 2-glandular, slender. *Racemes* 2-4 in.; the earliest in the year all male; bracts short, acute. *Male fl.* clustered, $\frac{1}{10}$ in. diam., pedicelled; calyx cupular, truncate; anthers large, exserted. *Fem. fl.* longer and more stoutly pedicelled; sepals ovate, acute. *Ovary* glabrous

narrowed into a stout style with recurved stigmas. *Capsule* coriaceous, the size of a pea, subglobose, shortly pointed. *Seeds* globose, with a coating of wax under the epidermis.

Sect. II. PARASAPIUM *Spikes* simple, androgynous. *Fruit* large, woody, globose; cocci at length deciduous, not leaving a columella.

4. **S. indicum**, *Willd. Sp. Pl.* iv. 572; leaves shortly petioled elliptic-lanceolate obtusely acuminate serrate or subserrate not glaucous beneath, petiole eglandular, racemes spiciform terminal solitary, male fl. subsessile, fem. pedicelled elongate, capsule large woody. *Roxb. Fl. Ind.* iii. 692; *Wight Ic.* t. 1950; *Grah. Cat. Bomb. Pl.* 181. *S. Hurmais*, *Ham. in Trans. Linn. Soc.* xvii. 229. *S. Bingirium*, *Roxb. in Wall. Cat.* 7963. *Stillingia indica* & *Bingyrica*, *Baill. Etudes Gen. Euphorb.* 513, t. 6, f. 11, 12. *S. himalayensis*, *Klotzsch Bot. Reise Pr. Wald.* 116, t. 21. *Excœcaria indica*, *Muell. Arg. in DC. Prodr.* xv. ii. 1216; *Kurz For. Fl.* 413; *Brandis For. Flor.* 441; *Gamble Man. Ind. Timb.* 367; *Beddome Forester's Man.* 215.—? *Rheede Hort. Mal.* iv. t. 51.

BAY of BENGAL, from the Sunderbunds to Tenasserim. ? SOUTH CONCAN, Graham.

An evergreen glabrous tree. *Leaves* 3–5 in., rather coriaceous, dark green, brown when dry, base acute, nerves many pairs; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Racemes* 2–4 in., chiefly on lateral short branches, sparsely pubescent; bracts broad, obtuse, ciliate; male fl. crowded in clusters, pedicel very short; calyx-lobes acute, ciliate; fem. larger, with long style and stigma; sepals acute, ciliate. *Fruit* 1 in. diam., old woody, young succulent, obscurely 3-lobed, walls of cocci very thick and hard. *Seeds* $\frac{1}{2}$ in. long, ellipsoid, slightly compressed; testa pale, polished.—Bentham (*Gen. Plant.*) rightly remarks that the African plant referred to this species by Mueller is quite distinct from it.

5. **S. virgatum**, *Benth. in Gen. Pl.* iii. 335; leaves moderately petioled subcoriaceous base 2-glandular, bracts broadly ovate acuminate, their glands small rugulose, styles rigid connate beyond the middle three times or more longer than the ovary, capsules large woody acuminate. *Stillingia virgata*, *Baill. Etudes Gen. Euphorb.* 508. *Excœcaria virgata*, *Zoll. & Moritz. in Miquel Fl. Ind. Bat.* i. ii. 416; *Muell. Arg. in DC. Prodr.* xv. ii. 1216.

MOULMAINE, *Wallich* in *Herb. DC.*—DISTRIB. Java.

Leaves lanceolate, acuminate, base acute crenate or subrepand-serrate, shining above; bracts many-fld., powdery-puberulous. *Fem. pedicels* 2–3 times as long as the calyx. *Male fl.* subsessile; calyx segments lanceolate, laciniately toothed. *Fem. calyx* multiglandular within. *Stamens* 3, styles sharply revolute above. *Capsules* 2 cm. broad. *Seeds* smooth, shining.—Differs from *E. indica* in the larger longer more coarsely serrate lucid leaves, larger flowers, strong connate styles and form of the capsule.—The above description is copied from Mueller. I find in the Wallichian *Herb.* no *Sapium* or *Excœcaria* from Moulmein.

Sect. III. FALCONERIA. *Spikes* unisexual. *Male fl.* sessile in orbicular clusters under each bract; fem. solitary. *Calyx* of male 2-lipped, of fem. of 2–3 ovate acuminate sepals. *Fruit* coriaceous or drupaceous, with tardily dehiscing or indehiscent cocci.

6. **S. insigne**, *Benth. in Gen. Pl.* iii. 335; leaves elliptic or oblong-lanceolate acuminate crenate-serrate, spikes solitary terminal, rachis very robust. *Falconeria insignis*, *Royle Ill.* 354, t. 84 (or t. 98). *F. Wallichiana*, *Royle l. c. f.* 3; *Brand. For. Fl.* 442. *Carumbium insigne*, *Kurz For. Fl.* ii. 412.—*Wall. Cat.* 8021.

SUBTROPICAL HIMALAYA, from Simla and Kumaon, alt. 5300 ft., to Bhotan (except ? Sikkim). CHITTAGONG, J. D. H. & T. T. PEGU, Kurz.

A very robust deciduous-leaved tree, with thick soft branchlets leafy at the tips, shrinking when dry. *Leaves* 6-12 in., greenish when dry, nerves 12-20 pairs spreading slender; petiole 1-2 in., glandular below the tip. *Spikes* 3-10 in., fem. greatly thickened in fruit. *Male fl.* in circular clusters $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.; bracts very small, central flowers opening first and leaving short persistent pedicels, outer fl. sessile; calyx membranous, lobes rounded concave; stamens 2, very short. *Fem. fl.* shortly pedicelled; sepals ovate, acuminate; ovary globose; stigmas very short, pulvinate. *Fruit* $\frac{1}{2}$ in. diam., 1-3-celled, ovoid or globose, obscurely lobed.—Kurz describes the cocci as 2-valved. Except in the form of the fruit, I know of no difference between the two following forms.

S. INSIGNE PROPER; fruiting racemes very stout, fruit ovoid.

Var. *malabarica*; fruiting racemes more slender, fruit globose. *Excœcaria insignis*, *Beddome Forester's Man.* 214, t. 22, f. 5. *Falconeria malabarica*, *Wight Ic.* t. 1866; *Dalz. & Gibs. Bomb. Fl.* 227; *Grah. Cat. Bomb. Pl.* 367.—*Wall. Cat.* 8914.

73. EXCŒCARIA, Linn.

Glabrous trees or shrubs, with acrid milky sap. *Leaves* alternate or opposite, entire or subserrate. *Flowers* minute in lateral axillary or terminal spiciform unisexual or androgynous racemes or spikes, diœcious or monœcious, apetalous; males 1-3 in each bract, 2-bracteolate; fem. at the base of the raceme, or on separate racemes; rachis with large glands beneath or at the sides of the bracts. *Disk* 0. *MALE FL. Sepals* 3 (rarely 2), small, subequal. *Stamens* 3, filaments free; anthers didymous; cells globose, distinct, contiguous, parallel. *Pistillode* 0. *FEM. FL. Calyx* 3-fid or -partite. *Ovary* 3-celled; styles shortly connate, stout, spreading and recurved, entire; cells 1-ovuled. *Capsule* of 3 cocci separating from a columella, valves crustaceous twisting elastically. *Seeds* globose or subglobose, estrophiolate, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species about 30, Tropical Asia, Africa and Australia.

This genus had better be reunited with *Sapium*.

* *Leaves* alternate.

1. **E. Agallocha**, Linn. *Sp. Pl.* 1451; leaves alternate long-petioled elliptic ovate or orbicular acute or obtuse quite entire or sinuate-crenate, male spikes axillary dense-fld., bracts rounded fleshy 1-fld., male fl. sessile, sepals minute unequal, fem. spikes short few-fld., flowers pedicelled, sepals broadly ovate acute subserrulate with a basal gland within, capsule $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. tridymous smooth. *Muell. Arg. in DC. Prodr.* xv. ii. 1220; *Wall. Cat.* 7962 and 7964; *Brand. For. Fl.* 442; *Kurz For. Fl.* 414; *Gamble Man. Ind. Timb.* 368; *Grah. Cat. Bomb. Pl.* 185; *Dalz. & Gibs. Bomb. Fl.* 227; *Beddome Forester's Man.* 255; *Wight Ic.* t. 1865 B, and in *Hook. Comp. Bot. Mag.* ii. 306, t. 30. *E. Camettia*, *Willd. Sp. Pl.* iv. 864; *Lamk. Ill.* t. 805. *E. affinis*, *Endl. Prodr. Fl. Norf.*, 83. *Stillingia Agallocha*, *Baill. Etudes Gen. Euphorb.* 518, t. 7, f. 31-34.—*Rheede Hort. Mal.* v. t. 45.

Tidal forests on all the coasts of INDIA and CEYLON.—DISTRIB. Eastwards to Australia and the Friendly Islands.

A small evergreen tree. *Leaves* between fleshy and coriaceous, 2-4 in., pale brown when dry, base acute or rounded; nerves many, very faint, subhorizontal; petiole $\frac{1}{2}$ -1 in., slender, tip sometimes 2-glandular. *Male spikes* numerous, 1-2 in.; fem. racemes few, $\frac{1}{2}$ -1 in.; flowers fragrant, upper fem. usually imperfect. *Bracts* of male spike with 1 flower and several minute bracteoles. *Filaments* much lengthening

after flowering. *Styles* free nearly to the base. *Seeds* subglobose, smooth.—The variations in the size of the fruit and seeds are remarkable.

2. ***E. acerifolia***, *F. Didrichs. Plant. Nonnull. Mus. Univ. Hafn.* 7; leaves alternate short-petioled elliptic oblong-lanceolate or oblanceolate acuminate serrulate or crenulate, nerves strong beneath arched, spikes terminal and axillary bisexual, bracts broadly ovate acute entire 2-3-fld., male sepals lanceolate acuminate entire, fem. broadly ovate acute glandular at the base within. *Muell. Arg. in DC. Prodr.* xv. ii. 1222; *Brand. For. Fl.* 441. *E. himalayensis*, *Muell. Arg. in Linnæa* xxxii. 122. *Stillingia himalayensis*, *Klotzsch in Bot. Reise Pr. Waldem.* 116, t. 21.—*Wall. Cat.* 7969.

WESTERN and CENTRAL HIMALAYA, from Nepa^l, *Wallich*, to Kumaon, alt. 5-6000 ft., *Edgeworth, Strachey & Winterbottom.* KHASIA MTS.; at Nunklow, alt. 4000 ft., *J. D. H. & T. T.*

A small evergreen tree. *Leaves* 3-6 by 1-2 in., rather membranous, green when dry; nerves 8-10 pairs; base acute or subacute; petiole $\frac{1}{2}$ - $\frac{1}{4}$ in., stout, eglandular. *Spikes* 1-2 in., slender; bracts rounded or acuminate; male fl. sessile; fem. pedicelled. *Style* short, very stout. *Capsule* about $\frac{3}{4}$ in. diam., tridymous, smooth. *Seeds* globosely ovoid, mottled.—The Khasian specimens have much narrower leaves than the Himalayan, and are referred by Mueller to a variety (*E. himalayensis*, var. *β. cuspidata*, *Muell. Arg. in Linnæa* xxxii. 122, and in *DC.* l. c.).

3. ***E. holophylla***, *Kurz For. Fl.* ii. 414; leaves alternate oblong to broadly lanceolate or oblanceolate obtusely acuminate quite entire, nerves arched very slender, spikes terminal slender, bracts short broad 1-3-fld. female at the base, bracteoles 0, sepals of male very minute subulate.

Forests of MARTABAN and UPPER TENASSERIM, *Kurz*; on Thoungun, *Brandis*.

An evergreen tree. *Leaves* 3-6 in., thin, quite glabrous rather polished; petiole $\frac{1}{2}$ - $\frac{1}{4}$ in., eglandular. *Spike* 2 in.; male flowers in scattered clusters, sessile; bracts rounded.—I have seen only a small flowering specimen collected by Brandis and named by Kurz, in which the male flowers are as described.

4. ***E. rectinervis***, *Kurz in Herb. Hort. Calcutt.*; branchlets very stout, leaves 5-7 in. coriaceous obovate-oblong abruptly narrowed to an obtuse point, nerves numerous nearly horizontal, petiole stout 1-1 $\frac{1}{2}$ in. eglandular. *Actephila rectinervis*, *Kurz in Trimen's Journ. Bot.* xv. (1875) 329.

NICOBAR ISLANDS; Katchall, *Kurz*.

Branchlets as thick as a goose-quill. *Leaves* 3-4 in. broad, very smooth, dull green and leathery when dry; base acute; nerves 12-15 pair, distinct beneath but slender. *Fruiting raceme* axillary, young fruit $\frac{1}{2}$ in. diam. on a stout pedicel $\frac{1}{2}$ in. long.

**** Leaves opposite.**

5. ***E. crenulata***, *Wight Ic.* t. 1865; leaves shortly petioled from elliptic to lanceolate serrate or crenulate acuminate, spikes axillary and terminal unisexual, bracts 1-fld., male fl. sessile, fem. pedicelled short few-fld., bracteoles subulate as long as the flower, male sepals oblong irregularly toothed, fem. broadly ovate erose. *E. cochinchinensis*, *Muell. Arg. in DC. Prodr.* xv. ii. 1215; *Beddome Forester's Man.* 215. *E. oppositifolia*, *Muell. Arg. in DC. Prodr.* xv. ii. 1219 (*excl. syn.*) (*not of Jack*); *Beddome l. c.* *Salix glabrata*, *Herb. Heyne.* *Microstachys*, *Wall. Cat.* 7977 A.

THE DECCAN PENINSULA; in woods on the Western Ghats from Coorg south-

wards, ascending to 7000 ft. CEYLON, common in the Central Province, alt. 4-6000 ft.

A small evergreen tree or shrub, branchlets slender, sometimes 4-gonous. *Leaves* 2-6 in., rather coriaceous, rarely somewhat obovate, base very acute, nerves 10-16 pairs, faint, spreading or subhorizontal; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Spikes* usually terminal, males 1-2 in.; fem. very short, always axillary, sometimes 1-fl.; bracts erose; bracteoles subulate, erose, conspicuous beyond the bracts. *Sepals* 3, of male quite free, inserted by a narrow base; of fem. fl. ovate, acute, with a large gland at the base within. *Styles* very short, and stigmas persistent. *Capsule* $\frac{1}{2}$ - $\frac{2}{3}$ in. diam., deeply 3-lobed, especially at the top; cocci thinly crustaceous, twisted after dehiscence. *Seeds* broadly ovoid, mottled.—In the absence of authentic specimens of *E. cochinchinensis*, Lour., to which this is referred by Mueller, I hesitate to follow him, for the subulate bracteoles distinguish it from all the more eastern species that I have examined. Some specimens with shorter more coriaceous highly reticulated leaves with fewer very prominent nerves look different, but I find no floral characters whereby to distinguish them. Mueller describes this under the name of *E. oppositifolia*, *Jack in Calc. Journ. Nat. Hist.*, by error for *Griffith*, l. c. (Jack has no species of that name), and he omits Griffith's Silhet habitat. In fact Griffith's plant is very different from the Deccan one (see No. 8).

6. ***E. robusta***, *Hook. f.*; branches very stout, leaves opposite linear-oblong acuminate coriaceous entire or sinuate-suberrate, spikes axillary unisexual very robust, bracts 1-fl., bracteoles broadly ovate erose, sepals of male orbicular irregularly toothed. *E. oppositifolia*, *Muell. Arg. in DC. Prodr.* xv. ii. 1219 (not of Lour.).—*Wall. Cat.* 7968.

The CONCAN, *Stocks*; Mts. of Kurg, *Herb. G. Thomson, Wight (in Herb. Wall.)*.

Branches as thick as a goose-quill. *Leaves* 5-8 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., base acute; nerves 15-20 pair, very spreading, slender; petiole $\frac{1}{2}$ - $\frac{2}{3}$ in., very stout, eglandular. *Male spikes* solitary, sessile, 4-5 in.; rachis very stout; bracts small, broad, fleshy; bracteoles large, embracing the unexpanded flower. *Male sepals* 3, membranous, base broad cordate, point of insertion small. *Fem. fl.* not seen. *Fruit* immature, $\frac{2}{3}$ in. diam., on a very short axillary raceme, shortly stoutly pedicelled, 3-lobed, top truncate, style short persistent.—The robust habit, stout long male spikes and form of the bracteoles and sepals distinguish this at once from *E. crenulata*.

7. ***E. quadrangularis***, *Muell. Arg. in DC. Prodr.* xv. ii. 1219; branchlets slender 4-gonous, leaves opposite elliptic-lanceolate or oblanceolate acuminate, spikes axillary slender bisexual, bracts 1-fl. serrulate, bracteoles lanceolate erose, sepals of male oblong irregularly spinulose-toothed, of fem. ovate acute spinulose-serrate with many subulate processes at the base within.—*Microstachys*, *Wall. Cat.* 7977 B.

PENANG and SINGAPORE, *Wallich*.

A shrub or tree with the habit and lanceolate leaves of *E. crenulata*, but the branchlets are more distinctly 4-angled, the leaves more membranous, with only 8-10 pair of more arched nerves, the bracteoles and male sepals are spinously toothed, and the fem. sepals have a row of fleshy setæ at the base within, as in some species of *Sapium*.

8. ***E. oppositifolia***, *Griffith in Calcutt. Journ. Nat. Hist.* iv. 386; branchlets terete, leaves opposite linear-oblong acuminate entire or suberrate, spikes unisexual? males terminal very slender 1-fl., bracts entire 1-fl., bracteoles 0, sepals broadly oblong toothed. ? *E. oppositifolia*, *Kurz For. Fl.* ii. 414 (excl. syn. *Bedd.*).—*Wall. Cat.* 8028, *Gnetum*.

SILHET, *Wallich*, and *Hort. Bot. Calc. (Kew Distrib.* 4707). ? UPPER TENASSEIM, *Kurz*.—DISTRIB. ?

Leaves 6-8 by 2-2½ in., thinly coriaceous, glossy above, base more or less acute, nerves 16-20 pair slender, slightly arched; petiole ½ in., eglandular. *Male spikes* 4-5 in., pedicelled, rachis very slender, flowers scattered, sessile; sepals of male free, base auricled, insertion very small. *Fem. fl.* solitary, terminal, pedicelled, with a large basal gland on each side. *Ovary* 3-celled, ovoid, narrowed into a short robust style with 3 subulate recurved stigmas. *Fruit* [pedicelled, berried, subumbilicate, 6-grooved, of 3 cocci, size of a small apple. *Seed* subglobose.—This is named *E. oppositifolia*, Griffith, by himself in his herbarium. I have seen no specimens but his and Wallich's. In Kurz's *E. oppositifolia* the flowers are shortly pedicelled, males several in each bract; male spikes robust and fruit the size of a cherry. See under *crenulata* for the erroneous quotation of Jack as the authority for this species.

IMPERFECTLY KNOWN SPECIES.

EXCÆCARIA? Larut, Perak, alt. 2-3500 ft. (*Herb. Hort. Bot. Calcutt.*, No. 2344); a shrub 8-12 ft. quite glabrous, branches terete, leaves membranous 4-6 in. ovate-lanceolate acuminate margin slightly waved, base acute or rounded, nerves very many slightly arched, petiole ¼-½ in. slender, capsules sessile clustered in the leaf-axils ½ in. diam. 2-3-dymous, cocci globose quite smooth.

74. **SEBASTIANIA**, Spreng.

Shrubs, rarely (the Indian species) a herb. *Leaves* alternate, pinninerved. *Flowers* monœcious, in terminal axillary and lateral slender racemes, apetalous; males minute, 1-3 in each bract; females solitary or at the base of the raceme. *Disk* 0. *MALE FL.* *Calyx* minute, membranous, unequally 5-lobed or -partite. *Stamens* 2-4, filaments short free or nearly so; anther-cells distinct, contiguous, parallel. *Pistillode* 0. *FEM. FL.* *Calyx* 3-lobed or -partite. *Ovary* exserted, 3-celled; styles free or connate at the base, entire, revolute or spreading; cells 1-ovuled. *Capsule* globose, of 3 cocci separating from a columella, endocarp crustaceous. *Seeds* oblong or subglobose, strophiolate, testa smooth, albumen fleshy; cotyledons broad, flat.—Species 40, all American but the following, and another which is American and African.

S. Chamælea, Muell. Arg. in DC. Prodr. xv. ii. 1175; annual, glabrous, leaves linear obtuse finely serrulate, racemes very short, cocci with two dorsal rows of spinules. *Benth. Fl. Austral.* v. 151. Microstachys Chamælea, A. Juss. Tent. Euphorb. 49; Dalz. & Gibs. Bomb. Fl. 228. Cnemidostachys Chamælea, Spreng. Syst. Veg. iii. 835. Stillingia Chamælea & asperococca, Baill. Etudes Gen. Euphorb. 516, 517. Excæcaria Chamælea, Baill. Adans. vi. 323. Cnemidostachys linearifolia, Miquel Fl. Ind. Bat. Suppl. 460. Elachocroton asperococcus, Ferd. Muell. in Hook. Journ. Bot. ix. (1857) 17. Tragia Chamælea, Linn. Sp. Pl. 1391; Grah. Cat. Bomb. Pl. 186; Wall. Cat. 7797.

BEHAR; at Dunwah, J. D. H.; Hazaribagh, &c., Clarke. DECCAN PENINSULA, from Bombay southwards. BURMA, MALACCA and SINGAPORE, Wallich, Griffith, Maingay. CEYLON, common.—DISTRIB. China, Malay Islands, Tropical Australia and Africa.

Stems usually many from the root, ascending 1-2 ft., slender, grooved ribbed or terete, dichotomously branched. *Leaves* 1-3 in. by ¼-½ in., base acute; petiole ⅓-½ in., very slender. *Male spikes* axillary or leaf-opposed; bracts minute, acute with a large often stipitate gland on each side, 1-2-lid. *Fem. fl.* usually solitary at the base of the male, or lateral on the branches. *Sepals* minute, of the male ovate, acute, ciliate; of the fem. the larger, obovate, acute, lacerate and ciliate, 2-glandular within. *Capsule* subglobose oblong, thinly crustaceous, ¼-½ in. diam. *Seed*

oblong, mottled.—I can find no character whereby to separate the specimens with terete, and those with grooved ribbed stems.

GENERA OF DOUBTFUL AFFINITY.

75. **LOPHOPYXIS**, Hook. f.

A glabrous climbing shrub. *Leaves* alternate, shortly petioled, quite entire, 3-nerved at the base. *Flowers* small, monœcious, cymose, cymes in lax elongate branched axillary and terminal panicles, females towards the base of the branches. MALE FL. *Calyx* 5-partite, persistent; lobes ovate, spreading, valvate, tomentose. *Petals* minute, oblong, tomentose, inserted under the obcordate lobes of a thick disk. *Stamens* 5, alternate with the disk-lobes, filaments short pubescent; anthers short; cells oblong, dehiscence extrorse, connective minutely produced. *Pistillode* small, villous. FEM. FL. *Perianth* of the male. *Disk* annular, crenate. *Ovary* tomentose, 5-celled; stigmas 5, sessile, subulate, recurved; ovules 2, linear, collaterally pendulous in each cell, obturator 0. *Young fruit* cylindric-oblong, finely tomentose, deeply 5-grooved and ribbed.

L. Maingayi, Hook. f. in *Ic. Plant. t. 1714.*

MALACCA, Maingay (*Kew Distrib.* 1429).

Branchlets brown, grooved, puberulous. *Leaves* 4-6 in., coriaceous, ovate from a broad subcordate base, subcaudately acuminate, shining and minutely reticulate above, purplish brown beneath; nerves 4-5 pair above the short basal, cross-nervules reticulate; petiole $\frac{1}{8}$ in.; stipules not seen. *Panicles* a foot long, drooping, rachis puberulous, branchlets hoary-tomentose; flowers $\frac{1}{10}$ in. diam., very shortly pedicelled; buds globose, bracts very minute. *Sepals* tomentose on both surfaces. *Young fruit* $\frac{1}{2}$ in. long, crowned with the subulate styles, grooves extending almost to the axis, ridges obtuse.—I am very uncertain as to the affinities of this curious plant, which resembles no Euphorbiaceous one known to me.

76. **BOTRYOPHORA**, Hook. f.

A glabrous tree. *Leaves* alternate, long-petioled, coriaceous, elliptic or oblong-lanceolate, caudate, quite entire, penninerved. MALE FL. sessile on the simple horizontal branches of an erect terminal? puberulous pyramidal brachiate panicle; buds pisiform, globose, glabrous. *Perianth* membranous, bursting irregularly. *Stamens* very numerous in a globose mass; anthers peltately attached to a central receptacle, imbricating; connective broad, disciform with 4 minute oblong free cells in two pairs pendulous from its outer margin.

B. Kingii, Hook. f.

PERAK, in open sandy soil near the coast, *King's Collector*.

A tree, 40-50 ft.; branchlets woody, knotted; bark red brown, smooth. *Leaves* 8-10 by 3-4 in., pale yellowish brown when dry, base acute; nerves 10-12 pairs, very strong, raised on both surfaces, cross-nervules finely and strongly reticulate; petiole $2\frac{1}{2}$ -4 in., strict, geniculate at the base of the leaf, terete; stipules not seen. *Panicles* 6-10 in. long, 4 in. diam. at the base, terminal and axillary, shortly peduncled, rachis and branches rigid; bracts minute. *Male fl.* $\frac{1}{2}$ in. diam., half yellow half red, waxy. *Stamens* yellow.—This may be allied to *Mallotus* or *Macaranga*, but I know nothing at all like it, and it is too remarkable a plant to be passed over. The anthers, which are in a young state, recall on a minute scale those of a *Cycas*; the connective is very large in proportion to the cells, which are distant from one another.

77. **SPHYRANTHERA**, *Hook. f.*

An evergreen bush; branches slender, puberulous. *Leaves* alternate, petioled, elliptic-lanceolate, obtusely acuminate, entire, penninerved. *Flowers* minute, diœcious; males subumbellately crowded on the top of a slender solitary axillary peduncle, emerging from a capitate cluster of very minute pubescent imbricating bracts; buds globosely ovoid. *Sepals* 4, broadly ovate, acute, concave, pubescent without, valvate. *Petals*? much smaller than the sepals, membranous, variable, entire or cleft to the base into two lanceolate segments. *Stamens* about 20, in the centre of the flower, filaments filiform, free; anther-cells globose, distant, divaricate, one at each end of the rather dilated connective. *Fem. fl.* and *fruit* unknown.

S. capitellata, *Hook. f. Ic. Plant. t. 1702*; *Codiæum*? *lutescens*, *Kurz For. Fl. ii. 405.*

MIDDLE ANDAMAN ISLAND; in bamboo jungles along the Middle Straits, *Kurz.*

A bush, 10–12 ft., of a yellowish green. *Leaves* 3–5 in., rather membranous, straight or subfalcate, narrowed into a petiole $\frac{3}{4}$ in. long; nerves 10–15 pairs, slender. *Peduncles* $\frac{1}{2}$ in., slender, pubescent, pedicels $\frac{1}{10}$ in., decurved. *Petals* or *disk-glands* sometimes subspathulate.—I am quite uncertain as to the affinities of this curious plant. I had named, figured, and described it before recognizing it as *Kurz's Codiæum? lutescens*, or I should have adopted his specific name.

ORDER CXXXVI. **URTICACEÆ.**

Herbs, shrubs or trees. *Leaves* rarely opposite, often oblique. *Stipules* various. *Inflorescence* cymose or clustered; flowers usually minute, mono- or di-œcious, rarely unisexual, often crowded on the surface of a fleshy flat concave or globose involucre, or on (in *Ficus*) the inner walls of a closed receptacle. *Perianth* equally or unequally toothed, lobed or partite. *Stamens* as many as and opposite the perianth divisions, or fewer; anthers 2-celled. *Pistillode* small or 0. *Ovary* superior, 1-celled, style often excentric, simple or 2-fid with stigmatose arms, or stigma sessile plumose or penicillate; ovule solitary. *Fruit* simple, a drupe or samara or of small indehiscent free achenes, or compound as a confluent mass of perianths and pericarps. *Seed* erect or pendulous, testa membranous; albumen copious, scanty or 0; embryo various.—Genera 108; species 1500, chiefly tropical.

The seven tribes of *Urticæ* here adopted (following *Gen. Plant.*) are by many considered as 2 or more Orders.

Phenax Sonneratii, Wedd. (*DC. Prod. xvi. i. 235*³⁷), a S. American herb, differing from *Maoutia* in the filiform stigma, is, according to Sonnerat, an Indian plant; if so, no doubt introduced.

TRIBE I. **Ulmææ**. Trees, sap watery. *Flowers* usually 2-sexual or polygamous, appearing before the leaves. *Anthers* erect in bud. *Style* 2-fid. *Ovule* pendulous, anatropous. *Fruit* dry.

Leaves serrate. Cotyledons flat	1. ULMUS.
Leaves entire (serrate in young plants). Cotyledons	
folded	2. HOLOPTELEA.

TRIBE II. **Celtidææ**. Character of *Ulmææ*, but fruit a drupe.
Male sepals imbricate. Stipules free. Cotyledons broad 3. CELTIS.

Male sepals induplicate-valvate. Stipules free. Cotyledons narrow 4. TREMA.
Male sepals imbricate. Stipules connate, convolute . . . 5. GIRONNIERA.

TRIBE III. **Cannabineæ.** Herbs, sap watery. *Flowers* diœcious. *Anthers* erect in bud. *Style* 2-fid. *Ovule* pendulous. *Fruit* an achene.

A climbing hispid perennial. Leaves opposite. Embryo spiral 5*. HUMULUS.
An erect annual. Leaves alternate. Embryo curved . . . 6. CANNABIS.

TRIBE IV. **Moreæ.** Trees or shrubs, sap usually milky. *Stamens* inflexed in bud, anthers reversed. *Ovule* pendulous, anatropous.

Subtribe 1. **FATOUÆ.** Male fl. in axillary cymes, with a few fem. intermixed, or fem. fl. solitary.—Shrubs or trees.

Leaves entire. Male sepals imbricate. Cotyledons twisted . . . 7. PSEUDOSTREBLUS.

Subtribe 2. **STREBLEÆ.** Male fl. capitate spicate or racemose, fem. solitary or few on a common peduncle. *Style* 2-fid.—Shrubs or trees.

Male fl. racemed; bracts minute. Fem. sepals very short . . . 8. TAXOTROPHIS.

Male fl. subcapitate; bracts many, large. Fem. sepals foliaceous 9. PHYLLOCHLAMYS.

Male fl. subcapitate; bracts 2. Fem. sepals clasping the ovary 10. STREBLUS.

Subtribe 3. **BROUSSONETIÆ.** Male fl. capitate spicate or racemose, fem. in globose head. *Style* undivided, elongate.—Shrubs or trees.

Male fl. spicate. Achenes stipitate. Leaves 3-nerved . . . 11. BROUSSONETIA.

Male fl. spicate. Achenes sessile. Leaves penninerved . . . 12. ALLEANTHUS.

Male fl. in globose heads. Achenes sessile. Leaves penninerved 13. PLECOSPERMUM.

Subtribe 4. **EUMOREÆ.** Male and fem. fl. spicate, or fem. subcapitate. Fem. sepals fleshy in fruit and enclosing the achene . . . 14. MORUS.

Subtribe 5. **DORSTENIÆ.** Male and fem. fl. crowded on a narrow or broad flat fleshy receptacle.

Receptacle linear, like a unilateral spike.—Trees . . . 15. SLOETIA.

Receptacle flat, entire or lobed.—Herbs or shrubs . . . 16. DORSTENIA.

TRIBE V. **Artocarpeæ.** Trees or shrubs, sap usually milky. *Flowers* unisexual, males or all in globose heads or open or closed receptacles. *Anthers* erect in bud.

Flowers on the inner walls of a closed receptacle . . . 17. FICUS.

Male fl. on a disciform receptacle, fem. solitary . . . 18. ANTIARIS.

Flowers in naked or bracteate heads, rarely racemes.

Flowers all in globose heads; stamens 4 19. CUDRANIA.

Flowers in globose oblong or cylindric heads, male monandrous 20. ARTOCARPUS.

Male fl. in cylindric spikes, fem. racemose 21. BALANOSTREBLUS.

TRIBE VI. **Conocephaleæ.** Shrubs, often climbing, or trees, sap usually milky. *Flowers* in unisexual heads. *Anthers* erect in bud. *Style* undivided or 2-fid. *Ovule* erect, orthotropous.

Male and fem. heads cymose, or fem. solitary. Stamens free. *Style* short 22. CONOCEPHALUS.

- Male and fem. heads solitary. Stamen 1. Style
 2-partite 23. *PRAINEA*.
 Male and fem. heads solitary. Stamens 2, connate. Style
 simple 24. *KUEZIA*.

TRIBE VII. **Urticeæ**. Trees herbs or shrubs, sap watery. *Flowers* unisexual. *Stamens* 1-5, inflexed in bud, with the anthers reversed. *Style* undivided or 0. *Ovule* erect, orthotropous.

Subtribe 1. **UREREÆ**. Herbs or shrubs, rarely trees, with stinging hairs. Flowers cymose, 2-5-merous.

- Leaves opposite. Achene straight; stigma penicillate . . . 25. *URTICA*.
 Leaves alternate; stipules connate. Achene oblique;
 stigma ovate or linear 26. *FLEURYA*.
 Leaves alternate. Fem. sepals 4. Achene oblique; stigma
 filiform 27. *LAPORTEA*.
 Leaves alternate. Fem. perianth tubular, 2-3-toothed . . . 28. *GIRARDINIA*.

Subtribe 2. **PROCRIDEÆ**. Herbs, rarely shrubs, without stinging hairs. Inflorescence cymose, or flowers on a fleshy receptacle. Fem. fl. 3-5-partite. Stigma penicillate.

* *Leaves opposite*.

- Flowers cymose or capitellate 29. *PILEA*.
 Flowers on a discoid receptacle 30. *LECANTHUS*.

** *Leaves alternate*.

- Flowers all cymose. Fem. sepals longer than the achene . . . 31. *PELLIONIA*.
 Flowers all on a fleshy receptacle, fem. perianth small or 0 . . . 32. *ELATOSTEMA*.
 Male fl. cymose; fem. on a fleshy receptacle 33. *PROCRIS*.

Subtribe 3. **BOEHMERIÆ**. Shrubs or trees, rarely herbs, without stinging hairs. Flowers not involucrate, spicate, fascicled, racemed, or panicled: male perianth 2-5-merous, fem. tubular or 0.

* *Fruiting perianth membranous or dry, including the free or adnate achene*.

- Shrubs or undershrubs. Stigma filiform, persistent . . . 34. *BOEHMERIA*.
 A herb. Leaves opposite. Stigma ovate, persistent . . . 35. *CHAMABAINA*.
 Herbs. Flowers 4-merous. Stigma deciduous, filiform . . . 36. *POUZOLZIA*.
 A herb. Flowers dimerous. Stigma linear 37. *DISTEMON*.

** *Fruiting perianth more or less fleshy, including the free or adnate achene*.
 —*Trees or shrubs; leaves alternate*.

- Leaves narrow. Ovary free; stigma penicillate 38. *SARCOCHLAMYS*.
 Leaves broad. Ovary free; stigma linear, deciduous . . . 39. *PIPTURUS*.
 Leaves broad. Ovary adnate; stigma sessile, subpeltate,
 ciliate 40. *VILLEBRUNEA*.
 Leaves broad. Ovary adnate; stigma penicillate 41. *DEBBEGEASIA*.

*** *Fem. perianth minute or 0*.

- Shrubs. Flowers in panicled clusters 42. *MAOUTIA*.

Subtribe 4. **PARIETARIÆ**. Herbs or undershrubs, without stinging hairs. Leaves alternate, quite entire. Flowers in cymose involucre.

43. *PARIETARIA*.

Subtribe 5. FORSKOHLÆ. Herbs or undershrubs, without stinging hairs. Leaves toothed. Flowers in naked or involucrate clusters, males monandrous.

Involucre 3-6-partite, woolly within : 44. FORSKOHLIA.
Involucre campanulate, toothed 45. DROGUETIA.

1. *ULMUS*, Linn.

Deciduous trees. *Leaves* alternate, distichous, serrate, penninerved; stipules lateral, scarious. *Flowers* fascicled at the leaf-scars of annotinous shoots. *Perianth* campanulate, 4-8-lobed, imbricate. *Stamens* 4-8, erect in bud. *Ovary* compressed; style short 2-fid or 2-partite, branches stigmatose within to the base; ovule pendulous. *Fruit* dry flat, nucleus expanded into an orbicular obcordate or obovate reticulate wing. *Seed* flat, exalbuminous; embryo straight, cotyledons flat, equal, radicle small superior. —Species about 16, natives of N. temperate regions.

The Western Himalayan small-leaved elm, referred to by Brandis as probably the European *U. campestris*, and which he describes as a small shrub along river-beds, and a middle-sized tree where planted by villages, is, I suspect, only *U. Wallichiana*. This latter tree is very closely allied to *U. campestris*; its leaves vary as greatly as do those of *campestris* and take similar forms. *U. erosa*, Roth Nov. Sp. 183; Planch. in DC. Prodr. xvii. 163, a plant of Heyne's, is not an *Ulmus*, and is indeterminate.

1. *U. Wallichiana*, Planch. in Ann. Sc. Nat. Ser. 3, x. (1848) 277, and in DC. Prodr. xvii. 158; branchlets tomentose, leaves 4-8 in. obliquely elliptic acuminate or subobovate and cuspidate doubly or trebly serrate scabrous or smooth above pubescent or tomentose beneath, nerves 15-20 pairs, perianth 5-6-fid, samara orbicular obovate, stipes very slender exceeding the perianth, seed in the middle. Brandis For. Fl. 432, t. 52; Gamble Man. Ind. Timb. 341. *U. erosa*, Wall. Cat. 3546 (not of Roth). *U. lævigata*, Royle Ill. 341. *U. pedunculata*, Herb. Ind. Or. H. f. & T.

WESTERN HIMALAYA; from Nepal to Kashmir, alt. 3500-10,000 ft.

A tree attaining 90 ft., with a trunk 24 in girth; bark very rough, exfoliating in diamond-shaped flakes; branches suberect, roughly pubescent or tomentose. *Leaves* usually narrowed at the very unequal base, which is cordate or round on one side acute on the other; nerves strong, pubescent beneath. *Flowers* in short dense many-fid. racemes; rachis 1 in. or less, pubescent; pedicels $\frac{1}{2}$ in., pubescent below the joint. *Perianth* turbinate, glabrous, persistent; lobes ciliate. *Stamens* 5-6. *Samara* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, glabrous or disk puberulous, sometimes obcordate, wings reticulate; stipes very slender, longer than the calyx.—As in the European *U. campestris*, the leaves on shoots differ greatly from those on the older branches, being larger, more coarsely doubly or trebly serrate, and more scabrous above.

2. *U. lancifolia*, Roxb. Fl. Ind. ii. 66; subdeciduous, leaves 1-3 in. obliquely lanceolate or ovate-lanceolate obtusely acuminate crenulate shining, nerves 15-20 pair, perianth 5-cleft, samara obliquely obovate orbicular or obcordate stipitate, seed in the middle. Wall. Pl. As. Rar. ii. 86, t. 200; Planch. in Ann. Sc. Nat. Ser. 3, x. (1848) 281; DC. Prodr. xvii. 162; Kurz For. Fl. ii. 473; Gamble Man. Ind. Timb. 342. *U. Hookeriana*, Planch. in DC. l. c.

SUBTROPICAL HIMALAYA; Kumaon, near Sooring, alt. 4-5000 ft., Strachey & Winterbottom; Sikkim, alt. 1-1500 ft., J. D. H. KHASIA HILLS, alt. 1-3000 ft. CHITTAGONG, Roxburgh. PEGU and MARTABAN, Kurz.

A tree attaining 70 ft., with thick bark, wide-spreading branches, and the drooping branchlets pubescent with deciduous hairs. *Leaves* hard, reticulate, shortly petioled, base acute on one side rounded on the other; petiole very short, stout, pubescent. *Flowers* in very short racemes, which are axillary or at the leaf-scars; pedicels sometimes $\frac{1}{2}$ in., slender, villous; bracts many, ciliate. *Perianth* campanulate, 5-cleft, glabrous. *Samara* about 1 in. long, lobes usually incurved.

3. **U. parvifolia**, *Jacq. Hort. Schoenb.* iii. t. 262; a shrub or small tree, branchlets pubescent, leaves 2-3 in. shortly petioled coriaceous oblong-lanceolate finely serrate glabrous, nerves 14-16 pairs with axillary tufts of hairs, flowers appearing with the leaves, clusters androgynous, perianth 4-fid, samara shortly stipitate elliptic or obliquely oblong, seed in the middle. *Brand. For. Fl.* 434. *U. virgata*, *Roxb. Fl. Ind.* ii. 67; *Wall. Pl. As. Rar.* iii. 67, t. 290; *Cat.* 3548; *Planch. in Ann. Sc. Nat. Ser.* 3, x. (1848) 272. *U. pumila*, *H. f. & T. Herb. Ind. Or.*

WESTERN TIBET; Nubra, alt. 10,000 ft., *Thomson*.—DISTRIB. China, Japan.

Described by Brandis (but not from Indian specimens) as a slow-growing shrub with reddish flowers, the male and fem. mixed in scaly clusters. He gives Kumaon, Sikkim and Bhotan as habitats, but I have seen no other Indian specimens than Thomson's Tibetan, which are not in flower or fruit. Wallich's figure is of a Chinese specimen cultivated in Calcutta, and is a copy of Roxburgh's drawing. The Tibetan plant may be a small-leaved form of *U. Wallichiana*.

2. **HOLOPTELEA**, *Planch.*

Habit and characters of *Ulmus*, but leaves quite entire, perianth cleft to the base, and cotyledons complicated longitudinally.

H. integrifolia, *Planch. in Ann. Sc. Nat. Ser.* 3, x. 269; *DC. Prodr.* xvii. 164; *Wight Ic.* t. 1968; *Dalz. & Gibs. Bomb. Fl.* 238. *Ulmus integrifolia*, *Roxb. in Willd. Sp. Pl.* i. 1326, and *Fl. Ind.* ii. 68; *Cor. Pl.* 56, t. 78; *Brand. For. Fl.* 431; *Kurz For. Fl.* ii. 473; *Grah. Cat. Bomb. Pl.* 644; *Gamble Man. Ind. Timb.* 342; *Bedd. Fl. Sylvat.* t. 310; *Wall. Cat.* 3547.

Outer lower ranges of the HIMALAYA, from Jamu to Oudh, ascending to 2000 ft. From BANDA and BEHAR to TRAVANCORE, and from PEGU to MARTABAN, CEYLON, in the hot drier regions.—DISTRIB. Cochin China.

A large spreading deciduous tree; shoots pubescent. *Leaves* 3-6 in., coriaceous, elliptic or obovate-oblong, acuminate (in seedlings serrate), glabrous, or pubescent beneath, base unequally rounded or subcordate; nerves 5-7 pair; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ in. diam. *Sepals* pubescent. *Anthers* hairy. *Ovary* long-stipitate. *Samara* 1 in. long, obliquely elliptic or roundish, glabrous or pubescent; wings membranous or chartaceous, tip 2-fid, lobes incurved.—Planchon has three varieties: *leiocarpa* with glabrous fruit deeply notched, *hebecarpa* with similar but pubescent fruit, and *zeylanica* with smaller obsoletely notched fruit.

3. **CELTIS**, *Linn.*

Trees or shrubs, evergreen or deciduous. *Leaves* alternate, bifarious, ovate, entire or serrate, triple-nerved. *Flowers* small, polygamous, cymose; male and androgynous cymes usually at the base of the shoots; female in the upper axils. *Sepals* 4-5, imbricate. *Stamens* 4-5, short, erect in bud, surrounding a woolly torus. *Ovary* sessile; style central, arms plumose simple or lobed; ovule pendulous. *Drupe* small, ovoid or globose, endocarp hard smooth or rugose. *Albumen* 0 or scanty; embryo curved, coty-

ledons broad, inflexed flat or replicate, surrounding the upcurved radicle.—Species about 50, temperate and tropical, chiefly in the northern hemisphere.

The species of this genus appear to me inextricable. The Asiatic, except *C. Wightii*, are founded on very variable characters.

1. *C. australis*, Linn. *Sp. Pl.* 1043; leaves deciduous very obliquely ovate or ovate-lanceolate acuminate coarsely serrate green when dry, drupes subsolitary subglobose or broadly ovoid, putamen rugose. *Brand. For. Fl.* 428, t. 50; *Planch. in DC. Prodr.* xvii. 169; *Boiss. Fl. Orient.* iv. 1156; *Gamble Man. Ind. Timb.* 343. *C. caucasica*, Willd.; *DC. l. c.* 170; *Boiss. l. c.* 1156; *Gamble l. c.* *C. Acata*, Ham. in *Trans. Linn. Soc.* xvii. 211.

The SALT RANGE and TEMPERATE HIMALAYA, alt. 4–8000 ft., from Marri to Nepal (and ? Sikkim).—DISTRIB. Westwards to Spain.

A tree; branches slender, pendulous, and leaves beneath glabrous pubescent or subtomentose with often fulvous hairs. Leaves 3–5 in., entire towards the base, glabrous above, basal nerves not produced into the tip; stipules subulate. Male fl. in axillary tufts or racemed on short leafless axillary branchlets, pedicels capillary. Sepals oblong, obtuse, margins woolly. Fem. or bisexual flowers rather larger than the male. Ovary ovoid, woolly at the base or all over. Drupe very variable in size and shape, $\frac{1}{2}$ in. long or less; peduncle $\frac{1}{2}$ –2 in.—I follow Brandis in referring the common W. Himalayan *Celtis* to *australis*, and uniting with it *C. caucasica*, which, according to Boissier, differs only in the drupes being yellow (they are black in European *australis*) and more rugose.

VAR. *eriocarpa*; drupe pubescent tomentose or woolly. *C. eriocarpa*, Dene. in *Jacquem. Voy. Bot.* 150, t. 152; *Planch. in DC. Prodr.* xvii. 179; *Brand. For. Fl.* 429; *Gamble Man. Ind. Timb.* 343.—Has the same range as *C. australis*, but is not common. Brandis, who doubts its being a species, refers Hamilton's *C. Acata* to it, but that has a glabrous ovary. Planchon implies that the pubescent drupe alone distinguishes *eriocarpa*. I find this to be an inconstant character.

2. *C. tetrandra*, Roxb. *Hort. Beng.* 21, and *Fl. Ind.* ii. 63; leaves as in *C. australis*, but more persistent more entire usually brown when dry, flowers usually tetrandrous in shorter more robust, more often bisexual cymes, drupes solitary or binate globose or ovoid. *Planch. in Ann. Sc. Nat. Ser.* 3, x. 300; *DC. Prodr.* xvii. 179; *Kurz For. Fl.* 472; *Dalz. & Gibs. Bomb. Fl.* 337. *C. trinervia*, Roxb. *Fl. Ind.* ii. 65; *Gamble Man. Ind. Timb.* 344; *Wall. Cat.* 3695. *C. serotina*, *Planch. in Ann. Sc. Nat. l. c.*; *Wight Ic.* t. 1570; *Beddome For. Man.* 218, and *Sylv. Madr.* t. 218. *C. Roxburghii*, *Planch. in Herb. DC. l. c.*; *Bedd. l. c.* t. 312. *C. glabra*, var. *nepalensis*, *Planch. l. c.* 298.

LOWER OUTER HIMALAYA, from Kumaon eastwards, ascending to 3000 ft. in Sikkim; KHASIA MTS., CHITTAGONG, BURMA, BEHAR, and the DECCAN PENINSULA on the Eastern and Western Ghats.—DISTRIB. Malay Islands.

* Except by the trifling characters given above, I do not see how this is distinguished from *C. australis*. The leaves are often subentire. The drupes vary in shape, size and length of pedicels.

VAR. *Hamiltoni*; branchlets and leaves tawny pubescent, leaves yellowish green on both surfaces when dry. *C. Hamiltoni*, *Planch. l. c.* 301 and 179.—Sikkim Himalaya, the Khasia Mts., Chittagong and Burma.

VAR. *mollis*; leaves entire or subentire softly fulvous-tomentose beneath, yellowish when dry, drupes sparingly hairy. *C. mollis*, *Wall. Cat.* 7203; *Planch. l. c.* 297, 179; *Kurz l. c.* 472.—Burma, Wallich.

3. *C. cinnamomea*, Lindl. in *Wall. Cat.* 3696; leaves evergreen coriaceous obliquely ovate acuminate crenate-serrate 3-nerved to below the

tip, cymes short, flowers stoutly shortly pedicelled, drupes racemed narrowed to the tip. *Planch. in Ann. Sc. Nat. Ser. x.* 303; *DC. Prodr.* xvii. 181; *Kurz For. Fl.* ii. 472; *Blume Mus. Bot.* ii. 72; *Miq. Fl. Ind. Bat. Suppl.* 412. *C. dysodoxylon*, *Thwaites Enum.* 267; *Bedd. For. Man.* 219. *C. Waitzii*, *Blume l. c.* 71; *Planch. in DC. l. c.* 180.

SIKKIM HIMALAYA; in the lower hills, ASSAM, CHITTAGONG and BURMA. CEYLON; Central Province, ascending to 5000 ft.—DISTRIB. Malay Islands.

I doubt this being distinct from *C. tetrandra*; the habit is the same, as is the inflorescence, but the drupes have an almost beaked apex.—The wood in Ceylon smells disgustingly.

4. **C. Wightii**, *Planch. in Ann. Sc. Nat. Ser. 4, x.* 307; *DC. Prodr.* xvii. 184; leaves very coriaceous straight oblong or elliptic-oblong acute entire or very sparsely crenate-serrate 3-nerved to the tip, drupes racemed ellipsoid obtuse or 2-cuspidate scarlet. *Wight Ic. t.* 1969; *Bedd. For. Man.* 218; *Wall. Cat.* 9056. *Solenostigma Wightii*, *Miq. Fl. Ind. Bat.* i. ii. 220; *Kurz For. Fl.* ii. 471. *S. consimile*, *Blume Mus. Bot.* ii. 68. *Bosia trinervia*, *Roxb. Fl. Ind.* ii. 87.

The Circars, *Roxburgh*. NILGHIRI HILLS, alt. 4–6000 ft., *Wight, &c.* ANDAMAN ISLANDS, *Kurz*. CEYLON, dry parts of the island.—DISTRIB. Malay Islands, Australia.

A large tree (*Roxburgh*); branches stiff, glabrous or tomentose. Leaves 4–6 in., bifarious, acute or cuspidate, yellowish when dry, glabrous or pubescent beneath, nerves very strong, cross-nervules parallel; stipules peltate, caducous. Cymes stout, short, axillary, male and bisexual fl. together; sepals acute. *Drupe* $\frac{1}{4}$ – $\frac{1}{2}$ in. long; nut reticulate, styles deciduous.—The straight leaves with nerves produced to the tip are very different from those of the preceding species. I suspect that *C. philippinensis* is not different from *C. Wightii*.

4. TREMA, Lour.

Shrubs or trees, unarmed. Leaves alternate, serrate, base 3–7-nerved; stipules lateral, caducous. Flowers unisexual or polygamous, in small axillary cymes. MALE FL. *Sepals* 4–5, induplicate-valvate or subimbricate. *Stamens* 4–5, erect in bud. *Pistillode* 0 or small. FEM. FL. *Sepals* of the male in stamiferous flowers, flat and subimbricate in unisexual. *Ovary* sessile; style terminal, arms 2 linear; ovulé pendulous. *Drupe* small, straight, ovoid or subglobose, usually crowned by the style, endocarp hard. *Albumen* fleshy; embryo curved or involute; cotyledons narrow; radicle upcurved, incumbent.—Species about 20, tropical and subtropical.

1. **T. timorensis**, *Blume Mus. Bot.* ii. 60; nearly glabrous, branches very slender, leaves membranous ovate-oblong or -lanceolate caudate-acuminate serrulate base rounded or subcordate, petiole very slender, cymes glabrous equalling the petiole or shorter, fruiting sepals narrow ciliate, drupe turbidly ovoid, nut rugose. *Kurz For. Fl.* ii. 469. *T. virgata*, *Blume l. c.* *Sponia virgata*. *Planch. in Ann. Sc. Nat. Ser. 3, x.* (1848) 316; *DC. Prodr.* xvii. 195. *S. timorensis*, *Decne. Herb. Timor.* 170; *Planch. l. c.* 318, 196. *Celtis virgata*, *Roxb. in Wall. Cat.* 3694.

TENASSERIM and the MALAY PENINSULA.—DISTRIB. China, Malay Islands? Australia.

A small evergreen tree, branchlets almost filiform, pubescent, drooping. Leaves 3–5 in., thin, nerves slender; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. Cymes few-fl., glabrous. *Drupe* $\frac{1}{2}$ in. diam.

2. **T. angustifolia**, *Blume Mus. Bot.* ii. 58; branches very slender, leaves ovate-lanceolate finely acuminate serrulate scabrous on both surfaces base rounded rufous beneath with strigose nerves, cymes hispidulous about equalling the petioles, drupe ovoid. *Sponia angustifolia*, *Planch. in Ann. Sc. Nat. Ser.* 3, x. 326; *DC. Prodr.* xvii. 202. *Celtis angustifolia*, *Lindl. in Wall. Cat.* 3691.

PENANG, *Wallich*. MALACCA, *Griffith* (*Kew Distrib.* 4685).

Very similar to *T. virgata*, and perhaps a variety of that plant, but the leaves are narrower, scabrid, rufous when dry beneath, and the flowers hispidulous.

3. **T. orientalis**, *Blume Mus. Bot.* ii. 62; branchlets appressed-pubescent, leaves rigid obliquely ovate-oblong or oblong-lanceolate acuminate crenate-serrulate scabrid above beneath silvery with appressed pubescence, base 3-7-nerved cordate, cymes lax spreading usually longer than the petiole, drupe ovoid black. *Kurz For. Fl.* ii. 463 (var. *orientalis* proper); *Benth. Fl. Austral.* vi. 158. *Sponia orientalis*, *Planch. in Ann. Sc. Nat. Ser.* 3, x. 323; *DC. Prodr.* xvii. 200; *Brandis For. Fl.* 430; *Bedd. For. Man.* 219. *S. Wightii*, *Planch. l. c.* 322; *Wight Ic.* t. 1971; *Bedd. Fl. Sylvat.* t. 311; *Dalz. & Gibs. Bomb. Fl.* 238. *Celtis orientalis*, *Linn. Fl. Zeyl.* 176 in part; *Roxb. Fl. Ind.* ii. 65; *Wall. Cat.* 3689.

Foot of the NEPAL and SIKKIM. HIMALAYA; BENGAL, BEHAR, and southwards to TRAVANCORE and SINGAPORE. CEYLON common.—DISTRIB. Malay Islands.

An evergreen small tree. *Leaves* 3-6 in., nerves 3-4 pairs, stipules as long as the young petioles, deciduous. *Stigmas* villous, reflexed in fruit. *Drupe* $\frac{1}{8}$ in. long, glabrous.

4. **T. amboinensis**, *Blume Mus. Bot.* ii. 61; branchlets villous or tomentose, leaves usually large ovate-oblong caudate-acuminate serrulate scaberulous or pubescent above beneath silkily tomentose velvety or villous, cymes usually large compact and exceeding the petiole. *Benth. Fl. Austral.* vi. 159. *T. orientalis*, var. *amboinensis*, *Kurz For. Fl.* ii. 469. *T. velutina* & *Burmanni*, *Blume l. c.* 62. ? *T. cannabina*, *Lour. Fl. Coch.* *Sponia amboinensis*, *Decne. in Nouv. Ann. Mus.* iii. 498; *Planch. in DC. Prodr.* xvii. 199. *S. Griffithii*, *Planch. in Ann. Sc. Nat. Ser.* 3, x. 324. *S. amboinensis* & *velutina*, *Miq. Fl. Ind. Bat.* i. ii. 216. *S. velutina*, *Planch. l. c.* 327; *Bedd. For. Man.* 219. *S. Burmanni*, *Planch. in DC. l. c.* 200. *Celtis amboinensis*, *Willd. Sp. Pl.* iv. 997; *Wall. Cat.* 3690; *Brongn. in Bot. Duperr. Voy.* 212, t. 47. *C. tomentosa*, *Roxb. Fl. Ind.* ii. 66. *C. caudata*, *Wall. mss.*

SIKKIM HIMALAYA; in hot valleys, ASSAM, SILHET, and southwards to SINGAPORE and the ANDAMAN ISLANDS.

A tree with the habit of *T. orientalis*, from which it differs in the tomentose leaves, and of which it is perhaps a large form, as considered by *Kurz*. If it should prove to be the *Trema cannabina* of *Loureiro*, that author's name will stand.

5. **T. politoria**, *Planch. in Ann. Sc. Nat. Ser.* iii. x. (1848) 326; *DC. Prodr.* xvii. 202 (*Sponia*); branchlets stout scabridly hairy, leaves oblong- or ovate-lanceolate acuminate base nearly equal serrulate very scabrid on both surfaces, cymes compact males about equalling the petiole. *Brandis For. Fl.* 430; *Gamble Man. Ind. Timb.* 345. *Celtis politoria*, *Wall. Cat.* 3693.

Dry places in the SUBTROPICAL HIMALAYA, from the Salt Range eastwards to OUDH and SIKKIM, and southwards to Mount Aboo in MAHWAR and CENTRAL INDIA.

A small tree, sparingly branched. *Leaves* 2-5 in., triple- and pinni-nerved, very

hard and roughly shortly hispid, usually shining above, paler beneath, base rounded or cordate, hairs with swollen persistent bases; petiole $\frac{1}{4}$ in.; stipules longer than the petiole, deciduous.

5. **GIRONNIERA**, Gaud.

Evergreen unarmed trees or shrubs. *Leaves* alternate, penninerved; stipules sheathing the buds, caducous. *Flowers* diœcious, in axillary cymes, or the fem. solitary. *MALE FL. Sepals* 5, broad, obtuse, imbricate. *Stamens* 5, erect in bud. *Pistillode* woolly. *FEM. FL. Sepals* narrower than the males, acute. *Ovary* sessile; style central, arms 2 filiform; ovule pendulous. *Drupe* ovoid or suborbicular, terete or compressed, often 2-keeled, endocarp hard. *Albumen* 0, scanty or copious; embryo contorted.—Species 8 or 10, South Indian, Malayan and Chinese.

1. **G. nervosa**, Planch. in *Ann. Sc. Nat. Ser. 3*, x. (1848) 338; *DC. Prodr.* xvii. 206; branchlets petioles peduncles and leaf-nerves beneath tawny or golden silky villous, leaves elliptic or oblong acuminate entire subsilky between the very stout nerves beneath, male cymes spiciform, drupe ovoid compressed beaked hispidulous. *Kurz For. Fl.* ii. 469; *Miq. Fl. Ind. Bat.* i. ii. 223; *Suppl.* 412; *Blume Mus. Bot.* ii. 74. *Antidesma nervosum*, Wall. *Cat.* 7289.

PENANG, Porter; PERAK, MALACCA and SINGAPORE, Griffith, &c.—DISTRIB. Malay Islands.

A tree attaining 70 ft. *Leaves* 5–7 in., coriaceous, opaque and glabrous above; nerves 12–15 pairs, sunk above, very strong beneath, interspaces reticulated, base acute; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; stipules $\frac{3}{4}$ –1 in., silky. *Cymes* 1–1 $\frac{1}{2}$ in.; males rather stout with few dense-fl. branches; fem. cymes of sparingly branched racemes. *Drupe* shortly pedicelled, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, obtusely 2-edged.—Kurz gives “Burma probably Tenasserim” as a habitat, but I have seen no specimens.

2. **G. subæqualis**, Planch. in *Ann. Sc. Nat. Ser. 3*, x. 339; *DC. Prodr.* xvii. 206; branchlets stipules young petioles leaf-nerves beneath and cymes sparsely strigose, leaves elliptic or elliptic-oblong acuminate entire scaberulous beneath between the nerves shining on both surfaces, drupe broadly ellipsoid compressed appressed-pubescent. *Miq. Fl. Ind. Bat.* i. ii. 222; *Blume Mus. Bot.* ii. 73. *G. nervosa*, var. *subæqualis*, *Kurz For. Fl.* ii. 470. *G. costata*, *Miq. in Zoll. Cat.* 88, and in *Fl. Ind. Bat.* l. c. *Sponia annulata*, *Teijsm. & Binnend. in Nat. Tijdsch. Neerl. Ind.* ii. 363.

PERAK, Scortechini, King's Collector. MALACCA, Maingay. ANDAMAN ISLANDS, Kurz.—DISTRIB. Malay Islands, China.

A tree, 70–80 ft. *Leaves* 5–8 in., sometimes 5 in. broad, pale brown when dry, very coriaceous, reticulate beneath between the 8–10 pairs of strong nerves; base acute; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules $\frac{1}{2}$ – $\frac{3}{4}$ in. *Cymes* sparingly branched, slender, much longer than in *G. nervosa*. *Drupe* $\frac{1}{3}$ – $\frac{1}{2}$ in., compressed, obtusely 2-edged, usually beaked, rarely orbicular.

VAR. *ceylanica*, Thwaites Enum. 268; more slender, leaves narrower caudate-acuminate less rigid and coriaceous sometimes oblanceolate and serrulate towards the tip, stipules smaller silky villous, fem. cymes very few-fl., drupe smaller subsolitary axillary. *G. parvifolia*, β . in part, *Planchon l. c.* *G. subæqualis*, *Bedd. For. Man.* 219, and *Fl. Sylvat.* t. 313. *Helminthospermum scabridum*, *Thwaites in Hook. Journ. Bot.* vi. (1854) 303, t. 9 C.—Ceylon, in the Central Province, alt. 1000–2000 ft., *Walker*.—Referred by Planchon to *G. parvifolia*, but I think, with Thwaites, that it is much nearer *G. subæqualis*. Better specimens are wanted. *Beddome* figures the Ceylon *G. subæqualis* as having only 4–5-nerved leaves, and the male flowers as forming minute axillary clusters.

VAR. *birmanica*; leaves large elliptic more membranous crenate-serrate above the middle.—Tenasserim, on Mount Moolyet, *Beddome* (fem. fl. only).

3. **G. parvifolia**, *Planch. in Ann. Sc. Nat. Ser. 3, x.* (1848) 338; *DC. Prodr.* xvii. 206 (*excl. syn.*); branchlets young petioles stipules and leaf-nerves beneath faintly strigose, leaves elliptic ovate or ovate-lanceolate acuminate rather shining nearly smooth beneath, male cymes very slender much branched, flowers very minute, drupe ovoid or orbicular compressed 2-edged appressed puberulous. *Miq. Fl. Ind. Bat. i. ii.* 223.

PERAK, *Scortechini, King's Collector.* PENANG, *Maingay* (*Kew Distrib.* 1470). MALACCA, *Griffith.*

A shrub or small tree; branches slender. Leaves 3–5 in., quite entire, reticulate, nearly smooth beneath between the 6–8 pairs of rather slender raised nerves; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules $\frac{1}{2}$ in., silkily strigose. Male cymes with scattered clusters of 2–3 flowers, peduncle and branches filiform. Fem. cymes few-fl. Drupes 2–3 on a long slender peduncle, $\frac{1}{2}$ in. broad, often long-beaked, and with the style-arms 1 in. long.—*Planchon*, erroneously including the Cingalese *G. subæqualis* var. *ceylanica*, describes the leaves as serrate above the middle.

4. **G. reticulata**, *Thwaites Enum.* 268; glabrous except the youngest shoots, leaves oblong- to ovate-lanceolate acuminate or caudate base rounded or acute quite smooth and glabrous on both surfaces, male cymes much branched, fem. few-fl., drupes large solitary axillary ovoid hardly compressed quite glabrous. *Bedd. Fl. Sylvat. t.* 313. *G. cuspidata*, *Kurz For. Fl. ii.* 470. *Sponia suberrata*, *Kurz in Flora*, 1872, 448. *Aphananthe cuspidata*, *Planch. in DC. Prodr.* xvii. 209. *Galumpita cuspidata*, *Blume Mus. Bot. ii.* 73; *Miq. Fl. Ind. Bat. i. ii.* 224. *Cyclostemon cuspidatum*. *Blume Bijl.* 599. *Helminthosperma glabrescens*, *Thwaites mss.* *Celtis reticulata*, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 1–3000 ft., *Kurz, &c.* ASSAM; Goalpara, *Hamilton.* KHASIA MTS., alt. 2000 ft., *Mann.* UPPER BURMA, at the Serpentine mines, *Griffith.* PEGU, *Kurz.* DECCAN PENINSULA; on the Ghats from S. Canara to Travancore. CEYLON; Badulla district, ascending to 3000 ft.—DISTRIB. Java.

A lofty tree, branchlets slender, glabrous. Leaves 3–7 in., very long-pointed, finely reticulated on both surfaces, young serrulate above the middle, often shining above; nerves 10–12 pairs, slender; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. Male cymes shortly peduncled; branches short, many-fl.; flowers nearly glabrous; pistillode of male a very small tuft of hairs. Drupes about as long as their pedicel, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, stoutly beaked, obscurely 2-angled.

5. **G. lucida**, *Kurz For. Fl. ii.* 470; quite glabrous, leaves oblong or oblong-lanceolate or -ovate acuminate shining on both surfaces, base rounded or cuneate, male cymes shortly peduncled much branched quite glabrous, drupes large solitary axillary ovoid hardly compressed quite glabrous.

SOUTH ANDAMAN ISLANDS, *Kurz, King's Collector.*

A tree, 30–40 ft. Leaves 5–8 in., very coriaceous, glossy above with 10–15 pairs of impressed nerves, reticulate beneath; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. Male fl. and drupe as in *G. reticulata*, from which *G. lucida* differs chiefly in the larger more coriaceous glossy foliage, with more leaf-nerves.

5*. HUMULUS, Linn.

Perennial, twining, scabrid herbs. Leaves opposite, lobed, palmatinerved; stipules lateral, persistent. Flowers dioecious, males panicle; fem. in pairs in the axils of the broad bracts of a catkin-like ovoid spike, bracteate and 2-bracteolate. MALE FL. Sepals 5, imbricate. Stamens 5, adnate to the

sepals, erect in bud. *Pistillode* 0. FEM. FL. *Sepal*, a membranous scale. *Ovary* sessile, compressed; styles 2, subulate; ovule pendulous, campylotropous. *Fruit* an ovoid spike of imbricating bracts in the axils of which are 2 flattened achenes each enclosed in its sepal. *Albumen* scanty or 0; embryo a flat helix.—Species one Chinese and Japanese, and the following.

H. LUPULUS, *Linn. Sp. Pl.* 1028; bracts and bracteoles scarious covered with resinous glands. *A. DC. Prodr.* xvi. i. 29; *Bentl. & Trim. Med. Pl.* iv. 230; *Reichb. Ic. Fl. Germ.* xii. t. 656.

NORTH-WEST HIMALAYA, cultivated. Native of N. America, and perhaps of N. Asia.

Rootstock stout, branched; stems tall, scabrid or prickly with reversed bristles. *Leaves* 3-4 in. diam., petioled, cordate, toothed, upper ovate, lower 3-5-lobed. *Male fl.* $\frac{1}{2}$ in. diam.; panicles 3-5 in. across. *Fem. heads* $\frac{1}{2}$ in. diam., yellow; styles purple; fruiting $1\frac{1}{2}$ in. diam., scales orbicular.—The Hop.

6. CANNABIS, Tournef.

A tall erect annual herb. *Leaves* alternate or the lower opposite, upper 1-3-lower 5-11-partite, serrate, palmatinerved; stipules lateral. *Flowers* small, axillary, diœcious, males fascicled in short pendulous panicles; fem. crowded under leafy convolute bracts. MALE FL. *Sepals* 5, imbricate. *Stamens* 5, erect in bud. *Pistillode* 0. FEM. FL. *Perianth* hyaline, embracing the ovary or 0. *Ovary* sessile; style central, arms 2 filiform caducous; ovule pendulous. *Achene* compressed, crustaceous. *Seed* flattened, albumen unilateral fleshy; embryo curved, cotyledons broad thick subequal, radicle upcurved incumbent.

C. sativa, *Linn. Sp. Pl.* 1027; *Roxb. Fl. Ind.* iii. 772; *Grah. Cat. Bomb. Pl.* 187; *A. DC. Prodr.* xvi. i. 30; *Bentl. & Trim. Med. Pl.* iv. 231; *Reichb. Ic. Fl. Germ.* t. 655; *Wall. Cat.* 4665. *C. indica*, *Lamk. Encycl.* i. 695.—*Rheede Hort. Mal.* x. 60, 61.

Throughout INDIA; wild in the N.-W. Himalaya, cultivated elsewhere.—DISTRIB. Central Asia, wild; cultivated in temp. and trop. regions.

Stem 4-8 ft., strict, subsimple. *Leaves* 4-8 in. diam. *Flowers* green.—Hemp; produces cordage, and Bhang or Kief.

7. PSEUDOSTREBLUS, Bureau.

Unarmed glabrous trees. *Leaves* alternate, quite entire, penninerved; stipules small, lateral, caducous. *Flowers* monœcious, axillary, males in short cymes, fem. 4-bracteolate, solitary in different axils, or solitary in the male cyme. MALE FL. *Sepals* 5, orbicular, imbricate. *Stamens* 5, inflexed in bud. *Pistillode* small, linear. FEM. FL. *Sepals* 4, orbicular, concave, embracing the ovary. *Ovary* subglobose; style terminal, arms 2 filiform subequal; ovule pendulous. *Fruit* (unripe) enclosed in the enlarged perianth.—Species 3, Eastern Indian and Malayan.

P. indica, *Bureau in DC. Prodr.* xvii. 220; leaves elliptic oblong or oblong-lanceolate acuminate base acute, nerves very many parallel nearly horizontal and anastomosing.—*Epicarpurus*, No. 8, *Herb. Ind. Or. H. f. & T.*

KHASIA Mts.; Bor panee River, alt. 4000 ft., J. D. H. & T. T.

A small tree; shoots and inflorescence puberulous. *Leaves* 4-6 in., coriaceous, glabrous, drying brown, rather shining on both surfaces; petiole $\frac{1}{2}$ - $\frac{1}{3}$ in.; stipules ovate-lanceolate. *Male fl.* about $\frac{1}{2}$ in. diam.; buds globose; *fem.* much larger. *Fruit* $\frac{1}{2}$ in. diam. or more.

8. TAXOTROPHIS, Blume.

Spinous trees or shrubs. *Leaves* alternate, penninerved; stipules small, connate, caducous. *Flowers* diœcious, axillary, males in short spikes racemate or fascicles, *fem.* 1-4 on a long peduncle. MALE FL. *Sepals* 4, valvate. *Stamens* 4, inflexed in bud. *Pistillode* with a dilated top. FEM. FL. *Sepals* 4, imbricate, persistent and shorter than the fruit. *Ovary* ovoid, straight, at length very oblique; style 2-partite, at length lateral; ovule pendulous. *Fruit* obliquely subglobose, fleshy on one side and at the base, apex thin. *Seed* oblique, albumen 0; cotyledons broad, fleshy, crumpled, radicle upcurved.—Species 3-4, Ceylon and Malayan.

T. zeylanica, *Thwaites Enum.* 264; glabrous, leaves rhombic or trapezoidally elliptic obtusely acuminate serrate. *Beddome Forester's Man.* 222, t. 26, f. 3. *Diplocos zeylanica*, *Bureau in DC. Prodr.* xvii. 215. *Epicarpurus zeylanicus*, *Thwaites in Hook. Lond. Journ.* iv. (1852) 1, 3, t. 2; *Wight Ic.* t. 1962 (the lower left-hand figure). *Streblus zeylanica*, *Kurz For. Fl.* ii. 464.

BURMA, *Griffith (Kew Distrib.* 4659). CEYLON, near Kandy, *Thwaites*.

A small evergreen tree or shrub; spines short or long, straight; shoots puberulous. *Leaves* 3-4 in., rhomboidly oblong or lanceolate, obtusely caudate, glabrous; petiole $\frac{1}{2}$ - $\frac{1}{3}$ in.; stipules lanceolate. *Male fl.* minute, shortly pedicelled, subracemose, puberulous. *Fruit* size of a pea, subtended by the small lanceolate rather enlarged sepals.

9. PHYLLOCHLAMYS, Bureau.

Glabrous spinous trees or shrubs; sap milky. *Leaves* alternate, penninerved; stipules lateral, free. *Flowers* diœcious, males in short axillary involucrate spikes or clusters; *fem.* solitary, peduncled. MALE FL. *Sepals* 3-4, ovate, imbricate. *Stamens* 3-4, inflexed in bud. *Pistillode* dilated at the top. FEM. FL. *Sepals* 3-4, accrescent and foliaceous in fruit. *Ovary* straight in flower, at length very oblique; style 2-partite, at length lateral; ovule pendulous. *Fruit* small, shorter than the sepals, obliquely globose or ovoid, subfleshy below, with a very thin umbonate apex. *Seed* oblique, albumen very scanty; embryo globose, one cotyledon very large 2-fid enclosing the smaller, radicle upcurved.—Species 2 or 3, Indian and Malayan.

1. **P. spinosa**, *Bureau in DC. Prodr.* xvii. 218; leaves subsessile elliptically rhombic or subtrapezoid remotely serrate on one or both margins or subentire. *Brandis For. Fl.* 411; *Bedd. For. Man.* 220, t. 26, f. 2. *Epicarpurus spinosus*, *Wight Ic.* 1962 (upper and right-hand figures). *E. timorensis*, *Dcne. Herb. Timor.* 171, t. 21. *Taxotrophis Roxburghii*, *Blume Mus. Bot.* ii. 58; *Miq. Fl. Ind. Bat.* i. ii. 279; *Thw. Enum.* 264. *Trophis spinosa*, *Roxb. Fl. Ind.* iii. 762 (not of Willd.). *T. taxiformis*, *Spreng. Syst.* iii. 902. *T. taxoides*, *Heyne in Roth Nov. Sp.* 368. *T. ? Heyneana*, *Wall. Cat.* 4642. *Streblus taxoides*, *Kurz For. Fl.* ii. 465.

DECCAN PENINSULA; the Circars, *Heyne*; Courtallam, *Wight*. BURMA and the ANDAMAN ISLANDS, *Kurz*. CEYLON, in the dry districts.—DISTRIB. Malay Islands.

A small evergreen gnarled tree; spines long, strong, often leafy and flowering. *Leaves* 2-4 in., nerves 6-8 pair, nearly straight; petiole $\frac{1}{2}$ in.; stipules acute. *Bracts* of small involucre short, imbricate. *Fem. peduncles* solitary or binate, bracteate at or below the middle. *Fruiting sepals* $\frac{1}{2}$ -1 in., lanceolate, acuminate. *Fruit* size of a cherry.—Wight describes the fem. sepals as 5, but figures 4.

VAR. ? microphylla, Kurz l. c.; shoots and spines puberulous, leaves 1-1 $\frac{1}{2}$ in. ovate to oblong obtuse mucronate crenate.—Irawaddi River in swampy forests, Kurz.

2. **P. Wallichii**, King in *Herb. Calcutt.*; leaves elliptic-oblong or lanceolate obtuse or obtusely acuminate quite entire or very obscurely toothed.—*Erythroxyl*i fere facie, &c., *Br. in Wall. Cat.* 7519.

PENANG, Porter, *Curtis*. PERAK, King's Collector.

A thorny shrub or small tree, 10-15 ft.; branchlets quite glabrous. *Leaves* 5-7 in., coriaceous, pale when dry, strongly reticulate between the nerves beneath; petiole $\frac{1}{10}$ in. *Male fl.* in small globose sessile clusters, sparsely pubescent. *Fruit* $\frac{1}{2}$ in. diam., sepals $\frac{3}{4}$ in., oblong, obtuse.—In Wallich's specimens some branchlets are clothed with ovate acute rigid imbricating bracts or scales $\frac{1}{12}$ in. long, which no doubt led to Brown's observation (*facie Erythroxyl*i) in *Herb. Wallich*.

10. **STREBLUS**, Lour.

Unarmed shrubs or trees, juice milky. *Leaves* scabrid, alternate, penninerved; stipules small, subulate. *Flowers* axillary, di- rarely monœcious, males in peduncled heads or spikes; fem. peduncled, solitary or 2-4 together. *MALE FL. Sepals* 4, imbricate. *Stamens* 4, inflexed in bud. *Pistillode* dilated at the top. *FEM. FL.* bracteate. *Sepals* of male embracing the ovary. *Ovary* straight, retuse; style central, arms very long; ovule pendulous. *Fruit* membranous, subglobose, not oblique, laxly clothed with the persistent sepals. *Seed* globose, testa membranous, albumen 0; embryo globose, one cotyledon very large fleshy, enclosing the other which is very small and the upcurved radicle.—Species 2, Indian and Malayan.

1. **S. asper**, Lour. *Fl. Coch.* ii. 615; scabrid, male fl. capitate. *Bureau in DC. Prodr.* xvii. 218; *Brand. For. Fl.* 410; *Kurz For. Fl.* ii. 464; *Dalz. & Gibs. Bomb. Fl.* 240; *Bedd. For. Man.* 221, t. 26, f. 1; *Miq. Fl. Ind. Bat.* i. ii. 278, and *Suppl.* 171; *Gamble Man. Ind. Timb.* 326. *Epicarporus orientalis*, *Blume Bijl.* 488; *Wight Ic.* t. 1961. *E. asper*, *Steud. Nomencl.* i. 556. *Trophis aspera*, *Retz. Obs.* v. 30 (*excl. syn.*); *Roxb. Fl. Ind.* iii. 761; *Wight in Hook. Journ. Bot.* i. (1834) 62, t. 121; *Wall. Cat.* 4640. *T. cochinchinensis*, *Poir. Encycl.* viii. 123. *T. aculeata*, *Roth Nov. Sp.* 868. *Achymus patens*, *Soland. mss.*—*Rheede Hort. Mal.* i. t. 48.

Drier parts of India; from ROHILKUND, eastward and southward to TRAVANCORE, PENANG and the ANDAMAN ISLANDS. CEYLON; common.—*DISTRIB.* Malay Islands, Cochinchina, China, Siam.

A rigid shrub or gnarled tree; branchlets tomentose or pubescent. *Leaves* 2-4 in., rigid, elliptic, rhomboid, ovate or obovate, irregularly toothed; petiole $\frac{1}{12}$ in. *Male heads* globose, solitary or 2-nate, sometimes androgynous; peduncle short scabrid; flowers minute. *Fem. fl.* longer peduncled. *Fruit* pisiform; perianth yellow.

2. **S. mitis**, Kurz *For. Fl.* ii. 464; glabrous, male fl. in simple or branched spikes.

ATA; on the Kakhyen Hills, Kurz.

I do not know this plant, which Kurz describes as an evergreen tree with leaves

like those of *S. scaber*, but much larger (2-4 in.), membranous, oblong to obovate, with rounded base, and male spikes $\frac{1}{2}$ -1 in. *Fem. fl.* unknown.—Probably not a *Streblus*.

11. **BROUSSONETIA**, Vent.

Trees or shrubs. *Leaves* alternate, serrate or lobed; stipules lateral, deciduous. *Flowers* diœcious, in solitary capitate or cylindric spikes. **MALE FL.** *Perianth* 4-fid, or -lobed, valvate. *Stamens* 4, inflexed in bud. *Pistillode* minute. **FEM. FL.** mixed with persistent bracts. *Perianth* ovoid or tubular, 3-4-toothed, persistent. *Ovary* included, stipitate; style subulate, 2-partite; ovule pendulous. *Achenes* in small heads, surrounded with the bracts and perianths, stipitate, exserted, fleshy below crustaceous above; style excentric. *Albumen* scanty; cotyledons oblong, equal, radicle ascending incumbent.—Species 2-3, Malayan, Chinese and Japanese.

B. papyrifera, Vent. *Table Règne Vég.* iii. 547; branchlets sub-tomentose, leaves obliquely ovate or oblong acuminate entire or (young) sinuately 2-3-lobed and toothed scabrid above pubescent beneath. *Bureau in DC. Prodr.* xvii. 224; *Brand. For. Fl.* 410; *Kurz For. Fl.* ii. 467; *Bot. Mag.* t. 2358; *Andrews Bot. Rep.* t. 488.

MAITABAN and AVA HILLS, *Kurz*.—**DISTRIB.** Malay and Pacific Islands.

A small tree. *Leaves* 3-8 in., membranous; petiole 2-3 in. *Male spikes* 2-3 in., cylindric, peduncled, pubescent. *Fem. heads* longer peduncled, globose, $\frac{1}{2}$ - $\frac{2}{3}$ in. diam., tomentose. *Fruit* fleshy, red, shining, stipes long.

12. **ALLÆANTHUS**, Thwaites.

Trees, flowering after the leaves fall, sap milky. *Leaves* alternate, penninerved from the base; stipules lateral. *Flowers* diœcious, males in very long cylindric spikes, fem. capitate. **MALE FL.** *Perianth* 4-fid, imbricate. *Stamens* 4, inflexed in bud. *Pistillode* minute. **FEM. FL.** mixed with persistent bracts. *Perianth* tubular, 4-toothed, persistent. *Ovary* sessile; style elongate, undivided or with a short basal branch; ovule pendulous. *Achenes* in globose tomentose heads, oblique, sessile, surrounded with bracts and perianths, coriaceous. *Seed* exalbuminous; embryo recurved, cotyledons broad plicate, radicle ascending incumbent.—Species 2 or 3, Indian, Malayan and Cingalese.

1. **A. zeylanicus**, Thwaites in *Hook. Lond. Journ. Bot.* vi. (1854) 302, t. 9 B, and *Enum.* 263; branchlets pubescent, fem. heads solitary. *Bureau in DC. Prodr.* xvii. 223; *Bedd. Fl. Sylvat.* t. 307.

CEYLON; in the Central Province, alt. 1-2000 ft.

A deciduous tree, 30-40 ft.; branchlets terete, hairy. *Leaves* 3-4 in., distichous, hairy, cordate-lanceolate, acuminate, paler beneath; petiole $\frac{1}{2}$ in., hairy; stipules obliquely oblong, acuminate, striate. *Fem. heads* $\frac{1}{2}$ in. diam., stoutly peduncled.

2. **A. Kurzii**, Hook. f.; branchlets quite glabrous, fem. heads cymose. *Malaisia tortuosa*, *Kurz For. Fl.* ii. 466 (not of Blume).

ASSAM, *Masters*; at Goalpara, *Clarke*. BURMA, *Griffith (Kew Distrib.* 4657). PEGU, to TENASSERIM, *Kurz*.

Branchlets very long, terete. *Leaves* not seen. *Male spikes* 1-1 $\frac{1}{2}$ in., in shortly peduncled subracemose clusters, pendulous; bracts orbicular. *Fem. heads* $\frac{1}{2}$ in. diam., 4-6 in a raceme, pubescent. *Achenes* 6-12 in a head, not protruded, ovoid, acute, coriaceous; style very long, undivided; cotyledons subequal, broad, thin, incurved.—

Resembles *Malaisia tortuosa*, a widely diffused Malayan and Australian plant, and mistaken for it by Kurz; it differs in the erect habit, embryo, and undivided style. The genera might well be united. The true *M. tortuosa*, though abundant from the Malay to the Pacific Islands, has not hitherto been found in the limits of British India.

13. **PLECOSPERMUM**, *Trecul*.

Glabrous trees or shrubs. *Leaves* alternate, quite entire, penninerved; stipules minute. *Flowers* dioecious, in axillary solitary or 2-3-nate peduncled heads. MALE FL. bracteolate. *Perianth-lobes* 4, concave, imbricate. *Stamens* 4, inflexed in bud. *Pistillode* minute, hairy. FEM. FL. *Perianths* fleshy, 4-toothed, connate into a fleshy many-celled head. *Ovary* straight, included; style filiform, undivided; ovule pendulous. *Achenes* few in the globose fleshy receptacle, coriaceous, adnate to the perianths. *Albumen* 0; embryo subglobose, one cotyledon very large fleshy, embracing the smaller folded one; radicle upcurved.—Species 3, an African and the following.

1. **P. spinosum**, *Trecul* in *Ann. Sc. Nat. Ser. 3*, viii. 124; spinous. *Bureau* in *DC. Prodr.* xvii. 233; *Wight Ic. t.* 1963; *Brand. For. Fl.* 401; *Gamble Man. Ind. Timb.* 327; *Bedd. Flor. Sylvat. t.* 220. *Batis spinosa*, *Roxb. Fl. Ind.* iii. 762 (*excl. syn. Rumph.*). *B. aurantiaca*, *Wall. mss.* *Trophis spinosa*, *Heyne in Willd. Sp. Pl.* iv. 734; *Wall. Cat.* 4641 A, E. *T. aculeata*, *Roth Nov. Sp.* 368.

From the SALT RANGE, alt. 3000 ft., eastwards along the foot of the Himalaya, and southwards to TRAVANCORE and CEYLON.

A shrub or tree, spines axillary, straight; branchlets puberulous. *Leaves* 2-3 in., elliptic-oblong or obovate, obtuse or acute, glabrous; nerves obscure; petiole $\frac{1}{8}$ - $\frac{1}{2}$ in. *Male heads* $\frac{1}{2}$ in. diam.; sepals obtuse or notched, pubescent. *Fruiting heads* $\frac{1}{2}$ in. diam., lobed, with 1-2 achenes.—Closely resembles *Cudrania javanensis* in habit and foliage.

2. **P. andamanicum**, *King* in *Herb. Calcutt.*; unarmed.

TENASSERIM; banks of the Atran, *Lobb.* ANDAMAN ISLANDS, *King's Collector*.

Apparently a larger stouter species than *P. spinosum*, and unarmed, with elliptic-oblong coriaceous leaves 4-5 by 2-3 in., rounded at the base, longer petioles ($\frac{1}{2}$ -1 in.) and larger fem. heads on very stout peduncles.

14. **MORUS**, *Linn.*

Trees or shrubs. *Leaves* alternate, entire toothed or 3-lobed, base 3-5-nerved; stipules small, lateral, caducous. *Flowers* mono- or dioecious, spicate. MALE FL. *Sepals* 4, imbricate. *Stamens* 4, inflexed in bud. *Pistillode* turbinate. FEM. FL. *Sepals* 4, ducussate, imbricate, accrescent and succulent in fruit. *Ovary* included, straight, 1-celled; style central, 2-partite or 2-fid; ovule pendulous. *Fruiting spikes* or *heads* many; achenes enclosed in the succulent perianths. *Seed* subglobose, albumen copious fleshy; embryo incurved, cotyledons oblong equal, radicle ascending incumbent.—Species few, tropical and temperate.

I follow Brandis as to the first four Indian species of this genus, which he knew well in a living state, and had carefully studied. *M. atropurpurea*, *Roxb. Fl. Ind.* 595, *Wall. Cat.* 4647, a Chinese species closely allied to if not a variety of *M. alba*, with long cylindric dark-purple fruit, is cultivated in India.

M. ALBA, Linn. *Sp. Pl.* 986; leaves ovate or ovate-cordate acute often lobed toothed base 3-nerved, male sepals' elliptic, fem. spikes short ovoid, outer sepals keeled, inner flat or concave, styles short free. *M. alba* (*in part*), Bureau in *DC. Prodr.* xvii. 238; *Roxb. Fl. Ind.* iii. 594; *Brand. For. Fl.* 407, t. 47; *Gamble Man. Ind. Timb.* 327; *Reichb. Ic. Fl. Germ.* t. 657. *M. serrata*, Wall. *Cat.* 4648 B. *M. tatarica*, Linn. *Sp. Pl. Ed.* 3, 1399; *Roxb. l. c.* 598; *Pallas Fl. Ross.* i. ii. 9, t. 52.

Cultivated in the PANJAB, NORTH-WEST HIMALAYA and WESTERN TIBET, ascending to 11,000 ft.—DISTRIB. Afghanistan, N. and W. Asia, wild, or cultivated (for its fruit).

A deciduous monœcious tree, 30–40 ft.; branchlets petioles and leaves beneath puberulous or pubescent. *Leaves* 2–3 in., rather membranous; petiole $\frac{1}{2}$ –1 in. *Fruiting spikes* peduncled, white or red, sweet.—Roxburgh describes this as diœcious. The common black mulberry differs from *alba* in its broader firm thick often 5-nerved leaves, subsessile fem. spikes, densely hairy perianth and styles, and purple aciculous-sweet fruit, *Brandis*. *M. alba* is cultivated for its fruit.

1. *M. indica*, Linn. *Sp. Pl.* 986; leaves ovate caudate-acuminate sharply serrate often deeply lobed scaberulous, male sepals elliptic hairy, fem. spikes short ovoid, sepals obovate, outer keeled, inner flat, styles long hairy connate below. *M. alba*, var. *indica*, Bureau in *DC. Prodr.* xvii. 243; *Roxb. Fl. Ind.* iii. 596; *Brand. For. Fl.* 408; *Kurz For. Fl.* ii. 468; *Gamble Man. Ind. Timb.* 328; *Wight Ic.* t. 674; *Wall. Cat.* 4645 (*except H*). *M. parvifolia*, Royle *mss.* ? *M. acidosa*, Griff. *Notul.* iv. 388. *M. cuspidata*, Wall. *Cat.* 4646; *Gamble l. c.* *M. alba*, var. *cuspidata*, Bureau *l. c.* 243.

TEMPERATE and SUBTROPICAL HIMALAYA, from Kashmir to Sikkim, ascending to 7000 ft., wild and cultivated (for silkworm-feeding) in Bengal, Assam, Burma, &c.—DISTRIB. China, Japan.

Habit of *M. alba*, but cultivated usually as a shrub, of which it is perhaps a form with long points to the rougher leaves, connate styles, and obovate female sepals. Wallich's 4645 H is a very different plant, which I do not recognize.

2. *M. serrata*, *Roxb. Fl. Ind.* iii. 596; leaves broadly ovate-cordate acuminate coarsely toothed or serrate, petiole tomentose, fem. spikes short cylindric, fem. sepals 2–4 equal oblong ciliate, styles very hairy connate below, fruit shortly cylindric purple sweet. *M. alba*, *L. ?*, *Wall. Cat.* 4648 A; *Brand. For. Fl.* 409; *Gamble Man. Ind. Timb.* 328. *M. alba*, var. *serrata*, Bureau in *DC. Prodr.* xvii. 242. *M. pabularia*, *Decne. in Jacquem. Voy. Bot.* 149, t. 151. *M. vicorum*, *Jacquem. mss.*

TEMPERATE HIMALAYA, from Kumaon westwards, alt. 4–9000 ft. (cultivated in Kunawur).

A lofty tree, attaining 60–70 ft., and girth of trunk 28 ft.; young parts pubescent or tomentose. *Leaves* 2–8 in., often lobed, membranous; petiole 1–2 in., and young leaves beneath pubescent; stipules broadly lanceolate. *Spikes*, males 1–2 in., fem. $\frac{1}{2}$ in., peduncles softly tomentose. *Sepals* of male elliptic-oblong, villous; filaments flattened below. *Fruit* mucilaginous.—United with *alba* by Bureau, but I think very distinct. Roxburgh describes the leaves as rough but void of pubescence, and distinguishes the species by the long points and remarkably large teeth of the leaves, thus resembling *M. indica*.

3. *M. lævigata*, Wall. *Cat.* 4649; leaves ovate or ovate-cordate cuspidate finely serrate toothed glabrous or subscaberulous, spikes of both sexes very long-peduncled, sepals 4 rounded concave of male very hairy of fem. glabrous, styles nearly free papillose, fruit long cylindric yellowish-

white sweet, acini very small. *Brand. For. Fl.* 409; *Kurz For. Fl.* ii. 467. *M. alba*, var. *lævigata*, *Bureau in DC. Prodr.* xvii. 245. *M. glabrata*, *Wall. mss.*

TROPICAL and SUBTROPICAL HIMALAYA; from the Indus to Assam, wild and cultivated, ascending to 4000 ft. BEHAR, cultivated, *Brandis*. MARTABAN and TENASSERIM, wild, *Kurz*.

A medium-sized tree, shoots stipules and peduncles softly hairy. *Leaves* 3-7 in., membranous, young sparsely pubescent, base rounded or cordate; petiole 1 in., pubescent; stipules slender. *Male spikes* 4-5 in., slender, villous, shortly peduncled; fem. as long, glabrous. *Fruit* insipid.

VAR. *viridis*, *Bureau l. c.* 245; leaves rounded at the top. *M. viridis*, *Ham. in Wall. Cat.* 4650.—*Patna, Hamilton*.

15. SLOETIA, *Teijsm. and Binnend.*

Trees. *Leaves* large, alternate, entire, penninerved; stipules lateral, caducous. *Flowers* monœcious, in solitary or binate axillary long male or androgynous spikes with peltate bracts, often unilateral; fem. few, amongst the males. MALE FL. *Perianth* 3-lobed or -partite, imbricate. *Stamens* 3, inflexed in bud. *Pistillode* small. FEM. FL. *Sepals* 4, embracing the ovary. *Ovary* straight; style subcentral, persistent, arms 2, very long and slender; ovule pendulous. *Fruit* globose or turgidly ovoid, elastically ejected. *Albumen* 0; cotyledons thin, broad, unequal, concave, outer embracing the smaller, radicle elongate.—Species 3 or 4, Malayan.

1. **S. Sideroxylon**, *Teijsm. & Binnend. in Tijdschrift. Nat. Ver.* 1863; leaves petioled 10-12 by $3\frac{1}{2}$ -5 in. elliptic-oblong or broadly oblanceolate cuspidate base acute subequal. *Bureau in DC. Prodr.* xvii. 257; *Kurz in Journ. Linn. Soc.* viii. 168, t. 13. *Artocarpus elongatus*, *Miq. Fl. Ind. Bat. Suppl.* 172, 419. *Morus bifaria*, *Hort. Calcutt. (in part)*.

SINGAPORE, *Kurz*.—DISTRIB. Java, Sumatra.

A tall tree; shoots puberulous; branchlets smooth. *Leaves* shining above, subscaberulous beneath; nerves 16-22 pairs; petiole $\frac{1}{2}$ -1 in.; stipules $\frac{1}{2}$ in. *Spikes* 3-5 in., one narrow part of the rachis flowerless. *Fruit* pisiform.—*Kurz l. c.* describes the nerves as 12 to 15 pairs, but I find (in his specimens) 16-20.

2. **S. penangiana**, *Oliv. in Hook. Ic. Pl.* t. 1531; leaves 9-15 by 3-5 in. subsessile elongate-oblong acuminate broader at the unequal subcordate base.

PENANG; on Government Hill, *Curtis*. PERAK; at Goping, *King's Collector*.

The form of the leaf distinguishes this from *S. Sideroxylon*. Old leaves from Perak are very large, glossy above, quite smooth beneath, cordate with overlapping lobes, and have a very stout petiole $\frac{1}{4}$ in. long. *Spikes* $\frac{1}{2}$ - $\frac{3}{4}$ in. long (perhaps not well developed).

3. **S. Wallichii**, *King mss.*; leaves 6-9 by 1-3 in. shortly petioled oblanceolate or oblong and widened upwards cuspidate or acuminate, base very unequal acute obtuse or semicordate. *Urticæa*, *Wall. Cat.* 9090. *Morus bifaria*, *Hort. Calc. (in part)*.

PENANG, *Wallich, &c.* PERAK, *Scortechini, King's Collector*. MALACCA, *Main-gay (Kew Distrib.* 1490). SINGAPORE, *Murton*.—DISTRIB. Java? (*Herb. Hort. Bogor.*, No. 7357.)

A much smaller-leaved species than either of the foregoing, with 10-20 pairs of nerves. *Spikes* 2-4 in., with a narrow flowerless streak on one side.—The Calcutta Garden specimens have elliptic-oblong leaves quite equal at the base.

16. **DORSTENIA**, Linn.

Herbs or small shrubs. *Leaves* alternate or radical, entire or lobed; stipules lateral. *Flowers* monœcious, crowded on a flat simple or lobed androgynous receptacle. MALE FL. *Perianths* more or less connate and adnate with the receptacle, obscurely 2-lobed or toothed. *Stamens* 1-3, inflexed in bud. *Pistillode* 0. FEM. FL. deeply sunk in the receptacle; perianth-mouth almost closed. *Ovary* included; style excentric or lateral, arms 2 subulate; ovule pendulous. *Achene* minute, crustaceous. *Albumen* 0; cotyledons subequal, contorted, embracing the upcurved radicle.—Species about 45, all American and African but the following.

D. indica, Wall. Cat. 4639; stem simple, leaves alternate membranous from obovate to lanceolate acuminate sinuate-toothed, receptacle peltate broadly obconic rounded or angular with 5-12 linear arms. *Bureau in DC. Prodr.* xvii. 272; *Wight Ic.* t. 1964.

DECCAN PENINSULA; in the Nilghiri, Pulney and Dindygul Mts., *Wight*. Ceylon; Central Province, alt. 3-6000 ft.

Sparsely hairy; stem 3-10 in., erect from a creeping base, stout or slender. *Leaves* 2-3½ in., narrowed into a petiole ½-1 in., puberulous or glabrous. *Receptacles* ½-¾ in. diam.

17. **FICUS**, Linn. (by G. King).

Trees or shrubs, sometimes scandent, sap milky. *Leaves* alternate, rarely opposite, entire, lobed, serrate or toothed; stipules various. *Flowers* minute, unisexual, on the inner walls of a fleshy receptacle, the mouth of which is closed by imbricate bracts; flowers often mixed with bracteoles. MALE FL. *Perianth* 2-6-fid or partite, imbricate. *Stamens* 1-2, rarely 3-6, erect in bud. FEM. FL. *Perianth* of the male, or imperfect, or 0. *Ovary* straight or oblique; style excentric, stigma various; ovule pendulous. *Achenes* crustaceous or fleshy. *Albumen* scanty; embryo curved, cotyledons equal or unequal, radicle upcurved.—Species about 600, mostly tropical.

In *Ficus* the receptacles are sometimes unisexual, but are usually androgynous with the males nearest the mouth. The flowers are of four kinds or forms, male, female, galls, and (rarely) neuters. The male and female fl. are described above. The gall fl. are like the female but perfect no seed, their style is short, often dilated above, and the ovary occupied by the pupa of a Hymenopterous insect. Neuter flowers, found in Sect. *Synœcia* only, have the perianth of the males.—The male, fem. and gall fl. may occupy the same receptacle; or the males and galls one set of receptacles, and the fem. and neuters in another set; or the males and galls may be in one set of receptacles and the females in another set.

I am indebted to Dr. King for the following account of the Indian Figs, extracted from his fine work on the Indo-Malayan Fici prepared for the "Annals of the Calcutta Botanical Gardens," of which the first part only, embracing the four first sections of the genus, have as yet come to hand. It will be observed that I have throughout modified the wording and arrangements of the characters, so as to bring the descriptions into harmony with those of other genera in this Flora.

Owing to the redundancy of the synonymy and citations unhappily introduced into this genus through the multiplication of the species by the late Dr. Miquel, and the numerous works in which he published, I have been compelled to abbreviate the titles of the latter, which would otherwise have occupied an unreasonable amount of space. Thus "Miq. Ann." stands for "Miquel's Annales Musei Lugduni Batavorum;" "Miq. Flor." for his "Flora Indiæ Batavæ;" and "Miq. in L. J. B." for his papers in Hooker's London Journal of Botany.—J. D. H.

KEY TO THE SECTIONS, &c.

Sect. I. PALÆOMORPHE. *Male fl.* monandrous and containing a pistillode, in the same receptacles with gall fl. *Fem. fl.* in separate receptacles, their perianth gamophyllous (except in *M. gibbosa*).—Small trees or erect or subscandent shrubs. Sp. 1–6.

Sect. II. UROSTIGMA. *Flowers* unisexual or asexual. *Male, fem. and gall fl.* in the same receptacle; stamens 1 (sometimes 2 in Nos. 52 and 53); stigma elongate, usually acute.—Usually trees or powerful climbers, epiphytal, at least in early life. *Leaves* alternate, entire, rarely membranous. *Receptacles* axillary, or from the scars of fallen leaves, base tribracteate (bracts at the base of the peduncle in Nos. 34 and 42).

Series 1. *Leaves* coriaceous or subcoriaceous; petiole short or moderately long, nerves jointed to the blade.

a. *Leaves* coriaceous, more or less ovate and cordate, pubescent when young.—Sp. 7–12.

b. *Leaves* coriaceous, more or less ovate or elliptic, base not cordate, glabrous even when young (except *F. altissima*).—Sp. 13–20.

c. *Leaves* coriaceous, tapering at both ends; basal bracts of receptacles large and prominent.—Sp. 21–24.

d. *Leaves* coriaceous, tapering at both ends; basal bracts of receptacles not large nor prominent.—Sp. 25–27.

e. *Leaves* coriaceous, narrowly elliptic or oblanceolate, tips broad obtuse.—Sp. 28–29.

f. *Leaves* coriaceous or subcoriaceous; primary and secondary nerves equally prominent, close together, straight and anastomosing little, except near the margin.—Sp. 30–32.

g. *Leaves* subcoriaceous, ovate or elliptic subovate or sublanceolate; secondary nerves almost as prominent as the primary; anastomoses numerous, minute, distinct.—Sp. 33–41.

h. *Leaves* coriaceous, elliptic or oblanceolate; receptacles without basal bracts.—Sp. 42.

Series 2. *Leaves* subcoriaceous or membranous; petiole long, jointed to the blade. Sp. 43–51:

Series 3. *Leaves* coriaceous. *Stamens* 2 (or 1 in *F. callosa*). Sp. 52–53.

Sect. III. SYNÆCIA. *Flowers* unisexual or neuter; male and gall fl. in one set of receptacles, fem. and neuters in another set (neuters 0 in *F. apio-carpa*). *Male fl.* membranous.—Climbers with large coloured receptacles. *Leaves* alternate, tessellate beneath. Sp. 54–57.

Sect. IV. SYCIDIUM. *Flowers* unisexual; male and gall fl. in one set of receptacles, female in another set. *Male fl.* monandrous.—Shrubs small trees or climbers, rarely epiphytal. *Leaves* alternate, small, more or less scabrid. *Receptacles* small, chiefly axillary (rarely fascicled). Sp. 57–67.

Sect. V. COVELLIA. *Flowers* unisexual; male and gall fl. in the same receptacle. *Fem. fl.* in separate receptacles. *Male fl.* monandrous; sepals 3–4. *Fem. perianth* gamophyllous, short, or 0, rarely of 4–5 sepals.—Trees or shrubs, never epiphytes or climbers. *Leaves* alternate or opposite. *Receptacles* on long subaphyllous branches from near the base of the stem, or subhypogaeal, or on tubercles of the trunk or large branches, rarely axillary.—Sp. 68–78.

Sect. VI. EUSYCE: *Flowers* unisexual; male and gall fl. in one set of receptacles; fem. fl. in distinct sets (except *F. Thwaitesii*). *Male fl.* diandrous (95 *F. hirta* is mono- triandrous, and 80 *F. laevis* is often triandrous).—Scandent or erect shrubs or small trees, rarely epiphytes. *Leaves* not scabrid or hispid. *Receptacles* small (except *F. laevis* and vars. of *F. juveolata*), axillary.

* Scandent or creeping shrubs. Sp. 79–90 (see also 91).

** Shrubs or trees. Sp. 91–103.

Sect. VII. NEOMORPHE. *Flowers* unisexual, male and gall fl. in one set of receptacles; fem. fl. in a distinct set, smaller than the males. *Male fl.* diandrous (*F. Clarkei* is triandrous); perianth inflated, 3–4-sepalous.—Trees, rarely scandent shrubs, never epiphytal. *Leaves* alternate. *Receptacles* often very large, in clusters from tubercles on the stem and larger branches.—Sp. 104–111.

Sect. I. PALÆOMORPHE (see p. 495).

1. ***F. psifera***, Wall. *Cat.* 4504; branchlets scabrid-hispid, leaves shortly petioled membranous or subcoriaceous inequilateral subobovate or elliptic-lanceolate or oblanceolate acuminate or cuspidate repand remotely serrate-toothed or subentire along the upper margin and entire towards the narrowed very unequal base, receptacles 4–10 together $\frac{1}{2}$ – $\frac{1}{4}$ in. diam. peduncled mostly in the axils of fallen leaves globose scabrid or verruculose, basal bracts usually 0. *King Fic.* 3, t. 1; *Miq. in L. J. B.* vii. 427; *Flor. i. ii.* 301. *F. Tremblas* (*in part*). Tadjam, & hypophila (*in part*), *Miq. Pl. Jungh.* 61, 62, 60; *Flor. l. c.* 304, 312, t. xx. C and 303. *F. grevæiflora*, *Blume Bijd.* 476 (*in part*); *Miq. l. c.* 306. *F. saxatilis*, *Miq. in Zoll. Syst.* 92. *F. acuminatissima*, *Miq. in L. J. B. l. c.* 233. *F. Tondana*, *Miq. Flor. l. c.* 305, and *F. microtus*, *l. c. Suppl.* 428. *F. leucoxydon*, *Miq. Pl. Jungh.* 61. ? *F. exasperata*, *Roxb. Fl. Ind.* iii. 555.

PENANG, PERAK and SINGAPORE, very common.—DISTRIB. Malay Islands.

A shrub or small tree. *Leaves* 4–7 in., subsabrid and punctulate beneath, above smoother; nerves 3–5 pairs and midrib prominent and puberulous beneath, reticulations distinct; stipules 2, $\frac{1}{2}$ – $\frac{1}{4}$ in., lanceolate, puberulous, persistent. *Recepts* red with yellow dots; peduncle $\frac{1}{4}$ – $\frac{1}{2}$ in., slender, scabrid, with sometimes 1–2 wart-like bracts. *Male fl.* near the top of the receptacle with gall flowers; sepals 4, united at the base; stamen 1, with a pistillode. *Gall fl.*; sepals 3, linear-lanceolate; ovary obovoid, smooth, stipitate; style short, lateral, stigma clavate. *Fem. fl.*; calyx deeply 4-cleft; achene ovoid; style subterminal, stigma capitate.—Closely allied to *F. rostrata*, Lamk., but shrubby or arboreous, leaves more unequal-sided, receptacles more hispid and more generally peduncled. Most of Blume's *grevæifolia* are referable to this, but a few belong to *F. Ampelos*, Burm., and I have hence adopted Wallich's name. Probably Roxburgh's *F. exasperata* is this, judging from a drawing in Roxburgh's *Icones*. If this was certain, his name would claim priority, but no specimens of Roxburgh's plant appear to be extant.

2. ***F. gibbosa***, *Blume Bijd.* 466; branchlets scaberulous often pubescent, leaves petioled coriaceous usually inequilateral elliptic-ovate to lanceolate or oblanceolate obtuse cuspidate or obtusely or acutely acuminate entire, base cuneate or obtuse 3-nerved never rounded gibbous on one or both sides, receptacles $\frac{1}{2}$ – $\frac{1}{4}$ in. or in pairs or fascicled axillary or from below the leaves peduncled globose or depressed-pyriform mammillate scabrid and verruculose yellow, umbilicus rather prominent, basal bracts 0, peduncle as

long bracteate at the base. *King Fic.* 4, t. 2; *Miq. Pl. Jungh.* 62; *Flor. i.* ii. 398, and *var. unigibba*, *l. c. Suppl.* 430. *F. rigida* & *cuneata*, *Blume l. c.* 465, 468. *F. paradoxa*, *Blume l. c.* 467; *Miq. l. c.* 308. *F. Altimeraloo*, *Roxb. mss.*; *Wight Ic.* t. 650; *Miq. in L. J. B.* vii. 435, and *Flor. l. c.* 311. *F. excelsa*, *Vahl?* in *Roxb. Fl. Ind.* iii. 552 (*excl. syn. Rheede*), *Kurz For. Fl.* ii. 451; *Wall. Cat.* 4477 A to D. *F. subobliqua*, *Miq. Ann.* iii. 225, 293.

Bases of the hill ranges throughout INDIA from Kumaon eastwards to Burma, and southwards to the Malay Peninsula, Audamau Islands, and Ceylon.—DISTRIB. Malay Islands, Hong Kong.

A tree. *Leaves* 2½–8 in., always with prominent and usually (except in *var. parasitica*) more or less lucid nerves and veins; nerves 3–7 pairs (rarely more), pale-coloured and shining to (in *vars. cuspidata* and *parasitica*) dull and neither shining nor coloured, above glabrous, shining to dull, and (in *var. parasitica*) minutely hispid especially on the midrib and nerves, beneath firm, often more or less harsh from the prominent venation; petiole ¼–½ in.; stipules ¼–½ in., ovate-lanceolate, convolute. *Male sepals* 4–6, linear, fleshy, hairy; stamen 1, filament short, united by its base to an abortive (insect-attacked) pistil. *Gall fl.*; perianth of the male; ovary globose, smooth; style short, lateral. *Fem. sepals* 4, hyaline, linear, slightly hairy; achene slightly papillose, obliquely ovoid; style elongate, lateral.—The forms of this protean plant fall under four groups.

F. GIBBOSA, *Blume*; leaves variable glabrous shining purplish brown beneath when dry, midrib nerves and reticulations pale.—Malay Peninsula and Islands.

E. CUSPIDIFERA, *Miq. in L. J. B.* vii. 434; leaves elongate gradually narrowed above more or less acuminate minutely tubercled beneath opaque little coloured.—*F. excelsa*, *Wall. Cat.* 4477 *F. reticulosa*, *Miq. l. c.* 435. *F. pervia*, *Miq. l. c.* 433; *Wall. Cat.* 4777 D.—*Rumph.* iii. 58.—Throughout India, Timor.

F. PARASITICA, *Kæn. in Willd. Act. Berol.* 1798, 25, t. 3; leaves broad subrhomboid scabrid and hispid above and beneath. *Bedd. For. Man.* 224; *Miq. l. c.* 433; *Wall. Cat.* 4476 A to D; *Brand. For. Fl.* 420. *F. Ampelos*, *Kæn. in Roxb. Fl. Ind.* iii. 553; *Wight Ic.* t. 652. *F. sclerophylla*, *Roxb. l. c.* 546. *Urostigma Ampelos*, *Dalz. & Gibs. Bomb. Fl.* 315. *U. volubile*, *Dalz. l. c.* 242.—Central India, Behar and the Deccan.—Under *Urostigma Ampelos*, *Dalz. & Gibs.* 315, these authors suggest their *volubile* being the same species.

F. TUBERCULATA, *Roxb. Fl. Ind.* iii. 554; like *parasitica*, but leaves narrower, sometimes irregularly serrate. *Wight Ic.* t. 651; *Bedd. Forester's Man.* 224. *F. angulata*, *Miq. l. c.* 434.—Western Ghats and Ceylon.

3. *F. subulata*, *Blume Bijl.* 461; young parts puberulous, leaves short-petioled membranous elliptic elliptic-lanceolate or -subovate sometimes slightly inequilateral cuspidate margins entire waved, base acute 3- or more-nerved, receptacles axillary short-peduncled or subsessile solitary in pairs or clusters, the male ovoid with the umbilicus rather prominent and numerous umbilical bracts, the female globose when ripe, both ¾–1 in. diam. scaberulous subverrucose orange-red with no basal bracts but with a few scattered irregularly along the sides, peduncles short with numerous basal bracts. *King Fic.* 8, t. 6; *Miq. Flor. i.* ii. 311; *Ann.* iii. 275, 292; *Kurz For. Fl.* ii. 452. *F. acuminata*, *Roxb. Fl. Ind.* iii. 538; *Wall. Cat.* 4478. *F. ancolana*, *Miq. Pl. Jungh.* 62. *F. virgata*, *Reinw. in Blume l. c.* 454.

From CHITTAGONG, southward to PEGU, PERAK and PENANG, ascending to 4500 ft.—DISTRIB. China, Malay Islands.

A semi-scandent or straggling dioecious shrub. *Leaves* 4½–10 in., nerves 7–10 pairs, rather prominent beneath, glabrous when mature, dull when dry, rather pale beneath; petiole about ½ in., stout, scaberulous; stipules about 1 in., convolute, subulate curving. *Male fl.* (only in the ovoid receptacles with the gall fl.); perianth thick,

fleshy, tubular, 4-toothed; stamen 1, anther broad; pistil globose, insect-attacked. *Gall fl.* pedicelled, perianth of the male; achene subglobose, smooth; style short, lateral; stigma capitate. *Fem. fl.* (in globose receptacles without male fl.); perianth hairy, gamophyllous, with 4 long teeth; achene oblong; style lateral; stigma elongate.—Truly diœcious. The ovoid receptacles with male fl. and gall fl. occur only in the erect shrubby form; those with globose receptacles bear only fem. fl., and are semi-scandent epiphytes.

4. **F. parietalis**, *Blume Bijl.* 462 (*excl. var.*); branchlets' receptacles petioles and under surfaces of the leaves rusty-pubescent sometimes rather scaberulous, leaves coriaceous petioled elliptic-oblong-ovate or rarely-obovate sometimes inequilateral rather abruptly and shortly caudate margins entire revolute, base rounded obtuse acute or subcordate 3-5-nerved, receptacles peduncled axillary in pairs (solitary by abortion) globose or ovoid tapering towards the ebracteate base rather strongly umbonate especially when young hispid-tomentose, ripe $\frac{3}{4}$ -1 in. diam. yellow or orange, peduncles hispid about $\frac{1}{2}$ in. sometimes with 2 or 3 small ovate-acute bracts at their base. *King Fic.* 10, t. 8; *Miq. Flor.* i. ii. 307. *F. Junghuhniana* and *F. rufipila*, *Miq. Pl. Jungh.* 56, 57. *F. concentrica*, *Van Has. in Miq. Choir Pl. Buitenz.* t. 11. *F. cerasiformis*, *Desf. Cat. Hort. Paris Ed.* 3, 413; *Miq. in L. J. B.* vii. 428; *Lemaire Ill. Hort.* v. t. 167. *F. acuminata*, *Bot. Mag.* t. 3282 (*not of Roxb.*). *F. phlebophylla* and *F. Tabing*, *Miq. Flor. Suppl.* 430. *F. grandifolia*, *Wall. Cat.* 4525; *Miq. in L. J. B.* l. c. 432.

PENANG and SINGAPORE, *Wallich*. PERAK, *Kunstler, Wray*.—DISTRIB. Malay Islands.

A shrub or tree, often epiphytal. *Leaves* 3-12 in., glabrous smooth and shining above, beneath much paler and when young covered with short straight hairs, many or all of which disappear with age, leaving the under surface hard, subscaberulous, glabrous or glabrescent; nerves 2-3 pairs, nervules transverse, reticulations distinct, all prominent beneath; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., stout, hispid-pubescent; stipules small, ovate, acute, hirsute, about $\frac{1}{3}$ in. long. *Male fl.* few, under the oval bracts with the gall flowers; perianth gamophyllous, lobes 5, narrow, elongate; stamen 1, base of filament adnate to the pedicel of a pistillode. *Gall fl.* large, rounded; perianth of the male; style short, lateral; stigma dilated. *Fem. fl.* with a gamophyllous perianth deeply divided into three linear-lanceolate segments; achene reniform-ovoid; style rather long, subterminal, stigma cylindric.—Allied to *F. urophylla*, but is a much larger species. The receptacles with male and gall flowers are slightly larger and more umbonate than those with female flowers.

5. **F. urophylla**, *Wall. Cat.* 4483; young branches and petioles scurfy or subscabrid when dry, leaves subcoriaceous broadly ovate or ovate-elliptic abruptly caudate usually entire or sinuate towards the apex, base always entire gradually narrowed to the petiole 3-nerved, receptacles $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. shortly peduncled axillary subglobose umbonate scabrid-hispid without basal bracts reddish-yellow when ripe, peduncle $\frac{1}{2}$ - $\frac{3}{4}$ in. hispid-hirsute. *King Fic.* ii. t. 9.

ASSAM, the KHASIA Mts., CHITTAGONG, BURMA and PERAK.

An erect shrub or small tree. *Leaves* 2 $\frac{1}{2}$ -4 in., smooth and shining above, dull and harsh beneath; nerves 2 or 3 pairs, and midrib bold and harsh beneath; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules subulate, minute. *Male fl.*; sepals 4; stamen 1, invariably jointed to a pistillode. *Fem. fl.*; perianth 3-cleft; achene obliquely ovoid, rough; style short, diverging. *Gall fl.*; achene smooth, globose; style short, slightly hooked.—This and *F. rostrata*, Lamk., afford an excellent example of agreement in externals being associated with considerable differences in the flowers.

6. **F. celebica**, *Blume Bijl.* 461; branchlets hirsute, leaves mem-

braneous short-petioled elliptic-lanceolate acuminate or caudate-serrate, papillæ beneath with 4-6 pairs of hairy nerves above the 3-5 basal, recepts subsessile solitary or fascicled axillary or from scars subglobose setose, basal bracts 0. *King Fic.* 12, t. 10; *Miq. Flor.* i. ii. 313; *Ann.* iii. 274, 292 *F. lancifolia*, *Miq. in L. J. B.* vii. 452; *Ann.* 292.

PERAK, *Kunstler*.—DISTRIB. Celebes, Philippines.

A subsacandent shrub. *Leaves* 4-7 in., base entire, often auricled; petiole $\frac{1}{10}$ - $\frac{1}{2}$ in., hirsute; stipules subulate, tomentose. *Recepts* white, about $\frac{1}{2}$ in. diam., young ovoid. *Male perianth* 3-5-cleft; *gall* 3-cleft. *Gall* ovary stipitate, smooth; style long, lateral. *Fem. fl.* not seen.—The Perak plant may be regarded as a var. (*Kunstleri*) with leaves shortly acuminate, little tapering at the base and often fascicled recepts.

Sect. II. UROSTIGMA (see p. 495).

7. **F. Dalhousiæ**, *Miq. in Hook. Lond. Journ. Bot.* vi. 571; young branches at first softly pubescent afterwards glabrous, leaves subcoriaceous petioled elliptic- or broadly ovate acute entire base cordate 3-7-nerved, receptacles in pairs shortly peduncled axillary obovoid with 3 broad triangular apical scales which and the 3 spreading broad triangular sometimes bifid basal bracts are densely hairy when ripe about $\frac{1}{2}$ in. diam. pubescent, peduncles about $\frac{1}{2}$ in. densely hairy. *King Fic.* 16, t. 11 and 81^a; *Miq. Ann.* iii. 285.

NILGHIRI HILLS; alt. 2-3000 ft., *Wight, Gamble, King*.

An umbrageous tree, 30-40 ft. *Leaves* 4-9 in., minutely dotted and puberulous or glabrous above, beneath softly minutely pubescent; nerves 10-12 pairs, rather prominent beneath, with midrib minutely pubescent; petiole 1-2 $\frac{1}{2}$ in., pubescent; stipules $\frac{1}{2}$ -1 in., ovate-lanceolate, much acuminate, puberulous or glabrous. *Male fl.* very few, only near apex of receptacle, sessile, globose; sepals 3, concave, rounded; stamen 1, connective wide, filament thick adnate. *Gall fl.* on thick pedicels; perianth gamophyllous; ovary obovoid, smooth; style short. *Fem. fl.* sessile; achene ovate; style long, lateral, stigma cylindric.

8. **F. bengalensis**, *Linn. Hort. Cliff.* 471, n. 4; young parts softly pubescent, leaves coriaceous petioled ovate or orbicular-ovate to elliptic obtuse entire base rounded subcordate or slightly narrowed 3-7-nerved, receptacles sessile in pairs axillary globose puberulous red and about the size of a small cherry when ripe with 3 broad rounded spreading nearly glabrous coriaceous basal bracts. *King Fic.* 18, t. 13, 81^c; *Linn. Sp. Pl. Ed.* 2, ii. 1514; *Beddome For. Man.* 222; *Brand. For. Fl.* 412; *Kurz For. Fl.* ii. 440. *Urostigma bengalense*, *Gasp. Ric.* 82, t. viii. 14-21; *Wight Ic.* t. 1989; *Miq. in L. J. B.* vi. 572; *Dalz. & Gibs. Bomb. Fl.* 240. *F. indica*, *Linn. Amæn. Acad. Ed.* 3, i. 27, n. 6 (excl. 7 and 8, and syn. *Rheede*); *Roxb. Fl. Ind.* iii. 539; *Champ. in Hook. Journ. Bot.* 1841, 284-292, t. 13, 14.—*Rheede Hort. Mal.* i. t. 28.—*Ham. in Linn. Trans.* xiii. 489.—*Vuta, Asiat. Res.* iv. 310.—*Wall. Cat.* 4560 (in part).

Planted in all the plains of INDIA; wild only in the SUB-HIMALAYAN FORESTS and on the lower slopes of the DECCAN HILLS.

A tree, 70-100 ft., rooting from the branches, and thus forming accessory trunks, extending the growth of the tree indefinitely. *Leaves* 4-8 by 2-5 in., glabrescent above, beneath glabrous or minutely pubescent, reticulations distinct; nerves about 5 pairs, prominent; petiole $\frac{1}{2}$ -2 in., stout; stipules $\frac{1}{2}$ -1 in., coriaceous. *Male fl.* rather numerous near the mouth of the receptacles; sepals 4, rather broad; stamen 1. *Gall fl.* with a similar perianth, style short. *Fem. fl.* with shorter perianth and elongated style.—Known to Europeans as the banyan, and to natives of India under a variety of names. The name *F. bengalensis* was first published by Linnæus in

1737 in the *Hortus Cliffortianus*. The figures there quoted, and the remarks about the aerial roots, prove that this name was intended for the banyan, to which he unfortunately subsequently gave the name *F. indica*. In the *Amœnitates*, ed. 3, i. 27 (1785), a list is given of three species of *Ficus* which Linnæus named *F. indica*. The third of these is probably American. The second is *F. Tjiela*, Roxb., the *Tjiela* of Rheede (*Hort. Malab.* iii. t. 63), whilst remarks on the aerial roots appended to the notice of the first make it quite clear that the banyan is there meant. But under it is quoted Rheede's *Katou alou* (*Hort. Malab.* iii. t. 57), which is really *F. mysorensis*, Heyne, as also *F. indica*, Rumph's *Varinga repens* (*Hort. Amb.* iii. t. 84), and to this the name *F. indica*, Linn., has by modern writers been confined. *F. bengalensis*, Linn., is also mentioned in the *Amœnitates* (l. c., p. 29), and under it is quoted Rheede's figure of the *Peralu* (*Hort. Malab.* i. t. 28), which is unmistakably the banyan. It is thus clear that Linnæus gave two specific names, *bengalensis* and *indica*, to the banyan, and, further, confused with the banyan the *Katou alou* of Rheede. *F. bengalensis*, Linn., is hence the earliest name which can without doubt be connected with the banyan.

9. *F. mysorensis*, Heyne in *Roth Nov. Sp.* 390; branchlets covered with rusty grey or rufous flocculent tomentum afterwards nearly glabrous and dotted, leaves coriaceous petioled ovate elliptic-ovate rarely -obovate cuspidate entire base rounded emarginate or cordate 3-5-nerved, receptacles sessile in axillary pairs oblong to subobovate truncate or slightly depressed at the apex, young flocculent-tomentose, ripe nearly glabrous 1 in. long orange-red, basal bracts 3 broadly triangular obtuse spreading. *King Fic.* 19, t. 14, 15, 81^a; *Beddome For. Man.* 222; *Kurz For. Fl.* ii. 440; *Miq. Ann.* iii. 285. *F. indica*, Linn. *Sp. Pl. Ed.* 2 (1763), ii. 1514; *Amœn. Acad.* i. 27, n. 6 (*partly*). *F. cotonifolia*, Vahl *Enum.* ii. 189 (*excl. syn. Rumph*). *F. citrifolia*, Willd. *Sp. Pl.* 1137. *F. Gonia*, Ham. in *Trans. Linn. Soc.* xv. 137; *Wall. Cat.* 4496 A, B and C (not D); *Rheede Hort. Mal.* iii. t. 57. *Urostigma mysorens*, *Miq. in L. J. B.* vi. 574.

Forests of the base of the HIMALAYA from Sikkim eastwards; the KHASIA MTS., BURMA, the DECCAN PENINSULA and CEYLON.

A large umbrageous tree; aerial roots few, embracing the stem. *Leaves* 3½-8 in.; nerves 10-13 pairs, prominent, upper glabrous and minutely dotted, beneath flocculent-tomentose, ultimately nearly glabrous; petiole ¾-1½ in., stout; stipules ¼-½ in., broadly triangular, flocculent-tomentose. *Male fl.* near the apex of receptacle, rather numerous, pedicelled; stamen 1; anther-cells subglobose. *Gall fl.* broad, smooth; sepals 4; style short, subterminal. *Fem. fl.* with ovoid achene and elongate lateral style.—Young receptacles enclosed in calyptroform involucre (as in *F. bengalensis*, Linn.), and others. The following are varieties.

F. PUBESCENS, Roth Nov. Sp. 387; leaves smaller, nerves fewer, pubescence denser longer deeper rusty red especially in the youngest parts. *F. rupestris*, Ham. in *Trans. Linn. Soc.* xv. 137. *F. tomentosa*, *Herb. Madr. in Wall. Cat.* 4499. *Urostigma dasyacarpum*, *Miq. in L. J. B.* vi. 574; *Dalz. & Gibs. Bomb. Fl.* 242.—Deccan Peninsula, and Ceylon with the typical form ascending to 2500 ft.

F. SUBREPANDA, *Wall. Cat.* 4568 A; leaves larger, adult glabrous subscabrid and dotted, nerves 12-20 pairs above the basal 7-9, receptacles globose (young ovoid) 1½ in. diam. smooth orange-red. *F. lateritia*, *Wall. Cat.* 4496 D.—Himalaya, Khasia and Burma Hills.

10. *F. pilosa*, Reinw. in *Blume Bijl.* 446; young parts covered with short flocculent (usually grey) caducous tomentum, leaves subcoriaceous elliptic-oblong to -obovate entire or margins subundulate, base narrowed rounded or truncate often subcordate occasionally slightly unequal, apex with a short abrupt obtuse apiculus, receptacles sessile in axillary pairs ovoid-cylindrical umbonate ¾ in. long reddish and glabrous when ripe with

3 minute rounded membranous ciliate basal bracts. *King Fic.* 21, t. 16, 81^e; *Kurz For. Fl.* ii. 441. *Urostigma pilosum*, *Miq. in Zoll. Syst. Verz.* 90, 96, and *Flor.* i. ii. 351. *U. bicornis*, *Miq. Pl. Jungh.* 47, and *Flor. l. c.* 350, t. 24 A. *U. subcuspidatum*, *Miq. in Zoll. l. c.* 97.

UPPER TENASSERIM, *Kurz*. PENANG? (I have seen no specimen).—DISTRIB. Java, Borneo, N. Australia.

A large tree, with a few aerial roots. *Leaves* $3\frac{1}{2}$ in., nerves about 8-11 pairs, curving and anastomosing near margin; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules $\frac{1}{2}$ – $\frac{3}{4}$ in., membranous, rufous-tomentose when young. *Male fl.* on short thick pedicels; sepals 4, hyaline; anther 1, filament stout, short. *Gall fl.* with a gamophyllous 3-4-toothed, oblique, closely-embracing perianth; style elongate, stigma flattened; ovary smooth. *Fem. fl.* very like the galls, but the perianth less distinct and the achene broader and tuberculate.—Probably a var. of *mysorensis*. The only good fruit I have seen is in Queensland specimens, here described. The following variety is parallel to the var. *pubescens* of *F. mysorensis*.

F. CHRYSOCOMA, *Blume Bijdr.* 443; tomentum more copious bright rufous. *Urostigma chrysothrix*, *Miq. in Zoll. Syst. Verz.* 90, 96.

11. ***F. tomentosa***, *Roxb. Hort. Beng.*, and *Fl. Ind.* iii. 550; shoots petioles leaves beneath and receptacles covered with rusty-grey tomentum, leaves crowded towards the ends of the branches coriaceous petioled elliptic-ovate or -obovate obtusely apiculate entire, base rounded or slightly cordate 5-7-nerved, receptacles sessile in axillary pairs pisiform tomentose $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., apical scales small glabrous, basal bracts 3 large spreading pubescent sometimes 3-fid when young. *King Fic.* 22, t. 18 and 81^e; *Willd. Spec. Plant.* iv. 1136; *Wight Ic. t.* 647; *Brand. For. Fl.* 414; *Bedd. For. Man.* 223. *Urostigma tomentosum*, obversum & connivens, *Miq. in L. J. B.* vi. 573. *F. mollis*, *Vahl Symb.* i. 82, and *Enum.* ii. 192 (*excl. syn. Willd.*). *F. asinina*, *Ham. in Trans. Linn. Soc.* xv. 138; *Wall. Cat.* 4497 A to D.

Drier parts of the GANGETIC PLAIN, BEHAR, BANDA, CENTRAL INDIA, the DECCAN PENINSULA, and CEYLON.

A large umbrageous tree, throwing out small aerial roots from the branches. *Leaves* 2-5 in., with about 5 pairs of nerves, upper surface glabrous or glabrescent minutely dotted when dry; petiole $\frac{3}{4}$ –1 in.; stipules $\frac{1}{2}$ – $\frac{3}{4}$ in. densely woolly outside, margins broad scarious glabrous. *Male fl.* few, near the mouth of the receptacle; sepals 4, lanceolate; stamen 1. *Gall* and *fem. fl.* with 4 sepals shorter than the ovary; gull fl. with smooth ovary and short style; fem. fl. with tubercled achene and long style.

12. ***F. bracteata***, *Wall. Cat.* 4498; young branches leaves beneath stipules petioles and receptacles densely covered with deciduous reddish-brown flocculent tomentum, leaves coriaceous petioled obovate-oblong entire with an abrupt short obtuse apiculus, base cordate slightly unequal truncate 5-nerved, receptacles sessile crowded at the apices of the branches in the axils of the undeveloped leaves globose or turbinate slightly trigonous densely tomentose even when ripe bright orange $\frac{1}{2}$ in. diam. *King Fic.* 23, t. 19, 81^b; *Miq. in L. J. B.* vi. 576.

PENANG, PERAK and SINGAPORE, *Wallich, King.*—DISTRIB. Java.

A powerful scandent epiphyte. *Leaves* 7-11 in.; nerves 4-6 pairs, prominent beneath, upper surface smooth except the persistently rusty-tomentose midrib, lower in adult leaves pubescent or subglabrous; petiole $\frac{3}{4}$ –1 $\frac{1}{2}$ in.; stipules flaccid, ovate-acuminate, 2 by 1 in., densely tomentose on the midrib outside; basal bracts 3 or 4, broad, rounded, scarious, glabrous. *Male fl.* scattered all over the receptacle, pedicelled; sepals 2 or 3 hyaline; anther 1, filament very short. *Gall fl.* with a gamophyllous, 3-toothed perianth closely enveloping the smooth ovoid ovary. *Fem. fl.*

with 4 loosely attached lanceolate sepals, achene elongate, often sessile.—The interior of the receptacle contains numerous lanceolate bracteoles. The enormous persistent prefoliar stipules (really leaf-scales) on the apices of the branches and surrounding the densely tomentose young fruit distinguish this from any other *Urostigma*.

13. **F. pruniformis**, *Blume Bijd.* 451; all parts except the stipules glabrous, leaves coriaceous long-petioled lanceolate or ovate-lanceolate acuminate entire, base much narrowed rarely rounded 3-nerved, receptacles long-peduncled axillary solitary or in pairs ovoid slightly umbonate and reddish when ripe about 1 in. long, apical scales small coriaceous, basal bracts 3 small coriaceous free-ovate acute puberulous sometimes attached to the peduncle a little below the base of the receptacle, peduncle $\frac{1}{2}$ – $\frac{3}{4}$ in. slender. *King Fic.* 24, t. 21 and 81^k. *F. depressa*, *Blume l. c.* 450; *Miq. Ann.* iii. 286. *Urostigma pruniforme*, *Miq. Ann. l. c.* 266, 286; in *Zoll. Syst. Verz.* 91, 97; and in *Flor.* i. ii. 352, and *Suppl.* 177, 440? *U. depressum*, *Miq. Flor. l. c.* 351 (not of L. J. B.). *U. peracutum*, *Miq. Flor. l. c.* 343.

PERAK, *Kunstler*, alt. 1–4000 ft.—DISTRIB. Sumatra, Java.

A powerful stem-clasping epiphyte or large tree. *Leaves* 4–6 in.; nerves 6–10 pairs, prominent beneath; petiole slender, $\frac{3}{4}$ –1 $\frac{1}{4}$ in.; stipules linear-lanceolate, $\frac{1}{2}$ – $\frac{3}{4}$ in., pubescent. *Male fl.* very numerous over all the receptacle, pedicelled; sepals 2, broad, concave, hyaline; stamen 1, anther elongate-ovate sessile. *Gall fl.* pedicelled; perianth gamophyllous, 5-cleft; ovary smooth, short, stigma obliquely truncate. *Fem. fl.* mostly sessile, the achene ovoid, tuberculate; style long, lateral; stigma flat, elongate.—Readily recognized by its large long-peduncled receptacles.

14. **F. annulata**, *Blume Bijd.* 448; all parts glabrous or (var. *valida*) the leaves and stipules beneath and petioles more or less pubescent, leaves thinly coriaceous oblong or oblanceolate or ovate-elliptic and shortly acuminate entire or margins slightly undulate, base acute or slightly rounded never cordate 3-nerved, receptacles peduncled in axillary pairs ovoid or oblong prominently umbonate smooth, ripe 1–1 $\frac{1}{2}$ in. long greenish orange-yellow with white spots, basal bracts 3 ovate acute free, peduncle stout $\frac{1}{2}$ – $\frac{3}{4}$ in. with a thickened annulus near the top and below the basal bracts of the receptacle. *King Fic.* 25, t. 23, 81^k; *Miq. Ann.* iii. 285; *Kurz For. Flor.* ii. 443. *F. flavescens* & *valida*, *Bl. l. c.* 449. *Urost. annulatum*, *Miq. in Zoll. Syst. Verz.* 90; *Flor.* i. ii. 352, and *Suppl.* 440. *U. flavescens*, *Miq. in Plant. Jungh.* 48, and *Fl. Ind. Bat. l. c.* 335, and *Suppl.* 436. *U. biverrucellum*, *Miq. Flor. Suppl.* 436. *U. validum* & *conocarpum*, *Miq. l. c.* 337, 350. *U. depressum*, *Miq. in L. J. B.* vi. 576, and *Zoll. Syst. Verz.* (excl. *F. depressa*, *Bl.*).

BURMA; on the plains and lower hills. PERAK, *Kunstler*.—DISTRIB. Malay Islands.

A large stem-clasping, semi-scandent epiphyte, rarely an independent tree. *Leaves* 6–12 in.; nerves 10–15 pairs, prominent with curving submarginal anastomoses, reticulations conspicuous; petiole 1–1 $\frac{1}{2}$ in.; stipules linear-oblong, flaccid, fugacious, 1 $\frac{1}{2}$ –6 in. scattered all over the interior of the receptacle, numerous, pedicelled. *Gall fl.* numerous; perianth gamophyllous, 3-toothed; achene ovoid, smooth; style long, stigma long flattened. *Fem. fl.* very few; perianth deeply 4-cleft; achene tubercled; style shorter than achene, stigma clavate.—Widely distributed and variable; the following are the two principal forms.

F. FLAVESCENS, *Blume*; leaf-base much narrowed. *U. biverrucellum*, *Miq.*—Burma; ascends to 5000 ft. in Java. Cultivated in Bengal as *F. magnifolia*.

F. VALIDA, *Blume*; leaves puberulous beneath especially on the nerves, stipules silky, pedicels only $\frac{1}{4}$ in. very stout deciduously tomentose.

15. **F. Beddomei**, *King Fic.* 26, t. 24 and 81^k; all parts glabrous,

young branches thick, bark pale, leaves coriaceous long-petioled ovate-rotund or broadly ovate shortly acuminate, entire or margins slightly undulate, base broad truncate or very slightly emarginate 3-nerved, receptacles peduncled in axillary pairs ovoid or subobovoid with a rather prominent apical umbilicus and several vertical ridges smooth 1 in. long about $\frac{3}{4}$ in. across, basal bracts 3 small broadly triangular coriaceous united by their bases, peduncles stout $\frac{3}{4}$ in.

DECCAN PENINSULA; Tinnevely Hills, *Beddome*.

A tree? *Leaves* about 7 by 4 in.; nerves nearly at right angles to the midrib, about 12 pairs, prominent on both surfaces; petiole stout, about $2\frac{1}{2}$ in.; stipules lanceolate, about $\frac{1}{2}$ in. *Male fl.* numerous, scattered, shortly pedicelled; anther broad, single, sessile; sepals 2 or 3. *Gall* and *fem. fl.* shortly pedicelled; sepals 4 or 5, lanceolate (ripe *achenes* unknown). Interior of the receptacle covered between the insertions of the flowers with long, narrow, pointed scales.—A remarkable species; I have seen only three specimens.

16. *F. globosa*, *Blume Bijl.* 449; younger branches covered with deciduous brown scurf mixed with a few hairs ultimately all parts glabrous, leaves thinly coriaceous petioled elliptic or oblong suddenly shortly cuspidate entire, base broad rounded slightly emarginate (narrowed in var. *Manok*) 3-nerved, receptacles shortly peduncled in axillary pairs subglobose and umbonate when young, ripe depressed at the apex almost turbinate $\frac{1}{2}$ –1 in. diam. minutely scurfy, basal bracts 3 small, peduncles stout $\frac{1}{2}$ in. *King Fic.* 27, t. 25, 81^a; *Miq. Ann.* iii. 285. *F. onusta*, *Wall. Cat.* 4563; *Kurz For. Fl.* ii. 441. *F. firma*, *Wall. Cat.* 4564 A, B. *Urost. globosum*, *Miq. Flor.* i. ii. 335. *U. Manok*, *Miq. in Zoll. Syst. Verz.* 90, 96; *Flor. l. c.* 337. *U. onustum*, *Miq. in L. J. B.* vi. 57; *Flor. l. c.* 336.

BURMA and PENANG, *Wallich*. PERAK, *Kunstler*.—DISTRIB. Malay Islands.

A large climber. *Leaves* $3\frac{1}{2}$ –6 $\frac{1}{2}$ in.; primary nerves 6–9 pairs, nearly at right angles to the midrib, rather prominent below; petiole $\frac{1}{2}$ –1 $\frac{1}{2}$ in.; stipules $\frac{3}{4}$ –2 $\frac{1}{4}$ in., deciduous, linear, acute. *Male fl.* few, scattered, pedicelled; sepals 4, hyaline; anther single, sessile. *Gall fl.* mostly pedicelled; perianth gamophyllous, 5-cleft; ovary smooth; style short, lateral. *Fem. fl.* few, sessile or nearly so; perianth gamophyllous, with 5 lanceolate teeth; style elongate, stigma obovate; achene ovoid, tubercled.—Miquel's *U. Manok* is a variety with a narrowed leaf-base.

17. *F. travancorica*, *King Fic.* 28, t. 26, 82°; young parts minutely pubescent all ultimately glabrous, bark of young shoots pale, leaves coriaceous lanceolate acuminate entire margins subundulate, base much narrowed 3-nerved, receptacles in axillary pairs peduncled globose smooth when ripe and about $\frac{1}{2}$ in. diam., apical scales broad flat, basal bracts 3 broadly triangular obtuse, peduncles $\frac{1}{2}$ in.

HILLS of NORTH TRAVANCORE, alt. 3500 ft., *Beaume*.

A straggling shrub. *Leaves* 5–6 in.; nerves 10–12 pairs, distinct but not thick, reticulations minute but distinct; petiole about $\frac{1}{2}$ in.; stipules linear-lanceolate, about 1 in. *Male fl.* scattered, sessile; sepals 4 or 5; anther 1, filament short. *Gall* and *fem. fl.* subsessile, sepals of both 4 or 5; ovary of the gall elongate-ovate, and style short; achene of fem. ovate, with a long style and bifid stigma.—The single specimen of this at Kew is the only one I have seen; it approaches *F. Beddomei*, but has differently shaped leaves and much smaller receptacles.

18. *F. xylophylla*, *Wall. Cat.* 4558; branchlets thick pale scurfy when very young, other parts quite glabrous except the stipules and receptacular bracts, leaves large very coriaceous broadly elliptic or oblong to elliptic-obovate, narrowed to the strongly 3-nerved base, apex broad rounded,

margins entire revolute when dry, receptacles in axillary pairs or solitary sessile cylindro-conical base truncate, apex umbonate, ripe smooth bright red with faint white spots $1\frac{1}{2}$ -2 in. long by 1 broad at base, basal bracts 3 spreading broadly triangular pubescent. *King Fic.* 29, t. 28, 82^a; *Miq. Ann.* iii. 286. *Urostigma xylophyllum*, *Miq. in L. J. B.* vi. 577; *Flor.* i. ii. 352, t. 23.

PERAK, PENANG and SINGAPORE, *Wallich, &c.*—DISTRIB. Sumatra.

A powerful epiphyte or small tree. *Leaves* 6-10 by 3-4 $\frac{1}{2}$ in.; nerves about 5 pairs, prominent below, reticulations inconspicuous; petiole stout, about 1-1 $\frac{1}{2}$ in.; stipules 1 $\frac{1}{2}$ in., coriaceous, broadly ovate, acute, shortly reddish pubescent, or with broad smooth margins. *Male fl.* numerous, scattered over the whole interior of the receptacle, pedicelled; sepals 4; anther 1, elongate, sessile. *Gall fl.* subsessile or pedicelled; sepals 5; ovary smooth; style elongate. *Fem. fl.* sessile; achene minutely tubercled; perianth degenerate into cellular tissue.

19. **F. altissima**, *Blume Bijd.* 444; young parts puberulous, ultimately all glabrous except the external surface of the stipules, leaves coriaceous petioled broadly ovate-elliptic rarely ovate-lanceolate shortly obtusely cuspidate entire, base rounded rarely narrowed occasionally slightly unequal never cordate 3-5-nerved, receptacles sessile axillary in pairs enveloped when young in early deciduous calyptriform bracts ovoid smooth, ripe $\frac{3}{4}$ -1 in. long lake-red or yellowish, basal bracts 3 short broad obtuse united at the base pubescent or puberulous. *King Fic.* 30, t. 30, 31, 82, 82^a; *Miq. Ann.* iii. 285; *Kurz For. Fl.* ii. 442. *F. laccifera*, *Roxb. Fl. Ind.* iii. 545; *Wight Ic.* t. 656; *Brand. For. Fl.* 418; *Kurz l. c.* 441; *Bedd. For. Man.* 223; *Wall. Cat.* 4559 F, 4560 (*in part*). *Urostigma altissimum*, *Miq. in Zoll. Syst. Verz.* 90 and 96; *Flor.* i. ii. 349. *U. lacciferum*, *Miq. in L. J. B.* vi. 575.

TROPICAL HIMALAYA, from Nepal to Bhotan, and in the plains and lower hills of the DECCAN PENINSULA, and from ASSAM to Burma, the Malay Peninsula, and the Andaman Islands. CEYLON common.—DISTRIB. Malay Islands.

A large spreading tree, with few aerial roots. *Leaves* 4-7 in.; nerves 5 or 6 pairs, distinct; petiole $\frac{3}{4}$ -1 $\frac{1}{2}$ in.; stipules 1-1 $\frac{1}{2}$ in., very coriaceous, lanceolate, greyish pubescent. *Male fl.* scattered all over the interior of the receptacles, pedicelled; sepals 4; anther subsessile. *Gall and fem. fl.* with a similar gamophyllous deeply 4-cleft perianth; ovary of the gall fl. smooth, of the fem. minutely tubercled; style in both elongate; gall fl. sometimes pedicelled; fem. usually sessile.—After much consideration, I cannot but regard *F. laccifera*, *Roxb.*, as a northern form of *altissima*, best distinguished by its larger, thinner leaves.

VAR. *Fergussoni*; leaves narrower often narrowed at the base, nerves 9-12 pairs closer, receptacles smaller subglobose.—Ceylon, *Thwaites* (C.P. 2221).—Named after my friend, Mr. W. Fergusson, F.L.S., an indefatigable botanist. It is peculiar to Ceylon, and, as Dr. Trimen informs me, certainly indigenous.

20. **F. Lowii**, *King Fic.* 32, t. 33, 82^a; young branches and stipules covered with a deciduous brown scurf, ultimately all parts glabrous, leaves very coriaceous oblong or elliptic rather suddenly and shortly cuspidate, margins thickened strongly revolute, base rounded or tapering slightly to the petiole strongly 3-nerved, midrib very prominent, receptacles crowded sessile in axillary pairs globose with a broad flat apical mammilla, apical bracts 3 flat, ripe about $\frac{3}{4}$ in. diam. yellow with purplish spots, basal bracts 3 rather small broad coriaceous.

PERAK, *Wray, Kunstler*.

A powerful climber. *Leaves* 5-8 in.; nerves about 6 pairs, not prominent, reticulations obscure; beneath dull whitish, above smooth rather dull; petiole stout,

1-1½ in.; stipules ½-1 in., ovate, acuminate, convolute. *Male fl.* over whole interior of the receptacle, pedicels thick, sepals 4; anther 1, sessile, elongate. *Gall fl.* pedicelled or sessile; sepals 5, distinct; ovary smooth; style elongate, lateral; stigma elongate, flat, bilobed. *Fem. fl.* sessile, globose, tubercled; style long; stigma clavate; perianth degenerating into a glairy cellular mass.—A remarkable and very distinct species. The leaves are very pale when dry.

21. ***F. consociata***, *Blume Bijl.* 447; young parts especially the leaves beneath basal bracts and stipules densely covered with reddish-brown flocculent deciduous tomentum, otherwise glabrous, leaves coriaceous narrowly elliptic or oblanceolate (broadly subobovate-elliptic in var. *Murtoni*) with a rather short obtuse cusp entire, base narrowed 3-nerved, receptacles crowded near the apices of the branches axillary sessile depressed-spheroidal young flocculent ripe glabrous about ⅓-⅔ in. diam., apical bracts flat shining, basal 3 broadly ovate keeled sometimes bifid. *King Fic.* 33, t. 36, 37, 82^r. *Urostigma consociatum*, *Miq. in Zoll. Syst. Verz.* 91, and *Flor.* i. ii. 337; *Suppl.* 177, 437; *Ann.* iii. 286.

MALACCA, (var. *Murtoni*) *Griffith (Kew Distrib.* 593). PERAK, (var. *Murtoni*) *King's Collector*.—DISTRIB. Sumatra, Java.

A large tree with aerial roots (*Miquel*). *Leaves* 3-7 by 1½-2½ in.; nerves 5-8 pairs, distinct, not very prominent; petiole ¾-1½ in., stipules ¾-1½ in., membranous, ovate-lanceolate, at first densely tomentose, ultimately glabrous, caducous. *Male fl.* numerous, scattered over the whole surface of the receptacle, pedicelled; sepals 2, concave; anther single, sessile. *Gall* and *fem. fl.* similar, sessile, sepals 5. *Gall achene* ovoid-reniform; *fem. achene* broadly ovoid, tubercled.—The perianth degenerates into gelatinous tissue.

VAR. *Murtoni*; all parts larger less flocculent, leaves subovately elliptic to ovate obtuse base rounded or cordate, receptacles ½ in. diam.—Malacca and Perak.—Intermediate between Javan *F. procera*, Bl., and *consociata*, approaching the former in the more or less ovate leaves, large receptacles, and smooth coriaceous basal bracts, and to *consociata* in the tomentum.

22. ***F. rigida***, *Miq. in Ann. Mus.* iii. 280; perfectly glabrous, leaves petioled coriaceous lanceolate acuminate or broadly oblanceolate shortly and acutely cuspidate, margins entire recurved, base acute 3-nerved, receptacles sessile in axillary pairs subglobose smooth ½ in. diam., basal bracts 3 large orbicular glabrous. *King Fic.* 35, t. 39, 82^r. *Urostigma rigidum*, *Miq. in L. J. B.* vi. 578.

PENANG, *Phillips*. Perak, *Kunstler*.

A tree? *Leaves* 5½-6½ in., dotted above; nerves 3-4 pairs, prominent beneath, reticulations fine; petiole ¾ in., stout; stipules coriaceous, ovate-acuminate, ⅔ in. *Male fl.* numerous, scattered, pedicelled, clavate when unexpanded; sepals 2, broad, concave; anther sagittate, filament short. *Gall fl.* sessile or pedicelled; sepals 3; style short; achene ellipsoid. *Fem. fl.* sessile; sepals 4 or 5, narrow; style elongate; achene tubercled.—There are only two specimens of this at Kew, both with immature receptacles.

23. ***F. Hookeri***, *Miq. Ann.* iii. 215, 286; glabrous, leaves thinly coriaceous long-petioled broadly elliptic or subobovate with a short broad obtuse cusp entire, base rounded or slightly narrowed 3-nerved, receptacles in axillary pairs sessile obovoid depressed ripe ½-1 in. diam., large basal bracts united in an entire cartilaginous cup which envelopes the lower third of the ripe receptacle. *King Fic.* 36, t. 42, 82^r.

SIKKIM HIMALAYA and KHASIA HILLS, alt. 1-6000 ft.; not common.

A tree. *Leaves* 5-11 in.; nerves 6-8 pairs, not very prominent; under surface pale; stipules 1½-3½ in., linear-lanceolate, flaccid, caducous. *Male fl.* numerous,

scattered, with no proper perianth; stamen single, filament long and embraced by the ancelate bracteoles. *Gall* and *fem. fl.* alike, except as regards the contents of the ovary; sepals 4 or 5, linear-lanceolate; achenes very dark brown; style rather short, thick.—At once distinguished by the cup formed by the united basal bracts.

24. **F. glaberrima**, *Blume Bijl.* 451; glabrous, branchlets and leaves beneath puberulous, leaves subcoriaceous shining above elliptic oblong or ovate-lanceolate acuminate entire, base acute or narrowed rarely rounded 3-nerved, receptacles peduncled in axillary pairs subverrucose when young globose smooth, ripe $\frac{1}{4}$ in. diam. orange-coloured, basal bracts 3 broad minute pubescent deciduous, peduncle $\frac{1}{4}$ – $\frac{1}{3}$ in. *King Fic.* 37, t. 43, 82²; *Miq. Ann.* iii. 286. *F. angustifolia*, *Roxb. Fl. Ind.* iii. 554. ? *F. bistipulata*, *Griff. Notul.* iv. 398; *Ic. Plant. Asiat.* t. 559, f. 1. *F. Thomsoni*, *Miq. in Ann.* l. c. 215, 286; *Kurz For. Flor.* ii. 443. *F. fraterna*, *Miq. Ann.* l. c. 217, 287. *F. aurantiaca*, *Wall. Cat.* 4565 (not *Griff.*). *Urostigma glaberrimum*, *Miq. Fl. Ind. Bat.* i. ii. 340.

TROPICAL HIMALAYA; from Kumaon, *Duthie*, to Bhotan. BURMA and the ANDAMAN ISLANDS.—DISTRIB. Malay Islands.

A tall tree. *Leaves* 5–8 in.; nerves 8–10 pairs, nearly horizontal, not very prominent; petiole $\frac{3}{4}$ – $1\frac{1}{4}$ in., slender; stipules glabrous, linear-lanceolate, fugacious, $\frac{1}{2}$ – $\frac{3}{4}$ in. *Male fl.* few, only near the mouth of the receptacles, subsessile; sepals 4, lanceolate; stamen 1, anther broad, filament short. *Gall fl.* sessile or shortly stoutly pedicelled; perianth 4-cleft. *Fem. fl.* when ripe with viscid achenes and no perianth.—The receptacles are often attacked by an insect, and become three or four times their normal size. The leaves of some individuals retain their hairs much longer than others, but all ultimately become glabrous. There are two distinct forms of the leaf-base; broad and rounded in Chittagong specimens, much narrowed at the base in Sikkim and Khasian ones.

25. **F. microstoma**, *Wall. Cat.* 4566; glabrous, leaves coriaceous petioled elliptic-ovate to -obovate shortly abruptly and obtusely cuspidate occasionally rounded obtuse and non-cuspidate entire, base narrowed 3-nerved, receptacles sessile in axillary pairs pisiform dotted glabrous prominently umbonate, apex perforated, basal bracts 3 broadly ovate free. *King Fic.* 38, t. 44, 83^a.

SINGAPORE, *Wallich*. PERAK, *Kunstler*.

A tree. *Leaves* 3–6 $\frac{1}{2}$ in.; nerves 4–7 pairs, rather prominent beneath; petiole $\frac{1}{2}$ – $1\frac{1}{2}$ in., rather slender; stipules $\frac{1}{2}$ in. *Male fl.* scattered over all parts of receptacle, pedicelled; sepals 2, broad, concave; anther 1, elongate. *Gall fl.* with ovoid ovary and hooked stigma; perianth, as of female, of 4 lanceolate sepals; achene broadly ovate; style not hooked.—The scales, which usually close the mouth of the receptacle, are here partially united in a ring surrounding a comparatively wide opening into the receptacle. In the unripe receptacle this annulus is bright yellow and very conspicuous.

26. **F. indica**, *Linn. Sp. Pl. Ed.* ii. 1514 (*in part*); glabrous except the stipules, leaves coriaceous shortly petioled broadly to narrowly oblong acute or shortly caudate-acuminate entire, base narrowed with 2 prominent and sometimes 2 small basal nerves, receptacles in crowded pairs, sessile globose (ovoid or ellipsoid in var. *Gelderi*) smooth ripe yellowish-red and about $\frac{1}{3}$ in. diam., basal bracts 3 rather large ovate acute spreading. *King Fic.* 39, t. 45, 83^b; *Miq. Ann.* iii. 287 (*excl. many syns.*); *Kurz. For. Fl.* ii. 442. *F. sundaica* & *rubescens*, *Blume Bijl.* 450, 453. *F. pellucidopunctata*, *Griff. Notul.* iv. 394, and *Ic. Pl. Asiat.* t. 544. *F. longifolia*, *Ham. in Wall. Cat.* 4570 (C, D, and part of E). *Urostigma rubescens* &

sundaicum, *Miq. Flor.* i. ii. 338, and 339 (*in part*). U. Tjiela, *Miq. in L. J. B.* vi. 580 (*excl. syn.*), and *Flor. l. c.* 344 (*excl. all syns. but sundaicum*). ? U. pseudo-rubrum, *Miq. Flor. l. c.* 343.

BURMA, PERAK, SINGAPORE and the ANDAMAN ISLANDS, Wallich, &c.—DISTRIB. Malay Islands.

A large spreading tree. *Leaves* 4–7 in.; nerves about 4–6 pairs, not very prominent, reticulations distinct; both surfaces (but especially the upper) minutely tuberculate; petiole $\frac{1}{2}$ –1 in.; stipules ovate-lanceolate, pubescent, $\frac{1}{2}$ – $\frac{3}{4}$ in. *Male fl.* numerous, scattered; pedicels long, thin; sepals about 2, concave; anther elongate, elliptic, sessile. *Gall* and *fem. fl.* alike; ovary ovoid or elliptic; style long, lateral; stigma oblique, infundibuliform; achene tubercled and viscid; gall fl. sometimes pedicelled.—Linnaeus quoted figures of several different plants for his *F. indica*, and the retention of that name for this species in particular is therefore quite arbitrary. It might be better to abandon the name.

27. **F. acamptophylla**, *Miq. Ann. Mus.* iii. 264, 287; branchlets thinly covered with rufous scurf tips pubescent, leaves thickly coriaceous glabrous subobovate oblong or elliptic shortly obtusely cuspidate margin entire thickened subrevolute, base narrowed 3-nerved, receptacles numerous crowded in pairs towards the extremities of the branches turbinate apex much flattened, umbilical scales large smooth ripe yellow $\frac{1}{4}$ in. diam., basal bracts 3 large ovate-rotund puberulous. *King Fic.* 40, t. 46, 83^d. *Urostigma acamptophyllum*, *Miq. Flor. Suppl.* 439.

PERAK, *Kunstler*.—DISTRIB. Banka.

A large tree, young epiphytal. *Leaves* 2 $\frac{1}{2}$ –4 $\frac{1}{2}$ in.; nerves 3–6 pairs, not much more prominent than the secondary, reticulations obscure; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules ovate, acute, silky pubescent, about $\frac{1}{2}$ in. *Male fl.* scattered; pedicels long, thin; sepals 2 or 3, concave; anther elongate, sessile. *Gall* and *fem. fl.* similar; sepals 3, obtuse; style elongate; stigma slightly infundibuliform; achene tuberculate.

28. **F. truncata**, *King*; young parts and especially the leaves beneath thinly covered with brown deciduous powder and a few minute hairs, ultimately all parts glabrous, leaves coriaceous crowded short-petioled obovate or cuneate-oblong top broad obtuse sometimes truncate entire, base much narrowed strongly 3-nerved, receptacles much crowded near the apices of the branches sessile in axillary pairs depressed-spheroidal reddish-yellow smooth $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., apical scales broad flat shining surrounded by a ring, basal bracts 3 large free ovate-rotund. *King Fic.* 41, t. 48, 83^f; *Miq. Flor.* i. ii. 336, and *Ann.* iii. 286. *Urostigma truncatum*, *Miq. in Zoll. Syst.* 91, 97.

PERAK, *Kunstler*.—DISTRIB. Java, Borneo.

A small tree. *Leaves* 2 $\frac{1}{2}$ –4 $\frac{1}{2}$ in.; nerves about 5 pairs, very prominent beneath, as are the reticulations; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules lanceolate, about $\frac{1}{2}$ in. *Male fl.* few, only near the apex of receptacle, sessile; sepals 3, broad, longer than the single ovate, sagittate, subsessile anther. *Gall* and *fem. fl.* sessile; sepals 4 or 5, small, ovate; ovary of galls ovoid-acuminate, with long straight terminal style; achene ovate-rotund, tubercled; style subterminal, bent at right angles.

29. **F. obtusifolia**, *Roxb. Fl. Ind.* iii. 546; all parts glabrous, leaves thickly coriaceous short-petioled shining elliptic-oblong or -obovate, tip rounded obtuse or very slightly and obtusely apiculate, margins entire slightly undulate, base acute faintly 3-nerved, receptacles rather crowded in axillary pairs sessile chiefly at the scars of fallen leaves globose subtrigonus apex depressed yellowish when ripe and dotted, basal bracts 3 coriaceous large rounded cordate. *King Fic.* 42, t. 49, 83^g; *Wight Ic.* t. 662;

Kurz For. Fl. ii. 443. *F. longifolia*, *Ham. in Wall. Cat.* 4570 A, B. *Urostigma obtusifolium*, *Miq. in L. J. B.* vi. 569.

Tropical forests of the base of the EASTERN HIMALAYA, from Sikkim to Munni-pore; ASSAM, CHITTAGONG, BURMA and PERAK.

A large tree, young often epiphytal. *Leaves* 4–7 in.; nerves obscure, about 8–10 pairs, secondary nearly as prominent as the primary, reticulations obsolete; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., stout; stipules $\frac{1}{2}$ –1 in., lanceolate or ovate, acuminate. *Male fl.* scattered, very numerous, on long pedicels; sepals 3, lanceolate. *Gall fl.* pedicelled or sessile; sepals about 4; ovary spherical, white; style subterminal, elongate. *Fem. fl.* sessile; achene ovate-rotund, tubercled and viscid; style lateral, as long as the achene, stigma infundibuliform.

30. **F. Benjamina**, *Linn. Mantiss.* 129 (*excl. syn. Rheede*); all parts glabrous, leaves petioled thinly coriaceous shining more or less broadly ovate-elliptic abruptly shortly acuminate entire, base rounded or subacute, receptacles sessile in axillary pairs globose or ovoid smooth and blood-red when ripe about $\frac{1}{2}$ in. diam. with 3 short broad rounded basal bracts or (var. *comosa*) globose narrowed at the base and about $\frac{3}{4}$ in. diam. *King Fic.* 43, t. 52, 83^b; *Kurz For. Fl.* ii. 446; *Bedd. For. Man.* 223. *F. nuda*, *Miq. Ann.* iii. 288; *Kurz l. c.* 445. *F. comosa*, *Roxb. Cor. Pl.* ii. t. 125, and *Fl. Ind.* iii. 552; *Bedd. l. c.* 223; *Wight Ic.* t. 658. *F. pendula*, *Link. Enum.* ii. 450. ? *F. striata*, *Roth Nov. Sp.* 387. *F. papyrifera*, *Griff. Ic. Pl. Asiat.* t. 554. *F. dictyophylla*, *Wall. Cat.* 4502 A, B, D. *F. hæmatocarpa* & *neglecta*, *Blume, fid. Dcne. in Nouv. Ann. Mus.* iii. 494, 495. *Urostigma Benjamina*, *Miq. in L. J. B.* vi. 583, and *Flor. l. c.* 346; *Dalz. & Gibs. Bomb. Fl.* 242. *U. nudum*, *Miq. in L. J. B. l. c.* 584.

Cultivated in the MALAY PENINSULA, wild (var. *comosa* only) in the base of the EASTERN HIMALAYA, ASSAM, CHITTAGONG, BURMA, the ANDAMAN ISLANDS and the DECCAN PENINSULA.—DISTRIB. Sumatra, Celebes, Timor.

An umbrageous tree, branches drooping; nerves very numerous, close, straight, anastomosing just inside the margin; petiole $\frac{1}{2}$ –1 in.; stipules lanceolate, about $\frac{1}{2}$ in. *Male fl.* very few, scattered, pedicelled; sepals 2, large, flat; anther subsessile. *Gall fl.* mostly pedicelled; sepals 3 or 4, long, spatulate; ovary ovoid, smooth. *Fem. fl.* sessile; sepals shortly spatulate; achene ovoid-reniform, longer than the style, stigma large.

VAR. *comosa*, *Kurz For. Fl.* ii. 446; fruit large globose narrowed at the base about $\frac{3}{4}$ in. diam. when ripe, sepals of all the flowers lanceolate-acuminate not spatulate. *F. comosa*, *Roxb., &c.*—I have seen wild specimens only from Timor, Celebes and Sumatra. Beddome and Dalzell mention it as in the Western Peninsula, but I have seen no specimens.

31. **F. elastica**, *Roxb. Hort. Beng.* 65, and *Fl. Ind.* iii. 541; all parts quite glabrous, leaves shortly petioled coriaceous shining oblong to elliptic rather abruptly obtusely caudate entire, base rounded or narrowed obscurely 3–5-nerved, receptacles in pairs sessile in the axils of fallen leaves covered at first by hooded involucre which fall off and leave a basal involucrel entire-edged cup when ripe ovate-oblong smooth greenish yellow about $\frac{1}{2}$ in. long. *King Fic.* t. 45, 54; *Blume Bijl.* 446; *Wight Ic.* 663; *Griff. Ic. Pl. As.* t. 552; *Brand. For. Flor.* 417; *Kurz For. Flor.* ii. 444. *Urostigma elasticum*, *Miq. in L. J. B.* vi. 578, and *Flor. i.* ii. 347, t. 23; *Wall. Cat.* 4557 A, B, C, D. *U. circumscissum*, *Miq. Pl. Jungh.* 292; *Flor. l. c.* 344. *U. Karet*, *Miq. l. c.* 348. *U. odoratum*, *Miq. Pl. Jungh.* 49; *Flor. l. c.* 348, t. 24. *Visiania elastica*, *Gasp. Nov. Gen. Fic.* 9. *Macrophthalma elastica*, *Gasp. Ric.* 83, t. 8.

In damp forests at the base of the SIKKIM HIMALAYA eastwards; the KHASIA HILLS, ASSAM, BURMA and PERAK.—DISTRIB. Malayan Archipelago.

A large tree, usually epiphytic. *Leaves* 3–12 in.; primary and secondary nerves numerous, hardly distinguished from one another, all nearly horizontal; midrib thick, prominent and running nearly straight almost to the margin; petiole 1–2½ in.; stipule single, subpersistent, coloured, almost half as long as the leaves, lanceolate, flaccid. *Male fl.* scattered over interior of receptacle, pedicelled; sepals 4, ovate; anther ovate, sessile. *Gall fl.*; sepals 4; ovary smooth; style subterminal, hooked. *Fem. fl.* mostly sessile; achene ovoid, tubercled; style long; stigma large, subcapitate.

This species, though it has received many names, is not very variable. The greatest difference is, that the leaves of old fruiting-branches are very much smaller and broader in proportion than those on young shoots. In all states the close parallel straight nervation of the leaves (almost resembling that of a monocotyledon) and the enormous “stipules” form unmistakable diagnostic marks.

32. **F. Trimeni**, *King in Trimen Journ. Bot.* xxiii. 242; all parts glabrous, leaves coriaceous elliptic acute entire, base slightly tapering obscurely 3-nerved, receptacles sessile in axillary pairs globose slightly verrucose when ripe ⅓–½ in. diam, basal bracts 3 small spreading ovate-cordate slightly pubescent. Urostigma Tjiela, *Thwaites Enum.* 265 in part.

The DECCAN PENINSULA and CENTRAL PROVINCES of INDIA. CEYLON; Central Province, *Thwaites*.

A gigantic tree, with very few aerial roots. *Leaves* 3–4½ in.; nerves diverging at a low angle from the thick prominent midrib, very numerous, close, straight, anastomosing just within the slightly thickened revolute margin; petiole about ½ in., stout; stipules ovate, acuminate, ⅓–⅔ in. *Male fl.* scattered, peduncled; sepals 3, broadly ovate; anther sessile. *Gall fl.* pedicelled; fem. fl. sessile; sepals of both 5, lanceolate; achenes similar; style of both elongate; stigma flattened, especially in the gall flower.—Approaches *Tsiela*, Roxb., and *retusa*, L., var. *nitida*, but differs by its more numerous straight primary nerves, much more spreading habit, and fewer aerial roots.

33. **F. dubia**, *Wall. Cat.* 4561; all parts glabrous, leaves petioled thickly coriaceous shining from broadly oblanceolate to elliptic acute entire, base narrowed 3-nerved, receptacles peduncled solitary axillary ovoid-globose slightly narrowed to the peduncle smooth dull red with yellowish spots when ripe 1–1½ in. diam., peduncle thick ¼ in. with basal bracts 3 short broad rounded. *King Fic.* 46, t. 56, 83^k.

PENANG, *Wallich*; MALACCA, *King*.—DISTRIB. Sumatra.

An epiphytal climber or small umbrageous tree. *Leaves* 4–5 in.; nerves 6–8 pairs, reticulations minute but distinct; petiole about ⅓ in., rather stout; stipules linear-lanceolate, flaccid, caducous, 1½–2½ in. *Male fl.* numerous, scattered, elongate; sepals 3, elongate-spathulate; stamen 1, filament long. *Gall fl.*; sepals of the male; ovary ovoid, pedicel as long as the perianth; style short, subterminal. *Fem. fl.* sessile; sepals 3, long, lanceolate, acuminate; style longer than the smooth-ovoid achene.—The flowers are mixed with numerous linear bracteoles.

34. **F. Kurzii**, *King Fic.* 47, t. 57, 83^l; all parts glabrous, leaves petioled thinly coriaceous ovate-elliptic or elliptic upper surface minutely tubercled shortly acuminate entire, base narrowed obscurely 3-nerved, receptacles axillary peduncled (in pairs?) globose when ripe about ½ in. diam. dark purple and apparently tubercled, apical scales prominent, bracts at base of receptacle 0 but at base of the peduncle 3 minute glabrous caducous. *F. nuda*, *Miq.*, var. *macrocarpa*, *Kurz For. Flor.* ii. 446. ? *F. euphylla*, *Kurz l. c.* 445.

BURMA, *Kurz*.—DISTRIB. Java (*Zollinger, Herb.* 2228).

A tree. *Leaves* 4 in.; nerves 10–14 pairs, obsolete above, distinct beneath, diverging from the midrib at a high angle, secondary almost as prominent as the primary and more numerous; petiole about $\frac{1}{2}$ in.; stipules lanceolate, glabrous, $\frac{1}{2}$ in. *Male fl.* few, only near the mouth of the receptacle, on thick pedicels; sepals 2, broad, ovate, hyaline; anther single, ovate-rotund, sessile. *Gall fl.* pedicelled; perianth 4-toothed; ovary ovate, with broad ends, smooth; style elongate, stigma flat. *Fem. fl.* sessile; achene ovate-reniform, minutely tubercled.

35. ***F. rhododendrifolia***, *Miq. Ann.* iii. 286; quite glabrous except the stipules, leaves thinly coriaceous shining smooth elongate-elliptic or oblong rarely elliptic-ovate acuminate entire, base narrowed or subcuneate rarely rounded, receptacles in axillary pairs sessile smooth globose purplish-red when ripe about $\frac{1}{2}$ in. diam., basal bracts 3 broad rounded glabrous persistent. *King Fic.* 47, t. 58, 83^m. *Urostigma rhododendrifolium*, *Miq. in L. J. B.* vi. 579 (*not of others*); *Kurz For. Fl.* ii. 445.

At the base of the SIKKIM and BHOTAN HIMALAYA; the KHASIA and PEGU HILLS.

A tree. *Leaves* 4–5 in.; main nerves slightly more prominent than the secondary, from 12–14 pairs, anastomosing near the margin; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules lanceolate, $\frac{1}{2}$ in., deciduously pubescent. *Male fl.* few, only near the mouth of the receptacle, sessile; sepals 2, broadly ovate, flat, longer than the stamen; anther ovate, apiculate, filament very short. *Gall fl.* shortly pedicelled, perianth with 3 sharp teeth; ovary globose; style elongate; stigma flat. *Fem. fl.* sessile; sepals 3, lanceolate; achene triangular, prominently but minutely tubercled; style elongate; stigma small.—A species badly represented in herbaria, and not well understood. *Kurz* is, I believe, in error in giving the Andaman Islands as a habitat.

36. ***F. caudiculata***, *Trimen in Journ. Bot.* xxiii. 243; all parts glabrous, leaves petioled thickly membranous narrowly elliptic shortly cuspidate margins entire when dry subrevolute, base broad rounded or subtruncate, receptacles shortly peduncled axillary solitary or in pairs globose smooth bright red when ripe about $\frac{1}{2}$ in. diam., basal bracts 3 broad obtuse united in a shallow cup, peduncle $\frac{1}{2}$ in. *King Fic.* 48, t. 58 A.

CEYLON; in the Western Province, at Paregodde and Padun Korle.

A large tree. *Leaves* 2 $\frac{1}{2}$ –3 $\frac{1}{2}$ in.; lateral nerves about 12 pairs, prominent, nearly at right angles to the strong broad midrib, reticulations dark-coloured, small, but very distinct beneath; petiole stout, about $\frac{1}{2}$ in.; stipules ovate, much acuminate, about 1 in., membranous, rather persistent. *Male fl.* few, scattered, sessile; sepals 3, lanceolate, scarcely covering the single stamen; anther ovate, apiculate, filament short broad. *Gall* and *fem. fl.* similar, sessile or pedicelled; perianth 4–5-cleft; ovary ovoid; style elongate when young, short when ripe from breaking off.

The affinities are with *F. nemoralis*, Wall., from which the thicker and more elliptic leaves, and larger stipules and receptacles distinguish it.

37. ***F. pisocarpa***, *Blume Bijdr.* 454; glabrous except the stipules, leaves crowded at the extremities of the branches membranous elliptic rarely subobovate-elliptic very shortly cuspidate margin entire undulate, base 3-nerved obtuse rounded or very slightly narrowed, receptacles crowded along the branches in pairs from the scars of fallen leaves sessile small turbinate-globose smooth $\frac{1}{4}$ in. diam., basal bracts 3 broad obtuse. *King Fic.* 48, t. 59, 83ⁿ. *Urostigma pisocarpum*, *Miq. Flor.* i. ii. 344.

PERAK, *Kunstler*.—DISTRIB. Java.

A small tree. *Leaves* 1 $\frac{3}{4}$ –2 $\frac{1}{2}$ in.; nerves 5–7 pairs, prominent, reticulations fine, distinct; petiole slender, $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules ovate-lanceolate, pubescent externally, $\frac{1}{2}$ in. *Male fl.* few, only near the mouth of the receptacles, sessile; sepals 2, broadly

ovate, longer than the stamen, anther ovate, filament short. *Gall* and *fem. fl.* alike; sepals 1 or 2, hyaline or 0; achene elongate-ovoid, smooth; style elongate, stigma cylindric.—I have not seen the specimens from Java on which Blume founded the species, but Kunstler's plant agrees well with the description.

38. **F. glabella**, *Blume Bijl.* 452; young parts pubescent or all glabrous, leaves petioled thinly coriaceous obovate-oblong or oblanceolate (except in vars.) shortly cuspidate entire, base 3-nerved acute or cuneate rarely rounded jointed to the petiole, receptacles rather crowded in axillary pairs from the scars of fallen leaves sessile or peduncle $\frac{1}{10}$ – $\frac{1}{8}$ in. spheroidal apex often slightly depressed smooth dark-bluish purple with sometimes yellow dots $\frac{1}{8}$ – $\frac{1}{4}$ in. diam., basal bracts minute broadly triangular. *King Fic.* 49, t. 60, 83; *Miq. Ann.* iii. 286. *F. parvifolia*, *Miq. l. c.* *F. affinis*, *Wall. Cat.* 4524; *Kurz For. Fl.* ii. 444. *F. subpedunculata*, *Miq. l. c.* 217, 286. *F. Wightiana*, *Benth. Fl. Hongk.* 327. *Urostigma glabellum* & *Moritzianum*, *Miq. Flor.* i. ii. 340 and 342. *U. canaliculatum* & *parvifolium*, *Miq. in L. J. B.* vi. 579, and *Flor. l. c.* 340, 343.

EASTERN HIMALAYAS, the KHASIA MTS., CHITTAGONG and BURMA.

A tree. *Leaves* 2–4 in.; nerves 7–10 pairs, not very prominent, reticulations distinct; petiole $\frac{3}{8}$ –1 in.; stipules ovate-lanceolate, $\frac{1}{2}$ in. *Male fl.* few, only near mouth of receptacle, sessile; sepals 2, ovate, hyaline, larger than the single subsessile anther. *Gall* and *fem. fl.* alike, sessile or shortly pedicelled; sepals 4, hyaline, free or 0; achene spherical or ovoid, smooth; style very long, stigma obovate.—The following is one variety, and there are others in the Malay Islands, &c.

F. AFFINIS, *Wall. Cat.* 4524; leaves ovate-lanceolate acuminate shining, base narrowed, nerves up to 12 pairs, receptacles peduncled. *Herb. Griff. (Kew Distrib.* 4589, 4590); *Herb. H. f. & T. Ficus*, 113.

39. **F. retusa**, *Linn. Mant.* 129; quite glabrous, leaves shortly petioled coriaceous broadly ovate obovate or rhomboid obtusely cuspidate or subacute, base 3-nerved narrowed into the petiole, receptacles small sessile in axillary pairs $\frac{1}{2}$ in. diam. yellow or reddish, basal bracts broadly ovate obtuse spreading persistent. *King Fic.* 50, t. 61, 62, 84; *Brand. For. Fl.* 417; *Kurz For. Fl.* ii. 444; *Bedd. For. Man.* 223. *F. dilatata*, *Miq. Ann.* iii. 218, 288. *F. nitida*, *Thunb. Fic.* 14; *Blume Bijl.* 455; *Wight Ic.* t. 642. *F. rubra*, *Roth Nov. Sp.* 391 (*excl. syn.*). *F. littoralis*, *Blume l. c.* 455. *F. microcarpa*, *Linn. f. Suppl.* 442. *F. Benjamina*, *Willd. Sp. Pl.* iv. 1143 (*excl. syn. Lin.*); *Roxb. Fl. Ind.* iii. 550. *Urostigma retusum* & *nitidum*, *Miq. Flor.* i. ii. 345; *Dalz. & Gibs. Bomb. Fl.* 241, 242. *U. microcarpum*, *Miq. l. c.* 346. *U. ovoideum* (*excl. syn.*) & *pisiferum*, *Miq. in L. J. B.* vi. 580.

Base of the EASTERN HIMALAYA, KHASIA HILLS, ASSAM, BURMA, the MALAYAN and DECCAN PENINSULAS.—DISTRIB. Malay Islands, China, New Caledonia.

A large umbrageous evergreen tree, with a few aerial roots. *Leaves* 2–4 in.; nerves 5 or 6 pairs, not much more prominent than the secondary nerves; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; stipules lanceolate, about $\frac{1}{2}$ in. *Male fl.* numerous, scattered, sessile or shortly pedicelled; sepals 3, subspathulate; stamen single; anther cordate-apiculate, as long as the filament. *Gall fl.* sessile or pedicelled; sepals 3, broadly spathulate; ovary smooth. *Fem. fl.* sessile or pedicelled; achene ovoid or obovoid, perianth much smaller than in the gall; styles of both short, stigma cylindric or clavate.—The following are the prevalent forms.

F. RETUSA, *Linn. l. c.*; leaves inclining to round apiculate, base narrowed.—The Deccan Peninsula, Penang, Ternate and Australia.

F. NITIDA, *Thunb. l. c.*; leaves ovate to rhomboid elliptic apiculate, base narrowed.—Transgangetic India, &c.

40. **F. Talboti**, *King Fic.* 51, t. 63, 84^a; all parts glabrous, leaves petioled thinly coriaceous shining above ovate or elliptic shortly caudate-acuminate entire, base narrowed 3-5-nerved, receptacles in axillary pairs sessile obovoid rather depressed at the apex smooth when ripe about $\frac{1}{4}$ in. diam., basal bracts 3 ovate acute.

Forests of CANARA, *Talbot*.

A large tree. *Leaves* $3\frac{1}{2}$ -4 in.; nerves 6-9 pairs, rather prominent on both surfaces; petiole $\frac{1}{2}$ -1 in.; stipules ovate, about $\frac{1}{4}$ in. *Male fl.* few, only near the mouth of the receptacle, sessile; sepals 3, broadly ovate; anther 1, filament short. *Gall fl.* sessile or pedicelled; sepals 3, lanceolate; ovary ovate, narrowed to each end; style terminal. *Fem. fl.*; perianth of the galls; achene ovoid or obovoid, minutely tubercled; style short, lateral.—Near *F. retusa*, Liun., but differs in the form and venation of the leaf.

41. **F. Maclellandi**, *King Fic.* 52, t. 64, 84^a; young parts softly tomentose ultimately all glabrous except the stipules and receptacles, leaves coriaceous oblong or narrowly elliptic obtusely and shortly cuspidate entire, base rounded or slightly narrowed both surfaces in adult leaves minutely tubercled, receptacles in axillary pairs sessile globose covered with pale flocculent tomentum about $\frac{1}{2}$ in. diam., basal bracts small broadly ovate silky.

PEGU, *McClelland*.

A tree? *Leaves* $3\frac{1}{2}$ -4 $\frac{1}{2}$ in.; nerves about 12 pairs, not much more prominent than the secondary, reticulations rather small, distinct; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in.; stipules lanceolate, tomentose, about $\frac{1}{2}$ in. *Male fl.* not seen. *Fem. fl.* sessile; sepals 3, lanceolate; ovary ovoid, acuminate; style terminal, as long as ovary.—This has been collected only once, and it is poorly represented in collections.

42. **F. nervosa**, *Roth Nov. Sp.* 338; young parts appressed pubescent or puberulous at length glabrous except the puberulous stipules, receptacles and midribs occasionally appressed pubescent, leaves $\frac{1}{2}$ -1 in. thinly coriaceous elliptic oblong-lanceolate to obovate-elliptic or oblanceolate abruptly rather narrowly acuminate entire or margin slightly undulate and revolute shining on both surfaces lower minutely tubercled, base narrowed rarely rounded subequal 3-5-nerved, receptacles in axillary pairs peduncled young subverrucose ripe depressed globose $\frac{1}{4}$ -1 in. diam., peduncles $\frac{1}{2}$ - $\frac{1}{2}$ in. slender, bracts at the base 0 but 3 small free rounded-ovate pubescent bracts low down on the peduncle. *King Fic.* 53, t. 65; *Kurz For. Fl.* ii. 453; *Wight Ic.* t. 660; *Miq. Ann.* iii. 286; *Bedd. For. Man.* 223. *F. montana*, *Wall. Cat.* 4514 A to D. *F. magnoliæfolia*, *Blume Bijl.* 448; *Miq. l. c.* 263, 286. *F. modesta*, *Miq. l. c.* 286. *Urostigma nervosum* & *modestum*, *Miq. in L. J. B.* vi. 585. *U. euneuron*, *Miq. Flor.* i. ii. 353.

SIKKIM and BHOTAN HIMALAYA, ASSAM, the KHASIA MTS., BURMA, the MALAY and DECCAN PENINSULAS and CEYLON.—DISTRIB. Malay Islands, China.

A tree. *Leaves* $3\frac{1}{2}$ -8 in.; nerves 7-10 pairs, nearly horizontal, prominent beneath; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules lanceolate or ovate-lanceolate, membranous, puberulous, about $\frac{1}{2}$ in. *Male fl.* few, only near mouth of receptacle, pedicelled; sepals 2, long, spatulate; stamen 1, filament as long as the anther adnate to one sepal. *Gall fl.* sessile or pedicelled; sepals 3, elongate, acuminate; ovary ovoid, smooth; style short. *Fem. fl.* rarely pedicelled; sepals 3, lanceolate; achene ovoid, acuminate; style twice as long, stigma clavate.

VAR. minor; smaller, more puberulous, nerves 5-7 pairs. *U. modestum*, *Thwaites Enum.* 266.—Nilghiri Hills, Ceylon, 3-5000 ft.

43. **F. Rumphii**, *Blume Bijl.* 437; all parts glabrous, leaves long-petioled subcoriaceous minutely tuberculate above when dry shining

broadly ovate acuminate margins entire subundulate, base broad slightly narrowed towards the petiole, basal nerves 5 rarely 7 (2 minute), receptacles sessile in axillary pairs or at leaf-scars globose smooth when young whitish with dark spots when ripe nearly black $\frac{1}{2}$ in. diam., basal bracts 3 rotund small. *King Fic.* 54, t. 673, 84^a; *Dene. in N. Ann. Mus.* iii. 493; *Miq. Ann.* iii. 287; *Kurz For. Flor.* ii. 448. *F. cordifolia*, *Roxb.* (not *Bl.*) *Fl. Ind.* iii. 548; *Brand. For. Flor.* 416, t. 48; *Wight Ic.* t. 640. Urostigma Rumphii, *Miq. in Zoll. Syst. Verz.* 90, and *Flor.* i. ii. 332. *U. cordifolium*, *Miq. in L. J. B.* vi. 564. *F. species*, *Griff. Itin. Notes* iii. n. 145, and *Ic. Plant. Asiat.* 549.—*Wall. Cat.* 4484, A to G.

On the dry lower slopes of the mountains of the PANJAB; and NORTHERN, WESTERN and CENTRAL INDIA, ASSAM, BURMA and the Malay Peninsula.—*DISTRIB.* Malay Islands.

A large tree, often epiphytal. *Leaves* 4–6 in.; nerves 3–6 pairs, rather irregular, prominent when young, apex forming about $\frac{1}{2}$ of the blade; petiole 2 $\frac{1}{2}$ –3 $\frac{1}{2}$ in.; stipules ovate-lanceolate, $\frac{1}{2}$ –1 in. *Male fl.* few, only near mouth of receptacle; sepals 3, spatulate; stamen 1; filament about as long as the anther. *Gall* and *fem. fl.*; sepals 3, lanceolate; gall ovary smooth, usually obovoid; achene minutely tubercled, mucilaginous; style in both elongate, stigma clavate.

44. ***F. religiosa***, *Linn. Hort. Cliff.* 471; leaves long-petioled coriaceous shining above minutely tubercled when dry beneath ovate-rotund narrowed upwards and caudate margins entire undulate, base broad rounded to truncate or a little narrowed occasionally emarginate or when young cordate 5–7-nerved, receptacles in axillary pairs sessile smooth depressed spheroidal when ripe dark purple $\frac{1}{2}$ in. diam., basal bracts 3 broad spreading coriaceous. *King Fic.* 55, t. 67 A, 84^a; *Blume Bijl.* 436; *Roxb. Fl. Ind.* iii. 547; *Wight Ic.* t. 1967; *Bedd. Fl. Sylvat.* t. 314; *Brand. For. Flor.* 415; *Kurz For. Flor.* ii. 448. *F. affiniior*, *Griff. Notul.* iv. 392, and *Ic. Pl. Asiat.* t. 553. Urostigma religiosum, *Gasp. Ric.* 82, t. 7, f. 1; *Miq. Flor.* i. ii. 333, t. 23, in *L. J. B.* vi. 563; *Dalz. & Gibs. Bomb. Fl.* 241. *U. affine*, *Miq. in L. J. B.* vi. 564.—*Rheede Hort. Mal.* i. 47, t. 27.—*Wall. Cat.* 4487 A, B to E.

Wild in the SUB-HIMALAYAN FORESTS, in BENGAL and in CENTRAL INDIA. Universally planted in India and Ceylon, less frequently in Burma, and rarely in the Malayan region.

A large, glabrous, usually epiphytal tree. *Leaves* 4 $\frac{1}{2}$ –7 by 3–4 $\frac{1}{2}$ in.; nerves about 8 pairs, reticulations fine, distinct, the tail forming about a third of the blade; petiole 3–4 in., slender; stipules minute, ovate, acute. *Male fl.* very few, only near the mouth of some receptacles (often absent), sessile; sepals 3, broadly ovate; anther 1, ovate-rotund, filament short. *Gall* and *fem. fl.* sessile or pedicelled; sepals 5, lanceolate; style short, lateral; stigma rounded. *Gall* much more numerous than the *fem.*, many without perianth.—I reduce *F. affiniior*, of Griffith, here with some hesitation: for his figure shows a slight difference from ordinary *religiosa* in the nervation. It agrees, however, in this respect no better with *F. Rumphii*.

45. ***F. Arnottiana***, *Miq. Ann. Mus.* iii. 287; everywhere glabrous, leaves long-petioled subcoriaceous broadly ovate narrowed to the shortly caudate-acuminate apex entire, base from truncate-emarginate to deeply cordate never narrowed to the petiole 7-nerved, receptacles mostly from the axils of fallen leaves in pairs or clusters from tubercles sessile or short-peduncled depressed-globular smooth when ripe purple with greenish dots, $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., basal bracts 3 brown membranous, peduncles 0 or $\frac{1}{10}$ – $\frac{1}{8}$ in. *King Fic.* 56, t. 68, 84^a. *F. populifolia*, *Wall. Cat.* 4485 A, C (in part).

Urostigma Arnottianum, *Miq. in L. J. B.* vi. 564; *Thwaites Enum.* 264.
U. cordifolium, *Dalz. & Gibs. Bomb. Fl.* 242.

THE DECCAN PENINSULA AND CEYLON, in rocky places.

A tree or shrub. *Leaves* 3–8 in.; nerves 5–7 pairs, reticulations lucid, minute; petiole 2–6 in.; stipules ovate-lanceolate, $\frac{1}{2}$ –1 in., caducous, reddish-brown when dried. *Male fl.* few, near the mouth of the receptacles, sessile; sepals 3, loose, inflated, broadly acuminate, much larger than the single small ovate-rotund subsessile anther. *Gall and fem. fl.* undistinguishable except by contents of ovary, sessile or pedicelled; perianth lax, toothed, completely investing the ovary; style elongate; stigma flat.

VAR. courtallensis; leaves smaller, base less cordate. *U. courtallense*, *Miq. in L. J. B. l. c.* 564.

46. **F. Mooniana**, *King Fic.* 57, t. 69, 84^w; leaves subcoriaceous elliptic or ovate-oblong shortly cuspidate glabrous prominently minutely reticulated margin entire minutely undulate, base rounded or slightly narrowed 3-nerved not cordate, receptacles crowded below the ends of the branches solitary or in pairs chiefly in the axils of fallen leaves globose $\frac{3}{4}$ – $\frac{1}{2}$ in. diam. punctate, peduncle $\frac{1}{2}$ in. *Urostigma Wightianum*, *Miq., var. majus*, *Thwaites Enum.* 265.

CEYLON; in the Central Province.

A large tree. *Leaves* $4\frac{1}{2}$ – $6\frac{1}{2}$ in.; nerves 10–15 pairs; petiole about $1\frac{1}{2}$ in.; stipules about $\frac{1}{2}$ in., puberulous. *Male fl.* few, only near the mouth of the receptacles, sessile; sepals 3, lanceolate, not quite covering the single stamen; anther ovate-apiculate, filament as long. *Gall and fem. fl.* sessile or pedicelled; perianth 4-toothed, shorter than the ovary; gall ovary ovoid; achene broadly triangular ovoid. —Differs from *Wightiana* and any form of *infectoria* in the straighter, more numerous and spreading nerves and longer peduncles.

47. **F. Tjakela**, *Burm. Fl. Ind.* 227; all parts glabrous, leaves coriaceous very glossy above long-petioled oval to ovate shortly abruptly acuminate margins entire slightly undulate, base broad rounded or subtruncate rarely narrowed 3–5-nerved, receptacles in clusters of 2–6 on very short crowded tubercles in the axils of the leaves or most frequently at the scars of fallen leaves sessile rarely very shortly peduncled depressed-globose whitish-yellow and dotted when ripe $\frac{1}{2}$ in. diam., basal bracts 3 broad deeply bifid. *King Fic.* 57, t. 70, 84^w; *Miq. Ann.* iii. 287. *F. venosa*, *Ait. Hort. Kew* iii. 451; *Poir. Encycl. Suppl.* ii. 657; *Ham. in Trans. Linn. Soc.* xv. 151. *F. infectoria*, *Willd. (not Roxb.) Sp. Pl.* iv. 1137; *Ait. l. c.* 485. *F. caulocarpa*, *Miq. Ann. l. c.* 287 (*excl. syn. caulocarpa*). *Urostigma Tjakela*, *infectorium (in part)*, *caulobotryum & ceylonense*, *Miq. in L. J. B.* vi. 566, 567, 568.—*Wall. Cat.* 4519 A, B.—*Rheede Hort. Mal.* iii. t. 64.

THE DECCAN PENINSULA AND CEYLON, ascending to 4000 ft.

A very tall tree without aerial roots. *Leaves* 5– $7\frac{1}{2}$ in.; nerves 7–10 pairs, slightly prominent on both surfaces; petiole $1\frac{3}{4}$ – $2\frac{1}{2}$ in., slender; stipules small, ovate-lanceolate, $\frac{1}{2}$ in.; leaf-scales of young branches large, linear-lanceolate, flaccid, caducous, 3–5 in. *Male fl.* few, only near the mouth of the receptacle, sessile; sepals 3, ovate, shorter than the single stamen; anther ovate, filament about as long. *Gall and fem. fl.* alike; sepals 3 or 4; achene obovate; style elongate, stigma cylindric.—A distinct and beautiful species, allied to *F. infectoria*, Roxb., with which it has been confused. It is distinguishable by its minute receptacles in clusters of 4 to 6, and when dry by the dark greenish-grey leaves, with the upper surface smooth and glistening. The large, membranous, caducous, flaccid leaf-scales resemble the stipules of *F. elastica*, but are more fugacious. A small form collected by Mr. Gamble in the Cuddipore Forests has leaves only about $3\frac{1}{2}$ in. long.—Under *F.*

infectoria in the London Journal of Botany, Miquel has mixed up references to both *infectoria* and *Tjakela*.

48. **F. insignis**, *Kurz For. Flor.* ii. 447; branchlets tomentose ultimately pubescent or glabrous, leaves long-petioled glabrous glossy above dull beneath very coriaceous elliptic or ovate-elliptic subinequilateral tip short abrupt obtuse, margins entire slightly revolute and undulate, base slightly narrowed obscurely 3-5-nerved, receptacles crowded towards the apices of the branches axillary or at the scars of fallen leaves globose, apex mammillate, when ripe greyish-white with pink dots and densely tomentose except the glabrous mammilla, peduncle short tomentose $\frac{1}{2}$ in., basal bracts 3 small ovate-rotund glabrous scarious. *King Fic.* 58, t. 71, 847.

PEGU; forests of Prome, *Kurz*.

A tree. *Leaves* $4\frac{1}{2}$ -7 by $2\frac{1}{4}$ -4 in.; nerves 10-12 pairs, reticulations obscure; petiole jointed to the blade, 2-2 $\frac{1}{2}$ in.; stipules small, very broadly ovate, tomentose. *Male fl.* few, only near mouth of receptacles; perianth toothed, shorter than the filament of the single stamen; anther broad, thick. *Gall* and *fem. fl.* with a 3- or 4-toothed perianth, shorter than the ovary; gall ovary ovoid; achene triangular, ovoid, minutely tubercled; style elongate, stigma cylindric.—Collected only by *Kurz*. It is near *F. geniculata*, but distinguished by its much more coriaceous leaves, and tomentose stipules and receptacles.

49. **F. Tsiela**, *Roxb. Fl. Ind.* iii. 549; all parts glabrous, leaves coriaceous broadly ovate or ovate-lanceolate acute or broadly obtusely cuspidate entire with a thickened marginal nerve, base narrowed or rounded 3-nerved, receptacles crowded at the ends of the branches axillary or at leaf-scars sessile globose, when ripe purple smooth about $\frac{1}{2}$ in. diam., basal bracts 3 minute broadly ovate scarious. *King Fic.* 59, t. 74, 842; *Ham. in Trans. Linn. Soc.* xv. 149; *Wight Ic.* t. 668; *Bedd. For. Man.* 314; *Miq. Ann.* iii. 286. *F. amplissima*, *Smith in Rees Cyclop.* xiv. 1. *F. indica*, var., *Linn. Sp. Pl. Ed.* 2, 1514. *F. Benjaminia*, *Wall. Cat.* 4503 B, C. *Urostigma pseudo-Tjiela*, *Miq. in Hook. L. J. B.* vi. 566, and *Ann. l. c.* 286; *Dalz. & Gibs. Bomb. Fl.* 241. *U. pseudo-Benjaminia*, *Miq. ll. c.* 566 and 286. *U. Tjiela*, *Miq. in L. J. B. l. c.* 580; *Thwaites Enum.* 265.—*Rheede Hort. Mal.* iii. t. 63.

THE DECCAN PENINSULA, from the Concan southward. CEYLON.

A large spreading tree without aerial roots. *Leaves* 2-4 $\frac{1}{2}$ in.; nerves indistinct (until the leaf is dry), from 8-10 pairs; petiole $1\frac{1}{4}$ -2 in.; stipules ovate, acuminate, $\frac{1}{2}$ -1 in. *Male fl.* few, sessile; sepals 3, ovate, acuminate, longer than the single stamen; anther broadly ovate, filament longer thick. *Gall fl.* sessile or pedicelled; fem. mostly sessile; sepals of both 3, ovate, shorter than the achene; fertile and gall achenes ovate-reniform, fertile broadest; style in both long, stigma cylindric.—A sport is common at Madras (*Wall. Cat.* 4503 C) with tufts of very long petioled leaves at the ends of the branches.

50. **F. infectoria**, *Roxb. Fl. Ind.* iii. 550 (*excl. syn. Rheede, not Willd.*); all parts glabrous, leaves membranous or rather long slender petioles oblong-ovate or ovate abruptly shortly acuminate, margins entire subundulate, base usually rounded and emarginate or subcordate sometimes narrowed or acute 3-nerved, receptacles in axillary pairs sessile globose, when ripe $\frac{1}{2}$ in. diam. whitish flushed with red and dotted, basal bracts 3 ovate-rotund minute. *King Fic.* 60, t. 75 to 79; *Brand. For. Fl.* 414 (*excl. syn.*); *Kurz For. Fl.* 446; *Bedd. For. Man.* 222 (*excl. syn.*); *Wight Ic.* t. 665. *F. Tjiela*, *Wall. Cat.* 4520. *F. venosa*, *Wall. Cat.* 4515 D, F,

4529 A. F. Lacor, *Ham. in Trans. Linn. Soc.* xv. 150. F. terminalioides, *Griff. Notul.* iv. 393; *Ic. Pl. Asiat.* t. 550. F. lucescens, *Blume Bijl.* 444. Urostigma infectoria, *Miq. Flor.* i. ii. 339; *Dalz. & Gibs. Bomb. Fl.* 241. U. timorensis, *Miq. in L. J. B.* vi. 569; *Ann.* iii. 286; *Flor.* l. c. 343. U. leucocarpum, *Miq. in L. J. B.*; *Ann.* ll. c. 576 and 286. U. lucescens, *Miq. Flor.* l. c. 339.

Plains and lower hills of INDIA, from the Salt Range to Sikkim; BENGAL, ASSAM, BURMA, both PENINSULAS, and CEYLON; not common wild, frequently planted.—DISTRIB. Malay.

A deciduous, low tree. *Leaves* $3\frac{1}{2}$ –5 in.; nerves 5–7 pairs, not very prominent; petiole $1\frac{1}{2}$ –2 in., sometimes indistinctly jointed with the blade; stipules about $\frac{1}{2}$ in., broadly ovate, acute, pubescent. *Male fl.* few, sessile, near the mouth of the receptacles; anther broadly ovate, filament short; sepals 4 or 5, linear. *Gall and fem. fl.*; sepals 3 or 4, like those of the male, the latter often sessile; style of fem. long, of gall fl. short, stigma elongate.—Several geographical forms occur, of which 3 are Indian and 2 more Eastern.

F. INFECTORIA PROPER; leaf-base emarginate subcordate or slightly narrowed, receptacles sessile.

F. LAMBERTIANA, *Miquel Ann. Mus.* iii. 286; leaves coriaceous, base broad rounded emarginate or subcordate, receptacles $\frac{1}{2}$ – $\frac{1}{2}$ in. diam., pedicel pubescent $\frac{1}{2}$ – $\frac{1}{2}$ in. F. punctata, *Heyne in Wall. Cat.* 4569. F. rigida, *Ham. in Wall. Cat.* 4527, 4585 B. Urostigma Lambertianum & ægeiophyllum & perseæfolium, *Miq. in L. J. B.* vi. 565, 567; U. Lambertianum, *Dalz. & Gibs. Bomb. Fl.* 241.—Western and Central India, from the Sewaliks to the Deccan Peninsula and Ceylon.

F. WIGHTIANA, *Wall. Cat.* 4540; leaves smaller often only $2\frac{1}{2}$ in., base narrowed, receptacles large, peduncles about $\frac{1}{2}$ in. pubescent. *Bedd. For. Man.* 222; *Miq. Ann. l. c.* 286. Urostigma Wightianum, *Miq. in L. J. B. l. c.* 566.—South edge of the Gangetic Plain and Western Ghats.

51. **F. geniculata**, *Kurz For. Flor.* ii. 447; glabrous except the pubescent stipules, leaves subcoriaceous broadly elliptic or ovate-rotund cuspidately acuminate, margins subundulate, base rounded or narrowed sometimes emarginate 3-nerved, receptacles crowded shortly peduncled or sessile in groups of 2 to 4 at the scars of fallen leaves depressed-globose $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. when ripe reddish with dots, basal bracts 3 broadly ovate. *King Fic.* 64, t. 80, 84¹².

TROPICAL SIKKIM HIMALAYA and ASSAM to CHITTAGONG, BURMA and the MALAY PENINSULA.—DISTRIB. Malay Islands.

A large tree. *Leaves* 4–7 by $2\frac{1}{2}$ –4 in.; nerves 8–12 pairs, nearly horizontal, nervules and reticulations distinct; petiole $2\frac{1}{2}$ –4 in., separating from the blade when dry; stipules about $\frac{1}{2}$ in., broadly ovate, pubescent. *Male fl.* near the mouth of the receptacles, rather numerous; sepals connate, barely covering the single stamen; anther broad, filament short. *Gall and fem. fl.* with 2 or 3 lanceolate sepals; style of gall fl. short, of fem. fl. long.—Closely allied to *infectoria*, but separable by the rounder leaves, longer petioles, and gamophyllous male perianth.

52. **F. callosa**, *Willd. in Act. Acad. Berol.* 1798, 102, t. 4; branchlets hoary warted, leaves rigid coriaceous petioled elliptic or oval, tip rounded or shortly obtusely acuminate, margins entire slightly recurved, base broad rounded sometimes slightly narrowed to the petiole 3–5-nerved, receptacles peduncled solitary axillary pubescent-scabrid subglobose very slightly depressed at the apex contracted at the base into a short stalk, basal bracts 3 broadly ovate pubescent when ripe yellow about 1 in. diam., peduncle proper about $\frac{3}{4}$ in. pubescent-scabrid. *King Fic.* 64 to 85, 84¹²; *Miq. Ann.* iii. 295; *Kurz For. Fl.* ii. 454. F. scleroptera, *Miq. Pl. Jungh.* 63, and

Flor. i. ii. 314. *F. cinerascens*, *Thw. Enum.* 266; *Bedd. For. Man.* 224. *F. artocarpifolia*, *Roxb. mss.*

DECCAN PENINSULA, from Canara southwards; BURMA, the ANDAMAN ISLANDS and CEYLON.—DISTRIB. Java.

A large tree. *Leaves* 5–8 in. (12 or more in barren shoots); nerves 5–12 pairs, slender but prominent beneath, as are the nervules and reticulations; above smooth, shining, and hard; beneath pale, minutely papillose, pubescent when young, ultimately glabrous but subscaurid; petiole $1\frac{1}{2}$ – $1\frac{3}{4}$ in.; stipules ovate-lanceolate, $\frac{1}{2}$ – $\frac{1}{2}$ in., pubescent. *Flowers* intermixed with many ovate-lanceolate bracteoles. *Male fl.* rather numerous, scattered, pedicelled, 1–2-androus; sepals 3, spatulate; stamens 1 or 2, anther small, ovate, filament short thin. *Gall and fem. fl.*; perianth deeply divided above into 3 or 4 broadly lanceolate segments; style elongate, stigma deeply bifid; achene obovoid.—The bracteoles are often with difficulty distinguished from the perianth. I follow Miquel in adopting Willdenow's name *callosa* for his *scleroptera* and Thwaites' *cinerascens*, though I rather doubt Willdenow's description really referring to this plant.

53. ***F. vasculosa***, *Wall. Cat.* 4482; quite glabrous, leaves pale green when dry coriaceous petioled elliptic or obovate-oblong entire obtuse or obtusely cuspidate gradually narrowed to the acute or cuneate obscurely 3-nerved base, receptacles in axillary pairs peduncled globose glabrous minutely tubercled base constricted and minutely 3-bracteate pale yellow, $\frac{1}{2}$ – $\frac{1}{2}$ in. diam., pedicel $\frac{1}{2}$ – $\frac{1}{2}$ in. slender. *King Fic.* 65, t. 86, 84^{m.2}; *Miq. in L. J. B.* vii. 454, and *Flor.* i. ii. 315; *Kurz For. Fl.* ii. 453. *F. Championi*, *Benth. in Hook. Kew Journ.* vi. 76, and *Fl. Hong Kong*, 328.

TAVOY, *Wallich.* PERAK, *King's Collector.* PENANG and SINGAPORE, *Curtis*, &c.—DISTRIB. Banka, Java, China.

A tree. *Leaves* 2–3 in.; nerves 6–12 pairs, nearly transverse, slender but prominent below, reticulations rather distinct; both surfaces pale and perfectly glabrous and shining, $\frac{1}{2}$ – $\frac{2}{3}$ in.; petiole $\frac{1}{2}$ – $\frac{2}{3}$ in.; stipules $\frac{1}{2}$ in., ovate, acute. *Male fl.* few and only near the mouth of the receptacle, pedicelled, diandrous; sepals 4, ovate or obovate. *Fem. and gall fl.* alike, sessile or pedicelled; perianth 4-toothed; ovary obovoid; style lateral, elongate, stigma 2-armed.

Sect. III. SYNÆCIA (see p. 495).

54. ***F. aurantiaca***, *Griff. Notul.* iv. 394, and *lc. Pl. Asiat.* t. 504, f. 2; scaurid, leaves thickly coriaceous elliptic-ovate subinequilateral shining and smooth above, hispidly scaurid beneath, nerves 8–9 pairs, receptacles ovoid-cylindric base ebracteate. *F. trachycoma*, *Miq. in Zoll. Syst. Verz.* 92; *Flor.* i. ii. 304; *Ann.* iii. 293. '*F. ? dimidiata*, *Wall. Cat.* 4515.

MALACCA, *Wallich, Griffith (Kew Distrib.* 460).—DISTRIB. Java.

A scandent scaurid shrub. *Leaves* $2\frac{1}{2}$ –4 in., acute or apiculate, margins entire recurved, above hispid when young, beneath often pale pustular and hispidulous, nerves strong; petiole $\frac{1}{2}$ in., stout, scaurid; stipules in pairs, ovate-lanceolate or subulate, glabrous. *Receptacles* $2\frac{1}{2}$ by $1\frac{1}{2}$ in., solitary, russet-red, peduncled, young umbonate scaurid, ripe smooth, umbilicus with large bracts; peduncle $\frac{1}{2}$ in., scaurid; basal bracts 3, broad, rounded. *Fem. fl.* mixed with neuters, subsessile; sepals 5, linear; ovary ovoid; style short, lateral, stout; stigma large, arms 2–3 subulate. *Neuter fl.* shortly pedicelled, sepals 3.

55. ***F. punctata***, *Thunb. Fic.* 9; branchlets reddish-pubescent, leaves often dimorphous coriaceous oblong to oblanceolate or subrhomboid very inequilateral obtuse or subacute above glabrous shining beneath tessellately dotted and coloured, nerves 2–4 pairs, receptacles solitary or

fascicled globose ovoid obovoid or pyriform glabrous. *Miq. in L. J. B.* vii. 440; *Ann.* iii. 268, 269. *F. stipulata*, *Wall. Cat.* 4574. *Synœcia falcata*, *Miq. in L. J. B. l. c.* 470, t. 11; *Flor.* i. ii. 329. *S. serpens*, *Miq. Pl. Jungh.* 67.

PERAK, PENANG and SINGAPORE, *Wallich*, &c.—DISTRIB. Malay Islands.

A branching creeper. *Leaves* shortly petioled, base rounded or truncate, nerves sometimes obscure; reticulations white beneath; stipules in pairs, equalling the petiole. *Receptacles* about $\frac{1}{2}$ in. long, on stem and branches, young usually pubescent and umbonate, ripe russet-brown to orange, peduncle thick, bracts 3, united. *Sepals* 3, of male fl. broad, of gall fl. linear, of fem. linear; ovary oblong stipitate, margins hyaline, stigma 2-fid. The following are the principal forms.

F. PUNCTATA, *Thunb.*; leaves oblanceolate subequal tapering below.

F. FALCATA, *Miquel*; leaves oblong or subrhomboid not tapering below.

56. ***F. callicarpa***, *Miq. Ann. Mus.* iii. 268, 289, t. 10 B; glabrous short-petioled subrhomboidly obovate shining above beneath smooth or sparsely strigose, reticulations tessellate not pale, nerves 3–4 pairs, receptacles solitary subglobose papillose. *F. pomifera*, *Kurz For. Fl.* ii. 454. *Synœcia sumatrana*, *Miq. Flor.* i. ii. 329.

UPPER TENASSERIM, *Kurz*. PERAK, *Kunstler*. SINGAPORE, *King*.—DISTRIB. Malay Islands.

Stem strong, creeping or climbing, often flattened. *Leaves* $2\frac{1}{2}$ –4 in., narrowed to the subequal obscurely 3-nerved base, entire, reticulations distinct minute with interposed minute hairs; petiole $\frac{1}{3}$ – $\frac{1}{2}$ in., scurfy; stipules in pairs, narrow, glabrous, shorter than the petiole, persistent. *Receptacles* on the stem and branches, peduncled, $1\frac{1}{2}$ – $2\frac{1}{2}$ in. long, subumbonate, ripe papillose mottled yellowish; bracts 3, about its middle, ovate acute united.

57. ***F. apiocarpa***, *Miq. Ann. Mus.* iii. 269, 289; shoots scurfily pubescent, leaves long-petioled coriaceous ovate or ovate-oblong acuminate above glabrous shining beneath puberulous when young only, nerves 2–3 pairs, reticulations distinct, receptacles peduncled dimorphous ovoid or long-pyriform glabrous, neuter fl. 0. *F. tetrargys*, *Miq. Flor. Suppl.* 432. *Urostigma apiocarpa*, *Miq. l. c.* 440.—*Wall. Cat.* 4570 E (*leaves only*).

PERAK, *Kunstler*. SINGAPORE, *Wallich*. MALACCA, *Griffith*.—DISTRIB. Malay Islands.

Leaves $4\frac{1}{2}$ –10 in., base narrowed or rounded, reticulations coloured beneath; petiole $1\frac{1}{2}$ –2 in.; stipules in pairs, $\frac{1}{2}$ in., ovate-lanceolate, puberulous. *Receptacles* in axillary pairs or solitary, $1\frac{1}{2}$ –2 in. long, ripe dark red, spotted yellow; peduncle 1–2 in.; bracts 3, basal, minute, ovate. *Male fl.* pedicelled; sepals 3 linear. *Gall. fl.*; sepals of male, ovary ovoid-elliptic rough. *Fem. fl.*; perianth 3-partite; achene elliptic edges pale.

Sect. IV. SYCIDIUM (see p. 495).

58. ***F. heterophylla***, *Linn. fil. Suppl.* 442; leaves membranous from long-lanceolate to broadly ovate acuminate entire or 3– ∞ -lobed coarsely toothed or repand scabrid above and beneath, nerves 4–8 pairs, receptacles solitary axillary peduncled spherical to elongate pyriform young scabrid old smooth. *Roxb. Fl. Ind.* iii. 532; *Brand. For. Fl.* 424; *Kurz For. Fl.* ii. 456; *Dalz. & Gibs. Bomb. Fl.* 243; *Wight Ic.* t. 659; *Miq. ll. c.* *F. truncata* and *F. denticulata*, *Vahl Symb.* i. 83. *F. truncata*, *repens* & *rufescens*, *Ham. in Trans. Linn. Soc.* xv. 143. *F. rufescens*, *Vahl Enum.* ii. 203. *F. aquatica*, *Kæn. in Willd. Sp. Pl.* iv. 1133. *F. scabrella*, *Roxb. l. c.* 532; *Wight Ic.* t. 661; *Miq. in L. J. B.* vii. 229; *Kurz l. c.* 455. *F. repens*,

Willd. l. c. 1149; *Roxb. l. c.* 535; *Wight Ic. t.* 636; *Miq. l. c.* 226. *F. rubifolia*, *Griff. Notul. iv.* 399, and *Ic. Pl. Asiat. t.* 557, ii. iii. *F. assamica*, *acutiloba*, *elongata* & *subpanduræformis*, *Miq. in L. J. B. l. c.* 226, 227, t. xi. A, 231, 235. *F. grossularioides*, *Burm. Fl. Ind.* 227. *Covellia Griffithii*, *Miq. l. c.* 467.

Throughout the HOTTER PARTS OF INDIA, near water, from the Gangetic Plain eastwards, and southwards to PERAK and CEYLON.—DISTRIB. Malay Islands.

A creeping pubescent shrub. *Leaves* 2–5 in., base rounded or cordate, petiole $\frac{1}{2}$ –2 $\frac{1}{2}$ in.; stipules in pairs, $\frac{1}{2}$ – $\frac{1}{2}$ in., ovate. *Receptacles* $\frac{1}{2}$ –1 in., umbilicus partially open; basal bracts minute; peduncle $\frac{1}{2}$ –1 in. *Male* and *gall perianth* 3–4-cleft, fem. 4-cleft; gall ovary smooth ovoid, style short lateral. *Achene* subglobose tubercled, viscid, style long lateral, stigma cylindric.—Polymorphous under two pretty constant forms.

F. SCABRELLA, *Roxb.*; leaves shortly petioled narrow not lobed, receptacles globose or subpyriform, peduncle short.

F. REPENS, *Willd.*; leaves long-petioled broad, receptacles long peduncled more or less pyriform.

59. **F. bhotanica**, *King*; branchlets tomentose, leaves petioled membranous oblong or obovate-oblong to broadly lyrate toothed or lobed, base rounded or subtruncate 3-nerved, above strigose-scabrid, beneath tomentose, nerves about 5 pairs, stipules ovate-lanceolate scarious, receptacles in axillary pairs peduncled ovoid young hispid old smooth.

BHOTAN, *Griffith*; ASSAM, *Masters*, *Mann*.

Shrubby, erect. *Leaves* 3 $\frac{1}{2}$ –4 $\frac{1}{2}$ by 1 $\frac{1}{2}$ –3 $\frac{1}{2}$ in., more or less acuminate; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules $\frac{1}{2}$ in., midrib tomentose. *Receptacles* $\frac{3}{4}$ by $\frac{1}{2}$ in.; umbo prominent, many-bracted; basal bracts 3, ovate, acute; peduncle $\frac{1}{2}$ in., tomentose. *Male fl.* pedicelled; sepals 5, linear-lanceolate; stamens 1 or 2, anthers broadly ovate. *Gall fl.* with perianth longer than the male; ovary ovoid smooth, style short subterminal. *Fem. fl.* perianth of the male but half as long; achene triangular rounded smooth, style lateral shorter than the ovary.

60. **F. quercifolia**, *Roxb. Fl. Ind.* iii. 534; shoots hispid, leaves short-petioled thickly membranous entire lobed ovate elliptic or elliptic obovate coarsely crenate-serrate acuminate, nerves 5–7 pairs scabrid beneath and often above, receptacles usually in axillary pairs ovoid or pisiform scabrid. *Wight Ic. t.* 646; *Miq. passim*; *Loëd. Bot. Cat. t.* 1540. *F. humilis*, *Roxb. l. c.* 535; *Wight Ic. t.* 635; *Miq. Flor. l. c.* 299; *Ann. l. c.* 271, 291. *F. sinuosa*, *Miq. in L. J. B. l. c.* 232; *Ann. l. c.* 291. *F. inconstans*, *Miq. in L. J. B. l. c.* 252, 330. *F. biglandula*, *Blume Bijl.* 475. *F. biglandulosa*, *Miq. Flor. l. c.* 298, and *Suppl.* 426; *Bedd. For. Man.* 224. *F. anastomosans*, *Wall. Cat.* 4513, 4546; *Kurz For. Fl.* ii. 455. ? *F. montana*, *Burm. Fl. Ind.* 226; *Blume Bijl.* 471.

BURMA and the MALAY PENINSULA; in crevices of rocks.—DISTRIB. Malay Islands.

A shrub, often creeping or decumbent. *Leaves* 2–5 in., base acute or cuneate rarely rounded, nerves 3–5 pairs prominent above and beneath, petiole $\frac{1}{2}$ –1 in. hirsute; stipules in pairs, $\frac{1}{2}$ in., lanceolate. *Receptacles* $\frac{1}{2}$ – $\frac{1}{2}$ in. diam., rarely from below the leaves, young umbonate, ripe globose or tip depressed, crimson; peduncle $\frac{1}{2}$ – $\frac{1}{2}$ in.; bracts 1–2 above the base, linear. *Male sepals* 2, anther broadly ovate. *Gall sepals* about 3; ovary ovoid-globose, smooth; style short, lateral. *Fem. sepals* 3, minute; achene broadly ovoid tuberculate, style long, stigma cylindric.—Resembles *F. heterophylla* in habit, &c., but male fl. and receptacles very different. There are two leading forms: *F. quercifolia*, *Roxb.*; leaves coarsely sinuate-crenate deeply lobed, and *F. humilis*, *Roxb.*; leaves subentire or serrate not lobed.

61. **F. nigrescens**, King; leaves alternate petioled broadly or rounded ovate shortly acuminate coarsely serrate toothed above minutely strigose beneath harshly pubescent, nerves 3 pairs above the cordate 5-nerved base, receptacles solitary or in pairs shortly peduncled harshly pubescent.

MUNNIPORE and KEGARONA in the NAJA HILLS, alt. 5-5800 ft., Clarke.

A small creeping shrub, rooting at the nodes; shoots at first softly pubescent. Leaves $1\frac{1}{2}$ -2 in.; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., pubescent; stipules in pairs, lanceolate scarious glabrous about $\frac{1}{2}$ in. Receptacles $\frac{1}{2}$ in. diam. on short scaly tubercles at the leaf-scars. Fem. fl. stoutly pedicelled; sepals 3, lanceolate; style lateral longer than the minutely tubercled achene, stigma cylindric. Figs nearly black (Clarke).—Male fl. unknown, but species clearly allied to *heterophylla* and *Ampelos*.

62. **F. rostrata**, Lamk. *Encycl.* ii. 498; leaves alternate petioled narrowly oblong elliptic or lanceolate rarely subobovate abruptly caudate entire or subsinuately toothed above the middle, nerves 3-6 pairs, recepts subsessile in axillary pairs or clustered ovoid then globose scabridly hispid, basal bracts 0. *Blume Bijl.* 465; *Miq. Flor.* i. ii. 307; *Ann.* iii. 274, 293. *F. radicans*, Roxb. *Fl. Ind.* iii. 536; *Wight Ic.* t. 67; *Miq. passim.* *F. acuminata*, Kunth & Bouché *Ind. Sem.* 21; *Wall. Cat.* 4478 A to D. *F. saxatilis*, parietalis var. ovalis, & quercifolia, *Blume Bijl.* 460, 462, 466, 468. *F. obtusidens*, *Miq. Pl. Jungh.*, and *Flor. l. c.* 305, and angulidens, *l. c.* 310. *F. Lobbii* & *raridens*, *Miq. ll. c.* 233, 430, and *Flor.* 305, 309. *F. glandulosa*, *Wall. Cat.* 4479; *Kurz For. Fl.* ii. 453; *Miquel ll. c.*

Forests at the base of the hills in BHOTAN, the KHASIA, CHITTAGONG, BURMA and the MALAY PENINSULA.—DISTRIB. Malay Islands.

A scandent or creeping rarely erect shrub. Leaves $2\frac{1}{2}$ -8 in., glabrous, base (rarely suddenly) narrowed 3-nerved, nerves and reticulations strong, above shining beneath pale harsh; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. scurfy; stipules minute, subulate. Receptacles in axillary pairs or fascicles or from leaf-scars, $\frac{1}{5}$ - $\frac{1}{2}$ in. diam., young boldly umbonate, ripe red-yellow; peduncle 0- $\frac{3}{4}$ in. Male and gall sepals linear, gall ovary pedicelled globose smooth, style short lateral. Fem. perianth 2-3-cleft; achene ellipsoid, notched at the style base; stigma cylindric.

63. **F. cuspidata**, Reinw. in *Blume Bijl.* 474; leaves shortly petioled elliptic-lanceolate or linear-oblong caudate-acuminate glabrous, nerves 6-8 pairs horizontal, recepts clustered in the leaf-axils subsessile ovoid or subglobose scabrid, basal bracts 0. *Miq. in L. J. B.* vii. 429; *Flor.* i. ii. 308; *Ann.* iii. 274, 292. *F. tenuiramis*, Kunth & Bouché *Ind. Sem.* 21; *Miq. l. c.* 432. *F. angulifolia*, *Blume l. c.* 463. *F. fallax*, *Miq. Flor. l. c.* 308; *Ann.* 292.

PERAK, Kunstler.—DISTRIB. Sumatra, Java.

A shrub or tree, never scandent or creeping, branches slender. Leaves 3-5 $\frac{1}{2}$ in., tail long straight, base 3-nerved acute, shining above, dull and minutely subscabrid beneath; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in.; stipules $\frac{1}{4}$ - $\frac{1}{2}$ in. convolute. Recepts $\frac{1}{2}$ - $\frac{1}{2}$ in., umbonate; peduncle 0- $\frac{1}{2}$ in. slender, with one bract about the middle and several at the base. Male sepals 3-4, lanceolate, stamens 1-2, anther short subsessile. Gall fl.; sepals 3, lanceolate, ovary pedicelled smooth, style short lateral. Fem. fl.; sepals 2-3; achene ellipsoid notched at the lateral style base, stigma dilated.

VAR. *sinuata*; leaves larger narrowly oblong sinuate or lobed.

64. **F. clavata**, Wall. *Cat.* 4495; shoots scabrid, leaves alternate short-petioled membranous oblong-lanceolate or oblanceolate cuspidate or caudate glabrous coarsely toothed above the middle, nerves 4-6 pairs, recepts shortly peduncled axillary solitary dimorphic obovoid and subglobose smooth scabrid or warted, fem. recepts smaller than those with male and gall. fl.

Miq. in L. J. B. vii. 431; *Ann.* iii. 275. *F. trachycarpa*, *Miq. in L. J. B. l. c.* 430; *Brand. For. Fl.* ii. 421. *F. caudata*, *Wall. Cat.* 4494; *Miq. in L. J. B. l. c.* 431; *Ann.* 275. *F. Chincha*, *Roxb. Fl. Ind.* iii. 534.

Lower hills of the HIMALAYA, ascending to 4500 ft.; from the Sutlej to Bhotan; MUNNIPORE, the KHASIA MTS., BURMA and MALACCA.

An erect shrub, shoots scabrid. *Leaves* 4-5 in.; base acute, 3-5-nerved, nerves prominent harsh punctulate beneath; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in.; stipules $\frac{1}{2}$ in., lanceolate, caducous. *Recepts* strongly umbonate in the obovoid forms and $\frac{1}{2}$ in. diam., $\frac{1}{2}$ in. in the globose, umbilical bracts often large, basal small, ripe yellow; peduncle $\frac{1}{10}$ - $\frac{1}{2}$ in. *Male and gall fl.* 5-6-cleft, anther broadly ovoid. *Fem. fl.* campanulate, 5-toothed; achene ovoid subpapillose, style subterminal elongate, stigma cylindric.—*F. clavata*, Wall., has the obovoid large recepts, with male and gall flowers intermixed all over. *F. caudata*, Wall., has subglobose scabrid ones, some exclusively female, others male and gall; they are often wrinkled in both.

65. ***F. sikkimensis***, *Miq. Ann. Mus.* iii. 225, 292; leaves alternate membranous elliptic or oblanceolate cuspidate entire, nerves 5-6 pairs, recepts small shortly peduncled solitary or clustered globose or globosely ovoid smooth warted. *F. salicifolia*, *Miq. in L. J. B.* vii. 431; *Ann.* iii. 292. *F. caudata*, *Herb. H. f. & T.*

EASTERN HIMALAYA and KHASIA MTS., alt. 2-4000 ft.

A small tree, sometimes epiphytal, shoots puberulous. *Leaves* 2½-5 in., tip subacute, base acute or acuminate 5-nerved, under surface pale punctulate, nerves prominent, petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. scurfy; stipules $\frac{1}{2}$ - $\frac{3}{4}$ in., convolute curved. *Recepts* $\frac{1}{2}$ in. diam., subumbonate, with long warts and sometimes whitish scales near the apex, peduncle about $\frac{1}{10}$ in., bracts at the middle or base minute. *Male fl.*; sepals 3; anther ovoid, filament with a basal process. *Gall fl.*; ovary ovoid smooth, style short lateral tubular. *Fem. fl.*; perianth 3-toothed; achene bordered with white, style short, stigma cylindric solid.—Resembles a miniature *F. subulata*, which is a climber not found north of Chittagong.

66. ***F. obscura***, *Blume Bijl.* 474; leaves short-petioled membranous oblong to oblanceolate or elliptic-obovate or subtrapezoid very unequal-sided caudate dentate serrate or subentire scaberulous, nerves 4-5 pairs, recepts solitary or in axillary pairs on the old wood subsessile ovoid or globose scabrid hispid or hirsute. *Miq. Flor. i. ii.* 302; *Ann.* iii. 272, 292. *F. coronata*, *Reinw. in Blume l. c.* 470; *Miq. Flor.* 304. *F. asperiuscula*, *Kunth & Bouché Ind. Sem.* 21; *Miq. in L. J. B.* vii. 234, and *Flor. l. c.* 300. *F. grewiæfolia*, *Hort. Berol.* *F. Reemblas (in part)*, brevipes & hyphila (*in part*), *Miq. Pl. Jungh.* 58, 60; *Flor.* 304, 305, 303. *F. Zollingeriana* & *dasycaula*, *Miq. in L. J. B. l. c.* 460; *Flor. l. c.* 322. *F. cyrtophylla*, *Wall. Cat.* 4532; *Miq. in L. J. B. l. c.* 460. *F. subdenticulata*, *Miq. Wall. l. c.* 323.

EASTERN HIMALAYA, KHASIA MTS. to BURMA and the MALAY PENINSULA, ascending to 3000 ft.—DISTRIB. Malay Islands.

Shrubby or subarborescens. *Leaves* 5-10 in., narrowed to the tail, base oblique often $\frac{1}{2}$ -sagittate, 3-7-nerved, above scabrous or subscabrous, hirsute or hispid, beneath with strong nerves; petiole $\frac{1}{2}$ -1½ in.; stipules lanceolate, deciduously hirsute. *Recepts* $\frac{1}{2}$ - $\frac{3}{4}$ in., young umbonate, ripe reddish or orange with 1-2 wart-like side and no basal bracts; peduncle $\frac{1}{10}$ - $\frac{1}{2}$ in., with minute hispid bracts. *Male fl.* 4-sepalous and monandrous, or diandrous with 6 obovate sepals. *Gall fl.*; ovary globose, smooth, style short lateral, stigma dilated. *Fem. fl.*; sepals 5, linear, hispid; achene ovoidly globose, style long lateral, stigma cylindric.—Some narrow-leaved forms approach *F. pisifera*, Wall.

67. **F. asperima**, *Roxb. Fl. Ind.* iii. 554; leaves petioled ovate oblong lanceolate or elliptic obtuse or acuminate subentire toothed or crenate above the entire base scabrous-hispid on both surfaces, nerves 3-5 pairs, recepts peduncled globose scabrous-hispid top depressed. *Dalz. & Gibs. Bomb. Fl.* 243; *Wight Ic.* t. 633; *Bedd. For. Man.* 224; *Miq. in L. J. B.* vii. 230. *F. hispidissima*, *Wight mss.*; *Miq. in L. J. B. l. c.* 229. *F. politoria*, *Moon Cat. Ceyl. Pl.*

CENTRAL INDIA and the DECCAN PENINSULA, and CEYLON, ascending to 3000 ft.

A tree or shrub; shoots scabrid. *Leaves* 1-1½ in., subterminal, base obtuse 3-nerved, nerves beneath very prominent; petiole ½-2 in. stout; stipules minute. *Recepts* ½-1 in. diam., ripe yellow or purple spotted. yellow, umbilicus prominent, its bracts erect. *Male* and *gall* sepals 4-5, linear, scabrid. *Gall. fl.*; ovary ovate-lanceolate, style terminal thick, stigma dilated. *Fem. fl.*; achene narrow obovoid, tubercled, style filiform lateral, stigma clavate.

68. **F. lepidosa**, *Wall. Cat.* 4541; leaves petioled membranous ovate-oblong to elliptic obovate or lanceolate acute or cuspidate entire glabrous above pale and appressed pubescent beneath, nerves 7-8 pairs, recepts in axillary pairs peduncled pubescent male ellipsoid fem. globose or subpyriform. *Kurz For. Fl.* ii. 450. *F. Lamponga*, *Miq. Flor. Suppl.* 430; *Ann.* iii. 294. *F. Lamponga var. 1*, *Kurz l. c.* 451. *F. martabanica*, *Wall. Cat.* 4551.

BHUTAN, *Gamble*; ASSAM, CHITTAGONG and BURMA, *Wallich, &c.*; PERAK, *King's Collector*.

A small tree, branchlets pubescent. *Leaves* 4-7 in., rather harsh, base obtuse or subacute 3-nerved, subglabrous above, beneath pale with prominent nerves, nervules straight, petiole ½-1½ in. pubescent, stipules ½ in. lanceolate, midrib pubescent. *Receptacles* ½ in. diam., ripe orange-red, young umbonate; basal bracts 3, ovate, acute; peduncle ½-¾ in. *Male sepals* 4. *Gall ovary* globose, smooth, style lateral, stigma tubular; fem. fl. mixed with hairs; sepals 4-5; achene oblong oblique rugose, style subterminal, stigma cylindric.

VAR. martabanica; leaves elongate lanceolate acuminate.

Sect. V. COVELLIA (see p. 495).

69. **F. conglobata**, *King*; hispid, leaves elliptic or subobovate acuminate serrulate or denticulate, nerves 4 pairs, recepts long-peduncled in crowded panicles from the base of the stem subglobose or pyriform nearly smooth.

TROPICAL SIKKIM HIMALAYA, *Griffith's Collectors (Kew Distrib.* 4639), *J. D. H., King*; CHITTAGONG, *Lister*. Munnipore, *Watt*.

A small tree. *Leaves* opposite and alternate, 6-14 in., above sparsely strigose with hispid-tomentose nerves, beneath papillose with setose nerves; petiole 1½-6 in. setose; stipules ¾ in. hispid. *Receptacles* ½ in. diam., in the axils of scarious bracts, oral bracts large, basal 3 united below glabrous. *Male sepals* 3 broad. *Gall* and *fem. perianth* short, tubular, or 0; style short lateral, stigma dilated. *Achene* broad rhomboid rough.—*Leaves of F. hispida*, receptacles more or less hypogaeal.

70. **F. hispida**, *Linn. f. Suppl.* 442; hispid, leaves ovate oblong or subobovate acute or cuspidate entire or toothed, nerves 3-5 pairs, recepts short-peduncled fascicled on the old wood or leafy branches, turbinate obovoid or subpyriform. *Blume Bijl.* 469; *Brand. For. Fl.* 423; *Kurz For. Fl.* ii. 460; *Bedd. For. Man.* 224; *Miq. Ann.* iii. 282, 296. *F. oppositifolia*, *Willd. Sp. Pl.* iv. 1151; *Roxb. Cor. Pl.* 124, and *Fl. Ind.* iii. 561;

Wight Ic. t. 638; *Dalz. & Gibs. Bomb. Fl.* 243. *F. dæmonum*, *Kæn. in Roxb. l. c.* 562; *Wight Ic.* 641; *Wall. Cat.* 4538. *F. prominens*, *Wall. Cat.* 4537; *Miq. Ann.* iii. 291. *F. mollis*, *Willd. in Act. Berol.* 1798, 103, t. 5. *F. scabra*, *Jacq. Hort. Schænb.* iii. t. 315. *Covellia dæmonum*, *Miq. in L. J. B.* vii. 461; *Dalz. & Gibs. l. c.* 244. *C. oppositifolia*, *Gasp. Rich.* 85; *Miq. in L. J. B. l. c.*; *Griff. Ic. Pl. Asiat.* t. 560. *C. setulosa*, *cour-tallensis*, *Wightiana*, *assamica* & *dasycarpa*, *Miq. in L. J. B. l. c.* 461 to 464; *Flor.* i. ii. 323. *Sycomorpha Roxburghii*, *Miq.*

Throughout INDIA, from the PANJAB in the N.W. to MALACCA and CEYLON.—DISTRIB. Malay Islands, China, Australia.

A shrub or small tree. *Leaves* usually opposite, 4–12 in.; base rounded cuneate or subcordate, rather scabrid above, hispid beneath; petiole $\frac{1}{2}$ –1 $\frac{1}{2}$ in., or on shoots 3–3 $\frac{1}{2}$ in., hispid; stipules $\frac{1}{2}$ in., pubescent, often in whorls of 4 on the receptacles with leafless branches. *Receptacles* ripe hispid yellowish, with bracts scattered on the sides; peduncle $\frac{1}{2}$ – $\frac{1}{2}$ in.; basal bracts 3. *Flowers* much as in *F. conglobata*, but fem. style hairy and stigma cylindric tubular.—*Receptacles* often hypogeal in sandy coast of Coromandel.

71. ***F. saemocarpa***, *Miq. Ann. Mus.* iii. 232, 296; branchlets hirsute, leaves opposite crowded linear-lanceolate or oblanceolate entire, nerves 6–8 pairs, recepts solitary axillary or in short panicles from the old wood subglobose, base constricted 8–10-ribbed warted and hispid. *F. pyrrhocarpa*, *Kurz For. Fl.* ii. 424. *F. tuberculata*, *Wall. Cat.* 4539. *F. squamosa*, *Roxb.*, and *F. laminosa*, *Hardw. in Roxb. Fl. Ind.* iii. 531.

Foot of the HIMALAYA; in sandy and rocky streams from Kumaon to Bhotan. ASSAM, the KHASIA HILLS and BURMA.

A low shrub; branchlets hirsute. *Leaves* 3–9 in., smooth, rarely scabrid above, beneath smooth or scaberulous, rarely hispid, base narrowed, 3-nerved; petiole $\frac{1}{2}$ –1 in., pubescent; stipules in pairs, $\frac{3}{4}$ – $\frac{1}{2}$ in., ovate, acuminate, nearly glabrous. *Recept.* $\frac{1}{2}$ –1 in. diam., with scattered bracts on the sides, umbilicus large; peduncle $\frac{1}{2}$ – $\frac{1}{2}$ in., pubescent; basal bracts 3, triangular, deciduous. *Male fl.*; stamen 1, anther ovate or obovate. *Fem. fl.*; perianth 0. *Gall ovary* smooth, style short lateral. *Achene* rhomboid, and very long style hairy.—*Leaves* variable as to pubescence.

72. ***F. Cunia***, *Ham. in Roxb. Fl. Ind.* iii. 561; leaves alternate elliptic to oblong-lanceolate inequilateral acuminate entire or serrate, above scabrid or smooth, beneath more or less pubescent, base semisagittate, nerves 9–14 pairs, recepts in pairs or clusters on scaly usually leafless branches globose or pyriform hispid. *Wight Ic.* t. 648; *Miq. Ann.* iii. 282, 296; *Brand. For. Fl.* 421; *Kurz For. Fl.* ii. 461; *Bedd. For. Man.* 224. *F. conglomerata*, *Roxb. l. c.* 559; *Wight Ic.* t. 669; *Wall. Cat.* 4531. *Coyellia Cunia*, *conglomerata* & *inæquiloba*, *Miq. in L. J. B.* vii. 459.

SUB-HIMALAYAN FORESTS, from the Chenab to Bhotan; CENTRAL INDIA, ASSAM, the KHASIA Mts., CHITTAGONG and BURMA; ascending to 4000 ft.

A low tree. *Leaves* $\frac{1}{2}$ –1 in., larger basal lobe 3–4, smaller 1-nerved; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., scabrid; stipules $\frac{3}{4}$ –1 in., linear-lanceolate, puberulous. *Recept.* $\frac{1}{2}$ in. diam., ripe red-brown; basal bracts 3; peduncle short. *Male sepals* 3; anther ovate. *Gall* and *fem. sepals* about 4, lanceolate, united below; gall ovary globose, smooth; style very short, lateral. *Achene* broadly ovoid, emarginate on one side, tuberculate, viscid; style very long, lateral; stigma large, bifid.

73. ***F. prostrata***, *Wall. Cat.* 4536; glabrous, leaves alternate oblanceolate-oblong long-acuminate entire, nerves about 10 pairs, receptacles subpyriform on long flexuous nearly simple leafless branches solitary in the

axils of scarious bracts glabrous. *Miq. Ann.* iii. 297. *Covellia prostrata*, *Miq. in L. J. B.* vii. 465.

SIKKIM HIMALAYA, alt. 2000 ft., *Kurz.* SILHET and the KHASIA HILLS, *Wallich*, &c.

A small tree. *Leaves* 5½–7 in., tapering from above the middle to the rather obtuse 3–5-nerved base; petiole ½ in.; stipules ¾ in., narrow, convolute. *Fruiting branches* 10–12 ft., prostrate. *Recepts* with 3 ovate acuminate basal bracts, peduncle ½ in. *Fem. fl.* sessile or pedicelled; sepals 3–4, linear; achene broadly ovoid; style about as long, stigma cylindric.—Male and gall fl. unknown.—Closely allied to *F. Ribes*, Reinwdt., but distinguished by its larger size, absence of hairs and larger receptacles; intermediates, however, occur.

74. **F. Miquelii**, *King*; shoots strigose, leaves subopposite and alternate obovate-oblong or oblanceolate cuspidately tailed entire subglabrous, nerves 6–8 pairs, recepts depressed globose in woody panicles from the stem pubescent. *F. caulocarpa*, *Miq. Ann.* iii. 235, 297 (not *Urost. caulocarpa*). *F. fistulosa*, *Kurz For. Fl.* ii. 459 (in part, not of Reinwdt.).

PÉGU to TENASSERIM, *Kurz.* PERAK, *Kunstler.* SINGAPORE, *King*.—DISTRIB. Sumatra, Celebes.

A tree. *Leaves* 4½–8 in., membranous, pubescent above and beneath when young, adult almost glabrous, tail 1 in., base narrowed 3-nerved; petiole ½–¾ in.; stipules ½ in., lanceolate, pubescent. *Fruiting branches* cauline, large, much paniced, scurfy. *Recepts* ¾ in. diam., ripe greenish with pale stripes; oral bracts many broad, basal 3 ovate acute; peduncle ½ in. *Male sepals* 3, ovate, inflated, broadly imbricate; anther broadly ovate, emarginate. *Gall* and *fem. fl.* naked. *Gall ovary* ovoid-globose; style short, lateral, stigma tubular. *Achene* obovoid, tubercled; style lateral, as long as the ovary, stigma cylindric.

75. **F. fasciculata**, *King*; shoots purplish-strigose, leaves alternate short-petioled narrowly or obovate-elliptic cuspidate subrenate glabrous above tuberculate beneath with 4–5 pairs of appressed hairy nerves, recepts fascicled on cauline tubercles peduncled subglobose ridged glabrous.

PERAK; banks of the Kampo River, *Kunstler.*

A small tree. *Leaves* 7–9, minutely 3-nerved, base acute; petiole ½ in., hispid with purplish hairs; stipules ½ in., lanceolate, hispid. *Recepts* 5–8 in a cluster, russet-brown; basal bracts 3, minute, ovate; peduncle ½ in., pubescent. *Fem. fl.* pedicelled; perianth tubular, girding the lower half of the stipes of the obliquely ovoid tubercled achene; style subterminal, filiform, about as long as the ovary, stigma clavate.—Male and gall fl. not seen.

76. **F. Ribes**, *Reinwdt. in Blume Bijl.* 463; shoots strigose, leaves alternate petioled glabrous except the appressed pubescent midrib and nerves beneath lanceolate or oblanceolate subfalcate caudate entire, nerves 7–9 pairs, recepts on long leafless branches from the base of the stem very small peduncled subglobose constricted at the base ribbed puberulous. *Miq. Ann.* iii. 284, 297; *Kurz For. Fl.* ii. 458. *F. polycarpa*, *Roxb. Fl. Ind.* iii. 556; *Wall. Cat.* 4509. *F. copiosa*, *Steud. Nomencl.* i. 635. *F. prostrata*, *Wall. Cat.* 4536 (in part). *Covellia Ribes*, *Miq. Flor.* i. ii. 325. *C. microcarpa* & *paniculata*, *Miq. in L. J. B.* vii. 466, t. 9 A, and 467.

TENASSERIM to PENANG and SINGAPORE, *Wallich*, &c.—DISTRIB. Malay Islands, New Guinea.

A small tree. *Leaves* 2½–4½ in., membranous, narrowed from below the middle to the acute sub-3-nerved base; petiole ½ in., strigose; stipules ¾ in., convolute. *Recepts* ½ in. diam., young warted, mouth closed by 5 broad bracts, base constricted into a 3-bracteate stipes ⅓ in. long; peduncle ½ in. *Male sepals* 2, large, inflated;

anther subsessile, very broad. *Gall ovary* naked, broadly obliquely obovoid; style terminal, thick. *Fem. perianth* tubular, covering the pedicel of the rhomboid tubercled achene; style much longer, stigma cylindric or clavate.

77. **F. fistulosa**, *Reinwdt. in Blume Bijl.* 470; nodes of shoots strigose, leaves opposite and alternate oblong to ovate- or obovate-lanceolate acute entire or subserrate, nerves 4-7 pairs, recepts axillary and short-peduncled or rameal or cauline and clustered depressed-globose glabrous. *Kurz For. Fl.* ii. 459 (*in part*). *F. geminifolia*, *Miq. in Zoll. Syst.* 93; *Flor.* 313. *F. tenerensis*, *Miq. Ann.* iii. 296. *F. diphylla*, *Wall. Cat.* 4543. *Covellia subopposita*, *Miq. Pl. Jungh.* 66; *Flor.* i. ii. 327, and *Suppl.* 435, and *Choix Pl. Buitenz.*, t. 15. *C. tuberculata*, *Miq. in Zoll. Syst.* 94, 99, and *Flor. l. c.* 325.

KHASIA HILLS, *J. D. H.*, &c. CHITTAGONG to PENANG, PERAK and SINGAPORE. —DISTRIB. Malay Islands.

A shrub or small tree. *Leaves* $3\frac{1}{2}$ -10 in., granulate beneath with coloured nerves; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; stipules $\frac{1}{2}$ - $\frac{3}{4}$ in., scarious. *Recepts* $\frac{1}{4}$ -1 in. diam., sometimes constricted at base, warted and subpyriform when young; oral bracts many; basal 3, small, acute; peduncle $\frac{1}{4}$ -1 $\frac{1}{2}$ in. *Male fl.* few; sepals 2-3, concave. *Gall and fem. fl.* naked or perianth small round the base of the pedicel of the ovary. *Gall ovary* ovoid, smooth; style short, subterminal, stigma funnel-shaped. *Fem. fl.* as a rule in the axillary short-peduncled recepts. *Achene* obliquely obovoid, granulate; style lateral, long, stigma cylindric.

78. **F. lepicarpa**, *Blume Bijl.* 459; nodes swollen at first pubescent, leaves subopposite and alternate obovate-oblong cuspidate glabrous except the midrib and nerves, base narrowed unequal 5-nerved, nerves 7-8 pairs erect, recepts subsolitary axillary sessile ellipsoid sparsely hairy warted, bracts in a ring below the umbilicus large flat tips white. *Miq. Ann.* iii. 283, 297. *F. volkhameriæfolia*, *Wall. Cat.* 4542. *F. inclinata*, *Ham. in Wall. Cat.* 4486 A. *Covellia didynama*, *Miq. Pl. Jungh.* 65; *Flor.* i. ii. 327. *C. lepidicarpa*, *Miq. Flor.* 328. *C. volkhameriæfolia*, *Miq. in L. J. B.* vii. 464, t. 8.

PERAK, *Kunstler*. SINGAPORE, *Wallich*; in rocks and by streams, up to 3500 ft. —DISTRIB. Malay Islands.

A small tree. *Leaves* 7-10 in., sometimes subrepand near the tip; petiole $\frac{3}{4}$ -1 $\frac{1}{4}$ in.; stipules $\frac{1}{2}$ -1 in., large. *Receptacles* usually solitary; basal bracts 3, ovate, spreading. *Male sepals* 8, inflated; filament adnate short curved. *Gall perianth* a pellucid sack enclosing the ovary, style terminal, stigma dilated. *Fem. perianth* small, tubular, toothed; achene obliquely obovoid; style lateral, long, stigma cylindric.—Miquel describes the recepts as sometimes long-peduncled and cauline, but I have not seen them so.

79. **F. obpyramidata**, *King*; shoots at first tomentose, leaves elliptic ovate or subobovate acute margins subentire undulate, nerves 6 pairs, recepts in small clusters from leafless cauline branches peduncled obpyramidal ridged warted puberulous.

PERAK; at Laroot, *Kunstler*.

A tree, 25-30 ft. *Leaves* 6-7 in., base 7-nerved rounded or cordate, above substrigose, nerves and midrib beneath pubescent; petiole $\frac{1}{2}$ in., tomentose; stipules $\frac{2}{3}$ in., hairy. *Recepts* 1 in. diam., umbilicus depressed. *Fem. perianth* a ring at the base of the stipes of the ovary; achene ovoid, granulate, viscid; style long, subterminal, stigma cylindric or subclavate.

Sect. VI. EUSYCE (see p. 496).

80. **F. Thwaitesii**, *Miq. Ann. Mus.* iii. 229, 294; leaves polymorphous, cauline elliptic or ovate or 3-lobed and subhastate obtuse scabrid

above pubescent beneath, those on fruiting branches twice as large elliptic or obovate entire, recepts subsolitary axillary globose smooth. *F. diversiformis*, *Miq. in L. J. B.* vii. 441; *Ann. l. c.* 281, 294, and *F. disticha*, *Thwaites Enum.* 266. *F. oxycoccoides*, *Linn. Fl. Zeyl.* 438. *F. stipulata*, *Moon Cat.* 6.

CEYLON; Central Province, ascending to 5000 ft.

A slender climbing rooting shrub, with free fruiting branches. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., base 3-nerved notched or cordate; petiole 1 in.; stipules a little longer, ovate. *Recepts* $\frac{1}{2}$ in. diam., base contracted into a $\frac{1}{10}$ in. stipes with 3 broad basal bracts. *Sepals* of all fl. 3, short, broad; gall and fem. fl. similar.

81. *F. excavata*, *King*; shoots tawny-pubescent, leaves obliquely or orbicular-ovate obtuse entire glabrous above sparsely appressed-pubescent beneath, nerves 2 pairs, reticulations lacunose, recepts in axillary clusters sessile depressed-globose pubescent.

PERAK, *King's Collector*.—DISTRIB. Borneo.

Scandent. *Leaves* $1\frac{1}{2}$ – $1\frac{1}{2}$ in.; base subequal, 5-nerved; petiole $\frac{1}{2}$ in., pubescent; stipules in pairs, $\frac{1}{2}$ in., ovate, acuminate, silky, deciduous. *Recepts* in clusters of about 6, unripe orange-red (ripe unknown); basal bracts 3, triangular-ovate, glabrous. *Fem. fl.* subsessile; sepals 4; achene oblong, subpapillose, style short, subterminal.—Allied to *F. recurva* and *lanata*, Blume.

82. *F. lævis*, *Blume Bijl.* 437; usually glabrous, leaves membranous long-petioled orbicular or broadly or elliptic-ovate cuspidate entire or obscurely toothed towards the tip, nerves 3–4 pairs above the basal, recepts axillary peduncled subsolitary globose rarely pyriform. *Miq. Ann.* iii. 278, 293. *F. vagans*, *Roxb. Fl. Ind.* iii. 537. *F. Emodi*, *Wall. Cat.* 4515. ? *F. pedicellata*, *Wall. Cat.* 4486 (*in part*). *F. ceylanica*, *Miq. Ann. l. c.* 293, and in *L. J. B. l. c.* 75. *Pogonotrophe lævis*, *Miq. Flor.* i. ii. 330. *P. assamica*, *Miq. in L. J. B.* 73. *P. dasyphylla*, *Miq. l. c.* 74, and *Ann. l. c.* 293.

TROPICAL HIMALAYA, from Nepal eastwards, alt. 2–5000 ft.; and from ASSAM to the MALAY PENINSULA and CEYLON.—DISTRIB. Malay Islands.

A small tree or epiphyte. *Leaves* 4–7 in., glabrous above except the nerves, beneath puberulous or pubescent; base rounded to cordate rarely narrowed, 5–7-nerved; petiole $1\frac{1}{2}$ – $2\frac{1}{2}$ in.; stipules $\frac{1}{2}$ – $\frac{1}{2}$ in. *Recepts* $\frac{1}{2}$ –1 in. diam., ripe greenish-yellow, smooth, puberulous or tomentose, hispid within; basal bracts 3, small, spreading; peduncle slender, glabrous. *Sepals* of all fl. 5, linear-lanceolate; anthers 2–3, elongate, subsagittate. *Gall ovary* globose, smooth; style short, subterminal, stigma dilated. *Achene* ellipsoid, style terminal, nearly as long, stigma bifid.—The following are the prominent forms.

VAR. dasyphylla; leaves more or less appressed pubescent beneath, receptacles and peduncles tawny-tomentose.—Ceylon (the only form there).

VAR. tomentosa; leaves tomentose, receptacles tomentose or pubescent, peduncles 1 in.—Perak.

VAR. assamica; shrubby, leaves very broad rather thick puberulous, receptacles in pairs, peduncles $1\frac{1}{2}$ in. divaricate.—Khasia and Duphla Hills, Cachar.

83. *F. scandens*, *Roxb. Fl. Ind.* iii. 536; leaves ovate or elliptic-ovate subacute or acute entire base broad rounded, nerves 3 pairs above the basal, receptacles axillary long-peduncled solitary or in pairs globose scaberulous. *Wight Ic.* t. 643; *Miq. in L. J. B.* vii. 452; *Ann.* iii. 281, 294; *Brand. For. Fl.* 421; *Kurz For. Fl.* ii. 455. *F. fruticosa* & *hederacea*, *Roxb. l. c.* 533, 538. *F. fruticosa*, *Roxb.?*, *crustacea* & *tripplinervis*, *Wall. Cat.* 4501, 4533 A, B.

TROPICAL HIMALAYA, from Kumaon eastwards; ASSAM, KHASIA HILLS, CHITTAGONG, BURMA and the ANDAMAN ISLANDS. BEHAR, on Parusnath.

Scandent; stem and branches often rooting. *Leaves* 2-3½ in., rugulose and subsabrid above, beneath subareolar, base strongly 3-nerved; petiole ¼-½ in.; stipules ½ in., ovate, acuminate. *Recepts* ½ in. diam., yellow to red; base sometimes constricted into a stipes; umbilicus rather prominent; peduncle 3-5 in. *Sepals* of all fl. 4; anthers subsessile. *Gall ovary* obovoid, smooth; style subterminal, short, thick, stigma hooked. *Achene* oblong, smooth; margin broad, pale; style lateral, long, stigma subcapitate.—In Roxburgh's drawings of *F. scandens* and *hederacea* the male fl. are monandrous, of *fruticosa* diandrous.

84. **F. obtusa**, Hassk. *Cat. Hort. Bogor.* (1844) 75; shoots softly brown tomentose, leaves broadly or elliptic-ovate or subobovate acute or obtuse entire hispidulous above when young scabrid when old, beneath puberulous or pubescent, nerves 3 or 4 pairs above the basal, recepts subsessile in axillary pairs subglobose or depressed glabrous puberulous or subtomentose. *F. alnifolia*, *Miq. Pl. Jungh.* 51; *Flor.* i. ii. 330; *Ann.* iii. 278, 293, t. 8 D. *F. piperifolia*, *Miq. Ann.* l. c. 293. *F. platycaula*, *Miq. Flor.* l. c. 318. *Pogonotrophe javana*, *Miq. in L. J. B.* vii. 75, *Flor.* l. c. 330; *Ann.* l. c. 278, 293. *P. piperifolia*, *Miq. in Zoll. Verz.* 93, 99; *Flor.* l. c. *F. borneensis*, *Flor.* l. c. 330.

PERAK, *Kunstler*.—DISTRIB. Java.

Leaves 2½-5 in.; base broad, rounded, rarely narrowed, cordate or notched, 5-7-nerved; petiole ¼-¾ in., tomentose or subsabrid; stipules ½ in., lanceolate, pubescent or villous. *Recepts* ½ in. diam., yellow-brown to crimson; basal bracts 3, broadly ovate, pubescent; peduncle 1-3 in., fulvous-tomentose. *Fem. sepals* 5; ovary long-elliptic; style long, filiform, adjacent stigmas cohering in a thick umbonate disk.

85. **F. alutacea**, Blume *Bijd.* 457; leaves coriaceous elliptic or elliptic-ovate or oblong entire acute or cuspidate, smooth and shining above, beneath pale tessellate squamulose, nerves 5-6 pairs above the basal, recepts long-peduncled in axillary pairs or cauline and fascicled globose smooth. *Miq. Flor.* i. 319.

PERAK, *Kunstler*.—DISTRIB. Java.

Shoots puberulous or glabrescent, verruculose. *Leaves* 4-7 in.; base rounded or narrowed, sub-2-auricled, 3-nerved; nerves prominent beneath; petiole ¾-1½ in., stout, scurfy; stipules in pairs, ½ in., ovate-lanceolate, puberulous. *Receptacles* ½-¾ in. diam., ripe reddish; basal bracts 3, united; peduncle nearly 1 in., slender, glabrous.

VAB. *Teymanniana*; branches warted, leaves pubescent beneath, especially on the nervules, receptacles axillary. *F. Teymanniana*, *Miq. l. c.* 319.

86. **F. recurva**, Blume *Bijd.* 457; shoots subsabrid and deciduously villous, leaves elliptic-ovate oblong or lanceolate obtuse or acuminate entire subsabrid above glabrous or sparsely hairy beneath, nerves 2-3 pairs above the rounded or subcordate base, receptacles sessile or subsessile axillary and solitary or in pairs or clustered on short axillary tubercles depressed globose pubescent or glabrate. *Miq. Flor.* i. ii. 317; *Suppl.* 432, and *Ann.* iii. 279, 294. *F. Spanogheana*, *Miq. in L. J. B.* vii. 451, and *Flor.* l. c. *F. villipes*, *Miq. in L. J. B.* l. c. *F. strigosa*, Blume l. c. 318; *Miq. Ann.* l. c. 279, 294. *F. urnigera*, *Miq. in Zoll. Syst.* 92, 98, and *Flor.* l. c. 318, t. 19. *F. ribesioides*, Wall. *Cat.* 4522; *Miq. Ann.* l. c. 293. *F. adnascens*, Wall. *Cat.* 4578 B.

PENANG, *Curtis*. PERAK, *Kunstler*. SINGAPORE, *Wallich*.—DISTRIB. Malay Islands.

Stem often rooting. *Leaves* 3–5 in., above smooth and glabrous or scabrid, beneath from glabrous to sparsely pilose and hispid, nerves more or less horizontal; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., stout, glabrous strigose or scaberulous; stipules $\frac{1}{4}$ in., broadly ovate, $\frac{1}{3}$ in. on the barren shoots. *Receptacles* 2–3 in. diam., (ripe) yellow, umbilical annulus smooth sometimes open, basal bracts 3, rather large, ovate acute. *Male fl.* and galls in the upper half of the cavity; anthers subsessile, large, oblong. *Sepals* of all fl. 4, lanceolate. *Gall ovary* obliquely ovoid, smooth, style short lateral. *Achene* subobovoid or oblong, style terminal.—The following forms are distinguishable.

F. RIBESIOIDES, *Wall.* (and ADNASCENS); leaves lanceolate glabrous or sparsely hairy, receptacles $\frac{1}{2}$ in. diam. fewer in a cluster, peduncle $\frac{1}{2}$ in. or less.

F. URNIGERA, *Miq.*; leaves substrigose beneath, receptacles flattened at the top, annulus large, basal bracts large.

87. **F. foveolata**, *Wall. Cat.* 4493; shoots pubescent, leaves membranous ovate elliptic or oblong or lanceolate acute or acuminate entire glabrous above base rounded, nerves 3–6 pairs, recepts subsolitary sessile axillary globose to ovoid or obovoid. *Miq. Ann.* iii. 294; *Brand. For. Fl.* 423. F. erecta, *Miq. l. c.* 294. F. nipponica, *Franch. & Savat. Enum. Pl. Jap.* i. 436. F. Thunbergii, *Maxim. in Bull. Acad. Petersb.* xi. 339. F. impressa & Wrightii, *Benth. Fl. Hongk.* 328. F. luducca, *Roxb. in Wall. Cat.* 4493 D. F. pubigera, *Wall. Cat.* 4518; *Brand. l. c.* 424; *Kurz For. Fl.* ii. 450. F. ludens, *Wall. Cat.* 4579. Pogonotrophe pubigera, verrucosa & reticulata, *Miq. in L. J. B.* vii. 76, 77.—*Ficus* sp., *Griff. Notul.* iv. 400, and *l. c. Pl. Asiat.* t. 561.

OUTER HIMALAYA, from Chamba to Bhotan, alt. 2–7000 ft.; the KHASIA HILLS, CHITTAGONG and BURMA.—DISTRIB. China.

A creeper or lofty climber. *Leaves* $1\frac{1}{2}$ –6 in., pubescent or glabrate beneath with prominent nerves; base 3-nerved, rounded cordate or subcuneate; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in., pubescent; stipules in pairs, $\frac{1}{2}$ in., villous. *Receptacles* $\frac{1}{2}$ – $\frac{1}{2}$ in. diam., or ovoid and 1 by $\frac{3}{4}$ in., umbonate puberulous warted or wrinkled or obovoid and $1\frac{1}{2}$ in. long and broad; basal bracts 3, ovate, acute, often reflexed; peduncle $\frac{1}{10}$ – $\frac{1}{2}$ in. *Male fl.* pedicelled, filaments connate; anthers 2–3 ovate, pointed. *Sepals* of all fl. 4. *Gall ovary* obovoid, style short, stigma dilated. *Achene* oblong-reniform, papillose, style long subterminal.—Distinct forms are—

VAR. *oleoformis*; creeping (never on trees), leaves oblong-lanceolate, receptacles 1 in. long ovoid.—Sikkim.

VAR. *maliformis*; climbing and fruiting at the top, leaves ovate-lanceolate, recepts $1\frac{1}{2}$ –2 in. diam. much umbonate.

88. **F. ramentacea**, *Roxb. Fl. Ind.* iii. 547; leaves coriaceous ovate or elliptic-ovate subacuminate entire glabrous except the 5 or 6 pairs of nerves beneath, recepts subsessile solitary or in axillary pairs or clusters depressed globose stipitate. *Kurz For. Fl.* ii. 454. F. rigescens, *Miq. Ann.* iii. 293. F. subrigida, *Miq. Flor. Suppl.* 175. F. oligosperma, *Miq. Pl. Jungh.* 55, and *Flor. l. c.* 319. F. microcarpa, *Blume Bijl.* 442. F. vagans, *Wall. Cat.* 4562. F. leptocarpa, *Steud. Nomencl.* i. 636. F. adhærens, *Miq. Pl. Jungh.* 55; *Flor. l. c.* 319, t. 22; *Ann. l. c.* 280, 294. Pogonotrophe rigida, *Miq. in L. J. B.* vii. 74; *Flor. l. c.* 331.

SILHET, *Wallich*. BURMA, *Kurz*. PERAK, *Kunstler*.—DISTRIB. Malay Islands.

A powerful epiphyte, often eventually a tree. *Leaves* $2\frac{1}{2}$ –8 in. (on shoots 11 in.), base rounded notched or cordate 3–7-nerved, nerves parallel, reticulations minute; petiole $\frac{3}{4}$ – $1\frac{1}{2}$ in., stout; stipules $\frac{1}{2}$ in., villous or pubescent, caducous. *Recepts* $\frac{1}{2}$ – $\frac{1}{2}$ in. diam., young sparsely hairy, suddenly contracted into the stipes; basal bracts 3, small reflexed glabrous. *Sepals* of male and gall fl. 2–3; filaments short, anthers

elongate. *Gall ovary* obovoid, smooth, style short. *Achene* elliptic, style long, stigma cylindric.—*F. adhærens* is a constant form with smaller leaves and sessile recepts.

89. **F. araneosa**, King; leaves ovate-lanceolate obtusely cuspidate entire glabrous above, densely flocculent beneath, recepts in axillary pairs or clusters pyriform flocculent.

PERAK; at Laroot, *Kunstler*.

Leaves $2\frac{1}{2}$ – $3\frac{1}{2}$ in.; *petiole* $\frac{1}{2}$ – $\frac{3}{4}$ in.; *stipules* ovate, convolute, flocculent. *Recept*s shortly peduncled, basal bracts 0. *Sepals* in all fl. 4, broad, anthers 2 elongate sagittate. *Gall ovary* narrowly obliquely ovoid; style short, subterminal. *Achene* (young) with a short thick style.

90. **F. villosa**, Blume *Bija*. 441; shoots fulvous villous, leaves coriaceous ovate-oblong or -lanceolate acuminate entire glabrous and subrugose above except the hirsute midrib and 5–6 pairs of nerves, beneath densely fulvous villous, recepts in clusters on axillary tubercles shortly peduncled. *Miq. in L. J. B.* vii. 451; *Flor.* i. ii. 317, t. 21 B; *Ann.* iii. 294. *F. dives*, *Miq. Choix*, t. 12. *F. obtecta* & ? *F. barbata*, *Wall. Cat.* 4505, 4576.

PENANG and SINGAPORE, *Wallich*. PERAK, *Kunstler*.—DISTRIB. Malay Islands.

Leaves 5– $7\frac{1}{2}$ in., base 3–5-nerved rounded notched or subcordate; *petiole* $\frac{1}{2}$ –1 in., villous; *stipules* in pairs $\frac{3}{4}$ – $1\frac{3}{4}$ in., broadly oblong-lanceolate, glabrous, caducous. *Recept*s $\frac{1}{2}$ in. diam., (ripe) orange-yellow, umbonate; *peduncle* $\frac{1}{10}$ – $\frac{1}{2}$ in., villous, bracts minute. *Sepals* of all fl. 4, lanceolate; anthers elongate, filaments short. *Gall ovary* narrowly elliptic, style subterminal. *Achene* ellipsoid.—Very near *F. lanata* and *recurva*, Blume.

91. **F. crininervia**, *Miq. Fl. Ind. Bat. Suppl.* 432; shoots tawny-silky, leaves coriaceous elliptic- or ovate-oblong acuminate or cuspidate entire above glabrous and minutely lepidote beneath tessellately reticulate, nerves 5–6 pairs above the cordate or subsagittate base silky beneath, recepts axillary solitary or in pairs obovoid or globose smooth in age, basal bracts 0. *F. lanigera*, *Wall. Cat.* 4577. *F. grossinervis*, *Miquel in Herb.*

ASSAM, *Griffith, Clarke*. CHITTAGONG, *Lister*.—DISTRIB. Malay Islands.

Creeping and rooting from stem and branches. *Leaves* $\frac{1}{2}$ – $1\frac{1}{4}$ in., base 5–7-nerved; *petiole* $\frac{1}{2}$ – $1\frac{1}{4}$ in., scurfy and deciduously hirsute; *stipules* $\frac{3}{4}$ – $1\frac{1}{2}$ in., in pairs, linear-lanceolate flaccid glabrous, very conspicuous on the branchlets. *Recept*s $\frac{1}{2}$ – $\frac{1}{2}$ in. diam., subumbonate, base contracted, hairs deciduous; *peduncle* $\frac{1}{2}$ – $\frac{1}{2}$ in., base bracteate. *Fem. sepals* 3; *achene* (young) obliquely ovoid; style subterminal, short, stigma large.

92. **F. diversifolia**, Blume *Bijd.* 456; leaves sessile polymorphous usually deltoid or cuneate-obovate with the apex obtuse rounded truncate or 2-fid and base narrowed glandular with a forked midrib, sometimes obovate oblanceolate or rhomboid and penninerved tip acute or obtuse, recepts axillary solitary or in pairs depressed globose ovoid or pyriform smooth. *Miq. Ann.* iii. 288. *F. deltoidea*, *Jack Mal. Misc.* vii. 71, and ovoida, *l.c.*; *Wall. Cat.* 4526. *F. spathulata*, *Miq. in L. J. B.* vii. 441 (*excl. F. retusa*). *F. sideroxifolia*, *Griff. Notul.* iv. 389; *l.c. Pl. Asiat.* 551, f. 2. *F. lutescens*, *Desf. Hort. Par. Ed.* 3, 413. *Synœcia diversifolia*, *Miq. in L. J. B. l. c.* 470, t. 9 B; *Flor.* i. ii. 328. *Erythrogynne frutescens*, *Visiani in Gaspar. Ric.* 86; *Miq. in L. J. B. l. c.* 453.

PENANG, PERAK and SINGAPORE, *Wallich*, &c.—DISTRIB. Malay Islands.

Often epiphytal shrub or small tree. *Leaves* 1 by $\frac{3}{4}$ in., to 5 by 4 in., coriaceous or subcoriaceous, beneath granulate and with dark glands in the fork of the midrib or in the axils of the lower nerves in the penninerved forms; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in. ($1\frac{1}{2}$ –3 in. in var. *Kunstleri*); stipules $\frac{3}{4}$ – $\frac{1}{2}$ in., linear-lanceolate, convolute. *Recepts* dull yellow or reddish; basal bracts 3, short, broad, spreading, puberulous; peduncle $\frac{1}{2}$ –1 in. *Male sepals* 4, obovate. *Gall sepals* 3, ovate or linear; ovary globose, smooth, or angular rough and crustaceous; style short, subterminal; stigma wide tubular. *Achenes* twice as large as the gall ovary, elongate-reniform shining; style lateral, long, stigma forked.—The leaves are usually of the obovate-cuneate type, with bifurcating midrib, rarely also elongated oblanceolate and penninerved. Such dimorphous individuals suggested Blume's name of *diversifolia*. This was not published until 1825, whereas Jack's *deltoidea* and *ovoidea* were both published in 1822. I, however, retain Blume's name, because it recognizes the dimorphism, and covers both Jack's forms. Three vars. are distinguishable.

VAR. *ovoidea*; all parts smaller, leaves narrowly obovate to oblanceolate, tip rounded entire, recepts usually in pairs subglobose or ovoid $\frac{1}{2}$ in. long. F. *ovoidea*, Jack.

VAR. *Kunstleri*; leaves large cuneate-deltoid, tip rounded or notched, petiole $1\frac{1}{2}$ –3 in., recepts about $\frac{1}{2}$ in. long, male fl. long-pedicelled, perianth minute, gall sepals 3 linear much longer than the achene.—Perak.

VAR. *lutescens*; leaves pinnate-nerved subrhombic acute at both ends. F. *lutescens*, Desf.—Perak, alt. 4–5000 ft., on the ground and trees.

93. **F. palmata**, *Forsk. Fl. Egypt.* 179; leaves membranous orbicular-ovate acute or apiculate toothed or serrate entire or obtusely 3–5-lobed subscabrous above scabrid or shortly tomentose beneath, nerves 3–6 pairs, recepts solitary axillary subglobose to pyriform, base constricted. *Vahl Symb.* i. 84, t. 24; *Miq. Ann.* iii. 290, and in *L. J. B.* vii. 225. F. *caricoides*, *Roxb. Fl. Ind.* iii. 529; *Miq. in L. J. B. l. c.* 224. F. *pseudo-sycamorus*, *Dene. Fl. Sinaic.*; *Miq. in L. J. B. l. c.* 227; *Boiss. Fl. Orient.* iv. 1155. F. *virgata*, *Roxb. l. c.* 530; *Wight Ic. t.* 649; *Miq. in L. J. B.* 228, and *Fic. Afric.* 130; *Brand. For. Fl.* 419; *Wall. Cat.* 4507 A and ? B, 4492.

N.W. INDIA, from the Indus eastwards to Oudh, ascending to 3000 ft. in the HIMALAYA. MT. ABOO, King.—DISTRIB. Westward to Egypt and Abyssinia.

A bush or small tree, nerves epiphytal, shoots tomentose, pubescent or glabrous. *Leaves* $1\frac{1}{2}$ –5 in., base 3-nerved; petiole 1–2 in.; stipules in pairs, ovate, acute, pubescent, deciduous. *Recepts* $\frac{1}{2}$ –1 in. diam., umbonate, (ripe) yellow; basal bracts 3, acute, deciduous; peduncle $\frac{1}{2}$ –1 in. *Male fl.* on hairy pedicels; sepals 4–5, lanceolate, hairy. *Gall fl.* sessile or pedicelled; perianth deeply 5-cleft; ovary ovoid, smooth; style very short, lateral, stigma dilated. *Fem. fl.*; perianth of gall fl.; achene trigonous, granular; style subterminal, long, hairy, stigma bifid.—The Indian representative of *F. Carica*, L.

94. **F. alba**, *Reinw. in Blume Bijl.* 467; leaves ovate elliptic ovate-lanceolate or subrhombic entire or acutely 3-lobed irregularly toothed scabrid or hispidulous above clothed with white or cinnamon tomentum beneath, nerves 3–4 pairs above the basal, recepts in axillary pairs sessile depressed globose or ovoid smooth when ripe. *Miq. Flor.* i. ii. 294, and *F. Mappan, Suppl.* 424, 425; *Ann.* iii. 270, 290. F. *nivea*, *Blume l. c.*; *Miq. Flor. l. c.* 294. F. *gossypina*, *Wall. Cat.* 4488; *Miq. in Hook. L. J. B.* vii. 455; *Flor. l. c.* 294; *Suppl.* 425. F. *Hunteri*, *Miq. in L. J. B. l. c.* 225, and *Flor. l. c.* 296. ? *F. palmata*, *Roxb. Fl. Ind.* iii. 529.

PENANG, PERAK, SINGAPORE and MALACCA, ascending to 4000 ft.—DISTRIB. Malay Islands.

A shrub or small tree. *Leaves* 5-8 in., base 3-nerved, narrow or broad and cordate, or the shoots large palmately 5-7-lobed and -nerved; petiole $1\frac{1}{2}$ -3 in., glabrous or pubescent; stipules $\frac{1}{2}$ - $\frac{1}{2}$ in., ovate-lanceolate, at first pubescent. *Recepts* $\frac{1}{2}$ - $\frac{1}{2}$ in. diam., young pubescent; basal bracts 3, broadly ovate, obtuse. *Male fl.* sessile, short, broad; sepals 3, broadly imbricate; stamens 1-2. *Gall sepals* 2, lanceolate; ovary ovoid, smooth; style short, lateral, stigma funnel-shaped. *Achene* crustaceous, tubercled; style as long, lateral, stigma cylindric.

95. **F. fulva**, Reinw. in *Blume Bijl.* 578; shoots hispid, leaves membranous from ovate or elliptic to rounded rhombic 3-5-sinuate or -lobed acute or apiculate denticulate above scabrid with tomentose nerves beneath tawny-tomentose, nerves 2-4 pairs, recepts crowded sessile or subsessile in axillary pairs ovoid to globose. *Miq. Ann.* iii. 269, 290; *Flor.* i. ii. 296; *De Vriese Pl. Rar. Jard. Leyd. fasc.* 1. *F. Reinwardtii*, Link & Otto, *lc. Rar.* I. 6, t. 31; *Miq. in L. J. B.* vii. 457. *F. suborbicularis*, *Miq. Flor. Suppl.* 425. *F. apiculata*, *Miq. in Zoll. Syst.* 92, 98; *Flor.* l. c. 296; *Ann.* l. c. 269, 290. *F. chlorocarpa*, *Miq. Flor.* 294. *Pogonotrophe flavidula*, *Miq. l. c. Suppl.* 435.

BURMA, the ANDAMAN ISLANDS and MALAY PENINSULA.—DISTRIB. Malay Islands.

A small shady tree. *Leaves* 4-8 in., base rounded or cordate, 5-7-nerved; petiole $1\frac{1}{2}$ -3 $\frac{1}{2}$ in., pubescent; stipules single, broadly ovate, acute, base truncate, hairs deciduous. *Recepts* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., (ripe) yellow-red; basal bracts 3, broad, villous. *Male fl.* sessile; sepals 3, large, oblong, much overtopping the 2 subsessile oblong anthers. *Gall* and *fem. sepals* 5, narrow-lanceolate; gall ovary ovoid, smooth; style short, lateral, stigma funnel-shaped. *Fem. fl.* sessile or pedicelled; achene obliquely ovoid, crustaceous, granulate.—There are two principal forms: *F. fulva* with rounded leaves, and *F. flavidula* & *chlorocarpa* with ovate or elliptic ones.

96. **F. chrysocarpa**, Reinw. in *Blume Bijl.* 475; leaves membranous elliptic to oblanceolate acute serrate (not lobed or cordate) above sparsely strigose beneath pubescent or tomentose, nerves 3-4 pairs above the basal, recepts in axillary pairs ovoid or globose densely golden-hairy. *Miq. Flor.* i. ii. 302, and *Suppl.* 427; *Ann.* iii. 270, 291; *Kurz For. Fl.* ii. 596. *F. aurata*, *Miq. Ann.* l. c. 271, 291. *F. densiserra*, *Miq. Flor. Suppl.* 426. *F. arguta*, *Wall. Cat.* 4489. *Covellia aurata*, *Miq. Flor. Suppl.* 433.

MARTABAN, *Kurz.* PENANG, *Wallich.* PERAK, *Kunstler.*—DISTRIB. Malay Islands.

A tree, branchlets hollow, yellowish or rusty hirsute. *Leaves* 4-7 in., base 3-nerved; stipules $\frac{1}{2}$ in., lanceolate, rufous-tomentose. *Recepts* $\frac{1}{2}$ in. diam., young ovoid, interior densely hairy. *Male sepals* 4, broadly ovate, glabrous. *Gall* and *fem. sepals* 4, oblanceolate, tips penicillate. *Gall ovary* ovoid, smooth; style short, lateral. *Achene* subrhombic, wrinkled, tubercled; style long, lateral, hairy, stigma cylindric.

97. **F. hirta**, Vahl *Enum.* ii. 201; leaves polymorphous ovate elliptic rounded to oblong-lanceolate acuminate serrate entire or 3-5-lobed above scabridly hispid beneath hirsute or tomentose, nerves 2-7 pairs above the 3-7 basal, recepts in axillary pairs sessile or subsessile hispid globose with usually fem. fl. and ovoid with male and gall. fl. *Roxb. Fl. Ind.* iii. 534; *Wight Ic.* t. 672; *Miq. in L. J. B.* vii. 456; *Flor.* i. ii. 297, t. 18; *Ann.* iii. 290; *Kurz For. Fl.* ii. 449. *F. setosa*, *Blume Bijl.* 477; *Miq. in L. J. B.* l. c. 456; *Hook. & Arn. Bot. Beech. Voy.* 216, t. 49. *F. setifera*, *Stend. Nomencl.* i. 638. *F. hibiscifolia*, *Champ. in Hook. Kew Journ. Bot.* vi. 77.

F. Roxburghii, *Miq. in L. J. B. l. c.* 456. *F. triloba*, *Ham. in Wall. Cat.* 4491; *Miq. Ann. l. c.* 270, 290; *Brand. For. Fl.* 423; *Kurz For. Fl.* ii. 449. *F. hirsuta*, *Roxb. l. c.* 528; *Wight l. c. t.* 670.

TROPICAL HIMALAYA, from Sikkim eastwards; ASSAM, BURMA and the MALAY PENINSULA.—DISTRIB. Malay Islands, China.

A shrub or small tree. *Leaves* 5–12 in., base narrow, rounded or cordate; petiole $\frac{1}{3}$ –1 in., hirsute; stipules $\frac{1}{2}$ – $\frac{3}{4}$ in., ovate-lanceolate, deciduously strigose or hirsute. *Recepts* $\frac{3}{4}$ –1 in. diam.; oral bracts many, some large; basal ovate, acuminate. *Sepals* of all fl. 4, lanceolate, glabrous. *Stamens* 1–3. *Gall ovary* globose or ovoid, smooth; style short, stigma funnel-shaped. *Achene* granulate, ellipsoid, notched at the base of the lateral long style, stigma cylindric.

F. hirta proper has narrower leaves and recepts $\frac{1}{2}$ in., and is the southern form. *F. triloba*, *Ham.* (*Roxburghii*, *Miq.*), has ovate or rounded ovate leaves entire or deeply lobed, and recepts $\frac{1}{2}$ in. diam. Both forms meet on the Khasia Mts.

98. ***F. variolosa***, *Lindl. in Hook. Lond. Journ. Bot.* (1842) i. 492; glabrous, leaves oblong- or ob-lanceolate subacute entire, nerves 8–10 pairs, basal subhorizontal, recepts in axillary pairs peduncled globose umbonate warted glabrous. *Benth. Fl. Hongk.* 328; *Miq. Ann.* iii. 294; *Maxim. in Bull. Acad. Petersb.* xi. 336.

PERAK, *Kunstler*.—DISTRIB. Hong Kong.

A shrub. *Leaves* 2 $\frac{1}{2}$ –4 $\frac{1}{2}$ in., sometimes obtusely acuminate, base cuneate, not 3-nerved, margins recurved; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in.; stipules $\frac{1}{2}$ in., ovate, acuminate. *Recepts* $\frac{1}{2}$ in. diam.; oral bracts large, basal 3, triangular-ovate, connate below, spreading; peduncle $\frac{1}{2}$ – $\frac{1}{2}$ in., slender. *Fem. fl.* subsessile or pedicelled; sepals 3–4; achene trigonous, wrinkled minutely; style lateral.—Male and gall fl. unknown.

99. ***F. erecta***, *Thunb. Diss. Fic.* 9, and in *Trans. Linn. Soc.* ii. 327, var. *Sieboldi*; leaves long-lanceolate acuminate entire or subserrate towards the tip above glabrous or scabrid beneath hispid and minutely tuberculate, nerves about 8 pairs, recepts in axillary pairs peduncled pyriform smooth, base much constricted. *Kämpf. Ic. Sel. t.* 4; *Franch. & Savat. En. Pl. Jap.* i. 435, ii. 490. *F. pumila* β , *Thunb. Fl. Jap.* 33. *F. Sieboldi*, *Miq. Ann.* ii. 199, iii. 295; *Maxim. in Bull. Acad. Petersb.* xi. 327. ? *F. pyrifolia*, *Burm. Fl. Ind.* 226; *Miq. Prolus.* 231. ? *F. japonica*, *Blume Bijl.* 440; *Sieb. & Zucc. Fl. Jap. Fam. Nat.* No. 778; *Maxim. l. c.* 328.—*Itaber, Kämpf. Amœn. Exot.* 803.

SIKKIM HIMALAYA, *J. D. H.* KHASIA HILLS, *Mann*.—DISTRIB. China, Japan.

A small tree, shoots subglabrous. *Leaves* 2–4 in. *Recepts* $\frac{1}{2}$ in. diam., glabrous or puberulous. *Male* and *gall sepals* 3, lanceolate. *Gall ovary* globose; style short, lateral, stigma dilated. *Fem. fl.* subsessile; sepals 4; style lateral, thick, stigma 2-lobed.—The typical *F. erecta* has broadly ovate or elliptic-obovate fewer-nerved leaves, and depressed recepts less constricted below. The Hong Kong var. (*Beecheyana*) has the leaves beneath and recepts hispid or almost tomentose.—See *F. silhetensis* and *chartacea*.

100. ***F. glandulifera***, *Wall. Cat.* 4481; leaves membranous ovate to subobovate-oblong cuspidate entire glabrous except the puberulous midrib and 4–5 pairs of nerves, recepts in axillary clusters smooth dimorphous subglobose with male and gall fl. or ellipsoid and female. *F. aurantiaca*, *Miq. Ann.* iii. 293. *Pogonotrophe aurantiaca*, *Miq. in Zoll. Syst.* 93, 99, and *Flor.* i. ii. 332. *P. glandulifera*, *Miq. in L. J. B. vii.* 77; *Flor. l. c.* 331. *P. sumatrana*, *Miq. Flor. Suppl.* 436.

BURMA, *Falconer*. PENANG, *Porter*. PERAK, *Kunstler*. MALACCA, *Griffith*, *Maingay*.—DISTRIB. Malay Islands.

A small spreading tree, shoots and petioles rusty-pubescent. *Leaves* 3-4 in., olive-green, base broad, rounded or notched, 3-nerved; petiole $\frac{3}{4}$ -1 in.; stipules $\frac{1}{2}$ in., broadly ovate, villous. *Recepts* $\frac{1}{2}$ in. diam., top flattened, base constricted, (ripe) yellow, nearly smooth, young softly pubescent; peduncle $\frac{1}{4}$ in., and basal bracts rusty-pubescent.—The colour of dry leaves is characteristic.

101. **F. silhetensis**, *Miq. Ann. Mus.* iii. 223, 291; leaves membranous ovate-lanceolate or oblanceolate acute or acuminate entire subglabrous above granulate and sparsely hispid beneath, nerves 3-4 pairs, recepts axillary solitary or in pairs subsessile ovoid or subglobose sparsely hairy. *F. umbonata*, *Wall. Cat.* 4548; *Miq. in L. J. B.* vii. 437.

ASSAM, SILHET and the KHASIA HILLS, ascending to 4000 ft., *Wallich*, &c.

A shrub, shoots tomentose. *Leaves* $2\frac{1}{2}$ -4 in.; margins sometimes subundulate when dry; base acute or subacute, 3-nerved; petiole $\frac{3}{4}$ - $\frac{1}{2}$ in., hairy; stipules as long, lanceolate, glabrous. *Recepts* $\frac{1}{2}$ in. diam., (ripe) reddish, young much umbonate; oral bracts many, basal 3, minute. *Sepals* of all fl. 3, lanceolate. *Stamens* 2-4. *Gall ovary* globose or obovoid, smooth; style short, lateral. *Achene* obovoid, flattened, granulate; margins thickened; style long, lateral, deflexed, hairy.—Probably a form of *F. erecta* of smaller size and with sessile receptacles.

102. **F. pyriformis**, *Hook. & Arn. Bot. Beech. Voy.* 216; leaves oblong- to linear-lanceolate obtusely acuminate entire smooth or scaberulous above glabrous pubescent or hispid beneath, nerves 5-10 pairs, recepts axillary solitary peduncled pyriform umbonate. *Miq. in L. J. B.* vii. 437, t. 6, f. A; *Ann.* iii. 281, 294; *Benth. Fl. Hongk.* 328. *F. Millettii*, *Miq. in L. J. B.* vii. 438; *Maxim. in Bull. Acad. Petersb.* xi. 336. *F. Abelii*, *Miq. Ann. l. c.* 281, 295. *F. subpyriformis*, *Miq. Ann. l. c.* 229, 294; *Kurz For. Fl. ii.* 456. *F. Finlaysoniana*, *Wall. Cat.* 4553. *F. ichnopoda*, *Miq. Ann. l. c.* 229, 294; *Kurz l. c.*

ASSAM, the KHASIA MTS., BURMA and PERAK.—DISTRIB. China.

A shrub, young parts pubescent. *Leaves* $1\frac{3}{4}$ -4 in., minutely reticulate, base acute, 3-nerved; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules as long, subulate, glabrous. *Recepts* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., stipitate, puberulous or subhispid; basal bracts 3, triangular, those with fem. fl. smallest. *Male fl.* many; *sepals* 3. *Gall sepals* 4; ovary globose, smooth; style short, lateral; stigma dilated, tubular. *Achene* reniform, granulate; style subterminal, long, slender.—The following forms are connected by intermediates.

F. pyriformis, H. & A.; leaves lanceolate glabrous asperulous punctulate beneath (China).—*F. Abelii*, *Miq.*; leaves of type but hispid beneath, receptacles hispidulous (China).—*F. subpyriformis*, *Miq.*; leaves linear-lanceolate pubescent beneath, nerves about 10 pairs, recepts and peduncles pubescent (India).—*F. ichnopoda*, *Miq.*; leaves of *subpyriformis* but glabrous, receptacles long-peduncled glabrous (India).

103. **F. chartacea**, *Wall. Cat.* 4580; leaves membranous glabrous lanceolate or ovate- or ob-lanceolate acuminate or cuspidate entire, nerves 3-5 pairs, receptacles in axillary pairs clustered subsessile globose smooth. *F. Lamponga*, var. *chartacea*, *Kurz For. Fl. ii.* 451. *F. torulosa*, *Wall. Cat.* 4550.

BURMA, *Wallich*. PERAK, common on the coast, *Kunstler*.

A shrub, shoots appressed-pubescent. *Leaves* 2-4 in., narrowed to the cuneate 3-nerved base, scaberulous beneath; petiole $\frac{1}{2}$ -1 in., slender; stipules $\frac{1}{3}$ - $\frac{1}{2}$ in., lanceolate, convolute, glabrous. *Recepts* $\frac{1}{4}$ in., (ripe) yellow, young umbonate; basal bracts 3, minute; peduncle 0- $\frac{1}{10}$ in., glabrous. *Male fl.* sessile; *sepals* 3, spatulate. *Gall fl.* pedicelled; *sepals* 4, linear-lanceolate; ovary subglobose, smooth; style short, lateral, stigma tubular. *Fem. fl.* pedicelled; *sepals* of gall. fl.; achene ovoid, rugose; margin thickened; style subterminal, stigma cylindric.—Near *silhetensis*, but leaves quite glabrous, not punctulate, and recepts subsessile. Possibly a local form of *F. erecta*. *F. torulosa* is a more obovate-leaved form.

104. **F. nemoralis**, Wall. Cat. 4517; glabrous, leaves membranous ovate-elliptic- or ob-lanceolate acuminate entire, nerves 7-12 pairs subhorizontal, recepts subsessile axillary subglobose or clavate. *Miq. in L. J. B.* vii. 453; *Ann.* iii. 295 (*excl. verrucosa*); *Brand. For. Fl.* 424. *F. gemella*, Wall. Cat. 4516, and *F. densa*, *Miq. in L. J. B. l. c.* 545; *Ann. l. c.* *F. Fieldingii*, *Miq. in L. J. B. l. c.* 439; *Ann. l. c.* 280, 294. *F. trilepis*, *Miq. Ann. l. c.* 294; Wall. Cat. 4494 B. *F. binata*, Wall. Cat. 4554.

HIMALAYA, from Hazara to Bhotan, alt. 1500-6500 ft. KHASIA MTS. and ASSAM.

A small glabrous tree or shrub. *Leaves* 3-5½ in., base cuncate, rarely rounded, 3-nerved, nerves and reticulations prominent and dark beneath; petiole ½-1 in.; stipules lanceolate, convolute, glabrous. *Recepts* ½ in. diam., all with male fl.; basal bracts 3, broad, connate; peduncle ½ in. or less. *Male fl.* pedicelled, few in the fem. recepts and near the mouth, numerous and sometimes scattered all over the gall recepts. *Sepals* in all fl. 3, lanceolate, fleshy. *Stamens* 2-3. *Gall ovary* ovoid, crustaceous. *Achene* rounded, wrinkled; style longer and more lateral than of gall fl. —The forms are disposable in two series. I. Recepts ovoid or clavate; male fl. few, fem. many, galls few or 0.—*F. nemoralis*; leaf-base rather broad, recepts ovoid shortly peduncled (Central and E. Himal., Assam).—*F. trilepis*; recepts clavate young ellipsoid truncate (Central and E. Himal.). II. Recepts subglobose, male and gall fl. many, fem. few or 0.—*F. gemella*; leaves narrow, recepts sessile (Central Himal. and Assam).—*F. Fieldingii*; leaves narrow much acuminate, recepts abruptly shortly peduncled (W. Himal. to 300 ft., E. Himal. to 8000 ft.). Approaches *Urostigma*.

Sect. VII. NEOMORPHE (see p. 496).

105. **F. macrocarpa**, Wight mss.; scandent, leaves long-petioled membranous broadly ovate shortly acuminate sometimes unequal-sided glabrous above pubescent beneath, nerves about 3 pairs, recepts in cauline clusters globose, basal bracts 0. *Pogonotrophe macrocarpa*, *Miq. in Wight Ic. t.* 1965.

NILGHIRI HILLS, alt. 5000 ft., Wight, Gamble.

A large climbing tree, shoots at first puberulous. *Leaves* 5 in., base rounded or subcordate; petiole 2-2½ in.; stipules ½ in., lanceolate. *Recepts* 1-2½ in. diam., spotted; peduncles about ½ in., with several bracts at their base. *Fem. fl.* sessile or pedicelled; sepals 6; ovary subovoid; style as long, subterminal, hairy; stigma 2-lobed.—Miquel (*Ann.* iii. 278) refers *macrocarpa*, Wight, to *vagans*, Roxb., which is *lævis*. Perhaps a form of the following.

106. **F. guttata**, Kurz; leaves broadly ovate cuspidate sparsely puberulous above minutely villous or glabrescent beneath, nerves about 3 pairs, recepts in cauline and rameal clusters shortly peduncled subglobose pubescent, basal bracts 3. *Covellia guttata*, Wight *Ic. t.* 1966.

NILGHIRI and PULNEY HILLS, Wight, Gamble, Beddome.

A climbing tree, branchlets tomentose at length glabrous. *Leaves* 4-5 in., base broad, rounded or subcordate, 3-5-nerved. *Recepts* 1-1½ in. diam., (ripe) blotched. *Fem. fl.* sessile; sepals 6, style short, stigma widely funnel-shaped.

107. **F. Roxburghii**, Wall. Cat. 4508; leaves broadly ovate or rounded mucronate entire or toothed above glabrous or glabrescent beneath softly pubescent base cordate, nerves 3-4 pairs, recepts on short leafless cauline branchlets peduncled turbinate 8-12 ridged. *Brand. For. Fl.* 422; *Kurz For. Fl.* ii. 460. *F. macrophylla*, Roxb. *Fl. Ind.* iii. 550; Wight *Ic. t.* 673. *F. scleroptera*, Griff. *Ic. Pl. Asiat.* t. 558. *F. regia*, *Miq. Ann.* iii. 230, 297 (*in part*). *Covellia macrophylla*, *Miq. in L. J. B.* vii. 465.

OUTER HIMALAYA, from the Indus to Bhotan; KHASIA Mts., CHITTAGONG and BURMA, ascending to 5000 ft.

A low spreading tree, 10-30 ft., bark brown. *Leaves* 5-15 by $4\frac{1}{2}$ -12 in., base cordate, rarely rounded, 5-7-nerved; nerves prominent on both surfaces, nervules nearly transverse; petiole 1-4 in.; stipules $\frac{1}{2}$ -1 in., ovate-lanceolate, pubescent. *Recepts* 2 in. diam. and more, pubescent or glabrous, (ripe) russet-brown or purplish and spotted, umbilicus large, base sometimes constricted; basal bracts 3, rather large, triangular; peduncle $\frac{3}{4}$ -1 $\frac{1}{2}$ in., pubescent. *Male sepals* large, inflated, broadly imbricate; stamens 2-3, filaments long, stout. *Gall perianth* 2-3-lobed; style short, subterminal, stigma dilated. *Fem. fl.* subsessile or pedicelled, perianth of gall fl.; achene granulate, viscid; style long, lateral, curved, hairy, stigma cylindric.

108. **F. pomifera**, Wall. *Cat.* 4547; leaves glabrous or nearly so elliptic subovate or lanceolate acute coarsely serrate, nerves 4-5 pairs, recepts clustered on cauline and rameal tubercles or short leafless branches long-peduncled globose or subpyriform 4-6-grooved pubescent. *F. oligodon*, *Miq. Ann.* iii. 234, 297. *F. regia*, *Miq. l. c.* 230, 296 (*in part*); *Kurz For. Fl.* ii. 458. *F. Hamiltoniana*, Wall. *Cat.* 4545 A.

SIKKIM HIMALAYA, alt. 1-3000 ft., J. D. H., &c. CHITTAGONG, Lister. BURMA, Kurz, &c. PERAK, Kunstler.—DISTRIB. Malay Islands.

A tall tree, head narrow, bark white. *Leaves* $4\frac{1}{2}$ -8 in., above when young puberulous, beneath papillose puberulous or glabrous, base rounded or subcuneate, 3-5-nerved; petiole $1\frac{1}{2}$ -3 $\frac{1}{2}$ in., pubescent; stipules $\frac{3}{4}$ -1 in., ovate-lanceolate. *Recepts* 1 in. diam., (ripe) reddish, sometimes warted, oral bracts large, pubescent, basal 3, ovate, acute; peduncle 1-2 $\frac{1}{2}$ in. *Male sepals* 3, large, enclosing the 2 curved anthers. *Gall* and *fem. perianth* 3-toothed, of the gall fl. often enveloping the ovoid smooth ovary. *Achene* papillose; style long, lateral, stigma clavate.—Differs from *F. Roxburghii* in the white bark, smaller more glabrous not cordate leaves, and hairy receptacles on longer slenderer peduncles; it is also a more southern plant.

109. **F. variegata**, Blume *Bijd.* 459; leaves broadly or elliptic-ovate acuminate entire subrepand or denticulate glabrous above puberulous or glabrous beneath, nerves 4 pairs, recepts clustered on cauline and rameal tubercles peduncled globose smooth. *Miq. Flor.* i. ii. 320; *Ann.* iii. 295. *F. subracemosa*, Blume *l. c.* 469; *Miq. Flor.* l. c. 330; *Choix Pl.* t. 13. *F. racemifera*, Roxb. *Fl. Ind.* iii. 560; *Wight Ic.* t. 639. *F. sycamoroides*, *Miq. Ann.* l. c. 230, 295. *F. subopaca*, *Miq. Flor.* l. c. 320. *F. cerifera*, Blume *in Ann. Sc. Nat. Ser.* 4, iii. 333, t. 14. *F. ceriflua*, *Jungh. Java* i. 439. *F. chlorocarpa*, Benth. *Fl. Hongk.* 330; *Miq. Ann.* l. c. 296; *Maxim. in Bull. Acad. Petersb.* xi. 330. *Covellia racemifera*, *Miq. in L. J. B.* vii. 465; *Flor.* l. c. 325. *Sycomorus capensis* and *gummiflua*, *Miq. Pl. Jungh.* 64.—*Rumph. Herb. Amb.* 145, t. 93.

CHITTAGONG, Lister. ASSAM, Mann. PENANG, King's Collector.—DISTRIB. Malay Islands.

A tall spreading tree, bark pale, shoots glabrous or pubescent. *Leaves* 4-7 in., base rounded, notched or cordate, 5-nerved; nerves prominent, nervules transverse; petiole 1-2 in.; stipules $\frac{1}{2}$ - $\frac{3}{4}$ in., acuminate, glabrous. *Recepts* 1 in. diam., smooth, (ripe) red, with white streaks and dots, base sometimes constricted; basal bracts 3, minute, deciduous; peduncle $\frac{3}{4}$ -2 in. *Male sepals* 3 or 4, linear-lanceolate; anthers 2. *Gall perianth* 4-5-toothed; ovary ovoid, smooth, stigma funnel-shaped. *Achene* obovoid, granulate, stigma clavate.

110. **F. glomerata**, Roxb. *Cor. Pl.* ii. t. 123, and *Fl. Ind.* iii. 558; leaves membranous ovate- to obovate-oblong or lanceolate subacute glabrous rarely softly pubescent above pubescent and glabrous or asperous beneath,

nerves 4-6 pairs, recepts on cauline and rameal short leafless scaly branches rarely axillary peduncled pyriform turbinate or subglobose all bearing male fem. and gall fl. *Wight Ic.* t. 667; *Miq. Ann.* iii. 297; *Brand. For. Fl.* 422, t. 49; *Kurz For. Fl.* ii. 458; *Bedd. For. Man.* 224; *Wall. Cat.* 4511 A. *F. chittagonga*, *Miq. Ann.* l. c. 294; *Kurz l. c.* 596. *F. racemosa*, *Wall. Cat.* 4549. *F. mollis*, *Miq. Ann.* l. c. 283, 296. *F. Goolereea*, *Roxb. Fl. Ind.* iii. 538. *Covellia glomerata*, *Miq. in L. J. B.* vii. 465; *Dalz. & Gibs. Bomb. Fl.* 243. *C. mollis*, *Miq. in L. J. B. l. c.* 466; *Flor.* 326.

OUTER HIMALAYA and plains and low hills of INDIA, from Rajpootana and the Salt Range to the Khasia Mts., Burma, the Deccan Peninsula and CEYLON.

A tree, shoots glabrous or pubescent. *Leaves* 4-7 in., tapering to the point, entire, base obtuse, rarely acute, 3-nerved; petiole 1-2 in.; stipules $\frac{1}{2}$ -1 in., ovate-lanceolate, pubescent. *Recept*s $1\frac{1}{4}$ in. diam., reddish, umbilicus depressed, base of young much contracted; basal bracts 3. *Male fl.* near the mouth of the recept; sepals 3-4, inflated. *Gall* and *fem. fl.* intermixed, perianth toothed; gall ovary ovoid, rough. *Achene* granulate, stigma clavate.—Three forms are definable: *F. chittagonga*; shoots leaves beneath and pyriform recepts pubescent, leaves ovate-oblong or lanceolate.—*F. Goolereea*, *Roxb.*; leaves of the type, recepts densely white-pubescent.—*F. mollis*; leaves softly pubescent above and beneath (Java).—*VAR. elongata*; leaves 7 in. oblong acute (Burma, Chittagong). Only distinguished from *F. lanceolata* by the recepts, which are not ridged and warted.

111. **F. Clarkei**, *King*; leaves glabrous unequal-sided oblong or narrow-oblong entire or 1-2-toothed near the cuspidate tip, nerves 6-8 pairs, recepts in short cauline and rameal scaly panicles peduncled pyriform smooth red.

KHASIA HILLS; alt. 5000 ft., *Clarke*.

A tall tree, bark whitish, shoots hispidly scabrid. *Leaves* 6-10 in., obscurely granulate beneath, base cuneate, 3-nerved; nerves spreading, prominent beneath; petiole $\frac{1}{2}$ in.; stipules as long, lanceolate, convolute. *Recept*s 1 in. diam., red, base contracted into a long stipes, with 3 basal ovate-lanceolate bracts; peduncle $\frac{1}{2}$ in., puberulous. *Male fl.* at the apex of the receptacle; sepals 3, large, loose; stamens 2-3, filaments short, anthers ovate apiculate. *Gall perianth* with 3 linear-lanceolate teeth; ovary ovoid, slightly tubercled; stigma cylindric. *Fem. fl.* not seen.

112. **F. lanceolata**, *Ham. in Roxb. Fl. Ind.* iii. 557; leaves membranous narrow-lanceolate entire or remotely serrate granulate beneath, nerves 6-8 pairs, recepts in cauline and rameal clusters of 6-8 peduncled pyriform glabrous with white warts, top depressed. *Wight Ic.* t. 645; *Miq. Ann.* iii. 297; *Kurz For. Fl.* ii. 457; *Wall. Cat.* 4512. *Covellia lanceolata*, *Miq. in L. J. B.* vii. 465.

KHASIA HILLS, *Mann.* CHITTAGONG, *Lister, Gamble.* BURMA, *Kurz.*

A much-branched glabrous shrub. *Leaves* 4-8 in., base 3-nerved; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in.; stipules $\frac{1}{2}$ in., lanceolate. *Recept*s $1-1\frac{1}{4}$ in. diam., (ripe) russet-brown with white warts, young turbinate, top concave, base slightly constricted; basal bracts 3, minute, ovate, acute. *Male sepals* 3-4, large, inflated. *Gall* and *fem. perianth* 3-toothed; gall ovary ovoid, smooth; style short, subterminal, stigma dilated. *Achene* obliquely ovoid, granulate; style elongate, lateral, stigma clavate.—Related to *F. glomerata* & *Roxburghii*.

UNDETERMINABLE AND EXCLUDED SPECIES.

F. ABBREVIATA, *Wall. Cat.* 4573, from Singapore, is not determinable.

F. BIGLANDULOSA, *Wall. Cat.* 4480, is a Chinese species.

F. ALTERNANS, *Wall. Cat.* 4555. Siam? (*Herb. Finlayson*.) There is no specimen answering to this number in *Herb. Wallich*.

- F. APERTA, *Wall. Cat.* 4552, is a solitary leaf, from Siam.
 F. CALONEURA, *Kurz For. Fl.* ii. 448, from Burma, without locality. The leaf resembles that of an Euphorbiaceous plant, the fruit is unknown.
 F. CINERASCENS, *Wall. Cat.* 4535, from Burma, is not identifiable.
 F. CONGESTA, *Roxb. Fl. Ind.* iii. 559 (from Amboyna) and *Wall. Cat.* 4510, is not recognizable.
 F. CUNEATA, *Wall. Cat.* 4534, is an *Erythroxylon*.
 F. ? GRACILIS, *Wall. Cat.* 4572, is not a *Ficus*.
 F. GRISEA, *Wall. Cat.* 4544, from Burma, consists of leaves only.
 F. HAPALOPHYLLA, *Kurz For. Fl.* ii. 461, from Chittagong and the Khasia Hills, is not identifiable.
 F. INCISA, *Wall. Cat.* 4490, from Ava, consists of leaves only.
 F. INCLINATA, *Ham. in Wall. Cat.* 4486 B! from Silhet. There is no specimen in Herb. Wall. answering to this number and letter.
 F. MACROPODA, *Kurz For. Fl.* ii. 459, from South Andaman Islands, is probably *F. copiosa*, Steud.
 F. NUDA, *Kurz For. Fl.* ii. 445 (not Miquel), is probably *F. rhododendrifolia*.
 F. PUBIGERA, *Kurz For. Fl.* ii. 450 (not of Wallich and Brandis), from Martaban, alt. 4000 ft., is undeterminable. Kurz has left no specimen in Herb. Calcutt.
 F. ? PULCHRA, *Wall. Cat.* 4571, from Singapore, is not a *Ficus*.
 F. RAMEA, *Wall. Cat.* 4556, from Mauritius, is *F. rubra*.
 F. ROTUNDIFOLIA, *Roxb. Fl. Ind.* iii. 555, from N. Bengal, is undeterminable.
 F. SUBREPANDA, *Wall. Cat.* 4568 B? from Silhet, is not identifiable.
 F. URTICIFOLIA, *Roxb. Fl. Ind.* iii. 533, from N. Bengal, is undeterminable.
 F. VESTITA, *Wall. Cat.* 4500, from Nilghiris. There is no specimen answering to this number in Herb. Wallich.
 PIPER CLYPEATUM, *Wall. Cat.* 6655, referred to in this volume, p. 96, as a species of *Ficus*, is not so; but what it is (if not a *Piper*) I cannot tell.—J. D. H.

18. ANTIARIS, Leschen.

Evergreen trees. *Leaves* alternate, bifarious, penninerved, entire or serrate; stipules small, lateral and connate and intrapetiolar, caducous. *Flowers* monœcious, males crowded on the surface of an axillary unisexual fleshy shortly peduncled receptacle surrounded by imbricate bracts; fem. solitary in a pyriform involucre of many bracts. MALE FL. *Sepals* 4, rarely 3, spatulate, imbricate. *Stamens* 3–8, short, erect, included. *Pistillode* 0. FEM. FL. *Perianth* 0. *Ovary* adnate to the involucre; style 2-partite, arms subulate recurved; ovule pendulous. *Fruit* fleshy, pericarp confluent with the involucre. *Seed* exalbuminous, testa hard; embryo subglobose, cotyledons equal fleshy, radicle small superior.—Species 5–6 ? Indian, Malayan and Australian.

A. toxicaria, Leschen. in *Ann. Mus. Paris* xvi. 478, t. 22; leaves oblong or elliptic-oblong acuminate and mucronate entire or serrulate scabrous glabrous or tomentose beneath, male receptacles 3–4 together rounded concave tomentose. *Kurz For. Fl.* ii. 462; *Gamble Man. Ind. Timb.* 332; *Blume Rumph.* i. 56, t. 22, 23; *Hook. Comp. Bot. Mag.* i. 11, t. 17; *Benn. Pl. Jav. Rar.* 52, t. 13; *Trecul in Ann. Sc. Nat. Ser.* 3, viii. (1847) 143, t. 6; *Miq. Fl. Ind. Bat.* i. ii. 291; *Wall. Cat.* 7494. *A. innoxia*, *Blume l. c.* 172, t. 54; *Thwaites Enum.* 263; *Brandis For. Fl.* 427; *Miq. l. c.* 292. *A. saccidora*, *Dalz. in Hook. Kew Journ. Bot.* iii. (1851) 232; *Dalz. & Gibs. Bomb. Fl.* 244; *Wight Ic.* t. 1958; *Bedd. Fl. Sylvat.* t. 307. *A. dubia*, *Spanog. in Linnaea* xv. 343. *Lepurandra saccidora*, *Nimmo in Grah. Cat. Bomb. Pl.* 193.

The DECCAN PENINSULA, on the Ghats, from the Concan southwards. PEGU to MARTABAN, *Kurz*. CEYLON; in the drier parts of the island.—DISTRIB. Malay Islands.

A majestic tree, attaining 250 ft.; branchlets glabrous, pubescent or pruinose, young villously hirsute. *Leaves* 4–8 in., glossy, base rounded or cordate; young lanceolate, serrulate, hirsute; petiole very short. *Male receptacles* orbicular and peduncles velvety, $\frac{1}{2}$ in. diam. *Fruit* like a small fig, purple, scarlet or crimson, pyriform, velvety, intensely bitter, tipped with a few bracts.—*Kurz* was the first to unite the western *A. saccidora* with the eastern *toxicaria*. The N. Australian *A. macrophylla*, Br., may be the same, for *A. toxicaria* is found as far eastward as Timor. According to Dalzell, the leaves on the shoots are very different from the old, being densely hirsute, elliptic-lanceolate, caudate acuminate, and serrulate; similar but much larger leaves, 6–10 by 2–3½ in., occur in Malayan specimens named *A. rufa*, Miquel, from Batsam and Suembu Pula (Hort. Bogor. No. 7311, 7302). Low sends from Perak as the Ipo (*A. toxicaria*) a species with oblong acute entire leaves 3–6 by 1½–3 in., which are scabrid above and hirsutely tomentose beneath; and Pierre has the same as *A. innoxia*, Blume, from Cochin China.

19. **CUDRANIA**, *Trecul*.

Shrubs or small trees, usually spinous, erect or scandent. *Leaves* alternate, quite entire, penninerved; stipules lateral, small. *Flowers* dioecious in small naked globose heads, bracteolate. MALE FL. *Sepals* 3–5, oblong, obtuse, adnate to 2–4 bracts, imbricate. *Stamens* 4, erect, more or less adnate to the sepals. *Pistillode* subulate or 0. FEM. FL. *Sepals* broader than in the male, embracing the ovary. *Ovary* straight; style terminal, simple or 2-partite, arms stout or slender; ovule pendulous. *Achenes* enclosed in the enlarged fleshy bracts and perianth forming a globose fleshy head, ovoid, compressed, crustaceous. *Testu* membranous, albumen scanty; cotyledons twisted and folded, equal or unequal, embracing the slender upcurved radicle.—Species 3 or 4? Asiatic, Australian and New Caledonian.

Habit and foliage of *Plecosperrum*.

1. **C. javanensis**, *Trecul* in *Ann. Sc. Nat. Ser. iii. viii.* (1847) 123; branchlets pubescent, spines straight or recurved, leaves 1–3 in. oblong or obovate to oblanceolate obtuse acute or acuminate glabrous, nerves slender 8–10 pairs, style 2-fid short. *Brand. For. Fl.* 425; *Benth. Fl. Austral.* vi. 179. *C. amboinensis*, *Kurz For. Fl.* ii. 434. *Cudranus Rumphii*, *Thwaites Enum.* 262; *Bedd. For. Man.* 220, t. 27, f. 1. *C. amboinensis*, *Miq. Fl. Ind. Bat.* i. ii. 290. *Maclura amboinensis*, *javanica* & *timorensis*, *Blume Mus. Bot.* ii. 83, 84, t. 31. *M. javanica*, *Miq. l. c.* 280. *Trophis spinosa*, *Blume Bijdr.* 489; *Willd. Sp. Pl.* iv. 734 (*in part*). *Plecosperrum cuneifolium*, *Thwaites in Hook. Kew Journ.* vi. (1854) 303; *Wall. Cat.* 4641 B, D. *Batis fruticosa*, *Roxb. ? Wall. Cat.* 4643 B. *Morus Cudranus*, *Herb. Ham.*—*Cudranus*, *Rumph. Amb.* v. 22, t. 15, 16.

TROPICAL HIMALAYA, from Garwhal eastwards to the KHASIA HILLS. BURMA, CHITTAGONG, PEBAK and MALACCA. CEYLON, common in the drier parts of the island.—DISTRIB. E. Africa, Malay Islands, Australia.

A straggling or subscandent shrub, or small tree with drooping branchlets. *Leaves* reticulate, base obtuse; petiole $\frac{1}{4}$ in. or less. *Flower-heads* solitary or binate, shortly peduncled, pubescent; males $\frac{1}{4}$ in. diam.; fem. smaller at base, $\frac{3}{4}$ in. diam. in fruit. *Sepals* of male 3–5, cuneate, unequal, hairy. *Fem. fl.* more or less incurved; sepals 4, tips thickened, velvety. *Fruit* 2–3 in. diam., glaucous green, velvety.—Wight's *C. javanensis* (Ic. t. 1960), founded on the *Morus scandens*, Hort. Calc. from China, differs in the obovoid or subclavate fem. heads and very long style-arms.

2. **C. fruticosa**, *Wight ex Kurz For. Fl.* ii. 434; branchlets glabrous, spines curved, leaves 4-6 in. oblong or elliptic subcaudate-acuminate glabrous, nerves 3-4 pairs very strong beneath, styles slender deeply 2-fid. *Batis fruticosa*, *Roxb. ? Wall. Cat.* 4643 A.

KHASIA HILLS, alt. 4000 ft., *J. D. H. & T. T.* CHITTAGONG, AWA and UPPER TENASSERIM, *Kurz.*

A large scandent shrub. *Leaves* membranous, base rounded, laxly reticulate; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., glabrous. *Flower-heads* globose, the size of a pea, puberulous; females in pairs on stout puberulous peduncles $\frac{1}{2}$ - $\frac{3}{4}$ in. long. *Fruit* the size of a cherry, glaucous green, velvety. *Achenes* the size of a large pea, ovoid, protruding from the fleshy perianths.—This description is taken from Kurz, who gives Wight as the authority for the specific name, which I do not find elsewhere published.

3. **C. pubescens**, *Trecul in Ann. Sc. Nat. Ser.* iii. viii. (1847) 123; branchlets pubescent, spines straight, leaves 4-6 in. ovate or ovate-lanceolate cuspidately acuminate puberulous above softly pubescent beneath, nerves very strong beneath, style simple slender. *Kurz For. Fl.* ii. 435; *Miq. Fl. Ind. Bat.* i. ii. 290.

PEGU and MARTABAN, ascending to 3000 ft., *Kurz.*—DISTRIB. Java.

An evergreen woody climber; stem lenticellate. *Leaves* membranous, base rounded; petiole $\frac{1}{2}$ in. *Flower-heads* globose in pairs; peduncles long, slender, puberulous. *Fruit* the size of a large cherry, fleshy, compact, velvety, wrinkled, glaucous green. (Descr. from Kurz.)

20. **ARTOCARPUS**, *Forst.* (by G. King).

Evergreen trees. *Leaves* often very large, alternate, coriaceous, entire or pinnately lobed, penninerved; stipules various. *Flowers* monœcious, densely crowded on globose or oblong unisexual solitary axillary (rarely terminal) receptacles, often mixed with peltate bracts. *MALE FL. Perianth* 2-4-lobed or -partite; lobes obtuse, concave, valvate or slightly imbricate. *Stamen* 1, erect. *Pistillode* 0. *FEM. FL. Perianths* tubular, connate and confluent below with the receptacle, mouth minute. *Ovary* straight; style central or lateral, stigma entire, rarely 2-3-fid; ovule pendulous. *Fruit* a large fleshy oblong cylindric globose or lobed receptacle, clothed with the greatly enlarged fleshy perianths and carpels (*anthocarps*) which have hardened spinous or truncate or pyramidal or plane tips. *Achenes* deeply sunk in the fleshy mass. *Seed* exalbuminous; embryo straight or incurved, cotyledons fleshy equal or unequal, radicle very short, superior.—Species about 40, Tropical Asiatic and Pacific.

The following descriptions are mainly taken from Dr. King's monograph of the Indian species to be published in the Annals of the Calcutta Botanical Gardens.

A. incisa, Linn. f., the bread-fruit tree (*Roxb. Fl. Ind.* iii. 527; *Bot. Mag.* t. 2869-2871), a native of the Pacific Islands, with pinnatifid leaves, is occasionally cultivated in the hottest parts of India.

SECT. I. *Fruit* spinous or tubercled (tips of the anthocarps ending in a sharp spine or tubercle).

* Fruit spinous.

† *Fruit* globose or subglobose.

1. **A. Forbesii**, *King in Ann. Bot. Gard. Calc. ined.*; leaves elliptic-

oblong or -obovate glabrous shining, fruit subglobose lobed nearly glabrous, spines conical shining.

PERAK, *King's Collector*.—DISTRIB. Sumatra.

A glabrous tree, attaining 60 ft.; branches glabrous. *Leaves* 3–5½ in., obtuse or cuspidate, base narrow; nerves 5–6 pairs; petiole 1½–2 in. *Fruit* 4–8 in. diam., irregularly lobed; spines ½ in. and less, stout, spreading, recurved, glabrous, perforate.

2. ***A. bracteatus***, *King in Ann. Bot. Gard. Calc. ined.*; leaves obovate or elliptic-obovate tip rounded puberulous or glabrous above softly or subhispidly puberulous beneath, fruit globose bracteate at the base, spines straight slender terete smooth. *A. rufescens*, *Kurz For. Fl. ii. 431 (not of Miquel)*.

MALACCA, *Griffith (Kew Distrib. 4663)*, *Maingay (K. D. 1476)*.

A tree; branchlets stout, annulate, fulvous-pubescent. *Leaves* 6–8 in., reticulate; nerves 10 pairs; petiole 1 in., puberulous; stipules ovate, acute, silky. *Fruit* peduncled, basal bracts 3–4.—“This is the *A. rufescens* of Kurz, but not of Miquel (*Fl. Ind. Bat. Suppl. 420*), which that author has subsequently (*Ann. Mus. Lugd. Bat. iii. 211*) reduced to *A. Tampang*, which is a variety of *A. Lakoocha*, Roxb.” (*G. King*).

3. ***A. calophylla***, *Kurz For. Fl. ii. 431*; leaves broadly ovate or oblong scaberulous above tomentose or pubescent beneath base rounded or subcordate, fruit globose ebracteate, spines straight terete hispid. *King in Ann. Bot. Gard. Calc. ined.*

UPPER TENASSERIM, *Falconer, Kurz*.

A medium-sized tree, shoots deeply striate and rugose. *Leaves* 4–6 in., acute, mucronate, base not narrowed; nerves 9–11 pairs; petiole ¾ in. or less; stipules ovate-lanceolate, tomentose. *Fruit* 4–5 in. diam.; peduncle ½–¾ in., tawny-tomentose; spines ½ in., perforate. *Seeds* ½ in., oblong or ovoid.—Fruit of *A. echinata*, but leaves very different. King throws doubt on the fruit (collected by Kurz) and the leaves (by Falconer) belonging to the same species.

4. ***A. rigida***, *Blume Bijl. 482*; leaves oblong or oblong-obovate obtuse mature glabrous above tomentose hispidulous or glabrate beneath with pubescent nerves base narrowed, fruit globose ebracteate, spines straight narrowly conical angled scabrid or hispid. *Kurz For. Fl. ii. 431*; *Trecul in Ann. Sc. Nat. Ser. 3, viii. 114*; *Miq. Fl. Ind. Bat. i. ii. 286*; *King in Ann. Bot. Gard. Calc. ined.* *A. echinata*, *Roxb. Fl. Ind. iii. 527*; *Trecul l. c. 113*; *Wight Ic. t. 680*; *Miquel l. c.*; *Wall. Cat. 4658 (in part)*. *A. cuspidata*, *Griff. Notul. iv. 400*.

BURMA, *Helper (Kew Distrib. 4669)*. PERAK, *King's Collector, Scortechini*. PENANG, *Roxburgh*. MALACCA, *Griffith (K. D. 4664)*, *Maingay (K. D. 1474)*.—DISTRIB. Malay Islands.

A tree, 50–80 ft.; shoots strigose. *Leaves* 4–7 in., hard, obtuse or subacute, base rounded or acute, above at first scaberulous; nerves 10–12 pairs; petiole 1 in.; stipules lanceolate, strigose. *Male receptacle* 1 in. diam., globose; peduncle hispid; sepals 2, ovate, obtuse, hispid; bracteoles with flat ciliate tips. *Fruit* about ¾ in. diam., spines ¼ in. *Seeds* ½ in., ovoid or oblong.

†† *Fruit oblong or ovoid.*

5. ***A. Kunstleri***, *King in Ann. Bot. Gard. Calc. ined.*; leaves very large ovate-oblong narrowed at both ends young coarsely serrate appressed hairy beneath, fruit oblong, spines strongly reflexed hispidly tomentose.

PERAK, *King's Collector*. MALACCA, *Maingay* (*Kew Distrib.* 1484).

A tree, 40–60 ft.; branchlets annulate, fulvous-tomentose. *Leaves* 9 in. to 3 ft. by 6–15 in., minutely strigose above; nerves 10–12 pairs; petiole $1\frac{1}{2}$ –3 in.; stipules 4–7 in., sheathing the buds, ovate-lanceolate, fulvous-tomentose. *Male heads* cylindric, 4–5 in., pubescent, cream-cold.; peduncle (of both sexes) 2–3 in.; sepals 2, ovate, concave, hispid. *Fruit* 4–7 in., yellow; bracteoles 0.

6. **A. hirsuta**, *Lamk. Encycl.* iii. 201; leaves broadly ovate elliptic or obovate subacute glabrous except the hispidulous strong nerves beneath, fruit ovoid, spines straight cylindric hispid. *Roxb. Fl. Ind.* iii. 521; *Brandis For. Fl.* 426; *Bedd. Fl. Sylvat.* t. 308; *Grah. Cat. Bomb. Pl.* 193; *Gamble Man. Ind. Timb.* 331; *Dalz. & Gibs. Bomb. Fl.* 244; *Wight Ic.* t. 1957. *A. pubescens*, *Willd. Sp. Pl.* iv. 189; *Trecul in Ann. Sc. Nat. Ser.* 3, viii. 122; *Wall. Cat.* 4656; *King in Ann. Bot. Gard. Calc. ined.*—*Rheede Hort. Mal.* iii. t. 32.

DECCAN PENINSULA; from the Concan southwards, ascending to 4000 ft.

A lofty tree; branchlets, stipules, petioles, midribs and peduncles strigose. *Leaves* 6–9 in., entire, base slightly narrowed; nerves 7–11 pairs; petiole $\frac{3}{4}$ –1 in.; stipules about as long, lanceolate. *Male heads* pendulous, 4–6 in., slender, narrowly cylindric; sepals 2, united below; bracteoles chaffy. *Fruit* erect, size of a lemon; spines $\frac{1}{4}$ in., perforate. *Seeds* $\frac{1}{2}$ – $\frac{3}{4}$ in., ovoid.

** Fruit tubercled, i. e. with flattish rarely acute tips of the anthocarps.

† *Fruit oblong or cylindric.*

7. **A. integrifolia**, *Linn. f. Suppl.* 412; leaves elliptic-oblong or obovate acuminate entire or 3-lobed base acute rather rough beneath, stipules large spathaceous lanceolate, fruit large oblong or clavate, anthocarps pyramidal. *Trecul in Ann. Sc. Nat. Ser.* 3, viii. 115; *Roxb. Cor. Pl.* t. 250, and *Fl. Ind.* iii. 522; *Griff. Notul.* iv. 402; *Brand. For. Fl.* 425; *Kurz For. Fl.* ii. 432; *Dalz. & Gibs. Bomb. Fl.* 244; *Bedd. For. Man.* 219; *Wight Ic.* t. 678; *Gamble Man. Ind. Timb.* 329; *Wall. Cat.* 4654; *King in Ann. Bot. Gard. Calc. ined.*; *Miq. Fl. Ind. Bat.* i. ii. 287; *Bot. Mag.* t. 2833, 4. *Sitodium cauliflorum*, *Gartn. Fruct.* i. 345, t. 71, 72. —*Rheede Hort. Mal.* iii. t. 26–28. *Polyphema Jaca*, *Lour. Fl. Coch.* 547.

DECCAN PENINSULA, native of the forests of the Western Ghats, *Beddome*. Cultivated throughout the hotter parts of India and Eastern Asia.

A large evergreen tree, attaining 60 ft.; shoots and nearly all parts glabrous. *Leaves* 4–8 in., thickly coriaceous, dark green, those of young plants often lobed; nerves 7–8 pairs; petiole $\frac{1}{2}$ –1 in., rather slender; stipules glabrous. *Flower-heads* embraced by spathaceous deciduous stipular sheaths, axillary and terminal, often 2-nate; peduncles $\frac{3}{4}$ in., at first slender; male cylindric, 2–6 in. by 1–2 in. diam.; bracteoles 0; sepals 2, oblong or spatulate, tips pubescent. *Fruit* 1–2½ ft. long. *Seeds* size of a nutmeg, oblong or reniform, testa coriaceous.—The discovery of this plant in a wild state by *Beddome* is a very interesting one.—The *Jack fruit*.

8. **A. peduncularis**, *Kurz in Trimen Journ. Bot.* iv. (1875) 331; leaves ovate or ovate-oblong obtuse base rounded, fruit erect entire or lobed cylindric, anthocarps pyramidal subacute smooth. *King in Ann. Bot. Gard. Calc. ined.*

PERAK, *King's Collector*. NICOBAR ISLANDS, *Kurz*.

A tree, 40–50 ft.; branchlets annular, puberulous. *Leaves* 5–7 in., glabrous on both surfaces; nerves 6–7 pairs; petiole $1\frac{1}{2}$ –2 in.; stipules as long, linear-lanceolate,

appressed pubescent. *Flower-heads* of both sexes erect, cylindric; peduncles $2\frac{1}{2}$ – $3\frac{1}{2}$ in.; male $2\frac{1}{2}$ in. long, very slender, ebracteolate; sepals 2, oblong, obtuse, hairy. *Fruit* immature, $2-2\frac{1}{2}$ by 1 in. diam.; anthocarps 4–5-angled. *Seeds* few, $\frac{1}{2}$ in. long.

9. **A. Lowii**, *King in Ann. Bot. Gard. Calc. ined.*; leaves oblong-lanceolate acute glabrous or puberulous base narrow, stipules very long, young fruit cylindric-oblong, anthocarps pyramidal obtuse or subacute smooth.

PERAK, *King's Collector*.

A tree, 50–70 ft.; branchlets, petioles and peduncles sparsely hairy. *Leaves* 9–11 in., thinly coriaceous, minutely reticulate beneath; nerves 10–11 pairs; petiole $1\frac{1}{4}$ in.; stipules $2\frac{1}{2}$ –3 in., narrowly lanceolate, puberulous. *Male heads* $\frac{1}{2}$ – $\frac{3}{4}$ in., slender, erect; bracteoles ligulate; sepals 2, ovate, truncate, hirsute. *Fruit* immature, 2–3 in., erect, oblong, glabrous; anthocarps 4–5-angled.

10. **A. Polyphema**, *Persoon. Syn. ii. 531*; leaves ovate-oblong or subobovate cuspidate strigose beneath, stipules large, fruit cylindric-oblong, anthocarps low pyramidal puberulous. *Blume Bijdr. ii. 481*; *Trecul in Ann. Sc. Nat. Ser. 3, viii. 115*; *Miquel Fl. Ind. Bat. i. ii. 286*; *Wall. Cat. 4659*; *King in Ann. Bot. Gard. Calc. ined.* *Polyphema* Champeden, *Lour. Fl. Coch. 547*.

PENANG, *Wallich, King's Collector*. MALACCA, *Griffith (Kew Distrib. 4667)*, *Maingay (K. D. 1473)*.—DISTRIB. Malay Islands, Coch. China.

A tree, 20–25 ft. in Perang; shoots, petioles, peduncles, stipules and leaf-nerves beneath strigose. *Leaves* $3\frac{1}{2}$ –8 in., opaque above with pubescent nerves, shining beneath, young densely clothed with tawny bristles; nerves 5–9 pairs; petiole $\frac{1}{2}$ in.; stipules $1-1\frac{1}{2}$ in., lanceolate, convolute. *Flower-heads* erect, cylindric; males $1-1\frac{3}{4}$ in., ebracteolate; peduncle as long, slender; sepals 2, thick, oblong, truncate, pubescent. *Fruit* 2 in. by 1 in. diam., cylindric, not lobed.

11. **A. Maingayi**, *King in Ann. Bot. Gard. Calc. ined.*; leaves elliptic-obovate obtuse base narrowed scaberulous above appressed-pubescent beneath, petiole slender, stipules small, fruit obovoid-cylindric surface tessellate, anthocarps broad truncate.

PERAK, *Scortechini, King's Collector*. MALACCA, *Maingay (Kew Distrib. 1481)*.

A tree, 20–40 ft.; branchlets slender, striate and annulate, scaberulous. *Leaves* $2\frac{1}{2}$ –4 in., rigid, reticulate beneath, base narrowed; nerves 8–9 pairs; petiole $\frac{1}{2}$ in., pubescent; stipules $\frac{1}{2}$ in., lanceolate, silky. *Male heads* $1\frac{1}{2}$ –2 in., cylindric, slender, rugulose; peduncle $\frac{1}{2}$ in., pubescent; bracteoles 0; sepals 2, flat, square. *Fruit* 1 in. long; anthocarps flat, scaberulous.—*King* remarks that this differs from the description of *Miquel's A. Dadah* in the leaves narrowed at the base (not rounded) and the nerves meeting the midrib at a different angle.

12. **A. Scortechinii**, *King in Ann. Bot. Gard. Calc. ined.*; leaves ovate-oblong obtuse base narrowed softly pubescent beneath, stipules large, fruit cylindric, anthocarps truncate scaberulous.

PERAK, *King's Collector, Scortechini*.

A tall tree, 60–80 ft.; branchlets annulate, warted, puberulous. *Leaves* 8–16 in., rigid, puberulous above, especially on the nerves; nerves 14–16 pairs, appressedly pubescent; petiole $1\frac{1}{2}$ in., puberulous; stipules 2–3 in., ovate-lanceolate, silky, margins recurved. *Fruit* long peduncled, immature, $2\frac{1}{2}$ in. by $1\frac{1}{2}$ in. diam.—*Foliage of A. Kunstleri, King*.

13. **A. nobilis**, *Thwaites Enum. 262*; leaves large broadly ovate cuspidate coarsely crenate glabrescent base obtuse narrowed or rounded,

stipules very large, fruit oblong transversely constricted, anthocarps broad pyramidal truncate. *Bedd. Fl. Sylvat.* t. 309; *Gamble Man. Ind. Timb.* 331. *A. pubescens*, *Moon Cat.* 61.

CEYLON; in the central and southern districts, ascending to 2000 ft.

A large tree, 40–50 ft.; branchlets, peduncles, petioles, stipules and nerves beneath hispidly scabrid. *Leaves* 6–14 in., more or less scaberulous on both surfaces, on young plants pinnatifid; nerves about 9 pairs; petiole $\frac{3}{4}$ –1½ in., stout; stipules 3–5 in., spatheous. *Flower-heads* erect, oblong; peduncles 3 in., stout; bracteoles in both sexes hairy, peltate; male 3–6 in. by $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; sepals 2, broad, truncate. *Fruit* 6–8 in. by 3½–4 in. diam.; anthocarps 4–5 angled. *Seeds* $\frac{1}{2}$ in. diam., subglobose.

†† *Fruit globose.*

14. ***A. lanceæfolia***, *Roxb. Fl. Ind.* iii. 527; leaves ovate-lanceolate or elliptic-oblong obtusely cuspidate glabrous on both surfaces, stipules small, fruit globose, anthocarps truncate pubescent. *Wight Ic.* t. 679; *Trecul in Ann. Sc. Nat. Ser.* 3, viii. 122; *Miq. Fl. Ind. Bat.* i. ii. 209; *King in Ann. Bot. Gard. Calc. ined.*

PENANG, *Roxburgh.* PERAK, *King's Collector.* MALACCA, *Maingay (Kew Distrib.* 1478).

A tree, 60–80 ft., glabrous except the flower-heads, fruit and stipules; shoots annulate. *Leaves* 9–14 in., base narrowed; nerves 8–10 pairs; petiole $\frac{1}{2}$ –1 in.; stipules $\frac{1}{2}$ – $\frac{3}{4}$ in., ovate-lanceolate, appressed hairy. *Flower-heads* on peduncles, 2–3 in.; male obovoid-cylindric, $\frac{3}{4}$ –1 in. by $\frac{1}{2}$ in. diam.; sepals 2, narrow, entire or 2-fid; bracteoles almost funnel-shaped, entire or lobed, ciliate. *Fruit* about 3 in. diam., pubescent.

15. ***A. Chaplasha***, *Roxb. Fl. Ind.* iii. 525; leaves obovate rounded or oblong tip broad rounded or cuspidate entire serrate or lobulate base narrow obtuse or subcordate scabrid on both surfaces, stipules large, fruit globose, anthocarps hispidulous. *Trecul in Ann. Sc. Nat. Ser.* 3, viii. 112; *Wight Ic.* t. 682; *Brandis For. Fl.* 426; *Kurz For. Fl.* ii. 432; *Gamble Man. Ind. Timb.* 331; *Wall. Cat.* 4657; *King in Ann. Bot. Gard. Calc. ined.*

Transgangetic India, from BENGAL, SIKKIM and ASSAM, to TENASSERIM and the ANDAMAN ISLANDS.

A lofty deciduous tree, attaining 150 ft.; shoots rough. *Leaves* 7–12 in., on young shoots 1–2 ft. and often pinnatifid, thinly coriaceous; nerves 8–10 pairs, appressed hairy or hispid; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., stout, hispid; stipules 1½ in., spatheous, strigose. *Flower-heads* globose, long-peduncled, males size of a nutmeg; bracteoles peltate, pubescent; sepals 2, narrow, 2-fid. *Fruit* 3–4 in. diam., nodding, globose, not lobed. *Seeds* $\frac{1}{2}$ in., oblong.

SECT. II. *Fruit smooth* (tips of the anthocarps truncate and flat).

16. ***A. Lakoocha***, *Roxb. Fl. Ind.* iii. 524; leaves oblong elliptic or subovate cuspidate softly pubescent beneath base usually rounded, stipules small, fruit globose sublobed smooth or wrinkled glabrous. *Trecul in Ann. Sc. Nat. Ser.* 3, viii. 117; *Thwaites Enum.* 262 (*excl. var. B.*); *Wight Ic.* t. 681; *Brandis For. Fl.* 426; *Kurz For. Fl.* ii. 433; *Dalz. & Gibs. Bomb. Fl.* 244; *Bedd. For. Man.* 219; *Gamble Man. Ind. Timb.* 330; *Wall. Cat.* 4665; *King in Ann. Bot. Gard. Calc. ined.* *A. mollis*, *Wall. Cat.* 4661.

TROPICAL HIMALAYA, ascending to 4000 ft., from Kumaon eastwards to BURMA, and southwards to TRAVANCORE and MALACCA.

A large deciduous tree, attaining 60 ft.; branchlets softly tomentose or villous. *Leaves* 4–12 in., thinly coriaceous, above glabrous or puberulous, reticulate beneath, young sometimes serrate; nerves 8–12 pairs; petiole $\frac{1}{2}$ –1 in., pubescent, at length glabrous; stipules $\frac{1}{2}$ in., lanceolate, pubescent. *Flower-heads* shortly peduncled, pubescent; male $\frac{1}{2}$ –1 in. diam., oblong or globose, pubescent; bracteoles clavate, puberulous. *Fruit* 2–3 in. diam. *Seeds* oblong.

VAR. *malayana*, King l. c.; leaves more uniformly elliptic and narrower, peduncles 1 in., male sepals fleshy, fruit $1\frac{1}{2}$ in. diam.—Perak, *King's Collector*.

17. **A. Denisoniana**, King in *Ann. Bot. Gard. Calc. ined.*; leaves elliptic-oblong or -ovate cuspidate base narrowed rarely rounded beneath glaucous or subpuberulous, stipules small glabrous, fruit obovoid not lobed smooth.

PERAK, *King's Collector*.

A tree, attaining 60 ft.; branchlets slender, grey, smooth, glabrous. *Leaves* 5–7 in., glabrous except the nerves and shining above; nerves 7–10 pairs; petiole $\frac{3}{4}$ –1 in., glabrous; stipules ovate-lanceolate. *Flower-heads* shortly peduncled; males in the upper axils $\frac{3}{4}$ –1 $\frac{1}{2}$ in. long, slender; bracteoles stipitate, peltate, ciliate; sepals 4, oblong, truncate, hirsute, sometimes connate below, tips thickened. *Fruit* rugulose, at length smooth; bracteoles sessile, crowded, peltate.—King suggests this being possibly the Sumatran *A. tephrophylla*, Miquel (Fl. Ind. Bat. Suppl. 422), but that is described as having velvety golden stipules; in other respects the descriptions tally very closely.

18. **A. Gomeziana**, Wall. *Cat.* 4660; leaves oblong or ovate-oblong cuspidate glabrous shining above subpruinose beneath base rounded or obtuse, stipules small linear, fruit unevenly globose or ovoid. *Kurz For. Fl.* ii. 433; *King in Ann. Bot. Gard. Calc. med.* *A. rigida*, Wall. *Cat.* 4658 *A. pomiformis*, Teijsm. & Binnend. in *Nat. Tijdsch. Ned. Ind.* xxv. 400.

TENASSERIM; at Tavoy, Wallich. **PERAK**, *King's Collector*. **MALACCA**, Maingay (*Kew Distrib.* 1486). **ANDAMAN ISLANDS**, *King's Collector*.

A medium-sized tree, quite or nearly glabrous, and subpruinose. *Leaves* 6–10 in., reticulate beneath between the 8–12 pairs of very strong nerves; petiole $\frac{1}{2}$ –1 in.; stipules sparingly hairy. *Flower-heads* on short pubescent peduncles, more or less globose or ovoid, or the males cylindric; bracteoles of male broadly peltate, stipitate, puberulous; sepals 2, ovate, puberulous. *Fruit* smooth,

VAR. *Griffithii*, King mss.; smaller in all its parts, leaves $3\frac{1}{2}$ –6 in. oblong or elliptic-oblong, fruit ovoid not shining or pruinose beneath.—Perak, *Scortechini*, *King's Collector*; Malacca, *Griffith* (*Kew Distrib.* 4665), Maingay (*K. D.* 1482); Penang, *Curtis*.

21. **BALANOSTREBLUS**, Kurz.

A small nearly glabrous evergreen tree. *Leaves* alternate, penninerved, spinous-toothed; stipules small, caducous. *Flowers* monœcious, axillary, bracteate; males in cylindric catkin-like spikes, fem. racemose. **MALE FL.** *Sepals* 4, thick, obtuse, subvalvate. *Stamens* 4, erect in bud. *Pistillode* 0. **FEM. FL.** *Perianth* utricular, base connate with the ovary, free above, mouth minute. *Ovary* included, half-superior; style short, bifid, arms short thick villous; ovule pendulous. *Fruit* a globose drupe enclosed in the fleshy perianth.

B. ilicifolia, Kurz in *Journ. As. Soc. Beng.* xlii. 247, t. 19, and *For. Fl.* ii. 465.

CHITTAGONG, Kurz, J. D. H. & T. T. **BHAMO**, J. Anderson. **AVA**, Kurz. **PENANG**, on Praug Island, *King's Collector*.

Branchlets pubescent and rough. *Leaves* 1-3 in., very coriaceous, deep green, elliptic, orbicular, oblong, subrhomboid or lanceolate, tip and teeth spinescent, base acute or obtuse, subequal; nerves few or many pairs, straight, reticulate and anastomosing. *Spikes* $\frac{1}{2}$ in.; male very dense-flid.; bracts rounded, ciliate. *Drupe* red, tubercled and wrinkled, glabrous.

22. CONOCEPHALUS, Blume.

Climbing shrubs often very large. *Leaves* alternate, simple, quite entire, penninerved, and sometimes 3-nerved; stipules connate, intrapetiolar. *Flowers* dioecious, in axillary usually cymose heads. MALE FL. *Perianth* tubular or turbinate 4-lobed or -partite, valvate. *Stamens* 2-4, erect in bud. *Pistillode* small. FEM. FL. *Perianth* oblong or clavate, 4-lobed. *Ovary* included; style undivided, stigma linear oblique or recurved; ovule erect, orthotropous. *Achene* included. *Seed* erect, testa membranous, albumen scanty or 0; embryo straight; cotyledons fleshy or thin, equal, radicle short superior.—Species about 10, Tropical Asiatic and Malayan.

The species of this genus are (all but *C. suaveolens*) very imperfectly described:

1. **C. suaveolens**, *Blume Bijl.* 483; glabrous, leaves elliptic ovate oblong or subobovate obtuse obtusely cuspidate or acuminate, base acute obtuse rounded or cordate glabrous or puberulous on one or both surfaces, male in excessively branched cymes, heads very small, fem. of 3-5 much larger heads, fem. fl. very shortly pedicelled oblong obtusely 4-toothed. *Kurz For. Fl.* ii. 430; *Benn. Pl. Rar. Jav.* 47, t. 12; *Miq. Fl. Ind. Bat.* ii. 430. *C. ovatus*, pubescens, Roxburghii & suaveolens, *Trecul in Ann. Sc. Nat. Ser.* 3, viii. 87-90, t. 2, f. 37-41. *C. naucleiformis*, *Lindl. Bot. Req.* t. 1203. *C. gratus*, *Miq. Pl. Jungh.* i. 43. *Urtica naucleiflora*, *Roxb. Fl. Ind.* iii. 657; *Wight Ic.* t. 684; *Wall. Cat.* 4624; *Griff. Notul.* iv. 385.

Tropical forests of the EASTERN HIMALAYA and the KHASIA Mts., southwards to TENASSERIM and MALACCA.—DISTRIB. Malay Islands, Cambogia.

An immense climber; shoots glabrous or sparsely pubescent. *Leaves* 6-10 by 3-6 in., dotted and streaked with cystoliths; nerves 8-12 pairs, above the very short basal; petiole 2-6 in.; stipules large, rusty-brown, smooth. *Male heads* $\frac{1}{4}$ in. diam., in broad shortly peduncled dichotomous cymes; stamens 3-4. *Fem. heads* 1 in. diam.; bracts rounded, concave, opposite, deciduous.—Flowers sweet-scented, flesh-cold.

2. **C. amœnus**, *King mss.*; quite glabrous, branches very stout, leaves 8-12 by 5-7 in. elliptic or broadly oblong-ovate obtuse shortly 5-7-nerved at the cordate base, nerves 12-15 pairs above the basal, petiole 3-5 in., male cymes with very short thick branches, heads $\frac{1}{2}$ in. diam. pink, flowers sessile tubular angular 4-toothed, stamens 4, fem. heads fewer 1-2 in. diam., pedicels as thick as the little finger, flowers shortly pedicelled shortly 4-lobed. *Urtica superba* & *amœna*, *Wall. Cat.* 4625, 4626.

PENANG, Porter. PERAK, *Scortechini*, *King's Collector*.

3. **C. Scortechinii**, *King mss.*; quite glabrous, branches slender smooth, leaves 3-6 in. shortly petioled elliptic-oblong or -lanceolate and acuminate or subobovate and cuspidate, base acute or rounded, nerves 6-8 pairs basal 0, petiole $\frac{1}{2}$ -1 in., male cymes excessively branched, heads very small and numerous $\frac{1}{4}$ in. diam., perianth 4-lobed (or partite?), stamens 4, filament very broad, fem. cymes sparingly branched, heads

$\frac{1}{2}$ –1 in. diam. shortly stoutly peduncled, flowers shortly pedicelled, perianth obtusely 4-lobed.

PERAK, *Scortechini*, King's Collector. SINGAPORE, Maingay (*Kew Distrib.* 1489).

4. **C. subtrinervius**, *Miq. Fl. Ind. Bat. Suppl.* 417; glabrous, leaves 6–8 in. long-petioled oblanceolate rarely obovate-oblong cuspidate or acuminate finely reticulate beneath, base narrowed 3-nerved rounded acute or cordate, nerves 6–8 pairs above the basal, petiole 2–4 in., heads small in very short axillary and rameal cymes shortly pedicelled, males $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., perianth tubular 4-crenate, stamens 3–4, filaments slender, fem. heads 1 in. diam., flowers shortly pedicelled, perianth subclavate.

PENANG and MALACCA, *Griffith (Kew Distrib.* 4673), *Maingay (K. D.* 1487). PERAK, *Scortechini*, *Kunstler*. SINGAPORE, *Lobb*.

The leaves are of a fine brown colour when dry; the reticulations beneath enclose silvery areoles.

5. **C. sp.?**; quite glabrous, leaves 12 in. long-petioled elliptic-obovate obtuse, base subacute, nerves 10–12 pairs above the short basal very strong beneath, petiole 2–4 in. very stout, fem. heads 2 in. diam. shortly stoutly pedicelled, fem. fl. on pedicels very much longer than the oblong 4-toothed perianth.

MALACCA, *Maingay (Kew Distrib.* 1499).

The leaves resemble those of a Bangka plant ticketed as Akar Kelangis and Telangis (*Teijsm. in Hort. Bot. Bogor.* Nos. 7307, 7297). (There is quite a different plant under this name, also from Hort. Bogor.)

6. **C. sp.?**; quite glabrous, leaves 4–8 in. shortly petioled elliptic obtuse, base rounded, nerves 7–10 pairs above the very short basal, petiole $\frac{1}{2}$ –1 in. stout, male heads in pairs in very shortly peduncled cymes, perianth 4-toothed, stamens 4, fem. heads as in *C. suaveolens*.

MALACCA, *Griffith (Kew Distrib.* 4675). PENANG, *Maingay (K. D.* 1488).

7. **C. sp.?**; quite glabrous, leaves long-petioled 8 by 6 in. broadly ovate cordate subacute, nerves 10–14 pairs above the short basal strong, petiole 3 in., fem. heads $1\frac{1}{2}$ in. diam., fem. fl. on pedicels longer than the narrow perianth which is 4-cleft to the middle. ? *C. azureus*, *Teijsm. & Binnend. in Tijdschr. Nedert. Ind.* (1864) xxvi. 26.

PERAK; Pluss River, Wray.—DISTRIB. ? Sumatra.

DOUBTFUL SPECIES.

C. CONCOLOR, *Dalzell in Dalz. & Gibs. Bomb. Fl.* 239; “leaves 1 ft. 3-nerved perfectly smooth oblong-ovate acute green on both sides, fem. fl. axillary.”—Concan, at the Phoonnda Ghat.

23. **PRAINEA**, *King mss.*

A lofty glabrous climber. *Leaves* alternate, quite entire, penninerved. *Flowers* of both sexes in globose axillary pedicelled heads, mixed with peltate bracts. **MALE FL.** minute. *Perianth* tubular, obtusely 4-toothed. *Stamen* 1, filament short, thick; anther ovoid. *Pistillode* 0. **FEM. FL.** much larger than the male. *Perianth* tubular-clavate, thickened upwards, mouth minute. *Ovary* included, free; style terminal, deeply 2-fid,

included; ovule erect, orthotropous. *Fruit* globose, of many dry abortive flowers and one or few oblong achenes enclosed in their enlarged fleshy perianths. *Embryo* exalbuminous, cotyledons plano-convex, radicle minute superior.

***P. scandens*, King mss.**

PERAK; in dense forests, *King's Collector*.

A climber, 50–100 ft.; stem 12–15 in. diam. *Leaves* 3–8 in., thinly coriaceous, elliptic- or obovate-oblong, quite smooth on both surfaces, yellowish brown when dry, base acute; nerves 10–12 pairs, very slender; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in., very slender. *Male heads* $\frac{1}{2}$ –1 in. diam., peduncle stout, 1–1½ in.; bracts minute, hairy, long-stipitate. *Fem. heads* 1½–2 in. diam.; flowers ½ in. long.—Habit of *Conocephalus*.

24. **HULLETTIA** (KURZIA, p. 479), *King mss.*

Dicæcious shrubs, branchlets tomentose. *Leaves* alternate, quite entire, penninerved; stipules small. *Flowers* 10–12, sunk in cavities of axillary peduncled open funnel-shaped 3–4 lobed receptacles. MALE FL. *Perianths* oblong, tubular, connate below and with the receptacle, tip free, 2-lobed or -toothed. *Stamens* 2, filaments connate in a column; anthers ovoid, erect. *Pistillode* 0. FEM. FL. *Perianth* tubular-clavate, mouth minute. *Ovary* free, clavate; style short, central, included, stigma minute; ovule erect, orthotropous. *Fruiting receptacle* subglobose or lobed, fleshy, 1–6 seeded; pericarp membranous. *Seed* erect, subglobose or flattened; cotyledons subequal, plano-convex, radicle minute included.

Dr. King informs me that the name *Kurzia*, which he originally proposed for this genus, is preoccupied, and that he has replaced it by *Hullettia*, in recognition of Mr. Hullett's valuable contributions to a knowledge of the Singapore Flora.

1. ***H. Griffithiana*, King mss.**; leaves cordate or rounded at the contracted base, peduncles elongate slender. *Dorstenia Griffithiana*, *Kurz in Beng. As. Soc. Journ.*; *For. Fl.* ii. 462.

TENASSERIM; at Mergui, *Griffith* (*Kew Distrib.* 4676), *Helper* (*K. D.* 4676).

An evergreen shrub, branches stout. *Leaves* 8–16 in., cuspidate, coriaceous, margins undulate, shining above, scaberulous beneath; nerves 15–20 pairs, very strong beneath, spreading; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in.; stipules subulate, tomentose. *Peduncles* 1½–2 in., pubescent. *Fruiting receptacles* 1–2 in. diam., velvety; involucre bracts minute, reflexed.

2. ***H. dumosa*, King mss.**; leaves acuminate at the base, peduncles very short stout.

PERAK, *Scortechini*, *King's Collector*.

Habit and general characters of *H. Griffithiana*.

25. **URTICA**, Linn.

Annual or perennial herbs, rarely suffruticose, with stinging hairs. *Leaves* opposite, toothed or lobulate, base 3–7-nerved; stipules lateral, free or connate. *Flowers* mono- or dicæcious, in axillary unisexual or androgynous cymose clusters. MALE FL. *Sepals* 4, ovate, imbricate. *Stamens* 4, inflexed in bud. *Pistillode* cupular. FEM. FL. *Sepals* 4, outer usually much smaller. *Ovary* straight, stigma sessile or subsessile, feathery or penicillate; ovule erect, orthotropous. *Achene* embraced by the sepals, ovoid or oblong, compressed, membranous or thinly crustaceous. *Seed* erect, adherent to the pericarp, albumen scanty, cotyledons rounded.—Species about 30, temperate and subtropical.

U. pilulifera, Linn., the Roman nettle, a common European weed, occurs occasionally near Simla and elsewhere near houses in the hills.

1. ***U. hyperborea***, *Jacquem. mss. in Wedd. Monogr.* 68; *DC. Prodr.* xvi. i. 45; a low tufted undershrub pubescent between the small stinging hairs, leaves subsessile broadly coarsely toothed or ovate-cordate serrate, stipules in opposite intrapetiolar pairs, cymes small androgynous, inner fruiting sepals not armed hispid larger than the achene.

WESTERN TIBET, alt. 12-17,500 ft., *Jacquemont, Falconer, &c.* EASTERN TIBET, north of Sikkim, alt. 16-17,000 ft., *J. D. H.*

Roots stout, woody; *stems* stout, ascending, densely tufted, 6-18 in., woody below. *Leaves* 1-2 in., glandular-puberulous beneath. *Cymes* very short, crowded.

2. ***U. parviflora***, *Roxb. Fl. Ind.* iii. 581; herbaceous, slender, monœcious, glabrous or pubescent, stinging hairs copious stiff, leaves ovate or ovate-cordate or lanceolate acuminate doubly crenate or serrate, stipules connate, cymes slender effuse axillary and forming an erect terminal pyramidal panicle, inner fruiting sepals rounded twice as long as the outer. *Wedd. Monogr.* 85; *DC. Prodr.* xvi. i. 55; *Wight Ic.* t. 690. *U. ardens*, *Link. Enum.* ii. 385. *U. himalayensis*, *Kunth & Bouché in Ann. Sc. Nat. Ser. 3*, vii. 182. *U. virulenta*, *Wall. Cat.* 4586.

TEMPERATE HIMALAYA, alt. 5-12,000 ft., from Kashmir to Mishmi. NILGIRI HILLS, at Ootacamund, *Foulkes*.

Root perennial; *stem* 3-5 ft., slender, sparingly branched, obtusely angled. *Leaves* 1-4 in., membranous, wrinkled; *petiole* $\frac{1}{4}$ -2 in.; *stipules* ovate-oblong, entire, puberulous. *Cymes* shortly peduncled, lower males more simple; male and fruiting sepals hispid.

3. ***U. dioica***, *Linn. Sp. Pl.* 984; herbaceous, monœcious or dioecious, pubescent, stinging hairs copious, leaves ovate-cordate oblong or lanceolate serrate, stipules usually free, cymes unisexual rarely androgynous, inner fruiting sepals longer than the outer. *Wedd. Monogr.* 77; *DC. Prodr.* xvi. i. 50; *Reichb. Ic. Fl. Germ.* t. 654; *Boiss. Fl. Orient.* iv. 1146.

N.W. HIMALAYA; from Kashmir and the Salt Range to Simla, alt. 8-10,700 ft. WESTERN TIBET, alt. 8-12,000 ft.—DISTRIB. Westward to the Atlantic.

Habit of *U. parviflora*, but differing in the free stipules.—The common English Nettle.

26. **FLEURYA**, *Gaud.*

Annual herbs, with stinging hairs. *Leaves* alternate, toothed, 3-nerved; stipules connate in opposite pairs, or 0. *Flowers* mono- or dioecious, clustered, clusters in solitary axillary cymes or spikes, unisexual or androgynous. MALE FL. *Sepals* 4-5, ovate-lanceolate, subvalvate or imbricate. *Stamens* 4-5, inflexed in bud. *Pistillode* globose or clavate. FEM. FL. *Perianth* cupular, 4-lobed, or sepals 4, imbricate, equal or very unequal, posticous hooded, anticons minute or 0. *Ovary* oblique; style obliquely ovoid or linear, at length hooked, with sometimes 2 basal arms; ovule erect. *Achene* oblique, compressed, exserted, membranous. *Seed* nearly exalbuminous, cotyledons broad.—Species 8, Tropical, and South African.

Dr. King has sent me (from Herb. Hort. Calcutt.), as *Pilea umbrosa*, what is, I think, a species of *Fleurya* with tomentose branches, leaves and cymes; it is from Sikkim, in male fl. only.

F. interrupta, *Gaud. in Freyc. Voy. Bot.* 497, t. 83; stinging hairs scattered, leaves ovate acuminate crenate or serrate base subcordate trun-

cate or cuneate, cymes spiciform or paniculate, usually much larger than the petiole, fem. perianth cupular, 4-lobed or toothed stipitate, style unequally 3-lobed. *Wedd. Monogr.* 115, t. 1 A, f. 9; *DC. Prodr.* xvi. i. 74; *Dalz. & Gibs. Bomb. Fl.* 238; *Wight Ic.* t. 1975; *Miq. Fl. Ind. Bat.* i. ii. 228. *F. spicata* & *glomerata*, *Gaud. l. c.* *Urtica interrupta*, *Linn. Sp. Pl.* 985; *Roxb. Fl. Ind.* iii. 585; *Wight Ic.* t. 692; *Wall. Cat.* 4623. *U. javanica*, *Blume Bijl.* 503. *U. affinis*, *Hook. & Arn. Bot. Beech. Voy.* 4, 69. *U. lomatacarpa*, *Hochstett. in Bot. Zeit.* xxxiii. 260. *U. spicigera*, *Steud. Nomencl.* ii. 736. *Bœhmeria javanica*, *Hassk. Cat. Hort. Bogor.* 79. *B. interrupta*, *Willd. Sp. Pl.* iv. 342.—*Burm. Thes. Zeyl.* t. 110, f. 1, 2.

KHASIA HILLS, *Griffith.* TAVOY, *Gomez.* MALACCA, *Hallett.* DECCAN PENINSULA, from the Concan southwards. CEYLON, common.—DISTRIB. Malay and Pacific Islands, China, Abyssinia.

Stem 2-4 ft., erect, flexuous, furrowed, branched. *Leaves* 2-6 in., sparsely clothed with stinging hairs; petioles as long as the blade; stipules 2-fid. *Cymes* 6-12 in., very slender, erect, branchlets recurved. *Fem. perianth* compressed, keeled on one side, the keel decurrent on the stipes, reflexed, exposing the cordate achene.

27. LAPORTEA, *Gaud.*

Perennial herbs, shrubs or trees, with (sometimes very minute) stinging hairs. *Leaves* alternate, entire or toothed, 3- or penninerved. *Stipules* in opposite free or connate pairs. *Flowers* mono- or diœcious, in axillary paniculate usually unisexual cymes or racemes, upper cymes usually very long and male, flowers and fruit often reflexed. MALE FL. *Sepals* 4-5, subvalvate. *Stamens* 4-5, inflexed in bud. *Pistillode* clavate or subglobose. FEM. FL. *Perianth-lobes* or segments 4, subequal or outer small, one sometimes absent. *Ovary* at length oblique; style linear, papillose on one side; ovule erect. *Achene* oblique, flattened or compressed, membranous or fleshy, seated on the perianth, sometimes obliquely stipitate. *Seed* subexalbuminous, cotyledons broad.—Species about 25, Asiatic, Australian, African and a few North American.

Sect. I. SCLEPSION, *Wedd.* *Fem. sepals* 4, very unequal; pedicels broadly winged.

1. *L. terminalis*, *Wight Ic.* t. 1972; herbaceous, glabrous or pubescent, stinging hairs few or many, leaves orbicular to oblong-obovate or lanceolate acuminate coarsely toothed or serrate base rounded or subcordate, male cymes axillary, fem. subterminal panicle long-peduncled, pedicels spathulate broadly winged, fem. sepals very unequal, achenes sharply deflexed. *Wedd. Monogr.* 125, t. 2 C, f. 1. *L. evitata*, *Wedd. in DC. Prodr.* xvi. i. 79. *Urtica evitata*, *Wall. Cat.* 4588.

SUBTROPICAL HIMALAYA, from Kumaon to Mishmi, alt. 4-8000 ft. NILGIRI Mts., *Wight, &c.* CEYLON; Central Province, alt. 4-6000 ft.

Stem 2-4 ft., erect. *Leaves* 4-10 by 2-8 in., membranous, smooth, pubescent or scaberulous above, very variable in the amount of stinging hairs on both surfaces; petiole slender, 1½-6 in.; stipules ½ in. or less. *Male cymes* as long as the petioles, or longer; sepals subequal, pubescent. *Fem. cymes* much larger and very long-peduncled; branches and branchlets divaricate; lateral sepals much the largest, pubescent. *Achene* slightly tubercled on the faces.

2. *L. oleracea*, *Wedd. Monogr.* 141, and in *DC. Prodr.* xvi. i. 87; nearly glabrous and stingless, leaves broadly ovate acuminate coarsely serrate base rounded subcordate or cuneate.

SIKKIM HIMALAYA; interior valleys, alt. 7–10,000 ft., J. D. H.

This has the cymes in a very young state, and is, I think, a slight var. of *L. terminalis* with distinctly serrate (not toothed) leaves.

3. ***L. crenulata***, Gaud. in Freyc. Voy. Bot. 498; shrubby, dioecious, branches unarmed, leaves from broadly elliptic ovate oblong to elliptic lanceolate acute or acuminate, clothed beneath and often above with small stinging hairs, entire or sinuate crenulate above the middle, base rounded or cordate, cymes short flexuous suberect, fem. pedicels cylindric, sepals subequal, achenes ovate erect. Wedd. Monogr. 133, t. 2 C, f. 5; DC. Prodr. xvi. i. 85; Brand. For. Flor. 404; Kurz For. Flor. ii. 421; Bedd. Fl. Sylvat. t. 306; Gamble Man. Ind. Timb. 323; Miq. Fl. Ind. Bat. i. ii. 230. *L. gigantea* & *latifolia*, Gaud. l. c. t. 81. *Urtica crenulata*, Roxb. Fl. Ind. iii. 591; Wight Ic. t. 686; Wall. Cat. 4611. *U. gigantea*, Poir.? Encycl. Suppl. iv. 224. *U. sinuata*, Blume? Bijl. 605. *U. Churta*, Ham. in Wall. Cat. 4608. *Urera javensis* & *gigantea*, Gaud. l. c. 496. *U. crenulata* & *Commersoniana*, Wedd. in Ann. Sc. Nat. Ser. 3, xiii. 104, 105. *Dendrocnide crenulata*, Miq. Pl. Jungh. i. 31.

TROPICAL HIMALAYA; from Sikkim eastwards, ASSAM, the KHÁSIA MTS. and southwards to PERAK. The Concan, Stocks. CEYLON, ascending to 5000 ft.—DISTRIB. Sumatra, Malay Islands.

An evergreen shrub, 8–10 ft., or small tree; branches stout, terete, green. Leaves 9–12 in., largest 16 by 12 in., base acute obtuse cordate or notched, nerves 12–16 pairs; petiole stout, 1–4 in.; stipules ovate lanceolate. Cymes longer than the petioles, dichotomously branched; flower-clusters remote, often unilateral; flowers subsessile. Male perianth 4-partite; fem. subcampanulate, lobes acute. Achene oblique, ventricose, seated on the minute perianth, crowned with the style.

28. **GIRARDINIA**, Gaud.

Herbs or undershrubs with stout stinging hairs. Leaves alternate, 3-nerved, entire or lobed, serrate; stipules connate, foliaceous. Flowers dioecious or monœcious, clustered, clusters in simple or paniced spikes or heads armed with stinging hairs. MALE FL. Sepals 4–5, valvate. Stamens 4–5, inflexed in bud. Pistillode globose or cupular. FEM. FL. Perianth tubular, ventricose, 2–3-toothed, at length split on one side. Ovary straight; stigma subulate, papillose; ovule erect. Achene broad, compressed, seated on the perianth, pericarp thickish. Seed sub-exalbuminous; cotyledons broad.—Species 7, Tropical Asia and Africa.

G. heterophylla, Dcne. in Jacquem. Voy. Bot. 151, t. 153; a tall coarse herb armed with very long stout stinging hairs, leaves large broad cordate variously lobed often palmately coarsely toothed pubescent, stipules large 2-fid, cymes peduncled lower male subcylindric, upper fem. with capitate clusters. Wedd. Monogr. 164; DC. Prodr. xvi. i. 100; Blume Mus. Bot. ii. 158; Brand. For. Flor. 404; Dalz. & Gibs. Bomb. Fl. 238; Gamble Man. Ind. Timb. 323. *Urtica heterophylla*, Vahl Symb. i. 76; Roxb. Fl. Ind. iii. 586; Wight Ic. t. 687; Wall. Cat. 4603. *U. diversifolia* & *horrida*, Link. Enum. Hort. Berol. ii. 385. *U. palmata*, Forsk. Fl. Egypt. 159.—Rheede Hort. Mal. ii. t. 41.

TEMPERATE and SUBTROPICAL HIMALAYA, from Marri eastwards, ascending to 5000 ft. ASSAM, SILHET and southwards to BURMA; and from MAHWAR and CENTRAL INDIA to TRAVANCORE. CEYL N, not uncommon.—DISTRIB. Java.

A tall stout erect tufted herb, 4–6 ft., with perennial roots; stem and branches

furrowed, pubescent hispid or hirsute. *Leaves* 4–12 in. long, often as broad, upper often palmately 3–5-lobed; petiole 4–6 in. *Male cymes* loosely panicleate, shorter than the leaves, flowers subsessile hispid; fruiting cymes elongate, lobulate (14 in. long and pendulous in Mishmi specimens); perianth hispid. *Achene* broadly ovate or subcordate, punctate, black, style persistent.—The following are varieties.

Var. *G. PALMATA*, *Gaud. l. c.* 498; leaves hirsute beneath, stipules large usually cordate, fruiting cymes elongate. *Wedd. in DC. l. c.* 101. *G. Leschenaultiana*, *Dcne. l. c.*; *Wedd. Monogr.* 165. *Urtica palmata*, *Leschen. U. acerifolia*, *Zenker Pl. Ind. dec. i. t. 3, 4.*—Nilghiri Mts. Ceylon, alt. 5–6000 ft.

Var. *G. ZEYLANICA*, *Dcne. l. c.* 152; leaves pinnatifidly lobed, stipules broadly cordate, cymes in reniform clusters, stinging hairs slender. *Wedd. Monogr. Urtic.* 167, and in *DC. l. c.* 101; *Miquel Fl. Ind. Bat. i. ii.* 233. *G. hibiscifolia*, *Miquel Plant. Jungh. i.* 32. *Urtica zeylanica*, *Burm. Thes. Zeyl.* 232. *U. heterophylla*, *Wight Ic. t.* 687.—Deccan Peninsula and Ceylon.

29. **PILEA**, *Lindl.*

Herbs, rarely undershrubs. *Leaves* in opposite equal or unequal pairs, entire or serrate, 3-nerved, very rarely penninerved; stipules connate into one intrapetiolar. *Flowers* monœcious or diœcious, minute, in axillary long or short peduncled dichotomously branched cymes; bracts small or 0. **MALE FL.** *Sepals* 2–4, free or connate in a cup, often gibbous or horned at the back. *Stamens* 2–4. *Pistillode* conic or oblong. **FEM. FL.** *Sepals* 3, rarely 4, very small and unequal, dorsal longest, sometimes gibbous or hooded. *Staminodes* minute, or of scales, or 0. *Ovary* straight; stigma sessile, penicillate; ovule erect. *Achene* ovoid or oblong, compressed, membranous or crustaceous, embraced or not, and at the base only, by the sepals. *Seed* erect, albumen very scanty, cotyledons broad.—Species about 160, Tropical (none Australian).

I have been baffled in my attempts to correlate all the Indian species of *Pilea*, as named by Weddell (evidently in great haste) in the Hookerian Herbarium, with the descriptions in his Monograph of Urticaceæ and in De Candolle's Prodrômus, and am unable to follow him satisfactorily in respect of their diagnoses, nomenclature and classification. The genus is an exceptionally difficult one, and I am not satisfied with my own results. Of the characters most relied on, that of monœcious or diœcious is of little avail, for the same species may be unisexual, or have male and fem. cymes or even androgynous and unisexual cymes on the same individual. Of the commoner species the leaves are very variable in size and form, but there is usually a marked distinction between those with large deep serratures, and those with small and shallow ones. It is often impossible to say from dried specimens whether the stipules are undeveloped or have fallen away. The length of the peduncle of the cyme, and the size and form of the cymes of both sexes are so variable that it is of no use for exact diagnostic purposes. The male sepals vary as to the number in each flower that have dorsal gibbositities or spurs, as does the length of these spurs. There is an obvious difference between the female perianth of 3 subequal orbicular sepals, and that of one narrow concave dorsal and two small lateral sepals or lobes. All of the Indian species have fleshy staminodes on the fem. perianth-lobes, which in some are lengthened, inflexed, and by recurving elastically discharge the achenes. The achenes afford good characters, but they are extremely minute, usually about $\frac{1}{30}$ in. long, and there is no definite line to be drawn between those with granulate and those with smooth faces.

I have no materials that enable me to compare the Indian with the Malay Island species, and therefore have but sparingly cited Malayan synonyms.

The little *P. muscosa*, *Lindl.* (*P. microphylla*, *Liebm.*, *Urtica microphylla*, *Linn.*), the "gunpowder plant" (so called from the cloud of pollen discharged from the anthers when the plant is shaken), a common S. American species, has been in-

troduced into India, and will no doubt soon be ubiquitous there. It occurs under two forms, as a creeping weed with very minute petioled elliptic or orbicular leaves $\frac{1}{10}$ in. broad, in the streets of Calcutta (Harrington St., *Clarke*); and in a more erect form with spatulate leaves $\frac{1}{2}$ in. long, on damp walls at Hoogly (*Levinge*), at Dacca, and in Perak (*Kunstler*). It has been found also in Ceylon. It is a penninerved entire-leaved species, but the nerves are very obscure.

A. *Leaves* penninerved throughout. *Achenes* smooth.

1. **P. ternifolia**, *Wedd. Monogr.* 202; *DC. Prodr.* xvi. i. 124; quite glabrous, stem erect usually simple, leaves opposite and ternately whorled subsessile linear or linear-oblong more or less coarsely serrate, cymes short lax or dense-fld., peduncles longer than the petioles, achenes minute oblong-ovate smooth.

SIKKIM HIMALAYA, alt. 6-8000 ft., *Griffith, &c. (Kew Distrib.* 4520).

Stem 10-18 in. from a thickened base, smooth, slender, rarely branched. *Leaves* $2\frac{1}{2}$ - $3\frac{1}{2}$ by $\frac{1}{4}$ - $\frac{1}{2}$ in., flaccid, base obliquely cordate, subglauous beneath; nerves very many, close set; petiole $\frac{1}{10}$ in.; stipules obscure. *Cymes* sometimes half as long as the leaves very slender and sparingly branched, at others short rounded or with spreading branches. *Flowers* and *achenes* very minute.—In the absence of the 3 nerves, this species suddenly departs from the typical condition of its near allies. "The incurved sepals eject the achene with elastic force" (*Clarke*).

B. *Leaves* 3-nerved, those of each pair unequal. *Achenes* smooth.

2. **P. anisophylla**, *Wedd. Monogr.* 193; *DC. Prodr.* xvi. i. 117; suffruticose, diœcious, shoots petioles and peduncles more or less furfurously tomentose, leaves 3-nerved in unequal pairs, larger petioled obliquely oblong lanceolate caudate-acuminate base hastate or cordate, smaller sessile ovate deeply cordate auricled on one side, achenes smooth. *Urtica anisophylla*, *Wall. Cat.* 4594.

EASTERN SUPTROPICAL HIMALAYA; Nepal, *Wallich*; SIKKIM, alt. 3-5000 ft., *J. D. H., Clarke*; Bhotan, *Griffith*. NAGA HILLS, alt. 6500 ft., *Clarke*.

Stem 2-3 ft., sparingly branched, rustily hairy. *Leaves* glabrous or strigose beneath, larger 4-6 in., subfalcate, entire serrulate or crenulate; petiole $\frac{1}{2}$ -1 in.; smaller $\frac{1}{2}$ in. or 0; stipules small, triangular. *Cymes* half as long as the leaves paniculate, peduncle longer or shorter than the petiole. *Achene* smooth.

VAR. robusta; stem stouter, shoots petioles and cymes more densely tomentose, small cymes very robust, flowers densely crowded along one side of the rachis and branches.—Sikkim, at Rungbee, alt. 5000 ft., *Clarke* (who states that it is monœcious).

VAR. khasiana; larger leaves ovate or oblong, smaller petioled or sessile oblong base hastate.—Khasia Hills, at Moflong, *Griffith (Kew Distrib.* 4513), and Shillong, alt. 5-6000 ft. ? Mishmi Hills, *Griffith*.—Male flowers more minute than in the type; achenes not seen. The Mishmi specimens are imperfect.

3. **P. insolens**, *Wedd. in DC. Prodr.* xvi. i. 118; quite glabrous, diœcious, leaves alternate or in very unequal pairs 3-nerved, larger long-petioled broadly ovate caudate-acuminate remotely serrate more or less, base peltate or cordate, smaller sessile orbicular-ovate base cordate or subhastate, cymes very slender paniced, flowers very minute, achene smooth.

Mishmi Mts. in UPPER ASSAM, *Griffith (Kew Distrib.* 1425).

Stem 6-12 in., subsimple, terete. *Leaves* membranous, larger 2-4 in., 3-nerved from the insertion of the petiole, cross-nerves distant; petiole $1\frac{1}{2}$ -3 in.; stipules oblong-ovate. *Cymes* (fem. alone seen) as long or shorter than the leaves; flowers rather scattered. *Achenes* very minute, obliquely ovoid.

4. **P. Clarkei**, *Hook. f.*; dwarf, nearly glabrous, diœcious, leaves $\frac{1}{2}$ – $1\frac{1}{2}$ in. in unequal pairs oblong ovate or lanceolate obtuse or subacute oblique or not sparingly serrate 3-nerved base cordate, cymes erect longer than the leaves sparingly branched, sepals half the length of the minute straight turgid orbicular-ovate smooth achene.

SIKKIM HIMALAYA; at Tchonpong, alt. 5000 ft., *Clarke*.

Stems 3–6 in., simple or much branched, leafy. *Leaves* membranous, smaller from half to two-thirds the size of the larger; petiole about half as long as the blade, stipules broadly ovate obtuse. *Cymes* usually long-peduncled. *Achene* $\frac{3}{8}$ in. long, pale, sometimes hardly longer than the broadly ovate or narrowly oblong dorsal sepal.

C. *Leaves* 3-nerved, subwhorled at the top of the stem, very unequal.

5. **P. approximata**, *Clarke in Journ. Linn. Soc. Bot.* xv. 123; quite glabrous, diœcious, stem short naked below, leaves crowded and almost whorled at the top of the stem lanceolate or elliptic-lanceolate coarsely serrate 3-nerved, petioles very unequal, cymes very small on very long peduncles often subglobose few-fl., achenes smooth. *P. ternifolia* β , *Herb. Ind. Or. H. f. & T.*

TEMPERATE SIKKIM HIMALAYA, alt. 7–10,000 ft., *J. D. H., Clarke, Treutler*.

Stem 4–8 in. from a tuberous base, slender. *Leaves* 1–4 in., very variable in length, lower pair sometimes distant, smaller ovate and oblong, obtuse, all the upper crowded and spreading, base rounded or subcordate; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in.; stipules minute. *Peduncle* of cymes much longer than the petiole; male sepals broad, shortly mucronate; fem. very unequal, narrow, one or more nearly as long as the minute straight achene.—Mr. Dutbie sends from the Jumba Valley (No. 580), Kumaon, young plants of what may be a form of this with ovate leaves $\frac{1}{2}$ in. long, or is perhaps *P. Wightii*, var. *Roylei*.

D. *Leaves* 3-nerved, those of each pair subequal, quite or nearly entire.

6. **P. smilacifolia**, *Wedd. in Ann. Sc. Nat. Ser. 4, i.* 186; *Monogr.* 181; *DC. Prodr.* xvi. i. 110; suffruticose, quite glabrous, diœcious, branches angular, leaves elliptic-lanceolate acuminate quite entire (rarely serrate at the tip) 3-nerved, cymes shortly peduncled, achenes smooth. *P. Goglado & glaberrima*, *Blume Mus. Bot.* ii. 53, 54. *P. miconiaefolia*, *Meq. in Zoll. Syst. Verzs.* 106; *Fl. Ind. Bat.* i. ii. 235. *U. glaberrima*, *Blume Bijdr.* 493. *U. smilacifolia*, *Wall. mss.* *U. Goglado*, *Ham. in Wall. Cat.* 4593.

EASTERN TROPICAL HIMALAYA; from Sikkim to Mishmi, alt. 2–4000 ft. ASSAM, KHASIA MTS., SILHER and CHITTAGONG.—DISTRIB. Java.

Stems 2–4 ft., very robust, woody below, many-angled, branched above. *Leaves* 3–14 in., membranous, narrowed into a petiole 1–4 in., cross-nervules strong; stipules triangular or lanceolate, persistent. *Cymes* often in pairs, very variable in length and form, short and dense-fl., or lax and dichotomously branched; male fl. minute; fem. sepals much shorter than the achene. *Achene* $\frac{1}{10}$ in. long, broadly obliquely ovoid.—In many respects this approaches *P. scripta*. The names *Pilea smilacifolia* & *miconiaefolia* appeared in the same year.

7. **P. lancifolia**, *Hook. f.*; small, herbaceous, quite glabrous, diœcious, slender, leaves long-petioled subfalcately lanceolate acuminate entire or sparingly serrate towards the tip 3-nerved, cymes very slender sparingly branched sometimes as long as the leaves, flower-clusters very sparse, achene smooth.

KHASIA Mts.; north of Boga pane, alt. 3000 ft., *Clarke*.

Stem 6-8 in. from a short stiff creeping base, often branched from the base; branches slender, terete. *Leaves* 2-3 by $\frac{1}{2}$ - $\frac{1}{2}$ in., not flaccid, base rounded or subcordate; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules triangular-ovate, obtuse. *Achenes* minute, suborbicular, rather longer than the longest linear-oblong sepal, smooth.

E. Leaves 3-nerved, those of each pair subequal, more or less crenate serrate or toothed (rarely entire in *P. peploides*).

* *Achenes* quite smooth (mottled, as if rough, in *P. pachycarpa*).

8. **P. peploides**, *Hook. & Arn. Bot. Beech. Voy.* 96; very small, tufted, flaccid, branched from the base, glabrous, monœcious, leaves long-petioled orbicular-ovate tip rounded entire or crenate above the middle 3-nerved, base cuneate, stipules obscure, cymes sessile androgynous capitate dense-fl., achenes most minute smooth. *Wedd. Monogr.* 179. *U. peploides*, *var. B.*, *Wedd. DC. Prodr.* xvi. i. 109; *Miq. Fl. Ind. Bat.* i. ii. 237. *P. pygmæa*, *Miq. in Zoll. Syst. Verzeichn.* 106. *Dubruelia peploides*, *Gaud. in Freyc. Voy. Bot.* 495.

UPPER WESTERN HIMALAYA, Lahul and Zaskar, *Watt.* SIKKIM TERAI, *Gamble.* CACHAR, *Keenan.* BURMA, at Mogong, *Griffith (Kew Distrib.* 4582).—DISTRIB. Japan, Java, Sandwich and Gallapago Islands.

Stems or branches 3-5 in., succulent, flaccid, leafy. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in. long and broad, cuneate from the base to the middle; raphides transverse; petiole as long as the blade. *Cymes* $\frac{1}{4}$ in. diam., lobed. *Achene* about $\frac{1}{10}$ in., subglobose, quite smooth.

9. **P. Symmeria**, *Wedd. Monogr.* 246; *DC. Prodr.* xvi. i. 134; quite glabrous or leaves rarely above sparsely hairy, leaves 2-6 in. ovate oblong- or ovate-lanceolate caudate-acuminate coarsely serrate 3-nerved base rounded or notched, stipules small deciduous, peduncles long or short, male fl. large, dorsal fem. sepal longest, achenes large flattened nearly smooth, edges acute.

TEMPERATE HIMALAYA, alt. 6-10,000 ft.; Kumaon, *Strachey & Winterbottom* (No. 17). Sikkim, *Griffith (Kew Distrib.* 4528), *J. D. H., Clarke.* KHASIA HILLS, Shillong, alt. 4400 ft., *Clarke.*

Erect from the base, 2-3 ft., slender, monœcious or diœcious. *Leaves* membranous; petiole 1-3 in. *Cymes* very variable, when large paniculately branched; peduncle $\frac{1}{2}$ -3 in. *Male fl.* $\frac{1}{8}$ in. diam., rather scattered. *Achene* $\frac{1}{12}$ in. or less, with sometimes a faint intramarginal rough line.—Best distinguished by the leaf-bases and large achenes. The stipules are probably large and caducous. *Weddell* does not describe the fruit, but says the fem. perianth is cupular; this latter does not differ from the ordinary form in the genus, of one long and two very short lobes or sepals.—*Duthie's* No. 3378, from Kumaon, alt. 9-10,000 ft., with large very coarsely serrate leaves subcordate at the base and small persistent stipules, is perhaps a state of this.

10. **P. Wightii**, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 186; *Monogr.* 205; *DC. Prodr.* xvi. i. 125; quite glabrous, monœcious, stems creeping below, leaves ovate or rounded ovate acute or acuminate coarsely serrate 3-nerved, stipules short or 0, cymes long-peduncled suberect loosely branched androgynous, flowers minute, achenes smooth or nearly so. *P. radicans*, *Wight Ic.* t. 1974. *P. Hugelii*, *Blume Mus. Bot.* ii. 53. *Urtica obesa*, *Wall. Cat.* 4587.

TEMPERATE HIMALAYA; Nepal, *Wallich.* Sikkim, alt. 4-7000 ft., *J. D. H.*

NILGHIRI MTS., in the higher ranges, *Wight*, &c. CEYLON; Central Province, alt. 5–6000 ft.—DISTRIB. Java.

Stem 4–18 in., stout or slender. *Leaves* 1–3 in., flaccid, very variable in breadth, base rounded or subacute; petiole usually about half the length of the blade; stipules triangular. *Cymes* shorter or longer than the leaves, erect; male sepals broad, spurred; fem. fl. in small clusters or open paniced cymes. *Achene* ovoid, straight, about $\frac{1}{30}$ in. long, sometimes hardly longer than the perianth.—I find it difficult to distinguish between this and more glabrous forms of *P. umbrosa*, to which Weddell has referred some of the Himalayan specimens. Except by the coarse serratures and small stipules, it is not easily distinguished from *P. bracteosa*. Weddell is my authority for *P. Hugelii* being a synonym. *Urtica obesa*, Wallich, referred by Weddell to *P. umbrosa*, being quite glabrous, is, I think, rather referable here, and perhaps to the following variety.

VAR. *macrophylla*; leaves 4–6 in. deeply obtusely serrate, petiole 2–4 in., cymes sessile or shortly peduncled.—Nilghiris, in the Ochterlony Valley, *King*; Courtallam, *Wight*.

VAR. ? *Roylei*; very small, stem slender, leaves very few rounded ovate, sparsely hairy above, serratures few large. *Procris racemosa*, *Royle Ill.* t. 83, f. 1.—Kumaon and Garwhal, alt. 8–10,000 ft., *Royle*, *Duthie*. ? Sikkim, *J. D. H.*—This looks like a depauperated form of high elevations. I have alluded to it under *P. approximata*; it may be a distinct species, but better specimens are wanted. Weddell at the end of *Procris*, refers it to *Pilea Wightii*, but the synonym is not taken up under that species.

11. ***P. stipulosa***, *Miquel in Zoll. Syst. Verz.* 102; *Fl. Ind. Bat.* i. ii. 236; dioecious, glabrous, or leaves very sparsely hairy, leaves 3–4 in. long-petioled elliptic or oblong-ovate acute or acuminate 3-nerved coarsely serrate or toothed base cuneate or rounded, stipules large oblong, peduncles very short, fem. sepals subequal orbicular, achenes minute smooth. *Wedd. Monogr.* 230. *P. petiolaris*, *Wedd. in Ann. Sc. Nat. Ser. 4, i.* 186. *P. angulata*, *Blume Mus. Bot.* ii. 55; *Thwaites Enum.* 259; *Wedd. in DC. Prodr.* xvi. i. 131 (excl. *Khasia & Sikkim*). *Urtica angulata*, *Blume Bijdr.* 494. *U. stipulosa*, *Miq. Pl. Jungh.* 28.

CEYLON, *Walker*, *Thwaites* (C.P. 2184).—DISTRIB. Java.

Tall rather stout species with the habit of *P. umbrosa*, but glabrous or with a very few hairs on the upper surface of the leaves, large green stipules and equal orbicular female sepals like those of *P. Hookeriana*. Thwaites refers Blume's *P. hygrophila* to it, no doubt rightly as far as the Ceylon specimens of that plant are concerned; he describes it as very variable. Weddell refers Sikkim and Khasia specimens collected by me to this species, but none of these have the equal fem. sepals.—Wright's Loochoo plant, referred to *stipulosa* by Miquel, differs in the dorsal sepal of the female being as long as the achene.

12. ***P. bracteosa***, *Wedd. Monogr.* 245; *DC. Prodr.* xvi. i. 134; glabrous or leaves with a few sparse hairs, leaves 2–4 in. long petioled elliptic ovate or elliptic-lanceolate caudate-acuminate serrate serratures shallow often apiculate 3-nerved, base rounded or cuneate, stipules large oblong persistent, peduncles long, fem. dorsal sepals longest, achenes minute nearly smooth edges acute. ? *P. oxyodon*, *Wedd. Monogr.* 222; *DC. l. c.* 126.

TEMPERATE HIMALAYA; from Nepal, *Wallich*, to Mishmi, alt. 4–7000 ft. KHASIA HILLS, alt. 3–5000 ft., *Griffith*, &c. Munnipore, alt. 5–8000 ft., *Clarke*.

Stem 1–2 ft., sometimes rather woody below and often warted (by disease). *Leaves* usually small, reticulate beneath, base sometimes notched; petiole $\frac{1}{2}$ –2 in.; stipules $\frac{1}{4}$ – $\frac{1}{2}$ in. *Cymes* variable; peduncle usually very slender. *Achene* $\frac{1}{30}$ in. straight, with an obscure intramarginal ridge.—The fem. perianth distinguishes this

from *P. stipulosa*; the persistent stipules and minute achene from *P. Symmeria*. I suspect that Weddell's *P. oxyodon* is this; there is nothing in his description to distinguish it except its being perfectly glabrous. He describes *P. bracteosa* as having large or small serratures to the leaf, and there are Sikkim specimens of a plant altogether resembling *bracteosa* except in having smaller broader deeply serrate leaves, and which hence looks very different, and may be so.

13. ***P. umbrosa***, Wedd. in *Ann. Sc. Nat. Ser. 4*, i. 187, and *Monogr. Urtic.* 243, and in *DC. Prodr.* xvi. i. 133; more or less pubescent or tomentose, leaves 2-5 in. broadly elliptic-ovate or oblong acute acuminate or subcaudate coarsely crenate-toothed or serrate 3-nerved base cordate or rounded rarely acute, stipules subpersistent large, peduncles longer or shorter than the petioles, dorsal fem. sepal much the longest, achenes minute flattened nearly smooth with often a raised intramarginal ridge. *Urtica umbrosa*, Wall. *Cat.* 4598. *U. paniculata*, *Herb. Royle*.

TEMPERATE HIMALAYA, alt. 4-9000 ft., from Kashmir eastwards. KHASIA Mts., alt. 4-6000 ft., Griffith, &c.

Usually a tall robust monœcious or diœcious species, often densely clothed with flexuous cellular hairs. Leaves broad, rather broadly toothed, with numerous rather distant straight or arched cross-nervules; petiole 1-3 in.; stipules membranous. Cymes very various, sometimes 2-4 in. long and broad; peduncles 1-3 in., rarely 0. Male fl. small, sepals usually without spurs. Achenes $\frac{1}{30}$ in., pale, straight.

** Achenes granular or tuberculate or with a strong intramarginal ridge (or smooth in Hookeriana, see also *P. umbrosa*).

14. ***P. scripta***, Wedd. *Monogr.* 222; *DC. Prodr.* xvi. i. 127; quite glabrous, leaves 3-10 in. elliptic-lanceolate (rarely broad) caudate-acuminate denticulate or serrulate teeth always small and shallow, cross-nervules very many slender, base acute or narrowed and rounded rarely notched, stipules short, peduncles long or short, male fl. minute, fem. sepals broad dorsal longest, achenes minute granulate within the intramarginal ridge. *Blume Mus. Bot.* ii. 53, 57. *P. scripta* & Goglado, Wedd. in *Ann. Sc. Nat. Ser. 4*, i. 187, 188. *Urtica scripta*, Ham. in *Don Prodr.* 59. *U. Hamiltoniana*, Wall. *Cat.* 4590. *U. triplinervis*, Ham. *ms.*

TEMPERATE HIMALAYA; Dalhousie, alt. 6000 ft., Clarke. NEPAL, Wallich; Sikkim, alt. 3500-6000 ft., abundant; Bhotan and Mishmi Mts., Griffith. KHASIA Mts., alt. 4-5000 ft. MUNNIPORE, alt. 4000 ft., Clarke.

A tall branched glabrous large-leaved species, the best characters for which are the usually elliptic leaves with numerous transverse nervules and very small teeth, the small male flowers without spurs on the sepals, and the minute strongly granulate bordered achenes $\frac{1}{30}$ in. long. Small obtuse-based leaves are, however, common. The size and form of the cyme and length of its peduncle afford no characters. Munnipore specimens have very large leaves 10 by 4½ in. The Dalhousie one is in very imperfect flower, and hence perhaps doubtful, but the leaves are characteristic. The Munnipore and some of the lower level Sikkim and Khasian specimens have more fascicled greener achenes. The Mishmi plant has broadly elliptic and even orbicular leaves, and stouter warted (by disease?) stems; though quite glabrous, it has been named *P. umbrosa* by Weddell. Some of Wallich's Nepal and other country specimens have interrupted thickened nervules, but this is a very inconstant character; they are sometimes prominent on the upper leaf surfaces.

A very large monœcious form (or different species) occurs at low elevations in Sikkim (Mongpo, 4000 ft., Clarke), with stem as thick as the little finger, and the typical leaves of *scripta*, but very long (4-7 in.) and slender alternately branched male cymes; the branches again divided, with scattered male flowers, all four sepals of

which are shortly spurred; fem. cymes very short, subsessile; achenes with rounded margins and the intramarginal ridge very indistinct.

VAR. *sarcocarpa*; achenes with pulvinate rugose fleshy faces and a very thick smooth margin.—Assam, *Jenkins*.

I do not recognize Weddell's var. *stipularis* with the stipules produced into a long point (Khasia Mts., *Griffith*) as founded on any stable character. In habit and achenes it approaches *P. Hookeriana*. The "*Urtica triplinervis*, Ham. mss.," cited by Weddell as a synonym of *P. scripta*, is an erroneous reading of Wallich's "4590 C? *U. triplinervis*, *Herb. Heyne*."

15. *P. Hookeriana*, *Wedd. Monogr.* 226; *DC. Prodr.* xvi. i. 123; quite glabrous, leaves 4–10 in. long-petioled broadly elliptic or elliptic-ovate to orbicular acuminate or caudate faintly obtusely serrate 3-nerved, base acute or rounded, stipules large oblong green, cymes sessile or subsessile, male fl. in large globose heads, fem. sepals 3 orbicular subequal, achene minute smooth or granular green not margined.

SIKKIM HIMALAYA, alt. 1–4000 ft., *J. D. H., Treutler, Clarke*. **KHASIA MTS.**, at Mongpo, alt. 2000 ft. **Kohima in the NAGA HILLS**, alt. 5500 ft., *Clarke*.

A tall robust monœcious or diœcious species, 6 ft. high, with stem as thick below as the middle finger. *Leaves* membranous, rarely strongly serrate, cross-nervules distant; petiole 2–5 in.; stipules $\frac{1}{2}$ –1 in., tip rounded. *Male cymes* very shortly peduncled; flowers large in globose heads $\frac{1}{2}$ – $\frac{1}{2}$ in. diam.; sepals not spurred; fem. cymes sessile, branches short, dense-fl.; sepals ciliolate. *Achenes* $\frac{1}{8}$ in., dark green, some quite smooth and dry, others with a granular herbaceous coat.

16. *P. trinervia*, *Wight Ic. t.* 1973; quite glabrous, stem very stout internodes swollen, leaves 3–6 in. from oblong-lanceolate to broadly elliptic acuminate or caudate serrulate 3-nerved, base acute cuneate or rounded rarely notched or cordate, stipules caducous, cymes long or short peduncled usually much branched, fem. dorsal sepal much the longest, achene granular, margins obtuse. *Wedd. Monogr.* 224; *DC. Prodr.* xvi. i. 127. *P. melastomoides*, *Wedd. in Ann. Sc. Nat. Ser.* 3, i. 186.

DECCAN PENINSULA; damp forests of the Nilghiris and other hills. **CEYLON**; common, ascending to 5000 ft., *Thwaites*.—**DISTRIB.** Malay Islands?

A very robust succulent monœcious herb, probably 4–5 ft. high; internodes close, swollen when fresh, but when dried narrower than the nodes. *Leaves* very variable in shape, cross-nervules close-set; petiole 1–6 in. *Male cymes* often widely spreading, corymbiform and 6 in. across; flowers scattered or in globose clusters; sepals spurred. *Fem. cymes* usually slender. *Achene* $\frac{1}{8}$ in., margins obscurely thickened.—This is the only Indian species with the internodes short fleshy and conspicuously thickened.—I hesitate to quote under this the Javan species referred to it by Weddell and Miquel, viz. *P. pellucida*, *melastomoides* and *oreophila*, Blume (*Mus. Bot.* ii. 54); *P. elongata*, Miq.; and *peduncularis*, Smith in Rees Cyclop. With regard to Roxburgh's *Urtica trinervia* (Fl. Ind. iii. 582) of Chittagong, also referred here by Miquel and Weddell, Wight says that it is not his *P. trinervia*, but a *Boehmeria*.

17. *P. pachycarpa*, *Wedd. Monogr.* 225; *DC. Prodr.* xvi. i. 128; quite glabrous, leaves 2–3 in. elliptic acuminate serrulate 3-nerved, base acute or rounded, stipules small triangular persistent, cymes small shortly peduncled, fem. dorsal sepal longest, achene straight rather large with a herbaceous coat covered with depressed tubercles.

ASSAM, *Griffith, Jenkins*.

Apparently a large branched species, with the stem as thick as the little finger. *Leaves* rather stiff, cross-nervules not very close; petiole 1–1½ in. *Achenes* $\frac{1}{8}$ in.

long, red-brown with obtuse edges.—The material for this species is fem. only, and quite insufficient. Weddell describes the achene as marbled and smooth not granular, I find a herbaceous granulate coat covering a smooth endocarp.

18. ***P. obliqua*, Hook. f.**; glabrous, stem slender, leaves 3–5 in. long-petioled broadly obliquely ovate acuminate serrulate 3-nerved, base rounded or cordate, stipules oblong, cymes slender long-peduncled, fem. dorsal sepal longest, achenes minute straight with an intramarginal rugose or granular ridge, the faces nearly smooth.

SIKKIM HIMALAYA, alt. 1000 ft., and KHASIA Mts., at Nunklow, alt. 3500 ft., *Clarke*.

The very oblique broadly ovate leaves of this species which is a native of low levels, and the concentric ridge on the otherwise nearly smooth achenes which are only $\frac{1}{30}$ in. long, are its best characters, otherwise it is very near *P. bracteosa*.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

19. ***P. cordifolia*, Hook. f.**; tall, stout, quite glabrous, leaves large broad long-petioled oblique orbicular-ovate or elliptic cuspidate or acuminate obtusely serrate 3-nerved, base cordate or rounded, petiole 3–6 in., stipules rather large broad persistent, male cymes very long-peduncled paniculately branched, sepals obtuse, dorsal of fem. fl. longest.

SIKKIM HIMALAYA, alt. 7000 ft., *J. D. H.*, at Rungbee and Darjiling, alt. 5000–6500 ft., *Clarke*. KHASIA Mts., at Churra, alt. 3–5000 ft., *J. D. H. & T. T.*

Much the largest leaved Indian species. *Stem* 2–4 ft. or more, rooting at the base. *Leaves* attaining 6 in. broad; petiole 4 in.; stipules $\frac{1}{2}$ in., green broadly triangular obtuse. *Cyme* with divergent branches and branchlets. *Achenes* minute, immature.

Weddell has named one Sikkim specimen *P. trinervis*, which it does not resemble, and a Khasia one *P. bracteosa*.

20. ***P. fruticosa*, Hook. f.**; shrubby, quite glabrous, stem branched terete woody, leaves 3–4 in. long-petioled in equal pairs elliptic or elliptic-lanceolate acute at both ends obscurely obtusely serrate 3-nerved, stipules very short, male cymes sparingly branched, peduncles longer than the petioles, flowers in small remote clusters minute, fem. cymes small sessile, flowers crowded, dorsal sepal longest, achenes very minute with an intramarginal granular ridge.

PERAK; at Goping, *King's Collector*.—Nearly allied to *P. smilacifolia*, but the stems are quite terete, and the minute achenes $\frac{1}{40}$ in. long are very different.

P. GRIFFITHII, *Blume Mus. Bot.* ii. 55; *Wedd. in DC. Prodr.* xvi. i. 131, is not recognizable from the description. Weddell had not seen it, and there is no Malaccan *Pilea* in Griffith's collection at Kew. Miquel doubtfully refers it to *P. stipulosa*, from which Blume says it differs in the lateral nerves produced to the tip of the leaf, and in the caducous stipules.

P. PRODUCTA, *Blume l. c.* 56; *Wedd. Monogr.* 265; *DC. l. c.* 136, from the Himalaya, distinguished by its authors from *P. umbrosa* by the leaves narrowed into the petiole and the more shortly peduncled cymes, is no doubt referable to that plant.

P. HYGROPHILA, *Blume l. c.* 56; *Wedd. Monogr.* 264; *DC. l. c.* 135; *Miq. Fl. Ind. Bat.* i. ii. 237. *Urtica hygrophila*, *Miq. Pl. Jungh.* 28, is probably a mixture, being described as having the fem. sepals either all of the same size, which would answer for a Ceylon plant of Gardner's (*P. stipulosa*), or with the dorsal larger, which would answer for the Khasian plant, whatever that may be. The Nilghiri one is probably *Wightiana*. The type of the species, Miquel's Javan *Urtica hygrophila*, is unknown to me; it is described as having the fruiting perianth one-half longer than the achene, which I have seen in no Indian species.

30. **LECANTHUS**, Weddell.

Characters of *Elatostema*, but leaves opposite. Differs from *Pilea* in the fleshy discoid receptacles.

L. Wightii, Wedd. in *Ann. Sc. Nat. Ser. 4*, i. 187; *Monogr.* 280, t. 9; *Miq. Fl. Ind. Bat.* i. ii. 238. *L. peduncularis*, Wedd. in *DC. Prodr.* xvi. i. 164. *L. major* and *L. Wallichii*, Wedd. *l. c.* 187. *Elatostema ovatum*, Wight *l. c.* 1985. *E. oppositifolium*, Dalz. in *Hook. Journ. Bot.* iii. 179; *Dalz. & Gibs. Bomb. Fl.* 239. *Procris peduncularis*, Wall. *Cat.* 4634 A; *Royle Ill.* t. 83. *P. obtusa*, *Royle l. c.*

TEMPERATE and SUBTROPICAL HIMALAYA, alt. 4-12,000 ft., from Chamba to Sikkim and the KHASIA and NAGA HILLS. MUNNIPORE, *Clarke*. MARWA, on Mt. Aboo, *King*. DECCAN PENINSULA, on the Ghats, from the Concan southwards. CEYLON; Matelle East, *Beckett* (C.P. 3870).—DISTRIB. Java, Tropical Africa.

Succulent, decumbent, monoëcious or diëcious, very variable in size, from a weak little herb 1-2 in. high, with 2 or 3 pairs of small subentire leaves $\frac{1}{4}$ -1 in. long towards the top of the thread-like stem, to a stout branched herb, 12-18 in. high, with numerous pairs of long- or short-petioled leaves coarsely serrate 6 in. long and glabrous or sparsely hairy. *Leaves* membranous, obliquely ovate, obtuse, acute, acuminate or caudate, subentire or coarsely toothed, serrate or crenate to the base or from one-third to half-way up, 3-nerved and penninerved, base cuneate acute or rounded; petiole $\frac{1}{4}$ -3 in., slender; stipules scarious, entire or toothed. *Heads* of both sexes peduncled, rarely sessile; peduncle sometimes 10 in. long and very stout; receptacles flat or turbinate, $\frac{1}{2}$ -3 $\frac{1}{2}$ in. diam.; male sepals 4-5; fem. 3, very minute and unequal. *Achene* minute, ovoid, compressed.—Weddell makes two varieties, viz. *Wallichii*, diëcious with acutely serrate leaves; and *major* (from the Concan) with leaves more obtusely serrate and male and fem. fl. in the same head. The most puzzling state of this plant is the minute one mentioned above, in which the receptacles are reduced to $\frac{1}{10}$ in. diam. It occurs at all elevations, but is the only one also at great heights, and is found in the Himalaya, Munnipore and the N.ghiris.

31. **PELLIONIA**, Gaud.

Herbs with the alternate leaves and habit of *Elatostema*, but the male flowers are disposed in open or contracted sometimes capituliform cymes (not seated on a receptacle), and the fem. perianth is longer than the compressed tubercled achene.—Species about 15, Eastern Asiatic and Pacific.

* *Leaves serrate.*

1. **P. Griffithiana**, Wedd. in *DC Prodr.* xvi. i. 165; branches and cymes pubescent, leaves sessile obliquely oblong-lanceolate caudate coarsely crenate-serrate above the entire semicordate base, male cymes long-peduncled laxly dichotomously branched.

UPPER ASSAM; in the Patkoye Mts., *Griffith*.

Stems 1-2 ft. and leaves fleshy. *Leaves* 2-6 in., nerves puberulous beneath. *Male cymes* 1-2 in. diam.; peduncle 2-3 in.; bracts lanceolate, exceeding the flowers; fem. unknown.

2. **P. heteroloba**, Wedd. *Monogr.* 283, t. 5, f. 11 inf.; *DC. Prodr.* xvi. i. 166; nearly glabrous, diëcious, leaves sessile obliquely elliptic or oblong acuminate or caudate coarsely crenate-serrate above the middle, base semicordate, cymes all peduncled, males laxly dichotomously branched, fem. subcapitate.

SIKKIM HIMALAYA; at Yoksun, alt. 5000 ft., *J. D. H. KHASIA MTS.*; at Nurtiung, alt. 4000 ft., *Clarke*.

Stem 6–10 in., stout, ascending from a creeping base. *Leaves* 2–2½ in., rather thick, quite glabrous; stipules subulate. *Male cymes* with subulate bracts and bracteoles; fem. ¼–½ in. diam. or shorter, slender; peduncles ¼ in. long, branches so short as to be hidden by the flowers; bracts subulate; sepals lanceolate, very unequal, much longer than the tubercled ellipsoid achenes.—The Khasian specimens are in male fl. only, and more slender than the Sikkim ones.

3. *P. stenocarpa*, *Wedd. Monogr.* 284, t. 5, f. 13, 15; *DC. Prodr.* xvi. i. 168; glabrous, leaves alternate subsessile obliquely oblong or elliptic-lanceolate acuminate coarsely serrate above the lower third or middle, base acute or obtuse, male cymes long-peduncled corymbose, fem. sessile capitate, sepals subequal mucronate, achene narrow subcylindric minutely warted.

KHASIA MTS., alt. 1–4000 ft., *J. D. H. & T. T.* (Weddell).

Dioecious or monœcious. *Stem* erect, 4 in. *Leaves* ¾–2 by ¼–¾ in., membranous, whitish beneath and reticulated with cystoliths; stipules 2, linear, persistent. *Male peduncle* ½–1½ in. *Fem. cymes* nearly as in *Elatostema*, but with the bracteoles much shorter than the pedicels of the flowers; fruiting sepals about equal in length, but with unequal mucros. *Achene* narrowed from the middle to the tip, about twice as long as the sepals, equally minutely warted.—I find no specimens answering to this amongst Thomson's and my collections. Weddell describes the fem. heads as like those of an *Elatostema*, to which the achene would seem to refer it.

4. *P. ambigua*, *Wedd. Monogr.* 285; *DC. Prodr.* xvi. i. 168; nearly glabrous, leaves alternate sessile obliquely oblong-lanceolate or elliptic penninerved coarsely serrate above the entire obtuse or subcordate base, male cymes long-peduncled very contracted capitellate, fem. sessile, male sepals subequal mucronate with long points, achenes ellipsoid tubercled.

KHASIA MTS., alt. 0–4000 ft., *J. D. H. & T. T.*

Stem simple, 4–6 in. *Leaves* 3–5 by ¾–1½ in., puberulous on the midrib above and nerves beneath; minute linear or subulate leaves occur in some specimens alternating with the larger. *Male cymes* with very short branches forming obconical heads ¼ in. long and broad; bracts subulate; flowers rather long-pedicelled. *Fem. heads* if on the same plant with the male in the upper axils, ½ in. diam.; bracts subulate, exceeding the flowers.

5. *P. Duvauana*, *N. E. Br. in Ill. Hort.* xxix. 189, t. 472; *Gard. Chron.* xviii. (1882) 712; prostrate, leaves sessile broadly obliquely oblong or orbicular coarsely crenate tip obtuse or rounded, nerves pubescent, stipules large ovate acuminate persistent, male cymes long and stoutly peduncled branched pubescent, bracts minute. *Elatostema gibbosa*, *Kurz in Journ. As. Soc. Beng.* xlii. ii. 104. *Procris gibbosa*, *Wall. Cat.* 7273.

PEGU, *Brandis*. PERAK, *Scortechini, Wray, &c.*—DISTRIB. Cochin China.

Stem or branches 1–2 ft., succulent, creeping below, tips pubescent. *Leaves* 1–2½ in., fleshy?; stipules in pairs, ½ in. long, scarious. *Male peduncle* 1–5 in.; branches irregular, divaricate; flowers large, outer sepal gibbous; fem. fl. and fruit unknown.—Wallich's No. 7273 is doubtfully referred to *Elat. cornutum*, by Weddell.

6. *P. bulbifera*, *Hook. f.*; very slender, quite glabrous, axils bulbiferous, leaves membranous subsessile obliquely elliptic-oblong or lanceolate acuminate or caudate coarsely serrate, male and fem. infl. on long slender pedicels, male fl. cymose pedicelled, fem. on a disciform involucrate head

with linear-lanceolate sepals. *Elatostemma bulbiferum*, *Kurz in Journ. As. Soc. Beng.* 1873, ii. 104.

TENASSERIM; at Attran, *Kurz, Brandis*.

Stem erect, 6-12 in., branched; axillary bulbs $\frac{1}{2}$ - $\frac{1}{2}$ in. diam. *Leaves* scattered, 3-5 in., with sometimes a very small opposite one; base entire, cuneate or subauricled on one side; nerves very slender, basal about half the length of the leaf; cystoliths very obscure. *Peduncles* 1-2 in., capillary; male cymes few-fl., subumbellately branched; pedicels very short; fem. recepts $\frac{1}{2}$ in. diam.; involucre bracts numerous, ovate-lanceolate, glabrous; bracteoles linear-lanceolate; sepals much longer than the young fruit.

7. **P. burmanica**, *Hook. f.*; quite glabrous, stem very slender flexuous, leaves membranous broadly obliquely ovate or ovate-oblong caudate coarsely crenate toothed or serrate, fem. heads axillary sessile disciform.

TENASSERIM, *Gallatly (Herb. Hort. Bot. Calcutt. No. 1033)*.

Stem a span long, very flexuous. *Leaves* 2-4 in., base cuneate or subauricled on the lower margin; nerves very slender, basal not half the length of the leaf; cystoliths very obscure. *Fem. heads* $\frac{1}{2}$ - $\frac{1}{2}$ in. diam.; involucre bracts numerous, lanceolate, confluent except at the tips; bracteoles lanceolate; sepals linear-oblong, exceeding the broadly elliptic tubercled achene.—Very near *P. bulbifera*, but the leaves are broader, more toothed than serrate, and the fem. heads are perfectly sessile.—Male infl. not seen.

**** Leaves large, quite entire; stipules usually large, scarious, lanceolate with long points, very persistent.**

8. **P. Heyneana**, *Wedd. Monogr.* 287, t. 5; *DC. Prodr.* xvi. i. 169; stem woody below, leaves short-petioled or subsessile falcately oblong or elliptic-lanceolate obtusely acuminate quite entire 3-nerved, base unequally cordate, nerves pubescent beneath, male and fem. infl. stoutly peduncled. *Procris Heyneana*, *Wall. Cat.* 7272.

DECCAN PENINSULA; Nilghiri and Travancore Mts., *Heyne, &c.* CEYLON, in the Central Province.

Stems 6-10 in., from a branched woody creeping base; tips hirsute. *Leaves* 4-8 in., coriaceous, with often minute subalternating leaflets, grey with many cystoliths when dry; petiole $\frac{1}{10}$ - $\frac{1}{4}$ in., stout, and midrib hirsute; stipules large. *Male fl.* in lax or dense cymes, or capitate, and peduncle villous; fem. capitate, and peduncle glabrous; sepals of fem. subequal, denticulate, mucronate, ciliate. *Achenes* compressed, tubercled.

9. **P. Helferiana**, *Wedd. in DC. Prodr.* xvi. i. 170; stem stout creeping, leaves long-petioled subfalcately ovate-oblong caudate quite entire, nerves pubescent beneath, male infl. capitate very stoutly peduncled.

TENASSERIM, *Helfer, Griffith*. ?ANDAMAN ISLANDS, *King's Collector*.

Very near to *P. Heyneana*, but the petioles are much longer, $\frac{1}{2}$ -1 $\frac{1}{4}$ in. The specimens are very imperfect in young male fl. only. The Andaman Islands plant has capitate fem. infl. with more slender peduncles.

10. **P. javanica**, *Wedd. Monogr.* 187; *DC. Prodr.* xvi. i. 170; quite glabrous, stem short, leaves long-petioled subfalcately oblong or elliptic-lanceolate obtusely caudate quite entire, base subacute, fem. cymes much branched very long-peduncled. *Miq. Fl. Ind. Bat.* i. ii. 239. *Pilea javanica*, *Wedd. in Ann. Sc. Nat. Ser. 4*, i. 187.

PENANG, *Curtis*. SINGAPORE, *Lobb*.—DISTRIB. Java ?.

Stem woody below. *Leaves* 4-7 in., and stipules as in *Helferiana*, but petiole 2-3 in. *Achenes* compressed, tubercled.—The authority for this being a Javan plant consists in specimens in Herb. Hook. ticketed "Java, Lobb;" but as Lobb also collected in Singapore, and corresponding specimens of Lobb's in Herb. Bentham are ticketed from Singapore, it is possible that the Javan habitat is an error.

11. *P. acaulis*, Hook. f.; stem very short and petioles and nerves beneath villous, leaves crowded at the top of the stem falcately elliptic-lanceolate obtusely acuminate, base acute, fem. cymes capitate very shortly peduncled.

PENANG; on damp rocks, *King's Collector*.

Stems 1-2 in., rooting up to the leaf-bases. *Leaves* 2-4 in., cystoliths obscure; petiole $\frac{1}{2}$ in. *Fem. cymes* $\frac{1}{2}$ in. diam.; flowers sessile; sepals narrowly linear, ciliate; achenes compressed, tubercled.

SPECIES UNKNOWN TO ME.

12. *P. procrdifolia*, Kurz in *Trimen Journ. Bot.* 1873, 330, and in *Journ. As. Soc. Beng.* xlv. ii. 149: monœcious, scandent, fleshy, glabrous, leaves 4-7 in. obversely or linear-oblong shortly or abruptly acuminate entire, base unequal acute, nerves 5-6 pairs, cystoliths slender, flowers white males in small subaxillary glabrous cymes, peduncle $\frac{1}{2}$ -1 $\frac{1}{4}$ in. slender, fem. forming dense axillary hemispheric clusters.

NICOBAR ISLANDS; in Katchall, Kurz.

Kurz observes that the leaves are very like those of *P. lavigata*, and (in *Beng. As. Soc. Journ.*) that the species is very near *P. frutescens*, which is a Javan hill species with serrate leaves. I find no reference elsewhere to *P. frutescens* and *lavigata*, both which names occur under *Procris* as species of Blume's.

32. *ELATOSTEMA*, Forst.

Herbs or undershrubs. *Leaves* alternate or with sometimes a minute leaf subopposite to the normal leaf, distichous, sessile or subsessile, usually very oblique and unequal-sided, triple-nerved at the base or above it; stipules intrapetiolar or lateral. *Flowers* very minute, crowded on sessile or peduncled unisexual usually involucre receptacles; invol. bracts rounded oblong or ovate, outer sometimes with a dorsal spur or horn, bases nearly free or more or less confluent in a fleshy circular or lobed disk margined with the tips of the bracts, margin rarely quite entire; bracteoles densely crowded, of male heads usually oblong, of fem. spatulate; the flowers are often collected in clusters, each surrounded by partial bracts, giving the head a lobed appearance. *MALE FL.* *Sepals* 4-5, 2 or more usually tubercled or spurred at the back. *Stamens* 4-5, inflexed in bud. *Pistillode* minute. *FEM. FL.* *Sepals* 3-5, very minute, much shorter than the ovary, persistent. *Staminodes* minute or 0. *Stigma* penicillate; ovule erect. *Achene* minute, ellipsoid or fusiform, usually ribbed, subtended by the most minute perianth. *Seed* usually exalbuminous, testa membranous; cotyledons ovate or semiterete.—Species about 50, natives of the tropics of the Old World, except Australia.

As in the case of *Pilea* (p. 551), the type specimens of the Indian species of this genus were so hastily named by Weddell in the Hookerian Herbarium, that I have had great difficulty in identifying many of them with his descriptions, and have failed in one or two instances. The presence of small leaflets opposite the leaves not being a constant character in some of the species where these do occur, and a very obscure one in others, I have not been able to use it as a sectional character. Probably much

better divisional characters than those here adopted will be found in the form of the free or confluent bracts of the male receptacles, but these are difficult of analysis in dried ones. The character of peduncled and sessile heads will, I expect, prove very deceiving, and be abandoned. The difficulty of describing the form and nervation of the leaves is great, from their variability; and the presence or absence of cystoliths on one or both surfaces is not constant in individual specimens of many species. In some species the male and fem. receptacles are in different individuals, in others in the same, whilst many species are either monœcious or diœcious, so that I can attach no importance to this character.

Sect. I. ANDROSYCE, *Wedd.* Male receptacle fleshy, exinvolucrate, fig-like, at first closed, latterly bursting irregularly and expanded.

1. **E. ficoides**, *Wedd. Monogr.* 306, t. 10; *DC. Prodr.* xvi. i. 171; leaves 5-9 in. subsessile obliquely oblong or obovate-oblong caudate sharply coarsely serrate from the base penninerved sparsely setose above. *E. Mariannæ*, *Clarke in Journ. Linn. Soc. Bot.* xv. 114. *Procris ficoidea*, *Wall. Cat.* 4635. *Androsyce indica*, *Wedd. mss.*

CENTRAL and EASTERN HIMALAYA, alt. 4-8000 ft.; Nepal, *Wallich*; Sikkim, *J. D. H.*, &c. KHASIA MTS., *Herb. Calcutt.* MUNIPORE; on Kohaima, alt. 6000 ft., *Clarke*.

Monœcious or diœcious, glabrous or sparsely pubescent. Stem 4-6 ft., grooved. Leaves membranous, brown when dry, base narrowed very unequal, cystoliths very minute; nerves 3-5 pairs, arched; stipules oblong-lanceolate. Male recepts pyriform or globose, splitting into very unequal lobes, then 1-2 in. diam.; peduncle 5-6 in., stout; flowers many, large. Fem. recept smaller, sessile, often in pairs. Achenes ellipsoid, acute at both ends, ribbed.

Sect. II. ELATOSTEMA PROPER. Male receptacle with usually a distinct involucre of many bracts, which are more or less free or confluent into a fleshy disk with the tips free or not; rarely laciniate (in *E. dissectum*).

* Male receptacles sessile or very shortly peduncled, peduncle rarely $\frac{1}{2}$ in. long (male recept unknown in *E. Walkeræ* and *cuneatum*). (See also *E. papillosum*, *decipiens*, *Treutleri* and *surculosum*.)

† Leaves acuminate or caudate.

2. **E. sessile**, *Forst. Char. Gen.* 106; glabrous or pubescent, stem simple, leaves 4-8 in. sessile or shortly petioled membranous obliquely oblanceolate or oblong caudate coarsely serrate from the base to the tip, recepts sessile or shortly peduncled, invol. bracts of male free broadly ovate or rounded coriaceous. *Wedd. Monogr.* 294, t. 9, f. 9; *DC. Prodr.* xvi. i. 173. *E. serratum*, *Forst. mss.* *E. pubescens*, *Pers. Synops.* ii. 557. *Procris sessilis*, *Hook. & Arn. Bot. Beech. Voy.* 70. *P. australis*, *Spreng. Syst.* iii. 846.

TEMPERATE and SUBTROPICAL HIMALAYA, from Chamba eastwards; alt. 4-8000 ft. ASSAM, SILHET, the KHASIA and NAGA HILLS. PENANG, *Curtis*; Perak, *King's Collector*. NILGHIRI HILLS, *Wight*, &c. CEYLON, Rambodde, alt. 4000 ft.—DISTRIB. China, Japan, Malay and Pacific Islands, Trop. Africa.

Stem 1-2 ft., usually prostrate and rooting below. Leaves greenish when dry, cystoliths very abundant especially above. Recepts solitary or 2-3, rarely more in each axil, $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.; peduncle rarely $\frac{1}{2}$ in., of fem. ebracteate; bracteoles very minute, villous, hyaline. Achenes very minute, ellipsoid, acute at both ends, ribbed.—The Australian plant referred here by Weddell is by Bentham regarded as a different species. *E. sessile* is a very variable plant; the following are the principal but ill-defined forms.

Var. *cuspidata*, Wedd. l. c.; leaves glabrous or setose above and pubescent on the nerves beneath, base acute rarely rounded or subauricled. *E. cuspidatum*, *Wight Ic.* t. 1983 (not 2091, f. 1). *E. affine*, *Wedd. in Ann. Sc. Nat. Ser. 4*, i. 188.—Himalaya, Silhet, Nilghiris.

Var. *pubescens*; stem and leaves more or less substrigosely tomentose, leaf-base acute or rounded.—Nilghiris, Naga Hills, Penang.

Var. *hispidula*; leaves smaller rugose, hispidly setose beneath.

Var. *polycephala*; leaves as in var. *cuspidata* but base auricled, glabrous or hispidulous beneath, receptacles small clustered shortly peduncled. *E. sessile*, *β. punctata*, *Wedd. l.c.* *E. polycephalum*, *Wedd. in Ann. Sc. Nat. l.c.* 189. *Procris polycephala*, *Wall. Cat.* 4629. *P. punctata*, *Ham. in Don Prodr.* 61.—Himalaya.

3. ***E. molle***, *Wedd. Monogr.* 298; *DC. Prodr.* xvi. i. 173; stem and leaf-nerves beneath strigosely pubescent, leaves 3–5 in. subsessile coriaceous obliquely elliptic-lanceolate acuminate or caudate crenulate or serrulate throughout their length strongly reticulate beneath, recepts sessile and subsessile, invol. bracts of male rounded confluent below. *Procris mollis*, *Wall. Cat.* 4633.

ASSAM; on the Duphla Hills, alt. 2000 ft., *Lister*. KHASIA MTS., *Herb. Calcutt.* ? CHITTAGONG, *Clarke*. PENANG, *Phillips*. SINGAPORE, *Wallich*.

Stem erect, stout, angular, branched. Leaves rather rigid, pale when dry, base very oblique, hardly auricled, sometimes petioled, nerves very strong beneath; cystoliths minute, crowded; stipules very long, $\frac{1}{2}$ –1 in., lanceolate. Heads diœcious; male $\frac{1}{2}$ – $\frac{2}{3}$ in. diam.; invol. bracts broad, scarious, puberulous. Fem. heads not seen.—The very small leaf-serratures are one good character of this species.

4. ***E. rupestre***, *Wedd. Monogr.* 304; *DC. Prodr.* xvi. i. 177; stem stout rigid erect and leaf-nerves beneath substrigosely tomentose, leaves 4–6 in. subsessile obliquely (or not) narrowly elliptic or linear-lanceolate caudate serrate from above the middle lower third many-nerved, base acute, recepts sessile or subsessile, invol. bracts rounded confluent at the base only. *Procris rupestris*, *Ham. in Don Prodr.* 60. *P. punctata*, *Wall. Cat.* 4627 A.

NEPAL, *Wallich*. KHASIA MTS., usually on rocks in beds of streams, alt. 1–4000 ft., *J. D. H.*, &c. CHITTAGONG, *Clarke*.—DISTRIB. Java (*Weddell*).

Diœcious. Stems 6–10 in., very stout, erect from a running stock, often branched. Leaves brown when dry, suberect, young silky, base sometimes very narrow and straight; cystoliths small, crowded; stipules $\frac{1}{2}$ – $\frac{3}{4}$ in., linear-lanceolate, acuminate. Receptacles sessile or subsessile, $\frac{1}{2}$ –1 in. diam.; invol. bracts of male rounded, pubescent or villous; bracteoles of fem. woolly. Achene very minute, warted.—Differs from *E. molle* in the narrower acutely serrate leaves. I have seen no Javan specimens.

5. ***E. sesquifolium***, *Hassk. Cat. Hort. Bogor.* 79; shrubby, leaves 4–10 in. (or less) subsessile or petioled obliquely oblong elliptic or lanceolate caudate-acuminate quite entire, cystoliths crowded conspicuous, recepts small usually crowded lobed subsessile, invol. bracts rounded, of male glabrate, of fem. tomentose. *Wedd. Monogr.* 308; *Miq. Fl. Ind. Bat.* i. ii. 243. *E. cuspidiferum*, *Miq. Pl. Jungh.* i. 22. *E. Miquelianum* & *Zollingerianum*, *Wedd. in Ann. Sc. Nat. Ser. 4*, i. 188. *E. integrifolium*, *Wedd. in DC. Prodr.* xv. i. 179. *E. lineolatum*, in part, *Herb. Ind. Or. H. f. & T.* *Procris integrifolia*, *Don Prodr.* 61. *P. piperifolia*, *Wall. Cat.* 4628. *P. sesquifolia*, *Reinw. in Blume Bijdr.* 54.

ASSAM and the lower KHASIA MTS., to CHITTAGONG, BURMA and the ANDAMAN and NICOBAR ISLANDS.—DISTRIB. Java.

A branching shrub, 2-6 ft.; branches terete, lower woody. *Leaves* 1-3 in. broad, pale greyish brown when dry, smooth, rarely with 1-2 teeth below the tip; nerves 3-5 pairs, arched; petiole 1-2 in. in Assam specimens. *Heads* small, often lobed or branched, male and fem. in the same or separate axils or plants. *Achene* minute, turbidly ellipsoid, ribbed.—Possibly a large state of *E. lineolatum*. A specimen from Assam has fem. recepts above and male below, the latter broken up into sessile capitate branched ebracteate cymes. The female recepts are also sometimes divided.

Var. tomentosa; stem and leaves beneath substrigosely or hirsutely tomentose. —Khasia Hills, alt. 3-5000 ft.

6. *E. lineolatum*, *Wight Ic. t.* 1984; herbaceous or shrubby, leaves 1-6 in. subsessile oblong or oblong-lanceolate or narrowly linear-oblong or cuneately obovate acuminate or caudate coarsely crenate toothed or serrate above the middle, base always acute or cuneate, cystoliths very crowded and conspicuous, recepts small pisiform solitary or crowded, invol. bracts rounded often confluent. *Wedd. Monogr.* 312; *DC. Prodr.* xvi. i. 181. *Procris punctata*, *Wall. Cat.* 4627 B.

TROPICAL HIMALAYA; from Kumaon eastwards to Bhotan and the Khasia Mts., and southwards to TRAVANCORE. CEYLON, ascending to 5000 ft.

It is impossible to frame a diagnostic character for this protean plant, whose forms as recognized by Weddell to be conspecific, are as dissimilar as those of *E. surculosum*. The inflorescence, flowers and invol. bracts and achenes are as in *sesquifolium*. The following are conspicuous varieties.

VAR. major, Thwaites Enum. 260; Wedd. in DC. l. c. 182; much branched, glabrous or tomentose on the branches and leaves beneath especially on the nerves, leaves 3-5 in. coarsely crenate or serrate above the middle. *E. integrifolium*, *var. semiserrata*, *Wedd. in DC. l. c.* 180. *E. rupestre*, *var.?* *Herb. Ind. Or. H. f. & T.* —Himalaya, Khasia and Western Ghats.

VAR. integrifolia; leaves 3-7 in. falcately lanceolate or oblong-lanceolate gradually caudate with one or a few coarse teeth towards the tip. *E. cuspidatum*, *Wight Ic. t.* 2091, f. 1 (not 1983). —Khasia Mts., Nepal, Sikkim and the Concan.—This in colour and foliage seems to unite *E. sesquifolium* and *lineolatum*, and may be referred to either. A specimen from the Concan has broader leaves with more spreading nerves, and their base rounded on one side.

VAR. Helferi; much branched, leaves 1-2 in. obliquely cuneate or oblong-cuneate or lanceolate gradually or suddenly caudate with 2-5 very large crenatures or teeth above the middle on each side, recepts heads very small.—Tenasserim, *Helfer (Kew Distrib.* 4503).

VAR. petiolaris, Thwaites mss.; leaves 5 in. linear-lanceolate narrowed into a petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. with 3-5 very large teeth above the middle on each side and a tail 1 in. long, cystoliths abundant beneath, absent above except along the margin and midrib.—Ceylon, *Thwaites (C.P.* 3920); a very remarkable state.

VAR. falcigera, Thwaites Enum. 260; very slender and much branched, leaves 2-5 in. narrowly falcately linear-lanceolate entire or with one or two large teeth on each side.—Ceylon.

VAR. bidentata; slender, much branched, leaves $\frac{3}{4}$ –1½ in. lower half cuneately obovate abruptly ending in two large teeth, between which rises an upper half which is as long ligulate obtuse, smaller elliptic leaves occur lower on the branchlets.—Ceylon, *Sir G. McKenzie*; Adams Peak, *Thwaites (C.P.* 456).—A very singular form; in some specimens the 2 large teeth are replaced by 3 or 4 rounded ones. The lower pair of nerves often end in the teeth.

VAR. linearis, Thwaites Enum. 260; branches very slender, leaves 2-4 by $\frac{1}{8}$ – $\frac{1}{6}$ in. linear obtuse quite entire or with 1-2 large teeth, nerves very obscure.—Ceylon.

VAR. tomentella; small, leaves 1-3 in. falcately oblong-lanceolate pubescent on both surfaces.—Tenasserim, on Molyet, alt. 5000 ft., *Gallatly*.

7. **E. Walkerae**, *Hook. f.*; stem short simple tips strigosely pubescent, leaves 3-4 in. sessile or very shortly petioled broadly obliquely oblong or cuneate-obovate caudate coarsely crenate above the middle or upper third, sparsely setose on both surfaces, penninerved, base obliquely cordate, fem. recepts small sessile, invol. bracts confluent into a fleshy disk with a membranous crenate ciliate margin.

CEYLON; Central Province, *Walker*, alt. 4000 ft., *Thwaites* (C.P. 3767).

Stem 4-10 in., woody below, terete, flexuous, rather stout. *Leaves* sometimes nearly as broad as long, rather thin, dull dark green when dry, setæ of the upper surface with sometimes bulbous bases, of the lower softer; nerves 4-5 pairs above the basal, spreading, and costa very slender and faint; cystoliths on the upper surface, minute. *Recepts* closely appressed to the branch. *Achenes* turgidly ellipsoid, ribbed, pedicel very short.—Male fl. unknown.

8. **E. subincisum**, *Wedd. Monogr.* 314; *DC. Prodr.* xvi. i. 182; herbaceous, glabrous, leaves 1-2½ in. sessile membranous obliquely oblong-lanceolate caudate deeply subpinnatifidly crenate or serrate or base subauricled on the lower margin, stipules linear-lanceolate, recepts sessile or subsessile, invol. bracts rounded outer stoutly mucronate.

SIKKIM HIMALAYA, alt. 7-10,000 ft., *J. D. H.*, *Clarke, King*.

Stem 8-10 in., erect, usually slender, simple or branched. *Leaves* drying brown, nerves 3-4 pairs above the basal; cystoliths very minute. *Recepts* about ¼-½ in. diam., often androgynous; bracts hardly exceeding the flowers, inner keeled; fem. bracts membranous; bracteoles ciliate. *Achenes* ellipsoid, ribbed.—The herbaceous habit distinguishes this from *E. acuminatum*. It resembles var. *subincisa* of *E. surculosum*, but the absence of the small opposite leaves and the minute cystoliths distinguish it.

9. **E. acuminatum**, *Brong. in Duperr. Voy. Bot.* 211; slender, much branched, often woody below, quite glabrous, leaves subsessile 1-6 in. membranous obliquely oblong or oblanceolate caudate coarsely crenate-toothed above the lower third or higher, base acute or subacute, cystoliths invisible, recepts small or minute sessile, invol. bracts minute. *Wedd. Monogr.* 311, t. 9 D, f. 1-4; *DC. Prodr.* xvi. i. 181; *Miq. Fl. Ind. Bat. i.* ii. 244. *E. membranifolia*, *Kurz in Journ. As. Soc. Beng.* xlii. (1823) ii. 204. *Procris acuminata*, *Poir. Encycl.* iv. 629. *P. membranacea*, *Reinw. in Blume Bijl.* 512. *Boehmeria acuminata*, *Gaud. in Freyc. Voy. Bot.* 494. *Langeveldia acuminata*, *Gaud. Voy. Uranie Bot.* 494.

KHASIA MTS., *Griffith* (*Kew Distrib.* 4538), *Clarke*, alt. 1-3000 ft. TENASSERIM at Thoungyen, *Brandis*. PERAK, *Scortechini*, *King's Collector*. MALACCA, *Griffith*, &c. TRAVANCORE, on the Anamallay Hills, *Beddome*. CEYLON; in the Central Province, alt. 3000 ft., *Macrae*, *Thwaites*.—DISTRIB. Java.

Stem smooth, terete, woody below, slender, branches divaricate. *Heads* sessile, solitary, monœcious or diœcious, males pisiform, fem. smaller.—*Thwaites'* specimens have leaves 6 by 2½ in., *Beddome's* 3-5 by 1-1½; the Perak, Malacca and Tenasserim ones 2-3 by ½-¾ in.; these last have fewer teeth and much longer entire points, they are sometimes glaucous beneath, and resemble those of *E. lineolatum*, var. *Wightii*; from all forms of which species the invisibility of cystoliths under an ordinary lens at once distinguishes this. The Khasia, Ceylon and Tenasserim form is that of a slender shrub with smooth terete stiff woody branches. In *Thwaites'* specimens I find very minute punctiform cystoliths.

10. **E. platyphyllum**, *Wedd. Monogr.* 301; *DC. Prodr.* xvi. i. 175; tall, robust, leaves 6-10 by 3-7 in. sessile or petioled coriaceous broadly obliquely rhomboid to oblong-lanceolate cuspidate or caudate-acuminate

crenulate or serrulate from near the often auricled base, male receipts lobed or clustered sessile or shortly peduncled exinvolucrate, invol. bracts confluent in a fleshy disk with lobed margins.

TROPICAL HIMALAYA; Kumaon, *Thomson*. Sikkim, alt. 1-6000 ft., *J. D. H.*, *Clarke*. KHASIA MTS., alt. 4-5000 ft., *Griffith*, &c. NAGA HILLS, on Kohima, alt. 6000 ft., *Clarke*.

The largest and stoutest Indian species, 4-5 ft. high, yellow green when dry; stem terete, grooved when dry, branches often zigzag. *Leaves* coriaceous, largest 6-10 by 3-4½ in., narrowest 6 by ¾-2 in., smooth or scaberulous above, base very variable, glabrous or pubescent beneath, cuneate or more often with a large round or incurved hooked auricle on the lower margin, which is produced far below the acute upper; cystoliths crowded; nerves all oblique; stipules 1 in., or less. *Receipts* ½-1 in. diam.; peduncle sometimes ½ in.; fem. small, tomentose; invol. bracts confluent with free tips. *Achene* ovoid, dotted with red.—Very variable; the leaves are sometimes quite entire below the middle.

11. ***E. Stracheyanum***, *Wedd. in Ann. Sc. Nat. Ser. 4, i. 188; Monogr. 328, t. 9, f. 18; DC. Prodr. xvi. i. 189*; very slender herbaceous, stem long creeping sending up flaccid tomentose branches, leaves 1-2 in. sessile membranous obliquely oblong or oblong-lanceolate acuminate strongly serrate throughout sparsely setulose above pubescent beneath, cystoliths minute obscure, male receipts small subsessile, invol. bracts few free rounded green pubescent.

WESTERN HIMALAYA; Kumaon, alt. 64,000 ft., *Strachey & Winterbottom*. KHASIA MTS., alt. 5-6000 ft., *J. D. H. & T. T.*

Creeping stem 2-3 ft.; branches 4-10 in. *Leaves* very membranous, lower base rounded, a minute opposite green leaflet ½ in. long is sometimes present; nerves very slender; stipules lanceolate. *Male receipts* ¼-½ in. diam., globose, few-fl.; bracteoles linear-oblong, ciliate; sepals apiculate. *Fem. heads* not seen, described by *Weddell* as smaller than the males with obovate bracteoles, sepals shorter than the staminal nodes, and the achenes as broadly elliptic and obtusely acuminate.—The leaves in form and serrature resemble those of *E. sessile*, which is perhaps its nearest ally, and from which it differs in size and its creeping habit.

12. ***E. Hookerianum***, *Wedd. Monogr. 309; DC. Prodr. xvi. i. 180*; herbaceous, quite glabrous, stem long slender and rooting below, leaves 2-4 in. membranous or coriaceous sessile falcately oblong-lanceolate acuminate or caudate serrate in the upper half, base broad auricled on the lower margin, cystoliths minute or obscure, stipules lateral linear or filiform persistent, receipts sessile or the male shortly peduncled, male invol. bracts free mucronate, fem. confluent in a fleshy disk with a membranous crenate ciliate margin.

SIKKIM HIMALAYA, alt. 4-6000 ft., *Herb. Griffith, J. D. H.*, &c. KHASIA and NAGA HILLS, alt. 6000 ft., *Clarke*.

Monœcious or diœcious. *Stem* creeping below for sometimes a great length, then erect or inclined, stout or slender, simple or branched. *Leaves* green when dry, very uniform along the stem, rarely straight with acute bases, cystoliths imperceptible or crowded along the very margin; stipules ¼-½ in. *Male fl.* long-pedicelled; bracts and bracteoles glabrous; fem. fl. on a very thick pedicel shorter than the achenes, bracteoles ciliate. *Achenes* ellipsoid, obtuse, irregularly ribbed.

VAR. ? *peduncularis*; leaves less falcate, base narrowed, cystoliths abundant.—Sikkim, alt. 4-5000 ft., *Clarke*.

†† *Leaves small short, tip rounded or cuspidate.*

13. ***E. reptans***, *Hook. f.*; stem slender creeping and rooting through-

out its length pubescent or tomentose leafy throughout, leaves $\frac{1}{2}$ – $1\frac{1}{2}$ in. membranous sessile broadly obliquely oblong sharply serrate nearly throughout, tip rounded, lower base auricled, cystoliths crowded minute, male recepts small sessile, invol. bracts few rounded hyaline, outer free and sepals with a long slender dorsal spur.

SIKKIM HIMALAYA, at the foot of the outer hills, alt. 1–4000 ft., *Herb. Griffith* (*Kew Distrib.* 4535), &c. CHITTAGONG, at Burkul, *Clarke*.

Stem 1–2 ft., spreading from a perennial stock, flaccid, simple or branched. *Leaves* glabrous or nerves pubescent beneath, green or yellow when dry; nerves spreading; cystoliths minute but conspicuous; stipules small. *Male recepts* $\frac{1}{4}$ in. diam., globose; invol. bracts and bracteoles almost hyaline, with remarkably slender spurs; bracteoles ciliate.—Weddell has named this (in *Herb. Hook.*) *E. sessile*, var. *minor*, but it has no affinity with that species. It is very near *E. cornutum*, differing in the sessile heads and pubescence, and if, as is possible, the characters of sessile and peduncled heads are deceiving, it may prove a form of that plant.

14. *E. pusillum*, *Clarke mss.*; dwarf, very slender, suberect, glabrous or pubescent, leaves few $\frac{1}{2}$ –1 in. membranous sessile obliquely elliptic or oblong obtuse entire or with a large tooth on each margin, base acute with sometimes an opposite leaflet, recepts minute sessile, invol. bracts free oblong or lanceolate ciliate.

TEMPERATE HIMALAYA; Simla, alt. 7–8000 ft., *Thomson*; Kumaon, alt. 10–11,000 ft., *Duthie*; Sikkim, alt. 10,000 ft., *Clarke*.

Stem 1–6 in., annual, simple, solitary, flaccid. *Leaves* glabrous or puberulous; nerves very faint; cystoliths very many and crowded, large for the size of the plant. *Recepts* $\frac{1}{2}$ – $\frac{1}{6}$ in. diam., of both sexes sessile; bracteoles like the bracts, but smaller. *Achene* fusiform, striate.

15. *E. cuneatum*, *Wight Ic. t.* 2091, f. 3; dwarf, stem stout and leaves pubescent, leaves few $\frac{3}{4}$ – $1\frac{1}{2}$ in. sessile falcately cuneate or hatchet-shaped, coarsely crenate above the middle, tip rounded or subacute, base subauricled with sometimes a minute opposite leaflet, fem. heads sessile, invol. bracts of fem. confluent below in a fleshy disk, tips ovate acuminate ciliate produced beyond the flowers. *Wedd. Monogr.* 330; *Dalz. & Gibs. Bomb. Fl.* 239; *Miq. Fl. Ind. Bat.* i. ii. 246. *E. Webbianum*, *Wedd. in Ann. Sc. Nat. Ser. 4*, i. 190. *E. approximatum*, *Wedd. in DC. Prodr.* xvi. i. 190. *Procris approximata*, *Wall. Cat.* 4630.

SIKKIM HIMALAYA, alt. 6000 ft., *Clarke*. The CONCAN, on old walls, &c., *Lav*, &c. TENASSERIM, *Gomez*; at Mergui, *Griffith* (*Kew Distrib.* 4545).—DISTRIB. Java.

Stem 4–6 in., simple, glabrous or strigose. *Leaves* membranous, drying brown, often sparsely setose above, crenate chiefly on the lower margin; nerves very slender with connecting arches within the margin, basal pair not reaching the middle; cystoliths numerous, slender; stipules ovate. *Fem. recepts* $\frac{1}{2}$ – $\frac{1}{4}$ in. diam.; invol. bracts pubescent; bracteoles ciliate. *Achene* minute, ellipsoid, ribbed.

** Male receptacles on usually long peduncles; short in *E. decipiens* and *Treutleri*, sometimes in *E. Clarkei* and others; sessile in forms of *E. surculosum*. (Male fl. unknown in *E. Griffithii* and *procridioides*.)

† Leaves acuminate or caudate (except in forms of *E. surculosum*).

a. Bracts of male receptacle rounded, or broadly ovate, none produced into a spur beyond the receptacle.

16. *E. dissectum*, *Wedd. Monogr.* 314; *DC. Prodr.* xvi. i. 182;

quite glabrous, erect, leaves 3-5 in. sessile or petioled obliquely or falcately oblanceolate or broadly or oblong-ovate acuminate coarsely crenate or serrate from the middle of the lower margin upwards upper subentire, base acute, male recepts long-peduncled, receptacle when large lobed or lacerate often to the base exposing the flowers, fem. sessile.

SIKKIM HIMALAYA, alt. 3-8000 ft., and KHASIA Mts., alt. 4-6000 ft., *J. D. H., Clarke.* MISHMI Mts., *Griffith.*

Monœcious or diœcious. *Stem* simple, erect from a shortly creeping base, 8-12 in., stout and subsucculent or slender, and leaves drying green. *Leaves* rather thick, narrowed to the entire bases, most so in Khasian specimens, which are often very acute and distinctly petioled; cystoliths very many, minute, slender; nerves meeting in the intramarginal basal one; stipules lateral, subulate or lanceolate. *Male recepts* $\frac{1}{2}$ -1 in. diam., lobed; lobes fleshy, fringed with small ovate acute glabrous bracts; flowers large, pedicelled, 1-2 sepals spurred; fem. recepts much smaller, depressed, bracteoles ciliate. *Achenes* ellipsoid, subcompressed, rather fleshy, not ribbed or striate.—The male fl. are much larger than usual in the genus. Small specimens 4-8 in. high have oblanceolate leaves 2 by $\frac{1}{4}$ - $\frac{3}{4}$ in.

17. **E. Griffithii**, *Hook. f.*; quite glabrous, stem stout erect, leaves 5-6 in. subsessile coriaceous obliquely oblanceolate acuminate base narrow acute obtusely serrate from near the base penninerved, fem. recepts long-peduncled large fleshy irregularly lobed with crenulate ciliate margins.

UPPER ASSAM; Mishmi Hills, *Griffith (Kew Distrib. 4537).*

Stem 8-10 in., erect from a deusely matted fibrous root, probably fleshy. *Leaves* green when dry; cystoliths minute, abundant above and on the nerves beneath; basal nerves reaching about half-way; stipules $\frac{1}{2}$ - $\frac{1}{2}$ in., linear, acute, hyaline. *Male recepts* 1-1 $\frac{1}{2}$ in. diam.; bracts confluent in a fleshy disk, with crenulate margins, and branching nerves; peduncles 1-2 $\frac{1}{2}$ in.; bracteoles ciliate, membranous, outer broadly oblong, inner narrower or subspathulate, those towards the disk deformed very short; fem. fl. very shortly pedicelled. *Achene* ellipsoid, acute at both ends.—Named *E. ficoideum* by Weddell in *Herb. Hook.* (to the male receptacles of which the females of this bear some resemblance), but it is a very different species, and probably nearest *E. dissectum*. The male fl. are unknown.

18. **E. papillosum**, *Wedd. Monogr. 327; DC. Prodr. xvi. i. 188*; stem stout erect tomentose above, leaves 4-6 in. sessile or shortly petioled thick obliquely elliptic or subrhombic ovate caudate-acuminate crenate or toothed, nerves beneath pubescent, cystoliths microscopic or 0, male recepts stoutly peduncled, invol. bracts large broad rounded, fem. subsessile. *Procris peduncularis*, *Wall. Cat. 4634 B.*

SILHET, CACHAR and the KHASIA HILLS, alt. 1-4000 ft., *Wallich, &c. CHITTAGONG, Lister.*

Stem 8-12 in., erect from the swollen or shortly inclined base, fleshy, naked below. *Leaves* rather fleshy, drying yellow-brown, opaque, base unequally cuneate or subauricled on the lower margin; nerves few, sunk in the tissue; stipules lanceolate or linear. *Male recepts* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., hemispheric; outer invol. bracts glabrous, free, fleshy; bracteoles linear-oblong, ciliate; fem. recepts rather smaller than the males. *Achenes* ellipsoid, acute at both ends, acutely ribbed, the ribs rather granular and interrupted, with granules in the interspaces.

19. **E. Clarkii**, *Hook. f.*; quite glabrous, stem simple stout erect rigid, leaves 4-6 in. subsessile coriaceous straight lanceolate acuminate crenate-serrate from a little above the straight acuminate base, male and fem. recepts peduncled subglobose, invol. bracts of male rounded, of fem.

ovate obtuse or acute pubescent, achenes narrowly oblong terete quite smooth.

LOWER BENGAL; at Shooshung, near Mymensingh, *Clarke*. Also in MUNNIPORE and the NAGA HILLS, alt. 500 ft., *Clarke*.

Stem erect from a short creeping base, probably succulent, hard angled and grooved when dry, naked below. *Leaves* the narrowest of the large-leaved species, drying rigid and yellowish, opaque; basal nerves produced to near the tip, lateral faint very oblique; stipules linear-oblong, membranous, deciduous; cystoliths minute, conspicuous in the youngest leaves only of the Mymensingh specimens, but all over the upper surface of the Naga Hills ones. *Recepts* $\frac{1}{2}$ –1 in. diam., often lobed; invol. bracts coriaceous, concave, ciliate; bracts of fem. much more numerous, outer sometimes shortly spurred at the back; peduncles $\frac{1}{2}$ –1 in., erect, rather slender.

20. **E. Wightii**, *Hook. f.*; quite glabrous, stem stout branched, leaves 3–4 in. sessile subfalcately oblong-lanceolate subcaudately acuminate very coarsely subserrately toothed from above the lower third base subacute, cystoliths abundant, male recepts long and stoutly peduncled, invol. bracts rounded membranous, fem. sessile much smaller.

NILGHIRI MTS.; at Avalanche, *Wight* (*Kew Distrib.* 2692).

Diœcious. *Stem* erect from the root, succulent, branches divaricate. *Leaves* 3–7 in., rather succulent, yellowish when dry, base unequal, of lower margin straight or rounded; cystoliths very many, small; basal nerves hardly produced beyond the middle, supra-basal one or two pairs not inarching; stipules very short, broad. *Male recepts* $\frac{1}{4}$ – $\frac{1}{2}$ in.; peduncle 1–2 in., spreading, bracts green, glabrous; fem. smaller, silvery; bracteoles linear, fimbriate. *Achenes* fusiform, ribbed.

b. *Bracts of male receptacle very unequal, 2 or more of the outer spurred or acuminate and produced beyond the others* (or rounded in some vars. of *E. sterculosum*).

21. **E. procridioides**, *Wedd. in DC. Prodr.* xvi. i. 180; erect, quite glabrous, leaves 4–6 in. sessile or shortly petioled elliptic or obliquely ovate-oblong acuminate quite entire, base unequal, nerves spreading, male recepts long-peduncled large, outer invol. bracts ovate or ovate-lanceolate acuminate, 2 or more with dorsal flattened horns exceeding the others.

The KHASIA MTS., *Griffith*; alt. 6000 ft., *Clarke*. UPPER ASSAM, in the Tea districts, in the MISHMI HILLS. UPPER BERMA, *Griffith*.

Stem erect from the base, probably fleshy, simple or branched, stout or slender. *Leaves* fleshy or thin, opaque and dark greenish brown when dry, paler beneath, base unequally cuneate or acute; nerves 4–5 pairs above the basal, spreading; cystoliths small, slender, numerous; petiole short; stipules $\frac{1}{4}$ – $\frac{1}{2}$ in. *Male recepts* 1 in. diam. and less; peduncle 1–3 in., slender or stout; invol. bracts confluent in a fleshy disk with many ovate acute points, glabrous; bracteoles cuneate; flowers large, many; 2 or more sepals horned.—*Female recepts* not seen.

22. **E. decipiens**, *Wedd. in DC. Prodr.* xvi. i. 176; stem often tall stout erect from a long creeping base and leaf-nerves beneath rusty puberulous, leaves 4–8 in. sessile or petioled membranous broadly obliquely oblong or obovate-oblong caudate-acuminate coarsely serrate from above the subauricled base, male recepts sessile or shortly peduncled, 2 outer invol. bracts with long fleshy horns.

KHASIA MTS.; at Nunklow, alt. 4–5000 ft., *J. D. H.* MUNNIPORE; on Kohima, alt. 6000 ft., *Clarke*.

Stem rather fleshy, 2–3 ft. high. *Leaves* amongst the largest of the Indian

species, dark green when dry except the rufous nerves beneath; nerves strong, spreading, lower margin at the base produced below the upper and more or less auricled; cystoliths numerous in the Mishimi specimen, very obscure in the others. *Male receptacles* solitary or binate, $\frac{2}{3}$ in. diam.; peduncle $0\frac{1}{2}$ in., very stout; invol. bracts glabrous, confluent below, horns fleshy laterally compressed, flowers shortly pedicelled.—The Khasia specimen is named *E. papillosum* by Weddell in Herb. Hook.

23. *E. Treutleri*, Hook. f.; stem tall stout erect fleshy glabrous, leaves 4–6 in. petioled rather fleshy obliquely oblong acuminate, serratures few small above the middle only, base not auricled, nerves few broad quite glabrous beneath, cystoliths very obscure, fem. recepts large sessile and stoutly peduncled, invol. bracts confluent in a fleshy disk tips of two large and produced into long horns, of the rest very short ovate acute.

SIKKIM HIMALAYA, alt. 5000 ft., *Dr. Treutler*.

Stem probably when fresh as thick as a goose-quill. *Leaves* quite opaque when dry, dark green, quite entire except in the upper third; nerves 2 pairs above the basal, very broad compared with those of *decipiens*, &c.; petiole $\frac{3}{4}$ – $\frac{1}{2}$ in., stout; stipules of uppermost leaves $\frac{1}{2}$ – $\frac{3}{4}$ in., of lower $\frac{1}{8}$ in. *Fem. recepts* $\frac{1}{2}$ –1 in. diam.; the fleshy disk has a narrow rim from the margin of which the long horns proceed, whilst the very numerous smaller bracts are inserted just within the rim; bracteoles linear, fimbriate. *Achene* young, very shortly pedicelled, fusiform, striate.—A remarkable species, of which I have but one specimen.

24. *E. sikkimense*, Clarke in Journ. Linn. Soc. Bot. xv. 125; stem erect rusty-puberulous above, leaves 4–8 in. sessile or shortly petioled membranous obliquely or falcately oblong or obovate elliptic caudate acuminate very unequal-sided coarsely serrate above the middle, base cuneate or acute, nerves glabrous beneath, male and fem. recepts long-peduncled, invol. bracts confluent 2 outer produced into long spreading spurs.

SIKKIM HIMALAYA; on wet rocks, alt. 4500–8000 ft., J. D. H., Clarke, Treutler, &c.

Stem 1–3 ft., simple, erect from a creeping base, succulent, stout or slender. *Leaves* variable, from 4 by 2 in. to 8 by $2\frac{1}{2}$ in., the larger usually very falcate with the upper margin convex, dark olive-green when dry, base always acute and nearly equal, teeth very large; nerves slender, quite glabrous beneath, lateral 6–8 pairs; stipules $\frac{1}{2}$ –1 in., linear, tip rounded or acute. *Recepts* pink, monœcious with the males above or diœcious; peduncles 1–4 in., stout or slender; male $\frac{1}{3}$ –1 in. diam., with the flowers in two masses, one to each bract; spurs of bracts laterally flattened, $\frac{1}{8}$ – $\frac{1}{4}$ in., stout or slender; bracteoles of male oblong, ciliate; flowers small; sepals rounded, outer gibbous at the back; fem. recepts smaller; bracteoles spatulate, fimbriate. *Achenes* very minute, fusiform, ribbed.—Treutler's specimens from low elevations are more succulent, and hence approach *P. decipiens*, and I should not be surprised if these proved forms of one variable species.

25. *E. nasutum*, Hook. f.; stem glabrous widely creeping at the base, leaves 2–3 in. sessile membranous broadly falcately ovate acuminate coarsely sharply serrate from above the auricled lower base to the tip and half-way down the upper margin, nerves glabrous beneath, male recepts peduncled, one or two outer invol. bracts with thick obtuse spreading horns, fem. sessile. *E. nigrescens*, Clarke in Journ. Linn. Soc. Bot. xv. 125 (not of Miquel).

SIKKIM HIMALAYA, alt. 5–7000 ft., J. D. H., Clarke, Kurz.

Stem 2-3 ft. long or more, stout or slender; base rooting. *Leaves* blackish green when dry, often sparsely setulose above, nerves 3-5 pairs, spreading, laxly reticulate; cystoliths invisible; stipules $\frac{1}{2}$ - $\frac{3}{4}$ in., lanceolate or linear-oblong, acute, obtuse or apiculate. *Receptacles* diœcious, or monœcious with the fem. below; males $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.; peduncles $\frac{1}{2}$ -1 $\frac{1}{2}$ in., slender; invol. bracts glabrous, outer confluent, horns $\frac{1}{2}$ - $\frac{1}{4}$ in. laterally flattened, flowers small; fem. recepts with small invol. bracts, and bracteoles and minute achenes as in *E. sikkimense*, but sessile.

26. *E. stellatum*, Hook. f.; stem erect rusty-puberulous, leaves 4-6 in. sessile submembranous falcately oblong caudate-acuminate coarsely serrate in the upper half, base acute, nerves glabrous beneath, male and fem. recepts on long slender peduncles, invol. bracts very many confluent below all with stellately spreading spur-like horns.

SIKKIM HIMALAYA; at Rungbee, alt. 4-5000 ft., *Clarke*.

Stem 6-8 in., suberect from the base, rigid and red-brown when dry. *Leaves* quite glabrous, thicker than in *E. sikkimense* and *nasutum*, cystoliths small many and obvious in some leaves, invisible in others; base always acute; nerves rather strong; stipules $\frac{1}{2}$ - $\frac{3}{4}$ in., linear-oblong, acute. *Recepts* diœcious or monœcious with the males above, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; peduncles 1-2 in., filiform; invol. bracts confluent in a fleshy puberulous disk, outer broadly triangular; tips of both inner and outer free, subulate, $\frac{1}{10}$ in. long, with here and there one twice or thrice as long; male fl. pinkish, sepals rounded; fem. fl. very minute; bracteoles fimbriate, outer linear, inner spatulate, and achenes as in *E. sikkimense*.

27. *E. surculosum*, Wight Ic. t. 2091, f. 4; stem erect from the rooting base tufted glabrous or pubescent above stout or slender, leaves $\frac{1}{2}$ -3 in. glabrous sessile membranous or coriaceous polymorphous subentire crenate serrate or pinnatifid each with a small oblong subopposite one that is often deflexed, cystoliths numerous, stipules minute, male recepts sessile long-peduncled, invol. bracts of male rounded or the outer horned, fem. smaller sessile, achene slender ribbed. *Wedd. Monogr.* 329. *E. diversifolium*, *Wedd. in DC. Prodr.* xvi. i. 189. *E. lætum*, *Wedd. in Ann. Sc. Nat. Ser. 4, i.* 190. *Procris diversifolia, elegans & læta*, *Wall. Cat.* 4631, 4632, 4637. ? *P. monandra*, *Ham. in Don Prodr.* 61.

TEMPERATE HIMALAYA, from Simla, alt. 4-7000 ft., to Sikkim, alt. 4-9000 ft. The KHASIA MTS., abundant, alt. 4-6000 ft. NAGA HILLS, alt. 9000 ft., *Clarke*. NILGHIRI MTS., *Wight*. CEYLON; Central Province, ascending to 6000 ft.

Diœcious or monœcious. *Stem* 3-12 in., stout and fleshy or slender, always tufted, prostrate or ascending, base not or very shortly creeping, stoloniferous. *Leaves* usually numerous, increasing in size upwards, membranous coriaceous or almost fleshy, small opposite ones $\frac{1}{10}$ - $\frac{1}{4}$ in., green, usually oblong, obtuse, entire, the larger sometimes imbricate upwards and the smaller imbricate downwards; in form they vary from almost orbicular to cuneiform elliptic oblong ovate-lanceolate lanceolate or falcately oblanceolate; they are always perfectly glabrous, green or yellowish when dry; the tips vary from obtuse to caudate, the margin usually in the upper half only, but sometimes from the base, subentire to 2-3 crenate, or many-toothed serrate or pinnatifid, the bases from very acute to obtuse and rounded, very rarely subauricled on one side; nerves few faint, even in the most membranous forms, basal pair prolonged to the middle or beyond it. *Male recepts* $\frac{1}{2}$ - $\frac{1}{2}$ in. diam., pale green; peduncles longer than the leaves, sometimes three or four times as long, very slender; invol. bracts free, broad, membranous, all rounded or one or more with a very broad spreading or recurved acute laterally compressed spur or horn, the base of which occupies the whole length of the bract; flowers few, long-pedicelled; fem. very much smaller; bracteoles ciliate.—I have seen no Nilghiri specimens. The small subopposite leaves are the best character for this species, which is extraordinarily protean in habit and foliage. The following are extreme forms, which seem to pass into one another in a perplexing way.

a. *Receptacles all sessile.* Male unknown in var. *serpens*.

VAR. *elegans*; stem 2-8 in. slender glabrous or pubescent above, leaves few membranous upper $1\frac{1}{2}$ -2 in. from obliquely ovate to lanceolate serrate, base acute or gibbous, lower leaves rounded obovate or cuneiform, small subopposite leaves various, heads very small, invol. bracts rounded. *Procris elegans*, Wall. l. c.—The commonest form

VAR. *pinnatifida*; excessively slender 8-12 in. simple or more often divaricatingly branched, leaves rather distant very membranous upper $\frac{1}{2}$ -2 in. lanceolate pinnatifidly cut base acute, lower leaves small obovate entire or crenate, small subopposite leaves linear obovate or oblong, receptacles very small, invol. bracts rounded.—Sikkim, alt. 7-9000 ft.

VAR. *subincisa*; stem 6-10 in. rather slender simple or branched, leaves more coriaceous and less deeply cut than in var. *pinnatifida*, receptacles larger, invol. bracts acuminate.—Sikkim, alt. 3-5000 ft.

VAR. *ciliata*; stem short 4-6 in. very stout and leaves beneath sometimes scurfily rusty-pubescent, leaves $\frac{1}{4}$ - $\frac{3}{4}$ in. fleshy rounded elliptic or cuneiform crenate ciliate or not, uppermost sometimes larger and lanceolate, recepts very small few-fld., invol. bracts rounded or acute.—Nepal, Sikkim, alt. 6-8000 ft.

VAR. *rigidiuscula*, Thwaites mss.; quite glabrous, stem 4-8 in. simple slender or stout, leaves $\frac{1}{2}$ in. very many uniform spreading cuneately oblong or lanceolate obtusely serrate or crenate towards the tip base acute, recepts very minute 2-3-fld., invol. bracts few acute.—Ceylon, on Adam's Peak, Thwaites.

VAR. *serpens*; stem elongate prostrate glabrous flexuous, leaves $\frac{1}{2}$ in. uniform oblong coarsely obtusely serrate above the middle base acute, fem. recepts small, bracts as in var. *zeylanica*.—Ceylon, Walker.—Male recepts unknown.

b. *Male receptacles long-peduncled.*

VAR. *pedunculosa*; stem 6-10 in. stout simple or branched, leaves membranous or rather coriaceous, upper 2-3 in. obliquely ovate or lanceolate coarsely serrate above the middle, lower rounded cuneiform or obovate crenate, small opposite leaves sometimes $\frac{1}{2}$ in. long spreading or deflexed, male peduncles longer or shorter than the leaves, 2 or more of the invol. bracts with long or short recurved beaks.—Khasia and Nilghiri Mts.

VAR. *crassa*; stems short very stout and leaves fleshy, leaves as in var. *pedunculosa* but smaller and imbricating upwards, small opposite leaves imbricating downwards, peduncles of male longer than the leaves.—Khasia Mts., alt. 4-6000 ft.

VAR. *zeylanica*; habit and leaves of var. *pedunculosa* but invol. bracts more numerous lanceolate acute, male shorter, fem. strongly ciliate.—Ceylon, ascending to 6000 ft.

†† *Leaves short, broad, tips rounded or acute.* (See also *E. surculosum*.)

28. **E. obtusum**, Wedd. in Ann. Sc. Nat. Ser. 4, i. 190; Monogr. 324; DC. Prodr. xvi. i. 187; stem slender creeping and rooting retrorsely hirsute or scurfy, leaves $\frac{1}{4}$ - $\frac{1}{2}$ in. sessile membranous uniform cuneately obovoid or orbicular coarsely crenate above the middle glabrous or ciliate, tip rounded, base rounded or semicordate, male recepts long-peduncled few-fld., outer invol. bracts 2-3 ovate acute spurred or long-cuspidate.

TEMPERATE HIMALAYA; from Kumaon to Bhotan, alt. 7-10,000 ft., reaching 12,000 ft. in Sikkim. KHASIA HILLS, alt. 4-5000 ft., Griffith, Clarke.

Stems 1-2 ft., flaccid, branched. Leaves greenish, paler beneath, membranous, cystoliths visible on the upper surface only, slender; stipules lanceolate, acute. Recepts diœcious, $\frac{1}{4}$ in. diam., of both sexes peduncled; peduncle $\frac{1}{2}$ -1 in., filiform, sparsely hispid; invol. bracts few, broadly ovate, glabrous, narrowed into a slender spur or horn; male fl. few, large, long-pedicelled.—I have seen no fem. recepts.

29. *E. cornutum*, Wedd. *Monogr.* 316; *DC. Prodr.* xvi. i. 183 (*excl. syn.* *Procris gibbosa*); stem slender creeping and rooting flaccid, leaves 1-2½ in. sessile or petioled obliquely or falcately oblong or orbicular obtuse or acute sharply serrate nearly throughout, base auricled on the lower side or on both and amplexicaul, male recepts long-peduncled, outer invol. bracts free rounded concave with a long slender dorsal spur.

SIKKIM HIMALAYA, alt. 1-4000 ft., *J. D. H., Clarke.* KHASIA Mts., alt. 0-4000 ft., *J. D. H. & T. T.*

Stems trailing, branched, glabrous. *Leaves* membranous, pale green, puberulous on the nerves beneath, cystoliths minute, slender; stipules lanceolate, acuminate. *Male recepts* ⅓-½ in. diam., pale green; peduncle 1-3 in.; invol. bracts glabrous, membranous, hyaline; bracteoles linear, hyaline; male fl. few, sepals apiculate.—*Fem. recepts* not seen. See remarks under *E. reptans*.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

30. *E. ciliatum*, *Clarke mss.*; stem simple ascending from a creeping base glabrous, leaves 5-7 in. few membranous subsessile rather obliquely linear-oblong or oblanceolate acuminate coarsely serrate pale beneath base narrowed acute or obtuse sparsely setose with slender bristles above and especially towards the margins, fem. recepts small subsessile from the stem below the leaves, invol. bracts confluent in a thick tomentose entire disk, achene costate.

MUNNIPORE; on the Barak River, alt. 300 ft., *Clarke.*

Stem ascending from a rather fleshy creeping and stoloniferous base, 6-10 in. high, rather slender, naked below. *Leaves* green when dry, young strongly ciliate, penninerved; nerves 4-6 pairs above the basal, strizosely ciliate beneath, slender but prominent, basal pair reaching beyond the middle; teeth acute or cuspidate; cystoliths abundant; stipules ¼ in., oblong, green, sometimes in pairs or scattered on the stem below the leaves. *Fem. recepts* ¼ in. diam. *Achene* turgidly ellipsoid, acute.—The specimens are indifferent. The ciliate leaves are very peculiar.

31. *E. ELLIPTICUM*, Wedd. in *DC. Prodr.* 186; quite glabrous, stem long slender creeping and rooting branched, leaves ½-1½ by ⅓-1 in. petioled fleshy elliptic obtuse nearly equilateral quite entire rigid when dry, base rounded or subcordate triple-nerved, cystoliths minute on the upper surface only, petiole ⅓-¼ in., stipules small ovate-lanceolate, male recepts (very young ½ in. long) shortly peduncled solitary ovoid.

MISHMI HILLS; at Khoshai, *Griffith.*—May be a *Pellionia* near *P. Duvauana*.

32. *E. NOVARÆ*, *Kurz in Journ. Beng. As. Soc.* xlv. ii. 149; a glabrous branched undershrub, leaves 3-6 in. alternate subsessile membranous black when dry obliquely lanceolate or ovate-lanceolate repand serrate subulate-acuminate, cystoliths scattered, lateral nerves confluent towards the margin, stipules ⅓-½ in. subulate deciduous, flowers subglabrous as in *E. lineolatum*, crowded in the axils.

NICOBAR ISLANDS; at Nankowry (Novara Exped.).

Differs from *E. lineolatum* in the blackening leaves, different nervation, smaller flowers and flower clusters.—Description from Kurz; my specimens (from Dr. King) are very indifferent.

URTICA, *Griff. Notul.* iv. 404; *Ic. Plant. Asiat.* t. 562, f. 2, from Tongse, in Bhotan, may be an *Elatostema*, but the transverse nervation is unlike any species known to me.

33. **PROCRIS**, Juss.

Succulent herbs or shrubs, often epiphytic, with the characters of *Elatostema*, but the male flowers in axillary cymes or clusters, the fem. only being on a receptacle. *Achene* ovoid or elliptic, striolate.—Species 5 or 6, Asiatic, African and Polynesian.

1. **P. lævigata**, *Blume Bijl.* 508; quite glabrous, leaves obliquely oblanceolate acuminate entire or crenate-serrate above the middle, flowers from the naked branches, males in small sessile clusters, fem. in shortly peduncled small recepts. *Wedd. in DC. Prodr.* xvi. i. 192; *Thwaites Enum.* 260; *Miq. Fl. Ind. Bat.* i. ii. 248; *Hook. Ic. Pl.* t. 1295. *P. Wightiana*, *Wall. Cat.* 4638; *Wedd. Monogr.* 336. *Elatostema lævigatum*, *Hassk. Cat. Hort. Bogor.* 79. *E. Wightianum*, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 188.

SIKKIM HIMALAYA, alt. 1–4000 ft., *J. D. H.*, and BHOTAN, *Clarke*. KHASIA and MISHMI HILLS, alt. 1–4000 ft., *Griffith*, &c. MUNNIPORE, *Clarke*. DECCAN PENINSULA, *Wight*. CEYLON, ascending to 6000 ft.—DISTRIB. Java, Borneo, Tropical Africa.

A succulent epiphytic undershrub, 2–5 ft. high; stem as thick as the thumb below. *Leaves* 6–10 in., narrowed into the short petiole. *Fem. recepts* $\frac{1}{4}$ – $\frac{1}{2}$ in., peduncles $\frac{1}{8}$ – $\frac{1}{4}$ in. *Achenes* ovoid, slightly compressed.—Subopposite or alternating minute leaflets occur, but not constantly, in this and the following.

2. **P. frutescens**, *Blume Bijl.* 510; leaves oblong-obovate or oblanceolate cuspidate nearly entire, male cymes lax-fl., fem. heads solitary sessile. *Wedd. Monogr.* 335; *DC. Prodr.* xvi. i. 192; *Miq. Fl. Ind. Bat.* i. ii. 248. *Elatostema frutescens*, *Hassk. Hort. Bogor.* 79.

PENANG, *Porter, Curtis*.—DISTRIB. Java, Borneo.

An epiphyte; stem woody below, branches succulent. *Leaves* 6–8 in., very thick; petiole $\frac{1}{4}$ in. *Male fl.* not seen. *Fem. heads* $\frac{1}{2}$ in. diam. *Achenes* ellipsoid.

34. **BOEHMERIA**, Jacq.

Shrubs or small trees. *Leaves* opposite and alternate, toothed, 3-nerved; stipules usually free. *Flowers* in unisexual axillary or spiked racemed or paniced clusters. MALE FL. *Perianth* 3–5-lobed or -parted, valvate. *Stamens* 3–5, inflexed in bud. *Pistillode* clavate or globose. FEM FL. *Perianth* tubular, 2–4-toothed, fruiting sometimes angled winged or swollen. *Ovary* included; stigma filiform, persistent; ovule erect. *Achene* closely invested by the perianth, crustaceous, at length free. *Seed* albuminous; cotyledons ovate.—Species about 45, chiefly tropical.

* *Flower clusters* axillary. *Leaves* opposite or alternate.

1. **B. malabarica**, *Wedd. Monogr.* 355; *DC. Prodr.* xvi. i. 203; monœcious, leaves alternate subequal or the alternate smaller elliptic or ovate to oblong acuminate or caudate crenulate or serrulate from above the rounded or cordate base glabrous above pubescent beneath, clusters axillary, fruiting perianth elliptic or roundish pubescent, margins obtuse. *Kurz For. Fl.* ii. 422; *Thwaites Enum.* 260. *B. travancorica*, *Bedd. For. Man.* 225 (*B. ramiflora*). t. 27, f. 2. *Urtica malabarica*, *Wall. Cat.* 4610. *U. aquatica*, *Moon Cat. Ceyl. Pl.* 62.

SIKKIM HIMALAYA, ascending to 5000 ft., *J. D. H.*, &c. MISHMI HILLS, *Griffith*.

SILHET, the KHASIA Mts. and CHITTAGONG to TENASSERIM. The WESTERN GHATS, from the Concan southwards. CEYLON, common.—DISTRIB. Java.

An erect shrub or small tree; branches terete, pubescent. *Leaves* 4–8 in., membranous, sometimes rugose above; petiole $\frac{1}{4}$ –3 in.; stipules small, deciduous. *Flower clusters* small. *Flowers* minute, sessile. *Achene* ovoid, closely invested by the acute perianth.

2. **B. Helferii**, *Blume Mus. Bot.* ii. 201; monœcious, leaves opposite subequal broadly ovate-cordate acuminate sharply toothed sparsely hairy above, nerves beneath finely pubescent, clusters axillary confluent unisexual, fem. fl. concealed by the large bracts, perianth tubular 2-toothed. *Wedd. in DC. Prodr.* xvi. i. 204; *Kurz For. Fl.* ii. 423.

TENASSERIM, *Helfer (Kew Distrib.* 4585).

Branches nearly glabrous. *Leaves* 3–4 in., membranous, quite smooth, serrate to the base; nerves very slender; petiole 1–3 in., very slender.—*Leaves* correctly described by Blume as opposite, but by Mueller (no doubt by lapsus, and followed by Kurz), as alternate.

3. **B. Didymogyne**, *Wedd. in DC. Prodr.* xvi. i. 204; herbaceous, monœcious, leaves alternate subequal ovate acuminate coarsely crenate toothed above the middle, sparsely hairy above, base cuneate obtuse or rounded, clusters axillary androgynous, fem. fl. usually adnate in pairs. *Kurz For. Fl.* ii. 423. *Didymogyne boehmerioides, Weddell mss.*

TENASSERIM; at Moulmein, *Parish*.

Stem simple, 1–2 ft., soft, glabrous. *Leaves* 3–4 in., very membranous, sometimes unequal-sided; nerves extremely slender; petiole 2–2½ in., slender.—A very obscure plant, of which better specimens are wanted.

4. **B. sidæfolia**, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 203; monœcious, leaves opposite and alternate subequal elliptic or ovate-lanceolate caudate-acuminate sharply serrulate hairy on both surfaces, clusters axillary and on leafy branchlets, fruit oblong or lanceolate compressed hispid. *B. diffusa, Wedd. Monogr.* 356; *Kurz For. Fl.* ii. 423. *B. comosa, Wedd. in DC. Prodr.* xvi. i. 205. *Urtica viminea, Wall. Cat.* 4616 (in part). *U. comosa, Ham. mss.*

TROPICAL and SUBTROPICAL HIMALAYA, from E. Nepal and Sikkim, ascending to 4000 ft., to Mishmi, *Griffith*. ASSAM, the GARROW and KHASIA HILLS, PEGU and TENASSERIM, *Wallich, &c.*—DISTRIB. Java.

A slender erect or diffuse undershrub, hairy villous or glabrate. *Leaves* 3–5 in., membranous, smooth or rugulose, serrulate to the base; nerves sometimes strongly reticulate beneath; petiole $\frac{1}{2}$ –2½ in. *Flower clusters* many, often confluent.—Very variable in leaf and pubescence.

** *Flower clusters* in simple or paniculately branched spikes.

† *Leaves* alternate.

B. NIVEA, Hook. & Arn. in Bot. Beech. Voy. 214; monœcious, leaves alternate all equal broadly ovate or orbicular acuminate crenate-serrate scabrid above, snow-white except the nerves beneath, stipules free, clusters in axillary panicles, fruit oblong compressed hairy. *Wedd. Monogr.* 380, t. 11, f. 10–17; *DC. Prodr.* xvi. i. 206; *Hook. Kew Journ. Bot.* iii. (1851) 315, t. 8; *Brand. For. Fl.* 402; *Benth. Fl. Hongk.* 331; *Miq. Fl. Ind. Bat.* i. ii. 253; *Blume Mus. Bot.* ii. 210. *B. tenacissima, Gaud. Bot. Freyc. Voy.* 500; *Blume l. c.* 211, t. 56. *B. candicans, Hassk. Pl. Jav. Rar.* 203. *Urtica*

nivea, Linn. *Sp. Pl.*; Jacq. *Hort. Vind.* t. 166; Wall. *Cat.* 4606. *U. tenacissima*, Roxb. *Fl. Ind.* iii. 590; Wight *Ic.* t. 688. *U. candicans*, Burm. *Fl. Ind.* 297; Blume *Bijl.* 503. *U. utilis*, Hort. Procris nivea, Gaud. l. c. 499.

Cultivated in the warmer parts of INDIA, especially Assam and Bengal.—DISTRIB. Native of the Malay Islands, China and Japan.

A shrub with herbaceous shoots; branches and petioles softly hairy. *Leaves* 3-6 in.; above subscabrid, beneath white with densely appressed hairs; base cuneate or subcordate; teeth triangular often up-curved; petiole $1\frac{1}{2}$ -4 in.; stipules subulate, deciduous. *Panicles* shorter than the petiole, sessile; fem. upper. *Styles* exserted, hairy.—Weddell distinguishes as *β. candicans* the form under this name, and that of *tenacissima*, by the more robust habit, larger longer petioled concolorous leaves.

5. ***B. rugulosa***, Wedd. in *Ann. Sc. Nat. Ser.* 4, i. 200; *Monogr.* 373; DC. *Prodr.* xvi. i. 207; dioecious, leaves alternate coriaceous elliptic-lanceolate acuminate crenulate strongly 3-nerved, above smooth or rugulose glabrous, beneath pale finely velvety-pubescent, stipules connate, clusters in simple spikes each with a cordate bract, fem. short simple pendulous, fem. perianth elliptic compressed ciliate. *Brand. For. Fl.* 403; *Blume Mus. Bot.* ii. 212. *B. nervosa*, Madden in *Journ. As. Soc. Beng.* xvii. i. 587. *Urtica rugosula*, Wall. *Cat.* 4597. *U. venosa*, Wall. *Cat.* 460 B.

SUBTROPICAL HIMALAYA; from Garwhal to Bhotan, alt. 2-4000 ft., Wallich, &c.

A small tree, branchlets robust, glabrous, petioles and leaves beneath hoary or yellowish white, bark wrinkled pale. *Leaves* 3-5 in., teeth obtuse, nerves penninerved, nervules anastomosing; stipules ovate; petiole $\frac{1}{2}$ -1 in., stout. *Fl. clusters* pisiform; receptacle hirsute. *Achenes* elliptic, stipitate, acute at both ends, ventricose.—Dr. King sends as var. *tenuis* a Sikkim plant with thinner ovate coarsely serrate perfectly glabrous leaves 3-5 in. long; it is in male fl. only. Clarke gathered the same at 7000 ft. elevation, and refers it to *malabarica*, but its inflorescence is spicate. It appears to me to be quite a different species.

†† *Leaves opposite (and alternate in B. platyphylla).*

6. ***B. macrophylla***, Don *Prodr.* 60; monœcious, leaves opposite lanceolate caudate-acuminate serrulate base acute above sparsely hispid rugulose and pustular, beneath softly or hispidly pubescent or glabrate, spikes elongate pendulous leafless simple or branched below, clusters with lanceolate bracts, fruit obovate-cuneate compressed ciliate with a 2-4-toothed neck. Wedd. *Monogr.* 375, t. 11, f. 1-9; DC. *Prodr.* xvi. i. 209; *Brand. For. Fl.* 403; *Kurz For. Fl.* ii. 424; *Blume Mus. Bot.* ii. 217. *B. penduliflora*, Wedd. in *Ann. Sc. Nat. Ser.* 4, i. 199. *Urtica penduliflora*, Wall. *Cat.* 4595. *U. angustifolia*, Ham. mss., and *U. macrostachya*, Wall mss., ex Don l. c. *U. pulcherrima*, Wall. *Cat.* 4596.

SUBTROPICAL HIMALAYA, from Kumaon to Mishmi, ascending to 4000 ft. KHASIA MTS., alt. 2-4000 ft. AVA HILLS, *Kurz*.

A shrub or small tree; branchlets stout, obtusely 4-angled, glabrous or strigose. *Leaves* 6-12 in., teeth obtuse, pustules on surfaces often perforate; upper surface sometimes bullate, under with deep hollows between the nervules; petiole $\frac{1}{2}$ -1 in., strigose or glabrous; stipules lanceolate, midrib hairy. *Spikes* shorter than or equalling the leaves; clusters globose, $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.

7. ***B. Kurzii***, Hook. f.; quite glabrous except the spikes, leaves opposite elliptic-oblong or lanceolate acuminate quite entire subsilvery beneath 3-nerved, spikes very slender simple tomentose, fruit very minute

pedicelled narrowly ellipsoid beaked villous much shorter than the slender style.

PEGU, Kurz.

Branches slender. Leaves 5-7 by 2-2½ in., coriaceous, finely reticulate, base acute; nerves strong, somewhat glandular in the axils beneath; petiole ½-1½ in., rather stout. Spikes about equalling the leaves; male fl. villous.—Near *B. macrophylla*, but quite glabrous, with much more slender spikes, and smaller villous fruits with a longer style. The leaves more resemble *B. rugulosa*, but are opposite and quite entire. Kurz has named one specimen *B. Hamiltoniana*, Wedd., and another "nov. sp." In Herb. Calcutt. it is called var. *Kurzii* of *B. platyphylla*. I think there are traces of crenatures in some of the leaves, but they are very obscure.

8. *B. platyphylla*, Don Prodr. 60; monœcious or diœcious, leaves mostly opposite broadly ovate elliptic or orbicular acuminate or caudate coarsely toothed pubescent tomentose scaberulous or glabrate on both surfaces, base rounded or cordate, spikes usually longer than the leaves simple or sparingly branched, fruit compressed or angled. Wedd. Monogr. 364; DC. Prodr. xvi. i. 210; Brand. For. Fl. 403; Maximov. Diagn. xx. 641.

TROPICAL and SUBTROPICAL HIMALAYA, from Simla eastwards, ascending to 7000 ft., and southwards to BEHAR and TRAVANCORE on the West, and TENASSERIM on the East. CEYLON; ascending to 6000 ft.—DISTRIB. Malay Islands, China, Japan, Africa.

Shrubby, branches soft, glabrous or subtriglose. Leaves 3-9 in., teeth usually large, triangular; 3 nerves all penninerved; petiole 1-5 in. Fl. clusters piiform. Fruit narrowed or beaked at the 4-toothed tip.—A most variable plant. B andis makes three principal varieties of the North-Western forms: 1. *macrostachya*, with long-petioled leaves and simple fem. spikes; 2. *rotundifolia*, with orbicular cuspidate leaves; 3. *scabrella*, with smaller leaves and shorter spikes. Weddell enumerates still other forms, which may be approximately defined as follows.

B. PLATYPHYLLA PROPER; leaves rounded sparsely hispid or pubescent, base eglandular, fem. spikes very long pendulous. *B. macrostachya*, Wedd. in Ann. Sc. Nat. Ser. 4, i. 199; *Blume Mus. Bot.* ii. 224. *B. Wightiana*, *Blume l. c.* 217. *B. mauritiana*, Wedd. l. c. 200; *Blume l. c.* 216. *B. caudata*, Poir. in Bonpi. Jard. Malm. t. 15; Kurz l. c. 424. *Splitgerbera macrostachya*, Wight Ic. t. 1977. *Urtica macrostachya*, Wall. Cat. 4582 (excl. D). *U. platyphylla*, Ham. mss.

Var. *zeylanica*, Wedd. in DC. l. c. 211; leaves membranous elliptic ovate or ovate oblong caudate-acuminate crenate serrate throughout sparsely hispid above, nerves beneath hairy, spikes simple much shorter than the leaves.—Ceylon, Thwaites, with var. *scabrella*, under C. P. 2197.

Var. *scabrella*, Wedd. l. c.; leaves orbicular elliptic or obovate cuspidate usually rugose above and lacunose beneath, spikes short subsimple erect. *B. scabrella*, Gaud. Bot. Freyc. Voy. 499; *Miquel Fl. Ind. Bat.* i. ii. 252. *B. ourantha*, Miq. Pl. Jungh. i. 33; *Blume l. c.* 221. *Splitgerbera scabrella*, Dalz. & Gibs. Bomb. Fl. 239. *Urtica caudata*, Burm. Fl. Ind. 198; *Blume Bijl.* 492. *U. scabrella*, Roxb. Fl. Ind. iii. 581; Wight Ic. t. 691; Wall. Cat. 4581. *U. uragera*, Steud. Nomencl. ii. 736.—All India, common.—Clarke (Journ. Linn. Soc. Bot. xv. 125) considers this a very distinct species.

Var. *rugosissima*, Wedd. l. c. 212; leaves coriaceous rugose serrate throughout hispid above pubescent beneath, spikes subsicled shorter than the leaves. *B. rugosissima*, Miquel Pl. Jungh. i. 32; Fl. Ind. Bat. i. ii. 251; *Blume Mus. Bot.* ii. 222. *Urtica rugosissima*, Reinw. in Blume Bijl. 490.—Ceylon, Sumatra, Java.

Var. *tomentosa*, Wedd. l. c.; leaves subcoriaceous acutely serrate softly tomentose or villous on both surfaces, teeth medium-sized? spikes simple often short and very stout. *B. tomentosa*, Wedd. in Ann. Sc. Nat. Ser. 4, i. 200.—Khasia Mts., alt. 4-5000 ft., Sikkin and Bhotan.

Var. *rotundifolia*, Wedd. l. c. 212; leaves broadly elliptic ovate or rounded cuspidately caudate tail often long and broad tomentose pubescent hispid or smooth, teeth usually very large sometimes confined to the upper part. *B. rotundifolia*, *Don Prodr.* 60. *B. caudigera*, *Wedd. l. c.* 199; *Blume l. c.* 219. *Urtica caudigera*, *Wall. Cat.* 4585. *U. blanda*, *Wall. mss.*—Himalaya, Khasia, the Concan, Ceylon.—Clarke (*Journ. Linn. Soc. Bot.* xv. 125) regards this as a very distinct species.

Var. *canescens*, Wedd. l. c. 213; leaves membranous hoary serrated to the base green when dry. *B. canescens*, *Wedd. l. c.* 200; *Blume l. c.* 224. *B. ternifolia*, *Don Prodr.* 59. *Urtica macrostachya*, var. *canescens*, *Wall. Cat.* 4582 D.—Kumaon, Nepal ("Herb. Madr." in *Wall. Herb.* is probably an error).

Var. *cinerascens*; stem slender flaccid hoary and with long spreading hairs, leaves membranous ovate toothed to the base, spikes short simple slender. *Urtica cinerascens*, *Wall. Cat.* 4591.—Nepal, *Wallich*. Duphla Hills, *Booth*.—Probably a shade-loving form passing into *U. Hamiltoniana*, but the teeth are larger.

Var. *longissima*; glabrous, leaves ovate or elliptic-oblong coarsely crenate-toothed base acute rounded or subcordate, petiole 3–6 in., spikes 12–18 in. extremely slender, fl. clusters very small hispid, beak of fruit long, style short.—Pulney Mts., *Wight* (*Kew Distrib.* 2707). Nilghiris, *Gardner*. Ceylon, *Walker*.

9. **B. Hamiltoniana**, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 199; *Monogr.* 371; branches slender glabrous, leaves opposite membranous long-petioled lanceolate or oblong-lanceolate finely acuminate crenulate or serrulate or subentire, base acute or obtuse, petioles of opposite pairs usually very unequal, spikes simple very slender, fl. clusters small, styles shorter than or equalling the minute fruit. *Kurz For. Fl.* ii. 424; *Clarke in Journ. Linn. Soc. Bot.* xv. 124. *B. platyphylla*, var. *Hamiltoniana*, *Wedd. in DC. Prodr.* xvi. i. 213. *Urtica Hamiltoniana*, *Wall. Cat.* 4590 A, B?

TROPICAL HIMALAYA, from Nepal, *Wallich*, to Bhotan. KHASIA and MISHMI HILLS. Pegu and Martaban, *Kurz*.

Differs from the more flaccid green states of *B. platyphylla* in being more glabrous, the leaves subentire or with very small serratures. The axils of the basal leaf-nerves are often 2-glandular.—Hamilton's specimens are from Goalpara (Assam), and more hairy than the others with leaves 7 by 3 in.

10. **B. polystachya**, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 200; *Monogr.* 370; *DC. Prodr.* xvi. i. 215; glabrous, branches stout, leaves large opposite or alternate coriaceous flat broadly ovate ovate-cordate or orbicular acuminate or cuspidate rather coarsely crenate or toothed from above the base, spikes panicle much shorter than the leaves, fruit sessile hispid, style short. *Clarke in Journ. Linn. Soc. Bot.* xv. 125. *Urtica polystachya*, *Wall. Cat.* 4584. *U. venosa*, *Wall. Cat.* 4602 A.

TEMPERATE HIMALAYA; Kumaon, alt. 7000 ft., *Duthie*; Nepal, *Wallich*; Sikkim, alt. 4–9000 ft., *J. D. H.*, &c.; Bhotan and Mishmi Hills, *Griffith*. KHASIA Mts., alt. 4–5000 ft., *Griffith*, &c. Ava, *Wallich*.

A robust shrub. Leaves 5–12 by 2½–6 in.; petiole stout, 2–5 in. Spikes often shorter than the petioles, erect even in fruit.—Weddell in *DC. Prodr.* says of this that he formerly saw it in Herb. Wall., and then thought it a form or subvar. of *platyphylla*. It is, however, a much more temperate plant, and with Clarke I think it must be regarded as distinct. Wallich's Ava specimen is named *B. rugulosa* by Weddell, but the leaves are strictly opposite. The specimen is not in flower.

DOUBTFUL SPECIES.

The following Indian species amongst others recklessly founded by Blume (*Mus. Bot.* ii. 216, &c.), often on very imperfect materials, are no doubt, as Weddell thought they probably are, varieties of *B. platyphylla*.

B. HETEROIDEA, *Bl.*, East Indies, *Helfer*, has the perianth winged and achene with a thickened margin.

B. CUSPIDATA, *Bl.*, from Nepal.

B. SPICIFLORA, *Bl.* (*Caturus spiciflorus*, *Herb. Jacq. f.*, not of *Linn.*), East Indies.

B. HUGELIANA, *Bl.*, East Indies, *Hugel*.

B. SUBPERFORATA, *Wedd. Monogr.* 383 (*Urtica subperforata*, *Wall.*).

35. *CHAMABAINIA*, *Wight*.

A slender diffuse herb. *Leaves* opposite, toothed, 3-nerved; stipules in pairs large, orbicular, scarious, enclosing the young flower-clusters, persistent. *Flowers* 4-merous, in axillary clusters; perianth, &c., as in *Bœhmeria*, but stigma ovate fimbriate spreading.

C. cuspidata, *Wight Ic. t.* 1981; *Wedd. Monogr.* 387, t. 12. *C. squamigera*, *Wedd. in DC. Prodr.* xvi. i. 218. *Bœhmeria squamigera*, *Wedd. in Ann. Sc. Nat. Ser. 4*, i. 203. *Urtica squamigera*, *Wall. Cat.* 4592.

TROPICAL HIMALAYA; Garwhal, alt. 2-7000 ft., from Kumaon eastwards to Sikkim, alt. 4-8000 ft. KHASIA HILLS, alt. 4-5000 ft. NILGHIRI HILLS, *Wight*, &c. CEYLON, *Thwaites*.

Stem rooting and branching, more or less pubescent, branches ascending. *Leaves* $\frac{1}{2}$ -2 in., membranous, ovate, acute, serrate, base rounded or cuneate 3-nerved, glabrous or sparsely pubescent above, more so beneath; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules 4 at each node, very conspicuous, brown when dry. *Male fl.* in the upper axils, shortly pedicelled; sepals hairy, mucronate. *Fem. fl.* in dense clusters; bracteoles small, lanceolate; perianth hirsute, compressed. *Achene* compressed, ovate, acute.—Closely resembles *Droguetia diffusa* in habit and foliage.

36. *POUZOLZIA*, *Gauz.*

Characters of *Bœhmeria*, but with the flowers in axillary clusters, never in naked spikes, and the slender style jointed on to the top of the ovary and deciduous.—Species estimated at about 50, but reduceable to a very much smaller number, all tropical, chiefly Asiatic.

The Indian species of this genus are extraordinarily variable, and have been inordinately multiplied by *Wight* and *Blume*, the former of whom, however, first detected the fact overlooked by previous authors, that winged and wingless perianths occurred in fruits of the same clusters. *Bennett's* descriptions of *Wallich's* species in the "*Flora Javæ*" are quite insufficient, and overlooked the facts that winged and wingless fruits afforded no specific character, and that tetrandrous and pentandrous flowers was a remarkably constant one; it is further evident that he did not work upon the original set of *Wallich's* plants in the Linnean Society, for the numbers and habitats of some of these plants which he cites, on *Wallich's* authority, are not those attached to the specimens in that Society's possession. *Weddell* does not appear to have consulted *Wallich's* Herbarium, or he could not have confounded the northern *P. hirta* (or *quinquenervis*) with the common Deccan species. I have been fortunate in finding in *Wight's* Herbarium types of all the species he figured in his *Icones*. These were evidently published in great haste, at the very end of his Indian career, and without due consideration; in which respect his treatment of the genus is a remarkable deviation from the standard of that invaluable work.

Phenax pentandrus, *Blume* (*P. Sonneratii*, *Wedd.*; *Pouzolzia Sonneratii*, *Gaud.*), widely distributed tropical American plant closely allied to *Pouzolzia*, has been collected in India (Madras?) by *Sonnerat* and by *Helfer* in Tenasserim (*Kew Distrib.* 4584). It differs from *Pouzolzia* in the minute fem. perianth and conspicuously in the numerous broad imbricating scarious bracts which surround the flowers.

SECT. I. *POUZOLZIA proper*. Lobes or segments of the male perianth convex or gibbous at the back.

* Leaves toothed or serrate, base 3-nerved, nerves branching.

1. *P. viminea*, Wedd. in DC. *Prodr.* xvi. i. 228; Brand. *For. Fl.* 405; Kurz *For. Fl.* ii. 425. *P. borbonica*, Wight *Ic. t.* 2100, f. 44. *P. ovalis*, Miq. *Pl. Jungh.* i. 24. and *Fl. Ind. Bat.* i. ii. 259; Wedd. *Monogr.* 410. *Boehmeria viminea*, Wall. mss.; Blume *Mus. Bot.* ii. 202. *B. sanguinea*, Hassk. *Hort. Bogor.* 367. *B. ovalis*, Miq. in Zoll. *Syst. Verz.* ii. 100. ? *B. frondosa*, Don *Prodr.* 59. *Urtica viminea*, Wall. *Cat.* 4616 (in part). *U. sanguinea*, Blume *Bijd.* 501. *U. Chiple*, punctata & parvifolia, Ham. mss. *Margarocarpus vimineus*, Wedd. in *Ann. Sc. Nat. Ser.* 4, i. 203. *Leptocnide borbonica*, Blume *Mus. Bot.* l. c. 294.

TROPICAL and SUBTROPICAL HIMALAYA, from the Sutlej eastwards, ascending to 7000 ft. in Sikkim; and from ASSAM to TENASSERIM and PERAK.—DISTRIB. Malay Islands.

Shrubby or subarborescent; branchlets and petioles pubescent or strigose. Leaves $\frac{1}{2}$ –5 in., alternate, ovate- or oblong-lanceolate, acuminate, above smooth or scaberulous, beneath strigose or pubescent with a grey or white tomentum; petiole $\frac{1}{2}$ –2 in. Flowers in axillary clusters, pubescent or hoary, stamens 4. Fruit angled and obscurely margined.—In Weddell's var. *fulgens*, the leaves are often snow-white beneath.

** Leaves quite entire, lateral nerves more or less branched.

2. *P. indica*, Gaud. in Freyc. *Voy. Bot.* 503; leaves opposite or alternate ovate to lanceolate, nerves one pair above the 3 basal sparingly branched, fruit with a 2-fid beak. Wedd. *Monogr.* 398, t. 13 B. and in DC. *Prodr.* xvi. i. 220; Benn. *Pl. Jav. Rav.* 67; Wight *Ic. t.* 1980, f. 1, 2100, f. 40; Dalz. & Gibs. *Bomb. Fl.* 240. *P. suffruticosa*, Wight *Ic. t.* vi 43, and *P. procumbens*, t. 2099, No. 35. *P. parva*, Blume *Mus. Bot.* ii. 234. *Parietaria indica*, Linn. *Mant.* 128. *Urtica triplinervis* & *glomerata*, Wall. *Cat.* 4617, 4619. *U. suffruticosa*, Roxb. *Fl. Ind.* iii. 583; Wall. *Cat.* 4618; Wight *Ic.* 694.

Throughout TROPICAL and SUBTROPICAL INDIA, from the Indus (at Iskardo, alt. 8000 ft., Clarke), eastward to Burma, and southward to Malacca and CEYLON.—DISTRIB. Malay Islands, China.

A perennial rooted herb; erect or prostrate, hoary pubescent hirsute or glabrate; stem stout or slender. Leaves $\frac{1}{2}$ –1 rarely 2–4 in., membranous, obtuse acute or acuminate, base usually very acute; petiole $\frac{1}{2}$ –1 in. Flowers in axillary clusters, strigose with simple or hooked hairs; stamens 4 rarely 5. Fruit subequally ribbed, winged or not.—Of the following varieties *P. angustifolia* is the only well-marked one.

VAR. *angustifolia*, Wedd. in DC. l. c. 221; tall, leaves mostly alternate, narrowly lanceolate or ovate-lanceolate. *P. angustifolia*, Wight *Ic. t.* 2100, f. 39. *P. glomerata*, Hassk. *Cat. Hort. Bogor.* and Wedd. *Monogr.* 401.—Malacca and Perak.

VAR. *alienata*, Wedd. l. c.; leaves mostly opposite long-petioled ovate base rounded. *P. alienata*, Gaud. l. c. *P. zeylanica*, Benn. l. c. 67; Wight *Ic. t.* 2101, f. 45. *P. tenuis* & *heterophylla*, Blume *Mus. Bot.* ii. 233, 237. *Boehmeria alienata*, Willd. *Sp. Pl.* iv. 341. *B. nana*, Don *Prodr.* 60. *Urtica alienata*, Linn. *Syst. Ed.* 13, 709; Roxb. *Fl. Ind.* iii. 582; Wight *Ic. t.* 693. *U. nana*, Ham. mss. *Parietaria zeylanica*, Linn. *Fl. Zeyl.* n. 371, and *Sp. Pl.* 1492.—Common in India.

VAR. *tetraptera*, Wedd. l. c. 222; leaves larger mostly alternate hairy on both surfaces, petiole short, fruit usually with 4 wings produced upwards. *P. tetraptera*, minor, pilosa, Johnsoniana & pyramidata, Wight *Ic. t.* 2100, fs. 42, 43, 46, 47, 48. *P. trichophora*, Hohenack. *Herb. Ind. Or.* No. 179.—Common in the Deccan.

VAR. *diffusa*; creeping or prostrate or with the branches ascending, leaves all opposite elliptic or ovate, stamens usually 5, fruit ribbed and narrowly 4-winged. *P. diffusa*, *Wight Ic.* t. 2099, f. 36; *Wedd. Monogr.* 394, and in *DC. l. c.* 226.—Nilghiris.

VAR. *microphylla*, procumbent, diffuse, leaves $\frac{1}{2}$ in. opposite subsessile ovate acute base rounded or cordate appressed villous on both surfaces, fruit ribbed and narrowly winged. *P. microphylla*, *Wight Ic.* t. 2098, f. 30; *Wedd. Monogr.* 397, and in *DC. l. c.* 227.—Malacca, *Griŋŋith*.

3. ***P. tuberosa***, *Wight Ic.* vi. i. 43; root of large tubers, stems flaccid 4-angled, leaves opposite below ovate to lanceolate acuminate hairy, stamens 4, fruit smooth or ribbed. *Wedd. Monogr.* 402, and in *DC. l. c.* 222. *Urtica tuberosa*, *Roxb. Fl. Ind.* iii. 583; *Wight Ic.* t. 697.

The **CIRCARIS**, *Roxburgh*.

Root in Roxburgh's drawing, copied by Wight, 6 by $2\frac{1}{2}$ in. diam. with basal rootlets. *Stems* 1-6 ft., flaccid, prostrate or climbing. *Leaves* 1-3 in. petiole $\frac{1}{2}$ — $\frac{3}{4}$ in.—Weddell (probably rightly) suggests this being a form of *P. indica*, of which the root according to Blume is somewhat tuberous. I have seen a rootless authentic specimen from Roxburgh in Herb. Bentham (from Herb. Forsyth); which in no way differs from *P. indica*; and a specimen of *P. indica* in Herb. Wallich (under *Urtica glomerata*, No. 4069) has a tuberous root $1\frac{1}{2}$ in. long.

4. ***P. vesicaria***, *Wight Ic.* vi. 43; shrubby, erect, stem 4-6 ft., stout, leaves alternate broadly lanceolate acuminate narrowed into the short petiole, stamens 4, fruit with 6-7 basal inflated vesicles. *Wedd. Monogr.* 414, and in *DC. l. c.* 222. *Urtica vesicaria*, *Roxb. Fl. Ind.* iii. 587; *Wight Ic.* t. 695.

The **CIRCARIS**, *Roxburgh*.

Stem 4-6 ft., somewhat winding, bark smooth ashy. *Leaves* 2-3 by 1 in.—Only known from Roxburgh's drawing and Wight's copy of it. I quite expect that it is a form of *P. indica*.

5. ***P. auriculata***, *Wight Ic.* 1980, f. 2, and 2099, f. 37; leaves alternate long or short petioled broadly or narrowly ovate or ovate-lanceolate acute or acuminate, nerves many branching, stamens 5. *Wedd. Monogr.* 393, and in *DC. l. c.* 225. *P. Rheedii*, *Wight Ic.* t. 2099, f. 38. *P. rostrata*, 1980, f. 3, and 2099, f. 34. *P. rotundifolia*, t. 2068, f. 31. *P. elliptica*, t. 32, bicuspidata, f. 33, and scabrida, t. 2100, f. 41. *P. propinqua*, *Blume Mus. Bot.* ii. 230.

CENTRAL INDIA, at Singhboom, *Clarke*. **EASTERN and SOUTHERN DECCAN**, *Wight*, &c. **CEYLON**, common.

Usually tall, stout or slender, flaccid or stout. *Leaves* 1-5 in., pubescent on both surfaces; petiole 1-3 in., base usually acute. *Fruit* strigose, very variable, of which Wight's figures represent the extremes,—thus in *P. bicuspidata* and *elliptica* it is not winged; in *rotundifolia* the wings are semicordate; in *scabrida* they are narrow from above the middle to the tip. Weddell makes two varieties, one of *Rheedii* with broad triangular wings truncate above; the other of *P. rostrata*, with similar wings produced upwards.

VAR. *cymosa*, leaves all opposite short petioled, base rounded or cordate, flowers in short spreading cymes. *P. cymosa*, *Wight Ic.* t. 1979, f. 2; *Wedd. Monogr.* 396, and in *DC. l. c.* 227. *Elkania multinervis*, *Schlecht. mss.*—Nilghiri Hills, *Wight*, *Clarke*.—Different as extreme states of this with subsessile leaves and lax-fl. peduncled cymes are from *P. auriculata*, it is united to that species by intermediates.

SECT. II. MEMORIALIS. Lobes or segments of the *male perianth* usually abruptly inflexed about the middle, transversely angled or plaited at the

flexure, buds hence truncate. *Leaves* quite entire; primary nerves 3, simple, running to the tip of the leaf or near it.

* *Stem* terminating in a bracteate spike the leaves becoming gradually or suddenly smaller (upper leaves not greatly smaller in *P. Wightii* var. *acuta*).

6. **P. pentandra**, *Benn. Fl. Jav.* 64, t. 14; nearly glabrous, stem terete below angular above, leaves rather membranous sessile or petioled, lower opposite oblong to linear-lanceolate obtuse acute or acuminate entire, upper gradually smaller mostly alternate imbricate, stamens 5, fruit with 3-broadly membranous wings. *Wight Ic.* t. 2096, No. 20; *Blume Mus. Bot.* ii. 242; *Dalz. & Gibs. Bomb. Fl.* 240. *Memorialis pentandra*, *Wedd. in DC. Prodr.* xvi. ii. 235²; *Boiss. Fl. Orient.* iv. 1148. *M. ciliaris*, *Ham. mss.*; *Wedd. Monogr.* 417. *Urtica pentandra*, *Roxb. Fl. Ind.* iii. 583; *Wall. Cat.* 4598 (excl. B); *Wight Ic.* t. 696. *U. hippurioides*, *Griff. Itin. notes*, 362. *Gonostegia oppositifolia*, *Turcz. in Bull. Soc. Hist. Nat. Mosc.* 1846, ii. 510. *Hyrtanandra pentandra* & *javanica*, *Miq. Pl. Jungh.* i. 25, and *Fl. Ind. Bat.* i. ii. 26. *Boehmeria melastomoides*, *Griff. Notul.* 386; *Ic. Pl. Asiat.* iv. 563, f. 2.

TROPICAL HIMALAYA from Kangra, eastwards to ASSAM, the KHASIA MTS. and BENGAL, and southwards to ORISSA and CANARA.—DISTRIB. Afghanistan, ? China, Java.

Annual; stem stout, 2-3 ft., glabrous or hispidulous, erect or more slender and decumbent, often branched. *Leaves*, cauline $\frac{1}{2}$ -4 in., base rounded or cordate, usually rigid, nerves 3 strong, hispidulous beneath, margins ciliate; stipules short; floral leaves linear-oblong ovate or cordate. *Male fl.* pedicelled, truncate in bud with a concave top, ciliate, with often hooked hairs at the flexure; fem. perianth simple or 2-3-winged, very variable.—The following forms all pass into one another.

P. PENTANDRA PROPER; diffusely branched, stem prostrate below, leaves 1-4 in. lanceolate or linear-oblong, floral similar but much smaller. *P. pentandra*, *Roxb. l. c.*

VAR. *Stocksii*, branches very slender flaccid quite glabrous, leaves glabrous or nearly so, lower floral larger. *P. integrifolia*, β , *Dalz. in Herb. Hook. Mem. pentandra* var. *Dalzellii*, *Wedd. in DC. l. c.* *P. Stocksii*, *Wight Ic.* vi. p. 41, n. 18. The Concan and Deccan.—I identify this by specimen and drawing in *Herb. Wight*; there is no figure of it in the *Icones*, and I do not understand Weddell's citation, "*Wight Ic.* t. 2097, n. 28, sub *ramosissima*," which is, I think, true var. *ramosissima*.

VAR. *ramosissima*, *Wedd. in DC. l. c.* 235³; stem glabrous or scaberulous, usually tall robust and excessively branched above, floral leaves small ovate-cordate acuminate. *P. ramosissima*, *Wight Ic.* t. 2095, f. 17, and *P. Dalzellii*, t. 2096, f. 21.—The Concan.

VAR. *integrifolia*; perfectly smooth and glabrous, leaves 2-2 $\frac{1}{2}$ in. sessile base cordate oblong-lanceolate acute soft, floral $\frac{1}{2}$ in. ovate-lanceolate base cordate, margins of all perfectly smooth not ciliate. *P. integrifolia*, *Dalz. mss.*—The Concan? *Dalzell.* A large-leaved flaccid form, unlike any other.

VAR. *Walkeriana*; stem tall erect or suberect glabrous, leaves 3-6 in. petioled flaccid lanceolate or oblong-lanceolate acuminate, base acute, floral petioled large lanceolate, all smooth and scaberulous above, margins usually not ciliate, petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *P. Walkeriana*, *Wight Ic.* t. 2095, f. 16, and *glabra*, f. 15. *Memorialis aquatica*, *Wedd. Monogr.* 418, and *DC. Prodr.* xvi. 1, 235³ (excl. *Sens. Moon*, and var. β . *cordata*). *Hyrtanandra Walkeriana*, *Thwaites Enum.* 261. *Urtica pentandra*, *Wall. Cat.* 4598 B.—Ceylon.—The long petiole and acute leaf base are very unlike any ordinary state of *P. pentandra*, but Thwaites sends specimens (No. 3372) with

sessile round-based leaves. Wallich's specimens are from the Calcutta Botanical Garden.

7. **P. Wightii**, Benn. *Pl. Jav. Rar.* 66; stem tall stout hoary or pubescent. lower leaves opposite or 3-nately whorled sessile or petioled from shortly oblong to narrowly lanceolate more or less scabrid above, upper similar or gradually smaller lanceolate or ovate-lanceolate often bractlike, stamens 4, fruit grooved wingless or broadly winged, wings opaque hairy.

Throughout the WESTERN DECCAN from the Concan southwards, *Heyne*, &c.

A taller usually more robust pubescent and larger leaved and bracted plant than *P. pentandra*, always tetrandrous, with leaves more or less scabrid above.—Under this must be included all the Deccan species with the leaves shorter upwards and 4 stamens. As with most other species its extreme forms are very definable, the more marked are

P. WIGHTII PROPER; stem pubescent or puberulous, leaves lanceolate base usually rounded hardly scabrid above, transverse nervules inconspicuous, male sepals more or less hairy above the flexure. *P. Wightii*, Benn. l. c.; *Wight Ic.* t. 2093, f. 8. *P. ternata*, Benn. l. c.; *Wight l. c.* 2093, f. 7. *P. ambigua*, *Wight l. c.* 2095, f. 19. *P. trialata*, *Wight l. c.* 2097, f. 22. *P. concinna*, *Wight l. c.* 2093, f. 9. *Memoralis ternata* & *ambigua*, *Wedd. Monogr.* 422, 430. *M. cordata* β, *Wedd. Monogr.* t. 13 A. *M. concinna*, *Wedd. in DC. Prodr.* xvi. 1, 235*. *M. nilghirensis*, β. *trialata* & ε. *ternata*, *Wedd. in DC. l. c.* *Urtica ternata*, *Heyne in Wall. Cat.* 4599.—I find no difference between the type specimens of Bennett's *P. Wightii* and *ternata*, and have retained the former of these names.

VAR. *lavifolia*; stem pubescent, leaves oblong-lanceolate coriaceous smooth above harshly tomentose beneath with strong cross-nervules, male sepals glabrous except the tips. *P. nilghirensis*, *Wight Ic.* t. 2096, f. 26 *in part.*—Iyamallay Hills, *Wight*.—This which is marked *P. nilghirensis* in *Wight's Herb.* differs in the perfectly smooth upper surface of the leaves.

VAR. *nilghirensis*; stem harshly tomentose or scabrid, leaves coriaceous elliptic ovate oblong or oblong-lanceolate subacute acute or acuminate scabrid above tomentose beneath, transverse nervules strong, male sepals hirsute above the flexure. *P. ovata*, oblongifolia & *nilghirensis*, *Wight Ic.* t. 2097, f. 24, f. 25 and f. 26. *Memoralis nilghirensis*, *Wedd. Monogr.* 423; *DC. Prodr.* xvi. i. 235* (excl. vars. β, γ and ε)—Nilghiri and Iyamallay Hills, *Wight*.

VAR. *Wallichiana*; characters of var. *nilghirensis* with ovate-lanceolate leaves, but floral leaves closer and longer, and male sepals glabrous, as in var. *lavifolia*. *P. Wallichiana*, *Wight Ic.* t. 2096, f. 23. *Memoralis nilghirensis*, var. *Wallichiana*, *Wedd. in DC. l. c.* Nilghiri and Iyamallay Hills.—*Wight* describes the leaves as nearly glabrous above but all the named specimens in his Herbarium have them very scabrid. Possibly the *lavifolia* is the *Wallichiana* of his description. No doubt intermediates between these three last forms are common. *Wight* describes *Wallichiana* as shrubby and 10–12 feet high in the Nilghiris, but seeking support.

VAR. *longifolia*; stem scaberulous not elongating at the tip, leaves ovate lanceolate from a cordate base membranous subsaberulous above puberulous beneath, upper rather smaller than the lower, flowers all axillary, male sepals hirsute above the flexure. *P. acuta*, *Wight Ic.* t. 2092, f. 2, and *P. longifolia*, 2093, f. 6. *Memoralis ambigua*, *Wedd. Monogr.* 430, *DC. Prodr.* l. c. 235* (excl. *Syn. Wight*).—Malabar, &c.—This is I think only a form of *Wightii proper*, in which the stem does not elongate into a bracteate spike.

8. **P. scabra**, *Wight Ic.* t. 2097, f. 29; scabrid all over, stem tall erect, leaves opposite or ternately whorled sessile rigid from broadly ovate acute to ovate-lanceolate, flowers in slender or stout axillary and terminal paniced spikes, bracts $\frac{1}{2}$ – $\frac{3}{4}$ in. ovate or cordate-ovate acuminate, stamens 4, fruit scabrid cordate 2-winged. *P. aspera*, *Wight l. c.* t. 2095, f. 18. *Me-*

memoralis scabra, *Wedd. Monogr.* 423; *DC. Prodr.* xvi. i. 235³. *Urtica foliolosa*, *Wall. mss.*—*Herb. Hohenack.* No. 335.

DECCAN PENINSULA, Canara, near Mangalor, *Schmidt*; Anamallay Hills, *Wight, Beddome.* BERMA, at Taongdong, *Wallich.*

Stem 2–1 ft., rigid, terete, and everywhere more or less scabrid. *Leaves* 3–5 in., more or less rigid, 3–5-nerved. *Spikes* 12–18, very many-fl.; flowers in rather distant clusters; bracts very variable.—The Burmese specimens in *Herb. Wallich* are very poor, and bear no number, but the name *Urtica foliolosa*.

9. ***P. caudata***, *Benn. Pl. Jav. Ra.* 65; glabrous or nearly so, stem tall erect slender, leaves opposite sessile or subsessile membranous oblong to lanceolate acuminate, flowers in slender short axillary and terminal paniced spikes, bracts $\frac{1}{2}$ – $\frac{1}{3}$ in. ovate or ovate-lanceolate acuminate, fruit costate or 2-winged. *Wight Ic.* t. 2097, f. 27. *P. courtallensis*, *Wight l. c.* 2093, f. 10. *P. bracteata*, *Benn. l. c.* 67. *Parietaria bracteata*, *Wight mss.* *Memoralis bracteata & caudata*, *Wedd. Monogr.* 421 and 425 (*excl. figs.*); *DC. Prodr.* xvi. i. 235⁵, 235⁶. *Urtica caudata*, *Wall. Cat.* 4600. *U. bracteata*, *Herb. Wight.*

DECCAN PENINSULA; Cochin, *Johnston.* Anamallay Hills, *Wight.*

Stem 2–3 ft., very slender, sparsely pubescent. *Leaves* 2–5 in., smooth, nearly glabrous, 3-nerved, base rounded or subcordate. *Spikes* 1–2 ft., almost filiform; flowers in rather distant small clusters, bracts very variable.

** *Stem* not running out into a bracteate spike. *Leaves* all subequal, flowers axillary. (See also *P. Wightii*, var. *longifolia*).

† *Flowers* pentandrous.

10. ***P. Bennettiana***, *Wight Ic.* t. 1978; glabrous pubescent or tomentose, stem erect suberect or prostrate terete, leaves opposite or ternately whorled sessile or shortly petioled membranous from elliptic-ovate to lanceolate, stamens 5, fruit costate or with 2–4 membranous reticulate wings. *Memoralis hirta*, *Wedd. in DC. Prodr.* xvi. i. 235⁶ (*excl. many syns.*). *M. hispida*, *Wedd. Monogr.* 426 (*excl. a*).

The DECCAN PENINSULA; from the Concan southwards. CEYLON, ascending to 6000 ft.

This is the common Deccan species, with upper leaves as large as the lower (hence with all the flowers axillary), pentandrous flowers, and fruit with membranous wings. It includes all the varieties included by Weddell under his *Memoralis hirta* except probably vars. ϵ . and ζ ., of which I have seen no authentic specimens. There is no specimen of it in Wallich's Herbarium, and it is not described by Bennett. Weddell has confounded it with Bennett's *P. hispida*, which is a North Indian species (identical with his *quinqueneris*), which differs in the thick opaque wings of the fruit. In the absence of winged fruit I cannot distinguish forms of each, and as I find no winged fruits in the majority of North and Eastern India, nor in any of the Sumatran, Javan, Chinese, and Philippine Island specimens, I prefer to regard all these as referable to *hispida*, with which they agree better in habit than they do with *Bennettiana*. The following forms in their extreme states look very different; winged fruits are common in all but

P. BENNETTIANA PROPER; stem erect pubescent tomentose or glabrate, leaves 4–6 in. petioled lanceolate from a rounded base acuminate glabrous puberulous or scaberulous above, glabrous or pubescent beneath, male fl. nearly glabrous. *P. Bennettiana*, *Wight Ic.* t. 1978; *Blume Mus. Bot.* 245. *P. quadrialata & heterocarpa*, *Wight l. c.* 2094, f. 12, and f. 14. *P. Hugeliana*, *Blume l. c.* (*vide Weddell*). *Elkana?* *Hohenack Pl. Essicc. Nilgh.*, No. 1045. *P. sponiaefolia*, *Schlecht. Pl. Essicc. Ind. Or.*, No. 1045, and *Blume l. c.* 244 (*vide Weddell*). *Memoralis hirta*, β . *Bennettiana*, and δ . *heterocarpa*, *Wedd. in DC. l. c.* 235⁷.

VAR. *tomentosa*; stem erect and leaves beneath villously tomentose, leaves 2-2½ in. sessile rather coriaceous ovate or lanceolate acuminate, male sepals hirsute above the flexure. *P. tomentosa*, *Wight Ic.* t. 2094, f. 11. *Memoralis hirta* γ. *tomentosa*, *Wedd. l. c.*—Nilghiri Hills.

VAR. *macrophylla*; stem stout and leaves beneath tomentose or villous, leaves large 5-8 by 1-1½ in. petioled flaccid 3-5-nerved lanceolate from an acute rounded or cordate base scaberulous above, male sepals villous above the flexure.—Wight has named this *Bennettiana* in his *Herb.*, but it is very different-looking from his other specimens so named, though clearly only a form of these.

VAR. *Gardneri*; sparsely pubescent, shrubby, prostrate or decumbent with dark-brown ascending branches and leaves above, leaves 2-5 in. opposite petioled ovate or oblong acute or acuminate base acute or rounded, stipules large acuminate brown, male sepals hispid above the flexure. *P. Gardneri*, *Wight Ic.* t. 2092, f. 3. *P. Gardneri* & *obscura*, *Blume Mus. Bot.* ii. 240, 241.—Ceylon, Central Province, alt. 4-6000 ft. Nilghiri Hills, Wight (*Kew. Distrib.* 2695).—Wight describes the stem as erect and somewhat ramous, but in the numerous specimens they are obviously prostrate or decumbent. His Nilghiri specimens are unnamed. Thwaites mentions a form with leaves not exceeding 4 in. and closely resembling *P. triandra*. In habit, foliage, colour, and the large stipules *Gardneri* is by far the most distinct form of *Bennettiana*, though both Weddell and Thwaites refer it to that species.

VAR. *ovalifolia*; stem prostrate slender glabrous branched from the base, leaves 1½-2 in. opposite membranous shortly petioled elliptic-ovate acuminate scaberulous above smooth beneath, stipules short broad, male perianth glabrous or nearly so. *P. ovalifolia*, *Wight Ic.* t. 2092, f. 3.—Alpine jungles, *Wight*. Belgaum, on Cheeta hill, *Ritchie*.—This closely resembles forms of *P. hirta*.

VAR. *quadrialata*; stem woody stout prostrate or decumbent, branches ascending and leaves beneath tomentose, leaves 1-3 in. opposite shortly petioled ovate to lanceolate acuminate softly pubescent above young silky, male sepals tomentose or villous above the flexure. *P. quadrialata*, *Wight Ic.* t. 2094, f. 12.—Nilghiri Hills, *Schmidt*, and *Herb. Wight*.—This form is omitted by Wight in the text of his *Icones*. The specimen so named in his Herbarium was probably received (like that in the Hookerian Herbarium, of which it is the counterpart) from the Rev. Mr. Schmidt.

VAR. *mysorensis*; stem slender 4-angled glabrous, leaves 3-6 in. opposite flaccid rather long-petioled elliptic or oblong-lanceolate acuminate base rounded or acute glabrous on both surfaces, male fl. quite glabrous, fruit costate. *V. mysorensis*, *Wight Ic.* t. 2092, f. 4 (*excl. magnified leaves*). *Memoralis mysorensis*, *Wedd. Monogr.* 428. *M. hirta*, var. *mysorensis*, *DC. Prodr.* xvi. 1, 235⁷.—CANARA, on the Bababooden Hills, *Law, Stocks*.—The flaccid habit is that of *P. Wightii* var. *longifolia*. Wight describes and figures the leaves as hairy, but the figure represents perfectly glabrous 3-nerved leaves of the natural size, and magnified portions of leaves with hairy surface and 4 nerves in each, and which as the portions do not extend to the midrib would indicate a 9-nerved leaf. I find traces of hairs in the very young leaves, and cilia in the margin of some mature ones. I suspect it is only a form growing in moist places.

11. ***P. hirta***, *Hassk. Cat. Hort. Bogor.* 80; suberect or decumbent, stem glabrous pubescent or hispidulous, leaves 1-6 in. opposite sessile or shortly petioled lanceolate or oblong-lanceolate from a rounded or cordate base 3-5-nerved rarely ovate or shortly oblong and scaberulous above, sepals 5 ciliate at the flexure or glabrous, stamens 5, fruit lanceolate black costate, or perianth with 2-3 thick opaque nerveless wings. *Blume Mus. Bot.* ii. 239. *P. hispida* & *quinquenervis*, *Benn. Pl. Jav. Rar.* 66. *P. quinquenervis*, *Benth. Fl. Austral.* vi. 187. *Memoralis quinquenervis*, *Ham. in Wall. Cat.* 4601; *Wedd. in DC. Prodr.* xvi. 235⁸; *Benth. Fl. Hongk.* 322. *M. hispida* (α only) & *quinquenervis*, *Wedd. Monogr.* 428, 429. *M. hispida*, *Herb. Ham.* *Hyrtanandra hirta*, *Miquel Pl. Jungh.* 26; *Fl. Ind. Bat.* i. ii. 261. *Urtica hirta*, *Blume Bijdr.* 495.

TROPICAL HIMALAYA, from Chamba, *Thomson*, eastwards, ascending to 3500 ft. in Kumaon and 7000 in Sikkim. ASSAM, the KHASIA HILLS, alt. 1-5000 ft., CACHAR and the JHEES. BEHAR, on Parusath, alt. 3000 ft., *Clarke*. NICOBAR ISLANDS (*Kurz*).—DISTRIB. China, Malay Islands, Australia.

Stem 6 in. to 3 ft., oft-u branched, slender and decumbent or subscandent. *Leaves* usually membranous, 3-nerved, with rarely a short extra basal pair; stipules broad, usually acuminate. *Fruit* very variable in size and breadth, dull black when ripe, with strong ribs; achene black or white, shining.—I can find no character whereby to separate the common N. Indian *P. quinquenervis* from the Malayan *P. hirta*, except in that winged fruits occur here and there in specimens of the former, but never in the latter. On the other hand, winged fruits precisely like those of the Indian occur in a tropical Australian plant referred by Bentham, rightly I think, to *P. quinquenervis*, from which it differs only in a more robust habit. I have seen no specimens of *P. hirta* from the Deccan proper, though it may occur in Canara, as it does in Behar, which is the northern limit of the Deccan Flora. *P. Bennettiana*, var. *ovalifolia*, is very like states of it, except that it has transparent veined wings of the fruit.

** *Flowers* 2-4-androus.

12. ***P. integrifolia***, *Dalz. in Hook. Journ. Bot.* iii. (1851) 134; nearly glabrous or sparsely hairy, stem slender compressed, leaves 2-5 in. opposite and ternately whorled sessile membranous triangular-lanceolate from a broad usually cordate subamplexicaul base 3-nerved, stamens 3-4, fruit costate or with 2-3 membranous wings. *Wight Ic.* t. 2979; *Dalz. & Gibbs. Bomb. Fl.* 240. *Memorialis integrifolia*, *Wedd. in DC. Prodr.* xvi. i. 235^a. *M. Dalzellii*, *Wedd. Monogr.* 431.

The CONCAN and DECCAN; Belgaum, *Ritchie*; Phoonda Ghat on the Syhadree Mts., *Dalzell*. CANARA; on the Bababoodan Hills, *Law*.

Somewhat shrubby, 3-4 ft., root thick (*Dalzell*). *Stem* with 2 lines of hairs. *Leaves* very thin, apparently flaccid when fresh, very sparsely hairy above, ciliate, narrowed from just above the sometimes 5-nerved base to the tip, young more hairy; stipules short, broad. *Male sepals* ciliate at the flexure.—The membranous leaves of an elongate triangular shape with sessile truncate or cordate bases are the best characters for this plant. *Ritchie's* and *Law's* specimens have smaller harsher leaves sometimes ovate or oblong with rounded bases, passing into *P. Bennettiana*, var. *ovalifolia*.

This is probably another form of *P. Wightii*. I have seen no winged fruits, only a lanceolate black acutely ribbed achene.

13. ***P. parvifolia***, *Wight Ic.* t. 2092, f. 1; procumbent, diffusely branched and rooting, stem very slender, leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. opposite subsessile elliptic or ovate acute or acuminate more or less strigosely hairy 3-nerved, stamens 2-3, fruit very minute costate. *P. triandra*, *Blume Mus. Bot.* ii. 241. *Hvrtanandra triandra*, *Miquel Fl. Ind. Bat.* i. ii. 262; *Thwaites Enum.* 261. *Memorialis parvifolia*, *Wedd. Monogr.* 432; *DC. Prodr.* xvi. i. 235^a. *M. triandra*, *Wedd. in DC. l. c.* *Urtica triandra*, *Blume Bijdr.* 496.

CEYLON; at Newera Elia, *Walker, &c.*—DISTRIB. Java.

Stems 6-12 in., spreading from the root, almost filiform, flaccid, more or less pubescent or hirsute. *Leaves* green when dry, paler beneath; stipules short, broad, persistent. *Flowers* minute, solitary or few together; male sepals ciliate at the flexure. *Fruit* 4-5-costate.

DOUBTFUL SPECIFS.

P. CONFINIS, *Blume Mus. Lot.* ii. 230; *Wedd. in DC. Prodr.* xvi. i. 227.—East

Indies.—It is impossible to identify this by Blume's description. It is said to be allied to *scabrida*, Wt. (*auriculata*, Wt.), but to differ in the angled branches.

P. ORIENTALIS, Wedd. *Monogr.* 413, and in *DC. l. c.* 222 (*Leucococcus orientalis*, Liebm. in *Kœnigl. Dansk. Vidensk. Selsk. Skr. V. Math.* ii. 312).—This, which Liebman describes as a tree from Tranquebar, *Rottler*, is undeterminable; it is probably not a *Pouzolzia*.

P. ROTHIANA, Blume *l. c.* 231; *Wedd. in DC. l. c.* 226, said to be closely allied to *P. minor*, Wight (*P. indica* var. *tetraptera*), is undeterminable.

37. **DISTEMON**, Wedd.

A very slender erect annual herb. *Leaves* alternate, petioled, coarsely toothed, 3-nerved and penninerved. *Flowers* monœcious, in small bracteate 3-fld. androgynous clusters which form slender axillary and long terminal spikes. *MALE FL.* *Perianth* campanulate, 2-3-fld, valvate. *Stamens* 2-3, inflexed in bud. *Pistillode* woolly. *FEM. FL.* *Perianth* tubular, ventricose. *Ovary* included and more or less adnate to the perianth; stigma linear, deciduous; ovule erect. *Achene* broadly ovoid, acuminate, included in the thickened fleshy or thin crustaceous perianth; pericarp fragile. *Albumen* copious, cotyledons broad.

D. indicum, Wedd. *Monogr.* 551, t. 20 A; *Miquel Fl. Ind. Bat.* i. ii. 275. *D. grossum*, Wedd. in *DC. Prodr.* xvi. i. 235⁶². *Urtica grossa*, Wall. *Cat.* 4615.

ASSAM, *Jenkins, Griffith (Kew Distrib.* 4581). BURMA, at Segain, *Wallich*.—DISTRIB. Java.

Sparsely hairy on the branches, petioles, leaves above and nerves beneath. *Stem* 2-3 ft., sub-4-gonous and deeply grooved when dry, branches erect. *Leaves* 2-3 in., membranous, broadly ovate, acuminate, base cuneate, rarely rounded or subcordate, brown when dry, paler beneath with patches of whitish cobwebby pubescence between the hairy nerves, giving a mottled appearance, cystoliths punctiform; petiole 1-1½ in., very slender. *Spikes* interrupted; terminal 4-6 in., branched below, axillary shorter; bracts broadly ovate, acuminate, concave; male fl. minute, tipped with hooked hairs; fem. strigose. *Fruit* ¼ in. long, ovoid or rhomboid, beaked.

38. **SARCOCHLAMYS**, Gaud.

A shrub with the habit and characters of *Boehmeria*, but the fem. perianth is campanulate, the ovary oblique, and the achene enclosed in the fleshy accrescent perianth. The leaves are alternate, and clusters of flowers in long axillary spikes.

S. pulcherrima, Gaud. *Bot. Voy. Bonite*, t. 89; *Wedd. Monogr. Urtic.* 440, t. 16 C; *DC. Prodr.* xvi. i. 235⁴⁴; *Brandis For. Fl.* 405; *Kurz For. Fl.* ii. 426. *Urtica pulcherrima*, *Roxb. Fl. Ind.* iii. 588; *Wall. Cat.* 4596.

ASSAM, the KHASIA HILLS, SILHET, CACHAR, and from CHITTAGONG to TENASERIM. BENGAL, at Myinensing, *Clarke*.—DISTRIB. Sumatra.

An evergreen tree or large shrub with tubercled stems and pubescent branchlets. *Leaves* 4-12 in., from ovate to linear-lanceolate or linear-oblong, acuminate, 3-nerved; nerves very strong, produced to the tips; base rounded, glabrous and pustulate above, beneath densely white-tomentose with the nervules tessellately reticulate; petiole ½-2 in.; stipules 2-fld. *Spikes* in branched cymes, pubescent, about equalling the petiole; fem. fl. denser; bracteoles toothed.

39. **PIPTURUS**, Weddell.

Trees or shrubs, erect or climbing. *Leaves* alternate. 3-5-nerved; stipules bifid. *Flowers* monœcious or diœcious, in spicate or panicle clusters; bracts minute. *MALE FL.* *Perianth* 4-5-fid, valvate. *Stamens* 4-5. *Pistillode* woolly. *FEM. FL.* on an at length fleshy receptacle. *Perianth* ovoid, narrowed to a minute mouth. *Ovary* adherent to the perianth; stigma linear, elongate; ovule erect. *Achene* free within the thinly fleshy perianth. *Albumen* scanty; cotyledons broad.—Species 8, Malayan, Mascarene, Australian and Pacific.

1. **P. mollissimus**, Wedd. *Monogr.* 449; *DC. Prodr.* xvi. i. 235¹⁹; leaves elliptic or obovate, tip subacute or rounded, base rounded cuneate or subcordate quite entire puberulous above tomentose beneath, fl. clusters in short spikes. *Urtica mollissima*, *Blume Bijd.* 501; *Wall. Cat.* 4609.

PENANG, Porter, Curtis. PERAK, Scortechini.—DISTRIB. Java.

Branches terete, woody, scurfily tomentose. *Leaves* 3-5 in., rigid and grey-brown when dry; nerves 1-2 pairs above the basal; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Spikes* 1-4 in., solitary or fascicled, erect, hoary.

2. **P. velutinus**, Wedd. in *Ann. Sc. Nat. Ser.* 4, i. 196; *Monogr.* 446, t. D, f. 4-8; hoary, subsilvery, leaves large long-petioled broadly ovate or ovate-cordate crenate-serrate white beneath, fl. clusters in simple or branched axillary spikes. *P. incanus*, Wedd. in *DC. Prodr.* xvi. i. 235¹⁸. *Boehmeria velutina*, *Dcne. Herb. Timor.* 163. *B. incana*, *Hassk. Cat. Hort. Bogor.* 79. *Urtica incana*, *Blume Bijd.* 497. *Morus paniculata*, *Roxb. Fl. Ind.* iii. 600; *Wight Ic.* t. 676.

NICOBAR ISLANDS, King's Collector.—DISTRIB. Malay and Pacific Islands.

A tree or shrub, branches woody terete hoary, shoots hairy. *Leaves* 4-7 in. diam., white beneath with appressed tomentum, nerves several above the basal, cross-nervules many straight; petiole slender, 2-5 in.; stipules ovate-lanceolate, $\frac{1}{2}$ -cordate, caducous. *Spikes* usually shorter than the petiole, slender, hoary. *Filaments* long, recurved. *Fem. perianths* succulent, in fruit forming pisiform heads with long exserted curved styles.—This is the hitherto unrecognized *Morus paniculata* of Roxburgh, cultivated in the Calcutta Garden from seeds introduced from the Moluccas.

40. **VILLEBRUNEA**, Gaud.

Trees with the characters of *Pipturus*, but the leaves of some species are penninerved, the fem. perianth is adnate to the ovary, and the achenes adnate to the perianth, the base of which only is fleshy.—Species about 8, Indian, Malayan and Japanese.

1. **V. integrifolia**, Gaud. *Bot. Bonite Voy.* t. 91; branches petioles and leaves beneath pubescent or tomentose, leaves 6-14 in. elliptic-oblong caudate quite entire or obscurely crenate penninerved. *Blume Mus. Bot.* ii. 166; *Wedd. Monogr.* 452. *V. appendiculata*, *Wedd. in DC. Prodr.* xvi. i. 235²⁰. *Oreocnide acuminata*, *Kurz For. Fl.* ii. 427. *Urtica appendiculata*, *Wall. Cat.* 4604. *Celtis elongata* & *tetrandra*, *Wall. Cat.* 3692 C and 3695 F.

TROPICAL SIKKIM HIMALAYA, ASSAM, the KHASIA MTS., SILHET, BURMA, MUNIPORE, CHITTAGONG and TENASSERIM; ascending to 4000 ft. DECCAN PENINSULA, from the Concan, *Stocks*, southwards.—DISTRIB. ? Malay Islands.

An evergreen tree. *Leaves* rather membranous, drying brown, nerves 8-15 pairs,

slender; petiole 1-6 in.; stipules silkily villous. *Flower clusters* globose, in small shortly peduncled dichotomously branched hispid cymes from the branchlets below the leaves, males 3-4-merous. *Stigma* plumose.—Weddell cites *U. urophylla*, *Wall Cat.* 437, under this species, but I do not find the name in the Catalogue, and No. 437 is a *Tiarella*.

VAR. *sylvatica*; leaves 4-6 in., narrower oblong or oblong-lanceolate, entire or crenulate above the middle glabrous beneath or pubescent on the nerves only. *V. sylvatica*, *Blume Mus. Bot.* ii. 167, f. 16; *Wedd. Monogr.* 453, t. 15 C; *DC. Prodr.* xvi. i. 235²¹. *Bœhmeria sylvatica*, *Hassk. Hort. Bogor.* 79. *Oreocnide sylvatica*, *Miquel Pl. Jungh.* i. 40; *Fl. Ind. Bat.* i. ii. 270; *Kurz For. Fl.* ii. 427; *Beddome Forester's Man.* 225, t. 26, f. 4.—Sikkim, Assam, Burma, the Andaman and Nicobar Islands, the Western Ghats and Ceylon.

2. *V. frutescens*, *Blume Mus. Bot.* ii. 168; branchlets pubescent, leaves 4-8 in. elliptic oblong lanceolate or ovate rarely almost rounded acuminate crenulate or serrate nearly throughout 3-nerved and penninerved, beneath ashy or white with woolly hairs or glabrate. *Brand For. Fl.* 406; *Benth. Fl. Hongk.* 332. *Morocarpus microcephalus*, *Benth. in Hook. Kew Journ. Bot.* vi. (18) 74. *Urtica frutescens*, *Roxb. Fl. Ind.* iii. 589.—*Urticea*, *Wall. Cat.* 9091.

TROPICAL HIMALAYA, from Kumaon eastwards, ascending to 5000 ft. in Sikkim. KHASIA MTS, at Shillong, alt. 4000 ft., *Clarke*.—**DISTRIB.** Japan, China.

A small tree; branches very slender. *Leaves* membranous, sparsely pilose above, drying very dark; cross-nervules often giving the under surface a tessellated aspect; petiole $\frac{1}{2}$ -4 in., and nerves very slender; stipules $\frac{1}{2}$ in., lanceolate, pubescent. *Male fl.* in subsessile clusters, fem. in very short cymes.

41. **DEBREGEASIA**, *Gaud.*

Shrubs or trees. *Leaves* alternate, serrate, 3-nerved; stipules 2-fid. *Flowers* monœcious or diœcious, in capitate sessile paniced or spicate clusters. **MALE FL.** *Sepals* 3-5, valvate. *Stamens* 3-5, inflexed in bud. *Pistillode* glabrous or woolly. **FEM. FL.** *Receptacle* fleshy. *Perianth* ovoid or obovoid, succulent in fruit, mouth contracted very minute. *Ovary* straight, included; style short or 0. *stigma* penicillate; ovule erect. *Achene* at first cohering with the fleshy perianth. *Seed* with copious or scanty albumen; cotyledons short, broad.—Species 5, trop. Asia, and Africa.

* *Leaves* narrow.

1. *D. velutina*, *Gaud. Bot. Bonite Voy.* t. 90; leaves linear- or oblong-lanceolate acuminate serrulate rugose pubescent or scabrid above white- or ashy-tomentose beneath, heads in short sessile dichotomous cymes, male sepals 4 exceeding the bracteoles. *Wedd. Monogr.* 460, t. 15 A. f. 19. *Brand. For. Fl.* 405; *Kurz For. Fl.* ii. 428. *D. longifolia*, *Wedd. in DC. Prodr.* xvi. i. 235²¹. *Missiessya velutina*, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 195. *Morocarpus longifolius*, *Blume Mus. Bot.* ii. 156; *Kurz For. Fl.* ii. 428; *Bedd. For. Man.* 226, t. 26, f. 5. *M. longifolius* & *angulatus*, *Blume l.c.* *Bœhmeria angustata* & *dichotoma*, *Hassk. Hort. Bogor.* 79. *Urtica longifolia*, *Burm. Fl. Ind.* 297. *U. angustata*, *Blume Bijdr.* 499. *U. muricata*, *Heyne in Wall. Cat.* 4612. ? *U. bicolor*, *Wall. Cat.* 4613. *U. verrucosa*, *Moon. Cat. Pl. Ceylon.* *Conocephalus niveus*, *Wight Ic.* t. 1959; *Dalz. & Gibs. Bomb. Fl.* 239.

SUBTROPICAL HIMALAYA, alt. 2-5000 ft.; from Kumaon to Sikkim, alt. 3-6000 ft. ASSAM and the KHASIA HILLS TENASSERIY. *Gallatly*. The DECCAN PENINSULA,

from the Concan to Cape Comorin, ascending to 7000 ft. in the Nilghiris. CEYLON; alt. 1-2000 ft., *Walker, &c.*—DISTRIB. Java.

A tall shrub; branches and petioles pubescent tomentose or villous. *Leaves* 4-7 in., base rounded, smooth or scabrid above, lacunose or pitted between the nerves beneath; petiole $\frac{1}{2}$ -1 in. *Fruit* $\frac{1}{2}$ in. diam., yellow; receptacle fleshy, studded with the minute achenes.

2. **D. hypoleuca**, *Wedd. Monogr.* 463, t. 15, A, f. 10, 11; branches and leaves beneath clothed with snow-white wool, leaves lanceolate or oblong-lanceolate acuminate serrulate scabrid above, heads conglobate sessile, male sepals 4 shorter than the bracteoles. *D. bicolor*, *Wedd. in DC. Prodr.* xvi. i. 235²⁵; *Brand. For. Fl.* 405; *Boiss. Fl. Orient.* iv. 1148. *Urtica bicolor*, *Roxb. Fl. Ind.* iii. 589; *Wall. Cat.* 4613. *Bœhmeria salicifolia*, *Don Prodr.* 60. *B. hypoleuca*, *Hochst. in A. Rich. Fl. Abyss.* ii. 264. *Missiessya hypoleuca*, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 195. *Morocarpus salicifolius*, *Blume Mus. Bot.* 157.

WESTERN TEMPERATE HIMALAYA; from Kashmir and the SALT RANGE, alt. 3-5000 ft., to Kumaon.—DISTRIB. Afghanistan, Abyssinia.

A large shrub. *Leaves* 3-6 in. very white, pitted or not between the nerves beneath; petiole $\frac{1}{10}$ - $\frac{1}{2}$ in. *Fruit* yellow, as in *D. velutina*, to which it is closely allied.

** *Leaves broad.*

3. **D. dentata**, *Hook. f.*; branchlets pubescent or scabrid, leaves long-petioled orbicular-ovate cuspidate toothed scabrid above, ashy-tomentose beneath, base cuneate or rounded, fem. heads in short sessile lax dichotomous cymes with slender divaricate branches. *D. velutina*, *var.* δ , *Wedd. in DC. Prodr.* xvi. i. 235²⁴.

CHITTAGONG, *J. D. H. & T. T., Clarke.*

A twiggy bush, 10 ft.; branches sometimes tubercled. *Leaves* 4-8 in. long and nearly as broad, membranous; petiole 3-5 in., slender. *Cymes* $\frac{1}{2}$ - $\frac{3}{4}$ in. broad.—Very different from *D. velutina* in the broad leaves, long petioles, and much larger cymes with filiform branches.

4. **D. squamata**, *King in Herb. Calcutt.*; branches pubescent and softly spiculose, leaves long-petioled orbicular-ovate cuspidate toothed, softly pubescent on both surfaces, ashy-white beneath, base rounded or cordate, fem. heads in short sessile dichotomous cymes with slender divaricate branches.

PERAK; at Larut, *King's Collector.*

Branches stout, terete, rough with flattened spreading (soft?) prickles. *Leaves* 4-6 by 3-3 $\frac{1}{2}$ in., membranous; petiole 2-5 in., pubescent. *Cymes* $\frac{1}{2}$ -1 in. diam., branches tomentose.—Possibly a form of *D. dentata*.

5. **D. Wallichiana**, *Wedd. Monogr.* 464, t. 14 (*excl. the Ceylon plant*); branches and petioles glabrous or sparsely cottony, leaves long-petioled broadly elliptic-ovate cuspidate entire or sinuate-serrate, base rounded or cordate, above glabrous, beneath white with closely appressed tomentum, fem. heads in long-peduncled dichotomous cymes with slender divaricate branches, male sepals 4 longer than the bracteoles. *D. leucophylla*, *Wedd. in DC. Prodr.* xvi. i. 235²⁵. *Morocarpus Wallichianus*, *Kurz For. Fl.* ii. 428. *Missiessya Wallichiana*, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 195. *Urtica leucophylla*, *Wall. Cat.* 4067.

SIKKIM HIMALAYA, alt. 2-4000 ft., *J. D. H., Clarke.* KHASIA MTS., alt. 4000 ft., *Griffith, &c.* PEGU, *Kurz.* TENASSERIM, *Parish.*

A tree, 20–30 ft.; branches robust. *Leaves* 6–12 by 4–9 in., membranous, snow-white beneath with dark nerves; nervules slender parallel; petiole 2–10 in. *Cymes* from the upper axils, 2–4 in. diam., on peduncles 1–3 in.; fem. heads $\frac{1}{4}$ in., white or reddish in fruit.

6. **D. ceylanica**, *Hook. f.*; branches very stout, tips and petioles pubescent, leaves orbicular cuspidate quite entire, base rounded or cordate, above glabrous, beneath softly white tomentose, fem. heads in stoutly peduncled tomentose cymes, with short stout divaricate branches. *D. Wallichiana*, *Wedd. Monogr.* 464 (*the Ceylon plant only*). *Morocarpus Wallichianus*, *Thwaites Enum.* 262.

CEYLON; at Hantani in the Central Province, *Walker, Thwaites*.

A tree. *Branchlets* as thick as the little finger. *Leaves* 3–4 in. diam.; petiole 2–4 in., stout, somewhat furfuraceously pubescent, as are the cymes, peduncles and branches. *Cymes* with stout peduncles $1\frac{1}{2}$ –2 in., each bearing 3 rarely more stoutly pedicelled fem. heads $\frac{1}{2}$ in. diam.—The orbicular leaves, the shorter stouter petioles and peduncles, and the much larger fruiting heads distinguish this from *D. Wallichiana*.

42. **MAOUTIA**, *Weddell*.

Shrubs. *Leaves* alternate, crenate, tomentose and snow-white beneath; stipules connate. *Flowers* minute, monœcious or diœcious, in small cymose globose heads. MALE FL. *Sepals* 5, valvate. *Stamens* 5, inflexed in bud. *Pistillode* woolly. FEM. FL. *Perianth* 0. *Ovary* straight; stigma penicillate; ovule erect. *Achene* ovoid, crustaceous or with a fleshy coat, hispid; albumen scanty, cotyledons oblong.—Species 8, Eastern Asiatic and Pacific.

M. Puya, *Wedd. in Ann. Sc. Nat. Ser. 4, i. 193; Monogr.* 477, t. 16 B; *DC. Prodr.* xvi. i. 233²¹; leaves elliptic caudate-acuminate coarsely toothed, achene gibbously ovoid trigonous hispid. *Brand. For. Fl.* 436; *Kurz For. Fl.* ii. 429. *Boehmeria Puya*, *Hook. Lond. Journ. Bot.* iii. (1851) 316, t. 7 (*excl. syn. Roxb.*). *B. frutescens*, *Don. Prodr.* 59 (*not of Thunb.*). *Urtica Puya*, *Ham. in Wall. Cat.* 4605, and ? 4606.

TROPICAL HIMALAYA, from Garwhal eastwards, the KHASIA Mts. and BURMA, alt. 1–4000 ft.

Stem 6–8 ft.; branches pubescent. *Leaves* 4–8 in., membranous, scabrid above, beneath white except the pubescent nerves; petiole 1–5 in.; stipules lanceolate 2-fid. *Cymes* axillary and terminal, spreading, slender, dichotomously branched; fem. heads $\frac{1}{2}$ in. diam., males rather larger.

43. **PARIETARIA**, *Tournef.*

Herbs, rarely undershrubs. *Leaves* alternate, quite entire, triple-nerved, exstipulate. *Flowers* polygamous, in cymose clusters, bracteate. MALE FL. *Sepals* 3–4, valvate. *Stamens* 3–4, inflexed in bud. *Pistillode* glabrous. FEM. FL. *Perianth* tubular 4-fid. *Ovary* straight; stigma recurved penicillate; ovule erect. *Achene* enclosed in the persistent perianth, crustaceous. *Albumen* copious; cotyledons oblong.—Species about 8, temperate and tropical.

1. **P. judaica**, *Linn. Sp. Pl. Ed. 2, 1492*; a tufted pubescent undershrub with a woody stock, leaves ovate or lanceolate acute base rounded or cordate, cymes few-fid. lower flower of each female, bracts broadly ovate more or less connate, fruit elongate. *Wedd. Monogr.* 508, t. 17, f. 15; *DC. Prodr.* xvi. i.

235⁴³; *Boiss. Fl. Orient.* iv. 1149; *Reichb. Ic. Fl. Germ.* xii. t. 651. *P. punctata*, *Willd. Sp. Pl.* iv. 953. *P. tibethana*, *Blume Mus. Bot.* 235⁴⁴.

WESTERN TIBET; Balti, and in the Indus and Shayuk Valleys, *Thomson*.—**DISTRIB.** Afghanistan and westwards to Greece.

2. ***P. debilis***, *Forst. Prodr.* 387; annual, leaves long-petioled elliptic broadly ovate or ovate-cordate membranous obtuse, bracts linear, lobes of fem. perianth acute, fruit ovoid. *Wedd. Monogr.* 517, t. 17; *DC. Prodr.* xvi. i. 235⁴⁵; *Boiss. Fl. Orient.* iv. 1150. *P. micrantha*, *Ledeb. Fl. Alt.* iv. 303; *Ic. Fl. Ross.* t. 22.

TEMPERATE HIMALAYA, from the Panjab to Sikkim, alt. 8–12,000 ft. WESTERN TIBET, alt. 10–14,000 ft. The CONCAN and NILGHIRI MTS.—**DISTRIB.** Many temp. and trop. regions extending to Australia and Chili.

A diffuse flaccid pubescent herb, 6–12 in. *Leaves* $\frac{1}{2}$ –1 in. *Cymes* 3–7-fl.; bracts shortly united.

44. **FORSKOHLEA**, *Linn.*

Slender scabrous herbs or undershrubs. *Leaves* alternate, toothed, triple-nerved; stipules lateral, free. *Flowers* in axillary androgynous woolly or silky involucre, males many in the periphery of the involucre, fem. solitary in the centre. **MALE FL.** *Perianth* clavate, 3–5-cleft, one lobe inflexed. *Stamen* 1, inflexed in bud. *Pistillode* 0. **FEM. FL.** *Perianth* 0; *Ovary* straight; stigma filiform, hispid, persistent; ovule erect. *Achenes* ovoid, compressed, woolly; albumen scanty or 0; cotyledons broad.—Species 5, Indian, Oriental, African and Spanish.

F. tenacissima, *Linn. Mant.* 72; leaves rhombic orbicular or obovate obtuse base cuneate hispid or softly hairy above with hooked hairs woolly beneath, invol. bracts 2–5 lanceolate silky below hispid above. *Wedd. in DC. Prodr.* xvi. i. 235⁵⁵; *Boiss. Fl. Orient.* iv. 1151; *Wall. Cat.* 4666; *Lamk. Ill.* t. 388. *F. latifolia*, *Retz. Obs.* 51. *Caidbeja adherens*, *Forsk. Fl. Æg. Arab.* 82.

WESTERN PANJAB, on the Salt Range, *Aitchison*. SCINDE, *Vicary*.—**DISTRIB.** Westwards to Arabia and N. Africa; also S.E. Spain.

Shrubby, stem 6–24 in. *Leaves* $\frac{1}{2}$ –1 in., snow-white beneath; petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. *Involucre* $\frac{1}{4}$ in.

45. **DROGUETIA**, *Gaud.*

Slender herbs, differing from *Forskohlea* in the campanulate scabrid involucre, and of which some species have opposite leaves, and others terminal spicate involucre.—Species 4, Indian and African.

D. diffusa, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 211; *Monogr.* 541, t. 19 A. f. 1–11; diffuse, leaves opposite ovate acuminate serrate or toothed hispidly hairy above and on the nerves beneath, involucre axillary 1- or more-fl., achenes glabrous shining. *D. pauciflora*, *Wedd. in DC. Prodr.* xvi. i. 235⁵⁵. *Forskohlea urticoides*, *Wight Ic.* t. 1982. *Pouzolzia pauciflora*, *A. Rich. Tent. Fl. Abyss.* ii. 259. *Didymogyne abyssinica*, *Wedd. in Ann. Sc. Nat. l.c.* *Boehmeria pauciflora*, *Blume Mus. Bot.* ii. 201. *B. parvifolia*, *Wedd. Monogr.* 359. *Urtica pauciflora*, *Hochst. Plant. Schimp.* No. 652. *U. rivularis*, *Schlecht. in Plant. Hohenack.* No. 1326.

NILGHIRI HILLS, *Wight*, &c.—**DISTRIB.** Abyssinia, Java.

Habit and foliage of *Chamabainia cuspidata*, *Wight*. *Leaves* $\frac{1}{2}$ –1 $\frac{1}{2}$ in., very membranous, green when dry, nerves faint, petiole $\frac{1}{10}$ –1 in. slender; stipules small.

ovate, ciliate. *Involucre* minute, membranous, toothed, ciliate, scarcely exceeding the flowers. *Flowers* very minute, male several or solitary in the same involucre with the female, pedicelled, exserted, irregularly cleft; stamen 1, exserted; fem. fl. few, shortly pedicelled or sessile; style filiform, short, deciduous. *Achene* obliquely ovoid, compressed, hispid or glabrate.

ORDER CXXXVI*. PLATANACEÆ.

Deciduous monœcious trees with flaking bark. *Leaves* alternate palmately-lobed and -nerved; petiole calyptriform at the base, enclosing a bud; stipules caducous. *Flowers* in long-peduncled globose unisexual axillary heads; sepals on a chaffy or silky receptacle. *Male* ebracteolate; anthers numerous, subsessile, with a small basal scale, cells parallel, connectives truncate or subpeltate. *Fem.* of many naked 1-celled ovaries mixed with slender bracteoles, narrowed into a long style stigmatose on one side; ovule 1, rarely 2, pendulous, orthotropous. *Ripe carpels* coriaceous, cuneiform, angled, top thickened truncate or pyramidal; seed linear, albumen scanty or 0, cotyledons long narrow radicle inferior.—Genus 1; species 5 or 6, Oriental and N. American.

PLATANUS, Linn.

P. ORIENTALIS, Linn. *Sp. Pl.* 999; leaves broadly palmately 3-5-fid. base truncate or cordate lobes irregularly toothed or lobulate, ripe carpels with prominent pyramidal tips. *Brand. For. Fl.* 434; *Gamble Man. Ind. Timb.* 345; *A. DC. Prodr.* xvi. ii. 159; *Sibth. Fl. Græc.* t. 945; *Boiss. Fl. Orient.* iv. 1161. *P. vulgaris*, *Spach. in Ann. Sc. Nat. Ser.* ii. xv 292.

NORTH-WESTERN HIMALAYA; from the Sutlej westwards, alt. 5000-8500 ft., cultivated only.—DISTRIB. Wild from N. Persia westwards to S. Italy.

A large tree, in Kashmir attaining 75 ft. and with the trunk 25 ft. in girth; branches very spreading. *Leaves* 6-9 in. diam., usually broader than long, base cuneate at the insertion of the petiole, young woolly beneath; petiole 3-5 in.; stipules on shoots leafy and lobed. *Heads* 1-1½ in. diam., 2-3 on a slender peduncle 4-6 in. long.—The *P. occidentalis*, L., of N. America, is not, as Brandis (l. c. 435) supposes, commonly cultivated in Western Europe, where the plant so called is a var. (*acerifolia*) of *orientalis*. The true *occidentalis* differs in the truncate tips of the ripe carpels, whence the head of fruits is smooth.

ORDER CXXXVII. JUGLANDEÆ.

Trees, often strongly aromatic, monœcious. *Leaves* alternate pinnate; stipules 0. *Male fl.* in pendulous spikes; perianth 0, or of 3-6 scales on the margins of the bracts; stamens 2 or more on the bracts, anther-cells parallel. *Fem. fl.* in erect few-fid. spikes, bracteate; calyx-limb superior short, 4-toothed; petals minute or 0; ovary 1-celled, 1-ovuled; style 2-fid, arms stigmatose within; ovule erect anatropous. *Drupe* or *nut* indehiscent, or with a dehiscent nut the walls of which are sinuously inflexed and the cavity with 2-4 basal pits. *Seed* basifixed, base 2-4-lobed; albumen 0; cotyledons equal sinuous or subfoliaceous and contorted, radicle superior.—Genera 5; species about 30, chiefly North temperate.

Fem. fl. subsolitary. Bracts not enlarged in fruit. *Drupe* solitary, large, with a fleshy exocarp and bony 2-valved endocarp

1. JUGLANS.

Fem. fl. numerous spicate; bracts produced in fruit into long veined wings. Nut small coriaceous, imbedded in the base of the membranous bract 2. ENGELHARDTIA.

1. JUGLANS, Linn.

Male fl. from the scars of last year's leaves; stamens 10-40. *Fem. fl.* one or few at the ends of the branches; petals 4, minute. *Fruit* as above. —Species 3 or 4, Asiatic and N. American.

J. regia, Linn. *Sp. Pl.* 997; leaflets 5-6 pairs ovate-oblong or -lanceolate entire or subserrate. *Rorb. Fl. Ind.* iii. 631; *Brand. For. Fl.* 497; *Gamble Man. Ind. Timb.* 392; *Kurz For. Fl.* ii. 491; *Boiss. Fl. Orient.* iv. 1160. *J. regia*, var. *Kumaonica*, *Cas. DC. in Ann. Sc. Nat. Ser. 4*, xviii. 33; *DC. Prodr.* xvi. ii. 136. ? *J. aguta*, *Wall. Cat.* 4944.

TEMPERATE HIMALAYA and WESTERN TIBET, alt. 3-10,000 ft., from Kashmir and Nubra eastwards; wild and cultivated. KHASIA HILLS (cultivated). AVA HILLS, *Wallich*.—DISTRIB. Beluchistan, N. Persia, the Caucasus, Armenia.

A large deciduous tree, attaining 100 ft. with a trunk 20 ft. in girth; shoots tomentose. *Leaves* 6-12 in., young tomentose; leaflets subsessile, 3-8 in., glabrous or with the 15-20 pairs of nerves beneath pubescent, terminal petiolulate. *Male spikes* 2-5 in.; bracts stipitate, lobed. *Fem. fl.* 1-3; petals linear-lanceolate, green. *Fruit* ellipsoid green, smooth or pubescent. *Nut* thick-shelled in the wild form, with greatly thickened margins of the valves.—*Kurz* mentions a species with small almost globose smooth nuts as inhabiting the Shan States of Burma.—The Walnut.

2. ENGELHARDTIA, Leschen.

Trees or shrubs. *Leaves* pinnate entire or serrate glandular or not beneath. *Male fl.* in slender simple or branched erect or pendulous lateral spikes. *Perianth* (or *bract*) of simple lobed or laciniate usually very unequal scales, sometimes arranged so as to resemble a 4-sepaed calyx. *Stamens* 4-12, subsessile on the scales. *Fem. spikes* long, pendulous; flowers solitary, sessile on a 3-4-lobed bract; calyx adnate to the ovary, 4-lobed or toothed; stigmas 2, short sessile or long laciniate. *Fruit* a small globose nut adnate to the greatly enlarged scarious 3-lobed reticulately nerved bract, of which the midlobe is much the longest; epicarp or calyx-tube thin, glandular or hirsute; endocarp 2-valved.—*Species* 4 or 5, or fewer, Chinese, Indian, and Malayan.

1. **E. spicata**, *Blume Bijl.* 528; *Fl. Jar. Jugland.* 8, t. 1 and 5 A; leaflets 5-10 in. petiolulate linear-oblong entire or subentire, petiole and nerves beneath pubescent, at length glabrate, nut hispidly hirsute. *Cas. DC. Prodr.* xvi. ii. 140; *Kurz For. Fl.* ii. 491; *Gamble Man. Ind. Timb.* 393; *Miq. Fl. Ind. Bat.* i. i. 842. *E. Roxburghiana*, *Lindl. in Wall. Pl. As. Rar.* ii. 87, t. 199 (excl. anal.); *Brand. For. Fl.* 500; *Wall. Cat.* 4940. *Juglans pterococca*, *Rorb. Fl. Ind.* iii. 631 (in part).—*Rumph. Herb. Amb.* ii. 169.

SUBTROPICAL HIMALAYA; from Nepal, *Wallich*, eastwards to Bhotan, ascending to 6000 ft. ASSAM, MUNIPORE, and the KHASIA Mts., and southward to Tenasserim.—DISTRIB. Java, Cochin China.

A large subdeciduous tree, gigantic in Java, petioles young leaflets midrib and petiolules more or less tomentose, glabrous in age. *Leaves* 6-12 in., petiole terete; leaflets rather membranous, except when old, obtuse or acute, base very unequal; nerves 10-12 pairs; petiole $4\frac{1}{2}$ in. *Spikes* 6-12 in., very slender, flexuous, pendu-

lous, hispidly pubescent; male deciduous; flowers very small, bracts entire; anthers sessile; fem. larger, bract 3-lobed. *Fruiting bract* 2-3 in.; lobes scarious and reticulated, lateral short spreading, midlobe linear-oblong, reticulately nerved on each side the midrib. *Nut* globose, $\frac{1}{4}$ - $\frac{1}{3}$ in. diam., crustaceous, villously hispid.—Roxburgh's description of *Juglans pterococca* is made up of male flowers of *E. Wallichiana* (which is the *J. pterococca* of his *Icones*), and the female of *E. spicata* from Silhet. The plate in Wallich's *Plant. Rar. of E. Roxburghiana*, is a copy of Roxburgh's drawing of *E. Wallichiana* (inscribed *Juglans pterococca*), in which the nut is erroneously figured as hairy.

2. *E. acerifolia*, Blume *Fl. Jav. Jugland.* 11, t. 2 and 3 B; leaflets 5-7 in. sessile or subsessile linear-oblong entire or serrate, petiole and nerves beneath tomentose, nut hispidly hirsute. *Cas. DC. Prodr.* xvi. ii. 141; *Miquel Fl. Ind. Bat.* i. i. 842. *Pterilema acerifolium*, *Reinw. Syllog.* ii. 13 (*Flora*, 1825).

SIKKIM HIMALAYA, alt. 1-5000 ft., *J. D. H. KHASIA Mts., Griffith, &c.* CHITTAGONG, *J. D. H. & T. T.*—DISTRIB. Java, Borneo, Philippines.

Possibly only a form of *E. spicata* with sessile or subsessile leaflets.

3. *E. Colebrookiana*, Lindl. in Wall. Pl. As. Rar. iii. 4, t. 208, and *Cat.* 4941; branchlets and petioles stout densely tomentose, leaflets 2-4 in. petiolulate rarely sessile broadly or narrowly oblong obtuse or tip rounded rarely acute tomentose beneath, male spikes hispid, fruiting spikes 4-6 in., nut hirsute. *Cas. DC. Prodr.* xvi. ii. 141; *Brand. For. Fl.* 499; *Gamble Man. Ind. Timb.* 393. *E. villosa*, *Kurz For. Fl.* ii. 491. *Juglans villosa*, *Wall. Cat.* 4945.

WESTERN HIMALAYA, from the Chenab to Nepal. ASSAM and the KHASIA MTS., BURMA, *Wallich, Kurz, &c.*—DISTRIB. China.

This again is, I think, and as Brandis suspects, a form of *E. spicata*, with stouter more tomentose branches and leaves, broader shorter often coriaceous leaflets, tomentose beneath, and shorter male and female spikes. *Male spikes* hispid. The leaflet base varies from acute to almost cordate with a rounded lobe on one margin and an acute one on the other.

4. *E. Wallichiana*, Lindl. in Wall. Cat. 4942; quite glabrous, leaflets 4-6 in. petiolulate subfalcately lanceolate quite entire obtusely acuminate, male spikes paniced, nut globose clothed with golden scales. *Cas. DC. Prodr.* xvi. ii. 141. *Juglans pterococca*, *Roxb. Fl. Ind.* iii. 631, *in part.* *E. chrysolepis*, *Hance in Ann. Sc. Nat. Ser.* 4, xv. 227.

PENANG; *Wallich, Curtis, &c.* SINGAPORE, *Wallich.*

Branches and petioles slender. *Petiole* 3-5 in.; leaflets thinly coriaceous, bases narrowed into the petiole, opaque on both surfaces. *Male spikes* in spreading suberect panicles, 3-4 in. long; flowers clustered, very minute, of 4 unequal oblong segments or bracts; stamens about 12, irregularly inserted on the segments; anthers minute, subsessile, didymous. *Fem. perianth* 4-lobed; ovary globose, stigmas 4 sessile spreading. *Nut* globose, $\frac{1}{2}$ in. diam., crowned with the erect 4 lobes of the perianth; exocarp (tube of perianth) thin, clothed with yellow-glandular scales; endocarp thick, bony, intruded base columnar; wings of bract brown, mesial 1-1 $\frac{1}{2}$ in. long.—I suspect that all Roxburgh's description of *J. pterococca* is taken from this plant, except the nut, which he describes as very hairy and as large as a large pea, which applies to *E. spicata*, not to *Wallichiana*.

5. *E. serrata*, Blume *Fl. Jav. Jugland.* 14, t. 4, and 5 C?; branchlets petioles and leaflets beneath glandular, leaflets 4-7 pairs 2-3 in. subsessile coriaceous obliquely elliptic- or ovate-oblong acute or acuminate crenate, fruiting racemes 6-8 in., nut hirsute. *Cas. DC. Prodr.* xvi. ii. 14. *E. palembanica*, *Miquel Fl. Ind. Bat. Suppl.* i. 346.

PENANG; at Muka Head, *Curtis*.—DISTRIB. JAVA.

This accords so well in habit and foliage with Blume's figure and description of *E. serrata*, that I would have referred it without doubt to that plant, but that he describes the style as short and thick, whereas, as far as I can make out, it is rather long and hairy in the Penang plant. It is possibly a state of the following, but I have seen no male fl.

6. ***E. nudiflora***, *Hook. f. Ic. Plant. ined.*; branchlets petioles and leaves beneath glandular, leaflets 2-6 pairs 1-1½ in. subsessile coriaceous elliptic-oblong or cuneate-obovate obtuse often oblique entire or subcrenate, bract of male fl. lacinate with slender antheriferous arms, anthers ellipsoid, fruiting raceme 4-6 in., style long hairy.

PENANG; on Government Hill, *Maingay* (*Kew Distrib.* 1510).

A very large tree (*Maingay*). *Leaves* 3-5 in., nerves 6-8 pairs, strong beneath. *Fruiting racemes* like those of *E. spicata*, but nuts smaller. This very much resembles Blume's figure and description of *E. rigida*, but he describes the bract of the male fl. as thick and the anther as ovate-cordate.

ORDER CXXXVIII. MYRICACEÆ.

Glandular and aromatic trees or shrubs. *Leaves* alternate; stipules 0. *Flowers* unisexual, in cylindric bracteate catkin-like spikes; male spikes solitary fascicled or paniced, and with sometimes fem. fl. at the top; fem. spikes axillary, bracts 1-4-fld. MALE FL. *Stamens* 3-6, rarely more, on a torus adnate to the bract, filaments short free or connate, anthers erect, 2-celled. FEM. FL. A 2-4-bracteolate sessile 1-celled ovary; style 2-fld, stigmatose inwardly; ovule 1, erect, orthotropous. *Drupe* ovoid or globose, resinous succulent or waxy, endocarp hard. *Seed* erect, testa membranous, albumen 0; embryo straight, cotyledons plano-convex, radicle short superior.—Genus 1; about 35, temperate and tropical (not Australasian).

MYRICA, Linn.

CHARACTERS OF THE ORDER.

M. Nagi, *Thunb. Fl. Jap.* 76; leaves lanceolate oblanceolate or obovate obtuse acute or acuminate entire or serrulate towards the tip, young sharply serrate, male spikes solitary or racemed, stamens 3-6, fruit globose or ellipsoid succulent granulate. *Cas. DC. Prodr.* xvi. ii. 151; *Kurz For. Fl.* ii. 475; *Bot. Mag.* t. 5727. *M. sapida*, *Wall. Tent. Fl. Nap.* 59, t. 45, and *Cat.* 6811; *Cas. DC. l. c.* 152; *Brand. For. Fl.* 495; *Gamble Man. Ind. Timb.* 391. *M. integrifolia*, *Roxb. Fl. Ind.* iii. 765; *Cas. DC. l. c.* 151; *Wight Ic.* t. 764, 765; *Wall. Cat.* 6812. *M. missionis*, *Wall. Cat.* 7297; *Cas. DC. l. c.* 152. *M. Farquhariana*, *Wall. Tent.* 61; *Cas. DC. l. c.* *M. rubra*, *Sieb. & Zucc. Fam. Nat. Jap.* ii. 106. *Nageia japonica*, *Gärtn. Fruct.* 1, 191, t. 39, f. 8.

SUBTROPICAL HIMALAYA, from the Ravi eastwards, alt. 3-6000 ft. The KHASIA Mts., SILHET, and southwards to SINGAPORE.—DISTRIB. Malay Islands, China, Japan.

An evergreen diœcious tree, branchlets pubescent. *Leaves* 3-7 in., with resinous glands beneath. *Fruit* the size of a small or large cherry, flesh formed of red spindle-shaped fibres radiating from the rugose nut. No doubt *M. javanica*, *Blume*, and *longifolia* and *Lobbia*, *Teysm.* and *Binnend.*, are other forms of this very common and variable shrub.

ORDER CXXXIX. **CASUARINÆ.**

Leafless trees or shrubs; branchlets cylindric, grooved, jointed, internodes terminating in a short sheath of connate subulate scales (leaves). *Flowers* unisexual; males in terminal spikes formed of short superposed toothed cups; fem. in ovoid or globose heads, bracteate and 2-bracteolate. **MALE FL.** *Sepals* 1 or 2, concave, circumsiss at the base. *Stamen* 1, inflexed in bud; anther large. **FEM. FL.** *Ovary* minute, 1-celled; style 2-fid, arms filiform, stigmatose to the base. *Ovules* 2, collateral, semianatropous. *Fruit* an oblong or cylindric cone formed of the enlarged hardened bracts and bracteoles, together forming 2-valved cavities enclosing the compressed winged achenes; wing terminal, tipped by the style. *Albumen* 0; embryo straight, cotyledons flat equal, radicle very short superior.—Genus 1; species about 23, Australian, a few Malayan and Pacific.

CASUARINA, Forst.

CHARACTER OF THE ORDER.

C. equisetifolia, Forst. Char. Gen. 103, f. 53; branchlets filiform, internodes $\frac{1}{2}$ in., sheaths with 6–8 appressed teeth, male spikes cylindric or subclavate, fruit oblong or globose. *Miquel in DC. Prodr.* xvi. i. 338; *Brand. For. Fl.* 435; *Kurz For. Fl.* ii. 494; *Gamble Man. Ind. Timb.* 346; *Beddome Forester's Man.* t. 226. *C. muricata, Roxb. Fl. Ind.* iii. 519; *Wall. Cat.* 6815.

On the east side of the BAY of BENGAL, from Chittagong southward, cultivated elsewhere in India.—**DISTRIB.** Malay Islands, Australia, Pacific.

A very tall diœcious? leafless tree, branches drooping; branchlets deciduous, cylindric or sub-6–8-angled. *Male spikes* about $\frac{1}{2}$ in.; fem. peduncled. *Fruit* $\frac{3}{4}$ in. diam. with about 12 rows of puberulous achenes, hardened bracts puberulous, obovate-oblong, mucronate.

ORDER CXL. **CUPULIFERÆ.**

Trees or shrubs, monœcious or diœcious. *Leaves* alternate, penninerved; stipules free, caducous. *Male fl.* spicate; sepals 1–5, free or connate or 0. *Stamens* 2–20, on a hairy torus, or on the base of the sepals. *Fem. fl.* solitary spicate or capitate; perianth adnate to the ovary or 0, limb minute; ovary 2–3, rarely 4–6-celled; styles or style-arms as many as the cells; ovules 1, or 2-collateral, pendulous, anatropous. *Fruit* included within or in the axil of often greatly enlarged bracts. *Seed* pendulous, albumen 0; cotyledons plano-convex sometimes rugose or ruminant, radicle superior.—Genera 10; species about 400, chiefly North temperate.

Tribe I. Betuleæ. *Male spikes* pendulous; sepals 4 or fewer; stamens 2–4. *Fem. spikes* catkin-like, pendulous or suberect; perianth 0; ovary 2-celled, 2-ovuled; styles or style-arms 2. *Nut* small, compressed, in the axils of the bracts.

Scales of fem. spikes thin, deciduous 1. **BETULA.**
Scales of fem. spike thick, persistent 2. **ALNUS.**

Tribe II. Quercineæ. *Male spikes* deciduous or persistent; perianth 4–10-lobed or parted. *Fem. fl.* 1–3 in an involucre of many bracts which enlarge in fruit forming a cup at the base of or becoming confluent and enclosing one or more nuts; ovary 3–7-celled, cells 2-ovuled.

- Involucre of many imbricating appressed bracts 3. QUERCUS.
 Involucre armed with clusters of spines or tubercles 4. CASTANOPSIS.

Tribe III. **Coryleæ.** *Male spikes* pendulous; perianth 0; stamens included between 2-bracteoles; anthers hairy at the tips. *Fem. fl.* in pairs in the axils of the leafy or coriaceous bracts that enlarge greatly in fruit; ovary imperfectly 2-celled, cells 1-ovuled.

- Fem. spike minute, few-fl.; bracts minute, greatly enlarged and convolute in fruit 5. CORYLUS.
 Fem. spike of many leafy veined bracts, which are flat and elongated in fruit 6. CARPINUS.

1. **BETULA**, Tourn.

Trees or shrubs, monœcious. *Leaves* alternate, deciduous, penninerved, toothed or serrate. *Male fl.* in pendulous spikes; bracts peltate, with 3 bi-bracteolate flowers; sepals 2-4; stamens 2, filaments forked separating the anther-cells. *Fem. fl.* in erect or pendulous spikes; bracts imbricate, bracteoles 2 adnate to the bract which thus appears 3-lobed; perianth 0; ovary compressed, 2-celled, cells 1-ovuled; styles 2, slender, stigmas terminal. *Fruit* a spike of lenticular winged or margined nuts; cotyledons flat.—Species about 25, N. temp. Arctic, and Andean.

1. **B. utilis**, Don *Prodr.* 58; shoots and young leaves pubescent, leaves ovate acuminate irregularly serrate glandular beneath bracts of male spikes stipitate; fem. spike stout subsolitary, bracts pubescent broader than the wings of the nut. *B. Bhojpattra*, Wall. *Pl. As. Rar.* ii. 7; *Cat.* 2792; *Lindl. Bot. Reg.* 1840, *Misc.* 73; *Brand. For. Fl.* 437; *Regel Monogr.* 58, t. 6, f. 13-19; t. 13, f. 7-14; *DC. Prodr.* xvi. ii. 177; *Gamble Man. Ind. Timb.* 372. *B. Jacquemontii*, Spach. in *Ann. Mus. Ser.* 2, xv. 189, and in *Jacquem. Voy. Bot.* t. 158; *Regel in DC. l. c.* 178. *B. Bhojpattra*, var. *ε. Jacquemontii*, *Regel. Monogr.* 60, t. 6, f. 60; *DC. l. c.* 177. *B. castanæ*, *Herb. Ham.*

TEMPERATE HIMALAYA and WESTERN TIBET; from Kashmir, alt. 7-12,000 ft., to Sikkim, alt. 9-14,000 ft., and Bhotan.—DISTRIB. Japan, Afghanistan.

A tree, 40-50 ft., or shrub at high altitudes; bark peeling in horizontal flakes. *Leaves* 2-3 in.; nerves 8-12 pairs; petiole $\frac{1}{2}$ - $\frac{2}{3}$ in. *Bracts* of male ciliate, stipes scaly; anthers glabrous except the tip. *Fem. spikes* 1-2 in., by $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; wings of nut equalling or narrower than the nucleus.—I see no reason for abandoning Don's name of *utilis*, as no one doubts its belonging to this plant; the barbarous name "*Bhojpattra*" is common to this and *B. alnoides*. *Regel (in DC.)* cites *B. Jacquemontii* as a species, and as a var. of *B. Bhojpattra*.

2. **B. alnoides**, Ham. in Don *Prodr.* 58; shoots and young leaves tomentose, leaves ovate or ovate-oblong or lanceolate acuminate unequally doubly or trebly often cuspidately serrate pubescent beneath when young, glandular when old, spikes slender paniced, bracts of fem. narrower than the very broad wings of the nut. *B. acuminata*, Wall. *Pl. As. Rar.* ii. 7, 109, *Cat.* 2793; *Brand. For. Fl.* 458, t. 56; *Kurz For. Fl.* ii. 476; *Gamble Man. Ind. Timb.* 372; *Regel Monogr.* 71; *DC. Prodr.* xvi. i. 179. *B. nitida*, Don *l. c.*; Wall. *Cat.* 2795; *Lindl. in Wall. Pl. As. Rar.* ii. 7; *Regel Monogr.* 72; *DC. l. c.* 180. *B. cylindrostachys*, Wall. *l. c.*; *Cat.* 2794; *Regel Monogr.* 61, t. 6, f. 32, 34, and t. 13, f. 29; *DC. l. c.* 179. *B. affinis*, Endl. *Gen. Pl. Suppl.* iv. ii. 20; *Regel in DC. l. c.* *Betulaster cylindro-*

stachya, acuminata, affinis & nitida,^o *Spach. in Ann. Mus. Ser. 2*, xv. 198, 199, 200.

TEMPERATE AND SUBTROPICAL HIMALAYA, alt. 5-10,000 ft., from the Sutlej to the Mishmi Hills; KHASIA and MARTABAN HILLS, alt. 3-6000 ft. MUNNIPORE, alt. 9000 ft., *Watt*.

A tree, 50-60 ft.; young plants and shoots sometimes cottony-tomentose. *Leaves* 3-6 in., base cuneate rounded or cordate; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Male and fem. spikes* 3-5 in., slender, fascicled, pendulous; anthers fem. bracts ovary and style hairy; wings of nut rounded much broader than the nucleus.—Wallich having in his catalogue cited (as a variety) Don's *B. alnoides* under his *B. acuminata*, I do not see how the former name, given to the plant by its discoverer Hamilton, can be set aside. I follow Brandis in uniting with it *B. cylindrostachys*, for which I can find no character. Gamble, however, keeps it distinct, giving as a character the bark flaking vertically.

2. *ALNUS*, Gærtn.

Deciduous trees or shrubs, monœcious. *Leaves* alternate, penninerved. *Male fl.* in solitary or paniced pendulous spikes; bracts 3-fld. with 3-5 adnate bracteoles; sepals 4; stamens 4, anthers subsessile. *Fem. fl.* in short erect spikes; bracteoles 2-4, minute; perianth 0; ovary 2-celled, cells 1-ovuled; styles 2, tips stigmatose. *Fruit* a small woody cone; bracts persistent, covering the small crustaceous 1-seeded nuts; testa membranous; cotyledons flat.—Species about 14, N. temperate and Andean.

1. *A. nepalensis*, *Don Prodr.* 58; branchlets glabrous, leaves elliptic-lanceolate acute entire or subentire, fruiting spikes in large erect panicles. *Regel Monogr. Bot.* 83, t. 16, f. 4-6; t. 13, f. 40-43, and in *DC. Prodr.* xvi. i. 181; *Brand. For. Fl.* 460; *Kurz For. Fl.* ii. 476; *Wall. Pl. As. Rar.* ii. 27, t. 131; *Cat.* 2799. *Clethropsis nepalensis*, *Spach. in Ann. Mus. Ser. 2*, xv. 202. *Betula leptostachya*, *Wall. Herb.*

TEMPERATE HIMALAYA, alt. 3-9000 ft., from Chamba to the Mishmi Hills in Upper Assam. KHASIA HILLS. AVA, on the Khaken Hills, *Kurz*. YUNAN, *Anderson*.

A deciduous tree, flowering after the leaves. *Leaves* 3-7 by 2-4 in., subglaucous beneath, nerves 10-18 pairs; petiole $\frac{1}{4}$ -2 in. *Male spikes* 4-10 in., in terminal drooping panicles; flowers in clusters of 6-12; stamens mixed with ciliate scales under each bract. *Fem. spikes* $\frac{1}{4}$ in., pendulous in flower. *Fruit spikes* in lateral panicles, each $\frac{1}{4}$ -1 in. long, ellipsoid or subcylindric; nuts with a membranous wing.

2. *A. nitida*, *Endl. Gen. Pl. Suppl.* iv. ii. 20; branchlets pubescent, leaves elliptic-ovate or elliptic acuminate obscurely crenate or entire, base cuneate rarely rounded, fruiting spikes solitary or in short erect racemes. *Regel Monogr. Bot.* 82, t. 14, f. 23-30, and in *DC. Prodr.* xvi. i. 181; *Brand. For. Fl.* 461, t. 57. *Clethropsis nitida*, *Spach. in Ann. Mus. Ser. 2*, xv. 202, and in *Jacquem. Voy. Bot.* 159, t. 159.

WESTERN TEMPERATE HIMALAYA, alt. 5-9000 ft., from Kashmir to Kunawur, sometimes descending into the plains.

A large deciduous tree, attaining 100 ft., and trunk 15 ft. girth; flowering after the leaves. *Leaves* 4-8 in., sometimes $3\frac{1}{2}$ broad, nerves 8-12 pairs, axils beneath with tufts of hair; petiole 1-1 $\frac{1}{2}$ in. *Male spikes* 2 in. long, in terminal erect often leafing racemes. *Fem. spikes* 1-2 by $\frac{3}{4}$ in. diam.; fruiting ovoid oblong or cylindric, $\frac{3}{4}$ -1 $\frac{1}{2}$ in. *Nut* with a narrow thickened margin.

3. *QUERCUS*, Linn.

Deciduous or evergreen trees and shrubs. *Leaves* alternate, entire

toothed or lobed, penninerved. *Flowers* monœcious, small or minute, spicate; male in pendulous or erect spikes; bracts small; female erect. **MALE FL.** *Perianth* campanulate, 4-7-lobed or -partite. *Stamens* indefinite, 6-12; filaments slender; anther-cells contiguous. *Pistillode* hairy or 0. **FEM. FL.** enclosed in imbricate bracts. *Perianth-tube* adnate to the ovary, limb very minute lobed or toothed. *Staminodes* minute or 0. *Ovary* after fecundation more or less perfectly 3- rarely 4-5-celled; styles 3-5, short; ovules 2 in each cell. *Nut* ovoid globose or depressed, 1-celled, seated in or enclosed in, and attached by a broad base or by all its surface to an involucre of imbricate hardened bracts. *Seeds* 1 or 2, testa membranous; cotyledons plano-convex, thick, fleshy, smooth grooved lobed or ruminant; radicle minute.—Species about 300, temperate and tropical; absent in S. America, Tropical and S. Africa, the Deccan Peninsula, Australia and the Pacific.

The following prodromus of the Indian Oaks is a very imperfect one. It is founded on a systematic list with references and synonyms of the Indo-Malayan species kindly sent me by Dr. King, and which embodies his ideas of the limitation of the species as they will appear in the illustrated Monograph which he is preparing, and which will doubtless supplement the shortcomings of this work. The genus is one of exceptional difficulty, from the variability of the foliage, and in the size and form of the involucre of the fruit and of the nut itself, and I doubt the possibility of identifying most of the species in many of these states by descriptions alone.

Since the above lines were written Dr. King has visited England, bringing his mss. account of the Oaks with him. This he has generously allowed me to collate with my descriptions to the great advantage of the latter.

SECT. I. LEPIDOBALANUS, Endl.—*Male spikes* simple, lax-fl., pendulous, deciduous. *Fruit* subsessile, on short spikes; bracts of cup imbricate, tips free. *Leaves* usually toothed serrate or lobed.

1. **Q. semecarpifolia, Smith in Rees Cyclop.** xxix. No. 20; leaves short-petioled elliptic or oblong entire or spinous-toothed obtuse or pungent, base cordate or rounded, cup hemispheric covering the base rarely more of the oblong or globose nut, bracts appressed acute tips often membranous. *A. DC. Prodr.* xvi. ii. 15; *Wall. Pl. As. Rar.* ii. 56, t. 174; *Cat.* 2776; *Brand. For. Fl.* 479, t. 64; *Gamble Man.* 382; *Miquel Ann. Mus.* i. 119. *Q. obtusifolia* & Cassura, *Don Prodr.* 56, 57; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 219.

TEMPERATE HIMALAYA; from Kumaon to Bhotan and Munnipore, alt. 6-12,000 ft. —**DISTRIB.** Afghanistan.

A small or large subevergreen gregarious tree, 30-80 ft., rarely 80-100 ft., with trunk 12-18 ft. in girth. *Leaves* 2-6 by 1-4 in., coriaceous, glabrous-pubescent or young stellate-pubescent; nerves 6-8 pairs, forked; petiole 0- $\frac{1}{2}$ in. *Male spikes* crowded, softly pubescent; sepals obtuse, ciliate; stamens 8-18, glabrous. *Fem. spikes* short; styles long, recurved. *Cups* solitary, $\frac{1}{2}$ -1 in. diam., margin thin; nut globose, rarely ovoid, 1 in. diam., glabrous, umbo large.—Often confounded with *Q. ilex*, from which the forked nerves distinguish it.

2. **Q. serrata, Thunb. Fl. Jap.** 176; leaves long-petioled oblong-lanceolate acute or acuminate spinulose-toothed many-nerved, cup half covering the globose or oblong nut, bracts free long thick coriaceous recurved. *Brand. For. Fl.* 486; *Gamble Man.* 384. *Q. serrata, var. Roxburghii, A. DC. Prodr.* xvi. i. 57; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 221. *Q. polyantha, Lindl. in Wall. Cat.* 2771. *Q. Roxburghii, Endl. Gen. Pl., Suppl.* iv. 28.

EASTERN TEMPERATE HIMALAYA; from Nepal, *Wallich*, to Sikkim, alt. 5-6000 ft., Bhotan. MUNNIPORE and the KHASIA HILLS, alt. 3-5500 ft.—DISTRIB. Shan Hills, China, Japan.

A deciduous tree of moderate size. *Leaves* 4-6 in., coriaceous, glabrous or with tufts of hairs in the nerve axils, young tawny tomentose beneath; nerves 14-16 pairs, ending in the often long slender teeth; petiole 1-2 in. *Male spikes* long, tomentose; stems glabrous. *Fem. spikes* short; fl. usually clustered; style slender; cups 1-1½ in. diam., at first enclosing the glabrous nut, which is ½-¾ in. long.—The Indian plant differs slightly from the Japanese in the rather broader bracts and stipules.

3. *Q. dilatata*, *Lindl. in Wall. Cat.* 2785; leaves short-petioled glabrous oblong-lanceolate entire or spinous-serrate, nerves forked and reticulate, cup hemispheric half enclosing the ovoid nut, bracts lanceolate appressed. *A. DC. Prodr.* xvi. ii. 41; *Royle Ill.* 346, and *Q. dealbata*, t. 84, f. 2; *Brand. For. Fl.* 482; *Gamble Man.* 383; *Wenzig in Jahrb. Bot. Gart. Berl.* v. 220. *Q. floribunda*, *Lindl. in Wall. Cat.* 2773.

WESTERN TEMPERATE HIMALAYA; from Kumaon to Kashmir, alt. 4500-9000 ft.—DISTRIB. Afghanistan (ascending to 10,000 ft.).

A large subevergreen gregarious tree, 50-60 ft., but often 80-100 ft.; trunk attaining 20 ft. girth; shoots flocculent. *Leaves* 2-3 in., coriaceous, shining, base rounded or cordate; nerves 8-12 pairs; petiole ¼ in. *Male spikes* crowded, 1-1½ in. *Fem. spikes* short; fl. solitary; styles 3-5, linear-clavate. *Cup* ¾ in. diam., tomentose; nut ¾ in. long.

4. *Q. Ilex*, *Linn. Sp. Pl.* 995; leaves subsessile very coriaceous elliptic oblong or orbicular entire or spinous-toothed base cuneate rounded or cordate, softly and thickly tomentose or very pubescent beneath or at length glabrous, nerves subsimple, cup campanulate obconic or turbinate at first nearly enclosing the cylindric nut, bracts appressed tips narrow. *A. DC. Prodr.* xvi. i. 39; *Brand. For. Fl.* 480; *Gamble Man.* 383; *Boiss. Fl. Orient.* v. 1167; *Reichb. Ic. Fl. Germ.* xii. t. 642; *Kotschy Eichen*, t. 38. *Q. Baloot*, *Griff. Itin. Not.* 328; *A. DC. l. c.*; *Boiss. l. c.* 1168; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 200.

WESTERN TEMPERATE HIMALAYA; in the drier ranges from Kumaon westwards, alt. 3000-8500 ft.—DISTRIB. Afghanistan, and from Syria westwards to the Atlantic.

An evergreen shrub or small tree, 40 ft., trunk attaining 7-8 ft. girth; shoots stellate-pubescent. *Leaves* 1-3 in., very coriaceous, young pubescent above, nerves 6-12 pairs, not strong; petiole ½-¾ in. *Male spikes* fascicled, stellately-pubescent. *Fem. spikes* short, usually slender, flexuous, with 1 or more flowers at the flexures; styles 3-5, linear-clavate, surrounded by the perianth-limb. *Cup* very thick, hoary; nut 1-1½ in., tip conical.—The specific identity of the Himalayan *Q. Baloot*, Griffith, with the Mediterranean *Q. Ilex*, has been carefully studied by Thomson, Brandis and King, and settled affirmatively. The real or supposed characters for the Indian plant were the pubescence of the leaves, and the smallness and flatness of stellate hairs which have a more distinct centre and shorter more slender rays.

5. *Q. Griffithii*, *Hook. f. & Thoms. in A. DC. Prodr.* xvi. ii. 14; leaves large subsessile obovate-oblong or oblanceolate acute base cordate rounded or acute entire or coarsely sinuate toothed or serrate pale and stellately-pubescent or tomentose or smooth and glaucous beneath, cup small sessile hemispheric embracing half the ovoid-oblong nut, bracts appressed upper acute. *Gamble Man.* 381; *Miq. Ann. Mus.* i. 104; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 218.

SIKKIM HIMALAYA; at Mongpo, alt. 3500 ft., introduced by *Clarke*. KHASIA MTS., alt. 3-5000 ft., *Griffith*, &c.; Munnipore, *Watt*, *Clarke*. ? BHOTAN, *Booth*. BURMA, *Brandis*.

A small or large deciduous tree. *Leaves* 6-10 by 2-5 in., smooth above and pale when dry; petiole $\frac{1}{10}$ - $\frac{1}{6}$ in. *Male spikes* 1-2 in., crowded and glabrous; anthers hairy. *Cups* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., hoary, margin thin; nut $\frac{1}{2}$ - $\frac{3}{4}$ in. long, glabrous, tip conical.—A diseased state is common in which the branchlets are replaced by globose sessile brush-like masses of imbricating subulate rigid tomentose scales.—King thinks it probable that this and the Mongolian and Japanese *Q. aliena*, Bl., *mongolica*, Fisch., *crispula*, Bl., and *grosseserrata*, Bl., are one species.

VAR. *oblonga*, King mss.; leaves oblong or oblong-obovate shortly acuminate sub-entire concolorous and puberulous or glabrate beneath.—Khasia Mts., *Mann*, *Clarke*.—A very constant form.

6. *Q. lanuginosa*, *Don Prodr.* 57; shoots and leaves beneath densely rusty or tawny woolly or tomentose, leaves petioled oblong-lanceolate toothed acute or acuminate, nerves many parallel very strong beneath, cups small hemispheric axillary spicate or on the old wood sessile, cup about half as long as the small oblong nuts, bracts ovate appressed. *A. DC. Prodr.* xvi. ii. 51; *Brand. For. Fl.* 481; *Gamble Man.* 384. *Q. lanata*, *Smith in Rees Cyclop.* xxix. No. 27, and in *Wall. Cat.* 2772; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 221 (excl. var. *incana*). *Q. Banga*, *Ham. mss.*

TEMPERATE HIMALAYA; from Kumaon to Bhotan, alt. 6000-7500 ft.

A large evergreen tree, attaining 80 ft. *Leaves* 4-8 in., very coriaceous; nerves 10-16 pairs, impressed above, simple, straight; petiole $\frac{1}{4}$ -1 in., stout. *Male spikes* densely woolly, clustered, stamens glabrous. *Fem. fl.* tomentose, solitary or in pairs; styles linear. *Cups* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; margin acute; nut as long, glabrous.

7. *Q. incana*, *Roxb. Hort. Beng.* 113; *Fl. Ind.* iii. 642; leaves oblong- or ovate-lanceolate acuminate mucronate-serrate densely tomentose beneath, nerves many parallel very strong beneath, cups axillary solitary or clustered campanulate embracing half the conico-ovoid nut, bracts triangular closely appressed tips often membranous. *A. DC. Prodr.* xvi. ii. 57 (excl. syn. *lanata*); *Brand. For. Fl.* 482; *Gamble Man.* 384; *Wall. Cat.* 2770; *Miquel Ann. Mus.* i. 111. *Q. dealbata*, *Wall. Cat.* 2769. *Q. lanata*, *Smith in Rees Cyclop.* xxix. n. 27. *Q. lanata*, *Don*, var. *incana*, *Wenzig in Jahrb. Bot. Gart. Berl.* iv. i. 222. ? *Q. oblongata*, *Don. Prodr.* 57.

TEMPERATE HIMALAYA; from the Salt range and Murree to East Nepal, alt. 4500-7500 ft.—DISTRIB. Shan States of Upper Burma.

An evergreen tree, attaining 50-80 ft., and trunk 4-12 ft. in girth; shoots and petioles hoary or woolly. *Leaves* 3-6 in., coriaceous, glabrous above, nerves 14-20 pairs; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Male spikes* softly hairy; anthers glabrous. *Fem. fl.* usually sessile; styles linear-clavate, spreading. *Cup* $\frac{1}{2}$ in. diam., margin acute, tomentose at length glabrate, at first enclosing the nut, which is 1 in. long, hoary with a short cylindric umbo.

SECT. II. CYCLOBALANOPSIS, *Oerst.* *Male spikes* as in *Lepidobalanus*. *Bracts* of the cupular involucre connate in concentric connate or free belts. *Leaves* rarely entire.

8. *Q. oideocarpa*, *Korth. in Verh. Nat. Gesch. Bot.* 216, t. 47, t. 18; leaves long-petioled glabrous elliptic oblong abruptly caudate entire or serrate-toothed towards the tip, cup large solitary peduncled hemispheric globose or turbinate half to three-fourths as long as the ovoid or globose hoary nut, zones 5-7 entire thin. *Blume Mus. Bot.* 302; *A. DC. Prodr.* xvi. ii. 99; *Miquel Fl. Ind. Bot.* i. i. 856; *Ann. Mus.* i. 115; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 233.

BURMA, *Parish*. PERAK; at Larut, *Scortechini*, *King's Collector*.—DISTRIB. Sumatra, Java, Borneo.

Shoots quite glabrous. *Leaves* 6-8 in., rather thinly coriaceous, pale, shining above, reticulate beneath; nerves 8-10 pairs, slender; petiole 1 in., very slender. *Male spikes* unknown; fem. short. *Cup* $\frac{1}{2}$ -1 in. diam., sessile; belts 6-8, thin, flat, crenate, pubescent; nut $\frac{3}{4}$ -1 $\frac{1}{2}$ in. diam. usually globose with a long conical zoned umbo.

9. ***Q. semiserrata***, *Roxb. Fl. Ind.* iii. 641; leaves oblong to lanceolate acuminate repand-serrate towards the tip, subglaucous beneath, nerves laxly reticulate, petiole pubescent, cups 1-3 velvety on a short stout peduncle at first turbinate, then hemispheric and embracing the base or all of the ovoid velvety nut, belts 5-8 very thick, margin acute or obtuse and densely velvety. *A. DC. Prodr.* xvi. ii. 99; *Wight Ic.* t. 211; *Brand. For. Fl.* ii. 488; *Kurz For. Fl.* ii. 488; *Wall. Cat.* 2798; *Wight Ic.* t. 211; *Miquel Ann. Mus.* i. 112. *Q. Horsfieldii*, *Miquel l. c.* 856; *A. DC. l. c.*

ASSAM, SILHET, CACHAR, and the KHASIA Mts., alt. 2-3000 ft., and from PEGU to TENASSERIM.—DISTRIB. Sumatra, Banca.

An evergreen tree, 40-50 ft.; shoots and young leaves beneath tawny-tomentose. *Leaves* 5-9 in., thinly coriaceous, base acute or obtuse; nerves slender, loosely reticulate; petiole $\frac{1}{2}$ -1 in., slender. *Male spikes* slender, villous; flowers minute. *Cups* 1-1 $\frac{1}{2}$ in. diam., villous; belts very variable in number and thickness; nut $1\frac{1}{2}$ to nearly 2 in. long, broadly globosely ovoid or oblong, umbo long subcylindric.

VAR. *Mannii*, leaves 4-6 in. narrowed downwards, nerves 12-14 pairs straight ascending, margin of cup very thick broadly everted villous.—Khasia and Naga Hills.

10. ***Q. glauca***, *Thunb. Fl. Jap.* 175; leaves long-petioled oblong to ovate-lanceolate acuminate entire or cuspidate-serrate above the middle many-nerved glaucous or not beneath, base unequal, cups 2-3 small sessile on a short axillary peduncle half as long as the oblong or ovoid thin glabrous nut, belts 4-8 silky thin outer crenate. *A. DC. Prodr.* xvi. ii. 100; *Blume Mus. Bot.* i. 289; *Miquel Ann. Mus.* i. 115; *Wenzig Jahrb. Bot. Gart. Berl.* iv. 233; *Banks. Ic. Sel. Kaempf.* t. 17. *Q. annulata*, *Smith in Rees Cyclop.* xxix. No. 22; *A. DC. Prodr.* xv. ii. 100; *Wall. Cat.* 2767; *Brand. For. Fl.* 488, t. 65 (*excl. syn. semiserrata*); *Gamble Man. Cat.* 2775. *Q. Phyllata*, *Ham. in Don Prodr.* 57. *Q. dentosa*, *Lindl. in Wall. Cat.* 2775. *Q. laxiflora*, *Lindl. in Wall. Cat.* 2774; *A. DC. l. c.* 108.

SUBTROPICAL HIMALAYA; from Kashmir to Bhotan, alt. 3-6000 ft. KHASIA Mts., alt. 2-4500 ft.—DISTRIB. Japan.

A large evergreen tree; buds glabrous, tetragonous. *Leaves* 3-6 in., coriaceous, young silky beneath, teeth incurved; nerves 12-14 pairs; petiole $\frac{1}{2}$ -1 in., slender. *Male spikes* very slender, hairy; bracts lanceolate, much longer than the flowers; anthers glabrous. *Cup* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., belts very thin appressed; nut $\frac{1}{2}$ - $\frac{3}{4}$ in., top conical; style with a large stout umbo.—Specimens with small entire leaves look very different from the type.

11. ***Q. Brandisiana***, *Kurz in Journ. As. Soc. Beng.* 1873, ii. 108; *For. Fl.* ii. 488; leaves thinly coriaceous oblanceolate or elliptic or obovate-oblong acute or obtusely cuspidate coarsely repand serrate glaucous beneath, base rounded or acute, nerves 10-12 pairs straight slender, cups solitary shortly peduncled velvety, belts 5-6 erose or entire, nut hemispheric base truncate.

MARTABAN; in dry forests, alt. 1-4000 ft., *Kurz*.—DISTRIB. Shan Hills, in Burma.

An evergreen tree, 35-40 ft., shoots pubescent. *Leaves* 4-5 in., glabrous and wrinkled above, hardly shining sparsely downy and reticulate beneath, nerves slender conspicuous; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., slender. *Cup* $\frac{1}{2}$ in. diam., velvety; belts 3-4, thin, very appressed. *Nut* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.

12. **Q. lineata**, *Blume Bijl.* 523; *Fl. Jar. Cupul.* 32, t. 19; *Mus. Bot.* i. 302; leaves coriaceous obovate linear oblong or lanceolate acute or acuminate spinulosely serrate tip serrulate or entire glaucous pale glabrous or pubescent beneath, nerves 16-30 pairs, cups shortly peduncled not half as long as the more or less hemispheric or subglobose smooth nut. *A. DC. Prodr.* xvi. ii. 98; *Miquel Fl. Ind. Bat.* i. i. 855; *Ann. Mus.* i. 114; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 232. *Q. polyneura*, *Miquel Pl. Jungh.* i. 11. *Q. oxyrhyncha*, *Miq. Fl. Ind. Bat. Suppl.* i. 347; *Ann. Mus.* l. c. 113. $\frac{1}{2}$ *Q. kamroopii*, *Don Prodr.* 57.

SIKKIM HIMALAYA, alt. 4-7000 ft. BHOTAN, *Griffith*; KHASIA and NAGA Mts., alt. 5-6000 ft.—DISTRIB. Java.

A small tree; branches thickly lenticellate. *Leaves* 3-7 in., shining above; nerves straight, strongly shiny beneath; petiole $\frac{3}{4}$ -1 in., slender. *Male spikes* 2-4 in., tawny villous. *Cups* in very short spikes, sessile, $\frac{3}{4}$ in. or less in diameter, very variable, usually almost hemispheric, margin acute often toothed, shorter than the large or small nut.

VAR. oxyodon, *Wenzig*, l. c.; branchlets glabrous, leaves lanceolate caudate crenulate, spinulous serrate glaucous beneath, nerves many close, cup $\frac{3}{4}$ in. diam., belts many thin hoary-tomentose, nut subglobose. *Q. oxyodon*, *Miquel Ann. Mus.* i. 114; *A. DC. Prodr. l. c.*—Khasia Mts., alt. 3-5000 ft., *J. D. H.*, &c. Naga Hills, *Prairie*.

VAR. Lobbiai, *Wenzig*, l. c.; branchlets tawny-woolly, leaves 2-4 in. closely serrulate serratures setaceous, beneath white or yellowish and finely tomentose, nerves many close-set.—Khasia Hills, alt. about 3000 ft., *Griffith, Mann.*

VAR. Griffithii, *King mss.*; leaves subentire caudate-acuminate.—Khasia Hills.

VAR. Thomsoniana, *Wenzig*, l. c.; leaves glaucous or fulvous beneath serrate above the middle, nerves many strong, cups large turbinate or cupular fulvous-tomentose, belts crenate at first large loose and thin, nut $1\frac{1}{2}$ in. hemispheric glabrous. *Q. Thomsoniana*, *A. DC. l. c.* 98.—Sikkim, alt. 6-8000 ft.; Bhotan, *Griffith*.

VAR. Hildebrandii, *King mss.*; branchlets glabrous, leaves sinuate-denticulate glabrous and glaucous beneath, cup $1\frac{1}{4}$ in. diam. nearly flat, belts confluent into ridges, nut hemispheric $1\frac{1}{2}$ in. diam., umbo small.—Arracan.

13. **Q. mespilifolia**, *Wall. Cat.* 2766; leaves ovate to oblong- or ovate-lanceolate obtuse or obtusely acuminate glabrous or midrib villous beneath coarsely serrate not glaucous beneath, young flocculent, nerves 12-14 pairs stout, cup deep hemispheric or obconic, belts 6-10 velvety, nut globose or broad and depressed hardly or half exserted hoary. *A. DC. Prodr.* xvi. ii. 102; *Kurz For. Fl.* ii. 488.

MUNNIPORE, *Watt*. ARRACAN and BURMA, alt. 4-5000 ft., *Wallich, Kurz*.

An evergreen tree; branchlets tawny-villous. *Leaves* 4-7 in., thinly coriaceous, shining above, reticulate beneath; nerves nearly straight, stout beneath; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., stout, woolly. *Male spikes* 4-6 in., dense-fld., woolly. *Cup* $1\frac{1}{4}$ in. diam., base hemispheric or obconic, belts 8-15 entire or crenate; nut 1 in. diam., globose or hemispheric, depressed, globose.

14. **Q. Helferiana**, *A. DC. Prodr.* xvi. ii. 101; leaves large coriaceous elliptic- or ovate-lanceolate acute or obtuse obtusely sinuate-serrate more or less softly tomentose beneath, nerves 10-12 pairs, cups hemispheric or flatter, belts almost free crenulate, nut turbinate or depressed hemispheric half exserted.

AVA, Wallich. TENASSERIM, alt. 4000 ft., Gally; Moulmein, Helfer. MUNIPORE, alt. 3000 ft., Watt.

Branches softly tawny-tomentose or woolly. Leaves 8-10 in., shining above, almost woolly beneath, nerves rather slender; petiole $\frac{3}{4}$ -1 in., stout. Cups $\frac{3}{4}$ -1 in. diam., broader than the nut which has a low umbo.

15. *Q. velutina*, Lindl. in Wall. Pl. As. Rar. ii. 41, t. 150; Cat. 2768; leaves short-petioled pale thinly coriaceous lanceolate or elliptic-lanceolate acuminate at both ends obtusely or acutely serrate towards the tip glabrous, young densely villous beneath, nerves 8-10 pairs slender arched, cups few large in a very short spike very shallow half as long as the tomentose depressed hemispheric or globose or turbinate nut, belts 6 or more crenate densely silkily villous. A. DC. Prodr. xvi. ii. 99; Kurz For. Fl. ii. 487 (in part); Miquel Ann. Mus. i. 115; Wenzig Jahrb. Bot. Gart. Berl. iv. 236.

CHITTAGONG, Lister, King's Collector. PEGU and TENASSERIM, King, &c.

A deciduous tree, 60-80 ft.; shoots and young leaves beneath tawny- or brown-villous. Leaves 4-9 in., rather thin base acute, nerves slender not impressed above; petiole $\frac{1}{2}$ in., slender, glabrous or pubescent. Male spikes densely tawny-villous. Cups $1\frac{1}{2}$ in. diam., base broadly intruded. Nuts of the first year depressed, broader than long, when ripe as broad as long, pale tomentose, top conical, umbo minute.

16. *Q. lamellosa*, Smith in Rees Cyclop. xxix. No. 23; shoots glabrous, leaves very large shortly petioled from broadly oblong to lanceolate acuminate cuspidately serrate glabrous and glaucous or pubescent beneath, nerves very many strong and straight, fem. fl. solitary or crowded in short spikes, cups very large hemispheric silky half enclosing the subglobose or turbinate velvety nut. A. DC. Prodr. xvi. ii. 101 (excl. syn. Q. Wallichiana); Brand. For. Fl. 488; Hook. f. Ill. Pl. Himal. t. 20; Lindl. in Wall. Pl. As. Rar. ii. 41, t. 149; Wall. Cat. 2777; Gamble Man. 387; Miquel in Ann. Mus. i. 114; Wenzig Jahrb. Bot. Gart. Berl. iv. 236. Q. imbricata, Ham. in Don Prodr. 57. Q. paucilamellosa, A. DC. l. c.

EASTERN HIMALAYA; from NEPAL, Wallich, to BHOTAN, the Naga and Duphla Hills, alt. 5-8000 ft. MUNIPORE, alt. 7-8000 ft., Watt.

A lofty evergreen tree, attaining 120 ft., and trunk 15 ft. girth; buds short. Leaves 6-12 in., sometimes 10 in. broad, dark green and shining above; nerves 20-25 pairs, impressed above, very stout beneath; petiole $\frac{1}{2}$ -1 $\frac{1}{2}$ in., very stout or slender. Cups sometimes 2 $\frac{1}{2}$ in. diam. and coriaceous fleshy; belts large, deeply crenate, inner incurved, much larger than the nut.—Roxburgh's locality of Penang is a mistake.

SECT. III. PASANIA, Miquel. Male spikes stout, erect, more or less persistent, simple or paniculately branched. Fem. fl. at the base of the male spikes or in separate spikes. Invol. of fruit hemispheric or discoid or saucer-shaped, bracts imbricate; nut free or adnate to the cup at the narrowed base only. Leaves entire in all except *Q. Lindleyana*.—See also *Q. eumorpha*.

The characters of the subordinate divisions of this Section founded on the form of the nut, must be taken with many exceptions.

* Nut usually longer than broad, but very variable in most (see also *Q. spicata*).

17. *Q. Kunstleri*, King mss.; branchlets tomentose, leaves sessile narrowly elliptic- or obovate-oblong acute or obtusely cuspidate entire glabrous or pubescent beneath and on the nerves on both surfaces,

base rounded or cordate, nerves 8-10 pairs arched, cups solitary in long spikes turbinate much shorter than the ovoid-cylindric glabrous nut, bracts broadly ovate.

PERAK, *Scortechini, King's Collector.*—DISTRIB. Borneo.

A tree, 40-50 ft. *Leaves* 5-8 in., thinly coriaceous, pale brown when dry. *Male spikes* panicle, rachis fulvous-tomentose, flower glabrous. *Fruiting spikes* 1-10 in. *Cups* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; bracts appressed-tomentose. *Nut* $\frac{1}{2}$ -1 in. long, rarely hemispheric, umbo contracted below the persistent calyx-limb.

18. **Q. Lindleyana**, *Wall. Cat.* 2782; leaves shortly petioled coriaceous obovate base cuneate acute or obtusely cuspidate sparsely tomentose beneath entire or sinuate-toothed towards the tip, nerves 8-10 pairs arched very strong beneath, fruiting spikes long, cups small confluent in threes hemispheric woody embracing one-third of the elongate ovoid acute glabrous obscurely trigonous nut, bracts closely appressed. *A. DC. Prodr.* xvi. ii. 108; *Kurz For. Fl.* ii. 480; *Hance in Journ. Bot.* 1875, 136.

BURMA; at Taongdong, *Wallich.* UPPER BURMA, *Collett.*

Leaves 6-8 in., pale when dry, nerves slightly impressed above, cross-nervules beneath reticulate, base narrowed into a petiole $\frac{1}{4}$ in. long. *Fruiting spikes* 8-10 in., very stout; cups $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., sessile, hoary, margin acute entire. *Nut* $\frac{2}{3}$ - $\frac{3}{4}$ in. long, shining, umbo minute.—The bracts are sometimes obscurely disposed in rings, as shown in a drawing of this species in *Herb. Kew.*

19. **Q. Amherstiana**, *Wall. Cat.* 2783 (*in part*); quite glabrous, leaves long-petioled elliptic-oblong to lanceolate or oblanceolate acuminate quite entire, base acute, nerves slender arched, cups hemispheric areolate by the confluent large obscure bracts, margins often reflexed silky-velvety covering half the hemispheric obovoid-globose tomentose nut. *A. DC. Prodr.* xvi. ii. 83; *Kurz For. Fl.* ii. 484; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 223.

MARTABAN and TENASSERIM, *Wallich, &c.*

A large evergreen tree. *Leaves* 6-9 in., thinly coriaceous; nerves 6-10 pairs; petiole $\frac{1}{2}$ in. *Fruiting spikes* stout, long. *Cups* 1 in. diam., free or connate by twos or threes, subhemispheric. *Nut* depressed at the top with an obscure umbo.

20. **Q. acuminata**, *Roxb. Fl. Ind.* iii. 636; quite glabrous, leaves large shortly petioled elliptic-lanceolate caudate quite entire very shining pale and smooth on both surfaces, nerves 10-15 pairs slender impressed above, cups subhemispheric echinate from the projecting tips of the confluent bracts much shorter than the ovoid or hemispheric hoary nut. margin toothed. *A. DC. Prodr.* xvi. ii. 90; *Wight Ic.* t. 221, f. 6-9; *Kurz For. Fl.* ii. 484; *Miquel Ann. Mus.* i. 109. *Q. fenestrata*, *Roxb.*, var. *acuminata*, *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 224.

CHITTAGONG, *Roxburgh, King's Collector.*

Branchlets shining. *Leaves* 8-10 by $2\frac{1}{2}$ -4 in., flat, pale, narrowed into a short stout $\frac{1}{4}$ - $\frac{1}{2}$ in. petiole. *Cups* 1 in. diam., hoary. *Nut* as broad and rather longer, umbo small.

21. **Q. lappacea**, *Roxb. Fl. Ind.* iii. 637; shoots villously tomentose, leaves short-petioled oblong-lanceolate acuminate or caudate pubescent or tomentose beneath quite entire, base acute, nerves 12-15 pairs, cups hemispheric or shallower echinate or tubercled one-third to one-half the length of the broadly conico-ovoid hoary nut, bracts velvety shortly spreading. *A. DC. Prodr.* xvi. ii. 87; *Wight Ic.* t. 220; *Wall. Cat.* 2780;

Kurz For. Fl. ii. 484: *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 223. *Q. hirsuta*. *Lindl. in Wall. Cat.* 3734. *Q. Mackiana*, *Hook. Ic. Pl.* t. 224.—*Wall. Cat.* 9099.

SILHET and the KHASIA MTS., ascending to 4000 ft. TENASSERIM, *Helfer*. PERAK, *Scortechini*, *King's Collector*.

An evergreen tree. *Leaves* 5-7 in., thinly coriaceous, young tomentose on both surfaces, nerves 10-12 pairs, slender, nervules reticulate; petiole $\frac{1}{8}$ - $\frac{1}{4}$ in., stout. *Male spikes* 4-5 in., fulvous-tomentose, slender. *Fruiting spike* 2-4 in., stout; cups $\frac{3}{4}$ -1 in. diam., hoary. *Nut* 1 in. long and less, umbo prominent.

** Nut usually subglobose, base truncate, sometimes hemispheric.

22. ***Q. Falconeri***, *Kurz in Journ. As. Soc. Beng.* 1875, ii. 197; *For. Fl.* ii. 485; glabrous, leaves stoutly petioled elongate linear-oblong acuminate or apiculate quite entire base acute glabrous, fruiting spikes long tomentose, cups flattish or concave coriaceous velvety within, margins thin recurved or waved broader than the large subglobose or hemispheric nut, bracts small triangular appressed.

TENASSERIM, *Falconer*, *Kurz*.

An evergreen tree. *Leaves* thinly coriaceous, 1-1 $\frac{1}{2}$ ft., glossy on both surfaces; nerves about 20 pairs, impressed above, strong and arched beneath. *Fruiting spikes* 12-18 in., stout. *Cups* $\frac{3}{4}$ -1 in. diam., very open, margin thin.—*Kurz* by error gives Upper Assam as the habitat.

23. ***Q. Scortechinii***, *King mss.*; glabrous, leaves coriaceous shortly petioled elliptic quite entire base acuminate, nerves 8-10 pairs slender arched, cups shallow densely echinate with long spreading bracts covering the base only of the large subglobose nut.

PERAK, alt. about 3000 ft., *King's Collector*.

A tree, 60-100 ft. *Leaves* 6-8 in., shining above, nerves hardly depressed, pale beneath; petiole $\frac{1}{2}$ in., stout. *Fruiting spike* 6-10 in., very stout. *Cups* 1 $\frac{1}{2}$ in. diam., conspicuous for the long bracts. *Nut* amongst the largest of the genus, sometimes turbinate.—I have seen only old leaves and fruit.

*** Nut hemispheric hardly or not longer than broad.

† Cup almost enclosing the nut (see also *Q. spicata*).

24. ***Q. pachyphylla***, *Kurz in Journ. As. Soc. Beng.* 1875, ii. 197, t. 14, f. 1-4; quite glabrous, leaves petioled very coriaceous elliptic or elliptic-lanceolate caudate base acute, nerves about 8 pairs, cups large very thick woody cuneate half as long as the hemispheric glabrous nut. *Q. Andersoni*, *Hook. f. in Journ. Linn. Soc.* xv. (1877) 125 (name only).

SIKKIM HIMALAYA, alt. 6-10,000 ft., *J. D. H.*, &c. MUNNIPORE, alt. 7-9000 ft., *Watt*.

A shrub, or small tree, 50-60 ft., branches stout black when dry. *Leaves* 4-7 in., shining above with impressed nerves, pale beneath; nerves slightly arched, slender; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Male spikes* stout, rachis glabrous. *Cups* in confluent clusters 2-4 in. diam., each woody 1-2 in. diam. with thick incurved margins and many rows of broad appressed often confluent bracts.

25. ***Q. fenestrata***, *Rorb. Fl. Ind.* iii. 633; branches glabrous or hoary, leaves coriaceous petioled elliptic or lanceolate caudate base acute glabrous or midrib pubescent beneath, nerves 6-16 pairs slender, cups thin globose velvety with a circular apical opening enclosing $\frac{3}{4}$ or all of the

hemispheric glabrous nut, bracts triangular acute appressed or spreading. *A. DC. Prodr.* xvi. ii. 84; *Wight Ic.* t. 219; *Wall. Cat.* 2784; *Kurz For. Fl.* ii. 483; *Wall. Cat.* 2784 (in part); *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 224 (excl. syn. *dealbata* & *acuminata*). *Q. callicarpifolia*, *Griff. Itin. Notes*, ii. 87 (in part).

SIKKIM HIMALAYA, alt. 5-8000 ft. KHASIA Mts., alt. 4-5000 ft. MUNNIPORE, alt. 4-8000 ft., *Watt*.

A large evergreen tree. *Leaves* 5-10 in., coriaceous, shining above with impressed slender nerves; petiole $\frac{3}{4}$ - $\frac{1}{2}$ in. *Male spikes* stout, erect, rachis and flowers thinly tomentose. *Cups* $\frac{3}{4}$ -1 in. diam., usually clustered but hardly confluent, margin thin entire. *Nut* with a conical top and small cylindric umbo.—*Leaves* very like *Q. pachyphylla*; in a very large-leaved state more ovate and $3\frac{1}{2}$ in. broad. *Clarke* has a state from Shillong in the Khasia (alt. 6000 ft.) with slender branches and leaves 3 in. long.

26. *Q. dealbata*, *Hook. f. & Thoms. mss.* (not *Wall.*); branches glabrous or hoary, leaves coriaceous elliptic-ovate or lanceolate acuminate quite entire glabrous or minutely pubescent beneath, nerves 6-12 pairs, spikes terminal, cups hemispheric embracing half or more of the subglobose hemispheric or subpyriform hoary nut, bracts triangular acute appressed or spreading. *A. DC. Prodr.* xvi. ii. 85; *Miquel Ann. Mus.* i. 107. *Q. fenestrata*, *Roxb.*, var. *dealbata*, *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 224. *Q. callicarpifolia*, *Griff. Itin. Notes*, ii. 87 (in part).

BHOTAN and KHASIA Mts., alt. 3-6500 ft., *Griffith*, &c. NAGA HILLS, alt. 5800 ft., *Clarke*.

A bush or small tree, near *Q. fenestrata*, but the leaves are smaller, never caudate and often finely tomentose beneath, the acorns are much smaller and the nut hoary. A Khasia form has leaves and branches flocculent, and the leaves hoary above.

†† Cup covering only the lower part of the nut (or more in *Q. spicata*)

§ *Leaves quite glabrous on both surfaces.*

27. *Q. spicata*, *Smith in Rees Cyclop.* xxi. n. 12; branchlets glabrous, leaves large polymorphous subsessile or petioled oblong to lanceolate oblanceolate or obovate or subpanduriform base acute rounded or cordate, nerves 10-20 pairs slender arched reticulate, fruiting spikes long stout, cups polymorphous usually small clustered or confluent covering more or less of the ovoid subglobose or hemispheric glabrous nut, bracts minute ovate often confluent in toothed rings pubescent. *A. DC. Prodr.* xvi. ii. 85; *Don Prodr.* 56; *Wall. Pl. As. Rar.* i. 40, t. 46; *Cat.* 2781 *Brand. For. Fl.* ii. 489; *Kurz For. Fl.* ii. 486; *Gamble Man.* 385; *Miquel Fl. Ind. Bat.* i. 846; *Ann. Mus.* i. 106; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 224; *Oudem. Annot. Cupulif. Jav.* 5, 6, t. 1, 4, f. 1. *Q. squamata*, *Roxb. Fl. Ind.* iii. 638; *Wight Ic.* t. 213. *Q. grandifolia*, *Don in Spreng. Syst.* iii. 856; *Prodr.* 57, and in *Lamb. Pin.* ii. App. 2. *Q. pyrifolia*, *Blume Mus. Bot.* i. 304; *Miq. Fl. Ind. Bat.* i. i. 864. *Q. elegans*, *Blume in Batar. Verh.* ix. 208; *Bijl.* 518; *Fl. Jav. Cupulif.* 21, t. 10; *Oudem. Annot. Cupulif. Jav.* 5, 6, t. 2, 3. *Q. racemosa*, *Jack in Mal. Misc.* vii. 86; *Korthals in Verh. Nat. Gesch.* 205. *Q. Arcaula*, *Ham. mss. in Spreng. Syst.* iii. 857; *Blume Mus. Bot.* i. 290.

TROPICAL HIMALAYA; from Nepal eastwards, alt. 2-4000 ft. ASSAM, MUNNIPORE, and southwards to TENASSERIM and the MALAY PENINSULA.—DISTRIB. Malay Islands.

A small tree, all parts glabrous except the hoary male spikes, monœcious or

diaceous. *Leaves* sometimes 18 in. long, usually more or less obovate, thinly coriaceous; petiole long or short. *Cups*, the larger 1 in. diam., very thick and woody with very thick margins and obscure bracts; the smaller $\frac{1}{2}$ in. diam., hemispheric with well-marked elegantly imbricating bracts and acute entire margins. *Nuts* $\frac{1}{4}$ – $\frac{3}{4}$ in. diam., more or less sunk in the cup; umbo very small.—It is impossible to frame a diagnosis for this common and variable species; the following is King's grouping of its prevalent forms:—

VAR. *brevipetiolata* & *depressa*, A. DC. Prodr. xvi. ii. 86; leaves obovate or panduriform base rounded or cordate, cups usually connate, nut globose or much broader than long.—Himalaya, Khasia, Tenasserim.

VAR. *gracilipes*, Miquel Ann. Mus. i. 106; leaves lanceolate long-petioled, cups and nuts as in var. *brevipetiolata*. *Q. gracilipes*, Miquel Fl. Ind. Bat. i. 347.—Khasia, Burma, Malay Peninsula.

VAR. *microcalyx* & *glaberrima*, Blume Mus. Bot. i. 290; leaves small elliptic lanceolate or oblanceolate base acuminate, cups small hemispheric sometimes confluent, nut sometimes depressed-globose with the top intruded. A. DC. l. c. 86 (excl. syn. *Q. turbinata*, Roxb.). *Q. microcalyx* and *Q. anceps*, Korthals in Verh. Nat. Gesch. Bot. 204; Oudeman Annot. Cupulif. Jav. 6, t. 4, f. 3. L. *anceps*, Korthals l. c.—Khasia, Perak, Java, Sumatra.

VAR. *Collettii*, King mss.; leaves thin lanceolate or oblanceolate narrowed to the base, nerves 15–20 pairs, cups confluent hemispheric with an acute entire margin and many rows of small very distinct hoary bracts half the length of the subcylindric-ovoid nut.—Munnipore, Clarke; Naga Hills, Collett.—Very unlike the ordinary states of *Q. spicata* in foliage, cups and nuts; perhaps a distinct species.

VAR. *Chittagonga*, King mss.; leaves thin narrowly lanceolate caudate-acuminate narrowed into the slender petiole $\frac{1}{2}$ –1 in. long, cups small thin-edged covering half or the base only of the small ovoid globose or suboblong nut. *Q. mixta*, A. DC. l. c. 88 (in part).—Chittagong.

28. ***Q. grandifrons*, King**; quite glabrous, leaves very large sessile rigidly coriaceous elliptic-oblong obtusely acuminate or caudate, nerves 15–20 pairs arched and spreading, cups pedicelled covering the lower part of the hemispheric glabrous nut.

PERAK, ascending to 3000 ft., Scortechini, King's Collector.

A large tree, 60–100 ft. *Leaves* 9–16 by 4–6 in., very shining above with impressed nerves and a deeply impressed raised midrib, pale beneath with obscure transverse nervules; petiole $\frac{1}{2}$ in., very stout. *Male spikes* very slender, in large hoary panicles. *Cups* (young) with stout obconic pedicels, cupular with minute acute impressed bracts in superimposed series (mature not seen). *Nut* $\frac{3}{4}$ in. diam., umbo small.

29. ***Q. polystachya*, Wall. Cat. 2789**; branches hoary, leaves long-petioled ovate-lanceolate acuminate at both ends glabrous, pale above white beneath, nerves 10–11 pairs arched, cup small shallow covering the base only of the globose or globosely ovoid glabrous nut, margin acute entire smooth, bracts minute appressed. A. DC. Prodr. xvi. ii. 107; Kurz For. Fl. ii. 485. *Q. bancana*, Kurz l. c. (not of Scheffer).

MUNNIPORE, alt. 600–1000 ft., Watt. AVA, Wallich, &c. MOULMEIN, Parish. —DISTRIB. Shan Hills.

Leaves 6–8 in., rather thinly coriaceous; petiole $\frac{1}{2}$ –1 in. *Fruiting spikes* 6–8 in. *Cups* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. *Nut* $\frac{1}{2}$ in. diam., shining, umbo minute capping the conical summit.

§§ *Leaves glabrous above, pubescent beneath.*

30. ***Q. Wallichiana*, Lindl. in Wall. Cat. 2778**; branches hoary or tomentose, leaves coriaceous short-petioled elliptic-lanceolate or oblanceolate

caudate quite entire glabrous or subtomentose beneath, nerves 8-14 pairs arched strong beneath, cups crowded shallow hoary covering the base only of the hemispheric or subglobose conic-topped hoary nut, bracts subannulate minute appressed obscure. *Hance in Seem. Journ. Bot.* viii. (1870) 4, and in *Trimen Journ. Bot.* 1874, 241.

PERAK, PENANG, SINGAPORE and MALACCA, *Wallich*, &c.

A large tree. *Leaves* 5-7 in., usually shining above, midrib often pubescent; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Cups* $\frac{1}{2}$ in. diam.; margins acute. *Nut* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., umbo small.

31. **Q. sundaica**, *Blume Batar. Verh.* ix. 216; *Bijl.* 520; *Fl. Jar. Cupulif.* 11, t. 2, 3; branches hoary, leaves subsessile coriaceous elliptic or ovate acute (not caudate) entire glabrous above pale and hoary beneath base usually rounded, nerves 8-10 pairs spreading, cups stoutly peduncled very shallow echinate covering the base only of the hemispheric conic-topped glabrous nut. *A. DC. Prodr.* xvi. ii. 89; *Miquel Fl. Ind. Bat.* i. 850; *Ann. Mus.* i. 109; *Oudem. Annot. Cupulif. Jar.* 11. *Q. mappacea*, *Korth. Verh. Nat. Gesch. Bot.* 202; *Miquel Fl. Ind. Bat.* i. i. 850. *Q. Korthalsii*, var. *mappacea*, *Blume Mus. Bot.* i. 293; *A. DC. l. c.* 90. *Q. pseudomolucca*, vars. *sundaica* & *Korthalsii*, *Wenzig in Jahrb. Bot. Gart. Berl.* i. 227. *Q. muricata*, *Roxb. Fl. Ind.* iii. 635. ? *Q. macrophylla*, *Miquel Fl. Ind. Bat. Suppl.* 351; *A. DC. l. c.* 107.

PENANG, *Roxburgh*, &c. PERAK, *Scortechini*, *King's Collector*. MALACCA, *Maingay* (*Kew Distrib.* 1530).—DISTRIB. Sumatra, Java, Borneo.

A lofty tree, young parts furfuraceous. *Leaves* 4-7 by 2-3 in., shining above when mature (young hoary above) with a tomentose prominent midrib, pale beneath; petiole $\frac{1}{4}$ in., very stout. *Cups* $\frac{3}{4}$ -1 in. diam., pubescent. *Nut* $\frac{3}{4}$ -1 in. diam., umbo rather long.—Near *Q. Wallichii*, but the leaves are broader not caudate, petiole shorter and fruit larger.

32. **Q. Lamponga**, *Miquel Fl. Ind. Bat. Suppl.* 347; branches hoary or glabrous, leaves subsessile elliptic or elliptic-lanceolate caudate glabrous entire base acute white or silvery beneath, nerves 10-14 pairs arched, cups crowded covering the base only of the conico-hemispheric hoary nut, bracts subannulate obscure appressed. *A. DC. Prodr.* xvi. ii. 95; *Miquel Ann. Mus.* i. 109; *Wenzig in Jahrb. Bot. Gart. Berlin*, iv. 229. *Q. brevipetiolata*, *Scheff. Obs. Phyt.* ii. 47.

PERAK, *Scortechini*, *King's Collector*.—DISTRIB. Malay Islands, New Guinea.

A tree. *Leaves* 4-5 in., hardly shining; nerves not impressed above, slender beneath; petiole $\frac{1}{4}$ in., slender. *Cups* $\frac{3}{4}$ -1 in. diam., base flat. *Nut* as broad, narrowed into the minute umbo.—Intermediate between sections *Pasania* and *Cyclobalanus*.

§§§ *Leaves pubescent on both surfaces.*

33. **Q. Hystrix**, *Korth. Verh. Nat. Gesch. Bot.* 201, t. 43; branches densely tomentose, leaves very coriaceous elliptic or elliptic-oblong acuminate entire asperulous or softly pubescent above with 12-15 pairs of arched tomentose nerves and midrib, base acute, cups echinate tomentose covering the lower part of the low conico-hemispheric glabrous nut. *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 223. *Q. Korthalsii*, *Blume*, vars. *Kajan* & *Hystrix*, *Blume Mus. Bot.* i. 293; *A. DC. Prodr.* xvi. ii. 90; *Oudem. Annot. Cupulif. Jar.* 11. ? *Q. pruinosa*, var. β ., *Blume Fl. Jar. Cupulif.* 10. *Castanea* ? *purpurella*, *Miquel Fl. Ind. Bat. Suppl.* 352; *Ann. Mus.* i. 105.

PERAK and SINGAPORE, *King's Collector*. MALACCA, *Maingay* (*Kew Distrib.* 1458).—DISTRIB. Sumatra, Java.

A tree, 60-80 ft.; branches and leaves beneath rufously tomentose. *Leaves* 4-6 in., hard, nerves sunk above strong beneath, cross-nervules distinct on both surfaces. *Fruiting spikes* 4-8 in., very stout, tomentose. *Cups* shortly stoutly peduncled, young with long spinous incurved bracts, mature $\frac{2}{3}$ - $\frac{3}{4}$ in. diam., flat with incurved margins, silky within, and short pubescent bracts. *Nut* much broader than long; top conical with a long stout umbo.

*** Nut turbinate.

34. **Q. Curtisii**, *King mss.*; leaves subsessile elliptic-lanceolate obtusely caudate base acuminate entire pale above white or silvery beneath, nerves 8-10 pairs obliquely ascending slender, cups small quite flat thin narrower than the hoary hemispherico-turbinate conic-topped nut, bracts much appressed.

PERAK, *King's Collector*. PENANG, *Curtis, King*.

Branches pustular, pale, glabrous. *Leaves* 6-8 in., thinly coriaceous, nerves hardly impressed above; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., stout. *Fruiting spikes* long-peduncled. *Cups* crowded, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., wavy, margin entire not or hardly incurved, pubescent within. *Nut* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., broader than long, umbo short.

SECT. IV. CYCLOBALANUS, *Endl.* *Male spikes* stiff, erect. *Styles* as in *Pasania*. *Invol.* of fruit cupular: bracts connate, forming entire or toothed ridges, zones or belts (as in *Cyclobalanopsis*). *Leaves* quite entire in all.

* Nut normally longer than broad.

35. **Q. eumorpha**, *Kurz in Journ. As. Soc. Beng.* 1873, ii. 107; *For. Fl.* ii. 487; glabrous, leaves long-petioled undulate elliptic-oblong obtuse or obtusely acuminate entire base acute shining above pale beneath, nerves 6-8 pairs very faint arched, cups sessile campanulate or turbinate hemispheric embracing half the broad glabrous umbonate nut, bracts confluent in indistinct belts.

MARTABAN and TENASSERIM; on Moolyet, alt. 6-7000 ft., *Kurz*, &c.

A small scraggy evergreen tree. *Leaves* 3-4 in., thinly coriaceous, pale brown when dry, minutely reticulate beneath; nerves as impressed striæ above, very slender beneath; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Cups* narrowed to the base, $\frac{3}{4}$ in. diam. *Nut* $\frac{3}{4}$ in. long. — I have seen no good fruit.

36. **Q. conocarpa**, *Oudem. in Versl. en. Mededeel.* xii. 206; *Annot. Cupulif. Jav.* 18, t. 10; branches tomentose, leaves small short-petioled elliptic-oblong or lanceolate obtusely caudate entire base acute puberulous above with tomentose costa whitish or brownish finely tomentose beneath with 12-14 pairs of very strong arched nerves, cups stoutly peduncled hemispheric with a flat or intruded base half embracing the conico-hemispheric umbonate pointed silky or glabrous nut, belts few thin appressed hoary. *A. DC. Prodr.* xvi. ii. 93; *Miquel Ann. Mus.* i. 113; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 230.

PERAK and SINGAPORE, *Kunstler, Scortechini*.—DISTRIB. Sumatra, Java, Borneo.

A tree, 60-80 ft. *Leaves* 3-4 in., coriaceous, very shining though puberulous above, cross-nervules strong beneath; petiole $\frac{1}{2}$ in., tomentose. *Cups* nearly 1 in. diam. *Nut* as long and as broad.

37. **Q. Bennetti**, *Miquel Fl. Ind. Bat.* i. 857; *Suppl.* 348; *Ann. Mus.* i. 112; glabrous, leaves broadly elliptic abruptly obtusely cuspidate entire base narrowed into the slender petiole, nerves 10-12 pairs arched very faint on

both surfaces, cups shortly stoutly peduncled nearly flat or saucer-shaped half embracing the conico-hemispheric glabrous nut, belts broad appressed. *A. DC. Prodr.* xvi. ii. 94; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 235. *Q. Miqueliana*, *Scheff. Obs. Phyt.* ii. 48; iii. 94.

SINGAPORE, *Maingay (Kew Distrib. 1460)*.—DISTRIB. Banka, Borneo.

Branches rather slender. *Leaves* 4-5 in., opaque above, grey brown and faintly reticulate beneath. *Cups* $\frac{3}{4}$ -1 in. diam., margin acute entire. *Nut* as broad, with a broad deeply intruded base, umbo small low.

38. **Q. Cantleyana**, *King mss.*; glabrous, leaves large petioled oblong or obovate-oblong obtusely cuspidate entire base acute, nerves 12-15 pairs slender slightly arched and raised, cross-nervules very faint; cups shallow stoutly pedicelled embracing the base of the depressed hemispheric densely hoary conical-topped nut, belts very obscure.

PERAK and SINGAPORE, *King's Collector. MALACCA?* *Lobb.*

A tree, 60-100 ft. *Branches* stout, angular. *Leaves* 6-8 in., rigidly coriaceous, pale brown, midrib raised above; petiole $\frac{1}{2}$ in., stout. *Fruiting spikes* 6-8 in., young cups globose, free or connate on a stout common peduncle $\frac{1}{2}$ in. long. *Cups* $\frac{3}{4}$ in. diam., glabrous within, margin acute erect entire. *Nut* as broad, umbo small.—*Lobb's* specimens are marked as from Malacca in *Herb. Hook.*, but from Singapore in others.

** Nut hemispheric.

† *Leaves glabrous at all times.*

39. **Q. Wenzigiana**, *King mss.*; glabrous, leaves short-petioled elliptic obtusely caudate entire base acute shining above with 10-12 pairs of very faint raised nerves, cross-nervules very faint, cups sessile shallow covering three-fourths of the hemispheric nut, belts many narrow thick distinct. *Q. Dæpenhorstii*, *Wenzig in Jahrb. Bot. Gart. Berl.* 231 (not of *Miquel*).

PERAK, *King's Collector. PENANG, Curtis. MALACCA, Griffith (Kew Distrib. 4483); Maingay (Kew Distrib. 1527)*.—DISTRIB. Borneo.

Branches slender. *Leaves* 4-6 in., coriaceous, coloured beneath like *Q. Cantleyana*, but much smaller and caudate; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., slender. *Cups* $\frac{3}{4}$ in. diam., margin rounded. *Nut* not seen (described from *King mss.*).

40. **Q. Rassa**, *Miquel Fl. Ind. Bat. Suppl.* 350; *Ann. Mus.* i. 112; glabrous, leaves small elliptic obtusely caudate entire narrowed into the slender petiole, nerves 10-12 pairs very faint on both surfaces arched, cups small sessile shallow turbinate much shorter than the globose or globosely conical glabrous nut, belts broad entire. *A. DC. Prodr.* xvi. ii. 95.

PENANG, *Curtis, King's Collector. PERAK, Scortechini, King's Collector*.—DISTRIB. Sumatra, Borneo.

A tall tree. *Branches* slender. *Leaves* 2-3 in., rigidly coriaceous, shining above pale-greyish beneath, reticulations very obscure; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Cups* $\frac{1}{2}$ in. diam., margin acute entire. *Nut* as broad as the cup or broader, umbo minute.

? VAR. *montana*; leaves narrower tip more slender (cup not seen), nut subcylindric-ovoid.—Perak, alt. 4-5000 ft., *King's Collector*; Sumatra, alt. 6000 ft.

? VAR. *Griffithii*; leaves with much shorter rounder tips, fruit not seen.—Mergui, *Griffith (Kew Distrib. 4482)*.

†† *Leaves glabrous when adult only, or puberulous beneath.*

41. **Q. cyrtorhyncha**, *Miquel Fl. Ind. Bat. Suppl.* 350; glabrous.

leaves short-petioled thinly coriaceous oblong obtusely cuspidate entire base rounded or cuneate midrib raised above subglaucous beneath with 12-13 pairs of slender arched raised nerves, cups broad shallow base flat with a short conic pedicel covering half the very depressed broadly conical glabrous nut, belts many indistinct. *A. DC. Prodr.* xvi. ii. 105.

PERAK, *King's Collector*, alt. 500-3000 ft.—DISTRIB. Sumatra, Borneo.

A tree, 50-70 ft.; branches stout. *Leaves* 6-8 by 3 in., reddish brown above and minutely reticulate; petiole $\frac{1}{2}$ in., stout. *Cups* 1 in. diam., margin acute, belts obscurely toothed. *Nut* as broad, top conical, umbo small, base deeply intruded.

42. **Q. Ewyckii**, *Korth. in Verh. Nat. Gesch. Bot.* 212, t. 46; var. *latifolia*, *King*; branches glabrous, leaves short-petioled elliptic or elliptic-oblong abruptly caudate entire base acute glabrous above with raised nerves obscurely puberulous beneath with 11-14 pairs of slender nerves and close cross-nervules, cups flattish embracing the base of the hemispheric conic-topped glabrous nut, belts thin confluent appressed.

PERAK, *King's Collector*.—DISTRIB. Sumatra.

A large tree. *Leaves* 4-6 in., coriaceous, brown, shining above, pale beneath; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Fruiting spikes* long. *Cups* subsessile, rather thin, $\frac{3}{4}$ -1 in. diam. *Nut* 1 in. diam., umbo very small.

*** *Nut turbinate or hemispheric.*

43. **Q. Clementiana**, *King mss.*; glabrous, leaves coriaceous oblong acuminate entire shining above with a stout raised midrib and on both surfaces 10-12 pairs of very oblique slender nerves pale beneath base acute, cups large saucer-shaped embracing the base of the turbinate nut, margin and belts very thick.

PENANG, *Maingay (Kew Distrib. 1529)*. PERAK?, *Scortechini*.

Branches black, angled when dry. *Leaves* 6-8 in., grey brown above; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., stout. *Cups* 1 $\frac{1}{2}$ in. diam., woody. *Nut* 1 $\frac{1}{2}$ in. diam., broader than long.

44. **Q. lucida**, *Roxb. Fl. Ind.* iii. 635; glabrous, leaves oblanceolate or obcuneately oblong tip obtuse or rounded red brown when dry narrowed into the short petiole, nerves 6-10 pairs subhorizontal faintly raised on both surfaces, cups large saucer-shaped, margins acute belts many, nut hemispheric glabrous top conic umbo minute. *Q. cuneata*, *Herb. Roxb. in Wull. Cat.* 3732; *A. DC. Prodr.* xvi. ii. 108; *Miquel Fl. Ind. Bat.* i. i. 863; *Ann. Mus.* i. 116.

PENANG, *Roxburgh, Maingay (Kew Distrib. 1526)*. SINGAPORE and PERAK, *King's Collector*.

A tree, 60-100 ft., branches angled when dry. *Leaves* 5-7 in., margins often recurved; petiole $\frac{1}{2}$ in. *Cups* 1-1 $\frac{1}{2}$ in. diam. *Nut* often obtusely trigonous, 1 $\frac{1}{4}$ in. diam., very thick and hard.

45. **Q. Omalkos**, *Korth. in Verh. Nat. Gesch. Bot.* 214; glabrous, leaves small elliptic-oblong or oblanceolate obtuse or cuspidate entire very pale narrowed into the short petiole, midrib stout raised on both surfaces, nerves 15-20 pairs very slender horizontal obscure on both surfaces, cups large saucer-shaped margin thick belts obscure, nut hemispheric glabrous. *A. DC. Prodr.* xvi. ii. 92; *Blume Mus. Bot.* i. 301; *Miquel Fl. Ind. Bat.* i. 860; *Ann. Mus.* i. 112; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 231.

PERAK, *Scortechini, King's Collector*, ascending to 3000 ft.—DISTRIB. Sumatra.

A large tree, 80-100 ft. *Leaves* 2-4 in., coriaceous. *Cups* 1-1½ in. diam., belts rather acute; nut with a small abrupt umbo.

46. **Q. cyclophora**, *Endl. Gen. Pl. Suppl.* iv. ii. 28; glabrous, leaves shortly petioled very coriaceous oblong or oblong-lanceolate caudate entire base acute midrib raised pale beneath with 16-20 pairs of very strong arched oblique nerves, cups very large sessile saucer-shaped margin very thick rounded, belts wavy, nut very much depressed. *A. DC. Prodr.* xvi. ii. 102; *Miquel Ann. Mus.* i. 113. *Q. depressa*, *Roxb. Fl. Ind.* iii. 640 (not of *H.B.K.* or *Blume*). *Q. placentaria*, *Wall. Cat.* 2779 (not of *Blume*); *Hance in Journ. Bot.* 1875, 364. *Q. penangensis*, *Miquel Fl. Ind. Bat.* i. 859. *Q. umbonata*, *Hance in Trimen Journ. Bot.* 1874, 241; 1875, 364.

PENANG and SINGAPORE, *Wallich, &c., Maingay (Kew Distrib.* 1528). PERAK, ascending to 3000 ft., *King's Collector*.

A tree, 70-150 ft. *Leaves* 6-10 in., brown and shining above, yellowish or grey beneath; petiole stout, ¼-½ in. *Cups* 2-2½ in. diam., embracing half the almost flat nut, which has a depressed top and stout erect umbo.

47. **Q. Eichleri**, *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 236; glabrous, leaves very coriaceous elliptic-lanceolate elongate caudate entire base acuminate shining above, nerves 8-10 pairs arched slender on both surfaces, cups large saucer-shaped margin acute as high as the flattened hoary nut, belts obscure.

PERAK, *King's Collector*.—DISTRIB. Sumatra.

A large tree, 70 ft. *Leaves* 6-12 in., pale when dry; narrowed into a petiole ¼-½ in. *Cups* 1-1½ in. diam., margin much incurved, overlapping the nut, which has a conical top and minute umbo.

48. **Q. Thomsoni**, *Miquel Ann. Mus.* i. 109; glabrous, leaves coriaceous elliptic-lanceolate caudate base acute entire subsilvery beneath, nerves 10-13 pairs obliquely arched slender above strong beneath, cups shortly pedicelled saucer-shaped hoary narrower than the globose or turbinate depressed nut margin acute belts obscure. *Q. turbinata*, *Roxb. Fl. Ind.* iii. 636 (not of *Blume*); *Wight Ic.* t. 221. *Q. leucocarpa*, *Hook. f. & Thoms. mss.*; *Wenzig in Jahrb. Bot. Gart. Berl.* i. 225.

SILHET and the KHASIA MTS., ascending to 5000 ft., *Griffith, &c.* CHITTAGONG. *Roxburgh. BURMA, Kurz.*

A tree, 80-100 ft. *Leaves* very variable in size, 3-10 in., young with very long points; petiole ¼-½ in. *Cups* ½-¾ in., very shallow, margins spreading. *Nut* ¾-1 in. diam., very thickly hoary, top sometimes deeply depressed, base adnate to the base of the cup, umbo small.

SECT. V. CHLAMYDOBALANUS, *Endl.* *Male spikes* erect, stiff. *Styles* as in *Pasania*. *Invol. of fruit* ovoid or globose, tubercled or belted, closely embracing the whole nut (or with the tip of the nut alone free), but not adnate to it except at the base. *Nut* at length free. *Leaves* quite entire in all. See also *Q. fenestrata* and *Q. costata*.

* *Involucre of fruit* tubercled or spinous.

49. **Q. Blumeana**, *Korth. Verh. Nat. Gesch. Bot.* 208, t. 44; glabrous, leaves very coriaceous petioled oblong or oblong-lanceolate acuminate entire base acute appressed puberulous beneath, nerves 12-14 pairs very strong beneath with parallel cross-nervules, involucre thin depressed globose young echinulate mature with broad faint belts, nut globose or hemispheric

with a conic base truncate, exposed top densely white-tomentose. *A. DC. Prodr.* xvi. ii. 103; *Blume Mus. Bot.* i. 288; *Miquel Fl. Ind. Bat.* i. i. 803; *Ann. Mus.* i. 116; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 237.

PERAK, alt. 3-4000 ft., *Scortechini*, ¹/₂ *King's Collector*.—**DISTRIB.** Sumatra, Borneo.

A densely leafy tree, 40-50 ft.; branches glabrous. *Leaves* 6-8 in., brown above with the midrib prominent, paler beneath; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., very stout. *Involucres* sessile or stoutly pedicelled, $\frac{3}{4}$ in. diam., hoary, when young depressed and clothed with minute confluent bracts, when mature smooth or obscurely annulate, dehiscing vertically.

50. **Q. discocarpa**, *Hance in Journ. Bot.* 1874, 242; leaves coriaceous subsessile oblong-lanceolate acuminate entire base acute beneath with cinnamon appressed pubescence, nerves 8-10 pairs ascending straight and midrib sunk above strong beneath, involucres crowded at the tips of the branches disciform hoary with 3-4 belts of simple or compound prickles wholly enclosing the depressed silky nut. *Castanopsis discocarpa*, *Hance in Journ. Bot.* 1878, 201.

PERAK, *King's Collector*.—**DISTRIB.** Banka.

A tree, 100-130 ft. *Branches* purple, glabrous. *Leaves* 3-6 in., pale above, obtusely acuminate; petiole $\frac{1}{2}$ in.—I have seen no fruit. *Hance* describes it as closely adherent to the base of the involucre, subangular, depressed-pyramidal, pale brown, with a short thick style.

51. **Q. confragosa**, *King mss.*; glabrous, leaves very coriaceous elliptic-lanceolate or broadly oblong acuminate obtuse or obtusely cuspidate entire base acute, nerves 6-8 pairs arched sunk above strong but slender beneath, involucre globose rugosely reticulated or tubercled completely enclosing the densely hoary globose or turbinate nut.

PERAK, *King's Collector*.

A large tree, 60 ft. *Leaves* rigid, 5-7 by 2-3 in.; petiole $\frac{1}{2}$ in., stout. *Involucres* in slender spikes, $\frac{3}{4}$ -1 $\frac{1}{2}$ in. diam., reticulatedly pitted when dry. *Nut* with a concave truncate base.

**** Involucre of fruit zoned.**

52. **Q. lanceæfolia**, *Roxb. Fl. Ind.* iii. 634; glabrous, leaves thin long-petioled lanceolate subcaudate entire base acute or rounded grey or subsilvery beneath, nerves 8-15 pairs slender arched raised on both surfaces, involucres in long spikes obliquely ascending ovoid hoary with 3-4 broad wavy often interrupted concentric ridges enclosing the ovoid thin puberulous nut. *A. DC. Prodr.* xvi. ii. 102 (*excl. syn. Q. lucida*); *Wall. Cat.* 3733; *Wight Ic.* t. 212; *Miquel Ann. Mus.* i. 116; *Wenzig Jahrb. Bot. Gart. Berl.* iv. 236. *Q. glomerata*, *Wall. Cat.* 2791 (*not of Roxb.*). *Q. fenestrata*, *Wall. Cat.* 2784 (*in part, not of Roxb.*). *Castanopsis lanceæfolia*, *Kurz For. Fl.* ii. 482. *Castanea tribuloides*, *Wall. Cat.* 2765 B.

SIKKIM and BHOTAN HIMALAYA, alt. 1-2000 ft., *J. D. H.* **ASSAM** and the **KHASIA MTS.**, *Wallich, &c.* **MUNIPORE**, *Clarke*. **CHITTAGONG**, *J. D. H. & T. T.* **UPPER BURMA**, *Anderson*.

A small or large tree. *Leaves* very variable in size, 4-10 in., always membranous, grey green above, pale reddish grey beneath, base rarely rounded, nerves reticulate; petiole $\frac{3}{4}$ -1 in. *Involucre* 1-1 $\frac{1}{2}$ in. long, very stoutly pedicelled, bursting irregularly.

Var. *semicristata*, *King*; ridges wavy crested or more or less tubercled. *Q. Kurzii*, *Hance in Journ. Bot.* 1878, 328. *Castanea semicristata*, *Kurz mss.*—**KHASIA Mts.**, alt. 4000 ft.

53. **Q. encleisocarpa**, Korth. *Verh. Nat. Gesch. Bot.* 208, t. 45; glabrous, leaves petioled elliptic-lanceolate obtusely caudate or acuminate entire base acute subglaucous beneath with 6-8 pairs of strong arched nerves, involucre long and stoutly pedicelled depressed or globose then smooth or obscurely belted not quite surrounding the densely velvety white nut. *A. DC. Prodr.* xvi. ii. 104; *Miquel Fl. Ind. Bat.* i. i. 862; *Ann. Mus.* i. 116; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 238.

PERAK, *King's Collector*. PENANG, *Maingay (Kew Distrib. 1531), Curtis, &c. SINGAPORE, Cantley.*—DISTRIB. Sumatra.

A tree, 60-80 ft. Branches slender, black when dry. Leaves 3-7 in., dark grey or brown above, polished or not; nerves slender, raised on both surfaces, reticulate beneath; petiole $\frac{3}{4}$ - $\frac{1}{2}$ in., slender. Male spikes very slender, puberulous. Involucre 1-1 $\frac{1}{4}$ in. diam., base flat or intruded; pedicel $\frac{1}{2}$ - $\frac{3}{4}$ in., very stout indeed, conical, margin thin split and torn. Nut silvery white with retrorse hairs, umbo ringed, endocarp with intruded plates.

Var. *aperta*, *King mss.*; involucre more open.—Perak, *Scortechini, King's Collector*.

SECT. VI. LITHOCARPUS. Male spikes stiff, erect. Styles as in *Pasania*. Invol. of fruit large, woody, ovoid or urceolate, turbinate or subglobose, completely enclosing (except in *Q. costata*) and more or less adnate to the nut, tubercled or concentrically or obliquely belted. Leaves quite entire in all.

* *Involucre of fruit zoned.*

54. **Q. costata**, *Blume Bijl.* 522; *Fl. Jar. Cupulif.* 26, t. 14; *Mus. Bot.* i. 302; glabrous, leaves coriaceous oblong or elliptic obtusely caudate entire narrowed into the petiole, nerves 10-12 pairs very obscure above faint beneath there pale and reticulated, involucre very stoutly pedicelled thick woody very broadly turbinate belted with acute concentric ridges or belts adnate to the base and incurved over the sides of the large disciform convex-topped woody glabrous nut.

PERAK, *Scortechini, King's Collector*.

A tree, 60-80 ft. Leaves 4-6 in., subglaucous beneath, midrib raised above; petiole $\frac{3}{4}$ - $\frac{1}{2}$ in., rather slender. Involucres 1 $\frac{1}{2}$ -2 in. diam., hoary, concentric ridges acute, one forming a prominent edge to the broadest part of the involucre, succeeded by smaller ones towards its acute incurved margin. Nut $\frac{1}{2}$ in. high by $\frac{1}{2}$ diam., walls thick, laminated with intruded vertical plates, base convex.

55. **Q. Maingayii**, *Benth. in Hook. Ic. Pl.* t. 1315; branches and fruit finely rusty-tomentose, leaves coriaceous long-petioled elliptic oblong or obovate-oblong acuminate entire pale beneath, nerves 14-20 pairs faint above very strong spreading and subarched beneath, involucre very stoutly pedicelled thick woody turbinate obovoid subtruncate distinctly belted, nut adnate to the involucre except at the flattened tomentose top which is exposed or not.

PENANG, *Maingay (Kew Distrib. 1464), Curtis*.

A very large tree. Leaves 10-20 by 3-4 in., grey, hardly glaucous beneath, base acute; petiole 1 in. Involucres with the thick pedicel 1 $\frac{1}{2}$ -2 in. long, sometimes decurved, with one or two slightly raised concentric belts on the side, top 1 in. broad, contracted into an umbo (not of the nut). Nut $\frac{1}{2}$ in. diam., confluent with the walls of the involucre, inner walls with intruded lamellæ.

56. **Q. Beccariana**, *Benth. in Hook. Ic. Pl.* t. 1315; glabrous, leaves coriaceous petioled elliptic-lanceolate obtusely acuminate entire base acute

polished above whitish beneath, nerves 6-8 pairs arched obscure above strong beneath, involucre very large turbinate obovoid thick woody umbonate glabrous belted with distant ridges enclosing and adnate to the nut.

PENANG, *Curtis*.—DISTRIB. Borneo.

A tree, 60-70 ft. *Leaves* 2-3 in., very dark brown and polished above, nervules beneath finely reticulate; petiole $\frac{1}{2}$ - $\frac{2}{3}$ in., slender. *Involucre* 3 in. long, pedicel $\frac{1}{2}$ -1 in., top convex with a very large persistent umbo (not of the nut).

** *Involucre of fruit tubercled, not zoned.*

57. *Q. xylocarpa*, *Kurz in Beng. Journ. As. Soc.* 1875, ii. 196, t. 14, f. 5-8; *For. Fl.* ii. 489; branches hoary, leaves thickly coriaceous petioled lanceolate caudate entire opaque above with a slender pubescent midrib subsilvery beneath with a fine appressed pubescence base acute, nerves 10-15 pairs arched ascending impressed above strong beneath, involucre sessile confluent globose clothed with soft spinous pubescent bracts, nut globose the umbo only exerted, adnate to the involucre except the convex glabrous top.

ASSAM, *Jenkins*; on the Naga Hills, *Clarke*. MUNNIPORE, *Watt*. ARRACAN, alt. 4-5000 ft., *Kurz*.

Leaves 4-6 by 1-1 $\frac{1}{2}$ in.; nerves rather brown beneath; petiole $\frac{1}{2}$ - $\frac{1}{2}$ in., slender. *Involucres* in masses 1 $\frac{1}{2}$ in. diam., each about $\frac{1}{2}$ in. diam., thick but not woody. *Nut* with very thick walls, the inner forming intruded lamellæ.

58. *Q. truncata*, *King mss.*; leaves thinly coriaceous oblong lanceolate or ovate-lanceolate acuminate or caudate entire base acute opaque above pale beneath, nerves 12 pairs slender arched sunk above much raised beneath, involucre sessile broadly pitcher-shaped thick woody hoary base broad flat sides subrugose top truncate with a small opening, nut globose or turbinate adnate to the involucre except at the convex top.

ASSAM, *Jenkins*. NAGA HILLS, alt. 2000 ft., *Collett*. MUNNIPORE; on Kohima, *Watt*, *Prairie*, *Clarke*, alt. 3500-7000 ft.

A tree, 30-40 ft. or more. *Leaves* 5-8 by 2-4 in.; midrib prominent above, cross-nervules slender, reticulate beneath; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Involucres* $\frac{3}{4}$ -1 $\frac{1}{2}$ in. by $\frac{2}{3}$ -1 in. across the truncate top, solitary or confluent in twos or threes, sides with large obscure confluent bracts, margin incurved with many rows of bracts. *Nut* with a depressed hemispheric top and small conical umbo.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

Q. ? DIVARICATA, *Lindl. in Wall. Cat.* 2790; *A. DC. Prodr.* xvi. ii. 105, from Tavoy, *Wallich*, is in flower only and undeterminable. The specimen presents no salient character. *Kurz* refers it to *Castanopsis rhamnifolia*.

Q. GLOMERATA, *Roxb. Fl. Ind.* iii. 660, Penang, *W. Roxburgh*; "leaves elliptic entire polished on both sides, flowers in long terminal glomerate spikes, acorn ovate smooth half hid in the tubercled cup." *Roxb.*

Q. JENKINSIANA, *Benth. in Hook. Ic. Pl.* t. 1312, 1313, is a mixture of leafing specimens of two very distinct plants, and the fruit of what may belong to either or to a third. The latter only is from Colonel Jenkins, who gave it to Mr. Griffith; it apparently belongs to the section *Lithocarpus*. Of the leafing specimens, one is probably a *Quercus*, the other probably a *Castanopsis* (see end of that genus). The following is a description of the *Quercus*.

QUERCUS SP., *Benth. in Hook. Ic. Pl.* t. 1313 only; bark of branches white, leaves 8-12 by 2 $\frac{1}{2}$ -5 in. elliptic-oblong acuminate entire coriaceous base acute, above bright brown and polished with a raised midrib, beneath pale or whitish with 9-14 pairs of

strong arched ascending nerves, petiole 1-2 in., fem. panicle erect pyramidal with slender horizontal distant white-tomentose branches, bracts densely tomentose 1-fl.—Upper Assam, *Griffith* (*Kew Distrib.* 4472, 4464), *Brandis, Mann*; on the Duphla Hills, *Lister*.

QUERCUS (*Lepidobalanus*) *sp.*, *Benth. in Hook. Ic. Pl.* t. 1312 (the fruit only). Involucre $1\frac{1}{2}$ in. long, broadly ovoid oblong, thickly crustaceous when dry, finely tomentose rounded at both ends, surface with adnate rather distant bracts in broken transverse series longer more crowded and recurved towards the apex; nut very broadly oblong wholly included adnate all but the very small terminal pubescent area to the walls of the involucre, walls excessively thick and strong, seed conform the cavity, cotyledons fleshy not ruminant.—Assam, *Jenkins*.

Q. MIXTA, *A. DC. Prodr.* xvi. ii. 83, consists of imperfect specimens of possibly two species mixed in Wallich's Herbarium (*Cat.* 2783) with *Q. Amherstiana*.

Q. (Lithocarpus) OLLA, *Kurz in Journ. Beng. As. Soc.* 1875, ii. 197, t. 14, f. 9, from Assam, *Jenkins*. Described from the fruit alone, of which Dr. King has kindly sent me a specimen; it is broadly pitcher-shaped, $\frac{3}{4}$ in. high, with a broad flat base 1 in. diam., and thick walls narrowing to the mouth which is $\frac{3}{8}$ in. diam., sides hoary clothed with many series of appressed broadly triangular cuspidate bracts, mouth thick rounded with the bracts inflexed. Nut with the depressed top level with the mouth of the cup, umbo capitate stipitate.—Probably nearest *Q. truncata*.

QUERCUS sp.? In the Kew collection of drawings of plants of Singapore there are some made by or for a Mr. Parry, and amongst them one represents a magnificent species of oak, with stout branches, elliptic-oblong cuspidate dark-green leaves 12 by $5\frac{1}{2}$ in., obtuse at both ends or tip cuspidate, with 10 pairs of spreading arched nerves, and a petiole 1 in.; cups sessile on a short rachis, shallow, broadly campanulate, 2 in. diam. across the broadly spreading recurved mouth, which is formed of very stout obtuse bracts $\frac{1}{2}$ of an inch long; nut $1\frac{1}{2}$ in. long, broadly oblong, with a rounded umbonate top and deeply intruded base, the walls are represented as very thick; seed broader than long, vertically grooved, and with a large conical umbo; the base only of the nut appears to be embraced by the cup.

QUERCUS sp., "*Antidesmæ? Herb. Finlayson, Wall. Cat.* 9144," and

QUERCUS sp., "*Antidesmæ? Wall. Cat.* 9145," *Tavoy*, are *Querci* in flower only, and undeterminable.

4. **CASTANOPSIS**, *Spach.*

Habit and character of *Quercus*, *Sect. Chlamydobalanus*; differs in the closed fruiting involucre enclosing 1-4 nuts and being covered with clusters of spines or tubercles, and often splitting irregularly.—Species about 25, one Californian, the rest Eastern Tropical Asian.

A genus inseparable from *Quercus* by any constant character; the male and female inflorescences of the two are undistinguishable, except when the fem. involucre contains more than one flower, which is very rare in *Quercus*. The fruits present internally several very distinct types of structure, but my attempts to ascertain these from dried specimens have failed. The statement under *Quercus* (p. 601) of my indebtedness to Dr. King for aid in the description of its most difficult species, applies to this equally difficult genus. His forthcoming monograph of the Indo-Malayan species of both genera will be indispensable for their determination.

A. Involucre ovoid or globose, rarely transversely elongate, dehiscent, spinous.

* Walls of involucre more or less concealed by the crowded subulate spines.

† *Leaves beneath pubescent or minutely tomentose*.—See also *C. catalpæfolia*.

1. ***C. indica***, *A. DC. in Seem. Journ. Bot.* i. (1863) 182; *Prodr.* xvi. ii. 109; branches and inflorescence rufous-tomentose or -villous, leaves short-petioled oblong or obovate-oblong sinuate-toothed or -serrate finely pubescent beneath, nerves 15–20 pairs very strong beneath, spines of involucre close-set $\frac{1}{4}$ – $\frac{1}{2}$ in. long. *Miq. Ann. Mus.* i. 119; *Brand. For. Fl.* ii. 490. *Castanea indica*, *Roxb. Fl. Ind.* iii. 643; *Blume Mus. Bot.* i. 284; *Wight Ic.* t. 417; *Kurz For. Fl.* ii. 478; *Wall. Cat.* 2761. *Quercus serrata*, *Roxb. Fl. Ind.* iii. 641 (not of Willd.). *Q. dubia*, *Lindl. in Wall. Cat.* 2786.

TROPICAL HIMALAYA, from Nepal eastwards, alt. 1–4000 ft. ASSAM, the KHASIA Mts. and SILHET, alt. 4000 ft. CHITTAGONG, *J. D. H. & T. T.*, &c.

A small or large tree. *Leaves* 5–8 in., rusty-red when dry, thinly coriaceous, opaque and glabrous above obtuse acute cuspidate or acuminate, base rounded acute or narrowed into the petiole, serratures subspinular; nerves straight ascending, cross-nervules fine parallel; petiole $\frac{1}{8}$ – $\frac{1}{2}$ in. *Male spikes* densely tomentose. *Involucres* subspherical, 1–1 $\frac{1}{2}$ in. diam.

2. ***C. Hystrix***, *A. DC. in Seem. Journ. Bot.* i. (1863) 182; *Prodr.* xvi. ii. 111; branches glabrous or nearly so, leaves petioled lanceolate acuminate entire or obtusely serrate above the middle appressed tomentose pubescent or puberulous beneath, nerves 10–12 pairs, spines of involucre dense $\frac{1}{4}$ – $\frac{1}{2}$ in. long. *Miquel Ann. Mus.* i. 119. *Q. rufescens*, *Herb. Ind. Or. H. f. & T.*

EASTERN HIMALAYA; Sikkim, alt. 4–8000 ft., *J. D. H.*, &c. KHASIA Mts., alt. 2–4000 ft., *Griffith*, &c. ? PERAK, alt. 4–5000 ft., *King's Collector*.

A large or small tree. *Leaves* 3–4, rarely 7 in., very coriaceous, sometimes oblong-lanceolate and caudate, very variable as to pubescence beneath, base rounded or acute; nerves very oblique strong though sometimes obscured by thick red-brown tomentum; petiole $\frac{1}{8}$ – $\frac{1}{2}$ in. *Involucres* 1 in. diam., or less, walls very thick; spines simple or compound, pubescent. *Nuts* 2–3, silky, free.

3. ***C. diversifolia***, *King mss.*; branches tomentose, leaves (young very large) short-petioled broadly oblong or ovate-oblong quite entire, nerves 12–15 pairs very strong beneath arched tomentose on both surfaces, cross-nervules very strong, involucre large, spines close-set. *Castanea diversifolia*, *Kurz in Journ. Beng. As. Soc.* xlv. ii. 198; *For. Fl.* ii. 479.

PEGU and MARTABAN, in hill forests, *Kurz*; alt. 3500–6000 ft., *Brandis*.

A tree, 40–60 ft. *Leaves*, young 7–9 by 4–4 $\frac{1}{2}$ in., on the old branches 4 $\frac{1}{2}$ –6 in., more elliptic; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., stout, pubescent.—I have seen specimens of only the large-leaved state, which according to *Kurz* is the young, and no fruit or flower; the leaves are pale when dry with deeply sunk nerves above highly raised beneath, base rounded or subcordate. *King* describes the involucre as indistinctly ribbed and the spines as nearly $\frac{1}{2}$ in. long, and the species as differing from all others in the diverse forms of the leaf.

4. ***C. javanica***, *A. DC. in Seem. Journ. Bot.* i. (1863) 182; *Prodr.* xvi. ii. 111; branches glabrous or nearly so, leaves petioled oblong to ovate-oblong or oblong-lanceolate entire subacute or cuspidate, rufous subpubescent beneath, nerves 9–12 pairs very strong beneath arched or nearly straight, involucres very large, spines in dense clusters, walls very thick and woody. *Miquel Ann. Mus.* i. 120. *C. costata*, *A. DC. l. c.* 110; *Miquel l. c.*; var. *bancana*, *Scheff. Obs. Phyt.* ii. 50. *C. trisperma*, *Scheff. l. c.* *Castanea javanica*, *Blume Bijl.* 525; *Fl. Jav. Cupulif.* 44, t. 23;

Mus. Bot. i. 283; *Miquel Fl. Ind. Bat.* i. i. 867; *Kurz For. Fl.* ii. 479. *C. montana*, *Blume Bijl.* 526; *Miquel Fl. Ind. Bat. l. c.* *C. costata*, *Blume Mus. Bot.* i. 284; *Miquel l. c.* 866. *C. breviscupis*, *Miquel l. c.* *C. spectabilis*, *Miquel l. c.*; *Ann. Mus.* i. 120.

MARTABAN and TENASSERIM, *Kurz, Parish. MALACCA, Maingay (Kew Distrib. 1461). PENANG, Phillips. PERAK, Scortechini, King's Collector. SINGAPORE, Cantley.*—DISTRIB. Sumatra, Java.

A large evergreen tree. *Leaves* 3–10 in., very coriaceous, base rounded or acute, shining above with faintly raised nerves, more or less rufous beneath, but sometimes pale and glabrate; cross-nervules very faint; petiole $\frac{1}{2}$ –1 in. *Involucres* tomentose, sometimes 2 in. diam.; spines $\frac{1}{2}$ – $\frac{2}{3}$ in., tips glabrous. *Nut* apparently adnate to the involucre and villous, but the structure of the interior is very obscure in dry specimens.

†† *Leaves glabrous on both surfaces—puberulous in C. catalpæfolia.*

5. ***C. argentea***, *A. DC. in Seem. Journ. Bot.* i. (1863) 182; *Prodr.* xvi. ii. 112; branches nearly glabrous, leaves petioled lanceolate or oblong-lanceolate acuminate entire glabrous subsilvery beneath, nerves 10–12 pairs rather slender beneath arched, involucre solitary and clustered globose tomentose, spines close-set branched pubescent, nut solitary half adnate to the involucre free part thin pubescent. *Miquel Ann. Mus.* i. 120. *Castanea argentea*, *Blume Bijl.* 525; *Flor. Jar. Cupulif.* 40, t. 21; *Mus. Bot.* i. 282; *Miquel Fl. Ind. Bat.* i. i. 867; *Kurz For. Fl.* ii. 479, and var. *Tungurrut* (not *C. Tungurrut*, *Blume*). *C. martabanica*, *Wall. Cat.* 2764; *Pl. As. Rar.* ii. 6, t. 107.

TENASSERIM and MARTABAN, *Wallich, Parish, Kurz, Helfer (Kew Distrib. 4443).*—DISTRIB. Malay Islands.

An evergreen tree, 50–60 ft. *Leaves* 5–7 in., thinly coriaceous, base obtuse or acute, shining above with faintly raised nerves, sometimes quite silvery beneath; petiole $\frac{1}{2}$ – $\frac{2}{3}$ in., slender. *Involucre* $\frac{1}{2}$ –1 in., spines about $\frac{1}{4}$ in.—Leafing and flowering specimens of this may be referable to *Q. argyrophylla*, and vice versa. Nor can I without fruit be sure that *Blume's*, *Miquel's*, *Wallich's*, and *Kurz's* plants are conspecific. *Kurz's* var. *Tungurrut* is a stunted form from elevations of 4–5000 ft. in Tenasserim.

6. ***C. castanicarpa***, *Spach Hist. Veg. Phan.* xi. 185; leaves large petioled lanceolate or oblong-lanceolate acuminate or caudate entire base acute, nerves 10–12 pairs slanting arched rather slender beneath, cross-nervules very faint, involucre ovoid pubescent densely clothed with slender quite glabrous simple spines, nut solitary glabrous. *A. DC. Prodr.* xvi. ii. 111; *Miquel Ann. Mus.* i. 119. *Castanea Roxburghii*, *Lindl. in Wall. Pl. As. Rar.* ii. 480; *Kurz For. Fl.* ii. 480. *Quercus castanicarpa*, *Rorb. Cor. Pl.* iii. 93, t. 296; *Fl. Ind.* iii. 640; *Wight Ic.* t. 769.

CHITTAGONG, *Roxburgh, J. D. H. & T. T., Clarke. MUNIPORE, Watt.*

A large evergreen tree; branchlets glabrous or pubescent. *Leaves* 6–12 in., thinly coriaceous, glabrous on both surfaces, more or less shining above; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., glabrous or puberulous. *Involucre* 1 in.—I have seen only very small fruits $\frac{1}{2}$ – $\frac{3}{4}$ in. long, with straight spines $\frac{1}{2}$ in. long, and ovoid free nuts with a broad flat or convex areola.

7. ***C. catalpæfolia***, *King mss.*; leaves very large very stoutly shortly petioled oblanceolate or obovate-oblong acute entire shining above puberulous beneath, nerves 18–20 pairs very strong spreading and arched beneath, involucre large globose, spines clustered stout flattened glabrous.

PERAK, *King's Collector*.

A large tree, 60-80 ft. *Leaves* 18-20 in., very coriaceous, midrib and slender nerves raised above, under surface pale reddish brown with a very stout midrib long arched nerves and rather distant slender cross-nervules, base sometimes much narrowed into the very stout $\frac{1}{2}$ in. petiole. *Involucre* 1-2 in. diam.; spines $\frac{1}{2}$ in. long. *Nuts* 1-2, silky, 1 in. long.

** Walls of involucre with tufts or ridges of spines that do not conceal its walls.

8. **C. argyrophylla**, *King mss.*; leaves elliptic or oblong to lanceolate acute entire glabrous more or less glaucous beneath, nerves 10-12 pairs rather slender, involucre ovoid thin-walled glabrous densely clothed with subulate hooked radiating spines.

PEGU; at Rangoon, M'Lelland, *Maingay* (*Kew Distrib.* 1457/2). ARAKAN, *Hildebrand*. ? TENASSERIM, *Helper* (*Kew Distrib.* 4446).

Leaves 4-6 in., thinly coriaceous; petiole $\frac{3}{4}$ -1 $\frac{1}{4}$ in. *Involucre* 1 $\frac{1}{4}$ in. long, brittle, spines $\frac{1}{4}$ in. *Nuts* 1-3, rusty tomentose.—I have seen no fruit, which Dr. King informs me is very characteristic, being large and glabrous, as are the spines.—Under *L. argentea* I have stated my difficulty in distinguishing leafing specimens of this and that plant.

9. **C. armata**, *Spach Hist. Veg. Phan.* xi. 185; glabrous, leaves small lanceolate or oblong- or ovate-lanceolate acuminate shining above often subsilvery beneath, nerves 6-8 pairs arched slender raised on both surfaces, involucre large globose tomentose loosely covered with stout shortly substellately branched spines. *Miquel Ann. Mus.* i. 119. *C. argentea*, var. *martabanica*, *A. DC. Prodr.* xvi. ii. 112. *Quercus armata*, *Roxb. Cor. Pl.* iii. 92, t. 296; *Fl. Ind.* iii. 640; *Wight Ic.* t. 770. *Castanea tribuloides*, var. *armata*, *Kurz For. Fl.* ii. 480. *C. Falconeri*, *Hance in Journ. Bot.* 1875, 367. *C. sphærocarpa*, *Lindl. in Wall. Cat.* 3736, and in *Plant. As. Rar.* ii. 5.

ASSAM and the KHASIA HILLS, TIPPERA, CHITTAGONG and BURMA, alt. 2-3000 ft.

A small or large tree. *Leaves* 3-6 in., pale when dry, coriaceous, quite glabrous, reticulate beneath; petiole $\frac{1}{8}$ - $\frac{1}{2}$ in., rather slender. *Involucres* 1-1 $\frac{1}{2}$ in. diam.; tufts of spines often in zones, $\frac{1}{8}$ - $\frac{1}{4}$ in. long, branching from a very stout conical base. *Nuts* usually solitary.

10. **C. tribuloides**, *A. DC. in Seem. Journ. Bot.* i. (1863) 182; *Prodr.* xvi. ii. 111 (*excl. C. armata*); branchlets glabrous or pubescent, leaves petioled from lanceolate to oblong acuminate or caudate glabrous or hoary beneath or silvery rarely pubescent entire or coarsely serrate above the middle, nerves 6-10 pairs arched slender raised beneath, nervules finely reticulate, involucre small globose finely tomentose covered with long slender or short substellate spines or tubercles in sessile subsessile or stipitate clusters.

Tropical, subtropical and lower temperate HIMALAYA, and all the hill ranges of TRANS-GANGETIC INDIA to BURMA.

An exceedingly variable tree (40-60 ft.), or possibly more than one species are included here, to determine which a study of the flowers of both sexes on the living plants is necessary. The involucre are largest and spines longest in var. *longispina*; they are smaller with shorter spines in *tribuloides*, *ferox* and *echidnocarpa* successively.

C. TRIBULOIDES PROPER; leaves usually small lanceolate 4-6 in. rarely serrate, spines close-set slender $\frac{1}{4}$ - $\frac{1}{3}$ in. often curved, nuts usually solitary.

C. tribuloides, *A. DC. l. c.* *C. armata*, *Don Prodr.* 56 (not of *Roxb.*). *Quercus tribuloides*, *Smith in Rees Cyclop.* xxiv. No. 13. *Q. acuta*, *Herb. Hum.* *Castanea tribuloides*, *Wall. Cat.* 2765; *Pl. As. Rav.* ii. 6; *Kurz For. Fl.* ii. 480. *C. microcarpa*, *Lindl. in Wall. Cat.* 3735 (by error 2735).

SUBTROPICAL HIMALAYA; common from Kumaon eastwards to ASSAM, the KHASIA Mts. and MUNNIPORE, alt. 4–7000 ft.

VAR. longispina, *King mss.*; leaves usually larger and broader but sometimes ovate-lanceolate often 5–7 in. and elliptic-oblong pubescent or glabrous beneath, nerves 10–12 pairs, involucre larger 1 in. diam., spines very long and stout often $\frac{1}{2}$ in., nuts 1–3. *Castanea tribuloides*, *var. ferox*, *Kurz For. Fl.* ii. 480.—Sikkim, ASSAM, Khasia and Munnipore, alt. 1–4000 ft.

VAR. ferox, *King mss.*; leaves ovate-lanceolate entire rarely serrate, involucre $\frac{1}{2}$ in. diam., spines short about $\frac{1}{4}$ in. stout spreading, nuts 1–3.—*Castanopsis ferox*, *Spach Hist. Pl. Phan.* xi. 180. *Quercus ferox*, *Roxb. Fl. Ind.* iii. 639; *Wight Ic.* t. 218.—Common in Sikkim, the Khasia Mts., &c., alt. 4–7000 ft.

VAR. echidnocarpa, *King mss.*; leaves small elliptic-lanceolate or lanceolate caudate often serrate above the middle glabrous, nerves 6–10 pairs, involucre much smaller, hoary spines fewer very short often reduced to compound tubercles, nut solitary. *Castanopsis echidnocarpa*, *A. DC. in Seem. Journ. Bot.* 1863, 182; *Prodr.* xvi. ii. 112. *Castanea echidnocarpa*, *Herb. Ind. Or. H. f. & T.* *Quercus* ? *caudata*, *Lindl. in Wall. Cat.* 2787.—Bhotan, Khasia, ASSAM, Munnipore and Burma, alt. 4–7000 ft.

VAR. Wattii, *King mss.*; involucre small thick almost woody densely clothed with very short branched often rufous spines, inner surface rufous-villous, nuts 2–3.—Munnipore, alt. 2000 ft., *Watt.* Khasia Hills (at Maobleh), *Clarke*, alt. 4000 ft.

11. **C. Clarkei**, *King mss.*; branches slender tomentose, leaves elliptic-oblong or lanceolate rarely oblanceolate acuminate serrate nearly to the base pale and puberulous beneath, nerves 16–18 pairs, fruiting spikes very slender, involucre globose, (young) spines slender.

SIKKIM HIMALAYA; at Kalempong, alt. 5000 ft., *Clarke*.

A monœcious tree, 120 ft., at once distinguished from all states of *C. tribuloides* by the very pale many-nerved leaf, serrated always from $\frac{2}{3}$ or more of its length. The leaves are puberulous, almost white beneath, the petiole 1 in. Flowering spikes very slender.

B. *Involucre* subglobose to subovoid, more or less depressed; walls with transverse tubercled zones. *Nuts* usually more than one.

12. **C. sumatrana**, *A. DC. in Seem. Journ. Bot.* 1863, 182; *Prodr.* cvi. ii. 113; leaves oblong- or elliptic-lanceolate or oblanceolate acuminate entire glabrous base acute, nerves 10–15 pairs, involucre large sub-ovoid or globose more or less lobulate or angled tubercled in wavy interrupted zones. *C. mitifica*, *Hance in Journ. Bot.* 1878, 200. *Castanea inermis*, *Lindl. in Wall. Pl. As. Rav.* ii. 6; *Cat.* 2762; *A. DC. Prodr.* 116; *Kurz For. Fl.* ii. 481. *C. glomerata*, *Blume Mus. Bot.* i. 285. *Quercus glomerata*, *Wall. Cat.* 2791 (not of *Roxb.*). *Callæocarpus sumatrana*, *Miquel Pl. Jungh.* 13; *Fl. Ind. Bat.* i. i. 868 (excl. syn.); *Suppl.* 353; *Ann. Mus.* i. 118.

UPPER BERMA, at the Amber Mines, *Griffith (Kew Distrib.* 4471). PERAK, alt. 0–5000 ft., *King's Collector*. PENANG, SINGAPORE, *Wallich*, &c. MALACCA, *Griffith (Kew Distrib.* 4442, 4470), *Maingay (Kew Distrib.* 1157).—DISTRIB. BORNEO.

A large tree. Leaves thinly coriaceous, 4–9 in.; petiole $\frac{3}{4}$ –1 in. Spikes long-peduncled, hoary. *Involucre* 1–1 $\frac{1}{4}$ in. long, bursting irregularly, walls very thick, young depressed. *Nuts* 1–3, subsilky.

13. **C. Hullettii**, *King mss.*; leaves elliptic or oblong-lanceolate acute

or subacute entire, glabrous and shining above, rufous and puberulous beneath, nerves 16-18 pairs glabrescent prominent beneath, involucre subglobose obscurely angled grooved vertically and with wavy zones of tubercles 3-4-valved.

SINGAPORE and PERAK; *Hullett, King's Collector*. MALACCA, *Maingay (Kew Distrib. 1459, 1463)*.—DISTRIB. Riou and Billiton Islands.

A large tree. *Leaves* coriaceous, 5-9 by 2-3 in., base acute or rounded, midrib strong; petiole $\frac{3}{4}$ -1½ in. *Involucre* 1½ in. diam., often depressed, or with the base contracted. *Nuts* 2-4, sparsely hairy.

C. *Involucre* subglobose, flattened on one side, indehiscent, adnate to the nut, flattened surface smooth, the rest clothed with short prismatic or patelliform spines or tubercles.

14. **C. rhamnifolia**, *A. DC. Prodr.* xvi. ii. 113; leaves elliptic-ovate or oblong obtusely acuminate entire glabrous or midrib puberulous, nerves 7-8 pairs, involucre ovoid flattened on one side thick-walled furfuraceous, flat side smooth, convex sides with conical tomentose spines, nut solitary. *Quercus rhamnifolia*, *Miquel Fl. Ind. Bat.* i. 853. *Castanea rhamnifolia*, *Kurz For. Fl.* ii. 481. *Callæocarpus rhamnifolia*, *Miquel Fl. Ind. Bat. Suppl.* 353; *Ann. Mus.* i. 118; *Scheffer Obs. Phyt.* iii. 95.

BURMA, *Kurz*. SINGAPORE, *Cantley*.—DISTRIB. Sumatra, Banca.

Leaves thinly coriaceous, nerves slightly raised beneath; petiole $\frac{1}{2}$ in. *Involucre* hoary-tomentose, about 1 in. long; spines $\frac{1}{8}$ in., conical, spinous tipped. *Nut* flattened on one side.

15. **C. Wallichii**, *King mss.*; leaves lanceolate or ovate-lanceolate acuminate entire glabrous above, puberulous or hoary beneath, nerves 6-7 pairs, involucre ovoid flattened on one side indehiscent thick-walled rounded surface covered with flattened pyramidal hooked pubescent spines flattened surface less so, nut solitary. *Castanea Tungurrut*, *Wall. Cat.* 2763 (*not of Blume*).

PENANG, *Wallich*. SINGAPORE, *Cantley*. PERAK, *King's Collector*. MALACCA, *Griffith (Kew Distrib. 4444)*, *Maingay (Kew Distrib. 1465)*.

Leaves coriaceous, 2-3½ in., base acute, sometimes flocculent beneath, nerves raised beneath; petiole $\frac{1}{4}$ in. *Involucres* 1½ in. long, walls thick. *Nut* depressed globose.

16. **C. nephelioides**, *King mss.*; leaves elliptic oblong or subobovate obtusely acuminate entire glabrous above sparsely furfuraceous beneath, nerves 9-12 pairs, involucre obovoid flattened on one side thin crustaceous covered with patelliform simple short obtuse tubercles.

PERAK, *Scortechini, King's Collector*.

A tree, 30-60 ft. *Leaves* thinly coriaceous, 2½-5 in.; petiole $\frac{1}{2}$ in. *Involucres* 1 in. long, adnate to the solitary nuts, puberulous.

DOUBTFUL SPECIES.

CASTANOPSIS?; branches stout dark, leaves 6-10 by 3-4 in. very coriaceous oblong obtuse or acute glabrous entire brown-green and polished above silvery or pale brown beneath with 12 pairs of strong spreading arched nerves and rather distant cross-nervules, midrib and nerves slender and raised above, base acute or rounded, petiole $\frac{1}{2}$ -¾ in., fem. spikes as long as the leaves or longer very stout tomentose simple or sparingly branched, involucre tomentose 1-fld.; young fruiting spikes very stout woody, involucre sessile $\frac{1}{2}$ -¾ in. diam. globose covered with tomentose short very thick spines. *Quercus Jenkinsii*, *Benth. in Hook. Ic. Pl.* t. 1312 (*excl. fruit*).—

Upper Burma, Lamoom and banks of Mogoung River, *Griffith* (*Kew Distrib.* 4460, 4463).—See at end of *Quercus* for other plants included under *Q. Jenkinsii*. Wallich, No. 9145, from Tavoy, resembles this a good deal, but its nerves are more numerous, fem. spikes more slender, and it is from a very different region.

5. **CORYLUS**, *Linn.*

Deciduous monœcious trees or shrubs, flowering before leafing. *Leaves* alternate, doubly serrate, plicately penninerved. *Male fl.* solitary in the bracts of a many-fl. pendulous spike, 2-bracteolate; perianth 0; stamens 4-8, filaments forked, separating the anther-cells. *Fem. fl.* in pairs in the upper bracts of a minute few-fl. many-bracteate spike or head, bracteole solitary 3-partite; perianth superior, limb annular, toothed; ovary 2-celled, cells 1-ovuled; style-arms linear. *Nut* large, woody or bony, enclosed in the greatly enlarged coriaceous bracts, 1-seeded.—Species 7, of North temperate regions.

1. **C. ferox**, *Wall. Pl. As. Rar.* i. 77, t. 87; *Cat.* 2797; leaf-buds lanceolate silky, leaves oblong or ovate-oblong acuminate very finely laciniately serrate, fruiting bracts tomentose spinescent and lobed. *Brand. For. Fl.* 494; *Gamble Man. Ind. Timb.* 390; *A. DC. Prodr.* xvi. ii. 129.

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 8-10,000 ft., *J. D. H.*

A small tree; shoots puberulous. *Leaves* 4-5 in., young pubescent, old puberulous beneath; nerves 10-12 pairs; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., hairy. *Male spikes* clustered, 1-2 in.; bracts obovate, acute, densely villous; stamens 4-6, subsessile; anther-cells contiguous, tips hairy. *Fem. fl.* subcapitate; spines of invol. $\frac{1}{2}$ in. long, slender, branched. *Nuts* in nodding clusters, 2-4 in. diam., of 3-6 each, ovoid or globose, very hard, $\frac{3}{4}$ in. diam.

2. **C. Colurna**, *Linn. Sp. Pl.* 999; leaf-buds short rounded, leaves obovate acuminate lobulate and toothed, base cordate, bracts velvety unarmed outer fruiting laciniated inner longer sheathing ribbed cleft into serrate glandular-hairy lobes. *Brand. For. Fl.* 494; *Gamble Man. Ind. Timb.* 390; *A. DC. Prodr.* xvi. ii. 131; *Boiss. Fl. Orient.* iv. 1176. *C. lacera*, *Wall. Cat.* 2798. *C. Jacquemontii*, *Dcne. in Jacquem. Voy. Bot.* 160, t. 160.

WESTERN TEMPERATE HIMALAYA, alt. 5500-10,500 ft., from Kashmir to Kumaon.—DISTRIB. Asia Minor, Thrace and Hungary.

A small gregarious tree, 40-50 ft. *Leaves* 5-8 by $2\frac{1}{2}$ -6 in., glabrous or nearly so, membranous, nerves 10-12 pairs, terminating the lobes; petiole 1-1 $\frac{1}{2}$ in. *Male spikes* clustered, 1-2 in., very stout; bracts obovate, acute with about 8 anther-cells on the midrib, their filaments variously connate. *Nut* globose, very hard.

6. **CARPINUS**, *Tourn.*

Deciduous trees or shrubs, monœcious. *Leaves* alternate, serrate, plicately penninerved. *Male fl.* in lateral pendulous spikes, bracts ovate, bracteoles 0; perianth 0; stamens 3 or 4 on a hairy torus adnate to the bract, filaments 2-fid separating the anther-cells. *Fem. fl.* in erect terminal spikes; bracts foliaceous, bracteoles 2; perianth limb minute, superior, toothed; ovary 2-celled, cells 1-ovuled; style-arms 2 long, stigmatose on the inner face. *Nut* ribbed, enclosed in the base of the elongate foliaceous bract and bracteoles. *Cotyledons* fleshy, enclosing the radicle.—Species 9, of N. temp. regions.

1. **C. viminea**, *Wall. Cat.* 7800; branches warted, leaves ovate caudate doubly serrate, fruiting bracts lanceolate unequal-sided obtusely toothed on the broader side entire on the other or base lobulate. *Lindl. in Wall. Pl. As. Rar.* ii. 4, t. 106; *A. DC. Prodr.* xvi. ii. 127; *Brand. For. Fl.* 492; *Kurz For. Fl.* ii. 477; *Gamble Man. Ind. Timb.* 390.—Ament, *Wall. Cat.* 9146.

TEMPERATE HIMALAYA; from Chamba eastwards, alt. 5-7000 ft. KHASIA Mts., alt. 5-6000 ft. MARTABAN HILLS, alt. 5-6000 ft., *Kurz*.

A rather small tree, with slender pendulous branches; buds slender, softly hairy. *Leaves* 3-4 in., thin; petiole $\frac{1}{2}$ - $\frac{1}{3}$ in., hairy. *Male spikes* 1-2 in., fem. 2-3 in. *Fruiting bracts* 1 in., 3-5-nerved. *Nut* $\frac{1}{2}$ in., 7-8-nerved, glandular.

2. **C. faginea**, *Lindl. in Wall. Pl. As. Rar.* ii. 5; branches tomentose, leaves ovate-oblong acute subdoubly serrate, fruiting bracts triangular oblong-lanceolate very unequal-sided narrow side (with the nerve submarginal) entire, the other coarsely toothed. *A. DC. Prodr.* xvi. ii. 127; *Brand. For. Fl.* 492, t. 66.

TEMPERATE HIMALAYA; from Jamu eastwards, alt. 4-7000 ft.

A moderate-sized tree. *Leaves* 3-5 in., often falcate, young pubescent; petiole $\frac{1}{6}$ - $\frac{1}{4}$ in., pubescent. *Fruiting bracts* $\frac{3}{4}$ in., pubescent; nerves 4-6 pairs. *Nut* $\frac{1}{2}$ in.

ORDER CXLI. SALICINÆ.

Deciduous, dioecious trees or shrubs. *Leaves* alternate, base 3-5-nerved, stipulate. *Flowers* in catkins, one under each bract, ebracteolate; perianth 0; disk a scale or cupular or of glands; stamens 2 or more; filaments free or connate; ovary sessile or stipitate, 1-celled, style short or 0, stigmas short notched or lobed; ovules few or many on 2-4 subbasal or parietal placentas, erect, anatropous. *Capsule* ovoid or lanceolate, 2-4-valved. *Seeds* few or many, funicle with a pencil of long silky hairs, albumen 0; cotyledons plano-convex, radicle short inferior.—Genera 2, species about 180, chiefly N. temperate.

Disk of 1 or 2 separate glands 1. **SALIX**.

Disk cupular or annular 2. **POPULUS**.

1. **SALIX**, *Linn.*

Characters as above.—Species about 160, very rare in the tropics and thern hemisphere, absent in Australia and the Pacific.

Nothing of importance has been added to the descriptions of the Indian Willows contained in Andersson's monograph (*A. DC. Prodr.* xvi. ii.) published in 1868, except the excellent remarks of Brandis, contained in his *Forest Flora*. Many of the species are very incompletely represented in Herbaria, and all are as protean as are their European congeners. I have thought it best in many cases of doubt to adhere to Andersson's determinations, leaving it to Indian Botanists to note carefully the variations of all the species (which no one has hitherto attempted), and which will no doubt profoundly modify the characters and specific limits as here given.

SECT. I. PLEIANDRÆ. *Stamens* 3-12; filaments free, villous at the base. (See also *S. alba* & *fragilis*, which are sometimes 3-4-androus.)

1. **S. tetrasperma**, *Roxb. Cor. Pl.* i. 66, t. 97; *Fl. Ind.* iii. 573; leaves petioled narrowly or broadly ovate-lanceolate acuminate serrulate rarely entire usually glaucous beneath, catkins very slender, flowers in

scattered clusters, bracts subspathulate, stamens 5-10, capsules long stipitate glabrous or puberulous, stigmas sessile short entire. *Anderss. Monogr.* 1, f. 1; *DC. Prodr.* xvi. ii. 192; *Wight Ic.* t. 1954; *Brand. For. Fl.* 462, t. 58; *Kurz For. Fl.* ii. 493; *Beddome Fl. Sylrat.* t. 302; *Wall. Cat.* 3700 A in part, E, 3707, 9104, 9106; *Dalz. & Gibs. Bomb. Fl.* 220; *Gamble Man. Ind. Timb.* 375; *Miq. Fl. Ind. Bat.* i. ii. 460; *Forbes Salicet. Wob. t.* 31. S. disperma, *Don Prodr.* 58; *Anderss. in Act. Holm.* 1850, 500; in *Journ. Linn. Soc.* iv. 42. S. Horsfieldiana, *Miq. l. c.* 461. S. nilagirica, *Miq. Plant. Hochst. Exsicc.* 1851, n. 982. S. tetrasperma, β . nilagirica, *Anderss. Monogr.* 3; *DC. l. c.* 193.

Throughout TROPICAL and SUBTROPICAL INDIA, from the Panjab eastwards to Mishmi, Assam and Munnipore, ascending the Himalaya to 7000 ft., and southwards to Travancore and Singapore. (Absent from Ceylon.)—DISTRIB. Sumatra, Java.

A small tree, 20-40 ft., flowering after leafing, trunk stout, attaining 10 ft. girth; head large, branches suberect. *Leaves* 3-8 in., glabrous or the young as well as the branchlets more or less softly tomentose or silky; petiole $\frac{1}{4}$ -1 in.; stipules ovate or orbicular, deciduous. *Male catkins* 2-4 in., on leafy branchlets, sweet-scented; bracts obovate or spathulate, pale, hairy; fem. 3-5 in., bracts smaller; disk small, $\frac{1}{2}$ -annular. *Capsules* very variable in length and breadth, $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipes as long or shorter. *Seeds* 4-6.—A polymorphous plant, of which the prevalent N.W. Indian form differs very much from the southern and eastern in the longer narrower leaf, like those of *S. daphniphylla*, pale green or yellowish when dry, with more oblique nerves, and much larger shortly stipitate pale capsules; the eastern and southern forms have (when dry) dark-brown usually shorter and often broader leaves shining above, with more horizontal nerves, smaller dark capsules, on often very slender stipes; of these southern and eastern forms, some have glabrous branchlets and young leaves, in others they are tomentose or almost silky. Roxburgh describes the style as being as long as the capsule, and the latter as cordate at the base; the first character never applies, and the capsule is only cordate after dehiscence. Of the varieties founded by authors on looser or denser-fld. catkins and form of the leaves and capsule none seem to me to be tenable.

VAR. pyrina, *Anderss. in Journ. Linn. Soc.* iv. 42; shoots petioles young leaves beneath and rachis of catkins softly tomentose or woolly, capsules narrow, mature leaves often subsilky on both surfaces. *S. pyrina*, *Lindl. in Wall. Cat.* 3705; *Anderss. in Act. Holm.* 1850, 486; *Monogr.* 4; *DC. Prodr. l. c.* 193; *Miq. Fl. Ind. Bat.* i. ii. 461. *S. Wallichii*, *Wimm. in Herb. Vind.* S. lenta, *Fries Nov. Fl. Sr. Mant.* i. 78; *Anderss. l. c.* and *Monogr.* 4, f. 2.—Common from Nepal eastwards and southwards.—*Andersson*, who makes a variety of *pyrina* in *Journ. Linn. Soc.*, quotes that work in the *Prodromus* for it as a species.

VAR. suaveolens, *Anderss. in Journ. Linn. Soc.* iv. 41; *DC. l. c.* 193; branches chestnut-red quite glabrous, leaves ovate-lanceolate 3 in. broad very coriaceous and shining at length glabrous and densely glaucous beneath, male bracts very broadly ovate densely villous. *S. suaveolens*, *Anderss. in Act. Holm.* 1850, 491. *S. Myurus & Hugelii*, *Wimmer in Herb. Vind.*—Ajmir and N.W. Himalaya.

VAR. viridifolia; shoots and young leaves glabrous, leaves lanceolate acuminate serrate pale yellow-green on both surfaces when dry.—Coimbatore, *Herb. Wight*.—This, which is in male fl. only, may be a different species. There are scraps in *Herb. Wallich* under No. 3702, which consists of this, *S. tetrasperma* and *ichnostachya*.

S. GLABRESCENS, *Lindl. in Wall. Cat.* 3706, omitted by *Andersson* in his various works, is probably a form of *tetrasperma*, said to be from both Oude and Rohilkunds with old hoary capsules and branches.—*Andersson* has written on the sheet "*S. lamarina* \times *macrostachya* valde affinis," *Wall. Cat.* 3707 D. *S. tetrasperma*, var. *pubescens*, *Lindl.*, with large rounded stipules, is probably the same.

S. CUSPIDATA, *Wall. Cat.* 3703 (omitted by *Andersson*); *Don Prodr.* 58. There are two sheets from *Herb. Wight*; A is *tetrasperma* with long bracts and glabrous capsules, B consists of leaves only, and is labelled by *Andersson* *S. apiculata*, *Anderss.*

S. CALOPHYLLA, *Wall. Cat.* 9102, from Attran (Burma), consists of a glabrous branch with very large long and stoutly petioled ovate-lanceolate leaves, resembling those of *S. ichnostachya*; it is probably a form of *tetrasperma*. It is overlooked by Andersson.

S. DENSA, *Wall. Cat.* 9103, from Martaban, also overlooked by Andersson, consists of a glabrous branch with linear-oblong petioled leaves 6 in. long. It is also probably referable to *tetrasperma*.

S. NOBILIS, *Fries*; *S. TETRASPERMA*, var. *NOBILIS*, *Anderss. in Act. Holm.* 1850, 492, and in *Journ. Linn. Soc.* iv. 42 (omitted in the *Prodromus*), from Nepal, is described as having a very long 2-fid style with linear split stigmas.

2. *S. ichnostachya*, *Lindl. in Wall. Cat.* 3704; shoots and young leaves silky-pubescent, leaves petioled lanceolate or ovate-lanceolate acuminate serrulate usually glaucous beneath, catkins densely woolly sessile or pedicelled, male sparse-fl., fem. rather dense-fl., stamens 6-8, capsules shortly stipitate globosely ovoid densely woolly, style short 2-fid. *Anderss. in Act. Holm.* 488; *Wight Ic.* t. 1953. *S. tetrasperma*, var. *ichnostachya*, *Anderss. in Journ. Linn. Soc.* iv. 41; *DC. Prodr.* xvi. ii. 193. *S. pondichiana*, *Anderss. mss.*

The DECCAN; Pondicherry, *Perrottet*; Maisor; near Salem, *Wight*.

Habit and foliage of *S. tetrasperma*, from which the densely woolly catkins and the shape and woolliness of the capsules distinguish it.

3. *S. acmophylla*, *Boiss. Diagn.* vii. 98; *Fl. Orient.* iv. 1183; leaves linear-lanceolate upper caudate-acuminate quite entire or serrulate glaucous beneath, catkins short shortly peduncled, bracts ovate or oblong concave villous, stamens 4-6, capsules ovoid-oblong shortly stipitate, stigmas sessile short entire. *Anderss. Monogr.* 7, f. 76; *DC. Prodr.* xvi. ii. 195; *Brand. For. Fl.* 463. *S. glauca* and *S. acmophylla*, *Anderss. in Act. Holm.* 1850; *Journ. Linn. Soc.* l. c. 43. *S. octandra*, *Del.*; *Aitch. Cat. Panjab Pl.* 140.

NORTH-WESTERN INDIA, from the Beas westward; (cultivated at Delhi, *Aitchison*.)

—DISTRIB. Afghanistan, Beluchistan (cultivated all over it, *Stocks*) and westward to Syria.

A moderate-sized quite glabrous tree, flowering after leafing; trunk attaining 7 ft. girth; crown rounded, branches often pendulous. *Leaves* 2-5 in., pale, lower often subacute or mucronate. *Male catkins* 1-2 in., cylindric, dense-fl.; fem. 1 in., nodding, with deciduous long-haired bracts.—*Brandis* observes that *S. acmophylla* is both geographically and structurally intermediate between *S. tetrasperma* and the N. African *S. Sufuf*, *Forsk.*

SECT. II. DIANDRÆ. Fem. catkins sessile or peduncled; bracts coloured, persistent. *Stamens* 2 (or more in *S. alba* & *fragilis*), free. *Disk* of one or two scales.

* Capsules usually stipitate; style 0.

4. *S. Wallichiana*, *Anderss. in Act. Holm.* 1850, 447; *Monogr.* 80, f. 46; *DC. Prodr.* xvi. ii. 223; shoots and leaves beneath silky, leaves oblong lanceolate or ovate-lanceolate smooth quite entire, catkins densely silky subsessile with small leaves at the base, males 1-1½ in. erect, fem. 3-4 in. drooping, bracts black, stamens 2 free, capsules shortly stipitate slender silky, stigmas erect subsessile. *Brand. For. Fl.* 468; *Gamble Man. Ind. Timb.* 376; *Wall. Cat.* 3700 A in part, B, C.—*Salix*, *Herb. Strach. & Wint.* No. 3, 5, 11.

TEMPERATE HIMALAYA, from Kashmir to Bhotan, ascending to 9000 ft., and in the PANJAB PLAINS; wild or cultivated.—DISTRIB. Afghanistan.

A shrub or small tree, flowering before leafing. *Leaves* 2-3 in., young silvery-tomentose on both surfaces, sometimes obscurely crenate; nerves numerous, not very distinct. *Male catkins* 1 in., short, stout, tip rounded; *fem.* 3-5 in., rachis tomentose. *Capsules* $\frac{1}{2}$ in., valves slender.—Andersson has the following varieties.

VAR. grisea, Anderss. Monogr. 80; DC. l. c.; leaves serrulate glabrate above base narrow or rounded, catkins crowded scales long acute pale with brown tips, capsules subsessile very slender hoary, stipes hardly longer than the disk. *S. grisea*, Wall. Cat. 3700 G. *S. pseudo-grisea*, Steud. Nomencl.

VAR. julacea, Anderss. Monogr. l. c.; DC. l. c. 224; leaves ovate-oblong subobtusely minutely distantly serrulate, catkins shortly peduncled very long slender flexuous, bracts glabrate tips brown, capsules sparsely hairy, stipes 3-4 times as long as the disk.—Hyderabad, Jacquemont.—I have not seen this.

VAR. sericea, Anderss. ll. c.; leaves silky on both surfaces, catkins stout shortly pedicelled, bracts acute black glabrous, capsules short pale, stipes about three times as long as the disk.—Kashmir.

S. CAPREA, Linn. Sp. Pl. 1020; leaves elliptic oblong or obovate crenate rugose beneath and grey-pubescent with crispy or cottony down, nerves 8-12 pairs strong beneath, stipules large subreniform, catkins subsessile densely silky, male 1 in. erect ovoid-oblong, bracts dark, stamens 2 free, *fem.* 2-3 in. slender nodding, bracts tipped with black, capsules shortly stipitate cylindric from an ovoid base downy, stigmas subsessile erect. Anderss. in DC. Prodr. xvi. ii. 222; Brand. For. Fl. 467, t. 60; Reichb. Ic. Fl. Germ. t. 577; Boiss. Fl. Orient. iv. 1188.

Cultivated in Rohilkund and N.W. India.—DISTRIB. Europe, W. Asia.

A tree, 25-30 ft., flowering before leafing; trunk attaining 3-4 ft. girth, often a shrub. *Leaves* 2-4 in., dark green above, margins often recurved, base cuneate rounded or cordate. *Male catkins* very stout, sweet-scented; *fem.* 2-3 in. *Capsules* $\frac{1}{2}$ in.—Sallow, or Goat Willow.

S. ALBA, Linn. Sp. Pl. 1021; a tree, leaves narrow lanceolate acuminate glandular-denticulate silky beneath, stipules lanceolate deciduous, catkins on leafy peduncles, male cylindric dense-fld. drooping, bracts oblong ciliate, stamens 2 free, *fem.* lax-fld., bracts yellow ciliate, capsules subsessile ovoid glabrous, style very short, stigmas 2-fld. Anderss. in DC. Prodr. xvi. ii. 211; Brand. For. Fl. 466; Reichb. Ic. Fl. Germ. t. 608; Boiss. Fl. Orient. iv. 1485.

NORTH-WEST HIMALAYA and WESTERN TIBET, cultivated only.—DISTRIB. Europe, N. Asia.

A tree, attaining 80 ft., flowering after leafing; branchlets olive-green, yellow, red, or purple. *Leaves* 2-4 in., dull green above, young silky on both surfaces, old glabrous, often glaucous beneath; petiole eglandular. *Male catkins* 1-1 $\frac{1}{2}$ in.; *fem.* 2-3 in. *Disk scales* 2. *Capsules* with narrowed tips.—White Willow.

S. BABYLONICA, Linn. Sp. Pl. 1017; a tree with weeping branches, leaves linear-lanceolate acuminate serrulate glabrous or sparsely hairy beneath, stipules falcate serrate, catkins very slender on leafy peduncles, male short slender curved pale yellow, stamens 2 free, *fem.* as long, bracts small lanceolate pale, capsules sessile narrowly conic glabrous or nearly so, stigmas sessile entire. Anderss. in DC. Prodr. xvi. ii. 212; Brand. For. Fl. 465, t. 59; Wall. Cat. 3709; Boiss. Fl. Orient. iv. 1185.

Cultivated in the plains of INDIA, and the HIMALAYA, ascending to 9000 ft.; and elsewhere in gardens, &c.—DISTRIB. Europe, N. and W. Asia.

A tree, attaining 50 ft.; trunk 12 ft. in girth, flowering and leafing together; males much commoner than *fem.* *Leaves* 3-6 by $\frac{1}{2}$ in., midrib prominent. *Male*

catkins $\frac{1}{2}$ –1 in.; bracts lanceolate; fem. as long; bracts as in the male. *Capsule* $\frac{1}{2}$ in., pale green.—Weeping Willow.

5. ***S. elegans***, Wall. Cat. 3699; shoots petioles and midrib above usually pubescent, leaves elliptic obovate or oblong acute or obtuse or tip rounded serrulate very glaucous and reticulate beneath, catkins slender on leafy peduncles, bracts small yellow, male compact, stamens 2 free, fem. much longer slender drooping, bracts minute yellow subpubescent, capsules shortly stipitate conic obtuse, stigmas subsessile 2-partite. *Anderss. in DC. Prodr.* xvi. ii. 256; *Brand. For. Fl.* 466; *Gamble Man. Ind. Timb.* 377. *S. kumaonensis*, Lindl. in Wall. Cat. 3701. *S. denticulata*, *Anderss. in Act. Holm.* 481, and in *Bot. Reise Pr. Wald.* 119, t. 89.

WESTERN HIMALAYA; from Nepal to Marri, alt. 6–11,000 ft., and Gilgit.

A shrub or small tree, flowering after leafing; branches black or brown. *Leaves* 1–2 in., young membranous, old rigid; petiole $\frac{1}{4}$ in. *Male catkins* $1\frac{1}{2}$ in.; fem. 3–5 in. *Capsules* $\frac{1}{2}$ in.; stigmas spreading.

VAR. *Govaniana*, *Anderss. in DC. l. c.* 257; taller, leaves larger almost lanceolate more sharply serrulate more glaucous beneath. *S. Govaniana*, Wall. Cat. 3699. *S. himalensis*, Klotzsch in *Herb. Berol.* *S. denticulata*, var. *himalensis*, *Anderss. in Act. Holm.* 482. *S. elegans*, var. *himalensis*, *Anderss. Monogr.*—Nepal and Kumaon.

6. ***S. sclerophylla***, *Anderss. Monogr.* 148; *DC. Prodr.* xvi. ii. 248; branches stout glaucous, buds large, leaves small oblong quite entire glabrous base rounded or subcordate, catkins small sessile short ovoid-oblong, base not leafy, male erect, fem. curved, bracts obovate obtuse tips brown or not ciliate, capsules sessile conic beaked hoary, stigmas sessile stout spreading. *Salix*, No. 8 and 10, *Herb. Strach. & Winterb.*

NORTH-WESTERN HIMALAYA and TIBET; Laptal, alt. 15,000 ft., *Strachey & Winterbottom*; Dras, alt. 10,000 ft., *Thomson*.

A stout much-branched shrub, flowering before leafing; branches glaucous. *Leaves* 1 in., rigid, pale beneath; nerves strong, arched. *Male catkins* $\frac{1}{4}$ – $\frac{1}{2}$ in. *Disk* surrounding the base of the capsule, which is about $\frac{1}{4}$ in. long.—*Andersson* compares this with the European *S. repens*, L., in habit; he makes 2 varieties, *a. glabra*, with leaves glabrous and bright green on both surfaces, and *b. pubescens*, with rigid leaves apiculate rounded at both ends and white villous on both surfaces, but especially beneath.

** Capsule stipitate (*stipes very short in S. fragilis*); style produced.

S. FRAGILIS, Linn. *Sp. Pl.* 1017; a tree, branchlets smooth polished fragile at the insertion, leaves lanceolate caudate-acuminate glandular-serrate glabrous young hairy, stipules $\frac{1}{2}$ -cordate deciduous, catkins on leafy peduncles, bracts long narrow pale, male cylindric drooping, stamens 2–4 free, fem. longer slender, capsules narrowly conic shortly stipitate glabrous narrowed into a 2-fid style, stigmas 2-fid. *Anderss. in DC. Prodr.* xvi. ii. 209; *Brand. For. Fl.* 466; *Reichb. Ic. Fl. Germ.* t. 609; *Boiss. Fl. Orient.* iv. 1184.

Cultivated in LAHOUL and WESTERN TIBET.—DISTRIB. N. and W. Asia, Europe.

A tree, 80–90 ft. (in Europe), flowering after leafing; branches divaricate. *Leaves* 3–6 in., green, silky when young; petiole often glandular at the top. *Disk* 2-glandular. *Capsule* $\frac{1}{4}$ in.—Crack-Willow.

7. ***S. hastata***, Linn. *Sp. Pl.* 1017; shoots silkily hairy, leaves oblong to lanceolate obtuse acute or apiculate toothed glabrous or midrib and

nerves beneath hairy, stipules broadly ovate or $\frac{1}{2}$ -cordate, catkins subsessile or shortly peduncled robust with small leaves at the base, male cylindric compact silkily hairy, bracts subspathulate dark, stamens 2, anthers yellow, fem. longer, capsules stipitate glabrous, style filiform, stigmas spreading 2-fid. *Anderss. in DC. Prodr.* xvi. ii. 259; *Brand. For. Fl.* 467; *Reichb. Ic. Fl. Germ.* t. 570; *Boiss. Fl. Orient.* iv. 1191. *S. arbuscula?* *Herb. Ind. Or. H. f. & T.*

WESTERN HIMALAYA, in the inner ranges, and TIBET, from Garwhal westwards, alt. 9-15,000 ft. SIKKIM; at Tallum Samdong, alt. 11,500 ft., *J. D. H.*—DISTRIB. N. and W. Asia, Subalpine Europe.

A small shrub, flowering and leafing together; branches dark brown or black, glabrous. *Leaves* 1-3 by $\frac{1}{4}$ - $2\frac{1}{2}$ in., membranous, green on both surfaces but paler beneath; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in.; stipules large or 0. *Male catkins* 1- $1\frac{1}{2}$ in.; fem. 2-7 in. *Disk* half as long as the stipes of the ovary. *Capsules* $\frac{1}{3}$ - $\frac{1}{2}$ in., ovoid, beaked.—The Sikkim specimens are in leaf only, and the leaves are 3- $4\frac{1}{2}$ in. long. *Andersson* refers them to *S. hastata*.

*** Capsules sessile or subsessile; style produced (very shortly in *S. longiflora* & *Lindleyana*).

† *Trees or large shrubs, leaves glabrous glaucous silky or villous beneath.*

8. ***S. daphnoides***, *Villars Delph.* iii. 765; branches shining or glaucous, buds large downy, leaves oblong- or linear-lanceolate acuminate serrate shining above glaucous beneath, nerves prominent, stipules $\frac{1}{2}$ -cordate acuminate, catkins sessile stout, bracts black-tipped villous, male erect, stamens 2 free, anthers yellow, fem. longer nodding, capsule subsessile glabrous, style filiform, stigmas diverging entire. *Anderss. in DC. Prodr.* xvi. ii. 261; *Brand. For. Fl.* 469, t. 62; *Gamble Man. Ind. Timb.* 377; *Reichb. Ic. Fl. Germ.* t. 602, 603; *Boiss. Fl. Orient.* iv. 1191. *S. daphnoides*, var. *indica*. *Anderss. in Journ. Linn. Soc.* iv. 46. *S. acutifolia*, *Willd. Herb. Ind. Or. H. f. & T.*

TEMPERATE HIMALAYA, from Kumaon westwards, from 2500 ft. in the outer ranges to 15,000 in the inner and in WESTERN TIBET.—DISTRIB. N. and W. Asia, Europe.

A large shrub, or a tree attaining 60 ft., and trunk 9-12 ft. in girth, flowering before leafing; branchlets yellowish or reddish. *Leaves* 3-5 in., broader in the lower elevations; nerves many, glabrous or silky beneath; stipules lanceolate in the Indian forms ($\frac{1}{2}$ -cordate in European). *Male catkins* 1- $1\frac{1}{2}$ in., cylindric; fem. 2-4 in. *Disk* surrounding the base of the ovary. *Capsules* with the style $\frac{1}{4}$ in.

9. ***S. insignis***, *Anderss. in Journ. Linn. Soc.* iv. 47; *DC. Prodr.* xvi. ii. 262; shrubby or arboreous, branches stout glaucous, buds large, leaves elliptic lanceolate acuminate at both ends glandular-serrate glaucous (or silky) beneath sometimes silky on both surfaces, stipules $\frac{1}{2}$ -cordate persistent, catkins sessile with brown deciduous basal scales, male stout, bracts black with yellow hairs, stamens 2 free, fem. longer acute erect, bracts obtuse glabrate, capsules shortly stipitate conic puberulous, style short, stigmas stout erect entire. *Brand. For. Fl.* 470.

WESTERN TEMPERATE HIMALAYA; Kunawur to Kashmir, alt. 5-12,000 ft.

Perhaps a variety of *S. daphnoides* (as named by *Andersson* in *Herb. Wall.*) with puberulous longer stipitate capsules, shorter styles, and often very silky leaves.—*Andersson* describes a hirsute form with narrower leaves, and tomentose shoots.

10. ***S. viminalis***, *Linn. Sp. Pl.* 1021; shoots silky, leaves linear-

lanceolate acuminate reticulate above silvery-silky beneath, margins entire revolute, stipules linear-lanceolate (or $\frac{1}{2}$ -cordate), male catkins sessile, bracts brown- or black-tipped silkily ciliate, stamens 2 free yellow, fem. much longer subsessile cylindric, capsules subsessile tomentose, style slender, stigmas slender spreading. *Anderss. in DC. Prodr.* xvi. ii. 264; *Brand. For. Fl.* 470; *Gamble Man. Ind. Timb.* 377; *Reichb. Ic. Fl. Germ.* t. 597; *Boiss. Fl. Orient.* iv. 1191.

TEMPERATE HIMALAYA, from Jamu westwards, alt. 5-9000 ft.—DISTRIB. N. and W. Asia, Europe.

A shrub or small tree, flowering before the leaves, branchlets slender flexible. *Leaves* 4-5 in., pubescent or glabrate above. *Male catkins* 1 in., erect, golden yellow; disk-gland narrow; fem. 2-4 in. *Capsules* $\frac{1}{4}$ in., beaked, narrowed into the style.—The Osier.

VAR. *Smithiana*; stipules $\frac{1}{2}$ -cordate, leaves broader, style shorter. *Anderss. in DC. l. c.* 267. *S. Smithiana*, *Willd. Enum. Hort. Berol.* ii. 1008; *Anderss. in Journ. Linn. Soc.* iv. 48.—Sikkim, alt. 5-8000 ft.—Brandis refers a Sikkim willow collected by me at 5-8000 ft. in Sikkim to this. *Andersson* regards the European *Smithiana*, which is common in osier-grounds, as a hybrid between *viminialis* and *Caprea*. The Sikkim plant is probably *S. eriophylla* of the Khasia Mts.

11. ***S. obscura***, *Anderss. in DC. Prodr.* xvi. ii. 269; a diffuse shrub, shoots tomentose, leaves elliptic or linear-lanceolate acute dull green above brown when dry, beneath glabrous or subsilky reddish or glaucous, margins entire or very remotely toothed, fem. catkins sessile, bracts minute acute black tips hairy, capsules small sessile broadly ovoid puberulous, style slender thickened upwards, stigmas very short erect entire.

SIKKIM HIMALAYA; Lachen, alt. 9-14,500 ft., *J. D. H.*, *Pantling*.

Branches stout, smooth, bark black. *Leaves* 2-3 in., midrib pubescent above, young villous and somewhat shining beneath; stipules not seen. *Fem. catkins* 1-1 $\frac{1}{2}$ in., narrowly cylindric. *Capsules* about $\frac{1}{2}$ in., conic-ovoid, narrowed into the style.—Possibly a form of *S. viminialis*.

12. ***S. sikkimensis***, *Anderss. in DC. Prodr.* xvi. ii. 269; branches very stout angled glaucous, leaves (young) ovate-lanceolate obtuse quite entire glabrous above densely silkily villous and coppery beneath, male catkins subsessile with deciduous basal leaves stout curved villous, stamens 2 free, bracts obovate-cuneate villous tip toothed densely villous with long hairs, fem. as long but narrower, capsules sessile conic densely silkily villous narrowed into the deeply cleft style, stigmas sub-2-fid brown spreading.

SIKKIM HIMALAYA, alt. 9-14,000 ft., *J. D. H.*, &c.

A tree, becoming shrubby at higher elevations, branches smooth, erect, shining, bark very dark. *Leaves* (not mature) 1-1 $\frac{1}{2}$ in., dark brown when dry. *Catkins* about 1 in., silky; male very stout, $\frac{3}{4}$ in. diam. *Capsules* $\frac{1}{2}$ in., nearly hidden by the villous bracts. *Anthers* linear-oblong. *Style* nearly as long as the capsule.

13. ***S. Daltoniana***, *Anderss. in Journ. Linn. Soc.* iv. 49; *DC. Prodr.* xvi. ii. 269; branches black, leaves lanceolate acute, margins flat quite entire or minutely glandular-serrulate silky and coppery beneath, catkins on leafy peduncles very long slender flexuous, bracts linear-oblong or spatulate yellow-brown tip notched or crenate hairy, capsules small sessile narrow silky at length glabrous, style very slender cleft, stigmas slender flexuous entire or 2-fid.

SIKKIM HIMALAYA, alt. 9-14,000 ft., *J. D. H.* BHOTAN, *Griffith (Kew Distrib.* 4498).

A small tree, becoming a shrub at high altitudes; shoots puberulous. *Leaves* 1-3 in., dull green above with impressed nerves. *Male catkins* 1 in.; fem. 4-6 in., erecto-patent, peduncle tomentose with 3-4 short leaves rounded at the base; bracts broadest at the tip, often notched or 2-fid. *Capsule* $\frac{1}{2}$ in., gradually narrowed into the style.

VAR. *crassijulis*, Anderss. in DC. l. c. 270; leaves smaller, catkins 1 in. dense-fld., bracts broader, style subentire, stigmas shorter.—Sikkim with the type.

14. **S. eriophylla**, Anderss. in *Journ. Linn. Soc.* iv. 48; DC. *Prodr.* xvi. ii. 270; a large bush, shoots tomentose, leaves coriaceous lanceolate acute or acuminate sinuate-crenate dull green above with impressed nerves, densely silvery silky or woolly beneath, catkins shortly peduncled dense-fld., stamens 2 free, bracts broadly obovate densely villous, capsules minute sessile subglobose ovoid obtuse woolly, style deeply cleft, stigmas suberect 2-fid. *S. psilostigma*, Anderss. in *Act. Holm.* 1850, 496. *S. viminalis*, var. stipularis, *Herb. Ind. Or. H. f. & T.*

KHASIA HILLS, alt. 4-5000 ft., J. D. H. & T. T.

A spreading shrub with suberect branches. *Leaves* 2-4 in., very shortly petioled, base usually rounded or subcordate; stipules subcordate. *Male catkins* 1 in., narrow; bracts very obtuse, villous; stamens hairy, anthers yellow; fem. $1\frac{1}{2}$ -2 in.; disk narrow. *Capsule* about $\frac{1}{2}$ in.; stigmas very short.—Andersson seems to have abandoned the name of *psilostigma*, which has priority in the Linn. Journ.; he describes the style as nearly hidden by the hairs of the capsule.

15. **S. eriostachya**, Wall. *Cat.* 3704; branches more or less glaucous, leaves elliptic-lanceolate acute entire sparsely pubescent or silky on both surfaces old glabrate or silky on the midrib, catkins on long leafy peduncles, stamens 2 free, bracts broadly obovate hairy, capsules sessile ovoid-conic pubescent at length glabrate, style 2-cleft, stigmas long filiform quite entire. Anderss. in *Act. Holm.* 1850, 493; *Journ. Linn. Soc.* iv. 46.

NEPAL, Wallich. ? BHOTAN, Griffith.

A large shrub or a tree, branches reddish or ashy, quite glabrous. *Leaves* 2-2½ in., acute at both ends, disk green with an ashy midrib above, pubescence short beneath and hardly glaucous. *Fem. catkins* 1½-2 in., curved, spreading, peduncle pubescent. *Capsules* ½-¾ in., angled, dark brown.—Andersson regards this as nearest to *S. Daltoniana*.

16. **S. longiflora**, Anderss. in *Journ. Linn. Soc.* iv. 50; DC. *Prodr.* xvi. ii. 271; shoots and petioles silky, branchlets glabrous divaricate, leaves elliptic or elliptic-lanceolate acute quite entire dull green above glabrous and glaucous when old not shining beneath, fem. catkins on leafy peduncles very slender lax-fld. pendulous, bracts obtuse brown glabrous or sparsely pubescent, capsules small sessile broadly ovoid acute quite glabrous, style very short slender 2-fid, stigmas erect 2-partite.

SIKKIM HIMALAYA; Lachen, alt. 9000 ft., J. D. H., Pantling.

A small tree, 10-30 ft.; bark of branches black. *Leaves* variable, smaller 1-2 larger 3-6 in.; petiole slender. *Fem. catkins* 2-5 in., ½ in. diam., nearly glabrous, flexuous; bracts $\frac{1}{2}$ in., membranous, shortly villous. *Capsules* ¾ in., base thickened; stigmatic lobes spreading.—Andersson compares the catkins with those of *S. elegans*, the leaves with those of *S. Daltoniana*. In the London Journal and De Candolle's Prodr. Andersson cites *longiflora* as a plant so named by Wallich in *Herb. Hook.*, but this is an oversight; on some of the specimens he has himself written "*S. longiflora*, Anderss." Neither species or name exists in Wallich's Herbarium, nor did Wallich ever see the plant.

†† *Small usually prostrate (S. Thomsoniana is suberect) shrubs, often*

half buried in the soil with ascending short branches. Leaves small, usually coriaceous and strongly nerved.

17. **S. Serpyllum**, Anderss. in *Journ. Linn. Soc.* iv. 55; *DC. Prodr.* xvi. ii. 292; leaves very small subdistichous obovate- or elliptic-lanceolate flat serrulate towards the tip pale or glaucous beneath, catkins terminating long leafy branchlets short subclavate dense-fl., stamens 2 free, bracts rounded cuneate black crisply hairy at length glabrous ciliate, capsules sessile turgid glabrous a little longer than the black oblong bracts, style long 2-cleft, stigmas yellow shortly 2-fl. *S. longipes*, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 10–14,000 ft., *J. D. H.*

Stem and branches stout, creeping and rooting; leafing branchlets slender, very short. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., lingulate, deep green above, narrowed into the petiole, subglaucous beneath. *Male catkins* $\frac{1}{2}$ –1 in., erect; fem. $1\frac{1}{2}$ in.; filaments brown, base woolly. *Capsules* $\frac{1}{2}$ in., turgidly conic, brown.—Represents *S. Myrsinites* of the European Alps.

VAR. pusilla, Anderss. in *DC. l. c.* 293; branchlets longer, leaves $1\frac{1}{2}$ in., margins subrevolute glaucous beneath, catkins $\frac{1}{4}$ in. on shorter peduncles.

18. **S. flabellaris**, Anderss. in *Act. Holm.* 497; in *Bot. Reise Pr. Wald.* 120, t. 90; *DC. Prodr.* xvi. ii. 295; branches prostrate very stout, leaves long-petioled obovate or broadly obovate acute or obtuse crenulate glabrous paler or glaucous beneath, catkins on leafy branchlets usually very short few-fl., stamens 2 free, bracts lingulate-obovate glabrous dark, capsules subsessile turgidly ovoid quite glabrous red, style not long, stigmas entire. *Brand. For. Fl.* 471. *S. lucida*, *Jacquem. mss.* *S. obovata*, *Wall. Cat.* 3698. *S. rotundifolia*, *Herb. Royle.*

WESTERN HIMALAYA; from Kumaon to Kashmir, alt. 11–15,000 ft., *Royle, &c.* SIKKIM; at Lachoong, *J. D. H.*

A procumbent shrub; branches angled, glabrous, reddish, subflabellately leafy. *Leaves* $\frac{3}{4}$ –1 in., bright green above, paler beneath with reticulate nerves, rounded spatulate or obovate; petiole $\frac{1}{4}$ in. *Male catkins* about 1 in., bracts subcrenulate; anthers yellow; fem. as long or longer, purplish; bracts half as long as the red capsules; rachis glabrous.—Distinguished from *S. Lindleyana* & *calyculata* by the larger glabrous leaves green on both surfaces. Andersson suggests this being a Himalayan form of the European *S. arctica*, from which it differs in broader crenulate leaves, longer catkins and brown capsules. Duthie sends specimens from Kumaon with red or yellow leaves 2 in., petiole $\frac{1}{4}$ – $\frac{3}{4}$ in. and fem. catkins 3 in. The smooth red capsules $\frac{1}{2}$ in. long are very characteristic of all the specimens.

19. **S. Lindleyana**, *Wall. Cat.* 3697; a prostrate creeping and rooting shrub, leaves petioled small oblong-lanceolate quite entire serrulate or crenulate glabrous glaucous beneath, catkins on short leafy branchlets ovoid few-fl., bracts oblong-obovate quite glabrous, capsules shortly pedicelled much longer than the bracts conic quite glabrous, style minute, stigmas stout. Anderss. in *Act. Holm.* 1850, 499; *Journ. Linn. Soc.* iv. 56; *DC. Prodr.* xvi. ii. 296; *Brand. For. Fl.* 471. *Salix*, No. 12 and 14, *Herb. Str. & Wint.*

ALPINE HIMALAYA; from Kumaon, alt. 11–14,000 ft., to Sikkim, ascending to 16,000 ft.

Branches often running along the ground. *Leaves* variable in breadth and serrulation. *Catkins* $\frac{1}{2}$ –1 in. *Capsules* $\frac{1}{2}$ – $\frac{3}{4}$ in., dark brown, valves narrower than *S. flabellaris*.—Andersson has two varieties, *latifolia*, with leaves $\frac{1}{2}$ – $\frac{3}{4}$ in., serrulate almost throughout, and *microphylla*, with narrower leaves $\frac{1}{2}$ – $\frac{3}{4}$ in., deeply channelled down the centre and with revolute margins. He likens the species in habit (only) to

S. fruticulosa, and in other respects to *S. retusa* of the Alps, which it represents in the Himalaya, differing in the narrower leaves, shorter catkins and reddish glaucous capsules. Andersson in the Prodrômus likens this to *S. fruticulosa*, probably alluding to his *S. fruticulosa* described in Journ. Linn. Soc., a species overlooked in the Prodrômus. (See end of the Genus.)

Forma major, *Anderss. in Herb. Wall.*, has leaves 1-1½ in. rounded obovate narrowed into a petiole ½ in., and capsules nearly ¼ in. long. *S. clavata*, *Wall. Cat.* 3698.—Kumaon, *Blinkworth*.—Omitted in all Andersson's works.

20. ***S. calyculata***, *Hook. f. Herb. Ind. Or.*; leaves petioled elliptic or broadly obovate tip subacute or rounded ciliate with silky hairs entire or crenulate towards the tip, young villous, old glaucous beneath, catkins on leafy branchlets subsessile short oblong, bracts oblong-obovate brown glabrous, capsules very shortly stipitate ovoid-conic glabrous, style thick not long, stigmas short erect. *Anderss. in Journ. Linn. Soc.* iv. 55; *DC. Prodr.* xvi. ii. 296.

SIKKIM HIMALAYA, alt. 14-15,000 ft., *J. D. H.*

A very small gnarled shrub, with ascending branchlets. Leaves about 1 in., dull green above, with the nerves impressed, dark when dried; petiole ¼ in. Male catkins ½ in., almost hidden amongst the leaves, broadly ovoid; fem. rounded. Capsule ½ in., pitchy brown; stipes longer than the glabrous disk-gland.—Andersson says that he retains this species on my authority, but that he regards it as doubtful, and intermediate between *flabellaris* and *Serpyllum*. My opinion is that if the two latter are kept as distinct species, so must *S. calyculata*, but that all are best united. The name, he observes, is derived from the stamens being almost connate in a tube. In Journ. Linn. Soc. he describes them as free except in a monster in which the filaments are united in a tube which is thickened and bifid above the divisions, ovate acute and subantheriferous within, concealed by the dilated disk-scale. My impression is that the long bracts of the catkin suggested the specific name.

21. ***S. oreophila***, *Hook. f. Herb. Ind. Or.*; leaves shortly petioled obovate or oblong-cuneate pale green glabrous tips deeply serrulate, catkins minute hidden amongst the leaves few-fl., bracts pale obovate glabrous, disk-scale very large, stamens 2 free, capsules subsessile conic glabrous thrice as long as the lingulate bracts, style very short, stigmas short entire. *Anderss. in Journ. Linn. Soc.* iv. 57; *DC. Prodr.* xvi. ii. 296.

SIKKIM HIMALAYA, alt. 15-16,000 ft., *J. D. H.*

A very dwarf shrub, flabellately branched; branches prostrate, curved. Leaves ½-¾ in., densely imbricate, rugulose above, quite glabrous except the slightly hairy base. Catkins very small, fem. ¼ in. with the flowers subumbellately spreading. Capsule ¼-½ in., rather obtuse brown shining.

VAR. *secta*, *Anderss. in DC. l. c.* 297; forming rounded tufts at very high elevations, leaves rosulate ⅓ in. lacinate, catkins 2-4-fl., capsules conic, stigmas minute. *S. secta*, *Hook. f. Herb. Ind. Or.*; *Anderss. in Journ. Linn. Soc.* iv. 57.—Sikkim, alt. 14,000 ft.—Andersson remarks that this is both the smallest and most alpine willow known to him. It is, perhaps, a form of *S. Lindleyana*.

22. ***S. Thomsoniana***, *Anderss. in Journ. Linn. Soc.* iv. 54; *DC. Prodr.* xvi. ii. 297; a dwarf shrub, branches stout ascending, leaves elliptic-lanceolate acuminate remotely serrulate hoary or silkily villous beneath with hirsute nerves, catkins on leafy branchlets elongate cylindric males slender lax-fl., fem. few-fl., bracts broadly obovate hirsute with white hairs, disk-scale very long black, stamens 2 free, capsule minute sessile globose woolly, style cleft to the base, segments divaricate, stigmas short subbifid. *S. vagans*, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 8-10,000 ft., *J. D. H.*; Lachoong, *Pantling*.

A prostrate shrub with branches about a foot high, or (according to Brandis) with a stout trunk, and prostrate and rooting rarely erect brown branches. *Leaves* 1 in., rather broadest above the middle, narrowed at both ends, dull green above, margin narrowly revolute, hoary beneath. *Male catkins* $1\frac{1}{2}$ – $2\frac{1}{2}$ in., flexuous; filaments free, much longer than the bracts, and anthers didymous, brownish; fem. shorter, more dense-fld.; bracts rounded, longer than half the white capsule.—This has no affinity with the preceding species.

SECT. III. SYNANDRÆ. *Stamens* 2, filaments more or less connate.

23. ***S. pycnostachya***, Anderss. in *Journ. Linn. Soc.* iv. 44; *DC. Prodr.* xvi. ii. 309; branches shining, leaves lanceolate subacute flat quite entire or serrulate glabrous young silky beneath, catkins stout males on leafy peduncles cylindric, bracts minute obtuse yellow tips brown ciliate, filaments connate, capsules sessile ovoid silky, style short tip thickened, stigmas short broad erect 2-fld. *Brandis For. Fl.* 470. *S. purpurea*, L.?, *Herb. Ind. Or. H. f. & T.*

WESTERN HIMALAYA in the drier regions, and WESTERN TIBET, alt. 12–15,000 ft., wild and cultivated.

A shrub, 6–7 ft., or a small tree attaining 16 ft., with a trunk 2 ft. girth and divaricate branches, flowering after the leaves; shoots silky; branches violet brown red or blackish. *Leaves* 2–3 in., midrib prominent; nerves many, oblique, inconspicuous; petiole $\frac{1}{12}$ – $\frac{1}{8}$ in., and midrib often with galls. *Catkins* nodding; bracts oblong; filaments united throughout; fem. 2 in. *Capsule* $\frac{1}{10}$ in., subacute, base gibbous.—Andersson compares this species with the European *S. rubra* and *S. daphnoides*.

Var. alpina, Hook. f.; Anderss. in *DC.* l. c.; smaller, branches slender yellowish, leaves pubescent on both surfaces, male catkins very short with brown rounded obovate bracts.

24. ***S. oxycarpa***, Anderss. in *Journ. Linn. Soc.* iv. 45; *DC. Prodr.* xvi. ii. 310; shrubby, branches hoary or glabrate, leaves lanceolate acute entire or subserrate old rigid glabrous shining glaucous beneath, stipules small $\frac{1}{2}$ -lanceolate, catkins (appearing before the leaves) sessile very long flexuous lax-fld., bracts yellow or brown, capsules large sessile elongate-conic acute silky, style very short, stigmas short subclavate. *Brandis For. Fl.* 471. *S. zygostemon*, Boiss. *Herb. Ind. Or. H. f. & T.*

WESTERN HIMALAYA; Kishtwar, alt. 6–11,000 ft., Thomson.

Brandis describes this as differing from *S. pycnostachya* only in the flowers appearing a little before the leaves, the larger more pubescent serrate leaves, black bracts of the male, and brown of the fem. catkins, and which latter attain 4 in. The filaments are united to the middle, and capsules $\frac{1}{2}$ in. long.—Andersson describes it as very close indeed to the N. Persian *S. zygostemon*, Boiss.; he makes 2 varieties, β . *serrata* (*serratifolia* in *Journ. Linn. Soc.* iv. 46) with sessile very lax catkins 4–5 in., leaves 3 in. exactly lanceolate acutely glandular-serrate, midrib and nerves yellowish elevated glaucous beneath, capsules rufescent glabrous, from Simla, 8000 ft., Thomson, and which I cannot distinguish from *S. daphnoides*; and γ . *breviuscula*, with narrow lanceolate remotely serrulate leaves glabrous on both surfaces opaquely glaucous beneath, shorter catkins, and silky at length glabrate capsules.

25. ***S. angustifolia***, Willd. *Sp. Pl.* iv. 699; branches slender glabrous, leaves very narrowly linear subsessile silky or glabrate, midrib prominent, margins revolute, catkins subsessile leafy at the base male very small, bracts oblong or linear obtuse glabrous yellow, filaments connate, capsules sessile silky narrowed into the short style, stigmas spreading cleft. Anderss. in *DC. Prodr.* xvi. ii. 315; *Brand. For. Fl.* 471; *Boiss. Fl. Orient.* iv. 1187; *Trautvett. Salicet.* 627, t. 3.

WESTERN TIBET; Nubra and Shayuk Valleys, alt. 11-12,000 ft., *Thomson*.—
DISTRIB. Soongaria, N. Persia and the Caucasus.

A shrub, 4-15 ft., flowering after leafing, branches strict, shoots silky. *Leaves* 1-3 by $\frac{1}{2}$ - $\frac{1}{4}$ in., subsessile, rigid, sometimes denticulate. *Catkins* suberect, male $\frac{1}{2}$ in., fem. $\frac{3}{4}$ -1 in.; filaments united throughout. *Capsules* $\frac{1}{2}$ in., longer than the bracts; stigmas red.—Andersson describes the capsules as sessile (which they are) in the diagnosis, but as distinctly stipitate in the remarks that follow it.

26. **S. divergens**, *Anderss. in DC. Prodr.* xvi. ii. 316; a small excessively branched shrub, leaves small oblong or obovate-oblong obtuse or acute glaucous green above quite entire beneath paler glabrous silky or glaucous, catkins on short leafy peduncles oblong-ovoid dense-fld., bracts rounded obovate villous with white hairs, filaments connate, capsules minute sessile ovoid-conic densely silky, style minute yellow, stigmas stout entire erect. *S. myricæfolia*, *Anderss. in Act. Holm.* 1850, 483; *Journ. Linn. Soc.* iv. 53.

NORTH-WESTERN HIMALAYA, in the interior ranges of Zanskar and Kishtwar alt. 12,000 ft., *Thomson*.

A shrub, about a foot high, with widely divaricate rather stout branches. *Leaves* shortly petioled, $\frac{1}{2}$ - $\frac{3}{4}$ in., tip often rounded and apiculate. *Male catkins* $\frac{1}{2}$ - $\frac{1}{2}$ in.; filaments united above the middle, fem. longer, bracts pale. *Disk-gland* pale, reaching the base of the capsule. *Capsules* $\frac{1}{2}$ in., twice as long as the bracts.—Andersson says of this that it is altogether analogous to the *S. cæsia*, Vill., of the Alps, nor except by the revolute margin of the leaf of the latter do I see how he distinguishes them specifically. *S. myricæfolia*, the earlier name of the author, is, I assume, abandoned by him as being quite inapplicable.

DOUBTFUL SPECIES.

S. UROPHYLLA, *Lindl. in Wall. Cat.* 3708; *Anderss. in Act. Holm.* 1850, 487; *Monogr.* 5; *DC. Prodr.* xvi. ii. 194. The specimens in Herb. Wall. are in ripe fruit only, and too incomplete to found a species upon, and further are from a plant no doubt cultivated at Oude; they resemble *S. acmophylla*, but are worthless for any identification. Andersson refers to it the Javan *S. Zollingeriana* of Miquel, which from the description is *tetrasperma*. There is in Herb. Hook. a specimen of apparently the same species from Delhi marked as cultivated.

S. CALOSTACHYA, *Anderss. in Act. Holm.* 1850, 489; *Journ. Linn. Soc.* iv. 42; *Monogr.* 5, from alt. 6000 ft. (Kahvata to Mahadeb, *Jacquemont*), described as with the habit of *S. alba*, but long-stipitate capsules, is probably *tetrasperma*.

S. MYRTILLACEA, *Anderss. in Journ. Linn. Soc.* iv. 51. The plant here described is from Sikkim (Lachen, alt. 12,000 ft.), in old fem. fruit only; it resembles *S. obscura*. Anderss., but the shoots and very short petioles are glabrous, leaves $\frac{3}{4}$ -1 in., elliptic, apiculate, brown on both surfaces. It is omitted in *DC. Prodr.*

S. SERICOCARPA, *Anderss. in Journ. Linn. Soc.* iv. 43 (omitted by Andersson in *DC. Prodr.*), is from Kashmir, *Thomson*, alt. 6000 ft., and described as similar to *S. alba*, but differing in the leaves, bracts and capsules. In Hook. Herb. Andersson has named it a var. of *alba*, from which it appears to me to differ in the densely silky carpels.

S. FRUTICULOSA, *Anderss. in Journ. Linn. Soc.* iv. 53 (not of *Kerner*) (omitted in *DC. Prodr.*), from Pindari (Kumaon), *Strachey & Winterbottom*, and Zanskar, alt. 15,000 ft., *Thomson*, is perhaps *S. Lindleyana*.

2. **POPULUS**, *Linn.*

CHARACTERS AS ABOVE (p. 626).—Species about 18, North temperate regions.

The Lombardy Poplar, a pyramidal form of the Black Italian (*P. nigra*, L., var. *pyramidalis*, Spach, *P. fastigiata*, Desf.), is cultivated here and there in the N.W. Himalaya, from Simla westward, and in Western Tibet up to 12,500 feet. Griffith considered it to be wild in Afghanistan. The common spreading form is wild in Western Asia and Central Europe. See Brand. For. Fl. 472, and Royle Ill. 344.

1. *P. ciliata*, Wall. Cat. 2796; leaf-buds viscidly resinous, branches angled, leaves ovate or ovate-cordate acuminate unequally toothed glabrous teeth gland-ciliate, base 3-nerved, stigmas 3-4 obcordate, capsules stipitate ovoid 3-4-valved. Brand. For. Fl. 475; Royle Ill. 346, t. 84^a; Wesm. in DC. Prodr. xvi. ii. 329. *P. pyriformis*, Royle l. c. 344; Gamble Man. Ind. Timb. 379. *P. rotundifolia*, Griff. Notul. i. 382; Itin. Notes 172, No. 881; Ic. Pl. Asiat. t. 546.

TEMPERATE HIMALAYA, alt. 4-10,000 ft., from Kashmir to Bhotan.

A tree, 60-70 ft., with a trunk attaining 10 in girth. Leaves 3-7 in., nerves 4-5 pairs above the basal; petiole 2-5 in., compressed vertically. Male catkins short, bracts $\frac{1}{2}$ in.; fem. 6-9 in., disk toothed embracing half the ovary. Capsule $\frac{1}{4}$ - $\frac{1}{2}$ in., stipes as long.

2. *P. balsamifera*, Linn. Sp. Pl. 1034; leaf-buds viscidly resinous, branches angled, leaves ovate acuminate obtusely toothed glabrous, base rounded or cordate, stigmas 2-3 2-lobed, capsules sessile 2-4-valved. Brand. For. Fl. 476; Gamble Man. Ind. Timb. 379; Wesm. in DC. Prodr. xvi. ii. 329. *P. suaveolens*, Loud. Encycl. 830. *P. laurifolia*, Ledeb. Fl. Altaic. 297; Icon. t. 479.

Inner ranges of the N.W. HIMALAYA; from Kunawur, alt. 8-13,000 ft., westwards, and in WESTERN TIBET, up to 14,000 ft., wild and planted.—DISTRIB. Central and N. Asia, N. America.

A tree, 60-70 ft., strongly balsamic; shoots glabrous or pubescent. Leaves 2-5 in., rather coriaceous, pale, sometimes brown beneath; petiole 2-5 in. Male catkins sessile, drooping, rachis winged; stamens 20-30, filaments slender; fem. peduncled, drooping; fruiting 5-6 in.; disk crenate. Capsule $\frac{1}{4}$ in.

3. *P. euphratica*, Oliv. Voy. iii. 449, t. 45, 46; leaf-buds pubescent, not viscid, branches terete, leaves polymorphous, stigmas 2-3 semilunar, capsule ovoid sessile 2-3-valved. Brand. For. Fl. 474, t. 63; Gamble Man. Ind. Timb. 378; Boiss. Fl. Orient. iv. 1194; Wesm. in DC. Prodr. xvi. ii. 326; Monogr. t. 10-13. *P. diversifolia*, Schrank. Enum. 1842, 15. *Balsamiflora deltoides*, Griff. Notul. iv. 382; Itin. Notes 211, No. 73; Ic. Pl. Asiat. t. 526.

Along the Indus Valley, in SCIND, the PANJAB, and WESTERN TIBET, where it ascends to 13,500 ft., and planted in the N.W. Provinces.—DISTRIB. Western and Central Asia, and westward to Syria and Egypt.

A tree, 40-50 ft., trunk attaining 8 ft. in girth. Leaves of young shoots 3-6 in. long and broad linear, or oblong entire and shortly petioled; of older parts 2-3 in., ovate, oblong, rhombic, or orbicular, more or less lobed or cut, base cuneate rounded or cordate, 3-5-nerved; petiole 1-2 in. Catkins lax-flid.; male fl., bracts oblanceolate, incised; disk orbicular, 8-cleft; stamens 8-12; fem. fl., disk tubular, 8-12-cleft, membranous, caducous. Capsule large, $\frac{1}{4}$ - $\frac{1}{2}$ in., turgidly lanceolate.—From Griffith's plate this is certainly his Afghan *Balsamiflora deltoides* (a "nom de plume" which he never would have published), but I am puzzled by his description of the buds as being gummy, and suspect he had *P. balsamifera* in his mind, a species he also collected in Afghanistan.

4. *P. alba*, Linn. Sp. Pl. 1034; leaf-buds shoots and leaves beneath white with cottony tomentum, leaves oblong-ovate or broadly ovate or

orbicular sinuately lobed or toothed, palmately on young shoots, base 5-nerved more or less cordate, stigmas 2, 2-partite, arms linear, capsule pedicelled 2-valved. *Brandis For. Fl.* 473; *Boiss. Fl. Orient.* iv. 1193; *Reichb. Ic. Fl. Germ.* t. 614.

N. W. HIMALAYA, alt. 4-10,000 ft., from Kunawur westwards, wild and cultivated, and in WESTERN TIBET.—DISTRIB. Western Siberia, Syria, Asia Minor, Europe, and N. Africa.

A lofty tree in Europe, in India not exceeding 40 ft. (Brandis). *Leaves* 2-4 in., dull green above; petiole 1-2 in., laterally compressed. *Catkins* hairy; male 2-4 in.; stamens 6-10; fem. shorter; bracts lanceolate, tips crenate, ciliate; disk shallow, entire. *Capsule* $\frac{1}{2}$ in., shortly pedicelled.

5. **P. microcarpa**, *Hook. f. & Thoms. Herb. Ind. Or.* 4495; leaf-buds and shoots glabrous, leaves long-petioled orbicular sinuate base 3-nerved rounded or subcordate, capsules minute subsessile.

BHUTAN; about Panga and towards Chupeh, alt. 7600 ft., *Griffith*.

Leaves 3-4 in. diam., when dry black above and grey beneath; nerves 4-5 pairs above the basal; petiole 1-2 $\frac{1}{2}$ in., very slender, laterally compressed. *Fruiting spikes* 3-5 in., very slender, rachis tomentose. *Capsules* $\frac{1}{2}$ in., broadly ovoid hoary, pedicel very short.

ORDER CXLII. CERATOPHYLLÆ.

Submerged monœcious slender fragile branched herbs. *Leaves* whorled, dichotomously cleft into filiform toothletted lobes; stipules 0. *Flowers* minute, axillary, sessile. MALE FL. solitary; perianth (or involucre) of 6-12 narrow subvalvate 2-fid segments; stamens 20-30, filaments very short; anthers erect, extrorse, connective at the top truncate or 2-toothed. FEM. FL. *Perianth* of the male. *Ovary* sessile, ovoid, 1-celled; style subulate, stigmatic on one side; ovule solitary, pendulous, orthotropous. *Fruit* a small coriaceous ovoid or ellipsoid somewhat compressed nut terminating in an elongate subulate style, and with a styliform spur projecting from above the base on either side. *Seed* exalbuminous; embryo straight, cotyledons thick, radicle very short inferior, plumule many-leaved.—Species one, very variable.

CERATOPHYLLUM, Linn.

CHARACTERS OF THE ORDER.

C. demersum, *Linn. Sp. Pl.* 992; *Gærtn. Fruct.* t. 44; *Boiss. Fl. Orient.* iv. 1202. *C. verticillatum*, *Roxb. Fl. Ind.* iii. 624; *Wight & Arn. Prodr.* 309.

Throughout INDIA and CEYLON, in tanks and still waters.—DISTRIB. All temp. and tropical countries.

Stem 8 in. to 3 ft., densely leafy, green. *Leaves* about 1 in. long, segments spreading in the water, collapsing in a tassel when removed, variable in thickness and amount of toothling. *Segments* of perianth (or involucre) subulate. *Fruit* very variable.—I have failed in establishing species amongst the dried specimens of the Indian forms of *Ceratophyllum*, but there are differences in those figured by Wight, that require to be verified by living specimens, and especially the simple and bifid segments of the perianth, and the truncate and bicuspidate connectives of the anthers. I find very great variety in the fruits upon which species have generally been founded, but in no Indian specimen have I seen the short lateral spines which are characteristic of the European species or variety *submersum*. The following are the principal Indian forms of fruit.

C. TUBERCULATUM, *Chamisso. in Linnæa* iv. 504, t. 5, f. 6 d; fruit ellipsoid
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nearly smooth or tubercled, sides rounded, lateral spines deflexed, anthers 2-cuspidate. *Wight & Arn. Prodr.* 309; *Wight Ic.* t. 1948, t. 3; *Miquel Fl. Ind. Bat.* i. i. 800. *C. indicum*, *Herb. Willd.* *C. demersum*, *Klein mss.*—Chamisso's *C. oxyacanthum*, f. 6 b, is the smooth-fruited state of this.

C. MURICATUM, *Cham. l. c.* f. 6 c; fruit ellipsoid or ovoid more compressed winged wing toothed, surface tubercled, lateral spines horizontal or deflexed, anther (in Wight's figure) truncate. *Wight Ic.* t. 1948, f. 1, 2.—In Wight's fig. 1 the leaf segments are entire, in f. 2 they are denticulate, and the perianth segments of the male fl. are entire. *C. platyacanthum*, *Cham. l. c.* f. 6 a, seems to be this.

C. MISSIONIS, *Wall. Cat.* 7007; fruit ellipsoid compressed tubercled narrowly winged and wings toothed, lateral spines decurved, connective bicuspidate. *Wight Ic.* t. 1948, f. 4.

CLASS. GYMNOSPERMÆ.

ORDER CXLIII. GNETACEÆ.

Trees or shrubs; branches jointed at the nodes. *Leaves* opposite, large and green or minute scale-like, exstipulate. *Flowers* in axillary or terminal spikes or cones, monœcious or diœcious. MALE FL. tubular or of 2-4 sepals. *Anthers* 2-8, subglobose, 1-3-celled, sessile or subsessile on the top of a column formed of the connate filaments. FEM. FL. *Ovule* erect with 2 or 3 coats of which one is produced into a styliform tube with a discoid mouth. *Seed* dry or drupaceous, albumen copious or scanty; embryo straight, cotyledons appressed, radicle long superior.—Genera 3, species about 40, temperate and tropical.

Shrubs, leafless or nearly so 1. EPHEDRA.
Trees or shrubs with large green leaves 2. GNETUM.

1. EPHEDRA, Linn.

Erect or subscandent rigid shrubs, branches opposite or fascicled, terete, striate, with opposite scales at the nodes which are rarely produced into linear leaves. *Flowers* in the axils of the decussately opposite bracts of solitary or fascicled cones; bracts dry or fleshy in fruit, lower empty, upper 1-fld. MALE FL.; perianth of 2 opposite compressed membranous sepals; anthers 2-10, sessile or stipitate on the top of a column formed by the connate filaments, cells 2 globose. FEM. FL., a naked ovule with the outer coat produced into a styliform tube. *Seeds* usually oblong, plano-convex, testa dry.—Species 8 or 10, Europe, Temp. Asia, S. America.

It is impossible to define the limits of the West Asiatic species of *Ephedra* without careful observations on the living plants; young and old specimens of the same species appear to differ very considerably, as do individuals from localities differing in altitude and humidity. Dr. Aitchison's and Griffith's copious suites of specimens from Afghanistan and Beluchistan are very puzzling, and the forms (of *vulgaris*?) from the dry region of Tibet are no less so. I have many specimens from N.W. India that I do not know whether to refer to *vulgaris* or *pachyclada*.

1. *E. vulgaris*, *Rich. Conif.* 26 (excl. figs. a, d, e, f); branches rather slender erect striate nearly smooth, bracts connate to the middle not margined eciliate, anthers 6-10 sessile or subsessile. *Parlat. in DC. Prodr.* xvi. ii. 355; *Brand. For. Fl.* 501. *E. distachya*, *Linn.*; *Boiss. Fl. Orient.* v. 713. *E. monostachya* & *distachya*, *Linn. Sp. Pl.* 1040; *Reichb. Ic. Fl. Germ.* t. 539. *E. Gerardiana*, *Wall. Cat.* 6048; *Royle Ill.* 348; *Parlat. in DC. l. c.* 359. *E. macrocephala*, *Bertolon. Miscell.* xxiii. 17, t. 3.

TEMPERATE and ALPINE HIMALAYA and WESTERN TIBET in the drier regions, alt. 7-12,000 ft.; 12-16,000 ft. in Sikkin.—DISTRIB. Europe, W. and Central Asia.

A low-growing rigid tufted shrub with usually a gnarled stem and erect green branches, 6 in.-4 ft. *Spikelets* $\frac{1}{4}$ - $\frac{1}{2}$ in., subsessile, often whorled; fruiting with often fleshy red succulent bracts, 1-2-seeded. *Seeds* biconvex or plano-convex.—I follow Brandis in referring *E. Gerardiana* to *vulgaris*. From its locality I suspect that Regel's *E. glauca* is the same as a common West Tibetan form.

2. ***E. pachyclada***, Boiss. *Fl. Orient.* v. 713; branches rather stout erect striate scaberulous, bracts connate to the middle margined ciliate, anthers about 6 sessile or subsessile.

WESTERN HIMALAYA in the drier regions, and WESTERN TIBET, from Garwhal westwards, ascending to 15,500 ft., Thomson, Edgeworth, Clarke, &c.—DISTRIB. Afghanistan, E. Persia. ♀

A rather tall shrub, described by Boissier from male plants alone; it is generally more robust than *E. vulgaris*, and more scabrid. Gilgit specimens collected by Clarke are very scabrid. I can find no good characters in the spikes and flowers except the more or less margined bracts.

3. ***E. peduncularis***, Boiss. *Fl. Orient.* v. 717; scandent, branches slender, leaves often developed filiform, male catkins sessile or peduncled 6-20 fld., anthers sessile, fem. bracts 4 pairs ciliate, lower pairs confluent patelliform uppermost shortly 2-fld. *E. Alti*, Brand. *For. Fl.* 501, t. 69. *E. alata* (? misprint for *Alti*), Edgew. in *Journ. Linn. Soc.* vi. 194.

The PANJAB, RAJPOOTANA and SCINDE; Balewala, Edgew.; the Salt and Margulla Ranges, Vicary, Fleming, &c.—DISTRIB. Afghanistan to Syria.

A tall sarmentose climber, covering rocks and bushes, often glaucous; branchlets often fasciated and filiform, sometimes scaberulous. *Male catkins* often on a peduncle 1-1½ in., rarely axillary and fasciated, fem. peduncles often recurved. *Fruit* with often fleshy red bracts that sometimes are so large and juicy as to resemble grapes and be eatable.—Boissier distinguishes *peduncularis* from *Alti* by the minute male catkins, and slender recurved peduncles of the female, but these characters I find to be valueless, and I quite believe that these, together with *E. foliata*, Boiss., and *ciliata*, Fisch. & Meyer, will prove to be one species.

2. GNETUM, Linn.

Climbing monœcious or diœcious evergreen shrubs or erect trees, branches jointed. *Leaves* opposite, quite entire, penninerved. *Flowers* whorled in the axils of the cup-shaped bracts of axillary or terminal solitary or paniced spikes, often surrounded with jointed hairs. *Male fl.*; perianth narrowly clavate, entire or valvately 2-fld.; anther-cells 2, slits terminal. *Fem. fl.* (some imperfect); ovule ovoid or globose, inner integument produced into a slender exerted tube with often a toothed or fimbriate mouth. *Seed* drupaceous.—Species about 15, Tropical Asia, Africa, America and Pacific.

The species of this genus want further investigation; they are evidently very variable in foliage and in the size and form of the seed. I cannot identify several of the species enumerated in Griffith's "Notulæ," and of which analyses are given in his "Leoues."

* *Ovary and seed sessile.*

1. ***G. Gnemon***, Linn. *Mant.* 125; an erect monœcious tree or shrub, leaves from elliptic-lanceolate to broadly oblong acuminate or cuspidate; spikes solitary or paniced, hairs round the ovary white, seed ovoid acute sessile. *Endl. Conif.* 250; *Parlat. in DC. Prodr.* xvi. ii. 349; *Roxb. Fl.*

Ind. iii. 518; *Kurz in Flora* iv. (1872) 350; *For. Fl.* ii. 497; *Blume in Arn. Sc. Nat. Ser.* 2, ii. 105; *Rumph.* iv. 3, t. 176; *Miq. Fl. Ind. Bat.* ii. 1067; *Brongn. in Duperr. Voy. Bot.* 6, t. 1; *Wall. Cat.* 8025, 8026. *G. Brunonianum*, *Griff. in Lindl. Veg. Kingd.* 233; *Trans. Linn. Soc.* xxii. 308, t. 55, f. 9-20, and t. 56, f. 27, 28, 41, 43, 44-47; *Notul.* 30; *Kurz in Flora* iv. (1872) 349. *G. Griffithii*, *Parlat. l. c.* 349, 352.

KHASIA and MUNNIPÖRE HILLS, and southward to SINGAPORE.—DISTRIB. Malay Islands.

Usually a shrub, rarely a small tree, 10-15 ft. *Leaves* membranous or coriaceous, 4-8 in., very variable in length breadth and the number and direction of the nerves, which are either strong or faint, often brightly polished above, yellow green or brown when dry, base acute; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Spikes* about 1 in., slender; cupular bracts at length distant. *Seed* $\frac{1}{2}$ in. long, orange-cold., shining.—A very slender form from Tenasserim, also named *G. Brunonianum* by Griffith, is noted by him as being scandent. A specimen of apparently the same is in Wallich's herbarium from Penang, under No. 8021 B; it has pedicelled young fruit. These possibly may be a different species, but the flowering spikes do not differ from those of *G. Gnemon*.

2. *G. ? neglectum*, *Blume Rumph.* iv. 6, t. 175, f. 2, and t. 184; *Mus. Bot.* i. 28; a dioecious climbing shrub, leaves rigidly coriaceous elliptic-oblong or -lanceolate obtusely cuspidately acuminate or apiculate, spikes solitary or paniced, hairs round the ovary rusty-red, seed sessile. *Parlat. in DC. Prodr.* xvi. ii. 350; *Kurz in Flora* iv. (1872) 350; *For. Fl.* ii. 496. *G. microcarpum*, *Blume Rumph. l. c.* t. 175, f. 1; *Mus. Bot. l. c.* 29. *G. apiculatum*, *Griff. in Trans. Linn. Soc.* xxii. 308, t. 55, f. 21, 24-26, and t. 56, f. 29-40; *Notul.* iv. 31.

ARRACAN and TENASSERIM, *Griffith, & c.* (*Kew Distrib.* 4972). PERAK, *Wray*. PENANG, *Wallich, Curtis*. MALACCA, *Griffith*.

An evergreen climber. *Leaves* 3-4 in., very variable, usually very glossy above, base rounded obtuse or acute, margins sometimes recurved; nerves very faint; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Spikes* short, fem. flowering $\frac{1}{2}$ - $\frac{3}{4}$ in.; young fruiting 2 in.; young seeds very acuminate.—I am doubtful as to this being *Blume's G. neglectum*, which he figures with acutely acuminate leaves (and describes as "rarissime obtusiuscula") and fruiting spikes 6 in. long. *Griffith* (*Linn. Soc. Trans.* l. c.) gives "Silhet, Roxburgh," as a locality, but I have seen no specimens from so far north.

3. *G. macrostachyum*, *Hook. f.*; scandent, dioecious, leaves large oblong or oblong-lanceolate very coriaceous base acute rounded or cordate, fem. spikes as thick as the finger hairs round the ovules brown.

SINGAPORE, *Hullett*. ? PENANG, *Curtis*. MALACCA, ? Mt. Ophir, *Mainjay*. * *Leaves*; in Singapore specimens a lower pair are 8 by 4 in., cuspidate, with a cordate base; the upper are smaller, 7 by 2 $\frac{1}{2}$ in., acuminate, base acute, very coriaceous, shining on both surfaces and reticulate. *Young male spikes* 2 $\frac{1}{2}$ in. by $\frac{1}{2}$ in. diam.; fem. 4 in. long by $\frac{3}{4}$ in. diam.; cupular bracts short, close together, separated only by the profuse hairs. *Ovules* acuminate, quite glabrous. The Penang specimens are in ripe seed, have less coriaceous leaves narrowed into the petiole, and the very old solitary fem. rachis sessile with close articulations, and a sessile broadly ellipsoid seed $\frac{3}{4}$ in. long, with rounded base and top. The Mt. Ophir specimens are in young male fl. only. Possibly the Mt. Ophir and the Penang plant may not be the same as the Singapore one, of which the great fem. spikes are most remarkable. A drawing apparently of this species (in *Herb. Kew*) has oblong-lanceolate or oblan- ceolate acuminate leaves, short very stout fruiting spikes 8 in. long, and elliptic-oblong green sessile seeds 1 $\frac{1}{2}$ in. long, with both ends rounded; it is in a collection of drawings of Singapore plants (by Parry).

** *Seed stipitate*.

4. *G. scandens*, *Roxb. Fl. Ind.* iii. 518; a lofty dioecious climber,

leaves oblong or ovate obtusely cuspidate, spikes in stiff brachiate panicles. hairs round the ovary rusty (when dry), seed gradually stoutly stipitate young often silvery scaly. *Parlat. in DC. Prodr.* xvi. ii. 351; *Griff. in Trans. Linn. Soc.* xxii. 309, t. 55, f. 1-8, 22, 23, and t. 56, f. 39, 40, 42; *Notul.* iv. 29; *Brand. For. Fl.* 502; *Grah. Cat. Bomb. Pl.* 188; *Dalz. & Gibs. Bomb. Fl.* 246. *G. edule*, *Blume Nov. Pl. Fam.* 31; *Rumph.* iv. 6; *Kurz in Flora* iv. (1872) 350; *For. Fl.* ii. 495; *Miq. Fl. Ind. Bat.* ii. 1068. *G. gneumonoides* and *G. Ula*, *Brongn. in Duperr. Voy. Bot.* 12. *G. funiculare*, *Wight Ic.* t. 1955 (not of *Blume*). *G. pyrifolium*, *Miquel in Herb. Hohenack.* No. 489. *G. latifolium*, *Parlat. l.c.* 350 (not of *Blume*). *Thoa edulis*, *Willd. Sp. Pl.* iv. 477.—*Gnetum*, *Wall. Cat.* 8023 and 8024.—*Rheede Hort. Mal.* vii. t. 22.

EASTERN TROPICAL HIMALAYA, from Sikkim eastwards, and from ASSAM to SINGAPORE and the ANDAMAN ISLANDS. The DECCAN; on the Ghats from the Concan to the Nilghiris.—DISTRIB. Malay Islands.

Trunk compressed, 4-5 ft. girth. *Leaves* 5-7 in., usually black when dry, smooth and shining, reticulations lax; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Male bracts* closely imbricate, fem. interrupted. *Fruiting spikes* 3-10 in. *Seed* oblong, 1-1 $\frac{1}{4}$ in. long, terete, orange-cold., top rounded, narrowed into a very stout stipes about $\frac{1}{4}$ in. long, but often much shorter.—*Kurz* describes the ovarian hairs as rusty, *Griffith* as white. Neither *Blume* nor *Roxburgh* describes the silvery scales on the ovule and young seed, which *Kurz* relies on for distinguishing this from *G. funiculare*. In many specimens I find no trace of them. The Deccan specimens have stouter male spikes than the Eastern.

Var. ? *apoda*; seed small $\frac{3}{4}$ in. sessile.—Sikkim Himalaya in the Terai.—Perhaps a distinct species, but the specimens are very imperfect.

5. ***G. funiculare***, *Blume Nov. Pl. Fam.* 32; *Ann. Sc. Nat. Ser.* 2. v. 2, 106; *Rumph.* iv. 7; a lofty diœcious climber, leaves oblong ovate or lanceolate cuspidate or apiculate shining finely reticulate beneath, spikes in stiff brachiate panicles, hairs round ovary rusty, seed quite glabrous suddenly stipitate, stipes slender. *Endl. Conif.* 252; *Parlat. in DC. Prodr.* xvi. ii. 351; *Kurz in Flora* iv. (1872) 350; *For. Fl.* ii. 496; *Miq. Fl. Ind. Bat.* ii. 1068; *Brongn. in Duperr. Voy. Bot.* 12. *Abatua indica*, *Lour. Fl. Coch.* 630.—*Gnetum*, *Wall. Cat.* 8024 C.

ASSAM, *Lister*; PEGU and BURMA, *Wallich*, *Kurz*.

Stem as thick as the arm (*Kurz*). *Leaves* 5-7 in., very variable in form and breadth, very shining brown or black when dry; base acute or obtuse; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Male bracts* hardly imbricate, fem. spikes twice as long as in *G. scandens*, bracts interrupted. *Seeds* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, oblong, apiculate, stipes $\frac{1}{4}$ - $\frac{1}{2}$ in.

6. ***G. macropodum***, *Kurz in Trimen Journ. Bot.* xiii. (1875) 331; a lofty climber, leaves broadly oblong or elliptic, fem. spikes rameal paniced, involucre cupular very short, hairs round ovule short ashy yellow, seed smooth obtuse apiculate, stipes $\frac{3}{4}$ -1 $\frac{1}{2}$ in. long slender.

NICOBAR ISLANDS; at Kamorta, *Kurz*.

Leaves 6-7 by 3 $\frac{1}{2}$ -4 in., base subacute, thinly coriaceous, conspicuously but laxly reticulate.—I have seen only fragmentary specimens. *Kurz* says it is very near *G. scandens*, differing in the less coriaceous leaves and very long stipes of the seed.

ORDER CXLIV. CONIFERÆ.

Trees or shrubs, wood-cells studded with disks. *Leaves* usually alternate, rigid, linear or subulate, rarely broad, solitary or fascicled in mem-

branous sheaths. *Flowers* monœcious or dioecious; males in deciduous catkins, females solitary or in cones. *Perianth* 0. *Male fl.* of many 1- or more-celled anthers, seated on the scales of the catkin, sessile or filaments connate. *Fem. fl.* of one or more sessile naked orthotropous or anatropous ovules, seated on a scale (an open carpellary leaf), which is free, or adnate to the scale (bract) of a cone. *Seeds* often winged, testa thick or thin, albumen densely fleshy; embryo axile, straight, cotyledons 2 or more, radicle terete often attached to a crumpled thread (suspensor).—DISTRIB. Genera 33, species about 300, chiefly in cold regions, very rare in Trop. Africa and America; absent in the Western Peninsula and Plains of India and in Ceylon.

Thuja orientalis, L. (Wall. Cat. 6047) is commonly cultivated in India.

It is unnecessary in this Order to cite under each species all the (chiefly) horticultural works in which the Indian Conifers are enumerated or described, and which add nothing to what is known of them beyond what the cited authorities give.

A. Ovules erect.

Tribe I. **Cupressinæ**. *Scales* of the fem. cone opposite, in several series. *Ovules* usually 2 or more on each scale. *Leaves* very short or subulate.

Scales of cone woody; testa winged 1. CUPRESSUS.

Scales of cone cohering into a globose berry-like fruit, enclosing the seeds; testa hard, not winged 2. JUNIPERTS.

Tribe II. **Taxodiæ**. *Scales* of fem. cone spirally crowded. *Ovules* 2 or more on each scale. *Leaves* scattered or distichous.

Leaves linear, distichous; seed large, drupe-like 3. CEPHALOTAXUS.

Tribe III. **Taxæ**. *Scales* of fem. cone or spike few, imbricate, all or the upper only ovuliferous. *Ovule* solitary on each scale, erect. *Leaves* scattered or bifarious.

Fem. cone minute, 1-fl.; seed seated in a symmetric fleshy cup; anthers connate in a whorl 4. TAXUS.

Fem. spike 1-6-fl.; seed seated in a very oblique fleshy peduncle; anthers free 5. DACRYDIUM.

B. Ovules reversed.

Tribe IV. **Podocarpeæ**. *Scales* of fem. cone very few, spirally crowded, often fleshy. *Ovule* 1 under each scale.

Seed on a fleshy stipes 6. PODOCARPUS.

Tribe V. **Araucariæ**. *Scales* of fem. cone many, spirally arranged in several series, bract and ovuliferous scale confluent as one scale.

Anther-cells 5 or more; ovules 1, rarely 2; seeds winged . . . 7. AGATHIS.

Tribe VI. **Abietinæ**. *Scales* of fem. cone many, spirally arranged in several series; scale distinct from the bract beneath it.

Leaves persistent, in bundles of 2, 3, or 5, narrowly linear; scales of cone persistent 8. PINUS.

Leaves persistent, in bundles of many, acicular; scales of erect cone deciduous 9. CEDRUS.

Leaves scattered, not distichous, usually subulate, jointed on the branches; scales of reflexed cones persistent . . . 10. PICEA.

- Leaves distichous, flat; scales of small reflexed cone persistent 11. *TSUGA*.
 Leaves more or less distichous, linear; scales of large erect
 cone deciduous 12. *ABIES*.
 Leaves deciduous in bundles of many, acicular; scales of erect
 cones persistent 13. *LARIX*.

1. *CUPRESSUS*, Linn.

Evergreen, monœcious trees or shrubs. *Leaves* opposite, small and scale-like, very rarely subulate, densely appressedly imbricate and decurrent. *Male fl.* a subsessile terminal column of decussately opposite 2-6-celled peltate anthers. *Fem. fl.* a globose or shortly oblong cone of 3-6 series of opposite peltate at length woody scales, with 4-6 erect ovules at the base of the 2nd and 3rd series. *Seeds* small, winged; testa coriaceous or hardened; cotyledons 2-4.—Species about 12, S.E. Europe, Temp. Asia and America.

C. glauca, Lamk. *Encycl.* ii. 243 (*DC. Prodr.* xvi. ii. 470; *Brand. For. Fl.* 534; *Dalz. & Gibs. Bomb. Fl. Suppl.* 83. *C. lusitanica*, Mill. *Gard. Dict.*; *Willd. Sp. Pl.* iv. 511), commonly known as the Goa Cypress, is extensively cultivated in the Western Ghats, and thence introduced into Portugal. It is doubtful whether it is referable to *C. torulosa* or *C. sempervirens*.—The Yunnan *Libocedrus macrolepis*, Benth. (*Gen. Pl.* iii. 426) (*Calocedrus macrolepis*, Kurz in *Trimen Journ. Bot.* (1873) 196, t. 133), with elongate cylindric cones and flattened branches, may be expected to be found in the mountains of N.W. Burma.

1. *C. torulosa*, Don *Prodr.* 55; crown broadly pyramidal, branches spreading tips pendulous, leaves triangular-ovate obtuse, cones sessile erect $\frac{1}{2}$ in. diam. bluish, scales rugose, seeds narrowly winged. *Endl. Conif.* 58; *Parlat. in DC. Prodr.* xvi. ii. 469; *Wall. Cat.* 6046; *Brand. For. Fl.* 533; *Gamble Man. Ind. Timb.* 410; *Griff. Itin. Notes* 240; *Ic. Pl. Asiat.* t. 372.

WESTERN HIMALAYA; from Nepal to Chamba, alt. 5500-8000 ft., on dry slopes.

A tree, attaining 150 ft., and girth of trunk 17 ft.; branches with the leaves on terete or obscurely 4-angled. *Leaves* $\frac{1}{20}$ in. long, with an oblong gland on either side of the midrib. *Anthers* 3-4. *Scales of cone* 8-10, umbonate, 4-6-ovuled. *Seeds* nearly orbicular, nucleus convex on both sides, not angled.—Though described as with spreading branches in a wild state, all the specimens cultivated at Kew are fastigiata.

C. SEMPERVIRENS, Linn. *Sp. Pl.* 1002; crown (in India-grown specimens) narrowly cylindrical, branches and their tips erect, leaves ovate-oblong, cones scattered peduncled 1 in. diam. globose or oblong, scales tubercled, seeds angled and narrowly winged. *Gertn. Fruct.* ii. t. 91; *Richard Conif.* t. 9; *Brand. For. Fl.* 533; *Gamble Man. Ind. Timb.* 411; *Boiss. Fl. Orient.* v. 705. *C. Roylei*, Carr. *ms.* *C. sempervirens*, var. *indica*, *Parlat. in DC. Prodr.* xvi. ii. 468. *C. pyramidalis*, Targ. *Obs. Dec.* iii. v. 53. *C. fastigiata*, *DC. Fl. Franc.* v. 336. *C. horizontalis*, Mill. & *fastigiata*, *DC.* *Endl. Conif.* 56, 57. *C. Whitleyana*, Carr. *Conif.* 128; *Gord. Pinet.* 72, *Suppl.* 27. *C. Doniana*, Hort.

NORTH-WEST INDIA; planted only.—DISTRIB. The horizontally branched var. is wild in N. Persia, Syria and Asia Minor; the fastigiata is only known in cultivation.

A tall tree, attaining 100 ft., and 9 ft. girth of trunk; branches with the leaves 4-angled. *Leaves* ovate-oblong, convex with a gland on either side. *Anthers* about 4

Scales of cone 3-14, usually with a short horn or boss. *Seeds* ovoid or oblong, nucleus angle d.—Parlatore separates the Indian form as a variety with globose cones, and umbonate scales mucronate at the tip.

C. FUNEBRIS, *Endl. Conif.* 58; crown very broadly pyramidal, branches horizontal branchlets pendulous distichous compressed, leaves ovate acute, cones small $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., scales rugulose, seeds angled and broadly winged. *Parlat. in DC. Prodr.* xvi. ii. 471; *Brand. For. Fl.* 534; *Gamble Man. Ind. Timb.* 410; *Flore des Serres* vi. 90 with fig. *C. pendula*, *Staunton, Embass. to China* ii. 525, t. 41; *Griff. Itin. Notes* 131, 143, No. 679 a; *Lamb. Pin. Ed.* 2, 124, t. 66.

Planted near Buddhist temples in NEPAL, SIKKIM and BHOTAN, alt. 4-8000 ft.—DISTRIB. Wild in China.

A very handsome tree, attaining 60 ft., remarkable for its wide-spreading branches, and pendulous distichous branchlets.—*C. pendula* is the first name given to this species, but it was preoccupied for *Thuja pendula*, Lamb., the *Biota pendula*, Endl., which genera are now reduced to *Cupressus*.

2. JUNIPERUS, Linn.

Characters of *Cupressus*, but leaves more often subulate and 3-nately whorled, scales of cone fleshy and coherent or connate in fruit, and seeds with a thick hard testa and often connate into a hard several-celled mass.—Species about 25; temperate and cold regions of the N. Hemisphere.

1. *J. communis*, *Linn. Sp. Pl.* 1040; shrubby erect or decumbent. leaves $\frac{1}{4}$ – $\frac{3}{8}$ in. all oblong-lanceolate or subulate pungent base narrowed flat or concave above convex or keeled beneath, fruit subglobose about 3-seeded. *Endl. Conif.* 15; *Parlat. in DC. Prodr.* xvi. ii. 479; *Wall. Cat.* 6044; *Brand. For. Fl.* 535; *Gamble Man. Ind. Timb.* 411; *Boiss. Fl. Orient.* v. 707; *Richard. Conif.* 33, t. 5; *Reichb. Ic. Fl. Germ.* t. 535. *J. nana*, *Willd. Sp. Pl.* iv. 854.

WESTERN HIMALAYA, from Kumaon westward, alt. 5500 to 14,000 ft.—DISTRIB. Temperate and Subarctic Europe, Asia, N. Africa, and N. America.

A bush in the Himalaya, rarely 6-7 ft., prostrate at high elevations with broader leaves; foliage grey green. *Leaves* crowded. *Fruit* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., blue black, glaucous, with scarious empty scales at the base.—The common Juniper.

2. *J. pseudo-sabina*, *Fisch. & Mey. Ind. Sem. Hort. Petrop. Animad.* 65; a robust shrub or tree, leaves dimorphous, those on the lower branches linear pungent, those on the terminal branchlets 4-farious closely imbricate appressed. fruit erect ovoid $\frac{1}{4}$ – $\frac{3}{8}$ in., endocarp very thick bony 1-seeded, seed slender. *Endl. Conif.* 21; *Parlat. in DC. Prodr.* xvi. ii. 482; *Ledeb. Fl. Ross.* iii. 652. *J. excelsa*, *Wall. Cat.* 6041 (not of Bieb.). *J. Wallichiana*, *Hook. f. & Thoms. Herb. Kew*; *Brand. For. Fl.* 537; *Gamble Man. Ind. Timb.* 412. *J. sabina*? *Herb. Ind. Or. H. f. & T. J. indica*, *Bertoloni Miscell.* xxiii. 16, t. 1.

TEMPERATE HIMALAYA, from Kashmir to Bhotan, and WESTERN TIBET, alt. 9-15,000 ft.—DISTRIB. Siberia, Soongaria.

A bush in the N.W. Himalaya; a tree, 60 ft., in Sikkim, with stout trunk and black thick ramification and foliage. *Largest leaves* $\frac{1}{2}$ in., rather spreading, the smaller $\frac{1}{10}$ in., rhombic ovate, closely-imbricate, tips free, back obtusely keeled.

Fruit black or blue shining, not glaucous.—Brandis points out that this differs from the description of the Siberian plant in the fruit not being recurved. Bertoloni's figure of *J. indica* is a very poor one, but I think it is of this species. I have seen no specimens of the Siberian and Soongarian plants.

3. ***J. recurva***, *Ham. in Don Prodr.* 55; a glaucous blue prostrate or erect bush or small tree with fastigiate branches, which are decurved and ascending with pendulous branchlets in large plants, leaves subulate imbricate & appressed, back convex, fruit $\frac{1}{3}$ – $\frac{1}{2}$ in. ovoid. *Endl. Conif.* 18; *Parlat. in DC. Prodr.* xvi. ii. 481; *Griff. Notul.* iv. 26; *Ice. Plant. Asiatic.* t. 373, 374; *Wall. Cat.* 6042; *Brand. For. Fl.* 536; *Gamble Man. Ind. Timb.* 412; *Boiss. Fl. Orient.* v. 708. *J. squamosa*, *Ham. in Wall. Cat.* 6043.

TEMPERATE and ALPINE HIMALAYA, alt. 7500–15,000 ft.—DISTRIB. Afghanistan.

As a tree attains 30 ft., with a straight trunk, conical crown and pendulous branchlets; at higher elevations it becomes stunted, and in alpine or exposed situations passes into

VAR. *squamata*, *Parlat. in DC.* l. c. 482; a decumbent or prostrate bush, leaves broader often incurved. *J. squamata*, *Ham. in Lamb. Pin. Ed.* i. ii. 17; *Don Prodr.* 55; *Endl. Conif.* 18. *J. densa*, *Gord. Pinet. Suppl.* 32. *J. Lambertiana* & *rigida*, *Wall. mss.* *J. religiosa*, *Royle Ill.* 350 (*name only*).

4. ***J. macropoda***, *Boiss. Fl. Orient.* v. 709; a small tree, branchlets subdistichous slender, leaves dimorphic, of the lower branches subulate pungent, of the upper and branchlets scale-like imbricate closely appressed ovate acute with a dorsal large gland, male catkins on a scaly peduncle, fruit subglobose $\frac{1}{4}$ in. diam. black glaucous 2–5-seeded, tips of the scales forming transverse crests. *J. excelsa*, *Brand. For. Fl.* 538, t. 68, and *Wall. Cat.* 6041 (not of Bieb.); *Gamble Man. Ind. Timb.* 412. *J. gossainthaneana*, *Loddig. Cat.* 1836, 48; *Loud. Encycl.* 1090.

Inner drier ranges of the HIMALAYA, from Nepal westward, and WESTERN TIBET, alt. 5–14,000 ft.—DISTRIB. Afghanistan, Beluchistan, Persia, Arabia.

A tree, attaining 50 ft., with girth of trunk over 33 ft.; branchlets like those of *Cupressus torulosa*, trunk generally gnarled; foliage light green.—The above notes are from Brandis. Boissier distinguishes this from *J. excelsa* by the scaly peduncles of the male catkins, and the crest-like tips of the scales of the fruit, and the fewer seeds. I doubt its proving distinct from *J. excelsa*, Bieb.

3. **CEPHALOTAXUS**, *Sieb. & Zucc.*

Evergreen yew-like diœcious shrubs or trees. *Leaves* alternate, distichous, linear, flat, often falcate. *Male fl.* in axillary globose heads of 1-fl. scales; anthers few, subsessile, cells 2–4 deflexed; connective with an incurved claw. *Fem. cone* terminal, small, ovoid, sessile or peduncled, surrounded with imbricating bracts; ovuliferous scale adnate to the bract, 2-ovuled; ovules erect. *Seed* large, drupe-like, ellipsoid or globose; testa fleshy without, hard within; albumen hard, fleshy; cotyledons 2.—Species about 6, Eastern Asia, China and Japan.

1. ***C. Mannii***, *Hook. f. Ic. Pl.* t. 1523; leaves linear acuminate subfalcate green beneath.

KHASIA MTS.; in the Lankhla Woods, alt. 5000 ft., *G. Mann, Clarke.*

A small tree. *Leaves* 2 by $\frac{1}{4}$ – $\frac{1}{2}$ in., shining above, paler beneath, base acute or obtuse, margins recurved when dry; midrib stout on both surfaces. *Male heads*

globose, peduncle scaly; anthers about 12, mucronate. *Fem. cones* 3–4, on a common peduncle, pedicelled; bracts adnate, ovate, obtuse. *Seed* $1\frac{1}{2}$ in. long, obovoid-oblong, mucronate, narrowed at the base.

2. **C. Griffithii**, *Hook. f.*; leaves linear acuminate falcate white beneath, base rounded.

UPPER ASSAM; Mishmi Hills, alt. 6060 ft., *Griffith* (*Kew Distrib.* 5000). MUNNIPOR, *Watt*.

Very similar in a dried state to *C. Mannii*, but the leaves are white beneath.—I have seen no fruit. The plant has long been cultivated at Kew, having been sent from the Calcutta Botanical Garden by Dr. Thomson.

4. **TAXUS**, *Tournef.*

Evergreen diœcious (rarely monœcious) trees or shrubs with very tough wood. *Leaves* bifarious, linear, obtuse acute or acuminate, 1-nerved. *Male fl.* a pedicelled whorl of 3–8 anther-cells on a peltate scale. *Fem. fl.* a single erect orthotropous ovule, terminating a short peduncle clothed with imbricating scales, and seated on a thick scale that enlarges as a fleshy red cup. *Seed* ovoid, subcompressed, testa hard; cotyledons 2, radicle superior.—Species one, variable; or several differing only in foliage, all N. temperate.

T. baccata, *Linn. Sp. Pl.* 1040; leaves more or less falcate acute or acuminate, paler beneath. *Endl. Conif.* 242; *Parlat. in DC. Prodr.* xvi. ii. 500; *Wall. Cat.* 6055; *Brand. For. Fl.* 539; *Gamble Man. Ind. Timb.* 413; *Boiss. Fl. Orient.* v. 711. *T. nucifera*, *Wall. Tent. Fl. Nep.* 44, t. 57 (*excl. syn.*); *Cat.* 6054 (not of Kämpfer). *T. virgata*, *Wall. mss.* *T. Wallichiana*, *Zucc. in Abhandl. Bayr. Akad. Classe Math. Phys.* iii. 803, t. 5; *Endl. l. c.* 244. *T. orientalis*, *Bertoloni Misc.* xxiii. 17, t. 2. *T. nepalensis*, *Jacquem. mss.* *T. contorta*, *Griff. Itin. Notes* 351, No. 536; *Notul.* iv. 128; *l.c. Pl. Asiat.* t. 376.

TEMPERATE HIMALAYA, alt. 6–11,000 ft. KHASIA HILLS, alt. 5000 ft. UPPER BURMA.—DISTRIB. N. and Temperate E. Asia, all Europe, N. Africa, N. America.

A tree, in the Himalaya attaining 100 ft., and 20 in girth of trunk; branches spreading; bark thin, flaking. *Leaves* $\frac{3}{4}$ – $1\frac{1}{2}$ in., dark green, coriaceous. *Fruit* $\frac{1}{2}$ in. long, ovoid; cup mucilaginous, sometimes concealing the olive-green seed.—Bertoloni's *T. orientalis* is a narrow long-leaved form from Sikkim, collected by myself.

5. **DACRYDIUM**, *Soland.*

Evergreen diœcious trees or shrubs. *Leaves* either scale-like and 4-fariously imbricate, or distichous scattered and subulate, both forms sometimes on the same branch. *Male fl.* small, sessile, at the tips of the branches; anthers spirally crowded on a short stipes; cells 2, globose, deflexed, connective with an apical claw. *Fem. fl.* in small lax spike-like cone; ovuliferous scale free, concave or cup-shaped, at length exceeding the bract; ovule 1, erect or oblique. *Seed* small, ovoid, erect, longer than the cup-shaped enlarged ovuliferous scale; testa hard, striate; albumen not ruminate.—Species about 12, Malayan, Australasian and Pacific.

D. elatum, *Wall. Cat.* 6045; leaves of two forms, some on the

barren branchlets acicular 4-angled subpungent, those on the fruiting branchlets small closely imbricate ovate-oblong obtuse or mucronate, male spikes cylindric. *Endl. Conf.* 226; *Parlat. in DC. Prodr.* xvi. ii. 494; *Kurz For. Fl.* ii. 499; *Hook. Lond. Journ. Bot.* ii. (1843) 144, t. 2; *Blume Rumph.* iii. 221, t. 172; *Miquel Fl. Ind. Bat.* ii. 1075. *Juniperus elata*, *Roxb. Fl. Ind.* iii. 838. *J. Phillippsiana* & *rigida*, *Wall. mss.*

TENASSERIM ? *Kurz.* PENANG, *Wallich.* MALACCA; on Mount Ophir, *Griffith, Lobb.* SINGAPORE, *Schomburgk.*—DISTRIB. Sumatra, Borneo, Cambodia.

A lofty pyramidal tree with spreading branches and weeping branchlets. Barren branchlets in brush-like clusters, $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., densely clothed with erect subulate or acicular shining subulate or acicular deeply-grooved shiny leaves, $\frac{1}{3}$ – $\frac{2}{3}$ in. long; fertile branchlets very slender, terete, clothed with minute imbricating triangular-ovate obtuse leaves $\frac{3}{10}$ in. long; branchlets with leaves of all sizes and forms between these extremes occur. *Seeds* scattered on the sides of the fertile branchlets, $\frac{1}{2}$ in. long, ovoid, obliquely seated on the shallow cup-like scale.

6. **PODOCARPUS**, *L'Herit.*

Evergreen, monœcious or diœcious trees or shrubs. *Leaves* opposite or alternate, scattered and linear or distichous, or broad and oblong with a midrib or with parallel nerves, or of two forms on the same branch some scale-like and imbricate, others distichous linear or subulate. *Male fl.* solitary, fascicled or spicate, with imbricate bracts; anthers sessile, spirally crowded; cells 2 parallel, slits extrorse or lateral; connective with an apical claw or appendage. *Fem. fl.* solitary or few and spicate; bract forming a peduncle to the also fleshy ovuliferous scale; ovule adnate to the scale, reflexed. *Seed* small, globose or ovoid, seated on an enlarged fleshy peduncle (scale and bract); testa hard, often fleshy without; albumen fleshy; cotyledons 2.—Species about 40, tropical and S. temperate.

The *P. chinensis*, *Wall. Cat.* 6057, from the Calcutta Garden, is referred by Maximovicz (*Diagn.* viii. 562) to a variety (*P. chinensis*) of the *P. macrophylla*, *Don.*

1. ***P. latifolia***, *Wall. Pl. As. Rar.* i. 26, t. 30; *Cat.* 6050; leaves opposite and subopposite oblong to lanceolate acute or acuminate ecostate many-nerved. *Endl. Conf.* 208; *Parlat. in DC. Prodr.* xvi. ii. 508; *Gamble Man. Ind. Timb.* 414; *Bedd. Sylv. Madr.* t. 257; *Hook. Lond. Journ. Bot.* i. (185) 658, t. 23; *Miq. Fl. Ind. Bat.* ii. 1071. *P. agathifolia*, *Blume Rumph.* iii. 217, t. 173. *Nageia latifolia*, *Gord. Pinet.* 138; *Kurz For. Fl.* ii. 500.

The KHASIA Mts., alt. 3000 ft. Hill forests of BURMA and the MALAY PENINSULA. SOUTH DECCAN; Tinnevely, alt. 3–5000 ft., *Beddome.*—DISTRIB. Java.

An evergreen glabrous tree, attaining 80 ft., with aromatic wood. *Leaves* 4–7 by $\frac{1}{2}$ –2 in., very coriaceous, acute at both ends; nerves very many, close and slender; petiole 0– $\frac{1}{4}$ in. *Male spikes* $\frac{1}{2}$ in. long, 2–5 together, sessile or on a short peduncle; bracts ovate, acuminate, denticulate. *Seeds* solitary, subglobose, $\frac{3}{4}$ in. diam., blue-black, seated on a cylindric fleshy scaly peduncle.—Foliage of *Agathis loranthifolia*.

2. ***P. nerifolia***, *Don in Lamb. Pin. Ed.* 1, 122, *Ed.* 3, 74; leaves scattered linear or linear-lanceolate obtuse acute or acuminate 1-nerved. *Endl. Conf.* 215; *Parlat. in DC. Prodr.* xvi. ii. 514; *Brand. For. Fl.* 541; *Brown in Benn. Fl. Jar.* 40; *Flor. des Serres*, viii. 49, t. 768. *P. bracteata*,

Blume Enum. i. 881; *Rumph.* iii. 214, t. 172, f. 1; *Parlat. l. c.* 515; *Gamble Man. Ind. Timb.* 414. *P. polystachya*, *Brown l. c.* 40; *Parlat. l. c.* 515; *Endl. l. c.* *P. macrophylla*, *Wall. Cat.* 6052. *Nageia bracteata*, *Kurz For. Fl.* ii. 501.

TROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 3000 ft., *J. D. H.* KHASIA HILLS and forests of BURMA, the MALAY PENINSULA and ANDAMAN ISLANDS.—DISTRIB. JAVA, Sumatra, Borneo.

A glabrous evergreen tree. *Leaves* 4–8 in. (in saplings to 8 in.), coriaceous, straight or falcate, base narrowed, midrib prominent on both surfaces; petiole $\frac{1}{2}$ – $\frac{1}{3}$ in. *Male spikes* 1 in., solitary or clustered, sessile, cylindric, surrounded at the base by broad acute keeled bracts. *Seeds* solitary, globose, $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., seated on an oblong fleshy peduncle.

3. ***P. cupressina***, *Br. ex Mirb. in Mem. Mus.* xiii. 75, and in *Benn. Fl. Jav.* 35, t. 10; leaves on older branches minute quadrifarious lanceolate mucronate keeled, on the younger distichous spreading linear and falcate or compressed and tetragonous. *Endl. Conif.* 222; *Blume Rumph.* iii. 218, t. 172, f. 2, and 172 B, f. 2. *P. imbricata*, *Blume Enum.* 89. *P. Horsfieldii*, *Wall. Cat.* 6049.

UPPER BURMA; at Bhamo, *Griffith*. MALACCA; on Keddah Peak, *Griffith*. PENANG, *Wallich*, *Maingay* (*Kew Distrib.* 1501).—DISTRIB. Malay Islands.

A lofty tree. *Branchlets* of 3 forms; (1) short, flat, feather-like, 1–2 in. long, with a slender rachis and close-set distichous horizontally-spreading linear falcate acuminate shiny leaves $\frac{1}{2}$ – $\frac{1}{2}$ in. long; (2) terete, filiform branchlets, clothed with minute imbricate ovate acute leaves $\frac{1}{20}$ in. long; (3) stouter, terete, fruiting branchlets with subulate leaves $\frac{1}{10}$ – $\frac{1}{3}$ in. long. *Seeds* globose, $\frac{1}{4}$ in. diam., on short decurved lateral branchlets.

7. AGATHIS, *Salisb.*

Evergreen monœcious or diœcious trees. *Leaves* coriaceous, broad, nerves parallel. *Male fl.* solitary, peduncled; peduncle clothed with decussate imbricate scales; anthers densely spirally crowded in a cylindric or oblong column; cells 5 or more, pendulous from the top of a rigid stipes, slits introrse; connective with an apical inflexed claw. *Fem. cone* ovoid or globose; scales closely spirally imbricate, tips broad; ovuliferous scale thin and confluent with the scale; ovules 1, rarely 2, reversed and adnate to the scale. *Ripe cone* globose or oblong; scales hard, broad, persistent. *Seed* 1 on one side of the scale (rarely 2 perfect), reversed, compressed, ovate or oblong, testa thin winged; albumen fleshy; cotyledons 2.—Species about 6, Malayan, Australasian and Polynesian.

A. loranthifolia, *Salisb. in Trans. Linn. Soc.* viii. 312, t. 15; leaves petioled subopposite or alternate oblong-lanceolate to linear-lanceolate obtuse, anther-cells with an orbicular cuneate claw, fem. cones subglobose, scales rounded, wing of seed horizontal. *Wall. Cat.* 6057; *Blume Enum. Fl. Jav.* 90. *A. Dammara*, *Rich. Conif.* 83, t. 19. *Dammara alba*, *Rumph. Herb. Amb.* ii. 174, t. 57; *Parlat. in DC. Prodr.* xvi. ii. 374. *D. orientalis*, *Lamb. Pin. Ed.* 2, ii. 97, t. 54; *Endl. Conif.* 189. *D. Rumphii*, *Presl. Epimel.* 236. *Abies Dammara*, *Poiret. Dict.* v. 35.

PENANG, *Wallich*, *Maingay* (*Kew Distrib.* 1500 ft.). PERAK; at Larut, Low.—DISTRIB. Malay Islands.

A lofty resiniferous tree, with a pyramidal crown and whorled branches. *Leaves* 3–7 in., usually opposite, very coriaceous, obtuse, acute, or tip rounded, very like those of *Podocarpus latifolia*, ecostate, very many-nerved. *Male cones* $\frac{1}{2}$ –2 in.,

cylindric-oblong. *Fem. cone* 1-2 in. diam., globose or ovoid; scales broadly cuneate, $\frac{1}{2}$ in. across. *Seeds* $\frac{1}{2}$ in. long, including the falcate decurved obtuse wing.—*Dammar*.

8. **PINUS**, *Linn.*

Evergreen monœcious trees. *Leaves* dimorphic, primary consisting of small membranous scales, secondary linear in clusters of 2, 3, or 5 in the axils of the primary; clusters girt at the base by a sheath of hyaline scales. *Male fl.* spicate; staminal column ovoid oblong or cylindric; anthers in many series, shortly stipitate; cells 2; connective produced at the tip. *Fem. cones* globose or ovoid, bracts spirally imbricate; ovuliferous scale much larger than the bracts; ovules 2, at the base of the scale, reflexed. *Ripe cone* ovoid or oblong, bracts obsolete or small; scales persistent, formed of the enlarged thickened usually woody ovuliferous scales the tips of which are often square and with a boss. *Seeds* 2, reversed, usually winged, the wing formed by the adhesion of the hard testa to a thin separable layer of the scale; cotyledons 2 or more.—Species 70, confined to the Northern Hemisphere, very rare in its tropics.

Pinus Royleana, Jameson in Journ. Hort. Soc. Lond. ix. 52, with a woodcut (Parlatore in DC. Prodr. xvi. ii. 390), a species which on the authority of Royle is a native of the Nepal Himalaya, alt. 8-10,000 ft., is referred by Gordon (Pinetum Ed. 2, 170) to *P. mitis* of N. America, and if it came from Nepal was no doubt from the Residency Garden. *P. nepalensis*, Royle (*P. Latteri*, Madden mss.), is *P. Pinaster*, also no doubt from the Residency Garden. *P. nepalensis*, Forbes, Pinet. Woburn. 34, referred by Endlicher to *P. sinensis*, and by Parlatore l. c. to *P. Kasya*, is known only from Forbes's insufficient description, which states that it is a very tender species, a native of Nepal, procured for Messrs. Lawson of Edinburgh, with leaves in pairs, occasionally in threes or fours, glaucous when young, green when old. Neither flower nor fruit are known; and it is not worth further notice. Wallich's "Pinus No. 7278 an *P. Pinea*," from specimens cultivated in Nepal or Kumaon, is one of above.

* *Leaves in clusters of 5-8.*

1. **P. excelsa**, *Wall. Pl. As. Rar.* iii. t. 201; *Cat.* 6059 (by error 5059); leaves 4-8 in. slender drooping, sheaths and primary leaves deciduous, cones peduncled cylindric pendulous, scales rhomboidly ovate hardly thickened at the rounded apex, seeds oblong, wing subfalcate obliquely truncate. *Endl. Conif.* 145; *Parlat. in DC. Prodr.* xvi. ii. 404; *Griff. Notul.* iv. 18 (*Itin. Notes* 123, No. 398); *Ic. Pl. Asiat.* 366; *Brand. For. Fl.* 510; *Cleghorn Pines of N.W. Himal.* t. 2; *Gamble Man. Ind. Timb.* 398; *Lamb. Pin. Ed.* 2, 40, t. 26. *P. pendula*, *Griff. Journ.* 211, &c. *P. Griffithii*, *McClelland in Griff. Notul.* iv. 17 (*Itin. Notes* 145, No. 21?); *Ic. Pl. Asiat.* t. 365.

TEMPERATE HIMALAYA, alt. 6-12,500 ft. (absent in Central and N.W. Kumaon and in Sikkin).—*DISTRIB.* Afghanistan, Macedonia?

A lofty symmetrical tree, attaining 150 ft. *Leaves* filiform, triquetrous, grey- or blue-green, margins serrulate, white on two of the faces, falling in the second or third year; sheaths $\frac{3}{4}$ in., wholly deciduous, entire. *Male spikes* short cylindric-oblong. *Cone* 6-10 in.; scales concave. *Seeds* about 1 in., cotyledons usually 9.—The *P. Peuce* of Macedonia is hardly distinguishable by definable character in a dry state. *P. Griffithii*, *McClelland*, is founded on Griffith's drawing of the ripe cone of *P. excelsa*.

** *Leaves in clusters of 3.*

2. **P. longifolia**, *Roxb. Fl. Ind.* iii. 651; leaves 9-12 in. slender triquetrous, back obtuse, sheaths persistent, cones peduncled ovoidly conical, scales with a greatly thickened 4-6-lobed tip which is beaked in the centre, seeds oblong with an oblanceolate unequal-sided wing. *Endl. Conif.* 158; *Parlat. in DC. Prodr.* xvi. ii. 390; *Royle Ill.* 353, t. 85, f. 1; *Lamb. Pin. Ed.* 2, 32, t. 22; *Wall. Cat.* 6065; *Brand. For. Fl.* 506; *Cleghorn Pines of N.W. Himal.* t. 3; *Gamble Man. Ind. Timb.* 396; *Griff. Notul.* iv. 18; *Ic. Pl. Asiat.* t. 369, 370.

OUTER HIMALAYAN RANGES, from the Indus to Bhotan, alt. 1500-6000 ft., and to 7500 ft. in Kumaon.—DISTRIB. Affghanistan.

A large tree, attaining 110 ft., but often stunted and gnarled; trunk usually naked, rarely 12 ft. girth; bark very thick and furrowed. *Leaves* dark or light green, serrulate, falling about the third to fourth year; sheaths fimbriate. *Male spikes* cylindric. *Cones* solitary or clustered, 4-7 by 3 in. diam. at the base; scales $1\frac{1}{2}$ -2 by $\frac{3}{4}$ in., beak pungent or obtuse. *Seeds* with the wing $\frac{1}{2}$ -1 in. *Cotyledons* about 12.

3. **P. Khasya**, *Royle in Gardn. Mag.* 1840, 8; leaves 5-9 in. semiterete grooved above, sheaths persistent, cones long-peduncled ovoid, tips of scales thickened flat or convex transversely keeled, seeds with an oblong wing. *Parlat. in DC. Prodr.* xvi. ii. 390; *Brand. For. Fl.* 508. *P. Kasya*, *Kurz For. Fl.* ii. 499; *Gamble Man. Ind. Timb.* 397. *P. Khasvana*, *Griff. Notul.* iv. 18 (*Itin. Notes* 58, No. 901); *Ic. Plant. Asiat.* t. 367, 368; *Hook. f. Himal. Journ.* ii. 282. *P. Keseya*, *Royle ex Endl. Conif.* 158.

KHASIA, CHITTAGONG and BURMESE HILLS, alt. 3-7000 ft.

Usually a small tree in the Khasia, but in Burma attaining 200 ft., with a trunk 10 ft. in girth; bark very thick and cracked. *Leaves* very slender, green, serrulate; sheaths $\frac{1}{2}$ - $\frac{3}{4}$ in. *Cones* 2-3 in., young recurved; peduncle bracteate. *Seeds* $\frac{3}{4}$ in. long with the round topped wing.

4. **P. Gerardiana**, *Wall. in Lamb. Pin. Ed.* 3, t. 79; *Cat.* 6064; leaves stout 3-5 in. stiff compressed and triquetrous, sheaths and bracts deciduous, cones peduncled ovoid or oblong-ovoid tips of scales broad obtusely triangular with a recurved spine from the upper margin, seeds cylindric wing short caducous. *Endl. Conif.* 159; *Parlat. in DC. Prodr.* xvi. ii. 391; *Royle Ill.* 353, t. 85, f. 2; *Brand. For. Fl.* 508, t. 67; *Cleghorn Pines of N.W. Himal.* t. 4.

Dry interior valleys of the N.W. HIMALAYA, alt. 5800-12,000 ft., from Kunawur westwards, and in Garwhal.—DISTRIB. Affghanistan.

A tree, attaining 60 ft., with a stout trunk sometimes 12 ft. in girth, and a roundish head; branches horizontal or decurved, tips ascending; bark smooth, often silvery, deciduous in long flakes. *Leaves* dark green, persistent for 3-4 years, serrulate; sheaths $\frac{1}{2}$ in., entire. *Cones* 6-9 by 4-5 in., glaucous, young erect, peduncle 1 in., bracteate. *Seeds* 1 in. long.

*** *Leaves 2 in a sheath.*

5. **P. Merkusii**, *Jungh. & De Vriese in Plant. Nor. Ind. Bat. Or.* 5, t. 2; leaves 8-10 in. slender semiterete grooved above, sheaths persistent, cones ovoid-oblong, scales with thickened 4-5-angled pyramidal tips and a transverse ridge and depressed scars. *Endl. Conif.* 176; *Parlat. in DC. Prodr.* xvi. ii. 389; *Kurz For. Fl.* ii. 499; *Gamble Man. Ind. Timb.* 398; *De Boer Conif. Archip. Ind.* 5; *Blume Rumph.* iii. 210; *Miq. Fl. Ind. Bat.* ii. 1069. *P. sumatrana*, *Jungh. in Bot. Zeit.* (1846) 698. *P. Finlaysoniana*,

Wall. Cat. 6062. *P. Latteri*, *Mason in Journ. As. Soc. Beng.* xviii. (1849) 74, and *Burma*, 545; *Kurz in Flora*, 1872, 264.

MARTABAN and UPPER TENASSERIM, alt. 500–2500 fr., *Kurz*. TENASSERIM; on Thoungyong, alt. 3–4000 ft., *Riley*.—DISTRIB. Sumatra, Borneo.

A tree, 50–60 ft. in Burma (60–100 ft. in Sumatra). *Leaves* quite smooth, slender; sheaths $\frac{1}{2}$ in. long, fimbriate. *Cones* about 3 in., erect, scales with a pyramidal boss, and small transverse rough scar.—*Kurz* describes the tips of the cone scales as “not zonate, with a depressed umbonate tubercle.” *Parlatore* adds “radiation rugose.”

9. CEDRUS, *Loud.*

Large trees, evergreen. *Leaves* triquetrous, in dense clusters, acicular, jointed near the base. *Cone* of *Pinus*, but scales deciduous, leaving a columnar axis.—Species 1, with three marked forms, a Himalayan, an Oriental, and an Algerian.

C. Libani, *Barrel.*, var. *DEODARA*, *Hook. f. Himal. Journ.* i. 257, and in *Nat. Hist. Rev.* (1861) ii. t. 1–3; branches and leader with drooping tips, leaves 1–1 $\frac{1}{2}$ in., cones oblong, scales broadly flabellately triangular. *C. Deodara*, *Lond. Arb. Brit.* iv. 2428, f. 2283–2286; *Forbes Pinet. Wob.* 149, t. 48, 49; *Parlat. in DC. Prodr.* xvi. ii. 408; *Brand. For. Fl.* 516; *Cleghorn Pines of N.W. Himal.* t. 1; *Gamble Man. Ind. Timb.* 400; *Boiss. Fl. Orient.* v. 699. *Abies Deodara*, *Lindl. in Penny Cyclop.* 34. *Pinus Deodara*, *Roxb. Fl. Ind.* iii. 651; *Lamb. Pin. Ed.* 2, 68, t. 42; *Ed.* 3, 93, t. 52; *Endl. Conif.* 135; *Antoine Conif.* 59, t. 22, f. 2; *Griff. Ic. Pl. Asiat.* t. 364; *Wall. Cat.* 6060 (by error 5060).

N.W. HIMALAYA, from Kumaon westwards, alt. 3500–12,000 ft.—DISTRIB. Afghanistan.

A lofty robust tree, attaining 250 ft., with a girth of trunk 36 ft., and 600 years' age; bark thick, furrowed vertically and cracked transversely. *Leaves* usually glaucous green, acute, persistent for 3–5 years; sheaths very short. *Cones* 4–5 by 3–4 in., erect, top rounded; scales very numerous, margin thin. *Seeds* $\frac{1}{4}$ in. long; wing longer, broadly triangular with rounded sides.

10. PICEA, *Link.*

Large evergreen trees. *Leaves* scattered, acicular, jointed at the base. *Cones* cylindric, pendulous, or erect when young, scales thin, not thickened at the tip, persistent.—Species 12, N. Temperate and Arctic.

P. Morinda, *Link. in Linnæa*, xv. 522; branchlets slender pendulous glabrous, leaves 1–1 $\frac{1}{2}$ in. acicular tetragonous pungent, cones 4–6 in., scales broadly ovate or subreniform from a cuneate base, outer margin rounded. seeds oblong with a broad spatulate wing. *A. Smithiana*, *Forbes Pinet. Woburn.* 103, t. 30; *Loud. Arboret.* iv. 2317, f. 2229; *Brand. For. Fl.* 525; *Cleghorn Pines of N.W. Himal.* t. 5; *Gamble Man. Ind. Timb.* 407. *P. Khutrow*, *Carr. Conif.* 258. *Abies spinulosa*, *Griff. Journ.* 259; *Itin. Notes* 145, No. 694; *Ic. Pl. Asiat.* t. 363. *Pinus Smithiana*, *Lamb. Pin.* iii. t. 88; *Wall. Pl. As. Rar.* iii. 24, t. 246; *Cat.* 6063; *Parlat. in DC. Prodr.* xvi. ii. 416. *P. Kutrow*, *Royle Ill.* 353, t. 84, f. 1; *Endl. Conif.* 122.

TEMPERATE HIMALAYA; throughout the range at elevations of 6–11,000 ft.—DISTRIB. Afghanistan.

A conical tree, attaining 150 ft., with a trunk 21 ft.; branches whorled, spreading;

bark tessellated. *Leaves* dark green, stiff. *Cones* 4-6 by 1-2 in. diam., obtuse; scales rounded, concave, dark brown and shining. *Seeds* $\frac{3}{8}$ in long with the obliquely truncate wing.

11. *TSUGA*, *Carrière*.

Evergreen trees. *Leaves* more or less distichous, narrow, 1-nerved, petiole very short, jointed on the branch. *Cones* small, ripening in the first year, scales few, persistent, thin, not thickened at the tip.—Species about 7, a Himalayan, a Japanese and several N. American.

T. Brunoniana, *Carr. Conf.* 188; branches spreading, branchlets pendulous pubescent, leaves $\frac{1}{2}$ -1 in. narrowly linear white beneath margins recurved tips serrulate, cones 1 in. ovoid, scales obtuse. *Abies Brunoniana*, *Lindl. in Penny Cyclop.* i. 31; *Griff. Itin. Notes* 131, No. 529. *A. dumosa*, *Loud. Arb.* iv. 2325, f. 2233, 2234. *Pinus dumosa*, *Don Prodr.* 55; *Parlat. in DC. Prodr.* xvi. ii. 429; *Lamb. Pin. Ed.* 2, ii. 7; *Ed.* 3, 80, t. 46. *P. Brunoniana*, *Wall. Cat.* 6061; *Pl. As. Rar.* iii. 24, t. 247; *Endl. Conf.* 84; *Antoine Conf.* 82, t. 32, f. 1. *P. decidua*, *Wall. mss.*—*Taxaceæ*, *Griff. Notul.* iv. 28; *Ic. Pl. Asiat.* t. 375.

TEMPERATE HIMALAYA, from Kumaon to Rhotan, alt. 8-10,500 ft.

A tree, attaining 120 ft., with 28 ft. girth of trunk; branchlets very slender; bark thick, rough. *Leaves* $\frac{1}{2}$ in. broad, caducous after the branch is cut, dark green. *Cones* terminal, erect or horizontal. *Seeds* $\frac{1}{2}$ in. long with the oblong obtuse wing; nucleus very small.

12. *ABIES*, *Juss.*

Lofty evergreen trees with tabular branches. *Leaves* more or less bifarious, linear, rarely 4-gonous, 1-nerved, jointed on to the branch. *Cone* erect, cylindric or oblong, scales very many, thin, tip hardly thickened, deciduous, leaving a woody axis as in *Cedrus*, bract more or less free under the scale and sometimes produced beyond it.—Species about 18, N. Temperate and Arctic.

A. Webblana, *Lindley in Penny Cyclop.* i. 30; leaves 1-2 in. linear flat retuse or bicuspidate rarely rounded or subacute white beneath on either side the midrib, cones oblong or cylindric dark purple, scales much longer than the bracts, seeds with a broadly obovate truncate wing. *Link in Linnæa*, xv. 532; *Forbes Pinet. Woburn.* 117, t. 41; *Griff. Notul.* iv. 19; *Ic. Pl. Asiat.* t. 371; *Brand. For. Fl.* 528; *Gamble Man. Ind. Timb.* 408. *A. densa*, *Griff. Journ.* 258; *Notul.* iv. 19 (*Itin. Notes* 141, Nos. 662, 663). *A. spectabilis*, *Spach Hist. Phaner.* xi. 422. *Picea Webbiana*, *Loud. Arboret.* iv. 2344, f. 2251-2253; *Cleghorn Pines of N.W. Himal.* t. 6. *Pinus Webbiana*, *Wall. in Lamb. Pin. Ed.* 3, 77, t. 44; *Cat.* 6058 (by error 5058); *Endl. Conf.* 106; *Antoine Conf.* 61, t. 24, f. 1; *Parlat. in DC. Prodr.* xvi. ii. 425. *P. striata*, *Ham. mss.* *P. spectabilis*, *Lamb. Pin. Ed.* 2, ii. 3, t. 2; *Don Prodr.* 55.

TEMPERATE and SUBALPINE HIMALAYA, alt. 7-12,000 ft. in the west, and 8500-13,000 ft. in the east.—DISTRIB. Afghanistan.

A lofty black stout tree, attaining 150 ft., and a girth of trunk of 30 ft.; crown cylindric, branches horizontal flat. *Leaves* spirally arranged but more or less bifarious, very variable in length, persisting for 8-10 years, flat, about $\frac{1}{2}$ in. broad, channelled down the middle, very dark green and shining, tip very variable; midrib raised beneath; petiole very short. *Male cones* sessile, solitary, or clustered.

Fem. cones 4-6 by $1\frac{1}{2}$ -3 in. diam., ripening in the same year, top and base rounded; outer margins of scales rounded. *Seeds* oblong or obovoid, with the wing $\frac{1}{2}$ -1 in. long.

VAR. *Pindrow*, Brand. For. Fl. 528; leaves longer (2-3 in.), cones usually slender and cylindric. *A. Pindrow*, *Spach l. c.* 423. *Picea Pindrow*, *Loud. Arboret.* iv. 2346, f. 2254, 2255. *P. Herbertiana*, *Madden mss.* *P. Naplita*, *Knight in Loud. Encycl. of Trees*, 1053. *Pinus Pindrow*, *Royle Ill.* 354, t. 86. *Endl. Conif.* 106; *Lamb. Pin.* iii. t. 92; *Antoine Conif.* 62, t. 24, f. 1. *P. Naphtab*, *Antoine Conif.* 80. *Taxus? Lambertiana*, *Wall. Cat.* 6056.—N.W. Himalaya, in better soil and in more sheltered places than *Webbiana proper*.—The question of the specific distinctness of *P. Pindrow* has long been a subject of doubt. Dr. Brandis has decided against its claim. *Royle* figures the cone as pale purple, $4\frac{1}{2}$ by $3\frac{1}{2}$ in., and seeds $\frac{1}{2}$ in. long.

13. **LARIX**, *Miller*.

Tall pyramidal trees. *Leaves* in dense clusters, acicular, deciduous, jointed near the base, 1-nerved. *Cones* of *Picea*, but erect, with the bract often exerted beneath the scale.—Species 8, N. Temperate and Arctic regions.

L. Griffithii, *Hook. f. & Thoms. Ill. Himal. Pl.* t. 21 (*excl. f.* 1-4); branchlets long pendulous, leaves 1 in. slender, cones cylindric, bracts exerted twice the length of the scales, with reflexed cuspidate tips. *Brand. For. Fl.* 531; *Gamble Man. Ind. Timb.* 410. *L. Griffithiana*, *Gord. Pinet.* 126; *Carrière Conif. Ed.* 2, 359. *Abies Griffithiana*, *Lindl. & Gord. in Journ. Hort. Soc. Lond.* v. 214. *Pinus Griffithii*, *Parlat. in DC. Prodr.* xvi. ii. 411.

EASTERN NEPAL, SIKKIM and BHOTAN, alt. 8-12,000 ft.

A small tree, 20-60 ft., with pale-green foliage; bark thick, brown; heart wood red. *Leaves* 30-50 in a cluster, linear, flat. *Cone* erect from the pendulous branchlets, 2-3 in. long; bracts persistent, obovate-spathulate, notched, the cusp longer than the bract. *Seeds* oblong, wing oblong twice as long as the nucleus.—The male flowers figured in "Ill. Himal. Pl." are those of *Cedrus Deodara*, which were mixed with specimens of *L. Griffithii* in Griffith's collections.

ORDER CXLV. **CYCADACEÆ**. (By W. T. Thiselton Dyer.)

Shrubs or small trees, with a thick simple (rarely forking) stem and terminal crown of leaves, or stemless with leaves arising from a tuberous simple or branched rootstock. *Leaves* in alternate series of short coriaceous scales and of palm-like pinnate rarely 2-3-pinnate leaves with membranous or coriaceous leaflets. *Flowers* diœcious; *males* in one or more terminal cones formed of numerous fleshy flat or variously peltate scales bearing beneath crowded 1-celled anthers; *females* of flat carpellary leaves (*carpophylls*) crowded round the apex of the stem (*Cycas*) or cones of flat or thickened variously peltate scales. *Ovules* large, sessile, orthotropous, either numerous and erect in notches on either margin of the carpophyll or solitary and inverted on either side of the peltate scales. *Seeds* large, drupaceous, external coat more or less fleshy, internal crustaceous or bony; albumen copious, fleshy then horny, and with one or more embryonic cavities; embryo usually single by abortion, slender, radicle superior attached to the crumpled suspensory cord, cotyledons 2.—Genera 9, species about 80, natives of the tropics and S. temperate regions.

1. **CYCAS**, L.

Shrubs or trees with a simple or rarely branched cylindric trunk clothed with the woody bases of the petioles. *Leaves* in terminal crowns, linear-oblong, pinnate; leaflets linear, 1-nerved, quite entire, involute in veneration, lower often reduced to spines. *Male cones* apparently terminal, peduncled; scales cuneate, closely imbricate, apex often long-acuminate; anthers ellipsoid, in groups of 3-5. *Carpophylls* numerous, crowded round apex of the stem, densely woolly, appressed into an apparently terminal cone, then spreading, elongate, flattened, dilated above into an entire, crenate or pectinate blade. *Ovules* 1-5 in notches on either side of the stalk of the carpophyll, distant, alternate or opposite, nearly erect. *Seeds* ellipsoid or globose.—Species about 12; Tropical Africa to Polynesia.

C. revoluta, Thunb., a Japanese species with the foliage of *C. Beddomei*, is commonly cultivated in Indian gardens.

* Margins of leaflets flat.

† Margins of blade of carpophylls spinous-toothed.

1. **C. circinalis**, Linn. *Sp. Pl.* 1658; antheriferous scales long-acuminate, acumen turned upwards, blade of carpophyll ovate or lanceolate tapering into a long acumen, crenate or more or less spinous-toothed throughout. *A. DC. Prodr.* xvi. ii. 526; *Grah. Cat. Bomb. Pl.* 198; *Dalz. & Gibs. Bomb. Fl. Suppl.* 83; *Miq. Monogr.* 27, *Anal. Bot. Ind.* ii. t. 5, f c (antheriferous scales), and *Linnæa* xix. 413, t. i. (carpophyll); *Pet. Th. Hist. Veg.* 1804, 2, t. 1 and 2; *Richard Conf.* t. 24-26; *Bot. Mag.* t. 2826 and 2827. *Thw. Enum.* 294; *De Vriese Descr.* t. 4 and 5; *Bedd. Forester's Flor.* 227. *C. sphaerica*, *Roxb. Fl. Ind.* iii. 747. *C. Thuarsii*, *Br. Prodr.* 347. *C. madagascariensis*, *Miq. Comm.* 127, in *Linnæa* xvii. 699.—Todda Panna, *Rheede Hort. Malab.* iii. 9, t. 13-21.

MALABAR COAST, *Rheede, Buchanan*. Dry hills in W. MADRAS to 3500 ft., *Beddome*. CEYLON to 1500 ft., *Thwaites*.—DISTRIB. E. Tropical Africa, Comoro Islands, Madagascar. Sumatra, Java.

An evergreen palm-like tree, 15 ft. and upwards, rarely forked when old, glabrous throughout. *Leaves* 5-9 ft. long; petiole 18 in. to 2 ft., with short distant slightly deflexed spines to near the base; leaflets 10-12 in. long, about $\frac{1}{2}$ in. wide, elongate-linear-lanceolate, subfalcate, acuminate. *Male cone* shortly peduncled, often $1\frac{1}{2}$ ft. long, cylindric-ovoid; antheriferous scales $1\frac{1}{2}$ -2 in. long, $\frac{1}{2}$ - $\frac{3}{4}$ in. wide, obovate-deltoid, prolonged into an upward curved subulate acumen about 1 in. long, clothed with a brown tomentum externally, glabrous above. *Carpophylls* about 1 ft. long, long-stalked, with 3-5 pairs of ovules above the middle, ferruginous-tomentose; blade 3-4 in. long, 1- $1\frac{1}{2}$ in. wide. *Seeds* about the size of a pigeon's egg.—From the materials at Kew obtained by Sir John Kirk and others I have no hesitation in identifying the African plant with this species; the antheriferous scales, however, figured by Du Petit Thouars and Richard have a short acumen as in *C. Rumphii*; but the African plants appear to be variable in this respect. To *C. circinalis* must also be referred a form, probably existing under unfavourable conditions, which has been several times introduced into cultivation from S. India (see Gard. Chron. Aug. 27, 1881, 270, 271). It is *C. squamosa*, Lodd. Cat.; *C. squarrosu* (*sphalmate*), Steud. Nomencl. ed. 2 (*Ind. Or.*); *Miq. Linn.* xvii. 702; *DC. Prodr.* xvi. pars 2, 529; *C. pluma*, Bull. Retail List, 1877, 4, and *C. Boddami*, Hort. I am indebted to Herr Wendland for a frond of Loddige's plant, which he informs me was originally obtained from Travancore; it agrees with a plant of low and stunted habit which appears to be not uncommon in the neighbourhood of Bangalore, and only to differ from the type in the smaller leaves with narrower leaflets.

2. C. Rumphii, *Miq. in Bull. Sc. Phys. et Nat. Néerl.* 1839, 45, *Monogr.* 29, *Anal. Bot. Ind.* ii. t. 5, f. A and B (antheriferous scales), and *Linnaea* xvii. 688; antheriferous scales shortly acuminate, blade of carpophyll ovate-rhomboid, spinous-toothed above entire below, more or less abruptly acuminate. *A. DC. Prodr.* xvi. ii. 527; *De Vriese Descr.* t. 2 and 3 (male plant); *Kurz For. Fl.* ii. 502; *Bedd. For. Flor.* 227. *C. circinalis*, *Roxb. Fl. Ind.* iii. 744; *Griff. Notul.* iv. 1 et seq.; *Ic. Pl. As.* t. 361. *C. circinalis*, *var. angustifolia*, *Miq. Comm.* 119. *C. Wallichii*, *Miq. Monogr. Cycad.* 32; in *Linnaea* xvii. 695. *C. glauca*, *Miq. Monogr.* 30. *C. macrocarpa*, *Griff. Notul.* iv. 11; *Ic. Pl. As.* t. cccxii. f. 2; *C. sp.*, *Griff. Notul.* iv. 16; *Ic. Pl. As.* t. cccx. (unnumbered figs.). *Zamia Corsoniana*, *G. Don in Gard. Mag.* 1842, 371.—*Olus calappoides*, *Rumph. Amboin.* i. 86, 87, t. 22, 23.

S. TENASSERIM, *Kurz*; Mergui, *Griffith*. MALACCA, the ANDAMAN ISLANDS and NICOBARS, *Griffith*. Often cultivated in Indian gardens.—**DISTRIB.** Moluccas, New Guinea, North Australia.

Similar in habit to the preceding species, but said to reach 20 ft. or more, and often much branched. *Leaves* usually described as somewhat shorter and with fewer leaflets. *Antheriferous scales* thickened and obliquely truncate at the apex with a short upward curved, sometimes caducous, acumen. *Carpophylls* narrower with an entire often subulate acumen. *Seeds* ellipsoid, 2–2½ in. long, 1½–1¾ in. diam.—The anatomical details given by Griffith *Icon. Pl. As.* t. cccxxvii. and cccxxviii., refer apparently to this species. Miquel figures as the carpophylls of this species (*Linn.* xxv. 589, t. ii.) monstrous states probably belonging to *C. circinalis*. *C. Scratchleyana*, F. Muell., *Victorian Naturalist*, April 1885, is only a state with the acumen of the antheriferous scales evanescent. It closely approaches in this respect a form in *Herb. Kew* from Cape York.

†† *Margins of blade of carpophylls pectinate.*

3. C. pectinata, *Griff. Notul.* iv. 10; *Ic. Pl. As.* t. cccx., f. 3; a palm-like tree 8–10 ft., leaves 5–7 ft. long recurved, leaflets 7–10 in. long narrow linear tapering into a minute spine subfalcate, blade of carpophyll broadly orbicular long-acuminate, margin deeply subulate-pectinate. *Kurz For. Fl.* ii. 503; *Gamble Man. Ind. Timb.* 415. *C. Jenkinsiana*, *Griff. Notul.* iv. 9; *Ic. Pl. As.* t. cccx., f. 1 and 2, and cccxii., f. 1. *C. dilatata*, *Griff. Notul.* iv. 15.

NEPAUL, *Wallich*. **SIKKIM**; Great Runjeet Valley, *J. D. H. & T. T. **EAST BENGAL**; Khasia, 2000 ft., *J. D. H. & T. T. **ASSAM**; Gowhatty, *Jenkins & C. B. Clarke*. **CHITTAGONG**, *J. D. H. & T. T. **MARTABAN** and **TENASSERIM**; eng and pine forests, *Kurz*.***

An evergreen palm-like tree, glabrous throughout. *Leaf-petioles* about 18 in. long with a few small distant spines, leaflets ½ in. broad. *Male cone* 18 in. long, 6 in. diam., cylindric-ovoid; antheriferous scales 1½ in. long, 1 in. diam., deltoid-clavate, apex much thickened, abruptly acuminate, acumen 1½ in. long, subulate, ascending. *Carpophylls* 6 in. long, densely tawny-villous throughout, stalk about equal in length to blade with 2–3 pairs of ovules above the middle; blade 2½–3½ in. diam., margin deeply pectinate with spinous subulate teeth ¾ in. long; acumen 1½ in. long, tapering from a flat base, with one or two spinous teeth. *Seeds* about 1½ in. long, ovoid.

4. C. siamensis, *Miq. in Bot. Zeit.* 1863, 334; an evergreen shrub or small palm-like tree, stems 2–6 ft. much swollen at the base, leaves 2–4 ft. stiff spreading, leaflets 3–8 in. linear mucronate-acuminate, blade of carpophyll ovate-rhomboid long-acuminate, margin deeply pectinate lacerate. *A. DC. Prodr.* xvi. ii. 528; *Kurz For. Fl.* ii. 503; *Regel in Ill. Hort.* t. 433; *Carrière, Rev. Hort.* 1881, 396. *C. aurea*, *Hort. Verschaaffelt*.

BURMA; dry forests of the Prome district, *Kurz*; Shan States, *Aplin*.—DISTRIB. Siam, Cochin China.

Very close to *C. pectinata*, and perhaps only a geographical form. The enlarged base of the stem calls to mind the habit of some species of *Dasyllirion*. *Antheriferous scales* about $\frac{2}{3}$ in. long, with a slender acumen of the same length. *Carpophylls* somewhat smaller than in *C. pectinata*, wholly tawny-villous when young; blade afterwards glabrescent above, marginal teeth above 1 in. long; acumen about 2 in. long, flat from a broad base and spinous dentate in Burmese specimens, almost subulate and entire in those from Cochin China. *Seeds* $1\frac{1}{2}$ long, obovoid-oblong (*Kurz*).

** Margins of leaflets revolute.

5. **C. Beddomei**, *Dyer in Linn. Trans. Ser. 2, Bot. ii. 85, t. 17*; antheriferous scales long-acuminate, acumen in upper half of cone strongly deflexed, blade of carpophyll ovate-lanceolate tapering into a long acumen strongly dentate-lobate. *C. revoluta*, *Bedd. For. Flor. 227 (not of Thunb.)*.

E. MADRAS; abundant on Cuddapah and other hills, *Beddome*.

A low shrub. *Stems* only a few inches high, clothed with the glabrescent closely imbricated leaf-bases. *Leaves* about 3 ft. long, 9 in. wide, rachis subquadrangular; petiole about 6 in. long, strongly 4-angled, with a few minute teeth in upper third clothed at base with a tufted tomentum; leaflets about $\frac{1}{2}$ in. wide, strongly revolute. *Male cone* about 1 ft. long, 3 in. diam., very shortly peduncled; antheriferous scales tapering acuminate from an oblong-deltoid base, ascending at the base of the cone, strongly deflexed in the upper half or two-thirds. *Carpophylls* 6-8 in. long, with two pairs of ovules above the middle; blade 3 in. long, 1 in. wide. *Seeds* globose, $1\frac{1}{2}$ in. diam.

CLASS, MONOCOTYLEDONES.

ORDER CXLVI. HYDROCHARIDÆÆ.

Aquatic herbs. *Leaves* undivided. *Flowers* monœcious or diœcious, enclosed in an entire or 2-leaved spathe, fem. solitary; perianth superior. *Sepals* 3, green or petaloid. *Petals* membranous or 0. *Stamens* 3-12, anthers 2-celled. *Ovary* inferior, placentas parietal or projecting and almost meeting; styles or style-arms 3-12; ovules anatropous or orthotropous. *Fruit* rarely dehiscent, membranous or fleshy, few- or many-seeded. *Seeds* exalbuminous, embryo various.

Tribe I. **Hydrilleæ**. Fresh-water herbs; stem branching, leafy. *Spathes* small, sessile.

Leaves whorled. Perianth double. Ovules anatropous . . . 1. HYDRILLA.
Leaves scattered. Perianth single. Ovules orthotropous . . . 2. LAGAROSIPHON.

Tribe II. **Vallisneriæ**. Fresh-water herbs, stemless, or with stolons only. *Leaves* sessile, long and narrow. *Spathes* on long scapes.

Flowers unisexual. Perianth single 3. VALLISNERIA.
Flowers uni- or bi-sexual. Perianth double 4. BLYXA.

Tribe III. **Stratioteæ**. Fresh-water herbs, stemless or with a creeping rootstock. *Spathes* peduncled. *Perianth* double. *Leaves* various.

Flowers unisexual. Male spathe 2-3-fld. Ovary not beaked 5. HYDROCHARIS.

Flowers unisexual, solitary. Fruit winged. 6. OTTELIA.
 Flowers unisexual. Male spathes many-fld. Ovary stoutly
 beaked 7. BOOTTIA.

Tribe IV. **Thalassieæ**. Salt-water herbs. *Spathes* 2-leaved. *Ovary*
 beaked in all.

Male spathes many-fld. Perianth double 8. ENHALUS.
 Male spathes 1-fld. Perianth single 9. HALOPHILA.

1. **HYDRILLA**, Richard.

A submerged leafy dioecious herb. *Leaves* short, 3-4-nately whorled, or the lower opposite. *Male fl.* solitary, shortly pedicelled, in a subglobose sessile muricate spathe; sepals 3, ovate or obovate, green; petals 3, oblong or cuneiform; stamens 3, anthers large reniform, opening elastically; pistillode small. *Fem. fl.* 1-2, sessile in a tubular 2-toothed spathe; perianth of the male, but leaflets narrower; ovary produced beyond the spathe in a filiform beak, 1-celled; styles 2-3, linear, undivided; stigmas 3, fimbriate; ovules anatropous. *Fruit* subulate, smooth or muricate; seeds 2-3, oblong, testa shortly produced at each end.

H. verticillata, *Casp. in Monatsber. Akad. Berl.* 1857; *Pringhs. Jahrb.* i. 493; *Boiss. Fl. Orient.* v. 8; *Benth. Fl. Austral.* vi. 259. *H. ovalifolia*, *Rich. in Mem. Inst. Fr.* 1811, ii. 76, t. 2; *Thwaites Enum.* 331; *Dalz. & Gibs. Bomb. Fl.* 377. *H. dentata*, *Casp. in Bot. Zeit.* 1854, 56. *H. Wightii*, *Planch. in Ann. Sc. Nat. Ser.* 3, xi. 79. *H. angustifolia*, *Blume Mus. Bot.* i. 82. *Leptanthes verticillata*, *Herb. Wight.* *Serpicula verticillata*, *Lim. f. Suppl.* 416; *Roxb. Fl. Ind.* iii. 578; *Cor. Pl.* ii. t. 164; *Wall. Cat.* 5048. *Vallisneria verticillata*, *Roxb. Fl. Ind.* iii. 751. *Hottonia serrata*, *Willd. Sp. Pl.* i. 816.

Still and slowly running waters throughout INDIA and CEYLON.—DISTRIB. Central Europe, Mauritius, Madagascar, Tropical Asia and Australia.

Plants forming large masses. *Leaves* $\frac{1}{4}$ – $\frac{1}{2}$ in., 4-8 in a whorl, with a short sheathing one at the base of each branch and a short pair above this, linear or oblong-linear, serrulate or entire. *Flowers* $\frac{3}{8}$ – $\frac{1}{4}$ in. long; perianth segments very variable. *Fruit* smooth or sometimes muricate or (in Ceylon, Thwaites) squarrose with filaments above the middle.—The male fl. escape from the sheath when mature, and float on the top of the water.

2. **LAGAROSIPHON**, Harv.

Submerged dioecious herbs. *Leaves* scattered, fascicled or subwhorled, lower opposite, serrulate. *Male fl.* minute, many in an ovoid 2-fid axillary sessile spathe; sepals petaloid; petals rather shorter; anthers 2 or 3, ovoid, with often 3 staminodes; pistillode 0. *Fem. fl.* solitary, sessile in a narrow oblong spathe; perianth of the male; staminodes 0; ovary oblong, produced into a filiform beak; styles 3, stout, notched; ovules many, orthotropous. *Fruit* ovoid, oblong or linear, many-seeded.—Species 5, India, Africa, and Madagascar.

L. Roxburghii, *Benth. in Gen. Pl.* iii. 451; leaves 2-4 in. scattered linear-lanceolate. *Nechamandra alternifolia*, *Thwaites Enum.* 332. *N. Roxburghii*, *Planch. in Ann. Sc. Nat. Ser.* 3, xi. 78 (*excl. syn. Roxb. Cor. Pl.*); *Dalz. & Gibs. Bomb. Fl.* 277. *Vallisneria alternifolia*, *Roxb. Fl. Ind.*

iii. 750; *Wight in Hook. Bot. Misc.* ii. 344, *Suppl.* t. 11; *Ham. in Brewst. Edinb. Journ. Sc.* i. (1824) 34.

Common in tanks throughout INDIA and CEYLON.—DISTRIB. Tropical Asia.

Stems filiform. *Leaves* 3-4 in., nerveless, acute, often twisted. *Male spathes* at length 2-valved; flower on a short spadix; anthers 2, dehiscence transverse.

3. **VALLISNERIA**, Linn.

A submerged tufted stemless stoloniferous diœcious herb. *Leaves* very long, linear. *Male fl.* very numerous, minute, in an ovoid 3-lobed shortly peduncled spathe; sepals 3; petals 0; stamens 1-3; anthers didymous; pistillode 0. *Fem. fl.* solitary in a tubular 3-toothed spathe terminating a very long filiform spiral scape; perianth of the male; staminodes 3, 2-fid; ovary narrow, not produced upwards; stigmas 3, broad, notched; ovules numerous. *Fruit* linear, included in the spathe, many-seeded.

V. spiralis, Linn. *Sp. Pl.* 1015; *Reichb. Ic. Fl. Germ.* t. 60; *Hook. Bot. Misc.* iii. 87, *Suppl.* t. 23, 24; *Benth. Fl. Austral.* vi. 259; *Boiss. Fl. Orient.* v. 3; *Wall. Cat.* 5045. *V. spiraloïdes*, *Roxb. Fl. Ind.* iii. 750.

Throughout INDIA and CEYLON.—DISTRIB. Westward to Spain, and in warm regions of the Old and New Worlds.

Very variable in size. *Leaves* long, 10 by $\frac{1}{2}$ in., or shorter according to the depth of water, green, translucent, entire or tips serrulate. *Male spathes* $\frac{1}{4}$ in., breaking off at the base, when the flowers emerge rise to and float on the surface, pedicels long slender. *Fem. spathe* carried to the surface in flower by the uncoiling of the scape, which after fertilization again coils close and brings the ovary down to ripen under water.

4. **BLYXA**, Thouars.

Submerged tufted, stemless, scapigerous, hermaph. or diœcious annuals; scapes long or short. *Leaves* linear, acute, entire or minutely serrulate. *Male fl.* several in a tubular 2-toothed spathe; sepals 3, linear; petals 3, longer, linear; stamens 3-9, 1 or more arrested, anthers narrow erect; pistillodes 3, slender. *Fem. fl.* solitary, sessile in its spathe; spathe and perianth of the male; staminodes 0, or minute; ovary very slender, beaked; style very short; stigmas 3, filiform; ovules many. *Fruit* very slender included in the ventricose ribbed spathe, many-seeded; seed with a mucilaginous testa.

Under this genus the following Indian forms occur. These present such diverse characters that it is difficult to suppose they do not represent species; on the other hand, water plants are so variable, and herbarium specimens of them are so unsatisfactory, that I must leave it to Indian botanists to work up the genus. I refrain from citing extra-Indian authorities.

* *Leaves broad at the base, narrowed upwards to the acuminate tip.*

1. **B. Roxburghii**, *Rich. in Mem. Inst. Fr.* 1811, 77, t. 5; leaves 8-24 in., flowers diœcious, stamens 8, capsule 2-4 by $\frac{1}{8}$ in., compressed? seeds small $\frac{1}{8}$ in. tubercled with or without short tails. *Vallisneria octandra*, *Roxb. Cor. Pl.* ii. 34, t. 165; *Fl. Ind.* iii. 752.

BENGAL, and the MALAY and DECCAN PENINSULAS, common in still water.—DISTRIB. Trop. Asia, Australia.

Roxburgh does not describe or figure the seeds, and I have therefore described these from the common Bengal form, which I assume is the plant he had under his eye.

2. **B. echinosperma**, *Hook. f.*; leaves $\frac{1}{2}$ –4 ft., flowers bisexual, stamens 3, capsule 2–3 by $\frac{1}{8}$ in. terete, seeds $\frac{1}{16}$ in., spinescent with a long filiform tail at each end. *Hydrotrophus echinospermus*, *Clarke in Journ. Linn. Soc. Bot.* xiv. 8, t. 1.

BENGAL, *Clarke*. CANARA, *Stocks, Talbot, &c.*

The seed including the tails is sometimes $\frac{1}{2}$ in. long.

3. **B. Griffithii**, *Planch. in Herb. Hook.*; leaves 4 in.–2 ft., scape compressed, flowers bisexual, stamens 9, capsules linear narrow, seeds $\frac{1}{8}$ in. faintly tubercled, tails 0. ? *Saivala vallisnerioides*, *Wall. Cat.* 5047. *Saivála*, *Jones in As. Research.* iv. 275.

BENGAL, CHITTAGONG, to MALACCA.—DISTRIB. Sumatra.

Sir W. Jones describes the flowers of *Saivála* as hermaphrodite, the stamens as 9, and the seeds as muricate. Parish sends fine specimens from Moulmein, with flowers and stamens as above, but no seeds. The Chittagong specimens gathered by myself are flowerless; the leaves are 4–5 in. and capsules 2 in. on short scapes. Griffith's Malacca specimens are not in flower, but have capsules 2–2½ in. on very long scapes; the leaves are 2 ft. long. Mergui specimens from Griffith in fruit only, have leaves intermediate between those of the Malacca and Chittagong forms.

4. **B. oryzetorum**, *Hook. f.*; leaves 4–6 in., flowers 2-sexual, stamens 3, capsule 1–1½ by $\frac{1}{8}$ in., scape very short, seeds $\frac{1}{12}$ in. sparsely tubercled, tails 0 or very short. *Diplosiphon oryzetorum*, *Dcne. in Jacquem. Voy. Bot.* 167, t. 167.

BANDA, *Edgeworth*. KASHMIR, *Jacquemont*. KHASIA MTS. abundant.—DISTRIB. ? Hongkong.

5. **B. ceylanica**, *Hook. f.*; leaves 6 in.–2 ft., flowers bisexual, stamens 3, capsule 1–2 by $\frac{1}{8}$ in., scape as long, seeds obscurely tubercled apiculate at both ends. *B. octandra*, *Planch. in Thw. Enum.* 332.

CEYLON, *Walker, Thwaites*.

Very near the Madagascar *B. Aubertii*, *Rich.*, which is unisexual.

** *Leaves narrowed from below the middle to the base.*

6. **B. lancifolia**, *Hook. f.*; leaves 4–6 in. linear-lanceolate, capsules 1–2 in. slender, scape as long, flower bisexual, stamens 3, seeds sparsely tubercled, tail 0 or very short.

KHASIA HILLS, alt. 5000 ft., at Myrung and Nunklow, *Clarke*.

The Myrung specimens have large seeds $\frac{1}{12}$ in. long with no tails at all, and very obscure tubercles; the Nunklow ones have much smaller and more tubercled seeds with short tails.

7. **B. Talboti**, *Hook. f.*; leaves 4–6 in. linear-lanceolate serrulate. flowers unisexual, capsules 1–2 in. by $\frac{1}{8}$ in., seeds very strongly echinate with a short tail at each end.

NORTH CANARA, *Talbot*.

I have seen only fem. fl.

5. **HYDROCHARIS**, *Linn.*

A floating herb. *Leaves* orbicular or reniform, quite entire. *Male fl.* 2-3 in a peduncled 2-leaved spathe; sepals 3, herbaceous; petals 3, membranous, white; stamens 6-9, with 3-6 staminodes; filaments forked, anther-cells basifixed. *Fem. spathe* 1-fl., flower long-peduncled; perianth of the male; staminodes 6, in pairs; ovary ovoid, 6-celled; stigmas 6, linear, 2-fl. *Fruit* ovoid or oblong, fleshy, 6-celled; seeds many, testa pulpy, full of spiral vessels; embryo ovoid.

H. Morsus-ranæ, *Linn. Sp. Pl.* 1036; *Boiss. Fl. Orient.* v. 5; *Reichb. Ic. Fl. Germ.* t. 62. *H. asiatica*, *Miquel Fl. Ind. Bat.* iii. 239.

KASHMIR, *Jacquemont*. BENGAL, Jheels at Manda, near Beaula, *Clarke*.—DISTRIB. Europe, N. Asia, China, Japan, Australia, ? Java.

Stoloniferous; roots fibrous and bulbiferous. *Leaves* 1-1½ in. diam., often reddish beneath. *Flowers* erect, 1½ in. diam.; sepals small, oblong; petals broadly obovate, rumpled, fem. with a fleshy tubercle at the base.

6. **OTTELIA**, *Pers.*

Submerged fresh-water herbs. *Leaves* crowded, the submerged narrow, the floating long-petioled ovate-lanceolate oblong or cordate. *Flowers* solitary, sessile on a tubular 2-fid spathe. *Sepals* linear or oblong. *Petals* larger obovate or orbicular, base with fleshy appendages. *Stamens* 6-15; anthers erect. *Ovary* oblong, beaked, almost 6-celled; styles 6, linear, 2-fid; ovules many, on the placentas and walls. *Fruit* oblong, 6-valved enclosed in the spathe. *Seeds* many, oblong, testa pulpy.—Species 6-7, tropical and subtropical.

O. alismoides, *Pers. Synops.* i. 400; leaves orbicular- or oblong-cordate, spathe 5-6-winged. *Rich. in Mem. Instit. Fr.* 1811, ii. t. 7; *Benth. Fl. Austral.* vi. 257. *O. indica*, *Planch. mss.*; *Dalz. & Gibs. Bomb. Fl.* 278. *Damasonium indicum*, *Willd. Sp. Pl.* ii. 276; *Roxb. Fl. Ind.* ii. 216; *Cor. Pl.* ii. 45, t. 185; *Bot. Mag.* t. 1201. *Stratiotes alismoides*, *Linn. Sp. Pl.* 535.—*Rheede Hort. Mal.* ix. t. 46.

In tanks and ditches throughout INDIA and CEYLON.—DISTRIB. Trop. Asia, Australia.

Root fibrous. *Leaves* extremely variable, from 2-6 by 1-2 in. to broadly rounded and cordate, 7 in. diam., 7-11-nerved, usually submerged; petiole 1-10 in. *Spathe* 1-1½ in.; wings waved, unequal. *Petals* 1 in. broad, white. *Fruit* oblong, crowned with the withered perianth, 6-grooved, from linear-oblong to globose, and attaining 2 in. diam.

7. **BOOTTIA**, *Wall.*

Habit and characters of *Ottelia*, but the flowers are dioecious, the males very numerous in the spathe, the fem. solitary; the ovary beaked, the styles petaloid, and the fruit ribbed but not winged.—Species 3-4, Burma and Trop. Africa.

B. cordata, *Wall. Pl. As. Rar.* i. 51, t. 65; *Cat.* 7271; *Miq. Fl. Ind. Bat.* iii. 238.

BURMA; in the Irawaddi River near Ava, and in ponds on the summit of the Taongdong Mts., *Wallich*.

Densely tufted; stem with bases of leaves 1-3 in. *Leaves* fleshy, submerged, sessile, oblong, obtuse, 12-18 by 2-3 in., green with purplish cross bands beneath, midrib very stout; upper leaves 4-6 in. long, stout, petioled, oblong-ovate, deeply cordate with overlapping rounded lobes. *Male spathe* 3 in. either way, ampulliform, compressed, mouth toothed, ribs many tuberculate. *Flowers* $1\frac{1}{4}$ in. diam., white with yellowish tinge.

8. ENHALUS, Richard.

A submerged marine monœcious or diœcious herb; rootstock crinite with the remains of old leaves. *Leaves* narrowly linear, enclosed in two or three in a basal sheath. *Male fl.* many, minute, enclosed in a short compressed subsessile 2-leaved spathe, at length escaping and floating; sepals and petals broadly elliptic; stamens 3, anthers subsessile, oblong; pistillode 0. *Fem. fl.* much larger, solitary, sessile in a longer spathe, scape spiral; sepals oblong, imbricate; petals longer, linear, subvalvate, wrinkled, staminodes 0; ovary ovoid with 6 papillose ridges, long-beaked, almost 6-celled; styles 6, bipartite, arms slender, fimbriate; ovules few on each placenta, anatropous. *Fruit* ovoid, beaked, indehiscent, deliquescent, spathe persistent, placentas nearly meeting in the centre, spongy. *Seeds* few, large, conoid, testa mucilaginous; plumule many-leaved.

E. Koenigii, Rich. in *Mem. Institut. Fr.* 1811, ii. 64; *Miq. Fl. Ind. Bat.* iii. 237. *E. acoroides*, Zoll. *Verz. Ind. Archip. Pl.* ii. 69; *Boiss. Fl. Orient.* v. 6; *Ascherson in Nuov. Giorn. Bot. Ital.* iii. 299, and in *Linnæa* xxxv. 158. *Stratiotes acoroides*, Linn. f. *Suppl.* 268. *Enhalus*, Griff. *Notul.* 175; *Ic. Pl. Asiat.* t. 249, 250. *E. marinus*, Griff. l. c. 178; *Thwaites Enum.* 332.—*Rumph. Herb. Amboin.* vi. 191, t. 75, f. 2.

Shores of the Malay Peninsula, Griffith, Beccari. CEYLON, Thwaites.—DISTRIB. Malay Seas, Australia.

Rootstock extensively creeping in sand. *Leaves* 2-3 ft. by $\frac{1}{2}$ - $\frac{3}{4}$ in., margins thickened, tip rounded denticulate. *Spathes* 2 in. long, strigose. *Ovary* with papillose margins. *Fruit* raised to the surface for ripening.

9. HALOPHILA, Thouars.

Submerged marine plants. *Leaves* in pairs from the axil of a scarious or hyaline scale at every node of a slender creeping stem, petioled, ovate or oblong, penninerved. *Spathes* of both sexes small, of 2 bracts, solitary, sessile between the pairs of leaves, 1-fl. *Male fl.* pedicelled; sepals 3; petals 0; anthers 3, alternate with the sepals, subsessile, linear-oblong, extrorse; pistillode 0. *Fem. fl.* sessile; sepals 3, minute. *Ovary* long-beaked, 1-celled; styles 3, filiform, papillose all over; ovules 2-seriate on 2 parietal placentas. *Fruit* included, subglobose, beaked. *Seeds* many, subglobose, testa membranous; embryo thick with the spiral cotyledon in a cavity at the side.

H. ovata, Gaud. in *Frey. Voy. Bot.* t. 40, f. 1; leaves elliptic-oblong or -lanceolate. *H. ovalis*, Hook. f. *Fl. Tasm.* ii. 45; *Miq. Fl. Ind. Bat.* iii. 230; *Boiss. Fl. Orient.* v. 2; *Benth. Fl. Austral.* vii. 182; *Aschers. in Nuov. Giorn. Bot. Ital.* iii. 301, and in *Linnæa* xxxv. 173. *Barkania punctata*, Ehrh. *Symb. Phys. Bot. in Abhandl. Berl. Akad.* i. 429. *Diplanthera*, Griff. *Ic. Pl. Asiat.* t. 161 C, f. 2. ? *Thalassia stipulacea*, *Miq. Fl. Ind. Bat.* iii. 226 (excl. citations). *Caulinia ovalis*, Br. *Prodr.* 339.

MADRAS, *Cleghorn, Drew.* CEYLON, at Batticaloa, *H. Nevill.*—DISTRIB. Indian, Malayan, Australian and Pacific Seas.

Stems creeping and rooting at the nodes, with 2 convolute stipular scales at each node. *Leaves* 2–2½ in., membranous, with a broad costa and slender oblique nerves.

DOUBTFUL SPECIES.

Thwaites gives (Enum. 333) *Thalassia stipulacea*, *Koen.* (*Halophila stipulacea*, *Aschers.*), as being found at Trincomalee by Dr. Harvey. I have seen no specimens from Ceylon, and suspect that *H. ovata* is intended. *H. stipulacea* is a Red Sea species with short petioles, and is remarkable for its (when dry) bullate leaves.

ORDER CXLVII. **BURMANNIACEÆ.**

Herbs. *Leaves* linear, chiefly radical, entire, or reduced to scales. *Flowers* bisexual, regular, spicate or racemed along one side of a forked rachis, each opposite a bract. *Perianth* superior, persistent, 6-lobed or cleft, rarely 3-lobed. lobes valvate. *Anthers* 3 or 6, 2-celled, sessile on the corolla. *Ovary* inferior, 3-celled or 1-celled with 3 parietal placentas; style single, stigmas various; ovules numerous. *Capsules* loculucidal, or dehiscence transverse. *Seeds* minute, testa reticulate, nucleus homogeneous. —Genera about 10, and species 54.

Stem often leafy below. Ovary 3-celled. Stamens 3 1. BURMANNIA.
Stem scaly. Ovary 1-celled. Stamens 6 2. THISMIA.

1. **BURMANNIA**, *Linn.*

Annual herbs with ensiform acuminate radical leaves (sometimes reduced to scales or 0). *Stem* simple or divided. *Flowers* solitary, or few, or more and unilateral on the branches of a forked cyme. *Calyx-tube* winged or angled, limb 3-lobed. *Petals* smaller or 0. *Anthers* 3, sessile or subsessile, cells short separated by a broad connective, crested dorsally, dehiscence transverse. *Ovary* 3-celled; style 3-lobed. *Capsule* sometimes dehiscing transversely.

I find no characters in the perianth-lobes of the species whereby to distinguish them.

* *Radical leaves ensiform.*

1. **B. disticha**, *Linn. Sp. Pl.* 287, stem short, root-leaves 1–2½ in., midrib obscure, flowers ½–¾ in. crowded and secund on the branches of an erect forked cyme oblong or elliptic in outline, wings truncate or rounded at the top. *Roxb. Cor. Pl.* iii. t. 242; *Fl. Ind.* ii. 117; *Grah. Cat. Bomb. Pl.* 223; *Don Prodr.* 44; *Wall. Cat.* 9004; *Benth. Fl. Austral.* vi. 397. *B. distachya*, *Br. Prodr.* 265; *Burm. Fl. Zeyl.* 50, t. 20, f. 1.

TROPICAL HIMALAYA; Nepal, *Wallich.* SIKKIM, *Griffith's Collector.* KHASIA MTS. abundant. The DECCAN PENINSULA; from the Concan southwards to Ceylon. —DISTRIB. China, Australia.

Root fibrous. *Leaves* many, ¼–½ in. broad. *Forks of cyme* 1–3 in.; bracts ½ in.; flowers bright blue.

VAR. sumatrana; leaves narrower more gradually tapering. *B. sumatrana*, *Miq. Fl. Ind. Bat. Suppl.* 617.—Malacca, on Mt. Ophir, *Griffith*, &c. Sumatra, Banca, China.

2. **B. longifolia**, *Beccari Malesia* i. 244, t. 13, f. 1–5; stem long

leafy, leaves 3-6 in. narrow recurved, midrib stout, flowers $\frac{1}{2}$ in. secund on the branches of a deflexed forked cyme, wing narrow.

PERAK; alt. 3-4000 ft., *Scortechini*, *King's Collector*.—DISTRIB. Borneo at 5000 ft.

Root fibrous. Leaves 1 in. broad. Forks of cyme 1 in.; bracts $\frac{1}{2}$ in.; flowers pale blue; perianth-segments long, narrow.

3. ***B. cœlestis***, *Don Prodr.* 44; stem 4-8 in. slender leafy or nearly leafless, radical leaves $\frac{1}{4}$ - $\frac{3}{8}$ in., flowers solitary or 2-3 $\frac{1}{4}$ - $\frac{1}{2}$ in. oblong obcordate or orbicular in outline blue, wings rounded truncate or retuse at the top. *Royle Ill.* 373, t. 91; *Wall. Cat.* 9005. *B. uniflora*, *Herb. Rottl.* *B. azurea*, *Griff. Notul.* iii. 236; *Ic. Pl. Asiat.* t. 272, f. 1; *Beccari Males.* i. 242, t. 15, f. 1-3. *B. javanica*, *Blume Enum. Pl. Jav.* i. 28; *Miquel Fl. Ind. Bat.* iii. 614. *B. bifurca*, *Herb. Ham.* *B. triflora*, *Rorb. Fl. Ind.* ii. 117. *Cryptonema malaccensis*, *Turcz. in Flora* 1848, i. 590. *Nephrocœlium malaccense*, *Turcz. l. c.* 1853, i. 287 (and by error *Nephrocodium* in *Walp. Ann.* vi. 41).

TROPICAL HIMALAYA; Nepal, *Wallich*. KHASIA MTS.; CHITTAGONG and southward to MALACCA and the ANDAMAN ISLANDS. CENTRAL INDIA and the DECCAN PENINSULA, from Hazarebagh, *Clarke*, to TRAVANCORE and CEYLON.—DISTRIB. Mauritius, China, the Malay Islands and N. Australia.

Very variable in size, stout or slender, leafy or almost leafless, and in the form and size of flowers; oblong or elliptic and orbicular perianths occur on the same specimen. The principal varieties are—

1. Stem 6-10 in. rather stout with numerous erect radical and cauline leaves $\frac{1}{2}$ -1 in. long, the radical narrow or short and $\frac{1}{8}$ in. broad.—Malacca, Mergui, Singapore, Borneo, China, Cochin China.

2. Stem 4-8 in. slender, leaves very few or reduced to scales in the stem.—Common. Passes into *B. pusilla*.

4. ***B. pusilla***, *Thwaites Enum.* 325; stem 2-6 in. very slender, leaves very few radical $\frac{1}{2}$ in., cauline 0 or 1-2, flowers 1-3 $\frac{1}{4}$ in. oblong orbicular or obcordate, wings rounded at the top. *Benth. Fl. Austral.* vi. 397. *Tripteranthes pusillus*, *Wall. Herb.* *Cyananthus pusilla*, *Miers in Woll. Cat.* 9008. *Gonyanthes pusilla*, *Miers in Trans. Linn. Soc.* xviii. 537, t. 38, f. 3.

TENASSERIM; at Tavoy, *Gomez*. NORTH and SOUTH CONCAN, *Law*.—DISTRIB. Cambodia.

I suspect this is a small state of *B. cœlestis*.

** *Radical leaves 0.*

5. ***B. candida***, *Griff. mss.*; stem 4-8 in. filiform naked or with a few minute subulate scales, flowers $\frac{1}{4}$ - $\frac{1}{2}$ in. solitary or 2-3 white or blue orbicular deltoid or obcordate in outline, wings rounded truncate or retuse at the top. *Gonyanthes candida*, *Blume Enum. Pl. Jav.* 29; *Miquel Fl. Ind. Bat.* iii. 615; *Miers in Trans. Linn. Soc.* xviii. 537.

KHASIA MTS., alt. 4-5000 ft., *Griffith*, &c. BURMA; at Amherst, *Wallich*. TENASSERIM, *Griffith*, *Parish*. DECCAN PENINSULA, from Canara southwards. CEYLON.—DISTRIB. Siam, Cochin, Madagascar.

This I can distinguish from small forms of *B. cœlestis* or *pusilla* only by the absence of radical leaves, possibly the effect of growing in water. The flowers are usually blue, but Griffith has given the name to a white-flowered state. I have no specimens of Blume's *Gonyanthes candida*, which he describes as being fleshy and growing on the dead roots of trees.

6. **B. nepalensis**, *Hook. f.*; stem 2-6 in. capillary 1-4-fld. naked, flowers $\frac{1}{2}$ - in. obcordate white or yellowish, wings rounded or retuse at the top. *Gonyanthes nepalensis*, *Miers in Trans. Linn. Soc.* xviii. 537, t. xxxviii. f. 1. *Cyanotis nepalensis*, *Miers in Wall. Cat.* 9006.

NEPAL, *Wallich*. KHASIA HILLS, alt. 3-4000 ft., *J. D. H. & T. T., Clarke*.—DISTRIB. Cochin China, Hong Kong.

An extremely delicate white species.

7. **B. Wallichii**, *Hook. f.*; stem 4-6 in. naked or with a few minute lanceolate scales, flowers 1-5 $\frac{1}{4}$ - $\frac{2}{3}$ in. linear triquetrous or narrowly 3-winged. *Gonyanthes Wallichii*, *Miers in Trans. Linn. Soc.* xviii. 537, t. 38, f. 2; *Benth. Fl. Hongk.* 364. *Burmattia* sp., *Griff. Ic. Pl. Asiatic.* t. 272, f. 2.

BURMA, *Wallich*. TENASSERIM; at Mergui, *Griffith* (*Kew Distrib.* 5592). TRAVANCORE; on the Anamallay Hills, *Wight*.—DISTRIB. Hong Kong.

Very variable in stature and robustness; the Mergui specimens are filiform or even capillary, the Anamallay ones quite robust and branched.

8. **B. Championii**, *Thwaites Enum.* 325; stem 4-6 in. rather stout scaly 5-12-fld., flowers subcapitate $\frac{1}{4}$ - $\frac{1}{2}$ in. tubular trigonous white. *B. pseudolata*, *Champ. mss.*

CEYLON; in forests of the Saffragan and Hinidoon Corle districts, *Champion, Thwaites*.

Apparently a very distinct species; the perianth-lobes are larger than usual in the genus, and the stigmas are on longer branches of the style.—Near *B. tuberosa*, *Beccari*, of Borneo.

2. **THISMIA**, *Griff.*

Dwarf fleshy coloured simple herbs with leaves reduced to scales. *Flowers* few or solitary, large, terminal. *Calyx-tube* produced far above the ovary, at length circumscribed, campanulate or turbinate, mouth annulate, contracted; lobes 3, recurved, subulate. *Petals* ovate oblong or subulate, recurved. *Stamens* 6, subsessile on the throat, connective very broadly dilated, connate or conniving as a deflexed membranous tube concealing the 2 parallel distinct elliptic cells. *Ovary* short, broad, 1-celled; style short, conic; stigmas 3, stout, erect; ovules many on 3 parietal placentas. *Fruit* turbinate, top falling away with the calyx-tube.—Species 7 or 8, Tropical Asiatic and American.

1. **T. Brunoniana**, *Griff. in Trans. Linn. Soc.* xix. 341, t. 39; stem several-flowered, calyx-lobes broadly ovate.

TENASSERIM; on decayed wood, *Griffith*.

A fleshy saprophyte, yellow, 4-8 in. high; stem stout, flexuous; scales scattered, ovate-lanceolate. *Flowers* racemose, pedicels stout, bracts like the scales. *Calyx-tube* $\frac{3}{4}$ in. long, yellow tessellated with scarlet, warted. *Connectives* very large, membranous, truncate and denticulate at the apex, connate for half their length, with a 2-lobed gland? at each commissure. *Fruit* broadly truncate.—Description from *Griffith*, l. c.

2. **T. Gardneriana**, *Hook. f. in Thwaites Enum.* 325; stem 1-fld., calyx-lobes rounded. *T. Brunoniana*, *Miers in Trans. Linn. Soc.* xx. t. 15, f. 20, 21 (not of *Griff.*). *Tribrachys Gardneriana*, *Champ. mss.*

CEYLON; at the roots of trees near Galle, *Champion*.

Whole plant 3-4 in. high, very closely allied to *T. Brunoniana*, but differing in the solitary flower and orbicular perianth-lobes.

ORDER CXLVIII. ORCHIDÆÆ.

Herbs of various habit, rarely shrubby, of two principal forms: 1, terrestrial, tuberous-rooted herbs, with annual herbaceous simple stems and solitary or spicate or racemose flowers; 2, epiphytes with perennial stems or branches variously thickened and forming a pseudobulb, flowering from the top sides or base of the pseudobulb. *Perianth* superior, irregular, of 6 free or variously combined pieces; 3 outer (sepals) more or less alike, the 2 lateral sometimes united into a short or long sac or spur-like base (*mentum*); 3 inner (petals) dissimilar, the 2 lateral alike, the other (*lip*) usually very differently shaped. *Stamens* and *style* united in a column opposite the lip, anther (except in *Cypripediæ*) solitary on the front or top or back of the column and free or adnate to it, 2-celled or by subdivisions 4-celled; top of the column sometimes produced in front (towards the lip) into a beak (*rostellum*); pollen grains usually cohering in each cell into 1, 2, or 4 pairs of oblong globose or pyriform waxy or powdery masses (*pollinia*) which are free or attached by pairs or fours to a viscus or gland, or a stalk (*caudicle*) that terminates in a gland and by which the pollen mass or masses may be removed entire. *Ovary* inferior, 1-celled (3-celled in *Apostasia*), usually linear and twisted; stigma a viscid surface on the top or concave face of the column, opposite the lip and below the anther (in *Cypripedium* the anthers are 2, one on each side of the base of a short style with a discoid stigma). *Seeds* minute, testa lax enclosing a homogeneous nucleus.—Genera 340, species about 5000, temperate and tropical, rarely arctic.

KEY TO THE TRIBES AND SUBTRIBES.

TRIBE I. **Epidendrææ**. *Anther* 1, opercular, usually deciduous, cells parallel, distinct. *Pollinia* waxy, 1-4 in each cell, free, or those of each cell held together at the base by a viscid appendage, not attached by their bases or by a caudicle to the rostellum. (5 *Tipularia* has caudicled pollinia, and in *Calanthe* and other *Cœlogyneæ* the long bases of the pollinia resemble caudicles.)

Subtribe 1. **MALAXEÆ**. Stems simple, leafy, rarely leafless, with often a pseudobulbous base. Inflorescence terminal. Flowers small or minute. Anther erect or inclined, usually persistent, not incumbent. Pollinia 4 (or 8), subequal, close together, usually free (without a viscid appendage).

Subtribe 2. **DENDROBIEÆ**. Inflorescence terminal, lateral, or on a leafless scape. Pollinia 4, rarely 2, 1seriate, parallel, appendage 0.

Subtribe 3. **ERIEÆ**. Inflorescence lateral, or on a leafless scape. Pollinia 8, subequal, appendage 0 or obscure.

Subtribe 4. **BLETIEÆ**. Inflorescence usually lateral. Pollinia 8, except in *Anthogonium*, usually in 2 series, parallel, ascending, connected by a granular appendage.

Subtribe 5. **CŒLOGYNEÆ**. Inflorescence terminal. Pollinia 8 or 4, subequal, connected by viscus or an appendage (in *Calanthe* and others, the pollinia are appendaged, but the appendage is an undeveloped portion of the pollen itself, and is not derived from the rostellum).

An amended Key to the Genera, &c., of the ORCHIDÆÆ will be given at the end of the Order, in Vol. VI.

TRIBE II. **Vandææ**. *Anther* 1, posticous, opercular, resting on the rostellum, cells usually confluent. *Pollinia* waxy, usually 2 or 4 in superposed pairs, attached singly or in pairs to a gland or process of the rostellum which is carried away with them when they are removed.

Subtribe 1. **EULOPHIÆ**. Leaves on pseudobulbs, plaited and nerved. Scape leafy or not. Lip spurred.

Subtribe 2. **CYMBIDIÆ**. Leaves on pseudobulbs, plaited and nerved. Scape leafy or leafless. Lip not spurred. Column not produced into a foot.

Subtribe 3. **SARCANTHÆ**. Stem without pseudobulbs, rooting. Leaves distichous (rarely 0), not plaited. Peduncle lateral or axillary.

Subtribe 4. **NOTYLIEÆ**. Stem with a 1-leaved pseudobulb, or slender. Leaves small, distichous. Anther behind and parallel to the terminal erect or inclined rarely horizontal rostellum. Pollinia with a simple or double stipes, pendulous from the tip of the rostellum.

TRIBE III. **Neottieæ**. Stem not bulbous (roots often bulbous). *Anther* 1, posticous, opercular, or erect and persistent; cells distinct, parallel. Pollen granular, powdery or in small masses.

Subtribe 1. **VANILLEÆ**. Stem tall, erect or climbing, often branched. Racemes or panicles terminal or terminal and axillary. Anther subopercular, incumbent on a short rostellum.

Subtribe 2. **CORYMBÆ**. Stem tall, sometimes branched. Leaves broad. Racemes or panicles terminal. Anther erect, parallel to the erect rostellum.

Subtribe 3. **SPIRANTHÆ**. Stem simple erect; root not tuberous. Leaves membranous or 0. Anther erect or inclined forward, parallel to the elongate rostellum.

Subtribe 4. **DIURIDÆ**. Stem simple, erect from an underground tuber. Anther erect or inclined forward; rostellum usually short.

Subtribe 5. **ARETHUSÆ**. Stem simple, erect from an underground tuber. Anther opercular, incumbent or suberect.

Subtribe 6. **LIMODOREÆ**. Stem simple, usually leafy, erect from an underground rootstock. Anther opercular, incumbent or suberect.

TRIBE IV. **Ophrydeæ**. *Anther* 1, posticous, erect, inclined or reflexed. Cells parallel or diverging, adnate to the column and often continuous with the rostellum. *Pollinia* 1, rarely 2 in each cell, granular, produced into short caudicles attached to a gland or to the rostellum.—Terrestrial herbs.

Subtribe 1. **ECOPHYDEÆ**. Anther erect. Pollinia with their glands enclosed in a pouch of the rostellum.

Subtribe 2. **HABENARIÆ**. Anther erect. Pollinia with their glands naked or partially included in a groove or fold of the rostellum.

Subtribe 3. **DISEÆ**. Anther reclinate or reflexed on the back of the column, rarely suberect. Stigma broad, subterminal or subadnate to the lip.

TRIBE V. **Cypripediæ**. *Anthers* 2, one on each side of the ros-

tellum, sessile or stipitate. *Anther* posticous. *Pollinia* granular.—
Terrestrial herbs.

KEY TO THE GENERA.

TRIBE I. **Epidendrææ.**

Subtribe 1. MALAXEÆ (and LIPARIDEÆ, *Gen. Pl.*).

1. OBERONIA. Epiphytic. Leaves distichous, fleshy, laterally compressed, nerveless. Flowers very minute, in cylindric spikes or racemes; column very short.

2. MICROSTYLIS. Terrestrial. Leaves membranous, base sheathing. Flowers small. Column very short.

3. LIPARIS. Terrestrial or epiphytic. Leaves membranous or coriaceous, base sheathing. Flowers small or medium-sized. Column long.

4. PLATYCLINIS. Epiphytic; pseudobulb 1-leaved. Flowers small; bracts rigid, glumaceous, ribbed, margins convolute. Column long or short with long or short membranous side arms.

5. TIPULARIA. Terrestrial; pseudobulb 1-leaved. Lip with a long spur.

6. OREORCHIS. Terrestrial, 1-leaved. Sepals and petals suberect. Column long.

7. CORALLORHIZA. Leafless. Root coralloid. Sepals and petals suberect. Column long.

Subtribe 2. DENDROBIEÆ.

* *Inflorescence lateral on a leafy or leafless stem, or terminal, or from the top of a 1-2-leaved pseudobulb.*

8. DENDROBIUM. Lip adnate to the produced foot of the column, contracted at the base or clawed, base erect and incumbent on the column, not mobile.

** *Inflorescence distinct from the pseudobulb.*

9. BULBOPHYLLUM. Racemes or spikes elongate, rarely 1-fld. or umbelliform. Sepals usually subequal, free. Lip jointed on the foot of the column and mobile.

10. SUNPIA. Characters of *Bulbophyllum*, but anther turned away from the rostellum and dehiscing upwards. Flower spicate, coriaceous, concealed by the concave bracts.

11. CIRRHOPETALUM. Flowers umbellate. Lateral sepals longer than the dorsal, placed under the mobile lip or connate.

12. TRIAS. Scape 1-fld. Sepals spreading equally. Anther produced into a long appendage. Very small herbs, pseudobulbs 1-leaved.

13. DRYMODA. Scape 1-fld. Lateral sepals far removed from the dorsal. Pollinia connate in pairs. Pseudobulb small, 1-leaved; leaf caducous.

14. MONOMERIA. Raceme long, lax-fld.; flowers large. Lateral sepals broad, far removed from the dorsal. Pseudobulb 1-leaved; leaf narrow, petioled, coriaceous.

15. DENDROCHILUM. Flowers small, racemose. Sepals equal, spreading. Pseudobulb 0, or on a rigid creeping stem; leaf narrow.

16. PANISEA. Scape slender, few-fld. Sepals subequal. Lip very narrow, with a long sigmoid claw. Pollinia 4, distinct. Pseudobulb narrow, crowded, 1-leaved.

17. ACROCHÆNE. Scape loosely many-fld. Mentum saccate. Petals fimbriate. Lip jointed on the base of the column. Pollinia 2, globose, connected by a granular appendage.

18. *CHRYSOGLOSSUM*. Scape tall, raceme long. Mentum saccate. Lip not jointed on the column. Anther 2-celled. Pollinia 2, not connected. Leaf plaited.

Subtribe 3. *ERIEÆ*.

19. *ERIA*. Peduncles 1-many-fl'd., axillary or subterminal on a leafy stem or on a pseudobulb. Column short, produced into a foot. Habit very various.

20. *PHREATIA*. Peduncle lateral or from a leafless rootstock, flowers minute. Column very short, produced into a foot. Stem short, leaves distichous.

21. *PACHYSTOMA*. Scape leafless. Sepals conniving. Column elongate, produced into a foot. Capsule deflexed. Pseudobulb 1-2-leaved.

22. *SPATHOGLOTTIS*. Scape distinct from the 1-2-leaved pseudobulb. Sepals spreading. Column elongate, foot 0. Capsule erect or nodding. Leaves elongate, plicate.

Subtribe 4. *BLETIÆ*.

23. *ACANTHEPHIPIUM*. Sepals connate into a broad fleshy cup. Petals included, adnate to the base of the short column, which is prolonged into a long foot. Flower large in short few-fl'd. racemes.

24. *PHAIUS*. Flowers large, racemose. Sepals free. Lip gibbous or spurred, lateral lobes embracing the long column, which is not prolonged into a foot. Leaves often large, plaited.

25. *NEPHELAPHYLLUM*. Flowers racemose on a leafless scape. Sepals free. Lip spurred. Column 2-winged, foot 0. Pseudobulb very narrowed above and jointed with the membranous leaf.

26. *TAINIA*. Flowers racemose on a leafless scape. Sepals and petals acute, caudate; lateral sepals inserted on the short foot of the column. Lip spurred or gibbous. Pseudobulbs thick, 1-leaved.

27. *ANTHOGONIUM*. Flowers racemose on a leafless scape. Sepals connate in a slender tube. Petals linear, claws free within the sepals. Column elongate, foot 0. Pollinia 4 (upper series wanting). Leaves few, grass-like, from a pseudobulb.

Subtribe 5. *CÆLOGYNÆ*.

* *Pseudobulb 0. Peduncle elongate, branched. Flowers small.*

29. *JOSEPHA*. Lateral sepals forming a mentum. Column narrowly winged, foot 0. Pollinia 4.

** *Flowers capitate. Lateral sepals forming a mentum with the foot of the column.*

29. *GLOMERA*. Stem leafy. Flowers in a dense head. Pollinia 4.

30. *AGROSTOPHYLLUM*. Stem leafy. Flowers in a dense head. Pollinia 8.

31. *CERATOSTYLIS*. Flowers in a lax head, which is adnate to the solitary leaf. Column with 2 long arms. Pollinia 8.

*** *Flowers spicate or racemose. Lateral sepals united in a mentum.*

32. *CRYPTOCHILUS*. Pseudobulbs 1-2-leaved. Sepals connate in a 3-toothed tube. Clinandrium very broad; pollinia 8.

33. *TRICHOSMA*. Stem not thickened, 2-leaved. Sepals spreading. Clinandrium elevated, toothed; pollinia 8. Flowers large.

**** *Flowers solitary, spicate or racemose. Sepals free. Column without a foot.*

34. *CÆLOGYNE*. Pseudobulbs distinct, 2-leaved. Lip sessile, its base embracing the elongate column. Pollinia 4. Flowers racemose, often large.

35. *OTOCHILUS*. Pseudobulbs superposed, uppermost 2-leaved. Lip sessile, base saccate, lateral lobes ear-like. Column elongate; pollinia 4. Peduncle terminal, sheathed.

36. *PHOLIDOTA*. Pseudobulbs 2-leaved, solitary or superposed. Lip saccate. Column short, broadly 2-winged; pollinia 4. Peduncle sheathed.

37. *CALANTHE*. Terrestrial herbs. Leaves plicate, produced after the racemose flowers. Lip usually spurred, claw connate into a tube with the column.

38. *ARUNDINA*. Terrestrial herbs; stem leafy. Sepals spreading. Lip sessile, not spurred, base concave embracing the column.

TRIBE II. *Vandæ*.

Subtribe 1. *EULOPHIÆ*.

39. *EULOPHIA*. Scape usually leafless. Petals like the dorsal sepal. Lip gibbous or saccate, rarely spurred. Gland of the rostellum usually produced into a stipes.

Subtribe 2. *CYMBIDIÆ*.

40. *CYMBIDIUM*. Sepals and petals subequal, spreading. Lobes of the lip embracing the unwinged column. Pollinia with a transverse granular appendage. Leafy stems short, pseudobulbous.

41. *CYPERORCHIS*. Lip erect from the base, narrow; lateral lobes embracing the column. Stem short, leafy. Scape sheathed, leafless.

42. *GEODORUM*. Sepals and petals erecto-patent, subequal. Lip sessile, broad from the base, ventricose, erect, almost complicate. Stem short, leafy, and leafless scapes arising from a stout subtuberous rootstock.

43. *GRAMMATOPHYLLUM*. Sepals and petals spreading. Pollinia after removal attached to the lobes or horns of a lunate or curved stipes. Stem leafy; scape many-fld., leafless.

44. *DIPODIUM*. Sepals and petals spreading. Pollinia after removal attached to 2 distinct stipes. Stems leafy or leafless; pseudobulb 0.

45. *THECOSTELE*. Sepals and petals spreading. Lip adnate to the base of the column, united at the base with it into a short tube, then spreading. Column sigmoid. Pseudobulb 1-leaved. Scape leafless, lateral, recurved.

46. *BROMHEADIA*. Sepals and petals spreading. Lip erect; lateral lobes embracing the 2-winged column. Pseudobulb 0; flowering stem with distichous leaves; peduncle terminal, sometimes branched, rachis of raceme often thickened serrate by the distichous bracts.

47. *POLYSTACHYA*. Sepals conniving or subpatent; lateral connate into a mentum with the foot of the short column. Flowering stems short, few-leaved, at length pseudobulbous, flowers small racemose or panicle.

Subtribe 3. *CYRTPODIEÆ*.

48. *PLOCOGLOTTIS*. Terrestrial. Lip saccate at the base, connate by a plaited membrane with the column. Pollinia affixed to distinct filiform stipes. Scape erect, raceme simple.

Subtribe 4. *SARCANTHÆ*.

* *Lip not spurred (see Arachnanthe). Column without a foot, short, not winged.*

49. *LUISIA*. Sepals and petals not spreading widely. Lip not jointed at the base, usually longer than the sepals. Stipes of the pollinia ovate, flat. Leaves terete; flowers in short spikes.

50. *COTTONIA*. Sepals spreading widely, broader than the petals. Lip not

jointed at the base. Stipes of the pollinia long, narrow. Flowers in simple or branched, very long peduncled racemes.

51. *STAUROPSIS*. Sepals and petals spreading widely. Lip not jointed at the base. Stipes of pollinia long, narrow. Flowers medium-sized, in simple or branched racemes.

52. *ARACHNANTHE*. Sepals and petals widely spreading. Lip jointed at the base, gibbous or shortly spurred. Stipes of the pollinia flat, acute from a broad base. Flowers large, loosely racemed.

****** *Lateral sepals adnate to the foot of the column, forming a mentum. Spur, if present, distant from the base of the lip, sometimes recurved and ascending.*

53. *PHALENOPSIS*. Lip spreading from the base or erect at the base, not spurred. Column erect, foot short. Stipes of the pollinia linear or spatulate. Flowers large, in simple or branched racemes.

54. *DORITIS*. Lip with a long claw, incumbent, 3-lobed, not spurred. Column winged, foot long. Flowers small or medium-sized, in simple or branched racemes.

55. *RHYNCHOSTYLIS*. Lip saccate at its union with the foot of the column, then narrowed, blade ovate or tongue-shaped. Column wingless, foot short. Stipes of the pollinia subfiliform. Flowers rather large, in long dense racemes.

56. *SARCOCHILUS*. Lip shortly incumbent or adnate to the base of the column, blade fleshy, top often inflexed, gibbous or shortly stoutly spurred. Stipes of the pollinia linear or oblong. Flowers usually small, in simple racemes.

57. *TRICHOLOTTIS*. Lip with a long foot adnate to the base of the column. Flowers few, small.

58. *AERIDES*. Lip jointed on to the long foot of the column, blade with an ascending or recurved hollow spur. Stipes of the pollinia narrow. Flowers in simple or branched racemes.

******* *Lip saccate or spurred at the base (not under the blade). Column wingless.*

59. *RENANTHERA*. Sepals and petals spreading widely; lateral sepals usually the largest, parallel and placed under the small lip. Stipes of the pollinia flat, narrow. Racemes branched.

60. *VANDA*. Sepals and petals fleshy, widely spreading from a narrow base. Stipes of pollinia broad. Flowers large, in simple racemes.

61. *SACCOLABIUM*. Sepals and petals widely spreading. Column without appendages. Stipes of pollinia usually slender. Flowers small, in simple or branched racemes.

62. *SCHÆNORCHIS*. Flowers of *Saccolabium*, but column with 2 erect linear appendages.

63. *UNCIFERA*. Sepals and petals erecto-patent. Spur of lip strongly incurved. Stipes of the pollinia with a dilated sub-2-lobed tip. Flowers small, in dense-fl. racemes.

64. *ACAMPE*. Sepals and petals thick, concave. Stipes of pollinia slender. Flowers small, crowded in a short rigid simple or branched peduncle.

65. *SARCANTHUS*. Sepals and petals fleshy, spreading. Spur of the lip internally divided longitudinally. Flowers small, in simple or paniced slender racemes.

66. *CLEISOSTOMA*. Spur of the lip almost closed with a callus or lamella. Flowers small, crowded in simple or branched racemes.

67. *ORNITHOCHILUS*. Sepals spreading; lateral connate at the base of the claw of the lip, and together with it forming a mentum. Lip broadly 2-3-lobed, often fimbriate. Stipes of the pollinia strap-shaped. Flowers small, in simple or branched slender racemes.

68. *TENIOPHYLLUM*. Sepals connivent or subpatent, bases often connate. Pollinia 4, distinct; stipes short. Dwarf herbs, leafless or few-leaved; flowers minute.

69. *MICROSACCUS*. Sepals and petals spreading. Pollinia 4, distinct; stipes linear. Small herbs with many small distichous leaves, and 1-2 minute flowers.

70. *DIPLOCENTRUM*. Sepals and petals widely spreading. Lip 2-spurred towards the base.

Subtribe 5. *NOTYLIEÆ*.

71. *ACRIOPSIS*. Sepals narrow, spreading; lateral connate. Petals broader. Claw of lip connate with the column, and forming a broad pitcher. Top of column hooded, membranous. Pollinia 2 or 4, stipes simple. Pseudobulbs with 1-2 narrow leaves. Flowers small, in simple or branched slender lax racemes.

72. *PODOCHILUS*. Sepals erect. Lip jointed on to the foot of the column. Stipes of the 4 pollinia 2. Leaves small, distichous; pseudobulb 0. Flowers small, in a terminal raceme.

73. *APPENDICULA*. Sepals erect. Lip continuous with the foot of the column, not jointed. Leaves distichous; pseudobulbs 0. Flowers small, in lateral or subterminal racemes.

74. *THELASIS*. Sepals erect. Lip erect, undivided. Column without a foot. Stipes of pollinia simple. Herbs with 1-leaved pseudobulbs, or leaves distichous as in *Oberonia*. Flowers minute, in terminal racemes.

TRIBE III. *Neottieæ*.

Subtribe 1. *VANILLEÆ*.

75. *GALEOLA*. Climbers. Leaves 0 or on flowerless branches. Sepals spreading or broadly concave. Lip broad, concave, loosely investing the column.

76. *VANILLA*. Climbers. Leaves 0 or coriaceous. Claw of the lip adnate to the column; limb broad, concave, embracing the column.

Subtribe 2. *CORYMBIÆ*.

77. *CORYMBIS*. Sepals and petals narrow, cohering in a tube. Lip linear. Column elongate. Flowers loosely paniced.

78. *TROPIDIA*. Lateral sepals connate, forming a mentum. Lip sessile. Column short. Spikes short, dense-fld.

Subtribe 3. *SPIRANTHÆÆ*.

* Lip spurred, or with a prominent sac.

79. *PHYSTURUS*. Lip above the spur abruptly contracted, hollow, spreading; blade entire or 2-lobed. Clinandrium hardly prominent. Leaves membranous, ovate or lanceolate.

80. *ANGECTOCHILUS*. Claw of the lip long, spreading, fimbriate; blade 2-lobed. Clinandrium cupular. Leaves subradical, ovate, often coloured.

81. *VRYDAGZINIA*. Lip sessile. Base of column with 2 processes descending into the spur. Stem leafy.

82. *CYSTORCHIS*. Lip sessile; spur obtuse or saccate; blade lanceolate, entire. Leaves subradical, ovate, often coloured.

83. *HERPYSMA*. Lip erect, concave, margins connate with the column; spur long; blade spreading. Clinandrium hooded. Pollinia with rigid caudicles. Stem leafy.

** Lip not spurred, if saccate the sac concealed by the sepals.

† Lip clawed, ventricose above the base (or sessile in *Spiranthes*).

84. *ODONTOCHILUS*. Lateral sepals connate, forming a mentum. Claw of lip toothed or fimbriate. Stem leafy; flowers loosely spiked.

85. *HÆMABIA*. Sepals free. Claw of lip concave, entire; blade 2-lobed. Clinandrium cupular. Stem leafy; flowers loosely spiked or racemed.

86. *DOSSINIA*. Sepals free. Lip with erect side lobes and a 2-fid midlobe. Column with a long appendage in front.

87. *SPIRANTHES*. Dorsal sepals and petals together forming a hood; lateral and column decurrent on the ovary or spike, lax or dense-fld., often secund or spiral.

†† *Lip not clawed (see also Spiranthes) sessile or adnate to the column; base not ventricose.*

88. *NEOTTIA*. Leafless scaly herbs. Sepals and petals free. Lip 2-fid.

89. *LISTERA*. Stem with 2*opposite or subopposite leaves. Sepals and petals free, spreading.

90. *CHEIROSTYLIS*. Stem laxly leafy. Sepals combined in a tube.

††† *Lip sessile, not clawed, often adnate to the column, usually shorter than the sepals, base ventricose (except Zeuxine).*

91. *ZEUXINE*. Sepals free, dorsal with the petals cohering in a hood. Column without appendages.

92. *HYLOPHILA*. Dorsal sepal hooded; lateral obliquely adnate to the base of the column. Lip with a small linear inflexed blade.

93. *GOODYERA*. Sepals free. Lip erect, entire. Clinandrium cup-shaped.

94. *HETERIA*. Sepals free or connate below. Lip at the base more or less adnate to the column, entire or with 2 spreading lobes.

Subtribe 4. *DIURIDEÆ*.

95. *APHYLLORCHIS*. Leafless herbs. Sepals free.

96. *CRYPTOSTYLIS*. Leaves one or few. Sepals and petals subulate, convolute. Lip superior, broad, embracing the base of the very short column.

97. *CORYSANTHES*. Dorsal sepal large; lateral small, linear or filiform. Lip tubular. Low herbs, flower solitary, very large for the plant.

Subtribe 5. *ARETHUSEÆ*.

98. *POGONIA*. Sepals erect or spreading. Lip undivided or 3-lobed. Column elongate, not winged. Flowering stem leafy, or leafless with the leaf produced afterwards.

99. *DIDYMOPLEXIS*. Perianth bilabiate, upper lip formed by the dorsal sepal and petals, lateral sepals connate, forming a 2-fid lower lip. True lip very broad undivided. Slender leafless herbs, flowers small.

100. *GASTRODIA*. Sepals and petals united into a ventricose 5-lobed tube. Lip undivided. Leafless herbs.

101. *EPIPOGUM*. Sepals narrow, free. Lip concave, saccate or shortly spurred at the base. Column short. Leafless herbs.

Subtribe 6. *LIMODOREÆ*.

102. *CEPHALANTHERA*. Sepals conniving. Lip concave or shortly spurred at the constricted base. Stem leafy; flowers and capsules erect.

103. *EPIPACTIS*. Sepals free, spreading. Lip concave above the constricted base. Stem leafy; flower and capsules nodding or pendulous.

TRIBE IV. *Ophrydeæ*.

Subtribe 1. *SERAPIEÆ*.

104. *ORCHIS*. Lip spurred. Glands of the pollinia both in one pouch.

Subtribe 2. HABENARIÆ.

105. *HERMIRIUM*. Lip not spurred. Low small-fl. herbs.
 106. *HABENARIA*. Lip spurred. Sepals equalling or exceeding the petals. Flowers spicate or racemose. Rostellum not elongate.
 107. *DIPLOMERIS*. Lip spurred. Sepals much smaller than the petals. Flowers solitary, large.
 108. *HEMIPILIA*. Lip spurred. Sepals larger than the petals. Leaf radical, solitary; raceme few-fl. Rostellum very prominent.

Subtribe 3. DISEÆ.

109. *SATYRIUM*. Lip erect, 2-spurred. Flower spicate.

Subtribe 4. CORYCIÆ.

110. *DISPERIS*. Lateral sepals spurred or saccate. Lip not spurred, tip 2-lipped or variously dilated.

TRIBE V. *Cypripediæ*.

111. *CYPRIPEDIUM*. Sepals spreading. Lip inflated. Anthers 2. Ovary 1-celled. Flowers large.
 112. *APOSTASIA*. Sepals, petals and lip all similar. Anthers 2. Ovary 3-celled. Flowers small.
 113. *NEUWIEDIA*. Sepals and petals similar. Lip rather broader. Anthers 3. Ovary 3-celled. Flowers small.

TRIBE I. *EPIDENDRÆ* (see p. 667).

1. **OBERONIA**, *Lindl.*

Tufted epiphytes. *Leaves* distichous, equitant, ensiform (very rarely terete). *Flowers* very minute in dense subcylindric spikes or racemes. *Sepals* broadly ovate or oblong, subequal. *Petals* smaller. *Lip* sessile, concave, entire or 2-4-lobed. *Column* very short; anther terminal, incumbent; pollinia 4, waxy, cohering by a viscus.—Species about 60, Tropical Asiatic, Australian and Pacific.

The flowers are generally 2 to each bract, which is lanceolate and free or broader and more or less convolute, sometimes very broad and forming a tube round both flowers; the upper flower has often a sheathing obtuse bracteole.—The genus wants a careful study of living specimens. I am far from satisfied with the following delimitation of species, the specimens being in some cases quite insufficient for a sure diagnosis.

Sect. I. **Oberonia** PROPER. *Stem* very short, rarely 2-4 in. *Leaves* ensiform, chiefly radical or subradical. *Sepals* subequal.

* Side lobes or all the lobes of lip deeply toothed or laciniate.

1. **O. iridifolia**, *Lindl. Gen. & Sp. Orchid.* 15; *Fol. Orchid.* *Oberon.* 1; stem short, leaves 3-5 in. broadly ensiform, spike long slender decurved, flowers not whorled sessile, bracts broad erose convolute sheathing the ovary, petals oblong erose, lip more or less quadrate deeply toothed tip broadly 2-fid. *Wall. Cat.* 1948/2 (*in part*). *Malaxis iridifolia*, *Reichb.f. in Walp. Ann.* vi. 208.

SIKKIM HIMALAYA, *Griffith*. SILHET and the KHASIA HILLS, *Roxburgh*, &c. TENASSERIM, *Griffith*, *Parish*. NILGHIRI and PULNEY HILLS, *Wight*, &c.

Very variable if, as I think probable, the following forms are correctly referred to it. The perianth alone is exposed from the broad sheathing scarious bract as in *O. ensiformis* and others. The rachis is stout or slender, the capsule sessile. There is such a mixture of specimens in a very bad state under Wallich No. 1948 that a reference to them is of no use.

O. IRIDIFOLIA PROPER; leaves 6–10 by $\frac{3}{4}$ –1 in., lip broader than long quadrate glabrous or pubescent. *Cymbidium iridifolium*, *Roxb. Fl. Ind.* iii. 458.—Sikkim, Silhet and Tenasserim.

Var. *denticulata*; leaves 4–5 by $\frac{3}{4}$ –1 in., scape shorter flattened, lip longer than broad more triangular glabrous less deeply toothed. *O. denticulata*, *Wight Ic.* t. 1625; *Lindl. Fol. Orchid. Oberon.* 2; *Walp. l. c.* 208.—Nilghiri and Pulney Hills.

Var. *angustifolia*; leaves 8–10 by $\frac{1}{2}$ in. straight, scape longer narrowly winged, lip short glabrous with a small square midlobe.—Khasia Hills.

Var. *brevifolia*; leaves 2–4 by $\frac{1}{2}$ – $\frac{3}{4}$ in. falcate, scape and spike shorter, lip triangular glabrous tip broadly bifid. *O. flexuosa*, *Parish mss.*—Moulmein, *Griffith*, *Parish*.

2. *O. Clarkei*, *Hook. f. Ic. Pl.* t. 1779 A; very small, stem short, leaves 1 in. linear-ensiform acute or obtuse, scape short many-bracteate and spike very slender, flowers very minute whorled subsessile longer than the broad acuminate toothed bracts, petals broadly ovate obtuse nearly as large as the sepals, lip 3-lobed about equalling the sepals, lateral lobes pectinately toothed, midlobe small obtusely truncate.

KHASIA MTS.; Shillong, alt. 5000 ft., *Clarke*.

Whole plant 2 in. high. *Leaves* about $\frac{1}{2}$ in. broad, straight. *Scape* adnate at the base to the uppermost leaf, rachis filiform; flowers red, about $\frac{1}{30}$ in.—I have seen only one specimen of this little species, which is most nearly allied to *O. Griffithiana*, *Lindl.*

3. *O. Jenkinsiana*, *Griff. mss.*; stem elongate, leaves linear, scape terete sparsely bracteate, spike decurved, flowers minute subsessile densely imbricate, bracts short erose, petals oblong, lip very short 3-lobed, lateral lobes deeply toothed, terminal small quadrate crenate. *Lindley Fol. Orchid. Oberon.* 4. *Malaxis Jenkinsiana*, *Reichb. f. in Walp. Ann.* vi. 211.

KHASIA HILLS, *Griffith*, &c., Joowye and Kumroot, alt. 4000 ft., *Clarke*, *J. D. H. & T. T.*

Stem 2–4 in. *Leaves* 3–6 by $\frac{1}{3}$ – $\frac{1}{2}$ in., straight or falcate, acuminate. *Scape* adnate to the upper leaf, with the spike 3–4 in.; flowers dark brown, about $\frac{1}{30}$ in.; lip with a concave disk.—The lip resembles that of *O. iridifolia*.

4. *O. Griffithiana*, *Lindl. Sert. Orchid.* t. 8 B; *Fol. Orchid. Oberon.* No. 44; stem elongate, leaves linear, scape slender naked, spike very slender, flowers very minute pedicelled more or less whorled, bracts lanceolate subentire, petals narrow linear, lip short 3-lobed, lobes subequal lacerate. *O. cimicina*, *Griff. Notul.* iii. 275; *Lindl. Fol. Orchid. Oberon.* 1. *Malaxis Griffithiana* & *cimicina*, *Reichb. f. in Walp. Ann.* vi. 208, 216.

PEGU, *M'Lelland*, *Kurz*. MARTABAN and TENASSERIM, *Griffith*, *Parish*.

Stem $\frac{1}{2}$ –3 in. (plant sometimes caulescent). *Leaves* 1–2 by $\frac{1}{2}$ – $\frac{1}{4}$ in., acute or obtuse, straight or falcate. *Scape* and *spike* together 2–3 in.; decurved; flowers pedicelled, purplish brown, about $\frac{1}{30}$ in., sometimes in separate whorls; lip about equalling the sepals, midlobe irregularly lacerate or more or less 2-lobed.

** Lip entire or 3-lobed, margins quite entire or erose, never pectinate.

† Petals broad elliptic oblong or ovate.

a. *Lip quadrate or orbicular entire, or if lobed with the midlobe very small and short.*

5. **O. maxima**, *Parish mss.*; leaves very long and broad, scape very stout, flowers sessile most densely imbricate round a thick straight rachis, bracts broad obtuse erose sheathing the subsessile ovary, petals short broad quite entire, lip orbicular crenulate, disk thickened.

TENASSERIM; at Moulmein, *Parish*.

This and *O. ensiformis* are the largest-leaved species, and this has the stoutest scapes, 3-4 by $\frac{1}{4}$ - $\frac{1}{2}$ in., and thickest spikes, which are 4-6 in. long. The flowers are appressed to the spike with very short ovaries. *Leaves* 12 by $1\frac{1}{2}$ in., nearly straight.

6. **O. orbicularis**, *Hook. f.*; leaves narrowly ensiform acute, scape subcompressed, flowers densely imbricate on a stout rachis, bract orbicular erose sheathing the shortly pedicelled ovary, petals broad quite entire, lip orbicular crenulate notched.

SIKKIM HIMALAYA; at Dikkeeling, alt. 3000 ft., *Clarke*.

Leaves 4-6 by $\frac{1}{4}$ - $\frac{3}{4}$ in., nearly straight. *Scape* 2-3 in.; spike 3-5 in., straight or slightly curved; flowers about $\frac{1}{2}$ in.

7. **O. brachystachys**, *Lindl. Sert. Orchid. (undert. 8); Fol. Orchid. Oberon. 4*; leaves short oblong obtuse thin, scape very short, raceme about equalling the leaves, bracts lanceolate, flowers whorled shortly pedicelled, petals broad erose, lip very short crenulate, lateral lobes large rounded terminal short truncate. *Malaxis brachystachys*, *Reichb. f. in Walp. Ann. vi. 211*.

TENASSERIM; at Mergui, *Griffith*.

Leaves 1-2 by $\frac{1}{2}$ - $\frac{1}{2}$ in. *Raceme* flexuous or decurved, rachis slender; lower bracts longer than the flowers, which are about $\frac{1}{3}$ in. *Fruit* pedicelled.

8. **O. truncata**, *Lindl. Fol. Orchid. Oberon. 3*; leaves linear ensiform subacute, scape adnate to a leaf greatly flattened above it, spike stout short lax-fl'd., flowers subwhorled sessile, bracts acuminate serrulate, petals oblong quite entire, lip much broader than long subreniform with rounded oblong lateral lobes and an obscure midlobe. *Malaxis truncata*, *Reichb. f. in Walp. Ann. vi. 210*.

CEYLON; at Hantani, *Champion*.

Leaves 3-4 by $\frac{1}{2}$ - $\frac{1}{2}$ in., straight. *Scape* above the adnate leaf very short and broad; spike $2\frac{1}{2}$ in., stout; flowers much smaller than the rachis is broad, very pale, about $\frac{1}{10}$ in.; lip quite unlike that of any other species, succulent, more than twice as broad as long, margins quite entire, midlobe a low broad rounded projection on the margin as it were of the edge furthest from the column.—Described from a single specimen.

β. *Lip oblong or obcordate, longer than the sepals, side lobes undeveloped or minute, midlobe 2-fid.*

9. **O. verticillata**, *Wight Ic. t. 1626*; leaves small narrowly ensiform acute or acuminate, scape short terete, racemes very long, flowers whorled pedicelled, bracts lanceolate, petals oblong, lip twice as long as the sepals

obcordate with rounded lobes and an acute sinus. *Lindl. Fol. Orchid. Oberon*. 3 (*excl. some vars.*). *Malaxis verticillata*, *Reichb. f. in Walp. Ann.* vi. 211.

TRAVANCORE and NILGHIRI MTS., *Wight, &c.*—DISTRIB. Java?

Leaves 2-4 by $\frac{1}{4}$ - $\frac{1}{3}$ in., rather thin, nearly straight. *Scape* 1-2 in.; racemes 4-6 in., decurved; bracts erose, about equalling the pedicels; flowers $\frac{1}{10}$ - $\frac{1}{8}$ in., pale yellow; lip with narrow rounded shoulders, contracted quite entire sides and rather diverging lobes. *Capsules* pedicelled.—The Javan plant has a much narrower lip and much larger capsules.

10. **O. pyrulifera**, *Lindl. Fol. Orchid. Oberon*. No. 15; leaves small narrowly ensiform acute or subacute, scape terete with slender subulate bracts, racemes short decurved, flowers whorled pedicelled, bracts lanceolate, petals oblong, lip oblong cleft to the middle into two parallel acute lobes. *O. verticillata*, *var. khasiana*, *Lindl. Fol. Orchid. Oberon*. 3. *Malaxis verticillata var. khasiana* and *M. pyrulifera*, *Reichb. f. in Walp. Rep.* vi. 210, 211.

KHASIA MTS., alt. 4-6000 ft., *J. D. H. & T. T. MUNNIPORE*, *Watt*.

Leaves 1-2½ by $\frac{1}{4}$ - $\frac{1}{3}$ in., straight or falcate. *Scape* and *raceme* together 2-3 in.; flowers pale yellow-green, about $\frac{1}{15}$ in.—Differs from *O. verticillata* in the small size, short racemes, very small flowers and lip with acute parallel lobes. I find no difference between *O. pyrulifera* and *O. verticillata var. khasiana*; the petals are very obscurely erose and crenulate at the tip.

11. **O. Thwaitesii**, *Hook. f.*; leaves ensiform coriaceous straight subacute, scape terete, spike long suberect rigid, flowers sessile minute in separated whorls, bracts ovate obtuse fimbriate, petals oblong erose, lip longer than the sepals gradually widening to the 2-lobed base, lobes rounded with a broad sinus. *O. verticillata*, β . *pubescens*, *Lindl. Fol. Orchid. Oberon*. 3. *Malaxis verticillata, var. pubescens*, *Reichb. f. in Walp. Ann.* vi. 210.

CEYLON, *Thwaites* (C.P. 2516 in Herb. Hook, which is the number of *Strychnos colubrina*).

Whole plant of a whitish hue when dry. *Leaves* 3-4 by $\frac{1}{2}$ in. *Scape* and *spike* 6-10 in.; rachis firm and rather stout, but not swollen; flowers few in a whorl, about $\frac{1}{20}$ in., yellow; ovary extremely short, so that the perianth is close on the rachis. *Capsules* very small, sessile, subglobose.—Very different from *O. verticillata* in the bracts, habit and minute sessile flowers; I find no trace of the pubescence described by Lindley.

12. **O. Falconeri**, *Hook. f.*; leaves short broadly ensiform acute, scape short stout bracteate, raceme stout erect or decurved, bracts ovate-lanceolate or oblong serrulate, flowers shortly pedicelled, petals ovate, lip oblong or subquadrate with small rounded or tooth-like lateral lobes, tip with two small incurved lobes separated by a broad sinus. *Hook. f. Ic. Plant.* t. 1780. *O. iridifolia*, *Wall. Cat.* 1948/1 and 3.

TROPICAL HIMALAYA, KUMAON and the Deyra Dhoon, *Falconer, Wallich*. BEHAR and Chola Nagpore, *J. D. H., Clarke*. The CONCAN; at Bombay, *Lau, &c.*

Leaves 1-2 by $\frac{1}{4}$ - $\frac{1}{2}$ in., straight or falcate, coriaceous. *Scape* terete, much shorter than the leaves; racemes longer; rachis stout, deeply grooved in fruit; flowers about $\frac{1}{20}$ in., greenish yellow. *Capsules* shortly pedicelled.—Nearly allied to *O. khasiana*, but more robust with shorter broader leaves, short lateral lobes or shoulders to the lip, the terminal lobes of which are short and distant.

13. **O. longibracteata**, *Lindl. Gen. & Sp. Orchid.* 3; *Fol. Orchid.*

Oberon. 2; stem elongate, leaves linear or oblong-linear, scape subterete above where adnate to the upper leaf, spike short, bracts subulate much exceeding the sessile flowers, petals broadly oblong entire, lip short, lateral lobes small orbicular, midlobe large rounded-obcordate obscurely 2-lobed. *Malaxis longibracteata*, *Reichb. f. in Walp. Ann.* vi. 209.

CEYLON; Hantani and Hewahetti districts, *Walker*, &c.

Stems 1-6 in., flexuose, flattened above. *Leaves* 2-3 by $\frac{1}{4}$ - $\frac{1}{3}$ in., acute. *Scape* and sharply decurved spike 1-2 in.; flowers pale red, lip red (*Thwaites*). *Capsules* subsessile.—In habit intermediate between the caulescent and stemless species.

14. **O. Helferi**, *Hook. f. Ic. Plant.* t. 1785 A; leaves small membranous ensiform acuminate, scape filiform naked, raceme about as long as the leaves filiform, bracts lanceolate, petals oblong obtuse, lip twice as long as the sepals linear-oblong with narrow lateral lobes and linear midlobe cleft to the base into two narrow parallel acute arms.

TENASSERIM, *Helfer*.

Leaves $\frac{1}{2}$ -1 in., translucent when dry. *Scape* with raceme 1-2 in., erect or curved; flowers very membranous, loosely clustered, very pale, about $\frac{1}{20}$ in. long.—The narrow lateral lobes of the lip extend about half-way down, and end in an obtuse tooth. A very delicate species.

γ . *Lip* deeply 3-lobed, side lobes broad or long, midlobe obcordate or 2-fid.

15. **O. ensiformis**, *Lindl. Fol. Orchid. Oberon.* 4; leaves very long coriaceous ensiform acuminate, scape subterete naked, spike dense-flid., bracts sheathing the flowers erose, petals broad erose, lateral lobes of erose lip broad rounded midlobe obcordate. *O. trilobata*, *Griff. Notul.* iii. 273. *O. acaulis*, *Hook. Bot. Mag.* t. 5056 (not of *Griff.*). *Malaxis ensiformis*, *Smith in Rees Encycl.*; *Reichb. f. in Walp. Ann.* vi. 212 (excl. syn.).

NEPAL, *Hamilton*. Khasia Mts., *Griffith*.

Leaves 10-18 by $\frac{1}{2}$ - $\frac{3}{4}$ in., narrowed to the tip. *Racemes* shorter than the leaves, nearly straight or curved; bracts tubular with truncate tips, perianth alone exserted, membranous; flowers about $\frac{1}{20}$ in., orange-yellow; lip hardly longer than the sepals.

16. **O. ferruginea**, *Parish mss.*; leaves long coriaceous narrowly ensiform falcate acuminate, scape short stout terete naked, spike shorter than the leaves, bracts broadly ovate subacute sheathing the subsessile flowers, petals linear-oblong fimbriate, lip short fimbriate, side lobes narrow short ascending, midlobe obcordate lobules rounded crenate sinus acute.

TENASSERIM; at Moulmein, *Parish*.

Leaves 6-10 by $\frac{1}{2}$ - $\frac{3}{4}$ in. *Scape* with raceme 4-5 in., bracts membranous; flowers about $\frac{1}{20}$ in., perianth alone exserted; lip covered with large dots, side lobes acute or obtuse.

17. **O. myriantha**, *Lindl. Fol. Orchid. Oberon.* 4; leaves narrowly ensiform straight acuminate, scape stiff terete naked or with erect subulate bracts, raceme elongate, flowers pedicelled more or less whorled, bracts erose lower subulate upper ovate, petals broad entire, lip longer than the sepals, lateral lobes broad, midlobe oblong or obcordate deeply 2-lobed lobules oblong or rounded sinus acute. *Walp. Ann.* vi. 212. *O. sikkimensis*, *Lindl. l.c.* *O. acaulis*, *Griff. Notul.* iii. 275; *It. Notes* 76

No. 1130; *Ic. Pl. Asiat.* t. 286, f. 1. *Malaxis myriantha & sikkimensis*, *Reichb. f. in Walp. Ann.* vi. 212.

SIKKIM HIMALAYA, alt. 4-5000 ft., *J. D. H., Clarke.* KHASIA MTS., alt. 3500-5000 ft., *Griffith, &c.*; Naga Hills, *Clarke.*

Leaves 4-10 by $\frac{1}{2}$ - $\frac{2}{3}$ in., coriaceous. *Scape* sometimes adnate to the uppermost leaf; spike and raceme longer or shorter than the leaves, straight or decurved, rachis slender but stiff; flowers about $\frac{1}{10}$ in., pale yellow-green, lateral lobes of lip rounded, or rather truncate and notched or crenate; terminal lobes variable in length. *Capsules* pedicelled.—Except in the shorter racemes, I find no character for *sikkimensis*, and they are as short in some specimens of *myriantha*.

18. ***O. demissa***, *Lindl. Fol. Orchid. Oberon.* 4; leaves short thin linear-oblong obtuse, scape short adnate to the uppermost leaf, bracts short ovate acute erose, spike short erect or decurved dense-fl., flowers minute subsessile, petals broadly oblong denticulate, lip very short, lateral lobes broad truncate crenate terminal short broad quadrate. *Hook. f. Ic. Plant.* t. 1785 B. *Malaxis demissa*, *Reichb. f. in Walp. Ann.* vi. 211.

SIKKIM HIMALAYA; at the foot hills, *J. D. H.*

Leaves 2 by $\frac{1}{2}$ in., obtuse. *Scape* $\frac{1}{2}$ in.; raceme $1\frac{1}{2}$ in., pale green; flowers about $\frac{1}{30}$ in., obscurely whorled; lateral sepals orbicular, much larger than the dorsal.—Specimens very few.—The species had perhaps better be referred to the group with *O. orbicularis*. Lindley describes the midlobe of the lip as ovate, acute, but I find it to be as described above in his and my own specimens.

19. ***O. recurva***, *Lindl. in Bot. Reg.* 1839, *Misc.* No. 8; *Fol. Orchid. Oberon.* 5; leaves small oblong-lanceolate acuminate, scape very short, raceme slender dense-fl., flowers very minute not whorled, bracts lanceolate, petals obovate oblong and lip erose, lateral lobes rounded midlobe 2-fid. *Hook. f. Ic. Plant.* t. 1784 A. *O. setifera*, *Lindl. l. c.* 3. *Malaxis setifera & recurva*, *Reichb. f. in Walp. Ann.* vi. 210, 212.

THE CONCAN, *Law, Dalzell, &c.*

Leaves 1-1 $\frac{1}{2}$ in., thin. *Scape* and *raceme* 2-3 in., more or less recurved or decurved; bracts shorter than the pedicels; flowers $\frac{3}{30}$ in., hyaline, sparsely gland-dotted; lip equalling or longer than the sepals; divisions of midlobe variable in breadth, sinus acute or obtuse. *Capsules* on pedicels as long as themselves.—I have failed to find in Lindley's or other specimens the setaceous petals described by that author.

†† Petals linear.

a. *Lip orbicular or quadrate, entire or obscurely lobed.*

20. ***O. zeylanica***, *Hook. f. Ic. Plant.* t. 1782 A; leaves linear ensiform obtuse, scape flattened with a small adnate leaf about the middle, spike shorter than the leaves decurved, flowers loosely imbricate, bracts ovate subentire, petals linear entire, lip quadrate quite entire or with obscure lobes at the outer angles. *O. Browneana*, *Thwaites Herb.* (C.P. 386v). *O. longibracteata*, *Thw. in part* (C.P. 543).

CEYLON; at Matelle East, *Beckett*; Hantani, *Thwaites*.

Leaves 4-7 by $\frac{1}{2}$ - $\frac{3}{4}$ in., nearly straight. *Scape* 3-4 in., about $\frac{1}{2}$ in. diam., stout, hardly compressed above the adnate leaf, which is very small. *Spike* 3 in., curved or decurved; flower $\frac{1}{10}$ in., pale. *Fruit* sessile.—I advance this species with much hesitation, for I suspect that there has been some confusion in the distribution of Thwaites' *Oberonias*, and more specimens are wanted of all.

21. **O. Wallichii**, *Hook. f.*; leaves short broad fleshy falcate obtuse, scape much flattened adnate below to a broad leaf, spike decurved, flowers densely imbricate, bracts ovate acuminate erose, lip quadrate or rounded tip retuse or 2-auricled. *O. iridifolia*, *Wall. Cat.* 1948/2 in part.

SILHET, De Silva.

Leaves 3-5 by $\frac{3}{4}$ -1 $\frac{1}{4}$ in., falcate. *Scape* $\frac{1}{4}$ in. broad above the adnate leaf. *Spike* 6 in., decurved; flowers $\frac{1}{10}$ in., sessile, sheathed in blunt bracteoles.—This is the Khasian *O. Brunoniana* of Lindley, which differs from the Peninsular plant in the very small flowers, and much shorter leaves and scapes.

22. **O. forcipata**, *Lindl. Fol. Orchid. Oberon.* 2; leaves ensiform obtuse or acute, scape slightly 2-winged short, spike long slender decurved, flowers minute sessile densely imbricate, bracts ovate acute erose or fimbriate, petals narrow, lip as broad as long quadrate entire or with obscure entire or toothed side lobes, or contracted into a forcipate terminal lobe. *Hook. f. Ic. Plant.* t. 1782 B. *Malaxis forcipata*, *Reichb. f. in Walp. Ann.* vi. 209.

CEYLON; Peradenya and Hewahetti district, alt. 1-3000 ft., *Thwaites.*

Leaves 4-5 by $\frac{1}{2}$ - $\frac{3}{4}$ in., slightly falcate. *Scape* 1-2 in., free; spike 4-7 in., covered with very pale flowers about $\frac{1}{10}$ in. long; bracts not exceeding the flowers; ovary very short; lip variable in form and when lobed in the abruptness of the line between the terminal and lateral lobes. *Capsules* short, sessile, turgid.—A very elegant species. Some specimens might almost be referred to the section with the terminal lobe of the lip produced.

23. **O. pachyrachis**, *Reichb. f. in Herb. Kew*; leaves 3-4 in. narrowly ensiform acuminate, scape very broad flat adnate to a leaf, spike straight, flowers sessile most densely imbricate on a very thick rachis, bracts very short semi-orbicular erose, petals narrow, lip orbicular or rounded-ovate quite entire.

TROPICAL HIMALAYA; Garwhal, *Falconer*. Kumaon, *Strachey & Winterbottom*. SIKIM, *J. D. H.*

Leaves 3-4 by $\frac{1}{2}$ - $\frac{1}{2}$ in., apparently flaccidly fleshy when fresh, base not broadened. *Scape* 2-4 in., very variable in breadth $\frac{1}{4}$ - $\frac{1}{2}$ in., with the adnate leaf in various positions and its free portion long and narrow or short broad and recurved; spike 4-5 in., rachis cylindric, tip slender; flowers very minute, about $\frac{1}{10}$ in., depressed on one another; lip concave towards the base. *Fruit* sessile, short, turgid, often gibbous, the ribs less prominent than usual in the genus.

β. Lip 3-lobed, side lobes large, midlobe much smaller.

24. **O. Brunoniana**, *Wight Ic.* t. 1622; leaves linear-oblong very coriaceous, scape much flattened and adnate to the upper leaf, spike erect, rachis very stout, bracts lanceolate erose, flowers sessile densely imbricate, petals narrow, lip orbicular with a short terminal auricle. *Lindl. Fol. Orchid. Oberon.* 2. *Malaxis Brunoniana*, *Reichb. f. in Walp. Ann.* vi. 209.

Mountains of CANARA, MALABAR and TRAVANCORE, *Wight, &c.*

Stem rather elongate. *Leaves* 6-14 by $\frac{3}{4}$ -1 $\frac{1}{4}$ in., succulent. *Scape* 2-8 in.; adnate leaf 1-4 in., variable in position. *Spike* 4-6 in., like a rat's tail; flowers $\frac{1}{2}$ - $\frac{1}{2}$ in.; lip dirty yellow, with an orbicular concave disk; terminal auricles variable.—Some of Wight's specimens have much longer, narrower and more acuminate leaves than those figured in his *Icones*.

25. **O. Lindleyana**, *Wight Ic.* t. 1624; leaves shortly broadly

ensiform obtuse or subacute, scape stout flattened, spike stout decurved, flowers sessile densely imbricated all round the stout rachis, bracts broadly ovate obtuse fimbriate, petals linear entire, lip rather longer than the sepals broadly 3-lobed crenate, midlobe broad rather smaller than the lateral 2-lobed. *Lindl. Fol. Orchid. Oberon.* 2. *Malaxis Lindleyana*, *Reichb. f. in Walp. Rep.* vi. 210.

NILGHIRI and TRAVANCORE MTS., *Wight, G. Thomson.*

Leaves 3-5 by $\frac{3}{4}$ -1 $\frac{1}{4}$ in., very fleshy, subfalcate, broad to the base. *Scape* with spike 4-6 in., very stout; flowers pale with an orange? centre of lip, about $\frac{1}{12}$ in. long; lip gland-dotted. *Capsules* small, sessile on the thickened rachis.—Very near *O. Brunoniana* & *Wallichiana*, but the midlobe of the lip is well developed though smaller than the side lobes together.

26. **O. platycaulon**, *Wight Ic. t.* 1623; leaves long narrowly ensiform straight subacute, scape very broad flat adnate to a leaf to the top, spike straight, flowers large densely imbricate, bracts broad sheathing the sessile ovary erose obtuse, petals narrow, lip with broad rounded lateral lobes and a very short 2-fid or 3-fid terminal one. *Lindl. Fol. Orchid. Oberon.* 2. *Malaxis platycaulon*, *Reichb. f. in Walp. Rep.* vi. 239.

On the WESTERN GHATS; from the Concan, *Graham*, to the Nilghiris, *Lobb*, and *Pulneys*, *Wight*.

Leaves 6-10 by $\frac{1}{2}$ - $\frac{3}{4}$ in., coriaceous. *Scape* shorter than the leaves, $\frac{1}{4}$ - $\frac{3}{4}$ in. broad, very coriaceous, with the apex of the adnate leaf at the base of the spike which is 3-5 in. with a stout rachis; flowers about $\frac{1}{2}$ in.; lip broader than long. *Fruit* sessile.—The largest-flowered Indian species. *O. platycaulon* of *Thwaites* is a very different species in fruit only.

27. **O. bicornis**, *Lindl. in Wall. Cat.* 1949; *Gen. & Sp. Orchid.* 16; *Fol. Orchid. Oberon.* 4; leaves very small membranous acute or obtuse, scape short very slender with subulate bracts, raceme short slender, bracts setaceous longer than the very minute flowers, petals narrow, lip much broader than long, side lobes ascending as erect horns, terminal very small quadrate. *Malaxis bicornis*, *Reichb. f. in Walp. Rep.* vi. 211.

KHASIA HILLS, *De Silva, J. D. H. & T. T.*

Leaves $\frac{1}{2}$ -1 in., straight or falcate, very thin when dry, nerveless. *Racemes* lengthening after flowering to twice the length of the leaves; rachis very slender, curved or flexuous; flowers about $\frac{1}{30}$ in., pale.

28. **O. tenuis**, *Lindl. Fol. Orchid. Oberon.* 3; leaves short linear-oblong obtuse or acute, scape bracteate and raceme very slender, bracts setaceous hyaline longer than the very minute pedicelled flowers, petals linear quite entire, lip with a very small short hatchet-shaped midlobe and linear erect incurved side lobes that form a circle round the ovary. *Hook. f. Ic. Plant. t.* 1779 B. *Malaxis tenuis*, *Reichb. f. in Walp. Ann.* vii. 211.

CEYLON; at Hittawahe, *Thwaites*.

Whole plant 2 $\frac{1}{2}$ in. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Flowers* ochreous red; lip dark red. *Outer edge* of midlobes of lip truncate and obscurely 3-lobed.—Described from a single specimen and *Lindley's* drawing.

γ. Lip with no side lobes or very small or narrow ones, midlobe large or long.

29. **O. caulescens**, *Lindl. Fol. Orchid. Oberon.* 7; subcaulescent, leaves

linear acute or acuminate, scape terete bracteate, raceme very slender, bracts lanceolate, flowers subwhorled pedicelled, petals narrow, lip twice as long as the sepals obscurely lobed at the base with two acute parallel lobes at the tip and a short tooth in the sinus. *Wall. Cat.* 1950. *Malaxis caulescens*, *Reichb. f. in Walp. Ann.* vi. 215.

NEPAT, *Wallich*. KHASIA HILLS, *Lobb*, Kala Panee and Pomrang, alt. 5000 ft., *J. D. H. & T. T.*

Stem 2-3 in., rather slender. *Leaves* 2-3 by $\frac{1}{2}$ in. *Scape* with the raceme, 2-3 in.; flowers pale, about $\frac{1}{10}$ in. *Capsules* on slender pedicels.

30. **O. ruflabris**, *Lindl. Sert. Orchid.* t. 8 A; *Fol. Orchid. Oberon.* 5; leaves small narrowly oblong thin, scape short with many setaceous spreading bracts and rachis filiform, spike very slender, flowers minute very shortly pedicelled in dense separate whorls, bracts setaceous, petals linear-oblong, lip longer than the sepals oblong with filiform lateral lobes close to the narrow base and two parallel short terminal lobes with recurved acute tips and a broad lobule in the sinus. *Malaxis ruflabris*, *Reichb. f. in Walp. Ann.* vi. 213.

BURMA, *Berkeley*; at Moulmein, *Griffith*.

Leaves 1-1 $\frac{1}{2}$ in., acute or obtuse. *Scape* and *raceme* together 1-2 in.; flowers $\frac{1}{12}$ - $\frac{1}{10}$ in.; lip red-brown; column with two subulate teeth.

♂. *Lip* with broad or long side lobes and a large midlobe.

31. **O. Scortechini**, *Hook. f.*; leaves long narrowly ensiform, raceme very long slender, bracts ovate-lanceolate as long as the pedicels, petals linear, lip 3-lobed, side lobes lanceolate longer than the small orbicular or rhomboid midlobe.

PERAK, *Scortechini*, *King's Collector*.

Rootstock creeping. *Leaves* 6-10 by $\frac{1}{4}$ - $\frac{1}{2}$ in., falcate, narrowed from the base to the acuminate tip. *Scape* short, cylindric, puberulous; raceme 12-18 in.; bracts white, $\frac{1}{12}$ in.; flowers yellowish; lateral sepals revolute, oblong, obtuse.—A very remarkable species with a stout creeping rootstock, quite unlike any other in the flowers, which more resemble those of a minute-fl. *Liparis*.

32. **O. Wightiana**, *Lindl. in Bot. Reg.* 1839, *Misc.* No. 9; *Fol. Orchid. Oberon.* 5; leaves short linear-oblong or ensiform acute, scape short terete naked or sparsely bracteate, raceme slender curved or decurved, flowers shortly pedicelled, bracts oblong or lanceolate erose, petals linear, lip equalling or exceeding the sepals, lateral lobes very large oblong or rounded terminal narrow with diverging often toothed lobes. *Wight Ic.* t. 1627; *Hook. f. Ic. Plant.* t. 1784 B. *O. Arnottiana*, *Wight l. c.* 1628. *O. stachyoides*, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 15, t. 1 A. *Malaxis Wightiana*, *Reichb. f. in Walp. Ann.* vi. 212.

TRAVANCORE and NILGHIRI MTS., *Wight*, &c. CEYLON, *Walker*, &c.

Leaves 1-4 by $\frac{1}{4}$ - $\frac{1}{2}$ in., acute, rarely falcate. *Scape* and *raceme* together 3-6 in., usually decurved; bracts longer or shorter than the pedicels; flowers whorled or not, very variable in size, $\frac{1}{30}$ - $\frac{1}{10}$ in., pale yellow-green. *Capsules* long-pedicelled.—Resembles strongly *O. myriantha* & *verticillata*, from the first of which the lip distinguishes it, and the narrow petals from both. *O. Arnottiana* is, I think, a longer pedicelled variety. The variety figured in *Ic. Plant.* is a very small state.

33. **O. Treutleri**, *Hook. f. Ic. Plant.* t. 1786 A; subcaulescent leaves short linear oblong or oblong-lanceolate, scape adnate below to the upper leaf flat, above it very short bracteate, spike short, bracts ovate-lanceolate

acuminate erose, flowers in dense separate whorls minute subsessile, petals linear-oblong, lip hardly longer than the sepals thick subequally 3-lobed obscurely crenate, lateral lobes oblong or rounded, midlobe very shortly obcordate.

SIKKIM HIMALAYA, alt. 6000 ft., *Treutler*.

Leaves 1-2 by $\frac{1}{4}$ - $\frac{1}{2}$ in., rather thin, subalternate on the rather elongate stem. *Scape* and *spike* together $1\frac{1}{2}$ in. (above the leaf); bracts rather longer than the whorls; flowers about $\frac{1}{10}$ in.—The specimens are few, and resemble *O. demissa*, with the same tendency to elongation of the stem, which suggests its belonging to the caulescent group. The crowded separate whorls of flowers resemble those of *obcordata* and *rufilabris*; the size of the midlobe of the lip removes it from group with *O. Brunoniana*. Reichb. f. refers it to a form of *obcordata*, as var. *latifolia*, possibly rightly, but the foliage seems different.

34. ***O. anthropophora***, *Lindl. in Wall. Cat.* 1951; *Gen. & Sp. Orchid.* 16; $\frac{1}{2}$ *Fol. Orchid. Oberon.* 7; leaves narrowly linear, scape short sparsely bracteate, flowers very minute subwhorled, bracts ovate erose, petals linear, side lobes of lip rather broad decurved, midlobe elongate ending in two parallel tails. *Malaxis anthropophora*, *Reichb. f. in Walp. Ann.* vi. 215.

TENASSERIM, *Wallich*.

Stem 2 in. *Leaves* $\frac{1}{2}$ -2 by $\frac{1}{4}$ in. *Scape* with raceme 6 in.; flowers about $\frac{1}{10}$ in.; dorsal sepal small oblong, lateral much larger.—The specimens are very few.

35. ***O. obcordata***, *Lindl. Fol. Orchid. Oberon.* 7; leaves linear acute, scape very short, spike long or short, flowers very minute densely clustered in whorls which are much exceeded by the lanceolate bracts shortly pedicelled, petals linear-oblong or linear, lip with a narrow base oblong straight or falcate and long or short lateral lobes and a large obcordately 2-lobed terminal lobe. *Hook. f. Ic. Pl. t.* 1783. *Malaxis obcordata*, *Reichb. f. in Walp. Ann.* vi. 216.

SIKKIM HIMALAYA, *Griffith, J. D. H. & T. T.*, alt. 5-9000 ft., *Clarke*. KHASIA HILLS, alt. 5000 ft., *Griffith, Clarke*.

Stem 1-2 in., flat, flexuous. *Leaves* 1-1 $\frac{1}{2}$ by $\frac{1}{6}$ - $\frac{1}{4}$ in., usually falcate. *Scape* with spike 1-1 $\frac{1}{2}$ in.; flowers $\frac{1}{10}$ in., yellow.

VAR. ? *bracteata*; larger, bracts much larger $\frac{1}{4}$ in. long, flowers pink, lateral lobes of lip longer subacute midlobe narrower with shorter lobes.—Sikkim, at the foot of the hills, *Thomson*.—Perhaps a different species. The lip is more like that of the following.

36. ***O. angustifolia***, *Lindl. Fol. Orchid. Oberon.* 5; leaves narrow linear subacute, scape very short, spike short, bracts subulate exceeding the clusters of very minute flowers, petals ovate lanceolate, lip with oblong deflexed lateral lobes and a broad obcordate midlobe. *Malaxis angustifolia*, *Reichb. f. in Walp. Ann.* vi. 213.

KHASIA HILLS, *Lobb*; at Kala Panee and Pomrang, *J. D. H. & T. T.*

Stem rather slender, 2-4 in., flat, flexuous. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ by $\frac{1}{2}$ in., usually falcate. *Scape* with raceme 1-1 $\frac{1}{2}$ in.; flowers subsessile, $\frac{1}{10}$ in., pale. *Capsules* very small, shortly pedicelled.—More materials are wanted for a satisfactory description.

Sect. II. ***Scylla***. *Stem* short or 0. *Leaves* ensiform. *Sepals* very unequal, dorsal lanceolate, lateral very much larger, orbicular.

37. ***O. Scyllæ***, *Lindl. Fol. Orchid. Oberon.* 5; leaves linear, or lanceolate acuminate, scape with filiform flaccid bracts, raceme slender erect

or decurved, bracts subulate from a lanceolate base, petals and dorsal sepal incurved green ciliate, lip very small lunate entire crinite, lateral lobes erect on each side the column narrowly lanceolate. *Hook. f. Ic. Plant. t. 1781.* *Malaxis Scyllæ, Reichb. f. in Walp. Ann. vi. 213.*

CEYLON; Maturatte and Elephant Plains, alt. 4-6000 ft., *Thwaites.*

Stem very short or 0. *Leaves* $1\frac{1}{2}$ - $2\frac{1}{2}$ by $\frac{1}{3}$ - $\frac{1}{2}$ in. *Scape* $1\frac{1}{2}$ in., crinite (in one specimen) with filiform flaccid hyaline bracts; raceme about as long; flowers whorled, longer than the bracts, about $\frac{1}{8}$ in. long, incurved, the lanceolate acuminate dorsal sepal and two petals being all quite equal and similar and curving upwards and inwards like the beak of a bird, whilst the orbicular hyaline lateral sepals look like a globose pouch at the base of the flower; the minute lip most resembles that of *O. tenuis*; its lateral lobes resemble a pair of erect horns.—A very singular plant.

Sect. III. **Myosurus.** *Leaves* all radical, elongate, terete, fleshy.

38. **O. Myosurus**, *Lindl. in Wall. Cat. 1947; Gen. & Sp. Orchid. 16; Fol. Orchid. Oberon. 8;* leaves 3-4 by $\frac{1}{2}$ in. diam. linear terete curved, scape very short stout bracteate, spike very short dense-fl., bracts lanceolate denticulate, petals narrow linear, lateral lobes of the lip rounded sinuate toothed, midlobe oblong-quadrate with toothed sides and two curved ascending spurs from each side of the truncate or retuse tip. *Hook. f. in Ic. Plant. t. 1786 B.* *Malaxis Myosurus, Walp. Ann. vi. 216.* *Epidendrum Myosurus, Forst. Prodr. No. 317.* *Dendrobium Myosurus, Swartz in Nov. Act. Upsal. vi. 82.*

NEPAL, *Wallich.* MOULMEIN, *Parish.*—DISTRIB. ? Society Islands.

A very singular plant. The leaves are described by Parish as papillose; the short stout scape is densely clothed with subulate bracts; the spike in the only specimen seen is less than half an inch long, with crowded pale minute shortly pedicelled flowers which are shorter than the bracts.

Sect. IV. **Caulescentes.** *Stem* elongate, with many equitant short cultriform leaves.

39. **O. anceps**, *Lindl. Sert. Orchid. under t. 8; Fol. Orchid. 6;* leaves ovate-oblong tip rounded, spike stout subsessile dense-fl., bracts short broad erose, petals small broad, lip truncate tip crenulate. *O. imbricata, Wight Ic. t. 1629 (not of Blume).* *O. Griffithii, Wight Ic. v. 4.* *Malaxis anceps, Reichb. f. in Walp. Ann. vi. 214.*

TENASSERIM, *Parish.* PERAK, *Scortechini, &c.* MALACCA, *Maingay.*—DISTRIB. Malay Islands.

Stems 12-18 in., stout, tufted, $\frac{1}{2}$ - $\frac{3}{4}$ in. across the leaves. *Leaves* suberect, subincurved. *Spike* 2-3 in.; flowers about $\frac{1}{10}$ in. *Capsule* sessile, globose.

40. **O. miniata**, *Lindl. in Bot. Reg. 1843, Misc. 8; Fol. Orchid. Oberon. 6;* leaves falcate acute, spike long slender lax-fl., pedicels pubescent, bracts lanceolate, petals oblong, lip fleshy base dilated concave narrowed into a linear emarginate tip. *Malaxis miniata, Reichb. f. in Walp. Ann. vi. 215.*

SINGAPORE (Hort. Loddiges).—DISTRIB. Philippine Islands.

Leaves 1- $1\frac{1}{2}$ in. *Raceme* 4-8 in., decurved, puberulous, lax-fl.; flowers $\frac{1}{10}$ in.; pedicels slender, $\frac{1}{12}$ in., longer than the membranous bracts.

41. **O. gracilis**, *Hook. f.;* slender, leaves straight suberect lanceolate acute, spike lax-fl., flowers subsessile, bracts very short triangular-ovate,

dorsal sepal orbicular, lateral ovate, petals linear, lip with two basal oblong cylindric obtuse ascending horns and a flat quadrate obtusely 2-fid midlobe.

PERAK; at the Kinla River, *King's Collector*.

Stems 6-8 in., tufted, flexuous; roots fibrous. Leaves 1 in., membranous when dry. Spike 4-6 in., flowering to the base; flowers reddish, $\frac{3}{10}$ in.

INDETERMINABLE SPECIES.

O. GARDNERIANA, *Thwaites Enum.* 296 (C.P. 593), closely allied to *Wightiana*, but flowers pale red, petals oblong denticulate.—Ceylon, Ambagamowa district, *Gardner*.

O. PLATYCAULON, *Thwaites* (C.P. 3913), in fruit only, is not Wight's plant of that name.

O. SPIRALIS, *Griff. Notul.* iii. 275, wants description and locality.

2. MICROSTYLIS, Nutt.

Terrestrial or epiphytic, pseudobulbous or not. Leaves 1 or more, continuous with their sheath. Flowers small, in terminal racemes, resupinate. Sepals spreading or recurved. Petals as long, slender. Lip adnate to the base of the column, usually flat, sides often produced upwards beyond the column as broad or long auricles. Column very short, with short spreading arms; anther subterminal, pollinia 4.—Species about 50, temperate and tropical.

* Sides of the lip produced upwards into large auricles.

† Apex of the lip entire or notched (not serrate or pubescent).

1. **M. Wallichii**, *Lindl. in Wall. Cat.* 1938; *Gen. & Sp. Orchid.* 20; leaves 2-4, bracts spreading shorter than the ovary, auricles of the lip acute or obtuse, blade with a rounded notched or bifid tip. *Ridley in Journ. Linn. Soc.* xxiv. 337. *Malaxis acuminata*, *Don Prodr.* 29 (note in *Herb. Wall.*).

TEMPERATE and SUBTROPICAL HIMALAYA, alt. 4-7000 ft., from Simla to Sikkim. KHASIA MTS., alt. 5-6000 ft., *J. D. H. & T. T.* ANDAMAN ISLANDS, *Kurz*. TRAVANCORE; on the Anamallay Hills, *Beddome* (*Ridley*).—DISTRIB. Cambodia.

Stem 2-3 in. Leaves 3-5 in., sessile or petioled, ovate-lanceolate, often discoloured. Scape 3-8 in. Flowers about $\frac{1}{2}$ in. long, greenish purplish or yellowish; sepals oblong, dorsal 1-3-nerved, lateral 3-5-nerved; petals 3-nerved; auricles of lip very variable. The Andaman specimen has an acute lip.—A very variable plant, if, as I think, the following are varieties.

VAR. *omphaloides*, *Parish*; leaves more unequal at the base, auricles of lip rounded and overlapping, *Ridley l. c.* 338.—Moulmein, *Parish*.

VAR. *biloba*; bracts usually longer, pedicels shorter, blade of lip contracted below the level of the column, tip bifid, arms of column larger. *M. biloba*, *Lindl. in Wall. Cat.* 1940; *Gen. & Sp. Orchid.* 20; *Ridley l. c.* 337.—Nepal, &c.—Wallich's 1940 is a mixture of specimens from Kuwaon, Nepal and Burma.

VAR. *brachycheila*; leaves lanceolate, auricles acute, blade very short with a forcipate tip.—Moulmein, *Parish*.

2. **M. khasiana**, *Hook. f.*; leaves 3-4 petioled ovate or lanceolate, bracts spreading equalling the ovary, sepals broad hooded, auricles of

concave lip obtuse dilated below, blade constricted into a broadly subreniform rounded or obcordate terminal lobe.

KHASIA Mts., alt. 4-5000 ft., *Lobb, &c.*

Stem 1-2 in. *Leaves* 3-5 in. *Flowers* $\frac{1}{2}$ in. across, chestnut-red; auricles of lip shorter than or equalling the blade.—This is the chestnut-red flowered plant alluded to by Ridley under *M. Wallichiana*, from which it differs in the small flowers, short pedicels, and form of the lateral sepals and lip.

3. ***M. blaurita***, *Lindl. in Wall. Cat.* 1941; *Gen. & Sp. Orchid.* 30; leaves 3-5 rather small sessile, bracts equalling the ovary, auricles of lip narrowed into the triangular-ovate blade, arms of the sessile column large rounded crenulate. *Ridley in Journ. Linn. Soc.* xxiv. 335.

KHASIA Mts., *Wallich.* ? SOUTH ANDAMAN ISLANDS, *Kurz.*

Leaves basal, 2-3 in. *Scape* stout, 3-6 in. *Flowers* smaller than in *Wallichii*, yellow? pedicel $\frac{1}{2}$ in.; dorsal sepal narrow; lip ovate-lanceolate in outline, auricles acute.—Pundua, the locality assigned to this and other of Wallich's collections, includes the Khasia Mts.

4. ***M. purpurea***, *Lindl. Gen. & Sp. Orchid.* 20; leaves 4-6 petioled base very unequal, bracts equalling or shorter than the ovary, auricles of the concave lip dilating downwards and then narrowing to the obtusely 2-fid tip, column very short, arms obscure. *Ridley in Journ. Linn. Soc.* xxiv. 340.

CEYLON, *Macrae*; near Galle, alt. 1000 ft., *Thwaites.*

Leaves 4-5 by 2-2 $\frac{1}{2}$ in., on a stout sheathed stem 3-4 in. high. *Scape* 6-10 in. *Flowers* dark purple, $\frac{1}{2}$ in. from tip of broad flat 3-nerved dorsal sepal to tip of lip; lip rather fleshy and very concave, auricles obtuse, broad sides of blade almost like lobes.

5. ***M. Josephiana***, *Reichb. f. in Bot. Mag.* t. 6325; leaves 4-5 sessile, scape stout acutely angled few-fld., bracts much shorter than the ovary, flowers large, sepals broad revolute, lip cucullate deeply cupped, auricles short broad rounded, column very stout thickly winged. *Ridley in Journ. Linn. Soc.* xxiv. 336.

TROPICAL SIKKIM HIMALAYA, *Anderson, Gammie, Clarke.*

Pseudobulbs 2-4 in., narrowly ovoid, compressed; stem from the base of the pseudobulb, short. *Leaves* 3-4 in., elliptic-lanceolate, acuminate, plumed, often purplish-brown above. *Scape* and *raceme* 8-10 in.; pedicels $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., golden-yellow blotched with red-brown round the column; sepals connate at the base, dorsal saccate at the base, all 3-nerved; petals broadly linear, revolute; lip forming a deep hemispheric cup.—A remarkable species, like a *Eulophia*. My specimens are not good.

6. ***M. Scottii***, *Hook. f.*; leaves 2-5 sessile obliquely ovate acuminate crenate blackish brown with a broad pale dotted border, scape elongate red, bracts reflexed, lateral sepals broadly oblong half the length of the linear-oblong dorsal and petals, lip green rhomboidly orbicular, auricles erect obtuse as long as the broad rounded blade which has a contracted 2-fid apex.

PEGU; at Rangoon, *Scott.*

Leaves 3-4 in., falcate, 5-7-nerved from the base, most remarkable for their colouring. *Scape* 6-8 in. *Lip* $\frac{1}{2}$ in. long and broad.—A beautifully coloured species, which I have named after the late Mr. John Scott, of the Calcutta Botanical Garden, who discovered it at Rangoon. It is eminently worth cultivating. Described from a drawing in Herb. Calcutt.

†† *Blade of lip toothed or pectinate.*

7. ***M. plantaginea***, *Steud. Nomencl.* ii. 144; leaves about 6 long-petioled elliptic, scape short, raceme long, bracts lanceolate deflexed, lip with the long erect auricles much longer than rounded pectinate blade, column with incurved arms. *Cuzent. Tahiti* 239. *M. Rheedii*, *Lindl. Gen. & Sp. Orchid.* 21 (*excl. syn. Rheede*); *Ridley in Journ. Linn. Soc.* xxiv. 342. *M. bella*, *Reichb. f. in Gard. Chron.* 1886, 8; *Ill. Hort* t. 581. *Malaxis Rheedii*, *Swartz in Act. Holm.* 1800, 235; *Willd. Sp. Pl.* iv. i. 90. *Crepidium Rheedii*, *Blume Bijl.* 387, f. 63. *Pterochilus plantagineus*, *Hook. & Arn. Bot. Beech. Voy.* 71, t. 17. *Epidendrum resupinatum*, *Forst. Prodr.* No. 322.

PERAK, *Scortechini*, *King's Collector*.—DISTRIB. Java, Society Islands, Tahiti.

Rootstock stout, creeping; stem 1–4 in., stout. *Leaves* 4–6 in., base very unequal; petiole $\frac{1}{2}$ –2 in. *Scape* with *raceme* 4–6 in.; flowers $\frac{3}{4}$ in. long, purple or greenish; disk of lip concave, teeth incurved.—Blume, following Willdenow and Swartz, referred this to *Rheede's* xii. t. 57, which is, as Wight first showed, a very different species (see *M. Rheedii*, Wight).

8. ***M. polyodon***, *Hook. f.*; leaves 5 petioled elliptic, scape stout, bracts minute, auricles of lip broad erect, blade rounded or subquadrate pectinately toothed, column short, arms spreading. *M. Rheedii*, *Reichb. f. in Trans. Linn. Soc.* xxx. 138 (not of Wight, Lindley or Willdenow).

TENASSERIM; at MOULMEIN, *Parish*.

Stem short, stout, base tuberos. *Leaves* 3–5 in., exclusive of the broad petiole. *Scape* 4 in.; *raceme* 6 in., many-fl.; pedicels $\frac{1}{2}$ in. *Flowers* yellow, about $\frac{1}{2}$ in. across the sepals; disk of lip with a raised 3-lobed callus surrounding the central pit.—I have seen only one specimen; it is referred to *M. Rheedii* by Parish and Reichb. f., from which it differs in the minute bracts, colour of flower, and blade of lip toothed all round.

9. ***M. acutangula***, *Hook. f. Ic. Pl.* t. 1835; leaves 3–5 shortly petioled lanceolate acuminate, scape stout flowering to the base, bracts lanceolate deflexed, lip with triangular acute auricles thin outer margins terminating downwards in an acute angle, blade much narrower and shorter than the auricles deeply pectinate all round or on each side with a broad rounded sinus at the tip, arms of the column large rounded.

PERAK; at Batang Padong (*Wray in Herb. Calcutt.*).

Stem short, very stout. *Leaves* 4–7 in., 5–7-nerved, acuminate, bases subequal. *Raceme* 9 in.; lower bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., very slender; pedicels $\frac{1}{2}$ in., slender; flowers nearly $\frac{1}{2}$ in. broad, white; sepals 3-nerved; lip with a large central concavity with raised edges.

10. ***M. micrantha***, *Hook. f. Ic. Pl.* t. 1834; leaves 6–8 petioled ovate-lanceolate subacute, scape slender, bracts lanceolate deflexed, flowers minute, lip subquadrate, auricles erect subacute shorter than the broad blade which is pectinate with 3 long teeth on each side and two at the tip, arms of column small.

PERAK, *Scortechini*.

Rootstock creeping and rooting. *Leaves* 2–3 in., 5-nerved, base unequal, petiole $\frac{1}{2}$ –1 in. *Scape* and *raceme* together 7 in., slender; pedicels short; flowers $\frac{1}{2}$ in. across; sepals 3-nerved, obtuse; lip broadest below the auricles, or with the auricles diverging; laciniae all pointing downwards.—I have seen but one specimen.

** Sides of the lip not produced upwards into auricles.

† *Lip* quite entire, or bearded at the tip only.

11. **M. muscifera**, *Ridley in Journ. Linn. Soc.* xxx. 333; leaves 2 sessile or petioled, bracts equalling or shorter than the pedicels, flowers minute, lip ovate acute, margins thickened, column sessile, arms very short. *Dienia muscifera*, *Lindl. in Wall. Cat.* 1935; *Gen. & Sp. Orchid.* 23.

TEMPERATE HIMALAYA, alt. 8-12,000 ft., from Kashmir to Sikkim.—DISTRIB. Afghanistan.

Variable in size, 6-18 in.; stem tuberous at the base, sheathed. *Leaves* 2-4 in., oblong or rounded, obtuse. *Scape* about equalling the raceme, together 4-10 in.; flowers yellow green, $\frac{1}{10}$ in. broad; pedicel $\frac{1}{2}$ - $\frac{1}{3}$ in., erect.

12. **M. cylindrostachya**, *Reichb. f. in Walp. Ann.* vi. 207; leaf solitary, bracts equalling or shorter than the pedicels, lip ovate acute, margins thickened, column stout, arms none. *Ridley in Journ. Linn. Soc.* xxiv. 333. *Dienia cylindrostachya*, *Lindl. in Wall. Cat.* 1934; *Gen. & Sp. Orchid.* 22.

TEMPERATE HIMALAYA; from Simla, alt. 7-8000 ft., to Sikkim, alt. 8-12,000 ft. CENTRAL INDIA, *Hope (in Herb. Clarke)*.

Habit, &c., of *M. muscifera*, but leaf solitary, stem and scape usually more slender (but often very stout) and frequently curved or flexuous; pedicels shorter and column longer.—*Ridley* gives by error Sylhet Wallich as a locality, and omits Sikkim where it is abundant.

13. **M. discolor**, *Lindl. Gen. & Sp. Orchid.* 20; leaves 3-6 broad, margins crisped, bracts equalling or exceeding the pedicels, flowers minute, lip ovate-cordate or subreniform tip rounded, column short, arms long. *Thwaites Enum.* 297; *Ridley in Journ. Linn. Soc.* xxiv. 336; *Reichb. f. in Walp. Ann.* vi. 206; *Wight Ic. t.* 1631; *Bot. Mag. t.* 5403.

CEYLON; in the Central Province, *Walker, Thwaites*.

Stem stout below, base not tuberous. *Leaves* 2-3 in. long and broad, subcavately acuminate, dark vinous purple with a green crisped margin. *Scape* and *raceme* 2-3 in.; pedicels about $\frac{1}{12}$ in.; flowers yellow in bud, then red; lip with a yellow margin.—*Wight* represents the lip as obscurely 3-lobed.

14. **M. Maingayi**, *Hook. f. Ic. Pl. t.* 1826; leaf large radical sessile amplexicaul, scape short stout, bracts lanceolate, lip cuneate-oblong with 3-4 long teeth at each angle of the truncate tip, column rather long, arms obscure.

—PENANG, Maingay (*Kew Distrib.* 1602).

Stem very short, tuberous. *Leaf* 6 by 3½ in. or less, broadly elliptic, acuminate, very many-nerved. *Scape* and *raceme* together about equalling the leaf, stout; pedicels ½ in., filiform; flowers ½ in. long; sepals subequal, narrowly oblong, petals very narrow; lip slightly dilated towards the tip, coriaceous.

VAR. ? *Kunstleri*; lip longer, angles of tip fimbriate, flower dark blue.—Perak, alt. 3500 ft., *King's Collector*.

†† *Lip* 2-3-lobed or cleft.

15. **M. congesta**, *Reichb. f. in Walp. Ann.* vi. 206; leaves 3-6 lanceolate, bracts shorter than the very short pedicels, flowers minute, lip subquadrately ovate concave with a fold under the column and a 3-lobed apex. *Ridley in Journ. Linn. Soc.* xxiv. 334. *M. Bernaysii*, *F. Muell. Fragment.* xi. 21. *M. fusca*, *Reichb. f. l. c.* 207. *M. trilobulata*, *Kurz*

Andam. Rep. App. B. xix.; *N. E. Br. in Gard. Chron.* 1833, 392. *M. flavescens*, *Lindl. Gen. & Sp. Orchid.* 20; *Ridley l.c.* 337. *M. fusca*, *Reichb. f. in Walp. Ann.* vi. 207. *Dienia congesta*, *Lindl. in Wall. Cat.* 1936; *Gen. & Sp. Orchid.* 22; in *Bot. Reg.* under t. 825; *Reichb. f. in Bonpland.* iii. 259. *D. fusca*, *Lindl. Gen. & Sp. Orchid. l.c.* *Malaxis latifolia*, *Smith in Rees Cyclop.* *M. plicata*, *Roxb. Fl. Ind.* iii. 456. *Crepidium flavescens*, *Blume Bijl.* 388.

TROPICAL HIMALAYA; from Nepal eastwards. KHASIA MTS. and MUNNIPORE, BEHAR on Parusnath, *Clarke*. BURMA, the ANDAMAN ISLANDS, the DECCAN PENINSULA and CEYLON.—DISTRIB. Malay Islands, China, Australia.

Stem 2-6 in., stout, base tuberosus. *Leaves* 3-10 in., sessile or petioled, ovate elliptic or lanceolate. *Scape* with *raceme* 2-8 in., stout or slender; pedicel $\frac{1}{2}$ in.; ovary trigonous and grooved; flowers $\frac{1}{8}$ - $\frac{1}{10}$ in., yellow green to pale brown or purplish. *Capsules* $\frac{1}{2}$ in., crowded, erect.

16. ***M. parvula***, *Hook. f. Ic. Pl.* t. 1827 B; leaf small solitary sessile on the small globose pseudobulb ovate acuminate, bracts minute, flowers very minute, sepals broad 1-nerved, lip narrowly panduriform papillose terminating in two slender tails separated by a broad sinus, column-arms rounded spreading.

PERAK; on rocks, alt. 3-4000 ft., *King's Collector*.

Pseudobulb $\frac{1}{2}$ in. diam., sheathed. *Leaf* 1 in., membranous. *Scape* and *raceme* 2-3 in.; pedicels very short; flowers dark blue, $\frac{1}{10}$ in. across; sepals broadly oblong obtuse, and petals nearly flat; lip cellular, with an obtuse tooth or lobule between the tails, disk and 3 med. an obtuse ridges.

17. ***M. furcata***, *Hook. f. Ic. Pl.* t. 1827 A; leaf small solitary on the small subglobose pseudobulb elliptic and acute or ovate and acuminate, bracts lanceolate, flower very small, sepals obtuse 1-nerved, lip narrowly panduriform 2-lobed beyond the middle, lobes linear-oblong fimbriate on the outer edge, sinus subacute, column-arms spreading.

PERAK. *Scortechini*.

Pseudobulb $\frac{1}{2}$ in., sheathed. *Leaf* 1-2 $\frac{1}{2}$ in., membranous. *Scape* with *raceme* 2-5 in.; bracts shorter than the pedicels; flowers $\frac{1}{12}$ in. across; sepals oblong obtuse, and petals nearly flat; lip contracted at the middle, 3-nerved at the base.

††† *Lip crenulate, toothed or pectinate.*

18. ***M. Rheedii***, *Wight Ic.* t. 902 (*not of others*); stem stout, leaves 3-5 shortly petioled broadly ovate or elliptic, raceme elongate lax-flid., bracts lanceolate deflexed, lip rounded reniform or fan-shaped pectinate. *Dalz. & Gibs. Bomb. Fl.* 260 (*excl. syn.*); *Hook. f. Ic. Pl.* t. 1832. *M. versicolor*, *Lindl. Gen. & Sp. Orchid.* 21; *Wall. Cat.* 1939; *Ridley in Journ. Linn. Soc.* xxiv. 343. *Liparis prionchilus*, *Lodd. Bot. Cab.* t. 1751. ? *L. intermedia*, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 17, *Malaxis Rheedii*, *Herb. Heyne*.—*Rheede Hort. Mal.* xii. t. 27.

The DECCAN PENINSULA, common in the Western Ghats.

Stem 3-6 in., slender or stout, stoloniferous. *Leaves* 3-7 by 1 $\frac{1}{2}$ -3 in., acute or acuminate, 5-7-nerved, base equal or not; petiole $\frac{1}{2}$ -3 in., rarely 0. *Scape* with *raceme* 4-12 in., stout or slender; flowers very variable in size and colour, greenish yellow or purplish, sweet-scented; sepals obtuse, dorsal often the longest and narrowest.—This is unquestionably *Rheede's* plant, to which the Javan and Pacific *M. plantaginea* has been erroneously referred. *Rheede* describes the abundant spiral vessels, which are so conspicuous in this genus and in *Liparis*.

19. **M. versicolor**, *Wight Ic. t. 901* (not of Lindl.); stem short, pseudobulb ovoid, leaves 2 rarely 3 sessile or shortly petioled ovate to lanceolate, raceme usually dense-fl., bracts lanceolate deflexed, flowers small, lip short cuneate or subreniform pectinately toothed, style-arms spreading subacute. *M. pratensis*, *Ridley in Journ. Linn. Soc. xxiv. 344*. *Liparis densiflora*, *A. Rich. in Ann. Sc. Nat. Ser. 2, xv. 18, t. 1 B*.

The DECCAN PENINSULA; on the hills from the Nilghiris southwards. CEYLON; at Ratnapoora, *Thwaites*.

Nearly allied to *M. Rheedii*, but always small and pseudobulbous, with sessile or subsessile leaves and smaller flowers in denser spikes. The lip accords well, as does the column. Flowers yellow or purple. *Thwaites*, and, following him, *Ridley*, refer *Thwaites*' 2743 to *M. Rheedii*, but its habit and pseudobulbs are entirely those of *versicolor*; on the ticket *Thwaites* names it *M. luteola*, to which species also *Ridley* refers it (by oversight in one or the other case).

VAR. *luteola*; flowers larger. *M. luteola*, *Wight Ic. t. 1632*; *Ridley l. c. 345* (excl. *Hab. Ceylon*).—Nilghiri Hills, *Wight*.—I find no other difference than the size of the flower whereby to distinguish this from *M. versicolor*.

20. **M. lancifolia**, *Thwaites Enum. 269*; stemless, pseudobulb small or 0, leaves 5–8 rather long-petioled lanceolate acuminate, raceme dense-fl., bracts lanceolate suberect, flowers small, lip short almost semicircular with the convex margin to the column the other deeply 6–8-toothed, column stout, arms suberect. *Ridley in Journ. Linn. Soc. xxiv. 346*; *Hook. f. Ic. Plant. t. 1830*.

CEYLON; in the Saffragam and Ambagamowa districts, *Thwaites*.

Root fibrous. Leaves 2–4 by $\frac{1}{2}$ – $\frac{3}{4}$ in., 3-nerved; petiole $\frac{1}{4}$ – $1\frac{1}{4}$ in., rather slender. Scape and raceme 4–6 in.; flowers about $\frac{1}{2}$ in. across, yellow?—Resembles a narrow-leaved *M. versicolor* with long petioles. The suberect bract is an excellent character indicated by *Thwaites*.

21. **M. Stocksii**, *Hook. f. Ic. Pl. t. 1833*; leaves 2–3 shortly petioled ovate or ovate-lanceolate, bracts lanceolate deflexed, flowers rather large, lip much broader than long transversely oblong or very broadly flabelliform deeply palmately lobed strongly nerved, arms of column suberect rather broad. *M. luteola*, *Herb. Ind. Or. H.f. & T.* (not of *Wight*).

The DECCAN PENINSULA; on the Bababoodan Hills in Canara, *Stocks*, &c.

Stem 1–2 in. Leaves $1\frac{1}{2}$ –3 in., 3–5-nerved. Scape with raceme 2–4 in.; flowers yellow, $\frac{1}{2}$ in. across.—This differs from all the preceding species in the great breadth and deep lacinix of the lip, and further from *M. versicolor* (to the var. *luteola* of which it approaches in the large flowers) in the absence of pseudobulbs.

22. **M. crenulata**, *Ridley in Journ. Linn. Soc. xxiv. 346*; stem short hardly pseudobulbous, leaves 1 or 2 shortly petioled lanceolate, scape and raceme 4 in., bracts lanceolate deflexed, flowers small, lip shortly clawed rounded-reniform crenulate, column broader and shorter than in *M. Rheedii*.

WESTERN NILGHIRIS, *Beddome* (in *Herb. Mus. Brit.*).

The above description from the work quoted barely suffices to distinguish this from *M. Rheedii*, except by the fewer leaves, and less deeply cut lip.

3. LIPARIS, Richard.

Terrestrial or epiphytic; pseudobulbous or not. Leaves 1 or more,

membranous and continuous with their sheath, or thicker and jointed on the sheath or pseudobulb. *Flowers* small, in terminal racemes, resupinate. *Sepals* spreading, recurved or revolute, margins often revolute. *Petals* as long, very slender. *Lip* adnate to the base of the column, usually broad, deflexed from a very short base, or recurved. *Column* long, incurved, margined or winged towards the tip; anther terminal; pollinia 4.—Species about 100, temperate or tropical.

Sect. I. MOLLIFOLIÆ. *Leaves* membranous, not jointed at the base on their sheath or pseudobulb, usually broad, often petioled.

* *Lip* broad, abruptly deflexed from very base, flat or with deflexed sides. *Sepals* narrow and petals with recurved or revolute margins; lateral sepals usually placed under the lip.

† *Leaf* solitary.

1. ***L. cordifolia***, Hook. f. *Ic. Pl.* t. 1811; leaf solitary sessile broadly rounded-ovate deeply cordate amplexicaul, bracts small triangular or lanceolate, pedicels long filiform, sepals lanceolate acute 3-nerved, lip large flat obcordate or orbicular-obovate apiculate crenulate, column very slender incurved.

NORTH-WEST HIMALAYA (drawing in *Herb. Kew*). SIKKIM; at Yoksun, alt. 6000 ft., Clarke. KHASIA MTS., alt. 3-6000 ft., Griffith, J. D. H. & T. T. (*Liparis*, No. 8).

Pseudobulbs short, stout, crowded. *Stem* short, stout. *Leaves* 2-5 by $1\frac{1}{2}$ -4 in., acuminate; nerves distant, faint. *Scape* naked, with the raceme 4-5 in. *Sepals* lanceolate, 3-nerved; lip $\frac{3}{4}$ - $\frac{1}{2}$ in. long, yellow-green, base narrow, callus obscure. *Column* obscurely winged.—Referred to *L. rupestris*, Griff., by Ridley, but the flowers are large and the bracts minute.

2. ***L. rupestris***, Griff. *Notul.* iii. 276; "pseudobulb formed after flowering obpyriform sheathed, leaf solitary petioled broadly cordate acute, scape angled and winged, bracts minute lanceolate much shorter than the pedicels, flowers small resupinate, sepals linear convolute, lateral placed under the flat oblong membranous veined lip, column forming a semicircle top clavate margined."—Griffith.

KHASIA MTS.; on rocks at Nunklow, Griffith.

I know of no Khasian small-flowered plant answering to this description, nor can I follow Ridley in his reference to it of Reichenbach's *L. rostrata*, or of the Nunklow plant of myself and Thomson (which is, I think, *nepalensis*), or of Royle's and Thomson's N.W. Indian species. Ridley's var. *purpurascens*, with 2 leaves, from Sikkim, collected by myself, is *L. pulchella*.

3. ***L. Thwaitesii***, Hook. f.; leaf solitary petioled ovate-cordate acute 5-nerved, bracts lanceolate, sepals lanceolate 3-nerved, lip broadly oblong or subovate retuse base 2-toothed, column slender incurved with 2 erect teeth. *L. Wightiana* in part, *Thwaites Enum.* 294; Ridley in *Journ. Linn. Soc.* xxii. 278.

CEYLON; in the Central Province, alt. 3-5000 ft., Thwaites (C.P. 3179).

Pseudobulbs tufted; stem 1-3 in., rather slender, sheaths acute. *Leaf* 2-3 in., crenulate, nerves strong. *Scape* 2-6 in.; bracts $\frac{1}{2}$ in., shorter than the capillary pedicels; lip $\frac{1}{2}$ in. long, red-purple, covering the sepals, contracted below the narrow 2-auricled base.—Very different from Wight's *L. atropurpurea*, with which Thwaites and Ridley have united it, in the solitary petioled crenulate leaf, column, &c.

4. **L. Glossula**, *Reichb. f. in Linnæa* xli. 43; leaf sessile or shortly petioled oblong or linear-oblong obtuse or acute entire, scape stout, bracts long slender lanceolate, sepals lanceolate acute 3-nerved, lip large flat broadly obovate-oblong cuspidate crenulate, calli 0. *Ridley in Journ. Linn. Soc.* xxii. 268; *Hook. f. Ic. Pl.* t. 1809.

WESTERN and CENTRAL HIMALAYA; Kumaon, alt. 5-7500 ft., *Edgeworth, Strachey & Winterb.* (*Liparis nepalensis*), *Duthie*; Nepal, *Wallich*; Sikkim, at Chumbi, *King's Collector*.

Pseudobulbs large for the plant. *Stem* 1-3 in.; sheaths appressed, obtuse. *Leaf* 2-4 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in.; nerves many, slender. *Scape* 4-7 in.; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., shorter than the pedicels; lip $\frac{1}{2}$ - $\frac{3}{4}$ in. long, overlying the lateral sepals. *Column* not long, curved, wings very short.

5. **L. Gamblei**, *Hook. f. Ic. Pl.* t. 1812; leaf sessile oblong obtuse or acute often crenulate, scape stout, bracts short ovate acute, sepals oblong-lanceolate obtuse 3-nerved, lip elliptic acute crenulate sides reflexed, calli 2 small near the base, column slender incurved with notched wings.

SIKKIM HIMALAYA; at Rungbee, *Clarke*; Sinchul, alt. 6500 ft., *Gamble*.

Habit of *L. Glossula*, but leaf often crenulate, bracts much broader, flowers much smaller, and lip very different.

6. **L. diodon**, *Reichb. f. in Linnæa* xli. 43; leaf elongate spatulate fleshy membranous oblong obtuse, scape angled naked, bracts minute, sepals linear, petals filiform, lip cuneate and angled on both sides at the base then dilated subquadrate crenulate at the end and apiculate column slender curved 2-toothed at the base. *Ridley l. c.* 285.

N.W. HIMALAYA; Kumaon, in the Debra Doon, *Hort. Wil. Sanders*.

The "fleshy membranous" leaf is anomalous. *Reichenbach* places this amongst the *Mollifolia*. *Ridley* removes it to *Coriifolia*, but gives no reason.

†† Leaves 2, rarely 3.

7. **L. nepalensis**, *Lindl. in Wall. Cat.* 1945; *Bot. Reg. sub. t.* 882; *Gen. & Sp. Orchid.* 28; leaves 2 large petioled from ovate to orbicular acute base rounded or cordate, bracts large lanceolate, sepals lanceolate acuminate, lip sessile ovate or ovate-lanceolate acuminate, calli small, column incurved, wings obscure. *Ridley in Journ. Linn. Soc.* xxii. 278. *Malaxis cordifolia*, *Smith in Rees Cyclop.* *Acianthus petiolatus*, *Don Prodr.* 29.

SUBTROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 3-5000 ft., *Griffith, &c.* KHASIA HILLS, *J. D. H. & T. T.*

Rootstock creeping, stout; *pseudobulbs* short, $\frac{3}{4}$ -1 in.; *stem* usually developed, $\frac{1}{2}$ -3 in. *Leaves* usually both petioled, but upper sometimes sessile on the scape. *Scape* and *raceme* 4-10 in.; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in.; pedicels $\frac{1}{2}$ in.; lip $\frac{1}{2}$ in. long or less, dark purple; base not amplexicaul, sides reflexed.

8. **L. pulchella**, *Hook. f. Ic. Pl.* t. 1810; leaves 2 broadly ovate-cordate subacute radical long-petioled or one sessile on the slender scape the other free, racemes few- and lax-fl., bracts lanceolate, sepals lanceolate 3-nerved green, lip flat broadly orbicular-oblong retuse or obtuse and petals purple, column very slender incurved with a small decurved rounded or tooth-like wing. *L. rupestris*, *var. purpurascens*, *Ridley l. c.* 268.

KHASIA Mts.; at Myrung, Moflong and Surureem, alt. 5-6000 ft., *J. D. H. & T. T.* (*Liparis*, No. 7). NAGA HILLS, *Prairie*.

Rootstock slender, creeping; *pseudobulbs* $\frac{1}{2}$ in.; *stem* slender, 1-3 in. *Leaves*

1½–2 in., subacute, nerves very faint; petiole as long, slender. *Scape* and *raceme* 3–6 in., slender; bracts ¼–½ in.; pedicels slender; lip ½ in. long, calli very obscure, base rounded.—Near *L. nepalensis*, but much smaller, more slender, and with lip of a different shape and a column with hooked wings.

9. ***L. rostrata***, *Reichb. f. in Linnæa* xli. 44; leaves 2 opposite sessile or petioled elliptic ovate or oblong obtuse or subacute narrowed at the base, bracts small broad, sepals lanceolate 3-nerved, lip very broadly obcordate flat crenulate apiculate yellow-green, calli 0, column short rather stout incurved with a small rounded wing. *Hook. f. Ic. Pl.* t. 1813. *L. olivacea* in part, *Herb. Ind. Or. H. f. & T.* (not of Lindl.). *L. rupestris* in part, *Ridley in Journ. Linn. Soc.* xxii. 145 (not of Griffith).

TEMPERATE HIMALAYA, *Royle*; Simla, alt. 6–8000 ft., *Thomson*; Kumaon, 5–7000 ft., *Edgeworth*.

Pseudobulb ½–¾ in., tufted on a short rootstock, broadly ovoid; stem stout, erect, 1–3 in. *Leaves* ½–3 in.; petiole broad. *Scape* stout with the *raceme* 2–6 in.; bracts ½–¾ in., base broad; pedicels slender, ¼–½ in.; lip ½–¾ in. broad, base contracted, cordate, calli 0.—Differs conspicuously from *L. olivacea* in the small bracts. *Ridley* has referred this to Griffith's *rupestris*, and gives Assam and the Khasia Mts. as localities. It cannot, however, be Griffith's *rupestris* (which has a solitary cordate leaf and lanceolate bracts), nor is it a Khasian plant. It is certainly *Reichenbach's rostrata*, under which that author refers to the specimen in *Lindley's* herbarium fastened on a sheet with *L. olivacea*.

10. ***L. Cathcartii***, *Hook. f. Ic. Pl.* t. 1808; leaves 2 opposite petioled oblong ovate or subcordate, bracts minute broad, sepals lanceolate acuminate 3-nerved, lip obcordate or rounded obovate flat entire or obscurely crenulate, calli 2 basal elongate, column long and very slender curved truncate with very obscure rounded wings. *L. rupestris* in part, *Ridley in Journ. Linn. Soc.* xxii. 145 (not of Griffith).

SIKKIM HIMALAYA, alt. 8–10 000 ft., *J. D. H., Clarke*.

Habit of *L. rostrata*, but with a narrower lip and very different column. A figure of apparently this species is amongst the *Cathcart* drawings in *Herb. Kew* with a straw-coloured lip; in my specimens the lip was pale purple.

11. ***L. olivacea***, *Lindl. in Wall. Cat.* 1942; *Gen. & Sp. Orchid.* 27; leaves 2 opposite sessile lanceolate acuminate plicate, bracts linear-lanceolate deflexed, sepals linear-oblong obtuse 5-nerved, lip flat orbicular subcrenulate, calli 2-tubercled, column rather stout slightly curved, wings very narrow. *Ridley in Journ. Linn. Soc.* xxii. 263.

NFPAL. *Wallich*.

Pseudobulb small, pyriform; stem 1 in., sheathed. *Leaves* 2½–3 in., spreading, 5-nerved. *Scape* 3–5 in., stout; pedicels about ½ in.; lip ¼ in. diam., suddenly contracted into a very short narrow neck, veined.—I have seen only *Wallich's* three specimens.

12. ***L. campylostalis***, *Reichb. f. in Linnæa* xli. 43; pseudobulb tunicate, leaves 2 cuneate oblong obtusely acute, scape angular, bracts most minute triangular, flowers as large as *L. Loeselii*, sepals linear-lanceolate, lip embracing the base of the column obtusely 5-angled behind retuse in front, callus 0, column curved broader near the fovea. *Ridley in Journ. Linn. Soc.* xxii. 273.

INDIA; locality unknown.

Evidently near *L. Cathcartii*, which, however, has an obcordate lip.

13. **L. platyphylla**, *Ridley in Journ. Linn. Soc.* xxii. 265; stem slender, leaves 2 spreading ovate or ovate-lanceolate acute 7-nerved, bracts lanceolate, at length reflexed equalling the pedicels, sepals lanceolate ligulate, lip orbicular-obovate subretuse crenulate 2-tubercled, column short thickish, wings long narrow obtuse.

TRAVANCORE; on the Anamallay Hills, alt. 3500 ft., *Beddome*.

Stem 1-2 in. *Leaves* 4 by 3 in. *Scape* a foot, weak, many-fl. — Allied to *L. olivacea*, but differing in the broader leaves and crenulate lip. Description from *Ridley*, l. c.

14. **L. Wightiana**, *Thwaites Enum.* 295; leaves 2 opposite sessile ovate-lanceolate acuminate, bracts lanceolate, sepals lanceolate acuminate 3-nerved, lip orbicular or orbicular-oblong flat dull purple entire, calli 2 minute, column very slender sigmoidly incurved, wings very obscure. *Ridley in Journ. Linn. Soc.* xxii. 278. *L. atropurpurea*, *Wight Ic.* t. 904 (not of *Lindl.*).

TRAVANCORE? on the Pulney Mts., *Wight*. CEYLON, *Walker*; Central Province, alt. 3-5000 ft., *Thwaites*.

A small delicate species. *Pseudobulbs* tufted; stem very short. *Leaves* 1½-2 in. *Scape* with *raceme* 2-4 in.; bracts ½ in. shorter than the capillary pedicels; lip ¾-1 in. long. — I have seen no Travancore specimens.

15. **L. Beddomei**, *Ridley in Journ. Linn. Soc.* xxii. 268; leaves 2 rarely 3 ovate-lanceolate acuminate, scape angled, bracts minute, sepals narrowly ligulate, lip flat orbicular-oblong obtuse green with a purple spot on the disk, column very slender arched, wings minute.

TRAVANCORE; on the Pulney Mts., alt. 5000 ft., *Beddome*.

This, which inhabits the same mountains as *L. Wightiana*, appears to differ only in the minute bracts ¼ in. long. I have seen no specimens.

16. **L. venosa**, *Ridley in Journ. Linn. Soc.* xxiv. 350; tall, stout, leaves 2 opposite, sepals broadly ovate, bracts minute, pedicels long slender, sepals lanceolate 5-nerved, lip flat obovately obcordate retuse with a semilunar ridge at the base, column short straight, wings decurrent.

MALACCA, *Maingay (Kew Distrib.* 1600). PERAK, *Scortechini*. SINGAPORE (a drawing).

Rootstock creeping, as thick as the little finger, with crowded tufts of thick roots; stem short, stout, sheathed. *Leaves* 2-3 in. broad, nerves red beneath. *Scape* and *raceme* stout, 2 ft.; flowers scattered; pedicels very slender, ½-1 in. *Sepals* nearly ½ in. long, yellow. *Lip* sessile, but not embracing the column, red purple. — The specimens are very badly preserved.

17. **L. Trimenii**, *Ridley in Journ. Linn. Soc.* xxiv. 350; small, leaves 2 unequal ovate-lanceolate, scape terete, bracts lanceolate, flowers shortly pedicelled, bracts erecto-patent, lip flat broadly elliptic obtuse, margins faintly waved, tip rounded, calli 2 small basal, column long incurved, wings minute. *Hook. f. Ic. Pl.* t. 1836.

CEYLON; at Hangkela, *Trimen*.

Pseudobulb not developed. *Leaves* 1-1½ in., 5-nerved. *Scape* with *raceme* 1-3 in.; bracts about equalling the pedicels. *Lip* sessile, not embracing the column, ½ in. long. — I am indebted to Dr. Trimen for specimens. Except by its much smaller size, it is undistinguishable from *L. Wightiana*, *Thw.*

** Lip usually broad deflexed or recurved. Lateral sepals spreading.

† *Bracts very small, short.* (See also *L. paradoxa* & *brachyglottis*.)

18. ***L. bituberculata***, *Lindl. in Bot. Reg. sub. t. 882*; stem usually tall, leaves 2 or more subopposite sessile or petioled elliptic-lanceolate acute, bracts minute broad, sepals linear-oblong obtuse, lip decurved cuneately obovate retuse purple 2-tubercled, column curved, wings narrow rounded. *Ridley in Journ. Linn. Soc. xxii. 263.* *Empusa paradoxa, Wall. Cat. 1937/2.* *Cymbidium? bituberculatum, Hook. Exot. Fl. t. 116.* *Sturmia bituberculata, Reichenb. f. in Bonplandia, ii. 22.*

SUBTROPICAL HIMALAYA; Kumaon, *Blinkworth*; Nepal, *Wallich*; Sikkim, alt. 5-7000 ft., *Griffith, J. D. H.*

Stems 2-4 in., tufted, hardly pseudobulbous. *Leaves* 3-5 in., very variable, nerves rather strong. *Scape* stout, few- or many-flid.; bracts $\frac{1}{10}$ - $\frac{1}{10}$ in., ovate, acute; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in. *Lateral sepals* often revolute or recurved. *Lip* shorter than the sepals, margins quite entire.—*Ridley* describes the bracts as lanceolate; they are very small, by which character the species is best distinguished from all its allies but the two following.

Var. ? khasiana, leaves broader more ovate or orbicular-ovate sessile or shortly petioled, lip cuneately orbiculate, column much shorter and broader, capsule $\frac{1}{2}$ - $\frac{3}{4}$ in.—*Khasia Mts.*, alt. 4-6000 ft., *Griffith, &c.*—Perhaps a different species.

19. ***L. macrocarpa***, *Hook. f.*; tall, robust, leaves 4-6 large broadly petioled obliquely elliptic-ovate or oblong acuminate nerves 7 strong, bracts minute, capsules $1\frac{1}{4}$ - $1\frac{1}{2}$ in. elliptic-oblong.

SIKKIM HIMALAYA and the KHASIA MTS., in tropical forests, *J. D. H.*

Resembles a very large state of *L. bituberculata*, but is, I have no doubt, a very distinct species; the stem is sometimes as thick as the little finger, more or less naked and fleshy, the leaves very unequal at the base, with petioles 1-3 in., and the fruiting scape is 12-18 in. high.

20. ***L. acuminata***, *Hook. f.*; leaves 5-6 sessile erect broadly sheathing lanceolate finely acuminate, bracts minute ovate, flowers large, sepals spreading, lateral falcately oblong-lanceolate acute 5-nerved, dorsal linear, lip slightly recurved transversely oblong subcrenulate contracted into a short 2-tubercled neck, column slender incurved truncate, wings very small.

KHASIA MTS., *Griffith*.

Stem 3-5 in., many-sheathed to the base which is not swollen. *Leaves* very membranous, slightly recurved; nerves very slender. *Scape* 4-6 in.; bracts $\frac{1}{10}$ in., ovate; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in.; buds $\frac{1}{2}$ in., falcate; lip with erect sides, slightly recurved.

21. ***L. barbata***, *Lindl. Gen. & Sp. Orchid. 27*; small, leaves 2 opposite subsessile elliptic subacute, bracts minute broad, flower small pale, sepals obtuse, lateral oblong 3-nerved, dorsal rather longer and narrower 1-nerved, lip oblong, base 2-auricled 2-tubercled, tip truncate slightly dilated erose and subfimbriate, column incurved, wings short rounded toothed. *Ridley in Journ. Linn. Soc. xxii. 276.*

CEYLON, *Macrae*.

Stem $1\frac{1}{2}$ in., not pseudobulbous. *Leaves* 2 by $1\frac{1}{2}$ in., nerves very slender. *Scape* and *raceme* 2 in., pedicels $\frac{1}{2}$ in.; flower about as much across, apparently green.—Described from a solitary specimen in *Herb. Lindl.* I find in two flowers examined no trace of the hairs on the lip described by *Lindley* and *Ridley*.

†† *Bracts lanceolate* (shorter in *L. paradoxa* & *brachyglottis*).

22. **L. ferruginea**, Lindl. in *Gard. Chron.* 1848, 55; tall, leaves 4-6 subcoriaceous very narrowly linear-lanceolate acuminate, scape $1\frac{1}{2}$ -2 ft., bracts lanceolate, sepals 5-nerved, lateral falcately oblong obtuse spreading, dorsal longest linear-oblong obtuse, lip revolute cuneately obovate, base 2-auricled, apex shortly 3-lobed papillose beyond the middle, column short stout. *Ridley in Journ. Linn. Soc.* xxii. 264.

PERAK, *King's Collector*. MALACCA, *Griffith*.—DISTRIB. Borneo, Siam.

Stems tufted, swollen at the base. *Leaves* 6-12 by $\frac{1}{4}$ -1 in., subplicate, nerves strong. *Scape* sometimes as thick as a swan's quill, ribbed, nearly naked; bracts $\frac{1}{2}$ in.; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in. *Dorsal sepals* $\frac{1}{2}$ in. long; lip yellow-brown. *Capsules* $\frac{1}{2}$ in., clavate, twice as long as their pedicels.

23. **L. Jovis pluviæ**, *Parish and Reichb. f. in Trans. Linn. Soc.* xxx. 155; stem short, leaves 2-4 sessile or petioled ovate to lanceolate acuminate, bracts lanceolate reflexed after flowering, flowers very small, sepals obtuse, lateral short falcately oblong obtuse 5-nerved, dorsal much longer lanceolate 3-nerved, lip recurved reniform crenulate base 2-tubercled, column incurved, wings short rather broad uncinatè.

TENASSERIM; at Mouhmein, *Lobb, Parish*.

Stem short, thickened, but hardly pseudobulbous below. *Leaves* 3-5 in., very membranous, 5-nerved, petiole broad if present. *Scape* 6-8 in., slender; bracts slender, $\frac{1}{2}$ in. and less; flowers about $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.; lip variable in breadth, narrowed into a very short 2-auricled claw. *Capsule* clavate.—Flowers in the rainy season, whence the name.

24. **L. deflexa**, *Hook. f.*; stem short, leaves 2 opposite sessile or petioled ovate-lanceolate acuminate, scape tall, bracts slender at length deflexed, sepals 3-5-nerved obtuse, lateral oblong, dorsal longer oblong-lanceolate, lip flabelliform, calli obscure, column short straight flattened truncate, wings 0.

SIKKIM HIMALAYA; at Darjeeling, *Griffith's Collectors*.

Stem with a pseudobulbous base; sheaths few. *Leaves* 4-8 in., very membranous, 5-nerved. *Scape* and slender and many-fid. raceme 8-12 in.; bracts very slender, lower $\frac{1}{2}$ in.; pedicels $\frac{1}{2}$ in.; flower about $\frac{1}{2}$ in. across. *Lip* with a contracted 2-auricled base. *Column* compressed from back to front. *Capsule* $\frac{1}{2}$ in., clavate.—The column distinguishes this at once from *L. tuberculata* and *Jovis pluviæ*.

25. **L. stenoglossa**, *Parish and Reichb. f. in Trans. Linn. Soc.* xxx. 154; leaves 3-4 subradical petioled elliptic-lanceolate acuminate, scape slender lax-fld., bracts very long spreading lanceolate nearly as long as the ovary, sepals 5-nerved subacute, lateral spreading oblong-ovate, dorsal longer narrower, lip short reflexed cuneately obovate shortly broadly 2-lobed constricted above the middle, base 2-auricled and 2-tubercled, column incurved, wings very narrow. *Ridley in Journ. Linn. Soc.* xxii. 279.

TENASSERIM; at Moulmein, *Parish*.

Stems very short, tufted, base slightly swollen. *Leaves* 3-4 in., narrowed into a petiole $1\frac{1}{2}$ in. or shorter. *Scape* slender, 5-6 in.; bracts $\frac{1}{2}$ in.; flowers about as much across. *Lip* with a broad acute sinus at the broad tip.

26. **L. paradoxa**, *Reichb. f. in Walp. Ann.* vi. 218; leaves 1-5 sessile erect alternate sheathing lanceolate acuminate, nerves strong, scape stout

angular, bracts spreading ovate not reflexed after flowering lanceolate, flowers coriaceous, sepals short obtuse 5-nerved, lateral falcately oblong spreading and recurved, dorsal longer narrower, lip recurved cuneately obovate or obcordate, base 2-tubercled, column incurved, wings narrow. *Ridley in Journ. Linn. Soc.* xxii. 261. *L. odorata*, *Lindl. Gen. & Sp. Orchid.* 26; *Thwaites Enum.* 295. *Empusa paradoxa*, *Lindl. in Wall. Cat.* 1937 A in part; *Bot. Reg. sub. t.* 825; *Gen. & Sp. Orchid.* 17; *Miquel Prolus. Fl. Jap.* 135; *Thwaites Enum.* 426. *Empusaria* sp., *Reichb. f. Conspect.* 69. *Malaxis lancifolia*, *Smith in Rees Cyclop.* *M. odorata*, *Willd.—Rheede Hort. Mal.* xii. t. 23.

TEMPERATE and SUBTROPICAL HIMALAYA; Kumaon, alt. 6000 ft., *Blinkworth*; Nepal, *Wallich.* KHASIA MTS., alt. 4-6000 ft., *Griffith*, &c. BENGAL, at Mymeringh, *Clarke.* The CONCAN and MYSORF, *Stocks, Law*, &c. CEYLON; alt. 2-5000 ft., *Thwaites.*—DISTRIB. Java, Siam, China, Japan.

Very variable in habit, 6-18 in. high; stem tufted, base sometimes pseudobulbous. *Leaves* 2-8 in., rarely elliptic-lanceolate and narrowed into a broad petiole, membranous or subcoriaceous. *Scape* 4-10 in., naked or nearly so, rigid; bracts variable in length, $\frac{1}{2}$ in. and longer, not reflexed; pedicels usually short and stout; flowers about $\frac{1}{2}$ in. across, yellow-brown; ribs of ovary wrinkled. *Lip* variable in breadth, sides erect. *Capsules* clavate.—I follow *Ridley* in accepting the name of *paradoxa* for this plant, though, as he points out, *L. odorata* is the oldest. The latter name is, as *Thwaites* states, inapplicable. I have seen no Ceylon specimens.

VAR. *Parishii*; leaves narrowed at the base or broadly petioled flat more membranous, scape taller and flowers longer.—Tenasserim, *Lobb, Parish.*

27. ***L. Dalzellii***, *Hook. f.*; tall, stem as thick as the thumb, leaves 2-3 sessile elliptic-ovate acute, scape stout, bracts lanceolate not deflexed spreading, flowers $\frac{1}{2}$ in. across, sepals 5-nerved obtuse sides recurved, lateral falcately oblong, dorsal longer linear-oblong, lip broadly obcordate fleshy dark purple, base 2-tubercled, column stout incurved, wings rounded.

SOUTH CONCAN, *Dalzell.*

I have seen only one specimen of this remarkably gigantic species, of which the sheathed stem 4 in. long, and $\frac{3}{8}$ in. diam., terminates below in a small pseudobulb. *Leaves* 4-6 by $2\frac{1}{2}$ -3 in. *Scape* stout; bracts $\frac{1}{2}$ in. long, not deflexed; pedicels $\frac{1}{2}$ in., stout; flowers twice as large as those of *L. paradoxa*.

28. ***L. Walkeriæ***, *Graham in Bot. Mag.* t. 3770; stem stout, leaves 2-3 petioled ovate or orbicular acute, racemes many-fl., bracts lanceolate spreading, sepals obtuse 5-nerved, lateral flat falcately oblong, dorsal longer linear-oblong sides recurved, lip orbicular recurved crenulate, base contracted 2-tubercled, column incurved, wings uncinat. *Thwaites Enum.* 295; *Ridley in Journ. Linn. Soc.* xxii. 277.

DECCAN PENINSULA; on the Ghats from the Nilghiri Hills to Travancore, *Wight*, &c. CEYLON; Central Province, alt. 3-5000 ft., *Walker*, &c.

Stem 2-4 in., base pseudobulbous. *Leaves* 2-4 by $1\frac{1}{2}$ -4 in., 7-nerved, base sometimes very unequal; petiole 0-1 $\frac{1}{2}$ in. *Scape* with raceme 3-6 in.; bracts $\frac{1}{2}$ in., not deflexed; pedicels rather large; flowers about $\frac{1}{2}$ in., pale. *Lip* wrinkled and rather fleshy.—I have examined many flowers, but find no lip to be at all oblong, but always more or less rounded, as described by *Graham*; but when the lip is figured as oblong, it is because of the sides being incurved and foreshortened. It is very difficult to flatten out the lips of species in which it is recurved.

29. ***L. atropurpurea***, *Lindl. Gen. & Sp. Orchid.* 28; stem stout, leaves 3-4 petioled ovate or orbicular, base very oblique and unequal, bracts lanceolate spreading, sepals very long linear obtuse, all with recurved sides,

dorsal 3- lateral 5-nerved, lip recurved orbicular-obovate fleshy with 2 large long tubercles at the narrowed base, column very slender curved, wings large rounded. *Thwaites Enum.* 295; *Ridley in Journ. Linn. Soc.* xxii. 277 (excl. syn. *L. livida*); *Bot. Mag.* t. 5529. *L. olivacea*, and *L. Walkeriæ*, *Wight Ic.* t. 903, 905.

TRAVANCORE; on the Pulney Mts., *Wight*. CEYLON, *Macrae*; elevated parts of the Central Province, *Thwaites*, &c.

Habit and foliage of *L. Walkeriæ*, but leaves always extremely unequal at the base, with one side rounded or auricled and the other acute, margins smooth or crisped; scapes taller, racemes longer, and flowers very much larger and dark vinous purple, the dorsal sepal $\frac{3}{4}$ of an inch long.—*L. livida*, Lindl., included under *atro-purpurea* by Ridley, is a very different plant (see end of genus). Lindley has fastened on the same sheet with this in his Herbarium a specimen of *L. Walkeriæ* with the habitat “Khasia, Lobb,” which I doubt not is an error for the Nilghiri Hills, where Lobb also collected.

30. ***L. brachyglottis***, *Reichb. f. in Trimen Cat. Pl. Ceylon*; small, leaves 2 alternate petioled or the upper sessile ovate or ovate-cordate acuminate, bracts ovate concave, flowers very small, sepals obtuse 3-nerved, lateral broadly ovate-oblong, dorsal much longer lanceolate, lip short transversely oblong with obscure basal thickenings, column short straight truncate. *Ridley in Journ. Linn. Soc.* xxii. 275.

CEYLON; Central Province, alt. 5000 ft.; on Wateakelle Hill, *Thwaites*.

Stem 2-3 in., rather slender, not pseudobulbous. *Leaves* $1\frac{1}{2}$ - $2\frac{1}{2}$ in., 5-nerved. *Scape* and *raceme* 2-3 in.; bracts $\frac{1}{2}$ in., persistent, concave, not reflexed; pedicels $\frac{1}{2}$ in.; flowers about $\frac{1}{4}$ in. across, red-purple.

31. ***L. biloba***, *Wight Ic.* vi. 1633; small, leaves 2-3 petioled ovate acute undulate, flowers small, bracts $\frac{1}{2}$ in. lanceolate, sepals oblong-lanceolate acute, lateral hardly falcate, lip cuneate straight shortly clawed 2-lobed 2-tubercled, lobes oblong or lanceolate obtuse, column slender curved, wings small obtuse. *Walp. Ann.* vi. 218; *Ridley in Journ. Linn. Soc.* xxii. 276.

NILGHIRI HILLS; at Ootacamund, *Wight*.

Whole plant purplish. *Stem* $\frac{3}{4}$ in., pseudobulb $\frac{1}{4}$ in. *Leaves* 1 by $\frac{1}{2}$ - $\frac{3}{4}$ in., green or purple. *Scape* $1\frac{1}{2}$ in.; flowers very dark purple.—Wight likens it to *L. atropurpurea*, from which the 2-lobed lip distinguishes it.

Sect. II. CORNIFOLIÆ. *Leaves* jointed at the base upon the leaf-sheath or on a pseudobulb, usually coriaceous.

* Leaf usually solitary on the pseudobulb. Lip as long as the lateral sepals or nearly so (when spread out).

† *Sepals* 3-nerved (obscurely in *L. Prainii*).

32. ***L. elegans***, *Lindl. in Wall. Cat.* 1943, in *Herb. Lindl. (in part)*, *Gen. & Sp. Orchid.* 40; leaf solitary 6-12 in. narrowly obovate-oblong or oblanceolate acute, scape tall stout many-fld., bracts setaceous, flowers very small, pedicels short, sepals obtuse revolute, lip reflexed cuneately oblong truncate, tip erose retuse, calli 0, column slender, wings very small. *Rolle in Gard. Chron.* 1886, 158; *Ridley in Journ. Linn. Soc.* xxiv. 350.

PENANG, Porter, *Maingay (Kew Distrib.* 1599). PERAK, *King's Collector*.

Rootstock stout creeping; pseudobulbs hardly developed. *Leaves* $\frac{3}{4}$ -1 in. broad, 5-7-nerved. *Scape* with *raceme* 12-18 in.; bracts $\frac{1}{2}$ in., pedicel about as long; flowers as broad, yellowish. *Lip* obscurely 5-nerved. *Capsule* $\frac{1}{2}$ in. long.—Like

L. longipes, with which it was mixed in Herb. Lindl., whilst in Herb. Wall. only fragments of the former are retained. The Perak specimens have obscure side-lobes.

33. ***L. bootanensis***, *Griff. Notul.* iii. 278; *Itin. Notes*, 98; *Ic. Pl. Asiat.* t. 287; leaf solitary sessile 5-10 in. linear- or ob-lanceolate acuminate, scape very slender flexuous margined lax-fl'd., bracts subulate shorter than the filiform pedicels, flowers rather large, sepals straight, sides revolute, lip recurved cuneately oblong, tip rather dilated truncate erose, calli 2 minute, column slender, wings hooked. *Ridley in Journ. Linn. Soc.* xxii. 285, *in part*.

SIKKIM HIMALAYA (*Ic. in Herb. Kew*); BHOTAN, at the foot of the hills, *Griffith. KHASIA MTS.*, alt. 4-6000 ft.

Pseudobulb oblong, formed after flowering. *Leaf* $\frac{3}{4}$ -1 in. broad, narrowed to the base but not petioled, many-nerved. *Scape* long; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in.; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in.; flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, ochreous or reddish.—*Ridley* describes the leaves as sometimes in pairs.

34. ***L. lancifolia***, *Hook. f. Ic. Pl.* t. 1855; pseudobulbs narrow, leaf linear-lanceolate acuminate narrowed into a slender petiole, scape slender naked, bracts lanceolate shorter than the slender pedicels, sepals straight, margins revolute, lip recurved cuneately obovate, tip rounded, calli obscure, column slender, wing hooked. *L. bootanensis*, *in part*, *Ridley l. c.*

KHASIA MTS.; at Churra and Pomrang, alt. 4-5000 ft., *J. D. H. & T. T. (Liparis, No. 18)*; on Shillong, alt. 6000 ft., *Clarke, Munn.*

Pseudobulbs 1-1 $\frac{1}{2}$ in., many on a creeping stock; sheaths long, acuminate. *Leaves* 5-8 in., including the 1-2 in. petiole, thin, many-nerved. *Scape* straight or curved, hardly margined; flowers dirty yellow, like those of *bootanensis*. *Capsule* $\frac{1}{2}$ in., narrowly pyriform on a decurved pedicel.—Differs from *bootanensis* in the long narrow pseudobulbs and long petioled leaves, but may prove a form of that species.

35. ***L. pachypus***, *Parish and Reichb. f. in Trans. Linn. Soc.* xxx. 155; pseudobulb large fleshy ovoid, leaf 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in. sessile oblanceolate acuminate, scape short bracteate, bracts lanceolate shorter than the pedicels, sepals narrow obtuse straight, margins recurved, lip recurved cuneate, tip broad truncate retuse crenulate, nerves 5 outer branching, calli obscure, column slender, wings obscure. *Ridley in Journ. Linn. Soc.* xxii. 288.

TENASSEERIM; at Moulmein, *Parish*.

Pseudobulbs tufted, ovoid, 1 in. or more long and as broad. *Leaf* $\frac{3}{4}$ in. d'am., sessile, thin, midrib slender, nerves obscure. *Scape* few-fl'd.; bracts $\frac{1}{4}$ in. and less; flowers about $\frac{3}{8}$ in. across, yellow?

36. ***L. Griffithii***, *Ridley in Journ. Linn. Soc.* xxii. 285 (*in part*); leaf linear-lanceolate, scape stout and rachis broadly 2-winged, bracts very slender longer than the lower short stout pedicels, flowers small, sepals straight obtuse, sides revolute, lip recurved deltoidly obcordate with a shallow crenulate sinus, calli minute, nerves 5, lateral branched, column slender curved, wings 0. *Griff. Ic. Pl. Asiat.* t. 307, f. 1.

BHOTAN, *Griffith*.

Pseudobulb 0 on the single flowering specimen. *Leaf* 12 in., and base of short stem clothed with equitant acute sheaths. *Scape* 8 in., nearly $\frac{1}{4}$ in. broad; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., green.—*Ridley's* description includes fruiting specimens of *L. plantaginea*.

37. ***L. Prainii***, *Hook. f. Ic. Pl.* t. 1857 A; dwarf, pseudobulb small. leaf linear-oblong coriaceous keeled, scape stout strict many-fl'd., bracts

lanceolate equalling the pedicels, flowers minute, lateral sepals flat oblong obtuse obscurely 3-nerved, dorsal longest, lip recurved oblong-quadrate apiculate, base auricled embracing the column, which has minute acute apical wings.

Naga Hills in UPPER ASSAM, Prain.

Pseudobulbs $\frac{1}{2}$ in., flagon-shaped. *Leaf* 1 in., sessile, obtuse. *Scape* and *raceme* 3 in.; *bracts* $\frac{1}{2}$ in.; *flowers* $\frac{1}{10}$ in.; *petals* flat.

†† *Sepals* 1-nerved (*unknown* in *L. Mannii*).

38. **L. pusilla**, *Ridley* in *Journ. Linn. Soc.* xxii. 294; leaf 2-4 in. linear-lanceolate acute, scape slender, *raceme* dense-fl., bracts lanceolate equalling the slender pedicels, flowers minute, sepals obtuse flat or revolute, margins not recurved, lip recurved broadly oblong 5-nerved, tip rounded entire or notched, calli 0, column short incurved obscurely winged. *Hook. f. Ic. Pl.* t. 1856 A. *L. auriculata*, *Reichb. f. in Flora*, 1872, 277 (*not of Miquel*).

SIKKIM HIMALAYA; at Rungbee, *Clarke*. KHASIA MTS., alt. 4-6000 ft., common. TRAVANCORE; on the Anamallay Hills, *Beddome* (fid. *Ridley*).

Pseudobulbs $\frac{1}{2}$ - $\frac{2}{3}$ in., broad or narrowly ovoid. *Leaf* $\frac{1}{2}$ - $\frac{1}{2}$ in. broad, pale green, costa and nerves obscure. *Scape* 3-6 in., terete or margined; bracts $\frac{1}{2}$ in.; flowers $\frac{1}{2}$ in. across, white. *Lip* thick, base 2-auricled, nerves simple. *Capsule* $\frac{1}{2}$ in., globose.—*Reichb.*, followed by *Ridley*, describes the lip as panduriform, but I do not find it so; and I have *Ridley's* authority for this being his *pusilla*. Name singularly inappropriate. I have seen no Travancore specimens.

39. **L. Mannii**, *Reichb. f. in Flora*, 1872, 275; *Ridley* l. c. 286; leaf chartaceous linear-lanceolate acuminate, scape 2-edged, bracts setaceous, lower longer than the pedicelled ovary, upper much shorter, sepals linear-ligulate obtuse acute, lip recurved 3-fl., side lobes $\frac{1}{2}$ -falcate, isthmus very short narrow, midlobe transversely ovate crenulate in front, column broader above, anther acute.

ASSAM; at Obres, *Mann*.

Densely caespitose; pseudobulbs cylindric, many-sheathed; upper sheath elongate, acuminate.—I have seen no specimens. *Description* is from the author.

40. **L. Duthiei**, *Hook. f. Ic. Pl.* t. 1857 B; leaf $\frac{3}{4}$ -1 in. petioled elliptic or linear-lanceolate acute 5-nerved, scape slender equalling the leaf, bracts subulate rather shorter than the ovary, flowers minute, sepals revolute, margins not or slightly recurved, lip recurved quadrately oblong 5-nerved, tip truncate crenate, calli 0, column stout curved obscurely winged.

WESTERN HIMALAYA; Kumaon, in the Gori Valley, alt. 2-3000 ft., *Duthie*.

Pseudobulbs $\frac{1}{4}$ - $\frac{1}{2}$ in., ovoid, tufted. *Leaf* $\frac{1}{4}$ - $\frac{1}{2}$ in. broad. *Raceme* 1-1 $\frac{1}{2}$ in., rather dense-fl.; bracts $\frac{1}{10}$ in.; flowers about $\frac{1}{12}$ in. across, yellowish (when dry); lip hardly auricled at the base; nerves simple.

41. **L. obscura**, *Hook. f. Ic. Pl.* t. 1886; leaf solitary 3-4 in. narrowly oblanceolate, scape equalling or shorter than the leaf, bracts equalling or exceeding the ovary, flowers very minute, sepals lanceolate acute recurved or revolute, lip broadly oblong 3-5-nerved, tip broad subacute, column short suberect, wings obscure. *L. angustifolia*, *Thwaites Enum.* 206 (*not of Lindl.*). *L. caespitosa*, *Ridley* in *Journ. Linn. Soc.* xxii. 290 (*not of Lindl.*).

CEYLON: Central Province, alt. 2-5000 ft., *Thwaites*.

Pseudobulbs tufted, 1 in., narrow. *Leaf* $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, subacute. *Flowers* $\frac{1}{12}$ in.

diam., yellow; sepals revolute, but margins not recurved; petals flat; lip rather thick. Capsule $\frac{1}{10}$ – $\frac{1}{12}$ in.—Very near the Javan *L. angustifolia*, but the flowers and fruit are much smaller, and the lip shorter almost quadrate. The Mauritian *L. cæspitosa* also closely resembles it, but has a lanceolate lip. The capsules of all three are alike, broadly pyriform, with high ribs and flat nerved interstices.

** Leaves 2 or more rarely solitary on the pseudobulb or stem. Lip as long as the lateral sepals or nearly so (when spread out).

† Sepals 3-nerved (unknown in *L. Scortechini*).

42. ***L. bistriata***, *Parish and Reichb. f. in Trans. Linn. Soc.* xxx. 155; pseudobulbs elongate, leaves 2–4 in. elliptic-oblong or -lanceolate, scape longer than the leaves bracteate stout margined or winged, bracts lanceolate equalling the ovary, sepals oblong-lanceolate obtuse, sides revolute, lip recurved panduriform 5-nerved, tip dilated broadly truncate, calli 0, column slender incurved, wings usually hooked. *Ridley l. c.* 288; *Hook. f. Ic. Pl.* t. 1858.

SIKKIM HIMALAYA, *Griffith's Collector*; alt. 7000 ft., *J. D. H.* KHASIA MTS., alt. 5–6000 ft. NAGA HILLS, in Assam, *Prain*. TENASSERIM, *Parish*.

Pseudobulbs stem-like, 4–6 in., cylindric. *Leaves* $\frac{2}{3}$ in. broad, obtuse or apiculate, many-nerved, coriaceous, base narrowed. *Scape* 4–6 in.; bracts $\frac{1}{4}$ in.; flowers yellowish; lip undulate, sides with obscure rounded lobes, base auricled; side nerves branching.

Var. robusta; pseudobulbs shorter stouter with 2 large acute sheaths, scape very stout, bracts and flowers larger, lip obcordately panduriform, columnar wings rounded, capsule larger clavate.—Naga Hills, on Kohima, *Prain*.—Perhaps a different species.

43. ***L. lacerata***, *Ridley in Journ. Linn. Soc.* xxii. 284; pseudobulbs ovoid, leaves 2–8–10 in. narrowly oblanceolate acuminate, scape slender laxly many-fl., bracts lanceolate shorter than the ovary, sepals straight, sides recurved, lip recurved from the broad base, then straight oblong 7-nerved, tip with 2 lacerate lobes, column slender incurved, wings small rounded.

TENASSERIM; at Mergui, *Griffith*. Perak, *Scortechini*, *King's Collector*.—DISTRIB. BORNEO.

Pseudobulbs 1 in., oblong or ovoid. *Leaves* $\frac{2}{3}$ – $1\frac{1}{2}$ in. broad. *Scape* with the raceme 9–10 in.; pedicels $\frac{1}{3}$ – $\frac{1}{2}$ in.; flowers $\frac{1}{2}$ in. across, light pink; lip red, contracted below the rounded shoulders.

44. ***L. plantaginea***, *Lindl. Gen. & Sp. Orchid.* 29; leaves 2 opposite 6–10 in. sessile linear- or oblong-lanceolate acute, scape stout not winged, bracts large ovate-lanceolate, sepals obtuse 3-nerved straight, sides revolute, lip large deflexed from the base orbicular erose or crenulate veined suddenly contracted into a 2-auricled 2-tubercled short neck, column incurved, wings 0. *Ridley in Journ. Linn. Soc.* xxii. 286. *L. selligera*, *Reichb. f. in Linnaea* xli. 42. *L. orbicularis*, *Loddiges mss.*; *Gard. Chron.* N. S. xvi. (1881) 592. *L. Griffithii* in part, *Ridley l. c.* 285.

SIKKIM HIMALAYA, alt. 1–2000 ft., *Clarke*. UPPER ASSAM; at Brahmakoond, *Griffith* (*Kew Distrib.* 5069).

Pseudobulbs 2–3 in.; sheath large, membranous, acute. *Leaves* 1– $1\frac{1}{2}$ in. broad, petioled or not, 5-nerved. *Scape* with the raceme 8–12 in., flexuous; bracts $\frac{1}{3}$ – $\frac{2}{3}$ in., green, concave; pedicels rather longer; flowers 1 in. across the sepals, greenish.—The Assam specimens are flowerless. Mr. Ridley in his monograph included them under his *L. Griffithii*, but in the Kew Herbarium has separated them, marking the Assam plant as probably a form of *L. plantaginea*. The Bhotan

habitat is an error. In Lindley's Herbarium the plant is ticketed by Griffith as from the Brahmakoond.

45. **L. Scortechini**, *Hook.f.*; pseudobulb long stout, leaf 14 by $2\frac{1}{2}$ in. linear-oblong acute 5-nerved, scape as long as the leaf flowering to the base, rachis very stout, bracts small lanceolate, sepals recurved, margins recurved, lip nearly straight longer than the sepals flabellately obcordate from a narrow 2-auricled 2-tubercled neck, lobes deeply crenate, column slender incurved, wings obscure.

PERAK, *Scortechini*.

Pseudobulb subcylindric, $4\frac{1}{2}$ by 1 in. *Leaves* sessile. *Raceme* laxly many-fl., rachis $\frac{1}{8}$ in. diam.; bracts $\frac{1}{4}$ in.; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in.—Near *L. latifolia* of Java, but the bracts are much smaller, lip with a longer narrower neck and much smaller limb. A very fine species, of which I have seen only a drawing by Father Scortechini, numbered 1518, but which does not correspond with the plant so numbered in his collection.

46. **L. flaccida**, *Reichb. f. in Linnæa* xli. 44; leaves 2 6–10 in., scape and raceme very long slender, bracts minute, pedicels decurved, flowers very small, sepals obtuse 3-nerved flattish, lateral at length revolute, lip recurved narrow oblong dilated below the middle and there ciliate, tip 2-fid, lobes triangular subacute, calli 0, column incurved, wings obscure. *Ridley in Journ. Linn. Soc.* xxii. 296.

PERAK, *King's Collector*.—DISTRIB. Java, Borneo.

Pseudobulb in Perak spns. small; in Javan very large, 2 by 1 in. *Leaves* in Perak spns. 8–10 by $\frac{3}{4}$ in., narrowed from near the lip to the base, in Javan much broader, nerves 5–9. *Scape* with *raceme* much longer than the leaves, flowering nearly to the base, bracts lanceolate membranous; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in.; flower about $\frac{1}{10}$ in. across.

†† *Sepals* 1-nerved (unknown in *L. vestita*).

47. **L. longipes**, *Lindl. in Wall. Pl. As. Rar.* i. 31, t. 35, *Cat.* 1943 (in part); *Gen. & Sp. Orchid.* 40; leaves 2 linear obovate-oblong or oblanceolate, scape many-fl., bracts small lanceolate acuminate, flowers very many small white, sepals obtuse at length revolute 1-nerved, lip recurved yellow broadly ovate subacute rather fleshy, calli 0, column incurved, wings rounded. *Ridley in Journ. Linn. Soc.* xxii. 293 (excl. syn. *L. elegans*, Lindl.); *Wight Ic.* t. 906; *Thwaites Enum.* 295. *L. pendula*, *Lindl. in Bot. Reg.* 1838, *Misc.* 180; *Regel Ind. Sem. Hort. Petrop.* 1868, 79. *L. spathulata*, *Lindl. in Bot. Reg.* 1842. ? *L. nesophila*, *Reichb. f. Ot. Hamb.* i. 56. ? *L. Boothii*, *Regel Ind. Sem. Hort. Petrop.* 1864, *Suppl.* 14.

TROPICAL HIMALAYA, alt. 1–5000 ft., from Kumaon eastwards to MUNNIPOR and the KHASIA MTS., alt. 3–5000 ft., and southwards to PERAK and PENANG. NILGHIRI HILLS and southwards. CEYLON, common below 3000 ft.—DISTRIB. Malay and Pacific Islands, China.

Pseudobulbs short and ovoid, or long sometimes 6 in. and cylindric. *Leaves* 4–12 by $1\frac{1}{2}$ – $1\frac{1}{4}$ in., obtuse, acute or acuminate, 5–7-nerved. *Scape* and *raceme* 6–10 in. with a few bracts below the flowers, slender.—Variable in habit and foliage, but constant in inflorescence and flowers. The sepals are not acute, as sometimes described. The form with short pseudobulbs (*L. spathulata*) occurs everywhere with the long pseudobulbed, and intermediates abound.

48. **L. vestita**, *Reichb. f. in Flora* 1872, 274; pseudobulbs approximate subterete rod-like 2-leaved, young clothed with broad sheaths, leaves cu-

neately oblong-ligulate acute, scape subterete naked below, raceme dense-fld., bracts lanceolate equalling the ovary, sepals ligulate obtuse, lip oblong retuse angled on both sides crenulate in front, column enlarged at the base and apex. *Ridley in Journ. Linn. Soc.* xxii. 294.

ASSAM; at Obres, Mann (*in Herb. Reichb.*).

Of this, which I have not seen, the author says that "it is not *L. longipes*, which differs in the retuse lip."

49. ***L. distans***, *Clarke in Journ. Linn. Soc.* xxv. 71, t. 29; leaves 2 very narrowly oblanceolate acuminate thin, scape slender as long as the leaves 2-winged few-fld., flowers 1 in. across, bracts membranous shorter than the long pedicels, sepals narrow linear obtuse obscurely 1-nerved, margins revolute, lip recurved spatulately obovate obtuse crenulate obscurely nerved 2-tubercled near the concave base, column slender, wings narrow. *L. macrantha*, *Hook. f. Ic. Plant.* t. 1851.

UPPER ASSAM; Naga Hills, *Prain, Clarke.*

Pseudobulb elongate, narrow, enclosed in one long sheath. *Leaves* 12 by 1 in., many-nerved, narrowed into a petiole. *Flowers* green; sepals, petals and lip $\frac{3}{4}$ in. long.—The largest-flowered Indian species. Leaves distinctly jointed in the pseudobulb where hidden by the sheath, which is 4 in. long.

50. ***L. condylobulbon***, *Reichb. f. in Hamb. Gartenzeit.* 1882, 34; leaves 2-8 in. linear-oblong, scape short, raceme dense-fld., flowers minute very shortly pedicelled, bracts as long as the short pedicels, sepals obtuse 1-nerved, lateral revolute, lip recurved oblong with an entire rounded tip fleshy nerveless, calli 0, column slender, wings small. *L. parviflora*, *Ridley in Journ. Linn. Soc.* xxii. 296.

TENASSERIM; at Moulmein, *Parish.*

Pseudobulb 1-2 in., narrow. *Leaves* 1 in. broad, 7-nerved. *Scape* with raceme 6 in. Much resembling *L. gladiata*, and with flowers yellowish when dry of the same size, but the bracts are longer, slender and membranous, and the lip is very different.—The above is from Reichenbach. Ridley makes it a synonym of the Javan *L. parviflora*, but it differs *in toto* from the description he gives of that species.

51. ***L. viridiflora***, *Lindl. Gen. & Sp. Orchid.* 31; leaves 2 3-4 in. elliptic-lanceolate or oblanceolate membranous, raceme many-fld. subsecund, bracts lanceolate, pedicels short decurved, sepals flat broad obtuse or subacute 1-nerved, lip recurved orbicular-ovate subacute very obscurely 3-lobed concave rather fleshy, calli 0, column short incurved. *Ridley in Journ. Linn. Soc.* xxii. 289; *Thwaites Enum.* 295. *L. elliptica*, *Wight Ic.* t. 1735. *L. Wightii*, *Reichb. f. in Walp. Ann.* vi. 218. *L. Hookeri*, *Ridley l. c.* 288. *Malaxis viridiflora*, *Blume Bijl.* 392, t. 54.

SIKKIM HIMALAYA, alt. 4-6000 ft. UPPER ASSAM, KHASIA, and NILGHIRI HILLS. CEYLON, alt. 3-7000 ft.—DISTRIB. JAVA.

Pseudobulbs very variable, $\frac{1}{2}$ -1 in. long, from ovoid to subcubical or subglobose. *Leaves* $\frac{3}{4}$ -1 in. broad, elliptic and sessile, or $\frac{1}{4}$ - $\frac{3}{4}$ in. broad oblanceolate and petioled, acute or acuminate; nerves many, slender. *Scape* 4-6 in., erect or recurved, with scattered filiform membranous bracts below the raceme; flowers ascending from the recurved pedicel. *Sepals* white or yellowish, not widely spreading, about $\frac{1}{10}$ in. long.—The subsecund raceme and flowers ascending from the recurved pedicel are quite peculiar to this species. I find no character whereby to separate *L. Hookeri*, nor is this species related to *L. bistriata*.

52. ***L. luteola***, *Lindl. in Wall. Cat.* 1944; *Gen. & Sp. Orchid.* 32; leaves 2 2-4 in. erect narrowly oblanceolate coriaceous, midrib stout, scape

exceeding the leaves few-fl'd., bracts lanceolate, pedicels long, sepals subfalcate lanceolate subacute, margins revolute, lip recurved cuneate truncate apiculate, base auricled, calli 2 minute, column slender curved, wings obscure. *Ridley in Journ. Linn. Soc. xxii. 289; Griffith Notul. iii. 277.*

KHASIA HILLS, alt. 4-5000 ft., common. UPPER BURMA, *Griffith. TENASSERIM, at Moulmein, Parish.*

Pseudobulbs densely tufted, very small, depressed-globose. *Leaves* $\frac{1}{2}$ - $\frac{1}{4}$ in. broad. *Scape* 2-4 in.; bracts $\frac{1}{2}$ in., green; pedicels $\frac{1}{2}$ - $\frac{1}{2}$ in.; flowers $\frac{1}{4}$ in.

*** Lip minute much shorter than the sepals quadrate. Sepals straight or lateral subfalcate, margins revolute.—A peculiar group of small species.

53. **L. resupinata**, *Ridley in Journ. Linn. Soc. xxii. 290*; leaves 3-4 1-3 in. linear-lanceolate acuminate, scape much longer than the leaves slender, bracts lanceolate green longer than the pedicels, flowers $\frac{1}{2}$ in., sepals straight broadly oblong obtuse 1-nerved, margins recurved, lip broadly ovate-oblong with rounded basal lobes 2-tubercled, tip broad rounded, column broadly winged to the base, wings with a capillary tail. *Hook. f. Ic. Plant. t. 1888.*

SIKKIM HIMALAYA, alt. 5-6000 ft., and the KHASIA Mts., common, alt. 4500-6500 ft. ? NILGHIRI Mts., *Wight.*

Pseudobulbs tufted, $\frac{1}{2}$ -1 in., narrow. *Leaves* alternate, sessile, submembranous, rather distant, 7-nerved. *Scape* bracteate, with the raceme 5-7 in., many-fl'd.; lower bracts $\frac{1}{4}$ - $\frac{1}{2}$ in.; pedicels $\frac{1}{4}$ in.; flowers yellow.—The capillary tail of each wing of the column is peculiar to this and the following species. *Ridley* gives Nilghiri Mts. Wight as a habitat, but there are no specimens in Wight's Herbarium.

54. **L. Ridleyi**, *Hook. f. Ic. Plant. t. 1887*; leaves 3-4 3-5 in. linear-lanceolate acuminate, scape much longer than the leaves slender bracteate, bracts lanceolate green shorter than the pedicels, flowers $\frac{2}{3}$ in., sepals straight obtuse 1-nerved, margins recurved, dorsal lanceolate, lateral oblong-lanceolate, lip ovate-oblong with rounded basal lobes 2-tubercled, tip rounded, column broadly winged to the base, wings with a capillary tail.

SIKKIM HIMALAYA, alt. 4-6000 ft., common.

Habit, &c., of *L. resupinata*, under which *Ridley* has placed it, but a larger plant, with flowers more than twice as large, and much narrower sepals.

55. **L. delicatula**, *Hook. f. Ic. Plant. t. 1889*; leaves 2 1-1 $\frac{1}{2}$ in. petioled elliptic-lanceolate membranous, scape much longer than the leaves filiform, bracts ovate much shorter than the pedicels, flowers $\frac{1}{2}$ in., sepals straight broadly oblong obtuse 1-nerved, margins revolute, lip straight orbicular-oblong with small rounded basal lobes and 2 tubercles, tip broad rounded abruptly caudate, column broadly winged. *L. decurrens, in part, Ridley in Journ. Linn. Soc. xxii. 291 (the Khasian plant only).*

KHASIA Mts., alt. 4-5000 ft., *Lobb, J. D. H. & T. T. MISHMI HILLS, in Upper Assam, Griffith.*

Pseudobulbs tufted, $\frac{1}{2}$ in., ovoid or oblong. *Leaves* $\frac{1}{2}$ - $\frac{1}{4}$ in. broad, pale, obscurely 3-nerved, acute or apiculate. *Scape* 3-5 in., very slender, bracteate; bracts $\frac{1}{2}$ in., acute, membranous; flowers white. *Column* with uncinate wings near the top, and narrow lateral wings (not confluent with the terminal) descending to the base.—Placed under the Javanese *L. decurrens* by *Reichb. f.* and *Ridley*, but differs from

that plant in the filiform scape, ovate bracts, and ciliate sepals and petals. Blume figures the sepals of his *Malaxis decurrens* as papillose all over.

56. ***L. platyrachis***, Hook. f. *Ic. Plant.* t. 1890; leaves 2-3 1-1½ in. petioled linear-lanceolate membranous, scape much longer than the leaves flattened or 2-winged, bracts minute subulate, flowers ½ in., sepals subfalcate oblong obtuse 1-nerved, lip recurved quadrately panduriform, basal portion 2-auricled 2-tubercled, distal with acute upper angles and a rounded sometimes apiculate base, column with small upper wings and winged sides.

SIKKIM HIMALAYA, alt. 4-5000 ft., *Treutler, Clarke*.

Habit and size of *L. delicatula*, from which it differs in the winged rachis, minute subulate bracts, and form of the lip, which, as in all the species of this group, is very difficult of analysis, being crumpled in drying.

57. ***L. perpusilla***, Hook. f. *Ic. Plant.* t. 1856 B; leaves 4-5 recurved ½-1 in. linear acute, midrib stout, margins recurved, scape much longer than the leaves, bracts ovate-lanceolate, flowers ⅓ in., sepals very broadly elliptic-oblong obtuse 1-nerved, lip minute quadrate with 2 rounded side lobes and 2 tubercles, tip very broad rounded, column short stout broadly winged.

SIKKIM HIMALAYA, on trees, alt. 7-8000 ft., *J. D. H., Clarke, Gamble*.

Pseudobulbs tufted, ½-¾ in., ovoid or oblong. *Leaves* ⅓-⅓ in. diam., coriaceous. *Scape* curved, obscurely margined, naked; bracts ⅓ in.; flowers yellow.—A singular little plant which I found in 1848 on trees upon Sinchal near Darjeeling, and made a drawing of, but have lost the specimens.

Sect. III. DISTICHÆ. Bracts of the short flat raceme distichous and imbricating, coriaceous, ensiform.

58. ***L. disticha***, *Lindl. in Bot. Reg. sub.* t. 882; leaf solitary 5-10 in. coriaceous linear, scape naked, sepals oblong-ovate acute 3-nerved, lip recurved, lateral lobes rounded and inflexed at the base, midlobe orbicular-ovate obtuse, column very short erect dorsally compressed with very broad coriaceous wings dilating downwards. *Ridley in Journ. Linn. Soc.* xxii. 292; *Miquel Fl. Ind. Bat.* iii. 623. *L. gregaria*, *Lindl. Gen. & Sp. Orchid.* 33; *Thwaites Enum.* 296. *L. mucronata*, *Lindl. l. c.* 32. *Malaxis disticha*, *Thouars Orchid. Isles Austr. d'Afrique*, t. 89. *Malaxis mucronata*, *Blume Bijl.* 391; *Moon Cat.* 467.

TENASSERIM; at Moulmein, *Parish*. CEYLON, *Walker, &c.*—DISTRIB. Malay Islands, Tinnor, Mauritius, Bourbon.

Rootstock slender, creeping; *pseudobulbs* distant, ½-¾ in., pyriform. *Leaves* ½-¾ in. broad, acuminate. *Scape* usually shorter than the leaves, stout, margined or winged; raceme ½-2 in., rachis flattened; bracts ¼-½ in.; flowers ½ in., ochreous yellow. *Lip* fleshy, with a large basal callus. *Capsule* ½ in. long, pedicelled.

59. ***L. compressa***, *Lindl. Gen. & Sp. Orchid.* 32; leaf solitary 10-12 in. linear-lanceolate strongly nerved beneath, scape naked, sepals lanceolate, lip cuneately flabelliform from a narrow 2-tubercled claw, tip broadly truncate or rounded crenulate apiculate, column slender incurved, wings 0. *Ridley in Journ. Linn. Soc.* xxii. 291; *Miquel Fl. Ind. Bat.* iii. 621. *Malaxis compressa*, *Blume Bijl.* 390, t. 54.

PEBAK, *Scortechini, King's Collector*, alt. 3000-3500 ft.—DISTRIB. Sumatra, Java.

Pseudobulb 1 in. or more. *Leaf* 1-1½ in. broad. *Scape* winged; raceme as in *L. disticha*, but bracts and flowers larger.

DOUBTFUL AND EXCLUDED SPECIES.

L. ALATA, *A. Rich. in Ann. Sc. Nat. Ser. 2, xv. 17*; pseudobulbs ovoid, sheaths lax membranous acute, leaves usually 2 subpetioled sheathing membranous ovate acute entire, base rounded, spike elongate few-fl., rachis compressed winged, lip subcordate convex quite entire, base erect embracing the column.—Nilghiri Hills, moist woods at the Waterfall, *Perrottet*.—This may be either a *Liparis* or *Microstylis*.

L. BIDENTATA, *Griff. Notul. iii. 277*; *Ic. Pl. Asiat. t. 286, f. 2*, from the Naga Hills, is not a *Liparis*.

L. CUMINGII, *Ridley in Journ. Linn. Soc. xxii. 292*, founded on Cuming's No. 2141, is erroneously described as a Malaccan plant. Cuming collected it in the Island of Bopod, one of the Philippians. It is hardly different from *L. compressa*.

L. DECURSIVA, *Reichb. f. in Gard. Chron. 1884, ii. 38*; pseudobulb tumid subpyriform very obtusely angled on both sides, leaves 2 cuneate-oblong chartaceous, scape narrowly winged, bracts lanceolate acuminate keeled the lower exceeding the pedicelled ovaries, sepals triangular-ligulate, lip with a short channelled claw, blade large abruptly transversely hastate emarginate with a tooth in front serrulate, claw with a notched tubercle, column incurved dilated towards the base angled on both sides next the pit.—E. Indies (*Hort. Glasnevin*).—Description from *Reichenbach f. l. c.*

L. GROSSA, *Reichb. f. in Gard. Chron. 1883, i. 110*; pseudobulbs short stout pyriform 2-leaved, leaves broadly ligulate obtuse, tip unequal, raceme many-fl., rachis depressed, base with an acute compressed foliaceous sheath, and many scarious sheaths above, flowers yellow-brown, bracts linear-cuspidate hardly equalling the pedicelled ovary, sepals ligulate acute, lip ligulate, base minutely obtusely auricled abruptly constricted in the middle, apex divergently 2-lobed, side lobes quadrate denticulate on the outer margin, basal calli obscure. *Ridley in Journ. Linn. Soc. xxii. 288*.—Burma, *H. Low*.—Allied to *L. pachypus*, but much larger, with a very different lip. Description from *Reichb. f. l. c.* I have seen no specimens.

L. LIVIDA, *Royle Ill. 364*, name only, from Nepal.—In the Kew collection of Indian drawings there is one named by Lindley "*L. livida*," but which is so incorrectly drawn (the petals being represented as lateral sepals) that no confidence can be placed in it. It may be a form of *L. bituberculata*. In Lindley's Herbarium there is a copy of this drawing, and on the same sheets is fastened a specimen of what is clearly *L. Walkeria*, ticketed "*Khasia, Lobb*," but which is probably from the Nilghiri Hills, where Lobb also collected.

L. OBOCADATA, *Fahl. ex King Cat. of N.W. Indian plants in Atkinson's Notes on the Economic Products of N.W. India, Part V. 318*.—This is undescribed.

L. ODONTOSTOMA, *Reichb. f. in Linnea xli. 97*; *Ridley l. c. 263*; 2 ft. high, pseudobulb subterete?, leaves about 4 membranous cuneate-oblong acute, raceme many-fl., dorsal sepal lanceolate 3-nerved, lateral oblong-ligulate 4-nerved curved, claw of lip with the base obtusely angled, blade as long as the claw subquadrate emarginate and apiculate, calli 2 conical, column angled at the base and apex.—Sikkim, alt. 3-5000 ft., *J. D. H.*—I suspect this to be a form of *L. bituberculata*. The bracts are not described, and the 4-nerved lateral sepals are anomalous.

L. STACHYURUS, *Reichb. f. in Flora 1872, 274*; *Ridley l. c. 295*; pseudobulbs ligulate (2-edged?) 2-leaved, leaves cuneately oblong-ligulate acuminate, scape dense-fl., bracts setaceous about equalling the pedicelled ovaries, sepals ligulate obtuse, lip triid, side lobes semicordate at the base obtuse-angled in front, midlobe triangular, column dilated at the apex, anther acute.—Assam, *Mann*.—Placed in the section *Coriifolia* and near *L. longipes* by Ridley, who does not say that he has seen the plant. I have not.

L. STRICKLANDIANA, *Reichb. f. in Gard. Chron. 1880, i. 232*; *Ridley l. c. 295*; pseudobulbs conico-ovoid 2-(1-3)-leaved, leaves linear-ligulate acute, scape ensiform winged, raceme rather dense-fl., bracts triangular shorter than the pedicelled ovaries, sepals ligulate, petals linear retuse, lip 3-lobed from a cuneate transversely dilated base, lateral lobes rounded, midlobe short triangular, lobes all

minutely denticulate in front, calli minute, column curved hardly dilated in front.—Assum? (*Hort. Strickland*).—Unknown.

L. TRISTIS, *Loddiges Orchid.* p. 4, cult. by Loddiges, from Ceylon; name only.

LIPARIS, “Ceylon, *Loddiges*” l. c., name only. Ridley has referred to this (*Journ. Linn. Soc.* xxii. 297) as *L. “zeylanica,”* but Loddiges has given it no specific name.

4. **PLATYCLINIS**, *Benth.*

Tufted epiphytes, pseudobulbs narrow or 0. *Leaves* solitary, petioled. *Flowers* small, in a terminal raceme; bracts very rigid, straight, convolute. *Sepals* and *petals* spreading. *Lip* sessile or shortly clawed, narrow or broad. *Column* erect, short or rather long, sides produced into 2 membranous points, wings or arms, tip produced into an entire or cleft hood; anther incumbent, 2-celled; pollinia 4, waxy, ovoid, superposed, cohering in pairs in separate cells.—Species about 20, Malayan.

The rigid pale narrow convolute grooved glumaceous bracts are very characteristic of this genus.

1. **P. gracilis**, *Hook. f.*; leaves linear-lanceolate obtuse, scape very slender, bracts acute half as long as the very shortly pedicelled flowers, sepals $\frac{1}{2}$ in. long broadly lanceolate finely acuminate 3-nerved, petals as long linear-oblong, lateral lobes of lip rounded crenulate, tips lanceolate spreading, midlobe cuneate, tip rounded, disk with an elevated green coriaceous 3-furcate ridge, column slender with gladiate arms.

PERAK; alt. 4–5000 ft., *King's Collector*.

Pseudobulb 1 in., subcylindric. *Leaf* 4–6 by 1 in., petiole 1 in. *Scape* naked and *raceme* 12 in.; bracts $\frac{1}{2}$ in.; flowers yellowish-white. *Lateral nerves* of sepals and petals very faint.

2. **P. Kingii**, *Hook. f.*; leaves linear-lanceolate, raceme long-peduncled few-fl'd., bracts almost as long as the flowers, sepals $\frac{1}{4}$ in. ovate-lanceolate finely acuminate, lateral 5-nerved, lip with rounded crenulate side lobes, midlobe ovate acute veined, disk with 2 small curved calli, column very short, hood with a very thick dorsal ridge.

PERAK, *Scortechini*, *King's Collector*.—DISTRIB. ? Borneo (*Beccari*, No. 2095).

Pseudobulb $\frac{1}{2}$ –1 in., narrowly ovoid. *Leaves* 3–7 in., subacute or acuminate, rather thin; petiole 1 in. *Scape* and *raceme* about equalling the leaves; bracts $\frac{1}{4}$ in., acute; flowers $\frac{1}{2}$ in. across, pale yellow, lip light green.—The Bornean plant differs in having a longer column which has not a dorsal ridge, and its wings are longer. The column of *P. Kingii* is so minute and short that I had great difficulty in finding the wings.

5. **TIPULARIA**, *Nutt.*

Terrestrial herbs; pseudobulb small. *Leaf* solitary, ovate, petioled. *Scape* long; flowers loosely racemose. *Sepals* spreading and petals narrow, subequal. *Lip* much smaller than the sepals, sessile, suberect, lateral lobes rounded, midlobe flat; spur long, slender. *Column* slender erect, anther 2-celled with a short filiform stipes ending in a gland attached to the rostellum (as in *Vandea*); pollinia 4, distinct.—DISTRIB. The following and a N. American species.

T. Josephi, *Reichb. f. mss.*; sepals 3-nerved, petals 1-nerved, lip with large side lobes, midlobe ovate or ovate-lanceolate acute. *Lindl. in Journ. Linn. Soc.* i. 174.

TEMPERATE SIKKIM HIMALAYA; in woods of the interior, alt. 10-12,000 ft., J. D. H.

Pseudobulb $\frac{1}{2}$ in. *Leaf* 2-3 in., 5-7-nerved; *petiole* $\frac{1}{2}$ -1 in. *Scape* with the *raceme* 8-12 in., slender; bracts very minute; flower $\frac{1}{2}$ in. across. *Sepals* with revolute margins and petals obtuse; lip 3-nerved, spur rather longer than the ovary and short pedicel.—Differs from the American *T. discolor* in the much smaller flowers, shorter 3-nerved sepals, larger side lobes of the lip, ovate midlobe, and much shorter spur and column.

6. *OREORCHIS*, Lindl.

Terrestrial herbs, stem tuberous or pseudobulbous, 1-2-leaved. *Leaves* long, narrow. *Scape* slender; flowers small, racemose. *Sepals* and *petals* subsimilar, erect, 5-nerved. *Lip* adnate to the base of the column, claw erect, side lobes short, erect; midlobe spreading, entire. *Column* elongate, subclavate, truncate; anther 1-celled, with a stipes (as in *Tipularia*); pollinia 4, subglobose, distinct.—Species 4, North Asiatic.

1. *O. foliosa*, Lindl. in *Journ. Linn. Soc.* iii. 27; flowers pedicelled, dorsal sepal linear-oblong subacute, lateral falcately oblong acuminate, petals broadly oblong obtuse, base of lip produced into a sac, lateral lobes of lip large rounded, midlobe as large as both lateral rounded. *Corallorhiza* sp. with leaves, Lindl. in *Royle Ill.* 362.

TEMPERATE HIMALAYA; Simla, alt. 7800 ft., Gamble; Garwhal, Royle; Sikkim, Lachen Valley, alt. 11-12,000 ft., J. D. H.

Root a tuber rather than pseudobulb. *Leaf* 3-6 in., linear-lanceolate, nerves strong. *Scape* with *raceme* 6-12 in., few-fl'd.; sheaths 2-3, tubercled; bracts lanceolate, caducous; flowers $\frac{1}{2}$ in. long, red-brown; pedicel and ovary $\frac{1}{2}$ in.; lip many-nerved, median keels very obscure.

2. *O. indica*, Hook. f.; flowers sessile, dorsal sepal linear-lanceolate, lateral subfalcately lanceolate, petals narrowly subfalcately oblong obtuse, mentum 0, lip clawed, side lobes ear-shaped incurved obtuse, midlobe rounded entire or sub-2-lobed, disk with a raised median lamella between the lateral lobes. *Corallorhiza indica*, Lindl. in *Journ. Linn. Soc.* iii. 26 (not of Dcne.).

TEMPERATE WESTERN HIMALAYA; Simla, on Hattu, Thomson; Garwhal, alt. 8-9000 ft., Edgeworth.

Much more robust than *O. foliosa*; flowers much larger, sepals $\frac{1}{2}$ in. long.—Edgeworth's specimen has a tuberous lobed root, and a broken leaf 1 in. broad, which removes the plant from *Corallorhiza*.

3. *O. micrantha*, Lindl. in *Journ. Linn. Soc.* iii. 27; dorsal sepal obtuse, mentum 0, lip with small lanceolate falcate basal lobes, midlobe large with a 2-lobed crumpled tip, disk with a very elevated linear channelled fleshy callus.

WESTERN HIMALAYA; Kumaon, alt. 8-10,000 ft., Thomson, Strackey & Winterbottom (*Orchid.* No. 56).

Pseudobulb globose. *Leaves* 2, $\frac{1}{4}$ - $\frac{1}{2}$ in. broad, narrowly linear. *Scape* 12-18 in., with 2-3 tubular sheaths; flowers $\frac{1}{2}$ in. long.

7. *CORALLORHIZA*, Br.

Leafless, red-brown, erect, terrestrial herbs; rhizome coralloid, jointed. *Scape* simple, sheathed; flowers small, whitish, in a terminal spike or

raceme. *Sepals* and *petals* subequal, linear; petals ascending, incurved. *Lip* clawed, adnate to the base of the column, erect, entire or 3-lobed, spur minute or 0. *Column* erect, incurved; anther 4-celled; pollinia 4; ovoid, soft, cohering by a viscus.—Species about 12, in N. temperate regions.

C. innata, *Brown in Hort. Kew* v. 209; scape slender few-fl., flowers subsessile, bracts minute, lip 3-lobed, side lobes narrow, midlobe retuse. *Lindl. Gen. & Sp. Orchid.* 533; *Reichb. Ic. Fl. Germ.* xiii. t. 490. *C. Jacquemonti*, *Dene. in Jacquem. Voy. Bot.* 165, t. 165.

KASHMIR, *Jacquemont*.—DISTRIB. Europe, N. Asia, N. America.

Scape 6–10 in., slender; sheaths lax; flowers $\frac{1}{4}$ in. long; sepals ovate lanceolate, lateral deflexed; lip (in European specimens) whitish with purple blotches.

8. **DENDROBIUM**, Swartz.

Epiphytes; stems elongate or pseudobulbous. *Leaves* never plaited. *Flowers* racemose, often large and handsome. *Sepals* subequal, lateral obliquely adnate to the foot of the column, and forming with it a sac or mentum. *Lip* contracted at the base, rarely clawed, adnate to and incumbent on the foot of the column, side lobes embracing the column or spreading or 0, terminal narrow or broad, flat, convex, concave or saccate, disk often lamellate. *Column* short, foot long or short, top angled or 2-toothed; anther 2-celled; pollinia 4, free, ovoid or oblong, compressed, closely collateral in pairs in each cell.—Species about 300, Tropical Asiatic, Australasian and Polynesian.

The following attempt to arrange the Indian species of this vast and very intricate genus into definable groups is open to much criticism in detail. It has entailed many months of labour, and it must stand or fall according to the verdict of those who may use it.

Series I. Inflorescence terminal (that is, from the base of a terminal arrested internode), or both terminal and lateral. (See also some species of sect. *Aporum*; lateral in *Formosa*.)

SECT. I. SARCOPODIUM. *Pseudobulbs* short, erect, unimodal, seated singly on a stout creeping rhizome. *Leaves* 2, terminal, opposite, coriaceous, flat, persistent. *Flowers* solitary from between the leaves, or on a 1–few-fl. scape, large or medium-sized; mentum short, rounded.—Habit of *Bulbophyllum*, sect. *Sestochilus*.

SECT. II. BOLBODIUM. *Pseudobulbs* erect, as in *Sarcopodium*, but more tufted, clavate and stipitate. *Leaves* 2, terminal, opposite, coriaceous, flat, persistent. *Flowers* solitary or few from between the leaves, medium-sized, white; mentum large, longer than the lateral sepals, conical, incurved.

SECT. III. CADETIA. *Stem* branched, pendulous, branches forming chains of unimodal sessile or stipitate pseudobulbs. *Leaf* solitary, terminal, coriaceous, flat, persistent. *Flowers* 1–2 from the base of the leaf, medium-sized, white or pale; mentum short or elongate.

SECT. IV. STACHYBIUM. *Stems* tufted, forming a small polynodal pseudobulb, or more or less elongate, often compressed, simple or branched. *Leaves* many, narrow, membranous, deciduous or persistent. *Flowers* solitary, or in slender terminal or terminal and lateral racemes, small or medium-sized, often white; mentum rather long, conical, incurved, or short and obtuse; lip with often a flat keel on the disk that terminates in a truncate crenate callus on the midlobe.—Small species of this section resemble *Eria*, sect. *Bryobium*.

SECT. V. FORMOSE. *Stems* rather short, tufted, leafy, usually suberect, often with deciduous black hairs on the sheaths. *Flowers* solitary or racemose, often large,

white or pale buff with faint colouring on the lip; mentum usually long and funnel-shaped, or conical, acute, straight or incurved (short in *D. albo-sanguineum*); mid-lobe of lip often fimbriate on the margin or disk.—Similarly hairy sheaths occur in sect. *Virgatæ* and in *D. nutans* and a few others.

Series II. Inflorescence lateral on the stem or pseudobulb (terminal in some species of *Aporum*).

Sect. VI. *AP RUM*. *Stems* tufted, compressed, leafy. *Leaves* shortly ensiform distichous, sheaths equitant, imbricating, fleshy or coriaceous, nerveless, persistent. *Flowers* small, white or yellowish with pink markings, shortly pedicelled, solitary or in bracteate heads or short racemes, sometimes appearing racemose from occupying the leafless ends of the branches; mentum stout, as long as or longer than the short broad lateral sepals.

Sect. VII. *STRONGYLE*. *Stems* tufted, slender, often branched, terete. *Leaves* terete, subterete or subulate, persistent. *Flowers* small, white or pale, solitary or as if racemed on the leafless ends of the stem or branches; mentum as in *Aporum*.—This section is not very well distinguished from the preceding and following.

Sect. VIII. *VIRGATÆ*. *Stems* tufted, elongate, slender, but hard, rigid and polished, simple or branched, leafy, often swollen above the base. *Leaves* distichous, long, linear (shorter and oblong in *D. tuberiferum* & *crumenatum*), persistent. *Flowers* small or medium-sized, white or yellow with often pink or green markings, solitary or few on a leaf-opposed tubercle, or appearing racemed on the leafless ends of the stem or branches; sheaths sometimes pubescent with black hairs; mentum usually long, stout, incurved; petals and lip often very narrow.

Sect. IX. *BREVI-FLORES*. *Stems* tufted, long or short, terete or clavate, sparingly leafy. *Leaves* oblong or lanceolate, persistent or deciduous. *Flowers* few, small, in short racemes or heads, pink or yellow, often dingy; mentum large, saccate; lip very short, deeply concave or urceolate, truncate or lobes short.

Sect. X. *PEDILONIUM*. *Stems* tufted, long, terete, simple, stout or slender, erect or pendulous, leafy. *Leaves* distichous, oblong or lanceolate, coriaceous or submembranous, persistent or deciduous. *Flowers* medium-sized, pink or yellow, rarely white, in short leaf-opposed often dense-fld. secund racemes, or in corymbs or tufts, rarely solitary; mentum stout and often very long, equalling or longer (often much) than the short triangular sepals; lip usually very long and narrow, clawed, with often a small lamella, callus or spur on the claw near the base.—*D. sanguinolentum* is perhaps better referred to Sect. XII.

Sect. XI. *DISTICHOPHYLLÆ*. *Stems* tufted, elongate, stout or slender, leafy throughout. *Leaves* short, uniform, distichous, bases imbricating, persistent, emarginate or 2-fld. *Flowers* small, usually white or yellow, solitary or in short leaf-opposed racemes; mentum stout, spur-like, as long as the lateral sepals or longer; lip short, broad, sides recurved.—Habit of *Appendicula*.

Sect. XII. *EUDENDROBIUM*. *Stems* tufted, elongate, stout or slender, clavate or nodose in some species. *Leaves* various, distichous (terminal and solitary in *D. aggregatum* only), membranous or coriaceous, persistent or deciduous. *Flowers* usually large in lateral pairs, fascicles or racemes, very rarely solitary, highly coloured or white.—This section is best characterized by wanting the sum of the characters of any of the others. The species with narrow sepals, petals and a long mentum approach *Formosæ* and *Pedilonium*.

Sect. I. SARCOPODIUM (see p. 710).

* *Flowers solitary.*

1. **D. amplum**, Lindl. in Wall. Cat. 2001; Gen. & Sp. Orchid. 74; leaves petioled oblong, scape long, sepals lanceolate acuminate, lip sessile 3 lobed, side lobes short rounded, midlobe broad acute crenulate, disk

3-lamellate between the side lobes. *Wall. Pl. As. Rar.* i. 25, t. 29; *Part. Mag.* t. 121; *Griff. Notul.* iii. 307; *Ic. Pl. Asiat.* t. 304. *Sarcopodium amplum*, *Lindl. in Part. Fl. Gard.* i. 155; *Fol. Orchid.* 1. *Bolbophyllum amplum*, *Reichb. f. in Walp. Ann.* vi. 244.

TROPICAL HIMALAYA, from Nepal eastwards, ASSAM and the KHASIA MTS., alt. 4-5000 ft.

Pseudobulbs 1-2 in., oblong. *Leaves* 4-6 in., often 2 in. broad; petiole $\frac{1}{2}$ -1 in. *Flowers* white to dull green and purple; sepals $1\frac{1}{2}$ in. long; midlobe of lip dark purple, variable in size and breadth.

2. ***D. fuscescens***, *Griff. Notul.* iii. 308; *Ic. Pl. Asiat.* t. 309; leaves petioled elliptic or linear- or oblong-lanceolate, sepals ovate-lanceolate caudate-acuminate, petals shorter very narrow, lip sessile, base lamellate, side lobes oblong, midlobe larger orbicular-ovate acuminate. *Sarcopodium fuscescens*, *Lindl. in Part. Fl. Gard.* i. 155; *Fol. Orchid.* 2. *Bolbophyllum fuscescens*, *Reichb. f. in Walp. Ann.* vi. 244.

SIKKIM HIMALAYA, alt. 6500 ft., *Clarke*. KHASIA MTS., alt. 4-5000 ft., common. NAGA HILLS, alt. 6-7000 ft., *Prain*.

Pseudobulbs ovoid or ellipsoid, $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Leaves* 2-4 in. *Flowers* purplish brown; sepals 1-2 in.; bracts large, sheathing.

3. ***D. rotundatum***, *Benth. in Gen. Plant.* iii. 499; leaves elliptic-oblong notched, scape shorter than the membranous bracts, sepals and petals subequal erect ovate acute fleshy, lip sessile, base lamellate, side lobes small rounded, midlobe largest. *Fol. Orchid.* 2. *Bolbophyllum rotundatum*, *Reichb. f. in Walp. Ann.* vi. 244.

SIKKIM HIMALAYA, alt. 6-7000 ft., common. NAGA HILLS, *Prain*.

Pseudobulbs 1-2 in., ovoid or ellipsoid, sheathed. *Leaves* 4-6 in., sessile or petioled. *Flowers* pale chestnut-brown.

4. ***D. Cœlogyne***, *Reichb. f. in Gard. Chron.* 1871, 136; leaves broadly elliptic-oblong notched, flowers very large, sepals lanceolate acuminate, petals narrower, side lobes of lip narrow, midlobe trapezoidly ovate.

TENASSERIM; at Moulmein, *Parish*.

Pseudobulbs very stout, $1\frac{1}{2}$ -2 in. long. *Leaves* 3-6 in., very coriaceous, sessile or petioled. *Flowers* the largest of the section, yellowish mottled with red; bracts large, sheathing; sepals $2\frac{1}{2}$ in. long; lip deep dull purple.

5. ***D. longicolle***, *Lindl. in Bot. Reg.* 1840, *Misc.* 172; pseudobulb compressed long-necked, leaf linear-oblong obtuse concave, flower solitary, sepals and petals narrowed from a broad base into purple filiform tips, lip ovate, side lobes small, midlobe plaited crisped and lobulate, disk with 2 crisped lamellæ. *Walp. Ann.* vi. 302.

SINGAPORE, *Cuming (cult. in Hort. Loddiges)*.

The only specimen I have seen is in Lindley's Herbarium, and consists of a stem as thick as a quill, composed of 2 internodes, each 3-4 in. long, a sessile leaf 5 by 1 in., and a flower with subfalcate sepals and petals $\frac{1}{2}$ in. long and three times the length of the lip; the ovary is 2 in. long, filiform and jointed on the peduncle, bracts sheathing as long as the ovary, and the pedicel and bract 1 in.—The habit is not that of a *Cadetia*. Only one leaf remains, but there appear to have been two. This is possibly a several-fl. species.

** *Scape several-fl.*

6. ***D. perakense***, *Hook. f.*; pseudobulbs short, leaves lanceolate

acuminate narrowed to the base, scape stout bracteate many-fl., sepals lanceolate acuminate many-nerved, petals linear-lanceolate, mentum short rounded, lip with rounded side lobes and a narrower ovate-lanceolate acute midlobe, disk between the side lobes with 3 crenate ridges.

PERAK, *Scortechini*.

Stem stout, woody; pseudobulbs enclosed in many acute sheaths. *Leaves* 6-9 in., broadest (1-1½ in.) in the middle, strongly nerved. *Scape* as long as the leaves; bracts short, sheathing. *Flowers* shortly pedicelled; sepals ¾ in. long; lip as long; column acute dorsally.

7. **D. macropodum**, *Hook. f.*; leaves short elliptic obtuse, scape stout much longer than the leaves 4-6-fl., pedicels very short, ovary 1½ in., sepals lanceolate and linear petals many-nerved, mentum rounded, side lobes of lip rounded, midlobe small orbicular-ovate with strongly nerved margins, disk from the base to the tip with irregular thickened ridges.

PERAK, *Scortechini*, *Wray* (in *Herb. Calcutt.*).

Stem very stout, densely sheathed; pseudobulbs ovoid, 1-1½ in. *Leaves* 2-2½ in., very coriaceous. *Scape* 8 in.; bracts small, ovate, acute; sepals ¾ in. long; lip auricled at the base. *Column* very stout, tip notched.—Remarkable for the long angular ovary, as in *D. cymbidioides*.

8. **D. geminatum**, *Lindl. mss.*; pseudobulbs small, leaves linear-oblong obtuse, scapes 2-nate shorter than the leaves 4-6-fl., sepals linear-lanceolate and narrow, petals many-nerved, mentum rounded, side lobes of short lip rounded, midlobe ovate acute, disk with thickened ridges between the side lobes.

PERAK, *Scortechini*, *King's Collector*; on rocks, alt. 3-4000 ft.—DISTRIB. Java.

Stem apparently straight as if suberect, stiff, 2-3 ft.; pseudobulbs ¼-¾ in., equidistant. *Leaves* 1½-3 in., very coriaceous, sessile. *Scape* slender; pedicels with ovary ¾ in.; bracts small; flower yellow; sepals ¾ in. long; lip coriaceous; anther 2-lobed at the tip.

9. **D. longipes**, *Hook. f.*; leaves small elliptic-oblong notched, scape very much longer than the leaves erect 3-4-fl., sepals linear-lanceolate and narrower petals many-nerved, mentum rounded, side lobes of short lip truncate with recurved edges, midlobe dagger-shaped acuminate, disk between the side lobes with 3 ridges ending in elongate tubercles.

PERAK, *Scortechini*.

Stem creeping, with very thick vermiform roots; pseudobulbs obpyriform, ¾-1 in., rather close set. *Leaves* 1½ in., very thickly coriaceous, subsessile, prominently 5-nerved beneath. *Scape* 6-8 in., pedicel with ovary 1 in.; bracts small; flowers white?; sepals 1¼ in. long; lip coriaceous.—*Scortechini* has two drawings of this, one with leaves as described above, the other with narrower longer petioled leaves.

Sect. II. BOLBODIUM (see p. 710).

10. **D. pumilum**, *Roxb. Hort. Beng.* 61; *Fl. Ind.* iii. 479 (in part); pseudobulbs oblong to cylindric, leaves short orbicular to elliptic obtuse, flowers solitary shortly pedicelled, lateral sepals broadly triangular, dorsal much smaller ovate, petals linear-oblong, mentum very large obtuse incurved, lip oblong or obovate-oblong with 2 rounded crisped terminal lobes. *Grieff. Notul.* iii. 315; *Lindl. in Journ. Linn. Soc.* iii. 6.

CHITTAGONG, Roxburgh. PEGU, at Rangoon, *lc. in Herb. Calcutt.* TENASSERIM, Griffith, &c. PERAK, *Scortechini*.—DISTRIB. Borneo.

Pseudobulbs of one many-grooved internode 1–1½ in. long, sessile or stipitate. *Leaves* ¾–1 in., coriaceous, sessile. *Flowers* 1 in. long, white; pedicel shorter; lateral sepals 7-nerved; lip with an obscurely caruncled yellow horse-shoe spot at the base of the lobes.—Roxburgh's description of this has been mixed up with that of an *Eria* in Fl. Ind., doubtless through an error of a transcriber or printer; his drawing is excellent.

11. **D. quadrangulare**, *Parish mss.*; pseudobulbs narrowly clavate acutely 4-angled stipitate, leaves linear-oblong, flowers fascicled. *D. pumilum*, *Par.* & *Reichb. f. in Trans. Linn. Soc.* xxx. 150, t. 31.

TENASSERIM; at Moulmein, *Griffith, Parish*.

Parish considered this to be different from *D. pumilum*, and his drawing seems to confirm it; the deeply 4-grooved terminal internode or pseudobulb 1½–2½ in. long and ½ in. broad, preserves its 4-angled character from its earliest stage (when only ½ in. long); it is supported on a stipes of 2–3 slender internodes. The flowers are quite like *D. pumilum*.

Sect. III. CADETIA (see p. 710).

12. **D. Macraei**, *Lindl. Gen. & Sp. Orchid.* 75; in *Journ. Linn. Soc.* iii. 6; leaf linear-oblong obtuse, flowers 2–3 shortly peduncled, sepals and petals erecto-patent linear-lanceolate acute, mentum short conic, side lobes of lip oblong obtuse, midlobe small with 2 diverging lobules crenulate and crisped, disk between the side lobes with 2 fleshy crests. *Thwaites Enum.* 297; *Dalz. & Gils. Bomb. Fl.* 260. *D. fimbriatum*, *Lindl. Gen. & Sp. Orchid.* 76 (not of Hook.). *D. nodosum*, *Dalz. in Hook. Journ. Bot.* iv. (1852) 292. *D. Rabani*, *Lindl. Journ. Linn. Soc.* l. c. 7. *D. pardalinum*, *Reichb. f. in Gard. Chron.* 1885, ii. 230. *D. Flabellum*, *Reichb. f. in Bonplandia* 1857, 56; *Xen. Orchid.* ii. t. 118. *Desmotrichum fimbriatum*, *Blume Bijl.* 329.

SIKKIM HIMALAYA, alt. 7–8000 ft. (*Herb. Hort. Calc.*). KHASIA MTS., alt. 4000 ft., *J. D. H. & T. T.* The CONCAN, at Ram Ghat, *Dalzell*. NILGHIRI HILLS, *G. Thomson*. CEYLON, not uncommon, *Thwaites*.—DISTRIB. Java.

Rootstock creeping, annulate; stems pendulous, 2–3 ft.; branches ending in fusiform pseudobulbs 2–2½ in. long. *Leaves* 4–8 in., sessile. *Flowers* ¾–1 in. long, white; pedicels ¾–1 in.; bracts basal, sheathing; side lobes of lip sprinkled with red, midlobe variable.—I find no characters whereby to distinguish the species included above under *D. Macraei*. Thwaites says of the Ceylon plant “leaves usually 2-nate,” but I have never seen more than one in any specimen or drawing.

13. **D. lonchophyllum**, *Hook. f.*; leaf linear-lanceolate acuminate, flower subsolitary, dorsal sepal ovate-oblong acute, petals linear-oblong, mentum as long as the rest of the flower upcurved, side lobes of lip triangular acute many-nerved, midlobe with a short undulate limb and two oblong divaricate rounded lobes, disk not crested or ridged.

PERAK, *Scortechini*.—DISTRIB. ? Java.

Stems slender; pseudobulbs 1–1½ in., fusiform. *Leaves* 3–5 in., base cuneate. *Flowers* ¾ in. long, nerves and cross nervules very slender. *Lip* cuneate. *Column* with incurved subulate tips; anther with a very long stipes.—Closely resembles the drawing of a Javan plant in *Herb. Lindl.*

14. **D. Kunstleri**, *Hook. f.*; leaves large elliptic-lanceolate acuminate, mentum much shorter than sepals conic acute nearly straight, lip

much larger than the sepals, side lobes triangular acute, midlobe very large quadrate-orbicular with 2 crenulate lamellæ on the disk and plaited undulate sides.

PERAK, *Scortechini, King's Collector*, alt. 500–1000 ft.

Branches long, stout; pseudobulbs 2–3 in., fusiform. *Leaf* 6–10 by 2–3½ in., very coriaceous, base narrowed. *Flower* 1 in. long, very membranous, white mottled with red, nerves and nervules very slender; sepals and petals lanceolate, acuminate; midlobe of lip $\frac{2}{3}$ in. across. *Column* with incurved subulate tips.

Sect. IV. STACHYBIUM (see p. 710).

* Stem simple or nearly so, often a small pseudobulb.

† Flowers small (except *D. ciliatum*). Petals not broader than the dorsal sepal.

§ *Side lobes of lip strongly inciso-serrate.*

15. **D. denudans**, *Don Prodr.* 34; stems 4–6 in. suberect, leaves linear-oblong caducous, racemes elongate drooping many-fl., bracts very small, sepals and petals long slender, mentum incurved obtuse, lip much shorter than the sepals, side lobes inciso-serrate, midlobe small crisped, disk 2-lamellate. *Wall. Cat.* 2014 (in part); *Lindl. Gen. & Sp. Orchid.* 84; in *Bot. Reg.* 1838, *Misc.* 156, and 1844, 61; in *Journ. Linn. Soc.* iii. 19; *Walp. Ann.* vi. 300.

SUBTROPICAL and TEMP. HIMALAYA, alt. 4–7000 ft., from Kumaon eastwards to Sikkim.

Stem clothed with broad sheaths, $\frac{1}{2}$ in. long. *Leaves* 3–8 in., obtuse or notched. *Scape* with raceme 4–6 in., very slender; flowers $\frac{2}{3}$ –1 in. long, usually white with red veins on the lip, sometimes yellowish with a green lip; dorsal sepals 3-nerved, lateral 5-nerved; petals 1-nerved.

16. **D. eriæflorum**, *Griff. Notul.* iii. 316; *Ic. Pl. Asiat.* t. 307; stem 3–4 in. erect, leaves linear-lanceolate acute or notched, racemes many-fl., bracts very small, mentum incurved obtuse, sepals lanceolate, lip nearly as long as the sepals broadly ovate, side lobes subfimbriately serrate, midlobe broad undulate, disk longitudinally crested. *Lindl. in Journ. Linn. Soc.* iii. 19.

SIKKIM HIMALAYA, alt. 6000 ft. KHASIA Mts., alt. 4–5000 ft., *Griffith, &c.*

Stem 3–8 in., basal internode sometimes thickened.—Very closely allied to *D. denudans*, but the racemes are shorter and fewer-fl., the sepals and petals shorter and broader, and the lip stronger in comparison. The colours are as variable as in that plant, between which and *D. alpestre* it is intermediate in characters.

17. **D. alpestre**, *Royle Ill.* 370, t. 88, f. 2; stem pseudobulbous, leaves 3–4 linear-oblong, scape short erect 3–5-fl., sepals ovate-lanceolate, petals oblanceolate, mentum short obtuse, lip lanceolate, side lobes inciso-serrate, midlobe small crisped acute, disk 2-lamellate. *Lindl. in Bot. Reg.* 1844, *Misc.* 61; *Walp. Ann.* vi. 300. *D. denudans*, *Wall. Cat.* 2014 (in part). ? *D. pusillum*, *Don Prodr.* 35.

TEMPERATE HIMALAYA, alt. 5–6000 ft., from Garwhal, *Royle, &c.*, to Nepal, *Wallich, &c.*

Resembles a dwarf state of *D. eriæflorum*; the flowers are fewer and smaller, but of the same colour, the sepals and petals broader in proportion to their length.—

Lindley refers Don's *D. pusillum* to his *D. pygmæum*, which is a Nepal and Wallichian plant, and agrees better with *alpestre*.

18. ***D. strongylanthum***, *Reichb. f. in Gard. Chron.* 1878, i. 462; racemes lateral dense-fl., sepals acuminate, lateral lanceolate, dorsal linear, mentum obtusely angled, lip clawed dilated triangular, sides pectinately serrate to the middle, apex narrowed with small abrupt fleshy calli on each side, disk with a depressed callus very papillose in front keeled in the middle.

INDIA (*Hort. Hincks*).

Stem 12 in., erect, as thick as a goose-quill, closely sheathed. *Flowers* rather small, yellow green; bracts lanceolate, about equalling the pedicelled ovaries; base of sepals dark violet-brown, petals spotted brown; sides and tip of lip dark violet; column 3-toothed, constricted in the middle.—Nearest to *eriaeflorum*, *denudans*, and *pycnostachyum*, *R. f. l. c.* I have seen no specimens. The lateral racemes are exceptions in the group.

§§ *Side lobes of lip entire, serrulate or crenulate.*

19. ***D. microbulbon***, *A. Rich. in Ann. Sc. Nat. Ser. 2, xv. 19, t. 8*; pseudobulbs small crowded ovoid, leaves 2 linear-oblong acute, scape solitary erect 4-8-fl., bracts about equalling the pedicel, lateral sepals obtuse, petals narrowly subspathulate, mentum long incurved, lip thick, side lobes broad acute, midlobe small round crenulate, disk with a channelled ridge thickened at the end. *Lindl. in Bot. Reg.* 1844, 61; *in Journ. Linn. Soc.* iii. 19; *Dalz. & Gibbs. Bomb. Fl.* 261; *Walp. Ann.* vi. 307. *D. humile*, *Wight Ic.* t. 1643; *Walp. l. c.* 308. *D. crispum*, *Dalz. in Hook. Journ. Bot.* iv. (1852) 111; *Walp. l. c.*

DECCAN PENINSULA; on the Western Ghats, from the Concan, *Law, &c.*, to the Nilghiris, *Perrottet, &c.*, and Anamallay Hills, *Wight*.

Pseudobulbs $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; sheaths membranous, which decaying leave a network of fibres. *Leaves* 2-3 in., rather thick, caducous. *Scape* 1-2 in., flowers white with a pink lip; sepals $\frac{1}{2}$ in. long; lip attached above the base of the acute or obtuse mentum.

20. ***D. porphyrochilum***, *Lindl. in Journ. Linn. Soc.* iii. 18; stem very short erect, leaves 1-4 ligulate, scape short solitary few-fl., bracts about equalling the pedicels, sepals lanceolate, petals shorter, mentum rounded, lip short ovate acute concave, disk with 2 broad plates and 3 ridges.

SIKKIM HIMALAYA, alt. 6000 ft. KHASIA MTS., alt. 4-6000 ft., *Griffith, &c.*

Stem $\frac{1}{2}$ –1 in., often pseudobulbous. *Leaves* 1-3 in., obtuse or obliquely notched. *Sepals* $\frac{1}{2}$ in. long, dirty yellow; lip brown purple.—The Sikkim specimens are in young bud only, and the bracts are longer than the flowers; it may be a different species.

21. ***D. cuspidatum***, *Lindl. in Wall. Cat.* 2015; *Gen. & Sp. Orchid.* 84; *in Bot. Reg.* 1844, *Misc.* 61; stem short stout erect, leaves 2-5 linear-oblong, scape short subsolitary erect 3-6-fl., bracts lanceolate as long as the pedicels, sepals narrowly lanceolate, petals oblanceolate, mentum short incurved, side lobes of lip large rounded, midlobe ovate acuminate quite entire, disk with a channelled ridge rising into 2 lamellæ at the base and fleshy at the tip.

TENASSERIM, *Wallich, Lobb, Parish.*

Stem 1-2 in. *Leaves* as long, rather coriaceous. *Scape* rather stout; flowers white; sepals $\frac{1}{2}$ - $\frac{3}{4}$ in. long; lip rather shorter, inserted above the base of the short mentum.

22. **D. pygmæum**, *Lindl. in Wall. Cat.* 1999; *Gen. & Sp. Orchid.* 85; in *Bot. Reg.* 1844, *Misc.* 62; pseudobulbs tufted ovoid, leaves 2-3 linear, scapes many terminal and lateral erect short dense-fl'd., bracts exceeding the ovary, sepals lanceolate, lateral decurved, petals oblanceolate, mentum long acute, lip obovate, side lobes narrow subacute, midlobe triangular crisped, disk with a crenate fleshy ridge. *D. peguannum*, *Lindl. in Journ. Linn. Soc.* iii. 19.

SIKKIM HIMALAYA, at the foot of the hills, *Gamble*. PEGU, *M'Lelland*. TENASSERIM, *Parish*.—DISTRIB. ? BORNEO.

Pseudobulbs $\frac{1}{2}$ -1 $\frac{1}{2}$ in., of several internodes. *Leaves* caducons. *Scape* with raceme 1 in.; bracts nearly $\frac{1}{4}$ in.; sepals $\frac{1}{2}$ in., white or purplish; lip with purple veins.—*Lindley* in *Gen. & Sp. Orchid.* refers *D. pusillum*, *Don*, doubtfully to this, and without a doubt in *Bot. Reg.*, but I think incorrectly (see *D. alpestre*).

23. **D. panduratum**, *Lindl. in Journ. Linn. Soc.* iii. 19; pseudobulbs ovoid, leaves subsolitary lanceolate acuminate, scape erect capillary few-fl'd., bracts minute, sepals lanceolate acuminate, petals oblanceolate, mentum long straight acute, lip panduriform, side lobes narrow acute, midlobe short rounded crenulate. *Thwaites Enum.* 293 (*excl. syn.*).

CEYLON; in the Central Province, ascending to 6000 ft., *Thwaites*.

Pseudobulb $\frac{1}{3}$ - $\frac{1}{2}$ in. *Leaf* 1-2 in. *Scapes* 1-3 in.; flowers $\frac{1}{2}$ in. long, very narrow, white tinged with purple; mentum much longer than the dorsal sepal, lip inserted much above its base.

24. **D. Diodon**, *Reichb. f. in Linnæa* xli. 89; pseudobulbs crowded, leaves linear-oblong unequally notched coriaceous, scapes 1-2 terminal few-fl'd., bracts ovate acuminate rather shorter than the pedicel, sepals lanceolate acuminate, petals subfalcately linear-oblong, mentum obtuse incurved notched, lip as long as the sepals, claw narrow dilating into a nearly rounded reticulately nerved limb, side lobes with short acute fronts, midlobe broad crenate and crisped, disk with a depressed channelled ridge with a notched tip. *D. albidulum*, *Thwaites in Trim. Cat. Ceyl. Pl.* 88.

CEYLON; at Hakgalle, *Thwaites*.

Pseudobulbs $\frac{1}{2}$ in., pyriform, of several internodes, at first enclosed in membranous sheaths. *Leaves* 1- $\frac{1}{2}$ in., base narrowed. *Scape* with the raceme 1-1 $\frac{1}{2}$ in.; pedicels $\frac{1}{2}$ in.; sepals as long, and lip? white.—The specimens are few, and flowers far advanced.

25. **D. nanum**, *Hook. f. Ic. Pl.* t. 1853; pseudobulbs ovoid, leaves 2-3 elliptic-lanceolate, scapes 1-2 terminal many-fl'd., bracts shorter than the pedicels, sepals subequal, dorsal oblong-lanceolate obtuse, lateral ovate-lanceolate decurved, petals linear-oblong obtuse, mentum incurved obtuse, lip long-clawed limb suborbicular serrulate, side lobes small, midlobe rounded disk with a broad depressed fleshy truncate ridge.

MALABAR; on the Bababoodan Hills, *Law*.

Pseudobulbs $\frac{1}{4}$ - $\frac{1}{2}$ in. *Leaves* 1-1 $\frac{1}{2}$ in., obtuse or subacute. *Scape* and raceme 1 $\frac{1}{2}$ -3 in.; pedicel and ovary $\frac{1}{2}$ - $\frac{3}{4}$ in.; bracts lanceolate; flowers $\frac{1}{2}$ in. diam., white? lip glandular ?-serrate; column very short.

26. **D. miserum**, *Reichb. f. in Gard. Chron.* 1869, 381; pseudobulbs

fusiform, leaves ligulate aristulate microscopically serrulate, raceme terminal, bracts small triangular, dorsal sepal ligulate acute, lateral triangular, petals ligulate acuminate, lip clawed ovate subacute serrulate, disk with a linear depressed keel which is dilated at the apex.

ASSAM (*Hort. Day*).

Description from the author cited. I have not seen specimens.

27. **D. Heyneanum**, *Lindl. in Wall. Cat.* 1995; *Gen. & Sp. Orchid.* 90; *in Bot. Reg.* 1839, *Misc.* 41; stem erect flexuous, leaves linear-lanceolate acute, scapes long slender, bracts shorter than the short pedicels, sepals and petals ovate-lanceolate, mentum long straight acute, side lobes of lip acute, midlobe rounded crenate, disk with a channelled ridge ending in a fleshy callus. *Wight Ic.* t. 909; *Walp. Ann.* vi. 298.

THE DECCAN PENINSULA; on the Ghats of Malabar, *Heyne, &c.*

Stem 4-8 in. *Leaves* 3-4 in. *Scapes* terminal and axillary, with the few- or many-fld. racemes as long as the leaves or longer; flowers white; sepals $\frac{1}{2}$ in. long; mentum as long as the dorsal sepal, lip inserted above its base.—Habit of *D. denudans*.

28. **D. pycnostachyum**, *Lindl. in Journ. Linn. Soc.* iii. 19; stem erect fleshy, scape terminal, raceme dense-fld., bracts lanceolate equalling the ovary, sepals and petals lanceolate, mentum short obtuse incurved, side lobes of lip very narrow, midlobe longer ovate serrate and crisped, disk with a channelled ridge 2-fld at the tip.

TENASSERIM, *Lobb*.

I have seen no good specimens, and no leaves. A drawing apparently of this species (*in Herb. Hort. Calc.*) represents a leafless stem a foot long, tapering to the tip, and ending in a many-fld. raceme 4 in. long; the flowers are shortly pedicelled, white with a green lip.

29. **D. incurvum**, *Lindl. in Journ. Linn. Soc.* iii. 18; stems usually narrowed upwards, leaves linear-oblong obliquely notched, scapes terminal and leaf-opposed shorter than the leaves flexuous few-fld., bracts membranous equalling the pedicels, sepals lanceolate, petals narrower, mentum conic acute, lip oblong-lanceolate acute or acuminate concave crisped, disk with a ridge ending in 2 teeth. *Dendrob.* No. 9, *Griff. Notul.* iii. 314. *D. Actinia*, *Lindl. in Journ. Linn. Soc.* iii. 9.—*Actinia*, *Griff. Notul.* iii. 320; *Ic. Pl. Asiut.* t. 351 A, fig. 21.

TENASSERIM; at Mergui, *Griffith, Parish*.

Stem 3-6 in., internodes $\frac{1}{2}$ - $\frac{3}{4}$ in. *Leaves* 2-3 in. *Scape* with the raceme 1-1 $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ in.; pedicel with ovary twice as long; sepals $\frac{1}{4}$ in., white; lip greenish with purple veins.—Habit of *D. eriæflorum*. *Griffith's Actinia* is a Pelorian form.

30. **D. graminifolium**, *Wight Ic.* t. 1649; rhizome creeping, stem slender, leaves narrowly linear acute, racemes terminal short solitary or 2-nate capillary erect few-fld., bracts minute, sepals 5-nerved, lateral falcately lanceolate, mentum long straight spur-like, petals as long linear-lanceolate 3-nerved erose, lip with small short spreading side lobes, midlobes oblong flat crenate.

TRAVANCORE; at Courtallam, *Wight*.

Stem 4-8 in. *Leaves* 2-3 in., grass-like. *Scapes* much shorter than the leaves, 4-6-fld.; pedicels short; flowers $\frac{1}{2}$ in. long, white; lip veined.—*Wight* remarks that this differs from its allies in its long slender creeping rhizome.

31. **D. ciliatum**, *Parish in Bot. Mag. t. 5430*; tall, leaves linear unequally notched, scapes strict long terminal and axillary, racemes laxly many- and large-fld., bracts minute, lateral sepals falcate decurved, petals spatulate, mentum short conical obtuse, lip cuneately-oblong, side lobes incurved, midlobe small ovate fimbriate with long clavate hairs on the nerves. *Veitch Man. Dendrob. 30.*

TENASSERIM, *Parish*. ARRACAN, *Benson (fld. Reichb. f.)*.

Stem 12-18 in., terete, leafy above. *Leaves* 3-4 by $\frac{1}{2}$ in. *Scape* with the raceme 6-8 in., rather stout; pedicels $\frac{3}{4}$ in.; flowers nearly 1 in. long, pale green; lip yellow-green; dorsal sepal and petals erect; side lobes of lip veined with red.—In stout habit and large flowers this is very unlike others of the section.

†† *Flowers rather large. Petals much broader than the dorsal sepals.*

32. **D. chlorops**, *Lindl. in Bot. Reg. 1844, Misc. 44*; leaves oblong-lanceolate, scapes terminal and axillary stout many-fld., flowers subcorymbose, lateral sepals oblong obtuse, petals twice as broad obovate, mentum short conic incurved, lip flat, side lobes small rounded, midlobe large subquadrate, disk hairy and with a channelled ridge. *Dalz. & Gibs. Bomb. Fl. 261*; *Walp. Ann. vi. 299*; *Veitch Man. Dendrob. 27*. *D. barbatulum*, *Wight Ic. t. 910*. *Cymbidium ovatum*, *Willd. Sp. Pl. iv. i. 101*.—*Rheede Hort. Mal. xii. t. 7*.

The DECCAN PENINSULA; from the Concan to Malabar on the Ghats.

Stems 12-18 in., sometimes very stout and $\frac{3}{4}$ in. diam.; internodes 1-1 $\frac{1}{2}$ in., terete. *Leaves* 1-4 in., caducous. *Scapes* 3-5 in.; bracts small; flowers white, greenish or yellowish, $\frac{3}{4}$ in. long, very variable in size and colour.

33. **D. barbatulum**, *Lindl. in Wall. Cat. 2013*; *Gen. & Sp. Orchid. 84*; in *Journ. Linn. Soc. iii. 20*; in *Part. Fl. Gard. iii. 113*, fig. 285; leaves narrowly lanceolate acuminate, scapes stout terminal and lateral strict many-fld., lateral sepals lanceolate falcate, dorsal narrow, petals much larger elliptic-lanceolate, mentum conical acute, lip flat, side lobes small short obtuse, midlobe much larger ovate acute, disk hairy. *Bot. Mag. t. 5918*; *Dalz. & Gibs. Bomb. Fl. 261*; *Veitch Man. Dendrob. 21*; *Walp. Ann. vi. 299*.

The DECCAN PENINSULA; from the Concan to Kurg.

Stems 10-15 in., tapering to the top; internodes $\frac{3}{4}$ -1 in., swollen. *Leaves* 3-4 in., caducous. *Flowers* $\frac{1}{2}$ in. diam., whitish; bracts minute.

34. **D. Fytcheanum**, *Batem. in Gard. Chron. 1864, 100, and 1863 1317*; erect, leaves linear-lanceolate, racemes terminal and lateral many-fld., sepals lanceolate acute, petals much larger rounded-obovate, mentum long spur-like, lip subcordately obovate, side lobes minute incurved. *Veitch Man. Dendrob. 46*; *Berkeley in Gard. Chron. 1887, 209 (rar. rosea)*. *D. barbatulum*, *Batem. in Bot. Mag. t. 5444*.

ARRACAN, RANGOON, and TENASSERIM, *Parish, Berkeley*.

Stem 12-18 in. *Leaves* 3-4 in., deciduous. *Flowers* 1 $\frac{1}{2}$ -2 in. across, white or rosy; pedicels sheathed; bracts small.

** *Stems long, copiously branched. Flowers small.*

35. **D. herbaceum**, *Lindl. in Bot. Reg. 1840, Misc. 69, and 1844, Misc. 58*; leaves linear-lanceolate acuminate caducous, racemes terminal very short few-fld., sepals and petals linear-oblong obtuse 3-nerved, mentum very

short rounded, lip very small narrow, side lobes very narrow, tips rounded, midlobe shorter ovate rugose. *Walp. Ann.* vi. 295. *D. ramosissimum*, *Wight Ic. t.* 1648; *Dalz. & Gibs. Bomb. Fl.* 261; *Walp. l. c.* 300.

BEHAR; on Parusnath, *Thomson*. DECCAN PENINSULA; from the Concan to Kurg, *Jerdon*, &c.; Godaveri district, *Gamble*.

Stem pendulous, 2-3 ft. long, and lower part of branches naked, upper with short sheaths. *Leaves* (in *Wight Ic.*) 2 in. long. *Racemes* subsessile, $\frac{1}{4}$ - $\frac{1}{2}$ in. long; bracts minute, lanceolate; pedicels nearly as long, capillary; flowers yellow; sepals shorter than the pedicels.—*Wight* describes the midlobe of the lip as suborbicular, but it is not so in his figure or in the specimens. The Parusnath specimens are stouter than the Concan ones, and the Godaveri ones still more so, and shorter. The name *herbaceum* is inappropriate, but claims priority.

36. **D. parcum**, *Reichb. f. in Gard. Chron.* 1866, 1042; *Xen. Orchid.* ii. t. 169; racemes extremely short 2-4-fl., petals linear-spathulate, mentum broad obtuse much longer than the oblong obtuse 3-nerved sepals, lip exceeding the sepals straight narrow with a dilated cuneiform truncate tip dull yellow speckled with purple.

TENASSERIM, *Parish*.

Stems 12-18 in., like those of *herbaceum*. *Raceme* $\frac{1}{2}$ - $\frac{1}{3}$ in.; flowers $\frac{1}{2}$ in. long, greenish yellow.

Sect. V. FORMOSÆ (see p. 710).

37. **D. longicornu**, *Lindl. in Wall. Cat.* 1997; *Gen. & Sp. Orchid.* 80; *Bot. Reg. t.* 1315, and 1844, *Misc.* 53; in *Journ. Linn. Soc.* iii. 16; sheaths hirsute, flowers lateral and terminal, sepals lanceolate acuminate not keeled, petals narrower acuminate, mentum slender funnel-shaped straight acute as long as the dorsal sepal or longer, side lobes of lip rounded, midlobe small orbicular fringed, disk with 3 crenate or wrinkled ridges, nerves rarely papillose, ovary terete. *Veitch Man. Dendrob.* 56; *Walp. Ann.* vi. 292. *D. flexuosum*, *Griff. Notul.* iii. 317.

TEMPERATE HIMALAYA; from Nepal eastwards, ascending to 8000 ft. in Sikkim. KHASIA AND NAGA HILLS, common.

Stem 6-12 in., rather slender, flexuous; internodes 1-1 $\frac{1}{2}$ in. *Leaves* linear-lanceolate, unequally obtusely 2-fid. *Flowers* 2 in. long, white; lip variable in breadth and in the length of the fimbriæ of the midlobe.

VAR. hirsuta; usually larger leaved, sepals petals and lip broader, nerves and ridges of lip copiously setosely fimbriate. *D. hirsutum*, *Griff. Notul.* iii. 328; *Ic. Pl. Asiat.* t. 305; *Reichb. f. in Gard. Chron.* 1884, ii. 488.—Khasia Hills, alt. 4000 ft., *Griffith*, &c. Munnipore, *Watt*.—After examining many specimens, I think that Lindley was right in uniting this with *D. longicornu*, of which it is an extreme form.

38. **D. cariniferum**, *Reichb. f. in Gard. Chron.* 1869, 611; sheaths sparsely hairy, leaves linear-oblong, flowers 2-3 on a short peduncle, sepals lanceolate keeled, petals broader than the sepals elliptic-oblong apiculate, mentum as long as the dorsal sepal corniform acute incurved, side lobes of lip rounded crenate, midlobe obovate or rounded crisped papillose, disk fimbriate, ovary triquetrous. *Veitch Man. Dendrob.* 27.

MUNNIPORE, *Watt*. BURMA, at Bhamo, *Berkeley*.

Stem 6-10 in.; internodes $\frac{1}{2}$ - $\frac{3}{4}$ in. *Leaves* 2-3 in., coriaceous. *Sepals* 1 $\frac{1}{2}$ in., pale buff; disk of lip with golden streaks.—Flowers coriaceous when dry, fragrant.—*Var. lateritia*, *Reichb. f. in Gard. Chron.* 1883, i. 656, has brick-red on the lip.

39. **D. Wattii**, *Reichb. f. in Gard. Chron.* 1888, ii. 725; sheaths sparsely pubescent, leaves linear, flowers on leafless stems subsolitary white, sepals ovate-lanceolate acuminate keeled, petals broader than the sepals elliptic-oblong acute, mentum corniform as long as the dorsal sepal straight obtuse, side lobes of lip rounded, disk yellow, midlobe small oblong crisped papillose, ovary terete. *D. cariniferum*, *var. Wattii*, *Hook. f. in Bot. Mag.* t. 6715.

MUNNIPORE, *Watt.*

Very near *cariniferum*, differing in the slenderer stems, narrower less coriaceous leaves, larger flowers that are membranous when dry, and the terete ovary.

40. **D. Infundibulum**, *Lindl. in Journ. Linn. Soc.* iii. 16; sheaths pubescent above, leaves oblong or lanceolate, flowers few together large white, sepals ovate-lanceolate, petals much larger broadly obovate, mentum as long as the sepals funnel-shaped incurved, lip obovate-oblong toothed white, disk golden, side lobes rounded incurved, midlobe large shortly 2-lobed. *Bot. Mag.* t. 5446; *Gard. Chron.* 1862, 1194; *Ill. Hort.* 1874, t. 172; *Veitch Man. Dendrob.* 50.

TENASSERIM; on Thoungyun, alt. 4-5000 ft., *Lobb, Parish.*

Stem 1-2 ft. *Leaves* 3-5 in., deeply 2-fid. *Flowers* 3-4 in. diam.; pedicels $1\frac{1}{2}$ in.; bracts $\frac{1}{2}$ in.—*Var. Jamesiana*, *Veitch l. c.* (*D. Jamesianum*, *Reichb. f. in Gard. Chron.* 1869, 554; *Williams Orchid. Alb.* t. 221; *Gartenfl.* 1867, 549, f. 137; *Godef. Orchidoph.* 1886, 189, with fig.; *Flor. & Pomol.* 1869, 187, with fig.), is stouter, more rigid, side lobes of lip rough within, dull red. *Var. ornaticissima*, *Reichb. f. in Gard. Chron.* 1883, i. 656, has cinnabar markings on the lip.

41. **D. formosum**, *Roxb. in Wall. Cat.* 1998; *Fl. Ind.* iii. 485; stout, sheaths pubescent, leaves oblong, flowers very large in terminal or lateral racemes, sepals oblong-lanceolate acuminate, petals much larger suborbicular cuspidate undulate, mentum half as long as the dorsal sepal conical, lip broadly obovate entire, side lobes small rounded, midlobe dilated retuse apiculate, disk golden with 2 tubercled ridges. *Lindl. Gen. & Sp. Orchid.* 81; in *Wall. Pl. As. Rar.* 34, t. 39; in *Bot. Reg.* 1838, *Misc.* 86, 1839, t. 64; in *Journ. Linn. Soc.* iii. 16; *Part. Mag.* vi. p. 49, with fig.; *Fl. des Serres*, t. 226, t. 1633-4 (*var. gigantea*); *Williams Orchid. Alb.* vii. t. 308; *Veitch Man. Dendrob.* 44, with fig.; *Ann. de Gand.* 1848, t. 171. *D. Infundibulum*, *Reichb. f. in Gartenfl.* t. 1253.

TROPICAL HIMALAYA; from Nepal to Bhotan; the KHASIA HILLS, ASSAM, and southwards to TENASSERIM and the ANDAMAN ISLANDS.

Stem 12-18 in., as thick as the little finger. *Leaves* 3-5 by $1\frac{1}{2}$ in., subamplexicaul. *Flowers* 3-5 in. diam.; bracts short, ovate.—*Var. Berkeleyi*, *Reichb. f. in Flora* 1882, 534; in *Gard. Chron.* 1883, i. 110, 210, has smaller flowers, shorter petals, and a narrower lip. *Var. sulphurata*, *Hook. ex Reichb. f. l. c.* 1882, ii. 437, has the throat of the lip sulphur-colored. *Var. gigantea*, *Reichb. f. in Gard. Chron.* 1882, i. 369, f. 54, is a large state.

42. **D. Williamsoni**, *Day & Reichb. f. in Gard. Chron.* 1869, 78; sheaths and leaves puberulous, leaves oblong or lanceolate, flowers 1-2 on a short bracteate peduncle, sepals lanceolate acuminate, dorsal ovate acute, petals hardly broader oblanceolate, mentum funnel-shaped nearly as long as the dorsal sepal, side lobes of lip rounded, midlobe orbicular ciliate, disk obscurely 3-ridged.

ASSAM, *Williamson.* KHASIA HILLS, *Gallatly (l. c. in Herb. Calcutt.).*

Stem 6-8 in., stout, sometimes fusiform. *Flowers* yellowish without, white within, except the yellow lip, which is often dashed with red within.

43. **D. albo-sanguineum**, *Lindl. in Part. Fl. Gard.* ii. 93, t. 57 (*very inaccurate*); stems subclavate erect, leaves linear-lanceolate obtuse or subacute, racemes erect lateral or subterminal on the leafing stems, bracts very small, flowers large cream-cold with red bars on the very base of the lip, sepals oblong obtuse, petals twice as broad apiculate, mentum rounded, lip large broadly obovate expanded waved with a short convolute base. *Bot. Mag.* t. 5130.

TENASSERIM; on the Attran River, *Lobb*.

Stem 6-16 in., glabrous; internodes 1-1½ in. by ½ in. diam., lower narrower. Leaves 5-7 by 1 in. Raceme 3-4 in., stout, erect; bracts sheathing; flowers 3 in. diam., slightly scented.—The figure in Paxton's Magazine (copied in *Fl. des Serres* vii. t. 721, and *Jard. Fleur.* t. 203) is, as Lindley implies, a made up one, and differs *in toto* from that in the *Bot. Mag.*, having 2-nate lateral flowers on a very stout leafless stem. Lindley, however, cites Lobb for the flowers being racemose, as they really are.—A very anomalous plant.

44. **D. draconis**, *Reichb. f. in Bot. Zeit.* 1862, 214; *Xen. Orchid.* ii. 130, t. 146; in *Gard. Chron.* 1883, i. 598; stems clavate, sheaths pubescent, leaves coriaceous, flowers solitary or fascicled large, sepals lanceolate acuminate, mentum long straight, petals large undulate, lip lanceolate, side lobes small rounded, midlobe long acuminate crenate. *Warn. Orchid. Alb.* iii. t. 103; *Veitch Man. Dendrob.* 39. *D. eburneum*, *Reichb. f. in Bot. Mag.* t. 5459; *Rev. Hortie.* 1883, 332, *with fig.*

TENASSERIM; at Moulmein, *Parish*.—DISTRIB. Siam, Cochin China.

Near *D. longicornu*, but stems much stouter, clavate after leafing, leaves much broader, and midlobe of lip larger.

45. **D. Lubbersianum**, *Reichb. f. in Gard. Chron.* 1882, i. 460; stem hirsute with black hairs, leaves oblong hispidulous on both surfaces, sepals triangular acute carinulate, petals oblong apiculate, mentum conical rather shorter than the pedicelled ovary, lip cuneate dilated 3-fid, side lobes obtuse-angled toothed in front, midlobe short lobulate fimbriate retuse and with pectinate filiform processes, disk with a thickened grooved ridge between the side lobes.

BURMA (*Hort. Veitch*, where it no longer exists).

Sepals and petals yellowish white; lip with 3 carnation blotches.—Description from the author. I have seen no specimens.

46. **D. virgineum**, *Reichb. f. in Gard. Chron.* 1884, ii. 520; 1888, ii. 725; hirsute with black hairs, leaves oblong ligulate, tip 2-lobed, raceme terminal, lateral sepals triangular obscurely keeled, dorsal oblong obtuse, petals rhombic, mentum short conical, side lobes of lip ½-ovate crenulate, midlobe rounded notched crenulate, disk with 2 parallel depressed ridges.

BURMA (*Hort. Low*).

Like *D. Infundibulum*, but leaves nearly twice as broad, flowers one-third smaller, ivory-white, ridges of lip red.—Description from the author, l. c.

Sect. VI. APORUM (see p. 711).

* *Flowers on the leafless extremities of the branches.*

47. **D. Serra**, *Lindl. in Journ. Linn. Soc.* iii. 3; stem long, leaves short ovate acute, flowers very small very shortly pedicelled, mentum short, lip linear-oblong with 2 terminal auricles or lobules. *D. micranthum*,

Lindl. l. c.; *Walp. Ann.* vi. 279. *D. aloefolium*, *Reichb. f. l. c.* *Aporum* Serra, *Lindl. in Wall. Cat.* 2021; *Gen. & Sp. Orchid.* 71. *A. micranthum*, *Griff. in Calc. Journ. Nat. Hist.* iv. 375, t. 17, and v. 369; *Lindl. in Journ. L. S. l. c.* *Macrostomium aloefolium*, *Blume Bijdr.* 335, fig. 37. *Oxystophyllum macrostoma*, *Hassk. in Tijdsch. Nat. Gesch.* x. i. 22.

PENANG, *Porter, Maingay (Kew Distrib.* 1604). SINGAPORE, *Wallich*. PERAK, *Scortechini*.—DISTRIB. Java.

Stems 2–3 ft., naked extremities 4–8 in., sometimes branched. *Leaves* $\frac{3}{4}$ –1 in. *Flowers* $\frac{1}{10}$ in., arising from a small globose tuft of rigid bracts; sepals obtuse.—Griffith's *D. micranthum* is unquestionably *D. Serra*: the specimen he figures has lost all of the naked end of the branch but the lowest node.

48. ***D. acinaciforme***, *Roxb. Fl. Ind.* iii. 487; leaves lanceolate, flowers small, mentum as long as the rest of the flower, lip elongate-cuneate, tip rounded crenulate. *Griff. in Calc. Journ. Nat. Hist.* v. 370.

ASSAM, *Jenkins*. KHASIA MTS., alt. 3–4000 ft.: at Nowgong, *J. D. H. & T. T.*; at Bhorlasa, *Clarke*.

Stems 1–3 ft., with long naked extremities. *Leaves* $1\frac{1}{2}$ –2 in. *Flowers* $\frac{1}{2}$ in. long, yellowish white; bracts minute; pedicel as long as the flower.—Roxburgh states this to have been sent to the Calcutta Garden from Amboyna, but the Khasia plant so perfectly agrees with his description and figure, that I suspect some mistake. Lindley, who had not seen Roxburgh's drawing, nor the then unpublished 3rd vol. of the *Fl. Ind.*, doubtfully refers *D. acinaciforme* to *Serra*.

** *Flowers in terminal heads of many bracts.*

49. ***D. Leonis***, *Reichb. f. in Walp. Ann.* vi. 280; stout, leaves very thickly coriaceous broadly ovate as broad as long obtuse, head of bracts solitary fibrous, mentum very broad as long as the rest of the flower, lip linear with involute margins and a rounded crenulate tip carunculate on the disk. *Aporum indivisum*, *Lindl. in Wall. Cat.* 2018; *Gen. & Sp. Orchid.* 70 (not of Blume). *A. Leonis*, *Lindl. in Bot. Reg.* 1840, *Misc.* 59; *Griff. in Calc. Journ. Nat. Hist.* v. 368.

SINGAPORE, *Prince*. MALACCA, *Griffith*, *Maingay (Kew Distrib.* 1605). PERAK, *Scortechini*, *Wray*.

Stem 6–10 in. *Leaves* $\frac{3}{4}$ in. long and broad, not striated, margins thickened when dry. *Flowers* shortly stoutly pedicelled, $\frac{3}{4}$ in. long, dirty purplish and yellow (pale citron tinted with claret, *Wray*).—*A. indivisum*, Blume (fid. Herb. Lindley), has much longer not thickened leaves, and a transverse lamina on the lip (like *D. eulophotum*); it is Cuming's 2068.

*** *Flowers in lateral or lateral and terminal heads of many bracts.*

50. ***D. eulophotum***, *Lindl. in Journ. Linn. Soc.* iii. 5; leaves oblong or lanceolate, flowers shortly pedicelled, mentum about as long as the rest of the flower, tip broad 2-lobed, lip linear-oblong with incurved margins and a truncate broad flat lamella on the disk, and a dilated rounded crenulate tip.

TENASSERIM, *Griffith, Helfer (Kew Distrib.* 5066), *Parish*. PERAK, *Scortechini*.—DISTRIB. Java.

Stem stout, 6–10 in. *Leaves* 1–2 in., obtuse, acute or acuminate, striate when dry. *Flowers* about $\frac{1}{2}$ in., yellow and red; lamella on lip with 2 spur-like recurved processes in the Javan specimens and in a drawing by Scortechini, truncate or retuse in the Tenasserim specimens and in another drawing by Scortechini.

51. **D. grande**, *Hook. f.*; very stout, leaves lanceolate acuminate, flowers pedicelled, mentum about as long as the rest of the flower incurved, lip cuneate with a toothed lamella on the disk and a spreading fan-shaped 2-lobed tip, the lobes broadly truncate.

PERAK, *Scortechini*. PENANG (*Ic. in Herb. Kew*). ? S. ANDAMAN ISLANDS, *Kurz*.

Stem 6–18 in., very broad (1 in.) above. *Leaves* 2–2½ in. *Flowers* about ½ in. long, yellow, with red on the disk of the sepals and petals.—Described from the Kew and Scortechini's drawings.

52. **D. atropurpureum**, *Miquel Fl. Ind. Bat.* iii. 644; leaves lanceolate or linear-lanceolate acute, flowers subsessile in axillary shortly peduncled bracteate heads, mentum as long as the sepals, lip thick ciliate linear, tip dilated obscurely 3-lobed, disk caruncled. *D. concinnum*, *Miq. l.c.* *Oxystophyllum atropurpureum*, *Blume Rumph.* iv. 41, t. 193, f. 4, and 198 C; *Walp. Ann.* iii. 536. *O. carnosum*, *Blume Bijl.* 336, fig. 38; *Lindl. Gen. & Sp. Orchid.* 72. *Aporum concinnum*, *Lindl. in Wall. Cat.* 2019; *Gen. & Sp. Orchid. l.c.*

TENASSERIM; at Moulmein, *Parish*. PERAK, *Scortechini*. SINGAPORE, *Wallich*.—DISTRIB. Siam, Malay Islands.

Stem 4–6 in. *Leaves* 1–1½ in., variable, not striate. *Flowers* about ½ in., yellowish or pink; lip with a tubercle under the tip.

**** *Flowers axillary or terminal; bracts minute, inconspicuous.*

53. **D. sinuatum**, *Lindl. ex Walp. Ann.* vi. 280; leaves very many close set lanceolate acuminate, flowers axillary solitary, lip fleshy elongate cuneate with a carunculate ridge within the margin at the tip ciliate. *Aporum sinuatum*, *Lindl. in Bot. Reg.* 1841, *Misc.* 1; *Griffith in Calcutt. Journ. Nat. Hist.* v. 368; *Walp. Ann.* vi. 280.

PENANG, *Maingay (Kew Distrib.* 1603). MALACCA, *Griffith*. SINGAPORE, *Cuming (Hort. Loddiges)*.—DISTRIB. Borneo.

Resembles *D. atropurpureum*, but stems 6–10 in., leaves 1½ in., more numerous, close set and shining when dry, flowers very much larger and solitary with small basal bracts.

54. **D. anceps**, *Swartz in Act. Holm.* 1800, 246; leaves lanceolate or ovate-lanceolate acute, flowers axillary very shortly pedicelled, mentum longer than the sepals, lip cuneately oblong obscurely 3-lobed membranous veined, margins crisped. *Willd. Sp. Pl.* iv. 136; *Roxb. Fl. Ind.* iii. 487; *Walp. Ann.* vi. 279. *Aporum anceps*, *Lindl. Gen. & Sp. Orchid.* 71 (*excl. cit. Wall.*); *Bot. Reg.* t. 1239; *Bot. Mag.* t. 3608; *Lodd. Bot. Cab.* t. 1895; *Griff. in Calc. Journ. Nat. Hist.* v. 368.

GANGETIC DELTA, *Roxburgh*. Sikkim Himalaya, in hot valleys, *J. D. H.* ASSAM, *Hamilton*. TENASSERIM, *Parish*.

Stem 1–3 ft., stout, flattened, sometimes ½ in. broad. *Leaves* 1–1½ in., striate when dry. *Flowers* ½ in. long, greenish or yellowish.

55. **D. Nathanielis**, *Reichb. f. in Sehill. Cat. Orchid. Ed.* 3 (1857) 26; leaves lanceolate acuminate, flowers very small, pedicel capillary, mentum longer than the sepals, lip membranous cuneate elongate, side lobes small, midlobe broad 2-lobed. *D. cuspidatum*, *Lindl. in Journ. Linn. Soc.* iii. 4. *D. multiflorum*, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 149, t. 31, f. 2. *Aporum cuspidatum*, *Wall. in Bot. Reg.* 1841, *Misc.* 2. *A. anceps*, *Lindl. in Wall. Cat.* 2020.

CACHAR, *Keenan*. TENASSERIM and MARTABAN, *Wallich, Parish*.

Habit and foliage of *A. anceps*, but the flowers are much smaller, $\frac{1}{3}$ in. long, very membranous, and have capillary pedicels. Lip with a flat ridge on the disk that ends abruptly opposite the side lobes.—Lindley (in Journ. Linn. Soc.) has confounded this with *acinaciforme*.

56. **D. terminale**, *Parish & Reichb. f. in Trans. Linn. Soc.* xxx. 149; leaves small ovate or ovate-oblong acute, flower terminal solitary large, mentum broad much longer than the rest of the flower, lip triangular-cuneate truncate, or 2-lobed.

TENASSERIM, *Parish*. MALACCA (*lc. in Herb. Calcutt.*).

Stems 4-6 in. Leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. Flower $\frac{2}{3}$ in. long, white, lip yellowish.—The large flower at once distinguishes this from its allies.

57. **D. spatella**, *Reichb. f. in Hamb. Gartenzeit.* xxi. 298; leaves not imbricating ascending fleshy triangular, flowers solitary minute, dorsal sepal triangular, lateral twice as large oblong most obtusely acute, petals $\frac{1}{2}$ -ovate acute, mentum moderate, lip spathulate or cuneately dilated $\frac{1}{2}$ -ovate in front crenulate angled, disk with 3 elevated yellow lines, column very short obtuse.—*Descript. from the author, l. c.*

ASSAM (*Hort. Day*).

Sect. VII. STRONGYLE (see p. 711).

* *Flowers terminal.*

58. **D. parviflorum**, *Reichb. f. ex Lindl. in Journ. Linn. Soc.* iii. 4; stem stout terete, leaves 2 in. straight stout obtuse, flower solitary terminal 1 in. long, dorsal sepals and petals subequal oblong obtuse half the length of the very large broad obtuse nearly straight mentum, free part of lateral sepals triangular, lip obovate truncate, tip broad crenulate and crisped. *Aporum Jenkinsii*, *Griff. in Calc. Journ. Nat. Hist.* v. 367, t. xxv.

ASSAM, *Jenkins*.

Stem 6-10 in., terete. Leaves $\frac{1}{4}$ in. diam. at the base, gradually narrowed to the obtuse tip. Flower solitary, white; disk of lip yellow; peduncle much shorter than the mentum.—I have seen no specimens.

59. **D. kentrophyllum**, *Hook. f.*; stem stout, leaves $\frac{1}{2}$ -1 in. recurved or straight stout acute, flower solitary terminal $\frac{1}{2}$ in. long, dorsal sepal ovate-oblong, lateral obtuse, petals oblanceolate, mentum more than twice as long as the dorsal sepal stout incurved narrowed to the obtuse base, lip spathulate with a long claw.

PERAK, *Scortechini*.

Near *D. parviflorum*, but distinguished by the above characters.

60. **D. aciculare**, *Lindl. in Bot. Reg.* 1840, *Misc.* 81; stem short slender tapering from a conic base, leaves few acicular, bracts many scale-like at the top of the short (1-fl. ?) peduncle, flower yellowish tinged with pink, lip 3-lobed, side lobes rounded serrulate in front, midlobe ovate serrulate. *Walp. Ann.* vi. 281.

SINGAPORE, *Cuming (Hort. Loddiges)*.—DISTRIB. Philippines.

I doubt this species being from Singapore. Cuming's herbarium specimens (No. 2112) are marked, Bohol Island (Philippines).

61. **D. junceum**, *Lindl. in Bot. Reg.* 1842, *Misc.* 11; stem very slender except at the fusiform base branched above, leaves 2-3 in. very slender pungent, flowers 2 at the ends of the branches $\frac{3}{4}$ in. long, mentum much longer than the linear-oblong very obtuse dorsal sepal broadly obtusely conical, petals linear-oblong, tips rounded, side lobes of lip rounded, midlobe orbicular emarginate, disk scabrid. *Reichb. f. in Gard. Chron.* 1873, 361; *Walp. Ann.* vi. 281.

SINGAPORE (*Hort. Loddiges*).—DISTRIB. Borneo.

Stem 12-18 in.; fusiform base 4-5 by $\frac{1}{2}$ in. Flower green, lip purple veined.

62. **D. subulatum**, *Hook. f.*; stem slender flexuous, leaves $\frac{1}{2}$ in. recurved terete fleshy acute, flowers solitary at the nodes of the leafless ends of the stems $\frac{1}{3}$ in. long, bracts membranous convolute, dorsal sepal and petals broadly oblong obtuse, mentum 3-4 times as long as the dorsal sepal very stout slightly incurved obtuse, lip cuneately obovate, tip obscurely emarginate. *Podochilus bicolor*, *Miq. Choix*, t. 22, f. 3.

PERAK, *Scortechini*.—DISTRIB. Java, Borneo.

Very near *D. acerosum*, but smaller in all its parts, and with very different sepals and petals.

63. **D. acerosum**. *Lindl. in Bot. Reg.* 1841, *Misc.* 86; stem rather slender flexuous, leaves $\frac{1}{2}$ in. recurved subacute fleshy, flowers solitary, bracts 1 in. membranous convolute ovate-lanceolate, petals narrow acute, mentum twice as long as the dorsal sepal stout incurved obtuse, lip narrowly cuneate, tip dilated retuse waved. *Walp. Ann.* vi. 281. *Aporum subteres*, *Griff. in Calc. Journ. Nat. Hist.* v. 371.

TENASSERIM, *Parish*. SINGAPORE, *Hort. Loddiges*. MALACCA, *Griffith*.—DISTRIB. Borneo.

Stem 6-10 in., including the leafless ends. Flowers $\frac{1}{2}$ in. long, pale rose-colored. —Griffith describes the flowers as racemose, but they are solitary in his specimens (in *Herb. Lindley*).

64. **D. teres**, *Lindl. in Bot. Reg.* 1840, *Misc.* 111; stem almost filiform, leaves 2-3 in. distant slender obtuse, bracts spathaceous, mentum as long as the ovate-lanceolate acuminate dorsal sepal straight conical slender, petals linear-lanceolate, lip cuneate truncate serrulate cuspidate, ridges 3 crested. *Walp. Ann.* vi. 281.

SINGAPORE, *Hort. Loddiges*.

Stem 12-16 in. Leaves? Flowers $\frac{3}{4}$ in., fragrant, whitish, tip of the lip orange. —Described from scanty materials.

Sect. VIII. VIRGATÆ (see p. 711).

* Lower nodes of stem not swollen. Mentum long or short.

65. **D. conostalix**, *Reichb. f. in Walp. Ann.* vi. 292; leaves suberect linear unequally 2-fid, sheaths hispidulous, flowers small solitary or 2-nate leaf-opposed greenish pendulous from a tubercle-like decurved bracteate peduncle, sepals ovate, lateral revolute, petals narrower linear-oblong, mentum longer than the triangular acute lateral sepals, lip linear-oblong with 2 tooth-like spreading side lobes and a small orbicular thickened midlobe. *D. calcaratum*, *Lindl. in Bot. Reg.* 1840, *Misc.* 89.

SINGAPORE and MALACCA, *Cuming*, *Lobb*, *Maingay* (*Kew Distrib.* 1606).

Stem 12-18 in., as thick as a crow-quill, internodes 1-1½ in. *Leaves* 2-3 by ½ in. *Flowers* ½ in. long, nearly straight; column with rounded tips.

66. **D. bambusæfolium**, *Parish & Reichb. f. in Trans. Linn. Soc.* xxx. 149; leaves linear-lanceolate unequally 2-fid, flowers 1-3 on a leaf-opposed tubercle, pedicel slender, dorsal sepal oblong-lanceolate, petals linear-lanceolate acute, mentum as long as the ovate acute lateral sepals cylindric-conic obtuse, lip narrowly spatulate entire or oblong membranous veined, tip rounded or emarginate, sides involute.

TENASSERIM, *Parish*.

Stem 2 ft., stouter than in *D. conostaliæ*, polished. *Leaves* 5-6 by ½ in., sheaths minutely granulate. *Flowers* ½ in. long, green or white with purple on lip, which is described by Parish as "strangely different on one and the same specimen."—Habit and foliage of *D. gemellum*, of which it may be a var. Parish figures a more oblong lip, notched at the end, unlike that which I examined; he informs me that the lip is very variable.

67. **D. hæmoglossum**, *Thwaites Enum.* 429; habit, size and characters of *D. bambusæfolium*, but pedicels shorter, flowers smaller, petals ovate lanceolate, and mentum very short depressed conical, lip tongue-shaped acute undulate.

MALABAR, *Jerdon*. CEYLON; at Matele and the Dolosbagey district, alt. 3000 ft., *Gardner, Thwaites*.

So like *D. bambusæfolium* that without the flowers the specimens seem to be inseparable.

68. **D. Cathcartii**, *Hook. f.*; leaves linear-lanceolate unequally 2-fid, flowers in leaf-opposed pairs yellow with purple on the lip, pedicel slender, dorsal sepal ovate-lanceolate acute, petals similar but narrower, mentum stout incurved shorter than the lanceolate lateral sepals, lip elliptic-oblong acute quite entire.

SIKKIM HIMALAYA (*IC. Cathcart* and *IC. Hort. Bot. Calc.*).

Stem 12-18 in., internodes 1 in. *Leaves* 4-6 by ½-¾ in. *Flowers* 1 in. long.—A very distinct species with golden flowers, three times as large as *D. bambusæfolium* according to the drawings.

69. **D. gemellum**, *Lindl. Gen. & Sp. Orchid.* 81; in *Bot. Reg.* 1840, *Misc.* 192; 1844, *Misc.* 62; leaves linear-lanceolate unequally 2-fid, flowers 2 on a leaf-opposed tubercle, "lip oval acute, tip suberisped with 3 inconspicuous serrulate ridges, 3-lobed." *Walp. Ann.* vi. 286. Pedilonium biflorum, *Blume Bijl.* 322.

SINGAPORE, *Cuming (Hort. Loddiges)*. MALACCA; at Bronang, *Griffith*.

Only seen in Herb. Lindley; the two specimens exactly resemble *bambusæfolium*, but are flowerless; a drawing accompanies them of an oblong-lanceolate acute lip, with 3 serrulate ridges (not at all spatulate as in *bambusæfolium*).

70. **D. pachyglossum**, *Parish & Reichb. f. in Trans. Linn. Soc.* xxx. 149; young sheaths hispid, leaves very slender acuminate, flowers solitary or geminate, sepals triangular-ovate, petals narrowly linear acuminate, mentum equalling the sepals recurved obtuse, side lobes of lip very small, midlobe minute retuse, disk 2-keeled.

TENASSERIM; at Moulmein, *Parish*.

Stem 6-8 in., narrowed at the base and apex. *Leaves* 2-3 by ⅓ in. *Sepals* streaked with brown. *Lip* white, with brown streaks.—Reichenbach, from whom the description is taken, says, "Very like *D. attenuatum*, Lindl."

71. **D. villosulum**, Wall. Cat. 2006 (not of Lindl.); sheaths hirsute, leaves 1 in. linear-lanceolate unequally acutely 2-fid, flowers very small solitary shortly pedicelled white, mentum cylindric obtuse longer than the oblong obtuse 3-nerved sepals, petals linear obtuse 1-nerved, lip very narrow, the long stiff claw gradually dilated into 2 narrow incurved acute side lobes, midlobe long slender rigid spur-like with a thickened tip and inflexed beak.

PENANG, Porter.

Stem as thick as a crow-quill; internodes $\frac{1}{2}$ in. Leaves rather rigid, channelled, margins recurved. Flowers $\frac{1}{2}$ in. from the tip of the dorsal sepal to that of the lip.—Lindley's Wallichian specimen was flowerless, and as the stem precisely resembles that of *D. nutans*, he referred the latter to *villosulum*.

72. **D. Lobbii**, Teijsm. & Binnend. in Nat. Tijdsch. Neerl. Ind. iii. 399; stems erect leafy terete rusty-pilose, leaves sessile lanceolate lepidote beneath, tip obliquely notched, flowers solitary leaf-opposed pendulous, sepals linear acute, petals narrower erect, lip erect with 3 ridges, side lobes acute, midlobe toothed emarginate. Walp. Ann. vi. 292.—Description from the authors, l. c.

SINGAPORE, Lobb.

** Lower internodes of stem tuberous or fusiform. Mentum equalling or exceeding the lateral sepals.

73. **D. tuberiferum**, Hook. f.; leaves short coriaceous oblong obtuse, margins recurved, flowers small hyaline 1-2 at the nodes of the leafless ends of the stems very shortly pedicelled, dorsal sepal oblong, petals narrower lanceolate falcate ciliate, mentum cylindric straight obtuse twice as long as the lateral sepals, lip obcordate with a minute ciliate lobe between the rounded side lobes and a truncate raised ridge in front.

PERAK, Scortechini (drawing only). SINGAPORE, from Guning Hijan, Murton. ? CHITTAGONG (Ic. Hort. Calcutt.).

Stem 12-18 in., often branched; internodes $\frac{1}{2}$ - $\frac{3}{4}$ in., basal tuber globose or fusiform. Leaves $1\frac{1}{2}$ -2 in. Flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. long, veins and cross-venules slender.—Scortechini's drawing represents the lateral sepals as rounded and midlobe of lip as ovate; in the Singapore specimens the former are acute, and the latter linear and longer. Very near *D. Boothii*, Teijsm. & Binnend. (Miquel Choix, t. 24, f. 2), which has larger flowers and fimbriate bracts.

74. **D. podagraria**, Hook. f.; leaves linear-oblong or linear obtuse or emarginate, flowers small solitary on bracteate tubercles at the upper nodes or leaf axils, dorsal sepal lanceolate, petals narrow oblong-lanceolate 3-nerved, mentum longer than the ovate uncinately 7-nerved lateral sepals stout incurved obtuse, lip obcordate from a narrow base, side lobes rounded, midlobe small rounded, sinus with a plate and caruncle. *D. angulatum*, Wall. Cat. 2010 (not of Lindl. Gen. & Sp. Orchid.).

BURMA; at Attran, Wallich. TENASSEEIM, Griffith, Parish.

Stem 1-3 ft., branched; internodes $1\frac{1}{2}$ in.; basal tuber 1-5 in. Leaves $1\frac{1}{2}$ -2 by $\frac{1}{4}$ - $\frac{1}{2}$ in. Flowers $\frac{1}{2}$ in. long, white with pink veins on the lip.

75. **D. clavipes**, Hook. f.; leaves erect linear, tip rounded, flowers small solitary axillary, dorsal sepal ovate obtuse, petals narrower lanceolate 3-nerved, mentum stout obtuse longer than the obtuse 7-nerved lateral

sepals, lip obcordate, with rounded side lobes, a minute midlobe, and a caruncle at the sinus.

PERAK, *Scortechini*.—DISTRIB. JAVA.

Stem as thick as a sparrow's quill, basal tuber $\frac{1}{2}$ –1 in., globose or fusiform, branches also thickened at the base. Leaves 1–1 $\frac{1}{2}$ in., strict, striate. Flowers $\frac{1}{4}$ in., white?, midlobe of lip very variable.—The Java specimens seem to have narrower petals and more acute lateral sepals than the Perak ones.

76. **D. crumenatum**, Swartz in *Act. Holm.* 1800, 246; stem tall branched, base fusiform, leaves oblong obtuse or notched, flowers many on the leafless ends of the branches large white, dorsal sepal ovate-lanceolate 7-nerved, petals linear-oblong 5-nerved, mentum equalling the lanceolate acuminate lateral sepals conical acute incurved, side lobes of lip narrow, midlobe much larger suborbicular crisped, disk with crenate ridges. *Lindl. Gen. & Sp. Orchid.* 88; in *Bot. Reg.* 1839, t. 22; in *Trans. Hort. Soc.* vii. 70; *Griff. Notul.* iii. 315; *Bot. Mag.* t. 4013; *Miquel Choix*, t. 22; *Walp. Ann.* vi. 291. *Onychium crumenatum*, *Blume Bijd.* 326.—*Rumph. Herb. Amb.* vi. t. 47, f. 2.

TENASSERIM, the ANDAMAN ISLANDS and MALAY PENINSULA, common.—DISTRIB. Malay Archipelago, S. China, Siam, &c.

Stem 2–3 ft., stout. Leaves 2–3 in., coriaceous. Flowers 1–1 $\frac{1}{4}$ in. long; sheathed peduncle $\frac{1}{4}$ – $\frac{1}{2}$ in.; pedicel $\frac{1}{2}$ in.; lip with a primrose disk and sometimes pink veins.—In a drawing in Hort. Calcutt. of a plant very like this from Penang, named *D. flexuosum*, Wall., the sepals and petals are obtuse, and the midlobe of the lip quite entire, rounded at the tip; the mentum is shorter and straight. The Ceylon locality attributed to *D. crumenatum* is no doubt an error.

Sect. IX. BREVIFLORES (see p. 711).

77. **D. bicameratum**, *Lindl. in Bot. Reg.* 1839, *Misc.* 85; leaves linear-lanceolate, flowers crowded on a short sheathed peduncle, dorsal sepal ovate-oblong subacute 5-nerved, mentum urceolate, foot of column 3-lamellate, lip broadly cuneate truncate, side lobes spreading small acute, midlobe small fleshy caruncled. *Saunders Refug. Bot.* t. 143; *Walp. Ann.* vi. 299. *D. breviflorum*, *Lindl. in Journ. Linn. Soc.* iii. 14.

SIKKIM HIMALAYA, alt. 2000 ft., *Mann (Ic. in Hort. Bot. Calc.)*. KHASIA HILLS, *Gibson*. BEHAR; on Parusnath (*Ic. in Hort. Bot. Calc.*). TENASSERIM, *Parish*.

Stem clavate, fusiform or elongate, and 12–18 in. Leaves 3–4 in., obliquely 2-fid. Flowers $\frac{1}{2}$ in. broad, yellow with stripes of red speckles; lip golden yellow.—Apparently very variable. The figure in *Refug. Bot.* has fusiform stems with internodes $\frac{1}{2}$ – $\frac{3}{4}$ in., and a rounded midlobe of the lip. The Parusnath plant has stems 6–7 in. narrowed at both ends, internodes $\frac{3}{4}$ –1 $\frac{1}{4}$ in., dirty-yellow flowers, and a narrower mentum; the midlobe of lip is very short. *Lindley's* specimen of *D. breviflorum*, erroneously supposed to be from Singapore, is a mere frustule of a stem. A note of Dr. Thomson's attached to a drawing of this species (in Hort. Calc.) states that it was introduced from Parusnath into the Calcutta Garden; it has pale rose-colored flowers. *Lindley* by an oversight says of the flowers, "A little smaller than those of *Maxillaria stapelioides*," which he figures (*Bot. Reg.* 1839, t. 17) with flowers $2\frac{1}{2}$ in. diam.

78. **D. bolboflorum**, *Falc. mss.*; stem short fusiform or subclavate, leaves oblong or lanceolate acute, flowers very small fascicled on a very short bracteate peduncle subsessile, dorsal sepal broadly ovate obtuse 7-nerved rather broader than the obovate 5–7-nerved petals, lateral sepals

triangular acute, mentum urceolate, base rounded, lip triangular broadly truncate, apex formed of the spreading acute side lobes which are longer than the very short broad sessile caruncled apiculate midlobe, column with 2 spurs at the base.

SIKKIM HIMALAYA; Rungbee, alt. 3000 ft., *Clarke*; Darjeeling, alt. 7000 ft., *Gamble*.

Stems 4-8 in., often curved or subflexuose, internodes very obscure. *Leaves* 2-3 in., many-nerved. *Flowers* $\frac{1}{2}$ in. long and broad, greenish; pedicels as long; bracts scarious; column short and broad; anther short.—The name *bolbiflorum* is attached by Falconer to a drawing of this plant in Hort. Bot. Calc., but no locality is given.

79. **D. aduncum**, *Wall. in Bot. Reg.* 1842, *Misc.* 62, 1846, t. 15; stems slender pendulous, leaves linear-lanceolate, flowers on the leafless stems in short racemes, bracts obtuse, dorsal sepal ovate acute, petals rather broader, mentum very large urceolate as long as the triangular acuminate lateral sepals, lip small cymbiform cuspidate ciliate, claw short, disk villous, column bearded in front. *Bot. Mag.* t. 6784; *Veitch Man. Dendrob.* 14; *Walp. Ann.* vi. 295.

SIKKIM HIMALAYA, alt. 7000 ft., *Pantling*. BHOTAN, *Lister*. ASSAM, *Jenkins*, &c.—DISTRIB. China.

Stems 1-2 ft. *Leaves* 2-3 in., thin, acute or obtuse. *Flowers* $\frac{1}{2}$ in. broad, translucent, rose-pink; peduncle clothed with membranous scales; perianth segments recurved; tip of column crenate; anther purple, papillose.—The Chinese *D. hercoglossum*, *Reichb. f.* in *Hamb. Gartenzeit.* xlii. 558, resembles a form of this with more acute sepals and petals, and deeper rose-colored flowers.

Sect. X. PEDILONIUM (see p. 711).

80. **D. secundum**, *Wall. Cat.* 1996; stem stout, racemes shortly peduncled secund dense-fl., bracts small membranous, dorsal sepal ovate obtuse, petals narrower linear-oblong, mentum as long as the dorsal sepal or longer, lip spathulately oblanceolate cymbiform and entire subacute, claw saccate, disk with a semilunate transverse ridge. *Lindl. Gen. & Sp. Orchid.* 81; *in Bot. Reg.* t. 1291 and 1844, *Misc.* 65; *Reichb. Fl. Exot.* t. 269; *Bot. Mag.* t. 4352; *De Vriese Illust.* t. 6; *Veitch Man. Dendrob.* 72. *Pedilonium secundum*, *Blume Bijl.* 322.

MARTABAN, *Wallich*. TENASSERIM, *Griffith, Helfer*. PENANG, *Wallich*. DISTRIB. Sumatra, Java, Cochin China.

Stem 10-24 in., pendulous, sometimes $\frac{3}{4}$ in. diam., grooved. *Leaves* very variable, 2-4 by 1-2 in., oblong to linear-oblong, obtuse or retuse. *Racemes* 2-4 in., decurved, rachis very stout; flowers hardly expand, and vary from deep red to white, with yellow on the lip.—Var. *nivea*, *Reichb. f.* in *Gard. Chron.* 1881, i. 733.

81. **D. cornutum**, *Hook. f.*; stem long slender, flowers on the leafless stems 2-3 on a very short peduncle, bracts minute, dorsal sepal oblong obtuse 5-nerved, petals narrower elliptic or oblanceolate, mentum cylindric stout 2-3 times as long as the broadly ovate lateral sepals, lip entire very narrowly spathulate, claw long with involute margins and a small fleshy tubercle near the base.

PERAK, *Scortechini*; Summit of Gunong Batu Pateh, *Wray*.

Stems 12-18 in.; internodes 1 in. *Leaves* 4 by $\frac{1}{2}$ in., linear-lanceolate, acuminate, membranous, strict; sheath $\frac{1}{2}$ in., dotted with black. *Flowers* 1 in., often arched like a bow, bright rose-colored; pedicel $\frac{3}{4}$ in., capillary; column short, tips crenu-

late, stipes of anther long subulate.—Near *D. Kuhlii*, Lindl., of Java (Bot. Reg. 1847, t. 17), which has broadly elliptic leaves.

82. **D. cumulatum**, Lindl. in *Gard. Chron.* 1855, 756; stem rather slender, racemes subcorymbose, dorsal sepal subacute, petals much broader obovate or rounded obtuse erose, mentum as long as the acute lateral sepals subcylindric incurved, lip obovate-spathulate erosely toothed, claw short with a small tubercle above the base. *Bot. Mag.* t. 5703; *Reichb. f.* in *Gard. Chron.* 1868, 6; *Veitch Man. Dendrob.* 34.

SIKKIM HIMALAYA (*l.c.* in *Herb. Calc.*). BHOTAN, *Lister*. TENASSERIM, *Parish*, *Benson*. ? PERAK, *Scortechini*.

Stem 1-2 ft., rather slender, pendulous. *Leaves* 3-4 in., oblong-lanceolate, acuminate. *Racemes* 3-4 in. long and broad; flowers 1-1½ in. broad, more expanded than in others of the section, rose-cold., vanilla-scented; lip suffused with yellow, very variable in breadth.

VAR. Jenkinsii; petals orbicular-obovate, lip with an orbicular-oblong waved imb speckled with red. *D. Jenkinsii*, *T. Anders. mss.*—Assam (*l.c.* in *Herb. Calcutt.*).

83. **D. sanguinolentum**, Lindl. in *Bot. Reg.* 1842, *Misc.* 73, 1843, t. 6, 1844, *Misc.* 52; pendulous, flowers on leafless stems 3-5 on a short, peduncle, bracts small, sepals ovate-obtuse, petals orbicular-oblong, mentum stout obtuse compressed, lip clawed, side lobes rounded, midlobe quadrate retuse trapezoid or obreniform, claw with a retrorse spine. *Veitch Man. Dendrob.* 72.

PENANG (*l.c.* in *Herb. Kew*), *Maingay* (*Kew Distrib.* 1615).

Stem 2-3 ft., sulcate; sheaths purplish. *Leaves* 2-8 in., ovate or lanceolate, red beneath. *Peduncle* ¼-½ in.; *pedicels* ¾ in.; flowers 1 in. diam., yellow with violet tips and a red blotch on the lip; mentum as long as the sepals.—The Ceylon habitat usually given is an error. An anomalous *Pedilonium*; perhaps a *Eudendrobium* near *D. Ruckeri*.

84. **D. kentrochilum**, *Hook. f.*; stem subclavate, flowers axillary 2-nate, bracts minute, lateral sepals ovate-oblong, petals suborbicular obtuse, mentum very stout, lip clawed rhombic-obovate obscurely sub- equally 3-lobed, claw with a strong spine.

PERAK; in the Balang Padung Valley, *Wray*.

Stem elongate, internodes ½-¾ in. *Leaves* 5-6 by 1¼-1½ in., coriaceous, oblong, obtuse. *Flowers* 1 in. diam., white, not veined; mentum as long as the broadly obovate dorsal sepal.—Like the Bornean *D. pictum* (Lindl. in *Gard. Chron.* 1862, 548), but the leaves and sepals are obtuse, flowers white, and lip much broader.

85. **D. megaceras**, *Hook. f.*; stem terete, racemes very short 3-5- fld., bracts minute, dorsal sepal elliptic-oblong obtuse, petals as large obovate 7-nerved, mentum very long stout, lip membranous clawed cuneate with lacerate shoulders and a small orbicular crenate midlobe, claw with a lamella on the disk.

MALACCA, *Maingay* (*Kew Distrib.* 1613).

Stem 2 ft., stout. *Leaves* 3-4 in., rather membranous, lanceolate, acuminate. *Peduncle* and *rachis* of raceme together ½ in.; bracts recurved; flowers 1½ in. long, "dull yellowish green, spur pinkish" (*Maingay*).

86. **D. rhodocentrum**, *Reichb. f.* in *Gard. Chron.* 1872, 426; stem stout, racemes subcorymbose, dorsal sepal linear-oblong, petals much broader erose, mentum as long as the acuminate lateral sepals conical,

lip very shortly clawed obovate, side lobes very short acute, midlobe large erose, claw naked, column with a tuft of hairs in front.

INDIA? (*Hort. Buller*).

Very like *D. cumulatum* in habit, foliage, and inflorescence, but mentum shorter, side lobes of lip smaller, its claw unarmed, and column bearded.—*Description from the author*.

87. **D. hymenanthum**, *Hook. f.*; flowers solitary? on the leafing stems very membranous, dorsal sepal ovate obtuse, lateral ovate-lanceolate subacute and elliptic obtuse petals 7-nerved, mentum twice as long as the dorsal sepal nearly straight obtuse, lip with a long slender channelled claw and obovate denticulate limb which has two linear-oblong calli at its base.

PERAK, alt. 3400 ft., on Gunung Patu Pateh, *Wray*.

Stems 10–12 in., internodes 1 in. Leaves 3–4 by $\frac{3}{8}$ – $\frac{3}{4}$ in., oblong-lanceolate, coriaceous, tip oblique. Flowers $\frac{3}{4}$ in. diam., “white tinted with rose and green,” *Wray*; column with recurved apical auricles that are 1-toothed on the dorsal margin.

88. **D. ionopus**, *Reichb. f. in Gard. Chron.* 1882, ii. 808; racemes short, bracts minute, flowers yellow with red blotches, sepals and petals triangular, mentum elongate falcate, claw of lip elongate thick keeled with a flat retrorse tooth, limb dilated and 3-lobed, side lobes obtuse angled, midlobe produced retuse emarginate, column trifid.—*Description from the author, l. c.*

BRUMA (*Hort. Low*).

89. **D. Perula**, *Reichb. f. in Hamb. Gartenzeit.* xxi. 298; internodes short green sheathed, flower 2-nate subterminal (of *Pedilonium*) sulphur with orange veins, dorsal sepal and petals subequal ligulate acute, lateral triangular, mentum oblong $\frac{1}{2}$ -lunate saccate elongate anteriorly, lip cuneate-oblong lobulate and crenulate in front, with $\frac{1}{2}$ -lunate calli from the thickened veins, column short unifalcate on each side.

ASSAM (*Hort. Day*). Description from the author, l. c.

Sect. XI. DISTICHOPHYLLÆ (see p. 711).

90. **D. revolutum**, *Lindl. in Bot. Reg.* xxvi. (1840), *Misc.* 53; stem stout, flowers solitary pedicelled, sepals and petals revolute, dorsal sepal ovate subacute, petals narrower oblong-lanceolate, spur longer than the ovate obtuse lateral sepals, mentum funnel-shaped nearly straight subacute, lip broad, side lobes very small, midlobe rhomboidly suborbicular emarginate, sides deflexed, disk 3-nerved. *Bot. Mag.* t. 6076; *Part. Fl. Gard.* i. 63, fig. 42; *Wulp. Ann.* vi. 291. *D. uniflorum*, *Griff. Notul.* iii. 305; *Ic. Pl. Asiat.* t. 303.

TENASSERIM, *Parish*. SINGAPORE, *Walker*. MALACCA, on Mt. Ophir, *Hallett*, *Maingay* (*Kew Distrib.* 1610).

Stem 12–18 in., internodes $\frac{1}{2}$ in., deeply channelled. Leaves 1–2 in., linear-oblong or oblong emarginate, back keeled, very variable in breadth, base cordate. Flowers 1 in. diam., white with a brown lip; pedicel $\frac{1}{2}$ in.

91. **D. bifarium**, *Lindl. in Wall. Cat.* 2002; stem rather slender, flowers solitary sessile, dorsal sepal ovate subacute 5-nerved, petals lanceolate 3-nerved and sepals erect, mentum longer than the ovate

acuminate 5-nerved lateral sepals conical obtuse, lip hardly lobed obovate-spathulate contracted about the middle, basal half 7-nerved with convex sides fleshy with 7-9 close-set crested ridges. *D. excisum*, *Lindl. in Bot. Reg.* 1841, *Misc.* 77.

PENANG, Wallich, *Maingay* (*Kew Distrib.* 1611).

Very like *D. revolutum* in habit, but stems shorter not so robust, internodes longer, leaves smaller linear-oblong unequally 2-toothed, flowers about half the size white sessile, and lip very different.—Lindley (in *Hook. Journ. Bot.* vii. (1825) 355) erroneously refers this to *Appendicula bifida*.

92. ***D. metachilinum***, *Reichb. f. in Bonplandia*, iii. 122; flowers fleshy in short corymbiform racemes, bracts short, dorsal sepal ovate obtuse 5-nerved, petals obovate oblong obscurely 3-nerved, mentum longer than the recurved acute lateral sepals conical straight obtuse, lip spathulate concave lamellate at the base, tip with two small short side lobes that overlie the subreniform small caruncled concave fleshy midlobe.

MALACCA, Cuming, *Maingay* (*Kew Distrib.* 1612).

Stem rather stout, 12-18 in., deeply grooved when dry. Leaves 2-3 in., linear-oblong, unequally 2-fid, recurved, coriaceous, complicate below, lowest sometimes longer and lanceolate. Flowers nearly $\frac{1}{2}$ in. diam., chrome yellow; bracts minute; peduncle and pedicels each $\frac{1}{4}$ - $\frac{1}{2}$ in.

Sect. XII. EUDENDROBIUM (see p. 711).

* Mentum as long or nearly as long as the dorsal sepal. Flowers like those of sect. *Formosæ*, but lateral, yellow, or white with yellow or red markings; lip usually narrower than broad, very narrow in *D. nutans*, *Jerdonianum* & *Arachnites*. (See also *D. amœnum* for long spur.)

93. ***D. xanthophlebium***, *Lindl. in Gard. Chron.* 1857, 268; in *Journ. Linn. Soc.* iii. 16; flowers on the leafless branches 2-nate white with yellow and brown veined lip, sepals and petals lanceolate acute, mentum conical acute, lip broad, side lobes large triangular subacute, midlobe orbicular crisped scabrid, disk fleshy. *Batem. in Bot. Mag. under t.* 1515; *Veitch Man. Dendrob.* 84. *D. marginatum*, *Batem. l. c. t.* 5454.

TENASSERIM; at Moulmein, alt. 4500 ft., *Parish, Lobb*.

Habit and foliage of *D. longicornu*, but stems glabrous, striped green and white, and flowers axillary, much more open, $1\frac{1}{2}$ -2 in. diam.

94. ***D. Ruckeri***, *Lindl. in Bot. Reg.* 1843, *Misc.* 8, t. 60; stems slender pendulous, flowers with the leaves solitary or 2-nate from a short sheathed peduncle shortly pedicelled, pale yellow with lip pink or yellow with red veins, dorsal sepal and narrower petals subspathulately oblong obtuse, lateral larger obtuse, mentum ventricose, tip contracted obtusely 2-lobed, lip sessile subtrapezoidly obovate, base auricled, lateral lobes large rounded convolute, midlobe orbicular crisped, disk with a villous green ridge. *Walp. Ann.* vi. 288.

KHASIA MTS. (*lc. in Herb. Calcutt.*). — DISTRIB. Philippines (fid. *Lindley*).

Stem 1-2 ft., often branched; internodes 1-2 in. Leaves 3-5 in., lanceolate, acute. Flowers $1\frac{1}{2}$ in. from tip of dorsal sepal to that of mentum, pale primrose.—Spur twisted and lip pink in the Khasia plant.

95. ***D. luteolum***, *Batem. in Gard. Chron.* 1864, 269; stem erect, leaves linear-oblong acute coriaceous, flowers 2-4 on a short axillary peduncle yellow, sepals oblong subacute, petals much broader obtuse,

mentum stout obtuse, lip broadly ovate-oblong, side lobes rounded, midlobe ovate subacute undulate, disk with 3-5 villous ridges. *Bot. Mag.* 5441; *Veitch Man. Dendrob.* 57, with fig.

TENASSERIM; on the Attran River, *Parish*.

Stem 10-12 in., furrowed, striped. *Leaves* 3-4 in., sessile. *Flowers* 2½ in. across; sheaths of peduncle obtuse; pedicels ½ in.; lip with red veins between the side lobes.—*Var. chlorocentrum*, Reichb. f. in *Gard. Chron.* 1883, i. 340, fig. 48; *Williams Orchid. Album*, vii. t. 322, has greenish hairs on the lip.

96. **D. lasioglossum**, *Reichb. f. in Gard. Chron.* 1868, 682; 1869, 277; stem slender branched, flowers on the leafing stems 2-4 on very short axillary peduncles shortly pedicelled white with a purple veined lip, sepals oblong obtuse, petals broadly obovate, mentum as long as the dorsal sepal conical incurved, side lobes of sessile lip rounded entire purple veined, midlobe shorter subquadrate crisped, disk villous, yellow or greenish. *Bot. Mag.* t. 5825; *Veitch Man. Dendrob.* 52.

BURMA, *Parish*.

Stem 10-18 in., internodes 1-2 in. *Leaves* 3-5 in., lanceolate, acuminate, base acute. *Flowers* 1½-2 in. diam.

97. **D. Jerdonianum**, *Wight Ic.* t. 1644; stems stout very slender below, leaves linear-oblong, base broad, tip broad deeply acutely cleft, sheaths hirsute, flowers 2-3 racemose on a very short peduncle yellow, sepals lanceolate acuminate, petals linear-oblong, mentum half as long as the sepals, lip linear-oblong, side lobes small, midlobe elongate, margins crisped.

NILGHIRI and KURG HILLS, *Wight*.

Stems 8-18 in., very slender below, sulcate. *Leaves* 1-2 by ½ in. *Peduncle* ¼ in.; bracts small, ovate; flowers 1-1½ in. long. *Capsules* ¾ in. long, pedicel decurved.—I can scarcely, without further evidence, unite this with *D. nutans*, as Reichenbach has done; it is a much more robust and larger-flowered plant, with broader, more oblong, deeply cleft leaves, and much larger flowers.

98. **D. nutans**, *Lindl. Gen. & Sp. Orchid.* 90; in *Bot. Reg.* 1844, *Misc.* 52; stems very slender below and linear-lanceolate acute leaves pubescent, tip narrowed obliquely notched, flowers 2-3 racemose on a short lateral peduncle, sepals and petals linear-lanceolate, lip as in *D. Jerdonianum*. *Walp. Rep.* vi. 292; *Thwaites Enum. (excl. syn. Jerdonianum)*.

CEYLON; in the Central Province, alt. 4-6000 ft., *Macrae, Walker, &c.*

Stems 6-10 in., rather slender and swollen in the middle, but hardly clavate, sulcate. *Leaves* 2-2½ by ¾-¾ in. *Flowers* ¾ in. long.—Lindley describes the peduncles as subterminal, and the flowers as white tinged with green, but in an excellent drawing by Mr. Walker they are leaf-opposed on most of the nodes, and bright ochreous yellow.

99. **D. Arachnites**, *Reichb. f. in Gard. Chron.* 1874, 354; stems very short tufted terete, leaves linear-lanceolate acute, flowers 1-3 ochreous, sepal very narrow 5-nerved, dorsal oblanceolate obtuse, lateral linear-lanceolate from a broad base subacute, petals narrower than the dorsal sepal 3-nerved, mentum very short conical, lip nearly as long as the sepals subpanduriformly lanceolate acuminate shortly clawed slightly recurved, disk 2-ridged at the very base. *Veitch Man. Dendrob.* 19.

TENASSERIM; at Moulmein, *Borall*.

Stems 2-3 in., internodes shining, slightly swollen upwards. *Leaves* 1-3 in.;

sepals spotted; petals paler, lip purple-veined.—One of the narrowest-sepaled species. I have seen only a flower.

** Mentum short conical or rounded (long in *D. amœnum*). Flowers white or more or less purple. Lip not calceolar. (*Porphyrantha*.)

† Petals as narrow as the sepals or narrower. Lip narrower than broad.

100. **D. candidum**, Wall. in Lindl. Bot. Reg. 1838, Misc. 54, and 1844, Misc. 52; stem slender erect flexuous terete, leaves lanceolate, flowers on the leafless stems 2-3 on a short sheathed peduncle erect pure white, sepals and petals subsimilar linear-oblong obtuse, mentum rounded, lip ovate-lanceolate or narrowly trapeziform, base cuneate, side lobes narrow, midlobe ovate obtuse, disk bearded and with a long callus. *Past. Fl. Gard.* i. 63, fig. 41; *Walp. Ann.* vi. 286.

TROPICAL HIMALAYA; Kumaon, alt. 3000 ft., *Strachey & Winterbottom*; Nepal, *Wallich*; Sikkim, alt. 7000 ft., *King's Collector*; Bhotan, *Griffith*. KHASIA HILLS, *Gibson* (*lc.* in *Hort. Bot. Calc.*).

Stem 6-12 in., internodes 1-1½ in. Leaves 3-5 in. Flowers 1-1¼ in., fragrant; bracts ¼ in., ovate; pedicels ¾ in.

101. **D. macrostachyum**, Lindl. Gen. & Sp. Orchid. 78; in Bot. Reg. t. 1865, and 1844, Misc. 50; stems long pendulous terete, leaves membranous ovate-oblong acute, flowers 2-3 on a short peduncle from the subleafless stems small long-pedicelled yellowish, sepals and petals lanceolate acuminate recurved, mentum rather long funnel-shaped, lip oblong acute flat with a convolute base crenulate. *Wight Ic.* t. 1647; *Walp. Ann.* vi. 286.

TRAVANCORE, *Wight*. CEYLON, common in the Central Province.

Stems 1-2 ft., rather slender. Leaves 3-4 in. Flowers 1 in. long, fragrant; bracts small; pedicels ¾ in., slender; lip with purplish veins; sepals and petals sometimes tinged with pink.

102. **D. scabrilingue**, Lindl. in Journ. Linn. Soc. iii. 25; stems erect subclavate hirsute, leaves linear-oblong broadly 2-lobed, flowers 2-nate on a short peduncle from the leafing or leafless stems white, lip yellow with green veins, sepals ovate-lanceolate subacute, petals more oblong, mentum conical green, side lobes of oblong lip narrow, midlobe oblong retuse recurved, disk scabrid and 5-ridged. *Reichb. f.* in *Trans. Linn. Soc.* xxx. 150; *Veitch Man. Dendrob.* 72. *D. hedyosmum*, *Batem.* in *Bot. Mag.* t. 5515.

TENASSERIM; at Moulmein, *Parish*.

Stems 6-12 in., internodes ¾ in., nodes sometimes ½ in. diam. Leaves 2½ in., coriaceous, unequally obtusely 2-fid. Flowers 1½ in. diam., sweet-scented; pedicels short; bracts very small.

†† Petals as narrow or narrower than the sepals. Lip as broad as long.

103. **D. primulinum**, Lindl. in Gard. Chron. 1858, 223; in Journ. Linn. Soc. iii. 12; stems short pendulous, leaves coriaceous broadly oblong, flowers solitary on the leafless stems shortly pedicelled white or pink, lip primrose, sepals and petals subequal linear-oblong obtuse, mentum rounded,

lip large shortly clawed pubescent orbicular or reniform with a short convolute base, margins everted ciliate. *Trans. Russ. Hort. Soc.* 1861, t. 52; *Regel Gartenfl.* 1861, t. 326; *Williams Orchid. Alb.* vi. t. 286; *Veitch Man. Dendrob.* 70, with fig., and var. *gigantea*, 71. *D. nobile*, var. *pallidiflora*, *Hook. Bot. Mag.* t. 5003.

TROPICAL HIMALAYA; Nepal and Sikkim.

Stems 10–12 in., often $\frac{1}{2}$ in. diam. Leaves 4 in., smaller upwards. Flowers $2\frac{1}{2}$ in. diam., odour of cowslips; bracts small; lip 2 in. diam. in var. *gigantea*, tip rounded acute or emarginate.—Near *D. Pierardi*, but stem shorter and stouter, sepals and petals narrower and subequal.

104. **D. cretaceum**, *Lindl. in Bot. Reg.* 1847, t. 62; stems stout curved pendulous, sheaths large loose, leaves lanceolate, flowers solitary on the leafless stems shortly stoutly pedicelled nearly white, lip crimson-veined, sepals and petals subequal linear-oblong obtuse, mentum conical obtuse, lip shortly clawed orbicular from a short convolute base pubescent ciliate. *Bot. Mag.* t. 4686; *Jard. Fleur.* iv. t. 344; *Fl. des Serres* viii. t. 818; *Veitch Man. Dendrob.* 33.

ASSAM, the KHASIA HILLS, and southward to TENASSERIM.

Stems 6–12 in., $\frac{3}{8}$ in. diam., internodes $\frac{1}{2}$ –1 in. Leaves 3–4 in. Flowers $1\frac{1}{2}$ –2 in. diam.; bracts small. Capsule $\frac{1}{2}$ in., clavate.

105. **D. cruentum**, *Reichb. f. in Gard. Chron.* 1884, i. 604; stems erect terete, base swollen, leaves obliquely oblong emarginate, flowers 1–2-nate axillary green, lip with crimson side lobes, bracts lanceolate convolute, sepals triangular-ovate acuminate keeled, petals linear acute, mentum rounded, lip 3-lobed, side lobes erect oblong crimson, midlobe ovate apiculate green with a tumid warted scarlet crest and 3 red ridges. *Veitch Man. Dendrob.* 33; *Warn. Orchid. Alb.* iv. t. 174.

MALAYAN PENINSULA, on the west coast (*Hort. Sanders*).

Stems 1 ft. Leaves deciduous. Flowers $1\frac{1}{2}$ –2 in. diam.; margins of midlobe of lip scarlet; column green, margins crimson.

106. **D. ramosum**, *Lindl. in Wall. Cat.* 2003; *Gen. & Sp. Orchid.* 82; stems long slender branched pendulous, leaves lanceolate acuminate, flowers in pairs on a short peduncle from the leafless stems, sepals lanceolate acuminate, petals spathulately oblong, mentum obtuse, lip broadly obcordate from a short cuneate claw 3-lobed glabrous, side lobes rounded as long as the small intermediate orbicular waved or crisped midlobe.

SILHET; at Pundua, *Wallich*.

Stems 2–3 ft., internodes $1\frac{1}{2}$ –2 in. Leaves 2–3 in., thin. Flowers 1– $1\frac{1}{2}$ in. diam., “yellow-green, lip with red lines.”—The specimens are very bad, and Lindley’s description consequently erroneous. The colours are from a note on Wallich’s specimens.

††† Petals broad. Lip narrower than broad.

a. Flowers in short few-fl. racemes (hardly racemose in *D. spathaceum*).

107. **D. Macarthiae**, *Thwaites in Bot. Mag.* t. 4886; *Enum.* 297; stems slender terete pendulous, leaves lanceolate acuminate, flowers 3–5 racemose from the leafing stems rosy, sepals lanceolate acuminate, petals ovate oblong acute, mentum stout, lip spathulately rhomboid, side lobes obscure rounded midlobe broadly ovate subacute, disk glabrous.

Warner Orch. Alb. vii. t. 319; *Veitch Man. Dendrob.* 58, with fig.; *Walp. Ann.* vi. 290.

CEYLON; in forests between Ratnapoora and Galle, *Thwaites*.

Stems 1-2 ft., internodes 1½-2 in., mottled. *Leaves* 2½-4 in., thin. *Racemes* 2-3 in.; rachis stout, flexuous; bracts ½ in.; flowers 3-4 in. long, flattened dorsally, not spreading widely; disk of lip dark purple or maroon.

108. ***D. sphegidoglossum***, *Reichb. f. in Bonpland.* ii. 58; stems rather slender grooved, leaves linear-oblong, flowers small in few-fl. racemes on the leafless stems white, sepals oblong acute lateral keeled, petals broadly ovate acute erose, mentum short, lip cuneately obovate, lobes subequal short rounded villous and ciliate with long gland-tipped hairs. *Walp. Ann.* vi. 290. *D. stuposum*, *Lindl. in Bot. Reg.* 1838, *Misc.* 52, and 1844, 52.

KHASIA HILLS, alt. 3-5000 ft. TENASSERIM, *Parish*.

Stems 6-10 in., internodes 1-1½ in. *Leaves* 3-4 in., rather thin. *Raceme* ½-¾ in.; bracts linear-oblong, obtuse; flowers ½ in. long; pedicels capillary; lip white with red veins and a yellow band.

β. Flowers solitary or 2-4 on a very short peduncle.

109. ***D. spathaceum***, *Lindl. in Journ. Linn. Soc.* iii. 15; stems very slender flexuous, leaves lanceolate obtuse, bracts lanceolate, flowers on the leafless stems 1-2 on a short sheathed peduncle white, dorsal sepals linear-oblong acute, lateral lanceolate from a broad base acuminate, petals obovate-oblong obtuse, mentum rounded, lip oblong-lanceolate subacute waved with 2 rounded lobes above the middle, disk between the lobes with 2 elongate calli.

SIKKIM HIMALAYA; on rocks by the Lachen River, alt. 6-7000 ft., *J. D. H.*

Stems 6-10 in., terete, as thick as a crow-quill, internodes 1-1½ in.; roots filiform, long and matted. *Leaves* 3 in., tip obliquely 2-fid. *Flower* odorous; pedicel ½ in., slender; sheaths of peduncle ¼-½ in., hyaline.—Apparently a very distinct species, with the habit of *D. amœnum*, of which it is perhaps a narrow-lipped state. The specimens are very scanty.

110. ***D. heterocarpum***, *Wall. in Lindl. Gen. & Sp. Orchid.* 78; *Pl. As. Rar.* ii. 84, t. 196; stems subclavate suberect, leaves oblong-lanceolate, flowers 1-3 on a very short peduncle from the leafless stem white or straw-cold, lip yellow, sepals linear-oblong acute, petals ovate-lanceolate acuminate, mentum large conical truncate, lip ovate-lanceolate acute recurved, base with incurved sides, disk pubescent. *Lindl. in Bot. Reg.* 1844, *Misc.* 49; *Bot. Mag.* t. 4708 and 4770 (var. *Henshallii*); *Fl. des Serres* viii. t. 842; *Jard. Fleur.* iv. t. 386; *Gard. Chron.* 1885, i. 472, fig. 84 B. *D. aureum*, *Lindl. Gen. & Sp. Orchid.* 77; in *Bot. Reg.* 1839, t. 20 (var. *pallida*); *Wight Ic.* t. 1646; *Veitch Man. Dendrob.* 19 with fig.; *Reichb. in Gard. Chron.* 1880, 72 (var. *philippinensis*); *Reichenbachia* ii. t. 63. *D. rhombeum*, *Lindl. in Bot. Reg.* 1843, t. 17. — *Dendrob. sp.*, *Griff. Notul.* iii. 304; *Ic Pl. Asiat.* t. 306.

TROPICAL HIMALAYA, from Nepal eastwards, ASSAM, the KHASIA and PATKOYE MTS., BURMA, MALABAR, and CEYLON.—DISTRIB. Java, Philippine Islands.

Stems 9-18 in., ribbed; internodes ¾-1½ in. *Leaves* 4-5 in., tip oblique and subacute or emarginate. *Flowers* 2-2½ in. diam., fragrant, often tinged with green; pedicels short; lip variable in colour, yellow, or white with a yellow disk and 2 red or purple blotches on the disk.

111. **D. transparens**, Wall. Cat. 2008/1; stems slender pendulous, leaves linear-lanceolate acute, flowers in pairs on the leafless stems white and pink, lip purple within, bracts very large, sepals lanceolate acute, petals broader ovate, mentum conic, lip clawed elliptic-oblong from a convolute cuneate base obtusely lobed recurved pubescent. *Lindl. Gen. & Sp. Orchid.* 79; in *Bot. Reg.* 1844, *Misc.* 62; in *Journ. Linn. Soc.* iii. 12; *Bot. Mag.* t. 4663; *Part. Fl. Gard.* i. 134, t. 27; *Jard. Fleur.* t. 68; *Veitch Man. Dendrob.* 81. *D. Henshallii*, Reichb. f. in *Bonpland.* iii. 226.—*Dendrob.*, *Griff. Notul.* 198, No. 1135.

TROPICAL HIMALAYA; from Kumaon, alt. 3000 ft., eastwards; ASSAM, the KHASIA and GARROW HILLS.

Stems 11–18 in., internodes 1–1½ in. Leaves 3–4 in. Flowers 1½ in. diam.; bracts ¼–½ in., oblong, acute; pedicels short; lip with a broad purple single or double blotch.

112. **D. amœnum**, Wall. in *Lindl. Gen. & Sp. Orchid.* 78 (excl. syn.); stems slender pendulous, leaves linear-lanceolate acuminate, flowers 2–3 on a short peduncle from the leafless stems white with violet tips and purple lip, bracts small, sepals oblong-lanceolate obtuse, petals larger ovate, mentum conic stout, lip shortly clawed ovate obtuse undulate crenate ciliolate, disk villous. *Lindl. in Bot. Reg.* 1844, 49; in *Journ. Linn. Soc.* iii. 12; *Bot. Mag.* t. 6199; *Florist. Cab.* t. 117; *Reichb. f. in Gard. Chron.* 1875, i. 305, figs. 57, 58; 1881, ii. 625, fig. 126; *Veitch Man. Dendrob.* 17. *D. mesochlorum*, *Lindl. in Bot. Reg.* 1847, under t. 36; *Part. Fl. Gard.* i. 63, fig. 43. *D. Egertoniae*, *Lindl. l. c.*; *Part. l. c.*, fig. 44.

TROPICAL HIMALAYA, from Garwhal eastwards to Bhotan, SILHET, BURMA.

Stems 1–2 ft.; internodes 1–2½ in., smooth. Leaves 2–4 in., membranous. Flowers 1½–2½ in. diam., violet-scented; bracts on the peduncle imbricating. Lip amethyst-purple bordered with white, base yellow.—Flowers very variable in size and colour.

113. **D. marmoratum**, Reichb. f. in *Gard. Chron.* 1875, 492; stems stout greyish black terete, flowers 2-nate on the leafless stems (white with purple tips, lip purplish in front), mentum short retuse, lip oblong from a cuneate base ciliate densely velvety towards the base.

BURMA, *Boxall (Hort. Low)*.

Description from the author, l. c.

†††† Petals much broader than the sepals. Lip as broad as long or broader.

§ Flowers solitary or 2–3-nate on a short peduncle or simply pedicelled. Margin of lip entire or slightly erose.

a. Internodes cylindric.

114. **D. Pierardi**, Roxb. in *Hock. Exot. Flor.* t. 9; *Fl. Ind.* iii. 482; stems slender pendulous, leaves sessile lanceolate acuminate, flowers 2–3 on a short peduncle from the usually leafless stems rose-colored, lip yellow, bracts small, sepals oblong-lanceolate subacute, petals broader oblong, mentum short, lip orbicular cucullate pubescent ciliate, base tubular. *Lindl. Gen. & Sp. Orchid.* 79; in *Bot. Reg.* t. 1756; Wall. Cat. 2007; *Bot. Mag.* t. 2584; *Wight Ic.* t. 908; *Lodd. Bot. Cab.* t. 750; *Veitch Man. Dendrob.* 69.

EASTERN TROPICAL HIMALAYA, Sikkim. BENGAL, in the Soonderbunds, and southward to TENASSERIM.

Stems 2-3 ft., smooth. Leaves 2-4 in., membranous. Flowers 1-2 in. diam., translucent—Var. *latifolia*, Fl. des Serres, t. 955, is a doubtful plant, a good deal like *D. primulinum* in the flowers.

VAR. *cucullata*; flowers smaller $1\frac{1}{2}$ in. diam., pedicels shorter, lip with a longer tubular base and short limb with incurved tip. *D. cucullatum*, Brown in Bot. Reg. t. 548; Bot. Mag. t. 2242; Lindl. in Bot. Reg. 1844, Misc. 49; Reichb. Fl. Exot. t. 65; Walp. Ann. vi. 284. *Limodorum aphyllum*, Roxb. Cor. Pl. i. 34, t. 41; Fl. Ind. iii. 462. *Cymbidium aphyllum*, Swartz in Nov. Act. Ups. vi. 73; Willd. Sp. Pl. iv. 100.—Sikkim Himalaya, J. D. H.; Coromandel, Roxburgh.—Lindley refers Roxburgh's *L. aphyllum* to *D. amœnum*. *D. cucullatum* is the earliest name for the species, but it applies to an obvious variety.

115. **D. crystallinum**, Reichb. f. in Gard. Chron. 1868, 572; Xen. Orchid. ii. 210, t. 193, f. 1; stems pendulous, leaves falcately lanceolate acute, flowers 1-3 nate on a very short peduncle long-pedicelled white, tips purple, lip orange, sepals oblong-lanceolate acute, petals much broader, mentum short, lip shortly clawed suborbicular, disk puberulous, base shortly convolute, anther elongate papillose. Bot. Mag. t. 6319; Veitch Man. Dendrob. 34.

SIKKIM HIMALAYA, alt. 3-5000 ft., J. D. H., Treutler. ARRACAN, Benson. TENASSERIM, at Moulmein, Parish.

Stems 12-18 in.; internodes 1 in., terete, striate. Leaves 4-6 in., membranous. Flowers 2 in. diam.; bracts ovate-lanceolate; pedicels $1-1\frac{1}{2}$ in.; lip with a pale margin and ochreous base.—Named from the remarkable anther.

116. **D. Bensoniæ**, Reichb. f. in Bot. Zeit. 1867, 230; stems stont, leaves linear, flowers 1-3 on a short peduncle from the leafless stems (pale yellow or white, lip yellow with 2 purple spots), bracts very small, sepals linear-oblong obtuse, petals very large, mentum short, lip large shortly clawed orbicular concave tomentose erose, base shortly convolute. Bot. Mag. t. 5679; Floral Mag. t. 355; Jennings Orchid. t. 32; Linden, iv. t. 148; Orchidoph. 1886, 49, with fig.; Veitch Man. Dendrob. 21, with fig.

PEGU; Rangoon, Kurz. ARRACAN, on the Kareen Hills. TENASSERIM, at Moulmein, Benson.

Stems 1-3 ft., suberect or drooping, terete; internodes $1-1\frac{1}{2}$ in. Leaves 2-3 in., tip notched. Flowers $2\frac{1}{2}$ in. diam.; lip with a golden disk, purple spots sometimes confluent, or obsolete.—In Jennings' figure and Veitch's Manual, the flowers are on a very short peduncle; in Bot. Mag. and specimens from Rangoon, they are 2-3 racemose on peduncle $\frac{1}{2}$ -1 in.

117. **D. aqueum**, Lindl. in Bot. Reg. 1843, Misc. 6, t. 54; 1844, Misc. 53; in Journ. Linn. Soc. iii. 14; stems decumbent compressed, leaves ovate-lanceolate acuminate, flowers 2-3-nate axillary cream-white, sepals ovate subacute, petals obovate, mentum short incurved, lip sessile rhombic pubescent erose, side lobes small incurved, midlobe broad triangular. Bot. Mag. 4640; Jard. Fleur. t. 262; Veitch Man. Dendrob. 18; Walp. Ann. vi. 289. *D. album*, Wight Ic. t. 1645; Part. Fl. Gard. ii. 175, fig. 226.

DECCAN PENINSULA; on the Nilghiri and Iyamalley Hills, Wight, &c.

Stems 10-20 in., subclavate, $\frac{1}{2}$ in. diam.; internodes $\frac{1}{2}$ -1 in. Leaves 3-5 in. thin, wavy. Flowers $1\frac{1}{2}$ -2 in. diam.; lip suffused with pale yellow.

118. **D. crepidatum**, Lindl. in *Part. Fl. Gard.* i. 63, fig. 45; stems stout erect, leaves linear-lanceolate acute, flowers 1-3-nate shortly peduncled on the leafless stems long pedicelled white or pink, lip yellow, bracts small, sepals oblong obtuse, petals more obovate, mentum short obtuse, lip shortly clawed orbicular or broadly obovate retuse pubescent or ciliate, margins waved. *Bot. Mag.* t. 4993, 5011; *Veitch Man. Dendrob.* 33. *D. Lawanum*, Lindl. in *Journ. Linn. Soc.* iii. 10; *Dalz. & Gibs. Bomb. Fl.* 261. *Dendrochilum roseum*, Dalz. in *Hook. Kew Journ.* iv. (1852) 291.

ASSAM and the KHASIA MTS. (*Ic. in Herb. Calcutt.*). The SOUTHERN CONCAN and CANARA, *Dalzell*, &c.

Stems 6-18 in., loosely sheathed, striated green and white. *Leaves* 2-3 in., subcoriaceous. *Flowers* 1-1½ in. diam., waxy; pedicels purple; lip with a basal pit and ridge across the claw.—A specimen in Herb. Kew marked Garwhal Falconer is perhaps a cultivated one.

119. **D. lituiflorum**, Lindl. in *Gard. Chron.* 1856, 372; stems slender pendulous, leaves linear-lanceolate, flowers 1-5 on a short very large-bracted peduncle from the naked stems purple or white with purple and white lip, sepals linear-oblong subacute, petals broadly elliptic, mentum short saccate, lip trumpet-shaped puberulous, mouth large orbicular, margins recurved. *Bot. Mag.* t. 6050; *Warner Sel. Orchid.* ii. t. 3; *Reichb. f. Xen. Orchid.* iii. 36, t. 214; *Veitch Man. Dendrob.* 54; *Gartenfl.* t. 1086 (*var. Farmeri*). *D. Hanburyanum*, *Reichb. f. in Bonpland.* iv. 329.

ASSAM, RANGOON and BURMA, *Griffith*, &c.

Stems 12-24 in.; internodes 1-1½ in., very smooth. *Leaves* 3-4 in. long. *Flowers* 2-2½ in. diam., variable in colouring; bracts ½-1 in., white, scarious; tube of lip ½-¾ in., purple and white; limb upcurved, deep purple within, with a broad white ring within the purple margin.—*Var. candida*, R. f. in G. C. 1880, i. 586, has white flowers with a pale yellow lip. *Var. Freemanii*, R. f. l. c. 1887, 744, has short stiff stems, and purple sepals and petals.

120. **D. nobile**, Lindl. *Gen. & Sp. Orchid.* 24; *Sert. Orchid.* t. 3; in *Bot. Reg.* 1844, *Misc.* 48; in *Journ. Linn. Soc.* iii. 12; stems erect compressed, leaves oblong obliquely notched, flowers 2-4 subracemose on a short peduncle from the leafing or leafless stems purple or white with purple tips and lip, sepals linear-oblong obtuse, petals much broader, mentum short broad, lip subsessile broadly ovate-oblong pubescent, margins recurved, base shortly convolute. *Part. Mag.* vii. t. 7; *Hartm. Parad.* i. t. 11; *Reichb. f. in Gard. Chron.* xvii. 366; *Williams Orchid. Alb.* t. 214; *Reichenbachia* ii. t. 58 (*var. Sandersiana*); *Veitch Man. Dendrob.* 63, with fig. and *var. nobilium*, 64. *D. cœrulescens*, Wall. in Lindl. *Sert. Orchid.* t. 18; *Bot. Reg.* l. c. *D. Lindleyanum*, *Griff.* *Notul.* iii. 309 (*excl. fig.*); Lindl. in *Journ. Linn. Soc.* iii. 13.

EASTERN HIMALAYA; Sikkim, ascending to 5000 ft., J. D. H.; Bhotan, *Griffith*. The KHASIA MTS., *Gilson*, &c.—DISTRIB. China.

Stems 1-2 ft. *Leaves* 3-4 in., coriaceous, "persistent for 2 years," *Veitch*. *Flowers* 2½-3 in. diam., variable in colour, almost racemose; bracts oblong, ¼ in.—A multitude of varieties have been described, and of hybrids especially with *D. heterocarpum* (see *Reichb. f. in Gard. Chron.* 1884, 338, 445, 576, and *Veitch Mau. Dendrob.* 63).

121. **D. Parishii**, *Reichb. f. in Bot. Zeit.* 1863, 237; *Xen. Orchid.* ii. 140. t. 152; stems stout decurved, leaves oblong-lanceolate, bracts rather

large, flowers 1-3 on a short peduncle from the leafless stems rose-purple or white, lip with two maroon blotches, sepals oblong acuminate, petals broadly elliptic, mentum short obtuse, lip shortly clawed convolute with a small ovate obtuse tomentose and ciliate recurved limb. *Bot. Mag.* t. 5488; *Jennings Orchid.* t. 39; *Veitch Man. Dendrob.* 68.

UPPER BURMA, *Berkeley*. TENASSERIM, *Parish*.

Stems 6-12 in.; internodes $\frac{1}{2}$ - $\frac{3}{4}$ in., when old contracted in the middle. *Leaves* 3-5 in., coriaceous. *Flowers* $1\frac{1}{2}$ -2 in. diam.; pedicels 1 in.; bracts $\frac{1}{4}$ in.; limb of lip small compared with the tube; claw with a pit and transverse ridge. *Column* white, anther purple.

122. **D. rhodopterygium**, *Reichb. f. in Gard. Chron.* 1875, i. 684; stems terete decurved, leaves linear-oblong, bracts minute, flowers 1-3-nate on a short peduncle from the leafless stems rose-purple, lip with pale border, sepals oblong-lanceolate acute, petals ovate-lanceolate, lip with a cylindric convolute base streaked with purple and an orbicular erosely ciliate mouth rough or hispid on the disk. *Veitch Man. Dendrob.* 71. *D. polyphlebium*, *Reichb. f. l. c.* 1887, i. 702; *Warner Orchid. Alb.* vii. t. 299.

TENASSERIM; at Moulmein, *Boxall, Berkeley*.

Habit, leaves and inflorescence of *D. Parishii*, but bracts smaller, flowers much larger, 3 inches in diameter, of a paler rose-purple, often mottled with white, and lip with an orbicular mouth broadly or narrowly bordered with pale yellow, no maroon blotches, the disk not downy but rough, column white, anther purple.—*Reichenbach* suggests *polyphlebium* being a hybrid between *Pierardi* and *rhodopterygium*.

123. **D. Scortechini**, *Hook. f.*; stems long, leaves oblong-lanceolate obliquely notched, flowers solitary or 2-nate on the leafing stems waxy white, lip purple, peduncle stout, sepals lanceolate acuminate, petals broadly elliptic acute erose, mentum large broadly conical obtuse, lip rose-purple with a large ventricose tube and small acute limb tomentose towards the recurved fimbriate margin on both surfaces and closely veined.

PERAK, *Scortechini*.

Stems a foot and more, as thick as a goose-quill; internodes 1 in. *Leaves* 3 in., coriaceous. *Flowers* on the leafless upper part of the leafing stems, 3-3 $\frac{1}{4}$ in. diam.; pedicels with ovary $1\frac{1}{2}$ in.; bracts small; sepals clawed, sometimes rose-pink, lip much deeper-colored; column short, "anther dark purple with a 3-lobed top," *l. c.* *Scortechini*.

. β . *Internodes swollen at the top (slightly in D. gratiosissimum).*

124. **D. pendulum**, *Rorb. Fl. Ind.* iii. 484; stems stout decurved, nodes subglobose, leaves linear-lanceolate, flowers 1-3-nate on the leafless stems stoutly pedicelled white or tips purple, lip with yellow disk, sepals linear-oblong subacute, petals much broader, mentum obscure, lip orbicular subcordate pubescent ciliate. *D. crassinode*, *Bens. & Reichb. f. in Gard. Chron.* 1869, 164; 1870, 417; 1875, 93 (var. *albiflora*); 1876, 567 (var. *Barberiana*); *Bot. Mag.* t. 5766; *Warn. Orchid. Alb.* iv. t. 152; *Veitch Man. Dendrob.* 31, with fig. ? *D. polyanthum*, *Wall. Cat.* 2009; ? *Lindl. Gen. & Sp. Orchid.* 81; in *Bot. Reg.* 1844, Misc. 57. *D. Wardianum*, *Warner Sel. Orchid. Ser.* i. t. 19; *D. melanophthalmum*, *Reichb. f. in Gard. Chron.* 1869, 164; 1870, 417.

CHITTAGONG, *Roxburgh*. ARRACAN, *Benson*.—DISTRIB. Siam.

Stems 1-2 ft.; internodes $\frac{3}{4}$ -1 $\frac{1}{2}$ in., as broad at the nodes. Leaves 4-5 in., membranous. Flowers 2-2 $\frac{1}{2}$ in. diam., variable in colour; pedicels 1-1 $\frac{1}{2}$ in.—Wallich's specimens of *D. polyanthum* are indeterminable; they are from Burma, and quite like *D. pendulum*. I doubt if Lindley's is the same plant.

125. **D. Findlayanum**, *Par. & Reichb. f. in Trans. Linn. Soc. xxx.* 149; in *Gard. Chron.* 1877, i. 334; stems flexuous, internodes long clavate, leaves lanceolate, flowers 2 on a very short peduncle from the leafless stems very long pedicelled pale lilac, lip yellow, sepals oblong-lanceolate subacute, petals much broader, mentum subcylindric, lip shortly clawed orbicular from a short convolute base pubescent, tip acute. *Bot. Mag. t.* 6438; *Warner Orchid. Alb. ii. t.* 92; *Veitch Man. Dendrob.* 43.

BURMA; in the confines of Siam, *Findlay (Parish)*.

Stems 1-2 ft.; internodes 1-2 $\frac{1}{2}$ in., compressed, $\frac{3}{4}$ in. broad above the middle. Leaves 3-4 in., obtuse, acute or unequally notched. Flowers 3 in. diam., widely spreading; pedicels 2-3 in.; bracts short.

126. **D. Falconeri**, *Hook. Bot. Mag. t.* 4944; stems slender much branched pendulous, leaves small 1-3 in. narrow acute, flowers solitary on the subleafless stems rose-cold. or white with purple tips, lip purple and orange, sepals narrowly oblong acuminate, petals ovate-lanceolate, mentum incurved, lip broadly ovate acute or acuminate from a short convolute base, mouth undulate, margins recurved pubescent ciliate. *Lindl. in Gard. Chron.* 1856, 692; *Fl. des Serres, t.* 1197; *Belg. Hort. 1874, t.* 15; *Floral Mag. N. S. t.* 226; *Ill. Hort. N. S. t.* 243; *Linden. i. t.* 4; *Williams Orchid. Alb. vi. t.* 257 (var. *gigantea*); *Veitch Man. Dendrob.* 40; *Reichb. f. in Gard. Chron.* 1876, 688, 689 (var. *albidula*); 1879, 76 (var. *robusta*). *D. Wardianum*, var. *assamica*, *Jennings Orchid. t.* 2.

BHOTAN HIMALAYA, alt. 4000 ft.; ASSAM, KHASIA MTS., MUNNIPORE and UPPER BURMA.

Stems 2-3 ft., straggling; internodes $\frac{1}{2}$ - $\frac{3}{4}$ in., contracted in the middle, striated. Leaves 1-4 in. Flowers 2-4 $\frac{1}{2}$ in. diam., colour variable; pedicel 1-1 $\frac{1}{2}$ in.; bracts large, membranous.—The var. *gigantea* rather resembles *D. Wardianum*, which may prove only a form.

127. **D. Wardianum**, *Warner Sel. Orchid. i. t.* 19; stems stout erect or pendulous, leaves 3-4 in. linear-lanceolate, flowers 1-2 on a very short peduncle from the leafless stems white or tips purple, lip ochreous with maroon blotches, sepals oblong acute, petals twice as broad, mentum rounded, lip clawed, mouth orbicular or ovate subcordate densely pubescent, margins recurved, base short convolute. *Ill. Hort. xxxvii. t.* 277; *Floral Mag. N. S. t.* 212 (var. *Lowii*); *Williams Orchid. Alb. iii. t.* 113 (var. *gigantea*); *Reichenbachia i. t.* 9; *Reichb. f. in Gard. Chron.* 1876, ii. 460 (var. *candida*); *Veitch Man. Dendrob.* 83, with fig. *D. Falconeri*, var., *Bot. Mag. t.* 5058.

ASSAM, the KHASIA MTS. and BURMA.

Very near and perhaps only a form of *Falconeri*, from which it is difficult to distinguish some of the published drawings; stem stouter, sometimes 1 in. diam., not so nodose.—I have referred to this the *D. Falconeri*, var., sepals petalisque obtusioribus, of *Bot. Mag.*, which differs from the typical *Falconeri* (t. 4944) in the much stouter (though long and pendulous) stems, larger leaves, broader more obtuse sepals and petals, shorter lip with an orbicular limb, and much shorter anther.

128. **D. gratiosissimum**, *Reichb. f. in Bot. Zeit.* 1865, 99; *Xen. Orchid.* ii. 211, t. 193; stems slender pendulous striate, leaves ovate-lanceolate acute, flowers 1-2 on a short peduncle from the leafless stems long-pedicelled white with purple tips or purplish, disk of lip yellow, sepals oblong-lanceolate acute, petals broader, mentum short conical, lip orbicular or broadly ovate from a broad cuneate base entire undulate glabrous. *Veitch Man. Dendrob.* 47. *D. Bullerianum*, *Batem. in Bot. Mag.* t. 5652. *D. Boxalli*, *Reichb. f. in Gard. Chron.* 1874, 315; *Xen. Orchid.* ii. 212, t. 194; *Floral Mag.* 1874, t. 114; *Jennings Orchid.* t. 19; *Veitch l.c.* 24.

TENASSERIM; at Moulmein, *Parish*.

Stems 1-3 ft.; internodes 1-1½ in., slightly swollen upwards; sheaths purplish. *Leaves* 3-4 in. *Flowers* 2½ in. diam.; pedicels 1 in.; bracts small; lip white with a large circular golden disk, sometimes purple-spotted or -striated.—In *Veitch's Manual* the sepals and petals of *D. Boxalli* are described as equal and similar, but I find the petals to be much the broader. In that work *D. gratiosissimum* and *Boxalli* are kept distinct, and *D. Bullerianum* referred to the latter. They all appear to me to be like forms of one species.

129. **D. Aphrodite**, *Reichb. f. in Bot. Zeit.* 1862, 246; stems branched, internodes long clavate, leaves linear-oblong subacute, flowers solitary on the leafless stems stoutly pedicelled pale primrose or white, lip orange and purple, sepals linear-oblong obtuse, petals ovate-oblong, mentum obscure, lip shortly clawed orbicular-ovate from a short convolute base pubescent entire, anther purple. *Veitch Man. Dendrob.* 17. *D. nodatum*, *Lindl. in Gard. Chron.* 1862, 177; *Bot. Mag.* t. 5470; *Flor. des Serres*, t. 1582.

TENASSERIM; at Moulmein, *Parish*.

Stem 1-2 ft.; internodes 1½ in. *Leaves* few, 2-3 in. *Flowers* 2 in. diam.; pedicel 1-1½ in.; bracts small, appressed, sometimes many and imbricate; lip bright orange with a broad pale border, and purple blotches on the tube.

§§ Flowers solitary, 2-nate or racemose. Lip fimbriate.

130. **D. Devonianum**, *Part. Mag.* vii. 169, with fig.; stems long pendulous, leaves linear-lanceolate acuminate, flowers 1-2 on a very short peduncle from the leafless stems white or pale yellow with purple-tipped sepals and lip, sepals lanceolate acute, petals broadly ovate ciliate, mentum saccate, lip orbicular-cordate from a short convolute base densely deeply fimbriate. *Bot. Mag.* t. 4129; *Lindl. in Bot. Reg.* 1844, Misc. 48; *Gard. Fleur.* t. 11; *Fl. des Serres* vii. t. 647; *Belg. Hort.* iii. t. 31; *Ill. Hort.* 1857, t. 145; *Warner Sel. Orchid.* ii. t. 11; *Veitch Man. Dendrob.* 38, with fig. *D. pictum*, *Griff. f.d. Lindl. in Journ. Linn. Soc.* iii. 12. *D. pulchellum*, *Lindl. l.c.* (not of *Lodd.*).

BHUTAN HIMALAYA, *Griffith*. ASSAM, the KHASIA and NAGA HILLS, and southwards to TENASSERIM.

Stems 2-3 ft., terete. *Leaves* 3-4 by ½ in. *Flowers* 3 in. diam.—Var. *Elliotiana*, *Reichb. f. in Gard. Chron.* 1876, i. 756, is described as having thicker sepals and denticulate petals.—Var. *rhodoneura*, *R. f. l.c.* 1868, 682, has shorter sepals, a rounded lip with violet veins, and an odour of Patchouli.—Var. *candidula*, *R. f. l.c.* 1876, i. 654, wants the purple tip.

131. **D. Dalhousieanum**, *Wall. mss. in Part. Mag.* xi. t. 115;

stems stout, leaves linear-oblong, base cordate, racemes 5-12-fl., flowers very large rosy or yellowish with crimson on the lip, sepals oblong acute, petals much broader, mentum rounded, lip shortly clawed orbicular-oblong, tip and sides densely glandular-villous, disk with 2 pectinate fringed lamellæ. *Lindl. in Bot. Reg.* 1836, t. 10; *in Journ. Linn. Soc.* iii. 18; *Flor. des Serres* vii. t. 698; *Ill. Hort.* 1864, t. 423; *Warner Sel. Orchid.* i. t. 22; *Veitch Man. Dendrob.* 35, with fig. *Dendrob. sp., Griff. Ic. Plant. Asiat.* 308.

SIKKIM HIMALAYA, J. D. H. UPPER ASSAM, Griffith. ARRACAN to TENASSERIM.

Stems 3-4 ft., purple-spotted; internodes 1-1½ in. *Leaves* 4-6 in., obtuse or acute. *Flowers* 3½-5 in. diam., on leafing and leafless stems; bracts small.—Var. *Rossiana*, Reichb. f. in *Gard. Chron.* 1882, i. 796, is a large yellow-fl. var.

132. **D. tortile**, *Lindl. in Gard. Chron.* 1847, 797, with fig.; stems subfusiform compressed, leaves narrow retuse, racemes 3-6-fl. on leafless stems, flowers pale or rose-lilac, lip yellow, sepals and petals oblong undulate and twisted, mentum conical, lip subsaccate with a dilated orbicular everted erose limb pubescent and ciliate. *Bot. Mag.* t. 4477; *De Puydt Les Orchids* 54, with fig.; *Veitch Man. Dendrob.* 81; *Walp. Ann.* vi. 284.

CHITTAGONG and BURMA to TENASSERIM, Lobb, &c.

Stems 6-12 in., ¾ in. broad, grooved and ribbed. *Leaves* 3-4 in., subcoriaceous, recurved. *Flowers* 3-3½ in. diam.—Near *primulinum* and *Pierardi*, according to Veitch, with lip like *lituiflorum*.

** Mentum short. Lip calceolar (pyriform or hemispheric with inflexed margins). Flowers pink, coppery or yellow.

133. **D. Calceolaria**, *Carey in Hook. Exot. Flor.* t. 184; stems erect terete, leaves ovate-oblong to lanceolate, flowers 6-15 in an elongate raceme from the leafing stems large many white or pink purplish or golden yellow, sepals elliptic-oblong, petals broader, mentum stout, lip calceolar pyriform or hemispheric with broadly incurved fimbriate margins. *Lindl. Gen. & Sp. Orchid.* 83; *De Puydt Les Orchid.* t. 15. *D. moschatum*, *Wall. in Don Prodr.* 34; *Pl. As. Rar.* ii. 83, t. 195; *Lindl. l. c.* 82; *in Bot. Reg.* 1844, *Misc.* 57; *in Journ. Linn. Soc.* iii. 8; *Bot. Mag.* t. 3837; *Part. Mag.* ii. t. 241 (*excl. syn. D. claratum*); *Maund. Bot.* i. t. 37; *Hort. Parad.* ii. t. 2; *Veitch Man. Dendrob.* 61; *Warner Orchid. Alb.* t. 165 var. (*cuprea*); *Walp. Ann.* vi. 296. *D. cupreum*, *Herbert in Bot. Reg.* t. 1779. *Epidendrum moschatum*, *Ham. in Syme's Embassy*, iii. 315, with fig.

TROPICAL HIMALAYA; from Kumaon, *Strachey & Winterbottom*, eastwards to ASSAM and the KHASIA Mts., and southwards to TENASSERIM.

Stems 3-5 ft.; internodes 1-1½ in. *Leaves* 3-5 in., coriaceous, acute or unequally notched. *Flowers* 2½-3½ in. diam., odour musky or sweetish; perianth reticulate, extraordinarily variable in colour, especially the lip, which has fimbriate veins within, and often 2 large purple blotches.—The name *D. Calceolaria* (1823) is much the oldest.—The examination of a very extensive series of published and unpublished drawings of this plant convinces me that the names quoted above are all referable to our plant, which is so variable that to attempt a definition of its varieties would be impossible in this work.

134. **D. chrysocreps**, *Parish & Reichb. f. in Bot. Mag.* t. 6007; *in Trans. Linn. Soc.* xxx. 150; stems subclavate above, leaves lanceolate, flowers on the leafless stems solitary or shortly peduncled golden yellow,

sepals oblong subacute, petals broadly obovate, mentum short, lip pyriform calceolar villous, disk rufously villous within. *Veitch Man. Dendrob.* 29.

TENASSERIM; at Moulmein, *Parish*.

Stems 6-10 in.; internodes sometimes 2 by $\frac{1}{2}$ in. and flattened. *Leaves* 2-3 in., acute or unequally notched. *Flowers* $1\frac{1}{2}$ in. diam., resupinate; pedicel $\frac{3}{4}$ in.—The flowers are those of a small *D. Calceolaria*, but are solitary on leafless stems.

*** Mentum short. Lip not calceolar. Stem often swollen at the very base. Flowers golden yellow (or pale pink in *D. Farmeri*). Mentum long in *D. lamellatum*.—*Xanthina* or *Holochrysa*.

† Stem terete (not clavate). Flowers racemose.

§ *Lip fimbriate*. (See also *D. Gibsonii*.)

135. ***D. fimbriatum***, *Hook. Exot. Fl.* t. 71; leaves lanceolate acuminate, racemes usually on leafing stems pendulous, flowers many orange-yellow, sepals and arose petals subequal, mentum short, lip orbicular equally deeply fringed, base truncate. *Wall. Cat.* 2001; *Lindl. Gen. & Sp. Orchid.* 83 (not 76); *Paxt. Mag.* ii. 172; *Fl. Gard.* iii. t. 84; *Veitch Man. Dendrob.* 42, with fig.; *Jard. Fleur.* t. 314; *Flor. Cab.* t. 109; *Warner Sel. Orchid. Ser.* 2, t. 19; *Walp. Ann.* vi. 293.—*Dendrob. sp.*, *Griff. Notul.* iii. 113.

SUBTROPICAL HIMALAYA, from Kuraon, alt. 5500 ft., *Strachey & Winterbottom*, eastwards, to the KHASIA HILLS, MUNNIPORE, ABBACAN and BURMA.

Stems 4-5 ft., base swollen. *Leaves* 6 in. *Racemes* 7-12-fl.; flowers 2-3 in. diam.; bracts small.

VAR. oculata, *Hook. Bot. Mag.* t. 4160; stems stouter deeply grooved, leaves 6-8 in. strongly nerved, lip with a deep purple blotch. *Ill. Hort.* 1, t. 15; *Warner Sel. Orchid.* ii. t. 19. *D. Paxtoni*, *Paxt. Mag.* vi. 169 (not of *Lindl.*); *Fl. des Serres* vii. t. 725.

136. ***D. Hookerianum***, *Lindl. in Journ. Linn Soc.* iii. 8; stems terete, leaves oblong-lanceolate acuminate, racemes on leafing stems pendulous lax-fl., flowers very large golden, lip with 2 purple blotches, sepals and entire petals subequal, mentum rounded, lip orbicular deeply equally fringed, base cuneate. *Bot. Mag.* t. 6013; *Reichb. f. in Gard. Chron.* 1857, 616; *Veitch Man. Dendrob.* 49. *D. chrysotis*, *Reichb. f. l. c.* 1870, 1311; *Ill. Hort.* 1873, t. 155; *Warner Sel. Orchid. Ser.* 3, t. 6; *Flor. & Pomol.* 1871, 145, with fig.

TROPICAL SIKKIM HIMALAYA, *J. D. H.* ASSAM and the KHASIA HILLS, alt. 2-5000 ft., common.

Stems 6-8 ft., base swollen. *Leaves* 2-6 in. *Flowers* 3-4 in. diam.; bracts short, rounded; pedicel with ovary $1\frac{1}{2}$ in. *Capsule* 3 in., fusiform.

137. ***D. Brymerianum***, *Reichb. f. in Gard. Chron.* 1875, ii. 323; 1876, i. 366; 1879, i. 475, fig. 65; 1881, ii. 689, fig. 140; stems terete, leaves lanceolate acuminate, racemes on leafless stems 2-3-fl., flowers large yellow, sepals oblong-lanceolate, petals linear-oblong entire, mentum obscure, lip 3-lobed deeply fimbriate, base subcordate, fimbriæ of the oblong midlobe much longer than the limb. *Bot. Mag.* t. 6383; *Flor. Mag. N. S.* t. 459;

Veitch Man. Dendrob. 24, with fig.; *Lindenia* iv. t. 183; *Gartenfl.* 1883, t. 371; 1887, t. 183, 548; *Orchidoph.* 1881, t. 148. ? *D. criniferum*, *Lindl. in Bot. Reg.* 1844, *Misc.* 55; *Walp. Ann.* vi. 303.

BURMA, Berkeley.

Stems 1-2 ft., narrowed below, sulcate, old subfusiform. *Leaves* 4-5 in., 5-7-nerved. *Raceme* erect; sheaths short, lower not tubular; pedicels stout, 1½-2 in. (with the ovary); flowers 3 in. diam., often triandrous.—The leaves are stated in *Veitch's Manual* to be persistent, but in the native specimens the flowers are on leafless stems.—Var. *histrionica*, *Reichb. f. l. c.* 1858, i. 104; *Veitch l. c.* 25 has more fusiform stems, smaller flowers with much shorter fimbriae on the lip or O. Of *Lindley's D. criniferum*, supposed, but erroneously, to be from Ceylon (an island credited with Orchids as natives, which were no doubt sent from its Bot. Gardens there), nothing is known beyond the description, which differs from that of *Brymerianum* in the branched stem.

138. **D. moulmeinense**, *Parish mss.*; stems slender, leaves (narrowly linear-lanceolate, *Parish*), flowers on the leafless stems lower racemose upper 1-2 on a short peduncle, pedicels slender, bracts ovate concave, sepals oblong-lanceolate acute, petals elliptic acute erose, mentum subcylindric obtuse, lip large broader than long flabellately orbicular expanded sessile, base cuneate pubescent above glabrous beneath fimbriate all round.

TENASSERIM; at Moulmein, *Parish*.

Stems about as thick as a duck's quill; internodes 1 in. *Flowers* 1½-2 in. diam., membranous; rachis of 2-4-fld. raceme ¾ in., slender, base with a lunate sheath; bracts ½ in., thin; sepals and petals pale yellow?; lip primrose-yellow with spotted bars at the very shortly convolute base; column very short.

§§ *Lip with the margin entire or erose (subfimbriate in D. Gibsonii).*

139. **D. Gibsonii**, *Lindl. in Part. Mag.* v. 169; *Fl. Gard.* ii. 133, fig. 204; stems slender, leaves lanceolate acuminate, racemes many-fld. pendulous, basal sheaths tubular, flowers orange-yellow, lip with 2 brown spots, sepals suborbicular, petals broader entire, mentum short, lip suborbicular cochleate villous obtuse, margins everted subfimbriate, base cuneate. *Veitch Man. Dendrob.* 47; *Walp. Ann.* vi. 293. *D. fuscum*, *Lindl. in Journ. Linn. Soc.* iii. 8; *Bot. Mag.* t. 6226.

SIKKIM HIMALAYA, *J. D. H.*; ASSAM, the KHASIA Mts. and BURMA, common.

Near *D. fimbriatum*, but stems shorter and more slender, flowers smaller, petals not erose, lip broader, margins rather villous than fimbriate.

140. **D. dixanthum**, *Reichb. f. in Gard. Chron.* 1865, 674; 1883, i. 814; stems long slender, leaves linear-lanceolate, racemes on the leafless stems often whorled 2-5-fld., flowers golden yellow, sepals oblong subacute, petals broader obtuse ciliolate, mentum subglobose, lip dilated from the 2-aureoled base flat puberulous ciliolate. *Bot. Mag.* t. 5564; *Veitch Man. Dendrob.* 39.

TENASSERIM; at Moulmein, *Parish*, &c.

Stems 2-3 ft., smooth. *Leaves* 4-6 by ½ in., erect, caducous. *Racemes* 3-4 at each node; bracts minute; peduncle and pedicels slender; flowers 1½ in. diam.; lip darker than the sepals, minutely barred with red at the base.

141. **D. clavatum**, *Wall. Cat.* 2004; stems stout slightly clavate, leaves linear-oblong obtuse, racemes on the leafless stems short few-fld., flowers large ochreous yellow, lip paler with blood-red disk, bracts large,

sepals linear-oblong, petals much broader, mentum short, lip with a short convolute base and transversely oblong pubescent limb, margin recurved erose. *Lindl. in Part. Fl. Gard.* ii. 104, fig. 189; *Bot. Mag.* t. 6993; *Walp. Ann.* vi. 293.

TROPICAL HIMALAYA; from Kumaon eastwards. KHASIA HILLS, alt. 5-6000 ft., Mann.

Stems $1\frac{1}{2}$ -2 $\frac{1}{2}$ ft., as thick as the finger. Leaves 3-5 in., coriaceous. Racemes with membranous oblong tubular sheaths; flowers 2-2 $\frac{1}{2}$ in. diam., glossy; petals suborbicular. Capsule 2 in., fusiform.

142. **D. binoculare**, *Reichb. f. in Gard. Chron.* 1869, 785; stems slender, leaves lanceolate acuminate, racemes ascending, bracts very small, flowers small coppery orange with 2 maroon spots on the lip, sepals elliptic-oblong, petals obovate, lip clawed reniform pubescent plicately denticulate or crenate, disk concave. *Veitch Man. Dendrob.* 23.

PEGU; hills east of Prome, Benson.

A little known plant, differing, according to Veitch, from *D. fuscatum* (Gibsoni) by its more slender stems, smaller leaves and flowers ($\frac{1}{2}$ in. diam.), and differently shaped lip.

†† Stem terete (not clavate). Flowers solitary or 2-3. (See also *D. aggregatum*.)

143. **D. chrysanthum**, *Wall. Cat.* 2012; stems pendulous, leaves lanceolate acuminate, flowers 2-4-nate on an obscure leaf-opposed peduncle fleshy yellow, lip with a blood-red spot, sepals broad concave, petals orbicular fimbriate, mentum broad crested, lip clawed orbicular from a cuneate base villous, margins toothed or subfimbriate, everted. *Lindl. Gen. & Sp. Orchid.* 80; in *Journ. Linn. Soc.* iii. 8; in *Bot. Reg.* t. 1299; *Gartenfl.* t. 446; *Trans. Hort. Soc. Russ.* 1864, t. 154; *Veitch Man. Dendrob.* 28. *D. Paxtoni*, *Lindl. in Bot. Reg.* 1839, *Misc.* 56 (not of *Part. Mag.*); *Fl. des Serres* vii. t. 725.

TROPICAL HIMALAYA, from Nepal eastwards, alt. 2-5000 ft. KHASIA HILLS, Griffith.

Stems 5-7 ft., ribbed, leafy throughout; internodes short; sheaths large, cupular. Leaves 4-7 in., 5-nerved. Flowers $1\frac{1}{2}$ -2 in. diam., waxy; back of petals suberistate; pedicel with ovary $1\frac{1}{2}$ -2 $\frac{1}{2}$ in.; bracts small, ovate, acute. Capsule 2 in., subclavate.—In Veitch's Manual the flowers are described as 4-6 and racemose, but in the native specimens they are 2-4 and hardly racemed.—Vars. *anophthalma*, *Reichb. f. in Gard. Chron.* 1883, i. 44, has an unspotted lip, and *microphthalma* *Reichb. l. c.* 1879, i. 365, has sepals without dorsal crests, petals subserrate or very shortly fimbriate.

144. **D. Harveyanum**, *Reichb. f. in Gard. Chron.* 1883, 624; stems short fusiform, leaves 2-3 ovate-oblong, flowers 3 or more on a short lateral peduncle (yellow), sepals lanceolate acute, petals larger oblong fimbriate, mentum short retuse, lip orbicular concave papillose fringed. *Veitch Man. Dendrob.* 48.

BRITISH BURMA (*Liverpool Hort. Association*).

Stems 6-9 in. or less. Flowers 2 in. diam., bright canary-yellow; petals fimbriate as in *D. Brymerianum*, but less so.—I have seen no specimens.

145. **D. ochreatum**, *Lindl. in Wall. Cat.* 7110; in *Bot. Reg.* under

t. 1765; stems short stout decumbent, leaves ovate-lanceolate acuminate, flowers 2-nate on a leaf-opposed peduncle golden yellow, disk of lip blood-red, sepals oblong obtuse, petals larger quite entire, mentum stout, lip with a convolute claw and orbicular concave blade pubescent, margins revolute erose. *Veitch Man. Dendrob.* 66; *Walp. Ann.* vi. 287. *D. Cambridgeanum*, *Pact. Mag.* vi. t. 265; *Lindl. in Bot. Reg.* 1841, *Misc.* 171; *Bot. Mag.* t. 4450.

KHASIA MTS., *Giffith*, &c. CHITTAGONG, *Wallich*.

Stems 6-9 in., internodes contracted in the middle; sheaths inflated. *Leaves* 4-5 in., base very unequal, subcordate, twisted. *Flowers* 3 in. diam.; pedicel with ovary 1-1½ in.

146. ***D. chryseum***, *Rolfe in Gard. Chron.* 1888, i. 233; stems slender erect, leaves few linear-oblong, tip notched, flowers on the leafless stems solitary or in short sheathed racemes orange-yellow, bracts large sheathing, sepals oblong-lanceolate acuminate, petals broader, mentum conical, lip broadly clawed orbicular from a cuneate base pubescent subfimbriate.

BHUTAN HIMALAYA (*Ic. in Herb. Calcutt.*). ASSAM (*Hort. Veitch*). SYLHET, *Melville (Ic. Jerdon in Herb. Kew)*.

Stems 1-2 ft., rather slender. *Leaves* 3-4, subterminal. *Flowers* 1½ in. diam.; bracts ½-¾ in., sheathing; lip with sometimes faint crimson streaks at the base.

147. ***D. normale***, *Falc. in Ann. Nat. Hist.* iii. 196 (*name only*); stems terete, leaves linear-lanceolate acuminate, flowers 2-3 subracemose on a lateral peduncle with tubular basal sheaths golden yellow, sepals equal ovate acute entire, petals and lip all equal and similar larger than the sepals broadly ovate acute serrulate, column monstrosous. *Griff. Notul.* iii. 255; *Ic. Pl. Asiat.* t. 284; *Lindl. in Journ. Linn. Soc.* iii. 10.

WESTERN HIMALAYA; Garwhal, alt. 3-6000 ft., *Falconer, Thomson*.

Stems 12-16 in., sulcate; internodes 1-1½ in. *Leaves* 4-5 in., thin. *Peduncle* or *rachis* 1-1½ in., pedicels ½ in., bracts small membranous; flowers 1½ in. diam.; sepals and petals suberect.—It can hardly be but that this evidently monstrosous form is a state of some better known plant, but I fail to detect its origin.

††† Stem clavate.

§ *Flowers* racemose or 1-2 in form of *D. aggregatum*. *Petals* in all but *lamellatum* broader than the sepals.

148. ***D. densiflorum***, *Wall. Cat.* 2090; stems narrowly clavate pendulous terete or 4-angled, leaves subterminal acute, flowers many crowded in decurved racemes white or yellow, lip orange, bracts very large membranous, sepals obtuse, petals broader erose, mentum large subglobose, lip large funnel-shaped hippocrepiform retuse in front pubescent serrulate. *Lindl. in Wall. Pl. As. Rar.* i. 34, t. 40; *Gen. & Sp. Orchid.* 90; in *Bot. Reg.* t. 1828; in *Journ. Linn. Soc.* iii. 7; *Pact. Mag.* v. 121; *Bot. Mag.* t. 3418 and t. 5780 (var. *albo-lutea*); *Fl. des Serres*, t. 1397; *Warner Sel. Orchid. Ser.* 3, t. 21 (var.); *Orchid. Alb.* vi. t. 303; *Veitch Man. Dendrob.* 37. *D. clavatum*, *Roxb. Fl. Ind.* iii. 481. *D. thyrsiflorum*, *Reichb. f. in Ill. Hort.* xxii. t. 207; *Gartenfl.* t. 1021; *Flor. Mag. N. S.* t. 449; *Veitch Man. Dendrob.* 80, with fig.; *Gard. Chron.* 1877, i. 653, fig. 105; *Lindenia* i. t. 46 *Epidendrum Dumunsattei*, *Herb. Ham.*

TROPICAL HIMALAYA; from Nepal eastwards to the KHASIA HILLS, and southwards to TENASSERIM.

Stems 12–18 in. Leaves subterminal, 4–6 in. Flowers 2 in. diam; pedicel with ovary $\frac{1}{2}$ – $\frac{3}{4}$ in.; bracts twisted and revolute, strongly nerved. Capsule 3 in.—Veitch observes that almost the only characters of *thyrsiflorum* are the terete more slender stems and white sepals and petals; he refers to it the var. *albo-lutea* of Bot. Mag. He has a var. *Walkeriana* (Warner Sel. Orchid. iii. t. 21) with longer stems and racemes and larger flowers; also a var. *Schroederi* (Flor. Mag. t. 502) of true *densiflorum*, with looser racemes, larger flowers, French white petals and sepals, and pale yellow anterior margin of the lip.

149. **D. sulcatum**, Lindl. in Bot. Reg. 1838, t. 65; stems stout compressed grooved, leaves subterminal oblong acuminate, flowers many in short racemes from the leafless stems (dull orange or paler), bracts minute, sepals oblong obtuse and rather broader obovate, petals concave, mentum broad, lip broadly ovate hirsute, base saccate convolute, margins ciliate revolute. Bot. Mag. t. 6962; Veitch Man. Dendrob. 76; Rolfe in Gard. Chron. 1887, i. 607.

KHASIA HILLS, Gibson, &c.

Stems 6–10 in.; internodes about 6, compressed, green. Leaves 4–8 in., coriaceous, 3-nerved. Flowers 1 in. diam.; sepals and petals erect.

150. **D. Griffithianum**, Lindl. in Bot. Reg. under t. 1756; stems elongate clavate grooved, leaves oblong-lanceolate obtuse, flowers many in pendulous racemes white or yellow, lip orange, bracts small, sepals ovate-lanceolate acute spreading, petals broader ciliolate, mentum rather long incurved, lip orbicular papillose, base convolute, margin denticulate. Reichenb. f. in Gard. Chron. 1877, i. 590; Veitch Man. Dendrob. 48. *D. aggregatum*, Wall. Cat. 7411 B.

BURMA; at Chappedong, Wallich, Griffith.

Stems 12–18 in., obscurely 4-angled, base very slender. Leaves few, $3\frac{1}{2}$ by $1\frac{1}{2}$ in., very coriaceous. Flowers $1\frac{1}{2}$ –2 in. diam.

VAR. *Guibertii*, Veitch l. c.; stems more abruptly narrowed below, leaves broadly elliptic, racemes longer, flowers larger brighter-coloured. *D. Guibertii*, Carriere in Rev. Hortie. 1876, t. 431; Ill. Hortie. N. S. t. 258; De Puydt Les Orchid. t. 16.

151. **D. lamellatum**, Lindl. Gen. & Sp. Orchid. 89; stems short pyriform flattened, leaves few ovate subacute, flowers 3–5 in a short drooping raceme yellow, bracts minute, sepals ovate apiculate suberect, petals smaller obovate, mentum long flattened, lip clawed cuneate truncate erose, disk many-grooved. *D. compressum*, Lindl. in Bot. Reg. 1842, Misc. 76; 1844, t. 53; Walp. Ann. vi. 307. *Onychium lamellatum*, Blume Bijdr. 526, fig. 10.

TENASSERIM; at Moulmein, Parish. PERAK, Scortechini, King's Collector.—DISTRIB. BORNEO.

Stems 3–4 by $1\frac{1}{4}$ in., proliferously branched; internodes 3–4. Leaves 1– $1\frac{1}{4}$ in.; sheaths very short, broad. Flowers $\frac{3}{4}$ in. long, yellow in lc. Bot. Reg.; petals white in lc. Herb. Kew of Bornean plant; flower pale pink with white petals in lc. Parish.—This is by error described as a native of Ceylon; if imported from that country, it was doubtless from the Bot. Gardens there.

152. **D. aggregatum**, Roxb. Fl. Ind. iii. 477; stems fusiform, leaf solitary oblong, tip notched, flowers 1–2 or many in a loose drooping

lateral raceme (yellow), bracts minute, sepals small ovate obtuse spreading, petals much broader ovate, base cuneate, mentum subglobose, lip shortly clawed transversely oblong from a short subconvolute base, disk concave pubescent, margin quite entire ciliolate. *Lindl. in Wall. Cat.* 7411 A; *in Bot. Reg.* t. 1695; *Bot. Mag.* t. 3643; *Part. Mag.* vi. t. 145; *Veitch Man. Dendrob.* 15. *D. Lindleyi*, *Steud. Nomencl.* i. 490. *D. Jenkinsii*, *Wall. in Bot. Reg.* 1839, t. 37; *Warn. Sel. Orch.* ii. t. 28; *Veitch l. c.* 50; *Walp. l. c.* 307.

ASSAM, *Jenkins*; ARRACAN, MARTABAN, TENASSERIM and PERAK.—DISTRIB. S. China.

Stems $1\frac{1}{2}$ –2 in., angled. *Leaf* 2–3 by 1 in. *Raceme* from the axil of a small scale; flowers at first primrose, at length orange, $1\frac{1}{2}$ in. diam.; column yellow. *Capsule* 4 in., fusiform.—A plant now flowering at Kew shows both *aggregatum* and *Jenkinsii* in the same clump.

153. ***D. chrysotoxum***, *Lindl. in Bot. Reg.* 1847, under t. 19 and t. 36; stems short grooved, leaves 2–8 oblong to lanceolate, tip 2-fid, flowers many in lateral slender decurved racemes (golden, lip orange streaked or blotched with red), sepals oblong obtuse, petals twice as large, mentum rounded, lip orbicular pubescent, base convolute, margin pectinately fimbriate. *Bot. Mag.* t. 5053; *Ill. Hort.* 1858, t. 164; *Veitch Man. Dendrob.* 29; *Benson in Gard. Chron.* 1870, 796; *Walp. Ann.* vi. 305. *D. suavissimum*, *Reichb. f. in Gard. Chron.* 1874, 406; *Xen. Orchid.* iii. 2, t. 202; *Warn. Orchid. Alb.* t. 13.

ARRACAN and BURMA, on the hills and plains.

Stems 3–15 in., very variable, from subglobose to narrowly clavate. *Leaves* 3–4 in., coriaceous. *Racemes* 6–9 in.; flowers 2 in. diam.—*D. suavissimum* is regarded by *Veitch* as a variety with shorter stouter stems and broader leaves.

154. ***D. Farmeri***, *Part. Mag.* xv. 241, with fig.; *Fl. Gard.* iii. 104; stems erect clavate 4–5-grooved, leaves 2–4 elliptic or oblong, flowers many in lax pendulous lateral racemes golden or pink with yellow lip, bracts small, sepals ovate-oblong, petals much broader, mentum rounded, lip shortly clawed orbicular with lateral inflexed folds pubescent, margin erose. *Bot. Mag.* t. 4659; *Fl. des Serres* vii. t. 741; *Jard. Fleur.* t. 307; *Pescatorea* i. t. 4; *Gartenfl.* t. 595; *Jennings Orchid.* t. 24; *Veitch Man. Dendrob.* 42, with fig. *D. densiflorum*, var. *Farmeri*, *Regel Gartenfl.* t. 788.

TROPICAL EASTERN HIMALAYA, and ASSAM to BURMA.

Stems 10–18 in., 4-angled, base slender. *Leaves* 4–8 in., coriaceous, striate. *Flowers* 2 in. diam., variable in colour, sepals and petals usually pink or golden yellow tinged with pink, disk ochreous.—There are two principal varieties; *aureo-flava*, *Bot. Mag.* t. 5451; *Williams Orchid. Alb.* iii. t. 99; and *albiflora*, *Belg. Hort.* 1860, t. 21; *Gartenfl.* 1868, t. 595; *Fl. des Serres* 1882, t. 2161.

155. ***D. palpebræ***, *Lindl. in Journ. Hort. Soc.* v. 33; stems clavate 4-angled, leaves 3–5 oblong-lanceolate acute, flowers in loose lateral racemes (white or rose, disk of lip orange), bracts small, sepals oblong, petals broader clawed ciliolate, mentum rounded, lip oblong softly downy, base shortly clawed convolute and villously fringed. *Part. Fl. Gard.* i. 48; *Veitch Man. Dendrob.* 67.

SIKKIM HIMALAYA; in the Teesta Valley (*l.c. in Herb. Calcutt.*). BURMA, *Lobb. Berkeley.*

Stems 7–9 in. *Leaves* 4–6 in. *Flowers* $1\frac{1}{2}$ –2½ in. diam., faintly fragrant.—Near *D. densiflorum*, but bracts very different. Nearer *D. Griffithianum*, but mentum short.

156. **D. capillipes**, *Reichb. f. in Gard. Chron.* 1867, 997; *Xen. Orchid.* ii. 164, t. 169; stem very short fusiform, leaves 1-2 lanceolate acute, flowers 1-4 on a capillary lateral peduncle golden yellow, bracts small lanceolate, sepals small oblong-lanceolate, petals much broader, mentum short, lip with a convolute base and reniform retuse undulate limb. *Veitch Man. Dendrob.* 26.

BURMA; on hills N. of Thayetmyo, *Parish*.

Stem 2-6 in., 3-4-nodal. *Leaves* small, lanceolate. *Lip* with a deep orange blotch; anther elongate, conico-pyramidal.

Var. *elegans*, *Reichb. f. in Gard. Chron.* 1880, i. 743; stems taller, base of lip dark orange.

157. **D. senile**, *Parish & Reichb. f. in Gard. Chron.* 1865, 434; pseudobulb short subclavate and 2-3 leaves softly hairy, flowers lateral solitary or 2-nate long-pedicelled golden, bracts minute, sepals lanceolate acute, petals broader, mentum rounded, lip broadly ovate obscurely 3-lobed, side lobes rounded, midlobe ovate obtuse, disk puberulous, margins quite entire glabrous. *Xen. Orchid.* ii. 143, t. 155; *Bot. Mag.* t. 5520; *Veitch Man. Dendrob.* 74.

TENASSERIM; at Moulmein, *Parish*.

Stems 2-4 in.; internodes 4-6, $\frac{1}{2}$ -1 in. *Leaves* 2-3 in., flat, subacute, subfalcate. *Flowers* 2 in. diam., ochreous between the side lobes of the lip.

158. **D. trigonopus**, *Reichb. f. in Gard. Chron.* 1887, ii. 682; stem short and leaves at first and sheaths hispidulous, leaves 1-3 subterminal, peduncle 1-fl. (? always), flowers yellow, ovary trigonous, sepals ligulate acuminate, petals shorter broader, mentum obtuse, lip clawed dilated 3-fl., side lobes quadrate and semi-orbicular, midlobe denticulate, disk very rough.

BURMA (*Hort. Low*).

Stem at length sulcate. *Leaves* oblong-ligulate. *Flowers* larger than *D. Cambridgeanum*, as thick in texture as in *Vanda tricolor*. *Lip* yellow, with a row of red transverse lines superposed on each side of the disk between the side lobes, and a green area on the midlobe.—*Descript.* from the author.

SPECIES UNKNOWN TO ME, AND AN ERRATUM.

D. ACROBATICUM, *Reichb. f. in Gard. Chron.* 1871, 802; stems with stalked bulbs on the opposite sides, leaves oblong-ligulate, racemes lateral few-fl. at the top, flowers yellowish, sepals ligulate obtuse, petals oblong with a bigibbous callus at the base within, lip rhombic obtuse-angled, claw with a transverse callus, disk minutely velvety, column hatchet-shaped on each side.—TENASSERIM (*Hort. Veitch*).—Reichenbach says of this, "Near *D. polyanthum*, Lindl.," but Lindley's *polyanthum* is a very doubtful plant, and not Wallich's. Of the growth he says, "One stalked bulb comes out of the side of the first, and the third very high up on the opposite side."

D. AURANTIACUM, *Reichb. f. in Gard. Chron.* 1887, ii. 98. I regret having omitted to compare *D. chrysseum*, Rolfe (p. 748, No. 146, with Reichenbach's previously published description of *aurantiacum*, of which there are no specimens at Kew. I have now done so with Mr. Rolfe, and we are convinced that the name *chrysseum* must give place to *aurantiacum*, Reichb. f.

D. CREPIDATUM, *Griff. Notul.* iii. 319 (not of Lindl.). Of Griffith's description Lindley rightly says, in *Journ. Linn. Soc.* iii. 21, "It is so confused and self-contradictory that I have not been able to identify the species."

D. FLORIBUNDUM, *Don Prodr.* 31; stem few-leaved, leaves linear nerved very finely serrulate, scape 6-12 in. longer than the leafing stems sheathed many-fl., flowers rose-colored, sepals lingulate obtuse flat, base elongate, petals oval-oblong, lip

oval flattish obtuse reticulate bearded crosely serrulate yellow above.—**NEPAL**, *Wallich*.—This must be in Wallich's collection, but I fail to recognize it.

D. FUGAX, *Reichb. f. in Gard. Chron.* 1871, 1257; pseudobulbs 1–2 in. stipitate short fusiform 1-leaved, leaves 5 by 1 in. cuneate-ligulate obtusely acute, flowers terminal subsolitary membranous fugacious (yellow, lip white with purple and yellow marks), dorsal sepal ligulate acute, lateral subequal broader, petals much narrower, mentum rectangular, lip dilated from a cuneate base, side lobes obtuse-angled, midlobe clawed abruptly hastate flabelliform dilated emarginate retuse, sides undulate, two membranous keels run from the base to the top of the claw crenulate and lobulate in front, column very short.—**INDIA** (*Hort. Day*).—The flowers last but a few minutes.—*Descript.* from the author, l. c., who says it is near *convexum*, Lindl., and *xantholeucum*, R. f.

D. HUGHII, *Reichb. f. in Gard. Chron.* 1882, ii. 764; stems slender, leaves linear acuminate, flowers solitary (2–3 ?) fleshy like those of *D. revolutum*, pure white with a sulphur wart on the disk of the lip, sepals ligulate acute, petals oblong rhombic, mentum conico-cylindric, lip subrhombic from a cuneate base, lower half narrower constricted and angled in the middle, upper subcordate obtusely acute, lamellæ in the outer margin free obtuse-angled extrorse and incumbent on the surface, column broader above.—**SINGAPORE**, *H. Low*.—Near *revolutum*, but leaves thinner grassy.—*Descript. from the author, l. c.* Said to be a form of *D. crumenatum*.

D. LEUCOCHLORUM, *Reichb. f. in Gard. Chron.* 1879, i. 202; pseudobulb cylindric channelled thickish stipitate, raceme 1–2-fld., sepals triangular, petals as long oblong acute, mentum conical, lip 3-lobed in the middle, side lobes obtuse, midlobe produced broad retuse, disk muricate between the side lobes, column short.—**TENASSERIM**, at Moulmein (*Hort. Veitch*).—Flowers as large as *D. sphegidoglossum*, white, mentum green, lip white, yellow green without, side lobes with purple lines.—*Descript. from the author, l. c.*

D. PARVIFLORUM, *Don Prodr.* 34; stem 1 in., leaves few $1\frac{1}{2}$ in. lanceolate acute, raceme $\frac{1}{2}$ –2 in. peduncled many-fld., bracts lanceolate shorter than the straight pedicels, flowers small ochroleucous, lip oblong obtuse concave crenulate, sepals and petals subequal lanceolate, base hardly saccate.—**NEPAL**, *Wallich*.—Perhaps an *Eria*; it must be in Wallich's collection, but I do not recognize it.

D. PRECINCTUM, *Reichb. f. in Gard. Chron.* 1871, 750; stems subterete grooved, leaves narrow cuneate-ligulate 2-toothed, peduncle 2-fld., sepals ligulate obtusely acute, petals rhombic obtuse, mentum large obtuse-angled dorsally gibbous, lip cuneate dilated 3-fld ciliate, side lobes linear-ligulate obtuse, midlobe ligulate produced velvety with crests and threads, disk with 3 angled keels, column with a triangular excavate base.—Imported with *D. Devonianum* (*Hort. Veitch*).—Stem obscurely olive-green, sheaths ashy white, flowers yellow-white, sepals and petals margined with purple, lip yellow and orange, column sulphur.—*Descript. from the author, l. c.*

D. VEXABILE, *Reichb. f. in Gard. Chron.* 1884, i. 271, is a doubtful species or hybrid, something like *D. Ruckeri*, very imperfectly described. It was seen by Prof. Reichenbach in Low's nursery amongst a multitude of *D. luteolum*.—Nothing further is known of it.

9. **BULBOPHYLLUM**, *Thouars*.

Pseudobulb from a creeping rhizome (rarely 0), 1- very rarely 2-leaved. *Scope* from the base of the pseudobulb, rarely distant from it. *Flowers* solitary, capitate, umbelled, spicate or racemose. *Sepals* subequal, or the dorsal rather shorter (rarely only half as long), lateral adnate to the foot of the column. *Petals* various, usually much smaller than the dorsal sepal. *Lip* jointed on the foot of the column, mobile, usually very small and strongly recurved. *Column* very short, often 2-aristate at the top; anther 2-celled; pollinia 4 (2 rarely suppressed).—Species about 100, tropical and subtropical, chiefly Asiatic, a few African, American and Australian.

A polymorphous genus, of which § III. A resembles *Sarcopodium* of *Dendrobium*, but differs in its mobile lip, and scape lateral on the pseudobulbs.—See under *Cirrhopetalum* for further remarks.

Sect. I. EPICRIANTHES. *Rhizome* creeping, pseudobulbous. *Flowers* solitary, axillary, very shortly pedicelled. *Petals* represented by 6-7 elongate narrowly strap-shaped stipitate pendulous mobile threads.—*Epicrianthes*, *Blume*.

1. **B. Epicrianthes**, *Hook. f.*; *Epicrianthes javanica*, *Blume Bijdr.* 306 (*Epicranthes*); *Fl. Jav. Præf.* vi.; *Lindl. Gen. & Sp. Orchid.* 61; *Miquel Fl. Ind. Bat.* iii. 654.

TENASSERIM; at Moulmein, *Parish*.—DISTRIB. JAVA.

Rhizome ascending, as thick as a crow-quill; pseudobulbs $\frac{1}{2}$ in., narrow. *Leaf* 1 in., sessile, elliptic-oblong, acute, coriaceous. *Scape* $\frac{1}{2}$ in., 1-fl.; bracts lanceolate; flowers green and red; sepals about $\frac{1}{2}$ in., subequal, ovate-lanceolate, spreading; threads of petals nearly as long; lip sessile, ovate-lanceolate, acute, warty, base 2-lobed; column truncate.—Described from a drawing and notes of *Parish*. I assume he is right in referring his plant to *Blume's E. javanica*; he describes the threads of the petals as 6, in threes, membranous, *Blume* as 7, fleshy. There being a *Bulb. javanicum*, I have adopted the generic name for the specific.

Sect. II. OXYSEPALA. *Stems* many from a rooting base, densely tufted, very slender, pendulous, much branched, clothed with scarious silvery sheaths; pseudobulbs few, minute, ovoid. *Flowers* very small, solitary or 2-nate on a very short scape which is concealed by the sheaths; bracts cymbiform. *Sepals* very slender, connivent.

2. **B. clandestinum**, *Lindl. in Bot. Reg.* 1841, *Misc.* 77; *Walp. Ann.* vi. 248. *B. trisetosum*, *Griff. Notul.* iii. 23; *Id. Pl. Asiat.* t. 293. *Oxysepala ovalifolia*, *Wight Ic.* t. 1736; *Walp. l. c.* *Epidendrum sessile*, *König in Retz. Obs.* vi. 60 (*ex Herb. Rottler*).

TENASSERIM; at Mergui, *Griffith*. PERAK, *Scortechini*. MALACCA, *Griffith* (*Kew Distrib.* 5295).—DISTRIB. Borneo.

Stems 6-12 in., as thick as a crow-quill; internodes $\frac{1}{2}$ in., sheaths appressed, ribbed. *Leaf* $\frac{1}{2}$ -1 in., oblong or linear, retuse. *Scape* capillary; bracts many, hyaline; flowers $\frac{1}{2}$ in. long, erect, cellular, yellow-white. *Sepals* subequal, lanceolate, ciliate acuminate; petals half as long, ovate-oblong, acute, 1-nerved; lip shortly stipitate, lanceolate, obtuse; column short, 2-toothed.

Sect. III. EUBULBOPHYLLUM. *Rhizome* creeping, bearing distant or approximate pseudobulbs (sometimes very small or 0, see p. 765). *Inflorescence* various. *Lip* usually strongly recurved and much shorter than the sepals.—The divisions of this section are in great measure artificial. (See remarks under *Cirrhopetalum*.)

A. *Flowers* solitary, rarely 2-3, usually large. *Scape* sometimes very short, with the pedicel of the flower long and scape-like. *Petals* and *lip* usually much larger than in other groups. (Species 3-18.)

* Column truncate, teeth at the apex in front 0, or minute.

† *Lip* sessile, i. e. foot of column not produced beyond the insertion of the lateral sepals.

3. **B. macranthum**, *Lindl. in Bot. Reg.* 1844, t. 13; scape 0, pedicel longer than the petiole of the elliptic oblong leaf, flower 2 in. diam., petals lanceolate 9-nerved as long as the sepals, lip small ovate acuminate, base

truncate. *Walp. Ann.* vi. 245. *Sarcopodium macranthum*, *Lindl. in Part. Fl. Gard.* i. 155; *Fol. Orchid.* 3.

TENASSERIM; alt. 3636 ft., *Parish*. SINGAPORE (*Hort. Loddiges*).

Rhizome stout, crinite at the nodes. *Leaf* 4-8 in. *Pedice*l 4-5 in., with appressed basal sheaths; flower ringent, rather fleshy, red-purple and spotted; anther small.

4. **B. megalanthum**, *Griff. Notul.* iii. 286; *Ic. Pl. Asiat.* t. 292; scape very short, pedicel stout shorter than the oblong-lanceolate leaf, flower $\frac{3}{4}$ in. diam., petals lanceolate long-acuminate rather shorter than lanceolate acuminate falcate sepals, lip long narrow slender, basal lobes acute. *Walp. Ann.* vi. 246.

MALACCA; on Pulo Bessar, abundant, *Griffith*.

Pseudobulbs very small. *Leaves* 4 in.; petiole short. *Pedice*l 2-3 in.; flowers pale brown, purple-spotted; sepals 3 in. long, lateral scythe-like, deflexed and crossed over the very long lip. *Fruit* 2 in. long.—Described from Griffith, who says the lip is sessile, but his figure shows a stipes.

5. **B. psittacoglossum**, *Reichb. f. mss.*; scape very short stout 1-3-lin., pedicel longer than the petiole of the broadly elliptic leaf, flower 1-1 $\frac{1}{2}$ in. diam., petals ovate 5-nerved as long as the falcately ovate lateral sepals, foot of column forked, lip with membranous toothed basal lobes. *Sarcopodium psittacoglossum*, *Reichb. f. in Bot. Mag.* t. 5408.

TENASSERIM, *Parish*.

Pseudobulbs ovoid, enclosed in a reticulate sheath. *Leaf* 2-4 in. long and broad. *Scape* 1-1 $\frac{1}{2}$ in., sheath basal; pedicel 1 in., stout; sepals greenish yellow with red nerves, dorsal incurved. *Lip* spongy, yellow and scarlet, obtuse, base deeply 2-lobed; tips of column acute.

6. **B. nasutum**, *Reichb. f. in Gard. Chron.* 1871, 1482; flower subsessile, sepals subequal triangular-ovate, petals very small linear, lip sessile as long as the sepals oblong, tip rather dilated rounded, base with a hooked incurved auricle on each side, anther conical.

TENASSERIM; at Moulmein, *Parish*.

Pseudobulbs crowded, short, obturbinate. *Leaf* 2-3 in., sessile, lanceolate, very thick. *Pedice*l with ovary $\frac{1}{2}$ in.; flower 1 in. diam.; sepals and petals 5-nerved, pale yellow; lip with a red-purple base, auricles as in *B. Careyanum*.—The specimens are very insufficient.

7. **B. pileatum**, *Lindl. in Bot. Reg.* 1844, *Misc.* 73; scape 0, pedicel slender, sepals ovate-oblong obtuse, petals nearly as long narrower ovate-oblong obtuse 5-nerved, lip nearly as long as the sepals tongue-shaped obtuse with 2 mesial ridges from the base to beyond the middle, column terete, anther conical. *Walp. Ann.* vi. 246. *Sarcopodium pileatum*, *Lindl. Fol. Orchid.* 4.

SINGAPORE (*Hort. Loddiges*). PENANG, *Maingay (Kew Distrib.* 1676), and *Ic. in Herb. Kew*. PERAK, *Wray*.—DISTRIB. Sumatra (*Ic. Marsden*).

Rhizome long, rooting, and crinite at the nodes. *Leaf* 3-5 in., elliptic or obovoid-oblong, rather membranous. *Pedice*l 1-3 in., often distant from the pseudobulb; flower 1 $\frac{1}{2}$ in. diam., yellow, ridges of lip red.—The materials are very indifferent.

8. **B. Reinwardtii**, *Reichb. f. in Walp. Ann.* vi. 246; pseudobulbs long slender, leaf long-petioled, scape and pedicel slender, petals ovate-lanceolate caudate-acuminate rather shorter than the uncinately lanceolate lateral sepals, lip cordate-lanceolate. *Sarcopodium Reinwardtii*, *Lindl.*

Fol. Orchid. 4; *Miquel Fl. Ind. Bat.* iii. 652. *Dendrobium grandiflorum*, Reinwardt mss.

PERAK, alt. 3-4000 ft., *Wray, King's Collector*.—DISTRIB. Java.

Pseudobulbs 3-4 in., terete. *Leaf* 6-8 in., thin, elliptic, acuminate, many-nerved. *Peduncle* 3-4 in., distant from the bulb, sheaths several; flower $\frac{3}{4}$ in. long; mentum globose.—Colour of flowers variously described: "saffron-cold., lip white above, crimson beneath," *Wray*; "pale greenish yellow, brown inside, lip bright reddish blue," *King's Collector*; "pale pink tinted with crimson," *Wray* (1889).

†† *Lip stipitate by the produced foot of the column.*

9. **B. Lobbii**, *Lindl. in Bot. Reg.* 1847, sub. t. 29; scape 0, pedicel much exceeding the petiole of the linear-oblong leaf, petals narrow 9-nerved as long as the falcately ovate-lanceolate lateral sepals, lip large broadly ovate recurved. *Bot. Mag.* t. 4532; *Reichb. f. in Gard. Chron.* 1847, 423; *Saunders Refug. Bot.* t. 116 (var. *siamense*); *Walp. Ann.* vi. 245. *B. Henshallii*, *Lindl. in Gard. Chron.* 1852, 422. *B. siamense*, *Reichb. f. l. c.* 1867, 572. *Sarcopodium Lobbii*, *Lindl. in Paxt. Fl. Gard.* i. 155; *Jard. Fleur.* t. 183. *S. Lobbii*, var. *Henshallii*, *Henfrey in Gard. Mag. Bot.* iii. 269, with woodcut. *Sestochilos uniflorum*, *Breda Orchid. Jav.* t. 3.

TENASSERIM; on Donnatong, *Parish*.—DISTRIB. Siam, Java.

Rhizome stout; pseudobulbs ovoid. *Leaves* 4-8 in. *Pedicel* 4-6 in., speckled; sheaths loose, spotted; flowers $2\frac{1}{2}$ -4 in. diam., very variable in colour, ochreous or reddish yellow with red nerves or with yellow and pink speckles and striate with brown.

10. **B. uniflorum**, *Griff. Notul.* iii. 293; *Ic. Pl. Asiat.* t. 295; *Itin. Notes* 110, No. 138 (not of *Kuhl & Hassk.*); scape very short sheathed, pedicel very long, dorsal sepal ovate-oblong obtuse very much larger than the uncinately incurved broadly ovate lateral, petals linear 3-nerved, lip with recurved acute basal auricles. *Walp. Ann.* vi. 247. *Sarcopodium uniflorum*, *Lindl. Fol. Orchid.* 16.

BHUTAN HIMALAYA; at Dewangiri, *Griffith*. MISHMI HILLS, towards Lung, *Griffith (in Herb. Lindley)*.

Rhizome very stout; pseudobulbs 1-2 in., cylindric. *Leaf* 2-6 in., subsessile. *Pedicel* 3-4 in.; flower $\frac{3}{4}$ in. diam.; sepals orange-yellow spotted with purple; lip tipped with red and petals with white.—Very like *B. capillipes* in habit. The basal auricles of the lip are as in *B. Careyannum*.

11. **B. capillipes**, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 150, t. 37; scape very short, pedicel very long slender pendulous, petals ovate obtuse 5-nerved rather shorter than the oblong dorsal sepal all much smaller than the broadly triangular-ovate obtuse 7-9-nerved lateral sepals, lip very short pyramidal, basal angles acute.

TENASSERIM; at Moulmein, *Parish*.

Pseudobulbs 1 in., narrowly obpyriform. *Leaf* 3-4 in., subsessile, linear. *Pedicel* 2-3 in.; flowers $\frac{3}{4}$ in. diam., yellow with red nerves; lip violet-purple.—Very like *B. uniflorum* in habit.

12. **B. striatum**, *Reichb. f. in Walp. Ann.* vi. 257; scape 1-3-flid. longer than the long petiole of the elliptic leaf, petals ovate-lanceolate acute 1-nerved half the length of the subequal oblong-lanceolate 5-nerved sepals, lip linear-oblong obtuse. *Sarcopodium striatum*, *Lindl. Fol. Orchid.* 5. *Dendrobium striatum*, *Griff. Notul.* iii. 318.

KHASIA HILLS, alt. 4000 ft., *Griffith (Kew Distrib.* 5156), *Lobb, &c.*

Pseudobulbs $\frac{1}{2}$ – $\frac{3}{4}$ in., obpyriform. *Leaf* 2–3 in.; petiole 1–2 in., rather slender. *Scape* with several ovate membranous bracts, as if normally several-fl.; flowers $\frac{1}{2}$ in. diam., yellow-green striped with purple; lip rather large and thin.

13. **B. affine**, *Lindl. in Wall. Cat.* 1982; *Gen. & Sp. Orchid.* 48; scape very short (rarely 2-fl.), pedicel longer than the petiole of the linear-oblong leaf, petals ovate-lanceolate acute 3–5-nerved about a third shorter than the reflexed falcate lanceolate lateral sepals, lip shortly stipitate. *Walp. Ann.* vi. 246. *Sarcopodium affine*, *Lindl. in Paxt. Fl. Gard.* i. 155; *Fol. Orchid.* 5.

NEPAL, *Wallich*. KHASIA HILLS, alt. 4–5000 ft., *J. D. H. & T. T. NAGA HILLS*, *Prain*.

Rhizome very stout; pseudobulbs oblong. *Leaves* 3–6 in.; petiole short. *Pedicel* 1–2 in.; basal sheaths short; flowers white, papillose, streaked with red; lip reddish-brown; column yellow.

** Column with two long teeth or spines at the top.

14. **B. leopardinum**, *Lindl. in Wall. Cat.* 1981, *Gen. & Sp. Orchid.* 48; scape very short 1–3-fl., pedicel stout shorter than the long petiole of the elliptic or oblong leaf, flower subglobose, petals broadly ovate acute 7-nerved, shorter than the similar 9-nerved sepals, lip long-stipitate with toothed basal auricles. *Walp. Ann.* vi. 247. *Sarcopodium leopardinum*, *Lindl. in Paxt. Fl. Gard.* i. 155. *Dendrobium leopardinum*, *Wall. Tent. Fl. Nep.* 39, t. 23.

NEPAL, *Wallich*. KHASIA HILLS, alt. 3–5000 ft., *H. f. & T., Clarke, &c.*

Rhizome very stout, pseudobulbs 1–1 $\frac{1}{2}$ in., crowded, narrow. *Leaf* 3–8 in.; petiole 1–2 in. *Scape* and *pedicel* about as long as the pseudobulb; bracts large; flowers 1 in. diam., greenish or yellowish, spotted purple; mentum hemispheric; columnar spurs stout; anther conic.

15. **B. Griffithii**, *Reichb. f. in Walp. Ann.* vi. 247; scape very short pedicel longer stout, petals oblong obtuse 3-nerved shorter than the ovate obtuse 5-nerved subequal sepals, lip stipitate oblong obtuse. *Sarcopodium Griffithii*, *Lindl. Fol. Orchid.* 6. *Bulboph. sp., Griff. Ic. Pl. Asiat.* t. 296, f. 2 (not of *Notul. & It. Notes*). *Dendrob. Bulbophylli, Griff. It. Notes* 65, No. 1019 (fide Lindley).

KHASIA HILLS; in Myrung Woods, alt. 5000 ft., *Griffith, H. f. & T.*

Pseudobulbs small, crowded. *Leaf* 1 $\frac{1}{2}$ –2 in., linear-oblong; scape with a short loose bract; flower 1 in. diam., greenish-yellow, spotted with brown.

16. **B. Dayanum**, *Reichb. f. in Gard. Chron.* 1865, 434; *Xen. Orchid.* 128, t. 144; scape 0, pedicel very short sigmoid, flowers ciliate with long hairs, petals oblong much smaller than the broadly ovate obtuse equal sepals, lip sessile trigonous sharply toothed, basal auricles uncinately incurved, columnar teeth short. *Bot. Mag.* t. 6119; *Reichb. f. Xen. Orchid.* ii. t. 144; *Fl. des Serres*, t. 2236; *Saunders Refug. Bot.* t. 115.

TENASSERIM; at Moulmein, *Parish, &c.*

Pseudobulbs 1 in., crowded. *Leaf* 3 in., elliptic, reddish beneath; petiole short. *Flower* 1 in. diam.; sepals green, streaked with purple specks; petals blood-red, margins yellow; lip green, disk with blood-red ridges.

17. **B. membranifolium**, *Hook. f. Ic. Pl. ined.*; leaf elliptic-lanceolate membranous narrowed into a petiole, scape short 1-bracteate, petals elliptic-lanceolate 7-nerved smaller than the ovate-lanceolate many-nerved acute lateral sepals, lip stipitate, column with long falcate decurved then ascending arms.

PERAK; on Gunong Batu Pateh, Wray.

Pseudobulb 1 in., narrow, with rigid basal fibres. *Leaf* 6-8 in., with many slender nerves and cross nervules. *Scape* with pedicel about 2 in.; bract $\frac{1}{2}$ in., lanceolate; flower nearly 1 in. long, "pale greenish yellow with dotted crimson lines, lip claret-cold," Wray.

18. **B. moniliforme**, Par. & Reichb. f. in *Trans. Linn. Soc.* xxx. 151; pseudobulbs pisiform with the filiform rhizomes forming moniliform creeping tufts, scape capillary 1-fl., petals oblong 1-nerved, tip rounded much shorter than the lanceolate acute strongly 5-nerved lateral sepals, lip stipitate.

TENASSERIM; Moulmein, Parish; on trunks of Betel-nut Palms.

Leaf unknown. *Scape* $\frac{3}{4}$ -1 in.; bracts sheathing, obtuse; pedicel $\frac{1}{4}$ in. *Flower* $\frac{1}{2}$ in. diam.; dorsal sepal a third shorter than the lateral, 5-nerved; lip obtuse, auricles rounded. *Columnar spurs* long, slender.—A remarkable little species, like a small *Eria*.

B. Flowers capitate or subumbellate. (See also 57. *repens*, and 59. *xylophyllum*.)—In this division the scape is often distant from the pseudobulb. (Sp. 19-31.)

* *Sepals* 5- or 7-nerved. *Petals* 1- or 3-nerved.

19. **B. Medusæ**, Reichb. f. in *Walp. Ann.* vi. 262; scape stout loosely sheathed, flowers in a large dense globose head, bracts large lanceolate, sepals lanceolate with long capillary tips, dorsal 5-nerved more than half as long as the 7-nerved lateral, petals ovate-lanceolate 1-nerved, tips capillary, lip nearly straight. *Cirrhopetalum* Medusæ, Lindl. in *Bot. Reg.* 1842, t. 12; 1843, under t. 49; *Bot. Mag.* t. 4977; *Hort. Parad.* ii. t. 5. Belg. *Hortic.* viii. t. 12.

SINGAPORE (*Hort. Loddiges*). PERAK, *Scortechini*, Wray.

Rhizome stout; pseudobulbs 1-1 $\frac{1}{2}$ in., obpyriform, often curved. *Leaf* 5-6 in., linear-oblong, 2-fl., very coriaceous; petiole stout. *Scape* 6-8 in., curved; sheaths 1 in.; head 1 $\frac{1}{2}$ in. diam.; bracts $\frac{1}{2}$ in.; flowers 3 in. long, yellow spotted red; columnar teeth very long.

20. **B. albidum**, Hook. f.; scape stout 2-3-sheathed, umbel 6-8-fl., sepals lanceolate acuminate 5-nerved, dorsal one-third shorter than the lateral, petals elliptic-oblong 3-nerved, tip rounded, lip stipitate, posterior angles acute recurved, column shortly toothed. *Cirrhopetalum* albidum, Wight *Ic.* t. 1653.

NILGHIRI HILLS, Wight.

Rhizome very stout, copiously rooting; pseudobulbs short, broadly ovoid, golden when dry. *Leaf* 1-2 in., elliptic-oblong. *Scape* 2-3 in.; flowers pedicelled, $\frac{3}{4}$ in. long, white freckled with pale brown.

21. **B. confertum**, Hook. f. *Ic. Plant. ined.*; scape slender much shorter than the linear-lanceolate long-petioled leaf, flowers small subracemose, sepals 5-nerved finely acuminate, dorsal ovate-lanceolate about a third shorter than the lanceolate falcate 5-nerved gibbous-based lateral, mentum large rounded, petals half as long as the lateral sepals ovate-oblong acute 3-nerved serrulate, lip minute stipitate, column dorsally 3-toothed, spurs very slender.

KHASIA HILLS, Griffith (*Kew Distrib.* 5170).

Pseudobulbs $\frac{1}{2}$ -1 in., densely crowded, narrowly ovoid. *Leaf* 2 $\frac{1}{2}$ -3 in., narrowed into a slender 1 in. petiole. *Scape* 1 $\frac{1}{2}$ -2 in., naked; bracts lanceolate, shorter than the slender $\frac{1}{6}$ in. pedicels; sepals $\frac{1}{4}$ in., dorsal suberose.

** *Sepals 3-nerved. Petals 3-nerved, or 1-nerved in B. radiatum*

22. **B. radiatum**, Lindl. in Wall. Cat. 1986; Gen. & Sp. Orchid. 55; scape slender shorter than the linear-obtuse leaf, flowers umbellate long-pedicelled, sepals subequal narrowly caudate-lanceolate 3-nerved, petals half as long narrowly lanceolate from an ovate 1-3-nerved base finely acuminate, mentum 0, lip minute stipitate, columnar spurs slender. Walp. Ann. vi. 264.

TENASSERIM; at Tavoy, Wallich; Moulmein, Parish.—DISTRIB. Hong Kong.

Pseudobulbs 1 in., very narrowly conical or subcylindric, crowded on a stout rhizome. *Scape* 2-3 in.; bracts setaceous, pedicel $\frac{1}{4}$ - $\frac{1}{3}$ in., capillary; flowers yellowish; sepals $\frac{1}{2}$ in.

23. **B. stenobulbon**, Par. & Reichb. f. in Trans. Linn. Soc. xxx. 153; scape short slender, sheaths 3-5 small, flowers fascicled on the top of the scape few very small subsessile, sepals subequal lanceolate finely acuminate 3-nerved three times as long as the oblong obtuse 3-nerved petals, lip sessile, columnar spurs long.

TENASSERIM, Helfer (Kew Distrib. 5166); at Moulmein, Parish.

Pseudobulbs $\frac{1}{2}$ -1 in., cylindric; rhizome slender. *Leaf* 1-2 in., linear, notched. *Scape* $\frac{1}{2}$ -1 in.; bracts small, lanceolate; flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. long, yellow.

24. **B. cauliflorum**, Hook. f. Ic. Plant. ined.; scape capillary distant from and much shorter than the long pseudobulb, flowers small umbelled, sepals subequal lanceolate caudate-acuminate 3-nerved, petals nearly as long lanceolate 3-nerved, lip very small stipitate, columnar spurs slender.

SIKKIM HIMALAYA, Griffith's Collectors (Kew Distrib. 5165), J. D. H. KHASIA HILLS, Griffith (Kew Distrib. 5139).

Rhizome stout, branched, divaricate; pseudobulbs $1\frac{1}{2}$ -2 in., subcylindric, distant. *Leaf* 2-5 by 1-1 $\frac{1}{2}$ in., oblong, obtuse; petiole $\frac{1}{3}$ - $\frac{1}{2}$ in. *Scape* $\frac{1}{2}$ - $\frac{3}{4}$ in., bracts ovate-lanceolate, shorter than the slender $\frac{1}{2}$ in. long pedicel; flowers $\frac{1}{4}$ in. long, yellow-green, inodorous.—The slender tails of the sepals and 3-nerved petals distinguish this from *B. odoratissimum*.

25. **B. protractum**, Hook. f. Ic. Plant. ined.; scape capillary much shorter than the leaf, flowers very small umbelled, bracts setaceous sepals subequal lanceolate acute 3-nerved, petals nearly as long 3-nerved lip very small subsessile, columnar spurs slender.

TENASSERIM (on Andaman Islands), Helfer (Kew Distrib. 5164).

Rhizome long, nearly straight; pseudobulbs $\frac{3}{4}$ -1 in., narrow, distant. *Leaf* 2-3 in., shortly petioled, linear-lanceolate, acute, rather thin. *Scape* 1 in., sheath slender; pedicel $\frac{1}{10}$ in.

*** *Sepals 3-nerved. Petals 1-nerved.*

26. **B. odoratissimum**, Lindl. in Wall. Cat. 1987; Gen. & Sp. Orchid. 55; scape stout loosely sheathed, flowers in a dense globose head, bracts longer than the ovary, sepals subequal lanceolate caudate 3-nerved, tips solid obtuse, petals minute 1-nerved, lip minute sessile papillose. *Stelis odoratissima*, Smith in Rees Cyclop. xxxiv. S. caudata, Don Prodr. 32. *Tribrachia odoratissima*, Lindl. Coll. Bot. 41.

SUBTROPICAL HIMALAYA; Nepal, Wallich; Sikkim, alt. 4-7000 ft., J. D. H. KHASIA HILLS, Lobb, &c. TENASSERIM, Helfer (Kew Distrib. 5167, 5168).—DISTRIB. China.

Rhizome stout; pseudobulbs $\frac{1}{2}$ – $1\frac{1}{2}$ in., subcylindric. *Leaf* 1–3 in., linear-oblong, notched. *Scape* sometimes distant from the bulb; bracts oblong or lanceolate; heads $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; pedicels $\frac{1}{8}$ in.; flower $\frac{1}{4}$ – $\frac{1}{2}$ in. long, yellow, sweet-scented; column truncate.

27. **B. capitatum**, *Lindl. Gen. & Sp. Orchid.* 56; rhizome ascending, pseudobulbs narrow erect, scape very short, flowers few subcapitate, sepals subequal lanceolate acuminate 3-nerved much longer than the elliptic obtuse 1-nerved petals, lip small stipitate obtuse, columnar spurs long. *Miquel Fl. Ind. Bat.* iii. 649. *Diphyes capitata*, *Blume Bijl.* 314.

PERAK; on Gunong Batu Pateh, *Wray*.

Rhizome very long and apparently scandent; pseudobulbs parallel to it, i. e. erect, $\frac{3}{4}$ –1 in. *Leaf* 1–3 in., linear, striate. *Scape* $\frac{1}{4}$ – $\frac{1}{2}$ in.; flowers shortly pedicelled, yellow; sepals $\frac{1}{8}$ in. long, cellular.

28. **B. caudatum**, *Lindl. in Wall. Cat.* 1983; *Gen. & Sp. Orchid.* 56; leaf small, scape very short and stout sheathed at the base, flowers small umbellately capitate, sepals lanceolate caudate 3-nerved, lateral much longer than the dorsal and three times as long as the oblong obtuse 1-nerved petals, lip shortly stipitate, columnar spurs slender.

NEPAL, *Wallich*.

Rhizome slender; pseudobulbs $\frac{1}{4}$ – $\frac{2}{3}$ in., ovoid. *Leaf* $\frac{1}{2}$ –1 in., oblong, obtuse or retuse. *Scape* hardly longer than the pseudobulb; bracts many, ovate-lanceolate, exceeding the ovary; flowers $\frac{1}{2}$ in. long, papillose.—Near *Cirrhopetalum*.

29. **B. modestum**, *Hook. f. Ic. Pl. ined.*; scape nearly as long as the leaf filiform few-fl., flowers very small subsessile, sepals subequal lanceolate subacute 3-nerved about twice as long as the narrowly oblong obtuse 1-nerved petals, mentum rounded, lip sessile small, columnar spurs slender.

PERAK, *Scortechini*.

Rhizome slender; pseudobulbs $\frac{1}{4}$ – $\frac{1}{2}$ in., distant, narrow, curved. *Leaf* 1– $1\frac{1}{2}$ in., sessile, linear, retuse. *Scape* as long, 1-sheathed about the middle; bracts ovate-lanceolate, longer than the pedicels; flower $\frac{1}{2}$ in. long.

30. **B. leptanthum**, *Hook. f. Ic. Pl. ined.*; scape capillary equalling the cylindric pseudobulb, flowers few subracemose, bracts large finely acuminate, sepals 3-nerved lanceolate narrowed into capillary tips twice as long or more than the oblong apiculate 3-nerved sepals, lip very small stipitate, columnar spurs slender.

KEASIA HILLS, alt. 4–5000 ft., *Griffith, &c.*

Rhizome rather stout; pseudobulbs $\frac{1}{2}$ –1 in., narrow, terete, distant. *Leaf* 2–3 in., subpetioled, linear, obtuse. *Scape* 1–2 in., 2–4-fl.; bracts much longer than the pedicels; flowers $\frac{1}{2}$ in. long, sweet-scented.

VAR. ? *Gamblei*; rhizome very slender, pseudobulbs shorter, scape longer, sepals rather broader, petals longer linear-lanceolate.—Sikkim, at Goompahar, alt. 7000 ft., *Gamble*.—Probably a distinct species.

31. **B. petiolare**, *Thw. Enum.* 298; leaf obovate-oblancheolate or linear-lanceolate long-petioled, scape long slender, flowers very small fascicled, sepals subequal oblong ovate obtuse strongly 3-nerved, lateral falcate, petals ovate acuminate, lip stipitate fleshy tongue-shaped, columnar teeth broad acute.

CEYLON, *Ambagomawa*.

Pseudobulbs as in *B. purpureum*, from which this differs in the longer scape, longer petioled leaves, more fascicled rather larger flowers, larger purple lip. In one

drawing lent by Dr. Trimen, the flowers are pale pink with broad red stripes, in another yellow with slender red stripes.

C. Flowers racemose or spicate (capitate in 57. *repens*, and 59. *xylophyllum*). (Sp. 32-72.)

* Lip with recurved lateral basal auricles. Except sp. 32 and 40, all want revision.

32. **B. fusco-purpureum**, *Wight Ic. t.* 1651; scape stout, raceme few-fl., flowers large, sepals subequal ovate-oblong acuminate, petals very small tipped with a clavellate capillary awn, lip sessile broad papillose, columnar teeth short. *Walp. Ann. vi.* 256.

NILGHIRI HILLS; at the Kaitia Falls, *Jerdon, Wight*.

Rhizome stout; pseudobulbs $\frac{1}{2}$ -1 $\frac{1}{2}$ in., ovoid. *Leaf* 2-4 in., shortly petioled, oblong, obtuse. *Scape* twice as long, suberect, raceme drooping; sheaths loose; bracts short; sepals 1 in., 5-nerved, dark purple; petals subserrate; auricles of purple lip crenate.

33. **B. Kingii**, *Hook. f. Ic. Pl. ined.*; scape short stout pendulous, raceme dense-fl., bracts large, dorsal sepal ovate, lateral ovate-lanceolate acute, petals nearly as long as the dorsal sepal ovate-oblong ciliate, auricles of the lip deeply toothed, column truncate.

SIKKIM HIMALAYA, alt. 6000 ft., *King (Ic. in Herb. Calcutt.)*.

Rhizome stout; pseudobulbs 1 $\frac{1}{2}$ in. diam., globose and deeply grooved, as if lobed. *Leaf* 6 in., linear-oblong, acute; petiole 1 $\frac{1}{2}$ in. *Scape* with raceme 5 in., sheaths short ventricose, and flowers green sprinkled with red; bracts $\frac{1}{2}$ in.; flowers 1 in. diam.; lip dark green.—Described from an excellent (but probably enlarged) native drawing.

34. **B. Careyana**, *Spreng. Syst. Veg. iii.* 732; scape very stout many-sheathed longer than the pseudobulb, bracts equalling or exceeding the densely imbricating flowers, sepals oblong-ovate acute, dorsal shorter, petals minute broadly ovate aristate 1-nerved, auricles of shortly stipitate lip subentire, columnar spurs long-aristate from a broad base. *Wall. Cat.* 1990/1; *Lindl. Gen. & Sp. Orchid.* 51; *Walp. Ann. vi.* 256. Anisopetalum *Careyanum*, *Hook. Fl. Exot. t.* 149. Pleurothallis purpurea, *Don Prodr.* 33. Tribrachia purpurea, *Lindl. Coll. Bot.* 41.

TROPICAL HIMALAYA; from Nepal, *Wallich*, eastwards. KHASIA HILLS and Burma.

Rhizome very stout; pseudobulbs globose ovoid or oblong. *Leaf* 4-10 by 1-2 in., subpetioled, oblong or linear-oblong. *Scape* 3-5 in.; raceme 2-4 in., decurved; bracts $\frac{1}{2}$ in., oblong or lanceolate; flowers $\frac{1}{4}$ - $\frac{1}{2}$ in. long, orange-yellow or greenish, more or less spotted or suffused with red-brown or purple, sometimes almost all blue-purple.—I find it impossible from dried specimens to ascertain if there be more than one species here, and if the two following are, if distinct, accurately distinguished by the characters given.

VAR. *ochracea*; flowers ochraceous unspotted, lip red-brown. *B. cupreum*, *Bot. Mag. t.* 5316.—Arracan.

35. **B. crassipes**, *Hook. f.*; scape very stout shorter than the pseudobulbs concealed by ventricose sheaths, bracts sepals petals and lip as in *B. Careyana*, but column longer with short erect spurs. *B. Careyana*, *Wall. Cat.* 1990/2; *Bot. Mag. t.* 4166.

SIKKIM TERAI, *Clarke*. MARTABAN, *Wallich*. Arracan (*Herb. Calcutt.*). PENANG (*Herb. Lindl.*).

36. **B. sicyobulbon**, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 152; habit and scape of *B. Careyanum*, but pseudobulbs very large, flowers orange-yellow, bracts narrower, petals subserrulate, column and its spurs as in *B. crassipes*.

TENASSERIM; at Moulmein, *Parish*.

37. **B. cupreum**, *Lindl. in Bot. Reg.* 1838, *Misc.* 95; scape slender decurved, sheaths distant, raceme elongate lax-fl., bracts narrow equalling the yellow or reddish-yellow flowers, sepals and (not aristate) petals ovate-lanceolate acuminate, lip narrow, auricles entire or obscurely toothed, columnar spurs slender. *Walp. Ann.* vi. 257; *Reichb. f. in Trans. Linn. Soc.* xxx. 152 (*var. stenopetala*).

TENASSERIM, *Parish*. MANILLA (*Hort. Loddiges*).

This again so closely resembles a lax-flowered state of *B. Careyanum*, as to be with difficulty distinguishable in the dried state. Lindley describes the flowers as copper-coloured and smelling of Valerian roots. Reichenbach's *var. stenopetala* seems hardly different; it has orange-yellow flowers. His *var. flava*, *Gard. Chron.* 1882, i. 330, of which the habitat is unknown, may be *B. nilgherrense*?

38. **B. nilgherrense**, *Wight Ic.* t. 1650; scape stout elongate, sheaths few distant, racemes lax-fl., bracts acute much shorter than the flowers, lateral sepals oblong, dorsal broadly ovate, petals triangular-ovate acuminate, auricles of lip entire or toothed, columnar spurs lanceolate. *Bot. Mag.* t. 5050; *Walp. Ann.* vi. 256.

MALABAR; on the NILGHIRI HILLS, &c., *Wight*.

Habit of *B. Careyanum*, but scape more slender, with few sheaths, racemes fewer and larger flowered, and bracts very short. Flowers described by Wight as sepals dull brownish-yellow, lip greenish-brown; in *Bot. Mag.* figure the sepals are green and purple, the lip purple. In a plant cult. at Kew apparently of this the auricles of the lip are wanting.

39. **B. ruflabrum**, *Parish mss.*; scape short, racemes many and dense-fl., bracts very small, flowers small, sepals subequal ovate-oblong obtuse, dorsal narrower, petals broadly ovate acuminate, tip serrulate, lip shortly stipitate scabrid, columnar teeth short. *B. limbatum*, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 152 (*not of Lindl.*).

TENASSERIM; on trees at Mergui, *Parish*.

Rhizome slender; pseudobulb broadly ovoid or subglobose, $\frac{1}{2}$ – $\frac{3}{4}$ in. long. *Leaf* $1\frac{1}{2}$ –2 in., subsessile, elliptic or oblong. *Scape* with raceme $2\frac{1}{2}$ in., sheath loose; bracts equalling the ovary; flowers $\frac{1}{2}$ in. long, dull purple.—Colours described from *Parish's* drawing named *limbatum* by Reichenbach, who describing them from a living plant (in *Hort. Saunders*) says that the dorsal sepal is red spotted with yellow, the lateral brown spotted yellow and with a green mesial line, the lip as dark purple. The leaves he says are lurid violet beneath.

40. **B. microtepalum**, *Reichb. f. in Walp. Ann.* vi. 253; scape slender, sheaths small distant, raceme dense-fl., bracts lanceolate equalling the small flowers, sepals ovate-lanceolate acuminate, petals very broadly triangular shorter than the column, lip minute, spurs of column recurved, tips toothed.

TENASSERIM; at Moulmein, *Lobb (in Herb. Lindl.)*.

Rhizome stout; pseudobulbs 1 in., ovoid. *Leaf* 4 in., rather longer than the scape and raceme, shortly petioled, linear-oblong, obtuse, coriaceous. *Flowers* $\frac{1}{2}$ in. long; auricles of lip obscurely toothed.—The small flowers, minute petals ("tepals," *Reichb. f.*), and peculiar spurs of the column distinguish this.

** Lip without basal auricles.

† Sepals pubescent.

41. **B. lemniscatum**, *Parish mss.*; *Bot. Mag.* t. 5961; scape erect slender or thickened upwards, spike short pendulous, flowers minute globose villous, sepals orbicular-ovate connate below, midrib of each below the apex with a long slender pendulous appendage, petals linear-oblong obtuse 1-nerved, lip sessile short obtuse purple, columnar spurs stout incurved. *Fl. des Serres*, t. 2476. *B. lemniscatum* & *var. tumida*, *Reichb. f. in Trans. Linn. Soc.* xxx. 151.

TENASSERIM; at Zwabakir in Moulmein, *Parish*.

Pseudobulbs $\frac{3}{4}$ in. diam., crowded, globose, strongly tubercled. *Leaves* 3 on the shoots, lanceolate (not seen on pseudobulbs). *Scape* 4-6 in., slender below, sometimes tumid above the middle; spike $\frac{3}{4}$ in., dense-fl. ; bracts ovate, acuminate; flower green and purple, $\frac{1}{6}$ in. long; appendages three times as long, 10-angled by as many crenate lamellæ, banded white and red; lip purple.—A very curious plant. I suppress *var. tumida*, *Par.* & *Reichb.*, the characters of which apply to the type, well figured in *Bot. Mag.* l. c.

42. **B. gracile**, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 152; scape and elongate suberect raceme filiform, flowers minute subglobose glandular and villous, dorsal sepals oblong shorter than the orbicular-ovate obtuse 3-nerved lateral, petals linear obtuse 1-nerved, lip subsessile oblong-lanceolate obtuse, columnar spurs slender incurved. *Reichb. f. in Gard. Chron.* 1874, ii. 162.

TENASSERIM; on Moolee-it, alt. 3000 ft., *Parish*.

Pseudobulbs $\frac{3}{4}$ in. diam., subglobose, tubercled (when dry), young 2-leaved? *Scape* with lax-fl. raceme 6 in.; bracts setaceous, longer than the very short pedicels; flowers $\frac{1}{2}$ in., green mottled with brown.

43. **B. hirtum**, *Lindl. in Wall. Cat.* 1989; *Gen. & Sp. Orchid.* 51; *Bot. Reg.* xxxiii. (184) under t. 66; scape tall stout, spike long many-fl. drooping, flowers sessile tomentose, dorsal sepal lanceolate 3-nerved rather shorter and narrower than the broad-based falcately-lanceolate 3-nerved lateral, petals small oblong obtuse ciliate, lip subsessile clawed linear-oblong truncate hispid below the middle, columnar spurs short. *B. suave*, *Griff. Notul.* iii. 292. *Stelis hirta*, *Smith in Rees Cyclop.* xxxiv. *Tribrachia hirta*, *Lindl. Collect.* 41.

SUBTROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 3-6000 ft., *J. D. H.*, &c. KHASIA MTS., *Griffith*, &c. TENASSERIM, *Parish*.

Pseudobulbs 1-1 $\frac{1}{2}$ in., ovoid-oblong, terete, 2-leaved. *Leaves* 1-2, 4-8 in., oblong to lanceolate, obtuse, rather thin. *Scape* with spike 8-12 in.; flowers $\frac{1}{4}$ - $\frac{1}{2}$ in. long, yellow or greenish white, scented of *Anthozanthum*; bracts ovate, acute, exceeding the ovary; pollinia globose, one pair minute.

44. **B. comosum**, *Collett & Hemsl. in Journ. Linn. Soc. ined.*; scape robust 2-3-sheathed, raceme inclined cylindric truncate, flowers most densely crowded $\frac{2}{3}$ in. long horizontally spreading, sepals subequal hyaline subulate-lanceolate villous with flaccid hairs, petals small linear obtuse 1-nerved, lip shortly stipitate lanceolate recurved, columnar teeth short.

EASTERN BURMA; Shan Hills, alt. 6000 ft., *Collett*.

Pseudobulbs and *leaves* unknown. *Scape* 10 in., curved, as thick as a crow-quill, kneeled at the top so that the racemes form an angle of 45° with it. *Racemes* 2 $\frac{1}{2}$ by 1 $\frac{1}{2}$ in. diam., like a bottle brush, the flowers being perfectly horizontal and densely villous with unicellular hairs; bracts subulate, as long as the very short pedicel and ovary;

sepals membranous, nerves 1-3 very slender.—A very remarkable species, resembling no other, but allied to *hirtum* and *auricomum*.

45. **B. Lindleyanum**, *Griff. Notul.* iii. 287; scape tall, raceme many-fl. drooping and pedicelled flowers tomentose, sepals subequal ovate acuminate 5-nerved, lateral with an outer basal angle, petals small oblong crinate, lip shortly stipitate lanceolate villous, columnar arms slender.

TENASSERIM; shores of Mergui, *Griffith, Parish.*

Pseudobulbs 1 in. diam., depressed ovoid. *Leaf* 3-6 in., oblong-lanceolate, acute. *Scape* 4-8 in.; bracts ovate, aristately acuminate, longer than the pedicel and ovary; flowers $\frac{1}{2}$ in. diam., when closed as if spurred by the mentum; pedicels $\frac{1}{2}$ in.; sepals greenish with purple stripes and margins.

46. **B. parviflorum**, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 152; scape slender, raceme elongate, bracts minute, flowers small very shortly pedicelled, sepals subequal ciliate, dorsal lanceolate 1-nerved narrower than the ovate acute sub-3-nerved lateral, petals half as long oblong obtuse ciliate, lip shortly stipitate oblong obtuse laxly hairy, columnar spurs short.

TENASSERIM; on trees in the mountains, *Parish.*

Pseudobulbs depressed globose; rhizome stout. *Leaf* 4-5 in., petioled, ligulate, obliquely 2-fl. *Scape* longer, with the raceme 6 in.; flowers $\frac{1}{10}$ in. diam., yellow?; mentum rounded.—Reichenbach describes the dorsal spur of the column as plumose. I do not find it so.

47. **B. lasianthum**, *Lindl. in Gard. Chron.* 1855, 53; scape stout many-sheathed, raceme drooping, flowers large, sepals hispid, dorsal shortest linear-oblong, lateral with an ovate concave base, petals one-third shorter lanceolate acuminate glabrous, lip broadly stipitate glabrous. *De Vriese Ill. Orchid. Ned. Ind. cum Ic.*; *Miquel Fl. Ind. Bat.* iii. 649. *Anisopetalum lasianthum*, *Kuhl mss.*

PERAK (*Scortechini*). PENANG (*Ic. in Herb. Kew*).—DISTRIB. Sumatra.

Rootstock very stout; *pseudobulbs* 2-3 in. *Leaf* large, 5-7 by 2-3 in., elliptic or linear-oblong, acute, many-nerved. *Scape* 6-10 in.; bracts $\frac{1}{2}$ in., ovate-lanceolate; flowers dark purple; sepals 1 in. long, tips slender, nerves 5 strong.—Perhaps the largest species of the genus. The flowers are described as fleshy and copiously covered with fleshy hair-pointed bristles. Lindley's *Manilla* habitat is probably an error.

48. **B. limbatum**, *Lindl. in Bot. Reg.* 1840, *Misc.* 74; rhizome very stout, *pseudobulb* depressed subglobose, scape stout many-fl., flowers small, sepals subequal ovate obtuse, sides strongly ciliate, petals spatulate villous, lip as long as the sepals sessile ovate obtuse concave, disk smooth, margins scabrid.

SINGAPORE (*Hort. Loddiges*).

Rhizome thicker than a duck's quill. *Leaf* not seen. *Scape* with spike 4 in.; bracts minute; flowers dingy purple; sepals $\frac{1}{4}$ in. long; lip dull-green purple at the base.—I have seen only a very poor specimen in *Herb. Lindl.*

49. **B. tremulum**, *Wight Ic.* t. 1749; leaf ovate-lanceolate acute, scape slender erect lax-fl., flowers large, sepals subequal linear-lanceolate, sides villously ciliate 3-nerved, petals very small fringed, lip linear-oblong straight fringed with long hairs, columnar teeth short.

NILGHIRI HILLS, *Wight*, in the Wynnad, *Jerdon.*

Pseudobulbs subglobose. *Leaf* $1\frac{1}{2}$ -2 in., sessile, base rounded. *Scape* with

raceme 6-8 in.; bracts very small; pedicels short; sepals $\frac{3}{4}$ in. long, white with broad red-purple nerves and lips; petals acuminate; anther pubescent.—Described from Wight's figure and a coloured drawing by Jerdon.

†† Sepals glabrous or faintly ciliate. Petals ciliate or serrulate. (See *B. Blepharistes* in *Cirrhopetalum*.)

50. **B. Penicillium**, *Par. & Reichb. f. in Trans. Linn. Soc. xxx.* 151; scape long stout, raceme lax-fl., bracts lanceolate, sepals narrow subequal 5-nerved long-acuminate, dorsal ovate-lanceolate, lateral lanceolate from a broad gibbous base, petals small oblong obtuse fleshy crinite, lip sessile on the broad short foot of the column lanceolate crinitely hirsute with purple hairs, columnar spurs long slender.

TENASSERIM; at Moulmein, *Parish*.

Pseudobulbs 1 in., stout, ovoid; rhizome stout. *Leaf* 6 in., linear, notched; petiole $1\frac{1}{2}$ in. *Scape* 12 in., lower empty bracts $\frac{1}{2}$ in., floral shorter; pedicels $\frac{1}{2}$ in.; flower $\frac{1}{2}$ in. long; mentum rounded; sepals yellow striped with purple, dorsal obscurely ciliate.

51. **B. eublepharum**, *Reichb. f. in Walp. Ann.* vi. 252; scape tall stout, raceme long lax-fl., bracts ovate-lanceolate aristate, sepals ovate-lanceolate acuminate, dorsal concave, lateral broader and longer, petals oblong obtuse erose fimbriate, lip stipitate oblong-lanceolate, columnar spurs very long.

SIKKIM HIMALAYA, alt. 7-10,000 ft., *Griffith's Collectors*, &c.

Pseudobulbs $1\frac{1}{2}$ -3 in., cylindric. *Leaf* 3-8 in., shortly petioled, linear-oblong, acute. *Scape* 10-18 in.; sheaths 3-4; raceme 4-6 in.; bracts $\frac{1}{4}$ - $\frac{1}{2}$ in.; sepals $\frac{1}{2}$ in. long, white, flushed or speckled with pink; mentum rounded; lip purple, base cordate.

52. **B. gymnopus**, *Hook. f. Ic. Plant. ined.*; scape rigid flexuous, raceme elongate, bracts minute, pedicels slender, sepals lanceolate acuminate 3-nerved, lateral falcate inserted at the apex of the naked foot of the column, petals linear serrulate, lip subsessile laterally compressed, columnar teeth short. *Bulbophyll.*, *Griff. Notul.* 294; *Ic. Pl. Asiat.* t. 297; *Itin. Notes* 104, No. 65.

RHOTAN HIMALAYA, alt. 2200 ft., *Griffith (Kew Distrib.* 5133). KHASIA HILLS, *Griffith (K. D.* 5134); at Joowye, alt. 3500 ft., *Clarke*.

Rhizome very stout, sheathed, with stout runners from the base of the narrow pseudobulbs. *Leaf* 4-7 in., petioled, very thick, linear, 2-fid. *Scape* flowering to near the base; basal sheaths imbricate; bracts ovate; pedicels $\frac{1}{2}$ in.; flower pale greenish white; mentum rounded; lip obtuse, yellow.—Insertion of lateral sepals as in 62. *B. Wrayi*.

53. **B. Thomsoni**, *Hook. f. Ic. Plant. ined.*; scape flexuous, raceme elongate, flowers minute subsessile, bracts minute, sepals lanceolate acuminate 3 nerved, lateral broadest, petals oblong obtuse ciliate 1-nerved, lip stipitate much compressed obtuse loosely villous, columnar teeth short.

SIKKIM HIMALAYA, *Thomson*.

Habit and foliage of *B. gymnopus*, but pseudobulbs short and strongly curved, leaf thinner, scape not floriferous to near the base, flowers subsessile, lip hairy and above all lateral sepals in normal position. Flowers pale green, lip yellow.

54. **B. securdum**, *Hook. f. Ic. Plant. ined.*; scape very slender

much longer than the leaves, raceme secund, bracts minute, flowers small shortly pedicelled, sepals obtuse, dorsal ovate 1-nerved, lateral broadly obliquely ovate obtuse 3-nerved, mentum rounded, petals oblong obtuse ciliate, lip stipitate ovate-cordate ciliate, columnar teeth minute.

UPPER ASSAM; Naga Hills, on Kohima, *Prain*.

Pseudobulbs $\frac{1}{2}$ in. diam., subglobose. *Leaf* $1\frac{1}{2}$ – $2\frac{1}{2}$ in. petioled, linear, obtuse, nerves strong. *Scape* with raceme 5–6 in.; pedicels $\frac{1}{10}$ in.; sepals $\frac{1}{10}$ in. long, obscurely ciliate.

55. **B. auricomum**, *Lindl. in Wall. Cat.* 1935; *Gen. & Sp. Orchid.* 50; scape slender ascending, raceme long many-fl. puberulous cernuous, bracts small lanceolate, sepals elongate-lanceolate membranous 3-nerved, dorsal shorter, mentum obscure, petals ovate-oblong 1-nerved ciliate, lip shortly stipitate lanceolate, columnar teeth short. *B. fœnisecii*, *Par. ex Reichb. f. in Bot. Zeit.* 1865, 99. *Dendrobium tripetaloides*, *Roxb. Fl. Ind.* iii. 479.

RANGOON, *Carey*. TENASSERIM; Tavoy, *Wallich*; Moulmein, *Parish*.

Pseudobulbs $\frac{3}{4}$ –1 in., subcylindric, terete, or obpyriform. *Leaf* not seen. *Raceme* 3–5 in.; bracts $\frac{1}{10}$ in.; pedicels very short; flowers yellow, sweet-scented (of *Anthoxanthum*); sepals $\frac{1}{2}$ in. long.

††† Sepals and petals glabrous, eciliate.

§ *Pseudobulbs* 0, or very small.

56. **B. cylindraceum**, *Lindl. Gen. & Sp. Orchid.* 53; scape tall with usually a large upper sheath, spike erect cylindric, flowers imbricate, bracts small, dorsal sepal triangular much smaller than the oblong obtuse lateral, petals small oblong 1-nerved, lip ovate, columnar spurs short erect. *Wall. Pl. As. Rar.* i. t. 69.

NEPAL, *Wallich*. SIKKIM HIMALAYA, alt. 6–7000 ft., *Clarke*. KHASIA MTS., alt. 4–6000 ft., common.

Rhizome very stout. *Leaf* 4–10 in., obtuse; petiole 1–4 in. *Scape* 6–10 in.; sheaths 1–2; bracts ovate, acute; flowers $\frac{1}{2}$ in. long, dorsally flattened, white, pink or deep purple; dorsal sepal with sometimes a spiral tip; lip green or purple; ovary very short.—There are two forms found in both Sikkim and the Khasia Hills.

B. CYLINDRACEUM PROPER; upper sheath of scape embracing the base of the spike. *B. imbricatum*, *Griff. Notul.* iii. 289.—*Wallich's* figure is probably grossly exaggerated (made in Nepal, there are no specimens in his herbarium), with yellow flowers, leaves 10–12 by $1\frac{1}{2}$ –2 in., scape 18 in., and spike 6–8 in.

VAR. *khasiana*; upper sheath smaller distant from the spike. *B. khasianum*, *Griff. Notul.* iii. 284; *Reichb. f. in Gard. Chron.* 1878, ii. 716.

57. **B. repens**, *Griff. Notul.* iii. 293; *Ic. Pl. Asiat.* t. 294; scape slender much shorter than the leaf, flowers in a dense globose head, bracts short, sepals 3-nerved, dorsal triangular much shorter than the broadly oblong obtuse lateral, petals minute cuneately obovate 1-nerved, lip sessile oblong convex obtuse, columnar spurs simple or branched. *B. khasyanum*, *Reichb. f. in Trans. Linn. Soc.* xxx. 133 (not of *Griff.*).

KHASIA HILLS; at Myrunga, alt. 5000 ft., *Griffith*. TENASSERIM, *Parish*, *Gallatly (Ic. Herb. Calcutt.)*.

Rhizome very stout, densely fibrous. *Leaves* 2–6 by $\frac{3}{4}$ –1 in., very thick; petiole 1–3 in. *Head of flowers* $\frac{1}{2}$ in. diam.; flowers purple, $\frac{1}{4}$ in. long and broad, much flattened dorsally.—*Griffith's* drawing is a very bad one, and the specimen in *Herb. Lindley* is flowerless; the scape is much longer in the Tenasserim plants.

58. **B. conchiferum**, *Reichb. f. in Walp. Ann.* vi. 253; scape tall, spike long erect lax-fl'd., bracts ovate acuminate, dorsal sepal broadly ovate obtuse shorter than the oblong obtuse concave 3-5-nerved lateral that are connate beyond the foot of the column, petals oblong apiculate 1-nerved, lip stipitate compressed, columnar teeth very short. *B. rufinum*, *Reichb. f. Xen. Orchid.* ii. 45, t. 219.

SIKKIM HIMALAYA, alt. 3-4000 ft., *Griffith's Collectors (Kew Distrib.* 5291), *Clarke, &c.*

Leaf 6-10 in., oblanceolate, obtuse or acute; petiole 3-4 in. *Scape* 2-3-sheathed; spike 3-5 in., rachis stout; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in.; flowers distant, erect, $\frac{1}{4}$ in. long, green and yellow with purple veins; tips of lateral sepals rounded; ovary and column very short.

59. **B. xylophyllum**, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 151; scape distant from the leaf slender erect, flowers capitate fleshy dorsally flattened, bracts very small, dorsal sepal with a minute spur at the base on each side ovate obtuse 3-nerved, lateral broadly falcately oblong, petals small oblong, lip oblong obtuse, columnar spurs falcate toothed dorsally.

TENASSERIM; at Moulmein, *Parish.*

Leaf $1\frac{1}{2}$ -2 by $\frac{3}{4}$ -1 in., broadly elliptic or orbicular, very thick, smooth. *Scape* 2 in., sheaths minute, head of fl. $\frac{1}{2}$ in. diam.; flowers suborbicular, $\frac{1}{10}$ in. broad, greenish, lip tumid, tip rounded.—The minute spurs at the base of the dorsal sepal answer to the much longer ones in *B. bisetum*.

60. **B. alcorne**, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 151; scape slender, top decurved, spike drooping short dense-fl'd., bracts minute, flowers fleshy compressed, sepals subequal oblong obtuse 3-nerved, petals ovate-oblong 1-nerved, arms of column 3-branched.

TENASSERIM, *Parish.* BURMA, *Berkeley.*

Rhizome with annular pits at the leaf insertions. *Leaf* 2-3 in., sessile, oblanceolate or subspathulate, obtuse, very thick. *Scape* 4-5 in.; sheaths small; spike 1-1 $\frac{1}{2}$ in.; flowers $\frac{1}{2}$ in. long; ovary and column very short.

61. **B. apodum**, *Hook. f. Ic. Plant. ined.*; scape much shorter than the leaf, basal sheaths large, spike lax-fl'd., bracts small, sepals subequal lanceolate acuminate 1-3-nerved, lateral falcate, petals linear-lanceolate 1-nerved, lip sessile oblong, columnar teeth minute.

MALACCA, *Maingay (Kew Distrib.* 1619). PERAK; top of Batu Kurau, *Scortechini.*

Leaf 5-8 in., linear-oblong or oblanceolate, obtuse, coriaceous; petiole 1-3 in. *Scape* 3-4 in., rigid, stout below, flowering nearly to the base; basal sheaths rigid; flowers $\frac{1}{2}$ in. diam., greenish yellow; mentum rounded.—Near *B. gymnopus*, but without pseudobulbs, and with the lateral sepals inserted all along the foot of the column.

62. **B. Wrayi**, *Hook. f. Ic. Plant. ined.*; scape tall stout erect, raceme stout lax-fl'd., bracts ovate-lanceolate, sepals 3-nerved lanceolate arched, lateral falcate inserted at the apex of the naked foot of the column, petals broadly oblong 3-nerved, lip stoutly stipitate, columnar spurs erect.

PERAK; on Gonong Brumbar Pahang, alt. 8000 ft., *Wray.*

Rhizome stout, very woody. *Leaf* 4-6 in., thick, linear-oblong, narrowed into a petiole 4 in. long. *Scape* longer than the leaf; sheaths 1-2, appressed; raceme 3 in., rachis stout; pedicel $\frac{1}{2}$ in.; flowers pale green, spotted red; sepals

$\frac{1}{2}$ in. long, subacute; lip subterete, obtuse, with large rounded basal auricles; column large.—Insertion of lateral sepals as in 52. *B. gymnopus*.

63. **B. leptosepalum**, Hook. f. *Ic. Plant. ined.*; scape capillary, raceme lax-fl'd, bracts lanceolate exceeding the ovary, sepals subequal lanceolate caudate-acuminate, lateral from a broad gibbous base, petals small linear-lanceolate, lip stipitate membranous 3-nerved, columnar spurs slender.

PENANG; on Gov't Hill, Curtis. PERAK, *Scortechini*. MALACCA, Maingay (*Kew Distrib.* 1674).

Rhizome short, tufted. *Leaves* 4–6 in., crowded, petioled, linear-lanceolate, subacute, margins recurved. *Scape* shorter than the leaves; raceme flexuous; flowers $\frac{1}{2}$ in. long, white, cellular; pedicel very short; mentum rounded; lip with rounded basal auricles.

64. **B. hymenanthum**, Hook. f. *Ic. Plant. ined.*; rhizome very slender, pseudobulbs 0, leaves small elliptic or suborbicular, scape capillary 2-fl'd., sepals subequal acuminate from a broadly ovate base 3-nerved, petals linear 1-nerved, lip stipitate oblong obtuse, column with obtuse arms.

KHASIA HILLS; at Myrung, alt. 5000 ft., J. D. H. & T. T.

Rhizome tortuous, as thick as packthread. *Leaf* $\frac{1}{2}$ – $\frac{1}{2}$ in., subpetioled, coriaceous, nerveless, tip rounded. *Scape* 1 in.; flowers $\frac{1}{2}$ in. diam. when spread out, close together, but one superposed; bracts minute, sepals and petals hyaline, colourless.—A remarkable little species.

§§ *Pseudobulbs* ovoid or globose.

65. **B. bisetum**, Lindl. in *Ann. Nat. Hist.* x. 186; scape very slender, raceme short erect dense-fl'd., bracts lanceolate recurved, sepals subequal broadly ovate obtuse dorsally winged, dorsal with a fleshy spur at the base on each side, petals narrowly spatulate 1-nerved, lip stipitate narrow acute pubescent, columnar spurs long. *B. cirrhopetaloides*, Griff. *Notul.* iii. 290. Bulb. sp., *Ic. Pl. Asiat.* t. 296, f. 1. *B. cariniflorum*, Reichb. f. in *Walp. Ann.* vi. 253.

KHASIA HILLS, alt. 4–5000 ft., Griffith (*Kew Distrib.* 5140), H. f. & T. (*Bulboph.* 23), &c.

Rhizome slender; pseudobulbs $\frac{1}{2}$ –1 in., ovoid, narrow or broad. *Leaf* 3–4 in., shortly petioled, lanceolate, obtuse. *Scape* 2–3 in. (pendulous, *Ic. Griff.*); sheaths slender; raceme $\frac{1}{2}$ – $\frac{3}{4}$ in.; flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. long, shortly pedicelled, dark purple.—The fleshy appendages at the base of the dorsal sepal are very singular, and homologous with the spurs of *B. xylophyllum*.

66. **B. Globulus**, Hook. f. *Ic. Plant. ined.*; pseudobulbs small globose, scape many-fl'd. longer than the linear-oblong coriaceous leaf, bracts minute, sepals subequal 3-nerved, dorsal linear-oblong, lateral lanceolate subacute, petals half as long ovate obtuse 1-nerved, lip very small shortly stipitate recurved acuminate, column subtruncate.

PERAK, *Scortechini*.

Pseudobulbs $\frac{1}{2}$ in. diam., crowded. *Leaf* $1\frac{1}{2}$ –2 in., obtuse. *Scape* arched; flowers $\frac{1}{2}$ in. diam., membranous.—The single specimen is indifferent, but shows the species to be quite unlike any other.

67. **B. polyrhizum**, Lindl. *Gen. & Sp. Orchid.* 53; pseudobulbs crowded globosely ovoid leafless when flowering, scape erect slender, dorsal sepal ovate-oblong obtuse rather smaller than the subfalcately oblong

obtuse lateral, petals ovate-oblong obtuse, lip sessile obtuse, columnar teeth short.

NEPAL ? , Wallich (*Ic. in Herb. Kew*). ? SIKKIM, Lister (*Ic. in Herb. Calcutt.*).

Rhizome very short, excessively branched; pseudobulbs size of a small hazel nut, rooting profusely. *Scape* with 6-8-fld. spike 3-5 in.; bracts minute; flowers green, $\frac{1}{4}$ in. long, suberect.—Of this remarkable plant there is a drawing of Wallich's artist, no doubt made in Nepal; its pseudobulbs are smooth and flowers green. A drawing of a very similar plant from Sikkim has pseudobulbs marked with superposed zones of oblong tubercles; the flowers are pale yellow flushed with pink on the dorsal sepal. Both are represented as leafless.

68. **B. suavissimum**, Rolfe in *Gard. Chron.* 1889, i. 297; scape very slender, raceme elongate decurved, flowers secund, sepals subequal narrowly linear-oblong obtuse 3-nerved, petals not half as long ovate or ovate-lanceolate obtuse 1-nerved obscurely erose, lip sessile small linear-oblong obtuse recurved, columnar teeth broad acute.

UPPER BURMA, Cooper (*Hort. C. Bill.*).

Pseudobulbs 1 in., ovoid-oblong, sheathed. *Leaf* 4 in., narrowly oblanceolate, obtuse, rather thin. *Scape* with raceme 8-10 in.; sheaths 2, membranous, appressed; bracts very small; flowers $\frac{1}{2}$ in. long, pendulous, shortly pedicelled, very sweet-scented; sepals and petals primrose; lip golden.—Very like *B. auricomum*, and as deliciously scented, but perfectly glabrous.

69. **B. purpureum**, Thw. *Enum.* 298; small, scape short, flowers minute in a dense short spike, bracts very minute, sepals subequal oblong obtuse falcate strongly 3-nerved, petals linear-oblong obtuse, lip stipitate spongy, columnar arms curved obtuse.

CEYLON; in the Ambagamowa district, Thwaites.

Rhizome slender; pseudobulbs fusiform, densely crowded. *Leaf* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., obovate or spatulate, retuse, coriaceous. *Scape* sheathed; spike $\frac{1}{2}$ - $\frac{3}{4}$ in. long; pedicel deflexed; ovary erect; flower $\frac{1}{10}$ in. long.—Of three drawings kindly lent by Dr. Trimen, the sepals are in one rose-pink with deep-red nerves, in another lilac with purple nerves, in a third dull purple.

70. **B. triste**, Reichb. f. in *Walp. Ann.* vi. 253; scape slender, top decurved, spike pendulous densely many-fld., bracts minute acute, flowers small, dorsal sepal shortest triangular-ovate obtuse 3-nerved, lateral falcately oblong obtuse concave, petals ovate-oblong acute 1-nerved, lip stipitate broad convex obtuse, columnar spurs slender.

TENASSERIM; on the Toungoo Mts., Lobb, Parish, Berkeley.

Rhizome as thick as a duck's quill; pseudobulbs conico-globose, $\frac{1}{4}$ in. diam. *Leaf* not seen. *Scape* 4-5 in.; sheaths narrow; spike 1-2 in.; rachis slender; flowers $\frac{1}{2}$ in. long, purple?; ovary very short.—“Odour strong, pungently fœtid,” Berkeley.

71. **B. micranthum**, Hook. f. *Ic. Plant. ined.*; scape slender, spike decurved or pendulous densely many-fld., bracts minute acute, flowers very small, dorsal sepal shortest triangular-ovate acute 3-nerved, lateral falcately ovate acute concave 3-nerved, petals ovate acute 1-nerved, lip large stipitate, columnar spurs slender.

TENASSERIM; on Teongoo and Ta-ok, Parish.

Pseudobulbs and habit of *B. triste*, to which Parish and Reichb. f. have referred it, but the flowers are spreading, not half the size, and the sepals are acute.

72. **B. reptans**, Lindl. in *Wall. Cat.* 1988; *Gen. & Sp. Orchid.* 51; pseudobulbs obpyriform, scape shorter than the linear-obtuse leaf

sheathed, spike lax-fl., bracts oblong-lanceolate as long or half as long as the sessile flowers, sepals subequal narrowly lanceolate acute 3-nerved, lateral with a broad gibbous base, mentum rounded, petals broadly oblong obtuse 1-3-nerved, lip stipitate recurved, spurs of very minute column slender. *B. Clarkei*, *Reichb. f. in Journ. Linn. Soc.* xxv. 72. *Tribrachia reptans*, *Lindl. Coll. Bot.* t. 41 A.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 6-7000 ft., *Griffith's Collectors* (*Kew Distrib.* 5129). KHASIA and NAGA HILLS, alt. 5-6000 ft., *Griffith* (*K. D.* 1573).

Pseudobulbs $\frac{1}{2}$ - $\frac{3}{4}$ in., distant; rhizome slender. *Leaf* 4-6 in., narrowed into a petiole. *Scape* and lax-fl. raceme together 2-4 in.; bracts $\frac{1}{3}$ - $\frac{1}{2}$ in.; sepals yellow green with pink nerves; lip yellow.

VAR. *subracemosa*; bracts much shorter oblong obtuse, flowers often shortly pedicelled. *B. grandiflorum*, *Griff. It. Notes* 146, n. 705; *Notul.* iii. 293; *Ic. Pl. Asiat.* t. 294, f. 1.—Sikkim, Bhotan and the Khasia Mts., *Griffith* (*Kew Distrib.* 5130), &c.—Griffith's name *grandiflorum* must be a blunder of the Editor of his works; it does not occur in Griffith's mss.

Sect. IV. IONE. *Lateral sepals* usually connate and placed under the lip. *Lip* rather large, straight, rigid. *Pollinia* 4, attached in pairs to two cartilaginous glands.

* *Flowers* $\frac{3}{4}$ -1 in. long. *Lateral sepals* 5-7-nerved.

73. **B. paleaceum**, *Benth. in Gen. Pl.* iii. 503; scape tall much longer than the leaf, bracts spathaceous much exceeding the ovary, flowers large racemose, sepals many-nerved, lateral wholly connate, petals broadly oblong 1-3-nerved, lip ovate-lanceolate. Ione paleacea, *Lindl. Fol. Orchid.* 2; *Bot. Mag.* t. 6344 (*excl. syn. Griff.*); *Walp. Ann.* vi. 636.

SIKKIM HIMALAYA; at Dorjeeling, *Griffith's Collectors* (*Kew Distrib.* 5176). DAMSONG, in Western Bhotan, alt. 5-6000 ft., *Clarke, Gamble*.

Pseudobulbs 1-1 $\frac{1}{2}$ in., obpyriform. *Leaf* 4-6 in., petioled, linear-oblong. *Scape* with the 4-6-fl. erect raceme 8-14 in.; bracts $\frac{3}{4}$ -1 in., oblong-lanceolate, acuminate; flowers $\frac{3}{4}$ -1 in. long, drooping; sepals greenish, nerves pink; petals spreading, subserrate; lip purple, entire or crenate, tip thickened or slender.

74. **B. mishmeense**, *Hook. f.*; scape tall much longer than the leaf, bracts ovate imbricate equalling the ovary, flowers large racemose, lateral sepals free, petals acute, lip ovate-cordate, tip elongate stout terete. Ione fusco-purpurea, *Lindl. Fol. Orchid. Ione* 2; *Walp. Ann.* vi. 636. *Dipodium*, *Griff. Notul.* iii. 405; *Ic. Pl. Asiat.* t. 327, *left-hand figure*.

UPPER ASSAM; Mishmee Mts., on Thumathya, *Griffith*.

Habit and stature of *B. paleaceum*, but bracts and sepals much broader and shorter; lateral sepals free, light brown, purple-veined; lip greenish brown, margin purplish.—I have seen only a mutilated specimen in Herb. Lindl.

75. **B. cirrhatum**, *Hook. f. Ic. Plant. ined.*; scape equalling the leaf, bracts cucullate exceeding the ovary, flowers large racemose, lateral sepals connate, petals rounded quite entire, lip ovate-oblong entire with two elevated lines which are clavate at the base. Ione cirrhata, *Lindl. Fol. Orchid.* 1; *Walp. Ann.* vi. 635.

SIKKIM HIMALAYA, alt. 4000 ft. (*Ic. Cathcart*).

"Very similar to *B. virens*, but leaves longer; lip not serrate, but with 2 elevated white lines. *Flowers* dirty white, with purple streaks and a deep violet lip.—Described from Cathcart's figure." *Lindl. l. c.*

76. **B. virens**, *Hook. f.*; scape longer than the leaves, bracts ovate acuminate longer than the ovary, flowers large racemose, lateral sepals connate, petals quite entire, lip oblong serrulate narrowed into a long stout terete striate point. *Ione virens*, *Lindl. Fol. Orchid.* 1; *Walp. Rep.* vi. 636. *Dipodium*, *Griff. Notul.* 405; *Ic. Pl. Asiat.* t. 328, f. 1.

UPPER ASSAM; Mishmee Hills, *Griffith*.

Closely allied to *B. paleaceum*. "Bracts whitish with purple veins; lateral sepals white, margins greenish, veins purple; petals purple and blood-red." *Griffith*.

77. **B. elegans**, *Gard. mss. in Thwaites Enum.* 298; scape very slender longer than the leaf 1-fl., flower large, dorsal sepal ovate acute half the length of the free or coherent oblong lanceolate acuminate lateral, petals ovate-lanceolate, lip with an orbicular membranous waved base traversed by a broad hard axis that terminates in a dagger-shaped apex, columnar spurs long slender.

Ceylon; in the Hantani, &c., districts, alt. 3-5000 ft., *Gardner, Thwaites*.

Pseudobulbs $\frac{1}{2}$ - $\frac{1}{2}$ in., ovoid, close-set on a slender rhizome. *Leaf* 3-4 in., linear-lanceolate. *Scape* 1-2 in.; sheath 0; bract small, acute; pedicel with ovary slender, $\frac{3}{4}$ -1 in.; flower 1- $\frac{1}{2}$ in. long, purplish green spotted, lateral sepals forming a boat-shaped body; lip yellow purple spotted.

** *Flowers* $\frac{1}{2}$ - $\frac{1}{2}$ in. long. *Lateral sepals* 3-nerved.

78. **B. bicolor**, *Hook. f.*; scape slender shorter than the leaf, bracts lanceolate longer than the ovary, flowers small, sepals subequal linear-lanceolate acuminate, lateral connate at the bases, petals ovate or oblong obscurely serrate, lip panduriform traversed by a rigid axis that terminates in a short or long rigid emarginate point, sides membranous lacerate. *Ione bicolor*, *Lindl. Fol. Orchid.* 3; *Walp. Ann.* vi. 637. *Sunipia bicolor*, *Lindl. Gen. & Sp. Orchid.* 179; *Sert. Orchid. Frontisp.* f. 5. *I. khasiana*, *Lindl. Fol. Orchid.* 2; *Reichb. f. l. c.* 636. *Dipodium khasianum*, *Griff. Notul.* 354; *Ic. Pl. Asiat.* t. 327, f. 2.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 5-6000 ft., and Bhotan, *Griffith (Kew Distrib.* 5137), &c. KHASIA MTS., alt. 5000 ft., *Griffith (K. D.* 5133), &c.

Pseudobulbs $\frac{3}{4}$ -1 in., obpyriform, distant on a slender rhizome. *Leaf* 3-5 in., subpetioled, linear, obtuse. *Scape* with spike $1\frac{1}{2}$ -2 in.; bracts $\frac{1}{4}$ - $\frac{1}{2}$ in.; flower very membranous, $\frac{1}{2}$ - $\frac{3}{4}$ in. long; sepals whitish with pink veins; lip purple.—Very like *B. reptans*, under which name it is alluded to by Bentham under *Ione (Gen. Pl.* iii. 503).

79. **B. candidum**, *Hook. f. Ic. Plant. ined.*; habit inflorescence and flower of *B. bicolor*, but rather smaller, sepals white, lip yellow dagger-shaped with membranous serrulate sides in the basal half. *Ione candida*, *Lindl. Fol. Orchid.* 3; *Reichb. f. in Walp. Rep.* vi. 637.

KHASIA HILLS, alt. 4-5000 ft., *J. D. H. & T. T. NAGA HILLS, Prain*.

SPECIES EXCLUDED AND UNKNOWN TO ME.

B. ADENOPETALUM, *Lindl. in Bot. Reg.* 1842, *Misc.* 85, which was supposed to be a native of Singapore, is a Philippine Island species.

B. ALOPECURUM, *Reichb. f. in Gard. Chron.* 1880, ii. 70; like *B. triste* but larger, pseudobulb spherical, flowers shorter, sepals connate conchoid equal, petals and conchoid connate equal sepals nerveless.—Burma (*Hort. Low*).

B. CRASSIFOLIUM, *Thw. mss. in Trimen Journ. Bot.* 1885, 244; pseudobulbs pisiform smooth, leaf $\frac{1}{2}$ - $\frac{3}{4}$ in. sessile fleshy-oval obtuse, flowers solitary very small shortly peduncled in the sheath of a short truncate bract, sepals subequal broadly

ovate, dorsal arched erect, lateral spreading yellow-green densely dotted with red, petals minute broad truncate, lip very small truncate obtuse white.—Ceylon; Kukul Korle in the Western Province, *Thwaites*, C.P. 3879.

B. INERS, *Reichb. f. in Gard. Chron.* 1880, i. 776; pseudobulbs $\frac{1}{2}$ – $\frac{3}{4}$ in. brown pyriform, leaf 3 by $\frac{3}{4}$ in. cuneate-ligulate subacute thick purple beneath, scape slender, top nodding, bracts equalling the ovary, flowers subumbellate white, bracts linear acute, sepals 3-nerved, dorsal triangular shorter than the ligulate attenuate acute lateral, petals triangular 3-nerved, lip cordate-triangular, column 3-toothed.—Assam? (*Hort. Bull*).

B. OLIGOGLOSSUM, *Reichb. f. in Hamb. Gartenzeit.* xxi. 297; allied to *B. odoratissimum*, bracts scarious lanceolate 3–5-nerved longer than the pedicelled ovary, sepals oblong flat to the acuminate tips, petals 3 or 4 times shorter ovate subacute 1-nerved, lip much smaller than the petals cordate obtuse-angled 3-toothed apiculate, mid-tooth produced obtuse, column short angled on both sides.—Burma (*Hort. Low*).

B. PSYCHOON, *Reichb. f. in Gard. Chron.* 1878, ii. 170; pseudobulbs crowded ovoid furrowed, scape exserted many-bracteate at the top 1-fld. (normally umbelled), flowers pale green, dorsal sepal triangular acuminate deflexed, lateral lanceolate acuminate decurved, inner side inflexed, petals much smaller acute minutely denticulate, lip thick semisigmoid, base erect cordate, column with a tooth on each side.—Assam (*Hort. Bull*).—Allied to *B. radiatum*, L.; *odoratissimum*, L.; *oligoglossum*, R. f.

B. SCHMIDTIANUM, *Reichb. f. in Hamb. Gartenzeit.* xxi. 357; allied to *B. psittacoglossum*, raceme long-pedicelled 2-fld., flowers as large as *B. macranthum* golden spotted with brown, mentum oblique obtuse, sepals obtusely acute, dorsal oblong ligulate, lateral broader oblique, petals short ovate acuminate, lip long-clawed fleshy oblong acute, base rounded hastate with a few serratures on each side, column stout 3-toothed angled in the middle on both sides.—*Hort. Schiller, from Calcutta*.

B. SILLENIANUM, *Reichb. f. in Gard. Chron.* 1884, ii. 166; pseudobulb subglobose, leaves cuneate ligulate, peduncle longer than the leaf 1-fld., flowers nearly orange, dorsal sepal ligulate obtuse acute, lateral much broader oblong-triangular, petals ligulate falcate obtuse acute, lip long-clawed cordate 5-angled mauve above whitish beneath, tip inflexed acute, column very short broad, top obtusely angled, anther with a linear apical ridge.—Burma (*Hort. Schlim*).

9/1. **KENOSIS**, *Hook. f.*

Habit of *Bulbophyllum*, but flowers very long-pedicelled. *Sepals* adnate to the prolonged foot of the column, falcately oblong, acute. *Petals* oblong, adnate by one margin to the column throughout its length, the other decurrent on the foot of the column nearly to its apex. *Lip* articulate with the foot of the column, linear, villously fringed. *Column* membranous, elongate, forming with the longer petals a 2-winged membrane; anther marginal in the sinus between the wings, shortly stipitate, subhemispheric, 2-celled; pollinia 2, oblong, laterally flattened; clinandrium small, transverse.

H. longipes, *Hook. f. Ic. Plant. ined.*—*Bulbophyllum longipes*, *Reichb. f. in Walp. Ann.* vi. 255.

TENASSERIM; at Moulmein, alt. 4–5000 ft., *Lobb in Herb. Lindl.*

Rhizome as thick as a goose-quill, naked; pseudobulbs $\frac{1}{2}$ –1 in. long, broadly ovoid, smooth. *Leaf* 3–4 in., subsessile, elliptic-lanceolate, subacute, very coriaceous. *Scape* with raceme 9 in., very slender, 10–12-fld.; sheaths 2–3, appressed; bracts $\frac{1}{2}$ in., oblong; pedicel with ovary 1–1 $\frac{1}{2}$ in., filiform; sepals $\frac{1}{2}$ in. long, dorsal erect, subacute; lateral rather longer; foot of column $\frac{1}{2}$ in.—A curious plant; very inaccurately described by Reichenbach, who failed to perceive its remarkable structure.

10. **SUNIPIA**, Lindl.

A tufted epiphyte; rhizome creeping; pseudobulbs narrow, 1-leaved. *Leaf* coriaceous, many-nerved. *Flowers* small in a distichous spike, concealed by the imbricating bracts. *Sepals* very broad, subequal, spreading. *Petals* minute, rounded-ovate. *Lip* small, sessile on the base of the column, erect, broadly tongue-shaped; midlobe thick, oblong, concave, margins recurved. *Column* very short, broad; anther suberect, sessile, persistent, cells distant; pollinia 4, ovoid, free or cohering by a viscus.

S. scariosa, Lindl. in Wall. Cat. 7373; Gen. & Sp. Orchid. 179; Orchid. Seel. 25; Sert. Orchid. Frontisp. No. x.; Fol. Orchid. 1. Ornithidium bracteatum, Wall. mss.

SUBTROPICAL HIMALAYA; Nepal, Wallich; Sikkim, alt. 4-6000 ft., common. KHASIA Mts., alt. 3-4000 ft., Lobb, &c. TENASSERIM; at Moulmein, Parish.

Pseudobulbs 1-1½ in., ovoid. *Leaf* 4-6 by ¾-1 in., subsessile, subacute, or tip rounded. *Scape* 5-10 in., very slender; sheaths distant, tubular, truncate; spike curved, 2-6 in.; bracts ¼-½ in., very broadly ovate, acute, complicate, scariously coriaceous, nerved; flowers rosy, subsessile; ovary very short, obconic; sepals obscurely 3-nerved, and petals obtuse, very thick; disk of lip with an oblong callus.

11. **CIRRHOPETALUM**, Lindl.

Habit and characters of *Bulbophyllum*, but here distinguished by the more often and more regularly whorled flowers, and by the short dorsal sepal, rarely half the length of the almost invariably much longer lateral. *Lip* very small and stipitate in all the species.—Species 30 or more, chiefly Indian and Malayan.

The species of *Bulbophyllum* and *Cirrhopetalum* are in many cases so allied by cross affinities, that the two genera might well be regarded as one. My keeping them apart is due to the consideration of convenience, and the fact that all my attempts to commingle the species of both have resulted in a chaotic aggregate, with most unsatisfactory sectional characters; in fact, a far less natural result than the keeping them apart. The species of this genus are far the most difficult of the two, as regards analysis from dried specimens, on account of the delicacy of the perianth, and the fact that the length, form, colour, and consistence of the lateral sepals alter greatly during development. *C. viridiflorum* and *Blepharistes* have the longer dorsal sepal of *Bulbophyllum*.

A. Flowers solitary (occasionally solitary in imperfectly developed species of other groups).

1. **C. merguense**, Par. & Reichb. f. in Trans. Linn. Soc. xxx. 154 (*Bulbophyllum*); lateral sepals 1½ in., linear-lanceolate acute 5-nerved very much longer than the ovate concave 5-nerved dorsal the tip of which is ciliate with rigid bristles, petals like the dorsal sepal 3-nerved, lip hispid, arms of column rounded.

PEGU; near Rangoon, Berkeley. TENASSERIM, Parish.

Pseudobulbs 1 in., narrow, 5-angled. *Leaf* 1½-2 in., narrowly oblong. *Scape* 2-3 in., filiform, sheaths 2; bracts linear; pedicels ¼ in., slender; flowers yellow and purple; lip purple.

2. **C. lasiochilum**, Par. & Reichb. f. in Trans. Linn. Soc. xxx. 153 (*Bulbophyllum*); lateral sepals 1 in. spreading falcately lanceolate subacute 5-nerved twice as long as the lanceolate coriaceous ciliate dorsal, petals nearly as long as the dorsal sepal thick lanceolate scabrid ciliate obscurely 3-nerved, lip laterally strigose, columnar teeth short hooked.

TENASSERIM; at Mergui, *Griffith, Parish.*

Pseudobulbs 1 in., oblong. *Leaf* 1-2 in., very coriaceous, linear-oblong. *Scape* as long as the pedicel and ovary; bracts lanceolate. *Dorsal sepal* and *petals* dark purple; lateral sepals at the end of the naked foot of the column, connate beyond the stipes of the lip.

B. Flowers capitate.

3. **C. vaginatum**, *Lindl. in Wall. Cat.* 1979; *Gen. & Sp. Orchid.* 59; *Bot. Reg.* 1842, under t. 12, and 1843, under t. 49; scape laxly sheathed, flowers capitately racemose, bracts long lanceolate, sepals ending in capillary tails, dorsal ovate acuminate ciliate 5-nerved many times shorter than the lanceolate 5-nerved lateral, petals oblong, tip rounded ciliate faintly 3-nerved, lip oblong 2-ridged, columnar spurs long slender erect. *C. caudatum*, *Wight Ic.* t. 1658 (not of *Wallich*). *Bulbophyllum vaginatum*, *Reichb. f. in Walp. Ann.* vi. 261.

PENANG, *Curtis.* SINGAPORE, *Wallich, &c.* MALACCA, *Griffith.*—DISTRIB. Borneo.

Pseudobulb $\frac{1}{2}$ -1 in., conic, rhizome very stout. *Leaf* 2-4 in., oblong, emarginate, densely coriaceous. *Scape* 2-3 in.; bracts $\frac{1}{2}$ in., much longer than the slender pedicels; flowers 1 in. or more.—Closely allied to *Bulb. Medusæ*.

C. Flowers umbelled; umbels rarely reduced to 1-2 flowers.

* *Dorsal sepals and petals ciliate fimbriate or appendaged.*

4. **C. grandiflorum**, *Wight Ic.* t. 1656 (excl. left-hand anal.); sepals acuminate, lateral 2 in. linear 5-nerved twice as long as cymbiform ciliate 3-nerved dorsal, petals subulate-lanceolate 3-nerved ciliate, arms of large column erect 2-toothed. *Bulbophyllum Wightii*, *Reichb. f. in Walp. Ann.* vi. 262.

CEYLON; Central Province, alt. 3-6000 ft., *Walker.*

Pseudobulbs conic. *Leaf* 3-5 in., shortly petioled, linear-oblong, obtuse. *Scape* as long, stout; sheaths 2; bracts $\frac{1}{3}$ - $\frac{1}{2}$ in., lanceolate, thick; umbels few-fl.; pedicels $\frac{1}{2}$ in., stout; flowers purple.

5. **C. ornatissimum**, *Reichb. f. in Gard. Chron.* 1882, ii. 424; lateral sepals 2-4 in. linear-lanceolate with filiform tips 6-nerved much longer than the cymbiform acuminate 5-nerved dorsal, petals subulate-lanceolate falcate 3-nerved and dorsal tipped with a brush of slender red paleæ, lip strigose, columnar arms large decurved. *Warner Orchid. Alb.* t. 369.

SIKKIM HIMALAYA (*Ic. in Herb. Calcutt.*). ASSAM, *Griffith.*

Pseudobulbs 1-2 in., 3-4-angled. *Leaf* 4-6 in., linear-oblong, obtuse, petiole short. *Scape* very robust; bracts $\frac{1}{2}$ in.; pedicels $\frac{1}{4}$ in.—In the *Herb. Calcutt.* drawing the flower is 4 in. long, sepals and petals yellow-green with streaks of purple dots.

6. **C. Collettii**, *Hemsley in Journ. Linn. Soc. ined.*; lateral sepals 4-5 in. linear-lanceolate with very long filiform tips, dorsal cymbiform narrowed into a long tail fringed with large lanceolate paleæ, petals very short broad ciliate abruptly narrowed into a linear tip fringed with large cuneate-obovate toothed paleæ, lip glabrous, columnar teeth short.

EASTERN BURMA; Shan Hills, alt. 6000 ft., *Collett.*

Rhizome very stout; *pseudobulbs* very small, young enclosed in coriaceous sheaths. *Leaf* 1-1 $\frac{1}{2}$ in., sessile, ovate to elliptic-oblong, thick. *Scape* 3-6 in., very robust; umbel many-fl.; bracts $\frac{1}{4}$ - $\frac{1}{3}$ in.; pedicel with ovary $\frac{1}{4}$ - $\frac{1}{3}$ in.; dorsal sepal $\frac{3}{4}$ in.,

5-nerved, paleæ sessile or with a capillary stipes, mobil, terminal often largest; petals $\frac{1}{2}$ in., very oblique, nerves 3, distant; paleæ about 12; lip thick, obtuse, recurved, papillose, base sagittate.—A beautiful plant.

7. **C. fimbriatum**, Lindl. in *Bot. Reg.* 1839, *Misc.* 72; lateral sepals 1-1 $\frac{1}{2}$ in. linear acute flat coherent 5-nerved many times longer than the triangular-ovate caudate long-ciliate dorsal, petals triangular caudate long-ciliate 1-nerved, lip tumid, columnar arms long horizontal. *Wight Ic.* t. 1655; *Bot. Mag.* t. 4391; *Dalz. & Gibs. Bomb. Fl.* 261. *Bulbophyllum fimbriatum*, Reichb. f. in *Walp. Ann.* vi. 260. ? C. Wallichii, *Grah. Cat. Bomb. Pl.* 205.

The CONCAN and CANARA; from Bombay southwards, Law, &c.

Pseudobulbs globose, smooth, leafless when flowering. *Umbels* many-fl.; flowers subsessile, green with red cilia.

8. **C. gamosepalum**, Griff. *Notul.* iii. 296; lateral sepals $\frac{2}{3}$ in. linear-oblong or -lanceolate acute flat at first coherent 5-nerved many times longer than the ovate obtuse long-ciliate dorsal, petals longer than the dorsal sepal lanceolate caudate 3-nerved long-ciliate, lip membranous 3-nerved, columnar arms rounded. C. Andersonii, *Kurz in Report Veg. Andaman.* 51. *Bulbophyllum Griffithianum*, Par. & Reichb. f. in *Trans. Linn. Soc.* xxx. 153.

TENASSERIM, Griffith, Parish. PERAK, Scortechini. MALACCA, Maingay (*Kew Distrib.* 1622-3). ANDAMAN ISLANDS, Kurz.—DISTRIB. ? Borneo.

Pseudobulbs 1-1 $\frac{1}{2}$ in. *Leaf* 2-5 in., linear-oblong or oblanceolate, obtuse, trabeculate with cross nervules when dry, subpetioled. *Scape* 4 in., slender; umbels many-fl.; bracts setaceous; pedicels $\frac{1}{2}$ in.; dorsal sepal and petals bright red, lateral speckled with purple at length widely divergent.

9. **C. Roxburghii**, Lindl. *Gen. & Sp. Orchid.* 58; in *Bot. Reg.* 1843, under t. 49; lateral sepals $\frac{2}{3}$ in. linear subfalcate obtuse 3-4 times longer than the broadly ovate aristate ciliate dorsal, petals 3-nerved equalling and similar to the dorsal, lip smooth, column unarmed. *Hook. f. Ic. Plant. ined.* *Bulbophyllum Roxburghii*, Reichb. f. in *Walp. Ann.* vi. 263. *Aerides radiatum*, Roxb. *Fl. Ind.* iii. 476.

GANGETIC DELTA, Carey (Roxburgh).

Pseudobulbs small, subglobose. *Leaf* 3-4 in., linear-oblong. *Scape* longer than the leaf; umbel many-fl.; dorsal sepal and petals yellow striped with red; lateral yellow; lip red-purple.—I have seen no specimens, but an excellent drawing of Roxburgh's artist.

** *Dorsal sepal glabrous or nearly so. Petals erose ciliate or fimbriate.*

10. **C. cornutum**, Lindl. in *Bot. Reg.* 1838, *Misc.* 75; 1843, under t. 49; lateral sepals 1 $\frac{1}{2}$ in. linear-lanceolate obtuse convex coherent 5-nerved many times longer than the small cymbiform dorsal, petals ovate acute ciliate 3-nerved, lip smooth, columnar arms acute. *Bot. Mag.* t. 4753. *Bulbophyllum cornutum*, Reichb. f. in *Walp. Ann.* vi. 261.

SIKKIM HIMALAYA (*Ic. Cathcart*). KHASIA HILLS, alt. 5-6000 ft., Simons, &c.

Pseudobulbs 1-5 in., ovoid or columnar, terete. *Leaf* 6-10 in., linear-oblong, obtuse; petiole long. *Scape* long, slender; umbels many-fl.; lateral sepals red-brown, dorsal and petals green blotched with purplish brown.

11. **C. picturatum**, G. Loddiges in *Bot. Reg.* 1840, *Misc.* 49; lateral sepals 1-2 $\frac{1}{2}$ in. linear-lanceolate acuminate convex coherent 5-nerved 3-5 times longer than the cymbiform abruptly aristate dorsal, petals caudate-

acuminate erose 3-nerved, column large, arms subulate. *Lindl. in Bot. Reg.* 1843, under t. 49; *Bot. Mag.* t. 6802. *Bulbophyllum picturatum*, *Reichb. f. in Walp. Ann.* vi. 262.

TENASSERIM; at Moulmein, *Parish.*

Pseudobulbs 2-7 in., ovoid, smooth, angled. *Leaf* 3-5 in., linear-oblong, tip rounded. *Scape* 5 in., slender; bracts $\frac{1}{2}$ in., slender; pedicels as long; flowers purple, stained with dark red; lip hastate with incurved uncinuate basal lobes.

12. **C. simillimum**, *Reichb. f. Ot. Hamburg.* 49; lateral sepals $\frac{3}{4}$ -1 in. linear-lanceolate acuminate 5-nerved three times as long as the ovate-lanceolate acute 5-nerved dorsal, petals nearly as large as the dorsal sepal ovate acute 3-nerved serrulate, lip scabrid, column unarmed.

TENASSERIM; at Moulmein, *Parish.*

Pseudobulbs 1 in. *Leaf* 4 in., linear-oblong, obtuse. *Scape* slender, 4-5 in.; umbels few-fl.; bracts $\frac{1}{2}$ in., subulate; flowers spotted with purple.—My specimen is very indifferent; the absence of the awn on the dorsal sepal at once distinguishes it from the preceding, and the 3-nerved serrulate petals from *elatum*.

13. **C. cæspitosum**, *Wall. in Bot. Reg.* 1838, *Misc.* 35; lateral sepals $\frac{3}{4}$ in. linear-lanceolate obtuse 5-nerved three times as long as the cymbiform subacute 5-nerved dorsal, petals broadly ovate-oblong subacute erose 3-nerved, columnar teeth minute. *Lindl. in Bot. Reg.* 1843, under t. 49. *Bulbophyllum scabratum*, *Reichb. f. in Walp. Ann.* vi. 259.

KHASIA HILLS, *Gibson, Griffith.*

Pseudobulbs ovoid. *Leaves* 4-6 in., linear- or oblong-lanceolate. *Scape* loosely sheathed; umbel few-fl.; flowers cellular or papillose, pale ochreous yellow, nerves of sepals and petals flexuous.

*** *Dorsal sepal and petals glabrous, quite entire.*

† *Lateral sepals more than $\frac{1}{2}$ in. long.* (A very vague character; see note under generic description.)

14. **C. bootanense**, *Griff. Notul.* iii. 297; *Ic. Pl. Asiatic.* t. 299; flowers dorsally compressed coriaceous, lateral sepals dimidiate-oblong obtuse cohering in a subpanduriform blade three times as long as the suborbicular apiculate dorsal, petals oblong obtuse 3-nerved, lip shortly stipitate, columnar teeth slender erect. *Bulbophyllum bootanense*, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 153, t. 32, f. 2.

BHOTAN HIMALAYA, *Griffith.* TENASSERIM, *Parish.*

Pseudobulbs $1\frac{1}{2}$ -2 in., narrow. *Leaf* 2-3 in., linear-oblong or lanceolate, notched. *Scape* stout, shorter than the leaves; umbels few-fl.; bracts large; pedicels stout; flowers rose-red sprinkled with purple.—In Griffith's drawing the flowers are umbelled, in Parish's sketch there are but two flowers, their pedicels springing from the base of the pseudobulb. This species resembles no other, and is closely related to *Bulboph. cylindraceum* and *repens*, but its flowers are normally umbelled, and the dorsal sepal is shorter.

15 **C. elatum**, *Hook. f. Ic. Plant. ined.*; lateral sepals 1- $1\frac{1}{4}$ in. linear-lanceolate subacute 5-nerved convex 3-4 times as long as the broadly ovate obtuse 5-nerved dorsal, petals broadly ovate apiculate 1-nerved, lip convex, columnar teeth very short.

SIKKIM HIMALAYA, alt. 5000 ft., *Gamble, Clarke.*

Pseudobulbs 2-4 in., ovoid or columnar. *Leaf* 8-10 in., linear-oblong, obtuse; petiole stout. *Scape* 10 in., stout, speckled with purple; sheaths 3, loose; umbels

many-fld.; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in.; pedicels as long; flowers dirty yellow, speckled with purple.—Size and habit of *C. picturatum*, but the dorsal sepal has no awn, the petals are not erose, and the column has very short teeth.

16. **C. maculosum**, Lindl. in *Bot. Reg.* 1841, *Misc.* 81; 1843, under t. 49; scape much shorter than the leaf, lateral sepals $\frac{1}{2}$ – $\frac{3}{4}$ in. falcately ovate-lanceolate from a broad base acute 7-nerved twice as long as the broadly ovate acute dorsal, petals small ovate acute 3-nerved, lip short broad stipitate, columnar teeth short. *Bulbophyllum umbellatum*, Lindl. in *Wall. Cat.* 1984; *Gen. & Sp. Orchid.* 56 (not of *Bot. Reg.* 1845, t. 44). *Bulbophyllopsis maculosa*, Reichb. f. in *Walp. Ann.* vi. 243. *B. Morphologorum*, Reichb. f. in *Bot. Zeit.* 1852, 933.

WESTERN HIMALAYA; Nepal, Wallich; Garwhal and Kumaon, alt. 3–4000 ft., Falconer, Strachey & Winterbottom, &c.

Rhizome slender. *Leaf* 5–6 in., linear, notched. *Scape* 2–3 in., stout; umbels 2–5-fld.; flowers subracemose, pale yellow-green, unspotted; bracts ovate-lanceolate.—Quite intermediate in flower between this genus and *Bulbophyllum*, but habit of this.

Var. fuscescens, flowers dull pale pink yellowish or brownish.—Nepal, Sikkim.

17. **C. guttulatum**, Hook. f.; scape equalling or exceeding the leaf, lateral sepals $\frac{1}{2}$ – $\frac{3}{4}$ in. ovate-lanceolate from a broad base 7-nerved hardly twice as long as the broadly ovate obtuse 5-nerved dorsal, petals ovate obtuse 3-nerved, lip short nearly as broad as long, columnar spurs long slender. *Bulbophyllum umbellatum*, Lindl. in *Bot. Reg.* 1844, t. 44 (not elsewhere). *B. guttulatum*, Wall. mss.

SUBTROPICAL HIMALAYA; Nepal, Wallich; Sikkim, alt. 3–6000 ft.

Pseudobulbs 1–2 in., ovoid. *Scape* 6–10 in., sprinkled with purple; umbel few-fld.; sepals spreading, yellow or greenish, speckled with purple; lip pale purple.—The longer scape and long spurs of the column at once distinguish this from *C. maculosum*.

18. **C. retusiusculum**, Reichb. f. in *Gard. Chron.* 1869, 1182; lateral sepals 1 in. linear subacute coherent 3-nerved many times longer than the broadly oblong retuse 3-nerved dorsal, petals broadly oblong as long as the dorsal 3-nerved, tip rounded, lip lanceolate recurved, columnar spurs short erect.

TENASSEEIM; on Moolee, alt. 5–6000 ft., Benson, Parish.

Pseudobulbs $\frac{1}{2}$ –1 in., obpyriform, striate. *Leaf* 2–3 in., subspathulate, obtuse. *Scape* 3–4 in., slender; sheaths 2; umbels many-fld.; bracts $\frac{1}{4}$ in., slender; pedicel with ovary $\frac{1}{2}$ in., slender.—The specimens are poor, and colours unknown.

19. **C. Wallichii**, Lindl. in *Wall. Pl. As. Rar.* i. 53, t. 67; *Gen. & Sp. Orchid.* 59 (not of *Bot. Reg.*); lateral sepals 1–1 $\frac{1}{4}$ in. linear-lanceolate acuminate falcately incurved 5-nerved 3–4 times as long as the oblong obtuse 3-nerved dorsal, petals as long as the dorsal oblong, tip rounded or retuse 3-nerved, lip subacute, columnar teeth very short. ? *Bulbophyllum muscicola*, Reichb. f. in *Flora* 1872, 275.

TEMPERATE HIMALAYA; Nepal, Wallich; Sikkim, alt. 5–7000 ft., Griffith's Collectors, &c.

Pseudobulbs $\frac{3}{4}$ –1 in., subglobose or ovoid, or elongate. *Leaf* 2–4 in., elliptic-oblong, acute or obtuse. *Scape* slender, equalling or exceeding the leaves; umbels few-fld.; bracts subulate, $\frac{1}{4}$ – $\frac{1}{2}$ in., shorter than the pedicels; flowers red-brown.—On Jillapahar (Sikkim), alt. 7500 ft., I found and drew a species closely resembling this, but with a linear leaf 5 in. long, a small quadrate dark red ribbed dorsal sepal

and yellowish lateral sepals with red nerves. Reichenbach's *B. muscicola* (from the Eastern Himalaya, alt. 9000 ft.) is, I suspect, the same; the leaf is described as oblong ligulate, the lateral sepals coherent to the tip, the dorsal sepal and petals ovate obtusely retuse, the lip complicate sagittate, and the column as 3-toothed. It is said to be near *retusiusculum*.

20. **C. Andersoni**, *Hook. f. Ic. Plant. ined.*; lateral sepals $\frac{3}{4}$ in. dimidiate-obovate from a narrow base obtuse apiculate coherent nearly throughout five times longer than the orbicular dorsal, petals ovate acuminate.

SIKKIM HIMALAYA; near Darjeeling, alt. 7000 ft., *T. Anderson (Ic. in Herb. Calcutt.)*.

Pseudobulbs 1-1½ in., narrow. *Leaf* 4-6 in., petioled, narrowly linear-oblong, acute. *Scape* 4-5 in., slender; umbels about 6-fld.; flowers shortly pedicelled, $\frac{1}{2}$ in. across the coherent sepals, white sprinkled with red-purple.—A beautiful plant, described from a drawing in *Herb. Calcutt.*

21. **C. brevipes**, *Hook. f. Ic. Plant. ined.*; scape very short sheathed, lateral sepals 1 in. falcately lanceolate acute free, three times as long as the broadly obovate obtuse dorsal, petals broadly ovate, tip rounded.

SIKKIM HIMALAYA, between Yoksun and Jongri, alt. 8000 ft., *T. Anderson*.

Rhizome long, slender, suberect, probably scandent, bearing very distant erect narrow pseudobulbs 1-1½ in. long. *Leaf* 2 in., linear-oblong, apiculate. *Scape* $\frac{1}{2}$ -1 in.; sheaths lanceolate; umbels 3-4-fld., flowers rose-pink.—Described from a drawing in *Herb. Calcutt.* The erect habit is singular.

22. **C. aureum**, *Hook. f. Ic. Plant. ined.*; small, lateral sepals $\frac{3}{4}$ in. linear-oblong acute incurved three times as long as the orbicular ovate obtuse dorsal, petals oblong, tip rounded, column with spreading obtuse arms.

MALABAR; in the Wynaad, *Jerdon (Ic. in Herb. Kew)*.

Pseudobulbs ovoid, distant on a slender rhizome. *Leaf* 1½ in., linear-oblong. *Scape* slender, shorter than the leaf; umbel 2-fld.; flowers golden yellow; lateral sepals at first cohering.—Described from *Jerdon's* drawing. I find nothing like this beautiful little plant in any collection.

23. **C. Wightii**, *Thwaites Enum.* 299 (*in part*); lateral sepals $\frac{3}{4}$ in. linear-oblong subacute convex 5-nerved three times as long as the broadly ovate obtuse 5-nerved dorsal, petals ovate acute erose 3-nerved, columnar teeth short. *C. Macraei*, *Wight Ic. t.* 1652 (*not of Lindl.*). *Bulbophyllum Ellii*, *Reichb. f. in Walp. Ann.* vi. 263; *Trimen in Journ. Bot.* 1874, 199 *in part*.

CEYLON; Newera Elia, *Walker*; Central Province, alt. 4-7000 ft., *Thwaites*.

Rhizome stout; pseudobulbs ovoid. *Leaf* 1½-2½ in., very coriaceous, elliptic or linear-oblong; petiole short. *Scape* rather stout, shorter or longer than the leaf, green speckled with red; umbels 6-8-fld.; flowers ochreous-green; sepals with a marginal line of red specks.—There are (as *Thwaites* suggests) several species included under *Thwaites' numbers* 632, 2740, 3160, and these numbers do not apply to the same species in all herbaria, nor are they represented by sufficiently good specimens in any. I therefore hesitate to quote their numbers.

24. **C. Thwaitesii**, *Reichb. f. in Walp. Ann.* vi. 263, and in *Trimen Journ. Bot.* 1874, 198 (*Bulbophyllum*); lateral sepals $\frac{1}{2}$ in. lanceolate obtuse widely spreading 5-nerved twice as long as the ovate obtuse or acute dorsal, petals ovate acute, columnar teeth very short.

CEYLON; Newera Elia, alt. 4-7000 ft., *Thwaites*.

There are two drawings of this in *Herb. Peradenzia*, both ticketed by *Thwaites*

C. Wightii, var., C.P. 2740; in one the leaves are short broadly elliptic, the scape stout and pedicels and ovaries with red granulations, the dorsal sepal elliptic obtuse, and the petals oblong rounded; in the other the leaves are linear, the scape slender, the dorsal sepal lanceolate acuminate, and the petals ovate obtuse or acute. The flowers of both are pale straw-coloured.

25. *C. nilgherrense*, *Wight Ic. t.* 1654; lateral sepals $\frac{3}{4}$ –1 in. linear-lanceolate acuminate 5-nerved coherent thrice as long as the ovate acute 5-nerved dorsal, petals broadly oblong thickly 3-nerved, tip rounded, columnar spurs short erect. Bulbophyllum kaitiense, *Reichb. f. in Walp. Ann. vi.* 262.

NILGHIRI HILLS; at Conoor and below Kaitia, alt. 6000 ft., *Wight, Gamble*.

Pseudobulbs $\frac{3}{4}$ –1 in., ovoid. *Leaf* 3–4 $\frac{1}{2}$ in., linear-oblong, obtuse. *Scape* 3–4 in.; sheaths small; umbels many-fld.; bracts and pedicels $\frac{1}{2}$ in.; flowers papillose; sepals, pedicels and bracts yellowish mottled with red; petals with broad red nerves.—I do not find the pubescence on the lip beneath and face of the column described by Wight. Except in the much greater size in Wight's figure this hardly differs from *C. acutiflorum*.

26. *C. Gamblei*, *Hook. f. Ic. Plant. ined.*; lateral sepals $\frac{1}{2}$ in. linear-oblong subacute 5-nerved puberulous towards the base three times as long as the broadly ovate 3-nerved dorsal, petals broadly oblong 3-nerved, tip rounded, lip with rounded basal angles, columnar teeth minute.

NILGHIRI HILLS; at Conoor, alt. 6000 ft., *Gamble*. BABABOODAN HILLS, *Law*.

Pseudobulbs $\frac{1}{2}$ in., ovoid. *Leaf* 1–2 in., linear-oblong or -lanceolate. *Scape* 1–2 in., very slender; sheaths 1–2, loose; bracts and pedicels $\frac{1}{2}$ in.; flowers yellow, streaked and dotted with red.

27. *C. Thomsoni*, *Hook. f.*; lateral sepals $\frac{1}{2}$ in. falcately lanceolate acute 5-nerved three times as long as the ovate subacute 5-nerved dorsal, petals broadly oblong 3-nerved, tip rounded, column truncate.

NILGHIRI HILLS, *Wight, G. Thomson*; at Neddivuttum, alt. 7000 ft., *Clarke*.

Pseudobulbs $\frac{1}{4}$ – $\frac{1}{2}$ in., ovoid. *Leaf* 1–3 in., linear-oblong, petioled. *Scape* very slender; sheaths 2–3, small, and bracts $\frac{1}{2}$ in., ovate-lanceolate, membranous; dorsal sepal and petals purple; lateral yellow, purple at the base.—Near *C. nilgherrense*, but much smaller, leaves shorter, umbels fewer-fld., lateral sepals narrower, and colour very different.

†† *Lateral sepals about* $\frac{1}{2}$ in. long or less.

28. *C. Pumilio*, *Par. & Reichb. f. in Trans. Linn. Soc. xxx.* 153 (Bulbophyllum); bracts minute, lateral sepals $\frac{1}{2}$ in. linear-lanceolate acuminate 3-nerved three times as long as the ovate acuminate 3-nerved dorsal, petals orbicular-oblong broader than the dorsal 3-nerved, lip ovate-lanceolate spongy, columnar spurs short erect.

TENASSERIM; on trees, *Zuggick, Parish*.

Rhizome slender; pseudobulbs small, conico-globose. *Leaf* 1–1 $\frac{1}{2}$ in., linear-oblong. *Scape* 2 in., slender; bracts $\frac{1}{2}$ in.; pedicels as long, capillary; lateral sepals yellow, and dorsal and petals streaked with purple.

29. *C. parvulum*, *Hook. f. Ic. Plant. ined.*; bracts longer than the pedicel and ovary, lateral sepals $\frac{1}{2}$ in. elongate-lanceolate acuminate 3-nerved thrice as long as the elliptic obtuse 3-nerved dorsal, petals elliptic-oblong 3-nerved, tip rounded, lip subacute, columnar teeth short slender.

SIKKIM HIMALAYA; at Darjeeling (*Griffith's Collectors*).

Rhizome slender, flexuous; pseudobulbs $\frac{1}{4}$ – $\frac{1}{2}$ in., ovoid or narrower. *Leaf* 1 in., elliptic or linear-oblong obtuse; petiole short. *Scape* 2 in., naked; flowers 2–3, scarcely umbelled; bracts $\frac{1}{4}$ – $\frac{1}{2}$ in.

30. **C. acutiflorum**, *A. Rich. in Ann. Sc. Nat. Ser. 2*, xv. 18, t. 7 (Bolbophyllum); lateral sepals $\frac{1}{2}$ in. linear-lanceolate acuminate 7-nerved twice or thrice as long as the falcately ovate-lanceolate long-acuminate 5-nerved dorsal, petals broadly oblong 3-nerved, tip rounded, lip with uncinately recurved basal lobes, columnar teeth minute. *Reichb. f. in Walp. Ann.* vi. 263.

NILGHIRI HILLS; at Ootacamund, *Perrottet*; Conoor, *Wight*.

Pseudobulbs $\frac{3}{4}$ –1 in., globose ovoid. *Leaf* $1\frac{1}{2}$ –2 in., oblong. *Scape* slender, about equalling the leaves; sheaths 2–3; umbels 6–8-flid.; bracts $\frac{1}{4}$ in., lanceolate; pedicels longer, slender; flowers greenish white or creamy.—Specimens very indifferent. Very near *Bolboph. albidum*.

D. Flowers racemose (or very shortly subumbellate in *C. Macraei*). See also *C. parvulum*, and others in Sect. C.

31. **C. refractum**, *Zollinger in Flora* 1847, 457; lateral sepals 1–2 $\frac{1}{2}$ in. strap-shaped acuminate cohering to the tips, many times longer than the lanceolate awned ciliate dorsal, petals lanceolate ciliate and pubescent, columnar spurs long slender decurved. *Walp. Ann.* i. 776. *C. Wallichii*, *Lindl. in Wall. Cat.* 1980; in *Bot. Reg.* 1839, *Misc.* 71; 1843, under t. 49 (not of *Wall. Pl. As. Rar.*). *C. tripudians*, *Par. & Reichb. f. in Gard. Chron.* 1876, 817. *Bolbophyllum tripudians*, *ejusd. in Trans. Linn. Soc.* xxx. 154. *B. refractum*, *Reichb. f. in Walp. Ann.* vi. 259.

SUBTROPICAL HIMALAYA, from Kumaon, alt. 3700 ft., *Strachey & Winterbottom*, to Sikkim, alt. 4–5000 ft., *J. D. H.*, &c. TENASSERIM, *Parish*.—DISTRIB. Java.

Pseudobulbs short, conical, crowded. *Leaves* 2 on young pseudobulbs, 4–5 in., lanceolate, acute. *Scape* stout, 4–6 in.; raceme few- or many-flid., nodding; bracts large, ovate or lanceolate; pedicels very short; dorsal sepal 3-nerved, orange; lateral 3–5-nerved, golden yellow; petals 3-nerved and lip speckled with red; lip subcylindric, hispid or glabrate.

32. **C. viridiflorum**, *Hook. f. Ic. Plant. ined.*; lateral sepals $\frac{3}{4}$ in. ovate-lanceolate acute cohering to the tips twice as long as the ovate acute dorsal, petals suborbicular, columnar arms erect hatchet-shaped apiculate.

SIKKIM HIMALAYA, alt. 6–7000 ft., *Treutler*, &c. KHASIA HILLS; at Shillong, alt. 5500 ft., *Clarke*.

Pseudobulbs 1 in., subovoid. *Leaves* 2, 4–6 in., elliptic-lanceolate, subacute. *Scape* as long; raceme 2–4 in., nodding; bracts ovate-lanceolate, membranous; flowers subsessile; sepals 5–7-nerved, green; petals 1-nerved and short lip purple.—Closely allied to *C. refractum*, though the dorsal sepal is long enough for a *Bolbophyllum*.

33. **C. Blepharistes**, *Reichb. f. in Trans. Linn. Soc.* xxx. (Bolbophyllum); lateral sepals 1 in. linear-lanceolate acuminate coherent three times as long as the lanceolate acuminate dorsal, petals broadly oblong or obovate fimbriate, columnar arms minute.

KHASIA HILLS, *Badgeley (Ic. in Herb. Calcutt.)*. TENASSERIM, *Parish*.

Pseudobulbs $1\frac{1}{2}$ –3 in., on a very stout rhizome, oblong. *Leaves* 2–3 in., oblong, very thick. *Scape* 6–12 in.; raceme short, erect, dense-flid.; rachis stout; bracts minute, acute, persistent; pedicels $\frac{3}{4}$ in., slender; lateral sepals 7-nerved, pale

yellow-green with faint red nerves, bases rounded together forming a cordate-lanceolate blade; petals 5-nerved, yellow tipped with red.—Dorsal sepal of a *Bulbophyllum*, but whole habit of *Cirrhopetalum*. The colours are taken from the drawing with obovate petals.

34. **C. Macraei**, Lindl. *Gen. & Sp. Orchid.* 59; in *Bot. Reg.* 1841, *Misc.* 52; lateral sepals 2 in. narrowly linear-lanceolate with long filiform tips coherent three times as long as the lanceolate acuminate dorsal, petals falcately ovate-lanceolate, columnar arms long broad horizontal crenate on one side. *Bot. Mag.* t. 4422. *C. Walkerianum*, *Wight Ic.* t. 1657. *Bulbophyllum Walkerianum*, *Reichb. f. in Walp. Ann.* vi. 263.

CEYLON; in the Hantani and Hewahette districts, alt. 3–4000 ft.

Pseudobulbs small, ovoid. *Leaves* 3–5 in., petioled, oblong, subacute. *Scape* 6 in., very slender; flowers between umbelled and racemose; bracts long, ovate-lanceolate; pedicels very short; sepals pale yellow and scarlet, lateral 5- dorsal 3-nerved; petals 3-nerved, scarlet.

SPECIES UNKNOWN TO ME.

B. (*Cirrhopetalum*) **MANNII**, *Reichb. f. in Flora* 1872, 275; leaf petioled cuneate-oblong obtusely acute dilated above, peduncle deflexed, umbel few-fl., mentum angled, sepals golden with many brown specks, dorsal lanceolate aristate, lateral contiguous caudately narrowed from a broad base, petals ligulate decurved awned from the middle, lip thick curved somewhat margined 2-edged with a small callus at the base of the claw, column dilated at the base, arms curved retuse, base above 1-toothed, lip 2-toothed, lower tooth obtuse.—Assam, *Mann*.—Probably near *C. cornutum*.

C. **TENOPHYLLUM**, *Par. & Reichb. f. in Trimen Journ. Bot.* 1874, 198 (*Bulbophyllum*); pseudobulb conic, top narrowed, when dry furrowed lengthwise and across, leaf cuneate ligulate obtuse acute longer than the peduncle, flowers yellow with purple dots, bracts broadly triangular 1-nerved not equalling the pedicelled ovary, dorsal sepal short triangular 1-nerved, lateral 3–4 times longer coherent, bases free acute 3-nerved, petals ligulate acute 3-nerved, lip 2-edged $\frac{1}{2}$ -lunate, column bisetose.—Tenasserim, *Parish*.

12. **TRIAS**, Lindl.

Small epiphytes with the habit and foliage of *Bulbophyllum*. *Scape* lateral, 1-fl. *Sepals* subequal, spreading, 7-nerved, lateral adnate to the foot of the column. *Petals* small, oblong or linear. *Lip* small, coriaceous or fleshy, jointed on to the foot of the column, inflexed, incumbent, mobile. *Column* short, broad, tip angled, winged or toothed; anther erect, caducous, 2-celled, produced into a long horn; pollinia subcoherent in pairs in each cell.—Species 3, all Indian.

1. **T. oblonga**, Lindl. in *Wall. Cat.* 1977; *Gen. & Sp. Orchid.* 60; leaves elliptic or oblong obtuse, sepals subacute, petals ovate, lip trulliform subacute with erect auricles, horn of anther notched at the tip. *Wall. Pl. As. Rar.* i. 55, t. 70. *Bolb. oblongum*, *Reichb. f. in Walp. Ann.* vi. 249. *Dendrobium tripterum*, *Wall. mss.*

TENASSERIM; at Moulmein, *Wallich, Griffith, Parish*.

Pseudobulbs $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. *Leaves* 1–1 $\frac{1}{2}$ in. long. *Scape* very slender, $\frac{1}{2}$ –1 in. *Flower* 1 in. diam.; lip grooved in the middle.—Lindley describes the flowers as brownish green, and lip as purple. *Parish* has flowers yellow.

2. **T. picta**, *Benth. in Gen. Plant.* iii. 505; leaves ovate or elliptic-lanceolate contracted at the tip or at both ends, sepals subacute, petals obovate deflexed, lip oblong granulate, tip rounded, horn of anther entire.

Bolbophyllum pictum, *Parish & Reichb. f. in Trans. Linn. Soc.* xxx. 150.
? *B. moulmeinense*, *Reichb. f. in Walp. Ann.* vi. 249.

TENASSERIM; at Moulmein, *Parish*.

Pseudobulbs $\frac{3}{4}$ in. diam. *Leaves* 2-2 $\frac{1}{2}$ in. *Flowers* $\frac{3}{4}$ in. diam.; sepals greenish white with purple spots; lip not grooved, surface convex.

3. **T. Stocksii**, *Benth. mss.*; leaves elliptic acute, sepals obtuse, petals ovate-lanceolate erect, lip oblong, shoulders convex, tip rounded, horn of anthers slender, tip entire.

The DECCAN PENINSULA; Canara, *Stocks*; N. & S. Concan, *Law*.

Pseudobulbs $\frac{3}{4}$ in. *Leaves* 1 in. *Scape* $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; lip convex, smooth.

4. **T. ovata**, *Lindl. Gen. & Sp. Orchid.* 60; leaves ovate, petals white striped with purple, lip green.

EAST INDIES, *Wallich*.

Described by Lindley as above, from a drawing, with the remark that it may be a variety of *T. oblonga*.

13. **DRYMODA**, *Lindl.*

A very small epiphyte; pseudobulbs disciform, 1-leaved. *Scape* basal, filiform, 1-fl.; sheaths 1-2 near its base, minute. *Sepals* spreading; dorsal small, broadly ovate; lateral at the end of the naked foot of the column, oblong-lanceolate. *Petals* minute, orbicular. *Lip* very small, stipitate on the foot of the column, base saccate, lobes short rounded. *Column* very short, with 2 linear-oblong decurved wings and a long naked foot; pollinia 4, globose, sessile on a large gland.

D. picta, *Lindl. Sert. Orchid.* t. 8 C; *Bot. Mag.* t. 5904; *Walp. Ann.* vi. 467.

BURMA, *Griffith*. TENASSERIM; on mountains, alt. 5000 ft., *Parish*.

Pseudobulbs $\frac{1}{2}$ in. diam., appressed to the bark. *Leaf* $\frac{1}{2}$ in., sessile, ovate, acute, fugacious. *Scape* 1 $\frac{1}{2}$ -2 in.; flower $\frac{1}{2}$ in. long; lateral sepals yellow-green with purple stripes; lip dark red-purple; column and its foot and wings green, purple-spotted.

14. **MONOMERIA**, *Lindl.*

Pseudobulbs 1-leaved, on a stout long rhizome. *Leaf* long, flat, thick, petioled. *Scape* from the rhizome long; flowers loosely racemed. *Dorsal sepal* broad, erect, complicate, acuminate; lateral much longer at the end of the naked foot of the column. *Petals* minute, broad, fimbriate. *Lip* small, jointed on the foot of the column, subcordate, margin revolute; side lobes small, horn-like, apex terete obtuse, disk broadly lamellate. *Column* very short, broad, 3-toothed; anther 1-celled; pollinia 4, cohering by a globose gland.

M. barbata, *Lindl. in Wall. Cat.* 1798; *Gen. & Sp. Orchid.* 61; *Sert. Orchid. Frontisp.* M. Crabro, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 143, t. 28. *Epicranthes barbata*, *Reichb. f. in Walp. Ann.* vi. 265.

NEPAL, *Wallich*. TENASSERIM, at Moulmein, *Parish*.

Pseudobulbs 2-3 in., ovoid, smooth. *Leaf* 8-10 in., thickly coriaceous, tip

obliquely obtusely 2-fid, narrowed into the 4-6 in. petiole. *Scape* 12-18 in., flexuous; sheaths short, distant; raceme long; bracts $\frac{1}{2}$ in.; flowers white speckled with purple, about 1 in. long; lip orange-brown.—I find no character whereby to distinguish *M. Crabro*; the analysis of the lip in the plate does not conform to mine. Possibly the Nepal habitat is an error.

15. **DENDROCHILUM**, Blume.

Epiphytes; rhizome creeping, scaly; pseudobulbs narrow, 1-leaved. *Leaf* flat, narrow, coriaceous. *Scape* lateral, slender; flowers small, in slender spikes or racemes. *Sepals* subequal, spreading; lateral adnate to the foot of the column. *Petals* smaller. *Lip* jointed on the foot of the column, subsessile, erecto-patent, oblong, base umbonate. *Column* short, with lateral or terminal teeth or arms; anther 2-celled; pollinia 4, ovoid, bases cohering by a slight viscus.—Species 3-4, Indian and Malayan.

1. **D. pallidiflorum**, Blume *Bijd.* 398, t. 52; leaf elliptic-oblong, sepals linear obtuse 1-nerved, lip oblong obtuse, base with 2 bosses, arms of column from above the middle. *Lindl. Gen. & Sp. Orchid.* 34.

TENASSERIM, *Parish*. PERAK, ascending to 4000 ft., *Scortechini*, *King's Collector*.—DISTRIB. Java.

Rhizome 2-4 ft., rigid. *Pseudobulbs* $\frac{3}{4}$ in., ovoid. *Leaf* 3-5 in., shortly petioled. *Scape* slender, bracteate below the 3-4 in. raceme; bracts shorter than the ovary, ovate, acute; flowers $\frac{1}{2}$ - $\frac{1}{2}$ in. diam.; sepals thickened beyond the middle.—Perak specimens have smaller flowers than the Tenasserim. I have seen no authentic Javan ones.

2. **D. linearifolium**, Hook. f. *Ic. Plant. ined.*; leaf narrowly linear obtuse, sepals acuminate 3-nerved, lip oblong or obovate-oblong obtuse, base 3-ridged, arms of column basal elongate.

PERAK, *Scortechini*; on Batang Padong, alt. 4900 ft., *Wray*.

Pseudobulbs $\frac{1}{2}$ in., curved. *Leaf* 1 $\frac{1}{2}$ -2 in., petioled. *Scape* 1-2 in., raceme as long, lax-fid.; bracts lanceolate, equalling the ovary; flowers $\frac{1}{2}$ in. diam., greenish; sepals and subequal petals lanceolate.

3. **D. bracteosum**, Reichb. f. in *Walp. Ann.* vi. 24; leaf elliptic-lanceolate or oblanceolate acute, sepals lanceolate acuminate 3-nerved, lip subpanduriform, base 3-ridged and with 2 recurved teeth, terminal lobe orbicular apiculate, arms of column subterminal erect acute.—*Liparis bracteosa*, *Wall. Cat.* 7406.

MALAY PENINSULA, *Finlayson*.

Rhizome short, stout, crinite; pseudobulbs 3 in., slender. *Leaf* 6 in.; petiole short. *Scape* 3-8 in., slender, curved; spike 3-7 in.; bracts obovate-oblong, equalling the ovary, truncate, scarious; flowers $\frac{1}{2}$ in. diam.; petals linear-lanceolate.

16. **PANISEA**, Lindl.

Small tufted epiphytes; pseudobulbs crowded, 2-leaved. *Leaves* plaited. *Scape* lateral; flowers few, racemed; bracts membranous. *Sepals* and *petals* subequal, narrow, erect; lateral sepals saccate at the base. *Lip* as long as the sepals, adnate to the base of the column; claw sigmoid. *Column* slender, erect, 2-winged above; anther 2-celled; pollinia 4, ovoid, free or subcoherent by a viscus.

Very near *Calogyne* (to which Bentham has referred Lindley's other species), differing chiefly in the clawed lip.

1. **P. parviflora**, *Lindl. Fol. Orchid.* 1; lip narrowly lanceolate. *P. reflexa*, *Lindl. l. c.* *Cœlogyne parviflora*, *Lindl. Gen. & Sp. Orchid.* 44. *Dendrobium demissum*, *Don Prodr.* 34.—*Androgyne*, *Griff. Notul.* iii. 279.

SUBTROPICAL HIMALAYA; Nepal, *Wallich*; Sikkin, alt. 4–10,000 ft., *Clarke*. KHASIA MTS., *Griffith*, &c.

Pseudobulbs $\frac{1}{2}$ –1 in., narrow. *Leaves* 2–3 in., petioled, elliptic-lanceolate, acute. *Scape* filiform; bracts $\frac{1}{2}$ in., oblong, acute; raceme 3–5-fl.; flowers $\frac{3}{4}$ in. long, white; lateral sepals membranous, lanceolate, acute, 5-nerved; dorsal linear-oblong; petals ovate-lanceolate, 3-nerved, base gibbous; lip 3-nerved, subacute, tip of slender claw 2-tubercled; column pale brown, tip entire or toothed. *Capsule* $\frac{1}{2}$ in. long, turbidly obovoid.

2. **P. apiculata**, *Lindl. Fol. Orchid.* 2; lip broadly oblong apiculate. *Cœlogyne apiculata*, *Par. & Reichb. f. in Gard. Chron.* 1865, 1035.

TENASSERIM; at Moulmein, *Lobb, Parish*.

Pseudobulbs $\frac{1}{2}$ in., ovoid, 2-leaved. *Leaves* 2 $\frac{1}{2}$ –3 in., shortly petioled, linear-lanceolate. *Scape* 1–2-fl., shorter than the leaves; basal sheaths membranous; bracts shorter than the pedicel; flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., greenish or white with two small brown blotches on the lip; sepals keeled, acute; petals ovate-lanceolate, acuminate; lip with a saccate sigmoid claw, sides obscurely angled, tip sometimes obtusely 3-toothed.

17. ACROCHÆNE, *Lindl.*

A large epiphyte; pseudobulbs on a stout rhizome, 1-leaved. *Leaf* long-petioled, linear-oblong, coriaceous. *Scape* lateral, erect; raceme long-lax-fl.; bracts large, membranous. *Sepals* spreading, subequal, lateral obliquely adnate to the foot of the column. *Petals* small, lacerate. *Lip* erect, shorter than the sepals, jointed to the foot of the column, claw short; side lobes induplicate, adnate to the face of the narrow oblong obtuse blade. *Column* very short, stout, foot long; anther transversely oblong, 1-celled; pollinia 2, globose, cohering by a short flat granular at length 2-partite viscus.

A. punctata, *Lindl. Fol. Orchid.* 1; *Walp. Ann.* vi. 635.

TROPICAL SIKKIM HIMALAYA, *J. D. H.*

Pseudobulbs 1 in., conic or subglobose. *Leaf* 5–6 by 1 $\frac{1}{4}$ –2 in.; petiole 3–4 in. *Scape* 6–10 in., stout, base broadly sheathed; bracts $\frac{3}{4}$ in., acute, deciduous; flowers 1 in. diam.; pedicel slender; sepals membranous, 7-nerved, dorsal oblong-ovate; lateral gibbously triangular-ovate, acuminate; petals with capillary ends of the fimbriæ; lip incurved, side lobes very convex, obtuse, adnate to the narrow short thick truncate midlobe.

18. CHRYSOGLOSSUM, *Blume*.

Terrestrial; rhizome creeping; pseudobulb narrow or 0, 1-leaved. *Leaf* solitary, elliptic-lanceolate, plaited. *Scape* lateral from the rhizome, long, erect, sheathed; flowers laxly racemed. *Sepals* subequal, lateral connate into a mentum with the base of the lip. *Petals* narrower. *Lip* erect, broadly 3-lobed and with sometimes an auricled base, disk with 3 lamellæ. *Column* incurved, margins 2-auricled or lobed about the middle; anther 2-celled; pollinia 2, free.—Species 4–5, Indian and Malayan.

Entirely resembles *Tainia* and *Plocoglottis* in habit, but pollen very different.

1. **C. villosum**, *Blume Bijdr.* 338, t. 17; *Orchid. Archip. Ind.* 162. t. 47; leaf very large shortly petioled villous on both surfaces. *De Vries* *Ill. Orchid.* 290, t. 12, f. 4; *Walp. Ann.* vi. 206.

PERAK, *Scortechini*.—DISTRIB. JAVA.

Leaf 6-12 in., broadly elliptic or ovate; petiole 1-2 in. *Scape* with *raceme* 1-2 ft., and flowers villous; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., shorter than the ovary; flowers $\frac{3}{4}$ in. diam., yellow, banded with purple; dorsal sepal linear, lateral decurved; petals up-curved; lip clawed, side lobes truncate, midlobe panduriform; lamellæ undulate or crisped. *Columnar arms* long, ascending, truncate.

2. **C. erraticum**, *Hook. f. Ic. Plant. ined.*; glabrous, leaf long-petioled, scape slender, pedicels long slender, lip hastately 3-lobed, base 2-auricled, mentum very short.

TROPICAL SIKKIM HIMALAYA; at Rishep, alt. 4000 ft., *Clarke*.

Leaf 16 by 2½ in., 5-7-nerved; petiole 3 in., ending below in a narrow pseudo-bulb. *Scape* with *raceme* 2 ft.; bracts ½ in.; pedicel with ovary 1¼ in.; flower green speckled brown; sepals and petals falcately oblong-lanceolate, acute; side lobes of lip broad, recurved, midlobe orbicular; disk 3-lamellate; auricles of column rounded.—Only one specimen seen.

3. **C. assamicum**, *Hook. f. Ic. Plant. ined.*; glabrous, leaf long-petioled, scape slender, lip cuneately 3-lobed, lobes rounded, base obscurely auricled, mentum spurred.

ASSAM, *Griffith*.

Leaf 10 by 2 in.; nerves 5, strong; petiole 4 in.; base not thickened. *Scape* with *raceme* 1½-2 ft.; bracts ½ in., as long as the pedicel and ovary; flowers ½-¾ in. diam.; sepals and petals 3-nerved, obtuse; lip with a broadly cuneate base above the rounded auricles, disk 3-lamellate; spur horn-like, free of the lateral sepals, as long as the lip, incurved, subacute; auricles of column rounded.—Only one specimen seen.

4. **C. maculatum**, *Hook. f. Ic. Plant. ined.*; glabrous, leaf short-petioled, scape stout, lip cuneately 3-lobed, base 2-auricled, mentum minute. *Ania maculata*, *Thwaites Enum.* 301.

CEYLON; in the Central Province, alt. 5000 ft., *Thwaites*.

Leaf 7-12 by 3-4 in., elliptic-lanceolate, 5-7-nerved; petiole 1-4 in., thickening into a conical elongate pseudobulb. *Scape* with *raceme* as long as the leaf or longer; bracts ½-¾ in., shorter than the ovary; sepals ½ in., 5-nerved and 3-nerved petals obtuse, pale green with lines of purple specks; lip white, base purple-spotted, side lobes and short auricles rounded; midlobe concave column with rounded side auricles and two small basal ones.

18/2. **COLLABIUM**, *Blume*.

Terrestrial?; rhizome creeping; pseudobulbs narrow, 1-leaved. *Leaf* plicate. *Scape* from the base of the pseudobulb; flowers in a long raceme. *Lateral sepals* adnate to the trumpet-shaped foot of the column. *Petals* ovate or linear. *Lip* short, articulate with the mentum or foot of the column; side lobes ear-shaped, erect; midlobe very broadly obcordate, pubescent. *Column* long, incurved, sides at top angled or with two subterminal incurved arms; anther small, hemispheric, 2-celled; pollinia 2, double, united by a viscus.

C. Wrayi, *Hook. f. Ic. Plant. ined.*; leaf lanceolate, bracts short ovate acute, mentum not spur-like, column with 2 incurved arms.

PERAK; on Waterfall Hill, *Wray, Scortechini*.

Pseudobulb 3 in., narrowly oblong, curved. *Leaf* 12 by 2 in., subacute. *Scape* with *raceme* 16 in., slender, flexuous, with many scattered bract-like sheaths; flowers ½ in. diam.; sepals acute, 5-nerved, united to the base only of the upcurved trumpet-shaped hollow foot of the column, which rises in front in 2 obtuse horns, and is open in front just over the insertion of the lip.—This species requires a modification of

the generic character, the original *C. nebulosum*, Bl. (Miq. Choix, t. 26), of Java, having broad petals, no arms to the column, and the mentum spur-like. A figure of this by Scortechini represents a pendulous plant with 2 double pollinia sessile on a broad semilunate gland? (he has no specimens). Reichenbach's Bornean *C. simplex* can hardly be a congener.

19. **ERIA**, Lindl.

Epiphytes of various habit. *Flowers* never large or bright-coloured. *Sepals* free (very rarely connate), adnate to the elongate foot of the column, and with it forming a short or long and spur-like or saccate mentum (mentum 0 in *E. leiophylla*). *Lip* sessile on the foot of the column and incumbent (mobile in *E. pulchella* and *barbata*). *Anther* imperfectly 4- or 8-celled; pollinia normally 8, pyriform or broadly obovoid, attached in fours by narrow bases to a viscus.—Species upwards of 100, Tropical Asiatic.

Perhaps the most polymorphous genus of Orchids, and very difficult of division into definable groups. Though never confounded with *Dendrobium*, the only available distinctive character between these is the oblong pollinia of the latter genus, and more or less pyriform of *Eria*. In the following descriptions of the species, I have omitted many characters of the column, anthers, and pollen that are doubtless of first-rate importance, but cannot be sufficiently well detected or examined in dried specimens as to afford safe sectional characters. I am unable to retain as sections *Urostachya* and *Cylindrolobus*. The monotypic sections *Xiphosium*, *Dilochiopsis*, and *Pellaianthus*, are aberrant. *E. pulchella*, Lindl. (*Callostylis*, Blume), should form a section (or genus), if the lip is, as Blume says, mobile; perhaps together with *E. barbata*, which, according to Griffith, has a tremulous lip. The thickened nerves, calli, &c., of the lip in many species are very variable in development; and considerable allowance must be made for faulty characters due to the unsatisfactory condition of complicated organs that have been dried for years, and restored by maceration or boiling.

KEY TO THE SECTIONS.

I. **PORPAX**, Lindl. (Gen.). Small species. *Pseudobulbs* depressed, clothed with reticulated sheaths, 2-leaved. *Leaves* sessile, membranous, caducous. *Flowers* 1-3, subsessile on the top of the pseudobulb; sepals free or connate; column very short.—Species 1-5.

II. **CONCHIDIUM**, Griff. (Gen.). Small species. *Pseudobulbs* naked or sheathed, and leaves as in *Porpax*. *Flowers* solitary or few, on a slender scape from the top of the pseudobulb.—Sp. 6-9.

III. **BRYOBIUM**, Lindl. (Gen.). Small species. *Pseudobulbs* ovoid or depressed, 2-3-leaved. *Leaves* membranous. *Scape* from between the leaves, filiform. *Flowers* racemose, small, glabrous.—Sp. 10-15.

IV. **ERIURA**, Lindl. *Stem* tall (rarely short), terete, leafy. *Leaves* distichous, long, narrow. *Flowers* minute, woolly, in subterminal spikes, racemes or fascicles; lateral sepals short, broad; column very short.—Sp. 16-20.

V. **MYCARANTHES**, Blume (Gen.). *Pseudobulbs* on a creeping rhizome, elongate, cylindric or clavate, naked. *Leaves* 2-3, terminal, narrow. *Flowers* minute, woolly, in second spikes from the side of the pseudobulb or from between the leaves.—Sp. 21, 22.

VI. **HYMENERIA**, Lindl. (and *UROSTACHYA*, Lindl.). *Pseudobulbs* short or long, 1- ∞ -noded, often forming a fleshy stem, or crowded on the creeping rhizome. *Flowers* small or medium-sized, glabrous or pubescent, rarely woolly, in lateral or subterminal spikes or racemes.

* Flowers small or minute, in dense spikes, racemes or clusters.—Sp. 23-27.

** Flowers small or medium-sized, in lax spikes or racemes.—Sp. 28-51.

*** Flowers medium-sized, 1-3, long-pedicelled, on a short subterminal scape with as many large spreading white or coloured bracts. *Stem* erect, elongate,

usually fleshy, cylindric. (*Cylindrolobus*, *Blume*, Gen.) (See also Gen. 33. *TRICHOSMA*).—Sp. 52-60.

VII. *DENDROLIRION*, *Lindl.* Stems or pseudobulbs very various. Leaves one or few, terminal or subterminal on the pseudobulbs, or on a creeping rhizome. Flowers in terminal or subterminal spikes or racemes, or subsolitary on the rhizome, woolly or densely tomentose.

* Pseudobulbs usually large. Inflorescence white-woolly.—Sp. 61-68.

** Pseudobulbs large. Inflorescence brown-tomentose.—Sp. 69-70.

*** Pseudobulbs very small or 0.—Sp. 71-76.

VIII. *BAMBUSIFOLIA*, *Hook. f.* Stem tall, terete, leafy. Leaves distichous, elliptic or lanceolate, glabrous. Flowers in leaf-opposed racemes, glabrous or tomentose.—Sp. 77-79.

IX. *TRICHOTOSIA*, *Blume* (Gen.). Stems usually long, terete, leafy (short and creeping in *E. sedifolia*), often hirsute. Leaves narrow, distichous. Flowers in leaf-opposed clusters, spikes or racemes, more or less hirsute; lip usually very narrow and stiff; mentum short.—Sp. 80-90.

X. *XIPHOSIUM*. Pseudobulb uninodal, 1-leaved. Scape from the base of the pseudobulb, clothed below with equitant sheaths, the uppermost ensiform. Flower rather large; sepals keeled; ovary and pedicel tripterous.—Sp. 91.

XI. *ARIDOSTACHYA*, *Hook. f.* Pseudobulb very short, 1-leaved, sheathed as in *Xiphosium*. Scape from the base of the pseudobulb, stout, erect. Flowers minute, in dense rusty-tomentose spikes; sepals very short; mentum long, spur-like.—Sp. 92.

XII. *DILOCHIOPSIS*, *Hook. f.* Stems tufted, tall, erect, leafy. Leaves distichous, ensiform. Flowers in a short terminal branched panicle with large deciduous rigid bracts.—Sp. 93.

XIII. *PELLAIANTHUS*, *Hook. f.* Stems terete, short, erect from a creeping rhizome. Leaves 2, terminal. Spike short, lateral; perianth very thick; column with a very short foot or 0.—Sp. 94.

Sect. I. PORPAX (see p. 785).

1. *E. reticulata*, *Benth. in Gen. Pl.* iii. 509; sepals united in a subcampanulate very short broadly 3-lobed tube, petals spathulate 5-nerved, mentum obscure, lip half the length of the petals very shortly clawed panduriform, base with a long erect spur. *Porpax reticulata*, *Lindl. in Bot. Reg.* xxxi. (1845), *Misc.* 62; *Walp. Ann.* vi. 266. *Cryptochilus reticulatus*, *Reichb. f. in Bot. Zeit.* 1862, 214. *Aggeianthus reticulatus*, *Wight Ic.* t. 1737.

The DECCAN PENINSULA; Iyamallay Hills, *Wight*. Canara; at Chandway, *Ritchie*.

Pseudobulbs $\frac{3}{4}$ in. diam., densely crowded. Leaves not seen. Flower $\frac{1}{2}$ – $\frac{3}{4}$ in. long, purple-brown, minutely hispid; pedicel very short, with a very large broad bract and many sheaths; nerves strong, petals and lip subcrenulate; pollinia 4 or 8, pyriform.

2. *E. Meirax*, *N. E. Br. in Gard. Chron.* 1880, 603; sepals glabrous 5-nerved coherent into a gibbous-based tube with free ovate acute lobes, petals broadly oblong 5-7-nerved ciliate, lip minute ovate-cordate 5-nerved serrulate. *E. Elwesii*, *Reichb. f. in Gard. Chron.* 1883, i. 402. *Cryptochilus Meirax*, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 148.

TENASSERIM; at Moulmein, *Parish*. SIKKIM HIMALAYA, *Elwes*.

Pseudobulbs $\frac{1}{2}$ in. diam., minutely reticulate. Leaves not seen in Moulmein specimens, in Sikkim 1 in., oblong-lanceolate, acute, petioled. Flowers $\frac{1}{2}$ in. long; bracts very large, hemispheric, with a long mucro.—Mr. Brown indicates the

probability of *E. Elwesii* not differing from *E. Meirax*, and no distinctive characters for it are given.

3. *E. Lichenora*, Lindl. in *Journ. Linn. Soc.* iii. 46; leaves orbicular-ovate ciliate, perianth 2-labiate, lateral sepals connate pubescent, petals linear 1-nerved, mentum small rounded, lip very small shortly clawed ovate-cordate, sides toothed, tip acute or subulate. *E. Jerdoniana*. Reichb. f. in *Walp. Ann.* vi. 267. *Lichenora Jerdoniana*, Wight Ic. t. 1738.

MALABAR; on the Bababoodan Hills, Jerdon, &c.; Travancore, Johnson.

Pseudobulbs $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., crowded. *Leaves* 1 in., dark green or purplish. *Flowers* $\frac{1}{2}$ in. long, tawny; pedicel very short, with a very broad ciliate bract, and many subsimilar sheaths; dorsal sepal orbicular-ovate, 5-nerved, united lateral concave.

4 *E. ustulata*, Par. & Reichb. f. in *Trans. Linn. Soc.* xxx. 147; leaves elliptic or broadly ovate subacute ciliolate, perianth 2-labiate pubescent, lateral sepals connate, mentum obscure, petals subspathulate 3–5-nerved, lip orbicular with a short tip erosely ciliate.

TENASSERIM; at Moulmein, Parish.

Very similar to *E. Lichenora*, but the flowers are much smaller and the lip different; the latter is described by the authors of the species as oblong acute undulate umbonate at the base.

5. *E. Parishii*, Lindl. & Reichb. f. in *Trans. Linn. Soc.* xxx. 147; leaves ovate acute ciliolate, sepals free glabrous 3-nerved, dorsal large orbicular-ovate obtuse, lateral short uncinate recurved obtuse, mentum large rounded, petals lanceolate falcate 3–5-nerved, lip very small elliptic subacute at both ends.

TENASSERIM; at Moulmein, Parish.

Pseudobulbs $\frac{1}{2}$ – $\frac{1}{2}$ in. diam. *Leaves* $\frac{3}{4}$ in. *Flowers* minute; sepals $\frac{1}{10}$ in. long; pollinia pyriform.

Sect. II. CONCHIDIUM (see p. 785).

6. *E. reticosa*, Wight Ic. t. 1637; leaves lanceolate or elliptic-lanceolate, flowers rather large, sepals acute 5-nerved, dorsal linear-lanceolate, lateral falcate, mentum broad incurved, petals lanceolate acute 5–7-nerved, lip nearly as long as the sepals linear-oblong 3-lobed, side lobes rounded terminal ovate, disk with 2 crested ridges. *E. uniflora*, Dalz. in Hook. *Kew Journ. Bot.* iv. (1852) 111. *E. braccata*, Dalz. & Gibs. *Bomb. Fl.* 262 (not Lindl.).

On the WESTERN GHATS, from the Concan to the Nilghiris, Wight, &c.

7. *E. braccata*, Lindl. in *Journ. Linn. Soc.* iii. 46 (excl. syn. Wt. & Dalz.); leaves oblanceolate, flowers large, sepals obtuse 5-nerved, dorsal oblong-lanceolate, lateral nearly straight, mentum broad incurved, lip narrowly oblong entire as long as the sepals, disk with 2 crested ridges. *Dendrobium braccatum*, Lindl. *Gen. & Sp. Orchid.* 75.

CEYLON; Central Province, Walker, &c.

Pseudobulbs $\frac{1}{4}$ – $\frac{2}{3}$ in. diam., not netted. *Leaves* 1–1 $\frac{1}{2}$ in. obtuse, apiculate. *Scape* 1–1 $\frac{1}{2}$ in.; bract cucullate. *Sepals* $\frac{1}{2}$ – $\frac{2}{3}$ in. long.

8. *E. pusilla*, Lindl. in *Journ. Linn. Soc.* iii. 48; leaves 1–3 spathu-

lately obovate with a terminal seta, flowers small, sepals acuminate and linear-lanceolate petals 3-nerved, mentum large incurved, lip lanceolate obscurely serrulate. *Walp. Ann.* vi. 267. *Conchidium pusillum*, *Griff. Notul.* 321; *Ic. Pl. Asiat.* t. 310 (*greatly enlarge*). *Phreatia uniflora*, *Wight Ic.* t. 1734.

KHASIA Mts., alt. 4-5000 ft., *Griffith*, &c.

Pseudobulbs $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., distant on the slender rhizome. *Leaves* $\frac{1}{2}$ -1 in. *Scape* $\frac{1}{2}$ -1 in., capillary, 1-fl., with often a rudimentary second within the concave bract; sepals $\frac{1}{4}$ in. long.—*Lindley* overlooked this in the *Herb. Ind. Or. H. f. & T.*, referring it to *Bolbophyllum*.

9. ***E. extinctoria***, *Oliver in Bot. Mag.* t. 5910; dorsal sepal much smaller than the lateral ovate obtuse 5-nerved, lateral triangular acute 5-nerved, mentum longer than the lateral sepals conical incurved 2-lobed, petals oblong obtuse 3-nerved, lip larger than the sepals obcordate with a 2-lobed undulate midlobe in the sinus. *Dendrobium extinctorium*, *Lindl. in Bot. Reg. under t.* 1756, and in *Journ. Linn. Soc.* iii. 11; *Walp. Ann.* vi. 308.

TENASSERIM; at Moulmein, *Griffith*, *Parish*.

Pseudobulbs crowded, $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., naked. *Leaves* not seen. *Scape* 2-3 in., filiform, with 1-2 small sheaths; mentum $\frac{1}{4}$ - $\frac{1}{2}$ in. long; disk of lip with 3 hispid ridges, lobules of midlobe orbicular, with a scarlet blotch at the base; column very short.

Sect. III. BRYOBIUM (see p. 785).

10. ***E. articulata***, *Lindl. in Journ. Linn. Soc.* iii. 47; pseudobulbs ellipsoid adhering end to end like a chain, scape from the point of juncture of the bulbs capillary, spike flexuous, bracts cymbiform, flowers minute distant, sepals obtuse lanceolate, dorsal recurved, lateral with upcurved tips, mentum large incurved, petals small lanceolate, lip minute with a long slender claw and horseshoe-shaped limb. *Alwisia tenuis*, *Lindl. Fol. Orchid.* 1; *Thwaites Enum.* 300.

CEYLON; in the Ambagamowa district, *Walker*, *Thwaites*.

Pseudobulbs $\frac{1}{4}$ - $\frac{1}{2}$ in. long. *Leaves* 1-2, $\frac{1}{2}$ -1 in. long, oblanceolate, apiculate. *Scape* 1-3 in., naked; bracts broad, cucullate, acute; flowers buff, $\frac{1}{10}$ in. long; ovary very short; nerves of sepals very obscure.

11. ***E. exilis***, *Hook. f. Ic. Plant. ined.*; pseudobulbs as in *E. articulata*, scape short capillary, flowers distant in a flexuous spike, bracts cymbiform, sepals obtuse nerveless, dorsal largest oblong, lateral short falcately decurved, tips thickened, mentum as long as the sepals very stout incurved, petals linear-oblong 1-nerved, lip minute elliptic-oblong obtuse fleshy.

TRAVANCORE, *Johnson (Herb. Wight)*.

Much smaller than *E. articulata*, but closely resembling it in scape, bracts, and spike; leaves not seen; flowers $\frac{1}{12}$ in. long; pseudobulb small, with a membranous coat.

12. ***E. perpusilla***, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 148; pseudobulbs clustered depressed, scape filiform, spike rather dense-fl., bracts ovate-lanceolate, sepals obtuse 1-nerved, dorsal triangular-ovate, lateral lanceolate, mentum obscure, petals linear 1-nerved, lip lanceolate 3-nerved, margins waved.

TENASSERIM; at Moulmein, *Parish*, *Lobb (in Herb. Lindl.)*.

Pseudobulbs $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., smooth. *Leaves* not seen. *Scape* 2–2 $\frac{1}{2}$ in.; *spike* $\frac{1}{2}$ – $\frac{3}{4}$ in.; *bracts* $\frac{1}{10}$ in., hyaline; *sepals* about as long.

13. **E. Dalzellii**, *Lindl. in Journ. Linn. Soc.* iii. 47; pseudobulbs clustered depressed, scape filiform, spike many-fl. second, bracts lanceolate, sepals 1–3-nerved, dorsal ovate-lanceolate, lateral falcately ovate or lanceolate subacute or acuminate, mentum short rounded, petals lanceolate 1–3-nerved, lip small panduriform with 2 thickened nerves meeting near the rounded tip. *Dalz. & Gibs. Bomb. Fl.* 262; *Walp. Ann.* vi. 268. *E. microchilos*, *Lindl. l. c.*; *Dalz. & Gibs. l. c.*; *Walp. Ann. l. c.* *E. filiformis*, *Reichb. f. l. c.* 268 (in part). *Dendrobium microchilos*, *Dalz. in Hook. Kew Journ.* iii. (1851) 345. *D. filiforme*, *Wight Ic.* t. 1642 (central and left-hand figs.).

DECCAN PENINSULA; on the Ghats from the Concan southwards.

Very variable. *Pseudobulbs* $\frac{1}{2}$ – $\frac{1}{2}$ in. diam. *Leaves* 1–4 in., linear to oblanceolate, tip rounded, apiculate. *Scape* with spike 1–3 in.; flower yellow; sepals $\frac{1}{2}$ – $\frac{1}{2}$ in. long, lateral straight or falcate.

VAR. fimbriata; petals and in a less degree the lateral sepals fringed with translucent gland-tipped hairs. *Dendrobium fimbriatum*, *Dalz. in Hook. Kew Journ.* iv. (1852) 292. *D. Dalzellii*, *Hook. l. c.*

14. **E. nana**, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xi. 19; leaves 2 elliptic-lanceolate, scape and spike short, flowers second, sepals linear-lanceolate 3-nerved, mentum short, petals linear acuminate, base 3-nerved, lip half as long as the sepals, linear slightly contracted in the middle 3-nerved, tip rounded crenulate. *Lindl. in Journ. Linn. Soc.* iii. 46; *Walp. Ann.* vi. 269. *Dendrobium filiforme*, *Wight Ic.* t. 1642 (lower right-hand fig.).

NILGHIRI HILLS on trees, *Wight, Sir F. Adam.*

Closely allied to *E. Dalzellii*, but leaves more oblong, scape shorter, flowers twice as large, and lip much narrower.—An authentic specimen in Herb. Lindl. certifies Wight's figure quoted above, and his specimens being the plant of A. Richard. Lip not acute, as described by A. Richard and Lindley.

15. **E. muscicola**, *Lindl. in Journ. Linn. Soc.* iii. 47; leaves 2–3 petioled oblanceolate apiculate, scape and raceme longer than the leaves, flowers very small, bracts ovate or lanceolate, sepals lanceolate finely acuminate 1–3-nerved, lateral falcate, petals narrowly lanceolate 1–3-nerved, mentum rounded, lip narrow lanceolate or slightly dilated in the middle. *Dendrobium muscicola*, *Lindl. in Wall. Cat.* 2017; *Gen. & Sp. Orchid.* 75.

NEPAL, *Wallich*. KHASIA MTS., alt. 3–4000 ft., *Griffith, &c.* TENASSERIM, *Parish*. CEYLON; Central Province, alt. 5–7000 ft., *Gardner*.

Very like a small state of *E. Dalzellii* (with which *Reichb.* is disposed to unite it), but the lip is never panduriform. There may be more than one species here. *Wallich's* (imperfect) specimens are very small-flowered. I do not share *Lindley's* doubts (*Journ. Lin. Soc.* l. c.) as to their being from Nepal, for the specimens bear (in his own writing) the date of 1821, the year in which *Wallich* was in that country. In Tenasserim specimens the lip has very narrow side lobes about the middle, and an obtuse tip. In the Ceylon ones the flowers are larger (sepals $\frac{1}{2}$ – $\frac{1}{2}$ in.), and lip ovate-lanceolate, subacute, margins waved. The Khasia ones are in fruit only, capsule $\frac{1}{2}$ in., pyriform.

Sect. IV. ERIURA (see p. 785).

16. **E. paniculata**, *Lindl. in Wall. Pl. As. Rar.* i. 32, t. 36; in *Bot. Reg.* xxviii. 1842, *Misc.* 38; in *Journ. Linn. Soc.* iii. 55; leaves 10–

12 in. linear fleshy nerveless, bracts ovate-lanceolate reflexed, lip sub-orbicular, side lobes falcately oblong, midlobe reniform or 2-lobed crenate, hypochile greatly thickened with a disciform elevated basal tubercle and a very large heel-like one concave towards the column on the midlobe.

SIKKIM HIMALAYA, at Kursiong, J. D. H. KHASIA MTS., alt. 4000 ft., Griffith, &c. Naga Hills in UPPER ASSAM, Prain.

Stem 1-2 ft., as thick as a goose-quill. *Leaves* $\frac{1}{2}$ - $\frac{1}{2}$ in. broad, taper-pointed, in Sikkim specimens loaded with crystalline concretions. *Branches* of panicle 6-8 in.; bracts $\frac{1}{2}$ in.; mentum short, rounded; petals elliptic, obtuse, 3-nerved.

17. **E. obliqua**, Lindl. in *Journ. Linn. Soc.* iii. 55; stem 1-2 in., sheaths coriaceous, leaves 2 in. linear subacute thickly coriaceous, raceme erect capillary tomentose, bracts ovate-lanceolate, flowers minute, lip broadly cuneate, side lobes elongate triangular-lanceolate acute, midlobe very short truncate, angles acute, disk with a large erect fleshy spur on the midlobe and pulvinus at the base. *Mycaranthes obliqua*, Lindl. in *Bot. Reg.* 1840, *Misc.* 77.

SINGAPORE, Cuming; at Kranji in Mangrove Swamps, Ridley.

Stem erect from a very stout rhizome with fibrous roots. *Leaves* $\frac{1}{2}$ - $\frac{1}{2}$ in. diam., strict, erect; sheaths $\frac{1}{2}$ in., tubular, truncate. *Racemes* terminal, 2 in., stellately tomentose; pedicels slender, longer than the membranous bracts; sepals $\frac{1}{2}$ in. long, ovate, acute; petals linear, 1-nerved; mentum rounded; lip much broader than long; midlobe very short indeed, subapiculate and thickened at the broad truncate tip; spur flattened, incurved.—A curious little species.

18. **E. Kingii**, Hook. f. *Ic. Plant. ined.*; stem stout, leaves 4-7 in. linear-lanceolate unilaterally acuminate much shorter than the 1-3 scapes, bracts minute reflexed, pedicels slender, lip suborbicular, side lobes falcately oblong with a tooth at the sinus, midlobe subreniform, axis with a thick woolly ridge leading from 1 or 2 small papillæ at the base to a woolly knob on the midlobe.

PERAK, alt. 3-4000 ft., King's Collector, Scortechini.

Stems 2-3 ft., as thick as a swan-quill. *Leaves* coriaceous, nerved. *Racemes* 8-12 in.; bracts $\frac{1}{2}$ in.; flowers blue within; mentum cylindric; petals oblanceolate, 3-nerved. *Capsule* $\frac{3}{4}$ in., linear.

19. **E. iridifolia**, Hook. f. *Ic. Plant. ined.*; leaves 12-14 by $\frac{1}{2}$ -1 in. ensiform gradually narrowed from a broad sheathing base, much longer than the several simple slender hoary scapes, flowers in dense spikes white-tomentose, bracts ovate, lip broadly oblong from a rounded base, side lobes large membranous obtuse, disk with a broad tomentose ridge ending in a minute exserted thickened tip or midlobe.

PERAK; on Gunong Batu Pateh, Wray.

Stem at base 1 in. thick. *Leaves* coriaceous, spreading, uppermost longest. *Spike* and *scape* stellately hoary or tomentose; bracts acute, nearly glabrous; perianth tomentose, about $\frac{1}{8}$ in. long; mentum shortly cylindric; lip with 2 strong nerves parallel to the central ridge, and 3 calli at the very base.

20. **E. longifolia**, Hook. f. *Ic. Plant. ined.*; stem clothed with very long sheaths, leaves 12-14 in. grass-like, spikes solitary short shortly peduncled dense-fld., bracts minute, mentum short rounded, lip minute cup-shaped obtusely pointed.

PERAK, alt. 5000 ft., Wray.

Stem swollen at the base; internodes few, long; basal sheaths long, free, acuminate, lower 3-4 in., upper 4-6 in. *Leaves* unilaterally acuminate, many-nerved. *Spike* and peduncle 2 in.; flowers $\frac{1}{10}$ in.; sepals gland-dotted; petals

elliptic; lip very curious, like a short round-bottomed cup attached by the margin with a broad oblique mouth produced in front.—Only one specimen seen.

Sect. V. MYCARANTHES (see p. 785).

21. **E. stricta**, Lindl. *Coll. Bot.* t. 41 B; in *Journ. Linn. Soc.* iii. 52; pseudobulb elongate cylindric, spikes 1-2 terminal, lip 3-lobed with a basal oblong and subapical globose woolly callus. *Walp. Ann.* vi. 271. *E. secundiflora*, Griff. *Notul.* iii. 302; *Ic. Pl. Asiat.* t. 30. *Mycaranthes stricta*, Lindl. in *Wall. Cat.* 1970; *Gen. & Sp. Orchid.* 63; *Wight Ic.* t. 1763. *Octomeria secunda*, *Wall. mss.*

EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, *Griffith's collectors*, alt. 3-4000 ft., *J. D. H.* Naga Hills in UPPER ASSAM, *Griffith*. KHASIA HILLS, alt. 4000 ft., *J. D. H. & T. T.*—DISTRIB. Siam (alt. 7000 ft., *Murton*).

Pseudobulb 1-5 in., from a stout oblique rhizome, as thick as a goose-quill, basal sheaths very large, membranous. *Leaves* 3-4 in., oblong-lanceolate. *Scape* and *raceme* 3-5 in.; bracts cupular; petals oblong, 3-nerved.—The Siam specimen has a panduriform lip.

22. **E. merguensis**, Lindl. in *Journ. Linn. Soc.* iii. 52; pseudobulb clavate, spikes lateral, lip 3-lobed with a pubescent callus on each side lobe. *Reichb. f. in Gard. Chron.* 1880, 616.

TENASSERIM; at Mergui, *Griffith* (*Kew Distrib.* 5120), *Helper* (*Kew Distrib.* 5381), *Parish*, &c.

Pseudobulb 2-3 in., stipitate. *Leaves* as long, linear-lanceolate, obtuse or acute. *Scape* with *raceme* 2-5 in.; bracts obsolete; petals elliptic, 1-nerved.

Sect. VI. HYMENERIA (see p. 785).

* Flowers small or minute in dense spikes or racemes. See also 46. *E. recurvata*.

23. **E. convallarioides**, Lindl. in *Wall. Cat.* 1975; *Gen. & Sp. Orchid.* 70; in *Bot. Reg.* 1841, t. 62, *Misc.* 58; in *Journ. Linn. Soc.* iii. 53; stem after flowering very stout, leaves elliptic-lanceolate acuminate plicate, flowers in nodding oblong spikes small densely crowded concealing the membranous bracts, sepals very broad obtuse 5-7-nerved, mentum rounded, petals 3-nerved, lip cuneate truncate or with a broadly triangular warted tip. *Walp. Ann.* vi. 276. *Octomeria spicata*, *Don Prodr.* 31. *O. convallarioides*, *Wall. mss.* *Pinalia alba*, *Ham. mss.*

TROPICAL HIMALAYA, from Kumaon, alt. 4000 ft., *Strachey & Winterbottom*, eastwards to the KHASIA and NAGA HILLS, ascending to 5000 ft. TENASSERIM, *Parish*.

Stem after flowering 2-8 in., sometimes 1 in. diam. *Leaves* 4-7 by 1-2 in., loosely sheathed. *Scape* 2-3 in., stout; spike as long, ovoid; flowers subglobose, glabrous or sparsely pilose, white or straw-colored; bracts equalling the ovary, lowest longest. *Capsule* $\frac{1}{2}$ in., ellipsoid.—Var. *major*, Lindl. in *Bot. Reg.* 1847, t. 23, is only a large specimen.

24. **E. pumila**, Lindl. in *Wall. Cat.* 1972; *Gen. & Sp. Orchid.* 68; in *Bot. Reg.* 1838, *Misc.* 79; pseudobulbs 2-3 in. subcylindric or clavate, leaves lanceolate acuminate, flowers minute subcapitate on a short lateral peduncle, sepals very broad obtuse 3-nerved, mentum rounded, petals linear acute 1-nerved, lip broadly oblong 3-nerved, side lobes long spreading lanceolate acuminate close under the small orbicular midlobe. *Walp. Ann.* vi. 278.

KHASIA HILLS, *Wallich*. TENASSERIM; at Moulmein, *Parish*.

Pseudobulbs $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., tufted. *Leaves* petioled, acuminate. *Spike* $\frac{1}{2}$ in., oblong; bracts very broad, membranous; flowers $\frac{1}{2}$ in. diam., subglobose. *Capsule* $\frac{1}{4}$ in., pubescent.

25. ***E. floribunda***, Lindl. in Wall. Cat. 7408; Bot. Reg. 1843, Misc. 43; 1844, t. 23; in Journ. Linn. Soc. iii. 60; stem very stout, erect terete fleshy, leaves subterminal linear-lanceolate to elliptic, flowers small very many in leaf-opposed or lateral decurved spikes, lateral sepals very short and obtuse, mentum deeply saccate, side lobes of lip basal acute separated from the small fan-shaped truncate midlobe by a strong ridge. Walp. Ann. vi. 276.

MALAYAN PENINSULA; from Tenasserim to Singapore.—DISTRIB. Sumatra, Siam, Borneo.

Stem 10–18 in., as thick as the thumb or less. *Leaves* 2–5, 5–10 by $\frac{1}{2}$ – $2\frac{1}{2}$ in., many-nerved. *Scape* short and rachis stout, pubescent; spike 3–6 in.; bracts $\frac{1}{2}$ in., broadly ovate, reflexed; flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, white tinged with pink; dorsal sepal small, broad, obtuse, 3–5-nerved; petals ovate-oblong, obtuse; column very short; pollinia very narrow.—The specimens present great differences in size, breadth of leaf, and the tip of the lip, but I am unable to find specific characters for the forms.

26. ***E. bipunctata***, Lindl. in Bot. Reg. 1841, Misc. 83; stem oval compressed, leaves lanceolate acuminate 11-nerved, racemes axillary cylindric densely many-fl., flowers very minute subglobose, sepals ovate obtuse broadly oblong and acute, petals 3-nerved, mentum rounded, lip short, side lobes rounded spreading narrower than the rounded fleshy convex midlobe.

KHASIA HILLS, Gibson.

Stems 2–3 in., flat, green, old light purplish. *Leaves* as in *E. floribunda*. *Racemes* drooping, slightly pubescent; bracts ovate, acuminate, reflexed; flower very shortly pedicelled; sepals membranous, $\frac{1}{10}$ in. long; lip peculiar, claw broad short continuous with the foot of the column, the lateral ribs of which run along its sides, diverge opposite the side lobes enclosing a sunk space, and there form a thickened margin to the midlobe meeting at its apex; a strong ridge or nerve traverses the axis of the lip.—I have examined flowers only (in Herb. Lindl.), and seen no leaves.

27. ***E. scabrilinguis***, Lindl. in Journ. Linn. Soc. iii. 51; quite glabrous, leaves 2 broadly elliptic-lanceolate acuminate, scape stout erect, spike dense-fl., bracts minute, sepals $\frac{1}{2}$ in. oblong-lanceolate subacute, mentum rounded incurved, petals nearly as broad falcate, lip as long as the sepals, side lobes narrow with two mesial ridges, midlobe orbicular hispid with lines of purple papillæ.

SIKKIM HIMALAYA, Ic. Cathcart in Herb. Kew.

Pseudobulbs $1\frac{1}{2}$ –2 in., ovoid or ellipsoid, green, sulcate. *Leaves* 5–7 by $1\frac{1}{2}$ – $2\frac{1}{4}$ in., 3-nerved. *Scape* from between the leaves, very short, and rachis purplish; spike $2\frac{1}{2}$ in.; ovary $\frac{1}{2}$ in.; sepals and petals white; lip with pale rosy side lobes and purple midlobe.—Described from Ic. Cathcart.

** Flowers small or medium-sized, in lax many-fl. spikes or racemes.

† Lip entire or nearly so. (See also 37. *E. vittata* and 49. *E. saccifera*.)

28. ***E. polystachya***, A. Rich. in Ann. Sc. Nat. Ser. 2, xi. 20, t. 9; pseudobulbs 2–4 in. as thick as the thumb, racemes from amongst the lanceolate leaves suberect densely pubescent, flowers $\frac{1}{4}$ in. long, sepals

narrow obtuse 3-nerved, dorsal longest, petals linear oblong-ovate obtuse 3-nerved, lip entire ovate subpanduriform subacute, side nerves forming a 2-arched thickened purple ridge towards the base. *Wight Ic.* 1635 (*E. pubescens on the plate*); *Walp. Ann.* vi. 275.

NILGHIRI HILLS; on the West slope, *Perrottet, Wight.*

Leaves 3-5 in., acute or acuminate. Racemes as long or shorter, very many-fl.; pedicels shorter than the bracts; flowers yellowish.

29. **E. pubescens**, *Wight Ic.* 1634 (*E. polystachya* on the plate); pseudobulbs short as thick as the thumb, racemes from amongst the (lanceolate) leaves drooping slightly pubescent, flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. long, sepals lanceolate acute 5-7-nerved, dorsal longest, petals linear-lanceolate 5-nerved, lip entire ovate-subcordate acute, side nerves forming arched thickened ridges. *Walp. Ann.* vi. 275.

NILGHIRI HILLS; on the West slope, *Wight.*

Readily distinguished from *E. polystachya*, by its much larger flowers, nearly glabrous racemes, and 5-7-nerved sepals, which are white with pale streaks; lip with purple blotches and yellow tip.

30. **E. mysorensis**, *Jindl. in Journ. Linn. Soc.* iii. 54; pseudobulbs short thick, racemes from amongst the (lanceolate) leaves curved glabrous, flowers $\frac{1}{2}$ in., sepals lanceolate acute, nerves 3-5 very strong and reticulate, petals lanceolate acute 3-nerved, side nerves branching, lip clawed entire from ovate- to oblong-lanceolate subpanduriform, side nerves usually forming arched thickened ridges.

MALABAR and DHARWAR; on the Bababoodan Hills, *Law.*

This will probably prove to be a form of *E. polystachya*. Lindley describes the lip (which is very variable in size, shape, and nervation) as wholly smooth, but though the arched ridges are sometimes slender, they are always present, and often very thick and even crenate.

31. **E. bicolor**, *Lindl. Gen. & Sp. Orchid.* 65 (*not elsewhere*); pseudobulb 4-6 in. columnar, leaves linear, racemes from amongst the linear sessile leaves erect puberulous, flowers $\frac{1}{2}$ in. long, sepals lanceolate acute 3-nerved, outer nerves branching, petals linear acute 3-nerved, lip entire ovate-lanceolate acute obscurely lobed at the side smooth, claw very large deeply saccate. *Thwaites Enum.* 299.

CEYLON; Central Province, alt. 4-7000 ft., *Macrae, &c.*

Readily distinguished from *mysorensis* by the narrow leaves, stout scape and raceme, and by the remarkable sac at the base of the lip, which is constant.

32. **E. ringens**, *Reichb. f. in Bonplandia*, v. 222; pseudobulb 5 in. fusiform, leaves linear-lanceolate acuminate, racemes lateral glabrous, bracts ovate much shorter than the pedicels, flowers $\frac{1}{4}$ in., sepals lanceolate and broadly linear, petals 3-nerved, lip small ovate acute 5-nerved with an oblong thickening on each side below the middle. *Walp. Ann.* vi. 275.

TENASSERIM; at Moulmein, *Parish.*

Pseudobulb as thick as the finger in the middle. Leaves 5-6 in., terminal. Raceme 2-2 $\frac{1}{2}$ in., suberect.—Lindley (in *Journ. Linn. Soc.* iii. 55) refers this to *E. ovata*, B. R. xxx. (1844) under t. 29, of the Philippines, which has ovate obtuse leaves and a pubescent raceme.

33. **E. obesa**, *Lindl. in Wall. Cat.* 1976; *Gen. & Sp. Orchid.* 68; in *Bot. Reg.* 1844, under t. 29; in *Journ. Linn. Soc.* iii. 53; pseudobulbs

1-3 in. very stoutly clavate silvery green and with scarious sheaths, racemes lateral subcorymbose few-fl. puberulous, bracts large, flowers $\frac{3}{4}$ in. long, sepals lanceolate acuminate falcate 5-nerved, mentum subconic, petals oblong-lanceolate 3-nerved, lip nearly as long as the sepals linear-oblong, sides obscurely lobed, disk with 3 thickened ridges. *Walp. Rep.* vi. 277. *E. Lindleyana*, *Griff. Notul.* iii. 300.

MARTABAN, *Wallich*. TENASSERIM; at Mergui, *Griffith, Parish*.

Leaves "lanceolate or ovate-lanceolate," *Griffith*. *Flowers* white, lip pale yellow with purple lines. *Capsule* $1\frac{1}{2}$ in. long, slender.

†† Lip 3-lobed.

§ Flowers sessile or subsessile.

34 ***E. elata***, *Hook. f. Ic. Plant.* t. 1848; leaves coriaceous 6-12 in. oblanceolate acuminate, sheaths at their base 4-5 in., scape 12-14 in. very stout lax-fl., bracts $\frac{3}{4}$ -1 in. glabrous, lateral sepals $\frac{3}{4}$ in. strongly falcate 5-7-nerved, petals oblong 5-nerved, lip semilunar with a short rough midlobe in the sinus and 3 ridges in the axis.

PERAK, *Scortechini*.

Pseudobulb 4-5 in., base tuberous. *Bracts* lanceolate, much exceeding the broad incurved flowers; ovary and base of sepals pubescent; mentum rounded, incurved; column very long and slender, foot with a few hairs at the base. — A very peculiar species, quite unlike its allies, with much the habit of sect. *Xiphosium*. Perhaps referable to sect. *Dendrolirion*, but is nearly glabrous.

35. ***E. fragrans***, *Reichb. f. in Bot. Zeit.* xxii. 415; leaves lanceolate acuminate, spikes long drooping pubescent, bracts lanceolate equalling the ovary, sepals $\frac{3}{4}$ -1 in. and narrower, petals lanceolate acuminate falcate 5-nerved, lip with 5 crenulate ridges from the base nearly to the tip, side lobes ear-like, midlobe as long lanceolate.

TENASSERIM; at Moulmein, *Falconer, Parish*.

Pseudobulb 2-3 in., ovoid, sheathed. *Leaves* 8-12 in., variable in breadth. *Spikes* longer; flowers very sweet, white; side lobes of lip red; mentum rounded, incurved; column very short.

36. ***E. vittata***, *Lindl. in Journ. Linn. Soc.* iii. 51; leaves 2 elliptic or lanceolate, spikes decurved glabrous, base sheathed, lateral sepals $\frac{1}{2}$ in. short strongly decurved acute 5-nerved, petals linear-oblong falcate 5-nerved, lip sessile oblong with 5 crenulate ridges from the base to the apex, margins waved contracted towards the tip into a very short and broad midlobe. *Reichb. f. in Gard. Chron.* 1832, i. 330.

SIKKIM HIMALAYA, *McCarty & Hort. Kew.* MUNIPORE, alt. 4000 ft., *Watt*.

Pseudobulbs 2-5 in., oblong or cylindric. *Leaves* very variable, 4-8 in. *Rachis* of spike stout; flowers broad, green striped with red; mentum nearly as long as the sepals, broadly conic or saccate; column long. — *Bracts* not seen, probably deciduous.

37. ***E. graminifolia***, *Lindl. in Journ. Linn. Soc.* iii. 54; leaves 4-6 linear-lanceolate, spikes erect puberulous, bracts broadly ovate shorter than the pubescent ovary, lateral sepals $\frac{1}{2}$ in. ovate-lanceolate subacute 3-5-nerved, petals linear-lanceolate acute 3-nerved, lip short, side lobes oblong recurved with a short ridge or auricle, midlobe orbicular, axis with sometimes a crenulate ridge from base to tip. *Hook. f. Ic. Plant.* t. 1847. *E. alba*, var. β ., *Lindl. l. c.*

SIKKIM HIMALAYA, *Griffith's Collectors* (*Kew Distrib.* 5115, *E. alba*?), alt. 5-6000 ft., *J. D. H.*

Pseudobulbs short or elongated into a naked or sheathed vermiform cylindric stem, 5-6 in., and as thick as a pencil, at first sheathed. *Leaves* 4-6 in., subovate, rigid. *Spike* shorter; flowers glabrous, white; mentum rounded; lip very variable as to ridges, &c.; its spreading and recurved side lobes are a good character.—A drawing (in *Herb. Hort. Calc.*) of a Sikkim plant which may be a form of this has small side lobes of the lip pointing upwards, a ridge on the centre only of the midlobe, and two calli? between the side lobes. The habit is entirely that of *graminifolia*.

38. **E. Andersoni**, *Hook. f. Ic. Plant. ined.*; leaves 2 narrowly linear-lanceolate, spike suberect stout pubescent, bracts large broadly ovate or ovate-lanceolate revolute, lateral sepals triangular ovate acuminate, mentum broadly conical obtuse, petals oblong-lanceolate acute, lip obovate, side lobes short erect, midlobe orbicular, disk with 2 median ridges, column short.

SIKKIM HIMALAYA; at Darjeeling, *T. Anderson* (*l.c.* in *Herb. Calcutt.*).

Pseudobulbs 2-5 in., cylindric, striate. *Leaves* 4-6 in. *Spike* much shorter than the leaves, rather dense-flid.; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., green; ovary $\frac{1}{2}$ in., sessile, tomentose; lateral sepals $\frac{1}{2}$ in., pinkish; lip purplish, midlobe yellow.—Described from two drawings in *Herb. Hort. Calcutt.*

39. **E. excavata**, *Lindl. in Wall. Cat.* 1974 (*in part*); leaves 4-6 narrow strongly nerved, scape shorter and spikes pubescent, bracts lanceolate, sepals $\frac{1}{2}$ in. ovate-lanceolate falcate, petals 5-nerved, mentum 0, lip short sessile with 3 central crenate ridges, side lobes basal ovate obtuse spreading, midlobe large suborbicular or obovate or transverse, column very short broad, foot deeply excavate. *Hook. f. Ic. Pl. t.* 1846. *E. excavata*, *in part*, *Lindl. Gen. & Sp. Orchid.* '67. *E. sphærochila* and *E. flava*, *var. rubida*, *Lindl. in Journ. Linn. Soc.* iii. 54, 49. *Octomeria excavata*, *Wall. mss.*

NEPAL, *Wallich*. SIKKIM and KHASIA Mts., alt. 4-6000 ft., *J. D. H.*

Pseudobulbs 1-2 in., ovoid or subcylindric, never much elongate. *Leaves* 5-6 in., sessile, rigid, lanceolate. *Spike* few-flid.; very short pedicel with ovary $\frac{1}{2}$ - $\frac{3}{4}$ in.; flowers white, lip yellow with pink side lobes and very strong purple nerves, base saccate.—The only species of this group with basal spreading side lobes of the lip. *Wallich's* No. 1974 consists of flowering specimens of this, and flowerless of *E. confusa* (which has not an excavate column); but in the distribution of his Herbarium, Lindley received flowering specimens of *confusa* only, the character of the stem of which he introduced into that of *excavata*.

40. **E. alba**, *Lindl. Gen. & Sp. Orchid.* 67; pseudobulbs not elongating, leaves 3-5 narrow strongly nerved, scape and ovary pubescent, bracts lanceolate, sepals $\frac{1}{2}$ - $\frac{3}{4}$ in. ovate-lanceolate 3-5-nerved glabrescent, petals linear-oblong 3-nerved, mentum rounded, lip oblong broadly clawed, side lobes about the middle pointing forward obtuse, midlobe orbicular, disk with usually 2 thick obtuse ridges between the side lobes and a slender mesial one on the rough midlobe, column short. *Hook. f. Ic. Pl. t.* 1845. *Octomeria alba*, *Wall. mss.*

SUBTROPICAL HIMALAYA; from Kumaon, alt. 3-6000 ft., *Edgeworth, Royle, Strachey & Winterbottom* (*E. excavata*), to Sikkim, alt. 6-7000 ft.

Habit of but differing from *excavata* in the pronounced mentum, and different column and lip, on which latter the ridges are sometimes obsolete or represented by 2 calli; nerves of sepals and petals sometimes anastomosing; flowers white, lip yellow and red; column small, but not broad and excavate.

41. **E. Eriopsidobulbon**, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 148; leaves 2-3 narrow, spike short puberulous, bracts equalling the very small glabrous flowers, lateral sepals ovate-lanceolate obtuse and linear-oblong acute petals 3-nerved, mentum short incurved, lip obovate with 2 thickened arched ridges on the disk, side lobes above the middle, midlobe small semicircular 5-ridged, column long.

TENASSERIM; at Moulmein, *Parish*.

Pseudobulbs 2 in., oblong or ovoid. *Leaves* 4-6 in., linear-lanceolate, nerves slender. *Spike* 2 in.; nerves of sepals and petals quite simple.

§§ Flowers pedicelled.

a. *Bracts large, lanceolate or ovate-oblong.*

42. **E. confusa**, *Hook. f. Ic. Plant.* t. 1850; pseudobulbs elongating into cylindric stems, leaves 2-8 narrow rigid strongly nerved, racemes lateral tomentose, bracts large lanceolate pubescent, sepals $\frac{1}{2}$ - $\frac{2}{3}$ in. broadly ovate-oblong obtuse 5-nerved pubescent, mentum broadly conic, petals elliptic-lanceolate 3-5-nerved, lip broadly obovate, side lobes incurved with 3 thick middle ridges, midlobe orbicular or ovate thickened, column rather long. *E. excavaea*, in part, *Lindl. Gen. & Sp. Orchid.* 67, and in *Wall. Cat.* 1974.

NEPAL, *Wallich*. SIKKIM, alt. 4-6000 ft., *J. D. H.*, &c. (*E. alba*).

Pseudobulbs 2-4-nodal, lengthening into terete striate stems 3-10 in. long, and as thick as the finger. *Leaves* lanceolate. *Racemes* 2-4 in., inclined; flowers white, lip yellow; pedicel with ovary $\frac{3}{4}$ -1 in.; bracts $\frac{1}{2}$ in.; nerves of perianth not branching.—Near *E. bractescens*, differing in the stiff narrow leaves and bracts. A drawing of it in *Herb. Calcutt.* shows no ridges on the side lobes of the lip, but 2 small spots on the disk and a mesial crest on the yellow midlobe.

43. **E. acervata**, *Lindl. in Journ. Hort. Soc.* 1851, 57, with woodcut; and in *Part. Fl. Gard.* i. 170; pseudobulbs crowded, leaves 3-5 oblanceolate flaccid, racemes and flowers glabrous, scape interfoliar, bracts lanceolate, lateral sepals ovate-lanceolate acuminate 5-7-nerved, petals linear-oblong or lanceolate 5-nerved, mentum rounded or broadly conic, lip oblong or obovate with 3 median ridges, side lobes about the middle incurved, midlobe ovate or orbicular, column very short. *Reichb. f. in Gard. Chron.* 1878, 106; *Hook. f. Ic. Pl.* t. 1849; *Walp. Ann.* vi. 269. *Dendrobium seriatum*, *Wall. mss.*

SIKKIM HIMALAYA (*Ic. in Hort. Bot. Calc.*). KHASIA HILLS, alt. 4-5000 ft., *J. D. H. & T. T.* ? TENASSERIM, *Parish*.

Pseudobulbs 1-2 in., ellipsoid, grooved or flask-like and flattened if too crowded, not lengthening into long stems. *Leaves* 4-8 in., obtuse or acute, pale green, many-nerved. *Racemes* 2-3 in., slender; pedicels with ovary $\frac{3}{4}$ -1 in.; bracts half as long; flower broad, white or yellowish, membranous.—The texture of the leaves is peculiar. In *Herb. Calcutt.* is a drawing of a Sikkim plant which I take to be a form of this with a more conical incurved mentum. *Parish's* Tenasserim plant has short broad leaves of a different texture.

44. **E. bractescens**, *Lindl. in Bot. Reg.* 1841, *Misc.* 18; 1844, t. 29; leaves 2-3 oblong, racemes slender and long-pedicelled white flowers glabrous or puberulous, bracts large, lateral sepals $\frac{1}{4}$ - $\frac{1}{2}$ in. ovate-lanceolate acuminate falcate and linear-oblong petals 5-nerved, mentum conical subacute, hypochile cuneate-obovate with 3 thickened ridges, the lateral short, side lobes pink rounded, midlobe quadrate. *Walp. Rep.* vi. 277.

SINGAPORE, *Cuming* (*Hort. Loddiges*). TENASSERIM; at Mergui, *Parish*.

Pseudobulbs 1-1½ in., crowded, oblong, 2-3-nodal. *Leaves* 3-4 in., obliquely 2-fid. *Racemes* suberect; bracts linear-oblong or elliptic, lower ¾ in., empty, margins recurved; pedicel very slender, with the ovary 1 in.; column rather long.

VAR. ? *Kurzii*; pseudobulb 2-3 by ½-1 in. diam. brown, leaves 3-5 by 1½-2 in. elliptic shortly petioled, bracts elliptic flat tipped with pink, flowers much larger white, ridges of lip yellowish, midlobe orbicular-cordate. *E. Kurzii*, *T. Anders. mss.*—Andaman Islands, *lc. in Herb. Calcutt.*

VAR. ? *affinis*; pseudobulbs elongate rugose, leaves lanceolate, bracts yellowish tinged with brown, racemes sparsely pubescent, flower white, base of green lip pale orange, foot of column red. *E. affinis*, *Griff. Notul. iii. 297.*—Mergui, *Griffith*, who suggests its being a variety of his *E. pulchella* (*Griffithii*, *R. f.*).

45. ***E. Griffithii***, *Reichb. f. Xen. Orchid. ii. 163*; leaves 2-3 shortly petioled elliptic-lanceolate, racemes erect pubescent equalling the leaves, flowers ochreous, bracts large oblong, margins revolute, lateral sepals lanceolate acute, mentum rather long, petals ovate-lanceolate, hypochile cuneate 3-ridged, side lobes rounded purple, midlobe ovate acute yellow. *E. pulchella*, *Griff. Notul. iii. 297.*

TENASSERIM; at Mergui, *Griffith, Parish*.

I cannot distinguish dried specimens of this from *E. bractescens*. There is an excellent drawing of it by Griffith in *Herb. Lindley* and by Parish at Kew.—Identified by Lindley with *bractescens*. Griffith's specimens have ovoid rugose almost grooved pseudobulbs, 2-3 in. long, and leaves narrowed into a petiole, but in his drawing the pseudobulbs are small and leaves sessile.—The endeavour to distinguish the species of this section, of which the specimens are often insufficient, has been very laborious, and the result is far from satisfactory.

46. ***E. recurvata***, *Hook. f. Ic. Plant. ined.*; pseudobulbs 6-8 in. stout terete, leaves long-petioled elliptic-lanceolate acuminate, racemes lateral many-fid. pubescent, bracts ovate-lanceolate acuminate as long as the ovaries, sepals falcately lanceolate acuminate 5-nerved and lanceolate acuminate petals recurved from the middle, mentum long 2-lobulate incurved, side lobes of lip narrow rounded, midlobe obcordate apiculate, disk with a flattened broad ridge between the side lobes.

PERAK, *Kunstler* (*lc. in Herb. Calcutt.*).

Pseudobulbs subtoruous, 3-4-nodal, grooved. *Leaves* 6-10 by 1-1½ in., plicate; petiole 1-2 in. *Racemes* 6 in., drooping; bracts yellow, flat or concave, lower 1 in.; sepals ½ in., glabrous, white with pink veins and tips; lip with purplish side lobes and a yellowish disk and midlobe; column very short.—A very fine species, perhaps better referred to the section with dense flowers (after *scabrilinguis*).

47. ***E. myristiciformis***, *Hook. Bot. Mag. t. 5415*; pseudobulbs ellipsoid, leaves 2-3 oblanceolate, racemes erect and flowers glabrous, bracts lanceolate exceeding the ovary reflexed, lateral sepals ovate acute 5-nerved, petals oblong 3-nerved, mentum rounded, lip obovate with 2 long calli between the small rounded side lobes and an ovate crested midlobe, disk ridged.

TENASSERIM; at Moulmein, *Parish*.

Pseudobulbs of the size and form of nutmegs, striate. *Leaves* 5-7 in., acute. *Racemes* much shorter than the leaves; pedicels with ovary 1 in.; flowers pure white; lip yellowish; column very short.—Specimens insufficient. *Parish's E. trilophata*, *mss.*, referred by Reichenbach to *E. dasypus*, is, I think, this.

β. *Bracts small or narrow.*

48. ***E. saccifera***, *Hook. f. Ic. Plant. ined.*; pseudobulbs elongate

cylindric, leaves few 8-12 in. petioled elliptic-lanceolate, racemes slender laxly many-fl. drooping subtomentose, bracts linear-oblong shorter than the slender ovaries, flowers small, lateral sepals short acute, mentum subcylindric-sacciform, base rounded, petals elliptic acute 3-nerved, lip with a long claw expanding into a subreniform or fan-shaped rugose limb.

PERAK; on Gunong Batu Pateh, *Wray*.

Pseudobulbs 3 in., tufted, base swollen. *Leaves* 2-3, contracted into a slender 1-1½ in. petiole, plaited. *Racemes* 5 in., brown-pubescent; bracts ½ in.; pedicels with ovary longer than the saccate mentum; flowers about ½ in. diam., membranous, glabrous within, "shades of dull pink, claret, and yellow," *Wray*.—An anomalous species, with the habit of this group, but a very different lip.

49. ***E. concolor***, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 148; pseudobulbs fusiform, leaves linear-lanceolate, racemes suberect few-fl. sparsely pubescent, bracts small ovate-lanceolate, lateral sepals ½ in. ovate-lanceolate acuminate and oblong acute petals 3-5-nerved, hypochile oblong, base narrow cuneate, side lobes very narrow, disk with a thick ridge, midlobe orbicular retuse apiculate.

TENASSERIM, *Parish*; on Moolyet, *Gallatly*.

Pseudobulbs 1-3 in., young clothed with truncate cupular imbricating sheaths. *Leaves* 4-6 in., very narrow, rather membranous. *Racemes* very slender; flowers 2-4, pale yellow-green; mentum obtusely triangular; epichile dirty yellow; column rather long.—Described chiefly from *Parish's* drawing. Very like *Griffithii*, except in the small bracts.

50. ***E. Maingayi***, *Hook. f. Ic. Plant. ined.*; pseudobulbs tufted fusiform, leaves 2-3 linear-lanceolate thickly coriaceous, racemes very slender lax-fl. puberulous, bracts oblong as long as the very slender pedicels, flowers small, lateral sepals triangular-ovate acute and linear-oblong obtuse petals 5-nerved, mentum stout incurved, hypochile broadly obovate-oblong 3-ridged, base rounded, side lobes rounded crenate small, midlobe orbicular.

PENANG; on Government Hill, *Maingay (Kew Distrib. 1632)*.

Pseudobulbs 1-1½ in. *Leaves* spreading rigidly horizontally. *Racemes* 2 in., flowering nearly to the base; bracts ½ in. long, nerved; sepals about ½ in. long.—*Reichenbach* has given this the mss. name of *E. anthomeniaca* (in *Herb. Kew*), the application of which I fail to see.

51. ***E. tricolor***, *Thwaites Enum.* 429; pseudobulbs tufted fusiform, leaves many 5-9 in. lanceolate, bases sheathing, racemes slender laxly many-fl. furfuvaceous, bracts small elliptic obtuse 1-nerved, sepals ovate and linear-oblong petals obtuse white, mentum broad, hypochile cuneate with subfalcate side lobes, midlobe rounded, tip recurved obtuse.

CEYLON; in higher parts of the Central Province, *Thwaites*.

Pseudobulbs 3-5 in., polynodal, brown; young clothed with many short obtuse imbricating sheaths. *Leaves* 6-8 in., forming a distichous terminal tuft, recurved. *Racemes* from the sides of the pseudobulb, erect, as long as the leaves; bracts green, shorter than the ovary; flowers ¾ in. diam.

*** Stem elongate, terete, cylindric or clavate (broad and compressed in *E. bifolia*), fleshy or rigid. *Leaves* few, usually subterminal. *Flowers* 1-3, medium-sized, usually long-pedicelled on a short sometimes obsolete lateral or subterminal peduncle; bracts large, often coloured, sessile

amongst the leaves when the peduncle is short or 0; flowers usually white.

52. **E. pauciflora**, *Wight Ic. t.* 1636; stem slender below clavate above, leaves 2 linear-oblong, flowers 1-2, pedicels very slender with 2-3 oblong bracteoles, bracts basal oblong obtuse, lateral sepals $\frac{1}{2}$ in. ovate acute glabrous 5-nerved, mentum rounded, petals oblong 3-nerved, lip sessile cuneately oblong truncate, lobes obscure, disk with 2 calli, axis ridged, column short. *Lindl. in Journ. Linn. Soc.* iii. 58 (*excl. Khasia hab.*); *Walp. Ann.* vi. 272.

NILGHIRI HILLS, *Wight*.

Stems 5-6 in., from a creeping stock; internodes $\frac{1}{2}$ -1 in.; sheaths short, truncate. *Leaves* 2-5 in., obtuse or subacute. *Scape* 1-1 $\frac{1}{2}$ in., very slender; bracts $\frac{1}{2}$ in., membranous; bracteoles scattered, $\frac{1}{3}$ - $\frac{1}{2}$ in.; flowers white; outer nerves of petals branching; lip strongly nerved.—The bracteoles are anomalous.

53. **E. Lindleyi**, *Thwaites Enum.* 299; stem elongate clavate, leaves elliptic-lanceolate, scape short 2-3-fl., bracts very large oblong, sepals ovate or lanceolate 7-9-nerved glabrous, mentum rounded, petals linear-oblong falcate obtuse 3-5-nerved, broad lateral lobes of hypochile almost as long as the suborbicular epichile, disk with 2 calli between the lobes, column long. *E. ephemera*, *Reichb. f. in Walp. Ann.* vi. 272. *E. bicolor*, *Lindl. in Journ. Linn. Soc.* iii. 58 (*not of Gen. & Sp.*). *Dendrobium bicolor*, *Lindl. Gen. & Sp. Orchid.* 90.

CEYLON; in the Central Province, ascending to 7000 ft., *Walker, Thwaites*.

Stem 6-18 in., sometimes 1 in. diam. above, smooth; internodes not swollen. *Leaves* 3-4 in. *Peduncle* 1-1 $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., very variable in shape; flowers white; sepals $\frac{1}{2}$ - $\frac{3}{4}$ in., variable in breadth.

54. **E. truncata**, *Lindl. in Journ. Linn. Soc.* iii. 58; stem subcylindric, leaves lanceolate, scape short and flowers tomentose, bracts large oblong, sepals oblong-ovate obtuse 7-nerved, mentum rounded, petals linear-oblong falcate 5-nerved, lip sessile fleshy semicircular truncate with a slender triple ridge, column rather long and broad.

TENASSERIM; on Thoung-gyun, alt. 4-5000 ft., *Lobb*.

Stem 4-6 in., covered with obtuse sheaths. *Leaves* 3-5 in., thick, acute. *Peduncle* $\frac{1}{2}$ in., stout, pedicel with ovary as long; sepals $\frac{3}{4}$ in. long, white.

55. **E. clavicaulis**, *Wall. mss. ex Lindl. Bot. Reg.* 1840, *Misc.* 90 (*not of Journ. Linn. Soc.*); stem elongate subclavate, leaves 2-4 elliptic-lanceolate, scape 2-3-fl., bracts elliptic or oblong, lateral sepals triangular acute, mentum broad rounded or incurved, petals broadly oblong 5-nerved, hypochile broadly obovate, side lobes large rounded sometimes embracing the smaller rounded crenate puberulous epichile, disk with a tomentose ridge thickened at the sinus and 2 elongate lateral calli, column long. *Walp. Ann.* vi. 278. *E. khasiana*, *Lindl. in Journ. Linn. Soc.* iii. 59.

KHASIA HILLS, *Griffith (& Ic. in Hort. Bot. Calc.)*.

Stems 6-8 in., crowded, terete; internodes 2 in.; sheaths short, acute. *Leaves* 3-4 in., terminal, acuminate. *Scape* $\frac{1}{2}$ -1 in.; pedicels about as long, slender; bracts $\frac{1}{2}$ -1 in., many-nerved; flowers glabrous, white, lateral sepals $\frac{1}{2}$ - $\frac{1}{2}$ in., and lip white with purple margins.—The habitat of Wallich's *E. clavicaulis* is not recorded; the cultivated specimens in Herb. Lindley have larger flowers than the native ones, with a broader lip.

56. ***E. amica***, *Reichb. f. Xen. Orchid.* ii. 168, t. 3, f. 6-9; stem cylindric, leaves cuneately oblong-ligulate, raceme few-fl., rachis and sepals puberulous; bracts large ovate acute, lateral sepals triangular, petals linear-lanceolate, lip cuneately dilated 3-fid, side lobes obtusely angled, isthmus narrow, midlobe obcordate, disk 3-keeled.

ASSAM, *Hort. Day*.

Pseudobulb cylindric, 4-5 by $\frac{1}{2}$ in. *Leaves* acuminate. *Bracts* 7-nerved, $\frac{1}{2}$ as long as the pedicel with the ovary. *Flowers* pale straw-colour with red nerves; lip dark purple, midlobe pale yellow; androclinium immersed, foot with two small horns in the hollow.—Description from Reichb.

57. ***E. acutifolia***, *Lindl. in Bot. Reg.* 1842, 38; stem short oblong, leaves fleshy lanceolate coriaceous very acute as long as the erect 5-6-fl. pubescent scape, bracts oblong reflexed, flowers glabrous, side lobes of hypochile very acute, epichile oblong obtuse concave with 3 fleshy nerves, column deeply hollowed. *Walp. Ann.* vi. 278.

INDIA (*Hort. Loddiges*).

Near *E. clavicaulis*. *Leaves* 2-3 in. *Flowers* white, veined with violet; lip with purple base and dull yellow tip.—Description from Lindley; I find no specimens in his Herbarium.

58. ***E. marginata***, *Rolfe in Gard. Chron.* 1889, i. 200; stem clavate slender below, leaves 3 linear-oblong obtuse, scape short 2-fl. and sepals white-tomentose, bracts large oblong, lateral sepals triangular-lanceolate acuminate 5-nerved, petals oblong obtuse 7-nerved, mentum rounded, hypochile oblong, side lobes uncinatè much shorter than the rounded crenate pubescent epichile, disk with a tomentose ridge and tubercle at the base of the epichile.

BURMA (*Hort. Bonham Carter*).

Stem 3 in. *Leaves* as long. *Scape* $\frac{1}{2}$ in., bracts $\frac{1}{2}$ in., petaloid, glabrate, yellow; pedicel with ovary as long; flower 1 in. diam., white flushed with pink; lip pale yellow, margined with red.—Described from one specimen.

59. ***E. nutans***, *Lindl. in Bot. Reg.* 1840, *Misc.* 83; in *Journ. Linn. Soc.* iii. 58; stem terete leafy sheathed throughout, leaves lanceolate acuminate, bracts broad flat fleshy acute, flower pedicelled solitary campanulate glabrescent, lateral sepals broad and petals obtuse, hypochile sessile lunate embracing the small orbicular epichile, disk with a central ridge from base to apex and two short lateral ones. *Walp. Ann.* vi. 272.

PENANG, *Maingay (Kew Distrib.* 1679, 1679/2). PERAK, *Scortechini*. SINGAPORE, *Cuming (Hort. Loddiges)*.

Stem 6-10 in.; sheaths imbricate, acute. *Leaves* 4-7 in., lanceolate, acuminate. *Bracts* flesh-cold; pedicel $\frac{1}{4}$ - $\frac{3}{4}$ in.; flowers white tinged with bright red; tips of petals and lip yellow.—Amongst Scortechini's Perak drawings is one like this (*Dendrobium*, 892), but with ovate-lanceolate spreading side lobes of lip, and a much larger orbicular midlobe.

60. ***E. biflora***, *Griff. Notul.* iii. 302 (not of Lindl.); stem clavate, internodes very short, leaves elliptic-lanceolate, scape very short lateral 2-fl., bracts ovate-cordate, flowers very small glabrous, sepals oblong-lanceolate and linear-oblong petals obtuse 3-nerved, mentum short incurved, lip elliptic obtuse, disk with 2 broad lamellæ and a median ridge, column very short.

SIKKIM HIMALAYA (*Ic. Herb. Calcutt.*). TENASSEEIM; at Mergui, *Griffith*.

Stems 4-6 in., tufted, slender below; internodes $\frac{1}{2}$ in., terete. *Leaves* 3 in.

Scape $\frac{1}{2}$ in.; bracts twice as long; flower $\frac{1}{4}$ in. diam., yellow-white.—The Sikkim habitat is from a drawing of a garden specimen. Lindley, in founding his *E. biflora* on Griffith's *Trichotosia biflora*, overlooked Griffith's *E. biflora*.

Sect. VII. DENDROLIRION (see p. 786).

* *Pseudobulbs usually large. Inflorescence white- or yellowish-tomentose or woolly.*

61. ***E. flava***, Lindl. in Wall. Cat. 1973 (in part); Gen. & Sp. Orchid. 65; in Journ. Linn. Soc. iii. 49 (excl. var. β .); pseudobulbs large 3-5-leaved, scape and sessile flowers white-tomentose, lateral sepals $\frac{3}{4}$ in ovate-lanceolate obtuse 9-nerved, mentum subcylindric, petals obtuse 3-nerved, hypochile broadly oblong puberulous, lobes short broad, epichile subquadrately rounded. *E. pubescens*, Lindl. in Bot. Reg. under t. 904. *E. laniceps*, Reichb. f. in Hamb. Gartenzeit. xix. 10. *Dendrobium pubescens*, Hook. Exot. Fl. t. 124. *Octomeria flava*, Wall. mss. *O. pubescens*, Spreng. Syst. iv. 310.

TROPICAL HIMALAYA, from Garwhal eastwards to Bhotan.

Pseudobulbs 3-4 in.; base sheathed; young leafy throughout. *Leaves* 6-10 in., petioled, acuminate, often loaded with concretions. *Scape* 6-10 in., stout; bracts $\frac{1}{2}$ -1 in., ovate, acuminate; ovary $\frac{3}{4}$ -1 in.; flowers yellow with purplish markings on the disk of the lip, which is tumid or variously thickened, claw very broad; column short, broad.—In the Fl. Exot. figure the petals are ovate-oblong, obtuse. In a Garwhal specimen marked by Reichenbach as the true plant of Fl. Exot. the claw of the lip is pointed, and the thick disk of the midlobe trifid in front. In Garwhal specimens of Falconer's marked *E. laniceps* by Reichb. the disk of the midlobe is thickened on each side with a central callus and another above the claw. Wallich's 1973 includes *E. flava*, *elongata* & *tomentosa*.

VAR. *lanata*; flowers smaller, lip narrower, midlobe purplish with thickened nerves on the disk. *E. lanata*, Griff. Notul. iii. 301; Lindl. in Journ. Linn. Soc. iii. 49.—Sikkim Himalaya, J. D. H. Tenasserim, Griffith (Kew Distrib. 5123), Helfer (Kew Distrib. 5122).

62. ***E. elongata***, Lindl. in Journ. Linn. Soc. iii. 49; characters of *E. flava*, but spikes often much longer, flowers smaller, often pedicelled, petals oblanceolate. *E. flava*, Griff. Notul. iii. 301; Wall. Cat. 1973/3 (in part).

TENASSERIM and AWA, Wallich, Griffith, Lobb, Parish.

I doubt this being more than a variety of *E. flava*, but there may be several species included under this and *E. flava*.

63. ***E. andamanica***, Hook. f. Ic. Pl. ined.; pseudobulbs as in *E. flava*, leaves elliptic-lanceolate, lateral sepals $\frac{3}{4}$ in. long acuminate 9-nerved, petals oblanceolate 5-nerved, lip 1 in. long narrowly oblong from a broad claw pubescent, side lobes narrow acute, axis thickened, midlobe as broad but much shorter subquadrate 2-fid veined, column long.

SOUTH ANDAMAN ISLANDS, Kurz.

I advance this as a species with great hesitation, but the long column, nearly half as long as the dorsal sepal, and the corresponding long lip are very strong characters (if constant).

64. ***E. pulchella***, Lindl. in Wall. Cat. 7407; in Bot. Reg. 1841, Misc. 52; in Journ. Linn. Soc. iii. 51; pseudobulbs ellipsoid or clavate, leaves 2-5 subcoriaceous, flowers few in a stout leaf-opposed white-tomentose

scape, sepals short thick spreading from the base tomentose on both surfaces, mentum 0, lip small sessile entire orbicular or subcordate, disk thickened pubescent, column long stout, foot very short with a large purple shining tubercle at the base. *Walp. Ann.* vi. 271. *E. discolor*, *Lindl. in Journ. Linn. Soc. l. c.* *Callostylis rigida*, *Blume Bijdr.* 340, f. 74; *Lindl. Gen. & Sp. Orchid.* 129. *Tylostylis*, *Blume Fl. Jav. Præf.* vi.

SIKKIM HIMALAYA, alt. 3-4000 ft., J. D. H. TENASSERIM, alt. 4000 ft., *Parish.* PERAK, *Scortechini.* MALACCA, *Cuming.*—DISTRIB. Siam, Java.

Pseudobulb 1-pluri-nodal, 2-10 in. long, contracted at both ends. *Leaves* 3-5 in., sessile, obtuse or notched. *Scape* 2-3 in., base sheathed; bracts orbicular, coriaceous; flowers yellow, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; lateral sepals broadly ovate; petals linear-oblong, tomentose; lip with a minute claw, mobile (*Blume*).—Very distinct from its congeners in the spreading flowers, lip, and foot of column; perhaps a distinct section with *E. barbata*, which also has a mobile lip.

65. ***E. sicaria***, *Lindl. in Journ. Linn. Soc.* iii. 50; pseudobulbs narrowly oblong, leaves linear or linear-lanceolate semi-terete fleshy channelled, scape slender and flowers white-woolly, bracts ovate acuminate, lateral sepals ovate obtuse 5-7-nerved, petals linear- or obovate-oblong 5-nerved, mentum obscure, lip shortly broadly clawed, side lobes spreading rounded, midlobe obcordate, disk with a tricrural thickened ridge.

TENASSERIM; at Mergui, *Griffith, Parish.*

Pseudobulbs $1\frac{1}{2}$ -2 in. long, from a stout woody rhizome. *Leaves* 4-6 in., acuminate, tapering to the base (dry pustulate). *Scape* 4-6 in.; bracts $\frac{1}{4}$ in.; pedicel with slender ovary $\frac{3}{4}$ in.; flowers spreading, $\frac{3}{4}$ in. across, white with purple markings on the lip.

66. ***E. Dayana***, *Reichb. f. in Gard. Chron.* 1877, ii. 102; pseudobulbs ovoid, leaves 3 linear-lanceolate very coriaceous, raceme lax-fl'd. tomentose, bracts linear-lanceolate scarious equalling the lower pedicelled ovaries, sepals triangular tomentose, petals narrower, lip broad, side lobes oblong narrow, midlobe oblong emarginate, callus longitudinally ligulate with retrorse arms at the end.

EAST INDIES (*Hort. Day*).

Allied to *E. sicaria*, *Lindl.* Unknown to me. Description from *Reichb. f.*

67. ***E. dasypus***, *Reichb. f. in Bot. Zeit.* 1864, 415; pseudobulb cylindric, leaves 2-3 narrowly oblanceolate obtuse, racemes lateral slender white-woolly few-fl'd., bracts broadly ovate apiculate, pedicels slender and ovate oblong obtuse 3-4-nerved sepals woolly, petals oblong 3-nerved, lip cuneate-obovate with 3 median ridges, side lobes oblong, almost as long as the transverse midlobe, column long.

TENASSERIM; at Mergui, *Parish.*

Pseudobulbs $1\frac{1}{2}$ -2 in., as thick as the little finger, erect. *Leaves* as long. *Racemes* 1 in., very slender; bracts membranous, apiculate; pedicel $\frac{1}{2}$ in.; sepals $\frac{1}{4}$ in.; mentum rounded, subincurved.

68. ***E. pellipes***, *Reichb. f. in Herb. Kew*; pseudobulbs small very close set on the creeping rhizome 1-leaved, leaf obtuse very thick terete or subcompressed, scape slender and 1-2 flowers white-woolly, bracts small, lateral sepals triangular-ovate acute 5-nerved, mentum large saccate, petals linear 3-nerved woolly, lip coriaceous subspathulate or linguiform, tip rounded or retuse, back woolly.

PENANG, and MALACCA on Mount Ophir, *Maingay* (*Kew Distrib.* 1630/2). PERAK, *Wray*.—DISTRIB. Borneo (*Beccari*, No. 483).

Pseudobulbs $\frac{1}{2}$ – $\frac{3}{4}$ in., sessile, more or less tomentose, conic or subglobose. *Leaves* 2–3 in., straight or curved, smooth, thick and spongy; basal sheaths short, woolly. *Scape* equalling the leaf, erect; peduncle with ovary about $\frac{3}{4}$ in., lengthening to $1\frac{1}{2}$ in. in fruit; sepals about $\frac{1}{2}$ in. long; column very short; capsule $\frac{3}{4}$ in., narrowly ellipsoid.

** *Pseudobulbs large. Flowers brown-tomentose.*

69. **E. barbata**, *Reichb. f. in Walp. Ann.* vi. 270; pseudobulbs broadly ovoid 2-leaved, leaves large petioled lanceolate, scape and pedicels very long, bracts large, lateral sepals lanceolate falcate 5–7 nerved, mentum incurved, petals very narrow, lip stipitate narrowly lanceolate *Erioidea*, *Griff. It. Notes* 83. *Tainia barbata*, *Lindl. in Gard. Chron.* 1857, 68.

KHASIA HILLS; in the Suniassee Valley, *Griffith* (*Kew Distrib.* 5297); Shillong, alt. 5000 ft., *Clarke*.

Pseudobulbs 2 in. long and broad. *Leaves* 12–14 in., plicate, long-acuminate. *Scape* 3 ft., very stout below, pubescent; bracts $\frac{1}{2}$ –1 in., lanceolate; flowers distant; pedicels 1 in., lengthening in fruit; sepals $\frac{2}{3}$ in. long, yellow tessellated with blood-red (*Griff.*), dorsal linear; petals red-purple, tip spatulate; lip tremulous (*Griff.*), revolute, strongly nerved, tip scabrid; column stout; pollinia broadly pyriform, attached to a stiff viscus. *Capsule* 1 in., narrowly oblong.

70. **E. tomentosa**, *Hook. f.*; pseudobulbs large ovoid, leaves few elliptic-oblong very thick, scape terminal very stout and raceme brown-villous, bracts very large, pedicels with the long ovary 1– $1\frac{1}{2}$ in., sepals coriaceous falcate lanceolate, mentum large incurved, petals oblanceolate, lip oblong strongly nerved, claw broad, side lobes narrow, midlobe clawed subquadrately cordate. *E. ornata*, *Lindl. in Journ. Linn. Soc.* iii. 48 (not of *Gen. & Sp. Orchid.*). *E. flava*, *Wall. Cat.* 1973/2 (in part). *Epidendrum tomentosum*, *König in Retz. Obs.* vi. 53.

SILHET, *Wallich*. KHASIA HILLS, alt. 3–4000 ft., and CHITTAGONG, at Seetakoond, *J. D. H. & T. T. (E. ornata)*. TENASSERIM (*lc. in Herb. Lindl. & Parish*).

Pseudobulbs 2–4 in., from a very stout woody rhizome, 3–4-leaved when young. *Leaves* 3–6 by $1\frac{1}{2}$ –3 in., nerveless, smooth and almost spongy, contracted into a very thick petiole. *Scape* 6–12 in., as thick as a goose-quill or less, base with short coriaceous sheaths; rachis of raceme stout, scarred after fruiting; bracts 1 in. and less, oblong or lanceolate, not reflexed, coarsely veined with a broad thickened roughened central area from the base to the apiculate tip.—This differs from the Philippine Island *E. ornata* in the much shorter bracts and lip.

*** *Pseudobulbs very small or 0. (See also 68. E. pellipes.)*

71. **E. Thwaitesii**, *Hook. f.*; pale tomentose all over, rhizome very stout with short 3–7-leaved branches, leaves linear-lanceolate subacute thickly coriaceous, scapes 1–2 terminal lax-fl., bracts small, flowers small coriaceous, lateral sepals broad obtuse, petals linear subacute, lip tongue-shaped recurved fleshy tomentose, side lobes very small. *E. velutina*, *Thwaites Enum.* 299 (not of *Lodd.*).

CEYLON; in the Central Province, alt. 3000 ft., *Thwaites*.

Rhizome as thick as a swan's quill, internodes very short; sheaths woolly. *Leaves* 2–4 in., often subfalcate or oblanceolate, midrib distinct. *Scape* with raceme 3–4 in., suberect; bracts $\frac{1}{2}$ in., oblong, obtuse, woolly; pedicels very short; sepals $\frac{1}{2}$ in. long, yellow. *Capsule* $\frac{1}{2}$ in.

72. ***E. ferruginea***, Lindl. in *Bot. Reg.* 1839, t. 35; in *Journ. Linn. Soc.* iii. 57; brown-tomentose, rhizome stout, branches short 2-leaved, leaves lanceolate thickly coriaceous, escapes from the bases of the branches, bracts large, flowers coriaceous, lateral sepals very broad 9-nerved, petals obovate-oblong, hypochile broad saccate shortly clawed, lobes small, epichile short crisped, disk with large toothed crests. *Walp. Ann.* vi. 274.

KHASIA and JYNTFA HILLS, alt. 4000 ft., *Griffith*, &c.

Rhizome as thick as a swan's quill, jointed, young sheathed. Leaves 5-8 in., acuminate, base narrowed. Scape 4-6 in., base sheathed; raceme 3-5 in., rachis stout; bracts 1 in. and less, lanceolate; flowers 1 in. diam., white; lip pink; column short, stout.—Referred to sect. *Trichotosia* by Lindley.

73. ***E. pannea***, Lindl. in *Bot. Reg.* 1842, *Misc.* 64; in *Journ. Linn. Soc.* iii. 50; stems very short 1-4-leaved from a creeping rootstock, leaves linear terete fleshy, scape 1-2-fld. and large ovate bracts and sepals densely woolly, sepals ovate-lanceolate obtuse, petals linear-oblong woolly, mentum rather long obtuse, lip oblong obtuse thick concave with an oblong granulate callus at the base and near the tip. *Walp. Ann.* vi. 273. ? *E. teretifolia*, *Griff. Notul.* iii. 298; *Ic. Pl. Asiat.* t. 300.

SIKKIM HIMALAYA, *Herb. Griffith*, alt. 1-2000 ft., J. D. H. KHASIA HILLS, alt. 3-4000 ft., J. D. H. & T. T. TENASSERIM, *Parish*. PERAK, *Scortechini*. MALACCA, on Mount Ophir, *Lobb*. SINGAPORE, *Hort. Lodd.*—DISTRIB. Borneo.

Rhizome as thick as a crow-quill; stems woolly, sometimes forming small globose pseudobulbs. Leaves 1-10 in. by $\frac{1}{2}$ – $\frac{1}{4}$ in. diam., often pustulate. Scape 2-3 in.; flower sessile; lateral sepals $\frac{1}{2}$ in. long; column very short.—Griffith's *teretifolia* from Malacca, together with the Perak and Singapore plants, may be different from the Sikkim and Khasia ones, the former having narrow lanceolate and the latter broadly ovate bracts.

74. ***E. Pleurothallis***, *Par.* & *Reichb. f.* in *Trans. Linn. Soc.* xxx. 147; small, tufted, leaf solitary from a very short stem which is hidden by imbricating reticulately nerved sheaths coriaceous petioled linear-oblong or oblanceolate obtuse, scapes from sheaths on the side of the stem filiform and very small solitary flower woolly, sepals $\frac{1}{2}$ in. long broad obtuse 3-nerved, petals narrow 1-3-nerved, lip with a broad claw orbicular, side lobes and midlobe small solid globose.

TENASSERIM; on Moolyet, alt. 5000 ft., *Parish*.

Tufted, pseudobulb 0; stem $\frac{1}{2}$ in.; sheaths $\frac{1}{2}$ in., acute. Leaves when young ensiform, mature 2-2 $\frac{1}{2}$ in. Scape much shorter; bract under the flower small, membranous, sheathing; mentum large, rounded; column very short.

75. ***E. pygmæa***, *Hook. f. Ic. Plant. ined.*; size habit and inflorescence of *E. Pleurothallis*, but leaves fleshy, flowers very much larger, lateral sepals $\frac{1}{2}$ in. ovate 5-nerved, petals elliptic-oblong 5-nerved, lip very narrow, claw narrowly cuneate, side lobes short oblong obtuse, midlobe ellipsoid.

PERAK, *Wray*.

At first I was disposed to regard this as a large-fld. state of *E. Pleurothallis* but the differences in the flowers are too great.

76. ***E. lancifolia***, *Hook. f. Ic. Plant. ined.*; stems 1-2 in. tufted, pseudobulbs small appearing after flowering fleshy loosely sheathed, leaves 1-3 terminal petioled elliptic-lanceolate thin plicate, spikes from the side of the stem slender laxly many-fld. and ovary white-woolly, flowers small, lateral sepals $\frac{1}{2}$ in. triangular ovate 5-nerved, mentum rounded, petals

oblong obtuse 3-nerved, lip narrow fleshy?, side lobes tooth-like, midlobe narrow tongue-shaped or oblong.

PERAK; at low elevations, *King's Collector*.

Pseudobulbs at first the sheathed thickened lower internode of the stem, after the fall of the sheaths ovoid-oblong, $\frac{1}{2}$ – $\frac{3}{4}$ in. long; sheaths 1 in., ovate. *Leaves* 3–4 in., many-nerved, tip unequally 2-fid. *Racemes* 1–2 in., 6–10-fld.; bracts $\frac{1}{2}$ in., broadly ovate, membranous, quite glabrous, as long as the woolly ovary; “flowers waxy white, blue inside;” sepals sparsely woolly.

Sect. VIII. BAMBUSIFOLIA (see p. 786).

77. E. bambusifolia, *Lindl. in Journ. Linn. Soc.* iii. 61; leaves large linear-oblong or oblong-lanceolate, racemes as long simple or branched slender laxly many-fld. and flowers densely brown-tomentose, bracts small orbicular apiculate, lateral sepals ovate-lanceolate falcate 5-nerved, mentum long incurved, petals oblanceolate acuminate falcate 3-nerved, lip clawed ovate-oblong strongly nerved, side lobes very small, midlobe small orbicular, column long decurved.

TROPICAL SIKKIM HIMALAYA, *J. D. H. KHASIA Mts.*; at Borpanee, alt. 3–4000 ft., *Simonds, Griffith (Kew Distrib.* 5112).

Stem 2–3 ft., as thick as the thumb or less. *Leaves* a span long and less, 1–2 in. broad, acuminate, many-nerved. *Raceme* longer than the leaves; rachis slender; bracts $\frac{1}{2}$ in., reflexed; pedicel $\frac{1}{4}$ – $\frac{1}{2}$ in.; ovary slender; lateral sepals $\frac{1}{2}$ in. long. *Capsule* 1–1 $\frac{1}{2}$ in., slender, subterete, ribs slender.

78. E. crassicaulis, *Hook. f. Ic. Plant. ined.*; leaves subterminal elliptic ovate or elliptic-lanceolate, racemes as long slender laxly many-fld. and flowers brown-tomentose, bracts small orbicular; lateral sepals broadly oblong very obtuse 5-nerved, mentum short incurved, petals oblong 3-nerved, lip banded with purple shortly clawed, side lobes narrow, midlobe emarginate, base not contracted, claw axis and midlobe furfuraceous as are sometimes the 2 lateral nerves on the disk, column large decurved. *E. clavicaulis*?, *Lindl. in Journ. Linn. Soc.* iii. 59.

KHASIA Mts.; at Pomrang, alt. 4–5000 ft., *J. D. H. & T. T.*

Stem 10–12 in., as thick as the thumb or less; lower internodes 2–3 in. *Leaves* 4–6 in., acutely unequally 2-fid, coriaceous, nerved. *Racemes* as long; bracts $\frac{1}{2}$ in.; pedicels with ovary $\frac{3}{4}$ –1 in.; flowers pale, banded with purple; lateral sepals $\frac{1}{2}$ in., dorsal as long; pollinia broadly pyriform.—Much less leafy than *E. bambusifolia*, more pseudobulbous in habit, with shorter ovary and very differently shaped sepals, petals and lip; the racemes and bracts of the two are singularly alike. The Khasia specimens have only stem, leaves, raceme and bracts; the description of the flowers is from Kew Garden specimens, and a fine drawing in Herb. Calcutt. of a form with stem $\frac{1}{2}$ in. diam.

79. E. leptocarpa, *Hook. f. Ic. Plant. ined.*; leaves linear-lanceolate, tip dimidiate, peduncle subracemosely 3–5-fld., bracts ovate acute, lateral sepals ovate-lanceolate acuminate and oblong petals 3-nerved, mentum large obtuse incurved, lip broadly clawed, side lobes oblong incurved overlapping the larger broadly orbicular pubescent midlobe, axis with 3 ridges thickened at the sinus, column very short, capsule 3 in. very slender.

PERAK; *Scortechini, King's Collector*.

Stem 2–3 ft., nearly as thick below as the little finger, and hollow; internodes 1–1 $\frac{1}{2}$ in. *Leaves* 6–8 in., thinly coriaceous, obtuse, tip of one side $\frac{1}{2}$ in. longer than the other. *Peduncle* 1 in., and bracts $\frac{1}{4}$ – $\frac{1}{2}$ in., fleshy?; flowers yellow mottled with

brown, cream-cold. within; pedicel and ovary 1 in.; lateral sepals $\frac{1}{2}$ in., falcate; anther completely 4-celled; capsule strict, $\frac{1}{8}$ in. diam., angled.—The long capsule resembles *E. nutans*.

Sect. IX. TRICHOTOSIA (see p. 786).

* *Large more or less hirsute species. Column long.*

80. ***E. vestita***, Lindl. in *Bot. Reg.* 1844, *Misc.* 76; 1845, t. 2; stem stout rufously hispid, leaves 5–7 in. thickly coriaceous glabrous above nerveless, spike long laxly many-fl., bracts large ovate, sepals lanceolate, petals linear obtuse, lip oblong shortly clawed 5–7-lamellate. *Bot. Mag.* t. 5807; *Walp. Ann.* vi. 274; *Blume Mus. Bot.* ii. 184 *Dendrob. vestitum*, Wall. *Cat.* 2005 (in part); Lindl. *Gen. & Sp. Orchid.* 82.

SINGAPORE, Wallich. MALACCA, Maingay (*Kew Distrib.* 1626). PERAK, alt. 4200 ft., Curtis.—DISTRIB. Borneo.

Stem as thick as a swan's quill. *Leaves* tomentose beneath, midrib raised, otherwise nerveless. *Spike* 6–10 in.; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in.; sepals within and petals white; mentum half as long as the sepals; side lobes of lip narrow, obtuse; midlobe transverse, crisped, emarginate; column glabrous; pollinia very slender. *Capsule* 1 in., oblong, walls very thick.—Wallich's 2005 consists of detached stem, leaves and fruit of this; a good fruiting specimen of *E. ferox*, and leaves of a third species. Lindley received from him a good specimen of this, and none of *ferox*.

81. ***E. ferox***, Blume *Mus. Bot.* ii. 184; stem stout hispidly hirsute, leaves 3–4 in. many-nerved, spikes 2–3 in., bracts ovate-lanceolate, sepals ovate obtuse, petals subspathulate 3-nerved, lip cuneate-spathulate. *Trichotosia ferox*, Blume *Bijl.* 342; Lindl. *Gen. & Sp. Orchid.* 132; *De Vriese Ill.* t. 9 and t. 11, f. 5.

PENANG; Lobb, Maingay (*Kew Distrib.* 1625). PERAK, ascending to 4500 ft., Wray, &c.—DISTRIB. Java, Borneo.

Stem 4–6 ft., very stout. *Leaves* with very distinct nerves when dry. *Flowers* rather close set; bracts equalling the flowers; mentum broad, uncinat, nearly equalling the sepals; lip very variable, veined, side lobes waved, crenate, midlobe emarginate, with 2–3 rough calli; disk with 2–3 rugose nerves; foot of column flat, glabrous.

82. ***E. monticola***, Hook. f.; stem below and narrowly lanceolate leaves glabrous, flowers 2-nate on a short peduncle, bracts lanceolate nearly equalling the glabrescent rigid keeled lateral sepals, petals narrowly oblong 3-nerved, lip narrowly spathulate pubescent all over within. *E. biflora*, Lindl. in *Journ. Linn. Soc.* iii. 56 (not of Griff.). *Trichotosia biflora*, Griff. *Notul.* iii. 331, t. 315.

MALACCA; Mount Ophir, Griffith, Maingay (*Kew Distrib.* 1628/2).

Stem 12–18 in., as thick as a goose-quill, upper sheaths and young leaves hispid or villous. *Leaves* distinctly nerved when dry. *Bracts* ovate, acuminate; mentum not half as long as the sepals; lip with terminal rounded lobes, disk concave; foot of column pubescent. *Capsule* $\frac{1}{2}$ in., subglobose ellipsoid.—Griffith doubtfully refers Blume's *T. pauciflora* to this, but in that the lip is emarginate.

Var. ? *hirsuta*; leaves softly tomentose beneath, flowers hirsute, sepals not keeled, lip broader more obtusely, lobes broader.—Perak, *Scartechini*.

83. ***E. gracilis***, Hook. f. *Ic. Plant. ined.*; stem slender, leaves $1\frac{1}{2}$ –2 in. narrowly lanceolate glabrous above and beneath, peduncle $\frac{1}{2}$ in. 2–3-fl., bracts ovate-lanceolate, sepals narrow 3–5-nerved, petals linear

3-nerved, lip with a long straight claw and small flabelliform limb densely pubescent except the margin.

PERAK, *Scortechini*.

Stem 6-8 in., as thick as a duck's quill, upper sheaths hirsute. *Leaves* slightly hairy when young. *Peduncle* hirsute or glabrescent; bracts $\frac{1}{2}$ - $\frac{2}{3}$ in.; mentum half as long as the sepals; lip straight, limb thick crenate; column glabrous, foot tumid villous.—The smallest species of this sub-section.

84. **E. oligantha**, Hook. f. *Ic. Plant. ined.*; nearly glabrous, leaves 2-2 $\frac{1}{2}$ in. thickly coriaceous ovate-lanceolate glabrous above tomentose beneath, flowers 1-2 sessile glabrescent, sepals ovate acuminate 5-7-nerved, petals narrowly oblanceolate acute 3-nerved, lip narrow, claw long pubescent, limb half as long obovate villous.

PENANG, *Maingay* (*Kew Distrib.* 1629).

Stem 10-12 in., curved, as thick as a goose-quill, tips hirsute. *Leaves* with strongly recurved margins when dry, not nerved. *Flowers* $\frac{1}{2}$ in. long, at first hirsute; mentum as long as the sepals; side lobes of lip narrow, rounded; terminal thickened, crenulate, emarginate; column and its foot pubescent.

85. **E. velutina**, G. Loddiges in *Bot. Reg.* 1840, *Misc.* 86; stem above and leaves softly villous, leaves 2-3 in. thickly coriaceous oblong-lanceolate, flowers few in subsessile spikes, bracts ovate coriaceous, sepals ovate-lanceolate, petals linear obtuse 5-nerved, lip very long-clawed, glabrous with a villous cushion on the cuneate obovate limb. *Walp. Ann.* vi. 274.

SINGAPORE, *Cuming* (*Hort. Loddiges*). MALACCA, *Maingay*. TENASSERIM, *Helfer* (*Kew Distrib.* 5110).

Stem 1-2 ft., as thick as a goose-quill. *Leaves* with strongly revolute margins when dry. *Spikes* dense-fl.; mentum as long as the sepals; side lobes of lip rounded, midlobe short, 2-fid; foot of column puberulous.—The flowers are described in *Bot. Reg.* as solitary.

86. **E. pulvinata**, Lindl. in *Journ. Linn. Soc.* iii. 56; villously hirsute, stems short, leaves 1 $\frac{1}{2}$ -2 in. ovate subacute, flowers solitary hirsute, sepals ovate-lanceolate, petals linear, lip spatulate emarginate hairy and with a pubescent cushion within the tip.

TENASSERIM; at Mergui, *Griffith*.

Described by Lindley from (an evidently enlarged) drawing by Griffith. Parish has a drawing of a plant named *E. pulvinata* with tufted erect stems 6 in. long swollen at the base, flowers white 2-nate nearly 1 in. long, mentum truncate much shorter than the sepals.

87. **E. tuberosa**, Hook. f. *Ic. Plant. ined.*; stem short glabrous except the tips and base, leaves 2-2 $\frac{1}{2}$ in. lanceolate thickly coriaceous glabrous on both surfaces, flowers 2 on a short peduncle hirsute, bracts orbicular or ovate very coriaceous, sepals ovate-lanceolate falcate, petals narrowly spatulate obtuse 3-nerved, lip obovate, axis tomentose, midlobe short broad 2-winged or retuse.

PERAK, *Scortechini*.

Stems 6-8 in., as thick as a goose-quill, curved, tumid base $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. *Flowers* $\frac{2}{3}$ in. long; mentum half the length of the sepals, tip swollen; side lobes of lip obscure; midlobe with thickened nerves, column and its tumid foot pubescent.

88. **E. rufinula**, Reichb. f. in *Hamb. Gartenzeit.* xix. 13; hirsute, leaves 3-4 in. narrowly lanceolate very coriaceous, spikes short 2-4-fl.

hispid, bracts long narrow recurved, sepals lanceolate, petals oblanceolate acute 3-nerved, lip glabrous except the ciliate base, claw broad, limb obcordate. *E. annulata*, Lindl. in *Journ. Linn. Soc.* iii. 57 (not of Blume).

SIKKIM HIMALAYA, alt. 5000 ft., J. D. H. CACHAR, Keenan. ? TENASSERIM, Helfer.

Stem 10-12 in., about as thick as a duck's quill. *Leaves* subfalcate, usually (in Sikkim) loaded with concretions. *Flowers* $\frac{1}{2}$ in. long, smaller than in the foregoing species; bracts ovate-lanceolate, acuminate, falcate; mentum much shorter than the sepals; lip much thickened along the mesial line and tip; foot of column glabrous.

89. *E. aporina*, Hook. f. *Ic. Plant. ined.*; short, villously hirsute, leaves $\frac{3}{4}$ -1 in. close-set lanceolate, flowers solitary sessile, bracts small ovate acute, sepals broadly ovate obtuse 3-nerved, petals narrowly subspathulate 3-nerved, lip broadly clawed panduriform ciliate, surfaces glabrous.

PERAK, alt. 3-4000 ft., King's Collector, Scortechini.

Stem 6-8 in., uniformly clothed with close-set distichous leaves; internodes $\frac{1}{4}$ in. *Leaves* with revolute margins. *Flowers* $\frac{1}{2}$ in. long, glabrescent; mentum as long as the sepals; side lobes of lip small, rounded; midlobe larger than both, emarginate, crenate; column and its foot glabrous.—Habit of sect. *Aporum* of *Dendrobium*.

** *Small species with procumbent or creeping stems, hirsute, column very short.*

90. *E. dasyphylla*, Par. & Reichb. f. in *Trans. Linn. Soc.* xxx. 147; hirsute all over, stems interlaced, leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. sessile fleshy elliptic-obovate, flowers very small solitary shortly peduncled.

SIKKIM HIMALAYA, Herb. Griff. (*Kew Distrib.* 5131); at the foot of the hills, J. D. H. KHASIA HILLS, alt. 1-2000 ft., J. D. H. & T. T. PEGU, Kurz. TENASSERIM, Helfer (*K. D.* 5382), Parish.

Stems as thick as a sparrow-quill. *Leaves* subacute, convex on both surfaces. *Scape* $\frac{1}{4}$ - $\frac{1}{2}$ in.; bracts cupular; sepals 5-nerved, dorsal very small, lateral triangular, acute; mentum large, rounded; petals broadly oblong, 1-3-nerved; lip large, cuneately obovate, side lobes small, midlobe broader, nerves strong; anther beaked; pollinia equal, pyriform.—Near *Trichotosia microphylla*, Blume, of Java.

Sect. X. XIPHOSIUM (see p. 786).

91. *E. carinata*, Gibs. in *Calc. Journ. Nat. Hist.* v. 365; Lindl. in *Journ. Linn. Soc.* iii. 50. *E. rosea*, Wall. Cat. 7409 (not of Lindl.); Reichb. f. in Walp. Ann. vi. 269 (in part). *E. Fordii*, Rolfe in *Gard. Chron.* 1886, ii. 584 (excl. habitat). *Xiphosium acuminatum*, Griff. *Notul.* iii. 332; *Itin. Notes* 78, No. 1153; *Ic. Plant. Asiat.* t. 316.

SIKKIM HIMALAYA, King, Elwes. KHASIA MTS., Griffith (*Kew Distrib.* 5121).

Pseudobulbs on a stout or slender rhizome, 2-4 in., ovoidly oblong, sulcate. *Leaf* thickly coriaceous, with the stout petiole 6-18 in. *Scape* 6-8 in., included up to the raceme in the sword-shaped upper sheath; bracts $1\frac{1}{2}$ in., linear-lanceolate; sepals ovate or ovate-lanceolate, green and white with red nerves, keel serrate; mentum rounded; petals rhombic, acute; lip obovate-oblong, red-brown, side lobes narrow, midlobe rounded or ovate; column short.—Very near the Hong Kong *E. rosea*.

SECT. XI. ACRIDOSTACHYA (see p. 786).

92. **E. acridostachya**, *Reichb. f. mss.*; *Lindl. in Journ. Linn. Soc.* iii. 48.

PERAK, *Scortechini*; Larut, alt. 3500–4500 ft., *King's Collector*.—DISTRIB. Java.

Rhizome very stout; sheaths 1–3 in., rigidly coriaceous; upper ensiform, sometimes 3–4 in. *Leaf* 6–12 in., petioled, acute, thickly coriaceous. *Scape* stout, 6–10 in., naked; raceme 4–6 in., cylindric; flowers spreading or deflexed, coriaceous, about $\frac{1}{2}$ in. from tip of mentum to upper sepal; bracts minute; pedicel with ovary $\frac{1}{2}$ in.; lateral sepals much longer than broad, falcate, obtuse; dorsal much smaller; petals linear-oblong, obtuse; lip sessile, coriaceous, oblong, obtuse, base concave, side lobes very small; column very short, foot long, fleshy, channelled.

SECT. XII. DILOCHIPSIS (see p. 786).

93. **E. Scortechinii**, *Hook. f. Ic. Plant. ined.*

PERAK, *Scortechini*; on trees, alt. 5–5300 ft., *King's Collector*.

Stem 3–6 ft., as thick as a goose-quill; internodes 1– $\frac{1}{2}$ in. *Leaves* 3–5 in., linear-lanceolate, tips dimidiate, nerves strong. *Panicle* 4–5 in. long and broad, tomentose; bracts at the axils $\frac{1}{2}$ – $\frac{3}{4}$ in., chartaceous, floral narrow; flowers sessile, waxy-white, bluish within; ovary very short; sepals $\frac{1}{2}$ in., orbicular-ovate, obtuse, 3-nerved, keel winged; dorsal oblong; petals broadly oblong, 3-nerved; mentum short; lip sessile, broadly cuneate; side lobes long, spreading, obtuse, midlobe transversely 2-winged, disk with a broad tomentose ridge ending in a large cushion on the midlobe; column not long.—Habit of *Arundina*, sect. *Dilochia*.

SECT. XIII. PELLAIANTHUS (see p. 786).

94. **E. leiophylla**, *Lindl. in Journ. Linn. Soc.* iii. 57. *Ceratostylis pellita*, *Reichb. f. in Herb. Kew.*

PENANG; on stones, *Maingay* (*Kew Distrib.* 1631); alt. 2000 ft., *Curtis*.—DISTRIB. Borneo.

Rhizome very stout, rusty-tomentose; pseudobulb small, depressed conical, narrowed into a cylindric sheathed 2–3-nodal fleshy erect stem 1–3 in. long. *Leaves* 2, 5–7 by $\frac{1}{2}$ –1 in., linear-oblong, obtuse or notched. *Spike* far below the leaves, very short and flowers rusty-tomentose; bracts rounded; lateral sepals $\frac{1}{2}$ in., oblong, very obtuse and linear-oblong petals fleshy or thickly coriaceous; mentum obscure; lip sessile, ovate-oblong, obtuse, entire, very thick, smooth with a furfuraceous cushion towards the base and over the tip; column very short, broad; anther low, 4-celled; pollinia 2, large, compressed, angular (and ? 2 small).—A remarkable plant, described by Lindley from an imperfect Borneau specimen, and referred to sect. *Trichotosia*.

DOUBTFUL AND EXCLUDED SPECIES.

E. Rimanni, *Reichb. f. in Gard. Chron.* 1885, ii. 712; pseudobulbs 3 by 1 in. pyriform, leaves 2–4 cuneate-oblong acute coriaceous light green 11-nerved, raceme dense-fl. drooping and inflorescence rusty-pilose, flowers pellucid sulphur-col., lateral sepals triangular, mentum long obtuse, petals oblong obtuse, lip cuneate, side lobes dimidiate-oblong, midlobe transversely oblong emarginate golden with 2 purple spots, base with a tumid callus.—Burma (*Hort. Sanders*).—Probably near *E. Griffithii*, R. f. I have seen no specimens.

E. polyura, *Lindl. in Bot. Reg.* xxviii. (1842), *Misc.* 2, is a Malayan species erroneously supposed to be a native of Ceylon.

19/1. **CLADERIA**, Hook. f.

Terrestrial; stem tall, terete, rooting on tree-trunks, leafy. *Leaves* large, ovate-lanceolate, finely acuminate, plicate, narrowed into strongly ribbed inarticulate sheaths. *Scape* terminal, erect, simple or sparingly branched, sheathed rachis of spike many-fl., very stout, rigid, tomentose; bracts short, broad, rigidly coriaceous, persistent; flowers large, coriaceous or fleshy, tomentose without. *Sepals* obtuse, dorsal oblong; lateral obliquely oblong, base saccate. *Petals* strongly falcate, oblanceolate, obtuse, costa stout. *Lip* as long as the sepals, concave, coriaceous, sessile at the base of the column; hypochile large, broadly oblong, base saccate, disk with 2 tomentose ridges and many horizontally spreading nerves, epichile small, of 2 orbicular lobes, their bases incumbent on the tip of the hypochile. *Column* long, sigmoid, thickened upwards; clinandrium concave; anther terminal, hemispheric, imperfectly 2-lobed; pollinia 2? pyriform.

C. viridiflora, Hook. f. *Ic. Plant. ined.*

PERAK; at Sunga Ryah, *King's Collector*. MALACCA, *Maingay*; in dense jungles.

Stem 8-10 ft., as thick as a goose-quill, terete; the lower part creeping and rooting, the upper erect and clinging to trees by side roots. *Leaves* 5-10 by $1\frac{1}{2}$ -3 in., 5-nerved. *Spikes* 2-5 in., very stout, strict, erect; bracts concave, $\frac{1}{2}$ in. long, sessile by a very broad base; flowers $1\frac{1}{2}$ in. diam., pale green, striped with darker; sepals and petals nearly glabrous within, strongly nerved, the nerves branching and anastomosing; lip abruptly shortly narrowed at the base.—I know nothing very like this curious plant, which I place provisionally near *Eria*.

20. **PHREATIA**, Lindl.

Tufted often very small plants, with the habit of *Oberonia*, pseudo-bulbous or not. *Leaves* distichous, articulate on equitant sheaths. *Scape* axillary or lateral, or from the rootstock, slender; flowers very minute, cellular, racemed or spicate. *Sepals* equal, connivent or spreading. *Petals* smaller. *Lip* jointed on the base of the column or its foot, sessile or clawed, broad or narrow. *Column* very short, top broad; anther low, 2-4-celled; pollinia 8, obovoid, waxy, cohering by a viscus. *Capsule* minute, ovoid, terete.—Species about 10, Indian, Malayan and Oceanic.

The flowers are of the same cellular texture as in *Thelasis*.

1. **P. Myosurus**, Lindl. in *Journ. Linn. Soc.* iii. 61; stem 0, leaves 8-12 in. strap-shaped, tip obliquely rounded, scape long, bracts ovate-lanceolate acuminate, sepals obtuse, mentum rounded, lip sessile cuneate, broad end obscurely 3-lobed. *Eria* (*Phreatia*) *Myosurus*, Reichb. f. in *Bonplandia*.

PERAK, alt. 3000-3500 ft., *King's Collector*, *Scortechini*.—DISTRIB. JAVA, *Sunatra*.

Rhizome very stout. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, flat, membranous. *Scape* and *raceme* rather longer than the leaves; bracts variable in length; flowers $\frac{1}{2}$ in. long, waxy-white.—The Javan specimens have a shorter, broader, more rhomboid lip.

2. **P. elegans**, Lindl. *Gen. & Sp. Orchid.* 63; in *Journ. Linn. Soc.* iii. 61; stem 0 or a small pseudobulb, leaves $2\frac{1}{2}$ -5 in. linear-lanceolate or oblanceolate obtuse, scape longer, bracts ovate-lanceolate exceeding the

ovary, sepals acute, mentum rounded, lip with a short saccate claw and triangular blade. *Thelasis elegans*, *Blume Mus. Bot.* ii. 187.

KHASIA MTS.; at Pomerang, alt. 4-5000 ft., *J. D. H. & T. T.* CEYLON, *Macrae*.

Stems densely tufted. *Leaves* coriaceous, obtuse, 1-nerved. *Spikes* 3-4 in., dense-flid.; flowers white; lateral sepals $\frac{1}{2}$ in. long, triangular, acute, 1-nerved; petals broadly ovate; lip obscurely 3-nerved; column very short; anther membranous; pollinia free, globose pyriform.—I do not find the hairs on the lip described by Lindley.

3. **P. perpusilla**, *Benth. in Gen. Pl.* iii. 511; pseudobulbs clustered depressed, scape filiform, bracts ovate-lanceolate, sepals obtuse, lateral lanceolate, mentum obscure, lip lanceolate, margins waved. *Eria* (*Phreatia*) *perpusilla*, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 148.

TENASSERIM; at Moulmein, *Lobb, Parish*.

Pseudobulbs $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., smooth. *Leaves* not seen. *Scape* 2-2 $\frac{1}{2}$ in.; spike $\frac{1}{2}$ - $\frac{3}{4}$ in.; bracts $\frac{1}{10}$ in., hyaline; sepals about as long.

4. **P. nana**, *Hook. f. Ic. Plant. ined.*; stems short leafy, leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. narrowly ensiform acute, spikes axillary as long as the leaves capillary decurved, bracts ovate acute, sepals broadly ovate and very small petals obtuse, lip ovate obtuse.

PERAK, *Scortechini, King's Collector*.

Stems densely tufted, $1\frac{1}{2}$ -2 in., often decurved. *Leaves* about $\frac{1}{8}$ in. diam., fleshy; flowers $\frac{1}{10}$ in. diam.; ovary ellipsoid, smooth.

5. **P. minutiflora**, *Lindl. in Journ. Linn. Soc.* iii. 62; leaves equitant linear obtuse recurved, spike erect very slender as long as the leaves, bracts triangular setaceous, lip obovate concave.

SINGAPORE, *Ridley (in litt.)*.—DISTRIB. BORNEO.

Leaves about 2 in. long; flowers the smallest of the genus, in a very slender erect spike; bracts brown, setaceous, broad at the base.—Description from Lindley. I have seen no specimens.

6. **P. parvula**, *Benth. in Herb. Kew*; stem short, leaves $\frac{1}{2}$ in. imbricating subcylindric acute, scape very short, spikes axillary decurved, bracts cymbiform shorter than the ovary, mentum 0, lip and petals minute, the latter cymbiform. *Octarrhena parvula*, *Thwaites Enum.* 3072.

CEYLON; Central Province, in forests, alt. 3-4000 ft., *Thwaites*.

Stems 1 in., densely tufted, stout, leafy from the base. *Leaves* spreading. *Spikes* longer; rachis stout; flowers pale green; lateral sepals $\frac{1}{8}$ in. long, rounded, concave, nerveless; petals oblong; lip close under the broad short column; pollinia 4-8, free, globose.—A remarkable little plant overlooked by Bentham in *Gen. Plant.*, but the specimen he has placed in *Phreatia*, though there is no foot to the column or mentum. Thwaites wrongly referred it to *Vandea*.

21. **PACHYSTOMA**, *Blume*. (See 212. ITSEA.)

Terrestrial; rhizome underground, nodose. *Leaves* 1-2, often post-foliar, narrow, plaited. *Scape* sheathed; flowers rather small, racemed, pendulous; bracts large, scarious. *Sepals* subequal; lateral adnate to the base of the column. *Lip* sessile on the base of the column, erect;

side lobes oblong, midlobe small; disk with 3-5 deeply crested or fimbriate ridges. *Column* slender, clavate above, foot 0; anther 4-celled; pollinia 8, pyriform.—Species 6-8, probably forms of one, Indian, Malayan and African species.

P. senile, *Reichb. f. in Bonpland*. iii. 250; bracts ovate- or linear-lanceolate longer or shorter than the flowers. *P. Smithianum*, Edgeworthii, montanum & Lindleyanum, *Reichb. f. l. c.*; *Walp. Ann.* vi. 642, 643. *Apaturia senilis*, *Smithiana* & *montana*, *Lindl. in Wall. Cat.* 3739, 3737, 3738; *Gen. & Sp. Orchid.* 130, 131. *A Lindleyana*, *Wight Ic.* t. 1662.

Plains and foot-hills of N. INDIA, from GARHWAL to SIKKIM, the KHASIA HILLS and MUNNIPORE, and southwards to MALABAR and CEYLON.—? *DISTRIB.* Malay Islands and S. China.

Rhizome 1-2 in. *Leaf* solitary, very long and narrow. *Scape* with *raceme* 8-15 in., white or nearly so; bracts in the longest state (*P. senile* type) 2 in. long, narrow lanceolate; in the shortest state (*P. montanum*) shorter than the flowers, and spathaceous; flowers about $\frac{1}{2}$ in. long, glandular-puberulous, white, greenish or pinkish; sepals membranous, acute or acuminate, 5-nerved; petals narrowly spatulate, acuminate, 3-nerved; mentum very short; lip from oblong to nearly orbicular, claw very short; side lobes large, obtuse or subacute; midlobe as long or longer, oblong or obovate, retuse or pointed, purplish; disk with 5 (rarely 3) crested ridges from the base to the midlobe, and there thickened; column puberulous.—I cannot distinguish the plants here included under *P. senile*, they all vary so much and into one another. Clarke finds the long and short bracted states growing intermixed in the Sikkim *Teraï*.

21/2. **IPSEA**, Lindl.

Terrestrial herbs with the long narrow plicate leaves and sheathed scape of *Pachystoma*, but distinctly pseudobulbous, with few large highly-coloured flowers.—Species 3, Indian and an African.

I cannot follow Reichenbach and *Gen. Plant.* in uniting *Ipsea* with *Pachystoma*.

1. **I. speciosa**, *Lindl. Gen. & Sp. Orchid.* 124; flowers golden-yellow, lip 3-lobed, disk with 5 thick ridges, *Wight Ic.* t. 1663; *Bot. Mag.* t. 5701. *Pachystoma speciosum*, *Reichb. f. in Bonpland*. iii. 250; *Walp. Ann.* vi. 462.

CEYLON; on grassy hill-sides, alt. 4-5000 ft.

Puberulous. *Pseudobulbs* 1-1½ in., tufted, depressed. *Leaves* 6-10 in., long-petioled. *Scape* as long, 2-3-sheathed, 2-4-fld.; bracts spathaceous, equalling the ovary; flowers 2-3 in. diam.; lateral sepals ovate-oblong, subacute; lip oblong, side lobes triangular, obtuse or subacute; midlobe produced, obovate; column narrowly winged, subclavate.

2. **I. malabarica**, *Hook. f.*; midlobe of lip emarginate denticulate, disk with 5 serrated lamellæ. *Pachystoma malabaricum*, *Reichb. f. in Walp. Ann.* vi. 462.

MALABAR, *Jerdon*.

I do not know this plant. *Wight (Ic. v. 8)* says that he has a species from the Malabar Ghats, which he has not examined. I do not find it in his Herbarium.

3. **I? Wrayana**, *Hook. f.*; flowers claret-cold., lip triangular-ovate acute with 3 narrow lamellæ.

PERAK; on Gunong Batu Patch, alt. 4500 ft., *Wray*.

Scape 9 in.; bracts $\frac{3}{4}$ in.; flowers $1\frac{1}{2}$ in. diam., resupinate; dorsal sepal ovate-lanceolate, acuminate, lateral and 3-nerved petals lanceolate; mentum with the sac of the lip produced into an incurved stout round-tipped spur; side lobes of the broad lip very short, tooth-like; column rather short, winged; pollinia 8, seated on a forked thick membrane, in superposed pairs.—A very curious plant, perhaps a *Spathoglottis*.

22. SPATHOGLOTTIS, Blume.

Pseudobulbs on a creeping terrestrial rhizome, broadly conic, 1-3-leaved. *Leaves* long-petioled, elongate, narrow, plaited. *Scape*, lateral; flowers racemed, often large. *Sepals* free, subequal. *Petals* subsimilar or longer and broader. *Lip* sessile, erect; lateral lobes erect, midlobe clawed; disk at its base tubercled or crested. *Column* long, arched, subclavate above and 2-winged, foot 0; anther 2-celled; pollinia 8, slightly cohering in fours.—Species about 10, tropical Asiatic, Australian and Pacific.

* *Pseudobulbs* clothed with rigid fibres of old leaves. *Scape* tall, stout. *Petals* much broader than the sepals, many-nerved.

1. **S. plicata**, Blume *Bijd.* 401, t. 76; tall, stout, scape 2-3 ft., raceme puberulous, bracts ovate or lanceolate acuminate, flowers 1 in. diam. lilac, sepals broad acute, midlobe of lip longer than the side lobes, claw narrow dilating into a cuneately flabelliform blade. *Lindl. Gen. & Sp. Orchid.* 119; in *Wall. Cat.* 3743; *Walp. Ann.* vi. 455. *S. lilacina*, *Griff. Notul.* iii. 323; *Ic. Pl. Asiat.* t. 311, f. 3. *Bletia angustifolia*, *Gaud. in Freyc. Voy. Bot.* 421, t. 32.

MALAY PENINSULA; from Penang and Perak to Singapore, *Wallich, Griffith (Kew Distrib.* 5937, 5193), *Maingay (K. D.* 1637, 1639).—DISTRIB. Java, Manilla, New Guinea.

Pseudobulbs when full grown 2 in. diam. *Leaves* 2-4 ft. by 1-3 in., finely acuminate; petiole 6-18 in. *Raceme* 6-12 in., many-fl'd.; bracts $\frac{1}{2}$ -1 in., reflexed (in young plants flowers few and bracts larger); pedicels 1 in.; calli of lip yellow, sparsely villous. *Capsule* $1\frac{1}{2}$ in., pendulous.—*Griffith (Notul.* l. c. 324) gives the Khasia Hills as a locality (as well as Malacca), but this is a mistake.

2. **S. aurea**, *Lindl. in Part. Fl. Gard.* i. 16, and in *Journ. Hort. Soc.* v. 34; tall, stout, scape 2 ft., raceme glabrous, bracts oblong obtuse, flowers $1\frac{1}{2}$ in. diam. golden, sepals broad obtuse, midlobe of lip equalling the falcate side lobes narrowly lanceolate fleshy acute. *Walp. Ann.* vi. 455. *S. plicata*, *Griff. Notul.* iii. 325; *Ic. Pl. Asiat.* t. 311, f. 1.

MALAY PENINSULA; PERAK, on Gunong Batu Patch, *Wray*; Mount Ophir, *Griffith (Kew Distrib.* 5290), *Maingay (K. D.* 1638).—DISTRIB. Malay Islands.

Pseudobulbs $\frac{1}{2}$ -1 in. diam. *Leaves* 12-18 in., narrowly lanceolate, acuminate; petiole as long. *Raceme* 6-8 in.; bracts $\frac{1}{2}$ in., spreading, fleshy; pedicels $\frac{1}{2}$ in.; side lobes of lip narrow, falcate.

3. **S. Wrayi**, *Hook. f. Ic. Plant. ined.*; tall, scape 12-18 in., raceme glabrous, bracts large oblong, flowers $2\frac{1}{2}$ in. diam. bright yellow, sepals broad subacute, midlobe of lip longer than the straight side lobes very narrowly spatulate.

PERAK, alt. 4500 ft., *Wray*.

Habit of *S. aurea*, but flowers nearly twice as large, pedicels $1\frac{1}{2}$ in.; bracts $\frac{3}{4}$ in.—I have seen but one specimen of this splendid species, which is 3-4-fl'd. The inflorescence is probably as variable as in *S. plicata*.

4. **S. Bensoni**, Hook. f. *Ic. Plant. ined.*; tall, scape 18 in. or more, raceme elongate and flowers puberulous, bracts very small ovate-lanceolate, flowers 1 in. diam., sepals subacute, midlobe of the saccate lip hardly longer than the side lobes sessile cuneately obovate.

PEGU; on the Prome Hills, Benson (*Herb. Maingay*).

Leaf 12 in., narrowly lanceolate. Racemes 6-10 in.; flowers rather distant; bracts $\frac{1}{8}$ in., pedicels $\frac{3}{4}$ in. Capsule 1 in.—The specimens consist of a leaf and two racemes. Side lobes of lip shorter and broader than in the preceding three species; the calli together form as it were an intermediate lobe, keeled at the back.

** *Pseudobulbs small, depressed conic, naked or nearly so. Scape usually very slender. Petals equalling or broader than the sepals, 7-9-nerved.*

5. **S. Lobbii**, Reichb. f. in Walp. *Ann.* vi. 455; in *Gard. Chron.* 1876, 534; *Ot. Hamburg.* 46; raceme 4-8-fld., bracts small lanceolate pubescent, flowers $1\frac{1}{2}$ in. diam., sepals puberulous, midlobe of lip longer than the obovate oblong side lobes, claw slender suddenly dilating into an obcordately flabelliform smooth blade.

ARRACAN; at Akyab, Parish.

Pseudobulbs about 1 in. diam., with a few fibres. Leaves not seen. Scape 12-18 in.; bracts $\frac{1}{4}$ - $\frac{1}{2}$ in., acute; flowers sulphur-yellow; pedicel 1 in., very slender; sepals and petals obtuse.—Very near to *S. pubescens*, but the flowers are larger, and the midlobe of the lip has a narrower claw and no ridges on the blade.

6. **S. pubescens**, Lindl. in Wall. *Cat.* 3744; *Gen. & Sp. Orchid.* 120; in *Bot. Reg.* 1845, under t. 19; in *Journ. Linn. Soc.* iii. 22; scape usually much longer than the very narrow leaves, racemes 6-8-fld. pubescent, bracts small lanceolate, flowers 1 in. diam., midlobe of saccate lip cuneately flabellate or obcordate longer than the broadly oblong side lobes, disk with 1-3 keeled nerves. S. Fortuni, Lindl. in *Bot. Reg. l. c.* t. 19. *Pachystoma Wightii* & Fortuni, Reichb. f. in Walp. *Ann.* vi. 464.

KHASIA and NAGA HILLS, alt. 3-5000 ft., Wallich, &c. Mts. of ARRACAN and BURMA, Lobb, Parish, Griffith, &c.—DISTRIB. China.

Pseudobulbs as large as a hazel or walnut. Leaves 2-12 in., rarely $\frac{3}{4}$ in. broad. Scape stout or slender; bracts $\frac{1}{2}$ in. or less; flowers golden yellow with red at base of the lip; pedicels and ovary $\frac{1}{2}$ -1 in.; sepals 5-7-nerved, subacute; petals very obtuse, 9-nerved; lip variable, side lobes rather membranous, calli glabrous or villous at the base within.—The Chinese *S. Fortuni* has a broader column than *pubescens*, and the commissure of the side lobes of lip always villous, but I find no other differences.

VAR. *parvifolia*; pseudobulbs very small, leaves very narrow, sometimes quite linear, scape 4-8 in. very slender 2-3-fld. *S. parvifolia*, Lindl. in *Bot. Reg. l. c.*; in *Journ. Linn. Soc.* iii. 22. *S. pubescens*, Wight *Ic.* t. 1739. *S. khasiana*, Griff. *Notul.* iii. 323; *Ic. Pl. Asiat.* t. 311, f. 1. *Pachystoma parvifolium*, Reichb. f. *l. c.* 462. *Epipactis graminifolia*, Roxb. *Fl. Ind.* iii. 456.—Khasia Mts.; at Churra, alt. 4000 ft., Griffith, J. D. H. & T. T.

VAR. *Berkeleyi*; leaf 14 by $1\frac{1}{2}$ in., raceme many-fld., flowers $\frac{3}{4}$ in. diam.—Arracan Hills, Berkeley—The leaves of *S. Fortuni* being sometimes nearly a foot long, I venture to regard this as a variety of *pubescens*, as suggested by Lindley.

7. **S. ixiolides**, Lindl. in Wall. *Cat.* 3745; *Gen. & Sp. Orchid.* 120; in *Journ. Linn. Soc.* iii. 22; scape 4-6 in. longer or shorter than the slender leaves 1-2-fld., bracts sheathing and sepals pubescent, flower $1\frac{1}{2}$ in. diam., midlobe of subsaccate lip cuneate or obcordate with a tooth or auricle on each side at its base, side lobes very broad oblong, disk pubescent. *Bot.*

Mag. t. 7060. *Pachystoma Josephi, Reichb. f. in Walp. Ann. vi.* 464. *Cymbidium ixioides, Don Prodr.* 36.

NEPAL, *Wallich, Scully*. SIKKIM, alt. 8-1000 ft., *J. D. H., Elwes*.

Possibly only a small alpine form of *S. pubescens*, which latter has not been found in the Himalaya. The accessory teeth or auricles at the base of the midlobe of the lip vary greatly in size, and are sometimes very obscure; the disk between the side lobes is pubescent; there are two short raised ridges on the disk at the base of the midlobe.

*** *Petals narrower than the sepals, 3-nerved.*

8. ***S. Handingiana***, *Par. & Reichb. f. in Ot. Hamburg. i.* 45; scape 10 in. slender longer than the elliptic-lanceolate leaf, raceme many-fl. and lanceolate bracts and ovary pubescent, sepals oblong-lanceolate 5-nerved, petals linear acuminate 3-nerved, lip very slender, side lobes a mere dilatation of the axis bearing two large erect falcate cuneate oblong calli, midlobe very long filiform recurved.

NORTH BURMA; Bhamo, *Herb. Parish*.

Pseudobulb small. *Leaf* solitary?, 5 by 1 in., acuminate. *Raceme* 4 in.; bracts $\frac{1}{2}$ in., slender; pedicel with ovary 1 in., capillary; flowers 1 in. diam., membranous; sepals and petals rose-purple, lip longer than the sepals, white with yellow purple-spotted calli; column as long as the sepals, narrowly winged above; anther narrow; pollinia narrowly clavate.—A very remarkable plant, one specimen only seen.

23. **ACANTHEPHIPIUM**, *Blume*.

Terrestrial; pseudobulbs 3-9-leaved. *Leaves* broad, plaited, petioled. *Flowers* few, large, fleshy, in very short lateral raceme; pedicels thickened after flowering. *Sepals* broad, cohering in a ventricose tube, with recurved tips, lateral adnate to the foot of the column; mentum very large, saccate. *Petals* erect, narrow, included. *Lip* very small, stipitate on the foot of the column, inflexed; lateral lobes broad, erect; midlobe recurved, entire; disk with a complex callus. *Column* short, stout; foot very long, inflexed; anther 2-celled; pollinia 8, erect, cohering by a granular mass.—Species 3-4, Indian and Malayan.

1. ***A. bicolor***, *Lindl. in Bot. Reg. t.* 1730; sepals and petals yellow with blood-red tips, side lobes of lip hatchet-shaped, midlobe short tongue-shaped, disk 3-lamellate. *Thwaites Enum.* 307; *Maund. Bot. iv. t.* 300; *Walp. Ann. vi.* 461.

CEYLON; Central region, ascending to 2000 ft.

Pseudobulbs ovoid, 2-3 in. high, smooth, elongating into a stout short fleshy stem. *Leaves* 9-18 by $2\frac{1}{2}$ -4 $\frac{1}{2}$ in., bases sheathing. *Scape* 3-7-fl., sheathed; bracts 1 in., ovate-lanceolate; flowers $1\frac{1}{2}$ in., like broad gibbous-based jugs.—Lindley figures the disk as a broad 2-lobed concave plate, Thwaites as of 3 lamellæ of which the outer are tubercled, the median slender and mucronate at both ends.

2. ***A. sylhetense***, *Lindl. Gen. & Sp.* 177; in *Journ. Linn. Soc. iii.* 21; leaves long-petioled, sepals and petals white or straw-coloured freckled with red towards the tips, side lobes of lip falcate acute, midlobe tongue-shaped, disk with 3-5 fleshy toothed lamellæ. *A. ringidorum, Griff. Notul. iii.* 347; *Ic. Pl. Asiat. t.* 325.

SYLHET and KHASIA Mts., alt. 2-4000 ft., *Wallich, J. D. H. & T. T.* UPPER ASSAM, in the Abor Mts., *Griffith*

Pseudobulbs stout, narrow, short or lengthening into a leafy stem 4-14 in. high. *Leaves* 6-10 in., elliptic-lanceolate, acuminate. *Scape* 2-6 in., very stout, sheathed; flowers $1\frac{1}{2}$ in. long, fleshy, like those of *A. bicolor*.—Lindley unites Griffith's *ringiporum* with *syhetense*, but it may be another species, having white flowers.

3. *A. striatum*, Lindl. in *Bot. Reg.* 1838, *Misc.* 45; flowers white streaked with red, mentum spur-like, side lobes of lip very broad falcate obtuse, midlobe contracted acute scarlet, lip with a single median crested ridge and thickened lateral nerves. *Walp. Ann.* vi. 460.

NEPAL (*Hort. Kew*). SIKKIM, Griffith's *Collectors* (*Kew Distrib.* 5289) and *lc.* in *Herb. Calcutt.*

Very near *A. sylhetense*, but the flowers are much shorter, and the side lobes of lip very different.

24. PHAJUS, Lour.

Terrestrial or epiphytic large stout herbs. *Leaves* plaited. *Scape* lateral on the pseudobulb, or axillary or terminal; flowers large, handsome, racemed. *Sepals* and *petals* subequal, spreading or suberect. *Lip* adnate to the base of and embracing the column, erect, base gibbous or spurred, midlobe various. *Column* long, stout; foot 0; anther incompletely 4-celled; pollinia 8, attached by fours to a large granular viscus.—Species about 14, tropics of the Old World.

I am not sure that the following arrangement according to the position of the scape, being derived from often imperfect dried specimens, will hold good.

* *Scape from the side of the pseudobulb, tall, stout.*

1. *P. Wallichii*, Lindl. in *Wall. Pl. As. Rar.* ii. 46, t. 158; *Gen. & Sp. Orchid.* 126; leaves 1-2 ft. elliptic-lanceolate acuminate, scape very tall, sepals and petals spreading lanceolate acuminate, spur slender short or long, lip with a tubular limb and ovate-lanceolate acute or acuminate sometimes truncate crisped midlobe. *Part. Mag.* vi. t. 193; *Walp. Ann.* vi. 459. ? *P. Blumei*, Lindl. *Gen. & Sp. Orchid.* 127; *Blume Orchid. Archip. Ind.* 2, t. 1; *De Vriese Illust.* t. 8. *P. bicolor*, Lindl. *l. c.* 128; *Sert. Orchid.* t. 25; *Bot. Reg.* 1839, *Misc.* 61; *Bot. Mag.* t. 4078; *Wight Ic.* t. 1659-60; *Thwaites Enum.* 300; *Blume Mus. Bot.* ii. 178; *Walp. Ann.* l. c. 458. *P. grandifolius*, Lindl. in *Wall. Cat.* 3747 (not of Loureiro). *Limodorum Tankervilleæ*, Roxb. *Fl. Ind.* iii. 466 (not of Aiton).

SIKKIM HIMALAYA; in tropical valleys, J. D. H. ASSAM and SYLHET, Wallich, &c. UPPER BURMA, Griffith. TENASSERIM, Parish. CEYLON, alt. 2-4000 ft.—DISTRIB. Malay Islands?

Pseudobulbs 1-1½ in. diam., conical, sheathed by the leaf-bases. *Leaves* 2½-8 in. broad, sometimes spotted; petiole 6-10 in. *Scape* 2-4 ft., sometimes thicker than the thumb; bracts 2 in., spathaceous, caducous; pedicel 1 in.; flowers 4-5 in. diam.; sepals and petals white greenish or rosy without, within yellow-brown with a golden margin, rarely white or concolorous; tube of lip pink or red with a yellow base, midlobe orange, red, or white and pink; spur ¼-¾ in. long. *Capsule* 2-2½ in.—Possibly a form of the Chinese *P. grandifolius*, Lour. I know of no character whereby to distinguish *P. Blumei*.

2. *P. veratrifolius*, Lindl. in *Wall. Cat.* 3746; *Gen. & Sp. Orchid.* 127; scape shorter than the leafing stem, flowers crowded, bracts cymbiform lanceolate, sepals and petals dirty-white spreading and recurved lanceolate acute, spur narrowly conical, lip short broad yellow, side lobes rounded and short retuse midlobe crenulate.

SYLHET, Wallich.

Pseudobulbs 3-5 in., elongate, naked. *Leaves* 2-3 ft. by 2-6 in. *Scape* 12-18 in.; sheaths acuminate; flowers $1\frac{1}{2}$ in. diam., in short pyramidal racemes; bracts $1\frac{1}{2}$ in. long, subsistent; pedicels short; lip longer than the sepals.—Described chiefly from drawings in Herb. Kew by Roxburgh and another.

3. **P. maculatus**, Lindl. in Wall. Cat. 3748; Gen. & Sp. Orchid. 127; leaves elliptic-lanceolate acuminate, scape with tubular sheaths, racemes many and dense-fld., flowers golden, sepals and petals erect oblong very obtuse concave, side lobes of lip narrow, midlobe very short broad crumpled, spur short conical. Lodd. Bot. Cab. t. 1803; Bot. Mag. t. 3960; Blume Mus. Bot. ii. 180; Orchid. Archip. Ind. 9. Bletia flava, Wall. mss. B. Woodfordii, Hook. Bot. Mag. t. 2719; Reichb. Fl. Exot. t. 63.

TROPICAL HIMALAYA; Nepal, Wallich; Sikkim, J. D. H. KHASIA Mts., Griffith.—DISTRIB. China, Japan.

Pseudobulbs broadly ovoid, as large as the fist. *Leaves* 1- $1\frac{1}{2}$ ft., often spotted with dull yellow. *Scape* 2-3 ft.; bracts 1- $1\frac{1}{2}$ in., obtuse; pedicels very short; sepals $1\frac{1}{2}$ in., often tipped with green; midlobe of lip orange-brown or colourous.

** *Scape from the top of the pseudobulb.*

4. **P. callosus**, Lindl. in Gard. Chron. 1848, 287 (with cut of fl.); leaves radical or subradical linear-lanceolate acuminate, scape from the top of the pseudobulb at the base of the leaves, sepals linear-oblong acute, petals linear dilated above the middle, lip with a tubular limb and short midlobe, spur short incurved. Blume Mus. Bot. ii. 178; Orchid. Archip. Ind. 4, t. 2; Reichb. f. Xen. Orchid. ii. t. 122. Limodorum callosum, Blume Bijdr. 374, t. 6.

PERAK, King's Collector.—DISTRIB. Java.

Very similar to *P. Wallichii*, but distinguished by its more oblong sepals and the broad ends of the petals. *Flowers* dull reddish brown; tube of lip yellowish white with a pink tinge, bright red towards the apex, midlobe retuse.—The colours probably vary as in *Wallichii*.

*** *Scape axillary or from amongst the leaves.*

5. **P. mishmensis**, Reichb. f. in Bonpl. v. 43; in Walp. Ann. vi. 922, 928; hardly pseudobulbous, stem tall, leaves alternate elliptic-lanceolate, scape axillary, bracts lanceolate caducous, raceme lax-fld., sepals and petals erecto-patent linear-oblong subacute concave rose-cold., lip not exceeding the sepals, side lobes rounded and small 2-lobuled midlobe quite entire, spur narrowly conical. Limatodes mishmensis, Lindl. & Pax. Fl. Gard. iii. 36.

SIKKIM HIMALAYA; in hot valleys, Clarke, (Ic. Cathcart). Mishmi Hills in UPPER ASSAM, Griffith.

Stem, in Ic. Cathcart, 3-4 ft., sheathed below, 6-8-leaved above. *Leaves* 6-12 by 4-5 in., acuminate. *Scapes* 1-2, rather slender, not exceeding the leaves; flowers erect, $1\frac{1}{2}$ in. long; pedicel and ovary as long; lip white, axis pubescent.

6. **P. luridus**, Thwaites Enum. 300; pseudobulb?, leaves lanceolate acuminate, raceme few-fld., bracts caducous, sepals and petals lanceolate acuminate, lip rounded obscurely 3-lobed, side lobes short broad rounded, midlobe waved, disk hairy, spur very short.

CEYLON; in the Saffragam district, Thwaites.

Terrestrial; stem 2 ft. *Leaves* 12-18 by 3-5 in. *Scapes* 1-2, as long as the

leaves; bracts oblong, acute; flowers 2 in. broad, greenish yellow and rufous; sepals and petals spreading; lip yellow with two red blotches.—Trimen, Syst. Cat. Ceyl. Pl. 88, refers this to *P. bicolor*, but the habit is quite different, the flowers much smaller, and lip short. I have seen no drawing of this.

**** *Raceme terminating the leafy stem.*

7. *P. albus*, Lindl. in Wall. Cat. 3749; Gen. & Sp. Orchid. 128; pseudobulb 0, leaves distichous oblong- or linear-lanceolate acuminate, raceme sessile, bracts nearly as long as the flowers persistent, sepals and petals oblong-lanceolate acuminate, lip shovel-shaped with a broad toothed and crisped midlobe, disk with 5 crested ridges, spur short. Bot. Reg. 1838, t. 33; Bot. Mag. t. 3991; Knowles & Westc. t. 125; Paxt. Mag. v. t. 125; Grah. Cat. Bomb. Pl. 205; Blume Mus. Bot. ii. 181. *P. Marshalliana*, Reichb. f. in Linnæa, xli. 65; Regel Gartenfl. t. 1098; Warn. Orchid. Alb. t. 130. *P. Dodgsoni*, Dean Floral Mag. 1878, t. 329. *Thunia alba*, Reichb. f. in Bot. Zeit. 1852, 764; Rev. Horticol. 1874, t. 450. *T. pulchra*, Reichb. f. in Gard. Chron. 1881, ii. 166. *Limodorum bracteatum*, Roxb. Fl. Ind. iii. 466.

TROPICAL HIMALAYA, alt. 2-5000 ft., from Garwhal to Sikkim, ascending to 6000 ft. KHASIA MTS., alt. 4-5000 ft. ABBACAN and BURMA. The CONCAN; on Matheran Hill, Graham, Dalzell, &c.

Stems stout, 6-18 in., densely tufted, pendulous, leafy from the slightly swollen base. Leaves 6-14 in., soft, glaucous beneath. Raceme 2-3 in., distichously 4-8-fld.; bracts $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., chartaceous, narrowly cymbiform, acute; sepals and petals erectopate, 2 $\frac{1}{2}$ -3 $\frac{1}{2}$ in. long, white; lip white or pale or dark yellow with purple red or ochreous veins. Capsule 1 in. long.—Very variable in size of flower and colour of lip. See vars. *Veitchiana*, Warn. Orchid. Alb. viii. t. 326, and *Wrigleyana*, Williams.

VAR. *Bensoniæ*; flowers rose-purple, lip deep purple with a white base. *Thunia Bensoniæ*, Hook. f. Bot. Mag. t. 5694; Jennings Orchid. t. 35.

25. NEPHELAPHYLLUM, Blume.

Terrestrial creeping herbs with the habit of *Neottia*. Leaves few, petioled, ovate or cordate. Scape included in a large sheath with the leaf; flowers racemed. Sepals free, narrow, spreading or recurved. Petals linear. Lip sessile at the base of the column, erect, stoutly spurred; spur clavate, entire or 3-lobed. Column erect, 2-winged; anther 2-celled; pollinia 8, all parallel, adnate to a linear appendage.—Species 6, Indian, Malayan and Chinese.

1. *N. cordifolium*, Lindl. in Journ. Linn. Soc. iii. 23; leaves ovate-cordate acute or obtuse, racemes laxly 3-6-fld., bracts linear, lip elongate cuneate, side lobes narrow, midlobe transverse retuse, disk with 3 thickened nerves ending in flattened spines on the midlobe. *Citheris cordifolia*, Lindl. in Wall. Cat. 3750; Gen. & Sp. Orchid. 129; Blume Orchid. Archip. Ind. t. 61, f. 3, A-D.

KHASIA HILLS, alt. 4-5000 ft., Wallich, Griffith, &c.

Stem 1-10 in., succulent, ascending from the creeping rhizome; sheaths 1-4 in., membranous, hyaline. Leaves 2 $\frac{1}{2}$ -4 $\frac{1}{2}$ in., membranous, 5-7-nerved from the base; petiole 1-2 in. Scape 4-6 in.; sheath tubular; bracts $\frac{1}{2}$ in., equalling the pedicel and ovary; sepals $\frac{3}{4}$ in. long to tip of spur, and petals 3-nerved, greenish striped with purple; lip pale purple, longer than the sepals, disk pubescent from the base to the middle. Capsule $\frac{3}{4}$ in., oblong.

2. *N. pulchrum*, Blume Bijl. 372, t. 32; Orchid. Archip. Ind. 171,

t. 61, f. 1; leaves ovate or cordate, racemes densely many-fl., bracts large lanceolate, lip entire obovate-oblong with 3 crested ridges towards the rounded tip. *Lindl. Gen. & Sp. Orchid.* 24; *Reichb. f. Xen. Orchid.* i. 216, t. 88, f. 1; *Bot. Mag.* t. 5332.

PERAK, *King's Collector, Wray*.—DISTRIB. Java.

Habit of *N. cordifolium*, but stem, petioles and scape shorter, flowers in a conical spike, and lip very different. *Leaves* rather fleshy, mottled green, with a metallic lustre. *Scape* 1-3 in.; bracts $\frac{1}{2}$ in., membranous; sepals $\frac{3}{4}$ in. to the tip of the spur.—There may be two species confounded here. The *Bot. Mag.* plant has green sepals and a white lip with yellow ridges. *King's* specimens have waxy-white sepals tipped with yellow and a pink calyx; *Wray* figures an obcordate lip, cream-cold., pencilled with crimson, and dull-green sepals.

VAR. *sikkimensis*; sepals and petals narrower purplish or white spotted with pink.—Sikkim near Darjeeling (*Ic. Herb. Kew & Herb. Calcutt.*). Bhotan? *Griffith (Kew Distrib.* 5370).

3. **N. tenuiflorum**, *Blume Bijd.* 372; *Orchid. Archip. Ind.* 172, t. 61, f. 2; leaves subhastately cordate acuminate, scape tall slender lax-fl., bracts linear, lip narrowly panduriform; side lobes acute, midlobe ovate crenulate with 3 crested ridges. *De Vriese Illust. Orchid.* t. 12, f. 3 (*bad*); *Walp. Ann.* vi. 217.

PERAK, *Scortechini*.—DISTRIB. Java.

Stem 3-6 in., slender. *Leaves* $1\frac{1}{2}$ -3 in.; petiole 1 in. *Scape* 6-8 in., 1-10-fl.; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., longer than the pedicel and ovary; sepals and petals very narrow, 3-nerved, dorsal strongly keeled; lip pubescent between the side lobes.

26. **TAINIA**, *Blume*.

Terrestrial glabrous herbs; caudex creeping, bearing a solitary elliptic-lanceolate long-petioled leaf on a slender or stout pseudobulb, and with a very long scape at or near its base. *Flowers* small or middle-sized, racemose. *Sepals* narrow; lateral falcate, adnate to and forming a mentum with the saccate base of the lip, or inserted above it. *Lip* adnate by its base only to that of the slender column, hastately 3-lobed, rarely entire, disk lamellate. *Anther* with often a simple or 2-lobed boss, or 2 horns; pollinia 4 or 8, free or united by a viscus, 4 sometimes smaller.—Species 15-18, Indian, Malayan and Chinese.

Very like *Chrysoglossum*, which has 2 free pollinia, *Eulophia* which has a tuberous rhizome and 4 pollinia with stipes and gland, and *Plocoglottis* in which the sides of the lip are adnate to those of the column and the pollinia are in stipitate pairs on a gland. In habit, *Tainia* is totally distinct from *Eria*, as also in the long column. *Calanthes* are many-leaved, and the caudex is rarely creeping.

* Spur of lip free from the base of the lateral sepals.

1. **T. angustifolia**, *Benth. in Gen. Plant.* iii. 515; leaf-blade much longer than the petiole, sepals $\frac{3}{4}$ in. linear obtuse 3-nerved, petals broader linear-oblong obtuse 5-nerved, spur clavellate, lip narrowly oblong, side lobes narrow, midlobe small transversely oblong, disk with 3 ridges ending in as many lamellæ as the midlobe, anther with 2 bosses. *Ania angustifolia*, *Lindl. in Wall. Cat.* 3740; *Gen. & Sp. Orchid.* 129.

TENASSERIM; at Tavoy, *Wallich*.

Differs from *A. latifolia* in the narrower leaves, larger flowers, narrower lip with the lamellæ on the midlobe, and the free globosely clavellate incurved spur of the lip; "pollinia 8, 4 smaller," *Lindl.*

2. **T. penangiana**, *Hook. f.*; leaf-blade about equalling the petiole, sepals $\frac{3}{4}$ in. linear-lanceolate acuminate and narrow petals 5-7-nerved, spur shortly conical obtuse incurved, lip oblong, side lobes subacute incurved overlapping the orbicular acuminate crisped midlobe, disk with 3 slender ridges or lamellæ thickened on the midlobe, column broadly winged.

PENANG; on stones on the top of the hill, *Maingay* (*Kew Distrib.* 1642).

Leaf 8-12 by $1\frac{1}{2}$ -2 in.; petiole slender, base not pseudobulbous. *Scape* twice as long, slender, bracts $\frac{1}{2}$ in.—The specimens are in bad condition; pollinia not seen.

3. **T. viridi-fusca**, *Benth. in Gen. Plant.* iii. 515; scape tall stout, bracts long, sepals 1 in. lanceolate acuminate and oblanceolate petals 5-7-nerved, spur short obtuse, lip obovate-oblong, side lobes incurved, disk with 5 lamellæ about the middle which sink to rise again on the small suborbicular midlobe as 5 truncate very thick ridges. *Calanthe viridi-fusca*, *Hook. Bot. Mag.* t. 4669; *Jard. Fleur.* t. 336; *Part. Fl. Gard.* iii. 118, 591.

ASSAM, *Simons*. TENASSERIM; at Moulmein, *Parish*.

Pseudobulb 2-2 $\frac{1}{2}$ in. diam. *Leaf* 20 by 3 in.; petiole as long. *Scape* 3-5 ft.; bracts $\frac{1}{2}$ -1 in., exceeding the pedicel and ovary; sepals and petals green suffused with purplish brown; lip white with yellow ridges; anther hemispheric with 2 red bosses; pollinia 8, subequal.—One specimen has a narrower lip with 3 narrow lamellæ irregularly enlarged on the midlobe.

4. **T. promensis**, *Hook. f. Ic. Plant.* t. 1883; scape tall slender, bracts long, sepals $\frac{3}{4}$ in. oblong-lanceolate acute and elliptic obtuse petals 5-7-nerved, spur rather long obtuse, lip entire spathulate erose, disk concave with a dense granular cluster of truncate calli. *Eulophia promensis*, *Lindl. in Wall. Cat.* 7365; *Gen. & Sp. Orchid.* 181.

PEGU; on the Prome Hills, *Wallich*.

Leaf on a slender sheathed stem, blade narrow, 12 by $1\frac{1}{4}$ in., shorter than the very slender petiole. *Scape* with the 6-8-fld. lax raceme as long as the petiole; sheaths 4-5, 2-3 in.; bracts 1 in., lanceolate, longer than the ovary.—I think there are 4 flattened collateral pollinia in the only flower I have been able to examine.

** Lateral sepals forming a mentum with the base of the lip.

† *Sepals and petals not produced into long tails.*

5. **T. latifolia**, *Benth. mss.*; leaf-blade longer than the petiole, sepals $\frac{1}{2}$ in. linear obtuse 3-nerved narrower than the 5-nerved petals, mentum short rounded, lip obovate-oblong, side lobes small, midlobe small orbicular or fan-shaped, disk with a narrow central and 2 broad lateral lamellæ which are evanescent on the midlobe. *Ania latifolia*, *Lindl. in Wall. Cat.* 3741; *Gen. & Sp. Orchid.* 130. *Eria Ania*, *Reichb. f. in Walp. Ann.* vi. 270.

SYLHET, CACHAR and the KHASIA MTS., *Wallich*, &c. UPPER BURMA, *Griſſth*.

Leaf 6-12 by $2\frac{1}{2}$ -3 $\frac{1}{2}$ in. *Scape* with the raceme 1-2 ft.; pedicels with ovary $\frac{1}{2}$ in. long; midlobe of lip variable, rounded or retuse; anther with 2 obscure bosses; "pollinia 8 equal," *Lindl*.

6. **T. bicornis**, *Benth. in Gen. Plant.* iii. 515; pseudobulb fusiform, leaf-blade longer than the petiole, sepals linear obtuse, mentum rounded, lip obovate, midlobe broader than the narrow side lobes, disk 2-lamellate between the side lobes 3-lamellate on the midlobe, anther 2-horned. *Ania*

bicornis, *Lindl. in Bot. Reg.* 1842, *Misc.* 37; 1844, t. 8; *Thwaites Enum.* 301. *Eria bicornis*, *Reichb. f. in Walp. Ann.* vi. 269. ? *Ania latifolia*, *Wight Ic.* t. 914. *Eria Wightii*, *Reichb. f. l. c.* 270. *Mitopetalum Wightii*, *Blume Mus. Bot.* ii. 185.

TRAVANCORE; on the Pulney Mts.?, *Wight*. CEYLON; Hantani, alt. 3000 ft., *Thwaites*.

Habit and size of flower, according to Lindley's figure, of *T. latifolia*, but leaf much smaller and described as fleshy. Wight's represents a much larger plant, with sepals 1 in. long; his description of the lip lamellæ differs so greatly from what he figures that no reliance can be placed on either. Thwaites, however, refers it to *bicornis*. According to Lindley and Thwaites, the Ceylon plant is more or less purple. Lindley figures the flower as green and reddish, the lip and column yellow spotted with red. I have seen no Ceylon specimen or flower of the Travancore plant.

7. **T. khasiana**, *Hook. f. Ic. Plant. ined.*; leaf-blade longer than the stout petiole, scape tall, sepals $\frac{3}{4}$ in. linear obtuse and broader oblong obtuse petals 3-nerved, mentum shortly conic obtuse, lip cuneately obovate, side lobes rounded at the tip, midlobe much broader than long apiculate, disk with a slender mid-nerve and two narrow lamellæ all vanishing in the midlobe, anther hemispheric with a dorsal boss.

KHASIA HILLS; below Churra, alt. 3000 ft., *J. D. H. & T. T.*

Leaf 8 by 2 in., on a fusiform pseudobulb 3 in. long with a neck 1 in. long. Scape with long raceme 2 ft.; pedicel with ovary shorter than the sepals; bracts equalling the pedicel.—Only one specimen seen; it resembles Wight's figure of *Ania latifolia* (*T. bicornis*) more than any other species, but wants the 2 conical horns of the anther.

8. **T. minor**, *Hook. f. Ic. Plant. ined.*; leaf-blade 3-5 in. much longer than the petiole, scape and few-fl'd. raceme 8-12 in. very slender, sepals linear obtuse and rather broader petals 3-nerved, mentum very short, lip cuneate-obovate, side lobes subacute, disk with a central thickened nerve and two broad lamellæ reaching the base of the orbicular crenate midlobe which has 3-5 narrow ridges, anther with 2 conic obtuse bosses.

SIKKIM HIMALAYA; at Mahalderam, alt. 7000 ft., *Clarke*.

Pseudobulb very slender, 1-2 in. Leaf $1\frac{1}{2}$ -2 in. broad, very membranous, nerves very slender; petiole 2-3 in. Scape with a narrow sheath 2 in. long below the middle; bracts $\frac{1}{4}$ in.; pedicel with ovary $\frac{1}{2}$ in., very slender; sepals $\frac{3}{4}$ in.; column slender, narrowly winged; 4 of the pollinia very small.

9. **T. hastata**, *Hook. f. Ic. Plant. ined.*; scape very slender, raceme long many- and small-fl'd., bracts filiform as long as the ovary, sepals $\frac{1}{2}$ in. linear acuminate and subequal petals 3-nerved, mentum rather long obtuse, lip oblong-obovate, side lobes subacute, disk with a central nerve and two broad lamellæ reaching the base of the rather fan-shaped apiculate midlobe which has 3 narrow ridges, anther hemispheric smooth. *Eulophia hastata*, *Lindl. in Journ. Linn. Soc.* iii. 25.

ASSAM, *Masters, Griffith*.

Scape (base wanting) 2 ft. 6 to 3 ft. Raceme 5-7 in., dense-fl'd.; bracts and pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in.; column very slender, narrowly winged; 4 pollinia very small.—Lindley says of this (under *Eulophia*) that it is the smallest-flowered of the aphyllous species, and that the hastate lip is unlike that of any other. The pollen shows it to be a *Tainia*, of which the leaves, rootstock, and base of scape are unknown.

10. **T. maculata**, *Hook. f.*; pseudobulb conic, leaf lanceolate delicately nerved, scape 2 ft., sepals and petals pale green lanceolate acute, sepals with 4 petals with 6 lines of purple spots, mentum short cylindric

truncate, side lobes of white lip erect obtuse, midlobe rounded subacute concave, disk 3-lamellate, base spotted with purple, column yellow. *Ania maculata*, *Thwaites Enum.* 301.

CEYLON; at Hapootelle, alt. 5000 ft. (a single specimen), *Thwaites*.
Description from Thwaites; I have seen no specimen.

11. **T. hologlossa**, *Benth. in Gen. Plant.* iii. 515; characters of *T. latifolia*, but lip oblong entire or with faint traces of lateral lobes, margin undulate, disk with 3 thickened ridges, anther low rounded smooth. *Eria* (*Tainia*) *hologlossa*, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 148.

TENASSERIM; at Moulmein, *Parish*.

12. **T. latilingua**, *Hook. f. Ic. Plant. ined.*; pseudobulb narrow, leaf as long as its petiole, scape tall, bracts as long as the ovary, sepals and petals oblong-lanceolate 3-nerved, mentum very short, lip nearly orbicular with 3 rather distant crenulate ridges from the base to near the tip, anther hemispheric smooth.

PERAK, *Scortechini*.

Leaf 8 by $2\frac{1}{2}$ in. Scape and many-fl. raceme $1\frac{1}{2}$ –2 ft.; bracts $\frac{1}{2}$ in.; column narrowly winged; pollinia 8, equal.

†† *Sepals and petals produced into long filiform tails.*

13. **T. speciosa**, *Blume Bijd.* 354; pseudobulb very slender, leaf shorter than its petiole, sepals $2\frac{1}{2}$ –3 in. long and much shorter petals 5–7-nerved, mentum triangular obtuse, lip trapezoidly ovate acuminate many-nerved, margins undulate, anther 2-horned. *Eria speciosa*, *Reichb. f. in Walp. Ann.* vi. 269. *Mitopetalum speciosum*, *Blume Fl. Jav. Præf.* 8; *Mus. Bot.* ii. 185; *Orchid. Archip. Ind.* 158, t. 50, f. 1.

PERAK, *Scortechini*; Mount Ophir, *Griffith (Kew Distrib.* 5293); *Maingay (K. D.* 1667).—DISTRIB. Java.

Leaf 4–6 by $\frac{3}{4}$ in.; petiole 6–10 in. Scape 1–2 ft.; bracts $\frac{1}{2}$ –1 in., very slender; flowers “white, tails slightly yellow,” *Maingay*; column slender; anther with erect conical obtuse horns; pollinia 4?

14. **T. Maingayi**, *Hook. f. Ic. Plant. ined.*; pseudobulbs short close-set on a stout crinite ascending rhizome, petiole very short, sepals $1\frac{1}{2}$ –2 in. and petals 5–7-nerved, lip short rhombic, lobes inciso-fimbriate, lateral truncate, midlobe triangular acute strongly nerved.

PENANG; on red earth in the jungle, *Maingay (Kew Distrib.* 1668).

Leaf 5–10 in., narrowly elliptic-lanceolate, strongly 5–7-nerved, narrowed into a 1–2 in. petiole. Scape 20 in., very slender; bracts narrow, $\frac{1}{2}$ in., as long as the ovary; column slender, incurved.—I have seen but one flowering specimen, which is remarkable in habit and form of lip.

27. **ANTHOGONIUM**, *Lindl.*

A slender herb; pseudobulb small, 1–3-leaved. *Leaves* 1–3, very narrow, petioled, plaited. *Scape* from the base of the pseudobulb; flowers in a slender, simple or branched raceme, resupinate. *Sepals* connate in a narrow gibbously-based cylinder, free tips short, of dorsal linear straight, of lateral broad revolute. *Petals* included, linear, long-clawed. *Lip* adnate to the base of the column, long-clawed, limb flabelliform. *Column* very long and slender, tip 3-toothed; anther 2-celled; pollinia 4, ovoid, parallel, connected in pairs by a granular viscus.

A. gracile, *Lindl. in Wall. Cat.* 7398; *Gen. & Sp. Orchid.* 426

Journ. Linn. Soc. iii. 22. *A. Griffithii*, *Reichb. f. in Bonpland*, ii. 99; in *Allg. Gartenzeit.* 1856, 218; in *Walp. Ann.* vi. 471.—*Anthog.*, *Griff. Notul.* iii. 383; *Ic. Pl. Asiat.* t. 345.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 7500 ft., *Treutler*. KHASIA and NAGA HILLS, alt. 4-6000 ft., *Griffith*, &c. TENASSERIM; at Moulmein, *Lobb*.

Pseudobulb size of a hazel or walnut. *Leaves* 6-12 by $\frac{1}{4}$ -1 in., on a slender stem, lanceolate. *Scape* equalling or exceeding the leaves, slender; bracts very small; pedicel with ovary $\frac{1}{2}$ -1 in., at right angles to the perianth, both rose-cold.; tube of perianth $\frac{3}{4}$ in. long, 2-3 times as long as the free parts; limb of lip cuneate or recurved, obscurely lobed, spotted with bright red. *Capsule* 1 in., fusiform.

28. JOSEPHIA, *Wight*.

Epiphytic stemless tufted herbs; root fibres very stout. *Leaves* radical, rigidly coriaceous. *Flowers* very small, on the branches of panicked spikes. *Sepals* broad, subequal, concave, connivent. *Petals* narrower. *Lip* adnate to the base of the column, erect, fleshy, concave; lateral lobes small, erect; midlobe small, entire, papillose, with a basal callus uniting the side lobes. *Column* erect, broad, nearly as long as the sepals, shortly 2-winged above, foot 0; anther acuminate, 2-celled; pollinia 4, oblong, parallel, subcaudate, attached to the rostellum by a viscus.

1. *J. lanceolata*, *Wight* *Ic. t.* 1742; leaves petioled linear-oblong or -lanceolate subacute. *Walp. Ann.* vi. 924. *Polystachya ramosa*, *Gardn. mss.*

WESTERN GHATS; from the Concan, *Stocks*, &c., to Travancore, *Wight*, &c. CEYLON; abundant in the Central Province.

Leaves 3-5 in., narrowed into a petiole $\frac{1}{4}$ -2 in., young clothed with hyaline sheaths. *Scape* 4-12 in., slender, and its branches stiff; bracts short, ovate, appressed; flowers $\frac{1}{2}$ in. broad, white tinged with purple; sepals obtuse.—Inflorescence like that of a *Statice*. *Wight*, on *Jerdon's* authority, mentions the curious fact of the persistent continuously flowering spikes.

2. *J. latifolia*, *Wight* *Ic. t.* 1743; leaves subsessile broadly oblong obtuse. *Walp. Ann.* vi. 924.

TRAVANCORE; on the Pulney Mts., *Wight*. NILGHIRI HILLS; Wynaad, *Jerdon* (*Ic. in Herb. Kew*).

Habit of *J. lanceolata*, but leaves much broader, more coriaceous, and with a much stouter shorter petiole, purple beneath; flowers yellow with purple stripes, and tip of lip.—I have no materials for describing the flowers.

29. GLOMERA, *Blume*.

This genus, which I erroneously believed to be British Indian when I drew up the Key to the Genera, p. 670, is as hitherto known confined to the Malayan Archipelago and Pacific. It consists of two species, and is distinguished from *Agrostophyllum* solely by having only 4 pollinia. Some of the following species of the latter genus, of which I have not seen the pollen, may prove to belong to it.

30. AGROSTOPHYLLUM, *Blume*.

Epiphytes with tufted sheathed flattened leafy stem. *Leaves* distichous, linear; sheaths flattened, persistent. *Flowers* very small, white, crowded in sessile terminal heads, mixed with long paleaceous bracts, rarely in small racemes. *Sepals* erect, conniving, concave; lateral broader, adnate to the foot of the column. *Petals* narrow or broad. *Lip* adnate to the short foot of the column, short, erect, entire or 3-fid. *Column* short, stout, thickened above; anther 2-celled; pollinia 8, ovoid, free or connected in

fours by a small viscus.—Species 6–8, Indian and Malayan and Seychelle Islands.

* *Lip subentire or 3-lobed. Petals broad, 5-many-nerved.*

1. **A. callosum**, *Reichb. f. in Seem. Fl. Vit.* 296; sepals 5–7-nerved, petals orbicular many-nerved, lip broadly ovate or oblong obscurely 3-lobed concave with a large subbasal callus and 2 smaller ones at the lateral sinus.

EASTERN HIMALAYA, Sikkim and Bhotan, alt. 2–5000 ft., *Griffith (Kew Distrib.* 5215, 5217). KHASIA and NAGA HILLS, common. UPPER BURMA, *Griffith (K. D.* 5216).

Stem 12–18 in. *Leaves* 5–7 by $\frac{1}{2}$ in., narrowed from the base to the rounded notched tip; sheaths $\frac{3}{4}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in., mouth truncate. *Heads* 1–1 $\frac{1}{2}$ in. diam.; flowers $\frac{1}{4}$ in. diam., pink; lip very variable, sometimes distinctly 3-lobed with the midlobe orbicular from the same head with broadly ovate obscurely lobed lips; ovary obtusely angled, much longer than the obtuse inner bracts.

** *Lip with a concave hypochile, truncate in front, a broader epichile attached by a small base to its under surface. Petals linear, 1–3-nerved.*

2. **A. khasianum**, *Griff. in Calc. Journ. Nat. Hist.* iv. 378, t. 19; leaves 4–7 by $\frac{2}{3}$ – $\frac{3}{4}$ in. base contracted, sheaths $\frac{2}{3}$ in. broad, ovary obtuse-angled not exceeding the acute linear bracts, sepals acuminate 3-nerved, petals linear-oblong 3-nerved, epichile reniform. *A. planicaule*, *Reichb. f. in Walp. Ann.* vi. 909. *Appendicula Hasseltii*, *Wight Ic.* t. 1748, f. 3 (not of Blume). *Eria planicaulis*, *Wall. mss.*

KHASIA HILLS, alt. 2000 ft., *Gibson, J. D. H. & T. T. MUNNIPORE, Clarke.* TENASSERIM; at Moulmein, *Helper*, 5219, *Griffith*, &c.

Stem 6–8 in., few-leaved. *Leaves* almost petioled, obtuse and notched; sheaths lax, mouth very oblique. *Heads* $\frac{1}{2}$ in. diam.; flowers $\frac{1}{4}$ in. diam.

3. **A. glumaceum**, *Hook. f. Ic. Plant. ined.*; stemless or nearly so, leaves 8–18 by $\frac{1}{2}$ – $\frac{3}{4}$ in., base broad, tip contracted, sheaths very long, ovary acute-angled much longer than the cymbiform acute bracts, sepals acuminate 1-nerved, petals linear acuminate 1-nerved, epichile rounded ovate, column with short triangular wings.

PERAK, *Scortechini, King's Collector.*

Stems very short, tufted. *Leaves* rather flaccid, narrowed from the upper third to the tip; sheaths 2–5 by $\frac{1}{2}$ – $\frac{2}{3}$ in., mouth truncate. *Heads* broken up into short spikelets with distichous bracts $\frac{1}{10}$ in. long; flowers $\frac{1}{4}$ in. diam.—The triangular wings of the column are peculiar to this amongst Indian species.

4. **A. majus**, *Hook. f. Ic. Plant. ined.*; leaves 5–7 by $\frac{3}{4}$ –1 in., base broad, tip rounded, sheaths 1–2 in. long, heads large, ovary acute-angled not longer than the inner bracts, sepals acuminate 1-nerved, petals lanceolate acuminate 1-nerved, epichile orbicular acuminate.

PERAK, *Scortechini, King's Collector.*

Stem robust, 2 ft. *Leaves* not contracted at base or tip; sheaths $\frac{1}{2}$ in. broad, truncate. *Heads* 1 $\frac{1}{2}$ –2 in. diam.; outer bracts very broad, inner obtuse; flowers $\frac{1}{4}$ in. diam.; column short, broad, wingless; anther 2-lobed.—Resembles a Sumatran species (Beccari, 563), also a Javan named *A. longifolia*, Blume, by Reichenbach, but which has a triangular epichile with rounded bosses at the sides, and a narrower column.

5. **A. pauciflorum**, *Hook. f. Ic. Plant. ined.*; stem slender, leaves 2 in. flaccid very narrowly linear obtuse, flowers few minute in very short axillary peduncles, sepals ovate acuminate, petals linear 1-nerved, lip clawed rhomboid.

PERAK, *Scortechini*.

Stems 18-20 in., naked below, flexuous. Leaves $\frac{1}{2}$ in. diam., thin. Peduncles $\frac{1}{12}$ in.; flowers $\frac{1}{18}$ in.

Species of doubtful position.

6. *A. ZEYLANICUM*, *Hook. f.*; leaves 4-5 by $\frac{1}{2}$ in. flaccid, base slightly contracted, tip rounded, sheath 1-2 by $\frac{1}{2}$ in. truncate, ovary obtuse-angled very much longer than the obtuse bracts.—Ceylon, *McKenzie, Walker*, "Abundant on the road to Adam's Peak on trees."—I have seen only two specimens; in one the flowers are too withered for analysis, the other is monstrous with the head filled with fascicles of setaceous bracts. The thin flaccid leaves are peculiar.

31. *CERATOSTYLIS*, *Blume*.

Epiphytic low herbs with fibrous roots; stems tufted, simple or branched, sheathed, sometimes leafless and rush-like. Leaves narrow, coriaceous, fleshy or subterete, rarely thin. Flowers minute, solitary, or few in a small cluster of bracts. Sepals erect, conniving; lateral broader, forming with the foot of the column a gibbous or short spur-like mentum. Petals narrower. Lip adnate to the foot of the column by a long incumbent claw; blade short, erecto-patent, fleshy, entire. Column short, top broad, 2-lobed, or with two spatulate erect arms; foot long; anther 2-celled; pollinia 8, small, attached in fours or all together by a small viscus.—Species 15, Indian, Malayan and Pacific.

* Stems erect, rush-like. Flowers capitate; mentum spur-like. Arms of column long, erect.

1. *C. teres*, *Reichb. f.* in *Bonpland*. ii. 89, and in *Walp. Ann.* vi. 470; flowers pubescent, lip narrowly spatulate, tip thickened concave. *Appendicula teres*, *Griff. Notul.* iii. 359; *Ic. Pl. Asiat.* t. 332.

UPPER ASSAM; near Negregam, *Griffith*. KHASIA HILLS; at Amwee, alt. 4-5000 ft., *J. D. H. & T. T.*

Stems 8-12 in., as thick as a crow-quill, from a stout fibrous rhizome, straight or curved, jointed (or with a terete leaf) at the head of flowers, clothed at the base with appressed scarios sheaths. Heads of flowers $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., sessile lateral or terminal, in a tuft of sheathing bracts; flowers $\frac{1}{12}$ in. long, very shortly exserted; bracteole cymbiform, acuminate; ovary short, ovate, acuminate; lateral sepals pubescent; petals lanceolate, acute; mentum as long as the ovary, clavate; column much shorter than its spatulate arms.

2. *C. malaccensis*, *Hook. f.* *Ic. Plant. ined.*; flowers glabrous, lip lanceolate, tip thickened acute, disk with 3 ridges.

PERAK, *Scortechini*; on Batang Padang, alt. 4900 ft., *Wray*; Mount Ophir, *Griffith* (*Kew Distrib.* 5213).

Habit of *C. teres*, but stems shorter, flowers quite glabrous, and lip with membranous margins.—This will probably prove to be a Malay Archipelago species, but I cannot identify it with any.

** Stem ascending or pendulous, sheathed throughout. Flowers in lateral tufts of bracts; mentum very short, rounded; column with a broad reniform top.

3. *C. clathrata*, *Hook. f.*; glabrous, stems densely tufted, sheaths clathrately reticulate, leaves terete channelled, flowers papillose shortly

peduncled, bracts scarious sheathing, lip quadrate or very broadly triangular.

PERAK; on Batang Padang, alt. 4900 ft., Wray, *Scortechini*.

Stems 2-3 in., rigid, branched. Leaves $\frac{1}{2}$ -1 in., recurved when dry, acute; sheaths appressed; nerves beautifully reticulate in squares. Flowers about $\frac{1}{2}$ in. long, pale brownish; bracts brown, acuminate; lateral sepals triangular, 3-nerved; dorsal much narrower; mentum rounded; petals oblong-lanceolate, 1-nerved; lip rather membranous and plaited? top of column very broadly reniform.—More flowers are wanted for a satisfactory analysis. Scortechini figures the lip as with a slender claw, and the leaves as $\frac{1}{2}$ terete. The reticulated sheaths are beautiful objects. *C. retisquama*, Reichb. f., has similar sheaths, but much longer sepals and petals.

4. *C. pendula*, Hook. f. *Ic. Plant. ined.*; glabrous, stems tufted slender creeping or pendulous loosely clothed with scarious brown ribbed sheaths, leaves linear fleshy, margins convolute when dry, flowers in clusters of oblong scarious obtuse bracts, ovary hairy, lip ovate or ovate-oblong. *Trigonanthus pendulus*, Korthals mss. (*fid. Reichb. f. in Herb. Lindl.*).

PERAK, *King's Collector*.—DISTRIB. Borneo, Celebes.

Stems 6-10 in., weak, rooting, as thick as a sparrow-quill; sheaths $\frac{1}{2}$ in., loose, subacute, tips usually broken. Leaves 1-1 $\frac{1}{2}$ in., obtuse. Flowering bracts forming stellate tufts; flowers about $\frac{1}{10}$ in. long, yellowish brown; sepals ovate, obtuse, thick, glabrous, concave, 3-nerved; petals linear, concave; mentum rounded, indistinct; lip abruptly clawed, very thick, concave, subacute, with narrow membranous margins, base rounded or subcordate; column very short, arms short obtuse.—The clawed lip resembles *Bulbophyllum*; more flowers are wanted for a satisfactory description.

5. *C. himalaica*, Hook. f. *Ic. Plant. ined.*; stems densely tufted prostrate branched clothed with scarious brown ribbed sheaths, leaves linear-lanceolate thick fleshy, flowers pedicelled surrounded by acute membranous bracts; pedicel and sepals sparsely woolly. *Eria ramosissima*, Wall. mss.

EASTERN TROPICAL HIMALAYA; E. Nepal, J. D. H.; Bhotan, Griffith (*Kew Distrib.* 5214). KHASIA MTS., Gibson (*Ic. in Herb. Calcutt.*).

Stem 4-6 in. Leaves 2-2 $\frac{1}{2}$ in., subacute, base narrowed. Flowers $\frac{1}{2}$ in. long; lateral sepals broadly ovate, acute, pale pink, 3-nerved; petals linear, acute, white streaked with purple; mentum rounded; lip obovate-oblong, obscurely 3-lobed, coriaceous, concave, with a gibbosity on the back below the papillose yellow tip; top of column broadly reniform. Capsule $\frac{1}{2}$ in. long, ellipsoid, pedicelled.—The few flowers I have analyzed are insufficient for a satisfactory description.

*** Stem erect or ascending. Flowers solitary or few; arms of column long.

6. *C. lancifolia*, Hook. f. *Ic. Plant. ined.*; stem simple slender, sheaths few 1 in. long loose, leaf terminal membranous linear-lanceolate acute, flower solitary long-pedicelled, mentum short spur-like.

PERAK, *Scortechini*.

Stem 2-4 in., tufted. Leaf 1 $\frac{1}{2}$ -4 in., rather membranous, shortly petioled. Flower $\frac{1}{2}$ in. long; pedicel erect, filiform, pubescent; bract minute, tubular; sepals linear-lanceolate, subacute, 3-nerved; petals lanceolate, 3-nerved; mentum broader than long; lip fleshy, claw short with incurved margins; hypochile narrowly oblong; epichile as long but narrower, dagger-shaped, terete, obtuse.—Near *C. Gigas*, Bl. (*Reichb. f. Xen. t. 127*), which has broader flattened stems, and a very different lip. Also near *C. braccata*, R. f., which has a very fleshy leaf and long mentum. More flowers are necessary for a reliable description.

7. **C. robusta**, Hook. f. *Ic. Plant. ined.*; rhizome stout ascending rooting and small distant erect pseudobulbs clothed with reticulate acuminate appressed sheaths, leaves 4-5 in. solitary erect linear-lanceolate acuminate, scape enclosed in the sheath with the pseudobulb very slender 1-ld., mentum cylindric, lip long clawed spatulate obtuse.

PERAK; alt. 4900 ft., *Wray*.

Rhizome as thick as a goose-quill; trabeculately reticulate, membranous. *Scape* a little longer than the pseudobulbs; bract small, broad; flower about $\frac{1}{2}$ in., from the tip of the mentum to that of the dorsal sepal, pale yellow; mentum hoary, longer than the oblong obtuse 5-nerved sepals; lip apparently quite smooth and entire, tip fleshy.—A remarkable species, probably scandent.

32. **CRYPTOCHILUS**, Wall.

Low epiphytes; pseudobulbs crowded, 1-2-leaved. *Leaves* coriaceous, base complicate or petioled. *Scape* terminal, naked; flowers close set in distichous spikes, shorter than their persistent bracts. *Sepals* connate in an equally 3-lobed ovoid or urceolate gibbous 5-toothed tube. *Petals* narrow. *Lip* included, adnate to and incumbent on the foot of the column, narrow, erect. *Column* erect, top dilated toothed; anther 2-celled; pollinia 8, obovoid or oblong, connected in fours by a small viscus.—Species 2.

1. **C. sanguinea**, Wall. *Tent. Fl. Nep.* 36, t. 26; *Cat.* 7530; flowers pubescent longer than broad bright red, sepals acuminate. *Lindl. Gen. & Sp. Orchid.* 193; in *Journ. Linn. Soc.* iii. 21; in *Bot. Reg.* 1838, t. 23; *Wight Ic.* t. 1757; *Walp. Ann.* vi. 461.

SUBTROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, *J. D. H.* KHASIA and NAGA HILLS, alt. 4-5000 ft., *Griffith, Prain, &c.*

Pseudobulbs variable. *Leaves* 3-8 in., lower ensiform, upper linear-oblong, stoutly petioled. *Scape* 3-5 in., stout, naked; spike 3-5 in.; bracts linear, pubescent; petals and lip obovate; pollen green. *Capsule* $\frac{1}{2}$ in., oblong, erect.

2. **C. lutea**, *Lindl. in Journ. Linn. Soc.* iii. 20; flowers glabrous subglobose yellow, sepals obtuse. *Reichb. f. in Gard. Chron.* 1882, ii. 733.

TEMPERATE HIMALAYA; Sikkim, alt. 6000 ft., and Bhotan, *Griffith, &c.* (*Kew Distrib.* 5228, 5229, 5229/1). MUNIPORE; on Kohima, *Clarke*.

Pseudobulbs crowded, oblong. *Leaves* 1-2, 3-5 in., linear-lanceolate, acute, subsessile or petioled. *Scape* 2-4 in., rather slender; spike as long; petals and lip lanceolate; pollen whitish. *Capsule* $\frac{1}{4}$ in., ellipsoid.

33. **TRICHOSMA**, Lindl.

Epiphytic; stem tufted, sheathed, cylindric, 2-leaved. *Leaves* terminal, subopposite, petioled. *Scape* terminal; flowers few, large, white, racemed. *Sepals* subequal, spreading, lateral broader, adnate to the base of the column. *Lip* articulate with the base of the column, claw incumbent, 3-lobed, disk lamellate. *Column* short, top toothed, anther with 2-rounded appendages; pollinia 8, broadly ovate, compressed, cohering in fours by a viscus.

Very near sect. *Hymeneria* of *Eria*.

T. suavis, *Lindl. in Bot. Reg.* 1841, *Misc.* 83. *T. cylindripoda*, *Griff. Notul.* iii. 299. *Eria suavis*, *Lindl. in Journ. Linn. Soc.* iii. 52.

E. coronaria, *Reichb. f. in Walp. Ann.* vi. 272, and in *Gard. Chron.* 1876, 234. *Cœlogyne coronaria*, *Lindl. in Bot. Reg.* 1841, *Misc.* 83.

SIKKIM HIMALAYA, alt. 5-6000 ft., and KHASIA HILLS, alt. 4-5000 ft.

Stems 3-6 in., from an underground soft rhizome, as thick as a goose-quill, naked, fleshy; basal sheaths few, lax. *Leaves* ovate-lanceolate acuminate, thick, 3-nerved. *Scape* 1-2 in., 2-4-fl.; bracts large; pedicel with ovary $\frac{1}{2}$ -1 in.; flowers white, yellowish or purplish, sweet-scented; lateral sepals $\frac{1}{2}$ - $\frac{3}{4}$ in. long, ovate-lanceolate; petals oblong; lip subsessile, ovate-oblong, streaked with purple; disk yellow, with 2 thick crenate ridges between the side lobes, and 7 on the suborbicular midlobe; anther rather fleshy.

34. **CÆLOGYNE**, *Lindl.*

Epiphytes; rhizome creeping; pseudobulbs 2-(rarely 1-)leaved. *Leaves* coriaceous, or thin and plaited. *Scape* usually short; flowers usually racemed, rarely (except in sect. *Pleione*) 2 or solitary; bracts long, sheathing, deciduous. *Sepals* subequal, lateral saccate at the base. *Petals* narrower. *Lip* sessile at the base of the column, erect and embracing it, base concave or saccate. *Column* long, erect, winged, foot 0; top hooded, membranous; anther more or less 2-celled; pollinia 4, cohering in pairs by a granular viscus.—Species about 70, Indian and Malayan.

In some species of this genus the flowers are produced from the undeveloped pseudobulbs; in others only from the fully developed; and this character is quite constant. Again, in some species which flower from the undeveloped pseudobulbs the sheaths of the flowering scape are closely imbricating, and all coriaceous or membranous; in others the inner sheaths are more or less foliaceous, or one or two may form fully developed leaves. This character does not so well limit species, but is very useful. Lastly, the presence or absence of sheaths on the scape of the species which flower from the mature pseudobulb, and their position, afford very constant characters. A consideration of these hitherto partially recognized characters suggests the following arrangement of the Indian species.

Sect. I. EUCÆLOGYNE. *Flowers* and *leaves* cœtaneous. *Lip* 3-lobed, the terminal lobe spreading.

* Flowers from an undeveloped pseudobulb at the base of the old pseudobulb. Sheaths of the scape all basal.

† Sheaths of the scape imbricating, none becoming foliaceous (except sometimes in *C. suaveolens*, *occultata*, *breviscapa* & *sulfurea*).

§ *Racemes* pendulous or decurved, many-fl. (or few-fl. in *C. cristata*).—Sp. 1-8.

§§ *Racemes* erect or inclined, rarely drooping, many- or few-fl.—Sp. 9-20.

†† Inner sheaths of the scape more or less foliaceous. (See also *C. suaveolens*, *occultata*, *breviscapa* & *sulfurea*).—Sp. 21-29.

** Flowers from the top of the mature pseudobulb.

† Scape sheathed at the base only.—Sp. 30-35.

†† Scape not sheathed either at the base or beneath the raceme.—Sp. 36-38.

††† Scape with distichous imbricating sheaths below the raceme only.—Sp. 39-47.

Sect. II. PLEIONE. *Flowers* appearing before or after the leaves (except *C. Hookeriana*) from the base of the mature pseudobulb. *Lip* large, convolute, with a shovel-shaped mouth, very obscurely 3-lobed.—Sp. 48-53.

Doubtful species.—Sp. 54-55.

Sect. I. EUCÆLOGYNE (see above).

1. ***C. Gardneriana***, *Lindl. in Wall. Pl. As. Rar.* i. 33, t. 38;

Gen. & Sp. Orchid. 41; *Fol. Orchid.* 1; pseudobulbs long narrow, leaves large petioled elliptic-lanceolate, raceme nodding, flowers large distichous white, sepals and petals narrow connivent below, base of narrow lip bisaccate. *Past. Mag.* vi. t. 73; *Walp. Ann.* vi. 222. *C. trisaccata*, *Griff. Itin. Notes* 72; *Walp. l. c.*

SUBTROPICAL HIMALAYA, alt. 4-5000 ft., eastwards, and KHASIA MTS., common.

Pseudobulbs 3-6 in., narrowly flask-shaped. *Leaves* 6-14 in. *Scape* short, closely clothed with broad obtuse sheaths; raceme 4-8 in.; bracts 1-1½ in., cymbiform, obtuse; sepals linear-oblong, acute, keeled; base saccate; petals narrower; side lobes of lip small toothed, midlobe 2-cleft rounded and erose, disk yellowish with 2 waved ridges. *Capsule* 1½ in., fusiform, 6-winged.

2. ***C. flaccida***, *Lindl. in Wall. Cat.* 1961; *Gen. & Sp. Orchid.* 39; in *Bot. Reg.* 1841, t. 31; *Fol. Orchid.* 2; pseudobulbs elongate, leaves long-petioled, sepals ¾ in. linear-oblong acute, petals narrower acuminate, side lobes of lip large rounded, midlobe small broadly ovate, disk with 3 yellow flexuous ridges. *Bot. Mag.* t. 3318; *Walp. Ann.* vi. 222.

SUBTROPICAL HIMALAYA; from Nepal, *Wallich*, eastwards. TENASSERIM; on rocks of Jook Long, *lc. Parish*.

Pseudobulbs 2-6 in., sheaths large, coriaceous, purple-brown. *Leaves* 6-12 in., linear-lanceolate, acuminate; petiole 1-3 in. *Scape* with short broad obtuse basal sheaths; raceme 4-5 in., pendulous; bracts ½-¾ in., caducous; flowers ½-¾ in. diam., white (said to smell offensively), side lobes of lip brown. *Capsule* 2½ in., clavate, broadly winged.

3. ***C. testacea***, *Lindl. in Bot. Reg.* 1842, *Misc.* 38; *Fol. Orchid.* 2; pseudobulbs narrow ovoid, leaves petioled, sepals lanceolate subacute and rather narrower petals pale brown, side lobes of lip narrow dark brown margined with white, midlobe broad rounded crenate, disk with 4 spinulose ridges. *Bot. Mag.* t. 4785; *Walp. Ann.* vi. 223.

SINGAPORE, *Hort. Loddiges*.

Pseudobulbs 3-5 in., obtusely angled; sheaths narrow. *Leaves* 6-8 in., lanceolate, 3-5-nerved. *Scape* sheathed up to the flowers; raceme many-fl., pendulous; bracts ½ in., cymbiform, acute, persistent; flowers 1½ in. diam.; column white, anther brown.

4. ***C. cristata***, *Lindl. Coll. Bot.* t. 32; in *Bot. Reg.* 1841, t. 57; *Fol. Orchid.* 8; pseudobulbs oblong, leaves sessile lanceolate, raceme few-fl., sepals and petals subequal broad obtuse white, side lobes of lip large rounded with yellow fimbriate lamellæ between them, midlobe suborbicular with 2 crenulate broad yellow plates. *Walp. Ann.* vi. 229; *Past. Fl. Gard.* iii. 171, f. 312; *Fl. des Serres*, t. 1807; *Pescatoria* i. t. 25; *Warner Sel. Orchid.* t. 35; *Orchid. Alb.* t. 54; *Jennings Orchid.* t. 7; *Gartenfl.* viii. t. 245; *Deutsche Gartenz.* 1866, t. 341. *Cymbidium speciosissimum*, *Don Prodr.* 35.

TEMPERATE HIMALAYA, alt. 5-7000 ft., from Kumaon eastwards. SYLHET, *fid. Wallich*.

Pseudobulbs 2-3 in., distant. *Leaves* 6-12 in. *Scape* with pendulous raceme 6-12 in., 3-10-fl.; bracts 1½-2 in., oblong, persistent; flowers very large; sepals 1½-2 in., undulate. *Capsule* 1½-2 in., fusiform, angles obtuse.—There are many described varieties with very slight characters, as var. *hololeuca*, R. f. in *Gard. Chron.* 1881, i. 562, which has white crests on the lip; var. *Lemoniana*, *Orchidoph.* 188, 212, with lemon-yellow on the lip; another var. *Lindenia* iv. t. 173, and *marina*, *Reichb. f.* in *Gard. Chron.* 1886, i. 398, and in *Reichenbachia* i. 13, t. 8, which differs only in its larger size.

5. **C. macrobulbon**, *Hook. f.*; pseudobulbs very long narrow, leaves petioled broad, raceme many-fl., bracts subtruncate, sepals oblong-lanceolate acuminate green, petals narrowly linear, lip white mottled with yellow-brown, side lobes narrow, disk with 3 crisped ridges, the lateral double on the ovate acuminate midlobe. *C. fuscescens*, *Wall. Cat.* 1969/2.

PENANG, *Wallicn.* PERAK, *Scortechini*, *King's Collector*.—DISTRIB. Borneo.

Pseudobulbs 4–8 in., distant, narrowed from the base upwards; sheaths short, acuminate. *Leaves* 6–8 by 2–4 in., broadly elliptic- or ob-lanceolate. *Scape* with loose membranous obtuse basal sheaths.—Probably near *Hüttneriana*; but the bulbs differ entirely from Reichenbach's description of that plant, as do the basal sheaths of the scape and obtuse bracts.

6. **C. tomentosa**, *Lindl. Fol. Orchid.* 3; pseudobulbs narrowly ovoid, leaves long long-petioled lanceolate, raceme bracts and ovary pubescent, sepals lanceolate and narrower petals pale red-brown, lip yellow, side lobes narrow streaked with brown, disk with 3 crisped ridges the outer double and coalescing in a broad caruncled area on the small midlobe. *Reichb. f. in Gard. Chron.* 1873, 1843; *Wawra Bot. Voy. Pr. Saxe-Cob.* ii. 154, t. 14; *Walp. Ann.* vi. 224.

PERAK; at Larut, *King's Collector*. MALACCA, top of Mount Ophir, *Hullett*.—DISTRIB. Borneo.

Pseudobulbs 3–6 in.; sheaths very long, lanceolate, rigid. *Leaves* 12–20 by 1–2½ in., petiole 2–3 in. *Scape* 12–18 in., scurfily pubescent; basal sheaths loose; bracts 1–1½ in., subacute, persistent in flower; sepals 1–1½ in. long.

Var. ? *penangensis*; pseudobulbs shorter, leaves 6–8 by 2–2½ in. elliptic-obovate, ridges of lip not coalescing on the midlobe.—Penang, on Government Hill, *Maingay*.

7. **C. Massangeana**, *Reichb. f. in Gard. Chron.* 1878, 684; 1882, i. 369; pseudobulbs obpyriform, leaves petioled elliptic-obovate, bracts short broad, sepals oblong-lanceolate and narrower petals pale straw-colored, side lobes of lip narrow blue-grey with purple tips, disk with 3 crisped compound ridges produced on to the yellow orbicular apiculate midlobe. *Bot. Mag.* t. 6979; *Floral Mag.* N. S. t. 373; *Warner Orchid. Alb.* t. 29.

ASSAM (fid. *Gard. Chron.*) (more probably Malayan).

Pseudobulbs 2 in. *Leaves* 4–5 by 1½–2 in. *Raceme* 12–18 in., pendulous, quite glabrous; bracts ½–¾ in., cuneiform when spread out, persistent, tip broad, rounded; sepals 1 in. long; side lobes of lip striped purple within.—See note under *C. assamica*.

8. **C. Hüttneriana**, *Reichb. f. in Flora* 1872, 277; pseudobulbs fusiform very rugose, leaves petioled oblong-lanceolate, bracts acuminate, sepals ovate-lanceolate acuminate, petals linear, side lobes of lip rounded, disk with 3 crisped ridges extended into the rounded ovate acuminate midlobe.

TENASSERIM; at Moulmein, *Parish*.

Scape in the only specimen seen 7 in.; sheaths closely imbricating, the outer purple-brown; raceme 8–10-fl., drooping; bracts 1 in., cymbiform.—I have seen no pseudobulbs or leaves; the flower is described from a specimen named by Reichenbach, who says “flower white and lip toothed with a ligulate midlobe.”

9. **C. lentiginosa**, *Lindl. Fol. Orchid.* 3; pseudobulbs linear-oblong, leaves shortly petioled elliptic-lanceolate, raceme 5–8-fl., sepals oblong-

lanceolate acute and rather narrower petals pale green, side lobes of lip oblong obtuse, margins brown, midlobe large shortly broadly clawed nearly semicircular crenate white with orange blotches, disk with 3 obscure short crenate ridges. *Bot. Mag.* t. 5958; *Reichb. f. in Trans. Linn. Soc.* xxx. 146; *Walp. Ann.* vi. 224.

TENASSERIM; at Moulmein, *Lobb, Parish.*

Pseudobulbs 3-4 in., obtusely 4-angled. *Leaves* 6-8 in. *Scape* with erect raceme 4-5 in., sheathed up to the flowers; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., lanceolate, persistent; flowers $1\frac{1}{2}$ in. diam.; ridges of lip not produced on to the midlobe, side lobes speckled with brown.

10. **C. Maingayi**, *Hook. f.*; pseudobulbs narrowly ovoid, leaves long-petioled elliptic-lanceolate, raceme many-fl., flowers large white, lateral sepals linear-oblong acute, petals subspathulate obtuse, lip deeply 3-lobed blotched with orange, side lobes large, midlobe obovoid crenate undulate, disk with 3 crested brownish ridges between the side lobes and 2 on the midlobe.

MALACCA, *Maingay (Kew Distrib.* 1636).

Pseudobulbs 4 in. *Leaves* 10 in., acute, 7-nerved; petiole 2 in. *Scape* with drooping raceme 14 in., clothed at the base with short distichous sheaths, and above up to the flowers with long tubular membranous ones; bracts $1\frac{1}{2}$ in., persistent, reflexed; flower $2\frac{1}{2}$ in. diam.—Description partly from *Maingay* mss.

11. **C. corymbosa**, *Lindl. Fol. Orchid.* 7; pseudobulbs short, leaves elliptic-lanceolate, raceme erect or drooping, sepals and narrower petals lanceolate acute white, lip white with 4 large yellow eyes bordered with orange, side lobes erose, midlobe ovate or ovate-lanceolate, disk with 3 low ridges. *Bot. Mag.* t. 6955; *Walp. Ann.* vi. 228; *Reichb. f. in Gard. Chron.* 1876; *Rolfe l. c.* 1837, ii. 73, f. 15.

TEMPERATE HIMALAYA; KHASIA MTS., alt. 6-9000 ft., from Sikkim eastwards.

Pseudobulbs $1-1\frac{1}{2}$ in., crowded, obovoid or subrhomboid. *Leaves* 4-8 in. *Scape* sheathed up to the fragrant flowers; sepals $1-1\frac{1}{2}$ in.; spots on lip variable in form, side lobes sometimes streaked with red. *Capsule* $1\frac{1}{2}$ -2 in., pyriform, angles obtuse.—Var. *heteroglossa*, R. f. in G. C. 1878, ii. 8, is described as having a broader midlobe of lip.—This species is often confounded with *C. nitida*, which flowers from the mature bulbs.

12. **C. ochracea**, *Lindl. in Bot. Reg.* 1846, t. 69; *Fol. Orchid.* 5; pseudobulbs oblong, leaves petioled elliptic-lanceolate, raceme 6-8-fl., sepals linear-oblong acute and narrower petals white, lip white with confluent orange and yellow or brownish areas, side lobes serrulate, midlobe as long broadly ovate acute, base serrulate, disk 2-ridged. *Bot. Mag.* t. 4661; *Jard. Fleur.* iv. t. 342; *Walp. Ann.* vi. 226.

TEMPERATE HIMALAYA, alt. 5-7000 ft., from Kumaon to UPPER ASSAM.

Very near *C. corymbosa*, but pseudobulbs oblong polished, leaves narrower and longer petioled, scape more exerted very long in fruit, flowers smaller, sepals only 1 in. long more obtuse, and midlobe of lip broader.—Sub-sp. *conferta*, Par. & Reichb. f. in Trans. Linn. Soc. xxx. 146, t. 30, f. 3, with small elliptic acute leaves, shorter perianth segments, and entire side lobes of lip, may (as the authors suggest) be a different species.

13. **C. graminifolia**, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 146; pseudobulbs ovoid, leaves very narrow, raceme 3-4-fl., sepals and much narrower petals oblong-lanceolate acute white, lip orange-yellow

side lobes rounded, midlobe smaller broadly ovate acute, disk with 3 dark brown or red crisped ridges. *Bot. Mag.* t. 7006; *Rolfe in Gard. Chron.* 1888, i. 168.

ASSAM, Mann. TENASSERIM; mountains near Moulmein, *Parish*.

Pseudobulbs $1\frac{1}{2}$ – $2\frac{1}{2}$ in., crowded; sheaths short. *Leaves* 10–12 by $\frac{1}{2}$ – $\frac{1}{2}$ in. *Scape* much shorter, sheathed to the middle or lower; bracts caducous; sepals 1 in.

14. *C. viscosa*, *Reichb. f. in Allgemein. Berlin Gartenz.* 1856, 218; *in Bonpland.* iv. 328; *in Gard. Chron.* 1870, 1085; pseudobulbs narrowly ovoid or fusiform shining, leaves 8–12 in. petioled linear-lanceolate, scape very short closely sheathed up to the erect few-fl. raceme, ovary viscid, sepals and narrower petals linear-lanceolate acuminate white, lip very broad rounded, side lobes streaked with brown, midlobe small ovate, disk with 3 crenulate lamellæ from the base to the middle of the midlobe.

KHASIA HILLS (*IC. in Herb. Calcutt.*).

Reichenbach describes this as "a pretty little species in the way of *C. flaccida*;" but the pseudobulbs of specimens named by him are $2\frac{1}{2}$ in. long, the scape is erect, and the flower 2 in. diam. My only materials are the above pseudobulbs and flower, another of each from Messrs. Veitch, and a rude drawing in *Herb. Calcutt.*, of what Mr. Rolfe and I take to be the same species; and if so, it is the only authority for the habitat. In the drawing the very stout rhizome bears narrowly obpyriform pseudobulbs 3 in. long with sheaths as long, the leaves are $1\frac{1}{2}$ in. broad, 3-nerved, the flowers are smaller, sepals broader, and petals and lip narrower.

15. *C. suaveolens*, *Hook. f.*; pseudobulbs ovoid, leaves sessile elliptic, margins wavy, scape sheathed up to the raceme, flowers distinct, sepals and petals incurved oblong acute white, lip white, side lobes rounded, midlobe broadly ovate or orbicular, disk with 4–6 crenate yellow ridges. *C. undulata*, *Wall. mss.* *Pholidota suaveolens*, *Lindl. in Gard. Chron.* 1856, 372.

KHASIA MTS., *Gibson (IC. in Herb. Calcutt.)*; at Mungpo, alt. 1500 ft., *Clarke*. ASSAM (*IC. in Herb. Calcutt.*).

Pseudobulbs 2–3 in., distinct on a stout sheathed rhizome. *Leaves* 6–8 in. *Scape* 6–8 in., sometimes 2-leaved, ascending, lower sheaths closely imbricate; bracts $\frac{2}{3}$ in., deciduous; sepals $\frac{1}{2}$ – $\frac{2}{3}$ in. long; column rather short. *Capsule* $1\frac{1}{2}$ in., turgid, angles acute—Habit of *Pholidota*, and the column is rather short for *Cælogyne*, though very different from *Pholidota*.

16. *C. occultata*, *Hook. f. IC. Plant. ined.*; pseudobulbs turbinate ob-ovoid, leaves 2–3 in. petioled elliptic acute, scape 3–4-fl. very short ascending thickly clothed to the top with coriaceous sheaths the upper subfoliaceous, flowers half concealed by the sheaths white, sepals and narrower petals oblanceolate acute, side lobes of lip rounded streaked with dull red, midlobe ovate-rotundate obtuse crenate, disk between the side lobes with 2 very thick yellow crenate ridges.

SIKKIM HIMALAYA, *Griŋŋth's Collectors (Kew Distrib.* 5159) (*IC. in Herb. Calcutt.*).

Rhizome very stout, sheathed; pseudobulbs $1\frac{1}{2}$ in. *Leaves* coriaceous, 5-nerved. *Scape* $1\frac{1}{2}$ in., ascending or incurved; sheaths acute; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in.; bracts 1 in., oblong, acute; sepals 1 in., sometimes flanked with yellow; lip with a brown semilunar mark on each side lobe, and a brown margin to the ridges of the disk.—Described chiefly from the drawing in *Herb. Calcutt.*

17. *C. trinervis*, *Lindl. in Wall. Cat.* 1995; *Gen. & Sp. Orchid.* 41;

Fol. Orchid. 4; pseudobulbs large ovoid, leaves long-petioled elongate-lanceolate, raceme short 4-6-fld., sepals lanceolate acute and linear-lanceolate 3-nerved petals white?, lip brown, side lobes short broad, mid-lobe broadly clawed subreniform retuse bordered with white, disk with 3 narrow ridges extending into the midlobe.

TENASSERIM; at Tavoy, Wallich; Mergui, Griffith, Parish.

Pseudobulbs 2-3 in., curved; rhizome very stout. *Leaves* 10-18 in., 3-nerved; petiole 2-3 in. *Scape* with short basal sheaths; bracts lanceolate, caducous; flowers $1\frac{1}{2}$ in. diam. *Capsule* $1\frac{1}{2}$ in., narrowly pyriform, angles acute.—Lip described from a drawing by Parish. Very near *C. lentiginosa*, but leaves much longer, and longer petioled, pseudobulbs larger, petals narrower.

18. **C. breviscapa**, Lindl. *Fol. Orchid.* 4; pseudobulbs ovoid, leaves shortly petioled linear-oblong subacute, raceme few-fld., bracts persistent, sepals ovate-lanceolate acute and linear-oblong petals white, lip white?, side lobes short, midlobe large rounded apiculate or retuse, disk yellowish with 2 thickened crenate and a median slender ridge. *Thwaites Enum.* 300; *Walp. Ann.* vi. 225. *C. angustifolia*, Wight *Ic. t.* 1641, bad (not of A. Rich.).

NILGHIRI HILLS, alt. 6000 ft. CEYLON, in the Central Province, Walker, &c.

Pseudobulbs 1- $1\frac{1}{2}$ in., crowded; sheaths short, broad, brown-purple; rhizome very stout. *Leaves* 3-5 in., coriaceous, costa strong beneath. *Scape* (with sometimes 2 young leaves) with the raceme 1-2 in., lengthening to 7 in fruit; basal sheaths obtuse; bracts $\frac{3}{4}$ -1 in. long, lanceolate; flowers $\frac{3}{4}$ -1 in. diam. *Capsule* $1\frac{1}{2}$ in., narrowly fusiform.—Very near *C. odoratissima*.—Lindley, misled by Wight, describes the leaves as solitary. There is a drawing in Herb. Kew by Mrs. Walker of an allied species or variety from Ramboddi in Ceylon, with pseudobulbs 3 in., leaves 9 in., yellow flowers, and 2-lobed midlobe of lip.

19. **C. fuscescens**, Lindl. in *Wall. Cat.* 1962/1; *Gen. & Sp. Orchid.* 41; *Fol. Orchid.* 11; pseudobulbs long narrow, leaves petioled elliptic, raceme 3-8-fld., bracts deciduous, sepals oblong acute and very narrow 1-3-nerved petals yellow greenish or pink, lip mottled with brown, side lobes elongate free ends small obtuse, midlobe clawed large orbicular or quadrate, disk with 3 smooth ridges. *Bot. Mag.* 5494 (var. *brunnea*); *Walp. Ann.* vi. 231. *C. brunnea*, Lindl. in *Gard. Chron.* 1843, 71, with fig. *C. assamica*, Lindl. ex Reichb. f. in *Koch Allgemein. Gartenzeit.* 1857, 508; *Xen. Orchid.* ii. t. 134.

TROPICAL HIMALAYA, alt. 3-5000 ft., from Nepal eastwards, and the KHASIA Mts.

Pseudobulbs 4-6 in., subcylindric, grooved; sheaths short; rhizome very stout. *Leaves* 6-10 by 3-4 in., many-nerved. *Scape* with raceme 4-8 in., suberect or drooping; flowers $1\frac{1}{2}$ -2 in. diam., very variable in colouring. *Capsule* 2 in., pyriform, angles winged.

In var. *brunnea* the sinus between the mid- and side-lobes is almost obsolete. *Wall. Cat.* 1961/2 is *C. macrobulbon*.

20. **C. sulphurea**, Reichb. f. in *Bonpland.* 1857, 43; pseudobulbs obpyriform, leaf solitary petioled, scape slender 8-10-fld., bracts deciduous, flowers small pale green or sulphur-cold., sepals oblong-lanceolate acuminate, petals very narrow 1-nerved, side lobes of lip small, midlobe much broader 2-fld, disk with 2 lamellæ and an orange blotch. *Chelonanthera sulphurea*, Blume *Bijd.* 383.

PERAK, Scortechini, Wray.—DISTRIB. Java.

Pseudobulbs 1- $1\frac{1}{2}$ in., tufted; sheaths membranous. *Leaf* 6-8 by 1- $1\frac{1}{2}$ in.,

many-nerved; petiole 2-4 in. *Scape* with raceme 2-4 in., sometimes with 2 partially developed leaves; sheaths long, rather membranous; bracts longer than the hyaline flowers; sepals $\frac{1}{2}$ in.; column broadly hooded.

21. **C. cycnoches**, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 147; pseudobulbs narrow, leaves sessile elliptic, raceme drooping 6-8-fld., bracts persistent, flowers greenish and brown, sepals oblong-lanceolate acuminate, petals narrowly linear 3-nerved, side lobes of lip short, midlobe orbicular apiculate or broadly ovate, disk with 5 slender ridges.

TENASSERIM; on Douna-thong, alt. 4000 ft., *Parish*.

Very like *C. fuscens*, but much smaller, pseudobulbs $1\frac{1}{2}$ -2 in., leaves 4-5 in., scape with 2 leaves emerging from the sheaths, flowers smaller, sepals $1\frac{1}{4}$ in., and side lobes of lip barred with red-brown.

22. **C. spectiosa**, *Lindl. Gen. & Sp. Orchid.* 39; in *Bot. Reg.* 1847, t. 23; *Fol. Orchid.* 11; pseudobulbs ovoid, leaves elliptic or lanceolate, scape 1-2-fld. drooping, flowers large greenish yellow and brown, sepals oblong-lanceolate acute, petals narrowly linear, side lobes of lip obtuse toothed, midlobe broadly clawed rounded erose, disk with 2 compound muricate ridges. *Bot. Mag.* t. 4889. *Chelonanthera speciosa*, *Blume Bijl.* 384, t. 51.

PERAK; on Gunong Batu Pateh, *Wray*.—DISTRIB. Java.

Pseudobulbs 1-1 $\frac{1}{2}$ in. *Leaves* 4-12 in., 5-7-nerved, petioled. *Scape* slender, with 2 leaves emerging from the sheaths; bracts deciduous; flowers variable in colour; sepals 2-2 $\frac{1}{2}$ in.; lip red-brown or vinous purple. *Capsule* 2 $\frac{1}{2}$ in., pyriform, broadly winged.

23. **C. Cumingii**, *Lindl. in Bot. Reg.* 1840, *Misc.* 76; pseudobulbs ovoid, leaves petioled lanceolate, raceme few-fld., bracts narrow persistent, sepals oblong-lanceolate acute and narrower petals white, lip white and yellow, side lobes short obtuse, midlobe large broad erose, disk with 3-5. crenulate ridges. *Bot. Reg.* 1841, t. 29; *Bot. Mag.* t. 4645; *Jard. Fleur.* iv. t. 337; *Fl. des Serres*, viii. 764; *Walp. Ann.* vi. 229.

SINGAPORE, *Cuming (Hort. Loddiges)*.

Pseudobulbs 1 $\frac{1}{2}$ in., distant. *Leaves* 4-6 in. *Scape* 3-5 in., erect; sheaths short, obtuse; leaves 2; bracts 1 $\frac{1}{2}$ in., erect; sepals 1 $\frac{1}{4}$ in.; ridges of lip ending in orange calli at the base of the midlobe, which bears 2 short crenulate plates.

24. **C. Schilleriana**, *Reichb. f. in Berl. Allgem. Gartenz.* 1858, 189; *Xen. Orchid.* ii. t. 134; pseudobulbs globosely ovoid, leaves elliptic-lanceolate, scape 1-fld., sepals oblong-lanceolate subacute and very slender petals green or ochreous, side lobes of lip short, midlobe large rounded undulate erose yellow mottled with brown. *Bot. Mag.* t. 5072; *Fl. des Serres*, t. 2302.

Pseudobulbs $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; rhizome stout. *Leaves* 2-4 in., coriaceous. *Scape* very short; bracts $\frac{3}{4}$ in.; sepals 1 $\frac{1}{2}$ in., lateral deflexed; disk of lip with 3 smooth ridges; column very concave.—Referred to sect. *Pleione* by its author, with which it has nothing in common.

25. **C. odoratissima**, *Lindl. in Wall. Cat.* 1960; *Gen. & Sp. Orchid.* 41; *Fol. Orchid.* 5; pseudobulbs small globose or ovoid, leaves membranous elliptic-lanceolate, raceme 2-3-fld., bracts persistent, sepals oblong-lanceolate acuminate and oblanceolate petals white, lip white, side lobes small oblong falcate obtuse, midlobe large orbicular, disk yellowish with 3 crenate ridges. *Wight Ic.* t. 1640; *Bot. Mag.* t. 5462; *Walp. Ann.* vi.

226; *Thwaites Enum.* 300. *C. angustifolia*, *A. Rich. in Ann. Sc. Nat. Ser. 2*, xv. 16, t. 6. *C. trifida*, *Reichb. f. in Hamb. Gartenzeit.* 1863, 546; *Xen. Orchid.* ii. 144, t. 155, f. 2.

NILGHIRI HILLS, alt. 8000 ft. CEYLON, in the Central Province.

Pseudobulbs very variable; sheaths hyaline. *Leaves* 2-3 in., rather thin. *Scape* flowering from both undeveloped and fully formed 2-leaved pseudobulbs; bracts membranous; sepals $\frac{2}{3}$ -1 in. *Capsule* 1 in., pyriform or ellipsoid, winged.—I am not clear as to the limits between this and *C. brevicaapa*.

26. ***C. corrugata***, *Wight Ic.* t. 1639; pseudobulbs ovoid, leaves elliptic coriaceous, raceme 2-3-fld., bracts large, sepals and subequal petals oblong-lanceolate acuminate white, lip white and yellowish, side lobes short, midlobe ovate obtuse, disk with 3 crenulate ridges. *Lindl. Fol. Orchid.* 6; *Bot. Mag.* t. 5601; *Walp. Ann.* vi. 227. *C. nervosa*, *A. Rich. in Ann. Sc. Nat. Ser. 2*, xv. 16; *Lindl. l. c.*; *Walp. l. c.* (not of *Wight*).

NILGHIRI and TRAVANCORE HILLS, *Wight, Perrottet, &c.*

Pseudobulbs 1-2½ in. long, tufted, ribbed and rugose when dry; sheaths broad, acute. *Leaves* 3-5 in. *Scape* with broad basal sheaths and 2 undeveloped leaves; bracts 1½ in., acute, caducous; sepals 1¼-1½ in. *Capsule* 1-1½ in., fusiform or pyriform; ribs prominent.—Lindley keeps up both *corrugata* and *nervosa*, but I find no difference between authentic specimens of each.

27. ***C. glandulosa***, *Lindl. Fol. Orchid.* 6; pseudobulbs large, leaves oblong-lanceolate, scape erect few-fld., sheaths large, bracts very large persistent, sepals and petals subequal ovate-oblong acute white, lip white and yellow-brown, side lobes obtuse, midlobe as long ligulate, disk with 3 gland-toothed ridges. *Walp. Ann.* vi. 227. *C. nervosa*, *Wight Ic.* t. 1638 (not of *A. Rich.*).

NILGHIRI Mts.; at Pycurrah, *Wight*.

Pseudobulbs 2-3 in., ovoid, curved; rhizome very stout. *Leaves* 4-6 in., shortly petioled. *Scape* sheathed up to the flowers, sheaths large lax, with 2 more or less developed leaves; bracts 1½ in., cymbiform, coriaceous, subacute; sepals 1-1¼ in.

28. ***C. pandurata***, *Lindl. in Gard. Chron.* 1853, 78; *Fol. Orchid.* 3; tall, pseudobulbs very large flattened, leaves shortly petioled elliptic-lanceolate, scape very stout few-fld., lateral sepals linear-oblong acute, petals subspathulate, lip panduriform, midlobe large broad crispedly waved, disk 2-lamellate between the small subbasal subrecurved side lobes confusedly caruncled on the midlobe. *Bot. Mag.* t. 5084; *Fl. des Serres*, t. 2139; *Reichb. f. Xen. Orchid.* ii. t. 121; *Warner Orchid. Alb.* t. 63; *Orchidoph.* t. 363; *Linden.* ii. t. 86.

PERAK, alt. 3500 ft., *Scortechini, King's Collector*.—DISTRIB. Borneo.

Pseudobulbs 3-5 in., oblong or suborbicular, grooved; rhizome very stout. *Leaves* 8-18 in., rigid, 5-7-nerved; petiole very stout. *Scape* with raceme 6-12 in.; sheaths lanceolate, rigid, inner more or less foliaceous; bracts 1 in., persistent; flowers waxy-green, fragrant; sepals 1½-2 in., dorsal much the largest, oblong-lanceolate, clathrately 11-nerved, lateral 5-nerved, keeled; petals clawed; lip mottled with red-purple, clathrately nerved, base cordate, midlobe subquadrate, retuse, contracted in the middle; top of column winged.—A noble species.

29. ***C. asperata***, *Lindl. in Journ. Hort. Soc.* iv. 221; *Fol. Orchid.* 3; pseudobulbs very large, leaves long-petioled elliptic-lanceolate, racemes drooping many-fld., flowers waxy-white lip mottled brown and yellow, sepals oblong-lanceolate, petals linear-lanceolate, lip as in *C. pandurata*.

Warner Orchid. Alb. t. 311. C. Lowii, Lindl. in Paxt. Mag. 1849, 225; Pescatorea, i. t. 8.

PERAK; at low elevations, *King's Collector*.—DISTRIB. Borneo.

Very near *C. pandurata*, and as large, but with much thicker narrower pseudobulbs, leaves 2 ft. and under, with the petiole 6-7 in., a many-fld. drooping raceme, larger reflexed bracts, smaller flowers, and narrower petals.—The flowers are described as in the Perak plant “waxy-white, the petals mottled brown and yellow;” in the Bornean “pale cream-coloured, except the yellow and brown lip.”

30. *C. fimbriata, Lindl. in Bot. Reg. t. 868, 1838, Misc. 92; Fol. Orchid. 12;* pseudobulbs small ovoid-oblong distant on a slender rhizome, scape 1-fld. shorter than the lanceolate leaves, sepals ovate-lanceolate yellow-green or brownish, petals filiform, lip yellow streaked with red-brown, midlobe orbicular fimbriate, disk 2-lamellate. *Lodd. Bot. Cab. t. 1425; Walp. Ann. vi. 231; Benth. Fl. Hongk. 354.*

KHASIA Mts., alt. 4000 ft., *Griffith, &c.*—DISTRIB. China.

Pseudobulbs $\frac{3}{4}$ -1 $\frac{1}{2}$ in.; rhizome as slender as a duck's quill. *Leaves* 2-5 in., sessile. *Scape* 1-2 in.; basal sheaths few, appressed; bracts deciduous; sepals $\frac{3}{4}$ in., acuminate; petals 1-nerved; side lobes of lip with fimbriate tips.

31. *C. ovalis, Lindl. in Bot. Reg. 1838, Misc. 91; Fol. Orchid. 12;* pseudobulbs fusiform distant on a slender rhizome, scape 1-3-fld. shorter than the lanceolate leaves, sepals ovate-lanceolate pale yellow-brown, petals filiform, lip white or yellowish streaked with purple, lobes and surface and margins fringed with long black hairs. *Walp. Ann. vi. 232. C. fimbriata, Lindl. in Wall. Cat. 1957. C. fimbriata? Lindl., Griff. Notul. iii. 281; Ic. Plant. Asiat. 291, fig. 1. ? C. pilosissima, Planch. Hort. Donat. 104. Broughtonia linearis, Wall. mss.*

TEMPERATE HIMALAYA, from Kumaon eastwards, alt. 4-7000 ft. KHASIA Mts., alt. 4000 ft.

Very near indeed to *C. fimbriata*, differing in the much longer ascending rhizome, narrower 2-3 in. pseudobulbs, and usually larger flowers; but it varies much in all these respects, as also in the breadth of the sepals and length of lamellæ on the lip. *Capsule* 1 in., turgidly pyriform.

Var. *latifolia*; pseudobulbs cylindric, leaves 4-5 by 1 $\frac{1}{4}$ -1 $\frac{1}{2}$ in. elliptic.—Munnipore, on Kohima, alt. 4500 ft., *Clarke*.

32. *C. fuliginosa, Lindl. in Lodd. Cat.; Fol. Orchid. 12;* habit and characters of *C. ovalis*, but raceme 3-4-fld., flowers orange-yellow, lip dark brown, lamellæ ending abruptly. *Lindl. Fol. Orchid. 12 (excl. the Khasia plant); Bot. Mag. t. 4440; Jard. Fleur. t. 7; Miquel Choix, t. 25 (1-fld. var.). ? C. triplicatula, Reichb. f. in Bot. Zeit. 1864, 415; Xen. Orchid. ii. 159, t. 166.*

TENASSERIM; at Moulmein, *Parish*.—DISTRIB. Java?

As flowered at Kew this differs from *ovalis* in the characters indicated.

33. *C. micranthum, Lindl. in Gard. Chron. 1855, 173;* pseudobulbs small oblong, leaves oblong- or linear-lanceolate, scape short erect few-fld., sepals oblong acute, petals filiform, side lobes of lip small oblong obtuse, midlobe large broadly oblong or rounded retuse, disk covered irregularly with lamellæ and tubercles rising into short spines towards the contracted base where there are 3 oblong calli. *C. papagena, Reichb. f. in Bot. Zeit. 1862, 214.*

KHASIA HILLS, alt. 3000 ft., *J. D. H. & T. T., Mann. TENASSERIM;* at Moulmein (*Hort. Low*).

Pseudobulbs $1\frac{1}{2}$ in., on a branching rhizome; sheaths membranous. *Leaves* 3- $4\frac{1}{2}$ in. *Scape* with raceme 1-2 in.; basal sheaths small, subacute; flowers $\frac{1}{2}$ in. diam., "pale brown with sooty stains on the lip," *Lindl.*; "green with black specks on the lip," *Reichb. f.*

34. **C. Treutleri**, *Hook. f. Ic. Plant. ined.*; pseudobulbs small ovoid distant, leaves small elliptic-lanceolate, scape short 1-fld., sepals lanceolate acuminate, petals narrowly linear 5-nerved, side lobes of lip small oblong, midlobe large orbicular with a broadly cuneate base, tip rounded obtusely 3-fid, disk smooth with 3 smooth lamellæ from the saccate base to the base of the midlobe.

SIKKIM HIMALAYA, *Treutler*.

Pseudobulbs $\frac{1}{2}$ - $\frac{3}{4}$ in., curved; rhizome as thick as a duck's quill. *Leaves* 1 in., sessile. *Scape* $\frac{3}{4}$ in., base sheathed; bracts not seen; flowers $1\frac{1}{2}$ in. diam.; sepals 7-9-nerved; petals acuminate; lip narrowed at the base, much the same shape as in *micrantha*, but much larger and perfectly smooth except for the basal lamellæ; column narrowly winged.—I have seen only one specimen of this very distinct species.

35. **C. Parishii**, *Hook. Bot. Mag. t. 5323*; pseudobulbs very long columnar angled, leaves elliptic or lanceolate, raceme 3-5-fld. drooping, flowers large green, sepals lanceolate acuminate, petals larger, lip panduriform, side lobes small, midlobe large broadly clawed broader than long undulate, disk blotched with purple, ridges 4 pectinate on the midlobe warted along the mesial line.

TENASSERIM; at Moulmein, *Parish*.

Pseudobulbs 4-6 in., tufted, acutely or obtusely angled; sheaths short. *Leaves* 5-7 by 2- $2\frac{1}{2}$ in., acute. *Scape* stout, basal sheaths imbricate; flowers 3 in. diam.; sepals and petals yellow-green; lip blue-green; base of midlobe truncate, side lobes like auricles; column narrowly winged.—Near *C. pandurata*.

36. **C. nitida**, *Lindl. Coll. Bot. 33*; *Gen. & Sp. Orchid. 40*; *Fol. Orchid. 5* (all in part); pseudobulbs shining, leaves lanceolate, raceme 3-6-fld. erect or drooping, sepals oblong-lanceolate and linear 3-5-nerved petals obtuse white, lip with yellow eyes on the rounded side lobes, midlobe ovate obtuse white, disk with 3 ridges and a yellow area bordered with red. *C. ocellata*, *Lindl. in Wall. Cat. 1953* (in part); *Gen. & Sp. Orchid. 40*; in *Bot. Reg. 1839, Misc. 31*; *Bot. Mag. t. 3767* (not good); *Floral Mag. N. S. t. 365*; *Walp. Ann. vi. 228*. *C. punctulata*, *Lindl. Coll. Bot. 33* (ex *Gen. & Sp. Orchid.*). *Cymbidium nitidum*, *Roxb. Hort. Beng. 63*; *Fl. Ind. iii. 459*.—? *Cœlog*, *Griff. Ic. Pl. Asiatic. t. 328, f. 2*.

TEMPERATE EASTERN HIMALAYA; Bhotan, and the Mishmi Hills in Upper Assam, *Griffith*. KHASIA HILLS, alt. 3-6000 ft., abundant.

Pseudobulbs 1-3 in., crowded, ovoid oblong obpyriform or subglobose; sheaths broad, rigid. *Leaves* 3-10 in., petioled, variable in breadth. *Scape* not sheathed; bracts deciduous; sepals $1\frac{1}{2}$ in. long; lip with a row of tubercles on each side of the midlobe, markings and spots very variable. *Capsule* 2 in., narrowly pyriform, angles obtuse.—That this is Roxburgh's *Cymbid. nitidum* (the assumed type of *Lindley's Cœlogyne nitida*) is evidenced by a specimen so named from the Calcutta Garden, and by the figure in Roxburgh's drawings, wherein, however, the colouring of the lip is imaginary. *Lindley* confounded it with *ochracea*, which flowers from the unformed pseudobulb. *Wallich's C. ocellata* is a mixture of *nitida*, *ochracea*, and *cristata*; his habitat of Sirmore is an error, as is *Lindley's* of Sikkim, which applies to *ochracea*.

37. **C. stenochila**, *Hook. f. Ic. Plant. ined.*; pseudobulb small, leaves

small sessile elliptic, scape short, raceme very long erect many-fl'd., flowers small white, lateral sepals ovate-lanceolate acuminate, petals narrowly linear 1-nerved, hypochile of lip narrow very much longer than the orbicular waved epichile, base saccate, side lobes small rounded, disk of midlobe with 3 smooth ridges running nearly to the tip.

PERAK; summit of Gunong Batu Pateh, alt. 6700 ft., Wray.

Pseudobulbs $\frac{1}{2}$ in. *Leaves* 1-1 $\frac{1}{2}$ in., subacute, rigid. *Scape* 1 in., compressed; raceme 8 in., 25-fl'd.; bracts deciduous; flowers 1 in. diam.; lip strongly nerved; column 3-lobed at the top, narrowly winged.—I have seen but one specimen of this very distinct species.

38. **C. carnea**, *Hook. f. Ic. Plant. ined.*; pseudobulbs long fusiform, leaves petioled elliptic obovate or oblanceolate, scape erect compressed 6-20-fl'd., rachis zigzag, sepals oblong acuminate 7-nerved, petals very narrow 1-nerved, lip saccate at base, side lobes rounded, hypochile narrow much longer than the orbicular midlobe, disk with 2 large fleshy lamellæ about the middle reaching to the midlobe.

PERAK, *Scortechini*.

Pseudobulbs 4-5 in., distant on the stout rhizome. *Leaves* 4-5 by 1 $\frac{1}{4}$ -1 $\frac{1}{2}$ in., subacute. *Scape* as long or longer; bracts deciduous; sepals $\frac{3}{4}$ in., nerves trabeculate and petals flesh-cold., lip the same with dark veins.

39. **C. elata**, *Lindl. in Wall. Cat. 1959; Gen. & Sp. Orchid. 40; in Wall. Pl. As. Rar. iii. 12, t. 218; in Bot. Reg. 1839, Misc. 92; Fol. Orchid. 9*; pseudobulbs very large oblong, leaves very long-petioled lanceolate, scape shorter stout, raceme short, flowers subsecund, sepals oblong-lanceolate cream-cold., petals linear, lip white with yellow blotches, side lobes narrow erose, midlobe rounded-ovate acute erose, disk between the side lobes with 2 tortuous crenulate lamellæ. *Bot. Mag. t. 5001; Walp. Ann. vi. 230. —Cælog., Griff. Ic. Pl. Asiat. t. 290.*

TROPICAL HIMALAYA; from Garwhal, *Falconer*, to Bhotan, *Griffith*. UPPER BURMA, *J. Anderson*.

Pseudobulbs 3-5 by 1-2 in., narrowed upwards or not; sheaths very large, acute; rhizome as thick as the little finger. *Leaves* 5-12 by 1 $\frac{1}{2}$ -3 in.; petiole 2-4 in. *Scape* 10 in. and under; sheaths large; flowers 1-1 $\frac{1}{2}$ in. diam. ("smell unpleasant," *Lindl.*); lamellæ of disk of lip sometimes tipped with red.

40. **C. prolifera**, *Lindl. in Wall. Cat. 1956; Gen. & Sp. Orchid. 40; Fol. Orchid. 10*; pseudobulbs ovoid or oblong compressed, leaves petioled lanceolate, scape long very many-fl'd., raceme erect interruptedly sheathed, flowers small greenish yellow, sepals oblong, petals narrow linear, side lobes of lip short obtuse, midlobe orbicular retuse toothed, disk 2-lamellate. *Walp. Ann. vi. 230.*

TROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 2-4000 ft., *J. D. H.* KHASIA MTS., alt. 4-5000 ft., *Griffith, &c.*

Pseudobulbs 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in., distant; rhizome clothed with distichous scales. *Leaves* 3-7 in., acuminate. *Scape* slender, terete; sheaths short obtuse; sepals $\frac{1}{2}$ - $\frac{3}{4}$ in., 5-7-nerved; petals 1-3-nerved. *Capsule* $\frac{2}{3}$ -1 in., pyriform, angles obtuse.

41. **C. Griffithii**, *Hook. f. Ic. Plant. ined.*; pseudobulbs large linear-oblong compressed, leaves large petioled elliptic-lanceolate acuminate, scape many-fl'd., sepals broadly oblong 5-nerved, petals very slender 1-nerved, lip with very broad crenulate side lobes and a narrow truncate midlobe, disk between the lobes with 5 short lamellæ the 2 outer much the broadest.

UPPER ASSAM; summit of the Patkoye Mts., *Griffith*. MUNNIPORE, alt. 4-5000 ft., *Watt*.

Pseudobulbs 3-4 in.; rhizome as in *C. prolifera*. *Leaves* 5-10 by 2-3 in.; petiole 2 in. *Scape* 4-8 in., rachis zigzag; flowers 1 in. diam.

42. **C. barbata**, *Griff. Itin. Notes*, 721; *Notul.* iii. 280; *Ic. Pl. Asiat.* t. 291, f. 2; pseudobulb large ovoid, leaves very large petioled elliptic-lanceolate, scape and rachis very stout, flowers large white, sepals ovate-oblong acute, petals linear 3-5-nerved, lip broad, side lobes rounded white, and small ovate purple midlobe deeply fimbriate, disk with 3 fimbriate ridges. *Lindl. Fol. Orchid.* 9; *Walp. Ann.* vi. 229; *Warner Orchid. Alb.* t. 143; *Orchidoph.* 2888, p. 154; *Masters in Gard. Chron.* 1886, i. 117, fig. 23 (*f. rt.*); *Reichb. f. in Gard. Chron.* 1880, i. 8.

BHUTAN? *Griffith*. KHASIA MTS., alt. 4-5000 ft., *Griffith*, &c. NAGA and MUNNIPORE HILLS, alt. 5000 ft., *Prain, Watt*.

Pseudobulbs 3-4 in.; rhizome very stout. *Leaves* 6-12 in.; petiole 3-4 in. *Scape* as long as the leaves; sheaths $\frac{3}{4}$ in. and less; sepals $1\frac{1}{2}$ in.; lip very saccate at the base.

43. **C. flavida**, *Wall. mss.*; pseudobulbs short ovoid, leaves petioled narrowly lanceolate longer than the slender sometimes interruptedly sheathed scape, flowers small yellow, sepals oblong acute, petals filiform 1-nerved, side lobes of lip small obtuse, midlobe cuneately obcordate, disk faintly 2-ridged. *C. flavida*, *Hook. f. ex Lindl. Fol. Orchid.* 10; *Walp. Ann.* vi. 223.

SIKKIM HIMALAYA, alt. 1-4000 ft., *Griffith's Collectors*. KHASIA MTS., alt. 4-5000 ft., *Lobb*, &c. MUNNIPORE; on Kohima, *Prain*.

Pseudobulbs 1-2 in., distant on a slender scaly rhizome; sheaths narrow. *Leaves* 3-6 in., acuminate. *Scape* 8-10-fl.; flowers $\frac{1}{2}$ in. diam., suberect; side lobes of lip incumbent at the angles on the midlobe, base saccate; column narrowly winged. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in., ellipsoid.—The Munnipore specimen has a very stout rhizome.

44. **C. longipes**, *Lindl. Fol. Orchid.* 10; pseudobulbs long slender cylindric or narrowly ovoid, leaves petioled lanceolate, scape slender, flowers small yellow, sepals ovate-oblong acuminate, petals very slender 1-nerved, lip contracted at the saccate base, side lobes rounded, midlobe very broadly obcordate, disk with 2 slender lamellæ. *Walp. Ann.* vi. 230.

SIKKIM HIMALAYA, alt. 7000 ft., *Treutler, Pantling*. KHASIA MTS., alt. 4-5000 ft., *Griffith*, &c. MUNNIPORE; on Kohima, *Prain*.

Pseudobulbs 3-4 in., on a stout sheathed rhizome. *Leaves* 5-7 in., acuminate; petiole 1-2 in. *Scape* about as long as the leaves; flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; lip with waved margins; column very broadly winged above. *Capsule* $\frac{3}{4}$ -1 in., ellipsoid, angles obtuse.

45. **C. rigida**, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 146; pseudobulbs large narrowly oblong, leaves petioled elliptic-lanceolate, scape very slender rigid, raceme drooping lax-fl., sepals yellow lateral oblong-lanceolate acute, dorsal much broader, petals narrowly linear, lip saccate, side lobes large rounded yellow, midlobe suborbicular retuse or 2-lobed, disk with 2 long and a mesian short red crenulate ridges.

TENASSERIM; at Moulmein, *Parish*.

Pseudobulbs 3-5 by 1-1 $\frac{1}{2}$ in., distant on a very stout rhizome. *Leaves* 4-6 by 1-1 $\frac{1}{2}$ in., acuminate. *Scape* with raceme 6-8 in.; bracts 1 in., deciduous, as long as the flowers; sepals $\frac{1}{2}$ in.; column broadly winged above, top crenate.

46. **C. ustulata**, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 144; pseudobulbs ovoid, leaves small elliptic-lanceolate, scape very slender erect, flowers small, sepals subequal oblong acute, petals filiform, side lobes of very broad lip rounded, midlobe small suborbicular retuse, disk with 2 curved smooth ridges.

TENASSERIM; at Moulmein, *Parish*.

Pseudobulbs 1-1½ in.; rhizome stout. *Leaves* 1½-2 in., sessile or petioled, acuminate, rigid. *Scape* with raceme 4-5 in.; bracts ¼-½ in., deciduous; flowers amongst the smallest of the genus, yellow and brown, suberect; sepals ¼ in. long; lip saccate at the base, nearly orbicular in outline; column winged above.—Amongst *Parish's* admirable drawings is another plant named *C. ustulata*, with pseudobulbs 2-3 in., leaves 4-6 in. lanceolate undulate, bracts nearly 1 in. long, much larger flowers with narrow side lobes of lip and a much larger midlobe.

47. **C. anceps**, *Hook. f. Ic. Plant. ined.*; pseudobulbs ellipsoid, leaves shortly petioled elliptic subacute coriaceous, scape stout compressed, raceme erect, sepals linear-oblong acute, petals narrowly linear obtuse 3-nerved, lip long narrow, side lobes elongate with short free tips, midlobe orbicular, disk with 2 short lamellæ.

PERAK, *Scortechini*.

Rhizome very stout; pseudobulbs 1-1½ in., base contracted. *Leaves* 2½-4 by ½-1½ in., 7-9-nerved, stoutly petioled. *Scape* with raceme 5-10 in., sometimes narrowly winged, sheaths below the raceme ¾ in., obtuse; sepals and petals 1 in. long; lip recurved, hypochile 2-3 times as long as the epichile.

Sect. II. PLEIONE. See p. 828.

48. **C. præcox**, *Lindl. Coll. Bot.* 37; in *Wall. Cat.* 1965; *Fol. Orchid.* 16; pseudobulbs ampulliform or turbinate at length umbonate, leaf-sheaths tubercled, bracts equalling or exceeding the ovary, flowers rose-purple, lip subrepand laciniate in front, disk with 3-5 crested lamellæ, top of column 4-toothed. *Bot. Mag.* t. 4496; *Past. Mag.* xiv. t. 7; *Trans. Russ. Hort. Soc.* 1880, t. 69 (*var.*). *C. Wallichiana*, *Lindl. Gen. & Sp. Orchid.* 43; in *Wall. Plant. As. Rar.* i. 46, t. 54; *Bot. Reg.* xxvi. t. 24; *Past. Mag.* vi. t. 25; *Gartenfl.* t. 283; *Jennings Orchid.* t. 472; *Griff. Notul.* iii. 402. *Pleione præcox*, *Don Prodr.* 37. *P. Wallichii*, *Lindl. in Past. Fl. Gard.* sub. t. 51. *P. Wallichiana*, *Jard. Fleur.* t. 153. *P. birmanica*, *Reichb. f. in Gard. Chron.* 1882, ii. 840. *Epidendrum præcox*, *Smith Exot. Fl.* t. 97.

TEMPERATE HIMALAYA, alt. 5-8000 ft., from Garwhal eastwards. KHASIA Mts., alt. 4-6000 ft. *PEGU*, *Kurz*. TENASSERIM, summit of Nat-toung, *Parish*.

Pseudobulbs very variable, 1-1½ in. broad and long, at first depressed bottle-shaped, at length shortly cylindric with a depressed top conic in the middle, covered with reticulate filaments, usually dark green often blotched with red or purple. *Leaves* 1-2, 2-9 in., elliptic or lanceolate, acute; scape 3-4 in.; bracts sheathing, obtuse; flowers 2½-4 in. diam., sweet-scented; sepals and petals narrow, recurved, acute; lip 2-fid, deeply fimbriate in the Pegu and Tenasserim specimens. *Capsule* ¾-1 in., fusiform.—*C. Wallichiana* is not even a variety, and *var. sanguinea* is only characterized by the decaying leaf. A monstrous state bears imperfectly developed pseudobulbs crowned with a crinite tuft of narrow bulbs each with 2 setæ. *C. birmanica* is doubtfully described as a species by Reichenbach, distinguished by the bluish-purple pseudobulbs with many white circles and an entire border of the hood of the column.—*Fl. autumn.*

49. **C. humilis**, *Lindl. Coll. Bot.* 37; *Gen. & Sp. Orchid.* 43; in *Wall. Cat.* 1963; *Fol. Orchid.* 16; pseudobulbs flagon-shaped, leaf-sheaths smooth, bracts longer than the ovary, flowers white or very pale purple, lip obovate fimbriate speckled or striped with red purple orange or brown, disk with

fringed lamellæ, top of column truncate and toothed. *Bot. Mag.* t. 5674. *Pleione humilis*, *Don Prodr.* 37; *Pact. Fl. Gard.* t. 51; *Jard. Fleurist.* t. 153. *Epidendrum humile*, *Sm. Exot. Bot.* t. 98. *Cymbidium humile*, *Smith in Rees Cyclop.*

TEMPERATE HIMALAYA; Nepal, *Wallich*, &c. Sikkim, alt. 7-8000 ft., *J. D. H. Munnipore, Wall.*

Very near *C. præcox*, but flowers much smaller, pseudobulbs usually narrow, column truncate, and base of lip adnate to the base of the column.

Var. *tricolor*, *Reichb. f.* in *Gard. Chron.* 1880, i. 394; *Williams Orchid. Alb.* t. 102, has brown spots on the lip, and var. *altata*, *Reichb. f. l. c.* 1888, i. 392, has mauve-purple radiating lines on the lip.—*Fl. spring.*

50. **C. maculata**, *Lindl. Gen. & Sp. Orchid.* 43; in *Wall. Pl. As. Rar.* i. 45, t. 53; *Fol. Orchid.* 15; pseudobulbs stout umbonate with a conical top, sheaths of scape bullate, bracts large inflated truncate, flowers white, sepals oblong-lanceolate, petals oblanceolate, lip rounded quite entire blotched with dark purple, disk yellow and red with 5-7 pectinate ridges. *Bot. Mag.* t. 4691; *Fl. des Serres*, t. 1470; *Griff. Notul.* iii. 281. *C. candida*, *Lindl. in Wall. Cat.* 1964. *Pleione maculata*, *Lindl. in Pact. Fl. Gard.* t. 39, f. 1; *Jard. Fleur.* t. 93. ? *P. diphylla*, *Lindl. in Pact. Fl. Gard. under* t. 51; *Fol. Orchid.* 15; *Walp. Ann.* vi. 234.—*Cælog., Griff. Itin. Notes* 44, No. 684. *Gomphostylis candida*, *Wall. mss.*

NEPAL, *Wallich*. SIKKIM and BHOTAN, alt. 3500-4000 ft., *Clarke*, &c. KHASIA HILLS, alt. 4-5000 ft., *Wallich*, &c.

Pseudobulbs barrel-shaped, with a depressed top rising into a blunt cone, green spotted with purple. *Leaves* in pairs on the old pseudobulbs, 6-8 in., with bullate sheaths at the base. *Scape* very short, rarely 2-fl.; flowers 2-2½ in. diam.; sepals and petals variable in breadth.

Var. *virginæa*, *Reichb. f.* in *Gard. Chron.* 1887, ii. 681, has a light sulphur-cold. lip, with the purple lines and spots evanescent.

51. **C. lagenaria**, *Lindl. Fol. Orchid.* 15; pseudobulbs depressed broad umbonate with a thick ring and conical top, sheaths of scape bullate, bract as in *C. maculata*, sepals pale purple lateral lanceolate acuminate, petals linear-lanceolate, lip oblong toothed white with broad purple blotches, disk yellow with 7 subpectinate ridges. *Bot. Mag.* t. 5370; *Fl. des Serres*, t. 2386; *Ill. Hort.* t. 510. *Pleione lagenaria*, *Lindl. in Pact. Fl. Gard.* ii. t. 39, f. 2; *Jard. Fleurist.* t. 93; *Warner Sel. Orchid.* t. 17; *Peydt. Orchid.* t. 36; *Jennings Orchid.* t. 47/1.

INDIA (locality unknown).

Pseudobulbs 1½ in. diam., broader than long, mottled very dark and light green; the short cylindric portion swells out into a thick ring with a depressed inner border from which the cone arises. *Leaves* not seen. *Scape* 2 in.; flowers 3 in. diam.—Near *C. maculata*, but the sepals are very acuminate and the flowers much larger.

52. **C. Reichenbachiana**, *T. Moore in Gard. Chron.* 1868, 1210; pseudobulb large flagon-shaped 5-8 grooved, top conical, sheaths of scape appressed, bracts oblong-lanceolate acute, flower pale purplish, sepals linear oblong subacute, petals linear obtuse, lip white with red spots and 3 short pectinate ridges, margin toothed. *Bot. Mag.* t. 5753.

ARRACAN; at Raungoon, *Benson (Hort. Veitch)*.

Pseudobulbs 2-2½ in. high, green reticulate with black, gradually swelling upwards, 1-1½ in. diam. across the lobed base of the conical top. *Leaf* not seen. *Scape* 2-3 in., 1-2-fl., lower sheaths oblong green mottled; flowers 2½ in. diam.

53. **C. Hookeriana**, *Lindl. Fol. Orchid.* 14; pseudobulbs ovoid, flowering scape 1-leaved 1-fld., sheaths appressed, sepals and petals sub-similar oblong-lanceolate acute pale rose-purple, lip white with pale red brown blotches, disk with 5 yellow ciliate ridges, margin crisped toothed or undulate. *Bot. Mag.* t. 6388.

SIKKIM HIMALAYA, alt. 7-10,000 ft., *J. D. H.*

Pseudobulbs $\frac{3}{4}$ -1 in., narrow. *Leaf* 2-4 in., acuminate; sheaths at base appressed acute. *Scape* 1-1 $\frac{1}{2}$ in.; bract tubular, obliquely truncate, obtuse; flowers 2 in. diam.

DOUBTFUL SPECIES (bracts very small).

54. **C. ? uniflora**, *Lindl. in Wall. Cat.* 1966; *Gen. & Sp. Orchid.* 42; pseudobulbs small ovoid, sheaths scarious, leaves narrowly lanceolate, scape short 1-2-fld., bracts very small, sepals and petals lanceolate acute, lip with small acute side lobes towards the base and a subpanduriform midlobe, disk obscurely ridged. *Panisea uniflora*, *Lindl. Fol. Orchid.* 2; *Walp. Ann.* vi. 240. *Epidendrum*, *Griff. Ic. Pl. Asiat.* t. 313, f. 1.

TROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 3-5000 ft., *J. D. H.* KHASIA HILLS? *Griffith*. TENASSERIM; at Moulmein, *Parish*.

Pseudobulbs 1-2 in., densely crowded. *Leaves* 3-6 in., erect. *Scape* $\frac{1}{2}$ -1 in., clothed with distichous lanceolate membranous sheaths; bracts persistent; flowers white or flesh-cold; sepals 1 in.; lip with 3-7 orange spots; column rather dilated in the middle.

55. **C. ? purpurascens**, *Hook. f. Ic. Plant. ined.*; pseudobulbs very slender 1-leaved, leaf narrow coriaceous, scape from the base of the pseudobulb slender erect 1-3-fld., lip entire cymbiform. *Dendrobium purpurascens*, *Thwaites Enum.* 298.

CEYLON; in the elevated parts of the Central Province, *Thwaites*.

Pseudobulbs $\frac{1}{2}$ in., hardly thicker than the petiole; sheaths ovate, acute; roots very long, very thick, clothed with a loose inflated epidermis. *Leaf* 1-4 by $\frac{1}{2}$ - $\frac{1}{2}$ in., erect, rigid, often purplish, margins recurved when dry. *Scape* 3-4 in., sheaths few, minute; bracts minute, rounded; flowers nearly white; pedicel with ovary $\frac{1}{2}$ in.; sepals $\frac{1}{2}$ in., erecto-patent, linear-oblong, obtuse, 3-nerved; petals linear-spathulate, obtuse, 1-nerved; lip sessile, erect, spathulate base and crenulate tip saccate, disk quite smooth; column erect, narrowly winged, tip dilated with toothed sides; anther imperfectly 4-celled, persistent, purple; pollinia 4, free, 2 larger subpyriform, 2 smaller angular. *Capsule* $\frac{1}{2}$ in., narrowly oblong, 6-ribbed.—I have long puzzled over this curious little plant, for which I had proposed the generic name *Adrorhizon*, in allusion to its remarkable roots, but await more specimens before establishing it. From *Dendrobium* it differs in habit, in the long column without a foot, and in the pollen; and it is more near *Cœlogyne* or *Panisea*.

SPECIES UNKNOWN TO ME.

C. BRACHYPIERA, *Reichb. f. in Gard. Chron.* 1881, ii. 6; pseudobulb a span high tetragonous, leaves not seen, raceme several-fld., bracts equalling the ovary persistent, sepals triangular ligulate acute light parrot-green, lateral keeled in the middle, petals filiform, lip white with a brown stain, side lobes semi-ovate short triangular in front, midlobe oblong acute undulate, keels 3 all warted in front, column hooded and retuse at the top, hood crenulate.—Flowers like *C. lentiginosa*.—(Possibly *C. Parishiana*, *J. D. H.*)

C. CAULESCENS, *Griff. Notul.* iii. 282, from maritime marshes at Pulo Bisar, Malacca, cannot be a *Cœlogyne*, but may be allied to *Bromheadia*. There are in *Herb. Lindley* fragments from Griffith so named, consisting of the rachis of a raceme, which agrees with Griffith's description, and of leaves of what I take to be of another plant.

C. (Pholidota) CORNICULATA, *Reichb. f. in Gard. Chron.* 1865, 746; raceme pendulous many-fl., sheaths large, bracts oblong cucullate apiculate exceeding the ovaries, flowers honey-coloured sweet, sepals oblong acute obtusely keeled in the lower half, petals narrowly lanceolate acute, lip deep yellow angled and saccate in the middle, side lobes bordered with brown semi-ovate acute, midlobe transverse rounded retuse obsoletely acute or minutely lobulate, (column?) slender dilated on each side near the stigma, side wings subacute, dorsal wing erect subquadrate emarginate, rostellum ascending. Very curious in the angular centre of the lip.—India, probably Assam (*Hort. Day*).—(The word "column" is omitted in the text; its slenderness is quite at variance with *Pholidota*, J. D. H.)

C. GOWERI, *Reichb. f. in Gard. Chron.* 1869, 443; pseudobulbs and leaves of *C. ocellata* (*nitida*, L.), raceme flexuous erect lax-fl., bracts equalling the ovary deciduous, flowers white as large as those of *C. fimbriata*, sepals cuneate oblong acute, petals lanceolate, lip trifid, side lobes obtuse-angled serrulate in front, midlobe oblong with an inflexed tip and a tumor on each side near the base, disk ochreous with 3 entire keels the median shorter, top of column serrulate.—Assam (*Hort. Williams*).

C. LACTEA, *Reichb. f. in Gard. Chron.* 1888, i. 521; pseudobulb short thick fusiform, leaves very thick petioled cuneate oblong acuminate, raceme porrect 6-8-fl., bracts deciduous, flowers cream-white, sepals oblong obtusely acute, petals linear-lanceolate, side lobes of lip obtuse, midlobe porrect, disk with 3 crenulate keels from the base between the side lobes, top of column 2-3-fl.—Burma (*Hort. Lendy*).—(Perhaps *C. lutea*, *Purish mss.*, of which the specimens are very imperfect.)

C. PLANTAGINEA, *Lindl. in Gard. Chron.* 1855, 20; pseudobulbs 6 in. elongate terete 2-leaved, sheaths acuminate scorched, leaves 1 ft. petioled oblong-lanceolate firm waved 5-ribbed, raceme long pendulous many-fl., bracts small brown acute very deciduous, flowers greenish yellow, petals linear-lanceolate, sepals rather broader keeled, lip ovate-oblong acuminate 3-lobed white streaked with brown, disk with 3 fimbriate lamellæ between the side lobes and 4 on the midlobe.—India? (*Hort. Farnham Castle*).—Approaches nearest to *C. flaccida*.

C. (Erectæ) ROSSIANA, *Reichb. f. in Gard. Chron.* 1884, ii. 808; pseudobulbs obpyriform 4-ribbed, leaves 12 by 1½ in. long-petioled oblong-lanceolate, scape from the base of the old bulbs very short sheathed 4-fl., flowers second cream-white, bracts linear acuminate deciduous, sepals and petals linear-lanceolate, lip 3-fl., side lobes ochreous obtuse-angled, midlobe triangular dilated, disk with 3 plaited ridges produced into the midlobe where there is an additional plaited keel on each side, column white.—Burma (*Hort. Ross*).—Apparently near *C. flaccida*, J. D. H.

35. OTOCHILUS, *Lindl.*

Stem articulata, branched, formed of superposed elongate pseudobulbous internodes. *Leaves* in pairs at the nodes, elliptic or lanceolate, plaited. *Scape* subterminal on the internodes, slender, bases sheathed; flowers small, racemose; bracts scarious, sides convolute. *Sepals* and *petals* subequal, free, narrow, spreading. *Lip* sessile at the base of the column, base saccate, side lobes erect, midlobe narrow, entire. *Column* very long, slender, erect, foot 0; anther-cells distinct, subglobose; pollinia 4, ovoid or subglobose, cohering in pairs or all together by a viscus.—Species 3 or 4, Indian.

1. *O. alba*, *Lindl. in Wall. Cat.* 1967; *Gen. & Sp. Orchid.* 35; sepals and petals acute, side lobes of lip very small obtuse, midlobe linear-oblong acuminate. *Cœlogyne alba*, *Reichb. f. in Walp. Ann.* vi. 236. *Broughtonia pendula*, *Wall. mss.*

SUBTROPICAL HIMALAYA, alt. 3-5000 ft., from Nepal eastwards. The KHASIA HILLS and MUNNIPORE.

Pseudobulbs 1-3 in., subcylindric. *Leaves* 4-6 by 1½-2 in., elliptic-lanceolate.

Racemes cernuous; flowers $\frac{1}{2}$ in diam., white with a pink or green column; bracts oblong, acuminate, caducous; side lobes of lip yellow or white.

2. **O. fusca**, *Lindl. in Wall. Cat.* 1969; *Gen. & Sp. Orchid.* 35 sepals and petals obtuse, side lobes of lip reduced to small teeth, midlobe linear-oblong. *Bot. Mag.* t. 3921. *O. lancifolia*, *Griff. Notul.* iii. 278; *Ic. Plant. Asiat.* t. 289. *Cœlogyne fusca*, *Reichb. f. in Walp. Ann.* vi. 236. *Broughtonia* ? *fusca*, *Wall. mss.*

SUBTROPICAL HIMALAYA, alt. 3-6000 ft., from Nepal eastwards. ASSAM, the KHASIA HILLS and MUNNIPORE.

Pseudobulbs 1-2 in., cylindric, fusiform or clavate. *Leaves* 2-5 in., linear-lanceolate, shortly petioled. *Racemes* short or long; bracts $\frac{1}{2}$ in., subtruncate; flowers larger than in *O. alba*, pale pink; sepals $\frac{1}{2}$ in., linear-oblong; petals narrower, dilated upwards; lip concave; column red; pollinia subglobose. *Capsule* $\frac{1}{2}$ in.—The name is inappropriate.

3. **O. porrecta**, *Lindl. in Wall. Cat.* 1968; *Gen. & Sp. Orchid.* 36; sepals acuminate, side lobes of lip falcate obtuse, midlobe lanceolate. *O. latifolia*, *Griff. Notul.* iii. 279; *Ic. Plant. Asiat.* t. 289. *Cœlogyne porrecta*, *Reichb. f. in Walp. Ann.* vi. 236. *Tetrapeltis fragrans*, *Wall. mss.*

SUBTROPICAL HIMALAYA, from Nepal eastwards, alt. 3-6000 ft. The KHASIA HILLS and MUNNIPORE. TENASSERIM, alt. 5000 ft., *Parish.*

Pseudobulbs 2-4 in., subcylindric or clavate. *Leaves* 5-10 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., elliptic-lanceolate, rather long-petioled. *Racemes* decurved; bracts broad, acute, caducous; flowers white or pale flesh-colored; sepals $\frac{1}{2}$ - $\frac{3}{4}$ in., linear; petals linear; lip with larger side lobes than in the two other species; pollinia globose. *Capsule* $\frac{3}{4}$ -1 in.

36. **PHOLIDOTA**, *Lindl.*

Perennial herbs with the habit of *Otochilus*, or with sessile 2-leaved pseudobulbs. *Scape* or rachis of raceme often flexuous; bracts distichous, rigid; flowers small, globose. *Sepals* concave. *Petals* flat, broad or narrow. *Lip* sessile on the base of the column, erect, saccate, subentire or 3-4-lobed. *Column* very short, hooded or winged; anther-cells subglobose, rarely elongate; pollinia 4, subglobose, free or cohering in pairs by a viscus.—Species about 20, Indian, Malayan and Chinese.

* *Stems* elongate, branched, formed of pseudobulbous internodes. *Scape* from the top of the pseudobulb between the leaves.

1. **P. articulata**, *Lindl. in Wall. Cat.* 1992; *Gen. & Sp. Orchid.* 38; in *Bot. Reg.* 1839, *Misc.* 44; bracts rhombic-ovate, dorsal sepal suborbicular, lateral ovate keeled, lip cymbiform with a didymous midlobe. *P. khasiana*, *Reichb. f. in Walp. Ann.* vi. 238; in *Bonpland.* 1856, 329. *Cœlogyne articulata*, *Reichb. f. in Walp. Ann.* vi. 238. *C. khasiana*, *Reichb. f. l. c.*

SUBTROPICAL HIMALAYA, alt. 3-4000 ft., from Kumaon eastwards, and the KHASIA MTS., common.

Internodes 2-4 in., as thick as the little finger, terete. *Leaves* 2, 4-6 in., sessile or petioled, elliptic-lanceolate, acute. *Racemes* 2-4 in., drooping; bracts $\frac{1}{2}$ - $\frac{2}{3}$ in., rhombic-ovate; pedicel with ovary $\frac{1}{2}$ in.; sepals $\frac{1}{2}$ in.; lip with 5 basal lamellate nerves; column narrow, rostellum acuminate. *Capsule* $\frac{2}{3}$ - $\frac{3}{4}$ in., rachis not flexuous.

2. **P. recurva**, *Lindl. Gen. & Sp. Orchid.* 37; bracts very broad

truncate, dorsal sepal suborbicular, lateral ovate obtuse faintly 3-nerved not keeled, petals oblong-ovate 1-nerved, lip cymbiform with 2 auricle-like terminal lobes. *Hook. f. Ic. Plant.* t. 1878. *Cœlogyne recurva*, *Reichb. f. in Walp. Ann.* vi. 238.

SUBTROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, *Griffith's Collectors*.

Internodes 1-2 in., as thick as a swan's quill, deeply 3-5-winged. *Leaves* 2, 2-3 in., elliptic- or linear-lanceolate, obtuse or acute, sessile. *Raceme* 2-3 in., recurved; bracts $\frac{1}{4}$ in., secund, flabelliform, persistent; flowers very small; sepals $\frac{1}{2}$ in. long; base of column narrow; rostellum short, transverse; lip with 5 lamellate basal nerves. *Capsules* $\frac{1}{2}$ in., tumid; rachis stout not flexuous.

3. **P. Griffithii**, *Hook. f. Ic. Plant.* t. 1881; bracts oblong, dorsal sepal broadly ovate or suborbicular, lateral ovate-lanceolate acute 5-nerved keeled, petals elliptic-lanceolate 3-5-nerved, lip cymbiform with a didymous terminal lobe, no side lobes.

TROPICAL SIKKIM HIMALAYA, *Griffith's Collectors*, J. D. H. KHASIA Mts.; on Kollong, alt. 5000 ft., *Clarke*.

Internodes 3-5 in., as thick as a swan's quill. *Leaves* 2, 3-5 in., oblong-lanceolate. *Racemes* 1-2 in., decurved, rachis flexuous; bracts $\frac{1}{2}$ in., oblong, obtuse; sepals $\frac{1}{2}$ in.; lip with 5 basal lamellate nerves; column suborbicular; rostellum ovate, acuminate.

4. **P. obovata**, *Hook. f.*; leaves obovate retuse or apiculate, bracts oblong acute, dorsal sepal oblong, lateral ovate acute, petals obovate, lip cymbiform with a didymous terminal lobe.

BHOTAN, *Griffith*. KHASIA HILLS (*Ic. in Herb. Calcutt.*).

Internodes 2½-4 in., cylindric. *Leaves* 2½-3½ by 1½-2 in., sessile, 5-7-nerved. *Scape* very short; *raceme* 3 in., many-fl., fruiting recurved; flowers $\frac{1}{2}$ in. diam. *Capsule* $\frac{1}{2}$ -¾ in., ellipsoid, turgid, angles acute.—The materials for this very distinct species, which may be known at first sight by the short broad leaves, consist of fruiting specimens collected by Griffith, and a very rude drawing of a flowering specimen marked as from the Khasia by Mr. Simons of Assam. The description of the flower may not be very accurate.

** *Rhizome* elongate; internodes terete, clothed with membranous sheaths and bearing slender 1-2-leaved pseudobulbs at the nodes. *Scape* from the sheaths of the internodes.

5. **P. protracta**, *Hook. f. Ic. Plant.* t. 1877; bracts broadly ovate acute, sepals ovate obtuse 3-nerved not keeled, petals elliptic obtuse 3-nerved, lip cymbiform, terminal lobe suborbicular.

TEMPERATE SIKKIM HIMALAYA, *Griffith's Collectors* (*Kew Distrib.* 5012); at Neebong, alt. 7100 ft., *Clarke*. NAGA HILLS, *Prain*.

Rhizome flexuous, as thick as a goose-quill; internodes 1½-3 in.; sheaths long, appressed; pseudobulbs 2-4 in., subcylindric. *Leaves* 5-6 in., elliptic-lanceolate, acuminate. *Racemes* 1-1½ in., sessile, flexuous; bracts $\frac{1}{2}$ in., membranous; sepals $\frac{1}{2}$ in. long, very concave; lip gibbous above the base, 5-nerved, nerves simple. *Capsule* $\frac{1}{2}$ in. long, ellipsoid.

*** *Pseudobulbs* uninodal, seated on a very stout creeping rhizome. *Scape* from the top of the pseudobulb.

† *Bracts* very broad. *Lip* with 2 free or connate terminal lobes.

6. **P. imbricata**, *Lindl. in Hook. Fl. Exot.* t. 138; in *Wall. Cat.* 1991; *Gen. & Sp. Orchid.* 37; in *Bot. Reg.* t. 1213 and 1777; bracts semi-

circular, dorsal sepal orbicular 3-nerved, lateral cymbiform, keel winged, petals linear-oblong falcate 1-nerved, lip with large broad rounded sides and 2 smaller terminal lobes. *Lodd. Bot. Cab.* t. 1934; *Wight Ic.* t. 907; *Dalz. & Gibs. Bomb. Fl.* 262. *P. pallida*, *Lindl. in Bot. Reg.* xxi. sub. t. 1777. *Cœlogyne imbricata & pallida*, *Reichb. f. in Walp. Ann.* vi. 238. *Ptilocnema bracteatum*, *Don Prodr.* 33. *Cymbidium imbricatum*, *Roxb. Fl. Ind.* iii. 460. *Ornithidium imbricatum*, *Wall. mss.*—*Rheede Hort. Mal.* xii. t. 47.

TROPICAL HIMALAYA, from Kumaon, alt. 3500 ft., *Strachey & Winterbottom*, eastwards. The KHASIA MTS., CHITTAGONG, BURMA and the ANDAMAN ISLANDS. The DECCAN PENINSULA, from the Concan southwards. CEYLON.

Pseudobulbs 1–3 in. long and narrow, or short and broad. *Leaf* solitary, 6–12 in., elliptic-lanceolate, petioled, 3-nerved. *Raceme* long-peduncled, elongate, drooping, 3–8 in. long; bracts $\frac{1}{2}$ in. broad; sepals $\frac{1}{2}$ in. long, lateral connate at the base; lip 4-lobed, 5-nerved, 3 median nerves thickened at the base; column circular when spread out, rostellum truncate. *Capsule* $\frac{3}{4}$ in., ellipsoid on a thickened (not zigzag) rachis.

VAR. ? *sessilis*; raceme sessile, rostellum 2-brachiate.—Naga Hills, on Kohima, alt. 3500–5000 ft., *Prain*.

VAR. ? *coriacea*; leaf sessile coriaceous, flowers larger, 4 lobes of lip subequal in length, the lateral rather narrower.—Perak, *Scortechini*, *King's Collector*.

7. ***P. advena***, *Reichb. f. Otia Hamburg.* 47; bracts semicircular, dorsal sepal elliptic obtuse strongly 5-nerved, lateral ovate, midrib very strong, petals elliptic-lanceolate acute 3-nerved, lip with very broad rounded sides, and 2 terminal lobes caruncled at their bases.

TENASSERIM; at Moulmein, *Helfer (Kew Distrib.* 5047), *Parish*.

Pseudobulbs stout or slender, distant on the stout rhizome. *Leaves* 1–2, elliptic-lanceolate, acuminate; nerves very slender. *Raceme* short, decurved, peduncled; bracts $\frac{1}{2}$ in. broad; sepals nearly $\frac{1}{2}$ in. long; lip 5-nerved, 3 median nerves thickened at the base, caruncled towards the apex which is produced between the terminal lobes; column very broad and short; rostellum very large, 2-glandular or -tubercled at the tip; anther very large, long, truncate, very different from that of its congeners; pollinia as in the genus.

8. ***P. calceata***, *Reichb. f. in Walp. Ann.* vi. 238; bracts ovate, dorsal sepal orbicular 3-nerved, lateral ovate faintly 3-nerved, petals linear-oblong or ovate-lanceolate 1-nerved, lip with broad ascending subacute side lobes and 2 smaller auricle-like terminal lobes. *Hook. f. Ic. Plant.* t. 1876. *Cœlogyne calceata*, *Reichb. f.*

KHASIA HILLS, alt. 4–5000 ft., *Lobb, J. D. H. & T. T.*

Pseudobulbs crowded on a rather slender densely-rooting rhizome, 1–1½ in., slender, curved, rarely short and stout. *Leaf* solitary, 3–6 in., linear-lanceolate, acute, petioled, 1-nerved. *Raceme* 2–4 in., long peduncle and drooping rachis capillary; bracts $\frac{1}{2}$ in., acute or obtuse; sepals $\frac{1}{2}$ in. long, membranous; clinandrium hippocrepiform. *Capsule* $\frac{1}{2}$ in.—Much the most slender species.

†† *Bracts* narrow. *Lip* with a simple narrow terminal lobe or 0.

9. ***P. Convallariæ***, *Hook. f. Ic. Plant.* t. 1880; leaf linear, bracts linear, raceme stout suberect, scape sheathed to the tip, dorsal sepal oblong 5-nerved, lateral ovate acuminate, midrib thick, petals broadly ovate obtuse 3-nerved, lip cymbiform nearly orbicular broader than long 3-nerved, tip emarginate. *Cœlogyne Convallariæ*, *Reichb. f. in Flora* 1872, 277.

KHASIA HILLS, alt. 3–4000 ft., *J. D. H. & T. T.* NAGA HILLS; on Kohima, alt. 4500 ft., *Prain*. TENASSERIM; at Moulmein, *Parish*.

Rhizome very stout; pseudobulbs 1-2 in., sessile by a broad base, subcylindric. *Leaves* 1-2, 5-7 in., coriaceous, obtuse. *Scape* 1-2 in. long; rachis stout; bracts $\frac{1}{2}$ in., caducous; sepals $\frac{1}{4}$ in. long; lip obscurely 3-lobed, warted within (normally?); column broadly obovate, tip contracted obtuse.

10. **P. rubra**, *Lindl. Gen. & Sp. Orchid.* 37; leaves elliptic-lanceolate, raceme decurved, bracts acute, sepals ovate acute 3-5-nerved, petals narrowly linear 1-nerved, lip slightly 3-lobed, side lobes broad rounded, midlobe broadly ovate acute, nerves 5 thickened at the base. *Wall. Pl. As. Bar.* iii. 21, t. 239; *Hook. f. Ic. Plant.* t. 1879. *P. undulata*, *Lindl. in Bot. Reg. sub.* t. 1213, and xxvii. *Misc.* 6. *Cœlogyne rubra* & *undulata*, *Walp. Ann.* vi. 238.

SUBTROPICAL HIMALAYA; Sikkim, alt. 4-6000 ft. KHASIA HILLS, alt. 4-5000 ft., *Wallich*, &c. UPPER BURMA, *Griffith (Kew Distrib.* 5387).

Pseudobulbs 2-3 in., on a stout rhizome, narrowed below. *Leaves* 1-2, 4-10 in., 5-nerved. *Scape* when flowering short and sheathed to the top, at length 6-10 in. and naked; raceme 4-8 in., flexuous, drooping, lax-fl'd.; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., spreading and deflexed; sepals $\frac{1}{4}$ in. long, midrib thick; column with narrower wings than in its allies, clinandrium transversely oblong. *Capsule* $\frac{3}{8}$ in.

11. **P. micrantha**, *Hook. f. Ic. Plant.* 1891; leaves elliptic-lanceolate, raceme decurved, bracts lanceolate, sepals broadly ovate and ovate-oblong acute petals 1-nerved, lip boat-shaped subtrapezoidly ovate when spread out, gradually narrowed from the rounded side lobes into the concave 3-nerved base and ovate fleshy obtuse midlobe.

PERAK; summit of Gunong Batu Pateh, alt. 6000 ft., *Wray*.

Rhizome flexuous, scandent?, as thick as a goose-quill, sheathed; pseudobulbs $1\frac{1}{2}$ -2 in., narrow, erect, parallel to the stem. *Leaves* 1-2, $1\frac{1}{2}$ -3 in. *Scape* with raceme 3-4 in., rachis flexuous; flowers pale pink, $\frac{1}{8}$ in. long, trigonous. *Capsules* $\frac{1}{4}$ in.—Flower a good deal like the Javan *P. carnea*, but pseudobulb and lip very different.

37. CALANTHE, Br.

Terrestrial, often pseudobulbous. *Stem* short or tall, leafy. *Leaves* plaited. *Scape* axillary, terminal or from the side of the leafing pseudobulb; flowers small or medium-sized, racemed. *Sepals* subequal, spreading, rarely connivent. *Petals* broad or narrow. *Lip* adnate to the top or base of the column, 3-lobed, midlobe often deeply 2-fid, disk lamellate. *Column* long or short, obliquely truncate; anther conical or convex, 2-celled; pollinia 8, waxy, cohering in pairs by a granular viscus. *Capsules* drooping.—Species about 40, tropical or subtropical.

Sect. I. *Lip* at the top of the short stout column opposite to the stigmatic cavity.

* Bracts persistent. *Scape* usually from amongst the leaves.

† Spur 0 or minute. (See *C. gigantea* at end of genus, and *C. Mannii* in ††.)

1. **C. tricarinata**, *Lindl. in Wall. Cat.* 7339; *Gen. & Sp. Orchid.* 18; *Fol. Orchid.* 2; sepals lanceolate acuminate 7-nerved, petals nearly as broad acuminate 3-nerved, side lobes of sessile lip broadly oblong falcate, midlobe rounded or flabellate retuse or 2-fid crisped, disk with 3 large

crenulate fleshy ridges. *Walp. Ann.* vi. 912. *C. occidentalis*, *Lindl. Fol. Orchid.* 3; *Walp. l. c.*

TEMPERATE HIMALAYA, alt. 5-9000 ft.; from Kashmir, alt. 7000 ft., *Clarke*, 1cNepal, *Wallich*.

Stem 4-8 in. *Leaves* 2-3, sessile, 6-10 in., oblong, acuminate. *Scape* stout and lax-fl. raceme 12-18 in., puberulous; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., shorter than the ovary; flowers 1-1 $\frac{1}{2}$ in. across; sepals and petals greenish, sepals not aristate; lip brown-purple.—I can find no characters for *C. occidentalis*.

2. ***C. puberula***, *Lindl. in Wall. Cat.* 7342; *Gen. & Sp. Orchid.* 352; *Fol. Orchid.* 2; lateral sepals falcately oblong aristate 5-nerved, petals very narrow 3-nerved, side lobes of sessile lip broadly oblong falcate together broader than the rhombic crenate dagger-pointed midlobe. *Walp. Ann.* vi. 912.—*Bletia* sp., *Griff. Ic. Pl. Asiat.* t. 313 A.

SUBTROPICAL HIMALAYA, alt. 4-6000 ft.; from Simla, *Thomson*, eastwards. KHASIA Mts., alt. 4-6000 ft., *Griffith, & c. (Kew Distrib.* 5274). NAGA HILLS, alt. 6500 ft., *Prain*.

Stem short or 8-10 in. *Leaves* 2-7, petioled, 6-18 in., narrow or broad, caudate. *Scape* slender and lax-fl. raceme 8-14 in., puberulous; bracts 1-1 $\frac{1}{2}$ in., usually exceeding the ovary; flowers 1-1 $\frac{1}{2}$ in. broad. *Capsule* $\frac{1}{2}$ in. long.

3. ***C. brevicornu***, *Lindl. in Wall. Cat.* 7338; *Gen. & Sp. Orchid.* 251; *Sert. Orchid.* t. 9; *Fol. Orchid.* 3; lateral sepals ovate-oblong acute 5-nerved, petals oblong-lanceolate 3-nerved, side lobes of sessile lip falcate obtuse, midlobe clawed transversely oblong retuse crisped, disk with 3 fleshy tubercled lamellæ, spur very short conical. *Walp. Ann.* vi. 912.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 6-8000 ft., *J. D. H.*

Stem 4-8 in., stout. *Leaves* 2-3, sessile or petioled, oblong-lanceolate, acuminate. *Scape* and few-fl. raceme nearly glabrous; bracts $\frac{1}{2}$ in., as long as the puberulous pedicel and ovary; flowers $\frac{3}{4}$ in. broad; sepals not aristate and petals red-purple striped with gold; lip white and red.—*Lindley's* Kumaon habitat refers to *C. tricarinata*.

VAR. *Wattii*; lip with 3 small conical lamellæ on the disk of the midlobe.—Munnipore, *Watt*.

4. ***C. biloba***, *Lindl. Fol. Orchid.* 3; lateral sepals broadly ovate falcate aristate 5-7-nerved, petals oblong acuminate 3-nerved, lip with a narrowly winged claw, blade very large broad deeply 2-lobed, lobes broadly hatchet-shaped or orbicular, sinus very acute with a basal apiculus, spur very short. *Walp. Ann.* vi. 912.

TEMPERATE HIMALAYA; E. Nepal and Sikkim, alt. 5-7000 ft., *J. D. H.*

Stem short. *Leaves* 8-11 in., long-petioled, broadly elliptic or oblanceolate, caudate-acuminate. *Scape* 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ ft. with the long lax-fl. raceme, puberulous; bracts 1-1 $\frac{1}{2}$ in., very slender, equalling the ovary; flowers 1 in. diam.; sepals and petals pale purplish; lip as broad as the rest of the flower, pale pink, blade naked, inner angles of lobes subacute.

VAR. *obtusata*, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 144; flowers larger, blade of lip with a rounded apex and 3 obscurely caruncled nerves at the base, disk yellowish.—Tonasserim, *Parish*.

VAR. *diptera*; lobes of lip divergent, axis and sides towards the base granulate.—Naga Hills, *Prain*.

VAR. *Treutleri*; quite glabrous, blade of lip lunately 2-lobed, base with a thickened transverse ridge at the claw, incurved lobes, and a deep rounded sinus.—Sikkim, alt. 6000 ft., *Treutler*.

†† Spur half as long as the sepals or longer (except *C. Mannii*).

§ Flowers small; sepals $\frac{1}{4}$ – $\frac{1}{2}$ in. long. (See also *C. veratrifolia* & *purpurea* in §§.

5. *C. alismæfolia*, Lindl. *Fol. Orchid.* 8; raceme short pubescent, bracts large ovate, sepals elliptic obtuse 5-nerved, petals as broad 5-nerved, lip longer than the sepals, side lobes linear, midlobe clawed obcordate naked, base with a large yellow callus, spur slender longer than the sepals. *Walp. Ann.* vi. 918.

TROPICAL HIMALAYA; Garwhal, at Mussoori, *Falconer* (*Kew Distrib.* 1055, 1056); Sikkim Terai and low valleys, *Griffith*, &c. (*K. D.* 5276) KHASIA HILLS, *J. D. H. § T. T.*

Stems very short, from a very stout woody rhizome. *Leaves* 2–3, 4–6 in., elliptic-ovate, acuminate; petiole as long or longer, slender. *Scape* from between the leaves, 4–16 in., slender, 1-sheathed; raceme 1–4 in.; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., green, recurved; buds globose; pedicels short; sepals $\frac{1}{2}$ in. long, concave, and petals white, greenish or pinkish; lip whitish or yellowish.

6. *C. diploxiphion*, *Hook. f. Ic. Plant. ined.*; raceme short pubescent, bracts large broadly ovate acuminate, sepals broadly ovate subacute 5-nerved, petals ovate obtuse, lip of two pairs of similar narrowly reniform or hatchet-shaped falcately recurved obtuse lobes, the terminal pair longest, spur very slender longer than the sepals.

PERAK; at Goping, in shady places, *King's Collector*.

Stem very short, on a stout woody rhizome. *Leaves* 2, often 18 in., long lanceolate, narrowed into a very stout ribbed petiole. *Scape* from the side of the leaves, 20 in., 5-sheathed, slender above; raceme conical; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., imbricate, acuminate, green; pedicel and ovary 1–1 $\frac{1}{4}$ in., slender; flowers white; lip $\frac{1}{2}$ in. long, longer than the sepals.—I have seen only one specimen; it is allied to *alismæfolia*. An unnumbered drawing of this is amongst *Scortechini's* Perak ones.

7. *C. angusta*, Lindl. *Fol. Orchid.* 7; scape tall many-sheathed, bracts ovate, sepals broadly ovate obtuse 5-nerved, petals broad oblong 3-nerved, side lobes of lip falcately oblong obtuse caruncled at the suture, midlobe flabellately cordate naked much longer than the sepals, lobes rounded, sinus acute, spur very slender longer than the sepals. *Walp. Ann.* vi. 916.

KHASIA MTS., alt. 3000 ft., *Lobb, Clarke*. MUNNIPORE, alt. 3500 ft., *Watt*.

Stem very short, thickened. *Leaves* sessile, lanceolate. *Scape* 6–18 in., from the side of the leafing shoot which it precedes; sheaths $\frac{1}{2}$ –1 in.; raceme 1–2 in., dense-fl., puberulous; bracts $\frac{1}{2}$ – $\frac{2}{3}$ in., acuminate; pedicels short; flowers white; caruncles of lip yellow.

8. *C. vaginata*, Lindl. *Fol. Orchid.* 7; scape tall very stout many-sheathed, bracts lanceolate, sepals broadly oblong tomentose 5-nerved, petals similar 3–5-nerved, side lobes of lip caruncled at the suture broadly hatchet-shaped as long and nearly as broad as the similar spreading segments of the naked midlobe, spur longer than the sepals slender and column pubescent.

ASSAM, *Jenkins*.

Scape 18 in., swollen at base and surrounded by fibrous remains of old leaves; sheaths 1–1 $\frac{1}{2}$ in., obtuse or acute; raceme 2 in., dense-fl., pubescent; bracts $\frac{3}{4}$ –1 in.; sepals $\frac{1}{2}$ in.; lip much longer.—Only one specimen hitherto known, without leaves.

9. **C. pachystalix**, *Reichb. f. mss.*; bracts very small, sepals ovate obtuse 3-nerved, petals linear-oblong obtuse 3-nerved, lip very short, side lobes obovate larger than the linear oblong falcate obtuse segments of the midlobe, disk with 3 caruncled nerves, spur shorter than the sepals.

WESTERN HIMALAYA, *Falconer (Kew Distrib. 1054)*.

Leaves 12 in., sessile, linear-lanceolate, obtuse. *Scape* longer, naked, puberulous above; raceme 4 in., dense-fl.; bracts $\frac{1}{2}$ in., lanceolate, membranous; pedicels with ovary as long; sepals about $\frac{1}{4}$ in., longer than the broad lip; column very broad.—The single specimen is very imperfect, and in bud only.

10. **C. Mannii**, *Hook. f.*; bracts very small, sepals ovate-oblong obtuse 3-5-nerved pubescent, petals oblanceolate 1-3-nerved, side lobes of sessile lip rounded as broad or broader than the rounded retuse midlobe, disk with 2 tubercled ridges, spur short conical pubescent.

WESTERN HIMALAYA; Kumaon, below Ranikhet, *Duthie*. KHASIA HILLS, alt. 4000 ft., *Mann, Clarke*.

Stem very short. *Leaves* 2-3, lanceolate. *Scape* lateral, with the lax-fl. raceme 6-10 in., and flowers very pubescent; bracts membranous; flowers $\frac{1}{2}$ in. broad, drooping; sepals $\frac{1}{4}$ in. long.—The Kumaon specimens have sessile leaves 6-8 in. long; the Khasian have petioled leaves 12 by $1\frac{1}{2}$ in., and a smaller midlobe of the lip in comparison with the side lobes. This is one of the smallest-fl. species.

11. **C. Wrayi**, *Hook. f.*; bracts very short broad rigid revolute, sepals ovate acute 5-nerved, petals oblong-lanceolate acute 3-nerved, lip subequally 4-lobed, side lobes oblong spreading, tips rounded, midlobe cleft nearly to the base into two dimidiate-obovate crenulate segments, disk with conical calli, spur longer than the sepals.

PERAK, alt. 2000 ft., *Wray*.

Stem 0. *Leaves* 8-10 in., long-petioled, elliptic, acuminate, 5-nerved. *Scape* from amongst the leaves, with the long raceme $2\frac{1}{2}$ ft., slender, pubescent; raceme 3-6 in.; bracts $\frac{1}{4}$ in., $\frac{1}{2}$ -amplexicaul, as broad as long, acute, twisted when dry; pedicels slender, with ovary $\frac{2}{3}$ in.; flowers white tinted with lilac; sepals about $\frac{1}{2}$ in.—Described from one specimen. Resembles a Bornean species.

Var. ? *Scortechinii*; leaves smaller subsessile, scape and raceme shorter, petals much broader 5-nerved, outer nerves branching, lobes of lip much broader.—Perak, *Scortechinii*.

§§ *Flowers large; sepals $\frac{3}{4}$ -1 in. long; petals broad (except Masuca, var. fulgens).*

12. **C. alpina**, *Hook. f. in Lindl. Fol. Orchid. 4*; raceme few-fl., bracts equalling or exceeding the decurved ovary, flowers secund, sepals ovate-oblong acuminate 5-nerved, petals elliptic-lanceolate 3-nerved, lip very short indeed suborbicular inciso-fimbriate, spur equalling the sepals stout slightly incurved. *Walp. Ann. vi. 913*.

SIKKIM HIMALAYA, alt. 9-10,000 ft., *J. D. H.*

Stem very short. *Leaves* 4-7 in., sessile, elliptic-lanceolate, acuminate. *Scape* from amongst the leaves, with raceme 6-12 in., stout, and yellowish or greenish-white inodorous flowers glabrous; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., erect; perianth connivent; sepals $\frac{1}{2}$ - $\frac{3}{4}$ in., apiculate; lip white striped with purple.

13. **C. Masuca**, *Lindl. in Wall. Cat. 7337; Gen. & Sp. Orchid. 249; in Bot. Reg. 1842, Misc. 51; 1844, t. 37; Fol. Orchid. 6*; leaves glabrous or nearly so, bracts large ovate-lanceolate herbaceous, sepals lanceolate acuminate 5-nerved, petals obovate or broadly oblong 3-5-nerved, side lobes of lip falcate oblong, midlobe much larger broadly or cuneately reni-

form, disk tubercled, spur longer than the sepals. *Bot. Mag.* t. 4541; *Part. Fl. Gard.* i. 138; *Jard. Fleuriste*, t. 62; *Walp. Ann.* vi. 915. *C. versicolor*, *Lindl. Sert. Orchid.* t. 42; *Bot. Reg.* 1844, sub. t. 37; *Fol. Orchid.* 6. *C. emarginata*, *Wight Ic.* t. 918; ? *Lindl. Gen. & Sp. Orchid.* 249; *Fol. Orchid.* 5. *C. Wightii*, *Reichb. f. in Walp. l. c.* 933. ? *Amblyglottis emarginata*, *Blume Bijd.* 370. *Bletia Masuca*, *Don Prodr.* 30. *Zoduba Masuca*, *Herb. Ham.*

TROPICAL HIMALAYA, from Nepal eastwards. DECCAN PENINSULA, in the Ghats of Maisor and Malabar.—DISTRIB. Java.

Stem short, stout. *Leaves* 12–18 in., subsessile or petioled, elliptic-ovate to lanceolate, glabrous or subpubescent beneath. *Scape* lateral, stout, with the lax-fl. raceme $1\frac{1}{2}$ –3 ft., stout, pubescent; bracts $\frac{2}{3}$ –1 in.; pedicels with ovary $1\frac{1}{4}$ – $1\frac{1}{2}$ in.; flowers pale or dark purple, rarely pale rose, 2– $2\frac{1}{2}$ in. diam.; lip hardly exceeding the sepals often violet, calli yellow. *Capsule* $1\frac{1}{2}$ in.—The colour of flower and form of midlobe of lip vary much. In *C. versicolor* the perianth is white with a purple lip changing to yellow. Under *C. purpurea* (*Fol. Orchid.* 6) Lindley describes the leaves of *C. Masuca* as differing from those of *versicolor* in being pilose; but in his clavis of the species (p. 1) *Masuca* is described as glabrous.

VAR. fulgens; stem 6–8 in., leaves 12–14 by 4–5 in. at length petioled, petals narrower 3-nerved, flowers 3 in. diam., sepals almost crimson, lip deep purple. *C. fulgens*, *Lindl. Föl. Orchid.* 10.—Sikkim, alt. 2–4000 ft., J. D. H.

14. ***C. purpurea***, *Lindl. Gen. & Sp. Orchid.* 2491; in *Bot. Reg.* 1844, sub. t. 37; *Fol. Orchid.* 6; leaves softly sparsely hairy on both surfaces, scape and few-fl. raceme tomentose, bracts ovate shorter than the long pedicels, sepals ovate or oblong-lanceolate 5–7-nerved, petals broadly oblanceolate or oblong 3–5-nerved, side lobes of lip narrow or broad, midlobe broadly or narrowly cuneately obcordate, disk warted near the base, spur very long. *Walp. Ann.* vi. 915; *Trimen Cat. Pl. Ceyl.* 88. *C. Masuca*, *Thw. Enum.* 308.

CEYLON; in the Ambagamowa district, alt. 2–4000 ft., *Thwaites*.

Habit and flowers of *C. Masuca*, but much smaller in all its parts, and with leaves hairy on both surfaces, small bracts, and slender spur as long as the pedicel.

15. ***C. veratrifolia***, *Br. in Bot. Reg. sub. tab.* 573; leaves glabrous, bracts large ovate-lanceolate, racemes dense-fl., flowers white, sepals elliptic-obovate 5-nerved, petals broadly oblong or oblanceolate 3–5-nerved, side lobes of lip oblong obtuse, midlobe deeply divided into two linear-oblong falcately recurved segments, sinus acute, disk between the side lobes tubercled, spur slender. *Lindl. in Bot. Reg.* t. 720; *Gen. & Sp. Orchid.* 249; *Fol. Orchid.* 8; *Bot. Mag.* t. 2615; *Griff. Ic. Pl. Asiat.* t. 283, f. 4; *Walp. Ann.* vi. 917. *C. comosa*, *Reichb. f. in Linnæa* xix. 374. *C. Perrottetii*, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 68; *Wight Ic.* t. 1664; *Lindl. Föl. Orchid.* 7. *Limodorum veratrifolium*, *Willd. Sp. Pl.* iv. 122. ? *Amblyglottis veratrifolia*, *Blume Bijd.* 270. *Bletia quadrifida*, *Herb. Ham. Orchis triplicata*, *Willem. (Steud.)*.

DECCAN PENINSULA, alt. 6–7000 ft., from Canara southwards. CEYLON, alt. 6–7000 ft.—DISTRIB. Malay Islands, Australia.

Habit of *C. Masuca*, with which it is easily confounded in the Herbarium, but leaves always petioled and glabrous beneath; raceme dense-fl.; flowers white, smaller but variable in size; spur more slender, equalling or exceeding the sepals; lip longer than the sepals, very variable in the size and proportion of the lobes and tubercles.—*Reichb. f.* refers (*Walp. Ann.* vi. 933) his *comosa* (which is Lindley var.

D. comosa) to *Perrottetii*, but the specimen so named by Lindley in Herb. Kew is certainly *veratrifolia*. Thwaites has a var. *discolor* (Enum. 308), but does not define it.

16. **C. vestita**, Lindl. in Wall. Cat. 7345; Gen. & Sp. Orchid. 250; Fol. Orchid. 10; scape from the base of a large pseudobulb and lax-flid. cernuous raceme villous, flowers rosy white or greenish, bracts large ovate, sepals ovate-lanceolate aristate 5-nerved, petals broadly oblong 5-nerved, lip very large, side lobes cuneately obovate, midlobe flabellately deeply obcordate, sinus acute, spur very long slender involute. Bot. Mag. t. 4671; Fl. des Serres, t. 816; Jard. Fleur. iv. t. 333; Part. Fl. Gard. 147 (with ic.); Mag. xvi. t. 129. *Cytheris Griffithii*, Wight Ic. t. 1751-2. *Preptanthe vestita*, Reichb. f. Bot. Zeit. xvi. 128; Walp. Ann. vi. 460.

TENASSERIM; at Moulmein, Wallich, &c.—DISTRIB. Borneo.

Pseudobulb 2-5 in., ovoid, obtusely angled, leafing after flowering. *Leaves* 12-18 in., lanceolate, glabrous. *Scape* 12-18 in., stout below; sheaths few, large, acute; bracts $\frac{3}{4}$ -1 in.; pedicels very slender with ovary $1\frac{1}{2}$ in.; sepals 1-1 $\frac{1}{2}$ in.; petals obtuse or retuse and apiculate; lip variable, exceeding the sepals; side lobes sometimes absent.—The hybrids between this and *C. rosea*, *C. labrosa*, and others, are very numerous.

§§§ *Flowers large; sepals $\frac{3}{4}$ -1 in. long; petals narrow.*

17. **C. chloroleuca**, Lindl. Fol. Orchid. 10; scape stout, bracts very small membranous, sepals ovate-lanceolate acuminate 5-nerved greenish, petals lanceolate acuminate 3-nerved yellowish, lip white, side lobes small oblong or rounded, midlobe broadly cuneately obcordate or suborbicular 2-lobed, spur stout longer than the sepals. Walp. Ann. vi. 920. *C. galeata*, Lindl. l. c.; Walp. l. c.

SIKKIM HIMALAYA, alt. 6-8000 ft., J. D. H., Treutler.

Stem 4-6 in., stout; base pseudobulbous, sheathed. *Leaves* 6-10 in., long-petioled, elliptic, acuminate. *Scape* from amongst young leaves, 6-10 in.; bracts $\frac{1}{4}$ in., ovate-lanceolate; pedicels with ovary $\frac{1}{2}$ - $\frac{3}{4}$ in., stout; sepals $\frac{2}{3}$ in. long, sometimes streaked with red; side lobes sometimes incumbent on the midlobe; spur glabrous or puberulous. *Capsule* $1\frac{1}{2}$ in.—*C. galeata* is founded on a drawing of mine, made in Sikkim, of a faded specimen with drooping flowers, and hence connivent sepals. The broad midlobe of the lip distinguishes this from *C. herbacea*.

18. **C. herbacea**, Lindl. Fol. Orchid. 10; bracts large oblong-lanceolate acute herbaceous, sepals oblong or oblanceolate acute and oblanceolate 3-nerved petals green, lip white, side lobes narrow falcate, midlobe deeply 2-fid, segments narrow spreading, sinus apiculate, base with 2 small yellow calli, spur longer than the sepals slender. Walp. Ann. vi. 920.

SIKKIM HIMALAYA, alt. 4-8000 ft., J. D. H.

Stem robust, sheathed. *Leaves* 8-10 in., elliptic-lanceolate, acuminate. *Scape* 12 in., from the side of the leafing stem; bracts $\frac{3}{4}$ in., green; sepals 1 in. long; lip small for the size of the flower; spur flexuous.

19. **C. Griffithii**, Lindl. in Part. Fl. Gard. under t. 31; Fol. Orchid. 9; bracts small lanceolate, sepals ovate-lanceolate aristate 5-nerved, petals narrowly oblanceolate 3-nerved, lip shorter than the sepals, side lobes oblong, midlobe broadly or deltoidly obcordate, disk with a solitary erect triangular lamella or callus, spur equalling or shorter than the sepals.

Walp. Ann. vi. 919. *C. plantaginea*, Griff. Notul. iii. 368; Ic. Plant. Asiat. t. 339 A. *Calanthea*, Griff. It. Notes, 174, No. 174.

BHUTAN HIMALAYA; at Panukka, Telagong and Chuka, alt. 6000 ft., Griffith.

Stem 4-6 in., sheathed. Leaves small during flowering, oblong, acute. Scape with the raceme 8-14 in., glabrous or puberulous; bracts $\frac{1}{2}$ - $\frac{1}{3}$ in.; pedicels with ovary 1 in., puberulous; sepals $\frac{3}{4}$ in. long; spur straight or coiled. —The solitary large callus on the lip is characteristic, and identifies this with Griffith's *C. plantaginea*. Perianth according to Griffith greenish brown, lip ochroleucous or straw-colored.

20. *C. uncata*, Lindl. Fol. Orchid. 6; bracts as long as the pubescent flowers, sepals lanceolate acuminate, nerves obscure, petals oblanceolate acuminate, lip longer than the sepals, base caruncled, side lobes falcately oblong obtuse, midlobe clawed 2-fid, segments spreading, disk naked, spur uncinately incurved. Walp. Ann. vi. 916.

SIKKIM HIMALAYA, Griffith's Collectors.

Stem short, sheathed. Leaves broadly elliptic, petioled. Scape longer than the leaves; bracts $\frac{1}{2}$ - $\frac{2}{3}$ in., ovate-lanceolate, lower foliaceous; sepals $\frac{1}{2}$ in. long. —Very near *C. Griffithii*, but I find no callus on the lip. I have seen only one specimen; colour of flowers unknown.

21. *C. plantaginea*, Lindl. in Wall. Cat. 7346; Gen. & Sp. Orchid. 250; Sert. Orchid. t. 24; Fol. Orchid. 9; bracts small lanceolate, sepals ovate-lanceolate 3-5-nerved, petals oblanceolate acuminate 3-nerved, side lobes of lip cuneate-obovate, midlobe cuneately-obovate subtruncate apiculate, spur very slender longer than the sepals. Walp. Ann. vi. 920.

TEMPERATE WESTERN HIMALAYA, from Garwhal, alt. 9000 ft., Royle, &c., to Nepal. BHUTAN, alt. 7-7500 ft., Griffith.

Stem 3-10 in.; sheaths long, tubular. Leaves 8-12 in., petioled, elliptic-lanceolate. Scape with raceme 6-16 in., puberulous; bracts $\frac{3}{4}$ -1 in.; pedicels with ovary 1-1 $\frac{1}{2}$ in., slender, puberulous; flowers white or pale lilac; sepals $\frac{3}{4}$ in., glabrous; lip longer than the sepals, with 3 small basal lamellæ.

22. *C. odora*, Griff. Notul. iii. 365; raceme dense-fid. radical, bracts foliaceous equalling the pubescent ovaries, flowers (before the leaves) large white smelling strongly of hyacinths, sepals ovate or oblong-ovate mucronate, petals much narrower spathulate-lanceolate mucronate, lip adnate to the column, side lobes obliquely oblong, midlobe broadly deeply obcordate white or cream-coloured, base with erect yellow lobed calli, spur one-third longer than the ovary filiform, lip unequally 2-lobed pubescent without and within. Lindl. Fol. Orchid. 11.

UPPER ASSAM; at Suddya, Griffith.

I have seen no specimens; it is, no doubt, near *C. plantaginea*.

23. *C. elytroglossa*, Reichb. f. mss.; scape and raceme pubescent, bracts large green, pedicels very long, sepals oblanceolate acute green, nerves obscure, petals narrowly oblanceolate 1-nerved, side lobes of lip ovate obtuse caruncled at the suture, midlobe broadly cuneately cordate. from a narrow base, lobes subfalcate, spur much longer than the sepals.

SIKKIM HIMALAYA, alt. 6-8000 ft., Treutler, Clarke.

Stem very short. Leaves 6-10 in., petioled, elliptic ovate or lanceolate. Scape from amongst the leaves with the raceme 2-3 ft.; bracts $\frac{3}{4}$ -1 in., acute; pedicels with ovary 1-1 $\frac{1}{2}$ in.; flower 1 $\frac{1}{2}$ in. diam., fleshy; sepals and petals green or yellow; lip white; spur 1 in., slender. —The long pedicels are characteristic.

** *Bracts* caducous as the raceme elongates, equalling or exceeding the flowers. *Scape* shorter than the leaves. *Flowers* black when dried.

24. **C. curculigoides**, *Wall. Cat.* 7340; scape and dense-fld. cylindric raceme glabrous, sheaths inflated, bracts equalling the ochreous or orange flowers, lip subhastate, side lobes small obtuse, midlobe subpanduriform, tip dilated acute, spur short stout, tip hooked. *Lindl. Gen. & Sp. Orchid.* 251; in *Bot. Reg.* 1847, t. 8; *Fol. Orchid.* 4; *Bot. Mag.* t. 6104; *Walp. Ann.* i. 792, vi. 913. *Styloglossum nervosum*, *Kuhl & Hassk. in Herb. Lindl.*; *Breda Orch. Jav.* t. 10. ? *C. pulchra*, *Lindl. Gen. & Sp. Orchid.* 250. *Amblyglottis pulchra*, *Blume Bijl.* 371.

MALAY PENINSULA; Malacca, Perak, Penang and Singapore, *Wallich, Griffith, Maingay* (*Kew Distrib.* 1659), &c.—DISTRIB. Java.

Stem 0. *Leaves* 1–2 ft., linear-lanceolate, petioled. *Scape* from the side of the leafing stem, 6–18 in., stout or slender; raceme 2–10 in.; pedicel and ovary $\frac{1}{2}$ in.; flower rather long, perianth connivent; sepals oblong, subacute.

25. **C. Foerstermanni**, *Reichb. f. in Gard. Chron.* 1883, i. 814; “raceme cylindric dense-fld., bracts about equalling the yellow flowers, midlobe of whitish-yellow lip obreniform apiculate, spur clavate half the length of the pedicelled ovary.”

EASTERN BURMA, *Foerstermann*.

I have seen no specimens of this species, which is evidently very near *C. curculigoides*.

26. **C. clavata**, *Lindl. in Wall. Cat.* 7343; *Gen. & Sp. Orchid.* 251; *Fol. Orchid.* 5; scape loosely sheathed, bracts much longer than the yellow flowers, sepals oblong acuminate, petals broad, lip short broad, base rounded, side lobes small, midlobe suborbicular emarginate, base with 2 triangular lamellæ, spur clavate as long as the ovary. *Walp. Ann.* vi. 914.

SIKKIM HIMALAYA, alt. 4000 ft., *J. D. H. KHASIA HILLS*, *Wallich, Griffith* (*Kew Distrib.* 5272, 5391, 5392). ASSAM and UPPER BURMA, *Griffith*.

Rhizome creeping; *stem* 4–8 in.; sheaths long. *Leaves* 1–2 ft., long-petioled, narrowly lanceolate; nerves strong. *Scape* lateral, 10–20 in., stout or slender; young raceme crinite with bracts which are $1\frac{1}{2}$ in. long; pedicels $\frac{1}{4}$ in., very slender; sepals $\frac{1}{2}$ in.; lip very variable. *Capsule* $\frac{1}{2}$ in., pendulous.

27. **C. angustifolia**, *Lindl. Gen. & Sp. Orchid.* 251; *Fol. Orchid.* 5; scape slender, sheaths appressed, raceme short many-fld., flowers white with a yellow centre, sepals oblong acute, petals very broad, lip as broad as long subequally 4-lobed, midlobe retuse apiculate, base with 2 triangular lamellæ, spur clavate equalling the sepals. *C. phajoides*, *Reichb. f. in Bonpland.* v. (1857) 37; *Xen. Orchid.* i. 207, t. 19. ? *Amblyglottis angustifolia*, *Blume Bijl.* 369. *Limodorum striatum*, *Reinwardt mss.*

PERAK, alt. 5–7000 ft., *Scortechini*, &c.—DISTRIB. Java.

Stem very short or 0. *Leaves* 1–2 ft., petioled, narrowly lanceolate. *Scape* basal, 6–10 in.; bracts not seen; pedicels very slender, with ovary $\frac{1}{2}$ in.; sepals $\frac{1}{2}$ in. long, 3–5-nerved; petals broader, 5-nerved, outer nerves branched. *Capsule* $\frac{3}{4}$ in., pendulous.—Near *C. clavata*, but stemless, with differently coloured flowers and different lip.

28. **C. Scortechinii**, *Hook. f.*; scape with large loose sheaths, raceme short, sepals broadly obovate-oblong aristate, petals as broad aristate 3-nerved, lip small short, side lobes very small obtuse, midlobe

deltoidly cordate retuse apiculate, base with 2 triangular lamellæ, top of column clavate, spur more or less clavate about as long as the sepals or shorter.

PERAK, *Scortechini*.

Leaf 2 ft. 6 in., long-petioled, narrowly lanceolate. *Scape* 12 in.; sheaths $1\frac{1}{2}$ –2 in.; pedicels slender, with ovary 1 in.; sepals $\frac{1}{2}$ in., 3–5-nerved; petals 3-nerved, nerves faint, outer branching; top of column (above the lip), unlike that of other species, produced backwards, rostellum very long.—I have seen but one specimen.

Sect. II. *Lip* inserted at the base of the column, which is not embraced by its side lobes. *Bracts* very long, slender, caducous. *Scape* always shorter than the leaves.

29. **C. densiflora**, *Lindl. in Wall. Cat.* 7344; *Gen. & Sp. Orchid.* 250; in *Bot. Reg.* t. 1646; *Fol. Orchid.* 9; scape radical, sheaths inflated, raceme short dense-fl., bracts lanceolate much exceeding the yellow flowers, sepals oblong acute, petals as broad, lip broadly oblong, base rounded, side lobes small, midlobe small sessile emarginate, spur cylindric. *Knowles & West Flor. Cab.* t. 23; *Walp. Ann.* vi. 919.

SIKKIM HIMALAYA, alt. 5–6000 ft., *Treutler*, &c. KHASIA HILLS, alt. 4–5000 ft., common.

Rhizome short, stout. *Leaves* 8–10 in., narrowly lanceolate; petiole as long, slender. *Scape* 4–8 in.; raceme subglobose; bracts $1\frac{1}{4}$ in., membranous; pedicels slender, with the ovary $\frac{1}{2}$ – $\frac{3}{4}$ in.; perianth connivent; sepals $\frac{3}{4}$ in.; petals 3-nerved; lip as long as the sepals, base with 2 large triangular lamellæ, column arched. *Capsule* $\frac{2}{3}$ in., turgidly ellipsoid.—Habit and spur of *C. clavata* with lip of *gracilis*.

30. **C. tubifera**, *Hook. f.*; stem tall, internodes long, sheaths cylindric, leaves many, distichous alternate narrow, scape lateral, sheaths inflated, raceme pubescent lax-fl., lip as in *C. densiflora*, spur 0.

UPPER BURMA, *Griffith*.

Stem 15 in., about as thick as the middle finger; internodes loosely clothed with tubular sheaths 3–4 in. long. *Leaves* many, 6–14 in., sessile, linear-lanceolate. *Scape* 12 in.; raceme 6 in.; bracts not seen; sepals $\frac{3}{4}$ in. long, lanceolate, acuminate; petals subsimilar; lip as long, twice as long as the column, without lamellæ, lateral nerves divergent crested, midlobe crisped.—Allied to *C. gracilis*, but much larger, with flowers twice as large and pubescent.

31. **C. gracilis**, *Lindl. in Wall. Cat.* 7341; *Gen. & Sp. Orchid.* 251; stem tall, internodes long cylindric, scape very slender, raceme laxly many-fl., bracts linear much exceeding the puberulous flowers hair-pointed, lip with 2 velvety basal patches, lateral nerves narrowly lamellate, spur 0. *Bot. Mag. t.* 4714; *Griff. Notul.* iii. 367; *Walp. Ann.* vi. 922. *Limatodes gracilis*, *Lindl. Fol. Orchid.* 1.

KHASIA HILLS, alt. 3–4000 ft., *Wallich*, &c.—DISTRIB. China.

Stems 12–18 in., tufted; sheaths 2–3 in. *Leaves* many, subterminal, 6–12 in., ovate or lanceolate, decurved. *Scape* lateral, 8–14 in.; bracts 1 in., very slender, membranous; flowers greenish yellow; sepals $\frac{1}{2}$ – $\frac{3}{4}$ in. and petals linear, acute, recurved; lip yellow; side lobes incurved; midlobe crisped; column short, white, base tumid in front.

Sect. III. *Lip* inserted at the top of the broad short column, its side lobes convolute and embracing the column.

32. *C. rosea*, *Benth. in Gen. Plant.* iii. 521; scape from the base of a large pseudobulb and many-fl. raceme villous, bracts ovate-lanceolate persistent, flowers large rosy, lip with narrow convolute side lobes and a large obovate oblong entire spreading midlobe, spur slender shorter than the sepals. *Limatodes rosea*, *Lindl. in Paxt. Fl. Gard.* t. 81; *Fol. Orchid.* 1; *Bot. Mag.* t. 5312; *Walp. Ann.* vi. 921.

TENASSERIM; at Moulmein, *Parish*.

Pseudobulbs 4-8 in., obpyriform or fusiform, acutely keeled and grooved, leafing after flowering. *Leaves* 8-18 in., elliptic-lanceolate, acuminate. *Scape* 12-18 in., slender; pedicel and ovary $1\frac{1}{2}$ in.; bracts $\frac{1}{2}$ -1 in., green; flowers $1\frac{1}{2}$ in. across; sepals ovate-lanceolate; petals oblong, acute; lip $1\frac{1}{2}$ in. long, base yellow edged with scarlet; spur shorter, villous; column very short, pubescent.—In many respects allied to *C. vestita*, with which it hybridizes.

33. *C. labrosa*, *Hook. f.*; habit, foliage and inflorescence of *C. rosea*, but sepals yellow without, purplish within, as are the petals, lip flabelliform from a cuneate base retuse crisped pale purple with darker purple spots at the base, and spur longer than the sepals. *Limatodes labrosa*, *Reichb. f. in Gard. Chron.* 1879, i. 202.

TENASSERIM; at Moulmein (*Hort. Veitch*).

I have seen only a portion of a raceme.

DOUBTFUL SPECIES AND SPECIES OF DOUBTFUL POSITION.

34. *C. gigantea*, *Hook. f.*; stem tall, leaves alternate distichous, scape basal very tall and stout, raceme long puberulous very many-fl., bracts short $\frac{1}{2}$ -amplexicaul rigid revolute, flowers coriaceous, sepals and petals linear-lanceolate falcate caudate-acuminate, lip very small fleshy sessile opposite the stigma of the pubescent column quadrate truncate apiculate puberulous, side lobes mere coriaceous auricles, spur obsolete.

PERAK; in dense jungles, *King's Collector, Wray*.

Stem 2 ft., as thick as the middle finger. *Leaves* 6-10 in., sessile, lanceolate, acuminate. *Scape* with raceme 3-4 ft., as thick as the stem; bracts very broad with subulate tips; pedicels very short; flowers 1 in. diam., pubescent, yellow spotted with crimson; sepals spreading, many-nerved; petals narrower; sides of lip decurrent on the short almost hispid column; anther hispid, 4-celled; pollinia 8, each group of 4 consists of 2 large subhemispheric placed face to face, and 2 very much smaller, all attached to one viscus.—A remarkable plant, black when dry.

C. CARINATA, *Lindl. Gen. & Sp. Orchid.* 183 (not taken up in *Fol. Orchid.*), is founded on Willdenow's *Limodorum carinatum*, and that again on Rheede's xii. t. 26, which is possibly *C. nutans*, L.

C. SULPHUREA and *C. TRICOLOR*, *Hort. Huegel*, in *Heyne Nomencl.* ii. 105, are names only.

38. *ARUNDINA*, *Blume*.

Terrestrial erect herbs with rigid terete sheathed simple stems, and narrow grassy distichous leaves. *Flowers* large, red, in terminal erect stiff simple or branched racemes or panicles. *Sepals* free, spreading, lanceolate, acuminate, flat, many-nerved. *Petals* broader, many-nerved. *Lip* large, broad, sessile on the base of the column and embracing it. *Column* long, slender, narrowly winged; foot 0. *Anther-cells* 2, pollinia 8 in compressed superposed pairs cohering by a viscus.—Species 6-8, Indian, Malayan and Chinese.

Sect. I. EUARUNDINA. *Raceme* simple or sparingly branched; bracts small, broadly ovate, acute, persistent. *Lip* very variable but always large, oblong, broad, subentire or with obscure side lobes, a small crisped terminal lobe and 2 or more lamellate nerves at the base.

1. **A. bambusifolia**, Lindl. in Wall. Cat. 3751; *Gen. & Sp. Orchid.* 125; in *Bot. Reg.* xxvii, Misc. 2; in *Journ. Linn. Soc.* iii. 22; leaves 8-12 by $\frac{3}{4}$ -1 in., raceme 6-12 in., sepals 1-1 $\frac{1}{2}$ in., petals orbicular-obovate apiculate, side lobes of lip short or 0, midlobe small 2-fid crisped, disk with 3 lamellate nerves. *Wight Ic.* t. 1661; *Griff. Notul.* iii. 329, 331; *Ic. Pl. Asiat.* t. 314; *Walp. Ann.* vi. 457. *Cymbidium bambusifolium*, *Rorb. Fl. Ind.* iii. 460. *Bletia graminifolia*, *Don Prodr.* 29. *Limodorum graminifolium*, *Ham. mss.*

TROPICAL HIMALAYA, from Nepal eastwards. ASSAM and the KHASIA MTS. to Munnipore and Chittagong. MALABAR, *fid. Wight*.—DISTRIB. Java.

Stem 5-7 ft., sometimes as thick as the thumb below. *Raceme* stout, simple or laxly paniced; bracts $\frac{1}{2}$ in., broad, coriaceous, subacute. *Lip* brighter red than the sepals. *Capsule* decurved, 2-2 $\frac{1}{2}$ in.—Griffith at p. 331 describes the petals and sepals as white, at p. 329 as flesh-cold. Lindley errs in describing the petals as lanceolate, and Wight in giving Ceylon as the locality for his drawing, which is from a specimen in his Herbarium marked "Assam, Griffith."

2. **A. densiflora**, Lindl. in *Bot. Reg.* xxviii. t. 38, Misc. 26; in *Journ. Linn. Soc.* iii. 23; leaves 6-10 by $\frac{1}{2}$ - $\frac{1}{2}$ in., raceme very short, flowers as in *bambusifolia*, but midlobe of lip very obscure. *Walp. Ann.* vi. 456. ? *A. speciosa*, *Blume Bijl.* 401, t. 73; *Lindl. in Journ. Linn. Soc.* l. c.

PERAK, SINGAPORE and MALACCA; on Mount Ophir, Maingay, &c. (*Kew Distrib.* 1635, *A. speciosa*).

A more slender plant than *A. bambusifolia*, with a shorter raceme; but I doubt its specific difference. Perhaps the *A. speciosa*, Bl., but the petals are not lanceolate.

3. **A. chinensis**, *Blume Bijl.* 502; stem 8-12 in., leaves 4-7 by $\frac{1}{4}$ - $\frac{1}{2}$ in. spreading and recurved, racemes 1-3 in. few-fl. simple, sepals $\frac{3}{4}$ -1 $\frac{1}{2}$ in., petals ovate-oblong, lip yellow in the middle. *Hook. & Arn. Bot. Beech. Voy.* 217; *Lindl. in Hook. Kew Journ. Bot.* vii. (1855) 34; *Benth. Fl. Hongk.* 355; *Walp. Ann.* vi. 457. *A. affinis*, *Griff. Notul.* iii. 330; *Ic. Pl. Asiat.* t. 351 A, f. 28 (anther); *Lindl. in Journ. Linn. Soc.* iii. 22; *Walp. l. c.*

SIKKIM HIMALAYA, on the outer hills, J. D. H. KHASIA HILLS; in grassy places, alt. 3-5000 ft., common, Griffith (*Kew Distrib.* 5195, 6796), &c.—DISTRIB. China.

Apparently identical with the Chinese plant, and distinguished from *A. bambusifolia* by the small size and yellow on the lip. Lindley says it has only 2 ragged lamellæ on the lip instead of the 5 of the former plant, but I find 5 thickened and lamellate nerves. The raceme is rarely 7-fl., the flowers extremely variable in size. Griffith doubts its specific difference, but if so, all the Indian species (except sect. *Dilochia*) should be united, in which I might concur.

4. **A. minor**, Lindl. *Gen. & Sp. Orchid.* 125; stem 8-12 in., leaves 2-5 by $\frac{1}{6}$ - $\frac{1}{4}$ in. erect strict, raceme long peduncled few-fl., sepals and petals as in *A. chinensis*, but smaller.

CEYLON; in the Central district, ascending to 1000 ft., not uncommon.

This differs from *A. chinensis* in the shorter suberect strict leaves that are acuminate or subacute with an apiculus and smaller flowers. *Capsule* 1-1 $\frac{1}{2}$ in.

5. **A. revoluta**, *Hook. f.*; leaves 4-7 by $\frac{1}{2}$ - $\frac{1}{4}$ in. recurved, margins strongly revolute, sepals and petals white, tips light red, lip yellow within, wings purple, tip blue.

PERAK; on rocks in streams, *Scortechini*, *Wray*, *King's Collector*.

Very distinct-looking; about the size of *A. minor*, but the leaves are longer, much narrower, and the capsule only $\frac{3}{4}$ -1 in. long.

Sect. II. DILOCHIA. *Raceme* or *panicle* branched. *Bracts* large, deciduous. *Anthers* 3.

6. **A. Wallichii**, *Reichb. f. Xen. Orchid.* ii. 13, t. 105, f. 13-15; leaves elliptic-lanceolate long-acuminate, branches of panicle few erect very stout, lip with 3 ridges, anthers 3. *Dilochia Wallichii*, *Lindl. Gen. & Sp. Orchid.* 38; *Wall. Cat.* 1952; *Blume Orchid. Archip. Ind.* t. 8 and t. 5 A.

SINGAPORE, *Wallich*.—DISTRIB. Borneo.

Stem 2 ft., pendulous. *Leaves* 4-6 by $1\frac{1}{2}$ -2 in., base contracted. *Panicle* branched from the base, branches 6-8 in.; bracts 1 in., oblong, cymbiform, acute; sepals and petals 1 in., linear-oblong, obtuse, dull yellow; lip oblong, white with a red disk. *Capsules* $\frac{2}{3}$ in. long, ellipsoid, beaked.

7. **A. Cantleyi**, *Hook. f. Ic. Plant. ined.*; leaves ovate or ovate-lanceolate long-acuminate, branches of decurved panicle many divaricate, lip with 5 crenate ridges.

PERAK; on Gunong Batu, alt. 4500-5400 ft., *Cantley*, *Wray*.

Stem as in *A. Wallichii*. *Leaves* 3 by 1 in., base rounded. *Panicle* very many-fl.; bracts $\frac{1}{2}$ - $\frac{1}{3}$ in., orbicular, subacute, saccate; flowers pale yellow pencilled with crimson; sepals $\frac{2}{3}$ in. long; lip cuneate with a flabelliform midlobe.—Bears a certain resemblance to *Eria Scortechinii*. There were, I think, 3 anthers, but they have fallen away.

The Addenda and Corrigenda to the *Orchideæ*, with a revision of the Key to the Genera, will be placed at the end of the Order in Vol. VI.

ADDITIONS AND CORRECTIONS, VOL. V.

P. 102. *MYRISTICA*.—Since the publication of the Indian species of this genus in 1886, a good many additional specimens have been received, including twelve species from Singapore, collected by the late Mr. Cantley. Most of them are known species, but the following two are such remarkable novelties, that though I am unable to refer them to their sections of the genus, I think it desirable to make them known.

M. PENDULINA, *Hook. f.*; branchlets very long and young leaves beneath and panicles finely rusty-tomentose, leaves 10–14 by 2–3 in. close-set subsessile pendulous linear acuminate, nerves 30–50 pairs, fem. panicles 3–4 in. very robust, flowers shortly stoutly pedicelled $\frac{1}{4}$ in. long ellipsoid glabrous shortly 2-fid, ovary ovoid glabrous, stigma terminal minute sessile.

SINGAPORE, *Cantley*.

A tree; branches spreading, 15 ft. long, as thick as the fore-finger at the base, slender towards the tip, clothed throughout with crowded leaves; bark black when dry, except at the tips. *Leaves* rather coriaceous, old glabrous beneath, base cupate or rounded, narrowed into a very short broad petiole. *Fem. fl.* thickly coriaceous, ebracteate.—This very remarkable species resembles in the leaf *M. sylvestris*, *Houtt.*, of Ternate, but the nerves are far more numerous.

M. SPHERULA, *Hook. f.*; branches slender furrowed, tips and leaf-nerves beneath and inflorescence and fruit very finely tawny-tomentose, leaves 3–5 by $\frac{3}{4}$ –1 $\frac{1}{4}$ in. petioled narrowly linear-oblong acuminate subsilvery glaucous beneath with 10–16 pairs of very slender nerves, female fl. shortly pedicelled racemose on short very stout rugosely scarred simple peduncles urceolate 3-fid, ovary broadly ovoid silky narrowed into a short style with a lacerate stigma, fruit small spherical.

MALACCA, *Cantley*.

A tree, 20 ft. high. *Leaves* thinly coriaceous, shining above, midrib and nerves beneath reddish, base acute; petiole slender, $\frac{1}{2}$ – $\frac{1}{4}$ in. *Flowering peduncles* numerous, axillary, and on the branches $\frac{3}{4}$ – $\frac{3}{2}$ in. long, $\frac{1}{4}$ in. diam., straight, closely scarred from the base to the tip (as if continuously growing and flowering at the tips). *Fem. fl.* $\frac{1}{6}$ in. long; pedicels as long. *Fruit* exactly globose, about $\frac{1}{4}$ in. diam., apiculate.—Native name, Chindarah Padi.

P. 136. *MACHILUS*.

The loan from Dr. King of the rich collection of *Machili* in the Herbarium of the Royal Gardens, Calcutta, enables me to define better many of the species of this very perplexing genus. It leaves, however, more than it accomplishes towards finally discriminating the Indian species.

* Fruit oblong or ellipsoid. Flower quite glabrous.

1. *M. ODORATISSIMA*, *Nees* in part (p. 139); branchlets and young leaves beneath glabrous or slightly silky, leaves 4–6 in. elliptic-lanceolate impressed punctate, nerves 7–13 pairs, panicles shorter than the leaves and flowers and filaments quite glabrous, fruit $\frac{1}{2}$ – $\frac{3}{4}$ in. long.

TEMPERATE HIMALAYA from Kashmir and Hazara eastwards, alt. 5–7000 ft., to Bhotan, ascending to 8000 ft. in Sikkim. KHASIA MTS., alt. 5–6000 ft. MARTABAN, alt. 3–7000 ft., *Kurz*.

Of Wallich's *Laurus odoratissima* (Cat. 2607), as described by *Nees* under *Machilus* (Plant. As. Rar. ii. 70), letter A, from Nepal is in bud only. The panicle and buds are silkily pubescent, and it is possibly a large-leaved form of *M. bomlycina*. B from Chercole in the Deyra Dhoun (Kumaon), with perfectly glabrous panicle and old flowers and oblong fruit, is what I believe Wallich intended for

odoratissima; it is very sweet-scented both in leaf and flower, and is the plant so called by Brandis and accepted by the Forest department. C, the *L. Champa*, Herb. Ham., from Rungpore and Patgong with globose small fruit, and D? from Goalpara, are all the cultivated *M. bombycina*, King, and E? from Silhet with a silky perianth and long glaucous leaves is probably *M. Kurzii*, King. F, said to be from Singapore, is unquestionably the same as B, and the habitat is almost certainly erroneous. Meissner's *M. odoratissima* is an even greater mixture than Nees', and not worth unravelling, the specimens described being almost uniformly without fruit. Loureiro's *L. indica*, cited by both the above authors, is probably *M. rimosa*, Kurz. Kurz's *M. indica* with oblong fruit and glabrous panicles is, no doubt, *M. odoratissima*, as is Brandis' plant of the latter name, and Strachey and Winterbottom's *Ocotea ligustrina*. Gamble's is a mixture of plants from the plains up to 8000 ft. Blume's *M. odoratissima* may be anything.

2. *M. PARVIFLORA*, Meissn. (p. 137); branchlets and young leaves glabrous or faintly silky, leaves linear-lanceolate or oblanceolate often large 6-10 in. quite glabrous and very glaucous blue beneath with 6-10 pairs of distant nerves, panicles and small flowers quite glabrous, filaments short broad, fruit $\frac{3}{4}$ in. long.

KHASIA, and Diphla Hills, in ASSAM, alt. 4000 ft., common.

** Fruit globose or nearly so. Flowers silky tomentose or pubescent in all but *M. Gammieana*.

† Young leaves villously pubescent or tomentose beneath.

3. *M. VILLOSA*, Hook. f. (p. 140); nerves of leaf 6-8 pairs very strong, panicle long-peduncled, flowers about $\frac{1}{2}$ in. diam., sepals short ovate obtuse, fruit young $\frac{1}{2}$ in. diam.

NEPAL, Wallich (in Herb. Hook.). SIKKIM HIMALAYA, ascending to 6000 ft. CARROW, KHASIA, and PATKOYE HILLS.

Nees' *Phæbe glaucescens* may be a mixture of this and *M. macrantha*. There is no corresponding Nepal specimen in Wallich's Herb. to that in Herb. Hook., which was received about 1822.

4. *M. EDULIS*, King (p. 138). I have nothing to add to the description.

†† Young leaves glabrous or finely silky beneath.

5. *M. GAMMIEANA*, King (p. 137), and *M. CLARKEANA*, King (p. 137), seem to be one species; the leaves attain 10 in., glaucous beneath with many faint nerves beneath; flowers quite glabrous; the filaments are glabrous or hairy. The flowering specimens with few-nerved leaves sent with the fruiting and referred to at the end of the description of *M. Gammieana*, were those of *Phæbe lanceolata*. The quite glabrous flowers distinguish this from *M. Duthiei*.

6. *M. LISTERI*, King (p. 138). Two plants were here mixed. The true *M. Listeri* (to the description of which I have nothing to add) has cuneately obovate leaves glaucous and puberulous beneath with 10-12 pairs of parallel nerves, a short (immature) hoary panicle, and fruit 1 in. diam.; young leaves unknown. The Narainpore specimens certainly belonged to *M. Gamblei*.

7. *M. GAMBLEI*, King *ms.*; shoots and young leaves beneath finely silky, leaves 3-6 in. obovate or oblanceolate quite glabrous beneath impressed punctate on both surfaces, nerves 8-10 pairs very slender, sepals silky on both surfaces, filaments glabrate, fruit globose $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.

NEPAL, Wallich. SIKKIM HIMALAYA, ascending to 7000 ft. ASSAM and the DIPHLA HILLS.

The Assam specimens have more slender panicles, and more resemble *M. bombycina*, but the leaves are glabrous beneath.

8. *M. KURZII*, King *ms.*; shoots and young leaves glabrous, leaves 3-5 in. as in *M. Gamblei*, but more glaucous with 10-12 pairs of very indistinct nerves beneath, panicle subsilky tomentose, sepals linear-oblong silky on both surfaces, filaments nearly glabrous, fruit $\frac{1}{2}$ in. diam.

SIKKIM HIMALAYA, alt. 6-9000 ft. (a large tree), King, Kurz, Clarke, &c. ? UPPER BURMA, at Lamoom, Griffith.

9. *M. BOMBYCINA*, *King mss.*; altogether like *M. Gamblei*, but with the leaves more or less finely pubescent beneath and hairy along the midrib, fruit $\frac{1}{4}$ in. diam. *M. odoratissima*, *Wall. Cat.* 2607 D. *Laurus Chaupa*, and *L. bombycina*, *Herb. Ham.*

Cultivated in the ASSAM VALLEY and along the LOWER HIMALAYA, as far west as Nepal, for silkworm-feeding. The Soom-tree of Upper Assam (*Mann*). Perhaps a cultivated form of *M. Gamblei* or *Kurzii*, or all forms of one.

10. *M. DUTHIEI*, *King mss.*; branches and young leaves glabrous or very finely silky, leaves 5-10 in. oblanceolate or elliptic-lanceolate very coriaceous 12-20-nerved pale and glaucous beneath, petiole $\frac{1}{2}$ -1 in., flowers large $\frac{1}{2}$ in. diam., sepals linear-oblong finely silky, filaments glabrous, fruit globose $\frac{1}{2}$ in. diam. in often elongate drooping panicles with thickened pedicels.

WESTERN HIMALAYA; from Chauba, alt. 6000 ft., *Thomson*, to Kunawur, alt. 7000 ft.; Simla, 5000 ft., *Brandis*, *Madden*; Kumaon, alt. 2000 ft., *Strachey & Winterbottom*. ? SIKKIM, alt. 4-5000 ft., and KHASIA MTS., *J. D. H.*, &c. (without fl. or frt.).

11. *M. FRUTICOSA*, *Kurz* (p. 140); leaves (young not seen) thickly coriaceous glabrous, nerves 10-12 pairs very slender, petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., panicle long-peduncled hoary, flowers small $\frac{1}{8}$ in. diam. hoary, filaments glabrous, "fruit pisiform, pedicel elongate thickened," *Kurz*.

TENASSERIM and MARTABAN, alt. 4000 ft., *Griffith*, *Helper*, &c.

12. *M. MACRANTHA*, *Nees* (p. 140); leaves glabrous, nerves 10-12 pairs, petiole 1-1 $\frac{1}{2}$ in., panicle long- or short-peduncled hoary, flowers small $\frac{1}{8}$ - $\frac{1}{4}$ in. diam., sepals tomentose, filaments villous, fruit $\frac{1}{4}$ - $\frac{3}{4}$ in. diam.

DECCAN PENINSULA; on the Ghats, ascending to 6000 ft. from the Concan southwards.

The specific name is inappropriate. In *Herb. Calcutta* are specimens of what may be a different species from the Anamallay Hills in Travancore, with smaller more obovate shorter-petioled very coriaceous leaves and short panicles.

Species of which the fruit is unknown.

M. BOOTANICA, *Meissn.* (p. 138). I have nothing to add to the description of this very distinct plant.

M. ? EBASYANA, *Meissn.* (p. 137). This also is a very distinct plant, with leaves sometimes 11 in. long, of a thin texture, very blue beneath, and with a rusty-brown pubescence. (It may not be a *Machilus*.)

M. SERICEA, *Blume* (p. 139). The materials in the Calcutta Herbarium do not help to clear up this species, which had, perhaps, better be suppressed.

Under *L. sericea*, No. 2606 (in *Herb. Hook.* only) are specimens with white bark on the branches, and I collected apparently the same in Sikkim; the young leaves are perfectly glabrous, as are the branches of the panicle, leaves 3-5 in. elliptic, deeply punctate, flowers $\frac{1}{2}$ in. diam., sepals oblong, silky on both surfaces, filaments glabrous. It approaches *M. Gammieana*, which has sometimes white bark, but the flowers are much smaller.

M. KINGII, *Hook. f.* A small tree common in the Khasia at 4-5000 ft. elevation with very small leaf-buds, glabrous shoots and young leaves, leaves small 3-4 in. elliptic-lanceolate or oblanceolate coriaceous pale and closely punctate above with a deeply depressed costa, glaucous beneath with 8-10 pairs of very slender diverging nerves, petiole $\frac{1}{2}$ -1 in., panicle slender sparsely puberulous, flowers $\frac{1}{2}$ in. diam., sepals appressed-pubescent on both surfaces, filaments nearly glabrous.

M. RIMOSA, *Blume Mus. Bot. i.* 330? (*DC. Prodr. xv. i.* 42). Specimens of one or more species closely resembling this, but having neither mature flowers nor fruit, are in the Kew Herbarium from Burma, *Griffith*, and Chela in the Khasia Mts., *Clarke*. The branches are stout and very young leaves glabrous, leaves

5-7 in. broad and usually large, elliptic or obovate with few (8-10) strong arched nerves beneath. Meissner (in DC. l. c.) refers to this species a very much smaller-leaved plant of Lobb's from Moulmein. The identification of any of these with the Javanese *M. rimosa*, the fruit of which is undescribed, is mere guess-work. Meissner's *rimosa* from Moulmein, Lobb, is probably *M. fruticosa*. Javan specimens in Herb. Hook. are named *M. Madang* and *M. odoratissima* ϵ . *latifolia* by Miquel, who unites *rimosa* with *odoratissima*.

M. PUBESCENS, Blume Mus. Bot. i. 330; Meissn. in DC. Prodr. xv. i. 40. This is unrecognizable by description.

M. sp.?, Penang, Curtis, No. 942, is a small plant with glabrous young leaves, the old leaves 3-4 in. elliptic-lanceolate above finely reticulate beneath glaucous, nerves 10-12 pairs very slender, petiole very slender, panicle slender nearly glabrous, few-fl., flowers $\frac{1}{2}$ in. diam., sepals short nearly glabrous as are the filaments.

P. 116. After 5. *Endiandra* insert—

Perfect stamens 6; anthers 2-celled . . 5/1. MICROPORA.

P. 127. Before 6. *Syndiclis* insert—

5/1. MICROPORA, Hook. f.

A tree; branches slender. *Leaves* elliptic-oblong, acute. *Flowers* small, hermaphrodite, in slender axillary few-fl. racemes or panicles. *Perianth* very short, lobes 6 orbicular. *Stamens* 6, exserted, eglandular; anthers thick, sessile, subquadrate, 2-celled, tomentose, cells opening by minute pores; staminodes very short, thick, tomentose, opposite the stamens. *Ovary* ovoid, sessile, quite smooth, narrowed into a very short style; stigma minute.

M. CURTISII, Hook. f. Ic. Plant. t. 1547. Hexapora Curtisii, p. 189 of this volume.

PENANG; close to the Chalet, elev. 500 ft., Curtis.

Branches and racemes puberulous. *Leaves* 3-5 by $1\frac{1}{2}$ -2 in., young membranous, old coriaceous, beautifully reticulate, petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Racemes* 1-1 $\frac{1}{2}$ in. long; flowers globose, about $\frac{1}{10}$ in. broad.

P. 182. In remarks under LINDERA, after the word Indian erase 2-celled, and insert after plants—with 2-celled anthers.

P. 185. Under *L. melastomacea* insert the following habitats:—BHOTAN, Griffith (Kew Distrib. 4319). KHASIA Mts., alt. 3-4000 ft. MUNNIPORE, alt. 4000 ft., Watt.

P. 189. In the note respecting the genus near *Endiandra* for *Hexapora* read MICROPORA, and for three anthers read six anthers.

P. 193. *D. CANNABINA*. Madden describes two forms, a white and a purple-flowered, in the Western Himalaya, inhabiting different elevations.

P. 199. To habitats of *Gyrinops Walla*, add—Tinnevely Ghats, Beddome.

P. 237. *BALANOPHORA INDICA*. In a paper on this genus by W. C. Fawcett, F.L.S., in the Linnean Transactions, Ser. 2, ii. 233, that author points out that Wallich's *B. typhina* includes *B. indica*, Wall., and *B. polyandra*, Griff.; also that *B. gigantea*, Wall., differs from *B. indica* in the rhizome having no pustules, but being tessellated rather than warted; it may, however, he observes, be a variety of *indica*.

P. 238. *B. THWAITESII*. Dr. Trimen, in Journ. Linn. Soc. xxii. 330, inclines to regard this as a well-marked var. of *B. indica*. Its chief characters which he gives are, its large size, bright yellow colour, larger stellate pustules, its longer prominent crenate flower bracts in the male, ovoid or pyriform exserted fem. heads and shortly stalked fem. fl. inserted on the pedicels and very rarely attached to the bases of the spadixes.

P. 638. Under 3. P. EUPHRATICA, for *Balsamidora* read *Balsumifera*.

P. 640. EPHEDRA. As this sheet was passing through the press, I received a copy of Dr. Stapf's elaborate "Arten der Gattung Ephedra," published in the 56th volume of the "Denkschrift der Mathem.-Naturwissenschaft. Classe der Kais. Akad. der Wissenschaft" (Wien. 1899). The conspectus of his views which I here give will enable Indian botanists to estimate the value of the characters adopted for the discrimination of the species of this most puzzling genus. With the exception of the few references between brackets (), the following is a translation from Stapf's memoir.

Sect. PSEUDOBACCATÆ. Bracts not winged, margins sometimes membranous.

Tribe SCANDENIES. Scandent or subscandent shrubs (or prostrate in *E. foliata*).

1. *E. FOLIATA* (Boiss.), Stapf l. c. 49, t. 2, and 10, f. 1-11; male spikes usually clustered rarely subsolitary, peduncles very long and unequal, anthers 3-4, fem. cones 2-fld.

Var. *α. ciliata*; branchlets dense pseudovercillate or fascicled slender. *Aitchison Fl. Kurum Valley*, 187. *E. foliata*, *Aitch. Bot. Affghan. Bound. Comm.* 112. *E. Alte*, *Brand. For. Fl.* 501, t. 69. *E. peduncularis*, *Boiss. Fl. Orient.* v. 717. *E. asparagoides*, *Griff. Notul.* ii. 340. (*E. alata* (? *Alte*), *Edgew. in Journ. Linn. Soc.* vi. 194.)—Western Panjab and Scinde (Rajpootana).—*Distrib.* Turkestan and westwards to Syria.

Tribe PACHYCLADÆ. Shrubs. Branchlets very rigid, stout, strict. Male spikes densely crowded, sessile. Tubule of ovule (and seed) twisted.

2. *E. INTERMEDIA* (Schrenk & Mey.), Stapf l. c. 61, t. 2, and 15, f. 1-9; anthers densely crowded usually sessile, bracts of fem. cone connate beyond the middle, seeds very shortly exerted plano-convex. *E. pachyclada*, *Boiss. Fl. Orient.* v. 713.

Var. *glauca*; lowly, rarely exceeding 20 in., erect or ascending from a short prostrate base, glaucous, rarely subglaucous, branchlets numerous elongate and naked above often densely subparallelly approximate, clusters of male spikes often large.—Kashmir.—*Distrib.* from Mougolia to Kashmir and Turkestan.

Var. *tibetica*; a low shrub, erect or prostrate below with sometimes long lax branchlets, internodes elongate more slender rarely short thick, bark scabrous or scaberulous glaucous sometime bluish.—Western Tibet.—*Distrib.* Afghanistan, Khoten.

Tribe LEPTOCLADÆ. Low or middle-sized shrubs, branchlets slender rigidulous, rarely subflexuous. Male spikes variously disposed. Tubule of ovule (and seed) straight or twisted.—In *E. Gerardiana* specimens occur with thick branches.

3. *E. GERARDIANA* (Wall.), Stapf l. c. 75, t. 3, and 18, f. 1-9, and 31, f. 1; a low shrub, branches short, terminal buds short usually constricted at the base, male spikes solitary or few sessile crowded, fem. cones 1-2 fld., innermost bracts scarcely connate to the middle, seeds always, sometimes much, exerted.

Var. *α. Wallichii*; branches appressed to the ground, branchlets short slender curved ascending, terminal buds much constricted at the base, male spikes solitary small. *Wall. Cat.* 6048; *Royle Ill.* 40, 348. *E. vulgaris*, *Aitch. Fl. Kurum Vall.* 186. *Brandis For. Fl.* 501.—Western Tibet, Kunawur, Garwhal, Kumaon.—*Distrib.* Central Tibet at Talatschu, Karakoram.

Var. *β. saxatilis*; taller than var. *Wallichii*, bark softer when dry more distinctly striate and usually blackening, branchlets usually arcuately

ascending rarely erect. *E. vulgaris*, *Brand. For. Fl.* 501.—Garwhal and Kumaon.

Var. *γ. sikkimensis*; branchlets 12 in. high usually erect robust but softish, furrowed when dry and brownish, sheaths of leaves elongate, male spikes larger. *E. vulgaris*, *Brandis l.c.*, the Sikkim plant. (*E. macrocephala*, *Bertolon. Misc.* xxiii. 17, t. 3.)—Sikkim.

4. *E. NEBRODENSIS* (Tineo), *Stapf l.c.* 77, t. 3, xx. f. 1-7; an erect shrub, branches slender rigid usually strict, male spikes few or solitary crowded sessile, fem. cones 1-fl., innermost bracts connate for one-third of their length.

Var. *procera*; branchlets perfectly smooth, semi-mature fem. cones narrower longer, seeds elongate-ovate.—Kuhlwar, Lahul, and Western Tibet.—*Distrib.* Afghanistan and eastward to Greece.

(With regard to *E. vulgaris*, A. Rich., to which I have referred *E. Gerardiana* and *nebrodensis* var. *procera*, Stapf describes it as *E. distachya*, Linn. It may be useful to give Stapf's diagnosis of it, so as to enable Indian botanists to compare the three, premising that he places it in tribe *Leptocladae*.

E. DISTACHYA (Linn.), *Stapf l.c.* 66, t. 2, xvii. f. 1-5; low or very low shrub, erect or ascending from a long or short prostrate base, male spikes solitary clustered or subracemously panicled, bracts of the fem. cone shorter than the two seeds, tubule of ovule (and seed) erect.)

P. 667. The Key to the genera of Orchidæ having been compiled from the Genera Plantarum before the analysis of the Indian species was far advanced, requires revision, the results of which will be given at the end of the Order in Vol. VI.

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ERRATA. (See also p. 859.)

P. 142. Under *P. pallida*, for *P. glaucescens* & *fuscans* read *P. glaucescens*, var. *fulvescens*.

P. 154. For *A. leiantha* read *A. leiophylla*, Hook. f., and for *Litsæa leiantha*, Kurz, read *L. leiophylla*, Kurz.

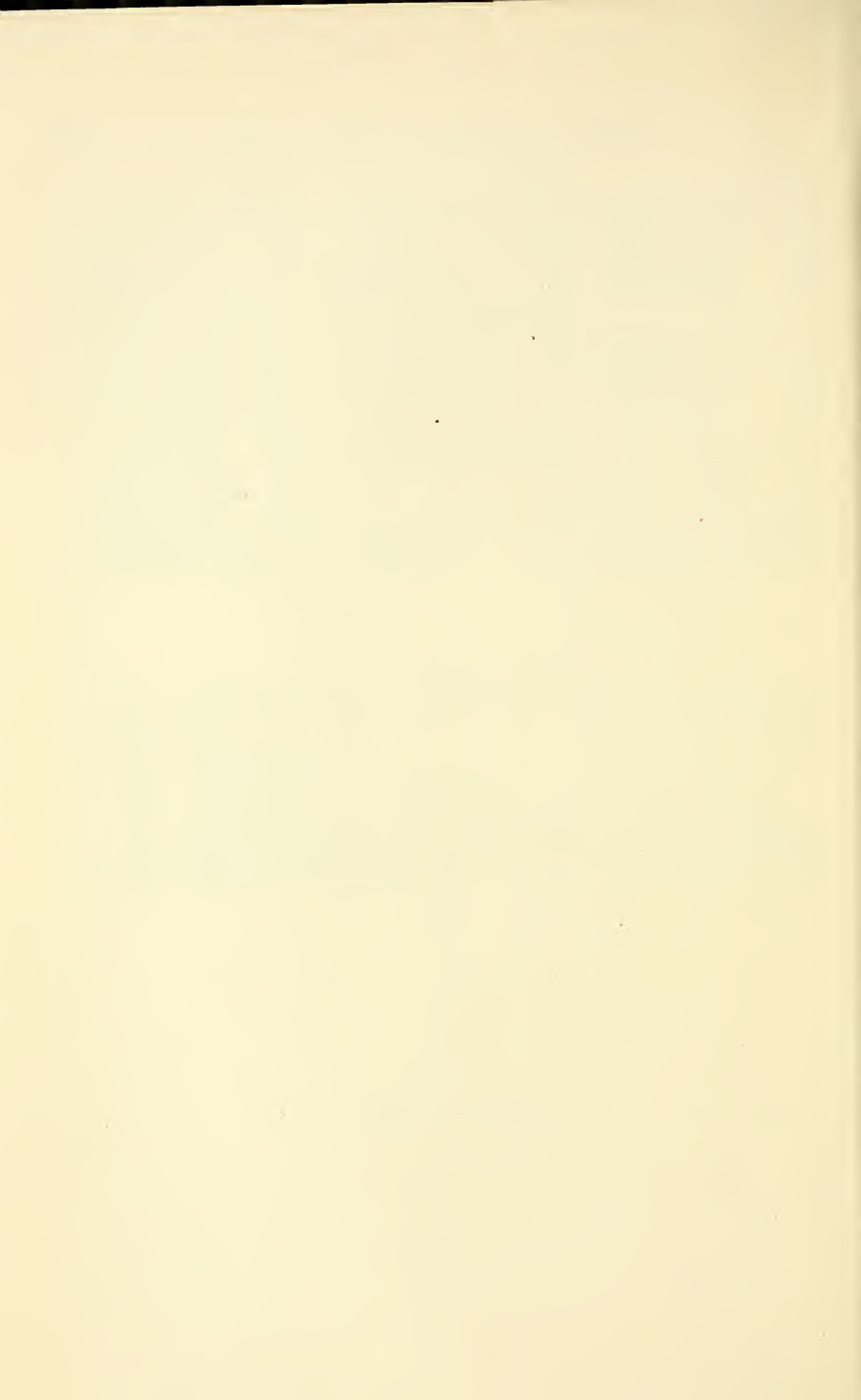
P. 618. For *Q. Jenkinsiana* read *Q. Jenkinsii*.

P. 759 Under 3 *B. leptanthum*, for 3-nerved sepals read 1-nerved petals.

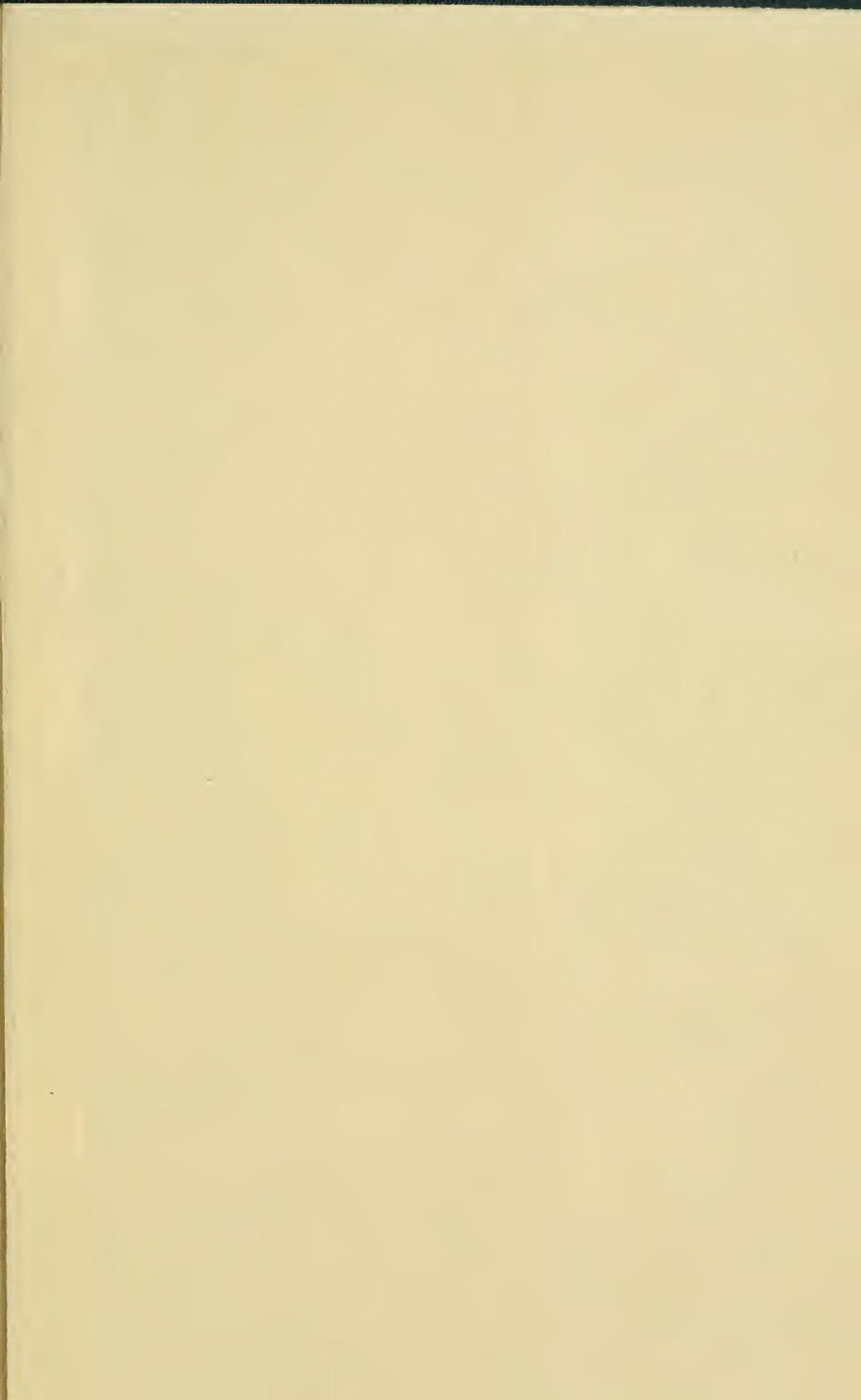
P. 784. *Chrysoglossum maculatum*. This I subsequently referred to *Tainia*, but under that genus I inadvertently omitted to refer to its description (p. 821).

P. 821. Under *T. maculata*, enter as a synonym *Chrysoglossum maculatum*, p. 784.









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THE
FLORA OF BRITISH INDIA.

BY

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ASSISTED BY VARIOUS BOTANISTS.

VOL. VI.

ORCHIDEÆ TO CYPERACEÆ.

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ORDER CXLVIII. ORCHIDÆE.

Continued from Vol. v. p. 858.

TRIBE II. **Vandæe**. (See Vol. v. p. 671.)

39. **EULOPHIA**, Br.

Terrestrial quite glabrous herbs; rhizome tuberous, rarely pseudo-bulbous. *Leaves* appearing with or after the flowers, plaited. *Scape* lateral, flowers racemose, rarely paniced. *Sepals* and *petals* free, spreading. *Lip* erect from the base or foot of the column; base saccate or with a mentum or short spur; lateral lobes erect, embracing the column, rarely 0; midlobe spreading or recurved; disk crested, softly spinous or lamellate. *Column* short or long, top oblique, entire; anther terminal, 2-celled; pollinia 2 or 4, sessile or attached by a short strap to a discoid gland of the rostellum.—Species about 50, tropical, chiefly Asiatic.

I follow Blume, and others, in removing *Cyrtopera* from *Cyrtopodium* (where it is placed in Gen. Plant.), and including it as a section under *Eulophia*, there being a direct passage from the species with, to those without, a foot to the column. In sect. *Cyrtopera* the lateral sepals are inserted either on the foot of the column, leaving the spur or sac of the lip free, or their insertion extends along the spur, which then is technically a mentum. The perianth of *Eulophia* is undistinguishable from that of *Dipodium*, *Geodorum*, *Plocoglottis*, and *Tainia*, of which the two first might but for habit be united with it; the two latter differ in having creeping rhizomes, usually solitary leaves, and more than 2 pollinia. *Chrysoglossum* resembles a *Eulophia* with the pollinia free from the rostellum.

SECT. I. **Eulophia** PROPER. *Column* not produced into a foot.

* Leaves and flowers coetaneous, or nearly so.

† Pseudobulb very large, epigeal, green. Leaves very narrow. Scape often branched.

1. **E. virens**, Brown in Bot. Reg. sub t. 573 (*Eulophus*); leaves grass-like, bracts very small ovate acute, sepals linear-oblong subacute or obtuse, petals elliptic obtuse, lip obovate-oblong, side lobes small, disk with 5-crested nerves. Lindl. Gen. & Sp. Orchid. 182; in Journ. Linn. Soc. iii. 24; Wight Ic. t. 913; Bot. Mag. t. 5579; Walp. Ann. vi. 647. *E. carinata*, Lindl. Gen. & Sp. Orchid. 183. *Aerobium carinatum*, Spreng. Syst. Veg. iii. 718. *Serapias epidendrea*, Retz Obs. vi. 65. *Limodorum virens*, Swartz in Nov. Act. Upsal. vi. 79; Roxb. Cor. Pl. i. t. 38; Fl. Ind. iii. 467. *L. epidendroides*, Willd. Sp. Pl. iv. 124.—Rheede Hort. Mal. xii. t. 26, and p. 25.

BENGAL and the DECCAN PENINSULA; in dry ground, Roxburgh, &c. CEYLON, in the Central Province, Walker, &c.

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Pseudobulb large, conico-obpyriform. *Leaves* many, 6-10 by $\frac{3}{8}$ in., midrib stout. *Scape* 1-3 ft.; sepals $\frac{2}{3}$ -1 in., and petals green with reddish nerves; lip as long as the sepals, white with red crested nerves; spur short, subcylindric or conical.—Rheede's xii. t. 26 is, I think, this; his t. 25 may be *E. graminea*.

2. *E. graminea*, *Lindl. in Wall. Cat.* 7372; *Gen. & Sp. Orchid.* 182; *in Journ. Linn. Soc.* iii. 23; leaves grass-like, bracts small lanceolate, sepals lanceolate acuminate and elliptic-lanceolate acute petals tessellate, lip obovate-oblong, side lobes small, disk with 3-5 lamellate or crested nerves which are fimbriate on the rounded midlobe. *E. inconspicua*, *Griff. Notul.* 349; *lc. Pl. Asiat.* t. 326; *Lindl. in Journ. Linn. Soc.* iii. 25.

ASSAM, *Mann.* BENGAL, *J. D. H., Clarke.* TENASSERIM, *Parish.* NICOBAR ISLANDS, *Kurz.* SINGAPORE, *Wallich.* MALACCA, *Maingay.* TRAVANCORE, *Wight.* CEYLON, at Damballa, *Trimen.*

Habit of *E. virens* and colour of flower, but leaves usually shorter, flowers much smaller, and spur cylindric with often a clavate tip.—Cuming's specimens No. 2059 are marked as from Malacca in some collections, from Bohol Island (Philippines) in others.

†† Roots tuberous, hypogæal. Leaves elliptic-lanceolate. Scape unbranched.

§ *Lip longer than broad, side lobes short or 0.*

3. *E. ochreatea*, *Lindl. in Journ. Linn. Soc.* iii. 24; leaves elliptic acuminate, scape with broad loose ochreate sheaths, bracts lanceolate equalling the ovary, sepals linear-oblong, petals broadly elliptic acute, lip broadly ovate entire, tip rounded, nerves all fimbriate. *Dalz. & Gibs. Bomb. Fl.* 265.

The CONCAN and CANARA, *Law, Dalzell, &c.*

Stem stout. *Leaves* 3-5, 4-10 in., many-nerved, sessile. *Scape* 10-12 in., very stout below; raceme many- and rather dense-fl., bracts $\frac{1}{2}$ -1 in.; sepals $\frac{2}{3}$ in. long; spur a small sac.

4. *E. herbacea*, *Lindl. Gen. & Sp. Orchid.* 182; *in Journ. Linn. Soc.* iii. 24; bracts very long, flowers large, sepals linear-lanceolate acuminate, petals elliptic or lanceolate obtuse or acute very many-nerved, lip obovate-oblong, side lobes small rounded, midlobe ovate-oblong, disk with many fimbriate nerves. *Dalz. & Gibs. Bomb. Fl.* 265. *E. brachypetala*, *Lindl. in Journ. Linn. Soc. l. c.* *E. albitoria*, *Edgew. mss.* *Limodorum bicolor*, *Roxb. Fl. Ind.* iii. 469.

WESTERN HIMALAYA; Garwhal, alt. 4-7000 ft., *Roule, Falconer, Edgeworth, &c.* BENGAL, *Roxburgh*; at Rungpore, *Clarke.* CONCAN, *Dalz. & Gibs. l. c.*

Stem 4-6 in., rather slender, sheathed. *Leaves* 6-8 in., linear-lanceolate, variable in breadth, many-nerved. *Scape* 2-3 ft., stout; sheaths large, acuminate; raceme short, 8-10-fl.; bracts $1\frac{1}{2}$ -2 in.; pedicel with ovary $\frac{1}{2}$ -1 in.; sepals $1\frac{1}{2}$ in., green; petals very variable, white, nerves purple; lip white, nerves yellow; spur very short, obtuse.—The flowers seem to be often produced before the leaves. *Lindley* gives Ceylon, Macrae, as a habitat, probably by the same error as affects *E. explanata*.

5. *E. lachnocheila*, *Hook. f.*; scape stout, raceme lax-fl., bracts equalling or exceeding the ovary subspathaceous, sepals lanceolate acuminate and shorter elliptic petals many-nerved, lip narrow pubescent, side lobes short rounded, midlobe obovate-oblong retuse, margin waved, disk densely softly spiny.

UPPER BURMA; at Maypongo, *Herb. Hort. Calcutt.*

Tuber globose. *Stem* 4-6 in. *Leaves* 2, linear-lanceolate, acuminate. *Scape* with the raceme 18 in.; sheaths 2, acuminate; raceme 6-8-fld.; bracts $\frac{2}{3}$ -1 in., membranous, linear-lanceolate, subspathaceous; flowers 1 in. diam.; lateral sepals inserted at the base of the column; lip shorter than the sepals; hypochile obovate, as long as the rather narrower epichile; spur short, cylindrical; column rather long.

6. ***E. bracteosa***, *Lindl. in Wall. Cat.* 7366; *Gen. & Sp. Orchid.* 180; *in Journ. Linn. Soc.* iii. 23; bracts very long, sepals oblong, tip rounded, petals broadly obovate very many-nerved, lip narrowly obovate-oblong, obscurely 3-lobed, disk with 5-crenulate veins. *E. grandiflora*, *Lindl. Gen. & Sp. Orchid.* 181.

KHASIA HILLS; on the north slopes, alt. 3-4000 ft., *J. D. H. & T. T. CHITTAGONG, Wallich.* TENASSERIM, alt. 3500 ft., *Parish.*

Stem 4-6 in., sheathed. *Leaves* 1-3, 10-18 in., linear-lanceolate, petioled, 3-nerved. *Scape* stout, shorter than the leaves, clothed with long sheaths; raceme short, few-fld.; flowers fleshy; bracts 1-1½ in.; sepals $\frac{2}{3}$ in., yellow; lip white or lilac, streaked; spur short, obtuse. *Capsule* 1 in.—Lindley's habitat of Ceylon for *grandiflora* is no doubt an error.

7. ***E. elata***, *Hook. f.*; bracts equalling the ovaries, sepals falcate lanceolate acuminate 5-nerved, petals elliptic-lanceolate obtuse strongly 5-nerved, lip narrowly ovate-oblong obtuse entire, disk with 3 slender moniliform nerves.

PERAK, *Scortechini*, 2023.

Leaves 12-14 in., petioled, elongate, linear-lanceolate. *Scape* 3½ ft., very stout below, sheaths appressed; raceme elongate, lax-fld.; bracts $\frac{1}{3}$ -½ in.; sepals as long, fleshy; lip equalling the sepals; spur a small sac; column short, stout, hooded; young fruit 2 in., deflexed.

8. ***E. explanata***, *Lindl. Gen. & Sp. Orchid.* 180; bracts shorter than the ovary, sepals oblong-ovate subacute and broader elliptic petals 5-nerved, lip subpanduriform, base saccate with spreading nerves, disk with two thick crenate lamellæ, midrib greatly thickened and caruncled towards the truncate emarginate tip. *Dipodium scariosum*, *Herb. Ham.*

NEPAL; at Maghada, in the Morung, *Hamilton.* NORTH-WEST INDIA (*Ic. Falconer*).

Leaves very young at the flowering time, surrounded at the base, along with 1 or 2 scapes, with short broad $\frac{1}{2}$ -1 in. long sheaths. *Scape* 4-8 in., rather stout, 10-12-fld.; bracts $\frac{1}{3}$ -½ in.; pedicels with ovary $\frac{2}{3}$ in.; perianth yellow and purplish, spreading, $\frac{3}{4}$ -¾ in. diam.; lip sessile, base adnate to the lateral sepals; sac or spur broadly conical, obtuse; column very short.—An anomalous species. Lindley's specimens being counterparts of Hamilton's, his Ceylon habitat is doubtless an error.

§§ *Lip broader than long, side lobes short or 0.*

9. ***E. obtusa***, *Hook. f.*; bracts equalling the ovaries, sepals oblong-lanceolate acute 7-nerved and broadly elliptic obovate obtuse many-nerved petals tessellate, lip clawed 3-lobed, side lobes rounded, midlobe much longer oblong, disk with 2 lobed calli at the mouth of the spur and 3-5 thickened nerves ending in calli within the apex, claw with a reniform callus on each side. *Cyrtopera obtusa*, *Lindl. Gen. & Sp. Orchid.* 190.

NORTH-WEST INDIA; on the banks of the Tonse river, *Royle.*

Leaves 12 in., narrowly ensiform. *Scape* very tall; raceme elongate, lax-fld.; bracts $\frac{1}{3}$ -½ in., ovate-lanceolate, acuminate; sepals $\frac{2}{3}$ in.; petals rather shorter, but

much broader; lip as long as the sepals; spur conic, acute, curved, placed between the lateral lobes; column short, stout.—Placed by Lindley in *Cyrtopera*, but there is no foot to the column; he also errs in describing the sepals and bracts as obtuse.

10. ***E. pratensis***, *Lindl. in Journ. Linn. Soc.* iii. 25; bracts shorter than the ovary, sepals oblong obtuse 5-nerved, petals subsimilar, lip sessile broader than long, side lobes large oblong rounded, midlobe small semi-circular, disk with three crenate nerves ending in crenate calli on the midlobe. *Dalz. & Gibs. Bomb. Fl.* 265. *E. ramentacea*, *Wight Ic.* t. 1666 (*not of Lindl.*).

The DECCAN PENINSULA; in pastures, from the Concan southwards.

Leaves few, 10–12 in., long-petioled, narrowly lanceolate, strongly 3-nerved. *Scape* 1–3 ft.; sheaths acute, appressed; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., ovate-lanceolate; sepals $\frac{3}{4}$ in., fleshy; spur conical, acute. *Capsule* $1\frac{1}{2}$ in., elliptic, turgid.—The broad lip is like that of *E. macrostachya*. Lindley and the Bombay Flora err in describing this species as leafless when flowering.

11. ***E. macrostachya***, *Lindl. Gen. & Sp. Orchid.* 183; in *Bot. Reg.* t. 1972; bracts lanceolate, sepals lanceolate acute, petals rather broader, lip broader than long, side lobes short obtuse, midlobe revolute rounded, disk 2-lamellate at the base. *Bot. Reg.* t. 1972; *Bot. Mag.* t. 6246; *Wight Ic.* t. 1667–8; *Walp. Ann.* vi. 646.

TRAVANCORE and NILGHIRI HILLS, *Wight*. CEYLON, in the Central Province, ascending to 4000 ft., *Thwaites*, &c.

Pseudobulb 2–6 in., fusiform. *Leaves* 2–3, 6–10 in., petioled, elliptic-lanceolate, 3-nerved. *Scape* stout and raceme together 2–3 ft.; sheaths appressed, obtuse; bracts caducous; sepals and petals $\frac{1}{2}$ in., green; lip golden yellow with red stripes; spur a 2-lobed green sac. *Capsule* 2 in.

12. ***E. Mannii***, *Hook. f. Ic. Plant. ined.*; scape tall, raceme many-fld., bracts shorter than the ovary, sepals oblong-lanceolate acute many-nerved, petals broader elliptic many-nerved, lip rhomboidly ovate obtuse obscurely lobed, disk with branching crested nerves. *Cyrtopera Mannii*, *Reichb. f. in Flora* 1872, 274.

UPPER ASSAM, *Mann*.

Leaves 12 by $\frac{1}{2}$ in., narrowly linear-lanceolate. *Scape* with raceme 3 ft.; sheaths appressed, acute; bracts $\frac{1}{4}$ – $\frac{1}{2}$ in., ovate-lanceolate; sepals $\frac{3}{4}$ in. long, lip shorter; spur conical; column short, clavate.

** Flowers appearing long before the leaves. (I have not seen the leaves of any species of this subdivision.)

13. ***E. campestris***, *Wall. Cat.* 7617; bracts variable, raceme many-fld., sepals $\frac{1}{2}$ – $\frac{3}{4}$ in. linear-lanceolate acute 5–7-nerved, petals oblanceolate 3–5-nerved, lip cuneate-obovate or oblong, side lobes short, midlobe orbicular quadrate or oblong crenulate, disk with 3 central nerves lamellate at the base and tubercled or spinulose on the midlobe. *Lindl. Gen. & Sp. Orchid.* 185; in *Journ. Linn. Soc.* iii. 24 (*excl. syn. Wight*); *Walp. Ann.* vi. 647. *E. ramentacea & rupestris*, *Lindl. in Wall. Cat.* 7367, 7368; *Gen. & Sp. Orchid.* 185; in *Journ. Linn. Soc.* iii. 25. *E. hemileuca*, *Lindl. in Journ. Linn. Soc.* iii. 25. *Limodorum ramentaceum*, *Roxb. Hort. Beng.* 63; *Fl. Ind.* iii. 467. *L. dubium*, *Ham. mss.* *Bletia Dabia*, *Don Prodr.* 30. *Dipodium ramentaceum*, *Herb. Ham.*

PLAINS OF INDIA; from the Panjab to Oudh, Bengal, Chittagong, and the Deccan.—DISTRIB. Afghanistan.

Scape 6–18 in., stout or slender from a deformed tuber; sheaths subappressed, acute; flowers many, subsecund; sepals slightly attached to the base of the lip, variable in breadth, acute or acuminate, yellow or green striped with pink; petals narrower; lip as long as the sepals, side lobes rounded or subacute, midlobe usually purple; spur conical, subclavate or subacute; column rather slender. *Capsule* $\frac{3}{4}$ in., ellipsoid.—The lip of *E. hemileuca* is rather tubercled than spinulose.

14. *E. stenopetala*, Lindl. in *Journ. Linn. Soc.* iii. 26; scape-sheaths loose, bracts longer than the ovaries, raceme few-fl., sepals $\frac{1}{2}$ in. linear-oblong 5-nerved, petals lanceolate acuminate 3-nerved, lip broadly cuneate, side lobes rounded much larger than the suborbicular crisped midlobe, disk with 3 nerves tubercled between the side lobes and on the midlobe.

BHOTAN HIMALAYA; dry hills at Punaka, Griffith.

Scape 12–18 in., slender; sheaths obtuse; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in.; lip as long as the sepals, spur clavellate.—Specimens indifferent. Very near *E. campestris*, but the lip is much broader and side lobes more spreading.

15. *E. decipiens*, Griff. in *Journ. As. Soc. Beng.* xlvii. 155, t. 13, f. 8–12; flowers secund, bracts minute, sepals and petals $\frac{1}{2}$ in. linear hardly falcate acute 5-nerved, lip obovate concave 3-lobed above the middle, midlobe much the largest, margin crisped, disk 5-nerved at the base, 10–13-nerved in the middle of which 4–5 form fleshy fibres on the midlobe, spur short slender saccate.

NICOBAR ISLANDS; at Kamorta, Kurz.

Scape 2–3 ft.; root tuberous; sheaths small, lanceolate. *Leaves* not seen. *Raceme* 3–4 in.; pedicel with ovary $\frac{1}{4}$ – $\frac{1}{2}$ in.; sepals and petals white; spur $\frac{1}{2}$ in.—“Closely resembles *Pachystoma senile*, but pollinia of *Eulophia*.” I have seen no specimens.

16. *E. densiflora*, Lindl. in *Journ. Linn. Soc.* iii. 25; scape robust, bracts shorter than the ovaries, sepals 1–1 $\frac{1}{2}$ in. narrowly oblanceolate acuminate, petals narrower, lip obovate-oblong, side lobes small rounded, midlobe orbicular, disk with 3 lamelliform nerves which are crenate or interrupted from the middle to near the apex, spur long slender.

SIKKIM HIMALAYA; at the foot of the hills, J. D. H. BHOTAN, Griffith.

Scape 1–3 ft., from a depressed tuber; lower sheaths obtuse, upper acuminate; raceme many-fl.; flowers secund, deflexed, very narrow; column short.—The long narrow flowers are very characteristic of this species.

17. *E. burmanica*, Hook. f.; scape robust, sheaths short loose, raceme many- and dense-fl., bracts filiform equalling the ovary, sepals $\frac{1}{2}$ in. oblong obtuse many-nerved, petals narrower 3-nerved, lip cuneately obovate, side lobes short rounded, midlobe small ovate, disk with 2 carunculate nerves.

UPPER BURMA; Bhamo, Griffith.

Tuber or base of scape oblong. *Scape* 14 in.; sheaths 1 in.; raceme 4 in.; bracts $\frac{1}{4}$ – $\frac{1}{2}$ in., almost capillary, reflexed; pedicel with ovary as long; spur conical; column short; pollinia globose.—A remarkable species, of which there is but one very bad specimen, with twisted scape; it is possibly near *E. macrobulbon*.

Sect. II. **Cyrtopera.** Column produced into a foot.

* *Lateral sepals inserted on the spur of the lip* (see also *C. explanata*).

18. *E. nuda*, Lindl. in *Wall. Cat.* 7371; *Gen. & Sp. Orchid.* 180; tall, raceme elongate many-fl., bracts various, flowers large green

or purple, sepals linear-oblong acute, petals shorter elliptic-oblong many-nerved, lip obovate-oblong obtuse, side lobes obscure, midlobe rounded or retuse crisped, disk crested with many crenulate or tubercled nerves. *E. bicolor*, *Dalz. in Hook. Kew Journ. Bot.* iii. (1857) 343; *Dalz. & Gibs. Bomb. Fl.* 264; *Walp. Ann.* vi. 647. *Cyrtopera fusca*, *Wight Ic.* t. 1690; *Lindl. in Journ. Linn. Soc.* iii. 31; *Thwaites Enum.* 429; *Walp. l. c.* 668. *C. plicata*, *Lindl. in Wall. Cat.* 7362; *Gen. & Sp. Orchid.* 190. *C. nuda*, *Reichb. f. in Flora* 1872, 274. *C. Gardneri*, *Thwaites Enum.* 302. *C. mysorensis*, *Lindl. in Journ. Linn. Soc.* iii. 32. *C. laxiflora*, *Gardn. mss.* *Dipodium Roniayte & plicatum*, *Herb. Ham.*—? *Rheede Hort. Malab.* xii. t. 26.

TROPICAL HIMALAYA, from Nepal eastwards, ASSAM, the Khasia Hills, MUNNIPORE, PEGU and TENASSERIM. UPPER BURMA (*Herb. Hort. Calcut.*). THE DECCAN PENINSULA; from the Concan southwards. CEYLON; in the Central Province.

Tuber large. *Leaves* 10–14 in., elliptic-lanceolate, very variable in breadth. *Scape* 1–3 ft., stout; sheaths appressed; bracts rarely equalling the ovary; sepals 1 in.; mentum rounded or conical; lip shorter than the sepals. *Capsule* $1\frac{1}{2}$ in., fusiform.—There may be more than one species here, so great are the differences in colour of the flower, from a pale green to a dull purple. There is in *Herb. Wight* a very fleshy-flowered species or variety (*C. Brunonian*, *Wight mss.*) from the Kaitea Falls (Nilghiris), with a root as large as the fist, the lip with a short horn and a linear-oblong pointed shaggy disk; its sepals are green and petals and lip white.

19. *E. squalida*, *Lindl. in Bot. Reg.* 1841, *Misc.* 77; raceme elongate many-fld., bracts equalling the ovary, sepals oblong-lanceolate acuminate, petals elliptic-oblong many-nerved, lip as broad as long subequally 3-lobed strongly closely nerved, midlobe crisped retuse, disk naked. *Cyrtopera squalida*, *Reichb. f. in Bonpland.* 1857, 38; *Lindl. in Journ. Linn. Soc.* iii. 31; *Walp. Ann.* vi. 668.

PENANG; on Govt. Hill, *Curtis*. SINGAPORE, *Ridley*.—DISTRIB. Malay Islands. *Stem* rooting from the base without a tuber. *Leaves* 8–12 by $1\frac{1}{2}$ –2 in., narrowly lanceolate, some long-petioled. *Scape* 18–24 in., stout or slender; sheaths appressed; sepals $\frac{2}{3}$ –1 in. long; lip $\frac{2}{3}$ in. across the side lobes, base rounded; mentum conical.

** *Lateral sepals inserted on the foot of the column, free of the spur of the lip or nearly so.*

20. *E. bicarinata*, *Hook. f.*; raceme oblong densely many-fld., sepals linear-oblong acute undulate, petals shorter broader many-nerved, lip obovate-oblong, side lobes narrow, midlobe large orbicular crisped, two lateral nerves forming long calli at the base of the disk and with the median nerve tubercled on the midlobe. *Cyrtopera bicarinata*, *Lindl. in Wall. Cat.* 7363; *Gen. & Sp. Orchid.* 189; in *Journ. Linn. Soc.* iii. 31 (*excl. cit. Ic. Griff.*). *Epipactis* ? *bicarinata*, *Herb. Ham.* *Cymbidium*, *Griff. Notul.* iii. 343, No. 9; *Ic. Plant. Asiat.* t. 320, f. 3 (*pollen*).

SIKKIM HIMALAYA, *Gamble*. ASSAM, *Hamilton*. KHASIA HILLS, alt. 2–3000 ft., *Clarke*. MUNNIPORE, *Watt*. UPPER BURMA, *Griffith*.

Flowering before leafing. *Scape* 8–30 in., stout or slender; sheaths inflated; bracts slender, short or long; flowers resupinate, purplish brown, greenish or yellowish; sepals $1\frac{1}{2}$ in. long; lip longer than the sepals, tip rounded or notched; spur conical, obtuse.—*Flowers* often streaked with pink. I have not seen leaves, and Griffith does not describe them; he says the flowers are purplish brown and the lip broadly obtusely spurred.

21. *E. candida*, *Hook. f.*; flowering with the leaves, scape slender,

raceme short many-fl., bracts shorter than the ovary, sepals linear-oblong, petals shorter elliptic obtuse, side lobes of lip short, midlobe large orbicular crisped, nerves of disk as in *E. bicarinata*. *Cyrtopera candida*, Lindl. in *Journ. Linn. Soc.* iii. 31 (in part).

SIKKIM HIMALAYA, alt. 3-4000 ft., J. D. H. ASSAM, Mann.

Flowering before leafing. *Leaves* 8-18 by 3-3½ in., elliptic-lanceolate, caudate, 5-nerved; petiole 6-8 in., slender. *Scape* 18-24 in.; sheaths rather loose; raceme 3-4 in.; bracts ½-¾ in., more turgid than in *E. bicarinata*; flowers 1½ in. diam., white or greenish; spur conical. *Capsule* 1 in., narrowly ellipsoid.—Perhaps a var. of *E. bicarinata*. Lindley's description is taken from a specimen gathered by myself, and a drawing of *E. nuda* (Ic. Cathcart), from which the root, the colour, and the anther are taken.

22. ***E. flava*, Hook. f.**; tall, robust, flowers very large, sepals oblong-lanceolate finely acuminate, petals as long much broader elliptic many-nerved, lip large saccate, side lobes large rounded, midlobe orbicular, disk with 2 small pyriform basal calli and 3 crenate lamellæ. *Cyrtopera flava*, Lindl. in *Wall. Cat.* 7364; *Gen. & Sp. Orchid.* 189; *Royle Ill.* 370, t. 88; *Reichb. f. in Gard. Chron.* 1870, 1407. C. Culleni, *Wight Ic.* t. 1754; *Walp. Ann.* vi. 667. *Dipodium flavum*, *Herb. Ham.*

WESTERN TROPICAL HIMALAYA; from Garwhal, alt. 4-5000 ft., to Nepal. TRAVANCORE, Cullen.—DISTRIB. Hong Kong.

Flowering before leafing. *Scape* 2-5 ft., as thick as the finger or less; raceme 1-2 ft.; bracts ½-¾ in.; flowers lemon-yellow; sepals 1-1½ in. long, variable in breadth; lip as long as the sepals; spur a broad sac; anther with a 2-fid top, and long anterior process; pollen obtusely angled.—Wight describes the leaves as 2 ft. long, lanceolate.

23. ***E. macrobulbon*, Parish & Reichb. f. in Trans. Linn. Soc.** xxx. 144; scape robust, raceme densely many-fl., bracts filiform, sepals linear-oblong acute, petals shorter elliptic obtuse many-nerved, lip cuneate, side lobes short subterminal, midlobe small orbicular crisped, disk with two nerves thickened at the base and together with the middle nerve crenate towards the apex.

SIKKIM HIMALAYA (*Ic. in Herb. Calcutt.*). TENASSERIM; at Moulmein, Parish.

Tuber large. *Scape* with raceme 18 in., as thick as the little finger; sheaths basal, oose; bracts ½-¾ in., equalling the filiform pedicels; sepals ½-¾ in. long; petals rather broader; lip shorter than the sepals; spur conic, obtuse; anther with a produced 2-fid top; pollinia oblong.—Parish describes the leaves as oblong, acuminate (more likely elliptic-lanceolate), sepals and petals brown, lip yellow, spotted red. The Sikkim drawing represents a stem as thick as the middle finger, with sessile obovate leaves 1-2 ft. long, purple beneath and on the margin; a scape as thick as a goose-quill, dark purple, as are the flowers; raceme 12 in., many-fl.; bracts very slender, as long as the ovary; sepals ¾ in. long and petals violet-purple; lip paler.

24. ***E. macrorhizon*, Hook. f.**; scape robust, raceme lax-fl., bracts long slender, sepals lanceolate acuminate and shorter obovate petals many-nerved, lip broad obtusely 3-lobed many-nerved, 3 median nerves tubercled, disk of mid- and side-lobes rough, spur conical.

SIKKIM HIMALAYA; at Ryang, alt. 2000 ft., King (in *Herb. Calcutt.*).

Rootstock elongate, as thick as the thumb, ringed. *Leaves* not seen. *Scape* 8-12 in., sheaths 3-4, loose, obtuse; raceme 2-4 in.; bracts ½-¾ in., about equalling the ovary; flowers 1 in. diam., reddish sepals adnate to the foot of the column but free of the spur of the lip; lip much shorter than the sepals, nerves slender, con-

tracted above the broad rounded base, then dilating into the rounded side lobes, margins of midlobe crisped and orenate.

25. *E. sanguinea*, *Hook. f.*; flowers large, sepals ovate-lanceolate acuminate, petals shorter elliptic apiculate many-nerved, lip short, side lobes rounded, midlobe orbicular or ovate, disk with many crenulate nerves. *Cyrtopera sanguinea*, *Lindl. in Journ. Linn. Soc.* iii. 32; *Bot. Mag.* t. 6161.

SIKKIM and BHOTAN HIMALAYA, alt. 2-5000 ft., *J. D. H.*, &c. KHASIA HILLS, alt. 5000 ft., *Mann*.

Flowering before leafing. *Scape* 6-10 in., stout; sheaths loose. *Raceme* 6-12-flid.; bracts slender, about equalling the ovaries; flowers $1\frac{1}{2}$ in. diam.; disk red purplish or brown; lip white, pink or green; spur large, broad, obtuse; petals (always?) with an apiculate notch at the apex; top of anther obscurely notched, pollinia ovoid.—Leaves unknown.

26. *E. andamanensis*, *Reichb. f. in Flora* 1872, 276; *raceme* lax-flid., bracts short, sepals linear-lanceolate 3-5-nerved acuminate, petals rather broader obtuse 3-nerved, side lobes of lip obtuse, midlobe large broadly clawed orbicular crisped retuse, disk with the 3 median nerves thickened between the side lobes, all other nerves thick divaricating and much branched.

TENASSERIM; at Moulmein, *Parish*. ANDAMAN ISLANDS, *Kurz*.

Stem at the base tuberous, with thick roots. *Leaves* short during flowering, linear-lanceolate. *Scape* 1-2 ft.; sheaths short; bracts shorter than the pedicels; sepals $\frac{3}{4}$ in. long; lip shorter than the sepals, white with green edges and nerves; spur conic, obtuse; anther 2-tubercled.—This much resembles *E. virens*, but the leaves are much broader, and the column produced into a foot.

SPECIES UNKNOWN TO ME.

CYRTOPERA RUFA, *Thwaites Enum.* 302; rootstock tuberous, leaves not seen, *scape* 2 ft. reddish, sheaths 3 distant, bracts narrowly lanceolate equalling the ovary, flowers rufous 2 in. diam., sepals oblong-lanceolate acute rather longer than the obovate acute petals, lip cucullate, nerves within pilose, side lobes obtuse, midlobe as long rounded apiculate, spur short obtuse, column linear slightly contracted in the middle, capsule $2\frac{1}{2}$ in. long oblong.—Ceylon, at Hantani, alt. 3000 ft., *Thwaites* (C.P. 3566).

E. ATRO-VIRENS, *Lindl. Gen. & Sp. Orchid.* 183, described by Lindley from a drawing made for Wallich in the Calcutta Garden, and hence supposed to be a native of India, is a Mauritian species, *E. monophylla*, *Spens. Moore in Baker's Flora of the Mauritius*, p. 360 (where it is erroneously confounded with the Brazilian *E. maculata*).

EULOPHIA sp., *Trimen Cat. Pl. Ceyl.* 89 (C.P. 3958). Not named or described.

I fail to recognize the following *Eulophias* described in Griffith's *Notulæ*, vol. iii. p. 162, and *lc. Pl. Asiat.* t. 285, f. 2; p. 263 and t. 285, f. 2; p. 266 and t. 285, f. 3; p. 350 and t. 351 B, f. 14.

40. CYMBIDIUM, Swartz.

Epiphytes, rarely terrestrial; stem very short, rarely elongate and pseudobulbous; roots tufted. *Leaves* very long, narrow and coriaceous, rarely short. *Scape* loosely sheathed; flowers often large in suberect or drooping racemes. *Sepals* and subequal *petals* free, erect or spreading. *Lip* sessile at the base of the column and embracing it upwards, base

concave, side lobes erect, midlobe recurved; disk with usually 2 pubescent median ridges. *Column* long, foot 0; anther 1- or imperfectly 2-celled; pollinia 2 deeply grooved or 4, subglobose or pyramidal, sessile on the broad strap or gland.—Species about 30, tropical and subtropical, on the Mountains of Asia, with a few African and Australian.

* Leaves rudimentary or 0 at flowering time.

1. **C. macrorhizon**, *Lindl. Gen. & Sp. Orchid.* 162; terrestrial, rootstock creeping branched, bracts narrow membranous.

N.W. INDIA, *Royle, Falconer*. KHASIA HILLS, alt. 5-6000 ft., *Lobb, &c.*; NAGA HILLS (*Herb. Calcutt.*).

Rootstock as thick as a goose-quill, branched. *Scape* very short, with the raceme 6-9 in., ascending, 6-8-fl.; basal sheaths short, or elongating to 2 in. and narrowly subfoliaceous; bracts $\frac{1}{4}$ - $\frac{1}{2}$ in., narrow, membranous; pedicel with ovary 1 in.; flower $1\frac{1}{2}$ - $1\frac{3}{4}$ in. broad, sepals linear-lanceolate, acuminate, and rather broader petals white or pale yellowish with pink striæ; lip white spotted with crimson, side lobes narrow, midlobe ovate obtuse, disk with 2 thick ridges between the side lobes; anther papillose; pollinia 4, subhemispheric.—A remarkable species, a parasite according to Clarke. Lindley describes the rootstock as jointed, and the ridges of the lip as arcuate.

2. **C. sikkimense**, *Hook. f.*; epiphytic, bracts minute triangular-ovate.

SIKKIM HIMALAYA; Lachen Valley, alt. 6000 ft., *J. D. H.*

Rootstock very stout. *Scape* with many obtuse basal sheaths 2-3 in. long, those higher up 1 in. long; raceme 4-8 in., more or less decurved, rather stout, 20-30-fl.; bracts $\frac{1}{3}$ in.; pedicel with ovary $\frac{1}{4}$ - $\frac{2}{5}$ in.; dorsal sepal linear-oblong, obtuse; lateral lanceolate, acute, subfalcate; petals elliptic, acute; lip as broad as long, rhombic-ovate, side lobes obscure rounded, narrowed into the very short ovate midlobe, disk without ridges but with 2 obscure rounded calli.—A very distinct species, overlooked by Lindley when studying my Sikkim Orchids, and mixed up with *C. aloifolium*.

** Leaves elliptic-lanceolate.

3. **C. lancifolium**, *Hook Exot. Fl.* t. 51; leaves long-petioled plicate, scape shorter than the leaves few-fl., bracts lanceolate shorter than the ovary, flowers long-pedicelled, disk of glabrous lip with two median lamellæ between the side lobes. *Lindl. Gen. & Sp. Orchid.* 164; in *Journ. Linn. Soc.* iii. 30; *Wall. Cat.* 7351; *Lodd. Bot. Cab.* t. 927. *C. Gibsoni*, *Paxton Fl. Gard.* iii. 618, fig. 301; *Walp. Ann.* vi. 623. *C. javanicum*, *Blume Bijdr.* 380; *Lindl. l. c.* 170.—*Griff. Ic. Plant. Asiat.* t. 300, fig. 1.

SUBTROPICAL HIMALAYA; from Nepal to Mishmi. KHASIA HILLS, alt. 4-6000 ft., *Griffith, &c.* PERAK, alt. 2-4000 ft., *Scortechini, &c.*—DISTRIB. Java, China, Japan.

Stem 2-6 in., fleshy, fusiform; sheaths ovate-lanceolate, acuminate; roots very long, thick and spongy. *Leaves* 6-10 in., petiole slender, sometimes as long. *Scape* nodding, 6-8-fl.; flowers $1\frac{1}{2}$ -2 in. diam.; sepals white, yellowish or greenish, lanceolate, acuminate; petals rather broader, white with a pink midrib; lip white spotted with red-purple, side lobes narrow, midlobe ovate obtuse.

4. **C. tigrinum**, *Parish in Bot. Mag.* t. 5457; leaves short-petioled very coriaceous, scape with raceme longer than the leaves few-fl., bracts lanceolate shorter than the ovary, flower long-pedicelled, lip with 2 glabrous ridges on the disk between the side lobes.

TENASSEERIM; on Moolee-it, alt. 6000 ft., *Parish*. BURMA; on the Siam frontier, *Berkeley*.

Pseudobulbs 1-1½ in., turgidly ovoid, top contracted. *Leaves* 3-5 in., recurved, petiole rarely 1 in. *Scape* suberect, with the raceme 6-8 in., 3-5-fl.; sheaths few; bracts small, ovate-lanceolate; pedicel with ovary 1-1½ in.; flowers 2-2½ in. diam.; sepals linear, subacute, dull yellow-green; petals subsimilar; lip narrowed at the base, white spotted with red, side lobes rounded erect, midlobe oblong, tip rounded apiculate; anther smooth; pollinia 3 angular, gland broadly triangularly obtuse above, sides acute.

5. **C. Devonianum**, *Part. Mag. Bot.* x. 97, *cum ic.*; leaves stoutly petioled thickly coriaceous, petiole articulate, scape with raceme as long as the leaves drooping very many-fl., bracts very small, pedicels very short, disk of lip with two short ridges with swollen tips between the side lobes. *Warner Orchid. Alb.* t. 170; *Reichb. f. in Gard. Chron.* 1881, i. 395.

SIKKIM HIMALAYA, *Mann*. KHASIA HILLS, *Gibson*; on Kollong rock, alt. 5000 ft., *J. D. H. & T. T.*

Stem very stout at the base, obscurely pseudobulbous. *Leaves* several, 6-12 in., narrowed into a petiole 3-5 in. *Scape* very stout, 8-10 in.; basal sheaths 1½ in., imbricating; bracts ½ in.; pedicel with ovary ½-¾ in.; flowers 1½ in. diam.; sepals oblong-lanceolate and petals green speckled with red, or pale reddish yellow streaked with red; lip short, side lobes rounded narrowing into a small triangular ovate obtuse midlobe, purple with a darker blotch on each side lobe; anther and pollen as in *C. eburneum*, var. *Parishii*. *Capsule* 1½ in., turgidly ellipsoid.—The flowers appear to vary extremely in colour. *Reichenbach* describes the sepals and petals as light brown with dull mauve streaks and blotches. In a specimen from Assam the tip of the lip is white with purple spots.

*** Leaves loriform, very long, tip broadly unequally 2-lobed.

6. **C. aloifolium**, *Swartz in Nov. Act. Upsal.* vi. 73; in *Schrad. Journ. Bot.* 1779, ii. 218; racemes elongate pendulous or decurved many-fl., flowers 1½-2 in. broad, sepals and petals linear-oblong subacute, epichile broadly oblong or suborbicular equalling or shorter than the hypochile, disk with 2 curved thick lamellæ. *Roxb. Fl. Ind.* iii. 458; *Lindl. Gen. & Sp. Orchid.* 165; *Wall. Cat.* 7352 C; *Walp. Ann.* vi. 624 (excl. *Ic. Wight*). *C. pendulum*, *Swartz, & Lindl. l. c.*; *Walp. l. c.* (excl. *cit. Bot. Reg.*); *Roxb. Cor. Pl.* i. 35, t. 44; *Fl. Ind.* iii. 458. *C. crassifolium*, *Wall. Cat.* 7357. *C. Mannii*, *Reichb. f. in Flora* 1872, 274. *Epidendrum aloifolium*, *Linn. Sp. Pl.* 953. *Ærides Borassi*, *Smith in Rees Cyclop. Suppl.*—*Rheede Hort. Mal.* xii. t. 8.

TROPICAL HIMALAYA, from East Nepal eastwards. ASSAM and southwards to TENASSEERIM and the ANDAMAN ISLANDS. (? Malabar, *Rheede*).—DISTRIB. China?

Stem short, stout. *Leaves* 1-3 ft. by ¾-2 in. *Raceme* 12-18 in.; flowers variable in colour and size, usually dull purplish brown with pale borders.—I am much puzzled with this and the following species, which appear to differ, in so far as all my copious materials show, only in the comparative length of the epichile and hypochile of their lips, and in their geographical ranges, *aloifolium* being strictly northern and eastern, and *bicolor* as strictly western. These characters would be absolute were it not that *Rheede's* figure of the Malabar plant has the lip of *aloifolium*. According to drawings in *Herb. Kew* and *Calcutta*, *C. aloifolium* is very variable in other respects, and three varieties are distinguishable. 1. Racemes shorter suberect fewer-fl., sepals and petals obtuse dull purple with yellowish pale margins. This exactly resembles the Chinese? *C. aloifolium*, *Lodd. Bot. Cat.* t. 967; *Jacq. Hort. Schoenb.* iii. 69, t. 383.—2. Flowers larger, sepals and petal sub-

acute bordered with white, lip yellowish streaked with red—all as described by Rheede.—3. Swartz's *C. pendulum*, which he says is too near *C. aloifolium*; flowers small or large, sepals and petals pale dirty yellow or greenish with a more or less broad dirty purple centre, lip streaked with red. To this belongs Wallich's *C. crassifolium* with pale flowers.—Lindley distinguishes *C. pendulum* from *alioifolium* chiefly by the lamellæ of the lip of the former being interrupted clavate and arched behind, and of the latter continuous, approximate, confluent at their tips. Thwaites gives *alioifolium* as a native of Ceylon (Jaffna, Gardner), but as he cites Wight's Ic., no doubt *bicolor* is intended. Lindley's *alioifolium* of Journ. Linn. Soc. iii. 27 includes this, *bicolor* and *sikkimense*. Reichenbach's description of *C. Mannii* is that of *alioifolium*, of which there are specimens in Mann's Herb. (kindly lent to me); as to his habitat of "Obres," Mr. Mann informs me he knows of no such place.

7. **C. bicolor**, Lindl. *Gen. & Sp.* 164; characters of *C. aloifolium*, but epichile longer than the hypochile ovate-oblong narrowed towards the tip. *C. aloifolium*, Wight Ic. t. 1687-8; Dalz. & Gibs. *Bomb. Fl.* 266; Thwaites *Enum.* 308. ? *C. erectum*, Wight Ic. t. 1753. *Epidendrum aloifolium*, Bot. Mag. t. 387.

The DECCAN PENINSULA, from the Concan southwards, and CEYLON.

For remarks on this see under *C. aloifolium*, from which Lindley distinguishes it chiefly by the saccate base of the lip and sigmoidly curved clavate lamellæ, which are interrupted in the middle and callous at the base, and the smaller differently coloured flowers, none of which characters appear to me to be satisfactory. He cites the Javanese *C. aloifolium*, Blume Bijdr. t. 19, for it.—Wight's figure of *C. erectum* from the Iyamallay Hills, which has an erect raceme, and flowers nearly 2 in. diam., is, I have little doubt, an exaggeration; the sepals described as obtuse are figured as acute. The only Iyamallay Cymbidium in his herbarium is much smaller flowered, and true bicolor.

8. **C. Finlaysonianum**, Lindl. in Wall. Cat. 7358; *Gen. & Sp. Orchid.* 164; habit, foliage, inflorescence and bracts of *C. aloifolium*, but flowers larger, $2\frac{1}{2}$ in. diam., midlobe of lip oblong contracted at the base, ridges on disk straight continuous or interrupted. *C. Wallichii*, Lindl. *Gen. & Sp.* 165. *C. aloifolium*, Wall. Cat. 7352 A, B. *C. pendulum*, Bot. Reg. 1840, t. 25 (excl. syn.). *C. pendulum*, var. *brevilabris*, Lindl. in Bot. Reg. xxx. t. 24. *C. tricolor*, Miq. Choix, t. 19.

PENANG, Porter, Curtis. Singapore, Hort. Loddiges.

Leaves 1-2 ft. by $\frac{3}{8}$ - $1\frac{1}{8}$ in. Raceme 2-3 ft., slender; basal sheaths short, inflated; flowers 1-2 in. apart; sepals and petals subequal, linear-lanceolate, acute or obtuse, dull yellow; lip not saccate, side lobes acute, streaked with red, midlobe white, red-purple towards the tip.

9. **C. pubescens**, Lindl. in Bot. Reg. 1840, Misc. 75; 1841, t. 38; leaves 1-2 ft. by $\frac{1}{2}$ in. obtuse, scape short naked decurved, raceme short pendulous 6-10-fl., flowers 1- $1\frac{1}{4}$ in. broad, sepals and petals linear obtuse, lip pubescent, hypochile saccate, disk with thick arched lamellæ, side lobes acute, midlobe as long as the hypochile ovate-oblong obtuse.

SINGAPORE, Cuming (Hort. Loddiges). DISTRIB. Borneo (Ic. in Herb. Kew).

A much smaller plant with narrower leaves, shorter racemes, and fewer flowers than any other of this section. Sepals and petals similar, dark purple with a yellow or green margin; lip yellow with a broad band of red-purple, or red-purple within the margin of the midlobe.

**** Leaves linear or elongate linear-lanceolate acute or acuminate.

† Bracts very small.

10. **C. eburneum**, Lindl. in Bot. Reg. 1847, t. 67; in Journ. Linn.

Soc. iii. 28; scape suberect 2-3-fld. sheathed to the top, flowers 4-5 in. diam. white, hypochile of lip with a very thick 3-5-grooved pubescent golden ridge. *Bot. Mag.* t. 5126; *Pact. Mag. Bot.* xv. t. 145; *Warner Sel. Orchid.* t. 21; *Jennings Orchid.* t. 16; *Gartenfl.* 1880, t. 155; *Orchidoph.* 1882, 297; *Wien. Ill. Gartenz.* 1887, t. 7, 8; *Gard. Chron.* 1882, i. 496, f. 78; 1884, ii. 77, f. 17. *C. syringodorum*, *Griff. Notul.* iii. 338.

EASTERN HIMALAYA; Nepal (*Ic. in Herb. Kew*). Sikkim, alt. 1000 ft., *Clarke*. KHASIA MTS., alt. 5000 ft., *Griffith*, &c.

Leaves 12-24 by $\frac{3}{4}$ - $\frac{3}{2}$ in., acute or acutely 2-fld. *Scape* 8-12 in.; sheaths equitant, erect, lanceolate, finely acuminate; bracts acuminate; pedicel with ovary $1\frac{1}{2}$ -2 in.; flowers very odorous; sepals very variable in breadth; petals subfalcate; side lobes of lip narrow, obtuse, midlobe small, short, undulately crenate, dark yellow.

Var. Parishii; leaves broader, lip blotched with dark purple or crimson. *C. Parishii*, *Reichb. f. in Trans. Linn. Soc.* xxx. 144; *Xen. Orchid.* iii. 55, t. 224 (*very bad*); in *Gard. Chron.* 1874, i. 338, 566; 1878, ii. 74; *Warner Orchid. Alb.* t. 25.—Tenasserim, on Nat-toung, alt. 5000 ft., *Parish*.—Reichenbach distinguishes this by the callus of the lip having no velvety line, by the spots on the lip, and by acute setiferous angles of the pollinia. The sepals and petals are very much narrower than in Warner's figure.

Var. Williamsiana, *Reichb. f. in Gard. Chron.* 1881, i. 530, has the midlobe and sides of the lip light purple and column light rose-colored.

Var. Dayana; leaves 4 ft. by $\frac{1}{2}$ in. corky beneath, flowers yellow white with purple streaks. *C. Dayanum*, *Reichb. f. in Gard. Chron.* 1869, 710.—Assam (*Hort. Day*).—I have not seen this.

11. ***C. grandiflorum***, *Griff. Notul.* iii. 342; *Ic. Plant. Asiat.* t. 321; leaves 8-24 by $\frac{3}{4}$ -1 in., scape very robust decurved, sheaths lax, raceme 6-12-fld., flowers 3-4 in. diam., sepals and petals oblong-lanceolate acute green, lip yellowish pubescent and ciliate, midlobe large suborbicular waved and crenate blotched or speckled with red. *C. Hookerianum*, *Reichb. f. in Gard. Chron.* 1866, 7; *Batem. in Bot. Mag.* t. 5574. *C. giganteum*, in part, *Lindl. in Journ. Linn. Soc.* iii. 29.—*Cymbidium* sp., *Griff. Itin. Notes* 145, No. 698.

EASTERN HIMALAYA; East Nepal, Sikkim and Bhotan, alt. 5-7500 ft., *Griffith*, &c.

Leaf-sheaths 2-8 in., deeply ribbed and grooved. *Scape* 12-18 in.; lower sheaths short, obtuse, upper 4 in., acute; racemes 10-18 in., drooping; bracts very small; flowers fleshy, sweet-scented; dorsal sepal incurved, lateral recurved; lip with 2 hairy ridges on the disk between the side lobes.

12. ***C. giganteum***, *Wall. Cat.* 7355; leaves 1-2 ft. by $\frac{3}{4}$ - $1\frac{1}{2}$ in. elongate lanceolate acuminate, scape very robust 6-12-fld., decurved or suberect, flowers 2-2 $\frac{1}{2}$ in. diam., sepals and petals oblong-lanceolate acute green streaked with red, lip yellow blotched with purple pubescent and ciliate all over, midlobe large orbicular waved. *Lindl. Gen. & Sp. Orchid.* 163; *Sert. Orchid.* t. 4; *Bot. Mag.* t. 4844; *Pact. Mag. Bot.* 241, and *Fl. Gard.* ii. 14, f. 143 (*flower*); *Warner Orchid. Alb.* vi. t. 284; *Griff. Notul.* iii. 341; *Walp. Ann.* vi. 626. *Iridiorchis gigantea*, *Blume Orchid. Archip. Ind.* 91, t. 26. *Limodorum longifolium*, *Ic. Hamilt. (fid. Lindl.)*.

TROPICAL HIMALAYA; from Kumaon, ascending to 4000 ft. eastwards to Bhotan and the KHASIA MTS., alt. to 4-5000 ft.

Habit of *C. grandiflorum* and leaves nearly as broad, but flowers smaller and differently coloured.—Blume founds the genus *Iridiorchis* on the protuberant base of the column forming a small sac, a character not shown in his analysis, and which I do not find in drawings on dried specimens. There are drawings of several varieties of

this in Herb. Kew and Calcutta, varying much in the depth of colouring of the flowers. The veins of the lip are very strong, arched and purple on the broad hypophylla, which has 2 central hairy ridges, villous and diverging, and again meeting at the base of the epichile.

Var. ? *Lowiana*, Reichb. f. in Gard. Chron. 1887, i. 684; leaves 2-3 ft. by $\frac{1}{2}$ - $\frac{3}{4}$ in., finely acuminate, side lobes of lip pale yellow green, midlobe dark purple with golden margins. *C. Lowianum*, Reichb. f. in Gard. Chron. 1879, 332, 405, f. 56; *Floral Mag.* N. S. t. 353; *Berlin Gartenz.* 1885, t. 73; *Orchidoph.* 1882, 321; 1885, 145.—Burma, *Boxall* (*Hort. Low*).—Perhaps a distinct species; the leaves are more like those of *C. longifolium*. The racemes attain 5 ft. in length, the very numerous flowers vary in colour, and the lip in breadth.

13. *C. longifolium*, *Don Prodr.* 36; leaves 2-3 ft. by $\frac{1}{2}$ - $\frac{3}{4}$ in. narrowly linear finely acuminate, scape suberect or decurved many-fl., flowers 2-2 $\frac{1}{2}$ in. diam., sepals and petals linear-oblong or lanceolate acute greenish streaked with red or purple, lip papillose within not ciliate, midlobe broadly ovate or orbicular white or yellowish spotted with red. *Lindl. Gen. & Sp. Orchid.* 163; in *Journ. Linn. Soc.* iii. 29; *Reichb. f. in Gard. Chron.* 1874, 14. *C. erythræum*, *Lindl. l. c.* 30. *Limodorum angustifolium*, *Herb. Ham.* (ex *Lindl. Gen. & Sp.*).

SUBTROPICAL HIMALAYA, alt. 5-6000 ft., from Kumaon, *Blinkworth*, eastwards. KHASIA MTS., common.

Resembles *C. giganteum*, but the leaves are very narrow, flowers smaller, and their colouring different. The lip is similar in shape, in the strong purple nerves, and pubescent ridges. *Lindley's C. erythræum* is founded on a drawing of mine of the flowers and fruit of a plant gathered in Sikkim, but of which I preserved no specimens; it has a small golden midlobe of the very narrow lip, but it otherwise does not seem to differ from *longifolium*, to which the specimens of *erythræum* in *Lindley's* Herbarium certainly belong.

†† Bracts large, lanceolate or cymbiform.

14. *C. cyperifolium*, *Wall. Cat.* 7353; leaves 2-3 ft. by $\frac{1}{4}$ - $\frac{1}{2}$ in., scape erect few-fl., bracts very slender equalling or exceeding the ovary, sepals and petals linear-lanceolate acute pale green and yellow streaked with red, lip narrow glabrous, greenish or white spotted with red. *Lindl. Gen. & Sp. Orchid.* 163; in *Journ. Linn. Soc.* iii. 28. *C. hæmatodes*, *Lindl. Gen. & Sp. Orchid.* 162. *C. viridiflorum*, *Griff. Itin. Notes* 126, No. 454. *Cyperorchis* ? *Wallichii*, *Blume Orchid. Archipel. Ind.* 92. *Limodorum longifolium*, *Roxb. Fl. Ind.* iii. 468.

SUBTROPICAL HIMALAYA; from Garwhal, alt. 5000 ft., *Edgeworth*, eastwards. The KHASIA, NAGA and MUNNIPORE HILLS, alt. 3500-6500 ft.

Leaves rigid, often petioled. Scape shorter than the leaves, slender; sheaths $\frac{1}{2}$ -2 in., distant; flowers 4-7, distant, sweet-scented; lip pubescent within; pollinia 4, broadly oblong, plano-convex, each pair of a large and small placed face to face. The Roxburghian figure of *L. longiflorum*, from the Khasia Hills, agrees in every respect except that the flowers are rose-cold; it is described in the *Flora Indica* as having a fusiform bulb and calcarate lip; in the drawing the bulb is the caudex denuded of leaves, and there is no trace of a spur; the bracts, which in the drawing are $1\frac{1}{2}$ -2 in. long, are undescribed. The species approaches *Cyperorchis*, differing in habit. *Lindley* gives Ceylon, *Macrae*, as a habitat for his *C. hæmatodes* (which is certainly *cyperifolium*), probably through the same error as affects other plants attributed by him to that country and collector.

15. *C. ensifolium*, *Swartz in Nov. Act. Upsal.* vi. 77; leaves 2-3 ft., by $\frac{3}{4}$ -1 $\frac{1}{2}$ in. sessile or petioled ensiformly lanceolate, bracts shorter than the

ovary, sepals and petals lanceolate acute green streaked with red, lip glabrous white or yellowish spotted with brown or red. *Willd. Sp. Pl.* iv. 112; *Lindl. Gen. & Sp. Orchid.* 162; *Bot. Reg.* t. 1976 (var. *estriata*); *Bot. Mag.* t. 1751. *C. sinense*, *Lindl. in Journ. Linn. Soc.* iii. 30 (? *Willd.*); *Epidendrum ensifolium*, *Linn. Sp. Pl.* 90; *Smith Spicileg. Bot.* 22, t. 24; ? *Bot. Repos.* t. 344. *Limodorum ensatum*, *Thunb. Fl. Jap.* 29; *Kæmpf. Ic.* t. 3.

SIKKIM HIMALAYA; in the Terai. KHASIA HILLS, alt. 2-4000 ft., *J. D. H. & T. T.*, &c. CEYLON; in the Central Province, *Thwaites*.—DISTRIB. China, Japan.

The Khasia plant agrees very well with Kæmpfer's figure, which alone represents the leaves as narrowed into a long petiole. In the *Bot. Repos.* the leaves are only a span long and quite sessile. The *Bot. Mag.* represents a very small plant with spotted lip. The Ceylon *ensifolium* has broader inflated lanceolate bracts. The Sikkim specimen has sessile leaves, many flowers, and a white lip with pale brown bars along the margin of the midlobe (much as in the *Bot. Reg.* figure) and no spots. I doubt *C. sinense* differing from *ensifolium*. Lindley would combine them.

DOUBTFUL AND EXCLUDED SPECIES.

C. ASSAMICUM, *Linden Cat.* 1863 (*name only*), *ex Ill. Hort.* xxviii. (1881) 95.

C. CARNOSUM, *Griff. Notul.* iii. 339, is probably a *Eulophia*.

C. CHLORANTHEUM, *Lindl. in Bot. Reg.* 1843, *Misc.* 68; in *Journ. Linn. Soc.* iii. 29; *Bot. Mag.* t. 4907, is *C. variciferum*, *Reichb. f. in Bonpland.* 1854, 91, an Australian species.

C. IRIDIODES, *Don Prodr.* 36, from Nepal, *Wallich*, doubtfully referred by Lindley to *C. giganteum*, is probably a *Celogyne*.

CYMBID. sp., *Griff. Notul.* iii. 343; *Ic. Plant. Asiat.* t. 319, is *Tainia latifolia*. The reference is omitted at vol. v. p. 820.

41. CYPERORCHIS, Blume.

Habit, foliage and inflorescence of *Cymbidium*, but racemes dense-fl., perianth segments narrow and connivent below the middle or higher, lip nearly straight, erect, epichile small and very much shorter than the elongate hypochile, and pollinia usually pyriform on a short subquadrate gland.—Species 3, all Indian.

Except by the narrow lip, long hypochile, and small usually orbicular epichile (or midlobe), it is not easy to separate this genus from *Cymbidium*, for the pollinia vary much in form in both genera, and *Cyp. Mastersii* resembles very much *Cymb. eburneum*.

1. *C. elegans*, *Blume Rumph.* iv. t. 47; *Orchid. Archip. Ind.* 93, t. 48 C; raceme elongate, flowers 1-1½ in. long straw-cold. or white, lip sparsely hairy towards the base, central ridges terminating below in 2 long pubescent calli, capsule 1 in. *Bot. Mag.* t. 7007. *Cymbidium elegans*, *Lindl. in Wall. Cat.* 7354; *Gen. & Sp. Orchid.* 163; *Sert. Orchid.* t. 14; in *Journ. Linn. Soc.* iii. 28; *Reichb. f. in Gard. Chron.* 1875, i. 429. *C. densiflorum*, *Griff. Notul.* iii. 337 (the Myrung plant only).

SUBTROPICAL HIMALAYA, alt. 4-7000 ft., from Nepal to Bhotan. KHASIA Mts. and MUNNIPORE, alt. 4-6000 ft.

Leaves 1½-2 ft. by ½-1 in. Scape 6-18 in., curved, densely clothed with imbricating compressed lanceolate acuminate sheaths 2-5 in. long; raceme pendulous, 4-8 in. long; rachis slender; flowers densely imbricate, inodorous; bracts small, membranous, acute; sepals and petals linear-oblong, acute, tips concave; lip as long as the petals, very slightly recurved; hypochile narrowly cuneate, side lobes spreading, broadly oblong, obtuse, nearly as long as the suborbicular or obcordate undulate midlobe; column very slender, base hairy in front. Capsule turgidly ellipsoid.—

In Griffith's Herb. this is named *C. syringolorum*, doubtless through a misplacement of labels (see *C. eburneum*, p. 12). In Herb. Calcutt. there are drawings of 3 forms apparently of this:—1. raceme laxer-flowered, flowers larger nearly white flushed with pale pink, lip not represented; 2, leaves 12–18 in., scape stout, sheaths distant, 2 in. long, and raceme inclined, flowers few, secund, drooping, pale yellow-green, lip yellow, no ridges shown; 3, a smaller plant, leaves 9 in., scape 7 in., densely clothed with imbricating sheaths 3 in. long; raceme suberect, secund, 5-fid.; flowers yellowish, $1\frac{3}{4}$ in. long: this last is named *Cymbid. elegans*, var. *lutescens*.

2. **C. Mastersii**, Benth. in Journ. Linn. Soc. xviii. 318; raceme short, flowers 2 in. long white, lip quite glabrous purple spotted, central ridge evanescent below, column glabrous, capsule 2 in. long. *Cymbidium Mastersii*, Griff. mss. ex Lindl. in Bot. Reg. 1845, t. 50; in Gard. Chron. 1845, 643; Paxt. Fl. Gard. t. 78; Floral Mag. N. S. t. 391; Jard. Fleur. t. 289; Reichenbachia, t. 66. *C. micromeron*, Lindl. in Journ. Linn. Soc. iii. 29 (excl. lip). ? *C. affine*, Griff. Notul. iii. 336; Ic. Plant. Asiat. t. 291, f. 3; Lindl. l. c. 28.

ASSAM, Mann. KHASIA MTS., alt. 4–5000 ft., Griffith, &c.

Habit and foliage of *C. elegans*, but raceme very short, decurved at the top, flowers larger, always white with a little red on the lip and smelling of almonds, lip broader, without the basal calli and quite glabrous; column stouter and pollinia broader; capsule very much larger.—It is not easy in the case of indifferent dried specimens to distinguish this from *Cymbid. eburneum* except by the smaller flower. Lindley's *Cymbid. micromeron* consists of a flowering and fruiting specimen of this, together with the loose lip and column of a *Cœlogyne*, from which the specific character is drawn. The same author, referring to Griffith's description of *C. affine* (from Churra), to that of *C. densiflorum* from Myrung, and of another species from Surureem (all in the Khasia Mts.), observes, "It is impossible to reconcile the statements made for Griffith by his editor, without assuming that some confusion has taken place." To this confusion Lindley has added by transferring the name *affine*, Griff., from the Churra to the Surureem plant. Of the three the only one certainly recognizable by the description is *C. densiflorum*, which is certainly *Cyperorchis elegans* (I have gathered it at Myrung). *C. affine* and the unnamed one, having white flowers, are both probably *C. Mastersii*, a name which Griffith's *affine* would have superseded, had he really given it; but on referring to his mss. preserved at Kew, I find no such name, Griffith's description being headed "*Cœlog. affine*," meaning simply that it is a plant allied to *Cœlogyne*, and the Churra plant is so ticketed by himself in both his own herbarium (at Kew) and in Lindley's, to whom he sent a specimen. No doubt the error was the editor's, who replaced *Cœlog.* by *Cymbidium*. The name of *Mastersii* is an mss. one of Griffith's given to cultivated specimens which he sent from the Calcutta Gardens to the Royal Horticultural Society.

C. affine, Warner Orchid. Alb. t. 140; Floral Mag. N. S. t. 346, is certainly not the plant described and figured under that name by Griffith; it has widely spreading sepals and petals, and the lip of a true *Cymbidium*.

3. **C. cochleare**, Benth. in Journ. Linn. Soc. xviii. 318; raceme elongate, sepals and petals very narrow, flowers 2 in. long, greenish brown, lip glabrous, median ridge strong 2-fid or spatulate at the tip vanishing downwards, column very slender glabrous, pollen pyriform, capsule $1\frac{1}{2}$ in. long. *Cymbidium cochleare*, Lindl. in Journ. Linn. Soc. iii. 28.

SIKKIM HIMALAYA, alt. 4–6000 ft., J. D. H., &c. KHASIA HILLS, alt. 5–6000 ft., Clarke; at Myrung, Griffith. Tezpur in ASSAM, Mann.

Leaves 2–3 ft. by $\frac{1}{3}$ – $\frac{1}{2}$ in. Scape 12–18 in., very slender; sheaths 3–4 in., lax; sepals and revolute petals brownish green; lip yellow speckled with red, midlobo suborbicular, golden-yellow.

41/1. **CREMASTRA**, *Lindl.*

A terrestrial herb; rootstock tuberous. *Leaves* radical, elliptic, plicate. *Scape* solitary, stout, sheathed. *Flowers* in second racemes, pendulous. *Sepals* and *petals* very long, narrow, connivent in a tube below, lanceolate acuminate and spreading and recurved above. *Lip* adnate to the base of the column, erect, linear, base subsaccate, tip dilated 3-lobed, lobes linear, disk with a tongue-shaped appendage. *Column* very long, slender, straight, top dilated 3-lobed; anther shortly stipitate, 1-celled; pollinia 4, ovoid, compressed, caudicle and gland membranous.

C. Wallichiana, *Lindl. Gen. & Sp. Orchid.* 172; *Franch. & Savat. Enum. Pl. Jap.* ii. 24. *Hyacinthorchis variabilis*, *Blume Cent. Plant.* Nov. 1829, 4; *Mus. Bot.* 48, fig. 16; *Walp. Ann.* iii. 628.

TEMPERATE HIMALAYA; Nepa^l, *Wallich*. Sikkim, alt. 5-7500 ft., *J. D. H.*, &c.
—DISTRIB. Japan.

Tuber the size of a chestnut. *Leaves* 6-10 by 2-2½ in., subsessile or petioled. *Scape* with raceme 1-2 ft.; sheaths long, loose; flowers 1½ in. long, narrow, purple; pedicels short; bracts linear.—I find no evidence of Blume's "Centuria" ever having been published, or even printed; if it was so, his name has priority.

42. **GEODORUM**, *Jackson.*

Terrestrial herbs, rootstock tuberous hypogæal. *Leaves* elliptic, acute, plicate. *Scape* from the rootstock, stout, erect, sheathed, shorter than the leaves; flowers crowded in decurved racemes, bracts narrow membranous. *Sepals* and broader *petals* conniving or spreading. *Lip* sessile on the base or short foot of the column, cymbiform, membranous, margins involute, disk with or without ridges ending in calli, and with a forked basal callus. *Column* short, stout; anthers 2, cells, appendaged after dehiscence by the persistent detached faces of the cells; pollinia 2, broad foveolate sessile or subsessile on a broad strap or gland.—Species 6-8? Indian, Malayan and Australian.

I am unable to define the species from Herbarium specimens, or to reduce to any system the descriptions and drawings of Roxburgh, Brown, Lindley and Griffith. The following descriptions are provisional only. I have spent days to no purpose in endeavours to improve on it by the analysis of specimens.

1. **G. purpureum**, *Br. in Hort. Kew, Ed. 2, v. 207 (Char. reform.)*; usually tall, leaves at length petioled, sepals linear-oblong acute 3-nerved, petals rather broader obovate-oblong apiculate 5-nerved, lip subpanduriformly oblong, tip dilated 2-lobed, disk with a broad channelled ridge ending in raised calli or a crenate callus. *Lindl. Gen. & Sp. Orchid.* 175; *Dalz. & Gibs. Bomb. Fl.* 266. *G. dilatatum*, *Wall. Cat.* 7376. *Limodorum nutans*, *Roxb. Cor. Pl.* i. t. 40; *Fl. Ind.* iii. 470 (*descr. and fig. in both erroneous*). *Malaxis nutans*, *Willd. Sp. Pl.* iv. 93.

TROPICAL HIMALAYA, from Nepal eastwards; BENGAL, ASSAM, BURMA, &c. DECCAN PENINSULA and CEYLON.—DISTRIB. Malay Islands, Australia?

Brown's *G. purpureum* was founded on Roxburgh's drawing of *Limodorum nutans*, a native of the Circars, but of which no specimen is recorded to exist. It is represented and described as having the scape longer than the leaves, a lax-flid. raceme, and an acute lip; characters not hitherto found in any *Geodorum*. But if it be allowed that the elongate scape and lax-flowered raceme are due to the lengthening

of the axis of the scape after flowering, and that the appearance of an acute lip is due to the infolding of its margins towards the apex, then the *G. purpureum* is the commonest and widest-distributed Indian species. Dalzell and Gibson alone identify a plant with *G. purpureum*, Br., and I have examined authentic specimens of it, which they did not, for they give Brown's characters for the species, whilst those of their specimens are what I have given above. *G. purpureum* is the tallest and largest-leaved Indian species; its flowers vary from white veined with red-purple to pale purple with stronger veins.

2. *G. dilatatum*, Br. in *Hort. Kew*, Ed. 2, v. 207; leaves usually sessile, sepals linear-oblong subacute 3-5-nerved, petals obovate-oblong 5-7-nerved, lip broadly cymbiform, tip dilated recurved crenulate or undulate, disk smooth or with granulate nerves ending in irregular small tubercles. *Lindl. Gen. & Sp. Orchid.* 175; *Lodd. Bot. Cab. t.* 1797; ? *Wight Ic. t.* 912. *Limodorum recurvum*, Roxb. *Cor. Pl. i.*, 33 t. 39; *Fl. Ind.* iii. 469. *Malaxis cernua*, Willd. *Sp. Pl.* iv. 93. *Otandra cernua*, Salisb. in *Trans. Hort. Soc.* i. 261.

ASSAM, SILHET, BURMA, the DECCAN PENINSULA and CEYLON (all more or less doubtful).

If I am right in respect of this species, it differs from *purpureum* in its lower stature, broader petals and lip, the disk of which is smooth, granulate or subcaruncled. Wight's figure is probably an exaggeration of the flowers. Dalzell and Gibson describe it as a Concan plant; but I have seen no specimens so named by them.

3. *G. candidum*, Wall. *Cat.* 7374; flowers ascending or erect, sepals linear-oblong, petals almost orbicular 7-9-nerved, lip very broad narrowed upwards from the 2-crested dilated base, disk nearly naked, tip crenulate. *Lindl. Fol. Orchid. (in part)*: *G. attenuatum*, Griff. in *Calc. Journ. Nat. Hist.* v. 358, t. 24.

BURMA, Griffith; Tenasserim, at Moulmein, Wallich.

Griffith further describes his *G. attenuatum* (which is certainly the same as Wallich's *candidum*) as having a truncate spike, subequal sepals and petals (which they are not in his drawing in *Herb. Calcutt.*), inodorous white wide flowers, less spreading than usual, tip of lip concave, almost conduplicate, emarginate, crenate, disk with a callus, column sprinkled with cellular pubescence below the stigma and along the broad nerves of the lip, and a very short column with a bidentate tooth on each side of the apex.—It is a very distinct species. A single specimen of *G. citrinum* is on the sheet with Wallich's specimens of this.

4. *G. citrinum*, Jackson in *Andrews' Bot. Rep.* t. 626; flowers $1\frac{1}{2}$ in. diam. yellow, sepals and petals very broad acute, lip large oblong deeply saccate with an obtuse gibbosity or spur, more or less streaked with red or purple, disk nearly smooth yellow, tip rounded or emarginate. *Lindl. Gen. & Sp. Orchid.* 176; *Fol. Orchid.* 3; *Bot. Mag.* t. 2195; *Wall. Cat.* 7375; *Walp. Ann.* vi. 633.

CHITTAGONG, Wallich. MOULMEIN, Wallich, Parish. PENANG (*Ic. in Herb. Kew*).

The figure in the Bot. Repository represents a plant with bracts hardly exceeding the ovary, 4-5 pale yellow flowers $1\frac{1}{2}$ in. in diameter, a large saccate subcalcarate lip broadly oblong with recurved margins, emarginate tip, and yellow and faint purple markings on each side of the smooth disk. The *Bot. Mag.* plant has flowers as large, but pale green, the lip is similar but not emarginate, and is streaked with red nerves; the pedicels are much longer with the ovary $1\frac{1}{4}$ in. long, and there are many long bracts below, but not on, the raceme, where they are small. The *G. citrinum*, Jacks. ? of *Wall. Cat.* 7375 has the long bracts below the inflorescence of the *Bot. Mag.* plant, but very short pedicels and a smooth lip with incurved and then reflected margins.—The Penang drawing shows short pedicels, pale greenish white flowers, a saccate lip with recurved margins and red nerves; there are only one or two bracts below the

inflorescence, and the floral are as long as the ovaries.—The var. *β. albido-purpureum*, Par. & Reichb. f. in Trans. Linn. Soc. xxx. 145, from Moulmein, has bracts as long as the flowers, but none below the inflorescence, green sepals and petals, and a dingy purple streaked lip.

DOUBTFUL SPECIES.

G. PALLIDUM, Wall. in *Don Prodr.* 31. There is no specimen of this in Wallich's Herbarium, nor is the name in his Catalogue; but there is a *Geodorum* in Herb. Kew, sent to Sir W. Hooker by Wallich from Nepal in 1818, which is, I think, *purpureum* as defined above. *G. pallidum*, Griff. l. c. 357, from Assam and Silhet, described from garden specimens, is perhaps the white-fl. *purpureum*; its flowers are described as rather small.

G. APPENDICULATUM, Griff. in *Calc. Journ. Nat. Hist.* v. 360, t. 24, is probably, as suggested by Griffith, Brown's *G. dilatatum*.

G. CANDIDUM, Lindl. *Fol. Orchid.* 3, *Limodorum candidum*, Roxb., from Silhet, Khasia and Moulmein, is probably *dilatatum*; it is certainly not *G. candidum*, Wall. Cat. 7374.

G. DILATATUM, Lindl. in *Bot. Reg.* t. 675, is, I think, pale-fl. *purpureum*.

G. FUCATUM, Lindl. in *Bot. Reg.* t. 1687; *Fol. Orchid.* 5, from Ceylon, resembles a small *G. purpureum*. Thwaites states that he has never seen it.

G. LAXIFLORUM, Griff. l. c. 356, t. 24, from Assam, *Jenkins*, strongly resembles *G. citrinum* in its broad petals, dilated undulate emarginate white lip with the disk tinged with yellow and purplish base.

G. RARIFLORUM, Lindl. *Fol. Orchid.* 3, from Assam, is, I think, certainly *G. purpureum*.

GEODORUM sp., a narrow-leaved plant, with the habit of *G. purpureum*, from Mount Ophir, Malacca, Griffith, resembles the Philippine *G. semicristatum*, Lindl.

G. JAVANICUM, Lindl. *Fol. Orchid.* 2. (*Cistella cernua*, Blume Bijdr. 293, t. 55), of Java, is a small-fl. species confidently referred by Reichenbach (*Bonpland.* 1857, 43) to *G. dilatatum*, with the observation that Wight's *G. dilatatum* is a totally different plant.

43. **GRAMMATOPHYLLUM**, Blume.

Large stout epiphytes. *Leaves* linear, distichous, jointed on their sheaths. *Scapes* lateral, long, stout; flowers large, racemose. *Sepals* and *petals* subequal, spreading. *Lip* small, adnate to the base of the column (mobile?) erect, concave; its side lobes embracing the column, midlobe short recurved. *Column* semiterete, foot 0, top incurved; anther broad, 2-celled; pollinia 2, subglobose, 2-cleft, attached one to each horn of a curved strap or gland.—Species 3 or 4, Malayan.

G. speciosum, Blume Bijdr. 377, fig. 20; *Rumph.* iv. 47, t. 191; gigantic, flowers 6 in. diam. golden spotted with brown. *Lindl. Gen. & Sp. Orchid.* 628; *Miquel Fl. Ind. Bat.* iii. 708; *Bot. Mag.* t. 5157; *Part. Fl. Gard.* ii. t. 69; *Fl. des Serres*, t. 1386; *Batem. 2nd Cent. Orchid.* t. 181; *Jard. Fleur.* t. 235; *Gard. Chron.* 1878, ii. 181, f. 36; 1890, i. 289, f. 46; *Walp. Ann.* vi. 628. *G. fastuosum*, Lindl. in *Part. Fl. Gard.* ii. 159 under t. 69. *G. macranthum*, Reichb. f. *Xen. Orchid.* ii. 16; *Walp. Ann.* l. c. *Pattonia macrantha*, Wight Ic. t. 1750. *Gabertia scripta*, Gaud. in *Freye. Voy. Bot.* 425. *Cymbidium scriptum*, Swartz in *Schrad. Diar.* 1799, 228; *Willd. Sp. Pl.* iv. 100. *Epidendrum scriptum*, Linn. *Sp. Pl.* 1351.—*Rumph. Amboin.* vi. 95, t. 42.

TENASSERIM, *Parish*. PERAK, *Scortechini*. MALACCA, Griffith (*Kew Distrib.* 5318), *Maingay* (*K. D.* 1655).—DISTRIB. Java, Borneo.

Stems 8–10 ft., tufted, as thick as the wrist. *Leaves* 1½–2 ft. by 1¼–1½ in., equitant, lorate, acute. *Scape* 4–6 ft., as thick as the finger, terete; bracts ovate; pedicels 4–6 in., as thick as a goose-quill; sepals and petals fleshy, obovate-oblong, variable in breadth, undulate, spreading and reflexed; lip half the length of the sepals, side lobes short, subacute; midlobe ovate, hirsute, disk with depressed

straight nerves and two linear ridges between the side lobes.—I cannot find characters whereby to distinguish *G. fastuosum* & *macranthum*; the latter was founded on Griffith's specimens. The flowers vary much in size, and the sepals and petals of the Perak plant are narrower than in the others.

44. **DIPODIUM**, Brown.

Stems leafy, tufted and epiphytic in the Indian species (terrestrial and leafless in Australian). *Leaves* coriaceous, jointed on their sheaths, equitant. *Racemes* long-peduncled, flowers rather large; perianth of *Grammatophyllum*, but with the base of the lip forming a small sac with the column, and the side lobes reduced to small teeth; pollinia separately stipitate on a globose gland.—Species 6, Australian, Malayan and Pacific.

1. **D. pictum**, Reichb. f. *Xen. Orchid.* ii. 15, and 20, t. 107; stem elongate scandent epiphytic from a terrestrial root, leaves spreading and recurved linear. *Walp. Ann.* iii. 562, vi. 647. *Walesia picta*, Lindl. in *Journ. Hort. Soc.* iv. (1849) 262; in *Part. Mag. Bot.* xvi. 321, with fig. *Grammatophyllum scandens*, Griff. *Notul.* iii. 345; *lc. Pl. Asiat.* t. 324. *Leopardanthus scandens*, Blume *Rumph.* iv. 47; *Mus. Bot.* i. 47, t. 15.

MALACCA, Griffith, Maingay.—DISTRIB. Java.

Leaves 12–18 in., tip oblique acute. *Peduncle* with the raceme 10–12 in., purple; bracts short, ovate; pedicels short, stout; flowers $1\frac{1}{2}$ in. diam., yellowish white blotched with crimson; sepals and petals elliptic-oblong obtuse; lip ovoid, narrowed into a broad tomentose claw; side lobes linear acute, midlobe ovate acute concave, pinkish streaked with crimson, disk and lip villous.

2. **D. paludosum**, Reichb. f. *Xen. Orchid.* ii. 15; stem and scape strict erect, leaves strict ensiform erect. *Walp. Ann.* vi. 648. *Grammatophyllum paludosum*, Griff. *Notul.* iii. 344. *G. affine*, Griff. *lc. Pl. Asiat.* t. 323. *Walesia paludosa*, Reichb. f. in *Bonpland.* 1854, 93.

MALACCA, in swamps, Griffith (*Kew Distrib.* 5317), Maingay (*K. D.* 1657) PERAK, Wray.

Stem 1–2 ft. *Peduncle* as long; bracts small, ovate, acute; pedicels very short; flowers $1\frac{1}{2}$ in. diam., sweet-scented, white blotched with purple; sepals and petals reflexed; lip lanceolate, acute, with a villous ridge from the base to the cuspidate tip; side lobes reduced to small teeth.

45. **THECOSTELE**, Reichb. f.

Epiphytes, pseudobulbous. *Leaf* 1, shortly petioled. *Scape* basal, slender; flowers racemed. *Sepals* subequal, broad. *Petals* much narrower. *Lip* connate with the foot of the column, 3-lobed; base with the foot forming a ventricose tube perforate in front; side lobes small, erect; midlobe entire or 3-lobulate, velvety. *Column* slender, arched, with incurved apical wings; anther 2-celled; pollinia 2, subglobose, separately stipitate on a scale-like gland.—Species 3.

1. **T. Zollingeri**, Reichb. f. in *Bonpland.* v. 37; *Xen. Orchid.* ii. 133, t. 147; side lobes of lip subclavate sigmoid, midlobe broadly obcordate. *T. alata*, Par. & Reichb. f. in *Trans. Linn. Soc.* xxx. 135. *Cymbidium alatum*, Roxb. *Fl. Ind.* iii. 459.

CHITTAGONG, Roxburgh. TENASSERIM, Parish.—DISTRIB. Borneo.

Pseudobulbs the size of a nutmeg or narrower. *Leaf* 5–9 in., oblong or linear-oblong. *Scape* with the raceme 5–8 in., decurved; bracts minute, acute, persistent; flowers $\frac{3}{4}$ in. diam., blotched with brick-red; sepals acute, dorsal lanceolate geniculately arched, lateral falcate ovate.

2. **T. Maingayi**, *Hook. f. Ic. Plant ined.*; side lobes of lip fan-shaped, midlobe broadly ovate reflexed.

MALACCA, *Maingay*.

Pseudobulbs oblong, $\frac{3}{4}$ –1 in. *Leaf* 3–5 in., from obovate- to linear-oblong. *Scape* with 6–8-fld. raceme 4 in.; flowers 1 in. diam.; sepals acuminate.—Only one specimen seen.

3. **T. quinquefida**, *Hook. f. Ic. Plant ined.*; side lobes of lip linear, midlobe deeply 3-lobulate, side lobules hatchet-shaped, mid-lobule ovate acute.

MALACCA, *Maingay*.

Pseudobulbs 1 in., oblong. *Leaf* 5–7 in., linear-oblong, tip obtuse very oblique. *Scape* with raceme 3 in.; flowers 1 in. diam.; sepals acute, lateral very broad; lip 5-fld from the deep lobing of the midlobe.

46. **BROMHEADIA**, *Lindl.*

Terrestrial erect rigid leafy herbs, pseudobulb 0. *Leaves* distant. *Flowers* in terminal simple or branched rigid racemes or panicles; bracts thick, imbricate, persistent. *Sepals* and *petals* subequal, narrow, widely spreading. *Lip* adnate to the base of and embracing the column, erect, side lobes erect, midlobe spreading, entire. *Column* membranous, broadly 2-winged, foot 0, top hooded; anther sub-2-celled; pollinia 2, ovoid, sulcate, sessile on a scale-like gland.—Species 2.

1. **B. palustris**, *Lindl. in Bot. Reg. 1841, Misc. 89; 1844, t. 18*; tall, leaves 3–5 in., racemes many-fld. *Bot. Mag. t. 4001; Wight Ic. t. 1740; Walp. Ann. vi. 630.* *B. Finlaysoniana, Reichb. f. in Walp. l. c. 882.* *Grammatophyllum?* *Finlaysonianum, Lindl. in Wall. Cat. 7561; Gen. & Sp. Orchid. 173.*

PENANG, PERAK, MALACCA and SINGAPORE (in dry exposed places, *Ridley*).—DISTRIB. Sumatra, Philippines.

Stem 4–8 ft., terete, very stout. *Leaves* 3–5 by $\frac{2}{3}$ – $\frac{1}{2}$ in., tip 2-lobed, many-nerved. *Peduncle* 6–12 in., strict; sheaths many, appressed; raceme 1–7 in., bracts ovate, obtuse, thickly coriaceous (rachis appearing serrate); pedicel with ovary 1 in.; flowers $2\frac{1}{2}$ –3 in. diam., sweet-scented; sepals linear-oblong, obtuse, spreading and recurved, white or pale pink; petals broader; lip white, disk purple, side lobes sub-acute streaked with purple; midlobe rounded apiculate, yellow, granulate; column elongate cymbiform.

? 2. **B. aporoides**, *Reichb. f. Ot. Bot. Hamb. 44*; dwarf, leaves $1\frac{1}{2}$ –2 in., peduncle very short 1–2-fld.

TENASSERIM; at Moulmein, *Parish*.

Stems tufted, 1– $1\frac{1}{2}$ in., clothed to the base with coriaceous falcate ensiform acute leaves. *Peduncle* $\frac{1}{2}$ in., clothed at the base with small coriaceous imbricate sheaths; flowers 1 in. long; sepals and petals oblong-lanceolate, acute, white; lip oblong, side lobes triangular acute streaked with red, midlobe small ovate yellow papillose; column slender; gland of pollinia lunate.—I have seen only very imperfect specimens, which differ so greatly in habit, foliage and the slender column from *B. palustris*, that I suspect the species will prove to be generally distinct. The habit is that of *Dendrobium atropurpureum*.

47. **POLYSTACHYA**, *Hook.*

Pseudobulbous leafy epiphytes. *Leaves* few, distichous, narrow, coriaceous, jointed on their sheath. *Scape* terminal, sheathed; flowers very small, in narrow panicles. *Sepals* free, dorsal ovate, lateral triangular adnate to the foot of the column. *Petals* very narrow. *Lip* superior, clawed, jointed on the foot of the column, erect, 3-lobed, side lobes small

erect, midlobe spreading or recurved. *Column* short, broad; anther 1- or sub-2-celled; pollinia 4, ovoid, cohering or connate in pairs, attached to a very short strap, or gland?—Species about 40, all tropical, chiefly American.

1. **P. Wightii**, *Reichb. f. in Walp. Ann.* vi. 640; stem 4-6 in., flowers yellow, lip broader than long, side lobes nearly as long as the short broad rounded midlobe, disk with the median ridge densely furfuraceous. *P. luteola*, *Wight Ic.* t. 1678.

MALABAR; on the Iyamallay Hills, *Wight (Kew Distrib.* 2990). ?PENANG, *Curtis.* ?CEYLON.

Leaves 2-3, 4-6 by $\frac{3}{4}$ -1 in. *Stem* stout; panicle glabrous, branches short; sheaths long, coriaceous, flattened; bracts small, acute, persistent; flowers yellow; sepals $\frac{1}{2}$ in. long, acute. *Capsule* $\frac{1}{2}$ in. long.—*P. luteola*, *Hook. Exot. Flor.* t. 105, figured from a cultivated specimen said to have been sent by Wallich, has been pronounced by Lindley (*Bot. Reg.* 1838, *Misc.* 78) to be a West Indian plant. No original specimen of it was preserved. Lindley distinguishes it from the Indian plant by the capsule being nerveless between the ribs, whilst those of the latter are reticulated. The figure in *Flor. Exot.* represents the sepals as obtuse. Much better specimens of the Indian species are wanted to determine their differences from one another and from the Mauritian and others, and the genus wants working up.

2. **P. purpurea**, *Wight Ic.* t. 1679; flowers purplish, lip longer than broad, side lobes much shorter than the large rounded midlobe, disk with a short median ridge furfuraceous. *Walp. Ann.* vi. 640.

TRAVANCORE; on the Iyamallay Hills, *Wight (Kew Distrib.* 2991).

Very near if not a variety of *P. Wightii*, but the flowers are smaller, and if my analysis is correct (the materials are unsatisfactory) the lip is much narrower.

3. **P. zeylanica**, *Lindl. in Bot. Reg.* 1838, *Misc.* 78 (*excl. Syn.*); stem 12-18 in., lip cuneate-obovate, side lobes small acute, midlobe rounded, disk furfuraceous, capsule $\frac{1}{2}$ in. reticulate between the ribs. *Walp. Ann.* vi. 639.

CEYLON, *Walker, Gardner.*

A very much larger plant than either of the former, with a stout stem, and panicle 6-10 in. long with branches 1-3 in. long, flowers larger, and leaves larger and broader upwards. The Mauritian *P. mauritiana*, *Spreng. Syst. Veg.* iii. 742 (*Dendrobium polystachys*, *Thou. Orchid. Afric.* t. 85), which Lindley referred to this more resembles *P. Wightii*.

48. **PLOCOGLOTTIS**, *Blume.*

Terrestrial herbs with the creeping rhizome, habit and inflorescence of *Tainia* and *Chrysoglossum*, from which they are only distinguishable by the short erect quadrate lip having its sides confluent with the sides of the short column, and by having the four pollinia attached in pairs by 2 stipes to a gland.—Species 4 or 5, Indian and Malayan.

1. **P. acuminata**, *Blume Mus. Bot.* i. 46; leaf solitary, bracts lanceolate as long as the pedicel or longer, raceme puberulous. *Miquel Fl. Ind. Bat.* iii. 676.

PERAK, alt. 2-3000 ft., *King's Collector.*—DISTRIB. Java, Sumatra.

Leaf-blade 10-12 by $2\frac{1}{2}$ -3 in., elliptic-lanceolate, longer than the slender petiole. *Scapes* as long or longer, slender; raceme very lax-fl., simple or with a branch from the base; bracts $\frac{1}{2}$ in., lanceolate, acuminate; pedicel with ovary as long; flowers 1 in. diam., sparsely puberulous; dorsal sepal lanceolate; erect lateral oblong-lanceolate, falcate, finely acuminate, 5-nerved; petals narrowly lanceolate, falcate; lip quadrate, contracted above the base, angles rounded, retuse in front with a long cusp; spur a conical gibbosity.—The specimen is not very good, but I think it is *P. acuminata*.

2. **P. javanica**, *Blume Bijdr.* 380, t. 21; *Orchid. Archip. Ind.* t. 14; *Mus. Bot.* i. 46; leaf solitary, bracts short ovate, raceme glabrous. *Lindl. Gen. & Sp. Orchid.* 132.

PERAK, alt. 3–1200 ft., *Scortechini, King's Collector*.—DISTRIB. Java.

Leaf-blade 10–12 by 3–4 in., as long as the very slender petiole. *Scape* much longer than the leaf, very slender; raceme 8–10 in.; bracts $\frac{1}{2}$ – $\frac{1}{4}$ in., often recurved; flowers $\frac{3}{4}$ in. diam., pale yellow speckled with red; dorsal sepal long, arched, narrowly lanceolate; lateral oblong-lanceolate, falcate, acute; petals narrowly oblanceolate, falcate; lip broadly obovate, angles and tip rounded, acuminate or cuspidate; spur a gibbosity.—A *Plocoglottis* from Malacca, *Maingay*, resembles this, but has a shorter raceme, and is described (by Maingay) as having obtuse sepals; the specimen is flowerless

49. **LUISIA**, *Gaud.*

Tufted epiphytes; stem terete, rigid, sheathed, pseudobulbs 0. *Leaves* elongate, terete, obtuse. *Flowers* drooping, small, spicate on a short or very stout erect axillary rachis; bracts very short, thick, imbricating, persistent. *Sepals* subequal or the decurved dorsal smaller. *Petals* often longer, narrower. *Lip* sessile on the base of the column, base flat concave or saccate. *Column* very short, truncate; anther 2-celled; pollinia 2, subglobose, seated on a replicate short strap. *Capsule* narrow, erect.—Species about 15, tropical Asia to N. Caledonia.

The materials at my disposal for the elucidation of this remarkable genus are, though considerable, far from being sufficient. Above all careful drawings for living plants should be obtained, when the following attempt at diagnosing the Indian species will want revision and probably correction.

* *Petals not much longer than the lateral sepals (most so in L. primulina).*

1. **L. teretifolia**, *Gaud. Bot. Freyc. Voy.* 427, t. 37; leaves 4–6 in., flowers small, lateral sepals subacute keel winged, petals linear-oblong obtuse hardly longer than the sepals, hypochile subquadrate saccate, epichile broadly cordate. *Blume Rumph.* i. t. 194, f. 3, t. 197 D; *Mus. Bot.* i. 63; *Lindl. Fol. Orchid.* 2 (excl. in all Syn. Ep. triste). *L. burmanica*, *Lindl. l. c.* *L. brachystachys*, var. *flaveola*, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 144. *L. platyglossa*, *Reichb. f. in Walp. Ann.* vi. 622. *L. zeylanica*, *Lindl. l. c.* *Cymbidium triste*, *Roarb. Fl. Ind.* iii. 461 (not of Willd.); *Bot. Mag.* t. 3648; *Wight Ic.* v. 11 (text, not Ic.); *Griff. Notul.* iii. 340 (the *Mergui plant*). *C. tenuifolium*, *Wight l. c.* t. 1689 (Ic., not text).

SIKKIM HIMALAYA (*Ic. Cathcart*). The KHASIA Mts., at Churra (*Ic. Jerdon*). BENGAL; in the Sunderbunds, *Roxburgh*. PEGU and TENASSERIM, *Griffith*, &c. THE WESTERN GHATS, from Canara to Travancore. CEYLON, *Macrae*, &c.—DISTRIB. Malay Islands to New Caledonia.

Stem 6–12 in., stout; internodes $\frac{1}{2}$ – $\frac{3}{4}$ in. *Leaves* variable in thickness. *Rachis* of spike $\frac{1}{2}$ – $\frac{1}{3}$ in. *Petals* $\frac{1}{2}$ – $\frac{1}{4}$ in. long. *Lip* equalling or rather exceeding the sepals. *Column* very short. *Capsule* $\frac{3}{4}$ –1 $\frac{1}{2}$ in.—Blume erred in referring Willdenow's *Cymbidium triste* to Gaudichaud's *Luisia teretifolia*. The latter appears to accord with the Indian plant, and Wight's t. 1689 is very characteristic. Blume's t. 194 has larger flowers. A coloured drawing of Lindley's *burmanica* by Griffith is excellent. The petals vary in length and form, but never much exceed the sepals. The lip is in five Indian drawings purple. Blume figures a purple hypochile and yellow epichile with purple disk. Roxburgh describes the lip as dark purple with yellow spots. Griffith figures it green with black purple blotches. Wight says, "Flowers pale pink, lip conformable, afterwards purple." In var. *flaveola*, *Par. & R. f.*, the flowers are yellow, the hypochile purple and epichile streaked with purple. Lindley's *L. zeylanica* (*Macrae*, 1829) is identical with the Peninsular species, but there are along with its flowers of a different and a garden plant, which he referred to *Vanda trichorhiza*, Hook. Reichenbach's *L. brachystachys*, founded on Wight's t. 1689, is

consequently *teretifolia*. Lindley's *L. trichorhiza* consists of three Nilghiri specimens of *L. teretifolia* (mislabelled Khasia Mts.), and one fruiting Khasian specimen (as indicated by Reichenbach in Herb. Lindl.). For *Cymbid. triste*, Willd., see *L. tristis*.

2. *L. brachystachys*, Blume Rumph. iv. 50; Mus. Bot. i. 64; leaves 2-6 in. slender, sepals and petals as in *L. teretifolia*, lip obovate-oblong nearly flat grooved hardly constricted at the base of the broadly ovate epichile. Reichb. f. Xen. Orchid. i. 204, t. 78, f. 1; Lindl. Fol. Orchid. 3. Mesoclastes brachystachys, Lindl. in Wall. Cat. 1994; Gen. & Sp. Orchid. 45.

TROPICAL WESTERN HIMALAYA; Garwhal, Falconer; Kumaon, Stewart. SILHET and the KHASIA HILLS, Wallich. BENGAL, at Jessore and Dacca, Clarke. TENASSERIM (Ic. Parish).

A more slender plant than *L. teretifolia*, but perhaps a variety; flowers of the same size, but with a very different lip, which varies a little in breadth, and in the distinctness of the hypochile from the epichile. The lip is rather thin, with usually strong parallel grooves or nerves, though sometimes it is very thick and fleshy when the grooves are not visible (in the dried state). Column very short. Capsule $\frac{3}{4}$ -1 in.—Clarke describes the sepals green without, rose-purple within; petals rose-purple with green tip and base; lip yellow at base, black-purple for $\frac{2}{3}$ of upper part, but variable.

3. *L. trichorhiza*, Blume Mus. Bot. i. 63; leaves 4-6 in. stout, flowers twice as large as in *L. teretifolia*, petals $\frac{1}{2}$ in. long about as long as the lateral sepals, lip obovate-oblong rather longer than the sepals flat grooved constricted at the insertion of the broadly ovate epichile with the quadrate hypochile, column rather long. Lindl. Fol. Orchid. 2; Reichb. f. Xen. Orchid. t. 77. f. 878. ? *Vanda* ? *trichorhiza*, Hook. Fl. Exot. t. 72.

TROPICAL HIMALAYA, Wallich; Garwhal, Falconer.

I have seen only two native specimens of this plant, a flowering and a fruiting, from Garwhal, they bear the mss. name of *L. retusa*, Reichb. f. It is the only species that approaches the Flora Exotica *Vanda* ? *trichorhiza* in the size of the flower and length of the column, differing from it only in the lip not being longer than the sepals, which is a very variable character. Flowers of *V. ? trichorhiza* in Lindley's Herbarium closely resemble this, except in having a longer lip. A spike of flowers of *V. trichorhiza* in Herb. Hook. is presumably from the type plant; the flowers are on slender pedicels, with the lip grooved as in *brachystachys*, but with the sepals and petals narrower and more acute. Of the hairy roots of *V. trichorhiza* described in Fl. Exot. I know nothing, but Lindley, who no doubt saw the original plant, says that it has sometimes an enormous development of downy roots.

4. *L. filiformis*, Hook. f.; stem elongate slender, leaves 6-12 in., very slender, rachis of spike very stout short few-fl., flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., lateral sepals cymbiform, keel broadly winged, petals linear and lip fleshy, hypochile broad flat smooth, epichile subquadrate deeply many-grooved, tip incurved fleshy, column very short broad.

SILHET; at Terrya Ghat, Mann.

Stem probably several feet long; internodes 1-2 in. Leaves as thick as a crow quill. Petals hardly longer than the lateral sepals.—Except in the short petals this a good deal resembles *L. Grovesii*.

5. *L. micrantha*, Hook. f.; stem short robust, leaves 2 in. slender, rachis of spike short thick few-fl., flowers $\frac{1}{2}$ in. diam., lateral sepals ovate subacute midrib very stout, petals oblong obtuse, hypochile of lip oblong concave with 2 strong incurved teeth on each side, epichile lozenge-shaped fleshy, column rather long.

ASSAM, Griffith (in Herb. Wight). KHASIA HILLS, alt. 3-4000 ft., Mann.

Stem 2-5 in.; internodes $\frac{1}{2}$ - $\frac{1}{2}$ in. *Leaves* as thick as a sparrow quill. *Rachis* of spike clothed with imbricate ovate acute bracts; pedicels decurved; flowers punctulate; dorsals sepal oblong obtuse and similar petals 1-nerved; lip as long as the sepals, epichile about half as long as the hypochile both concave.—Griffiths' specimens are not in flower but appear to be the same as Mann's, which are so.

6. ***L. primulina***, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 144, t. 30, f. 1; stem short very stout, leaves 3-4 in. very stout, rachis short few-fl., sepals subequal oblong acute, petals larger obovate-spathulate obtuse, lip much longer than the lateral sepals yellow, hypochile small short saddle-shaped, epichile large triangular-ovate obtuse, margin obscurely lobulate.

TENASSERIM; at Moulmein, *Parish*.

Stem 3-4 in.; internodes short. *Leaves* $\frac{1}{2}$ in. diam. *Flowers* $\frac{2}{3}$ in. diam., pale yellow with a purple column.—Described chiefly from a drawing by *Parish*. A drawing in *Herb. Calcutt.* of apparently the same species (collected at Moolyet, Moulmein) has elliptic-acute sepals, a shorter cordate epichile, a larger hypochile with a purple disk, and a yellow column; its concave lateral sepals are spurred at the back. There are in *Herb. Kew* flowers and leaf of a cultivated plant from Burma (*Hort. Kew*), resembling this, but with a purple lip.

7. ***L. macrotis***, *Reichb. f. in Gard. Chron.* 1869, 1110; habit and leaves of *L. Psyche*, sepals triangular keeled, petals longer triangular ligulate acute flat base broad, lip much longer than the sepals violet-black triangular-ovate from a broad 2-auricled base sulcate.

ASSAM (*Hort. Day*).

I have seen only flowers of what I take to be this (*Hort. Kew*), in which the sepals are ovate-oblong, subacute, the petals much longer ($\frac{1}{2}$ in. long), linear-oblong, obtuse, and the lip very like that of *L. primulina*, and of the same size, but dark purple. The shape of the petals distinguishes it from *primulina*.

** *Petals much longer than the sepals.*

8. ***L. Psyche***, *Reichb. f. in Bot. Zeit.* 1863, 98; in *Gard. Chron.* 1865, 342; stem tall stout, leaves 3-5 in. stout, rachis short, flowers few large, petals linear-spathulate or obovate obtuse twice as long as the obtuse concave sepals, lip broadly ovate-oblong retuse, base contracted saccate 2-auricled. *Bot. Mag. t.* 5558.

TENASSERIM; at Moulmein, *Parish*. ? KHASIA HILLS, alt. 3000 ft., *Mann*.

Stem 1 ft., internodes 1 in. *Leaves* strict, $\frac{1}{2}$ in. diam. *Sepals* $\frac{1}{2}$ in. long, petals $1\frac{1}{2}$ in., variable in breadth, both pale greenish yellow. *Lip* convex, nearly 1 in. long, violet-brown, tessellated with white or yellow, auricles erect, embracing the white column. *Capsule* $1\frac{1}{2}$ -2 in. long.—*Mann's* specimen is in fruit only. It has a large clavate capsule as figured by *Parish* in his drawing of *L. Psyche*.

9. ***L. tenuifolia***, *Blume Rumph. iv.* 50; *Mus. Bot. i.* 63; stem long slender, leaves 4-7 in., rachis $\frac{1}{2}$ in., flowers few large, petals narrow twice as long as the ovate subacute concave sepals, lip narrowly panduriform convex base broad 2-auricled, lip with 2 divergent lobes. *Lindl. Fol. Orchid. 2*; *Thwaites Enum.* 302; *Dalz. & Gibs. Bomb. Fl.* 266; *Walp. Ann. vi.* 619. *L. Birchea*, *Blume Rumph. iv.* 50; *Mus. Bot. i.* 63. *L. zeylanica*, *Thwaites mss.* (C. P. 2347). *Birchea teretifolia*, *A. Rich. in Ann. Sc. Nat. Ser. 2, xv.* 66, t. 10. *Cymbidium tenuifolium*, *Lindl. Gen. & Sp. Orchid.* 167 (*excl. Syn.*). *C. triste*, *Wight Ic. t.* 911 (*non Willd.*).

On the WESTERN GHATS, from the Concan to Travancore, *Wight*, *Dalzell*, &c. CEYLON; in the Central Province, *Macrae*, *Thwaites*.

Leaves very variable in thickness, sometimes very long and slender. *Sepals* $\frac{1}{2}$ - $\frac{2}{3}$ in. long, yellowish green stained or streaked with red; petals more green;

lip twice as long as the lateral sepals, white or greenish with deep purple base and lobes, or purple and streaked with paler lines (Dalzell), disk with 3 large calli. Macrae's Ceylon specimen is like the Malabar plant. A. Richards' figure of *Birchea teretifolia* is a very bad one. Rheede's figure in xii. t. 5, on which Linnæus' *Epidendrum tenuifolium* (*Cymbidium*, Willd.) was founded, is not a *Luisia*, the leaves are grooved, and spike very different.

10. **L. volucris**, Lindl. *Fol. Orchid.* 1; stem stout, leaves 3-5 in. stout, lateral sepals cymbiform with an acute dorsal wing, petals 2-4 times as long 1-1½ in. linear dilating to the rounded tip, hypochile oblong with incurved basal auricles, epichile as long much broader ovate-cordate obtuse fleshy. Walp. *Ann.* vi. 619.

SIKKIM HIMALAYA, J. D. H. KHASIA MTS. and SILHET, Lobb, J. D. H. & T. T. ? Chittagong Hills, *lc.* in *Hort. Calcutt.*

Stem 6-10 in., internodes ½ in. *Rachis* of spike ½ in., very stout. *Petals* and *sepals* very pale yellow-green; lip dark purple, epichile hardly cordate (as described by Lindley). *Capsules* 1 in.—Flowerless specimens closely resemble *L. teretifolia*. In the drawing of the Chittagong plant the stem is slender, the internodes are 1½ in. and leaves 7-9 in., the petals not dilated at the tip, and the epichile of the lip green and grooved.

11. **L. antennifera**, Blume *Rumph.* iv. 50; *Mus. Lugd. Bat.* i. 64; stem stout, elongate, leaves 3-4 in., rachis of spike very stout ¾-1½ in., petals linear ¾ in. long twice as long as the cymbiform sepals, lip cuneately oblong, epichile hardly distinct from hypochile which has a broadly 2-auricled base. *Reichb. f. Xen. Orchid.* i. 265, t. 78, f. 2.

PERAK, Scortechini, *King's Collector*.—DISTRIB. Borneo (Low).

Stem a foot and upwards; internodes 1 in. (the largest of the genus except *tristis*), as are the spikes. *Flowers* in Low's drawing pale green with purple lip as long as the sepals; in note by King's collector, "pale greenish white waxy inner petals dark blue," possibly the dark blue is meant for the lip. The form of lip is the same in a drawing by Scortechini of the Perak plant.

12. **L. tristis**, Hook. f.; stem stout elongate, leaves stout 3-5 in., rachis of spike very stout 1-2 in., petals ¾ in. long linear twice or thrice as long as the sepals, hypochile of lip quadrate base 2-auricled, epichile short broadly ovate-cordate grooved. *Cymbidium triste*, Willd. *Sp. Pl.* iv. 99. *Epidendrum triste*, Forst. *Prodr.* No. 314.

PENANG, Curtis.—DISTRIB. New Caledonia.

Very like *L. antennifera*, having the same stout habit, foliage, and thick long rachis of the spike, but the lip is very different, and is as far as can be judged from the indifferent specimens in Herb. Forster, identical with that of his *Epidendrum triste*.

13. **L. Grovesii**, Hook. f.; stem very slender elongate, leaves 6-10 in. filiform, rachis of spike very short few-fl., flowers 1 in. diam., lateral sepals cymbiform, petals twice or thrice as long narrowly linear obtuse, hypochile of lip subquadrate flat, epichile broadly cordate, column very short broad.

EASTERN BENGAL; in the Looshai Hills, G. B. Groves (*in Herb. Calcutt.*).

Closely resembles *L. filiformis*, but at once distinguished by the long petals.—Described from two drawings of plants cultivated in Hort. Calcutta, one of a specimen without locality, the other localized as above. The sepals and petals are pale yellowish, the hypochile and column dark purple, the epichile pale purplish in one with darker margins, greenish in the other, in both dark purple at the base.

DOUBTFUL SPECIES.

L. MICROPTERA, Reichb. f. in *Gard. Chron.* (1870) 1503; leaves terete rather stout, raceme few-fl., flowers small, sepals ligulate acute, longer than the petals, both straw-cold., lip half purplish half yellow, hypochile ovate uncinat at the base

on each side, epichile broadly triangular-ovate, column purplish, anther with 2 yellowish eyes in the centre of each half.—Assam, *Benson (Hort. Veitch)*.—Description from the author l. c. Possibly the sepals longer than the petals is an error, due to the omission of a comma in the phrase “sepals ligulatis acutis petalis longioribus.”

CYMBIDIUM TENUIFOLIUM, Willd. of *Thwaites mss.* (C. P. 3530) is certainly not *L. tenuifolia*, Bl., having short petals and a broad lip. It is probably a new species near *jiliformis*, but the specimen being solitary and only 1-fl'd. I leave it undescribed.

50. **COTTONIA**, Wight.

An epiphyte, stem leafy. *Leaves* long, narrow, coriaceous. *Scape* tall, very slender, branched. *Flowers* in short terminal racemes. *Sepals* subequal and narrower petals widely spreading. *Lip* sessile at the base of the column, much longer than the sepals, flat, spreading; side lobes minute basal; midlobe subpanduriform, retuse. *Column* short, foot 0; anther short, 2-celled; pollinia 2, pyriform, 2-cleft; strap linear, sides recurved; gland minute. *Capsule* slender, elongate.

C. macrostachya, Wight *l. c.* t. 1755; *Dalz. & Gibs. Bomb. Fl.* 263; *Lindl. in Journ. Linn. Soc.* iii. 39; *Bot. Mag.* t. 7099. *C. peduncularis*, *Reichb. f. in Cat. Orchid. Schüller* 1857, 52; *Thwaites Enum.* 303; *Walp. Ann.* vi. 860. *Vanda peduncularis*, *Lindl. Gen. & Sp. Orchid.* 216; *Part. Fl. Gard.* iii. t. 253.

The DECCAN PENINSULA; on the Ghats from the Concan southwards. CEYLON; in the Central Province.

Stem 4–8 in., leafy; internodes short. *Leaves* 5–6 by $\frac{1}{2}$ – $\frac{2}{3}$ in., lorate, recurved, unequally obtusely 2-lobed. *Scape* 12–18 in., strict, erect; branches few, tipped by short racemes; pedicels long, slender; bracts ovate; flowers $\frac{3}{4}$ in. diam.; sepals oblong and subspathulate; petals dirty orange with red streaks; lip dark purple with a broad villous golden margin; side lobes ear-like with 3 calli between them, the median pubescent, disk of midlobe with median callus; column puberulous; rostellum obscure. *Capsule* $1\frac{1}{2}$ in.—*Lip* like that of *Ophrys aranifera*.

50/1. **DIPLOPRORA**, Hook. f.

Stem short, slender. *Leaves* falcately lanceolate, acuminate. *Scape* short, simple, few-fl'd. *Sepals* widely spreading, keeled. *Petals* obovate. *Lip* as long as the petals, margins adnate to the sides of the column, cymbiform and sigmoidly curved, suddenly narrowed into a compressed 2-caudate tip, disk keeled. *Column* very short, foot 0; anther 2-celled; pollinia 2, globose; strap short linear, sides recurved; gland small. *Capsule* slender.

D. Championi, Hook. f.; *l. c.* *Plant. ined.* *Cottonia Championi*, *Lindl. in Hook. Journ. Bot.* vii. (1855) 35; *in Journ. Linn. Soc.* iii. 39; *Benth. Fl. Hongk.* 357. *Luisia bicaudata*, *Thwaites Enum.* 302. *Vanda bicaudata*, *Thwaites l. c.* 429.

BHOTAN HIMALAYA, *Gammie*. KHASIA MTS., alt. 3–4000 ft., *J. D. H. & T. T. TENASSEERIM, Parish*. CEYLON, *Thwaites*.—DISTRIB. Hong Kong.

Stem 1–3 in., ascending. *Leaves* 3–4 by $\frac{1}{2}$ – $\frac{2}{3}$ in., thin and many-nerved when dry. *Scape* 1–2 in., stout; rachis flexuous; flowers few, $\frac{1}{2}$ in. diam., yellow; lip with a deep longitudinal ridge within, sides streaked with red; column papillose. *Capsule* $1\frac{1}{2}$ in.—Very distinct from *Cottonia* in habit, foliage, inflorescence and lip, and much nearer *Phalænopsis*, but wants the appendages on the disk of the lip and the side lobes, and differs strikingly in habit.

51. **STAUROPSIS**, *Reichb. f.*

Epiphytes; stem stout, leafy. *Leaves* distichous, coriaceous, flat, 2-lobed. *Flowers* in lateral racemes. *Sepals* and similar but smaller *petals* widely spreading. *Lip* sessile, adnate to the base or sides of the column, incurved, base simple or saccate, lobes narrow, disk naked or hairy. *Column* short, thick, foot 0, top truncate; anther 1-celled; pollinia 2, subglobose, 2-cleft; strap broad, gland large.—Species about 8, Malayan.

1. **S. giganteus**, *Benth. in Gen. Plant.* iii. 572; flowers very large golden-yellow ocellately blotched with cinnamon, sepals and petals spathulately obovate, lip white hatchet-shaped obtuse, base cordate, side lobes rounded, midlobe narrow obtuse fleshy, disk with a broad conical callus. *Fieldia gigantea*, *Reichb. f. Xen. Orchid.* ii. 39; *Walp. Ann.* vi. 871. *Vanda gigantea*, *Lindl. in Wall. Cat.* 7326; *Gen. & Sp. Orchid.* 215; *Fol. Orchid.* 2; *Bot. Mag.* t. 5189. *Reichb. f. l. c.* 38, t. 112; *Ill. Hort.* 1861, 277; *Rev. Hort.* 1874, t. 291. *V. Lindleyana*, *Griff. Notul.* iii. 353.

TENASSERIM; at Moulmein, *Wallich, Griffith.*

Stem pendulous. *Leaves* 1–2 ft. by 2–3 in., very thick, flat. *Raceme* 10–15 in., decurved, many-fl.; rachis very stout; bracts short, broad; flowers 3 in. diam.; lateral sepals horned behind below the tip.—Griffith describes two sterile stamens between the lateral sepals and petals.

2. **S. undulatus**, *Benth. mss.*; flowers 1½ in. diam. nearly white, sepals and petals spathulately oblanceolate waved, base of lip saccate adnate to the sides of the column, midlobe laterally compressed 3-ridged *Vanda undulata*, *Lindl. in Journ. Linn. Soc.* iii. 42; *Reichb. f. in Gard Chron.* 1875, ii. 212; 1878, i. 168.

EASTERN SUBTROPICAL HIMALAYA; Sikkim and Bhotan, ascending to 6000 ft. The KHASIA HILLS, alt. 5–6000 ft.

Stem 6–10 in.; sheaths and scape minutely warted. *Leaves* 3–4 by ½–¾ in., unequally obtusely 2-lobed. *Scape* 5–8 in. and raceme strict, erect, laxly few-fl. near the top; bracts ¼ in. long, broad, obtuse; flowers white flushed with pink or purplish; sepals acuminate, undulate, lateral deflexed; petals similar but smaller; lip yellow, base orbicular, sides streaked with pink; midlobe linguiform; tip truncate, sometimes purplish; pollinia globose, strap short, gland large transverse.—I am very doubtful as to the affinity of this plant, which differs from *S. giganteus* in the base of the lip being adnate to the sides of the column, and forming with it a cup with a thickened rim.

52. **ARACHNANTHE**, *Blume.*

Characters of *Stauropsis*, but lip jointed on to the base of the column and mobile.—Species 5 or 6, Himalayan and Malayan.

This character of the mobile lip requires confirmation in the living plant of some species.

* *Flowers in simple racemes. Side lobes of lip much smaller than the midlobe.*

1. **A. Cathcartii**, *Benth. in Gen. Plant.* iii. 573; scape few-fl., lateral sepals and petals broadly elliptic obtuse, side lobes of lip small rounded. *Esmeralda Cathcartii*, *Reichb. f. Xen. Orchid.* ii. 38; *Walp. Ann.* vi. 871. *Vanda Cathcartii*, *Hook. f. Ill. Himal. Pl.* t. 23; *Bot. Mag.* t. 5845; *Lindl. Fol. Orchid.* 8; *Ill. Hort.* 1858, 187; *Flore des Ser.* t. 1251; *Warner Orchid. Alb.* t. 168; *Jenning's Orchid.* t. 10; *Floral Mag. N. S.* t. 66; *Gard. Chron.* 1870, 1409.

EAST NEPAL and SIKKIM HIMALAYA, alt. 3-6000 ft., *Griffith's Collectors, J. D. H., &c.* BHOTAN (*loc. in Hort. Calcutt.*).

Stem 12-18 in., stout. *Leaves* 6-9 by 1-1½ in., flaccidly coriaceous, lorate, unequally obtusely 2-lobed. *Scape* longer than the leaves, 4-6-fld.; bracts short, broad; flowers 2-2½ in. diam., fleshy; sepals whitish beneath, above yellowish closely barred with chocolate or red, dorsal obovate; lip shorter than the sepals, oblong, variable in breadth, side lobes erect speckled with red; midlobe shoe-shaped, obtuse, yellow, margins incurved sharply 2-keeled. *Capsule* 4 in., linear-oblong or subpyriform.

2. **A. bilinguis**, *Benth. in Gen. Plant.* iii. 573; scape few-fld., lateral sepals and petals oblanceolate, lip with a large recurved spur under the limb, side lobes very small rounded. *Renanthera bilinguis*, *Reichb. f. Xen. Orchid.* i. 7, t. 4. *R. labrosa*, *Reichb. f. l. c.* 88. *Arrhynchium labrosum*, *Lindl. in Part. Fl. Gard.* i. 142.

TENASSERIM; at Moulmein, *Parish*, &c. The KHASIA MTS.; at Nurtiung (*loc. Jerdon*).

Stem elongate, as thick as a swan's quill or less. *Leaves* 5-8 by ½-¾ in., keeled, coriaceous, unequally 2-lobed. *Scape* long or short, greenish brown; flowers 4-6, distant, 1½ in. diam.; sepals and petals obtuse, yellowish with broad red-brown or blotched margins; lip yellow, very narrow, recurved; spur adnate, recurved, as long as the limb, the tip of which is hence bifid with the lobes superposed; strap of pollinia short, gland large.

3. **A. Clarkei**, *Rolfe in Gard. Chron.* 1888, ii. 567; scape few-fld., sepals and petals linear-spathulate obtuse. *Bot. Mag.* t. 7077. *Esmeralda Clarkei*, *Reichb. f. in Gard. Chron.* 1886, ii. 552.

SIKKIM HIMALAYA, alt. 6000 ft., *Clarke*. BHOTAN (*loc. in Hort. Calcutt.*).

Stem 12-18 in., stout. *Leaves* 5-6 by 1¼-1½ in., flaccidly coriaceous, lorate, unequally obtusely 2-lobed. *Scape* 2-3-fld.; flowers 3½ in. diam., yellow barred with pale cinnamon-brown; lateral sepals and petals falcate; dorsal sepal erect; lip half the length of the sepals, base narrowed; side lobes short, broad, obtuse; midlobe ovate-cordate, obtuse, ridged; column speckled with red. *Capsule* 2½ in., oblong, very thick.

** *Flowers panicled. Side lobes of lip nearly equalling or exceeding the midlobe.*

4. **A. Maingayi**, *Hook. f.*; lateral sepals broadly obovate, dorsal narrower, petals linear-spathulate falcate, side lobes of clawed lip quadrate, midlobe as long oblong fleshy, spur red beneath.

MALACCA, *Maingay (Kew Distrib. 1645)*.

Stem 4-6 ft., sheaths smooth. *Leaves* 3-5 in., linear-oblong; tip narrowed, notched. *Panicle* 1-3 ft.; branches short, divaricate; pedicel and ovary stout; flowers 2 in. diam.; lip fleshy, not half as long as the sepals, yellow, sides blotched with red ("claw elastic," *Maingay*); column short, truncate; strap of large oblong furrowed pollen broadly linear, gland transverse.

5. **A. moschifera**, *Blume Rumph.* iv. t. 196, 199; lateral sepals and petals narrowly linear-spathulate falcate, dorsal sepal straight, side lobes of lip quadrate, midlobe as long obovate acuminate shortly spurred beneath. *Arachnis moschifera*, *Blume Bijdr.* 365, t. 26. *Aerides arachnites*, *Swartz in Schrad. Journ.* 1799, 233; *Willd. Sp. Pl.* iv. 131. *Renanthera Arachnitis*, *Lindl. Gen. & Sp. Orchid.* 217. *R. Flos-aeris*, *Reichb. f. Xen. Orchid.* i. 88; *Walp. Ann.* vi. 878. *Limodorum Flos-aeris*, *Swartz in Nov. Act. Upsal.* 1740, 37. *Epidendrum Flos-aeris*, *Linn. Sp. Pl.* 1348.

PERAK, alt. 4-6000 ft., *King's Collector*.—DISTRIB. Java, Borneo.

Stem 4-6 ft., as thick as a swan's quill, sheaths smooth. *Leaves* 4-7 in., loriform or linear-oblong, tip narrowly notched. *Panicle* 2-3 ft.; branches very short, divaricate, 2-3-fld.; pedicel with ovary 1 in.; flowers 3-4 in. diam., dark green or yellow barred with maroon; upper margin of side lobes recurved; anther broad, truncate; pollinia very large, flattened; strap broad with a median ridge.

53. *PHALÆNOPSIS*, Blume.

Epiphytes; stem short, leafy; pseudobulb 0. *Leaves* distichous, coriaceous. *Scape* lateral; flowers usually large, loosely racemed. *Sepals* widely spreading. *Petals* narrower or broader. *Lip* clawed or sessile, adnate to the base or foot of the column, side lobes erect, midlobe various, spur 0; disk variously appendaged, with usually a forked plate or callus. *Column* suberect, foot long short or 0; anther 2-celled; pollinia 2, sulcate or 2-partite, strap linear or spatulate, gland large or small.—Species about 25, Indian and Malayan.

The genus requires revision, and a careful examination of the lip, which is very imperfectly figured and described by the authors who have had access to living specimens. The beautiful *P. amabilis* has been sent from Singapore, where it is cultivated.

* Lateral sepals inserted by a narrow base to the base or very short foot of the column.

† *Rachis* of raceme compressed; bracts fleshy, distichous.

1. *P. Cornu-cervi*, Par. & Reichb. f. in *Hamb. Gartenz.* 1860, 116; scape 6-10 in., flowers 2 in. diam. yellow-green barred with brown. *Rolfe in Gard. Chron.* 1886, ii. 276. *Polychilus Cornu-cervi*, *Breda Orchid. Jav.* t. 1; *Bot. Mag.* t. 5570.

TENASSERIM; at Moulmein, Lobb, Parish. PERAK, *Scortechini*.—DISTRIB. Sumatra, Java, Borneo.

Leaves 3-8 in., oblanceolate. *Scape* stout, simple or branched; rachis 3-5 in.; bracts $\frac{1}{2}$ in., oblong, tip rounded; sepals oblong-lanceolate; petals shorter; lip subsessile, side lobes oblong, midlobe ovate acute with a short falcate wing on each side of the tip; disk with a broad 2-awned plate at the base, and a flattened sword-shaped compressed spur in front of it.—Habit of a *Sarcochilus*.

2. *P. violacea*, Teyssm. & Binn. in *Batav. Nat. Tydschr.* xxiv. (reprint 10); scape 2-12 in., flowers 1 in. diam. Reichb. f. in *Gard. Chron.* 1878, ii. 234; 1881, ii. 145, fig. 32, 187; *Warner Orchid. Album*, t. 182; *Flor. Mag.* N. S. t. 342; *Rolfe in Gard. Chron.* 1886, ii. 277; *Ill. Hort.* 1855, 173 (var. *Schræderi*). *Stauritis violacea*, Reichb. f. in *Hamb. Gartenzeit.* 1802, 34.

PERAK (*Scortechini*). SINGAPORE (*fid. Warner l. c.*)—DISTRIB. Sumatra.

Leaves 4-10 in., elliptic or oblanceolate, acute. *Scape* very stout, 1-7-fld.; bracts ovate, acute; lateral sepals oblong-lanceolate, unequal-sided, acute, deflexed; petals smaller, oblanceolate; lip narrow, incurved, broadly clawed or stipitate; side lobes erect, narrow, linear, truncate; midlobe cuneately obovate, apex triangular acute crenulate, disk with a bicuspidate appendage at the base; column rather long.—Colours of flower apparently very variable; *Scortechini* describes the sepals and petals as deep carnation with green tips, the side lobes of lip yellow dotted with purple, the midlobe purple; Warner's figure has a very short scape, few flowers, a violet lateral sepal with cream-cold, inner margins, cream-cold, dorsal sepals and petals, and a violet lip. According to Reichenbach the raceme is sometimes branched.—Perhaps two species are confounded under *violacea*.

†† *Rachis of raceme terete.*

3. **P. Lowii**, *Reichb. f. in Bot. Zeit.* 1862, 214; *in Gard. Chron.* 1862, 979; *Xen. Orchid.* ii. t. 151; petals fan-shaped very much larger than the oblong sepals, rostellum much longer than the column. *Bot. Mag.* t. 5351; *Fl. des Serres*, t. 1910; *Warner Select. Orchid. Ser.* 2, t. 15; *Rolfe in Gard. Chron.* 1886, ii. 276.

TENASSERIM; at Moulmein, *Parish.*

Leaves 3–5 in., ovate-oblong or lanceolate, acute. *Scape* with lax-fl. raceme 10–24 in., slender, simple or branched; flowers $1\frac{1}{2}$ –2 in. diam.; sepals white, dorsal largest and broadest; petals flushed with violet towards the base; lip sessile, as long as the lateral sepals, narrowly oblong, side lobes small, uncinately recurved yellow, midlobe obtusely oblong truncate and crenate at the tip purple; disk keeled and furnished with a transverse forked plicate callus at the base of the side lobes in front, and with some soft spines behind; column and rostellum pale purple.

4. **P. Mannii**, *Reichb. f. in Gard. Chron.* 1871, 902; 1876, 503; lateral sepals lanceolate acuminate, petals oblanceolate, lip clawed, side lobes falcately oblong, midlobe panduriform truncate with two spreading and recurved oblong caruncled apical lobules. *Rolfe in Gard. Chron.* 1886, ii. 276.

ASSAM, *Mann.*

Leaves 6–10 in., oblong-lanceolate. *Scape* 12 in., branched; flowers many, scattered, $1\frac{1}{2}$ in. diam.; sepals and petals yellow blotched with brown; lip white with purple blotches, disk with a forked appendage at the base of the midlobe, in front of which is a flattened sword-shaped spur; foot of column very short.—Flower and appendages of lip very like those of *P. Cornu-cervi*; in both the column is long, the pollinia ellipsoid.

5. **P. speciosa**, *Reichb. f. in Gard. Chron.* 1881, i. 562; 1882, ii. 744, fig. 130–132; sepals elliptic-lanceolate acute, petals similar but smaller, lip sessile, side lobes small linear-oblong truncate toothed, midlobe laterally compressed fleshy, tip dilated mallet-like papillose. *Warner Orchid. Album*, t. 158; *Gard. Chron.* 1882, ii. 745, f. 130–132; 1886, ii. 277, fig. 56–58; *Reichenbachia*, ii. t. 57; *Rolfe in Gard. Chron.* 1886, ii. 277.

AMDAMAN ISLANDS, *Berkeley.*

Leaves 8–12 in., obovate-oblong or -lanceolate. *Scape* tall, simple or branched; flowers 2 in. diam., scattered, white or rosy with darker blotches; lip with a forked callus; column long, tip toothed, foot very short; pollinia oblong.—Var. *Christiana*, R. f., has rose-madder sepals and white petals; var. *purpurata*, R. f., has rose-purple flowers.

6. **P. tetraspis**, *Reichb. f. Xen. Orchid.* ii. 146; *in Gard. Chron.* 1881, ii. 562, 656; flowers as in *P. speciosa*, but waxy white with 2 2-awned basal calli on the hairy disk. *Rolfe in Gard. Chron.* 1886, ii. 277.

ANDAMAN ISLANDS, *Col. Man.*—DISTRIB. Sumatra.

Leaves 12 by 2–4 in., cuneately obovate. *Scape* tall, stout, branched.—I have seen no flower of this.

7. **P. Kunstleri**, *Hook. f.*; sepals obovate apiculate, petals rather smaller, tip rounded, lip shortly clawed, side lobes small broadly cuneate truncate, midlobe obovate with 7 thick parallel ridges, tip rounded.

PERAK, *Kunstler.*

Leaves 4–6 in., obovate oblanceolate or elliptic-lanceolate, acute, pale green. *Scape* about equalling the leaves, 2–3-fl. at the tip; bracts very small, ovate; flowers

1 in. diam.; sepals and petals dull yellow green mottled closely with dull red for the basal half; lip small, white, side lobes erect streaked with red, midlobe red purple between the ridges; forked appendage small, with a 2-lobed callus behind it; column about half the length of the lip; pollinia globose, strap short, cuneate, gland quadrate.—Described from dried flowers and a drawing of the whole plant in Hort. Calcutt.

** Lateral sepals inserted by a broad base on the elongate foot of the column.

8. **P. Esmeralda**, *Reichb. f. in Gard. Chron.* 1874, ii. 582; lateral sepals orbicular-ovate, petals broadly obovate, claw of lip long geniculate with two narrow recurved auricles, side lobes broadly falcately obovate, midlobe oblong. *Rev. Hort.* 1877, t. 107; *Warner Orchid. Alb.* vii. t. 21. *Floral Mag.* N. S. t. 358; *Rolfe in Gard. Chron.* 1886, ii. 276; *Orchidoph.* 1881, t. 9. *P. antennifera*, *Reichb. f. in Gard. Chron.* 1878, 398; 1882, 520; *Rolfe l. c.* 1886, ii. 276.

BURMA, *Hort. Low.*—DISTRIB. Cochin China.

Leaves 4–6 in. *Scape* 1–2 ft., simple or branched, slender; rachis elongate; flowers 1 in. diam., amethystine; side lobes of lip erect, appressed, red-purple; disk with a 2-awned callus in front of the auricles, and a raised thickened fleshy ridge from the base of the side lobes to the tip of the midlobe.

9. **P. Parishii**, *Reichb. f. in Gard. Chron.* 1865, 410; 1871, 802; *Xen. Orchid.* i. 144, t. 156, f. 1. *in Saunders' Refug. Bot.* t. 85; flowers small, lateral sepals subrotund, lip short sessile, side lobes small falcate, midlobe much broader shortly stipitate reniformly cordate. *Bot. Mag.* t. 5815; *Rolfe in Gard. Chron.* 1886, ii. 276.

EASTERN HIMALAYA, *Lobb, Mann.* CACHAR, *Keenan.* TENASSERIM, *Lobb.*

Leaves 3–5 in., linear or obovate-oblong. *Scape* 3–4 in., 6–8-fld.; flowers $\frac{3}{4}$ in. diam.; sepals and obovate petals cream-cold.; lip mobile, purple-brown; disk with a narrow 4-awned appendage at the base overlapping a much broader ciliate lamina; rostellum 3-partite.—The figure in Saunders' Refug. is of var. *Lobbii*, R. f., which has a white lip with two chestnut bands.

SPECIES OF DOUBTFUL POSITION.

P. FUSCATA, *Reichb. f. in Gard. Chron.* 1874, ii. 6; “allied to *P. Cornu-cervi*, roots short, leaves very broad oblong obtuse acute, flowers medium-sized, sepals oblong obtusely acute, petals cuneately oblong obtuse, lip 3-partite, side segments ligulate retuse one toothed on each side, umbonate on the middle of the lower side, mid-segment oblong acute keeled in the middle, base with a 2-toothed callus, and with an aristate ligula on each side behind it, column not angled (*exangulata*) at the base.”—Malayan Peninsula, *Hort. Bull.*—Characters from Reichenbach l. c., who does not describe the inflorescence, or whether the column has a foot or not.

54. DORITIS, Lindl.

Characters of *Phalenopsis*, and having the same 2-awned plate on the disk of the lip, but the column is narrowly winged, its foot longer forming a spur-like mentum with the side lobes of the lip.—Species 5, Indian and Malayan.

D. pulcherrima, *Lindl. in Wall. Cat.* 7348 (*Gen. & Sp. Orchid.* 178, *Reichb. f. Xen. Orchid.* ii. 7), a Siam species, with flowers nearly 1 in. diam. in a panicle 2–3 ft. long, probably occurs in the Straits region.

1. **D. tænialis**, *Benth. in Gen. Plant.* iii. 574; scape short few-fld., mentum acute, side lobes of lip very narrow spathulate reflexed on the disk, tips of the forked appendage of the lip hooked. *Ærides tæniæle*,

Lindl. Gen. & Sp. Orchid. 239; *in Journ. Linn. Soc.* iii. 41. *Æ. carnosum*, *Griff. Notul.* iii. 365; *Ic. Plant. Asiat.* t. 338 A.

SUBTROPICAL HIMALAYA; from Kumaon, alt. 3-6000 ft., eastwards to BHOTAN, the KHASIA MTS., MUNNIPORE and BURMA.

Roots 1-3 ft., flat, $\frac{1}{8}$ - $\frac{1}{2}$ in. broad, forming large tortuous tufts. *Leaves* few, 3-5 in., obovate-oblong, obtuse or subacute, narrowed to the sessile base, soft when dry. *Scape* 1-2 in.; bracts small, broad; flowers $\frac{3}{4}$ in. diam., mauve purple; midlobe of lip dark red or purple. *Capsule* $1\frac{1}{2}$ in., fusiform.

2. **D. Wightii**, *Benth. in Gen. Plant.* iii. 574; scape elongate simple or branched, side lobes of spreading lip broad cuneate-obovate, midlobe obcordate. *Phalænopsis Wightii*, *Reichb. f. in Bot. Zeit.* 1862, 214. *Ærides latifolium*, *Thwaites Enum.* 430.

EASTERN HIMALAYA; Sikkim (*Ic. in Hort. Calcutt.*); Bhotan, *Lister. CHITTAGONG (Hort. Calcutt.)*. BURMA; Moulmein, *Parish*; Mougong, *Griffith*. The CIRCARS, *Heyne*. MALABAR, *Wight*, &c. CEYLON, *Thwaites*.

Habit of *D. tæniatis*, but leaves rather larger, scape much longer, and lip very different.

55. **RHYNCHOSTYLIS**, *Blume*.

Epiphytic, stem stout leafy, pseudobulbs 0. *Leaves* very thick, linear, 2-lobed. *Flowers* in long dense drooping cylindric racemes, bright-cold. *Sepals* and broader petals obtuse, spreading, contracted at the base. *Lip* adnate to the base of the column, deeply saccate, mouth of sac pubescent within, side lobes 0, outer margin produced into a clawed dilated limb. *Column* short stout, foot 0; rostellum shortly beaked; anther imperfectly 2-celled; pollinia 2, subglobose, 2-cleft, strap filiform, gland small.—Species 2 or 3, Indian or Malayan.

R. retusa, *Blume Bijdr.* 286, t. 49; leaves deeply channelled keeled præmorse or retuse, raceme drooping, sac cylindric much longer than the limb of the lip. *R. præmorsa*, *Blume l.c.* *R. guttata*, *Reichb. f. in Bonpland.* ii. 93. *R. Garwalica*, *Reichb. f. in Walp. Ann.* vi. 888. *Saccolabium guttatum*, *Lindl. in Wall. Cat.* 7308; *Gen. & Sp. Orchid.* 220; *in Journ. Linn. Soc.* iii. 32; *Bot. Mag.* t. 4108; *Wight Ic.* t. 1745-6; *Dalz. & Gibs. Bomb. Fl.* 263; *Hartm. Parad.* ii. t. 3; *Orchidoph.* 1888, 273 (var. *gigantea*); *De Vriese Orchid.* t. 14. *Warner Sel. Orchid. Ser.* 2, t. 18; *Griff. Ic. Pl. Asiat.* t. 819. *S. præmorsum*, *Lindl. l.c.* 221. *S. Rheedii*, *Wight Ic.* v. 19. *S. retusum*, *Fl. des Serres* xiv. 191, t. 1463-4. *S. Heathii*, *Hort., ex Gard. Chron.* 1885, 369. *S. Blumei*, *Lindl. Sert.* t. 47; *in Bot. Reg.* 1841, *Misc.* 55; *Ill. Hort.* t. 545; *Puydt. t.* 37; *Warner Orchid. Alb.* t. 169 and t. 238 (var.); *Pescator.* t. 21. *S. garwalicum*, *Lindl. in Journ. Linn. Soc.* iii. 32; *in Gard. Chron.* 1879, 102. *Sarcanthus guttatus*, *Lindl. in Bot. Reg.* t. 1443. *Ærides guttatum*, *Roxb. Fl. Ind.* iii. 471; *Regel Gartenfl.* 1863, 415. *Æ. retusum*, *Swartz in Schrad. Diar.* 1799, 130; *Willd. Sp. Pl.* iv. 130; *Grah. Cat. Bomb. Pl.* 204. *Æ. spicatum*, *Don Prodr.* 31. *Al. præmorsum*, *Willd. l.c.* *Limodorum retusum*, *Swartz in Nov. Act. Upsal.* vi. 80. *Epidendrum retusum*, *Linn. Sp. Pl.* 1351. *E. Hippium*, *Herb. Ham.—Rheede Hort. Mal.* xii. t. 1.

TROPICAL HIMALAYA, from Garwhal eastwards to Assam and Tenasserim, and southwards to BENGAL, the WESTERN PENINSULA and CEYLON.—DISTRIB. Malay Islands.

Stem stout, creeping in trees. *Leaves* 6-20 by $\frac{3}{4}$ -2 in., curved. *Racemes* 4-18 in.; bracts broad, obtuse, membranous; flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., white blotched with pink or violet; lateral sepals gibbously orbicular-ovate, obtuse or apiculate, dorsal oblong;

petals elliptic, obtuse; epichile of lip very variable in size, usually cuneiform, entire or emarginate at the tip, disk flat or obscurely channelled. *Capsule* 1-1½ in., clavate.—Lindley errs in describing the fruit of *R. Garvalica* as different from *R. retusa*, also in describing the blade of the lip of *Sacc. guttatum* as lanceolate, which misled Wight, who founded his *S. Rheedii* on the difference.

SPECIES UNKNOWN TO ME.

SACCOLABIUM BERKELEYI, *Reichb. f. in Gard Chron.* 1883, i. 814; from the author's remarks (there is no description) this appears to be near *R. retusa*, but the lip is acute; the flowers are white with amethyst spots. Its habitat is unknown, but probably Indian.

SACCOLABIUM LITTORALE, *Reichb. f. l.c.* 1881, ii. 198, has very long leaves, a short raceme, and the epichile cucullate, keeled and turned obliquely on one side.

56. SARCOCHILUS, Br.

Epiphytes, stem short or long, pseudobulbs 0. *Leaves* distichous, or 0 at flowering time. *Flowers* racemose or spicate. *Sepals* spreading; lateral adnate by a narrow base to the base of the column, or by a broad base to its foot, and sometimes to the lip also. *Petals* usually narrower. *Lip* sessile or clawed, very varied in form, side lobes small or large fleshy or petaloid, midlobe sometimes reduced to a pubescent callus, disk very various with often a callus or spur within. *Column* short or long, foot more or less produced; anther 2-celled; pollinia 2, sulcate, or 4 in pairs, strap short broad. *Capsule* usually long, strict, slender.—Species about 40 known, tropical Asiatic, Australian and Pacific.

A polymorphous genus, no doubt to be dismembered when better known. The following attempt to group the Indian species possibly indicates the lines upon which some of the genera may be established.

A. Flowers loosely inserted all round the rachis of a more or less elongate raceme or spike.

* *Lateral sepals inserted by a narrow base to the base of the column, or base of the column and sides of the lip. Foot of column 0 or very short.*

Sect. I. *Lip* shortly clawed. *Column* short; rostellum minute. PTEROCERAS, *Hasselt.* (Sp. 1-4.)

Sect. II. *Lip* sessile or subsessile. *Column* long; rostellum very long, slender. STEREOCHILUS, *Lindl.* (Sp. 5.)

Sect. III. *Lip* long-clawed. *Column* short; rostellum very short. (Sp. 6-7.)

Sect. IV. *Stem* elongate, scandent. *Lip* sessile. *Column* short; rostellum very long; strap of globose pollinia very slender, gland minute. MICROPERA, *Lindl.* (Sp. 8-11.)

** *Lateral sepals inserted by a very broad base to the elongate foot of the column.*

Sect. V. Leafless when flowering. *Stem* 0. Side lobes of *lip* large, erect, midlobe a tomentose pulvinus. CHILOSCHISTA, *Lindl.* (Sp. 12-15.)

Sect. VI. Leafing and flowering together. *Lip* various. (Sp. 16-19.)

B. Flowers in very short spikes at the apex of a slender scape, bracts persistent, imbricate.

Sect. VII. FORNICARIA. (Sp. 20-26.)

C. Flowers distichous on a compressed rachis, which is pectinate from the uniform persistent laterally compressed fleshy bracts.

Sect. VIII. *Peduncles* stout, solitary. *Lip* stipitate, articulate with the foot of the column. CUCULLA. (Sp. 27-33.)

Sect. IX. *Peduncles* filiform, fascicled. *Lip* sessile. RIDLEYA. (Sp. 34.)

Sect. I. PTEROCERAS, *Hasselt* (gen.). (See above.)

1. *S. suaveolens*, *Hook. f.*; leaves lorate acutely 2-fid, raceme
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elongate glabrous, side lobes of lip falcate, midlobe decurved with a recurved tip. *Ærides suaveolens*, *Roxb. Fl. Ind.* iii. 473. *Ornitharium striatum*, *Lindl. in Paxt. Fl. Gard.* iii. 473 (*figure bad*). *Ornithochilus striatulus*, *Hort. Calcutt.* *Thrixspermum teres*, *Reichb. f. Xen. Orchid.* ii. 121, 123 t. 140 (*excl. syn.*), in *Trans. Linn. Soc.* xxx. 136.

CHITTAGONG, *Roxburgh.* TENASSERIM; at Moulmein, *Parish.*

Stem slender, scandent. *Leaves* 3-5 by $\frac{3}{4}$ - $\frac{5}{4}$ in., many-nerved, coriaceous, base contracted. *Racemes* 3-6 in., shortly peduncled, lax-fl.; rachis stout; bracts small, rounded; flowers $\frac{1}{2}$ - $\frac{1}{2}$ in. diam., yellow speckled with red, very fragrant; lip rather laterally compressed; midlobe light purple or speckled with pink.—Reichenbach has referred this to the Javan *P. radicans*, Hassk. (*Dendrocolla teres*, Blume), a very much larger plant, with oblong obtusely 2-lobed or notched leaves, racemes 2-3 ft. long, and larger flowers (of which there is a drawing in Herb. Lindl.). The lip is curious, the limb being a terete spur with a minute mouth close to the claw, much as in *Micropera* and *Sarcochilus Berkeleyi*.

2. *S. muriculatus*, *Reichb. f. in Gard. Chron.* 1881, ii. 198; leaves 6-9 in. lorate, racemes very short, peduncle and rachis viscid, lip shortly clawed saccate, side lobes broadly ovate obtuse, midlobe small obtusely 2-partite pubescent.

ANDAMAN ISLANDS, *Kurz, Berkeley.*

Stem 6-8 in., stout, rooting below. *Leaves* 1-in. broad, obliquely notched or 2-lobed, lobes rounded. *Scape* with raceme $2\frac{1}{2}$ -3 in., strict; bracts broad, obtuse; flowers about $\frac{1}{2}$ in. diam., light yellow, sweet-scented; sepals and petals with two purple bars; column rather long; anther ovate, pollinia globose, strap short flat, gland small.—The lip is that of Sect. II.

3. *S. stenoglottis*, *Hook. f.*; stem very short stout, leaves broadly lorate, tip broad rounded emarginate, peduncle shorter than the leaves pendulous many-fl., sepals subsimilar oblong obtuse, petals as long narrower obovate-oblong acute, lip nearly as long as the sepals very narrow laterally flattened curved shortly clawed, with two small rounded auricles beyond the claw, an elongated cup with toothed margins along the top and an ellipsoid compressed terminal spur.

? PERAK, *Scortechini.*—DISTRIB. Sumatra, *King's Collector.*

Stem as thick as the thumb. *Leaves* decurved, 6-10 by $1\frac{1}{2}$ -2 in., nearly flat. *Peduncle*, 3 in., stout, deflexed, dull purple; bracts very small, ovate; pedicel with ovary $\frac{1}{2}$ in.; flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., very pale primrose; sepals and petals many-nerved; lateral sepals with faint red bars near the base; lip white, the elongated cup on the upper margin is edged with pink, and extends for about two-thirds of its length, a perforation at the distal end leads to the hollow compressed ellipsoid straight spur, which is in a straight line with the body of the lip, and resembles a terminal lobe; column winged narrowly to near the base, tip acute, rostellum beaked; anther shortly beaked, membranous; pollinia long, strap spatulate, gland small.—Described from similar materials as *S. aureus*.

4. *S. brachyglottis*, *Hook. f.*; stem very short, leaves elongate oblanceolate acuminate, peduncle short few-fl., sepals spreading subequal lanceolate acuminate, tips horned at the back, petals nearly as long oblong-obovate obtuse, lip very small laterally flat as seen in profile subcuneate and obtusely 3-lobed in front, column very short subglobose, foot 0.

PERAK, *King's Collector.*

Stem 1-2 in., curved. *Leaves* 4-8 by $1-1\frac{1}{2}$ in., pendulous, finely acuminate, nearly flat, keeled beneath. *Peduncle* 1 in., stout; bracts minute, broad, persistent; flowers $\frac{1}{2}$ in. diam.; sepals and petals white with a faint pink blush, nerves obscure; lip not half the length of the sepals, adnate to the foot of the column, so compressed

that the sides are almost in contact, leaving a narrow slit along the top as the opening to the cavity; of the three short lobes seen in looking sideways at it, that towards the column represents the side lobes, a shorter below it a spur? and the intermediate the apex of the lip; there are no internal caruncles or sepals; the edges of the lip are smooth and yellow, and there are a few red spots on the side; column with a narrow base, very oblique top, sloping backwards, and very concave face; rostellum minute, erect, 2-fid; anther shortly beaked, 2-celled; pollinia globose, strap short, gland oblong.—It is impossible to describe the form of the minute lip of this curious species intelligibly. I shall hope to give figures of it and of *S. aureus* in King's "Annals of the Calcutta Botanical Gardens."

Sect. II. STEREOCHILUS, *Lindl.* (gen.). (See p. 33.)

5. *S. hirtus*, *Benth.* in *Gen. Plant.* iii. 576; leaves lorate very thick straight horizontal, raceme pubescent, lip a conical sac with short acute 2-toothed side lobes and a large double callus below the column within. *Stereochilus hirtus*, *Lindl.* in *Journ. Linn. Soc.* iii. 58.

KHASIA Mts., alt. 5000 ft., *J. D. H. & T. T. TENASSERIM, Parish.*

Stem very short. *Leaves* 3–5 in., very thick. *Racemes* 1–3 in., drooping; peduncle and rachis slender; bracts short, broad, membranous; flowers $\frac{1}{2}$ – $\frac{1}{3}$ in. diam., pink, pubescent; lateral sepals adnate to the obscure foot of the column and base of lip; petals narrower, falcate, obtuse; lip white and pink; column white; anther purple, long-beaked, 2-celled; pollinia 4, oblong, stipitate in pairs on the spatulate end of a very long slender strap, gland minute. *Capsule* not seen.—Lindley errs in describing the lip as solid with a pair of horns at the base; it is a conical cup, the mouth oblong, and the horns are the 2-fid side lobes which appear to rise out of the cup. The callus below the column is that of *Cleisostoma*, and the strap and stipitate pollinia are those of *Saccolab.* § *Uncifera*.

Sect. III. (See p. 33.)

6. *S. aureus*, *Hook. f.*; stem very short, leaves large long loriform 2-lobed, peduncle stout several-fid., flowers large, sepals lanceolate acuminate many-nerved, petals subsimilar, lip shorter than the sepals, claw long narrow rigid linear, side lobes falcately cuneate, midlobe a short erect crest at the base of the globose subdidymous spur.

PERAK, *King's Collector.*

Stem as stout as the little finger. *Leaves* 4–10 by $1\frac{1}{2}$ –2 in., very coriaceous, keeled. *Peduncle* from below the leaves, 2–7 in., stout, nearly straight; flowers scattered towards the end of the peduncle; bracts very short, broadly ovate, persistent; pedicel with ovary $\frac{3}{4}$ in., straight; sepals 1 in., and petals golden yellow; lip about $\frac{1}{3}$ shorter than the sepals, claw caruncled where it expands to meet the blade, and then perforated for the passage to the globose spur; side lobes erect, white barred with dull pink; disk with a caruncled transverse crest over the base of the spur; column stout, rostellum inconspicuous; anther very shortly beaked, pollinia globose, strap subspathulate, gland narrow.—A beautiful species, described from several drawings lent by Herb. Calcutt. and the analysis of dried flowers.

7. *S. cladostachys*, *Hook. f.*; stem very short, leaves loriform tip narrowed bifid, peduncle much shorter than the leaves clavate few-fid., sepals and petals narrowly elliptic-lanceolate finely acuminate, lip shorter than the sepals, claw narrow rigid linear, side lobes oblong obtuse, midlobe 3-fid, side lobules quadrate retuse, mid-lobule (spur?) short rounded.

MALAYA, *Kunstler* (*lc.* in *Herb. Calcutt.*). ? PERAK, *lc.* *Scortechini.*

Stem 1 in., not very stout. *Leaves* recurved and pendulous, 6–12 by $1\frac{1}{2}$ –2 in., flat, keeled. *Peduncle* $1\frac{1}{2}$ in. or more, green; bracts ovate; pedicel with ovary $\frac{1}{2}$ in.; flowers white, $1\frac{1}{2}$ in. diam.; sepals $\frac{3}{4}$ in. long, and petals spreading, cream-colored;

claw of lip spotted with purple, lateral lobes purple, midlobe cream-cold., spur speckled with purple; column rather short; anther hardly beaked, yellow, pollinia subglobose, strap short.—Described from a drawing in the Calcutta Gardens. Evidently allied to *S. aureus* in the form of the lip, but the whole plant is much smaller. The peduncle is clavate, the sepals and petals much smaller and narrower, and as well as the lip differently coloured. Scortechini's drawing is of a young plant.

Sect. IV. MICROPERA, Lindl. (gen.). (See p. 33.)

8. **S. purpureus**, Benth. mss.; raceme peduncled lax-flid., flowers pale purple, lip strongly laterally compressed hatchet-shaped, side lobes 0, sac with a strong included recurved spine under the tip. *Micropera pallida*, Wall. Cat. 7321 (in part). *Camarotis purpurea*, Lindl. in Wall. Cat. 7329; Gen. & Sp. Orchid. 219; Sert. Orchid. t. 19; in Journ. Linn. Soc. iii. 37; Part. Mag. Bot. vii. t. 25. *C. rostrata*, Reichb. f. in Walp. Ann. vi. 881. *Ærides rostratum*, Roxb. Fl. Ind. iii. 474.

KHASIA Mts., near Churra. SILHET and CHITTAGONG, Roxburgh, Wallich., &c. Stem 2-3 ft., as thick as a goose-quill. Leaves 3-4 by $\frac{1}{2}$ in., obtusely 2-lobed, toothed or notched. Racemes equalling or exceeding the leaves, laxly many-flid.; bracts short, broad; flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; sepals and rather smaller petals very obtuse; beak of column turned on one side, flexuous. Capsule $1\frac{1}{2}$ –2 in. long, slender.

9. **S. Roxburghii**, Hook. f.; raceme long-peduncled decurved rather dense, flowers cream-white, lip slipper-shaped laterally compressed, side lobes large rounded, sac with an exerted spine under the tip. *Micropera pallida*, Lindl. in Bot. Reg. under t. 1522; in Wall. Cat. 7321 (in part); Gen. & Sp. Orchid. 219. *Camarotis pallida*, Lindl. in Journ. Linn. Soc. iii. 37. *Ærides pallidum*, Roxb. Fl. Ind. iii. 475 (not of Lindley).

BENGAL; at Comilla, Clarke. CHITTAGONG, Roxburgh, &c. TENASSERIM; at Mergui, Griffith (Kew Distrib. 5241), Helfer (K. D. 5254).

Stem 2-3 ft. Leaves 2-3 by $\frac{1}{2}$ in., tip rounded, notched. Peduncle with raceme longer than the leaves; bracts persistent; flowers many, $\frac{1}{2}$ in. diam.; sepals and petals as in *M. purpurea*, but nearly white; beak of column straight. The *Micropera pallida* of Wallich's Herb. in Linn. Soc. consists of one sheet of *S. purpurea*, one of *Saccolab. ramosum*, and one of *Sarcanthus secundus*; but there are specimens of *pallida* under his number 7321 in Herb. Lindley.

10. **S. obtusus**, Benth. mss.; raceme very shortly peduncled erect, lip slipper-shaped tip obtuse decurved, side lobes incurved; anticus scale erect under the truncate 3-lobed tip. *Camarotis obtusa*, Lindl. in Bot. Reg. 1884, Misc. 73; Walp. Ann. vi. 881.

TENASSERIM; at Moulmein, Griffith, Parish.

Stem 6-8 in., not so thick as a goose-quill, simple or branched. Leaves 2-3 by $\frac{2}{3}$ in., subacute, keeled, often recurved. Raceme subsessile, lax-flid.; bracts broad, acute; flowers $\frac{1}{2}$ in. diam., pale rose-cold.; sepals and petals linear-oblong, obtuse; lip yellowish with a subsaccate decurved apex, mouth with an exerted anticus lamella, midlobe minute 3-toothed; beak of column long, obliquely incurved.

11. **S. Mannii**, Hook. f.; raceme very short sessile few-flid., lip slipper-shaped obtuse decurved, side lobes obtusely triangular incurved, anticus scale truncate, close under the fleshy entire tip.

KHASIA HILLS, alt. 2-3000 ft., Maun.

Stem as thick as a goose-quill. Leaves very coriaceous, 4 by $\frac{1}{2}$ – $\frac{3}{4}$ in. Raceme $\frac{1}{2}$ – $\frac{3}{4}$ in. long; flowers $\frac{1}{2}$ in. diam., apparently pale; sepals and petals spathulately

oblong; lip with the claw as long as the saccate portion.—Very much stouter and larger more coriaceous-leaved than *S. obtusus*. Lip with a ridge along the posticous face.

Sect. V. CHILOSCHISTA, Lindl. (gen.). (See p. 33.)

12. *S. usneoides*, Reichb. f. in Walp. Ann. vi. 497; racemes elongate many-fl., flowers white, capsule $1\frac{1}{2}$ –2 in. Chiloschista usneoides, Lindl. in Wall. Cat. 7330; Gen. & Sp. Orchid. 219; Bot. Reg. under t. 1522; Sert. Orchid. Frontisp. f. 4; in Journ. Linn. Soc. iii. 43; Gard. Chron. 1846, 135. Thrixspermum usneoides, Reichb. f. Xenia, ii. 120.

TROPICAL HIMALAYA; Nepal, Wallich. SIKKIM, J. D. H.

Roots densely tufted, tortuous; stem 0. Raceme 3–6 in.; bracts ovate, acute, membranous; flowers subsessile, $\frac{1}{2}$ in. diam.; sepals spreading, oblong, obtuse; side lobes of lip linear-oblong, obtuse; disk between the lobes pubescent; midlobe truncate, emarginate; column very short; rostellum indistinct; anther broadly ovate, with 2–3 slender setae; pollinia 2, 2-lobed, strap very short broad, gland large. Capsule slender, slightly curved, glabrous.

13. *S. luniferus*, Reichb. f. in Gard. Chron. 1868, 786 (Thrixspermum); racemes elongate, many-fl. flowers yellow spotted with purple. Sarcochilus luniferus, Bot. Mag. t. 7044.

SIKKIM HIMALAYA, J. D. H.; at Mungpo (Ic. in Hort. Calcutt.). TENASSERIM; at Moulmein Parish.

Except in the colour of the flowers I can find no difference between this and *S. usneoides*, the authority for the colours of which latter is a drawing made by Wallich's artists during his visit to Nepal, and another in Sikkim. Parish observes that very small leaves are sometimes produced, and these have been seen in Kew Gardens.

14. *S. Wightii*, Hook. f.; racemes short few-fl., flowers white or cream-coloured, capsule $\frac{3}{4}$ in. long. Chiloschista usneoides, Wight Ic. t. 1741 (excl. the left-hand figure) (not of Lindl.); Walp. Ann. vi. 498. ? *Ecceceadus Retzii*, Lindl. Gen. & Sp. Orchid. 237. Epidendrum pusillum, Retz Obs. vi. 49. Limoderum pusillum, Willd. Sp. Pl. iv. 126.

MALABAR; at Cochin, Johnson. NILGIRI HILLS; on the western slope of the Wynad, Wight, &c. CEYLON, on trees in the Botanical Gardens; Trimen.

A very imperfectly known species; Wight's figure represents the side lobes of the lip as somewhat crenate, and the sepals and petals as glabrous without and hairy within, the flowers as much smaller than in *C. usneoides*, the capsules as much shorter and stouter.—The left-hand figure (No. 7) on Wight's plate represents a very different plant, which I do not recognize. There is in Herb. Kew a specimen, apparently of *S. Wightii*, from Ceylon (Herb. Hort. Peradeniya), sent by Dr. Trimen (C.P. 4017), who has since informed me of its locality.

15. *S. minimifolius*, Hook. f.; raceme few-fl., capsule $\frac{1}{3}$ in. long Cymbidium minimifolium, Thwaites mss.

CEYLON; Central Province, at Hattogodde Hill, Thwaites.

Roots much more slender than in *S. usneoides*. Leaves 2, very minute. Raceme $\frac{1}{2}$ – $\frac{3}{4}$ in.; flowers $\frac{1}{4}$ in. diam.; side lobes of lip rounded, nearly as large as the lateral sepals. Capsule much curved, pubescent.—The specimens are insufficient for a further description.

Sect. VI. (see p. 33).

16. *S. Berkeleyi*, Reichb. f. in Gard. Chron. 1882, 557 (Thrixspermum); raceme elongate decurved, lip long-clawed produced into an elongate clavate laterally compressed obtuse spur with an inflated tip, side lobes small erect, midlobe minute incurved.

NICOBAR ISLANDS; *Berkely*.

Leaves 6-9 by 1-1½ in., lorate, narrowed from above the middle to the base, obliquely obtusely 2-lobed. *Peduncle* short, compressed; raceme 4-6 in., drooping, with many erect white flowers; bracts short, broad, membranous; sepals ½ in. long, broadly ovate, lateral inserted on the long foot of the column; petals broadly obovate; midlobe of lip violet; column rather long, rostellum 2-cuspidate; anther broad, low; pollinia 2, globose, strap short broad, gland orbicular. *Capsule* 5 in., narrow, curved. —The lip is unlike that of any other species of the genus, resembling rather that of *Ærides*.

17. *S. leopardinus*, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 145 (*Thrixspermum*); stem short, raceme few-fl. much shorter than the leaves, sepals broadly oblong, petals much smaller, lip sessile, side lobes wing-like oblong obtuse, midlobe small, spur large urceolate.

TENASSEEIM; at Moulmein, *Parish*.

Stem 2-3 in., curved. *Leaves* 4-6 by ¾-1 in., lorate, fleshy, narrowed from the middle downwards, obtuse, many-nerved. *Peduncle* very stout; lower sheaths annular; bracts short, broad, obtuse; flowers yellow spotted with purple; sepals ½ in. long, obtuse, lateral inserted on the long foot of the column, dorsal smallest; lip with a large dorsal callus over the mouth of the descending fleshy round-based spur; midlobe recurved, broadly ovate, caruncled, white spotted with purple; anther depressed, pollinia broadly pyriform, sessile on a small gland.

18. *S. viridiflorus*, *Hook. f.*; stem very short, leaves 2 by ¾ in. falcately oblong, raceme shorter than the leaves 4-8 fl., lip narrowly clawed, side lobes falcate obtuse as long as the cylindric obtuse spur, midlobe reduced to a broad humid carunculate lobe. *Ærides viridiflorum*, *Thwaites Enum.* 430.

CEYLON; on trees in the Central Province, *Gardner* (C.P. 3385), *Trimen* (C.P. 4016).

Leaves sessile, fleshy, nerveless, obliquely notched. *Raceme* half as long, few-fl.; bracts small, broad, obtuse, membranous; flower ½ in. diam.; lateral sepals broadly obliquely ovate, obtuse, 5-nerved, adnate to the short foot of the column for half its length, the other half forming the claw of the lip; petals linear oblong, obtuse, 1-nerved. —I have seen only one small specimen and a coloured drawing.

19. *S. hirsutus*, *Hook. f.*; stem short, leaves lorate emarginate base narrowed, peduncle and very short raceme hirsute, lateral sepals ovate obtuse, petals oblong-obovate, lip very short stipitate on the prolonged foot of the column, side lobes elongate falcate, midlobe laterally compressed, disk with a broad transverse plate in front of the side lobes.

PERAK, *Kunstler (Hort. Bot. Calc.)*

Leaves 4-8 by 1-1½ in., flat, narrowed from beyond the middle downwards, tip rounded with a notch. *Peduncle* with 4-6-fl. raceme 1-2 in.; bracts ovate; pedicel with ovary ½ in.; flower subglobose, expanded ¾ in. diam.; sepals and petals golden barred with carmine; lip pale, half as long as the sepals, claw dilated and concave at the base of the side lobes, a short serrated cupular membrane rises between the base of the side lobes over the base of the narrow compressed midlobe; column rather long, base contracted; anther shortly beaked, apiculate behind, 1-celled; pollinia globose, strap short linear, gland small. —Described from drawing in *Hort. Calcutt.*, and analysis of dried flower. It is very difficult to describe the structure of the lip; its claw may be the base of the column produced beyond the insertion of the broad-based lateral sepals.

Sect. VII. FORNICARIA, *Benth. in Gen. Plant.* iii. 575. (See p. 33.)

20. *S. Hystrix*, *Reichb. f. in Walp. Ann.* vi. 500; peduncle about as

long as the short loriform leaves, bracts erect subulate-lanceolate, side lobes of the lip glandular-hairy. *Dendrocolla Hystrix*, *Blume Bijdr.* 291. *Ærides Hystrix*, *Lindl. Gen. & Sp. Orchid.* 242. *Thrixspermum Hystrix*, *Reichb. f. in Trans. Linn. Soc.* xxx. 145. *Grosourdya Hystrix*, *Reichb. f. Xen. Orchid.* ii. 123; *in Bot. Zeit.* 1864, 297.

TENASSERIM; at Mergui, *Griffith (Kew Distrib.* 5232), *Parish.*—DISTRIB. Java.

Stem 1–3 in. *Leaves* 2–3 by $\frac{1}{2}$ – $\frac{3}{4}$ in., obtusely 2-lobed; sheaths ribbed. *Peduncle* 2–3 in., stout or slender, 2–3 sheathed; spike $\frac{1}{2}$ – $\frac{3}{4}$ in.; flowers white; sepals and petals $\frac{1}{2}$ in. long, lanceolate, acuminate; lip stoutly clawed, spotted with yellow, base saccate, side lobes triangular, midlobe truncate glandular-pubescent within; column very short; anther broad; pollinia 2 bipartite or 4 in very unequal pairs, strap broad, gland rounded. *Capsule* $2\frac{1}{2}$ –4 in., linear, straight.—*Reichenbach* is my authority for this being a Javan plant, and for the Javan synonymy.

21. ***S. pulchellus***, *Trim. Cat. Ceyl. Plants*, 89; characters of *S. Hystrix*, but side lobes of lip glabrous. *Dendrocolla pulchella*, *Thwaites Enum.* 430. *Cylindrochilus pulchellus*, *ibid. l.c.* 307.

CEYLON; in the Central Province, ascending to 2000 ft.

Bentham (*Gen. Plant.* iii. 575) suspects that this and *Hystrix* are one, but in the absence of good specimens of either I hesitate to unite them.—*Capsule* 2– $2\frac{1}{2}$ in.; the sepals and petals are lanceolate, acute, lateral inserted on the very short foot of the short column. *Capsule* $2\frac{1}{2}$ – $3\frac{1}{2}$ in., slender, straight, subacute.

22. ***S. hirtulus***, *Hook. f. Ic. Plant. ined.*; peduncles hirtulous, much shorter than the falcately lanceolate obtusely acuminate leaves, bracts minute, spur long incurved, column very long contracted at the base.

PERAK, *Scortechini. MALACCA, Maingay.*

Stem very short, or 0. *Leaves* 3–5 by $\frac{1}{2}$ – $\frac{3}{4}$ in., coriaceous, falcate, narrowed from the middle downwards, tip recurved. *Peduncle* $\frac{1}{2}$ –1 in.; spike $\frac{1}{2}$ – $\frac{3}{4}$ in.; bracts spreading; flowers membranous; lateral sepals $\frac{1}{2}$ in. long, obovate-oblong, acute, 3-nerved; petals narrower; lip clawed, side lobes very narrow, elongate, recurved, midlobe much broader than long, formed of two falcately recurved lobes with an intermediate tooth; spur swollen above the narrow apex; anther shortly beaked; pollinia 2, globose, stipitate on the cuneiform strap, gland minute. *Capsule* $1\frac{1}{2}$ in., very slender.—A curious little plant with a longer column than usual in the genus.

23. ***S. recurvus***, *Hook. f. Ic. Plant. ined.*; peduncles much longer than the shortly loriform leaves, spike oblong, bracts broadly ovate densely imbricate acuminate recurved.

PERAK; Limbo Hills, in Larut, *King's Collector.*

Stem very short. *Leaves* 1–2 in., narrowed to the base, obtuse or retuse. *Peduncles* 4–5 in., rather stout; spike $\frac{1}{2}$ – $\frac{3}{4}$ in.; bracts very coriaceous; flowers not seen.

24. ***S. trichoglottis***, *Hook. f. Ic. Plant. ined.*; stem elongate, peduncles shorter than the shortly loriform leaves, spike short, bracts ovate-lanceolate, lip sessile saccate hirsute within, side lobes rounded hairy on both surfaces, midlobe a minute tooth.

PERAK, *Scortechini, King's Collector.* SINGAPORE, *Ridley.*

Habit and foliage of *S. Hystrix*, but sepals and petals much narrower, and lip hairy.—Described from *King's* specimen and drawings by *Scortechini* and *Ridley*, who has sent me a sketch of a flower of what appears to be this species from Singapore. The lateral sepals are inserted at the base of the footless column.

25. ***S. filiformis***, *Hook. f. Ic. Plant. ined.*; stem elongate, leaves

8–10 in. filiform terete, peduncle much shorter than the leaves, lip a spur-like cylindric sac with orbicular side lobes.

PERAK; at Larut, on branches of trees, *King's Collector*.

Stem in the only specimen 3 in.; sheaths $\frac{1}{2}$ in., strongly ribbed; roots very long and slender. *Leaves* about $\frac{1}{3}$ in. diam., flexuous. *Peduncles* $1\frac{1}{2}$ –3 in.; spike $\frac{1}{4}$ – $\frac{1}{3}$ in.; bracts $\frac{1}{2}$ in., broadly ovate, obtuse, fleshy; pedicel and ovary $\frac{1}{2}$ in.; flowers white; sepals $\frac{1}{2}$ in., oblong-lanceolate, obtuse, lateral adnate to the broad foot of the column; petals obtuse, 7-nerved; lip sessile, side lobes large, midlobe the lunate apex of the subcylindric round basal sac, calli 0; column very short, foot broad fleshy.—Flowers much like those of *S. Trimeni*, but habit very different.

26. *S. merguensis*, *Hook. f. Ic. Plant. ined.*; stem short, peduncles much shorter than the small linear-oblong leaves, bracts imbricate erect, capsule $1-1\frac{1}{2}$ in. linear terete beaked.

TENASSERIM; at Mergui, *Griffith (in Herb. Lindl.)*.

A remarkable little species, with the stem $\frac{1}{2}$ in. long, clothed with the imbricating bases of the distichous leaves, which are about an inch long. *Peduncles* $\frac{1}{2}$ –1 in., filiform; raceme $\frac{1}{2}$ in.; bracts ovate, acuminate. *Capsule* shortly pedicelled, $\frac{1}{8}$ in. diam., striate, beak $1\frac{1}{2}$ in.

Sect. VIII. CUCULLA, *Benth. in Gen. Plant.* iii. 575. (See p. 33.)

27. *S. lilacinus*, *Griff. Notul.* iii. 334; *Ic. Pl. Asiat.* t. 320, f. ii.; stem elongate, leaves amplexicaul ovate-cordate, peduncle very long, sepals and petals broadly ovate many-nerved, lip saccate, side lobes falcate obtuse, midlobe small recurved, disk with a prominent callus. *Walp. Ann.* vi. 499. *S. amplexicaulis*, *Reichb. f. in Walp. l. c.* *Dendrocolla amplexicaulis*, *Blume Bijdr.* 288. *Ærides amplexicaule*, *Lindl. Gen. & Sp. Orchid.* 239. *Orsidice amplexicaulis*, *Reichb. f. in Bonpland.* ii. 93. *Thrixspermum amplexicaule & lilacinum*, *Reichb. f. Xen. Orchid.* ii. 121.

MALAY PENINSULA; from Perak to Singapore, in marshes.—DISTRIB. Malay Islands.

Stem 2–3 ft., as thick as a goose-quill, decumbent, internodes 1–2 in.; roots very slender. *Leaves* $1\frac{1}{2}$ –2 in., tip rounded, sheaths smooth. *Peduncle* 8–10 in.; sheaths obtuse, appressed; raceme 1–8 in., few or many-fl'd.; rachis 4-angled; bracts $\frac{1}{2}$ in., obtuse, not imbricating; ovary very slender; sepals $\frac{1}{2}$ in., lateral adnate to the produced foot of the column, and petals white lilac or bluish; lip white, yellowish and pubescent within, base with a tuft of hairs; column very short; anther hyaline; pollinia 4, pairs very unequal, oblong, sessile on a reniform strap. *Capsule* 4–6 in., linear, straight, angles narrowly winged.

28. *S. Scopa*, *Reichb. f. mss. in Herb. Kew* (*Thrixspermum*); leaves linear-oblong sessile obtuse, peduncle rather longer than the leaves, sepals and petals lanceolate with very long capillary tails many-nerved, lip shortly stipitate saccate, side lobes falcate acute, midlobe small acute papillose, disk with a columnar callus.

PERAK; at Larut, on branches of trees, *King's Collector*.

Stem and roots like those of *S. lilacinus*; internodes 2 in. *Leaves* 3–4 in., coriaceous. *Peduncle* 2–3 in., at right angles to the stem; raceme 1 in.; bracts $\frac{1}{2}$ in., ensiform, subacute; sepals $1\frac{1}{2}$ long and petals many-nerved, margins of lip papillose.

29. *S. Scortechini*, *Hook. f.*; leaves oblong lorate 2-lobed, peduncle very long rather slender, sepals and petals lanceolate with long narrow tips, lip saccate, side lobes short, midlobe conical obtuse fleshy.

PERAK, *Scortechini*.

Stem 6 in., very stout, covered by the sheaths, internodes $\frac{3}{4}$ in. Leaves 4-6 by 1-1 $\frac{1}{2}$ in., coriaceous. Peduncle equalling or longer than the leaves (9 in. in *lc. Scort.*); raceme 2 in., bracts close set, $\frac{2}{3}$ in. long; sepals 2 $\frac{1}{2}$ in. long, $\frac{1}{4}$ in. broad at the base and petals yellow; lip yellowish, thickly mottled with rusty red outside; pollinia 4, 2 much smaller, adnate to the larger; gland lunate, strap oblong. Capsule 4-5 by $\frac{1}{2}$ in.—I know these noble species only from a drawing and description by Scortechini.

30. **S. Arachnites**, *Reichb. f. in Walp. Ann.* vi. 498; stem elongate, leaves loriform, peduncles shorter than the leaves, sepals and petals linear-lanceolate caudately acuminate 3-5-nerved, lip saccate, side lobes falcate, midlobe tongue-shaped laterally flattened obtuse puberulous. *S. serræformis*, *Reichb. f. l.c.* *Dendrocolla Arachnites*, *Blume Bijdr.* 287, t. 67. *Ærides Arachnites*, *Lindl. Gen. & Sp. Orchid.* 238. *Liparis serræformis*, *Lindl. in Wall. Cat.* 1946; *Gen. & Sp. Orchid.* 33 (*excl. Ceylon plant*). *Thrixspermum Arachnites*, *Reichb. f. Xen. Orchid.* ii. 121.

ASSAM, *Jenkins, Mann.* KHASIA MTS., alt. 4000 ft., *Clarke.* TENASSERIM and TAYOY, *Wallich, Parish.* PENANG, *Kunstler (lc. in Hort. Calcutt.).*—DISTRIB. Java.

Stem 6-12 in., curved or tortuous, internodes short; roots most numerous and long. Leaves 3-6 by $\frac{1}{2}$ - $\frac{2}{3}$ in. Peduncles many, 2-4 in., solitary or in pairs, bracts $\frac{1}{2}$ in.; sepals and petals 1 $\frac{1}{2}$ in., yellow; lip mottled with red; column very short; pollinia oblong, curved, strap very small, quadrate, gland still smaller, lunate. Capsule 2-2 $\frac{1}{2}$ in.

31. **S. complanatus**, *Hook. f.*; habit, foliage and inflorescence of *S. Arachnites*, but flowers very much smaller, sepals and petals $\frac{1}{3}$ - $\frac{1}{2}$ in. acute not caudate, lip a small sessile cup with an incurved minute midlobe and a callus in the concavity. *Dendrocolla serræformis*, *Lindl. Gen. & Sp. Orchid.* 33 (*the Ceylon plant only*); *Thwaites Enum.* 307. *Epidendrum complanatum*, *Retz Obs.* vi. 50. *Limodorum complanatum*, *Willd. Sp. Pl.* iv. 126; *Lindl. Gen. & Sp. Orchid.* 127.

CEYLON, *Macrae, Walker*; Ambagamowa and Saffragam districts, rare, *Thwaites*.

Like *S. Arachnites*. I can distinguish it only by the very different flower and form of the lip; and for these characters I am indebted to a copy of a drawing in the Peradeniya Bot. Garden. The leaves vary from 2-7 by $\frac{1}{2}$ - $\frac{2}{3}$ in., obtuse or unequally notched; the peduncle from 1-3 in., and the raceme from 1-5 in.; capsule 2-2 $\frac{1}{2}$ in., linear, straight; pollinia 4 in unequal pairs narrow, quite distinct, and without strap or gland in the figure.—There is a specimen of this in Herb. Rottler, without habitat, named *Epidendrum complanatum*, *Retz. Obs.* vi. 50.

32. **S. brachystachys**, *Hook. f.*; stem rigid, sheaths $\frac{1}{2}$ - $\frac{3}{4}$ in. strongly ribbed when dry, leaves oblong, peduncle with the few-fl. raceme much shorter than the leaves, sepals oblong and obovate-oblong petals obtuse, side lobes of sessile lip falcate incurved, midlobe as long fleshy oblong, spur scrotiform.

PENANG; on blocks of stone amongst decayed leaves, *Maingay*.

Stem as thick as a goose-quill. Leaves 2 $\frac{1}{2}$ -3 by $\frac{2}{3}$ -1 in., obtuse, notched. Peduncles at every node with the raceme 1 in., very stout, rigid; bracts 3-4, $\frac{1}{4}$ in. long, rounded; sepals and petals about 1 in. long, keel narrowly winged; column very short; anther low, not beaked.

33. **S. pauciflorus**, *Hook. f.*; stem rigid, leaves rather distant oblong obtuse, peduncle much shorter than the leaves 2-3-fl., sepals oblong-lanceolate acute, petals nearly as large obovate-oblong obtuse, lip stipitate,

side lobes broad rounded obtuse, midlobe small fleshy obtuse with a conic callus at its base, sac or spur short recurved obtuse.

PERAK; on the Larut range, alt. 3000 ft., *Scortechini*.

Stem $\frac{1}{2}$ in. diam., flexuous. *Leaves* $2\frac{1}{2}$ –3 by $1\frac{1}{4}$ – $1\frac{1}{2}$ in., coriaceous. *Peduncle* with raceme 1 in., basal sheaths imbricate; bracts $\frac{1}{2}$ in., subacute; sepals $\frac{3}{4}$ in. long, white; lip yellow, with a broad lamella between the side lobes; column very short; anther depressed; pollinia 2, each 2-lobed, strap short.

Sect. IX. RIDLEYA, gen. ? (See p. 33.)

34. *S. notabilis*, Hook. f. *Ic. Plant. ined.*; sepals and petals filiform from a narrowly lanceolate 3-nerved base, lip sessile at the base of the column deeply saccate, mouth dilated, tip contracted into a capillary tail.

SINGAPORE, *Ridley*.

Stem very short. *Leaves* $1\frac{1}{2}$ –2 in., subsessile, elliptic oblong, strongly striate when dry. *Peduncles* 3 or more from one point on the stem, $4\frac{1}{2}$ in. long, curved, naked; raceme $2\frac{1}{2}$ in., rachis $\frac{1}{4}$ in. diam. across the ovate incurved coriaceous subacute bracts; pedicel and ovary very slender, $\frac{1}{2}$ in. long; perianth very membranous, white? sepals and petals $\frac{3}{4}$ in. long, 3-nerved at the base; lip a large sac rounded at the base, delicately veined; column very short, foot 0; anther low, membranous, 2-celled; pollinia 2, clavate, sessile on a rather large gland.—A very singular and beautiful little plant, which I hesitate to remove from *Sarcophilus* as a genus, and dedicate to its discoverer. It closely resembles in flower *S. Arachnites*, but the stemless habit, foliage, inflorescence and footless column are very different.

SPECIES UNKNOWN TO ME OR IMPERFECTLY KNOWN.

THRIXSPERMUM FREEMANI, Reichb. f. in *Gard. Chron.* 1877, 749; dwarf, roots warted, leaves 6–7 by $1\frac{1}{4}$ in. ligulate unequally 2-toothed, racemes many-fl., bracts semioval larger than the small ovary, sepals linear long narrow, petals a little shorter, lip small saccate 3-toothed, with 4 small stipitate globose warted bodies before the base, centre white, lateral parts yellow with brown streaks.—Assam, *Freeman*.—Raceme like a yellow-brownish spotted broom.

S. SILLEMIANUS, Reichb. f. in *Gard. Chron.* 1882, i. 524; habit of *Vanda teres*, leaves slender elongate terete, peduncle 2-fl., bracts very short triangular, flowers milk-white suffused with yellow, mentum long, dorsal sepals elliptic, lateral cuneate-oblong, petals obtusely rhomboid, lip erect trifid, spur corniform nearly as long as the pedicel of the ovary, side lobes subquadrate striped with purple, midlobe shorter thick retuse 4-grooved, white outside with 2 purple blotches, yellow within, calli 0, column short thick, anther inappendiculate.—Burma?

S.—Sect. *Cuculla*; resembles *S. brachystachys*, but stem much more slender, internodes $\frac{3}{4}$ –1 in., not strongly ribbed when dry.—Mergui, *Griffith* (No. 1124).

S.—Sect. *Cuculla*; resembles *S. Arachnites*, but capsule 4 in. long and proportionately stout.—Perak, *Scortechini*.

S.—Sect. *Cuculla*; a very small species; stem 1–2 in., curved, peduncle 1 in., slender, bracts few distant acute, young capsule 1 in., very slender.—Khasia Hills, at Amwee, *J. D. H. & T. T.*

57. *TRICHOGLOTTIS*, Blume.

Epiphytes; stem elongate, leafy. *Leaves* distichous, flat, narrow. *Flowers* in branched panicles or solitary or few in very short racemes. *Sepals* and *petals* widely spreading oblanceolate or subspathulate. *Lip* adnate to the sides of the very short column, narrow, base saccate or spurred; side lobes one or two pairs of narrow processes; midlobe straight, or decurved from the middle, hairy. *Column* very short, sides produced into

2 spurs or horns; anther incompletely 2-celled; pollinia 2, globose, strap rather short, gland moderate.—Species 3 or 4? Malayan.

In the absence of good materials, I am doubtful as to the correctness of the above definition of *Trichoglottis*. Bentham refers Blume's *T. retusa* to *Saccolabium*; and by replacing that author's character of "lip adnate to the whole length of the column, with a process on each side," by "lip adnate to the foot of the column and forming with it a long horizontal spur-like mentum" and omitting that of a hairy lip, he excludes the others. I am disposed to regard the hairy-lipped species figured by Blume in his *Bijdragen* (*T. retusa*, 360, fig. viii.) as the type of the genus. That this is Kurz's and Reichenbach's view appears from the plants they have referred to it. In this case *Trichoglottis* is referable to the group with no foot to the column. There are amongst Scortechini's drawings of Perak Orchids, one or two that are referable to this genus, but the analyses are insufficient.

1. **T. Dawsoniana**, *Reichb. f. in Gard. Chron.* 1872, 699; flowers panicle pale green spotted with brown or purple, sepals and petals cuspidate on the back below the concave tip, lip saccate at the base tip 2-fid. *Cleisostoma Dawsoniana*, *Reichb. f. in Gard. Chron.* 1868, 815.

TENASSERIM; at Moulmein, *Parish*.

Stem 1–2 ft., stout, rooting. *Leaves* few 3–6 by $\frac{3}{4}$ –1 in.. *Panicle* 18 in., erect, stiff, branches spreading; bracts broadly ovate; pedicel with ovary $\frac{1}{2}$ in.; flowers 1–1 $\frac{1}{2}$ in. diam.; anther 2-lobed, crested; pollinia large, strap short slender.—Near *T. fasciata*, R. f., erroneously supposed to be a native of Ceylon, of which there is a fine drawing in Hort. Calcutt., giving Manilla as the habitat.

2. **T. quadricornuta**, *Kurz in Journ. Beng. As. Soc.* xlv. 156, t. 13; glabrous, leaves linear-lanceolate subsessile acuminate, flowers solitary or 3–4-panicled, sepals obovate-oblong obtuse, petals similar but narrower, lip strongly arched inflexed 2 posterior lobes acute twice as long as the basilar, with a hirsute callus between them, terminal lobes reflexed linear 2-fid, with a callus under the tip, spur subobtuse rather longer than the midlobe.

NICOBAR ISLANDS; forests of Kamorta, *Kurz*.

Leaves 2–3 $\frac{1}{2}$ in., base narrowed, twisted. *Flowers* leaf-opposed; pedicel $\frac{1}{2}$ in.; sepals $\frac{1}{2}$ in. long, lateral subfalcate; column very short; pollinia globose.—Description from Kurz l. c., I have seen no flowers.

58. **ÆRIDES**, *Lour.*

Epiphytes; stem leafy, pseudobulbs 0. *Leaves* linear, coriaceous. *Flowers* usually many and highly coloured, in dense or lax decurved racemes (few large or sessile in Sect. 1.). *Sepals* broad, spreading, lateral adnate to the base or foot of the column. *Petals* broad, spreading. *Lip* spurred, side lobes large small or 0; midlobe larger than the side lobes or smaller and incurved between them. *Column* short, foot long or short, rostellum short or long and bifid; anther 2-celled, beaked or not, pollinia 2, globose, sulcate; strap long or short, gland large or small.—Species about 10, Eastern Asiatic.

I am indebted for aid in determining the cultivated species of Sect. ii. & iii. to Messrs. Veitch for specimens, and to great knowledge of his assistant, Mr. Kent, and of Mr. Rolfe (of the Kew Herbarium) for valuable information respecting them.

Sect. I. *Leaves* terete, grooved in front. (See also *Æ. mitratum*.) *Peduncle* 1–2-fid. *Spur* slightly incurved, with a callus half way down the tube. *Anther* shortly beaked.

1. **Æ. Vandarum**, *Reichb. f. in Gard. Chron.* 1867, 997; 1875, 590; 1885, ii. 629, fig. 143; leaves 6–10 in., peduncle stout, side lobes of lip narrowly lanceolate, outer margin toothed, midlobe clawed tip dilated 2-partite. *Æ. cylindricum*, *Hook. Bot. Mag. t.* 4982 (not of *Lindl.*); *Lindl. in Journ. Linn. Soc.* iii. 41 (*the Sikkim plant*); *Warner Orchid. Alb.* iii. t. 116.

SUBTROPICAL SIKKIM HIMALAYA, alt. 5000 ft., *J. D. H.* KHASIA HILLS, alt. 4–5000 ft., *J. D. H. & T. T.* MUNNIPORE, alt. 4000 ft., *Watt.*

Stems 1–2 ft., tufted, as thick as a goose-quill; roots $\frac{1}{4}$ in. broad, flat. *Leaves* as thick as a duck's-quill. *Peduncle* 1–1½ in.; flowers 1½–2 in. diam., white; perianth with crisped margins; sepals obovate-oblong; petals broader; side lobes of lip flexuous, as long as the cylindric spur; segments of midlobe orbicular, toothed; pollinia globose; strap narrowly cuneate, gland large. *Capsule* 1½–2½ in., fusiform.

2. **Æ. longicornu**, *Hook. f. Ic. Plant. ined.*; leaves 6–8 in., peduncle very slender, side lobes of lip 2-partite, segments elongate subulate, midlobe narrow clawed, tip slightly dilated 2-fid. *Mesoclastes uniflora*, *Lindl. in Wall. Cat.* 1993; *Gen. & Sp. Orchid.* 45. *Luisia uniflora*, *Blume Rumph.* iv. 50; *Mus. Bot.* i. 64; *Lindl. Fol. Orchid.* 3.

NEPAL, *Wallich.* UPPER ASSAM; Naga Hills, alt. 5500 ft., *Clarke.*

Much more slender than *Æ. Vandarum*. *Leaves* as thick as a sparrow-quill. *Peduncle* 1 in.; flowers 1 in. diam., white; perianth with crisped margins; lateral sepals much larger than the orbicular-oblong petals; side lobes of lip shorter than the long spur, segments curved forwards, outer shortest, midlobe membranous, lobes divaricate. *Capsule* 2 in., fusiform; peduncle and pedicel very slender.

3. **Æ. cylindricum**, *Lindl. in Wall. Cat.* 7317; *Gen. & Sp. Orchid.* 240; leaves 2–6 in., peduncle short stout, side lobes of lip oblong obtuse, midlobe short cuneiform fleshy many-ridged. *Wight Ic. t.* 1744; *Gard. Chron.* 1875, i. 537; 1886, i. 405, fig. 81. *Epidendrum subulatum*, *Retz Obs.* vi. 50. *Limodorum subulatum*, *Willd. Sp. Pl.* iv. 126. *Cymbidium elegans*, *Herb. Heyne.*

DECCAN PENINSULA; from the Coorg Hills, *Heyne*, to Travancore, *Wight*, &c.

Stem elongate, as thick as a goose-quill. *Leaves* as thick as a crow-quill, very obliquely acuminate. *Flowers* 2–3, 1½ in. diam., white or tinged with pink; sepals obovate-oblong, obtuse, lateral decurved; petals broader, shorter; side lobes of lip erect, nearly as large as the midlobe, which is yellowish at the base; spur recurved; column rather long; strap of pollinia short, broad. *Capsule* 2 in., fusiform or subclavate.—The ridged lip is that of *Vanda*.

Sect. II, *Leaves* lorate, keeled (semi-terete in *Æ. mitratum*). Side lobes of lip very small, midlobe large; spur incurved.

* *Lip horizontal or inflexed.*

4. **Æ. mitratum**, *Reichb. f. in Bot. Zeit.* 1864, 415; leaves very long filiform, side lobes of lip minute uncinate, midlobe broadly ovate retuse, spur short inflated. *Bot. Mag. t.* 5728.

TENASSERIM; at Moulmein (*Hort. Day*).

Stem 1–2 in., and roots very stout. *Leaves* 2–3 ft., $\frac{1}{2}$ in. diam., deeply grooved above. *Racemes* many, suberect, 3 in. long, cylindric; peduncle very stout; bracts minute, acute; flowers $\frac{2}{3}$ in. diam.; petals and sepals subsimilar, oblong, tips rounded, white or tipped with violet; lip longer and broader than the sepals, violet; spur contracted at the neck, inflated, compressed, base truncate, obtuse, tip pointing forwards.

5. **Æ. multiflorum**, *Roxb. Cor. Pl.* iii. 63, t. 271; *Fl. Ind.* iii. 475; midlobe of lip hastately ovate tip rounded, spur short straight. *Belg. Hortic.* 1876, 286; *Walp. Ann.* vi. 897. *Æ.* affine, *Wall. Cat.* 7316;

Lindl. Gen. & Sp. Orchid. 239; *Sert. Orchid.* t. 15; in *Journ. Linn. Soc.* iii. 41; *Bot. Mag.* t. 4049; *Warner, Sel. Orchid. Ser.* i. t. 21. *Æ. roseum*, *Lodd., ex Paxt. Fl. Gard.* ii. 109, t. 60; *Jard. Fleur.* ii. t. 200; *Gartenfl.* viii. 253, t. 267; *Ill. Hort.* iii. t. 88. *Æ. Lobbii*, *Hort. ex. Ill. Hort.* 1868, t. 559 (an *Teism. & Binn.*?). *Æ. Veitchii*, *Hort. ex Morren in Belg. Hortic.* 1876, 291; *William's Man.* 70. *Æ. trigonum*, *Klotzsch. in Otto & Dietr. Allgem. Gartenz.* 1855, 177. *Epidendrum geniculatum*, *Herb. Ham.*

TROPICAL HIMALAYA; from Garwhal eastwards, the KHASIA HILLS, and southward to TENASSERIM.

Stem 4–10 in., stout. *Leaves* 6–8 in., deeply channelled and keeled, variable in breadth, 2-lobed. *Racemes* 6–12 in., rarely branched, shortly peduncled; flowers $\frac{3}{4}$ –1 $\frac{1}{4}$ in. diam., rose purple, sometimes spotted with darker; sepals and petals subequal, oblong, tips rounded; lip twice as long, sides recurved, claw geniculately inflexed, spur $\frac{1}{4}$ as long as the midlobe, pointing forwards under it with an incurved fleshy 2-lobed callus on the base of the midlobe; column beaked; anther long-beaked, strap long slender. *Capsule* $\frac{3}{4}$ –2 in., subclavate, stoutly pedicelled.—Common and variable. Lindley overlooked Roxburgh's works. In Griffith's Eastern Himalayan collections, a fruiting specimen of which is a different species, or perhaps a very large var. of this or the following, with leaves 12–14 by 1 $\frac{1}{2}$ in., and a stout raceme 12–16 in., the capsules are of *multiflorum*.

6. *Æ. Fieldingii*, *Lodd. ex Morren in Belg. Hortic.* 1876, 286, t. 10; characters of *Æ. multiflorum*, but a much more robust plant, with a different habit of growth, and an acute apex of the hastate midlobe of the lip. *Jenning's Orchid.* t. 20; *Reichb. f. in Hamb. Gartenzeit.* 1855, 225; *Morren. Belg. Hortic.* 1876, 286. *Æ. Williamsi*, *Warner Sel. Orchid. Ser.* i. t. 21.

SIKKIM HIMALAYA and ASSAM.

I am indebted to Mr. Kent, of Messrs. Veitch's establishment, for calling my attention to the differences between this and *Æ. multiflorum*. They are difficult of detection in Herbarium specimens. According to the published figures the flowers vary in colour, white, red, and purple. *Æ. Williamsi* is a white flowered variety. The figure of *Æ. affine* in *Bot. Mag.* (cited above under *multiflorum*) is referred to *Fieldingii* by Morren, but it is of far too slender a habit.—The Foxbrush Orchid. of gardens.

7. *Æ. maculosum*, *Lindl. in Bot. Reg.* 1845, t. 58; in *Gard. Chron.* 1845, 691; midlobe of lip ovate tip broad obtuse or retuse margins undulate, spur slender uncinately incurved. *Paxt. Mag. Bot.* xii. t. 49; *Walp. Ann.* v. 897; *Pescatorea*, i. t. 33; *Lindenia*, i. t. 11. *Saccolabium speciosum*, *Wight Ic.* t. 1674, 1675.

WESTERN GHATS; from the Concan to Travancore. RAJPOOTANA; on Mt. Abo.

Near *Æ. multiflorum*, but stem shorter, leaves more flat, racemes more often branched, flowers larger but very variable in size, pale spotted with purple, tip bright rose, spur longer and more slender.—Var. *Schraderi*, *Jard. Fleurist.* t. 54; *Gardner's Mag. Bot.* ii. 121, with fig.; *Pescatorea*, t. 36. *Æ. illustre*, *Reichb. f. in Gard. Chron.* 1882, 7, is a robust form with fewer shorter leaves, and large flowers blotched with purple, and amethystine tip.

8. *Æ. crispum*, *Lindl. in Wall. Cat.* 7319; *Gen. & Sp. Orchid.* 239; in *Bot. Reg.* 1841, t. 55; in *Gard. Chron.* 1842, 711 (with fig.); in *Journ. Linn. Soc.* iii. 41; midlobe of lip large broadly ovate-oblong obscurely 3-lobed crenate or toothed, spur very short obtuse. *Bot. Mag.* t. 4427; *Dalz. & Gibs. Bomb. Fl.* 265; *Flore des Serres*, v. t. 48; *Walp. Ann.* vi. 896; *Ill. Hort.* 1847, 123; *Gard. Chron.* 1859, 24, with Fig.; *Belg. Hortic.* 1876, 287; *Warner Orchid. Alb.* vii. t. 293 (var.). *Æ. Lindleyanum*, *Wight*

Ic. t. 1677 bis.; *Lindl. in Journ. Linn. Soc.* iii. 41; *Wall. l. c.* 879. *Æ. Brookeii*, *Lindl. in Gard. Chron.* 1841, 518; 1842, 559; *Batem. in Bot. Reg.* 1841, *Misc.* 55; *Paxt. Mag. Bot.* ix. t. 145; *Flore des Serres*, t. 151. *A. Warneri*, *Hort.*

WESTERN GHATS; from the Concan to Travancore.

Stem 4–10 in., very stout. *Leaves* 4–8 in., from oblong to lorate, variable in breadth, thickly coriaceous, lobes unequal rounded. *Racemes* 8–12 in., inclined or drooping, simple or branched; pedicels very robust; flowers $1\frac{1}{2}$ in. diam., sweet-scented; sepals and petals very broad, pale rose; lip geniculately inflexed at the claw, rose or purple, 2-cornute at the base; spur much shorter than the blade, and projecting forwards under it; anther long-beaked, strap of pollinia slender below, dilated above. *Capsule* $1\frac{1}{2}$ –2 in., clavate or pyriform, angles subulate.—I find no character whereby to separate *Æ. Lindleyanum*. *Lindley* says of *Æ. Brookeii*, more odorous than *Æ. odoratum*.

9. *Æ. falcatum*, *Lindl. in Paxt. Fl. Gard.* ii. 142; side lobes of lip half as long as the clawed midlobe dimidiate oblong or falcate, midlobe ovate or ovate-cordate sides replicate erose, spur parallel to the midlobe and concealed under it. *Reichb. f. Xen. Orchid.* i. 220, t. 92; *Morren Belg. Hort.* 1876, 288; *Walp. Ann.* vi. 897. *Æ. Larpentae*, *Hort. Makoy Prix Cour.* 1862; *Reichb. f. in Otto & Dietr. Gartenz.* 1856, 219. *Æ. retrofractum*, *Wall. mss.*

TENASSERIM, *Wallich, Parish, &c.*

Stem 6–8 in., robust. *Leaves* 8–12 by $1-1\frac{1}{2}$ in. *Raceme* decurved or pendulous, lax-fid.; flowers $1-1\frac{1}{2}$ in. diam., white, pale-violet, purple or pink; sepals and petals often, tipped with a darker shade, and lip usually darker; lateral sepals with a very broad base; column beaked; foot elongate; anther long-beaked; strap of pollinia slender, gland small.

10. *Æ. crassifolium*, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 145; characters of *Æ. falcatum*, but much more robust, with shorter leaves, dark purple flowers and the spur geniculate at the base and not hidden under the midlobe of the lip. *Reichb. f. in Gard. Chron.* 1877, i. 633, and ii. 492, fig. 96; *Olia Hamburg.* 43; *Warner Sel. Orchid. Ser.* 3, t. 12. *Æ. expansum*, *Reichb. f. l. c.* 1882, ii. 40.

TENASSERIM; at Moulmein, *Parish*.

Very nearly allied to *Æ. falcatum*, the chief difference being the form of the spur and that the sides of the midlobe of the lip are so reflected as that their under surfaces meet.—Var. *Leonæ*, *Reichb. f. in Bull. Soc. Tor. d'Orticult.* x. t. 14; *Williams' Orchid. Man.* t. 14, is described as having retuse side lobes of the lip and an expanded midlobe.

** *Lip deflexed.*

11. *Æ. radicosum*, *A. Rich. in Ann. Sc. Nat. Ser.* xv. 65, t. i. c.; stem short very stout, leaves 4–10 by $\frac{3}{4}-1\frac{1}{4}$ in. unequally 2-lobed, racemes or panicles very stout rarely exceeding the leaves, sepals orbicular and rather smaller petals 5-nerved, side lobes of lip minute, midlobe ovate, disk with 2 large basal calli, spur longer than the sepals stout incurved obtuse. *Saccolabium Wightianum*, *Lindl. in Wall. Cat.* 7303 (*in part*); *Gen. & Sp. Orchid.* 221 (*excl. Syn.*); *in Journ. Linn. Soc.* iii. 36 (*excl. Khasia*); *Wight Ic.* t. 917. *S. rubrum*, *Wight Ic.* 1673 (*not of Lindl.*). *S. ringens*, *Lindl. in Wall. Cat.* 7313; *Gen. & Sp. Orchid.* 220; *in Journ. Linn. Soc.* iii. 36; *Walp. Ann.* vi. 884.

The DECCAN PENINSULA; on the Nilghiri and Pulney Hills, and at Quilon, *Wight, &c.*

Stem as thick as the thumb. *Leaves* leathery, rigid, mottled with purple in

Wight's *S. rubrum*. *Peduncle* very short and stout; raceme simple or sparingly branched, rachis stout; bracts minute; flowers $\frac{3}{8}$ in. diam., bright red in Wight's *S. rubrum*, nearly white with rosy tips in his *S. Wightianum*; spur about as long as the blade of the lip, incurved, obtuse; anther beaked; strap of pollinia short, subtriangular, gland large. *Capsule* $\frac{3}{8}$ in. long, pyriform, angled and grooved.

12. *Æ. lineare*, *Hook. f.*; stem short stout, leaves 6–12 by $\frac{1}{2}$ – $\frac{3}{4}$ in. very unequally 2-lobed, panicle long peduncled much branched longer than the leaves, flowers as in *Æ. radicosum*, but rather smaller rose-cold. *Saccolabium lineare*, *Lindl. in Wall. Cat.* 7312. *S. paniculatum*, *Wight Ic. t.* 1676; *Reichb. f. in Bonpl. iii.* 225. *Cymbidium lineare*, *Herb. Heyne.*

DECCAN PENINSULA; on the Ghats from Canara southwards, alt. 5–7500 ft., *Wight, &c.* CEYLON; in the Doombura district, *Thwaites.*

As far as I can judge from dried specimen *Æ. lineare* is with difficulty distinguishable from *Æ. radicosum*, except by the more slender very much branched panicle, and rather smaller flowers. Wallich's specimens of *Sacc. lineare* are very bad.—The synonyms of this and the preceding may be mixed.

Sect. III. *Leaves* lorate, keeled. Midlobe of *lip* incurved between the much larger side lobes.

13. *Æ. odoratum*, *Lour. Fl. Coch.* 525; lobes of leaf large rounded, lateral sepals much larger than the dorsal and petals, midlobe of lip oblong-lanceolate acute entire or erose. *Lindl. Gen. & Sp. Orchid.* 239; in *Journ. Linn. Soc. iii.* 41; *Bot. Mag.* 4139; *Past. Fl. Gard. ii.* t. 143; *Flor. Cal. ii.* 75; *Maund Botanist. iv.* t. 180; *Knowles & West. t.* 75; *Hartm. Parad. ii.* t. 4; *Walp. Ann. vi.* 898, *Lindenia*, t. 14 (*var.*). *Æ. cornutum*, *Roxb. Hort. Beng.* 63; *Fl. Ind. iii.* 472; *Bot. Reg. t.* 1485.

TROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, *J. D. H.* The KHASIA HILLS, SILHET, CHITTAGONG and TENASSERIM. The CONCAN, *Heyne in Herb. Rottl.*—DISTRIB. Java, China, Cochin-China.

Stem 4–12 in., very stout. *Leaves* 6–10 by $\frac{3}{4}$ –1 $\frac{1}{2}$ in. *Racemes* many, 10–12 in.; peduncle and rachis stout; flowers purple to nearly white, sweet-smelling, often purple-spotted or -tipped; side lobes of lip subcuneate, midlobe short; spur very large, uncinately incurved; column short; anther obtuse; strap of pollinia not long, linear, gland small. *Capsule* 1–1 $\frac{1}{2}$ in., oblong-clavate, angles obtuse; pedicel $\frac{1}{2}$ in., very stout.

VAR. *bicuspidata*; midlobe of lip with a bicuspidate tip.—MALACCA, *Maingay (Kew Distrib.* 1648). PERAK (*Ic. in Hort. Calcut.*). A specimen of this sent from Calcutta (Garden?) to Herb. Hooker by Dr. Carey is named by the latter *Æ. cornutum*.

14. *Æ. suavissimum*, *Lindl. in Journ. Hort. Soc. iv.* 263; in *Past. Fl. Gard. ii.* 141, t. 66; differs from *Æ. odoratum* in the midlobe of the lip being longer and emarginate. *Jard. Fleur. t.* 213; *Rolfe in Gard. Chron.* 1890, i. 43; *Walp. Ann. vi.* 898. *Æ. Reichenbachii*, *Linden in Koch & Fintelm. Wochenschrift*, 1858, 61; *Reichb. f. Xen. Orchid. ii.* 11, t. 104. *Æ. nobile*, *Warner Sel. Orchid. Ser. 1. t.* 11; *Gartenfl.* 40, t. 641. *Æ. Rohanianum*, *Reichb. f. in Gard. Chron.* 1884, i. 206. *Æ. flavidum*, *Lindl. in Past. Fl. Gard. ii.* 101. *Æ. Ballantianum*, *Reichb. f. in Gard. Chron.* 1885, ii. 198.

PENANG and BURMA.

Said to be the sweetest scented species of the genus, but more definite characters are wanting to distinguish it from *Æ. odoratum*. The sepals and petals are rosy with often darker tips, the spur yellow mottled red. *Æ. Ballantianum* is an early flowering form.

15. *Æ. Emericii*, *Reichb. f. in Gard. Chron.* 1882, 586; lobes of

leaf long narrow subacute, sepals longer than the petals, midlobe of lip lanceolate acute.

ANDAMAN ISLANDS, *Berkeley*.

Stem 6-8 in. *Leaves* 10-12 by $\frac{3}{4}$ - $1\frac{1}{2}$ in., lobes much longer than in *Æ. odoratum*. *Racemes* 6-8 in.; flowers $\frac{1}{2}$ in. diam., pale lilac, pedicels 1 in., side lobes of lip rounded, entire; spur short, stout; foot of column very short; anther shortly beaked; strap of pollinia long, linear.—Much the smallest flowered of the Indian species.

SPECIES UNKNOWN TO ME.

Æ. BORASSI, *Ham. ex. Smith in Rees Cyclop.* xxxix. No. 8, is undeterminable.

Æ. DECUMBENS, *Griff. Notul.* iii. 365 (*without descript.*); *Ic. Plant. Asiat.* t. 320, fig. 1; *Lindl. in Journ. Linn. Soc.* iii. 423; from Mogoung in Burma. *Stem* very short. *Leaves* 2-4 in., elliptic, acute, many-nerved; peduncles several, short, stout, few-fl.; bracts small, triangular; pedicels with ovary $\frac{3}{4}$ in., erect; flowers $\frac{3}{4}$ in. diam.; lateral sepals very broad, obtuse.—This has the habit of a *Phalænopsis*.

Æ. LASIOPETALUM, *Willd. Sp. Pl.* iv. 130, is undeterminable.

Æ. LEPIDUM, *Reichb. f. in Gard. Chron.* 1883, i. 466; leaves lorate obtusely 2-lobed, flowers white ascending, sepals and petals subequal oblong apiculate, tips and of lip and spur purple, side lobes of lip short triangular, midlobe larger triangular, spur filiform curved as long as the pedicelled, with a slender curved ascending tooth in the middle of the cavity.—British India, *Berkeley*.

Æ. MENDALII, *Jenning's Orchid. under t.* xxx., without description, is probably *Æ. falcatum*.

Æ. PACHYPHYLLUM, *Reichb. f. in Gard. Chron.* 1880, ii. 230; leaves short most fleshy obtusely unequally 2-lobed, raceme short few-fl., sepals and rather shorter petals oblong-ligulate obtusely acute crimson-lake, side lobes of lip subtriangular short, midlobe purple triangular minute, spur white cylindric obtuse inflated longer than the pedicelled ovary, column white.—Burma (*Hort. Veitch.*).

Æ. RIGIDUM, *Ham. ex. Smith in Rees Cyclop.* xxxix. No. 12, is undeterminable.

59. **RENANTHERA**, *Lour.*

Epiphytes; stem elongate, branched, leafy; pseudobulbs 0. *Leaves* rigid, 2-lobed. *Flowers* large or medium sized, in lateral spreading panicles. *Sepals* narrow, widely spreading, dorsal erect, lateral deflexed or placed under the lip, oblanceolate or spatulate, at first parallel or connate. *Petals* narrow. *Lip* very small sessile, jointed on the base of the column, saccate, side lobes erect. *Column* short, truncate, foot 0; pollinia large, 2-grooved or 2-partite, strap short, gland transverse.—Species 5, Indian, Chinese and Malayan.

1. ***R. coccinea***, *Lour. Fl. Coch. Ch.* ii. 637; flowers 2-2 $\frac{1}{2}$ in. diam., lateral sepals free, much larger than the dorsal, midlobe of lip ovate-lanceolate recurved. *Lindl. Gen. & Sp. Orchid.* 217; *Bot. Reg.* t. 1131; *Bot. Mag.* t. 2997-8; *Part. Mag.* t. 49; *Reichb. Fl. Exot.* t. 114; *Walp. Ann.* vi. 875.

TENASSERIM; at the Moscos Isds., opposite Tavoy, *Parish*.—DISTRIB. Coch. China.

Stem 1-3 ft., stout. *Leaves* 2-4 in., distant, oblong or shortly lorate. *Peduncle* 2-3 ft., erect; branches long, divaricate, lax-fl.; bracts very small, broad; lateral sepals scarlet, dorsal and petals linear, orange-red, spotted; lip yellow, tip of small spur and midlobe scarlet; strap of pollinia linear acute.

2. ***R. elongata***, *Lindl. Gen. & Sp. Orchid.* 218; flowers $\frac{3}{4}$ in. diam., sepals subequal lateral free, midlobe of lip tongue-shaped revolute with 2

basal calli. *Reichb. f. Xen. Orchid.* i. 88; *Walp. Ann.* vi. 876. *R. matutina*, *Lindl. in Bot. Reg.* 1843, t. 41 (not of *Gen. & Sp.*); *Prescatorea*, i. t. 11. *R. micrantha*, *Blume Mus. Bot.* i. 60; *Reichb. f. l. c.* i. 87. Saccolabium reflexum, *Lindl. in Wall. Cat.* 7309; *Gen & Sp. Orchid.* 225.

SINGAPORE, *Wallich*. PERAK, *Scortechini*, &c. MALACCA, *Griffith* (*Kew Distrib.* 5212), *Maingay* (*K. d.* 1644)—DISTRIB. Malay Islands.

Habit and foliage of *R. coccinea*, but much more slender, bracts ovate reflexed, flowers much smaller and more numerous, orange yellow with red spots. *Lip* with the side lobes short, broad, margins revolute; spur large, cylindric, obtuse, somewhat recurved; strap of pollinia linear acuminate, gland small. *Capsule* 1 in., fusiform, angles acute.—King's collector describes the flowers as dark-red.

3. *R. angustifolia*, *Hook. f. Ic. Plant. ined.*; flowers $1\frac{1}{2}$ in. diam., lateral sepals lanceolate abruptly clawed, at first connate, midlobe of lip minute acute recurved.

PERAK; on Gunong Bata Pateh, *Wray*.

Stem as thick as a goose-quill. *Leaves* 4-5 by $\frac{1}{2}$ - $\frac{3}{4}$ in., linear, recurved. *Scape* long, sparingly branched; pedicel with ovary $1-1\frac{1}{4}$ in.; lateral sepals inserted by a point, and narrower dorsal acuminate; side lobes of lip very small, rounded; spur conico-cylindric; top of column hispid; pollen large, oblong, strap broad, gland large.

SPECIES UNKNOWN TO ME.

R. HISTRIONICA, *Reichb. f. in Gard. Chron.* 1878, ii. 74; low, leaves lanceolate acuminate, raceme laxly few-fl., sepals and petals cuneately ligulate obtusely acute, lip 3-fl., side lobes triangular, midlobe ligulate acute with two incumbent triangular or quadrate lamellæ at its base, spur short conic.—Singapore? or Malacca?, *Hort. Day*. Flowers yellow purple spotted and margined, lip white, side lobes spotted with purple, spur orange, column yellow and purple.—The first species with acuminate leaves.—Description from *Reichb. l. c.*

60. **VANDA**, *Br.*

Epiphytes; stem leafy. *Leaves* very coriaceous or fleshy, flat keeled or terete. *Flowers* usually large, highly coloured, in simple lax or dense racemes. *Sepals and petals* subequal, spreading or incurved, bases narrowed. *Lip* large, base usually saccate or spurred, side lobes large or small (rarely 0), placed on the sides of the sac or spur; midlobe various, fleshy, disk usually ridged or lamellate. *Column* short, stout; foot not or very shortly produced; anther 2-celled; rostellum obscure; pollinia 2, didymous, subglobose or obovoid, strap broad short or long geniculate, gland rather large (slender in § *Anotis* and gland small).—Species about 20, tropical Asiatic and Australian.

Sect. I. EUVANDA. *Sepals and petals* widely spreading (not incurved). *Lip* with erect side lobes. *Strap* of pollinia flat, geniculate, gland large.

* Leaves terete. *Scape* few-fl. See also *Ærides cylindricum*.

1. *V. teres*, *Lindl. in Wall. Cat.* 7324; *Gen. & Sp. Orchid.* 217; *Fol. Orchid.* 7; in *Bot. Reg.* t. 1809; midlobe of lip 2-fl., lobes hatchet-shaped, sac long conical. *Bot. Mag.* t. 4114; *Paxt. Mag.* v. t. 193; *Griff. Notul.* iii. 352; *Warn. Sel. Orchid. Ser.* iii. t. 2; *Reichenbachia*, i. t. 27; *Rev. Hort.* 1856, t. 22. *Dendrobium teres*, *Roxb. Fl. Ind.* iii. 485.

LOWER BENGAL; at Seeb Sagur, *Clarke*. ASSAM, SILHET, the KHASIA HILLS, CHITTAGONG and UPPER BURMA, *Roxburgh*, *Wallich*, &c.

Stem many feet long, branched, and leaves as thick as a goose-quill. *Leaves* 6-8 in. *Peduncle* 6-12 in.; bracts short, ovate; flowers 3-6, 4 in. diam., white or

rose-cold; sepals and petals undulate; lip hairy towards the base; side lobes broad, incurved, yellow within, crimson spotted; midlobe much larger, flabellately reniform purple or rose-cold., sac 1 in. long; column hairy in front. *Capsule* 1 in., clavate.

2. **V. Hookeriana**, *Reichb. f. in Bonpland*. 1856, 324; *in Gard. Chron.* 1882, ii. 488; midlobe of lip very large reniformly flabellate 3-lobed, sac very short. *Ill. Hort.* 1883, t. 484; *Orchidoph.* 1886, t. 158; *Reichenbachia*, ii. t. 74. *Warner Orchid. Alb.* t. 73, 1882.

PERAK, *Scortechini*; in swamps, *Wray*. SINGAPORE, *Ridley (in litt.)*.

Habit of *V. teres*, but leaves shorter, 2-3 in.; scape longer; flowers 3-5, 2 in. diam.; lateral sepals oblong or obovate-oblong, cream-cold; petals broader, lilac or carnation; lip towards the base and column hairy; side lobes purple; midlobe as large as the rest of the flowers, white or lilac, base 2-glandular; sac conical, obtuse. *Capsule* 4 in.

** Leaves flat or chanelled and keeled. Scape usually many-fld.

† Flowers $\frac{1}{2}$ -1 $\frac{1}{2}$ in. diam. (See also *V. Bensoni*.)

3. **V. parviflora**, *Lindl. in Bot. Reg.* xxx. Misc. 45; peduncle and raceme strict erect, flowers $\frac{1}{2}$ - $\frac{2}{3}$ in. diam., sepals oblong and spatulate petals yellow, lip rather shorter than the sepals, midlobe cuneate-obovate with a dilated truncate 2-lobed tip, disk with fleshy blue ridges, spur slender conical half as long as the lip. *Wight Ic.* t. 1669; *Reichb. f. in Gard. Chron.* 1877, 166. *Ærides Wightianum*, *Lindl. in Wall. Cat.* 7320; *Gen. & Sp. Orchid.* 238; *in Journ. Linn. Soc.* iii. 40; *Bot. Mag.* t. 5138; *Wight Ic.* v. p. 8; *Dalz. & Gibs. Bomb. Fl.* 265.

WESTERN HIMALAYA; Kumaon, Atakmunda river, alt. 3-4000 ft., *Edgeworth*. NEPAL, *Wallich*. ASSAM, *Mann*. BURMA, *Berkely*. WESTERN PENINSULA; from the Coucan to Travancore. CEYLON, *Walker, &c.*

Stem 4-6 in. Leaves 4-8 by $\frac{1}{2}$ - $\frac{3}{4}$ in., unequally obtusely 2-lobed. Peduncle and rachis stout; pedicel with ovary 1-1 $\frac{1}{2}$ in.; side lobes of lip small, ovate. *Capsule* 1-1 $\frac{1}{4}$ in., long pedicelled, clavate.

Var. *testacea*; sepals and petals brown. *V. testacea*, *Reichb. f. in Gard. Chron.* 1877, 166. *Ærides testaceum*, *Lindl. Gen. & Sp. Orchid.* 238; *Pact. Fl. Gard.* ii. t. 142; *Walp. Ann.* v. 897.—Ceylon.

Var. *albiflora*; sepals and petals white, lip white, ridges speckled with red, spur broader obtuse.—Moulmein (*Ic. Parish*).

4. **V. cœrulescens**, *Griff. Notul.* iii. 352; *Ic. Plant. Asiat.* t. 331; raceme drooping, flowers 1-1 $\frac{1}{2}$ in. diam., sepals obovate and spatulate, petals pale blue, lip rather shorter than the sepals, midlobe cuneate-obovate with a dilated truncate 2-lobed tip, disk with fleshy dark blue ridges, spur slender conical half as long as the lip. *Lindl. Fol. Orchid.* 9; *Walp. Ann.* vi. 868; *Bot. Mag.* t. 5834 and 6328; *Warner Orchid. Alb.* t. 48; *Floral Mag. N. S.* t. 256; *Orchidoph.* 1863, t. 637; *Reichb. f. in Gard. Chron.* 1869, 498; 1870, 529, f. 97.

UPPER BURMA, *Griffith*. PEGU; on hills near Prome, alt. 1500 ft., *Benson*.

Stem 6 in. Leaves 6-10 by $\frac{2}{3}$ in., much broader in cultivation, acutely 2-fid or 3-fid. Peduncle with racemes 1 ft. or less; pedicel with ovary 1-1 $\frac{1}{2}$ in.; flowers variable in colour, from blue to nearly white (vars. *Bozallii*, R. f. and *Louriana*, R. f.); spur and column blue.

5. **V. spathulata**, *Spreng. Syst. Veg.* iii. 719; leaves short, peduncle very tall, raceme terminal few-fld., flowers 1 $\frac{1}{4}$ in. diam. golden yellow, sepals and petals spatulately oblong flat, lip clawed as long as the sepals, side lobes very small, midlobe suborbicular. *Lindl. Gen. & Sp. Orchid.* 216; *Fol. Orchid.* 9; *Wight Ic.* t. 915; *Walp. Ann.* vi. 869. Epidendrum

spathulatum, *Linn. Sp. Pl.* 1348. *Limodorum spathulatum*, *Willd. Sp. Pl.* iv. 125. *Ærides maculatum*, *Smith in Rees Cyclop. Suppl.*—*Rheede Hort. Mal.* xii. t. 3.

WESTERN PENINSULA; from Malabar to Travancore and CEYLON.

Stem 2 ft. *Leaves* 2-4 by $\frac{1}{2}$ -1 $\frac{1}{4}$ in., shortly obtusely 2-lobed. *Peduncle* 12-18 in., robust, few-fl. and at the tip only; bracts large, ovate, acute; pedicel and ovary 1-1 $\frac{1}{2}$ in.; side lobes of lip broadly obovate, midlobe obscurely 3-fl.; spur conical. *Capsule* 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in., clavately fusiform.

†† *Flowers* 2 in. diam. and upwards (smaller in *V. Bensoni*).

6. **V. cœrulea**, *Griff. ex Lindl. in Bot. Reg.* 1847, under t. 30; *Fol. Orchid.* 8; peduncle elongate many-fl., flowers 3-4 in. diam. pale blue, lateral sepals obovate, petals clawed broadly obovate, lip much shorter than the sepals dark blue linear-oblong, side lobes small rounded, midlobe with 2 thickened ridges ending in a bigibbous tip. *Paxt. Fl. Gard.* t. 36; *Jard. Fleurist.* t. 102; *Fl. des Serres.* t. 609; *Reichb. f. Xen. Orchid.* i. 8, t. 5; *Pescatorea*, i. t. 29; *Ill. Hort.* vii. t. 246; *Warner Sel. Orchid.* t. 18; *Jennings Orchid.* t. 34; *Reichenbachia*, ii. 19, t. 57; *Lindenia*, iv. t. 160 *V. cœrulescens*, *Journ. Hort. Soc.* vi., *Proc.* vii. with fig. *Vanda*, *Griff. Itin. Notes*, 88, No. 1284.

KHASIA and JYNTEA MTS., on oaks, alt. 4000 ft., *Griffith*, &c.

Stem 3-6 in., very stout. *Leaves* 3-10 by $\frac{3}{4}$ -1 in., keeled, 2-lobed or tip obliquely truncate and toothed. *Peduncle* with lax-fl. 6-20-fl. raceme 1-2 ft., perianth segments somewhat waved and obscurely tessellate; lip not one-third the length of the sepals; spur conical obtuse. *Capsule* 3 in., fusiform, long pedicelled.

7. **V. Denisoniana**, *Benson & Reichb. f. in Gard. Chron.* 1869, 528; 1885, 105, f. 21; peduncle very short, flowers 2 in. diam., white, sepals and petals waved and twisted, lateral sepals largest broadly obovate falcate deflexed, petals clawed spathulate, lip longer than the sepals, side lobes large subquadrate, midlobe panduriform with two orbicular diverging and recurved terminal lobes. *Bot. Mag.* t. 5811; *Ill. Hort. N. S.* t. 105; *Lindenia*, t. 21; *Warner Orchid. Alb.* t. 248.

TENASSERIM; at Moulmein, *Parish*. ARRACAN, *Benson*.

Stem short. *Leaves* 6-10 in., deeply unequally 2-lobed. *Peduncle* stout, with the raceme 6-10 in.; pedicels with ovary 2 in.; midlobe of lip with rounded sides, and a very acute terminal sinus; disk with 5 thick obtuse ridges; side lobes concave, with orange streaks; spur short, villous within. *Capsule* 3-5 in., clavately fusiform.

8. **V. Bensoni**, *Batem. in Bot. Mag.* t. 5611; leaves narrow, peduncle tall inclined many-fl., flowers 1 $\frac{1}{2}$ -2 in. diam., sepals and petals dull yellow-green spotted with red-brown, lateral sepals broadly obovate, petals spathulately obovate, lip nearly as long as the sepals blue, side lobes triangular-ovate, much smaller than the panduriform midlobe which has 2 broad recurved terminal lobes. *Reichb. f. Xen. Orchid.* ii. 138; *Gard. Chron.* 1867, 180; *Flore des Serres*, t. 2329.

PEGU; near Rangoon, *Benson*. TENASSERIM; at Moulmein, *Parish*.

Stem short. *Leaves* 4-6 in. obliquely truncate and toothed. *Peduncle* with the raceme 18 in.; midlobe of lip with 3 obtuse ridges; spur conical obtuse.—Very near *V. Denisoniana*, but flowers much smaller, quite different in colour, not so waved, midlobe of lip more contracted, the terminal lobes uncinatè.—A form with brown flowers figured by *Parish* and called *tristis* may be this or *V. brunnea* (see end of genus).

9. **V. Parishii**, *Veitch & Reichb. in Gard. Chron.* 1867, 180, with fig.;

leaves broad obtusely 2-lobed, peduncle short stout erect, bracts large, flowers 2 in. diam., fleshy spotted mauve-brown or purple, lateral sepals broadly ovate-oblong and orbicular petals apiculate, lip half as long as the sepals, side lobes rounded, midlobe small cuneately flabelliform. *Reichb. f. Xen. Orchid.* ii. 138; in *Gard. Chron.* 1870, 890; *Warner Orchid. Alb.* t. 15, and 61 (var.).

TENASSERIM; at Moulmein, *Parish*.

Stem very short, stout. *Leaves* few, 8–10 by 2–3 in. *Peduncle* very short; raceme 6–8 in., drooping, 6–8-fld.; bracts acuminate; flowers variable in colour. The short stems and broad flat leaves are not those of *Vanda* proper, and more resemble *Stauroopsis* or *Arachnanthe*. In var. *Marriottiana*, *Reichb. f.* in *Gard. Chron.* 1880, 743; 1881, 726, the sepals and petals are mauve, the side lobes of the lip white with mauve stripes and 2 yellow blotches below the column, and the midlobe is carmine. In var. *purpurea*, N. E. Br. in *Gard. Chron.* 1883, 307, the sepals and petals are mauve-purple with white bases, and the lip bright mauve.

10. **V. bicolor**, *Griff. Notul.* iii. 354; *It. Notes*, 132, No. 546; *Ic. Plant. Asiat.* t. 330; leaves præmorse, peduncle short erect 4–6-fld., flowers 2 in. diam. brownish-purple obscurely tessellate, waved, lateral sepals obovate deflexed, dorsal small, lip nearly as long as the sepals, purple side lobes large orbicular, midlobe small panduriform, tip contracted 2-lobed. *Lindl. Fol. Orchid.* 6; *Walp. Ann.* vi. 867; *Reichb. f. in Gard. Chron.* 1875, 620.

EASTERN TROPICAL HIMALAYA; Sikkim (*Ic. in Herb. Calcutt.*); Bhotan, alt. 2000 ft. *Griffith.* ASSAM (*Ic. in Herb. Calcutt.*).

Stem 2–3 ft. *Leaves* 6–10 in., sometimes unequally rather obtusely 2-lobed. *Scape* very stout; bracts ovate, acute; dorsal sepal much the smallest, dilated in the middle; petals clawed, spatulate; side lobes of lip margined with yellow. *Capsule* almost a span long.—Near *V. Roxburghii*, but at once distinguishable by the large orbicular side lobes of the lip. A little-known species.

11. **V. Roxburghii**, *Br. in Bot. Reg.* t. 506; leaves præmorse, raceme suberect, flowers 1½–2 in. diam. tessellate with brown, sepals and petals subequal clawed obovate waved, lip nearly as long as the sepals, side lobes small acute, midlobe panduriform violet tip dilated truncate 2-lobed. *Lindl. Gen. & Sp. Orchid.* 215; *Fol. Orchid.* 3; *Wight Ic.* t. 916; *Fl. des Serres*, ii. t. 11; *Paxt. Fl. Gard.* t. 42, f. 2; *Reichb.-Fl. Exot.* t. 121; *Ill. Hort.* t. 185 (var.). *V. tesselloides*, *Reichb. f. in Walp. Ann.* vi. 864. *Cymbidium tesselloides*, *Roxb. Fl. Ind.* iii. 463. *C. tessellatum*, *Swartz in Nov. Act. Upsal.* vi. 75; *Willd. Sp. Pl.* iv. 102; *Roxb. Fl. Ind.* l. c. *C. Alagnata*, *Herb. Ham.* *Epidendrum tessellatum*. *Roxb. Cor. Pl.* i. 34, t. 42. *Ærides tessellatum*, *Wight in Wall. Cat.* 7318; *Lindl. Gen. & Sp. Orchid.* 240.—*Vanda*, *Jones in Asiat. Res.* iv. 302.

BENGAL, BEHAR and westwards to GUZERAT and the CONCAN, and southwards to TRAVANCORE, TENASSERIM and CEYLON.

Stem 1–2 ft., climbing. *Leaves* 6–8 in., narrow, complicate. *Peduncle* 6–8 in., 6–10-fld.; sepals and petals yellowish-green or blueish except from the clathrate-brown nerves, margins white; lip half as long as the sepals or more, disk of midlobe convex with fleshy ridges and white margins and mesial lines; spur conical.—*Reichenbach* in *Gard. Chron.* 1883, i. 9, describes a var. *Wightiana*, with purple lip, the side lobes with more or less developed anterior teeth. The colouring in the *Fl. des Serres*, ii. t. 11, is unlike that of any form known to me. *Roxburgh* distinguishes his *C. tessellatum* from his *C. tesselloides*, by the former having the lip with the sides incurved into a tube, and the blade tapering entire acute; whilst in the latter the lip is channelled above, concave underneath, and the tip of 2 obtuse lobes. The latter (the typical *V. Roxburghii*) is the only form known to Indian

botanists, and I suspect that the form of the lip of *C. tessellatum* is due to withering. Var. *unicolor*, Bot. Mag. t. 3416 is I suspect the Chinese *V. concolor*, Blume.

Sect. II. ANOTA, *Lindl.* Raceme dense-fl'd. Sepals and petals widely spreading. Lip without side lobes. Strap of pollinia long, slender, straight.

The two species of this section (the following and *V. violacea*) have been referred to *Saccolabium*, *Vanda*, and one of them to *Rhynchostylis*. In whichever genus placed they are aberrant; the ridged lip is quite that of *Vanda*; but the lip and strap of the pollinia is as in *Rhynchostylis*; and the spur is hardly that of *Vanda*, but rather of *Saccolabium*.

12. **V. densiflora**, *Lindl. in Paxt. Fl. Gard. under t. 42; Fol. Orchid. 2*; leaves truncately excised, lip cuneate tip shortly obtusely 3-lobed, base with 2 pubescent ridges descending into the spur. *Fl. des Serres*, t. 1765; *Reichb. f. in Gard. Chron.* 1866, 1194. *Saccolabium giganteum*, *Lindl. in Wall. Cat.* 7306; *Gen. & Sp. Orchid.* 221; *Bot. Mag. t.* 5635. *Reichenbachia* t. 22; *Jennings Orchid.* t. 8; *Lindernia*, f. 683; *Orchidopl.* 1888, t. 163.

PEGU; at Prome, *Wallich.* RANGOON, *Benson.*

Stem short, as thick as a child's wrist; roots $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. Leaves imbricating at the base, 6–12 by $1\frac{1}{2}$ –2 in., very thick, channelled, lobes acute. Peduncle very short, stout; raceme 8–14 in., cylindric, very dense-fl'd.; flowers 1–1 $\frac{1}{4}$ in. diam., white with a few purple spots at the base of the petals; lip fleshy, white with bright purple shining terminal lobes; spur short, inflated, pointing backwards.

Sect. III. CRISTATÆ. Racemes shortly peduncled, few-fl'd.; pedicels decurved. Sepals and petals incurved. Strap of pollinia very short, gland large.—Inflorescence and flowers of *Luisia*, but habit and foliage of *Vanda*.

13. **V. cristata**, *Lindl. in Wall. Cat.* 7328; *Gen. & Sp. Orchid.* 216; *Sert. Orchid. Frontisp. f.* 10; in *Bot. Reg.* 1842, t. 48; *Fol. Orchid.* 10; sepals and petals narrow yellow or green, side lobes of lip erect triangular, midlobe subpanduriform golden striped with purple, tip with 2 divaricate spindle-shaped lobes and an intermediate depressed one, spur conical. *Bot. Mag. t.* 4304; *Warner Orchid. Alb. vii. t.* 290; *Gartenfl. t.* 680; *Walp. Ann. vi.* 869. *V. striata*, *Reichb. f. Xen. Orchid. ii.* 137, t. 150. *Ærides cristatum*, *Wall. mss.* *Ærides* sp. *Griff. Itin. Notes*, 203, No. 1188.

TROPICAL HIMALAYA; from Kumaon to Bhotan, *Wallich*, &c. SILHET, *J. D. H. & T. T.*

Stem 3–6 in., very stout. Leaves 3–5 in., rigidly coriaceous, recurved, keeled, truncately 3-toothed. Raceme equalling or shorter than the leaves; bracts very short, broad; pedicels with ovary long, stout; flowers $1\frac{1}{2}$ –2 in. diam.; side lobes of lip acute truncate or toothed, midlobe as long as the sepals; spur short, obtuse. Capsule 2–2 $\frac{1}{2}$ in., narrowly clavate.

14. **V. alpina**, *Lindl. Fol. Orchid.* 10; sepals and petals narrow yellowish, side lobes of lip rounded, midlobe concave ovate obtuse or retuse pale yellow streaked with purple, spur 0. *V. Griffithii*, *Lindl. in Paxt. Fl. Gard. ii.* 22, and *Fol. Orchid.* 10 (*excl. cilat. Griffith*). *Luisia alpina*, *Lindl. in Bot. Reg.* 1858, *Misc.* 56.

SUBTROPICAL HIMALAYA, alt. 3500–5000 ft., from Garwhal, *Thomson*, to Bhotan. KHASIA HILLS, alt. 4–5000 ft., *J. D. H. & T. T.*

Habit of *V. cristata*, but smaller, leaves rather shorter, racemes always much shorter than the leaves, flowers only 1 in. diam., lip very different. Capsule not seen.—Lindley's citation of Griffith's *Itin. Notes*, No. 526, from his *V. Griffithii*, is (as he states in *Fol. Orchid.*) an error. But he again errs in referring this same plant to *Vanda bicolor*. It is his *V. undulata* (*Stauropsis undulatus*, p. 27).

15. **V. pumila**, *Hook. f.*; sepals and petals narrow pale yellowish

or white, side lobes of lip rounded, midlobe broadly ovate concave obtuse pale streaked with purple, spur conical as long as the midlobe. *V. cristata*, var. *Lindl. Fol. Orchid.* 10.

SIKKIM and BHOTAN HIMALAYA, alt. 2000 ft. (*IC. Cathcart & in Herb. Calcutt.*).

A smaller species than either *cristata* or *alpina*, with the lip of the latter, but furnished with a long conical spur. In the Cathcart drawings the leaves are 5–6 in. and sepals and petals white; in that of the Calcutta Herb. the leaves are only 3 in. long, and the sepals and petals are yellow. The latter is ticketed as from Mongpo, in Sikkim.

SPECIES UNKNOWN TO ME.

V. BRUNNEA, *Reichb. f. Xen. Orchid.* ii. 139; leaves long narrowly ligulate emarginate, flowers as large as in *V. concolor* (of China) olive within, sepals and petals cuneately oblong obtusely acute, lip and column pale yellowish white, side lobes semiround, midlobe ligulate 2-lobed retuse, spur acutely conical.—Moulmein, *Parish*.—There is a drawing at Kew, by *Parish*, of what may be this species named *V. tristis*, *Par. mss.*, the perianth is brown on both surfaces, the lip and column pale brown. (See *V. Parishii*, p. 51.)

V. STANGEANA, *Reichb. f. in Bot. Zeit.* xvi. (1858) 351; allied to *V. fusco-iridis*, *Lindl.* (of Java), auricles of the lip semiovate divergent, blade gradually narrowed from a broad semicordate base, lip slightly 2-lobed, a pair of small calli before the mouth of the spur, dorsal sepal cuneate-ovate about equalling the petals, lateral sepals larger.—Sepals and petals golden green tessellated with beautiful chestnut brown; lip and column white; lip pale violet in front, with a streak of red dots on each side of the spur, and a furrow under the column between the auricles.—Assam (*Hort. Schiller*).

V. VIPANI, *Reichb. f. in Gard. Chron.* 1882, ii. 134, 29; leaves very narrowly linear decurved deeply unequally 2-toothed, raceme few-fl., sepals and rather smaller petals cuneate-oblong obtuse undulate gradually narrowed to the base pale olive-green or ochreous barred with short brown-purple lines, lip panduriform, side lobes semiovate golden yellow, midlobe olive-green 2-callous at the base, spur conical glabrous within.—Burma, *Vipan*.

V. WIGHTII, *Reichb. f. in Walp. Ann.* vi. 932; allied to *V. Stangeana*, *Reichb. f.*, leaves more than a foot long narrowly ligulate unequally acutely 2-lobed, scape few and lax-fl., side lobes of lip subquadrate, midlobe broadly ovate, lip contracted ligulate obtusely 2-lobed, disk with 2 thick ridges, pilose at the base of the ridges and side lobes, spur conical, column slender for the genus.—Nilghiris, *Wight*.

61. **SACCOLABIUM**, *Blum.*

62. *SCHÆNORCHIS*, *Bl.* 63 *UNCIFERA*, *Lindl.* 64 *ACAMPE*, *Lindl.*

Epiphytes; pseudobulbs 0. *Leaves* flat keeled or terete. *Peduncles* lateral; flowers usually small spicate racemed panicled or subcorymbose. *Sepals* and *petals* adnate to the base of the column, spreading, subsimilar, free. *Lip* sessile at the base of the column usually consisting of a large saccate or conic cylindric spur, small lateral lobes and a small midlobe; sac or spur not septate within and without a large scale or callus within under the column (except *S. longifolium*). *Column* short, broad, truncate, rarely beaked, foot 0; anther 1- or imperfectly 2-celled; pollinia 2, entire or 2-partite.—Species about 40, Eastern Asiatic.

Of the genera enumerated above, *Schænorchis* is not British Indian, a fact which I overlooked when drawing out the key to the genera, though it is noted in *Gen. Plant.* *Uncifera* I refer to *Saccolabium*; its character of the incurved spur is insufficient; and that of the pollinia stipitate on the strap, or rather on the geniculate apex of the strap, though curious, is, considering how variable this organ is in the genus and its allies, not a dependable one for generic purposes. For *Acampe* I can find no characters whatever, and it is difficult to retain it as a section; its lip is that of sect. *Calceolaria*, as is the subcorymbose or umbellate inflorescence of most of the species.

The following sections are, I think, natural, but are not clearly definable by words.

Sect. I. MICRANTHÆ. *Leaves* flat terete or channelled. *Flowers* small, often minute, in simple or paniced racemes or spikes. *Lip* various; spur long or short. (See also Sect. vi. *Uncifera*). (Sp. 1-19).

Sect. II. CALCEOLARIA. *Leaves* lorate, flat, flaccid. *Flowers* subcorymbose on a short stout peduncle; bracts short, broad rounded. *Lip* a large hemispheric sac, with truncate or short side lobes and a short triangular or reniform adnate erose or fimbriate midlobe which is warted or echinate on the disk. *Column* very short; strap of globose pollinia linear. (Sp. 20-27).

Sect. III. ACAMPE. *Stem* usually long and very stout. *Leaves* keeled, thickly coriaceous. *Flowers* corymbose as in § *Calceolaria*, rarely in large spreading panicles. *Lip* as in § *Calceolaria*, but with a thicker warted reniform or ovate midlobe (spur cylindric in *S. ochraceum*). *Column* very short; strap of globose pollinia linear. (ACAMPE, Lindl.) (Sp. 28-34).

Sect. IV. PLATYRHIZON. *Stem* 0, or very short; roots very long, flattened. *Leaves* lorate, flaccid. *Flowers* racemed. *Lip* very small, spur saccate or conical, midlobe small reniform. *Column* very short; strap of globose pollinia linear, gland large. (MICROPERA, Dalz.) (Sp. 35-36).

Sect. V. DISTICHOPHYLLÆ. *Stem* tufted very slender pendulous, leafy throughout. *Leaves* uniform, distichous, lanceolate. *Flower* small, in very short racemes. *Lip* small, spur saccate. *Column* very short, strap of pollinia slender, gland sagittate. (Sp. 37-38).

Sect. VI. SPECIOSÆ. *Stem* very stout as are the long roots. *Leaves* linear rigid, keeled, often recurved. *Flowers* highly coloured, in dense racemes. *Lip* with a linguiform midlobe, small side lobes and a long cylindric spur. *Column* short or rather long; strap of globose pollinia slender.—Habit of *Erides* sect. II.; but there is no foot to the column. (Sp. 39-41).

Sect. VII. UNCIFERÆ. *Stem* very short. *Leaves* distichous, coriaceous. *Flowers* in dense racemes. *Lip* with a large funnel-shaped incurved spur much longer than the sepals. *Column* decurved, rostellum elongate; anther long-beaked; pollinia globose, seated near the geniculately inflexed apex of a very long slender strap with recurved margins; gland large, linear, or sagittate. UNCIFERA, Lindl. (Sp. 42, 43.)

Sect. I. MICRANTHÆ. (See p. 54.)

* Stems elongate pendulous; leaves terete, filiform, or semiterete.

1. **S. geminatum**, Lindl. in *Bot. Reg.* 1833 *Misc.* 50; leaves strongly curved terete channelled 3-toothed, racemes slender paniced, sepals ovate-oblong 1-nerved about equalling the conic obtuse spur, petals smaller obovate 1-nerved, midlobe of lip cymbiform obtuse. *Walp. Ann.* vi. 885.

EASTERN HIMALAYA, alt. 3-5000 ft.; Bhotan *Griffith*; Sikkim *J. D. H.* KHASIA and JYNTEA HILLS, alt. 2-4000 ft., common.

Stem 6-12 in., curved, rooting at the base. *Leaves* 2-4 in., fleshy, $\frac{1}{8}$ - $\frac{1}{4}$ in. diam. *Panicles* longer than the leaves, branches spreading; bracts small, acute, flowers $\frac{1}{2}$ in. long; sepals white, or purple with white tips; petals purple; lip variable, blade fleshy, sometimes laterally compressed, side lobes very small; column very short, anther ovate, strap of pollinia short, broad, gland very large. *Capsule* subsessile $\frac{1}{8}$ - $\frac{1}{4}$ in. long, oblong, curved.

2. **S. niveum**, Lindl. *Gen. & Sp. Orchid.* 224; stem short, leaves recurved semiterete channelled notched, racemes slender paniced, sepals ovate-oblong 1-nerved about equalling the ovoid obtuse spur, petals cuneately oblong truncate 1-nerved, midlobe of lip spatulate fleshy concave. *Thwaites Enum.* 304.

CEYLON; in the Central Province, alt. 3-4000 ft., *Walker, Thwaites*.

Stem stout; 1-4 in., curved. *Leaves* 2-4 in., fleshy, $\frac{1}{8}$ - $\frac{1}{4}$ in. diam. *Panicles* longer than the leaves, branches spreading; bracts minute, acute; flower $\frac{1}{2}$ in. long,

white; tips of lateral sepals fleshy at the back; lip with minute rounded side lobes; column very short; anther hemispheric; strap of pollinia very short, gland very large. *Capsule* $\frac{1}{2}$ in., oblong.—Gardner (n. 872) has a form with much broader leaves, $\frac{1}{2}$ in. diam. and stouter scapes.

3. **S. filiforme**, *Lindl. in Journ. Linn. Soc.* iii. 36; stem slender, leaves slender terete acuminate, racemes short stout simple, sepals linear, petals orbicular, shorter than the cylindric obtuse recurved spur, limb of lip ovate acute deflexed, side lobes large rounded. *Walp. Ann.* vi. 887. *Sarcanthus filiformis* & *roseus*. *Wight Ic. t.* 1684 (*excl. capsule*) 1685. *Schænonchis juncifolia*, *Thwaites Enum.* 304 (*not of Blume.*).

MALABAR and TRAVANCORE; on the Nilgiri hills, at Neddawuttum and Pycara, *Wight*; Pulney and Anamallay hill, *Cotton*, &c. CEYLON; Central Province, alt. 4-6000 ft., *Walker*, &c.

Stem 6-10 in.; internodes $\frac{1}{2}$ -2 in. *Leaves* 2-6 in., as thick as a sparrow quill or more slender. *Racemes* $1\frac{1}{2}$ -2 in., stout, subsesile, often deflexed; bracts lanceolate; flowers $\frac{1}{4}$ in. long, red, or orange streaked with crimson; sepals 1-nerved, petals with 3 nerves rugose on the back; spur of lip inflated; anther hemispheric; strap of globose pollinia short, dilated upwards, gland very large. *Capsule* $\frac{1}{2}$ in., pyriform, pedicelled.—Flowers rose coloured in *Wight's* plant, orange with red stripes in the Ceylon plants.

4. **S. perpusillum**, *Hook. f. Ic. Plant. ined.*; stem short curved, leaves terete recurved acute, racemes erect stout flowering to the base, bracts subulate persistent, flowers minute pubescent, sepals ovate-oblong, petals obovate-oblong obtuse, lip oblong slightly concave, tip with a fleshy acute subcordate appendage, spur short cylindric obtuse incurved.

SINGAPORE; at Sungei Buloh, *Ridley*.

Stem 3-5 in., as thick as a sparrow's-quill, rigid. *Leaves* 1-1 $\frac{1}{2}$ in., subsecund. *Racemes* $\frac{1}{2}$ - $\frac{3}{4}$ in.; rachis stout; flowers $\frac{1}{20}$ in. diam.; pedicel very short; sepals 1-nerved, lateral acuminate; petals as long, obtuse, glabrous, 1-nerved; lip as long as the sepals; spur large; fleshy appendage at the tip of the lip didymous on the upper face.—A remarkable little species, unlike any other.

5. **S. ? inconspicuum**, *Hook. f.*; stem rather stout, leaves 2-3 in., nearly straight terete obtuse, flowers small shortly peduncled clusters, sepals and petals broadly oblong acute, hypochile of lip hemispheric margins entire (side lobes 0), epichile broadly ovate retuse inserted on the margin of the hypochile. *Cymbidium inconspicuum*, *Wall. mss.*

LOWER ASSAM, *Jenkins (Ic. in Herb. Calcutt.)*

Stems 6-8 in. long, interlaced, flexuous, as thick as a duck's-quill; internodes $\frac{1}{2}$ in. *Leaves* rather more slender, slightly curved, but not falcate. *Flowers* $\frac{1}{2}$ in. diam., shortly pedicelled, pale green; sepals and petals subequal, spreading and recurved; lip about as long as the sepals; hypochile green suffused with purple, large for the size of the plant, margins everted, epichile as long as the hypochile, flat, smooth; column short, very stout, purple, rostellum not beaked; anther broader than long low, pollinia 2 globose, strap short, gland ovate.—The lip is like that of *sect. Calceolaria*. Described from the drawing in the Calcutta Herbarium.

** Stem short or long. Leaves flat or channelled.

† *Spur of lip longer than the sepals.* (See also 16, *S. rostellatum.*)

6. **S. Pumilio**, *Reichb. f. in Walp. Ann.* vi. 886; in *Gard. Chron.* 1875, ii. 98; stem very short, leaves falcately oblanceolate obtuse notched or 2-fid, racemes about equalling the leaves laxly many-fld., lateral sepals broadly ovate obtuse, petals oblanceolate obtuse, side lobe of lip very short rounded, midlobe large flat triangular 3-nerved smooth, spur much longer than the sepals slender incurved. *S. discolor*, *Reichb. f. Ot. Hamb.*

42. *S. pusillum*, *Lindl. in Journ. Linn. Soc.* iii. 36 (not of Blume). *Ceoclades pusilla*, *Lindl. in Wall. Cat.* 7332: *Gen. & Sp. Orchid.* 237.

SILHET, *Wallich*.

Roots very many, slender, tortuous. Leaves 2-3 by $\frac{1}{2}$ in., fleshy, thin when dry. Racemes slender; bracts ovate, membranous; flowers $\frac{1}{4}$ in. broad, pedicelled membranous; dorsal sepal obovate; column rather long, beaked in front; anther low; strap of pyriform pollinia dilated above, gland small oblong. Capsule $\frac{3}{4}$ in., shortly pedicelled, narrow, 6-ribbed.—The citation of "Herb. Wight" under *Wall. Cat.* 7332 B, is doubtless an error.

7. *S. penangianum*, *Hook. f. Ic. Plant. ined.*; leaves narrowly linear-lanceolate acuminate with a lateral notch, raceme short very stout dense-fl. pubescent, sepals broadly ovate 1-nerved, not half the length of the conical angled abruptly incurved spur, petals oblong 1-nerved, limb of lip minute, disk fleshy terminal, side lobes rounded.

PENANG; on the Sonkey River, *Curtis*. PERAK, *Kunstler (Ic. in Herb. Calcutt.)*

Stem flexuous, internodes $\frac{1}{2}$ in. Leaves $2\frac{1}{2}$ -3 by $\frac{1}{2}$ in. thick, nerve strong beneath. Racemes 1- $1\frac{1}{2}$ in., fruiting decurved; bracts subulate; flowers $\frac{1}{6}$ in., pubescent, white edged with yellow and a little pink; column short; strap of globose pollinia elongate, spatulate, gland small. Capsules $\frac{1}{4}$ in. long. oblong, sessile, crowded, reflexed.

8. *S. Helfer*, *Hook. f. Ic. Plant. ined.*; stem short, leaves loriform tip contracted notched, panicles shorter than the leaves, sepals orbicular-ovate 1-nerved shorter than the saccate broad spur, petals oblong, blade of lip reniform, half embracing the spur quite entire, lateral lobes narrow erect.

TENASSERIM, or ANDAMAN ISLANDS. *Helfer* (*Kew Distrib.* 5256). Moulmein, *Parish*; Mergui, *Griffith*.

Stem 1-3 in. Leaves few, close set, $2\frac{1}{2}$ - $3\frac{1}{2}$ by $\frac{1}{4}$ - $\frac{1}{3}$ in., sheaths short, black. Panicle about equalling the leaves, slender; bracts minute, acute; flowers $\frac{1}{6}$ in.; dorsal sepal much smaller than the lateral; blade of lip shorter than the spur; column very short; anther short, broad; pollinia globose, sessile on a large cuneate strap or gland.

9. *S. gracile*, *Lindl. Gen. & Sp. Orchid.* 225; in *Journ. Linn. Soc.* iii. 35; stem short slender, leaves elongate linear-lanceolate acuminate, racemes slender many-fl. longer than the leaves, sepals oblong obtuse 1-nerved, much shorter than the straight tubular acuminate spur, petals narrower oblong 1-nerved, blade of lip very small ovate acute, side lobes 0. *Thwaites Enum.* 304.

CEYLON; Central Province, alt. 3000 ft. *Macrae*, &c.

Stem 2-8 in., often zigzag, internodes $\frac{1}{4}$ - $\frac{1}{2}$ in. Leaves $2\frac{1}{2}$ -4 by $\frac{1}{2}$ in., straight or falcate, narrowed at base and tip, midrib obscure. Racemes 4-6 in., erect; bracts minute, subulate; flower $\frac{1}{4}$ in. long, white; mouth of spur very oblique; column short; anther short, broad, strap of globose pollinia very slender. Capsule globose, $\frac{1}{2}$ in. diam., pedicelled.

10. *S. brevifolium*, *Lindl. Gen. & Sp. Orchid.* 225, in *Journ. Linn. Soc.* iii. 35; stem rather stout scandent, leaves short linear-oblong unequally 2-lobed, racemes very short few-fl., sepals and petals subequal orbicular-ovate 1-nerved not half as long as the conico-cylindric straight obtuse spur, limb of lip very minute, side lobes 0. *Thwaites Enum.* 230. *S. virescens*, *Gardn. mss.*

CEYLON; Central Province common, *Macrae*, &c.

Stem 6-10 in., internodes $\frac{3}{4}$ in. or less. Leaves 1- $1\frac{1}{2}$ by $\frac{1}{3}$ - $\frac{1}{2}$ in., fleshy, midrib obscure. Racemes 1 in., recurved; bracts very minute; flowers $\frac{1}{2}$ in. long, rose-

purple or greenish white; spur as long as the pedicel; column short; anther very broad, apiculate, strap of globose pollinia short, gland as long very large 2-fid. Benthamin Gen. Plant. iii. 579 errs in referring *Ec. tenera* to this; it is my *Cleisostoma tenerum*.

11. **S. roseum**, Lindl. Gen. & Sp. Orchid. 225; stem very slender, leaves fleshy flat narrowly linear unequally notched, racemes very short simple, sepals ovate-oblong obtuse 1-nerved, petals as large rounded 1-nerved, spur of lip longer than the sepals cylindric obtuse, lip minute ovate acute, side lobes rounded. *Thwaites Enum.* 304. *Sarcanthus Walkerianus*, *Wight Ic. t.* 1686 (*bad*). *S. Walkerianum Reichb. f. in Walp. Ann.* vi. 887.

CEYLON; Central Province, up to 5000 ft., common; *Maaræ*, &c.

Stem curved, as thick as a pigeon's-quill. *Leaves* 2-3 by $\frac{1}{2}$ - $\frac{1}{4}$ in. *Raceme* 1-1 $\frac{1}{2}$ in., slender; bracts minute; flowers $\frac{1}{4}$ in long, rosy in *Ic. Walker*, lilac in *Ic. Thwaites*; column short; anther short broad, pollinia 2, strap short slender, gland large. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in., pyriform, pedicelled.

12. **S. flavum**, Hook. f. *Ic. Plant. ined.*; stem short very stout, leaves close set loriform deeply unequally acutely 2-cleft, raceme lax-fld., sepals oblong obtuse, lip small, infundibular spur much longer than the sepals with small toothed side lobes and truncate mouth.

TENASSEERIM; at Moulmein, *Parish*.

Stem 6 in., stout. *Leaves* 4-5 by $\frac{3}{4}$ in., dark green with darker nerves, apiculate between the lobes; sheaths $\frac{1}{4}$ in., deeply grooved. *Raceme* from the base of the stem, with the slender scape 4 in.; bracts small, recurved; flowers $\frac{1}{4}$ in. diam., pale yellow; column short, broad; rostellum large, 2-lobed, apparently fleshy.—A remarkable species with the pollinia approaching that of sect. *Uncifera* (and of *Sarcanthus mirabilis*, Reichb.), but having no trace of a midlobe to the lip. Described from a beautiful drawing by Parish, who observes that there is no apparent septum in the spur. Reichenbach has (on the drawing) named it *Saccolab. buccosum* (see No. 14), alluding to the cheek-like rostellum, but it is not the plant he has described under that name (*Gard. Chron.* 1871, 1938). It closely resembles *Sarcanthus Parishii*, but the flowers are yellow. There is no midlobe of the lip and no septum in the spur.

13. **S. fragrans**, Par. & Reichb. f. in *Journ. Bot.* xii. (1874) 197; dwarf, stem very short, leaves crowded oblong obtuse very thick, raceme shortly peduncled decurved many- and dense-fld., flowers rose-red, lateral sepals orbicular-oblong, petals linear-oblong obtuse, lip large saccate, base suddenly contracted into a decurved spur longer than the sepals and with an inflated tip, limb rhomboidly subspathulate fleshy acute toothed towards the tip. *Reichb. f. Otia. Hamburg.* 41.

TENASSEERIM; at Moulmein, *Parish*.

Stem $\frac{1}{2}$ in. *Leaves* 5-8 by 1 in., bases closely imbricate, deeply channelled. *Raceme* as long as the leaves; flowers about $\frac{1}{10}$ in. long, odour of violets; lip twice as long as the sepals, with a callus at the insertion of the tumid straight blade; column very short, sides acute; anther with a recurved tip; pollinia globose, sessile on the broad end of the short strap, gland lanceolate much longer than the strap.—Described chiefly from a drawing by Parish.

†† *Spur of lip shorter than (rarely equalling) the sepals.*

14. **S. buccosum**, Reichb. f. in *Gard. Chron.* 1871, 938; stem scandent, leaves linear-oblong obtusely 2-lobed, raceme simple or branched much longer than the leaves, sepals broadly ovate much longer than the bottle-shaped spur, lip large, side lobes spreading rounded, midlobe narrowly oblong. *S. parvulum*, Lindl. in *Journ. Linn. Soc.* iii. 36 (*in note*). *Cœocladæ paniculata*, Lindl. in *Wall. Cat.* 7334; *Gen. & Sp. Orchid.* 236. *Cymbidium Satyrium*, *Herb. Ham.*

BHOTAN HIMALAYA, *Lister*. ASSAM; at Goalpara, *Hamilton*. SYLHET, *Wallich*. TENASSERIM, *Parish*.

Stem stout, rigid, internodes $\frac{1}{2}$ in. *Leaves* 3-5 by $\frac{1}{2}$ - $\frac{3}{4}$ in., fleshy, 5-nerved. *Raceme* with long slender peduncle 5-6 in., laxly many-flid.; bracts subulate; flowers $\frac{1}{2}$ in. diam., yellowish; sepals 5-nerved; petals much smaller, cuneately obovate, 3-nerved; lip yellow, mouth of spur a very narrow chink, neck contracted, base globose didymous; side lobes of elongate column broad, rounded, top recurved; anther long-pointed; strap of globose pollinia very slender arched, gland very minute.—Column and lip so different from the genus that Reichenbach l. c. suggests its separation. Lindley's name of *parvulum* is too misleading to be adopted.

15. ***S. micranthum***, *Lindl. in Wall. Cat.* 7300; *Gen. & Sp. Orchid.* 220; leaves lorate unequally obtusely 2-lobed, scape stout flowering to the base, racemes very many and dense-flid., sepals broadly ovate obtuse 3-nerved, petals oblong or lanceolate serrulate, spur of lip shorter than the sepals subtruncate, blade obovate-spathulate with 2 basal calli, lateral lobes broad obtuse. *Saunders' Refug. Bot.* t. 110.

TROPICAL HIMALAYA; from Garwhal and Kumaon, alt. 2-3000 ft., *Falconer, Duthie*; to Bhotan, *Griffith*. ASSAM, SILHET and the NAGA HILLS, *Prairie*. TENASSERIM, *Griffith, Parish*.

Stem 6-10 in., curved, as thick as a goose-quill or less. *Leaves* 3-5 by $\frac{3}{4}$ -1 in., narrowed to the base. *Raceme* equalling the leaves; bracts small, broad; flowers about $\frac{1}{2}$ in. diam.; 3-nerved sepals and petals violet; lip rose-red; column very short; anther very broad, acuminate globose; pollinia strap very short broadly cordate, gland orbicular. *Capsules* $\frac{1}{2}$ in., subfusiform.

16. ***S. rostellatum***, *Hook. f. Ic. Plant. ined.*; stem very short, leaves 4-7 in. lorate flat unequally 2-flid, raceme much shorter than the leaves, bracts minute, sepals broadly ovate-oblong obtuse, lip infundibular narrowed below into a stout obtuse spur rather longer than the sepals, side lobes truncate, midlobe an incurved beak.

SIKKIM; at Darjeeling, alt. 7000 ft., *Gamble (in Herb. Calcutt.)*.

Roots very many and long, tortuous, flat, appressed to the bark. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., nearly straight. *Peduncle* with 8-10-flid. raceme 2 in., slender; flowers $\frac{1}{2}$ in. long from the tip of the dorsal sepal to that of the spur; petals oblong, obtuse, smaller than the sepals; column very short; rostellum subulate; pollinia large, globose, cleft.

17. ***S. minimiflorum***, *Hook. f. Ic. Plant. ined.*; stem very short, leaves elliptic-lanceolate narrowed at both ends acute, scape much longer than the leaves very slender very many-flid., bracts subulate equalling the very minute flowers, sepals and petals oblong obtuse, lip conico-sacciform, side lobes 0, midlobe an incurved beak with a globose tubercle at the mouth of the sac.

PERAK, *Scortechini*.

Roots slender, tufted. *Leaves* $1\frac{1}{2}$ -2 in., black when dry, thinly coriaceous, reddish beneath. *Scape* with raceme 2-6 in., with a few subulate empty bracts below; flowers greenish yellow mottled, about $\frac{1}{10}$ in. long or broad; lip larger than the rest of the perianth, its beak-like laterally compressed terminal lobe incurved over the mouth; column short; anther long-beaked.—A curious little plant. I have had difficulty in dissecting the few available flowers, and thereby confirming a description and rude drawing by Scortechini, who mentions "a something membranous whitish which I cannot make out whether it is a rostellum or stipes." This I presume to be a recurved elongate body which appears to be attached to the base of the column.

18. ***S. Jerdonianum***, *Reichb. f. in Walp. Ann.* vi. 886; leaves linear subacute, racemes simple or branched slender, sepals ovate 1-nerved

longer than the small saccate or subglobose spur, petals linear 1-nerved, blade of lip oblong concave subtruncate, side lobes small rounded. *Taeniophyllum Jerdonianum*, *Wight Ic. t. 1756*.

MALABAR; on branches of trees, *Jerdon*.

Stem 1-3 in., tufted. *Leaves* 1-1½ by ½ in. *Racemes* much longer than the leaves; bracts ovate, acuminate; flowers ⅓ in. long; column short; anther broad; pollinia with a short strap and large narrow gland.—Described chiefly from *Wight*.

19. ***S. lanatum***, *Hook. f.*; stem short, leaves linear-oblong broadly 2-lobed, peduncle very stout longer than the leaves, spikes dense-fld. tomentose or woolly, sepals ovate tips keeled, side lobes of lip triangular, midlobe ovate bicuspidate, spur short saccate traversed by a pubescent ridge from the base of the column to that of the midlobe. *Cleisostoma lanatum*, *Lindl. in Journ. Hort. Soc. iv. 264*; *Walp. Ann. 889*.

TENASSERIM; at Moulmein, *Parish, Scott*.

Stem very stout. *Leaves* 3-4 by 1-1½ in., thickly coriaceous, keeled. *Scape* with long appressed sheaths, simple or branched; spikes 4-7 in.; bracts ½ in., large, ovate, acuminate, spreading or reflexed; flowers ½ in. long; sepals dingy purple and green; petals obovate, ciliate, yellow and purple; side lobes of lip notched on the inner margin, ciliate; midlobe with a large pubescent gibbous compressed callus descending into the spur, mouth of spur contracted to a slit with a pubescent raised border; column stout, recurved, tumid below, shortly beaked; anther beaked; pollinia globose, sulcate, strap long slender dilated and forked above, each arm spatulate and with the globose pollinia immersed in their concave tips, gland small oblong.—A remarkable plant, put by Lindley into *Cleisostoma*, but I do not find the great gland in the spur under the column.

Sect. II. CALCEOLARIA. (See p. 54.)

The species of this section wants a thorough revision with much better material than is at my disposal.

20. ***S. calceolare***, *Lindl. in Wall. Cat. 7302*; *Gen. & Sp. Orchid. 223*; *Sert. Orchid. Frontisp. 6*; in *Bot. Reg. 1883*; *Misc. 139*; in *Journ. Linn. Soc. iii. 33 (exc. syn.)*; leaves acutely unequally 2-lobed or -cleft, blade of lip reniform erose disk echinate all over. *Griff. Notul. iii. 356*; *Itin. Notes 170, No. 869*; *Ic. Plant. Asiat. t. 334*; *Walp. Ann. vi. 883*. *Aerides calceolare*, *Smith in Rees Cyclop. Suppl. Ae. leopardorum, Wall. mss.* *Gastrochilus calceolaria, Don Prodr. 32.* *Sarcochilus nepalensis, Spr. Syst. Veg. iii. 721.* *Epidendrum calceolare, Ham. mss.*

TROPICAL HIMALAYA; from Garwhal to Bhotan, ASSAM, SILHET and the KHASIA HILLS. TENASSERIM, *Parish*. PERAK, *Carter*.—DISTRIB. ? Java.

A very common plant, and, if two species are not included, very variable. *Stem* very short. *Leaves* in Wallich's 7342 A from Nepal 6-12 by ½-¾ in., strongly falcate. His B from Silhet (which is the common form elsewhere) is a much smaller plant, with nearly straight leaves 4-5 by ⅓-½ in. *Peduncle* ½-1½ in.; pedicels ¼-1 in.; flowers ½-¾ in. diam., yellow or greenish speckled barred or blotched with red brown; lip white or yellow, speckled with red. *Capsule* in 7342 A 2 in. long; in the ordinary form ¾-1 in.—Griffith's Tab. 334 represents a plant with the leaves of *intermedia* and lip of *calceolare*, but it is impossible to determine satisfactorily his *Saccolab. No. 2, 3* and 4 of *Notul. iii. 356, 357*, and his *Ic. Plant. Asiat. t. 333, 334*.

21. ***S. nilagiricum***, *Hook. f.*; leaves narrow deeply unequally 2-lobed, sepals and petals each with two series of large blotches, limb of lip fimbriately erose, disk smooth. *Vanda pulchella, Wight Ic. t. 1671*.

NILGHIRI HILLS; on the banks of the Kaitairy river and at Quelin, *Wight*.

Stem short. *Leaves* 5-10 by ½-¾ in., flexuous, lobes very unequal, obtuse, often

divaricate, the longer sometimes 1 in. long. *Flowers* $\frac{1}{2}$ in. diam.; perianth strongly incurved. *Capsule* $\frac{1}{2}$ – $\frac{2}{3}$ in.—United with *S. calceolare* by Lindley (in Journ. Linn. Soc.), but I think as different as any other of this section.

22. ***S. acutifolium***, Lindl. *Gen. & Sp. Orchid.* 223; *Sert. Orchid. Frontisp.* No. 2; in *Journ. Linn. Soc.* iii. 33; stem elongate, leaves acute or acuminate, blade of lip erose, disk naked or very sparingly tubercled. *Reichb. f. Otia Hamburg.* 42; *Walp. Ann.* vi. 883. *S. denticulatum*, *Part. Mag. Bot.* vii. t. 145; *Reichb. f. l. c.*; ? *Bot. Mag.* t. 4772. *Aerides umbellatum*, *Wall. mss.*

SIKKIM HIMALAYA, alt. 3–5000 ft. KHASIA MTS., *Gibson*.

Usually a larger plant than the small states of *S. calceolare*, with longer stems (4–8 in.) and larger leaves, 4–6 by $\frac{3}{4}$ – $1\frac{1}{2}$ in. broad, never 2-fid., but very variable. *Perianth* whole-cold. and yellowish red, or more yellow or greenish and mottled with brown; lip white, centre yellow often speckled with red. *Capsule* in Sikkim sp. 3 in. long.—Paxton's *S. denticulatum* has greenish yellow flowers speckled with brown, and the lip is described as erose. Lindley refers it to *S. acutifolium*. The lip of the *Bot. Mag.* plant, apparently derived from the same source, is not erose, but with a broad thick white fringe of long papillæ.

23. ***S. intermedium***, *Griff. mss. ex. Lindl. in Journ. Linn. Soc.* iii. 33; stem rather long, leaves very narrow acuminate or 2-toothed, blade of lip fimbriate, disk smooth. *Reichb. f. Otia Hamburg.* 42. *S. calceolare*, *Part. Mag. Bot.* vi. 97.—*Saccolab. Griff. Notul.* iii. 357; *Ic. Plant. Asiat.* t. 333.

BHOTAN HIMALAYA, *Griffith*. KHASIA HILLS, alt. 3–5000 ft., *Griffith, Gibson, J. D. H. & T. T.*

Perhaps a small form of *S. acutifolium*, but the stem is more slender, the leaves narrower, and the flowers and capsules ($\frac{3}{4}$ in.) much smaller.

24. ***S. bellinum***, *Reichb. f. in Gard. Chron.* 1844, i. 174; 187, i. 145; stem rather long, leaves deeply unequally cleft, bracts and flowers large, blade of lip erose disk echinate and with cushions of cilia at the base. *Warner Orchid. Alb.* t. 156; *Bot. Mag.* t. 7142.

BURMA, *Boxall*.

This resembles a large state of *S. calceolare*, the flowers are $1-1\frac{1}{4}$ in. diam., bright yellow with large purple blotches.

25. ***S. obliquum***, Lindl. in *Wall. Cat.* 7304; *Gen. & Sp. Orchid.* 223; in *Journ. Linn. Soc.* iii. 33; stem very short stout, leaves broad and long unequally broadly 2-fid, bracts and flowers large, blade of lip fimbriate, disk papillose with a large 2-lobed callus. *Reichb. f. Otia Hamburg.* 42. *Vanda obliqua*, *Wall. mss.*

BURMA; at Taingdong, *Wallich*. ? KHASIA HILLS, *J. D. H. & T. T.*

Leaves 6–8 by 1–2 in.; flowers 1 in. diam.; sepals and petals narrow, whole-cold., all (in *Ic. Wallich*) pale yellow, with the lip white speckled with yellow. The Khasia specimens have the shorter leaves of *bigibbum*.

26. ***S. bigibbum***, *Reichb. f. in Bot. Mag.* t. 5766; *Otia Hamburg.* 43; stem very short, leaves oblong or obovate-oblong 2-fid, bracts small, blade of lip fimbriate, disk smooth with a large 2-lobed callus.

RANGOON, *Benson, Gilbert*. PERAK, *Scortechini*.

Probably a small state of *S. obliquum*, but the leaves are shorter and broader, 3–4 by $1-1\frac{1}{4}$ in., and the large bracts seem to be wanting. *Flowers* whole-cold., pale straw-cold. in a drawing by Mr. Gilbert, bright yellow in *Bot. Mag.*

27. ***S. acaule***, *Hook f.*; stem very short, leaves unequally 2-lobed, sepals obovate, limb of lip broadly ovate acute toothed and erose, disk rough

thickened. *Cleisostoma acaulis*, *Lindl. Gen. & Sp. Orchid.* 227. *Vanda fimbriata*, *Gardn. mss.*

CEYLON, *Macrae*; at Hantani, *Gardner*.

Leaves 5-6 by $\frac{1}{3}$ - $\frac{1}{2}$ in. Peduncle and pedicels very short, $\frac{1}{2}$ in., stout; flowers $\frac{1}{3}$ in. diam., apparently very fleshy.—Possibly a form of *S. nilagiricum*, but the leaves and lip appear to be very different. The specimens are very scanty and poor.

Sect. III. ACAMPE. (See p. 54.)

The species of this section are very difficult of discrimination in a dried state, and the following diagnoses and citation are not very reliable, owing to imperfection of specimens and vagueness of published descriptions. (See two species at the end of the genus.)

* *Peduncle rather slender; flowers in large panicles. Spur of lip cylindric; midlobe ovate.*

28. ***S. ochraceum***, *Lindl. in Bot. Reg.* 1842, *Misc.* 2. *S. lineolatum*, *Thwaites Enum.* 304. *Acampe dentata*, *Lindl. Fol. Orchid.* 3; *Reichb. f. in Gard. Chron.* 1872, 1752; *Walp. Ann.* vi. 894. *A. Wightiana* var. *longepedunculata*, *Thwaites l. c.* 303.

EASTERN TROPICAL HIMALAYA; Sikkim, *J. D. H.*, Bhotan, *Griffith (Kew Distrib.* 5233). KHASIA MTS. and TENASSERIM, *Griffith, &c.* MALABAR, *lc. Jerdon*. CEYLON, *Walker, &c.*

Stem 1-2 ft. Leaves 7-9 by 1- $1\frac{1}{2}$ in. Panicle longer or shorter than the leaves, branches distant lax-fl'd.; flowers $\frac{1}{3}$ - $\frac{1}{2}$ in. diam.; midlobe of lip ovate, crenate, 2-auricled and with fleshy teeth at the base; spur cylindric, as long as the limb, hairy within. Capsule 1- $1\frac{1}{2}$ in., fusiform.—Bentham in *Gen. Plant.* iii. 581, misled by a mixture of specimens of different species, errs in referring *S. lineolatum* to *Cleisostoma maculosum*; it is clearly this plant.

** *Peduncle very stout, simple or very sparingly branched. Lip a hemispheric or conic sac, midlobe reniform.*

29. ***S. longifolium***, *Hook. f.*; leaves 6-16 in., peduncle 6-7 in., internodes long, flowers subcorymbose, midlobe of lip ovate obtuse, sac broad conical with an erect dorsal hairy plate in the cavity. *Acampe ? longifolia*, *Lindl. Fol. Orchid.* 1. ? *A. multiflora*, *Lindl. l. c.* *Vanda longifolia*, *Lindl. in Wall. Cat.* 7322; *Gen. & Sp. Orchid.* 215; in *Journ. Hort. Soc.* vii. 267; *Walp. Ann.* vi. 872. *V. multiflora*, *Lindl. Collect.* t. 38.

TROPICAL SIKKIM HIMALAYA (*lc. in Hort. Calcutt.*). UPPER ASSAM, *Mann*. TENASSERIM, *Wallich, &c.*—DISTRIB. China. ?

Stem very stout. Leaves $1\frac{1}{2}$ -2 in. broad. Peduncle with racemes 6-7 in., as thick as a swan's quill, with often a few short lateral branches; bracts annular; flowers crowded, $\frac{3}{4}$ in. diam., golden yellow banded with red on both surfaces. The dorsal plate in the cavity of the lip recalls *Cleisostoma*.

30. ***S. Wightianum***, *Hook. f.*; leaves 4-6 in., peduncle 1-3 in., internodes very close, midlobe of lip ovate keeled, sac rounded papillose within. *S. papillosum*, *Dalz. & Gibs. Bomb. Fl.* 264 (*excl. some syn.*). *Acampe Wightiana*, *Lindl. Fol. Orchid.* 2. *Vanda Wightiana*, *Lindl. mss.* ? in *Wight l. c.* t. 1670; *Thwaites Enum.* 303; *Walp. Ann.* vi. 873. *V. fasciata*, *Gardn. mss.*—*Rheede Hort. Mal.* xii. t. 4.

WESTERN GHATS; from the Concan southward. CEYLON, *Gardner, &c.*

Stem 12-18 in. Leaves $\frac{2}{3}$ - $1\frac{1}{4}$ in. broad. Scape very stout; bracts very broadly ovate, acute; flowers $\frac{2}{3}$ -1 in. diam., subcorymbose, yellow barred with crimson, not papillose. Capsule 2- $2\frac{1}{2}$ in., fusiform.

31. ***S. præmorsum***, *Hook. f.*; leaves 5-7 in. narrow, scape 1-2 in.

very stout, internodes short, sheaths annular, bracts semicircular, flowers papillose, midlobe of lip broadly ovate or rounded, sac rounded tubercled and pubescent at the base within. *Acampe excavata*, *Lindl. Fol. Orchid.* 3; *Walp. Ann.* vi. 874. *Cymbidium præmorsum*, *Swartz in Nov. Act. Upsal.* vi. 75; *Willd. Sp. Pl.* iv. 103; *Roxb. Fl. Ind.* iii. 465. *Epidendrum præmorsum*, *Roxb. Cor. Pl.* i. 34, t. 43.—*Rheede Hort. Mal.* xii. t. 4. *Aerides undulata*, *Smith in Rees Cyclop.* xxxix.

WESTERN PENINSULA; in the Circars, *Roxburgh*; the Concan, *Law*.

Apparently near *S. Wightianum*, but more slender, leaves narrower, lip deeply lobed, very complicate, flowers small, papillose all over, $\frac{1}{2}$ – $\frac{2}{3}$ in. diam. *Capsule* $2\frac{1}{2}$ in.

32. ***S. papillosum***, *Lindl. in Bot. Reg.* t. 1552 (*excl. syn.*); *Gen. & Sp. Orchid.* 222; stem elongate branched scandent, leaves 3–4 in., scape 1–2 in., internodes close, bracts semicircular, midlobe of lip ovate, spur conical pubescent within. *S. carinatum*, *Griff. Notul.* iii. 354. *Acampe papillosa*, *Lindl. Fol. Orchid.* 2; *Walp. Ann.* vi. 873. *Sarcochilus præmorsus*, *Spreng. Syst. Pl.* iii. 721, *fid Steudel*.

BENGAL and the lower HIMALAYA MTS., from Sikkim eastwards. ASSAM, the GANGETIC DELTA, the CIRCARS and TENASSERIM.

Stem 2–3 ft., as thick as a goose-quill. *Leaves* obliquely notched. *Scape* closely scarred to the base; flowers $\frac{2}{3}$ in. diam.; ovary very short. *Capsule* $1\frac{1}{4}$ in., fusi-form.—The lip is broader in Lindley's figure than in Sylhet specimens, in which they are oblong-ovate.

33. ***S. cephalotes***, *Hook. f.*; stem very short, leaves 3–5 in. narrow with a unilateral semicircular sinus at the tip, peduncle 1 in., midlobe of lip broadly ovate crenulate, sac conic hairy within. *Acampe cephalotes* *Lindl. Fol. Orchid.* 3; *Walp. Ann.* vi. 873.

SILHET; *H. f. & T.*

A small species, of which there are very few specimens; it appears to differ from *S. papillosum* in the short stems, longer crowded leaves and small yellow green flowers barred with purple; lip pale rose with darker spots, disk fimbriate.

34. ***S. congestum***, *Hook. f.*; stem short very stout, leaves 6–8 in., scape $1\frac{1}{2}$ –2 in., internodes very short, bracts broadly ovate acute, flowers crowded, limb of lip rhomboid acute-angled, spur shortly conical or saccate hairy within. *S. papillosum*, *Wight Ic.* t. 1672 (*not of Lindl.*). *Acampe congesta*, *Lindl. Fol. Orchid.* 3; *Walp. Ann.* vi. 873. *Vanda congesta*, *Lindl. in Bot. Reg.* 1839, *Misc.* 61.

MALABAR, *Wight*. CEYLON (*Hort. Loddiges*).

Lindley's *V. congesta* from Ceylon is described as having obliquely mucronulate leaves, yellow and brown flowers, lip with an excavate pubescent base, and column with mucronate angles (a single flower only is in *Herb. Lindl.*). *Wight S. papillosum*, is figured with deeply 2-lobed leaves and a curved spur; his specimens (*in Herb. Lindl.* 1019/1836) have curved leaves 8–10 by 1–1 $\frac{1}{4}$ in.

Sect. IV. PLATYRHIZON. (See p. 54).

35. ***S. viridiflorum***, *Lindl. in Journ. Linn. Soc.* iii. 36; leaves 1–2 $\frac{1}{4}$ in., racemes shorter than the leaves subcorymbose, spur acute glabrous within parallel to the blade of the lip. *Dalz. & Gibs. Bomb. Fl.* 263; *Walp. Ann.* vi. 885. *Micropera viridiflora*, *Dalz. in Hook. Journ. Bot.* iii. (1851), 282.

The SOUTHERN CONCAN; in the Western Ghats, *Law*, *Dalzell*. CEYLON, near Kandy (*Ic. in Herb. Kew*).

Leaves $\frac{1}{2}$ – $\frac{1}{2}$ in. broad. *Raceme* 3–5-fl.; bracts short, broad, obtuse; flowers

$\frac{1}{2}$ – $\frac{1}{2}$ in. diam., greenish white; lip clouded with rose-colour, blade situated at the mouth of the spur which it embraces, broadly deflexed flabelliform membranous outer margins crenulate or trifid, side lobes free rounded; spur very short, conical, incurved.

36. **S. maculatum**, *Hook. f.*; leaves 4–6 in., raceme elongate much longer than the leaves laxly many-fl'd., spur obtuse villous within. *Micropera muculata*. *Dalz. in Hook. Journ. Bot.* iii. (1851), 282; *Dalz. & Gibs. Bomb. Fl.* 263; *Lindl. in Journ. Linn. Soc.* iii. 38. *Sarcophilus maculatus*, *Benth. in Gen. Plant.* iii. 575.

The SOUTHERN CONCAN and CANARA; on the Western Ghats, *Dalzell, Stocks, Ritchie*, &c.

Leaves 1–2 in., broad, linear-oblong to cuneately oblong, 2-lobed. *Raceme* 8–12 in., very shortly peduncled; bracts short, broad; rachis stout; flowers $\frac{1}{2}$ in. diam., subsessile; sepals and petals yellow with a central purple spot; lip white and rose-colored, blade situated below the mouth of the short saccate obtuse spur, which it overlaps, very coriaceous, entire; side lobes connate below, narrow, erect and recurved. *Capsule* $1\frac{1}{2}$ in., fusiform, 6-ribbed.—Allied, I think, to *S. viridiflorum*, and not a *Sarcophilus*, to which Benthham has referred it.

Sect. V. DISTICHA. (See p. 54.)

37. **S. distichum**, *Lindl. in Journ. Linn. Soc.* iii. 36; leaves 1 in. lanceolate acuminate or 2–3-cuspidate, peduncle 2–3-fl'd., sepals and petals obovate-oblong, lip with a saccate subhemispheric spur, midlobe small semi-circular fleshy entire with a didymous callus at the base. *Reichb. f. Otia Hamburg*, 43.

SIKKIM HIMALAYA, alt. 6–8000 ft., *Griffith's Collectors*. KHASIA HILLS, alt. 5–6000 ft., *J. D. H. & T. T. MUNIPORE*, alt. 6900 ft., *Watt*.

Stems 4–8 in., filiform. *Leaves* very fleshy. *Peduncle* rarely longer than the leaves; flowers racemose, $\frac{1}{3}$ – $\frac{1}{2}$ in. diam.; bracts small; sepals and petals green or yellowish spotted with purple; side lobes of lip 0; column very short. *Capsule* $\frac{2}{3}$ in., fusiform.

38. **S. tenuicaule**, *Hook. f. Ic. Plant. ined.*; leaves 3–4 in. linear-lanceolate, flowers shortly pedicelled on a tubercle of the stem, sepals broadly obliquely ovate acute, petals smaller, side lobes of lip erect subacute nearly as long as the lanceolate incurved bicuspidate midlobe, spur short constricted above the saccate incurved base, villous within at the constriction.

PENANG; on West Hill, *Curtis*. PERAK, *Scortechini, Wray*.

Stem 8–12 in., as thick as a crow-quill, simple or branched, rooting at the base only, deeply grooved. *Leaves* $\frac{1}{4}$ – $\frac{1}{3}$ in. broad, strict. *Flowers* $\frac{1}{4}$ in. diam., pale green; sepals thin, nerves 3 faint; petals 1-nerved; column stout; midlobe of lip cymbiform smooth. *Column* short, anther membranous, almost flat, acuminate; rostellum projected, styliform; strap of small reniform pollinia broad, with a dilated subreniform apex, gland small.

Sect. VI. SPECIOSÆ. (See p. 54.)

39. **S. ampullaceum**, *Lindl. in Wall. Cat.* 7307; *Sert. Orchid.* t. 17; *in Journ. Linn. Soc.* iii. 35 (*excl. syn.*); leaves suberect acutely 2-fl'd. or truncate and toothed, raceme subsessile, shorter than the leaves, spur straight. *Pact. Mag. Bot.* xiii. t. 49; *Bot. Mag.* t. 5595; *Warner Orchid. Alb.* t. 191. *Ærides ampullaceum*, *Roxb. Fl. Ind.* iii. 476.

TROPICAL HIMALAYA, alt. 1–3000 ft., from Nepal eastwards. SILHET, MUNIPORE, BURMA, and TENASSERIM.

Stem short, stout. *Leaves* 2–6 in., deeply channelled. *Racemes* shorter than the leaves, cylindric; bracts minute; flowers $\frac{3}{4}$ in. diam., rose-red; sepals and petals broadly obovate, widely spreading; spur longer than the blade of the lip.

Capsule 1 in., subclavate, angles acute, pedicel $\frac{1}{2}$ in.—Lindley in Journ. Linn. Soc. by oversight probably, refers his *S. rubrum* to this instead of to *curvifolium*.

40. ***S. curvifolium***, Lindl. *Gen. & Sp. Orchid.* 222; leaves strongly recurved very narrow, racemes much shorter than the leaves, spur straight. Lindl. *Gen. & Sp. Orchid.* 222; *Ill. Hort.* xii. t. 493; *Warner Orchid.* Alb. t. 107; *Puydt Orchid.* t. 38. *S. rubrum*, Lindl. in *Wall. Cat.* 7310; *Gen. & Sp. Orchid.* 222. *S. miniatum*, Hook. *Bot. Mag.* t. 5326 (not of Lindl.).

ASSAM; *Ic. in Hort. Calcutt.* BURMA, Wallich, Griffith, &c.—DISTRIB. Java.

Very closely allied to *S. ampullaceum*, but the leaves are twice as long, much narrowed and strongly recurved, the flowers more scarlet with a golden lip.—The strap of the pollen is figured in Bot. Mag. as broadly triangular, it should be very slender. Lindley's habitat of Ceylon is no doubt an error, or referable to a cultivated specimen; or an *Aerides* may have been intended.

41. ***S. trichromum***, Reichb. f. in *Hamb. Gartenzeit.* 1859, 51; *Xen. Orchid.* 119, t. 139; leaves spreading obtusely 2-lobed, racemes much shorter than the leaves, flowers subsecund, spur incurved. *S. pallens*, Lindl. (not Cathcart) in *Journ. Linn. Soc.* iii. 35.

SIKKIM HIMALAYA (*Ic. Cathcart*). BHOTAN and ASSAM (*Ic. in Herb. Calcutt.*).

Stem 1-3 ft. *Leaves* $\frac{3}{4}$ -1 in. broad. *Racemes* 3-5 in., lax-flid., shortly peduncled; pedicel with ovary $\frac{3}{4}$ in., sigmoid; sepals linear-oblong, acute and broader shorter petals yellowish-white with a rose-cold. midrib; lip yellowish or rose-cold., speckled with pink; spur $\frac{1}{2}$ - $\frac{3}{4}$ in. long, horn-like; limb short, acute, with a flattened hooked callus at the throat.

Sect. VI. UNCIFERA. (See p. 55.)

42. ***S. obtusifolium***, Hook. f. *Ic. Plant. ined.*; leaves broadly lorate 2-lobed, raceme elongate, lip cymbiform subacute or bifid, spur incurved upon the side of the lip, tip thickened. *Uncifera obtusifolia*, Lindl. in *Journ. Linn. Soc.* iii. 40.

SIKKIM HIMALAYA, alt. 5000 ft., Clarke. BHOTAN; in the Gheet Valley, Lister. KHASIA HILLS; Churra, alt. 4000 ft., J. D. H. & T. T.

Stem 2-4 in., as thick as a goose-quill; roots very many and long. *Leaves* flat, 4-6 by $\frac{3}{4}$ -1 in., very thick, lobes obtuse. *Peduncle* with raceme very stout, 2-3 in.; bracts rather large, ovate, persistent, at length reflexed; pedicel with ovary $\frac{1}{4}$ in.; flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., pale lemon-coloured, at first greenish; limb of lip shorter than the obovate-oblong obscurely nerved sepals, tip of lip thickened, side lobes truncate; column very short, rostellum beaked; anther long-beaked; pollinia small on the face of the refracted end of the elongate spatulate strap, the margins of which are recurved, gland very long.

43. ***S. acuminatum***, Hook. f.; *Ic. Plant. ined.*; leaves linear- or oblong-lanceolate obliquely acuminate, raceme short, lip cymbiform obtuse, spur arcuate, tip acute. *Uncifera acuminata*, Lindl. in *Journ. Linn. Soc.* iii. 40.

SIKKIM HIMALAYA, alt. 6-7000 ft., Gamble. KHASIA HILLS, Griffith (*Kew Distrib.* 5257), &c.

A much more slender plant than *S. obtusifolium*, with narrower shorter leaves and shorter racemes, a much less curved spur, flowers about the same size and colour,

but spur not so long or so much incurved, gland of the pollinia smaller. *Capsule* $\frac{1}{2}$ –1 in., narrowly fusiform, shortly pedicelled.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

S. CLAVATUM, *Lindl. Gen. & Sp. Orchid.* 223. (*Epidendrum clavatum*, *Retz Obs.* vi. 50. *Limodorum clavatum*, *Willd. Sp. Pl.* iv. 126; caulescent, pendulous, leaves linear clavate 2-toothed, spikes leaf-opposed, lip inflated bearded.—East Indies, on trees.—It is impossible to say what this is; it had better be suppressed.

S. DASYPOGON, *Lindl. Gen. & Sp. Orchid.* 222. (*Aerides dasypogon*, *Smith in Rees Cyclop. Suppl.* *Epidendrum umbellatum*, *Ham. mss.*); stemless, leaves ovate-oblong acute obliquely 2-toothed, corymbs subumbellate, sepals and petals incurved linear-oblong green without blood-red within, lip white dotted with blood-red, limb dilated subcordate toothed.—Nepal, *Hamilton*.—(Probably *S. calceolare*).

S. PECHÉI, *Reichb. f. in Gard. Chron.* 1887, i. 447; leaves very broad 7 by 2 in. ligulate obtusely 2-lobed, raceme few-fl., flowers as in Sect. *Calceolaria*, as large as *S. bellinum*, sepals and petals cuneately oblong ochreous spotted with red, lip a cupular spur, side lobes retuse and angular over the transversely triangular midlobe, blade white and yellow base of the spur spotted with red.—Moulmein, *Peché*.—(I have seen only imperfect cultivated specimens in Herb. Kew. It appears to be a very distinct large-leaved species of Sect. *Calceolaria*, J. D. H.)

ACAMPE GRIFFITHII, *Reichb. f. in Flora*, 1872, 277; near *A. dentata*, spur cylindric hairy within, midlobe of lip triangular angled on each side at the base protruding, two intermarginal lamellæ ("lineatis apice lobosis"), disk warted all over.—The rest as in *A. dentata*, *Lindl.*—Bhotan, *Griffith*.

ACAMPE INTERMEDIA, *Reichb. f. in Otto. & Dietr. Allgemein. Gartenzeit.* 1856, 217; near *A. multiflora*, *Lindl.*; flowers like those of *A. papillosa*, *Lindl.*, leaves shorter ovate lip equally 2-lobed, raceme short corymbose, lip ("labello aplectro"), canal between the lateral lobes hairy, midlobe oval acute tubercled.

65. *SARCANTHUS*, *Lindl.*

Characters of *Saccolabium*, but spur with a dorsal usually 2-lobed callus or an erect plate within, inserted under the column, and with the cavity more or less divided by a vertical septum.—Species about 20, Tropical Asiatic.

But for the inconvenience attending the substitution of a new generic name for the numerous species of this genus, I should unhesitatingly unite it to *Cleisostoma*, and both to *Saccolabium*. The only character whereby its species can be distinguished is the more or less septate cavity of the spur, often a very obscure one, and almost inappreciable when the septum is reduced to a mere ridge.

* Leaves elongate, filiform.

1. *S. filiformis*, *Lindl. in Bot. Reg.* 1842, *Misc.* 61; leaves 8–10 in., racemes long lax-fl., sepals oblong obtuse, petals smaller and narrower, lip broadly conically, saccate base 2-lobed, side lobes acute incurved, midlobe short broad toothed on each side at the base. *Bot. Mag.* t. 4639; *Jard. Fleur.* 266.

SIKKIM HIMALAYA, *Griffith's Collector*. KHASIA HILLS, *Lobb*. TENASSERIM, *Parish*.

Stem pendulous, as thick as a duck's quill, terete. *Leaves* distant, $\frac{1}{2}$ in. diam., obtuse. *Racemes* 6–10 in., curved; bracts minute, ovate; pedicels very short; flowers $\frac{1}{2}$ in. diam.; sepals and petals dark purple, margins and midrib green; lip fleshy, white, base broad yellow, midlobe white, sac with a narrow lamina from the base of the midlobe downwards; and a very large-lobed hispid callus below the very broad, thick, yellow column; strap of oblong pollinia rather broad, gland angular.

2. **S. Williamsoni**, *Reichb. f. in Hamb. Gartenzeit.* 1865, 333; in *Gard. Chron.* 1865, 674; leaves 4-5 in., racemes long laxly many-fl., sepals ovate-oblong, petals smaller oblong, side lobes of lip erect oblong obtuse subfalcate, midlobe incurved fleshy thickly clawed acuminate, spur globose.

TENASSERIM; at Moulmein, *Parish.* ANDAMAN ISLANDS, *Berkeley.*

Stem nearly as thick as a goose-quill. *Leaves* $\frac{1}{2}$ in. diam., curved, obtuse. *Racemes* 6-8 in., slender, sometimes branched; bracts ovate-lanceolate; flowers $\frac{1}{2}$ in. diam., pedicelled, amethystine; spur with a narrow lamella from the base of the lip downwards and a large lobed pubescent dorsal callus; anther short; pollinia very minute subglobose, strap broadly obcordate (short, slender in *Ic. Parish*).

3. **S. appendiculatus**, *Hook. f.*; leaves 3 in., racemes short few-fl., sepals oblong, petals smaller and narrower, side lobes of lip triangular acuminate, midlobe short incurved, column pubescent at the base in front, spur funnel-shaped slightly curved obtuse. *S. teretifolius*, *Reichb. f. in Trans. Linn. Soc.* xxx. 136 (not of *Lindl.*). *Aerides appendiculatum*, *Wall. Cat.* 7315; *Lindl. Gen. & Sp. Orchid.* 242.

TAVOY, *Wallich.* TENASSERIM; at Moulmein, *Griffith, Parish.*

Stem as thick as a duck's quill, rigid. *Leaves* $\frac{1}{2}$ in. diam., obtuse. *Racemes* 1-2 in.; bracts minute; pedicels short; flowers $\frac{1}{2}$ in. diam.; petals and sepals reflexed, yellow-green; lip rose-pink, spur 2-celled below the middle by a lamina descending from the base of the midlobe; dorsal callus very large, lobed, pubescent at the base; anther short; pollinia very large, strap broadly triangular-ovate.—Very near *S. teretifolius* of China, but flowers very much smaller and spur longer.

** Leaves flat or channelled.

† *Stem elongate, scandent or pendulous.*

4. **S. secundus**, *Griff. Notul.* iii. 362; *Ic. Pl. Asiat.* t. 336; stem slender elongate, leaves 4-7 in. narrowly linear-lanceolate acuminate, racemes slender, flowers subsecund, sepals oblong obtuse, petals smaller, side lobes of lip tooth-like, midlobe small ovate acute concave, spur conico-infundibular obtuse gibbous dorsally. *Micropera pallida*, *Lindl. in Wall. Cat.* 7321 (in part), (not of *Gen. & Sp. Orchid.*).

SILHET, *Wallich.* UPPER ASSAM, *Griffith.*

Leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, rigid, 5-nerved; sheaths $\frac{3}{4}$ -1 in., deeply grooved when dry. *Racemes* shorter than the leaves, peduncle and rachis slender; bracts minute, pedicel with ovary $\frac{1}{2}$ in.; flowers $\frac{1}{2}$ in. diam.; sepals and petals red with white or yellowish margins and central band; lip rose-colored, very fleshy, spur white with a longitudinal septum, dorsal callus 2-lobed; column stout, short, rostellum subulate; anther long-beaked, strap of globose pollinia slender, dilated above, gland minute. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in., ellipsoid or oblong, ribs low.—Referred to under *S. peninsularis* as possibly that plant by Lindley (in *Journ. Linn. Soc.* iii. 39), but is very different. From a so-named drawing in *Herb. Calcutt.* this would seem to be the original *S. oxyphyllus*, of *Wallich's* mss.; and that Lindley inadvertently transferred that name to No. 16.

5. **S. peninsularis**, *Dalz. in Hook. Kew Journ.* iii. (1857), 243; racemes 1-6 in., flowers reflexed, sepals and smaller petals obovate-oblong obtuse, side lobes of lip short erect subacute, midlobe small incurved acute, spur conical subacute dilated above. *Lindl. in Journ. Linn. Soc.* iii. 39; *Walp. Ann.* vi. 891; *Dalz. & Gibs. Bomb. Fl.* 264. *S. pauciflorus*, *Wight Ic.* t. 1747 (bad). *Saccolabium acuminatum*, *Thwaites Enum.* 34.

THE DECCAN PENINSULA; on the Ghats from the Concan to Travancore. Ceylon; in the Saffragam district.

Stem 10–12 in., as thick as a duck's quill, flexuous, pendulous. *Leaves* uniform, 6–8 by $\frac{1}{2}$ – $\frac{3}{4}$ in., rigid, strict or curved, 3–5-nerved, acuminate, tip obtuse, sheaths ribbed. *Racemes* slender, bracts minute; flowers $\frac{1}{2}$ in. diam., greenish or yellow with pink margins and a violet lip; sepals and petals rather spreading; spur more or less perfectly 2-celled, dorsal callus small; column short; anther beaked, pollinia didymous, strap slender dilated upwards, gland small. *Capsule* $\frac{3}{4}$ – $\frac{1}{2}$ in., deflexed, narrowly oblong.

6. **S. insectifer**, *Reichb. f. in Bot. Zeit.* 1857, 159; leaves many $\frac{1}{2}$ by $\frac{2}{3}$ in. oblong amplexicaul, spikes very short stout few-fl., sepals ovate-oblong obtuse, petals oblong, side lobes of lip rounded, midlobe large triangular-obovate fleshy, spur short broadly conical.

BEHAR; at Burkutta, *J. D. H.* CACHAR, *Mann.* CHITTAGONG (*l.c. in Hort. Calcutt.*). TENASSERIM, *Parish.*

Stem a foot and upwards, robust, scandent, thicker than a goose-quill. *Leaves* subimbricate, obliquely obtusely 2-lobed with sometimes an intermediate apiculus, thickly coriaceous. *Spikes* $\frac{1}{2}$ in., sessile; bracts small, deciduous; flowers $\frac{1}{2}$ in. diam., greenish-yellow striped with red-brown; lip white and pink or purple, midlobe acute or acuminate, spur semiseptate mouth with a pubescent ridge, dorsal callus large; column very short, stout, tip reclinate and with uncinate recurved arms; anther truncate, pollinia globose didymous, strap short very broad, gland transverse.

7. **S. Scortechinii**, *Hook. f.*; leaves 3–5 by $1\frac{1}{4}$ in. subpetioled oblong-lanceolate acute flat, spike about equalling the leaves very stout many-fl., sepals oblong acute, petals half as broad, side lobes of lip obsolete, midlobe hastately deltoid, spur longer than the sepals conical obtuse curved.

PERAK, *Scortechinii*; on rocks, *Wray.*

Stem elongate, robust, as thick as a goose-quill. *Leaves* very thick. *Spikes* 2–6 in., flowers $\frac{1}{2}$ in. diam.; sepals and petals lurid purple with green midrib and margins; lip $\frac{1}{2}$ in., yellowish, spur 2-celled, dorsal callus large; column short; anther obtusely beaked; pollinia 4, broadly oblong, strap linear. *Capsules* 1 in., linear-oblong, deflexed.—Described from fruiting specimens and a drawing by *Scortechinii*.

8. **S. pallidus**, *Lindl. in Bot. Reg.* 1840, *Misc.* 78; in *Journ. Linn. Soc.* iii. 39; leaves 10–14 in. lorate flat, panicle very large copiously branched laxly many-fl., sepals and smaller petals oblong obtuse, side lobes of lip triangular acuminate, midlobe a small incurved ovate acute fleshy beak, spur a cylindric obtuse sac. *S. racemifer*, *Reichb. f. in Wulp. Ann.* vi. 891. *S. tricolor*, *R. f. in Bonpland.* ii. 214. *Saccolabium racemiferum*, *Lindl. Gen. & Sp. Orchid.* 224. *Aerides racemiferum*, *Wall. mss.*

EAST NEPAL, alt. 4000 ft., *J. D. H.* BHOTAN and the KHASIA HILLS, alt. 4–6000 ft., *Wallich, &c.* BURMA, *Berkeley.*

Stem as thick as the thumb; roots very stout. *Leaves* very coriaceous, 2 in. broad, deeply obtusely 2-lobed. *Panicle* with the stout peduncle 2–3 ft., branches long, slender; bracts at the forks ovate-lanceolate, floral subulate, persistent; pedicel with ovary $\frac{1}{2}$ in.; flowers $\frac{1}{2}$ in. diam.; sepals and petals dark purple edged with yellow; lip white, spur thick-walled, about as long as the sepals, semiseptals longitudinally, dorsal callus 2-lobed; column short, stout, rostellum obscure; anther broad, acute, pollinia oblong, strap dilated above, gland small. *Capsule* $\frac{3}{4}$ in., ellipsoid or clavate.—The E. Nepal specimen has shorter leaves and an ellipsoid capsule.

†† *Stem short or 0.*

9. **S. erinaceus**, *Reichb. f. in Bot. Zeit.* 1864, 298; leaves linear-oblong subacute channelled, racemes longer than the leaves pendulous laxly many-fld. hirsute, sepals and smaller petals oblong-obovate white, side lobes of lip broad midlobe ovate-oblong obtuse, spur shorter than the sepals saccate. *Bot. Mag. t.* 5630. *S. Stowellianus*, *Batem. mss.*

TENASSERIM; at Moulmein, *Parish.*

Stem short, as thick as the little finger. *Leaves* close set, 2-3 by $\frac{2}{3}$ in., recurved, coriaceous. *Racemes* 4-6 in., rachis slender purple; bracts minute; flowers $\frac{2}{3}$ in. diam.; pedicel with ovary $\frac{1}{2}$ - $\frac{2}{3}$ in.; side lobes of lip with acute outer angles, spur with a sinuous ridge at the mouth, and with a broad plate extending downwards from the base of the pink midlobe, dorsal callus didymous; column stout, recurved, beak decurved, base broad; anther long-beaked, strap of pollinia very slender, gland minute.

10. **S. latus**, *Reichb. f. in Bot. Zeit.* 1886, 378; in *Saunders Refug. Bot. t.* 109; leaves very short broad fleshy, raceme 6-8 in., sepals broadly oblong obtuse, petals obovate-oblong, side lobes of lip erect, midlobe very short obtuse concave, spur broadly conical obtuse.

TENASSERIM; at Moulmein, *Griffith, Parish.*

Stem 0. *Leaves* $2\frac{1}{2}$ -3 by 1-1 $\frac{1}{4}$ in., linear-oblong, obtusely 2-lobed, clouded with purple beneath. *Peduncle* slender, branched at the base, very lax-fld.; bracts minute; pedicel with ovary horizontal, $\frac{2}{3}$ in. long; flowers yellow, resupinate; spur with a narrow longitudinal plate at the base within; dorsal callus 2-lobed, glabrous; column rather long rostellum elongate, deflexed; strap of globose pollinia very long, slender, gland minute.—Very near *S. erinaceus*. There are two specimens in Herb. Kew., both from the Royal Gardens; in one the sepals and petals are much broader than in the other, and the raceme much longer. A drawing of a flower of this species is in Herb. Lindl., marked "India (Griffith) Loddiges." The ridge within the spur hardly amounts to a septum, and the species is therefore intermediate between *Sarcanthus* and *Cleisostoma*.

11. **S. Parishii**, *Hook. Bot. Mag. t.* 5217; leaves 4-6 in. lorate keeled unequally obtusely 2-fld, racemes or panicles elongate many and lax-fld., sepals ovate obtuse, petals smaller narrower oblong, side lobes of lip rounded, midlobe broadly ovate, straight or recurved, spur longer than the sepals narrowly conical curved.

TENASSERIM; at Moulmein, *Parish.*

Stem 1-2 in., roots very stout. *Leaves* few, divaricate, bases closely imbricating. *Racemes* 6-16 in.; bracts minute, ovate, acute; flowers $\frac{1}{2}$ in. diam., golden yellow; sepals and petals striated with red; spur septate below the middle, dorsal callus large; column short; anther acuminate, pollinia didymous oblong shortly stipitate below the tip of the narrowly spatulate strap (as in sect. *Uncifera* of *Saccolabium*), gland minute.

12. **S. lorifolius**, *Parish mss.*; leaves very thick curved linear channelled keeled obtusely notched, scape flexuous and rachis of panicle dense-fld. spikes stout, bracts reflexed, lateral sepals broadly obovate, petals more oblong obtuse, side lobes of lip subulate, midlobe ovate concave, spur longer than the sepals. *Hook. f. Ic. Plant. ined.*

TENASSERIM; at Moulmein, *Parish.*

Stem 3-4 in., stout, few leaved. *Leaves* 4- by $\frac{1}{2}$ - $\frac{3}{4}$ in., sheath very short. *Peduncle* 4 in., green, sheaths obtuse; spikes 3-4 in.; bracts ovate-subulate; sepals and petals yellow with red; spur white, half 2-celled by vertical lunella, dorsal callus didymous; column short; anther short, broad, pollinia didymous, strap not long

gland ovate.—Described from an excellent drawing by Parish. Habit, spike and bracts of *Cleisostoma spicatum*; but the flowers are smaller, yellow, and the spur distinctly septate within.

13. *S. oxyphyllus*, Wall. ex Lindl. in *Bot. Reg.* 1840, *Misc.* 58; leaves 6-12 by $\frac{1}{2}$ - $\frac{3}{4}$ in. rigid acuminate, racemes short dense-fld., sepals oblong obtuse, petals smaller obovate-oblong, side lobes of lip acuminate, midlobe small ovate incurved, spur much longer than the sepals subcylindric obtuse. ? *Cleisostoma subulatum*, *Blume Bijl.* 362. *Angræcum pugioniforme*, *Klotzsch in Cat. Sem. Hort. Berol.*

TENASSERIM; at Moulmein, Parish.

Stem short. *Leaves* thickly coriaceous, margins recurved, narrowed to both ends. *Raceme* 4-6 in.; bracts minute, acute; flowers $\frac{1}{4}$ in. diam., dull purple, with yellow disk and margins; spur large, obtuse, septate below the middle, dorsal callus large lobed; column rather long, rostellum minute; anther acuminate, pollinia didymous, strap very slender, gland minute.—Very near *S. pugioniformis*, Reichb. f. in *Otto and Diet. Gartenzeit.* 1856, 219, but the leaves in that are broader and racemes much longer. Lindley (*Bot. Reg.* l. c.) says that *oxyphyllus* is nothing but a narrow leaved var. of the Chinese *S. rostratus*, but as noted under *S. secundus* there has been a misapplication or transference of Wallich's name of *oxyphyllus* by Lindley or Wallich.

SPECIES UNKNOWN TO ME.

S. ARIETINUS, Reichb. f. in *Gard. Chron.* 1869, 416; stem 5 in., leaves 3 in. straight stout terete as thick as a quill, raceme small deflexed many-fld., bracts triangular not half the length of the pedicelled ovary, flowers small greenish, lip rosy, sepals oblong, petals ligulate obtusely acute, lip 3-fid, side lobes obtuse-angled plaited in the middle, midlobe triangular acute yellowish, spur retrorse with an erect lamellate grooved callus under the column, column slender velvety at the angles of the lip near the fovea. Assam (*Hort. Day*). Stiff, as if made of tin.

S. ASPERSUS, Reichb. f. in *Hamb. Gartenzeit.* 1865, 297; near *S. Parishii*; leaves ligulate broadly 2-toothed, peduncle long slender, flowers racemed equalling *S. paniculatus*, sepals green, lip purple-spotted, sepals ovate apiculate, petals spur curved with a longitudinal septum, side lobes semi-ovate involute auricled at the isthmus and at the base, midlobe sessile triangular.—Burma, *Hort. Soc.*

S. CHRYSOMELAS, Reichb. f. in *Gard. Chron.* 1869, 662; leaves broadly lorate unequally 2-lobed, panicle simple, bracts triangular much shorter than the pedicelled ovaries, flowers yellowish, disk of sepals and petals blackish-purple, sepals and subequal petals oblong, side lobes of lip triangular with an ascending awn, midlobe triangular, spur straight conical, septum running from the posticous base of the spur along the anticous and excurrent on the midlobes, callus under the column bicural, column slender, base puberulous.—Tenasserim, at Moulmein, *Benson (Hort. Veitch.)* *S. paniculatus* has a 3-fid midlobe of the lip; *S. racemifer* (*Saccolab. racemiferum* and *Sarcanth. pallidus*, Lindl.), has a totally different column anther, callus, and different side lobes of lip.

S. MACRODON, Reichb. f. in *Gard. Chron.* 1872, 1555; leaves short oblong-ligulate with 2 triangular forcipate teeth, raceme elongate laxly many-fld., bracts most minute, pedicelled ovary and cylindric spur equal, sepals and petals oblong straight ribbed on the back, lip 3-fid, side lobes subquadrate anticous angle folded inwards, midlobe triangular concave, column short with a styliform deflexed process on each side next to the elongate deflexed linear triangular rostellum.—Madras Presidency, *Benson (Hort. Veitch.)*.

S. MIRABILIS, Reichb. f. in *Gard. Chron.* 1878, ii. 300; leaves $5\frac{1}{2}$ by $\frac{3}{4}$ in. ligulate 2-fid, lobes ligulate obtuse, panicle $1\frac{1}{2}$ in. elongate slender, branches distant erect ends racemose, bracts most minute, flowers small yellowish, spur purple, sepals oblong acute dorsal arched gibbous, petals ligulate, lip 3-fid, side lobes short erect oblong acute, midlobe triangular horizontal, spur cylindric semicurved grooved septate, dorsal callus forked, strap of pollinia oblong bent over the compressed androclinium, pollinia blue on a forked appendage of the strap.—Burma? (*Hort. Hobart*).—Near *S.*

Parishii, with even more remarkable pollinia. [The strap of the stipitate pollinia must resemble that of *Saccolab. sect. Uncifera*, J. D. H.].

CLEISOSTOMA, Blume.

Differs from *Sarcanthus* only in the spur not being septate, and from *Saccolabium* in having a dorsal scale or callus within the spur beneath the column.—Species (known) probably 15 or 20.

Under *Sarcanthus* I have given my reason for not bringing that genus under this; to which I may add that if both were brought under *Saccolabium*, the result would be perhaps more satisfactory still. There are no characters of habit or habitat whereby the three can be distinguished, and the structural are very minute and often obscure. In *Cleisostoma* and *Sarcanthus* the dorsal appendage within the spur is either a 2-lobed callus or a thin scale, suggesting the propriety of rearranging the species of both genera by this character, but it is one so difficult of accurate observation in dried specimens that I hesitate to adopt it.

* *Stem more or less elongate. Peduncle stout, usually longer than the leaves, branched, erect; flowers in short spikes or racemes terminating the branches, (as in Sarcanthus pallidus).*

1. *C. latifolium*, Lindl. in Bot. Reg. 1840, Misc. 60; stem very stout, leaves $2\frac{1}{2}$ –9 by $1\frac{1}{2}$ –2 in., from oblong to lorate, peduncle very stout, side lobes of lip short truncate, midlobe reniformly ovate caruncled towards the base, spur saccate. Walp. Ann. vi. 889. *C. fuscum*, Lindl. in Journ. Hort. Soc. 1850, 80; Walp. l.c.

PERAK, Wray, (Ic. Scortechini); SINGAPORE and MALACCA, Griffith. (Kew Distrib. 9235), Maingay, (K.d. 1647).

Stem 6–10 in., as thick as the middle finger. *Leaves* thickly coriaceous, flat, obtusely broadly 2-lobed, base narrowed. *Peduncle* 12–18 in., rather flexuous; sheaths annular; branches 1–2 in.; rachis of spikes very stout, bracts minute, broad; flowers $\frac{1}{2}$ in. diam.; sepals and petals obovate-oblong, greenish margined or spotted with red-brown; spur sometimes inflated below, dorsal scale truncate erose; column very short, rostellum inconspicuous; anther low, broad, strap of globose pollinia linear, gland small. *Capsule* 1 in., fusiform.—Of Lindley's *C. latifolium* there is no specimen in his Herbarium. It was described from a Singapore plant cultivated by Loddiges, and agrees in characters with *C. fuscum*, of which Lindley himself says it is probably only a form of *latifolium*.

2. *C. andamanicum*, Hook. f.; leaves 4–6 by $\frac{1}{2}$ – $\frac{3}{4}$ in. lorate, peduncle equalling or exceeding the leaves, side lobes of lip short truncate, midlobe very short reniform, spur cylindric.

SOUTH ANDAMAN ISLANDS, Kurz.

Stem as thick as a goose-quill. *Leaves* very coriaceous, recurved, obtusely unequally 2-lobed. *Peduncle* 5–7 in.; sheaths annular and bracts and flowers as in *C. latifolium*; flowers $\frac{1}{2}$ in. diam., pale greenish-yellow with a purple band within the margin; lip yellow, spur spotted with red, dorsal callus retuse; column very short, rostellum large, prominent; anther ovate, acuminate, strap of globose pollinia slender, gland medium-sized.—Closely allied to *latifolium*, but much more slender, leaves smaller and narrower and spur cylindric.

3. *C. maculosum*, Lindl. Gen. & Sp. Orchid. 227; in Bot. Reg. 1840, Misc. 37; leaves 6–7 by $\frac{2}{3}$ – $\frac{3}{4}$ in. narrowly lorate, peduncle stout shorter or about equalling the leaves, side lobes of lip short truncate, midlobe very short ovate papillose, spur saccate. Walp. Ann. vi. 888. *C. galeatum*, Thwaites Enum. 305. *Saccolabium galeatum*, Gardn. mss.

CEYLON; in the Central Province, *Macrae*, &c.

Stem as thick as a swan's quill. *Leaves* coriaceous, obtusely unequally 2-lobed. *Peduncle* with annular sheaths; bracts short, broad; flowers $\frac{1}{2}$ in. diam., yellow spotted with red; spur much smaller than the obovate-oblong sepals, dorsal scale truncate; column very short, rostellum short; anther small, strap of globose pollinia linear, gland small. *Capsule* $1\frac{1}{2}$ in., narrowly clavate.—Bentham (*Gen. Plant.* iii. 580) erroneously unites Thwaites' *Saccolabium lineolatum*, C.P. 2741 (*S. ochraceum*, Lindl.) with Lindley's *C. maculosum*.

4. ***C. crassifolium***, Lindl. in *Part. Fl. Gard.* iii. 125, t. 99; leaves 8–10 in. obtuse keeled, peduncle long stout branched, spikes recurved, lip with a pubescent ridge at the mouth of the cylindric spur, side lobes rounded, midlobe broadly ovate, lateral angles acute recurved. *Jard. Fleur.* iv. t. 397; *Walp. Ann.* vi. 889; *Lindema* iii. t. 139.

TENASSEEIM? (*Hort. Veitch*).

Stem as thick as the thumb. *Leaves* recurved, very thick, channelled above. *Peduncle* equalling the leaves; flowers $\frac{1}{2}$ in. diam.; sepals oblong, obtuse, and petals green and spotted; lip rose-cold., mouth of spur closed by the thickened ridge, disk of midlobe thickened; dorsal callus compressed, decurved; column very short; anther acuminate, pollinia 4, subglobose, strap linear, gland small.

** *Stem* short. *Peduncle* slender; flowers scattered on the slender branches of the panicle.

5. ***C. ramosum***, Hook. f.; stem short, leaves loriform obliquely 2-lobed, panicles broad, sepals obovate equalling the conical spur, side lobes of lip very small, midlobe triangular-ovate obtuse, disk at base and short spur within pubescent. *Saccolabium ramosum*, Lindl. *Gen. & Sp. Orchid.* 224. *S. flexuosum*, Lindl. in *Journ. Linn. Soc.* iii. 36. *Ceoclades flexuosa*, Lindl. in *Wall. Cat.* 7333; *Gen. & Sp. Orchid.* 236. *Aerides ramosum*, Wall. mss.

SIKKIM HIMALAYA; in hot valleys, J. D. H. LOWER BENGAL and the Sunderbunds, Wallich, Clarke. BURMA; on the Attran River, Wallich; Moulmein, Parish.

Stem 1–3 in. *Leaves* 3–5 by $\frac{1}{2}$ – $\frac{1}{3}$ in. *Panicle* erect; bracts minute; flowers $\frac{1}{2}$ in. diam., buff, or yellowish flushed or faintly blotched with red, or dull red with green margins; sepals and smaller obovate petals 3-nerved; lip white, flushed with pink or banded with yellow; dorsal scale in spur erect 2-fid. pubescent; column very short, broad; anther short very broad, pollinia (4, 2 very small, Clarke), strap dilated upwards and suddenly contracted at the tip. *Capsule* $\frac{1}{2}$ in., fusiform.—Wallich's specimens from Burma have very narrow leaves.

*** *Stem* usually elongate. *Peduncle* slender or stout rarely branched, usually shorter than the leaves.

6. ***C. spicatum***, Lindl. in *Bot. Reg.* 1847, under t. 32; leaves 4–8 by $\frac{1}{2}$ –2 in., spike stout simple dense-fld., bracts ovate-subulate deflexed, side lobes of lip broad rounded, midlobe small ovate fleshy, spur contracted above the inflated 4-lobulate base. *Sarcanthus densiflorus*, Par. & Reichb. f. in *Trans. Linn. Soc.* xxx. 136. *Saccolabium densiflorum*, Lindl. in *Wall. Cat.* 7311; *Gen. & Sp. Orchid.* 220; in *Bot. Reg.* 1838, *Misc.* 56. *Aerides densiflorum*, Wall. mss.

TENASSEEIM; at Moulmein, Parish. PENANG, Wallich, Curtis.—DISTRIB. BORNEO.

Stem as thick as the middle finger in Penang, more slender in Moulmein. *Leaves* oblong or linear-oblong, broadly unequally 2-lobed. *Spike* decurved or pendulous; flowers $\frac{1}{2}$ in. diam., glabrous or subfurfuraceous; sepals and petals broad,

dull red with a pale central band; lip yellowish flushed with red, midlobe incurved, spur sometimes transversely septate towards the base, dorsal callus forked; column very short, rostellum short; anther beaked, strap of globose pollinia slender, dilated upwards, gland small.—The spur is like that of *Saccolab. buccosum*.

7. *C. tenerum*, Hook. f.; stem scandent, leaves 1–2 in. oblong, base cordate, raceme few-fld. on a short stout leaf-opposed peduncle, side lobes of lip large truncate crenulate, midlobe ovate obtusely 3-lobed fleshy, spur very short conical incurved. *Ceoclares tenera*, Lindl. *Gen. & Sp. Orchid.* 236; *Wight Ic. t.* 1680; *Thwaites Enum.* 306; *Walp. Ann.* vi. 895. *Ceonia* ? *alata*, A. Rich. in *Ann. Sc. Nat. Ser.* 3, xv. 67, t. 7. *Saccolabium* ? *tenerum*, Lindl. in *Journ. Linn. Soc.* iii. 36.

NILGHIRI HILLS; in woods near Neddubetta, *Perrottet*. CEYLON; in the Central Province, alt. 3–5000 ft., *Macrae*, &c.

Stem 1–2 ft., as thick as a duck's quill. *Leaves* scattered, fleshy, tip rounded or notched. *Peduncle* $\frac{1}{2}$ – $\frac{3}{4}$ in., woody; basal sheaths cupular; bracts cymbiform; flowers $\frac{3}{4}$ in. diam., fleshy, yellow or greenish, nerves red; sepals and petals oblanceolate obtuse, lateral sepals decurved; midlobe of lip white, dorsal callus fleshy; column rather long; anther short broad acute, strap of globose pollinia slender, gland small. *Capsule* 1 in., turgid, elliptic-oblong or pyriform.—Erroneously referred to *Saccolab. brevifolium* in *Gen. Plant.* (iii. 579). I have seen no Nilghiri specimen.

8. *C. bipunctatum*, Hook. f.; stem slender scandent, leaves 4–6 by $\frac{1}{2}$ – $\frac{2}{3}$ in. subacute, peduncle very short, 1–2 fld. side lobes of lip small subfalcate, midlobe large ovate-lanceolate, spur very small incurved obtuse, saccate. *Saccolabium bipunctatum*, Par. & Reichb. f. in *Trans. Linn. Soc.* xxx. 145.

TENASSERIM; at Moulmein, *Parish*.

Stem about as thick as a duck's quill. *Leaves* lorate, laterally notched towards the tip; costa stout beneath. *Flowers* about $\frac{1}{2}$ in. diam., yellow and purplish; bracts obscure; sepals oblong-lanceolate, acute, 3-nerved, and linear-oblong 1-nerved petals falcate; midlobe of lip longer than the sepals, white, 3-nerved with a basal callus, dorsal scale membranous toothed; column very short; anther short, very broad, strap of subglobose pollinia linear, gland small.—I have seen only a very small specimen. Reichenbach, though describing the scale in the spur, places this in *Saccolabium*.

9. *C. brevipes*, Hook. f.; stem elongate, leaves 4 in. distichous uniform linear-lanceolate acute fleshy, spike short sessile dense-fld., rachis very thick, bracts short, flowers $\frac{3}{4}$ in. diam., sepals and petals subsimilar ovate-oblong obtuse orange-yellow with two purple bands, lip pale yellow, side lobes falcate acute, midlobe short hastate with a membranous 2-awned tip, disk thickened, spur a short sac tip rounded.

SIKKIM HIMALAYA, (*Ic. in Hort. Calcutt.*); alt. 5000 ft. *Gamble*. ASSAM, (*Hort. N. Campany*.)

Stems tufted, 8–12 in., as thick as a goose-quill, internodes $\frac{1}{2}$ – $\frac{3}{4}$ in., rugulose. *Leaves* erecto-patent, sessile, $\frac{3}{4}$ in. diam., flat, hard, tip micronate. *Spike* 1–1 $\frac{1}{2}$ in.; basal sheaths short, annular, and bracts brown; ovary $\frac{1}{2}$ in., green striped with dull purple; sac of lip shining, thickened disk extending backward to meet the thick callus at the base of the column, thus closing the orifice of the sac; column short, stout, pollinia subquadrate, strap compressed, gland large, 2-partite. *Capsule* 1–1 $\frac{1}{2}$ in., fusiform, terete, fleshy, striate.—Described from fresh cultivated specimens sent to Kew.

**** *Stem very short. Leaves subradical. Peduncle and raceme or spike much shorter than the leaves.*

10. **C. undulatum**, *Reichb. f. in Flora*, 1872, 274; leaves 4-8 by $\frac{3}{4}$ -1 $\frac{1}{4}$ in. lorate narrowed at both ends undulate, raceme many-fld., sepals oblong, side lobes of lip orbicular, midlobe suborbicular caruncled obscurely 3-lobed, spur short globose. *Saccolabium undulatum*, *Lindl. in Wall. Cat.* 7301; *Gen. & Sp. Orchid.* 222.

SILHET, *Wallich*. CHITTAGONG, hill tracts, *Gamble*.

Stem 1-1 $\frac{1}{2}$ in., roots fascicled. *Leaves* unequally obtusely 2-lobed, often falcate, sheath very short, flattened, midrib beneath strong. *Raceme* $\frac{3}{4}$ -1 in.; bracts minute; flowers $\frac{1}{6}$ in. diam., yellow blotched with red; sepals faintly 3-nerved; petals spatulately obovate, obtuse, 1-nerved; spur contracted at the mouth, membranous, dorsal scale erect bifid; column very short, rostellum minute, deflexed; anther broad, membranous; 1-celled, strap of globose pollinia slender, gland minute. *Capsule* $\frac{2}{3}$ in. long, linear-oblong.

11. **C. uteriferum**, *Hook. f.*; stemless, leaves 6-8 by 1 $\frac{1}{2}$ in. lorate tip broad rounded or retuse margins undulate, spike stoutly peduncled shorter than the leaves dense-fld., sepals obovate-oblong undulate tip rounded, petals smaller and narrower, side lobes of lip truncate, midlobe very small ovate fleshy, spur a large inflated subglobose sac sulcate in front, neck contracted.

PERAK, *Kunstler (Hort. Bot. Calc.)*.

Leaves flat, base hardly contracted. *Spike* with peduncle 3 in.; rachis very stout, strict; bracts minute; ovary very short, $\frac{1}{2}$ in.; flowers $\frac{1}{4}$ in. diam., thick, sepals and petals dirty yellow, dull red towards the base, nerves obscure; lip shorter, spur longer than the sepals, slightly incurved, grooved down the front, walls thin, dorsal scale large semicircular convex entire; column very short indeed, rostellum small, protruded; anther broad, truncate, 1-celled, pollinia globose, seated on the contracted apex of a rather broad lanceolate strap, gland oblong.—Near *C. undulatum* and *Wendlandorum*, but with a much larger inflated spur, smaller midlobe of lip, and broad strap of the pollinia. Described from an analysis of dried flowers and a fine drawing in the Calcutta Herbarium.

12. **C. Wendlandorum**, *Reichb. f. in Otto & Dietr. Allgemein. Gartenzeit.* 1856, 219; leaves 6-10 by 1-1 $\frac{1}{2}$ in., broadly lorate, raceme simple or branched many-fld., sepals obovate-oblong, petals narrower, side lobes of lip obscure rounded, midlobe small orbicular fleshy, spur short inflated. *C. callosum*, *Reichb. f. in Bonpland (not of Blume.)* *Pomatocalpa spicatum*, *Kuhl & Hasselt. ex. R. f. in Otto & Dietr. Allgemein. Gartenzeit.* l. c.

CACHAR; *Keenan*. TENASSERIM, *Parish*. ANDAMAN ISLANDS, *Berkeley*.

Stem 1-1 $\frac{1}{2}$ in., very stout; roots fascicled. *Leaves* coriaceous, 2-lobed, nerveless, midrib beneath slender. *Raceme* or *panicle* 4-6 in.; bracts obscure; flowers $\frac{1}{10}$ in. broad, yellow, papillose; spur very short broad truncate, dorsal scale semicircular erose; column very short, rostellum beaked; anther broad, strap of globose pollinia linear, gland small. *Capsule* (in Cachar) 1 in., linear-oblong.—A much larger plant than *C. undulatum*, named after the two Wendlands of Herrenhausen, father and son.

13. **C. Mannii**, *Reichb. f. in Flora*, 1872, 273; leaves lorate narrowed at both ends, raceme simple or branched many-fld., sepals and petals obovate, side lobes of lip truncate obtusely angled, midlobe orbicular-ovate, spur short inflated.

ASSAM, Mann. SIKKIM? (*Ic. in Herb. Calcutt.*)

I have seen but one specimen; it is as small as *C. undulatum*, from which it differs in the much longer stouter peduncle and raceme, and very small flowers about $\frac{1}{10}$ in. diam. (pale golden yellow flushed with red at the base of the sepals and petals, according to the Sikkim drawing). Dorsal scale of spur erect, 2-fid; column very short, anther broad, obtuse, pollinia subglobose, strap dilated upwards, rather long, gland small.

14. *C. decipiens*, Lindl. in *Bot. Reg.* 1884, *Misc.* 11; leaves 8-10 by 1 in. thick purple dotted beneath, peduncle simple or branched, spike many-fld., sepals and petals ovate or oblong-ovate, lip broader than long entire, spur short broad gibbous. *C. maculosum*, *Thwaites Enum.* 304 (*C. P.* 3885) (*not of Lindl.*) *C. Thwaitesianum*, *Trimen in Journ. Bot.* 1885, 244.

CEYLON; on trees in the low country, *Thwaites* (*C.P.* 3193).

A drawing of this plant from the Perideniya Herbarium represents the stem $\frac{1}{2}$ in. long, the leaves 5-6 by $\frac{3}{4}$ -1 in., lorate, unequally obtusely 2-lobed, sheaths $\frac{1}{2}$ in. long, and underside of leaf speckled with purple. *Flowering peduncle* stout, speckled with purple, with the dense-fld. spike 2 in., lengthening to 6 in. in fruit; bracts minute, subulate; flowers $\frac{1}{2}$ in. diam., yellowish, more or less suffused with red. *Capsule* sessile, $\frac{3}{4}$ in., linear-oblong.—The specimen in Lindley's herbarium (from Hort. Loddiges) consists of an imperfect leaf 4 by $\frac{3}{4}$ in. and a few inches of a branched panicle, the flowers not $\frac{1}{2}$ in. diam., are crowded in elongate spikes with a stout rachis. The sepals as drawn by Lindley are obovate-oblong, obtuse, reddish-brown, with a broad golden margin; side lobes of lip erect, truncate, midlobe white, spur yellowish; dorsal scale of spur broad erect; column and rostellum very short; strap of globose pollinia linear, with an apiculate tip.—Trimen rightly suspects his *Thwaitesianum* to be Lindley's *decipiens*.

15. *C. bicuspidatum*, Hook. f.; leaves 3-4 by $\frac{1}{2}$ -1 in. acutely 2-fid, raceme lax-fld. much shorter than the leaves, sepals orbicular-obovate obtuse, petals oblong-obovate, side lobes of lip plicate truncate, midlobe very stout ovate acute incurved, spur cylindric longer than the sepals obtuse.

SIKKIM HIMALAYA; near Darjeeling, *Anderson* (*in Herb. Calcutt.*). KHASIA HILLS; alt. 2000 ft., *Mann*. TENASSERIM, *Parish* (*Ic. in Hort. Calcutt.*).

Stem very short. *Leaves* flat, narrowed towards the base, lobes very acute, often unequal, the longer $\frac{3}{4}$ in. *Peduncle* with 5-6-fld. simple or branched raceme 2-5 in.; bracts small, ovate; flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., spreading or reflexed; sepals and petals yellowish-green, with a median stripe; lip white, speckled or flushed with rose, spur longer than the sepals, mouth infundibular with a thickened ridge, dorsal callus 2-lobed; column very short, rostellum long decurved; anther beaked; strap of globose pollinia dilated upwards, tip rounded produced beyond the pollinia, margins recurved, gland minute.

SPECIES UNKNOWN TO ME.

C. DISCOLOR, Lindl. in *Bot. Reg.* 1845, *Misc.* 59; leaves oblong channelled obliquely truncate, peduncle long slender dull purple branched at the extremity, sepals orbicular-ovate 5-nerved, and petals elliptic, both dull yellow with a greenish tinge, lip 3-fid, side lobes plicate with a conical caruncle in the inner faces within, dorsal tooth undivided keeled, spur longer than the sepals obtuse nearly white.—*India* (*Hort. Loddiges*). In Lindley's fragment the leaf is $3\frac{1}{2}$ by nearly 1 in., the very slender peduncle has some small ovate obtuse sheaths; bracts small, broad, membranous; fl. buds about $\frac{1}{2}$ in. diam., membranous; spur cylindric, longer than the broad sepals, walls thin; side lobes of lip truncate, subcrenate; midlobe very short continuous with the side lobes, incurved, ovate, acute, concave, thin, without calli; callus below the column 2-lobed, puberulous; pollinia each didymous, strap clavate with recurved margins, gland very small.

C. LORATUM, Reichb. f. in *Flora*, 1872, 273; stem short, leaves cuneately lorate obliquely acuminate, racemes stout strict, flowers small, bracts small triangular persistent, sepals and petals ligulate obtusely acute, side lobes of lip transverse retuse with a minute callus at each internal angle, spur short hemispheric, scale under column sharply 2-fid to the middle, limb ovate obtusely acute.—Assam.

ECHIOGLOSSUM STRIATUM, Reichb. f. in *Gard. Chron.* 1879, 390; stem erect strict branched, sheaths very rough (arphyllaceous), leaves linear-ligulate unequally acute very coriaceous keeled towards the tip, racemes short drooping, flowers small dense yellow streaked with red, sepals and narrower petals oblong obtusely acute, lip obtusely conic, side lobes triangular erect, midlobe bastately triangular, tip acutely 2-toothed, callus below the column ligulate, strap of pollen linear, gland very large, hippocrepiform. Sikkim Himalaya (*Hort. Mackay*)—(*Echiglossum* is reduced to *Cleisostoma* in Gen. Plant.)

67. *ORNITHOCHILUS*, Wall.

Epiphytes: *Stem* very short, pseudobulb 0. *Leaves* few, broad, flat. *Scapes* lateral, slender; flowers small, racemed or paniced. *Sepals* spreading, subequal, lateral obliquely obovate. *Petals* linear. *Lip* much larger than the sepals, clawed, side lobes subquadrate, midlobe clawed inflexed lobulate and fimbriate, with a velvety flap over the mouth of the short incurved spur, which is distant from the base. *Column* short, foot 0, rostellum forcipate; anther low 2-celled, pollinia 2, subglobose or oblong, grooved, strap obcuneate.—Species 1 or 2, Indian and Chinese.

O. fuscus, Wall. in *Lindl. Gen. & Sp. Orchid.* 242. *O. cublepharum*, Hance in *Journ. Bot.* xxii. (1884), 364. *Aerides difforme*, Wall. in *Lindl. l. c.* 242, *Sert. Orchid. Frontisp.* f. 7; Reichb. f. in *Gard. Chron.* 1865, 698; *Lindl. in Journ. Linn. Soc.* iii. 41; *Walp. Ann.* vi. 899; *A. Hystrix*, *Lindl. in J. L. S.* 42 (not of *Gen. & Sp. Orchid.*).

TROPICAL HIMALAYA; from Garwhal? Falconer, to SIKKIM, and the KHASIA HILLS, alt. 4-5000 ft. TENASSERIM; at Moulmein, Parish.—DISTRIB. China.

Stem $\frac{1}{2}$ – $\frac{3}{4}$ in., 2-3-leaved. *Leaves* 3-7 by 1- $1\frac{1}{2}$ in., obliquely elliptic-oblong, acute, many nerved, base narrowed. *Racemes* simple or sparingly branched, 6-12 in., lax-fld.; bracts small, subulate; flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. broad; sepals and petals yellow streaked with red; side lobes of lip striped with brown, midlobe variable in breadth, red, its lobules reflexed, the mid-one entire or fimbriate. *Capsule* 1 in., fusiform, pedicelled.

68. *TÆNIOPHYLLUM*, Blume.

Small stemless epiphytes, leafless when flowering, roots flattened pseudobulbs 0. *Leaves* linear or few or 0. *Peduncle* very short, filiform, simple, flowers very minute, spicate. *Sepals* and *petals* subequal, free or connate at the base. *Lip* sessile, saccate or spurred; side lobes short, broad, midlobe small fleshy. *Column* short, broad, foot 0; anther 2-celled; pollinia 4, in superposed pairs, strap linear, gland small.—Species about 6, Indian, Malayan, Australian and Pacific.

There are several Perak plants in Scortechini collections that are probably *Tæniophylla*; but the species are obscure, minute, and very imperfectly known, and there are no doubt many to be discovered.

1. *T. Alwisii*, *Lindl. in Journ. Linn. Soc.* iii. 42; peduncle glabrous, sepals and petals connate, lip cymbiform. *Thwaites Enum.* 305. Reichb. f. *Xen. Orchid.* 67, t. 116.

CEYLON; in the Ambagamowa district, *De Alwis*.

Roots fleshy. *Peduncle* $\frac{1}{2}$ in.; bracts keeled; flowers most minute, pale green; sepals, petals and lip connate into an acutely 6-toothed perianth; margins of lip free; column short; anther square, sub-4-celled; pollinia 4, pyriform, sessile on the gland.—Description from Thwaites.

2. **T. scaberulum**, *Hook. f.*; peduncle $\frac{1}{2}$ in. scaberulous, sepals petals and lip connate at the base, lip deeply saccate with a minute incurved midlobe.

TRAVANCORE; on teak branches, at Cottayam, *Johnson*.

Roots about $\frac{1}{10}$ in. diam., compressed. *Peduncle* 2-3-fld.; bracts broad; flowers sessile, $\frac{1}{10}$ in. diam.; sepals and petals oblong-lanceolate, obtuse, fleshy; sac or spur nearly as long as the limb of the lip, base rounded; column very short; anther truncate in front, pollinia pyriform. *Capsule* (young), $\frac{1}{4}$ in., slender, curved, scaberulous.

3. **T. serrula**, *Hook. f.*; leafless, spike sessile many-fld. appearing serrulate from the number and regularity of the very minute subdistichous bracts, sepals and petals free or nearly so, lip, cymbiform, side lobes low rounded, midlobe very short thick, spur scrotiform.

PERAK; at Larut, *King's Collector*.

Roots stout, $\frac{1}{2}$ in. diam. *Spikes* $\frac{1}{2}$ -1 in.; bracts concave, obtuse; flowers about $\frac{1}{2}$ in. diam., reddish-yellow; sepals lanceolate, obtuse and narrower petals with one thick nerve; side lobes of lip incurved; column very short, papillose. *Capsule* $\frac{3}{4}$ -1 $\frac{1}{2}$ in., trigonous.

69. **MICROSACCUS**, *Blume*.

Small densely tufted epiphytes; stems densely leafy. *Leaves* distichous, narrow or scalpelliform, fleshy. *Flowers* minute, subsessile or very shortly racemose. *Sepals* and *petals* subequal, widely spreading. *Lip* small, adnate to the base of the column, base broadly saccate; side lobes small or 0, midlobe broad subentire. *Column* very short, truncate; anther obtuse; pollinia 4, distinct, ellipsoid or globose, sessile on the slender strap, gland small or medium sized. *Capsule* small.—Species 3 or 4, Malayan.

1. **M. javensis**, *Blume Bijdr.* 367; leaves equitant scalpelliform, flowers subsolitary. *Lindl. Gen. & Sp. Orchid.* 219. *Saccolabium Griffithii*, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 145.

TENASSERIM; at Mergui, *Griffith* (*Kew Distrib.* 5244), *Helper* (*Kew Distrib.* 5384). *Parish. PERAK, Scortechini*.—DISTRIB. Malay Islands, Cambodia.

Stems 2-4 in., curved, $\frac{1}{2}$ in. diam. across the leaves. *Leaves* broadly ovate, obtuse, somewhat recurved, wrinkled when dry. *Flowers* $\frac{1}{8}$ in. diam., almost concealed by the leaves, cellular, white; bracts scarious, sheathing; sepals lanceolate; petals rather narrower; lip obtusely 3-lobed. *Capsule* $\frac{1}{2}$ in., sessile, ellipsoid.—Description of flower from a drawing by Griffith in *Herb. Lindl.* I have seen no authentic Javan specimen, but the Indian plant agrees well with Blume's description.

2. **M. virens**, *Hook. f.*; leaves linear-oblong trigonous, flowers in very short racemes. ? *Adenoncos virens*, *Blume Bijdr.* 381; *Lindl. Gen. & Sp. Orchid.* 235.

PERAK, *Scortechini*.—DISTRIB. Java, Borneo.

Stems 4-8 in., very stout, strongly incurved. *Leaves* 1-1 $\frac{1}{2}$ by $\frac{1}{2}$ in., very thick and fleshy, subacute. *Racemes* much shorter than the leaves, 3-6-fld.; bracts distichous, ovate, acute, very coriaceous and persistent; flowers coriaceous, about $\frac{1}{4}$ in.

diam.; sepals lanceolate, greenish; petals shorter and narrower; lip orbicular, apiculate, thick, greenish, base constricted into 2 obscure side lobes; pollinia 4, globose, gland rather large.—Described chiefly from a drawing and description by Scortechini. The Java and Bornean specimens are not in flower, but otherwise agrees with the Indian.

70. **DIPLOCENTRUM**, Lindl.

Epiphytes; stems short leafy, pseudobulbs 0. *Leaves* distichous, narrow, fleshy, subterete or complicate. *Peduncle* lateral, often branched; flowers small, in long subspiciform racemes. *Sepals* free, connivent, subequal or the lateral larger. *Petals* like the dorsal sepal. *Lip* sessile, jointed on the base of the column, spreading, entire, shortly 2-spurred, disk fleshy. *Column* very short, 2-auricled, truncate; anther 2-celled; pollinia 2, ovoid, sulcate or 2-partite, attached by a broad strap to a broad gland.—Species 2–3, Indian.

1. **D. recurvum**, Lindl. in *Bot. Reg. under t.* 1522; in *Wall. Cat.* 7331; *Gen. & Sp. Orchid.* 218; leaves 4–6 in. linear, panicle long-peduncled, branches spreading. *Wight Ic. t.* 1680, and *D. longifolium*, *Wight l. c. t.* 1681. *Cymbidium alofolium*, *Herb. Heyne*.

NILGHERY and TRAVANCORE, *Wight, &c.* CEYLON, in the Central Province.

Stem 2–6 in., densely leafy. *Leaves* linear, keeled, $\frac{1}{4}$ – $\frac{1}{2}$ in. broad, unequally obtusely 2-fid, recurved. *Panicle* with peduncle 5–8 in.; flowers $\frac{1}{2}$ in. diam., densely crowded towards the ends of the spreading branches; bracts minute, acute; sepals and petals deep pink or brownish tinged with pink; lip ovate-oblong, longer than the petals, entire, pinkish lilac or crimson spur much shorter than the blade of the lip, conical, incurved, obtuse; column very stout, auricles incurved, rostellum inconspicuous; anther truncate, cells basal, strap of pollinia narrowed from the broad base upwards. *Capsule* $\frac{1}{2}$ in., clavate.

2. **D. congestum**, *Wight Ic. t.* 1682; leaves 2–3 in. broadly oblong, spike very stout stoutly peduncled simple or shortly branched at the base.

TRAVANCORE; in the Iyamallay Hills, *Wight*.

Stem very short. *Leaves* $\frac{1}{2}$ – $\frac{2}{3}$ in. broad, deeply unequally 2-lobed, lobes obtuse. *Peduncle* with dense-fid. spike 4–6 in., rachis very stout; bracts minute, acute; flowers about $\frac{1}{2}$ in. diam.; colour, lip, spurs, column, anther and pollen much like *D. recurvum*.

70/2. **MYSTACIDIUM**, Lindl.

Epiphytes, pseudobulbs 0. *Leaves* few, distichous, linear, coriaceous. *Flowers* in axillary racemes, small. *Sepals* and *petals* subequal, free, spreading. *Lip* adnate to the base of the column, 3-lobed, spurred. *Column* very short, foot 0; anther hinged on to the top of the column; pollinia 2, globose, attached by separate straps to the gland.—Species about 20, tropical African and one Cingalese.

This genus should, I think, be reduced to *Angraecum*.

M. zeylanicum, *Trimen. Cat. Ceylon Pl.* 90. *Angraecum zeylanicum*, *Lindl. in Journ. Linn. Soc.* iii. 40; *Thwaites Enum.* 306.

CEYLON; near Galle, *Champion*.

Stem 3–4 in. *Leaves* 6–10 by $\frac{2}{3}$ – $\frac{3}{4}$ in., flat, narrowed to the acuminate apex, rigid, many-nerved. *Scapes* many, shorter than the leaves, very slender, rigid,

lax-fld. ; bracts minute, truncate, membranous ; pedicel with ovary $\frac{1}{8}$ in. ; sepals as long, lanceolate, 5-nerved ; petals narrower, 3-nerved ; lip nearly as long as the sepals, broadly ovate, finely acuminate, cymbiform, quite entire ; spur as long as the sepals, suberect, slightly clavate ; anther firmly attached by a point to the column. *Capsule* $\frac{2}{3}$ in., pedicelled, narrowly ellipsoid, ribs slender.—I have seen only indifferent specimens, from which the pollen was gone. Dr. Trimen informs me that it is found in several parts of Ceylon.

71. **ACRIOPSIS**, *Reinwdt.*

Epiphytes ; pseudobulbs clustered, 1-3-leaved. *Leaves* flat, linear, not plaited. *Scape* from the base of the bulb, slender, simple or branched ; racemelax-fld. ; bracts small acute. *Sepals* narrow, spathulately obovate, obtuse, dorsal arched, lateral connate placed under the lip. *Lip* adnate to the column above its middle, spreading, more or less 3-lobed, disk with 2 short erect lamellæ on the mesial line. *Column* incurved with 2 styliform horizontal or decurved processes on each side of the stigma, and a cucullate top concealing the anther ; rostellum suberect, acute ; anther membranous, 2-celled ; pollinia 2 or 4 in 2 pairs, narrowly pyriform attached by a strap to a small gland.—Species 5 or 6, Indian and Malayan.

In Herb. Calcutta is a fine drawing of what may be a new species from Moulmein, with a large quadrate clawed pubescent lip ; it may be intended for *A. javanica*.

1. **A. javanica**, *Reinwdt. in Flora Literat.* 1825, ii. 4 ; *in Syllog. Ratisb.* 1828 ; side lobes of lip broad rounded or subtriangular, midlobe very small clawed oblong concave, claw lamellate. *Blume Bijdr.* 377 ; *Lindl. Gen. & Sp. Orchid.* 140 ; *Walp. Ann.* vi. 492. *A. picta*, *Lindl. in Bot. Reg.* xxix., *Misc.* 105. *A. Griffithii*, *Reichb. f. in Bonpland.* ii. 92 ; *Walp. l. c.* *A. crispa*, *Griff. Notul.* iii. 333 ; *l. c.* *Plant. Asiat.* t. 318. ? *Spathoglottis* ? *trivalvis*, *Wall. Cat.* 3742 ; *Lindl. Gen. & Sp.* 120.

TENASSERIM, *Parish.* PERAK, *Scortechini*, and SINGAPORE, *Wallich, &c.* MALACCA, *Griffith, Maingay.*—DISTRIB. Java, Philippines.

Pseudobulbs $\frac{3}{4}$ –1 $\frac{1}{2}$ in., oblong or ovoid. *Leaves* 4–6 by $\frac{1}{2}$ – $\frac{1}{2}$ in., 2-dentate. *Scape* 6–18 in., simple or branched ; pedicels $\frac{1}{8}$ in., capillary ; sepals $\frac{1}{2}$ – $\frac{1}{2}$ in., white with purple tip and central broad or narrow band ; petals subsimilar ; lip white with a purple band and lamella. *Capsule* $\frac{1}{2}$ in., broadly ellipsoid.—It is difficult to reconcile Griffith's figure with the above description of the lip, but his habitat being that of Maingay's plant (Orchard trees, Malacca) seems to identify it.

2. **A. indica**, *Wight. Ic. t.* 1748 (*bad*) ; lip oblong subpanduriform tip rounded, lamellæ opposite the contraction. *Walp. Ann.* vi. 492.

TENASSERIM, *Griffith (in Herb. Lindl.)*, *Parish.* PENANG, *Maingay.*

A much smaller plant than *A. javanica*, with more densely tufted pseudobulbs, very narrow leaves, scapes shorter, more branched, and smaller flowers ; the sepals are $\frac{1}{8}$ in. long and the very different lip is inserted higher up, just under the column.—Wight who had lost the locality of the species he figured probably received it from Griffith. In a drawing by Parish the flowers are yellow green faintly blotched with purple. Wight's figure of the lip is quite unlike that of the specimen he depicted, which is now in Herb. Kew.

3. **A. Ridleyi**, *Hook. f.* ; lip with small oblong obtuse side lobes and a large orbicular or transversely oblong clawed smooth midlobe, lamellæ on the claw.

SINGAPORE; at Bukit Mandi, *Ridley*.

Pseudobulbs broadly ovoid, compressed. *Leaves* 3-4 in., linear, olive green. *Scape* simple (always?); *raceme* lax-flid.; flowers yellow, sparsely spotted with crimson; lip white, lamellæ crimson.

72. **PODOCHILUS**, *Blume*.

Stems tufted, erect or diffuse. *Leaves* many, uniform, distichous, flat or equitant and laterally compressed. *Peduncles* terminal or leaf-opposed; flowers minute, racemed or spicate; bracts persistent. *Lateral sepals* adnate with the prolonged foot of the column and together at the base, forming a mentum. *Petals* broad or narrow. *Lip* clawed, jointed to the foot of the column, mobile (always?) erect, with a basal appendage. *Column* very short; *rostellum* terminal, triangular, erect, bifid or bipartite; *anther* erect; *pollinia* 4, each pair half enclosed in a calyptriform stipe fixed by a gland to the top of the rostellum. *Capsule* very small, ellipsoid.—Species 12 or more, Indian and Malayan.

The flowers of all the species want careful examination on a living state. There are great differences in the columnar structure and pollinia that cannot be satisfactorily determined from dried specimens. These last are almost in all cases deficient in flowers, which are easily detached, and so minute as to escape the notice of collectors.

* *Leaves* equitant, laterally compressed, not articulate with the sheath. *Flowers* secund, on inclined or decurved lax-flid. racemes.

1. ***P. cultratus***, *Lindl. in Wall. Cat.* 7336; *Gen. & Sp. Orchid.* 234; *in Journ. Linn. Soc.* iii. 37; leaves ensiform subfalcate acute, lip cuneately oblong truncate 5-nerved, base saccate.

TROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, *J. D. H.* ASSAM, *Masters*. CACHAR, *Clarke*. TENASSERIM; the Attran River, *Parish*.

Stem 3-7 in., with the leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. broad. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., many nerved. *Peduncle* short, decurved; bracts ovate-lanceolate; flowers $\frac{1}{2}$ in. long; dorsal sepal broad, 5-nerved, lateral subacute; petals broadly obovate, acute, 3-nerved; mentum saccate; base of lip broad. *Capsule* $\frac{1}{4}$ in.—The lip resembles that of an *Appendicula*; I doubt its being articulate and mobile.

2. ***P. falcatus***, *Lindl. Gen. & Sp. Orchid.* 234: leaves ensiform obtuse, lip narrowly clawed oblanceolate 3-nerved, base with a short notched appendage. *Thwaites Enum.* 306.

CEYLON; Central Province, alt. 3-6000 ft., common.

Habit of *P. cultratus*, but stems longer, 6-12 in. *Rostellum* with an involute top, round which the capillary tails of the pollinia are curved, gland minute. In var. *angustata*, *Thw.* (C.P. 3889), the leaves are so closely appressed to one another, that not even the points are free, and the breadth of the stem across the leaves is only $\frac{1}{2}$ in.

3. ***P. malabaricus***, *Wight Ic. t.* 1748, fig. 2; leaves obtuse, spike many-flid. much longer than the leaves, mentum very short, lip linear-lanceolate obtuse contracted in the middle. *Walp. Ann.* vi. 893.

MALABAR, *Jerdon*; Wynnad jungles, *Drew*. TRAVANCORE, *Johnson*.

Stem 3-5 in., fleshy, $\frac{1}{2}$ in. across the leaves. *Leaves* $\frac{1}{2}$ in., straight. *Spike* 1-1 $\frac{1}{2}$ in., inclined or horizontal, few-flid.; bracts broadly ovate; flowers white tipped with pink; petals lanceolate; lip constricted in the middle.—I have seen no flowers. *Wight's* expression of lip contracted in the middle probably implied that the basal appendage is as large as the blade. Probably not different from *P. falcatus*.

4. **P. saxatilis**, *Lindl. Gen. & Sp. Orchid.* 235; leaves short recurved obtuse, lip oblanceolate obtuse 3-nerved. *Thwaites Enum.* 307.

Ceylon; Hantani and Ambagamowa districts, *Macrae, Thwaites*.

Stems 2-3 in., fleshy. Leaves $\frac{1}{4}$ - $\frac{1}{2}$ in. Peduncle terminal, $\frac{1}{2}$ in., drooping, few-fl.; bracts ovate, smaller than the yellow flowers; lip red in the middle; lateral sepals obtuse; petal obovate-oblong, obtuse; mentum short.—Description of flowers from a drawing by Lindley.

** Leaves flat, not equitant or laterally compressed.

† Leaves broad. Scapes lateral.

5. **P. unciiferus**, *Hook. f. Ic. Plant. ined.*; leaves $\frac{3}{4}$ -1 $\frac{1}{4}$ by $\frac{1}{2}$ - $\frac{3}{4}$ in. oblong, tip rounded, peduncles many very slender flowering at the tips, lip spatulate, basal appendage long slender uncinately recurved.

PERAK, *Scortechini*.—DISTRIB. Borneo, Philippines.

Stem erect, 18-24 in. Leaves $\frac{1}{2}$ -amplexicaul, shining, tip minutely mucronately toothed. Peduncle longer than the leaves, erecto-patent, flexuous, with scattered acicular sheaths; raceme terminal, capillary, 1-2-fl.; bracts orbicular; flowers $\frac{1}{2}$ in. long; dorsal sepal broad, 3-nerved, lateral acuminate; mentum cylindric; petals broad, acute, 3-nerved; claw of lip slender, jointed on the shortly free foot of the column; basal appendage grooved, truncate; column unarmed.

†† Leaves very small, linear acicular or lanceolate. Scape terminal or nearly so.

6. **P. microphyllus**, *Lindl. in Wall. Cat.* 7335 A; *Gen. & Sp. Orchid.* 234 in part; stems filiform diffuse, leaves $\frac{1}{8}$ - $\frac{1}{4}$ in. elliptic-lanceolate awned, spike as long as the leaves capillary flexuous 3-4-fl., bracts most minute, lip ovate oblong or lanceolate 3-nerved, basal appendage quadrate.

TENASSERIM; at Mergui, *Parish*. MALAY PENINSULA, common.—DISTRIB. Borneo, Cambodia.

Stems 6-8 in., flexuous, rarely branched. Leaves articulate on the sheaths, 7-9-nerved. Flowers $\frac{1}{10}$ in. long, white and purplish; mentum very variable, saccate, sometimes constricted at the top and 2-lobed at the base; dorsal sepal ovate, 1-nerved, lateral subacute; petals oblong, obtuse, 1-nerved; lip variable, obtuse or subacute; basal appendage erect, $\frac{1}{4}$ - $\frac{1}{2}$ the length of the blade, concave or margins convolute; rostellum narrow; anther lanceolate, acute. Capsule $\frac{1}{8}$ in., ellipsoid.—*Scortechini* mss. describes hyaline wings of the column, which I have not detected. Blume's *P. similis* of Borneo is very near this.

7. **P. khasianus**, *Hook. f. Ic. Plant. ined.*; stems suberect slender, leaves $\frac{1}{2}$ - $\frac{1}{2}$ in. linear acute, spike very short few-fl., bracts as long as the flowers ovate-lanceolate, lip narrowly oblong emarginate 3-nerved, base cordate. *P. microphyllus*, *Wall. Cat.* 7335 B; *Lindl. Gen. & Sp. Orchid.* 234 in part; in *Journ. Linn. Soc.* iii. 37.

SILHET, *Wallich*. KHASIA HILLS; at Amwee, *J. D. H. & T. T.*

Stems 4-6 in., simple, suberect. Leaves articulate on the sheath, rigid, often twisted. Peduncle shorter than the leaves; bracts rigid, strongly nerved; flowers $\frac{1}{5}$ in. long; lateral sepals acute, nerve strong; mentum globose; petals obovate-oblong, obtuse, 1-nerved; claw of lip inserted I think at the base of the column (not of its foot), I failed to discover the appendage; column very short, winged, divided (after flowering) to the base into two long erect arms concave posteriorly, much longer than the shortly calyptrate pollinia, the stipe of which is very short; anther very short, 2-cuspidate.—This differs in every respect of foliage and habit from *microphyllus*, but especially in the structure of the column.

8. **P. *lucescens***, *Blume Bijdr.* 295, t. 12; *Rumphia* iv. 43 (in *Obs.*); stem slender erect, leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. elliptic- or linear-oblong obtuse or apiculate, spikes elongate many-fld., bracts spreading and incurved, lip obovate or oblong obtuse, base sagittate. *Lindl. Gen. & Sp. Orchid.* 234; *Reichb. f. in Bonpland.* v. (1857) 41; *Ot. Bot. Hamb.* 45; in *Trans. Linn. Soc.* xxx. 145.

TENASSERIM; at Mergui, *Helper, Parish.*—DISTRIB. Sumatra, Java, Borneo.

Stems 4–8 in., rigid. Leaves black when dry, opaque, many-nerved. Spike $\frac{1}{2}$ –1 in., flexuous, flowering to the base; bracts $\frac{1}{10}$ in., strongly nerved; flowers $\frac{1}{10}$ in. diam.

9. **P. *acicularis***, *Hook. f. Ic. Plant. ined.*; stems densely tufted filiform, leaves $\frac{1}{2}$ – $\frac{1}{4}$ in. acicular, spike very short 3–4-fld., lip broadly oblong or obovate 3-nerved, base cordate with an incurved horn on each side.

PENANG, *Maingay (Kew Distrib.* 1653/2). PERAK, *Scortechini, &c.*

Stems 6–8 in., flexuous, diffuse. Leaves suberect, finely acuminate. Flowers $\frac{1}{2}$ in. long, white; bracts very minute; sepals obtuse or acute; petals linear, obtuse, 1-nerved; mentum short, rounded, sometimes globose and 2-lobed; columnar arms ensiform, obliquely truncate, tips at first cohering with the bidentate tip of the rostellum, and carrying away the pollinia; anther ovate-cordate, at length 2-fld; each pair of pollinia half enclosed in a calyptriform caudicle which is attached by a slender stipe to a linear gland.—Very near a Bornean species, with a cuneate 5-nerved lip truncate at the base, and shorter columnar wings.

73. **APPENDICULA**, *Blume.*

Stems tufted, leafy, often compressed. Leaves numerous, distichous, uniform, vertical, jointed on their sheaths. Peduncles terminal and leaf-opposed; flowers minute, racemed spicate or capitate; bracts persistent. Sepals connivent, lateral connate at the base and adnate to the produced foot of the column, forming a mentum. Petals various. Lip erect, inserted on the foot of the column or with its sides adnate to it. Column very short, rostellum erect 2-fld.; anther dorsal, erect; pollinia 8, 4 often imperfect, clavate, attached in fours to the tip of the rostellum by a point or gland. Capsule very small.—Species 20 or more, Tropical Asiatic, Australian, and Polynesian.

* Lip adnate below by a broad saccate claw to the sides and face of the foot of the column.

† Limb of lip with a large callus on the disk.

1. **A. *bifaria***, *Lindl. in Hook. Kew Journ.* vii. (1855), 35; leaves 1– $1\frac{1}{2}$ by $\frac{1}{2}$ in. oblong obtusely 2-toothed, racemes chiefly terminal very short, mentum saccate rounded, lip ovate-oblong base calceolar, sides of column produced into ensiform processes as long as the rostellum. *Benth. Fl. Hongk.* 358; *Walp. Rep.* vi. 893. *A. reduplicata*, *Reichb. f. in Ot. Bot. Hamb.* 45.

CACHAR, *Keenan.* TENASSERIM, *Helper.* SINGAPORE, *Ridley.*—DISTRIB. China, Borneo?

Stem 10–24 in., simple. Leaves often apiculate between the obtuse apical teeth. Racemes terminal, rarely lateral or leaf-opposed, 6–8-fld.; bracts reflexed, oblong; flowers about $\frac{1}{2}$ in. long; sepals obtuse; petals obovate-oblong, 3-nerved; lip calceolar at the base, that is having a horse-shoe membrane within the border, slightly constricted beyond the middle, callus on its disk globose or oblong, entire;

arms of column obliquely truncate or 2-lobed. *Capsule* $\frac{1}{4}$ in. long, turgidly ellipsoid.—Lindley in describing the Chinese plant assumed it to be the *Dendrobium bifarium* of Wall. Cat. 2002, which consists of two very distinct Penang plants, a *Dendrobium* (*D. bifarium*, *Lindl.*, see v. V. p. 732) and an *Appendicula* in fruit only, very like indeed the Chinese plant, but differing in the numerous lateral racemes. Specimens from Perak in flower exactly accord in foliage with Wallich's Penang in having many racemes, but differ in having a more 3-lobed lip, a broader margin to the base of the lip, and a 2-lobed callus. Assuming that the Perak and Wallich's Penang plant are the same, they may be either a different species from *bifaria*, or a variety. For the present it is safer to assume the latter and to call it:—

VAR. ? *Wallichiana*; racemes numerous lateral, lip with a broad rounded base surrounding the calceolar membrane, callus of disk 2-lobed in front. *Dendrobium bifarium*, *Lindl. in Wall. Cat. 2002, in part.*—Penang, *Wallich*. Perak, *Scortechini*.

†† *Lip without a median callus on the disk.*

2. **A. callosa**, *Blume Bijdr.* 303; leaves $\frac{1}{2}$ –1 by $\frac{1}{8}$ in. oblong strongly 2-fld., sheaths 2-cuspidate, flowers in terminal bracteate heads, lip very shortly ovate with a large transverse basal appendage. *Lindl. Gen. & Sp. Orchid.* 230; *Griff. in Calc. Journ. Nat. Hist.* v. 362, t. 62; *Saunders Refug. Bot.* t. 45; *Reichb. f. Oria Bot. Hamb.* 45. *A. stipulata*, *Griff. Notul.* iii. 358; *Ic. Plant. Asiat.* t. 335, f. 2.

TENASSERIM, *Griffith, Parish*. PENANG, *Walker, &c.* PERAK, *Scortechini, &c.*—DISTRIB. Java, Borneo.

Stem 6–18 in., simple. *Leaves* close together, coriaceous, base truncate, tip not contracted. *Heads of flowers* sessile; bracts lanceolate, scarious, obtuse, many-nerved; flowers $\frac{1}{2}$ in. long, erect, cream-cold.; mentum saccate; petals linear, obtuse; claw of lip as long as the foot of the column and adnate to it throughout its length; limb broadly ovate, narrower than the appendage, which has divergent lobes and is tubercled in the sinus; column with short truncate wings.—The leaves are often curiously pitted.

3. **A. Lewisii**, *Griff. in Calc. Journ. Nat. Hist.* iv. 378, t. 19; *Notul.* iii. 360; *Ic. Plant. Asiat.* t. 337; leaves 1–3 by $\frac{1}{2}$ – $\frac{2}{3}$ in. linear- or oblong-lanceolate 2-dentate, racemes very short leaf-opposed, mentum subglobose, lip ovate many-nerved, base calceolar. *Walp. Ann.* vi. 893. *A. cyathifera*, *Reichb. f. mss.* *Metachilum cyathiferum*, *Lindl. in Wall. Cat.* 2022; *Gen. & Sp. Orchid.* 74. *Dendrobium vaginatum*, *Wall. mss.*

PENANG, *Maingay* (*Kew Distrib.* 1616). *Curtis*. PERAK, *Scortechini, Wray*. SINGAPORE, *Wallich*.

Stem 6–18 in., unbranched, flattened, $\frac{1}{2}$ in. broad. *Leaves* rather distant and membranous; sheaths 1 in. long. *Racemes* axillary and terminal, 1–1 $\frac{1}{2}$ in., many-fld.; bracts small, ovate-lanceolate, reflexed; flowers about $\frac{1}{2}$ in. long, yellow-green; sepals acute; petals elliptic, 1-nerved; claw of lip adnate throughout its length to the foot of the column; column without arms. *Capsule* $\frac{1}{2}$ in., subcylindric.

** Lip attached by a short free claw to the apex only of the foot of the column.

4. **A. cordata**, *Hook. f. Ic. Plant. ined.*; leaves 1 by $\frac{1}{2}$ in. oblong obtusely bidentate, spikes very short incurved few-fld., mentum obscure, foot of column very short, lip ovate-cordate 3-nerved with a semilunar ridge towards the base.

PERAK, *Scortechini*.

Stem (of the only specimen) 7 in., unbranched. *Leaves* rather membranous,

apiculate between the teeth, sheaths $\frac{1}{3}$ – $\frac{1}{2}$ in. Spikes $\frac{1}{4}$ in., 3–4-fld.; bracts sheathing the rachis, erect during flowering, then reflexed, strongly nerved; flowers about $\frac{1}{10}$ in. long, dotted; sepals ovate, obtuse, 1-nerved, base of lateral gibbous; petals large, obovate, 1-nerved; column unarmed; rostellum very large, ovate.—The curious incurved spikes and spreading nearly symmetrical lateral sepals, and short foot of the column, are all unlike other species of the genus. The solitary specimen may not represent the plant fairly.

5. **A. Koenigii**, Hook. f. *Ic. Plant. ined.*; leaves $\frac{3}{4}$ by $\frac{1}{6}$ in. oblong-lanceolate obtuse and minutely obtusely 2-fld., racemes minute leaf-opposed 2–3 fld., flowers most minute, mentum globose, lip ovate or oblong 5-nerved base calceolar. Epidendrum hexandrum, *Kœnig in Retz Obs.* vi. 45.

INDIA, *Herb. Rottler* (1779).

Stem densely tufted, 4–6 in., very slender. *Leaves* close set, membranous, base rounded; sheaths $\frac{1}{4}$ in. *Racemes* $\frac{1}{4}$ – $\frac{1}{2}$ in., decurved; rachis slender, flexuous; bracts lanceolate, reflexed after flowering; flowers $\frac{1}{10}$ in. long; sepals ovate, acute, and elliptic petals 1-nerved; lip saccate at the base; column unarmed.—Of this very distinct species I have seen only one specimen in Rottler's Herbarium, now at Kew. In its slender tufted habit (upwards of twenty stems on a tuft) and minute racemes and flowers it is like no other; no locality is attached, to the specimen or to Kœnig's description, and as Rottler received (through Heyne) plants of both Indian Peninsulas, none can be assumed.

6. **A. torta**, *Blume Bijdr.* 303; leaves $\frac{1}{2}$ by $\frac{1}{4}$ in. oblong tip rounded emarginate, bracts of terminal sessile spike as long as the leaves densely equitantly imbricate acute falcately recurved complicate and enclosing the solitary flowers, mentum cylindric, lip narrowly panduriform twisted, margins incurved waved, narrow base calceolar suddenly dilated into a broad transversely oblong retuse serrulate concave terminal lobe. *Lindl. Gen. & Sp. Orchid.* 230; *Reichb. f. Xen. Orchid.* ii. 117, t. 138.

PERAK, *Scortechini*.—DISTRIB. Java, Borneo.

Stem 6–18 in., simple or branched, compressed, $\frac{1}{6}$ in. broad. *Leaves* close-set, shining, thin, base rounded; sheaths $\frac{1}{4}$ – $\frac{1}{2}$ in. *Bracts* of spike membranous, forming a terminal flattened coloured crest as broad as the rest of the branch, and coterminous with it; flowers $\frac{1}{6}$ in. long, quite sessile; lateral sepals erect, aristately acuminate, midrib very stout; petals oblong-lanceolate, strongly 3-nerved; column unarmed, rostellum slender, deeply 2-fld.—Blume's description is very meagre, but I cannot doubt belongs to this plant, of which there is an unnamed specimen in Herb. Kew, collected in Borneo by *Lobb*.

7. **A. xytriophora**, *Reichb. f. in Seem. Fl. Viti* 299; leaves $\frac{3}{4}$ – $1\frac{1}{4}$ by $\frac{1}{3}$ – $\frac{1}{2}$ in. oblong- or elliptic-lanceolate obtuse apiculate, raceme elongate terminal slender laxly many-fld., mentum broad incurved, lip obovate subtruncate 5-nerved base narrowed calceolar.

PERAK, *Scortechini*.—DISTRIB. Philippine Islands.

Stem 12–18 in., simple, compressed. *Leaves* rather close-set, membranous; base $\frac{1}{2}$ -amplexicaul. *Racemes* 2–5 in., suberect; bracts oblong-lanceolate, membranous, obtuse, 5-nerved; flowers $\frac{1}{4}$ in. long; sepals greenish tips purple; petals elliptic, obtuse, 3-nerved; lip concave, yellow and purple; column unarmed; anther short. *Capsule* $\frac{1}{2}$ in., slender.

8. **A. lancifolia**, *Hook. f. Ic. Plant. ined.*; tall, leaves 3–4 by $\frac{3}{4}$ – $\frac{3}{4}$ in. lanceolate obtuse 2-dentate, racemes elongate simple or branched stout many- and dense-fld., mentum cylindric, lip obovate-oblong 3-lobed, side lobes small rounded, midlobe broadly ovate acute, base narrowly calceolar.

PERAK; on Gunong Batu Pateh, alt. 3-4000 ft., on rocks, *King's Collector*.

Stem 12-24 in., stout, terete. *Leaves* rather thin, base semi-amplexicaul; sheaths $\frac{1}{2}$ in. *Racemes* 3-6 in., terminal and leaf-opposed, sessile or peduncled, erect; rachis stout; bracts $\frac{1}{5}$ in., oblong, obtuse, coriaceous, recurved, strongly nerved; flowers $\frac{1}{2}$ in. long, bright yellow with a red centre; lateral sepals recurved, acute; petals obovate-oblong, 3-nerved; column unarmed; anther as broad as long. *Capsule* $\frac{1}{2}$ in., fusiform, strongly ribbed, claret-coloured.—Very like *A. cristata*, Blume, of Java, but the limb of the lip is not "rounded emarginate and crested on either side."

9. **A. Maingayi**, *Hook. f. Ic. Plant. ined.*; leaves 2-3 by $\frac{1}{6}$ - $\frac{1}{2}$ in. linear-lanceolate tip dilated apiculate, racemes terminal many and dense-fl., bracts spreading and incurved, mentum sub-cylindric or shorter, lip elliptic-or ovate-oblong 5-nerved, base calceolar, tip rounded.

PERAK, *Scortechini*. PENANG, *Maingay*, (*Kew Distrib.* 1617).

Stems 6-16 in., rather slender or stout, unbranched. *Leaves* suberect, narrowed at the base, tip minutely 2-fid or rounded. *Racemes* 1-2 in., simple or branched at the base, suberect, flexuous; bracts $\frac{1}{2}$ - $\frac{1}{5}$ in., deflexed, then incurved, coriaceous, subacute, 5-ribbed; flowers $\frac{1}{10}$ in. long; lateral sepals broad, obtuse, nerve slender; petals linear- or obovate-oblong, 3-nerved; lip concave; column unarmed, rostellum short, triangular; anther ovate, acuminate. *Capsule* $\frac{1}{3}$ in., fusiform.—The Perak specimens are more slender than the Penang, the mentum is longer and more cylindric, the petals narrower, 1-nerved. The species should be compared with *A. graminifolia*, Teysm. and Binnend.

IMPERFECTLY KNOWN SPECIES.

10. **A. echinocarpa**, *Hook. f. Ic. Plant. ined.*; leaves $\frac{1}{3}$ - $\frac{1}{2}$ in. close set orbicular-oblong coriaceous margin thickened upper base reflexed, spike short terminal few-fl., bracts orbicular concave, capsule ellipsoid, valves densely clothed with soft bristles.

PERAK; lower camp in Gunong Batu Pateh, alt. 3400 ft., *Wray*.

Stem 4-6 in., slender but rigid; internode $\frac{1}{8}$ in. *Leaves* semi-amplexicaul, pale, opaque, rather wavy; tip rounded, obscurely 2-fid. with incumbent teeth; upper base usually reflexed, like an ear. *Capsule* $\frac{1}{4}$ in. long, turgid.—A very remarkable species.

A. LONGIFOLIA, *Blume Bijdr.* 304; *Lindl. Gen. & Sp. Orchid.* 230? *Thwaites Enum.* 806. CEYLON, Ambagamowa district, rare, *Thwaites* (C.P. 3208). Of the plant thus doubtfully referred by Thwaites to the Javan *A. longifolia*, this author says that the flowers are not in a sufficiently perfect state for analysis. Blume thus describes *longifolia*, "Stems simple compressed, leaves linear-lanceolate retuse, flowers densely capitate." Thwaites adds, "leaves 3-5 by $\frac{1}{2}$ in., retuse, mucronate." Can the Ceylon plant be an *Agrostophyllum* or *Phreatia*?

A. TERES, *Griff. Notul.* iii. 359; *Ic. Plant. Asiat.* t. 332, is *Ceratostylis teres*, R. f. see v. v. p. 825.

A. SP., *Griff. Notul.* 359; *Ic. Plant. Asiat.* 335, fig. 1, analysis only, from Afghanistan, cannot (as Lindley in *Hook. Kew Journ.* vii. 36 observes) be an *Appendicula*.

74. **THELASIS**, *Blume*.

Epiphytes, with either small 1-2-leaved pseudobulbs, or with short compressed stems clothed with equitant leaf-sheaths. *Leaves* oblong or linear-oblong flat, or loriform and jointed on the sheath. *Scape* from the base of the pseudobulb, or lateral on the stem, with 1-3 small sheaths; flowers very minute, spicate, cellular. *Sepals* connivent, dorsal flat, lateral concave keeled or winged. *Petals* narrow, membranous. *Lip* sessile at the

base of the column, erect, ovate or oblong. *Column* very short, sessile, foot 0; rostellum terminal, large, erect; anther elongate, dorsal, erect, base 2-4 celled; pollinia very minute, globose, attached by long threads to the tip of the rostellum, gland small. *Capsule* very small, turgidly ovoid. —Species about 10, tropical Asiatic and Pacific.

I am not well satisfied as to the character of lateral sepals in this genus, as to their being winged or not; the sepals are very soft, and their exact structure not very clear in specimens that have been dried, and again moistened.

Sect. I. EUTHELASIS. *Pseudobulbs* 1-2-leaved.

* *Lateral sepals distinctly strongly keeled or winged.*

1. **T. pygmæa**, Lindl. in *Journ. Linn. Soc.* iii. 63; scape 1-2 in. longer than the solitary linear leaf, spike very short lax-fld., lip ovate acute contracted towards the tip. *Par. g. Reichb. f. in Trans. Linn. Soc.* xxx. 145; *Walp. Ann.* vi. 923; *Euproboscis pygmæa Griff. in Calc. Journ. Nat. Hist.* v. 371; t. 72; *Wight Ic.* t. 1732.

NEPAL (*Cult. in Hort. Bot. Calc. fid. Griffith.*) MALABAR, *Jerdan.* TENASSERIM, at Moulemin, *Parish.*

Pseudobulbs $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. *Scape* very slender, curved; spikes $\frac{1}{2}$ – $\frac{1}{2}$ in. long; bracts ovate, acuminate; flowers $\frac{1}{10}$ in. long; dorsal sepal ovate-lanceolate acute, lateral linear-oblong; lip 3-nerved, with rounded sides from the middle to the base; rostellum 2-fid.—The Malabar plant seems the same as the Tenasserim, but is in a Peloria state, triandrous, with the petals and lip similar, ovate-lanceolate, 1-nerved; ovary with imperfect ovules.

Var. *multiflora*; leaf larger 3-4 by $\frac{1}{2}$ in., scape stouter 4-5 in., spike $1\frac{1}{2}$ –2 in. —Sikkim Himalaya, alt. 1000 ft., *Treutler.*

2. **T. ? capitata**, *Blume Bijdr.* 386; scape 4-6 in. stout longer than the solitary linear leaf, spike cylindric dense-fld., rachis pitted, lip oblong-ovate obtuse.

PERAK, *Scortechini.*—DISTRIB. Sumatra, Java.

Pseudobulbs small, oblong, on a stout creeping rhizome. *Leaf* 3-4 in., obtuse or subacute. *Spike* 1 in.; bracts very close set, ovate, acute, recurved; flowers $\frac{1}{10}$ in. long; dorsal sepal ovate-lanceolate, lateral oblong concave thickly keeled or shortly winged; petals lanceolate, acuminate; rostellum elongate, subulate, entire.—Differs from the Sumatran *capitata* in the long spike, acuminate petals and entire rostellum. It more resembles the raceme of *P. triptera*, R.f. of Manilla, which has an ovate lip narrowed to the apex.

3. **T. elongata**, *Blume Orchid. Archip. Ind.* 23, t. 7, f. 2, and t. 5, fig. C; scape 4-6 in. longer or shorter than the solitary linear leaf, spike cylindric dense-fld., lip ovate acute or acuminate.

SINGAPORE; at Johore, &c., *Ridley.* LANGKAWI, *Curtis.*

Pseudobulb very various in form. *Leaves* and spike as in *T. capitata*, from which it differs in the form of the tip. *Blume's* figure is a very bad one, and does not show the strong keels on the lateral sepals and angles of the ovary.—The species of this section are very difficult of discrimination in a dried state, and possibly *capitata*, *elongata*, *triptera* and others are all forms of one.

** *Lateral sepals not strongly keeled or winged.*

4. **T. bifolia**, *Hook. f. Ic. Plant. ined.*; scape 8 in. much longer than the two opposite elliptic-lanceolate acuminate leaves, spike very lax-fld., lip broadly elliptic obtuse.

KHASIA MTS., Lobb.

Pseudobulb $\frac{2}{3}$ in. diam. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., spreading, base contracted. *Spike* 2 in.; bracts broadly ovate, obtuse; flowers $\frac{1}{2}$ in. long; sepals broad, obtuse; petals obovate-oblong, 1-nerved; lip obscurely 5-nerved, broadest in the middle; rostellum very long, acuminate, entire.

5. **T. khasiana**, Hook. f. *Ic. Plant. ined.*; scape with spike 3–5 in. about equalling the solitary petioled linear leaf, spike elongate lax-flid., lip elliptic-ovate subacute. *T. pygmæa*, Lindl. in *Journ. Linn. Soc.* iii. 62 (in part).

KHASIA MTS., alt. 3–4000 ft., Lobb, J. D. H. & T. T.

Pseudobulbs $\frac{3}{4}$ -in., depressed-globose. *Leaves* 2–4 by $\frac{1}{2}$ – $\frac{2}{3}$ in. *Scape* and *spike* rather stout; bracts ovate-lanceolate; sepals ovate-lanceolate, obtuse; petals lanceolate, obtuse; lip 3-nerved, broadest rather nearer the base than tip; rostellum large, acute. —Very like *T. pygmæa*, but a much larger plant, without keel or wing on the sepals.

6. **T. longifolia**, Hook. f. *Ic. Plant. ined.*; scape stout with the spike 6–9 in. about equalling the solitary leaf, spike elongate lax-flid., lip elliptic-ovate acute.

KHASIA MTS. J. D. H. & T. T.

Differs from *T. khasiana* in being very much larger, and in the acute lip. *Pseudobulb* $\frac{3}{4}$ – $1\frac{1}{4}$ in. diam., depressed-globose. *Leaf* sometimes falcate, $\frac{2}{3}$ – $1\frac{1}{4}$ in. broad; *flowers* $\frac{1}{2}$ in. long.

Sect. II. OXYANTHERA, Brongn. (Gen.). *Pseudobulb* 0; stem short, clothed with the equitant sheaths of the linear leaves which are jointed at the sheath. (Oxyanthera is a very natural group).

7. **T. elata**, Hook. f. *Ic. Plant. ined.*; leaves 10–14 by 1 – $1\frac{1}{4}$ in. tip rounded, scape equalling or exceeding the leaves, raceme long slender lax-flid.

PERAK, on decayed wood, King's Collector.

Rootstock as thick as the little finger. *Leaves* few, sheaths 2 – $2\frac{1}{2}$ by $\frac{1}{2}$ in., complicate, coriaceous. *Scape* very slender, flexuous; sheaths 3–4, $\frac{1}{2}$ in. long, membranous, lanceolate; bracts ovate, acuminate, spreading and reflexed; flowers $\frac{1}{4}$ in., narrow, shortly pedicelled; sepals linear-oblong, acute, 1-nerved, venation distinct; petals lanceolate, acute; lip erect, claw short broad, limb linear subacute, margins waved, base broadly 2-auricled, auricles revolute; rostellum 2-partite, segments obtuse; pollinia 8, shortly obovoid. —Near *T. carinata*, Bl. (of which I have seen no flowers), but the leaves are very much longer, the scape very slender, raceme long, and bracts acuminate.

8. **T. decurva**, Hook. f. *Ic. Plant. ined.*; leaves 4–6 in., tip narrow or rounded and obtusely notched or subacute, scape very slender, raceme very short decurved, bracts reflexed, lip dagger-shaped from a concave cuneate base terete and fleshy beyond the middle with the crisped margins inflexed and close to the mesial line.

SINGAPORE; at Krangi, Ridley. PENANG, or Government Hill, Maingay.

Leaves $\frac{1}{2}$ – $\frac{2}{3}$ in. broad. *Scape* shorter than the leaves, filiform, flexuous, sheaths 1–2 lanceolate; raceme $\frac{1}{2}$ in.; pedicels $\frac{1}{6}$ in., longer than the oblong bracts; flowers $\frac{1}{2}$ in. long, pale fawn colour; sepals ovate-lanceolate acute and narrowly oblong obtuse petals 1-nerved. —This much resembles the figure of *O. micrantha* Brong., which is figured as having a stout broadly ovate obtuse lip narrowed into a broad short claw, base concave. The leaves of some specimens are narrow at the tip, others have 2 rounded lobes.

DOUBTFUL SPECIES.

T. carinata, Reichb. f. in *Trans. Linn. Soc.* xxx. 137; ? of *Blume Bijdr.* 385 & *Lindl. Gen. & Sp. Orchid.* 253. In the absence of flowers it is impossible to say what species this may be; it differs greatly from the figure of Blume's *T. carinata* (from Java) in its small size, slender scape, short decurved raceme, and bracts, in all which, as in foliage, it closely resembles *T. decurva*, and is nearer to the Moluccan *O. micrantha*, Brong. (in *Duperrey Voy. Bot.* 198, t. 37 B.) than to *T. carinata*.

Tribe III. **NEOTTIÆ.** (See vol. v., p. 668.)75. **GALEOLA**, Lour.

Leafless, rarely leafy, yellow or brown, climbing or erect herbs; stem or branches terminating in loosely paniced often drooping racemes or panicles; flowers rather large. *Sepals* subequal, concave, connivent or spreading. *Petals* as long, narrower or broader. *Lip* sessile at the base of and loosely embracing the column by its base, short, broad, concave; lateral lobes short or 0; midlobe broad. *Column* short or long, incurved, top dilated membranous; anther 2-celled; pollinia hippocrepiform, powdery or subwaxy. *Capsule* usually 2-4 valved, without septa; seeds winged or not.—Species 8 or 9, Indian, Malayan and Australian.

* Stem simple, erect.

1. **G. Lindleyana**, Reichb. f. *Xen. Orchid.* ii. 78; tall, very robust, sepals broadly ovate-oblong strongly ribbed dorsally, anther recurved clothed with long papillæ. *Cyrtosia Lindleyana*, Hook. f. & Thoms. in *Ill. Himal. Plant.* t. 22. *Erythorchis Lindleyana*, Reichb. f. in *Bonpland*, v. 37.

SIKKIM HIMALAYA, alt. 4-7000 ft., J. D. H., &c. ? KHASIA HILLS, alt. 4000 ft., J. D. H. & T. T. NAGA HILLS, *Prair.*

Rootstock elongate, very stout, 1-1½ in. diam., tortuous, dark pink; roots very stout simple fibres. *Stem* 2-3 ft., glabrous, with short ½-amplexicaul obtuse sheaths below, brown purple. *Panicle* loosely branched, branches horizontal, and yellow flowers furfuraceously tomentose; bracts small; perianth subglobose, 1 in. diam.; petals broadly ovate, tip obtuse, crenate; lip nearly hemispheric, margins and short expanded rounded limb erosely fimbriate, glabrous without, almost bearded within. *Capsule* 5-6 by ¾ in., fusiform, subacute, obtusely trigonous, red-brown, tardily dehiscing.

2. **G. Falconeri**, Hook. f.; tall, very robust, sepals broadly ovate dorsally nearly smooth, anther glabrous. *Pogochilus*, *Falc. in Hook. Journ. Bot.* iv. (1842), 73.

SUBTROPICAL HIMALAYA; from Garwhal, *Falconer*, to Sikkim, *Thomson*, &c.

Habit and stature of *G. Lindleyana*, but differing in the larger flowers and the characters given above. The rootstock is sometimes as thick as the wrist. Possibly only a form of *Lindleyana*, but recognized as distinct by all collectors in Sikkim. I did not find it myself.

3. **G. javanica**, Benth. in *Gen. Plant.* iii. 590; dwarf, stem very stout glabrous below furfuraceous above, sepals oblong membranous, anther subhemispheric. *Cyrtosia javanica*, *Blume Bijdr.* 396, t. 6; *Rumph.* i. 199, t. 69; *Lindl. Gen. & Sp. Orchid.* 438; *Reichb. f. Xen. Orchid.* ii. 76, t. 120.

ASSAM, *Masters (Ic. in Hort. Calcutt.)*.—DISTRIB. Java.

Stem a span high from branching tubers. *Flowers* $\frac{3}{4}$ in. diam.—The identification of the Assam drawing with Blume's figure and description is necessarily imperfect; but as far as it goes there is no reason to suppose that these represent two species.

4. ? **G. pusilla**, *Hook. f.*; stem flexuous from a woody nodose rootstock, with several short tubular basal sheaths and two open ones higher up 3-fld., bracts lanceolate equalling the ovary, sepals broadly ovate-oblong subacute, petals as large obtuse, lip orbicular concave retuse with a very small obtuse apical lobe in the sinus, disk papillose with 3 central low ridges.

PEGU; on the Pookee ridges, *Kurz (in Herb. Calcutt.)*.

Whole plant 5 in. high, white; rootstock tortuous, woody, as thick as a sparrow's quill, with woody roots as thick as the stock. *Stem* slender, basal sheaths $\frac{1}{2}$ – $\frac{3}{4}$ in., truncate, funnel-shaped; bracts $\frac{1}{2}$ in. long, membranous; flowers about $\frac{3}{4}$ in. diam.; sepals and petals 5–7-nerved; lip with a brown lunate band, apical lobe recurved; column long, semiterete; anther erect, oblong, 2-celled; pollinia hypocrepiiform?; stigma below the clinandrium in front.—I have seen but one specimen of this curious little plant, as to the genus of which I am doubtful.

** *Stem branched, scandent.*

5. **G. altissima**, *Reichb. f. Xen. Orchid. ii. 77*; quite glabrous, stem very slender, spikes very many-flowered, sepals and petals linear-oblong, lip with a broad fleshy ridge and a 2-lobed woolly mass on the disk. *Cyrtosia altissima*, *Blume Bijdr. 396*; *Rumph. i. t. 70*; *Lindl. Gen. & Sp. Orchid. 26*. *Erythorchis altissima*, *Blume Rumph. i. 200*; *Lindl. l. c. 438, in part*. *Hæmatorchis altissima*, *Blume l. c. iv. t. 200 B*.

PENANG, *Curtis*. PERAK, *Scortechini*.—DISTRIB. Malay Islands.

Root of fleshy thick fibres. *Stem* 50–120 ft., excessively branched, flexuous, fleshy and hard, reddish, branches slender, internodes swollen; spikes 6–10 in., pendulous; flowers $\frac{1}{2}$ in. long; sepals obtuse, 5-nerved, and narrower 3-nerved petals with rounded tips; lip cymbiform, tip rounded erosely waved, disk with a median broad fleshy puberulous disk reaching to the middle, beyond which is a 2-lobed woolly mass; sides of lip thin, transversely barred with purple, with slender nerves and impressed hairs; column rather long; anther mitriform. *Capsule* linear, 3–10 in. long, acuminate, valves membranous.

6. **G. Hydra**, *Reichb. f. Xen. Orchid. ii. 77*; furfuraceously puberulous, lateral sepals obliquely ovate, dorsal oblong, petals elliptic, lip cymbiform erose papillose within and with a compressed erect grooved callus towards the base. *G. altissima?*, *Reichb. f. in Trans. Linn. Soc. xxx. 135*. *Vanilla pterosperma*, *Lindl. in Wall. Cat. 7402*. ? *V. rubiginosa*, *Griff. Notul. iii. 247*. *Erythorchis altissima*, *Lindl. Gen. & Sp. Orchid. 438, in part (not of Blume)*.

SIKKIM HIMALAYA; in the Rishap Valley, *King*. TENASSERIM; at Moulmein, *Parish*. PENANG, *Curtis*. PERAK, SINGAPORE, and MALACCA, *Wallich, &c.*—DISTRIB. Java, Sumatra.

A lofty climber; branches much stouter than in *G. altissima*; inflorescence loosely branched; flowers much larger, $\frac{3}{4}$ in. diam., sepals and petals broader, and lip without the flat ridge and tuft of wool.—Blume's specimens of *G. altissima* in Herb. Kew consists of fruit of that plant and flowering branches of this.

7. **G. Cathcartii**, *Hook. f.*; branches very robust, sepals and petals linear-oblong revolute, lip cymbiform acute, margins everted undulate and ciliate, disk naked.

SIKKIM HIMALAYA (*IC. Cathcart*).

Mr. Cathcart's drawing represents a portion of a stem as thick as the little finger, bearing a branched panicle a foot long, which, as well as the flowers, is dull yellow and furfureous; the flowers are 1-1½ in. diam., the lip not nearly as concave as in *G. Hydra*, yellow with red veins.—A remarkable plant, very unlike its congeners, but the drawing of the habit, column, anther, and pollen leave no doubt as to its genus.

76. **VANILLA**, Swartz.

Climbing, rooting, branched, leafy or leafless shrubs; stems terete or angled. *Leaves* subsessile, coriaceous or fleshy. *Peduncles* short, axillary; flowers large. *Sepals* and petals subequal, spreading. *Lip* with the claw adnate to the column, which is embraced by its broad concave limb. *Column* elongate; anther incumbent, cells separate; pollen granular. *Capsule* long, fleshy, 1-celled, loculicidally 3-valved, without septa.—Species about 20, tropical.

The Indian species of this genus are most scantily represented in Herbaria, and imperfectly by drawings or descriptions.

* *Stem leafless.*

1. **V. Walkeriæ**, *Wight Ic. t.* 932; stem very stout, flowers 2 in. long, sepals oblanceolate, petals broader spathulately obovate acute margins undulate, epichile of lip ovate acute margins undulate, disk with two ridges below the middle. *Thwaites Enum.* 311.

TRAVANCORE and TREVANDEUM, *Wight*. CEYLON, *Walker*.

Stem as thick as the thumb. *Racemes* 5-6 in., many-fl. ; flowers white ; bracts ovate.

2. **V. Wightiana**, *Lindl. in Wight Cat.* 2091; flowers 1 in. long, sepals linear-oblong, petals lanceolate, epichile of lip ovate, its disk fringed with long hairs. *V. aphylla*, *Lindl. Gen. & Sp. Orchid.* 436, *in part* (not of *Blume*).

The DECCAN PENINSULA, *Wight*.

The specimens are very imperfect, and the description of the flowers is taken from a rude sketch by Lindley. The flowers are not half the size of those of *V. Walkeriæ*.

3. **V. Parishii**, *Reichb. f. Otia Bot. Hamb.* 39; flowers 1-1½ in. long, sepals linear-oblong, tips dilated cuspidate, petals broadly oblanceolate acuminate, lip trumpet-shaped, epichile small ovate or rounded crisped with a thick belt of long hairs down the centre and a dense brush at the base, side lobes with long scattered hairs within.

TENASSERIM, *Parish*.

This may prove the same as *V. Wightiana*, *Lindl.* It is very near the Javanese *V. aphylla*, *Blume*.

** *Stem leafy.*

4. **V. Moonii**, *Thwaites Enum.* 312; leaves elliptic- or linear-oblong often falcate obtusely acuminate, lip with a broad crenulate undulate apex, a thick pencil of excessively fine hairs on the disk, and beyond it towards the apex some loose flexuous bristles.

Leaves 5-7 in., many-nerved, subsessile. *Spikes* 1-3 in., very stout, many-fl.; bracts ovate, ½ in., obtuse; sepals about 1 in. long; pencil of hairs on the disk terminating below in a stout stipe, hairs of equal length forming a truncate brush.

5. **V. albida**, *Blume Bijdr.* 422, t. 34; *Rumph.* i. 197, t. 67; leaves ovate lanceolate elliptic or oblong cuspidate or acuminate, lip oblong subpanduriform margins undulate and serrate, disk of hypochile with a large globose woolly ball, epichile retuse or 2-lobed strongly echinately caruncled. *Lindl. Gen. & Sp. Orchid.* 435. *V. Griffithii*, *Reichb. f. in Bonpland.* ii. (1854), 88. *Vanilla*, *sp. Griff.* *Notul.* iii. 207; *Ic. Plant. Asiat.* t. 281. *Vanilla*, *Wall. Cat.* 7401.

PENANG, *Wallich, Curtis.* PERAK, SINGAPORE, and MALACCA, *Griffith, &c.*—DISTRIB. Java.

Climbing to 50 ft. *Leaves* very variable, 3–7 by $1\frac{1}{2}$ –4 in., sessile or shortly petioled. *Spikes* 2–3 in., very many- and dense-fl.; bracts $\frac{1}{2}$ in., oblong; flowers waxy white; sepals $\frac{3}{4}$ in. long, concave, obovate, obtuse, very thick; petals as long, but thinner and many-nerved, with a thick dorsal grooved keel that abruptly ends below the apex; column rather long; anther appressed to the woolly ball of the lip.

DOUBTFUL SPECIES.

V. APHYLLA, *Blume?*, ex *Wight Ic.* t. 931; leafless, stem angular, peduncle elongate as thick as a swan's quill, racemes 3–4 in. very stout many-fl., bracts ovate acute, pedicel with ovary 2 in, sepals as long oblanceolate-oblong acute, petals very much broader obovate acute margins crenulate, hypochile of lip with rounded angles and two rows of bristles on the disk, epichile ovate acuminate crisped naked. —Travancore, near Trevandrum, *Wight*.—From *Wight's* remarks under it I suspect this to be a most rude representation of *Lindley's V. Wightiana*; if so, the flowers are greatly exaggerated, and the hairs of the epichile are transferred to the hypochile.

77. CORYMBIS, *Thouars.*

Tall, terrestrial, rigid, leafy herbs, roots fibrous. *Leaves* broad, plaited. *Flowers* in short axillary stiff sessile spreading panicles. *Sepals and petals* very narrow, linear, at first cohering in a tube with spreading tips, persistent. *Lip* erect from the base of the column, linear, channelled, tip dilated and recurved. *Column* usually as long as the petals, erect, terete, tip clavate and 2-lobed or auricled; rostellum at length 2-fid.; stigma erect, transverse, saccate; anther narrow, erect, acuminate, 2-celled; pollinia clavate, attached by a subulate caudicle to a peltate gland. *Capsule* linear or fusiform.—Species 6–7, tropical.

1. **C. veratrifolia**, *Blume Orchid. Archip. Ind.* 125, t. 42 E, 43 f. 1 (Corymborchis); leaves elliptic-lanceolate caudate-acuminate, flowers 1–1 $\frac{1}{2}$ in. long, sepals and petals subsimilar narrowly oblanceolate, blade of lip lanceolate acuminate, ribs of capsule smooth. *C. disticha*, *Lindl. Fol. Orchid.* 1 (in part). *Macrostylis disticha*, *Breda Gen. & Sp. Orchid. Javan.* t. 2. *Hysteria veratrifolia*, *Reinw. in Bot. Zeit.* 1825, ii. 5; *Lindl. Gen. & Sp. Orchid.* 439. *Rhyncanthera paniculata*, *Blume Bijdr.* t. 78. *Corymborchis assamica*, *Blume Orchid. Archip. Ind.* 126, t. 43, f. 2 A.

SIKKIM HIMALAYA; in tropical ravines, *J. D. H. ASSAM, Griffith, Jenkins.* CHITTAGONG, *J. D. H. & T. T. ANDAMAN ISLANDS, King's Collector.* MALAY PENINSULA, *Maingay, &c.* MALABAR; the Nilghiri Hills and Courtallam, *Wight.* CEYLON; Matturatte, *Moon.*—DISTRIB. Java, Sumatra, Borneo.

Stem 4 ft. high, as thick as a swan's quill. *Leaves* 12–18 in., sessile on the sheaths, nerves very many* and strong. *Panicles* 4–6 in. long and broad; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., ovate-lanceolate; flowers greenish white; column long. *Capsule*, in *Ic.* *Blume*, 2 in. long.—I am not sure that the plants from the above localities are all of one species. The Sikkim and Assam ones are in a young state only; the Perak and

Nilghiri in flower only. The ripe fruit of the Andaman species is 1 in. long. The Ceylon one has much shorter points to the leaves, but the fruit is as large as in Blume's figure. Blume distinguishes *C. assamica* by the column being as long as the capsule; which they are in typical *veratrifolia*.

2. ***C. longiflora***, Hook. f.; leaves elliptic-lanceolate acuminate, flowers $1\frac{1}{2}$ –2 in. long, sepals very slender with very narrow blades, petals oblanceolate, blade of lip orbicular cuspidate.

PERAK, Scortechini, King's Collector. MALACCA, Maingay (Kew Distrib. 1661).

Stem 8–10 ft. high, as thick as the little finger; leaves much broader than in *C. veratrifolia*, and flowers twice as large, white. Column long. Fruit not seen.

3. ***C. rhytidocarpa***, Hook. f.; leaves lanceolate acuminate, flowers 1 in. long, sepals narrowly oblanceolate, petals oblanceolate crenate, blade of lip triangular-ovate acuminate, ribs of fruit strong wrinkled.

PERAK, Scortechini, King's Collector, Wray.

Stem 4 ft. high and leaves as in *C. veratrifolia*, from which the broader petals, form of the lip, and deeply ridged fruit $1\text{--}1\frac{1}{2}$ in. long with wrinkled ribs distinguish it. Column long.

4. ***C. brevistylis***, Hook. f.; leaves 5–6 in. elliptic acuminate subpetioled, column $\frac{1}{2}$ in. long.

PERAK; on limestone rocks, King's Collector.

Stem 1–2 ft., slender. Leaves 7-nerved, 2–3 in. broad. Panicles few-fl. Young fruit 1 in. long.—A very distinct species, probably the same as an undescribed Javan one.

78. **TROPIDIA**, Lindl.

Terrestrial, glabrous, leafy herbs. Stem often branched, roots rigid. Leaves sessile, membranous, subplicate; petiole sheathing. Flowers small, in axillary and terminal sessile or peduncled spikes; bracts coriaceous, often imbricate, strongly nerved. Sepals connivent, lateral more or less connate, dorsal free. Petals as long, or shorter, broad or narrow. Lip superior, sessile at the base of the column, cymbiform or produced into an obtuse spur, undivided, acute or with a reflexed tip, disk with short or long intramarginal ridges on lamellæ; column short or long; rostellum long, erect, at length 2-fid; stigma anticus; anther erect, acute or acuminate, cells contiguous; pollinia 2, clavate, 2-cleft, caudicle long or short, gland small. Capsule cylindric-oblong.—Species 6–8, Indian, Malayan, and Chinese.

Sect. I. CNEMIDIA. Lip spurred. Spike terminal, peduncled.

1. ***T. angulosa***, Blume Orchid. Archip. Ind. 122; leaves elliptic or ovate acuminate 9–11-nerved, spike many-fl., bracts slender spreading, lip oblong. *T. Govindovii* & *semilibera*, Blume l. c. *Decaisnea angulosa*, Lindl. in Wall. Cat. 7388. *Cnemidia angulosa* & *semilibera*, Lindl. Gen. & Sp. Orchid. 463. *Govindovia nervosa*, Wight Ic. t. 2090.

SIKKIM HIMALAYA, alt. 1000 ft., Clarke, King. SILHET, Wallich. TENASSERIM, Parish. UPPER BURMA, Griffith. MALABAR and TRAVANCORE, Wight, &c.

Stem 8–12 in. Leaves 3–5 by 2–3 in., base rounded or cordate. Peduncle short; spike 1–2 in.; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., as long as the flowers; sepals 3–5-nerved, lateral lanceolate, acuminate, connate nearly to the apex, dorsal linear-lanceolate, acute; petals rather narrower, ovate-lanceolate, obtuse, 3–5-nerved, midnerve very

stout; lip nearly as long as the petals, obtuse, lateral nerves narrowly lamellate below the middle; column with a long slender rostellum; anther narrowly lanceolate; pollinia clavate, grains lamelliform, caudicle long slender, gland minute.—I have examined Lindley's specimen of *T. semilibera*, and find that he was in error in supposing that the lateral sepals are free to below the middle; it does not differ from *T. angulosa*.

Sect. II. TROPIDIA PROPER. *Lip* cymbiform, not spurred.

* *Flowers in short sessile axillary or axillary and terminal spikes.*

2. **T. curculigoides**, Lindl. in Wall. Cat. 7386 A; Gen. & Sp. Orchid. 497; bracts ovate acuminate, lip with a reflexed tip a thickened midnerve and intramarginal ridges from beyond the middle to the base of the reflexed tip. *T. assamica*, Blume Orchid. Archip. Ind. 124, t. 41, f. 2.

SIKKIM HIMALAYA, King. SILHET, ASSAM, and BURMA, Wallich, &c ? PERAK, Wray.

Stem 1-2 ft. *Leaves* 6-10 by 1-1½ in., elliptic- or linear-lanceolate, caudate-acuminate, 5-nerved. *Spikes* ½-¾ in., erect or decurved; bracts imbricate, ½ in., ovate-lanceolate, upper narrower; sepals ½ in. long, strongly 5-nerved, dorsal linear-lanceolate, lateral strongly recurved, lanceolate from an ovate base, taper-pointed; petals rather shorter, obliquely ovate-oblong, obtuse, 5-nerved; lip much shorter than the sepals. *Capsule* ¾ in. long.—Bentham in Flora of Hong Kong has referred Schauer's *Ptychochilus septemnervis* of China to this, but according to Schauer's figure it differs in the much smaller flowers with ovate acute sepals, and a lip without the reflexed tip. Wallich's 7386 B from Burma is a different species, but in too imperfect a state for analysis.

3. **T. graminea**, Blume Orchid. Archip. Ind. 124, t. 41; leaves lanceolate strongly 3-5-nerved, spikes very small and few-fl'd., lip obtuse with short intramarginal lamellæ towards the middle, tip shortly recurved. *Miquel Fl. Ind. Bat.* iii. 747.

MALAY PENINSULA; on Mount Ophir, Griffith, Lobb.—DISTRIB. Java.

Stem 18 in., slender. *Leaves* 6-8 by 1-1½ in., acuminate as in *C. curculigoides*. *Spikes* ½ in. long, 1-2-fl'd.; bracts ½ in., about equalling the ovary; flowers ½ in. long, strongly recurved; sepals lanceolate, acuminate, 3-nerved; petals falcately gibbously lanceolate, 1-2-nerved; lip ovate, subacute, margins undulate towards the apex tip recurved.—Described from a single specimen. Blume's figure represents the leaves shorter and broader, and the spikes as with rather more flowers and terminal only.

** *Flowers in peduncled spikes.*

4. **T. Maingayi**, Hook. f.; spikes terminal and axillary, bracts subulate, lip with a median and intramarginal lamellæ extending from the base nearly to the acute tip.

MALAY PENINSULA; on Mount Ophir, Maingay.

Stem 12-18 in. *Leaves* 4-6 by ¾-1 in., elliptic-lanceolate, acuminate, 5-nerved. *Peduncle* 1½-2 in., flexuous, sheathed; spike short; bracts very variable, lower 1½ in., upper smaller; flowers ¼ in. long; sepals oblong-ovate, subacute, lateral 5-nerved, dorsal narrow; petals obliquely oblong, 3-4-nerved; lip with no reflexed tip.—Very like *T. pedunculata*, Blume, of Sumatra, but the flowers are not furfuraceous, the sepals are 5-nerved, and the intramarginal lamellæ of the lip are continuous.

5. **T. Thwaitesii**, Hook. f.; spike terminal subcapitate, bracts

subulate, lip ovate intramarginal lamellæ continuous to the base of the reflexed apex. *Cnemidia* circuligoides, *Thwaites Enum.* 315 (not of *Lindl.*).

CEYLON; in hot dry places, *Macrae*, *Thwaites*.

Stem 6-12 in., slender. *Leaves* 3-6 by $\frac{1}{2}$ - $\frac{3}{4}$ in., narrowly linear-lanceolate, acuminate, 3-5-nerved. *Peduncle* 1 in., naked; spike $\frac{1}{2}$ in.; bracts rather longer than the smooth ovaries; flowers $\frac{1}{2}$ - $\frac{1}{4}$ in. long; sepals with very thick midnerves, dorsal oblong 3-nerved, lateral ovate-lanceolate acuminate 5-nerved; petals oblong, obtuse, 3-nerved; lip rather thick.

IMPERFECTLY KNOWN SPECIES.

CNEMIDIA BAMBUSEFOLIA, *Thwaites Enum.* 314; stem 2-3 ft., leaves few 6-8 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in. elliptic-lanceolate caudate-acuminate 5-nerved, spike terminal sessile $\frac{3}{4}$ in. long, bracts crowded lanceolate lower narrower $\frac{1}{2}$ in. long.

CEYLON; Suffragan district, *Thwaites*.—Descript. from *Thwaites*.

TROPIDIA sp. (*T. curculigoides*, Kurz, from the Andaman Islands), a small slender species, with lanceolate subacute 3-nerved leaves 2-3 by $\frac{1}{2}$ - $\frac{3}{4}$ in.

TROPIDIA sp.; from Sikkim, alt. 1500 ft. (*King in Herb. Calcutt.*).—Resembles *T. curculigoides*, but is much larger, with 7-9-nerved leaves 7-11 in. long by 2-2 $\frac{1}{2}$ broad, and small fruit $\frac{1}{2}$ in. long.

79. **PHYSURUS**, *Richard*.

Terrestrial, leafy herbs; stem below creeping; roots fibrous. *Leaves* petioled, membranous, ovate or lanceolate. *Flowers* small, spicate. *Sepals* free, dorsal smaller forming a hood with the petals. *Lip* erect from the base of the column, spreading or recurved; spur exserted beyond the bases of the sepals. *Column* very short, not appendaged in front, rostellum 2-fid; stigma anticous, prominent; anther erect, 2-celled; pollinia 2, clavate.—Species about 20, Asiatic and American.

1. **P. Blumei**, *Lindl. in Wall. Cat.* 7397; *Gen. & Sp. Orchid.* 504; in *Journ. Linn. Soc.* i. 181; bracts equalling the ovary, lip short, terminal lobe transversely oblong entire, spur much shorter than the ovary 2-lobed. *Thwaites Enum.* 314. *P. humilis*, *Blume Orchid. Archip.* t. 27, f. 2.

SILHET, *Wallich*. CEYLON; in the Central Province, *Macrae*, &c.—DISTRIB. Java.

Stem 1-2 ft., slender, glabrous below. *Leaves* scattered, $2\frac{1}{2}$ -3 in., petioled, obliquely ovate or subcordate, acute, 3-nerved. *Scape* pubescent; sheaths distant, finely acuminate; spike 2-5 in., villous; sepals $\frac{1}{2}$ in. long, brownish-red, obtuse, 1-nerved; petals spatulate, 1-nerved; lip white, contracted at the base of the terminal lobe, spur subcylindric or inflated, nerves strong hooked.

2. **P. hirsutus**, *Lindl. in Journ. Linn. Soc.* i. 180; tall, stout, villously hirsute, leaves ovate acuminate 7-nerved subglaucous beneath, base acute. *Goodyera hirsuta*, *Griff. Notul.* iii. 393; *Ic. Plant. Asiat.* t. 347.

ASSAM; on the Burmese frontier, *Griffith*.

Stem as thick as a goose quill. *Leaves* 4-5 in., oblique. *Sepals*, *petals*, and *lip* brownish, blade of the latter white.—A very imperfectly known plant, of which there are no specimens in Griffiths' Herbarium at Kew.

80. **ANÆCTOCHILUS**, *Blume*.

Terrestrial herbs; stem below creeping. *Leaves* petioled, ovate or lanceolate. *Flowers* in glandular-pubescent spikes. *Sepals* free, dorsal

smaller and forming a hood with the narrow acuminate petals, lateral spreading. *Lip* adnate to the base of the column, contracted into an entire toothed or pectinate claw beyond the saccate spurred base, and having two rarely four terminal wing-like lobes; spur exerted beyond the bases of the sepals, and with 2 calli within. *Column* short, appendaged in front, stigmatic lobes lateral; anther 2-celled; pollinia narrowed into short or long caudicles.—Species 8, Indian and Malayan.

* *Claw of lip deeply fimbriate.*

1. ***A. regalis***, *Blume Orchid. Archip. Ind.* 46, t. 17 D; spur as long as the sepals, terminal lobes of the lip short quadrate much shorter than the claw. *A. setaceus*, *Lindl. in Bot. Reg.* t. 2010; *Gen. & Sp. Orchid.* 499; *Bot. Mag.* t. 5208; *Fl. des Serres*, ii. t. 15. *Satyrium repens*. *Linn. Sp. Pl.* 1339.

CEYLON; ascending to 3000 ft.

Stem 6–10 in. *Leaves* 1–1½ in., ovate-cordate, acute, usually dark velvety green and netted with golden nerves. *Scape* stout or slender, sheaths 2; spike 3–5 fld.; bracts lanceolate; sepals ½ in. long, ovate, subacute, green; petals broadly falcate, white; fimbriæ of white lip as long as the claw, spur inflated, tip subacute notched; column with 2 vertical lamellæ in front.—Without an examination of living plants it is impossible to say whether Blume is correct in separating the Ceylon from the original Javanese *A. setaceus*.—Var. *inornata*, *Hook. Bot. Mag.* t. 5208 is a variety with whole coloured coppery-purple leaves.

2. ***A. Roxburghii***, *Lindl. in Wall. Cat.* 7387; *Gen. & Sp. Orchid.* 499; spur as long as the sepals, terminal lobes of lip cuneately obovate as long as the claw. *Blume Orchid. Archip. Ind.* 50, t. 12 B, f. 2. *Chrysobaphus Roxburghii*, *Wall. Tent. Fl. Nep.* t. 27.

TROPICAL HIMALAYA; from Simla to Bhotan. ASSAM, SILHET, and MUNNIPORE.—DISTRIB. China.

Very near *A. regalis*, and leaves similarly netted with golden nerves, and has a variety (var. *β. Lobbiana*, *Blume l. c.*), with nearly whole-coloured leaves which have a rosy disk passing into yellowish-white.

3. ***A. elatior***, *Lindl. in Journ. Linn. Soc.* i. 178; very tall, spur of lip as long as the sepals, base of claw hastate, terminal lobes of lip oblong shorter than the claw fringes very long.

NILGHIRI HILLS; near Walla Ghaut, *M'Ivor*.

Leaves 1½ in. diam., orbicular-ovate, shortly petioled. *Scape* 12 in.; spike 3–4 fld., bracts ½ in., broadly ovate-lanceolate; flowers much larger than in *A. Roxburghii*; lip ¾ in. long, fimbriæ longer; spur inflated, tip subacute emarginate; column larger, with a didymous large hatchet-shaped appendage in front; rostellum long; anther large, lanceolate, acuminate.—The column differs a good deal from that of *regalis* and *Roxburghii*. Only one specimen seen.

4. ***A. Reinwardtii***, *Blume Orchid. Archip. Ind.* 48, t. 12, f. 2; spur of lip nearly as long as the sepals, terminal lobes of lip falcately oblong, base of claw cordate, fringes very long.

PENANG; on Government Hill, *Curtis*. PERAK, *Scortechini*; on Maxwell's Hill, *Wray*.—DISTRIB. Sumatra.

Leaves 1½–2 in., orbicular- or elliptic-ovate, netted with golden nerves or not. *Scape* 4–6 in., often very stout; flowers as in *A. elatior*; column with a long process descending into the spur.

5. ***A. brevilabris***, *Lindl. Gen. & Sp. Orchid.* 499; spur of lip saccate

much shorter than the sepals, terminal lobes obtusely hatchet-shaped, claw of lip very short, fringes few. *A. albolineatus*, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 141. *Dossinia marmorata*, *Lindl. in Journ. Linn. Soc.* i. 185 (not of *Morren*).

SIKKIM HIMALAYA (*lc. Cathcart & J. D. H.*). KHASIA HILLS, alt. 4-5000 ft., *Mack, &c. TENASSERIM, Parish.*

Leaves ovate, green with a white mesial band and golden nerves, red beneath. *Spike* as in *A. Reinwardtii*; sepals and petals green tinged with pink; lip white; column very large with a forcipate appendage projecting from the base.

** *Claw of lip entire or nearly so.*

6. *A. Griffithii*, *Hook. f. Ic. Plant. ined.*; claw of lip entire or with a membranous toothed margin and a trapeziform base, terminal lobes hatchet-shaped lobulate or toothed.

EASTERN HIMALAYA, *Griffith*. Naga Hills, in UPPER ASSAM, *Prain*.

Leaves $1\frac{1}{2}$ - $1\frac{3}{4}$ in., orbicular-ovate, apiculate. *Scape* 4-6 in.; spike 10-20-fl.; lobes of lip equalling or longer than the claw; column short with a broad folded appendage in front and a flap over the mouth of the very short saccate 2-flid spur; anther short.—The margin of the claw of the lip is broader and more toothed in the only Naga specimen I have seen.

7. *A. tetrapterus*, *Hook. f. Ic. Plant. ined.*; claw of lip quite entire, terminal lobes each 2-partite.

MUNNIPORE; at Eerung, alt. 2000 ft., *Clarke*.

Leaves 2 in., shortly petioled, ovate, caudate-acuminate. *Scape* 2 in., and few-flid. spike tomentose; sheaths and bracts large; claw of lip arched, narrow; lobules cuneate-obovate, terminal pair smallest; column with broad auricles in front that terminate in a 2-flid membrane overhanging the mouth of the very short conical obtuse spur; anther lanceolate, acuminate.

81. *VRYDAGZYNEA*, *Blume*.

Terrestrial, leafy herbs; stem below creeping, roots fibrous. *Leaves* petioled, ovate. *Flowers* small, spicate, suberect. *Sepals* subequal, free, dorsal smaller forming a hood with the petals. *Lip* included, sessile at the base of the column, membranous, concave, entire; spur large, inflated, exerted beyond the base of the sepals, with 2 stipitate calli within. *Column* short, inappendiculate; stigmatic lobes lateral; rostellum short; anther short, cells distant; pollinia 2, sessile on a large gland.—Species 8-10, Indian, Malayan and Pacific.

This genus is described as having two stipitate calli descending from the base of the column into the sac or spur of the lip; the stipites appear to me to be always more or less adnate to the walls of the sac, and represent two vascular bundles or nerves.—The name is variously spelled. All the species want revision and description from living plants.

1. *V. viridiflora*, *Hook. f.*; bracts ovate-lanceolate acuminate, lip orbicular-oblong tip truncate, disk with a high median ridge from the base to the middle, spur inflated. ? *Physurus viridiflorus*, *Lindl. in Journ. Linn. Soc.* i. 180 (*excl. Syn.* *Neottia viridiflora*, *Bl.*, which is a *Goodyera*).

LOWER BENGAL; Luckempore, on the Megua, *Clarke*.—DISTRIB. ? Java.

A span high. *Leaves* $1\frac{1}{2}$ -2 in., ovate to ovate-lanceolate, acute, membranous, shortly petioled. *Scape* 1- $1\frac{1}{2}$ in.; spike few-flid., rachis pubescent; bracts $\frac{1}{2}$ in. and

sheaths membranous; flowers $\frac{1}{2}$ in. long, pale yellow and pink; blade of lip as long as the oblong inflated spur, margins incurved.—Only one specimen seen.

2. *V. albida*, *Blume Orchid. Archip. Ind.* 75, t. 19, f. 2, 3; bracts subacute, lip oblong retuse with a short obtuse tooth, disk with a low hispidulous ridge from the base to beyond the middle. *Etæria albida*, *Blume Bijdr.* 410; *Lindl. Gen. & Sp. Orchid.* 491.

PERAK; in the Padang Valley, *Wray*.—DISTRIB. JAVA.

Whole plant 8–10 in. high, glabrous. *Leaves* $1\frac{1}{2}$ –2 in. long, ovate or elliptic, subacute. *Scape* slender, 1–3 in.; sheaths broadly acuminate, membranous; spike very many-fl. ; bracts $\frac{1}{2}$ in. long, exceeding the pale green flowers; sepals $\frac{1}{3}$ in. long, obtuse; blade of lip as long as the inflated spur. *Capsule* $\frac{1}{2}$ in. long.—The specimen as in fruit, but the withered flowers are well preserved. A drawing apparently of this by Scortechini represents the leaves as more lanceolate with waved margins.

3. *V. gracilis*, *Blume Orchid. Archip. Ind.* 72, t. 17, and t. 20, f. 1; bracts lanceolate acuminate, lip oblong, tip rounded apiculate, disk with a slender ridge from base to apex.

PERAK; at Horum, *Scortechini*.—DISTRIB. Sumatra.

Whole plant 3–8 in. high, simple or branched, glabrous. *Leaves* $\frac{3}{4}$ –1 in., petioled, ovate or ovate-cordate, subacute. *Scape* very short; spike few-fl., papillose; sepals $\frac{1}{2}$ in. long, acute, agglutinate to the narrow petals; spur obtuse, nearly as long as the blade of the lip; anther with a membranous tip.

82. CYSTORCHIS, *Blume*.

Characters of *Vrydagzynea*, but lip clawed as in *Zeuxine*, and with a large exposed didymous sac.—Species 3 or 4, Malayan.

Ætheria fusca, Lindl., referred here by Bentham, is a true *Goodyera*, with the shallow sac of the lip partially exposed. It must be by oversight that its habit is described as altogether that of *Cystorchis*, from which it differs in its tufted roots, radical leaves, robust habit, and alpine habitat. Amongst Scortechini's drawings of Perak Orchids there are several probably referable to *Cystorchis*, but unaccompanied with specimens.

1. *C. javanica*, *Blume Orchid. Archip. Ind.* 87, t. 24, f. 1; leaves dark green with crenate pinkish margins, lip with a long straight claw and dilated tip. *Etæria javanica*, *Blume Bijdr.* 410; *Lindl. Gen. & Sp. Orchid.* 491 (*Ætheria*).

PERAK, *Scortechini*.—DISTRIB. JAVA.

Stem a span long, leafy above. *Leaves* $\frac{3}{4}$ – $1\frac{1}{4}$ in., petioled, ovate, obtuse or subacute, margins entire or crenulate. *Scape* and short raceme puberulous; sheaths lanceolate, acuminate; bracts equalling the ovary; flowers $\frac{1}{4}$ in. long; lateral sepals ovate-lanceolate, 1-nerved, puberulous; petals linear-oblong, obtuse, 1-nerved; sac of lip membranous, claw rigid grooved, the margins being inflexed; rostellum ovate; anther sessile, very convex, umbonate; gland of pollinia ovate, acute.—Specimen not good, but I think referable to Blume's plant, of which the leaves are described as undulate, dark purple above and pale flesh coloured beneath.

2. *C. variegata*, *Blume Orchid. Archip. Ind.* 89, t. 24, f. 3, and 36 C; leaves pale green with dark transverse bands, scape slender, raceme puberulous, beak of lip with incurved sides and a small dilated tip.

SINGAPORE, *Ridley*.—DISTRIB. JAVA.

Leaves 2– $2\frac{1}{2}$ in., ovate-oblong or -lanceolate acute; petiole $\frac{1}{4}$ in. *Scape* with

raceme 4-6 in., glandular-pubescent; flowers about $\frac{1}{4}$ in. long; lateral sepals very gibbous at the base.—Named by Mr. Ridley. The flowers in the specimen he has kindly sent are far too young for analysis.

83. *HERPYSMA*, Lindl.

A terrestrial leafy herb; stem stout, erect. *Leaves* ovate-lanceolate, petioled, membranous; sheaths very large, hyaline. *Flowers* in a dense short sessile spike. *Sepals* subequal free; dorsal forming a hood with the oblong petals. *Lip* adnate to the sides of the column, spreading, spur elongate, straight, exposed, tip 2-fid. *Column* short, not appendaged in front; stigma anticous; rostellum short, erect, 2-fid; anther sessile, erect, linear-oblong, 2-celled; pollinia narrow, tipped with 2 hard lanceolate appendages or glands, pollen grains flattened.

H. longicaulis, Lindl. in Wall. Cat. 7389; in Bot. Reg. under t. 1618; Gen. & Sp. Orchid. 506; in Journ. Linn. Soc. i. 178, 190.

EASTERN HIMALAYA; Nepal, Wallich. Sikkim, alt. 3-4000 ft., J. D. H., &c. KHASIA MTS., alt. 4500 ft., Clarke.

Stem 6-12 in., elongate and creeping below, then ascending, as thick as a swan's quill or less, clothed below with the white, truncate leaf sheaths $\frac{3}{4}$ -1 in. long. *Leaves* 2-3 in., membranous, shortly petioled. *Spike* 1-2 in., pubescent; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., ovate-lanceolate; flowers with ovary rather longer, suberect, pale pink; sepals $\frac{1}{2}$ in. long, 5-nerved, and shorter petals obtuse; lip shorter than the sepals, subpanduriform, reflexed from the middle, strongly 5-nerved, disk with 2 flattish calli about the middle, and a thick lamella extending to the rounded tip; spur longer than the blade, strongly nerved; base of white column contracted below the broad pulvinate stigma.—I do not find the two lamellæ in the spur, which is longitudinally grooved or infolded at the back.

84. *ODONTOCHILUS*, Blume.

Habit and character of *Anætochilus*, but sac or small spur of the lip hidden between the more or less connate bases of the lateral sepals.—Species about 12, Indian, Malayan and Pacific.

The pollen varies greatly in structure in this genus. The species are most difficult of analysis and definition from dried specimens. *Myrmechis*, Blume, is only distinguishable by the fewer often erect flowers and stem with numerous small leaves.

* *Stem* stout, leafy. *Flowers* solitary or very few. (MYRMECHIS, Bl.)

1. **O. macranthus**, Hook. f. Ic. Pl. ined.; leaves ovate acuminate, flowers very large solitary erect, claw of lip entire, margins involute, limb small orbicular.

PERAK, Scortechini; on Maxwell's Hill, Wray.

Stem 2-3 in., from a nodose procumbent base. *Leaves* $\frac{3}{4}$ in., shortly petioled. *Flower* white, nearly 1 in. long, with a sheathing bract on the very short peduncle; sepals erect, lateral linear-oblong from a gibbous base, 1-nerved; dorsal ovate-lanceolate, long-acuminate; petals falcately dimidiate-ovate, long-pointed; sac of lip subglobose, enclosed calli small; limb shortly exserted; column very short, frontal appendage erect lanceolate; rostellar arms very long, slender; anther linear-lanceolate; pollinia clavate, united caudicles long slender, gland elongate.—Resembles *Myrmechis glabra*, Blume of Java, but the narrower flowers, long anther, pollen and rostellar arms at once distinguish it.

2. **O. calcaratus**, *Hook. f. Ic. Plant. ined.*; leaves very small ovate acuminate, flowers 1-3, claw of lip crenate, lobes small quadrate or rounded, column with a linear process descending into the cylindric or incurved spur.

PERAK, *Scortechini*; alt. 3900 ft., *Wray*.

Stem 3-5 in., slender, flexuous, leafy. *Leaves* $\frac{1}{4}$ - $\frac{1}{2}$ in., sessile or petioled, aristately acuminate. *Peduncle* very short, and bracts lanceolate, quite glabrous; flowers white; sepals linear, 1-nerved, lateral with the outer bases connate and enclosing the spur; petals linear-lanceolate, 1-nerved; lip $\frac{1}{2}$ in. long, spur half as long as the sepals, with a columnar caruncle enclosed, tip straight or incurved; column short; rostellar arms long, slender; anther ovate-lanceolate; pollinia short, each attached to the gland by a long stout caudicle.—*Wray* describes the leaves as green dashed with crimson, veined with gold, and bordered with red, the flowers white. *Scortechini* says, leaves dark purple, sepals pale carnation, lip white. This is a *Myrmecis* with the claw of lip of *Odontochilus*.

3. **O. pumilus**, *Hook. f. Ic. Plant. ined.*; leaves $\frac{1}{2}$ - $\frac{1}{2}$ in. scattered petioled ovate, scape 1-3-fld., bracts oblong ciliate, lateral sepals ovate subacute, claw of lip crenulate, terminal lobes subquadrate. *Cheirostylis pusilla*, in part, *Lindl. in Journ. Linn. Soc. i.* 188 (not of *Gen. & Sp. Orchid*).

SIKKIM HIMALAYA, alt. 8-10,000 ft., *J. D. H., Thomson, King*.

Stem with scape 2-3 in., ascending from a prostrate base, stout for the size of the plant. *Leaves* acute, rather thick; nerves obscure; sheaths very short. *Scape* with one membranous ciliate sheath; flowers subglobose, $\frac{1}{2}$ in. diam., white; dorsal sepal broadly ovate with an obtuse recurved tip, 1-nerved, lateral triangular-ovate, very oblique at the base, 1-nerved; sac of lip simple, internal calli very large; terminal lobes shortly exerted, thick.—So like *Cheirostylis pusilla* that it was confounded with it by *Lindley*. The specimens I have seen are very few, and the flowers very difficult of analysis.

** *Stem elongate. Leaves 1 in. or more long. Spikes few- or many-fld.* (ODONTOCHILUS, *Bl.*).

4. **O. crispus**, *Hook. f.*; leaves few ovate acute, bracts shorter than the glabrous ovary, claw of 2-winged lip quite entire, wings toothed much larger than the sepals. *Anæctochilus crispus*, *Lindl. in Journ. Linn. Soc. i.* 180.

SIKKIM HIMALAYA, alt. 5-6000 ft., *Ic. Cathcart, Clarke*. KHASIA HILLS; at Surureem, alt. 5000 ft., *Clarke*.

Stem slender, elongate below the 2-4 leaves. *Leaves* $\frac{3}{4}$ in., petiole $\frac{1}{4}$ -1 in. *Spikes* 4-8-fld., rachis and ovate-lanceolate bracts pubescent; lateral sepals $\frac{1}{2}$ in. long, dorsal much smaller; petals dimidiate-ovate, falcate, acuminate; claw of lip exceeding the sepals, slender; 2-winged limb $\frac{1}{2}$ in. diam., white; sac minute, didymous, enclosed caruncles large; column and rostellar arms very short indeed; anther very short, tip recurved; pollinia globose, sessile at the truncate end of the very large fleshy ? cuneiform caudicle; gland minute.—A Sikkim specimen of *Clarke's* very like this has pubescent sepals, and a few minute tubercles on the claw of the lip.

5. **O. pectinatus**, *Hook. f. Ic. Plant. ined.*; stem leafy, leaves ovate acute, spike few-fld. laxly villous, bracts as long as the ovary, claw of lip pectinate, limb lunate or broadly 2-winged, sac globose, rostellar arms long.

PERAK, alt. 3-4000 ft., *King's Collector; Maxwell's Hill, Wray*.

Stem 6-12 in. *Leaves* $1\frac{1}{2}$ - $2\frac{1}{2}$ in., light green, thick, fleshy, petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Spike*

6-8-fld.; bracts $\frac{1}{2}$ in. long, pubescent, laxly villous, ovary glabrous; sepals ovate-lanceolate, 1-nerved, softly pubescent; petals lanceolate, unequal sided, long pointed; sac of lip with 2 large caruncles; column very short, with 2 ascending auricles in front; rostellar arms long and broad; anther lanceolate; pollinia obovoid, much shorter than their broad thick coherent caudicles.

6. **O. brevistylis**, *Hook. f. Ic. Plant. ined.*; leaves towards the top of the stem obliquely ovate-lanceolate acute, spike few-fld. pubescent, bracts as long as the ovary, claw of lip slender with few curved spinous teeth, sac globose, limb bipartite, segments semicircular, rostellar arms very short.

PERAK; on Gunong Batu Pateh, alt. 3400 ft., *Wray*.

A span high. *Leaves* $1\frac{1}{2}$ -2 in., pale green; petiole $\frac{1}{2}$ in. *Spike* short; flowers white; ovary glabrous; sepals $\frac{1}{2}$ in. long, lateral broadly obliquely ovate, acute, hairy, dorsal much smaller; petals semicircular with long points; sac of lip with 2 large caruncles, claw narrow, limb larger than the sepals; column exceedingly short, frontal appendages obscure; rostellar arms triangular, subacute; anther short, ovate, obtuse; pollinia subglobose, sessile on the truncate base of the united caudicles which form a large fleshy triangular plate acute at the top, gland minute.—The pollinia and their caudicle are a good deal like those of *O. crispus*.

7. **O. Elwesii**, *Clarke mss.*; stem above and few-fld. spike hirsute, leaves ovate acute, flowers large, bracts as long as the hirsute ovary, sepals hairy, claw of lip broad irregularly toothed, sac scrotiform, lobes of limb subquadrate, rostellar arms subulate, pollen grains lamellate. *Hook. f. Ic. Plant. ined.*

SIKKIM HIMALAYA, alt. 4-6000 ft., *Clarke, King*. KHASIA HILLS; on Shillong, alt. 6100 ft., *Clarke*. MUNIPORE; on Kohima, *Prain*.

Stem stout below, 6-8 in. high. *Leaves* $1\frac{1}{2}$ -2 in., rather crowded, dark green with 3 red nerves. *Spike* 2-4-fld.; lateral sepals ovate, acuminate, 1-nerved, green purple-tipped or white, dorsal much smaller; petals semicircular, with long or short points; sac of lip 2-lobed, claw dark purple, centre and subquadrate lobes white; column very short, frontal appendages triangular; anther short, apiculate, connective very thick; pollinia broadly elavate, grains flat, caudicles 0, gland linear.—This and *O. grandiflorus* have lamellate ecaudiculate pollen.

8. **O. grandiflorus**, *Benth. in Gen. Plant. iii.* 598; tall, leafy, leaves 3-5 in. obliquely elliptic acute, spike stout many-fld., rachis pubescent, bracts about equalling the glabrous ovary, sepals glabrous, spur of lip decurrent on the ovary, claw with 5-6 pair of long recurved spines, wings large cuneate, anther lanceolate, pollinia clavate, grains lamellate. *Ancetochilus grandiflorus*, *Lindl. in Journ. Linn. Soc. i.* 179.

SIKKIM HIMALAYA, alt. 4-6000 ft., *J. D. H.* KHASIA HILLS, alt. 4000 ft. *J. D. H. & T. T.*

Stem with spike 12-15 in., as thick as a goose-quill below. *Leaves* 2-2 $\frac{1}{2}$ in. diam., base acute or rounded; petiole $1\frac{1}{2}$ -2 in. *Spike* 4-6 in.; bracts $\frac{1}{2}$ in., pink, slightly pubescent; lateral sepals $\frac{1}{2}$ in., falcately oblong-lanceolate, subacute, connate at the base and with the sac of the lip, and dorsal and petals mottled with pinkish white and green, dorsal much smaller, ovate; sac of lip rather long, calli within large crenate, limb $\frac{1}{2}$ - $\frac{2}{3}$ in. diam.; column longer than in its congeners, with 2 ascending frontal wings; rostellum very broad, 2-cuspidate; pollinia lamellate, without caudicles, narrowed upwards, the narrowed portion lamellate down to the small gland.

9. **O. Clarkei**, *Hook. f. Ic. Plant. ined.*; tall, leaves 2-2 $\frac{1}{2}$ in. obliquely elliptic acute, spike subtomentose many-fld., bracts longer than the

pubescent ovary, sepals glabrous lateral free at the base, sac of lip small globose didymous, claw with broad round auricles at the base and 2-3 pair of spines, wings hatchet-shaped, anther elongate, pollinia subglobose with a long flexuous thick caudicle, grains cuneiform.

SIKKIM HIMALAYA; Mongpo, alt. 3000 ft., *Clarke*.

A foot high including the spike. *Leaves* as in *grandiflorus*, but much smaller. *Spike* 5 in., very many-fld.; bracts $\frac{1}{2}$ in., pink, pubescent; lateral sepals $\frac{1}{2}$ in., broadly ovate-oblong, pink, 1-nerved, dorsal and petals coherent in a small deeply cordate pink cuspidate hood; sac of lip with 2 caruncles, claw expanding just beyond the sac into an, orbicular or obcordate plate, wings as large as the sepals; column with 2 ascending frontal appendages; rostellum broad, bifid; long caudicle of the pollinia rather stout golden, gland small.—The only species with a dilated base of the claw of the lip. The specimen is a solitary one.

10. **O. lanceolatus**, *Benth. in Gen. Plant.* iii. 598; leaves 2-3 in. ovate or ovate-lanceolate acute, spike many-fld., rachis pubescent, bracts as long or longer than the glabrous ovaries, flowers small glabrous, sac of lip globose didymous, claw with 3-4 pairs of recurved spines, wings subquadrate, anther very short, pollinia globose sessile on a broad fleshy triangular caudicle. *O. flavus*, (error for *luteus*), *Benth. l. c.* *Anæctochilus lanceolatus*, *Lindl. Gen. & Sp. Orchid.* 499; in *Journ. Linn. Soc.* i. 179. *A. luteus*, *Lindl. in Journ. Linn. Soc. l. c.*

SIKKIM HIMALAYA, alt. 5-6000 ft., *Griffith's Collectors (Kew Distrib.* 5345, 5354), &c. KHASIA MTS., *Mack, Griffith (Kew Distrib.* 5352), &c.

Stem with the spike 6-8 in., few or many-leaved. *Leaves* green. *Spike* 2-3 in.; bracts $\frac{1}{2}$ - $\frac{1}{2}$ in., usually broader and whiter than in other species, nearly glabrous; lateral sepals $\frac{1}{2}$ in., ovate, obtuse, green, 1-nerved; dorsal and petals connate in an obtuse hood broader than long; lip golden yellow, sac with a pair of curved spurs within, claw not dilated at the base, limb $\frac{1}{2}$ in. diam.; column very short indeed, frontal appendages obscure; rostellum broad, 2-cuspidate; anther short, thick, with a recurved beak, grains of pollen cuneiform.—The pollen is like that of *O. brevistylis* & *crispus*. I cannot distinguish dried specimens of Lindley's *A. luteus* from his *lanceolatus*. According to native drawings *A. luteus* should have much the largest flowers.

85. **HAEMARIA**, *Lindl.*

Terrestrial herbs; caudex creeping. *Leaves* petioled. *Flowers* racemed. *Sepals* subequal, free; dorsal erect forming a hood with the petals; lateral broad, widely spreading. *Lip* adnate to the base and sides of the column, elongate with a small basal sac which is concealed by the sepals; sides winged or auricled, blade of two spreading lobes, sac with 2 large internal calli. *Column* very large, clavate, stigma anticous; anther large, sub-horizontal, cells distinct; pollinia 2, clavate, sulcate, granular, attached by a fleshy gland to the forked rostellum.—Species 4, Malayan and Chinese.

H. discolor, *Lindl. Gen. & Sp. Orchid.* 490; *Miq. Choix. Pl.* t. 16. *Ludisia discolor*; *A. Rich. in Dict. Class. Hist. Nat.* vii. 457; *Blume Orchid. Archip. Ind.* 113, 114, t. 34, f. 2, 3, and t. 42. *Goodyera discolor*, *Ker in Bot. Reg.* t. 271; *Bot. Mag.* t. 2055; *Lodd. Bot. Cab.* t. 143. *Myoda rufescens*, *Lindl. in Wall. Cat.* 7390; *Gen. & Sp. Orchid.* 489.

MALAY PENINSULA; at Johore, *Ridley*. PENANG, *Wallich*.—DISTRIB. Hong Kong, Cochin China.

Caudex very short. *Stem* ascending from the base, 6–10 in., stout or slender, pubescent. *Leaves* subradical, 1–3 in., shortly petioled; elliptic or ovate, apiculate, fleshy, dark red beneath. *Racemes* many-fl.; rachis and ovary tomentose; bracts large, concave, membranous, acuminate, coloured; perianth $\frac{1}{2}$ – $\frac{2}{3}$ in. diam.; petals pinkish, broadly ovate, apiculate, 1-nerved, nerve with flexuous nervules; sepals linear, 1-nerved; lip longer than the sepals, recurved; sac small, 2-lobed; claw with dilated sides; lobes of limb divaricate, quadrately oblong.—Reichenbach's var. *Dawsoniana* from Moulmein (Trans. Linn. Soc. xxx. 142) consists of leaves only and is probably an *Anæctochilus*; it may or may not be his var. *Dawsonianus*, Gard. Chron. 1872, 321 (*Anæctochilus Dawsonianus*, Low in Gard. Chron. 1868, 1038) with red reticulations on the leaves.

86. DOSSINIA, Morr.

A Bornean genus, not hitherto found in British India. The plant referred to it by Lindley is *Anæctochilus brevibrabris* (see p. 95).

87. SPIRANTHES, Rich.

Terrestrial herbs, roots fibrous or tuberous; stem leafy, or the flowering leafless. *Leaves* various. *Flowers* small, secund, in often twisted spikes. *Sepals* subequal, free, or more or less cohæring with the petals in an erect hood, lateral gibbous at the base. *Lip* sessile or clawed, erect, entire or 3-lobed, base concave, disk callous or lamellate. *Column* short, terete, base often decurrent on the ovary; stigma antious, broad, rostellum erect obtuse or elongate and 2-fid; anther erect, 2-celled; pollinia pendulous from the gland of the rostellum.—Species about 80, temperate and tropical.

1. *S. australis*, Lindl. in Bot. Reg. t. 823; Gen. & Sp. Orchid. 464; Journ. Linn. Soc. i. 178; tall, pubescent, root of many fleshy fibres, leaves on the base of the flowering stem linear-lanceolate or linear obtuse or acute or oblanceolate, spikes slender, bracts ovate exceeding the ovary, lip oblong crisped, base saccate 2-glandular, tip dilated retuse or apiculate, disk hairy. Dalz. & Gibs. Bomb. Fl. 270; Wight Ic. t. 1724 (*middle and right-hand figs.*). *S. longispicata*, A. Rich. in Ann. Sc. Nat. Ser. 2, xv. 78. *S. flexuosa*, & *parviflora*, Lindl. in Bot. Reg. under t. 823. *S. pudica*, Lindl. Coll. Bot. t. 30. *S. amœna*, Bunge Enum. Pl. Chin. 63. *S. novæ Zelandicæ*, Hook. Fl. New Zeal. i. 243. *Neottia australis*, Br. Prodr. 319; Don Prodr. 27. *N. crispata*, Blume Bijdr. 406. *N. flexuosa* & *parviflora*, Smith in Rees Cyclop. *N. sinensis*, Pers. Syn. ii. 511. *N. amœna*, Bieb. Fl. Taur. Cauc. iii. 606. *Gyrostachys australis*, Blume Fl. Jav. 107, t. 37, 38.—*Spiranthes*, Griff. Notul. iii. 384; Ic. Plant. Asiat. t. 348.

Throughout INDIA from the PANJAB and W. TIBET to UPPER ASSAM, and southwards to CEYLON and CHITTAGONG; ascending to 7500 ft. in the Sikkim Himalaya, and 7000 ft. in the Nilghiris.—DISTRIB. Afghanistan, N. Asia, China, Java, Australia, N. Zealand.

Plant 6–18 in. high, stout or slender, sometimes almost tuberous. *Leaves* 1–5 in., very variable, rarely oblong and sessile, often scattered and lower long-petioled; sheaths rather distant. *Spike* 3–6 in., twisted, glandular-pubescent; flowers secund, close-set; perianth $\frac{1}{10}$ – $\frac{1}{8}$ in. long, horizontal, reddish or white; sepals obtuse, tips (and of truncate petals) recurved.—There is a great difference in the size of the leaves of this species, but the large and small fld. seem to inhabit the same areas.

VAR. *Wightiana*, Lindl. Gen. & Sp. 465; very stout, sheaths many almost

imbricating, flowers in a dense cylindric spike. *S. Wightiana*, Lindl. in Wall. Cat. 7378. *S. densa*, A. Rich. in Ann. Sc. Nat. Ser. 2, xv. 79: *S. australis*, Wight Ic. t. 1724 (left-hand fig.).—Nilgiri Mts.

2. *S. autumnalis*, Rich. Orchid. Europ. Ann. 57; glandular-pubescent, root of elongate stout tubers, leaves in a tuft at the side of the flowering stem ovate, bracts ovate-lanceolate acuminate exceeding the ovary, lip oblong-panduriform glabrous, base 2-glandular. Lindl. Gen. & Sp. Orchid. 469; in Journ. Linn. Soc. i. 277; Boiss. Fl. Orient. v. 90; Reichb. Fl. t. 47.

WESTERN HIMALAYA; at Lohoo Ghat, Thomson (Fl. May).—DISTRIB. Afghanistan, Caucasus to the Atlantic.

Root of 2 fleshy fusiform or subcylindric tubers $\frac{1}{2}$ –1 $\frac{1}{2}$ in. long. Leaves 1–1 $\frac{1}{2}$ in., on a very short lateral stem that flowers in the following year. Scape with the rather stout raceme 4–6 in.; spike twisted; flowers secund greenish white, variable in size, usually larger than in *S. australis*.—This common European species has not been recorded from any locality between the Caucasus and Afghanistan. Boissier errs in describing the tubers as napiform. In Europe it flowers in October to December; in India and Afghanistan in April and May.

88. *NEOTTIA*, Linn.

Terrestrial erect brown leafless herbs; rootstock with fibres, stem simple laxly sheathed. Flowers racemose. Sepals subequal, free, lanceolate, concave at length spreading, lateral falcate. Petals narrow. Lip pendulous from the base of the column, larger than the sepals, 2-fid, base flat or concave. Column erect or incurved, subterete; stigma transverse; anther erect or inclined forwards, cells contiguous; pollen in loosely connected masses, pendulous from the gland of the rostellum.—Species 3, temperate Europe and Asia.

NEOTTIA STRATEUMATICA, Br. Prodr. 319 (in note). In a note under *Neottia australis*, Brown refers the *Orchis strateumatica* of Linnæus (Flor. Zeylan. n. 319; Sp. Plant. 1. i. 943) to *Spiranthes*, on the faith of a specimen in Hermann's Herbarium; but Linnæus's character of "spur slender as long as the ovary" is quite opposed to this determination. I do not know what it is.

N. listeroides, Lindl. in Royle Ill. 368; Gen. & Sp. Orchid. 458; in Journ. Linn. Soc. i. 176. *N. Lindleyana*, Dcne in Jacquem. Voy. Bot. 163, t. 163.

TEMPERATE HIMALAYA; from Kashmir eastwards to Sikkim, alt. 5–10,000 ft. in Kumaon, and 10–11,000 ft. in Sikkim.

Stem with the raceme 8–14 in., high, stout or slender, stiff, flexuous; sheaths 3–4, lax. Raceme 6–12 in., lax-fld., laxly pubescent; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., sheathing, membranous, as long as the erect pedicels; flowers $\frac{1}{2}$ in. long, red brown; sepals truncate, 1-nerved; petals much narrower, margins convolute; lip 2–3 times as long as the sepals, linear-oblong, cleft into two ovate or linear-subacute parallel lobes from a third of the way up, nearly flat with a dorsal ridge; ovary pubescent. Capsule $\frac{1}{2}$ in. long, ellipsoid, erect.

89. *LISTERA*. Br.

Terrestrial erect 2-leaved herbs, with fibrous roots from a short rootstock. Leaves broad, subopposite. Flowers rather small, racemed. Sepals and petals subequal, free, spreading or reflexed. Lip pendulous from the base of the column, usually longer than the sepals, narrow, entire or 2-fid.

Column stout; *rostellum* terminal; *anther* inclined forwards, cells 2 contiguous; *pollinia* 2, usually 2-partite, pendulous from the gland of the *rostellum*.—Species 10, N. temperate regions.

1. ***L. ovata***, *Br. in Hort. Kew*, v. 201; leaves ovate, lip linear 2-fid. *Lindl. Gen. & Sp. Orchid.* 455; *Boiss. Fl. Orient.* iv. 92; *Ledeb. Fl. Ross.* iv. 80; *Reichb. Ic. Fl. Germ.* xiii. t. 479.

NORTH-WEST HIMALAYA?, *Falconer*.—DISTRIB. Europe to the Ural and the Caucasus.

Whole plant 12–18 in. high. *Root* of fleshy fibres. *Stem* 2–4 in., naked. *Leaves* 2–4 in., sessile, subacute. *Scape* with raceme 6–10 in., with 1–2 small sheaths; raceme 3–6 in., pubescent; bracts broadly ovate, membranous; pedicel $\frac{1}{2}$ – $\frac{3}{4}$ in.; flowers $\frac{1}{2}$ in. long, greenish; sepals ovate; petals linear; lip twice as long as the sepals, very narrow, 2-fid. *Capsule* $\frac{1}{2}$ in. long, globosely ellipsoid.—*Falconer*'s is the only Indian Herbarium in which this plant occurs, and as it has not hitherto been found eastwards of Long. 80° E. the specimen may not be Indian, but have been inadvertently placed by him in his Indian Herbarium.

2. ***L. tenuis***, *Lindl. in Journ. Linn. Soc.* i. 176; leaves ovate acute, lip cuneately obcordate.

SIKKIM HIMALAYA; Lachen valley, alt. 11,500 ft., *J. D. H.*

Whole plant 4–5 in. high, very slender; leaves nearer the raceme than the root, $\frac{1}{2}$ –1 in. long, sessile, 3–5-nerved. *Scape* almost filiform; raceme few-fid., puberulous; bracts ovate, acute, membranous; pedicels short; flowers $\frac{1}{2}$ in. long; lip twice as long as the petals, lobes rounded; column short.

3. ***L. pinetorum***, *Lindl. in Journ. Linn. Soc.* i. 175; leaves orbicular cordate acute, lip cuneately broadly obcordate from a narrow base, lobes broad.

SIKKIM HIMALAYA; in pine woods of the Lachen valley, alt. 10–11,000 ft., *J. D. H.*; Chumbi, *King's Collector*.

Whole plant 4–8 in. high, slender. *Leaves* 1–1 $\frac{1}{4}$ in., much nearer the raceme than the root, about as broad as long, very shallowly cordate, 5–7-nerved. *Scape* rather stout, very short and few-fid.; raceme pubescent; bracts appressed to the scape, ovate, acuminate, herbaceous; flowers decurved, $\frac{1}{2}$ in. long, greenish brown; lip twice or thrice as long as the sepals, deeply 2-lobed, sinus obtuse; column long, incurved.

4. ***L. micrantha***, *Lindl. in Journ. Linn. Soc.* i. 176; leaves subradical broadly ovate, lip 3-lobed short.

SIKKIM HIMALAYA; Lachoong valley, alt. 10,000 ft., *J. D. H.*

Whole plant 3–5 in. *Leaves* $\frac{1}{2}$ in. *Scape* filiform, and lax-fid.; raceme pubescent; bracts minute, ovate, acute, shorter than the $\frac{1}{2}$ in. pedicels; flowers very minute, $\frac{1}{10}$ in. long; lip very much smaller than the sepals, cuneate, truncately 3-lobed, lobes acute; column very short.—A remarkable little species.

90. **CHEIROSTYLIS**, *Blume*.

Terrestrial herbs. *Leaves* membranous. *Flowers* small, racemed. *Sepals* connate in a gibbous based tube to the middle. *Petals* narrow, *Lip* inserted at the base of the column, erect, narrow, base saccate, limb shortly clawed broadly dilated entire toothed or crenate. *Column* short with 2 appendages in front, *rostellum* 2-cleft; stigmatic lobes lateral; *anther* erect, cells short; *pollinia* 2, *caudicle* short, *gland* oblong.—Species about 8, Indian and Malayan.

* *Appendages of column as long as the rostellum.*

1. **C. pusilla**, Lindl. *Gen. & Sp. Orchid.* 489; in *Journ. Linn. Soc.* iii. 188 (in part); glabrous, leaves very small ovate, raceme 2-3-fld., limb of lip 2-lobed, lobes quadrate deeply toothed. *Etæria pusilla*, Wall. *Cat.* 7392. *Zeuxine moniliformis*, Griff. *Notul.* iii. 397; *Ic. Plant. Asiat.* t. 350.

KHASIA HILLS, alt. 4-5000 ft., Wallich, &c.

Stem 3-6 in., prostrate below, often moniliform from the swollen internodes. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., scattered, acute acuminate or aristate; petiole short. *Scape* 1-3 in.; sheaths and bracts oblong-lanceolate, ciliate; flowers inclined, $\frac{1}{4}$ in. long; sepals pink, obtuse; petals spatulate; lip white, base shortly saccate, nerves with a few fleshy setæ within, claw finely hairy towards the tip; columnar appendages fleshy, as long as the rostellar arms; anther lanceolate; pollinia pyriform, gland very long.—Closely resembles *Odontochilus pumilus*, and was confounded with it by Lindley.

2. **C. malleifera**, Parish & Reichb. f. in *Trans. Linn. Soc.* xxx. 141; glabrous, leaves very small ovate acute, raceme 3-5-fld., lobes of lip entire.

TENASSERIM; on Zwakabin, Parish.

Very like *C. pusilla*, but there is no appearance in the specimens of a moniliform stem, leaves rather larger, flowers not half the size, lip with a longer and shallower base, and quite entire somewhat hatchet-shaped lobes; anther with a dilated membranous apex.

3. **C. Griffithii**, Lindl. in *Journ. Linn. Soc.* i. 188; scape pubescent, flowers 1-3 large, limb of lip reniform lacinate, appendages of column linear. *Goodyera* No. 9, Griff. *Notul.* iii. 393.

KHASIA HILLS, alt. 4-5000 ft., Griffith, Lobb, Clarke. PEGU, Kurz (in Herb. Calcutt.). TENASSERIM; on Mt. Tungoo, Parish.

Stem below prostrate. *Leaves* 1 in., shortly petioled, ovate, acuminate; sheaths very large, cupular, hyaline. *Scape* 3-8 in., slender; sheaths and bracts large, loose, lanceolate; flowers nearly 1 in. long with the ovary, white with 2 green spots on the lip; sepals connate to the middle; petals narrowly spatulate; base of lip elongate, concave, with 2 series of glandular setæ within; claw short. *Capsule* $\frac{3}{4}$ in., pedicelled, pyriform.

4. **C. parvifolia**, Lindl. in *Bot. Reg.* 1839, *Misc.* 19; *Gen. & Sp. Orchid.* 488; in *Journ. Linn. Soc.* i. 187; raceme puberulous lax-fld., flowers minute, limb of lip subquadrate 6-8-lobed, appendages of the column dilated upwards rather short. *Thwaites Enum.* 313.

CRYLON; Ambagamowa district rare, Thwaites.

A span high. *Leaves* 2-3 about the middle of the slender stem, $\frac{1}{2}$ -1 $\frac{1}{2}$ in., ovate-lanceolate, acuminate. *Scape* slender, puberulous; raceme 8-10-fld.; bracts as long as the short pedicels; sepals $\frac{1}{2}$ in. long, glabrous, pink; petals oblong-obovate, obtuse, white; lip with a subsaccate base containing 2 small forked calli, limb white; column very short, rostellar arms subulate; anther ovate-cordate; pollinia pyriform, caudicle very short, gland linear.—The specimens are very poor, and the species is perhaps better placed in the following section.

** *Appendages of column shorter than the short rostellum, rarely as long.*

5. **C. flabellata**, Wight *Ic. v.* 16; scape glandular-pubescent, flowers subcorymbose, limb of lip suborbicular deeply 2-cleft, lobes sub 5-fld.,

appendages of column subspathulate; *Lindl. in Journ. Linn. Soc. i.* 187; *Thwaites Enum.* 313 (excl. in both *Syn. Zeuxine*); *Dalz. in Hook. Journ. Bot. iv.* (1852) 112; *Dalz. & Gibs. Bomb. Fl.* 271. *Monochilus flabellatus*, *Wight Ic. t.* 1727. *Goodyera flabellata*, *A. Rich in Ann. Sc. Nat. Ser. 2.* xv. 79, t. 12.

BHOTAN HIMALAYA, *Griffith*. TENASSERIM, *Parish*. The CONCAN, *Dalzel*. NILGHIRI HILLS, alt. 6000 ft., *Wight*, &c. CEYLON; Ambagamowa district, *Thwaites*, *Beckett*.

Stem sometimes moniliform below as in *C. pusilla*, but stouter. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., petioled, ovate, acute. *Scape* 6–8 in.; sheaths and bracts loose, acuminate; flowers 2–10, white, glandular-pubescent, perianth hemispheric; petals linear-oblong, falcate; sac of lip cymbiform, with 2 calli within; base hairy, claw short with 2 green spots; column very short, appendages subterminal and rostellar arms both subspathulate; anther with a dilated membranous tip; pollinia pyriform, subsessile on the elongate lanceolate gland.

6. ***C. pubescens***, *Parish & Reichb. f. in Trans. Linn. Soc. xxx.* 141; scape pubescent, limb of lip 2-lobed, lobes subquadrate crenate, appendages of the column cuneately obovate much shorter than the subspathulate arms of the rostellum.

TENASSERIM; at Moulmein, *Parish*.

Stem stout, ascending. *Leaves* $1\frac{1}{2}$ –3 in., ovate or ovate-lanceolate, acuminate; petiole slender. *Scape* 3–6 in.; sheaths and bracts lax, acuminate; raceme 3–10-fl.; perianth $\frac{1}{2}$ in. long; sepals connate to the middle; lip with a small concave 3-nerved base, lateral nerves with one slender callus; claw rather broad; anther truncate. *Capsule* $\frac{1}{2}$ in., pyriform, pedicelled.

91. **ZEUXINE**, *Lindl.*

Terrestrial herbs; stem creeping below. *Leaves* membranous. *Flowers* small, spicate. *Sepals* subequal, dorsal concave, cohering with the petals; lateral free. *Lip* inferior, adnate to the base of the column, cymbiform or saccate with a shortly-clawed or sessile entire 2-lobed or 2-winged terminal lobe; sac with 2 calli or spurs near the base within. *Column* very short, 2-keeled or -winged in front; stigmatic lobes 2, marginal, distant; anther membranous, cells contiguous; pollinia pyriform, attached by an oblong gland to the erect rostellum with often an intermediate appendage or a linear caudicle.—Species about 20, tropical Asia and Africa.

I refer to *Zeuxine* those species of *Heteria* that have large terminal lobes to the lip. The appendage between the gland of the pollinia and the pollinia itself is a very curious organ, and its real nature has not been ascertained, whether rostellar or pollinar; it occurs only in some species, and in these under very various forms, so that it cannot be relied on as a generic character. It is further so difficult of analysis in dried specimens, that much allowance must be made for my description of it.

Sect. 1. EUZEUXINE, *Lindl.* *Leaves* sessile, linear-lanceolate.

1. ***Z. sulcata***, *Lindl. Gen. & Sp. Orchid.* 485; in *Journ. Linn. Soc. i.* 186; *Griff. Notul.* iii. 396; *Ic. Plant. Asiat. t.* 349; *Blume Orchid. Archip. Ind.* 67; *Miquel Fl. Ind. Bat.* iii. 723. *Z. bracteata*, *brevifolia*, & *robusta*, *Wight Ic.* 1724 bis, 1725, 1726. *Z. membranacea*, *Lindl. Gen. & Sp.* 486; in *Journ. Linn. Soc. l. c.*; *Blume Orchid. Archip. Ind.* 68. *Z. Tripleura*, *Lindl. in Journ. Linn. Soc. l. c.* *Z. integerrima*, *Lindl. Gen. & Sp.* 486;

Blume Fl. Jav. 55, t. 19 and 23 C; *Orchid. Archip. Ind.* 67; *Miquel. l. c.* *Z. emarginata*, *Lindl. Gen. & Sp. l. c.* *Z. procumbens*, *Blume Fl. Jav.* 56, t. 22, f. 3 and t. 23 B; *Orchid. Archip. Ind.* 68. *Tripleura pallida*, *Lindl. in Wall. Cat.* 7391; *Gen. & Sp.* 452. *Adenostylis emarginata & integerrima*, *Blume Bijdr.* 414, t. 17. *Pterygodium sulcatum*, *Roxb. Fl. Ind.* iii. 452. *Corycium?* *humile*, *Herb. Ham.*

Throughout INDIA, in the plains and lower hills, from the Panjab and Scinde to ASSAM, CHITTAGONG, and southward to CEYLON.—DISTRIB. Afghanistan, Java, China, Philippines.

Stem 2–16 in., erect, glabrous, leafy to the top. *Leaves* few or many, 1–2 in., erect, acuminate, margins usually recurved. *Spike* $\frac{1}{2}$ –2 in., dense-fl., nearly glabrous; bracts $\frac{1}{2}$ – $\frac{1}{2}$ in., erect, lanceolate, acuminate, hyaline, 1-nerved; flowers white, yellow, or very pale rose; sepals $\frac{1}{2}$ in. long, oblong, obtuse, membranous; petals oblong, obtuse, hyaline; lip yellow, equalling the sepals, cymbiform, contracted into a short pubescent claw bearing a hammer-headed terminal lobe or 2 small lobes; column short, rostellum short; anther short, ovate; pollinia pyriform, attached within the tip of a linear appendage of the gland. *Capsule* $\frac{1}{2}$ in. long, ellipsoid.—The commonest Indian Orchid, very variable in size. The tall form, *Z. membranacea*, has large flowers, and may prove distinct, but there appears to be many intermediate forms.

Sect. 2. MONOCHILUS, *Wall. (Gen.)*. *Leaves* ovate.—All scapigerous.

* Claw of terminal lobes short with involute margins.

† Terminal lobe of lip very small, entire or subentire.

2. *Z. goodyeroides*, *Lindl. Gen. & Sp. Orchid.* 486; leaves ovate green with a median pale stripe, spike nearly glabrous, lip cymbiform terminal lobe orbicular or oblong concave membranous. *Monochilus galeatus*, *Lindl. in Journ. Linn. Soc.* i. 187.

EASTERN HIMALAYA; from Sikkim, alt. 6–8000 ft., to Mishmi, *Griffith, &c. Pegu, Kurz in Herb. Calcutt.*

Stem 2–4 in. *Leaves* 1–1 $\frac{1}{2}$ in., sessile or shortly petioled, obtuse acute or acuminate, sheaths short. *Scape* 3–6 in., slender; spike lax-fl.; bracts equalling the glabrous ovary; sepals $\frac{1}{2}$ in. long, dorsal ovate, acute, lateral lanceolate 1-nerved; petals falcate, very obtuse; lip wholly included, coriaceous, with 2 short spurs within; rostellar arms small; stigmatic lobes distant; pollinia pyriform, attached by a slender caudicle to the oblong gland.

3. *Z. reniformis*, *Hook. f. Ic. Plant. ined.*; leaves approximate ovate-lanceolate acuminate, scape short pubescent, bracts longer than the pubescent ovary, sepals ovate 3-nerved subacute glabrous, lip included, sac hemispheric with 2 toothed calli within, terminal lobe reniform crenate.

PERAK, *Scortechini*.

Stem 6–10 in. below the leaves. *Leaves* 2–3 $\frac{1}{2}$ in., membranous, base rounded; petiole $\frac{1}{2}$ in., slender, sheath short inflated. *Scape* 2 in.; spike about as long; bracts $\frac{1}{2}$ in., lanceolate, hyaline; sepals $\frac{1}{2}$ in. long, membranous, ovate, obtuse, 3-nerved; petals $\frac{1}{2}$ in., orbicular, long-beaked, 3-nerved; limb of lip with 2 small appendages at the base; column 2-winged in front; rostellar arms long, fleshy, trumpet-shaped; anther lanceolate; pollinia pyriform attached separately to the face of a large cuneately quadrate horny appendage which is continuous with the triangular gland, margin of gland and appendage recurved.

†† Terminal lobe of lip 2-winged.

4. *Z. longilabris*, *Benth. in Gen. Plant.* iii. 600; spike pubescent,

lip much longer than the sepals, wings of terminal lobe elongate toothed. *Monochilus longilabre*, *Lindl. Gen. & Sp. Orchid.* 487; in *Journ. Linn. Soc.* i. 186. *M. affinis*, *Wight Ic.* t. 1728 (not of *Lindl.*).

ASSAM, LOWER BENGAL and CHITTAGONG, *Clarke*. WESTERN GHATS; in the S. Concan, *Stocks*, and Travancore, *Wight*. CEYLON, in the drier parts of the island, *Macrae*, *Thwaites*.

Leaves 1-1½ in., near the base of the short stem, shortly petioled. *Scape* very slender and elongate, lax-flid.; spike glandular-pubescent; bracts about equalling the ovary; sepals ¼ in. long, broad, obtuse, green; lip twice as long, sac with 2 spurs within, wings toothed on the outer margin, variable in breadth; anther beaked; pollinia clavate, adnate for about two-thirds of their length to the linear appendage of the gland.

5. **Z. regia**, *Benth. in Gen. Plant.* iii. 600; leaves ovate-lanceolate with a median pale stripe acute, spike pubescent, sepals and petals with recurved tips, lip rather longer than the sepals, wings suborbicular or cuneiform. *Monochilus regium*, *Lindl. Gen. & Sp. Orchid.* 487.

CEYLON; damp woods in the Central Province, ascending to 4000 ft., *Macrae*, &c.

Stem slender, elongate. *Leaves* 1½-2½ in., dark green, variable in breadth; petiole and sheath short. *Scape* 3-5 in.; spike few-flid.; bracts as long as the ovary; sepals ½ in. long, very obtuse; lip with a short saccate base; anther broadly ovate, beaked; pollinia clavate, pendulous from the small oblong gland, appendages 0.

6. **Z. nervosa**, *Benth. in Gen. Plant.* iii. 600; leaves broadly ovate acute, sepals ovate obtuse tips straight, spike pubescent, lip rather longer than the sepals, wings cuneate. *Monochilus nervosum*, *Wall. in Lindl. Gen. & Sp. Orchid.* 487; in *Journ. Linn. Soc.* i. 187. *Etæria nervosa*, *Lindl. in Wall. Cat.* 7381.

SIKKIM HIMALAYA, alt. 2-4000 ft., *J. D. H. SILHET*, *Wallich*. CAHAB, *Keenan*. BENGAL; at Comilla, &c., *Clarke*.

Stem rather stout. *Leaves* 1-2 in. *Scape* 2-5 in., stout or slender; spike 1-8 in., lax or dense-flid.; bracts equalling the ovary; sepals ¼ in. or less, green or purplish; anther didymous, apiculate; pollinia and their appendages as in *Z. reniformis*.—The Ceylon habitat cited by *Thwaites* is an error.

7. **Z. flava**, *Benth. in Gen. Plant.* iii. 600; leaves ovate acute, spike glabrous or pubescent, flowers very small, lip shorter than the sepals, wings broadly obovate or hatchet-shaped. *Monochilus flavum*, *Wall. in Lindl. Gen. & Sp. Orchid.* 487; in *Journ. Linn. Soc.* i. 187. *Etæria flava*, *Lindl. in Wall. Cat.* 7380 A, B.

NEPAL, *Wallich*. ASSAM, *Griffith*; on the Naga hills, *Prain*. TENASSERIM, *Helper*, *Griffith*. CEYLON; Central Province, alt. 3000 ft., *Thwaites*.—DISTRIB. Java, Borneo.

Stem usually elongate, slender. *Leaves* 1-1½ in., usually scattered, petioled or not; sheath usually much inflated, hyaline. *Scape* 3-6 in., very slender; spike 1-1½ in., lax-flid.; bracts usually exceeding the ovaries; sepals ⅓ in., obtuse; lip included, sac with 2 long spurs within; anther ovate-lanceolate; pollinia subglobose, attached by a simple caudicle to the lanceolate gland.—Much the smallest flid. species. A drawing in *Herb. Peradeniya* represents the flowers as white with a red lip.

8. **Z. affinis**, *Benth. in Gen. Plant.* iii. 600; leaves ovate or ovate-lanceolate, spike and ovaries pubescent, lip longer than the sepals, wings

obovate-oblong or subcuneate. *Monochilus* affine, *Lindl. Gen. & Sp. Orchid.* 487 (*excl. hab. Courtallum*). *Etæria* affinis, *Lindl. in Wall. Cat.* 7383. *E. flava*, *Wall. Cat.* 7380 C. *Ætheria mollis*, *Lindl. in Journ. Linn. Soc.* i. 184.

SIKKIM HIMALAYA; in the Terai, *Gamble*. KHASIA HILLS, alt. 5000 ft., *Griffith, & a.* BURMA; at Taong Dong, *Wallich*. TENASSERIM; at Moulmein, *Lobb, Parish*. PENANG, *Maingay*.

Very like *Z. flava*, but the flowers are much larger, and much more numerous, the sepals $\frac{1}{2}$ in. long, and the pollinia are pyriform, attached by an elastic caudicle to the oblong gland.

9. ***Z. abbreviata***, *Hook. f.*; leaves lanceolate acuminate, bracts ovate-lanceolate shorter than the slender erect glabrous ovaries, sac of lip with 2 lamellæ on the midrib and 2 large calli on each side, wings of terminal lobe obliquely ovate subacute entire. *Etæria abbreviata*, *Lindl. in Wall. Cat.* 7385; *Gen. & Sp. Orchid.* 491 (*Ætheria*). *E. lanceolata*, *Reichb. f. in Trans. Linn. Soc.* xxx. 142. *Dossinia lanceolata*, *Lindl. in Journ. Linn. Soc.* iii. 186.

NEPAL, *Wallich*. KHASIA HILLS, alt. 4–5000 ft., *J. D. H. & T. T.*

Whole plant 1 ft. *Leaves* $2\frac{1}{2}$ in., many nerved; petiole $\frac{1}{2}$ – $\frac{2}{3}$ in. *Spike* puberulous; sepals pink, broadly ovate, acuminate; petals semi-orbicular or lunate; column with 2 membranous wings on the face; rostellum very short, 2-fid.; anther ovate, obtuse; pollinia elongate, clavate, lamellate down to the large gland.

** Claw of terminal lobe of lip slender, not margined.

10. ***Z. moulmeinensis***, *Hook. f.*; slender, leaves elliptic, spike glandular-pubescent few-fld., bracts ovate-lanceolate shorter than the slender glabrous ovaries, sepals and petals aristately acuminate, sac of lip large globose didymous with 2 large calli within, claw straight rigid, lobes narrowly falcately cuneate lacerate. *Etæria moulmeinensis*, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 142.

TENASSERIM; at Moulmein, *Lobb, Parish*.

Stem slender, with the spike 12–18 in. *Leaves* 2–3 in., elliptic, acute or acuminate, membranous; petiole 1 in., slender. *Spike* 2–3 in., few-fld.; flowers not secund, spreading; ovary slender, $\frac{1}{2}$ in. long; sepals membranous, 1-nerved, dorsal ovate, lateral much broader; petals broadly dimidiate ovate with recurved points; sac of lip with caruncled callous sides, sub-4-celled by imperfect transverse and longitudinal septa, claw slender pubescent, lobes divaricate as long as the rest of the lip; column very short and stout with projecting cheeks on the anterior face; rostellum short, 2-fid.; anther short, ovate, obtuse; pollinia pyriform, attached to the gland by very short caudicles.—Possibly a *Cystorchis*.

11. ***Z. longifolia***, *Hook. f.*; tall, very robust, leaves large lanceolate acuminate, spike elongate laxly many-fld., rachis puberulous, bracts shorter than the long slender glabrous ovaries, sepals and petals aristately acuminate, lip very broad saccate, sac with trapeziform sides two caruncles within towards the base and a flattened uncinat one on the midrib, claw beyond the lobe narrow rigid, wings flabellate lacerate. *Hetæria longifolia*, *Benth. in Journ. Linn. Soc.* xviii. 346. *Rhomboda longifolia*, *Lindl. in Journ. Linn. Soc.* i. 181.

SIKKIM HIMALAYA; in lower valleys, *J. D. H.*

Stem procumbent at the base, as thick as a swan's quill, branched. *Leaves* 6–8 by $1\frac{1}{2}$ –2 in., many-nerved, midrib stout; petiole $1\frac{1}{2}$ in.; sheaths short. *Spike* 7 in.; flowers very obliquely gibbous, not secund; bracts ovate-lanceolate; ovary

$\frac{3}{4}$ in., very slender upwards; sepals 1-nerved, dorsal ovate, lateral triangular-lanceolate; petals semi-lunate with long points; lip when spread out subtriangular, truncate in front with the stout straight stiff claw projecting from between the lobes and bearing 2 wings; column very large, hollow, broadly truncate, almost cupular, with 2 cuneate ridges down the face, a very small rostellum, and a small stigmatic lobe on each side; anther sunk in the column, lanceolate; pollinia narrowly clavate.—A very singular plant.

92. **HYLOPHILA**, *Lindl.*

Terrestrial herbs; stem elongate, creeping. *Leaves* petioled, obliquely ovate-lanceolate. *Flowers* small, spicate, subglobose; perianth horizontal, connivent. *Sepals* acuminate, dorsal with the petals forming a hood; lateral very broadly ovate, concave. *Petals* falcate or subspathulate. *Lip* a subglobose sac contracted at the mouth, with a very small linear blade, and 2 glands within near the base. *Column* very short, appendages 0 or minute; stigma prominent, frontal under the very long forked rostellum; anther elongate, cells short; pollinia shortly caudicled.—Species 2, Malayan.

1. **H. mollis**, *Lindl. in Wall. Cat.* 7396; *Gen. & Sp. Orchid.* 490; leaves flat acuminate, bracts subulate, sepals $\frac{1}{2}$ in. long pubescent. *Blume Orchid. Archip. Ind.* 115, t. 35, 36 F.

SINGAPORE, *Wallich*. MALACCA, *Griffith (Kew Distrib.* 5337). PERAK, *Scortechini*.—DISTRIB. Sumatra.

Caudex flexuous, roots very thick. *Leaves* 3–4 in., black when dry, base unequal, acute. *Scape* 8–12 in., very slender, sheath $\frac{1}{2}$ in., scattered, subulate; spike 4–6 in.; bracts $\frac{1}{2}$ in., equalling the flowers; sepals 3-nerved; petals falcately lanceolate, acute.

2. **H. lanceolata**, *Hook. f.*; leaves caudate-acuminate, margins waved, bracts lanceolate, sepals $\frac{1}{4}$ in. long nearly glabrous. *Dicerostylis lanceolata*, *Blume Orchid. Archip. Ind.* 116, t. 38, f. 1.

PERAK, *Scortechini*.—DISTRIB. Java.

A much stouter plant than *H. mollis*; leaves larger, 4–5 in., petiole 1 in., red brown when dry; scape in the only specimen seen much shorter and stouter, bracts broader and more concave, flowers twice as large, ovary twisted, sepals 5-nerved, petals dimidiately obovate, 3-nerved. *Column* with a minute subulate process on each side below the stigma.

93. **GOODYERA**, *Br.*

Terrestrial leafy herbs; stem short, or elongate and creeping below. *Leaves* subradical, petioled. *Flowers* small, in often twisted spikes. *Sepals* subequal, dorsal erect, concave, forming a hood with the narrow petals; lateral free, erect or spreading, covering the sac of the lip or not. *Lip* inferior, sessile at the base of the column, entire, cymbiform or subsaccate, usually acute, naked or setose within. *Column* various, top cupular; stigma broad, anticus; rostellum erect; anther-cells distinct; pollinia granular, caudicled or not, pendulous from the rostellar gland.—Species 25, temp. and trop. Europe, Asia, N. America, N. Caledonia, and the Mascarene Islands.

* *Stem* tall, stout, 18 in.–2 ft. *Leaves* large, suberect, petioled, lanceolate or elliptic lanceolate acuminate.—The species of this group are not allied *inter se*, agreeing only in stature.

1. *G. procera*, Hook. *Exot. Flor.* t. 39; spike dense-fld., flowers minute, lip saccate softly setose within and with 2 large calli within the obtuse recurved tip, column very short, anther obtuse. *Lindl. Gen. & Sp. Orchid.* 493; in *Journ. Linn. Soc.* i. 183; *Don Prodr.* 28; *Wight Ic.* t. 1729. *G. carnea*, A. Rich. in *Ann. Sc. Nat. Ser.* 2, xv. 80. *Cionisaccus lanceolatus*, Breda *Orch. Kuhl et Hassk.* t. 1. *Cordylestylis foliosa*, Falconer in *Hook. Journ. Bot.* iv. (1842) 75. *Neottia procera*, Ker in *Bot. Reg.* t. 639.—*Leucostachys*, Hoffman *Preisverz. Orch.* 1842, ex *Linnea*, xvi., *Littlb.* 234.

TROPICAL HIMALAYA, alt. 1-3000 ft., from Garwhal to Upper Assam, the KHASIA and NAGA HILLS, and PEGU. NILGHIRI HILLS and MALABAR GHATS, *Wight*. CEYLON, ascending to 4000 ft.—DISTRIB. Java, China.

Root of thick tufted fibres. Stem 10-30 in., usually many-leaved. Leaves 4-8 by 1-2 in., thick, petiole very stout. Spike 3-8 in.; rachis glabrous or pubescent; bracts equalling the subglobose whitish fragrant flowers, which are $\frac{1}{2}$ in. diam.; sepals broadly ovate, obtuse, 1-nerved; petals spathulate; lip not longer than the column; pollinia broadly pyriform, sessile on the gland. Capsule $\frac{1}{2}$ in. fusiform.

2. *G. rubens*, Blume *Orchid. Archip. Ind.* t. 9 C, D; spike rather lax-fld., lip saccate beaked densely clothed within with soft tubercles or short setæ, column long slender, anther lanceolate, pollinia powdery narrowed into one slender caudicle.

PERAK; upper part of the Batang Padang Valley, alt. 2000 ft., *Wray*.—DISTRIB. Java, Philippines.

Habit and foliage of *G. procera*, but leaves obliquely elliptic-lanceolate and petiole more slender. Scape sheathed; spike 4-5 in.; rachis bracts and buds pubescent; bracts lanceolate, longer than the brownish-pink flowers; sepals $\frac{1}{2}$ in. long, 1-3-nerved, dorsal oblong-lanceolate, lateral broader below, not covering the sac of the lip, which is shorter than the column; column keeled in front; rostellar arms large, erect, stigma at their base very large orbicular; caudicles of pollinia as long as the clavate body.—A remarkable plant, with the exposed sac of the lip of *Cystorchis*, but all other characters of *Goodyera* except the very long column.

3. *G. fumata*, Thwaites *Enum.* 314; spike rather lax-fld., lip concave rhomboidly orbicular caudate-acuminate glandular within column clavate, anther ovate subacute.

CEYLON; in the Central Province, rare, Thwaites.

Three feet high and very stout. Leaves many, 6-10 by 3-4 in., obliquely elliptic-lanceolate; petiole 2-4 in., stout. Scape stout and spike glandular-pubescent; bracts shorter than or equalling the greenish-red flowers, lower sometimes elongate; sepals $\frac{1}{2}$ - $\frac{3}{4}$ in. long, ovate, acute, 1-nerved; petals dimidiate lanceolate, acuminate, falcate; lip as broad as high, many-nerved, abruptly contracted into a revolute ligulate tail; column almost funnel-shaped, rostellar beaks short.

** Stem 4-8 in., rarely more. Leaves 1-2 in., usually rosulate, ovate-cordate or lanceolate.

† Lip smooth channelled or lamellate within, but with no hairs or soft setæ.

4. *G. repens*, Brown in *Hort. Kew, Ed.* 2, v. 198; leaves ovate acute shortly petioled, spike secund pubescent, bracts equalling or exceeding the flowers, lip ventricose shortly beaked channelled within, column very short ovate. *Lindl. Gen. & Sp. Orchid.* 492; in *Journ. Linn. Soc.* i. 183; *Reichb. Ic. Fl. Germ.* xiii. t. 482; *Ledeb. Fl. Ross.* iv. 86; *Boiss. Fl. Orient.*

v. 90. *G. marginata*, Lindl. in Wall. Cat. 7394; *Gen. & Sp. Orchid.* 493; in *Journ. Linn. Soc. l. c.* *Satyrium repens*, Linn. *Sp. Pl.* 1339.

TEMEPRATE HIMALAYA, alt. 8–11,000 ft., from Simla eastwards to Sikkim.—
DISTRIB. Europe, N. Asia, N. America.

Stem 4–8 in. *Leaves* dark grey or mottled with paler, $\frac{1}{2}$ –1 in. *Spike* 1–4 in., often twisted, sometimes almost glabrous; flowers whitish; lateral sepals $\frac{1}{2}$ in., ovate, acuminate, 1-nerved, dorsal narrow; petals linear, falcate; rostellar arms short; pollinia small, pyriform, sessile on the small gland.

5. *G. fusca*, Hook. f. *Ic. Pl. ined.*; very robust; leaves radical broadly ovate, spike second pubescent, bracts exceeding the flowers, lip deeply saccate with a decurved beak strongly ridged within, column very short, anther very small stipitate didymous. *Ætheria fusca*, Lindl. in *Journ. Linn. Soc.* i. 184. *Cystorchis fusca*, Benth. in *Gen. Plant.* iii. 599.

SUBALPINE HIMALAYA; Harung, Munro; Garwhal, alt. 13,000 ft., Duthie; Sikkim, in the inner ranges, alt. 12–14,000 ft., J. D. H.

Roots densely tufted. *Stem* 6–12 in., often as thick as a swan's quill. *Leaves* revolute, 1–1 $\frac{1}{2}$ in., subacute, coriaceous; petiole very short and broad. *Spike* very many- and dense-flid.; sepals $\frac{1}{4}$ in., obtuse, dorsal narrow, 1-nerved, lateral ovate-oblong, sub-3-nerved; petals gibbously falcate; sac of lip protruding beyond the base of the sepals, 5–7-ridged within; column broad, rostellar arms subulate; anther apiculate.—Closely allied to *G. repens*, though much larger. Besides differing in habit and locality it wants the calli in the lip of *Cystorchis*, under which genus see observation.

6. *G. recurva*, Lindl. in *Journ. Linn. Soc.* i. 283; leaves linear-lanceolate acute, spike second sharply deflexed glandular-pubescent, bracts filiform exceeding the small flowers, lip deeply saccate, beak nearly straight 5-ridged within, column with long slender rostellar arms, anther acuminate.

KHASIA HILLS, Lobb; at Moflong, alt. 6000 ft., on mossy trunks, J. D. H. & T. T.

Stem 4–6 in., sheathed by the leaves, suddenly decurved at the top, so that the spike is pendulous. *Leaves* 2–3 by $\frac{1}{3}$ – $\frac{1}{2}$ in., thick, acute, nerveless, not reticulate, narrowed into the broad petiole. *Spike* 3 in. long; flowers completely second; sepals $\frac{1}{3}$ in. long, 1-nerved, acuminate, dorsal ovate-lanceolate, lateral broader, falcate; petals obliquely linear-lanceolate; lip rather longer than the column, tip obtuse. *Capsule* pedicelled, ellipsoid, $\frac{1}{4}$ in. long.

7. *G. Prainii*, Hook. f. *Ic. Pl. ined.*; leaves ovate acute, spike second recurved glandular-pubescent, bracts lanceolate equalling the flowers, lip cymbiform obtuse lamellate within, column with long rostellar arms, anther acuminate.

NAGA HILLS in Upper Assam; on Pulinabadya, alt. 7200 ft., Prain.

Very near *G. recurva*, but the leaves are 1–1 $\frac{1}{2}$ in., ovate and strongly reticulately nerved, the spike recurved, but not deflexed, the sepals are broader, the lateral not falcate, and the lip is less saccate.

8. *G. gracilis*, Hook. f. *Ic. Pl. ined.*; leaves few petioled elliptic-ovate, stem very slender nearly naked, spike short puberulous, bracts shorter than the flowers, lip straight oblong concave beaked below the emarginate tip, with two large calli at the base within, and a very thick channelled lamella on the disk, column short, rostellar arms slender.

PERAK, *Scortechini*.

Whole plant 8–10 in. high; stem slender, with 2–3 distant lanceolate sheaths.

Leaves 1-1½ in., obtuse or apiculate, nerves obscure, not reticulate, margins minutely crenulate. *Spike* ½-1 in., few-fl., twisted; flowers crowded; sepals ¼ in. long, linear-oblong, obtuse, 1-nerved; petals linear, nearly as broad as the dorsal sepal; lip nearly as long as the sepals, narrow, margins incurved, very thick; rostellar arms slender; anther lanceolate, pollinia narrow, sessile on a long gland.—In a drawing of this by Scortechini corresponding to his specimens the leaves are represented as more ovate, acute and strongly crenate.

†† *Lip within setose and tubercled.*

9. **G. foliosa**, *Benth. in Herb. Kew*; stem with an elongate decumbent base leafy to the tip, leaves petioled ovate-lanceolate, spike glandular-pubescent, bracts much exceeding the flowers, sepals ¼-½ in. 3-nerved, lip saccate, beak rather dilated, base within copiously setose, column short, rostellar arms very long slender, anther lanceolate. *Georchis foliosa*, *Lindl. Gen. & Sp. Orchid.* 496. *G. secundiflora*, *Griff. Notul.* iii. 393 (*excl. Plate*).—*Goodyera* sp. *Griff. It. Notes*, 36, No. 591; *Notul.* iii. 396, No. 11; *Ic. Pl. Asiat.* 346, f. 1.

SIKKIM HIMALAYA, alt. 5-6000 ft., *J. D. H.*, &c. ASSAM, the KHASIA and NAGA hills, ascending to 5000 ft., common. BURMA, *Griffith.* PERAK, alt. 7000 ft., *Wray.*

Stem 6-12 in., rather slender. *Leaves* 1½-2½ in., oblique, acute, green, 3-5-nerved, not reticulate; petiole ¼-¾ in., sheath short. *Spike* 2-3 in.; bracts ½-¾ in., nearly glabrous; flowers pink; sepals ovate-lanceolate, obtuse, 1-nerved; petals dimidiately-oblong, as broad as the dorsal sepal, 1-nerved; pollinia with slender united caudicles.—Distinguished from all others of this section by the elongate and leafy stem, except *G. vittata*, which has a glabrous spike.

10. **G. secundiflora**, *Lindl. in Journ. Linn. Soc.* i. 182 (*excl. cit. Griff. Notul. in part & Ic.*); leaves few subradical ovate acute, mottled with white, spike glandular-pubescent lax-fl. second, bracts shorter than the flowers, petals oblancoate, lip saccate sparsely setose within, beak short lamellate in the disk, column short, rostellar arms slender, anther ovate acuminate. *Goodyera* sp. No. 6, *Griff. Notul.* iii. 392; *Ic. Plant. Asiat.*, t. 347, f. 2.

KHASIA HILLS, alt. 4-5000 ft. *Griffith*, &c. MUNNIPORE, alt. 9000 ft., *Watt.*—*DISTRIB.* China (*Herb. Lindl.*).

Stem strict, with spike 6-10 in., subtomentosely glandular above. *Leaves* 1½-2 in., rarely elliptic, acute, petiole ¼-½ in. *Spike* 2-3 in.; flowers all second, pubescent, white; sepals 1-nerved, lateral ¼-½ in. long, ovate, acute, dorsal much narrower; petals subfalcate, crenate on the outer edge, 1-nerved; lip setose on the 5-7 nerves within.

11. **G. robusta**, *Hook. f. Ic. Plant. ined.*; very robust, leaves subradical ovate-lanceolate acute, spike glandular-tomentose lax-fl., bracts shorter than the second flowers, petals spathulate, lip saccate sparsely setose within, beak short lamellate in the disk, rostellar arms slender, anther lanceolate.

KHASIA HILLS, alt. 4000 ft. *J. D. H. & T. T.*

Closely allied to *G. secundiflora*, but three times the size, and very robust, 18 in. high, including the spike, which is 7 in. long; the leaves are 3-4 in. long, whole coloured, the lateral sepals ¼-½ in. long, and the petals are clawed, gibbously spathulate and acute.—Named by Lindley *G. secundiflora*; but I think it quite different.

12. **G. vittata**, *Benth. in Herb. Kew*; quite glabrous, leaves subradical ovate acute dark green with white nerves, bracts about equalling

the flowers, lip saccate long-beaked setose within, beak 2-lamellate on the disk. *Hook. f. Ic. Plant. ined.* *Georchis vittata*, *Lindl. in Journ. Linn. Soc. i.* 184.

SIKKIM HIMALAYA, alt. 6-9000 ft., *J. D. H.*

Stout, 4-6 in. high, leafy nearly up to the spike. *Leaves* $1\frac{1}{2}$ -3 in., fleshy, dark green above, purplish beneath. *Spike* 2-3 in.; flowers subsecund; sepals 3-nerved, white with pink tips, lateral ovate acuminate, dorsal oblong-lanceolate; petals oblan-ceolate, falcate, 3-nerved; lip 7-nerved, acuminate; columnar arms elongate, subulate; anther ovate-lanceolate; pollinia with short caudicles and a long gland.—The only perfectly glabrous Indian species of this group.

13. *G. hispida*, *Lindl. in Journ. Linn. Soc. i.* 183; leaves sessile ovate-lanceolate acuminate, spike and flowers hispidly glandular, bracts shorter than the small flowers, lip saccate shortly obtusely beaked sparsely setose within. *Hook. f. Ic. Plant. ined.*

KHASIA HILLS, at Churra, alt. 4000 ft., *J. D. H. & T. T.*

Described from a solitary specimen, by Lindley, who observes its similarity to *G. repens*, except in the larger leaves, but who does not appear to have examined the lip, which differs from that of *repens* in the setose sac. It is nearer *G. secundiflora*.—Whole plant only 5 in. high. *Leaves* 2 in., whole-coloured, not reticulate; spike twisted; flowers white; sepals 1-nerved, lateral $\frac{1}{4}$ in. long, ovate-oblong, obtuse; petals oblong-lanceolate, nearly straight, 1-nerved; columnar arms subulate; anther lanceolate; pollinia narrow, with short caudicles and a large gland.

14. *G. cordata*, *Benth. in Herb. Kew*; leaves subradical ovate-cordate, spike puberulous few and lax-flid., bracts shorter than or equalling the large suberect flowers, lip rhomboid-ovate obtuse many-nerved setose at the subsaccate base within. *Hook. f. Ic. Plant. ined.* *Georchis cordata*, *Lindl. Gen. & Sp. Orchid.* 496 (*excl. habitat*); *Reichb. f. in Gard. Chron.* 1879, ii. 520.

KHASIA HILLS, alt. 3-4000 ft. *J. D. H. & T. T.* UPPER ASSAM; in the NAGA HILLS, *Prain*. ? PERAK, *Scortechini*.

Rather slender, 6-12 in. high. *Leaves* $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., variable in depth of basal sinus, acute; petiole $\frac{1}{4}$ - $\frac{1}{2}$ in., slender. *Spike* 4-8-flid.; flowers pubescent; sepals $\frac{3}{4}$ in. long, 3-nerved, subequal, ovate-lanceolate, obtuse; petals dimidiate-obovate, 2-3-nerved; column stout, with projecting cheeks; rostellar arms and anther very long and slender; pollinia slender, with long slender connate caudicles.—The largest flowered Indian species, except *G. biflora*. In the Perak specimen the front row of setæ within the lip are clavellate.

15. *G. biflora*, *Hook. f. Ic. Plant. ined.*; stem short stout leafy, leaves ovate, spike 2-4 flid. pubescent, bracts slender shorter than the very large second flowers, sepals narrow, 3-nerved lateral cuneate at the base, lip saccate at the base with a long recurved beak, sac setose within. *Georchis biflora*, *Lindl. in Wall. Cat.* 7379; *Gen. & Sp. Orchid.* 496.

TEMPERATE WESTERN HIMALAYA, alt. 4-6000 ft. Nepal, *Wallich*; Garwhal, *Edgeworth*; Simla, *Gamble*.

Stem 2-3 in., leafy. *Leaves* 1-2 in., obtuse or subacute, petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. *Raceme* hardly exceeding the leaves, rachis stout; bracts 1 in.; sepals 1 in., dorsal narrowly lanceolate recurved, lateral nearly straight; petals linear, falcate, 3-nerved; lip with a setosely 5-nerved base, beak twice as long as the sac, margins membranous waved; column concave in front, rostellar arms and anther very long and slender. *Capsule* nearly 1 in. long.

94. *HETERIA*, *Blume*. (ETHERIA).

ÆTHERIA, *Endl.*

Characters of *Goodyera*, but lip usually superior, and adnate to the

sides of the column, and stigma with 2 lateral lobes.—Species about 13, Indian.

1. **H. Gardneri**, *Benth. in Gen. Plant.* iii. 604; tall, slender, leaves elliptic acute, spike very long glandular pubescent, bracts equalling the very small flowers, petals linear-spathulate, lip saccate membranous with a few small calli on the nerves within. *Rhamphidia Gardneri*, *Thwaites*, *Enum.* 313.

CEYLON; in the Central Province, *Walker*, &c.

Stem 12–20 in., stout and leafy below. *Leaves* 2–4 by $1\frac{1}{2}$ –2 in., often oblique, 3-nerved, membranous; petiole $\frac{1}{2}$ –1 in., sheath large, short. *Spike* 4–10 in., very many-fld.; flowers hardly secund; bracts $\frac{1}{2}$ in.; sepals $\frac{1}{2}$ in. long, obtuse, dorsal ovate 1-nerved, lateral oblong 3-nerved; petals linear-spathulate, 1-nerved; lip cymbiform; column very short, stigmatic lobes large, lateral; rostellar arms and anther short, pollinia subglobose, each caudicled.—*Thwaites* describes the lip as with a very few short hairs within.

2. **H. ovalifolia**, *Benth. in Gen. Plant.* iii. 164; slender, leaves elliptic acute, spikes elongate glandular-pubescent, bracts exceeding the very small flowers, petals obovate-oblong, lip saccate tip obtusely 3-toothed, nerves with tooth-like calli towards the base. *Goodyera ovalifolia*, *Wight. Ic.* t. 1730. *Rhamphidia ovalifolia*, *Lindl. in Journ. Linn. Soc.* i. 181 (*excl. habitat*).

MALABAR; at Courtallam, *Wight*.

Very near to *H. Gardneri*, but smaller, 10–14 in. long, leaves the same, bracts rather longer. *Flowers* tinged with pink; dorsal sepal broadly ovate, obtuse, 1-nerved; lateral oblong, 3-nerved; column very short, stigmatic lobes marginal, very large; rostellar arms minute, pollinia as in *H. Gardneri*.—*Lindley* in *Journ. Linn. Soc.* whilst wrongly ascribing a Sikkim specimen of *H. rubens* to this, rightly describes the lip as 3-fid.

3. **H. rubens**, *Benth. in Gen. Plant.* iii. 164; tall, leaves elliptic acute, spike puberulous, bracts equalling or exceeding the flowers, petals hammer-shaped, lip subhemispheric with a small transverse terminal lobe and a jagged callus on each side towards the base within. *Hook. f. Ic. Plant. ined.* *Rhamphidia rubens*, *Lindl. in Journ. Linn. Soc.* i. 182. *Cerochilus rubens*, *Lindl. in Gard. Chron.* 1854, 87. *Goodyera*, No. 4, *Griff. Notul.* iii. 390.

SIKKIM HIMALAYA, alt. 1500–3000 ft., *J. D. H. Clarke*. ASSAM, *Mann*. UPPER BURMA, *Griffith (Kew Distrib., 5341 and 5342)*.

Rather stout, 10–18 in. high. *Leaves* 4–5 by $1\frac{1}{2}$ –2 in., as in *ovalifolia*, reticulately nerved in the Sikkim specimen; flowers twice as large, greenish-purple; sepals 1-nerved, broadly ovate; petals clawed, very gibbous on one side; lip short, terminal lobe sometimes 2-fid; column very short indeed, with two small wings in front; anther ovate-cordate; pollinia pyriform, subsessile on the gland; stigmatic lobes large, rostellar arms very short.

4. **H. Helferi**, *Hook. f. Ic. Plant. ined.*; slender, leaves elliptic, spike puberulous twisted, bracts shorter than the flowers, petals linear falcate, lip membranous cymbiform acuminate with a few fleshy cilia on each side towards the base within.

TENASSERIM; Misses Eider Islands, *Helfer*.

Stem 6–10 in. with the raceme. *Leaves* 3–4 in., acute, many-nerved, membranous. *Spike* 3–6 in.; bracts narrowly lanceolate; sepals $\frac{1}{2}$ in. long, subequal, ovate-oblong, obtuse, hairy, 1-nerved; lip small; column short with 2 membranous wings in front, and very short rostellar arms; anther ovate-cordate.

5. *H. elongata*, Lindl. in Wall. Cat. 7384 (Etæria); *Gen. & Sp. Orchid.* 494; tall, slender, leaves petioled oblong subacute, scape and elongate lax-fl. raceme and flowers laxly tomentose, bracts shorter than the erect ovary, sepals oblong obtuse, petals broadly obliquely obovate apiculate, lip cymbiform acute 5-nerved, nerves with 1-2 soft spines towards the base. *Hook. f. Ic. Plant. ined.* *Goodyera*? *elongata*, Lindl. *Gen. & Sp. Orchid.* 494.

MALAY PENINSULA, *Herb. Finlayson.*

Stem with scape and racemes 18 in., lower half leafy. *Leaves* 2-3 in., membranous, lower obtuse; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., slender; lower sheaths hyaline, inflated. *Scape* with distant lanceolate sheaths; raceme 4 in.; bracts $\frac{1}{2}$ in., lanceolate; sepals $\frac{1}{2}$ in. long; lip superior, membranous, adnate to the sides of the column; column short, flat, without wings or membranes in front, as long as the sepals; stigmatic lobes lateral; rostellar arms subulate; anther ovate-cordate; pollinia subglobose, caudicles as long slender, gland rather large, oblong.

6. *H. elata*, *Hook. f. Ic. Plant. ined.*; spike dense-fl., flowers minute, lip minute hemispheric, base within with 2 large calli on each side and with a thickened incurved transverse fold towards the apex which is tipped with a small orbicular membranous appendage, column very short, anther obtuse.

PERAK, *Scortechini*; or Batang Padong, alt. 4900 ft., *Wray*.

Habit of *Goodyera procera*, but petioles more slender, flowers rather smaller, lateral sepals more acute, petals broader, denticulate, and lip very different; column very short and broad, with short distant subacute rostellar arms, and two marginal stigmatic lobes.—The structure of the fleshy lip which is only $\frac{1}{2}$ in. long is difficult to make out, it is no larger than the column.

DOUBTFUL SPECIES.

H. ANOMALA, Lindl. in Journ. Linn. Soc. i. 185; leaves ovate acute, spike few-fl. and flowers hispidly hairy, sepals ovate-oblong, petals linear-spathulate very narrow, sac of lip with 2-3 cellular flattened crenate calli, terminal lobe transverse white wings subquadrate. *Goodyera*, *Griff. Notul.* iii. 394.

UPPER ASSAM in the Tingree Tea forests, *Griffith*.

A foot and a half high. *Leaves* petioled, 5-nerved. *Buds* posticous; bracts ovate-lanceolate pubescent, longer than the ovary; sepals greenish-brown, with white tips, hispid with reflexed hairs; lip continuous with the base of the short column, which has a membranous tooth on each side, an anticous stigma, subulate rostellar arms, and with a crested cellular process in front towards the centre; anther ovate fleshy; pollinia narrow, slender, sectile, sessile on the lanceolate gland, grains elongate scale-like.—Description from Griffith, who adds a notice of deformities of the column, the stigma being posticous, i.e. facing the anther, &c.

95. *APHYLLORCHIS*, Blume.

Terrestrial leafless herbs, caudex tuberous (or of fascicled fibres?); stem simple, sheathed. *Flowers* small, racemed or subspicate. *Sepals* subequal, free, erect or spreading. *Petals* narrower. *Lip* sessile or shortly clawed, at the base of the column, as long as the sepals; base 2-auricled or not, blade oblong, entire or 3-lobed. *Column* rather long; stigma short, ovate, concave; anther shortly stipitate, cells contiguous; pollinia reniform.—Species 5? Indian and Malayan.

* *Flower buds straight.*

1. *A. montana*, *Reichb. f. in Linnæa*, xli. 57; sepals and petals linear-oblong obtuse, lip narrowly obovate-oblong contracted beyond the

middle, and side lobes rounded at the base, claw short broad with 2 linear-calli tip obtuse thickened. *Apaturia montana*, *Thwaites Enum.* 301 (not of *Lindl.*).

? KHASIA Mts., alt. 3500 ft., and SIKKIM HIMALAYA, *Griffith*. CEYLON; Ambagamowa district, rare, *Thwaites*.

Stem 2 ft., with 8–10 loose stout basal sheaths, and a few distant higher up; yellowish tinged with purple. *Raceme* 4–8 in., lax-fl.; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., lanceolate, acuminate; pedicel with ovary $\frac{3}{4}$ –1 in.; sepals $\frac{1}{2}$ – $\frac{3}{4}$ in., and petals straw-coloured, backs and tips purple; lip broader than the sepals, base contracted into the subsaccate short claw, nerves with diverging nervules; column very slender.—I find no sufficient character whereby to separate the Sikkim and Khasia specimens, but these latter are quite insufficient for identification.

2. **A. Prainii**, *Hook. f. Ic. Plant. ined.*; sepals and petals linear-oblong, obtuse, lip ovate, claw saccate with two falcately ovate acute wing-like auricles.

NAGA HILLS; *Prain*.

Very like *A. montana* in size, habit, and inflorescence; distinguished by the winged claw of the lip. I have seen but one specimen.

3. **A. ? vaginata**, *Hook. f. Ic. Plant. ined.*; stem stout clothed with lax obtuse sheaths, lip sessile lanceolate acuminate.

KHASIA HILLS; at Mamloo, in woods, alt. 5000 ft., *J. D. H. & T. T.*

Stem 6 in., stout; sheaths $\frac{1}{2}$ in., loose, membranous, obtuse. *Raceme* few-fl.; bracts large sheathing; flowers subsessile, erect, about $\frac{1}{2}$ in. across, dingy red; sepals broadly ovate, obtuse, 3-nerved; petals lanceolate, acuminate, 1-nerved; lip broader than the sepals, as long, with no vestige of claw or caruncle; column shorter than in the other species of the genus, acuminate.—I have seen but one specimen of this curious plant which differs from its congeners in the sessile lip and shorter column. The flowers are young, and too much confidence must not be placed in the diagnosis.

** *Flower buds decurved.*

4. **A. pallida**, *Blume Bijdr. t. 77; Orchid. Archip. Ind. 52, t. 13, f. 1 & 17 D.*; sepals and petals falcate, claw of lip with large oblique auricles, limb 3-lobed, base cordate, side lobes oblong, midlobe oblong obtuse caruncled.

PERAK, *Scortechini*, in rocky places, alt. 800–1000 ft., *King's Collector*, alt. 3900 ft., *Wray*.—DISTRIB. Java.

Root of long tomentose fibres. *Stem* 12–18 in., rather flexuous, slender, spotted with brown-pink; sheaths few, obtuse. *Racemes* 2–6 in., lax-fl.; bracts oblong, upper ovate; pedicel erecto-patent, with the ovary $\frac{1}{2}$ – $\frac{3}{4}$ in.; flowers $\frac{1}{2}$ in. long, decurved, pale brownish-pink, spotted with dark brown; sepals linear-oblong, obtuse, concave; petals strongly falcate, 1-nerved; lip recurved; column subclavate; anther didymous; pollinia (*Scortechini*) pyriform (in *Scortechini*, reniform).

96. **CRYPTOSTYLIS**, *Br.*

Terrestrial herbs; caudex short, stout. *Leaves* basal, long petioled; membranous. *Scape* leafless. *Flowers* loosely racemed or subspicate. *Sepals* subequal, and petals very narrow, widely spreading. *Lip* superior, erect, lanceolate from a broad base which embraces the column, contracted above it, entire. *Column* very short; stigma stout; rostellum broad, thick, erect, acuminate; anther obtuse or acuminate; pollinia

pyriform, free, or fixed to the rostellum.—Species 7, Indian, Malayan, and Australian.

C. Arachnites, *Blume Orchid. Archip. Ind.* 132, t. 45. *Zosterostylis Arachnites*, *Blume Bijdr.* 419, t. 32. *Z. zeylanica*, *Lindl. Gen. & Sp. Orchid.* 446; *Thwaites Enum.* 312. *Z. Walkerae*, *Wight Ic.* t. 1748 f. 4.

KHASIA HILLS, *Griffith*; at Churra, alt. 4500 ft., *Clarke*. PERAK, *Scortechini*, &c. PENANG, *Hullett*. CEYLON, *Walker*, ascending to 4000 ft., *Thwaites*.—DISTRIB. Java.

Root of long fleshy tomentose fibres. *Leaves* 1-3, all radical, 3-6 in., elliptic or elliptic-lanceolate, acute, many-nerved and trabeculate, primary nerves 3 indistinct; petiole rather longer, embraced at the base by membranous sheaths. *Scape* 8-18, slender; sheaths acuminate. *Raceme* 4-8 in.; bracts convolute, acuminate, equalling the ovary; pedicel with ovary decurved; sepals $\frac{1}{2}$ - $\frac{3}{4}$ in., greenish, acuminate, margins revolute; petals rather shorter, reflexed; lip as long as the petals, acuminate, purple, mottled. *Capsule* $\frac{1}{2}$ in., ellipsoid.—There is some little difference in the breadth of the lip between the Ceylon and Malayan forms, broader in the former, but I do not find that organ to be pubescent in either, or in the Khasian.

97. **CORYSANTHES**, Br.

Very small, terrestrial, 1-leaved, 1-fl'd. herbs. *Leaf* suborbicular. *Flowers* large, red-purple. *Dorsal sepal* falcate; laterals and petals filiform, or petals 0. *Lip* large, erect, base tubular, dilating into a broad reflexed toothed or fimbriate limb. *Column* short, erect, 2-winged at the tip; stigma broad; anther erect; pollinia oblong, free or sessile on the rostellum. *Capsule* erect on an elongate pedicel.—Species about 15, Australian and Malayan.

1. **C. picta**, *Lindl. Gen. & Sp. Orchid.*, 394; lateral sepals and petals much longer than the dorsal sepal, limb of lip broadly obovate erose puberulous within. *Blume Orchid. Archip. Ind.* 174, t. 64 f. 1. *Calcearia picta*, *Blume Bijdr.* 417, t. 33 right-hand figure.

PERAK; near the top of Tambak Batak, *Scortechini*.—DISTRIB. Java.

Stem 1-2 in., base scaly. *Leaf* terminal, ovate, deeply cordate, acuminate, margins waved. *Flower* sessile, bracts $\frac{3}{4}$ in., subulate-lanceolate; dorsal sepal with a long claw, margined with white, and a broad deep violet cuneate emarginate hood; lip strongly recurved, claw embracing the column produced and 2-fid at the base, limb reflexed deep violet.

2. **C. fornicata**, *Lindl. Gen. & Sp. Orchid.* 394; lateral sepals and petals shorter than the dorsal sepal, limb of lip flabelliform with many rough short ridges. *Blume Orchid. Archip. Ind.* 175, t. 64, f. 2. *Calcearia fornicata*, *Blume Bijdr.* 417, t. 33, left-hand figure.

PERAK, Gunong Enar and Tambok Balak, *Scortechini*.—DISTRIB. Java.

Stem $\frac{1}{2}$ -2 in. *Leaf* $\frac{1}{2}$ - $\frac{3}{4}$ in., ovate-cordate, margin not waved. *Flower* sessile; bracts $\frac{1}{2}$ in., subulate-lanceolate; claw of dorsal sepal $\frac{3}{4}$ in., blade spathulate, 5-ribbed, rose-coloured; lip with a long erect convolute tube produced into two spurs at the base, and erose recurved glabrous ribbed limb marked with short blackish purple rugose concentric nerves that end abruptly at the same level towards the claw, and do not reach the margin.

98. **POGONIA**, Griff., Sect. NERVILIA.

Terrestrial tuberous 1-leaved herbs, leafing after flowering. *Leaf* very

broadly cordate or orbicular, strongly plicate. *Flowers* solitary, few, or many, racemed, horizontal or pendulous. *Sepals* and *petals* subequal, narrow, connivent or widely spreading. *Lip* inferior, adnate to the base of the column, sessile or sub-clawed, usually narrow, entire or 2-fid or 3-lobed; spur a very short sac. *Column* elongate, tip clavate, stigma oblong or broader; rostellum short; anther substipitate; pollinia 2 or 4. *Capsule* erect or pendulous.—Species about 30; of Sect. *Nervilia* about 12.

The above characters apply exclusively to the section *Nervilia*, (genus of Gaudichaud), to which all the Old World species of *Pogonia* belong; and which all flower before leafing. All the other species, except one Japanese, are New World, and their flowering stems bear leaves.—The species are very difficult of analysis from Herbarium specimens, but I have been greatly aided by the drawings in Herb. Kew, and those of Herb. Calcutt., kindly lent by Dr. King. All want revision.

* *Stem 1-3-fld.*

1. **P. plicata**, Lindl. *Gen. & Sp. Orchid.* 415; leaf orbicular-cordate hairy, stem 1-3-fld., lip embracing the column, tip dilated 2-lobed. *Epipactis plicata*, Roxb. *Fl. Ind.* iii. 454. *Arethusa plicata*, Andr. *Bot. Rep.*, t. 321.

LOWER BENGAL, the CONCAN & MYSORE, Roxburgh, &c.

Tuber globose. *Leaf* 2-4 in. diam., very many-nerved; petiole 1-3 in., often rusty-purple or brown. *Flowering stem* 4-6 in.; bracts small; flowers 1½ in. diam.; sepals and petals widely spreading, narrowly oblanceolate, acuminate, greenish; lip embracing the column, sides convolute, whitish or rose-coloured, tip pink.—Roxburgh observes and figures the tuberiferous suckers propagated from the apex of the petiole under the surface of the soil.

2. **P. biflora**, Wight. *Ic.* 7399; leaf unknown, stem 2-fld., lip obovate obtusely 3-lobed about the middle, embracing the column.

MALABAR; in the Wynaad jungles, Jerdon.

Tuber globose. *Flowering stem* 2-4 in.; bracts slender; flowers 1½ in. diam.; sepals and petals narrowly oblanceolate, white; lip pink, contracted at the base, side lobes rounded, midlobe emarginate crisped.—Amongst Parish's drawings is one of a similar Moulmein plant in flower only, with red-brown stem, pink sepals and petals, and a more clavate column than in Wight's figure.

3. **P. juliana**, Wall. *Cat.* 7399; leaf ovate-cordate glabrous, stem 1-fld., lip with 2 narrow falcate side lobes near the base which embrace the column, and a longer rhombic-lanceolate acuminate midlobe which is hairy at its base. *Hook. f. Ic. Plant. ined.* *Epipactis Juliana*, Roxb. *Fl. Ind.* iii. 453.

ASSAM (*Ic. in Herb. Calcutt.*). SILHET, Clarke. LOWER BENGAL, Roxburgh, Clarke. Ceylon; in the Doombura district; Thwaites.

Tuber globose. *Leaf* 2-3 in., 5-7-nerved, green or purple beneath; petiole short. *Flowering stem* 3-6 in.; bracts ensiform; flower about 2½ in. diam.; sepals and petals narrowly oblanceolate, acuminate, green; side lobes of lip white, midlobe spreading, white mottled with pink.—Amongst Parish's drawings is one of a Moulmein plant (*P. cuprea*, Par. mss.) like *juliana*, but with purple-green sepals and petals, and the hypochile longer than the epichile; it is in flower only.

4. **P. velutina**, Par. & Reichb. *f. in Trans. Linn. Soc.* xxx. 142; leaf orbicular-cordate velvety on both surfaces, stem 2-fld., lip shorter than the sepals embracing the column oblong-ovate obtuse.

TENASSERIM; at Moulmein, Parish.

Leaf 5-6 in. diam., many-nerved, rust-coloured; petiole very short. *Flowering stem* 4-12 in.; bracts very small; sepals and petals $1\frac{1}{2}$ in. long, narrowly lanceolate, dirty purple; lip ventricose towards the middle, flushed with pink, with two red purple branching nerves down the middle; column gibbously clavate.

5. ***P. macroglossa***, Hook. f. *Ic. Plant. ined.*; leaf unknown, stem 1-fld., lip longer than the sepals embracing the column strap shaped obtuse.

SIKKIM HIMALAYA; in hot valleys, J.D.H.; at Tumlong, alt. 6500 ft., Clarke.

Flowering stem 3-6 in.; bracts small, slender; sepals $1-1\frac{1}{2}$ in., linear-lanceolate, acuminate, white flushed with pink; lip $1\frac{1}{2}$ by $\frac{1}{2}$ in., of the same breadth from the rounded base to the rounded apex, except across the very small side lobes that project beyond the middle, nerves very slender; there is an appearance of lines of roughness on each side of the midrib opposite the side lobes. *Column* very slender, tip clavate.—Near *velutina*, but very distinct in the rather broader sepals, and shape of the remarkable lip which exceeds the sepals.

6. ***P. maculata***, Par. & Reichb. f. in *Trans. Linn. Soc.* xxx. 143; leaf orbicular-cordate glabrous, stem 2-fld., lip shortly spurred at the base embracing the column ovate-lanceolate 3-lobed about the middle woolly within. Hook. f. *Ic. Plant. ined.*

TENASSERIM; at Moulmein, Parish.

Leaf about 2 in. diam., about 13-nerved, green with a black-purple spot at the base of each fold beyond the middle; petiole 2-3 in. *Flowering stem* 5-6 in., slender; bracts minute; sepals and petals $\frac{3}{4}$ in., narrowly oblanceolate, green; lip equalling the sepals, yellow green with dark green veins; column rather slender; anther purple.

** *Flowers racemose. Bracts elongate, linear-lanceolate, reflexed.*

7. ***P. Gammiena***, Hook. f. *Bot. Mag.* t. 6671; leaf orbicular- or ovate-cordate acuminate glabrous, margin waved, sepals and connivent petals spathulately oblanceolate acute, lip saccate at the base, hypophyll narrow much longer than the orbicular waved hairy epichile.

TROPICAL HIMALAYA; from Garwhal, Falconer, &c., to Sikkim, Gammie, &c.

Leaf 6 in. broad and less, many-nerved, pitted between the folds; petiole 4-10 in., stout. *Flowering stem* 3-12 in., stout; bracts $\frac{3}{4}-\frac{3}{2}$ in., reflexed; sepals and petals 1 in. long, conniving, concave, pink; lip greenish-white or yellowish, as long as the sepals.

8. ***P. Scottii***, Reichb. f. in *Flora*, 1872, 276; leaf large reniform many-nerved glabrous, flowering stem tall stout, sepals and petals connivent linear-lanceolate acuminate, lip subclawed, base saccate, 3-lobed about the middle, side lobes obtuse, midlobe suborbicular velvety. ? *Pogonia*, No. 2, Griff. *Notul.* iii. 377; *Ic. Pl. Asiat.* t. 345.

SIKKIM HIMALAYA; at Darjeeling (ex Reichb.). CHITTAGONG; at Seetakoond (*Ic. in Herb. Calcutt.*). ? BURMA, Griffith.

Leaf 8 in. diam., abruptly acuminate, green, margin subundulate; petiole 12 in., very stout. *Flowering stem* dark brown, with raceme 18 in.; bracts $\frac{3}{4}$ in., reflexed; flowers horizontal, almost geniculate with the decurved ovary; sepals and petals $\frac{3}{4}$ in., connivent, dull green with red nerves; lip as long, yellow-white with purple nerves; top of column hairy on the back.—Lindley refers Griffith's plant to *P. carinata*, but the saccate base of the lip, and flowers set on at an angle with the ovary, rather indicate *P. Scottii*. These characters are not, however, shown in Griffith's drawing.

9. **P. carinata**, Lindl. *Gen. & Sp. Orchid.* 414; in *Journ. Linn. Soc.* iii. 45 (*excl. syn. Griff.*); leaf orbicular or cordate 7-9-nerved glabrous, sepals and petals narrowly oblanceolate acuminate, lip 3-lobed about the middle pubescent, side lobes very short, midlobe broadly ovate acute crenate, nerves rectangular. ? Dalz. & Gibs. *Bomb. Fl.* 270. *Epipactis carinata*, Roxb. *Fl. Ind.* iii. 452.

PLAINS OF INDIA; from Rohilcund to Lower Bengal, and the DECCAN PENINSULA. PEGU, Kurz.

Leaf $1\frac{1}{2}$ – $2\frac{1}{2}$ in. diam., cuspidate, not waved; petiole 1–2 in. Flowering stem with raceme 6–12 in., green; bracts $\frac{1}{2}$ in.; sepals and petals 1 in., green; lip not saccate at the base, white with red or purple veins.—I am unable to discriminate satisfactorily in Herbarium specimens of the flower (carefully moistened and laid out) between this and *flabelliformis*.

10. **P. flabelliformis**, Lindl. in *Wall. Cat.* 7400; *Gen. & Sp. Orchid.* 415; in *Journ. Linn. Soc.* iii. 45; leaf large orbicular-cordate many-nerved, lip 3-lobed about the middle, side lobes obtuse, midlobe ovate acute crisped and hairy. ? Dalz. & Gibs. *Bomb. Fl.* 270. *P. Nervilia*, Blume *Mus. Bot.* i. 32. *P. carinata*, Wight *Ic.* t. 1720. *Nervilia Aragoana*, Gaud. in *Freye. Voy. Bot.* 422, t. 35.

TROPICAL HIMALAYA; from Garwhal, alt. 4–5000 ft., Falconer, &c., eastwards. ? TENASSERIM, Parish.—DISTRIB. Marianne Islands, Timor.

Leaf 4–10 in. diam., cuspidate, margin waved; petiole 4–8 in. Flowering stem stout, 6–12 in.; raceme lax-fld.; flowers pale green; sepals $\frac{3}{4}$ in. long, linear-lanceolate, acute; petals rather narrower, obtuse; lip shorter than the sepals, like that of *P. carinata*, but white, and glabrous.—Differs from *carinata* in the many-nerved leaf; the flowers are not readily distinguishable in dried specimens. In a drawing by Parish the lip is represented as saccate at the base, truncate at the apex, with three green medial nerves meeting in the apex, and many red side nerves. In his specimen the tip of the lip varies to rounded, the side lobes are rounded, not acute as in *carinata*, and its nerves are not rectangular but ascending.

DOUBTFUL SPECIES.

POGONIA No. 1, Griff. *Notul.* iii. 376; stem 4 in. 1-fld., flower 1 in. long, sepals linear-lanceolate acuminate pale purplish-brown, petals narrower, lip white 3-lobed, side lobes rounded-oblong denticulate, midlobe obovate crisped pubescent white spotted and veined with purple and with 2 green veins and a yellow-green crest from the middle downwards, margins papillose.—Fields at Suddyah, in Upper Assam, smell of violets.

99. DIDYMOPLEXIS, Griff.

(LEUCORCHIS, Blume.)

Slender (parasitic ?) leafless, tuberous herbs. *Scape* simple, flexuous; flowers few, small, racemed; pedicels greatly elongate in fruit. *Sepals* dorsal and petals connate forming a 3-fld upper lip, lateral connate into an entire or 2-fld lower lip, forming a small mentum with the foot of the column. *Lip* inserted on the short foot of the column, very short, broad, entire, included, base and disk with small calli. *Column* long, narrowly 2-winged above and 2-toothed; stigma broad; anther low, shortly stipitate; pollinia 2, reniform, bipartite, 4? *Capsules* very long pedicelled.—Species 2 or 3, Indian, Malayan and Pacific.

D. pallens, Griff. in *Calcutt. Journ. Nat. Hist.* iv. 383, t. 17; *Hemsl. in Journ. Linn. Soc.* xx. 311, t. 28; *Kurz in Seem. Journ. Bot.* 1866, 40 (excl. *Syn. Epiblema & Gastrodia*). *Leucorchis sylvatica*, *Blume Mus. Bot.* i. 31; *Orchid. Archip. Ind.* 147, with woodcut. *Apetelon minutum*, *Wight Ic.* t. 1758. *Arethusa ecristata*, Griff. *Notul.* iii. 378; *Ic. Plant. Asiat.* t. 343, 344. *A. bengalensis*, *Hort. Bot. Calc.* *Epiphanes pallens*, *Reichb. f. in Seem. Fl. Vit.* 296.

LOWER BENGAL; from the foot of the Sikkim Himalaya to Calcutta. KURZ; in bamboo jungles, *Jerdon*. PERAK, *Scortechini*, *Wray*.

Root branching and tuberous; stem 4-6 in., sheaths loose. *Racemes* terminal, 4-8 fld.; bracts broadly ovate; flowers shortly pedicelled, dull yellow-white, perianth $\frac{1}{2}$ in. diam. subcampanulate; dorsal sepal ovate, obtuse, hooded; petals shorter and broader than the dorsal sepal, truncate, 3-nerved; lateral sepals united to the middle, free portions obtuse; lip stipitate, transversely or obcuneately oblong, membranous, with 3-median nerves between which the disk is papillose. *Capsule* 1-1 $\frac{1}{2}$ in., erect, fusiform, pedicel 3-8 in.—Ridley l. c. distinguishes his *D. pallens* from *Blume's sylvatica* by the entire lower lip of the latter, overlooking *Blume's* woodcut of the *sylvatica*, which represents it as 2-lobed.

100. GASTRODIA, Br.

Terrestrial leafless brownish tuberous herbs; stem erect, sheathed. *Flowers* in lax racemes. *Sepals* connate with the petals into a ventricose 5-lobed tube slit anteriorly. *Lip* short, base adnate to the foot of the column and to the perianth, blade entire. *Column* usually long, narrowly 2-winged, foot short or 0; rostellum small; stigma prominent; anther tumid; pollinia ecaudate, free.—Species 7, Asiatic, Malayan and Australasian.

1. **G. orobanchoides**, Benth. in *Gen. Plant.* iii. 617; lip adnate to the tube of the perianth with a short sessile ovate obtuse free plane blade. *Hook. f. Ic. Plant.* t. 1852. *Gamoplexis Falc. in Royle Ill.* 364; *Lindl. Gen. & Sp. Orchid.* 384; *G. orobanchoides*, *Falc. in Trans. Linn. Soc.* xx. 293, t. 13.

TEMPERATE HIMALAYA, alt. 7-8000 ft., from Kashmir to Garwhal, *Falconer*, &c.

Root a large oblong or ellipsoid annulate tuber, parasitic by a small fibrous base to roots. Stem 10-24 in., usually very stout; sheaths short, loose, truncate. *Raceme* loosely many-fld.; bracts oblong, acute, variable in size; flowers suberect, pedicels short; ovary turgid; perianth $\frac{1}{2}$ - $\frac{3}{4}$ in. long, ventricose, base gibbous, lobes very short obtuse, sepaline rather longer than the petaline; lip longer still, sessile, ovate, obtuse, recurved. *Capsule* $\frac{3}{4}$ in., erect, turgid.

2. **G. elata**, *Blume Mus. Bot.* ii. 174; *Orchid. Archip. Ind.* 143, t. 53; claw of lip adnate to the perianth and furnished with a pair of large fleshy prominent calli, limb free ovate-oblong.

CHUMBI; a Tibetan province east of Sikkim, *King's Collector*.—DISTRIB. China, Japan.

Habit, inflorescence and flowers of *G. orobanchoides*, but differing in the lip, the adnate claw of which has an almost reniform callus on each side, whereas in the first-named species the position of the claw on the perianth is marked by two thickened lines. The Chumbi specimen is a bad one, but having examined many flowers of it and of the Japan plant, I have no reason to doubt their identity.

3. **G. javanica**, *Endl. Gen. Plant.* 212; lip free from the tube of the perianth, blade broadly hastately cordate with two thickened ridges on the disk. *Lindl. Gen. & Sp. Orchid.* 384; *Thwaites Enum.* 311; *Blume, Orchid. Archip. Ind.* 145; *Mus. Bot.* ii. 175. *Epiphanes javanica*, *Blume Bijdr.* 421, t. 4.

CEYLON; near Ratnapoora, &c., *Thwaites*.

I have seen no specimen of the Ceylon plant, only the copy of a drawing in the Peradeniya Garden, kindly made for me by Thwaites, but it gives no analysis. This represents a slender plant with few flowers, an almost globose perianth divided to about the middle, and not representing a specimen of what may be the Javan plant in Herb. Kew collected by Lobb.

4. **G. ? Hasseltii**, *Blume Mus. Bot.* ii. 175; *Orchid. Archip. Ind.* 145, t. 52, f. 5-8; stem 6 in. rather slender, flowers few broadly campanulate $\frac{1}{2}$ in. long, lip quite free, claw slender, limb suborbicular with a broad truncate tip.

PERAK, *Is. Scortechini*.—DISTRIB. Java.

Without specimen either of Blume's or Scortechini's plants identification is impossible.

5. **G. exilis**, *Hook. f. Ic. Plant. ined.*; very slender, flowers minute, lip free sessile by a very small point ovate with 2 long wing-like lamellæ on the middle of the disk.

KHASIA MTS.; at Amwee in grassy places, alt. 3000 ft., *J. D. H. & T. T.*

Tuber $\frac{1}{2}$ – $\frac{3}{4}$ in., oblong; stem 6–12 in., filiform. *Racemes* few and lax-fl'd.; bracts ovate; flowers (with ovary) $\frac{1}{4}$ – $\frac{1}{2}$ in. long, erect, whitish; perianth cylindric, very shortly 5-lobed; sepaline lobes broad, obtuse; petaline much smaller, rounded, fimbriate (or glandular); lip as long as the column, membranous, faintly 5-nerved, base rounded; column acutely toothed at the truncate top. *Capsule* (unripe) $\frac{1}{2}$ in. fusiform.—A very singular species; difficult of analysis after having been dried.

100/1. **YOANIA**, *Maxim.*

A low stout leafless herb; stem with cucullate sheaths. *Flowers* racemose, long and stoutly pedicelled. *Sepals* oblong, obtuse, fleshy. *Petals* broadly ovate. *Lip* sessile at the foot of the column, very shortly clawed, cymbiform, obtusely apiculate. *Column* short, broad, margined, mid-lobe triangular, side lobes erect; stigma concave, transverse; anther long-beaked, 2-celled; pollinia 4, pulpy, sectile, attached in pairs to a viscid gland.

Y. japonica, *Maxim. in Bull. Acad. St. Petersb.* xviii. 68; *Mel. Biol.* viii. 647; *Benth. in Hook. Ic. Pl.* t. 1364.

MUNNIPORE; crest of Bareil range (S. W. of Japoo), alt. about 7000 ft., and on Kohima, *Prain*.—DISTRIB. Japan.

Brownish-white, glabrous. *Rootstock* stout, branched. *Stem* 3–6 in., tortuous in the Munnipore plant, erect in the Japanese, as thick as a goose-quill; sheaths $\frac{1}{2}$ in., shortly rounded; raceme short, 4–6 fl'd.; bracts like the sheaths; pedicel with ovary 1–1 $\frac{1}{2}$ in.; sepals $\frac{3}{4}$ in. long, and oblique obtuse petals many-nerved; lip very shortly clawed, almost hemispheric, with a thickened apex and axis, a small concavity within the lip and four strong flexuous nerves on each side. *Capsule* 2–2 $\frac{1}{2}$ in. long, stoutly pedicelled, erect, narrowly fusiform, ribs very stout.—Except in that the stems are sometimes curved, and the margins of the lip appear to be abruptly

thickened towards the tip, I find nothing to distinguish this from the Japan plant; the column and anther are identical; I failed to find pollen. The flowers, black when dry, are so fragile that I had great difficulty in making out their structure.

101. **EPIPOGUM**, *Gmelin*.

Terrestrial leafless brownish herbs; root tuberous or coralloid; stem erect, sheathed. *Flowers* laxly racemed. *Sepals* and *petals* subequal, free, narrow, erect or spreading. *Lip* sessile at the base of the column, superior or inferior, ovate, entire or 3-lobed, spurred, base broad, disk with rows of papillæ. *Column* short, foot 0; stigma broad, prominent; anther thickened, dorsally 2-cellèd; pollinia 2, separately attached by a filiform strap to a small gland.—Species the following.

1. **E. aphyllum**, *Swartz Summ. Veg. Scand.* 1814; root branching, column cylindric, spur very large as long as the superior 3-lobed lip inflated incurved, *Palmstr. Svensk. Bot.* t. 512; *Boiss. Fl. Orient.* v. 93; *Reichb. Ic. Fl. Germ.* xiii. t. 468; *Nees Gen. Fl. Germ. Monocot.* iii. No. 23. *E. Gmelini*, *Richard Orchid. Europ. Annot.* 36; *Lindl. Gen. & Sp. Orchid.* 383; in *Journ. Linn. Soc.* i. 176; *Bot. Mag.* t. 4821. *Satyrium Epipogium*, *Linn. Syst. Veg.* 676; *Jacq. Fl. Austr.* t. 84.

WESTERN TEMPERATE HIMALAYA, alt. 6–8500 ft., Kashmir, *Clarke*; Simla, *Thomson*; Garwhal, *Duthie*.—DISTRIB. Europe, N. Asia.

Stem 4–8 in., often very stout and swollen at the base; sheaths 1–2, short, appressed, truncate or obtuse. *Racemes* 3–6-fl. ; bracts large, membranous, oblong, obtuse or acute; flowers pale yellow or pinkish, spotted, ovary turgid; sepals $\frac{1}{2}$ – $\frac{3}{4}$ in. long and subequal petals lanceolate, margins involute; lip oblong, whitish, with lines of red glandular warts, lateral lobes small, very variable in size; spur obtuse.

2. **E. nutans**, *Reichb. f. in Bonpland.* 1857, 36; root an oblong tuber, spur straight shorter than the inferior entire lip. *Lindl. in Journ. Linn. Soc.* i. 177; *Benth. Fl. Austral.* vi. 308; *E. roseum*, *Lindl. l. c.* *Galera nutans*, *Blume Bijdr.* 415, t. 3; *Mus. Bot.* ii. 187; *Orchid. Archip. Ind.* 139, t. 52 & 54 E; *G. rosea*, *Blume Mus. Bot.* 188, & *Orchid. Archip. Ind.* 139; *Podanthera pallida*, *Wight Ic.* t. 1759. *Ceratopsis rosea*, *Lindl. Gen. & Sp. Orchid.* 383. *Limodorum roseum*, *Don Prodr.* 30.

TROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, in hot valleys, *J. D. H. Clarke*. KHASIA MTS., alt. 6000 ft., *Mann*. DECCAN PENINSULA, in the Wynaad, *Jerdon*. CEYLON, *Thwaites*.—DISTRIB. West Africa, Java, Australia.

Root like a small potato. *Stem* 4–8 in., stout or slender; sheaths several, short, inflated, truncate. *Racemes* few or many-fl. ; bracts large, membranous, oblong, acute; flowers pale yellow or pinkish white, speckled or stained with pink; sepals and petals narrowly lanceolate, $\frac{1}{4}$ – $\frac{3}{8}$ in. long; lip entire, disk with 2 or 3 glandular ridges.

102. **CEPHALANTHERA**, *Richard*.

Terrestrial herbs, leafless and tuberous rooted, or with leafy stem and fibrous roots. *Leaves* sessile, plicate. *Flowers* suberect, spiked or racemed. *Sepals* and *petals* subsimilar, free, conniving. *Lip* included, erect from the base of the column, hypochile concave or saccate embracing the column, epibible short. *Column* semi-terete, rostellum short or obsolete; stigma anticus; anther erect; pollinia 2, 2-partite. *Capsule* erect.—Species about 10, north temperate regions.

C. ensifolia, *Richard Orchid. Annot.* 29; leaves ovate or lanceolate, bracts of the upper flowers much smaller than the almost glabrous ovaries, epichile triangular obtuse 5-ridged. *Lindl. Gen. & Sp. Orchid.* 412; in *Journ. Linn. Soc.* i. 172, 175; *Boiss. Fl. Orient.* v. 85. *C. Xyphophyllum*, *Reichb. Ic. Fl. Germ.* xiii. t. 470. *C. acuminata*, *Lindl. in Wall. Cat.* 7405; *Gen. & Sp. Orchid.* l. c.; *Wight Ic.* t. 1721; *Dcne. in Jacquem. Voy. Bot.* 164, t. 164.

TEMPERATE HIMALAYA; alt. 6–12,000 ft., from Kashmir to Bhotan.—DISTRIB. Europe, Western Siberia, and from Afghanistan to Northern Africa.

Rootstock creeping; stem 6–18 in. *Leaves* lower lanceolate or oblong, acute or obtuse, upper linear. *Raceme* laxly 6–20-fld., glabrous; bracts ovate, acute; flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. long, white or lip spotted with yellow; sepals lanceolate, acute; petals elliptic, obtuse; ridges of lip crested.

SPECIES UNKNOWN TO ME.

C. THOMSONI, *Reichb. f. in Linnæa*, xli. 54; a span high, leaves (of *C. grandiflora*) oblong acute, upper linear-lanceolate, bracts linear-lanceolate, lower much longer than the flowers, sepals oblong-ligulate acute, petals narrower, lip expanded at the base into a very short conical sac trifid, side lobes broadly ligulate crenulate, midlobe oval transverse with a deflexed apiculus, keels two in the entire base lamellate, with many small papillæ between the posticous lacinia. —Sikkim, *T. Thomson.*, 1857. —*C. cucullata*, *Boiss. Held.* differs in the shorter hypochile with short quite entire lacinia, in the median nerves of the epichile keeled to the tip, in the keels not lamelliform, and in the conico-cylindric spur being thrice as long. —(The above is from Reichenbach. I have examined no *Cephalanthera* answering to the description, nor, as I am informed by King, is there any in the Calcutta Herbarium, whence Reichenbach's specimens must have been sent to him.)

103. **EPIPACTIS**, Br.

Terrestrial leafy erect herbs. *Leaves* sessile, plaited. *Flowers* racemose, pendulous; bracts long, leafy. *Sepals* and *petals* broad, acuminate, strongly-nerved. *Lip* sessile on the base of the column; hypochile concave or saccate, epichile contracted at the base, entire. *Column* short; stigma anticous; rostellum broad, prominent; anther erect, obtuse, cells contiguous; pollinia 2, 2-partite, gland globose.—Species 8 or 10, of the temperate N. hemisphere.

Lindley (*in Journ. Linn. Soc.* i. 172) is disposed to refer all the Himalayan species to states of *E. latifolia*, in which I do not concur.

1. **E. latifolia**, *Swartz in Act. Holm.* 1800, 232; flowers subsecund glabrous or nearly so, lip short, hypochile subglobose, epichile as long or shorter ovate-cordate, base with 2 calli. *Lindl. Gen. & Sp. Orchid.* 461; *Boiss. Fl. Orient.* v. 87; *Reichb. Ic. Fl. Germ.* xiii. t. 134–136. *E. macrostachya*, *Lindl. in Wall. Cat.* 7404; *E. consimilis*, *Don Prodr.* 28. *E. Dalhousiæ*, *Wight Ic.* t. 1723.

TEMPERATE HIMALAYA, from Kashmir, alt. 6500–10,000 ft., to Sikkim, alt. 10–11,000 ft.—DISTRIB. Europe, N. Africa, N. Asia to Japan.

Stem 1–3 ft., stout, puberulous above. *Leaves* 3–5 by 2–3 in., usually from orbicular to ovate-lanceolate rarely lanceolate, often with ciliolate margins, flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. diam, in often crowded bractate racemes, green variegated with yellow white or purple. *Column* very short.

Var. herbacea; smaller, leaves elliptic acute, raceme dense-fld., flowers $\frac{1}{2}$ in. diam. glabrous pale greenish white. *E. herbacea*, *Lindl. in Royle Ill.* 368; *Gen. & Sp. Orchid.* 462.—Western Himalaya.

Var. *Thomsoni*; small, slender, leaves lanceolate recurved margins quite glabrous, raceme lax-fl'd., flowers $\frac{1}{2}$ in. diam. quite glabrous. *E. macrostachya*, *Wight Ic. t. 1722* (not of *Lindl.*)—Western Tibet, alt. 10–11,000 ft., *Thomson*.—Wight does not know the origin of his specimen, which is a very bad one.

Var. *intrusa*; very slender, leaves few small, flowers few very distant, epichile without calli. *E. intrusa*, *Lindl. in Journ. Linn. Soc. i. 175*.—Sikkim, alt. 11,000 ft., *J. D. H.* This is hardly more than a starved state of *E. latifolia*, with which it grew.

2. ***E. consimilis***, *Wall. Cat. 7403* (not of *Don*); raceme lax-fl'd., flowers large pubescent or tomentose, lip nearly as long as the sepals, hypochile narrow oblong, epichile longer lanceolate inflexed at the base then recurved. *E. veratrifolia*, *Boiss. & Hohen. Diagn. Ser. 1, xiii. 11*; *Boiss. Fl. Orient. v. 87*. *Lindl. in Journ. Linn. Soc. i. 174*. *E. amœna*, *Herb. Ham.*

WESTERN TEMPERATE HIMALAYA; from Peshawur and Kashmir to Nepal.—DISTRIB. westward to Syria.

Stem 1–2 ft., rather slender, pubescent above. *Leaves* 4–7 in., lanceolate, acuminate. *Raceme* lax-fl'd.; bracts long, rarely short; flowers 1–1½ in. diam., distant, long-pedicelled, pubescent or ovary tomentose, greenish; column much longer than in *E. latifolia*.—Lindley is no doubt right in referring *Don's E. consimilis* to *E. latifolia*. A drawing by Jerdon of a plant grown on limestone rocks, overhanging water at Saugor in Malwah closely resembles this.

3. ***E. Royleana***, *Lindl. in Royle Ill. 368*; *Gen. & Sp. Orchid. 461*! in *Journ. Linn. Soc. i. 174*; raceme lax-fl'd. puberulous, hypochile large saccate very much broader than the ovate or ovate-lanceolate epichile. ? *E. americana*, *Lindl. in Ann. Sc. Nat. iv. 385*; *Gen. & Sp. Orchid. 462*. *E. gigantea*, *Dougl. mss. in Hook. Fl. Bot. Am. ii. 220, t. 202*. *Cephalanthera Royleana*, *Regel in Act. Hort. Petrop. vi. 490*; *Boiss. Fl. Orient. v. 85*.

TEMPERATE HIMALAYA; from Kashmir, alt. 7000 ft. to Sikkim, alt. 8–12,000 ft.—DISTRIB. Samarcand? N. America.

Stem 1–2 ft. *Leaves* from lanceolate to orbicular, 4–7 by 1–1½ in., margins eciliate. *Raceme* 6–10 in.; flowers distant, 1 in. diam., green with a yellowish (or reddish?) lip; bracts long, lanceolate.—The very broad strongly many-nerved hypochile, broader than long, with rounded erect sides, are unlike any other species but *E. americana*, which I suspect is the same, and if so, the latter is the earliest name. Lindley's description is taken from a very bad specimen, in which the epichile is constricted in the middle, probably by accident, as this organ contracts much in drying. Regel cites Lindley's *Epip. Royleana* for his *Ceph. Royleana*, and gives Samarcand as a locality.

Tribe IV. OPHRYDÆÆ. (See Vol. v. p. 673.)

104. **ORCHIS**, *Linn.*

Terrestrial erect leafy herbs, with entire oblong or palmately lobed tubers. *Leaves* sheathing, not plicate. *Flowers* racemed or spicate. *Sepals* free, subequal, lateral spreading, or conniving in a hood with the petals and dorsal. *Petals* usually smaller. *Lip* shortly adnate to the column, spreading or pendulous, spurred, entire or 3-lobed. *Column* very short, rostellum cupular or saccate; anther adnate to the face of the column, cells parallel or converging below; pollinia 2, caudicles adnate to 1 or 2 glands, which are concealed in one pouch formed by the rostellum.—Species about 80, of north temperate regions, and the Mascarene Islands.

With the exception of *O. latifolia*, I do not feel confident that the species here

below referred to *Orchis* are referable to that genus. This is owing to my inability to determine satisfactorily in specimens that have been pressed, the structure of the minute rostellum, and its relation to the glands of the pollinia. Moreover, as stated under *Habenaria*, I have in various minute flowered species of that genus been unable to determine whether the glands are hidden between folds of the rostellum, or are covered by pouches or a flap of that organ. Careful drawings of the column and anther, and a comparative study of the extra Indian species are wanted, in order to describe them with accuracy.

1. *O. latifolia*, Linn. *Sp. Pl.* 1334; tubers palmate, leaves erect oblong linear-oblong or lanceolate, spike cylindric dense-fl., bracts green acuminate usually much exceeding the flowers, lateral sepals ovate reflexed, lip oblong or rhomboid crenate entire or very obtusely 3-lobed sides deflexed, spur stout equalling or shorter than the ovary pendulous. *Boiss. Fl. Orient.* v. 71; *Reichb. Ic. Fl. Germ.* xiii. t. 50. *O. latifolia*, *S. indica*, *Lindl. Gen. & Sp. Orchid.* 260. *O. Hatagirea*, *Don. Prodr.* 23; *Wall. Cat.* 7062.

WESTERN TEMPERATE HIMALAYA; from Nepal to Kashmir, and in WESTERN TIBET, alt. 8–12,000 ft. (16,000 ft., *Heyde.*)—DISTRIB. Westward from Afghanistan to N. Africa and the Atlantic, N. Asia.

Stem 1–3 ft., usually fistular, leafy upward. *Leaves* many, 2–6 in., often spotted in Europe, tip flat or concave. *Spike* 1–6 in.; flowers about $\frac{2}{3}$ in. from dorsal sepal to tip of lip, dull purple; sepals and petals acute or obtuse; lip spotted with darker purple, midlobe small or obsolete; spur straight or curved.—The Himalayan specimens have, as far as I can make out from dried specimens, the leaves unspotted and tips concave, and are therefore referable to the European var. *incarnata* (*O. incarnata*, Linn.). Lindley's var. *indica* is characterized as having larger flowers, a rounded sub-lobed lip shorter than the spur, which is as long as the ovary. Lindley is disposed to refer some of the specimens from N.-W. India to *O. maculata*, but the lip in these is not lobed as in the European plant. *O. latifolia* is as variable in India as in Europe, from slender to very robust, with a lax or dense-fl. spike, and bracts equalling to or much longer than the flowers.

2. *O. Chusua*, *Don. Prodr.* 23; leaves few linear or linear-lanceolate acute, spike very short, bracts longer than the ovaries green, lateral sepals reflexed, dorsal much smaller orbicular, lip longer than the sepals broadly obovate 3-lobed, spur as long as the ovary stout cylindric obtuse. *Gymnadenia Chusua*, *Lindl. in Wall. Cat.* 7058; *Gen. & Sp. Orchid.* 280. *G. puberula*, *Lindl. in Wall. Cat.* 7059.

ALPINE HIMALAYA; alt. 10–13,000 ft., Kumaon, *Duthie*; Nepal, *Wallich*. SIKKIM, *J. D. H.*, &c.

Very variable in height and stoutness, 3–18 in., flexuous. *Tubers* oblong, entire. *Leaves* 1–3, rarely more, 3–6 by $\frac{1}{4}$ – $\frac{3}{4}$ in., almost filiform in very alpine forms. *Spike* 2–4 in., 2–many-fl.; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., lanceolate, acuminate; flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., white or purple; lateral sepals oblong-lanceolate, suberect; petals shorter, spreading, oblong, obtuse; lip variable in breadth, often broader than long, lobes spreading, broad, rounded, erose or crenate, rarely oblong with the midlobe retuse; spur thin-walled, slightly incurved, tip sometimes clavate; anther-cells parallel.

3. *O. spathulata*, *Reichb. f. mss.*; leaf solitary radical elliptic, spike few-fl., bracts much larger than the flower, sheaths leafy, sepals subequal lateral suberect, lip obovate not longer than the sepals entire or obscurely 3-lobed, spur shorter than the ovary stout. *Hook. f. Ic. Plant. ined.* *Gymnadenia spathulata*, *Lindl. Gen. & Sp. Orchid.* 280.

ALPINE HIMALAYA; alt. 11–13,000 ft.; Kumaon and Garwhal, *Royle*, *Duthie*, *Sikkim*, *J. D. H.*

Stem very short, sheathed; root elongate, stout, branching into thick fibres. *Leaf* 1–3 in, sessile or petioled, obtuse, fleshy, base narrowed. *Scape* 2–5 in., very stout, flexuous; flowers 2–4, dark purple, $\frac{1}{2}$ in. diam.; bracts $\frac{3}{4}$ –1 in., ovate, obtuse; dorsal sepal ovate, obtuse, lateral oblong, subacute; petals ascending, elliptic, obtuse; lip variable in breadth, from elliptic to cuneate-obovate, crenulate, spur variable in length, stout, obtuse; anther-cells parallel.

4. **O. Stracheyi**, *Hook. f. Ic. Pl. ined.*; leaf solitary radical elliptic or obovate, spike few-fld., bracts longer than the flowers leafy, sepals subequal lateral suberect, lip longer than the sepals broadly cuneate 3-lobed to the middle, lobes obtuse, spur as long as the ovary stout incurved obtuse.

WESTERN HIMALAYA; Garwhal, near Rogile, alt. 11,000 ft., *Strachey* and *Winterbottom* (No. 35 *Gymnad. puberula*.)

This has the solitary leaf of *O. spathulata*, and the flowers of *O. Chusua*, can it be a hybrid?

105. **HERMINIUM**, *Linn.*

Terrestrial small erect tuberous herbs; tubers oblong, undivided. *Leaves* solitary or few. *Flowers* small, spicate. *Sepals* subequal, 1-nerved, free or conniving in a hood, the lateral spreading. *Petals* smaller or nearly as large, often thick and fleshy. *Lip* continuous with the base of the column, shorter or longer than the sepals, broad or narrow, spreading or pendulous, entire or 2–3-fid, base flat concave or very shortly saccate. *Column* very short; stigma 2-lobed or with 2 globose or clavate processes; rostellum short; anther adnate to the face of the column, cells parallel or slightly diverging below; pollinia 2, caudicles very short, glands naked, small or large, or with each gland and its caudicle sheathed by a conical naked coriaceous extingisher-like shiny brown appendage.—Species 6 or 8, European and N. Asiatic.

There is no character by which *Herminium* can be distinguished from *Habenaria*, except that the lip has never a spur, only a gibbous sac. *H. fallax* & *Duthiei*, and some other species appear to me to be referable to either genus, but these from habit and locality I retain here. The glands of the pollinia vary extraordinarily in the several species, from small and orbicular, to extingisher-like bodies, truncate, hollow, coriaceous, brown, shining, and sometimes split down one side. The caudicle appears to be inserted at the bottom of this organ, which is a development of the gland itself; it is exposed at the base of the anther-cell, and like the ordinary gland, is removable with the pollinium. The Indian *Herminia* are all mountain or alpine, and attain the greatest elevation of any orchids.

* *Lip* 3-lobed.

1. **H. Monorchis**, *Br. in Hort. Kew. Ed. 2*, v. 191; leaves 2 rarely 3 linear-oblong, flowers decurved, bracts equalling the ovary or shorter, petals ovate hardly longer than the sepals, lip hardly longer than the sepals 3-fid, lobes narrow. *Lindl. Gen. & Sp. Orchid.* 305; *Boiss. Fl. Orient.* v. 82. *Reichb. Ic. Fl. Germ.* xiii. t. 415. *Ophrys Monorchis*, *Linn. Sp. Pl.* 1342.

ALPINE HIMALAYA and WESTERN TIBET, alt. 10–13,000 ft., from Kashmir to Sikkim.—DISTRIB. Europe, N. Asia.

Four to ten in. high; root ellipsoid. *Leaves* 1–4 in. *Scape* naked, rarely 2-leaved or 1 sheathed; spike 1–2 in.; flowers subsecund, $\frac{1}{2}$ in. diam., yellow-green;

musky at night; sepals and petals subconnivent; sepals oblong, obtuse; petals unequal-sided towards the base, tips fleshy; lobes and lip narrow, base concave; rostellum prominent between the base of the anther-cells.

2. *H. angustifolium*, *Benth. mss.*; tall, leaves elongate linear, spike very long slender many-fld., bracts equalling the ovary or shorter, flowers decurved, petals linear very narrow 1-nerved, lip linear equalling the sepals in length or longer narrow trifid beyond the middle, side lobes filiform, midlobe very short. *Accras angustifolia*, *Lindl. in Wall. Cat.* 7061; *Gen. & Sp. Orchid.* 232; *Bot. Reg. under t.* 1525; in *Journ. Linn. Soc.* iii. 43; *Royle Ill. t.* 87; *Wight Ic. t.* 1691. *H. longicruris*, *Wright in Mem. Acad. Philad. Ser. 2, vi.* 411.—*Thisbe*, *Falc. in Lindl. Veg. Kingd.* 183, c (name only).

TEMPERATE HIMALAYA, from 4–8000 ft. in the North West, and 6–15,000 ft. (*Clarke*) in Sikkim. KHASIA HILLS, alt. 5–6000 ft. UPPER ASSAM, in the Naga Hills, alt. 7000 ft., *Clarke*, *Prain*. TENASSERIM *Parish*.—DISTRIB. China, Manchuria, Japan.

Stout or slender, 1–3 ft. high, 1 or several leaved. *Leaves* scattered, 2–8 in., acute, rarely $\frac{1}{2}$ in. broad. *Spike* 2–10 in.; flowers often very many, subsecund; perianth connivent, $\frac{1}{10}$ – $\frac{1}{8}$ in. diam., green; sepals oblong, obtuse; petals membranous, acute; lip from as long to twice as long as the sepals or more, base not concave, lateral lobes very slender. Anther-cells parallel, pollinia clavate, glands large, staminodes large spreading; stigmatic lobes obscure or 0; rostellum minute, 2-lobed. *Capsule* $\frac{1}{2}$ in., erect, oblong, turgid.—Has in Sikkim an extraordinary range in altitude.

3. *H. fallax*, *Hook. f. Ic. Plant. ined.*; slender, leaves 1–2 towards the middle of stem linear or linear-lanceolate, spikes many-fld. subsecund, bracts longer than the short decurved ovaries, sepals spreading oblong- or ovate-lanceolate broader than the erect narrow falcate petals, lip shorter than the sepals obtusely 3-lobed, sac incurved subdidymous subglobose or clavellate with an inflated tip. *Peristylus fallax*, *Lindl. Gen. & Sp. Orchid.* 298. *Herminium fallax*, *Lindl. in Wall. Cat.* 7412. *Cybele*, *Falc. in Lindl. Veg. Kingd.* 193, c. *C. alpina*, *Falc. mss.*

ALPINE and SUB-ALPINE HIMALAYA, alt. 7–12,000 ft., from Garwhal to Sikkim.

Very variable in height, from 4–18 in.; stem with long tubular sheaths at the base, and one or two lanceolate sheaths above the leaf. *Leaves* usually solitary about the middle of the stem, 2–5 by $\frac{1}{2}$ –1 in., acute, sometimes two subopposite towards the base of the stem. *Scape* naked; spike 2–5 in., lax or dense fld.; lower bracts $\frac{2}{3}$ in. or less, lanceolate; ovary $\frac{1}{2}$ – $\frac{3}{4}$ in., shortly beaked; sepals $\frac{1}{2}$ in., 1-nerved, and petals variable in absolute and relative breadth; lip short and fleshy or narrower, thin, and with distinct nerves, base of limb truncate at the short broad concave claw; anther very small, cells parallel, tubes 0; pollinia ovoid, of few very large grains, sessile in the large solid shining glands which are exposed, one on side of the inconspicuous rostellum; stigmatic processes very short, subglobose.

** *Lip entire.* Bracts short in all but *H. gramineum*.

4. *H. Josephi*, *Reichb. f. in Flora* lv. (1872) 276; stout, leaves 2 rarely 3 lanceolate or oblanceolate, bracts minute, flowers large $\frac{1}{2}$ in. diam. suberect, sepals and petals erect, lip broadly ovate acute. *H. grandiflorum*, *Lindl. in Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 11–14,000 ft., *J. D. H.*

Plant, 5–12 in. high. *Leaves* 3–5 by $\frac{1}{2}$ –1 in., obtuse acute or acuminate. *Spike* 1–4 in.; flowers $\frac{1}{2}$ in. diam., not secund; bracts much shorter than the gibbous ovary; sepals 3-nerved, lateral falcately ovate, base rounded; petals as long, ovate, tips narrowed thickened obtuse; lip larger than the sepals, flat, with a thickened

midrib and point; anther-cells spreading at the base, pollinia clavate, terminating in horn-shaped or conical rigid truncate pouches, which embrace the caudicle gland and base of the pollinium; stigmatic processes obscure; rostellum small.—I do not find the single lanceolate sheath under the spike described by Reichenbach.

5. *H. Duthiei*, Hook. f. *Ic. Plant. ined.*; leaves 2 towards the middle or base of the stem linear or oblanceolate, spike many-fl. subsecund, bracts much shorter than the short ovaries, sepals obtuse, dorsal broadly oblong, lateral smaller, subfalcate petals ovate-lanceolate fleshy, lip as long triangular or orbicular-ovate entire subacute or obtuse, sac globose.

WESTERN HIMALAYA; Garwhal, near the Khasi Pass, alt. 11–12,000 ft., *Duthie*.

Whole plant, with the spike, 4–6 in. Leaves shorter than the scape, acuminate. Scape stout, curved, naked; spike 2–4 in.; ovaries $\frac{1}{2}$ in., turgid, curved, almost beaked; perianth $\frac{1}{2}$ in diam.; lip variable in form, as large as the sepals, sometimes orbicular with a contracted point, base with a narrow chink opening into the spur; anther oblong, cells parallel, pollinia clavate sessile on the conical truncate horny glands or caps of the glands; staminodes large, spreading; stigmatic processes clavate, large; rostellum subulate, erect.

6. *H. congestum*, Lindl. in Wall. Cat. 7068; Gen. & Sp. Orchid. 305; in Journ. Linn. Soc. iii. 43; leaves 1–3 oblanceolate, scape elongate, spike many-fl., bracts minute, flowers minute decurved, sepals obtuse, dorsal broadly ovate, lateral oblong, petals rather longer acute, lip ovate or triangular-ovate fleshy acute, base saccate. *H. unalaschcense*, Reichb. f. *Ic. Fl. Germ.* xiii. 107, t. 418. *Habenaria Schischmareffiana*, Chamiss. in Linnæa, iii. 29. *Platanthera Schischmareffiana*, Lindl. Gen. et Sp. Orchid. 286. *Neottia macrophylla*, Don Prodr. 27. *Spiranthes macrophylla* & *unalaschcensis*, Spreng. Syst. iii. 708.

ALPINE HIMALAYA; NEPAL, Wallich; Sikkim, alt. 11–16,000 ft., J. D. H. DISTRIB. Aleutian Islds.

Stem 6–18 in., leafy towards the base or upwards. Leaves 3–6 by $\frac{1}{2}$ – $\frac{2}{3}$ in. Scape rather stout, naked above; spike 2–4 in.; ovary short, gibbous, longer than the ovate bracts; flowers $\frac{1}{2}$ – $\frac{1}{4}$ in. diam.; dorsal sepal orbicular, lateral broadly oblong; petals ovate, equalling the sepals, fleshy; lip fleshy, variable in breadth; sides sometimes almost dilated into lobes, base very distinctly saccate; anther-cells parallel, pollinia subglobose, caudicles short inserted in large spur-like corneous body split on one side; stigma obscure; rostellum minute, erect. Capsule $\frac{1}{2}$ in. erect, twisted.

7. *H. pugioniforme*, Lindl. mss.; leaf solitary elongate-spathulate obtuse, spike few-fl., bracts minute orbicular, flowers minute suberect, petals oblong-ovate, lip dagger-shaped, base dilated.

ALPINE HIMALAYA; Kashmir, alt. 12,000 ft., Aitchison; Garwhal, alt. 14–15,000 ft., Duthie; Sikkim, alt. 15–16,000 ft., J. D. H.

Plant 2–5 in. high. Leaf shorter than the scape, $\frac{1}{2}$ – $\frac{2}{3}$ in. broad. Scape rather stout; bracts very small; flowers minute, $\frac{1}{12}$ in. diam.; dorsal sepal orbicular, lateral very broad obtuse; petals smaller; lip hardly longer than the sepals.—Very near *congestum*, but I think different, the flowers appear to be nearly erect.

8. *H. orbiculare*, Hook. f. *Ic. Plant. ined.*; stem very slender 1–2 leaved and with minute subulate sheaths, bracts minute, flowers very minute secund, sepals orbicular-oblong obtuse dorsal smaller, petals broadly oblong, lip orbicular fleshy with a pit towards the centre and gibbous beneath.

SIKKIM HIMALAYA; Rungboo in the Chumbi Valley, King's Collector.

Stem with spike 4-6 in. *Leaves* 2, towards the base of the stem, 1-1½ in. long, oblanceolate; bracts much shorter than the ovaries which are ½ in. long, curved; flowers ⅙ in. diam.; sepals and petals 1-nerved, all membranous; anther-cells rather divergent, pollinia clavate, gland orbicular translucent; stigmatic processes obscure; rostellum minute.—A very distinct little species, but the flowers are so minute that I cannot satisfactorily analyze the column.

9. **H. gramineum**, *Lindl. in Wall. Cat.* 7413; *Gen. & Sp. Orchid.* 305; very slender, 1-leaved, spike lax-fl., flowers minute secund suberect, bracts subulate equalling the ovary, petals erect linear subfalcate, lip ovate acuminate equalling or shorter than the sepals. *Royle Ill.* t. 87. *Neottia monophylla*, *Don Prodr.* 27. *Spiranthes monophylla*, *Spreng. Syst. Veg.* iii. 709.

WESTERN and CENTRAL HIMALAYA; Nepal, *Wallich*; Kumaon and Garwhal, alt. 5-8000 ft.

Plant 2-6 in. *Leaf* linear, acute, as long as the scape or longer. *Spike* 1-3½ in.; rachis striated with rough ridges; perianth ⅙-⅓ in. diam.; dorsal sepal oblong or broadly ovate, lateral ovate obtuse spreading; petals as long as the sepals, obtuse, thick; lip flat, with a concave base, variable in breadth, slightly saccate beneath; anther-cells parallel, pollinia subglobose, caudicles short, glands large shining coriaceous brown; stigmatic processes low; rostellum very large, as long as the anther, recurved, retuse, fleshy.

106. **HABENARIA**, *Willd.*

Terrestrial leafy herbs with undivided or lobed tubers, and fleshy radical fibres. *Leaves* not plaited, bases sheathing. *Flowers* spicate or racemed. *Sepals* subequal or the dorsal shortest, lateral ascending spreading reflexed or deflexed. *Petals* smaller or larger, simple or cleft (sect. *Ate*). *Lip* continuous with the base of the column, entire 3-lobed or 3-partite, base spurred. *Anther* adnate to the very short column, cells parallel or divergent below, bases often produced into a long or short tube; pollinia clavate or pyriform; caudicle long, short, or 0, sometimes winged, glands exposed, rarely overlapped by the rostellum; staminodes granular surfaces on the side of the anther, rarely elongate; stigma a single or double viscid area on the column below the anther, or two globose or clavate processes; rostellum usually small and erect between the cells of the anther, rarely wholly obsolete.—Species about 400, temperate and tropical.

After devoting many months to the examination of the Indian species of *Habenaria*, I propose the following grouping of them into sections as tentative only. I accept Bentham's view, that the genera which he has brought under it (in *Gen. Plant.*) cannot be separated from one another by natural or artificial characters. To these *Herminium* should be added, were it not for the consequent disturbance of much nomenclature and the multiplication of synonyms; and so should also be *Diplomeris* and *Hemipilia*, which, though they have recognizable differential characters, these are of less importance than those of the four last sections here adopted.

Of all the floral organs of the genus, that of the rostellum is the most difficult of analysis; and in the minute flowered species especially, of definition also. In respect of its relation to the glands of the pollinia it is often in moistened herbarium specimens impossible to determine whether the rostellum nearly overlaps these, or holds them exposed between its folds, or forms pouches beneath them, or a flap over them. By means alone of careful drawings of the rostellum of all the species made from living plants, can its modifications of form be understood; but I doubt whether even this will help much towards the classification of the species, for I think its value in this respect has been greatly overrated in both *Ophrydeæ* and *Vundææ*.

The structure of the stigma has been compendiously described by Benth in the Journal of the Linnean Society (xviii. 356), and I agree with him in thinking that to found genera on the modifications or even in the presence or absence of processes, would lead to a violation of affinities.

For observations on the Indian species referred to *Orchis*, see that genus.

The characters which I have taken for the primary groups, marked A and B, of lateral sepals reflexed spreading or deflexed, and erect or ascending, are in most cases obvious; but in dried specimens of some species placed in Sect. V. it is difficult to say whether the lateral sepals are reflexed naturally or accidentally, or whether, though erect in early flowering, they afterwards spread. The root and its tubers require investigation throughout the genus.

The staminodes present great variety; in most species they are mere warts on the sides of the anther, but in several not otherwise allied they are linear or styliform processes, attached either to the anther or base of the column, as in *Diphylax* and *Dithrix*.

At the end of the genus I have placed four monotypic sections founded on plants differing remarkably in habit from any of their congeners; some of these will, I expect, eventually be regarded (and rightly) as monotypic genera, but in my present imperfect knowledge of any but the Indian species of this very large genus, I prefer keeping them as sections, awaiting their confirmation as genera under the authority of a monographer of the whole tribe of *Ophrydeæ*.

KEY TO THE SECTIONS.

A. *Lateral sepals spreading deflexed or reflexed.*

In some small-flowered species of Sect. v. *Peristylus*, the lateral sepals appear to be spreading or deflexed during or after flowering, and might hence be placed in Sect. iii.

Sect. I. ATE. *Petals* truncate 2-fid or 2-partite. *Lip* 3-lobed or -partite. (Sp. 1-14.)

Sect. II. PLATYGLOSSA. *Petals* entire. *Lip* 3-lobed or -partite, side lobes broad (narrow in *H. platyphylla*) petaloid, mid-lobe narrow. (Sp. 15-34.)

Sect. III. TRIMEROGLOSSA. *Petals* entire. *Lip* 3-partite, side lobes very narrow, entire, usually filiform (lip entire in *Peloria* forms of *H. Mandersii* and *reniformis*). (Sp. 35-66.)

Sect. IV. HOLOGLOSSA. *Petals* entire. *Lip* entire, linear. (Sp. 37-66.)

B. *Lateral sepals erect, or ascending parallel to the dorsal and petals, or forming a hood with these, rarely at length spreading or deflexed.*

Sect. V. PERISTYLUS. *Petals* entire. *Lip* usually 3-fid or 3-partite (entire in *H. breviloba*).—*Flowers* usually very small, and *petals* broader than the lateral sepals and often fleshy; spur rarely exceeding the ovary, usually very short or saccate. (Sp. 67-99.)

Sect. VI. PHYLLOSTACHYA. *Petals* entire. *Lip* broad, entire, petaloid; spur conico-infundibular. *Flowers* large, in the axils of sheathing leaves; stigmatic processes 0; rostellum obscure. (See also 32. *H. triflora*.) (Sp. 100-102.)

ABERRANT SPECIES (OR GENERA?) OF GROUP B.

VII. PLECTOGLOSSA. *Flowers* large, in the axils of imbricating leaves. *Lip* coriaceous, clawed, 3-fid, longitudinally 3-plicate in bud, spur long slender. *Stigmatic processes* large, rhomboid; rostellum broad, triangular. (Sp. 103.)

VIII. DIPHYLAX. *Flowers* small, secund; lip entire; spur short, fusiform. *Anther* with a setiform staminode on each side as long as itself. (Sp. 104.)

IX. DIPYLA. *Flowers* small, secund. *Lip* 3-fid, spur inflated. *Pollinia* sessile on a single large obcordate gland seated in a sinus of the broad 2-lobed rostellum. *Stigmatic processes* small. (Sp. 105.)

X. DITHRIX. *Flowers* small, secund, tubular; sepals petals and lip coherent at the base. *Lip* oblong, 3-fid, base saccate. *Staminodes* 2, filiform, capitate, inserted on the back of the anther. *Stigma* a transverse cushion; rostellum a transverse plate below the anther. (Sp. 106.)

Sect. 1. ATE. See p. 132.

* Petals truncate or 2-fid.

1. **H. lucida**, Wall. in *Lindl. Gen. & Sp. Orchid.* 314; leaves fascicled towards the base of the tall scape, sepals cymbiform, petals subpanduriform truncate. *Platanthera lucida*, *Lindl. in Wall. Cat.* 7047.

PEGU; at Rangoon, *Wallich*. TENASSERIM, at Moulmein, *Parish*.—DISTRIB. Siam.

Leaves 4-8 by 2-2½ in., petioled, obovate or oblanceolate. *Scape* with the very lax-fid. raceme 12-20 in.; bracts broadly ovate, half as long as the slender pedicelled beaked ovary, or longer, tips subulate; flowers ½ in. diam., greenish; lateral sepals reflexed, obtuse; petals smaller and narrower, contracted below the truncate end; lip subequally 3-partite, midlobe narrow 3-nerved thick, rather longer than the sepals, lateral as long spreading and incurved; spur slender, curved, nearly as long as the ovary or longer, mouth with a short ligule; anther-cells short, erect, approximate, tubes short upcurved; pollinia pyriform, gland long narrow; stigmatic processes short, clavate; rostellum minute.

2. **H. barbata**, *Wight in Wall. Cat.* 7034; stem leafy, petals 2-fid pubescent. *Ate virens*, *Lindl. Gen. & Sp. Orchid.* 327; *Wight Ic.* t. 928; *Thwaites Enum.* 309.

TRAVANCORE; in the Pulney and Dindygah Mts., *Wight*. CEYLON; in the Maturatta district.

Stem 10-12 in. *Leaves* 3-5 in., erect, lanceolate, acuminate. *Racemes* few-fid.; bracts large, sheathing, as long as the flowers, or longer; flowers ¾ in. diam., green; lateral sepals narrowly falcate, acuminate; petals much broader, base rounded, upper lobe much the longest, tips filiform, lower broad acuminate, sinus rounded; lip longer than the sepals, scabrid, limb linear, trifurcate at the end, the segments subulate; spur as long as the ovary, mouth with a very long recurved ligule; anther-cells parallel, tubes as long as the cells upcurved, pollinia clavate, caudicles very long, glands small; stigmatic processes very long spreading; rostellum minute. *Capsule* ¾ in. long, linear-oblong.

3. **H. acuminata**, *Thwaites in Trim. Cat. Ceyl. Pl.* 91; stem leafy, petals 2-fid glabrous. *Ate acuminata*, *Thwaites Enum.* 309.

CEYLON; in the central province, *Walker*, *Thwaites*.

Stem 1-2 ft. *Leaves* 2-4 in., erect, lanceolate, and as well as the large cymbiform bracts petaceously acuminate. *Racemes* elongate, lax-fid.; flowers subsecund, ½ in. diam., green; lateral sepals broadly ovate, obtuse; upper lobe of petals slender exceeding the dorsal sepal and about twice as long as the subulate lower; lip as long as the sepals, broadly 3-lobed, dark purple, lobes broad fleshy obtuse very variable in length; anther-cells spreading below, tubes recurved, pollinia clavate, as long as their caudicles, glands minute; stigmatic processes large, globose; rostellum small, triangular.

** Petals 2-partite.

† Stem leafy upwards. Racemes many-flid.

§ *Sepals with filiform tips*.

4. **H. stenopetala**, Lindl. *Gen. & Sp. Orchid.* 319 (not 324); tall, leaves oblong or ovate-lanceolate base narrowed or broad and amplexicaul, raceme dense-flid., bracts as long as the ovaries, segments of petals slender equal or the lower shorter, segments of tripartite lip filiform, spur long slender equalling the ovary.

NORTH WEST INDIA; road to Kashmir, *Royle*. SIKKIM HIMALAYA, alt. 3-6000 ft., *J. D. H. & c.* UPPER ASSAM; the Naga hills, *Griffith, Prain*. LOWER BENGAL; at Mymensing, *Clarke*. ORISSA; at Singboom, *Clarke*. The CONCAN; *Stocks, &c.*

Stem 1-2 ft., stout. *Leaves*, 6-8 in., base contracted into a broad petiole or sessile. *Raceme* short, 4-6 in.; bracts membranous; flowers very variable in size, greenish; sepals oblong-lanceolate, $\frac{3}{4}$ - $\frac{1}{2}$ in. long, membranous, 3-nerved, filiform tips as long as the blade or shorter; lower segment of the petals sometimes obsolete; segments of lip very variable, the lateral sometimes as long or longer than the middle one, at others they are much shorter and subulate; spur equalling the ovary; anther-cells narrow, parallel, tubes nearly as long as the cells; caudicles of pollinia slender, glands small; stigmatic processes elongate, clavate; rostellum large, triangular, erect. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in., linear-oblong.—A very variable plant; the flowers of the Orissa and Bengal specimens are remarkably small; of some Sikkim ones also very small.

5. **H. macrostachya**, Lindl. *Gen. & Sp. Orchid.* 307; leaves large crowded above the middle of the robust stem, raceme lax-flid., bracts equaling the ovary, segments of petals subequal filiform, segments of 3-partite lip subequal filiform, spur shorter than the ovary. *Thwaites Enum.* 309.

TRAVANCORE; on the Anamallay hills, *Beddome* (in *Herb. Calcutt.*). CEYLON, *Macrae*, alt. 4000 ft., *Thwaites*.

Stem 2 ft. *Leaves* 5-7 in., obovate or oblanceolate, acute, broadly petioled. *Raceme* 6-8 in.; bracts and ovary very narrow; sepals $\frac{3}{4}$ in. long; petals and lip spotted with red; lip longer than the sepals, spur very slender, thickened downwards; anther-tubes as long as the parallel cells, suberect, pollinia pyriform, glands minute; stigmatic processes long, slender, adnate to the mouth of the lip; rostellum small.—The spur is stoutest in the Travancore specimen.

6. **H. andamanica**, *Hook. f. Ic. Plant. ined.*; leaves crowded towards the middle of the stout stem, raceme lax-flid., bracts rather shorter than the ovary, upper segment of petals very slender, lower broader divided above the middle into 3 filiform laciniae, side lobes of lip palmately multifid, midlobe linear 3-flid, spur shorter than the ovary.

ANDAMAN ISLANDS; *Parish*.

Stem 12-18 in. *Leaves* 3-4 in., ovate-lanceolate, acute. *Raceme* 6-8 in.; bracts lanceolate; ovary $1\frac{1}{4}$ in., very slender; sepals $\frac{1}{2}$ in. long; laciniae of mid-lobe of lip filiform; anther-cells parallel, tubes rather shorter than the cells; glands of pollinia minute; stigmatic processes subcylindric, elongate; rostellum erect.

§§ *Sepals without filiform tips*.

7. **H. digitata**, Lindl. *Gen. & Sp. Orchid.* 307; leaves ovate or ovate-oblong, raceme laxly many-flid., lateral sepals ovate acute, dorsal suborbicular, petals bipartite, segments subequal or the upper broader, lip tripartite segments linear, spur equalling the ovary. *Dalz. & Gibs. Bomb.*

Fl. 267. *H. trinervia*, *Wight Ic.* t. 1701. *Bonatea punduana*, *Lindl. in Wall. Cat.* 7063. *B. benghalensis*, *Griff. in Calc. Journ. Nat. Hist.* iv. 382. *B. herbacea*, *Wall. mss.*

KASHMIR, *Falconer*. ASSAM, *Simmons*. SILHET, *Wallich*. BENGAL, *Griffith*. TENASSERIM, *Parish*. The WESTERN GHATS, from the Concan southwards.

Stem 1–2 ft., leafy. *Leaves* 2–5 in., very variable, acute or acuminate, rarely narrowed into a petiole, from orbicular to lanceolate. *Raceme* 3–5 in.; bracts large, lanceolate, often almost foliaceous and exceeding the flowers; pedicels very short; flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, green; segments of petals variable in length, sinus between the segments narrow or rounded; midlobe of lip shorter or longer than the side lobes; spur subclavate, sometimes inflated, with an erect ligule at the mouth; anther-cells parallel, tubes short upcurved; glands of pollinia minute; stigmatic processes clavate; rostellum erect, triangular. *Capsule* shortly pedicelled, $\frac{1}{2}$ in., fusiform, ribs thick.

Var. *foliosa*; smaller, 6–12 in. high, leaves shorter broader imbricating, raceme dense-fl., bracts shorter, segments of lip filiform. *H. foliosa*, *A. Rich. in Ann. Sc. Nat. Ser.* 2. xv. 71; *Wight Ic.* t. 1700; *Dalz. & Gibs. Bomb. Fl.* 267. *H. laciniata*, *Dalz. in Hook. Journ. Bot.* ii. (1850) 261. *Platanthera marginata*, *Wall. Cat.* 7038 *B.* *Orchis mysorensis*, *Herb. Heyne*.—Nilghiri Mts., alt. 6–8000 ft. Bombay, at Salsette, *Dalzell*.—I have not seen the Salsette plant (*H. laciniata*) of Dalzell, which he describes as having the posticous segment of the petals spirally twisted, and the mid segment of the lip broader than the others; he refers it to *H. foliosa* quoting *Wight's* plate, and adds that it is allied to *H. lancifolia*, *A. Rich.*

8. *H. travancorica*, *Hook. f.*; leaves scattered ovate-oblong amplexicaul, raceme lax-fl., lateral sepals ovate acute pubescent within, petals bipartite, segments narrow lower shortest, lip tripartite, segments subequal filiform, spur shorter than the ovary. *H. Lindleyana*, *Wight Ic.* t. 922 (not of *Steudel*).

TEAVANCORE; on the Pulney Hills, *Wight*.

Stem slender, 12–18 in. *Leaves* 1–2 in. *Raceme* 3–5 in.; bracts as long as the beaked ovary or longer; flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; dorsal sepal orbicular; lip longer than the sepals.—The pubescent sepals (not observed by *Wight*) and habit distinguish this from all forms of *H. digitata*, of which however it may prove to be a variety. The leaves and flowers are much smaller, and the ligule at the mouth of the spur very short.

9. *H. Gibsoni*, *Hook. f. Ic. Plant. ined.*; very stout, leafy, leaves linear-oblong, raceme few-fl., bracts equalling or exceeding the ovary, flowers 1 in. diam., petals bipartite, segments narrow subequal, lip tripartite segments linear-subulate subequal fleshy, mouth of clavate spur broad without a ligule.

The CONCAN; near Kyreswur and at Kandalla, *Gibson*.

Stem 8–12 in. *Leaves* 4–6 in., base sheathing. *Raceme* short, 6–8-fl.; bracts 1–1½ in., membranous, broadly lanceolate, the lower exceeding the flowers; flowers white? as in *H. digitata*, but twice as large; upper segment of petals broadest, fleshy, and anther broad, stigmatic processes adnate to the back of the broad mouth of the spur; rostellum small, triangular, exposed.—Much like a gigantic state of *H. digitata*, but very robust, with much longer leaves, narrower for their length, and few very large flowers, and no ligule at the very broad mouth of the spur.

10. *H. dolichostachya*, *Thwaites Enum.* 309; stem leafy upwards, leaves oblong-lanceolate amplexicaul, raceme lax-fl., bracts as long as the flowers, lateral sepals ovate-lanceolate acute, petals bipartite, lower segment short subulate, lip tripartite, segments filiform the middle longest, spur as long as the ovary slender.

CEYLON; in the Central Province, alt. 5000 ft., *Gardner, Thwaites*.

Stem 2-3 ft., leafless below, slender. *Leaves* 2-3 in. *Raceme* 1 ft.; flowers subsessile, about $\frac{1}{2}$ in. broad; dorsal sepal orbicular, mucronate; lip longer than the sepals, side segments spreading; spur as long as the hardly beaked ovary, mouth with a short ligule; anther broad, cells parallel, tubes long upcurved, glands of pollinia small; stigmatic processes clavate, incurved round the mouth of the spur; rostellum short, triangular.—Nearly allied to *H. digitata*, but the flowers are smaller and the base of the leaves amplexicaul.

11. *H. corymbosa*, *Parish & Reichb. f. in Trans. Linn. Soc.* xxx. 141; very stout, leaves lanceolate, raceme dense-fl., bracts longer than the long-pedicelled beaked ovary, sepals broad acute, petals bipartite, segments slender lower subulate half the length of the upper, lip 3-partite, segments subulate subequal or lateral smaller.

TENASSERIM; at Moulmein, *Parish*.

Stem 2-3 ft., leafy upwards, but naked below, and with only sheaths for the upper half. *Leaves* 3-6 in., base contracted. *Raceme* 3-4 in., very dense-fl.; pedicels filiform; bracts $\frac{3}{4}$ -1 in., lanceolate; flowers $\frac{1}{2}$ in. diam.; sepals 3-nerved; lip not longer than the sepals, spur equalling the ovary, tip clavate; anther-cells divaricate below, tubes as long as the cells; pollinia narrow, glands minute; stigmatic processes elongate, clavate; rostellum triangular, acute.

12. *H. dichopetala*, *Thwaites Enum.* 309; leaves crowded about the middle of the stem ovate or ovate-lanceolate, lateral sepals ovate acute, dorsal orbicular, petals bipartite, segments divaricate elongate lowest narrowest and longest, lip tripartite, segments equal elongate setaceous, spur as long as the ovary slender pendulous.

CEYLON; Bintenne district, *Thwaites (in Herb. Lindl.)*.

Stem 1-1 $\frac{1}{2}$ ft. *Leaves* dark green with a red midrib, petioled. *Raceme* lax-fl.; bracts lanceolate; flowers greenish about $\frac{1}{2}$ in. diam.—The above description is from "*Thwaites' Enum.*" There are two specimens from Thwaites in Lindley's Herbarium which differ somewhat from that description, the leaves are linear-oblong erect and sheath the stem all the way up, the bracts $\frac{1}{2}$ - $\frac{2}{3}$, ovary with pedicel $\frac{2}{3}$ -1 in., segments of petals subequal on the lower rather than longest, mid segment of lip the shortest, anther-cells distant, stigmatic processes globose; rostellum short.

†† Stem leafy at or near the base only.

13. *H. grandiflora*, *Lindl. in Wall. Cat.* 7032; leaf solitary radical orbicular or ovate-cordate, flowers few long-pedicelled, petals bipartite upper segment obliquely ovate acuminate lower longer filiform, lip tripartite lateral segments filiform terminal linear or elongate lanceolate, spur longer than the ovary. *Dalz. & Gibs. Bomb. Fl.* 267. *H. rotundifolia*, *Lindl. Gen. & Sp. Orchid.* 306. *Orchis grandiflora*, *Herb. Heyne*.

The CONCAN; on the Ghats at Belgaum, Mahabuleshwar, &c., *Heyne, &c.*

Leaf 1-2 in. *Scape* 3-6 in., naked or with 1-2 sheaths, 2- or more-fl.; bracts sheathing, shorter than the pedicel, which with ovary is 1-1 $\frac{1}{2}$ in.; flowers $\frac{1}{2}$ -1 in. broad, white; sepals broad; petals rather smaller; margins of mid-segment of lip recurved, spur obtuse or thickened at the tip, mouth with a caruncled callus; anther 3-cuspidate, cells parallel, tubes rather short broad spreading, glands of pollinia large orbicular; stigmatic processes large, clavate; rostellum elongate, erect.

14. *H. rariflora*, *A. Rich. in Ann. Sc. Nat. Ser. 2, xv.* 70, t. 2; leaves radical or subradical linear-oblong or lanceolate acute, flowers few long-pedicelled, upper segment of petals ovate acuminate lower usually much longer filiform, lip tripartite, lateral segments filiform, median

linear, spur very long and stout. *Wight Ic. t. 924; Dalz. & Gibs. Bomb. Fl. 269.* *H. uniflora, Dalz. in Hook. Journ. Bot. iii. (1857) 344.*

The DECCAN PENINSULA; on the Ghats, ascending to 6000 ft., from Canara to Travancore.

Leaves very variable, in small specimens 2-3 by $\frac{1}{4}$ - $\frac{1}{2}$ in. and linear, in others 3-4 by 1 in. and elliptic-oblong, in some cauline 3-5 by $\frac{1}{2}$ - $\frac{3}{4}$ in., or ovate complicate and recurved. *Scape* 2-10 in., with 1-2 sheaths; bracts shorter than the stiff erect pedicels, which are as long as the ovary, together 1-2 in.; flowers very variable in size and length of lip, white; dorsal sepal $\frac{1}{8}$ - $\frac{1}{2}$ in. broad, lateral 5-nerved; upper segment of petals 3-4-nerved; spur 1-3 in., upcurved; anther large, apiculate, cells parallel, tubes short upcurved, glands of pollinia orbicular; stigmatic processes clavate; rostellum erect slender.—In Dalzell's *H. uniflora* the segments of the petals are described as subequal.

Sect. II. PLATYGLOSSA. (See p. 132.)

* Side lobes of the lip lacerate to the middle or inner margin, midlobe linear.

15. **H. Susannæ**, *Br. Prodr.* 312; tall, robust, leaves ovate-oblong upper sheathing, flowers few very large, lateral sepals subquadrately oblong ascending, petals linear acute, lip not longer than the sepals, side lobes very broad pectinate, spur twice as long as the ovary. *Blume Bijdr.* 402. *H. gigantea, Don Prodr.* 24; *Bot. Mag. t. 3374; Grah. Cat. Bomb. Pl.* 201. *Plantanthera Susannæ, Lindl. Gen. & Sp. Orchid.* 295; *Wight Ic. t. 920; Dalz. & Gibs. Bomb. Fl.* 269. *P. gigantea, Lindl. in Wall. Cat.* 7052. *P. robusta, Lindl. in Wall. Cat.* 7036; *Gen. & Sp. Orchid.* 295. *Orchis Susannæ, Linn. Sp. Pl.* No. 939. *O. gigantea, Sm. Exot. Bot. t. 100.* *O. altissima, Herb. Ham.*

TROPICAL HIMALAYA, from Garwhal eastwards; the KHASIA, NAGA and MUNIPORE HILLS, BURMA and the DECCAN PENINSULA to TRAVANCORE.—DISTRIB. China, Malay Islands.

Stem 2-4 ft.; tubers 3-4 in. long. *Leaves* 2-6 in., imbricating up to the flowers, upper cucullate. *Raceme* 3-5-fld.; bracts leafy; flowers 3-4 in. diam., subsessile, white, fragrant; sepals spreading, lateral obtuse, dorsal very broad rhomboid spreading; petals small; side lobes of lip truncate; midlobe linear, or dilated downwards; anther very broad and large, cells slightly divergent, tubes adnate to the sides of the column; pollinia linear, about as long as their caudicle; stigmatic surfaces obscure; rostellum confluent with the face of the column.—This is a true *Platanthera*, in wanting the produced stigmatic processes, and the obscure rostellum, which is marked by a triangular line only.

16. **H. pectinata**, *Don Prodr.* 24; leaves ovate-lanceolate, spike dense-fld., bracts leafy, flowers large, dorsal sepal lanceolate, lateral ovate-lanceolate, petals linear falcate glabrous, lip not longer than the sepals, spur rather longer than the ovary. *Wall. Cat.* 7029 A, and B in part. *H. Gerardiana, Wall. Cat.* 7031. *H. ensifolia, Lindl. Gen. & Sp. Orchid.* 321. *Orchis pectinata, Smith Exot. Bot. t. 99.*

TEMPERATE HIMALAYA, from Simla, alt. 5-8000 ft., eastwards, ascending to 9000 ft. in Sikkim. KHASIA HILLS.

Stem 1-2 ft., robust, very leafy. *Leaves* 4-6 in., strongly 3-nerved, upper or all sheathing, rarely linear-lanceolate. *Spike* 3-8 in.; bracts equalling or exceeding the flowers which are 1-2 in. diam. white or greenish; sepals 5-nerved, dorsal erect; petals obtuse, variable in breadth, somewhat dilated on the outer margin, 3-5-nerved; lip as long as the sepals, spur $\frac{1}{2}$ - $\frac{2}{3}$ in., tip subclavate; anther very broad and large,

cells rather divergent, tubes short, glands of pollinia small; stigmatic processes elongate, tips often falcate dilated and upcurved; rostellum obscure. *Capsule* $\frac{2}{3}$ in., sessile, fusiform, ribs thick.—Black when dry.

17. *H. arietina*, Hook. f.; habit and foliage of *H. pectinata*, but petals pubescent broader than the dorsal sepals gibbously dilated on the outer (lower) margin, spur rather longer than the ovary. *H. pectinata*, Lindl. *Gen. & Sp. Orchid.* 341; *Wall. Cat.* 7029 B in part, and C.

TEMPERATE HIMALAYA; from Simla eastwards, alt. 5–8000 ft. and to 10,000 ft. in Sikkim. KHASIA HILLS, alt. 5–6000 ft.

So similar in a dried state to *H. pectinata* as to be with difficulty distinguishable, and though separated by Lindley, perhaps only a variety. Unfortunately Lindley in describing both species gave Don's name to the wrong plant, as I have proved by examining Smith's original specimen of *O. pectinata* in his Herbarium at the Linnean Society, which is of a very small state.—Black when dry.

18. *H. intermedia*, Don. *Prodr.* 24; leaves ovate or oblong acuminate, flowers few very large, dorsal sepal recurved, lateral reflexed narrower than the dimidiate obovate falcate glabrous petals, lip longer than the sepals, spur twice as long as the ovary. *Lindl. Gen. & Sp. Orchid.* 322; *Wall. Cat.* 7030; *Reichb. f. in Gard. Chron.* 1879, 136.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 5–7000 ft.

Stem 8–10 in. *Leaves* 2–4 in., scattered, 5–7-nerved, base rounded or cordate. *Racemes* few-fl.; bracts broad, equalling the ovary; flowers 2 in. diam., white or greenish; lateral sepals falcately lanceolate, acuminate, reflexed, 5-nerved; petals strongly 5-nerved; spur very stout; anther-cells with long erect filiform tubes, glands of pollinia small; stigmatic processes long, slender, incurved; rostellum adnate to the face of the column between the anther-cells. *Capsule* $1\frac{1}{4}$ –2 in., pedicelled, fusiform, beaked, terete.

19. *H. trichosantha*, Wall. *Cat.* 7028; leaves ovate-oblong or lanceolate, spike lax-fl., bracts shorter than the long-decurved narrow ovary, lateral sepals ovate-oblong or lanceolate acuminate puberulous, petals linear falcate acuminate, lip longer than the sepals, side lobes capillaceo-multifid, spur longer than the ovary.

BURMA, at Taongdong, Wallich; Moulmein, Parish; Attran, Brandis (*in Herb. Calcutt.*).

Stem 8–18 in. *Leaves* few, 3–6 in., 5–7-nerved. *Raceme* 4–10-fl.; ovary 1 in., sessile; lateral sepals $\frac{1}{2}$ in., deflexed; petals dilated upwards, entire or serrulate, 1-nerved; spur $1\frac{1}{2}$ in.; anther-cells short, with short free tubes, pollinia much shorter than their caudicles, glands small; stigmatic processes short, globose; rostellum an obscure plate between the anther-cells. *Capsule* 1 in., fusiform, shortly beaked, deeply channelled.

** Side lobes of lip petaloid, outer margins entire, toothed, or fimbriate, midlobe narrow.

† Lip deeply 3-lobed or partite, not or hardly longer than the lateral sepals.

20. *H. geniculata*, Don *Prodr.* 25; stem tall leafy with many slender sheaths above, lateral sepals acute, petals linear-oblong, lip sub-orbicular, side lobes cuneate or rounded fimbriate or create, spur longer than the beaked ovary geniculate. *Platanthera geniculata*, Lindl. in *Wall. Cat.* 7042.—*Habenaria*, Griff. *Notul.* iii. 406; *Itin. notes*, 31, No. 494; *Ec. Plant. Asiat.* t. 340.

SUBTROPICAL HIMALAYA; from Nepal eastwards. KHASIA and NAGA HILLS, alt. 2-5000 ft. BURMA, *Wallich*.

Stem 1-2 ft., stout. *Leaves* 2-6 in., sessile, oblong-lanceolate. *Spike* 4-20-fl.; bracts as long as the ovary; flowers $\frac{3}{4}$ -1 in. long, white; lateral sepals $\frac{1}{2}$ in.; lip often $\frac{3}{4}$ in. broad; spur subclavate below the knee; anther-cells broad, divaricate, tubes elongate, upcurved, glands of pollinia small; stigmatic processes, clavate, incurved, margining the mouth of the spur; rostellum low, broad. *Capsule* 1 in., shortly pedicelled, beaked, deeply grooved and thickly ribbed.

21. **H. Richardiana**, *Wight Ic.* t. 1713; stem rather slender sheathed above, leaves oblong-lanceolate, spike few- and lax-fl., sepals ovate acuminate, glabrous, petals gibbously triangular subacute, lip cuneate strongly nerved, side lobes narrow deeply toothed, spur stout twice as long as the beaked ovary.

NILGHIRI and TRAVANCORE HILLS, alt. 6-8000 ft., *Wight, &c.*

Stem 6-8 in. *Leaves* often subradical, 4-6 in., cauline much smaller, or reduced to sheaths. *Spike* 8-10-fl.; bracts large, lanceolate, shorter than the curved ovaries, which are $\frac{2}{3}$ in. long; flowers obscurely puberulous, about $\frac{2}{3}$ in. diam.; dorsal sepal smaller than the 5-nerved lateral; side lobes of lip recurved, acuminate, longer or shorter than the linear 3-nerved midlobe, spur $1\frac{1}{2}$ in., slightly thickened downwards; anther-cells distant, tubes short upcurved, glands of pollinia cupular; stigmatic processes large, clavate; rostellum triangular.

22. **H. cephalotes**, *Lindl. Gen. & Sp. Orchid.* 322; stem short stout closely sheathed above, leaves short broad, spike dense-fl., lateral sepals obliquely ovate and shorter broad gibbous petals and lip scurfily pubescent within, lip cuneately obovate, side lobes fimbriate, spur shorter than the beaked ovary. *Wight Ic.* t. 1711.

NILGHIRI and TRAVANCORE HILLS, alt. 7-8000 ft., *Wight*.

Habit and foliage of *H. Richardiana*, but stouter, stem more densely sheathed, and flowers smaller, crowded in a cylindric or oblong spike; dorsal sepal very broad, obtuse; petals in *Wight's* figure with a deep sinus on the lower margin; midlobe of lip rather longer than the side lobes; anther-cells broad, nearly parallel, tubes rather long upcurved, glands of pollinia minute; stigmatic processes long clavate; rostellum short broad.

23. **H. polyodon**, *Hook. f.*; stem short stout sheathed above, leaves ovate-lanceolate, spike many-fl., bracts sheathing as long as the ovary, sepals obtuse glabrous, petals triangular-ovate obtuse, lip broadly obcordate, side lobes erose or pectinately fimbriate, spur very stout exceeding the stout curved ovary. *H. fimbriata*, *Wight Ic.* t. 1712.

NILGHIRI HILLS, *Wight, &c.*

Stem 8-10 in., leafy to the top; tubers large. *Leaves* 2-3 in., sheathing, upper cymbiform. *Spike* 3-4 in., lax- or dense-fl.; flowers $\frac{2}{3}$ in. diam.; bracts cymbiform; sepals broadly ovate, obtuse, dorsal smallest; petals smaller, triangular, fleshy; midlobe of lip short, oblong, spur clavate; anther broad, cells subparallel, tubes short ascending, pollinia longer than their caudicles, gland minute; stigmatic processes very large, short, stout; rostellum very short, broad.

24. **H. longicornu**, *Lindl. in Wall. Cat.* 7027; *Gen. & Sp. Orchid.* 322 (*longicornis*); leaves subradical linear-oblong or lanceolate acuminate, spike lax-fl., bracts shorter than the ovary, lateral sepals ovate acute glabrous, petals lanceolate or linear-oblong, lip tripartite, side lobes recurved cuneate fimbriate or crenate, spur stout twice as long as the very long-beaked ovary. *H. montana*, *A. Rich. in Ann. Sc. Nat. Ser. ii.* xv. 73; *Wight Ic.* t. 925 and t. 1714, *centre figure and lower right-hand flower.* *Orchis longicornu*, *Herb. Heyne.*

NILGHIRI and TRAVANCORE MTS., Heyne, &c.

Stem 6-12 in. *Leaves* 2-5 in., usually linear-oblong, rarely (as figured by *Wight*) shorter and broader. *Spike* 3-6-fl.; upper half of ovary almost filiform; flowers nearly 1 in. long; side lobes of lip longer than the linear midlobe; mouth of spur caruncled; anther-cells broad, parallel, tubes rather long spreading, pollinia as long as their caudicles; stigmatic processes short, clavate; rostellum low, broad.

25. **H. platyphylla**, *Spreng. Syst. Veg.* iii. 690; scapigerous, leaves sessile orbicular or elliptic, spike short dense-fl., bracts shorter than the long-beaked ovary, sepals broadly oblong obtuse, petals linear narrow, lip 3-lobed, side lobes small rounded, midlobe lanceolate, spur longer than the ovary slender. *Lindl. Gen. & Sp. Orchid.* 323; *Grah. Cat. Bomb. Pl.* 201; *Wight Ic. t.* 1709. *Orchis platyphyllos*, *Willd. Sp. Pl.* iv. 10; *O. plantaginea*, *Roxb. Cor. Pl.* 32, t. 37; *Fl. Ind.* iii. 450. *O. Roxburghii*, *Pers. Syn.* ii. 503.

The DECCAN PENINSULA; from the Concan and the Circars to Travancore.

Leaves 3-6, appressed to the earth, fleshy, 3-5 in. long, and as broad or narrower. *Scape* 6-18 in.; stout, strict; sheaths many, erect, narrowly subulate; spike 2-4 in., round-topped, flowers white, sweet-scented; sepals concave; ovary 1 in., beak slender, as long as the body; lip much less deeply lobed than in others of this group, margins erose, spur sometimes twice as long as the ovary, mouth funnel-shaped, with a short tooth; anther-cells divergent, tubes long, pollinar glands small; stigmatic processes subglobose; rostellum short triangular.

26. **H. Lindleyana**, *Steud. Nomencl. Ed.* 2, 716; leaves subradical large ovate-oblong acute, scape tall with a few lanceolate sheaths at the tip, raceme few-fl., flowers large, bracts narrowly lanceolate shorter than the very long ovary, dorsal sepal much smaller than the large oblong acute entire lateral, petals small falcate, side lobes of lip narrow linear much shorter and narrower than the linear-oblong obtuse midlobe, spur filiform longer than the ovary. *H. latifolia*, *Lindl. Gen. & Sp. Orchid* 323.

MALAY PENINSULA (*Ic. Finlayson in Herb. Kew*).

Leaves 5-6 by 2-2½ in., membranous, almost petioled, many-nerved. *Scape* 12 in.; bracts ⅔ in., linear-lanceolate, membranous; ovary 1½ in.; flowers white, spur green; dorsal sepal broadly ovate, acuminate, reflexed, lateral ⅔ in. long, subfalcate, 5-7-nerved; petals much smaller, acuminate; lip 1 in., rather longer than the sepals, midlobe 3-nerved; tube of anther-cells long, slender; stigmatic processes elongate.—A noble species. *Lindley* gives "Ceylon, Macrae" as its origin, but as a fine drawing by *Finlayson* (who collected only in the borders of Siam) is in *Herb. Kew*, and *Thwaites* never saw the plant in Ceylon, this is, no doubt, one of several plants in *Herb. Lindley* wrongly attributed to Ceylon. It is evidently nearly allied to *H. platyphylla*.

27. **H. suaveolens**, *Dalz. in Hook. Journ. Bot.* ii. (1850) 263; leaves subradical linear or linear-oblong acuminate, scape slender, spike few-fl., flowers secund, bracts longer than the ovary narrowly cymbiform acuminate, sepals subequal, petals as long but broader, lip cuneately flabellate, side lobes broad, midlobe as long narrow, spur as long as the curved beaked ovary, tip subclavate. *Dalz. & Gibs. Bomb. Fl.* 268 (excl. syn.).

The CONCAN; between Vignoria and Malwan, rare, *Dalzell*.

Leaves 4-6 by ½-¾ in., rather thick. *Scape* 6-12 in., often flexuous; sheaths 1-3 in.; bracts ⅔ in. long, finely acuminate, herbaceous; flowers 3-6, ½ in. broad, white, jasmine-scented; dorsal sepal orbicular-ovate, obtuse, lateral subfalcate, ovate-oblong, acute; petals triangular-ovate, subacute; lip as long as the lateral sepals, as broad as long, side lobes toothed or entire; anther narrow, erect, apiculate, cells contiguous narrow, tubes 0; pollinia clavate, as long as their stout caudicles;

glands large orbicular, lying close together on each side of the erect acute rostellum; (stigmatic processes short, truncate, *Dalzell*).—A very anomalous species of this section.

†† *Lip deeply 3-lobed or -partite, much longer than the lateral sepals.*

28. **H. longifolia**, *Ham. in Lindl. Gen. & Sp. Orchid.* 324; stem tall slender leafy, leaves very narrow, spike few- and lax-fl'd., bracts slender longer than the slender beaked ovaries, sepals small, petals gibbously ovate, lip flabelliform, side lobes semi-circular quite entire, spur slender twice as long as the ovary. *Gymnadenia longifolia*, *Lindl. in Wall. Cat.* 7060.

WESTERN HIMALAYA; Kumaon, *Royle*; Népál, at Nathpur, *Hamilton*.

Stem 10–18 in. Leaves 3–5 in., scattered, erect, linear, acuminate. Spike 2–3 in.; bracts $\frac{3}{4}$ –1 in.; ovary $\frac{1}{2}$ – $\frac{3}{4}$ in., curved; flowers white; lateral sepals $\frac{1}{2}$ in., oblong-lanceolate, 3-nerved, dorsal smaller; petals 3-nerved, as long as the dorsal; lip $\frac{1}{2}$ – $\frac{3}{4}$ in. long and broad, twice or thrice as long as the lateral sepals, midlobe linear, shorter than the side lobes; anther beaked, cells parallel, tubes upcurved; stigmatic processes short, clavate, incurved, surrounding the mouth of the spur; rostellum long, subulate, erect.

29. **H. plantaginea**, *Lindl. Gen. & Sp. Orchid.* 323; scapigerous, leaves narrowly oblong, scape slender, spike lax-fl'd., bracts half as long as the beaked ovary, sepals small, petals linear-lanceolate, lip flabelliform, side lobes semi-ovate entire or toothed, midlobe as long linear, spur as long as the ovary very slender. *Wight Ic. t.* 1710. *Gymnadenia platyphylla*, *Lindl. in Wall. Cat.* 7053. *Orchis platyphyllos*, *Roxb. Fl. Ind.* iii. 609. *O. tenuis*, *Herb. Rottl.*

SUBTROPICAL HIMALAYA, alt. 3–7000 ft., from Garwhal to Sikkim. BEHAR, CENTRAL INDIA, and the DECCAN PENINSULA, from the Concan southwards, *Heyne*, &c. CEYLON, in the hot drier parts of the Island.

Leaves 3–6 in., radical, horizontal, acute or obtuse, membranous. Scape 8–12 in., slender; sheaths small, acuminate; spike 2–3 in.; flowers subsecund, white; bracts setaceous or lanceolate; ovary $\frac{3}{4}$ in., curved; sepals $\frac{1}{2}$ in. long, subequal, acute, 3-nerved, dorsal ovate-oblong, lateral falcately oblong; lip $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, twice as long as the lateral sepals, puberulous, spur 1–1 $\frac{1}{2}$ in. green; anther rather broad, cells divergent, tubes short upcurved, pollinia as long as their caudicles, glands elongate; stigmatic processes large, clavate; rostellum triangular, broad. Capsule $\frac{3}{4}$ in., turgidly fusiform, curved, beak short slender.—In this species the caudicles of the pollinia are at first inserted in the hollow of a single concave 2-lipped or incurved gland of a lanceolate form, which afterwards splits longitudinally, each pollinia carrying away one half.

30. **H. longicalcarata**, *A. Rich. in Ann. Sc. Nat. Ser. 2*, xv. 71, t. 3; subscapigerous, leaves linear-oblong or lanceolate, flowers 1–4, bracts long convolute much shorter than the long-pedicelled beaked ovaries, sepals broad obtuse, petals oblong-lanceolate acuminate, side lobes of lip dimidiate-ovate acuminate fimbriate or toothed, spur several times longer than the long narrow ovary. *Wight Ic. t.* 925; *Dalz. & Gibs. Bomb. Fl.* 268. *H. decipiens*, *Wight. Ic. v. Pt. i.* 14. *H. montana*, *Wight Ic. t.* 1714 (*upper right and left hand figures*) (*not of A. Richard.*) *H. longicorniculata*, *Grah. Cat. Bomb. Pl.* 202. *H. macroceratitis*, *Herb. Rottl.*

The DECCAN PENINSULA; on the Western Ghats, from the Concan to Travancore, ascending to 6000 ft.

Stem or scape 10–18 in.; sheaths few, distant. Leaves 2–4 in. Flowers white, asmine-scented; bracts $\frac{3}{4}$ –1 in.; ovary 1 in., suberect, its pedicel sometimes as long; sepals $\frac{1}{2}$ in. long, 3-nerved; lip $\frac{1}{2}$ –1 in. long, spur thickened from below the middle to

the tip; anther very broad, tubes as long as the cells, pollinia narrowly pyriform shorter than their slender caudicles, which are narrowly winged on one side, glands very small; stigmatic processes surrounding the mouth of the spur; rostellum obscure.—Allied to *H. longicornu*, but much more slender, leaves longer, flowers much larger, lip longer than the sepals, its side lobes broader, and spur very much longer.

31. *H. crinifera*, Lindl. *Gen. & Sp. Orchid.* 323; scapigerous, leaves oblong or lanceolate, raceme lax-fl., bracts much shorter than the pedicelled ovary, sepals broad obtuse, petals linear acuminate, lip clawed sub 4-partite, side lobes cuneate or dimidiate-ovate crenate caudate, mid-lobe 2-lobuled, spur very slender incurved much longer than the filiform beaked ovary. *Wight Ic. t.* 926; *Dalz. & Gibs. Bomb. Fl.* 269. *H. schizochilus*, *Grah. Cat. Bomb. Pl.* 282. *Symmeria schizochilus*, *Grah. l. c. on last (unnumbered) page.*

The DECCAN PENINSULA, from the Concan to Travancore. CEYLON.

Leaves 1-6 in., very variable in breadth. *Scape* 1-18 in., very slender; sheaths scattered, subulate: bracts lanceolate; flowers white, $\frac{3}{4}$ -1 $\frac{1}{2}$ in. long; dorsal sepal orbicular, subacute, lateral broadly ovate; lip much longer than the sepals, as it were 4-lobed, the lobes tailed; spur with a long erect ligule at the mouth; anther tubes long, straight; caudicles of pollinia winged as in *H. longicalcarata*, glands minute; stigmatic processes clavate, adnate to the mouth of the spur; rostellum very short, obtuse.

32. *H. triflora*, Don *Prodr.* 25; stem leafy 1-2-fl., leaves short sheathing, bracts long embracing the ovaries of the large erect flowers, dorsal sepal oblong-ovate, lateral oblong-lanceolate, petals small linear-subulate, lip very large, side lobes semi-oblong hatchet-shaped crenulate, midlobe shorter linear, spur very slender as long as ovary straight. *Platanthera candida*, Lindl. in *Wall. Cat.* 7035; *Gen. & Sp. Orchid.* 295.

WESTERN HIMALAYA; Kumaon, alt. 5000 ft., *Strachey & Winterbottom*; Nepal, *Wallich*. LOWER BENGAL; at Mymensingh, *Clarke*.

Stem 8-12 in., rather slender. *Leaves* 1-3 in., oblong, acute, sometimes all imbricating, or the lower larger and spreading, upper acuminate. Flowers shortly pedicelled; bracts and slender ovary 1-1 $\frac{1}{2}$ in. long; sepals $\frac{1}{2}$ in. long, suberect; petals 1-nerved; lip 1-1 $\frac{1}{2}$ in. broad, sessile on the mouth of the spur, and there bigibbous; spur slightly thickened at the tip, mouth funnel-shaped; anther very broad, quadrate, truncate, cells marginal, tubes short free, glands of pollinia minute; staminodes prominent; stigmatic surface inconspicuous; rostellum broad obscure.—The suberect lateral sepals, and sheathed stem recall the species of the *Phyllostachya* section.

*** *Lip short, 3-lobed at the broad apex.*

33. *H. Orchidis*, Hook. f.; stem stout leafy, leaves oblong or linear-oblong erect acute, spike short cylindric very dense-fl., bracts longer than the short curved ovaries, flowers small, sepals puberulous, dorsal elliptic, lateral oblong, petals shorter rhombic-orbicular, lip cuneately obovate, spur as long as the ovary slender incurved. *Gymnadenia cylindrostachya*, Lindl. in *Wall. Cat.* 7056; *Gen. & Sp. Orchid.* 278. *G. Orchidis*, and violacea, Lindl. *Gen. & Sp. l. c.* *Platanthera Orchidis*, Lindl. in *Wall. Cat.* 7039 A.

TEMPERATE HIMALAYA; Garwhal, alt. 8-9000 ft., *Duthie*; Kumaon, *Wallich*; Sikkim, alt. 8-1000 ft., *J. D. H.*

Stem 1-2-ft. *Leaves* 2-6 in., broad or narrow, sheathing, sometimes short and imbricating. *Spike* 2-5 in.; bracts lanceolate, herbaceous; ovary $\frac{1}{2}$ in. long, incurved, subrotund; flowers $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., pink, odoriferous, perianth spreading;

dorsal sepal oblong; lobes of strongly nerved lip very short, obtuse, equal or the midlobe longest and broadest; anther short, broad, cells parallel contiguous, tubes 0, pollinia clavate almost sessile on the large oblong gland, grains very large and loose; stigmatic processes very large, globose, placed close under the anther, and swelling up after fertilization so as almost to cover it; rostellum minute. *Capsule* small, sessile, $\frac{1}{8}$ in. long, broadly ellipsoid or subglobose.—A very anomalous member of the section.

34. *H. monophylla*, Collett & Hemsl. in Journ. Linn. Soc. ined.; leaf solitary subradical, stem and many-fld. raceme scurfily pubescent, bracts as long as the ovary or shorter, sepals and petals subequal oblong obtuse glabrous, lip much larger than the sepals clawed cuneately obovate 3-lobed, lateral lobes broad erose, midlobe smaller ovate obtuse, spur as long as the lip incurved obtuse.

UPPER BURMA, Collett.

A foot high, rather slender. Leaf 2 in., oblong, obtuse, sheathing the base of the stem. Stem flexuous; sheaths 2-3, $\frac{1}{2}$ in., and bracts lanceolate, acuminate. Raceme 2 in., rather dense-fld.; bracts $\frac{1}{2}$ in.; flowers about as broad as long; side lobes of lip as broad as long, diverging, disk puberulous, speckled; anther ovoid or globose, cells parallel contiguous, tubes 0, glands of pollinia contiguous orbicular.— Closely allied to *H. Orchidis*. Described from a single indifferent specimen.

Sect. III. TRIMEROGLOSSA. (See p. 132.).

* Tubes of the anther-cells long.

† *Perianth membranous; lateral sepals with deeply looped or arched nerves.*

35. *H. commelinifolia*, Wall. in Lindl. Gen. & Sp. Orchid. 325; tall, robust, leaves oblong to oblong-lanceolate, bracts longer than the long-beaked ovary slender, dorsal sepal orbicular much smaller than the gibbously hatchet-shaped beaked lateral, petals oblong, lip with a linear blade dividing into 3 very long filiform segments, spur very long. Griff. Notul. iii. 372; Ic. Plant. Asiat. t. 339. *Platanthera commelinifolia*, Lindl. in Wall. Cat. 7037. *Orchis commelinifolia*, Roxb. Fl. Ind. iii. 451; Grah. Cat. Bomb. Pl. 201. *O. stylosanthes*, Herb. Ham.

TROPICAL WESTERN HIMALAYA; Kumaon, alt. 3500 ft., Royle, Strachey & Winterbottom. The CONCAN and CANARA, Stocks, Law, &c.

Stem 2-3 ft.; tubers ellipsoid (2-9 in. long, Roxb.). Leaves 3-6 in., upper or sheaths lanceolate. Spike 4-8 in.; ovary 1-1 $\frac{1}{2}$ in., upper two-thirds filiform; flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., white, incdorous; mid segment of lip deflexed, scaberulous, lateral widely spreading; spur 1-2 $\frac{1}{2}$ in., incurved, green, mouth funnel-shaped; anther reflexed, tubes long straight erect; staminodes seated on the long arms of the column; stigmatic processes large, clavate, incurved; rostellum short, triangular. *Capsule* $\frac{1}{2}$ in., sessile, fusiform, beak twice as long as the body.

36. *H. malleifera*, Hook. f.; tall, stout, leaves clustered large ob-lanceolate acute, spike long many-fld. furfuraceous, dorsal sepal orbicular cucullate much smaller than the large deformed lateral, petals very small, lip longer than the sepals tripartite to the base, segments filiform subequal or central longest, spur half as long as the long-beaked ovary, tip involute globose or clavate.

SIKKIM HIMALAYA; at Senadah, alt. 6000 ft., King (Herb. Calcutt.). KHASIA HILLS, Lobb; at Myrung, alt. 5000 ft., J. D. H. & T. T.

Stem with raceme 12–18 in.; hairs cellular, scattered. *Leaves* clustered below the middle of the stem, 5–8 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in. *Raceme* 4–6 in., lax-flid.; sheaths large, ovate, finely acuminate; bracts $\frac{3}{4}$ –1 in., shorter than the ovary, ovate-lanceolate; flowers greenish, about $\frac{1}{2}$ in. diam.; ovary $\frac{3}{4}$ –1 in., beak very slender; dorsal sepal embracing the anther, lateral reflexed triangular-oblong in outline but with the lower margin so gibbous as to form an obtuse false apex to the 5-nerved sepal, the true apex in which the looped nerves end being close to the base of the sepal; petals gibbously triangular; staminodes adnate to the sides of the anther; anther recumbent, tubes very long decurved; pollinia clavate, caudicle very long, glands minute; stigmatic processes very long; rostellum obscure.

37. **H. Murtoni**, *Hook. f.*; leaves petioled crowded towards the base of the stem oblanceolate, spike puberulous, dorsal sepal orbicular hooded, much smaller than the deformed lateral, petals small triangular, lip much longer than the sepals tripartite to the base, segments filiform subequal or lateral shorter, spur longer than the long-beaked ovary slender.

MALAY PENINSULA; Perak, on limestone rocks, *Scortechini*, *Kunstler*. SINGAPORE, *Murton*.

Stem 2–3 ft., with rather close-set ovate-lanceolate leafy sheaths, 1–2 in. long above the leaves. *Leaves* 6–10 by 2–3 in., narrowed into a broad petiole. *Spike* lax-flid.; bracts ovate-lanceolate, equalling the decurved ovary; flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; upper margin of lateral sepals very short straight, tip lateral, nerves forming deep loops; anther-cells very much as in *H. malleifera*, tubes very long; pollinia shorter than their long caudicles, glands minute; stigmatic processes globose; rostellum obscure.

38. **H. Kingii**, *Hook. f.*; robust, leaves large crowded towards the base of the stem petioled, spike puberulous, dorsal sepal obovate cucullate as long as the cultriform beaked strongly falcate lateral, petals linear-lanceolate obtuse, lip much longer than the sepals tripartite to the base, segments very slender subequal, spur as long as the slender long-beaked ovary.

PERAK; on limestone rocks, *King's Collector*.

Stem 1– $2\frac{1}{2}$ ft. *Leaves* 5–10 in., acute or acuminate. *Spike* lax-flid.; bracts ovate-lanceolate, as long as the ovaries; flowers pale silvery green; sepals about $\frac{1}{2}$ in. long, acuminate, 5-nerved; petals shorter than the dorsal sepal, 1-nerved; spur slightly thickened downwards; anther closely embraced by the hooded dorsal sepal, tubes very long stigmatic processes and rostellum as in *H. Murtoni*.—Differs from *H. Murtoni* in the form of the lateral sepals, the long dorsal, and in the petals and spur. Both these and *H. furfuracea* are near *H. ciliaris*, Kranzlein of China, and *H. muricata*, Vidal, of the Philippine Islands.

39. **H. furfuracea**, *Hook. f.*; tall, leaves large obovate or oblanceolate clustered, spike lax-flid. furfuraceous with short cellular hairs, dorsal sepal broadly ovate acuminate hooded as long as the cultriform strongly curved lateral, lip subequally tripartite to the base, spur shorter than the long-beaked ovary tip fusiform.

KHASIA HILLS; at Nunklow, alt. 3–4000 ft., *J. D. H. & T. T.*

Closely allied to *H. Kingii*, but more slender, with a furfuraceous spike and a shorter spur with a fusiform tip. The anthers stigmatic apparatus, &c., are nearly the same in both. This and *Kingii* differ remarkably from *H. malleifera* & *Murtoni* in the less deformed lateral sepals.

40. **H. pubescens**, *Lindl. Gen. & Sp. Orchid.* 322; stem leafy towards the base and elongate many-flid. raceme pubescent, leaves elliptic-lanceolate base narrowed, dorsal sepal hemispheric nearly as long as the dimidiate-ovate obtuse lateral, petals linear, lip much longer than the

sepals tripartite, segments linear obtuse central broadest, spur slender as long as the curved beaked ovary tip acuminate.

WESTERN HIMALAYA; Kumaon or Garwhal, *Royle, Falconer.*

Stem 12-18 in., stout; upper sheaths free, ovate-lanceolate. *Leaves* 4-6 by 1-1½ in., not margined. *Spike* 8-10 in.; bracts ovate-lanceolate, ciliolate, shorter than the ovary which is curved, ½ in., pubescent, beak slender; lateral sepals ⅓-½ in. long; tubes of anther-cells long, straight; staminodes large; stigmatic processes globose.—Much the smallest flowered of its subdivision.

41. **H. spatulæfolia**, *Par. & Reichb. f. in Trans. Linn. Soc. xxx.* 140; leaves 2-3 subradical obovate-spathulate, scape slender 2-fld., sheath and bracts large broad cymbiform, dorsal sepal hemispheric as long as the hatchet-shaped lateral, petals linear-oblong falcate, lip tripartite to the base, segments filiform side ones short central very long incurved, spur longer than the ovary tip clavate.

TENASSERIM; at Mergui, *Parish.*

Leaves 4-5 by 1-1½ in., not margined, subpetioled. *Scape* as long; sheath solitary; bracts much shorter than the filiform straight beaked pedicelled ovary which is 1½ in. long; sepals ½ in. long; tubes of anther-cells very long, slender; stigmatic processes short.—Habit of *Diplomeris*.

↑↑ *Lateral sepals curved or nearly straight, nerves straight or moderately arched.*

42. **H. pterocarpa**, *Thwaites Enum.* 309; stem leafy, leaves long linear-lanceolate, bracts equalling the ovary, flowers few very large, dorsal sepal ovate-oblong rather shorter than the falcate oblong-lanceolate acuminate lateral, petals linear-oblong falcate, lip twice as long as the sepals 3-cleft to above the middle, side lobes subulate-lanceolate falcately recurved longer than the straight midlobe, spur very large thrice as long as the beaked ovary thickened from below the middle.

CEYLON; at Kandy, *Walker*; at Ramboddi, alt. 3000 ft., *Thwaites.*

Stem 6-18 in. *Leaves* 4-10 in., base contracted. *Spike* 3-10-fld.; bracts large, ovate-lanceolate; ovary narrowly winged, shortly pedicelled; flowers 1½-2 in. diam., white; ovary 1½ in. long; lateral sepals spreading or deflexed, dorsal rather shorter acute as long as the petals; spur 3½ in., green, narrowly clavate, mouth with a tooth; midlobe with deflexed sides; anther-cells divaricate; caudicles of pollinia exactly as in *H. longicalcarata*; stigmatic processes elongate, clavate; rostellum triangular.

43. **H. rhynchocarpa**, *Hook. f.*; stem leafy, leaves lanceolate, spike short dense-fld., dorsal sepal cymbiform half as long as the broadly ovate-oblong lateral, petals linear, lip as long as the sepals 3-lobed to the middle, lobes linear-lanceolate acute mid one longest, spur much longer than the long slender beaked ovary. ? *H. stenopetala*, *Lindl. Gen. & Sp. Orchid.* 324 (not of p. 319). *Platanthera rhynchocarpa*, *Thwaites Enum.* 310.

CEYLON; above Galagama, alt. 4000 ft., *Thwaites.*

Stem 1-2 ft., leafy below the middle. *Leaves* 2-6 in., sessile. *Spike* 2-3 in., dense-fld.; bracts slender, equalling the ovary or longer; flowers white, ½-¾ in. diam.; lateral sepals deflexed, subacute; spur 1-1½ in., cylindric, green, obtuse; anther-cells divaricate, tubes straight; glands of pollinia minute; stigmatic processes elongate, incurved, adnate to the mouth of the lip; rostellum minute.—Lindley's *H. stenopetala* of p. 324 (not of p. 319) is I think a starved specimen of *rhynchocarpa*.

44. **H. vidua**, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 140, t. 27, f. 2; leaves subbasal elliptic-lanceolate acute, scape above and flowers puberulous, raceme lax-flid., bracts much shorter than the ovary, dorsal sepal orbicular pubescent rather smaller than the oblong subacute lateral, petals hatchet-shaped, lip tripartite, segments filiform subequal longer than the sepals side ones recurved over the flower, midlobe deflexed, spur longer than the long-beaked ovary acute.

TENASSERIM; at Moulmein, *Parish*.

Stem short, stout, with 1-2 spreading sheaths above the leaves. *Leaves* 3-5 by $\frac{1}{3}$ - $1\frac{1}{2}$ in. *Raceme* 4-6 in.; bracts ovate, acuminate; flowers $\frac{1}{2}$ in. diam., green and white, sweet scented; pedicel with ovary $\frac{3}{4}$ -1 in., nearly straight; lateral sepals reflexed, margins revolute; spur thickened below; tubes of anther-cells divaricate; pollinia much shorter than their slender caudicles, glands small; stigmatic processes short, clavate, adnate to the mouth of the spur; rostellum short, broad. *Capsule* $\frac{3}{4}$ in., shortly pedicelled, straight, fusiform, beak short.

45. **H. Mandersii**, *Hemsl. & Collett in Journ. Linn. Soc. ined.*; tall, lower leaves linear-oblong upper narrow lanceolate, raceme glabrous, bracts as long as the slender pedicelled long-beaked ovaries, dorsal sepal ovate obtuse as long as the oblong obtuse lateral, petals as long as the sepals linear-oblong obtuse, lip as long as the sepals entire or tripartite nearly to the base lateral segments 0 or shorter than the linear midlobe and recurved, spur twice as long as the ovary geniculate tip clavate.

BURMA; at Mandalay, *Anderson (in Herb. Calcutt.)*, *Collett*.

Stem with raceme 18 in. *Leaves* (imperfect) 3 in., upper narrow ones erect, 1- $1\frac{1}{2}$ in. *Raceme* 4 in.; bracts 1 in., ciliolate, lanceolate; ovary narrowly winged; sepals $\frac{1}{2}$ in., 3-nerved, lateral subfalcate; petals usually straight, 3-nerved; margins of midlobe of lip revolute, spur 1-2 in., mouth with a large obtuse ligule with revolute sides, the convex face (towards the mouth) has 2 short conical spurs side by side and a median tooth above them; anther very large, tubes long erect; pollinia much shorter than their long narrowly winged caudicle; glands ovate; stigmatic processes clavate.—The organ at the mouth of the spur is very curious.

46. **H. rostrata**, *Watl. in Lindl. Gen. & Sp. Orchid.* 325; leaves lanceolate acuminate, upper passing into many slender erect sheaths, spike many- and lax-flid., dorsal sepal cymbiform much shorter than the broadly ovate falcate lateral, petals broadly oblong obtuse, lip much longer than the sepals segments very long filiform, spur shorter than the very long-beaked ovary, tip pyriform. *Platanthera rostrata*, *Lindl. in Wall. Cat.* 7051 A.

PEGU and TENASSERIM, *Wallich*.

Stem 6-12 in. *Leaves* 4-6 by $\frac{1}{2}$ - $\frac{2}{3}$ in. *Spike* 2-4 in.; bracts very slender, ciliolate, longer than the ovary; flowers yellow spotted with brown, about $\frac{1}{3}$ - $\frac{1}{2}$ in. diam.; sepals coriaceous lateral dimidiate oblong, deflexed, 5-nerved, tips turned up; petals oblong, pubescent, falcate, shorter than the sepals; tubes of anther-cells elongate, caudicles of pollinia long, glands linear; stigmatic processes forming a ring round the mouth of the ovary; rostellum very short, triangular. *Young fruit* with the beak as long as the body.

47. **H. acuífera**, *Wall. in Lindl. Gen. & Sp. Orchid.* 325; slender, leaves scattered linear-lanceolate acuminate upper setaceous, spike short, bracts longer than the beaked ovary, sepals obtuse, dorsal broadly oblong shorter than the concave oblong lateral, petals much smaller linear-oblong, lip as long as the sepals, side lobes short subulate, midlobe linear, spur half as long as the ovary. *H. linguella*, *Lindl. l. c.* 325 (*excl. hab. Ceylon*).

Platanthera acuiifera, Lindl. in Wall. Cat. 7045. *P. rostrata*, Lindl. in Wall. Cat. 7051 B.

KHASIA HILLS, alt. 4-5000 ft., common. NAGA HILLS, Prain. TAVOY, Wallich.—DISTRIB. China.

Stem 10-18 in., flexuous. Leaves 2-4 by $\frac{1}{2}$ - $\frac{1}{2}$ in., erect, base sheathing, upper and linear lanceolate ciliolate bracts very finely acuminate; ovary $\frac{1}{2}$ - $\frac{3}{4}$ in., rugose, beaked for half its length; flowers golden, $\frac{2}{3}$ in. diam.; dorsal sepal strongly 3-lateral 5-nerved; petals 1-nerved; margins of midlobe of lip revolute, spur slightly clavate; anther large, apiculate, tubes long erect, caudicles of pollinia long very slender, glands minute; stigmatic processes clavate, incurved.—Lindley errs in describing the leaves as all radical, and in giving Ceylon as a habitat.

48. *H. chlorina*, Reichb. f. in Trans. Linn. Soc. xxx. 140; habit and character of *H. acuiifera*, but rather stouter, leaves broader, spike longer, sepals and petals 3-nerved, side lobes of lip large and spur incurved below the middle with a large clavate ellipsoid tip.

TENASSERIM; at Moulmein, Lobb, Parish. SHAN STATES, alt. 4400 ft., Collett.

Leaves $\frac{1}{2}$ - $\frac{3}{4}$ in. broad. Spike 2-3 in. long; flowers at first yellow-green, then spotted with brown, at last brown.—Probably a form of *H. acuiifera*, but besides the above difference the flowers are smaller.

** Tubes of anther-cells short.

† Stem leafy upwards.

§ Bracts lanceolate, acuminate. Flowers not or hardly secund.

49. *H. elliptica*, Wight Ic. t. 1706; leaves all linear-oblong or lanceolate acuminate narrowly margined, spike many-fld., bracts longer than or equalling the ovaries, dorsal sepal shorter than the broadly oblong obtuse lateral, petals triangular-ovate ciliolate, lip as long as the sepals trifid beyond the middle lobes oblong obtuse, spur stout equalling the shortly beaked incurved ovary.

TRAVANCORE; on the Pulney Mts., Wight.

Stem 12-18 in., rather stout. Leaves 2-3 by $\frac{1}{2}$ - $\frac{3}{4}$ in., upper short sheathing, erect or incurved. Spike 2-4 in., cylindric; bracts finely acuminate; flowers greenish-white, about $\frac{1}{2}$ in. diam.; perianth thick subpuberulous; sepals 3-nerved, dorsal ciliolate almost orbicular, lateral ovate-oblong; petals $\frac{1}{2}$ shorter, fleshy; lobes of lip parallel; anther broad, cells distant divaricate, tubes short; pollinia longer than their stout caudicles, glands small; stigmatic processes large, clavate; rostellum broad, triangular.

50. *H. fusifera*, Hook. f.; leaves oblong acute narrowly margined, spike many-fld., bracts longer than the ovary, dorsal sepal suborbicular nearly as long as but broader than the oblong obtuse lateral, petals larger than the sepals triangular-ovate, lip larger than the sepals 3-partite to the base, side segments filiform longer than the linear mid segment, spur shorter than the curved ovary fusiform with a short narrow neck.

TRAVANCORE; on the Annamallay Hills, Beddome (in Herb. Calcutt.).

Habit of *H. elliptica*, but very different in the shorter not beaked ovary, larger dorsal sepal, and petals, 3-partite lip, and spur; flowers yellow; anther broad, cells divaricate, tubes short; pollinia clavate, caudicles short, glands small; stigmatic processes clavate, incurved, adnate to the mouth of the spur.—I have seen only one specimen.

51. **H. trifurcata**, *Hook. f.*; leaves petioled elliptic-lanceolate acuminate, spike many-fl., bracts equalling the ovary, sepals subequal ovate-lanceolate acute, petals narrowly linear, lip as long as the sepals 3-partite to near the base segments subulate, spur as long as the ovary or longer slender.

KHASIA HILLS; at Nowgong (*Herb. Calcutt.*).

Stem 10–12 in., rather slender, leafless below. *Leaves* 3–4 in., alternate, membranous, not margined, upper or sheaths lanceolate. *Spike* many-fl.; bracts slender, lanceolate; ovary $\frac{1}{2}$ – $\frac{1}{2}$ in., slightly curved; sepals $\frac{1}{4}$ in. long, membranous, 3-nerved; petals as long, 1-nerved; anther oblong, cells contiguous, tubes short divaricate; stigmatic processes elongate, clavate, adnate to the sides of the lip; rostellum narrow, erect.—The petioled scattered leaves and petals distinguish this at once from *H. furcifera*, and the petals and spurs from *fusifera*.

52. **H. avana**, *Hook. f.*; leaves linear-lanceolate acuminate, spike many-fl., bracts longer than the flowers, dorsal sepal very broad, lateral oblong acute, petals as long triangular, lip longer than the sepals tripartite from beyond the base, segments linear-subulate lateral incurved, spur as long as the short not beaked ovary.

BURMA; at Ava, *Mrs. Burney* (*Herb. Calcutt.*).

Stem 6–10 in. *Leaves*, lower 2 in., with long tubular sheaths, upper many erect very narrow. *Spike* dense-fl.; lower bracts $\frac{3}{4}$ in.; ovary $\frac{1}{2}$ in., curved; sepals rather shorter, dorsal broadly ovate obtuse 5-nerved, lateral deflexed 3-nerved; petals 2-nerved; lip hardly twice as long as the sepals, linear before forking; anther short, rather broad, tips of cells recurved hardly tubular; caudicles of pollinia very short, glands large; stigmatic processes long, clavate, adnate to the lip; rostellum broad, acute, flat.—The specimens are indifferent.

§§ *Bracts large, cucullate. Flowers secund.*

53. **H. Heyneana**, *Lindl. Gen. & Sp. Orchid.* 320; stem stout, leaves subimbricate short sheathing acute, bracts cymbiform acuminate sheathing the flowers, sepals subequal obtuse, petals as long narrow, lip equalling the sepals 3-partite side lobes linear obtuse midlobe longer and broader, spur as long as the ovary or shorter straight subclavate. *Wight Ic.* t. 923, 1703–4; *Dalz. & Gibs. Bomb. Fl.* 268. *H. glabra*, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 75, t. 5 A. *Platanthera Heyneana*, *Lindl. in Wall. Cat.* 7044.

The DECCAN PENINSULA; on the Ghats, from the Concan southwards, ascending to 7500 ft. on the Nilghiris.

Stem 6–10 in. *Leaves* 1–1½ in., ovate, erect or recurved, rarely scattered and narrower. *Spike* 2–4 in.; bracts imbricating, lower 1 in. long; ovary $\frac{1}{2}$ in., not beaked; flowers greenish-yellow; sepals $\frac{3}{8}$ – $\frac{1}{4}$ in., thick, nerves obscure, dorsal ovate-oblong, lateral narrower; petals linear-oblong; lip thick, variable, midlobe oblong or ovate-lanceolate; anther short, cells rather spreading, tubes 0; caudicles of pollinia very short stout, glands very close together, large, orbicular; stigmatic processes very large, spreading, clavate; rostellum short, triangular, acute.—Turns black in drying.

54. **H. subpubens**, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 75, t. 4 C; leaves linear or linear-oblong scattered, bracts narrowly boat-shaped acuminate, sepals subequal, petals as long falcate, lip spathulate clawed 3-fid, as long as the sepals, side lobes linear midlobe broader, spur as long as the ovary acute. *H. candida*, *Dalz. in Hook. Journ. Bot.* ii. (1850), 262; *Dalz. & Gibs. Bomb. Fl.* 267.

The SOUTHERN CONCAN, *Perrottet, Jacquemont, Dalzell*, and NILGHIRI HILLS, &c.

Very near *H. Heyneana*, and perhaps only a form of it, but more slender, leaves scattered linear 2–2½ in., bases narrowed, bracts narrower, flowers white, lip very different, spur more slender, anther apiculate, glands of the pollinia approximate and even cohering oblong with recurved sides, stigmatic processes longer, adnate to the claw of the lip.—Does not turn black in drying.

†† Leaves more than three, clustered towards the middle or base of the stem.

55. *H. fuscifera*, *Lindl. Gen. & Sp. Orchid.* 319; leaves elliptic, spike long many-fl., bracts as long as the ovary, sepals subequal dorsal ovate-oblong obtuse, lateral falcately oblong-lanceolate subacute, petals as long oblong retuse, lip longer than the sepals trifurcate, side segments filiform longer than the linear mid segment, spur longer than the ovary very slender involute. *H. hamigera, Griff. in Calc. Journ. Nat. Hist.* iv. 380, t. 20. *H. tenuicornis, Wall. mss.*

TROPICAL HIMALAYA; Garwhal, alt. 2–3000 ft., *Royle, Edgeworth.* BHOTAN, *King.* ASSAM, *Wallich.* ORISSA, *Clarke.* EAST BENGAL, *Griffith.*

Stem 10–18 in., stout, with distant small sheaths above the leaves. *Leaves* 4–6 by 1½–2 in., acute or acuminate, base contracted, not petioled. *Spike* 5–7 in., narrow; bracts ovate-lanceolate; ovary ½ in., curved, hardly beaked; sepals ½ in. long, 3-nerved, lateral reflexed; petals as long, membranous, 2-nerved; anther rather small, tubes upcurved; stigmatic processes short. *Capsule* ½ in., fusiform, turgid, decurved, ribs thick, beak ¼ as long as the body.

56. *H. affinis*, *Wight Ic. t.* 1707; leaves large elliptic-lanceolate acuminate, spike elongate cylindric, bracts equalling or exceeding the curved beaked ovary, sepals subequal or dorsal longest ovate-oblong obtuse, petals as long linear- or oblong-lanceolate obtuse, lip longer than the sepals 3-partite, side segments narrow longer than the linear obtuse mid segment, spur half as long as the ovary slender incurved.

CENTRAL INDIA; at Singboom, *Clarke.* The CONCAN and CANARA, *Law, Ritchie*, &c. TRAVANCORE; on the Anamallay Hills, *Beddome (in Herb. Calcutt.)*

Stem stout, 1–2 ft.; clothed above the leaves with many erect lanceolate sheaths. *Leaves* 4–6 by 2–2½ in., hardly petioled, not margined. *Spike* 4–10 in., rachis stout; bracts ½–¾ in.; flowers green; ovary ½ in., beak short; sepals ½ in., 3-nerved; lip twice as long as the sepals; anther broad, cells parallel, tubes shortly upcurved, glands of pollinia small; stigmatic processes large, clavate.—The Travancore specimen has broader segments of the lip than the northern ones.

57. *H. ovalifolia*, *Wight Ic. t.* 1706; subscapigerous, leaves elliptic-lanceolate acute, scape tall, raceme elongate slender lax-fl., bracts as long or half as long as the ovary, dorsal sepal orbicular as long as the ovate obtuse lateral, petals as large as the lateral obtuse, lip as long as the sepals 3-partite side lobes linear-oblong obtuse incurved shorter than the ovate fleshy midlobe, spur slender rather longer than the slender beaked ovary incurved tip thickened acute.

DECCAN PENINSULA; on the Ghats, from the Concan to the Nilghiris.

Tall, 1–2 ft. *Leaves* 2–3, 6–8 by 2–4½ in., sessile or subpetioled, acute or acuminate. *Scape* with a leafy sheath below and slender ones above the leaves; spike 10 in. and under; flowers distant, ¼ in. diam, greenish; bracts lanceolate; nerves of sepals and petals obscure; spur straight, pendulous; anther short, cells diverging, tubes short upcurved, caudices of pollinia short, glands small; stigmatic processes clavate; rostellum short, broad.

58. **H. marginata**, *Coleb. in Hook. Fl. Exot.* t. 136; subscapigerous, leaves few subradical sessile oblong or linear-oblong margins yellow, spikes many-fld., bracts equalling the ovary, dorsal sepal broadly ovate as long as the oblong-lanceolate lateral, petals ovate falcate, lip longer than the sepals tripartite side segments slender longer than the linear obtuse central, spur stout equalling the curved ovary or shorter inflated below. *Lindl. Gen. & Sp. Orchid.* 320; *Dalz. & Gibs. Bomb. Fl.* 268; *Griff. Notul.* iii. 371; *Ic. Plant. Asiat.* t. 341; in *Calcutt. Journ. Nat. Hist.* iv. 382. *Platanthera marginata*, *Lindl. in Wall. Cat.* 7038. *H. promensis*, *Wall. Cat.* 7033; *Lindl. Gen. & Sp. Orchid.* 320. *Orchis mysorensis* and *clavata*, *Herb. Heyne*.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 5-7000 ft. BEHAR and BENGAL (*wild in Bot. Gard. Calc.*). BURMA, *Wallich*. The DECCAN PENINSULA, common on the Western Ghats.

Leaves $\frac{3}{4}$ -5 in. *Scape* 4-10 in.; sheaths many, erect, lanceolate, broad or narrow. *Spike* 2-6 in., cylindric; bracts ciliolate; flowers $\frac{1}{2}$ in. diam., yellow-green; lateral sepals 3-5-nerved, deflexed; petals as long, 2-nerved; spur clavate or fusiform below the middle; anther-cells distant, tubes short spreading funnel-shaped; caudicles of pollinia short, glands large; stigmatic processes long, adnate to the lip; rostellum triangular, acute. *Capsule* $\frac{1}{2}$ in., fusiform, turgid, curved, obscurely beaked.

59. **H. flavescens**, *Hook. f.*; scape slender, leaves few radical linear-oblong yellowish when dry margined with yellow, scape slender few-fld., bracts equalling the ovary, dorsal sepal broadly ovate, lateral oblong-lanceolate acute, petals larger than the sepals ovate-oblong, lip rather longer than the sepals 3-partite side-segments slender, mid-segment linear-oblong margins recurved, spur shorter than the ovary tip clavate.

The CONCAN, *Law, &c.*

A much more slender plant than *H. marginata*, turning yellow when dry, with fewer smaller flowers, and a more distinctly beaked ovary; but perhaps only a form of that plant.

60. **H. viridiflora**, *Br. Prodr.* 312; scapigerous, leaves shorter than the scape linear-lanceolate not margined, raceme many-fld., bracts much shorter than the beaked ovaries, dorsal sepal orbicular-ovate much shorter than the broadly oblong lateral, petals broadly obliquely ovate as long as the dorsal sepal, lip longer than the sepals 3-partite, segments slender, spur as long as the beaked ovary thickened below. *Lindl. Gen. & Sp. Orchid.* 319; *Wight Ic.* t. 1705. *H. graminea*, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 73 (*not of Lindl.*). *H. tenuis*, *Griff. in Calc. Journ. Nat. Hist.* iv. 379, t. 20; *Notul.* iii. 369; *Ic. Plant. Asiat.* t. 342. *Orchis viridiflora*, *Swartz. in Act. Holm.* 1800, 206; *Willd. Sp. Pl.* iv. 13.

LOWER BENGAL, *Griffith, Clarke*. The DECCAN PENINSULA; in rice fields, *Heyne, &c.* CEYLON, alt. 5-7000 ft., *Walker, &c.*

Tubers ovoid, $\frac{3}{4}$ -1 in. long. *Leaves* many, 2-4 by $\frac{1}{3}$ - $\frac{1}{2}$ in., acuminate, nerves obscure. *Scape* 4-14 in., slender, sheaths many and bracts lanceolate; raceme rather close-fld.; flowers $\frac{1}{2}$ in. diam., greenish-yellow; sepals 3-nerved, lateral reflexed; segments of lip variable in length; ovary $\frac{3}{4}$ in. long; anther-cells short, divaricate, tubes short upcurved, caudicles rather shorter than their pollinia; stigmatic processes clavate; rostellum short, broad. *Capsule* $\frac{3}{4}$ in., fusiform, straight or curved, beak short, pedicel $\frac{1}{4}$ in.

Var. *Dalzellii*; leaves radical linear 3-5 in., scape very slender wiry, flower rather smaller, spur longer than the ovary slender incurved. *Cæloglossum luteum*

Dalz. in Hook. Journ. Bot. ii. (1850), 263; Dalz. & Gibs. Bomb. Fl. 269 (excl. syn.).—The Deccan Peninsula; Malwan, *Dalzell, &c.*

61. **H. khasiana**, *Hook. f.*; scapigerous, leaves linear not margined, scape slender, raceme elongate, bracts much shorter than the ovary, sepals 3-nerved, dorsal nearly as long as the rather narrower lateral, petals as long ovate-lanceolate, lip much longer than the sepals, side segments much the longest filiform, spur as long as the beaked ovary rather stout slightly incurved. *H. graminea*, *Lindl. Gen. & Sp. Orchid.* 318 (*not of Sprengel*). *Platanthera linifolia*, *Lindl. in Wall. Cat.* 7041 (*the Silhet plant*).

KHASIA HILLS; in grassy places, alt. 4–5000 ft., common.

Leaves 3–4 by $\frac{1}{2}$ – $\frac{3}{4}$ in., acute or acuminate. *Scape* with elongate raceme 8–12 in.; sheaths very few and bracts lanceolate; ovaries $\frac{1}{2}$ – $\frac{2}{3}$ in., suberect, curved, shortly pedicelled and beaked; flowers sweet-scented, yellow, narrow; the strictly deflexed lateral sepals and erect dorsal sepal are in one line, $\frac{1}{2}$ in. long; anther broad, cells subparallel, tubes short; caudicles of pollinia short stout, gland rather large; stigmatic processes clavate, adnate to the mouth of the spur; rostellum very short, broad. *Capsule* $\frac{1}{2}$ in., subsessile, fusiform, not beaked.—Very near *H. viridiflora*, from which the narrower leaves, shorter pedicels, subequal sepals, of which the dorsal is narrower and erect, and stout spur distinguish this.

62. **H. ditricha**, *Hook. f.*; scapigerous, leaves linear acute not margined, spike few-fl., bracts as long as the ovary, sepals 1-nerved dorsal broadly ovate as long as the lanceolate acute lateral, petals as long ovate-lanceolate acute, lip much longer than the sepals 3-partite, side segments capillary, spur longer than the beaked curved ovary slender incurved.

TENASSERIM; at Moulmein, *Lobb.*

Leaves as in *H. khasiana*. *Scape* with few-fl. raceme 2–4 in.; sheaths few, membranous; bracts $\frac{1}{4}$ – $\frac{1}{2}$ in., ovate-lanceolate; flowers few, $\frac{1}{2}$ in. broad; ovary $\frac{1}{2}$ in., sessile, curved; dorsal sepal obtuse, obscurely 5-nerved; mid segment of lip shorter than the lateral; spur hardly thickened at the tip; anther-cells divaricate, tubes short; pollinia and stigmatic processes as in *H. khasiana*.—Very near *H. khasiana*, but the scape is very short, the bracts different, the ovary shorter, and the flowers smaller. *Lobb's* specimens have all short scapes.

††† Leaves 2, rarely 3, radical or opposite on the stem, sessile, broadly ovate-cordate or oblong.

63. **H. crassifolia**, *A. Rich. in Ann. Sc. Nat. Ser. 2, xv. 72, t. 3 C*; leaves radical orbicular or broadly ovate-cordate margined fleshy, raceme many-fl., bracts large exceeding the ovary, sepals and petals short broad, lip subequally 3-fid hardly longer than the sepals, lobes linear-oblong obtuse, spur equalling the beaked ovary. *H. brachyphylla*, *Reichb. f. in Trans. Linn. Soc. Ser. 2, iii. 113*. *Platanthera brachyphylla*, *Lindl. Gen. & Sp. Orchid.* 293; *Wight Ic. t. 1694; Dalz. & Gibs. Bomb. Fl.* 269.

The DECCAN PENINSULA; from the Concan to the Nilghiris, common.

Leaves 2–3, 1–1 $\frac{1}{2}$ in. diam. *Scape* 6–12 in., stout; sheaths many, finely acuminate. *Spike* 6–8 in., narrow; bracts ovate-lanceolate, sheathing; flowers $\frac{1}{4}$ in. diam., greenish-white, rather fleshy; sepals 3-nerved; petals 1-nerved; side lobes of lip hardly spreading; bases of anther-cells distant, tubes very short spreading; stigmatic processes short; rostellum small, erect.—The Khasian habitat taken by *Reichenbach* from *Lindley's Herbarium* is an error.

64. **H. diphylla**, *Dalz. in Hook. Journ. Bot. ii. (1850) 262*; leaves radical orbicular cordate margined, raceme many-fl., bracts much shorter

than the ovary, sepals ovate-oblong subequal, petals as long linear, lip much longer than the sepals 3-partite, segments filiform lateral longest, spur about equalling the ovary inflated acute. *Dalz. & Gibs. Bomb. Fl.* 268. *H. Jerdoniana*, *Wight Ic. t.* 1715. *H. Sutleri*, *Reichb. f. in Linnæa* xxv. 229. *Platanthera canarensis*, *Lindl. in Plant. Hohenack exsicc.*, No. 142. *Liparis diphyllus*, *Nimmo in Grah. Cat. Bomb. Pl.* 252.

WESTERN HIMALAYA; Garwhal, *Falconer*. EASTERN BENGAL; *Dacca*, *Clarke*. THE DECCAN PENINSULA; from the Concan to Malabar.

Leaves 1-2 in. diam., thinly fleshy. *Scape* 4-10 in., slender; sheaths many, small. *Spike* 2-4 in., narrow; bracts $\frac{1}{2}$ in., acute; flowers about $\frac{1}{2}$ in. diam.; ovary $\frac{1}{2}$ in., hardly beaked; dorsal sepal ovate, lateral oblong, acute, 3-nerved; anther broad, cells diverging, tubes very short; stigmatic processes elongate, clavate, adnate to the mouth of the spur; rostellum obscure.

65. **H. Aitchisoni**, *Reichb. f. in Trans. Linn. Soc. Ser. 2, Bot.* iii. 113; leaves opposite orbicular cuspidate, scape tall, spike elongate, flowers subsecund erect, bracts half as long as the ovary, sepals subequal oblong-ovate obtuse, petals as long ovate-lanceolate, lip as long as the sepals 3-partite above the base, side segments longest spreading and recurved, spur shorter than the short curved ovary clavate. *H. brachyphylla*, *Aitch. & Hemsl. in Journ. Linn. Soc.* xix. 118.

TEMPERATE HIMALAYA; Kashmir, alt. 7000 ft., *Falconer*, &c.; Kumaon, alt. 9-12,000 ft., *Duthie*; Sikkim, alt. 10-11,000 ft., *J. D. H.*—DISTRIB. Affghanistan.

Very variable in size and stoutness, 10-18 in. high. *Leaves* inserted above the base of the stem, 1-3 in. broad, not margined. *Scape* sometimes as thick as a goose-quill; sheaths few, small; spike rather dense-fld.; bracts $\frac{1}{2}$ in., acute or acuminate; flowers $\frac{1}{2}$ in. diam., greenish; sepals 3-nerved, lateral spreading, dorsal erect; petals 1-nerved; mid-segment of lip straight; anther short, broad, cells parallel, tubes very short upcurved; stigmatic processes large, clavate; rostellum minute.

Var. *Josephi*; smaller, 2-4 in. high, leaves 1-1 $\frac{1}{2}$ in., spike few-fld. *H. Josephi*, *Reichb. f. l. c.* 114.—Kumaon, alt. 10-11,000 ft., *Duthie*; Sikkim, alt. 12-14,000 ft., *J. D. H.*, *King's Collector*.

66. **H. reniformis**, *Hook. f.*; leaves 1-2 radical orbicular or oblong, scape slender few-fld., bracts much shorter than the ovary, sepals and petals subequal ovate or ovate-lanceolate acute, lip longer than the sepals entire or 3-partite with slender segments, spur shorter than the ovary or 0.—*Herminium reniforme*, *Lindl. in Wall. Cat.* 7067. *Aopla reniformis*, *Lindl. in Bot. Reg. under t.* 1701; *Gen. & Sp. Orchid.* 304, 457; *Benth. Fl. Hongk.* 363. *Listera reniformis*, *Don Prodr.* 28.

NEPAL, *Wallich*. KHASIA HILLS, alt. 4-5000 ft., *Lobb*, &c.—DISTRIB. China.

Leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. long, fleshy, very variable in form, sessile, obtuse. *Scape* with 4-6-fld. spike 3-6 in., wiry; sheaths few, small; bracts lanceolate; flowers about $\frac{1}{2}$ in. diam., green; sepals 3-nerved, lateral deflexed; lip (in the *Peloria* state) entire and linear-oblong, or with two small basal teeth; in the perfect state with three very narrow often tortuous divaricate segments longer than the sepals; spur usually wholly absent, if present slender, nearly as long as the ovary, slightly incurved; anther-cells nearly parallel, tubes very short; caudicles of pollinia short, glands large?; stigmatic processes large, subcylindric or clavate; rostellum short, triangular, acute.—A puzzling little plant, which in the Khasia usually and in Nepal has been collected only in the *Peloria* form, without spur, and with an entire lip. *Bentham* (in *Gen. Plant.*) retains it in *Herminium* from which it differs in being normally spurred. It is obviously allied to *H. Aitchisoni*.

Sect. IV. HOLOGLOSSA (see p. 132). See also *H. Mandersii* and *reniformis*.

* Stigmatic processes large.

† Stem leafy upwards.

67. *H. latilabris*, Hook. f.; leaves sessile ovate or oblong acuminate, spike many-fld., bracts green longer than the ovary, dorsal sepal broadest, lateral broadly ovate, petals dimidiate-ovate or broadly ovate, lip linear or lanceolate, spur flexuous longer than the curved beaked ovary. *Platanthera acuminata*, Lindl. in Wall. Cat. 7040; Gen. & Sp. Orchid. 289. *P. latilabris*, Lindl. Gen. & Sp. l. c. *P. orchidis*, Wall. Cat. 7039 B.

TEMPERATE HIMALAYA; from Kashmir, alt. 5–10,000 ft., to Sikkim, alt. 7–12,000 ft. CENTRAL INDIA, Hope (Herb. Clarke).

Stem 6–18 in., stout or slender, leafy. Leaves 3–5 in., usually sheathing. Spike 3–10 in., lax-fld.; bracts ovate-lanceolate, lower leafy; ovary $\frac{1}{3}$ – $\frac{1}{2}$ in., curved; flowers yellow-green, $\frac{1}{3}$ – $\frac{1}{2}$ in. diam. or more; sepals 3–5-nerved, glabrous or ciliolate, lateral spreading or deflexed, dorsal orbicular concave; petals as long as the lateral sepals, variable in shape, fleshy, lower base gibbous; spur stout or slender, often involute and upcurved; anther-cells contiguous, tubes 0; caudicles of pollinia very short, glands small; stigmatic processes large, subglobose; rostellum short, triangular, obtuse. Capsule $\frac{1}{4}$ in., sessile, fusiform, shortly beaked, more or less curved or twisted.—A very common and variable species in the Himalaya.

68. *H. stenantha*, Hook. f.; leaves many sessile oblong, spike many-fld., bracts green much longer than the flowers, dorsal sepal oblong, lateral linear deflexed, petals erect as long as the sepals linear, lip linear obtuse, spur flexuous longer than the straight obtuse ovary.

TEMPERATE HIMALAYA; Sikkim, alt. 8–12,000 ft., J. D. H., Clarke.

Very near to *H. latilabris*, differing in the form of the lateral sepals and petals, which are very narrow, and straight; and the former being sharply deflexed, whilst the latter are erect; the flower hence looks as if laterally compressed. The lip also is very narrow, but more so than in forms of *acuminata*, with which *stenantha* agrees in the column, anthers, pollinia, stigma and rostellum.

69. *H. densa*, Wall. in Lindl. Gen. & Sp. Orchid. 326; tall, stout, leaves many ovate or oblong acuminate base sheathing, spike very long narrow stout, bracts sheathing and exceeding the very short ovaries, flowers very small, sepals obtuse puberulous, lip linear obtuse as long as the sepals, spur clavate shorter than the ovary. *Platanthera densa*, Lindl. in Wall. Cat. 7046. *P. clavigera*, Lindl. Gen. & Sp. Orchid. 289.

TEMPERATE HIMALAYA; from Simla to Sikkim, alt. 5–9000 ft.

Stem 1–3 ft. usually much stouter than in any form of *H. acuminata* or its allies. Leaves 3–5 by 1–2 in. Spike 8–14 in., rather dense-fld.; rachis stout; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., finely acuminate; ovary $\frac{1}{4}$ in., stout, curved, shortly beaked; flowers erect, $\frac{1}{4}$ in. diam.; sepals subequal, thick, 3-nerved; petals nearly as long, obliquely ovate or narrower, obtuse, fleshy; lip with a tooth at the mouth of the spur; anther short, broad, cells parallel, tubes 0; pollinia subglobose, almost sessile on the large orbicular gland; stigmatic processes large, shortly clavate; rostellum small, erect.—Varies greatly in size; a Wallichian specimen from Nepal is 3 ft. high, with leaves 6 by 2 in., and a fruiting spike nearly 18 in. long. The most distinct species of its group.

†† Leaf solitary at or below the middle of the stem (rarely 2). Flowers subsecund. Rootstock or root branching (I think in all).

70. **H. oligantha**, *Hook. f.*; stem slender naked above the usually solitary oblong leaf, bracts lanceolate herbaceous much longer than the flower usually divaricate, sepals and petals subequal, spur stout about as long as the shortly beaked ovary incurved clavate.

SIKKIM HIMALAYA; in the interior valleys, alt. 10–12,000 ft., *J. D. H.*

Stem 5–10 in. *Leaf* sessile, 2–4 by $\frac{3}{4}$ –1 $\frac{1}{2}$ in., obtuse or subacute. *Spike* 1 $\frac{1}{2}$ –4 in., lax-flid.; bracts spreading, lower $\frac{3}{4}$ –1 in., green, upper gradually smaller, uppermost hardly exceeding the short sessile curved ovary; sepals $\frac{1}{2}$ in. long, oblong or oblong-lanceolate, subacute, obscurely 3-nerved, subciliate; petals as long, triangular-lanceolate, base of lower margin gibbous; lip linear-lanceolate, fleshy; anther-cells parallel, tubes 0; pollinia pyriform, caudicles short, glands minute; stigmatic processes short; rostellum fleshy, triangular, obtuse.

71. **H. leptocaulon**, *Hook. f.*: stem slender, with 2–3 narrow distant sheaths above the linear-oblong acute leaf, spike slender few-flid., bracts equalling the erect curved ovary, sepals and petals subequal, spur slender as long as the ovary incurved.

SIKKIM HIMALAYA; Lachen Valley, alt. 10–11,000 ft., *J. D. H.*

Stem 8–12 in. *Leaf* below the middle of the stem, 1 $\frac{1}{2}$ –4 by $\frac{2}{3}$ in.; sheaths above the leaves 1–1 $\frac{1}{2}$ in., linear-lanceolate, erect. *Spike* 3–8-flid., 1–2 in., rachis slender; bracts $\frac{1}{2}$ – $\frac{1}{2}$ in., erect, slender; sepals $\frac{1}{4}$ in. long, 1-nerved, lanceolate, acute; petals broader than the sepals, triangular-lanceolate from a broad gibbous base, fleshy; anthers as in *H. oligantha*, but rostellum shorter, and glands of pollinia large, oblong, resting on the sides of the rostellum; stigmatic processes short.—Near *H. oligantha*, but distinguished by the narrow leaves, the sheaths above them, small bracts, and long slender spur.

72. **H. pachycaulon**, *Hook. f.*; stem short very stout with 2 or 3 large herbaceous sheaths above the solitary oblong leaf, spike short dense-flid., bracts herbaceous much longer than the flowers, sepals and petals subequal, lip ovate-lanceolate, spur equalling the ovary incurved clavate.

SIKKIM HIMALAYA; Lachen Valley, alt. 12,000 ft., *J. D. H.*; Nattong, *King's Collector*.

Rootstock branched; roots thick, fleshy. *Stem* 4–6 in., as thick as a goose-quill or less. *Leaf* 2 $\frac{1}{2}$ –3 $\frac{1}{2}$ by $\frac{3}{4}$ –1 $\frac{1}{2}$ in., thick, obtuse; sheaths 1–1 $\frac{1}{2}$ in., lanceolate. *Spike* 1 $\frac{1}{2}$ –2 in.; bracts $\frac{3}{4}$ –1 in., many-nerved; flowers purple; ovary $\frac{1}{2}$ in., hardy beaked; sepals thick, linear-oblong, 1-nerved, ciliate; petals shorter, ovate-oblong, fleshy; lip fleshy, subacute; anther-cells parallel; glands of pollinia oblong resting on the sides of the short acute rostellum; stigmatic processes obscure.

73. **H. nematocaulon**, *Hook. f.*; stem very slender naked or with one or two sheaths above the small oblong subacute leaf, spike very slender lax-flid., bracts half the length of the erect ovary, flowers minute, sepals erect and petals subequal, lip oblong-lanceolate, spur very short clavate.

SIKKIM HIMALAYA; alt. 10–12,000 ft. *J. D. H.*, *Clarke*.

Stem 3–8 in. *Leaf* towards the base of the stem, 1–1 $\frac{1}{2}$ in.; sheaths usually very small, rarely green and leaf-like. *Spike* 2–4 in. long; bracts membranous; ovary $\frac{1}{4}$ – $\frac{1}{2}$ in., hardly beaked; flowers $\frac{1}{16}$ in. long; sepals ovate-lanceolate, acute, 1-nerved; petals as broad as the dorsal sepal, triangular-ovate, acute, 1-nerved; lip not fleshy, 5-nerved, obtuse; spur not half the length of the sepals, neck contracted; anther short, broad, cells parallel, glands of pollinia rather large, resting on the sides of the erect fleshy rostellum; stigmatic processes globose. *Capsule* $\frac{1}{2}$ in. long, sessile, erect, fusiform, beaked.—The erect lateral sepals, minute flowers and short spur, are those

of *Sect. Peristylus*, to which this species is perhaps referable, but the branched rootstock, habit, and habitat induce me to refer it here.

** No stigmatic processes.

74. *H. arcuata*, Hook. f.; stem very robust leafy, leaves oblong or lanceolate, bracts herbaceous narrow longer than the large flowers, dorsal sepal beaked, petals small linear membranous, lip twice as long as the sepals linear, spur many times longer than the ovary. *Platanthera arcuata*, Lindl. *Gen. & Sp. Orchid.* 289.

WESTERN HIMALAYA; Royle; Naini Tal, Davidson.

Stem as thick as the little finger. *Leaves* 3-4 in., oblong, subacute, upper lanceolate, bases sheathing. *Spike* many-flid.; lower bracts 1-1½ in., linear-lanceolate; ovary 1½ in., hardly beaked, curved; sepals ½ in. long, dorsal cucullate, lateral larger, oblong, obtuse, 3-nerved, deflexed; petals very narrow, 1-nerved; lip large, linear, with rounded shoulders at the base, puberulous, sides reflexed, spur 2-2½ in., incurved, acute; anther large, broad, cells divergent, tubes erect; pollinia with stout, short caudicles, glands very large, ovate; rostellum broad, flat, acute.—A very remarkable species, with the lip of *Hologlossa*, but anther of the larger *Trimeroglossa*. I have seen but one specimen from Col. Davidson, and a rude tracing in Herb. Lindl., of Royle's plant.

75. *H. sikkimensis*, Hook. f.; stem stout leafy, spike elongate lax-flid., bracts herbaceous longer than the large flowers, petals as large as the sepals triangular-lanceolate, lip as long as the sepals linear, spur rather longer than the ovary very stout obtuse strongly incurved.

SIKKIM HIMALAYA; on Sinchal, alt. 8-9000 ft., Thomson.

Stem with spike 10-12 in. *Leaves* 3-4 in., narrowly oblong. *Spike* 3-4 in.; bracts lanceolate, acute, lower 1½ in., spreading and reflexed; ovary ¾ in., strongly curved, hardly beaked; sepals 3-nerved, green, dorsal broadly ovate obtuse rather shorter than the oblong-lanceolate acuminate spreading lateral; lip linear; anther broad, cells narrow, distant, tubes short; pollinia rather shorter than their stout caudicles, glands small; rostellum obscure, very broadly triangular.—Closely allied to *H. acuminata*, but flowers much larger, and there are no stigmatic processes or rostellum. The broad anthers and its cells are those of *H. arcuata*. Only one specimen seen.

76. *H. concinna*, Hook. f. *Ic. Plant. ined.*; small, stem many-leaved, leaves small sessile erect ovate or oblong, spike many-flid., bracts longer than the small flowers herbaceous, lateral sepals linear longer and much narrower than the dorsal and petals, lip linear from a broad base as long as the sepals, spur as long as the ovary slender incurved acute.

KHASIA HILLS; at Kala-pane, alt. 5000 ft., J. D. H. & T. T.; Clarke.

Root of thick tuberous fibres. Stem with spike 4-8 in. *Leaves* almost imbricating, amplexicaul, lower 1-1½ in. obtuse, upper gradually smaller acute; spike 2-4 in., rather dense-flid.; bracts ½ in., ovate-lanceolate, acute; ovary ¼ in., suberect; dorsal sepals 3-nerved, ovate, obtuse; lateral ⅙ in. long, reflexed, obtuse, 1-nerved; petals as long as the dorsal sepal, 1-3-nerved; lip narrow; anther large, cells distant, bases slightly divergent, tubes 0; pollinia as long as their caudicles, glands small; rostellum triangular.—The habit is that of *Sect. Peristylus*.

77. *H. zosterostyloides*, Hook. f.; radical leaves long-petioled elliptic acute, cauline sessile ovate-cordate amplexicaul, racemes long sparse-flid., bracts as long as the ovary, lateral sepals linear-oblong obtuse rather longer than the rounded ovate dorsal, petals as large as the dorsal sepal triangular-ovate, lip linear as long as the sepals, spur as long as the ovary slender acute.

MALAYAN PENINSULA; on Mt. Ophir, *Griffith* (*Kew Distrib.*, 5359), *Lobb*, PERAK, *Scortechini*, alt. 7000 ft., *Wray*.

Root of thick tomentose fibres spreading from the crown, which gives off one or more long-petioled leaves and a tall rather slender scape. *Radical leaf* 4–6 in. *Scape* with the raceme 12–18 inches high, with membranous basal sheaths, and bearing one or more sessile or oblong leaves about the middle, and with 2–8 small distant ovate herbaceous sheaths above them. *Spike* 4–6 in.; flowers distant; bracts $\frac{1}{2}$ in. long, lanceolate, acuminate; sepals dorsal, 3-nerved, nearly orbicular, lateral $\frac{1}{4}$ in. subacute, reflexed; lip elongate, linguiform, obtuse; anther broad, cells distant divergent, tubes hardly any; pollinia shorter than their stout caudicles, glands large orbicular; stigmatic processes 0; rostellum very obscure. *Capsule* (immature) sessile, curved.—A remarkable species, in habit unlike any other. The solitary long-petioled radical leaf, sometimes distant from the flowering stem, is very peculiar, and closely resembles that of *Cryptostylis* (*Zosterostylis*, *Blume*), *zeylanica*.

Sect. VI. PERISTYLUS. (See p. 132.)

* Spur as long the sepals, or longer, or shorter in *H. aristata*.

† *Leaves scattered along the stem, or radical.* (See also 83. *H. Gardneri*.)

78. *H. bicornuta*, *Hook. f.*; leaves lanceolate or ovate-lanceolate, spike long many-fl'd.; bracts equalling or exceeding the ovary, lateral sepals linear obtuse, petals as long elliptic, lip tripartite, segments filiform, lateral longer than the sepals recurved over the flower, mid-segment shorter, spur longer than the sepals clavate or fusiform incurved. *Peristylus Richardianus*, *Wight Ic.* t. 1097.

The WESTERN GHATS; on the Nilghiri and Pulney hills, ascending to 6500 ft. *Stem* 1–2 ft., rather stout. *Leaves* 2–3 in., sessile, acute or acuminate, 5–7-nerved. *Spike* 6–10 in., rather dense-fl'd.; bracts herbaceous, lanceolate, acuminate, lower $\frac{1}{2}$ – $\frac{2}{3}$ in.; sepals $\frac{1}{4}$ in. long, dorsal oblong obtuse sub 5-nerved, lateral erect at length spreading; petals 1-nerved; lip with a large concave claw, mid-segment variable in length from triangular to linear, straight, obtuse; spur stout; anther minute, cells parallel, tubes 0, pollinia clavate, caudicles short; stigmatic processes long, lying in the claw of the lip; rostellum truncate, plicate, concealing the base of the cells and pollen glands?—Blackens when dry. Differs from *stenostachya* in the larger flowers, long side lobes of the lip, and spur.

79. *H. stenostachya*, *Benth. Fl. Hongk.* 362; leaves lanceolate acuminate, spike narrow lax- or dense-fl'd., flowers small, bracts equalling or exceeding the ovary, lateral sepals linear obtuse, petals larger than the sepals triangular-ovate or oblong fleshy, lip as long as the sepals 3-fl'd, side lobes subulate, midlobe usually shorter broader and obtuse, spur straight about as long as the ovary. *H. peristylodes*, *Wight Ic.* t. 1702. *Platanthera stenostachya*, *Lindl. in Hook. Journ. Bot.* vii. (1855) 37. *Gymnadenia*? *tennis*, *Lindl. in Wall. Cat.* 7057. *Cœloglossum densum*, *Lindl. Gen. & Sp. Orchid.* 302. *C. peristylodes*, *Reichb. f. in Bonpland.* 1856, 321. *C. cernuum*, *Rf. l. c.* 1855, 250.

SIKKIM HIMALAYA, *King (Herb. Calcutt.)*, the KHASIA HILLS, TENASSERIM, and the DECCAN PENINSULA, from the Concan Southward.—DISTRIB. China.

Stem with the spike 6–30 in., usually slender, with many small sheaths above the leaves. *Leaves* 1–4 in., sometimes all subradical, erect, bases sheathing, 5–7-nerved. *Spike* 3–5 in.; flowers small, erect, greenish yellow or white, about $\frac{1}{2}$ in. diam.; bracts $\frac{1}{4}$ – $\frac{1}{3}$ in., broadly ovate-lanceolate, finely acuminate; ovary $\frac{1}{4}$ in.; sepals $\frac{1}{6}$ in. long, subequal, concave, lateral suberect, at length spreading, nerve very thick, produced into a point under the apex of the sepal; lip with a large excavate base, very variable in the length of the lobes, lateral spreading or recurved; anther

minute, cells parallel, tubes 0; pollinia short, grains large, caudicle and gland obscure; stigmatic processes clavate; rostellum erect, truncate, toothed, plicate, concealing the glands of the pollinia.—Habit of *H. viridiflora*. In the Khasia specimens the midlobe of the lip is much longer than in the Peninsular. I have had difficulty in choosing a specific name, for Bentham, in adopting *stenostachya*, overlooked the older published one of *tenuis*. That of *peristyloides* may be objected to from the plant being sectionally a *Peristylus*, though Wight did not recognize it as such, and it is preoccupied by A. Richard for an Abyssinian species.

80. *H. cubitalis*, Br. Prodr. 312; tall, slender, leaves scattered or subradical, linear oblong or lanceolate acute, spike long narrow, flowers minute, bracts as long as the curved ovary or shorter, sepals linear-oblong concave keeled, petals larger ovate-oblong, lip not exceeding the sepals 3-fid, side lobes spreading and recurved, midlobe shorter broad obtuse, spur straight as long as the sepals nearly cylindric. *Platanthera cubitalis*, Lindl. Gen. & Sp. Orchid. 292; *Thwaites Enum.* 310. *Orchis cubitalis*, Linn. Fl. Zeyl. 320.

The KHASIA MTS., TENASSERIM, Parish, &c. CEYLON; Hermann, at Pasdoon Corle, Thwaites.

Stem with the slender spike 1–3 ft. *Leaves* 2–6 in., sessile, flat, nerves obscure. *Spike* 8–12 in.; bracts ovate-lanceolate, acuminate, lower $\frac{1}{2}$ in.; ovary $\frac{1}{4}$ in., erect, tip decurved; sepals $\frac{1}{2}$ in., obtuse, 1-nerved, nerve produced beneath the tip, dorsal longest and broadest; petals obliquely oblong, obtuse; lip with a short concave claw, lateral lobes shorter than or equalling the sepals; anther minute, cells parallel, tubes 0, pollinia short granular, caudicles and glands obscure; stigmatic processes clavate; rostellum erect, truncate, toothed, plicate, concealing the glands of the pollinia.—Near *H. stenostachya*, but flowers much smaller. There are two forms in Ceylon, one with leaves scattered along the stem, and another also found in Tenasserim with radical leaves; the latter is,—

Var. *brevifolia*; leaves very short 1–1½ in. radical linear-oblong. *Cæloglossum brevifolium*, Lindl. Gen. & Sp. Orchid. 302 (excl. hab. Nepal).—Tavoy, Wallich. Ceylon, Walker & Gardner. Wallich's specimen in Herb. Linn. Soc. are not numbered by him, but are ticketed, "Tavoy, Dec. 16, 1827." The number 7041 which has been put on the sheet by another hand, Wallich gave only to the Khasian plant, his *linifolia* (*H. khasiana*, p. 151). To var. *brevifolia* he gave the mss. name of *comelinifolia* (not *micrantha*, as Lindley states in his Herbarium).

†† *Leaves clustered round the middle of the stem (sometimes scattered in H. Gardneri.) Slender species; spike long, lax-fl'd.*

81. *H. tipulifera*, Par. & Reichb. f. in Trans. Linn. Soc. xxx. 139; leaves 4–6 linear-lanceolate acuminate, bracts very slender equalling the slender ovaries, lateral sepals linear obtuse, petals broader ovate-oblong obtuse membranous, lateral segments of lip many times longer than the sepals capillary, mid one short subulate, spur clavate as long as the sepals. ? *Peristylus gracilis*, Blume Bijdr. 406.

TENASSERIM; at Moulmein, Parish.

Stem 1–2 ft., with appressed sheaths below the leaves, and 1–2 lanceolate ones above them. *Leaves* 5–8 by $\frac{3}{4}$ –1 in., clustered about the middle of the stem, membranous, sessile. *Spike* 6–10 in.; flowers erect, small, distant; bracts $\frac{1}{2}$ – $\frac{2}{3}$ in.; ovaries as long, straight; sepals $\frac{1}{2}$ in. long, 1-nerved, dorsal ovate-oblong broad or narrow, lateral erect; lip divided close to the narrow concave claw; anther minute, cells parallel, tubes 0, pollinia clavate, caudicles very short, glands oblong; stigmatic processes marginating the claw of the lip; rostellum broad, plicate, concealing the bases of the anther-cells and glands. *Capsule* $\frac{1}{2}$ in., very slender, straight, erect.—Very near *H. aristata*, differing in the long narrow leaves, and much longer very slender ovary.

82. *H. aristata*, *Hook. f.*; very slender, leaves 3-5 elliptic-lanceolate membranous, spike very slender lax-fl., bracts shorter than the shortly beaked ovaries, sepals subequal linear obtuse, petals broader oblong membranous, lip longer than the sepals 3-partite lateral segments longest filiform or capillary, spur clavate or fusiform equalling or shorter than the sepals. *Peristylus aristatus*, *Lindl. Gen. & Sp. Orchid.* 300; *Thwaites Enum.* 310 (*in part excl. syn.*). *P. exilis*, *Wight Ic.* t. 1698.

KHASIA HILLS, alt. 4-5000 ft. *J. D. H. & T. T. TRAVANCORE*; on the Pulney Mts., *Wight*. CEYLON; at Newera Elia, *Thwaites*.

Stem with spike 18-20 in. *Leaves* 2-3 in., clustered around the middle of the stem, sessile or subpetioled. *Scape* with a few narrow sheaths; bracts $\frac{1}{2}$ in., ovate-lanceolate; flowers distant, $\frac{1}{4}$ in. diam.; greenish; ovary $\frac{1}{2}$ in., erect; sepals and petals membranous, 1-nerved, $\frac{1}{5}$ in. long; lip with a retrose spur over the concave claw, lateral segments broad at the base sometimes very long and circinnate, spur variable; anther minute, cells parallel, tubes 0, pollinia minute of few grains, caudicles and glands obscure; stigmatic processes clavate; rostellum obscure. *Capsule* $\frac{1}{2}$ in., fusiform.—The very minute column is so distorted by pressure that I have failed to detect the relations of the rostellum to the gland of the pollinia.

83. *H. Gardneri*, *Hook. f.*; tall, leaves oblong-lanceolate acute, spike narrow many-fl., bracts as long as the ovary, lateral sepals linear-oblong falcate obtuse, petals larger broadly oblong obtuse, lip rather longer than the sepals 3-partite lateral segments subulate recurved mid-segment shorter obtuse, spur as long as the sepals incurved tip globose didymous. *Peristylus aristatus*, *Thwaites Enum.* 310 (*in part*).

CEYLON, *Gardner, Walker*; Adam's Peak, *Thwaites* (C.P. 3081. *Ic. in Herb. Peradeniya*, 2373 *in Herb. Lindl.*).

Stem with spike 14-30 in., stout or slender, naked below and above except for a few sheaths. *Leaves* 2-3 in., usually clustered towards the middle of the stem, spreading or suberect, strongly 5-7-nerved beneath, bases sheathing. *Spike* 6-14 in., rather stout; lower bracts $\frac{1}{2}$ in., ovate-lanceolate, acuminate; ovary erect, $\frac{3}{4}$ - $\frac{1}{2}$ in.; sepals $\frac{1}{4}$ in. long and petals spreading, lateral sepals falcate linear obtuse; lip thick, claw concave; anther small, cells parallel, tubes 0, pollinia pyriform grains large, caudicles and glands obscure; stigmatic processes clavate; rostellum erect, truncate, toothed, plicate, concealing the glands of the pollinia. *Capsule* $\frac{1}{2}$ in., erect, fusiform, hardly beaked, very shortly pedicelled.—Differs from *H. aristata* in the large size, robust habit, less membranous leaves with strong nerves, larger flowers and longer ovary and capsule. Near *H. stenostachya*, but the spike and ovaries are much longer, the stem naked below for several inches, and the spur shorter.

84. *H. Stocksii*, *Hook. f.*; rather stout, leaves obovate or elliptic obtuse acute or acuminate, spike strict twisted, flowers secund, bracts longer than the ovaries, lateral sepals linear-oblong, dorsal elliptic, petals larger ovate obtuse fleshy, lip shorter than the sepals obtusely 3-fl., spur as long as the sepals straight or incurved subclavate.

THE CONCAN AND MYSORE, *Stocks, Ritchie, &c.*

Stem with spike 6-18 in. *Leaves* more or less clustered towards the middle of the stem, 4-6 in. long, usually petioled. *Spike* 3-6 in.; lower bracts often $\frac{3}{4}$ in. long, finely acuminate; ovary $\frac{1}{2}$ - $\frac{1}{3}$ in., curved; flowers $\frac{1}{2}$ in. diam., yellowish; lateral sepals at length reflexed; lateral lobes of lip incurved, claw broad concave; anther minute, cells parallel, pollen clavate; stigmatic lobes clavate; rostellum minute, erect, 2-fl.—Very like *H. Lawii*, but spur quite different.

** Spur much shorter than the sepals, globose or ellipsoid.

† *Stem leafy, leaves scattered or subimbricate.*

85. **H. breviloba**, *Hook. f.*; slender, leaves oblong-lanceolate acuminate, spike short dense-fl., bracts about equalling the ovary, lateral sepals lanceolate, petals broadly oblong, lip as long as the sepals obcordate sub-fimbriiform, spur minute inflated incurved. *Peristylus brevilobus*, *Thwaites Enum.* 311.

CEYLON; near Ratnapoora, *Thwaites*.

Stem with spike 10–18 in., naked below. *Leaves* 2–3 by $\frac{3}{4}$ – $\frac{3}{2}$ in., bases sheathing, nerves very slender. *Spike* (young) 1 in.; bracts lanceolate, finely acuminate; ovary $\frac{1}{4}$ in.; lateral sepals linear-lanceolate, subacute, 1-nerved; petals oblong, obtuse, 3-nerved; lip sessile at the base of the column; anther oblong, truncate, cells parallel, tubes 0; stigmatic processes 0; rostellum 3-fid, concealing the small polliniferous glands.—A very anomalous species, the flowers are too young for satisfactory analysis. *Thwaites* describes the lip as having a minute midlobe.

86. **H. malabarica**, *Hook. f.*; stem leafy, leaves many ovate or lanceolate acuminate upper passing into bracts longer than the flowers, spikes many-fl., ovary very short, lateral sepals linear, petals obliquely ovate-oblong obtuse, lip as long as the sepals deeply trifid, lateral segments subulate recurved, mid one straight, spur a small globose didymous or ellipsoid sac. *Peristylus brachyphyllus*, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 70, t. 2 A.

NILGIRI, and Bababudan Hills in CANARA, *Heyne, Perrottet, Stocks*.

Stem rather stout, 6–12 in. *Leaves* 1–2½ in., bases sheathing, nerves very slender. *Spike* 2–4 in., rather dense-fl.; bracts herbaceous, lower $\frac{1}{2}$ – $\frac{3}{4}$ in. or longer, often twice as long as the flowers, ovate-lanceolate, acuminate, sheathing; ovary $\frac{1}{4}$ in.; lateral sepals as long, erect or spreading, 1-nerved, apiculate below the tip, dorsal elliptic obtuse faintly 3-nerved; base of lip 3-lobed above the concave claw, contracted at the base of the segments; spur incurved or not; anther-cells parallel, glands of pollinia concealed by the 3-fid rostellum; stigmatic processes clavate.—Habit of *H. peristyloides* & *concinna*.

87. **H. torta**, *Hook. f.*; small, slender, subbasal leaves linear-lanceolate upper passing into narrow sheaths, spike very slender lax-fl. twisted, bracts longer than the very small second flowers, lateral sepals linear obtuse, petals linear-oblong, lip equalling the sepals 3-cleft beyond the middle, lobes short obtuse lateral spreading or incurved midlobe straight, spur a minute sac. *Peristylus spiralis*, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 69, t. 2 B; *Wight Ic.* t. 1696.

On the WESTERN GHATS; from the Concan to Travancore, *Wight, &c.* CEYLON, in the Central Province, alt. 4–7000 ft.

Stem with the spike 6–18 in., often flexuous. *Leaves* 1–2½ in., obtuse acute or acuminate, nerveless, passing into the sheaths of the scape. *Spike* 2–4 in., rachis often flexuous; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., lanceolate, acuminate; flowers decurved, greenish white; lateral sepals reflexed, $\frac{1}{10}$ – $\frac{1}{8}$ in. long, dorsal linear-oblong obtuse; lip very variable, fleshy, broader or narrower than long, base truncate above the short concave claw; anther minute, cells parallel; stigmatic processes clavate; rostellum between the cells, 3-fid.—The Ceylon plant has larger flowers than the Peninsular.

88. **H. Prainii**, *Hook. f.*; stem slender naked above or with one or two sheaths, leaves few oblong or ovate-oblong acute, spike many-fl., bracts as long or longer than the ovary, lateral sepals linear-oblong obtuse, petals

broadly ovate fleshy obtuse or apiculate, lip shorter than the sepals broad obtusely 3-lobed at the apex, spur a minute globose sac.

NAGA HILLS in UPPER ASSAM; on Kohima, *Prain*. UPPER BURMA (*in Herb. Calcutt.*).

Stem 12-18 in., naked below, and above except for a few lanceolate sheaths. *Leaves* $1\frac{1}{2}$ -2 in., obtuse or acute, sessile, nerves obscure. *Spike* 2-3 in., rather dense-fld.; bracts subulate-lanceolate, acuminate, not herbaceous, lower $\frac{1}{2}$ in.; ovary $\frac{1}{4}$ - $\frac{1}{2}$ in.; flowers nearly horizontal; sepals $\frac{1}{2}$ - $\frac{3}{4}$ in. long, apiculate behind the tip, 1 nerved; lip with a broad concave claw; anther small short broad, cells parallel; stigmatic processes rather long; rostellum minute, 3-fid.

89. **H. robustior**, *Hook. f.*; stem tall slender naked below, leaves close set ovate-lanceolate acuminate passing into foliaceous imbricating bracts much longer than the flowers, spike many-fld., flowers erect, lateral sepals linear acute, petals oblong obtuse, lip longer than the sepals 3-partite lateral segments elongate subulate recurved over the flower, mid one shorter straight obtuse, spur very small ellipsoid or fusiform. *Peristylus lancifolius*, *A. Rich. in Ann. Sc. Nat. Ser. 2, xv. 69, t. 2 C.* *P. robustior*, *Wight Ic. t. 1699.* *Gymnadenia secunda*, *Lindl. in Wall. Cat. 7054.* *Cœloglossum secundum*, *Lindl. Gen. & Sp. Orchid. 303.* *Satyrum foliosum*; *Herb. Heyne.*

MALABAR; in the Bababudan Hills, *Heyne*. NILGHIRI HILLS, *Perrottet, Lobb*. TRAVANCORE; in the Pulney Hills, *Wight*.

Stem 1-2 ft., sometimes naked for a foot, then leafy, the leaves gradually diminishing upwards. *Leaves* 2-3 in., suberect or spreading, bases sheathing, nerves obscure. *Spike* 2-6 in.; bracts twice as long as the flowers, lower $\frac{3}{4}$ -1 in. long, green; ovaries $\frac{1}{2}$ in. long, nearly straight; lateral sepals $\frac{1}{2}$ in., 1-nerved, reflexed; petals nearly as long, 2-3-nerved; lip 2-auricled at the small concave claw; anther-cells parallel; stigmatic processes long; rostellum 3-fid, between the cells. *Capsule* $\frac{1}{2}$ in., oblong, erect.—*Wight's figure of P. robustior* has the flowers large, bracts shorter and side segments of lip much larger and more slender than in his specimens, which bear the mss. name of *P. persimilis*.

90. **H. Hamiltoniana**, *Hook. f.*; stem tall slender naked below, leaves linear-lanceolate acuminate, spike dense-fld., bracts filiform much longer than the minute flowers, lateral sepals linear-oblong obtuse, petals broadly oblong, lip shorter than the sepals broad shortly obtusely 3-lobed, spur globose. *Herminium Hamiltonianum*, *Lindl. in Wall. Cat. 7069.* *Peristylis Hamiltonianus*, *Lindl. Gen. & Sp. Orchid. 299.* *Orchis micranthema*, *Herb. Ham.*

NEPAL; in the Morung, *Hamilton*. SIKKIM HIMALAYA, *Griffith's Collectors (Kew Distrib. 5356).* KHASIA MTS.; on Shillong, *Clarke*.

Stem 6-12 in., stout or slender, elongate and sheathed below the leaves, and with one or two filiform sheaths above them. *Leaves* 4-6 by $\frac{1}{2}$ - $\frac{3}{4}$ in., or broader, sometimes overtopping the spike, nerves obscure. *Spike* 3-6 in.; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., often tortuous (when dry); ovary $\frac{1}{4}$ - $\frac{1}{2}$ in., slender, suberect; sepals $\frac{1}{2}$ in., 1-nerved, nerve strong, excurrent below the tip, dorsal oblong; lip broadly cuneate, base broad, concave, lobes variable; spur large for the size of the flower, bladdery; anther-cells parallel, glands of pollinia exposed on each side of the minute rostellum; stigmatic processes large, clavate.—Habit of *H. robustior*, but the flowers are much smaller, the lateral sepals obtuse, and the spur globose.

†† *Leaves clustered about the middle of the stem.*

91. **H. gigas**, *Hook. f.*; stem very stout and tall, leaves elliptic acuminate, spike very many and dense-fld., bracts membranous longer

than the flowers, lateral sepals $\frac{1}{3}$ in. long lanceolate acuminate, petals as long gibbously ovate obtusely acuminate, lip as long as the sepals obtusely trifid lobes subparallel, spur very shortly oblong.

PERAK; in the Batong Padang Valley, *Wray*.

Stem 4-5 ft., hollow at the base, nearly an inch diam., nearly 3 ft. before leafing; sheaths above the leaves few. *Leaves* 8-10 by 3-4 in., narrowed into a petiole. *Spike* 8 in., cylindric, lax-flid. below; bracts $\frac{3}{4}$ in., lanceolate; ovaries $\frac{1}{2}$ in.; flowers pale green; sepals 1-nerved, $\frac{1}{2}$ in. long, dorsal linear-oblong, obtuse; petals with fleshy tips; lip rather oblong, lobes subequal; spur an incurved sac; anther orbicular, cells parallel, tubes upcurved, pollinia clavate subsessile on the large oblong glands which have recurved sides; stigmatic processes large, clavate, adnate to the sides of the lip; rostellum small. *Capsule* $\frac{3}{4}$ in., sessile, linear-oblong, obtuse, not twisted.—Resembles a huge *H. goodyeroides*, but leaves petioled, flowers smaller, lip shorter, capsule much longer.

92. *H. goodyeroides*, *Don Prodr.* 25; stem 1-2 ft. stout, leaves elliptic-oblong or lanceolate acute, spike elongate dense-flid., flowers subsecund, bracts equalling or exceeding the ovary, lateral sepals $\frac{1}{4}$ in. linear- or ovate-oblong obtuse, petals gibbously ovate, lip as long as the sepals trifid, spur minute. *Peristylus goodyeroides*, *Lindl. Gen. & Sp. Orchid.* 299; *Dalz. & Gibs. Bomb. Fl.* 270: *Royle Ill. t.* 87, f. 2. *P. grandis*, *Blume Bijdr.* 405. *Herminium goodyeroides*, *Lindl. in Wall. Cat.* 7066.

SUBTROPICAL HIMALAYA; from Kumaon to Bhotan, alt. 2-5000 ft. The KHASIA MTS. and SILHET, MUNNIPORE, TENASSERIM and the ANDAMAN ISLANDS. THE DECCAN PENINSULA, from Behar (on Parusnath) and the Concan to Travancore. —DISTRIB. Java, Philippine Islands.

Stem 1-2 ft., stout. *Leaves* 6-10 by 2-3 ft., base contracted, hardly petioled. *Spike* 4-12 in.; bracts lanceolate, membranous; flowers about $\frac{1}{4}$ in. diam., very variable in size, yellowish green; sepals $\frac{1}{2}$ - $\frac{3}{4}$ in.; lip recurved, sessile, lobes very variable, spur subglobose fusiform or clavate; anther small, tubes very short, pollinia clavate, caudicles hardly any; glands small; stigmatic processes short clavate; rostellum erect, toothed. *Capsule* $\frac{1}{2}$ in., sessile, fusiform, acute,—The Ceylon habitat given by Thwaites no doubt refers to *H. Wightii*, which has been confounded with this.

93. *H. constricta*, *Hook. f.*; stem stout tall, leaves elliptic acute or acuminate, spike dense-flid. cylindric, bracts as long or longer than the flowers, lateral sepals linear-lanceolate, petals larger ovate-oblong gibbous on the lower side, lip rather longer than the sepals 3-fid to the middle side lobes slender longer than the midlobe, spur globose. *Platanthera constricta*, *Lindl. in Wall. Cat.* 7043. *Herminium constrictum*, *Lindl. in Bot. Reg. under t.* 1449. *Peristylus constrictus*, *Lindl. Gen. & Sp. Orchid.* 300. *Orchis leucantha*, *Herb. Ham.*

SUBTROPICAL SIKKIM, *J. D. H. KHASIA HILLS*, alt. 2-4000 ft., *J. D. H. & T. T.*, &c. TENASSERIM; at Moulmein, *Helfer (Kew Distrib.* 5357), &c.

Stem with spike 2-3 ft. *Leaves* 4-6 by $2\frac{1}{2}$ -4 in., narrowed at the base or broadly petioled. *Spike* 4-8 in.; bracts large; flowers yellowish; sepals $\frac{1}{2}$ - $\frac{3}{4}$ in., dorsal lanceolate; lobes of lip very variable, claw hardly any; anther minute, cells parallel, tubes short; pollinia clavate, caudicles short, glands large; stigmatic processes clavate; rostellum 2-fid, erect.

94. *H. Parishii*, *Hook. f.*; stem short stout, leaves sessile ovate-oblong, spike narrow elongate, bracts linear-lanceolate longer than the small flowers both erect, lateral sepals linear-oblong obtuse, petals broader ovate-oblong, lip as long as the sepals shortly 3-lobed beyond the middle,

spur very short fusiform. *Peristylus Parishii*, *Reichb. f. in Trans. Linn. Soc.* xxx. 139.

TENASSERIM; at Moulmein, *Parish*.

Stem below the leaves very stout, 3-4 in., laxly sheathed, above the stem 3-6 in., with 2-3 lanceolate sheaths. *Leaves* 3-5 by $1\frac{1}{2}$ -2 in., acute or acuminate. *Spike* 4-6 in.; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in. with filiform tips and flowers appressed to the rachis; ovary $\frac{1}{2}$ in.; sepals $\frac{1}{2}$ in.; petals ovate-cordate, obtuse; lip very variable in form, broad or narrow, lobes short obtuse, or the middle one narrower and longer.—Turns black in drying. The specimens are not good. Perhaps a form of *goodyeroides*.

95. **H. Wightii**, *Trimen Cat. Ceyl. Pl.* 91; tall, leaves oblong-lanceolate acuminate, spike elongate narrow dense-fl., bracts longer than the ovary, flowers small, lateral sepals oblong obtuse dorsal shorter orbicular or very broadly ovate, petals very broad obliquely orbicular nerves branched, lip shorter than the sepals broad entire or shortly 3-lobed, spur small scrotiform. *H. goodyeroides*, *Hook. Bot. Mag. t.* 3397 (not of *Lindl.*). *Peristylus plantagineus*, *Lindl. Gen. & Sp. Orchid.* 300; *Wight Ic. t.* 921; *Thwaites Enum.* 310. *P. elatus*, *Dalz. in Hook. Journ. Bot.* iii. (185) 344.

The CONCAN, *Nimmo*; Malwan, *Dalzell*, &c. TRAVANCORE; at Paul Ghat, *Wight*. CEYLON, *Macrae*.

Stem 1-2 ft., rather stout, loosely sheathed below the leaves and with lanceolate sheaths above them. *Leaves* 5-7 by $2\frac{1}{4}$ -3 in., acute or acuminate. *Spike* 4-8 in.; bracts $\frac{1}{2}$ in., lanceolate; ovary $\frac{1}{4}$ - $\frac{1}{2}$ in.; flowers greenish white; sepals 1-nerved, lateral $\frac{1}{2}$ in., apiculate below the lip, dorsal $\frac{1}{4}$ in. shorter; lip contracted beyond the very short broad concave base; anther rounded, cells parallel with short recurved tubes; pollinia clavate, caudicles very short, glands small solid; stigmatic processes short; rostellum short, acute.—*Dalzell* describes the petals as longer than the sepals. I do not find the erect long narrow processes on each side of the anther figured in *Bot. Mag.*—The Travancore plant figured by *Wight* precisely resembles the Concan one.

96. **H. Lawii**, *Hook. f.*; stem slender not tall, leaves few elliptic or lanceolate, spike slender, flowers few or many distant very small, bracts longer than the ovary, sepals obtuse, dorsal elliptic, lateral linear-oblong, sepals very broad obtuse, lip as long as the sepals broadly obtusely 3-fl., spur small globose or clavate. *Peristylus Lawii*, *Wight Ic. t.* 1695; *Dalz. & Gibs. Bomb. Fl.* 270.

BEHAR; on Parusnath, alt. 4200 ft., *Clarke*. The CONCAN and MAISOE, *Law*, &c.

Stem 6-10 in., loosely sheathed below the leaves. *Leaves* 3-5, membranous, 3-4 by 1-2 in., subpetioled, acute. *Spike* narrow, strict, 2-3 in., lax-fl.; bracts $\frac{1}{4}$ - $\frac{1}{2}$ in., ovate-lanceolate, membranous; ovary $\frac{1}{4}$ in., straight or curved, almost beaked; flowers $\frac{1}{2}$ in. diam., yellow; sepals $\frac{1}{2}$ - $\frac{3}{4}$ in., 1-nerved, at length spreading; petals thick; lip broad with a concave claw; anther-cells parallel, tubes 0, pollinia clavate, caudicle 0, glands small, stigmatic processes clavate; rostellum short, acute.—*Wight's* figure is of a very indifferent few-fl. specimen.

97. **H. Brandisii**, *Hook. f.*; very slender, leaves scattered towards the middle of the stem linear- or oblong-lanceolate acute, spike very long laxly many-fl., bracts nearly as long as the erect not beaked ovary, lateral sepals linear obtuse, petals broader ovate-oblong, lip clawed 3-partite, segments much longer than the sepals, lateral segments capillary, midlobe short, spur very short globose.

PEGU, *Brandis (Herb. Hort. Calcutt.)*.

Stem with spike 20 in. *Leaves* 3-5 in., membranous, upper smaller. *Spike* 8 in., very slender; bracts $\frac{1}{2}$ in., ovate-lanceolate; flowers $\frac{1}{6}$ in. diam.; sepals and petals membranous, 1-nerved, lateral sepals deflexed; long segments of lip 1 in.; spur sub 2-lobed, with a very short contracted neck; ovary small, with a thick dorsal ridge and terminal beak, cells parallel (tubes short upcurved?); pollen grains few, large, glands not seen; stigmatic processes clavate; rostellum erect between the cells.—Closely allied to *H. aristata*, though with so different a spur.

††† *Leaves* few radical, or solitary and cauline.

98. **H. lacertifera**, Benth. *Fl. Hongk.* 362; stem or scape stout or slender with few or many erect sheaths, leaves usually radical ovate or oblong, spike elongate few- or many-fl., bracts narrow longer than the erect very small flowers, lateral sepals linear-oblong obtuse, lip equalling or longer than the sepals trifid tripartite or obtusely 3-toothed, lobes or segments short subequal or the lateral long, spur minute ovoid or globose. *Cœloglossum lacertiferum* & *acuminatum*, Lindl. *Gen. & Sp. Orchid.* 302. *Peristylus chloranthus*, Lindl. in *Kew Journ. Bot.* vii. (1855) 37. *Gymnadenia*? *tenuiflora*, Lindl. in *Wall. Cat.* 7055. *Chæradoplectron Spiranthes*, Schauer in *Pl. Meyen.* 436, t. 13 C.

KHASIA, NAGA and MUNNIPORE HILLS, alt. 2-4500 ft., TENASSERIM, TAVOY and PENANG, Wallich.—DISTRIB. Hong Kong.

Stem 6-10 in.; sheaths $\frac{1}{2}$ -1 in., lanceolate. *Leaves* few, 1-2 in., spreading, acute or obtuse. *Spike* 3-10 in., slender, lax- or dense-fl.; lower bracts often $\frac{2}{3}$ in.; ovary $\frac{1}{2}$ - $\frac{3}{4}$ in., slender, erect, not beaked; sepals $\frac{1}{2}$ - $\frac{3}{4}$ in., 1-nerved, dorsal ovate-oblong, obtuse; petals variable, rather thick; lip very variable in length, and in length of lobes or segments, limb with a short spur over the short broad claw; anther minute, cells nearly parallel, tubes 0; pollinia ovoid, grains large, glands obscure; stigmatic processes small; rostellum a plicate-membrane stretched across the base of the anther but not? concealing the glands. *Capsule* $\frac{2}{3}$ in., sessile, oblong, obtuse.—Both this and the following var. are found in Penang. Lindley errs in giving "Nepal, Wallich," as a habitat. I suspect that Lindley's *Glossula tentaculata* (Bot. Reg. t. 862), of Hong Kong, is only a form of this with elongate filiform side lobes of the lip.

Var. *robusta*; very stout, 12-18 in., leaves 3-5 by $\frac{3}{4}$ -1 in., spike very long many-fl., lateral segments of lip slender exserted much longer than the middle one.—Penang, Wallich, Maingay (*Kew Distrib.* 1662, *Spiranthes*), Curtis.

99. **H. gracillima**, Hook. f.; stem long filiform, leaves subradical narrowly linear, spike elongate, flowers few minute distant, bracts shorter than the curved ovaries, lateral sepals linear-oblong, petals broader ovate obtuse fleshy, lip very short fleshy trifid lobes obtuse, spur very short inflated 2-lobed. *Cœloglossum Mannii*, Reichb. f. in *Linnaea* xli. 54.

KHASIA HILLS, alt. 4-5000 ft., on grassy hills, common. MUNNIPORE, Clarke.

Stem 6-16 in., with a few subulate sheaths. *Leaves* 1-3 by $\frac{1}{3}$ - $\frac{1}{4}$ in., alternate, acuminate. *Spike* 2-6 in.; flowers $\frac{1}{2}$ in. apart; bracts $\frac{1}{2}$ in.; ovary $\frac{1}{4}$ in.; sepals $\frac{1}{4}$ in., 1-nerved; lip shorter than the sepals, claw as broad as, and hardly shorter than the blade, midlobe rather the longest; pollinia most minute, broadly pyriform, subsessile on one large flat ovate (2-flid?) gland, grains large.

Sect. VI. PHYLLOSTACHYA. (See p. 132.)

100. **H. galeandra**, Benth. *Fl. Hongk.* 263; leaves oblong obtuse or subacute base contracted, bracts ovate, flowers $\frac{1}{2}$ in. diam., lip broadly cuneiformly obovate or obcordate, spur a short conical sac. *Platanthera obcordata*, Lindl. in *Wall. Cat.* 7050; *Gen. & Sp. Orchid.* 290. *P. gale-*

andra, *Reichb. f. in Linnæa*, xv. 226. P. Championi, *Lindl. in Hook. Journ. Bot.* vii. (1855) 38. *Gymnadenia obcordata* & *galeandra*, *Reichb. f. Ot. Hamb.* 32, 33. *Orchis obcordata*, *Don Prodr.* 230. O. *Susannæ*, *Herb. Heyne*.

WESTERN HIMALAYA; Nepal, *Wallich*; Kumaon, *Blinkworth*, alt. 7000 ft., *Strachey & Winterbottom*. CENTRAL INDIA; Hawalbagh, *Clarke*.—DISTRIB. China.

Tubers small, globose or oblong. *Stem* 6–8 in., rather slender, glabrous or puberulous. *Leaves* 1–2 in., rarely subacute; bases not sheathing. *Spike* 2–4 in.; bracts oblong-ovate or lanceolate, lower twice as long as the pale purple flowers, upper shorter; ovaries $\frac{1}{2}$ in. long, glabrous or puberulous; dorsal sepal ovate, lateral falcately lanceolate; petals rather narrower, obtuse; lip shortly clawed, base puberulous; anther-cells approximate; rostellum very minute.—I do not find the difference between the spurs of the Indian and Chinese plant that Lindley indicates.

VAR. nilagirica; leaves broader acute, bases sheathing. *Platanthera affinis*, *Wight Ic. t.* 1693.—Travancore, on the Pulney Mts., *Heyne, Wight*.

VAR. major; stem 12–18 in., leaves and larger flowers more remote.—Khasia Hills; at Myruug, alt. 5000 ft., *J. D. H. & T. T.*

101. **H. jantha**, *Benth. in Gen. Plant.* iii. 626; leaves imbricate ovate or lanceolate amplexicaul acuminate, flowers $\frac{3}{4}$ in. diam., lip broadly flabelliform or orbicular-ovate retuse crenulate spur very short conical obtuse. *Platanthera jantha*, *Wight Ic. v.* 11 (? t. 1692).

MALABAR and TRAVANCORE; on the Nilghiri and Pulney Mts., *Wight*.

Except in being more robust and having much larger flowers, this hardly differs from *H. obcordata*. *Wight* gives the larger flowers as a character, but in his figure t. 1692 they are represented as even smaller. In his specimen the lip is $\frac{3}{4}$ in. diam.; he describes the flowers as deep lilac, and the leaves as of the same colour and streaked with a darker shade.—Probably a large state *H. obcordata*.

102. **H. Helferi**, *Hook. f.*; stem pubescent, leaves and bracts linear- or oblong-lanceolate acuminate, flowers 1–1 $\frac{1}{2}$ in. diam., lip very large orbicular cucullate, spur infundibular acute. *Gymnadenia Helferi*, *Reichb. f. in Flora* 1872, 276; in *Trans. Linn. Soc.* xxx. 139.

ASSAM (*Herb. Wight*) KHASIA MTS., *Simons*. TENASSERIM, at Moulmein, *Lobb. Helfer, Parish*.

Stem 12–18 in., rather stout; tubers oblong. *Leaves* 4–8 in., sessile, acuminate, base narrowed. *Flowers* shortly pedicelled; sepals falcately-lanceolate, acuminate, nearly 1 in. long, green, lateral at length recurved; petals ovate-lanceolate, acuminate, green; lip twice as large as the sepals, very concave with recurved edges, folded down the centre, purple; anther obtusely apiculate, cells narrow parallel, tubes very short, pollinia clavate, as long as their broadly winged caudicles, glands approximate, rather large; stigmatic processes obscure; rostellum small, fleshy, 3-lobed, erect between the gland. *Capsule* $\frac{3}{4}$ in., linear-oblong, sessile, erect, ribs thick.—*Reichenbach* describes the lip as broad or narrow.

SECT. VII. PLECTOGLOSSA. (See p. 132.)

103. **H. Perrottetiana**, *A. Rich. in Ann. Sc. Nat. Ser. 2*, xv. 74, t. 4 B. *Platanthera lutea*, *Wight Ic. t.* 919. *H. lutea*, *Benth. in Journ. Linn. Soc.* xviii. 354; *Gen. Plant.* iii. 626.

TRAVANCORE; as the Pulney Mts. amongst long grass, *Wight*. Nilghiri Hills, *Perrottet*.

Stem 1–2 ft., very stout; clothed with short imbricating amplexicaul sheathing acuminate leaves 2–3 in. long that pass upward into the bracts. *Spike* 6–8 in.;

bracts foliaceous, broadly ovate, $1\frac{1}{2}$ –2 in. long, cymbiform, acuminate; ovary $\frac{3}{8}$ in. long, erect, slender, beaked, narrowly winged; sepals erect, $\frac{3}{8}$ in., ovate-oblong, obtuse, concave; petals erect, as long, linear, obtuse; lip as long as the sepals, very coriaceous, triplicate in bud, being folded longitudinally down the middle, with the side lobes appressed to the midlobe, and each also folded down the middle with the concavity inwards, long clawed, cuneately obovate, obtuse, claw geniculate; side lobes linear-oblong, obtuse, incurved, shorter than the triangular ovate midlobe; spur pendulous, subclavate; anther broad, bases of cells shortly upcurved; pollinia large, pyriform, grains large, caudicles short, glands small orbicular.—The stigmatic processes differ from those of any other Indian *Habenaria*, A. Richard figures them as clavate as in most *Habenariæ*, but I have never found them so, though I have examined many flowers. The rostellum? forms a broad triangular acute plate extending across the column, and reaching to the bases of the anther-cells.

Sect. VIII. DIPHYLAX. (See p. 133.)

104. *H. urceolata*, Clarke in Journ. Linn. Soc. xv. 73, t. 30.
Diphyllax urceolata, Hook. f. Ic. Plant. t. 1865.

SIKKIM HIMALAYA; Yakla, alt. 10,000 ft., and NAGA HILLS, alt. 9000 ft., Clarke.

Root unknown. Stem very slender, recurved, with the raceme 4–6 in. high. Leaves one large (2–4 in.) subradical, elliptic-lanceolate, acute, and several small scattered ones alternate higher up, all membranous, 5–7-nerved. Racemes 2–3 in., decurved; flowers secund, $\frac{1}{3}$ – $\frac{1}{2}$ in. diam., very shortly pedicelled; bracts ovate or lanceolate, as long as the short ovary; sepals white and rosy; petals 1-nerved; lip recurved, lanceolate, terminal half solid terete acuminate green, spur inflated, nearly as long as the sepals; anther beaked, cells contiguous, parallel, pollinia oblong, grains large, caudicles very short.

Sect. IX. DIPYLA. (See p. 133.)

105. *H. secundiflora*, Hook. f. Ic. Plant. ined.

SUB-ALPINE HIMALAYA; Kumaon, alt. 9–10,000 ft., Duthie. Sikkim, alt. 14,000 ft., J. D. H.; in Chumbi, King's Collector.

Tubers globose, small. Stem 3–5 in., erect or recurved. Leaves 2–5 in., linear, acuminate, sides complicate, bases sheathing. Spike 1–2 in., more or less recurved, dense-flid.; flowers secund, pink; bracts linear-lanceolate, lower $\frac{1}{2}$ – $\frac{3}{4}$ in. longer than the flowers; ovary $\frac{1}{8}$ in., curved; sepals lanceolate, 1-nerved; petals much narrower, acuminate; lip as long as the sepals, sessile, linear-oblong, trifid to about the middle, puberulous, strongly-nerved, lobes parallel, lanceolate, acuminate; spur nearly as long as the sepals, conoidal, slightly contracted at the base, inflated, apex subacute; anther membranous; pollinia clavate, grains very large, caudicles short, glands large, cordate, membranous.—The resemblance to *H. urceolata* is remarkable; lobes of the rostellum inflected over the glands of the pollinia like two flaps or doors, whence the name.

Sect. X. DITHRIX. (See p. 133.)

106. *H. (Dithrix) decipiens*, Hook. f., Ic. Plant. ined.—Herminium, Griff. Notul iii. 270; Ic. Plant. Asiat. t. 285 f. 1.

NORTH-WEST INDIA; Edgeworth, alt. 3000 ft.; Lahul, alt. 4–5000 ft., Thomson.—DISTRIB. Afghanistan, Griffith, (Kew Distrib., 5326.) Kurrum Valley, Aitchison No. 322.

Tubers small, oblong. Stem 5–8 in., rather slender, erect or flexuous, laxly leafy. Leaves 1–2 $\frac{1}{2}$ in., lower larger, elliptic or linear-oblong, acute or obtuse, membranous, lower subpetiolate, upper sessile, bases sheathing. Spike 1–2 in.; flowers close-set, decurved; bracts ovate-lanceolate, longer than the ovary, membranous; ovary $\frac{1}{8}$ – $\frac{1}{6}$ in., curved, and sepals about as long, soft, 1-nerved; dorsal ovate-lanceolate, obtuse, lateral linear-oblong, tip rounded, petals as long, narrowly lanceolate, sub

3-nerved; lip as long as the sepals, obscurely 3-nerved, narrowed from the base upwards, terminal teeth acute, middle one longest.—The analysis of the dried flowers has been very difficult, and repeated many times; the capillary stamnodia long escaped detection. Resembles a small *Spiranthes* of the *S. æstivalis* type, with which it was confounded in Griffith's Herbarium.

IMPERFECTLY KNOWN SPECIES.

H. AFFINIS, *Don Prodr.* 25; *Lindl. Gen. & Sp. Orchid.* is a small state of *H. goodyeroides*.

H. CARANJENSIS, *Dalz. in Hook. Journ. Bot.* ii. (1850) 262; *Dalz. & Gibs. Bomb. Pl.* 267; lower leaves somewhat rounded, upper oblong-lanceolate 3-nerved, bracts shorter than the ovary 3-nerved, flowers small, yellow, dorsal sepal rounded, petals half ovate obtuse, lip tripartite, midsegment oblong rather obtuse, lateral shorter cuneate truncate, spur obovate shorter than the ovary.—The Concan; Island of Caranjah, *Dalzell*.

H. GRACILIS, *Coleb. in Hook. Exot. Fl.* t. 135, a Silhet plant, figured and described by Colebrooke (*in Hook. Exot. Fl.*), and to which he attributes an articulated fibrous root. I know of no plant in this least like the figure. *Lindley (Gen. & Sp. Orchid.* 302) suggests its being possibly his *Cæloglossum brevifolium* (*H. cubitalis*, β). It is possibly a bad drawing of *H. peristyloides*.

H. LOBBII, *Reichb. f. in Linnæa*, xli. 50; leaf cuneately oblong ligulate acuminate, raceme 2 ft. lax-fld., bracts half as long as the pedicelled ovary oblong acuminate, dorsal sepal ovate apiculate cucullate 3-nerved, lateral triangular retrorse 3-nerved, petals linear falcate 1-nerved, lip tripartite, lateral segments linear retrorse, midsegments twice as long linear obtusely acute, spur filiform shorter than the pedicelled ovary tip clavate, anther erect emarginate, tubes ascending, staminodes triangular.—*E. Indies, T. Lobb*. Flowers rather larger than those of *H. leptoceras*, *Hook. Bot. Mag.*, t. 2726 (a Brazilian species).

H. LONGIBRACTEATA; *Hook. f.*; stem stout leafy 2-3 ft., leaves 6 by $\frac{3}{4}$ -1 in. linear-oblong acute margins thickened, bracts 2-3 in. narrowly linear-lanceolate finely acuminate, lip 3-partite, segments linear lateral shorter, spur short obtuse. *Platanthera longibracteata*, *Lindl. in Wall. Cat.* 7048; *Gen. & Sp. Orchid.* 293.—*BURMA*, on the banks of the Irawaddy at Seendya, *Wallich*. *Wallich's* specimens are in very young bud only, and the description of the flowers taken from *Lindley* cannot be depended on. It is a noble species, and should be sought for in Burma.

H. MODESTA, *Dalz. in Hook. Journ. Bot.* ii. (1850) 262; *Dalz. & Gibs. Bomb. Fl.* 267; stem leafy at the base, naked above, bracts half as long as the ovary, flowers greenish white, lip 3-fid, lateral divisions linear lanceolate free spreading, mid one shorter ovate obtuse cohering with the tips of the petals and upper sepal and concealing the column, spur filiform hardly clavate a little longer than the ovary.—The Concan, at Salsette, *Dalzell*. Description from *Dalzell*, who does not appear to have seen leaves; it is, perhaps, *H. stenostachya*.

H. PELOBOIDES, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 139, t. 27, f. A; tall, robust, leaves ovate or oblong-lanceolate passing into copious sheaths, spike many-fld., bracts large equalling the ovary ciliolate, sepals subequal lanceolate acuminate, lip linear, spur 0. *TENASSEERIM*; Amherst by the seaside, *Parish*. Stem a foot high. Leaves 2-3 in., largest subradical; upper sheaths slender, passing into the bracts the lower of which are $1\frac{1}{2}$ in. long. Spike 2-3 in., many-fld.; sepals $\frac{3}{4}$ in. long, membranous; petals as long as the sepals, lanceolate, 1-nerved; lip very narrow; anther-cells elongate, with very long erect tubes, stigmatic processes long. Capsule $\frac{3}{4}$ in., sessile, fusiform.—An anomalous plant, clearly a *Peloria* form. I have seen but one indifferent specimen.

H. UNIFLORA, *Don Prodr.* 25. *Platanthera uniflora*, *Lindl. Gen. & Sp. Orchid.* 2957 is probably a state of *H. triflora*.

107. **DIPLOMERIS**, *Don*.

Terrestrial small 2-fld. and 1-2-leaved. Leaves ensiform or oblong.

Flowers large. *Sepals* subequal, free, lanceolate, spreading. *Petals* longer and broader. *Lip* sessile at the base of the column, spreading, very broad, entire, spurred. *Column* very short; rostellum broadly dilated, membranous, beneath which is a broad oblong lamina from the column; anther-cells thick, parallel, tubes very long incurved ascending; caudicles of pollinia very long slender, glands small naked; stigmatic processes 0; rostellum prominent between the anther-cells.

1. **D. pulchella**, *Don Prodr.* 26 (excl. hab.); glabrous, leaves ensiform, lip broadly orbiculate. *Lindl. Gen. & Sp. Orchid.* 330; in *Journ. Linn. Soc.* iii. 44. *Diplochilos longifolium*, *Lindl. in Wall. Cat.* 7064; in *Bot. Reg. under t.* 1499. *Orchis uniflora*, *Roxb. Fl. Ind.* iii. 452; *Griff. Notul.* iii. 368. *Habenaria uniflora*, *Griff. Ic. Plant. Asiat.* t. 338, f. 2. *Paragnathis pulchella*, *Spreng. Syst. Veg.* iii. 694.

KHASIA HILLS, alt. 4–5000 ft., *Roxburgh, Wallich, &c.*

Rootstock creeping, subterraneous and fibrous; stem short. *Leaves* usually 2, erect, 3–4 by $\frac{1}{2}$ – $\frac{1}{2}$ in., acute. *Scape* about equalling the leaves, naked, 1-fl.; bract cymbiform, green, acuminate; flower 1– $1\frac{1}{2}$ in. diam., white; sepals ovate-lanceolate, acute; petals much larger, broadly obovate rounded or ovate-oblong; lip $\frac{2}{3}$ in. diam., sinus cuspidate; spur $1\frac{1}{2}$ in., incurved or upcurved, thickened beyond the middle, tip acute.—Don gives “Nepal, Wallich,” as the habitat, but Wallich’s specimens are from the Silhet Mts. (Khasia hills). Don’s generic description is unintelligible, and he erroneously describes the flowers as rose purple.

2. **D. hirsuta**, *Lindl. Gen. & Sp. Orchid.* 331; hirsute, leaf oblong, lip cuneately orbicular. *Diplochilos hirsutum*, *Lindl. in Wall. Cat.* 7065; in *Bot. Reg. under t.* 1499.

TROPICAL HIMALAYA; Nepal, *Wallich*; Western Bhotan, alt. 1500 ft., *Gammie*.

Tubers globose. *Leaf* 2– $2\frac{1}{2}$ in., radical, with sometimes a small second. *Scape* 1– $1\frac{1}{2}$ in.; flowers $1\frac{1}{2}$ in. diam.; bract oblong, sheathing; sepals 5-nerved, ovate-oblong, subacute; petals very much larger, orbicular; lip with a short slender claw, apex retuse or rounded, apiculate or not; spur $1\frac{1}{2}$ in., very slender, incurved and ascending.

108. **HEMIPILIA**, *Lindl.*

Terrestrial 1-leaved tuberous herbs. *Leaf* radical, broad. *Flowers* laxly racemose. *Sepals* equal in length, lateral spreading. *Petals* broadly ovate, entire. *Lip* continuous with the column, broad, obscurely 3-lobed, spreading; spur trumpet-shaped. *Column* very short; rostellum broad projecting from between the anther cells, complicate; stigmatic processes 0; anther-cells subdivergent, tips produced into grooves of the rostellum; pollinia 2, caudicles long, glands distant exposed.

1. **H. cordifolia**, *Lindl. Gen. & Sp. Orchid.* 296; leaf ovate-cordate, lip obovate-oblong, spur longer than the sepals. *Platanthera cordifolia*, *Lindl. in Wall. Cat.* 7049; *Gen. & Sp. Orchid.* 296.

WESTERN TEMPERATE HIMALAYA; alt. 4–500–7000 ft., from Nepal, *Wallich*, to Simla, *Gamble*.

Tubers oblong. *Leaf* 2–4 in., amplexicaul, acute, many-nerved. *Scape* with few or many-fl. racemes, 4–10 in.; bracts shorter than the ovary; flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; dorsal sepal oblong obtuse, lateral falcately oblong; petals subacute; lip with low rounded side lobes and a broad subcrenate midlobe, spur recurved; anther sessile, cells nearly parallel, pollinia clavate, caudicles short, glands rather distant.

2. **H. calophylla**, *Par. & Reichb. f. in Journ. Bot.* xii. (1874) 197;

leaf ovate or oblong, lip obcordate, spur shorter than the sepals, *Reichb. f. in Ot. Hamb.* 38; *Bot. Mag. t.* 6920.

TENASSERIM; on limestone rocks at Moulmein, *Gilbert, Parish.*

Leaf 3-5 in., from almost orbicular-ovate to linear-oblong acute, and slender scape and bracts dark green mottled with brown. Scape with few-fl. racemes 6-8 in.; flowers distant, $\frac{2}{3}$ in. diam.; bracts shorter than the ovary; dorsal sepal oblong, and lateral and petals white; lip purple, side lobes low, rounded, midlobe broad, 2-lobed; pollinia small, oblong, adnate to the elongate spatulate caudicles.

109. **SATYRIUM**, Swartz.

Terrestrial leafy erect herbs, tubers undivided. *Leaves* broad or narrow. *Flowers* in dense spikes. *Sepals* and *petals* subsimilar, free, spreading or deflexed. *Lip* superior, sessile at the base of the column, erect, broad, hooded, 2-spurred or -saccate behind. *Column* erect, terete; stigma terminal, broad, concave, [or forming with the rostellum a 2-lipped body; anther dorsal, cells subparallel; pollinia 2, caudicles recurved, glands large naked sometimes connate.—Species 50, African and Indian.

S. nepalense, *Don Prodr.* 26; *Lindl. Gen. & Sp. Orchid.* 340; in *Journ. Linn. Soc.* iii. 44; *Wight Ic. t.* 929; *Bot. Mag. t.* 6625; *Wall. Cat.* 7025. *S. Perrottetianum*, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 76, t. 53; *Wight Ic. t.* 1716. *S. albiflorum*, *A. Rich. l. c.*; *Wight Ic. t.* 1717. *S. pallidum*, *A. Rich. l. c.*

TEMPERATE HIMALAYA, from Kashmir, alt. 4-6000 ft., eastwards, ascending to 14,000 ft. in Sikkim. KHASIA HILLS, alt. 4-6000 ft. The DECCAN PENINSULA, from Concan to Travancore. CEYLON, alt. 4-6000 ft. ?BURMA; Shan states, alt. 4000 ft., *Manders.*

Stem with spike 6-30 in., usually very stout, sheathed above. *Leaves* few, from oblong to linear-oblong, 4-10 by .2-4 in., rather fleshy, sessile, base sheathing. *Spike* 1-6 in., dense-fl.; bracts much larger than the flowers, oblong or lanceolate, erect spreading or recurved; ovary turgid, $\frac{1}{2}$ in. long; flowers from dark pink to white, fragrant; sepals linear-oblong, obtuse, spreading and recurved; petals rather narrower; lip superior, broadly oblong, concave, strongly keeled on the back, spurs variable in length and stoutness, about as long as the ovary; column contracted and terete at the base; anther broad, cells turgid, tubes short, pollinia clavate, caudicles short, glands orbicular; stigma large, concave.—A very common and variable plant. The Burmese specimen has orbicular leaves at the very base of the stem.

Var. *Wightiana*; radical leaves few broad, spike short dense-fl. *S. Wightianum*, *Lindl. Gen. & Sp. Orchid.* 340; in *Journ. Linn. Soc. l. c.*; *Wight Ic. t.* 1718.—Nilghiri Mts.

Var. *ciliata*, *Lindl. l. l. c.*; a small plant with spurs hardly longer than the sepals.—Sikkim, alt. 7-12,000 ft., *J. D. H.* Bhotan, alt. 10,000 ft., *Griffith.*

110. **DISPERIS**, Swartz.

Terrestrial leafy herbs; tubers entire. *Leaves* 2 or more, scattered, sessile, cordate. *Flowers* solitary or few. *Dorsal sepal* very narrow, coherent with the broad petals into a subglobose hood; lateral spreading or deflexed, free or bases connate, disk with a depression within answering to a cone without. *Lip* confluent with the column to above the anther, appearing as if it surmounted the column. *Column* short in the Indian species, terete below, stigmas on a transverse hyaline membrane, the ends of which form twisted tubular processes that sheath the caudicles and glands of the

pollinia; anther oblong, obtuse, completely 2-celled; grains of pollinia 3-4-seriate, secund on the rachis, cuneiform, caudicles rather long, twisted, glands large naked. *Capsule* fusiform.—Species 20, Africa and the following.

The above description applies to the two Indian species of this highly interesting genus, the fertilization of which deserves a careful study. The analysis of dried specimens is so difficult that I advance the description of the membrane of the column and its appendages (which differs from that of others) with hesitation.

1. **D. zeylanica**, *Trimen Cat. Pl. Ceyl.* 91; lateral sepals concave not waved, petals semilunate obtuse. *D. tripetaloides*, *Lindl. Gen. & Sp. Orchid.* 371 (*in part*); *Thwaites Enum.* 311; *Wight Ic. t.* 930 & v. 15.

CEYLON; in the Central Provinces alt. 3-5000 ft., *Walker, &c.* The MALABAR & CANARA Ghats, &c., *Wight, &c.*

Stem 6-10 in. erect from the subglobose tubers, 1-3-leaved. *Leaves* $\frac{3}{4}$ -1 in., distant, amplexicaul, acute. *Flowers* $\frac{1}{2}$ in. diam., subcorymbosely, spicate; bracts leafy; ovary $\frac{1}{2}$ in., straight; lip included under the hood, erect from the top of the column, 2-partite from a narrow cuneate base, arms falcately recurved, papillose; a pendulous linear appendage, with a rounded dilated papillose apex bearing a central cone, is inserted on the cuneate base of the lip. *Capsule* $\frac{1}{2}$ in.

2. **D. neilgherrensis**, *Wight Ic. t.* 1719; lateral sepals strongly waved, petals lunate cuspidately acuminate.

NILGHIRI HILLS, *Wight*.

Larger and stouter than *D. zeylanica*, with larger reddish white flowers spotted with crimson; the lateral sepals are free or connate, and pubescent at the base.—Perhaps a form of *D. zeylanica*.

Tribe V. CYPRIPEDIEÆ. (See vol. v. p. 668.)

111. CYPRIPEDIUM, Linn.

Terrestrial herbs, with a leafy stem, plaited leaves, and terminal flowers, or stemless with distichous radical coriaceous often tessellately coloured leaves and 1-∞-fid. scapes. *Flowers* large, solitary or few. *Sepals* spreading, free on the lateral connate and placed under the lip. *Petals* free, very various. *Lip* sessile, side lobes small, spreading or inflexed, midlobe very large saccate, inflated oblong or helmet-shaped. *Column* short, terete; anthers 2, globose, together with the disciform deflexed stigma hidden under a large disciform staminode; ovary 1 celled.—Species about 40, Europe, temp. and trop. Asia and America.

In describing the Scapigerous species I have largely availed myself of published plates and the description in Veitch's excellent Manual, made from living plants. I have made no attempt to enumerate even the multitude of named hybrid forms that have been produced by crossing the Indian species with one another. They are well systematized in Veitch's Manual, where nearly 50 are assigned to their parents. *C. barbatum* alone has been crossed with upwards of 15 other species.

* Leaves 2, opposite on the stem, plicate.

1. **C. elegans**, *Reichb. f. in Flora*, 1886, 560; villous with cellular hairs, leaves orbicular-ovate or oblong, flowers solitary.

SIKKIM HIMALAYA, alt. 1000 ft., *Pantling*. EASTERN TIBET; North of Phari, *King's Collector*.

Stem 1-2 ft. high below the leaves. *Leaves* 1-2 in. broad. *Scape* shorter than the leaves; bract elliptic; flower about 1 in. diam.—A very interesting plant, the nearest ally of which is *C. japonicum*. I have seen only a single small specimen.

* Leaves several, alternate, plaited.

2. **C. cordigerum**, *Don Prodr.* 37; sepals and narrower petals spreading ovate-lanceolate acuminate green or white, lip oblong white, staminode ovate- or oblong-cordate. *Lindl. Gen. & Sp. Orchid.* 527; *Dcne in Jacquem. Voy. Bot.* 165, t. 166.

TEMPERATE HIMALAYA; from Kashmir, alt. 9–11,000 ft., *Clarke*, to Kumaon, alt. 7–9000 ft., *Royle*.

Stem 10–24 in., robust or slender, and ovary puberulous. *Leaves* 3–6 by 2–4 in., approximate or scattered, from nearly orbicular to lanceolate, acute or acuminate. *Flower* solitary; bract 1–4 in., leafy; sepals $1\frac{1}{2}$ –2 in., longer than the lip, the connate lateral entire or split at the apex; column yellow. *Capsule* $1\frac{1}{2}$ in., erect, clavate. —As *Lindley* observes, this is not distinguishable except by colour from the European *C. calceolus*, which extends from Britain to Dahuria. It would be well to compare living specimens before uniting them.

3. **C. macranthon**, *Swartz in Act. Holm.* 1800, 251; dorsal sepal from linear- to ovate-oblong acute, connate lateral narrower, lip subglobose much inflated purple, staminode ovate-oblong. *Lindl. Gen. & Sp. Orchid.* 528; in *Bot. Reg.* t. 1534; *Bot. Mag.* t. 2938; *Reichb. Fl. Exot.* ii. t. 16, No. 99; *Ic. Fl. Germ.* xiii. t. 498; *Fl. des Serres*, t. 1118; *Ill. Hort.* 1857, t. 147; *Belg. Hort.* vii. 353, t. 61; *Gartenfl.* 1863, t. 409; *Trans. Russ. Hort. Soc.* 1863, t. 135; *Orchidoph.* 1887, t. 75, f. 1; *Ledeb. Fl. Ross.* iv. 87.

ALPINE HIMALAYA; from Garwhal to Sikkim, alt. 11,500–14,000 ft.—DISTRIB. Northern and Subarctic Europe and Asia to Japan.

Stem 1– $1\frac{1}{2}$ ft., usually very stout, pubescent. *Leaves* 3–6 by 2–4 in., ovate or oblong, acute, puberulous. *Flowers* 1–2, $1\frac{1}{2}$ –2 in. diam.; sepals and petals very variable in length and breadth, longer or shorter than the lip, yellowish or greenish with dark purple stains, or all purple; combined lateral acute or bidentate; lip inflated, light or dark purple, mouth small crenate, sides often grooved concentrically. —In Sikkim specimens gathered by myself, the dorsal sepal is broadly oblong 1 in. long, and the petals as long but narrower and lanceolate, both yellow-green and striped with dark red.

VAR. *ventricosa*; *Carrière in Rev. Hort.* 1877, '310; dorsal sepal broader, and petals usually much longer, often 2 in. long, lip very large 1– $1\frac{1}{2}$ in. diam. *C. ventricosum*, *Swartz in Act. Holm.* 1800, 251; *Lindl. Gen. & Sp. Orchid.* 529; *Sweet Fl. Gard.* iv. t. 1; *Reichb. Ic. Fl. Germ.* xiii. t. 497. —Chumbi, in Tibet, N.E. of Sikkim, *King's Collector*. —Distrib. Siberia. —In King's Tibetan specimen, of which he has lent me a drawing, the dorsal sepal is broadly ovate, $1\frac{1}{4}$ by $\frac{3}{4}$ in., the petals 2 by $\frac{3}{4}$ in., oblong-lanceolate, both white striped with red.

** Leaves radical, distichous, oblong or lorate, coriaceous, not plaited. Scape 1–3-fld., pubescent or villous.

a. *Petals as broad as the dorsal sepal, short, sessile, broadly oblong, margins not undulate nor warted.*

4. **C. concolor**, *Batem. in Bot. Mag.* t. 5513; leaves oblong or linear-oblong tessellated, scape short 1–2-fld., sepals suborbicular and elliptic-oblong petals yellow ciliate, sac of lip subcylindric, staminode subrhomboidly ovate apiculate. *Ill. Hort.* 1865, t. 444; *Gartenfl.* 1874, t. 803; *Fl. des Serres*, t. 2321; *Williams Orchid. Alb.* t. 302; *Reichb. f. in Gard. Chron.* 1865, 626; 1883, i. 19, fig. 3; *Veitch Man.* 17, with fig.

TENASSERIM; near Moulmein, *Parish*. UPPER BURMA; in the Shan hills, *Prayer*. —DISTRIB. Cambodia.

Leaves 3-5 in., crowded, obtuse, pale green above, fascicled with undulate bands of dark green, purple or purple spotted beneath. *Scapes* 1-2 in. and cymbiform bract dark purple; flowers 2-3 in. diam., pale yellow, sparsely dotted with purple; petals hardly longer than the sepals; lip small, mouth slightly dilated.—Reichb. f. describes (Gard. Chron. 1886, 294) a var. *chlorophylla* with an interrupted line of purple spots along the midribs of the sepals and petals, and var. *sulphurina* (l. c. 1888, ii. 264) with unspotted sulphur coloured flowers. Other vars. are *tonkinensis*, Lindenia, ii. t. 77, and *Regneri*, Orchidoph. 1886, 226.—The *C. Godefroyi* of Siam is very closely allied, but has dorsal sepals and petals broader than long, copiously spotted, and a 3-toothed staminode.

5. ***C. niveum***, Reichb. f. in Gard. Chron. 1869, 1038; Xen. Orchid. ii. 155; leaves linear-oblong tessellated, scape elongate 1-2-fld., sepals orbicular and broadly oblong petals ciliate, sac of lip ovoid mouth contracted, staminode large transversely oblong. Bot. Mag. t. 5922; Ill. Hort. 1871, t. 83; Flor. Mag. 1871, t. 543; Jennings Orchid. t. 28; Reichenbachia, i. t. 34; Gard. Chron. 1883, ii.; fig. 1. Veitch Man. 39, with fig.; C. concolor, var. *nivea*, Reichb. f. in Gard. Chron. l. c.

STRAITS OF MALACCA; Langkawi Islands, south of Penang.—DISTRIB. Tambilan Island, between Singapore and Borneo, and W. coast of Siam.

Leaves 4-6 in., green above with darker blotches, lurid purple beneath. *Scape* 1-2-fld.; bracts very short; flowers 3 in. diam., pure white more or less dotted with purple; dorsal sepal very broad, stained with purple on the back; petals rather longer, variable in size and breadth; staminode closing the mouth of the lip.

β. *Petals* as broad as the dorsal sepal or nearly so, spatulate, clawed, margins not warded.

6. ***C. villosum***, Lindl. in Gard. Chron. 1854, 125; leaves loriform, not tessellate, scape elongate, villous bract nearly as long as the ovary, dorsal sepal suberect obovate-oblong with the lower margins revolute and spatulate petals ciliate, lip helmet-shaped, staminode obovate base cordate. Ill. Hort. iv. t. 126; Pescator. t. 48; Fl. des Serres, t. 1475. Lindenia, iii. t. 132; Warner Sel. Orchid. ii. t. 30. Veitch Man. 54, with fig. C. Boxalli, Reichb. f. in Gard. Chron. 1877, i. 367; Ill. Hort. xxvi. 345.

TENASSERIM; Moulmein, alt. 4-5000 ft., Lobb, Parish.

Leaves 10-18 in., green above, paler beneath. *Scape* 1-fld.; bract spathaceous and ovary villous; flowers 5-6 in. diam., glossy; dorsal sepal green with brown-purple base and white margins, keel hirsute; petals hirsute towards the base, and lip brownish yellow, mouth and staminode tawny yellow.—*C. Boxalli* is a var. with black spots on the dorsal sepal and more tessellated petals. Var., *aurea* (Gard. Chron. 1883, i. 374) has a bright yellow-green dorsal sepal margined with white and golden yellow petals and lip.

7. ***C. hirsutissimum***, Lindl. in Bot. Mag. t. 4990; leaves lorate acute not tessellate, bract small and flower hirsute, dorsal sepal erect orbicular-ovate obtuse, petals horizontal spatulate claw crisped or undulate, lip helmet-shaped, staminode quadrate angles rounded. Warner Sel. Orchid. i. t. 15; Belg. Hortic. vii. 353, t. 61; Ill. Hort. iv., Misc. 67; Xen. Orchid. ii. 107, t. 132; Rev. Hortic. 1859, 182; Fl. des Serres, t. 1430; Veitch Man. 29, with fig.

KHASIA HILLS; on the Assam face, Simons.

Leaves 9-12 in., green. *Scape* 12 in., green, hairs of bracts and flowers dark purple; flowers 4 in. diam.; dorsal sepal green with a dull purplish spotted disk; petals nearly as broad as the dorsal sepal, violet-purple, the lower half with green sides and midrib and copious dark spots, and hairs; lip green flushed with dark purple, minutely warded, mouth green within; staminode green, base white.

γ. Petals narrower but not much longer than the dorsal sepal, sometimes warted on the surface, but not on the margins, which are glabrous.

8. **C. Drurii**, *Beddome Ic. Plant. Ind. Or.* 23, t. 112; leaves ligulate glabrous not tessellated, scape tall 1-fl. pubescent, bract much shorter than the ovary, dorsal sepal broadly ovate ciliate arched, petals linear-oblong obtuse surface warted and hirsute towards the base, lip helmet-shaped mouth open, staminode subquadrate. *Reichb. f. in Gard. Chron.* 1876, 68; *Xen. Orchid.* ii. 223; *Ill. Hort.* 1877, t. 265; *Lindenia*, i. t. 6; *Flor. Mag. N. S.* t. 425; *Veitch Man.* 22, with fig.

TRAVANCORE MTS., alt. 5-6000 ft., *Drury*.

Leaves 7-10 in., bright green. *Scape* 9-12 in. and small obtuse bracts and ovary pubescent; flowers 3 in. diam.; dorsal sepal greenish yellow with a broad dark median band and a dorsal keel with black hairs; lower connate sepals smaller; petals incurved tips rounded, bright ochreous yellow, with a dark median band, warts and hairs blackish; staminode much smaller than the mouth of the lip, which is bright yellow dotted with purple within, and with acute margins.

9. **C. insigne**, *Wall. mss. in Lindl. Coll. Bot.* t. 32; leaves ligulate glabrous not tessellated, scapes elongate 1-2-fl., bract equalling the ovary, dorsal sepal large arched orbicular-ovate margins subrecurved, petals linear-oblong glabrous margin undulate, lip broadly helmet-shaped, staminode subquadrate. *Lindl. Gen. & Sp. Orchid.* 530; *Hook. Fl. Exot.* t. 34; *Lodd. Bot. Cab.* t. 1321; *Bot. Mag.* t. 3412; *Williams Orchid. Alb.* iv. t. 155; *Griff. Notul.* 344; *Ic. Pl. Asiat.* t. 322; *Veitch Man.* 32; *Flore des Serres*, 1564.

KHASIA HILLS, alt. 4-5000 ft., *Wallich, &c.*

Leaves 8-12 in., acute, pale green. *Scape* 12 in., 1-2-fl. and large oblong compressed bracts and ovary pubescent; flowers 4-5 in. diam., glossy; dorsal sepal apple-green, purple-spotted, tip white, lateral smaller, paler; petals rather longer than the sepals, margins subcordate, green with white tips and purple veins; lip broad yellow or green suffused with purple, tawny yellow within; staminode pubescent with a central callus.—The above description is of the wild form; cultivated specimens vary greatly in colour, and have numberless synonyms, the principal given by Veitch are

VAR. Chuntinii, Rafar. in *Rev. Hort.* 1866, 249; 1878, 130, with fig.; dorsal sepal margined with white purple spotted, lower combined sepals longer more acute, petal veined with amber, lip chesnut brown. *Fl. des Serres*, xxi. 72; *Orchidoph.* 1885, 36; *Williams Orchid. Alb.* vi. t. 278; *Gard. Chron.* 1882, ii. 717, fig. 127.

VAR. Maulei, Moore in *Flor. Mag.* 1861, t. 57; flowers larger, margins of dorsal sepal revolute towards the base white at the tip, petals paler, lip longer narrower paler. *Fl. des Serres*, xv. t. 1564; *Gard. Chron.* 1882, ii. 716, fig. 126.

VAR. Sanderæ; flowers primrose yellow, except the white margins.

Other vars. are *aspera*; *aurea*, *Fl. & Pomol.* 1882, 75, and *albo-marginata*, *Williams Orchid. Alb.* v. t. 232, 178. For figures of the flowers of many varieties see *Gard. Chron.* 1882, ii. 716, f. 126.

10. **C. Spicerianum**, *Reichb. f. in Gard. Chron.* 1880, i. 40, 74, fig. 7; leaves ligulate subacute not tessellated, scape tall 1-2-fl., bracts much shorter than the ovary, dorsal sepal very large erect rhombic-obovate hirsute sides strongly recurved below, petals shorter deflexed ligulate margins undulate and crisped, lip helmet-shaped mouth dilated, staminode orbicular. *Bot. Mag.* t. 6490; *Ill. Hort.* 1883, t. 473; *the Garden*, 1883, t. 378; *Williams Orchid. Alb.* iii. t. 119; *Belg. Hort.* 1883, 289, t. 18; *Orchidoph.* 1890, 415; *Gard. Chron.* 1880, i. 41, f. 7; *Veitch Man.* 46, with fig.

ASSAM (*Low's and Sander's Collectors*).

Leaves 6-9 in., dark green, margins more or less waved, beneath purple-spotted near the base. *Scape* 9-12 in., slender, pubescent; bract narrow; flowers about 3 in. diam.; dorsal sepal horizontal, sides at the base so stoutly reflexed as to appear clawed, white base purple dotted on a green ground, midline purple; petals shorter than the lip, obtuse, yellow- or olive-green with a red median band and spots; lip brown, tinged with crimson; staminode red, edged with white, base contracted into auricle-like folds.

δ. *Petals narrower than the dorsal sepal, very long in C. Parishii, margins bearded or hirsute and warted.*

11. **C. venustum**, Wall. in *Bot. Mag.* t. 2129; *Cat.* 7023; leaves elliptic-oblong or loriform tessellate, scape 1-2-fid., bracts half as long as the ovary, dorsal sepal broadly ovate or cordate, petals linear-oblong bearded sparsely warted, lip subcylindric reticulate, staminode semi-lunate. *Lindl. Gen. & Sp. Orchid.* 530; *Hook. Exot. Flor.* t. 35; *Bot. Mag.* t. 2129; *Bot. Reg.* t. 788; *Reichb. Fl. Exot.* 100; *Lodd. Bot. Cal.* 585; *Warner Sel. Orchid.* ii. t. 24; *Veitch Man.* 53. *C. pardinum*, *Reichb. f. in Gard. Chron.* 1869, 554, and 1887, i. 382, fig. 76 (*pardinum* var.); *Flor. Mag.* N. S. t. 51.

TROPICAL SIKKIM HIMALAYA, alt. 3-4000 ft., J. D. H., Clarke. SILHET and ASSAM, Wallich, Griffith, &c.

Leaves 4-10 in., dark green, marbled with pale green above and dull purple beneath. *Scape* 6-9 in., pubescent; flowers 2-2½ in. diam.; dorsal sepal white with dark stripes; petals spreading, subspathulate, green and purplish, warts blackish; lip yellow green, flushed with pink, and with green reticulations, inflexed lobes yellow nearly closing the mouth.—The var. *pardina* has larger flowers, whiter sepals, and larger and more scattered wart on the petals.

12. **C. Fairleanum**, Lindl. in *Gard. Chron.* 1857, 740; leaves linear-oblong or loriform not tessellate, scape slender 1-fid., bracts half as long as the glandular hairy ovary, dorsal sepal large erect suborbicular obtuse, petals linear-lanceolate falcately upcurved margins crisped bearded and with black tubercles, lip slipper-formed pubescent, staminode orbicular with a deep notch and included spur in front. *Bot. Mag.* t. 5024; *Fl. des Serres*, t. 1244; *Xen. Orchid.* ii. 108, t. 133; *Orchid. Alb.* ii. t. 70; *Veitch Man.* 24, with fig.

ASSAM, Tronson (*l.c.* in *Hort. Calcutt.*).

Leaves 4-6 in., acute, bright green. *Scape* 4-6 in., green; bract green; ovary purple; flower 2½-3 in. diam.; dorsal sepal greenish white with broad purple reticulated nerves, ciliate, margin waved, keel hairy; petals yellow- or greenish-white with purple nerves and margins; lip green with purple veins and spots; staminode deeply notched and 3-fid in front, side lobes acute incurved, midlobe as long, straight acute.

13. **C. superbiens**, Reichb. f. in *Bonpland.* 1855, 227; in *Algem. Gartenzeit.* 1856, 323; *Xen. Orchid.* ii. 9, t. 103; leaves elliptic-oblong tessellate, scape 1-fid., bract much shorter than the ovary, dorsal sepal orbicular-ovate acute, petals broadly linear deflexed fringed with black hairs and warted, lip helmet-shaped, staminode suborbicular notched in front, base 2-lobed. *Gartenfl.* 1863, 49; *Warner Sel. Orchid.* ii. t. 12; *Fl. des Serres*, t. 1996; *Veitch Man.* 51, with fig.; *Gard. Chron.* 1886, ii. 405, f. 83, 84. *C. Veitchianum*, Ill. *Hort.* xii. t. 429; *De Puydt, Les Orchid. frontisp.* p. 267; *Rev. Hort.* 1871, 595, fig. 78, 79. *C. barbatum* Veitchii, *Fl. des Serres*, t. 1453. *C. barbatum superbum*, Belg. *Hortic.* 1883, 97.

MALAY PENINSULA; Mt. Ophir, *Lobb*.

Leaves 5-7 in., pale or dark green with dull blotches. *Scape* 9-12 in., 1-fl.; flowers ciliolate, 4 in. diam.; dorsal sepal white striped with green; petals longer than the dorsal sepal, white veined with green; lip brownish purple, inflexed, lobes crimson, warted.

14. **C. barbatum**, *Lindl. in Bot. Reg.* 1841, *Misc.* 53; 1842, t. 17; leaves oblong to linear-oblong acute tessellate, scape 1-2-fl. pubescent, bract much shorter than the ovary, dorsal sepal broadly ovate or orbicular acute or obtuse, petals longer linear-oblong spreading and decurved ciliate and with a few black warts along the upper or both margins, lip helmet-shaped mouth dilated, staminode hypocrepiiform. *Bot. Mag.* 4234; *Fl. des Serres*, iii. t. 190, and xviii. t. 1879 (var. *grandiflorum*); *Belgique Hortic.* xxxiii. 96, t. 7; *Warner Sel. Orchid. Ser.* 3, t. 11 (var. *Warneri*); *Veitch Man.* 12. *Gard. Chron.* 1886, ii. 308, f. 63. *C. purpuratum*, *Wight Ic.* t. 1760 (not of *Lindl.*). *C. Warnerianum*, *Reichb. f. in Gart. Zeit.* 1883, fasc. ix. *C. orbum*, *Reichb. f. in Gard. Chron.* 1887, ii. 778. *C. Crossii*, *Belg. Hortic.* xv. 227; *Veitch Man.* 12, with fig.

PENANG, *Maingay*. MALACCA; on Mt. Ophir, *Griffith*, &c.—DISTRIB. W. Siam.

Leaves 4-8 in., pale green above with darker oblong spots. *Scape* 10-12 in.; flowers 2-3 in. diam.; dorsal sepal folded in the middle, white with purple veins and greenish base, lower connate sepals much narrower; petals greenish brown towards the base, purple towards the tip; lip dark purple. Variable in the size and colour of the flowers. *Veitch* retains two varieties, 1, *Crossii*, leaves paler with more scattered deep green spots, under which are *C. Warneriana* and *orba*, and 2, *O'Brieni*, with leaves paler, spots smaller, petals and lip deeper coloured.—*C. orbum* is described as a hybrid by *Reichenbach*, but *Veitch* regards it as a synonym of var. *Crossii*.

15. **C. Parishii**, *Reichb. f. in Flora*, 1869, 322; in *Gard. Chron.* 1869, 814, with fig.; leaves ligulate 2-fl. not tessellated, scape stout 4-7-fl., bracts spathaceous, dorsal sepal suberect broadly elliptic-ovate with the basal margins revolute, petals very long linear pendulous twisted margin sparsely warted below, lip helmet-shaped, staminode obovate-oblong obtusely 2-fl. base spurred. *Bot. Mag.* t. 5791; *Williams Orchid. Alb.* ii. t. 86; *De Puydt. Orchid.* 188; *Orchidoph.* 1887, t. 91. *Ill. Hort.* 1875, t. 214; *Gard. Chron.* 1869, 814; *Veitch Man.* 41. *Selenipedium Parishii*, *Rev. Hort.* 1885, 132.

TENASSERIM; at Moulmein, *Parish*.

Leaves 9-15 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., glossy green. *Scape* 12-18 in., pale green, hairy; bracts and hirsute ovary green; flowers 3-4 in. diam.; dorsal sepal arched, keeled, pale yellow green; petals 4-6 in. long, spreading, at length pendulous, basal half green with pale undulate margin and a few bristly marginal tubercles, the other half dark purple, tip obtuse pubescent; lip green or stained with purple, mouth green within; staminode greenish yellow, margins white.

112. APOSTASIA, *Blume*.

Terrestrial herbs, with a short caudex and leafy rigid stems. *Leaves* narrow, strongly nerved. *Flowers* small, in terminal or axillary simple or paniced often decurved or deflexed spikes. *Sepals, petals and lip* all equal and alike, free, spreading or recurved. *Ovary* very slender, 3-celled. *Column* short; anthers 2, at the sides of the rostellum, shortly stipitate, narrow, erect, 2-celled, cells parallel; staminode erect, behind the stigma,

or 0; stigma terminal long erect, tip discoid.—Species 6, Indian, Malayan and Australian.

1. **A. Wallichii**, Br. in Wall. Cat. 4448; in Pl. As. Rar. i. 75, t. 84 (A. odorata); leaves linear-lanceolate 5-7-nerved, spikes panicled, peduncle naked below, anthers versatile cell bases unequal, staminode adnate to the style. Blume in Ann. Sc. Nat. Ser. 2, ii. 93; Miquel Fl. Ind. Bat. iii. 748; Thwaites Enum. 315; Rolfe in Journ. Linn. Soc. xxv. 237, t. 48, f. 22-24. Mesodactylus deflexa, Wall., ex. Pl. As. Rar. l. c. 74.

TROPICAL NEPAL, Wallich. KHASIA HILLS, J. D. H. & T. T. ASSAM, Griffith. PENANG, Curtis. PERAK, Scortechini, King's Collector, CEYLON; in the Suffragan district, Thwaites.—DISTRIB. Sumatra, Java, N. Guinea.

Stem 1-2 ft. Leaves 4-8 in. Panicle decurved, 4-10 in.; bracts subulate; flowers subsecund, $\frac{1}{2}$ in. diam., yellow; ovary $\frac{1}{2}$ - $\frac{3}{4}$ in. Capsule $\frac{1}{2}$ - $\frac{3}{4}$ in.

2. **A. nuda**, Br. in Wall. Cat. 4449; in Wall. Pl. As. Rar. i. 76, t. 85; leaves narrowly linear-lanceolate finely acuminate 3-5-nerved, spikes panicled many-bracteate at the base, anthers erect cell-bases equal, staminode 0. Blume in Ann. Sc. Nat. Ser. 2, ii. 93; Miquel Fl. Ind. Bat. iii. 748; Rolfe in Journ. Linn. Soc. xxv. 239, t. 48, f. 20, 21. A. Brunonis, Griff. Notul. iii. 243; Ic. Pl. Asiat. t. 282.

KHASIA HILLS and CHITTAGONG, J. D. H. & T. T. TENASSERIM; at Mergui, Griffith (Kew Distrib. 5604). MALACCA, Maingay, top of Mt. Ophir, Hullett. SINGAPORE, Lobb. PERAK, Wray.—DISTRIB. Sumatra, Java.

Stem 10-12 in. Leaves 4-10 in. Panicle decurved, much shorter than in A. Wallichii, as are the ovaries.

3. **A. latifolia**, Rolfe in Journ. Linn. Soc. xxv. 242; leaves petioled elliptic-lanceolate finely acuminate very many nerved, spikes panicled, peduncle naked at the base, anther erect bases equal staminode 0.

PERAK, Scortechini, Wray.

Stem 3 ft. Leaves 4-6 by 1-1 $\frac{1}{2}$ in., nerves very close; petiole 1-1 $\frac{1}{2}$ in. Panicle stouter than in nuda and Wallichii, bracts broader; ovaries $\frac{3}{4}$ in., curved; flowers very small.

113. NEUWIEDIA, Blume.

Terrestrial herbs, with a short caudex and leafy stiff stems. Leaves elongate, petioled, strongly nerved. Flowers small, in a terminal simple erect dense raceme, clothed with long bracts. Sepals and petals equal and similar, free, or the latter rather broader. Lip subspathulate. Column short; stigma terminal, long, erect, tip discoid; anthers 3, erect, narrow, stipitate, one on each side of the stigma, and one dorsal, cells parallel. Ovary 3-celled.—Species 6, Malayan.

1. **N. Lindleyi**, Rolfe in Journ. Linn. Soc. xxv. 232, t. 48, f. 10-12; peduncle elongate, raceme elongate many and dense-fl. and flowers puberulous, bracts 1-1 $\frac{1}{2}$ in. membranous, erect and recurved.

PENANG, Curtis.—DISTRIB. Borneo.

Stem very short, stout. Leaves many, 1-2 ft. by 2-3 in., oblanceolate, membranous, many-nerved, stoutly petioled. Raceme 1-2 ft., stout, erect, rachis stout; bracts much longer than the flowers, narrowly lanceolate; flowers 1 in. long, horizontal, pedicelled; ovary $\frac{1}{2}$ in.

2. **N. Curtisii**, Rolfe in Journ. Linn. Soc. xxv. 233, t. 48, f. 13, 14;

peduncle short, raceme short many-fl. and flowers pubescent, bracts $\frac{1}{2}$ – $\frac{3}{4}$ in. erect.

PENANG; on West Hill, alt. 2000 ft., *Curtis*.—DISTRIB. Sumatra.

Leaves as in *N. Lindleyi*, but peduncle and raceme very short, and bracts glandular-pubescent.

3. *N. Griffithii*, *Reichb. f. Xen. Orchid.* ii. 215; peduncle short, spike short many-fl. and flowers subhispidly pubescent, bracts $\frac{1}{2}$ – $\frac{3}{4}$ in.

MALACCA, *Griffith, Maingay (Kew Distrib.* 1682). PERAK, *King's Collector*.

Stem very short. *Leaves* 4–10 in., elliptic-lanceolate, finely acuminate, many-nerved, petioled. *Raceme* 2–3 in.; flowers white, very shortly pedicelled, $\frac{1}{2}$ in. long, decurved. *Capsule* $\frac{1}{2}$ in. long, turgid, trigonous.

SUPPLEMENT TO **ORCHIDÆ**, WITH ADDITIONS AND CORRECTIONS.

During the elaboration of the *Orchidæ* for this Flora, very large collections of species, from many parts of India, were being received at intervals by the Herbarium of the Royal Gardens, Kew, especially from the rich stores of the Royal Gardens of Calcutta, together with the loan of a magnificent series of original drawings of Orchids from the same source. The most important of these collections were Malayan, abounding in novelties, from Penang, Perak, Singapore and Malacca, made by the late Father Scortechini (presented, together with the loan of the Rev. father's pencil drawings of many species, by the Government of Perak), by Kunstler, a collector sent from the Calcutta Bot. Gardens by Dr. King, by Curtis, Hullett, Wray and Ridley. Important collections were also sent by Mann, from Assam, Bhotan, and the Khasia hills; by Gamble (on loan) from various parts of India; by Duthie from Garwhal; by Clarke from Sikkim, the Khasia hills, and Bengal, together with a few from Central India; and (on loan) by Dr. Trimen from Ceylon. These successive arrivals necessitated many consecutive revisions and emendations of the work already prepared, some printed, some in the press, and some in mss., besides adding many species and some genera to the Indian Flora.

Vol. v. p. 667. KEY TO THE TRIBES AND SUBTRIBES.

The Key to the Indian Genera Subtribes and Tribes was extracted, with a few modifications, from that prepared by Bentham for the Genera Plantarum; which, whether as regards the difficulties that attend the analysis of the plants of this most complicated Order, or the chaotic state into which the family had fallen since Lindley's days, is a masterpiece of research and scientific taxonomy. As may be supposed, the detailed examination of so many Indian genera and species as are contained in this Flora (about 1400), and of a large proportion of which Bentham had no knowledge, or only a superficial one, has suggested a few emendations in his classification, but these are very slight, and I shall notice them in their order, in the following pages.

Sub-order MALAXEÆ. I have departed from Bentham, in including LIPARIEÆ and MALAXEÆ under one sub-order. The essential character of *Lipariæ*, the incumbent anther, fails in a great measure when *Oberonia* is placed in it, for the pollinia of this genus are as Griffith points out (*Notul.* iii. 273) in *O. anthropophora* and *trilobata (ensiformis, Lindl.)* at first accumbent; and in these and others he describes them as "accumbenti-incumbentia." Added to this the habit of *Microstylis*, which is placed in *Malaxeæ*, is that of *Lipariæ*, and of *Oberonia*, which is placed in *Lipariæ*, is that of *Malaxis*. The clinandrium is so minute in *Oberonia* and *Microstylis*, that I have little confidence in my own results obtained by softening these parts in dried specimens, but my impression is that in *Microstylis* the anther will be found to both accumbent and incumbent, very much as in *Oberonia*. Lastly the pollinia of *Oberonia* are variously described and figured as 2 or 4. I think

that 4 is the rule, but one of each pair is often much smaller, and I suspect sometimes suppressed.

In line 3 of the character of subtribe *Malaxæ* for not incumbent, read accumbent or incumbent.

P. 667. Subtribe *ERIEÆ*. The inflorescence is often subterminal in *Eria*, and appears to be truly terminal in the anomalous genus 10/2 *Cladocria*. (See p. 810.)

P. 668. The Subtribe *CYRTOPODIEÆ* of Benthams, is here included as far as the Indian genera are concerned in *Eulophiæ*, though by oversight, it is introduced at p. 671. *Eulophiæ* are described in the "Genera" as pseudobulbous, and having a spurred lip, but very few indeed of the Indian species are pseudobulbous, many have a mere sac to represent the spur, in many the so-called spur is a true mentum, and Bolus "Orchid of Cape Peninsula" describes species that have neither a spurred nor saccate lip. The only character given for *Cyrtopodiæ*, as distinctive from *Eulophiæ*, is that of the column being produced into a foot; but this is invalidated by my having to follow Blume, Bolus and others in replacing *Cyrtopera*, which in the "Genera" is referred to *Cyrtopodium*, in *Eulophia*; and as I find no character by which *Plocoglottis*, the only other Indian genus of Benthams *Cyrtopodiæ*, can be excluded *Eulophiæ*, I propose as a character—

Subtribe *EULOPHIÆ*. Terrestrial, never epiphytic. Stem rarely pseudobulbous. Lip usually spurred saccate or forming with the lateral sepals a mentum.

39. *EULOPHIA*. Lip free from the sides of the column, adnate to its base or foot.

48. *PLOCOGLOTTIS*. Lip adnate by a membrane to the sides of the column.

Suborder *CYMBIDIEÆ*. Terrestrial or epiphytic. Lip neither spurred nor conspicuously saccate; adnate to the base of the column.—Genera as at p. 671, including *Cremastra*, which has to be added.

Suborder *VANILLEÆ*. The free often hippocrepiform pollinia, without caudicle or gland, distinguish the Indian species from *Corymbæa* and *Spiranthea*.

Subtribe *CORYMBÆÆ*, differs from all other Indian *NEOTTIEÆ* in the hard almost woody stem, and rigid leaves, in which respect the species resemble *Apostasia*.

Tribe *OPHRYDEÆ*. In 4th line insert "long or" before short.

Subtribe *EUOPHRYDEÆ*. If I am correct in my analyses of the rostellum in some of the smaller *Habenariæ*, it may prove difficult to separate this subtribe from *Habenariæ*. Under any circumstances the modifications of the rostellum are so great in both, that I doubt its forming a subtribal character.

After Subtribe *DISEÆ* should follow (as at p. 675)—

Subtribe *CORYCIEÆ*, to include 110 *DISPERIS*. This genus and *Satyrium* are the solitary Indian representatives of the extensive S. African Subtribes *Diseæ* and *Coryciæ*, which are distinguished from one another by Benthams, and more recently by Bolus (the Orchids of the Cape Peninsula) by the former having the sepals and petals all free, and the lip at the base of the column, whilst in the latter the dorsal sepal and petals cohere, and the lip is adnate to the column nearly to its tip.

Tribe *CYPRIPEDIEÆ*. This tribe I think includes two subtribes, if not two tribes; namely—

CYPRIPEDIEÆ. Flowers very irregular. Lip inflated. Anthers 2, one on each side of a large dilated rostellum. Staminode very large.

APOSTASIEÆ. Flowers regular. Lip like the sepals and petals. Anthers 2 or 3 on the sides of a small erect rostellum; staminode very small or 0.

KEY TO THE GENERA.

P. 669. After 9. *BULBOPHYLLUM*, insert—

9/1. *HENOSIS*, see Vol. v. p. 771, and for amended characters p. 189 of this volume.

P. 670. After 18. *CHRYSOGLOSSUM*, insert—

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18/2. *COLLABIUM*. *Scape* tall, raceme long. *Lip* jointed on to the trumpet-shaped foot of the column. *Pollinia* 2, 2-cleft, united by a viscus. (See Vol. v. p. 784.)

After 19. *ERIA*, insert—

19/1. *CLADERIA*. Terrestrial, subsucculent. Leaves plicate. Inflorescence terminal. Lip sessile at the base of the long sigmoid column. Pollinia 2?

21. *PACHYSTOMA*, add to description. Flowers small; and insert after it—

21/1. *IPSEA*. *Scape* leafless. Flowers large. Sepals spreading. Column elongate, foot 0. Pseudobulb 1-2-leaved.

28. For *JOSEPHA* read *JOSEPHIA*.

29. *GLOMERA*. Cancel this genus. (See Vol. v. p. 823.)

P. 671. *EULOPHIA*. See remarks under Subtribes *EULOPHIÆ*, at p. 177 of this volume. The character of "petals like the dorsal sepal," is subject to many exceptions.

41. *CYPERORCHIS*, though removed in "Gen. Plant." from proximity to *Cymbidium*, should stand next to it. The two genera are hardly separable. After it insert—

41/1. *CREMASTRA*. Sepals and petals and lip very narrow and conniving in a tube. Leaf solitary on a tuberous rhizome. *Scape* leafless, sheathed; flowers racemose, secund.

Subtribe 3. *CYRTOPODIÆ* and 48. *Plocoglottis*. For remarks on these see Subtribe *Eulophiæ*, at p. 177 of this volume.

Subtribe 4. *SARCANTHÆ*. The classification of the genera of this subtribe presents great difficulties. In so far as the Indian genera are concerned I have not been able to improve upon Bentham's arrangement; though I find numerous exceptions to the characters given under the three subdivisions marked by stars.

49. *LUISIA*. The *Cristaria* section of *Vanda* unites that genus with this. The incurved sepals and petals of Sect. *Cristaria* are those of *Luisia*, but the foliage and habit are those of most *Vandæ*. The lip of one species of Sect. *Cristaria* is spurred or saccate as in *Vanda*, of another it is flat as in *Luisia*, without spur or sac.

50. *COTTONIA*. Replace the character by,—Sepals and narrower petals spreading. Lip sessile, not jointed at the base of the column, flat. Stipes of pollinia long, narrow. Raceme very long-peduncled,—and follow it with—

50/1. *DIPLOPROBA*. Sepals and broader petals spreading. Lip with the sides adnate to the sides of the column, cymbiform, with a compressed bioandate tip. Stipes of pollinia short, narrow. Raceme very shortly peduncled.

P. 672. 53. *PHALÆNOPSIS*. Add to character of lip, disk with a forked callus or plate, and after foot short, add—or long or 0.

54. *DORITIS*. In this genus the foot of the column forms a conical mentum with the lateral sepals.

55. *RHYNCHOSTYLIS* is placed by Bentham in a division of *Sarcanthea* with a foot to the column and a mentum, but appears to me to have these characters very obscurely if at all. The lip and spur are exactly those of *Saccolabium*.

56. *SARCHOCHILUS* is inconstant as regards the presence or absence of a foot to the column, and in having a mentum or spur or neither. It is a truly polymorphous genus, incapable of precise definition.

58. *ÆRIDES*. I do not find the lip to be truly articulate with the foot of the column as described in "Gen. Plant." The species of the first section with terete leaves closely approach the terete leaved *Vandæ*, and those of Section II. ** resemble *Saccolabia*. The stipes of the pollinia is sometimes short and broad.

60. *VANDA*. See above under 58 *Ærides*, and 49 *Luisia* for remarks. The Sect. *Anota* (*V. densiflora*) has so short a foot to the column that it might well be placed in *Saccolabium*. The stipes of the pollinia varies greatly in length and breadth.

61. *SACCOLABIUM*. The sepals and petals are often incurved. To the character should be added—Spur without a callus under the column within, or a septum.

62. *SCHÆNORCHIS*. As stated at p. 54 of this volume this genus was inserted by oversight, *Saccolabium filiforme* having been mistaken for it by Thwaites.

63. *UNCIFERA* and 64. *ACAMPE* I have been obliged to include under *SACCOLABIUM*. See remarks under the latter genus in this volume, p. 54.

65. *SARCANTHUS* and 66. *CLEISOSTOMA*, are separated from *Saccolabium*, and from one another, by characters so minute and trivial, that they might well rank as sections of that genus, to which 67. *Ornithochilus* might be added.

P. 673. Subtribe 3. *SPIRANTHÆ*. The Indian genera of this subtribe are most difficult of classification. The following attempt which may aid the student, requires critical revision with living specimens; the characters of the minute fleshy column and stigma being extremely difficult of accurate analysis in herbarium specimens, however carefully their organs may be moistened or laid out.

KEY TO THE INDIAN GENERA OF SPIRANTHÆ.

* Spur or sac of the lip exposed beyond the base of the lateral sepals. (See also a few species of *Goodyera*.)

79. *PHYSURUS*. Lip not clawed beyond the spur, limb broad abruptly contracted at the base; spur eglandular within; column not appendaged in front; stigma anticus.

80. *ANÆCTOCHILUS*. Lip clawed beyond the spur, limb 2-winged; spur 2-glandular within; column appendaged in front; stigmatic lobes lateral.

81. *VRIDAGZYNEA*. Lip not clawed, limb oblong membranous entire; spur 2-glandular within; column not appendaged in front; stigmatic lobes lateral.

82. *CYSTORCHIS*. Lip saccate, contracted into a beak with a small dilated tip; sac 2-glandular within (or not?); column not appendaged in front; stigma anticus.

83. *HERPYSMA*. Lip adnate to the sides of the column, limb spreading; spur long, naked within; column not appendaged in front; stigma anticus.

** Lip if spurred, with the spur or sac covered by the bases of the lateral sepals (except in a few *Goodyera*).

† Lip clawed beyond the spur or sac.

84. *ODONTOCHILUS*. Lateral sepals connate at the base; claw of lip crenate toothed or fimbriate, limb usually 2-winged; sac 2-glandular within; column appendaged in front; stigmatic lobes lateral.

85. *HÆMARIA*. Sepals free; lip adnate to the base and sides of the column, claw winged, limb 2-winged; sac 2-glandular within; column large, clavate; stigma anticus.

90. *CHEIROSTYLIS*. Sepals connate to the middle in a tube; lip with a saccate or cymbiform base and 2-lobed toothed or pectinate limb, sac 2- or multi-glandular within; columnar appendages long, fleshy; stigmatic lobes lateral.

91. *ZEUXINE*. Sepals free; lip with a cymbiform or saccate base, a short broad entire toothed or crenate claw, and broadly dilated limb; sac 2-glandular within; column with two linear appendages in front; stigmatic lobes lateral.

†† Lip saccate or spurred, not clawed beyond the sac or spur.

92. *HYLOPHILA*. Lip a large globose sac with a narrow linear inflexed blade; sac 2-glandular within; column minutely appendaged in front; stigma anticus.

93. *GOODYERA*. Lip cymbiform or subsaccate, naked or setose within; column not appendaged in front; stigma anticus.

94. *HETERIA*. Sepals free at the base or connate, lip adnate to the sides of the column, limb entire or 2-lobed; sac 2-glandular or setose within; column winged or not in front; stigmatic lobes lateral.

††† *Lip flat, neither clawed spurred or saccate.* (*Subsaccate in Spiranthus, and see also some Goodyeræ.*)

87. SPIRANTHUS. Leaves several.

88. NEOTTIA. Leafless herbs.

89. LISTERA. Two-leaved herbs.

P. 674. After 100. GASTRODIA, insert—

100/1. YOANIA. Sepals and petals free. Lip shortly clawed, cymbiform. Column 3-lobed. A stout leafless herb.

P. 675. 105. HERMINIUM. The Herminia will with a saccate base of the lip differ in no way from HABENARIA.

P. 675. 1. O. IRIDIFOLIA, Lindl. is not the *iridifolia* of Bot. Mag. t. 4517, which is *O. tahitensis*.

P. 676. After 4. O. GRIFFITHIANA, insert—

4/1. INSECTIFERA, Hook. f. *Ic. Plant.* t. 2004; stem 0, leaves 2-4 in. ensiform straight narrowed from the base to the tip, scape very short, spike about equalling the leaves, flowers subwhorled sessile, sepals ovate subacute and linear petals reflexed, lip much longer than the sepals, side lobes 2-3-partite segments elongate, midlobe with 2 long slender tails.

PERAK; at Larut, King's Collector.

Leaves $\frac{1}{2}$ in. broad, coriaceous, acute, shortly sheathing. Scape minutely bracteate; bracts with subulate tips, minutely erose; flowers about $\frac{3}{10}$ in. from the tip of the dorsal sepal to that of the lip; sepals hyaline, obscurely 3-nerved; petals 1-nerved; lip papillose, like a minute 2-tailed insect, the 3-partite side lobes representing its legs. Capsule very shortly pedicelled.—The flowers closely resemble those of *O. Griffithiana*, from which this differs in the absence of stem, short scape, ensiform leaves narrowed from the base to the tip, and longer lip.

4/2. O. LUNATA, Lindl. *Gen. & Sp. Orchid.* 17; stemless, leaves ensiform erect straight or falcate acuminate, scape and spike stout nearly as long as the leaves, bracts broadly ovate, flowers in crowded whorls sessile, sepals ovate acuminate nerveless, petals linear-lanceolate, lip semilunar erose fimbriate. *Malaxis lunata*, Blume *Bijdr.* 394.

SINGAPORE; at Selitan, Ridley.—DISTRIB. Java.

Leaves 3-5 by $\frac{1}{2}$ - $\frac{1}{2}$ in., not very fleshy, broadest about the middle. Peduncle 1-1 $\frac{1}{2}$ in., with many subulate bract-like scales; spike 2-3 in., straight or decurved; flowers $\frac{1}{10}$ in. diam., whitish, sepals and petals membranous; lip with the broad sides or lateral lobes sometimes drawn up into large auricles (like a *Microstylis* of Sect. *), tip notched or retuse, smooth. Capsule (young), sessile, tripterous.

P. 678. 12. O. FALCONERI. After Hook. f. insert— *Ic. Plant.* t. 1780.

P. 680. After 19. O. RECURVA, add—

19/1. O. ROSEA, Hook. f. *Ic. Plant.* t. 2005; stem short, leaves narrowly ensiform, scape very short, spike as long as the leaves or shorter, bracts lanceolate, flowers sessile, petals elliptic erose, lip hardly longer than the sepals, side lobes quadrate, midlobe cuneiform retuse.

MALAY PENINSULA, Norris. PERAK; Gunong Batu Pateh, Wray; Larut, alt. 3-4000 ft., King's Collector.

Stem sometimes flexuous. Leaves 2-3 $\frac{1}{2}$ by $\frac{3}{4}$ - $\frac{1}{2}$ in., slightly curved, acuminate. Scape rather stout, naked; flowers about $\frac{1}{10}$ in. diam., pink; sepals rounded-ovate, obtuse, nerveless; petals as long; side lobes of lip incurved or spreading. Capsules subsessile.

19/2. O. MANNII, Hook. f. *Ic. Plant.* t. 2003; stem elongate, leaves linear-ensiform subacute recurved, spike very slender, flowers very minute subfascicled, bracts ovate erose, petals ovate-oblong erose, lip longer than the sepals quadrately oblong, side lobes small subulate-lanceolate divaricate, tip bifid with a minute lobule in the sinus, segments subulate.

JYNTEA HILLS, north of Silhet, alt. 3000 ft., *Mann*.

Stem 3-4 in. *Leaves* alternate, 1 in. long, $\frac{1}{2}$ in. at the base. *Spike* 2 in.; flowers $\frac{3}{16}$ in. broad, green; sepals rounded-ovate, obtuse; petals obtuse, nerveless; side lobes of lip decurved, terminal segments diverging or dependent. *Capsules* minute, shortly pedicelled.—*Habit* of *O. angustifolia*, which has more obtuse shorter leaves, an obcordate midlobe and linear-oblong side lobes of the lip. It would be better to transfer *angustifolia* and place it with *Mannii*, in the broad petaled division with a 3-lobed lip.

P. 681. 23. *O. PACHYRACHIS*, add to habitats—Khasia Hills, alt. 4-5000 ft., *Mann*.

P. 682. 29. *O. CAULESCENS*, may be easily confounded with 36. *O. angustifolia* from which the many straight acuminate leaves narrowed to the base, and pedicelled ovaries, at once distinguish it.

P. 684. 36. *O. ANGUSTIFOLIA*, add to collectors' names in the Khasia—*Griffith*,—As mentioned under *O. Mannii*, *O. angustifolia* had better be referred to the division + δ at p. 680, and placed next to that plant.

P. 686. After 40 insert—

41/1. *O. CILIOLATA*, *Hook. f.*; caulescent, leaves broadly equitant short broadly ensiform obtuse, spike dense-fl., bracts minute lanceolate, sepals ovate acute nerveless and narrow petals ciliate with long hairs, lip quadrately oblong truncate pectinately irregularly toothed.

SINGAPORE; at Krangi, *Ridley*.

Stem $1\frac{1}{2}$ -3 in., $\frac{2}{3}$ in. broad across the base of the leaves. *Leaves* erecto-patent, 1- $1\frac{1}{2}$ by $\frac{1}{2}$ - $\frac{3}{4}$ in., straight, rather broadest at the base, not very coriaceous. *Scape* shorter than the leaves; spike 2-3 in.; flowers hardly whorled, $\frac{3}{16}$ in. diam., shortly pedicelled, sparsely hairy externally, as are the bracts and young fruit. *Capsules* pedicelled, $\frac{1}{16}$ in. long, turgid, thickly 3-winged.

After * Sides of the lip produced upwards into large auricles, add—(*CREPIDIUM*, *Blume*).

2. *M. KHASIANA*, after *Hook. f.* insert— *Ic. Plant. t. 1831.*

P. 687. 6. *M. SCOTTII*, add— *Ic. Plant. t. 2001.*

P. 688. 8. *M. POLYODON*, add— *Ic. Plant. t. 2002.*

P. 689. Under synonyms of 15. *MICROSTYLIS CONGESTA*, enter—*Neottia plantaginea*, *Don Prodr. 26, fid. Lindl. Gen. & Sp. Orchid. 458*; and under habitats, enter—PENANG, SINGAPORE, and MALACCA, *Ridley in litt.*

P. 691. 22. *MICROSTYLIS CRENULATA*, Mr. Ridley informs me that the lip is much more rounded than in any other species, that it is a much smaller plant than *M. Rheedii*, and that it may be a curious form of *M. versicolor*.

P. 692. 3. *L. THWAITESII*, add— *Ic. Plant. t. 2006.*

P. 696. 20. *L. ACUMINATA*, add— *Ic. Plant. t. 2007.*

21/1, *L. WRAYII*, *Hook. f.*; leaves 3-4 large elliptic-acuminate, scape shorter than the leaves, bracts minute, sepals subequal linear-oblong 3-nerved, lip deflexed from above the 2-tubercled base cuneately flabelliform beyond the contracted middle truncately 2-lobed, lobes fimbriately toothed.

UPPER PERAK, alt. 300 ft., *Wray (in Herb. Calcutt.)*.

Stem stout, 3-5 in., base swollen; roots stout. *Leaves* 4-6 in., sessile or contracted into a broad petiole. *Scape* rather stout; raceme 2-4 in., glabrous; pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in.; flowers $\frac{1}{2}$ in. diam., pale green with 2 claret-coloured stripes on the lip; sepals flat, at length revolute; petals very narrow, margins revolute; lip as long as the sepals; column stout, incurved, not winged.

P. 697. 24. *L. DEFLEXA*, after *Hook. f.* insert— *Ic. Plant. t. 2008.*

26. *L. PARADOXA*. Mr. Ridley, who finds this species at Singapore, informs me that there are two forms, one with pure yellow flowers, the other with the sepals and petals deep blackish-purple, and the lip green with a purple centre, which latter is

the *L. nervosa*, *Lindl. Gen. & Sp. Orchid.* 24; *Benth. Fl. Hongk.* vi. 352; *Franch. et Sav. Enum. Fl. Jap.* ii. 21; *Ridley in Journ. Linn. Soc.* xxii. 262 *Ophrys nervosa*, *Thunb. Fl. Jap.* 27; *Ic. Pl. Jap.* t. 10. *Malaxis nervosa*, *Swartz in Act. Holm.* 1800, 235. *Sturmia nervosa*, *Reichb. f. in Bonpland.* iii. 250.—DISTRIB. China, Japan.

P. 698. *E. PARADOXA*, var. *Parishii*. Additional specimens of this collected in Upper Burma (Herb. Calcutt.), appear to prove this to be a distinct species, which may be characterized as follows:—

26/1. *L. PARISHII*, *Hook. f.*; leaves 2–3 narrowed to the base or broadly petioled lanceolate acuminate, flowers fleshy, bracts small ovate acuminate, sepals oblong obtuse 5-nerved, lip recurved obovate retuse, base with 2 teeth, sides flat, column suberect not winged. *L. paradoxa*, var. *Parishii*, *Hook. f. l. c.*

TENASSERIM, *Lobb, Parish. UPPER BURMA, Herb. Calcutt.*

Leaves 2–3 in. *Scape* 6–8 in., naked, few-flid.; bracts $\frac{1}{2}$ in.; pedicels $\frac{1}{2}$ in.; ribs of ovary not wrinkled; flowers $\frac{1}{2}$ in. diam.; sepals spreading, dorsal longest; petals deflexed, margins revolute; lip thick, minutely erose beyond the middle; basal teeth united by a curved ridge, nerves faint subconcentric.—Very near *L. paradoxa* but pedicels longer, bracts smaller and sides of lip not erect.

P. 701. After 37. *L. OBSCURA*, insert—

37/1. *L. LATIFOLIA*, *Lindl. Gen. & Sp. Orchid.* 30. *L. Scortechinii*, *Hook. Fl. Brit. Ind.* v. 703, *Ic. Plant.* t. 2009. *L. robusta*, *Hook. f. Ic. Plant.* t. 2012. *Malaxis latifolia*, *Blume Bijdr.* 393.—I have now little doubt but that the two species which I proposed as *L. Scortechinii* & *robusta* are forms of the Javanese *L. latifolia*; the former of which was taken from a drawing of a specimen in an advanced state of flowering. *L. latifolia* should be referred to the subsection of *Coriifolia*, with single-leaved pseudobulbs and 3-nerved sepals. *L. robusta* is a native of Maxwell's Hill, PERAK (*Wray*).

P. 701. After 41. *L. OBSCURA*, insert the two following:—

41/1. *L. TORTA*, *Hook. f. Ic. Plant.* t. 2014; pseudobulbs small, leaf sessile elliptic-lanceolate acute 9-nerved, scape terete, bracts half as long as the long decurved pedicels, sepals linear-oblong obtuse 1-nerved revolute, margins recurved, lip shorter than the sepals cuneate-obovate angles rounded, tip rounded obscurely crenulate, callus basal 2-lobed.

KHASIA HILLS, alt. 3000 ft., *Mann.*

Pseudobulbs $\frac{3}{4}$ in., conical-ovoid. *Leaf* 4–5 by $1\frac{1}{4}$ – $1\frac{1}{2}$ in., thinly coriaceous. *Scape* rather stout, with few lanceolate bracts, sometimes flexuous; bracts $\frac{1}{4}$ – $\frac{1}{2}$ in., lanceolate, membranous, spreading; pedicel with ovary $\frac{2}{3}$ in.; sepals $\frac{1}{2}$ in.; lip $\frac{1}{2}$ in. broad.—A very distinct species, perhaps nearest to *L. bootanensis*, but differing in the 1-nerved sepals and the wings of the column not being hooked.

41/2. *L. TENUIFOLIA*, *Hook. f. Ic. Plant.* t. 2013; pseudobulbs small narrow, leaf elongate very narrowly linear-oblancoate, scape naked with the elongate raceme as long as the leaf, bracts setaceous equalling the short capillary pedicels, flowers minute, sepals deflexed flat 1-nerved, lip with a suberect sessile lunate hypochile and a rhomboidly orbicular convex puberulous deflexed epichile, calli 0, column not winged.

UPPER ASSAM; on the Mikir Hills, alt. 1000 ft., *Mann.*

Pseudobulbs $\frac{1}{2}$ – $\frac{3}{4}$ in., narrowly pyriform. *Leaf* 6–8 by $\frac{1}{4}$ – $\frac{1}{2}$ in. at the broadest part, rounded downwards, 1-nerved. *Scape* and *raceme* very slender; bracts $\frac{1}{2}$ in., as long as the pedicel and ovary; flowers pale, $\frac{1}{2}$ in. diam.; sepals linear-oblong, obtuse, margins slightly recurved, nerve faint; lip rather shorter than the sepals, lobes of the hypochile incurved, subacute, half as long as the epichile; column rather slender.—A very distinct species.

P. 703. 45. *L. SCORTECHINII*, see *L. latifolia*, above.

After 46. *L. FLACCIDA*, insert—

46/1. *L. GRACILIS*, *Hook. f. Ic. Plant.* t. 2011; pseudobulbs narrow, leaves 2 oblancoate, scape long slender terete, raceme long lax-flid., bracts as long as the

very short pedicels, sepals linear-oblong obtuse revolute 3-nerved, lip sharply reflexed from above the middle subclawed quadrately oblong nerveless truncate shortly bifid and toothed with a minute entire obtuse interposed tooth, calli obscure or 0.

PERAK; on Waterfall Hill, Wray.

Pseudobulbs 1 in., sheathed. *Leaves* 3-7 in., acute, rather thin, 5-nerved. *Scape* with raceme much longer than the leaves; bracts $\frac{1}{2}$ in.; flowers distant, about $\frac{1}{2}$ in. diam., pale green; margins of sepals not recurved; lip shorter than the sepals, concave towards the base with thickened involute margins, blade smooth red, no calli, but an obscure thickened ridge at the very base; column obscurely winged above.—A very distinct species.

P. 704. After 49. L. DISTANS, insert—

49/1. L. DOLABELLA, Hook. f. *Ic. Pl.* t. 2010; pseudobulbs narrow, leaves 2 narrowly oblanceolate, scape narrowly winged, raceme erect lax-fld., bracts small subulate, flowers small, sepals oblong obtuse spreading 1-nerved, margins not recurved, lip axe-shaped reflexed from a short broad claw anterior margin crenulate, disk with a depressed 3-carinate ridge which is truncate posteriorly and vanishes beyond the middle of the lip and a branched nerve on each side.

KHASIA HILLS, alt. 4000 ft., Mann.

Pseudobulbs 1-2 in. *Leaves* 6-14 by $\frac{3}{4}$ -1 in., acute, subpetioled, 5-7-nerved. *Scape* with raceme shorter than the leaves; pedicels $\frac{1}{2}$ in., longer than the bracts; flowers $\frac{1}{2}$ in. diam.; lip broader than long, exactly the shape of an axe or chopper, anterior margin slightly rounded; column incurved, slender, not winged.

P. 705. 53. L. RESUPINATA. Mr. Ridley informs me that the Nilghiri habitat is no doubt an error, taken up from the late N. B. Ward's Herbarium (at the British Museum). The specimen was collected by Griffith, and no doubt in the Khasia.

P. 707. LIPARIS DECURSIVA. Mr. Ridley informs me that this is absolutely identical with *L. reflexa*, Lindl., an Australian species.

P. 708. LIPARIS ZEYLANICA. Mr. Ridley informs me that he cannot guess what Loddiges' *Liparis* from Ceylon is, and that the additional name of *zeylanica* is a misprint in his monograph.

In generic character of PLATYCLINIS, after *sepals* and *petals*, add subequal.

1. P. GRACILIS, in fourth line of character, for linear-oblong read ovate-lanceolate; and after tip rounded, add or acute. Add at end, *Ic. Plant.* t. 2016.

2. P. KINGII; after Hook. f., insert *Ic. Plant.* t. 2015.

P. 709. OREORCHIS INDICA; at end of character dele (*not of Dene*).

P. 710. In character of Sect. 1. SARCOPODIUM after "*Leaves* 2" insert in brackets (*Leaf* solitary in *D. longicolle*).

P. 711. Line 6, after *Aporum* add, and *Strongyle*.

P. 712. 5. DENDROBIUM LONGICOLLE. Mr. Ridley informs me that this species occurs in New Guinea, and that Reichenbach's *D. inauditum* Reichb. f. (*Lindenia* ii. 66) is a synonym of it; as also that the pseudobulbs are constantly 1-leaved, in which respect it differs from all other Indian *Sarcopodia*, and approaches *Bulbophyllum*.

6. D. PERAKENSE, after Hook. f. insert, *Ic. Plant.* t. 2019.

P. 713. 7. D. MACROPODIUM, add *Ic. Plant.* t. 2020; and for "pedicels very short" read "pedicels with ovary very long."

8. D. GEMINATUM, for "*Lindl. mss.*," read *Lindl. Gen. & Sp. Orchid.* 77, and add as synonym *Desmotrichum geminatum*, *Blume Bijdr.* 332.

9. D. LONGIPES, add *Ic. Plant.* t. 2017, and in line 2 add, pedicel with ovary very long.—A fine suite of specimens from Mr. Wray offers great variations; a small form from the top of Gunong Batu Pateh, alt. 6700 ft., has close-set polished pseudobulbs $\frac{1}{2}$ in. long, and leaves only $\frac{1}{2}$ - $\frac{1}{3}$ in., scape $1\frac{1}{2}$ in.; another has a 3-leaved pseudobulb nearly 1 in. long, and petioled leaves 3 in., the flowers of these are white tinged with

yellow in the centre, veined with red brown; a third form has 3 sessile elliptic leaves 2-2½ in. long, and a very stout 3-4-fl. scape, the flowers are straw coloured, finely lined with dull pink; a fourth form from a lower elevation has leaves 1-2½ in., and a slender 2-fl. scape, the flowers are large white. The breadth of the midlobe of the lip in this species varies from almost orbicular-ovate to dagger-shaped. The sheaths of the rhizome and pseudobulb are very membranous, red-brown.

10. *D. PUMILUM*. "Common at Singapore, with flowers yellow or cream coloured; lip with a dark spot at the tip, or veined with red. The two forms look totally different, but I can find no structural difference. I never saw so many flowers in a head as in *D. quadrangulare*." *Ridley in litt.*

P. 714. 12. *D. MACRAEI*, in line 2, for peduncled read pedicelled.

13. *D. LONCHOPHYLLUM*, add *lc. Plant. t.* 2018.

14. *D. KUNSTLERI*, add *lc. Plant. t.* 2023, and in line 1 for leaves read leaf. "Common in mangrove swamps at Singapore, flower very fugacious, lip superior." *Ridley in litt.*

P. 723. 49. *D. LEONIS*. After the habitats insert, *DISTRIB. JAVA*. "Flowers exquisitely scented of Vanilla." *Ridley in litt.*

P. 724. 51. *D. GRANDE*. Add *lc. Plant. t.* 2024.

P. 724. 52. *D. ATROPURPUREUM*. "I think that the yellow fl. *D. carnosum* is distinct. *D. atropurpureum* is smaller, shabbier-looking, and the flowers dark claret-coloured as in Blume's drawing." *Ridley in litt.*

P. 725. After Sect. VII. *STRONGYLE*. Dele "*Flowers terminal*."

59. *D. KENTROPHYLLUM*. Add *lc. Plant. t.* 2021, and in line 2 for flowers terminal, read "terminal or lateral."

P. 726. 62. *D. SUBULATUM*, for *Hook. f.* read *Lindl. Gen. & Sp. Orchid.* 91, and add as synonym *Onychium subulatum*, *Blume Bijdr.* 328.

63. *D. ACEROSUM*. Add to *Syns.*, *D. subteres*, *Lindl. in Journ. Linn. Soc.* iii. 4. "Flowers all white or veined with red, leaves curiously grooved on each side." *Ridley in litt.*

P. 727. 68. *D. CATHCARTII*. After *Hook. f.* insert *lc. Plant. t.* 2022.

P. 728. 72. *D. LOBBII*, add *Syn. D. Teysmanni*, *Miquel Fl. Ind. Bot.* iii. 640.

73. *D. TUBERIFERUM*. After *Hook. f.* insert *lc. Plant. t.* 2025, and in the habitats, for Singapore read "Perak." The Singapore and Chittagong plants are probably different species.

74. *D. PODAGRABIA*. After *Hook. f.* insert *lc. Plant. t.* 2026.

75. *D. CLAVIPES*, *lc. Plant. t.* 2027.

P. 729. After 76. *D. CRUMENATUM*, insert—

76/1. *D. TENUICAULE*, *Hook. f.*; stem tall very slender above, basal internode minute globose, 2nd and 3rd slender, 4th and 6th thickened elongate conical, 5th stout 1 in. thickened cylindric ribbed, leaves 3-4 in. very narrowly linear, flowers few terminating the leafless stems, dorsal sepal oblong 7-nerved, petals oblong with one branched nerve, mentum twice as long as the obtuse lateral sepals straight, lip cuneate side lobes short rounded as broad as the sessile orbicular midlobe, disk pubescent.

ANDAMAN ISLANDS (*lc. in Hort. Bot. Calc.*).

Stems 10-12 in., sheathed at the upper nodes. *Leaves* $\frac{1}{10}$ in. broad, acute. *Bracts* minute, pedicel with ovary slender $\frac{1}{2}$ in.; flowers $\frac{1}{2}$ - $\frac{3}{4}$ in. long, pure white; petals as long as the dorsal sepal; mentum trumpet-shaped tip acute yellowish; lip sessile at the base of the mentum, membranous, delicately veined; column very short, 3-toothed; anther hemispheric.—Described from a drawing (that will be published in King's Annals of the Calcutta Garden) and dried flowers.

78. *D. BOLBOFLOSUM*. To end of specific character add *lc. Plant. t.* 2028. The spurs at the base of the column, figd. and observed by Mr. Clarke, are not apparent in dried specimens.

P. 730. 79. *D. ADUNCUM*. Dele *Bot. Mag.* t. 6784.—Two very closely allied species are confounded under this name. *D. ADUNCUM* and *D. HERCOGLOSSUM*, agreeing in habit, foliage, inflorescence, and very nearly in flowers, but distinguished by the lip, which in *aduncum* has a glabrous area on the disk, its flowers too are paler, the sepals less acuminate, and the arms of the column more notched. Until quite recently the native country of *aduncum* was unknown, and it was supposed to be specifically the same as a Chinese plant which Reichenbach described as *hercoglossum*, and which in Veitch's "Manual" is cited as a synonym. The lip in both is very shortly clawed. Lindley regarded *D. aduncum* as closely related to *D. moschatum*, but to me it seems widely different.

The following are the characters of the two species:—

79. *D. ADUNCUM*; flowers pale pink, lip with a broad naked area on the pubescent disk.—Sikkim and Bhotan Himalaya, Assam.

79/1. *D. HERCOGLOSSUM*, *Reichb. f. in Hamb. Gartenzeit.* xliii. 558, in *Gard. Chron.* 1886, ii. 487; flowers bright rose-red, disk of lip villous all over. *D. aduncum*, *Hook. f. Bot. Mag.* t. 6784.

SINGAPORE, *Ridley in litt.* China.

79/2. *D. FLAVIDULUM*, *Ridley mss.*; stems slender pendulous, leaves linear-lanceolate, racemes on the leafless stems short, bracts subacute, dorsal sepal ovate-oblong obtuse, tip thickened, lateral ovate acute deeply keeled from the middle to the tip, petals oblong obtuse 5-nerved, mentum large obtuse shorter than the lateral sepals, lip ovate-oblong 3-fid beyond the middle, lobes ciliate, midlobe thickened.

SINGAPORE; at Kranji, in Mangrove swamps, common, *Ridley*.

Stems 12–18 in., rather flexuous, soft, internodes about 1 in. Leaves $2\frac{1}{2}$ –3 in., acuminate with a notch on one side, membranous. Raceme with the slender peduncle $\frac{1}{2}$ –2 in.; bracts $\frac{1}{2}$ in.; flowers $\frac{1}{2}$ in. long; sepals and petals rigid; lip 7-nerved, lobes ovate-oblong obtuse.—A very distinct species. Mr. Ridley informs me that there are 2 forms of it, one with flowers all yellow, the other with white sepals and petals.

81. *D. CORNUTUM*. Insert after *Ic. Plant.* t. 2029.

P. 731. 82. *D. CUMULATUM*. I have examined specimens preserved in spirits sent by Dr. King (collected by Mr. Lister in Bhotan). The claw of the lip is not short, but may be traced down the spur, and is as long as the blade; and what appeared as a small tubercle in the dried specimen is an elongated grooved callus much raised towards base of the claw, the mentum is more or less laterally compressed, sometimes longer than the sepals. The Perak plant doubtfully referred to *D. cumulatum* is very different, but not in a state for description.

P. 731. 81/1. *D. CROCATUM*, *Hook. f.*; stems terete, leaves 4 by 1 in. lanceolate acuminate, racemes on leafless stems slender few-fld., dorsal sepal and petals broadly oblong subacute 7-nerved, mentum twice as long as the ovate-oblong subacute lateral sepals slender spur-like acute, lip large spatulate, claw as long as the obovate entire crenulate limb, with an obtuse oblong reversed callus at the base.

PERAK; at Larut (*Ic. in Hort. Calcutt.*).

Stems 2–3 ft., narrowed to the base, which is not tuberos, internodes 1 in., $\frac{1}{3}$ in. diam. Leaves bright green, many-nerved. Raceme 1 in.; bracts small, ovate; pedicel with ovary slender, $\frac{1}{2}$ – $\frac{3}{4}$ in.; flowers $1\frac{1}{2}$ in. long, bright orange yellow with red specks on each side of the lip towards the base of the limb; mentum nearly straight.—Described from dried flowers and a drawing that will be published in King's Annals of the Calcutta Garden.

84. *D. KENTROCHILUM*, after *Hook. f.* insert *Ic. Plant.* t. 2030.

85. *D. MEGACERAS*, after *Hook. f.* insert *Ic. Plant.* t. 2031.

P. 732. 87. *D. HYMENANTHUM*, after *Hook. f.* insert *Ic. Plant.* t. 2032. There being an earlier *D. hymenanthum* (Lindl. Gen. & Sp. Orchid. 86), I have named this species *HYMENOPTERUM* in the "Icones Plantarum."

After 89, *D. PERULA*, insert—

89/1. *D. PANDURIFERUM*, *Hook. f.*; stems elongate cylindric grooved, leaves (on young stems only) lanceolate, racemes short 6–8-fld., dorsal sepal broadly ovate obtuse, petals orbicular crenate, mentum many times longer than the broadly ovate subacute lateral sepals tip swollen, claw very long and slender, limb small deeply constricted in the middle forming lateral auricle-like side lobes and an obcordate midlobe, disk with a large transverse lamella between the side lobes.

PERG; at Rangoon, *Gilbert (Ic. in Herb. Calcutt.)*.

Stems 2–3 ft., narrowed at the base; internodes 1–1½ by ¼ in., nodes often rooting; sheaths membranous, white, young green and speckled. Leaves few, 1–1½ in., acuminate. Racemes 1–2 in.; bracts small; pedicel with ovary ½ in.; flowers 1 in. long; sepals and petals green with streaks of red dots along the numerous nerves; mentum incurved, thickened towards the rounded tip, straight or slightly curved, green streaked with red; claw of lip 3–4 times as long as the dull yellow limb, margins incurved above, below united to the walls of the mentum; anther stipitate on the top of the column.—Nearly allied to *D. tropæoliflorum*. Also near 88, *D. ionopus*, R.f., but the flowers are not yellow with red blotches, nor is the claw of the lip thick and keeled. This will be figured in King's Annals of the Calcutta Garden.

Var. *serpens*. In the Calcutta Garden collection of drawings is one of a variety of *panduriferum*, or of a very closely allied species, marked as from Perak (*Kunstler*), with longer flexuous stems tuberous at the base, yellow sepals, and petals streaked rather than dotted with red along the nerves, and a mentum as long but not thickened towards the tip; the limb of the lip is less constricted in the middle. This may be Reichenbach's *D. ionopus*.

89/2. *D. TROPÆOLIFLORUM*, *Hook. f.*; stem flexuous thickened upwards deeply grooved, leaves linear-oblong, raceme slender 6-fld., dorsal sepal ovate acute, petals very broad, mentum straight cylindric many times longer than the triangular-ovate acute lateral sepals, lip with a very long slender claw and small panduriform limb disk with a large semilunar callus.

PERAK; at Larut, *Kunstler (Ic. in Herb. Calcutt.)*.

Stem a foot long, incurved, internodes ¾–1 in., the thickest ¼ in. diam. Leaf 2½ by ¾ in., acute. Raceme 2 in., rachis pink; bracts minute; pedicel with ovary ¾ in., green; flowers 1 in. long; sepals and petals ¼–½ in. long, dark red-purple; mentum ¾ in., yellow-green, tip rounded; limb of lip with a rounded retuse apiculate tip.—A remarkable species, described from a drawing, which will be published in King's Annals of the Calcutta Garden. According to a note by Mr. Brace which accompanies the drawing, the sides of the claw of the lip adhere to the sides of the mentum (as in *panduriferum* and probably other species of Sect. *Pedilonum*). The flowers very much resemble in form those of *Tropæolum pentaphyllum*, Lamk.

P. 732. 91. *D. BIFARIUM*; after *Wall. Cat. 2002*, add (*in part*), for one of the specimens is a var. of *Appendicula bifaria*. (See p. 83.)

P. 737. 108. *D. SPHEGIDOGLOSSUM*. *D. STUPOSUM* being the earlier name should be adopted.

P. 741. 124. *D. PENDULUM*. Dele Syn. *D. Wardianum* (see No. 127). *D. melananthum* is considered to be a hybrid with *D. Wardianum*.

P. 743. 130. *D. DEVONIANUM*; under Syns., after “not of Lodd.,” add, nor of *Roxb.*, or of *Bot. Mag.*

131. *D. DALHOUSIEANUM*, must take the name of *PULCHELLUM*, *Roxb. in Lindl. Gen. & Sp. Orchid.* 82; *Fl. Ind.* iii. 486, a species, which, misled by Lindley's reference to it of *D. Devonianum*, I had hitherto failed to recognize. Reverting to it for this supplement, I find nothing in Roxburgh's description and drawing to distinguish it from *Dalhousieanum* (also a native of Silhet) except the drawing of the lip, which is too obcordate, and does not represent the villous tip, or the pectinate lobes on the disk which are so conspicuous in the latter plant. On the other hand, Roxburgh describes the lip as “beautifully marked, ciliate and ramentaceous,” characters that apply to *Dalhousieanum* and to no other species at all like it.

In short, as with *Cælogyne nitida* & *Geodorum recurvum*, the faulty drawings, all by the same native artist, of the lips (probably in a withered state) have retarded the recognition of otherwise well marked and described species. In this view Mr. Rolfe is disposed to agree with me.

With regard to Loddige's *pulchellum*, (Bot. Cab. t. 1935, & Bot. Mag. t. 5037), Rolfe (Gard. Chron. 1887, ii. 155) has shown that it is a Chinese plant (*D. Loddigesii*, Rolfe), and neither Roxburgh's *pulchellum* nor *Devonianum*.

P. 745. 137. *D. BRYMERIANUM*. Dr. Trimen has sent me a fine drawing from the Peradeniya Herbarium of a cultivated specimen of *D. criniferum*, showing that has no affinity with *D. Brymerianum*, but belongs to the Sect. *Cadetia*. It is probably a Philippine species.

P. 746. *D. MOULMEINENSE*, is perhaps only a state of *D. dixanthum*. At the end of the specific character add *lc. Plant. t. 2033*.

P. 748. 146. *D. CHRYSEUM*, as stated at vol. v. p. 751, this name must give place to *D. aurantiacum*, R.f.

P. 752. *D. HUGHII*. Dele, said to be a form of *D. crumenatum*; and add to SPECIES UNKNOWN TO ME—

D. ANDERSONII, Scott in Journ. Agric. Soc. Ind. iii. (1872) 117, from Burma, collected by Dr. J. Anderson in 1868, and described from a plant that flowered in the Calcutta Bot. Gardens. It resembles, according to its author, a dwarfed form of *D. formosum*, from which species the description does not enable me to distinguish it. It is stated to be highly aromatic.

P. 753. 2. *B. CLANDESTINUM*. Common at Singapore, Ridley in litt.

3. *B. MACRANTHUM*, in last line after "lip" add "strongly recurved," and to citations, Ridley in Ann. Bot. iv. (1890), 335, t. 22, f. 1-6. The flowers smell of cloves, Ridley.

P. 754. After 4. *B. MEGALANTHUM*, add—

4/1. *B. PATENS*, King mss.; scape very short 1-fl., pedicel longer than the pseudobulb of the elliptic-oblong leaf, flower $1\frac{1}{2}$ in. diam., petals linear-lanceolate and broader lateral sepals widely spreading and falcately decurved, lip shortly stipitate linear-oblong quite straight, column truncate without apical teeth.

PERAK, Kunstler (*lc. in Herb. Calcutt.*)

Rhizome stout, crinite at the nodes; pseudobulbs 1- $1\frac{1}{2}$ in., ellipsoid. *Leaf* 6-8 in. by 2- $2\frac{1}{2}$ in., acute, narrowed into a short petiole. *Scape* $\frac{1}{2}$ - $\frac{1}{2}$ in., close to the pseudobulb, clothed with short imbricate scales; pedicel $1\frac{1}{2}$ -2 in., yellowish speckled with red; sepals and petals yellowish, closely mottled with red-purple, $\frac{3}{4}$ -1 in. long, dorsal erect and incurved, linear-lanceolate, lateral ovate-lanceolate; lip $\frac{1}{2}$ in. long, obtuse, base truncate; column very short.—Described from the drawing in Herb. Calcutt., and dried flowers. The straight lip is remarkable in the genus, and distinguishes it from *B. macranthum*.

P. 755. 9. *B. LOBBII*, add to habitats, Chittagong hills, (*lc. in Herb. Calcutt.*)

P. 756. 17. *B. MEMBRANIFOLIUM*. After *lc. Plant.* insert t. 2034.

P. 757. 19. *B. MEDUSÆ*. Mr. Ridley informs me that there are two forms of this; a Bornean with pale hardly spotted flowers, and a Singaporean with much larger thickly spotted flowers.

21. *B. CONFERTUM*. After *lc. Plant.* insert 2035.

P. 758. 24. *B. CAULIFLORUM* " " " 2036.

25. *B. PROTRACTUM* " " " 2037.

P. 759. 29. *B. MODESTUM* " " " 2038 B.

29/1. *B. CONCINNUM*, Hook f. *lc. Plant.* t. 2038 A; scape shorter than the oblong leaf slender few-fl., flowers very small, sepals ovate-lanceolate acute 3-nerved cellular, 3 times as long as the linear-oblong obtuse 1-nerved petals, mentum rounded, lip minute recurved, columnar spurs slender.

SINGAPORE, at Chang Chu Rang. Ridley.

Rhizome very slender, sheathed; pseudobulbs $\frac{1}{2}$ - $\frac{3}{4}$ in., narrow terete curved.

Leaf $\frac{3}{4}$ –1 in., acute or obtuse, coriaceous. *Scape* $\frac{3}{4}$ –1 in., 3–5-fld., sheaths few small, bracts lanceolate nearly as long as the ovary or shorter, flowers orange-yellow; sepals about $\frac{1}{2}$ in. long, dorsal rather the shortest; lip tongue-shaped.

30. *B. LEPTANTHUM*. After *Ic. Plant.* insert 2039 A, and in line 4 for 3-nerved sepals read 1-nerved petals.—Var. ? *Gamblei*. After a further comparison of specimens with *B. leptanthum*, I am convinced of the specific distinctness of this variety, which I have figured in the “*Icones Plantarum*” as *B. Gamblei* t. 2039 B.

P. 760. 3. *B. KINGII*. After *Ic. Plant.* insert t. 2053 *ined.*

P. 761. Under 37. *B. CUPREUM*. Dele the synon. *var. stenopetala*. Two very closely allied species are here confounded, both natives of Tenasserim; one is the true *cupreum* *var. stenopetalum*, which, as Mr. Rolfe has pointed out to me is also that author’s *B. rufinum*, a plant referred by me by oversight to 58. *B. CONCHIFERUM* (which has no pseudobulb and no auricles to the lip). The following are the characters of the two species:—

37. *B. CUPREUM*, *Lindl. l.c.*; pseudobulb 1 in. subglobose, scape slender inclined slightly curved, sheaths small distant, raceme 1–2 in., flowers uniformly coppery yellow, bracts ovate-oblong much shorter than the ovary, lateral sepals ovate-lanceolate acute, petals triangular-ovate acuminate, lip narrow obtuse auricles large, columnar spurs short slender. *TENASSERIM, Parish.*—Very like *B. Carey-anum*, but the rhizome and scape are much more slender, the flowers fewer and less dense, and the petals are not aristate. Lindley’s description is wholly insufficient. In his specimen the petals and auricles of the lip are serrulate, in others that flowered at Kew they are entire. The Manilla habitat is no doubt an error.

37/1. *B. RUFINUM*, *Reichb. f. Xen. Orchid.* iii. 45 t. 219; pseudobulb 2 in. oblong, scape long stout decurved, sheaths large, raceme 6–10 in. lax-fld., bracts lanceolate about as long as the flowers, flowers dirty-yellow with red streaks on the sepals, lateral sepals and small petals narrowly lanceolate acuminate, lip narrow obtuse, auricles small entire, columnar spurs slender. *B. cupreum* *var. stenopetalum*, *Reichb. f. in Trans. Linn. Soc.* xxx. 152.—*TENASSERIM, Parish.*—The large pseudobulb, stout large scape, long raceme and bracts, narrow sepals, and colour of the flowers readily distinguish this from *cupreum* and *Careyanum*.

P. 764. 32. *B. GYMNOPIUS*. After *Ic. Plant.* insert t. 2040.

53. *B. THOMSONI* “ “ t. 2041.

54. *B. SECUNDUM* “ “ t. 2042.

P. 766. 58. *B. CONCHIFERUM*, dele *B. rufinum*, &c. See above, No. 37/1.

61. *B. APODUM*. After *Ic. Plant.* insert t. 2043.

62. *B. WRAYI* “ “ t. 2044.

P. 767. 63. *B. LEPTOSEPALUM* “ “ t. 2045.

64. *B. HYMENANTHUM* “ “ t. 2046, and after it place—

64/1. *B. ADENOPETALUM*, *Lindl. in Bot. Reg.* 1842, *Misc.* 85; pseudobulbs obsolete, leaves petioled oblong obtuse base scarcely pseudobulbous, spike rather longer than the leaf many-sheathed below many-fld., sepals acuminate, petals spatulate acute glandular within, lip narrowly ovate obtuse ciliate base channelled. *Walp. Ann.* vi. 255.

SINGAPORE; *Hort. Loddiges.*

Flowers yellowish, slightly sweet-scented.—Described from Lindley; there is no specimen in his Herbarium, only a sketch of the flower, in which the ovate sepals are narrowed into long capillary points.—Two different Philippine species in *Herb. Hook.* and in *Herb. Lindley*, both labelled by that author *B. adenopetalum*, led me to suppose that the latter had been erroneously attributed to Singapore, whence my exclusion of it from the Flora.

64/2. *B. VERMICULARE*, *Hook. f. Ic. Plant.* t. 2054; rhizome very slender tortuous, leaves small linear-oblong obtuse base narrowed, scape short slender few-fld., sepals 1-nerved dorsal linear, lateral ovate-lanceolate uncinately falcate, petals narrowly linear 1-nerved, lip linear-oblong obtuse 3-nerved hairy.

SINGAPORE; at Kranji, *Ridley*.

Rhizome as thick as a sparrow's quill; pseudobulb 0. *Leaf* $1\frac{1}{2}$ – $1\frac{3}{4}$ in., narrowed into a short petiole. *Scape* with the spike shorter than the leaves, 2-sheathed; bracts half as long as the flower; ovary very short; flowers $\frac{1}{8}$ in. long; lateral sepals finely acuminate, decurved; petals half as long, obtuse; lip thin, sessile, almost as long as the petals, hairs long flexuous; column with short spurs.—Near *B. adenopetalum*, differing in the petals not being spatulate or glandular within, and in the sepals not having long filiform apices, and in the linear 3-nerved lip.

66. *B. GLOBULUS*. After *Ic. Plant.* insert t. 2047.

P. 768. 71. *B. MICRANTHUM* " " " t. 2048.

P. 769. 75. *B. CIRRHATUM* " " " t. 2049.

P. 770. 79. *B. CANDIDUM* " " " t. 2050.

P. 770. *B. ADENOPETALUM*. See above, No. 64/1.

P. 771. *B. SILLENIANUM*, should be *SILLEMIANUM*.

After *B. SILLEMIANUM*, add—

B. STRIAELLUM, *Ridley in Ann. Bot.* iv. (1890) 335 (*excl. fig.*); very small, rhizome filiform, pseudobulbs conic curved, leaf lanceolate acute, scape very short filiform 1-fld. sepals subequal oblong or oblong-lanceolate caudate, petals ovate-oblong obtuse, lip very short narrow recurved pubescent beneath, columnar arms obtuse.

SINGAPORE, on trees, Char Chu Raang, *Ridley*.

Pseudobulbs hardly $\frac{1}{2}$ in. long. *Leaf* erect, 2 by $\frac{1}{2}$ in. *Scape* hardly longer than the pseudobulb, 1–2-sheathed at the base; pedicel 1 in., red; perianth closed; sepals $\frac{1}{2}$ in. long and petals yellow with 3 red keels; petals 1-nerved; lip yellow, tip dotted with red and with 2 red dots at the base; column short.—I have seen no specimen. Description from *Ridley*, who describes the arms of the column as short and obtuse. The petals he describes as being rather shorter than the body of the sepals (that is without the tails). The figure which he gives (t. 22 f. 7, 8, 9) must belong to a different species, for the columnar arms are represented as very slender. I do not know where to place this curious 1-flowered species which certainly does not naturally belong to the 1-fld. section. It may be a depauperated state of a plant of either the racemose or capitate section.

9/1. *HENOSIS*. I have erred in the description of this remarkable plant. The real petals, which form a minute broad low wing on each side of (what is not a column with adnate petals but) the enormous 2-winged column, along the naked foot of which they extend as a membranous boarder to the insertion of the lateral sepals, they are perfectly hyaline, and were so appressed to the sides of the very base of the column that (though they are indicated in a rude sketch by Lindley), I overlooked them, and I am indebted to my artist, Miss Smith, for pointing them out to me; they are not triangular-ligulate, as described by Reichenbach, but low and very broad.—It may be a question whether this plant should not be restored to *Bulbophyllum*, in which Reichenbach placed it; if it is to be retained it must be on account of the remarkable very large 2-winged column, like none other in the genus known to me; the long pedicels too are quite peculiar. If referred to *Bulbophyllum* it should be to the racemose section with pseudobulbs and glabrous eciliate sepals and petals, though very unlike any member of that group. It might with 52. *B. gymnopus* and 62. *B. Wrayi*, form a group distinguished from all others by the lateral sepals being inserted at the apex of the naked foot of the column.

H. LONGIPES, after *Ic. Plant.* insert t. 2051 *ined.*

P. 773, after 3. *C. VAGINATUM*, insert—

3/1. *C. LONGESCAPUM*, *Teysm. & Binn. in Batav. Natur. Tijdsch.* xxiv. (1862) 311; pseudobulbs subovate obtuse 4-angled 2-leaved, leaves oblong obtuse emarginate coriaceous glabrous, scapes long cylindric, flowers capitate densely crowded horizontal, bracts short, lateral sepals subserrulate, dorsal smaller linear-lanceolate erect, petals obtuse ciliate with long hairs 5-nerved, lip tongue-shaped obtuse reflexed channelled base cordate. *PENANG, Lobb.*

Pseudobulb 2 by $1\frac{1}{2}$ in. *Leaves* 6 by $1\frac{1}{2}$ in. *Scape* 15 in.; flowers 20–25, brown.—Description from the authors. I know nothing like it. The 2-leaved pseudobulbs are remarkable.

P. 774. 9. *C. ROXBURGHII*. After *Ic. Plant.* 2057 A. insert—From a drawing lately received from Calcutta, I suspect that *C. Andersonii* should be referred to *C. Roxburghii*.

9/1. *C. CONCINNUM*, *Hook. f. Ic. Plant.* t. 2060 B.; very small, rhizome slender, pseudobulbs conico-ovoid, lateral sepals $\frac{1}{2}$ in. linear-oblong acute nearly flat, twice as long as the ovate caudate long-ciliate dorsal, petals as long as the dorsal sepal ovate-lanceolate caudate acuminate long ciliate, lip fleshy strongly recurved, column winged shortly 2-toothed.

SINGAPORE; *Ridley*.

Pseudobulbs $\frac{1}{2}$ in.; close set, curved. *Leaf* $1-1\frac{1}{2}$ in., oblanceolate, obtuse, coriaceous, hardly petioled. *Scape* from the base of the pseudobulb, with membranous sheaths at the base, very slender, shorter than the leaf; flowers 6–8, whorled; bracts minute; pedicels very short; sepals 5-nerved; petals 3-nerved.

P. 775. 15. *CIRRHOPE TALUM ELATUM*, after *Ic. Plant.* insert—t. 2052

P. 777. 20. *C. ANDERSONI*, " " " t. 2055

21. *C. BREVIPES*, " " " t. 2056

22. *C. AUREUM*, " " " t. 2057 B

P. 778. 26. *C. GAMBLEI*, " " " t. 2058

27. *C. THOMSONI*, " " " t. 2059

29. *C. PARVULUM*, " " " t. 2060 A

P. 779. 32. *C. VIRIDIFLOREM*, " " " t. 2061

P. 780. 33. *C. BLEPHARISTES*. In a fine drawing of this lately received from the Calcutta Gardens, the leaves are often 2-nate, the scape long and decurved, and the sepals and petals 7–9-nerved.

34. *C. MACRAEI*. Under Synonyms, for *Bulb. Walkerianum*, read *Macraei*.

P. 782. 32. *DENDROCHILUM LINEARIFOLIUM*, after *Ic. Plant.* add t. 1859 *ined.*; and, confer *D. fuscum*, *Teijsm. & Binn. Bat. Natur. Tijdsch.* xxix. (1867) 242.

P. 784. 2. *CHRYSOGLOSSUM ERRATICUM*, after *Ic. Plant.* insert—t. 2062

3. " *ASSAMICUM*, " " " t. 2063

4. " *MACULATUM*, t. 2064, and add *Syn. Tainia maculata*, p. 821.

COLLABIUM WRAXI, After *Ic. Plant.* insert—t. 2065

P. 788. 11. *ERIA EXILIS*, " " " t. 2074 A

P. 789. 15. *E. MUSCICOLA*. The Ceylon form referred to at the end of the description is *var. oblonga*, *Trim. Cat. Ceyl. Pl.* 88.

P. 790. 18. " *KINGII*, After *Ic. Plant.* insert—t. 2066

19. " *IRIDIFOLIA*, " " " t. 2067

20. " *LONGIFOLIA*, " " " t. 2068

P. 795. 38. " *ANDERSONI*, " " " t. 2069

P. 797. 46. " *RECURVATA*, " " " t. 2070

48. " *SACCIFERA*, " " " t. 2071

P. 798. 50. " *MAINGAYI*, " " " t. 2072

P. 801. 63. " *ANDAMANICA*, " " " t. 2073

64. *E. PULCHELLA*. I have lately received more specimens, and from Calcutta drawings of this plant, from which I conclude that Lindley was right in distinguishing *E. discolor* from *E. pulchella*, though he assigns no good reasons for doing so. The chief differences are the very large stout articulate pseudobulbs of *E. discolor*, its much stouter rhizome, and stouter more glabrous scape with more numerous cochleate coriaceous bracts.

E. pulchella is a Malayan species, from Tenasserim to Java. *E. discolor* has been found only in Sikkim. Both have nearly orbicular lips articulate with the pulvinate purple shining foot of the column by a very narrow short claw.

P. 803. 71. *E. THWAITESII*. For *Hook. f.*, read *Trimen Cat. Ceyl. Pl.* 88.

P. 804. After 72. *E. PANNEA*, insert—

73/1. *E. CALAMIFOLIA*, *Hook. f.*; stems very short from a creeping rootstock 3-4-leaved, leaves linear terete acuminate, scape terminal 3-4-fld. and flowers densely woolly, bracts large ovate acuminate, mentum short obtuse, petals linear-oblong puberulous, lip ovate-oblong obtuse very thick concave about the middle, quite smooth and naked.

UPPER ASSAM; Makum forest, *Mann.*

Rhizome as thick as a crow-quill, and short leaf sheaths sparingly woolly; pseudobulbs 0. *Leaves* 3-6 in., about $\frac{1}{2}$ in. diam., obscurely channelled above when dry, acuminate, quite smooth, glabrous. *Scape* terminal, much shorter than the leaves, slender, densely white, silkily woolly as are the backs of the bracts and sepals; bracts $\frac{1}{2}$ in.; sepals $\frac{1}{2}$ in. long, dorsal oblong, lateral triangular-ovate acute; petals much smaller; lip straight, jointed on the broad foot of the column, which is short broad puberulous with an ovate subacute apex and incurved sides; anther mitriform, obtuse.—Probably the Sikkim & Khasian *E. pannea*.

P. 804. 75. *ERIA PYGMÆA*, After *Ic. Plant.* insert—t. 2074 B

76. „ *LANCIFOLIA*, „ „ „ t. 2075

P. 805. 78. „ *CRASSICAULIS*, „ „ „ t. 2076

79. „ *LEPTOCARPA*, „ „ „ t. 2077

P. 806. 83. „ *GRACILIS*, „ „ „ t. 2078

P. 807. 84. „ *OLIGANTHA*, „ „ „ t. 2079

87. „ *TUBEROSA*, „ „ „ t. 2080

P. 808. 89. „ *APORINA*, „ „ „ t. 2081

P. 809. 93. „ *SCORTECHINII*, „ „ „ t. 2082

P. 810. *CLADERIA VIRIDIFLORA*, „ „ „ t. 2083

P. 811. 4. *PHREATIA NANA*, „ „ „ t. 2084

P. 813. 2. *SPATHOGLOTTIS AUREA*, after *Walp. Ann.* vi. 455, insert *Reichb. f. in Gard. Chron.* 1888, 92, with fig.; *Veitch. Man. Orchid.* Pt. vi. 6. *S. Kimbali*, *Hort.*

3. *S. WRAYI*, after *Ic. Plant.* insert t. 2086.

P. 814. 4. *S. BENSONI*, „ „ „ t. 2087.

5. *S. LOBBII*, at end of description add in *Veitch Man. Orchid.* Pt. vi. 7 this species is described as a native of Borneo. Reichenbach gives *E. Indies*, ? Khasia. The specimens in Kew Herbarium are from Tenasserim, on rocks at Akyab, *Parish*.

6. *S. PUBESCENS*, var. *Berkeleyi*, specimen of this in Herb. Calcutt. from Upper Burma have leaves 1 in. broad, the scape 18 in., and flower as in *Fortuni*, except that the midlobe of the lip is very thick, and its wings cuneately oblong and truncate.

P. 816. 1. *PHAJUS WALLICHII*. Add after *Walp. Ann.* vi. 459, *Bot. Mag.* t. 7023, and after *de Vriese Illust.* t. 8, add *Regel Gartenfl.* 1865, t. 404.—*Veitch (Man. Pt. vi. 15)* describes *P. bicolor* as a var. of *Wallichii*, with small knobby rhizomes, and smaller flowers having a tawny yellow spur and tube of the lip, and white midlobe bordered with rose. It is a native of Ceylon. He retains *P. grandifolius* as a different species, including *Blumei* as a var. of it. The only tangible characters, except colour, by which he distinguishes *grandifolius* from *Wallichii* are, that in the former the sepals and petals are oblong-lanceolate, and the lip broadly obovate; whilst in the latter the sepals and petals are linear-lanceolate and the lip broadly oval. He gives the Himalayas as habitat for both. His var. *Blumei* differs from the type (*grandifolius*) in the broader deep buff yellow petals and sepals faintly mottled with red. As habitats of *grandifolius* he gives, besides the original one of China, the Himalaya, Cochinchina and Australia; thus following Benthams (*Fl. Austral.* vii. 304), who includes *P. australis*, *leucophæus* and *Carronii*, of F. Muell) under that species.

2. *P. VERATRIFOLIUS*. Add. *Syn. Dendrobium veratrifolium*, *Rowb. Hort. Beng.* 63.

P. 817. 3. *P. MACULATUS*. After *Mus. Bot.* ii. 180 insert *Williams Orchid. Alb.* t. 381, and place *Blum. Orchid. Archip. Ind.* 9, after *Reichb. Fl. Exot.* t. 63.

3/1. *P. NANUS*, *Hook. f. Ic. Plant.* t. 2088 *ined.*; leaves 4–5 in., scape very short closely sheathed, raceme dense-fld., sepals and petals lanceolate acuminate, lip as broad as long puberulous within, side lobes rounded, midlobe short broad undulate, spur 0.

BENGAL; in the Buxa Doar, *Gamble (in Herb. Calcutt.)*.

Pseudobulbs 0. *Roots* tufted; rootstock stout, with grass-like sheaths sometimes much longer than the leaf. *Leaf* elliptic, acute; petiole 2 in., stout. *Scape* from the base of the leaf and shorter than it is, sheaths subacute; bracts cymbiform, acuminate; sepals $1\frac{1}{2}$ in. long; column short, stout, puberulous.—A very singular species, of which I have seen but two specimens, kindly lent from the Calcutta Herbarium by Dr. King. The long grass-like sheaths or primordial leaves are singular.

P. 818. 7. *P. ALBUS*. Var. *Bensoniæ*, after description insert *Phajus Bensoniæ*, *Hemsl. in Gard. Chron.* 1882, 565; and after *Jenning's Orchid.* add *Williams Orchid. Alb.* ii. t. 67.—Veitch (*Man. Orchid.* Pt. vi. 19) does not regard *Bensoniæ*, *alba* and *Marshalliana* as specifically distinct; he distinguishes *Bensoniæ* from *alba* by the larger differently-coloured flowers, with the midlobe of the lip larger in proportion to the whole lip, and more oblong, and by the wings of the column being toothed. He keeps *Marshalliana* as a form from being usually more tall and robust, the lip shorter, the hairs on the crests of the lip more numerous and longer, the column shorter and stouter with the apical wings more dilated; and as a subvar. of this he maintains Reichenbach's var. *ionophlebia* (*Gard. Chron.* 1885, 70), with the centre of the lip pale yellow, the sides streaked with purple.

25. NEPHELAPHYLLUM, *Blume*.

In the generic description in the 2nd line after leaf, add, or elongate and exserted; and after 3. *N. TENUIFLORUM*, add—

4. *N. NUDUM*, *Hook. f.*; leaves ovate acuminate, scape slender much longer than the leaves few-fld., bracts slender, lip elongate narrowly subpanduriform, side lobes small acute, midlobe transversely oblong retuse with a short broad semicircular lamella on the midrib towards the tip.

SIKKIM HIMALAYA; *King*.

Stem stout, 4 in., ascending. *Leaves* distant, 1–2 in., lower petioled, upper sessile; sheath short, membranous. *Scape* 6 in., with a basal and median tubular appressed sheath nearly 1 in. long; bracts $\frac{1}{2}$ in., as long as the pedicel and ovary, deflexed; sepals and petals spreading, subequal, linear, subacute, 3-nerved: lip nearly 1 in. long from the base of the stout truncate spur to the tip of the dorsal sepal, membranous, 3-nerved with branching side nerves, gradually dilated upwards to the tooth-like side lobes, midlobe broader than the rest of the lip, margins undulate.—Near *N. tenuiflorum*, which has also a tall scape.

5. *N. GRANDIFLORUM*, *Hook. f.*; leaves ovate deeply cordate acuminate, scape longer than the leaves 2-fld., flowers 1 in. diam., lip oblong, side lobes small obtuse, midlobe ovate tip rounded, disk with 3 keels from base to apex.

PERAK (*Ic. Scortechini*). MALAYA, *Kunstler (Ic. in Herb. Calcutt.)*.

Leaves 3–5 by $2\frac{1}{2}$ – $3\frac{1}{2}$ in., strongly nerved, basal lobes rounded, sinus narrow; petiole 3–4 in., stout. *Scape* with raceme 8–10 in., pubescent, sheaths tubular, appressed, membranous; bracts small, lanceolate; flowers greenish flushed with red, lip purple; sepals lanceolate, acute; petals rather broader, elliptic; lip decurved, white externally, mentum truncate; column white, purple at the base.—Described from a fine drawing in *Herb. Calcutt.*, perhaps (as usual with native artists) exaggerated in dimensions.

P. 820. 2. *TAINIA PENANGIANA*, after *Hook. f.* insert *Ic. Plant.* t. 2089 *ined.*

6. *T. LATIFOLIA*, add *Syn. Cymbid.*, *Griff. Notul.* iii. 343; *Ic. Plant. Asiat.* t. 319.

7. *T. KHASIANA*, after *Ic. Plant.* insert t. 2090
 8. *T. MINOR*, " " t. 2091
 9. *T. HASTATA*, " " t. 2092
 10. *T. MACULATA* to be cancelled; it is *Chrysoglossum maculatum*, p. 784.
 11. *T. LATIILINGUA*, after *Ic. Plant.* insert t. 2093
 14. *T. MAINGAYI*, after " " t. 2094 and add—

15. *T. CORDATA*, *Hook. f.*; leaf-blade longer than the stout petiole base cordate, scape tall many-fld. slender, sepals linear subacute and lanceolate petals 1-nerved, mentum very short, side lobes of lip short acute, midlobe suborbicular, disk with 2 lamellæ reaching nearly to the apex.

SIKKIM HIMALAYA (*Ic. in Hort. Calcutt.*).

Rhizome as stout as the middle finger or stouter and pseudobulb and petiole dark purple. *Leaf* about 12 by $4\frac{1}{2}$ in., 7-nerved, base oblique. *Scape* with raceme 2 ft.; raceme laxly many-fld.; bracts $\frac{1}{2}$ in., lanceolate, shorter than the ovaries; sepals and petals $\frac{2}{3}$ in., dark green and red; lip yellow, midlobe entire; anther with two purple nobs.—Described from an excellent drawing made in the Calcutta Bot. Gardens, where there is also an outline drawing, by Simons, of an Assam allied species, with no pseudobulb, a petiole as thick as the little finger, a suborbicular-cordate acuminate 9-nerved leaf $7\frac{1}{2}$ by 6 in., a scape much shorter than the leaf few-fld., sepals lanceolate 5-nerved, petals ovate-oblong acute 5-nerved, and a cuneiform lip with small midlobe, mentum large conical.

- P. 824. 3. *AGROSTOPHYLLUM GLUMACEUM*, after *Ic. Plant.* insert t. 2095
 4. *A. MAJUS* " " " t. 2096
 5. *A. PAUCIFLORUM* " " " t. 2097
 P. 825. 2. *CERASTOSTYLIS MALACCENSIS* " " " t. 2098
 3. *C. CLATHRATA* " " " t. 2099
 P. 826. 4. *C. PENDULA* " " " t. 2100
 5. *C. HIMALAICA* " " " t. 2101
 6. *C. LANCIFOLIA* " " " t. 2102
 P. 827. 7. *C. ROBUSTA* " " " t. 2103.
 33. *TRICHOSMA SUAVIS*, for 1841 *Misc.* 83, read 1842, t. 21.

P. 828. 34. *CÆLOGYNE*. After the publication of Vol. V. of this work, Veitch's Manual Pt. vi. appeared, containing the cultivated species of *Cælogyne* with good descriptions, and with figures of several British Indian ones, which are cited below.

1. *CÆLOGYNE GARDNERIANA*, after *Pact. Mag.* vi. t. 73 insert *Williams Orchid. Alb.* iv. t. 153.

- P. 829. 4. *C. CRISTATA*, after *Coll. Bot.* t. 32 insert *Gen. & Sp. Orchid.* 39 (*excl. Syn. Cymbid. strictum, Don*); and add to citations, *Wall. Cat.* 1958; *Gard. Chron.* 1877, 597, *with fig.*; 1888, i. 488, *fig.* 68; *Veitch Man. Orchid.* Pt. vi. 34, *with fig.*

- P. 830. 6. *C. TOMENTOSA*, add *Veitch Man. Orchid.* Pt. vi. 57, *with fig.*
 7. *C. MASSANGIANA*, add " " " 43, *with fig.*

- P. 831. After 9. *C. LENTIGINOSA*, insert—

9/1. *C. ROSSIANA*, *Reichb. f. in Gard. Chron.* 1884, ii. 808; pseudobulbs large 8-10-grooved, leaves elliptic-lanceolate petioled, scape very stout decurved then suddenly upcurved 3-4-fld. closely clothed with short densely imbricate sheaths, lateral sepals narrowly linear-oblong acute and very narrow petals white, lip narrow side lobes with rounded angles and brown sides, midlobe ovate entire revolute yellow, disk with 2 crenate lamellæ from base to apex and a slender median one. *Veitch Man.* Pt. vi. 48; *Rolfé in Gard. Chron.* 1889, 650; *Bot. Mag.* t. 7172.

BURMA (*Hort. Ross*).

Pseudobulbs 2-3 in., oblong or subpyriform; sheaths 0. *Leaves* 8-12 by 2-3 in., strongly 3-nerved, petiole 1-1 $\frac{1}{2}$ in. *Scape* from the base of the pseudobulb, 2-3 in. long along its curvature, narrowed from the stout base upwards; sheaths coriaceous, green, tips rounded; raceme erect, 2-3 in., slender, lax-fld.; bracts

$\frac{2}{3}$ in. long, as long as the pedicel and ovary, lanceolate, concave, caducous; flowers $1\frac{1}{2}$ –2 in. diam.; sepals $\frac{1}{2}$ in. broad; midlobe of lip not contracted at the base; column white.—The strong decurvature of the scape is not mentioned by Reichenbach or Veitch.

P. 831. 11. *C. CORYMBOSA*, after *Gard. Chron.* 1876, insert, 88.

P. 832. 16. *C. OCCULTATA*, insert after *Ic. Plant.* 2104.

P. 834. After 21. *C. CYNOCHES*, insert—

21/1. *C. LONGIBRACTATA*, *Hook. f.*; pseudobulbs small, leaves petioled lanceolate, scape very long stout strict erect, raceme erect few-fl. bracts 2 in. persistent, flowers white, sepals lanceolate acuminate, petals narrowly linear-oblong, side lobes of lip short rounded, midlobe orbicular, disk with 3 crenate yellow ridges.

PERAK, *Kunstler*.

Rhizome very stout; pseudobulbs $1\frac{1}{2}$ –2 in., obovoid, deeply grooved. *Leaves* 6–7 by 1 – $1\frac{1}{2}$ in. *Scape* lateral, 6 in., clothed with cylindric green tubular truncate sheaths $1\frac{1}{2}$ –2 in. long, and with 2 leaves emerging from the upper sheath; bracts very narrow, at length deflexed; flowers nearly 2 in. diam.; midlobe of lip yellowish towards the centre, margins at the base crisped. In many respects allied to *C. Maingayi*.

22. *C. SPECIOSA*. Veitch (*Man. Orchid.* Pt. vi. 50) gives as a synonym *C. salmonicolor*, Reichenb. f. in *Gard. Chron.* 1883, 328, and describes a Var. *albicans*, with larger flowers, sepals and petals light yellowish-green, lip 3 in. long, white, side lobes freckled with red-brown, midlobe brown.

24. *C. SCHILLERIANA*, insert after the description, TENASSERIM, at Moulmein, Lobb.

P. 835. 28. *C. PANDURATA*, in line 1 for 78 read 791, and add to citations, *Veitch. Man. Orchid.* Pt. vi. 47, with fig.

29. *C. ASPERATA*. Veitch (*Man. Orchid.* Pt. vi. 31) says of this, "Widely distributed over the Malay Archipelago, from Sumatra to New Guinea."

P. 836. 33. *C. MICRANTHUM* should be *MICRANTHA*.

P. 837. 34. *C. TREUTLERI*, after *Ic. Plant.* insert t. 2105.

36. *C. NITIDA*, under Syn. *C. OCELLATA*, add *Veitch Man. Orchid.* Pt. vi. 45.

37. *C. STENOCHILA*, after *Ic. Plant.* insert t. 2106.

P. 838. 38. *C. CARNEA*, after *Ic. Plant.* insert t. 2107.

39. *C. ELATA*. This is said to inhabit higher regions than the Tropical, up to 9000 ft. (*Veitch Man. Orchid.* Pt. vi. 37).

41. *C. GRIFFITHII*. After *Ic. Plant.* insert t. 2108.

P. 839. 42. *C. BABBATA*, add *Veitch Man. Orchid.* Pt. vi. 32, with fig.

P. 840. 47. *C. ANCEPS*. After *Ic. Plant.* insert t. 2109.

48. *C. PRÆCOX*. In line 1, before *Fol. Orchid.* insert *Gen. & Sp. Orchid.* 43, and to syns. add *Cymbidium præcox*, *Smith in Rees Cyclop.* *Veitch (Man. Orchid.* Pt. vi. 58) distinguishes his Var. *Wallichiana*, by its deeper colour, more strongly-marked veins, the midlobe of the lip toothed rather than fringed, and the shorter teeth of the crests; he includes *C. birmanica* under it, and gives a figure of the flower.

49. *C. HUMILIS*. Veitch (*Man. Orchid.* Pt. vi. 55) gives an excellent figure and description of this.

P. 841. 50. *C. MACULATA*, add VAR. *Arthuriana*, *Veitch Man. Orchid.* Pt. vi. 57; pseudobulbs smaller angular, flowers smaller, petals with purple lines, midlobe of lip margined with a purple band. *C. Arthuriana*, *Reichenb. f. in Gard. Chron.* 1881, i. 40.—Rangoon.

51. *C. LAGENARIA*, Veitch (*Man. Orchid.* Pt. vi. 57) gives a good figure of the flowers, and adds that it was introduced by Lobb from the Khasia Hills.

52. *C. REICHENBACHIANA*, Veitch gives 6–7000 ft. as the elevation at which this species was found.

P. 842. 53. *C. HOOKERIANA*. Veitch (*Man. Orchid.* Pt. vi. 53) cites a var. *brachyglossa*, *Reichenb. f. in Gard. Chron.* 1887, i. 833, with a shorter and more open

lip, white with a light yellow disk spotted with brown, and pale rose sepals and petals. It is a native of Sikkim at a higher elevation than the type. *C. HOOKERIANA* is, as stated at p. 828, the only species in which the leaves persist after flowering.

55. *C. ? PURPURASCENS*, after *Ic. Plant.* insert 2109.

P. 843. *C. ROSSIANA*. See ante p. 192.

1. *O. ALBA*. After *Wall. mss.* add *Dipodium*, *Griff. Ic. Pl. Asiat.* t. 329 (not of *Notul.* iii. 406).

P. 847. 11. *PHOLIDOTA*, for *MICRANTHA*, read *PARVIFLORA*.

1. *CALANTHE TRICARINATA*. Add to citations *Veitch Man. Orchid.* Pt. vi. 69; *Franch. & Savat. Enum. Pl. Jap.* ii. 26; and after habitat add, *DISTRIB.* Japan.—I have not compared the Japanese with the Indian plant.

P. 849. 5. *C. DIPLOXIPHION*. After *Ic. Plant.* insert t. 2111.

P. 850. 10. *C. MANNII*, after *Hook. f.* insert *Ic. Plant.* t. 2113.

11. *C. WRAYI* " " " t. 2114.

P. 851. 15. *C. VERATRIFOLIA*. To the synonyms of this species add *Veitch Man. Orchid.* Pt. vi. 88 and *C. Petri*, *Reichb. f. in Gard. Chron.* 1880, 326. *C. colorans*, *Rf. l. c.* 1885, 360; *Williams Orchid. Alb.* v. t. 218. *C. australis*, *Hort.* It is well figured at p. 69.

P. 852. 16. *C. VESTITA*. Under *Bot. Zeit.* for xvi. 128 read 1853, 493. *Veitch (Man. Orchid. Pt. vi. 70)* enumerates several subvars.; as *gigantea*, *Williams Orchid. Alb.* v. t. 211, (*Syns. grandiflora*, *Hort. Belg.* 1889, 121, and *rubro-oculata*, *Part. Mag.* xvi. 129; *Regel Gartenfl.* 1873, 751); also Var. *Regnieri*, *C. Regnieri*, *Reichb. f. in Gard. Chron.* 1883, 274, with its Subvars. *Sanderii* and *Stevenii*, *Williams Orchid. Alb.* iii. t. 134; also a Var. *Turneri*, with the elongated pseudobulbs of *Regnieri* and the flowers of *rubro-oculata*.

16/1. *C. RUBENS*, *Ridley in Gard. Chron.* 1890, i. 576; pseudobulbs 6 by 1½ in. conical silvery, scape 2 ft. woolly, sheaths about 5, raceme 14-fl. flowers pink smaller than in *C. vestita*, bracts 1 in., pedicel with ovary 2 in., sepals sub-similar dorsal ¾ in. slender lanceolate mucronate, lateral longer-mucronate, petals shorter more spatulate, lip rose-pink darker at the base adnate to the base of the column erect 4-lobed, side lobes oblong erect appressed to the column, midlobe deeply divided segments rounded with an interposed tooth, spur ½ in. filiform curved, column as in *C. vestita*.

Langkawi Island, north of Penang, *Curtis*.—I have seen no specimen.

P. 854. 27. *C. ANGUSTIFOLIA*. To *Syn. C. phajoides* add *Ic. Plant.* t. 1864.

P. 855. After 31. *C. GRACILIS*, add—

31/1. *C. LONGIPES*, *Hook. f.*; stems tall, scape axillary very long stout, raceme very short and flowers pubescent, lateral lobes of lip rounded crenate, midlobe flabelliform margins undulate and crenate, disk with a membranous lamella on each side from the base to that of the midlobe, spur 0.

SIKKIM HIMALAYA, *King*.

Stem as thick as the little finger. *Leaves* not seen. *Scape* 10–12 in., with 2–3 inflated sheaths; raceme 8–10-fl.; flowers ¾ in. diam.; sepals 5-nerved and 3-nerved petals subequal, elliptic, acuminate; lip as long as the sepals, adnate to the base of the column.—I have seen but one flowering specimen of this plant, which is leafless; its habit is that of *C. tubifera*, but the flowers are very much smaller, the sepals broader.

P. 856. 33. *C. LABROSA*, for *Hook. f.* substitute *Reichb. f. in Gard. Chron.* 1883, 44.

P. 858. 7. *ARUNDINA CANTLEYI*, after *Ic. Plant.* insert t. 2112.

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P. 1. Under 1. *E. VIRENS*, for *Ærobrum*, read *Ærobrion*.

P. 5. 14. *E. DECIPIENS*, in line 1, for *Griff.* read *Kurz*.

P. 3. 8. *E. EXPLANATA*; at end of diagnosis insert *Hook. Ic. Plant.* t. 1882.

P. 6. After *E. SQUALIDA*, insert—

29/1. *E. HOLOCHILA*, *Coll. & Hemsl. in Journ. Linn. Soc.* xxviii. 132; raceme lax-fl'd., flowers large, bracts about equalling the ovary, scape robust, sepals oblong obtuse, petals obovate-oblong tips rounded, lip orbicular entire or very obscurely broadly 3-lobed, disk smooth. *Hook. f. Ic. Plant.* 2116 ined.

BURMA; on the Shan Hills, alt. 4000 ft., *Collett.*

Leaves very young at flowering time. *Scape* 12 in., as thick as a swan's quill, with two oblong ventricose obtuse sheaths below the middle; raceme 6 in.; bracts slender, membranous; pedicel with ovary $\frac{3}{4}$ in.; flowers $1\frac{1}{2}$ –2 in., broad; sepals 7-nerved, lateral adnate to the sides of the spur; petals 5-nerved, the outer pair branching outwards; lip about as long as the sepals, nerves very many parallel, mentum spur-like.—Only one specimen seen by me.

P. 8. 25. *E. SANGUINEA*. Add Syn. *C. rufa*, *Thw. Enum.* 302, and to the habitats, CEYLON, at Hantani, alt. 3000 ft., *Thwaites.*

CYRTOPERA RUFa, *Thwaites.* This plant was unknown to me till I was shown a living specimen that was sent by Dr. Trimen from Ceylon, and which flowered in the Royal Gardens, Kew. It is identical with 25, *Eulophia sanguinea*, as figured in Bot. Mag. t. 6161. The colour of the flowers varies.

EULOPHIA Sp., *Trimen Cat. Pl. Ceyl.* 89 (C.P. 3958). Dr. Trimen has kindly lent me the Herb. Peradeniya species of this; it is *E. graminea*, L.

To the species of *Eulophia* "UNKNOWN TO ME" add ? *BLETIA BICALLOSA*, *Don Prodr.* 30 (*Limodorum bicallosum*, *Ham. mss.*),¹ from Nepal, thus described by Don.—*Scape* $1\frac{1}{2}$ ft. erect terete scaly, raceme 6–8-fl'd., flowers pale, lip 3-lobed subungiculate anfractuously articulate and saccate at the claw, lobes rounded, midlobe largest crisped glabrous, sepals and petals elliptic mucronulate, lateral sepals adnate to the unguiform process; pollinia 4, parallel, waxy.—Don adds that it is hardly a *Bletia*, under which genus he includes an *Arundina*, a *Calanthe* and a *Eulophia*.

P. 32. After 2. *DORITIS WIGHTII* insert—

3. *D. BRACEANA*, *Hook. f.*; scape stout elongate, mentum spur-like acute, side lobes of lip ovate-lanceolate, midlobe spatulately obovate.

SIKKIM HIMALAYA, *Gamble.*

Roots very many, broad, flat. *Stem* very short. *Leaves* oblong, very dark green. *Scape* much longer than the leaves, as thick as a crow-quill or thicker, very dark green, speckled with brown; raceme 6–10-fl'd.; bracts minute, triangular; peduncle with ovary $\frac{3}{4}$ –1 in., decurved; flowers 1 in. diam.; sepals obovate-oblong, obtuse, and narrower petals fleshy yellow with pinkish midrib; lip membranous, violet-purple, tips of the forked appendage straight. *Column* very large, fleshy; pollinia 4 subglobose.—Described from a drawing and notes by Mr. Brace. Much nearer to *D. tanialis* than to *Wightiana*, differing in the many-fl'd. long remarkable stout scape and much larger flowers with yellow sepals and petals and a longer spur-like mentum.

P. 40. After 26. *SARCOCHILUS MERGUENSIS*, insert—

26/1. *S. (Fornicaria) PUGIONIFOLIA*, *Hook. f. Ic. Plant. ined.*; stemless, peduncle about equalling the few elongate-subulate recurved deeply channelled leaves, bracts suberect, lip sessile on the foot of the column saccate truncately 3-lobed ciliate.

CEYLON; at Varuniya, in the N. Central Province, *Trimen.*

Leaves 2–3 by $\frac{1}{2}$ in. at the thickest part, fleshy, more than semi-terete with a rounded back and very deep channel in front. *Peduncle* glabrous; bracts ovate-oblong, obtuse. *Flowers* $\frac{1}{2}$ in. diam., pale primrose; lip with a few purplish markings; sepals ovate-oblong obtuse, lateral gibbous on the lower margin; petals oblong obtuse; lip ciliate on the lobes and disk towards the broad 3-lobed apex, side lobes rounded, midlobe not longer orbicular; a small caruncle at the base of the midlobe; column short, white.—I have to thank Dr. Trimen for a specimen and a drawing.

P. 40. On last line of description of *SARCOCHILUS FILIFORMIS*, for *S. Trimeni* read *S. viridiflorus*. I had proposed the former name for the latter plant before discovering (whilst the description was passing through the press) that it was *Arides viridiflorum*, *Thw.*

P. 44. To habitats of 3, *Æ. CYLINDRACEUM*, add CEYLON.

P. 55. For 1. *S. GEMINATUM* read *GEMMATUM*.

P. 60. Under the citations for 20, *S. CALCEOLARÆ*; in line 2, for Bot. Reg. 1883, Misc. 130, read 1838, Misc. 75.

P. 62. To syns. of 29. *S. LONGIFOLIUM* add *Ærides rigidum*, *Smith in Rees. Cyclop.*

30. *S. WIGHTIANUM*, under the syns. place *Thwaites Enum.* 303. after *Lindl. Fol. Orchid.* 2.

P. 88. 3. *G. JAVANICA*, add to habitats, CEYLON, on roots of coffee trees in the Central Province, *Thwaites*.

P. 107. 1. *Z. SULCATA*, add to syns. *Orchis stratumatica*, *Linn. Sp. Pl.* 903.

P. 116. 5. *H. ELONGATA*, add to syns. *Rhamphidia elongata*, *Thwaites Enum.* 313; and to habitats, CEYLON, alt. 4000 ft., *Thwaites*.

P. 141. 30. *Habenaria longecalcarata*. Two species are confounded here, having been mixed up in Wight's descriptions, *Icones* and *Herbarium*; they are—

30. *H. LONGECALCARATA*, *A. Rich. (Wight Ic. t. 925, Dalz. & Gibs. l.c.)* with few (2-3) very large flowers, large cucullate sheathing bracts much shorter than the long-pedicelled ovary, lip twice as long as the sepals.

30/1. *H. DECIPIENS*, *Wight Ic. vol. v. pt. i. p. 14*, with several (4-8) smaller flowers, very short pedicels, lanceolate bracts nearly as long as the ovary, lip rather longer than the sepals. *H. montana*, *Wight (not of A. Rich.) Ic. t. 827*, and 1714 the upper right and the left hand figures only.—This much resembles *H. longicornu* *Lindl. (montana, A. Rich.)* but has a longer lip and much longer spur. Wight has given it both names in his *Herbarium*, and says there that it is intermediate between *longicornu* and *longecalcarata*.

P. 147. 48. *H. CHLOBINA*, insert *Par. &* before *Reichb. f.*

P. 151. 63. *H. CRASSIFOLIA*, add to syns. *P. canarensis*, *Lindl. Plant. Hohenack. Essicc. n. 142*.

P. 165. 106. *H. DECIPIENS*. This name being confirmed for Wight's plant (see above) must be replaced by *H. GRIFFITHII*.

INDIAN ORCHIDÆE OF UNDETERMINED AFFINITY.

In the above revision of the Indian Orchids I have doubtless overlooked some species that have been published in one or other of the multitude of works I have had to ransack, and in others that have escaped my notice; and for which I must beg indulgence. There are further some published ones, of which from the incompleteness of the descriptions in respect especially of the pollinia, I have been unable to determine the genera. The chief of these are Kœnig's Indian species, referred to *Epidendrum* (a genus now known to be peculiar to the New World,) and published in the 6th Part (p. 43 et seq.) of Retz's *Observationes* (in 1791). Of these few have been taken up by subsequent authors. They are for the most part Peninsular and probably all communicated by Heyne, who included a few Malaccan species from his correspondents. The descriptions are so full and good in all but the pollinia, &c., that local botanists may in time recognize many of them. It is unfortunate that Kœnig should not have identified any of them with Rheedee's plates.

Epidendrum bidentatum, Kœn. in Retz. Obs. Pt. vi. 54 = *Limodorum bidentatum*, Willd. *Sp. Pl.* iv. 124.

„	calceolaria	„	„	„	45	
„	Calceolaria terrestre	„	„	„	63	Malacca.
„	clavatum	„	„	„	50	= ? <i>Saccolabium clavatum</i> , Lindl. <i>Gen. & Sp.</i> 223.
„	complanatum	„	„	„	50	= <i>Sarcochilus complanatus</i> , Hook. f. ante p. 41.
„	Flabellum Veneris	„	„	„	57	
„	Flor æris v. Saaronicum	„	„	„	58	= <i>Renanthera Arachnites</i> , ex. Lindl. <i>Gen. & Sp.</i> 217.
„	Flos æris ?	„	„	„	64	

Epidendrum hexandrum, Kæn. in Re'z. Obs. Pt. vi. 45 =				Appendicula Kænigii, H. f. ante p. 84.
"	liliiflorum	"	"	61 = Limodorum liliiflorum, Willd.
"	longiflorum	"	"	55
"	lycopodioides	"	"	55 Malacca, on Mangostin bark.
"	nudum	"	"	52
"	ophrydis	"	"	46
"	orchideum	"	"	48 = ? Ceratochilus orchideus, ex. Lindl. Gen. & Sp. Orchid. 232.
"	plantaginifolium	"	"	60 Malacca, near Tsing, on top branches of loftiest trees.
"	pusillum	"	"	49 = Sarcophilus Wightii, H. f.; ante p. 37.
"	sessile	"	"	60 = Bulbophyllum clandestinum, L. ante v. p. 753.
"	spathulatum	"	"	43 = Vanda spathulata, Spr. ante p. 50.
"	subulatum	"	"	51 = ? Erides cylindricum, L., ex. Lindl. Gen. & Sp. 240.
"	Supplex minima	"	"	47 = Dendrobium atropurpureum, Miq. ante v. p. 724.
"	tomentosum	"	"	53 = Eria tomentosa, Lindl. ante v. p. 803.
"	variegatum	"	"	44
Serapias Epidendrea	"	"	"	65 = Eulophia virens, Bl. ante p. 1.

Order CXLIX. SCITAMINEÆ. (By J. G. Baker, F.R.S.)

Herbs, often large, rarely with a woody caudex. *Leaves* cauline or radical, usually membranous, closely pinnately nerved from a midrib. *Flowers* bracteate and often bracteolate, solitary or spicate, rarely paniculate, irregular, hermaphrodite (except *Musa*). *Calyx* superior; sepals free and imbricate, or connate into an entire toothed or spathaceous tube. *Corolla-tube* long or short, free or adnate to the petaloid staminodes; limb 3-partite, segments free or connate. *Stamens* either 5 subequal with a 6th imperfect, or one perfect with the rest forming petaloid staminodes; anthers linear, 2-celled, or of one cell on the margin of a petaloid connective. *Ovary* 3-, rarely 1- or 2-celled; style usually slender, with 2 very short stylodes crowning the ovary; stigma entire or subentire; ovules many, rarely few, axile, rarely parietal, anatropous. *Fruit* usually crowned with the remains of the perianth, loculicidally 3-valved, or fleshy or membranous and indehiscent. *Seeds* various, albumen flowery; embryo small.—Genera about 40, species 4–500, chiefly tropical.

The Traveller's tree, *Rarenala madagascariensis*, Sonnerat (*Urania speciosa*, Wall. Cat. 5765), is frequently planted, especially near Singapore. It has much the leaves of a *Musa* but they are distichous.

Tribe I. **Zingiberææ**. *Calyx* tubular or spathaceous. *Stamen* 1; anther 2-celled; lateral staminodes filiform or petaloid, or small, or 0. *Style* slender, embraced below the stigma by the anther. *Embryo* central, straight.

* Ovary 1-celled; placentas 3, parietal.

1. MANTISIA. Scape leafless; corolla-tube long; lateral staminodes filiform or spatulate, in the middle of the elongate filament, opposite, spreading.

2. GLOBBA. Stem leafy; corolla-tube long; lateral staminodes petal-like; filament slender.

3. HEMIORCHIS. Corolla-tube short; lateral staminodes petal-like; filament short.

** Ovary 3-celled; placentas axile.

† Lateral staminodes broad.

§ *Connective spurred at the base.*

4. ROSCOEA. Flowering stem leafy; bracts 1-fld.; filament long; capsule subdehiscent.—Flowers purple or white.

5. CAUTLEYA. Flowering stem leafy; bracts 1-fld.; filament long; capsule dehiscent with recurved valves.—Flowers yellow.

6. CURCUMA. Flowering stem leafy or not; bracts cucullate, several-fld., forming a cone-like spike; filament petaloid; capsule subdehiscent.

§§ *Connective very broad or crested, not spurred.*

7. GASTROCHILUS. Flowering stem short or erect; filament short; connective broad not crested.

8. KÆMPFERIA. Flowering stem leafy or not; filament very short; connective crested.

9. HITCHENIA. Flowering stem leafy; filament long, complicate; connective broad not crested.—Inflor. as in *Curcuma*.

§§§ *Connective very narrow, neither spurred nor crested.*

10. HEDYCHIMUM. Flowering stem leafy; filament long, slender.

†† Lateral staminodes small or 0, rarely narrow and adnate to the lip.

§ *Flowers in a dense-fld. cone-like spike.*

11. AMOMUM. Flowering scapes usually leafless; filament short; anther-cells diverging above; connective dilated crested or 2-lobed, rarely simple.

12. ZINGIBER. Spikes terminating leafy stems or leafless scapes; filament short, anther-cells parallel, connective usually produced into a long appendage.

13. COSTUS. Spikes terminating leafy stems or leafless scapes; filament petaloid, anther adnate to its middle, cells parallel.

§§ *Flowers in lax-fld. spikes or panicles.*

14. CYPHOSTIGMA. Scape leafless, panicle loosely flowering from the base upwards; filament short, connective with a 3-lobed crest.

15. ELETARIA. Scape leafless, panicle loosely flowering from the base upwards; filament very short; anther-cells parallel, connective not dilated.

16. ELETARIOPSIS. Scape leafless; spike simple; bracts small; filament short, anther petaloid.

17. SCAPHOCHLAMYS. Scape leafless; spike simple; bracts large, persistent; filament short, connective petaloid.

18. *ALPINIA*. Spike or panicle terminating a tall leafy stem; filament long, connective shorter than the anther or longer and dilated.

19. *RHYNCANTHUS*. Spike terminating a leafy stem; filament long, connective not dilated.

Tribe II. **Marantææ**. *Calyx* of free sepals, rarely loosely cohering. *Stamen* 1; anther 1-celled, laterally adnate to a lobe of the perianth; staminodes petaloid, connate into a 5-6-lobed inner perianth, of which 1 or 2 lobes are lateral, 1 (the lip) anticus; of the 2 or 3 dorsal one or two are hooded and another bears the anther. *Ovary* 1-3-celled, cells 1-ovuled; style excentric incurved or involute. *Embryo* curved.

20. *CLINOGYNE*. Stem leafy with terminal panicked scattered flowers; panicle with convolute deciduous sheaths at the forks; bracts deciduous.

21. *PHRYNIUM*. Stem with one broad leaf, and a lateral head or spike of flowers, or spike radical; bracts and bracteoles persistent.

Tribe III. **Cannææ**. *Sepals* free. *Stamen* 1; anther 1-celled, adnate to lateral petaloid filament; staminodes 4. *Ovary* 3-celled, cells many-ovuled; style flattened; stigma terminal. *Embryo* straight.

22. *CANNA*.

Tribe IV. **Musææ**. *Sepals* free or connate in a split spathe. *Stamens* 5, free; anthers linear, 2-celled; staminode 1 or 0. *Style* central; stigma 2-3-fid. *Embryo* short.

23. *MUSA*. Stem subarborescent, stout, simple; flowers in a stout terminal spike; calyx tube short.

24. *LOWIA*. Stem slender, dichotomously branched; flowers clustered at the base of a petiole; calyx tube very long.

1. **MANTISIA**, Sims.

Rhizome short, creeping; leafy stem short. *Scape* short, sheathed below. *Leaves* oblong-lanceolate, caudate. *Panicle* laxly-fld.; bracts at the forks membranous, coloured. *Calyx* short, campanulate, obtusely 3-lobed. *Corolla*-tube slender, lobes subequal, ovate; dorsal erect, concave. Lateral *staminodes* at or below the middle of the exerted incurved filament, slender, spatulate; lip deflexed, 2-fid; filament long, curved; anther-cells linear-oblong, broadly winged. *Ovary* 1-celled; ovules 3, parietal; style filiform, placed in a groove of the filament; stigma turbinate. *Capsule* globose, dehiscent at the apex. *Seeds* many, minute, oblong.—Species the following.

1. **M. saltatoria**, Sims in *Bot. Mag.* t. 1320, staminodes linear-subulate. *Horan. Prodr.* 19. *Globba saltatoria*, *Rosc. Scitam.* t. 112. *G. purpurea*, *Andr. Bot. Rep.* t. 615. *G. radicalis*, *Roxb. in Asiat. Res.* xi. 359; *Corom. Pl.* t. 230. *G. subulata*, *Roxb. Hort. Beng.* 2; *Fl. Ind.* i. 81.

CHITTAGONG, *Roxburgh*, *Lister*.

Rootstock perennial. *Stems* annual, 1-2 ft. *Leaves* 4-6 in.; sheath 1-2 in.; bract-leaves sheathing, oblong. *Panicle* lax, 3-6 in.; branches simple, usually short and ascending; flowers few, crowded towards the tips of the branches; bracts ovate, lilac, $\frac{1}{4}$ - $\frac{1}{2}$ in., lower flowerless. *Calyx* campanulate, lilac, $\frac{1}{4}$ in.; lobes suborbicular. *Corolla*-tube twice as long as the calyx; segments ovate, lilac, $\frac{1}{8}$ in., central rather larger and clasping the filament. *Staminodes* $\frac{1}{4}$ in.; lip yellow, cuneate, deeply lobed; wings of anther suborbicular. *Capsule* purple, the size of a small cherry.

2. **M. spathulata**, Schult. Mant. i. 49; staminodes with a narrow claw and flattened petaloid blade. Horan. Prodr. 19. Globba spathulata. Roxb. Hort. Beng. 2; Fl. Ind. i. 83.

SILHET, Roxburgh; CHITTAGONG, Lister.

Habit and foliage of *M. saltatoria*, but panicle larger, branches more numerous, bracts oblong, uppermost about as long as the calyx, corolla-segments narrower, lip less deeply bifid, staminodes much shorter, and placed lower down on the filament.

2. **GLOBBA**, Linn.

Rhizome short, creeping; stem erect. *Leaves* oblong or oblong-lanceolate. *Flowers* in terminal panicles, rarely spikes; bracts usually deciduous, buds often replaced by bulbils. *Calyx* funnel-shaped, 3-lobed. *Corolla*-tube longer than the calyx; lobes ovate, subequal. *Lateral staminodes* petaloid, contiguous to the corolla-segments; lip deflexed; filament with 2 dorsal appendages, long, incurved; anther oblong, connective simple, winged or spurred, produced beyond the cells. *Ovary* 1-celled; placentas 3, parietal; style filiform, placed in a groove of the filament; stigma turbinate. *Capsule* globose, finally dehiscent. *Seeds* small, ovoid; aril small, white, lacerate.—Species about 25, Indian, Chinese, and Malayan.

SECT. I. **Aplanthera**, Horan. Anther neither winged nor spurred.

* *Leaves glabrous beneath (or slightly pubescent in G. racemosa)*.

1. **G. racemosa**, Smith Exot. Bot. ii. 115 t. 117; leaves slightly hairy or quite glabrous beneath, panicle long narrow, lower branches 2-3-fld. at the tip, bulbils 0, bracts small deciduous, corolla-segments and staminodes ovate equal in length, lip longer shortly bifid, capsule smooth. *G. orixensis*, Wall. Cat. 6535 B, G, H., not of Roxb.

CENTRAL and EASTERN HIMALAYA, ascending to 6000-7000 feet in Kumaon.

Leafy stems 1½-2 ft. *Leaves* 6-9 in., oblong or oblong-lanceolate, subcaudate, sometimes slightly hairy beneath on the ribs towards the base. *Panicle* ½-1 ft.; rachis glabrous; branch-bracts and flower-bracts caducous. *Calyx* ¼ in., yellowish, shortly lobed. *Corolla* bright yellow; tube 2-3 times the length of the calyx; segments ½ in., reflexed; filament 2-3 times the length of the segments. *Capsule* ½ in. —The name *racemosa* is a misleading one.

2. **G. orixensis**, Roxb. in Asiat. Res. xi. 358; Hort. Beng. 2; Corom. Pl. t. 229; Fl. Ind. i. 78; leaves glabrous beneath, panicle long narrow, lower branches 2-3-fld. at the tip, bulbils 0, bracts small deciduous, corolla-segments staminodes and lip equal in length, capsule warted. Horan. Prodr. 19.

SIKKIM HIMALAYA, at a low level, Hook. f. et Thoms. (Herb. Ind. Or. No. 15). NORTHERN CIRCARS, Roxburgh.

Nearly allied to *G. racemosa*, but flowers smaller, deep orange, with a shorter corolla-tube; lip spotted with red-brown at the throat; capsules smaller.

3. **G. Clarkei**, Baker; leaves glabrous beneath, panicle long narrow, lower branches 2-3-fld. at the tip, bulbils many, bracts small deciduous, corolla-segments and staminodes ovate equal in length, lip longer shortly 2-lobed, capsule smooth.

SIKKIM HIMALAYA; alt. 3000-7500 ft. (Herb. Ind. Or. H. f. & T., No. 9); KHASIA HILLS, J. D. H. alt. 3000-5700 ft.; MUNNIPORE, Watt.

Nearly allied to *G. racemosa*, but racemes longer and laxer, with most of the upper flowers changed into bulbils, calyx less corolline, usually brownish, corolla yellow, tinged with brown.

4. **G. Wallichii**, *Baker*; leaves small glabrous beneath, panicle very long lax-fld., branches 1-2-fld., bracts small deciduous, bulbils few or 0, corolla-segments ovate, staminodes lanceolate rather longer, lip small placed a little above the segments, capsule small smooth. *G. pendula*, *Wall. Cat.* 6533, *not of Roxb.*

PENANG, *Wallich, Curtis.*

Much weaker in habit than other species of the section. *Leaves* 3-4 in., caudate, pale beneath. *Panicle* sometimes 1 ft.; rachis and slender patent branches glabrous. *Calyx* green, $\frac{1}{2}$ in. *Corolla* pale yellow; tube 2-3 times the length of the calyx; segments reflexed, $\frac{1}{2}$ in., upper concave; filament yellow, $\frac{3}{4}$ in., bearing the small lip a short distance above its base. *Capsule* $\frac{1}{2}$ in. diam.

** *Leaves more or less pubescent beneath.*

5. **G. Hookeri**, *Clarke mss.*; leaves very hairy on the midrib beneath, panicle long narrow, lower branches 2-3-fld. at the tip, bulbils sometimes present, bracts small deciduous, corolla-segments and staminodes ovate and equal in length, lip longer shortly bifid, capsule smooth.

NEPAL, *Wallich*; SIKKIM HIMALAYA, alt. 3000-5000 ft., *J. D. H. (Herb. Ind. Or. No. 10).* NAGA HILLS, alt. 4500 ft., *Clarke.*

Doubtfully distinct from *G. racemosa*, but more robust and floriferous, with broader leaves. *Flowers* bright yellow; lip not spotted.

6. **G. ophioglossa**, *Wight Ic. t.* 2002; leaves finely pubescent beneath, panicle narrow, lower branches 4-6-fld., bracts small deciduous, lower nodes with a few bulbils, corolla-segments ovate, staminodes longer lanceolate, lip longer deeply bifid, capsule smooth. *Horan. Prodr.* 19. *G. orixensis*, *Wall. Cat.* 6535 A, C, D, I, *not of Roxb.* *Alpinia?* *Missionis*, *Wall. Cat.* 6580.

TRAVANCORE *Heyne*; Anamallay hills, &c., *Wight, Jerdon.* COCHIN, *Gamble.* BEAR, on Parasnath, alt. 2500 ft., *Vicary, Clarke.*

Leaf conspicuously caudate, 6-9 in. *Panicle* 4-6 in., rachis and branchlets glabrous; flowers not crowded at their tips; bulbils ovoid, deflexed. *Calyx* $\frac{1}{2}$ in., broadly funnel-shaped, pale green; teeth broad, ovate. *Corolla* pale yellow; tube 3 times the length of the calyx; segments $\frac{1}{2}$ in., ovate; lip twice the length of the segments, lobes longer and narrower than in others of the section. *Capsule* $\frac{1}{2}$ in., globose.

7. **G. multiflora**, *Wall. Cat.* 6537 A; leaves pubescent beneath, panicle long narrow, lower branches 4-6-fld., bracts small deciduous, lower nodes with bulbils, segments of corolla and staminodes ovate and equal in length, lip not longer shortly bifid, capsule smooth. *G. velutina*, *Wall. in Voigt Hort. Sub. Calc.* 573 (*name only*).

SIKKIM HIMALAYA, ASSAM, SILHET, the KHASIA HILLS, and MUNNIPORE.

Leaves conspicuously caudate, $\frac{1}{2}$ -1 ft. *Panicle* $\frac{1}{2}$ -1 ft., rachis and branchlets very hairy; branchlets more crowded than in the foregoing species, and flowers not crowded at their tips. *Calyx* $\frac{1}{2}$ in. *Corolla*-tube 3 times the length of the calyx; segments and lip $\frac{1}{2}$ in.; filament $\frac{1}{2}$ in.; anther $\frac{1}{2}$ in., sometimes obscurely margined.

8. **G. substrigosa**, *King mss.*; leaves very pubescent on both surfaces, panicle lax cernuous, branches few-fld., bulbils 0, bracts large foliaceous persistent, corolla-segments ovate, capsule pubescent.

TENASSERIM, *Gallatly.*

Whole plant not more than 6-8 in. *Leaves* few, oblong-caudate, the largest 3-4 in. *Panicle* $1\frac{1}{2}$ -2 in.; branches few, short, lower spreading or reflexed; bracts oblanceolate-oblong, pubescent. *Calyx*-tube $\frac{1}{2}$ in. *Corolla* yellow, gland-dotted. *Capsule* blackish, the size of a pea.

9. **G. Andersoni**, *Clarke, mss.*; leaves slightly pubescent beneath,

panicle lax, flowers crowded at the tips of the branches surrounded by a whorl of large bracts, corolla-segments and staminodes equal in length, lip longer deeply bifid, capsule warted.

SIKKIM HIMALAYA, alt. 1500-2500 ft. (*Hk. fil. & Thoms. Herb. Ind. Or.* 12), *Clarke, Gamble, King.*

Habit and leaves of *G. racemosa*. Leaves sometimes 1 ft., caudate. Panicle 3-4 in., erect or spreading, rachis very hairy, branchlets short, spreading; bracts $\frac{1}{2}$ in., dark, ovate, membranous. Calyx green, tubular. Corolla bright yellow; tube 2-3 times the length of the calyx; segments $\frac{1}{2}$ in.; filament nearly 1 in.

10. *G. arracanensis*, *Kurz in Journ. Asiat. Soc. Beng.* xxxix. pt. ii. 83; leaves slightly pubescent beneath, panicle short, flowers crowded at the tips of the short branches surrounded by a whorl of large bracts, corolla-segments ovate lilac, lip deeply bifid, capsule smooth.

ARRACAN; forests of the low sandstone hills, *Kurz.*

Habit of *G. racemosa*. Leaves 6-9 in., caudate. Panicle 3-4 in., subsessile, rather spreading, bracts $\frac{1}{2}$ in., much imbricate, broadly ovate, obtuse, membranous, lilac. Calyx $\frac{1}{2}$ in. Corolla-tube short, whitish; lip yellow or tinged with lilac, segments obovate-oblong; filament long, lilac.

SECT. II. *Careyella*, *Horan*. Anther with a narrow entire border.

11. *G. sessiliflora*, *Sims in Bot. Mag.* t. 1428; raceme narrow or subspicate, bulbils many on lower nodes, corolla-segments ovate, staminodes longer lanceolate, lip long deeply bifid. *Horan. Prodr.* 19. *G. Careyana*, *Roxb. Hort. Beng.* 2; *Fl. Ind.* i. 80; *Rosc. Scit.* t. 110; *Lodd. Bot. Cat.* t. 691; *Wall Cat.* 6534; *Horan. Prodr.* 19. *G. orixensis*, *Wall. Cat.* 6535 F. Scitaminea Finlaysonianana, *Wall. Cat.* 6623.

PEGU, *Carey, &c.*

Leafy stem 1-1 $\frac{1}{2}$ ft. Leaves 6 in., oblong, acuminate, pale and finely pubescent beneath. Raceme short, erect or drooping; upper half bearing flowers on the rachis or on short branches; lower half with crowded bulbils sessile in the axils of small ovate scariose spreading or ascending bracts. Calyx $\frac{3}{8}$ - $\frac{1}{2}$ in., narrowly funnel-shaped. Corolla yellow; tube 2-3 times the length of the calyx; segments $\frac{1}{2}$ in.; filament yellow, $\frac{1}{2}$ - $\frac{3}{4}$ in.; anther cuspidate, margin very narrow. Capsule globose, warted, the size of a large pea.

12. *G. floribunda*, *Baker*; panicle long lax, branches many-fld., bulbils 0, staminodes scarcely longer than corolla-segments, lip long not bifid.

MALAY PENINSULA; Johore, *King.*

Habit of *G. multiflora*, 2 ft. high. Leaves oblong, caudate, nearly 1 ft., pubescent. Panicle erect, 6-8 in.; rachis very hairy; branches 1-1 $\frac{1}{2}$ in., many, ascending, 6-8-fld.; bracts small, deciduous. Calyx $\frac{1}{2}$ in. Corolla pale yellow; segments oblong, $\frac{1}{2}$ in.; anther narrowly margined at the sides and base; lip inserted above the base of the filament. Ovary glabrous.

13. *G. uliginosa*, *Miquel Fl. Ind. Bat. Suppl.* 613? panicle long very lax narrow, lower branches 1-2-fld., upper flowers sometimes replaced by bulbils, corolla-segments and staminodes ovate and equal in length, lip small. *G. elongata*, *King mss.*

PENANG, *King*. MALACCA, *Cuming, Griffith (Kew Distrib.* 5652), &c.—DISTRIB. Malay isles.

Stem very weak. Leaves small, membranous. Panicle sometimes 6-9 in.; bracts small, deciduous. Calyx funnel-shaped, $\frac{1}{2}$ in. Corolla yellow; tube $\frac{1}{2}$ in.; segments $\frac{1}{2}$ - $\frac{1}{3}$ in.; filament $\frac{1}{2}$ in.; lip placed a little above its base; anther obscurely margined. Capsule smooth.—I doubt whether *Bentham's Sect. Careyella* should be

separated from *Aplanthera*. Neither Miquel's description, nor his type specimen, indicate the structure of the anther in the Malay *G. uliginosa*.

SECT. III. **Ceratanthera**, *Lestib.* (gen.) Anther with a membranous spur from the base or side of each cell.

14. **G. Kingii**, *Baker*; panicle narrow subspicate, bracts small deciduous, bulbils 0, corolla-segments oblong, staminodes linear-oblong, lip small inserted above the base of the filament.

SINGAPORE, *King*.

Leafy stem a foot long. *Leaves* oblong-caudate, subglabrous, 3-4 in. long. *Peduncle* erect, longer than the panicle; panicle very lax, erect, 4-5 in. long; branches very short, 1-2-fld. *Calyx* $\frac{1}{2}$ in. long. *Corolla*-segments orange-yellow, $\frac{1}{2}$ in. long. *Spurs* as long as the anther-cells. *Ovary* glabrous.

15. **G. stenothyrsa**, *Baker*; panicle erect subspicate, lower nodes bearing bulbils, bracts deciduous, corolla-segments oblong, staminodes linear-oblong, lip small emarginate inserted above the base of the filament.

TENASSERIM; Moulmein, *Parish*.

Stem 1 ft. or more. *Leaves* 6-8 in., oblong, caudate. *Panicle* peduncled, 8-9 in., lower half with small sessile bulbils in the axils of small bracts; flowering branches short, ascending, 1-2-dd. *Calyx* funnel-shaped, $\frac{1}{2}$ in. *Corolla* bright yellow, tube $\frac{1}{2}$ in., segments $\frac{1}{2}$ in.; staminodes scarcely longer; filament nearly 1 in.; spurs membranous, as long as the anther-cells.

Var. ? *Cumingii*; bulbils 0, anther spur shorter. Malacca, *Cuming* (No. 2370.)

16. **G. pallidiflora**, *Baker*; panicle lax erect, branches few-fld., bulbils 0, bracts small deciduous, staminodes longer than the whitish corolla-segments, lip inserted above the base of the filament.

MALAY PENINSULA; Johore, *King*, 716, 717.

Stem $1\frac{1}{2}$ ft. *Leaves* 8-9 in., oblong, caudate, pubescent beneath. *Panicle* 2-3 in.; peduncle short; branches less than 1 in., ascending or spreading, 2-3-fld. towards the tip. *Calyx* $\frac{1}{2}$ in. *Corolla*-segments suborbicular, $\frac{1}{2}$ in., tube $\frac{1}{2}$ in.; filament 1 in.; lip with a spreading base; anther spurs subulate. *Ovary* glabrous.

17. **G. bracteolata**, *Wall. ex Voigt Hort. Sub. Calc.* 573 (name only) panicle short dense drooping, bracts oblong or obovate yellow subpersistent, bulbils 0, corolla-segments oblong, staminodes longer linear-oblong, lip small emarginate. *G. expansa*, *Wall. Cat.* 6536 D.

TAVOY, *Wallich*; TENASSERIM, *Griffith, Helfer*; UPPER BURMA, up to 4000 ft., *King*.

Stem $\frac{1}{2}$ -1 ft. *Leaves* oblong, acuminate, 3-4 in., tinged with purple beneath; sheaths broader than in the other species. *Panicle* oblong, 3-4 in.; lower branches spreading, about 1 in., 3-4-fld.; branch-bracts obovate; flower-bracts oblong, $\frac{1}{2}$ - $\frac{3}{4}$ in. *Calyx* funnel-shaped, $\frac{1}{2}$ in. *Corolla* bright yellow; tube $\frac{1}{2}$ in.; segments reflexed, $\frac{1}{2}$ in.; lip with a red spot at the throat; filament yellow, $\frac{1}{2}$ - $\frac{3}{4}$ in.; anther-spurs large curved. *Ovary* smooth.

18. **G. subscaposa**, *Coll. et Hemsl. in Journ. Linn. Soc.* xxviii. 135; panicle sparse erect, bracts small deciduous, bulbils 0, corolla segments oblong, staminodes longer lanceolate, lip long deeply bifid inserted at the base of the filament.

UPPER BURMA; Shan hills, 4000-5000 ft., *Collett*.

Stem including panicle not above 1 ft. Produced *leaves* few and small. *Raceme* short, lax; lower branches 1 in., spreading, 3-4-fld. *Calyx* funnel-shaped, $\frac{1}{2}$ in.

Corolla greenish-yellow; segments $\frac{1}{2}$ in.; lip pale yellow, $\frac{1}{4}$ in.; filament above $\frac{1}{2}$ in.; anther-spurs from the sides of the cells.

19. **G. pendula**, *Roxb. in Asiat. Res.* xi. 359; *Fl. Ind.* i. 79; *Coromand. Pl.* t. 228; panicle lax drooping, bracts deciduous, bulbils rarely produced, corolla-segments oblong, staminodes rather longer, lip small attached above the base of the filament. *Horan. Prodr.* 20. *G. multiflora*, *Wall. Cat.* 6537 B.

TAVOY, TENASSERIM and PENANG, *Roxburgh, &c.*

Stem 1-2 ft. *Leaves* 5-6 in., oblong, acuminate. *Racemes* sometimes 1 ft.; lower branches spreading, 2-3-fld.; bracts greenish, lanceolate or ovate, not longer than the buds. *Calyx* funnel-shaped, $\frac{1}{12}$ in. *Corolla* greenish-yellow; tube 3 times the length of the calyx; segments $\frac{1}{8}$ in. *Staminodes* linear-oblong; lip not longer than the corolla-segments; anther oblong, spurs linear-subulate, longer than the cells. *Ovary* globose, smooth.—I doubt the specific distinctness of the Javan *G. maculata*, Blume, *Enum.* i. 63.

SECT. IV. **Marantella**, *Horan.* *Anther* winged on each side by a bifid quadrate membranous process.

20. **G. cernua**, *Baker*; panicle very lax few-fld. cernuous, bracts minute deciduous, bulbils 0, staminodes longer than the corolla-segments, lip placed a little above the base of the filament, anther-wings spreading.

MALAY PENINSULA; Goping, *King's Collector*, 757.

Stem 9-12 in. *Leaves* oblong, caudate, 2-3 in. long, finely pubescent beneath. *Panicle* 1-1 $\frac{1}{2}$ in.; branches ascending, 1-2-fld. *Calyx* $\frac{1}{12}$ in. *Corolla* pale yellow; segments oblong, $\frac{1}{8}$ in.; lip with two spreading lobes at the base. *Ovary* glabrous.

21. **G. pauciflora**, *King mss.*; panicle very lax few-fld., bracts minute deciduous, bulbils 0, corolla-segments oblong, staminodes not longer than the corolla-segments, lip placed a little above the segments, anther-wings spreading.

ANDAMAN ISLANDS, *King's Collector*, 376.

Whole plant $\frac{1}{2}$ -1 ft. *Leaves* oblong, caudate, 2-3 in., minutely pubescent beneath. *Panicle* short, erect; lower branches 1 in., ascending, 1-2-fld. *Calyx* glabrous, $\frac{1}{8}$ in. *Corolla* pale yellow; segments $\frac{1}{8}$ in. *Capsule* glabrous.

22. **G. versicolor**, *Smith Exot. Bot.* t. 117 A, B, C; panicle broad very lax, bracts small deciduous, corolla-segments oblong, staminodes longer lanceolate, lip small placed a little above the segments, anther-wings deflexed. *Horan. Prodr.* 20. *G. Hura*, *Roxb. in Asiat. Res.* xi. 359; *Fl. Ind.* i. 79. *G. expansa*, *Wall. Cat.* 6536. *Hura siamensium*, *Koenig in Retz. Obs.* iii. 49.

MALAY PENINSULA, *Roxburgh.* From PEGU to SINGAPORE, *Roxburgh*, and PENANG. SOUTH ANDAMANS, *Kurz.*

Stem 1-1 $\frac{1}{2}$ ft. *Leaves* 4-8 in., oblong, caudate. *Panicle* 3-6 in.; rachis and branches very slender, lower 2-3 in., flowering only in the upper half. *Calyx* green, $\frac{1}{8}$ in. *Corolla* yellow or tinged with lilac; tube $\frac{1}{4}$ in.; segments half as long as the tube; filament yellow, $\frac{1}{2}$ - $\frac{3}{4}$ in.; anther-wings 1, deeply bifid, yellow, quadrate, deflexed. *Capsule* smooth, $\frac{1}{4}$ in.

23. **G. brachycarpa**, *Baker*; panicle lax, bracts small leafy persistent, lower with solitary bulbils in their axils, staminodes longer than the oblong corolla-segments, lip placed at the base of the filament, anther-wings spreading.

PERAK, alt. 2-3000 ft., *King's Collector*, 2414.

Stem 1 ft. *Leaves* about 5, oblong-caudate, 4-5 in., finely pubescent beneath. *Panicle* $\frac{1}{2}$ ft.; main bracts $\frac{1}{4}$ - $\frac{1}{3}$ in.; lower 4-5 bulbilliferous; branches spreading, 5-6-fld. *Calyx* $\frac{1}{8}$ in. *Corolla* segments pale yellow; staminodes $\frac{1}{8}$ in. *Ovary* rugose.—Very near *G. Schomburgkii*, Hook. f. in Bot. Mag. t. 6298, of Siam.

24. ***G. bulbifera***, *Roxb. in Asiat. Res.* xi. 358; *Fl. Ind.* i. 78; spike lax, bracts ovate ascending persistent, lower nodes bearing bulbils, corolla-segments ovate, staminodes rather longer oblong, lip small deeply bifid, anther-wings spreading. *Thw. Enum.* 315. *G. marantina*, *Wall. Cat.* 6532; *Dalz. & Gibs. Bomb. Fl.* 272; *Blume Enum.* i. 62. *G. bracteata*, *Herb. Heyne.* *G. bracteosa*, *Horan. Prodr.* 20. *G. marantinoides*, *Wight Ic.* sub t. 2001. *G. strobilifera*, *Zoll. & Moritz. Syst. Verz.* 84; *Miq. Fl. Ind. Bat.* iii. 591.

EASTERN HIMALAYA and TROPICAL INDIA; MALABAR, the MALAY PENINSULA and CEYLON.—DISTRIB. Malay Islands, Timor.

Stem not so stout as in *G. marantina*; leaves smaller and sheaths not so broad. *Spike* 3-4 in.; bracts $\frac{1}{2}$ -1 in., green, not touching one another, many of the lower enclosing ovoid bulbils. *Flower* and *stamens* as in *G. marantina*; in both the quadrate yellow deeply bifid anther-wings spread horizontally from the sides of the cells.

25. ***G. marantina***, *Linn. Mant.* ii. 170; spike dense, bracts imbricate persistent, lower nodes bulbilliferous, staminodes oblong rather longer than the corolla-segments, lip small deeply bifid, anther-wings spreading. *Rosc. in Trans. Linn. Soc.* viii. 356; *Scit.* t. 111; *Smith. Exot. Bot.* ii. 85, t. 103; *Roxb. in Asiat. Res.* xi. 358; *Fl. Ind.* i. 77; *Miq. Fl. Ind. Bat.* iii. 591. *Colebrookia bulbifera*, *Roxb. in Donn Hort. Cant.* edit. 1.

KHASIA HILLS, *Griffith.*—DISTRIB. Malay Islands, Philippines.

Stem 1 ft. *Leaves* 5-6 in., oblong, acuminate, sheaths broader than in the other species. *Spike* oblong, strobiliform, $1\frac{1}{2}$ -2 in.; bracts $\frac{1}{2}$ -1 in. broad, ovate, green, bulbils ovoid. *Calyx* short, green, teeth ovate. *Corolla* yellow; tube 3 times the length of the calyx; segments $\frac{1}{8}$ in.; lip as long as the segments; filament $\frac{1}{2}$ - $\frac{3}{4}$ in. *Ovary* smooth.

SPECIES IMPERFECTLY KNOWN. (Anthers not seen.)

26. *G. CANARENSIS*, *Baker*; leaves small thin caudate, panicle narrow erect very few- and lax-fld., most of the flowers replaced by long narrow acuminate bulbils, calyx green narrowly funnel-shaped $\frac{1}{8}$ in., corolla-tube more than twice as long as the calyx, corolla-segments oblong $\frac{1}{8}$ in.—Canara, *Law*.

27. *G. PLATYSTACHYA*, *Baker*; leaves large and thin, panicle short lax and very broad, lower branches 2-4 in. ending in a bulbil and bearing numerous close flowers shortly pedicelled towards the end each subtended by a small persistent ovate acutely-keeled bract, calyx green broadly funnel-shaped $\frac{1}{12}$ in., corolla-tube 3 times the length of the calyx, segments oblong yellow $\frac{1}{8}$ - $\frac{1}{10}$ in.—Canara, *Law*. (Hk. f. & Thoms. *Herb. Ind. Or.* 14.)

3. **HEMIORCHIS**, *Kurz.*

Rhizome stout, creeping. *Leafy stem* distinct from the flowering, produced after it. *Flowers* spicate; bracts membranous, deciduous. *Calyx* short, deeply 3-lobed. *Corolla-tube* shorter than the calyx, 3-lobed, lateral lobes oblong, midlobe rather longer, ovate. *Lateral staminodes* like the corolla-lobes, obovate with a short basal spur; lip orbicular, concave; filament short; anther-cells contiguous, connective narrow not produced.

Ovary 1-celled; *placentas* 3, parietal; *style* filiform; *stigma* small, subglobose. *Capsule* small, 1-celled, 3-valved. *Seeds* conical, aril white.

H. burmanica, *Kurz in Journ. Asiat. Soc. Beng.* xlii. pt. ii. 108, t. 8; *Baker in Bot. Mag.* t. 7120.

KHASIA HILLS, Mann. PEGU, MARTABAN and TENASSERIM, *Kurz*.

Habit of Gastrochilus. *Rhizome* white, hypogæous. *Leaves* few, oblong, acute. *Peduncle* with spike $\frac{1}{2}$ –1 ft., very pubescent, as are the rachis and calyx. *Spike* dense upwards; bracts small, lanceolate, deciduous. *Calyx* funnel-shaped, reddish-brown, $\frac{1}{4}$ in., cleft below the middle. *Corolla-lobes* reddish-brown; *staminodes* about $\frac{1}{2}$ in., greenish-white; lip whitish, minutely dotted with red-brown; *stamen* half as long as the corolla-segments. *Capsule* globose, 10-grooved, crowned by the persistent acute calyx-lobes.

4. ROSCOEA, Smith.

Root fibres thick, fleshy, fascicled; *rootstock* 0. *Leaves* lanceolate or oblong. *Flowers* in terminal spikes; bracts persistent, 1-fld. *Calyx* long, tubular, slit down one side. *Corolla-tube* slender, as long as or longer than the calyx; lateral segments spreading; upper broad, cucullate, erect, hiding the staminodes and stamen. *Lateral staminodes* oblanceolate, petaloid, erect; lip large, cuneate, deflexed, 2-fid or emarginate; filament short, erect; anther-cells linear, contiguous, connective produced at the base into a forked appendage. *Ovary* 3-celled, cylindric or oblong; ovules very numerous, superposed; *style* erect; *stigma* turbinate, margins ciliate. *Capsule* cylindric or clavate, membranous, tardily 3-valved. *Seeds* ovoid, minute, arillate.—One species in Cochin China, and the following.

1. **R. alpina**, *Royle, Ill.* 361, t. 89; stem short, produced leaves 2–3 sessile oblong-lanceolate, spike sessile 1–2-fld., corolla-tube much longer than the calyx, limb dark purple, upper segment orbicular, lip broad deeply bifid. *Wight Ic.* t. 2013; *Horan. Prodr.* 20. **R. purpurea**, *Royle l. c.* t. 89, f. 3. **R. purpurea** var. *minor*, *Wall. Cat.* 6528 D, E.

TEMPERATE CENTRAL and WESTERN HIMALAYAS; from KASHMIR to NEPAL, ascending to 11,000 ft.

Whole plant 4–6 in. high. *Leaves* 3–4 in., under and not fully developed at the flowering time. *Calyx-tube* green, 1 in. or more, slit nearly to the base. *Corolla-tube* white, 1 in., longer than the calyx; upper segment orbicular-cuspidate, erect, $\frac{1}{2}$ – $\frac{3}{4}$ in. long and broad; lateral $\frac{1}{2}$ in., linear-oblong, deflexed. *Staminode* oblong-spathulate, half as long as the upper segment; fertile stamen as long as the staminode; lip obovate-cuneate, $\frac{1}{2}$ – $\frac{3}{4}$ in., bifid about one-third of its length.

2. **R. purpurea**, *Smith Exot. Bot.* ii. 97, t. 108; leafy stem elongate, produced leaves 5–6 lanceolate, flowers few in a sessile spike, corolla-tube not longer than the calyx, limb purple rarely pale lilac or white, upper segment obovate-cuneate, lip broad deeply bifid. *Hook. Exot. Fl.* t. 144; *Bot. Mag.* t. 4630; *Rosc. Scit.* t. 64; *Lodd. Bot. Cal.* t. 1404; *Horan. Prodr.* 20; *Wall. Cat.* 6528 A, B.

CENTRAL and EASTERN HIMALAYA; from Kumaon to Sikkim, ascending to 10,000 ft. ASSAM, the KHASIA HILLS, and BURMA.

Leafy stem $\frac{1}{2}$ –1 ft. long. *Leaves* 6 by $\frac{1}{2}$ –1 in. at flowering time; sheaths broad, imbricated. *Bracts* oblong, hidden in the sheaths of the upper leaves. *Calyx* green, $1\frac{1}{2}$ in., slit deeply down one side as the flower expands. *Corolla-tube* rather dilated upwards; upper segment about 1 in., very cucullate; lower lanceolate, decurved, about as long. *Staminode* oblanceolate unguiculate, half as long as the upper

segment; fertile stamen as long as the staminode; anther-tails $\frac{1}{8}$ in.; lip $1-1\frac{1}{2}$ in., deflexed. *Capsule* cylindric, $1-1\frac{1}{2}$ in.—Varies greatly in robustness, breadth of leaves and colour and size of flowers. Var. *R. exilis*, "Smith;" Horan. Prodr. 21, is probably a dwarf narrow-leaved variety.

Var. *R. PROCERA*, Wall. *Pl. As. Rar.* t. 242; Wall. *Cat.* 6528 C.; taller, more robust, with broader leaf-sheaths and larger flowers. *R. purpurea*, Lindl. in Bot. Reg. xxvi. t. 61.—Kumaon, Nepal and Sikkim.

Var. *R. BRANDISII*, King mss.; leaf-sheaths narrower and perianth-tube longer than in the type.—Khasia Hills.

3. *R. capitata*, Smith in Trans. Linn. Soc. xiii. 461; stem elongated, leaves many linear, flowers many in a dense oblong peduncled spike, corolla-tube not longer than the calyx, limb pale blue, upper segment oblong-cuneate, lip narrow emarginate. Wall. *Pl. As. Rar.* t. 255; *Cat.* 6529; Horan. Prodr. 20.

NEPAL, Wallich, Scully.

Stem $\frac{1}{2}$ –1 ft. or longer. *Leaves* erecto-patent, $\frac{1}{2}$ –1 ft. by $\frac{1}{2}$ in. *Peduncle* erect, 3–6 in. *Spike* $1\frac{1}{2}$ –2 in.; bracts green, lanceolate, $1-1\frac{1}{2}$ in. *Calyx* 1 in., green, minutely 2-toothed, slit deeply down one side. Upper *corolla-segment* $\frac{3}{4}$ in., arcuate, very concave; lower rather longer, oblanceolate deflexed. *Staminode* nearly as long as the upper segment; lip 1 by $\frac{1}{2}$ in., oblong-spathulate. *Capsule* 1 in., clavate.

IMPERFECTLY-KNOWN SPECIES.

4. *R. LONGIFOLIA*, Baker; stem short, produced leaves about 6 outer oblong inner 12 in. linear or lanceolate, flowers 1–3 in a sessile spike, calyx-tube slender cylindric $1\frac{1}{4}$ in., corolla-tube twice as long, limb not seen, capsule shortly pedicelled clavate above an inch long.—SIMLA, on Fagu, Thomson.

5. *CAUTLEYA*, Royle.

Characters of *Roscoea*, but flowers yellow, dorsal lobe of the corolla narrow, and capsule dehiscing to the base with recurved lobes exposing the seeds in a columnar mass.—Species, the following.

1. ***C. lutea***, Royle Ill. 361; spike lax few-fl., leaves sessile lanceolate or oblong-lanceolate, bracts oblong green much shorter than the calyx, seeds black angular exarillate. Hook. f. in Bot. Mag. t. 6991. *Roscoea gracilis*, Smith in Trans. Linn. Soc. xiii. 460; Horan. Prodr. Scit. 21. *R. elatior*, Smith l. c.; Wall. *Cat.* 6531 A, B. *R. lutea*, Royle Ill. 361, t. 89, f. 2; Wight Ic. t. 2013.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, ascending to 7–8000 ft. KHASIA HILLS, J. D. H. & T. T.

Stem 12–18 in., slender. *Leaves* 6–9 by $1-1\frac{1}{2}$ in. at flowering time, usually purple beneath. *Flowers* 6–12 in a lax peduncled spike, rachis red flexuose; bracts $\frac{3}{4}$ – $\frac{1}{2}$ in. *Calyx* red, above $\frac{1}{2}$ in., minutely toothed, slit deeply down one side. *Corolla-tube* slightly exserted; limb bright yellow; upper segment $\frac{1}{2}$ – $\frac{3}{4}$ in., lower as long, oblong-cuneate, deflexed. *Staminode* nearly as long as the upper segment, bases minutely spurred on the inner side; lip $\frac{3}{4}$ in., 2-lobed to below the middle, lobes oblong. *Capsule* $\frac{1}{2}$ in., bright red, globose; valves ovate, reflexed, red inside. *Seeds* black, angled, top flat.

2. ***C. Cathcarti***, Baker; spike dense many-fl., leaves sessile lanceolate or oblong-lanceolate, bracts green oblong shorter than the calyx, seeds black angular exarillate.

SIKKIM HIMALAYA, alt. 7–8000 ft., Griffith's Collectors, &c.

Very near *C. lutea*, but more robust, flowers twice or thrice as many, bracts

larger, calyx longer and lip broader, with crisped margins; capsule and seeds quite similar.

3. **C. spicata**, Baker; spike dense many-fld., leaves oblong acuminate sessile or shortly petioled, bracts red as long as the calyx, seeds not angled completely enclosed in a white scarious aril. *Roscoeia spicata*, Smith in *Trans. Linn. Soc.* xiii. 461; *Wall. Cat.* 6530; *Horan. Prodr.* 21.

CENTRAL and EASTERN HIMALAYAS, from Kumaon to Sikkim, ascending to 8500 ft.

Stem 1-2 ft. *Leaves* sometimes 3-4 in. broad, not purple beneath. *Spike* shortly peduncled, 6-9 in.; bracts oblong, bright red, lower 1-1½ in. *Calyx* 1 in., tubular, red, minutely obtusely toothed, finally slit deeply down one side. *Corolla-tube* as long as the calyx, upper segment about 1 in.; lip bright yellow. *Staminodes* nearly as long as the upper segment of the corolla, oblanceolate-oblong. *Capsule* small, red, globose. *Seeds* ½ in., black, ovoid or flattened by pressure.

4. **C. robusta**, Baker; spike dense many-fld., leaves sessile oblong acute, bracts linear-oblong reddish as long as the calyx, seeds pink not angled enclosed in a red or yellow arillus.

SIKKIM HIMALAYA, alt. 5500-6500 ft., Clarke.

Leaves 1 ft. or less by 3 in. or more. *Spikes* peduncled, 6-9 in.; bracts 1 in. *Corolla* not seen. *Capsule* depressed-globose, ½ in. diam. *Seeds* ovoid or compressed, forming a dense mass ½ in. diam., entirely enveloped in the scarious aril.

5. **C. petiolata**, Baker; spike dense many-fld., leaves petioled oblong-lanceolate caudate, bracts oblong reddish shorter than the calyx. *Roscoeia petiolata*, Royle mss.

GARHWAL HIMALAYA; between Dehra and Landour, alt. 7000 ft., Royle.

Stem 1 ft. or more. *Leaves* 6 by 1½-2½ in., shortly petioled, erecto-patent. *Spike* 3-4 in., nearly sessile; bracts oblong, reddish, nearly 1 in. *Calyx* 1 in., reddish, obscurely bidentate, slit deeply down one side. Upper *corolla-segment* and lip pale sulphur-yellow, under 1 in. *Staminode* and stamen nearly as long as the upper segment.—Known only from an unpublished figure of Royle's artist.

6. CURCUMA, Linn.

Rootstock tuberous, bearing sessile and long stipitate tubers; stem none. *Leaves* usually oblong, often very large. *Flowers* in dense compound spikes (except in *C. Kunstleri*) crowned by a coma of coloured enlarged bracts; lower bracts ovate, membranous, enclosing several bracteolate fugitive flowers which open in succession. *Calyx* short, cylindric, minutely toothed. *Corolla-tube* funnel-shaped; segments usually ovate or oblong, upper longer and more concave. *Lateral staminodes* oblong, petaloid, connate with the short filament; anther not crested, cells contiguous, spurred at the base; lip orbicular, tip deflexed. *Ovary* 3-celled, many-ovuled; style filiform; stigma 2-lipped, lips ciliate. *Capsule* globose, membranous, finally 3-valved. *Seeds* ovoid or oblong, usually arillate.—India, Siam, Malay Islands and N. Australia.

The species of this genus are very difficult of determination and the characters are taken almost without exception from published or unpublished drawings.—Many of Sect. I. are probably varieties, but this can be determined only by a comparison of living specimens. I have failed in my endeavours to subdivide the species of the several sections.

Sect. I. **Exantha**, Horan. *Flower-spike* vernal or æstival, distinct
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from the leaves, and usually developed before they appear; peduncle sheathed by scarioso bract-leaves.

1. ***C. angustifolia***, *Roxb. in Asiat. Res.* xi. 338, t. 3; *Hort. Beng.* 1 *Fl. Ind.* i. 31; dwarf, rootstock small globose, leaves lanceolate plain green shortly petioled, bracts of the coma pink, lobes of the corolla pale yellow. *Royle, Ill.* 357, 359; *Horan. Prodr.* 22. *C. longa*, *Wall. Cat.* 6605 E, F, G.

TROPICAL HIMALAYA; from Kumaon to Nepal, alt. 3-4000 ft. NORTH OUDH.

Rootstock small; tubers many, oblong, at the end of long fibres. *Leaves* with petiole 1-1½ ft.; blade lanceolate, plain green, ½-1 ft. by 2-3 in. *Spike* with peduncle æstival, ½-1 ft., 3-6 by 2 in. diam.; flower-bracts 1 in., green, ovate; pink; bracts of coma few or many. *Corolla-tube* ½ in.; upper segment ovate, lateral shorter, oblong. *Staminode* and lip bright yellow, the latter orbicular-cuneate, emarginate.—Similar plants in flower and not distinguishable in a dried state are found in Upper Burma, alt. 4000 ft., *Collett, Prain*, and in Munnipore, alt. 5000 ft. *Watt*.

2. ***C. nellgherrensis***, *Wight Ic.* t. 2006; dwarf, rootstock small, white inside, leaves lanceolate pale green shortly petioled, bracts of coma pink, lobes of corolla pale ovate. *Horan. Prodr.* 22. *C. longa*, *Wall. Cat.* 6605 C. *C. angustifolia*, *Dalz. & Gibs. Bomb. Fl.* 274, not of *Roxb.*

CONCAN; at Ramghaut. MALABAR; abundant on the S.W. slope of the Nilghiris, alt. 4500-6000 ft.

Very near *C. angustifolia*. *Leaf* and petiole together 12 in. or more; blade glabrous beneath, narrowed gradually from the middle to both ends. *Spikes* vernal, 2-4 by 1½-2 in. diam.; flowering bracts pale yellowish green, 1-1½ in. *Flowers* 1 in., bright yellow; lip orbicular, deflexed, emarginate.

3. ***C. aromatica***, *Salisb. Parad.* t. 96; in *Trans. Hort. Soc.* i. 285; rootstock large, tubers sessile yellow and aromatic inside, petiole long green, leaves large oblong pubescent beneath, bracts of the coma pink, lobes of corolla pinkish white. *Rosc. Scit.* t. 103; *Wight Ic.* t. 2005; *Thw. Enum.* 316; *Horan. Prodr.* 23. *C. Zedoaria*, *Roxb. in Asiat. Res.* 333; *Hort. Beng.* 1; *Fl. Ind.* i. 23; *Wall. Cat.* 6601 A; *Dalz. & Gibs. Bomb. Fl.* 274; *Bot. Mag.* t. 1546; *Grah. Cat. Bomb. Pl.* 209.

Throughout INDIA from the EASTERN HIMALAYA to CEYLON, wild and frequently cultivated.

Rootstock tuberous, biennial, 1 in. diam. *Leaves* 3-4 ft.; petiole as long as the blade, which is 1-2 ft. by 4-8 in., caudate, base deltoid, plain green above or variegated with lighter and darker green, clothed beneath with fine persistent pubescence. *Spike* with peduncle 1 ft., produced from April to June with or before the leaves, the later half as long, 3-4 in. diam.; flower-bracts ovate, pale green, 1½-2 in.; those of the coma larger and more or less tinged with pink. *Flowers* shorter than the bracts. *Corolla-tube* 1 in., upper half funnel-shaped; lateral segments oblong, upper longer ovate, concave. *Staminode* obtuse, as long as the corolla-segments; lip deflexed, orbicular, yellow, obscurely 3-lobed. *Stigma* obscurely 2-lobed.

4. ***C. Zedoaria***, *Rosc. Scit.* t. 109; rootstock large, sessile tubers pale yellow or whitish inside, petiole long green, leaves large oblong glabrous beneath clouded with purple down the middle, bracts of the coma bright red, lobes of corolla whitish. *Wall. Cat.* 6601 B; *Horan. Prodr.* 23. *C. Zerumbet*, *Roxb. in Asiat. Res.* xi. 333; *Hort. Beng.* 1; *Fl. Ind.* i. 20; *Coromand. Pl.* t. 101; *Wall. Cat.* 6600 A, B; *Grah. Cat. Pl. Bomb.* 209;

Royle Ill. 859; *Thw. Enum.* 316. *C. officinalis*, *Salisb. in Trans. Hort. Soc.* i. 285. *C. speciosa*, *Link Enum.* ii. 3. *Amomum Zedoaria*, *Berg. Mat. Med.* 41; *Willd. Sp. Plant.* i. 7. *A. Zerumbeth*, *König in Retz. Obs.* iii. 55. *A. latifolium*, *Lamk. Ency.* i. 134.—*Rumph. Amboin.* v. 108; *Rheede. Hort. Malab.* xi. t. 7.

EASTERN HIMALAYA, wild; cultivated throughout India.—DISTRIB. Malay Islands.

Rootstock ovoid, tubers many, some 1 in. diam., sessile, cylindric, and many oblong terminating long fibres. *Leaves* 1–2 ft., oblong, acuminate, narrowed to the base; petiole longer than the blade. *Spikes* vernal, $\frac{1}{2}$ ft. by 3 in. broad; flowering bracts $1\frac{1}{2}$ in., ovate, green, often slightly tinged with red; bracts of the coma many, spreading, bright red. *Flowers* pale yellow, rather shorter than the bracts. *Calyx* whitish, obtusely toothed, scarcely half as long as the corolla-tube. *Corolla-tube* funnel-shaped; lateral segments oblong, upper rather longer, ovate, convex. *Lip* $\frac{1}{2}$ in. broad, orbicular, deflexed, obscurely 3-lobed emarginate. *Capsule* ovoid-trigonal, smooth, dehiscing irregularly. *Seeds* oblong, aril lanceolate white.

5. *C. elata*, *Roxb. Hort. Beng.* 1; *Fl. Ind.* i. 25; rootstock large, sessile tubers pale yellow inside, petiole long green, leaves large oblong plain-green pubescent beneath, bracts of coma bright red, lobes of corolla whitish. *Rosc. Scit.* t. 104; *Wall. Cat.* 6610; *Horan. Prodr.* 23.

BURMA, *Carey*.

Rootstock and numerous sessile tubers large. *Leafy tuft* 6–8 ft.; blade 2–3 by 1 ft. *Spike* vernal, $\frac{1}{2}$ ft. by 3 in. diam.; flowering bracts $1\frac{1}{2}$ in., ovate, green; those of the coma ovate-oblong, larger, spreading. *Flowers* pale yellow, shorter than the bracts; lip obscurely 3-lobed, midlobe broad, emarginate.—Very near *C. Zedoaria*.

6. *C. comosa*, *Roxb. in Asiat. Res.* xi. 336; *Hort. Beng.* 1; *Fl. Ind.* i. 29; rootstock large, sessile tubers few pale yellow inside, petiole long green, leaves large oblong plain green glabrous beneath, bracts of coma bright red, lobes of the corolla pinkish white. *Wall. Cat.* 6609 A; *Horan. Prodr.* 23.

PEGU, *Carey*.

Leafy tuft 5–6 ft.; blade 2–3 ft., plain green except in the earliest leaves, which are clouded with faint brown down the centre. *Spike* vernal, denser and thicker than in *C. Zedoaria*; flower-bracts pinkish white; those of the coma many, bright red, 2–3 in., spreading. *Flowers* pale yellow.—Very near *C. Zedoaria*.

7. *C. ornata*, *Wall. mss. ex Voigt Hort. Suburb. Calc.* 564 (name only); rootstock large, sessile tubers 0, leaves ovate clouded in the centre when young, bracts all white tipped with mauve-purple, lobes of the corolla tinged with red.

PEGU, *Wallich*.

Stalked tubers very numerous. *Leafy stem* produced after the flowers. *Leaves* young only seen, perhaps oblong when developed. *Spike* under 1 ft. long, 3–4 in. diam.; bracts all whitish tipped with mauve-purple, the upper more so, 2 in. *Flowers* as long as the bracts; expanded limb $\frac{1}{2}$ in. diam., white tinged with yellow.—Closely allied to *C. comosa*.

8. *C. latifolia*, *Rosc. Scit.* t. 108; very tall, rootstock large, sessile tubers pale yellow inside, petiole long green, leaves large oblong clouded down the middle with purple pubescent beneath, bracts of the coma bright red, lobes of the corolla whitish. *Horan. Prodr.* 23.

BENGAL?, *Carey*.

Very near *C. Zedoaria* & *aromatica*. *Leafy tuft* 8–12 ft.; blade 3–4 by 1 ft. or more. *Spike* produced vernal, 6–8 in., 3 in. diam.; flower-bracts green, ovate, $1\frac{1}{2}$ in., of the coma many, longer and more oblong. *Flowers* pale yellow, rather shorter than the bracts; lip obscurely emarginate.—Sent by *Carey* from Serampore to the Liverpool Botanical Garden; origin unknown.

9. ***C. leucorhiza***, *Roxb. in Asiat. Res.* xi. 337; *Hort. Beng.* 1; *Fl. Ind.* i. 30; rootstock large, sessile tubers nearly white inside, petiole long green, leaves large oblong plain green glabrous beneath, bracts of the coma pink, lobes of the corolla nearly white. *Rosc. Scit.* t. 102; *Wall. Cat.* 6607; *Horan. Prodr.* 22.

BEHAR; jungles south of Bhagulpore, *Glass*.

Very near *C. Zedoaria* & *aromatica*. *Rootstock* large, ovoid; sessile tubers cylindric, sometimes nearly 1 ft. *Leafy tuft* 3–4 ft.; blade 1–2 ft. by 5–6 in., broad at the middle, plain green and glabrous on both sides. *Spike* vernal; coma nearly as long as the fertile portion; flower-bracts green, obtuse, $1\frac{1}{2}$ in.; bracts of the coma longer, more oblong. *Flowers* pale yellow, rather shorter than the bracts; central lobe of the lip distinctly emarginate.

10. ***C. cæsia***, *Roxb. in Asiat. Res.* xi. 334; *Hort. Beng.* 1; *Fl. Ind.* i. 26; rootstock large, sessile tubers pale grey inside, petiole long green, leaves large oblong with a broad purple-brown cloud down the middle, bracts of the coma and corolla-limb red. *Wall. Cat.* 6613; *Horan. Prodr.* 22.

BENGAL, *Roxburgh*.

Rootstock ovoid; sessile tubers longer and not so thick as in *C. æruginosa*. *Leafy tuft* about 3 ft.; blade $1-1\frac{1}{2}$ ft. by 5–6 in., glabrous beneath. *Spike* produced, dense, 5–6 by $2\frac{1}{2}$ –3 in. diam.; flower-bracts green, ovate, very obtuse, $1\frac{1}{2}$ in.; bracts of the coma rather longer, many, bright red. *Flowers* pale yellow, rather shorter than the bracts; lip $\frac{1}{2}$ in., broad, obscurely 3-lobed, midlobe emarginate.—“Resembles *C. Zerumbet*, *Roxb.* (*Zedoaria* supra p. 210), but differs widely in the colour of the root,” *Roxb.*

11. ***C. æruginosa***, *Roxb. in Asiat. Res.* xi. 335; *Hort. Beng.* 1; *Fl. Ind.* i. 27; rootstock large, sessile tubers palmate verdigris-green inside, petiole long green, leaves large oblong green faintly tinged with red-brown down the middle, bracts of the coma pink, lobes of the corolla pale red. *Rosc. Scit.* t. 106; *Salisb. in Trans. Hort. Soc.* i. 285; *Wall. Cat.* 6606; *Horan. Prodr.* 22.

BURMA, *Carey*.

Very near *C. Zedoaria*. *Rootstock* ovoid; sessile tubers short, above 1 in. thick, stipitate tubers purely white within. *Leafy tuft* 4–6 ft.; petiole and blade each 2–3 ft., the latter 6–9 in. broad. *Spike* vernal, 6–8 by $2\frac{1}{2}$ –3 in. diam.; flower-bracts green, ovate, obtuse, 2 in.; many upper longer oblong, pink. *Flowers* pale yellow, shorter than the bracts; corolla-tube an inch long; lip deflexed, $\frac{1}{2}$ in. broad.

12. ***C. amarissima***, *Rosc. Scit. Pl.* t. 101; rootstock large, sessile tubers yellow and very bitter inside, petiole long red-brown, leaves large oblong plain green, bracts of the coma whitish tipped with pink, lobes of the corolla red. *Horan. Prodr.* 23.

BENGAL?, *Carey*.

Rootstock very large, yellow in the centre, æruginose towards the outside. *Leafy tuft* 3 ft.; blade $1-1\frac{1}{2}$ ft. by 5–6 in. *Spike, bracts and flowers* as in *C. Zedoaria*.—Sent by *Carey* in 1824 from Serampore to the Liverpool Botanic Garden, probably a native of Bengal.

13. **C. ferruginea**, Roxb. in *Asiat. Res.* xi. 336; *Hort. Beng.* 1; *Fl. Ind.* i. 27; rootstock large, sessile tubers pale yellow and very fragrant inside, petiole long red-brown, leaves large oblong with a faint red-brown cloud down the centre, bracts of the coma bright red, lobes of the corolla red. *Rosc. Scit.* t. 105; *Horan. Prodr.* 23.

BENGAL, Roxburgh.

Rootstock ovoid; sessile tubers very stout. *Tuft of leaves* 4-5 ft.; blade 1-1½ by 5-6 in. *Spike* vernal; flowers few, large; fertile bracts tinged with red-brown, those of the coma few bright red; lip above ½ in. diam., obscurely emarginate.

14. **C. rubescens**, Roxb. in *Asiat. Res.* xi. 336; *Hort. Beng.* 1; *Fl. Ind.* i. 28; rootstock large, sessile tubers white inside, petiole long red-brown, leaves large oblong green with a red-brown midrib, bracts of the coma few pale red, limb of the corolla reddish. *Rosc. Scit.* t. 107; *Horan. Prodr.* 23. **C. erubescens**, Wall. *Cat.* 6608. **C. longiflora**, Salisb. in *Trans. Hort. Soc.* i. 286. **C. rubricaulis**, Link. *Enum.* i. 3.

BENGAL, Roxburgh.

Rootstock ovoid-cylindric; tubers sessile and many on long fibres. *Leafy tuft* 4-5 ft.; blade dark green, 1-2 ft. by 5-6 in. *Spikes* vernal, produced apart from the leaves, and sometimes also from the centre of the leaves in September, 5-6 in., under 2 in. diam; flower-bracts pale green, 1½ in.; those of the coma few, ovate, pale red. *Flowers* pale yellow, protruding beyond the bracts; lip ½ in. diam., emarginate.

SECT. II. **Mesantha**, Horan. *Flower-spike* autumnal, in the centre of the tuft of leaves; bracts not recurved at the tip.

15. **C. attenuata**, Wall. *Cat.* 6602; rootstock small, petiole long slender, leaves lanceolate, flower bracts small, those of the coma oblong tinged with red, flowers ?

BURMA; banks of the Irrawaddy, Wallich.

Rootstock globose; sessile tubers oblong. *Leafy tuft* 2½-3 ft.; petiole as long as the blade, which is firmer in texture than is usual in the genus, quite glabrous, 1-1½ ft. by 1 in., tapering gradually to the base and a long point. *Peduncle* 1 ft., slender, erect; spike dense, 3-4 in. by 1 in. diam.; flower-bracts under 1 in., membranous, very obtuse; bracts of the coma few, 1 in., bright coloured. *Flowers*, withered only seen.

16. **C. plicata**, Wall. *Cat.* 6611; rootstock small, petiole slender long or shorter, leaves firm oblong-lanceolate, flower-bracts green, those of the coma much tinged with red, flowers small pale yellow.

BURMA and PEGU, Wallich, J. Anderson.

Rootstock globose; fibres bearing small tubers. *Leafy tuft* 9-18 in.; petiole as long as the blade, which is 6-8 in. by 1½-3 in., firm, tapering gradually to both ends, bright green, with a brown dorsal cloud the centre. *Peduncle* slender, 2-4 in. *Spike* 3-4 in. by 1½ in. diam.; flower-bracts 1 in., pale green, very obtuse; those of the coma few, rather longer and more oblong. *Flowers* rather longer than the bracts. *Corolla* whitish, ½ in. diam.; upper lobe ovate; lip obscurely 3-lobed, midlobe emarginate.

17. **C. Amada**, Roxb. in *Asiat. Res.* xi. 341; *Hort. Beng.* 1; *Fl. Ind.* i. 33; rootstock large, sessile tubers pale yellow inside, petiole long, leaves large oblong-lanceolate, flower-bracts pale green, those of the coma pinkish, flowers pale yellow. *Rosc. Scit.* t. 99; *Royle Ill.* 359; *Grah. Cat. Pl. Bomb.* 209; *Dalz. & Gibs. Bomb. Fl.* 275; *Horan. Prodr.* 23.

BENGAL and the CONCANS; native and widely cultivated, under the name of Mango Ginger.

Rootstock ovoid; sessile tubers thick, cylindric. *Leafy tuft* 2-3 ft.; petiole as long as the blade, which reaches 1-1½ ft. by 6 in. or more in breadth, plain green, tapering gradually to the base and apex. *Peduncle* ½ ft. or more, hidden by the sheathing bases of the leaves. *Spike* autumnal, 3-6 in. by 1½ in. diam.; flower-bracts about 1 in., those of the coma tinged with pink. *Flowers* about as long as the bracts. *Corolla* whitish, lip pale yellow.—Not distinguishable in Herbarium specimens from *C. longa*.

18. **C. longa**, *Linn. Sp. Plant.* 2; rootstock large, sessile tubers bright yellow inside, petiole long, leaves large oblong narrowed to the base, flower-bracts pale green, those of the coma tinged with pink, flowers pale yellow. *König in Retz. Obs.* iii. 71; *Roxb. in Asiat. Res.* xi. 340; *Hort. Beng.* 1; *Fl. Ind.* i. 32; *Royle Ill.* 358; *Wall. Cat.* 6605 D; *Grah. Cat. Pl. Bomb.* 209; *Lindl. in Bot. Reg.* t. 886; *Benth. & Trim. Med. Pl.* t. 269; *Horan. Prodr.* 23. *Amomum Curcuma*, *Jacq. Hort. Vind.* iii. t. 4.—*Rheede Hort. Mal.* xi. t. 11. *Rumph. Amboin.* v. t. 67.

Widely cultivated in BENGAL and other parts of INDIA. Clarke considers it to be indigenous on Parasnath, in Behar, alt. 4-5000 ft., *Clarke*.—DISTRIB. Cultivated through the Tropics.

Rootstock ovoid; sessile tubers thick, cylindric. *Leafy tuft* 4-5 ft.; petiole as long as the plain green blade, which is 1-1½ ft. by 4-8 in. broad. *Peduncle* ½ ft. or more, hidden by the sheathing petiole. *Spikes* autumnal, 4-6 in. by 2 in. diam.; flower-bracts pale green, ovate, 1½ in.; those of the coma pale pink. *Flowers* as long as the bracts, like those of *C. Zedoaria* & *aromatica* in structure.

19. **C. montana**, *Rosc. in Trans. Linn. Soc.* viii. 355; rootstock large, sessile tubers pale yellow inside, petiole long, leaves oblong narrowed to the base, flower-bracts pale green, those of the coma pink, flowers pale yellow. *Roxb. in Asiat. Res.* xi. 342; *Hort. Beng.* 1; *Corom. Pl.* t. 151; *Fl. Ind.* i. 35; *Griff. Notul.* iii. 415; *Ic. Plant. Asiat.* t. 352, fig. 1; *Horan. Prodr.* 23. *C. pseudo-montana*, *Grah. Cat. Pl. Bomb.* 210; *Dalz. & Gibs. Bomb. Fl.* 275; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* ii. 144.

CONCAN and the CIRCARS, *Roxburgh, &c.*

Rootstock ovoid, perennial. *Leafy tuft* 2-3 ft.; blade 1 ft. or more by 6-8 in., plain green, narrowed to the base; petiole green, deeply channelled, as long as the blade. *Peduncle* shorter than the petiole. *Spike* autumnal, ½ ft. by 2 in. diam.; flower-bracts ovate, 1½ in. *Flowers* about as long as the bracts. *Corolla*-segments subequal, lip longer, deflexed, obscurely 3-lobed.—*C. Kuchoor*, *Royle Ill.* 359 (name only), which is cultivated on the hills above the Dehra Doon, is said to be nearly allied. A flowerless specimen from Mussoorie, sent by Mr. Duthie, furnishes no distinctive characters.

20. **C. Kuntzleri**, *Baker*; petiole long, leaves oblong narrowed to the base, bracts very broad all pale green, coma 0, flowers yellow.

PEGU, *Kunstler (Hort. Calcutt.* 1882).

Rootstock not seen. *Leaf-blade* under 1 ft., 4-6 in. broad, acute, green above, tinged with purple beneath; petiole 5-6 in., robust, deeply channelled. *Peduncle* very short; spike short, 2 in. diam., without any coma of coloured bracts; flower-bracts 1½ in. long and broad. *Corolla*-tube as long as the bract; segments lanceolate, ½ in.; lip obovate-cuneate, rather longer than the corolla-segments, yellow throughout, emarginate.—Near *C. montana*.

21. **C. reclinata**, *Roxb. in Asiat. Res.* xi. 342; *Hort. Beng.* 1; *Fl. Ind.* i. 36; rootstock small, sessile tubers 0, petiole short, leaves thin oblong

obtuse, flower-bracts green tinged with red, those of the coma reddish, flowers reddish-yellow. *Horan. Prodr.* 24.

CENTRAL INDIA, *Colebrooke*.

Rootstock oblong, bearing many subglobose tubers at the end of fibres. *Leaves* plain green, obtuse, rounded at base, 6-8 by 3-4 in.; petiole shorter than the blade. *Peduncle* very short. *Spike* autumnal, oblong, 3-4 by 2 in. diam.; bracts 1 in.; those of the coma oblong, ascending, similar to flower-bracts in colour. *Flowers* small, dull red, except the yellow orbicular emarginate lip.

22. **C. decipiens**, *Dalz. in Kew Journ.* ii. (1850), 144; *rootstock* small, sessile tubers 0, petiole short, leaves thin cordate-ovate cuspidate, bracts and flowers purple. *Dalz. & Gibs. Bomb. Fl.* 274; *Horan. Prodr.* 23.

The CONCAN, *Dalzell, Law*.

Rootstock bearing numerous small almond-like tubers at the end of fibres. *Leaves* thin, 6-8 in. by 3-4, base rounded tip, deltoid with a small cusp; petiole as long as the blade. *Spikes* æstival, earlier lateral, later central, 4-6 by 1½-2 in.; peduncle short; lower bracts ovate, 1 in.; many upper sterile, longer, oblong; flower shorter than the bract; lip bifid, margins curled.

23. **C. albiflora**, *Thw. Enum.* 316; *rootstock* small, sessile tubers 0, petiole short, leaves small oblong rounded at the base, flower-bracts green all fertile, flowers white with a yellow spot on the lip. *Hook. f. in Bot. Mag.* t. 5909.

CEYLON; Maskellia, in the Ambagamowa district, at a low elevation.

Rootstock bearing a few small tubers at the end of fibres. *Leaves* bright green, 6-8 by 2½-3 in., acute, base rounded or cordate; petiole deeply channelled, as long as or rather longer than the blade. *Peduncle* very short; spike oblong, 3-4 in.; lower bracts 2 in., oblong-lanceolate, acuminate, upper shorter, ovate. *Flowers* 1 in. long. *Corolla*-lobes oblong. *Staminode* broad; lip ¾ in. broad, shallow, emarginate, pure white, with a yellow spot at the throat.

24. **C. oligantha**, *Trimen in Journ. Bot.* 1885, 245; *rootstock* small, sessile tubers 0, petiole short, leaves small ovate narrowed to the base, flower-bracts green all fertile, flowers white with a yellow spot on the lip.

CEYLON; Central Province, near the Mahaweli river, *Trimen*.

Near *C. albiflora*. *Leaves* 5-7 in., thin, bright light transparent green, with distinct veins and transverse veinlets. *Peduncle* short, slender; spike 4-6 in.; bracts green, appressed, acuminate; flowers few, erect, large for the genus. *Corolla*-tube 1 in.; segments long, pinkish. *Staminode* subacute, crisped, pure white; lip broad, deeply bifid, with a yellow stain at the throat. *Seeds* oblong, grey, shining, exarillate.

SECT. III. **Hitcheniopsis**, *Baker*. *Spike* autumnal, from the centre of the tuft of leaves; bracts very obtuse, adnate at the sides and spreading at the tip.

25. **C. parviflora**, *Wall. Pl. Asiat. Rar.* i. 47, t. 57; *rootstock* small, leaves small oblong rounded to the base, fertile bracts green, those of the coma greenish-white, lip violet. *Horan. Prodr.* 24.

BURMA; banks of the Irrawaddy, near Prome, *Wallich*.

Rootstock oblong, fibres bearing a few small fusiform tubers. *Leaves* about six to a tuft; petiole 4-8 in.; blade green, cuspidate, ½ ft. by 2-3 in., veins darker green. *Peduncle* short, slender, hidden by the clasping petioles; spike oblong, 2 in. by 1 in. diam.; flower-bracts ¾-1 in., very obtuse, tips spreading. *Flowers*

as long as the bracts. *Corolla*-segments small, ovate; staminodia oblong, white, as long as the *corolla*-segments; lip longer, obovate-cuneate, obscurely emarginate.

26. **C. strobilifera**, *Wall. Cat.* 6599; rootstock small, leaves small oblong, bracts all green, flowers pale yellow. *C. strobilina*, *Wall. mss.*; *Grah. Cat. Pl. Bomb.* 210.

PEGU; near Rangoon, *Wallich*.

Rootstock bearing a few globose sessile tubers. *Leaves* about six to a tuft; petiole green, deeply channelled, 6-8 in.; leaves 6-8 by $2\frac{1}{2}$ -3 in., bright green, acute, base rather rounded, darker green along the veins. *Peduncle* much shorter than the petioles; spike oblong, 3-4 in. by 2 in. diam.; bracts all similar, green, very obtuse, spreading at the tip. *Flowers* about as long as the bracts. *Corolla*-segments small, whitish; lip short, deflexed, orbicular, distinctly emarginate.

27. **C. grandiflora**, *Wall. ex Voigt Hort. Suburb. Calc.* 565 (name only); rootstock small, leaves small oblong acute, bracts all pale green, flowers pale yellow.

MALAY PENINSULA, *Wallich*.

Rootstock oblong; fibres not bearing tubers. *Leaves* 6-8 to a tuft; petiole deeply channelled, 6-10 in.; blade 6-8 by 3-4 in., cuspidate, base rounded, darker green along the veins. *Peduncle* much shorter than the petioles. *Spike* oblong, 3-4 in.; bracts all similar, very obtuse, spreading at the tip. *Flowers* rather longer than the bracts. *Corolla*-segments ovate or oblong; staminode short and broad; lip $\frac{3}{4}$ in., broad, obscurely emarginate, both primrose-yellow.

28. **C. petiolata**, *Roxb. Fl. Ind. i.* 37; rootstock small, leaves oblong base rounded, flower-bracts green, those of the coma purple or lilac, flowers yellowish-white. *Rosc. Scit. t.* 100; *Horan. Prodr.* 23; *Hook. f. in Bot. Mag. t.* 5821. *C. cordata*, *Wall. Pl. Asiat. Rar. i.* 8, t. 10; *Cat.* 6598; *Horan. Prodr.* 23; *Hook. Bot. Mag. t.* 4435. *C. cordifolia*, *Roxb. Hort. Beng. 1.*

BURMA, PEGU, and TENASSERIM, *Roxburgh, &c.*

Rootstock with a few sessile tubers, pale yellow inside, and many at the end of fusiform fibres. *Leaves* 4-6 to a tuft; petiole $\frac{1}{2}$ -1 ft.; blade 6-9 in., thin, cuspidate. *Peduncle* much shorter than the petioles; spike $\frac{1}{2}$ ft. by 2 in. diam.; flower-bracts $1\frac{1}{2}$ in., very obtuse, spreading at the tip; those of the coma similar in size and shape, but brightly coloured. *Flowers* nearly as long as the bracts. *Corolla*-tube nearly an inch long; upper segment convex, cuspidate; lip suborbicular, deflexed, emarginate.

29. **C. Roscoeana**, *Wall. Pl. Asiat. Rar. i.* 8, t. 9; *Cat.* 6597; rootstock small, leaves oblong rounded at the base, bracts of the flowers and coma both bright red, flowers yellowish white. *Hook. in Bot. Mag. t.* 4667; *Lem. Jard. Fleur. t.* 327; *Horan. Prodr.* 24. *C. coccinea*, *Wall. mss.* *Hitchenia Roscoeana*, *Benth. in Gen. Plant. iii.* 643.

BURMA and PEGU, *Wallich*.

Rootstock without sessile tubers, but with many small ones at the end of the fibres. *Leaves* 6-8 to a tuft; petioles $\frac{1}{2}$ -1 $\frac{1}{2}$ ft.; blade 6-12 in., cuspidate, bright green, darker along the veins. *Peduncle* short, hidden by the sheathing petioles; spike 6-8 in., by 2-3 in. diam.; bracts very obtuse, adnate at the sides and spreading at the tip; those of the coma similar in size, shape and colour to the lower ones. *Flowers* about as long as the bracts. *Corolla* $\frac{1}{2}$ in. diam., segments oblong, subequal; limb $\frac{1}{2}$ in. diam.; staminodes oblong; lip orbicular, entire.

IMPERFECTLY KNOWN SPECIES.

C. KURZII, *King mss.*; nearly allied to *C. petiolata*, but leaves larger, petioles longer, scape longer, bracts more imbricating, and their tips less spreading.—S. Andaman Islds.

7. GASTROCHILUS, Wall.

Perennial, rarely annual; rootstock 0 or creeping; root-fibres cylindric or slender. *Leafy stem* absent or present. *Leaves* oblong, acute. *Flowers* solitary or spicate, often secund. *Calyx* short, spathaceous. *Corolla*-tube slender; segments equal, connivent, linear-oblong, ascending; lateral staminodes petaloid, broader than the corolla lobes, oblanceolate-oblong; filament very short; anther-cells parallel, connective neither crested nor spurred; lip oblong, longer than the corolla-segments, entire. *Ovary* oblong, 3-celled; ovules few, or many, superposed; style filiform; stigma subglobose. *Capsule* oblong. *Seeds* ovoid, aril small basal.—India and one other species from China.

1. **G. longiflora**, Wall. *Plant. Asiat. Rar.* i. 22, t. 25; *Cat.* 6589; perennial, stemless, leaves large long-petioled often cordate, flowers 1-2 in radical spikes, corolla-tube much longer than the bracts, staminodes white rather longer than the white corolla-segments. *Hook. in Bot. Mag.* t. 4010; *Horan. Prodr.* 22. *Alpinia Hamiltoniana*, Wall. *Cat.* 6579. *Banglium sulphureum*, Ham. mss.

SIKKIM HIMALAYA, KHASIA HILLS, ASSAM, and from PEGU and UPPER BURMA to MALACCA.

Root-fibres tufted, cylindric. *Leaves* about 4 in a tuft; petiole long, erect, channelled; blade $\frac{1}{2}$ –1 ft. or more, base cordate or cuneate, often tinged purple beneath. *Scape* radical; bracts about 2 in., many, imbricate, scarious, oblong-lanceolate. *Calyx* much shorter than the bract. *Corolla*-tube 2–3 in., very slender; segments $\frac{1}{2}$ –1 in. *Stamen* rather shorter than the corolla-segments; lip half as long again as the corolla-segments, oblong-cuneate, sometimes 1 in. broad, more or less tinged with red and crisped on the incurved margins.—Perhaps more than one species is included. The Bot. Mag. plant is *G. Jenkinsii*, Wall. mss. and has larger flowers than that figured by Wallich, of a purer white, the lip tipped with bright red. *G. speciosa*, Kurz mss. has still larger flowers of a dull sulphur yellow, with the sides of the lip clouded with purple.

2. **G. minor**, King mss.; perennial, stemless, leaves oblanceolate-oblong long-petioled, corolla-tube not longer than the bract, staminodes and lip scarcely longer than the corolla-segments.

PERAK, King's Collector.

Rootstock slender, widely creeping. *Leaves* 1–4 in a tuft; petiole 3–4 in.; blade 4–5 in., glabrous, moderately firm, narrowed to the base. *Flowers* several in a sessile spike; bracts 2 in., lanceolate, membranous. *Corolla*-tube slender to the apex; segments 1 in., oblong, whitish; lip oblong, marked with red and yellow, with a decurved tip and incurved margins.

3. **G. pulcherrima**, Wall. *Pl. Asiat. Rar.* i. 22, t. 24; perennial, leafy stem usually produced, leaves sessile or shortly petioled, flowers many in terminal spikes with imbricate bracts, corolla-tube not longer than the bract, staminodes white not longer than the white corolla-segments. *Paxt. Mag. Bot.* vii. 75, with fig.; *Bot. Mag.* t. 3930; *Horan. Prodr.* 22.

PEGU, Wallich; TAYOY, Gomex; TENASSERIM, Helfer, Lobb, Parish; PENANG, Maingay.

Rootstock creeping; root-fibres thick, fleshy. *Stem* 6–12 in., rarely 0. *Leaves* 4–6 in., oblong, caudate. *Spike* sessile, 2–3 in.; bracts oblong-lanceolate, green, about $1\frac{1}{2}$ in. *Calyx* spathaceous, rather shorter than the bract. *Corolla*-segments linear-oblong, $\frac{1}{2}$ in. *Stamen* shorter than the corolla-segments; lip 1 in., obovate-cuneate, white tinged with pink.

4. **G. tillandsioides**, Baker; perennial, stem 0, leaves distinctly petioled, flowers many in a long subsessile spike with imbricate bracts, staminodes linear-oblong not longer than the corolla-segments.

?PEBAK; *Kunstler*.

Leaves 6-8 in., oblong, subacute, base rounded, green above, purplish beneath, petiole nearly or quite as long as the blade. *Spike* 6 in.; bracts 20-30, oblong, about 1 in. *Staminodes* $\frac{1}{4}$ - $\frac{1}{2}$ in., whitish, similar to the corolla-segments in shape and size; lip orbicular-cuneate, $\frac{1}{2}$ in. long and broad, pure white with a faint yellow spot at the throat; stamen half as long as the lip; filament as long as the anther.—Described from a specimen cultivated in *Hort. Calcutt.*

5. **G. rubrolutea**, Baker; perennial, leafy stem produced, leaves oblong caudate sessile or shortly petioled, flowers many, spike very narrow terminal on the stem or on a radical scape, corolla-tube not longer than the bract, staminodes yellow rather longer than the red corolla-segments.

KHASIA HILLS; J. D. H. & T. T., *Clarke*.

Leafy stem $\frac{1}{2}$ -1 ft. or more. *Leaves* 6-8 in. narrowed to the base. *Spike* 2-3 in., as long as its peduncle or scape, much narrower and fewer flowered than in *G. pulcherrima*; bracts few, small, closely sheathing the scape. *Corolla-segments* 1 in.; staminodes yellow, $\frac{1}{3}$ in. broad; stamen nearly as long as the staminodes; lip oblong-cuneate, panduriform, upper half red, lower yellow.

6. **G. parvula**, Wall. *Cat.* 6590; annual, stem short, leaves small shortly petioled oblong, flowers solitary from the centre of the leaves, corolla-tube not longer than the bract, staminodes longer than the corolla-segments.

TAVOY, *Gomez*.

A dwarf annual, with 3-4 acute membranous leaves $1\frac{1}{2}$ -2 in. long at the top of a short stem. *Root-fibres* all slender. *Bract* green, under 1 in., wrapped tightly round the corolla-tube, its base hidden by the sheath of the uppermost leaf. *Corolla-segments* linear-oblong, greenish, $\frac{1}{4}$ in.; lip $\frac{1}{2}$ in., obovate-cuneate; stamen arcuate half as long as the lip. Habit of a *Kämpferia* of the *Sincorus* section.

IMPERFECTLY KNOWN AND UNDESCRIBED SPECIES.

G. ? **TILIÆFOLIA**, Baker; annual, root-fibres slender fascicled, leafy stem short, leaves 4-5 by 3 in. distinctly petioled ovate cuspidate, base oblique, spike 4-5 in., terminal, sessile dense-fl., bracts 1- $1\frac{1}{2}$ in., oblong-lanceolate scarioso imbricate, corolla-tube as long as the bract, segments lanceolate under an inch, staminodes not longer than the segments, lip oblong-cuneate $1\frac{1}{2}$ in.—KHASIA HILLS, tropical region, *Hk. f. & Thomson* (*Monolophus* 6, *Herb. Ind. Or.*). I have not been able to make out the structure of the anther.

G. **AFFINIS**, Wall. *mss. ex. Voigt Hort. Suburb. Calcutt.* 372; *Horan. Prodr.* 22).—Assam.

G. **JENKINSII**, Wall. *mss. l. c.*—Assam. (See under *G. longiflora*.)

8. **KÄMPFERIA**, Linn.

Rootstock often tuberous, fibres various. *Stem* short or 0. *Leaves* few. *Flowers* spicate, on radical scapes, or terminating a leafy stem. *Calyx* short, cylindric, splitting down one side. *Corolla-tube* long, slender; segments equal, usually spreading. *Staminodes* broad, petaloid; stamen short, arcuate; anther-cells separated on a broad connective, which is produced above into a petaloid crest, not spurred below; lip broad, usually bifid. *Ovary* 3-celled; style long, filiform; stigma turbinate. *Capsule* oblong; pericarp thin. *Seeds* subglobose, aril small lacerate.—Tropics of the Old World.

SUBGEN. I. **Sincorus**, *Horan.* Stemless. *Leaves* contemporary with the flowers. *Spikes* central, radical. *Lip* usually bifid.

* *Anther crest* 2-lobed, 2-fid, or toothed.

1. **K. Galanga**, *Linn. Sp. Pl.* 3; *Hort. Cliff.* t. 3; leaves sub-orbicular subsessile, corolla-segments lanceolate, staminodes obovate-cuneate white, lip white with a lilac throat deeply bifid, anther-crest quadrate, lobes two rounded. *Rosc. in Trans. Linn. Soc.* viii. 351; *Scit. Pl.* t. 92; *Roxb. in Asiat. Res.* xi. 327; *Hort. Beng.* 1; *Fl. Ind.* i. 15; *Wall. Cat.* 6581; *Wight. Ic.* t. 899; *Grah. Cat. Pl. Bomb.* 208; *Dalz. & Gibs. Bomb. Fl.* 274; *Horan. Prodr.* 21. *K. sessilis*, *Kænic in Retz. Obs.* iii. 67. *K. humilis*, *Salisb. Prodr.* 6. *K. plantaginifolia*, *Salisb. in Trans. Hort. Soc.* i. 286. *Alpinia sessilis*, *Kænic in Retz. Obs.* iii. 62.—*Rumph. Amboin.* v. t. 69, fig. 2. *Rheede Malab.* xi. t. 41.

In the plains throughout BRITISH INDIA.—DISTRIB. Malay isles.

Rootstock tuberous; root-fibres cylindric. *Leaves* 3-6 in. long, spreading flat on the ground, tip deltoid, thin, deep green, 10-12-ribbed, margin not thickened nor coloured; petiole short, channelled. *Flowers* 6-12, fugitive, sweet-scented, opening successively; bracts lanceolate, green, small. *Calyx* as long as the bract. *Corolla-tube* 1 in.; segments $\frac{1}{2}$ in.; staminodes $\frac{1}{2}$ in. long and broad; lip 1 in. broad, bifid below the middle, lobes obtuse; anther-crest small, with two shallow obtuse lobes.

Var. *K. LATIFOLIA*, *Donn. Hort. Cant.* ed. vi. p. 3; lip spotted at the throat with brown. *K. Galanga*, *Willd., Enum.* i. 3; *Bot. Mag.* t. 850.

2. **K. marginata**, *Carey in Rosc. Scit. Pl.* t. 93; leaves orbicular subsessile edged with brown, corolla-segments lanceolate, staminodes lilac obovate, lip lilac cut deeply into two orbicular lobes, anther crest bifid. *Horan. Prodr.* 21.

BURMA, *Carey*; TENASSERIM, *Parish*.

Root-fibres oblong. *Leaves* spread flat on the ground, 4-6 in. long and broad, firmer in texture than in *K. Galanga*, tinged reddish-brown beneath, and with a distinct brown margin. *Flowers* few in a sessile central cluster; bracts and calyx under 1 in. *Corolla-tube* 1 in.; segments as long, white. *Staminodes* as long as the corolla-segments; lip 1 in., lobes $\frac{1}{2}$ in. broad, overlapping; anther-crest deeply bifid, lobes bidentate.—Nearly allied to *K. Galanga*. An allied plant with purple flowers sent by Dr. King from Quedah in the Malay Peninsula, is probably a distinct species.

3. **K. angustifolia**, *Roscoe in Trans. Linn. Soc.* viii. 351; *Scit. Pl.* t. 94; leaves ascending lanceolate, corolla-segments long linear, staminodes oblong white, lip lilac deeply cut into two obovate lobes, anther-crest bifid. *Roxb. in Asiat. Res.* xi. 328; *Hort. Beng.* 1; *Fl. Ind.* i. 17; *Red. Lil.* t. 389; *Horan. Prodr.* 21. *K. Roxburghiana*, *Schult. Mant.* i. 33. *K. undulata*, *Link.*; *Teysm. and Binnen. in Miq. Fl. Ind. Bat.* iii. 598.

Foot of the EASTERN HIMALAYAS. BENGAL, *Roxburgh*.—DISTRIB. Malay isles.

Rootstock tuberous; root-fibres slender or cylindric. *Leaves* many, 6-8 by 1 in. or less, sessile, ascending, lanceolate. *Flowers* few in a central sessile spike; bracts small. *Calyx* 1 in. *Corolla-tube* white, twice as long as the calyx; segments 1 in., very narrow, white, reflexing; staminodes erect, $\frac{1}{2}$ - $\frac{3}{4}$ in.; lip reflexed, $\frac{1}{2}$ by $\frac{3}{4}$ in., bifid about halfway down; lobes suborbicular; anther-crest quadrate, shallowly bifid.

4. **K. ovalifolia**, *Roxb. Hort. Beng.* 1; *Fl. Ind.* i. 19; *Corom. Pl.* t. 278; leaves oblong distinctly petioled, spike sessile, corolla-segments

large linear, staminodes oblong white, lip lilac deeply cut into two obovate emarginate lobes, anther-crest 3-4-dentate, *Rosc. Scit. Pl.* t. 95; *Wall. Cat.* 6583; *Horan. Prodr.* 21. *K. diversifolia*, *Link. in Dietr. Sp. Plant.* i. 57; *Horan. Prodr.* l. c. *K. Parishii*, *Hook. f. in Bot. Mag.* t. 5763.—*Trilophus*, *Lestib. in Ann. Sc. Nat. ser. ii. xv.* 341.

TENASSERIM, *Parish*; MALACCA, *Farquhar*.—DISTRIB. Siam.

Rootstock tuberous; root-fibres cylindric or oblong at the tip. *Leaves* 6 by 4 in., spreading, thin, pale green, acute; channelled petiole in the wild plant 2-3 in., sometimes 6 in. in the cultivated. *Spike* few-fl., sometimes produced before the leaves; bracts imbricate, 1-2 in., pale green striped with brown. *Corolla*-tube $1\frac{1}{2}$ -2 in. long; segments narrow, $1\frac{1}{2}$ in.; staminodes erect, 1 by $\frac{1}{2}$ in.; lobes of lip short and broad, imbricate, bright lilac; anther-crest large, quadrate, usually trifid.—Connects the sections *Sincorus* and *Protanthium*, and is included by Horaninov in both, under different names.

5. ***K. speciosa***, *Baker*; leaves suborbicular erect shortly petioled, flowers in a sessile head large pure white, corolla-tube very long, segments ovate, staminodes large obovate, lip patent broader than long bifid.

BURMA (*lc. in Hort. Calcut.*)

Petiole 2-3 in.; blade 5-6 in. long and broad, plain green or variegated deeper and paler green. *Corolla*-tube 3 in.; segments nearly 1 in.; staminodes and lip 1 in., the expanded limb being 2 in. diam.

6. ***K. pandurata***, *Roxb. in Asiat. Res.* xi. 328, t. 2; *Hort. Beng.* 1; *Fl. Ind.* i. 18; leaves oblong petioled large erect, corolla-segments ascending, staminodes oblong as long as the corolla-segments white, lip oblong-cuneate twice as long as the staminodes entire, anther-crest quadrate bifid. *Rosc. Scit. Pl.* t. 96; *Bot. Reg.* t. 173; *Wall. Cat.* 6586; *Grah. Cat. Pl. Bomb.* 208; *Dalz. & Gibs. Bomb. Fl. Suppl.* 87; *Thw. Enum.* 316; *Horan. Prodr.* 21. *K. ovata*, *Rosc. in Trans. Linn. Soc.* viii. 351. *Curcuma rotunda*, *Linn. Sp.* 2.—*Rheede, Hort. Mal.* xi. t. 10; *Rumph. Amboin.* v. t. 69, fig. 2.

CONCAN and GUZERAT, *Graham*. SOUTH ANDAMAN ISLD., *Kurz*. TENASSERIM, *Helfer*. CEYLON, *Thwaites*.—DISTRIB. Malay Islds.

Rootstock perennial, tuberous, bright yellow; root-fibres cylindric. *Leaves* 9-12 in., acute, narrowed to the base; petiole long, channelled. *Spike* peduncled, hidden in the dilated bases of the petioles; bracts oblong or lanceolate, moderately firm, $1\frac{1}{2}$ -2 in. *Calyx* shorter than the bracts. *Corolla*-tube 2-2 $\frac{1}{2}$ in.; segments whitish, above $\frac{1}{2}$ in.; lip 1 in., white, tinged with red, margins incurved; anther-crest small.—Resembles *Gastrochilus* in the shape of the flower, especially *G. longiflora*, but the anther is crested. Cultivated for its ginger-like rootstock.

7. ***K. Prainiana***, *King mss.*; leaves oblong-lanceolate erect, petiole as long as the blade, corolla-segments oblong ascending, lip oblong-cuneate much longer than the corolla-segments.

MALAY PENINSULA; Goping, *King's Collector*.

Rootstock small. *Leaves* about 4 in a tuft; petiole 6 in.; blade 8-9 by 2-2 $\frac{1}{2}$ in., moderately firm, glabrous, narrowed to the base. *Flowers* in a sessile cylindric spike 6 in. long; bracts many, oblong, imbricate, membranous. *Corolla* whitish; tube 1 in., slender, segments under $\frac{1}{2}$ in., lip the same, but much smaller.—Nearly allied to *K. pandurata*.

** *Anther-crest entire*.

8. ***K. Roscoeana***, *Wall. in Bot. Reg.* t. 1212; leaves orbicular subsessile variegated black and green; flower entirely white; corolla-segments

short lanceolate; staminodes obovate, lip deeply cut into two obovate lobes, anther-crest ovate entire. *Hook. in Bot. Mag. t. 5600; Horan. Prodr. 21. K. Roscoe, Wall. Cat. 6584.*

BURMA, *Wallich* (not NEPAL, as stated by Horaninov).

Root-fibres many, fascicled, cylindric. *Leaves* 2, spreading flat on the ground, obscurely cuspidate, 4–5 in., firmer in texture than in *K. Galanga*, margins pale, obscurely crisped. *Flowers* few, in a sessile central tuft; bracts and calyx under 1 in. *Corolla-tube* 1–1½ in.; segments ½ in.; staminodes ½ in. long and nearly as broad; lobes of the lip similar in shape and size; crest of the anther small and not at all lobed.—Nearly allied to *K. Galanga*.

9. ***K. parviflora***, *Wall. Cat. 6587*; leaves subsessile ovate, corolla-segments short linear-oblong, staminodes narrow, lip lilac obovate-cuneate emarginate, anther-crest orbicular entire.

BURMA; banks of the River Attran, *Wallich*.

Root-fibres slender. *Leaves* thin, ovate, 3–4 in. long, rounded at the base, plain green; petiole short, channelled. *Flowers* few in a sessile central tuft; bracts 1 in., lanceolate, green. *Calyx* not longer than the bract, *Corolla-tube* 1½ in.; segments greenish, ½ in., upper ascending, rather concave. *Lip* ½ by ½ in., subemarginate; anther-crest obtuse, as broad as long.—The flower resembles that of a *Gastrochilus*, but the anther is crested.

10. ***K. involucrata***, *King mss.*; leaves oblanceolate-oblong long-petioled erect, flowers several in a head surrounded by large oblong green bracts, corolla-segments ascending, staminodes rather longer than the corolla-segments, lip orbicular bifid twice as long as the corolla-segments, anther-crest orbicular entire.

SIKKIM HIMALAYA, *Jaffray*. ASSAM, *Jenkins*.

Stemless. *Petiole* 5–6 in.; blade 6–7 by 1½–2 in., green, membranous, narrowed gradually to the base. *Peduncle* 1–4 in.; outer bracts membranous, 1½–2 in., inner small lanceolate. *Corolla-tube* 1½ in.; segments small, oblong, whitish. *Staminodes* crested, oblong, white, ¾–½ in.; lip ½ in. long and broad, white with a yellow blotch in the centre.

11. ***K. Andersoni***, *Baker*; leaves oblong acute shortly petioled ascending, flowers several in a head surrounded by large oblong green bracts, staminodes small obovate, lip orbicular emarginate, anther-crest orbicular entire.

BURMA, *T. Anderson (in Hort. Bot. Calc.)*.

Petiole 1–2 in.; blade 3–4 in., light green, not mottled, narrowed to the base. *Peduncle* 0; bracts 1½–2 in. *Corolla-tube* shorter than the bracts; segments small, ovate; lip above ½ in. long and broad, pure white with a yellow spot at the throat.—Nearly allied to *K. involucrata*.

12. ***K. concinna***, *Baker*; leaves oblong-lanceolate long-petioled ascending, spikes oblong shortly peduncled, corolla-tube rather longer than the bract, flower white blotched with red, lip oblong margins incurved, anther-crest small entire.

PERAK, alt. 4–600 ft., *King's Collector*.

Rootstock very slender. *Leaf-blade* subcoriaceous, glabrous, 6–8 by 2 in.; petiole slender, 9–12 in. *Spikes* many-flid.; bracts 1 in., ovate-lanceolate, reddish. *Calyx* very short. *Corolla-tube* very slender, gradually dilated to the throat; segments oblong, ½ in.—Habit of *K. pandurata*.

Subgen. II. ***Protanthium***, *Horan*. Stemless. *Leaves* not produced till after the flowers. *Spikes* radical. *Lip* and *anther-crest* bifid.

13. **K. rotunda**, Linn. *Sp.* 3; leaves oblong erect petioled, corolla-segments long linear, staminodes oblong acute white, lip lilac or reddish deeply cut into two suborbicular lobes, anther-crest deeply bifid. *Roxb. in Asiat. Res.* xi. 327; *Hort. Beng.* 1; *Fl. Ind.* i. 16; *Rosc. Scit. Pl.* t. 97; *Bot. Mag.* t. 920 and 6054; *Wight Ic.* t. 2029; *Grah. Cat. Pl. Bomb.* 208; *Dalz. & Gibs. Bomb. Fl., Suppl.* 86; *Thw. Enum.* 316. *K. longa*, Jacq. *Hort. Schoenb.* t. 317; *Red. Lil.* t. 49. *K. versicolor*, Salisb. in *Trans. Hort. Soc.* i. 286.—*Rheede Hort. Mal.* xi. t. 9.

Throughout INDIA from the HIMALAYAS to CEYLON and the MALAY PENINSULA, often cultivated.—DISTRIB. Malay Islands.

Rootstock tuberous; root-fibres many, very thick. *Leaves* erect, petiole short channelled; blade 12 by 3-4 in., usually variegated with darker and lighter green above and tinged purple beneath. *Spikes* 4-6-fl., produced in March and April before the leaves; bracts oblong, acute, outer short, the inner 2-3 in. long. *Calyx* nearly as long as the corolla-tube, minutely toothed, slit down one side. *Corolla*-tube 2-3 in., segments spreading, nearly as long as the tube. *Staminodes* $1\frac{1}{2}$ -2 in.; lip rather shorter, reflexed, 2-lobed to below the middle lobes $\frac{3}{4}$ -1 in. broad, deeply tinged with lilac or red-purple; anther-crest cut half way down into two lanceolate lobes, with often a small tooth between them.

14. **K. candida**, Wall. *Pl. Asiat. Rar.* i. 47, t. 56; *Cat.* 6585; flowers white, corolla-segments lanceolate, staminodes obovate obtuse, lip orbicular-cuneate shallowly bifid, anther-crest bifid.

BURMA, Wallich, &c; Shan Hills, 3000 ft., Collett.

Rootstock tuberous; root-fibres slender, with large tubers at the end. *Leaves* not known. *Spikes* 6-8-fl.; bracts broader than in *K. rotunda*, inner 2-3 in. long. *Calyx* 1 in., minutely toothed. *Corolla*-tube twice as long as the calyx; segments 1 in. or less; staminodes $1\frac{1}{2}$ by 1 in., erect, pure white; lip reflexed, $1\frac{1}{2}$ in. long and broad, tinged yellow in the centre; anther-crest much smaller than in *K. rotunda*.

Subgen. III. **Monolophus**, Wall. (gen). *Leafy stem* usually produced. *Leaves* contemporary with the flowers. *Spikes* terminal on the leafy stem. *Lip* bifid or entire. *Anther-crest* entire.

15. **K. siphonantha**, King mss.; leafy stem none, leaves oblong oblique at the base, petiole longer than the blade, flower lilac, staminodes oblong, lip broad deeply bifid.

ANDAMAN ISLANDS, King's Collector.

Annual, stemless; root-fibres slender. *Leaves* 3 in a tuft; petiole 6 in.; blade 4-5 in., oblong, acute, membranous, glabrous, base unequal-sided, sides rounded. *Flowers* solitary at the end of a long very slender spike; bracts few, narrow, membranous. *Corolla*-tube much exserted from the upper bract; segments $\frac{1}{2}$ in., oblong-lanceolate, greenish.

16. **K. elegans**, Wall. *Cat.* 6593; leafy stem short or none, leaves oblong, petiole rather shorter than the blade, flowers bright lilac, staminodes obovate-cuneate, lip cut nearly to the base into two obovate lobes. *K. Crawfordii*, Wall. *ined.* *Monolophus elegans*, Wall. *Pl. Asiat. Rar.* i. 24, t. 27; *Horan. Prodr.* 22.

PEGU, MARTABAN, TAVOY, and TENASSERIM.

Annual, root-fibres slender. *Leaves* 2-4 to a tuft, 5-6 by 2-3 in., acute, thin, green above, much paler beneath, base rounded; petiole channelled, nearly as long as the blade. *Cluster* of flowers shortly peduncled; outer bracts 2 in., oblong-lanceolate, green. *Calyx* about 1 in. *Corolla*-tube slender, twice as long as the

calyx; segments less than 1 in., green, lanceolate; staminodes spreading, $\frac{1}{2}$ in.; lip $\frac{1}{2}$ –1 in. long and broad, bifid nearly to the base; anther-crest large, suborbicular.

17. **K. macrochlamys**, *Baker*; stemless, leaves lanceolate petioled, flowers white, staminodes orbicular-cuneate, lip broad cut deeply into two orbicular lobes.

TENASSERIM, *Parish*.

Leaves 4–5 by 1 in., acute, narrowed gradually into a channelled petiole 2–3 in. long. *Cluster* of flowers shortly peduncled; outer bracts 2 in., oblong, purplish-brown. *Corolla*-segments $\frac{1}{2}$ in.; staminodes a little longer than the corolla-segments; lip 1 in. broad, bifid half way down, yellow and pilose below; anther-crest ovate, entire.—Described from a sketch and notes made by Prof. Oliver of a plant that flowered in Kew in May, 1871.

18. **K. linearis**, *Wall. in Roxb. Fl. Ind. ed. Wall. & Carey*, i. 20; leafy stem elongate, leaves sessile lanceolate acuminate, flowers white, corolla-tube half as long again as the bracts, corolla-segments linear-oblong whitish, staminodes oblong-cuneate, lip broad cuneate entire or slightly emarginate. *Monolophus linearis*, *Wall. Cat.* 6592; *Horan. Prodr.* 22.

EASTERN HIMALAYA, ASSAM, SILHET and the KHASIA HILLS, alt. 2–3500 ft.

Annual, root-fibres slender. *Stem* simple; slender, erect, 4–10 in. *Leaves* ascending, membranous, green, 3–4 by $\frac{1}{4}$ – $\frac{1}{2}$ in. *Spikes* 1–2, sessile or shortly peduncled, 1–2-flid.; outer bract 1–1 $\frac{1}{2}$ in., lanceolate, acuminate, green. *Corolla*-tube 1 $\frac{1}{2}$ –2 in.; segments $\frac{3}{4}$ – $\frac{1}{2}$ in.; staminodes as long as the corolla-segments; lip about $\frac{3}{4}$ in. long and broad, tinged with yellow at the throat; anther-crest large, orbicular.

19. **K. sikkimensis**, *King mss.*; leafy stem elongate, leaves sessile lanceolate-acuminate, corolla-tube twice as long as the bract, segments linear-oblong dark lilac, staminodes white orbicular cuneate, lip suborbicular white entire.

SIKKIM and BHOTAN HIMALAYA, *King, Elwes*.

Stems slender, 2–4 in. long. *Leaves* reaching 2–3 in. long, $\frac{1}{2}$ –1 in. broad. *Spike* solitary; 1-flowered, its base hidden in the sheath of the uppermost leaf; bract green, $\frac{1}{2}$ in. long. *Corolla*-tube slender, an inch long; segments $\frac{1}{2}$ in. long.—Very near *K. linearis*.

20. **K. secunda**, *Wall. in Roxb. Fl. Ind. ed. Wall. & Carey*, i. 19; leafy stem produced, leaves sessile oblong acute, flowers white or red, corolla-segments linear-oblong, staminodes oblong-cuneate, lip broad cuneate slightly emarginate. *Bot. Mag. t.* 6999. *Monolophus secundus*, *Wall. Cat.* 6591; *Horan. Prodr.* 22.

SIKKIM HIMALAYA, ASSAM, SILHET, the KHASIA HILLS and TENASSERIM, ascending to 4000 ft.

Annual. Leafy stem 6–9 in., slender, simple. *Leaves* 3–4 by 1 in. (or more), membranous, green, ascending, acuminate. *Spikes* 1–4; outer-bract 1–1 $\frac{1}{2}$ in., oblong-lanceolate, green, moderately firm. *Calyx* much shorter than the bract. *Corolla*-tube 1 $\frac{1}{2}$ –2 in.; segments $\frac{3}{4}$ – $\frac{1}{2}$ in., greenish, membranous; staminodes scarcely longer than the corolla-segments; lip 1 in. or more broad; anther-crest large, ovate.

21. **K. parvula**, *King. mss.*; leafy stem produced, leaves petioled oblong acute, flowers small white solitary in the axil of a large folded oblong firm green bract.

MALAY PENINSULA; Goping, *King's Collector*.

Habit of *K. secunda*. Leafy stem 3-4 in., bearing 3-7 distinctly-petioled oblique oblong acute moderately firm glabrous leaves 1-2 in. long. Bract 1 in., terminal, solitary, shortly peduncled. Corolla-tube very slender, much shorter than the bract.

Subgen. IV. **Stachyanthesis**, Benth. Leafy stem produced. Flowers many in a terminal spike. Lip bifid; anther-crest quadrate entire.

22. **K. scaposa**, Benth. in *Gen. Plant.* iii. 642. *Hedychium scaposum* Nimmo in *Grah. Cat. Pl. Bomb.* 205; Wall. in *Kew Journ. Bot.* v. (1853), 375. *Monolophus scaposus*, Dalz. in *Kew Journ. Bot.* ii. (1850), 143; Dalz. & Gibs. *Bomb. Fl.* 273; Wight *Ic. t.* 2030; Horan. *Prodr.* 22.

CONCAN; on the banks of rivulets, Graham, &c.

Rootstock tuberous, oblique; root-fibres long, slender. Leaves 12 by 2-3 in., oblong-lanceolate, acute, green above, paler and pubescent beneath, narrowed into a deeply channelled petiole. Spike 3-6 in., moderately dense; peduncle long, slender, naked; bracts 1-1½ in., oblong-lanceolate, persistent, green. Calyx loosely sheathing the corolla-tube, above 1 in., minutely toothed. Corolla-tube slender, 2-3 in., segments short, lanceolate; staminodes oblong, white, as long as the corolla segments, shorter than the broad bifid lip, which is above an inch long. Capsule obovoid, red, pubescent, the size of a sparrow's egg.

9. HITCHENIA, Wall.

Habit and inflorescence of *Curcuma*, but bracts subcoriaceous. Calyx short, minutely toothed. Corolla-tube slender, much longer than the calyx; segments oblong or lanceolate, subequal. Lateral staminodes petaloid, free from the filiform filament; lip orbicular or cuneate; filament narrow as long as the lip; anther-cells marginal on the broad connective, not crested. Ovary 3-celled; ovules many, superposed; style filiform, stigma turbinate. Capsule oblong-trigonus, finally dehiscent. Seeds ovoid, arillate.—All Indian.

1. **H. glauca**, Wall. in *Trans. Med. Phys. Soc. Calcutt.* vii. 215; bracts all with flowers, corolla-tube twice the length of the bract, segments oblong, staminodes as long as the corolla-segments, lip ovate, filament short. Horan. *Prodr.* 24. *Curcuma glaucophylla*, Wall. *Cat.* 6594; *Grah. Cat. Pl. Bomb.* 210.

BURMA, Wallich.

Rootstock bearing only small tubers at the end of long slender fibres. Stem 3-4 ft. Leaves oblanceolate-oblong, 1 ft. or more by 4-5 in., narrowed gradually from the middle to the base. Spike 5-6 in.; bracts crowded, orbicular-cuneate, 1-1½ in., upper third spreading. Flowers white; corolla-tube 2 in.; segments small, oblong, concave; expanded flower 1 in. diam. Staminodes as long as the corolla-segments; lip ovate, not clawed, acute, obscurely emarginate; stamen as long as the corolla-segments.

2. **H. caulina**, Baker; upper bracts empty and enlarged, corolla-tube half as long again as the bract, segments ovate, staminodes as long as the corolla-segments, lip orbicular, filament very short. *Curcuma caulina*, *Grah. in Cat. Pl. Bomb.* 210; Dalz. & Gibs. *Bomb. Fl.* 275; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* ii. 140, with fig.

The CONCAN; abundant on the table-land of Mahableshwur.

Rootstock ovoid, white inside, bearing large oblong tubers at the end of long

fibres. Leafy stem 3-4 ft. Leaves oblong, 1-1½ ft. by 5-6 in., narrowed to the base, often tinged red-brown. Spike ½ ft.; bracts 1 in., green, obovate-cuneate, spreading in the upper third, those of the coma longer, whitish. Flowers yellow; corolla-tube slender, 1½ in.; expanded limb 1 in. diam.; staminodes oblong, ½ in.; lip ½ in. diam., deeply bifid; stamen shorter than the corolla-segments.

3. **H. Careyana**, Benth. in *Gen. Plant.* iii. 643; bracts all flowering, corolla-tube little longer than the bract, segments linear, staminodes minute, lip cuneate with a long claw, filament long. *Curcuma Careyana*, Wall. Cat. 6595.

EASTERN HIMALAYA, subtropical region. KHASIA HILLS, ASSAM, CACHAR, SILHET and MANIPUR.

Stem 4 ft. Leaves oblong, 1-2 ft. by 4-5 in., narrowed gradually from the middle to the base. Spike 6-8 in.; bracts 1-1½ in., closely imbricate, obovate-cuneate, squarrose; bracteoles 1 in., lanceolate. Flowers purple; corolla-segments ½ in.; staminodes minute, obovate-cuneate, emarginate; lip ¾ in., cuneate, with a long claw and a small bifid cusp; filiform filament ½ in. Capsule small, green, oblong-trigonus.—Resembles *H. glauca* in habit, but differs so much in structure that probably it should form a different genus.

IMPERFECTLY KNOWN SPECIES.

4. **H. MUSACEA**, Baker; stemless, leaves like *Musa* in texture, 1½ ft. by 6-8 in., oblong, base rounded, petiole as long as the blade, spike central, peduncle ½ ft. long, bracts 1¼-1½ in. orbicular coriaceous slightly squarrose each several-fld., flowers withered and imperfect. *Curcuma musacea*, Wall. Cat. 6596.—Singapore, Wallich. Malacca, Griffith, Maingay.

10. HEDYCHUM, Kœnig.

Rootstock horizontal, tuberous; root-fibres not much thickened. Stem elongate, leafy. Leaves distichous, oblong or lanceolate. Flowers solitary or in terminal spikes; bracts oblong, subcoriaceous, one- or more-fld. Calyx tubular, 3 dentate. Corolla-tube long, slender; segments linear, equal, spreading. Lateral staminodes linear or oblong-cuneate; filament narrow; anther-cells contiguous, connective not produced; lip large, bifid. Ovary 3-celled; ovules many, superposed; style long, filiform, stigma subglobose. Capsule globose, 3-valved. Seeds many, small, aril lacerated.—India and Malay Islands.

SECT. I. **Gandasulium**, Horan. Stamen never much longer than the lip.

* Leaves more or less pubescent beneath.

1. **H. coronarium**, Kœnig in Retz Obs. iii. 73; leaves oblong or oblong-lanceolate, spike dense-fld., bracts large oblong imbricate 3-4-fld., flowers white or tinged with yellow, staminodes oblong or oblong-lanceolate, lip broad shallowly bifid distinctly clawed, stamen as long as or rather longer than the lip. Roxb. in *Asiat. Res.* xi. 325; *Hort. Beng.* 1; *Fl. Ind.* i. 10; Ed. Wall. & Carey, i. 9; *Rosc. in Trans. Linn. Soc.* viii. 343, t. 20, f. 6; *Scit. Pl.* t. 51; *Bot. Mag.* t. 708; *Smith Exot. Fl.* ii. t. 107; *Blume Enum. Fl. Jav.* i. 56; *Wight Ic.* t. 2010; Wall. Cat. 6539, in *Kew Journ.* v. (1853), 325; *Thw. Enum.* 319. *H. spicatum*, Lodd. Bot. Cat. t. 653, not of Hamilt. *H. Gandasulium*, Prophetæ and album, *Herb. Hamilt.*—*Hedychium*, Griff. *Notul.* iii. 419 (the 2nd species.)—*Rumph. Amboin.* t. 69, fig. 3.

Throughout India from the HIMALAYAS to CEYLON and MALACCA, ascending to 4000 ft. in the Khasia Hills, and 6000 ft. in Ceylon.—DISTRIB.—Malay Islands.

Rootstock 1 in. thick. *Stem* 4–6 ft. *Leaves* often above a foot by 3–5 in., usually pubescent beneath. *Spike* $\frac{1}{2}$ –1 ft.; outer bracts $1\frac{1}{2}$ –2 by 1 in., at first green, brown in age. *Calyx* green, cylindric, shorter than the bract. *Flowers* fragrant, in the type pure white or tinged with yellow. *Corolla-tube* 3 in.; segments linear, reflexing, half as long as the tube; lateral staminodes $1\frac{1}{2}$ –2 in. by about $\frac{1}{2}$ in.; lip $1\frac{1}{2}$ –2 in. broad, narrowed suddenly to a short claw, short lobes rounded; filament red; anther about $\frac{1}{2}$ in. *Capsule* oblong, glabrous, orange inside. *Seeds* with a crimson aril.

Var. *H. CHRYSOLEUCUM*, Hook. Bot. Mag. t. 4516 (sp.); lip white with a large yellow patch in the centre. Lindl. & Paxt. Fl. Gard. i. 110, t. 77.

Var. *H. MAXIMUM*, Rosc. Scit. Pl. t. 52 (sp.); leafy stem taller than in the type, flowers pure white larger, staminodes $\frac{3}{4}$ –1 in. broad, lip 2–2 $\frac{1}{2}$ in. broad. Lindl. in Bot. Reg. t. 1022; Horan. Prodr. 24.

Var. *H. FLAVESCENS*, Carey in Rosc. Scit. Pl. t. 50 (sp.); stature of the type, flowers sulphur yellow. Wight Ic. t. 2008–9; *H. flavum*, Bot. Mag. t. 2378 (not of t. 3039). *H. sulphureum*, Wall. mss.

Var. *H. UROPHYLLUM*, Lodd. Bot. Cat. t. 1785 (sp.); stature of the type, flowers bright yellow. Horan. Prodr. 24.

Var. *H. FLAVUM*, Roxb. Hort. Beng. 1; Fl. Ind. i. 12 (sp.); dwarfer than the type, flowers smaller bright yellow. Rosc. Scit. Pl. t. 49; Bot. Mag. t. 3039; Lodd. Bot. Cat. t. 604; Wall. Cat. 6542; Kew Journ. Bot. v. (1853), 326; Horan. Prodr. 24.

2. *H. Elwesii*, Baker; leaves oblong nearly glabrous beneath, spike dense-fld., bracts large oblong 4–5-fld., calyx shorter than the bract, flowers bright yellow, staminodes lip linear, broad shallowly bifid, stamen as long as the lip.

KHASIA HILLS; Bishop's fall, near Shillong, alt. 4000 ft., Elwes.

Leaves 1 ft. or more, by 3 in. *Spike* $\frac{1}{2}$ ft.; bracts green, subcoriaceous, 2–2 $\frac{1}{2}$ in., rather diverging, not so closely imbricate as in *H. coronarium*. *Corolla-tube* 2 $\frac{1}{2}$ in.; segments above 1 in.; staminodes resembling the segments in size and shape; lip $1\frac{1}{2}$ in. broad, narrowed suddenly to a broad claw; filament bright red; anther linear, $\frac{1}{3}$ in.—May be an extreme form of *H. coronarium*.

3. *H. marginatum*, Clarke in Journ. Linn. Soc. xxv. 75, t. 31; leaves oblong-lanceolate very hairy beneath, spike short dense-fld., bracts oblong imbricated 1-fld., flowers yellow, staminodes linear, lip small cuneate distinctly clawed shallowly bifid, stamen rather longer than the lip.

NAGA HILLS; Kohima, alt. 4500 ft. Clarke; Griffith (5680), without locality.

Leaves 1 ft. by $1\frac{1}{2}$ –2 in., pale beneath. *Spike* 3–4 in.; bracts $1\frac{1}{2}$ –2 in., not so firm as in *H. coronarium*, glabrous, with a pale horny margin and a tuft of hairs at the tip. *Calyx* 1 in. *Corolla-tube* twice as long as the calyx; segments 1 in., staminodes resembling the corolla-segments in size and shape; lip 1 in. long, claw long, blade $\frac{1}{4}$ – $\frac{1}{3}$ in. broad.

4. *H. venustum*, Wight Ic. t. 2012; leaves oblong-lanceolate nearly glabrous beneath, spike lax-fld. often cernuous, bracts small 1-fld., flowers whitish, calyx exceeding the bract, staminodes linear, lip narrow cuneate deeply bifid distinctly clawed, stamens shorter than the lip. Wall. in Kew Journ. Bot. v. (1853), 328. *H. cernuum*, Wight Ic. t. 2011.

NILGHIRI HILLS, Wight.

Leaves 1 ft. by 3–4 in., obscurely pubescent beneath. *Spike* 6–9 in., cernuous

or erect; bract thin, at most 1 in., glabrous, rolled round the calyx. *Calyx* $1\frac{1}{2}$ in. long. *Corolla*-tube 2 in.; segments $1\frac{1}{2}$ in.; staminodes as long as the corolla-segments; lip rather longer than the staminodes, cut down below the middle into two acute segments; anther linear. *Capsule* subglobose, pubescent.

** *Leaves quite glabrous beneath.*

5. **H. spicatum**, *Hamilt. ex Smith in Rees Cyclop.* xvii. No. 3; leaves oblong or oblong-lanceolate, spike dense-fld., bracts large oblong 1-fld., calyx shorter than the bract, flowers white, staminodes lanceolate, lip cuneate deeply bifid, stamen rather shorter than the lip. *Rosc. Scit. Pl.* t. 48; *Hook. Exot. Flora*, t. 46; *Bot. Mag.* t. 2300; *Royle Ill.* 357; *Wall. Cat.* 6553; in *Kew Journ.* v. (1853), 328; *Horan. Prodr.* 24.

SUBTROPICAL HIMALAYA; NEPAL, *Wallich*. KUMAON, alt. 5000-7000 ft., *Royle, Strachey & Winterbottom*.

Leaves reaching 1 ft. or more, very variable in breadth, glabrous. *Spike* sometimes 1 ft.; bracts oblong, obtuse, green, $1-1\frac{1}{2}$ in. by $\frac{3}{4}$ in. broad, flowers ascending and closely imbricate in the type. *Corolla*-tube $2-2\frac{1}{2}$ in.; segments 1 in., linear; staminodes 1 in., lanceolate; lip $\frac{1}{2}-\frac{3}{4}$ in. broad, not at all clawed, lobes 2 rounded; filament pale red; anther linear, $\frac{1}{4}-\frac{1}{2}$ in. *Capsule* glabrous, globose.

Var. **TRILOBUM**, *Wall. in Kew Journ.* v. (1853) 328; spike laxer, bracts narrower convolute round the calyx, corolla-segments staminodes and lip longer, the latter with a small tooth between the two lobes. *H. trilobum*, *Wall. Cat.* 6554.—Nepal, *Wallich*.

Var. **ACUMINATUM**, *Wall. in Kew Journ.* l. c.; leaves glabrous beneath, spike laxer and flowers fewer, bracts convolute round the calyx, flowers white or pale yellow, tube, corolla-segments staminodes and clawed lip longer than in the type, stamen about half as long as the lip. *H. acuminatum*, *Rosc. Scit. Pl.* t. 47; *Bot. Mag.* t. 2969; *Lodd. Bot. Cat.* t. 1795.—Kumaon to Sikkim, ascending to 7000 ft.

Var. **KHASIANUM**, *Clarke*; like the last, but leaves pubescent beneath.—Khasia Hills, *Clarke*.

H. flavescens, *Lodd. Bot. Cat.* t. 723 (not of *Carey*) and *H. Sieboldii*, *Wall. in Kew Journ.* v. 371 (*H. flavescens*, *Lindl. in Hort. Soc. Journ.* vii. 281, & *Paxt. Flow. Gard.* iii. 164, fig. 311. *H. Roxburghii*, *Siebold in Hort. Soc. Journ.* l. c.) are probably varieties of this species.

H. bicornutum, *Wall. mss.*, is a monstrous form, with two stamens, each with a large erect spur at the base of the anther.

6. **H. densiflorum**, *Wall. Cat.* 6552; *Kew Journ.* (1853) v. 368; leaves oblong, spike long moderately dense-fld., bracts small oblong 1-fld., calyx longer than the bract, flowers small bright yellow, staminodes lanceolate, lip cuneate deeply bifid, stamen as long as the lip. *Horan. Prodr.* 25.

TEMPERATE HIMALAYA; NEPAL, *Wallich*; SIKKIM, alt. 6000-8000 ft. *Griffiths' Collectors*; *J. D. H.*

Leaves 1 ft. by 4-5 in., glabrous beneath. *Spike* sessile, sometimes 1 ft.; bracts oblong, $\frac{1}{2}-1$ in., rolled tightly round the calyx. *Calyx* cylindric, about 1 in. *Corolla*-tube $1-1\frac{1}{2}$ in.; segments linear, reflexing, under 1 in.; staminodes lanceolate, under 1 in.; lip about $\frac{1}{2}$ in., not clawed; stamen just exceeding the staminodes; filament yellow, anther linear.

SECT. II. **Macrostemium**, *Horan*. Stamen much longer than the lip (rather longer in *H. Griffithianum*).

* Lip narrow 2-fid or 2-partite, lobes or segments narrow (lip emarginate in *H. ellipticum*.)

† *Leaves glabrous beneath.*

7. **H. crassifolium**, *Baker*; leaves oblong-lanceolate subcoriaceous, bracts short oblong 1-fld., calyx twice as long as the bract, flowers bright yellow, calyx-segments very long, staminodes lanceolate half as long as the corolla-segments, lip narrow long clawed bipartite segments narrow, stamen twice as long as the lip.

PERAK, in dense jungle, on trees, *King's Collector*.

Epiphytic; *leafy stem* 15-20 in. *Leaves* under 1 ft. $1\frac{1}{2}$ -2 in. broad, glabrous, firmer in texture than in any other species, narrowed gradually from the middle to the base. *Bracts* green, glabrous, $\frac{1}{2}$ in. rolled tightly round the calyx. *Corolla-tube* $\frac{1}{4}$ -in. longer than the calyx; segments linear-convolute, 2 in. long; staminodes and lip about 1 in.; filament bright red, 2 in.; anther large, linear.

8. **H. longicornutum**, *Griff. mss.*; leaves oblong-lanceolate, spike short dense-fld. oblong, bracts oblong hairy imbricate 1-fld., calyx longer than the bract, corolla-segments much longer than the oblanceolate staminodes, lip bipartite, segments narrow, stamen twice as long as the lip.

MALACCA, *Griffith, Maingay*.

Epiphytic. *Stem* slender, 1- $1\frac{1}{2}$ ft. *Leaves* 1 ft. by 2-2 $\frac{1}{2}$ in., thin, narrowed gradually to the base and apex. *Spike* $1\frac{1}{2}$ -2 in.; lower bracts 1 in. *Calyx* protruded, $\frac{3}{8}$ - $\frac{1}{2}$ in. beyond the bract. *Corolla-tube* protruded $\frac{1}{4}$ in. beyond the calyx; segments bright red, $1\frac{1}{2}$ -2 in.; staminodes half as long as the corolla-segments; lip a little shorter than the staminodes; stamens as long as the corolla-segments; anther linear.

9. **H. Gomezianum**, *Wall. Cat.* 6543, in *Kew Journ.* v. (1853) 368; leaves long lanceolate, spike dense-fld. curved, bracts 1-fld. cylindric, calyx longer than the bract, flowers white, staminodes linear, lip narrow clawed bipartite, segments narrow, stamen much longer than the lip. *Horan. Prodr.* 25. *Hedychium*, *Griff. Notul.* iii. 419, *first species*.

TAVOY, *Gomez*; TENASSERIM, *Griffith*.

Epiphytic, gland-dotted. *Leafy stem* 1 ft. or more. *Leaves* sometimes above 1 ft., 2-3 in. broad, narrowed gradually from the middle to the base. *Spike* cernuous, 3-4 in.; bracts glabrous, rolled tightly round the calyx. *Calyx* twice as long as the bract. *Corolla-tube* a little longer than the calyx; segments linear, 1 in. white; staminodes rather shorter than the corolla-segments; lip white; filament $1\frac{1}{2}$ in.; anther linear, orange yellow.

10. **H. ellipticum**, *Hamilt. ex Smith in Rees, Cyclop.* xvii. No. 2; leaves oblong, spike short dense-fld., bracts oblong imbricate 1-fld., calyx as long as the bract, flowers white, staminodes linear, lip narrow unguiculate faintly bifid, stamen twice as long as the lip. *Rosc. Scit. Pl.* t. 55; *Bot. Cat.* t. 1881; *Wall. in Kew Journ.* v. (1853) 327; *Horan. Prodr.* 25. *H. fastigiatum*, *Wall. Cat.* 6340.

TROPICAL HIMALAYA, from GARWHAL, SIKKIM, and KHASIA HILLS, alt. 2000-5000 ft.

Leaves $\frac{1}{2}$ -1 ft. by 3-5 in. *Spike* very dense, 3-4 in.; bracts bright green, about 1 in. *Corolla-tube* twice as long as the bract; segments 1 in., linear; staminodes rather shorter and broader than the corolla-segments; lip oblong, distinctly clawed, shorter than the staminodes, only emarginate at the apex; filament $1\frac{1}{2}$ -2 in.; anther linear, orange yellow.

11. **H. villosum**, *Wall. in Roxb. Fl. Ind.* i. 12; in *Kew Journ.* v.

(1853) 329; *Cat.* 6545 A, B; leaves oblong or oblong-lanceolate, spike long dense-fld., bracts oblong very hairy often 2-3-fld., calyx longer than the bract, flowers white, staminodes linear, lip narrow clawed bipartite segments narrow, stamen twice as long as the lip, anther small sagittate. *Rose Scit. Pl.* t. 54; *Horan. Prodr.* 25.

NÉPAL, SILHET, ASSAM, KHASIA HILLS, MŪNIPUR, alt. 4000-6000 ft.

Leaves sometimes 1 ft. 2-4 in. broad, glabrous beneath. *Spike* $\frac{1}{2}$ -1 ft.; rachis very stout and hairy; bracts pale green, $\frac{3}{4}$ -1 in. *Calyx* about $1\frac{1}{2}$ in. *Corolla*-tube longer than the calyx; segments linear, 1- $1\frac{1}{4}$ in.; staminodes like the corolla-segments; lip 1 in. or more; filament $1\frac{1}{2}$ -2 in., bright red; anther much shorter than in any other species.

Var. *TENUIFLORUM*, *Wall. Cat.* 6546 C.; flowers much smaller than in the type, corolla-segments staminodes and lip $\frac{1}{2}$ in.—Assam, Silhet and Khasia.

†† *Leaves more or less pubescent beneath.*

12. **H. aureum**, *Clarke & Mann mss.*; dwarf, leaves small thin lanceolate, spike short dense-fld. oblong, bracts 1-fld. wrapped tightly round the calyx, calyx as long as the bract, flowers very small golden yellow, staminodes linear, lip narrow cuneate deeply bifid segments narrow, stamen half as long again as the lip.

NORTHERN KHASIA HILLS; alt. 5000-6000 ft., *Clarke, Mann.*

Epiphytic; leafy stem short, slender. *Leaves* 6-8 by 1- $1\frac{1}{2}$ in., slightly pubescent beneath, tapering gradually to a long point. *Spike* $1\frac{1}{2}$ -2 in.; bracts cylindric, green, glabrous, $\frac{1}{2}$ in. *Calyx* about as long as the bract. *Corolla*-tube $\frac{1}{2}$ - $\frac{3}{4}$ in.; segments linear, $\frac{3}{4}$ - $1\frac{1}{2}$ in.; staminodes as long as the corolla-segments; lip $\frac{1}{2}$ - $\frac{3}{4}$ in. long, narrowed gradually to a short claw; filament as long as the lip; anther linear, $\frac{1}{8}$ in. *Capsule* globose, glabrous, the size of a pea.

13. **H. gracile**, *Roxb. Hort. Beng.; Fl. Ind.* i. 14; *Cor. Pl.* iii. 48, t. 251; leaves oblong-lanceolate, spike long moderately dense-fld., bracts 1-fld. wrapped tightly round the calyx, calyx longer than the bract, flowers small greenish white, staminodes linear, lip oblong-cuneate 2-partite, segments narrow, stamen half as long again as the lip. *Wall. Cat.* 5546 B. in *Kew Journ.* v. (1853) 367, in part.

KHASIA HILLS and CHITTAGONG, *Roxburgh, Wallich.*

Leafy stem 2-3 ft. *Leaves* 5-6 by $1\frac{1}{2}$ -2 in., thin, caudate, finely pubescent beneath. *Spike* 2-4 in.; bracts $\frac{1}{2}$ in., green, cylindric, thin, glabrous. *Calyx* a little longer than the bract. *Corolla*-tube 1 in., very slender; segments linear, nearly as long as the tube; staminodes very narrow, shorter than the corolla-segments; lip $\frac{1}{2}$ in., distinctly clawed; filament 1 in., bright red; anther linear. *Capsule* globose, glabrous, the size of a pea.

Var. *H. GLAUCUM*, *Rosc. Scit. Pl.* t. 53 (sp.) More robust and larger in all its parts; leaves glabrous and glaucous beneath; spike often 6-9 in.; bracts $\frac{3}{4}$ in.; parts of the flower half as long again as in the type. *H. gracile*, *Wall. Cat.* 6546 A, in *Kew Journ.* v. 367, in part; *Hook. f. in Bot. Mag.* t. 6638.—Khasia Hills, Bhotan, and Sikkim, alt. 3000-6000 ft.

14. **H. Griffithianum**, *Wall. in Kew Journ.* v. (1853), 369; leaves lanceolate, spike lax-fld., bracts 1-fld. cylindric, calyx longer than or equalling the bract, flowers white or pale yellow, staminodes linear, lip long narrow clawed bipartite, segments narrow, stamen rather longer than the lip. *Horan. Prodr.* 25.

KHASIA HILLS, alt. 4-5000 ft., *Griffith, Hook. f. & Thoms.*

Leaves sometimes above 1 ft., 2-3 in. broad, marked above with glandular lines,

finely pilose beneath. *Spike* 6–9 in.; bracts 1–1½ in., rolled tightly round the calyx, calyx and corolla glandular. *Corolla*-tube 2–3 in.; segments 1 in., linear. *Staminodes* nearly as long as the corolla-segments; lip 1 in. long; filament bright red, 1–1½ in.; anther large, linear. *Capsule* globose, glabrous, ½ in. diam.—Nearly allied to *H. spicatum*.

Var. *glanduligerum*, Clarke. *Leaves* glabrous beneath. Whole plant especially the flower very glandular.—Khasia Hills.

15. **H. thyrsoforme**, *Hamilt. ex. Smith in Rees Cyclop.* xiii. No. 4; leaves oblong or oblong-lanceolate, spike dense-flid. oblong, bracts cylindric 1-flid., calyx not longer than the bract, flowers white, staminodes linear, lip narrow clawed 2-partite, segments narrow, stamen twice as long as the lip. *Wall. Cat.* 6541; in *Kew Journ.* v. (1853), 327; *Rosc. Scit. Pl.* t. 56; *Horan. Prodr.* 25. *H. heteromallum*, *Lindl. in Bot. Reg.* t. 767. *H. Tocucho*, *Herb. Hamilt.*

TROPICAL HIMALAYA; from KUMAON to SIKKIM, alt. 2–4000 ft., and CHITTAGONG.

Leaf sometimes 1 ft., 3–4 in. broad, finely pilose beneath. *Spike* very dense, 3–6 in.; lower empty bracts ovate; flower-bracts cylindric, green, 1½ in. *Corolla*-tube not much longer than the bract; segments 1 in., linear; staminodes as long as the corolla-segments; lip as long, distinctly clawed, usually cut about half way down into two linear-oblong segments; filament whitish, 1½–2 in.; anther linear.

** Lip cuneate or obovate.

16. **H. Hookeri**, *Clarke mss.*; dwarf, leaves short oblong, spike short oblong, bracts oblong imbricate 1-flid., calyx shorter than the bract, flowers very small sulphur-yellow, staminodes oblong-cuneate, lip obovate-clawed bifid, stamen twice as long as the lip.

KHASIA HILLS, alt. 4–5000 ft., *Hook. f. & Thomson.* ASSAM, *Griffith.*

Leafy stem slender, 1–1½ ft. *Leaves* 5–6 by 2 in., thin, glabrous, caudate, base cuneate. *Spike* 1–2 in., resembling that of *Globba bulbifera*, few-flid.; bracts ½ in., oblong, laxly imbricate, green, glabrous. *Calyx* ¼ in. *Corolla*-tube a little longer than the calyx; segments linear, ½ in.; staminodes as long as the corolla-segments; lip nearly as long, distinctly clawed; filament ¾–1 in.; anther ½ in. *Capsule* globose, glabrous, ½ in. diam.

17. **H. Gardnerianum**, *Rosc. Scit. Pl.* t. 62; tall, leaves oblong white pulverulent beneath, spike long moderately dense-flid., bracts large oblong 1–2-flid., calyx not longer than the bract, flowers bright lemon-yellow, staminodes oblanceolate, lip obovate-cuneate, tip 2-fid or 2–3-toothed, stamen twice as long as the lip. *Wall. in Kew Journ.* v. (1853), 369 (*excl. syns. & vars.*); *Bot. Reg.* t. 774; *Hook. f. in Bot. Mag.* t. 6913 (*excl. syns.*); *Horan. Prodr.* 25; *Reichb. Exot.* t. 183; *Gard. Chron.* 1875, i. 461, figs. 92, 93; *Mart. Fl. Bras.* iii. p. 3, t. 9.

EASTERN HIMALAYA; Nepal, Sikkim, and the KHASIA HILLS, alt. 4–8000 ft.

Leafy stem 5–6 ft. *Leaves* 1–1½ ft. by 4–6 in., white pulverulent beneath, as are the young bracts and rachis of the spike. *Spike* 1–1½ ft.; bracts 1½–2 in., rolled tightly round the flowers, glabrous. *Corolla*-tube a little longer than the bract; segments greenish, reflexing, 1–1½ in. *Staminodes* above 1 in. by ½–¾ in. broad; lip 1 in. or more, ¾–¾ in. broad, narrowed gradually to a short claw; filament bright red, 2–2½ in.; anther linear, ¾–1 in. *Capsule*-valves ovate, orange-red within, persistent, ¾ in. *Seeds* brownish-crimson.

Var. **H. pallidum**, *Regel in Trans. Russ. Hort. Soc.* 1864, t. 153 (sp.). Lip narrower, more distinctly clawed and distinctly bifid. *Horan. Prodr.* 25.—Khasia, J. D. H.

18. **H. speciosum**, *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall. i. 13; Cat. 6550; Pl. As. Rar. iii. 51, t. 285*; leaves oblong-lanceolate, spike long moderately dense-fl., bracts large oblong 1-2-fl., flowers pale sulphur-yellow, staminodes linear, lip oblong-cuneate entire, stamen twice the length of the lip. *H. Gardnerianum*, *Wall. in Kew Journ. v. (1853) 369, in part. Gamochilus, Lestid. in Ann. Sc. Nat. Ser. 2, xv. 341.*

SILHET, Gomez.

Leaves above 1 ft., 3-4 in. broad, glabrous beneath. Spike $\frac{1}{2}$ -1 ft.; lower bracts $1\frac{1}{2}$ in., $\frac{3}{4}$ in. broad. Calyx cylindric, about as long as the bract. Corolla-tube 2 in.; segments linear, 1 in.; staminodes longer than the segments; lip not clawed, 1 in. by $\frac{1}{2}$ in. broad; filament bright red, twice as long as the lip; anther linear, yellow, $\frac{1}{4}$ - $\frac{1}{2}$ in.

19. **H. stenopetalum**, *Lodd. Bot. Cab. t. 1902*; very tall, leaves oblong very hairy beneath, spike long lax or moderately dense-fl., bracts large oblong often 2-fl., flowers pure white, staminodes oblanceolate, lip oblong-cuneate bifid, stamen twice as long as the lip. *H. barbatum*, *Wall. Cat. 6544. H. coccineum* β , in part, *Wall. in Kew Journ. v. (1853), 373. H. elatum*, *Clarke in Journ. Linn. Soc. xxv. 75. H. elatum var. orgyale, Horan. Prodr. 25.*

ASSAM, KHASIA, the NAGA HILLS, and NORTH BURMA, alt. 1500-3000 ft.

The tallest species. Leaves sometimes 2 ft. by 5-6 in., very hairy all over beneath. Spike 1 ft. or more, rachis very stout; bracts rigid, often 2 in. by 1 in. Calyx shorter than and corolla-tube scarcely longer than the bract. Corolla-segments linear, $1\frac{1}{2}$ in.; staminodes shorter than the corolla-segments; lip pure white, 1 in., narrowed gradually into a short claw; filament pale, $1\frac{1}{2}$ -2 in.; anther linear, yellow, $\frac{1}{2}$ in.

*** Lip orbicular.

20. **H. coccineum**, *Hamilt. ex Smith in Rees Cyclop. xvii. 5*; leaves lanceolate, spike long moderately dense-fl., bracts oblong 1-2-fl., calyx not longer than the bract, flowers small bright crimson, staminodes lanceolate, lip orbicular distinctly clawed deeply bifid, stamen more than twice as long as the lip. *Wall. in Kew Journ. v. (1853), 372, ex parte; Rosc. Scit. Pl. t. 58; Wall. Cat. 6548; Reichb. Ic. Exot. t. 184; Royle Ill. 357; Roxb. Fl. Ind. edit. Wall. & Carey, i. 82, in note.*

CENTRAL and EASTERN HIMALAYA, common (under one or other form). CEYLON (native?).

Leaves 1 ft. or more, $1\frac{1}{2}$ in. broad, base rather rounded, narrowed gradually from the middle to the point. Spike 1 ft.; bracts green, 1- $1\frac{1}{2}$ in. Corolla-tube scarcely longer than the bract; segments 1 in., linear, reflexing; staminodes under 1 in., $\frac{1}{2}$ - $\frac{3}{4}$ in. broad; lip above $\frac{1}{2}$ in. and broad; filament $1\frac{1}{2}$ in.; anther linear, $\frac{1}{4}$ - $\frac{1}{2}$ in.—The type was described and drawn from a plant in the Calcutta Garden.

Var. **H. ROSCOEI**, *Wall. mss. (sp.)*. Staminodes bright red; lip dull brick red. *H. coccineum*, *Lindl. in Bot. Reg. t. 1209.*

Var. **H. SQUARROSUM**, *Buch. Hamilt. mss. (sp.)*; less robust with smaller bright crimson flowers and very long glabrous leaves often not above 1 in. broad. *H. angustifolium*, *Wall. Cat. 6547; in Kew. Journ. v. (1853) 371, in greater part, non Roxb.*—Common in the Eastern Himalaya, Khasia, and Upper Burma, alt. 8-9000 ft. Ceylon.

Var. **H. LONGIFOLIUM**, *Rosc. Scit. Pl. t. 59 (sp.)*; flowers bright crimson, leaves very narrow pubescent beneath.—Same range as the last variety.

Var. **H. ANGUSTIFOLIUM**, *Roxb. Hort. Beng. 1; Cor. Pl. iii. 248, t. 251; Fl. Ind*

i. 13; leaves not so long and narrow as in the two last, spike shorter, flowers dull brick red or salmon-red often 3-4 in a fascicle, lip obovate-cuneate less deeply bifid under $\frac{1}{2}$ in. and broad. *Rosc. Scit. Pl.* t. 60; *Bot. Mag.* t. 2078; *Kern. Hort.* t. 807.—Chittagoug and Silhet, always at low levels.

Var. *H. CARNEUM*, *Rosc. Scit. Pl.* t. 57 (sp.); leaves $1\frac{1}{2}$ -2 in., flowers white tinged with pale red, lip orbicular $\frac{1}{2}$ - $\frac{3}{4}$ in. long and broad, filament pale red $1\frac{1}{2}$ -2 in. *Bot. Mag.* t. 2637; *Lodd. Bot. Cab.* t. 693.

21. *H. aurantiacum*, *Wall. Cat.* 6551; leaves long lanceolate, spike long moderately dense-fld., bracts oblong often 2-3-fld., calyx not longer than the bract, flowers bright orange-yellow, staminodes lanceolate, lip orbicular distinctly clawed deeply bifid, stamen more than twice as long as the lip. *Rosc. Scit. Pl.* t. 39. *H. Gardnerianum*, var. γ , *Wall. in Kew Journ.* v. (1853), 369; *Savi Fl. Ital.* iii. t. 112. *H. angustifolium*, *Bot. Reg.* t. 157.

KUMAON and NEPAL, alt. 5000 ft. or more.

Leaves $1-1\frac{1}{2}$ ft. by 2-3 in., narrowed gradually to the base, glabrous beneath. Spike $\frac{1}{2}$ -1 ft.; bracts oblong, green, glabrous, $1-1\frac{1}{4}$ in. Corolla-tube not much longer than the bract; segments linear, 1 in. or more; staminodes as long as the corolla-segments; lip shorter than the staminodes, about as broad as long; filament pale bright red; anther linear, yellow, $\frac{1}{2}$ in.—The affinity is stronger with some forms of *coccineum* than with *Gardnerianum*.

22. *H. luteum*, *Herb. Calcut.*; leaves oblong-lanceolate, spike short dense-fld., bracts oblong closely imbricate, flowers lemon-yellow, corolla-tube twice as long as the bract, staminodes lanceolate, lip orbicular bifid distinctly clawed, stamen half as long again as the lip.

ASSAM, Oldham.

Intermediate between *H. flavum* & *aurantiacum*. Stem slender. Leaves under 1 ft. Bracts broad, green, 1 in. Corolla-tube 2 in.; segments linear, pale yellow, above 1 in.; lip under 1 in. broad, uniform yellow throughout, narrowed suddenly to a short claw.—Described from a drawing in the Calcutta collection.

23. *H. gratum*, *Wall. ex Voigt. Hort. Suburb. Calcutt.* 570 (name only); leaves long lanceolate, spike dense-fld., bracts large oblong, corolla-tube much longer than the bract, flowers whitish, staminodes oblong, lip orbicular clawed deeply emarginate, stamen a little longer than the lip.

KHASIA HILLS, Wallich.

Leafy stem long and stout. Leaves above 1 ft., 3 in. broad. Spike $\frac{1}{2}$ ft.; bracts 2-3 in. Corolla-segments linear, $1\frac{1}{2}$ in.; staminodes 1 in., narrowed to the base; lip 1 in. broad, narrowed suddenly to a short claw.—Differs from *coccineum* by its whitish flowers and shorter stamens. Described from a drawing in the Calcutta collection.

24. *H. elatum*, *Br. in Bot. Reg.* t. 526; leaves large oblong, spike long moderately dense-fld., bracts oblong 1-2-fld. moderately large, calyx as long as the bract, flower white tinged with red, staminodes ob-lanceolate, lip orbicular clawed bifid, stamen twice as long as the lip. *Rosc. Scit. Pl.* t. 63; *Wall. Cat.* 6549 A, B; *Lodd. Bot. Cab.* t. 856; *Reichb. Fl. Exot.* t. 270; *Horan. Prodr.* 26. *H. coccineum*, var. β , *Wall. in Kew Journ.* v. (1853), 373, in part.

SUBTROPICAL HIMALAYA; from KUMAON to SIKKIM, alt. about 5000 ft.

Leaf above 1 ft., 3-4 in. broad, glabrous beneath. Spike 1 ft. or more, rachis very stout; bracts oblong, $1-1\frac{1}{4}$ in., $\frac{3}{4}$ in. broad. Calyx cylindric, $1-1\frac{1}{4}$ in. Corolla-tube a little longer than the bract; segments linear, $1\frac{1}{4}$ in.; staminodes $1-1\frac{1}{4}$ in.,

distinctly clawed; lip rounded at the base to a distinct claw, $\frac{3}{4}$ -1 in. broad, white, with a patch of dull red in the centre; filament pale red, 2 in. or more; anther $\frac{1}{4}$ - $\frac{3}{4}$ in.—This and *H. aurantiacum* are so difficult to distinguish when dried from some of the forms of *coccineum*, that I have purposely abstained from citing several of Wallich's numbers.

11. **AMOMUM**, Linn.

Rootstock perennial, widely creeping. *Leafy stem* elongate. *Leaves* usually oblong-lanceolate. *Spikes* dense-fl., except in § *Cenolophus* produced direct from the rootstock; bracts imbricate. *Calyx* cylindric, 3-dentate. *Corolla*-tube cylindric; segments oblong or linear-oblong, upper often broader and more convex. *Lateral staminodes* 0 or minute teeth; lip broad or lingulate; filament short, arcuate; anther-cells divaricate, sometimes hairy, often furnished with a petaloid crest. *Ovary* 3-celled; ovules many, superposed; style filiform, stigma small and subglobose or larger and gibbous on the back. *Fruit* indehiscent or dehiscent irregularly, sometimes beaked, winged or echinate. *Seeds* globose or truncate. Species about 150, in the tropics of the Old World.

SECT. I. **Geanthus**, Reinw. (gen.). *Spike* radical. *Lip* broad. *Anther* not crested. (Sp. 1-4.)

1. **A. gramineum**, Wall. *Cat.* 6558; leaves small thin lanceolate pubescent beneath, spike small globose, peduncle very short, outer bracts lanceolate, lip small.

TAVOY, Gomez.

Stem slender, 2-3 ft. *Leaves* 6 by 1 in. *Spike* 1 in.; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in. *Calyx* $\frac{1}{4}$ in. *Corolla*-tube rather longer than the calyx; segments $\frac{1}{4}$ in. linear-oblong; lip rather longer than the corolla-segments. *Anther*-cells short, glabrous.

2. **A. floribundum**, Benth. in *Gen. Plant.* iii. 644; leaves oblong-lanceolate glabrous beneath, spike globose, peduncle long erect, outer bracts large orbicular, lip small obovate. *Elettaria floribunda*, Thw. *Enum.* 319.

CEYLON; forests in the Ambagamwa district.

Leafy stem 3-6 ft. or more. *Leaves* subcoriaceous, 18-24 by 3-5 in. petioled. *Peduncle* 1-1 $\frac{1}{2}$ ft.; bract-leaves sheathing, obtuse. *Spike* 2-3 in. long and broad; flowers very numerous; bracts dark red, outer 1 $\frac{1}{2}$ in. long and broad. *Flowers* pale ochraceous yellow. *Corolla* tube $\frac{3}{4}$ in.; segments and lip much shorter than the tube. *Fruit* small, oblong, smooth.

3. **A. nemorale**, Benth. in *Gen. Plant.* iii. 644; leaves oblong-lanceolate glabrous beneath, spike small globose, peduncle very short, outer bracts ovate obtuse, lip small orbicular 3-lobed. *Elettaria nemoralis*, Thw. *Enum.* 319.

CEYLON; forests in the Reigam and Pasdoon Corles.

Rootstock slender. *Leafy stem* 2-4 ft. *Leaves* firm, 6-15 by 1 $\frac{1}{2}$ -2 in. *Spike* 1-1 $\frac{1}{2}$ in.; peduncle decumbent, shorter than the spike; bracts glabrous, outer $\frac{1}{2}$ - $\frac{3}{4}$ in., inner lanceolate. *Corolla*-tube under 1 in., segments short, oblong, obtuse. *Lip* yellow, copiously veined with purple; midlobe smaller, bifid. *Capsule* globose, $\frac{1}{4}$ in. shortly beaked.

4. **A. involucratum**, Benth. in *Gen. Plant.* iii. 644; leaves large oblong-lanceolate glabrous beneath, spike globose, peduncle long erect, outer bracts very large obovate overtopping the flowers, lip small obovate equally 3-lobed. *Elettaria involucrata*, Thw. *Enum.* 319.

CEYLON; damp forests of the central provinces, alt. 4000–6000 ft.

Leafy stem 6–10 ft. or more. *Leaves* thin, $1\frac{1}{2}$ –3 ft. by 4–7 in. *Spike* 2–3 in. long and broad; flowers very numerous; bracts bright red, outer 3 in.; inner lanceolate, $1\frac{1}{2}$ in. *Corolla*-tube as long as the inner bracts; segments oblong, obtuse. *Lip* pale ochraceous yellow. *Capsule* $1\frac{1}{2}$ in., ovoid-trigonus, smooth.

Sect. II. **Achasma**, Griff. (gen.). *Spike* radical. *Lip* narrow, margins incurved. *Anther* not crested.

* *Lip* not, or hardly longer than the corolla-segments.

5. **A. Fenzlii**, Kurz in Journ. Beng. As. Soc. xlv. pt. ii. 154, t. 12; leaves lanceolate glabrous beneath, spike globose, peduncle short erect, bracts ovate densely ciliated, lip not longer than the corolla-segments.

NICOBAR ISLANDS, Kurz.

Leafy stem 6–7 ft. *Leaves* thin, 2–3 ft. by $2\frac{1}{2}$ –3 in., green and glabrous on both surfaces. *Spike* very dense-fld., 2 in. diam.; peduncle 6 in., its bract-leaves large, oblong; outer bracts very large, ovate; inner 1 in., pale red, back glabrous, margin densely-matted with whitish tomentum. *Corolla*-tube $\frac{1}{2}$ in.; segments 1 in. linear, pale red. *Lip* 1 in., red, with white inflexed margins. *Fruit* obovoid, 1 in. *Seeds* obovoid, black; aril white.

6. **A. araneosum**, Baker; spike oblong, peduncle very short, bract ovate densely matted on the edge, lip rather longer than the corolla-segments.

TENASSERIM, Griffith, Helfer (Hook. f. & Thoms. Herb. Ind. Or. 4.).

Leaves unknown. *Spike* oblong, 2 in.; peduncle 2–3 in., bract-leaves large, crowded, ovate; outer bracts large, ovate, backs glabrous, margins densely matted with whitish cottony tomentum; inner lingulate, $1\frac{1}{2}$ in. *Corolla* as long as the inner bracts. *Anther*-cells glabrous.—Nearly allied to *A. Fenzlii*.

7. **A. stenoglossum**, Baker; leaves lanceolate glabrous beneath, spike globose, peduncle longer than spike, outer bracts large oblong acute glabrous, lip not much longer than the corolla segments.

PERAK, alt. 500–1000 ft., King's Collector.

Leafy stem 8–12 ft. *Leaves* 2 ft. or more, by 2 in. *Spike* globose, 3 in.; central bracts $1\frac{1}{2}$ –2 in.; peduncle 4–5 in., bract-leaves 1 in., rigid, oblong, obtuse. *Corolla*-tube $1\frac{1}{2}$ in.; segments shorter. *Anther*-cells $\frac{1}{2}$ in. glabrous, linear.

** *Lip* much longer than the corolla-segments.

† *Spike* globose.

8. **A. sphærocephalum**, Baker; leaves large oblong-lanceolate glabrous beneath, spike globose shortly peduncled, outer bracts oblong-lanceolate glabrous, lip much longer than the corolla-segments.

PENANG, Maingay (Kew Distrib. 1581).

Leafy stem long, robust. *Leaves* subcoriaceous, $1\frac{1}{2}$ –2 ft., by 3–4 in. *Spikes* $1\frac{1}{2}$ –2 in. long and broad; outer bracts $1\frac{1}{2}$ in., inner 1 in., lingulate, glabrous. *Calyx* cylindric, shortly 3-toothed, bearded at the apex. *Corolla*-tube 1 in.; segments oblong, obtuse. *Lip* deep crimson, $\frac{1}{2}$ in., bifid $\frac{1}{3}$ of its length, incurved margin white. *Anther* truncate.

9. **A. metriochelos**, Baker; leaves lanceolate glabrous beneath, spike globose shortly peduncled, outer bracts oblong-lanceolate glabrous, lip twice as long as the corolla-segments. *Achasma metriochelos*, Griff. Notul. iii. 427; Ic. Plant. Asiat. t. 356.

MALACCA, *Griffith* (*Kew Distrib.*, 5758). PENANG, on Government Hill, *Curtis*, 1530.

Leaves 1-1½ ft. by 1½ in., bright green. *Spike* 2 in. long and broad; peduncle arcuate, as long as the spike; outer bracts bright red, 1½ in.; inner as long, lingu- late. *Calyx* 1 in., spathaceous, cylindric; teeth minute, densely pilose. *Corolla*- tube as long as the calyx; segments 1 in. oblong, glabrous. *Lip* scarlet, with a small obovate tip, and margins incurved more than half way up. *Anther*-cells glabrous.—A closely-allied plant from Perak (*King's Collector*, 2933) has stems 12-15 ft. and leaves 3 ft. by 4-5 in.

10. **A. Maingayi**, *Baker*; leaves lanceolate glabrous beneath, spike globose, peduncle long erect, bracts glabrous outer orbicular, lip twice as long as the corolla-segments.

MALACCA, *Maingay* (*Kew Distrib.* 1586).

Rootstock slender, woody. *Leaves* thin, 12 or more by 2 in., narrowed very gradually to the base. *Spike* many-fl., 1½-2 in. long and broad; peduncle 12 in.; bract-leaves several distant obtuse small; outer bracts 1 in. orbicular; inner lingu- late. *Calyx* 1 in.; segments linear-lanceolate, as long as the tube. *Lip* 1 in., narrowed to an obtuse tip. *Filament* connate with the lip nearly to the top; anther- cells hairy. *Fruit* bright red, neither ribbed nor echinate.

†† *Spike* oblong.

11. **A. macrocheilos**, *Baker*; spike oblong shortly peduncled, outer bracts large oblong acute glabrous, lip more than twice as long as the corolla-segments bifid, margins of the lower third incurved. *Achasma macrocheilos*, *Griff.* *Notul.* iii. 429; *Ic. Plant. Asiat.* t. 357.

MALACCA, *Griffith*.

Leaves unknown. *Spike* 3 in.; peduncle 2 in., bract-leaves small, ovate, imbricate; outer bracts brownish, 2-2½ in. *Calyx* cylindric, spathaceous, as long as the corolla-tube. *Corolla*-segments linear-oblong, above 1 in.; upper broader. *Flower* greenish red. *Lip* 2½ in.; upper half linear, deeply bifid. *Anther* glabrous, deeply emarginate.

12. **A. costatum**, *Benth.* in *Gen. Plant.* iii. 644; leaves oblong-lanceolate pubescent beneath, spike oblong shortly peduncled, outer bracts oblong-lanceolate glabrous, lip twice as long as the corolla-segments. *Alpinia costata*, *Roxb. Corom. Pl.* t. 252. *A. Cardamomum* medium, *Roxb. Fl. Ind.* i. 74. *E. costata*, *Horan. Prodr.* 31. *Elettaria media*, *Link ex Horan.* *Cardamomum* medium, *Schult. Mant.* i. 244.

EASTERN TROPICAL HIMALAYAS; Silhet, *Roxburgh*.

Rootstock ½ in. diam. *Leafy stem* stout, 5-6 ft. *Leaves* 2-3 ft. by 3-4 in. *Spikes* 2-3 in.; peduncle as long as the spike; outer bracts pink, 1½ in. *Corolla*- tube 2 in., cylindric; segments obtuse, half as long as the tube. *Lip* 2 in., deflexed, lingu- late, red-yellow, tip entire, flat in the upper half, margins below the middle slightly incurved. *Fruit* ½ in., ovoid, strongly ribbed, smooth. *Seeds* many, obovoid, truncate acrid, aromatic, brownish.

13. **A. linguiforme**, *Benth.* in *Gen. Plant.* iii. 644; leaves oblong-lanceolate glabrous beneath, spike oblong few-fl. shortly peduncled, outer bracts ovate whitish glabrous, lip more than twice as long as the corolla-segments. *Alpinia linguiforme*, *Roxb. Fl. Ind.* i. 75; *Pl. Coromand.* t. 276. *Elettaria linguiformis*, *Schult. Mant.* i. 24; *Horan. Prodr.* 31.

EASTERN HIMALAYA, Tropical region, Sikkim, *J. D. H. KHASIA HILLS* (*Hook. f. & Thoms. Herb. Ind. Or.*, 10), *King. BENGAL*, *Roxburgh*.

Rhizome stout, copiously stoloniferous. *Leafy stem* 4-6 ft. *Leaves* thin,

1-1½ ft. by 3-5 in. *Spikes* about 3 in.; peduncle as long or shorter; inner bracts lanceolate, pink, 2-2½ in. *Corolla-tube* cylindric, 2 in.; segments oblong, bright red, half as long as the tube. *Lip* bright yellow, deflexed, above 2 in. long, bifid, margins below the middle incurved. *Stamen* shorter than the corolla-segments. *Ovary* hairy.

14. **A. gomphocheilos**, *Baker*; leaves large lanceolate glabrous beneath, spike oblong shortly-peduncled, outer bracts oblong-lanceolate large glabrous, lip twice as long as the corolla-segments, tip cuneate.

PERAK, *King's Collector*, 1897.

Leafy stem 12 ft. *Leaves* 2-3 ft. by 3 in. *Spike* 3 in.; outer bracts 2 in. *Corolla-tube* 2 in.; segments linear-oblong, under 1 in. *Lip* twice as long as the corolla-segments, with a cuneate-clawed tip, margins incurved to the tip of the corolla-segments. *Anther* emarginate; cells glabrous, tips much divaricated.

15. **A. megalocheilos**, *Baker*; leaves oblong-lanceolate, spike oblong very shortly peduncled, outer bracts ovate glabrous, lip more than twice as long as the corolla-segments tip obovate. *Achasma megalocheilos*, *Griff. Notul.* iii. 426; *Ic. Plant. Asiat.* t. 355.

MALACCA; foot of Mount Ophir, *Griffith*.

Leafy stem stout, 12-16 ft. *Spike* 3-4 in.; outer bracts 1½-2 in. *Calyx* spathaceous, cylindric, above 2 in. long; teeth small, lanceolate. *Corolla-tube* as long as the calyx; segments 1 in., linear-oblong. *Lip* 3 in., bright red; margins of the lower half incurved, yellow. *Anther*-cells glabrous, tip emarginate.

Sect. III. **Hornstedtia**, *Retz.* (gen.) (*Donacodes*, *Blume*; *Stenochasma*, *Griff.*). *Spike* radical. *Lip* narrow, margins incurved. *Anther* crested.

16. **A. macrodus**, *Scortech. in Nuov. Giorn. Bot. Ital.* xviii. 309, t. 12; leaves oblong-lanceolate, spike small subglobose shortly peduncled, bracts small ovate-lanceolate, lip not longer than the corolla-segments oblong margins involute, anther-crest small truncate.

MALAY PENINSULA; Kinta, *Scortechini*.

Leafy stem slender, 2 ft. *Leaves* caudate, 6-8 by 2-3 in. *Spike* 1 in. diam.; bracts red, glabrous, ½ in. *Calyx* spathaceous, ½ in. *Corolla-tube* half as long again as the calyx; segments oblong, ¼ in. *Lip* bifid, tip yellow, purple inside towards the base; small staminodes developed; anther-crest entire; cells parallel, glabrous.

17. **A. rubro-luteum**, *Baker*; leaves lanceolate glabrous beneath, spike globose sessile, outer bracts ovate glabrous, lip much longer than the corolla-segments.

MALACCA, *Maingay* (*Kew Distrib.*, 1588).

Leaves about 1 ft. by 2 in. *Spike* 2 in.; outer bracts 1½ in., pink ½ upwards. *Corolla-tube* 1½ in.; segments linear-oblong, subequal. *Lip* lingulate, deeply cleft at the tip, bright crimson, incurved margins yellow. *Filament* shortly produced beyond the anther.

18. **A. Leonurus**, *Kœnig in Retz. Obs.* iii. 69; leaves oblong-lanceolate glabrous beneath, spike cylindric subsessile, outer bracts large ovate pubescent, lip not longer than the corolla-segments. *Hornstedtia Leonurus*, *Retz. Obs.* vi. 18. *Stenochasma convoluta*, *Griff. Notul.* iii. 433; *Ic. Pl. Asiat.* t. 359.

MALACCA, *Kœnig*; dense woods at Rhim, *Griffith*.

Leafy stem 6 ft. or more. *Leaves* above 1 ft. *Spike* 3-4 in., 1 in. diam.; outer bracts $1\frac{1}{2}$ in., ovate, acute, rigid, reddish-green. *Corolla-tube* 3 in.; segments linear, red, half as long as the tube. *Lip* with an obtuse rigid point and sides, involute in the lower third. *Anther-cells* hispid; crest small, emarginate. *Capsule* large, oblong-trigonus.

19. **A. scyphiferum**, *Kœnig* in *Retz. Obs.* iii. 68; leaves oblong-lanceolate pubescent beneath, spike oblong shortly peduncled, outer bracts large suborbicular rigid reticulated, lip as long as the corolla-segments. *Hornstedtia Scyphus*, *Retz. Obs.* vi. 18. *Stenochasma urceolare*, *Griff. Notul.* iii. 431; *Ic. Plant. Asiat.* t. 358.

MALACCA, *Kœnig*, *Griffith*, *Maingay* (*Kew Distrib.*, 1582). SINGAPORE, *Ridley*.

Leafy stem 10-12 ft. *Leaves* $1\frac{1}{2}$ -3 ft. by 4-6 in. *Spike* 4 in., 2 in. diam.; central bracts 2 in., rigid, tip rounded, vertical ribs raised and connected by tomentose cross veinlets. *Corolla-tube* 2 in.; segments shorter, linear-oblong. *Lip* bright red, concave to the tip, base auriculate. *Anther-cells* pilose; crest orbicular-oblong. *Capsule* 1 in., oblong-trigonus.

20. **A. triorgyale**, *Baker*; leaves oblong-lanceolate pubescent beneath, spike oblong subsessile, outer bracts large suborbicular not reticulated, lip as long as the corolla-segments.

PERAK, *King's Collector*.

Nearly allied to *A. scyphiferum*. *Leafy stem* 20 ft. *Leaves* above 2 ft. by 6 in., distinctly petioled. *Spike* like that of *A. scyphiferum*, but the bracts less rigid and the close vertical ribs not connected by raised pubescent cross-veinlets. *Corolla-tube* 2 in.; segments and lip shorter than the tube.

Sect. IV. **Euamomum**, *Benth.* *Spike* radical. *Lip* broad. *Anther* crest.

* *Anther-crest* entire or crenate.

† *Anther-crest* lunate.

21. **A. Kœnigii**, *Baker*; leaves oblong, spike ovate-oblong shortly peduncled, outer bracts obtuse, lip 3-lobed bifid longer than the corolla-segments, anther-crest semilunar. *Amomum*, No. 57, *Kœnig* in *Retz. Obs.* iii. 54. *Meistera*, *Giseke Præl. Linn.* 205.

Coast of TENASSERIM; island of Junk Seylan, *Kœnig*.

Leafy stem 6-7 ft. Outer bracts ciliate, cymbiform, as long as the corolla-tube. *Corolla-segments* obovate, subequal, white. *Lip* white, broader than the corolla-segments; central lobe small; anther-crest white.—I have seen no specimen.

22. **A. acuminatum**, *Thw. Enum.* 317; leaves oblong-lanceolate caudate glabrous beneath, spike globose shortly peduncled, bracts small oblong acute, lip broad 3-lobed longer than the corolla-segments, anther-crest semilunar.

CEYLON; Ratnapoora, at a low elevation.

Rootstock wide-creeping. *Leafy stem* 2-4 ft. *Leaves* 5-6 by $1\frac{1}{2}$ in., shortly petioled. *Spike* 1- $1\frac{1}{2}$ in.; bracts under 1 in. *Lip* yellow tinged with red; central lobe emarginate; anther-cells ciliate; crest crenulate.

23. **A. fulviceps**, *Thw. Enum.* 317; leaves oblong-lanceolate glabrous beneath, spike globose, peduncle moderately long, bracts oblong pubescent, lip 3-lobed not longer than the corolla-segments, anther-crest semilunar.

CEYLON; Raxawa, in the central province, *Thwaites, Walker*. (*Hook. f. & Thoms. Herb. Ind. Or.* 11.)

Leafy stem 6–8 ft. and more. *Leaves* subcoriaceous, 1–2 ft. by $2\frac{1}{2}$ –3 in. *Spike* very dense, $2\frac{1}{2}$ –3 in. diam.; bracts dark red, $1-1\frac{1}{2}$ in., persistently pubescent. *Corolla*-tube $1\frac{1}{2}$ in.; segments oblong, a third the length of the tube. *Lip* pale yellow. *Anther-cells* pilose.

24. **A. masticatorium**, *Thw. Enum.* 317; leaves lanceolate glabrous beneath, spike globose shortly peduncled, bracts small obovate pubescent, lip broad 3-lobed, anther-crest semilunar, capsule small globose echinate.

CEYLON; common in the forests of the central province up to 4000 ft.

Rootstock slender. *Leafy stem* 6–8 ft. *Leaves* sessile, 1 ft. or more by $1-1\frac{1}{2}$ in. *Spikes* $1\frac{1}{2}$ in. long and broad; peduncle 2–3 in.; bract-leaves many, small, scarioso oblong; bracts under 1 in., ciliate. *Corolla*-tube hairy, as long as the bract; segments oblong, obtuse. *Lip* orbicular, dotted with red, bidentate at the base. *Capsule* $\frac{3}{4}$ in. diam., greenish-black.—*Rootstock* a native condiment.

†† *Anther-crest orbicular or transversely oblong.*

25. **A. pauciflorum**, *Baker*; spike sessile 1–2 fld., bracts oblong-lanceolate, lip orbicular-clawed longer than the corolla-segments, anther-crest small transversely oblong entire.

KHASIA HILLS; near Nunklow, *Hook. f. & Thoms.* (*Herb. Ind. Or.* 1).

Rootstock slender. *Leafy stem* unknown. *Spikes* several from one rootstock; bracts $1-1\frac{1}{2}$ in., several, pinkish, membranous. *Corolla*-tube $1\frac{1}{2}$ in.; segments 1 in. oblong, obtuse, white. *Lip* $1\frac{1}{2}$ –2 in., blade crisped orbicular, narrowed suddenly to a broad claw, with a yellowish middle, and radiating red veins; anther-cells glabrous, parallel.

26. **A. corynostachyum**, *Wall. Pl. Asiat. Rar.* i. 48 t. 58; *Cat.* 6561; leaves oblong-lanceolate glabrous beneath, spike globose, peduncle moderately long, outer bracts oblong, lip small broad obscurely 3-lobed, anther-crest orbicular.

SIKKIM HIMALAYA, *Kurz.* MARTABAN, *Wallich.* PEGU, *Kurz.*

Leafy stem 3–4 ft. *Leaves* $1-1\frac{1}{2}$ ft. by 2–3 in. *Spike* $1\frac{1}{2}$ in. diam.; peduncle $\frac{1}{2}$ –1 ft., bract-leaves obtuse and imbricate; outer bracts 1 in. oblong navicular, pale brown; inner oblanceolate, obtuse. *Corolla*-tube under 1 in.; segments oblong, shorter than the tube. *Lip* under 1 in. suborbicular, white, tinged with yellow in the middle; filament very short; anther-cells glabrous; crest white, entire, petaloid.

27. **A. graminifolium**, *Thw. Enum.* 430; leaves linear glabrous beneath, spike globose shortly peduncled, outer bracts oblong glabrous, lip obovate truncate longer than the corolla-segments, anther-crest large orbicular entire.

CEYLON; abundant in the Singherajah forest.

Rootstock slender. *Leafy stem* 3–4 ft. or more. *Leaves* about 12 in. under 1 in. broad, firm, linear, very acuminate. *Spike* few-fld.; peduncle 1–2 in., bract-leaves many, small, oblong, scarioso, brown; bracts 1 in. *Corolla*-tube as long as the bracts; segments obtuse, half as long as the tube. *Lip* 1 in.; anther-cells glabrous, $\frac{1}{2}$ in.; crest as long as the cells.

28. **A. ciliatum**, *Baker*; leaves lanceolate pubescent beneath, spike oblong shortly peduncled, bracts oblong pubescent densely ciliate, lip short broad, anther crest transversely oblong. *A. fulviceps* β , *Thw. Enum.* 317.

CEYLON; Reigam Corle, *Thwaites*, 3704.

Leaves 12 by $1\frac{1}{2}$ –2 in., sessile, caudate. *Spike* $1\frac{1}{2}$ –2 in. diam.; peduncle 3–4 in.;

bracts 1 in., dark coloured, back pubescent and densely ciliated with whitish hairs. Corolla-tube much shorter than in *A. fulviceps*; segments $\frac{1}{2}$ in. oblong.

29. **A. microstephanum**, Baker; leaves large lanceolate or oblong-lanceolate pubescent beneath, spike globose shortly peduncled, outer bracts oblong glabrous, lip obovate longer than the corolla-segments, anther-crest small orbicular, capsule 9-costate.

CONCAN, Stocks; near Chandwar (planted), Ritchie. (Hook. f. & Thoms. Herb. Ind. Or. 4).

Leafy stem 4 ft. Leaves $1\frac{1}{2}$ –2 ft. by 2–4 in., densely softly pubescent beneath. Spike 2 in.; outer bracts 1 – $1\frac{1}{2}$ in. Corolla-tube 1 in.; segments linear-oblong, half as long as the tube. Flower white. Lip 1 in.; anther-cells glabrous, $\frac{1}{2}$ in.

30. **A. xanthioides**, Wall. Cat. 6557; leaves lanceolate glabrous, spike globose shortly peduncled, outer bracts small oblong, lip cochleariform bifid longer than the corolla-segments, anther-crest short broad entire, capsule echinate.

TAVOY, Gomez. TENASSERIM, Parish.

Leafy stem 5–6 ft. Leaves 1 – $1\frac{1}{2}$ ft. by $1\frac{1}{2}$ –3 in., firm, bright green. Spike 1 in., few-flid.; peduncle arcuate, slender, 2–3 in.; outer bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., acute, glabrous. Corolla-tube under 1 in.; segments oblong, $\frac{1}{2}$ – $\frac{1}{2}$ in. Lip with an orbicular blade $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, narrowed suddenly to a broad claw; anther-crest auricled on each side. Capsule rigid, oblong-trigonous, pale brown, under 1 in. long.—A nearly allied plant from Perak (King's Collector, 1839) with robust leafy stems 12 ft. long and much longer leaves, is doubtless a distinct species, but the materials are too scanty for description.

††† Anther-crest subquadrate or truncate.

31. **A. littorale**, Kœnig in Retz Obs. iii. 52; leaves oblong, spike globose, peduncle very short, outer bracts orbicular, lip broad emarginate, anther-crest truncate emarginate.

COAST OF TENASSERIM; island of Yunk Seylan, Kœnig.

Leafy stem taller than a man. Leaves 1 ft. Outer bracts orbicular-cordate; inner linear-lanceolate, white; tip ciliate. Corolla-segments unequal; upper erect, oblong; lower lanceolate, approximate. Lip cordate, bright orange; margins crisped; recurved lip bidentate; stamen half as long as the lip. Capsule oblong-trigonous.—I have seen no specimens.

32. **A. dealbatum**, Roxb. Fl. Ind. i. 43; leaves large oblong-lanceolate pale and pubescent beneath, spike globose short-peduncled, outer bracts ovate, lip large obovate emarginate, anther-crest small subquadrate entire, capsule-ribs winged. Wall. Cat. 6556; Horan. Prodr. 30.

EASTERN HIMALAYAS; SIKKIM, KHASIA HILLS, SILHET, EASTERN BENGAL and CHITTAGONG. (Hk. f. & Thoms. Herb. Ind. Or. 5.) Roxburgh, &c.

Leafy stem 4–5 ft. Leaves 2–3 ft. by 4–6 in., bright green above, whitish beneath. Spike 2 in. diam.; peduncle very short; outer bracts 1 in., reddish. Corolla-tube 1 in.; segments oblong, obtuse, white, as long as the tube. Lip obovate-cuneate, $1\frac{1}{2}$ in., white with a yellow line down the centre and radiating red veins. Anther-crest small, subquadrate. Capsule globose, reddish, 1 in. diam., with 9 winged crenulate vertical ribs.—Nearly allied to the Malayan *A. maximum*, Roxb.

Var. **A. sericeum**, Roxb. Fl. Ind. i. 46 (sp.); leaves silvery white beneath, anther-crest larger, capsule ovoid.—Sikkim, Khasia and Cachar. (Hk. f. & Thoms. Herb. Ind. Or. 6.).

33. **A. hypoleucum**, *Thw. Enum.* 318; leaves large oblong-lanceolate silvery beneath, spike 1-3-fl., peduncle very short, bracts oblong membranous, lip broad longer than the corolla-segments, anther-crest subquadrate crenate, capsule 9-ribbed.

CEYLON; damp forests of the central province, up to 4000 ft.

Rootstock slender. *Leafy stem* stout, 4-5 ft. *Leaves* 1½-2 ft. by 3-5 in., persistently silky beneath, petiole 3 in. *Spikes* many to a rootstock; bracts 1½-2 in. *Corolla*-tube as long as the bracts; segments 1 in., oblong, white, subequal; lip orbicular-cuneate, 1½ in., entire, white with a yellow disk tinged with red. *Capsule* 1 in. globose, red.

34. **A. cannæcarpum**, *Benth. in Gen. Plant.* iii. 644; leaves oblong-lanceolate glabrous, spike oblong nearly sessile, outer bracts oblong-lanceolate, lip broad not longer than the corolla-segments, anther-crest short truncate, capsule globose echinate. *Elettaria cannæcarpa*, *Wight Ic.* t. 2007.

NILGHIRI HILLS; *Wight, Gardner.*

Leafy stem 4-6 ft. *Leaf* 12 by 2½ in. *Spike* 3 in.; outer bracts 1-1½ in., tips deep pink, paler below. *Corolla*-tube 1½ in.; segments oblong, half as long, the upper broader; lip obovate, yellow, emarginate; filament short; anther-cells parallel, glabrous; crest very small, entire. *Capsule* rigid, 1 in. diam. *Seeds* angled.—*Wight's* description and figure do not agree with one another, and neither is quite accurate.

35. **A. subulatum**, *Roxb. Cor. Pl.* t. 277; *Fl. Ind.* i. 44; leaves oblong-lanceolate glabrous beneath, spike globose shortly peduncled, outer bracts obtuse with a horny cusp, lip obovate-cuneate emarginate, anther-crest small truncate, capsule echinate. *Horan. Prodr.* 29.

EASTERN HIMALAYAS; *Roxburgh.*

Leafy stem 3-4 ft. *Leaves* 1-2 ft. by 3-4 in. green, glabrous on both surfaces. *Spike* very dense, shortly peduncled, 2-3 in.; bracts red-brown, outer 1 in., ovate, inner shorter and obtuse. *Calyx* and *corolla*-tube 1 in.; segments subobtus, shorter than the tube; upper cuspidate. *Lip* yellowish white, rather longer than the corolla-segments. *Filament* very short; anther-crest entire. *Capsule* 1 in., globose, red-brown, densely echinate.

** Anther-crest 3-4-lobed.

† *Spike* 2-3-fl.

36. **A. biflorum**, *Jack in Mal. Misc.* i. 2; leaves oblong-lanceolate glabrous except the midrib, spike 2-fl. peduncled, bracts lanceolate, lip obovate white with a yellow centre, anther-crest 3-lobed. *Hook. Bot. Misc.* i. 274.

PENANG, *Jack.*

Rootstock not thicker than a goose-quill. *Leafy stem* 3 ft. *Peduncle* enveloped in bracteal sheaths; bracts reddish; bracteole half as long as the calyx. *Corolla* white, segments subequal. *Lip* white, tip rounded.—Not seen.

37. **A. elatteroides**, *Baker*; leaves oblong-lanceolate softly pubescent beneath, spike sessile 2-fl., bracts lanceolate, corolla-tube long slender, lip broad longer than the corolla-segments, anther-crest 3-lobed.—*Amomum* sp. *Griff. Notul.* iii. 417.

MALACCA, *Griffith, Kew Distrib.* 5753, *Maingay* (K. d. 1573.)

Rootstock slender. *Leafy stem* 2-2½ ft. *Leaves* 9-12 by 1½-2 in. *Spikes* many

to a rootstock; bracts 1 in., reddish, membranous. *Corolla*-tube 2 in., very slender; segments $\frac{1}{2}$ in., linear-oblong, membranous. *Lip* white, subcochleate, twice as long as the corolla-segments, with a broad yellow central band with a reddish border; anther-crest large, petaloid.

†† *Spike many-fld., oblong.*

38. **A. Kingii**, Baker; leaves oblong-lanceolate, spike oblong peduncled, bracts ovate, lip small broad emarginate, anther-crest obscurely 3-lobed, fruit neither costate nor echinate.

SIKKIM HIMALAYA; *King*.

Leafy stem stout. *Leaves* above a foot long, 3-4 in. broad. *Spike* 4-5 in.; bracts pale brown, 1-1 $\frac{1}{2}$ in.; peduncle as long as the spike. *Corolla*-tube 1 in.; segments oblong, obtuse, nearly as long as the tube. *Lip* $\frac{1}{2}$ in. broad, white tinged with yellow, obscurely 3-lobed, narrowed suddenly to a broad claw; stamens shorter than the lip. *Capsule* globose, 1 in. diam.

39. **A. uliginosum**, Kœnig in Retz Obs. iii. 56; leaves oblong glabrous, spike peduncled, outer bracts oblong, lip broad emarginate margins rounded ascending, anther-crest 4-lobed, capsule globose echinate. Wurfbainia, Giseke Præl. Linn. 206.

MALAY PENINSULA; Raput Nok, Kœnig.

Rootstock filiform. *Leafy stem* 3-4 ft. *Leaves* scarcely 1 ft. *Spike* distant from the leaves; bracts oblong, membranous, subrigid, white. *Corolla*-segments white; upper oblong, obtuse; lateral lanceolate. *Lip* with a rigid claw and a recurvato-ascending cymbiform blade.—*Descript. from Kœnig, l. c.*

††† *Spike globose.*

40. **A. xanthophlebium**, Baker; leaves lanceolate glabrous, spike globose shortly peduncled, outer bracts large oblong glabrous, lip broad 3-lobed longer than the corolla-segments, anther-crest trifid.

MALACCA, Maingay (*Kew Distrib.* 1585).

Leafy stem long, robust. *Leaves* above 1 ft. *Spikes* 2-2 $\frac{1}{2}$ in. and broad; peduncle about as long; outer bracts reddish, 1 $\frac{1}{2}$ in. *Corolla*-tube as long as the bract; lower segments oblong, upper broader ovate. *Lip* dull red, paler towards the margin, with radiating yellow veins. *Anther*-crest broad; lateral lobes decurved.

41. **A. aromaticum**, Roxb. *Fl. Ind.* i. 45; leaves oblong-lanceolate glabrous beneath, spike globose shortly peduncled, outer bracts small ovate, lip large obovate-cuneate, anther-crest trifid, fruit neither costate nor echinate. *Wall. Cat.* 6559; *Horan. Prodr.* 29 ? *Renealmia fasciculata*, *Rosc. Scit. Pl. t.* 109. *Geocalis fasciculata*, *Horan. Prodr.* 33.

EASTERN HIMALAYAS, tropical region; NEPAL, Wallich; SIKKIM, KHASIA HILLS, SILHET, & NORTHERN BENGAL; *Roxburgh*, &c.

Leafy stem 3-4 ft. *Leaves* $\frac{1}{2}$ -1 ft. by 2-4 in., and glabrous on both sides. *Spike* small, globose; peduncle generally short, rarely longer and decumbent; outer bracts 1 in., ovate, pale brown. *Corolla*-tube 1 in.; segments obtuse, nearly as long as the tube, white, tinged with brown. *Lip* pale yellow, twice as long as the corolla-segments, outer half deflexed. *Anther*-crest large, petaloid, lobes rounded. *Capsule* 1 in., oblong, trigonous.

Renealmia fasciculata is founded on a rough drawing, probably of this species.

42. **A. pterocarpum**, Thw. *Enum.* 317; leaves large oblong-lanceolate glabrous beneath, spike globose shortly peduncled, outer bracts

oblong glabrous, lip short broad, anther-crest short 3-lobed, capsule ovoid 9-ribbed.

CEYLON; forests of the central province, up to 4000 ft.

Leafy stem 3-6 ft. or more. *Leaves* thin, 1-2 ft. by 2-6 in., narrowed gradually to the base. Flowering spike globose; bracts $1\frac{1}{2}$ in., deciduous and fruiting pedicels elongating. *Lip* round, white, shortly bidentate at the base; disk yellow, tinged with red. *Capsule* 1 in.; ribs crenulate.

43. **A. Benthamianum**, *Trimen Cat. Ceyl. Pl.* 92; leaves lanceolate glabrous beneath, spike small globose shortly peduncled, bracts oblong acute glabrous, lip short broad, anther-crest broad 3-lobed, capsule small echinate.

CEYLON; Reigam Corle, *Thwaites*.

Rootstock slender. *Leafy stem* short and slender. *Leaves* 6-8 by 1-1½ in., shortly petioled. *Spike* 1 in. diam.; outer bracts greenish, 1 in.; peduncle rather longer than the spike. *Corolla-tube* 1 in.; segments oblong obtuse. *Anther-crest* with 3 shallow orbicular lobes. *Capsule* ½ in. diam.

44. **A. aculeatum**, *Roxb. in Asiat. Res.* xi. 344, t. 6; *Fl. Ind.* i. 40; leaves oblong-lanceolate glabrous beneath, spike globose shortly peduncled, outer bracts ovate, lip broad rather longer than the corolla-segments, anther-crest broad 3-lobed, capsule echinate, *Horan. Prodr.* 30.

SOUTH ANDAMAN ISLANDS, *Kurz*.—DISTRIB. Malay isles.

Rootstock tuberous. *Leafy stem* 5-10 ft. *Leaves* sessile, 1-1½ ft. by 2-4 in. *Spike* 2 in. diam.; bracts brown, acute, 1-1½ in. *Corolla-tube* 1 in.; segments oblong, half as long as the tube. *Lip* suborbicular, pale yellow, tinged with red in the centre. *Anther-crest* short, broad, equally 3-lobed. *Capsule* brown, rigid, densely echinate, 1 in. under.

45. **A. echinatum**, *Willd. Sp. Plant.* i. 8; leaves lanceolate glabrous beneath, spike globose, peduncle moderately long, bracts small oblong, lip broad rather longer than the corolla-segments, anther-crest transversely oblong 3-lobed, capsule globose echinate. *Thw. Enum.* 316; *Horan. Prodr.* 30.

CEYLON; forests of central province, up to 4000 ft.

Leafy stem 6-12 ft. *Leaves* 1-2 ft. by 2-3 in.; caudate or acuminate, sessile. *Spike* $1\frac{1}{2}$ -2 in. diam.; peduncle stout, ½ ft. bright red in the lower part, its bract-leaves very obtuse and imbricate; bracts 1 in., faintly pubescent, brown-black, convex. *Corolla-tube* 1 in.; segments oblong, obtuse. *Lip* yellow, with many fine red veins. *Anther-crest* short and broad, with three subequal orbicular lobes. *Capsule* 1 in., purplish-black, with copious curved spines.

SUBGEN. V. **Cenolophon**, *Horan. (gen.)*. *Spike* terminal on the leafy stem. (Sect. 46-48.)

46. **A. rufescens**, *Benth. in Gen. Plant.* iii. 645; leaves oblong-lanceolate, spike dense-fl. globose, lip broad 3-lobed as long as the corolla-segments. *Elettaria rufescens*, *Thw. Enum.* 430.

CEYLON; Ambagomowa district, alt. 3000 ft.

Leafy stem $1\frac{1}{2}$ -2 ft. *Leaves* ½-1 ft. by 1-2 in. moderately firm, green and glabrous on both surfaces. *Spike* small, globose, terminal, enveloped at first in a large green orbicular cuspidate bract; flower-bracts obtuse, under 1 in. *Corolla-segments* oblong, obtuse; lip as long as the corolla-segments, midlobe retuse.

47. **A. vitellinum**, *Lindl. in Journ. Hort. Soc.* ii. 245; *Bot. Reg.*

1847, t. 52; leaves oblong, spike dense-fl. globose lip orbicular twice as long as the corolla-segments. *Cenolophon vitellinum*, *Horan. Prodr.* 36.

CEYLON? Hort. Chiswick.

Leafy stem slender, 2 ft. *Leaves* 6-8 by 3-4 in., bright green, glabrous. *Spike* small, shortly peduncled; bracts green, oblong, $\frac{1}{2}$ in. *Calyx* and corolla-tube about as long as the bract; corolla-segments linear-oblong, as long as the tube. *Lip* 1 in., base spurred, bright yellow, with red veins. *Anthers* with a large trifid crest; cells glabrous, tips diverging.

48. **A. macrostephanum**, *Baker*; leaves lanceolate base cordate, spike elongate, bracts deciduous, lip obovate-cuneate much longer than the corolla-segments.

PERAK; alt. 500-1000 ft., *King's Collector*.

Leafy stem very slender, 4-8 ft. *Leaves* 1-1 $\frac{1}{2}$ ft. by 2-3 in. thin, glabrous, caudate, narrowed from the middle to the cordate base. *Spike* 3-4 in.; peduncle long, erect, enveloped in the sheath of the topmost leaf; bracts caducous. *Ovary* densely villous. *Calyx* loosely tubular, $\frac{1}{3}$ in. *Corolla*-tube rather longer than the calyx; segments linear-oblong. *Lip* 1 in. *Filament* half as long; anther glabrous; crest large, leafy, crisped, lacerate.

12. ZINGIBER, *Adans.*

Rootstock horizontal, tuberous. *Leafy stem* elongated. *Leaves* oblong-lanceolate, clasping the stem by their long sheaths. *Spikes* usually radical, rarely lateral or terminal on the leafy stem; peduncle short or long; bracts persistent, usually single-fl. *Calyx* cylindric, shortly 3-lobed. *Corolla*-tube cylindric; segments lanceolate, upper concave. Lateral *staminodes* 0 or adnate to the obovate-cuneate lip; filament short; anther-cells contiguous, crest narrow, as long as the cells. *Ovary* 3-celled; ovules many, superposed; style filiform; stigma small, subglobose. *Capsule* oblong, finally dehiscing. *Seeds* large, globose, arillate.—Species 30, Tropics of Old World.

Sect. I. **Cryptanthium**, *Horan.* *Spikes* produced direct from the rootstock, very short and dense; peduncle very short.—(Sp. 1-11.)

* *Leaves more or less pubescent beneath.*

1. **Z. chrysanthum**, *Rosc. Scit. Pl.* t. 86; leaves pubescent beneath, bracts green outer ovate inner lanceolate with a hairy cusp, corolla-segments bright red, lip bright yellow deeply 3-lobed, midlobe orbicular, lateral ovate. *Horan. Prodr.* 27. *Z. ligulatum*, *Wall. Cat.* 6566, non *Roxb.*

TROPICAL HIMALAYA, from KUMAON, ascending to 5500 ft., to SIKKIM and ASSAM.

Leafy stem 6-8 ft. *Leaves* 12 by 2-3 in., oblong-lanceolate. *Spike* very dense, globose or oblong; peduncle very short; inner bracts 1 $\frac{1}{2}$ -2 in. broad. *Corolla*-tube 1 $\frac{1}{2}$ -2 in.; segments 1 in., lanceolate. *Lip* 1 in., unspotted; basal auricles largest of any species, hence the lip is as broad as long. *Stamen* shorter than the lip. *Capsule* oblong. *Seeds* brown, nearly as large as a pea, wrapped to the top in a white membranous aril.—*Z. FLAVESCENS*, *Link.; Dietr. Sp.* i. 54, is probably a form of this, but the description is very incomplete.

2. **Z. rubens**, *Roxb. in Asiat. Res.* xi. 348; *Hort. Beng.* 1; *Fl. Ind.* i. 53; leaves pubescent beneath, bracts bright red outer ovate inner

lanceolate, corolla-segments red, lip oblong much spotted and streaked with red on a pale ground, basal auricles small rounded. *Rosc. Scit. t. 88; Horan. Prodr. 28.*

KHASIA HILLS, *H. f. & T. (Herb. Ind. Or. 10), Clarke.* BENGAL; Rungpore, Hamilton.

Leafy stem stout, 6-8 ft. *Leaves* 12 by 4-5 in. or more. *Spike* very dense, globose; peduncle 1-4 in.; inner bracts $1\frac{1}{2}$ in. *Corolla*-tube as long as the bracts; segments 1 in., lanceolate, subequal, bright red. *Lip* nearly as long as the corolla-segments, yellowish-white, copiously spotted and streaked with minute dots and lines of red-purple. *Stamen* as long as the lip, beak of the anther bright red.

3. **Z. roseum**, *Rosc. in Trans. Linn. Soc. viii. 348; Scit. Pl. t. 87;* leaves pubescent beneath, bracts pale red outer ovate inner lanceolate, corolla-segments pale red, lip oblong-cuneate whitish unspotted, basal auricles very small yellow rounded. *Roxb. in Asiat. Res. xi., 347, Fl. Ind. i. 50; Wall. Cat. 6570; Horan, Prodr. 28.* *Amomum roseum, Roxb. Coromand. Pl. t. 126.*

NORTHERN CIRCARS, *Roxburgh.*

Leafy stem 3-4 ft. *Leaves* 8-12 by 3-4 in. *Spike* very dense, oblong; peduncle very short; inner bracts $1\frac{1}{2}$ -2 in. *Corolla*-tube whitish, 2 in.; segments 1 in., lanceolate, subequal. *Lip* shorter than the corolla-segments; margins recurved, crisped. *Stamens* arching over the lip and equalling it in length; beak as long as the anther, as in the other species.

4. **Z. Nimmonii**, *Dalz. in Hook. Kew Journ. Bot. iv. (1852) 341;* leaves pubescent beneath, bracts red-striped linear-oblong or lanceolate, corolla-segments reddish-yellow, lip yellow emarginate, basal auricles small rounded. *Dalz. & Gibs. Bomb. Fl. 273; Horan. Prodr. 28.* *Alpinia Nimmonii, Grah. Cat. Pl. Bomb. 206.*

CONCANS; common in the mountains, *Nimmo, Dalzell.*

Leafy stem 4-5 ft. *Leaves* 1- $1\frac{1}{2}$ ft., 6-12 by 2-3 in. broad. *Spikes* subglobose; peduncle very short; bracts glabrous, 1- $1\frac{1}{2}$ in. *Corolla*-tube as long as the bracts; segments lanceolate. *Lip* obovate-cuneate, faintly emarginate. *Capsule* the size of a pigeon's egg.—Nearly allied to *Z. panduratum*.

5. **Z. Wightianum**, *Thw. Enum. 315;* leaves pubescent beneath, bracts green outer ovate inner lanceolate, corolla-segments pale, lip obovate-cuneate pale yellow veined and spotted with purple, basal auricles small ovate. *Z. squarrosus, Wight Ic. t. 2004, non Roxb.*

TRAVANCORE; abundant in the Anamallay forests, &c. CEYLON; common in the forests up to 4000 ft.

Leafy stem 4-6 ft. *Leaves* 12-18 by 3-4 in., oblong-lanceolate. *Spikes* oblong or subglobose; peduncle very short; flower-bracts $1\frac{1}{2}$ in., pubescent. *Corolla*-tube as long as the bract; segments subequal, under 1 in. *Lip* nearly as long as the corolla-segments, emarginate. *Stamen* shorter than the lip, arching over it, as in the other species. *Capsule* 1 in.—In a specimen from Thwaites the spike is terminal on the leafy stem, thus connecting sections *Cryptanthium* and *Dymeris*.

6. **Z. barbatum**, *Wall. Pl. Asiat. Rar. t. 55; Cat. 6567;* leaves pubescent beneath, bracts reddish-green ovate cuspidate, corolla-segments whitish, lip obovate-cuneate white emarginate, basal auricles very small. *Horan. Prodr. 28.*

BURMA, *Wallich. PEGU, McClelland.*

Leafy stem 2-3 ft. *Leaves* oblong, 6-8 by $1\frac{1}{2}$ -2 in. *Spike* $1\frac{1}{2}$ -2 in. very dense, ovoid; peduncle very short; bracts 1 in., ovate with a large green cusp, hairy all

over. *Corolla*-tube $\frac{3}{4}$ –1 in.; upper segment larger than the two side ones, concave. *Lip* $\frac{1}{2}$ in. *Stamen* as long as the lip.

7. **Z. squarrosus**, *Roxb. in Asiat. Res.* xi. 348; *Hort. Beng.* 1; *Fl. Ind.* i. 54; leaves pubescent beneath, bracts green lanceolate, tips hooked, corolla-segments pink, lip ovate emarginate yellowish-white tipped with lilac, basal auricles small spreading rounded. *Wall. Cat.* 6568; *Horan. Prodr.* 28.

BURMA, *Roxburgh*; Prome, *Wallich*. PEGU, *F. Carey*.

Leafy stem 2–3 ft. *Leaves* 12 by 3–4 in. *Spike* globose, very dense; peduncle very short; outer bracts short, ovate; inner about 1 in., pale green, tip distinctly hooked. *Corolla*-tube 1 in.; segments lanceolate, subequal, about as long as the tube. *Lip* shorter than the corolla-segments, distinctly emarginate, margins deflexed. *Stamen* nearly as long as the lip.

** *Leaves glabrous beneath.*

8. **Z. ligulatum**, *Roxb. in Asiat. Res.* xi. 348; *Hort. Beng.* 1; *Fl. Ind.* i. 51; *Coromand. Pl.* t. 253; leaves glabrous beneath, bracts pink outer ovate inner lanceolate, corolla-segments pink, lip obovate-cuneate yellowish-white unspotted, basal auricles small ovate. *Horan. Prodr.* 28.

COROMANDEL, *Roxburgh*.

Leafy stem about 2 ft. *Leaves* 12 by 2–3 in., oblong-lanceolate. *Spike* dense, subglobose; peduncle 2–3 in.; bracts about 1 in. *Corolla*-tube as long as the bract; segments subequal, $\frac{3}{4}$ in.; lip as long as the corolla-segments, margin crisped, not distinctly emarginate; basal auricles more or less acute. *Stamen* yellow, shorter than the lip. *Capsule* oblong, 1 in. and more, bright red inside. *Seeds* blackish-brown, with a nearly complete white aril.—Very near *Z. roseum*.

9. **Z. cernuum**, *Dalz. in Hook. Kew Journ. Bot.* iv. (1852) 342; leaves glabrous beneath, bracts yellowish-green ovate or oblong obtuse, corolla-segments buff-yellow, lip deeply bifid variegated pink and white, basal auricles small red and yellow. *Dalz. & Gibs. Bomb. Fl.* 273; *Horan. Prodr.* 28.

CONCAN; at Ram Ghat, *Dalzell*.

Leafy stem curved, bright light green. *Leaves* oblong-lanceolate, acuminate. *Spikes* ovoid; peduncle very short. *Lip* beautifully coloured. *Capsule* smooth, yellowish-white. *Seeds* red, striated, aril membranous.

10. **Z. panduratum**, *Roxb. Hort. Beng.* 2; *Fl. Ind.* i. 55; leaves glabrous beneath, bracts red outer ovate inner lanceolate, corolla-segments bright red, lip obovate yellowish-white unspotted, basal auricles small rounded. *Wall. Cat.* 6569; *Horan. Prodr.* 28.

PEGU, *F. Carey*. TAVOY, *Gomez*.

Leafy stem 3 ft. *Leaves* 6–12 by 3–4 in.; ligule very large. *Spike* 2 in., very dense, oblong; peduncle very short; inner bracts $1\frac{1}{2}$ in., tip not hooked. *Corolla*-tube $1\frac{1}{2}$ in.; segments 1 in., subequal. *Lip* shorter than the corolla-segments, unspotted, not emarginate. *Stamen* as long as the lip.—Nearly allied to *Z. roseum* & *ligulatum*.

11. **Z. pardocheillum**, *Wall. ex Voigt Hort. Suburb. Calcut.* 562 (name only); leaves glabrous beneath, bracts obovate-cuneate red-brown truncate, corolla-segments reddish, lip deeply 3-lobed tessellated with dark lilac on a yellowish-white ground.

BURMA, *Wallich*.

Leafy stem stout. *Leaves* 12 by 3–4 in., oblong-lanceolate, acute. *Spikes* 2–3 in.

long and broad, very dense, globose, subsessile; bracts much imbricate, outer 1 in. Corolla-tube as long as the bract; segments ovate-lanceolate, a little shorter than the tube. Lip a little shorter than the corolla-segments; midlobe obovate-cuneate, lateral orbicular. Stamen as long as the lip.

SECT. II. **Lampuzium**, Horan. Spikes produced from the root-stock on more or less elongated peduncles with sheathing scariose bract-leaves.—Species 12–21.

* *Leaves glabrous beneath.*

12. **Z. intermedium**, Baker; spikes globose, bracts lanceolate, corolla-segments pale red, lip orbicular reddish-black finely spotted, basal auricles oblong.

North KHASIA HILLS; at Bhorlasa, alt. 3500 ft., Clarke.

Peduncle slender, 2–6 in.; bract-leaves several, small, sheathing, obtuse. Spike very dense, globose, $1\frac{1}{2}$ –2 in.; bracts membranous, convolute, $1\frac{1}{2}$ in. Corolla-tube as long as the bract; segments 1 in., lanceolate. Lip as long as the corolla-segments. Anther with a dark red beak.—Spike and bracts as in sect. *Cryptanthium*, with a produced peduncle. A plant from Silhet in Herb. Wallich under *Z. Cassumunar* may be this species. An allied plant collected by Prain in the Naga hills has oblanceolate-oblong leaves above a foot long, a slender erect peduncle as long, and bracts rather longer than in Clarke's plant.

13. **Z. officinale**, Rosc. in *Trans. Linn. Soc.* viii. 348; *Scit. Pl.* t. 83; leaves lanceolate glabrous beneath, spike oblong-cylindric, bracts greenish suborbicular cuspidate, corolla-segments greenish, lip small purplish-black, mid-lobe orbicular, lateral ovate. Roxb. in *Asiat. Res.* xi. 345; *Hort. Beng.* 1; *Fl. Ind.* i. 47; *Wall. Cat.* 6564; *Grah. Cat. Pl. Bomb.* 207; *Horan. Prodr.* 27; *Bentl. & Trim. Med. Pl.* t. 270. *Z. Missionis*, Wall. *Cat.* 6565. *Amomum Zingiber*, Linn. *Sp.* 1; *Jacq. Hort. Vind.* i. t. 75. *Curcuma longifolia*, Wall. *Cat.* 6612, in part.—*Rheede Hort. Mal.* xi. 21, t. 12; *Rumph. Amboin.* v. t. 66, fig. 1.

Widely cultivated in TROPICAL ASIA; native locality unknown.

Rootstock biennial, bearing many sessile tubers. Leafy stem 3–4 ft. Leaves 6–13 by 1 in., tapering gradually to the point. Spike 2–3 by 1 in. diam.; peduncle $\frac{1}{2}$ –1 ft.; bracts about 1 in. Corolla-segments lanceolate, subequal, under an inch long. Lip shorter than the corolla-segments. Stamen dark purple, as long as the lip.—“Very rarely flowers, and have never seen seeds,” Roxburgh.

14. **Z. Griffithii**, Baker; leaves oblong glabrous beneath, spikes cylindric shortly peduncled, bracts ovate obtuse bright red, lip yellowish-white 3-lobed.

MALACCA, Griffith (*Kew Distrib.* 5731), Maingay. (K. d. 1564.)

Leafy stem 2–3 ft. Leaves 6–8 by 2–3 in. Spike 4–6 in., 1 in. diam.; peduncle very short; bracts 1 in., lower orbicular, 1 in. broad. Corolla-tube as long as the bract; segments obtuse, under 1 in.

15. **Z. gracile**, Jack. in *Malay Misc.* i. 1; leaves oblong-lanceolate glabrous beneath, spike oblong-cylindric, bracts ovate acute red, flowers yellowish-white, lip 3-lobed, midlobe bifid. Horan. *Prodr.* 27; *Hook. Bot. Misc.* i. 273.

PENANG, Jack.

Leaves 6–7 in., bright green. Scape a foot. Corolla-segments longer than the lip.—No authentic specimens of Jack's plant exist, but King's 7954 and 1027 S. from Perak, and Hullet's 854 from Mount Ophir are probably the same species. They

have a spike 6-9 in., 1 in. diam., peduncle about as long, leafy stem 2-3 ft., and a pink capsule.

16. **Z. Zerumbet**, *Smith Exot. Bot.* ii. 105, t. 112; leaves oblong-lanceolate glabrous beneath, spike oblong very dense, bracts orbicular green, corolla-segments whitish, lip sulphur-yellow unspotted, midlobe orbicular emarginate, basal lobes large orbicular. *Rosc. in Trans. Linn. Soc.* viii. 348; *Scit. Pl.* t. 84; *Roxb. in Asiat. Res.* xi. 346; *Hort. Beng.* 1; *Fl. Ind.* i. 48; *Horan. Prodr.* 27; *Grah. Cat. Pl. Bomb.* 207; *Bot. Mag.* t. 2000; *Wall. Cat.* 6562; *Wight Ic.* t. 2003; *Dalz. & Gibs. Bomb. Fl.* 272. *Z. spurium*, *Kœnig in Retz. Obs.* iii. 60. Zingiber sp., *Griff. Notul.* iii. 412; *Ic.* t. 351. *Amomum Zerumbet*, *Linn. Sp.* i. 1; *Jacq. Hort. Vind.* iii. t. 54. *A. spurium*, *Gmel. Syst.* i. 6. *A. sylvestre*, *Poir. Ency. Suppl.* v. 548. *Zerumbet Zingiber*, *Lestib. in Ann. Sc. Nat.* ser. 2, xx. 329.—*Rheede Hort. Mal.* xi. 27, t. 13; *Rumph. Amboin.* v. 148, t. 64, fig. 1.

From the HIMALAYAS to CEYLON and the MALAY PENINSULA.—DISTRIB. Widely cultivated in tropics of Old World.

Rootstock tuberous, biennial, pale yellow inside. *Leafy stem* 3-4 ft. *Leaves* 12 by 2-3 in. *Spikes* 3-4 in., $1\frac{1}{2}$ in. diam.; peduncle $\frac{1}{2}$ -1 ft.; bracts 1-1 $\frac{1}{2}$ in. long and broad, very obtuse, green with a paler edge. *Corolla*-tube as long as the bract; segments 1 in., upper broader. *Lip* with a midlobe $\frac{3}{4}$ in. broad. *Stamen* pale, as long as the lip. *Capsule* oblong, above 1 in.—I cannot from the description distinguish *Z. amaricans*, Blume; *Miq. Fl. Ind. Bat.* iii. 593.

** *Leaves more or less pubescent beneath.*

17. **Z. cylindricum**, *Moon Cat. Ceyl. Pl.* 1; leaves oblong-lanceolate pubescent beneath, spikes oblong-cylindric, bracts ovate pale or reddish, corolla-segments green, lip yellowish-white unspotted obovate, basal auricles small obtuse. *Thwaites Enum.* 315.

CEYLON; in forests of the central province.

Leafy stem 3-6 ft. and more. *Leaves* 6-8 by 1-2 in. *Spike* 3-4 in., $1\frac{1}{2}$ in. diam.; peduncle 3-9 in.; bract-leaves obtuse, imbricate; bracts about 1 in., closely imbricate, upper subacute, lowest obtuse. *Corolla*-tube as long as the bract; segments lanceolate. *Capsule* subglobose red. *Seeds* black, aril white.

18. **Z. macrostachyum**, *Dalz. in Hook. Kew Journ. Bot.* iv. (1852) 342; leaves oblong-lanceolate pubescent beneath, spike cylindric, bracts ovate reddish, corolla-segments greenish-white, lip obovate yellowish-white marked with purple lines, basal auricles small. *Dalz. & Gibs. Bomb. Fl.* 273; *Horan. Prodr.* 27. *Alpinia Neesana* (Mesuana), *Grah. Cat. Pl. Bomb.* 207.

Hills of the CONCAN, *Graham, &c.*

Stems reddish, pubescent. *Leaves* dark green, 12-18 by $1\frac{1}{2}$ -3 in. *Spike* $\frac{1}{2}$ -1 ft., $1\frac{1}{2}$ in. diam.; peduncle elongate, with large obtuse sheathing scarious bract-leaves; bracts 1-1 $\frac{1}{2}$ in. *Corolla*-tube as long as the bract; segments lanceolate, nearly 1 in. *Capsule* red, pubescent, the size and shape of a sparrow's egg.

19. **Z. spectabile**, *Griff. Notul.* iii. 413; leaves oblong-lanceolate pubescent beneath, spike dense oblong-cylindric, bracts orbicular subcoriaceous reddish with a pale margin, corolla-segments yellowish-white, lip orbicular blackish-purple, basal auricles short obtuse.

MALACCA, *Griffith (Kew Distrib.* 5762), *Maingay (K. d.* 1567). PERAK; Larut, *King's Collector.*

Leafy stem long and stout. *Leaves* 9-12 by 2-3 in. *Spike* $\frac{1}{2}$ -1 ft., $2\frac{1}{2}$ in. diam.; bracts 1-1 $\frac{1}{2}$ in. long and broad, more coriaceous and more spreading than in the

other species, resembling those of *Hitchenia glauca*; peduncle sometimes 1 ft. Corolla-tube $1\frac{1}{2}$ in.; upper segment broader than the two others. Lip emarginate. Stamen nearly as long as the lip. Capsule oblong. Seeds shining, black, and 3-5 partite, large, white.

20. **Z. Casumunar**, Roxb. in *Asiat. Res.* xi. 347, t. 5; *Hort. Beng.* 2; *Fl. Ind.* i. 49; leaves oblong-lanceolate pubescent beneath, spikes oblong, bracts ovate reddish, corolla-segments whitish, lip yellowish-white with a deeply bifid midlobe, basal auricles large oblong obtuse. *Rosc. Scit.* t. 85; *Bot. Mag.* t. 1426; *Grak. Cat. Pl. Bomb.* 207; *Dalz. & Gibs. Bomb. Fl.* 272; *Horan. Prodr.* 27. *Z. purpureum*, *Rosc. in Trans. Linn. Soc.* viii. 348. *Z. Cliffordiæ*, *Andr. Bot. Rep.* t. 555. *Z. montanum*, *Link. in Dietr. Sp.* i. 52. *Amomum montanum*, *Koenig in Retz. Obs.* iii. 51. *Casumunar Roxburghii*, *Colla Nov. Gen. Scit. in Comm. Taur.* 1830.—*Rumph. Hort. Amboin.* v. 154, tab. 65, fig. 2.

From the HIMALAYAS to CEYLON and MALAY PENINSULA.—DISTRIB. Widely cultivated only in tropical Asia.

Rootstock perennial, bright yellow inside. *Leafy stem* 4-6 ft. *Leaves* 12-18 by 2-3 in. *Spike* oblong, 4-6 in., $1\frac{1}{2}$ -2 in. diam.; peduncle 3-12 in.; bracts 1-1 $\frac{1}{2}$ in. and nearly as broad, bright red or greenish-red. *Corolla*-tube as long as the bract; segments 1 in., upper broader and more concave. Lip with an orbicular unspotted midlobe $\frac{3}{4}$ in. long and broad. Stamen yellowish-white, shorter than the lip. Capsule small, globose.—*Z. Casumunar*, *Wall. Cat.* 6563, includes three species, none of them the true one and not in a state for description.

21. **Z. Parishii**, *Hook. f. in Bot. Mag.* t. 6019; leaves oblong-lanceolate pubescent beneath, spikes oblong, bracts orbicular usually cuspidate pale green with a red edge, corolla-segments yellowish-white, lip obovate sulphur-yellow marked with brown spots and lines, basal auricles short obtuse.

TENASSERIM, *Griffith, Parish.*

Leafy stem 3 ft. *Leaves* 4-6 by 1-1 $\frac{1}{2}$ in., thin, bright green. *Spike* 2-4 in., $1\frac{1}{4}$ in. diam.; peduncle 3-4 in., with obtuse oblong sheathing bract-leaves; bracts densely imbricate, about 1 in. broad. *Corolla*-segments as long as the tube, about 1 in. *Lip* shorter than the corolla-segments, faintly emarginate; basal auricles broad, truncate. *Stamen* pale yellow, as long as the lip; beak as long as the anther.

SECT. III. **Pleuranthesis**, Benth. *Spike* peduncled arising from the side of the leafy stem. (Sp. 22.)

22. **Z. Clarkei**, *King, mss. ex. Benth. Gen. Plant.* iii. 646.

SIKKIM HIMALAYA; alt. 3000-5000 ft., *Hook. f. Thoms. (Herb. Ind. Or. 3)*, *Clarke, King.*

Leafy stem 5-6 ft. *Leaves* oblong or oblong-lanceolate, 12-18 by 2-4 in., finely pubescent beneath. *Spike* lateral, oblong-cylindric, 3-4 in., cernuous; peduncle 3-6 in.; main bracts 1 in., oblong, obtuse, green, finally reddish, 2-4-fld. *Corolla*-tube as long as the bract; segments 1 in., pale yellow, upper one broadest. *Lip* as long as the corolla-segments, oblong, yellow flushed with purplish-brown. *Stamen* pale yellow, nearly as long as the lip. *Capsule* subglobose, membranous, shorter than the bract. *Seeds* as large as a pea, brown; aril small, white.

SECT. IV. **Dymczewiezia**, *Horan. (gen.)*. *Spikes* terminal on the leafy stem. (Sp. 23, 24.)

23. **Z. capitatum**, *Roxb. in Asiat. Res.* xi. 348; *Fl. Ind.* i. 55; leaves

linear ascending, bracts ovate. *Rosc. Scit. Pl.* t. 90; *Wall. Cat.* 6560. *Dymczewiezia capitata*, *Horan. Prodr.* 26.

CENTRAL and EASTERN HIMALAYAS, from KUMAON to SIKKIM the KHASIA HILLS & SILHET.

Leafy stem 3-4 ft. *Leaves* 12-18 by 1-1½ in., tapering gradually to the point, erecto-portent, usually pubescent beneath. *Spike* sessile at the end of the leafy stem, dense-fl., erect, oblong or oblong-cylindrical, 3-6 in., 1½-2 in. diam.; bracts closely imbricate, subcoriaceous, 1½ in., green with a narrow brown edge. *Corolla*-tube as long as the bract; segments 1 in., pale yellow. *Lip* pale yellow, unspotted, midlobe orbicular emarginate ¾ in. broad, basal auricles large, oblong, obtuse, bright red. *Capsule* bright red, the size of a small olive; valves ovate. *Seeds* black, shining, aril large lacerated white.

Var. *Z. ELATUM*, *Roxb. Fl. Ind.* i. 57 (sp.). A more tropical form, with taller stems, stouter spikes and larger flowers. *Rosc. Scit. Pl.* t. 91. *Dymczewiezia elata*, *Horan. Prodr.* 26.

24. **Z. marginatum**, *Roxb. in Asiat. Res.* xi. 349; *Fl. Ind.* i. 57? leaves oblong-lanceolate spreading, bracts oblong obtuse. *Dymczewiezia marginata*, *Horan. Prodr.* 26?

KHASIA HILLS; Umwai, alt. 3000 ft., *Clarke*.

Leafy stem 3-4 ft. *Leaves* 4-6 by 1 in.; ligule, very large, lanceolate, brown. *Spike* terminal, sessile, 1-2 in., under ½ in. diam.; rachis very hairy; bracts ½ in., closely imbricate, hairy, brown when dried, obtuse, 1-fl. *Corolla* and lip not seen.—*Roxburgh's* description is very brief, and he gives no locality. *Blume* and *Miquel* give the species as Javan, and cite for it *Lampuzium minus*, *Rumph. Hort. Amboin.* v. 148 tab. 64, fig. 2.

IMPERFECTLY KNOWN SPECIES.

22. *Z. (Lampuzium) near ODORIFERUM*, *Blume Enum.* i. 14. *Leafy stem* stout several feet long, leaves 6-8 in. oblong-lanceolate, peduncle 6-8 in. erect, spike 5-6 in. long 2 in. diam. dense-fl., bracts closely imbricate ovate subacute glabrous lower 1½ in., bracteole 1 in. complicate, flower not seen.—*Andamans*, on Mount Haniot, *Prain* 59.

23. *Z. (Lampuzium) near COROLLINUM*, *Hance in Journ. Bot.* 1890, 301. *Leafy stem* long, leaves 10-12 by 1½-2 in. lanceolate glabrous, spike dense-fl. a foot long 3 in. diam., bracts 1½-2 in. subcoriaceous oblong obtuse glabrous, bracteoles 1 in., complicate; flower not seen.—*Great Cocos island*, *Andanan group*, *Prain* 713.

13. **COSTUS**, *Linn.*

Rootstock tuberous, horizontal. *Leafy stem* long. *Leaves* oblong; sheaths broad. *Spike* dense-fl., globose or ovoid, usually terminal, rarely produced direct from the rootstock on a short peduncle. *Calyx*-tube short, infundibular; teeth ovate. *Corolla*-tube not longer than the calyx; segments large, oblong, subequal. *Lateral staminodes* 0 or minute. *Lip* large, obovate, margins incurved. *Filament* forming with the connective an oblong petaloid process, in the middle of which are placed the contiguous linear anther-cells. *Ovary* 3-celled; ovules many, superposed; style filiform; stigma with a semilunar foveole, ciliated round the margin. *Capsule* globose or ovoid, finally dehiscing on one side between the ribs. *Seeds* obovoid or subglobose, aril short.—*Species* 25; tropics of both hemispheres.

1. **C. speciosus**, *Smith in Trans. Linn. Soc.* i. 249; spike ovoid or oblong terminal on the leafy stem. *Roxb. in Asiat. Res.* xi. 349; *Hort.*

Beng.?; *Fl. Ind.* i. 58; *Wall. Cat.* 6555; *Wight Ic.* t. 2014; *Grah. Cat. Pl. Bomb.* 208; *Dalz. & Gibs. Bomb. Fl.* 274; *Thwaites Enum.* 320. *Reichb. Ic. Exot.* t. 69; *Paxt. Mag.* iv. t. 245. *C. arabicus*, *Jacq. Ic.* t. 1. *Hellenia grandiflora*, *Retz. Obs.* vi. 68. *Banksia speciosa*, *König in Retz. Obs.* iii. 75.—*Rheede Hort. Mal.* xi. t. 8; *Rumph. Amboin.* vi. t. 64, fig. 2.

Throughout India from the CENTRAL and EASTERN HIMALAYAS, ascending to 4000 ft. to CEYLON and MALACCA.—DISTRIB. Malay islands.

Leafy stem 6–9 ft. stout. *Leaves* $\frac{1}{2}$ –1 ft. or more, oblong, acute, thinly silky beneath. *Spike* very dense-fl'd. 2–4 in.; bracts ovate, bright red, 1–1 $\frac{1}{2}$ in. *Calyx* 1 in.; segments 3, ovate cuspidate. *Corolla*-segments white, oblong 1–1 $\frac{1}{2}$ in. *Lip* white, suborbicular, 2–3 in., the margins incurved and meeting. *Filament* 1 $\frac{1}{2}$ –2 in. including the oblong petaloid connective. *Capsule* 1 in., globose, red, crowned with the persistent calyx.

Var. *C. NIPALENSIS*, *Rosc. Scit. Pl.* t. 80* (sp.) leafy stem shorter, leaves narrower lanceolate, spike globose. *Wall. Cat.* 6555 p. *C. speciosus*. Var. *angustifolius*, *Ker in Bot. Reg.* t. 665—Central Himalayas.

Var. *ARGYROPHYLLUS*, *Wall. Cat.* 6555 G, H.; leaves more densely silky and paler beneath, spikes globose, bracts pubescent.—Pegu and Penang.

2. ***C. globosus***, *Blume Enum. Pl. Jav.* 62 ? leaves glabrous beneath, peduncle produced direct from the rootstock, bract-leaves very short small ovate, corolla-segments glabrous. *Miq. Fl. Ind. Bat.* iii. 610 ? *Horan. Prodr.* 36 ?

MALACCA, *Maingay (Kew Distrib.* 1578).—DISTRIB. Java.

Leaves 6–8 by 2 $\frac{1}{2}$ –3 oblanceolate-oblong, narrowed gradually from the middle to the base. *Peduncle* about 2 in. curved; bract-leaves $\frac{1}{2}$ in., ovate, densely imbricate. *Spike* 1 $\frac{1}{2}$ in. globose; outer bracts ovate; inner 1 in., oblong, back scabrous towards the tip. *Calyx* 1 in. *Corolla*-segments 1 in., ovate or oblong. *Lip* and stamen *C. speciosus*.

3. ***C. Kingii***, *Baker*; leaves pubescent beneath, peduncle longer produced direct from the rootstock, bract-leaves larger oblong, corolla-segments villous.

PERAK; Larut, *King's Collector*, 2194.

Leaves 6–8 by 3–3 $\frac{1}{2}$ in., oblanceolate-oblong, subcoriaceous, broadest above the middle, narrowed gradually to the base. *Peduncle* 4–5 in. stout; bracts 1 in., densely imbricate, oblong, scarious. *Spike* 2 $\frac{1}{2}$ –3 in., very dense, globose; outer bracts above 1 in., ovate; inner lanceolate. *Calyx*-tube 1 in., villous; segments ovate, sharply cuspidate. *Corolla*-segments 1 in., hairy. *Lip* suborbicular, 2 in. long and broad.

14. **CYPHOSTIGMA**, *Benth.*

Rootstock thick, horizontal, perennial. *Leafy stem* short. *Leaves* oblong-lanceolate. *Inflorescence* a panicle distinct from the leafy stem, lax, decumbent; flowers 1–2 to a bract, bracteolate. *Calyx* cylindric, minutely 3-toothed, slit down one side. *Corolla*-tube cylindric; segments linear-oblong, subequal. *Lateral staminodes* obsolete; lip orbicular-reniform, emarginate; filament short; anther-cells distant, crest very large petaloid. *Ovary* 3-celled; ovules many, superposed; style filiform; stigma large, cylindric, gibbous at the base, stigma cup-shaped. *Capsule* and seeds unknown.

C. pulchellum, Benth. *Gen. Plant.* iii. 645; *Hook. Ic. Pl.* t. 1380. *Amomum pulchellum*, *Thwaites Enum.* 318.

CEYLON; forests of the central province, alt. 3000 ft.

Leafy tuft $1\frac{1}{2}$ –2 ft. *Leafy stem* formed from the connate bases of the petioles. *Leaves* 1–2 ft. by 3–5 in. broad at the middle, narrowed to the base; petiole $\frac{1}{2}$ –1 ft. *Panicles* like those of *Elettaria*, decumbent, sometimes a foot long; bracts oblong, obtuse, clasping the slender rachis. *Calyx* under 1 in. *Corolla*-tube rather longer than the calyx; segments under an inch long. *Lip* 1 in. broad, red and yellow; anther-crest orbicular, crenulate, rose-purple, nearly as broad as the lip.

15. **ELETTARIA**, Maton.

Rootstock thick, horizontal, perennial. *Leafy stem* long. *Leaves* oblong-lanceolate. *Panicle* produced direct from the rootstock, long, flexuous, decumbent; bracts 2–3-fld.; flowers shortly pedicelled, bracteolate. *Calyx* cylindric, membranous, shortly lobed. *Corolla*-tube cylindric; mid-segment oblong, convex; lateral narrower. *Lateral staminodes* minute teeth; lip obovate-cuneate; filament very short; anther-cells contiguous, not crested. *Ovary* 3-celled; ovules many; style filiform; stigma small, turbinate. *Capsule* globose or oblong, coriaceous, indehiscent. *Seeds* small, angled by pressure.

E. Cardamomum, Maton in *Trans. Linn. Soc.* x. 254; Benth. & Trim. *Med. Pl.* t. 267; Thw. *Enum.* 318; Horan. *Prodr.* 30. *Alpinia Cardamomum*, Roxb. in *Asiat. Res.* xi. 355; *Hort. Beng.* 1; *Coromand. Pl.* t. 226; *Fl. Ind.* i. 70; *Grah. Cat. Pl. Bomb.* 206; Dalz. & Gibs. *Flor. Suppl.* 86. *Amomum Cardamomum*, Linn. *Sp.* 1; White in *Trans. Linn. Soc.* x. 220, t. 4–5. *A. repens*, Willd. *Sp. Plant.* i. 9; *Woodv. Med. Bot.* t. 131. *A. racemosum*, Lam. *Encyc.* i. 134. *Cardamomum officinale*, Salisb. in *Trans. Linn. Soc.* i. 232.—*Rheede Hort. Mal.* xi. 9, t. 4–5.

MALABAR; on the Western Ghats, from Kurg southwards (wild or cultivated). CEYLON (cult.).

Leafy stem 6–9 ft. *Leaves* 1–2 ft. by 3 in., pubescent beneath. *Panicles* several to one leafy stem, 1–2 ft.; bracts linear-oblong, persistent, $1\frac{1}{2}$ –2 in. *Calyx* $\frac{1}{2}$ in. *Corolla*-tube shortly exserted; segments $\frac{1}{2}$ in. *Lip* longer than the corolla-segments, white sheathed with violet. *Capsule* subglobose or oblong, marked with many fine vertical ribs.

Var. MAJOR, Thw. *Enum.* 318; more robust, leaves broader, capsule 1 in. oblong-fusiform. *E. major*, Smith in *Rees. Cyclop.*; Horan. *Prodr.* 31.—Ceylon, up to 3000 ft. (indigenous).

16. **ELETTARIOPSIS**, Baker.

Rootstock slender, wide-creeping. *Leaves* 1–2-nate direct from the rootstock, long petioled. *Spike* radical lax-fld.; bracts small, membranous. *Calyx*-limb spathaceous, clasping the flower-bud. *Corolla*-tube slender, cylindric; segments linear-oblong or lanceolate. *Lateral staminodes* 0; lip obovate-cuneate; filament shorter; anther with a small orbicular petaloid crest. *Ovary* oblong, 3-celled; ovules many, superposed; style filiform; stigma small, globose. *Fruit* and *seeds* unknown.—A Bornean species and the following:—

1. **E. exserta**, Baker; spike erect, corolla-segments lanceolate, tube very long. *Cyphostigma exsertum*, *Scortech. in Nuov. Gior. Bot. Ital.* xviii. 310, t. 13.

MALAY PENINSULA; Perak, *Scortechini*, 1947.

Leaves usually solitary, erect; blade oblong-lanceolate, $2\frac{1}{2}$ –3 ft., narrowed to the base; petiole much shorter. *Spike* 6 in.; lower internodes $\frac{1}{2}$ in.; bracts lanceolate. *Calyx* 1 in. *Corolla*-tube $2\frac{1}{2}$ –3 in., cylindric, rather dilated towards the top; segments $\frac{3}{4}$ in. *Lip* 1 in., yellow, with two red streaks.

2. **E. Curtisii**, *Baker*; spike decumbent, corolla-segments linear-oblong, tube very long.

PENANG; West hill, alt. 2500 ft., *Curtis*, 1578.

Rootstock sheathed with imbricated obtuse scale-leaves. *Leaves* solitary, erect; petiole $\frac{1}{2}$ ft.; blade 8–9 by 2 in., oblong-lanceolate, coriaceous. *Spike* $1\frac{1}{2}$ –2 in.; rachis very slender; bracts lanceolate, $\frac{1}{2}$ in. *Calyx* $\frac{1}{2}$ in. *Corolla*-tube $\frac{1}{4}$ in., very slender; segments $\frac{1}{2}$ in. *Lip* deflexed, twice as long as the corolla-segments.

3. **E. serpentina**, *Baker*; spike decumbent secund, corolla-segments linear-oblong, tube twice as long as the calyx-limb.

PENANG, alt. 100°–1500 ft., *King's Collector*.

Rhizome very slender, sheathed by oblong imbricated scale-leaves. *Leaves* less than 12 in. by 2 in., geminate, erect, lanceolate, subcoriaceous, glabrous; petiole slender, 8–9 in. *Spike* 2–3 in.; shortly peduncled; bracts small, lanceolate, membranous. *Calyx*-tube $\frac{1}{2}$ in. *Corolla*-tube 1 in.; segments half as long as the tube. *Lip* white, marked with red-brown and yellow in the centre.

17. **SCAPHOCHLAMYS**, *Baker*.

Rootstock wide-creeping, not tuberous. *Stem* 0. *Leaves* erect, oblong-lanceolate; petiole as long as the blade. *Spike* lax-fl'd.; bracts several-fl'd., large, lingulate, persistent. *Calyx* oblique, spatheaceous. *Corolla*-tube slender, cylindric, longer than the calyx; lip obovate-cuneate, emarginate; filament short; anther-cells slightly divergent, with a small petaloid-crest. *Ovary* 3-celled?; ovules few in a cell; style filiform; stigma small, globose. *Capsule* subglobose, membranous. *Seeds* ovoid, with a large white aril cut down to the base into subulate processes.

S. malaccana, *Baker*.

MALACCA; Mount Ophir, *Cuming*, *Griffith* (K. d. 5761), *Maingay* (*Kew Distrib.* 1579), *Hullett*.

Leaf-blade firm, glabrous, 6–8 by 2–3 in. *Spike* of about 6 nodes; peduncle short, slender; bracts 1– $1\frac{1}{2}$ in., green, lingulate, erecto-patent, obtuse, involute in the lower half. *Calyx* $\frac{1}{2}$ in. *Flowers* white. *Corolla*-tube under 1 in., slender, cylindric; segments shorter than the tube. *Lip* under 1 in. *Stamen* porrect, shorter than the lip. *Capsule* $\frac{1}{2}$ in., 3-seeded.

18. **ALPINIA**, *Linn.*

Rootstock horizontal. *Leafy stem* elongated. *Leaves* oblong or lanceolate. *Panicle* or *raceme* terminal (except in sp. 16–17); bracteoles sometimes enveloping the bud. *Calyx* laxly tubular, shortly 3-toothed. *Corolla*-tube cylindric, usually not longer than the calyx; segments linear-oblong or oblong, upper usually broader and more convex. *Lateral staminodes* 0 or very small; lip patent, often orbicular with incurved margins, sometimes with 2 subulate processes at the base of the claw; filament flattened; anther-cells divergent at the apex, furnished rarely with an orbicular crest. *Ovary* 3-celled, ovules few or many in a cell; style filiform; stigma subglobose. *Fruit* globose, dry or fleshy, usually

indehiscent. *Seeds* globose or angled by pressure.—Species 30, in the Tropics of the Old World.

Sect. I. **Ethanium**, Horan. *Anther* not crested. *Bud* not enclosed in large bracteoles. *Panicle* terminal.—(Sp. 1–9).

1. **A. conchigera**, Griff. *Notul.* iii. 424; *Ic. Plant. Asiat.* t. 354; leaves oblong-lanceolate glabrous beneath, panicle long narrow, flowers small, corolla-segments oblong greenish, lip orbicular yellowish with red lines and dots with two small teeth at the base. *A. Galanga*, Wall. *Cat.* 6572 E, F. *Strobidia conchigera*, Kuntze *inedit.*

CHITTAGONG and the Malay Peninsula to MALACCA.—DISTRIB. Siam, Cambodia.

Leafy stem 3–4 ft. *Leaves* $\frac{1}{2}$ –1 ft. by 2–3 in. *Panicle* 6–9 in.; rachis pubescent; lower branch often elongate, the others short ascending; bracts small, brown, scariose, ovate. *Calyx* $\frac{1}{2}$ – $\frac{3}{4}$ in.; mouth oblique, obscurely 3-dentate. *Corolla*-tube scarcely longer than the calyx; segments $\frac{1}{2}$ in. *Lip* with incurved margins, not longer than the corolla-segments, not clawed. *Ovules* 2 in each cell.—I do not regard *Strobidia* as generically distinct from *Alpinia*.

2. **A. Manii**, King MSS. (under *Strobidia*); leaves oblong-lanceolate glabrous beneath, panicle long narrow subracemose, flowers small, corolla-segments oblong, lip narrow cuneate.

ANDAMAN ISLANDS, King's Collector.

Leafy stem elongate. *Leaves* shortly petioled, 12 in. or more by 3–4 in., bright green, with more prominent ribs than in its allies. *Panicle* 6–9 in.; rachis pubescent; branches short, erecto-patent, usually 1-fl.; bracts minute, *Calyx* $\frac{1}{2}$ in., minutely 3-dentate. *Corolla*-tube twice as long as the calyx; segments $\frac{1}{2}$ in. *Lip* scarcely longer than the corolla-segments. *Capsule* globose, $\frac{1}{4}$ in. diam., 1–2 seeded.

3. **A. Galanga**, Sw. *Obs. Bot.* 8; leaves oblong-lanceolate glabrous beneath, panicle copiously compound, flowers small, corolla-segments linear-oblong greenish-white, lip obovate-clawed emarginate white veined with lilac, with a pair of subulate glands at the base of the claw. *Roxb. Hort. Beng.* 2; *Asiat. Res.* xi. 352; *Fl. Ind.* i. 59; *Rosc. in Trans. Linn. Soc.* viii. 345; *Wall. Cat.* 6572, ex parte; *Grah. Cat. Pl. Bomb.* 206; *Dalz. & Gibs. Bomb. Fl.* 274; *Thw. Enum.* 319. *A. viridiflora*, Griff. *Notul.* iii. 423; *Ic. Pl. Asiat.* t. 353. *Maranta Galanga*, Linn. *Sp. Plant.* 2. *Galanga*, Salisb. in *Trans. Hort. Soc.* i. 281.—*Rumph. Amboin.* v. t. 63.

Throughout INDIA from the foot of the Himalayas to CEYLON and MALACCA.—DISTRIB. Malay islands and widely cultivated.

Rootstock perennial, tuberous, slightly aromatic. *Leafy stem* 6–7 ft. *Leaves* 1–2 ft. by 4–6 in., green and glossy on both sides. *Panicle* dense-fl., $\frac{1}{2}$ –1 ft., rachis densely pubescent, branches numerous short; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in.; bracts small, ovate, *Calyx* greenish-white, $\frac{1}{2}$ in. oblique at the throat. *Corolla*-segments $\frac{1}{2}$ – $\frac{3}{4}$ in. *Lip* distinctly clawed, $\frac{1}{2}$ in., basal glands ascending, reddish, linear-subulate. *Stamen* arcuate, shorter than the lip. *Ovules* 1–2 in a cell. *Fruit* orange-red, the size of a small cherry.—Probably *A. alba*, *Rosc. in Trans. Linn. Soc.* viii. 346 (*Hellenia alba*, Willd. *Sp. Plant.* i. 5. *Languas vulgare*, Koenig in Retz. *Obs.* iii. 64; *Heritiera. alba*, Retz. *Obs.* vi. 18), *A. carnea*, Griff. *Notul.* iii. 420, and *A. zingiberina*, Hook. f. in *Bot. Mag.* t. 6944 are forms. The drawing of *Costus arabicus*, Linn. in Hermann's Ceylon Herbarium belongs here.

4. **A. Allughas**, *Rosc. in Trans. Linn. Soc.* viii. 346; *Scit. Pl.* t. 67; leaves oblong-lanceolate glabrous beneath, panicle narrow copiously com-

pound, flowers small, corolla-segments linear-oblong greenish-white, lip cuneate pink distinctly emarginate with two small linear-subulate glands at the base. *Roxb. in Asiat. Res.* vi. 353; *Hort. Beng.* 2; *Fl. Ind.* i. 61; *Wall. Cat.* 6571; *Griff. Notul.* iii. 432; *Grah. Cat. Pl. Bomb.* 206; *Dalz. & Gibs. Bomb. Fl.* 273; *Thw. Enum.* 320; *Horan. Prodr.* 33. *A. Rheedii*, *Wight Ic.* t. 2026, *Hellenia Allughas*, *Willd. Sp. Plant.* i. 4; *Andr. Bot. Rep.* t. 501; *Salisb. in Trans. Hort. Soc.* i. 281. *Heritiera Allughas*, *Retz. Obs.* vi. 17, t. 1. *Zingiber nigrum*, *Gaertn. Fruct.* t. 12.—*Rheede Hort. Mal.* xi. t. 14.

From the HIMALAYAS to CEYLON and MALACCA.—DISTRIB. Malay isles and widely cultivated.

Rootstock tuberous, biennial or perennial. *Leafy stem* 3–6 ft. *Leaves* 1–1½ ft. by 3–6 in., smooth and glossy on both surfaces. *Panicle* erect, ½–1 ft.; branches pubescent, fewer and more ascending than in *A. Galanga*; flowers crowded, shortly pedicelled; bracts small, ovate-amplexicaul. *Calyx* pubescent, ¾–1 in.; mouth oblique. *Corolla*-tube as long as the calyx; segments as long as the tube. *Lip* clawed. *Stamen* arcuate, shorter than the lip. *Capsule* globose, black, ½ in. diam.

5. *A. calcarata*, *Rosc. in Trans. Linn. Soc.* viii. 347; *Scit. Pl.* t. 68; leaves lanceolate glabrous beneath, panicle short, slightly compound flowers middle-sized, corolla-segments oblong greenish-white, lip oblong striped and spotted with red and yellow on a pale ground with edges slightly incurved, base spurred. *Roxb. in Asiat. Res.* xi. 355; *Hort. Beng.* 2; *Fl. Ind.* i. 69; *Bot. Reg.* t. 141; *Wall. Cat.* 6577; *Grah. Cat. Pl. Bomb.* 206; *Wight Ic.* t. 2028; *Dalz. & Gibs. Bomb. Fl.* 274; *Thw. Enum.* 320. *A. bracteata*, *Rosc. in Trans. Linn. Soc.* xi. 381; *Scit.* t. 70, non *Roxb.*, *A. cernua*, *Sims in Bot. Mag.* t. 1900. *Renealmia calcarata*, *Haw. in Andr. Bot. Rep.* t. 421; *Salisb. in Trans. Hort. Soc.* i. 231. *Globba erecta*, *Red. Lil.* t. 174.

SOUTHERN MALAY PENINSULA, the CONCAN, and CEYLON.—DISTRIB. China, and widely cultivated.

Rootstock perennial, not tuberous. *Leafy stem* slender, 2–4 ft. *Leaves* 6–12 by 1–2 in. acuminate, green and glossy on both surfaces. *Panicle* dense-fld., 3–4 in.; rachis pubescent; lower branches short, bearing 3–4 crowded flowers; bracts small, ovate. *Calyx*-tube funnel-shaped, ¼–½ in.; ovary densely pubescent. *Corolla*-segments ½ in. *Lip* 1–1½ in., beautifully variegated with red and yellow, emarginate. *Anther*-cells minutely margined. *Ovules* many in a cell. *Capsule* globose, red.

6. *A. Wrayi*, *King MSS.*; leaves lanceolate glabrous beneath, peduncle scarcely leafy, panicle short slightly compound, flowers middle-sized, corolla-segments oblanceolate, lip dark yellow obovate-cuneate.

PENANG, alt. 2–3000 ft., *King's Collector*.

Leafy stem elongate. *Leaves* 12 by 2 in. or more, acute, moderately firm. *Peduncle* from the rootstock, slender, erect, under a foot long, with several sheathing bract-leaves, only the uppermost produced into a small lanceolate blade. *Panicle* 3–4 in., dense-fld., erect; bracts small, deciduous. *Ovary* very hairy. *Calyx* ½ in., narrowly funnel-shaped. *Corolla*-tube as long as the calyx; segments ¾ in. *Lip* 1 in.—May be an abnormal form of *A. calcarata*.

7. *A. mutica*, *Roxb. in Asiat. Res.* xi. 354; *Hort. Beng.* 2; *Fl. Ind.* i. 67; leaves oblong-lanceolate glabrous beneath, panicle slightly compound, flowers large, corolla segments oblong white, lip suborbicular variegated red and yellow, base not spurred, margins much incurved. *Rosc.*

Scit. Pl. t. 69; *Hook. f. in Bot. Mag.* t. 6908; *Horan. Prodr.* 34. *Renealmia mutica*, *Salisb. in Trans. Hort. Soc.* i. 280.

PENANG, *Roxburgh.* MALAY PENINSULA.—DISTRIB. Malay isles.

Rootstock perennial, not tuberous. *Leafy stem* 4–6 ft. *Leaves* 1–2 ft. by 2–4 in. *Panicle* 6–9 in.; rachis stout, very pubescent; lower branches short, 2–3; bracts oblong. *Calyx*-tube $\frac{1}{2}$ in., funnel-shaped, white bordered with pink. *Corolla*-segments 1 in. *Lip* $1\frac{1}{2}$ in., nearly as broad, beautifully variegated with red and yellow, *Capsule* globose, 1 in. diam., bright yellow. *Seeds* many in a cell.

8. **A. petiolata**, *Baker*; leaves oblong-lanceolate petioled glabrous beneath, raceme simple, bracts large, flowers large, lip obovate-cuneate.

PERAK, alt. 2500–4000 ft., *Kunstler.*

Leafy stem 2–3 ft. *Leaves* 1– $1\frac{1}{2}$ ft. by 3–4 in., subcoriaceous, dark glossy green, petiole 3–4 in. *Spike* moderately dense-fl., erect, 3–4 in.; rachis slender, pubescent; bracts 1 in., green membranous. *Ovary* densely villose. *Calyx* 1 in. *Lip* half as long again as the calyx, bright yellow; filament 1 in.

9. **A. Rafflesiana**, *Wall. Cat.* 6575; leaves lanceolate finely pubescent beneath, panicle dense subglobose, flowers middle-sized, corolla-segments oblong reddish-yellow, lip suborbicular margins much incurved. *Hook. Ic.* t. 1063. *A. aurantiaca*, *Wall. mss.*

PENANG, SINGAPORE and MALACCA.

Rootstock perennial, not tuberous. *Leafy stem* 4–6 ft. *Leaves* 1– $1\frac{1}{2}$ ft. by 2–3 in. *Panicle* sessile at the end of the leafy stems, congested into a globose head 2 in. long, subtended by a large ovate green bract; pedicels very short; flower-bracts small, persistent, orbicular, subcoriaceous. *Calyx* funnel-shaped, bright red, $\frac{1}{2}$ – $\frac{3}{4}$ in. *Corolla*-segments concave, $\frac{1}{2}$ – $\frac{3}{4}$ in. *Lip* $\frac{3}{4}$ –1 in. long and broad, beautifully striped with red on a yellow ground. *Capsule* globose, small.—*Alpinia vittata* of gardens appears to be a form of this very distinct species with leaves variegated with white.

Subgen. II. **Catumbium**, *Juss.* *Anther* not crested. *Bud* enclosed in large membranous bracteoles. *Raceme* or *panicle* terminal.—Species 10–13.

10. **A. bracteata**, *Roxb. Hort. Beng.* 2; *Fl. Ind.* i. 63; raceme simple, bracteoles green. *Wall. Cat.* 6578, non *Roscoe*. *A. Roxburghii*, *Sweet Hort. Brit. edit.* 2, 493; *Horan. Prodr.* 34.

EAST HIMALAYAS, BENGAL, ASSAM, CACHAR, BURMA, the SHAN STATES and MALACCA.

Leafy stem 3–6 ft. *Leaves* oblong-lanceolate, 1– $1\frac{1}{2}$ ft. by 2–4 in., pubescent beneath. *Raceme* dense-fl., 6–9 in.; rachis densely pubescent; pedicels very short. *Buds* not so short and more acute than in *A. malaccensis*; bracteoles 1 in., oblong-navicular. *Corolla*-segments 1 in., oblong, pure white. *Lip* ovate, half as long again as the corolla-segments, emarginate, edge white, centre variegated red and yellow, margins incurved; base with two ascending horn-like processes. *Capsule* large, globose. *Seeds* many in a cell.

11. **A. malaccensis**, *Rosc. in Trans. Linn. Soc.* viii. 345; raceme simple, bracteoles white. *Roxb. in Asiat. Res.* xi. 353; *Hort. Beng.* 2; *Fl. Ind.* i. 64; *Bot. Reg.* t. 328; *Wall. Cat.* 6573 *A. Horan. Prodr.* 34. *Maranta malaccensis*, *Burm. Fl. Ind.* 2; *Willd. Sp. Plant.* i. 14. *Costus malaccensis*, *König in Retz. Obs.* iii. 71.—*Rumph, Amboin.* v. t. 71, fig. 1.

EASTERN HIMALAYAS, ASSAM, KHASIA HILLS and CHITTAGONG, ascending to 5000 ft. MALABAR, *Law.*

Rootstock perennial. *Leafy stem* 6–10 ft. *Leaves* 2–3 ft., oblong-lanceolate, pubescent beneath. *Raceme* erect, $\frac{1}{2}$ –1 ft.; rachis very stout, densely pubescent; pedicels all very short. *Buds* oblong, obtuse; bracteoles oblong-navicular, 1 in. *Corolla*-segments white, oblong, 1 in. *Lip* ovate, emarginate, $1\frac{1}{2}$ –2 in., margin pale; centre beautifully variegated red and yellow; edges much incurved. *Capsule* globose, yellow, 1 in. diam. *Seeds* many, ovoid.

12. **A. nutans**, *Rosc. in Trans. Linn. Soc.* viii. 346; *Seit.* t. 73; panicle cernuous slightly compound, bracts deciduous, peduncles short, bracteoles white tipped with pink. *Smith Exot. Bot.* ii. t. 106; *Roxb. in Asiat. Res.* xi. 354; *Hort. Beng.* 2; *Fl. Ind.* i. 65; *Bot. Mag.* t. 1903; *Wall. Cat.* 6574 ex parte; *Grah. Cat. Pl. Bomb.* 206; *Wight Ic.* t. 2027; *Thw. Enum.* 320. *A. malaccensis*, *Wall. Cat.* 6573 B, *C. A. cristata*, *Griff. Notul.* iii. 421. *Globba nutans*, *Linn. Mant.* 170; *Red. Lil.* t. 60. *Renealmia nutans*, *Andr. Bot. Rep.* t. 360; *Salisb. in Trans. Hort. Soc.* i. 279. *Zerumbet speciosum*, *Jacq. Fragm.* t. 68; *Wendl. Sert. Han.* t. 19.

EASTERN HIMALAYAS AND MALAY PENINSULA.—DISTRIB. Malay islands.

Rootstock perennial. *Leafy stem* 8–10 ft. *Leaves* 1–2 ft. by 3–6 in., oblong-lanceolate, finely pubescent beneath. *Panicle* $\frac{1}{2}$ –1 ft.; rachis very hairy; lower branches bearing 2–3 crowded flowers. *Bracteoles* 1 in. or more, broad, oblong-navicular. *Corolla*-segments oblong, 1 in., white tipped with pink. *Lip* ovate, $1\frac{1}{2}$ in. long and broad, base spurred, margins pale, centre beautifully variegated with red and yellow, margins much incurved. *Capsule* red, globose. *Seeds* many in a cell.

Var. . *ASERICEA*, *Moon Cat. Ceyl.* 1 (sp.); panicle shorter, flowers smaller, bracteoles and corolla-segments not tipped with pink.—Ceylon.

13. **A. involucrata**, *Griff. Notul.* iii. 422; panicle cernuous slightly compound, bracts persistent cupular, bracteoles white.

MALACCA, *Griffith (Kew Distrib.* 5697), *Maingay (K. d.* 1574). PERAK, *King's Collector*.

Nearly allied to *A. nutans*, of which it may be only a variety. *Leafy stem* 10–15 ft. Lower branches of the *panicle* elongated, with 2–3 flowers crowded at the lip, enveloped by persistent scarious bracts. *Capsule* globose, 1 in. diam.

SECT. III. **Hellenia**, *Willd.* *Anther* furnished with a small petioled crest. *Panicle* terminal. (Sp. 14–17.)

14. **A. aquatica**, *Rosc. in Trans. Linn. Soc.* viii. 346; leaves oblong not scabrous, anther with a semi-orbicular crest, lip obcordate. *Hellenia aquatica*, *Horan. Prodr.* 35. *Heritiera aquatica*, *Retz. Obs.* v. 18. *Languas aquaticum vel sylvestre*, *Kœnig in Retz. Obs.* iii. 65.

THE DECCAN PENINSULA, in swamps, *Kœnig*.

Leafy stem 4 ft. and more. *Leaves* coriaceous, bright green, denticulate, glabrous beneath. *Panicle* narrow, oblong, peduncled, with 2–3 membranous white bracts at the base. *Calyx*-limb tubulose-campanulate, glabrous, tridentate. *Corolla*-segments whitish; upper ovate-oblong; two lower acute, approximate. *Lip* shorter than the corolla-segments, with an oblong gland on each side at the base. *Anther* with a coloured crest. *Capsule* black. *Seeds* about 5, trietrous.—Known only from *Kœnig's* description.

15. **A. scabra**, *Benth. in Gen. Plant.* iii. 648; leaves lanceolate very scabrous above, anther with an obscure truncate crest, lip narrow bilobed. *Hellenia scabra*, *Blume Enum.* i. 60; *Miq. Fl. Ind. Bat.* iii. 603; *Horan. Prodr.* 35.

PERAK, alt. 2-3000 ft., *King's Collector*.—DISTRIB. JAVA.

Leafy stem 6-8 ft. *Leaves* above 1 ft., $2\frac{1}{2}$ -3 in. broad, very scabrous. *Panicle* 1 ft., erect, with a few short spreading compound branches at the base; branchlets about 1 in., bearing several pedicelled waxy white flowers; bracts minute. *Calyx* $\frac{1}{4}$ in.; teeth minute. *Corolla-tube* as long as the calyx; segments oblong, $\frac{1}{8}$ in. *Lip* not longer than the corolla-segments. *Anther-cells* divaricate upwards, the truncate connective scarcely overtopping them. *Capsule* globose, $\frac{1}{8}$ in. diam.

Subgen. IV. **Geostachys**, Baker. *Anther* not crested. *Buds* enclosed in large bracteoles. *Spike* radical.

16. **A. ? decurvata**, Baker; leaves lanceolate, racemes not secund.

PERAK; Larut, alt. 3-4000 ft., *King's Collector*.

Leafy stem 4-5 ft. *Leaves* 12-15 by $1-1\frac{1}{4}$ in., narrowed to a petiole 1 in. long. *Racemes* 6 in., lax, decurved; peduncle short, slender, erect, hidden by the large imbricate green bract-leaves; pedicels deflexed, $\frac{1}{2}$ in.; bracteoles $1\frac{1}{2}$ in., green, oblong-navicular, acute, persistent. *Ovary* oblong, shortly peduncled within the bracteole. *Calyx* $\frac{1}{2}$ in., spathaceous. *Corolla-tube* as long as the calyx; segments linear-oblong, $\frac{1}{2}$ in. *Lip* obovate, longer than the corolla-segments. "*Flowers* bright yellow, tinged with red. *Fruit* glossy, dark red."

17. **A. ? secunda**, Baker; leaves oblong-lanceolate, racemes secund.

PERAK, alt. 3-4000 ft., *King's Collector*, 8047.

Nearly allied to *A. ? decurvata*, with which it entirely agrees in habit and in the flower being enclosed in large persistent oblong-navicular green bracteoles. *Leaves* 6-8 by 2 in.; petiole short. *Raceme* simple, lax-fld., secund, deflexed; pedicels cernuous, $\frac{1}{2}$ in.; bracteoles under 1 in. *Calyx* cylindric, spathaceous, $\frac{1}{2}$ in. "*Flower* light yellow. *Fruit* deep red."

19. **RHYNCHANTHUS**, Hook. f.

Rootstock tuberous; fibres stout, hairy. *Stem* leafy. *Leaves* oblong-lanceolate. *Spike* terminal. *Calyx* cylindric, minutely toothed. *Corolla-tube* long, subcylindric; segments ovate-lanceolate, acuminate. *Lateral staminodes* obsolete; lip nearly obsolete; filament long linear, margins incurved, tip filiform; anther-cells contiguous, not crested. *Ovary* 3-celled: ovules many, superposed; style filiform; stigma small, turbinate. *Capsule* and *seeds* not seen.

R. longiflorus, Hook. f. in *Bot. Mag.* t. 6861.

BURMA (*Hort. Low*).

Rootstock ovoid, green, $1-1\frac{1}{2}$ in. diam. *Leafy stem* $1\frac{1}{2}$ -2 ft. *Leaves* 6-8 by $1\frac{1}{2}$ -2 in. *Spike* 4-6 in., sessile at the end of the stem; bracts 2 to each flower, linear, green, $1-1\frac{1}{2}$ in., wrapped round the calyx-tube. *Corolla-tube* $1\frac{1}{2}$ -2 in.; segments 1 in. *Stamen* as long as the corolla-tube.

20. **CLINOGYNE**, Salisb.

Rootstock tuberous or sublignose. *Stems* leafy, copiously dichotomously branched. *Leaves* oblong or oblong-lanceolate. *Panicle* lax-fld. terminal; flowers in pairs; bracts long, narrow, firm. *Sepals* short, free. *Petals* narrow, connivent. *Staminal tube* cylindric; segments obovate, petaloid, unequal; anther 1-celled, adnate to the margin of one segment. *Ovary* 3-celled; cells 1-ovuled; style adnate below to the staminal tube, above free, hooked; stigma capitate. *Fruit* indehiscent.

1-3-seeded. *Seeds* subglobose, aril lacerate; embryo curved.—Species 7-8; tropics of Old World.

1. **C. dichotoma**, *Salisb. in Trans. Hort. Soc. i.* 276; leaves broadly rounded at the base, branches of panicle few short, staminal tube elongate, fruit 2-3-lobed 2-3-seeded. *Benth. in Gen. Plant. iii.* 651. *Phrynium dichotomum*, *Roxb. in Asiat. Res. xi.* 324; *Hort. Beng. 1*; *Fl. Ind. i.* 2; *Horan. Prodr. 11, in part.* *Maranta dichotoma*, *Wall. Cat. 6614*. *M. ramosissima*, *Wall. Cat. 6615*; *Pl. Asiat. Rar. t.* 286; *Grah. Cat. Pl. Bomb. 212*. *Donax Arundinastrum*, *Lour. Fl. Coch. 15*. *Thalia cannæformis*, *Willd. Sp. Plant. i.* 16.—*Rumph. Amboin. iv.* 22, t. 7.

EASTERN BENGAL and the MALAY PENINSULA.—DISTRIB. Malay islds.

Shrub 15 ft.; stem short, woody; branches slender. Upper leaves ovate-oblong, 3-6 in. by $1\frac{1}{2}$ -2 in. Branches of panicle at most 3-4 in.; outer bracts lanceolate, $1\frac{1}{2}$ in. *Flowers* white; 1 in. *Sepals* lanceolate. *Petals* oblanceolate, spreading in the upper half. *Staminal tube* as long as the largest lobes; lip flat. *Fruit* $\frac{1}{2}$ in. diam.

2. **C. grandis**, *Benth. in Gen. Plant. iii.* 651; leaves broadly rounded at the base, branches of the panicle many and moderately long, staminal tube elongated, fruit globose smooth 1-seeded. *Maranta grandis*, *Miq. Fl. Ind. Bat. Suppl. 616*. *Phrynium dichotomum*, *Korn. in Mem. Mosc. xi.* t. 89; *Horan. Prodr. 11, in part, not Roxb.*

TENASSERIM, MALACCA, PERAK, SINGAPORE, and the ANDAMAN ISLANDS.—DISTRIB. Malay islds.

Habit of *C. dichotoma*. Upper leaves $\frac{1}{2}$ -1 ft. by 3-6 in. Branches of the panicle sometimes 6-9 in.; outer bracts $1\frac{1}{2}$ in. *Flowers* as in *C. dichotoma*. *Fruit* glossy, $\frac{3}{4}$ - $\frac{1}{2}$ in. diam.

3. **C. virgata**, *Benth. in Gen. Plant. iii.* 651; leaves slightly rounded at the base, branches of the panicle many and long, staminal tube short, fruit 2-3-lobed 2-3-seeded, *Maranta virgata*, *Wall. Cat. 6616*; *Wight Ic. t.* 2015; *Thw. Enum. 320*. *Phrynium virgatum*, *Roxb. in Asiat. Res. xi.* 324; *Hort. Beng. 1*; *Fl. Ind. i.* 4.

The DECCAN PENINSULA and CEYLON.

Stems 6-8 ft. Upper leaves 4-6 by $1-1\frac{1}{2}$ in.; lower $1-1\frac{1}{2}$ ft. *Panicle* 1 ft. or more; branches very slender, flexuose; outer bracts about 1 in. *Flowers* white, inodorous, much smaller than in *C. dichotoma*. *Fruit* the size of a large pea.

21. **PHRYNIUM**, *Willd.*

Rootstock creeping. *Leaves* large, oblong, radical; petiole long, sheathing. *Spike* compound, produced from the side of the petiole or direct from the rootstock; main bracts 2- ∞ -fid. *Sepals* 3, narrow. *Corolla*-tube cylindric; segments 3, linear-oblong, subequal, spreading. *Staminal tube* longer than the corolla-tube; segments unequal, petaloid, one bearing the 1-celled anther on its margin. *Ovary* 3-celled; cells 1-ovuled, rarely 2 cells empty; style adnate in the lower part to the staminal tube; free portion hooked; stigma capitate. *Fruit* globose, indehiscent or finally dehiscent. *Seeds* 1-3 erect; aril short, fleshy; embryo curved.—Species 20; tropics of Old World.

1. **P. capitatum**, *Willd. Sp. Plant. i.* 17; spike globose from the

side of the petiole rarely terminal, main bracts oblong with an incurved scarious tip which breaks up into bristles, corolla-segments longer than the tube, fruit usually 3-seeded. *Roxb. in Asiat. Res.* xi. 325, t. 1; *Hort. Beng.* 1; *Fl. Ind.* i. 8; *Wall. Cat.* 6619; *Wight Ic.* t. 2016; *Thw. Enum.* 320. *Phyllodes Placentaria*, *Lour. Fl. Coch.* ch. 17. *Maranta Placentaria*, *A. Dietr. Sp.* i. 30.—*Rheede Hort. Mal.* xi. t. 34.

EASTERN HIMALAYAS, MALAY PENINSULA, MALABAR, TRAVANCORE, CEYLON. **DISTRIB.** Malay islds.

Rootstock perennial, tuberous. *Leaves* oblong, 1-1½ ft. by 6-8 in.; petiole longer than the blade, that which bears the spike 2-3 ft. or more. *Spike* sessile. 1½-2 in. diam.; subtended by 2-3 large rigid ovate bracts; inner main bracts 1 by ½ in., firm, oblong, several-fld. *Sepals* large, linear. *Corolla*-segments linear-oblong purple. *Capsule* turbinate, 3-lobed, the size of a gooseberry, smooth, 3-valved.

2. **P. parviflorum**, *Roxb. Hort. Beng.* 1; *Fl. Ind.* i. 7; spike globose from the side of the petiole, bracts lanceolate, corolla-segments white shorter than the tube, fruit usually 1-seeded. *Rosc. Scit. Pl.* t. 34; *Wall. Cat.* 6620; *Horan. Prodr.* 11. *Maranta parviflora*, *A. Dietr. Sp.* i. 30.

EASTERN HIMALAYAS and MALAY PENINSULA, and the CONCAN.

Rootstock perennial. *Leaves* oblong-cuspidate, 1-1½ ft. by 6-8 in.; petiole longer than the blade, the one that bears the spike 2-2½ ft. *Spike* sessile, 1-2 in. diam.; bracts 1 in., pale green, acute, 2-3-fld. *Corolla*-tube as long as the bract; segments linear-oblong. *Staminal* lobes small, orbicular, white tipped with yellow.

3. **P. imbricatum**, *Roxb. Hort. Beng.* 1; *Fl. Ind.* i. 6; spike oblong from the side of the petiole, main bracts oblong obtuse, corolla-segments shorter than the tube, fruit usually 3-seeded. *Horan. Prodr.* 11. *Maranta imbricata*, *A. Dietr. Sp.* i. 30.

CHITTAGONG, *Roxburgh.*

Habit of *P. capitatum* and *parviflorum*. *Leaves* 1½-2 ft.; oblong, acute, petiole longer than the blade. *Spike* 3-4 in.; main bracts 1-1½ in. long, minutely toothed at the obtuse tip. *Calyx* and *corolla* of *P. parviflorum*. *Staminal* lobes small, white. *Capsule* rugose, oblong, the size of a large field bean.

A flowerless specimen with similar but terminal spikes and bracts, much smaller leaves and more slender petiole, collected at Rangoon by McClelland, probably represents a distinct species.

4. **P. macrostachyum**, *Wall. Cat.* 6612 A, B; spike long lax from the side of the petiole, main bracts lanceolate complicate, fruit 1-seeded.

PEGU, *Wallich.* TAVOY, *Gomez.* TENASSERIM, *Helfer.*

Rootstock short, with copious slender fibres. *Leaves* nearly 4 by 3-4 in., thin oblong, caudate; petiole twice as long as the blade. *Spike* sessile, 9-12 in.; main bracts 2-4 in., spaced out on the rachis, ascending; finally scarious. *Fruit* small, smooth, oblong, crowned with the small green lanceolate sepals.—*P. musaceum*, *Wall. Cat.* 6612 C, from the Trogl hills, known in leaf only, is probably a different species.

5. **P. spicatum**, *Roxb. Hort. Beng.* 1; *Fl. Ind.* i. 5; spike radical shortly-peduncled, main bracts ovate imbricate, corolla-segments shorter than the tube, fruit usually 3-seeded. *Wall. Cat.* 6617; *Horan. Prodr.* 11. *Maranta caespitosa*, *A. Dietr. Sp.* i. 30.

PEGU, *Carey, Wallich, R. Scott.* The CONCAN, *Law.*

Rootstock wide-creeping, perennial, not tuberous. *Leaf* oblong, 6–10 by 2–3 in.; petiole slender, longer than the blade. *Spike* 1–2 in.; bracts not 1 in., ovate, green, several-fld. *Corolla*-segments white, linear-oblong, much shorter than the cylindric tube. Larger *staminal lobes* obovate, as long as the corolla-segments. *Seeds* $\frac{1}{4}$ in., dull brown, triquetrous on the inner face.—An allied plant, with subequal crowded lanceolate bracts $1\frac{1}{2}$ –2 in., collected by Griffith and Helfer in Tenasserim, is no doubt a distinct species, but all the specimens are very incomplete. *P. sumatranum*, Miquel, appears to be specifically distinct from *P. spicatum*.

6. ***P. Griffithii*, Baker**; spike radical long-peduncled, bracts bifarious with tips rounded recurved, corolla-segments unequal, upper erect oblong, lateral reflexed. *P. spicatum*, *Griff. Notul.* iii. 418, non Roxb.

MALACCA, in wet jungles at Ching, *Griffith*.

Leafy stem many-leaved; petiole 3–4 ft.; blade oblong, 2 ft. *Peduncle* 1 ft. *Calyx*-segments linear, white, shorter than the tube. *Ovary* 3-celled.

7. ***P. zeylanicum*, Benth.** in *Gen. Plant.* iii. 653; spike shortly-peduncled radical, main bracts ovate imbricate, corolla-segments shorter than the tube, fruit 1-seeded. *Trimen Cat. Ceyl. Pl.* 92. *Maranta spicata*, *Thw. Enum.* 320, excl. *syn. Roxb.*

CEYLON; in the central province, rare; *Thwaites*.

Habit exactly of *P. spicatum*. *Leaves* oblong, caudate, $\frac{1}{2}$ ft.; petiole slender, twice as long as the blade. *Spike* $1\frac{1}{2}$ in.; main bracts few, green, not 1 in. *Fruit* small, smooth, oblong, crowned by the small green linear sepals.

8. ***P. Cadellianum*, King mss.**; spike shortly peduncled radical, main bracts ovate-lanceolate, fruit 1-seeded.

ANDAMAN ISLANDS., *King's Collector*.

Rootstock short-creeping, perennial, slender. *Leaf* oblong, 9–10 in. by 3–4 in., base deltoid; petiole slender, 2–2 $\frac{1}{2}$ ft. *Spike* $1\frac{1}{2}$ in.; bracts 1–1 $\frac{1}{2}$ in., few, closely imbricate, thin, glabrous. *Flower* not seen. *Fruit* oblong, smooth, $\frac{1}{4}$ in., crowned with the short sepals.

22. **CANNA**, Linn.

Rootstock perennial. *Stem* simple, leafy. *Leaves* large, oblong, acute. *Flowers* a lax terminal simple or branched raceme; bracts small, ovate. *Sepals* 3, small, oblong, or lanceolate. *Corolla*-tube cylindric, segments 3, lanceolate, equal. *Staminal tube* cylindric; segments petaloid, unequal, with the 1-celled anther adnate to the margin of one of the smaller ones. *Ovary* 3-celled; cells many-ovuled; style adnate at the base to the staminal tube, free above; stigma capitate. *Fruit* globose, echinate, indehiscent. *Seeds* large, globose; embryo straight.—Species 20–30 tropical American and the following:—

***C. indica*, Linn.** var. *C. ORIENTALIS*, *Rosc. Scit. Pl.* t. 12; corolla-tube much shorter than the segments, petaloid staminal segments of the outer row 3 oblanceolate emarginate bright red, lip reflexed emarginate at the truncate apex. *Horan. Prodr.* 16. *C. indica*, *Linn. Sp. Plant.* 1, in part; *Roxb. in Asiat. Res.* xi. 322; *Fl. Ind.* i. 1; *Wall. Cat.* 6621; *Dalz. & Gibs. Bomb. Fl.* 687; *Thw. Enum.* 320. *C. chinensis*, *Willd. Enum. Berol.* i. 2?—*Rheede Hort. Malab.* xi. t. 48; *Rumph. Hort. Amboin.* v. t. 71, fig. 2.

Throughout INDIA from the HIMALAYAS to CEYLON and MALACCA.—DISTRIB. Malay isles, &c.

Rootstock tuberous, with many fibres. *Stem* 3-4 ft. *Leaves* oblong, acute, lower 1 ft. or more. *Bracts* $\frac{1}{2}$ in., ovate, green. *Sepals* small, lanceolate. *Corolla*-tube $\frac{1}{4}$ - $\frac{1}{2}$ in.; lobes 1 in., lanceolate, greenish. *Outer staminal segments* 3, bright red, oblanceolate, $1\frac{1}{2}$ in. by $\frac{1}{8}$ - $\frac{1}{4}$ in.; lip rather shorter; anther $\frac{1}{4}$ in. *Capsule* globose, $\frac{1}{2}$ - $\frac{3}{4}$ in. *Seeds* black, the size of a pea.

Var. *FLAVA*, *Rosc. Scit. Pl.* t. 13; stature of the type, staminal segments plain bright yellow. *C. flavescens*, *Link*; *Horan. Prodr.* 41.

Var. *C. NEPALENSIS*, *Wall. Cat.* 6622 (sp.); stem much taller, leaves larger, corolla-segments $1\frac{1}{2}$ in., outer staminal segments usually 3 bright red not emarginate, capsule above 1 in. *Bouché in Linnæa*, viii. 158; *Horan. Prodr.* 15.—Nepal, *Wallich*.

Var. *C. SPECIOSA*, *Rosc. Scit. Pl.* t. 17 (sp.); much taller than the type, leaves larger, outer staminal segments 2 acute bright red with a channelled yellow claw, lip variegated with red and yellow. *Herb. in Bot. Mag.* t. 2317; *Wall. in Bot. Reg.* t. 1276; *Horan. Prodr.* 16.—Nepal and Kumaon.

Another Indian form, unknown to me, is *C. exigua*, *Bouché*; *Horan. Prodr.* 16. The American form to which Roscoe and Horaninow restrict the name *INDICA* is figured *Rosc. Scit. Pl.* t. 1; *Bot. Reg.* t. 776.

23. *MUSA*, *Linn.*

Stem subarborescent, of convolute leaf sheaths. *Leaves* very large, oblong. *Flowers* in an erect or decurved spike, subunisexual, lower female, upper male; bracts large, spathaceous ovate or orbicular. *Calyx* slit down one side to the base, 3-5-lobed. *Corolla* as long as the calyx or shorter, wrapped round the stamens and style. *Perfect stamens* 5, sixth rudimentary or 0; filaments stout, filiform; anthers linear, erect, 2-celled. *Ovary* 3-celled; ovules many, superposed; style filiform from a thickened base; stigma subglobose 6-lobed. *Fruit* fleshy, indehiscent, oblong or fusiform, trigonous. *Seeds* subglobose or angled by pressure.—Species about 20; tropics of the Old World.

* Not stoloniferous, dying after flowering. *Bracts* many-fld. *Fruit* not pulpy and edible.

1. *M. superba*, *Roxb. Hort. Beng.* 19; *Corom. Pl.* t. 223; *Fl. Ind.* i. 667; stem short stout ovoid, leaves sessile on the sheath, bracts large orbicular many-fld. dull red, calyx 3-cleft, petal shorter than the calyx obcordate with a large mucro, fruit oblong subcoriaceous. *Wall. Cat.* 5166; *Wight Ic.* t. 2017; *Grah. in Bot. Mag.* t. 3849-3850; *Dalz. & Gibs. Bomb. Fl.* 272; *Horan. Prodr.* 41. *M. textilis*, *Grah. Cat. Pl. Bomb.* 213, non *Née*.

WESTERN GHATS.

Whole plant 10-12 ft. *Stem* covered with the persistent sheaths of the leaves. *Leaves* 8-10 ft., narrowed to the base. *Spike* drooping; lower bracts nearly a foot long and broad; upper crowded, persistent; flowers biserial, 20-30 or more to a bract. *Calyx* $1-1\frac{1}{2}$ in.; lobes three, linear, loosely cohering. *Corolla* $\frac{1}{2}$ in. *Fruit* trigonous, 3 by $1\frac{1}{2}$ in. *Seeds* $\frac{1}{2}$ - $\frac{1}{3}$ in. diam. smooth, brown, subglobose.

2. *M. nepalensis*, *Wall. in Roxb. Fl. Ind. ed. Wall. & Carey*, ii. 492; stem short stout ovoid, leaves sessile on the sheath, bracts large ovate many-fld. dull purple, calyx 3-cleft, petal obcordate with a large mucro shorter than the calyx, fruit oblong subcoriaceous. *Horan. Prodr.* 41.

Lower hills of NEPAL, *Wallich*.

Habit of *M. superba*. Trunk 5-6 ft., 2 ft. diam at the base. *Leaves* as in *superba*, but smaller and rather glaucous, upper passing gradually into the bracts. *Spike* short, drooping; lower floriferous bracts 6 in.; flowers 2-seriate, 7-8 to a bract. *Calyx* and *corolla* yellowish-white. *Fruit* and *seeds* as in *M. superba*.

3. *M. glauca*, *Roxb. Hort. Beng.* 19; *Corom. Pl.* t. 300; *Fl. Ind.* i. 669; trunk cylindric, leaves shortly petioled, bracts ovate greenish many-fld., calyx 3-cleft, petal obcordate with a large mucro shorter than the calyx, fruit obovoid-oblong subcoriaceous. *Horan. Prodr.* 41.

PEGU; *Carey*.

Trunk 10-12 ft. below the leaves, 8 in. diam. *Leaves* 4-5 ft., oblong-lanceolate, acute. *Spike* drooping from the base; bracts numerous, imbricate, the lower not $\frac{1}{2}$ ft.; flowers 10-20 to bract. *Calyx* pale, about 1 in.; segments 3, loosely coherent, linear. *Corolla* not half as long as the calyx. *Fruit* 4-5 in., $1\frac{1}{2}$ in. diam. *Seeds* smooth, globose, nearly black, $\frac{1}{2}$ in. diam.

** Stoloniferous. *Bracts* many-fld. *Fruit* pulpy, edible.

4. *M. sapientum*, *Linn. Sp. Plant.* 1477; stoloniferous, stem tall cylindrical, leaves petioled, spike drooping, bracts ovate many-fld. usually deciduous, calyx 5-toothed at the tip, petal shorter than the calyx, fruit pulpy. *Roxb. Hort. Beng.* 18; *Corom. Pl.* t. 275; *Fl. Ind.* i. 663; *Grab. Cat. Pl. Bomb.* 212; *Dalz. & Gibs. Bomb. Fl. Suppl.* 88.; *Thw. Enum.* 321; *Horan. Prodr.* 42—*Rheede Hort. Malab.* i. 17, t. 12-14; *Rumph. Amboin.* v. 130, t. 60; *Trew Ehret.* t. 21-23.

Indigenous in BRHAR and the EASTERN HIMALAYAS, ascending to 4000 ft. CEYLON, *Thwaites*; cultivated throughout India and the tropics.—DISTRIB. Malay isles, &c.

Stem 8-12 ft. *Leaves* 4-5 ft. oblong, bright green above, paler beneath. *Inflorescence* about as long as the leaves; bracts ovate, more or less pruinose, lower 6-8 in., upper much shorter, falling before the fruit matures. *Calyx* yellowish-white, 1-1 $\frac{1}{2}$ in. *Petal* oblong, about half as long. *Fruit* oblong, trigonous, 2-3 in. in the wild form, and full of seed (seedless in the cult. forms) tapering to the base and apex, yellowish green when ripe. *Seeds* angled by pressure, brownish-black, rugose, $\frac{1}{2}$ in. diam. The principal varieties and subspecies wild and cultivated in India are—

M. DACCA, *Horan. Prodr.* 41; differs from typical *sapientum* by leaves paler green above white-pruinose beneath, pruinose stem, broad red border of the petiole and pale yellow fruit about 4 in. long with a very thick skin.

M. CHAMPA, *Hort.*; stem and midrib of the leaf red, fruit pale straw-coloured about 6 in. long.

M. SIKKIMENSIS, *Kurz in Journ. Agric. Hort. Soc. Ind.* n.s.v. 164; differs from *sapientum* by its duller purple spathes and angled tubercled seeds 4-5 lin. diam.—Wild in Sikkim. *Hook. f. & Thoms. (Herb. Ind. Or.)* 5.)

M. PARADISIACA, *Linn. Sp. Plant.* 1477; stem reaching a length of 20 ft., leaf-blade of 5-6 ft. and petiole of 2 ft., fruit larger than in *sapientum*, $\frac{1}{2}$ -1 ft. long, with firmer pulp, not fit to eat till cooked, bracts and male flowers more persistent. *Roxb. Hort. Beng.* 19; *Trew Ehret.* t. 18-20. *M. Cliffortiana*, *Linn. Hort. Cliff.* i. t. 1.—Commonly cultivated; wild in Ceylon, according to Moon.

M. SIMIABUM, *Kurz in Journ. Agric. Hort. Soc. Ind.* xiv. 297; bracts violet, only one opening at a time, those of the male flowers convolute, fruit very small.—Andamans and Malacca, *Kurz*.

M. TROGLODYTARUM, *Linn.*; *Kurz in Journ. Agric. Hort. Soc. Ind.* n. s. v. 166; leaves narrow oblong, flower-spike erect, bracts greenish imbricated, fruit 3 in. long dark yellow or reddish brown.—Wild in Ceylon, according to Moon.

M. CORNICULATA, (*Rumph.*) *Kurz in Journ. Agric. Hort. Soc. Ind. n.s. v.* 166, t. 2-3; flower larger than in any other form, only 2-3 rarely 4 whorls of flowers produced, fruit as large as in *paridisiaca*.

M. TEXTILIS, *Née in Cav. Ann. Ciénc. Nat. iv.* 123; leaves firmer in texture than in *sapientum*, yielding a useful fibre, bracts polished, seeds very small and scarcely at all angled.—Native of the Philippines, cult. in India.

M. ARAKANENSIS, *Ripley in Proc. Agric. Hort. Soc. Ind. x.* 51; a fibre-yielding form from Arrakan.

M. ZEBRINA, *Flore des Serres*, t. 1061-2 and *M. VITTATA*, *Bot. Mag. t.* 3402, are handsome forms with variegated leaves. Other forms are mentioned by *Kurz in Journ. Agric. Hort. Beng. n.s. v.* (1878), 112-168; and *Sagot in Journ. Soc. Nat. Horticult. France*, 1887, 238, 285.

*** Stoloniferous. *Stem* slender, cylindric. *Bracts* few-fl., bright coloured. *Fruit* not edible.

5. *M. rosacea*, *Jacq. Fragm. t.* 132, fig. 4; *Hort. Schoen. t.* 445; stoloniferous, leaves petioled, flower-spike drooping or erect, bracts ovate lilac or pale red, lower usually 3-fl., calyx yellowish-white 5-toothed, petal as long as the calyx, fruit oblong-trigonus pulpy. *Bot. Reg. t.* 706. *Lodd. Bot. Cab. t.* 615. *M. ornata*, *Rorb. Hort. Beng. 19*; *Fl. Ind. i.* 666; *Dalz. & Gibs. Bomb. Fl.* 272.

EASTERN HIMALAYA and the CONCAN.—DISTRIB. Java.

Stem cylindric, slender, 3-5 ft. *Leaves* linear-oblong, firmer in texture than in *M. sapientum*. *Spike* about $\frac{1}{2}$ ft., drooping in the cultivated form; bracts oblong, about $\frac{1}{2}$ ft., crowded; male fl. 5-6 in a cluster. *Calyx* about 1 in. *Fruit* and seeds as in typical *sapientum*.

6. *M. sanguinea*, *Hook. f. in Bot. Mag. t.* 2975; stoloniferous, leaves petioled, spike erect or finally drooping, bracts ovate-lanceolate bright red, lower usually 3-fl., rachis pubescent, calyx bright yellow 5-toothed, petal as long as the calyx, fruit oblong-trigonus pulpy.

ASSAM, *Mann*.

Stem 4-5 ft., very slender. *Leaves* 2 ft., thin, bright green; petiole 1 ft. or more. *Spike* $\frac{1}{2}$ ft.; bracts crowded, imbricate, 3-6 in. *Calyx* $1\frac{1}{2}$ in. *Fruit* 2-3 in., pale yellowish green, variegated with red. *Seeds* irregularly cubical, black, tubercled.

IMPERFECTLY KNOWN SPECIES ALLIED TO *M. SANGUINEA*.

M. ASSAMICA, *Cat. Hort. Bull.* 1871, 6; leaves about 1 ft. very unequal-sided bright green.—Assam.

M. AURANTIACA, *Mann. mss.*, from Assam. I cannot by dried specimen of inflorescence distinguish this from *M. sanguinea*.

M. DASYCARPA, *Kurz in Journ. Agric. Hort. Soc. Ind. xiv.* 301 (s.p.); fruit hairy.—Assam.

M. MANNII, *Wendl. mss.*; differs from *M. sanguinea* in the shorter stem and longer leaves.—Assam.

M. URANOSCOPOS, *Lour. Fl. Coch.* 645 (*M. coccinea*, *Andr. Bot. Rep. t.* 47), Java, China, Cochín China.—Cultivated in India.

M. VELUTINA, *Wendl. and Drude in Regel Gartenst.* xxiv. 65, t. 823, bracts densely pubescent externally, male fl. 6-9 in a cluster.—Assam, *Mann*.

24. *LOWIA*, *Seortechini*.

Stemless, herbaceous. *Stem* dichotomously branched. *Flowers* in a cluster from the base of the petiole, pedicelled, with a large persistent

lingulate bract folded round the calyx tube and others from the pedicel. *Calyx*-tube long, very slender; segments 3, lanceolate, reflexed. *Corolla* of 3 petals; two upper small, lanceolate; lower large, oblong, clawed. Fertile *stamens* 5; filaments short, cylindric; anthers linear, acuminate, 2-celled. *Ovary* 3-celled; ovules many, superposed; style long, slender, trifurcate at the stigmatose apex. *Fruit* and *seeds* unknown. *Orchidantha*, *N. E. Br. in Gard. Chron.* n. s. xxvi. (1886) 519.—Also Borneo.

L. longiflora, *Scortech. in Nuov. Giorn. Ital.* xviii. 308, t. 11.

PERAK, in the province of Kinta, *Scortechini, Kunstler*.

Whole plant 3-4 ft.; flower-bearing *petiole* $1\frac{1}{2}$ ft., flowerless much shorter; blade oblong, 2-3 ft. *Calyx*-tube 4-5 in.; segments rather shorter, $\frac{1}{2}$ in. broad. Upper *petals* equal, as long as the stamens; lower with a white oblong blade 2 in. long, narrowed suddenly to a rather shorter purple claw. *Style* an inch longer than the calyx-tube; branches of stigma channelled, margins toothed.

Order CL. **HÆMODORACEÆ.**

Perennial herbs. *Leaves* usually radical, distichous, narrow, nerve parallel. *Flowers* bisexual, in terminal spikes racemes in panicles, regular. *Perianth* corolline, persistent; lobes 6, biseriate, imbricate or induplicate-valvate. *Stamens* 6, opposite the perianth-lobes or fewer; anthers erect or versatile, 2-celled, rarely opening by pores. *Ovary* inferior or subinferior; 3-celled; stigma simple or 3-notched; ovules 1-many, on the inner angles of the cells, anatropous or semianatropous. *Fruit* superior or inferior, dehiscent or not. *Seeds* various; embryo small, partially enclosed in the fleshy albumen.

TRIBE I. **Conostyleæ.** *Ovary-cells* many-ovuled.

Flowers in a long simple spike or raceme 1. ALETRIS.

TRIBE II. **Ophiopogonæ.** *Ovary-cells* 1-2-ovuled.

Filaments connate in a ring closing the mouth of the
perianth 2. PELIOSANTHES.
Filaments short, free. Perianth short superior . . . 3. OPHIOPOGON.
Filaments filiform. Perianth inferior tube slender . . 4. SANSEVIERA.

1. **ALETRIS**, Linn.

Leaves radical, narrow. *Scape* leafless; flowers small, short, spicate, or racemed; bracts 1-fld. *Perianth*-tube short, subcampanulate, lobes sub-valvate. *Stamens* 6, on the bases of the lobes, filaments very short; anthers ovate or subglobose. *Ovary* half-inferior, top conic, 3-celled; style 3-partite, or 3-fld; ovules many, 2-seriate or elongate placentas. *Capsule* half superior, loculicidally 3-valved. *Seeds* minute, oblong.—Species 8, N. American and Asiatic.

Aletris litoralis, Kæn.; Wall. Cat. 5082, in *Aloe vera*, L. (*A. perfoliata*, Willd.).

1. ***A. nepalensis***, Hook. f.; leaves 5-7-nerved, flowers glabrous, anthers subglobose, ovary glabrous, style very short, capsule globose-ovoid. *Telfeldia nepalensis*, Wall. Cat. 5097; *Royle Ill.* 385. *Stachyopogon pauciflorus* & *spicatus*, Klotzsch in *Bot. Reise Pr. Wald.* 49, t. 94.

TEMPERATE and ALPINE HIMALAYA, from KASHMIR to BHOTAN, alt. 10–15,000 ft.—DISTRIB. China.

Leaves grass-like, 3–8 in. long, strongly nerved, rarely $\frac{1}{4}$ in. diam. *Scape* 4–12 in., nearly naked, glandular-pubescent or woolly above. *Spike* or raceme few or many-fl., 1–4 in.; tomentose flowers $\frac{1}{2}$ in. long, greenish, sessile or pedicelled; bracts 1–2, close under the flower, linear, green, longer or shorter than the flowers, lower sometimes $\frac{2}{3}$ in. long; perianth-lobes oblong, obtuse, recurved, 3-nerved.—Bureau and Franchet (in Morot, Journ. de Bot. V. 155,) observe that *Tosfieldia nepalensis*, Herb. Strachey & Winterb. No. 1 appears to belong to their *A. lanuginosa*; adding that Wallich's plant should be called *A. nepalensis*.

2. ***A. sikkimensis***, Hook. f.; leaves 7–9-nerved ensiform, scape tall, spike very long, flowers glabrous, ovary glabrous, capsule globosely ovoid.

SIKKIM HIMALAYA; Lachen valley, alt. 9–12,000 ft. J. D. H.

A much larger plant than *A. nepalensis*, with short narrowed leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, and a leafy scape with the raceme 1–2 ft. high, and with linear smaller and much narrower seeds.

3. ***A. khasiana***, Hook. f.; leaves many-nerved, flowers glandular-pubescent, anthers oblong, ovary puberulous, capsule ovoid-lanceolate.

KHASIA HILLS, alt. 4–6000 ft., common, Griffith, &c.

Leaves grass-like, 4–12 in., rarely $\frac{1}{2}$ in. broad, closely striately nerved. *Scape* 6–12 in., glandular-pubescent above. *Flowers* usually sessile, $\frac{1}{4}$ in. long, yellowish-red, pinkish or purplish; bracts as in *A. nepalensis*. *Seeds* very minute, reniform.

2. **PELIOSANTHES**, Andr.

Scapigerous herbs; rootstock horizontal. *Leaves* narrow, linear or lanceolate, subpubescently nerved. *Scape* erect; flowers small, racemed, bracts scarious. *Perianth* superior, tube short, broadly campanulate; lobes 6, subequal, spreading. *Stamens* 6, filaments very short connate in a ring almost closing the mouth of the perianth; anthers subsessile, slits introrse. *Ovary* inferior, top free conical, 3-celled; stigma subsessile, 3-lobed; ovules 2 or more, erect basal in each cell, anatropous. *Fruit* indehiscent. *Seeds* few, bursting through the pericarp during ripening, and resting on the base of the withered perianth, tube fleshy or succulent; embryo in the base of the hard fleshy albumen.—Species about 8, Indian and Malayan.

The species of this genus are far from well defined. Better characters than those hitherto employed for distinguishing them may perhaps be found in the number of ovules, and form of the staminal tube and anthers.

* *Bracts many-fl.*

1. ***P. Teta***, Andr. Bot. Rep. t. 605; leaves long petioled 12–24 by $1\frac{1}{2}$ –3 in., nerves 10–20, scape stout shorter than the leaves, raceme many-fl., Brown in Trans. Linn. Soc. 1817, 8; Kunth Enum v. 307; Bot. Mag. t. 1302; Redouté Liliac. t. 415, Reichb. Mag. t. 14; Baker in Journ. Linn. Soc. xvii. 505. P. violacea, Wall. Cat. 5084 (in part?) *Teta viridiflora*, Rorb. Fl. Ind. ii. 165.

SIKKIM HIMALAYA, the KHASIA HILLS, ASSAM, CHITTAGONG and BURMA. PENANG, Curtis.

Leaves 2–7; petiole variable in length; cross-nervules distinct when dry. *Scape* naked or with a few scales above and large membranous sheaths at the base; raceme 6–12 in.; bracts 1–3 to every fascicle of flowers, variable in length; pedicels short; flowers $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., purplish or bluish-green. *Seeds* as large as a pea, olive-blue.

2. **P. Griffithii**, *Baker in Journ. Linn. Soc.* xvii. 506; leaves long-petioled 6-8 by $1\frac{3}{4}$ - $2\frac{1}{4}$ in. strongly 5-nerved, scape very short.

SIKKIM HIMALAYA, *Griffith's Collectors*; alt. 1500 ft. *Clarke*.

Leaves 5-6, with 5-distant nerves much stronger than the numerous others; petiole 8-10 in., very slender. *Raceme* many-fl.; pedicels short, stout; bracts long; flowers not seen. *Seeds* globose, about $\frac{1}{8}$ in. diam.

** Bracts 1- rarely 2-fl. Flowers cernuous.

3. **P. violacea**, *Wall. Cat.* 5084; leaves 6-12 by $1\frac{1}{2}$ -3 in., long-petioled, nerves very many, racemes usually shorter than the petiole many-fl., flowers violet-blue. *Baker in Journ. Linn. Soc.* xvii. 502. *P. Teta*, *Wall. Cat.* 5083 A in part. *P. campanulata*, *Wall. mss.*

EASTERN HIMALAYA, the KHASIA HILLS, and BURMA.

Habit of *P. Teta* and with flowers of the same size and colour, but solitary in the bracts. *Seeds* $\frac{3}{8}$ in. long, oblong.—Baker has three varieties. 1. *minor*, with smaller fewer 5-7-nerved leaves and smaller green flowers; 2. *Clarkei*, with more conspicuous transverse nervules and a darker purple flower; 3. *Princeps*, more robust, leaves broader, 4-4 $\frac{1}{2}$ in. diam., racemes longer, flowers greenish.—Moulmein, *Lobb*.

4. **P. macrophylla**, *Wall. mss.*; *Baker in Journ. Linn. Soc.* xvii. 505; leaves petioled 10-18 by 3-4 $\frac{1}{2}$ in. elliptic-lanceolate nerves 13-15 strong, scape long or short, raceme many-fl., flowers greenish or purple.

EASTERN HIMALAYA; Sikkim alt. 3-600 ft., *J. D. H.*; *Clarke*; Mishmi Hills, *Griffith*.

The largest and stoutest Indian species, but I suspect only a further development of *P. violacea* var. *Princeps*. *Seeds* globose or obturbinate.

5. **P. neilgherriensis**, *Wight. Ic. t.* 2052; leaves long-petioled 4-8 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in. with 5-10 stronger nerves, scape about equalling the leaves, bracts short, flowers small. *Baker in Journ. Linn. Soc.* xvii. 503. *P. longifolia*, *Steudel Pl. Canara Exsicc.* n. 1306.

MALABAR and CANARA; in the Ghats, *Wight.*, &c.

Leaves few, membranous, transverse nervules conspicuous; petiole 6-9 in., very slender. *Scape* 4-6 in.; raceme as long; lower bracts many, $\frac{1}{2}$ in., upper very short; perianth dark purple, $\frac{1}{4}$ in. diam. *Seeds* obturbinate ovoid.

6. **P. courtallensis**, *Wight. Ic. t.* 2057; leaves long-petioled 8-12 by $1\frac{1}{2}$ -2 in. with 5 strong nerves, scape much shorter than the leaves, bracts longer than the flowers. *Baker in Journ. Linn. Soc.* xvii. 504. *P. Teta*, *Wall. Cat.* 5083 B.

TRAVANCORE; at Courtallum, *Wight.*, &c.

A much larger plant than *P. neilgherriensis*, with leaves twice as long as the scape and raceme, and long lanceolate bracts much exceeding the flowers.—In a coloured drawing of this by Jerdon, the flowers are blue-purple, $\frac{1}{2}$ in. diam.

7. **P. humilis**, *Andrews Bot. Repos. t.* 634 (not of *Baker*); dwarf, leaves sessile or very shortly petioled elliptic-lanceolate 5-nerved, scape short stout, raceme short, bracts ovate about equalling the small crowded very shortly pedicelled flowers. *Bot. Mag. t.* 1532; *Kunth Enum.* v. 307.

PENANG, *Maingay*.

Leaves about 3 in. long; petiole shorter than the blade or 0. *Flowers* about $\frac{1}{4}$ in. diam.; segments of perianth green margined with white, obtuse and emargi-

nate in Andrews' drawing, acute in that of the "Botanical Magazine."—A very little-known plant. Maingay's specimens accord with the figures but they are flowerless.

8. **P. Bakeri**, *Hook. f.*; dwarf, leaves elliptic-lanceolate 5-7-nerved, petiole slender, scape very short, raceme short, bracts subulate-lanceolate all or the lower much longer than the small pedicelled flowers. *P. humilis*, *Baker in Journ. Linn. Soc. xvii. 505 (excl. Penang)*.

EASTERN HIMALAYA, alt. 1-6000 ft., *J. D. H.*; *Clarke*; Mishmi Hills, *Griffith*. KHASIA HILLS, alt. 3-5000 ft., *J. D. H. & T. T.*

Leaves 4-7 by 1-2 in., thin, subcaudately acuminate; petiole as long. *Raceme* hardly exceeding the petiole; pedicels sometimes $\frac{1}{4}$ in. long, and lower bracts nearly $\frac{1}{2}$ in.; perianth $\frac{1}{2}$ in. diam., green or lurid purple (*Clarke*). *Seeds* small, oblong.—There are cultivated specimens in Wallich's Herbarium from the Calcutta Botanical Garden under No. 5083 D.

9. **P. albida**, *Baker in Bot. Mag. t. 7110*; leaves stoutly petioled 5-8-nerved, scape very short, raceme very long many-fld., bracts subulate-lanceolate longer than the small white shortly pedicelled flowers.

PENANG; *Curtis*.

Leaves 12 by $1\frac{1}{2}$ -2 in., elliptic-lanceolate, caudate-acuminate, nerves strong; petiole about half as long as the blade. *Raceme* longer than the petiole, stout, strict, white; lower bracts $\frac{1}{2}$ in. long, narrow; flowers deflexed; perianth $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.; outer segments broadly ovate, inner orbicular-obovate; anthers very small within the much contracted mouth of the low truncate staminal tube. *Ovarian cells* about 5-ovuled. *Style* short, columnar, stigma 3-lobed.

3. OPHIOPOGON, *Ker*.

Scapigerous herbs. Stem short from a short rootstock or elongate subscandent. *Leaves* linear or lanceolate parallel-nerved. *Scape* leafy or leafless, flowers racemed; bracts scarious, usually many-fld. *Perianth* superior, segments spreading. *Stamens* 6, on the bases of the segments, filaments short, erect; anthers basifixed. *Ovary* inferior, 3-celled, crown flat or depressed; style columnar, stigma 3-toothed; ovules 2 in each cell, collateral, erect, anatropous. *Fruit* indehiscent. *Seeds* few, as in *Peliosanthes*, testa fleshy or succulent.—Species 8 or 10, East Asiatic.

Ophiopogon was established in 1807 by Ker-Gawler (*Bot. Mag. t. 1063*) on the figure of a plant supposed to be the *Convallaria japonica* β minor of Thunberg (*Fl. Jap. 140*), and to which Gawler gave the name of *O. japonicus*, referring to it the *C. japonica* of Decandolle in Redouté's *Liliac. ii. t. 80* (Gawler's description is, however, that of a third plant). Judging from the figures, Gawler's and Decandolle's are not of the same species. Gawler's has blue flowers, linear-oblong perianth segments, and linear-oblong obtuse anthers; Redouté's has much smaller white flowers, ovate perianth-segments, and longer acute anthers. Both differ from any Indian species (except, perhaps, that mentioned at the end of the genus of which there are no flowers) in their small size, very short scape, and above all in the very short fusiform 6-grooved style, which was observed by Don (*Prodr. 48*) but overlooked by subsequent authors. Specimens of both are in Kew Herb.; that of Gawler, from Japan, is *O. japonicus* Gawl. *genuinus* of Maximovicz; the other is a continental garden specimen from Herb. Gay of what is clearly the plant figured in Redouté, and which is also figured in Schrader's *Neues Journ. t. 1* as *Fluggea japonica*, Rich.

O. japonicus hence disappears from the Flora of British India; all the Indian species having slender styles; but I am not prepared to say whether or no any other Indian species may be identical with Japanese. They are extremely variable and

difficult of definition, and I am not satisfied that all the species here proposed will prove distinct from one another.

* *Stem creeping and rooting; roots not tuberiferous.*

1. ***O. dracænoides***, *Hook. f.*; stem stout, leaves oblanceolate acuminate very many-nerved, petiole slender, racemes about equalling the leaves. *Fluggea dracænoides*, *Baker in Trimen Journ. Bot.* 1874, 174; in *Journ. Linn. Soc.* xvii. 502.

SIKKIM HIMALAYA, and the KHASIA HILLS, alt. 4-6000 ft., *J. D. H.*

Stems prostrate, as thick as a goose-quill, closely jointed, clothed at first with green sheaths that have broad scarious margins, rooting and with short tufts of leaves and flowery scapes. *Leaves* 3-6 in., including the petiole, $\frac{3}{4}$ -1 $\frac{1}{2}$ in. broad. *Racemes* 2-3 in.; bracts shorter than the flower, which are solitary or fascicled, white or pale lilac, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. *Perianth* segments ovate-oblong; anthers lanceolate, filaments very short; style filiform. *Seeds* oblong.

2. ***O. Clarkei***, *Hook. f.*; stem prostrate with a terminal tuft of secundly curved linear leaves which are 8-12 by $\frac{1}{2}$ in., scape short few-fl., flowers $\frac{3}{4}$ in. diam., filaments one-third the length of the lanceolate anther.

SIKKIM HIMALAYA, *J. D. H.*; at Rungbee, alt. 6000 ft., *Clarke*.

Stems 8-10 in. long, rigid, as thick as a crow-quill or thicker, bearing one rather slender terminal tuft of very long slender leaves, which are faintly rough beneath. *Scape* with the 3-5-fl. raceme curved, 3-4 in. long; bracts ovate-lanceolate, about equalling the pedicels, which are jointed at or near the base.—In this species the stem is a long runner bearing a solitary tuft of leaves and scape.

3. ***O. reptans***, *Hook. f.*; stem prostrate with distant tufts of linear leaves which are 6-8 by $\frac{1}{12}$ - $\frac{1}{8}$ in., scape very short slender few-fl.

KHASIA HILLS, at Nurtiung, alt. 4-6000 ft. *J. D. H.* GARROW HILLS; alt. 4000 ft., *Clarke*.

Stems 2-3 ft., prostrate, rather stouter than in *O. Clarkei*, rigid. *Leaves* quite smooth. *Scape* with fruiting raceme 2-3 in. *Seeds* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., subglobose.—Very different from *O. Clarkei* in habit, the numerous tufts of very narrow shorter leaves, and the very short slender scapes. It closely resembles a Tonkin plant (*Balanca* n. 4155 bis.).

** *Stems tufted. Roots often tuberiferous.*

4. ***O. Wallichianus***, *Hook. f.*; rootstock short very stout, leaves 6-24 in. by $\frac{1}{2}$ - $\frac{1}{3}$ in., scape stout usually much shorter than the leaves, flowers usually fascicled $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., anthers lanceolate, filaments very short broad. *O. japonicus*, *Wall. Cat.* 5139 A. *O. japonicus*, var. *Wallichianus*, *Maxim. in Bull. Acad. N. S. St. Petersburg.*; *Mel. biol.* vii. 321. *O. longifolius*, *Decne in Fl. des Serres*, xvii. 182 (ex. *Maxim.* l. c.). *Fluggea Wallichiana*, *Kunth Enum.* v. 303. *F. japonica*, var. *Wallichiana*, *Baker in Journ. Linn. Soc.* xvii. 501 (excl. syn. *Blume & Royle*).

TEMPERATE and SUBTROPICAL HIMALAYA; from Kumaon eastward, alt. 6-9000 ft. KHASIA HILLS, alt. 4-6000 ft.

Distinguished from the following by the rootstock, usually as thick as the thumb, sometimes 4-6 in. long, the stout scape longer or shorter than the leaves, and the large flowers. *Roots* of long cylindric tubes. *Leaves* often distichous and recurved, nearly quite smooth. *Raceme* lax or dense-fl., sometimes cylindric, with flowers nearly 1 in. diam.; bracts usually shorter than the flowers; pedicels

jointed about the middle; perianth white or pale lilac, segments variable in breadth, obtuse; anthers oblong-lanceolate, filament short and broad; style slender. *Seeds* $\frac{1}{3}$ – $\frac{1}{2}$ in. long, oblong.—Kunth's observation that the raceme is flexuous makes me suspect that the Wallichian plant which he describes (distributed as 5139 of Herb. Wallich.) is a Nepal specimen of 5139 A.

Var. *pauciflora*; more slender, leaves narrower, flowers few not fascicled.—Khasia Hills, alt. 4–6000 ft. Intermediate between *O. Wallichianus* & *intermedius*.

5. **O. intermedius**, *Don Prodr.* 48; rootstock short not very stout, leaves 6–24 by $\frac{1}{6}$ – $\frac{1}{2}$ in., margins minutely erose, scape slender as long as the leaves or shorter, flowers solitary or fascicled $\frac{1}{3}$ – $\frac{1}{2}$ in. diam. white, anthers linear-oblong, filaments very short or 0. *Royle Ill.* 382, t. 96, f. 1. *O. japonicus*, *Wall. Cat.* 5139 C. *O. japonicus*, var. *intermedius*, *Maxim. Mel. Biol.* vii. 321. *O. indicus*, *R. W., Rottl.?*; *Wight Ic.* t. 2050. *Fluggea Jacquemontiana*, *Kunth Enum.* v. 304. *F. japonica*, var. *intermedia*, *Schultes f. in Roem. & Sch. Syst.* vii. 310. *F. intermedia*, *Kunth l. c.* 306.

TEMPERATE HIMALAYA; from Kashmir eastwards, alt. 5–9000 ft. KHASIA and MUNNIPORÉ hills, alt. 5–7000 ft. Ghats of MALABAR, MYSORE, &c., *Wight*. CEYLON.

Except by the usually much smaller flowers and always narrow leaves, and more oblong anthers, this cannot be distinguished from small states of *O. Wallichianus* (however widely different the extreme states of each are). The following are the most marked forms selected from some hundreds of specimens. They pass into one another, and I fear into *O. Wallichianus*. The bracts are so variable that I have omitted describing them.

Var. 1. *occidentalis*; raceme suberect many-fl., flowers white about $\frac{1}{4}$ in. diam., pedicels often $\frac{1}{4}$ – $\frac{1}{2}$ in.—Western Himalaya, Khasia hills and Munnipore.

Var. 2. *macrantha*; scape stout, raceme erect many-fl., flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. white.—Western Himalaya.

Var. 3. *parviflora*; leaves very narrow secundly curved, scape very slender decurved, flowers $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. white or pale purplish, pedicels very short.—Sikkim Himalaya, Khasia, and Munnipore hills.

Var. 4. *pauciflora*; leaves long $\frac{1}{3}$ – $\frac{1}{2}$ in. broad not secund, scape usually very long, raceme short decurved few-fl., pedicels short, flowers $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. (*Wall. Cat.* 5139 C).—Khasia hills, Munnipore, Western Ghats and Ceylon.

Var. 5. *gratilipes*; leaves long very slender $\frac{1}{2}$ – $\frac{1}{3}$ in. broad narrowed into almost filiform petioles, scape slender, raceme few-fl. cernuous, flowers $\frac{1}{2}$ – $\frac{1}{3}$ in. diam. white.

6. **O. Malcolmsoni**, *Royle Ill.* 382 (*name only*); leaves 6–14 by $\frac{1}{2}$ in. flaccid petioled tip obtuse, scape erect and raceme very slender, flowers $\frac{1}{2}$ in. diam. solitary or in distant pairs, pedicels very short, filaments distinct, anthers lanceolate acute. *O. japonicus*, *Wall. Cat.* 5139 G.

PEGU; at Rangoon, *M'Clelland, Kurz. ATTRAN, Wallich.*

The flaccid elongate linear-lanceolate obtuse leaves and long slender racemes seem to distinguish this.—*Rootstock* stout; roots fascicled, fleshy; bracts usually longer than the flowers; pedicels jointed below the middle; perianth rather membranous, white?, style very slender. *Seeds* $\frac{1}{2}$ in. long, ellipsoid.—I assume this to be *Royle's O. Malcolmsoni*, a native of Rangoon, of which, however, I have seen no authentic specimen.

7. **O. micranthus**, *Hook. f.*; leaves 10–20 by $\frac{1}{3}$ – $\frac{1}{2}$ in. flaccid petioled, tip obtuse, scape rather stout long or short, raceme suberect elongate, flowers subsolitary $\frac{1}{2}$ in. diam., anthers sessile oblong obtuse.

ASSAM; *Mrs. Mack*.

In foliage this resembles *O. Malcolmsoni*, but the flowers are minute, with much shorter perianth-segments, and very different anthers, the seeds also are smaller and globose.

8. *O. Griffithii*, *Hook. f.*; leaves very narrowly elliptic-lanceolate 6-10 by $\frac{1}{2}$ - $\frac{3}{4}$ in. many-nerved narrowed into a very slender petiole, tips obtuse, scape stout compressed, raceme lax-flid., pedicels very short. *Flaggea Griffithii*, *Baker in Journ. Linn. Soc.* xvii. 502.

UPPER ASSAM; on the Patkoye hills, alt. 4500 ft., *Griffith*.

A very distinct-looking species, from the elliptic petioled leaves but not in flower. *Baker* describes the seeds as solitary oblong $\frac{1}{4}$ in. long, blue.

9. *O. prolifera*, *Lindl. in Journ. Hort. Soc.* 1 (1846), 76; rootstock climbing and rooting, leaves $\frac{3}{4}$ in. broad ensiform decurved bright green, scape bright purple, flowers subsessile clustered obovate between fleshy and spongy, stamens united by a short fleshy ring, ovary thin-skinned adherent but not growing to the ovary 3-celled, ovules 2 erect in each cell, style pyramidal, stigmas 3 point-like. *Maxim. Mel. Bot.* vii. 129. *Flaggea? prolifera*, *Baker in Journ. Linn. Soc.* xvii. 502.

PENANG. *T. Lewis* (Cult. in Hort. Soc. Gardens, 1845).

I have seen no specimen.—A sketch of that in the Lindley Herbarium (now at Cambridge) represents fragments of two strongly striated leaves 6-10 in. long, without apices and a stout scape, with clusters of flowers about $\frac{1}{4}$ in. diam. subtended by broad ovate bracts. It a good deal resembles *Liriope*.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

O. INDICUS, *Royle mss. Ill.* 382 (name only).

O. MINOR, *Royle mss. l.c.* (name only), from Turanda in Kumaon, is probably *intermedia*, var. *pauciflora*.

O. MOLLIS, *Royle mss. l.c.* (name only), "common in the Himalaya from the Ganges to the Sutlej," is probably *Theropogon pallidus*.

O. ? PALLIDUS, *Wall. Cat.* 5138, is *Theropogon pallidus*.

O. SPICATUS, *Ker-Gawl.*; said by *Don (Prodr.* 47) to be from Nepal, *Wallich*, is *Liriope spicata*, a native of Japan and China, not hitherto found in India.

OPHIPOGON, sp.? *Munnipore*, *Watt*, a small species not in flower, possibly the Japanese *O. japonicus*.

4. SANSEVIERIA, *Thurle*.

Stout herbs with a short often stoloniferous rootstock. *Leaves* narrow, cartilaginous or fleshy flat or terete, nerves immersed. *Scape* stout; flowers racemose. *Perianth-tube* long, slender, lobes narrow. *Stamens* 6, on the leaves of the lobes; filaments filiform; anthers dorsifixed. *Ovary* superior, attached by a broad base, 3-celled; style filiform, stigma simple; ovules solitary, erect in each cell. *Fruit* membranous, indehiscent. *Seeds* 1-3 ripening outside the pericarp globose, all large, or 1-2 imperfect; testa long, fleshy or succulent.—Species 10, Indian and African.

1. *S. zeylanica*, *Willd. Sp. Pl.* ii. 159; leaves 1-2 ft. ensiform semi-terete attenuate from the base to the acuminate lip, deeply channelled above, barred with green and edged with red, raceme short, flowers $1\frac{1}{2}$ in. long. *Redouté Liliac*, t. 290; *Bot. Reg.* t. 160; *Kunth Enum. Pl.* v. 18; *Baker in Journ. Linn. Soc.* xiv. 548. *Aletris zeylanica*, *Mill. dict.* No. 4. *A. hyacinthoides*, var. *zeylanica*, *Linn. Sp. Pl.* i. 456. *Aloe zeylanica*, *Jacq. Enum. Stirp. Agu. Vindot.* 310.

? CEYLON.—DISTRIB. ? Tropical Africa.

Leaves 1-1½ in. broad at the base, very thickly fleshy and hard, margins scarious. *Scape* 1-2 ft., with distant scarious sheaths; bracts ½ in. long; pedicels short; perianth 1½ in. diam.—The above description accords with Baker's, and with the plant figured in The Botanical Register, of which the origin is uncertain, but which has long been cultivated as a native of Ceylon. It is stated to inhabit also Tropical and South Africa; which is more probably its native country.

2. *S. Roxburghiana*, *Schult. fl. Syst.* vii. 357; leaves 1-2 ft. narrowly linear-ensiform narrowed towards the base semiterete channelled above green faintly clouded with black, scape slender, raceme elongate. flowers ½ in. long. *Kunth Enum.* v. 18; *Baker. in Journ. Linn. Soc.* xiv. 549. *S. zeylanica*, *Roxb. Pl. Cor.* ii. 45, t. 184; *Fl. Ind.* ii. 161.—? *Rheede Hort. Mal.* xi. t. 42.—*Moorva, As. Res.* iv. 271.

COROMANDEL COAST, *Roxburgh.*

According to Roxburgh's drawing (at Kew) this is a very different species from *S. zeylanica*, with fewer very much longer and much narrower leaves reaching 4 ft. in length, 1 in. broad, narrower at the base and not nearly so deeply channelled; the scape is more slender with few narrowly lanceolate sheaths, the raceme much longer and the flowers smaller.—Whether it is Rheede's xi. t. 42, which grows in sandy places on the Malabar coast, is doubtful. Roxburgh describes it as cultivated for its fibre. I suspect that it is the only species indigenous to India and is confined to the Western Peninsula and Ceylon, wild or cultivated.

Order CLI. IRIDÆ.

Perennial herbs; rootstock various, *Leaves* narrow, often distichous and equitant. *Flowers* 2-bracteate. *Perianth* superior, petaloid, segments 6-biseriate, imbricating. *Stamens* 3, epigynous, or aduate to the outer perianth-segments; anthers often narrow, extrorse. *Ovary* 3-celled; style simple; stigmas 3, simple or petaloid or variously cleft; ovules many, 2-seriate in the inner angles of the cells, anatropous. *Capsule* trigonous, 3-celled, loculicidal. *Seeds* many, testa thin or coriaceous; embryo immersed in the albumen, short, cylindric.—Genera 57, species about 700, chiefly temperate.

Tribe I. MOREÆ. Stamens opposite to and shorter than the petaloid style-arms.

Stigmatic surface on the back of the petaloid style-arms 1. IRIS.

Tribe II. SISYRINCHIEÆ. Stamens alternating with the style-arms.

Rootstock a tunicate corm; stem 0; perianth-tube long

slender 1. CROCUS.

Rootstock creeping; stem erect; perianth-tube very short. . . 2. BELAMCANDA.

1. IRIS, Linn.

Rootstock bulbous or creeping. *Leaves* equitant, ensiform. *Perianth-tube* long or short, segments large, outer (sepals) largest, stipitate, reflexed, inner (petals) usually smaller, suberect or reflexed. *Stamens* inserted at the base of the outer segments; anthers linear, basifixed. *Ovary* 3-gonous; style stout; stigmas petaloid, arching over the stamens, 2-fid and with a transverse dorsal crest, stigmatic surface a point below the crest. *Capsule* coriaceous, 3- or 6-ribbed. *Seeds* flat or globose, testa coriaceous or fleshy.—Species about 100, North temperate regions.

The Himalayan species of *Iris* are very imperfectly known; good specimens and drawings are much wanted, with descriptions from the living plants. The common *I. Xiphion* of Europe and the East advances into Afghanistan, but has not been collected in British India, and Prof. Foster informs me that he suspects that the European and Eastern *I. Sisgrinchium*, L., a species with the filaments united below, occurs in the Punjab. It is a native of Afghanistan. The character of bearded and crested sepals is artificial and inconstant in this genus.

* *Rootstock* a coated bulb or corm (*Xiphion*).

1. ***I. Aitchisoni***, Boiss. *Fl. Orient.* v. 123; leaves slender subterete, spathes 1-fld., sepals shortly clawed obovate, petals linear spreading, stamens adherent to the style-arms. *Xiphion Aitchisoni*, Baker in *Gard. Chron.* 1876, i. 723; in *Trim. Journ. Bot.* xiii. (1873) 108; in *Journ. Linn. Soc.* xvi. 124.

THE PANJAB; Salt range, alt. 3000 ft., *Vicary*, *Aitchison*.—DISTRIB. Afghanistan.

Corm 2 in. long, ovoid; coats brown, shining. *Stem* $\frac{1}{2}$ –1 $\frac{1}{2}$ ft., slender, 1–3-fld. *Leaves* as long, $\frac{1}{2}$ in. broad. *Spathes* 2–2 $\frac{1}{2}$ in., lanceolate, green. *Perianth* lilac or yellow; tube 1–1 $\frac{1}{2}$ in.; blade $\frac{1}{2}$ in.; petals much shorter, spreading, limb small 3-cuspidate. *I. Stocksii*, Boiss. *Fl. Orient.* v. 123, of Beluchistan, is closely allied to *I. Aitchisoni*, but is a dwarf species with lanceolate plicate leaves.

Var. *chrysantha*, Baker, has the stem 2 ft., and much stouter and flowers yellow.

** *Rootstock* stout, prostrate and creeping.

§ *Sepals* neither crested nor bearded.

2. ***I. ensata***, Thunb. in *Trans. Linn. Soc.* ii. 328; leaves linear rigid grooved glaucous, sheaths shorter than the fusiform ovary, flowers lilac, perianth-tube 0, blade of sepals rhomboidly ovate obtuse entire shorter than the claw, petals oblanceolate erect, style-arms linear tip acutely 2-fld. Boiss. *Fl. Orient.* v. 129; Baker in *Journ. Linn. Soc.* xvi. 139; in *Gard. Chron.* 1876, ii. 323; *Regel Gartenfl.* t. 1011. *I. biglumis*, Vahl *Enum.* ii. 149; *Sweet Brit. Fl. Gard. Ser.* ii. t. 187. *I. triflora*, Balbis *Misc. Bot.* vii. t. 1; *Redouté Lil.* t. 481. *I. Doniana*, Spach. *Hist. Veg.* xiii. 34. *I. Pallasii*, Fisch.; *Reichb. Ic. Fl. Germ.* t. 469; *Bot. Mag.* t. 2331. *I. fragrans*, Lindl. in *Bot. Reg.* xxvi. t. 1. *I. longispatha*, Fisch. in *Bot. Mag.* t. 2528. *I. Moorcroftiana*, Wall. *Cat.* 5021; Don. in *Trans. Linn. Soc.* xviii. 315. *I. pabulina*, Naud. in *Rev. Hort.* 1888, 338 (name). *Xiphion Donianum*, Alefeld in *Bot. Zeit.* (1863) 297. *Ioniris Doniana*, fragrans, triflora & Pallasii, Klatt in *Bot. Zeit.* 1872, 502.

WESTERN HIMALAYA and WESTERN TIBET, alt. 5–9000 ft., Royle, &c.—DISTRIB. Temp. Asia.

Stems tufted, short, or 1 $\frac{1}{2}$ –2 ft., stout or slender, sheaths fibrous. *Leaves* 1 $\frac{1}{2}$ ft. by $\frac{1}{4}$ – $\frac{1}{2}$ in. *Spathes* 3–4 in., 1–3-fld.; valves lanceolate, green. *Flowers* pedicelled; ovary 1 in., cylindric; blade of sepals 1 $\frac{1}{2}$ –2 by $\frac{1}{2}$ – $\frac{3}{4}$ in., claw rather longer; petals $\frac{1}{2}$ in. broad; style-arms 1 in., crests large, deltoid. *Capsule* 1 $\frac{1}{2}$ –3 in., by $\frac{1}{2}$ – $\frac{3}{4}$ in., 6-ribbed, beaked, ribs rounded.

3. ***I. spuria***, Linn. *Sp. Pl.* 58; leaves 1–3 ft. ensiform coriaceous strongly striate, spathes 2–3-fld., flowers lilac, perianth-tube long, blade of sepals orbicular half as long as the claw, petals oblanceolate, style-arms deflexed. *Bot. Mag.* t. 58, 1131, 1314–5; *Jacq. Fl. Austr.* t. 4; *Reichb. f. Fl. Germ.* ix. t. 345. *I. Notha*, M. Bieb. *Cent. Pl. Ross.* t. 77; *Reichb. Ic. crit.* x. t. 915. *I. halophila*, *Bot. Mag.* t. 875 (not of Pallas); Boiss. *Fl. Orient.* v. 128. *Xyridion Nothum* and *spurium*, Klatt in *Bot. Zeit.* 1872, 499.

KASHMIR, alt. 6000 ft., *Clarke*.—DISTRIB. Westward to Russia.

Stem 2-3 ft., sheathed. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{4}$ in. broad. *Spathes* 2-3 in., linear-oblong, firm, green. *Flowers* 2-3 in. diam., bright lilac; sepals $\frac{1}{2}$ in. broad, claw keeled; petals $\frac{1}{3}$ - $\frac{1}{2}$ in. broad; style-arms 1 in. long, crests small, deltoid. *Capsule* 1-2 in., 6-ribbed, long-beaked.—A very common Oriental plant. Baker refers the Kashmir specimens to *I. Notha* as a variety with very stout stems, broad leaves and large flowers.

4. **I. aurea**, *Lindl. in Bot. Reg.* xxxiii. t. 59; tall, stout, leaves ensiform, spathes 2-3-fld., flowers long-pedicelled yellow, ovary as long as the perianth-tube, blade of crisped and crenulate sepals oblong as long as the claw, petals shorter oblanceolate, style-arms with entire broad incurved lobes. *Baker in Gard. Chron.* 1876, ii. 584. *I. crocea*, *Jacquem. mss.* *Xyridion aureum*, *Klatt in Bot. Zeit.* 1872, 501.

WESTERN HIMALAYA; Kashmir, *Royle, Jacquemont*.

Stem 3-3 $\frac{1}{2}$ ft., stout, terete, with leafy sheaths. *Leaves* 1 $\frac{1}{2}$ -2 ft. by $\frac{3}{4}$ -1 in. *Spathes* 3-4 in.; valves lanceolate, green. *Flowers* bright yellow; sepals 2 $\frac{1}{2}$ -3 $\frac{1}{2}$ in., blade 1 in. broad; style-arms 1 $\frac{1}{4}$ -1 $\frac{1}{2}$ in. long, crests deltoid. *Capsule* 1 $\frac{1}{2}$ in. long, oblong, 6-angled, beaked.—Differs from *I. spuria*, chiefly in the yellow flowers.

5. **I. Wattii**, *Baker mss.*; tall, stout, leaves broadly ensiform, flower-heads racemose on stout long peduncles, spathes 2-3-fld., perianth-tube short infundibular, sepals obovate-spathulate, blade as long as the claw, petals rather shorter obovate-oblong, style-arms with 2-fid lacinate tips.

MUNNIPORE; summit of Kongui, alt. 6000 ft., *Watt*.

Stem with 5-6 flower-heads on erecto-patent peduncles. *Leaves* thin, 18 by 1 $\frac{1}{2}$ -2 in., as long as the stem. *Spathes* with the outer valve 1-1 $\frac{1}{2}$ in., lanceolate, thin, green; inner much shorter, oblong, obtuse; pedicels short, jointed with the ovary. *Flowers* pale lavender blue, tube $\frac{1}{2}$ in.; blade of sepals $\frac{3}{4}$ in. broad, striped and spotted with purple, throat yellow; petals $\frac{1}{2}$ in. broad; style-arms $\frac{1}{2}$ in. long, crest deltoid lacinate. *Capsule* small, oblong, obtusely trigonous.—Baker, from whose description much of the above is taken, says of the sepals, "apparently not crested."—Bhotan specimens from Griffith of this or an allied species have stout compressed grooved stems and firmer spathe-valves.

§§ Sepals crested.

6. **I. Milesii**, *M. Foster in Gard. Chron.* 1883, i. 231; tall, stout, leaves very broadly ensiform, flower-heads branched, spathes many-fld., perianth-tube rather short, sepals spreading, blade as long as the claw obovate, crests sharply toothed, petals as large spreading oblong undulate, style-arms with a large fimbriate crest. *Baker in Bot. Mag.* t. 6889.

WESTERN HIMALAYA; Kullu and Parbutta valleys, alt. 4000 ft., *Brandis*.

Stem 3 ft., as thick as the little finger, leafy upwards; sheaths at the forks 4-6 in. *Leaves* 1 $\frac{1}{2}$ -2 ft. by 1-2 in. broad, pale green, firm, strongly curved. *Spathes* 1-1 $\frac{1}{2}$ in., valves oblong, obtuse; pedicels short, jointed at the tip; flowers 2-4 in. diam., large; ovary clavate; perianth-tube $\frac{1}{2}$ in.; blade of sepals 1 $\frac{1}{2}$ -2 in., disk whitish with dark radiating purple blotches, margins purple, crest yellow; style-arms 1 in., blue-purple, crest square.—Possibly this is the tall *Iris* mentioned by Stewart (*Panjab Plants*, 241) as found in the Beas valley, alt. 5-12,000 ft., and used for thatching.

7. **I. nepalensis**, *Don Prodr.* 54 (not of Wall.); stem slender, leaves linear, spathes 1-3-fld., flowers shortly pedicelled, perianth-tube slender, blade of sepals oblong as long as the claw, crests narrow, petals oblong,

crests of style-arms large toothed, capsule 3-gonous with broad flat sides and a long slender beak. *Sweet Brit. Fl. Gard. Ser. ii. t. 11*; *Baker in Journ. Linn. Soc. xvi. 143*; *in Gard. Chron. 1876, ii. 37*. *I. decora, Wall. Pl. As. Rar. i. 77, t. 86*; *Don in Trans. Linn. Soc. xviii. 313*; *Royle Ill. 372*. *I. sulcata, Wall. Cat. 5049*. *Neubeckia decora and sulcata, Klatt in Linnaea, xxxiv. 588, 590*.

TEMPERATE HIMALAYA; from the Panjab and Western Tibet eastwards, alt. 5–10,000 ft. KHASIA HILLS, alt. 5–8000 ft.

Rootstock with densely fibrous sheaths, and copious fleshy finger-like roots; stem $\frac{1}{2}$ –1 ft.; flower heads 1–2. *Leaves* 6 in. long at flowering time, elongating to 24 by $\frac{1}{2}$ in., streaked with purple lines and dots. *Spathes* $1\frac{1}{2}$ –2 in. long, outer valves thin, green, persistent; pedicels very short. *Perianth-tube* $1\frac{1}{2}$ in., limb $1\frac{1}{2}$ in., pale lilac; blade of sepals $\frac{1}{2}$ in. broad, crest yellow; petals $\frac{1}{2}$ in. broad; style-arms 1 in. and less. *Capsule* oblong, trigonous, $1\frac{1}{2}$ in., enclosed in the persistent spathes.—Prof. Foster informs me that the roots are characteristic, resembling those of a *Hemerocallis*. Hemsley (*Journ. Linn. Soc. xxviii. 136*) mentions a starved form of this, 3–4 in. high, as having been collected in the Shan hills by General Collett at 4000 ft. elevation.

§§§ Sepals bearded.

† *Dwarf species*; stems 12 in. or less.

8. *I. gilgitensis*, *Baker mss.*; dwarf, leaves linear, flower-heads solitary, spathe 2-fld., pedicels short, perianth-tube long, blade of sepals small narrow oblong much shorter than the strongly bearded claw, petals oblong.

WESTERN TIBET; at Gilgit, alt. 12,000 ft., *Giles*.

Stems tufted, 4–6 in., basal sheaths entire. *Leaves* flaccid, 6–9 by $\frac{1}{2}$ – $\frac{3}{8}$ in. *Spathes* $1\frac{1}{2}$ –2 in., valves lanceolate green, margins pale. *Perianth-tube* less than 1 in., limb $1\frac{1}{2}$ in., bright lilac; blade of sepals $\frac{1}{4}$ in. broad; petals clawed; style branches $\frac{3}{4}$ in., crests small, deltoid.—Differs from *I. kumaonensis* by the small blade of the sepals. A single specimen only seen.

9. *I. kumaonensis*, *Wall. Cat. 5052*; dwarf, leaves linear, flower-head solitary, spathes 1-fld., pedicels very short, perianth-tube very long, blade of sepals spreading cuneate obovate as long as the bearded claw, petals erect, blade oblong, capsule ellipsoid or subglobose beaked. *Don in Trans. Linn. Soc. xviii. 311*; *Royle Ill. 372*; *Baker in Gard. Chron. 1876, ii. 709*. *I. Kingiana, M. Foster in Gard. Chron. 1887, i. 611*; *Baker in Bot. Mag. t. 6957*. *I. tigrina, Jacquem. mss.*

WESTERN HIMALAYA; from Kashmir to Kumaou, alt. 8–12,000 ft.

Stems 2–12 in., crowded; outer basal sheaths fibrous. *Leaves* 12–14 by $\frac{1}{2}$ in. *Spathes* 2–3 in., valves lanceolate, ventricose. *Perianth-tube* 2–2½ in.; limb $1\frac{1}{2}$ –2 in., bright lilac; blade of sepals $\frac{3}{4}$ in. broad, blotched with darker lilac, beard of claw of yellow-tipped hairs on a white crest, blade of petals $\frac{1}{2}$ in. broad; style-arms $\frac{3}{4}$ in. long, crests deltoid acute. *Capsule* 1–2 in., narrowed at both ends, trigonous, angles obtuse.—Don describes the sepals as blood-red with black-purple spots.

10. *I. goniocarpa*, *Baker in Gard. Chron. 1876, ii. 710*; *in Journ. Linn. Soc. xvi. 145*; dwarf, slender, leaves narrow linear, flower-heads solitary, spathes 1–2-fld., flowers subsessile, perianth-tube long, sepals cuneately-oblong, keel strongly bearded, petals erect, blade oblong, capsule trigonous with broad flat sides and a long slender beak.

SIKKIM HIMALAYA, alt. 10–13,000 ft., *J. D. H.*

Stem 6 in., 1-leaved, sheaths fibrous. *Leaves* 6–8 by $\frac{1}{2}$ in. *Spathes* 1 in. long, valves lanceolate persistent. *Perianth-tube* $\frac{1}{2}$ – $\frac{3}{4}$ in.; blade of lilac? sepals $\frac{1}{2}$ in. broad;

style-arms $\frac{1}{2}$ in.; crests large, deltoid, acute. Capsule exactly as in *I. nepalensis*, of which this may be a variety, but the sepals are strongly bearded.

11. **I. Duthieii**, *Foster in Gard. Chron.* 1887, i. 611; dwarf, leaves linear, flower-heads solitary, spathes 1-fld., perianth-tube very long, blade of spreading sepals cuneate-obovate gradually narrowing into the bearded claw, petals oblong obovate red lilac.

WESTERN HIMALAYA; Kumaon, *Duthie (Hort. Foster)*.

Seems to differ from *I. kumaonensis*, of which it is probably a variety, in the reddish lilac flowers, with darker veins. Capsule $1\frac{1}{4}$ by 1 in., trigonous. As in *kumaonensis* the flowering precedes the mature leafing.

12. **I. Hookeriana**, *Foster in Gard. Chron.* 1887, i. 611; dwarf, leaves linear, flower-head solitary, spathes three 2-fld., persistent perianth-tube short, blade of sepals obovate-cuneate gradually narrowing into the thickly bearded claw, blade of erect petals narrowly obovate, capsule small trigonous beaked.

WESTERN HIMALAYA; Lahul (*Hort. Foster*).

Stem 5-6 in., sheaths torn. Leaves immature at the flowering season, at length 24 by $\frac{1}{2}$ - $\frac{3}{4}$ in., pale green. Spathes about 5 in. long; valves lanceolate, ventricose. Perianth-tube $\frac{1}{2}$ in., limb $1\frac{1}{2}$ -2 in.; blade of sepals cuneate-obovate, $\frac{3}{4}$ in. broad, purplish blue blotched with darker; claw white with violet veins, hairs of beard white yellow-tipped; blade of petals $\frac{1}{2}$ in. broad, suddenly narrowed into the channelled claw; style-arms very convex dorsally, crests revolute deltoid, coarsely serrulate. Capsule oblong.

†† Stem 1 ft. or more.

13. **I. Clarkei**, *Baker mss.*; stem tall stout, leaves linear or ensiform strongly striate, flower-heads 1-2, spathes 1-2-fld., valves green to the tips, pedicels nearly equalling the spathe, perianth-tube short infundibular, blade of sepals oblong-cuneate with a bearded erect claw, blade of petals small oblong, claw long, capsule oblong obtuse at both ends.

SIKKIM HIMALAYA, alt. 10-11,500 ft., *J. D. H., Clarke*.

Rootstock very stout, creeping, sheaths long, fibrous. Stem 10-24 in., fruiting very stout, 2-leaved. Leaves not membranous at the tips, at length $1\frac{1}{2}$ -2 ft. by $\frac{1}{3}$ - $\frac{1}{2}$ in. Spathes 2 $\frac{1}{2}$ -3 in., valves lanceolate, persistent. Perianth bright lilac blotched with violet, throat yellow; tube $\frac{1}{2}$ in.; limb 2 in.; blade of sepals $\frac{3}{4}$ in. broad, style-arms 1 in. long, bright lilac, crests square. Capsule $1\frac{1}{2}$ -2 in., oblong, trigonous, valves thick, rigid, keeled at the back.—The leaves are very variable, linear and $\frac{1}{4}$ in. broad in small fld. specimens.

DOUBTFUL SPECIES.

Of the following, except *I. longifolia*, all are supposed to be either garden plants or originally garden escapes, and probably identical with Persian species. The attention of Indian botanists should be given to them.

I. DEFLEXA, *Knowles and Westc. Flor. Cab.* ii. 19, t. 57 (*Lindl. Bot. Reg.* 1840, Misc. 25, 34; *Baker in Gard. Chron.* 1876, ii. 774 (in part). *I. germanica*, var. *nepalensis*, *Herb. in Bot. Reg.* l. c. 34. Baker, who characterizes the plant of the Floral Cabinet by the scarious tips of the spathes and deflexed stem, considers it to be intermediate between *germanica* and *pallida*, but as he has included under it the *nepalensis* of Royle & Wallich, some of which are certainly different, his view is perhaps not correct. Herbert, who cultivated authentic specimens, says that the deflexed stem was due to its being grown in heat, and that it is a var. of *germanica*, and is *I. nepalensis*, *Wall. in Bot. Reg.* t. 818.

I. KASHMIRIANA, *Baker in Gard. Chron.* 1877, ii. 744 (Kashmir to Kumaon). Differs, according to Baker, from *I. florentina*, in the sweet-scented pure white flowers with the spathe-valves scarious at the tips only, and the pure milk white stigmas two-thirds as long as the perianth with large crests.

I. LONGIFOLIA, Royle Ill. 372, t. 91, f. 2; Baker is disposed to regard this as a long-leaved form of *I. nepalensis*, Don Prodr. (not of Trans. Linn. Soc.). Prof. Foster thinks it is an entirely different plant, apparently allied to *I. ruthenica*.

I. NEPALENSIS, Wall. Cat. 5050 *in part*, a native of Nepal and Kumaon. There are two plants under this number in Herb. Wall., one a solitary specimen, with spathes scarious throughout, the others with them green throughout. Of this latter there is an excellent drawing by Wallich's article made in Nepal. Except in the very pale flowers it may be a *I. germanica*; but Royle (Ill. Him. Pl. p. 372) says that he perceived a distinct smell of Orris-root (as of *I. florentina*) in Wallich's specimen, which is against its being *germanica*. The specimen with scarious valves looks more *I. florentina*, but it has no roots.

I. NEPALENSIS, Wall. mss. in Lindl. Bot. Reg. t. 818 (from Nepal, Wallich). This has the dark blue flowers of *I. germanica*, very unlike the Wallichian drawing of *I. nepalensis*, it may or may not agree in colour with some of his specimens. Herbert makes it a var. of *germanica*, but gives no varietal character. Baker cites it under *depressa*.

I. NEPALENSIS, Wall. ex *I. Don.*; in Trans. Linn. Soc. xviii. 310. This is a mixture of Wallich's, Royle's and the Bot. Reg. *nepalensis*; in consequence of which the root is described as fragrant, as in *I. florentina*, and used for similar purposes. Don distinguishes it from *germanica* by the shorter scarious ventricose spathes (while they are not in Wallich's plant!) entire sepals, longer slenderer tube, and more coarsely serrated stigmatic lobes. Don has a variety with the scape undivided, sub 2-fld. shorter than the leaves, but these are characters of Wallich's drawing of his type.

I. NEPALENSIS, Wall. ex Royle Ill. 372, t. 90, f. 2. I have seen no specimens of this, which is a native of Garwhal, on the ascent to Surkunda. It has a pale flower and "orris" scented roots.

CROCUS, Linn.

Rootstock a sheathed corm; stem 0. *Leaves* radical, narrowly linear, channelled, margins recurved. *Flowers* solitary or fascicled, subsessile; basal spathes 1-3 or 0 hyaline, floral embracing the ovary and sometimes a narrow hyaline bract. *Perianth* funnel-shaped, tube very slender; limb subequally 6-lobed in two series. *Stamens* on the throat of the perianth, filaments short, anthers longer, basifixed. *Ovary* 3-celled; style filiform, arms slender subentire lobed or laciniate; tips stigmatic. *Capsule* oblong, membranous, loculicidal. *Seeds* subglobose.—Species about 70, European and E. Asian.

C. sativus, Linn. Sp. Pl. 36; sheaths of corm closely reticulate, basal spathes embracing the scape 2-valved, flowers violet autumnal appearing with the leaves, throat of perianth bearded, anthers yellow, style-arms exserted orange-red subclavate tips entire or lobulate. *Maw Gen. Croc.* t. 20. *C. sativus* var. *kashmeriana*, Royle Ill. 374, t. 91, f. 1; *Stewart, Panjab Pl.* 239; *Boiss. Fl. Orient. V.* 100; *Reichb. Ic. Fl. Germ.* t. 360; *Benth. & Trim. Med. Bot.* 274.

KASHMIR, cultivated only. Native of South Europe.

The Kashmir saffron is regarded by Royle as a variety of that cultivated in England, distinguished by the very dark violet blue flowers, yellow anthers and brick-red stigmas, but this accords exactly with the common form figured by Bentley and Trimen.

BELAMCAUDA, Adams.

Rootstock creeping; stem erect, leafy. *Leaves* ensiform, equitant. *Inflorescence* branched, sheaths membranous; spathes several-fld., subscarious; bracts scarious; flowers pedicelled. *Perianth-tube* very short;

segments oblong, spreading, subequal. *Stamens* inserted at the base of the perianth, filaments filiform, anthers linear basifixed. *Ovary* obovoid; style filiform arms elongate, tips reniform stigmatic. *Capsule* obovoid, membranous, loculicidal, valves reflexed, leaving the seed-bearing axis persistent and free. *Seeds* subglobose, testa lax shining fleshy within.

1. **B. chinensis**, *Leman in Red. Lil.* t. 121; *Baker in Journ. Linn. Soc.* xvi. 113. *B. punctata*, *Moench Meth.* 529. *Pardanthus chinensis*, *Ker in Kœnig & Sims Ann. Bot.* i. 246; *Miquel Fl. Ind. Bat.* iii. 579; *Royle Ill.* 371; *Lodd. Bot. Cab.* t. 1874; *Flore des Serres* t. 1632. *P. nepalensis*, *Sweet Brit. Fl. Gard. Ser.* ii. 498. *Ixia chinensis*, *Linn. Sp. Pl.* 36; *Gœrtn. Fruct.* t. 13; *Bot. Mag.* t. 171. *Morœa chinensis*, *Murr. Syst. Veg.* 93; *Roxb. Fl. Ind.* i. 170.—*Rheede Hort. Mal.* xi. t. 37.

Very doubtfully wild in the HIMALAYA, ascending to 6000 ft. Cultivated all over INDIA; a native of China.

Order CLII. AMARYLLIDÆ.

Rootstock bulbous tuberous or a corm. *Leaves* radical. *Scape* naked (in the Indian genera). *Perianth*-superior, regular or irregular, tube long short or 0, limb 6-lobed or -partite, with sometimes a crown at the mouth. *Stamens* 6, on the bases of the segments, rarely epigynous, filaments free or connate; anthers erect or versatile. *Ovary* 3-celled; style stout or slender, stigma simple or cleft; ovules many, 2-seriate in the inner angle of the cells, anatropous. *Fruit* usually capsular, loculicidal, rarely fleshy and bursting irregularly. *Seeds* few or many, albumen fleshy enclosing the small embryo.—Genera 64, species about 650.

The American Aloe, *Agave americana*, Linn. (*A. cantula*, Roxb. *Fl. Ind.* ii. 167) is planted as a hedge in the Panjab (Stewart, Panjab Plants, 232) and introduced elsewhere in India. *A. vivipara*, Linn. (Wight *lc.* t. 2024) is naturalized in the Deccan. *Zeyhyranthes tubispatha*, Herb. a Peruvian plant, resembling a small *Pancratium*, but without a corona, is cultivated in gardens and found as an escape far from habitations.

Tribe I. HYPOXIDÆ. *Rootstock* tuberous. *Flowers* spicate or racemose. *Ovary* not produced above the crown into a stipes 1. HYPOXIS.
Ovary produced into a short or long stipes above the crown 2. CUCULIGO.

Tribe II. AMARYLLÆ. *Rootstock* bulbous. *Flowers* umbelled.
Filaments free 3. CRINUM.
Filaments united by a membrane 4. PANCERATIUM.

1. HYPOXIS, Linn.

Rootstock tuberous, or a coated corm. *Leaves* radical, narrow, strongly nerved. *Flowers* solitary, racemed, or umbellate. *Perianth* rotate, 6-partite, sessile on the top of the ovary, persistent. *Stamens* 6 on the base of the segments; filaments short; anthers erect, dorsifixed. *Ovary* 3-celled; style short, columnar, stigmas 3, erect, stout, distinct or connate; ovules 2-seriate. *Capsule* circumsciss below the top or 3-valved. *Seeds* subglobose, testa crustaceous shining beaked at the hilum.—Species about 50, widely diffused but rare in Asia, many S. African.

1. **H. aurea**, *Lour. Fl. Coch.* 200; villous or hairy, leaves narrowly linear, scape slender 1-2-fld., ovary and perianth lobes externally hairy,

anthers sagittate. *Baker in Journ. Linn. Soc.* xvii. 108; *Kurz in Mig. Ann. Mus. Lugd. Bat.* iv. 178. *H. minor*, *Don Prodr.* 53; *Royle Ill. t.* 91, f. 3. *H. Franquevillei*, *Miquel Fl. Ind. Bat.* iii. 586. *H. curculigoides*, *Wall. Cat.* 5164. *Curculigo graminifolia*, *Nimmo in Grah. Cat. Bomb. Pl.* 215; *Dalz. & Gibs. Bomb. Fl.* 276.

SUBTROPICAL HIMALAYA; from Kashmir eastwards, ascending to 7000 ft. in Sikkim. KHASIA HILLS, BENGAL, BEHAR and BURMA, and in the Western Ghats from the Concan southward. (Not in Ceylon).—DISTRIB. Java, China, Japan.

Dioecious. *Rootstock* globose, or elongate and erect, crowned with fibrous remains of old leaves. *Leaves* 4–14 by $\frac{1}{2}$ – $\frac{1}{4}$ in., subcoriaceous, keeled. *Scape* 1–4 in., filiform, hairy; bracts setaceous. *Ovary* clavate. *Perianth-lobes* $\frac{1}{2}$ – $\frac{1}{3}$ in., elliptic-lanceolate, yellow, outer green on the back. *Capsule* $\frac{1}{4}$ – $\frac{1}{2}$ in., clavate, at length 3-valved, crowned with the erect perianth-lobes, walls thin. *Seeds* black, tuberculate.

2. *CURCULIGO*, Gærtn.

Root stock tuberous, or a coated corm. *Leaves* lanceolate and plaited, or linear and flat. *Scape* short or long; flowers often unisexual, spicate or racemed or subcapitate. *Perianth* usually produced above the ovary as a solid stipes, bearing the rotate limb. *Stamens* ovary and seeds of *Hypoxis*. *Fruit* indehiscent, usually more or less beaked.—Species about 12, tropical.

SECT I. MOLINIERA. *Perianth* limb sessile or very shortly stipitate above the ovary.

1. *C. recurvata*, *Dryand. in Ait. Hort. Kew* Ed. 2, ii. 253; leaves long-petioled lanceolate plicate glabrous or with the nerves beneath hairy, scapes many flattened villous, flowers in a decurved subcapitate raceme, ovary turbinate, berry globose hairy. *Bot. Reg. t.* 770; *Roxb. Fl. Ind.* ii. 145; *Benth. Fl. Austral.* vi. 448; *Miquel Fl. Ind. Bat.* iii. 585; *Wall. Cat.* 5159. *C. villosa*, *Wall. Cat.* 5163 B. *Moliniera recurvata*, *Herbert Amaryllid.* 84; *Baker in Journ. Linn. Soc.* xvii. 120; *Kurz in Ann. Mus. Lugd. Bat.* iv. 175. *M. plicata*, *Colla, Hort. Ripp. App.* ii. 333, t. 18. *M. capitulata*, *Herbert l. c.* *Leucojum capitulatum*, *Lour. Fl. Coch.* 199. *Hypoxis Saarpata*, *Herb. Ham.*

TROPICAL HIMALAYA; from Nepal eastwards. BENGAL, CHITTAGONG and BURMA. CEYLON; at Saffragam.—DISTRIB. Malay Islands, S. China, Australia.

Rootstock tuberous. *Leaves* very variable, 2–3 ft. by 3–6 in., recurved, narrowed into a channelled petiole 1–2 ft., villous below, glabrous above. *Scapes* 3–9 in., stout or slender, bracts spathaceous, lanceolate, villous; heads of flowers 2–4 in. diam., villous; flowers pedicelled. *Ovary* $\frac{1}{4}$ – $\frac{1}{2}$ in., villous; bracts 1–1½ in.; cells about 10-ovuled. *Perianth* about $\frac{3}{4}$ in. diam., outer segments villous on the back. *Filaments* very short; anthers cohering. *Berry* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. *Stigmas* sub 3-lobed, shining. *Seeds* black, testa deeply closely grooved.

2. *C. gracilis*, *Wall. Cat.* 5760; leaves long-petioled lanceolate plicate glabrous, scapes many flattened tomentose, flowers in a decurved dense elongate raceme, ovary oblong tip narrowed, berry oblong? *Moliniera gracilis*, *Kurz in Ann. Mus. Lugd. Bat.* iv. 177; *Baker in Journ. Linn. Soc.* xvii. 120.

TROPICAL HIMALAYA; from Nepal, Wallich, eastwards.

Habit, &c., of *C. recurvata*, of which it is probably a form, but more slender, with the ovary oblong and the inflorescence elongate. Wallich's specimens have leaves 8–12 by $\frac{1}{2}$ –1 in., short woolly scapes, few-flid. loose racemes, and flowers $\frac{1}{2}$ in. diam. Sikkim specimens have stoutly petioled leaves 2½ ft. by 4½ in., and a robust scape 6–12 in. The var. *Jamesoni*, *Baker l. c.* 121; with leaves rigidly coriaceous flowers subsessile in a dense globose head I should refer to *recurvata*.

3. **C. crassifolia**, *Hook. f.*; leaves long-petioled elliptic-lanceolate thickly and rigidly coriaceous plicate glabrous above beneath white-tomentose, scape flattened stout densely tomentose, flowers in a very large dense oblong raceme, bracts glabrous or woolly, ovary oblong top silky, berry oblong. *Moliniera crassifolia*, *Baker in Journ. Linn. Soc.* xvii. 121.

SIKKIM HIMALAYA, *J. D. H.* KHASIA MTS., alt. 5-5000 ft., *J. D. H. & T. T., Mann, Clarke.*

Leaves 2-3 ft. by 3-6 in., strongly closely plicate; petiole 1 ft. stout. *Scape* 2-8 in.; raceme 3-4 in.; bracts 1-1½ in., very variable; lower flowers pedicelled. *Perianth* segments ½ in., outer hairy or villous externally. *Berry* ½ in. long. *Seeds* globose, black, granulate.

4. **C. Finlaysoniana**, *Wall. Cat.* 5162; leaves petioled elliptic-lanceolate plicate glabrous, scape very short villous, flowers in a lax erect or inclined few or many fld. raceme, bracts linear, ovary fusiform or clavate villous, berry oblong. ? *C. pauciflora*, *Moon Cat. Pl. Ceyl.* *Hypoxis trichocarpa*, *Wight Ic.* t. 2045; *Thwaites Enum.* 323; *Kurz in Ann. Mus. Lugd. Bat.* iv. 178. *H. latifolia*, leptostachya, pauciflora and brachystachya, *Wight Ic.* t. 2044-2046. *Moliniera Finlaysoniana*, *Baker in Journ. Linn. Soc.* xvii. 121.

TRAVANCORE and MALABAR, *Wight, &c.* CEYLON; central province, ascending to 5000 ft.

Leaves 12-24 by 1-1½ in., thin, 5-nerved, finely acuminate, sometimes sparsely hairy, petiole very slender. *Scape* short, slender; pedicels 1-1½ in., capillary; bracts filiform. *Racemes* with the upper flowers male. *Perianth* segments ½ in. long, of males shorter. *Fruit* ¾-¾ in., curved, few seeded, walls thin. *Seeds* ovoid-oblong, finely deeply striate, black, shining.

Var. *linearifolia*, *Thwaites l. c.*, has narrow almost linear leaves.

Sect. II. CURCULIGO PROPER. Ovary narrowed into a long beak or stipes supporting the perianth-limb.

5. **C. orchloides**, *Gartn. Fruct.* i. 63, t. 13; polygamous, leaves long- or short-petioled or subsessile lanceolate membranous plicate glabrous, scape very short subterranean, flowers subsessile, bracts lanceolate membranous, ovary small amongst the leaf bases, stipes of the perianth long filiform, stigmas 3 erect separate, capsule oblong. *Baker in Journ. Linn. Soc.* xvii. 124; *Roxb. Cor. Pl.* i. 14, t. 13; *Fl. Ind.* ii. 144; *Thwaites Enum.* 324; *Grah. Cat. Bomb. Pl.* 215; *Bot. Mag.* t. 1076; *Wall. Cat.* 5158; *Miquel Fl. Ind. Bat.* iii. 585. *C. malabarica*, *Wight Ic.* t. 2043; *Dalz. & Gibs. Bomb. Fl.* 276. *C. brevifolia*, *Dryand. in Ait. Hort. Kew Ed.* 2, ii. 253; *Wight Ic.* t. 2043; *Grah. Cat. Bomb. Pl.* 215; *Dalz. & Gibs. l. c.* *Hypoxis dulcis*, *Steud. Pl. Hohenack.* No. 135. *Gethyllis fusiformis*, *Herb. Ham.* *Franquevillea major*, *Zoll. ex. Kurz in Journ. As. Soc. Beng.* 1870, ii. 84.—*Rheede Hort. Mal.* xii. t. 59.

SUBTROPICAL HIMALAYA; from Kumaon eastwards, ascending to 6000 ft. The KHASIA HILLS, MUNNIPORE; and the WESTERN GHATS from the Concan southward.—DISTRIB. Java.

Rootstock tuberous or elongate, sometimes 1 ft. long and stout in proportion. *Leaves* 6-18 by ½-1 in., tips viviparous on reaching the ground; petiole 6 in. or less. *Scape* 1 in., clavate, flattened, hidden by the leaf-sheaths; flowers distichous, lowest 2-sexual, the rest all male; bracts lanceolate; perianth segments ½-¾ in. *Ovary* villous, the stipes and perianth alone epigaeous; stigma 3-cleft; cells 6-8 ovuled. *Capsule* ½ in., oblong, hypogeous, 1-4 seeded, beak slender; septa spongy. *Seeds* ½ in. long, oblong, deeply grooved in wavy lines, black, shining. *Male fl.* with no ovary, style or stigma.

6. *C. latifolia*, Dryand. in Ait. Hort. Kew, Ed. 2, ii. 253; polygamous, leaves long-petioled lanceolate membranous plicate glabrous or sparsely hairy beneath, scape very short villous or 0, flowers sessile in an hypogeous oblong or globose head with the filiform stipes of the perianth epigæal, bracts ovate-lanceolate acuminate hairy, style filiform, stigmas 3 small. Baker in Journ. Linn. Soc. xvii. 125; Bot. Mag. t. 2034; Bot. Reg. t. 754; Miquel Fl. Ind. Bat. iii. 585. *C. sumatrana*, Roxb. Fl. Ind. ii. 146; Lodd. Bot. Cab. t. 443; Wight Ic. t. 2042. *Moliniera sumatrana*, Herb. Amaryllid. 84. *M. latifolia* & *plicata*, Kurz in Ann. Mus. Lugd. Bat. iv. 176.

BURMA, the MALAY PENINSULA and ANDAMAN ISLANDS.—DISTRIB. Malay Islands.

Rootstock hardly any; base of stem stoloniferous. *Leaves* 1–2 ft. by $1\frac{1}{2}$ – $2\frac{1}{2}$ in.; petiole 1 ft. or less. *Ovary* oblong or globose; stipes of male fl. much longer than of the bisexual and more slender. *Fruit* 1 in. long, clavate or pyriform, hairy. *Seeds* black, shining (granular in Wight's figure).

There are four principal forms:—1. Leaves $1\frac{1}{2}$ –2 ft. by 4–5 in. sparsely villous beneath, petiole slender, flowers small in a dense ovoid head (Singapore, Java).—2. Leaves 1– $1\frac{1}{2}$ ft. by $1\frac{1}{2}$ in. sparsely villous beneath, petiole slender, heads small, flowers larger $\frac{1}{2}$ in. diam. (Wight Ic. t. 2042 and Andaman Islands).—3. Leaves $1\frac{1}{2}$ ft. by $1\frac{1}{2}$ –2 in. glabrous beneath, petiole slender, heads small few-fld. (Penang, Malacca).—4. Leaves 8–12 by 2–3 in., quite glabrous, longer than their petioles, heads dense-fld. (Burma, Malacca, Borneo).

Var. *villosa*, Baker l. c.; leaves coriaceous cobwebby beneath, petiole very stout, heads dense-fld., bracts oblong obtuse and nearly glabrous. *C. villosa*, Wall. Cat. 5763 A; Kurz. l. c. Singapore, Malay Islands.—Perhaps a distinct species.

3. CRINUM, Linn.

Rootstock bulbous. *Leaves* elongate, lorate or ensiform. *Scape* solid. *Flowers* large, umbelled; spathes 2; bracts linear. *Perianth* funnel- or salver-shaped, tube straight or upcurved, lobes linear to oblong. *Stamens* on the throat of the perianth, erect spreading or declinate; anthers linear, dorsifixed. *Style* filiform, stigma minute; ovules few or many. *Fruit* subglobose, membranous or coriaceous, bursting irregularly. *Seeds* few, large, rounded, testa thick; albumen very copious.—Species about 60, tropical Asiatic, African, Australian and American.

The identification by herbarium specimens of this genus is impossible, and I have little confidence in the following attempt to systematize the Indian ones, in which I have been guided by Herbert and Baker.

Sect. I. STENASTER. *Perianth* erect, salver-shaped, lobes linear. *Stamens* very long, spreading.

1. *C. asiaticum*, Linn. Sp. Pl. 419 (in part); leaves very many 3–4 ft. by 5–7 in. flat, scape $1\frac{1}{2}$ –2 ft. compressed, spathes 3–4 in., umbels 10–50-fld., pedicels $\frac{1}{2}$ –1 in., perianth-tube 3–4 in., lobes as long much longer than the filaments. Kunth Enum. v. 547; Baker Handb. of Amaryllid. 75; Herb. Amaryllid. 243; Dalz. & Gibs. Bomb. Fl. 275; Bot. Mag. t. 1073; Wall. Cat. 8969 A, in part, E, F. *C. toxicarium*, Roxb. Fl. Ind. ii. 134; Wight Ic. t. 2021–2; Lodd. Bot. Cab. t. 669. *Amaryllis carnosa*, Herb. Ham.

Throughout TROPICAL INDIA, wild or cultivated. CEYLON; common on the coast, Thwaites.

Bulb very large, neck 4–5 in. *Leaves* thin, edges smooth. *Scape* often 1 in. diam.; sheaths thick. *Flowers* white, fragrant at night, tube greenish; lobes revo-

lute. *Stamens* often reddish; anthers $\frac{1}{2}$ – $\frac{3}{4}$ in. *Fruit* subglobose, usually 1-seeded. —Much the largest Indian species.

Var. procera, Baker l. c.; leaves 5 ft. by 6 in., perianth-tube and lobes each 5 in., the latter tinged with red. *C. procerum*, *Carey ex Herb. in Bot. Mag.* t. 2684.

2. *C. defixum*, *Ker in Quart. Journ. Sci.* iii. (1817), 105; leaves few 2–3 ft. by $\frac{3}{4}$ –1 in. erect linear obtuse concave, scape $1\frac{1}{2}$ –2 ft. stout, umbels 6–15-fld., spathes $1\frac{1}{2}$ –2 in. ovate-lanceolate, perianth white, tube $2\frac{1}{2}$ –3 in., lobes nearly as long narrowly linear-lanceolate much longer than the stamens. *Herb. Amaryllid.* 255; *Kunth Enum.* v. 562; *Bot. Mag.* t. 2208; *Lodd. Bot. Cab.* t. 362; *Baker Handb. Amaryllid.* 76. *C. asiaticum*, *Roxb. Fl. Ind.* ii. 127; *Wall. Cat.* 8969, *G, H, I in part.* *C. asiaticum* var. *angustifolium*, *Wall. Cat.* 8969 *G, H.* *Amaryllis vivipara*, *Lamk. Encyc.* i. 123. *A. cœnosa*, *Herb. Ham.*

Swampy river banks throughout INDIA. ? CEYLON; in the hotter drier regions, *Thwaites*.

Bulb with a fusiform stoloniferous base, neck cylindric. *Flowers* sessile, fragrant at night, tinged with red. *Filaments* bright red; anthers $\frac{1}{2}$ in. *Fruit* subglobose, 1 in. diam., 1–2-seeded.

3. *C. ensifolium*, *Roxb. Fl. Ind.* ii. 129; leaves erect 12–18 by $1\frac{1}{2}$ in. ensiform tapering to the acuminate tip concave, scape rather slender, umbels 10–12-fld., spathes $1\frac{1}{2}$ –2 in., perianth white tube $3\frac{1}{2}$ in. rather longer than the linear lobes which are about as long as the stamens. *Herb. Amaryllid.* 255; *Bot. Mag.* t. 2301; *Kunth Enum.* v. 563. *C. defixum*, var. *ensifolium*, *Baker Handb. of Amaryllid.* 76. *C. Roxburghii*, *Grah. Cat. Bomb. Pl.* 215; *Dalz. & Gibs. Bomb. Fl.* 275.—*Rheede Hort. Malab.* xi. t. 38.

Banks of the DECCAN rivers. PEGU, *Carey*.

I follow Roxburgh and Herbert in keeping this distinct from *defixum* on account of the gradually acuminate leaves, as well represented by Rheede. Roxburgh's drawing named *C. asiaticum* (No. 1395) is clearly this and not his *asiaticum* (*defixum*). Herbert suggests the union of the two under the name of "*Ditch crinum*," both being marsh plants, with fusiform stoloniferous caudices, forming prolongations of the base of the bulb.

4. *C. Wattii*, *Baker Handb. of Amaryllid.* 76; leaves 18 by $1\frac{1}{4}$ in. flaccid, scape $1\frac{1}{2}$ ft. rather stout, umbel 6–8-fld., spathes deltoidly lanceolate, pedicels very short, perianth-tube 3 in. very slender, lobes half as long, stamens equalling the lobes.

MUNNIPORE, alt. 4000 ft.; in grassy places, *Watt*.

Bulb ovoid, 2 in. diam., neck very short. *Anthers* $\frac{1}{2}$ in.—A very obscure species; it is difficult in dried specimens to determine whether the corolla lobes are linear as in Sect. *Stenaster*, or lanceolate as in Sect. *Platyaster*.

5. *C. stenophyllum*, *Baker in Gard. Chron.* 1881, 786; *Handb. of Amaryllid.* 75; leaves 3 ft. by $\frac{1}{4}$ – $\frac{1}{2}$ in. linear flaccid, scape very slender 2-edged, umbel 4–6-fld., spathes 2 in. lanceolate, pedicels $\frac{1}{4}$ in., perianth-tube 3–4 in. very slender, lobes half as long or longer. *Crinum* sp. *Wall. Cat.* 8970.

BURMA; at Tavoy, *Gomez*.

Known only from Wallich's specimen, but Clarke has very similar plants from Silhet, Chota Nagpur and Bengal, except in that their perianth-lobes are decidedly lanceolate; as indeed I should be disposed to consider the perianth-lobes of Wallich's to be, rather than linear.

6. **C. pusillum**, *Herb. Amaryllid.* 255, t. 32, f. 3; leaves few less than 12 in. long $\frac{1}{4}$ – $\frac{1}{2}$ in. broad erect, linear acute, umbels few-fl., pedicels upwards of 1 in., perianth-tube 3 in., lobes nearly as long as an inch longer than the stamens. *Baker Handb. of Amaryllid.* 77.

NICOBAR ISLANDS.

A very little-known plant, assumed by Herbert to be stoloniferous, like *C. deflexum*. The bulb is described as 4 by $\frac{3}{8}$ in., columnar, cylindric.

Sect. II. PLATYASTER. *Perianth* erect, salver-shaped, lobes lanceolate. *Stamens* very long, spreading.

7. **C. humile**, *Herb. in Bot. Mag.* t. 2636; *Amaryllid.* 256; leaves about 12 in. linear pitted on the surface, margin smooth, scape about as long subcylindric, umbels 6–9-fl., spathes 2–3 in. lanceolate, pedicels short, perianth-tube 3 in., lobes linear-lanceolate rather longer than the stamens. *Kunth Enum.* v. 563; *Baker Handb. of Amaryllid.* 81.

TROPICAL ASIA.

Bulb globose, green, neck short. *Leaves* spreading, nearly flat, acute. *Perianth-tube* green, lobes narrow white acute; filaments very slender, purplish, anthers $\frac{1}{2}$ in. long.—The *Bot. Mag.* plate and description are the only authority for this species, which may not be Indian. It was brought from the East by a Capt. Cragie to Mr. Milne, of Fulham Nursery. *Baker* doubtfully refers to it a plant collected by Stocks, which is *C. brachynema*, *Herb.*

8. **C. amœnum**, *Roxb. Hort. Beng.* 23; *Fl. Ind.* ii. 127; leaves $1\frac{1}{2}$ –2 ft. by 1 – $1\frac{1}{2}$ in. suberect ensiform acuminate margin subscabrous, scape 1–2 ft. rather slender subcylindric, umbels 6–12-fl., spathes 2 in. lanceolate, flowers subsessile, perianth-tube 3–4 in., lobes 2–3 in. linear-lanceolate rather longer than the red filaments. *Kunth Enum.* v. 562; *Herb. Amaryllid.* 255; *Baker Handb. of Amaryllid.* 81; *Wall. Cat.* 8971.

TROPICAL HIMALAYA; from Nepal eastwards, ascending to 6000 ft. in Sikkim. The KHASIA HILLS, SILHET and BURMA, *Roxburgh*, &c.

Bulb globose, 2–3 in. diam. *Leaves* 10–12, tapering from the base to the acuminate tip, bright green. *Perianth* white, tube green; anthers $\frac{1}{2}$ in. *Ovary-cells* 4–5-ovuled.—Herbert describes 2 vars.; namely *caudicea*, from Ceylon, with smooth margins of the leaves and a cylindric neck of the bulb; and *verecunda*, from Rangoon, with more obtuse humifuse lacunose leaves.

9. **C. Stracheyi**, *Baker in Gard. Chron.* 1881, ii. 72; *Handb. of Amaryllid.* 81; leaves 2 ft. by $1\frac{1}{2}$ –2 in. lorate thin acute margin subdentate, scape $1\frac{1}{2}$ –2 ft. stout, umbels 12–15-fl., spathes lanceolate, pedicels $\frac{1}{2}$ –1 in., perianth-tube 3–3 $\frac{1}{2}$ in., lobes 2–2 $\frac{1}{2}$ in. hardly longer than the filaments.

KUMAON, in gardens. *Strachey* and *Winterbottom*.

Known imperfectly, and only as a garden plant.

10. **C. pratense**, *Herb. Amaryllid.* 256; leaves $1\frac{1}{2}$ –3 ft. by $1\frac{1}{2}$ –2 in. linear channelled margins entire, scape 12 in. or more decumbent compressed, umbels 6–12-fl., spathes 2–3 in. deltoid-lanceolate, flowers subsessile, perianth-tube 3–4 in., lobes about as long rather longer than the stamens. *Kunth Enum.* v. 563; *Baker Handb. of Amaryllid.* 82. *C. longifolium*, *Roxb. Hort. Beng.* 23; *Fl. Ind.* ii. 130; *Ker-Gawl. in Quart. Journ. Sc. & Arts*, iii. (1817) 107.

Plains of INDIA and BURMA.

Bulb 4–5 in. diam., ovoid or spherical, neck 2–2 $\frac{1}{2}$ in. *Leaves* 6–8, suberect or

declinate. *Flowers* fragrant, white; filaments red. *Ovarian cells* 3–4-ovuled.—Roxburgh's figure of *longifolium* represents a plant with a bulb $4\frac{1}{2}$ in. diam. having a neck 2–2 $\frac{1}{2}$ in., leaves obtuse concave ciliolate, scape very stout, flowers sessile, perianth-tube $3\frac{1}{2}$ –4 in., stout, green, lobes 3 in. by $\frac{1}{2}$ in., linear, obtuse, greenish externally, filaments as long, red, anthers $\frac{2}{3}$ in., yellow.—Herbert and Baker include under *C. pratense*, the *C. lorifolium*, Roxb. Fl. Ind. ii. 131, from Pegu, with weak spreading leaves 4–5 ft. long; *C. elegans*, Carey (Bot. Mag. t. 2592), with a narrower long-necked bulb and the perianth lobes an inch shorter than the tube (in the Bot. Mag. drawing the leaves are acute and the perianth lobes longer than the tube); *C. venustum*, Carey, from Silhet, with 30-fld. umbels; *C. canalifolium*, Carey, with leaves an inch broad, more channelled, rather glaucous, and about 10 flowers pale reddish externally.

Sect. III. CODONOCRINUM. *Perianth* funnel-shaped, tube upcurved, lobes oblong or lanceolate. *Stamens* very long, declinate.

11. *C. latifolium*, Linn. Sp. Pl. 291; leaves many 2–3 ft. by 3–4 in. lorate thin margin subscabrid, scape 2–3 ft. stout, umbels 10–20-fld., spathes 3–4 in. lanceolate, pedicels very short, perianth-tube 3–6 in., lobes as long or shorter elliptic-oblong or lanceolate much longer than the stamens. Ker-Gawl. in Quart. Journ. Sci. & Arts iii. 114; Roxb. Fl. Ind. ii. 137; Lindl. in Bot. Reg. t. 1297; Wight I. c. t. 2019, 2020; Baker Handb. of Amaryllid. 87; Andr. Bot. Rep. t. 478. *C. zeylanicum*, Linn. Syst. Veg. 263; Kunth l. c. 573; Roxb. l. c. 138; Bury Hexand. Pl. t. 29; Baker l. c. 87; Wall. Cat. 8972. *C. ornatum*, Herb. Amaryll. 262; Bot. Mag. t. 1171; Bury l. c. t. 18; Bot. Reg. t. 579, and 1297; Thw. Enum. 324. *C. speciosum*, Herb. in Bot. Mag. t. 2217. *C. ornatum*, vars. *latifolium*, *zeylanicum* and *Herbertianum*, Herb. Amaryll. 262, 263; Kunth Enum. v. 574. *C. speciosissimum*, Herb. in Bot. Mag. sub t. 2121. *C. Herbertianum*, Wall. Pl. As. Rar. ii. 39, t. 145. *C. insigne*, Schultes Syst. vii. 859. *C. Wallichianum*, Roem. *C. Linnæi*, Roem. *C. Careyana*, Herb. in Bot. Mag. t. 2466. *C. moluccanum*, Roxb. Fl. Ind. ii. 140; Bot. Mag. t. 2292. *C. asiaticum*, Wall. Cat. 8969 B in part, C, I, in part. *Amaryllis zeylanica*, Linn. Sp. Pl. 293. *A. insignis*, Ker-Gawl. in Bot. Reg. t. 579. *A. latifolia*, L. Herit. Sert. Angt. 14; Willd. Sp. Pl. ii. 57; Ker-Gawl. in Quart. Journ. Sci. & Arts, iii. 114.—Rheede Hort. Mal. xi. t. 39.

Throughout INDIA, BURMA and CEYLON, wild or cultivated.—DISTRIB. Tropical Asia, Malaya and Africa.

Bulb 5–6 in. diam., globose, neck short. *Leaves* bright green, keeled and waved. *Scape* and *spathes* green reddish or purple. *Flowers* very variable in size, fragrant, white more or less streaked or tinged with red towards the centre or red purple sometimes nearly all over the backs of the lobes. *Filaments* $2\frac{1}{2}$ –3 in., anthers $\frac{1}{2}$ – $\frac{2}{3}$ in. *Ovarian cells* 5–6-ovuled. *Fruit* subglobose, $1\frac{1}{2}$ –2 in. diam.—I am quite unable to find any characters whereby *C. latifolium* and *zeylanicum* are to be distinguished, and Mr. Baker gives none. The name *C. ornatum* seems to be applied to forms of either or to include both, and so of the other forms cited above, if they or any of them have specific characters, they remain to be indicated. Herbert's accounts of them (and of the species generally) in the Quarterly Journal of Arts and Sciences, in his enumeration of the species in Bot. Mag. under t. 2121, and in his work on Amaryllids, are all singularly unclear. Of all the figured forms that of *C. latifolium*, in the Botanical Register, t. 1297, differs most from the others in its much smaller size, nearly white undulate perianth lobes faintly suffused with pink, long perianth-tube, and style twice as long as the stamens. It is included by Herbert under *C. ornatum* as *longistylum*.—Roxburgh describes both *latifolium* and *zeylanicum* as natives of Bengal, and thus distinguishes them. *C. latifolium*, Linn. (Am. ornata, Bot. Mag. t. 923); bulb spherical, leaves 3–5 in. broad lanceolate obtuse margins scabrous, scape 12–24 in. compressed green 10–20-fld., flowers almost white, anthers

yellowish grey. *C. zeylanicum*, Linn. (Am. ornata, *Bot. Mag.* t. 1171. *A. lineata*, Lamk.), bulb smaller ovoid abounding more with cobweb-like fibres, leaves much narrower linear-lanceolate keeled, midrib much more prominent, margins much more waved perfectly smooth, scape longer 10-12-fld., flowers smaller colours very bright, anthers brown.

Sect. IV. BRACHYNEMA. *Perianth* nodding, funnel-shaped, lobes oblong. *Stamens* erect, filaments shorter than the anthers.

12. *C. brachynema*, *Herb. in Bot. Reg.* 1842, *Misc.* 36; leaves $1\frac{1}{2}$ -2 ft. by 3-4 in. broadly loratè margins smooth, scape 12 in., umbels 15-20-fld., spathes lanceolate, flowers pedicelled, perianth-tube $1\frac{1}{2}$ -2 in., lobes 2 by $\frac{3}{4}$ in. many times longer than the stamens. *Bot. Mag.* t. 5937; *Flore des Serres.* t. 2303; *Baker Handb. of Amaryllid.* 88.

The CONCAN; *Woodrow, Stocks.*

Bulb as large as the fist, ovoid, neck very short. *Leaves* produced long after flowering, concave, not keeled. *Scape* 8-12 in.; spathes greenish. *Flowers* fragrant, white; anthers yellow; style short, included in the tube.

DOUBTFUL SPECIES.

C. brevifolium, var. *a*, *Hort. Beng.*; *C. bracteatum*, *Bot. Reg.* t. 179; *Herb. in Bot. Mag.* under t. 2121, f. 4. "From Sundee near Chittagong."—Roxburgh's *C. brevifolium* (Fl. Ind. ii. 129, introduced into the Calcutta Gardens from the Mauritius) is a native of the Seychelles according to Baker, and referable to *C. bracteatum*, Willd., and to *asiaticum*, var. *bracteatum*, *Herb.*, it is a *Stenaster* with loratè leaves 1- $1\frac{1}{2}$ ft. by 3-4 in. broad with crisped margins, scape much compressed 10-20-fld., perianth-tube slender $2\frac{1}{2}$ -3 in., lobes white; cells of ovary 1-ovuled. Specimens of any Sundee *Crinum* should be procured for the determination of this plant.

C. CANALIFOLIUM, *Herb. in Bot. Mag.* under t. 2121; *Amaryllid.* 258 (*C. canaliculatum*, Carey, non Roxb.), is altogether doubtful. (See under 10 *pratense*.)

C. ERYTHROPHYLLUM, Carey mss. ex *Herb. in Bot. Mag.* sub t. 2121; *Amaryllid.* 259, from Rangoon, with deep blood-red leaves, is mentioned by Herbert as having been cultivated in Calcutta by Carey, but lost before flowering.

C. MACROCARPUM, Carey mss. ex *Herb. in Bot. Mag.* l. c., from Rangoon, is doubtfully referred by Herbert and Baker (*Handb. of Amaryllid.* 75) to *C. sumatranum*, Roxb. (*Bot. Reg.* t. 1049), a species of sect. *Stenaster*, with long narrow rigid leaves, the fruit as large as a man's fist, and seeds 2 in. broad.

C. (Stenaster) PEDUNCULATUM, Br. *Prodr.* 297; *Bot. Reg.* t. 52; *Bury Hexand. Pl.* t. ii.; *Herb. Amaryllid.* 246; *Baker Handb. of Amaryllid.* 77. This Australian species probably occurs in the Malay Islands and Peninsula. A leafless *Crinum* from Penang (Curtis, No. 1274) and Wallich's *C. asiaticum*, 8969 D, from Finlayson (Siam?) strongly resemble it. It differs from *C. asiaticum* only in the long pedicelled flowers, and according to the *Bot. Reg.* in the elongated rootstock. Bentham (Fl. Austral. vi. 455) doubts the *Bot. Reg.* plant being the true *pedunculatum*, and suspects that the true is only *C. asiaticum* (as do I).

C. (Platyaster) STRICTUM, *Herb. in Bot. Mag.* l. c. and t. 2365; *Amaryllid.* 253, 401; *Baker l. c.* 86 (*C. Herbertianum*, Schult. *Syst.* vii. 871); bulb small ovoid, leaves 12 by 2- $2\frac{1}{2}$ in. suberect loratè obtuse margins smooth, scape twice as long as the leaves, umbels about 4-fld., spathes 3-4 in., perianth-tube about 5 in. green, lobes 3-4 by $\frac{1}{2}$ in. white an inch longer than the red filaments.—Ceylon, *Hort. Herbert.*—Baker considers it to be allied to the American *Platyasters*; it may therefore have been imported into Ceylon.

C. UMBELLATUM, Carey ex *Herb. in Bot. Mag.* l. c.—Of this Herbert says that it is perhaps a small var. of *C. brevifolium*.

4. **PANCRATIUM**, Linn.

Rootstock bulbous. *Leaves* often bifarious, linear or lanceolate. *Scape* solid. *Flowers* large, umbelled or solitary; spathes 1-2, membranous; bracts few, linear, hyaline. *Perianth* funnel-shaped; tube long or short; lobes narrow. *Stamens* on the throat of the perianth, filaments united by a toothed or lobed membrane forming a cup; anthers dorsifixed. *Style* filiform, stigma small; ovules many superposed in each cell. *Capsule* large, subglobose 3-angled, loculicidal. *Seeds* angled, testa lax black.—Species about 12, S. European, Indian and African.

* *Perianth-tube* $1\frac{1}{2}$ -2 in. *Staminal cup* small.—*Bulb* without a neck.

1. **P. triflorum**, Roxb. *Fl. Ind.* ii. 126; scape 4-8-fld., perianth-tube longer than the linear lobes, filaments short. *Kunth Enum.* v. 661. *Baker Handb. of Amaryllid.* 128. *P. malabathricum*, *Herb. Amaryllid.* 206. *Crinum pauciflorum*, *Miquel Plant exsicc. Hohenacker.*—*Rheede Hort. Mal.* xi. t. 40.

BENGAL, Roxburgh. DECCAN PENINSULA, Canara. CEYLON, Thwaites.

Bulb globose, $1\frac{1}{2}$ -2 in. diam., neck 0. *Leaves* not bifarious, 8-12 by $\frac{1}{2}$ - $\frac{3}{4}$ in., lanceolate, acute. *Scape* 6-9 in., slender; spathe single, ovate, acute, pedicels very short. *Flowers* fragrant; tube $1\frac{1}{2}$ -2 in., throat dilated, lobes $\frac{3}{4}$ -1 in.; staminal cup $\frac{1}{4}$ in. diam., with 2-fid teeth between the short filaments.

2. **P. zeylanicum**, Linn. *Sp. Pl.* 290; scape 1-fld., perianth-tube as long as the lanceolate lobes or shorter, throat broadly funnel-shaped, filaments much longer than the broad shallow 12-toothed cup. *Kunth Enum.* v. 662; *Roxb. Fl. Ind.* ii. 124; *Thwaites Enum.* 324; *Wall. Cat.* 8973 A; *Baker Handb. of Amaryllid.* 118; *Bot. Reg.* t. 479; *Bot. Mag.* t. 2538. *P. tiaraeflorum*, *Salisb. Par. Lond.* t. 86.

TROPICAL ASIA and CEYLON.—DISTRIB. Malay Archipelago.

Bulb globose, $1\frac{1}{2}$ -2 in. diam.; neck 0. *Leaves* 8-12, bifarious, 6-11 in., linear-lanceolate acuminate. *Scape* shorter than the leaves; spathes as long as the corolla-tube. *Flowers* sessile, white, fragrant, 2-3 in. diam.; cup broad, subequally 12-toothed, teeth large; filaments $1-1\frac{1}{4}$ in. longer than the cup; anthers $\frac{1}{4}$ in.

** *Perianth-tube* 3-4 in. *Staminal cup* broad.—*Bulb* with a long neck.

3. **P. verecundum**, Ait. *Hort. Kew*, i. 412; scape stout about equalling the oblanceolate leaves or longer 2-6-fld., spathes 2, filaments much longer than the teeth of the cup. *Kunth Enum.* v. 661; *Bot. Reg.* t. 413; *Herb. Amaryllid.* 206; *Baker Handb. of Amaryllid.* 119 (*excl. syn. Wight.*)

Foot of the HIMALAYA, from the Panjab eastwards to Sikkim.

Bulb globose, 2 in. diam.; neck cylindric. *Leaves* thin, $1-1\frac{1}{2}$ by $\frac{1}{2}$ - $\frac{3}{4}$ in., acuminate. *Scape* 12 in., compressed; spathes lanceolate; pedicels short. *Perianth-tube* 3-4 in., throat obconic; lobes $1\frac{1}{2}$ in., linear; staminal cup obconic, $\frac{3}{4}$ -1 in. long, with a bifid tooth between the filaments; style longer than the stamens.—The above description is from Baker.

4. **P. biflorum**, Roxb. *Fl. Ind.* ii. 125; scape 2-3-fld., perianth-tube slender trigonous as long as the linear lobes, throat not dilated, filaments about as long as the funnel-shaped arose cup. ? *P. longiflorum*, *Herb. Amaryllid.* 208, t. 42, f. 2.

INDIA, rare, *Roxburgh*.

Leaves 4-8, bifarious, 12-16 in., erect, narrowed from the obtuse point to the base. *Scape* shorter than the leaves; *spathes* 3-4, unequal in length. *Perianth-tube* 3-4 in., slender, green, not at all inflated at the insertion of the linear lobes; *cup* 1½ in. long; *filaments* 1½-2 in., *anthers* ½ in. long.—A well marked species by its long 3-gonous perianth-tube not at all inflated above, erose (not 12-toothed) broad cup, and long stamens.—Herbert's figure of *longiflorum* almost exactly accords with Roxburgh's excellent description and figure of *biflorum*, except that the leaves are acute and that he gives the habitat (according to the Banksian Herbarium) as the Moluccas; with *P. verecundum* it has nothing in common.

5. ***P. longiflorum***, *Roxb. Fl. Ind.* ii. 125; *scape* much shorter than the narrowly lanceolate leaves usually 1-fl'd., *spathe* single, *filaments* longer than the teeth of the cup. *Kunth Enum.* v. 663; *Herb. Amaryllid.* 208, t. 42, f. 2; *Baker Handb. o Amaryllid.* 119. *P. cambayense*, *Herb. l.c.* 208, t. 42, f. 1.

CENTRAL INDIA and the DECCAN PENINSULA, *Rottler*.—DISTRIB. Moluccas.

Bulb globose, 1½-2 in. diam., *neck* long cylindric. *Leaves* 12 by ½-1 in. *Scape* compressed, *spathes* very acuminate. *Perianth-tube* 5-6 in., green, *throat* obconic; *lobes* 2 in., lanceolate; *staminal cup* above 1 in. long with large bifid teeth between the filaments.—Roxburgh describes this species as received from the Moluccas and as having the *scape* even shorter than the perianth-tube and the filaments very little longer than the lobes of the cup.

6. ***P. parvum***, *Dalz. in Hook. Journ. Bot.* ii. (1850) 144; *scape* very slender compressed about equalling the linear or lanceolate strict leaves 2-4-fl'd., *spathe* solitary, *filaments* hardly longer than the teeth of the cup and much shorter than the anthers. *Dalz. & Gibs. Bomb. Fl.* 276; *Baker Handb. of Amaryllid.* 119.

The CONCAN; on Mt. Dronoghiri, *Dalzell*.

Bulb globose; *neck* long, cylindric. *Leaves* 12 in. or less, linear, striate, nearly flat, thin. *Scape* 6-12 in.; *spathe* sometimes deeply bifid. *Perianth-tube* 3-5 in., *lobes* 1 in.; *staminal cup* half as long as the perianth lobes, equally 12-toothed, *filaments* hardly longer than the teeth, two-thirds shorter than the anthers; *ovarian cells* many-ovuled. *Capsule* ovoid, 3-lobed; *cells* few seeded.

DOUBTFUL SPECIES.

P. VERECUNDUM, *Wight Ic.* t. 2023, from Travancore (Coimbatore). This which is referred to by Baker as the *P. verecundum* of Aiton, appears from the figure to be a very different plant, having no neck to the bulb, a very short 8-fl'd. *scape*, a large solitary *spathe*, a perianth-tube much shorter than the lobes, and the bifid lobes of the cup have a small tooth in the sinus, the filaments are twice as long as the lobes of the cup. The figure is a rude one; in that of the whole plant the perianth lobes are narrowly linear, in the separate flower they are elliptic-lanceolate and clawed.

P. MALABARICUM, *Thwaites Enum.* 324 (*C. P.* 2339). *Baker (Handb. p. 184)* cannot distinguish this from *Hymenocallis tenuiflora*, *Herb.*, a New Grenadan plant. The genus *Hymenocallis*, which is exclusively S. American, differs from *Pancratium* in the ovules being 2 collateral and basal in each cell. Thwaites says that his *malabaricum* is a native of river-banks in Ceylon at 1-2000 ft. and gives it a native name (Deya-mānil.)

ORDER CLIII. TACCACEÆ.

Rootstock tuberous or creeping. *Leaves* radical, simple lobed or lacinate, costate and penninerved. *Scape* leafless, flowers umbelled, greenish-

brown or lurid; involucre of 2-6 spathes; bracts very long, filiform, like pedicels. *Perianth* superior, urceolate or subcampanulate, 6-lobed in 2 series. *Stamens* 6, at the base of the lobes, filaments very short, base dilated or appendaged on each side, above it dilated into an inflexed hood, with 2-ribs or horns on the inner surface; anthers sessile within the hood. *Ovary* 1-celled; style short, included, stigmas 3 broad or petaloid and reflexed like an umbrella over the style; ovules many, on 3 parietal placentas, anatropous or subamphitropous. *Fruit* indehiscent baccate or at length 3-valved, 3-6-ribbed. *Seeds* numerous, ovoid, testa appressed striate; albumen hard; embryo minute.—Species about 10, tropical.

1. **TACCA**, *Forst.*

CHARACTER OF THE ORDER.

1. **T. pinnatifida**, *Forst. Plant. Esculent.* No. 28; *Char. Gen.* 69, t. 35; leaves tripartite segments 2-3-fid or irregularly pinnatifid or pinnate at the base, petiole and scape long smooth, invol. leaves 4-12 or more subequal oblong acuminate, perianth lobes conniving subequal. *Roxb. Fl. Ind.* ii. 172; *Grah. Cat. Bomb. Pl.* 230; *Dalz. & Gibs. Bomb. Fl.* 276; *Benth. Fl. Austral.* vi. 458; *Miquel Fl. Ind. Bat.* iii. 566; *Kunth Enum.* v. 458; *Lodd. Bot. Cat.* t. 692. *Regel Gartenfl.* t. 582; *Lamk. Encycl.* t. 232; *Treviran. Symbol.* t. 54, 55; *Griff. Notul.* 238; *IC. Pl. As.* t. 272A. *T. pinnatifolia*, *Gærtn. Fruct.* i. 43 t. 14.

The CONCANE, and CENTRAL INDIA; Hazarebagh, *Vicary*; Chota Nagpore, *Clarke*. MALAYAN PENINSULA; Malacca and CEYLON, Trincomalee.—DISTRIB. Australia, Malayan and Pacific Islds.

Rootstock globose, 1 ft. diam. under cultivation. *Leaves* 2-3 ft. diam.; petiole 1-3 ft. *Scape* tapering, longer than the petiole, striped dark and light green, 10-40-fid.; flowers drooping; invol. leaves lanceolate, recurved, striped with purple; filiform bracts very numerous. *Perianth* greenish, subglobose, $\frac{3}{8}$ in. diam., fleshy, lobes margined with purple. *Fruit* size of a pigeon's egg, 6-ribbed, yellow.

2. **T. cristata**, *Jack. in Mal. Misc.* I. No. v. 23; leaves either oblong or elliptic-lanceolate, petiole and tall scape smooth, 2 inner involucreal spathes very large foliaceous erect with stout flat petioles, 2 outer much smaller sessile ovate acuminate cuneate, flowers dark purple, perianth-lobes spreading and recurved, 3 inner much the largest, orbicular. *Miquel Fl. Ind. Bat.* iii. 578. *T. Rafflesiana*, *Jack. in Wall. Cat.* 5172. *Atacca cristata*, *Kunth Enum.* v. 466; *Bot. Mag.* t. 4587. *Lemaire Jard. Fleur.* t. 186, 187. *Flore des Serres*, t. 860, 861.

MALAY PENINSULA; Malacca, Penang and Singapore.

Rootstock conic. *Leaves* 1-2 ft., dark greenish-purple; petiole very stout, brown-purple. *Scape* as long as the leaves, stout, dirty green, grooved; outer invol. spathes 3-4 in., revolute, brown-purple, inner 6 in., elliptic, obtuse, strongly plicately nerved, green, narrowed into a very stout compressed brown-purple petiole; flowers drooping, pedicels stout filiform; bracts 6-8 in., pendulous, pale. *Perianth* $1\frac{1}{2}$ in. diam.; outer lobes oblong, acute, inner rounded broader than long, all at length reflexed; throat with a thickened crenate ring. *Ovary* turbinate, 6-ribbed. *Stigmatic lobes* ciliate.

3. **T. integrifolia**. *Ker.-Gawl. in Bot. Mag.* t. 1488; leaves entire elliptic-ovate, petiole and short stout scape rough, 2 inner invol. leaves very large, spreading foliaceous petioles slender, 2 outer smaller sessile ovate acuminate, flowers pale, perianth lobes spreading and reflexed, 3

inner largest broadly oblong. *Roxb. Cor. Pl.* t. 257. *T. aspera*, *Roxb. Fl. Ind.* ii. 169. *Atacca integrifolia*, *Presl Rel. Hæk.* 149; *Flore des Serres*, t. 860, 861.

SILHET, CHITTAGONG and TENASSERIM.

Rootstock oblong, curved. *Leaves* 8–16 by 4–8 in., acuminate, strongly nerved and bullate; petiole shorter than the blade, and scape maroon-brown. *Scape* about as long as the petiole, stout, recurved or bent to one side, few-fl.; invol. spathes unequal, twisted, dirty green with purple nerves; outer 2–3 in., finely acuminate; inner longer, petioled, often vaulted over the at length drooping flowers. *Perianth* greenish-purple and yellow, or dirty lilac; outer lobes subacute, rather shorter than the obtuse inner; mouth obscurely thickened and ridged, all at length reflexed. *Ovary* turbinate, deeply grooved. *Berry* 1½ in., oblong, fleshy.

4. ***T. lævis***, *Roxb. Fl. Ind.* ii. 171; leaves entire elliptic-ovate petiole and short recurved scape smooth; invol. leaves 4 subequal sessile ovate acuminate, perianth-lobes spreading acute 3 inner largest and broadest. *Grah. Cat. Bomb. Pl.* 230. *Kunth Enum.* v. 466. *T. integrifolia*, *Herb. Ham.*

BHOTAN HIMALAYA, *Griffith*. **SILHET**, *Roxburgh*. **CHITTAGONG**, **MUNNIPORE**, and **TENASSERIM**, *S. CONCAN, Nimmo*.—**DISTRIB.** Tonkin, Java.

Rootstock subcylindric. *Leaves* 12–16 by 5–6 in., acuminate; petiole as long as the blade. *Scape* shorter than the petiole, greenish-purple, more or less recurved, 6–12-fl.; invol. leaves 2 by 1 in., finely acuminate, many-nerved; bracts numerous filiform. *Flowers* pedicelled, blueish, greenish-grey or violet; perianth ¾–1 in. diam.; outer lobes acute.

ORDER CLIV. DIOSCOREACEÆ.

Rootstock various. *Stem* climbing, branched, rarely short erect. *Leaves* entire lobed or digitately 3–5-foliate, costate and reticulate, petiole often angular and twisted at the base. *Flowers* small or minute, paniced racemose or spicate, rarely bisexual. *Perianth* superior, 6-cleft. *Male fl.* tubular or urceolate, lobes short, spreading. *Stamens* inserted at the base of the perianth, or on its lobes 3, 6, or 3 perfect and 3 staminodes, filaments incurved or recurved, anthers small, globose, oblong or didymous, or with the cells on branches of the filament. *Pistillode* various or 0. *Fem. fl.* *Perianth* of the male, but smaller. *Staminodes* 3, 6 or 0. *Ovary* 3-quetrous, 3-celled; styles 3, very short, stigmas entire or 2-fid recurved; ovules 2 superposed in each cell, pendulous, anatropous or subamphitropous. *Fruit* a berry or 3-valved capsule. *Seeds* flat or globose; embryo small, included in the hard albumen.—Genera 8, species about 160.

Climbers, flowers unisexual, capsule 3-winged . . . 1. **DIOSCOREA**.
Stem erect, 1-leaved, flowers bisexual, fruit indehiscent . . . 2. **TRICHOPUS**.

1. DIOSCOREA, Linn.

Fruit capsular.—Species 150, tropical and subtropical.

The species of *Dioscorea* are in a state of indescribable confusion, and I cannot hope to have escaped errors in the determination and delimitation of the Indian ones, to which I have devoted much labour. The Roxburghian food-yielding species are for the most part indeterminable, and except through a knowledge of them as cultivated in India they cannot be understood. No doubt some of the species described

by me may have other earlier names in Malayan Flora than I have given; but the Malayan species are even more loosely described than the Indian. The Wallichian collection is very complete, but the species are often mixed.

A. Leaves 3-5-foliolate. Capsule in all oblong. Seeds winged at the top.

SECT. I. *Stamens* 6, all antheriferous. *Pistillode* low, broad.

1. **D. dæmona**, Roxb. *Fl. Ind.* iii. 805; *Wight. Ic.* t. 811. *D. virosa*, Wall. *Cat.* 5099; *Kunth Enum.* v. 413. *D. triphylla* Herb. Ham. D. altissima, Herb. Roxb. *D. trinervia*, Roxb. ex Wall. *Cat.* 5099. *D. amoena*, Roxb. ex Wight. (error, for dæmona,) *D. hirsuta*, Dennst. *Schluess. Hort. Mal.* 33. *Helmia*? *dæmona*, Kunth l. c. 439. *Smilax*? *narcotica* & *virosa*, Herb. Ham. ex Wall. *Cat.*—*Rheede Hort. Mal.* vii. t. 51, 52.

Tropical forests throughout INDIA, BURMA, and the MALAY PENINSULA.—DISTRIB. Malay Islands, Tonkin.

Root tuberous, lobed, biennial. *Stem* stout, terete, more or less prickly. *Leaves* 3-foliolate, long-petioled; leaflets 3-12 in., glabrous or finely pubescent beneath, all petiolulate, broadly cuneate-obovate, cuspidately caudate-acuminate, sometimes strongly reticulate, lateral very oblique 5-6-nerved, central 3-5-nerved; petiole 6-12 in., smooth or prickly. *Male racemes* 6-18 in., pubescent or woolly; spikes $\frac{1}{2}$ - $\frac{1}{3}$ in., shortly peduncled, cylindric, dense-flid.; bracts shorter than the flowers; sepals orbicular-ovate, membranous, shorter than the coriaceous incurved petals; anthers subsessile. *Fem. spikes* solitary, flowers distant, perianth of the male. *Capsule* 2-2 $\frac{1}{2}$ by 1-1 $\frac{1}{4}$ in., base and top truncately rounded. *Seeds* with the oblong wing broader than the nucleus.—Roxburgh is undoubtedly right in referring Rumph's "Ubium sylvestre" to this, but by oversight cites t. 127 for 128.

Var. *reticulata*; leaves finely reticulate beneath, male racemes much branched, capsule tomentose. *D. macrocarpa*, Wall. *Cat.* 5100.

SECT. II. *Stamens* 3 antheriferous, alternating with 3 staminodes. *Pistillode* columnar.

2. **D. tomentosa**, Heyne in Roth *Nov. Pl. Sp.* 371; leaves 3-5-foliolate softly tomentose beneath, bracts shorter than the flower. Roxb. *Fl. Ind.* iii. 805; Wall. *Cat.* 5001. *D. triphylla*, Herb. Russ. *Helmia*? *tomentosa*, Kunth *Enum.* v. 431.

The DECCAN PENINSULA, from Canara southwards. CEYLON.

Root (of long tuberous fibres, 1-2 ft. *Ic. Thwaites*). *Stem* slender, prickly towards the base. *Leaves* usually snow-white beneath; leaflets very variable, 2-4 in. long, broad or narrow, acuminate or cuspidate, shortly petiolulate, lateral often gibbously oblique. *Male spikes* $\frac{1}{2}$ -1 in., ternate on the branches of a very slender exuous tomentose panicle; flowers $\frac{1}{10}$ in diam., sessile or pedicelled; perianth segments subequal; staminodes equalling the stamens, nearly as long as the sepals, tips dilated. *Capsules* 1 in., cuneately oblong, downy.

3. **D. pentaphylla**, Linn. *Sp. Pl.* 1032; leaves 3-5-foliolate glabrous or sparsely pubescent beneath, bracts shorter than the flowers. Roxb. *Fl. Ind.* iii. 806; *Wight. Ic.* t. 814; Wall. *Cat.* 5098; *Thwaites Enum.* 325; *Kunth Enum.* 396; *Dalz. & Gibs. Bomb. Fl.* 247. *D. triphylla*, Linn. l. c.; Wall. *Cat.* 5702; *Dalz. & Gibs. l. c.*; *Jacq. Ic.* t. 627; *Coll.* ii. 365; *Kunth l. c.* 394. *D. Kleiniana*, Kunth l. c. 394. *D. lunata*, Roth *Nov. Pl. Sp.* 370. *D. digitata*, Mill *Gard. Dict.* No. 6. *Botrysosicyos pentaphyllus*, Hochst. in *Flora* 1844 *Beil.* 3. *Hamatris triphylla*, Salisb. *Gen. Pl. Fragm.* 12.—*Rheede Hort. Mal.* vii. t. 34, 35.

Throughout tropical India, from Kumaon in the N.W. HIMALAYA eastward to BURMA, and southward to CEYLON and MALACCA. DISTRIB. Malay Hills, Afr. trop.

Tubers oblong (5-6 ft., *Ic. Thwaites*). *Stem* slender, prickly at the base, rarely above, often bulbiferous. *Leaves* as in *D. tomentosa*, but never softly tomentose, obovate, acuminate or cuspidate. *Male panicles* and flowers glabrous hispidly pubescent or villous, spikes lax or dense-fl.; flowers sessile or pedicelled, $\frac{1}{10}$ - $\frac{1}{12}$ in. diam. fragrant; filaments and staminodes very short. *Capsule* $\frac{3}{4}$ -1 in., rounded at both ends or base cordate and tip apiculate, glabrous or pubescent. *Seeds* $\frac{1}{3}$ - $\frac{1}{2}$ in., wing broader than the nucleus.—I cannot separate the glabrous tomentose and villous-flowered plants, or the sessile- from the pedicelled-flowered. A fruiting Bombay specimen from Ritchie has almost woolly capsules cordate at the base, and with a strong short beak at the retuse apex.

4. **D. kumaonensis**, *Kunth Enum.* v. 395; leaves 3-5-foliolate nearly glabrous or sparsely hairy beneath, bracts long-acuminate longer than the flowers. *D. pentaphylla*, *Wall. Cat.* 5098 E. *D. triphylla*, *Wall. Cat.* 5702 B. F. *Vitis*, *Wall. Cat.* 9032.

TEMPERATE HIMALAYA, alt. 4-6000 ft. from Kashmir to Sikkim. The KHASIA and MUNNEPORE HILLS, alt. 5-6000 ft.

Very near *D. pentaphylla*, but a plant of temperate regions, and more slender, with pisiform bulbils, more membranous narrower leaflets with long setaceous points, larger longer more pointed bracts, larger flowers $\frac{1}{12}$ - $\frac{1}{10}$ in. diam., longer staminodes and pistillode; but there are Garwhal specimens from Edgeworth with bracts as short and flowers as small as in *pentaphylla*. *Capsule* $\frac{3}{4}$ in. oblong, rounded at both ends.—A state occurs in both the Himalaya and Khasia with a much-branched panicle bearing imperfect long-pedicelled flowers with very narrow quite glabrous sepals and petals, abortive anthers, and sometimes a large imperfect stigma; the bracts in this are at the base of the pedicel which is an imperfect ovary.

5. **D. Jacquemontii**, *Hook. f.*; leaves 3-5-foliolate, leaflets finely acuminate glabrous, flowers much larger than in *D. pentaphylla* glabrous and short bracts both streaked with brown.

The CONCAN, between Poona and Carli, *Jacquemont*; Belgaum, *Ritchie*.

Closely allied to *D. pentaphylla*, but besides the above differences, the stamens, staminodes and pistillodes are all much longer.

B. Leaves simple.

SECT. III. *Sepals* broadly oblong or orbicular. *Stamens* 3, antheriferous, anther-cells remote on the arms of a forked connective.

6. **D. Collettii**, *Hook. f.*—*Diosc.* sp. indescrpt., *Collett & Hemsl.* in *Journ. Linn. Soc.* xxviii. 137.

BURMA; Shan Hills, alt. 4000 ft., *Collett*.

Quite glabrous. *Branches* slender, terete, unarmed. *Leaves*, largest 4-5 by 3-3½ in., broadly ovate-cordate, acuminate, 7-9-nerved from the deeply 2-lobed base, membranous, reticulate, basal lobes rounded; petiole slender. *Male spikes* axillary, solitary, longer than the leaves, very slender; flowers $\frac{1}{12}$ in. diam., in distant clusters; bracts very broad, membranous; sepals orbicular-ovate and broadly elliptic petals flat, with rounded tips; stamens inserted on the base of the sepals, distant from the minute 3-toothed staminode; filaments very short; anther-cells minute, globose.—Dries black. The only Asiatic species with forked filaments and separated anther-cells.

SECT. IV. *Sepals* broadly oblong or orbicular. *Stamens* 6, antheri-

ferous (except *D. decipiens*); anther-cells combined. *Capsule* (where known) broader than long. *Seeds* orbicular, broadly winged all round.

* Male flowers in long simple or nearly simple axillary spikes, distant, or in distant clusters.

7. ***D. spinosa***, *Roxb. ex Wall. Cat.* 5703 A, B, C, E, F; glabrous or tomentose, leaves orbicular- or reniform-cordate, perianth subrotate, pistillode large. *D. aculeata*, *Roxb. Fl. Ind.* iii. 800 (not of *Linn.*). *D. sativa*, *Linn. Sp. Pl.* 1033 partly; *Kunth Enum.* v. 341 (excl. β). *Thwaites Enum.* 326 in note. *D. tiliaefolia*, *Kunth l. c.* 401. *D. cymosula*, *Hemsl. Biol. Centr. Amer. Bot.* iii. 355, v. t. 90. *D. aculeata*, *Cerubulium* and *echinata*, *Herb. Ham.* *D. lanata*, *Balf. Bot. Socot.* v. 289.—*Rheede Hort. Mal.* viii. t. 52.—*Rumph. Amb.* v. t. 126.

TROPICAL INDIA, CEYLON, BURMA and the MALAY PENINSULA, cultivated.—
DISTRIB. Trop. America.

Tubers very large; base of stem with long woody rigid fibres bearing spines half an inch long. *Stem* terete, very spinous at the base. *Leaves* attaining 8 in. long and broad, acuminate or cuspidate, 5–7-nerved, rather membranous, basal lobes rounded. *Male spikes* 6–18 in.; flowers $\frac{1}{2}$ in. diam., often in very dense cymes, sessile or shortly pedicelled; bracteoles very broad; perianth segments remote from the large oblong pistillode; anthers large. *Fem. raceme* rather short. *Capsule* 1 in. diam., broadly obcordate.—I cannot adopt Roxburgh's name of *aculeata* for this, for it is not Linnæus's plant of that name, which is Rheede's Katter Kalengra, and which has panicked male spikes. Nor can I, as Kunth and Thwaites have, take Linnæus' name of *sativa*, though Rheede's figure of it is cited by Linnæus under his *sativa*, because the plant figured in "Hortus Cliffortianus" must be accepted as *sativa* Linn., it being cited by himself as his type.

8. ***D. deltoidea***, *Wall. Cat.* 5110; nearly glabrous, leaves hastately or subdeltoidly-cordate acuminate 7–9-nerved, perianth sub-rotate, pistillode minute. *Kunth Enum.* v. 340.

TEMPERATE HIMALAYA; from Kashmir to Bhotan alt. 6–1000 ft. KHASIA HILLS, alt. 4–5000 ft.—DISTRIB. Afghanistan.

Branches very slender, terete, unarmed. *Leaves* attaining 7 by 5 in., membranous, reticulate beneath, very variable in breadth and depth of lobing, lobes rounded or subangular, sometimes dilated outward; petiole 2–5 in., very slender. *Male spikes* very slender, rarely branched; flowers $\frac{1}{2}$ in. diam., solitary or clustered; perianth-segments nearly flat; stamens very short, anthers didymous. *Capsule* very variable, orbicular, deltoid or obtusely quadrate, rarely broadly obcordate, base rounded truncate or broadly cuneate; valves very thin. *Seeds* very variable in form, winged all round or on one side.—I hesitate to unite with this the Burmese plant referred to it by Hemsley and Collett (*Journ. Linn. Soc.* xxviii. 137) which is too imperfect for determination.

9. ***D. Wightii***, *Hook. f.*; quite glabrous, leaves ovate-cordate acuminate 7-nerved, perianth-segments erect, pistillode minute.

TRAVANCORE; Courtallam, *Wight*.

In habit and foliage very like *D. deltoidea*, but the flowers are always solitary, sessile by a broad base, the filaments much longer, and the anthers large and oblong.—Only one specimen seen.

10. ***D. spicata***, *Roth Pl. Nov.* 571; quite glabrous, leaves alternate shortly petioled linear-oblong or lanceolate 3–rarely 5-nerved finely reticulate beneath, flowers globose, pistillode large conical. *Kunth Enum.* vi. 399; *Thwaites Enum.* 326.

INDIA, Heyne. CEYLON, Walker, &c.

Branches very slender, terete, unarmed. *Leaves* 2-4 by $\frac{3}{4}$ -2 in., obtusely acuminate, thin, obscurely margined, base cuneate or rounded rarely subcordate. *Male spikes* 3-8 in., rarely branched; bracts ovate; flowers $\frac{1}{2}$ in. diam., solitary, sessile; segments erect, concave, elliptic, obtuse; filaments rather slender, anthers didymous. *Capsule* $1\frac{1}{2}$ in. diam., subquadrate, retuse at top and bottom, glabrous, shining. *Seeds* winged all round.—I follow Thwaites in referring the Ceylon plant to Roth's very insufficiently described *D. spicata*, of which I have seen no specimens. Thwaites' specimens of *D. oppositifolia* (C.P. 2302) in Herb. Kew are certainly this; but as *oppositifolia* is a Ceylon plant, the error probably arises from a misplacement of tickets.

**** Male spikes whorled in axillary and terminal panicles.**

† Leaves cuneate or rounded at the base, rarely retuse never deeply cordate.

§ *Leaves more or less pubescent beneath, or glabrous in D. oppositifolia.*

11. ***D. pyrifolia*, Kunth Enum. v. 384;** leaves mostly opposite orbicular or broadly oblong 5-nerved coriaceous more or less finely (not stellately) pubescent beneath, male spikes 1- $1\frac{1}{2}$ in. spreading, anthers subsessile, pistillode minute.

TENASSERIM, Helfer (Kew distrib. 5538). SINGAPORE, Wallich. MALACCA, (not Philippine Islands), Cuming (No. 2314), Griffith (K. d. 5562), Maingay (K. d. 1705), Hervey.

Branches terete, glabrous or puberulous. *Leaves* 2-4 by $1\frac{1}{2}$ -3 in., acuminate or cuspidate, base rounded or retuse, reticulate beneath; petiole $\frac{1}{2}$ -1 in. *Spikes* glabrous; flowers $\frac{1}{16}$ - $\frac{1}{8}$ in. diam., globose; sepals orbicular-oblong; petals cuneate-obovate; anthers very small. *Capsule* broader than long, cordate at base and top. *Seeds* $\frac{1}{2}$ -1 in. diam.—Kunth erred in assuming this to be one of Cuming's Philippine plants.

12. ***D. orbiculata*, Hook. in Herb.;** leaves mostly opposite orbicular 5-nerved stellately pubescent towards the base beneath, male spikes $1\frac{1}{2}$ -2 in. spreading, flowers very minute, anthers subsessile, pistillode minute. *D. sativa*, Wall. Cat. 5108 C.

PENANG; Philipp; on Govt. Hill, Curtis.

Very near *D. pyrifolia*, but the leaves are smaller, not coriaceous, and at once distinguished by the stellate hairs beneath, the petals also are elliptic.—Fem. fl. and fruit unknown.

13. ***D. oppositifolia*, Linn. Sp. Pl. 1033;** glabrous or sparsely pubescent, or panicles tomentose, leaves mostly opposite from lanceolate to elliptic-oblong ovate or orbicular strongly 3-5-nerved coriaceous with a cartilaginous margin, male spikes short rarely 1 in. spreading, anther large, pistillode minute. Kunth Enum. 390; Wall. Cat. 5104; Roxb. Fl. Ind. iii. 804; Wight Ic. t. 813; Dalz. & Gibs. Bomb. Fl. 247. *D. glabra*, Wall. Cat. 5105 D, E. *D. trinervia*, Roxb. mss. *D. lanceolata*, Herb. Heyne. *D. coriacea*, Herb. Wight.

Tropical India, from ASSAM, SILHET and CHITTAGONG, southwards to CEYLON.

A large climber, branches terete, unarmed. *Leaves* 3-5 by 1-3 in., with a well-defined cartilaginous margin; petiole $\frac{1}{2}$ -1 in., stout. *Male spikes* rather stout, usually dense-fld.; flowers rather large, $\frac{1}{10}$ in. diam., but variable in size, sessile, globose; sepals orbicular; petals obovate; filaments rather long. *Capsule* $1\frac{1}{2}$ - $2\frac{1}{2}$ in. diam., retuse or almost 2-lobed at the top, coriaceous, glabrous. *Seeds* $\frac{3}{8}$ - $1\frac{1}{4}$ in. diam., wing very broad.

14. **D. decipiens**, *Hook. f.*; leaves opposite ovate-lanceolate to orbicular finely pubescent beneath strongly 3-5-nerved, margin cartilaginous, male spikes short as in *D. oppositifolia*, but triandrous with 3 stamens on the petals. *D. glabra*, *Wall. Cat.* 5105 G, H.

BURMA; at Prome and Taongdong, *Wallich*; Upper Burma, *Collett*.

Resembles *D. oppositifolia* so closely that an examination of very many flowers of both species was necessary to determine me to regard it as a species; it has also hitherto occurred in a different geographical area, being confined to Burma where *D. oppositifolia* has not been collected.

♀♀ Leaves perfectly glabrous on both surfaces (see also 13. *oppositifolia*).

15. **D. laurifolia**, *Wall. Cat.* 5111; very slender, leaves linear or narrowly oblong-lanceolate obtusely acuminate 3-nerved strongly reticulate beneath, male spikes very slender deflexed, flowers very minute, pistillode minute. *D. glabra*, *Wall. Cat.* 5105 B.

PENANG, *Porter*, *Maingay* (*Kew distrib.* 1701), *Hullett*.

Leaves 3-4½ by ¾-1½ in., opposite and alternate, rather stiff; base rounded or cuneate; petiole ½-1 in., very slender. Male spikes 1½-2½ in. long elongate unilateral panicles, solitary or 2-4-nate, pendulous; flowers ⅙ in. diam., scattered; sepals broadly oblong; petals smaller, oblong; anthers rather large, filaments short. Fruit unknown.

Var. ? More robust, leaves shorter elliptic more coriaceous, male spikes stouter very densely whorled in stiffer panicles, flowers larger gibbous at the base. Fem. fl. in large branched green glabrous panicles.—Malacca, *Griffith* (*Kew distrib.* 5556).

16. **D. deflexa**, *Hook. f.*; leaves chiefly opposite ovate-oblong acuminate 5-nerved, base rounded or obscurely cordate, male spikes 1-1½ in. stout deflexed, anthers large, pistillode large.

SINGAPORE and MALACCA, *Maingay* (*Kew distrib.* 1705, 1706).

Branches rather stout, terete. Leaves 4-5 by 1½-3 in., strongly coriaceous, margin not thickened or cartilaginous; petiole 1-1½ in. Male spikes deflexed from the base; flowers globose, about ⅙ in. diam.; sepals broadly ovate; petals oblong. Fem. fl. in long much branched lax-fl. perfectly glabrous panicles. Capsule 2 in. broad, retuse at the top and base. Seeds nearly 1 in. diam., wing very broad.—Distinguished from *oppositifolia* by the deflexed male spikes and margin of leaf not thickened, and the large pistillode.

17. **D. obcuneata**, *Hook. f.*; very slender, leaves opposite cuneately obovate cuspidate 3-nerved membranous, petiole short very slender, male spikes ½-1 in. very slender in very slender axillary panicles, flowers very minute, pistillode obscure.

CEYLON.

Branches terete. Leaves 2 by 1-1½ in., very thin and pale when dry, very slender, nervules indistinct, base narrow exactly cuneate; petiole ½ in. Male spikes spreading horizontally, rachis almost capillary, flowers scattered, globose, sessile, ⅙ in. diam.—I have seen but one specimen, in the Hookerian Herbarium, marked as from Ceylon by Sir W. Hooker, but with no other locality or collector's name; I have searched throughout the genus for any species at all resembling it in the obcuneate leaves with very short slender petioles.

↑↑ Leaves cordate hastate or broadly truncate at the base.

18. **D. anguina**, *Roxb. Fl. Ind.* iii. 803; softly tomentose, leaves opposite and alternate large long-petioled broadly ovate- or orbicular-

cordate 7-nerved margin cartilaginous, male spikes short dense-flid. spreading, pistillode large globose. *D. spinosa*, *Wall. Cat.* 5103 G, H.

TROPICAL HIMALAYA; from Nepal, *Wallich*, to Bhotan (*Kew distrib.* 5548). ASSAM, SILHET, CACHAR, BENGAL, CHOTA NAGPORE.

Tubers columnar (*Roxb.*). *Leaves* 3-5 by 2-5 in., rather thick, nerves strong beneath, nervules transverse; petiole $1\frac{1}{2}$ -3 in. *Male panicles* stout; spikes crowded, densely tomentose; flowers $\frac{1}{10}$ in. diam.; sepals and petals very broad; anthers large. *Capsule* $\frac{3}{4}$ -1 $\frac{1}{2}$ in. diam., cordate at the top and base. *Seed* orbicular.

19. **D. polyclades**, *Hook. f.*; stems slender and leaves beneath and inflorescence tomentosely pubescent, leaves opposite and alternate orbicular-or ovate-cordate apiculate 5-costate, male spikes $\frac{1}{2}$ -1 in. 5-6 nately whorled in long panicles, flowers minute crowded. *D. nummularia*, *Kunth Enum.* vi. 386 (*excl. syn.*); *Moritz Syst. Verz. Zolling. Pflanz.* 92 (*not of Lamk.*).

SINGAPORE, *Ridley*.—DISTRIB. Java.

Stem terete. *Leaves* 3-4 by 2-2 $\frac{1}{2}$ in., orbicular-cordate in the Singapore plant, ovate-cordate in the Javan, opaque above, brown when dry, softly finely tomentose and laxly reticulate beneath; petiole 1-1 $\frac{1}{2}$ in., slender. *Male panicles* 6-10 in., terminal compound; whorls of spikes very numerous, sessile or shortly pedicelled; flower-buds $\frac{1}{10}$ in. diam.; sepals orbicular; petals ovate.—A very distinct species, referred to *D. nummularia*, *Lamk.*, by *Moritz*, but clearly not the plant figured by *Rumph.*, on which *Lamk.* founded that species, and which is described as having intensely green glabrous shining leaves, and by *Blume* (*Enum. Plant. Jav.* 22) as having leaves glaucous beneath. The Singapore plant is I think certainly *Zollinger's* No. 283 from Java, though the leaves are more rounded.

20. **D. glabra**, *Roxb. Fl. Ind.* iii. 804; quite glabrous, leaves opposite long-petioled orbicular ovate-oblong or hastate strongly 7-9-nerved and reticulate margins not cartilaginous, sub-glaucous beneath, base cordate or deeply 2-lobed, male spikes short spreading, sepals ovate-oblong, petals cuneately obovate, pistillode minute. *Kunth Enum.* v. 383; *Wall. Cat.* 5105 A, F, I, K. *D. sagittata*, *Royle mss.* (*not of Poir.*). *D. crepitans*, *Herb. Ham.*

SUBTROPICAL HIMALAYA, alt. 3-5000 ft., from Simla to Sikkim, and southwards to BENGAL, BEHAR, the CONCAN, BURMA and the MALAY PENINSULA.

Stems stout, somewhat flattened (*Roxb.*). *Leaves* extremely variable, 3-8 by 1-4 $\frac{1}{2}$ in., caudate-acuminate, youngest acute at the base, older truncate, or deeply cordate, lobes sometimes 1 in. incurved and overlapping; margin not thickened or cartilaginous; petiole 1-3 $\frac{1}{2}$ in. *Male spikes* 1 in., rarely more; flowers scattered, rather large, gibbously 8-lobed, often coarsely dotted. *Capsule* 1 $\frac{1}{2}$ in. diam., very variable in shape, subquadrate broadly obcuneate or obcordate, retuse at the tip and base, valves very thin. *Seeds* irregularly orbicular.

21. **D. gibbiflora**, *Hook. f.*; quite glabrous, very slender, leaves opposite, ovate or oblong acuminate 5-nerved, base cordate or sub-hastate, male spikes very short slender spreading in very slender panicles, flowers minute gibbous at the base, stamens very short, pistillode obscure. *D. glabra*, *Wall. Cat.* 5105 B, *in part.*

PENANG, *Wallich*.

Branches terete. *Leaves* 3-4 by 1 $\frac{1}{2}$ -2 in., not margined, nervules indistinct; petiole $\frac{1}{2}$ -1 in. *Male spikes* $\frac{1}{2}$ in., rachis very slender; flowers $\frac{1}{10}$ in. diam., sessile, with a boss at the broad base on the side opposite to the bracts.

22. **D. Wallichii**, *Hook. f.*; quite glabrous, leaves opposite long-petioled ovate or c. bicular-cordate 7-nerved, male spikes 1 in. in short axillary and terminal spreading panicles, flowers globose 3-lobed, stamens short, pistillode large globose. *D. sativa*, *Herb. Madr. in Wall. Cat.* 5708, A, B, F, D. ? *D. nummularia*, *Willd. ex Roeb. Fl. Ind.* iii. 803.

SILHET, CACHAR, MUNNEPORA and BURMA, common. CHOTA NAGPORE, *Clarke*. TRAVANCORE, *Herb. Madr.* (Cult.?).

Branches stout, terete. *Leaves* 3-6 in., as broad, always broadly cordate with rounded sides and a broad sinus, very finely reticulate beneath; petiole 3-5 in. *Flowers* about $\frac{1}{3}$ in. diam.; sepals and petals suborbicular; stamens inserted under the pistillode; anthers small. *Capsule* $1\frac{1}{2}$ in. diam., emarginate at the tip. *Seeds* orbicular, broadly winged.—The very broad rounded long-petioled glabrous leaves and large pistillode are good characters.

Sect. V. *Sepals* orbicular. *Siamen* 6 antheriferous; anther cells combined. *Capsule* longer than broad. *Seeds* laterally winged.

23. **D. Hamiltoni**, *Hook. f.*; quite glabrous, stem angled or slightly winged, leaves cordately or subhastately ovate or lanceolate 7-9-nerved, male spikes $\frac{1}{2}$ in. rachis very slender zigzag, stamens very short, pistillode obscure. *D. sativa*, *Wall. Cat.* 5108. *D. aculeata*, *Wight Ic.* t. 2060. *D. alata*, *Griseb. Fl. Brit. W. Ind.* 587. *D. incrassata* and *ovata*, *Herb. Ham.*

SIKKIM, ASSAM, CACHAR, BEHAR, CHOTA NAGPORE, MALABAR and BURMA; in all ? cultivated.—DISTRIB. St. Domingo (cult.).

Branches slender. *Leaves* opposite and alternate, undistinguishable from those of *D. glabra*; petiole 1-2 $\frac{1}{2}$ in. *Male spikes* whorled on the branches of very slender elongate axillary and terminal panicles; flowers globose, $\frac{1}{16}$ in. diam.; sepals broad; petals cuneate-obovate. *Capsule* 1-1 $\frac{1}{2}$ in. long, membranous, sides parallel, tip acute, base cordate.—The slender zigzag rachis of the male spikes, well represented by Wight, is quite peculiar to this species. I regret having to reject both Hamilton's names from being unable to comprehend their significance in respect of this plant.

Sect. VI. *Sepals* narrow, subvalvate, linear or linear-lanceolate. *Capsule* oblong. *Seeds*, winged laterally.

24. **D. sativa**, *Linn. Sp. Pl.* 1033 (*excl. syn. Rheede*); *Hort. Cliff.* t. 28; quite glabrous, stem terete bulbiferous, leaves broadly ovate-cordate acuminate cuspidate or caudate 7-9-costate, male spikes slender paniced. *Benth. Fl. Honk.* 368; *Fl. Austral.* vi. 460. *D. bulbifera*, *Br. Prodr.* 294. ? *Wight Ic.* t. 878. *D. Cliffortiana*, *Lam. Encycl.* iii. 232 (not of *Ill.* t. 818). *D. versicolor*, *Herb. Ham.*; *Wall. Cat.* 5106. *D. pulchella* and *heterophylla*, *Roeb. Fl. Ind.* iii. 801-804. *D. decemangularis* and *D. Tunga*, *Herb. Ham.* *Helmia bulbifera*, *Kunth Enum.* v. 435.

Tubers large, variable in form. *Stem* slender, green or purple. *Leaves* opposite and alternate, very variable in size, attaining 14 in. in length and breadth, membranous, dark green, usually very deeply cordate but sometimes with only a shallow broad sinus; petiole 2-6 in. *Male spikes* almost capillary, 1-4 in.; flowers crowded or scattered, very variable in size, green or purplish; sepals $\frac{1}{10}$ - $\frac{1}{4}$ in. long, fleshy; petals rather narrower; filaments much shorter than the perianth; anthers minute, didymous. *Fem. spikes* 4-10 in. long, pendulous; flowers $\frac{1}{8}$ - $\frac{1}{4}$ in. long; sepals as in the male. *Capsule* $\frac{2}{3}$ -1 by $\frac{1}{3}$ - $\frac{1}{2}$ in., membranous. *Seeds* with a broad basal wing.—I follow Benth in regarding this as *Linnaeus's sativa*; an inspection of the plate in "Hortus Cliffortianus," which is *Linnaeus's* authority for the species, confirming this

view. In *Sp. Plant.* he cites for *sativa* also Rheede's plate of *D. aculeata*, to which Kunth and others have confined the name. *Lamk. Encycl.* iii. 232, gives the name *D. Cliffortiana* to Linnæus's plant, but figures (*Ill.* t. 818) a very different one for it, rejecting the name *sativa* because he does not consider it to be the cultivated "igname." The difference in the size of the male flowers of *sativa* are so great that I have suspected that two species may be included, but I have failed to define them.

Sect. VII. *Sepals* narrowly oblong or lanceolate sub-valvate. *Capsule* broader than long, carpels rounded. *Seed* winged all round.

25. *D. alata*, *Linn. Sp. Pl.* 1033; quite glabrous, stem acutely angled or winged, leaves subhastately or deeply cordate orbicular or ovate 5-7-nerved, male fl. in slender fascicled spikes. *Kunth Enum.* v. 387; *Roxb. Fl. Ind.* iii. 797; *Wight Ic.* t. 810. *D. japonica*, *Hb. Madr. in Wall. Cat.* 5107 (not of *Thunb.*). *D. acutangula*, *Ham. in Wall. Cat.* 5109. *D. octangularis*, *Devipata*, & *Bisantaca*, and *Hurchusia*, *Herb. Ham. D. odoratissima*, *Wall. mss. (Ic. in Herb. Kew)*. *D. anguliflora*, *Steud. Pl. Hohenack. exsicc.* No. 699 A. *D. bulbifera*, *Russ. ex. Wall. Cat.*

TROPICAL INDIA (cult.?).

Roots very large. *Stem* stout (spinous towards the base in *D. Devipata*), often tuberiferous, variously angled or winged. *Leaves* as in *D. sativa*, almost all opposite; from orbicular to hastately ovate; petiole stout, often winged. *Male spikes* and flowers as in *D. sativa*; fem. in much stiffer spikes, and capsule entirely different, broader than long, 1-1½ in. diam., very broadly obcordate, coriaceous. *Seed* orbicular, broadly winged all round.—Of Steudel's *anguliflora* from Canara I have seen young fruit only.

IMPERFECTLY KNOWN AND UNDETERMINABLE SPECIES.

D. ACULEATA, *Linn. Sp. Pl.* 1033. The authority for this is Rheede's *Katter Kelengu*, vii. 71, t. 37, which is unrecognizable. A knowledge of the Malabar languages might reveal it.

D. ANGULATA, *Roxb. in Steud. Nomencl.* Ed. ii. i. 511. I have found no other reference to this species.

D. ATROPURPUREA, *Roxb. Fl. Ind.* iii. 800; tubers subrotund purple throughout, branches 4-7 winged, wings coloured and curled, leaves deeply cordate 5-7-nerved, petioles winged bases much enlarged and stem clasping.—Cultivated in Malacca, Pegu and the Eastern Islands.

D. BULBIFERA, *Linn. Sp. Pl.* 1033, is in same category as *D. aculeata*; it is Rheede's *Katu-Katsjit*, vii. 69, t. 36.

D. CRISPATA, *Roxb. Fl. Ind.* iii. 802; tubers rounded, stem unarmed terete 10-15 winged, wings curled, leaves alternate broad cordate 7-11-nerved, petiole with curled wings, male spikes paniced, fem. pendulous, perianth segments linear white.—Interior of Bengal.

D. CYLINDRICA, *Vitm. Summ. Pl.* v. 426. For this plant the author cites Rheede *Hort. Mal.* vii. t. 50 which is a *Cucurbit*.

D. FASCICULATA, *Roxb. Fl. Ind.* iii. 801; tubers pendulous size of an egg attached by slender filaments white, stem very slender, terete, prickles stipulary, leaves alternate round cordate 3-7-nerved slightly villous.—Cultivated near Calcutta.

D. GLOBOSA, *Roxb. l. c.* 797; tubers large round white, stems 6-winged prickly towards the root, leaves opposite and alternate sagittate-cordate ensiform waved 5-7-nerved, petiole 5-winged nearly as long as the leaf, male spikes compound long pendulous verticilled, fem. axillary simple erect, flowers few very remote fragrant.—Cultivated by Hindoos, the most esteemed yarn by Europeans.

D. INTERMEDIA, *Thwaites Enum.* 326; glabrous, unarmed, stem terete, leaves 3 by $\frac{1}{2}$ – $1\frac{1}{2}$ in., opposite and alternate elliptic or oblong acuminate mucronate 3-nerved, petiole $\frac{1}{2}$ –1 in., fem. spikes 1 in. or rather more solitary simple, male shorter than the leaves fascicled or in long panicles flowers hexandrous, —Hotter parts of Ceylon. —The specimens I have seen are too imperfect for further description. It is very near *D. spicata*, but has shorter spikes.

D. NEPALENSIS, *Sweet Hort. Brit. Ed.* ii. 522. No description.

D. PELTATA, *Jufs. in Pers. Syn.* ii. 621; *Kunth Enum.* vi. 413; from Ceylon, is probably a *Cocculuz*.

D. PURPUREA, *Roxb. Fl. Ind.* iii. 799; tubers oblong reddish throughout, stems 6-, or more-winged prickly, leaves opposite and alternate cordate 5–7-nerved, petiole long winged stem-clasping. Male and fem. spikes as in *D. rubella*. —Cultivated in Bengal.

D. RUBELLA, *Roxb. l. c.* 798; tubers oblong red-skinned, stem 6-winged, leaves opposite sagittate-cordate 3–7-nerved, male spikes axillary simple and compound, if simple shorter than the leaves, fem. spikes axillary generally simple longer than the leaves, flowers very fragrant, staminodes large almost like the male stamens. —Cultivated about Calcutta.

D. SPICATA, *Roth*; var. β . *Thwaites Enum.* 326 (*C. P.* 2872); a very slender plant with ovate caudate-acuminate leaves, and a short panicle of large broad orbicular cuspidate thin walled capsules, is something I think entirely different from *D. spicata*. Capsules 1– $1\frac{1}{4}$ in. diam., valves semicircular. Seed orbicular, $\frac{3}{4}$ in. diam., broadly winged all round.

2. **TRICHOPUS**, *Gærtn.*

A small erect rigid, perennial herb. Stem short. Leaf terminal, petioled, linear-lanceolate, ovate or triangular, 3–7-costate. Flowers small, fascicled at the base of the leaf, panicles filiform, bisexual. Perianth campanulate, subequally 6-fid. Stamens 6 on the bases of the perianth lobes; anthers subsessile, short, broad, connective produced. Ovary 3-celled; style very short; stigmas 3, short, reflexed, 2-fid; ovules 2, superposed in each cell, anatropous. Fruit ovoid, triquetrous, indehiscent. Seeds oblong, rugose, grooved dorsally, testa thin embryo minute in a cartilaginous albumen.

1. **T. zeylanicus**, *Gærtn. fruct.* 1, 44, t. 14; *Beccari in Nuov. Giorn. Bot. Ital.* ii. 13; *Beddome Ic. Pl. Ind. Or.* t. 290. *Trichopodium cordatum* intermedium and angustifolium, *Lindl. Bot. Reg. sub* t. 1543. *T. zeylanicum*, *Thwaites Enum.* 291, 443. *Podianthus arifolius*, *Schnitzl. in Bot. Zeit.* 1843, 739.

TRAVANCORE, *Beddome*. CEYLON common.

Stem 1–3 in. Leaves 2–8 in. long, petiole 1–8 in. Pedicels 1–3 in. long. Flowers minute, dark brown; perianth lobes lanceolate, acute. Fruit $\frac{1}{2}$ in. long, pedicel thickened at the top.

ORDER CLV. **ROXBURGHACEÆ.**

Rootstock tuberous or creeping; stem erect or climbing. Leaves alternate or opposite, petioled, 3 or more-costate, cross nervules parallel. Flowers in axillary peduncles, regular, bisexual. Perianth superior or half-superior, 2-seriately 4-cleft. Stamens 4 at the base of the perianth-lobes or subhypogynous; anthers dorsifixed. Ovary 1-celled; stigma subsessile, or stigmas 3; ovules 2 or more, erect from the base or pendulous from the top of the cell, anatropous. Capsule 2-valved (fruit unknown in

Stichoneuron). *Seeds* oblong, testa coriaceous; embryo long, in the axis of hard albumen.—Genera 3, species about 8.

Flowers large; ovula erect 1. STEMONA.
Flowers minute; ovules pendulous 2. STICHONEURON.

1. STEMONA, Lour.

Root of fleshy tubers. *Leaves* opposite, alternate or whorled, ovate 3-9-costate. *Flowers* solitary, or few and subracemose. *Perianth* segments 4, lanceolate, many-nerved. *Stamens* subhypogynous, filaments very short, more or less connate in a ring; anthers linear, erect, connective produced in a very long linear-lanceolate erect appendage. *Ovary* free, compressed; stigma small, sessile, pointed; ovules 2 or more, erect, funicles long or short. *Capsule* ovoid or oblong, compressed, few-seeded. *Seeds* erect, ovoid or oblong, terete, grooved, beaked; funicle bearded; testa thick.—Species 4 or 5, Malayan and Australian.

1. **S. tuberosa**, Lour. *Fl. Coch.* 490; stem twining leafing and flowering at the same time, leaves opposite or whorled rarely alternate, perianth $1\frac{1}{2}$ –2 in. long. *S. gloriosoides*, Voigt *Hort. Suburb. Calcutt.* 650. *Roxburghia gloriosoides*, Jones in *Roxb. Cor. Pl.* 1, 26, t. 32; *Fl. Ind.* ii. 234; *Wall. Cat.* 5156; *Fl. des Serres*, ii. t. 22. *R. Gloriosa*, Pears. *Syn.* 1. 412. *Bot. Mag.* t. 1500. *R. Stemona*, Steud. *Nom.* ii. 475. *R. viridiflora*, Smith *Exot. Bot.* i. 111, t. 57; *Wall. Pl. As. Rar.* iii. 49, t. 282; *Griff. Notul.* i. 29, 31; *lc. Pl. Asiat.* t. 12–16, 62, f. 2.

BENGAL, SILHET, CHITTAGONG, ASSAM, and the NORTHERN CIRCARS.—DISTRIB. China.

Root of cylindric tubers 6–12 in.; stem woody below, branches terete. *Leaves* 4–10 in., broadly ovate-cordate, acuminate membranous, shining; petiole $1\frac{1}{2}$ –2 in. *Peduncle* 1–2 in., usually 2-fld.; bracts small, lanceolate; flowers erect, fetid. *Perianth* spreading and revolute; segments lanceolate, acuminate, greenish with many purplish nerves. *Stamens* very large, erect; filaments stout, red, deeply grooved in front with crenulate margins; connective linear-lanceolate, green; anthers linear, adnate to the face of the connective at its base; endothecium becoming free and produced beyond the cells into a subulate point, pollen between waxy and flowery. *Capsule* $1\frac{1}{2}$ in., ovoid-oblong, 5–8-seeded.

2. **S. minor**, Hook. *f.*; stem twining leafing and flowering at the same time, leaves $1\frac{1}{2}$ –3 in. alternate, perianth $\frac{3}{4}$ –1 in. long. *Roxburghia gloriosoides* var. *minor*; *Thwaites Enum.* 432. *R. gloriosoides*, *Wight Ic.* t. 2061.

MALABAR; on the Pulicat Hills (?Paulghat) *Wight*. CEYLON; at Trincomalee, *Glenie*.

Smaller in all its parts than *S. tuberosa*, the leaves $1\frac{1}{2}$ –3 in. long, and much broader at the base; capsule $\frac{1}{2}$ in. long.

3. **S. Curtisii**, Hook. *f.*; stem twining leafing and flowering at the same time, leaves 4–5 in. alternate, flowers unisexual? perianth about $\frac{3}{4}$ in. long.

PENANG; near the Waterfall, *Curtis*.

In habit and forms of leaf this resembles *S. tuberosa*, but the leaves are alternate, the petiole very long and slender, and the small flowers appear to be unisexual.

Of these I have examined three; one is male with the four stamens sessile on a short narrow androphore, the other female, with apparently imperfect stamens.

4. **S. Griffithiana**, *Kurz in Journ. As. Soc. Beng.* xlii. pt. ii. (1873), 109, t. 10; stem erect flowering before leafing. *Gen. Nov. Griff. Journ.* 149.

BURMA; Ava, Martaban and Pegu; *Griffith, Kurz.*

Rootstock stout, hypogæous. *Leaves* (of *R. tuberosa*), 3-5 in., ovate; petiole 3-5 in. *Stem* 3-6 in. *Flowers* greenish or dull purple; bracts $\frac{1}{4}$ - $\frac{1}{2}$ in., lanceolate; pedicels 1 in., strict; perianth-segments 1 in., linear-lanceolate, acute. *Stamens* 4, filaments broad, purple; anthers yellow, cuspidate. *Ovary* 1-celled, ovules 6. *Capsule* $\frac{1}{2}$ in., 2-valved, 3-4-seeded, seeds furrowed, aril small white.—I have seen four flowers only.

2. **STICHONEURON**, *Hook. f.*

An erect rigid glabrous or minutely hairy herb; rootstock creeping; roots fibrous; stem erect, angular, sparingly branched. *Leaves* subsessile, subdistichous, linear-oblong, pinnately 3-5-nerved. *Peduncles* axillary, filiform, rigid, lying close on the midrib of the leaf, bearing a subracemose cluster of very minute pedicelled greenish flowers, bracts setaceous. *Perianth*-campanulate 4-fid; lobes ovate, subequal, valvate. *Stamens* 4, united to the bases of the lobes; anther-cells short, diverging. *Ovary* half inferior, top convex; ovules numerous, pendulous from the top of the cell, funicles very short. *Fruit* unknown.

S. membranaceum, *Hook. f. in Herb. Ind. Or.* Colpopodeum, Wall. mss. in Herb. Griffith.—Indeterminata, *Wall. Cat.* 9110.

KHASIA MTS.; alt. 4-5000 ft. WALLICH, GRIFFITH, &c. Bengal, at LUCKIPORE, *J. D. H. & T. T.*

Stem 1-2 ft. *Leaves* 3-6 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., membranous, caudate-acuminate; nervules transverse, parallel; petiole of flower $\frac{1}{4}$ in. *Peduncles* $\frac{3}{4}$ -1 in., stiff; pedicels $\frac{1}{4}$ in.; flowers $\frac{1}{10}$ in., yellow.—I follow Bentham in placing this curious plant in *Roxburghiaceæ*, from which it differs in the nervation of the leaves. Until its fruit is known its position is doubtful. The order itself is heterogeneous, *Stemona* and *Croomia* being sectionally different, and both might well rank as sections of the composite Order *Liliaceæ*.

ORDER CLVI. **LILIACEÆ.**

Herbs rarely shrubby or subarborescent, with fibrous roots, or creeping rootstocks, bulbs, or corms. *Leaves* various. *Flowers* bisexual, rarely unisexual. *Perianth* herbaceous or petaloid, 6-merous in 2 series, rarely 4-8 or 10-merous, imbricate rarely valvate in bud. *Stamens* 6, rarely 3 or fewer, filaments free or connate; anthers oblong or linear, often versatile. *Ovary* 3-celled, style 1 often long, rarely 0 or 3; ovules 2 or more in the inner angles of the cells, anatropous, rarely orthotropous. *Fruit* a 3-rarely 1-celled 1-or more seeded capsule or berry. Seeds globose or flattened; testa various; embryo small, terete, surrounded by the horny or fleshy albumen.—Genera 187, species about 2500; in all climates and countries.

Muscari bootanense, *Griff. Itin. Notes*, 242; *Notul.* iii. 242; & *Ic. Pl. Asiat.* t. 280; (Baker in *Journ. Linn. Soc.* xi. 414), is an Afghan plant, as stated in the

Notulæ, and no doubt *bootanense* is a misprint for *boolanense*, the plant being found near the Boolan pass.

Series A. *Rootstock* not bulbous. *Anthers* bursting inwards. *Fruit* a berry.

Tribe I. SMILACEÆ. Shrubs. *Stem* climbing. *Leaves* 3-5-nerved and reticulately-nervuled, petiole often cirriferous. *Flowers* small, in umbels. *Anthers* after dehiscence 1-celled. *Ovules* few, orthotropous or $\frac{1}{2}$ -anatropous.

Perianth 6-partite 1. SMILAX.
Perianth ovoid or tubular, mouth very minute 2. HETEROSMILAX.

Tribe II. ASPARAGEÆ. *Stem* erect or climbing. *Leaves* replaced by usually linear or acicular cladodes. *Flowers* small, solitary, fascicled or racemed. *Anthers* distinctly 2-celled. *Ovules* few, orthotropous or $\frac{1}{4}$ -anatropous.
3. ASPARAGUS.

Tribe III. POLYGONATEÆ. *Stem* herbaceous; unbranched, leafy. *Flowers* axillary or in terminal racemes or panicles.

Flowers axillary; perianth cylindric, lobes short 4. POLYGONATUM.
Flowers axillary; perianth rotate 5. STREPTOPUS.
Flowers in terminal racemes or panicles; perianth 6-partite 6. SMILACINA.

Tribe IV. CONVALLARIEÆ. Scapigerous herbs. *Leaves* radical. *Scape* lateral, naked, bearing a unilateral raceme or spike. *Stigma* small.
Perianth subglobose, 6-partite 7. THEROPOGON.

Tribe V. ASPIDISTREÆ. *Rootstock* very stout, creeping, stem very short. *Leaves* radical, coriaceous. *Scape* very short, axillary. *Flowers* solitary or spicate. *Perianth* subglobose fleshy. *Fruit* a berry.

Stigma large, peltate; spike many-flid. 8. TUPISTRA.
Stigma small, 3-lobed; spike erect, many-flid. 9. GONTOSCYPHA.
Stigma large, peltate, flower solitary 10. ASPIDISTRA.

Series B. *Rootstock* stout or a bulb. *Leaves* radical or cauline. *Anthers* dorsi- or basi-fixed. *Ovules* anatropous. *Fruit* usually loculicidal.

Tribe VI. HEMEROCALLEÆ. *Leaves* linear, radical. *Flowers* large, paniced racemed or spicate. *Perianth* cylindric or funnel-shaped. *Filaments* inserted in a dorsal pit of the anther. *Ovules* numerous.
Flowers paniced, erect; perianth funnel-shaped 10*. HEMEROCALLIS.

Tribe VII. DRACÆNEÆ. *Leaves* radical or on an erect woody caudex. *Perianth* cylindric funnel-shaped or campanulate. *Anthers* basifixed or dorsifixed, filaments not inserted in a pit. *Fruit* a berry.

Ovary with the cells 1-ovuled 11. DRACÆNA.
Ovary with the cells many-ovuled 12. CORDYLINA.

Tribe VIII. ASPHODELÆ. *Rootstock* short, or a bulb. *Flowers* racemed or paniced. *Perianth* segments distinct. *Capsule* loculicidal (berried in *Dianella*).

- Flowers racemed. Ovarian cells 2-ovuled; capsule 3-angled 13. ASPHODELUS.
 Flowers racemed. Ovarian cells 4-6-ovuled; capsule 3-winged 14. EREMURUS.
 Flowers racemed. Ovarian cells 4-6-ovuled; capsule 3-winged 15. CHLOROPHYTUM.
 Flowers in paniced cymes. Fruit a berry. 16. DIANELLA.

Tribe IX. ALLIÆ. *Rootstock* in the Indian genus a bulb. *Scape* simple; flowers umbellate or capitate, at first enclosed in a spathaceous involucre. *Capsule* loculicidal.

- Strong-scented herbs. Perianth rotate 17. ALLIUM.

Tribe X. SCILLEÆ. *Rootstock* a bulb. *Scape* simple, naked; flowers racemose not involucre; bracts at the base of the pedicels small.

- Perianth 6-lobed, tubes cylindric, outer lobes spreading, inner erect 18. DIPCADI.
 Perianth campanulate, 6-partite; ovules many; seeds flattened 19. URGINEA.
 Perianth 6-partite. Seeds subglobose 20. SCILLA.

Tribe XI. TULIPEÆ. *Rootstock* a bulb. *Stem* erect with one or more leaves. *Flowers* few, large, solitary or racemed. *Perianth* segments distinct. *Capsule* loculicidal (in the Indian species).

- Flowers large, nodding or pendulous; anthers versatile 21. LILIUM.
 Flowers large, nodding or pendulous; anthers basifixed erect 22. FREITILLARIA.
 Flowers 1-2, small, suberect; anthers basifixed 23. LLOYDIA.
 Flowers large, solitary or few, erect or suberect 24. TULIPA.
 Flowers small, subumbellate, suberect 25. GAGEA.

Series C. *Rootstock* a corm or bulb, or short. *Leaves* radical or radical and cauline. *Anthers* dehiscent extrorsely or introrsely. *Ovules* anatropous. *Capsule* usually septicidal.

Tribe XII. COLCHICEÆ. *Rootstock* a tunicate corm. *Leaves* all radical. *Scape* very short, hypogæous, flowers 1-3. *Perianth*-tube very long. *Anthers* dorsifixed, narrow, dehiscence introrse.

- Perianth-tube entire; styles 3 26. COLCHICUM.
 Perianth-tube of the twining claws of the segments; styles 3 27. MERENDERA.

Tribe XIII. ANGUILLARIÆ. *Rootstock* a tunicate corm. *Stem* 1-or more leaved. *Anthers* dehiscent extrorsely. *Styles* 3 28. IPHIGENIA.

Tribe XIV. NARTHECIÆ. *Rootstock* short, creeping. *Stem* usually leafy. *Leaves* often distichous. *Perianth* persistent. *Anthers* subbasifixed, dehiscence sublateral. 29. TOFIELDIA.

Tribe XV. UVULARIÆ. *Rootstock* tuberous or creeping. *Stem* leafy. *Leaves* not sheathing. *Flowers* axillary. *Anthers* dehiscent extrorsely.

- Stem twining. Leaves cirrhose. Capsule loculicidal 30. GLOBIOSA.
 Stem erect. Capsule septicidal 31. TRICYRTIS.
 Stem erect. Fruit a berry 32. DISPORUM.

Tribe XVI. MEDEOLEÆ. *Rootstock* short or creeping. *Stem* simple.

Leaves radical or whorled. *Flowers* solitary or umbelled. *Anthers* dehiscent extrorsely.

Leaves radical or subradical ; flowers solitary or umbelled . . . 33. CLINTONIA.
 Leaves 3 in a whorl ; flowers solitary 34. TRILLIUM.
 Leaves 4 or more in a whorl 35. PARIS.

1. **SMILAX**, Linn.

Climbing shrubs (rarely erect herbs). *Leaves* alternate, rarely opposite, persistent, 3-5-nerved and reticulate; petiole usually 2-circiferous above the base. *Flowers* dioecious, small, umbelled. *Perianth* segments 6, free, incurved or recurved. MALE FL. *Stamens* 6, or more, at the base of the perianth, free; anthers didymous, oblong, or the cells separated by a forking of the filament. FEM. FL. *Staminodes* 3 or 6. *Ovary* 3-gonous, 3-celled; style 0, or short, stigmas 3, stout, recurved; ovules 1 or 2 in each cell, orthotropous, pendulous. *Fruit* a globose berry. *Seeds* solitary, or more often 2 hemispheric, rarely 3; albumen horny; embryo small.—Species about 180, temperate and tropical.

The only authoritative nomenclature for most of the Indian species of *Smilax* is the great Herbarium of Wallich, in which these are copiously represented, but in several cases almost inextricably mixed. When to this is added the wide differences between the foliage and inflorescence of different parts of the same specimen, and the frequent difficulty of matching males with females and flowering with fruiting specimens, it is obvious that much confusion must attend any attempt to systematize the species upon any but very complete materials, and such do not exist in any Herbarium. Unfortunately Kunth, when monographing the genus for his "Enumeratio Plantarum," and M. A. De Candolle for his monograph, had not access to Wallich's Herbarium, and had recourse to duplicates distributed from it to various European Herbaria, which were invariably fragmentary and often wrongly numbered. A study of the Wallichian types has hence obliged me to set aside various determinations of these excellent botanists. Nor can I follow M. De Candolle in his primary and other divisions of the genus. These are founded on the one- or two-ovuled cells of the ovary, and on the inflorescence. That of the ovarian cells is very difficult of observation, is unavailable in the absence of fem. fl., it does not tally with habit or other characters, and I doubt its constancy. That of the inflorescence wants precision, and, as it appears to me, also confirmation by a study of the whole plant, and that it cannot be established on fragments. I am far, however, from regarding it as valueless because I have been unable to understand and apply it. The arrangement I have adopted is, I think, natural, though far from satisfactory. I have restricted the citations of authors to such as I feel pretty sure of; and, as with so many other Indian genera, I find that any attempt to determine the identity of the species with the insufficient descriptions of the authors of the Malayan Floras is hopeless.

Sect. I. COILANTHUS. *Buds* globose. *Sepals* incurved in flower. *Stamens* much shorter than the perianth. *Ovules* (when known) solitary in the ovarian-cells.

1. **S. glabra**, Roxb. *Fl. Ind.* iii. 792; leaves 3-6 by $1\frac{1}{4}$ - $2\frac{1}{4}$ in. elliptic or ovate-lanceolate acuminate 3-costate, petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., sheath $\frac{1}{4}$ - $\frac{2}{3}$ in. long axillary, umbels sub-sessile. *Wall. Cat.* 5114; *Benth. Fl. Hongk.* 369; *Seem. Bot. Herald. Voy.* 420, t. 100; *A.DC. Monogr. Smilax*, 60. *S. Hookeri*, *Kunth Enum.* v. 162 (excl. syn. *Burm. & Lour.*).

ASSAM, SILHET and the lower KHASIA HILLS, Wallich, &c. TENASSERIM, Gallatly.—DISTRIB. China.

Branchlets slender, terete, smooth, unarmed. *Leaves* rather thin, 3-costate to the rounded or cuneate base; petiole narrowly sheathing, unarmed, cirrhi very slender. *Umbels* many-fl.; peduncle ebracteate; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in.; bracteoles subulate; flowers very small, white; buds depressed-globose, deeply 6-lobed from the groove on the back of the obovate cucullate coriaceous sepals; petals minute; stamens very short; staminodes in fem. fl. 3.—There is an excellent figure of this in Roxburgh's collection of drawings. That author describes the leaves as white beneath, but this is not obvious in herbarium specimens. The roots are nodose, as in the "China-root."

2. **S. calophylla**, Wall. Cat. 5131; leaves 4–6 by $\frac{3}{4}$ – $1\frac{1}{2}$ in. oblong-lanceolate acuminate 3-costate glaucous beneath base acute, petiole $\frac{1}{4}$ – $\frac{1}{2}$ in., sheath obscure, umbels few-fl. sessile on an axillary rachis, pedicels decurved. A.DC. Monogr. Smilax, 60.

SINGAPORE and PERAK, Wallich, Cantley, Wray, King's Collector; summit of Mt. Ophir, Hullett.

Branchlets strict, terete, or slightly grooved, unarmed. *Leaves* opaque, costa stout, reticulations faint; petiole jointed about the middle. *Flowering branches* 1–4 in., erect, slender, with a lanceolate bract above the base; umbels 3–4, 1 in. or more apart; pedicels $\frac{1}{10}$ – $\frac{1}{4}$ in., unequal; male fl. globose, about $\frac{1}{8}$ in. diam.; sepals deltoid, fleshy, concave, deeply grooved down the back; petals small, flat; anthers sessile round a circular disk, deltoidly ovate, cuspidate. *Berries* $\frac{1}{3}$ in. diam., red. Fem. fl. not seen.

3. **S. peguana**, A.DC. Monogr. Smilax, 62; leaves $1\frac{1}{2}$ –3 by $\frac{3}{4}$ – $1\frac{1}{2}$ in. elliptic oblong or ovate-oblong 5–7-costate white beneath, base acute or cuneate, petiole $\frac{1}{2}$ – $\frac{3}{4}$ in., sheath very obscure, male umbels axillary very shortly peduncled many-fl., pedicels very short, anthers subsessile.

BURMA, Griffith (Kew Distrib. 5424); Taipo hills, Brandis; Moolyet, alt. 5000 ft., Gallatly.

Branchlets slender, terete, unarmed. *Leaves* shining above, laxly reticulate on both surfaces; petiole twisted, terete. *Peduncle* rarely longer than the petiole; bracteoles minute, broadly ovate; pedicels $\frac{1}{2}$ in.; flowers $\frac{1}{10}$ in. diam.; male sepals ovate, concave, coriaceous, not channelled on the back; petals very small, oblong, obtuse; anthers broad; filaments very short.—The specimens are few and not in good state. Griffiths No. 5424, referred by A.DC. to *hypoglauca*, is certainly *peguana*.

4. **S. myosotiflora**, A.DC. Monogr. Smilax, 65; branches slender terete, leaves oblong-ovate caudate-acuminate 3-costate, petiole short, sheath very narrow, peduncles short axillary solitary compressed, male fl. subsessile, anthers minute sessile. *S. extensa*, Wall. Cat. 5126 A.

PENANG, Porter. PERAK, Wray, King's Collector.—DISTRIB. Java.

Branches very smooth, unarmed. *Leaves* 5–7 by 2– $2\frac{3}{4}$ in., thin when dry, translucent when fresh, nervules very delicately closely reticulate, base cuneate rounded or subcordate; petiole $\frac{1}{2}$ in., cirrhi slender. *Male* peduncle $\frac{1}{2}$ in.; flowers $\frac{1}{8}$ in. diam., subcapitate, rather fleshy; sepals broadly oblong, incurved; petals narrow; anthers ovoid. *Berries* $\frac{1}{4}$ in. diam., 1-seeded; fruiting peduncles $\frac{1}{2}$ –1 in.; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in.—The male flowers of Javan specimens are a good deal larger than the Indian. Fem. fl. not seen. Wallich's *S. extensa* being a mixture I have retained De Candolle's name for this; his specimen of this had neither flower nor fruit.

Sect. II. EUSMILAX. *Buds* oblong or clavate. *Sepals* and *petals* recurved in flower. *Ovules* one or two in the ovarian cells.

* *Flowers* very small or minute. *Sepals* $\frac{1}{10}$ – $\frac{1}{6}$ in. long. *Stamens* much shorter than the sepals; staminodes 1–3.

† *Branches and branchlets acutely angled.*

5. **S. rigida**, Wall. *Cat.* 5120; leaves $\frac{1}{2}$ – $1\frac{1}{4}$ by $\frac{1}{3}$ – $\frac{3}{4}$ in. subsessile orbicular-ovate or ovate-cordate faintly 3-costate, umbels 1–4-fld., sepals elliptic oblong, petals rather narrower 4–5 times longer than the stamens. *Kunth Enum.* v. 164; *A.DC. Monogr. Smilax*, 105. *S. Wallichii*, Steud. *Nomencl.* (not of Kunth).

EASTERN HIMALAYA; Nepal, Wallich; Sikkim, alt. 7–10,000 ft.; Bhotan, Griffith.

A small erect much branched shrub with small coriaceous leaves, dwarf and densely leafy at high elevations, branches acutely angled, prickles few small; branchlets slender, distichous. *Leaves* obtuse acute or apiculate base, rounded or cordate, rarely acute; petiole decurrent on the branchlets, with 2 minute deciduous setæ (cirrhi?), jointed at the top. *Peduncle* short, $\frac{1}{6}$ – $\frac{1}{2}$ in.; bracts lanceolate, taper-pointed, persistent, lacinate or ciliate; pedicels unequal; perianth cupular; male flowers very small; sepals and petals membranous; anthers minute didymous; fem. fl. rather larger, staminodes 3; ovary subglobose, stigmas sessile. *Berries* $\frac{1}{3}$ – $\frac{1}{2}$ in. diam., black.—Closely allied to *S. myrtilus*, and next to which A.DC. places it though regarding it as most nearly allied to *S. ferox*.

6. **S. Myrtilus**, A.DC. *Monogr. Smilax*, 106; leaves 1– $1\frac{1}{2}$ in. ovate acuminate membranous faintly 3-costate base acute or rounded, petiole $\frac{1}{10}$ – $\frac{1}{8}$ in., articulate above the thickened broad base, peduncle few-fld. and pedicels very slender, sepals and petals subequal oblong three or four times as long as the stamens.

KHASIA HILLS, Griffith, alt. 4–6000 ft., J. D. H. & T. T. NAGA HILLS, alt. 7000 ft., Clarke.

Closely allied to *S. rigida*, which it represents in the Khasia, but a more slender plant, with larger more ovate acuminate leaves, more slender short or long peduncled pedicels, and longer but still very short petioles that have a setiform process on each side as in that plant. *Berries* $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., black, 2–3, seeded, on slender pedicels.—The Bhotan plant referred here by De Candolle is, I think, certainly *S. rigida*, which is a more alpine species, unknown in the Khasia.—The staminode was solitary in several flowers that I examined.

†† *Branches and branchlets terete or nearly so.*

7. **S. parvifolia**, Wall. *Cat.* 5118; leaves 1–3 in. ovate or ovate-cordate or lanceolate acute or acuminate 3–5-costate often glaucous beneath, base rounded or cordate, petiole $\frac{1}{7}$ – $\frac{1}{8}$ in. very slender sheathing half way up or more, male umbels few-fld., peduncles and pedicels very slender, bracteoles minute, sepals linear-oblong, petals much narrower, filaments very short. *Kunth Enum.* v. 163. *S. elegans*, A.DC. *Monogr. Smilax*, 107; Wall. *Cat.* 5117 B. *S. glaucophylla*, Klotzsch in *Reise Pr. Wald. Bot.* 45, t. 91.

TEMPERATE HIMALAYA, alt. 5–8000 ft., from Kashmir eastwards. The KHASIA HILLS, alt. 6000 ft.

Branches very slender, stiff, terete, smooth, unarmed; branchlets sometimes furrowed, often zigzag. *Leaves* very variable in size and shape, acuminate, thin, highly reticulate; petiole very short, jointed at the top; sheath often cirrhose. *Peduncles* and *pedicels* $\frac{1}{4}$ – $\frac{1}{2}$ in., capillary, the former often thickened and flat in fruit. *Umbels* few- or many-fld.; bracteoles lanceolate, very short; flowers minute; sepals and petals ovate-lanceolate; filaments very short; anthers didymous; ovary ovoid, 1–3-celled, staminodes 1–3. *Berries* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.—A very common and variable Himalayan plant.—The name *parvifolia* though appropriate for Wallich's and other specimens is for others delusive.

8. ***S. vaginata***, Decne. in *Jaquem. Voy. Bot.* 169, t. 169; leaves $2\frac{3}{4}$ – $1\frac{1}{4}$ in. elliptic-ovate or cordate obtuse acute or mucronate 5–7-nerved, petiole $\frac{1}{3}$ – $\frac{3}{4}$ in. very slender narrowly sheathing for $\frac{1}{4}$ to $\frac{1}{2}$ its length, sepals and petals subsimilar oblong much longer than the stamens. *A.D.C. Monogr. Smilax*, 109.

WESTERN HIMALAYAS; from Kashmir to Kumaon, alt. 6–9000 ft., *Falconer, Jacquemont, Thomson*. UPPER ASSAM; Naga hills, alt. 9000 ft., *Clarke*.

A slender diffuse unarmed shrub, branches white, smooth, terete. *Leaves* membranous, cuneate or subcordate at the base; petiole jointed below the top. *Peduncles* and *pedicels* very slender; male umbel many-fl., fem. 1-fl.; flowers purplish; bracteoles 0.—De Candolle says of this manifestly allied to *S. parvifolia* (his *S. elegans*), differing in the petiole articulate below the limb without cirrhi, and staminodes 6. The habitats he gives of Hyderabad, alt. 4000 to 6500 ft., cannot apply to the city of that name in the Deccan.

9. ***S. longebracteolata***, *Hook. f.*; stems slender, branches terete, leaves $2\frac{1}{2}$ – $3\frac{1}{2}$ in. ovate-cordate acuminate 5-costate, petiole 1 in. narrowly sheathing for half its length, tips of sheaths acute, umbels long peduncled, bracteoles subulate rigid $\frac{1}{2}$ – $\frac{3}{4}$ as long as the pedicels, sepals and rather narrower petals of male linear oblong, stamens very short. *S. elegans*, var. major, *A.D.C. Monogr. Smilax*, 107.

KHASIA HILLS; at Myrung, alt. 5–6000 ft., *J. D. H. & T. T.*

Branches terete, quite smooth, rather slender. *Leaves* thin, finely reticulated; petiole articulate at the top?, sheathing portion coriaceous, margins recurved, tips cuspidate, recurved, cirrhi inserted above the cusps. *Male umbels* small, few-fl., shortly peduncled, pedicels $\frac{1}{6}$ in.; bracteoles shorter than in the fem., subulate; sepals $\frac{1}{10}$ in.; fem. peduncles naked at the base, inserted a little above the axil of the leaf; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in.; sepals lanceolate, acuminate; petals narrower; stigmas very short.—The larger leaves and long rigid bracteoles of the fem. umbels distinguish this from *S. parvifolia* and *minutiflora*.

10. ***S. minutiflora***, *A.D.C. Monogr. Smilax*, 109; branches slender terete or grooved, leaves $2\frac{1}{2}$ – $4\frac{1}{2}$ by $\frac{2}{3}$ – $1\frac{1}{4}$ in. ovate-lanceolate or linear-oblong acuminate membranous 3–5-costate base obtuse rounded or subacute, petiole $\frac{1}{2}$ – $\frac{2}{3}$ in., sheath oblong $\frac{1}{4}$ of its length narrowed upwards, male umbels many-fl., sepals and petals subequal lanceolate 3–4 times longer than the stamens, fem. umbels very few-fl., peduncle very long slender.

SIKKIM HIMALAYA, alt. 6–9000 ft., *J. D. H.* KHASIA HILLS, *Griffith*.

Branches strict, woody, unarmed, smooth; scales at the base of the flowering branches $\frac{1}{4}$ – $\frac{1}{2}$ in. long. *Leaves* pale beneath, nervules laxly reticulate; petiole articulate below the limb, cirrhi 0. *Peduncle* of male umbel slender; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in.; buds globose. *Berries* $\frac{1}{2}$ in. diam., black.—“Differs from *S. vaginata* in the more acute or acuminate leaves, and shorter petiole; from *S. parvifolia* in the nerves of the leaf descending into the petiole before reaching the joint,” *A.D.C.*; I doubt its being anything but *parvifolia*.

11. ***S. elegans***, *Wall. Cat.* 5117 A; branches slender terete, leaves 2–3 in. ovate or ovate-cordate acute or acuminate thin 5-costate, petiole $\frac{1}{4}$ – $\frac{1}{2}$ in. sheathing half way up or more, male and fem. peduncles and pedicels capillary, umbels few-fl., sepals ovate-oblong, petals obovate, anthers subsessile, ovary globose. *S. menispermoidea*, *A.D.C. Monogr. Smilax*, 108.

TEMPERATE HIMALAYA; Kumaon and Nepal, *Wallich*; Sikkim, alt. 7–11,000 ft., *J. D. H., Clarke*.

A small shrub; branches and branchlets quite smooth, unarmed. *Leaves* variable

in breadth ; sheath of petioles of old leaves $\frac{1}{2}$ –1 in., axillary branches with a recurved basal scale, cirrhi slender. *Peduncles* 1–1½ in. long ; male flowers 4–6, $\frac{1}{4}$ – $\frac{1}{3}$ in. diam. ; bracteoles minute, subulate ; fruiting peduncles strict, slender, 1–1½ in. ; receptacle minute, pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. ; ovary with 2 (? 2–3) stigmas recurved from the base. *Berries* $\frac{1}{2}$ in. diam., blue-black ; seeds 2–3, small, obtusely angled.—The broad thin leaves and long sheaths of the petioles best distinguish this from *parvifolia*.

** Flowers large or small ; sepals rarely less than $\frac{1}{2}$ in. long. Stamens equalling or longer than the sepals ; rarely $\frac{1}{2}$ shorter.

† Umbels many spicate on an axillary peduncle.

12. **S. aspera**, *Linn. Sp. Pl.* 1028 ; leaves 1½–6 in. ovate deltoid or lanceolate base hastate or cordate, sepals linear-oblong, petals rather narrower, anthers linear shorter than the filaments. *Reichb. Ic. Fl. Germ.* x. t. 428 ; *A.DC. Monogr. Smilax*, 163 (*vars. genuina*, Perrottetiana and maculata). *S. maculata*, *Roxb. Fl. Ind.* iii. 796 ; *Wall. Cat.* 5113 ; *Royle Ill.* 384 ; *Kunth Enum.* v. 218 ; *Wight Ic.* t. 2059 ; *Thwaites Enum.* 338 (*excl. syn. Villandia*). *Boiss. Fl. Orient.* v. 343. *S. fulgens*, *Wall. Cat.* 5122. *S. nilagarensis*, *Steud. Pl. Exsicc. Hohen.* n. 952.

Throughout India, from KASHMIR, alt. 4–7000 ft., to the KHASIA HILLS, and southward to TRAVANCORE, alt. 4–7000 ft., and CEYLON ; ascending to 5000 ft.—DISTRIB. Syria, S. Europe, N. Africa.

A large shrub, branches armed or not. *Leaves* usually blotched with white, 5–9-nerved, acute or acuminate, basal lobes rounded or oblong ; petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. and nerves beneath often prickly ; cirrhi usually long. *Spikes* 2–6 in. ; rachis slender smooth, umbels many-fld., bracteoles minute ; flowers white, sweet scented, buds longer than the pedicels ; male sepals $\frac{1}{2}$ in. long, fem. rather smaller ; staminodes 6 ; stigmas oblong, recurved. *Berries* $\frac{1}{4}$ – $\frac{1}{2}$ in., blueish, usually 3-seeded.

†† Umbels solitary binate or paniced on a common peduncle.

§ Branches rough hispid or granulate.

13. **S. aspericaulis**, *Wall. Cat.* 5129 ; branches terete scabrid, leaves 2–8 by 2–3 in. oblong or linear-oblong thin 3-costate from above the base tip rounded or clawed, petiole $\frac{1}{2}$ –1 in. narrowly sheathing below the middle, male sepals $\frac{1}{2}$ in. linear-oblong, petals very narrow, stamens as long as the sepals. *A.DC. Monogr. Smilax*, 195. *S. Roxburghiana*, *Wall. Cat.* 5115, *in part.* ? *S. odoratissima*, *Blume*.

SIKKIM HIMALAYA, alt. 1–3000 ft., *J. D. H.* (6000 ft., *King*). The KHASIA HILLS and BURMA, *Wallich*, &c. ANDAMAN ISLANDS, *Kurz*. PERAK, *King's Collector*.

Branches unarmed or aculeate, sometimes closely. *Leaves* rounded or cuneate at the bases. *Umbels* many-fld., solitary or 2–3 on a common peduncle $\frac{1}{2}$ in. long, partial peduncle as long ; buds clavate $\frac{1}{2}$ in. long ; bracteoles obsolete ; fem. recept. globose ; pedicels $\frac{1}{2}$ in. ; fem. fl. not seen. *Berries* nearly $\frac{1}{2}$ in. diam.—If this is *Blume's S. odoratissima* that is the earliest name.

14. **S. barbata**, *Wall. Cat.* 5125 ; branches very stout terete densely bristly, leaves 6–10 in. long and broad elliptic or orbicular-cordate coriaceous cuspidate 7-costate from above the base, petiole very stout, base sheathing and bristly, umbels very long-peduncled. *A.DC. Monogr. Smilax*, 196. *S. setosa*, *Miq. Fl. Ind. Bat. Suppl.* 610.

SINGAPORE, *Wallich*, *Hullett*.—DISTRIB. Banca.

Leaves coarsely reticulate, white beneath ; petiole 1–1½ in. ; male umbels very

many-fl., solitary and bracteate towards the base or two on a long common peduncle, special peduncles 2-3 in., very slender; pedicels $\frac{3}{4}$ in.; bracteoles small, ovate; male fl. $\frac{1}{4}$ in. diam., sepals oblong-lanceolate, obtuse; petals very narrow; staminodes of fem. fl. 6; ovary oblong; stigmas very long, free to the base, revolute; ovules solitary (or 1-2 in one cell solitary in the others?).

15. **S. Kingii**, *Hook. f.*; branches very stout granulate, leaves 5-10 in. orbicular-ovate or elliptic and very large cymbiform petiolar sheaths thickly coriaceous 5-7-costate from the base, petiole 2-3 in.; umbels 1-3 on a very short common peduncle, partial peduncles 1-3 in., pedicels $1\frac{1}{2}$ -2 in., sepals $\frac{1}{3}$ in. long.

MALAYAN PENINSULA; Perak, *King's Collector*.

Stem 40 ft.; branches angular, lower as thick as the little finger with many conical spines $\frac{1}{2}$ in. long. *Leaves* very smooth on both surfaces; nerves obscure, immersed; petiole as thick as a goosequill; sheath cymbiform of lower leaves with sometimes large spines; cirrhi very stout. *Fem. fl.* sepals broadly oblong-lanceolate, obtuse; petals very narrow; staminodes 3; ovary oblong; style one-third as long, stigma much longer than the style. *Berry* 1 in. diam. Male fl. not seen.

16. **S. pallescens**, *A.DC. Monogr. Smilax*, 198; branches terete granulate, leaves 5-10 by 2-3 $\frac{1}{2}$ in. narrowly oblong tip rounded and broadly caudate thin pale 5-costate from the rounded or subacute base, petiole $\frac{2}{3}$ in. obscurely sheathing articulate at the middle.

UPPER ASSAM; in the Mishmi hills, *Griffith*.

The solitary specimen of this fine species consists of a branch with leaves and male racemes with a solitary flower. The branch is unarmed, not scabrid like *aspericaulis*, and hardly warted as described by De Candolle, but granulate; the racemes are very slender, 2-5 in. long, white, the umbels 1-3-nate, peduncles $\frac{1}{4}$ - $\frac{2}{3}$ in. divaricate, the bracts are all gone.—I have seen no flowers. Griffith describes them as greenish-brown spotted with red, and with white anthers.

§ Branches smooth, usually aculeate.

a. Umbels solitary rarely 2-nate; peduncle bracteate or not below the middle.

17. **S. ferox**, *Wall. Cat.* 5119; branches stout aculeate, leaves 2 $\frac{1}{2}$ -3 $\frac{1}{2}$ by 1-2 in. elliptic or ovate- or obovate-oblong acute or mucronate rigid 3-5-costate base cuneate or rounded, petiole $\frac{1}{4}$ in. broad coriaceous sheathing tumidly for half its length, sepals and petals oblong subequal, stamens 6-9 one-third shorter than the sepals. *A.DC. Monogr. Smilax*, 103. S. China, *Maxim. Dec.* v. 172 (*the Indian plant*). *S. Thomsoniana*, *A.DC. l. c.* 104.

EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim alt. 5-8000 ft. *J. D. H.* *BENGAL*, *Griffith* (*Kew distrib.* 5440). MUNNIPORE, *Watt*.—DISTRIB. Tonkin.

A stout shrub; branches strongly prickly, terete, branchlets unarmed, angled. *Leaves* epunctate and clineolate, marginal nerves very slender, nervulus faint; petiole jointed at the sheath. *Umbels* from the young shoots only, of which the leaves are membranous subglauous beneath; peduncles rather stout, solitary, rarely 2-nate, $\frac{1}{4}$ - $\frac{3}{4}$ in. long or shorter; bracteoles ovate, acuminate sepals $\frac{1}{4}$ - $\frac{1}{2}$ in. long, ovate-oblong; petals similar; staminodes 3; ovary oblong, short styles, stout. *Berries* $\frac{1}{2}$ in. diam., 1-2-seeded.—The stamens are certainly sometimes 9 in Sikkim specimens. De Candolle remarks on the close affinity of this with the "China," *Sm. China*, which he refers to sect. *Nemexia*, having 2-ovuled cells of the ovary; he further distinguishes *S. ferox* by the leaves not cuneate at the base, which, however, they sometimes are. I find no characters whereby to distinguish *S. Thomsoniana* as a variety.

18. **S. lævis**, Wall. Cat. 5116; unarmed, leaves 4-6 by 1-2 in. lanceolate or ovate-lanceolate acuminate 3-5-costate from or above the acuminate or cuspidate base, petiole $\frac{1}{2}$ - $\frac{2}{3}$ in. shortly sheathing, umbels solitary; peduncle bracteate below the middle much longer than the petiole. *A.DC. Monogr. Smilax*, 56. *S. oxyphylla*, Kunth Enum. v. 239 (the Penang plant of Wallich).

PENANG, Wallich, Curtis, &c. MALACCA; Mt. Ophir, Griffith, PERAK, alt. 3-4000 ft., King's Collector.—DISTRIB. China.

Branches slender, terete, smooth. Leaves jointed suddenly at the narrowed base, finely reticulate. Peduncle $\frac{2}{3}$ -1 in.; pedicels of male fl. very short; bracteoles obsolete; flowers $\frac{2}{3}$ in. diam.; sepals linear-oblong; petals very narrow; stamens nearly as long as the sepals; staminodes 3; stigmas large recurved. Berries small, $\frac{1}{4}$ in. diam., fruiting pedicels $\frac{1}{2}$ in., very slender.—The Mt. Ophir specimens (var. *ophirens*, A.DC.) have very strongly reticulated leaves.

19. **S. lanceæfolia**, Roxb. Fl. Ind. iii. 792; leaves 4-6 by $1\frac{1}{2}$ -3 in. orbicular-oblong- or oblong-lanceolate acuminate 3-costate base acute, petiole $\frac{1}{2}$ - $\frac{2}{3}$ in., sheath obscure, male umbels subsessile very many-fl., peduncles naked shorter than the petioles. Wall. Cat. 5132; *A.DC. Monogr. Smilax*, 57. *S. micropoda*, A.DC. l. c. 58.

SIKKIM HIMALAYA, alt. 4-7000 ft. The KHASIA, NAGA and MUNNIPORE HILLS, Clarke, &c. BURMA, in the Shan States.—DISTRIB. China.

Branches slender, subterete, prickles few or 0. Leaves membranous, subcaudate, intra-marginal nerves very slender, punctulate and lineolate. Male umbel 15-25-fl., pedicels $\frac{1}{3}$ in., filiform, bracteoles ovate, acute; flowers $\frac{1}{4}$ in. diam.; sepals and petals linear, subequal; anthers oblong, much shorter than the filaments. Fem. umbels subsimilar; peduncle stout, flattened; bracteoles very minute, subulate or 0; staminodes 3, ovary short, obtusely trigonous; stigmas short, obtuse, recurved. Berry about $\frac{1}{4}$ in. diam.—The Chinese plant (var. *opaca*, A.DC.) has more rigid epunctate leaves. The leaves are subcordate in the Burmese specimens. A specimen, apparently of this from the Dophla hills has leaves 5-6 by $3\frac{1}{2}$ -4 in., broadly ovate deeply cordate, and fruiting peduncle $1\frac{1}{2}$ in., with pedicels 1 in.

20. **S. oxyphylla**, Wall. Cat. 5128; branches very slender, leaves $2\frac{1}{2}$ -5 by $\frac{2}{3}$ - $1\frac{1}{2}$ in. narrowly oblong-lanceolate acuminate 3-costate base acuminate, petiole $\frac{1}{4}$ - $\frac{1}{3}$ in., sheath obscure, peduncle of male umbel equalling or rather longer than the petiole ebracteate very slender naked, pedicels capillary. Kunth Enum. v. 238 (excl. syn.); *A.DC. Monogr. Smilax*, 59.

SILHET, the KHASIA HILLS, and CHITTAGONG, Wallich, Griffith, &c.

Branches terete, with a very few short prickles or 0. Leaves membranous, sometimes caudate, very finely reticulate, lineolate, hardly punctulate, intramarginal nerves very slender. Male umbel 15-30-fl., bracteoles very minute; sepals and petals obovate-oblong, rather longer than the stamens; anthers oblong, much shorter than the very slender filaments.—Hardly distinguishable from narrow-leaved specimens of *S. lanceæfolia*. I have seen no fem. fl.

β. Umbels 2-3 on a common peduncle. Staminodes 3. Except in *S. zeylanica*.

† Costæ of leaves free from the base, or connate in *S. quadrata*.

21. **S. quadrata**, A.DC. Monogr. Smilax, 183; branches 4-angled zigzag, leaves 4-6 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in. oblong or elliptic-oblong broadly cuspidate membranous 3-costate from the rounded base or above it, petiole $\frac{1}{3}$ - $\frac{1}{2}$ in. narrowly sheathing for half its length, fem. umbels solitary or 2-3 on a

short common peduncle very many-fl'd., pedicels rigid, flowers small, sepals linear-oblong, petals narrowly linear. *S. zeylanica*, Wall. Cat. 5130 D. E.

KHASIA HILLS, *Griffith*; alt. 4-6000 ft. *J. D. H. & T. T.* MUNNIPORE, alt. 5500 ft., *Clarke*. BUMBA; Tavoy and Prome, *Wallich*.

A very remarkable species, at once recognized by the square unarmed almost 4-winged sparsely prickly zigzag branches, and oblong thin leaves with callous-tipped cusps; the peduncles $\frac{1}{2}$ in. long are very rigid, as are the pedicels which radiate forming a globe 1 in. diam. or less. *Fem. fl.* very small, $\frac{1}{4}$ in. diam.; staminodes 1-3; ovary contracted into a stout style with suberect stigmas. *Male fl.* peduncle slender; pedicels capillary, shorter than the buds; sepals $\frac{1}{2}$ in. long; petals very narrow; filaments very slender.—I found only 1-3 staminodes, A.D.C. in a solitary imperfect flower though there were probably 6.

22. *S. Helferi*, A.D.C. *Monogr. Smilax*, 176; branches slender sparingly prickly, leaves 3-5 by 1-3 in. oblong rounded at both ends 3-costate from the base membranous tip clawed, petiole $\frac{1}{6}$ - $\frac{1}{4}$ in. sheathing to above its middle, male umbels many-fl'd., sepals linear-oblong, petals much narrower, costa thick, stamens nearly as long as the sepals. ? *S. luzonensis*, *Presl Rel. Hænk.* i. 131.

PEGU, *McLelland*, TENASSERIM, *Helfer, Falconer*; MALACCA, *Griffith, Maingay*.—DISTRIB. ? Philippines.

Branches as thick as a crow-quill, terete, grooved; prickles small, nearly straight. Leaves retuse, or tipped with a fleshy nail-like process, rarely acuminate; costæ slender; cirrhi 0 or short. Male umbels usually solitary, peduncle $\frac{1}{2}$ -1 in., bracteate about the middle or lower; fruiting peduncles stout; receptacle globose, pitted; bracteoles minute, ovate; pedicels $\frac{1}{2}$ in., slender; staminodes 3. Berries very small, about $\frac{1}{2}$ in. diam.; seeds small.—De Candolle makes of Maingay's plant a variety with the costæ hardly separate above the base, and immature berries smaller, but I fail to find these differences. I have seen no specimens of Helfer's and Falconer's plants, nor other berries than Maingay's. Ritchie has collected a very similar plant in flowerless state at Kasarleh in Canara.

23. *S. extensa*, Wall. Cat. 5126 B; branches terete, leaves 3-6 by 1-2 in. elliptic or oblong-lanceolate acute or cuspidate coriaceous 3-costate from the cuneate or acuminate base, petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. narrowly sheathing to the middle, male umbels solitary or 2-3 on a short bracteate common peduncle many-fl'd., pedicels very short, sepals linear obtuse, petals much narrower, stamens as long as the sepals. A.D.C. *Monogr. Smilax*, 179.

PENANG, *Wallich, Curtis*, 1244.

Branches striate, unarmed, ribs slender. Leaves shining, not margined, very much narrowed at the base into the stout petiole; some of the largest are rounded at the tip with a broad cusp; cirrhi stout. Peduncle of umbels bracteate at the base; bracteoles minute, ovate; pedicels $\frac{1}{2}$ in.; sepals $\frac{1}{2}$ in.; staminodes 3.—*S. extensa*, Wall. 5126, A. is *S. myosotiflora* of A. De Candolle.

†† Costæ of leaves more or less connate at the base (see also *S. quadrata*).

24. *S. zeylanica*, Linn. *Sp. Pl.* 1029; branches slender more or less 4-angled, leaves 5-7 by 2 $\frac{1}{2}$ -4 in. elliptic or broadly oblong or ovate-oblong cuspidate 3-5-costate from above the base, petiole $\frac{1}{2}$ -1 in. very shortly sheathing at the base, umbels solitary or 2-3 on a common peduncle

small many-fl'd., special peduncle and pedicels short, sepals $\frac{1}{8}$ – $\frac{1}{4}$ in. linear, petals much narrower, stamens as long as the sepals. *A.DC. Monogr. Smilax*, 190; *Thwaites Enum.* 338; *Wall. Cat.* 5130 A. *S. indica*, *Vitm. Summa*, v. 422; *A.DC. l. c.* 187. *S. laurifolia*, *Hohen. Pl. Exsicc.* n. 122. *S. Hohenackeri*, *Kunth Enum.* v. 240. *S. umbellata* & pseudo-China, *Herb. Madr.—Burm. Fl. Zeyl.* 217 excl. syn.—*Rheede Hort. Mal.* vii. t. 31.

Throughout the hilly trop'cal districts of India, from the EASTERN HIMALAYA and BURMA to the MALAY PENINSULA, and from the CONCAN to CEYLON.—DISTRIB. Java.

Branches unarmed or with a few prickles; branchlets often zigzag. *Leaves* more uniform than in most species, base rounded or subcordate, or in the terminal leaves often acute; petiole jointed in the middle, at length cirrhose. *Peduncle* bracteate at the base, umbels 20–30-fl'd., male pedicels $\frac{1}{2}$ in., fem. $\frac{1}{2}$ in.; staminodes in few-fl. *Berries* $\frac{1}{2}$ in. diam., usually 2 plano-convex. The var. *sisparensis* A.DC. (*S. laurifolia*, Hohen.) is the common Deccan form, and not distinguishable from the Ceylon.

25. ***S. macrophylla***, *Roxb. Hort. Beng.* 72; *Fl. Ind.* iii. 793 (not of Willd.); branches stout terete, leaves 6–18 in., as broad or narrower orbicular or broadly oblong cuspidate 5–7-costate from the rounded subcordate or suddenly cuneate base, petiole 1–1 $\frac{1}{2}$ in. very stout narrowly sheathing below the middle, umbels 2–3 on a short common peduncle, male partial peduncle slender, sepals $\frac{1}{4}$ in. linear, stamens as long as the sepals. *A.DC. Monogr. Smilax*, 193 (excl. var. *cacharensis*). *S. ovalifolia*, *Roxb. Fl. Ind.* iii. 794; *Wight, Ic.* t. 809; *Dalz. & Gibs. Bomb. Fl.* 246; *Kunth Enum.* v. 248. *S. Roxburghii*, *Kunth l. c.* 852. *S. retusa*, *Roxb. l. c.* 793. *S. prolifera*, *Wall. Cat.* 5724 C. D. F. *S. prolifera* & *ovalifolia*, *Herb. Ind. Or. Hook. f. & T.* *S. grandis*, *Wall. ex Voigt Hort. Sub. Calc.* 648. *S. grandifolia*, *Voigt. l. c.*

TROPICAL HIMALAYA, from KUMAON (*Herb. Strach. & Winterb.* 8) Eastwards, ASSAM, BENGAL, CHITTAGONG, BURMA, the CENTRAL PROVINCES and CONCAN.

Stem stout, scandent, prickly, as thick as the thumb below. *Leaves* glossy above; cirrhi long. *Male peduncles* $\frac{1}{2}$ –1 $\frac{1}{2}$ in., slender; umbels many-fl'd.; pedicels $\frac{1}{8}$ – $\frac{1}{4}$ in., shorter than the buds; staminodes of fem. fl. 3. *Ovary* oblong; stigmas 3 sessile. *Berries* $\frac{1}{3}$ –1 $\frac{1}{2}$ in. diam., 1–2-seeded; pedicels short, stout. *Seeds* biconvex.—This is, I think, undoubtedly Roxburgh's *ovalifolia* as well as his *macrophylla*. It is best distinguished from *prolifera*, by the narrow sheath of the petiole, but both are so variable in foliage, that young shoots of *prolifera* with undeveloped sheaths may be mistaken for *macrophylla*. De Candolle unites Roxburgh's *ovalifolia* with *prolifera*, but cites Wight's t. 809 under *macrophylla*, overlooking the fact that Wight's figure is an acknowledged copy of Roxburgh's drawing of *ovalifolia* and bears that name, as also that of "Kunda gurvatiga," which Roxburgh also gives. De Candolle's *S. ovalifolia* must therefore take the name of *S. prolifera*.

26. ***S. Wightii***, *A.DC. Monogr. Smilax*, 174; branches robust, leaves 3–4 $\frac{1}{2}$ in. coriaceous orbicular or broadly ovate or elliptic subcordate 5–7-costate from above the base, petiole very stout sheathing for about half its length, umbels solitary or 2–3 on a common peduncle many-fl'd., sepals of male $\frac{1}{5}$ in. long and petals subequal linear hardly longer than the stamens. *S. zeylanica*, *Wight, Ic.* t. 2057–8.

NILGHIRI HILLS, alt. 4–6000 ft., *Wight, &c.*

A lofty climber; branches terete, sparsely prickly. *Leaves* shining, acute or cuspidate, or young acuminate, base rounded or cordate, margins of petiolar sheath incurved. *Common peduncle* 1-1½ in., stout, bracteate at the base; bracteoles subulate; pedicels $\frac{1}{3}$ - $\frac{2}{3}$ in.; male fl. largest, filaments very slender; fem. with narrower petals; staminodes 3; ovary broadly ovoid; stigmas sessile. *Berries* $\frac{1}{2}$ in. diam.—Wight's figure is inaccurate in representing the costæ of the leaf as free to the base, and peduncles and pedicels as far too slender.—De Candolle gives Khasia hills, Kurz, as a habitat, but I have seen no specimens, and suspect some error.

27. **S. polyacantha**, Wall. Cat. 5127; branches slender closely prickly, leaves 4-6 by 1½-2 in. coriaceous elliptic-lanceolate acuminate at both ends 3-5-costate from above the base, petiole stout narrowly sheathing below the middle, umbels solitary or 2 on a very short common peduncle many-fld., fem. sepals $\frac{1}{2}$ in. long. Kunth Enum. v. 239; A.DC. Monogr. Smilax, 176.

PENANG, Porter.

Branches terete, as thick as a crow-quill, prickles short, straight. *Leaves* narrowed into the petiole, which is $\frac{2}{3}$ -1 in., strongly 3-costate with slender submarginal nerves; cirrhi slender. *Common peduncle* very stout, partial (fruiting) $\frac{1}{2}$ -1 in., stout; receptacle ovoid; bracteoles minute, ovate; fem. fl. very small. *Ovary* with short recurved styles.

28. **S. Roxburghiana**, Wall. Cat. 5115; branches terete, branchlets 4-angled, leaves 5-8 in. polymorphous oblong ovate or ovate-lanceolate base rounded cordate or cuneate 3-5-costate from above the base, petiole with very large broad 2-auricled sheaths below the middle, umbels solitary or 2-3 on a common peduncle many-fld., sepals $\frac{1}{2}$ in. long, linear-oblong, stamens as long as the sepals. *S. ocreata* and *orthoptera*, A.DC. Monogr. Smilax, 193; *S. macrophylla*, var. *cacharensis*, A.DC. l. c. 194. *S. prolifera*, Wall. Cat. 5124 B, D, in part. *S. laurifolia*, Roxb. in Wall. l. c.

TROPICAL HIMALAYA from Garwhal Eastwards, SILHET, CACHAR, the KHASIA HILLS and BEHAR (on Parus-nath).

Stems more or less prickly; branches smooth. *Leaves* on young shoots 6 by 1½-2 in., thin, lanceolate base acute, petiole $\frac{1}{2}$ -1 in.; in older 8 by 3½ in., ovate or ovate-lanceolate, obtusely acuminate, on still older 5-7 by 2½-4 in. oblong or broadly ovate coriaceous 5-costate, base rounded cordate or truncate; costæ in all united above the base; auricles in old leaves 1-1½ in. produced behind into rounded lobes embracing the branch. *Umbels* 1-3; peduncles very variable in length and position, common peduncle 1-3 in., bracteate at the base; receptacle globose; fem. umbels 12-15-fld., pedicels $\frac{1}{2}$ in., slender; staminodes 3; stigmas long, recurved. *Berries* $\frac{1}{2}$ in. diam., pedicels as long or longer. *Seeds* 2, hemispheric or solitary and globose, less than $\frac{1}{4}$ in. diam.

29. **S. megacarpa**, A.DC. Monogr. Smilax, 186; branches terete smooth unarmed, leaves 3-7 in. elliptic ovate or oblong 3-costate from above the base, petiole $\frac{3}{4}$ -1½ in., sheath short narrow, umbels many-fld., pedicels $\frac{1}{2}$ in. slender, sepals $\frac{1}{3}$ in. long ligulate, petals very narrow, filaments very long slender, berry the size of a cherry 3-seeded, seeds lenticular.

The KHASIA HILLS, Griffith. MALACCA, Maingay. PERAK; Larut, Kunthler.—DISTRIB. Tonkin.

There are two forms (or species) included here, differing greatly in foliage, a Khasian and Malayan, but agreeing in their remarkable fruit and seeds. Both have fruiting branches rather thicker than a crow-quill, very rigid, unarmed. In the Khasian the leaves are elliptic or ovate 3-4 by 1- nearly 2 in., obtusely acuminate

margined, contracted at the base near to which the slender costæ unite, they are thin shining with finely reticulate nervules; the petiole is $\frac{3}{4}$ in. long, sheathing about $\frac{1}{2}$ way up, and articulate at the tip. In the Maingay specimen the leaves are detached, 6 by 3 in., broadly oblong rounded at the tip, very coriaceous; the costæ are much stouter, they match well the older leaves of Griffith's specimen. In both the umbels are numerous along the rigid branches. *Umbels* 1-3 on a stout common peduncle as long as the petiole or longer; peduncles $\frac{1}{4}$ -1 in. stiff; pedicels 3-5, also stiff. *Berries* nearly 1 in. diam.; seeds 3, orbicular, $\frac{1}{4}$ in. diam., biconvex. —Were it not that Griffith's specimen is labelled Khasia by his own hand, I should have suspected some error in the habitat. In the Perak specimens the male fl. branches are elongate, leafy upwards, and the upper umbels axillary, the lower arise from leafless scales; peduncles $\frac{1}{2}$ -1 in., pedicels $\frac{1}{4}$ in.; bracteoles minute.

γ Umbels more than three alternate or whorled over the rachis of a common peduncle.

30. **S. prolifera**, Roxb. *Fl. Ind.* iii. 795; branches stout terete prickly, leaves 4-8 by $1\frac{1}{2}$ -6 in. from ovate acuminate to orbicular-ovate or oblong cuspidate 3-7-costate from above the rounded or subcordate base, petiole 1-2 in. sheathing portion usually forming two large basal amplexicaul erect or reflexed auricles, racemes elongate, umbels 10-20 3-nate or whorled many-fl'd. *Wall. Cat.* 5124, A, B, D (in part) E, G, H; *Kunth Enum.* v. 247 (*excl. syn. ovalifolia*). *S. laurifolia*, Roxb. *l. c.* 793. *S. laurina*, Kunth *l. c.* 248. *S. ovalifolia*, A.DC. *Monogr. Smilax*, 199 (*not of Roxb.*). ? *S. macrophylla*, Dalz. & Gibs. *Bomb. Fl.* 246. *S. macrophylla*, var. *polycepala*, A.DC. *l. c.* 194. *S. umbellata*, *Herb. Heyne*.

TROPICAL WESTERN HIMALAYA; Kumaon, *Strachey & Winterbottom (Smilax Nos. 6, 7)*. NEPAL, *Wallich*. SILHET, BENGAL, BEHAR, BURMA, the DECCAN PENINSULA and CEYLON.

Stem stout, more or less strongly armed, climbing. *Leaves* extremely variable in form and size; costæ 3-7, the three inner united above the base; sheath of petiole very variable, sometimes exactly as in *S. Roxburghiana*, at others very narrow. *Umbels* 30-40-fl'd.; peduncles $\frac{3}{4}$ -1 $\frac{1}{2}$ in., pedicels $\frac{1}{2}$ in.; bracteoles minute; flowers very small; sepals $\frac{1}{2}$ in., oblong-lanceolate; petals as long, very narrow, both often breaking off above the base in the fem. fl.; stamens as long as the sepals; filaments slender; staminodes of fem. fl. 3; ovary oblong; stigmas large, long, erect, very deciduous. *Berries* red, the size of a pea. *Seeds* small, biconvex.—De Candolle certainly eris in referring this to *S. ovalifolia*, Roxburgh's drawings and descriptions are very precise. The *ovalifolia* var. *nervulosa*, A.DC. *l. c.* 200 from Ceylon (*Walker*, a solitary male specimen) is possibly a different species; the leaves are $3\frac{1}{2}$ by $1\frac{1}{2}$ -2 in., elliptic, oblong, apiculate, with 3 costæ meeting at the base, the petiolar sheaths form tumid auricles nearly $\frac{1}{2}$ in. long and at basal the racemes are shorter, the flowers rather larger, and pedicels shorter than in true *prolifera*. Var. *parvigloba*, A.DC. *l. c.* 200 (a solitary male specimen) resembles *nervulosa* in foliage, but has smaller petiolar sheaths, small panicles of minute flowers with sepals and narrow petals $\frac{1}{10}$ in. long; it is, I think, a very different species; its habitat is doubtful, being in a miscellaneous collection of Griffith's, supposed to be from E. Bengal (numbered 545, *Kew Distrib.*), but bearing also a ticket inscribed "Smilax stipulacea," which much resembles a Calcutta Bot. Gard. one. Of var. *polystemon* A.DC. from Burma *Kurz.* (n. 2636) with 8-9 stamens I know nothing; *S. ferox* is the only polystemonous Indian species that I have examined.

31. **S. leucophylla**, *Blume Enum.* 18 A, C; branches terete, leaves 6-8 by 2-4 $\frac{1}{4}$ in. ovate or oblong 3-5-costate from above the cuneate rounded or subcordate base coriaceous glaucous beneath, petiole 1-1 $\frac{1}{2}$ in. with two

large obtuse incurved auricles, male umbels very-many-fl., pedicels hardly longer than the sepals. *A.DC. Monogr. Smilax*, 200.

PENANG; *Griffith, Curtis*; PERAK, *King's Collector*.—DISTRIB. Malaya, Cochin-China.

Branches stout, quite smooth, more or less prickly. *Leaves* retuse acute or acuminate, nervules obscure. *Inflorescence* irregularly branched; peduncles of umbels $\frac{1}{2}$ –3 in., bracteoles obscure; buds $\frac{1}{4}$ in. long, clavate; pedicels slender, about as long; sepals linear; filaments slender, anthers linear.

32. **S. Blumei**, *A.DC. Monogr. Smilax*, 202; branches stout terete, leaves 8–24 in. orbicular-ovate acute or obtuse tomentose beneath stoutly 5–7-costate from above the base, petiole 2 in. very stout, sheathing base 1 in. with inflexed sides and acute tips, fruiting umbels on a short stout common peduncle, receptacle large globose deeply pitted, pedicels 1–1 $\frac{1}{4}$ in. *S. perfoliata*, *Blume Enum.* 18 (not of *Lour.*).

MALACCA, *Maingay*, at Ulu Bubong, *King's Collector*.—DISTRIB. Java.

Branches prickly. *Leaves* coriaceous, costæ and transverse nervules deeply sunk above, highly raised beneath. *Umbels* on a common peduncle 1–3 inches long and as thick as a crow-quill. "Ovules solitary, berries trigonous at the apex (*Maingay* mss.)."—Resembles *S. leucophylla*, but the leaves are tomentose and not glaucous beneath.

33. **S. Griffithii**, *A.DC. Monogr. Smilax*, 198; branches obtusely angled smooth, leaves 7–10 by 2 $\frac{1}{2}$ –4 $\frac{1}{4}$ in. ovate acuminate 5–7-costate from the cuneate base coriaceous, petiole 1 in. articulate in the middle, base sheathing with two rounded auricles, male panicles 7-umbelled buds clavate.

UPPER ASSAM, or UPPER BURMA, *Griffith*.

Branch (young) with a very few minute prickles. *Leaves* red brown when dry. *Panicle* 4 in. long. *Umbels* 2–4-nate; peduncles $\frac{1}{2}$ in.; pedicels $\frac{1}{4}$ in.; sepals $\frac{1}{2}$ in., narrowly obovate-oblong; petals narrowly linear; stamens shorter than the sepals. —This noble species was collected by Griffith in his journey from Assam to Burma; it is in male fl. only, and the ticket bears no precise habitat beyond that it was gathered on the 15th of some month, at an elevation of 5000 ft. probably either on the Patkoy hills, where he was on March 15th, 1837, on Laim-Planj, or in the Mishmi hills, where he was in Nov. 15th, 1836. The sepals are described as herbaceous and coloured with brown.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

S. COLLINA, *Kunth Enum.* v. 261, founded on *S. pseudo-China*, Roxb. Fl. Ind. iii. 792 from the Garrow hills, is unrecognizable. It may be *S. zeylanica*.

S. DECIPIENS, *Spreng. Pugill.* ii. 91. Undeterminable.

S. OBLIQUA, *Spreng. Pugill.* ii. 91. De Candolle (*Monogr.* 207) doubts this being a *Smilax*, the stem is described as pubescent, the leaves oblong oblique acutely 5-nerved and the spikes elongate compound.—E. Indies.

S. SINGAPORENSIS, *A.DC. Monogr. Smilax*, 177; *S. calophylla*, *Wall. Cat.* 5131 in *Herb. Richard.* De Candolle describes this as differing from *S. Helferi* in its few prickles, short sheaths of the petiole, the obtuse base of the more cuspidate leaves, basal scale of the raceme, larger female flowers and longer less papillose stigmas. He further remarks that three species have been distributed under Wallich's *S. calophylla*. No doubt this is so, but the confusion of certain species in the type collection of Wallich is so great that except the duplicate specimens (which are in most cases mere fragments) were brought together, it is impossible to arrive at any satisfactory identification of them.

S. WALLICHII, *Kunth Enum.* v. 246; *A.DC. Monogr. Smilax*, 178. *S. prolifera*,

Wall. Cat. 5124 B, D, in part. The specimens are quite insufficient for determination. They may belong to *S. zeylanica* or *Roxburghiana*.

S. VILLANDIA, *Ham. in Wall. Cat.* 5123; *Royle Ill.* 384, t. 94.—*Rheede Hort. Mal.* vi. t. 31. Detached leaves alone exist in Wallich's and Hamilton's Herbaria (from the Nepal Morung), and may belong to any one of several species. Royle's plant is only known from the figure the inflorescence of which represents nothing known to me. Rheede's plant is undeterminable.

2. **HETEROSMILAX**, *Kunth.*

Characters of *Smilar*, but perianth tubular, mouth contracted, 2-5-toothed, and stamens 3 with more or less connate filaments.—Species 5, Indian, Malayan, Chinese and Japanese.

H. indica, *A. DC. Monogr. Smilar*, 43; leaves ovate or oblong-lanceolate acuminate, filaments connate to about the middle, anthers obtuse.

ASSAM and the KHASIA HILLS, alt. 1-4000 ft.

Stem very slender. *Leaves* 4-8 by 2-3½ in., 5-nerved, rather thin, base rounded; petiole ½-1 in., subterete, sheathing base very short, cirrhose. *Peduncles* solitary, axillary, 1½-2½ in., flattened; umbels many-fl.; bracteoles minute, ovate, acuminate; pedicels ½-1½ in.; flowers very many, obovoid, male ¼ in. long. *Fruit* ½-¾ in. diam., globose. *Seeds* 2, hemispheric.—Very near *H. japonica*, Maxim., but differing by the filaments being united only half way up, and the anthers obtuse.

3. **ASPARAGUS**, *Linn.*

Rootstock stout, creeping. *Stem* erect straggling or climbing, terete grooved or angled. *Leaves* minute scales, often spinescent, bearing in their axils tufts of needle-like or flattened branchlets (cladodes). *Flowers* small or minute, axillary, rarely uni-sexual, solitary fascicled or racemed, pendulous; pedicel jointed. *Perianth* campanulate, 6-partite. *Stamen* on the bases of the segments; anthers oblong. *Ovary* 3-gonous; style 1, stigmas 3; cells 2- or more-ovuled. *Berry* globose. *Seeds* 2-6; testa, black, brittle; embryo dorsal.—Species about 100, Europe and Temp. and Trop. Asia and Africa.

* Flowers axillary, solitary clustered or umbelled, not racemed.

† *Leaves* not or rarely spinescent. *Cladodes* short straight or falcate.

1. **A. filicinus**, *Ham. in Don Prodr.* 49; tall, erect, cladodes 2-5-nate falcate flat acuminate costate, pedicels solitary or 2-nate, flowers polygamous. *Kunth Enum.* v. 73; *Baker in Journ. Linn. Soc.* xiv. 605.

TEMPERATE and TROPICAL HIMALAYA, from Kashmir 4-7000 ft. eastwards, alt. 6-9000 ft., to Bhotan (except Sikkim). The KHASIA HILLS alt. 5-6000 ft. ASSAM and BURMA.—DISTRIB. China.

Stems flexuous, fistular, much branched, smooth, unarmed, lower branches spreading; upper internodes short. *Cladodes* ⅓-½ in. *Pedicels* 0 or ¼-½ in., jointed about the middle. *Perianth* ⅓-⅓ in., subcampanulate. *Stamens* short; anthers minute. *Berry* ¼-½ in. diam.—The following are marked forms.

A. FILICINUS proper; cladodes ¼-½ in., pedicels very slender ½-¾ in.—Central and Western Himalaya.

Var. **BREVIFIPES**, *Baker l. c.*; cladodes ¼-½ by ⅓ in., pedicels very short.—Assam and Khasia hills.

Var. **BREVIFOLIA**, Baker l. c.; internodes very short, cladodes $\frac{1}{2}$ – $\frac{1}{6}$ in.—Khasia hills, at Syong, *J. D. H. & T. T.*

Var. **LYCOPODINEA**, Baker l. c.; cladodes solitary or 3-nate $\frac{1}{4}$ – $\frac{1}{3}$ in., $\frac{1}{10}$ – $\frac{1}{3}$ in. broad. A lycopodineus, *Wall. mss.* A. Curillus, *Wall. Cat.* 5155 E. (not of Roxb.)—Mishmí, *Griffith.* Burma, *Wallich, Parish.*—In Chinese specimens the pedicels are nearly 1 in.

Var. **MICROCLADA**; cladodes very small $\frac{1}{8}$ – $\frac{1}{16}$ in. subulate tapering to the acicular points.—Assam, *Masters*; Manipore, *Watt*; Shan hills, *Collett.*

2. **A. gracilis**, *Royle Ill.* i. 393; tall, much branched, lower leaves subspinescent, cladodes 3–6-nate or lower 8-nate acicular or setaceous strict, pedicels axillary or subterminal 2–4-nate, perianth segments spreading. *Baker in Journ. Linn. Soc.* xiv. 607.

The PUNJAB; at Rotas, *Vicary*; Rawul Pindi, *Aitchison.*—DISTRIB. Beluchistan.

A slender undershrub, branches divaricate, lower rigid striate deflexed. *Cladodes* $\frac{1}{2}$ – $\frac{3}{4}$ in., terete, erect, ascending, cuspidate. *Pedicels* in subcapitate clusters $\frac{1}{12}$ – $\frac{1}{10}$ in., jointed below the middle. *Perianth* $\frac{1}{6}$ in. *Stamens* half its length; anther very minute.

3. **A. capitatus**, *Baker in Journ. Linn. Soc.* xiv. 607; slender, much branched, subsacandent; branches smooth, leaves subspinescent, cladodes solitary or 2–3-nate acicular or setaceous firm, flowers terminating short branchlets, pedicels very short, perianth segments spreading.

Foot of the WESTERN HIMALAYA, alt. 1–3000 ft.; Black Mt., *Duthie.* NILGHIRI HILLS; *Wight.*

A tall undershrub, branches slender, terete, smooth, lower divaricate or deflexed, upper internodes very short. *Cladodes* $\frac{1}{4}$ – $\frac{3}{4}$ in., cuspidate. *Pedicels* $\frac{1}{12}$ – $\frac{1}{6}$ in., jointed about or below the middle. *Perianth* $\frac{1}{12}$ in. long. *Anthers* very minute, oblong.—A variety? from Lahore (Thomson) has softer capillary cladodes $\frac{1}{2}$ – $\frac{2}{3}$ in. long. "Possibly a form of *A. gracilis*" (Baker).

4. **A. dumosus**, *Baker in Journ. Linn. Soc.* xiv. 609; stem woody below strongly grooved, branches stout rigid, young leaves spinescent, cladodes $\frac{1}{2}$ – $\frac{1}{2}$ in. 3–8-nate linear stout mucronate channelled, flowers axillary and terminal 1–4-nate, perianth-segments oblanceolate.

SCINDE; at Kurrachee, *Stocks, Dalzell.*

An excessively branched undershrub, 2 ft. high; branches pale, flexuous, divaricate or reflexed, ridges scaberulous; upper internodes $\frac{1}{2}$ in. *Leaves* deltoidly cuspidate. *Pedicels* $\frac{1}{10}$ in., jointed below the middle. *Perianth* funnel-shaped. *Anthers* very minute, subglobose. *Berry* $\frac{1}{6}$ in diam.

5. **A. Rottleri**, *Baker in Journ. Linn. Soc.* xiv. 611; tall, branches scaberulous furrowed, leaves not spinescent, cladodes 3–6-nate $\frac{3}{4}$ – $1\frac{3}{4}$ in. slender ascending curved channelled, pedicels densely umbelled. A floribundus, *Herb. Rottler.*

DECCAN PENINSULA; *Rottler.*

Tall, shrubby branches, terete, branchlets decurved; upper internodes $\frac{1}{2}$ – $\frac{1}{2}$ in. *Cladodes* variable in length. *Pedicels* $\frac{1}{6}$ in., jointed below the middle. *Perianth* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., spreading; anthers much shorter than the filaments.—The specimens of this very distinct species are fragmentary.

†† *Leaves strongly spinescent.*

6. **A. subulatus**, *Steudel in Hohen. Pl. Nilgiri exsicc.*, No. 1303; erect or subsacandent, branches grooved smooth, spines long straight, cladodes 6–12-nate $\frac{1}{6}$ – $\frac{1}{3}$ in. acicular triquetrous acuminate, pedicels solitary

or 2-nate very short, perianth segments reflexed. *Baker in Journ. Linn. Soc.* xiv. 614. *A. asiaticus*, *Wight, Ic. t.* 2053 (not of *Linn.*). *A. Curillus*, *Wall. Cat.* 5155, B.

NILGHIRI HILLS, *Wight, Schmidt*.

A small erect or tall and variable bush, densely branched; branches flexuous; upper internodes very short. *Spines* $\frac{1}{2}$ – $\frac{3}{4}$ in. *Cladodes* ascending, spreading and curved, rather stout, variable in breadth. *Pedicels* jointed above the middle. *Perianth* segments oblong-lanceolate; anthers oblong. *Berries* $\frac{1}{3}$ in. diam.

7. ***A. Jacquemontii***, *Baker in Journ. Linn. Soc.* xiv. 615; stem terete smooth, branches angled ribbed and grooved, leaves spinescent, cladodes 2–5-nate $\frac{1}{2}$ in. slender 3-gonous curved acuminate, flowers solitary or in axillary pairs on a short peduncle, pedicels very short jointed under the minute perianth.

The CONCAN; between Poona and Carli, *Jacquemont*.

Tall, much branched, branches spreading and decurved; spines $\frac{1}{2}$ – $1\frac{1}{2}$ in. conical. *Cladodes* much longer than the internodes. *Flowers* $\frac{1}{2}$ in. diam., pedicels many times shorter than the cladodes.

8. ***A. asiaticus***, *Linn. Sp. Pl.* 409; stem scandent terete smooth, branches grooved, cladodes 6– ∞ -nate $\frac{1}{6}$ – $\frac{1}{4}$ in. very slender acicular terete acuminate, flowers axillary solitary or umbelled, pedicels almost equalling the cladodes, jointed in the middle.

DECCAN PENINSULA; *Herb. Rottler*; *Bellary Beddome*.—DISTRIB. Afr. trop.

Stem slender, branches deflexed. *Flowers* $\frac{1}{10}$ in. diam.

** Flowers racemed.

† *Cladodes* subulate, terete or triquetrous, somewhat flattened in *A. Curillus*.

9. ***A. nepalensis***, *Baker in Journ. Linn. Soc.* xiv. 622; subscandent, stem robust smooth, branches angled not grooved, spines stout recurved, cladodes 3–6-nate $\frac{1}{2}$ in. acicular spreading or ascending triquetrous acute, racemes short 1–3-nate sometimes branched below, perianth campanulate. *A. Curillus*, *Wall. Cat.* 5155, C.

NEPAL, *Wallich*.

An excessively branched undershrub. *Spines* $\frac{1}{4}$ – $\frac{1}{2}$ in., conical. *Cladodes* nearly straight. *Racemes* $\frac{1}{2}$ in.; bracts minute, lanceolate; pedicels jointed above the middle. *Perianth* $\frac{1}{8}$ in. diam.; anthers very minute, oblong, purple. *Fruit* $\frac{1}{3}$ in. diam.

10. ***A. racemosus***, *Willd. Sp. Pl.* ii. 152; stem scandent woody terete, branches triquetrous striate, lower spines long, cladodes 2–6-nate $\frac{3}{4}$ –1 in. slender finely acuminate falcate divaricate, racemes solitary or fascicled simple or branched, pedicels very slender, bracts minute, perianth-segments spreading. *Baker in Journ. Linn. Soc.* xiv. 623; *Roxb. Fl. Ind.* ii. 151; *Wall. Cat.* 5153; *Wight Ic. t.* 2056; *Thwaites Enum.* 337. *A. volubilis*, *Ham. in Wall. Cat.* 5754 (excl. D, K). *A. acerosus*, *Wall. Cat.* 5152 A, B, F (not of *Roxb.*). *A. sarmentosus*, *Heyne in Wall. Cat.* 5154, 2 (not of *Linn.*) *A. fasciculatus*, *Br. Prodr. (in part)*. *A. dubius*, *Decne in Nov. Ann. Mus.* iii. 363. *Asparagopsis Hohenackeri*, *abyssinica* and *Brownii (in part)*, *Kunth Enum.* v. 100, 101. *A. Decaisnei* and *floribunda*, *Kunth l. c.* 98, 103; *Miquel Fl. Ind. Bat.* iii. 560, 562.

Throughout TROPICAL AND SUBTROPICAL INDIA and CEYLON ascending the

Himalaya to 4000 ft. from Kashmir eastwards.—DISTRIB. Tropical Africa, Java and Australia.

A tall climbing excessively branched undershrub; roots tuberous. *Spines* $\frac{1}{4}$ – $\frac{1}{2}$ in., straight or subrecurved. *Cladodes* 1 in., channelled beneath. *Racemes* 1–2 in.; pedicels $\frac{1}{8}$ in., jointed in the middle. *Perianth* $\frac{1}{2}$ – $\frac{3}{8}$ in. diam.; anthers minute, oblong, purplish. *Ovules* 6–8 in each cell. *Berry* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam.—Thwaites observes that the leaves are wide on specimens growing on the hills. Baker has the following varieties :—

Var. *javanica*, Baker l. c. 624; cladodes $\frac{1}{2}$ –1 in., very slender erect flexuous, racemes narrow with terminal tufts of cladodes, perianth segments narrower. *Asparagopsis javanica*, Miquel *Fl. Ind. Bat.* iii. 562. *A. sarmentosa*, Dalz. & Gibs. *Bomb. Fl.* 246 (not of Kunth).—Deccan Peninsula, Java.

Var. *subacerosa*, Baker l. c.; cladodes strict $\frac{1}{2}$ – $\frac{3}{4}$ in. stout, racemes small few-fl., rachis and pedicels capillary.—Sikkim, alt. 1–4000 ft., J. D. H.—A form approaching *A. acerosus*.

11. **A. zeylanicus**, Hook. f.; stem stout smooth obscurely angled, branches acutely angled, cladodes 3–5-nate $\frac{1}{2}$ in. stout falcate triquetrous narrowed to both ends tips subspinescent, racemes 3–5 in. very stout, bracts lanceolate, flowers large, anthers large. *A. acerosus*, var. *zeylanicus*, Baker in *Journ. Linn. Soc.* xiv. 623.

CEYLON, alt. 6000 ft., Walker; at Newera Elia, Gardner, Thwaites (Cp. 2299).

The stout triquetrous cladodes thickened in the middle, stout racemes, large flowers $\frac{1}{2}$ in. diam., and large anthers seem to distinguish this from *A. racemosus*.

12. **A. lævissimus**, Steud. in *Hohen. Pl. exsicc. Nilgh.* Nos. 1304, 1305; stem subsucculent terete smooth, branches very slender triquetrous, spines short strong, cladodes 3–6-nate $\frac{1}{2}$ in. spreading stout triquetrous acuminate, racemes dense-fl., pedicels very short, bracts large cymbiform, perianth-segments widely spreading, anthers minute. Baker in *Journ. Linn. Soc.* xiv. 623. *A. volubilis*, Wall. *Cat.* 5154 K.

WESTERN GHATS, from the Concan southwards.

Differs from *A. racemosus*, of which Baker says it is little more than a variety, chiefly in the longer cladodes, and large bracts, which sometimes exceed the pedicels.

13. **A. acerosus**, Roxb. *Fl. Ind.* ii. 150; stem tall subsucculent smooth, branchlets very slender stiff ascending angled, spines short recurved, cladodes 3–6-nate 1–2 $\frac{1}{2}$ in. suberect strict triquetrous acuminate, racemes short solitary or 2-nate, bracts lanceolate concave, perianth-segments widely spreading. Baker in *Journ. Linn. Soc.* xiv. 624; Wall. *Cat.* 5152 C, D, E. *A. fasciculatus*, Br. *Prodr.* 281 (in part). *Asparagopsis acerosa* and *Brownii* (in part), Kunth *Enum.* v. 102, 103.

BENGAL, Roxburgh, Clarke, &c. CHITTAGONG (cult.), J. D. H. & T. T. PEQU, McLelland. BURMA, Wallich, &c.—DISTRIB. N. Australia.

An excessively branched under-shrub; roots tuberous, branchlets grooved. *Spines* $\frac{1}{2}$ – $\frac{3}{4}$ in., slightly curved. *Cladodes* shining, persistent. *Racemes* 1–1 $\frac{1}{2}$ in.; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., jointed in the middle. *Flowers* pure white, fragrant; anthers minute, subglobose. *Ovules* many in each cell. *Berry* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., 1-seeded.

14. **A. adscendens**, Roxb. *Fl. Ind.* ii. 153; stem tall stout suberect terete smooth white, branchlets grooved ascending angled, angles minutely scabrid, spines long, cladodes 6–20-nate $\frac{1}{2}$ – $\frac{3}{4}$ in. slender filiform terete suberect or curved, racemes many-fl., bracts minute, perianth-segments

spreading, anthers medium-sized. *A. volubilis*, *Wall. Cat.* 5154 D (*in part*). *Asparagopsis adscendens*, *Kunth Enum.* v. 102.

ROHILKUND, the WESTERN HIMALAYA, and the PANJAB, from Murree eastwards to Kumaon; ascending to 5300 ft.—DISTRIB. Afghanistan.

Stem excessively branched, flexuous, and primary branches ashy white; internodes very short. *Spines* $\frac{1}{2}$ – $\frac{3}{4}$ in., stout, straight. *Cladodes* densely crowded, soft. *Racemes* copious, 1–2 in., often branched at the top and bearing cladodes; pedicels $\frac{1}{12}$ – $\frac{1}{4}$ in., jointed above or below the middle; flowers $\frac{1}{6}$ in. diam. *Ovules* many in each cell. *Berry* $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., 1-seeded.

15. *A. Curillus*, *Ham. in Roxb. Fl. Ind.* ii. 152; stem tall smooth subscandent and branches angled, spines long straight, cladodes very small 3–6-nate $\frac{1}{6}$ – $\frac{1}{4}$ in. spreading or ascending linear flattened or subtriquetrous acute, racemes corymbiform, bracts minute, perianth-segments spreading. *Baker in Journ. Linn. Soc.* xiv. 627; *Wall. Cat.* 5155 D. *A. volubilis*, *Wall. Cat.* 5154 D (*in part*). *Asparagopsis Curilla*, *Kunth Enum.* v. 102.

SUBTROPICAL HIMALAYA, alt. 2–4000 ft., from Kumaon to Nepal, *Hamilton*, &c.

An excessively branched undershrub; branches spreading, angles obscurely scaberulous. *Spines* $\frac{1}{4}$ – $\frac{1}{2}$ in., pungent curved. *Cladodes* obtusely 3-gonous, *Racemes* $\frac{1}{2}$ – $1\frac{1}{2}$ in., few-fl.; pedicels $\frac{1}{6}$ in., jointed below the middle; bracts lanceolate; flowers $\frac{1}{2}$ in. diam. *Berry* 3-lobed (*Roxb.*).

†† *Cladodes linear, flattened.*

16. *A. falcatus*, *Linn. Sp. Pl.* 313; stem subscandent and branches terete smooth, spines short, cladodes solitary and 3–6-nate 4–6 in. long linear-ensiform falcate flat acuminate costate, racemes very short laxly few-fl., bracts cymbiform, perianth-segments reflexed. *Baker in Journ. Linn. Soc.* xiv. 626; *Kunth Enum.* v. 71; *Bresl. Diss. Asparag.* No. 2; *Burm. Fl. Zeyl.* 36, t. 13, f. 2 (bad); *Thwaites Enum.* 337. *A. æthiopicus*, var. *ternifolia*, *Baker in Saunders Refug. Bot.* t. 261, and in *Gard. Chron.* 1872, 1587, with woodcut. ? *A. sarmentosus*, *Thwaites Enum.* 337 (not of *Linn.*).

CEYLON; common in the warmer parts.—DISTRIB. Trop. and S. Africa.

Stem tall; branchlets very slender, flexuous. *Spines* $\frac{1}{6}$ – $\frac{1}{4}$ in. *Cladodes* $\frac{1}{12}$ – $\frac{1}{6}$ in. broad, narrowed at the spinescent tip. *Racemes* $\frac{1}{2}$ – $\frac{3}{4}$ in.; pedicels $\frac{1}{6}$ – $\frac{1}{4}$ in., jointed below the middle. *Flowers* $\frac{1}{8}$ in. diam., white, sweet scented. *Antthers* minute, subglobose. *Berry* $\frac{1}{4}$ in. diam., 1-seeded.

17. *A. gonoclados*, *Baker in Journ. Linn. Soc.* xiv. 627; stem subscandent terete smooth, branches green curved angled 3-quetrous, spines short, cladodes 2–6-nate $\frac{2}{3}$ –1 in. ensiform flat falcate subcostate, racemes elongate lax-fl., bracts short cymbiform, perianth-segments spreading. *A. Curillus*, *Wall. Cat.* 5155 A.

THE DECCAN PENINSULA; from the Concan southwards. CEYLON, *Thwaites* (Cp. 737).

An excessively branched undershrub; branchlets curved, green, strongly angled. *Spines* $\frac{1}{4}$ – $\frac{1}{2}$ in. *Cladodes* $\frac{1}{8}$ in. diam., narrowed to the acuminate tip, green. *Racemes* 1–3 in., often fascicled, sometimes connate; pedicels $\frac{1}{20}$ – $\frac{1}{12}$ in., jointed below the middle; flowers $\frac{1}{12}$ in. diam.; anthers small.

IMPERFECTLY KNOWN SPECIES.

A. RUBRICAULIS, *Baker in Journ. Linn. Soc.* xiv. 616; subscandent, branches flexuous smooth purplish, spines conical, cladodes densely fascicled setaceous terete

much longer than the internodes, pedicels solitary, anthers oblong. *Asparagopsis rubricaulis*, *Kunth Enum. v. 87.*—Ind. Or., *Heyne*.

A. SARMENTOSUS, *Linn. Sp. Pl. 314.* Ceylon.—Trimen in *Journ. Linn. Soc. xxiv.* 138, doubtfully refers this to *A. gonocladus*.

4. **POLYGONATUM**, *Tourn.*

Rootstock creeping. *Stem* leafy above. *Leaves* alternate opposite or whorled. *Flowers* in axillary 1- or more-fld. curved peduncles, drooping, white green or purplish; pedicels jointed at the top; perianth tubular, mouth 6-cleft, outer lobes subvalvate. *Anthers* sessile on or above the middle of the tube, included, dorsifixed. *Ovary* 3-gonous, style straight, stigmas 3; cells 2- or more-ovuled. *Berry* globose or ellipsoid, few- or many-seeded. *Seeds* subglobose, testa thin.—Species about 24, N. temp. regions.

The species are difficult of limitation, the leaves varying opposite alternate and even whorled in the same species, the flowers in number, size and colour, and the seeds in size.—*P. officinale* was by error given by Baker (*Journ. Linn. Soc. xiv.* 554) as Himalayan.

* *Leaves usually all alternate.*

1. **P. multiflorum**, *Allioni Fl. Pedem. i.* 131; stem terete, leaves subbifarious or secund oblong sessile, peduncles 1-5-fld., perianth constricted in the middle, filaments puberulous, berry globose. *Baker in Journ. Linn. Soc. xiv.* 555; *Desf. in Ann. Mus. ix.* 50; *Redouté Lil. t.* 229. *P. Govanianum. Royle Ill.* 380. *Convallaria multiflora, Linn. Sp. Pl.* 315. *Reichb. Ic. Fl. Germ. t.* 961, 962. *C. Govaniana, Wall. Cat.* 5137.

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 6-9000 ft. —DISTRIB. Europe, N. Asia, Japan.

Stem 2-3 ft., arched. *Leaves* many, 3-6 in., narrowed at the base, glaucous beneath, subacute. *Peduncles* $\frac{1}{2}$ - $\frac{2}{3}$ in., rarely 1-fld. *Perianth* $\frac{1}{2}$ - $\frac{3}{4}$ in., white with green lobes; nerves within hairy. *Stamens* inserted above the middle of the tube. *Berry* $\frac{1}{2}$ in. diam., blue-black. *Seeds* few.

2. **P. brevistylum**, *Baker in Journ. Linn. Soc. xiv.* 556; stem grooved, leaves shortly petioled oblong acute subcoriaceous, peduncles 2-4-fld., perianth cylindric, berry ellipsoid, style very short.

SIKKIM HIMALAYA, alt. 7-8000 ft., *J. D. H., Clarke.*

Stem 12-18 in., green spotted with purple. *Leaves* many, 2-4 in., strongly nerved, glaucous beneath, cross nervules obscure. *Peduncles* and *pedicels* stout, $\frac{1}{4}$ - $\frac{1}{2}$ in. *Perianth* $\frac{3}{4}$ in., yellow, lobes green. *Berry* broadly ellipsoid, $\frac{1}{4}$ in. long, many-seeded. *Seeds* $\frac{1}{16}$ in., ellipsoid or ovoid.

3. **P. nervulosum**, *Baker in Journ. Linn. Soc. xiv.* 557; stem flexuous, leaves 4-8 in. elliptic caudate-acuminate, nerves strong, peduncles long slender, berries globose 2-4-seeded.

SIKKIM and BHOTAN HIMALAYA, alt. 9-10,000 ft., *Griffith, J. D. H.*

Stem 3-5 ft., slender. Caudate tip of leaves nearly 1 in. long. *Peduncles* 1-3 in. fd. *Seeds* globose, $\frac{1}{8}$ in. diam.

** *Leaves most or all opposite.*

4. **P. graminifolium**, *Hook. Ic. Pl. t.* 833; dwarf, leaves crowded membranous linear obtuse, peduncles 2-fld., perianth cylindric, anthers inserted near the mouth of the corolla. *Baker in Journ. Linn. Soc. xiv.* 557.

WESTERN HIMALAYA; Barung, alt. 11,000 ft., *Munro*.

Rootstock fleshy, constricted at the internodes. *Stem* 6 in. *Leaves* $1\frac{1}{2}$ –2 in., 1-nerved. *Flowers* violet; peduncle and pedicels about half as long as the leaves. *Perianth* $\frac{1}{2}$ in. long; lobes oblong, about equalling the tube.—I have seen no specimen.

5. **P. Hookeri**, *Baker in Journ. Linn. Soc.* xiv. 558; dwarf, leaves opposite or the lower alternate sessile linear obtuse glaucous beneath, flowers solitary, perianth-tube cylindric, stamens inserted about the middle of the corolla.

TEMPERATE HIMALAYA, alt. 10–12,000 ft., Garwhal, *Duthie*; Sikkim, at Lachen, *J. D. H.*

Stem 1–2 in. *Leaves* crowded, $\frac{3}{4}$ – $3\frac{1}{2}$ in., nerves slender. *Flowers* suberect, violet; pedicels $\frac{1}{8}$ – $\frac{1}{6}$ in. *Perianth* $\frac{1}{2}$ –1 in. long, lobes variable in length, much shorter than the tube. *Style* short.—Probably a state of *P. verticillatum*; except from the insertion of the anthers I should be disposed to include it under *P. graminifolium*.

6. **P. geminiflorum**, *Decne in Jacquem. Voy. Bot.* 170, t. 170; stem tall puberulous above terete, leaves many opposite or ternately whorled membranous oblong or linear-oblong subacute glaucous and nerves ciliate beneath, peduncles 2-fld., perianth-tube cylindric. *Baker in Journ. Linn. Soc.* xiv. 558. *Kunth Enum.* v. 852. ? *P. ciliatum*, *Royle Ill.* 389. *P. verticillatum*, var. *gracile*, *Baker*, l.c. xviii. 103.

WESTERN HIMALAYA, alt. 7–11,000 ft., from Kashmir to Kumaon.—DISTRIB. Afghanistan.

Stem 12–18 in., flexuous. *Leaves* 2–4 in., rarely solitary, acute, base cuneate, nerves beneath puberulous. *Peduncles* and *pedicels* $\frac{1}{4}$ – $\frac{1}{2}$ in., bracteoles minute, caducous. *Perianth* $\frac{1}{2}$ in., $\frac{2}{3}$ in. long, white, lobes much shorter than the tube, green. *Anthers* inserted above the middle of the tube, filaments very short glabrous. *Style* as long as the ovary.—Probably a form of *P. verticillatum*.

7. **P. Griffithii**, *Baker in Journ. Linn. Soc.* xiv. 558; stem tall glabrous terete, leaves opposite sessile membranous linear-lanceolate acute or acuminate 3-nerved, peduncles 2-fld., perianth-tube constricted above the ovary.

EASTERN HIMALAYA; Mishmi hills, on Laim-planj-thaga, alt. 6000 ft., *Griffith*.

Stem 3 ft., slender. *Leaves* distant, 3–5 in., green above, subglaucous beneath. *Peduncles* and *pedicels* $\frac{1}{2}$ – $\frac{3}{4}$ in. *Perianth* white, $\frac{3}{4}$ in., lobes very short, deltoid, green. *Stamens* inserted at the mouth of the tube, filaments very short, naked; anthers minute. *Style* filiform, 2–3 times as long as the ovary.

8. **P. Cathcartii**, *Baker in Journ. Linn. Soc.* xiv. 559; stem tall glabrous terete, leaves all opposite subpetioled ovate-oblong or -lanceolate acuminate 3–7-nerved, peduncle 2–4-fld., perianth short broad slightly contracted in the middle.

SIKKIM HIMALAYA; woods at Lachen, alt. 8–10,000 ft., *J. D. H.*, *Clarke*. NAGA HILLS, alt. 9000 ft., *Clarke*.

Stem 2–3 ft., spotted with purple. *Leaves* 2–4 in., spreading, green above, glaucous beneath. *Peduncles* 1–3 in. *Pedicels* $\frac{1}{2}$ – $1\frac{1}{2}$ in. *Perianth* $\frac{3}{4}$ in., green or yellowish; tube constricted in the middle, lobes short, deltoid, green. *Anthers* inserted about the middle of the tube. *Style* as long as the ovary. *Berry* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. *Seeds* few or many, globose.—I have described the perianth from a drawing in the Cathcart collection.

9. **P. oppositifolium**, *Royle Ill.* i. 380; stem tall furrowed,

glabrous, leaves opposite or a few alternate shortly petioled coriaceous oblong acuminate, shining above, flowers many, peduncles usually many-fld., perianth-tube cylindric. *Baker in Journ. Linn. Soc.* xiv. 559; *Kunth Enum.* v. 141. *Convallaria oppositifolia*, *Wall. in Asiat. Research.* xiii. 380 with a figure; *Cat.* 5134; *Don Prodr.* 47; *Lodd. Bot. Cat.* t. 640; *Hook. Exot. Fl.* t. 125; *Bot. Mag.* t. 3529.

TEMPERATE CENTRAL and WESTERN HIMALAYA, from Nepal eastwards. KHASIA HILLS, alt. 4-6000 ft. MUNNIPORE, alt. 3500 ft. *Clarke.* Patkoye hills, in UPPER ASSAM, *Griffith.*

Stem 2-4 ft.; rhizome of green tubers. *Leaves* many, spreading, 3-6 in., bright green above, 7-9-nerved, pale beneath with reddish ribs. *Peduncle* many-fld. and pedicels $\frac{1}{2}$ - $\frac{3}{4}$ in. *Perianth* $\frac{1}{4}$ - $\frac{3}{4}$ in., all white, or tube with deltoid lobes greenish. *Stamens* inserted above the middle of the tube; filaments papillose; tips of anthers exerted. *Style* twice as long as the ovary. *Berry* $\frac{1}{4}$ in. diam., broadly ovoid or ellipsoid, scarlet. *Seeds* many, globose.

Var. *decipiens*, *Baker l. c.*; leaves shortly petioled lower alternate lanceolate very acuminate 3-4 in. broadest above the middle. *Wall. Cat.* 5134 B. Sikkim, alt. 7-11,000 ft. *J. D. H.* Khasia hills, alt. 4-5000 ft.—Approaches *P. Cathartii*.

10. **P. punctatum**, *Royle Ill.* 380; stem angled and grooved glabrous, leaves petioled or subsessile opposite rarely alternate coriaceous oblong-lanceolate obtuse or obtusely acuminate, rather shining above 5-7-nerved, peduncles 2-many-fld., perianth urceolate mouth contracted. *Kunth Enum.* v. 142; *Baker in Journ. Linn. Soc.* xiv. 559; *Bot. Mag.* t. 5061. *Convallaria punctata*, *Wall. Cat.* 5133. *Convallaria* sp. *Griff. Notul.* 243; *Ic. Pl. Asiat.* t. 274.

TEMPERATE HIMALAYA, alt. 5-8000 ft. from Nepal, *Wallich*, to Bhotan, *Griffith.* Munnipore, alt. 7000 ft., *Watt.*

Stem 1-2 ft. *Leaves* many, 2-3 in., broadest in the middle, base cuneate, pale beneath with many slender nerves. *Peduncle* and *pedicels* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Perianth* $\frac{1}{4}$ - $\frac{1}{2}$ in. *Flowers* white, spotted with lilac, lobes deltoid, green. *Stamens* inserted above the middle of the tube, filaments very short, glabrous. *Style* as long as the ovary. *Berry* as in *P. oppositifolium*, from which this in its typical state differs in its more robust habit more coriaceous obtuse leaves and smaller flowers.

*** *Leaves usually whorled.*

11. **P. verticillatum**, *Allioni Fl. Pedem.* i. 131; stem tall angled and grooved glabrous, leaves 4-8-nately whorled sessile linear or linear-lanceolate acuminate membranous, peduncles 2-3-fld. whorled, perianth contracted at the middle. *Kunth Enum.* v. 142; *Baker in Journ. Linn. Soc.* xiv. 560; *Deff. in Ann. Mus.* ix. 49; *Redouté Lil.* t. 244; *Maximov. Diagn.* xi. 852. *P. leptophyllum*, *Royle Ill.* 380. *P. Jacquemontianum*, *Kunth Enum.* l. c. 143. *P. roseum* *Bot. Mag.* t. 5049 (and *Kunth*?) *Convallaria verticillata*, *Linn. Sp. Pl.* 315; *Reichb. Ic. Fl. Germ.* t. 966. *C. leptophylla*, *Don Prodr.* 47.

TEMPERATE HIMALAYA, from Kashmir, alt. 6-11,000 ft to Sikkim, alt. 8-12,000 ft. Tibet (N. of Kumaon), alt. 13,500 ft., *Strachey & Winterbottom.*—DISTRIB. Europe, N. Asia, Afghanistan.

Stem 2-4 ft., very slender, or stout, sometimes as thick as the middle finger. *Leaves* 3-6 by $\frac{1}{4}$ -1 in., green above, glaucous beneath, often ciliolate on the margins and nerves. *Peduncles* and *pedicels* $\frac{1}{4}$ - $\frac{3}{4}$ in. *Perianth* very variable in size,

$\frac{1}{2}$ – $\frac{1}{2}$ in., greenish or lilac; tube slender. *Stamens* inserted above the middle of the tube, anthers subsessile. *Style* as long as the ovary. *Berry* $\frac{1}{4}$ in. diam., 6–10-seeded. *Seeds* globose.—There is a tendency in the leaves of some specimens to become circinate at the tip, thus passing into the following.

12. ***P. cirrifolium***, *Royle Ill.* 380; stem flexuous often climbing by the tips of the leaves terete puberulous or glabrous, leaves 3–6-nately whorled sessile membranous with slender circinate tips, peduncles 2–4-fld. whorled, perianth subcylindric. *Kunth Enum.* v. 145. *Maxim. Diagnos.* xi. 854. *P. sibiricum*, *Baker in Journ. Linn. Soc.* xiv. 501 in part. *Convallaria cirrifolia*, *Wall. in Asiat. Research.* xiii. 382 with a figure; *Cat.* 5136; *Don Prodr.* 47.

TEMPERATE HIMALAYA, from Simla eastward to Bhotan, alt. 5–11,000 ft. MUNNIPORE, alt. 4000 ft.—DISTRIB. Northern Asia.

Stem 2–4 ft., very weak; flexuous. *Leaves* 3–5 in., gradually narrowed into the slender revolute tips, glaucous and costate beneath. *Flowers* white green or purplish. *Stamens* inserted above the middle of the tube, filaments ciliolate. *Style* as long as the ovary. *Berry* $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., excessively variable in size and in the number of seeds; in some specimens from Simla, the seeds are $\frac{1}{2}$ in. diam. *Baker* has included this under *P. sibiricum*, probably rightly, but *Maximovicz* does not.

13. ***P. Kingianum***, *Collett & Hemsl. in Journ. Linn. Soc.* xxviii. 1381, t. 21; very robust, leaves 5-nately whorled or 2–3-nate sessile coriaceous linear-lanceolate with a thick circinate apex, peduncles 1–3-fld., perianth subcylindric.

BURMA; in the Shan hills, alt. 4000 ft., *Collett*.

A much stouter plant than *P. cirrifolium*, with thick leaves, and flowers three-fourths of an inch long; perianth lobes very short; anthers large inserted above the middle of the tube, filaments very short.—Only one specimen seen.

UNDESCRIBED SPECIES.

P. INGLESI, *Royle Ill.* 380, from Raldung.

5. **STREPTOPUS**, *Michaux.*

Rootstock creeping. *Stem* leafy. *Leaves* alternate, sessile or amplexicaul. *Flowers* axillary. *Perianth* campanulate or open, segments deciduous. *Stamens* hypogynous or 3 inner adnate to the bases of the segments; filaments broad at the base, tip acute; anthers erect, basifixed between the lobes, connective sometimes produced. *Ovary* sessile; style-arms 3 stigmatose within; cells many-ovuled. *Berry* subglobose. *Seeds* many, oblong, curved, striate; testa thin adnate; embryo cylindric.—Species 4, N. temp. regions.

S. simplex, *Don Prodr.* 48, and in *Trans. Linn. Soc.* xviii. 530; leaves amplexicaul ovate-cordate glaucous beneath, flowers solitary or 2-nate. *Baker in Journ. Linn. Soc.* xiv. 591. *S. candidus*, *Wall. Cat.* 5572. *Hekorima candida*, *Kunth Enum.* iv. 204.

TEMPERATE HIMALAYA, from Kumaon eastwards to Sikkim, alt. 8–12,000 ft.

Rootstock small. *Stem* 2–3 ft., flexuous, forked. *Leaves* 2–4 in., membranous, many-nerved. *Flowers* in most of the axils, 1 in. diam., white; pedicels 2–3 in., filiform; segments erecto-patent, oblong. *Stamens* much shorter than the perianth; anthers oblong, twice as long as the deltoid filaments. *Style* short. *Berry* $\frac{1}{4}$ in. diam., 5–6-seeded.

6. **SMILACINA**, Desf.

Rootstock short, or creeping. *Stem* simple, leafy above. *Leaves* alternate, subsessile, rarely petioled, ovate-lanceolate. *Flowers* in terminal racemes or panicles, small, shortly pedicelled. *Perianth* spreading; segments subequal, usually deciduous. *Stamens* hypogynous or adnate to the bases of the segments, filaments long or short; anthers minute, globose, dorsifixed. *Ovary* subglobose, 3-celled; style long or short, stigma entire or 3-fid; cells 2-ovuled. *Berry* globose. *Seeds* 1 or few, globose; testa thin, adnate; embryo about half the length of the seed.—Species about 20, Europe, temp. Asia and America.

* *Flowers* racemose.

1. **S. oligophylla**, Hook. f.; stem and leaves beneath and rachis of raceme puberulous, leaves 3 in., pedicels solitary, perianth-segments pale purple oblong-lanceolate. *Tovaria oligophylla*, Baker in Journ. Linn. Soc. xiv. 565.

SIKKIM HIMALAYA; woods at Lachen, alt. 10–13,000 ft. J. D. H.

Rootstock stout, creeping. *Stem* $\frac{1}{2}$ –1 ft., flexuous above, slender. *Leaves* 3–5 in., oblong, acute, or acuminate, membranous, pale and costate beneath, with many slender nerves. *Raceme* 10–20-flid., 2–3 in., shortly peduncled; pedicels $\frac{1}{6}$ – $\frac{1}{4}$ in.; bracts deltoid. *Perianth* $\frac{1}{2}$ in. long. *Style* very short.

2. **S. pallida**, Royle Ill. i. 380; stem stout, leaves beneath and rachis of raceme densely pubescent leaves, 4–6 in., pedicels solitary or 2-nate, perianth segments white oblong. *S. purpurea*, Wall. Cat. 4201; *Plant. As. Rar.* ii. 38, t. 144. *S. albiflora*, Wall. Pl. As. Rar. ii. 38. *Tovaria pallida*, and *purpurea*, Baker in Journ. Linn. Soc. xiv. 566. *Jocaste purpurea*, and *albiflora*, Kunth Enum. v. 155.

TEMPERATE HIMALAYA, alt. 8–11,000 ft., from Garwhal eastwards to Sikkim.

Stem 2–3 ft., very stout, naked below, flexuous above. *Leaves* 8–12, oblong, 4–6 in., acute, pale beneath, with 7–9 principal nerves. *Raceme* 3–6 in., rachis sub-erect; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in.; bracts deltoid. *Perianth* $\frac{1}{2}$ in. long, purple or white. *Filaments* deltoid. *Style* very short.

** *Flowers* in thyrsiform panicles.

3. **S. fusca**, Wall. Pl. As. Rar. iii. 37, t. 257; nearly glabrous, leaves petioled ovate-cordate acuminate, panicle deltoid, perianth brown-purple segments oblanceolate obtuse. *S. divaricata*, Wall. Cat. 4202. *S. bootanensis*, Griff. Notul. 178; *Ic. Pl. Asiat.* t. 279. *Tovaria fusca*, Baker in Journ. Linn. Soc. xiv. 568. *Medora divaricata*, Kunth Enum. v. 156.

TEMPERATE HIMALAYA, alt. 6–8000 ft. from Nepal, Wallich, to Sikkim and Bhotan. KHASIA HILLS, alt. 5–6000 ft.

Stem 1–2 ft., slender. *Leaves* 3–6 in., membranous, glabrous or sparsely pilose beneath; petiole $\frac{1}{2}$ – $1\frac{1}{4}$ in., nerves 5–7. *Panicle* 3–6 in.; peduncle short, branches flexuous, lax-flid.; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. solitary, bracts minute. *Perianth* $\frac{1}{2}$ in. diam. *Filaments* deltoid. *Style* very short. *Berry* $\frac{1}{2}$ – $\frac{3}{4}$ in., 1–3-seeded.

4. **S. oleracea**, Hook. f. & Thoms. Herb. Ind. Or.; stem leaves beneath and panicle pubescent, leaves subsessile oblong-lanceolate acuminate, panicle oblong or deltoid, perianth white, segments oblong obtuse. *Bot. Mag.* t. 6313. *Tovaria oleracea*, Baker in Journ. Linn. Soc. xiv. 569.

SIKKIM HIMALAYA; in woods alt. 9–11,000 ft., J. D. H., &c.

Rootstock short. *Stem* 2–5 ft., stout, flexuous. *Leaves* 3–8 in., pale beneath and 6–9-nerved. *Panicle* 3–12 in., oblong or deltoid, many-fl., branches flexuous, pedicels $\frac{1}{4}$ – $\frac{1}{3}$ in. *Perianth* $\frac{1}{3}$ – $\frac{1}{2}$ in. diam., segments serrulate. *Filaments* deltoid. *Style* very short, 3-cuspidate. *Berry* $\frac{1}{3}$ in. diam.—A favourite pot-herb with the Lepchas of Sikkim.

7. **THEROPOGON**, Maxim.

Rootstock branched with thick root fibres. *Leaves* radical, linear, bases enclosed in sheaths, costate. *Scape* axillary from the lower leaves, naked. *Flowers* in a terminal raceme, small, rose-col., nodding. *Perianth* globosely campanulate; segments subequal, broadly ovate, broadly imbricate. *Stamens* inserted at the base of the segments, included; filaments short, broadly obovoid, fleshy, incurved; anthers basifixed between the lobes, ovoid, acute, cells spreading over the top of the filament, erect. *Ovary* sessile; style filiform, acute, stigma minute; cells 6–10-ovuled. *Berry* subglobose. *Seeds* few or several, subglobose, testa thin adnate; embryo straight or curved.

1. **T. pallidus**, Maxim. in Bull. Acad. Petersb. xv. 89; Baker in Journ. Linn. Soc. xiv. 562; Bot. Mag. t. 6154. *Ophiopogon*? pallidus, Wall. Cat. 5138; Kunth Enum. v. 200. *O. brevifolius*, Royle mss.? *O. mollis*, Royle Ill. 382 (name).

TEMPERATE HIMALAYA, from Kumaon, alt. 6000 ft. to Sikkim, alt. 6–10,000 ft. KHASIA HILLS, alt. 5–6000 ft.

Habit of an *Ophiopogon*. *Leaves* 6–10 in., erect and recurved, grassy, acuminate, persistent, costa stout, green above, glaucous beneath. *Scape* shorter than the leaves, acutely angled. *Raceme* 2–3 in.; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., solitary, jointed under the perianth; bracts green, subulate. *Flowers* $\frac{1}{4}$ in. diam., drooping, white suffused with pink. *Berries* $\frac{1}{4}$ in. diam.—Maximovicz describes the foliage as annual.

8. **TUPISTRA**, Ker.

Rootstock tuberous or creeping. *Leaves* radical, petioled, oblanceolate, costate, strongly nerved. *Scape* short or long; flowers spicate, lurid. *Perianth* campanulate, tube broad; lobes 6 or 8, short. *Stamens* 6 or 8, inserted in the middle of the tube, included; filament very short, inflexed; anthers dorsifixed, incurved. *Ovary* small, sessile, subglobose, 3–4 celled; style very short, stigma peltate or capitate, entire or 3–6-lobed; cells 2-ovuled. *Berry* globose, usually 1-seeded. *Seeds* large, testa thin adnate; albumen fleshy.—Species 7 or 8, tropical Himalayan and Burmese.

* *Bracts* shorter than the flowers.

1. **T. nutans**, Wall. in Bot. Reg. t. 1223; Cat. 5793; spike pendulous densely many-fl., flowers dull brown and purple, perianth lobes broadly ovate, mouth closed by the large hemispheric stigma. Bot. Mag. t. 3054; Kunth Enum. v. 318. *T. squalida*, Baker in Journ. Linn. Soc. xiv. 580 (in part).

SIKKIM HIMALAYA, alt. 1–5000 ft., J. D. H. KHASIA HILLS, alt. 2–4000 ft., Wallich, &c.

Rootstock as thick as the little finger. *Leaves* 2–3 ft. by 2–2 $\frac{1}{2}$ in., narrowly oblanceolate, acuminate, coriaceous, shining; petiole as long as the blade or shorter. *Peduncle* 1 $\frac{1}{2}$ –4 in. stout, decurved; spike 3–6 in.; bracts deltoid, scarious. *Flowers* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., tube hemispheric longer than the lobes. *Berry* $\frac{3}{4}$ –1 in. diam.

2. **T. macrostigma**, *Baker in Bot. Mag.* t. 6280; spike pendulous or decurved few- and lax-fl'd., flowers vinous purple, perianth lobes broadly ovate, mouth closed by the large hemispheric stigma. *Macrostigma tupistroides*, *Kunth Enum.* v. 319; *Schnitzl. in Regel Gartenfl.* 1857, 130, t. 192.—? *Tupistra*, *Griff. Notul.* iii. 157; *Ic. Pl. Asiat.* t. 165.

KHASIA HILLS, 3-4000 ft.; *Griffith*, &c.

Except by the characters given above I cannot separate this from *nutans*, and in the dried state they are undistinguishable.—Griffiths' is a much exaggerated drawing.

3. **T. Clarkei**, *Hook. f.*; spike decurved or pendulous dense-fl'd., perianth lobes oblong, mouth not closed by the stigma, style long.

SIKKIM HIMALAYA, alt. 2-5000 ft., *J. D. H., Clarke, Treutler.*

Apparently a much larger plant than the above, with leaves 4-5 by 2-3½ in., and larger flowers of a pale greenish yellow or purplish colour.

4. **T. Stoliczkana**, *Kurz in Journ. As. Soc. Beng.* 1875, ii. 199; spike elongate erect, perianth-lobes linear-lanceolate, style very short stout, stigma large scabrid.

BUUMA; Moulmein, *Stoliczka.*

Leaves 2½-3 ft. by 4-5 in.; petiole 1-1½ ft. Spike 1 ft., robust; peduncle 4 in. Flowers ½-¾ in. diam.

** *Bracts longer than the flowers.*

5. **T. aurantiaca**, *Wall. Cat.* 5194; leaves sessile narrowly oblanceolate, spike subsessile. *Campylandra aurantiaca*, *Baker in Journ. Linn. Soc.* xiv. 582, t. 20.

SUBTROPICAL HIMALAYA; from Nepal, *Wallich*, &c., eastward to Mishmi, alt. 4-6000 ft. KHASIA and NAGA HILLS, alt. 4-8000 ft., *Griffith*, &c.

Rootstock as thick as the little finger, roots very long and stout. Leaves 12-18 by 1-1½ in., flaccidly coriaceous. Peduncle very short and stout. Spike erect, 1-1½ in. long, oblong, dense-fl'd.; bracts 1 in., lanceolate, spreading. Flowers ¼ in. diam., yellow; perianth-tube hemispheric, lobes short nearly orbicular; style short, stigma large, 3-fl'd. Berry ¾ in. diam., globose.

6. **T. Wattii**, *Hook. f.*; leaves petioled elliptic-lanceolate or -ovate acuminate, spikes subsessile. *Campylandra Wattii*, *Baker in Journ. Linn. Soc.* xxv. 78, t. 32.

BHOTAN HIMALAYA, *Griffith.* MUNNIPORE, alt. 6-7000 ft., *Watt, Clarke.*

Stem stout, fleshy, 6-10 in., from a long fleshy prostrate rhizome. Leaves 4-12 by 1½-3 in. Peduncle very short, stout. Spike 1-3 in., dense-fl'd.; bracts linear-lanceolate; flowers yellow. Berry 1½ in. diam., 1-seeded.

7. **T. singaporeana**, *Wall. Cat.* 5195; leaves petioled elliptic-lanceolate acuminate membranous, spike sessile elongate stout erect, bracts much longer than the globose fruit. *Baker in Journ. Linn. Soc.* xiv. 581.

SINGAPORE, *Wallich.*

Stem short, erect, as thick as the finger. Leaves 10-16 by 2-2½ in., erect; petiole 3-6 in., stout, ribbed. Spike 3 in.; bracts ½ in., lanceolate, membranous. Berries globose, ½ in. diam.—Wallich's solitary specimen is in fruit only. *Kurz (Journ. Beng. As. Soc.* 1875, ii. 199), who had not seen the plant, thinks it may be a *Hypoxidea* or *Apostasia*, but I see no reason to doubt its being a *Tupistra*.

9. **ASPIDISTRA**, Ker.

Characters of *Tupistra*, but scape very short, 1-fl.; flowers tetramerous, embraced by concave sheathing bracteoles inserted at the base of the perianth.—Species 3 or 4, Himalayan, Japanese and Chinese.

A. longifolia, Hook. f.; leaves 2–3 ft. by 1–2 in. narrowly linear-oblongate, bracts 2–3 hemispheric strongly nerved. *A. lurida*, Baker in Journ. Linn. Soc. xiv. 579, not of Ker.

UPPER ASSAM; in the Mishmi hills, Griffith.

Rootstock stout, creeping. *Leaves* tufted, rather thin, contracted into a rigid deeply grooved petiole that is produced into a trigonous keel extending half way up the leaf more or less, nerves close set slender. *Peduncle* $\frac{1}{2}$ – $\frac{3}{4}$ in., stout, with a boat-shaped bract at the top. *Flower* (bud?) very shortly pedicelled; bracts scarious, rounded at the apex; perianth $\frac{1}{2}$ in. diam., fleshy, subglobose contracted at the mouth; lobes very small. *Anthers* sessile, recurved. *Stigma* very large.—A very different plant from the *A. lurida*, Ker of China.

10. **GONIOSCYPHA**, Baker.

Leaves radical, petioled, oblong-lanceolate, acuminate, costate and strongly nerved. *Scape* radical, bracts elongate-subulate much exceeding the flowers; spike erect, cylindric, crowned with a tuft of flowerless persistent bracts. *Perianth-tube* cylindric; lobes 6, short, broadly ovate, spreading. *Stamens* 6, inserted in the throat of the perianth, filaments very short; anthers erect, linear-oblong. *Ovary* subglobose, 3-celled; style columnar; stigma small, 3-lobed; cells 2-ovuled.

G. eucomoides, Baker in Journ. Linn. Soc. xiv. 581, t. 19; N.E. Br. in Gard. Chron. 1886, ii. 744.

BHUTAN HIMALAYA; in the Duphla hills, alt. 4500 ft., Booth, Lister.

Rootstock long, fleshy. *Leaves* 1–2 ft. by 6–8 in., narrowed into a petiole 4 in. long, subpinnately 10–12-nerved. *Scape* 8–9 in., stout, strict, terete, with basal scarious sheaths; spikes 3 in., dense-fl., cylindric; bracts setaceous, persistent; flowers at length deflexed, nearly $\frac{1}{2}$ in. long, dark green. *Berry* ovoid, $\frac{1}{4}$ – $\frac{2}{3}$ in. long, fleshy, 1-seeded.

10* **HEMEROCALLIS**, Linn.

Rootstock very short, with fleshy root-fibres. *Leaves* elongate, narrowly linear, costate and many-nerved. *Scape* elongate, terete, naked, bearing a few-fl. panicle; bracts deciduous. *Flowers* large, suberect, orange-yellow. *Perianth* funnel-shaped, 6-partite, segments connate at the base in a tube, then recurved, outer smaller. *Stamens* 6, inserted at the mouth of the tube, exerted, filaments filiform, declinate, inserted in a dorsal pit of the linear-oblong versatile anther. *Ovary* 3-celled; style filiform, declinate, stigma capitate; cells many-ovuled. *Capsule* triquetrous, coriaceous, loculicidal. *Seeds* angled; testa thin, black, shining; embryo cylindric.—Species 5, Europe, temp. Asia and Japan.

H. fulva, Linn. Sp. Pl. Ed. ii. 462; inner perianth-segments much larger and broader than the outer, margins undulate with reticulate nerves. Kunth Enum. iv. 588; Baker in Journ. Linn. Soc. xi. 359; Boiss. Fl. Orient. v. 312; Bot. Mag. t. 64; Redouté Lil. t. 16; Reichb. Ic. Fl. Germ. t. 1113; Wall. Cat. 8975. *H. disticha*, Don in Sweet Brit. Fl. Gard. t. 28.

The HIMALAYA and KHASIA HILLS; possibly indigenous; cultivated throughout INDIA.—DISTRIB. S. Europe, the Caucasus and N. Asia to Japan.

Leaves 12–24 by 1–1½ in., erecto-patent, acute, subglaucous beneath. *Scape* 2–3 ft., panicle 6–12-fld.; pedicels short; bracts small, membranous. *Flowers* nodorous, 1–2 in. diam.; tube yellow-red; outer segments orange yellow, oblong, acute, inner very much broader.

Var. *angustifolia*, Baker l. c.; much smaller, leaves 12–18 by ½–¾ in., perianth-segments narrower more acute. Boiss. l. c. *H. longituba*, Miquel Ann. Mus. Lugd. Bat. iii. 152.

11. DRACENA, Linn.

Shrubs or trees. *Leaves* alternate or crowded and subterminal, sessile or petioled, costate or not and many-nerved. *Flowers* in terminal racemes panicles or heads; bracts small. *Perianth* tubular, campanulate or funnel-shaped, 6-cleft, lobes narrow. *Stamens* 6, inserted at the base of the tube, filaments filiform or flattened; anthers versatile. *Ovary* 3-celled; style filiform, stigma capitate; ovules 1, erect in each cell. *Berry* globose didymous or 3-lobed. *Seeds* globose or angled, testa thickish, albumen horny; embryo small.—Species about 35, in warm regions of the Old World.

This genus wants a thorough revision on living plants. The following attempt to delimit the Indian species has been a work of much labour and the result is provisional only.

* Leaves linear or ensiform, sessile.

1. *D. angustifolia*, Roxb. *Fl. Ind.* ii. 155; stem erect, leaves 8–20 by ¾–1 in. costate waved, panicle very large decurved spreading, flowers ½–1 in., pedicels ½–¾ in., fruit ½–¾ in. diam. fleshy. Wall. *Cat.* 5141; *Kunth Enum.* v. 4; *Regel Revis. Drac.* 36; Baker in *Trim. Journ. Bot.* 1873, 262; in *Journ. Linn. Soc.* xiv. 526; Kurz *For. Fl.* ii. 543. *D. ensifolia*, Wall. *Cat.* 5143; *Kunth Enum.* 5; Kurz l. c. *Terminalia angustifolia*, Rumph. *Amb.* iv. t. 35. *Sansevieria fruticosa*, Blume *Enum.* i. 11.

SILHET, Wallich, &c. KHASIA and NAGA HILLS, common. BURMA, ANDAMAN ISLANDS, Kurz.—DISTRIB. Malaya, Australia.

Stem 8–10 ft., as thick as a stout cane, simple or forked. *Leaves* sessile by a broad sheathing base, spreading and recurved. *Flowers* white or tipped with pink. *Fruit* orange-cold.—Kurz distinguishes his *ensifolia* by the panicle nodding longer than the leaves, bracts acute almost wholly scarious, filaments orange, pedicels ½ in.; and *angustifolia* by the erect stiff panicle shorter than the leaves, bracts with a scarious border, filaments white.

2. *D. graminifolia*, Wall. *Cat.* 5149; leaves 8–12 by ½–¾ in. obscurely costate, raceme erect simple or branched at the base quite smooth; flowers ¾ in. long. D. Finlaysoni, Baker in *Trim. Journ. Bot.* 1873, 261; in *Journ. Linn. Soc.* xiv. 525.

STRAITS OF MALACCA, Dinding Island, Finlayson.—DISTRIB. Borneo?.

Wallich's specimens are very insufficient, and I hesitate to regard the Bornean plant, from which Baker's description is in part taken, as specifically the same.

3. *D. granulata*, Hook. f.; arboreous, leaves 6–10 by ½ in. sessile, panicle erect pyramidal, rachis and branches finely granulate when dry, fruit ¾–1½ in. diam. shortly pedicelled fleshy.

MALAY PENINSULA; Perak, King's Collector.

Stem 50–60 ft. by 18–20 in. diam.

4. **D. brachyphylla**, *Kurz. For. Flor.* ii. 544; a low shrub, leaves $\frac{1}{2}$ –1 ft. costate, panicle erect stiff quite smooth shorter than the leaves, flowers $\frac{2}{3}$ in., filaments white. *D. atropurpurea*, var. *Kurzii*, *Baker in Journ. Linn. Soc.* xiv. 533.

ANDAMAN ISLANDS, frequent, *Kurz*.

I have seen only very imperfect specimens. *Kurz* describes the stem as thick as a goose-quill or twice as thick.

5. **D. brachystachys**, *Hook. f.*; leaves 3 ft. by 2 in. ensiform coriaceous costa beneath very stout, branches of panicle scaberulous spreading, flowers shortly pedicelled ternately fascicled.

PENANG; Monisti road, *Curtis*, 2302.

Stem 10–12 ft., 2–3 in. diam. *Leaves* fascicled. *Panicle* apparently very large with rather distant horizontal strict branches, bracts very small. *Flowers* in rather remote fascicles $\frac{2}{3}$ in. long white, pedicel $\frac{1}{12}$ in.—Described from one leaf and a portion of a panicle.

** Leaves elliptic-lanceolate or -oblanceolate (very narrowly in *D. Porteri*).

† Flowers in spiciform racemes that are simple or branched at the base only.

6. **D. Porteri**, *Baker in Trimen Journ. Bot.* 1873, 262; in *Journ. Linn. Soc.* xiv. 529; shrubby, leaves 8–10 by 1–1 $\frac{1}{4}$ in. sessile narrowly lanceolate or oblanceolate costate towards the base, raceme shortly peduncled erect, flowers $\frac{3}{4}$ in. long, pedicels very short, fruit pisiform. *D. maculata*, *Wall. Cat.* 5748 (not of *Roxb.*).

PENANG, *Porter, King's Collector*; SINGAPORE, *Wallich*. MALACCA, *Griffith* (*Kew Distrib.* 5874), *Maingay* (*K. d.* 1687).—DISTRIB. Siam.

Shrub 4–6 ft. (*King's Coll.*).—Apparently very near *D. spicata*, but with narrower leaves. *Wallich's* 5148 A has spotted leaves; his B from Singapore may be different, it is more slender with a more contracted leaf-base.

7. **D. spicata**, *Roxb. Fl. Ind.* ii. 157; arboreous, leaves 6–18 by 1 $\frac{1}{2}$ –2 in. very broadly petioled elliptic or broadly oblanceolate finely acuminate, raceme long or short simple or branched at the base, flowers fascicled very shortly pedicelled, fruit pisiform $\frac{1}{2}$ in. diam., or 3-lobed and $\frac{3}{4}$ in. fleshy. *Kunth Enum.* v. 10; *Wall. Cat.* 5146; *Regel Revis. Drac.* 44; *D. Wallichii*, *Kunth in Act. Acad. Berol.* 1842, 26.

SILHET, *Wallich*, CHITTAGONG, *Roxburgh*, SOUTH ANDAMAN ISLANDS, *Kurz*.

I am unable to unravel the synonymy and habitats of this species and *D. terniflora*, which however, according to *Roxburgh* and *Kurz* are very different plants. *Baker* (*Journ. Bot.* 1873, 263, and *Journ. Linn. Soc.* xiv. 532) unites them (as *D. spicata*), together with *D. aurantiaca*, *Wall.*, and gives its distribution as from the eastern Himalaya to the Nilghiris, Malacca, and the Congo River in Western Africa. Of these the Himalayan (for which *Griffith*, *Wallich*, and I are cited), is an error, as none of us collected it there. On the other hand it is probably a Malayan species. *Roxburgh* describes the flower as numerous and sessile in fascicles, pale greenish, cleft about half way down, and the ripe berries as deep reddish orange. *Kurz* says the flowers are in twos or threes, an inch long, greenish yellow and the berries glossy crimson.

8. **D. terniflora**, *Roxb. Fl. Ind.* ii. 159; a low decumbent slender shrub, leaves 6–12 in. by 1–2 in. elliptic or oblanceolate finely acuminate, petiole 1–6 in., flowers 2–3-nate pedicelled, fruit pisiform or 3-lobed. *Regel Revis. Drac.* 16; *D. ternifolia* (error for *terniflora*), *Kurz For. Fl.* ii. 545.

SILHET, CACHAR, the KHASIA HILLS, 'MUNNIPORE, CHITTAGONG, and the DECCAN PENINSULA, Roxburgh, and ? MALAY PENINSULA.

According to Roxburgh and Kurz, this is distinguished from *D. spicata* by size and habit, and the petioled leaves, and according to Kurz, by the perianth 6-cleft to the middle, that of *D. spicata* being 6-cleft half-way down. Roxburgh describes the fruit as of the size and appearance of a fine red cherry; but Kurz as orange red. In both species the perianth becomes twisted in age, and in both the thinly coriaceous leaves may be blotched with white.

Var. *Heyneana*; spike or panicle much shorter than the leaves. *D. Heyneana*, Wall. Cat. 5754. *D. terminalis*, Wight Ic. t. 2054.—Western Ghats, from the Concan southwards, Heyne, &c.

Var. ? *Thwaitesii*; spike or panicle very short, flowers smaller $\frac{1}{2}$ in. long. *D. Thwaitesii*, Regel Revis. Drac. 44; Baker ll. cc. *D. elliptica*, Thunb. & Dallm. Diss. 3 (the Ceylon plant); *Thwaites Enum.* 338.—Ceylon, ascending to 4000 ft.

Var. ? *Curtisii*; stem short, leaves 4–6 in. elliptic sessile squarrosely spreading and recurved elliptic-lanceolate caudate-acuminate, raceme much longer than the leaves slender long-peduncled, flowers 1 in. long very slender.—Penang, at Polo Boolong, Curtis.

9. ***D. pachyphylla***, Kurz For. Fl. ii. 546; shrubby 1–2 ft., leaves 4–6 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in. coriaceous subulate-acuminate costate, lower long-petioled, raceme subsessile very short or elongate, flowers very shortly pedicelled, berries pisiform or 3-lobed.

ANDAMAN ISLANDS, Kurz. PERAK, King's Collector. MALACCA, on Mt. Ophir, Hullett.—DISTRIB. Borneo.

Resembles a dwarf *D. spicata*. "Stem sometimes as thick as the little finger; leaves often blotched; flowers $\frac{3}{4}$ in. long, white, 6-cleft almost to the base; lobes conniving not recurved except the tips; tube not twisted; berries red," Kurz.

†† Flowers in spreading panicles.

§ Panicle large, rachis and branches very stout.

10. ***D. aurantiaca***, Wall. Cat. 5744; stem very stout, leaves 12–18 by 2–4 in. oblanceolate acuminate narrowed into a very broad almost flat petiole, costa broad obscure, panicle 12–18 in., peduncle very short stout, pedicels $\frac{1}{4}$ – $\frac{1}{3}$ in., flowers densely clustered $\frac{3}{4}$ in. *D. spicata*, var. *aurantiaca* (in part), Baker in Trim. Journ. Bot. 1873, 263, and in Journ. Linn. Soc. xiv. 532. ? *D. marmorata*, Baker in Bot. Mag. t. 7078.

SINGAPORE, Wallich, Cantley. MALACCA, Maingay (K. d. 1688).

Apparently arboreous. I doubtfully refer Baker's *D. marmorata* to Wallich's *aurantiaca*. Wallich's name may imply that either the flowers or fruit of his plant are orange yellow. The flowers of *D. marmorata* are white, and the leaves mottled with white. I have seen fruit of neither.

11. ***D. Maingayi***, Hook. f.; stem tall stout, leaves 8–12 by 1–2 in. narrowly elliptic-lanceolate caudate-acuminate costate below the middle, panicle erect peduncled very stout, pedicels $\frac{1}{4}$ in., flowers 1 in., berries 1– $1\frac{1}{4}$ in. diam. fleshy. *D. spicata*, var. *aurantiaca*, in part, Baker in Trim. Journ. Bot. 1873, 263, and Journ. Linn. Soc. xiv. 263.

MALACCA; at Pulo Bissom, Griffith (Kew Distrib. 5873), Maingay (K. d. 1685). PERAK, on low hills, King's Collector.

"Tree 30–40 ft.; stem $1\frac{1}{2}$ –2 ft. diam.; fruit waxy yellow," King's Collector. "Fruit scarlet," Griffith. The very narrow long-petioled leaves distinguish this from *D. aurantiaca*, and the large stout pyramidal panicle and large berries from *D. spicata*.

§§ *Panicle large or small, rachis and branches slender.*

12. **D. elliptica**, *Thunb. Diss. Bot. Dracæn.* 6; stem slender decumbent or ascending, leaves 4–8 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in. scattered or crowded acuminate or caudate narrowed into a short rather slender petiole costate at the base, flowers solitary or 2–4-nate in decurved lax-fld. panicles, pedicels $\frac{1}{4}$ – $\frac{1}{3}$ in. slender, perianth 6-lobed to the middle, lobes erect, berries pisiform $\frac{1}{2}$ in. diam., or 2–3-lobed. *Kunth Enum.* v. 14; *Baker in Trim. Journ. Bot.* 1873, 263; in *Journ. Linn. Soc.* xiv. 532; *Kurz For. Fl.* ii. 544. *D. Wallichii*, *Kunth l. c.* 11. *D. terniflora*, *Wall. Cat.* 5147 A.; *Kunth l. c.* 11. *D. maculata*, *Roxb. Fl. Ind.* ii. 157. *D. elliptica*, *var. maculata*, *Hook. Bot. Mag.* t. 4787 (*excl. some syns.*). *D. atro-purpurea*, *Roxb. Fl. Ind.* ii. 160; *Kunth Enum.* v. 12; *Baker in Journ. Linn. Soc.* xiv. 533. *D. elliptica*, *var. atropurpurea*. *Kurz l. c.* 544. *D. javanica*, *Kunth Enum.* v. 14; *Regel Revis. Dracæn.* 45. *D. maculata*, *Planch. l. c. t.* 569. *Cordyline terniflora*, *Planch. in Fl. des Serres*, vi. 136.

SILHET, the KHASIA HILLS, *Wallich*, &c, BURMA, the ANDAMAN and NICOBAR ISLANDS, *Kurz*.—DISTRIB. Java.

Stems low, 1–2 ft., as thick as a goose-quill, simple or branched, ascending, rooting at the base. *Leaves* thickly coriaceous, green or blotched with white or black or all purple. *Panicle* often lying flat on the uppermost leaves, subsessile, branches slender curved; bracteoles ovate, scarious. *Flower* $\frac{2}{3}$ in. long, slender, 6-cleft to the middle, white purple or greenish; filament white. *Berries* orange red.—The short rather slender petioles of this and the following species are very characteristic, of upper leaves at any rate; but I collected in the Khasia the lower purple leaves of what I supposed was the same species 12–14 by 2–3 in., oblanceolate, narrowed into a long broad petiole.—There may be more than one species under this name. Roxburgh's drawing of *atropurpurea* represents the panicle as erect.

13. **D. gracilis**, *Wall. Cat.* 5150; slender, much branched, leaves scattered 3–7 by $\frac{2}{3}$ – $1\frac{1}{2}$ in. elliptic-lanceolate acuminate narrowed into a very short narrow petiole, panicle short very slender few and sparse-fld. decurved, flowers $\frac{2}{3}$ in. subsolitary pedicels slender, bracts scarious, berries pisiform. *D. atropurpurea*, *var. gracilis*, *Baker in Trim. Journ. Bot.* (1873) 264; in *Journ. Linn. Soc.* xiv. 534.

PENANG, *Porter*; alt. 2500 ft., *Curtis*. PERAK, alt. 3500–4500 ft., *Wray*, *King's Collector*. MALACCA, Mount Ophir, *Hullett*.—DISTRIB. Siam, Sumatra, Borneo.

Perhaps, as Baker supposed, a small state of *D. elliptica*, the petiolation of the leaves being of the same character; if so, it is a mountain form of that plant.

14. **D. Helferiana**, *Wall. ex Kurz in Journ. As. Soc. Beng.* xlii. (1873) ii. 248; *Kurz For. Fl.* ii. 545; a small decumbent shrub, leaves 12–18 by $1\frac{1}{2}$ –2 in. oblanceolate acuminate narrowed into a longer or shorter petiole costate, panicle large loosely branched lax-fld., bracteoles minute, flowers 1 in. white or greenish, pedicels slender, perianth 6-cleft nearly to the base, segments erect, berries pisiform or 3-lobed. *D. Griffithii*, *Regel Revis. Dracæn.* 47. *D. terniflora*, *Wall. Cat.* 5147 B, *in part.* *D. atro-purpurea*, *var. Griffithii*, *Baker in Trim. Journ. Bot.* (1873) 264; in *Journ. Linn. Soc.* xiv. 533.

BURMA, Moulmein and Attran, *Wallich*; Pegu, *Scott*; Mergui, *Griffith* (*Kew Distrib.* 5869, 5877).

Habit of *D. elliptica*, but according to Kurz only 1–2 ft. high, and differing in the broad petioles, much larger panicle, minute bracteoles and the perianth-cleft nearly to the base.

15. *D. petiolata*, *Hook. f.*; leaves 10-14 by 4 in. elliptic caudate-acuminate ecostate suddenly narrowed into a slender petiole 3-4½ in., panicle long-peduncled narrow, branches slender erect, bracteoles longer than the short pedicels, flowers ¾ in., lobes as long as the tube, fruit pisiform, pericarp very thin wrinkled when dry. *D. spicata*, *var. aurantiaca*, in part, *Baker in Trim. Journ. Bot.* 1873, 263; in *Journ. Linn. Soc.* xiv. 532.

UPPER ASSAM; near Kujoo, and at the Brama Khoond, *Griffith*.

Apparently a very distinct species from the broad very long-petioled leaves and long-peduncled panicles.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

D. JACKIANA, *Wall. Cat.* 5145 A, B. (*D. spicata*, *var. aurantiaca*, *Baker in Trim. Journ. Bot.* 1873, 263; in *Journ. Linn. Soc.* xiv. 532.) A very robust plant, from Penang, like a large *D. spicata*, the tall raceme having short basal branches. I find no specimen of his 5145 C (Penang, *Porter*) in Wallich's Herbarium.

D. LINEARIFOLIA, *Kurz For.* ii. 542, in *Clavis* of species, but not taken up in the following descriptions. It has the habit of *P. angustifolia*, but has narrower leaves and the lobes of the fruit as large as a cherry or small plum. A Javanese species in Herb. Kew responds to this description.

D. CANTLEYI, *Baker in Journ. Bot.* 1881, 326. Singapore, *Cantley*. There is little in the description of this plant, of which a specimen flowered at Kew, to distinguish it from *D. marmorata (aurantiaca)*. Unfortunately flowers were not preserved for the Herbarium. The live plant at Kew has now a stem 4 in. long, with lanceolate leaves 15 by 4½ in., suddenly narrowed into a petiole 1-1½ in. broad.

12. **CORDYLINE**, *Commers.*

Characters of *Dracæna*, but ovarian cells 4-16-ovuled, testa black shining, and embryo nearly as long as the albumen.—Species about 10, Malayan, Australasian, Pacific, and one Brazilian.

1. *C. terminalis*, *Kunth Enum.* v. 25; shrubby, erect, leaves 12-36 by 2-5 in. oblong-lanceolate broadly petioled, flowers white or purplish subspicate or racemed on the branches of a large erect simply branched panicle, perianth ½ in. cleft to the swollen base, segments recurved. *Kurz For. Fl.* ii. 546; *Baker in Journ. Linn. Soc.* xiv. 539.

TROPICAL INDIA, from BENGAL and ASSAM eastward and southward to MALACCA.—DISTRIB. Eastwards to the Pacific Islds.

Au erect, glabrous shrub, 8-10 ft., stems as thick as the finger or wrist. Leaves distichous, green or purplish, acuminate at both ends; petiole complicate, base dilated and amplexicaul. Panicle 1-2 ft. high; lower bracts linear-lanceolate; bracteoles small, 3-nate; flowers ½ in. long, subsessile, or very shortly pedicelled, white or purplish. Berry ½ in. diam., usually 1-seeded.—*Kurz* (for *Fl.* l. c.) makes two varieties in Burma; *terminalis proper* with larger subsessile flowers, which is only cultivated; and *ferrea*, with smaller flowers, pedicels shorter or slightly longer than the bracteoles. *Baker* (in *Journ. Linn. Soc.* l. c.) has the following varieties:—

Var. 1. ferrea; leaves narrower more oblanceolate dull purple or variegated 2-2½ in. broad, petioles shorter, flowers usually smaller tinged with red. *D. ferrea*, *Linn. Syst.* 275; *Roxb. Fl. Ind.* ii. 156; *Bot. Mag.* t. 2053. *D. terminalis*, *Jacq. Ic.* t. 448; *Roxb.* l. c.; *Redouté Lil.* t. 91; *Lodd. Bot. Cat.* t. 1224. *Cordylina Jacquinii*, *Kunth l. c.* 23.

Var. 2. Sieberi; leaves oblanceolate 12-18 by 2-3 in., racemes 1 in. broad, pedicels longer, flowers larger. *Cordylina Sieberi*, *Kunth Enum.* v. 23.—Malacca, *Griffith*, *Maingay*.

13. **ASPHODELUS**, Linn.

Annual, or perennial, root-fibres slender or fleshy. *Leaves* radical, linear, triquetrous, or terete and fistular. *Flowers* racemed, solitary in the bracts. *Perianth* white, marcescent, 6-partite, segments conniving in a tube below. *Stamens* 6, hypogynous; filaments dilated at the base and embracing the ovary, inserted in a pit of the dorsifixed versatile anther. *Ovary* 3-celled; style filiform, stigma sub-3-lobed; ovules 2 collateral in each cell. *Capsule* usually 1-seeded, loculicidal. *Seeds* 3-quetrous, testa black appressed; embryo nearly as long as the cartilaginous albumen.—Species 6 or 7, S. Europe and eastward to India.

1. **A. tenuifolius**, Cavan. in *Anal. Cienc. Nat.* iii. 46, t. 27; and *Icon.* t. 587, f. 2; annual, leaves slender semi-terete fistular and scape smooth or papillosely scaberulous, pedicels jointed below the middle, perianth-segments white with a brownish costa, filaments fusiform towards the tip. *Kunth Enum.* iv. 558. *A. æstivus*, Reichb. *Ic. Crit.* t. 451. *A. microcarpus*, Reichb. *Ic. Fl. Germ.* t. 513. *A. clavatus*, Roxb. *Fl. Ind.* ii. 148; *Wall. Cat.* 5058; *Kunth l. c.* 559. *A. parviflorus*, *Wight Ic.* t. 2062 (bad. pauciflorus, in *text vi.* p. 27.). *A. fistulosus*, var. *tenuifolius*, *Baker in Journ. Linn. Soc.* xv. 272. *A. tenuifolius*, var. *micranthus*, *Boiss. Fl. Or.* v. 314.

Plains of INDIA, in fields, from Bengal westwards to Guzerat and the Punjab.—**DISTRIB.** Westward to the Canary Islds.

Leaves 6–12 in., erect, about $\frac{1}{2}$ in. diam., acuminate. *Scape* $1\frac{1}{2}$ –3 ft., terete, often excessively scopariously branched. *Racemes* lax-flid.; pedicels $\frac{1}{8}$ – $\frac{1}{4}$ in. *Perianth*-segments $\frac{1}{2}$ in. long. *Capsule* globose, $\frac{1}{8}$ in. diam., valves deeply wrinkled. *Seeds* trigonous, with 3–4 dorsal ridges and as many lateral pits.—Probably as Baker considers it, a form of the European *A. fistulosus*, but always much smaller, especially the flowers, and with the pedicel jointed below the middle. Wight's figure is very incorrect as regards the filaments, he is unable to give any locality for the specimen figured, which he supposes is from the sandy soils of the East Coast of the Deccan.

2. **A. comosus**, *Baker in Gard. Chron.* 1887, i. 799; leaves ensiform 18 by $1\frac{1}{2}$ in., peduncle very stout, racemes paniced dense-flid.

LAHUL, in the Rolang Pass, *Jaeschke.*

Habit of *A. albus* and *ramosus*. *Leaves* rather thick. *Peduncle* 2 ft.; panicle 1 ft., pedicels $\frac{1}{8}$ – $\frac{1}{4}$ in., ascending, jointed below the middle; bracts $\frac{1}{2}$ in., much longer, scarious. *Flowers* 1– $1\frac{1}{4}$ in. diam.; segments linear-oblong, white with a green keel. *Stamens* $\frac{1}{2}$ in. longer than the perianth; style as long.

14. **EREMURUS**, Bieberst.

Stately herbs, with the characters of *Asphodelus*, from which the genus differs only in the usually more numerous ovules.—Species about 20, oriental and Northern Asian.

1. **E. himalaicus**, *Baker in Journ. Linn. Soc.* xv. 283; glabrous, bracts subulate-lanceolate equalling the pedicels, flowers white, filaments as long as the perianth, capsule rugose, seeds not winged.

TEMPERATE WESTERN HIMALAYA, in the drier regions, from the Sutlej westwards, alt. 7–10,000 ft.—**DISTRIB.** Eastern Turkestan.

Leaves 1-3 ft. by $\frac{1}{2}$ -3 in. Scape and raceme very stout, 2-3 ft.; pedicels $\frac{2}{3}$ in., bracts subulate filiform. Flowers 1 in. diam.; segments oblong, 1-nerved, about equalling the filament. Capsule $\frac{1}{2}$ in. diam. Seeds triquetrous.

2. **E. persicus**, Boiss. *Diagn.* vii. 119; *Fl. Orient.* v. 326; puberulous, bracts ovate-lanceolate shorter than the pedicels, flowers white, filaments shorter than the perianth, capsule smooth small broadly winged. Baker in *Journ. Linn. Soc.* xv. 284. *Asphodelus persicus*, Jaub. & Spach *Ill. Pl. Or.* t. 102.

NORTH-WEST INDIA; Salt range, Mt. Sikesa, alt. 4-5000 ft., Aitchison.—DISTRIB. Affghan., Persia, Syria.

Leaves 6-12 by $\frac{1}{2}$ - $\frac{1}{2}$ in. Scape 10-24 in., simple, stont. Raceme 6-12 in.; bracts $\frac{1}{2}$ in., scarious; pedicels 1 in., fruiting $2\frac{1}{2}$ in. horizontal. Flowers $\frac{3}{4}$ in. diam., segments white with a brown central band. Capsule 1 in. broad. Seeds black, broadly 3-winged.—Very variable in stature and in length and breadth of the leaves.

15. CHLOROPHYTUM, Ker.

Characters of *Anthericum*, but capsule trigonous, deeply laterally 3-lobed with flattened lobes.—Species about 40, tropical and subtropical.

The species are most difficult of circumscription owing to the great variability in the leaves and length and robustness of the scapes, and racemes.

* Flowers in simple or shortly branched dense-fld. racemes.

† Leaves lanceolate or oblanceolate, if fully developed.

1. **C. Heyneanum**, Wall. *Cat.* 5060; scape stout shorter than the leaves naked, racemes short dense-fld., anthers shorter than the filaments, cells of the oblong capsule 8-10-seeded. C. Heynei, Baker in *Journ. Linn. Soc.* xv. 322. C. breviscopum, Thw. *Enum.* 339.

The DECCAN PENINSULA, Heyne, &c.; Nilgiri hills, alt. 6000 ft. Clarke. CEYLON, common in the central province.

Root-fibres tuberous. Leaves 12-18 by $1-1\frac{3}{4}$ in., oblanceolate; petiole 2-4 in. Scape $\frac{1}{2}$ -1 in.; bracts longer than the small flowers, pedicels $\frac{1}{3}$ - $\frac{1}{4}$ in., jointed near the tip. Perianth-segments $\frac{1}{4}$ in., narrowly lanceolate. Capsule $\frac{1}{2}$ in. long. Seeds black, shining.

2. **C. breviscopum**, Dalz. in Hook. *Kew Journ. Bot.* ii. 141; scape naked shorter than the leaves, raceme dense-fld., anthers as long as the filaments, cells of the orbicular or obcordate capsule 1-3-seeded. Dalz. & Gibs. *Bomb. Fl.* 252.

SIKKIM HIMALAYA, at the foot of the hills (fl. only), Clarke. The CONCAN, at Malwan, Dalzel.

Root-fibres tuberous. Leaves 12 by $\frac{3}{4}$ - $1\frac{1}{4}$ in., linear-lanceolate, broadly petioled, margins often crispulate. Scape stout, 3-6 in., rarely branched; raceme 3-5 in., bracts shorter than the flowers; pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in., jointed above the middle. Perianth-segments $\frac{1}{2}$ - $\frac{1}{2}$ in., linear-oblong. Capsule $\frac{1}{2}$ in. broad, seeds subglobose, black, opaque.—Differs from *C. attenuatum* in the broader leaves and short scape.

3. **C. arundinaceum**, Baker in *Journ. Linn. Soc.* xv. 323; in Gard. *Chron.* 1876, 260; scape usually tall naked, raceme elongate simple or shortly branched, anthers longer than the filaments, cells of the small orbicular capsule 3-4-seeded. Phalangium alatum, Herb. Ham. in Wall.

Cat. 5056. *Anthericum tuberosum*, *Herb. Heyne*. *Ornithogalum indicum*, *Koenig mss.*

EASTERN HIMALAYA, Sikkim, alt. 1-4000 ft. *J. D. H.* Bhotan, *Griffith*. ASSAM, *Hamilton*. BEHAR at Monghir, *Wallich*, on Parusnath, *J. D. H.* BURMA, at Prome, *Wallich*.

Root-fibres cylindric. *Leaves* 6-18 by $1\frac{1}{2}$ -2 in., oblanceolate, obtuse acute or acuminate, usually narrowed into a broad petiole. *Scape* 6-20 in. stout; raceme 3-8 in.; bracts $\frac{3}{4}$ - $\frac{1}{2}$ in. or lower longer pedicels $\frac{1}{2}$ - $\frac{1}{3}$ in. jointed in the middle. *Perianth-segments* $\frac{1}{2}$ - $\frac{1}{3}$ in. lanceolate, white. *Capsule* $\frac{1}{2}$ in. broad 2-lobed at the tip and base. *Seeds* $\frac{1}{2}$ in. diam., suborbicular, flat; black.—In small specimens the leaves are narrower and broadest at the base.

4. *C. glaucum*, *Dalz. in Hook. Kew Journ. Bot.* ii. 142; leaves glaucous, scape longer than the leaves 2-3-sheathed, racemes long stout dense-fld., bracts longer than the flowers erect bases cymbiform, filaments longer than the anthers, cells of the suborbicular capsule 2-4-seeded. *Dalz. & Gibs. Bomb. Fl.* 252; *Baker in Journ. Linn. Soc.* xv. 324.

The CONCAN; on the Ghats, rare, *Dalzell*, &c.

Root-fibres cylindric. *Leaves* 12-18 by 1-2 in., usually recurved, narrowly oblanceolate. *Scape* 1-2 ft., simple, sheaths narrowly lanceolate; raceme 6-12 in., unbranched; bracts green; pedicels $\frac{1}{2}$ in., jointed above the middle. *Perianth-segments* $\frac{1}{2}$ - $\frac{1}{3}$ in., white; filaments papillose; anthers twisted after flowering. *Capsule* $\frac{1}{2}$ - $\frac{1}{3}$ in. broad, top 2-lobed. *Seeds* $\frac{1}{2}$ - $\frac{1}{3}$ in. broad, flat, orbicular, opaque.

†† *Leaves linear or ensiform not or hardly contracted into a petiole.*

5. *C. tuberosum*, *Baker in Journ. Linn. Soc.* xv. 332; leaves sessile usually ensiform falcately recurved, scape short or tall, flowers large, anthers as long as the papillose filaments recurved finally revolute, cells of the oblong rarely orbicular retuse capsule 4-6-seeded. *C. anthericoideum*, *Dalz. in Hook. Kew Journ. Bot.* ii. (1850) 141: *Dalz. & Gibs. Bomb. Fl.* 251. *Phalangium tuberosum*, *Wight Ic. t.* 2036; *Kunth Enum.* iv. 598 (*in part.*) *P. ornithogaloïdes*, *Schweinf. Biltr.* *P. alatum*, *Wall. Cat.* 5056. *C. Anthericum tuberosum*, *Roxb. Fl. Ind.* ii. 149, *et Ic. in Herb. Kew*; *Cor. Pl.* ii. 20 (*not t.* 138). *A. ornithogaloïdes*, *Hochst. in A. Rich. Tent. Fl. Abyss.* ii. 232.

The DECCAN PENINSULA and CENTRAL INDIA, common from the Northern Circars, and the Concan to Travancore. BURMA; at Prome, *Wallich*.—DISTRIB. Abyssinia.

Root-fibres cylindric and tuberous. *Leaves* 8 in. to 2 ft. by $\frac{3}{4}$ - $\frac{1}{2}$ in. (to 4 in. *Roxb.*), margins crisped. *Scape* 6 in. to 3 ft. with a small sheath; raceme short, simple or shortly branched; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., white; pedicels $\frac{1}{2}$ in., stout, jointed below the middle; perianth-segments $\frac{1}{2}$ - $\frac{3}{4}$ in. long, oblong; stamens much shorter than the perianth. *Capsule* $\frac{1}{2}$ - $\frac{1}{3}$ in. long. *Seeds* irregularly orbicular, opaque.—The largest flowered Indian species and clearly the plant described by Roxburgh as having flowers as large as a snowdrop, but not that figured in the *Cor. Pl.*, which is *C. attenuatum*; his drawings of both are at Kew, and both named *tuberosum*.

6. *C. khasianum*, *Hook. f.*; scape tall naked simple or branched, racemes rather dense-fld., bracts shorter than the flowers, anthers elongate straight longer than the filaments, cells of large oblong 2-lobed capsule 4-6-seeded. *C. nepalensis*, *Baker in Journ. Linn. Soc.* xv. 330 (*in part.*).

KHASIA HILLS, alt. 3-6000 ft. *Griffith*, &c.

Leaves 10-24 by $\frac{1}{2}$ - $\frac{1}{3}$ in., linear, flat. *Scape* 2-3 ft., sometimes $\frac{1}{2}$ in. diam., smooth, branches short; racemes 6-10 in., pedicels $\frac{1}{2}$ - $\frac{1}{3}$ in., erect, jointed above the middle.

Perianth white, segments $\frac{1}{2}$ in. linear-oblong; anthers not recurved or revolute after flowering. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in. long. *Seeds* $\frac{1}{8}$ in. diam., orbicular, flat, black opaque.—Distinguished from *C. undulatum* by the short erect branches of the scape, crowded flowers, and large 4–6-seeded capsule.

7. ***C. attenuatum***, Baker in *Journ. Linn. Soc.* xv. 332; leaves linear, scape erect naked, raceme rarely forked lax or dense-fl., anthers straight longer than the papillose filaments, cells of the small broadly obcordate capsule 3–4-seeded. *Phalangium attenuatum*, Wight *Ic. t.* 2037. *P. indicum*, Kunth *Enum.* iv. 198. *Asphodelopsis arungadenensis*, Steud. in *Hohenack. Pl. exsc. Ind. Or. n.* 1317. *Anthericum tuberosum*, Rorb. *Fl. Cor. Pl. t.* 13 (not p. 20, nor of *Fl. Ind.*). *Ornithogalum indicum*, Roem. *f. Syst.* vii. 535.

The WESTERN GHATS; from Canara southwards to Coimbatore.

Root-fibres cylindric, often tuberos. *Leaves* 10–18 by $\frac{1}{2}$ –1 in., slightly narrowed at the base. *Scape* as long, erect, raceme 3–4 in.; bracts ovate, acuminate; flowers suberect, pedicels jointed about the middle. *Perianth* white, segments $\frac{1}{2}$ – $\frac{3}{4}$ in. *Capsule* $\frac{1}{2}$ in. broad.—Very small flowers with segments not $\frac{1}{2}$ in. long occur amongst the others. That this is Roemer's *Ornith. indicum* is proved by a specimen from Heyne in Herb. Rottler (now at Kew) marked as from Condapilly, which is the authority for the name (misspelt Cardapilly) and collector given by Heyne. This specimen and those of Wight precisely accord with Roxburgh's figure of *Anth. tuberosum* in *Cor. Pl.*, but not with his description in that work, or in *Fl. Ind.*

8. ***C. malabaricum***, Baker in *Journ. Linn. Soc.* xv. 331; leaves usually recurved, scape simple short naked, raceme short or long, anthers straight shorter than the filaments, cells of the very small broadly obcordate capsule 1–2-seeded? *Phalangium tuberosum*, Dalz. & Gibs. *Bomb. Fl.* 251 (not of Kunth).

WESTERN GHATS, from Canara southwards.

Root-fibres cylindric, fleshy. *Leaves* 6–12 by $\frac{1}{2}$ –1 in., usually narrowed from the sheathing base to the apex. *Scape* 3–4 in., curved, stout, raceme as long or shorter, bracts about as long as the flowers membranous, pedicels jointed above the middle. *Perianth* white, segments $\frac{1}{2}$ in. long. *Capsule* $\frac{1}{2}$ in. broad, tip deeply 2-lobed. *Seeds* $\frac{1}{10}$ in. diam., flat, opaque.—Dalzell's description of *Phalangium tuberosum*, as having small white flowers, and resembling his *Chlorophytum anthericoideum*, probably applies to *C. malabaricum*.

** Raceme simple or branched, with the flowers remotely scattered, solitary or in pairs.

9. ***C. undulatum***, Wall. *Cat.* 5059; scape naked paniculately branched, branches long spreading, flowers drooping, bracts shorter than the pedicels, anthers twice as long as the filaments, cells of the broad 3-dymous small capsule 2–3-seeded. *C. nepalense*, Baker in *Journ. Linn. Soc.* xv. 320 (in part). *Phalangium nepalense*, Lindl. in *Trans. Hort. Soc.* vi. 277; *Bot. Reg. t.* 998; *Kunth Enum.* iv. 597. *Anthericum nepalense*, Spreng. *Syst. Cur. Post.* 135.

SUBTROPICAL HIMALAYA, from Nepal, Wallich, to Sikkim, alt. 3–7000 ft.

Root-fibres cylindric. *Leaves* 6–18 by $\frac{1}{4}$ – $\frac{3}{4}$ in., linear, often narrowed to the base. *Scape* 1–3 ft., branches ascending with long sheathing bracts at the base; floral bracts ovate, acuminate; flowers solitary or in clusters $\frac{1}{2}$ –1 in. apart; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., jointed at or below the middle. *Perianth* white, segments $\frac{1}{2}$ in. long; anthers straight after flowering. *Capsule* $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, top 3-lobed. *Seeds* $\frac{1}{10}$ in. broad, angular, black.—Very variable in size, small specimens have simple scapes.

10. **C. orchidastrum**, *Lindl. in Bot. Reg. t. 813; in Trans. Hort. Soc. vi. 79*; scape tall naked paniculately branched, branches spreading, bracts small, flowers in distant pairs, cells of the broad small capsule 1-seeded. *Kunth Enum. iv. 603; Baker in Journ. Linn. Soc. xv. 325*. *C. Nimmonii*, *Dalz. in Hook. Kew Journ. Bot. ii. 142; Dalz. & Gibs. Bomb. Fl. 252*. *Anthericum Nimmonii*, *Grah. Cat. Bomb. Pl. 220*. *Hartwegia Nimmonii*, *Dalz. mss. Phalangium oligospermum*, *Wight Ic. t. 2038*.

The DECCAN PENINSULA, from the Concan southward to Travancore.—DISTRIB. Tonkin, Trop. Africa.

Root-fibres tuberous. *Leaves* 12–24 by $1\frac{1}{2}$ –4 in., elliptic-lanceolate. *Scape* 1–3 ft., branches long ascending bracteate at the base; bracts ovate; flowers geminate drooping; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. jointed about the middle. *Perianth-segments* $\frac{1}{2}$ in., white. *Capsule* $\frac{1}{2}$ in. diam., broader than long, 2-lobed at the tip. *Seeds* solitary, orbicular or oblong, flat, opaque.

11. **C. laxum**, *Br. Prodr. 277*; leaves subdistichous usually strongly recurved, scape filiform flexuous, flowers minute, anthers didymous many times shorter than the filaments, cells of broadly obcordate capsule 1–4-seeded. *Kunth Enum. iv. 603*. *C. laxiflorum*, *Baker in Journ. Linn. Soc. xv. 328; Benth. Fl. Austral. vii. 60*. *C. falcatum*, *Baker in Saund. Refug. Bot. t. 333*. *C. parviflorum*, *Dalz. in Hook. Kew Journ. ii. 141; Dalz. & Gibs. Bomb. Fl. 251; Thw. Enum. 339*. *C. abyssinicum*, *Kotschy & Peyr. Pl. Tinn. 46*. *Phalangium falcatum*, *Wall. Cat. 5057; Kunth l. c. 600*. *P. ? parviflorum*, *Wight Ic. t. 2309*. *Anthericum parviflorum*, *Benth. Fl. Hongk. 373*. *Ornithogalum falcatum*, *Herb. Wight. Nolina ? javanica*, *Hassk. Hort. Bogor. 27; Miquel Fl. Ind. Bat. iii. 554*.

The DECCAN PENINSULA; from the Concan southward, common, and in CEYLON.—DISTRIB. Borneo, China, Trop. Africa and Austral.

Root-fibres tuberous. *Leaves* 6–12 by $\frac{1}{2}$ – $\frac{3}{4}$ in., grass-like or conduplicate or flat, rather rigid. *Scape* 1–12 in., suberect or arched; flowers $\frac{1}{2}$ –1 in. apart; bracts lanceolate, equalling the pedicels which are jointed in the middle. *Perianth* white, segments $\frac{1}{2}$ – $\frac{3}{4}$ in.; anthers green. *Capsule* $\frac{1}{4}$ in. diam. *Seeds* angular, $\frac{1}{10}$ in. diam.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

12. **C. ACAULE**, *Baker in Journ. Linn. Soc. xv. 327*; root fibres smaller, leaves 6–9 by $\frac{1}{4}$ – $\frac{1}{2}$ in. narrowly linear, flowers 2–5 in a sessile corymb at the bases of the leaves, fruiting pedicels erect $\frac{1}{4}$ – $\frac{1}{2}$ jointed, capsule $\frac{1}{2}$ in. oblong emarginate, cells turgid 3–5 seeded, seeds rather tumid black opaque.—India, *Jerdon*.—The only specimen is flowerless. It is perhaps a state of *C. laxum*.

PHALANGIUM NIVEUM, *Poirot Encycl. 248; Kunth Enum. iv. 599*. *Anthericum niveum*, *Schult. f. Syst. vii. 480*, from India, *Sonnerat*, with long very dense-fl. spikes, snow-white bracts as long as the flowers and a scape 12–15 in.; may be *attenuatum*.

16. **DIANELLA**, *Lamk.*

Roostock usually branched, and stoloniferous. *Leaves* rigid, distichous, linear, bases often equitant. *Flowers* in cymose panicles, nodding; pedicels jointed at the top. *Perianth* marcescent; segment 6, distinct, spreading. *Stamens* 6, hypogynous, or the 3 inner on the bases of the segments, filaments much thickened; anthers basifixed between the lobes, reflexed, opening by terminal pores or short slits. *Ovary* 3-celled; style filiform, stigma minute; cells 4–8-ovuled. *Berry* blue. *Seeds* few, ovoid

or compressed; testa black, shining; albumen fleshy.—Species 7 or 8; tropical Asiatic, Mascarene, Australia and Polynesia.

D. ensifolia, *Redouté Lil.* t. 1; stem leafy, sheaths acutely keeled, filament greatly thickened at the very top. *Kunth Enum.* v. 50; *Baker in Journ. Linn. Soc.* xiv. 576; *Benth. Fl. Austral.* vii. 16; *Bot. Mag.* t. 1404; *Miquel Fl. Ind. Bat.* iii. 560; *D. odorata*, *Blume Enum.* i. 13; *Kunth.* l. c. 51: *D. nemorosa*, *Lamk. Encycl.* ii. 276; *Jacq. Hort. Schoenb.* i. 49, t. 94, *Wall. Cat.* 5169; *Miquel l. c.*; *Roxb. Fl. Ind.* ii. 164. *D. javanica*, *Kunth l. c.* 52; *Miquel l. c.* 561. *D. sandwicensis*, *Hook. & Arn. Bot. Beech. Voy.* 97. *Rhuacophila javanica*, *Blume l. c.* 14. *Antherium Adenanthra*, *Forst. Prodr.* No. 149. *Phalangium Adenanthra*, *Poir. Encycl.* v. 252.

TROPICAL HIMALAYA, from Nepal eastwards, alt. 2–5000 ft., the KHASIA HILLS, MUNNIPORE, and BURMA. CEYLON ascending to 4000 ft.—DISTRIB. Eastwards to Australia and the Pacific, Mascarene Islds.

Stem 3–6 ft., rigid. *Leaves* lower 1–2 ft. by $\frac{3}{4}$ –1 $\frac{1}{2}$ in., linear-lanceolate, keel and margins smooth or scabrid; sheaths long. *Panicle* 1–2 ft., cuneiform, pedicels short, rigid, slender; bracts spathaceous; flowers inodorous. *Perianth* white greenish or bluish, segments $\frac{1}{4}$ – $\frac{1}{2}$ in.; 3 inner reflexed. *Anthers* linear, 2-porose. *Berry* dark purple, or blue, $\frac{1}{2}$ in. diam., cells 1–3- or more seeded. *Seeds* ovoid, subacute.

17. ALLIUM, Linn.

Fœtid scapigerous herbs; bulbs coated. *Leaves* usually narrow, often fistular. *Flowers* capitate or umbelled, all at first enclosed in 1–3 membranous spathes, stellate or campanulate; sepals 6, free or connate below. *Stamens* hypogynous or inserted on the perianth; filaments free or connate below, anthers oblong. *Ovary* 3-gonous, 3-celled: style filiform, stigma minute, cells few-ovuled. *Capsule* small, loculicidal. *Seeds* few, compressed, testa black.—Species about 250, in all N. temp. regions.

In the following account of the Indian *Allia* I have been much aided by Regel's "Alliorum Monographia" and Baker's paper in the Journal of Botany, but I am far from satisfied as to the limitation of the sections, and the disposal of the species in them. Further, I expect that more complete Indian and Central Asiatic collections may modify the results given below. The following species are extensively cultivated in India:—

A. ASCALONICUM, *Linn.*; *Roxb. Fl. Ind.* ii. 142. *A. Sulvia*, *Ham. in Don Prodr.* 53. *A. fragrans* β *nepalensis*, *Bot. Reg.* t. 898. *Nothoscordium*? *Sulvia*, *Kunth Enum.* iv. 402; leaves basal and scape stout fistular, head globose very many-fld., pedicels very short, perianth white stellate, inner filaments 2-toothed.—The Shallot.

A. AMPELOPOEASUM, *Linn.* *A. Porrum*, *Linn. Roxb. l. c.* ii. 141; *Wall. Cat.* 5074; stem leafy, leaves linear flat keeled shorter than the tall terete scape, head globose very many- and dense-fld., pedicels longer than the campanulate white flowers, inner filaments 2-toothed.—The Leek.

A. CEPA, *Linn.*; *Roxb. l. c.* 142; *Wall. Cat.* 5072. *A. Cumaria*, *Herb. Ham.*; leaves subdistichous fistular shorter than the inflated scape, head bearing flowers and bulbils, pedicels shorter than the stellate flowers, sepals linear-oblong, filaments exerted simple or the inner 2-toothed at the base.—The Onion.

A. SATIVUM, *Linn.*; *Roxb. l. c.* 142; leaves flat, scape slender, spathes long-beaked, heads bearing bulbils and flowers, sepals lanceolate acuminate, inner filaments 2-toothed.—The Garlic.

Sect. I. SCHENOPRASUM. *Bulbs* free or clustered, not seated on a root-stock. *Leaves* and *scape* fistular or filiform. *Stamens* inserted usually much above the base of the perianth; filaments dilated and connate at the base.

* *Leaves fistular.*

1. **A. Semonovii**, *Regel Enum. Pl. Semenoff*, 126; *All. Monogr.* 85; leaves 2-3 stout about equalling the stout scape, sheaths very long, head subglobose dense-fld., pedicels shorter than the campanulate pale yellow flowers, sepals oblong-lanceolate acuminate, filaments included outer cuspidate inner 2-toothed. *Baker in Journ. Bot.* 1874, 293.

WESTERN HIMALAYA, alt. 8-14,000 ft., from Kashmir to Garwhal.—DISTRIB. Alatau and Thian-chan Mts.

Bulbs tufted, cylindric, scales membranous. *Leaves* $\frac{1}{2}$ - $\frac{1}{2}$ in. diam., acute. *Heads* $\frac{1}{2}$ in. broad; spathes persistent. *Sepals* $\frac{1}{2}$ - $\frac{2}{3}$ in.

2. **A. Schoenoprasum**, *Linn. Sp. Pl.* 301; leaves 1-2 slender, heads subglobose dense-fld., pedicels equalling or shorter than the campanulate pink or pale purple flowers, sepals linear or lanceolate, filaments included all simple filiform dilated at the base. *Regel All. Monogr.* 77; *Baker in Journ. Bot.* 1872, 292; *Boiss. Fl. Orient.* v. 250; *Reichb. Ic. Fl. Germ.* t. 1085. *A. sibiricum*, *Linn. Mant.* 562.

WESTERN HIMALAYA, alt. 8-11,000 ft.; from Kashmir to Kumaon.—DISTRIB. Westwards to the Atlantic, N. America.

Bulbs clustered, narrow; scales membranous. *Leaves* 4-10 in., terete or grooved above, smooth or scaberulous; sheaths elongate. *Scape* 6-14 in., stout or slender. *Sepals* $\frac{1}{2}$ - $\frac{2}{3}$ in., bearing the stamens near their bases. *Capsule* small, globose, cells 2-seeded.—Chives.

3. **A. atrosanguineum**, *Schrenk in Bull. Acad. Petersb.* x. 355; leaves 1-2 stout as long as the scape, head subglobose dense-fld., pedicels about equalling the campanulate dark red flowers, sepals oblong obtuse or subacute, filaments short triangular-subulate connate at the base. *Ledeb. Fl. Ross.* iv. 168; *Kunth Enum.* iv. 684; *Regel All. Monogr.* 83.

WESTERN HIMALAYA; Kashmir at Gilgit, *Tanner*.—DISTRIB. Turkestan.

Bulb narrow, coats membranous at length fibrous. *Leaves* fistular, 8-12 by $\frac{1}{2}$ - $\frac{1}{4}$ in., linear, obtuse; sheaths very long. *Scape* stout, fistular. *Head* $\frac{1}{2}$ -1 in. diam.; spathes persistent. *Perianth* $\frac{1}{4}$ - $\frac{1}{2}$ in. long; segments united below; filaments subequal, inserted at $\frac{1}{2}$ distance from their base, about $\frac{1}{2}$ as long as the perianth. *Ovary* globose; style short.—The Gilgit specimens have rather smaller flowers with more obtuse segments than the Turkestan.

4. **A. Fedschenkoanum**, *Regel All. Monogr.* 82; leaves 1-2 much shorter than tall stout scape, head globose dense-fld., pedicels about equalling the campanulate pale yellow flowers, sepals oblong-lanceolate acuminate, filaments very short inner with a dilated 2-toothed base outer simple.

WESTERN HIMALAYA; Kashmir, at Barzil, alt. 12,000 ft., *Clarke*.—DISTRIB. Turkestan.

Bulb 0. *Leaves* 3-5 by $\frac{1}{2}$ in., fistular, obtuse; sheath very long. *Scape* 2-3 ft. by $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. *Head* $\frac{1}{2}$ -1 in. diam.; spathes persistent; pedicels stout. *Perianth*-segments $\frac{1}{2}$ - $\frac{1}{2}$ in., united below; filaments united at $\frac{1}{2}$ distance from the base, connate, not $\frac{1}{2}$ the length of the perianth. *Capsule* globose, style very short.—The dilated bases of the inner stamens are certainly 2-toothed.

** *Leaves filiform.*

5. **A. rubellum**, *M. Bieb. Fl. Taur. Cauc.* i. 264; leaves $\frac{1}{2}$ -terete or flattish, head subglobose, pedicels much longer than the very small campanulate rosy flowers, sepals oblong- or elliptic-oblong acuminate, filaments included cohering at the very base all simple linear-lanceolate from a broad cuneate base inner broadest. *Regel All. Monogr.* 106; *Fl. Turkest.* t. 10, f. 9; *G. Don Monogr. All.* 36; *Kunth Enum.* iv. 399; *Boiss. Fl. Orient.* v. 253; *Baker in Journ. Bot.* 1874, 290. *A. rubellum* and *grandiflorum*, *Ledeb. Fl. Ross.* iv. 171. *A. leptophyllum*, *Wall. Cat.* 5073 A; *Kunth l. c.* 456. *A. Jacquemontii*, *Kunth l. c.* 399. *A. longisepalum*, *Bert. in Nov. Comm. Acad. Bonon.* v. 429. *A. tenue*, *G. Don Monogr. All.* 34; *Koch in Linnæa*, xxii. 238.

The PANJAB and WESTERN HIMALAYA, alt. 1500–8000 ft.; from Kashmir to Kumaon.—DISTRIB. Westwards to the Ural and Caucasus, and in Siberia.

Bulb small, ovoid-oblong, outer coats striate, inner membranous. *Leaves* 4–6, longer than the scapes, margins erose; sheaths elongate. *Head* $\frac{2}{3}$ –1 in. diam., spathe entire or 2–4-fid at length circunciss. *Sepals* $\frac{1}{2}$ – $\frac{1}{6}$ in., twice as long as the stamens, which are subbasal on the sepals. *Style* short.—I have followed Boissier in the limitation of this species and its varieties. *Regel* refers Don's *tenue* to *A. Pallasi*, *Bunge.*, which is described as having a long style; he retains as a species Boissier's *A. Griffithianum*, which the latter author has reduced to a variety of *rubellum*.

VAR. β. grandiflora, *Boiss. Fl. Orient.* v. 253; pedicels longer, flowers larger, sepals $\frac{1}{2}$ – $\frac{1}{3}$ in. long subacute, filaments much shorter and broader. *A. Griffithianum*, *Boiss. Diagn. Ser.* 2, iv. 117; *Regel All. Monogr.* 108; *Baker l. c.* 290. *A. vulcanicum*, *Boiss. in Plant. Kotsch. Pers. Bot.* No. 49.—Kashmir, alt. 5–7000 ft. Westward to Persia.

VAR. γ. parviflora, *Ledeb. Fl. Ross.* iv. 171; flowers smaller, sepals $\frac{1}{6}$ in. long. *A. syntamanthum*, *C. Koch in Linnæa*, 22, 239; *Regel All. Monogr.* 110.—Western Himalaya. Westward to S. Russia.

6. **A. lilacinum**, *Royle mss.*; leaves terete or channelled longer or shorter than the scape, head hemispheric, pedicels twice as long as or longer than the campanulate small pale red flowers, sepals ovate or ovate-lanceolate acute or obtuse, filaments exserted inner 2-toothed at the very base. *Regel All. Monogr.* 89. *A. rubens*, *Baker in Journ. Bot.* 1874, 293 (not of Schrad.).

WESTERN HIMALAYA, alt. 6–7000 ft.; from Garwhal westwards.

Bulb ovoid; coats scarious, red-brown. *Leaves* 2–3. *Scape* 8–10 in., fistular. *Head* 1–1½ in. diam.; spathes 2, acuminate; pedicels $\frac{1}{4}$ – $\frac{1}{3}$ in. *Sepals* $\frac{1}{4}$ in. long, with the filaments inserted near their bases; anthers large.

Sect. II. RHIZIRIDIUM. *Bulbs* solitary or clustered upon an erect or creeping rootstock. *Leaves* flat.

A. Scales of bulb membranous, not of reticulated fibres.

* *Stamens longer than the perianth.*

7. **A. blandum**, *Wall. Pl. As. Rar.* iii. 38, t. 260; tall, stout, leaves flat broadly linear obtuse shorter than the tall scape, head globose very dense-fld., pedicels shorter than the campanulate pale pink flowers, sepals oblong obtuse, filaments simple subulate much exserted. *Kunth Enum.* iv. 396; *Baker in Journ. Bot.* 1874, 295. *A. obtusifolium*, *Klotzsch & Garcke, Bot. Reise Pr. Wald.* 51, t. 95.

WESTERN HIMALAYA, alt. 13–17,000 ft.; in the interior ranges, and in WESTERN TIBET, from Kumaon to West Nepal.

Bulb large, oblong, often 5 by $1\frac{1}{2}$ in.; scales coriaceous, entire. *Leaves* 5–10 by $\frac{1}{2}$ – $\frac{1}{3}$ in., ensiform, recurved, tip rounded. *Scape* 1–2 ft., terete, leafy below the middle. *Head* 1– $1\frac{1}{2}$ in. diam.; spathes ovate, obtuse. *Sepals* $\frac{1}{2}$ in. long. *Filaments* much longer than the sepals, inserted near their bases, rather longer than the style.

8. **A. Stracheyi**, *Baker in Journ. Bot. N. S.* iii. (1874) 293; slender, leaves narrowly linear obtuse, scape slender compressed above, head globose or hemispheric dense-fl., pedicels shorter than the campanulate rosy or pale yellow flowers, sepals oblong obtuse, filaments simple free much exserted. *Regel All. Monogr.* 135. *A. longistamineum*, *Royle Ill.* 392 (*name only*).

WESTERN HIMALAYA; from Kashmir, alt. 9000 ft., *Clarke*, to Kumaon, alt. 10–12,000 ft., *Strachey & Winterbottom*, *Edgeworth*.

Bulbs small, clustered, narrowly ovoid, outer scales fibrous, produced into a long neck. *Leaves* 3–4, 12 by $\frac{1}{2}$ in., tips rounded. *Head* 1 in. diam.; spathes small, deltoid; pedicels $\frac{1}{2}$ – $\frac{1}{3}$ in., about as long as the sepals. *Filaments* filiform, inserted on the bases of the sepals. *Ovary* globose trigonous, cells 2-ovuled.—The Kashmir specimens have very pale yellow flowers.

9. **A. consanguineum**, *Kunth Enum.* iv. 431; leaves slender narrowly linear obtuse flat keeled, head hemispheric, pedicels equalling or rather longer than the campanulate golden yellow flowers, filaments simple filiform much longer than the oblong obtuse sepals. *Regel All. Monogr.* 131; *Baker in Journ. Bot.* 1874, 293.

WESTERN HIMALAYA; Kashmir, alt. 8–10,000 ft., *Jacquemont*, *Thomson*, &c.

Habit and characters of *A. Stracheyi*, but larger, flowers golden yellow, with longer pedicels, and larger longer bulbs with fibrous sheaths. *Filaments* inserted on the bases of the sepals. *Style* slender, far exserted.

10. **A. platyspathum**, *Schrenk Enum. Pl. Nov.* i. 7, ii. 8; leaves radical linear obtuse about equalling the tall scape, head subglobose, pedicels about equalling the rosy flowers, sepals oblong-lanceolate obtuse or subacute, filaments simple, bases dilated. *Kunth Enum.* iv. 453; *Regel Monogr. All.* 135; *Ledeb. Fl. Ross.* iv. 184 (*excl. var. β*).

WESTERN TIBET; (Var. β , only), *Herb. Calcut.* (Regel).—DISTRIB. Kansu.

Bulb solitary or clustered, on a short perpendicular rootstock, scales hyaline, quite entire, outer dark. *Leaves* flat, sheaths hypogeous.—I have seen no specimen of this variety, which *Regel* suggests may be a different species.—The type inhabits Soongaria and Turkestan.

VAR. β . *falcata*, *Regel l. c.*; leaves ligulate glaucous falcate, head globose dense-fl., flowers rose-lilac.

11. **A. Thomsoni**, *Baker in Journ. Bot.* 1874, 294; leaves rather stout linear fleshy obtuse shorter or longer than the scape, head globose, pedicels equalling or shorter than the red-purple campanulate flowers, sepals oblong-lanceolate acute, filaments simple filiform much exserted, anthers minute. *Regel All. Monogr.* 141.

KASHMIR; alt. 12,000 ft., *Thomson*.

Bulbs tufted, narrowly ovoid; outer scales hard, chestnut-brown, entire. *Leaves* 4–5, 6–9 by $\frac{1}{2}$ – $\frac{1}{3}$ in., sheathing the lower third of the stout terete scape, which is 1–2 ft. long, tip rounded. *Head* 1– $1\frac{1}{2}$ in. diam.; spathes short, deltoid. *Sepals* $\frac{1}{2}$ in. long, with the filaments on their bases. *Ovary* globose, cells 2-ovuled, style

much exserted.—Baker observes that this is closely allied to *A. blandum*, differing in the slender habit, narrower leaves, and longer more acute sepals.

12. **A. Bakeri**, *Regel All. Monogr.* 141; leaves basal narrowly linear, scape tall slender, head lax-fld., pedicels much longer than the campanulate red-purple flowers, sepals orbicular or oblong obtuse, filaments simple linear-subulate inner dilated and 2-toothed at the base, anthers minute. *A. splendens*, *Miq. Ann. Mus. Bot. Lugd. Bat.* iii. 154. *A. exsertum*, *Baker in Journ. Bot.* 1874, 294 (not of Don). ? *Caloscordon exsertum*, *Herbert in Bot. Reg.* xxxiii. under t. 5.

KHASIA HILLS; alt. 4–5500 ft.—DISTRIB. China, Japan.

Bulbs clustered, 1 in. long, ovoid-oblong; scales white, membranous. *Leaves* 2–4, 6–9 by $\frac{1}{2}$ in., shorter than the slender terete scape. *Head* few- or many-fld.; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. *Sepals* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, with the filaments on their bases. *Ovary* subglobose, style far exserted.

** *Stamens* equalling or shorter than the perianth.

13. **A. Wallichii**, *Kunth Enum.* iv. 443; tall, leaves long linear or ensiform flat longer than the stout triquetrous scape, head lax-fld., pedicels much longer than the stellate purple flowers, sepals linear narrow reflexed longer than the simple filaments elongate-subulate. *Regel All. Monogr.* 142; *Baker in Journ. Bot.* 1874, 291. *A. caeruleum*, *Wall. Cat.* 5076 (not of Pallas). *A. violaceum*, *Wall. mss.*

TEMPERATE HIMALAYA, alt. 8–13,000 ft. from Kumaon to Sikkim. Gilgit, Tanner.

Bulbs hardly developed, clustered, base of stem thickened, clothed with membranous entire and torn sheaths. *Leaves* basal, 2–3 ft. by $\frac{1}{2}$ – $\frac{3}{4}$ in., margins erose, narrowed to an acute point. *Scape* 1–2½ ft. *Head* 2–3 in. diam.; pedicels 1–1½ in.; spathe caducous, as long as the pedicels. *Sepals* $\frac{1}{2}$ in., obtuse; filaments inserted on their bases. *Capsule* turbinate.

14. **A. Hookeri**, *Thwaites Enum.* 339; slender, leaves basal linear membranous shorter than the tall subtrigonus scape 1-nerved, head globose laxly many-fld., pedicels much longer than the stellate white flowers, sepals linear acuminate about equalling the filiform filaments. *A. Wallichii*, var. *Regel All. Monogr.* 143.

KHASIA HILLS; at Kala Pana, alt. 5000 ft., J. D. H. & T. T. CEYLON; Newera Elia, alt. 7000 ft., *Thwaites*.

Bulb hardly any; base of stem clothed with long narrow membranous sheaths. *Leaves* 12–18 by $\frac{1}{2}$ – $\frac{3}{4}$ in., acute. *Scape* 1–2 ft.; heads 1½ in. diam.; spathe with a long tail; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in., capillary. *Sepals* $\frac{1}{2}$ in.; filaments inserted on their bases. *Capsule* obcordate; cells usually 1-seeded.

15. **A. sikkimense**, *Baker in Journ. Bot.* 1874, 292; leaves basal narrowly linear channelled shorter than the slender flexuous scape, head dense-fld., pedicels unequal longer or shorter than the campanulate lilac-purple flowers, filaments broadly subulate much shorter than the oblong subacute or obtuse sepals. *Regel All. Monogr.* 146.

SIKKIM HIMALAYA; in the inner ranges, alt. 11–14,000 ft., J. D. H., *Elwes*.

Bulbs tufted, slender, cylindric; outer scales of long parallel fibres. *Leaves* 2–3, 3–4 by $\frac{1}{2}$ – $\frac{3}{4}$ in. subacute. *Scape* 4–12 in. *Head* 6–15-fld.; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in.; spathe solitary, broadly ovate. *Sepals* $\frac{1}{2}$ to nearly $\frac{3}{4}$ in.; inner filaments with a broad triangular base adnate to the bases of the sepals; outer narrower free. *Capsule* 3-lobed. *Ovary* subglobose; style included, cells 2-ovuled.—Baker regards

this species as intermediate between the smaller vars. of *A. angulosum* and *Schænoprasum*.

B. Outer scales of the bulb of reticulated fibres, obscurely so in *tuberosum*.

* *Stamens longer than the perianth.*

16. **A. Jacquemontii**, *Regel All. Monogr.* 162; leaves basal filiform subterete shorter or equalling the slender strict scape, head globose or subglobose, pedicels shorter or longer than the lilac campanulate flowers, sepals oblong-lanceolate obtuse or subacute, filaments exerted subulate inner with a dilated 2-toothed base. *A. junceum*, *Jacquem. mss.*; *Baker in Journ. Bot.* 1874, 295 (not of *Smith*). *A. leptophyllum*, *Wall. Cat.* 5073 B.

WESTERN TIBET, alt. 12–14,000 ft., *Jacquemont, Thomson*; north of Kumaon, alt. 16,500 ft., *Strachey & Winterbottom*.

Bulbs tufted, cylindric, elongate; fibrous coats very finely reticulate, rusty brown. *Leaves* 3–6, 4–6 by $\frac{1}{4}$ in. *Scape* 3–9 in. *Head* 1–1½ in. diam.; spathes 2, membranous; pedicels $\frac{1}{3}$ – $\frac{1}{4}$ in. *Filaments* inserted much above the bases of the sepals, shortly exerted, inner obscurely toothed at the base. *Capsule* globosely ovoid; style very long—Much eaten in Western Tibet. *Baker* regards it as possibly a variety of the Siberian *A. lineare*, which has broader leaves and much broader inner filaments.

17. **A. auriculatum**, *Kunth Enum.* iv. 418; leaves narrowly linear flat obtuse stout shorter than the terete striate scapes, head globose very dense-fld., pedicels about equalling the very small campanulate purplish flowers, filaments as long as the oblong obtuse sepals, outer broadly subulate inner auricled at the base, stigma penicillate, *Baker in Journ. Bot.* 1874, 295.

WESTERN HIMALAYA; Kumaon, *Jacquemont*.

Bulb elongate, narrow, seated on an oblique rootstock; scales brown, reticulate, exactly as in *A. Jacquemontii*. *Leaves* 6–9 by $\frac{1}{4}$ – $\frac{1}{3}$ in., margins erose. *Scape* 12–18 in., strict. *Head* $\frac{1}{2}$ in. diam.; spathes 2–3, short, acuminate; pedicels $\frac{1}{3}$ in. *Sepals* $\frac{1}{2}$ in. long; filaments on the base of the sepals, outer rather shorter than the inner. *Ovary* subglobose.

18. **A. victorialis**, *Linn. Sp. Pl.* 295; leaves petioled elliptic-oblong-lanceolate obtuse or acute shorter than the terete scape, head drooping in bud then erect lax-fld., pedicels much longer than the stellate greenish white or yellowish flowers, filaments simple longer than the oblong subacute sepals gradually dilated from the middle to the base. *Kunth Enum.* iv. 432; *Don. Monogr. All.* 96; *Regel All. Monogr.* 170; *Baker in Journ. Bot.* 1874, 291; *Boiss. Flor. Orient.* v. 245; *Jacq. Fl. Austr.* iii. t. 216; *Reichb. Ic. Fl. Germ.* x. t. 508; *Redouté Lil.* v. t. 265; *Bot. Mag.* t. 1222. *A. ellipticum*, *Wall. Cat.* 5069; *Kunth l. c.* 456.

TEMPERATE HIMALAYA, alt. 7–13,000 ft., from Kashmir eastwards to Sikkim.—DISTRIB. Europe, N. Asia to Japan; N.-W. America.

Bulbs 2–3 in. long, clustered on an oblique rootstock, subconic or cylindric, outer scales fibrous, reticulate. *Stem* leafy. *Leaves* from below the middle of the scape, 6–10 by 1–3½ in., glaucous, rarely acuminate, narrowed into the petiole. *Scape* terete below, angled above. *Head* 1–1½ in. diam., spathes 2, shorter or longer than the flowers, pedicels $\frac{1}{2}$ –1 in. *Sepals* $\frac{1}{4}$ – $\frac{1}{2}$ in., spreading and reflexed; filaments inserted on the bases of the sepals, outer narrowly subulate, inner

lanceolate. Ovary broadly obcordate, style exserted. Capsule $\frac{1}{4}$ in. diam. cuneately obcordate.

Var. *angustifolia*; leaves $\frac{1}{2}$ – $1\frac{1}{4}$ in. broad, flowers pale pink.—Interior of Sikkim, alt. 10–12,000 ft. West Nepal, Duthie.

19. **A. Schrenki**, *Regel All. Monogr.* 172; leaves linear flat shorter than the terete striate scape, head globose, pedicels shorter than the purplish campanulate perianth, filaments simple shortly exserted.

HIMALAYA MTS., *Hort. Calcutt.* (Regel.).—DISTRIB. Siberia.

Bulbs subcylindric, inserted on a stout cylindric rootstock; outer scales densely fibrous, reticulate, brown. Leaves 3–4 below the middle of the scape, $\frac{1}{10}$ – $\frac{1}{8}$ in. broad. Scape 8–16 in., striate and grooved towards the top, strict or flexuous. Head many-fld.; spathes scarious, white, shorter than the head; flowering pedicels $\frac{1}{10}$ in., shorter than the perianth, at length $\frac{1}{2}$ in. Filaments unequal, outer linear-subulate, inner subulate from a lanceolate base. Ovary ovoid, 3-gonous; style at length very long, stigma capitate.—I have seen no Himalayan specimen. Regel says it differs from the widely diffused *A. strictum*, Sobrad. in the capitate stigma.

** *Stamens shorter than the perianth.*

20. **A. odorum**, *Linn. Mant.* 62; leaves many basal very narrowly linear flattish keeled shorter than the terete slender scape, head many or few-fld., pedicels much or rather longer than the small white campanulate perianth, filaments shorter than and adnate below to the obovate-oblong mucronate or subacute sepals triangular-lanceolate, style included. *Kunth Enum.* iv. 185; *Regel All. Monogr.* 175; (excl. *Syn. tuberosum*, &c.) *Baker in Journ. Bot.* 1874, 291; *Redouté Lil.* t. 98; *Bot. Mag.* t. 1142. *A. tataricum*, *Ait. Hort. Kew ed.* 2, ii. 233.

WESTERN TIBET; alt. 10–14,000 ft., Thomson. WESTERN NEPAL, alt. 13,000 ft., Duthie.—DISTRIB. N. Asia, Japan.

Bulb 1–4 in. clustered on an oblique jointed rootstock, subcylindric or conic; scales finely reticulate, white brown or blackish. Leaves many, 6–24 by $\frac{1}{10}$ – $\frac{1}{8}$ in., subacute. Scape terete or angled at the tip. Head 1– $1\frac{1}{2}$ in. diam.; spathes short, mucronate; pedicels short, filiform, angled, flowering $\frac{1}{2}$ in., fruiting $1\frac{1}{4}$ in. Sepals $\frac{1}{2}$ in., with usually a strong nerve. Filaments subequal, outer dilated at the base, inner ovate with a subulate tip. Ovary subglobose, trigonous. Capsule subglobose.

21. **A. tuberosum**, *Roxb. Hort. Beng.* 24; *Fl. Ind.* ii. 141; leaves 4–5 basal erect narrow-linear flat tall compressed or trigonous above, head lax-fld. pedicels much longer than the small white or pink stellate flowers, sepals oblong-lanceolate, filaments simple linear included connate below and perigynous, style short. *Baker in Journ. Bot.* 1874, 292; *Kunth Enum.* iv. 454; *Wall. Cat.* 5068. *A. Roxburghii*, *G. Don. Monogr. All.* 91; *Kunth l.c.* 454. *A. uliginosum*, *G. Don. l.c.* 60; *Kunth l.c.* 422. *A. senescens*, *Miq. Ann. Mus. Bot. Lugd. Bat.* iii. 154.

WESTERN HIMALAYA, *Royle*. KHASIA MTS., alt. 5–6000 ft. (apparently wild). *Griffith &c.* Cultivated in BENGAL, *Roxburgh*.—DISTRIB. China, Siam, Japan.

Bulbs elongate, cylindric, with white fleshy root-fibres; scales grey, fibrous. Leaves 6–12 by $\frac{1}{12}$ – $\frac{1}{8}$ in.; sometimes concave and twisted. Scape 1– $1\frac{1}{2}$ ft. Head 20–40-fld., hemispheric, 1– $1\frac{1}{2}$ in. diam., spathes 1–2 small; pedicels ascending, $\frac{1}{2}$ – $1\frac{1}{4}$ in. Sepals $\frac{1}{2}$ – $\frac{3}{4}$ in.; acute or obtuse, at length reflexed, filaments inserted on the bases of the sepals, gradually dilated from below the middle to the base, outer shorter, broader. Ovary globosely obovoid, deeply 3-lobed; stigma obscurely 3-toothed; cells 3-ovuled. Capsule obcordate.—Regel cites this as a synonym of *A. odorum*, and it is possible that it may be the cultivated form of that plant. Wallich's specimens are from the Mission Garden, Tranquebar.

22. **A. Govanlianum**, *Wall. Cat.* 5071; leaves many basal subdistichous linear flat obtuse about equalling the acutely angled scape, tip rounded, head many-fld., pedicels equalling or exceeding the white stellate flowers, sepals narrow at length reflexed, filaments very short perigynous subulate included bases dilated connate. *Baker in Journ. Bot.* 1874, 293; *Regel All. Monogr.* 177. *A. humile*, *Kunth Enum.* iv. 443; *Regel l.c.* *A. nivale*, *Jacquem. mss.*

TEMPERATE HIMALAYA; from Kumaon westwards, alt. 8–12,000 ft.

Bulbs and foliage as in *A. odorum*, from which it differs in the acutely angled scape, in the larger flowers with narrower sepals $\frac{1}{2}$ in. long, and much shorter stamens.—The name *humile* being quite inappropriate, except for a very dwarfed state, I follow Baker in retaining Wallich's, which commemorates the discoverer of the species.

23. **A. oreoprasum**, *Schrenk in Bull. Imp. Acad. Petersb.* x. 354; *Enum. Pl. Nov.* ii. 6; leaves basal narrowly linear flattish shorter than the striate scape, head few- or many-fld., pedicels longer than the rosy campanulate flowers, sepals oblong obovate with a recurved mucro, filaments simple connate below the middle included, *Ledeb. Fl. Ross.* iv. 185; *Regel. All. Monogr.* 180.

WESTERN TIBET; Zalung-Karpo Pass, alt. 10–17,000 ft., *Stoliczka (Regel)*.—

DISTRIB. Soongaria, Eastern Turkestan.

Bulb tufted, cylindric or elongate conic; outer scales rigid, appressed fibres strongly coarsely reticulated. *Leaves* 8–12 by $\frac{1}{8}$ – $\frac{1}{4}$ in., often minutely serrulate. *Scape* terete or somewhat 2-edged above. *Head* 1–1 $\frac{1}{2}$ in. diam., hemispheric, 6–12-fld., spathes 2, nearly as long as the pedicels which are $\frac{1}{2}$ – $\frac{3}{4}$ in., tips thickened. *Sepals* $\frac{1}{4}$ – $\frac{1}{2}$ in. long, midrib dark. *Filaments* inserted much above the bases of the sepals, $\frac{1}{2}$ shorter than these, all connate at the base, outer narrowly subulate, inner broadly subulate-lanceolate. *Ovary* globose, trigonous; style short, stigma capitate.—Described from Turkestan specimens, I have seen no Indian.

24. **A. Clarkei**, *Hook. f.*; leaves very many subbasal erect very narrowly linear or filiform shorter than the slender scape, head lax-fld., pedicels much longer than the stellate white flowers, filaments hardly as long as the linear-oblong acuminate sepals, inner broadly oblong obtusely-toothed below the middle.

KASHMIR at Skardo, alt. 7–11,000 ft., *Clarke*.

Bulb small, ovoid, 1 in., outer scales closely finely reticulated, pale. *Leaves* 4–8, 6–12 by $\frac{1}{10}$ – $\frac{1}{8}$ in., obtuse, flat. *Scape* 12–18 in., terete; head 1–1 $\frac{1}{2}$ in. diam.; spathes 2 one or both as long as the pedicels or shorter; pedicels $\frac{1}{2}$ – $\frac{3}{4}$ in. *Sepals* $\frac{1}{2}$ in., acuminate; filaments inserted near their bases, anthers large. *Ovary* subglobose; style included. *Capsule* broadly obcordate, $\frac{1}{2}$ in. diam.—Habit of *A. tuberosum*.

SECT. III. MOLIMUM. *Bulbs* not seated on a rootstock. *Leaves* flat or keeled. *Spathes* shorter than the head.

25. **A. atropurpureum**, *Waldst. & Kit. Pl. Rar. Hung.* i. 16, t. 17; leaves 2–3 basal narrowly linear-oblong or lanceolate shorter than the tall erect terete fistular scape, head large very many and dense-fld., pedicels much longer than the rose-purple stellate flowers, filaments subulate about equalling the linear-oblong or lanceolate sepals, base of ovary 3-foveolate. *Regel All. Monogr.* 247. *Don Monogr. All.* 90; *Kunth*

Enum. iv. 448; *Boiss. Fl. Orient.* v. 757; *Reichb. Ic. Fl. Germ.* x. t. 505. *A. robustum*, *Karel. & Kiril. Enum. Pl. Alt.* n. 855; *Kunth l.c.* 446; *Ledeb. Fl. Ross.* iv. 187; *Baker in Journ. Bot.* 1874, 289.

WESTERN HIMALAYA; from Kashmir, *Falconer*, to Kishtwar, alt. 8–10,000 ft., *Thomson*.—DISTRIB. Westwards to Hungary, Turkestan, Siberia.

Bulb subglobose, scales entire. *Leaves* 2–4, margins smooth, 1–2 ft. by 1–2 in., sheaths sometimes hirtellous. *Scape* 2–2½ ft., striate. *Head* usually hemispheric, 2–2½ in. diam., spathes 2–4, apiculate; pedicels ½–1 in., elongate in fruit. *Sepals* linear-oblong, subacute, pale or dark-purple, filaments inserted at their bases connate at the base, inner triangular below the middle, outer at the base only. *Ovary* subglobose or depressed; style short; stigma simple. *Capsule* globose.—Afghan specimens have leaves 2½ in. broad.

26. *A. loratum*, *Baker in Journ. Bot.* 1874, 290; leaves 3–5 linear-lanceolate flat flaccid ciliolate longer than the slender terete scape, head many and dense-fld., pedicels short but longer than the campanulate white perianth, filaments equalling the lanceolate acute sepals inner subulate outer linear with subulate tips.

WESTERN HIMALAYA and TIBET; Kishtwar and Banahal, alt. 10–14,000 ft., *Thomson*.

Bulb small, ovoid, outer scales membranous, grey. *Leaves* 2–5, 6–9 by ½–1 in., narrowed from above the base. *Scape* 3–6 in. *Head* 30–50-fld.; spathes 2, navicular, acute; pedicels ¾–1 in., tip thickened. *Sepals* ⅓–½ in.; midrib brown; filaments inserted on their bases. *Ovary* globose triquetrous; style very short.—*Baker* says that this, judging from the very imperfect specimens, closely resembles *A. narcissifolium*, *Linn.*, the handsomest of European species. Near *A. atropurpureum*, but the leaves are broader, and the head globose, with much shorter pedicels and paler flowers.

27. *A. macranthum*, *Baker in Journ. Bot.* 1874, 293; leaves many linear gradually acuminate keeled, scapes many grooved and ribbed, head lax-fld., pedicels much longer than the large campanulate dark purple flowers, filaments filiform equalling the oblong obtuse sepals. *Regel All. Monogr.* 182; *Bot. Mag.* t. 6789.

SIKKIM HIMALAYA; in the inner ranges alt. 12–13,000 ft., *J. D. H.*; *Elwes*.

Bulb narrow, coats membranous. *Leaves* 6–9, 18 by ¼–¾ in. *Scape* robust, 1–2 ft., pedicels 1–2 in., stout. *Sepals* ¾–1 in.; filaments inserted on their bases, dilated at the very base; anthers large. *Ovary* deeply 3-lobed, stigma capitate.—A very beautiful species, resembling *A. narcissiflorum*, *Vill.* *Regel* cites it in *Sect. Rhiziridium*, but it is not known to have a rootstock.

18. *DIPCADI*, *Medic.*

Tuberous scapigerous herbs. *Flowers* racemed. *Perianth* cylindric, of 6 erect segments, the outer recurved from about the middle, the inner at the tips only. *Stamens* included. *Capsule* short, broad, tridymous, loculicidal, many-seeded. *Seeds* flat; testa black, membranous.—Species about 20, S. European, W. Asiatic and African.

The Indian species want a thorough re-examination, with far better materials than I have access to.

* *Ovary stipitate.*

1. **D. montanum**, *Baker in Journ. Linn. Soc.* xi. 398; raceme many-fl., bracts lanceolate acuminate about equalling the pedicels, perianth $\frac{1}{2}$ – $\frac{2}{3}$ in. lobes of outer subequal as long as the tube ligulate. *Uropetalum montanum*, *Dalz. in Hook. Kew Journ. Bot.* ii. 152; *Dalz. & Gibs. Bomb. Fl.* 250.

ROHILKUND; at Delhi, *Vicary*. The CONCAN and WESTERN DECCAN, *Dalzell*.

Bulb small. *Leaves* 4–6 in., subfleshy, filiform, semiterete, deeply grooved above. *Scape* 6–9 in., terete; raceme 6–12-fl.; pedicels $\frac{1}{2}$ – $\frac{1}{3}$ in., longer or shorter than the lanceolate bracts. *Perianth* white or greenish, $\frac{3}{4}$ in., tubular-campanulate, lobes glandular at the tips. *Capsule* stipitate, $\frac{1}{2}$ in. diam. *Seeds* ellipsoid, $\frac{1}{8}$ in. long, flat.

2. **D. minor**, *Hook. f.*; racemes many-fl., bracts much shorter than the pedicels, perianth $\frac{1}{3}$ – $\frac{1}{2}$ in. lobes of outer as long as the tube.

The CONCAN; rocky places in Malwan, *Dalzell*.

The specimens are very indifferent and leafless; but the small size of the flowers at once distinguishes the species.

3. **D. concanense**, *Dalzell in Hook. Lond. Journ. Bot.* ii. 142; raceme few-fl., bracts triangular acuminate shorter than the pedicels, perianth $1\frac{1}{2}$ in. long, lobes much shorter than the tube subequal, outer ligulate. *Uropetalum concanense*, *Baker in Journ. Linn. Soc.* xi. 399; *Dalz. & Gibs. Bomb. Fl.* 250.

The CONCAN; Hewra Plain, rare, *Dalzell*.

Bulb small. *Leaves* few, 6–9 in., fleshy, filiform, semiterete, deeply grooved above. *Scape* 6–12 in., terete; raceme 2–6-fl.; pedicels $\frac{1}{2}$ – $\frac{1}{3}$ in. *Perianth* $1\frac{1}{2}$ in., white; lobes linear-oblong, obtuse, outer spreading, inner united to the middle, all glandular and papillose at the tip. *Capsule* stipitate, didymous, $\frac{1}{2}$ in. diam. *Seeds* $\frac{1}{2}$ in. long, oblong.

** *Ovary sessile or subsessile.*

4. **D. serotinum**, *Medic. in Act. Palatin.* vi. 431; leaves 6–18 in., scape 10–14 in., raceme elongate many-fl., bracts lanceolate about equalling the pedicels or longer, perianth $\frac{2}{3}$ in. long brown, lobes subequal three outer about equalling the tube, ovary sessile. *Baker in Journ. Linn. Soc.* xi. 397. *Uropetalum serotinum*, *Bot. Reg. under t.* 156; *Reichb. Ic. Fl. Germ.* x. 459; *Kunth Enum.* iv. 378. *Hyacinthus serotinus*, *Linn. Sp. Pl.* 317; *Cavan. Ic. t.* 30: *Redouté Lil. t.* 202. *Scilla serotina*, *Bot. Mag. t.* 859. *Urginea coromandeliana*, *Wight Ic. t.* 2064.

The PANJAB; Salt range, Mt. Tilla, *Aitchison*. KUMAON, in the Kali valley, alt. 7–8000 ft., *Duthie*.—DISTRIB. Europe.

Bulb ovoid. *Leaves* 6–12 by $\frac{1}{2}$ – $\frac{1}{3}$ in., acuminate. *Raceme* 4–6 in.; bracts about as long as the white or very pale pink flowers. *Flowers* $\frac{1}{2}$ – $\frac{2}{3}$ in. long, outer lobes of perianth revolute, inner erect with spreading tips. *Capsule* very variable, $\frac{1}{2}$ – $\frac{2}{3}$ in. diam., quadrate.—In a drawing from *Herb. Falconer* it appears that in this plant the flowers are very pale brown. In *Wight's* figure of *Urg. coromandeliana*, the flowers are those of an *Urginea*, but the foliage, capsule, &c., of *D. serotinum*.

5. **D. unicolor**, *Baker in Journ. Linn. Soc.* xi. 397; leaves 4–6 in., scape as long as very stout, bracts lanceolate about equalling the pedicel,

racemes few-fl., perianth $\frac{3}{4}$ in. long green lobes subequal, three outer about equalling the tube, capsule $\frac{1}{2}$ – $\frac{3}{4}$ in. broad.

SCINDE; on the lower hills, *Stocks*.

A much smaller and stouter plant than *D. serotinum* with green flowers. Capsule quadrate, retuse above and below. Seeds $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., orbicular.—Possibly a state of *D. serotinum*, but a very different-looking plant.

6. **D. hydsuricum**, *Baker in Journ. Linn. Soc.* xi. 397; leaves 4–6 in., scape tall, raceme elongate, bracts much shorter than the pedicels, perianth $\frac{3}{4}$ in. long green or pale pink. Uropetalum hydsuricum, *Edgew.* in *Trans. Linn. Soc.* xx. 88.

The PANJAB, at Loodiana, *Edgeworth*.

The short bracts are the best character of this species, which closely resembles *D. serotinum* in habit. In a drawing of what I take to be this, in Falconer's collection, the tube of the corolla is pale green, the lobes very pale pink.

19. **URGINEA**, *Steinh.*

Bulbous, scapigerous herbs. Flowers racemed. Perianth campanulate of 6 subequal segments. Stamens included. Capsule oblong, triquetrous, loculicidal, many-seeded. Seeds flat, testa black, membranous.—Species about 24, S. European, W. Asiatic, and African.

* Flowers appearing before the leaves.

1. **U. indica**, *Kunth Enum.* iv. 333; leaves $\frac{1}{2}$ –1 in. broad, flowers distant long-pedicelled drooping, bracts evanescent, perianth segments 3-nerved in the middle, capsule oblong. *Baker in Journ. Linn. Soc.* xiii. 222; *Dalz. & Gibs. Bomb. Fl.* 250. *U. senegalensis*, *Kunth l. c.* 334. *Scilla indica*, *Roxb. Fl. Ind.* ii. 147; *Grah. Cat. Bomb. Pl.* 220. *S. Cundria* and *S. denudata*, *Ham. in Wall. Cat.* 5062, A, B, C, E, H.

WESTERN HIMALAYA; Garwhal, Kumaon and the Salt Range, ascending to 6000 ft. BEHAR, the CONCAN and COROMANDEL coasts. BURMA, *Wallich*.—DISTRIB. Trop. Africa.

Bulb the size of an apple, bitter, nauseous. Leaves 6–18 in., subbifarious, linear, flat, acute. Scape erect, 12–18 in., brittle; raceme 6–12 in., erect; flowers very distant; pedicels 1–1 $\frac{1}{2}$ in., spreading or decurved. Perianth $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., greenish white, nerves green, tips rounded; filaments flattened below; style narrowly obconic. Capsule $\frac{1}{2}$ – $\frac{3}{4}$ in., subacute, cells 6–9-seeded. Seeds $\frac{1}{4}$ in. diam.

2. **U. coromandeliana**, *Hook. f. (not of Wight)*, leaves very narrow, flowers long-pedicelled drooping, bracts minute ovate acute persistent, sepals 1-nerved, inner bearded at the tips, style very short obconic. *Scilla coromandeliana*, *Roxb. Fl. Ind.* ii. 147.

COROMANDEL coast; on sand hills, *Roxburgh*.

Bulb globose, 1 $\frac{1}{2}$ in. diam. Leaves 6–8 by $\frac{1}{4}$ – $\frac{1}{2}$ in., subacute. Scape 12–18 in.; pedicels 1–1 $\frac{1}{2}$ in.; bracts $\frac{1}{2}$ in. Flowers dull green and purplish; sepals $\frac{1}{2}$ in. long, tips rounded; filaments clavate; style shorter than the ovary, narrowly obconic.—Described from *Roxburgh's* excellent drawing, and the characters given in his *Flora Indica*. *U. coromandeliana*, *Wight* is *Dipcade serotinum* (as his Herbarium proves) with the perianth and stamens very incorrectly represented.

3. **U. Wightiana**, *Hook. f.*; flowers long-pedicelled on the decurved or suberect raceme, bracts evanescent, sepals 1-nerved all bearded at the

tips, filaments dilated in the middle, style elongate. *U. indica*, *Wight Ic.* t. 2063 (sepals very incorrect) *excl. Syn. Kunth*. *Melanthium nudum*, *Herb. Heyne in Wall. Herb.* (misspelt *indicum* in Cat. 5062 D).

SOUTH DECCAN, *Heyne*; sand hills at Tuticorin and Coimbatore, *Wight*.

Very near *U. coromandeliana*, but differing as above. *Wight's* figure is good, except that he has made the sepals acuminate, and anthers too slender, very different from his specimens. His character is taken confessedly from Roxburgh's of *Scilla indica*, from which his figure and specimens differ totally.

**** Leaves and flowers appearing together.**

4. ***U. congesta***, *Wight Ic.* t. 2064 (*left-hand figure*); leaves appearing with the flowers, raceme many and dense-fld., flowers small suberect, bracts minute deltoid, perianth segments 1-nerved, capsule subglobose. *Baker in Journ. Linn. Soc.* xiii. 218.

DECCAN PENINSULA; on the sea coast, *Wight*. CEYLON; Dambulla, *Trimen*.

Bulb about 1 in. diam. *Leaves* 5-6 in., filiform, grooved above. *Scape* 6 in., flexuous; raceme 2-3 in.; pedicels $\frac{1}{2}$ - $\frac{1}{3}$ in., suberect. *Perianth* $\frac{1}{2}$ in. long, white and purplish; filaments flattened below broadly subulate, not longer than the linear oblong large anthers. *Capsule* $\frac{1}{2}$ in. broad; cells 3-4-seeded.—*Wight's* plate is very incorrect in respect of the perianth and stamens, *Trimen's* var. *rupicola*, (*Journ. Bot.* 1889, 167) differs in the laxer inflorescence.

5. ***U. polyphylla***, *Hook. f.*; leaves filiform, flowers suberect, bracts longer than the very short pedicels subulate with broad membranous auricles; sepals all thickened at the tips 5-nerved in the middle, filaments slender, style elongate. *Ornithogalum polyphyllum*, *Herb. Heyne in Wall. Cat.* 5062 F.

DECCAN PENINSULA? *Heyne*.

Bulb not seen. *Leaves* 8-10 by $\frac{1}{10}$ in., margins involute. *Scape* longer than the leaves, very slender; raceme terminal, 6-fld.; bracts $\frac{1}{2}$ in., persistent; sepals $\frac{1}{2}$ in. long, oblong-lanceolate, obtuse; filaments nearly as long as the sepals, style as long.—There is but one specimen in *Herb. Wall.*, without bulb, it resembles the Cape and European species, and is fastened down with *Urginea Wightiana* and *Dipcade serotina*.

20. **SCILLA**, *Linn.*

Bulbous, scapigerous herbs. *Flowers* racemed. *Perianth* persistent stellate or campanulate, segments recurved. *Capsule* globose, 3-lobed or tridymous, loculicidal, cells 1-2-seeded. *Seeds* obovoid or subglobose; testa thin, black.—Species about 80, Europe, As. temp.

1. ***S. indica***, *Baker in Saund. Refug. Bot.* iii. *App.* 12; in *Journ. Linn. Soc.* xiii. 250; leaves oblong or lanceolate, raceme very many-fld., perianth $\frac{1}{2}$ in. diam. *S. maculata*, *Baker in Journ. Linn. Soc.* l. c. *Ledebouria hyacinthina*, *Roth Nov. Sp.* 195; *Kunth Enum.* iv. 336; *Wight Ic.* t. 2040; *Wall. Cat.* 5170; *Grah. Cat. Bomb. Pl.* 220; *Dalz. & Gibs. Bomb. Fl.* 251; *Bot. Mag.* t. 3226; *Dene. in Jacquem. Voy. Bot.* t. 171. *L. maculata*, *Dalz. in Hook. Kew Journ.* ii. 143; *Dalz. & Gibs. l. c.* *Barnardia indica*, *Wight Ic.* t. 2041. *Melanthium hyacinthoides* & *Erythronium indicum*, *Herb. Madr.*

The DECCAN PENINSULA and CENTRAL INDIA, from the Concan and Nagpore

southwards, especially near the sea. CEYLON, at Trincomalee, *Glenie*.—DISTRIB. Abyssinia.

Bulb 1-2 in. diam. *Leaves* 3-6 in., very variable in breadth, petioled or not, often recurved, tips after reaching the ground bulbiferous, green or blotched with black. *Scape* 2-6 in.; raceme cylindric, 30-50 fld., pedicels $\frac{1}{4}$ - $\frac{1}{2}$ in.; bracts minute. *Flowers* greenish purple; filaments purple; ovary stipitate.—I can find no characters of *L. maculata*.

2. **S. Hohenackeri**, *Fisch. & Mey. in Bull. Soc. Nat. Mosc.* 1838, i. 256; leaves linear, raceme few or many-fld., perianth $\frac{3}{4}$ in. diam. *Baker in Journ. Linn. Soc.* xiii. 244; *Boiss. Fl. Orient.* v. 227. *S. cernua* var. *pluriflora*, *Ledeb. Fl. Ross.* iv. 157. *Hyacinthus purpureus*, *Griff. Notul.* 242; *lc. Pl. Asiat.* t. 275.

The PANJAB; *lc. Falconer*; Rawul Pindee, at Hussan, *Aitchison*.—DISTRIB. Afghanistan, Persia.

Bulb ovoid, $\frac{1}{2}$ -1 in. diam. *Leaves* 4-6, flaccid, 8-12 by $\frac{1}{8}$ - $\frac{1}{4}$ in. *Scape* 4-8 in., 6-12-fld.; bracts membranous. *Flowers* bright blue, scattered; sepals linear, obtuse, recurved from near the base, filaments narrowly lanceolate; anthers blue; cells of ovary 3-4-ovuled.

21. LILIUM, Linn.

Tall, bulbous, leafy, unbranched, usually very large fld. herbs. *Flowers* axillary or in terminal racemes. *Perianth* infundibular, segments 6, usually narrowly nectariferous at the base. *Stamens* hypogynous, anthers large dorsifixed versatile. *Style* long, stigma globose (rarely 3-fid as in *Fritillaria*). *Capsule* erect, coriaceous, loculicidal, very many-seeded. *Seeds* vertically compressed; testa pale, membranous, appressed.—Species about 50, N. temperate.

SECT. I. *Bulb* of narrow fleshy imbricating scales, without any outer coats. *Stamens* not diverging. *Stigma* capitate, obscurely 3-lobed. Eulirion.

* Leaves petioled, broadly cordate.

1. **L. giganteum**, *Wall. Tent. Fl. Nep.* 21, t. 12, 13 (*excl. syn.*); *Cat.* 5075; very tall, raceme many-fld., pedicels short, perianth white narrowly funnel-shaped. *Kunth Enum.* iv. 268; *Bot. Mag.* t. 4673; copied in *Fl. des Serres*, t. 771-2; and in *Belg. Hort.* iii. t. 21; *Duchart. Obs. Gen. Lis.* passim. *Baker in Journ. Linn. Soc.* xiv. 227; *Gard. Chron.* 1880, ii. fig. 18; *Elwes Monogr. Lil.* t. 11. *L. cordifolium*, *Don. Prodr.* 52.

TEMPERATE HIMALAYA; from Garwhal to Sikkim, alt. 5-10,000 ft. KHASIA HILLS, alt. 5-6000 ft.

Bulbs tufted, 3-4 in. diam.; scales subequal. *Stem* 6-12 ft., 2 in. diam. at base, fistular. *Leaves* 12-18 in. long and broad, penninerved; petiole of lower 9-12 in. *Raceme* 1-2 ft., bracts large; flowers 5-7 in. fragrant, drooping, tube purplish within; segments oblanceolate, tips rounded recurved. *Stamens* and style included, filaments decurved at the tip; anthers $\frac{1}{2}$ in., yellow. *Capsule* 2-3 in., obtusely angled; carpels refuse, septa pectinate. *Seeds* $\frac{1}{4}$ - $\frac{1}{2}$ in. broad, very thin.

** Leaves sessile, linear or lanceolate.

† Flowers white or greenish white.

2. **L. Wallichianum**, *Schultes f. Syst. Pl.* vii. 1689; leaves narrowly

linear, nerves 3-5 faint, perianth 6-10 in. narrowly tubular below then infundibular with the upper third recurved, stamens much shorter than the perianth, anthers 1 in. orange yellow. *Kunth Enum.* iv. 267; *Wall. Cat.* 5076; *Bot. Mag.* t. 4561; *Duchart. Obs. Gen. Lis.* 71; *Lindl. & Part. Fl. Gard.* 1850, 120, with woodcut; *Lemaire, Jard. Fleur.* t. 105-6; *Fl. des Serres*, t. 612; *Elwes Monogr. Lil.* iv. 267; *Baker in Journ. Linn. Soc.* xiv. 227. *L. longiflorum*, *Wall. Tent. Fl. Nep.* 40, t. 29. *L. Batisua*, *Ham. mss.*

WESTERN HIMALAYA; Nepal and Kumaon, alt. 3-4000 ft.

Bulbs small, on a creeping rootstock; scales many, short, ovate, acuminate. *Stem* 4-6 ft., base ascending, few-fl. *Leaves* 6-12 by $\frac{1}{4}$ - $\frac{3}{4}$ in. *Flowers* subsolitary, horizontal, sweet-scented, pedicel long; tube greenish outside; segments subequal, oblanceolate, 2 in. broad; style recurved at the top; stigma conoidal. *Capsule* $1\frac{1}{2}$ -2 in.

3. ***L. neilgherrense***, *Wight Ic.* t. 2031; leaves elliptic-lanceolate strongly nerved, perianth 8-12 in. narrowly tubular below then infundibular with the upper third recurved, stamens much shorter than the perianth, anthers $\frac{3}{4}$ in.; *Duchart. Obs. Gen. Lis.*, 71; *Baker in Journ. Linn. Soc.* xiv. 230; *Elwes Monogr. Lil.* t. vi. *L. neilgherrenicum*, *Lemaire Ill. Hort.* x. t. 353. *L. tubiflorum* and *Wallichianum*, *Wight, l. c.* t. 2033-4, 2035. *L. Metzii*, *Steud. in Hohenack. Pl. Exsicc. Ind. Or.* No. 954.

SOUTHERN DECCAN; Nilghiri and Pulney Mts., alt. 5-8000 ft., *Wight*, &c.

Very closely allied to *L. Wallichianum*, but the leaves are much shorter and broader, 3-5 by $\frac{3}{4}$ -1 in., and the perianth tube even longer.

4. ***L. Lowii***, *Baker in Bot. Mag.* t. 7232; leaves numerous short linear sessile, flowers corymbose or umbelled, perianth 3-4 in. broadly funnel-shaped recurved from about the middle, stamens shorter than the perianth, anthers in brown. *L. nepalense*, *Collett & Hemsl. in Journ. Linn. Soc.* xxvii. 133.

BURMA; in the Shan hills. *Collett*.

Bulb globose 2 in. diam., scales lanceolate. *Stem* 3-4 ft. *Leaves* 2-3 in. *Flowers* coriaceous, 3 in. diam., pedicels long; perianth segments nearly similar, 1 in. broad, white, or greenish externally, speckled with claret-brown in their lower halves; style as long as the stamens.—I have taken the characters from a ms. of Mr. Baker's drawn up from specimens that flowered in the nurseries of Messrs. Low & Co.

5. ***L. Bakerianum***, *Hemsl. & Collett in Journ. Linn. Soc.* xxviii. 138, t. xxii.; leaves short linear or lanceolate, flowers few long-pedicelled, perianth 3-4 in. campanulate, segments acute spreading from above the middle inner much the broadest, stamens much shorter than the perianth-anthers $\frac{1}{2}$ in. long.

BURMA; on the Shan hills, *Collett*.

Stem 2-4 ft., puberulous, 2-fl. *Leaves* 2 in., nerves obscure, costa and margins lepidote. *Flowers* erect; perianth segment spotted on the broad base, outer narrowly-lanceolate long-acuminate, inner oblanceolate tip rounded apiculate, margins furfuraceously puberulous.—Description from a single specimen as given by Hemsley l. c.

†† *Flowers* yellow.

6. ***L. nepalense***, *D. Don in Mem. Wern. Soc.* iii. 412; *Prodr. Fl. Nep.* 52; leaves lanceolate, perianth 4-5 in. broadly funnel-shaped from

the base recurved from beyond the middle, stamens exserted anthers 1 in. yellow. *Kunth Enum.* iv. 267; *Duchart. Obs. Gen. Lis.*, 64; *Wall. Pl. As. Rar.* iii. 67, t. 291; *Cat.* 5078; *Baker in Journ. Linn. Soc.* xiv. 231; *Elwes Monogr. Lil.* t. v.; *Bot. Mag.* t. 7053; *Gard. Chron.* 1880, ii. 77, f. 19. *L. ochroleucum*, *Wall. mss.*

WESTERN HIMALAYA, from Nepal to Simla, alt. 7–8000 ft.

Bulb unknown. *Stem* 2–3 ft., slender. *Leaves* 3–4 by $\frac{1}{2}$ – $1\frac{1}{2}$ in., 5–7-nerved. *Flowers* solitary or few and racemed or subumbelled, drooping, sweet-scented, tube greenish outside with a stout rounded keel, segment orange-yellow with purple dots or spots on the lower half of the recurved portion within, outer segments oblanceolate subacute, inner much broader, tips rounded; filaments bright red, rather spreading; style exserted.—The colours of the flower probably vary. A supposed variety with deep crimson green-tipped sepals is figured in *Gard. Chron.* 1888, ii. 412; but its flowers are much shorter than in the type form.

7. ***L. primulinum***, *Baker in Bot. Mag.* t. 7227; leaves lanceolate, flowers corymbose or umbelled long-pedicelled, perianth 5–6 in. funnel-shaped segments subequal, the upper half revolute, stamens exserted rather shorter than the perianth, anthers $\frac{3}{4}$ in. brown, style much longer than the stamens. *L. neilgherrense*, *Hemsl. & Collett in Journ. Linn. Soc.* xxviii. 138. *L. claptonense*, *Hort. Low.*

BURMA; in the Shan States, *Collett.*

Bulb large, globose, scales lanceolate. *Stem* 3–4 ft., erect, glabrous. *Leaves* 3–4 in. *Flowers* about 3 in a corymb or umbel, pedicel with a large leaf-like bract. *Flower* pale yellow, unspotted; perianth segments subequal, oblanceolate-oblong.—Described from Mr. Baker's account of a specimen that flowered with Messrs. Low & Co.

8. ***L. sulphureum***, *Baker in Bot. Mag. ined.*; leaves linear 1-nerved upper bulbiferous, perianth 7–8 in. broadly funnel-shaped recurved in the upper half, inner segments much broader than the outer, stamens rather shorter than the perianth, anthers 1 in. brown. *L. Wallichianum*, *var. superbum*, *Hort. Low.*; *Baker in Gard. Chron.* 1891, ii. 480.

UPPER BURMA, *Hort. Low.*

Bulb large, globose. *Stem* 6–7 ft. *Leaves* very many, 3–4 by $\frac{1}{2}$ in.; bulbils in upper large. *Flowers* pendant on long pedicels fragrant, pale sulphur-yellow, suffused with claret-colour outside; outer segments 1 in. broad, inner nearly 2 in.; filaments straight, yellow; style curved, rather longer than the anthers.—Described from Mr. Baker's notes.

SECT. II. *Bulb* and *stigma* of Sect. I., but stamens diverging (MARTAGON).

9. ***L. polyphyllum***, *Don in Royle Ill.* 388; leaves linear or oblanceolate, flowers whorled, perianth broadly infundibular segments revolute from the middle, stamens exserted, anthers $\frac{1}{2}$ in. long. *Kunth Enum.* iv. 677; *Klotzsch in Bot. Reis. Pr. Waldem.* 53; *Baker in Journ. Linn. Soc.* iv. 246; *Elwes Monogr. Lil.* t. 48. *L. punctatum*, *Jacquem. mss. ex Duchart. Obs. Gen. Lis.*, 77. *L. stylosum*, *Klotzsch mss.*

WESTERN TEMPERATE HIMALAYA; alt. 6–12,000 ft., from Kumaon to Kashmir, *Royle, &c.*—DISTRIB. Afghanistan.

Bulb narrow, of few long narrow subequal fleshy scales. *Stem* 3–4 ft., slender. *Leaves* 4–5 in., many-nerved, lower sometimes whorled, margins papillose. *Raceme* raised on the naked top of the stem, 4–10-fl.; bracts whorled; pedicels elongate, cernuous; flowers pendulous, 2 in. diam., fragrant, dull yellowish or greenish out-

side, white within speckled with long purple streaks; segments oblanceolate, $\frac{2}{3}$ in. broad; style very declinate.

Sect. III. *Bulb* with dark brown scarious coats. *Leaves* linear. *Stamens* not spreading. *Stigmas* 3-fid, lobes short, narrow, recurved. *NOTHOLIRION*.

10. **L. Thomsonianum**, *Royle Ill.* t. 92; stem 2-4 ft. very many-fld. *Duchart. Obs. Gen. Lis.* 68. *L. roseum*, *Wall. Cat.* 5077 B; *Belgic. Hort.* 1854, 129, cum *lc.*; *Berlin Gartenz.* 1884, 414, f. 125; *Gard. Chron.* 1884, i. 772, fig. 145. *L. longifolium*, *Griff. Itin. Notes*, 345; *Notul.* 241; *lc. Pl. Asiat.* t. 277. *Fritillaria*, *Thomsoniana*, *Don in Royle Ill.* 388; *Kunth Enum.* iv. 672. *Notholirion macrophyllum*, *Boiss. Fl. Or.* v. 191, excl. *syn.*

WESTERN HIMALAYA, alt. 5-7000 ft.; from Kumaon to Kashmir.—DISTRIB. Afghanistan.

Bulb 2-2 $\frac{1}{2}$ in., formed of lanceolate fleshy inner scales (bulbils) covered by dark brown loose scarious longitudinally undulate scales. *Stem* very stout. *Leaves* 8-12 by $\frac{1}{2}$ - $\frac{1}{3}$ in., flaccid, narrowed to very fine points. *Raceme* dense-fld., 1-2 ft. long; bracts lanceolate; pedicels short, stout. *Flowers* 2-2 $\frac{1}{2}$ in. long, sweet-scented, pale rose or rose-purple, segments narrowly spatulate, nectary 0. *Filaments* long; style much longer than the ovary, tip upcurved. *Capsule* 1 in.

11. **L. roseum**, *Wall. Cat.* 5077 A.; stem 12-20 in. few-fld. *Duchart. Obs. Gen. Lis.* 68; *Bot. Mag.* t. 4725. *L. Thomsonianum*, *Lindl. Bot. Reg.* 1845, t. 1. *L. Hookeri*, *Baker in Gard. Chron.* 1871, 201. *Fritillaria Hookeri*, *Baker in Journ. Linn. Soc.* xiv. 269; in *Bot. Mag.* t. 6385. ? *F. macrophylla*, *Don Prodr.* 51. *Notholirion roseum*, *Wall. mss. in Bot. Mag.* under t. 4725.

TEMPERATE HIMALAYA; Garwhal, at Mussoori (*Bot. Reg.*); Nepal, *Wallich*; Sikkim, alt. 9-10,000 ft., *J. D. H.*

A much smaller plant than *L. Thomsonianum*, with the bulb 1 $\frac{1}{2}$ in. long, the stem 1-2 ft., and the flowers varying from rose pink to pale lilac; but *Wallich* was probably right in thinking them varieties of one. *Notholirion* was taken up as a genus by Boissier and rightly attributed by him to *Wallich*, whose mention of it as a genus (not a section) was overlooked in *Gen. Plant.* *Don's F. macrophylla*, from Nepal, *Wallich*, with 3-4 flowers and a trifid stigma, must be meant for this plant, though he describes the flowers as yellow.

DOUBTFUL SPECIES.

L. NANUM, *Klotzsch Bot. Reis. Ergeb. Waldem.* 53; leaves linear grassy subobtusely strict erect 5-nerved, flowers small drooping campanulate white, perianth segments sessile oblong obtuse, stigma thickened trigonous puberulous, filaments subulate, anthers oblong obtuse base obtusely 2-fid.—Western Himalaya, *Hoffmeister*. (Translated from *Klotzsch, l.c.* I cannot imagine what it is.)

22. FRITILLARIA, Linn.

Characters of *Lilium*, but perianth campanulate or with segments spreading from near the naked or bearded base, nectaries usually broad, stigmas 3-fid with short spreading truncate divisions (as in Sect. III. of *Lilium*), rarely capitate and 3-lobed.—Species about 50, N. temp. regions.

* *Flowers solitary*. *Perianth segments spreading from near the base; stigma capitate, 3-lobed.*

1. **F. oxypetala**, *Royle Ill.* 388; leaves elliptic-lanceolate, perianth-

segments elliptic ovate acute, bearded above the nectary. *Lilium oxypetalum*, Baker in Journ. Linn. Soc. xiv. 234; *Elwes Monog. Lil.* t. 4, left-hand fig. ? *F. triceps*, Klotzsch Bot. Reis. Pr. Wald. 53, t. 93.

WESTERN HIMALAYA; Kuna-war, Royle; Kumaon, alt. 12,500 ft., Strachey & Winterbottom; Garwhal and W. Nepal, alt. 10-11,000 ft., Duthie.

Bulb 2 in. long; scales few, subequal, lanceolate, acuminate, outer membranous, inner fleshy. Stem 12-18 in., stout. Leaves $1\frac{1}{2}$ -3 by $\frac{3}{4}$ in. Flowers purple. Segments $1\frac{1}{2}$ -2 in., long. Style shorter than the ovary, stigma capitate, 3-lobed. Capsule 1 in., broadly oblong.—The flowers of *F. triceps* are described as white.

2. **F. Stracheyi**, Hook. f.; leaves narrowly linear, flowers solitary, perianth-segments elliptic-ovate acute bearded above the nectary. *F. oxypetala*, Hook. Bot. Mag. t. 4731; Lemaire Jard. Fleur. t. 422.

TEMPERATE HIMALAYA; Kumaon, Strachey (Hort. Kew); West Nepal, alt. 12-13,000 ft., Duthie; Sikkim, alt. 9-10,000 ft., J. D. H.

Bulb as in *F. oxypetala*, but much smaller. Stem 6-12 in., slender. Leaves 4-6 by $\frac{1}{2}$ - $\frac{3}{4}$ in.; radical linear-lanceolate, long-petioled, obtuse. Flowers pale purple speckled within below the middle; segments 1 in. long. Style as long as the ovary.

3. **F. Gardneriana**, Wall. Cat. 5080; leaves narrowly linear, flowers solitary, perianth-segments obovate-spathulate obtuse naked above the nectary. Baker in Journ. Linn. Soc. xiv. 265.

TEMPERATE HIMALAYA; Central Nepal, Wallich; Western Nepal, alt. 12-13,000 ft., Duthie.

Bulbs as in *F. Stracheyi*. Stem slender. Leaves 2-6 by $\frac{1}{2}$ - $\frac{3}{4}$ in. Flowers more infundibular than in the preceding species, with narrower segments, which are obtuse and only $\frac{3}{4}$ in. long. Style rather longer than the ovary.

** Flowers few or many. Perianth broadly campanulate. Stigma trifid, lobes spreading truncate.

4. **F. Roylei**, Hook. Ic. Pl. t. 860; leaves whorled or opposite linear-lanceolate acuminate straight, flowers solitary or few nodding tessellate, nectary broad naked. Baker in Journ. Linn. Soc. xiv. 257. *F. verticillata*, Wall. Cat. 5079 B, C, D (not of Willd.); Royle Ill. 387, t. 92, f. 2. *F. Gulielmi-Waldemarii*, Klotzsch Bot. Reis. Pr. Wald. 52, t. 92.

WESTERN TEMPERATE HIMALAYA; from Kumaon to Kashmir, alt. 8-12,000 ft. WESTERN TIBET, Thomson.

Bulb depressed, scales membranous. Stem 1-2 ft., naked below. Leaves 2-4 by $\frac{1}{2}$ - $1\frac{1}{2}$ in., opposite or 3-6 in a whorl, suberect. Flowers $1\frac{1}{2}$ -2 in. long, campanulate, yellow green, tessellated with dull purple, segments $\frac{1}{2}$ - $\frac{3}{4}$ in. broad. Stamens half the length of the perianth. Capsule, obovoid, obtusely angled.

5. **F. cirrhosa**, Don Prodr. 51; lower leaves opposite, upper whorled uppermost with cirrhose tips, flowers 1-2 tessellate, nectary broad naked. Kunth Enum. iv. 253; Baker in Journ. Linn. Soc. xiv. 257. *F. verticillata*, Wall. Cat. 5079 A (not of Willd.).

CENTRAL and EASTERN HIMALAYA; Nepal, Wallich; Sikkim, alt. 11-16,000 ft., J. D. H.

Very nearly allied to *F. Roylei*, and perhaps, as Wallich believed, a variety of that plant, the leaves are however larger and narrower and the uppermost have cirrhose tips.

6. **F. imperialis**, Linn. Sp. Pl. 303; leaves crowded lanceolate lower

opposite upper longer whorled, flowers umbelled yellow or brick-red not tessellate, nectary large rounded. *Baker in Journ. Linn. Soc.* xiv. 274; *Boiss. Fl. Orient.* v. 189; *Bot. Mag.* t. 194 and 1215; *Redouté Lil.* t. 131. *F. Corona-imperialis*, *Gærtn. Fruct.* i. 64, t. 17, f. 1. *Petilium imperiale*, *J. St. Hil. Fam. Nat.* i. 120; *Kunth Enum.* iv. 246.

WESTERN HIMALAYA; Kashmir, alt. 7-9000 ft., *Thomson, Clarke*.—DISTRIB. Westward to Kurdistan.

Bulb large, globose, of broad obtuse gibbous fleshy yellowish scales, strong-smelling. *Stem* 3-4 ft., robust, naked below. *Leaves* crowded, 6-10 by 1-2 in., lower obtuse, upper acute, often 10 in a whorl. *Flowers* 5-8; bracts leafy, whorled, erect, linear. *Perianth* 2-2½ in. long; segments ¾-1½ in. broad. *Filaments* flattened below. *Capsule* 2 in. long, obovoid, almost 6-winged, umbonate.—Crown Imperial.

23. **LLOYDIA**, *Salisb.*

Small slender bulbous herbs. *Leaves* filiform. *Flowers* few or solitary, small, white or yellow. *Perianth* funnel-shaped, suberect; segments 6, persistent, straight, 3-5-nerved, with an obscure basal fold or nectary. *Stamens* 6, subhypogynous, filaments erect, filiform; anthers basifixed. *Ovary* triquetrous; style columnar, sigma capitate, obscurely 3-lobed; cells many-ovuled. *Capsule* loculicidal. *Seeds* compressed and angled, testa appressed, brown or white.—Species 2 or 3, Northern.

L. serotina, *Reichb. Fl. Germ. Excurs.* 102; *Ic. Fl. Germ.* x. t. 440; *Kunth Enum.* iv. 244; *Baker in Journ. Linn. Soc.* xiv. 300; *Boiss. Fl. Orient.* v. 202. **L. alpina**, *Salisb. in Trans. Hort. Soc.* i. 328. **L. himalensis**. *Royle Ill.* 388, t. 93, f. 2; *Kunth l. c.* 672. **L. longiscapa**. *Hook. Ic. Pl.* t. 834. *Anthericum serotinum*, *Linn. Sp. Pl. Ed.* ii. 444. *Gagea ? pulchella*, *Wall. Cat.* 5064. *Nectarobothrium striatum*, *Ledeb. Fl. Alt.* ii. 36.

ALPINE HIMALAYA and TIBET; from Kashmir to Sikkim, alt. 12-17,000 ft.—DISTRIB. Alps of Europe, Asia and America.

Bulb elongate, ½-1 in., base rhizomatous, neck very long, coats membranous. *Leaves* 2-8 in., wiry, convolute. *Stem* 4-12 in., with 1-2 small leaves, rarely forked. *Flowers* suberect, white with violet veins or yellow, purple at the base; segments ½-¾ in., oblanceolate or spatulate, broad or narrow; nectary very small, green. *Stamens* ½-¾ shorter than the perianth; filaments glabrous pubescent or villous; anthers minute, very variable in shape. *Style* as long as the ovary. *Capsule* ¼-½ in., obovoid or obcordate. *Seeds* triquetrous, foveolate.—I am unable to find any character whereby to distinguish the yellow from the white fld. states, and, what is more remarkable, the specimens with hairy filaments (*L. longiscapa*, *Hook.*, *Gagea ? pulchella*, *Wall.*) pass into these with glabrous filaments and grow intermixed with them. A very minute tufted state, under an inch long, occurs at 13-14,000 ft. elevation in Sikkim with sepals only ⅓-¼ in. long. In a drawing which I made of the ordinary Sikkim form, the nectary is represented as a drop of fluid on the naked surface above the base of the sepal.

24. **TULIPA**, *Linn.*

Bulb coated. *Leaves* few, linear or oblong. *Scape* naked above, or 1-2-leaved, 1-3-fld. *Flowers* large, usually erect. *Perianth* campanulate; segments 6, quite free; nectary 0. *Stamens* 6, hypogynous; anthers basifixed, erect. *Ovary* oblong; stigmas 3, subsessile, recurved; cells 3, many-ovuled. *Capsule* loculicidal. *Seeds* flattened, testa membranous, pale, appressed.—Species about 50, temp. Europe, N. Africa and N. Asia.

1. **T. chrysantha**, Boiss. in Kotsch. *Pl. Pers. Bor. Exsicc.* 1846, No. 78; *Fl. Orient.* v. 193; bulb-scales woolly within, leaves linear or lanceolate undulate margins cartilaginous, perianth yellow within, without suffused with red, outer segments oblong acuminate, inner obovate obtuse or mucronate. *Baker in Journ. Linn. Soc.* xiv. 279. *T. Lehmanniana*, Merckl. in Bunge *Rel. Lehm.* 337. *T. undulata*, Jacquem. mss. Liliacea, Griff. *Ic. Pl. Asiat.* t. 278, f. 1.

The PANJAB, Jacquemont; Salt Range, Fleming.—DISTRIB. Afghanistan, Central Asia and N. Persia.

Bulb $\frac{3}{4}$ –1 in. diam. *Stem* 3–4 in. *Leaves* 4–5, glabrous, glaucous, lower 4–6 in., recurved, lanceolate, channelled, upper narrower. *Perianth* 1–1½ in. long; claws of the segments brown. *Anthers* longer than the glabrous filaments. *Ovary* with a narrow neck, stigmas small.—Bulbs eaten in Beluchistan.

2. **T. stellata**, Hook. *Bot. Mag.* t. 2762; bulb-scales woolly within, leaves narrowly linear channelled not undulate, perianth white within, base yellow, rosy or greenish without, segments all alike obtuse or subacute. *Kunth Enum.* iv. 223; *Baker in Journ. Linn. Soc.* xiv. 281 (*excl. syn. Kotschy*, No. 99). *T. Olusiana*, var. *stellata*, Regel *Enum. Tulip.* 54. *† Anthericum uniflorum*, Roxb. *Fl. Ind.* ii. 149.

TEMPERATE WESTERN HIMALAYA, alt. 5–8000 ft.; from Kumaon westwards.

Bulb $\frac{3}{4}$ –1 in. diam. *Stem* 12–18 in., slender, naked below. *Leaves* 4–6, 9–12 in., glabrous, glaucous, channelled. *Peduncle* 6–9 in. *Perianth* 1½–2 in. long, segments spreading, subspathulate oblanceolate. *Anthers* about as long as the very short glabrous filaments. *Ovary* with a narrow neck, stigmas small.—Roxburgh's drawing of *Anthericum uniflorum*, from Rohilkund, made from a specimen that flowered in the Calcutta Bot. Gardens, resembles nothing except this *Tulipa*, from which it differs in the long points to the anthers and in some roots from the base of the bulb being transformed into pedicelled tubers.

25. **GAGEA**, Salisb.

Small bulbiferous herbs, with a solitary leaf from the base of the bulb, and a short naked stem bearing more or less umbelliform leafy cymes or corymbs of flowers. *Perianth* stellate, usually yellow, nectary 0. *Anthers* erect, basifixed. *Capsule* membranous, loculicidal. *Seeds* many, flat or angled, testa membranous.—Species about 20, north temp. regions.

1. **G. lutea**, Schultz f. *Syst.* vii. 538; radical leaf linear or lanceolate, cauline 2 subopposite, flowers 3–6 subumbellate, sepals $\frac{1}{2}$ – $\frac{3}{4}$ in. long, capsule very small, seeds subterete curved. *Kunth Enum.* iv. 235; *Boiss Fl. Orient.* v. 207; *Reichb. Ic. Fl. Germ.* x. t. 477; *Bot. Mag.* t. 1200. *G. Moorcroftiana*, and *elegans*, Wall. *Cat.* 5063–5065.

WESTERN HIMALAYA; from Kumaon westwards, alt. 6–13,000 ft.—DISTRIB. Westward to the Atlantic, N. Asia.

Bulb solitary in the coats, about as large as a hazel-nut. *Radical-leaf* 3–8 by $\frac{1}{2}$ – $\frac{3}{4}$ in.; cauline subsimilar. *Stem* 2–5 in., glabrous or laxly villous. *Flowers* yellow; perianth segments linear-oblong, obtuse or acute; filaments about half as long; anthers oblong. *Capsule* not half as long as the perianth, broader than long.

2. **G. persica**, Boiss. *Diagn. Ser.* i. vii. 108; *Fl. Orient.* v. 210; radical leaf linear or linear-lanceolate, cauline very narrow, flowers many in unilateral dichotomous cymes, sepals $\frac{1}{2}$ in. long obtuse, capsule nearly as long

as the perianth, seeds compressed not angled or winged. *G. amblyopetala*, var. *bulbifera*, Boiss.; *Regel Fl. Turkest.* 112, t. 17 (non Boiss.). *G. stipitata*, Merkl. in *Bunge Rel. Haenk.* 512. *Bulbillaria gageoides*, Zucc. in *Abhandl. Akad. Wiss. Bay.* iii. 230, t. 2, f. 1. *Lloydia kunawarensis*, Royle *Ill.* 388, t. 93, f. 3.

WESTERN HIMALAYA; from Kunawur to Kashmir, alt. 5–8000 ft., Royle, &c.—DISTRIB. Westwards to Persia, Turkestan.

Bulb solitary in the coats. *Radical leaf* 4–6 by $\frac{1}{4}$ – $\frac{1}{2}$ in. *Stem* 4–6 in., glabrous, very slender. *Cymes* 1–2 in., often with bulbils in the axils of the short very slender pedicels. *Sepals* linear, obtuse; filaments nearly as long, anthers subdidymous. *Capsule* nearly as long as the perianth. *Seeds* compressed, not angled or winged.

3. *G. reticulata*, Schultes f. *Syst.* vii. 542; leaves all very long filiform recurved cauline numerous subverticillate, flowers many subumbellate, sepals $\frac{1}{2}$ – $\frac{3}{4}$ in. long acute or finely acuminate, capsule as long as the perianth, seeds flat angular. Boiss. *Fl. Orient.* v. 208; *Reichb. Fl. Germ.* x. t. 481; *Regel Fl. Turkest.* 110, t. 19, f. 1–4; *Expl. Alger.* t. 45 bis, f. 1. *G. taurica*, Stev. *Taur.* 335 (ex Boiss.) *G. commutata*, sarmientosa, and triphylla, C. Koch in *Linnaea*, xxii. 227–230. *G. pedunculata*, Wall. *Cat.* 5066.

The PANJAB PLAINS; ascending the Western Himalaya, Salt Range, &c., to 5500 ft.—DISTRIB. Westwards to Greece and N. Africa, Turkestan.

Bulb densely fibrilliferous. *Stem* 2–3 in., stout or slender. *Leaves* 4–8 in., cauline usually very many, and long, rarely few and short. *Flowers* numerous, very variable in size, green with a white border. *Anthers* linear-oblong.

26. *COLCHICUM*, Linn.

Corm coated. *Leaves* radical, linear or lanceolate. *Scape* very short, sessile amongst the leaf-sheaths, 1–3-fld. *Flowers* large, erect. *Perianth* funnel-shaped; tube very long and slender; lobes 6, subequal, suberect. *Stamens* 6, inserted in the bases of the segments, included; anthers dorsifixed, versatile, introrse. *Ovary* sessile, 3-celled; styles 3, long, filiform; cells many-ovuled. *Capsule* chartaceous, septicidal. *Seeds* subglobose; testa appressed brown.—Species about 30, Europe, N. Africa and temp. Asia.

G. luteum, Baker in *Gard. Chron.* (1874) 33; *Journ. Linn. Soc.* xvii. 434; leaves appearing with the flowers linear-oblong or oblanceolate obtuse, perianth golden yellow, tube 3–4 in., segments oblong or oblanceolate obtuse many-nerved. *Bot. Mag.* t. 6153. *Melanthaceæ*, Griff. *Notul.* iii. 241; *Ic. Pl. Asiat.* t. 278, f. 2.

WESTERN TEMPERATE HIMALAYA; Kashmir, alt. 4–7000 ft., Thomson, &c., Chamba, Ellis, &c.—DISTRIB. Afghanistan, Turkestan.

Corm gibbously ovoid, coats dark brown. *Leaves* few, lorate, short at the flowering time, at fruiting 6–12 by $\frac{1}{2}$ – $\frac{3}{4}$ in., tip rounded. *Flowers* 1–2 (in spring), 1–1 $\frac{1}{2}$ in. diam. when expanded. *Stamens* shorter than the perianth; filaments very much shorter than the long yellow anthers. *Style* filiform, much longer than the perianth. *Capsule* 1–1 $\frac{1}{2}$ in.; valves with long recurved beaks.

27. *MERENDERA*, Ramond.

Habit and characters of *Colchicum*, but with the perianth-segments free to their base, their long slender claws forming a tube, and the anthers

either basifixed or dorsifixed.—Species about 10, S. Europe, N. Africa and Oriental.

M. persica, Boiss. & Kotsch. *Diagn.* xiii. 37; *Fl. Orient.* v. 169; leaves appearing with the flowers linear acute, scape 1-4-fld., perianth pale lilac, segments lanceolate subacute, blade $\frac{1}{2}$ shorter than the slender claw, anthers basifixed. *Baker in Journ. Linn. Soc.* xvii. 440. *M. Aitchisoni*, *Hook. f. in Bot. Mag.* t. 6012; *Boiss. l. c.* 169.

The PANJAB; on the Salt Range, and near the Jhelum, *Vicary, Aitchison*.—**DISTRIB.** Afghanistan, N. Persia.

Bulb gibbously ovoid, long-necked, coats bright red-brown. *Leaves* 1-2 in. in the flowering state, 6-8 in the fruiting, dark green. *Flowers* $1\frac{1}{2}$ -2 in. diam.; segments with a reddish dorsal keel. *Filaments* subulate, equalling the anthers.—*Boissier* keeps *Aitchisoni* distinct from *persica*, on account of the paler corms, and shorter green anthers. *Baker* unites them.

28. IPHIGENIA, Kunth.

Corm coated. *Stem* erect, leafy. *Leaves* few, scattered, linear, upper bractiform. *Flowers* small, erect, solitary or corymbose. *Perianth* 6-partite, stellate, deciduous; segments equal, narrow, clawed, spreading. *Stamens* 6, hypogynous, filaments short, flat; anthers oblong, introrsely attached, versatile. *Ovary* sessile, 3-celled; styles minute, united at the base, linear, recurved, introrsely stigmatose; cells many-ovuled. *Capsule* loculicidal. *Seeds* subglobose; testa thin, brown, appressed.—Species 4, Indian, African and Australasian.

1. **I. indica**, *Kunth Enum.* iv. 213; perianth purplish, segments linear-subulate. *Baker in Journ. Linn. Soc.* xvii. 450; *Benth. Fl. Austral.* vii. 31. *I. racemosa*, and *I. caricina*, *Kunth l. c.* *Anguillaria indica*, *Br. Prodr.* 273; *Wall. Pl. As. Rar.* iii. 37, t. 259; *Cat.* 5085. *A. Heyneana*, *Wall. Cat.* 5086. *Melanthium indicum*, *Linn. Mant.* 226. *M. racemosum* and *caricinum*, *Roth Nov. Sp.* 199. *Hypoxidopsis pumila*, *Steud. Pl. Ind. Or. Hohenack.* No. 1313.

Throughout INDIA, from the N. W. frontier to BURMA; ascending the KHASIA HILLS to 4-5000 ft., and the HIMALAYA to 7000 ft. CEYLON; Trincomalee, *Glenie*.—**DISTRIB.** Australia, Philippines.

Corm globose, $\frac{1}{2}$ in. diam., neck 1-2 in., sheaths brown. *Stem* 3-10 in., flexuous. *Leaves* few, 6-8 by $\frac{1}{4}$ - $\frac{1}{2}$ in., upper smaller. *Flowers* few or many, reddish or purplish; bracts linear, leafy; pedicels 1-2 in. *Perianth* $\frac{1}{4}$ - $\frac{1}{2}$ in. long; segments clawed, spreading and reflexed. *Capsule* $\frac{1}{4}$ in., obovoid or oblong, most variable in size.—A sportive plant. *Prome* specimens are nearly 1 ft. high, very robust and broadish leaved.

2. **I. pallida**, *Baker in Journ. Linn. Soc.* xvii. 451; perianth white, segments oblanceolate acute many-nerved. ? *A. indica*, *Grah. Cat. Bomb. Pl.* 222.

The CONCAN; *Ritchie, &c.*, on the Ghats at Mahableshwar, and Belgaum.

Probably a var. of *indica*, with smaller narrower leaves and bracts, white flowers with much broader segments and shorter pedicels.

29. TOFIELDIA, Huds.

Rootstock creeping. *Leaves* radical, equitant, ensiform. *Scape* slender; flowers small green or white, spicate or racemed; bracts minute. *Perianth*

persistent; segments 6, spreading. *Stamens* 6, on the base of the segments, filaments filiform; anthers short, dorsifixed, versatile, introrse. *Carpels* 3, many-ovuled; styles short, persistent, stigmas obtuse. *Follicles* 3, membranous, acute. *Seeds* many, minute, cymbiform or slender, testa thin, pale.—Species about 14, Arctic and Alpine.

T. himalaica, *Baker in Journ. Linn. Soc.* xvii. 489; leaves narrowly linear 3-5-nerved margins scabrid, fruiting pedicels ascending bracteate at the base calyculate at the apex.

SIKKIM HIMALAYA; alt. 10-12,000 ft., J. D. H., *Clarke*.

Stem 8-18 in., glabrous. *Leaves* 2-4 by $\frac{1}{8}$ - $\frac{1}{2}$ in. *Fruiting raceme* 4-8 in.; lower pedicels $\frac{1}{2}$ - $\frac{2}{3}$ in. *Perianth* $\frac{1}{2}$ in. long, greenish white; segments narrowly oblanceolate, 1-nerved. *Capsule* $\frac{1}{2}$ - $\frac{1}{4}$ in., obovoid; styles very slender, $\frac{1}{3}$ the length of the cells. *Seeds* slender, terete, acute at both ends.

30. **GLORIOSA**, *Linn.*

Rootstock tuberous, naked. *Stem* climbing, leafy. *Leaves* scattered, opposite or 3-nately whorled, lanceolate, costate, tip elongate spiral. *Flowers* large, axillary, solitary; pedicels reflexed. *Perianth* persistent; segments 6, subequal, narrow, spreading or reflexed, often waved or crisped. *Stamens* 6, hypogynous, filaments filiform; anthers linear, dorsifixed, versatile, extrorse. *Ovary* 3-celled; style filiform, deflexed, 3-fid, arms subulate, introrsely stigmatose; cells many-ovuled. *Capsule* large, coriaceous, septicidal. *Seeds* subglobose, testa spongy; embryo cylindric.—Species 3, tropical Asiatic and African.

G. superba, *Linn. Sp. Pl.* 305; perianth-segments crisply waved. *Baker in Journ. Linn. Soc.* xvii. 457; *Roxb. Fl. Ind.* ii. 143; *Grah. Cat. Bomb. Pl.* 221; *Wight Ic.* t. 2047; *Bot. Reg.* t. 77; *Andr. Bot. Rep.* t. 139; *Reichb. Ic. Exot.* t. 51. *G. simplex*, *Don Prodr.* 51. *G. Doniana*, *Schultes f. Syst.* vii. 366. *Methonica superba*, *Lamk. Encycl.* iv. 133; *Kunth Enum.* iv. 276; *Redouté Lil.* t. 26; *Dalz. & Gibs. Bomb. Fl.* 250. *M. Doniana*, *Kunth l. c.* *Eugonia superba*, *Salisb. Prodr.* 238 — *Rheede Hort. Mal.* vii. t. 57.

Throughout TROPICAL INDIA; from the N. W. HIMALAYA to ASSAM, BURMA, MALACCA and CEYLON, ascending to 5000 ft.—DISTRIB. Trop. Africa, Malacca, Cochin China.

Rootstock a chain of fleshy arched tubers, budding from the convexity above. *Stem* 10-20 ft., terete, herbaceous. *Leaves* 6-8 in., sessile or shortly petioled, variable in breadth, many nerved. *Flowers* solitary or subcorymbose towards the ends of the branches from the nearness of the leaves; pedicels 4-6 in., tip deflexed. *Perianth* 3-4 in. diam., segments linear-lanceolate, bright red above the lower third, golden yellow below it as are the margins and midrib. *Filaments* stout, golden yellow; connective green. *Capsule* 2 in. long.

31. **TRICYRTIS**, *Wall.*

Rootstock creeping. *Stem* dichotomously branched above, leafy. *Leaves* alternate, subsessile or amplexicaul, strongly nerved. *Flowers* subcorymbose or racemose, white spotted with purple. *Perianth* campanulate, deciduous; segments 6, lanceolate, 3 outer saccate or 2-gibbous at the base, inner gibbous or flat. *Stamens* 6, subhypogynous, filaments cohering or conniving in a tube below, spreading above; anthers dorsi-

fixed, extrorse. *Ovary* 3-celled; style 3-fid, arms 2-fid; cells many-ovuled. *Capsule* coriaceous, linear, triquetrous, septicidal. *Seeds* 1-seriate, minute, flat; testa lax, brown, reticulate.—Species 5, Himalayan, Chinese and Japanese.

T. pilosa, Wall. *Tent. Fl. Nep.* 61, t. 46; glandular-pubescent, leaves cordately amplexicaul, flowers loosely corymbose white spotted with purple. *Kunth Enum.* iv. 279; *Baker in Journ. Linn. Soc.* xvii. 464; *Bot. Mag.* t. 4955; *Flore des Serres*, t. 1219. *T. elegans*, Wall. l. c. 62; *Cat.* 600. *Compsa maculata*, Don *Prodr.* 51. *Compsanthus maculatus*, Spreng. *Syst. Veg. Cur. Post.* 137.

TEMPERATE HIMALAYA; Nepal, Wallich; Sikkim, alt. 5–8000 ft.. *J. D. H.*, &c. Bhotan, Griff. THE KHASIA HILLS, alt. 5–6000 ft.

Stem 2–4 ft., slender. *Leaves* 4–6 by $1\frac{1}{2}$ –3 in., acuminate, subpinnately 6–9-nerved. *Flowers* $1\frac{1}{2}$ in diam., pedicels stout strict; bracts small, lower ovate-cordate, upper linear or 0. *Perianth segments* lanceolate, recurved from just above the gibbous nectariferous base, subacute, sparsely glandular without, yellowish white with purple spots. *Filaments* stout, terete, erect, then stellately spreading; anthers lilac. *Style* short, clavate, arms recurved, stout, obtuse. *Capsule* 1– $1\frac{1}{2}$ in.

32. **DISPORUM**, Salisb.

Rootstock creeping. *Stem* erect, angular, leafy. *Leaves* sessile or subsessile, strongly-nerved. *Flowers* in terminal or axillary few-fld. umbels; pedicels decurved. *Perianth* campanulate, deciduous; segments 6, erect, base saccate or spurred. *Stamens* 6, hypogynous; anthers dorsifixed, extrorse. *Ovary* 3-celled; style long or short, stigmas 3 short; cells 2–6-ovuled. *Berry* pisiform, fleshy, black. *Seeds* subglobose, testa appressed, brown.—Species about 12, Asiatic and N. American.

The study of a very large series of specimens and drawings of the Indian *Dispora* has satisfied me that no specific limits can be assigned to their forms, greatly though they differ, and Mr. Clarke has arrived at the same conclusion. The leaves afford no characters; the umbels are sessile or peduncled in the same form and even specimen, and vary in the number of flowers they bear; the flowers are white, greenish, or dark purple, and the perianth tubular with spreading tips of the narrow segments in the large flowered forms; but in others broadly campanulate with the broader segments spreading from shortly above the base. The filaments are shorter than the anthers in some forms, three to four times as long in others. The length of the style is usually proportionate to that of the perianth, but it is sometimes far exerted (indicating dimorphic conditions). The fruit is the same in all forms, a purple-black, pea-shaped berry. It remains for the resident botanists in the Himalaya to study all the forms, each in his own province, with the view of classifying them, which latter I have been unable to do satisfactorily; after which a review of all the results thus obtained would lead to a better knowledge of the genus.

1. **D. calcaratum**, Don in *Trans. Linn. Soc.* xviii. 516; perianth-segments lanceolate acute base spurred. *Kunth Enum.* iv. 207; *Baker in Journ. Linn. Soc.* xiv. 588. *D. Wallichii* and *Hamiltonianum*, Don & *Kunth l. cc.* *D. latipetalum*, Coll. & Hemsl. in *Journ. Linn. Soc.* xxviii. 139. *Uvularia calcarata*, Wall. *Cat.* 5087. *U. Hamiltoniana*, Wall. *Cat.* 5088 in part. *U. Betua*, Ham. *ms.*

TEMPERATE HIMALAYA; from Nepal, Wallich, eastwards, alt. 5–8000 ft. KHASIA MTS., MUNNIPORE and BURMA, alt. 3–6000 ft.

Stem 1-2 ft. *Leaves* 2-3 in., oblong-lanceolate, acuminate. *Flowers* $\frac{1}{4}$ - $\frac{3}{4}$ in. long, usually narrow, white greenish or purplish; spurs very variable, in short flowered specimens $\frac{1}{4}$ in. long, equalling the blade of the sepal in length. *Style* slender, rarely exerted.

Don gives the following characters to the species united above:—*calcaratum*, sepals lanceolate acuminate long-spurred, filaments thrice as long as the anthers. *Wallichii*, sepals lanceolate acuminate, spur short straight, filaments five times as long as the anthers. *Hamiltonianum*, sepals lanceolate acute, spur short recurved, anthers as long as the filaments. An original drawing of the latter (Hamilton's "Betua," spelled *Betiya*) has acuminate narrow purple sepals with very short spurs; it is not distinguishable from a drawing by Horsfield of the Javanese *multiflorum* (*Horsfieldii*). The Burmese *D. latipetalum* has broader sepals and in this respect approaches the Chinese *D. uniflorum*, berry intermediate.

2. ***D. pullum***, *Salisb. in Trans. Hort. Soc.* i. 330; perianth-segments spathulate or lanceolate acute or acuminate base saccate or subsaccate. *Don Prodr.* 50; *in Trans. Linn. Soc.* xviii. 521; *Kunth Enum.* iv. 208; *Baker in Journ. Linn. Soc.* xiv. 589. *D. Pitsutum*, *Don ll. cc.* 50 and 519; *Kunth l. c.* 207. *D. fulvum* (error for *pullum*), *Don Prodr.* 50. *D. multiflorum*, *Don in Proc. Linn. Soc.* v. 45; *in Trans. Linn. Soc. l. c.* 518; *Kunth l. c.* 207; *Miquel Fl. Ind. Bat.* iii. 552. *D. parviflorum*, *Don ll. cc.* 50 and 520; *Kunth l. c.* 208. *D. Horsfieldii*, *Don in Proc. Linn. Soc.* Nov. 1839; *Uvularia chinensis*, *Gawl. in Bot. Mag.* t. 916. *U. parviflora* and *umbellata*, *Wall. in Asiat. Research.* xiii. 379; *Plant. As. Rar.* iii. 43, t. 269; *Cat.* 5090. *U. multiflora*, *Reinw. in Blume Cat. Hort. Buitenz.* 62. *U. parviflora*, *Wall. in As. Res.* xiii. 378; *Cat.* 5091 *in part.* *U. Hamiltoniana*, *Wall. Cat.* 5088 C *in part.* *D. Streptopus chinensis* and *peduncularis*, *Smith in Rees Cyclop. under Uvularia.* *Drapiezia multiflora*, *Blume Enum.* i. 8.

TEMPERATE HIMALAYA; from Garwhal eastwards, alt. 4-8000 ft. KHASIA and MUNNIPORE HILLS. BEHAR, on Parusnath.—DISTRICTS. Sumatra, Java, China.

Stem 2-4 ft., sometimes robust, or branched. *Leaves* 2-6 in., ovate-oblong or lanceolate, acute or acuminate. *Flowers* white or dull purple, in sessile or peduncled many- or few-fl. umbels; pedicels $\frac{1}{2}$ -1 in.

The type of this species is the Chinese *uvularia chinensis* of the Botanical Magazine, a purple flowered plant hardly distinguishable from shortly spurred specimens of *calcaratum*. The flowers are narrow, nearly an inch long, with lanceolate acute sepals and filaments twice as long as the anthers. *D. multiflorum* has numerous very small white flowers, with subspathulate mucronate sepals and filaments twice as long as the anthers. *D. Pitsutum* has short cuneately lanceolate subacute white sepals, spreading from near the saccate base, and filaments longer or shorter than the anthers, it passes into *Leschenaultianum*. I have found it single-flowered in Sikkim where it is identified with Baker's Chinese *D. uniflorum*. *D. parviflorum* has white flowers only $\frac{1}{4}$ - $\frac{1}{2}$ in. long, with narrow lanceolate acuminate sepals, and filaments about twice as long as the anthers.

3. ***D. Leschenaultianum***, *Don in Trans. Linn. Soc.* xviii. 518; perianth-segments broadly oblong acute or acuminate base saccate. *Kunth Enum.* iv. 207; *Baker in Journ. Linn. Soc.* xiv. 590; *Thwaites Enum.* 338; *Wight Ic.* t. 2048; *Bot. Mag.* t. 6935. *D. ceylanicum* and *mysorensis*. *Wight Ic.* t. 2049. *Uvularia Leschenaultiana*, *Wall. Cat.* 5089.

THE WESTERN GHATS; from Canara southwards. CEYLON, alt. 4-7000 ft.

Stem 1-2 ft., branched above. *Leaves* mostly shortly petioled, 2-4 in., and broadly ovate or oblong-ovate, acuminate, but very variable in breadth. *Flowers* quite white, in 3-5-fl. umbels. *Perianth* $\frac{3}{4}$ in. long; segments obtuse, obscurely

ciliate. *Filaments* about as long as the anthers or longer.—Wight figures the perianth segments of his three species as acute or acuminate. His *ceylanicum* is intermediate between his other two, but has the smaller flowers of *mysorensis*. His figure of *Leschenaultianum* resembles a broad-leaved *pullum*. The Bot. Mag. plate of *Leschenaultianum* has the broad sepals of Wight's *mysorensis*, but the large flowers of the type. Royle's figure of the Kumaon plant referred to *Leschenaultianum* is so bad that I refrain from citing it.

33. CLINTONIA, Rafin.

Rootstock creeping. *Leaves* subradical, narrow, costate. *Scape* naked or 1-leaved. *Flowers* in terminal umbels or racemes, rarely solitary; bracts linear or 0. *Perianth* funnel-shaped, deciduous; segments 6, subequal. *Stamens* 6, inserted on the base of the segments, filaments filiform; anthers dorsifixed, subextrorse. *Ovary* 3-celled; style columnar, stigma thickened; cells 2- or more-ovuled. *Berry* fleshy, at length loculicidal. *Seeds* 2 or more, ovoid or obtusely angled; testa appressed, brown or pale; albumen hard; embryo minute.—Species 8, Temperate Asiatic and N. American.

C. alpina, Kunth Enum. v. 159; leaves obovate to oblanceolate cuspidate or acuminate, scape leafless and pedicels pubescent, perianth-segments oblanceolate 5-7-nerved. Baker in Journ. Linn. Soc. xiv. 585. *Smilacina alpina*, Royle Ill. 380.

TEMPERATE HIMALAYA, alt. 8-11,000 ft.; from Garwhal to Sikkim, alt. 12,000 ft., and Bhotan.

Leaves few, 4-9 by 2-4 in., suberect, glabrous; nerves many, slender. *Scape* 6-24 in., slender; flowers loosely racemose or the upper umbellate; pedicels $\frac{1}{4}$ -1 in., straight, fruiting elongate curved; bracts caducous. *Perianth* $\frac{1}{4}$ - $\frac{3}{4}$ in. long, white. *Stamens* included; anthers small. *Ovary* ovoid; style short, 3-toothed. *Berry* $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., many-seeded; fruiting pedicels $\frac{3}{4}$ -1 $\frac{1}{2}$ in., distant, upcurved.—The Chinese *C. udensis*, F. & M., hardly differs.

34. TRILLIUM, Linn.

Rootstock creeping, annulate. *Stem* simple, erect, base sheathed. *Leaves* 3, whorled at or above the middle of the stem, 3-5-nerved and reticulate: *Flower* solitary, sessile or pedicelled. *Perianth* persistent; segments 6, free, spreading. *Stamens* 6, inserted on the base of the segments, filaments short; anthers basifixed, cells bordering the connective, slits lateral. *Ovary* ovoid or subglobose, 3-celled; style 3-fid or 3-partite, arms recurved stigmatose within; cells many-ovuled. *Berry* fleshy. *Seeds* ovoid, with a lateral pulpy strophiole, albumen fleshy; embryo minute.—Species 12, a few Himalayan, Chinese and Japanese, the rest N. American.

1. **T. Govanianum**, Wall. Cat. 812; leaves shortly petioled ovate or ovate-cordate acute, sepals subequal narrowly linear. Royle Ill. 384, t. 93. *Trillidium Govanianum*, Kunth Enum. v. 120.

TEMPERATE HIMALAYA; from Kashmir, alt. 8-10,000 ft., to Sikkim, alt. 9-11,000 ft.

2. **T. Tschonoskii**, Maxim. in Bull. Acad. Petersb. xxix. (1884) 218; leaves sessile broadly subrhomboidally ovate or orbicular cuspidately acuminate, sepals green oblong-lanceolate, petals similar dull purple.

SIKKIM HIMALAYA, alt. 10-11,000 ft., J. D. H., Clarke. BHOTAN and the Mishmi Hills, Griffith.—DISTRIB. Japan.

Stem 8–12 in. *Leaves* 2–3 in. broad and long or narrower. *Peduncle* $\frac{1}{2}$ – $\frac{1}{3}$ in. *Flowers* $\frac{3}{4}$ –1 in. diam.; filaments flat, rather longer than the linear anther. *Style* very short.—This, which differs from the American and Japanese *T. erectum* chiefly in the longer filaments, will (with others) prove, I expect, a form of that variable species.

35. **PARIS**, *Linn.*

Characters of *Trillium*, but leaves 4–9 in a whorl, and flowers 8–12-merous. Species 5 or 6, Europe, Temp. Asia.

3. **P. polyphylla**, *Smith in Rees Cyclop.*; leaves 4–9 petioled oblong or oblanceolate acuminate, sepals 4–6 ovate-lanceolate acuminate, petals as long or longer filiform, fruit 3–6-valved, testa pulpy. *Don Prodr.* 49; *Kunth Enum.* v. 118; *Wall. Pl. As. Rar.* ii. 24, t. 126; *Cat.* 3710; *Hook. f. Ic. Cathcart*, t. 24. *P. Daisua*, *Herb. Ham.* *P. imperialis*, *Jacquem. mss.* *Euthyra*, *Salisb. Gen. Pl. Fragm.* 61.

TEMPERATE HIMALAYA; from Simla to Bhotan, alt. 6–10,000 ft.—DISTRIB. W. China.

Rootstock annulate, sometimes as large as a small potato. *Stem* 3 in. to 3 ft. *Leaves* 3–6 in., dark green, base rounded or acute; petiole $\frac{1}{2}$ in. or less. *Sepals* 1–4 in., green, 3-nerved. *Petals* sometimes twice as long, yellow. *Anthers* longer than the filament, very narrow, connective very shortly produced or not. *Ovary* subglobose, septa nearly reaching the axis. *Fruit* green, smooth, $2\frac{1}{2}$ in. diam., or less, coriaceous, loculicidal. *Seeds* $\frac{1}{2}$ in. long, or less, ovoid, scarlet.—Extremely variable in the number and size of all parts.

ORDER CLVII. **PONTEDERIACEÆ.**

Fresh-water and marsh herbs. *Leaves* erect or floating, nerves parallel. *Flowers*, bisexual, in spikes or racemes from the sheath of the uppermost leaf; bracts sheathing irregular. *Perianth* unequally 6-partite, white or blue, marcescent. *Stamens* 1–6, inserted at the base of the lobes; anthers erect or versatile, one usually longer than the others. *Ovary* free, 3-celled, or 1-celled with 3 parietal placentas; placentas one or more-ovuled; style slender, stigma subentire or lobed; ovules anatropous. *Capsule* membranous, loculicidally 3-valved. *Seeds* small, albumen horny or floury; embryo cylindric.—Genera 5, species about 36.

MONOCHORIA, *Presl.*

Rootstock short or creeping. *Leaves* radical and solitary at the top of the emerged stem or branches. *Perianth* campanulate, 6-partite. *Stamens* 6, one usually largest, with the filament toothed on one side; anthers basifixed, slit terminal at length elongating. *Ovary* 3-celled, many-ovuled.—Species about 6, in the tropics of the old world.

1. **M. hastæfolia**, *Presl Rel. Hænk.* ii. 128; rootstock creeping, leaves long-petioled sagittate hastate or cordate, flowers racemed or subumbellate long-pedicelled. *Kunth Enum.* iv. 133; *Miguel Fl. Ind. Bat.* iii. i. 548. *M. hastata*, *Solms Laub. in A.D.C. Monog. Phanerog.* iv. 523. *M. dilatata* & sagittata, *Kunth l. c.* 134. *Pontederia hastata*, *Linn. Fl. Zeyl.* 129; *Mant.* 363; *Roxb. Fl. Ind.* ii. 121; *Cor. Pl.* ii. 6, t. 63; *Wall. Cat.* 5092; *Dalz. & Gibs. Bomb. Fl.* 249; *Raspail in Ann. Mus.* xiv. t. 169, f. 7–9

P. saggitata, *Roxb. Fl. Ind.* ii. 124; *Wall. Cat.* 5093. *P. dilatata*, *Andrews Bot. Rep.* vii. t. 490; *Buch. Ham. in Syme's Embass.* 475 with plate; *Roxb. l. c.* 123; *Wall. Cat.* 4094. *P. sagittifolia*, *Herb. Heyne.*

Common throughout INDIA and CEYLON.—DISTRIB. Malay Islands, China.

Rootstock spongy; flowering stems short. *Leaves* 6-7 by 5-6 in., obtuse or acute, many-nerved; petiole of the floral leaf tumid above and embracing the short scape, of the radical 18-24 in., broad and sheathing at the base. *Inflorescence* centrifugal; flowers long-pedicelled, $\frac{3}{4}$ -1 in. diam., violet-blue dotted with red; pedicels 1 in. or less; larger sepal obovate, smaller oblong. *Filament* spurred. Large *anther* blue, the others yellow. *Capsule* $\frac{1}{2}$ in. diam., subglobose or oblong.

2. *M. vaginalis*, *Presl Reliq. Hænk.* ii. 128; rootstock short, leaves long-petioled, from linear to ovate and ovate-cordate, flowers short-pedicelled subspicate. *Kunth Enum.* iv. 134; *Solms Laub. in A.DC. Monogr. Phanerog.* iv. 524; *Miquel Fl. Ind. Bat.* iii. 548. *Pontederia vaginalis*, *Linn. Mant.* 228; *Roxb. Fl. Ind.* ii. 121; *Cor. Pl.* ii. t. 110; *Wall. Cat.* 5095; *Dalz. & Gibs. Bomb. Fl.* 243.—*Rheede Hort. Mal.* ii. t. 44.

Throughout INDIA; from Kashmir eastwards to Assam and southwards to Travancore and Singapore. CEYLON common.—DISTRIB. Malay Islands, China, Japan, Trop. Africa.

Rootstock suberect (creeping, *Roxburgh*). *Leaves* much as in *M. hastæfolia*, but few-nerved. *Inflorescence* centripetal, few- or many-fl'd.; flowers blue, sprinkled with red, very variable in size, pedicels shorter than the perianth. *Filaments* and *anthers* as in *M. hastæfolia*.—A most variable plant.

Var. *plantaginea*, *Solms Laub. l. c.*; smaller, leaves often narrow, raceme few-fl'd. *M. pauciflora*, *Kunth & Miquel l. c.* *M. linearis*, *Miq. l. c.* *Pontederia plantaginea*, *Roxb. l. c.* 123; *Wall. Cat.* 5096. *P. pauciflora*, *Blume Enum. Fl. Jav.* i. 32. *P. racinosa*, *Herb. Ham.*—India, Java.

ORDER CLVIII. PHILYDRACEÆ.

Erect herbs. *Leaves* narrowly linear. *Flowers* small, in bracteate spikes or panicles, bisexual, irregular. *Perianth* inferior, 2-partite; segments antero-posterior, petaloid, persistent. *Stamen* 1, inserted on the base of the anterior segment, filament flattened; anther straight or twisted; staminodes 2, alternate with the sepals, small, petaloid. *Ovary* free, 3-celled, or 1-celled with 3 projecting parietal many-ovuled placentas; style terminal, stigma entire; ovules anatropous. *Capsule* loculicidal, 3-valved. *Seeds* many, small, albumen fleshy, embryo minute.—Genera 3, species 4, Asiatic, Australian and Pacific.

PHILYDRUM, Banks.

Spike simple. *Anthers* at length twisted. *Ovary* 1-celled.

P. lanuginosum, *Banks in Gærtn. Fruct.* i. 62, t. 16, f. 10; *Kunth Enum.* iii. 380; *Bot. Mag.* t. 783; *Roscoe in Trans. Linn. Soc.* viii. 342, t. 20; *Miquel Fl. Ind. Bat.* iii. 250; *Guillem. Ic. Pl. Austral.* t. 5; *Benth. Fl. Austral.* vii. 74; *Caruel in A.DC. Monogr. Phanerog.* iii. 2; *Schleid. & Vog. in Nov. Act. Acad. Nat. Cur.* xix. 40, f. 1; *Griff. Notul.* iii. 231; *l. c. Pl. Asiat.* t. 269, 270. *Garciana cochinchinensis*, *Lour. Fl. Coch.* i. 15.

BURMA, the ANDAMAN ISLANDS and the MALAY PENINSULA.—DISTRIB. China, Malay Islands, Australia.

A tall stout herb, 2-3 ft., more or less woolly; stem simple or nearly so. *Leaves* 1-2 ft., distichous and equitant at the base, ensiform, upper passing into lanceolate bracts. *Spike* 1-2 ft., simple or branched, woolly; bracts 1-2-fld.; flowers sessile, yellow, $\frac{1}{2}$ in. diam. *Sepals* hairy, many-nerved, margins subinvolute in bud. *Stamen* as long as the sepals, filament flattened, acute; anther transverse; staminodes subconnate with the filament. *Ovary* 1-celled, placentas broadly 2-lobed, ovules very many; stigma broad, 3-angled. *Capsule* oblong. *Seeds* narrowly oblong, striate and tuberculate, chalaza black, funicle short pale.

ORDER CLIX. **XYRIDÆ.**

Tufted rigid herbs. *Leaves* radical, linear or subulate. *Scape* simple, naked. *Flowers* sessile in the rigid dark brown imbricating bracts of a terminal head or spike, bisexual. *Bracteoles* (sepals?) 3, deciduous, scarious, embracing the claws of the petals, 2 lateral, 1 broader dorsal often hooded. *Petals* 3, clawed, claw erect spreading, limb golden yellow, marcescent. *Stamens* 3, inserted at the bases of the petals, included; anthers sagittate; staminodes 3, alternating with the inner segments, filiform, bearded or antheriferous, sometimes 0. *Ovary* free, imperfectly 3-celled; placentas 3, many-ovuled, basal and confluent or parietal; style trifid, stigmas capitate or dilated; ovules anatropous. *Capsule* loculicidally 3-valved, or with the top circumsciss. *Seeds* numerous, linear, albumen flowery, embryo minute.—Genera 2, species about 50, one (*Xyris*) found in all warm regions; the other American.

XYRIS, Linn.

Characters of the Order.

* *Leaves distinctly flat.*

1. **X. indica**, Linn. *Sp. Pl.* 62; robust, leaves loriform $\frac{1}{4}$ - $\frac{1}{2}$ in. broad, scape stout deeply grooved, spike ovoid or globose, bracts orbicular or cuneately obovate. *Vahl Enum.* ii. 204; *Roxb. Fl. Ind.* i. 179; *Mart. in Wall. Pl. As. Rar.* iii. 30; *Kunth Enum.* iv. 20; *Wall. Cat.* 6086 B, C.; *Dalz. & Gibs. Bomb. Fl.* 259; *Miq. Fl. Ind. Bat.* iii. 528; *Steud. Syn. Pl. Cyp.* 288,—*Rheede Hort. Mal.* ix. t. 7.

BENGAL, in low marshes, at the foot of the SIKKIM, ASSAM and KHARIA HILLS, southward to MALACCA and from the South Concan (in salt marshes) to CEYLON.—DISTRIB. Malay Islands.

Leaves 1-2 ft., spongy, obtuse. *Scape* as long, acutely angled. *Spike* $\frac{1}{4}$ - $\frac{3}{4}$ in.; bracts $\frac{1}{4}$ in. broad, few or many, dark red brown, shining, broader than long, margins scarious; bracteoles linear-spathulate, smooth. *Petals* orbicular, erose.

2. **X. robusta**, Mart. in Wall. *Pl. As. Rar.* ii. 30; leaves scape and spike of *X. indica*, but bracts broadly ovate-oblong longer than broad. *Wall. Cat.* 6087. *Kunth Enum.* iv. 19; *Steud. Syn. Pl. Cyp.* 287.

SILHET; Wallich.

Apparently distinct from *X. indica* in the form of the bracts; probably also in other characters that are not available in the few dried specimens at my disposal.

3. **X. anceps**, Lamk. *Ill.* i. 132; leaves narrowly linear $\frac{1}{10}$ - $\frac{1}{6}$ in. broad rigid twisted much shorter than the flattened or 2-edged grooved

scape, margins smooth or scaberulous, spike ovoid-oblong, bracts orbicular pale. *Vahl Enum.* ii. 205; *Kunth Enum.* iv. 17; *Miquel Fl. Ind. Bat.* iii. 529; *Steud. Syn. Pl. Cyp.* 287. *X. Walkeri*, *Arn. in Wight Cat.* 2373; *Kunth l. c.* 19; *Miquel l. c. Suppl.* 608. *X. indica altera*. *Vahl Symb.* iii. 7. *X. malaccensis*, *Steud. l. c.* 287.—*Xyris* No. 2, *Griff. Notul.* iii. 123.

Sandy places, often near the sea. BURMA, *Griffith*. SINGAPORE and MALACCA, *Maingay*. SOUTH DECCAN PENINSULA and CEYLON, *Wight*, &c.—DISTRIB. Borneo, &c.

Densely tufted. *Leaves* 6–12 by $\frac{1}{10}$ – $\frac{1}{8}$ in., very rigid, pungent, strongly grooved on both faces, pale green. *Scape* 1–2 $\frac{1}{2}$ ft., slender, rigid. *Spike* $\frac{1}{2}$ – $\frac{3}{4}$ in., rarely globose; lateral bracteoles ovate-lanceolate, acuminate, tip lacerate, keel spinulose. *Petals* toothed.

4. ***X. Wallichii***, *Kunth Enum.* iv. 16; dwarf, leaves gladiate 3–6 by $\frac{1}{4}$ – $\frac{1}{2}$ in. broad acuminate flaccid as long as the slender compressed scape, spike very small, bracts few obovate-oblong obtuse. *Steud. Syn. Pl. Cyp.* 287.—*Xyris*, No. 1, *Griff. Notul.* iii. 123; *l. c. Pl. Asiat.* t. 161 C.—*Wall. Cat.* 6083 C.

KHASIA HILLS, alt. 4–6000 ft., *Wallich*, &c. BURMA, at Moulmein, *Lobb*.

A slender flaccid loosely tufted species. *Leaves* few, often falcate, bright pale green, faintly striate. *Scape* usually filiform, rarely stout. *Spike* $\frac{1}{4}$ – $\frac{1}{2}$ in.; bracts rich brown with pale midrib and margins; bracteoles subequal, red-brown, with green midrib and pale margins; lateral spathulately oblanceolate, obtuse, quite glabrous. *Petals* oblong, subrenate. *Style* very long.

** *Leaves usually less than $\frac{1}{6}$ in. broad, not distinctly flattened (except in forms of X. pauciflora).*

5. ***X. schœnoides***, *Mart. in Wall. Pl. As. Rar.* iii. 30; leaves narrowly linear acuminate much shorter than the very slender striate compressed scape, spike globose or ovoid, bracts broadly oblong obtuse outer nearly as long as the inner. *Wall. Cat.* 6084, and 6083 in part; *Kunth Enum.* iv. 16; *Miq. Fl. Ind. Bat.* iii. 529; *Steud. Syn. Pl. Cyp.* 287. *X. nilagarensis*, *Steud. Plant. Exsicc. Nilg. Hohenack.* No. 956.

NEPAL, *Wallich*. KHASIA and NILGHIRI HILLS, alt. 4–6000 ft., common. CEYLON, ascending to 6000 ft.,—DISTRIB. China.

Leaves 2–10 in., slender, $\frac{1}{10}$ – $\frac{1}{6}$ in. broad, tapering from the base to the tip. *Scape* 1–2 ft., stout. *Spike* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; bracts almost rounded, back brown, keeled towards the rounded tip; lateral bracteoles oblanceolate, acuminate, dorsal ovate-lanceolate.

6. ***X. pauciflora***, *Willd. Phytogr.* i. 2, t. 1, f. 1; *Sp. Pl.* i. 255; leaves narrowly linear rigid acute smooth or scaberulous equalling or shorter than the striate subterete or compressed and 2-edged scape, spike ovoid or globose, bracts orbicular-obovate pale thin with often a green tip. *Vahl Enum.* ii. 207; *Br. Prodr.* 256; *Mart. in Wall. Pl. As. Rar.* iii. 29; *Cat.* 6083 A, B (C & D, in part), and 6086 B; *Miq. Fl. Ind. Bat.* iii. 529; *Steud. Syn. Pl. Cyp.* 287. *X. oryzetorum*, *Miq. in Herb. Hohenack.* n. 369; *Steud. l. c.* 286.

Foot of the HIMALAYA, in marshes, from Nepal eastwards to BENGAL and BURMA, and southwards to MALACCA and CEYLON.—DISTRIB. Malaya, China and Australia.

Leaves 3-8 in., rarely $\frac{1}{2}$ in. broad, strongly nerved, scaberulous on the surface or margin or neither. *Spike* $\frac{1}{2}$ - $\frac{1}{2}$ in. long and broad, rarely ovoid. *Lateral bracteoles* oblanceolate, acuminate, keeled, hyaline, quite glabrous.—Part of Wallich's 6083 D is *Fimbristylis tetragona*, Br. Small specimens with small spikes resemble *X. bancana*, and there are Mergui specimens collected by Griffith and Lobb with leaves 6-10 by $\frac{1}{8}$ - $\frac{1}{4}$ in. and scape 6-24 in.

7. *X. bancana*, *Miq. Fl. Ind. Bat. Suppl.* 608; dwarf, leaves 1-2 in. filiform smooth flexuous rigid much shorter than the filiform flexuous smooth compressed scape, spike very small ovoid, bracts few obovate obtuse.

MALACCA, in sandy places near the sea, *Griffith, Maingay*; Pahang, *Ridley*.—DISTRIB. Banca.

Resembles a small form of *X. pauciflora*, but much more slender and rigid, with filiform scape. *Leaves* $\frac{1}{16}$ in. broad, grooved. *Spike* $\frac{1}{8}$ - $\frac{1}{4}$ in.; bracts pale, inner hardly exceeding the outer. *Lateral bracteoles* linear-lanceolate, strongly ciliate, keel toothed.

DOUBTFUL SPECIES.

8. *X. LAPPACEA*, *Herb. Heyne ex Mart. in Wall. Pl. As. Rar.* iii. 30; *Wall. Cat.* 6085; *Kunth Enum.* iv. 16; *Steud. Syn. Pl. Cyp.* 287.—There is no specimen in Wallich's Herbarium, only the empty sheet, with his number and a ticket of Heyne's inscribed "*Xyris capensis*, Restiac. 28," across which Wallich has written "Return."—The inference is that the specimen was lent to Martius with the others of the genus and possibly never returned. The reference to *capensis* makes me suspect that it is *X. anceps*, which strongly resembles and may be the same as a Cape species.

ORDER CLX. COMMELINACEÆ.

Herbs, rarely climbing or undershrubs. *Leaves* costate, bases sheathing, nerves parallel. *Inflorescence* various. *Flowers* usually bisexual, more or less irregular. *Perianth* inferior, 6-partite; 3 outer segments herbaceous often persistent, 3 inner petaloid, free or united in a tube below, marcescent, spreading. *Stamens* 6, inserted on the base of the segments, all antheriferous or 2 or more reduced to staminodes, filaments often bearded with jointed hairs; anthers oblong or globose, often dissimilar. *Ovary* free, 2-3-celled; style terminal, stigma small; ovules 1 or few in the inner angle of the cells, orthotropous. *Capsule* loculicidal or indehiscent. *Seeds* angled, testa smooth or rugose, albumen floury; embryo minute, far from the hilum.—Genera 25, species about 300, tropical and subtropical.

The specific characters, synonyms, &c., are drawn up, with permission, from C. B. Clarke's careful and exhaustive "Monograph of this Order" in Vol. III. of A. de Candolle's *Monographs* (p. 113 and seq.), 1881. I have added to the diagnoses a few subsidiary characters that may aid in the recognition of the species.

Tribe I. POLLIEÆ. *Fruit* indehiscent, crustaceous.

Panicle terminal, of scorpioid cymes 1. POLLIA.

Tribe II. COMMELINEÆ. *Capsule* loculicidal. *Stamens* 3 perfect, with 1-3 staminodes.

- Cymes solitary, included in a spathe. Ovary 3-celled, cells
 1-2-ovuled 2. COMMELINA.
 Cymes naked, panicled, rarely in a spathe 3. ANEILEMA.

Tribe III. TRADECANTIEÆ. Capsule loculicidal. Stamens 6 perfect.

- Cymes capitate. Petals free 4. FORRESTIA.
 Cymes from imbricating bracts, scorpioid or 1-few-fld. Corolla
 tubular below 5. CYANOTIS.
 Cymes scorpioid, panicled or spicate. Stem twining 6. STREPTOLIBION.
 Flowers panicled. Stem erect 7. FLOSCOPA.

1. **POLLIA**, Thumb.

Large herbs. Leaves lanceolate. Cymes in a terminal panicle. Sepals 3. Petals smaller, subequal, obovate. Stamens 6, or 3 with 3 staminodes, filaments naked; anther-cells parallel. Ovary 3-celled; cells 2-∞-ovuled. Fruit globose or ovoid, fragile, blue. Seeds smooth.—Species about 14, E. Asiatic and Australian.

1. **P. Aclisia**, Hassk. *Commel. Ind.* 55; tall, robust, panicle erect lax-fld., stamens 6 perfect, fruit subglobose, cells many-seeded. *Clarke Monogr.* 123; *Comm. & Cyrt. Beng.* t. 32. *P. indica* β, *Clarke in Journ. Linn. Soc. Bot.* xi. 451. *Aclisia* No. 2, *Herb. Ind. Or. H. f. & T.*

TROPICAL EASTERN HIMALAYA; Nepal and Sikkim, alt. 2-3000 ft.; Bhotan, *Griffith*. KHASIA MTS., SILHET, ASSAM, BURMA.—DISTRIB. Java, Tonkin.

Stem stout, erect. Leaves 8-12 by 2½-3½ in., narrowed into a broad petiole, lanceolate or oblanceolate, caudate-acuminate, glabrous or scaberulous, margins crisped. Peduncle short, stout, villous; panicle rigid, pubescent; bracts oblong; bracteoles acute, amplexicaul. Sepals membranous and petals white. Seeds brown, flattened and angled. Fruit ½ in. diam., bright blue, shining.

2. **P. thyrsoflora**, Endl. *Gen.* 1029; panicle short dense-fld., stamens 6 perfect, fruit ellipsoid, cells many-seeded. *Hassk. in Plant. Jungh.* 150, & *Comm. Ind.* 57; *Clarke Comm. & Cyrt. Beng.* t. 33; *Monogr.* 124. *P. glaucescens*, *Teysm. & Binnend. in Nat. Tijd. Ned. Ind.* xxiv. 305. *Tradescantia thyrsoflora*, *Blume Enum.* i. 6. *Lamprocarpus thyrsoflorus*, *Blume ex Schultes f. Syst.* vii., *Addend.* 1726.

SOUTH ANDAMAN ISLANDS, *Kurz*.—DISTRIB. Malay Islands.

Stem stout, erect, creeping below; sheaths pubescent. Leaves 10-12 by 2½-3½ in., oblanceolate, narrowed into a 1-2 in. petiole, glabrous, margins crisped. Peduncle stout and ovoid panicle pubescent; bracts ovate; branches closely scarred; flowers crowded. Fruit yellow-brown or blue, smooth, dorsally compressed.

3. **P. sorzogonensis**, Endl. *Gen.* 1029; leaves lanceolate, panicle ovoid peduncled, branches alternate, stamens 3 perfect, fruit globose, cells many-seeded. *Miquel Fl. Ind. Bat.* iii. 541; *Clarke Monogr.* 126. *Aclisia sorzogonensis*, *E. Meyer in Presl Rel. Haenk.* i. 138, t. 25; *Hassk. Comm. Ind.* 48.

EASTERN HIMALAYA; Sikkim and Bhotan, and southward to BURMA, MALACCA and CEYLON.—DISTRIB. Malay Islands, China, New Caledonia.

Stem stout, erect, viscid. Leaves 6-10 by 2-3 in., subsessile or shortly-petioled,

glabrous or scaberulous above. *Peduncle* villous with deflexed hairs; panicle viscidly pubescent; bracts oblong, persistent. *Sepals* elliptic, glabrous or puberulous. *Petals* white or pale pink. *Fruit* as in *P. Aclisia*.—The Indian forms occur under two varieties.

Var. *indica*; leaves subsessile caudate-acuminate glabrous or puberulous beneath, pedicels viscid, sepals persistent, the posterior pendulous. *P. indica*, *Thwaites Enum.* 323. *Aclisia indica*, *Wight Ic.* t. 2068; *Hassk. Commelin. Ind.* 41. *A. elegans*, *Hassk. Pl. Jungh.* 49; *Comm. Ind.* 50. *Commelina secundiflora*, *Blume Enum.* 3. *Aneilema secundiflorum*, *Kunth Enum.* iv. 69.—The Deccan Peninsula and Ceylon.—Java.

Var. *gigantea*; panicle corymbosely-dichotomous, branches panicle at the tips, 1-2 lower branches elongate. *P. indica*, var. *A.*, *Clarke in Journ. Linn. Soc. Bot.* xi. 451. *P. japonica*, *Hance in Trimen Journ. Bot.* 1878, 233 (not of Thunb.). *Aclisia gigantea*, *Hassk. Commelin. Ind.* 46. *A. indica*, *Herb. Wt.*; *Clarke Comm. & Cyrt. Beng.* t. 29. *Aneilema didymum*, *Wall. Cat.* 5202.—From Sikkim eastwards and southwards.—China.

4. ***P. subumbellata***, *Clarke in Journ. Linn. Soc. Bot.* xi. 451; *Monogr.* 129; panicle sessile depressed, branches subumbellately decurved, stamens 3 perfect, capsule globose, cells many-seeded. *Aclisia umbellata*, *Clarke Comm. & Cyrt. Beng.* t. 30. *Aneilema reniforme*, *Ham. in Wall. Cat.* 5205. *Aneilema*, sp. *Wall. Cat.* 9070. *A.* sp. 3, *Herb. Ind. Or. H. f. & T. Dictyospermum Wightii*, var. *robustum*, *Hassk. Commelin. Ind.* 19.

EASTERN HIMALAYA; Sikkim, the Bhotan and Mishmi hills, ascending to 6000 ft. ASSAM, SILHET, CACHAR and MUNNIPORE.

Stem creeping and rooting below, then suberect. *Leaves* 3-4 by 1-2 in., petioled, elliptic-lanceolate, caudate-acuminate, scaberulous on both surfaces. *Panicle* puberulous; bracts small; bracteoles amplexicaul, persistent, glabrous. *Sepals* rounded, glabrous, enclosing the globose blue fruit which is $\frac{1}{8}$ - $\frac{1}{4}$ in. diam. *Petals* white. *Seeds* trapezoid, dorsally much flattened, brown, smooth.

5. ***P. pentasperma***, *Clarke Monogr.* 129; panicle peduncled ovate-lanceolate, stamens 3 perfect, fruit ovoid narrowed into a long beak acute, cells 1-2-seeded.

KHASIA HILLS; at Shillong, alt. 4000 ft., *Clarke*. MUNNIPORE; on Kohima, alt. 6000 ft., *Clarke*.

Stem erect; sheaths long, pubescent. *Leaves* 3-6 by $1\frac{1}{2}$ - $2\frac{1}{4}$ in., shortly-petioled, caudate-acuminate, elliptic, acute at both ends, slightly scaberulous above and pubescent beneath. *Peduncle* pubescent with deflexed hairs, subumbellate; bracts oblong; bracteoles imbricate, ochreate, persistent. *Sepals* puberulous, accrescent. *Fruit* $\frac{1}{2}$ in. long including the beak, which is as long as the body, hard, smooth, brown, shining. *Seeds* much compressed, rugulose.

2. COMMELINA, Linn.

Herbs, usually slender and creeping below. *Flowers* in usually 2-fid cymes, emerging one at a time from a terminal complicate or funnel-shaped or cucullate spathe, flowers of upper branch of cyme small, deciduous, of lower fertile; fruiting pedicel and capsule retracted within the spathe. *Sepals* 3, membranous, 2 inner often connate at the base. *Petals* longer, one larger and often clawed. *Stamens* 3 perfect, and 2-3 imperfect; anthers oblong, one usually largest. *Ovary* 3-rarely 2-celled, 2 cells 1-2-ovuled, third cell if present 1-ovuled or empty. *Capsule* loculicidal, the posticous cell sometimes indehiscent or 0, or the 2 anticous cells empty connate in-

dehiscent and forming a persistent ligulate body, from which the posticous falls away. *Seeds* ellipsoid or angled, reticulate pitted or rugose.—Species about 90, all tropical and subtropical.

C. cælestis, Willd., a handsome robust pubescent or tomentose large-fl. species, a native of Mexico, is cultivated in gardens, and occurs as an escape at Darjiling and probably elsewhere.

Subgen. 1. **Didymoon**, Clarke. Two anticonic cells of the ovary 2-ovuled, posticous 1-ovuled or obsolete.

Sect. I. EUCOMMELINA. *Capsule* 3-celled, two anticonic cells loculicidal, each usually 2-seeded; the posticous keeled, deciduous, at length dehiscent, 1-seeded; seeds free in the cells. *Petals* blue.

* *Spathes* complicate, margin free or connate at the very base only.

1. **C. nudiflora**, Linn. *Sp. Pl.* 41 (not of others); leaves lanceolate, spathes peduncled ovate-lanceolate complicate, seeds cylindric reticulate black. *C. communis*, Walt. *Fl. Carol.* 68; *Wall. Cat.* 8978, D, E, C; *Kunth Enum.* iv. 36 (*Excl. Syn.*); *Clarke Comm. & Cyrt. Beng.* t. i.; *Monogr.* 144, t. i. f. 5, 6. *C. cæspitosa*, Roxb. *Fl. Ind.* i. 174, *Ed. Wall. & Carey*, i. 178. *C. diffusa*, *Burm. Fl. Ind.* 18, t. 7, f. 2. *C. agraria*, *Kunth l. c.* 38; *Hassk. Commelin. Ind.* 26; *Webb & Berthel. Phyt. Canar.* iii. 356, t. 238; *Seub. in Mart. Fl. Bras.* iii. i. 261, t. 36, f. 3. *C. salicifolia*, *Bojer Hort. Maurit.* 360; *Thwaites Enum.* 321 (*in part*). *C. longicaulis*, *Jacq. Coll.* iii. 234, t. 294. *C. deficiens*, *Flor. des Serres*, t. 1824 (*not of Hook.*).

Throughout the hotter parts of INDIA from the PANJAB to CEYLON and SINGAPORE.—DISTRIB. tropics and subtropics.

Stem creeping and rooting at the nodes or subscandent. *Leaves* $1\frac{1}{2}$ –3 by $\frac{1}{2}$ – $\frac{2}{3}$ in., glabrous scaberulous or puberulous, ciliate. *Spathes* $\frac{2}{3}$ –1 in., acute, base rounded or cordate, glabrous or pubescent, striate; peduncle $\frac{1}{2}$ – $\frac{3}{4}$ in., cymes 2, branches 1–3-fl. *Smaller petals* blue, outer pale or white.

2. **C. sikkimensis**, Clarke *Comm. & Cyrt. Beng.* t. 6; *Monogr.* 147; leaves lanceolate, spathes peduncled ovate-lanceolate complicate, seeds pyramidal rugose.

SIKKIM HIMALAYA, alt. 2–4000 ft. J. D. H. and KHASIA HILLS, alt. 3–4000 ft., Griffith.

Stem slender, widely creeping and rooting. *Leaves* 2–3 by $\frac{1}{4}$ – $\frac{1}{3}$ in., base unequal usually rounded. *Spathes* $1\frac{1}{2}$ –2 in., glabrous or nearly so, acuminate, base cordate; peduncles $\frac{1}{2}$ –1 in.; cymes 2-flid upper branch 6–12-flid. *Petals* blue. *Capsules* 4–8. *Seeds* puberulous, brown black.

3. **C. subulata**, Roth *Nov. Sp.* 23; slender, leaves linear, spathes very small sessile ovate-lanceolate falcate complicate, seeds pyramidal rugose, Clarke *Monogr.* 148; *Wall. Cat.* 8979. *C. striata*, & *C. subaurantiaca*, *Hochst. mss.*; *Kunth Enum.* iv. 44 & 658. *C. linearifolia*, *Kunth l. c.* 43. *Tradescantia triflora*, *Heyne in Herb. Rottl.*; *Schultes f. Syst.* vii. 1176.

THE DECCAN PENINSULA, Heyne, Wight, &c.—DISTRIB. Trop. Africa.

Stem erect from a fibrous root, simple or branched. *Leaves* 1–3 by $\frac{1}{10}$ – $\frac{1}{8}$ in., acuminate, tips often hooked, nearly glabrous; sheaths very short, glabrous or villously ciliate. *Spathes* $\frac{1}{4}$ in. long, scattered or clustered, acute, pubescent, base

cordate. *Flowers* small, orange-purple or violet. *Capsules* 2 on each raceme, small, 3-5-seeded, dorsal valve at length 2-partite. *Seeds* puberulous, deeply transversely grooved.

4. **C. salicifolia**, *Roxb. Fl. Ind.* i. 172, *Ed. Carey & Wall.* i. 176; leaves linear-lanceolate, spathes peduncled lanceolate complicate, seeds globose smooth truncate appendiculate. *Clarke Comm. & Cyrt. Beng.* t. 2 (not of Bojer); *Monogr.* 157? *Hassk. Commelin. Ind.* 27. *C. pedunculosa*, *Link Jahrb.* iii. 74 (in part). *C. communis*, *Wall. Cat.* 8978 C, D, F, G, I (in part, not of Linn.).

From ASSAM and BENGAL, southward and westward to the CONCAN and COROMANDEL.—DISTRIB. Java? Hong Kong.

Stem slender, diffuse, with long internodes. *Leaves* 3-6 by $\frac{1}{6}$ - $\frac{1}{2}$ in., nearly glabrous, sheaths ciliate. *Spathes* $1\frac{1}{2}$ -2 in., axillary, solitary, acute or acuminate, base rounded; branches of cyme 1-2-fld. *Flowers* small, dark blue. *Seeds* black, powdered with white.

5. **C. Hasskarlii**, *Clarke Comm. & Cyrt. Beng.* t. 5; *Monogr.* 157; stem much branched glabrous or pubescent, leaves narrowly lanceolate subacute, spathes peduncled cordate glabrous scabrid or hispid complicate, seeds cylindric-conic smooth not appendaged. *C. salicifolia*, var. *brevifolia*, *Herb. Ind. Or. Hf. & T.* *C. communis*, *Wall. Cat.* 8978 F. (in part).

The UPPER GANGETIC PLAIN; Kumaon and from Delhi eastward to Assam and Bengal, and southward to the DECCAN PENINSULA. MALWA, on Mt. Aboo, Duthie.

Stem much branched, scabrid or glabrate. *Leaves* 1-3 by $\frac{1}{2}$ - $\frac{2}{3}$ in., subacute or obtuse, sheaths short, glabrous or sparsely ciliate. *Spathes* $\frac{1}{2}$ -1 in., axillary, scattered, base rounded, longer than their peduncle; cymes pubescent, upper branch 2-4, lower 1-2-fld. *Seeds* truncate at one end, subacute at the other.

** *Spathe* funnel-shaped or hooded.

6. **C. benghalensis**, *Linn. Sp. Pl.* 41; stem glabrous or pubescent, leaves elliptic-ovate obtuse, or tip rounded, spathes 1-3 together turbinate base auricled on one side, capsule 5-seeded, seeds rugose. *Clarke Comm. & Cyrt. Beng.* t. 4; *Monogr.* 159; *Wall. Cat.* 8980 A, C, D, E, F, G (in part); *Hassk. Comm. Ind.* 28, 29; *Miq. Fl. Ind. Bat.* iii. 533. *Wight Ic.* t. 2065. *C. nervosa*, *Burm. Fl. Ind.* 18, t. 7, f. 3. *C. cucullata*, *Linn. Mant.* 176. *C. mollis*, *Jacq. Collect.* iii. 235; *Ic. Rar.* t. 293. *C. canescens*, *Vahl Enum.* ii. 173; *Webb & Berth. Plyt. Canar.* iii. 358, t. 239. *C. turbinata*, *Vahl l.c.* 171. *C. procurrens*, *Schlecht. in Linnæa* xxiv. 656, xxv. 183; *Regel Gartenfl.* iii. t. 104, iv. 44; *Seub. in Mart. Fl. Bras.* iii. i. 266. *C. prostrata*, *Regel l.c.* 1868, 289, t. 592, f. 1 (not of H, B, K). *C. delicatula*, *Schlecht. in Regel l.c.* iii. 349, t. 104.

Throughout INDIA; ascending to 6000 ft. in the Himalaya.—DISTRIB. trop. Asia and Africa.

Stem creeping and rooting below. *Leaves* 1-3 by $\frac{1}{2}$ - $1\frac{1}{2}$ in., sessile or petioled, base suddenly contracted or rounded; sheaths pubescent or villous, often bearded or ciliate. *Spathes* $\frac{1}{3}$ - $\frac{1}{2}$ in. long and broad, pubescent or hirsute; upper branch of cymes 2-3-fld., lower 1-2-fld. or suppressed. *Flowers* blue. *Capsule* membranous, shining, dorsal valve striolate. *Seeds* closely pitted.

Sect. 2. HETEROCARPUS, *Clarke*. *Capsule* 3-celled, lateral cells 0-2-seeded, dehiscent, dorsal not keeled, 1-seeded, indehiscent, deciduous; seed free or adnate to the cell. *Petals* yellow, or blue.

7. **C. hirsuta**, *Clarke Monogr.* 163; dwarf, hirsute or glabrate, leaves linear-lanceolate, spathes long-peduncled ovate-cordate or lanceolate complicate, capsule with the lateral cells empty, dorsal adnate to the ellipsoid smooth seed. *C. nilagirica*, *Steud. in Hohenack Pl. Exsicc.* p. 1316 (in part). *Heterocarpus hirsutus*, *Wight Ic.* t. 2067.

THE DECCAN PENINSULA; Belgaum, *Ritchie*; Nilghiri hills ascending to 6000 ft. *Wight, &c.*

Stem 6–12 in., erect, branched from the base. *Leaves* 2–3 by $\frac{1}{4}$ – $\frac{1}{2}$ in., acute or acuminate, more or less hirsute on both surfaces. *Spathes* $\frac{3}{4}$ –1 in., hirsute or villous, acuminate, base cordate, peduncle 1–2 in. *Flowers* yellow, drying blue. *Capsule* with the lateral valves linear, dorsal ellipsoid, subglobose.

8. **C. glabra**, *Clarke Monogr.* 163; nearly glabrous, leaves small sessile narrowly oblong obtuse, spathes peduncled ovate-lanceolate complicate, capsule with the lateral cells linear empty, dorsal globose membranous, seed free globose. *Heterocarpus glaber*, *Wight Ic.* t. 2067.

THE SOUTHERN DECCAN PENINSULA; on low hills, *Wight, &c.*

Stem rooting at the lower nodes, branched, slender, pubescent on one side. *Leaves* $1\frac{1}{2}$ –2 by $\frac{1}{2}$ – $\frac{3}{4}$ in., glabrous, margins of the sheaths villous. *Spathes* $\frac{1}{2}$ –1 in., longer than their peduncle, glabrous pubescent or ciliate, acuminate, base deeply cordate; peduncle scaberulous. *Flowers* small, orange-yellow.

9. **C. Forskalæi**, *Vahl Enum.* ii. 172; glabrate, leaves sessile narrowly oblong obtuse, spathes ovate or orbicular shortly peduncled complicate or hooded acute, capsule with the lateral cells 0–1-seeded, dorsal striate, seeds subglobose smooth. *Clarke Monogr.* 168; *Hassk. in Schweinf. Beitr. Fl. Æthiop.* 208. *C. falcata*, *Hassk. in Peter's Mossamb. Bot.* 527.

THE DECCAN PENINSULA; in the Concan, *Jacquemont, &c.*—DISTRIB. Afric. trop.

Stem diffuse, rooting at the nodes. *Leaves* 1–2 by $\frac{1}{2}$ – $\frac{3}{4}$ in., narrowed at the base, margins often undulate. *Spathes* $\frac{1}{2}$ in., broader than long, often hispid, base cuneate, or broadly truncate. *Petals* blue. *Seeds* lead-cold., appendage 0.—Leafless suckers bear deformed capsules that ripen underground.

SECT. III. DISSEOCARPUS, *Clarke*. *Capsule* 2-celled, rarely with a dorsal cell which is empty or contains an imperfect seed; lateral cells 1–2-seeded. *Flowers* blue or white.

10. **C. clavata**, *Clarke Comm. & Cyrt. Beng.* t. 5, *Monogr.* 171, t. 2, f. 2; glabrous or puberulous, leaves ovate or lanceolate, spathes peduncled ovate-lanceolate acuminate complicate, seeds terete faintly reticulate. *C. salicifolia*, *Thwaites Enum.* 321 (in part). *C. nilagirica*, *Steud. Pl. Hohenack.* No. 1316 (in part). *C. nov. sp. Miquel Plant. Exsicc. Hohenack.* No. 66. *C. communis*, *Wall. Cat.* 8978 L. (in part).

DECCAN PENINSULA, from the Concan southwards, ascending to 6000 ft. in the Nilghiris. CEYLON common.—DISTRIB. Java.

Stem 1–3 ft., sparingly branched. *Leaves* $\frac{1}{2}$ –3 by $\frac{1}{2}$ – $\frac{3}{4}$ in., acuminate, base narrowed. *Spathes* 1– $1\frac{1}{2}$ in., glabrous or pubescent, shorter than their peduncle base rounded; cymes on long capillary pedicels. *Petals* lilac. *Capsules* usually 2, oblong-quadrate, constricted in the middle. *Seeds* 4, nearly black, two lowe, often imperfect.—Possibly a variety of *C. nudiflora*, differing in the absent or empty dorsal cells of the capsule.

Var. β . *Hohenackeri*, *Clarke l. c.*; leaves oblong subacute, spathes smaller tip acuminate.—Nilghiris (*Hohenack.* No. 1066).

11. **C. persicariæfolia**, *Wight in Wall. Cat.* 8984 (not of DC); nearly glabrous, leaves large petioled ovate-cordate or lanceolate, spathes broadly ovate-cordate peduncled complicate, seeds oblong terete smooth or obscurely rugose. *Clarke Monogr.* 171. *C. paludosa*, *Burm. Thes. Zeyl.* 69 t. 20, f. 2; *Moon Cat. Pl. Ceyl.* 5 (not of Blume). *C. benghalensis*, *Wall. Cat.* 8980 H.

DECCAN PENINSULA, *Rottler*. Dindygul, *Wight*. CEYLON, *Regnaud*.

Stems diffuse. *Leaves* 3–5 by 1–2 in., acuminate, glabrous or puberulous, base rounded. *Spathes* 1 in., base truncate, peduncle as long. *Capsule* oblong, obtuse.

Var. *β. geniculata*, *Clarke l. c.* leaves narrowly oblong-lanceolate.—*C. communis* var. *geniculata*, *Wall. Cat.*, 8978 N. Burma, at Segain.—Mixed in Wallich's distribution with *obliqua* and *Kurzii*.

12. **C. attenuata**, *Kæn. mss. in Vahl Enum.* ii. 168; glabrous or hirsute, leaves small sessile linear or lanceolate, spathes peduncled oblong- or ovate-lanceolate deeply cordate, capsule 1-celled, with 2 superposed seeds truncate and appendaged at both ends, or 1 subglobose seed. *Clarke Monogr.* 172. *C. rajmahalensis*, *Clarke in Journ. Linn. Soc. Bot.* xi. 444, *Comm. & Cyrt. Beng.* t. 7; *Monogr.* 172. *C. repens*, *Roxb. in Heyne mss.* *C. communis*, *Wall. Cat.* 8978 B (in part).

BEHAR, CENTRAL INDIA, and the DECCAN PENINSULA in dry places common. CEYLON, *Walker*.

Stems 12–18 in., tufted, much branched, rather slender. *Leaves* 1–2 by $\frac{1}{4}$ – $\frac{1}{2}$ in., obtuse or subacute, often complicate and usually recurved. *Spathes* $\frac{3}{4}$ –1½ in., acute or caudate-acuminate, longer than their peduncles, base auricled, deeply cordate. *Flowers* small, blue. *Capsule* oblong-subquadrate, not constricted in the middle, either 1-celled with 2 superposed seeds, or with one subglobose seed. *Seeds* straw-colrd., or ashy.

Subgen. II. **Monoon**, *Clarke*. All the cells of the ovary 1-ovuled.

Sect. 4. TRITHYROCARPUS. *Capsule* 3-celled, subequally 3-valved. *Seeds* free in the cells.

13. **C. obliqua**, *Ham. in Don Prodr.* 45 (not of Vahl); stem stout, leaves lanceolate, spathes subsessile solitary or crowded funnel-shaped, capsule trigonous obovoid, seeds ellipsoid compressed. *Clarke Comm. & Cyrt. Beng.* t. 9, 10, 11; *Monogr.* 178, t. 2, f. 3. *C. polyspatha*, *Wight Ic.* t. 2066. *C. maculata*, & *C. striata*, *Edgew. in Trans. Linn. Soc.* xx. 89; *Wall. Cat.* 8983 & 8981 (in part) *C. semi-ovata*, *Ham. in Wall. Cat.* 8985. *C. communis*, *Roxb. Fl. Ind.* i. 171; *Ed. Wall. & Carey* i. 175 (not of Linn.). *C. Donii*, *Dietr. Sp. Pl.* ii. 395. *C. paludosa*, *Blume Enum.* i. 2. *Heterocarpus*? *obliquus*, *Hassk. Commelin. Ind.* 7.

Throughout INDIA, from the base of the Himalaya to 6000 ft.; the WESTERN GHATS and Singapore. CEYLON, not common.—DISTRIB. Malay Islds.

Stem tall, 2–3 ft., branched. *Leaves* very variable, 4–7 by 1–2 in., sessile or petioled, acute or caudate-acuminate, glabrous pubescent or villous beneath; sheaths $\frac{3}{4}$ in., margins often bearded. *Spathes* $\frac{3}{4}$ –1½ in. long and broad, sessile or peduncled, usually in terminal heads, acute, glabrous scabrid villous or glandular-hirsute with red hairs; raceme usually simple (no lower branch). *Petals* blue. *Seeds* lead-coloured, margins often marbled.—*C. maculata* is a smaller more slender very viscidly villous form. A small state from Darjeeling, alt. 5–7000 ft. (*Clarke*) has leaves only 1–1½ by $\frac{1}{2}$ – $\frac{3}{8}$ in.

14. **C. paleata**, *Hassk. Pl. Jungh.* 139; stem stout, leaves elliptic or broadly lanceolate, spathes shortly peduncled scattered broadly ovate

cucullate, seeds broadly ellipsoid smooth. *Clarke Monogr.* 178. *Commelina*, sp. No. 6. *Herb. Ind. or Hf. & T.* *Trithyrocarpus paleatus* & *T. oligospathus*, *Hassk. Commel. Ind.* 25.

The DECCAN PENINSULA; the Concan and Malabar, *Law, Stocks*, &c.—DISTRIB. Java.

Stem branched, glabrous. *Leaves* 3-6 by 1-2 in., glabrous or scaberulous, acuminate, base rounded or cuneate. *Spathes* $\frac{1}{2}$ in., crowded or not, scaberulous or finely pubescent, striate, base broad, rhomboid. *Petals* blue. *Seeds* dark brown, sometimes margined with white, broader and less compressed than in *C. obliqua*, of which it is perhaps a var. with peduncled spathes.

15. **C. undulata**, *Br. Prodr.* 270; stem stout, leaves lanceolate waved, spathes subsessile ovate hooded acute, seeds shortly ellipsoid smooth. *Clarke Monogr.* 179. *C. ensifolia*, *F. Muell. Fragm. Phyt.* viii. 60; *Benth. Fl. Austral.* vii. 83 (in part) (not of *Br.*). *C. setosa*, *Wight in Wall. Cat.* 8981 D.

The DECCAN PENINSULA; in the southern provinces, *Wight*.—DISTRIB. Australia China, Philippine Islds., &c.

No doubt a slight variety of *C. obliqua*. *Clarke* refers the only Indian specimen (*Wight's*) to a variety (*B. setosa*) with elongate leaves 4-5 by $\frac{1}{2}$ - $\frac{1}{2}$ in. The locality given, "Nopaloy," is meant for Nopalry, cultivated *Opuntia* fields in which *Wight* found many weeds. *J. D. H.*

Sect. 5. HETEROPYXIS. *Capsule* 3-celled, 2-valved, the dorsal cell indehiscent, deciduous, often scabrid. *Seed* adnate to the cell.

16. **C. albescens**, *Hassk. in Schweinf. Beitr. Fl. Æthiop.* 210; leaves linear or linear-lanceolate, spathes subsessile strongly recurved hooded auricled on one side falcately hooked on the other, seeds ellipsoid compressed smooth. *Clarke Monogr.* 184. *C. striata*, *Wall. Cat.* 8981 (in part, not of others). *C. Schimperiana* and *multicaulis*, *Hochst. in Schimp. Herb.* No. 1242 and No. 2268. *Commelina*, Sp. 3, *Herb. Ind. Or. Hf. & T.*

SCIND, *Stocks*, &c.—DISTRIB. Beluchistan, Arabia, trop. Africa.

Stem 1-2 ft., thickened at the base, glabrous. *Leaves* 2-3 by $\frac{1}{4}$ - $\frac{1}{2}$ in., margins white, often waved. *Spathes* $\frac{1}{2}$ in. long and broad as folded, glabrous or sparsely hispid; raceme usually simple. *Petals* blue. *Seeds* black, spotted with dull yellow.

17. **C. Kurzii**, *Clarke in Journ. Linn. Soc. Bot.* xi. 144; *Comm. & Cyrt. Beng.* t. 8; *Monogr.* 185, t. 2, f. 4; stem stout, leaves subsessile narrowly lanceolate acuminate scaberulous puberulous or hirsute, spathes sessile usually capitate cucullate or broadly cordate and complicate acute, seeds in the lateral cells broadly ellipsoid compressed smooth, in the dorsal hemispheric. *C. longifolia*, *Thwaites Enum.* 322 (not of *Lamk.*). *C. communis*, and *C. striata*, *Wall. Cat.* 8978 C, D (in part) and 8981 C (in part). *C. angustifolia*, *Hassk. as to Thwaites C. P.* 3224. *Commelina*, Sp. *Wall. Cat.* 8982.

The SOUTHERN DECCAN PENINSULA, Malabar and the Nilghiris, *Rottler*, &c. CEYLON, common.

Stem 1-2 ft., hairy or glabrate. *Leaves* 2-6 by $\frac{1}{4}$ - $\frac{3}{4}$ in., acuminate, sheaths ciliate. *Spathes* recurved, solitary or clustered, $\frac{3}{4}$ in. long and broad, raceme simple. *Petals* blue. *Capsule* with the dorsal cell scabrid.—Hardly distinguishable from the common American *C. virginica*, L., except by its country and slightly

by its hairyness. A variety (*B. glochidea* Kœn. mss. *Wall. Cat.* 8981 *B.* (in part) has elliptic-lanceolate scabrous or nearly glabrous leaves.

18. **C. appendiculata**, *Clarke Comm. & Cyrt. Beng.* 13; *Monogr.* 186; leaves sessile linear or linear-lanceolate, spathes very long-peduncled lanceolate deeply cordate complicate, seeds oblong smooth appendaged at both ends, or in the dorsal cell smaller or 0. *C. communis* var. *acuminata*, *Wall. Cat.* 8978 K. *C. alba*, *Ham. mss.*—*Commelina*, sp. 4, *Herb. Ind. Or. Hf. & T.*

NORTHERN BENGAL, *Hamilton*; MYMENSINGH, *Clarke*. SIKKIM HIMALAYA; foot of the hills, *J. D. H., Clarke*. CEYLON, *Macrae, &c.*

Diffusely branched, 1–3 ft. high. *Leaves* 4–6 by $\frac{1}{3}$ – $\frac{2}{3}$ in., narrowed at both ends, nearly glabrous. *Spathes* 2–3 in., glabrous without, hairy within, striate, caudate-acuminate, base cordate; raceme 2-fld. *Petals* blue or white. *Capsule* 2- or 3-celled (the dorsal often 0). *Seeds* somewhat flattened, nearly black, appendages conical.

Sect. 6. SPATHODITHYROS. *Capsule* 2-celled. (See also *C. appendiculata*.)

19. **C. suffruticosa**, *Blume Enum.* 3; stem stout, leaves large sessile lanceolate scabridly pubescent, spathes small shortly peduncled broadly ovate-cordate between cucullate and complicate, seeds ellipsoid rugose. *Clarke Comm. & Cyrt. Beng.* 12; *Monogr.* 188, t. 2, f. 5. *C. semiovata*, *Wall. Cat.* 8985 C, E. *C. Simsoni* & *C. rugulosa*, *Clarke in Journ. Linn. Soc. Bot.* xi. 446. *Spathodithyros suffruticosus*, *Hassk. Comm. Ind.* 11.

TROPICAL INDIA from Nepal, Sikkim and Bengal to Central India and the Malay Peninsula.—DISTRIB. Malay Islds.

Stem branched, nearly glabrous. *Leaves* 3–14 by $\frac{3}{4}$ –2 in., acuminate; sheaths auricled. *Spathes* $\frac{1}{2}$ – $\frac{3}{4}$ in. long and broad, longer than their peduncle, panicked or clustered, acute or obtuse, villous; raceme simple, 6–12-fld. *Petals* white or blue. *Seeds* straw-colrd., puberulous.

20. **C. ensifolia**, *Br. Prodr.* 269; leaves linear-lanceolate, spathes very shortly peduncled broadly ovate acute cucullate, seeds ellipsoid smooth. *Clarke Monogr.* 188; *Benth. Fl. Austral.* vii. 83 (in part). *C. striata*, *Wall. Cat.* 8981 (in part). *C. lunata*, *Heyne mss.* *Commelina* sp. *striatæ affinis*, *Edgw. in Trans. Linn. Soc.* xx. 90.

DECCAN PENINSULA, *Rottler, &c.* CEYLON, *Walker, &c.*—DISTRIB. Australia.

Stem 12–18 in., slender. *Leaves* 2–4 by $\frac{1}{2}$ – $\frac{3}{4}$ in., glabrous, or with deciduous hairs, or villous. *Spathes* $\frac{1}{2}$ – $\frac{3}{4}$ in., glabrous or hairy, base truncate on one margin, hooked at the other; raceme simple.

DOUBTFUL AND INDETERMINABLE SPECIES.

C. AVENÆFOLIA, *Grah. Cat. Bomb. Pl.* 224; leaves sparsely hairy, sheaths hairy, spathes truncate.—Bombay, near Kandalla.

C. NIMMONIANA, *Grah. l.c.*; small, leaves linear acuminate discoloured.—Bombay, on Malabar hill and near Rosa and Ellora.

C. ZEYLANICA, *Falkenb. in Just. Jahresb.*, iv. 406, 408, name only.

C. COMMUNIS, *Linn.* and C. BENGALENSIS, *Linn.*, of Dalzell & Gibson *Bomb. Flor.* are undeterminable from the descriptions.

3. ANEILEMA, Br.

Simple or branched, often tuberous rooted herbs. *Flowers* in axillary and terminal panicles, bracteate and bracteolate; bracts not spathaceous.

Sepals 3, free, membranous. *Petals* 3, obovate, equal. *Stamens* 2 or 3, filaments naked or bearded; anthers oblong, one usually smaller or larger than the others: staminodes 2-4, rarely with minute polliniferous anthers. *Ovary* sessile, 2-3-celled, cells 1-2, many ovuled. *Capsule* loculicidal, cells 1 or more seeded. *Seeds* with a thick hard rugose or pitted testa.—Species about 60, tropical and subtropical, chiefly Asiatic.

Subgen. I. **Tricarpellaria**; Clarke. *Capsule* 3-celled 3-valved.

Sect. 1. EUANEILEMA. Cells of ovary 2-∞-ovuled. *Seeds* 1-seriate in each cell.

* Cells of ovary 3-∞-ovuled, of capsule 1-3- or more-seeded (see also *A. nudiflorum*).

a. *Flowers panicled on a radical or subradical rarely leafy scape.*

1. **A. glaucum**, Thwaites mss. in Clarke Monogr. 200; leaves large rosulate broadly ensiform, scape erect, branched from the base, panicle spreading lax-fld., bracts small not sheathing, capsule triquetrous, seeds 5-8-superposed in each cell.

TRAVANCORE; on the Tinnevely hills, Beddome. CEYLON, Thwaites (C. P. 3977).

Root fibrous. *Leaves* 3-6 by 1-1½ in., acuminate, margin crisped scabrid. *Scape* and broad panicle 8-12 in.; bracteoles small; panicle widely spreading, branches very slender. *Stamens* 3, anthers subsimilar; staminodes 2. *Capsule* ½ in., oblanceolate, acute. *Seeds* straw-colrd., with a white minutely reticulate epidermis.

2. **A. scapiflorum**, Wight Ic. t. 2073; leaves narrowly ensiform, scape erect, panicle strict elongate, bracts large sheathing, capsule ellipsoid trigonous, seeds 3-6-superposed in each cell. Clarke Comm. & Cyrt. Beng. 14; Monogr. 200 t. 4, f. i. *A. tuberosum*, Ham. in Wall. Cat. 5207; Dalz. & Gibs. Bomb. Fl. 255. *A. serotinum*, Don mss. Commelina scapiflora, Roxb. Fl. Ind. i. 175. Murdannia tuberosa, Royle Ill. 403, t. 95. Tradescantia aphylla, Heyne mss.

TEMPERATE and TROPICAL HIMALAYA; from the upper Gangetic plain eastwards to Bhotan, and westwards to TRAVANCORE and TENASSERIM, CEYLON and the Shan hills.

Roots of elongated tubers. *Leaves* 4-10 in., all radical, erect, finely acuminate. *Scape* with the narrow panicle 8-18 in.; lower bracts long, upper small amplexicaul. *Flowers* small. *Capsule* ¼ in., mucronate. *Seeds* in a triangular column, angled, straw-colrd., with a white minutely reticulate and glandular epidermis.

3. **A. Loureirii**, Hance in Seem. Journ. Bot. 1868, 250; leaves ensiform, scape radical 1-2-leaved, panicle narrow, flowers fascicled in the sheathing bracts, sepals glandular-pubescent, capsule elliptic-oblong trigonous, seeds 3-5-superposed in each cell. Clarke Monogr. 201. *A. spectabile*, Kurz in Journ. As. Soc. Beng. 1871, ii. 77; Clarke Comm. & Cyrt. Beng. t. 20. *A. spicatum*, Wall. Cat. 5217. Commelina tuberosa, Lour. Fl. Coch. Ed. Willd. i. 50.

TENASSERIM, Wallich, Helfer (Kew Distrib. 5528), &c.—DISTRIB. Siam, Malay Islds., China.

Root of fascicled elongated tubers. *Leaves* all radical, 6-16 by ¾-1 in., sub-erect, margins smooth or ciliate only. *Scape* stout and panicle longer than the

leaves; upper bracts truncate, pedicels viscid. *Petals* blue. *Stamens* 2 fertile; staminodes 4, all bearded. *Capsule* $\frac{1}{2}$ in. acuminate. *Seeds* yellow brown, pitted.

b. *Flowering stem leafy, flowers corymbose or paniced.*

4. **A. Thomsoni**, *Clarke in Journ. Linn. Soc. Bot.* xv. 121; *Monogr.* 202, t. 4, f. 2; stout, leaves petioled broadly lanceolate or ensiform caudate-acuminate with large bearded sheaths, upper bracts lanceolate caducous, capsule elongate narrowly oblong acuminate and beaked, cells 5-9-seeded, seeds smooth. *Aclisia*? *Thomsoni*, *Clarke Comm. & Cyrt. Beng.* t. 31. *Dichospermum giganteum*, *Hussk. Commelin. Ind.* 42.—*Aneilema*, sp. 11, *Herb. Ind. Or. Hf. & T.*

EASTERN HIMALAYA; Sikkim, alt. 5-8000, *J. D. H.*, &c. Bhotan, *Griffith*. NAGA HILLS, alt. 7000 ft., *Clarke*.

Stem 1-2 ft., erect. *Leaves* 6-10 by 2-3 in., glabrous or scaberulous, pinninerved above the base. *Panicle* 3-6 in., glabrous, branches spreading widely in fruit, bracts caudate. *Sepals* glabrous. *Petals* purple. *Stamens* 3 fertile, unilateral; staminodes 3, sometimes polleniferous, filaments naked. *Capsule* $\frac{3}{4}$ -1 in. *Seeds* shortly cylindric, black, with white powder.

5. **A. divergens**, *Clarke Comm. & Cyrt. Beng.* t. 16; *Monogr.* 203; stem tall, leaves ensiform, sheaths bearded, panicle erect, upper branches opposite or subwhorled, bracts ovate persistent, capsule ellipsoid acute at both ends, cells 3-5-seeded. *A. herbaceum* *B. divergens*, *Clarke in Journ. Linn. Soc.* xi. 448. *A. longifolium*, *Wall. Cat.* 5213 A, B. *A. scapiflorum*, *Herb. Ind. Or. Hf. & T.*

TROPICAL and SUB-TROPICAL HIMALAYA; from Chamba, alt. 6000 ft., *Clarke*, eastwards to Sikkim. KHASIA HILLS, alt. 4-5000 ft. UPPER BURMA, *Anderson*.

Root of elongate tubers. *Stem* 2-3 ft., leafy. *Leaves* 6-12 by $\frac{1}{2}$ - $\frac{3}{4}$ in., erect, upper gradually smaller, acuminate. *Panicle* erect, narrow, bracts ovate, persistent. *Petals* blue. *Stamens* 3 fertile, staminodes 3, filaments all bearded. *Capsule* nearly $\frac{1}{2}$ in., subtrigonus. *Seeds* yellow.

6. **A. Hookeri**, *Clarke Comm. & Cyrt. Beng.* t. 171; *Monogr.* 204; stem tall stout, leaves ensiform base broad or subcordate, sheaths bearded, panicle erect branches slender spreading repeatedly dichotomous.

KHASIA HILLS, alt. 5-6000 ft., *J. D. H.* and *T. T.*

Distinguished from *A. divergens* by the broader leaf bases and spreading panicle. *Stem* 6-12 in., leafy to the top.

7. **A. zeylanicum**, *Clarke Monogr.* 204; leaves narrowly oblong narrowed at both ends glabrous or pubescent, branches of panicle spreading alternate, branches flexuous, bracts minute, capsule subglobose, cells 3-5-seeded, seeds slightly pitted. *A. montanum*, & *protensum*, *Thwaites Enum.* 322. *A. dimorphum*, *Thw. l. c. non Dalz.*

CEYLON, common up to 3000 ft.

Roots fibrous. *Stem* 6-12 in., often branched from the base, branches leafy. *Leaves* 1-3 by $\frac{3}{4}$ -1 in., sheaths bearded at the mouth. *Panicle* glabrous, bracts glabrous, hardly sheathing, persistent. *Stamens* 3 fertile; staminodes 2-3. *Capsule* $\frac{1}{2}$ - $\frac{3}{4}$ in., obtuse, concave, mucronate. *Seeds* brown, with white powder.—Var. *B. longiscapa*, *Clarke, l. c.*; capsule $\frac{1}{2}$ in.—*Courtalam, Wight*.

8. **A. lineolatum**, *Kunth Enum.* iv. 69; stem stout, leaves large narrowly oblong or ensiform acuminate, margins white, panicle glabrous

effuse, bracts marcescent, capsule ellipsoid or subglobose trigonous, cells 3-4-seeded, seeds smooth. *Hassk. Pl. Jung.* 146, *Commelin. Ind.* 36; *Clarke Comm. & Cyrt. Beng.* t. 15. *A. elatum*, *Kunth l.c.* 70; *Dalz. in Hook. Journ. Bot.* 1857, 137; *Dalz. & Gibs. Bomb. Fl.* 254. *A. latifolium*, *Wight Ic.* t. 2072. *A. herbaceum*, *Wall. Cat.* 5223; *Clarke Monogr.* 204; *in Journ. Linn. Soc. Bot.* xi. 448 (var. *a*). *Commelina herbacea*, *Roxb. Fl. Ind.* i. 175, *Ed. Wall. & Carey* i. 179. *C. lineolata*, *Blume Enum.* i. 3. *C. elata*, *Vahl Enum.* ii. 178. *Tinantia?* *lineolata*, *Hassk. Pl. Jav.* 98. *Prionostachys herbacea*, *Hassk. mss.*

TROPICAL INDIA; from Sikkim, Bhotan and the Khasia hills, alt. 2-4000 ft., to BURMA. Western Ghats from the Concan to Travancore.—DISTRIB. Malay Islands.

Root of slender tubers. *Stem* erect, stout. *Leaves* 4-12 by 1-1½ in., margins scabrous or smooth often crisped, base cuneate rounded or cordate, upper ovate-lanceolate. *Panicle* stout, glabrous, branches spreading and ascending; bracts marcescent in fruit. *Petals* blue. *Stamens* 2-3 with 2 or 3 staminodes, filaments all bearded. *Capsule* ¼ in. diam., mucronate. *Seeds* reticulate, glandular-puberulous.

9. ***A. esculentum***, *Wall. Cat.* 5208; root tuberous, stem subsolitary, leaves linear complicate, panicle glabrous spreading, bracts oblong or the lower 1-2 foliaceous, capsule ellipsoid, cells 3-5-seeded. *Clarke Monogr.* 206. ? *A. melanostictum*, *Hance in Seem. Journ. Bot.* 1869, 167. *Commelina esculenta*, *Heyne mss.*

MADEAS; in rice fields, *Heyne, Wight. CEYLON, Walker.*—DISTRIB. Australia, China.

Root of clavate tubers, crown with imbricating scarious scales. *Stem* with prostrate suckers. *Leaves* 3-4 in., recurved, obtuse, almost glabrous. *Panicle* with alternate branches; bracts oblong, persistent. *Stamens* 3 fertile, staminodes 3, filaments bearded. *Capsule* ¼ in. *Seeds* dark brown, obscurely scabrid or pitted.—Probably the same as the Australian *A. gramineum*, Br.

10. ***A. dimorphum***, *Dalz. in Hook. Journ. Bot.* 1851, 138; root fibrous, stems many, leaves linear-oblong flat, bracts ovate, panicle very short and broad, capsule ellipsoid or oblong, cells 3-5-seeded, seeds smooth. *Dalz. & Gibs. Bomb. Fl.* 254; *Clarke Monogr.* 206. *A. paniculatum*, *Wight Ic.* t. 2075. *A. scapiflorum*, *ß, Thwaites Enum.* 322 (not of *Wight*). *A. nudiflorum*, *Miq. in Pl. Hohenack. Exsicc.* No. 144 (not of Br.).—*Aneilema*, sp. *Miq. l. c. n.* 134.

The DECCAN PENINSULA; from the Concan southward, *Wight, &c. CEYLON*, alt. 5000 ft., *Thwaites*.

Stem slender, branched at the base, 6-12 in. *Leaves* 1-2½ by ¼-½ in., from oblong to ovate-lanceolate, base rounded or cordate, mouth of sheath ciliate. *Panicle* sparingly dichotomously branched, few-fl.; bracts small, cucullate, persistent. *Petals* blue. *Stamens* 3, fertile, filaments bearded; staminodes 3, filaments naked. *Capsule* ⅙ in., triquetrous, acute. *Seeds* black, with brown furfuraceous lines.—*Wight* figures all the filaments bearded, but describes them as above.

11. ***A. spiratum***, *Br. Prodr.* 271 (in note); root fibrous, stem branched decumbent, leaves small sessile flat oblong, base obtuse or cordate or auricled, panicle small leafy below, bracts ovate, capsule oblong or subglobose, cells 3-7-seeded, seeds smooth or minutely scaberulous. *Clarke Monogr.* 207. *A. nanum*, *Kunth Enum.* v. iv. 65; *Wight Ic.* t. 2077; *Hassk. in Pl. Jungh.* i. 141; *Thwaites Enum.* 322; *Clarke Comm. & Cyrt. Beng.* t.

18. *A. canaliculatum*, Dalz. in *Hook. Journ. Bot.* 1851, 137; Dalz. & Gibs. *Bomb. Fl.* 254. *A. nummularium*, Miq. *Fl. Ind. Bat.* iii. 535. *Commelina spirata*, Linn. *Mant.* 176. *C. bracteolata*, Lamk. *Encycl.* ii. 69. *C. nana*, Roxb. *Fl. Ind.* i. 173; ed. Wall. & Carey, i. 176. *C. pumila*, Herb. Royle. *Dichæsperrum repens*, Hassk. (not of Wight).

Throughout INDIA, in pastures, &c., from the Upper Gangetic plain to Chittagong and Travancore. Ceylon, common.—DISTRIB. Malay Islands, China.

Dwarf, tufted, prostrate, branches ascending 6–10 in. Leaves glabrous puberulous or ciliate, from oblong to ovate-lanceolate, subacute or acuminate; base amplexicaul. Cymes terminal and axillary; branches short, divaricate, few-fl.; bracts ovate, persistent. Flowers blue. Stamens 3, staminodes 3; filaments of both naked or bearded. Capsule $\frac{1}{2}$ in., acutely trigonous. Seeds straw-colrd.

c. Stem leafy. Cymes 1–3-fl. axillary.

12. *A. pauciflorum*, Wight, *Ic. t.* 2077; slender, diffuse, creeping, leaves small flat ovate, peduncles 1–3-fl. axillary, capsule lanceolate, pedicel decurved, cells 4–6-seeded, seeds cubical nearly smooth. Clarke *Monogr.* 207. *Dichæsperrum aurantiacum*, Hassk. in *Herb. Zoll.* No. 3312.

MALABAR and TRAVANCORE, Wight (*Kew distrib.* 1179).—DISTRIB. Macassar.

Tufted; stems 4–6 in. Leaves $\frac{3}{4}$ –1 by $\frac{1}{2}$ – $\frac{3}{8}$ in., sessile, acuminate, glabrous or sparsely hairy, base rounded or cordate. Peduncles and pedicels slender. Sepals linear. Stamens 3, staminodes 3, filaments all naked. Capsule $\frac{1}{4}$ in., obtusely 3-gonous. Seeds black, farinose.

13. *A. versicolor*, Dalz. in *Hook. Journ. Bot.* 1851, 136; stem slender branched hispid, leaves flat oblong-lanceolate-acuminate, peduncle short 1-fl., pedicel capillary, capsule oblong or lanceolate acute erect, cells 5–7-seeded, seeds cubical. Dalz. & Gibs. *Bomb. Fl.* 253; Clarke *Monogr.* 208.

The CONCAN and MALWAN, Stocks, Dalzell, Ritchie.

Root fibrous; stem 6–10 in. Leaves 1–2 by $\frac{1}{2}$ – $\frac{1}{2}$ in., rather distant, base rounded or cuneate, upper spathe-like, complicate and recurved. Peduncles with the pedicel $\frac{1}{2}$ – $\frac{3}{4}$ in. Petals ochreous yellow, blueish in withering. Stamens 3, filaments faintly bearded; staminodes 3. Capsule $\frac{1}{4}$ – $\frac{1}{2}$ in., obtusely 3-angled. Seeds yellowish brown.

14. *A. triquetrum*, Wall. *Cat.* 5220; stem slender elongate, leaves linear-lanceolate flat, peduncle 1-fl., pedicel rather stout, capsule oblong acute, cells 3–5-seeded, seeds smooth farinose. Clarke *Monogr.* 208.

SILHET, Wallich.—DISTRIB. China.

Stem 12–18 in. Leaves 1–2 in., rather thick, spreading and recurved, base obtuse. Petals blue?. Stamens 3, filaments strongly bearded; staminodes 3. Capsule $\frac{1}{4}$ in. Seeds truncate at each end.

** Cells of ovary 2-ovuled, of capsule 2-seeded (3-seeded in *A. nudiflorum*, var. *compressa*).

15. *A. nudiflorum*, Br. *Prodr.* 271 (in note); branches decumbent rooting, leaves linear or lanceolate, sheath bearded, panicle subterminal short, cymes at the ends of the branches few-fl., capsule broadly oblong or subglobose, seeds rugose and pitted. Clarke *Comm. & Cyrt. Beng.* t. 21; *Monogr.* 210; Dalz. & Gibs. *Bomb. Fl.* 253; Wall. *Cat.* 5224 (excl. A); Hassk. *Commelin. Ind.* 29. *A. radicans*, Don *Prodr.* 45 (in part). *A.*

diandrum, *Ham.*, and *A. debile*, *Wall.*, *Wall. Cat.* 5210, 5215. *A. nudicaule* and *A. minutum*, *Kunth Enum.* iv. 67, 661. *A. foliosum*, *Hassk. in Pl. Jungh.* 144, *Commelin. Ind.* 32. *A. diversifolium*, *Hassk. l. c.* 142. *A. Junghuhnianum*, *Miquel Fl. Ind. Bat.* 112, 538, Suppl. 609. *A. lancifolia*, *Griff. Notul.* iii. 236. *A. trichocolea*, *Schauer Pl. Meyer*, 448. *Commelina nudiflora*, *Linn. Mant.* 177 (not of *Sp. Pl.*); *Roxb. Fl. Ind.* i. 173; *Reichb. Ic. Exot.* t. 136. *C. nudicaulis*, *Burm. Fl. Ind.* 17, t. 8. *C. diandra*, *Kæn. mss.* *C. radicans*, *Spreng. Syst. Cur. post.* 25. ? *C. minuta*, *Blume Enum.* 34. *Tradescantia malabarica*, *Linn. Mant.* 362.—*Rheede Hort. Mal.* ix. t. 63, x. t. 19.

Throughout INDIA; from the N.W. Himalaya ascending to 6000 ft. eastwards and southwards to the Khasia hills, Burma, the Deccan, Travancore and CEYLON.—DISTRIB. China, Malay Islands.

Stem and branches slender, diffuse, complicate or not. *Leaves* 2–5 by $\frac{1}{4}$ – $\frac{1}{2}$ in., glabrous or hairy, or subvillous. *Panicles* rarely axillary, branches elongate, scarred; flowers pedicelled, clustered; bracts deciduous. *Petals* small, blue or purplish. *Stamens* 3 fertile, 3 sterile, filaments of fertile or all bearded. *Capsule* $\frac{1}{2}$ in., acute at both ends.

Var. compressa, *Clarke l. c.* 211; petals rosy, cells of capsule often 3-seeded. *A. compressum*, *Dalz. in Hook. Journ. Bot.* 1851, 138; *Dalz. & Gibs. Bomb. Fl.* 253 (excl. *Syn.*).—The Concan, *Dalzell*.

Var. terminalis, *Clarke l. c.*; stem stouter, leaves broader, sometimes 6 by $\frac{3}{4}$ in., cymes more elongate, capsules larger, seeds less rugose or almost smooth. *A. nudiflorum*, *var. rigidior*, *Benth. Fl. Hongk.* 377. *A. terminale*, *Wight Ic.* t. 2076. *A. loriforme*, *Hassk. in Pl. Jungh.* 143. *Prionostachys terminalis*, *Hassk. mss.*—Khasia hills, Malabar, Ceylon, China. *Wight's* figure represents the capsule as globose.

16. *A. sinicum*, *Lindl. Bot. Reg.* t. 659; stem elongate diffusely branched, internodes long, leaves linear elongate, branches of terminal panicle short, stamens 2 perfect, filaments bearded, staminodes 3 naked, capsule subglobose, seeds obscurely rugose. *Clarke Monogr.* 212. *A. scundum*, *Wight Ic.* t. 2075. *A. esculentum*, *Wall. Cat.* 5208 *C. Commelina sinica*, *Rœm. & Sch. Syst. i.; Mant. i. addend.* 376.

The DECCAN PENINSULA; from the Concan southward, and CEYLON, *Wight, &c.*—DISTRIB. China, Malay Islands, Africa.

Roots of elongate tubers. *Stem* 1–2 ft. *Leaves* 6–12 by $\frac{1}{2}$ – $\frac{3}{4}$ in., cauline and tufted at the base of the ascending leafy flowering stem, glabrous or puberulous. *Panicle* lax; bracts large, caducous, branches scarred. *Petals* blue. *Capsule* $\frac{1}{4}$ in. diam. *Seeds* brown.

17. *A. giganteum*, *Br. Prodr.* 271; stem tall erect, internodes long, leaves linear elongate, branches of the terminal panicle short stout, stamens 3, filaments bearded, capsule ellipsoid acute, seeds compressed nearly smooth. *Clarke Monogr.* 212. *A. longifolium*, *Hook. Exot. Fl.* t. 204; *Wall. Cat.* 5213 D, F (in part). *A. ensifolium*, *Wight Ic.* t. 2074; *Clarke Comm. & Cyrt. Beng.* t. 22 (excl. *Syn. F. Muell.*). *Commelina gigantea*, *Vahl Enum.* ii. 177. *C. longifolia*, *Spreng. Syst. Cur. post.* 25. *C. Hookerii*, *Dietr. Sp. Pl.* ii. 404. *Prionostachys ensifolia*, *Hassk. mss.*

ASSAM and the KHASIA HILLS, ascending to 4000 ft. TENASSERIM, the DECCAN PENINSULA, CEYLON and the NICOBAR ISLANDS.—DISTRIB. Malay Islands, China, Australia, Africa.

Root fibrous. *Stem* 1–3 ft. *Leaves* 6–12 by $\frac{1}{2}$ – $\frac{3}{4}$ in., glabrous or nearly so. *Panicles* sparingly branched; branches very closely scarred; bracts caducous.

Petals blue. *Staminodes* with glabrous or bearded filaments. *Capsule* $\frac{1}{3}$ in. long, mucronate, valves hard polished.

Sect. II. DICHÆSPERMUM. *Cells* of ovary 4–20-ovuled. *Seeds* 2-seriate in each cell.

* *Flowers axillary, solitary or clustered, pedicels jointed in the middle.*

18. **A. Hamiltonianum**, *Wall. Cat.* 5222; stem creeping rooting, leaves linear-oblong flat glabrate, pedicels axillary and terminal fruiting hardly exserted, capsule linear-oblong, seeds scabrid or flocculent biseriate. *Clarke Monogr.* 213. *DichæspERMUM* Blumei, *Hassk. Comm. Ind.* 41.; *Clarke Comm. & Cyrt. Beng.* t. 27. *Tradescantia terminalis*, *Blume Enum.* i. 6. *Callisia orientalis*, *Herb. Ham.*

UPPER GANGETIC PLAIN to ASSAM, in marshes; Chota Nagpore, *Clarke*.—**DISTRIB.** Java.

Stem 6–12 in., stout, sparingly branched. *Leaves* $1\frac{1}{2}$ –2 in., sessile, acute or sub-acute, base cuneate. *Peduncle* $\frac{1}{6}$ – $\frac{1}{4}$ in., rigid. *Petals* white or rosy. *Filaments* all naked. *Capsule* $\frac{1}{4}$ – $\frac{1}{2}$ in., acute. *Seeds* about 16 in each cell.

Var. *minor*, *Clarke l. c.* 214; stems shorter, seeds about 30 in each cell, nearly smooth.—*DichæspERMUM repens*, *Clarke Comm. & Cyrt. Beng.* t. 28 (not of Wight).—Assam, *Hamilton*.

19. **A. ochraceum**, *Dalz. in Hook. Journ. Bot.* 1851, 135; stem short erect or decumbent, leaves small flat oblong or ovate-oblong obtuse or acute, base cordate, pedicels axillary fruiting exserted, capsule broadly oblong, seeds angular rugose biseriate. *Dalz. & Gibs. Bomb. Fl.* 253; *Clarke Monogr.* 214, t. 4, f. 3. *DichæspERMUM repens*, *Wight Ic.* t. 2078 (not of *Hassk.*). *D. ochraceum*, *Hassk. Commelin. Ind.* 41.

The DECCAN PENINSULA; from the Concan southwards. TENASSERIM, *Griffith, Helfer*.

Stem 4–8 in., rooting at the lower nodes. *Leaves* $\frac{3}{4}$ – $1\frac{1}{2}$ by $\frac{1}{3}$ – $\frac{1}{2}$ in., glabrous or nearly so, bases subamplexicaul. *Pedicels* $\frac{1}{4}$ – $\frac{1}{2}$ in., slender. *Sepals* narrow. *Petals* yellow. *Stamens* and *staminodes* 3 each, filaments naked. *Capsule* $\frac{1}{2}$ in. long. *Seeds* 7–8 in each cell, pale yellow.—*Dalzell* describes the filaments as bearded in the *Journal of Botany*, but not in the *Bombay Flora*.

Var. *crocea*, *Clarke Monogr.* 214; aquatic, leaves ovate subacute, pedicels solitary or 2-nate, sepals densely pubescent, capsule narrower. *A. croceum*, *Griff. Notul.* iii. 235. *A. pilosum*, *Wall. Cat.* 5219. *A. ochraceum*, var. *Griffithii*, *Kurz in Journ. As. Soc.* 1870, ii. 85.—Arracan, Burma and the Andaman Islands.

20. **A. lanuginosum**, *Wall. Cat.* 5221; hirsute or glabrate, stem suberect, leaves linear-oblong or lanceolate acuminate, pedicels exserted, flowers large, filaments bearded, capsule oblong acute many-seeded, seeds nearly smooth. *Clarke Monogr.* 214. *Commelina lanuginosa*, *Heyne mss.*

The DECCAN PENINSULA; from the Concan southwards, in hilly districts, ascending the Nilghiris to 6000 ft.

Roots of thickened fibres. *Stem* 6–16 in., stout, branched. *Leaves* $1\frac{1}{2}$ –2 $\frac{1}{2}$ in., rigid, deeply grooved when dry, acuminate, strongly striate, usually complicate and recurved, base broad, margins waved. *Pedicels* bracteolate at the joint. *Sepals* straw-colrd. *Petals* yellow, blue when dry. *Capsule* $\frac{1}{4}$ in., or more. *Seeds* angular.

** *Flowers panicled.*

21. **A. Koenigii**, *Wall. Cat.* 5214; stem short much branched glabrous, leaves ovate- or linear-lanceolate obtuse or acute, branches of panicle slender, filaments all bearded, capsule linear-oblong, seeds very numerous biseriate minutely tessellate. *Clarke Monogr.* 215. *A. nudiflorum*, *Miq. Pl. Exsicc. Hohenack.* 144, c. *Dichæsperrum lanceolatum*, *Wight Ic. t.* 2078. *D. Koenigii*, *Hassk. mss.*

The DECCAN PENINSULA; from the Concan and Canara southwards.

Root fibrous. *Stem* 6–10 in., and branches slender. *Leaves* 1–2 in., sessile, base rounded or cordate. *Panicle* large for the size of the plant, much dichotomously branched; branches flexuous, slender; bracts ovate, acute, persistent. *Flowers* small, blue. *Capsule* $\frac{1}{2}$ in., pale yellow. *Seeds* 15–16 in each cell, small, yellow, neither rugulose nor reticulate.

22. **A. paniculatum**, *Wall. Cat.* 5216; stem short slender branched, leaves grass-like filiform or narrowly linear or subulate semiterete glabrous, branches of few-fl. panicle slender spreading, filaments all naked, capsule shortly oblong or subglobose, seeds nearly smooth biseriate. *Clarke Monogr.* 215. *A. semiteres*, *Dalz. in Hook. Journ. Bot.* 1851, 138; *Dalz. & Gibs. Bomb. Fl.* 254. *Dichæsperrum juncoides*, *Wight Ic. t.* 2078. *D. semiteres*, *Hassk. Commelin. Ind.* 41. *D. paniculatum*, *Herb. Ind. Or. H. f. & T.*

The DECCAN PENINSULA; from the Concan southwards in hilly places.

Roots fibrous. *Stems* densely tufted, tuberous and sheathed at the base. *Leaves* 2–4 by $\frac{1}{16}$ – $\frac{1}{8}$ in., acuminate, erect and recurved, fleshy according to Dalzell. *Branches* capillary. *Bracts* ochreate, truncate, persistent. *Petals* small, blue. *Filaments* according to Dalzell all connate at the base. *Capsule* $\frac{1}{2}$ in. long. *Seeds* about 6–8 in each cell, pale yellow.—Habit of a *Juncus*.

Sect. III. DICTYOSPERMUM. Cells of ovary 1-ovuled, of capsule 1-seeded or empty.

* *Capsule* glabrous.

23. **A. vaginatum**, *Br. Prodr.* 271 (*in note*); stem long slender, leaves long linear flat, pedicels 1–3 in the axils of distant lanceolate erect bracts pubescent, filaments naked or bearded, capsule subglobose glabrous, cells 1-seeded, seeds hemispheric rugose. *Wight Ic. t.* 2076; *Wall. Cat.* 5212; *Clarke Comm. & Cyrt. Beng. t.* 23, *Monogr.* 216; *Hassk. Commelin. Ind.* 34. *A. filiforme*, *Ham. & nudiflorum*, *Wall. Cat.* 5209, and 5224. *A. pauciflorum*, *Dalz. in Hook. Journ. Bot.* 1851, 136; *Dalz. & Gibs. Bomb. Fl.* 253. *Commelina vaginata*, *Linn. Mant.* 177. *Tradescantia gangetica*, *Linn. mss.*

Throughout TROPICAL INDIA; Bengal, Assam and the Deccan Peninsula. CEYLON; in rice fields and wet places.—DISTRIB. China.

Roots fibrous. *Stems* 6–18 in., decumbent and rooting at the lower nodes, branches suberect. *Leaves* 3–6 by $\frac{1}{2}$ – $\frac{1}{3}$ in., acuminate, sheaths short open, upper reduced to bracts equalling the $\frac{1}{2}$ – $\frac{2}{3}$ in. pedicels. *Flowers* 1–3, pedicels twice jointed in the middle. *Sepals* pubescent. *Petals* blue. *Stamens* 2-fertile, staminodes 3–4. *Capsule* $\frac{3}{8}$ – $\frac{1}{2}$ in. diam., cuspidate. *Seeds* black.—Wight figures and describes all the filaments as naked.

24. **A. montanum**, *Wight in Wall. Cat.* 5203; stem erect, leaves large petioled elliptic-lanceolate glabrous or scaberulous, panicle terminal, branches long lax few-fl. pubescent, stamens 3 perfect, filaments naked, staminodes 0, capsule globose, glabrous pedicels suberect, cells 1-seeded,

seeds hemispheric rugose. *Clarke Monogr.* 217. *Dictyospermum montanum*, *Wight Ic.* t. 2069; *Hassk. Commelin. Ind.* 23. *Tradescantia montana*, *Heyne mss.* *T. paniculata*, *Roth Nov. Sp.* 188; ? *Kunth Enum.* iv. 100.

UPPER ASSAM; in the Naga hills, *Clarke*. MUNNIPORE, *Watt*. NILGHIRI and TEAVANCORE HILLS, *Heyne*, *Wight*, &c.

Stem creeping and rooting below. *Leaves* 4-6 by $1\frac{1}{2}$ -2 in., ciliate, acuminate, sheaths pubescent. *Flowers* small, few at the ends of the long filiform branches of the panicle; bracts small. *Petals* blue. *Capsule* $\frac{1}{2}$ in. diam. *Seeds* floury.

25. **A. conspicuum**, *Kunth Enum.* iv. 69; stem suberect, leaves lanceolate, panicle short subsessile, branches horizontal, or decurved, stamens 3 perfect, capsule globose glabrous, pedicels reflexed, cells 1-seeded, seeds hemispheric rugose. *Clarke Monogr.* 218. *Dictyospermum conspicuum*, *Hassk. Commelin. Ind.* 22. *Floscopa paniculata*, *Hassk. in Plant. Jungh.* 151 (in part). *Commelina conspicua*, *Blume Enum.* i. 4.

ASSAM; Patkoye Mts., *Griffith*. PENANG, *Curtis*. MALACCA, *Griffith*.—DISTRIB. Malay Islands.

Stem 1-2 ft., creeping and rooting below. *Leaves* as in *A. montanum*, from which *conspicuum* differs in the pyramidal many-fl. panicle.

26. **A. ovatum**, *Wall. Cat.* 5206; stem suberect, leaves petioled elliptic acuminate, panicle very short sessile or subsessile, branches long slender depressed or horizontal pubescent, stamens 2 perfect, capsule globose glabrous, pedicel suberect, cells 1-seeded, seeds hemispheric rugose. *Clarke Comm. & Cyrt. Beng.* t. 25; *Monogr.* 218. *Dictyospermum ovatum*, *Hassk. Commelin. Ind.* 24.

PEGU and TAVOY, *Wallich*, &c. The ANDAMAN ISLANDS, *Kurz*.—DISTRIB. Siam, Malay Islands.

Stem 6-10 in., branched. *Leaves* 2-4 by 1-2 in., terminal on the branches; petiole $\frac{1}{2}$ -1 in. *Panicle* with the rachis so short, that the branches appear axillary amongst the uppermost leaves. *Capsule* $\frac{1}{2}$ in. diam.

27. **A. ovalifolium**, *Hook. f. in Clarke Monogr.* 218; stem erect, leaves shortly petioled elliptic-lanceolate acuminate pubescent, panicle short subsessile pyramidal, branches ascending pubescent, stamens 2 perfect, filaments glabrous, capsule globose glabrous, pedicel decurved, cells 1-seeded, seeds large reticulate. *Dictyospermum ovalifolium*, *Wight Ic.* t. 2070. *D. Wightii*, *Hassk. Comm. Ind.* 19 (excl. var.).—*Aneilema* Sp. 10, *Herb. Ind. Or. H. f. & T.*

NILGHIRI HILLS; on the western slopes, *Wight*, &c.

Stem stout, rooting at the base only. *Leaves* 3-6 by $1\frac{1}{2}$ -2 in.; sheaths pubescent. *Panicle* pubescent; branches slender.—Differs from *A. conspicuum* in the stouter naked large leaves, and larger capsule $\frac{1}{2}$ in. diam., and the 2 stamens (*Wight* figures 3).

28. **A. scaberrimum**, *Kunth Enum.* iv. 69; tall, erect, slender, leaves distant lanceolate or oblong-lanceolate acuminate hispid above, panicle with long slender peduncle and branches, bracts funnel-shaped acuminate persistent, stamens 2-3 perfect, filaments naked, capsule globose pubescent, cells 1-seeded, seeds rugose. *A. protensum*, *Wall. Cat.* 5218; *Clarke Comm. & Cyrt. Beng.* t. 24, *Monogr.* 219, t. 4, f. 4. *A. herbaceum*, *Wall. Cat.* 8223. *Commelina scaberrima*, *Blume Enum.* i. 4. *Dictyospermum protensum*, *Wight Ic.* t. 2071. *Lamprodithyros protensus*, *Hassk.*

in *Peters. Mossamb. Bot.* ii. 529, *Flora*, 1863, 389. *Piletocarpus protensus*, *Hassk. Comm. Ind.* 15.

The TROPICAL EASTERN HIMALAYA and the KHASIA HILLS.; from Nepal to Bhotan. TRAVANCORE, *Wight*. CEYLON, *Walker*, &c.—DISTRIB. Malay Islands.

Subfruticose 2–3 ft. high. *Leaves* 3–6 by $\frac{3}{8}$ – $1\frac{3}{8}$ in., sessile, sheaths loose, viscid or hispid; base narrowed or rounded. *Panicle* very lax and spreading with few flowers at the tips of the branches; bracts sheathing obliquely truncate; flowers small white. *Sepals* reflexed in fruit. *Capsule* $\frac{1}{4}$ in. diam., style long, persistent. *Seeds* plano-convex, glaucous, black.

EXCLUDED SPECIES.

A. ÆQUINOCTIALE, *Kunth Enum.* iv. 72; *Clarke Monog.* 221. *Amelina Wallichii*, *Clarke Comm. & Cyrt. Beng.* 6, 26, is an African species of which the locality was not determined when it was included in “Comm. & Cyrt. Beng.”

4. FORRESTIA, A. Rich.

Erect herbs; stem simple, creeping and rooting below. *Leaves* broad, sheaths tubular persistent after the fall of the blade. *Flowers* bracteate, sessile, in crowded subsessile axillary panicles. *Sepals* subequal. *Petals* subequal. *Stamens* 6, all perfect, filaments bearded; anthers ovoid. *Ovary* 3-celled, cells 2-ovuled or the dorsal 1-ovuled. *Capsule* subglobose, or ellipsoid, or oblong, 3-valved, loculicidal. *Seeds* 1–2 superposed in each cell, oblong, rugose.—Species 7, East Asiatic and New Guinea, and one African.

The first three species may prove to be forms of the *F. hispida*, A. Rich (*Sert. Astrolab.* ii. t. 1), a native of New Guinea and Formosa, J. D. H.

1. **F. mollis**, *Hassk. in Flora*, 1864, 68; *Commel. Ind.* 84; hirsute, leaves oblanceolate sparsely hairy above villous beneath, capsule oblong or ellipsoid about equalling the rusty hispidly villous sepals. *Clarke Monogr.* 236. *Campelia mollissima*, *Blume Enum.* i. 7. *Amischotolype mollissima*, *Hassk. in Flora*, 1863, 392.

MALABAR, J. Anderson. SINGAPORE, *Walker*. MALACCA, *Griffith* (*Kew distrib.* 5485), *Maingay* (*K. d.* 1712).—DISTRIB. Sumatra, Java.

Stem 3–4 ft., as thick as the thumb, glabrous hairy or shaggily hispid. *Leaves* 6–18 by 2–3 in., subpetioled, acute, base acute; sheaths glabrous or hirsute. *Panicle* a sessile dense-fl. globose head, 2–3 in. diam. *Capsule* $\frac{1}{4}$ in. long, rusty villous. *Seeds* subellipsoid, obscurely rugose.

2. **F. Griffithii**, *Clarke Monogr.* 236; leaves oblong-lanceolate fulvously hairy on both surfaces, capsule elliptic-oblong subacute fulvously hairy much longer than the sepals.

MALACCA, *Griffith*, *Maingay*, *Hullett*.

Stem stout, glabrate. *Leaves* 7 by $2\frac{1}{2}$ in., shortly acuminate; petiole shaggy; sheath glabrous, mouth villous. *Sepals* $\frac{1}{2}$ in., oblong, sparsely hairy. *Capsule* $\frac{1}{10}$ in. long.

3. **F. marginata**, *Hassk. in Flora*, 1864, 630; *Commelin. Ind.* 90; leaves obovate- or elliptic-lanceolate glabrous or margins villously ciliate, capsule ellipsoid longer than the sepals. *Clarke Monogr.* 237. *F. hispida*, *Bot. Mag.* t. 5425 (not of A. Rich). *Campelia marginata*, *Blume Enum.* i. 7; *Wall. Cat.* 8977 A, B. *Amischotolypa marginata*, *Hassk. in Flora*, 1863, 392.—*Tradescantia* sp., *Griff. Notul.* iii. 235. *Polia purpurea*, *Hort.*

SINGAPORE and PENANG, Wallich, Walker. MALACCA, Maingay (Kew distrib. 2974).—DISTRIB. Sumatra, Java.

Stem 2–3 ft., as thick as the thumb. *Leaves* 10–30 by $1\frac{1}{2}$ –3 in., subcaudately acuminate; sheaths puberulous, glabrous or hirsute. *Flower heads* $1\frac{1}{2}$ –2 in. diam. *Sepals* $\frac{1}{2}$ in. long.

Var. *rostrata*, Clarke l. c.; leaves narrower more caudate-acuminate, flowers fewer. *F. rostrata*, Hassk in *Flora*, 1864, 631; *Commelin. Ind.* 94.—Mishmi hills, Griffith (Kew distrib. 5486), Java.

4. **F. Hookeri**, Hassk. in *Flora*, 1864, 629; *Commelin. Ind.* 89; leaves petioled oblanceolate glabrous above, nerves beneath hairy, head of flowers small, capsule oblong-lanceolate much longer than the nearly glabrous sepals. *Clarke Commel. & Cyrt. Beng.* t. 41; *Monogr.* 237. *Campelia marginata*, Wall. *Cat.* 8977 (in part).

EASTERN HIMALAYA, SIKKIM and CHITTAGONG, J. D. H. BHOTAN, ASSAM, the KHASIA and NAGA HILLS, Griffith, Clarke.

Differs from *F. marginata* in the glabrous leaves, smaller few-fl. heads, and the beaked capsules $\frac{1}{2}$ – $\frac{3}{4}$ in. long, much exceeding the sepals.

5. **F. glabrata**, Hassk. in *Flora*, 1864, 360; *Commel. Ind.* 92; leaves lanceolate glabrous or margins pubescent, capsule ellipsoid much shorter than narrow sepals. *Clarke Commel. & Cyrt. Beng.* t. 42; *Monogr.* 238. *Campelia glabrata*, Hassk. *Pl. Jungh.* 154 (not of Kunth). *C. marginata*, β , *Blume Enum.* i. 7 (fid Hassk.). *Amischotolypa glabrata*, Hassk. in *Flora*, 1863, 392.

TROPICAL SIKKIM HIMALAYA, MUNNIPORE, BENGAL, ASSAM and TENASSERIM.—DISTRIB.—Sumatra, Java, Tonkin.

Differs from *F. Hookeri* in the short narrow capsule $\frac{1}{2}$ in. long.

5. **CYANOTIS**, Don.

Herbs, usually prostrate or creeping. *Leaves* small. *Flowers* in axillary and terminal scorpioid cymes, formed of large imbricating biseriate secund foliaceous falcate bracteoles, the petals and stamens alone exserted, rarely with the corolla-tube exserted; flowers sometimes in exposed racemes, or fascicled in the ochrea. *Sepals* subequal, free or connate below. *Petals* subequal often united in a tube below, limb orbicular. *Stamens* 6, all perfect subequal, hypogynous or epipetalous, filaments usually bearded often inflated towards the apex, anthers oblong. *Ovary* 3-celled; ovules 2 collateral in each cell one erect the other pendulous. *Capsule* 3-celled, loculicidal, cells usually 2-seeded. *Seeds* superposed, cubical or pyramidal, usually rugose.

Many of the following species may probably have to be reduced.

Sect. I. ENCYANOTIS. *Cymes* enclosed in biseriate falcate imbricating bracteoles.

* *Valves of the capsule separating from a free central columnar 3-toothed axis.*

1. **C. papilionacea**, Schultes, f. *Syst.* vii. 1151; hirsute with spreading hairs creeping and rooting, leaves linear-oblong or lanceolate, bracteoles subreniformly falcate acute ciliate, capsule oblong, seeds smooth or obscurely pitted. *Clarke Monogr.* 246; *Wight Ic.* t. 2089; *Wall. Cat.*

8987; *Hassk. Commelin. Ind.* 158. *C. hispida*, *Dalz. in Hook. Journ. Bot.* 1851, 139; *Dalz. & Gibs. Bomb. Fl.* 253 (excl. *Syn.*). *C. hirtella*, *Miquel. Plant. Ersicc. Hohenack.* No. 130; *Hassk. l. c.* 112. *Tradescantia papilionacea*, *Linn. Mant.* 513; *Vahl Symb.* i. 27 (excl. *Syn.*). *T. cristata*, *Heyne mss.* *T. rupestris*, *Law in Grah. Cat. Bomb. Pl.* 222.—? *Commelina cristata*, *Blume Fl. Ind.* t. 7, f. 4.

The DECCAN PENINSULA; from the Concan southwards, in rocky places.

Annual. *Stem* 4–6 in., branched from the base. *Leaves* 1–1½ by ¼–½ in., sessile, acute, acuminate, or obtuse and apiculate, base rounded; sheaths very short. *Peduncles* long, slender; bracts shortly exceeding the cymes. *Sepals* lanceolate. *Petals* blue. *Filaments* filiform, bearded. *Seeds* yellow-brown.

Var. *Burmänniana*, *Clarke l. c.*; leaves shorter broader. *C. Burmanniana*, *Wight Ic.* t. 2089.—Malabar.

2. *C. vaginata*, *Wight Ic.* t. 2083; softly hairy, erect or ascending, leaves ovate or oblong-lanceolate, sheaths short inflated, bracteoles ovate falcate acute ciliate, capsule oblong, seeds rugose dark brown. *Hassk. Commel. Ind.* 98; *Clarke Monogr.* 247.

MALABAR, *Wight*.

Annual; stem 4–6 in., lower part with inflated leafless sheaths. *Leaves* falcate. *Peduncles* slender; bracteoles glabrous, striate and cross-striolate. *Sepals* lanceolate. *Petals* blue. *Filaments* filiform, bearded. *Seeds* conic.

** Capsule with no free central column after dehiscence.

3. *C. cristata*, *Schultes, f. Syst.* vii. 1150; stem creeping below, branches erect or ascending glabrous or with spreading hairs, leaves ovate-oblong subacute, seeds striate and pitted. *Wight Ic.* t. 3082; *Clarke Commel. & Cyrt. Beng.* t. 36; *Monogr.* 247; *Dalz. & Gibs. Bomb. Fl.* 256; *Wall. Cat.* 8986; *Hassk. Commelin. Ind.* 120. *C. racemosa*, *Clarke Commel. & Cyrt. Beng.* t. 38. *C. Hugelii*, *Hassk. l. c.* 128. *C. cristata*, *Linn. Sp. Pl.* 42. *Tradescantia cristata*, *Jacq. Hort. Vind.* ii. 64, t. 137; *Bot. Mag.* t. 1435. *T. imbricata*, *Roxb. Fl. Ind.* ii. 120. *T. umbellata*, *Heyne mss.*—*Cyanotis* sp., *Wall. Cat.* 8989.—*Rheede Hort. Mal.* vii. t. 58.

Throughout TROPICAL INDIA in hilly districts. BURMA, MALACCA, CEYLON. *DISTRIB.* Malay Islands, Mauritius, trop. Africa.

Stem 6–18 in., slender, branched. *Leaves* rather distant, 2–4 by ½–¾ in., sessile, obtuse or acute, glabrous or hirsute, ciliate or not. *Bracts* twice as long as the cyme. *Bracteoles* ½ in., ovate, falcate, acute, striate and striolate. *Sepals* lanceolate. *Petals* blue. *Filaments* simple, bearded. *Style* thickened at the tip. *Capsule* ¼ in., obtuse.

Var. *Griffithii*, *Clarke l. c.* 248; seeds smaller not pitted.—Mergui, *Griffith (Kew distrib.* 5503, 5517).

4. *C. barbata*, *Don Prodr.* 46; creeping and rooting, glabrous or cobwebby, leaves oblong or linear-lanceolate, cymes subsessile axillary and terminal, bracteoles oblong falcate acute, filaments bearded, seeds reticulated. *Clarke Commel. & Cyrt. Beng.* t. 37 (excl. *Syn. Roxb.*); *Monogr.* 248; *Wall. Cat.* 8993; *Hassk. Commelin. Ind.* 143. *C. nodiflora*, *Clarke in Journ. Linn. Soc.* xi. 453 (not of *Kunth*). *C. nobilis*, *Hassk. l. c.* 148 (excl. *Syn. Wight*); *Clarke Commel. & Cyrt. Ind.* 6, 39. *C. glaberrima*, *Hassk. l. c.* 156. *C. fasciculata*, *Wall. Cat.* 8990. *Tradescantia barbata*, *Spreng. Syst. Cur. post.* 138. *T. radicans*, *Royle Ill.* 403.—*Cyanotis* sp. *Wall. Cat.* 8988, 8994.

SUBTROPICAL HIMALAYA; from Kashmir eastwards, ascending to 8000 ft. KHASIA Mts., alt. 4600 ft. BURMA & PENANG, *Wallich*.—DISTRIB. China.

Stems slender, branched, tufted, sometimes bulbiferous. *Leaves* 1–2 by $\frac{1}{8}$ – $\frac{1}{3}$ in., falcate or straight, sessile, acute or acuminate, ciliate, cobwebby beneath. *Bracts* much longer than the cyme. *Bracteoles* falcately ovate, acuminate. *Ovary* tipped with hairs. *Capsule* quadrate. *Seeds* brown.—*C. nobilis* and *glaberrima* are very large stout forms 1–2 ft. high, with leaves sometimes 6 in. long, common in the Khasia hills.

5. *C. tuberosa*, *Schultes, f. Syst.* vii. 1153; suberect or prostrate, tall, stout, glabrous or villous, root of cylindric tubers, radical leaves ensiform cauline narrowly oblong, cymes in the axil of a short leafy bract, terminal often corymbose, bracteoles villous ovate falcate, filaments bearded, tip tumid, style bearded thickened at the tip, seeds obscurely rugose. *Clarke Monogr.* 249; *Wall. Cat.* 8991; *Dalz. & Gibs. Bomb. Fl.* 256; *Hassk. Commelin. Ind.* 100. *C. concanensis*, Thomsonii & Stocksii, *Hassk. l. c.* 144, 133, 118. *Tradescantia tuberosa*, *Roxb. Cor. Pl.* ii. t. 108; *Fl. Ind.* ii. 19.—*Cyanotis* sp., No. 8, 9, *Herb. Ind. Or. Hf. & T.*

The DECCAN PENINSULA; on the west side, from the Concan to Travancore.

Stem 6 in.–3 ft., suberect or prostrate, hirsute at the base. *Leaves*, radical and lower cauline, 6–10 by $\frac{1}{2}$ –1 in., sessile, often purple beneath, scaberulous. *Cymes* villous, or densely hirsute; bracts ovate or lanceolate, falcate, shorter than the cyme; bracteoles $\frac{1}{2}$ – $\frac{3}{4}$ in. *Petals* blue-purple. *Capsule* hairy above.—A large coarse species.

Var. *adscendens*, *Clarke l. c.*; smaller, more glabrous, branches rooting and proliferous at the nodes. *C. adscendens*, *Dalz. in Hook. Journ. Bot.* 1852, 343; *Dalz. & Gibs. Bomb. Fl.* 255; *Hassk. Commelin Ind.* 102. *C. sarmentosa*, *Wight Ic.* t. 2087; *Hassk. l. c.* 154.—With the type; and at Agra, *Jacquemont*, Chota Nagpore, *Clarke*.

6. *C. Wightii*, *Clarke Monogr.* 250; tall, very stout, suberect, sparsely hirsute, leaves very long ensiform, cymes axillary and subcorymbose, bracteoles falcately ovate acuminate ciliate, filaments bearded, style thickened below the tip, seeds oblong dotted. *C. longifolia*, *Wight Ic.* t. 2084.

SOUTH DECCAN PENINSULA; Nilghiri and Travancore hills, *Wight*.

Stem branched, 2–3 ft. high. *Leaves* attaining 6–18 by $\frac{1}{2}$ –1 $\frac{1}{2}$ in., but usually much smaller, narrowed from the base to the tip, ciliate; sheaths short loose. *Bract* usually much longer and larger than the cyme; bracteoles $\frac{1}{2}$ in., ciliate. *Capsule* oblong, not half so long as the sepals.

7. *C. arachnoidea*, *Clarke Monogr.* 250; suberect, cottony or cobwebby, leaves very variable linear-oblong or lanceolate rather obtuse, cymes subsessile terminal and axillary, bracteoles falcately lanceolate, filaments bearded, style bearded and thickened below the tip, capsule oblong, seeds elongate conical obscurely pitted. *C. fasciculata*, *Wall. Cat.*, 8990 (for the most part). *C. pilosa*, *Wight Herb.* (not *Ic.* t. 2083). ? *C. sericea*, *Hassk. Commelin. Ind.* 152.—*Cyanotis* sp., 5, *Herb. Ind. Or. H. f. & T.* *Tradescantia lanata* and *incana*, *Heyne mss.*

The DECCAN PENINSULA; Nilghiri hills, *Wight* (*Kew distrib.* 2839). Ceylōn; Haragam, *Trimen*.

Differs from *C. Wightii* in the soft shining silky or cobwebby pubescence. *Trimen's* specimens are very robust, with radical leaves 12 by 1 $\frac{1}{2}$ –2 in., exactly as in the large states of *C. Wightii*; but those of the Deccan specimens are much smaller and narrower.

8. *C. pilosa*, Schultes, f. *Syst.* vii. 1155; more or less clothed with long spreading hairs or nearly glabrous, leaves linear or linear-lanceolate, cymes subsessile terminal and axillary, bracteoles oblong falcate acute, filaments bearded, style bearded and thickened below the tip, capsule quadrate, seeds shortly conic obscurely pitted. *Wight Ic.* t. 2083; *Clarke Monogr.* 251; *Hassk. Commelin. Ind.* 99; *Wall. Cat.* 8992; *Cyanotis* sp. 11, *Herb. Ind. Or. H. f. & T.* *Tradescantia pilosa*, Heyne mss.

The DECCAN PENINSULA; Nilghiri hills, Heyne, Wight, &c. CEYLON; in the higher parts of the island.

Habit of *C. arachnoidea*, from which it differs in the hairiness and quadrate capsule and seeds. The Ceylon are the only good specimens, and they are nearly glabrous.

9. *C. villosa*, Schultes, f. *Syst.* vii. 1155; silky or villous with spreading hairs, leaves narrowly lanceolate or ovate or oblong-lanceolate, cymes axillary and terminal, bracteoles small lanceolate falcate or nearly straight, filaments filiform, style fusiform below the tip, capsule oblong, seeds conical corrugated. *Clarke Monogr.* 251; *Hassk. Commelin. Ind.* 99; *Wall. Cat.* 8995. *C. lanceolata*, *Wight Ic.* t. 2085; *Hassk. l. c.* 125. *Commelina*, sp. 10, *Herb. Ind. Or. H. f. & T.* *Tradescantia villosa*, Spreng. *Syst.* ii. 116. *T. P cyanotidea*, *Hassk. l. c.* 65.

The DECCAN PENINSULA; on the E. slope of the Nilghiris, Wight, &c. CEYLON, Central province, ascending to 6000 ft.

Stems 3-4 ft., erect from a procumbent base, succulent, often rooting and proliferous at the nodes. Leaves 3-5 by $\frac{1}{2}$ - $\frac{1}{2}$ in., sessile, shining, green, silkily ciliate. Bract twice as long as the cyme; bracteoles $\frac{2}{3}$ in. long. Capsule obtuse.

10. *C. zeylanica*, Hassk. *Commel. Ind.* 145; stem elongate glabrous except a line of hairs, leaves narrowly lanceolate puberulous pilose beneath, cymes small terminal subsessile, bracteoles dimidiate-ovate, capsule subquadrate, seeds striate and obscurely pitted. *Clarke Monogr.* 253. *C. lanceolata*, Wight, var. subglabra, *Thwaites Enum.* 323.

CEYLON; Central province, up to 6000 ft., Thwaites.

Differs from *C. villosa* in the short capsule and striate seeds, glabrous stem and smaller leaves narrowed at the base. The bracts also are much shorter, hardly exceeding the cyme.

11. *C. vaga*, Schultes, f. *Syst.* vii. 1153; softly hairy, stems elongate procumbent, leaves oblong-lanceolate, cymes small axillary and terminal sessile, bracteoles obscurely 2-seriate lanceolate nearly straight, capsule small subquadrately oblong, seeds closely reticulate and 1-2-foveolate. *Clarke Monogr.* 252. *Tradescantia vaga*, Blume *Enum.* i. 5. *P. Lour. Fl. Cochinch.* i. 239, and *Hassk. Commelin. Ind.* 62 (not of Zollinger).

TENASSERIM, Helfer.—DISTRIB. Java, China.

Stems 10-20 in., slender. Leaves $1\frac{1}{2}$ -2 by $\frac{1}{2}$ - $\frac{2}{3}$ in. Bract large. Capsule obtuse. Seeds with two deep clefts or pits. The obscurely biseriate bracts ally it to the section *Dalzellia*.

12. *C. fasciculata*, Schultes, f. *Syst.* vii. 1152; annual, dwarf, decumbent, floccosely silky or hairy, leaves linear or lanceolate, cymes bracteate axillary and terminal sessile and peduncled, bracteoles falcately lanceolate, capsule oblong, seeds subrugose. *Clarke Monogr.* 253; *Hassk. Com. Ind.* 122; *Wight Ic.* t. 2086; *Dalz. & Gibs. Bomb. Fl.* 255; *Wall. Cat.* 8990 (in part). *C. dichotricha*, Stocks in *Wight Ic.* t. 2087; *Hassk. l. c.* 130. *C. Lawiana* and decumbens, *Wight Ic.* t. 2086 and 2088; *Hassk.*

l. c. 100. *C. rosea*, *Wight Ic. t.* 2086. *C. eriantha* and *C. disrumpens* (*in part*), and *C. Thwaitesii*, *Hassk. l. c.* 62, 138, 105, 136. *Tradescantia fasciculata*, *Heyne in Roth Nov. Sp.* 189. *T. rupestris*?, *Law in Grah. Cat. Bomb. Pl.* 223.

THE DECCAN PENINSULA; common in rocky places from the Concan southwards. CEYLON; abundant in the Central province.

Annual; roots fibrous. *Stem* 4-18 in. *Leaves* 1-2 by $\frac{1}{8}$ - $\frac{1}{3}$ in. *Bracts* about twice as long as the small cyme, silky or cobwebby. *Petals* rose-purple. *Filaments* bearded.

A very variable plant, of which there are the three following varieties:—*β glabrescens* (from Belgaum) with linear glabrous leaves, glabrous bracts and woolly bracteoles; *γ rosea* (*C. rosea*, *Wight*) (from the Bolamputty hills in Travancore) (of which no specimens exist in Wight's Herbarium) with sessile ovate-cordate obtuse leaves according to the description, but linear leaves in the plate; and *δ Thwaitesii* (from Belgaum, Courtallam and Ceylon), with dense divaricate branches, to which belongs *Tradescantia rupestris*, *Law*, and which appears to be intermediate between *C. arachnoidea* and *fasciculata*. *Wight* describes *rosea*, *Lawiana* and *dichotricha* as all of them succulent, as does *Dalzell* his *hispida*. Of *Lawiana* *Wight* describes the style as simple (not thickened) but figures it as fusiform above.

Sect. II. DALZELLIA. *Flowers* solitary or in terminal or subterminal few-fl. cymules, bracts and bracteoles small not imbricate in 2 series.

13. *C. kewensis*, *Clarke Monogr.* 243, *Tab.* 5, f. 6; villous, stem stout prostrate densely leafy, leaves bifariously imbricate sessile ovate-cordate acute bright red beneath, sheaths very short, flowers few terminal shortly pedicelled, filaments bearded. *Belosynapsis kewensis*, *Hassk. in Flora*, 1871, 259. *Erythrotis Beddomei*, *Hook. f. Bot. Mag. t.* 6150.

TRAVANCORE; on the Myhendra Mts., alt. 3-4000 ft., *Beddome*.

Stem and branches 6-10 in., pendulous, with ascending tips, rooting below. *Leaves* 1-1½ in., rather fleshy, green and convex above, hairs rufous when dry, sheaths $\frac{1}{4}$ in., ribbed, ciliate. *Flowers* 1-2 together in the uppermost axils; pedicel and 3 ovate sepals hispid; petals free, rose-purple; filaments bearded with blue hairs, anthers yellow; ovary hispid, style filiform naked. *Capsule* oblong, obtuse, tip villous. *Seeds* short, obscurely 2-pitted on the inner face.

14. *C. vivipara*, *Dalz. in Hook. Journ. Bot.* 1851, 226; epiphytic, subscapigerous, radical leaves ensiform, flowering stems numerous very slender flexuous pendulous with small distant leaves and few very small flowers. *Dalz. & Gibs. Bomb. Fl.* 255; *Clarke Monogr.* 244, t. 5, f. 5. *Dalzellia vivipara*, *Hassk. in Flora*, 1865, 594; *Commelin. Ind.* 161.

THE CONCAN; in the Syhadri hills, on trees, *Law, Dalzell*.

Rootstock small with tufts of pilose radical leaves 3-5 by $\frac{1}{4}$ - $\frac{1}{3}$ in. *Scapes* several, rooting and viviparous at the nodes, almost filiform; cauline leaves very small, sheaths very short. *Flowers* 2-3 on a subterminal peduncle; bracts small, oblong, acute; pedicels and sepals villous. *Petals* white, connate to the middle; style filiform, naked. *Capsule* $\frac{1}{10}$ in. long, oblanceolate. *Seeds* cylindric, smooth.

Sect. III. OCHREÆFLORA. *Flowers* axillary in the sheaths of the leaves; bracteoles small slender not imbricating. (See also *C. villosa*.)

15. *C. axillaris*, *Roem. & Sch. Syst.* vii. 1154; stem elongate glabrous or sparsely hairy, leaves elongate linear or linear-lanceolate, flowers clustered in the short inflated sheaths, filaments bearded, style glabrous filiform, capsule acute, seeds subcylindric punctate. *Clarke Monogr.* 244;

Comm. & Cyrt. Beng. t. 35; *Dalz. & Gibs. Bomb. Fl.* 256; *Benth. Fl. Austral.* vii. 82; *Hassk. in Pl. Jungh.* i. 154; *Commel. Ind.* 107; *Wall. Cat.* 8996. *C. disrumpens*, *Hassk. l. c.* 105 (in part). *Commelina axillaris*, *Linn. Sp. Pl.* 42. *Tradescantia axillaris*, *Linn. Mant.* 321; *Roxb. Cor. Pl.* 5, t. 107; *Fl. Ind.* ii. 118. *Zygomenes axillaris*, *Salisb. in Trans. Hort. Soc.* i. 271.—*Rheede Hort. Mal.* x. t. 13.

Throughout INDIA; in the plains from the upper Gangetic valley to ASSAM and southwards to CEYLON.—DISTRIB. E. Asia, trop. Australia.

Stem 6–18 in., annual, stout or slender, branched. *Leaves* 2–6 by $\frac{1}{4}$ – $\frac{1}{3}$ in., acuminate, sheaths ciliate, base broad or narrowed. *Petals* long-clawed, blue. *Ovary* glabrous; style ovoid below the tip. *Capsule* $\frac{1}{2}$ in. long, glabrous; valves 2-fid.

16. **C. cucullata**, *Kunth Enum.* iv. 107; glabrous or sparsely hairy, leaves linear, flowers clustered in the sheaths, filaments nearly naked, capsule depressed in the centre with 3 horns, seeds subquadrate pitted. *Roth Nov. Sp.* 189; *Clarke Monogr.* 245, t. 5, f. 7.

The DECCAN PENINSULA; from Canara to Malabar.

Habit and characters of *D. axillaris*, but differing in the glabrous filaments and broader capsule and shorter broader seeds.

DOUBTFUL SPECIES.

C. NILAGIRICA, *Hassk. Commelin. Ind.* 127; differing according to Hasskarl from *C. arachnoidea* in its glabrousness, obtuser leaves, denser spikes, and larger flowers.

C. KARLIANA, *Hassk. l. c.* 146; “stems creeping 8–12 in. glabrous, leaves $\frac{1}{2}$ –2 by $\frac{1}{10}$ – $\frac{1}{5}$ in. linear-lanceolate, sheaths purple, cymes 1–3-nate axillary or terminal small cobwebby-puberulous, bracteoles few, seeds longitudinally cracked not scrobiculate, style glabrous tip thickened.”—Poonah, *Hugel*.

C. INCERTA, *Hassk. l. c.* 165; “brown-villous, peduncles 5-nate,” (cymes?) “umbellately crowded at the top of a common peduncle, bracts” (bracteoles?) 7–20 falcate lanceolate acuminate, flowers woolly-villous, style hairy thickened below the tip.—Asia, *Hugel*.

6. **STREPTOLIRION**, *Edgew.*

A twining flaccid herb. *Leaves* long-petioled, ovate-cordate, acuminate. *Flowers* few, in axillary and terminal scorpioid cymes. *Sepals* oblong, free. *Petals* linear, free. *Stamens* 6, filaments bearded, anthers transverse, cells margining the 2-lobed connective. *Ovary* 3-celled; style filiform, stigma obconic ciliate; ovules 2 superposed in each cell. *Capsule* oblong trigonous beaked loculicidal. *Seeds* angular, rugose.

S. volubile, *Edgew. in Trans. Linn. Soc.* xx. 90, t. 2; *Wight Ic.* t. 2081; *Hassk. Commel. Ind.* 6; *Clarke Comm. & Cyrt. Beng.* 40; *Monogr.* 261. *S. Griffithii*, *Kurz. Tradescantia cordifolia*, *Griff. Journ.* 208.

TEMPERATE HIMALAYA; from Garwhal to Bhotan, alt. 5–9000 ft. UPPER ASSAM, on the Patkoy hills, and MUNNIPORE.—DISTRIB. China.

Stem 6 or more ft., glabrous or sparsely hairy, climbing over bushes, terete, branched, often rooting at the nodes. *Leaves* 4–6 in. diam., base often deeply 2-lobed nerves many from the base, concentric; petiole 2–5 in., glabrous or puberulous; sheath short, mouth ciliate. *Flowers* $\frac{1}{2}$ in. diam., white, upper often barren. *Filaments* with yellow hairs. *Capsule* $\frac{1}{2}$ in. long, glabrous or pubescent.—The Khasian specimens (var. *khasiana*, *Clarke*) are more hairy than the Himalayan with villous capsules and a penicillate stigma.

7. **FLOSCOPA**, *Lour.*

Erect or subscaudent herbs. *Leaves* lanceolate. *Flowers* in terminal or axillary thyrsoid panicles, bracteate; cymes secund-flowered (not scorpioid). *Sepals* 3, oblong, free. *Petals* free, obovate. *Stamens* 6, perfect (or one imperfect); filaments glabrous. *Ovary* 2-celled; cells 1-ovuled; style simple. *Capsule* 2-celled, crustaceous, loculicidal. *Seeds* hemispheric.—Species about 11, tropical.

1. **F. scandens**, *Lour. Fl. Coch.* 193; glabrous or pubescent, stems prostrate, branches suberect, leaves subpetioled acuminate, cymes paniced villous or hirsute. *Clarke Monogr.* 265. *F. paniculata*, *Hassk. Pl. Jungh.* 157; *Commel. Ind.* 167. *F. Hamiltonii*, undulata petiolata and *Meyenianus*, *Hassk. Commel. Ind.* 166, 167. *Dithyrocarpus paniculatus*, *Kunth Enum.* iv. 70; *Clarke Comm. & Cyrt. Beng.* 34; *Dalz. & Gibs. Bomb. Fl.* 256. *D. Meyenianus* and *rufus*, *Kunth l. c.* 78, 79. *D. petiolatus*, *Rothii*, and undulatus, *Wight Ic. t.* 2079, 2080. *Tradescantia paniculata*, *Roxb. Cor. Pl. ii. t.* 109; *Fl. Ind. ii.* 119; *Roth Nov. Sp.* 188. *T. rufa*, *Presl Rel. Haenk. i.* 138. *Commelina cymosa* and *densiflora*, *Blume Enum. i.* 4. *C. hispida*, *Ham. mss.*, and *C. Hamiltonii*, *Spreng. Syst. iv.*, and *Cur. post.* 25 and v. 186. *Aneilema hispidum*, *Don Prodr.* 45; *Wall. Cat.* 5204. *A. cymosum* and *densiflorum*, *Kunth Enum.* iv. 69. *Lamprodithyros paniculatus*, *Hassk. in Flora*, 1863, 389.

Throughout tropical INDIA, in swamps from E. Nepal, Sikkim and the KHASIA HILLS to TRAVANCORE, MALACCA and CEYLON.—DISTRIB. Eastern Asia and tropical Australia.

Stem stout, erect, creeping below. *Leaves* 2–6 by $\frac{1}{2}$ – $1\frac{1}{2}$ in., sessile or petioled; sheaths lax, short, glabrous or hirsute; mouth ciliate. *Panicles* shortly peduncled, pyramidal, with long erect or ascending many-fl. branches. *Flowers* small, subglobose, racemose, lower bracteate upper ebracteate; sepals villous; petals white, lilac or rosy. *Capsule* $\frac{1}{2}$ in. long, orbicular, or ellipsoid, acute, compressed, shining. *Seeds* glaucous.

ORDER CLXI. **FLAGELLARIÆ.**

Stem tall, leafy, erect or scandent. *Leaves* many-nerved or plaited, petiole sheathing. *Flowers* small, in terminal panicles, uni- or bi-sexual. *Sepals* 6, persistent, imbricate. *Stamens* 6, hypogynous, filaments free; anthers basifixed, erect. *Ovary* superior, 3-celled; style short, 3-cleft, or styles 3; ovules solitary in the cells, anatropous. *Fruit* a small berry, or a drupe with 1–3 pyrenes. *Seeds* laterally attached, testa membranous or thick, albumen flowery; embryo lenticular.—Genera 3, species 7–8, of the Old World and Pacific.

Stem scandent. *Flowers* 2-sexual. *Drupe* 1–2-seeded. 1. **FLAGELLARIA**.
Stem erect. *Flowers* diœcious. *Berry* 1–3-seeded 2. **SUSUM**.

1. **FLAGELLARIA**, *Linn.*

Stem climbing by the cirrhone leaf-tips. *Flowers* bisexual. *Sepals* subpetaloid. *Style arms* 3, entire or 2-partite. *Drupe* with a thin succulent exocarp and bony 1–2-seeded endocarp.—Species 2, a Fijian and the following:—

F. indica, Linn. *Sp. Pl.* 333; leaves sessile lanceolate with sheathing bases. *Kunth Enum.* iii. 370; *Roxb. Fl. Ind.* ii. 154; *Dalz. & Gibs. Bomb. Fl.* 256; *Wall. Cat.* 5198; *Benth. Fl. Austral.* vii. 10; *Miquel Fl. Ind. Bat.* iii. 249; *Redouté Lil.* v. t. 257; *Gaertn. Fruct.* i. 16, t. 16.—*Rheede Hort. Mal.* vii. t. 53.

Throughout INDIA, chiefly near the coast, from the SUNDERBUNDS and CHITTAGONG, to CEYLON and SINGAPORE.—DISTRIB. Trop. Asia and Africa.

Glabrous, climbing lofty trees; stem thick as the thumb below; branches clothed with the closed leaf-sheaths. *Leaves* 6–10 in., variable in breadth, lanceolate, tip a slender spiral tendril, many-nerved, not plaited; sheath 2-auricled. *Panicle* 6–18 in. broad and irregularly branched; flowers clustered, sessile; bracts scale-like. *Sepals* about $\frac{1}{2}$ in. long, white, subscarious. *Stamens* exserted; anthers as long as the filaments, deeply 2-fid at the base; ovary narrow, trigonous. *Fruit* pisiform, red.

Var. minor; stem very slender, leaves 3–5 by $\frac{1}{2}$ – $\frac{1}{4}$ in., panicle 1–3 in. broad. *F. minor*, *Blume in Roem. & Sch. Syst.* vi. 1498; *Miq. Fl. Ind. Bat.* iii. 249, & *Suppl.* 598. *F. angustifolia*, *Wall. Cat.* 5199.—Malay Peninsula.

2. SUSUM, Blume.

Stem stout, erect, simple or branched above. *Leaves* very long, sessile or petioled, many-nerved. *Flowers* diœcious, in broad panicles, sessile; bracts minute or 0. *Sepals* unequal, orbicular, concave, inner petaloid. MALE FL. *Stamens* 6, adnate to the base of the sepals. *Pistillode* 3–6 angled or 3-lobed. FL. FEM. *Staminodes* small or 0, stigmas 3, connate in a 3-lobed disk. *Berry* pisiform, succulent, 1–3-seeded; stigmas persistent, lateral or excentric.—Species 2, Indian and Malayan.

1. **S. anthelminticum**, *Blume in Schultes. f. Syst.* vii. 1493; panicle broad spreading irregularly branched. *Kunth Enum.* iii. 371; *Miquel Fl. Ind. Bat.* iii. 247; *Thwaites Enum.* 340. *Hanguana*, *Blume Enum. Pl. Jav.* 15.

MALAY PENINSULA and PENANG, common. CEYLON, in marshes.—DISTRIB. Malay Islands.

Glabrous, or young leaves and panicle sparsely clothed with short cottony pubescence. *Stem* 3–5 ft. high, stout, leafy at the tip, or throughout. *Leaves* 3–8 ft. long, long petioled, lanceolate, acuminate, coriaceous, many- and closely nerved, with conspicuous (when dry) cross nervules; petiole 1–3 ft., base sheathing. *Panicle* erect, shortly stoutly peduncled, decompound, rachis and branches stout. *Flowers* about $\frac{1}{2}$ in. broad, rather remotely sessile on the branches of the panicle, yellowish; perianth segments orbicular, concave; filaments short, dilated below, anthers oblong. *Berry* usually 1-seeded.

2. **S. malayanum**, *Planch. mss.*; more or less pubescent with scattered white hairs, panicle narrow, branches whorled. *Veratonia malayana*, *Miquel Fl. Ind. Bat.* iii. 553. *Veratrum?* *malayanum*, *Jack in Mal. Misc.* i. v. 25 (*Hook. Bot. Misc.* ii. 74); *Wall. Cat.* 3717. *T. anthelminticum*, *Maurty in Rev. Hort.* 1889, 77, f. 23.

PENANG, PERAK, SINGAPORE and MALACCA.—DISTRIB. Malaya.

Described by Jack as with the leaves all radical and 3–4 ft. long; but I suspect his description is taken from a young plant.—It may be doubted from Blume's description (in Willdenow) whether this or *S. anthelminticum* is the plant intended, but I assume that Miquel must have had access to the specimens of that author, or he would not have described *S. malayanum* as a different genus. If really different the two species are very closely allied.

ORDER CLXII. JUNCACEÆ.

Erect, rarely annual herbs; stems tufted or with a creeping rootstock. *Leaves* flat, terete, or reduced to sheaths. *Flowers* in axillary or terminal cymes, 2 sexual, bracteate, green, or whitish and membranous, or brown and coriaceous. *Perianth* inferior, segments 6 in two series, persistent, imbricate. *Stamens* 6, rarely 3, hypogynous or on the bases of the segments; anthers basifixed. *Ovary* 1- or 3-celled, style filiform or short, or 0, stigmas 3, filiform; ovules 3 basilar in the 1-celled ovary, or many in the inner angles of the 3-celled, anatropous. *Capsule* 1-3-celled, loculicidally 3-valved. *Seeds* erect, testa membranous, often produced at each end; albumen dense; embryo small, next the hilum.—Genera 14; species about 200.

Ovary many-ovuled 1. JUNCUS.
Ovary 1-celled 3-ovuled 2. LUZULA.

1. JUNCUS, Linn.

Glabrous herbs. *Perianth* with the 3 outer segments keeled or the midrib thickened. *Stamens* 6, rarely 3. *Ovary* 3- rarely 1-celled, ovules many.—Species about 150, temperate and arctic, rarely tropical.

Sect. I. Annual. *Stem* copiously branched. *Leaves* not septate. *Cymes* scattered, few-fl.

1. **J. bufonius**, Linn. *Sp. Pl.* 466; slender much dichotomously branched from the base upwards, cymes numerous, flowers pale green solitary or clustered, sepals and petals unequal. *Kunth Enum.* iii. 353; *Reichb. Ic. Fl. Germ.* t. 395; *Royle Ill.* 401; *Wall. Cat.* 8997; *Boiss. Fl. Orient.* v. 361; *Buchen. in Engl. Bot. Jahrb.* xii. 174.

NORTHERN INDIA; from the plains to 13,000 ft. in the Himalaya, but local.—DISTRIB. N. temp. regions.

Densely clustered, 1-12 in. high, erect or ascending, pale green. *Leaves* few, setaceous, channelled above, sheaths pale. *Cymes* scattered on the stem, branches short or long, often flexuous; bracts scarious; flowers $\frac{1}{6}$ – $\frac{1}{4}$ in. long, lateral open 6-androus, terminal closed 3-androus; sepals and petals lanceolate, long acuminate and with broad membranous margins. *Stamens* half as long as the sepals. *Capsule* shorter than and closely embraced by the perianth, obovoid, obtuse, mucronate, pale. *Seeds* very minute, finely reticulate, tips nearly rounded.

Sect. II. Perennial. *Rhizome* stout, tufted and creeping. *Stems* tall, terete, produced beyond the decomposed cyme and then erect and pungent; bases closed with rigid leafless sheaths. *Leaves* 0, or terete like the stem. *Flowers* usually distinctly pedicelled.

2. **J. effusus**, Linn. *Sp. Pl.* 326; stems soft, pith continuous, sepals lanceolate exceeding the obovoid retuse capsule, stamens usually 3, seeds not tailed at the ends. *Reichb. Ic. Fl. Germ.* t. 920; *Boiss. Fl. Orient.* v. 352; *Buchen. in Engl. Bot. Jahrb.* vi. 199; xii. 228. *J. communis*, E. Mey. *Junc.* 12; *Kunth Enum.* iii. 320.

SIKKIM HIMALAYA, alt. 6-10,000 ft. KHASIA HILLS, alt. 5-5500 ft.—DISTRIB. Europe, N. Asia, Africa, America, and Australia.

Usually forming circular densely matted tufts of pale green finely striate stems, 1-3 ft. high, and $\frac{1}{8}$ – $\frac{1}{2}$ in. diam.; spathes all leafless. *Cymes* most variable, effuse lax and pendulous with slender branches and distant flowers, or globose sessile and

with densely packed flowers. *Sepals* $\frac{1}{10}$ – $\frac{1}{8}$ in. *Stamens* 3, rarely 6, shorter than the sepals. *Capsule* obtuse or mucronate. *Seeds* very obtuse at each end, minute. —A graceful form with effuse nodding or decurved very lax-flowered cymes 3–5 in. long, long-pedicelled triandrous flowers and more or less interrupted pith, is common in the Sikkim woods at 5–8000 ft. elevation.

3. **J. glaucus**, *Ehrh. Beitr.* vi. 83; stems rigid glaucous deeply striate, pith interrupted, sepals lanceolate about equalling the ovoid mucronate capsule, stamens 6, seeds obtuse at either end. *Kunth Enum.* iii. 316; *Thwaites Enum.* 340; *Wall. Cat. Boiss. Fl. Orient.* v. 353; *Buchen. in Engl. Bot. Jahrb.* vi. 199; xii. 243; *Reichb. Ic. Fl. Germ.* t. 412. *J. effusus*, *Steud. Pl. Hohenack.*

WESTERN HIMALAYA, alt. 6–9000 ft., from Kashmir to Nepal; the NILGHIRI HILLS and CEYLON.—DISTRIB. Europe, N. Asia, N. Africa.

Habit of *T. effusus*, but usually stiffer and darker green with deeper striated stems. I have great difficulty in referring some of the Himalayan dried specimens whether to *glaucus* or to *effusus*.

4. **J. maritimus**, *Lamk. Encycl.* iii. 264; stem terete, basal sheaths short pale, leaves few terete pungent, cyme decomposed, branches erect, sepals lanceolate acute, petals shorter oblong obtuse rather shorter than the ovoid or conic 3-celled capsule, seeds shortly tailed at each end. *Kunth Enum.* iii. 322; *Buchen. in Engl. Bot. Jahrb.* xii. 256; *Reichb. Ic. Fl. Germ.* ix. t. 402; *Boiss. Fl. Orient.* v. 354.

Sandy shores of SINDH, *Stocks*, &c.—DISTRIB. Afghanistan and westward to the Atlantic, N. and S. America, Australia.

Stems 2–4 ft., striate, pith solid; basal sheaths narrow, obtuse, pungent or produced into a solid terete pungent leaf. *Cyme* 1–2 in. long; floral bracts ovate, mucronate, margins broadly membranous; sepals $\frac{1}{8}$ – $\frac{1}{6}$ in. long, pale green, margins membranous; stamens 6, filaments dilated and connate at the base, anthers linear. *Capsule* sometimes half as long again as the sepals, obtuse, mucronate, shining. *Seeds* oblong or obovoid.

Sect. III. Perennial. *Stems* simple, slender, leafy. *Leaves* filiform, not septate. *Cymes* terminal. *Stamens* 6, included. *Capsule* shorter or longer than the perianth.

5. **J. tenuis**, *Willd. Sp. Pl.* ii. 214; stem very slender tufted curved 1–2-leaved, leaves very slender flat or involute, cyme terminal rather effuse, flowers small distant or sparingly clustered, sepals lanceolate acuminate much longer than the 6 stamens, anthers shorter than their filaments; capsule hardly exerted subglobose trigonous. *Kunth Enum.* iii. 348; *Buchen. in Engl. Bot. Jahrb.* xii. 193; *Reichb. Ic. Fl. Germ.* ix. t. 398; *Kunth Enum.* iii. 348, 349.

ASSAM, *Griffith.*—DISTRIB. Europe, As., Am., N. Zealand.

Stem 9–18 in. and leaves wiry. *Leaves* rarely exceeding the stem, deeply striate; sheath membranous, 2-aucicled. *Cyme* narrow or broad, compound, rarely dense-fl., lower bract or bracts filiform, usually exceeding the cyme; floral membranous; flowers green; sepals spreading, $\frac{1}{6}$ in. long; anthers shorter than their filaments; style very short. *Capsule* mucronate. *Seeds* obovoid or oblong, apiculate.—Possibly introduced into Assam, as the species is spreading out of Europe.

6. **J. compressus**, *Jacq. En. Sirtip. Vind.* 60, 235; stems slender 1–2-leaved, leaves slender channelled, cyme terminal, branches spreading, flowers subsolitary, sepals linear-oblong obtuse about equalling the broadly

ovoid obtuse capsule, stamens much shorter than the sepals, anthers longer than their filaments. *Kunth Enum.* iii. 351; *Buchen. in Engl. Bot. Jahrb.* xii. 185; *Reichb. Ic. Fl. Germ.* ix. t. 399.

WESTERN HIMALAYA; Kashmir, *Jacquemont*; alt. 7000 ft., *Clarke*.—DISTRIB. Westward to the Atlantic, N. Asia.

Rootstock creeping; stems, 6–24 in., tufted, rigid, fistular, subcompressed, striate. *Leaves* shorter than the stem, nearly flat, or channelled above, tip subulate; sheath auricled. *Cyme* shorter than the filiform lower bracts, compound, lax-flid.; flowers subsolitary; sepals $1\frac{1}{2}$ in. long, with green or brown narrowly scarious margins. *Capsule* 3-celled, shining, apiculate. *Seeds* very minute, apiculate, strongly ribbed.—The capsule is shorter than in the usual form of *J. compressus*, and as short as in *J. Gerardi*, which is a salt marsh species (or variety of *compressus*), not uncommon in Europe and N. Asia.

7. ***J. ochraceus***, *Buchen. in Abh. Nat. Ver. Brem.* iii. 292; in *Engl. Bot. Jahrb.* vi. 207, t. 2; xii. 415; stems slender, leaves filiform channelled above, cyme compound in small heads usually transformed into crowded plumose clusters of long shining yellow glumes, flowers small pale green, sepals narrow membranous subequal longer than the stamens, anthers longer than the filaments, capsule exserted narrowly ovoid triquetrous cuspidate, style long slender.

SIKKIM HIMALAYA, alt. 5–9000 ft., abundant. BHOTAN, *Griffith*.

Stem densely tufted, 8–12 in. high, grooved. *Leaves* equalling the stem, or shorter, 2-tubular, wiry; sheaths long-auricled. *Cyme* polymorphous, loosely branched, invariably more or less reduced to feathery tufts of golden yellow shining bracts and glumes-like subulate lanceolate sepals with very rarely a few intermixed perfect flowers dispersed in small peduncled pale green heads or clusters, very shortly pedicelled; lower bract filiform, usually short, floral hyaline; sepals $\frac{1}{2}$ in. long, membranous, linear-lanceolate, 1-nerved; sepals more oblong, 3-nerved, apiculate; anthers at length strongly twisted; ovary with the very slender style nearly twice as long as the sepals. *Capsule* $\frac{1}{2}$ in. long. *Seeds* not seen.—A remarkable plant, quite unlike any other, doubtfully referred to this section by Buchenau; perhaps better placed with *J. filiformis*.

Sect. IV. Perennial. *Stem* usually leafy upwards. *Leaves* terete or compressed, septate within, the septa more or less prominent externally. *Cymes* terminal; flowers densely clustered in small heads.

* *Seeds* long-tailed at both ends. *Stamens* exserted.

8. ***J. Grisebachii***, *Buchen. in Abhandl. Nat. Verein. Bremen*, iii. 295; in *Engl. Bot. Jahrb.* vi. 202; xii. 265; stoloniferous, stem tall stout, cymes of several many-flid. pale yellow globose heads, sepals membranous equalling the ovoid long-beaked capsule, stamens exserted.

SUBALPINE HIMALAYA; Kumaon, alt. 11,000 ft., *Duthie*; Sikkim, alt. 10–14,000 ft., *J. D. H.*, *Clarke*. BHOTAN, *Griffith*.

Stems 8–18 in., soft, terete. *Leaves* as long as the stem, terete, channelled, strongly septate. *Cymes* with spreading branches; lower bracts 1–3, very long, leafy, erect; floral ovate to lanceolate, acuminate, membranous; flowers $\frac{1}{4}$ – $\frac{1}{2}$ in. long, sessile or shortly pedicelled; sepals and petals subequal, acute; anthers slender as long as their filaments; style slender. *Capsule* subterete, shining, almost 3-celled. *Seeds* very pale, fusiform, testa lax, tails as long as the nucleus.

9. ***J. chrysocarpus***, *Buchen. in Engl. Bot. Jahrb.* vi. 201; xii. 266; stems tufted very slender 1–2-leaved, leaves filiform, cyme a solitary

many-fl. pale yellow globose or hemispheric head, sepals membranous shorter than the long-beaked capsule.

SIKKIM HIMALAYA, alt. 10–12,000 ft., *J. D. H.*; *Clarke*.

Stem as thick as packthread. *Leaves* equalling or exceeding the stem, strongly or faintly (sometimes externally obscurely) septate. *Cymes* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; lower bracts produced and filiform or not; flowers sessile; sepals $\frac{1}{2}$ in. long, ovate-lanceolate acuminate and petals almost hyaline; stamens, style and seeds as in *J. Grisebachii*.—Differs from *Grisebachii* in its small size, slender habit, solitary head and smaller flowers. With difficulty distinguished from *J. membranaceus*, to which this and *Grisebachii* are most closely allied.

** *Seeds not tailed. Stamens included.*

10. **J. punctorius**, *Linn. f. Suppl.* 208; tall, stout, leaves cylindric or compressed multitubular with a central hollow, cyme terminal erect umbellately compound, heads many and many-fl., sepals oblong-lanceolate acute, petals broader subacute, stamens 6, capsule equalling the sepals ovoid mucronate 3-celled, seeds ovoid very minute. *Kunth Enum.* iii. 332; *Buchen. in Abh. Nat. Verein. Bremen*, iv. 424; in *Engl. Bot. Jahrb.* xii. 277; *Boiss. Fl. Orient.* v. 357.

SINDH, *Stocks*.—DISTRIB. Westwards to Persia, Arabia and N. and S. Africa.

Pale green, 2 ft. high; rootstock stout creeping; stems soft often as thick as a goose-quill. *Leaves* as long as the stem, and nearly as stout, acuminate, irregularly septate. *Cyme* decomposed; branches divaricate; bracts short, pungent, floral hyaline acuminate; flowers brownish, sessile or shortly pedicelled; sepals $\frac{1}{5}$ – $\frac{1}{4}$ in. long, glumaceous; stamens about $\frac{1}{2}$ shorter than the sepals, filaments rather longer than the anthers; style long. *Capsule* prismatic, apiculate. *Seeds* costate and reticulate.

11. **J. lampocarpus**, *Ehr. Calam. n.* 126; stems erect or ascending terete or compressed leafy, leaves linear-subulate unitubular strongly septate, cymes subumbellately compound with divaricate branches bearing small 2–5-fl. heads of sessile small flowers, stamens 6 much shorter than the lanceolate subacute or obtuse sepals, capsule pyramidal mucronate 1-celled, tip exserted, seeds obovoid. *Kunth Enum.* iii. 325; *Boiss. Fl. Orient.* v. 358; *Buchen. in Engl. Bot. Jahrb.* xii. 376; *Reichb. Ic. Fl. Germ.* ix. t. 405. *J. articulatus*, *Linn. Sp. Pl.* i. 327.

NORTH WEST INDIA; Lahore, *Thomson*; Jhelum river, *Jacquemont*. HIMALAYA and WESTERN TIBET, alt. 7–14,000 ft.; very common from Kashmir to Kundwur.—DISTRIB. North temp. regions.

Rootstock horizontal; stems densely tufted, 4–10 in., rather stout, soft, at length hollow. *Leaves* terete or compressed, acute. *Cyme* with stout strict divaricate branches $\frac{1}{2}$ –1 in. long, bearing small heads at the forks and tips; lower bracts leafy, floral ovate-lanceolate, mucronate; heads $\frac{1}{5}$ – $\frac{1}{4}$ in. diam.; hemispheric; sepals $\frac{1}{4}$ in. long, green or brown, margins membranous; anthers about equalling the filaments; style short. *Capsule* green or brown. *Seeds* reticulate, testa appressed.

12. **J. prismatocarpus**, *Br. Prodr. Fl. N. Holl.* 259; stem erect terete or compressed, leaves filiform or broader soft compressed or terete 1- or many-tubular indistinctly externally distantly septate, cymes irregularly compound, heads densely 6–10-fl., sepals subulate or linear-lanceolate, stamens 3 much shorter than the sepals, style very short, capsule prismatic or conical rather longer than the sepals, seeds obovoid or ellipsoid. *Kunth Enum. Pl.* iii. 33; *Buchen. in Engl. Bot. Jahrb.* xii. 311; *Miquel, Fl. Ind. Bat.* iii. 246. *J. Leschenaultii*, *J. Gay in La Harpe*

Monogr. Junc. 137, 139; *Kunth Enum.* iii. 336; *Thw. Enum.* 340. *J. Wallichianus*, *La Harpe l. c.* 139; *Kunth l. c.* 338. *J. indicus*, *Royle ex Don in Trans. Linn. Soc.* xviii. 323; *Wall. Cat.* 8999. *J. monticola*, *Steud. Syn. Pl. Glum.* ii. 301. *Rostkovia ensiformis*, *Herb. Ham.*—*Juncus*, *Wall. Cat.* 9000.

Plains of BENGAL and the PANJAB; ascending the Himalaya to 10,000 ft. The KHASIA HILLS, and DECCAN Ghats; BURMA; CEYLON.—DISTRIB. Eastern Asia, Australia.

Very variable, cæspitose, rootstock very short. *Stems* 18–24 in., sometimes decumbent and rooting at the nodes, leafy, not septate. *Leaves* 2–10 by $\frac{1}{8}$ – $\frac{1}{2}$ in., always shorter than the stem, acute. *Cymes* erect, branches erect or spreading; lower bract leafy, erect, shorter than the cyme; floral hyaline, lanceolate, long-acuminate; heads hemispheric; flowers green or brown, sessile; sepals $\frac{1}{2}$ – $\frac{1}{3}$ in. long, glumaceous; stamens very short, anthers oblong; style very short, stigmas long. *Capsule* usually much exceeding the perianth. *Seeds* very minute, apiculate, testa appressed, reticulate.—The commonest rush in wet meadows in Sikkim.

Var. *sinensis*; very slender, flaccid, prostrate and creeping, leaves filiform unitubular, cymes depauperate, heads few-fl. *J. sinensis*, *J. Gay in La Harpe Monogr. Junc.* 137; *Kunth Enum.* iii. 336; *Buchen. l. c.* vi. 203; xii. 313. *J. indicus*, var. *nanus*, *Royle Ill. Pl. Himal.* 137. *J. unibracteatus*, *Griff. Notul.* iii. 232.—Bengal, Nepal, and the Khasia hills, in very wet places.

13. *J. leptospermus*, *Buchen. in Engl. Bot. Jahrb.* vi. 203; xii. 339; stems tall, leaves cylindric unitubular, cymes decompose erect, heads crowded sub 5-fl., sepals subulate lanceolate shorter than the narrow lanceolate beaked prismatic capsule, stamens 3 much shorter than the sepals, seeds linear-oblong.

KHASIA HILLS, alt. 4–5000 ft., *Griffith, Clarke*.

Stem 2–3 ft., as thick as a crow-quill, terete or subterete, smooth, leafy above, at length fistular. *Leaves* shorter than the stem, septate, acuminate. *Cyme* branches erect, stiff; lower bract leafy, floral hyaline, awned; flowers reddish, prismatic; sepals $\frac{1}{2}$ – $\frac{1}{3}$ in. long, very narrow, rigid, acuminate, margins narrowly membranous; filaments rather longer than the anthers. *Capsule* 1-celled. *Seeds* fusiform, pointed at one end, testa close.—A taller plant than *J. prismatocarpus*, less leafy, with a much shorter cyme the branches of which are more erect, and with narrower seeds.

Sect. V. *Leaves* narrow, channelled, terete or filiform, 1-many-tubular, septa very indistinct or 0. *Cymes* consisting of solitary or a few globose or subglobose heads; flowers usually large, white yellowish or chesnut-brown. *Stamens* 6. *Seeds* scobiform or tailed at each end.

* Cyme a solitary sessile head. *Leaves* solitary or few, all at or near the base of the stem. *Anthers* included, or exerted.

14. *J. triglumis*, *Linn. Sp. Pl.* 328; stem slender stiff naked, leaves short subulate, cyme terminal 3–4-fl. dark brown, bracts short, sepals oblong-lanceolate acute glumaceous, stamens included, filaments equalling or longer than the small anthers, capsule exerted obtuse or mucronate, seeds with long tails. *Kunth Enum.* iii. 358; *Buchen. in Engl. Bot. Jahrb.* vi. 213; xii. 388; *Boiss. Fl. Orient.* v. 355; *Reichb. Ic. Fl. Germ.* ix. t. 392.

ALPINE HIMALAYA and WESTERN TIBET, alt. 12–15,000 ft., from Kashmir to Sikkim.—DISTRIB. Alpine and Arctic regions of the N. hemisphere.

Stems 2–6 in., tufted, not stoloniferous. *Leaves* stiff, 2-tubular. *Cymes* $\frac{1}{2}$ – $\frac{1}{3}$ in.

diam., outer bracts dark brown, spreading, usually shorter than the sessile flowers; sepals $\frac{1}{3}$ – $\frac{1}{2}$ in.; inner rather broader, tips membranous; style and stigmas short. Seeds $\frac{1}{10}$ in. long, including the long white tails.

15. **J. leucomelas**, Royle ex Don in Trans. Linn. Soc. xviii. 320; stem filiform naked, leaves 1–2 filiform very short, cyme a 3–8-fl. white head, bracts brown lower usually produced, sepals linear-oblong obtuse membranous, anthers very long exserted, capsule ovoid-oblong shortly exserted, seeds long-tailed. Buchen. in Engl. Bot. Jahrb. vi. 211; xii. 391. J. Thomsoni, Buchen. in Bot. Zeit. xxv. (1867) 148; in Engl. Bot. Jahrb. xii. 390.

WESTERN HIMALAYA and WESTERN TIBET; from Kashmir to Sikkim, alt. 12–16,000 ft.—DISTRIB. Mongolia.

Stems tufted, 2–6 in., not stoloniferous, hollow. Leaves 1–2-tubular. Cyme solitary; upper bracts pale, membranous; sepals subequal, $\frac{1}{3}$ – $\frac{1}{2}$ in. long; inner with membranous margins; anthers rather shorter than the filaments; style and stigmas short. Capsule 1-celled. Seeds $\frac{1}{10}$ in. long.—I cannot distinguish *J. Thomsoni* except by its dark chesnut colord. flowers, a very variable character.

16. **J. bracteatus**, Buchen. in Engl. Bot. Jahrb. vi. 220; xii. 397; stem very slender (rarely 1-leaved?), leaves few short filiform, cyme a solitary 3–5-fl. hemispheric head much exceeded by the horizontal filiform lower bracts, flowers pale or dark, sepals oblong-lanceolate membranous obtuse, anthers exserted, style long, capsule included beaked, seeds shortly tailed.

SUBALPINE HIMALAYA, alt. 12,000 ft.; Garwhal, Duthie; Sikkim, J. D. H.

Stems tufted, 6–8 in., fistular; basal sheaths soft. Leaves subcompressed tubular. Cyme $\frac{1}{2}$ in. broad, upper bracts rather membranous, brown, equalling the shortly pedicelled flowers; sepals $\frac{1}{2}$ in. long; anthers linear, as long as the filaments. Capsule ovoid, 1-celled. Seeds scabiform, testa shortly produced at each end.—Buchenau places this in the group with a leaf on the stem, this may occur occasionally, but I think that specimen of *J. leucanthus* may have been mixed with *bracteatus*. On the other hand the absence or presence of a stem leaf in the species of this section is I fear far from a good one, and *J. bracteatus* is perhaps only a form of *leucomelas*.

** Cyme a solitary sessile head. Stem with one or more leaves above the middle. Anthers exserted, linear.

17. **J. leucanthus**, Royle ex Don in Trans. Linn. Soc. xviii. 318; stem slender, basal sheaths hard brown, leaves filiform, cyme solitary 6–10-fl. pale yellow, bracts short brown, sepals oblong-lanceolate subacute membranous, capsule and long style exserted beaked with the long style, seeds with very short tails. Buchen. in Engl. Bot. Jahrb. vi. 218; xii. 395.—Wall. Cat. 9002 B and 3480 in part.

ALPINE HIMALAYA; from Kumaon to Sikkim, alt. 11–13,000 ft.

Stem 6–8 in., tufted, at length hollow. Leaves very slender, uppermost equalling the stem, unitubular, subacute. Cyme $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., bracts ovate-oblong, acute, lowermost equalling the flowers, sometimes produced to 1 in.; flowers shortly pedicelled; sepals $\frac{1}{2}$ in. long; anthers half as long as the filaments; style long, slender, stigmas short. Capsule obovoid-oblong, cuspidately beaked, 3-septate. Seeds obliquely ovoid, testa loose shortly produced at each end.—Buchenau has a var. *alpina* (l. c. xii. 395), from Jongri in Sikkim (alt. 13,000 ft., Clarke), smaller with brown cymes and smaller flowers.

18. **J. membranaceus**, Royle ex Don in Trans. Linn. Soc. xviii.

320; stem tall slender 1-3-leaved, leaves filiform acute, cyme many-fld. white exceeded or not by the lower bract, sepals oblong-lanceolate obtuse membranous inner longer, capsule usually far exserted long-beaked, seeds with very long tails. *Buchen. in Engl. Bot. Jahrb.* xii. 397. *J. Hoffmeisteri*, *Klotzsch in Bot. Reis. Pr. Waldem.* 60, t. 98; *Buchen. l. c.* vi. 220. *J. benghalensis*, *Kunth Enum.* iii. 360; *Buchen. l. c.* vi. 211; xii. 400. *J. sphenostemon*, *Buchen. l. c.* xii. 401. *J. concinnus*, *in part Herb. Hook. f. & T. Isolepis sp. Wall. Cat.* 348 A.

TEMPERATE and SUBALPINE HIMALAYA, alt. 6-13,000 ft., from Kashmir to Sikkim.

Stems 5-20 in., tufted, stoloniferous, at length fistular; basal sheaths membranous. *Leaves* slender, channelled, or flattish above, tubular; sheath long, auricled. *Cyme* 8-24-fld.; lower bracts variable, floral ovate-lanceolate, hyaline; flowers shortly pedicelled; sepals nearly $\frac{1}{2}$ in. long; anthers half as long as the filaments, style and stigmas short. *Capsule* often half as long again as the sepals, 1-celled. *Seeds* $\frac{1}{10}$ in. long, tails longer than the nucleus. *J. sphenostemon* appears to me to be only a poor small state of *membranaceus*, the anthers are not cuneate, but almost exactly linear; its seeds are not ripe. *J. benghalensis* was founded on a Wallichian specimen of *membranaceus* with a false locality.

*** Cyme compound of several heads.

† *Stoloniferous*. *Flowers* large ($\frac{1}{2}$ in. long and upwards). *Stamens* included.

19. ***J. sphacelatus***, *Decne. in Jacquem. Voy. Bot.* 172, t. 172; stem stout terete leafy, leaves involute, cyme of 2-5 clustered or distant and superposed erect dark brown 2-5-fld. heads, lower bract elongate, sepals narrowly lanceolate much longer than the stamens and prismatic beaked capsule, seeds long-tailed. *Buchen. in Engl. Bot. Jahrb.* vi. 225; xii. 404. —*Juncus*, *Wall. Cat.* 9001 *in part*.

ALPINE HIMALAYA; from Kashmir to Sikkim, alt. 12-16,000 ft.—DISTRIBUTION: Afghan, Turkestan.

Stems 8-16 in., tufted, smooth, fistular; stolons as thick as a crow-quill. *Leaves* strict, obtuse or acute, unitubular, obscurely septate. *Cyme* with the heads usually distant, sessile or peduncled; floral bracts lanceolate, acuminate; sepals $\frac{1}{2}$ to nearly $\frac{1}{2}$ in. long, thinly glumaceous, tips finely acuminate, of inner hyaline; anthers included, about equalling the filaments. *Capsule* dark brown, obtuse, mucronate, 3-septate. *Seeds* $\frac{1}{2}$ in. long, tails very slender.

20. ***J. himalensis***, *Klotzsch & Garcke in Bot. Reis. Pr. Waldem.* 60, t. 97; stem tall stout rigid, leaves filiform or involute, cyme of 2 or more dark brown 3-8-fld. heads, lower bract elongate, outer sepals lanceolate inner linear-oblong with broad membranous margins and tip rather longer than the stamens and the ovoid long-beaked capsule, seeds long-tailed. *Buchen. in Engl. Bot. Jahrb.* vi. 229, t. 3; xii. 405. *J. scirpoides*, *Jacquem. mss.* *J. castaneus*, *Herb. Ind. Or. Hook. f. et Thoms. Juncus* No. 7.—*Juncus*, *Wall. Cat.* 9001, *in part*.

ALPINE and SUBALPINE HIMALAYA, alt. 7-14,000 ft.; from Kashmir and Western Tibet to Blotian.

Stems 8-20 in., erect, leafy below, 1-leaved above, hollow. *Leaves* tubular, channelled above, obscurely septate; auricles obscure. *Cyme* irregularly branched; branches sometimes an inch long and spreading; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; flowers shortly pedicelled, brown; sepals $\frac{1}{2}$ in. long, glumaceous, lanceolate, acute obtuse or mucronate; petals more oblong, obtuse, margins broadly scarious; anthers linear,

$\frac{1}{2}$ shorter than the filaments; style slender, stigmas long. Capsule nearly twice as long as the sepals, tip conical beaked, dark brown, shining. Seeds nearly $\frac{1}{2}$ in. long, tails very slender.—Very near *J. castaneus*, of which it may be considered a large more robust form, with more membranous sepals, and filaments longer in proportion to the anthers. Buchenau makes two varieties; *genuina*, with slender stem and leaves, very long stigmas, and an ovoidly prismatic obtuse mucronate capsule, and *var. Schlagentweitii* (Sp. Buchen. in Nachr. Koen. Ger. Wiss. Goett. 1869, 255); stouter, with leaves cylindric below and subulate above, and more narrowly margined inner sepals.

21. *J. sikkimensis*, Hook. f. in Hook. Ic. Pl. ined.; rootstock very stout creeping, stem stout base clothed with red brown rigid sheaths, leaf solitary or few terete or compressed equalling the stem, cyme of two dark brown unilateral sessile 4–6-fld. heads, lower bracts foliaceous sheathing longer than the heads, sepals glumaceous outer lanceolate finely acuminate, inner linear-oblong obtuse, anthers included much longer than the very short filaments, capsule included, seeds with short stout tails.

SIKKIM HIMALAYA; Lachen valley, alt. 12–14,000 ft. J. D. H.

Rootstock as thick as a small quill; sheaths of stem $\frac{1}{2}$ –1 in. long; stem and channelled leaf solid, soft. Bracts 1–2 in., erect or horizontal, its sheath brown. Flowers sessile; floral bracts broad, membranous, equalling the flowers; sepals $\frac{1}{2}$ – $\frac{1}{2}$ in. long; smooth, shining, very dark brown, inner with membranous tips; stamens half the length of the sepals, anthers linear, at length twisted. Ovary small; style very slender, exserted, stigmas long. Capsule hardly exceeding the sepals, obovoid, acute, shortly beaked, dark brown, shining, 3-septate. Seeds $\frac{1}{4}$ in. long, with thick white tails.

Var. *monocephala*; much smaller, very slender, stem filiform, cyme a solitary head with an erect stout filiform lower bracts $\frac{1}{2}$ – $\frac{3}{4}$ in. long, sepals $\frac{1}{2}$ in.—Lachen valley, Sikkim, alt. 12,000 ft.

†† Coespitose, not stoloniferous. Stem more or less leafy. Flowers small (about $\frac{1}{6}$ in. long). Anthers exserted.

22. *J. concinnus*, Don Prodr. Fl. Nep. 44; in Trans. Linn. Soc. xviii. 321; stem slender, leaves flat or channelled, cyme branched of 2–7 very pale 6–10-fld. heads, sepals oblong-lanceolate acute membranous, inner rather shorter obtuse, anthers far exserted, much shorter than their filaments, capsule ovoid, beak stout exserted, seeds very minute shortly produced at one end. Buchen. in Engl. Bot. Jahrb. vi. 215, t. 2; xii. 406. J. elegans, Royle ex Buchen. in Bot. Zeit. 1867, 146.—Juncus, Wall. Cat. 9002 B.

TEMPERATE AND ALPINE HIMALAYA, alt. 7–13,000 ft., from Kashmir to Sikkim. KHASIA HILLS, alt. 5–6000 ft.

Stems tufted on a tuberous rootstock, 4–8 in. high, hollow, sulcate. Leaves few, variable, filiform or involute, many-tubular; sheath membranous. Cyme with erect or spreading branches; heads $\frac{1}{2}$ – $\frac{2}{3}$ in. diam., at length spherical; lowest bract elongate, slender, or like the floral short and membranous; flowers subsessile, white or yellowish; sepals $\frac{1}{2}$ in. long; filament four times as long as the anther; style slender, stigmas short. Capsule very pale, shining. Seeds exceedingly long minute, brown.—Leaves sometimes flat as in *J. Clarkei*.

23. *J. khasiensis*, Buchen. in Engl. Bot. Jahrb. xii. 407; very slender, leaves few filiform curved channelled, cyme of usually two (1–3) 3–10-fld. white heads, bracts all shorter than the lanceolate obtuse sepals,

anthers exerted $\frac{1}{2}$ shorter than the slender filaments, capsule as long as the sepals narrowly lanceolate prismatic, seeds with slender tails.

KHASIA HILLS, *Griffith* (*Kew distrib.* 5451), alt. 5-5500 ft., *Clarke*.

Stems 4-10 in., tufted, suberect, grooved, leafless above. *Leaves* shorter than the stem, wiry; sheath membranous. *Heads* usually 2, a lateral and terminal, sessile, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., quite white; bracts 3-4, ovate, acute, rarely finely acuminate and exceeding the sessile flowers; outer sepals $\frac{1}{2}$ in. long, keeled, inner rather longer; anthers linear; style slender, exerted, stigmas short. *Capsule* 1-celled. *Seeds* $\frac{1}{10}$ in. long.—The long narrow capsules distinguish this at once from *J. concinnus*.

24. **J. nematocaulon**, *Hook. f. in Hook. Ic. Pl. ined.*; stems capillary grooved flexuous, leaves capillary channelled, cymes of 1-3 distant 1-3-fl. heads, bracts very short lower rarely capillary, sepals small pale green lanceolate acuminate not half as long as the prismatic acuminate pale capsule, anthers far exerted much shorter than the very slender filaments, style long, stigmas short.

ASSAM; on the Naga hills, Jakpho, alt. 9900 ft., *Clarke*.

Stems tufted, 1-1 $\frac{1}{2}$ in., 1-leaved above, sometimes with only one terminal flower, and a capillary bract. *Leaves* few, flexuous; sheaths very short, membranous. *Flowers* sessile, floral bracts membranous about as long as the pale sepals which equal the petals and are $\frac{1}{4}$ in. long, 1-nerved. *Capsule* with the beak $\frac{1}{2}$ in. long, membranous, pale shining, 1-celled. *Seeds* with a long slender tail at one end and an equally long inflated one at the other.—A very singular (annual?) species, allied to *J. concinnus* and *khasiensis*, differing from both in the capsule much longer than the sepals. *Seeds* not seen.

Sect. VI. Perennial. *Leaves* flat or with involute margins, grass-like, strongly nerved. *Cymes* of several capitate clusters.

25. **J. minimus**, *Buchen. in Bot. Zeit.* 1867, 145; *in Engl. Bot. Jahrb.* vi. 209; xii. 412; stem short stout, leaves chiefly basal, cymes of 1-2 3-6-fl. dark chestnut sessile heads, lower bract usually foliaceous, sepals lanceolate glumaceous finely acuminate, petals shorter acute, stamens included, capsule exerted turgid obtuse or retuse, seeds very minute, testa forming an oblong very loose sac.

SIKKIM HIMALAYA, alt. 16-18,000 ft., *J. D. H.*

Rootstock short, stout; stems 2-4 in., densely tufted, naked or 1-leaved, grooved. *Leaves* shorter than the stem, $\frac{1}{2}$ - $\frac{1}{3}$ in. broad, flat, grooved. *Cyme* with sessile heads $\frac{1}{2}$ - $\frac{1}{2}$ in. diam.; flowers subsessile; sepals $\frac{1}{6}$ in. long; petals rather broader; anthers small, much shorter than the filaments; ovary ovoid; style and stigmas short. *Capsule* rarely half as long again as the sepals, dark brown, shining. *Seeds* $\frac{1}{12}$ in. long, testa white, rounded at both ends.—Imperfect flowers, or even cymes, occur amongst the basal leaves.

26. **J. Clarkei**, *Buchen. in Engl. Bot. Jahrb.* vi. 210; xii. 413; stoloniferous, stem slender many-leaved, leaves longer than the stem soft, flat, grass-like, cyme of 1-5 globose peduncled 4- many-fl. straw-colrd. heads, lower bract leafy, sepals lanceolate membranous, stamens exerted, capsule much exerted prismatic long-beaked, seeds with long slender tails.

SIKKIM HIMALAYA, alt. 10-13,000 ft., *J. D. H.* BHOTAN, *Griffith*. MUNNIPORE, on Jakpho, alt. 9900 ft., *Clarke*.

Stems 6-10 in., tufted, terete, striate. *Leaves* $\frac{1}{6}$ - $\frac{1}{4}$ in. broad, finely acuminate, flaccid; sheaths membranous. *Cyme* with heads $\frac{1}{2}$ - $\frac{3}{4}$ in. diam.; flowers pedicelled; sepals $\frac{1}{6}$ - $\frac{1}{4}$ in. long, outer lanceolate, inner more oblong; anthers linear, about $\frac{1}{2}$

shorter than the filaments; style long, slender, stigmas short. *Capsule* membranous, pale, shining. *Seeds* $\frac{1}{8}$ in. long, including the very long tails.—*Leaves* often involute and very slender as in *J. concinnus*, but seeds very different.

2. *LUZULA*, DC.

Leaves grass-like, hairy. *Perianth*-segments glumaceous. *Stamens* 3 or 6. *Ovary* 1-celled, 3-ovuled.—Species about 30, temperate and Asiatic.

1. *L. plumosa*, *E. Meyer in Linnæa*, xxii. (1849) 387; cyme subumbellate, branches very slender, flowers solitary, testa produced into a horn-like appendage. *Buchen. in Engl. Bot. Jahrb.* vi. 195 and xii. 85. *L. pilosa*, var. *plumosa*, *C. A. Meyer ex Franch. in Nouv. Arch. Mus. Paris*, x. (1887) 100. *L. Forsteri Herb. Ind. Or. H. f. & T. Juncus plumosus, Wall. mss.—Wall. Cat.* 9003.

TEMPERATE HIMALAYA, alt. 9–10,000 ft.; from Kumaon eastwards. KHASIA HILLS; alt. 6000 ft., *Clarke*.—DISTRIB. China.

Perennial, 6–18 in. high. *Leaves* linear, acuminate, $\frac{1}{6}$ – $\frac{1}{4}$ in. broad, glabrous or sparsely ciliate with very long hairs. *Branches* of cyme capillary, very unequal, divaricate, few-fl.; bracts scarious, much shorter than the flowers. *Sepals* $\frac{1}{10}$ – $\frac{1}{8}$ in., lanceolate, acuminate, pale brown. *Stamens* 6. *Capsule* oblong, obtuse or apiculate, about as long as the sepals.

2. *L. effusa*, *Buchen. in Engl. Bot. Jahrb.* vi. 196; xii. 106; cyme very laxly paniculately branched, branches divaricate very long and slender, flowers solitary sessile or pedicelled, testa with a terminal boss.

SIKKIM HIMALAYA, alt. 9–10,000 ft., *J. D. H., Clarke*. MUNNIPORE; on Jakpho, alt. 9900 ft., *Clarke*.

Perennial, 12–24 in. high. *Leaves* linear, $\frac{1}{3}$ – $\frac{1}{2}$ in. broad, glabrous or sparsely ciliate below. *Cyme* long-peduncled; branches 1–3 in. long; bracts ovate, acute, brown. *Sepals* $\frac{1}{12}$ – $\frac{1}{10}$ in. long, ovate-lanceolate, acuminate, pale or dark brown. *Stamens* 6. *Capsule* oblong, rather longer than the sepals, obtuse, mucronate.—The Munnipore specimens have leaves $\frac{1}{2}$ in. broad, and a closer inflorescence, with shorter capsules; the seeds appear to be diseased.

3. *L. campestris*, DC. *Fl. Franc.* iii. 161; cyme subumbellately branched, flowers in peduncled capitate clusters, testa apiculate at the tip caruncled at the base. *Buchen. in Engl. Bot. Jahrb.* v. 198; xii. 155; *Boiss. Fl. Orient.* v. 349; *Reichb. Ic. Fl. Germ.* ix. t. 375, 376. *Juncus campestris*, *Linn. Sp. Pl.* i. 329.

TEMPERATE AND ALPINE HIMALAYA; alt. 10–14,000 ft., from Kashmir eastwards. The KHASIA, NILGHIRI and ANAMALLAY HILLS, alt. 5–7000 ft.—DISTRIB. N. temp. regions.

Perennial, 6–18 in. high. *Leaves* $\frac{1}{6}$ – $\frac{1}{3}$ in. broad, glabrous or ciliate. *Branches* of cyme very unequal, $\frac{1}{4}$ – $\frac{1}{2}$ in.; heads $\frac{1}{4}$ – $\frac{1}{3}$ in. diam.; bracts very short, scarious. *Flowers* sessile. *Sepals* $\frac{1}{12}$ – $\frac{1}{10}$ in. long, pale or dark brown, ovate-lanceolate, acuminate. *Stamens* 6. *Capsule* shorter than the sepals, broadly oblong or subglobose, obtuse or mucronate.—I have described above only the Indian form (which is a common European one) of this widely diffused and variable plant.

4. *L. spicata*, DC. *Fl. Franc.* iii. 161; cyme a solitary oblong drooping or nodding bracteate head, testa rounded at the tip, caruncled at the base. *Buchen. in Engl. Bot. Jahrb.* v. 197; xii. 127; *Boiss. Fl. Orient.* v. 348; *Reichb. Ic. Fl. Germ.* ix. t. 379.

ALPINE HIMALAYA; from Kashmir to Kumaon, alt. 12-14,500 ft., Royle, &c.—
DISTRIB. North Alpine and Arctic regions.

Perennial, 2-10 in. high. *Leaves* densely fascicled, radical 1-4 in. long, $\frac{1}{12}$ - $\frac{1}{8}$ in. broad, channelled, ciliate or not. *Cyme* $\frac{1}{2}$ - $\frac{3}{4}$ in. long; lower bract leafy, usually elongate, floral as long as the flowers, lanceolate, aristate; bracts brown with broad white membranous ciliate margins and tip. *Sepals* $\frac{1}{2}$ in. long, ovate-lanceolate, aristate, very dark brown. *Stamens* 6. *Capsule* oblong, obtuse, shorter than the sepals.

DOUBTFUL SPECIES.

L. sp.?; Sikkim Himalaya, alt. 10-11,000 ft., *J. D. H.*, *Pantling*; referred by Buchenau doubtfully to the European *L. parviflora*, var. *subcongesta*, but in much too young a state for identification. The bracts are ciliate, the sepals ovate acuminate and the stamens are 3 only.—There are other Himalayan species in too imperfect a state for determination.

ORDER CLXIII. PALMÆ.

By Dr. O. Beccari & J. D. Hooker.

Shrubs or trees, solitary or gregarious, naked or prickly, rarely pubescent. *Stem* erect scandent or decumbent, rarely branched above. *Leaves* alternate, plaited in bud, pinnatisect or palmate, rarely simple or bipinnate; petiole sheathing. *Flowers* 1- or 2-sexual, small, in panicles or spikes that are enclosed in one or more large sheathing bracts (spathes), usually 3-bracteate. *Perianth* inferior, segments 6 in two series (sepals and petals) usually all free, imbricate or valvate. *Stamens* 3 or 6, rarely more; anthers versatile. *Ovary* 1-3-celled or of 3 1-celled carpels; stigmas 3, usually sessile; ovules 1-2 in each carpel, adnate to the wall, base, or top of the cell, anatropous. *Fruit* a 1-3-celled drupe or hard berry or of 1-3 carpels; pericarp smooth, rough, or clothed with shining scales that imbricate downwards. *Seeds* erect or laterally attached, rarely pendulous; raphe usually branching all over the testa; albumen horny or bony, solid (equable) or ruminant; embryo small, in a small cavity near the surface of the albumen.—Genera about 130, species about 1100, chiefly tropical.

I am deeply indebted to Dr. Beccari for the generous loan of the mss. of his most valuable researches on the Palms of British India, which form the materials for an elaborate treatise on all the Asiatic and Malayan genera and species of the Order, of which fragments have appeared in his (now abandoned) admirable work, "Malesia." The mss. include materials for framing more or less complete descriptions of most of the Indian Palms, with notes on others; and are very voluminous, many closely written foolscap pages being often devoted to a single species. This, and the fact of the whole being in Italian, and in an orthography that is not always legible, requires me to crave Dr. Beccari's and my readers' indulgence, if in the framing of diagnoses and descriptions I have in any case misinterpreted his statements or views.

It was, indeed, a great disappointment to me, that Dr. Beccari declined to undertake the completion of his work, and the drawing up of specific diagnoses in the form adopted in the Flora of British India, a task which he is so good as to assure me it would have gratified him to have accomplished, had he not definitely given up the further study of botany. This has compelled me to associate my name with his as joint author, which I do with great reluctance, for he is not only more familiar than I am with the genera through his long journeys in the Malayan Archipelago, but had collected together and examined, for the purpose of his work, the materials contained in all the principal European and Indian Herbaria. It remains to add that, after having examined all available specimens at Kew, I have throughout adopted Dr. Beccari's systematic disposition of the species, and his names for those previously undescribed.

TRIBE I. **Areceæ**. *Leaves* pinnatisect; leaflets free with reduplicate sides, or confluent as a plaited limb. *Flowers* monœcious or diœcious. *Seeds* with ventral raphe and dorsal embryo.

A. Spadix infrafoliar (that is flowering after the fall of the leaf in the axil of which it was formed).

Subtribe 1. **EVARECEÆ**. *Male fl.* unsymmetric; sepals small; petals imbricate. *Stigma* in the fruit terminal.—Spadix androgynous; flowers usually ternate, the middle one female.

* *Ovule basilar, erect.*

Male fl. minute, solitary or 2-nate towards the tips of the branches, 3- or 6-androus; fem. larger solitary. Albumen ruminant

1. **ABECA**.

Male fl. one on each side of a fem., stamens 6 or more.

Albumen ruminant

2. **PINANGA**.

** *Ovule parietal.*

Male fl. 6-androus; sepals equalling or longer than the petals; fem. sepals and petals broadly imbricate. Albumen ruminant

3. **NINGA**.

Male fl. 9-12-androus; fem. petals with valvate tips. Albumen ruminant

4. **LOXOCOCCUS**.

Subtribe 2. **PTYCHOSPERMEÆ**. *Male fl.* symmetric; sepals broad, rounded, imbricate. *Stigma* in the fruit terminal. *Ovule* parietal or pendulous from the tip of the cell.—Spadix androgynous, flowers usually ternate, the middle one female.

Stamens 6. Albumen ruminant. Leaflets acuminate.

Seeds deeply grooved along the raphe

5. **PTYCHOBAPHIS**.

Stamens 6-15. Albumen equable. Leaflets entire or obliquely 2-toothed

6. **CYTOSTACHYS**.

Subtribe 3. **ONCOSPERMEÆ**. *Male fl.* symmetric or not; sepals imbricate; stigma in fruit lateral or basilar.

Male sepals small, acute. Stamens 6-12. Albumen ruminant. Armed palms; leaflets acuminate

7. **ONCOSPERMA**.

B. Spadix interfoliar (flowering while the leaf in whose axil it is formed is still green) or infrafoliar in some *Caryotidææ*.

Subtribe 4. **IGUANUREÆ**. Spadix androgynous; fem. fl. between two males; male sepals broadly imbricate. *Ovules* basilar or parietal. *Stigma* in fruit lateral or basilar.

Stamens 6-9. *Ovules* parietal. *Stigma* in fruit basilar or subbasilar. Leaflets obliquely truncate

8. **IGUANURA**.

Subtribe 5. **GEONOMEÆ**. Spadices unisexual; flowers sunk in cavities of its branches; perianth glumaceous; sepals imbricate. *Stigma* in fruit basilar or lateral.

Filaments free. Leaflets acuminate

9. **BENTINCKIA**.

Subtribe **CARYOTIDÆÆ**. Spadices unisexual; flowers solitary, or ternate with the fem. placed above the others. *Petals* of both sexes valvate.

* *Spathes many; flowers symmetric; stigma in the fruit terminal.*

- Male calyx tubular. Stamens 6. Albumen equable . . . 10. WALLICHIA.
 Male calyx cupular. Stamens many. Albumen equable . . . 11. DIDYMOSPERMA.
 Male sepals 3. Stamens many. Albumen equable. . . . 12. ARENGA.
 Male sepals 3. Stamens many. Albumen ruminant . . . 13. CARYOTA.

** *Spathes 2; flowers unsymmetric; stigma in the fruit basilar.*

- Male calyx minute. Stamens 3 or 6, extrorse. Albumen equable 14. ORANIA.

ANOMALOUS GENUS.

- Male fl. in catkin-like branches of a drooping androgynous spadix; fem. capitate at the apex of the spadix 15. NIPA.

TRIBE II. **Phœniceæ.** *Leaves pinnatisect; leaflets with induplicate sides. Spadices interfoliar; spathe solitary. Flowers dioecious. Ovary of 3 free carpels, one only ripening. Seed ventrally grooved; embryo usually dorsal.*

16. PHENIX.

TRIBE III. **Corypheæ.** *Leaves flabelliform, orbicular or cuneiform, plaited, lobes or segments with induplicate sides. Spadices interfoliar; spathes many. Flowers usually bisexual. Ovary entire or 3-lobed, or of 1-3 smooth carpels. Fruit smooth, except Pholidocarpus. Seeds with a small hilum; raphe ventral.*

* *Stigma in the fruit basal. Albumen equable.*

- Ovary 3-lobed; style short. Embryo apical 17. CORYPHA.
 Ovary 3-celled; style subulate. Embryo dorsal 18. NANNORHOPS.

** *Stigma in the fruit terminal. Albumen equable; embryo dorsal.*

- Ovary of 3 trigonous carpels; style filiform 19. LICUALA.
 Ovary of 3 globose carpels; styles 3, free or coherent . . . 20. LIVISTONA.

*** *Albumen ruminant; embryo basal.*

- Fruit small, smooth 21. TRACHYCARPUS.
 Fruit large, tuberculate or tessellate 22. PHOLIDOCARPUS.

TRIBE IV. **Lepidocarpeæ.** *Leaves pinnatisect, leaflets with reduplicate sides. Spadices interfoliar or terminal; spathes usually many. Ovary 1-3-celled. Fruit clothed with reflexed shining closely imbricating appressed scales.—Leaves copiously and strongly armed, except Metroxylon.*

* Polycarpic palms, flowering annually.

† *Leaflets acuminate, quite entire, nerves parallel.*

- Stem elongate. Spathes tubular, persistent 23. CALAMUS.
 Stem elongate. Spathes cymbiform or open, deciduous . . . 24. DEMONORHOPS.
 Stem short or 0. Spathes many, persistent 25. ZALACCA.

†† *Leaflets rhomboid cuneate or oblanceolate, toothed; nerves flabellate.*

- Stem short or 0. Spathes many, persistent 26. KORTHALSIA.
 Stem scandent. Spathe solitary, deciduous 27. CERATOLOBUS.

** Monocarpic palms, flowering once and then dying.

† *Spadices axillary from the uppermost leaves.*

- Stem scandent. Spadix with long amentiform branches clothed with large closely imbricating inflated spathelets that conceal the spikelets of flowers 28. PLECTOCOMIA.
 Stem scandent. Spadix much branched, the branches bearing small infundibular spathelets, each containing a small spikelet. Scales of fruit distinct 29. PLECTOCOMIOPSIS.
 Stem scandent. Spadix as of the preceding; scales of fruit most minute 30. MYRIALEPIS.

†† *Spadix very large, terminal.*

- Stems short, tufted. Leaves armed 31. EUGEISSONIA.
 Stem stout, erect. Leaves unarmed 32. METROXYLON.

TRIBE V. **Borasseæ.** *Leaves flabelliform. Spadices* interfoliar; spathes numerous, sheathing. *Flowers* dioecious; males minute, sunk in cavities of the catkin-like branches; perianth glumaceous; fem. very large, sessile on very short branches of a very stout spadix, each clothed with large coriaceous rounded bracts.

33. BORASSUS.

TRIBE VI. **Coccolneæ.** *Leaves* pinnatisect, leaflets with reduplicate sides. *Spadices* interfoliar, unisexual or androgynous; spathes 2. *Ovary* 3-celled, stigmas terminal. *Fruit* a drupe with a fibrous pericarp and terminal stigmas; endocarp woody or stony, with 3 terminal pits of which two answer to arrested cells, the third is immediately over the position of the embryo in the subjacent albumen. *Seed* adherent to the endocarp by the diffuse reticulations of the raphe, which ramifies all over the seed.

34. Cocos.

1. **ARECA**, Linn.

Stem erect, annulate. *Leaves* pinnate. *Spadices* infrafoliar, branched; MALE FL. many, minute; sepals small; petals obliquely lanceolate, valvate. *Stamens* 3 or 6; anthers basifixed, erect. FEM. FL. much larger, few at the base of the branches; perianth acrescent; sepals and petals orbicular, imbricate, the petals with acute valvate tips; ovary 1-celled; stigmas 3, sessile; ovule basal, erect. *Fruit* ovoid or oblong, stigmas terminal. *Seed* with a truncate base, albumen ruminant, embryo basilar.—Species about 24, tropical Asia and Australia.

1. **A. Catechu**, Linn. *Sp.* Pl. 1189; hexandrous, trunk tall, fruit ovoid. *Roxb. Cor. Pl.* i. 54, t. 75; *Fl. Ind.* iii. 615; *Mart. Hist. Nat. Palm.* iii. 169, t. 102; *Kunth Enum.* iii. 184; *Blume Rumph.* iii. 65, t. 102 A. et t. 104; *Griff. in Calc. Journ. Nat. Hist.* v. 153; *Palms of Brit. Ind.* 47; *Miq. Fl. Ind. Bat.* iii. 8; *Kurz For. Fl.* ii. 536; *Gamble Man. Ind. Timb.* 421; *Scheff. Arc.* 9; in *Ann. Jard. Bot. Buitenz.* i. 144, t. i. v. iii. f. 2. *Areca* Faufel, *Gærtner. Fruct.* i. 19, t. 7, f. 2. *A. hortensis*, *Lour. Fl. Cochinch.* 568.—*Rheede Hort. Mal.* i. t. 5-8.

Cultivated in the hot damp regions of ASIA and the MALAYAN ISLANDS.

Trunk solitary, 40-100 ft. *Leaves* 4-6 ft.; leaflets numerous, 1-2 ft., upper

confluent, quite glabrous. *Spathe* glabrous, compressed. *Spadix* much branched, rachis stout compressed, branches with filiform tips bearing more or less distichous minute male fl. *Fem. fl.* solitary at the bases and axils of the branches; sepals $\frac{1}{2}$ in., ovate, obtuse; petals subsimilar; staminodes 6, connate. *Fruit* $1\frac{1}{2}$ –2 in., smooth, orange or scarlet.—Betel nut.

2. ***A. concinna***, *Thw. Enum.* 328; hexandrous, trunk short slender, fruit subfusiform.

CEYLON, Reigam and Pasdoon Corles, *Thwaites*.

Trunk 8–12 ft., $1\frac{1}{2}$ – $1\frac{3}{4}$ in. diam., green. *Leaves* about 7, 3–3 $\frac{1}{2}$ ft. long, subglabrous, leaflets 2 ft. long. *Spadix* and flowers as in *A. Catechu*. *Fruit* $1\frac{1}{2}$ in. long, umbonate, reddish yellow.

3. ***A. nagensis***, *Griff. in Calc. Journ. Nat. Hist.* v. 156; *Palms Brit. Ind.* 149; triandrous, trunk tall, fruit narrowly ovoid.

ASSAM, in the Naga hills, *Jenkins*.

Trunk 30–40 ft. *Leaves* 7 ft.; leaflets 19–20 in. *Spadix* 1 ft., branches stout, flexuose. *Fruit* 1 in., narrowed at both ends.—Description from Griffith, who states that the leaves were imperfect and open to doubt from their resemblance to *A. gracilis* (*Pinanga gracilis*).

4. ***A. triandra***, *Roxb. Hort. Beng.* 68; *Fl. Ind.* iii. 617; triandrous, stems tufted slender, fruit ellipsoid. *Ham. in Mem. Wern. Soc.* v. 310; *Mart. Hist. Nat. Palm.* t. 149; *Griff. in Calc. Journ. Nat. Hist.* v. 154; *Palms Brit. Ind.* 148, t. 230 A.; *Kurz For. Fl.* ii. 537.

CHITTAGONG, MARTABAN, TENASSERIM, the ANDAMAN ISLANDS, and the MALAYAN PENINSULA.

Stems 12–25 ft. by 1– $1\frac{1}{2}$ in. diam., green, sending out basal offshoots. *Leaves* 4–6 ft.; petiole slender; leaflets $1\frac{1}{2}$ –3 ft., lateral sometimes as well as the terminal confluent. *Spathe* 1 foot or more. *Spadix* and flowers as in *A. Catechu*, but triandrous. *Fruit* the size of an olive, orange-cold., at length scarlet, tip truncate.

2. **PINANGA**, *Blume*.

Stem erect, annulate. *Leaves* pinnate with the upper leaflets confluent. *Spadices* infrafoliar, androgynous; spathe solitary; flowers 3 together (a fem. between 2 males) clusters in 2–4 or 6 series. **MALE FL.** obliquely trigonous; sepals acute, keeled, not imbricate; petals ovate or lanceolate, valvate; stamens 6 or more, anthers subsessile, basifixed, erect. **FEM. FL.** much smaller, ovoid or globose; sepals and petals orbicular, broadly imbricate; ovary 1-celled, stigmas 3; ovule basilar erect. *Fruit* ovoid or ellipsoid, pericarp fibrous. *Albumen* ruminant; embryo basilar.—Species about 24, tropical Asiatic and Malayan.

A. SPIRANTHÆ, *Becc.* *Flowers* in 3 or more spiral series on the spadix or its branches.

1. ***P. hexasticha***, *Scheff. in Ann. Jard. Bot. Buitenz.* i. 148; stems slender gregarious, leaves pinnate, petiole scaly, spadix simple reflexed, male fl. in 5–6 series, fruit fusiform. *Kurz For. Fl.* ii. 539; *Becc. in Ann. Jard. Bot. Buitenz.* ii. 80, 86; *Males.* iii. 122. *Areca hexasticha*, *Kurz in Journ. As. Soc. Beng.* xliii. ii. 201, t. 12.

PEGU ; in marshy forests, *Kurz*.

Stems 25–30 ft. by $1\frac{1}{2}$ in. diam. *Leaves* 3–5 ft., sheaths and short petiole scaly; leaflets 1– $1\frac{1}{2}$ ft., many, narrow, linear, subfalcate, 2–3-ribbed, lower acuminate,

upper truncate, toothed. *Spadix* about 1 ft. long; rachis as thick as the finger, fleshy; flowers sessile, rows spirally arranged. *Fruit* narrowed at the top.

2. **P. gracilis**, *Blume, Rumph. ii. 77*; stems slender usually gregarious, leaves sparingly pinnate, petiole scurfy, spadix simple reflexed, male fl. in 3 rows, fruiting spadix pendulous, fruit ellipsoidly fusiform. *Kurz For. Fl. ii. 538*; *Becc. in Ann. Jard. Bot. Buitenz. ii. 81, 86*; *Males. iii. 122*. *Pinanga patula* β. *gracilis*, *Scheff. in Natuurk. Tijdsch. Ned. Ind. xxxii. 178*. *Seaforthia gracilis*, *Mart. Hist. Nat. Palm. iii. 185 (Ed. 2, 184) 313*; *Kunth Enum. iii. 191*. *Areca gracilis*, *Roxb. Fl. Ind. iii. 619*; *Griff. in Calc. Journ. Nat. Hist. v. 460*; *Palms Brit. Ind. 154, t. 232 A, C, f. 2 (not B)* *Kurz in Journ. As. Soc. Beng. xliii. ii. 201*. *T. Anders. in Journ. Linn. Soc. xi. 5*. *Nenga gracilis*, *Becc. Males. i. 25*. *A. triandra*, *Roxb. ? Wall. Cat. 8599*.

SIKKIM and BROATAN HIMALAYA, alt. 2-3000 ft., *J.D.H.* ASSAM, the KHASIA HILLS, and CHITTAGONG to TENASSERIM. *Roxburgh, &c.*

Stems 6-20 ft. by $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., thickened upward. *Leaves* 3-4 ft.; petiole and sheaths scurfy; leaflets inserted by a very broad base, 1 ft. long or more, lower 2-3-ribbed finely acuminate, upper 3-5 in. broad præmorse many-ribbed. *Spathe* solitary, 2-fid. *Spadix* white or scarlet, glabrous. *Male fl.* broad, flat, imbricating; calyx minute; petals broad, cuspidately acuminate. *Fruit* $\frac{1}{2}$ in. long, scarlet or orange, tapering to the tip, smooth.

3. **P. Griffithii**, *Becc. Males. iii. 117*; stem? leaves pinnatisect leaflets numerous, spadix peduncled reflexed subdigitately branched, branches 4 spreading, male calyx shorter than the petals, fruits spirally disposed in 4 series ovoid narrowed at the mamillate tip. *Areca* sp. *Griff. in Calc. Journ. Nat. Hist. v. 461 (under A. gracilis, fruit only)*; *Palms Brit. Ind. 55, t. 232 (spadix only)*.

KHASIA HILLS; *Griffith*.

Stem apparently very slender. *Peduncle of spadix* 2 in., branches 3-5, spreading, not compressed. *Fruit* rather more than $\frac{1}{2}$ in. long by $\frac{1}{4}$ diam., narrowed at the base, mamillate, pericarp thin, albumen deeply ruminant.—*Beccari (Males. l. c.)* has founded his *P. Griffithii* on the spadix with tetrastichous fruits described by Griffith, but regards the leaves (only supposed by the latter author to belong to it, and which are simple and forked) to belong to another plant. In the diagnosis of *P. Griffithii* ("Malesia," l. c.) there is no description of the leaves, but the author has added in pencil "pinnatisect, segments numerous 3-many-costate."

4. **P. polymorpha**, *Becc. Males. iii. 172*; stem slender, leaves short subentire forked or more or less pinnatifid, petiole very slender, sheath not grooved, spadix slender refracted after flowering simple or 2-3-partite, branches short, fl. 3-4-seriate, fruit small ellipsoid or obovoid subacute, base narrowed.

MALAY PENINSULA; Singapore, *Lobb*; Perak, alt. 3-4000 ft., *Scortechini (n. 345 a.)*, *King's Collector (n. 8072)*.

Stems solitary, $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., internodes 2 $\frac{1}{2}$ -4 in. long. *Leaves* very variable, 8-12 in. long, with 1-6 many-costate leaflets on each side and a broad flabelliform forked apex; petiole variable and sheath scaly. *Spathe* elliptic, acute. *Spadix* 3-5 in. long, peduncle nearly as long slender. *Male fl.* acuminate, calyx shortly 3-toothed; stamens 12; *fem. fl.* globose. *Fruit* $\frac{1}{2}$ by $\frac{1}{4}$ - $\frac{1}{2}$ in., tipped by the stigma; black, shining; (dark yellow *King's Collector*) pericarp thin. *Seed* obovoid; albumen densely ruminant. The fruits in some specimens are ellipsoid and narrowed at both ends, girt with a thickened ring at about $\frac{1}{3}$ of their length below the tip, from the shrinking of the pericarp.

5. **P. robusta**, *Becc. mss.*; stem taller and much more robust than *P. polymorpha*, 15–20 ft. high by $1\frac{1}{2}$ –2 in. diam., leaves $1\frac{1}{2}$ –2 ft. long, petiole and costa of blade nearly as thick as the little finger, spadix and its branches very stout.

MALAY PENINSULA; Perak, on the top of Gunong Booboo, alt. 3–5300 ft. *King's Collector* (No. 7372).

Evidently allied to *P. polymorpha*, but the specimens are insufficient for a fuller description.

6. **P. Scortechini**, *Becc. Males* iii. 170; stem solitary, young internodes scurfy, leaves pinnatifid, leaflets distant long narrow, petiole long slender, branches of spadix 5–6 ascending digitate, flowers spirally arranged in 4-series, fruit ovoid or obovoidly-oblong.

MALAY PENINSULA; Perak, *Scortechini*, alt. 3000–4000 ft., *King's Collector*.

Stem 6–15 ft., $\frac{3}{4}$ – $1\frac{1}{4}$ in. diam. Leaves 3–4 ft long; sheaths scurfy; leaflets numerous, 1– $1\frac{1}{2}$ ft. by 1– $1\frac{1}{2}$ in., rather rigid, 2–5-ribbed, finely acuminate, base hardly narrowed. *Spathes* elliptic-oblong. *Spadix* stoutly peduncled, depressed, $\frac{2}{3}$ – $1\frac{1}{4}$ in. long, with a large triangular deciduous bract; branches $2\frac{1}{2}$ –4 in. long. *Male fl.* sepals triangular, cuspidate, petals rather longer acuminate. *Sepals of fem. fl.* cuspidate, ciliolate; petals rather larger. *Fruit* $\frac{2}{3}$ in. long, black, shining, tip rounded or subacute; albumen densely ruminate.

B. ORTHOSTICHANTHÆ, *Becc.* Flowers in 2 series on the spadix or its branches.

* Leaves entire or sparingly divided.

7. **P. disticha**, *Blume (fd. H. Wendl. in Kerch. Palm. 253)*; stem very slender short, leaves small cuneately obovate simple and deeply forked or with a few broad lateral leaflets, spadix small simple refracted villous, male petals much longer than the calyx, fruit ovoid or fusiform acuminate. *Becc. Males* iii. 123. *P. bicolor*, *Blume in Bull. Néerl.* 1838, 65; *Rumphia*, ii. 92, t. 113, f. 2; *Kunth Enum.* iii. 641. *Areca disticha*, *Roxb. Fl. Ind.* iii. 620; *Griff. in Calc. Journ. Nat. Hist.* v. 461 (*partly as to descript. & local.*); *Palms Brit. India* 155 (*partly*). *A. humilis*, *Roxb. Ic. pict. ined.* *Areca curvata*, *Griff. Ic. Pl. Ind. Or.* t. 248 (*non Notul.* iii. 164.) *Seaforthia disticha*, *Mart. Hist. Nat. Palm.* 184; *Kunth l. c.* 190. *Ptychosperma disticha*, *Miq. Fl. Ind. Bat.* iii. 28 et *Suppl.* 253. 590; *Journ. Bot. Néerl.* i. 7; *De Palm. Arec.* 24.

PENANG, *Roxburgh, Curtis* (No. 391); Perak alt. 100–800 ft. *Herb. Calc.* (Nos. 2536, 4423.)

Stems 2–6 ft. by $\frac{1}{4}$ – $\frac{1}{2}$ in., usually tufted. Leaves 12–15 in., forked, and many-nerved, the nerves ending in setaceous points, or with a few unequal acuminate lateral leaflets inserted by a broad base; sheath closely grooved and short petiole scurfy. *Spadix* 2–3 in. long. *Stamens* about 15, pistillode 0. *Fruit* $\frac{1}{2}$ in. long, narrowed at both ends, but most so above, orange-red. *Seed* ovoid; albumen according to *Roxburgh's* description, and his drawing (copied by *Griffith*, t. 233) solid, but there are a few streaks of rumination in No. 4423 from Perak.—The leaves are often mottled with pale yellow green.

8. **P. subruminata**, *Becc. Males* iii. 174, stem very slender, leaves cuneately obovate forked, lobes truncate doubly-toothed 12–15-nerved, petiole long slender, sheath deeply closely grooved, spadix piercing the sheath of the old leaf very short reflexed bipartite glabrous, branches flexuous, fruit narrowly ovoid or ellipsoid apiculate.

MALAY PENINSULA; Perak, alt. 100 ft., *Herb. Calcutt.* (No. 7797); *King's Collector* (No. 1963). PENANG, alt. 1500–2000 ft., *King's Collector*.

Stem 2-6 ft. by $\frac{1}{2}$ in.; internodes 2-2 $\frac{1}{2}$ in., brown-scurfy. *Leaves* 9-12 by 4-5 $\frac{1}{2}$ in., glabrous; petiole 6-10 in., subterete; sheath 4 in., tubular, scurfy; ligule scarious, fimbriate. *Spadix* with its stout peduncle $\frac{3}{4}$ in. long, branches sinuous, few-ld. *Fruit* about $\frac{1}{2}$ by $\frac{1}{4}$ in., red. *Seed* narrowed at the tip; raphe with 5 branches; albumen very faintly ruminat.

** Leaves much divided.

† *Spadix* large, much branched.

9. **P. Manii**, Becc. *Males.* iii. 178; trunk tall stout, leaves large, leaflets very many strongly 1-3-nerved, spadix reflexed stoutly peduncled, branches filiform pendulous, male sepals about as long as the petals, fruit small ovoid from an acute base, seed subglobose. *Areca costata*, Kurz in *Journ. As. Soc. Beng.* xliii. ii. 200. *excl. all. synons.*

NICOBAR ISLANDS, *Man.* SOUTH ANDAMAN ISLDS., Kurz.

Trunk 50 ft. by 5 $\frac{1}{2}$ in. diam. *Leaves* 6 $\frac{1}{2}$ ft.; leaflets ensiform, straight, longest (middle) about 30 in. by 1 $\frac{1}{2}$ -3 $\frac{1}{2}$ broad, 2-3-partite, pale beneath. *Spadix* 19-20 in. long, shortly peduncled, branches 45-50 spirally arranged; flowers 2-seriate. *Fruit* $\frac{4}{10}$ by $\frac{2}{10}$ - $\frac{3}{10}$; pericarp thin. *Seed* with reticulate raphe, albumen densely ruminat.

10. **P. Kuhlîi**, Blume in *Bull. Néerl.* 1838, 65; *Rumph.* ii. 82, t. 111 et β t. 111, f. 11-13; stems tufted slender, leaves pinnate, leaflets many falcate linear to linear-lanceolate finely acuminate strongly 2-3-ribbed upper confluent, petiole subscurfy, spadix refracted shortly peduncled robust simply branched glabrous, branches elongate, fruit obovoid or ellipsoid shortly apiculate. *Kunth Enum.* iii. 641; *Miq. Pl. Jungh.* 57; *Scheff. in Natuurk. Tijdsch. Ned. Ind.* xxxii. 182; in *Ann. Jard. Bot. Buitenz.* i. 152; *Becc. Males.* iii. 138. *P. costata*, Bl. in *Bull. Néerl.* l. c.; *Rumphia* l. c. 80, t. 109 et β t. 109 C.; *Kunth l. c.*; *Miq. l. c.* 156; Kurz, *For. Fl.* ii. 538. *Seaforthia*, Kuhlîi, *Mart. Hist. Nat. Palm.* iii. Ed. 2, 185, 313. *S. oryzæformis*, Mart. l. c. Ed. 1, 185 (*excl. all. syns. but Gærtn.*); *Kunth l. c.* 191. *S. costata*, Mart. l. c. 313. *Ptychosperma*, Kuhlîi, *Miq. Fl. Ind. Bat.* iii. 21; *De Palm. Archip. Ind.* 23. *P. costata*, *Miq. ll. cc.* 25, 23. *Areca oryzæformis*, Gærtn. *Fruct.* i. 20, t. 7, f. 2, 6 (*not of Rumph.*).

SOUTH ANDAMAN ISLANDS, Kurz.—DISTRIB. Sumatra, Java.

Stem soboliferous, 20-30 ft. (Kurz), (10 ft., Becc.). *Leaves* 3-4 ft.; leaflets 1-2 ft.; petiole variable in length. *Spadix* 1 ft. *Fruit* nearly $\frac{1}{2}$ in. long. *Seed* adherent to the pericarp; albumen deeply ruminat.—The above is chiefly from Kurz's *P. costata* in *For. Fl.* It may be the *P. coronata* mentioned by Kurz in his Andaman Report as abundant in the South Andaman Islands.

†† *Spadix* with few distichous branches.

11. **P. Dicksonii**, Blume *Rumph.* ii. 85; trunk solitary tall, leaves pinnate, leaflets numerous elongate broadly linear præmorse 5-7-nerved, uppermost confluent, spadix refracted branches 4-8, male sepals subulate nearly equalling the petals, stamens 20-30, fruit ovoid or oblong. *Scheff. in Natuurk. Tijdsch. Ned. Ind.* 174; in *Ann. Jard. Buitenz.* i. 149; *Becc. Males.* i. 138. *Areca Dicksonii*, Roxb. *Fl. Ind.* iii. 616; *Griff. in Journ. As. Soc. Beng.* v. 458; *Palms Brit. Ind.* 153, t. 231. *Seaforthia Dicksonii*, Mart. *Hist. Nat. Palm.* iii. 184, 313; *Kunth Enum.* iii. 190.

WESTERN GHATS; on the Nilgiri and Travancore hills, alt. 2500 ft.

Trunk 16-18 ft. by about 2 in. diam. *Leaves* 4 ft., forked; leaflets sessile,

12-24 by $\frac{3}{4}$ -1 in. *Spathe* simple. *Spadix* with the branches stout, densely clothed with imbricating flowers. *Male fl.* sepals subulate, petals rather longer, ovate-cordate, tips tapering; stamens very numerous; filaments very short; pistillode 0. *Fem. fl.* sepals reniform; petals similar; staminodes 6, clavate, tips penicillate. *Fruit* about $\frac{1}{2}$ - $\frac{3}{4}$ in. long by $\frac{1}{2}$ in. diam.

12. **P. malaiana**, Scheff. in *Natuurk. Tijdsch. Ned. Ind.* xxxii. 175; stem slender, leaves pinnate, leaflets numerous linear acuminate glaucous beneath 2-nerved, upper confluent, spadix refracted branches 3-5, male sepals lanceolate acuminate much smaller than the petals, stamens about 40, fruit ovoid. *Becc. Males.* iii. 137. *Areca hæmatocarpa*, Griff. *Notul.* iii. 165; *Palms Brit. Ind.* 153. *A. malaiana*, Griff. in *Calc. Journ. Nat. Hist.* v. 457; *Palms Brit. Ind.* 252, t. 230 C. *Seaforthia malaiana*, Mart. *Hist. Nat. Palm.* iii. 184, Ed. 2, 183, 313, t. 158, f. 3; *Kunth Enum.* iii. 190. *Ptychosperma malaiana*, Miq. *Fl. Ind. Bat.* iii. 23; *de Palm. Arch. Ind.* 23.

MALACCA, Griff. PENANG, Herb. Hort. Calc. (3190). PERAK, *King's Collector* (8120).—DISTRIB. Sumatra.

Stem 8-12 ft., $\frac{3}{4}$ -1 in. diam., internodes generally subclavate. *Leaves* 5-8 ft. long, spreading; leaflets $1\frac{1}{2}$ -2 ft. by $\frac{1}{2}$ - $\frac{3}{4}$ in., finely acuminate, upper cuneate bipartite, lobes præmorse; petiole $1\frac{1}{4}$ - $1\frac{1}{2}$ ft.; sheath as long. *Spathe* 10 in., cuspidate. *Spadix* 6 in., blood red in fruit; branches 3-5, flowers crowded. *Male fl.* flat, sepals membranous, lanceolate; petals much larger; filaments very short. *Fem. fl.* sepals and petals very short; staminodes 0; stigma discoid. *Fruit* 1- $1\frac{1}{2}$ by $\frac{1}{2}$ - $\frac{3}{4}$ in., narrowed at both ends, blackish purple, mamillate. *Seed* ovoid, raphe about 7-branched; albumen deeply ruminant.

13. **P. pectinata**, Becc. mss.; stems 7-15 ft., cespitose, robust, leaflets numerous elongate acuminate 1-5-ribbed straight much contracted at the base, glaucous beneath, spadix with 3-9 short branches, male calyx shorter than the petals, fruit elongate ovoid tipped with the conical stigma.

PERAK, *King's Collector*; Goping, alt. 5800 ft. (n. 4393).

Stems $2\frac{1}{2}$ - $3\frac{1}{2}$ in. diam. *Leaves* 3-4 ft.; leaflets 10-16 by $1\frac{1}{2}$ - $1\frac{3}{4}$ in. *Spadix* with branches 4-5 in. long. *Fruit* $\frac{1}{10}$ - $\frac{7}{10}$ in. long by $\frac{2}{10}$ - $\frac{3}{10}$ diam. *Seed* ovoid, obtuse, base truncate.—Fruit much smaller than in *P. malaiana*.

14. **P. perakensis**, Becc. *Males.* iii. 175; stems short gregarious, internodes short the upper scurfy, leaves long-petioled, leaflets numerous stiff straight linear or ensiform acuminate 1-2-costate, spadix short sub-digitately 5-7-branched, male calyx much shorter than the petals, fruit ovoid or oblong crowned with the minute stigma.

PERAK; alt. 1200-1500 ft., *Scortechini*, on Maxwell hill, Wray.

Stems 3-4 ft. by 2-3 in. diam. *Leaves* 2- $2\frac{1}{2}$ ft.; leaflets 18-20 by $\frac{3}{4}$ -1 in., inserted at an angle of 45°, bright green, paler beneath; petiole 10-12 in., terete; sheath 8 in., squamulose; ligule $\frac{3}{4}$ -1 in. *Spathe* elliptic-oblong, apiculate, 2-keeled. *Spadix* 4-6 in., shortly peduncled; branches compressed; flowers subremote, 2-seriate. *Male fl.* calyx 3-toothed; stamens numerous. *Fem. fl.* globose; sepals and petals similar; stigma capitate. *Fruit* $\frac{1}{2}$ long by $\frac{1}{10}$ in. diam., purple-black. *Seed* conform to the fruit, raphe simply branched; albumen densely ruminant.

15. **P. Hookeriana**, Becc. *Males.* iii. 141; stem slender, petiole and rachis of leaves scurfy, leaflets numerous narrowly linear-lanceolate subfalcate acuminate 2-3-costate, spadix with a slender peduncle and 4-5 slender branches, male calyx much shorter than the petals, fruit ellipsoid apiculate. *Areca* sp. Griff. in *Calc. Journ. Nat. Hist.* v. 462, in footnote.

KHASIA HILLS; alt. 2-4000 ft., Griffith, J. D. H., &c. (in *Herb. Webb.*), Nunklow and Churra, Clarke.

Stem 3-4 ft.; internodes clavate, young scurfy. Leaves $4\frac{1}{2}$ ft.; leaflets opposite, 1 ft. long, much obliquely acuminate, 3-4-keeled above, terminal lobe 2-fid; petiole 6 in. Spathe 4 in., oblong. Spadix 3-4 in.; branches compressed, flexuose, flowers crowded. Male fl. calyx membranous 3-toothed; petals very unequal; stamens about 15; pistillode 0. Fem. fl. sepals and petals subequal; staminodes 0; stigma large, discoid. Fruit about $\frac{1}{2}$ in. long by $\frac{1}{4}$ diam., narrowed at the top. Seed of the same shape.—This is the plant alluded to by Griffith (*Calc. Journ. Nat. Hist.* l. c. 462), and described as probably a form of *A. gracilis* collected by Major Jenkins and himself in the Khasia hills and Assam, and of which he says, in a footnote, “Stem and leaves much the same as in *A. gracilis*, spadices slenderer 3-4-times branched, fem. fl. distichous distant.” The above is from Malesia. I have seen no specimen.

††† Spadix unbranched.

16. *P. hymenospatha*, Hook. f.; stem slender, petiole and rachis of leaves slender scurfy, leaflets very numerous falcately very narrowly ensiform finely acuminate unicostate, spadix very short, spathe fusiform terete acuminate membranous, male fl. flat imbricate.

BURMA; at Moulmein, Lobb.

Stem as thick as a goose-quill; internodes long. Leaves 12-14 by 4-5 in.; leaflets 3-4 by $\frac{1}{4}$ - $\frac{1}{2}$ in., very numerous (15-20 pairs) quite regularly close set, alternate, flat, thin, dark green above and brownish beneath when dry, costa slender, prominent on both surfaces; petiole 3 in., subterete; sheath 3-4 in., striate. Spathe $1\frac{1}{2}$ in., ellipsoidly fusiform, erect, quite membranous, subhyaline. Spadix as long as the spathe, flowering to the base. Male fl. closely imbricating, $\frac{1}{2}$ in. diam., trapezoidly orbicular; dorsal sepals twice as long as the others, apiculate; stamens 9, unequal; filaments very short, anthers linear. Fem. fl. minute, globose; ovary ovoid, stigma pulvinate, ovule erect.—A very distinct species remarkable for its membranous spathe and very elegant foliage.

17. *P. paradoxa*, Scheff. in *Natuurk. Tijdsch. Ned. Ind.* xxxii. 31: stem slender, leaves entire or pinnatisect with few broad 3- or more-nerved leaflets, spadix short decurved, fruit very narrow tapering from above the base to the obtuse tip often curved. Becc. *Males.* iii. 129, in note. *Areca curvata*, Griff. *Notul.* iii. 164, partly, as to the descr. (not *Is. Pl. Asiat.* t. 248). *A. paradoxa*, Griff. in *Calc. Journ. Nat. Hist.* v. 463; *Palms Brit. Ind.* 156, as to descr. of fruit, and fig. of fruit, t. ccxxxvii. C, f. 11. *Kentia paradoxa*, Mirt. *Hist. Nat. Palms.* 111, 312. *Nengella paradoxa*, Becc. *Males.* i. 32. *Ophiria paradoxa*, Becc. in *Ann. Jard. Bot. Buitenz.* ii. 128. *Cladosperma*, N.G. Griff. *Notul.* iii. 165.

MALACCA; foot of Mt. Ophir, Griffith. PERAK, alt. 3-4000 ft., Scortechini (427b, 2413); on Gunong Batu, Wray.

Stem 3-6 ft., very slender, $\frac{1}{4}$ in. diam.; internodes 1-2 in. Leaves 1 ft. long, entire and oblong, or with 3-6 pairs of sigmoidly linear-lanceolate acuminate leaflets with a broad base, 4-5 in. long by $\frac{1}{4}$ - $\frac{1}{2}$ broad; petiole 1-1 $\frac{1}{2}$ ft., very slender and rachis scurfy; terminal lobe deeply forked, toothed; sheath long, deeply striate. Fruiting spadix 2-2 $\frac{1}{2}$ in. long, slender, nearly glabrous; peduncle short. Fruits distichous, $\frac{3}{4}$ in. long by $\frac{1}{8}$ broad, red; albumen equable.

DOUBTFUL SPECIES.

18. *P. patula*, Blume in *Bull. Néerl.* 1838, 65; *Rumphia*, ii. 86, 87, t. 115; *Kunth Enum.* iii. 641; *Kurz in Journ. As. Soc. Beng.* xlii. ii. 201; *Scheff in Natuurk Tijdsch. Ned. Ind.* xxxii. 176 (partly and excl. all vars.); in *Ann. Jard. Bot. Buit.* i. 150 (partly as to descr.), t. 18, f. 4, t. 19; *Becc. Males.* iii. 139. *Scaforthia patula*, Mart. *Nat. Hist. Palm.* 323. *Ptychosperma patula*, Miq. *Fl.*

Ind. Bat. iii. 26, and Suppl. 253; in *Journ. Bot. Néerl.* i. 7; *De Palm. Archip. Ind.* 23; stems tufted slender 6-7 ft. high $\frac{1}{2}$ -1 in. diam., leaflets few, rarely many, broad, distant, sigmoidly lanceolate and falcate from a narrowed base caudate-acuminate 2-many-nerved, terminal broader 7-9-nerved truncate and deeply doubly toothed, spadix refracted, branches 2-5, fruit elliptic-ovoid, narrowed and acute at the tip, about $\frac{1}{2}$ - $\frac{3}{4}$ in. long $\frac{1}{5}$ - $\frac{1}{3}$ diam.—Perak, on Ulu Bubong, *King's Collector* 10702). Sumatra, Borneo.—The above description is chiefly from Sumatran specimens. The Perak have internodes $2\frac{3}{4}$ -3 $\frac{1}{4}$ in. long, $\frac{6}{10}$ in. diam., covered with white scurf, a 4-branched spadix, and the leaves minutely puberulous beneath. A very similar plant collected by Helfer in Burma (n. 6427) without flowers, in fruit, has broader leaflets with the nerves puberulous beneath.

3. **NENGA**, *H. Wendl. & Drude.*

Characters of *Pinanga*, but sepals and petals subequal, subulate, and ovule parietal.—Species few, Malayan.

1. **N. Wendlandiana**, *Scheff. in Ann. Jard. Bot. Buitenz.* i. 153 (partly), t. 9-10; leaves pinnate, leaflets alternate ensiform finely acuminate, spadix about 4-branched, flowers tetrastrichous, male sepals subulate rather longer than the petals, fruit ovoid mamillate, stigma conical, seed ovoid acute. *Becc. Males.* i. 25; in *Ann. Jard. Buitenz.* ii. 83. *N. pumila*, *Wendl. in Kerchov. Palm.* 251. *Pinanga Nenga*, *Blume Rumphia*, ii. 77, t. 107 (excl. var. *paehystachya*). *Areca Nenga*, *Blume in Mart. Hist. Nat. Palm.* iii. 179; *Scheff. in Natuurk. Tijdsch. Ned. Ind.* xxxii. 166 (excl. var. γ). *Areca pumila*, *Blume in Mart. l. c.* 177, t. 153, f. 1-3; *Miq. Fl. Ind. Bat.* iii. 14 (excl. var. γ); *De Palm. Arch. Ind.* 23.

Var. *malaccensis*, *Becc. Males.* iii. 182; petiole very short, fruit broadly ovoid about 1 in. long, seed broadly truncate at the base cuspidate and spinous at the tip. *Areca* (*Anacasmus*) *pumila*, *Griff. in Calc. Journ. Nat. Hist.* v. 456; *Palms of Brit. Ind.* 151.

Var. *malaccensis*, Ching forest, Malacca, *Griffith*. PERAK, Larut, *King's Collector* (4022).—DISTRIB. (of the species) Sumatra, Java.

Stem 10-20 ft. by 2-3 in. diam. *Leaves* 8-9 ft., pinnate nearly to the base, leaflets alternate $2\frac{1}{2}$ ft. by $\frac{1}{2}$ -1 $\frac{1}{2}$ in. broad, caudate-acuminate, bright green, coriaceous, 2-ribbed; petiole as thick as the little finger; sheaths 2 ft. long, subventricose. *Spathe* about 2 ft. *Spadix*; peduncle 1 $\frac{1}{2}$ in., branches 8-12 in., level-topped, pendulous, fruiting very thick; flowers about 4-ranked, yellowish white. *Male fl.* sepals $\frac{3}{4}$ -1 in. long, triangular-subulate, finely acuminate; petals ovate-oblong, cuspidate, stamens 6; pistillode 0. *Fem. fl.* sepals and petals roundish; staminodes 0. *Fruit* 1 in. by nearly $\frac{1}{2}$ in. broad, orange-colrd.—An abnormal form in which the male fl. has 3 sepals, and 6 petals; 2 rows (var. *malaccensis hexapetala*, *Becc. Males.* iii. 183), was found at Perak by *Scortechini*.

2. **N. macrocarpa**, *Scortech. mss. ex Becc. Males.* iii. 180; leaves pinnate, leaflets sigmoidly falcate, spadix 3-4-branched, flowers hexastichous, male sepals subulate hardly longer than the petals, fruit elongate ellipsoid, crowned by the large deeply 3-lobed stigma, seed broadly ovoid abruptly spinescent.

PERAK; on Maxwell hill, alt. 3200-5300 ft., *Scortechini* (No. 547^a, 302^b); Goping, *King's Collector* (4775), on Gunong Batu Pateh, *Wray* (930).

Stem solitary, 6-10 ft. *Leaves* 3-4 ft.; leaflets 18-30 pairs, rigid, acuminate, lower narrow 1-nerved, 16-20 by 1-1 $\frac{1}{2}$ in., upper longer broader and 2-nerved; petiole 4-12 in.; sheath as long, smooth or subscaly. *Spathe* glabrous, purplish. *Spadix* at first erect, then spreading; peduncle short, stout; branches 7-12 in. *Male fl.* stamens 6; pistillode of 3 tubercles. *Fem. fl.* sepals ciliolate and petals suborbicular;

staminodes 6 minute teeth. *Fruit* about $1\frac{1}{2}$ in. long by $\frac{1}{2}$ in. diam., ellipsoid; stigmas 3, broad, triangular.

4. **LOXOCOCCUS**, H. Wendl. & Drude.

Stem erect, annulate. *Leaves* pinnatisect, leaflets obliquely truncate. *Spadix* infrafoliar, branched; spathes 2; flowers 3 together (a fem. between 2 males) clusters spirally arranged. *Male fl.* Sepals 3, rounded, imbricate; petals 3, much larger, ovate, valvate; stamens 9–12, filaments very short, anthers subversatile. *Fem. fl.* smaller, subglobose; sepals rounded, broadly imbricate; petals ovate, base broad imbricate, tips valvate; ovary 1-celled, stigmas 3, minute; ovule parietal. *Fruit* subglobose, cuspidately beaked, stigmas terminal; albumen ruminant; embryo subbasilar.

L. rupicola, H. Wendl. & Drude in *Linnæa*, xxxix. 185; Hook. f. *Bot. Mag.* t. 6358. *Ptychosperma rupicola*, Thw. *Enum.* 328. *Caryota mitis*, Willd. ?; *Moon Cat. Ceyl. Pl.* 64.

CEYLON; in forests of the Southern and Central Provinces.

Trunk 30–40 ft. by 4–5 in. diam. *Leaves* 6–8 ft., spreading; leaflets 12–20 pairs, 2 ft. by $2\frac{1}{2}$ in., spreading, linear, subglaucous beneath, and sparsely furfuraceous; petiole 1–2 ft., sheath very short. *Spathe* 1 ft., pale yellow. *Spadix* 1 ft., blood-red, subdeltoid; peduncle short and branches stout spreading quite glabrous; flowers in scattered clusters of 3. *Male fl.* $\frac{1}{2}$ in. diam.; filaments about equalling the anthers; pistillode minute, 3-fld. at the tip. *Fruit* about 1 in. long, globosely ovoid. *Seed* globose.

5. **PTYCHORAPHIS**, Becc.

Stem slender, annulate. *Leaves* pinnatisect, leaflets narrow, caudate-acuminate. *Spathes* 2, complete, caducous. *Spadix* infrafoliar, paniculately branched; flowers spirally disposed, male only towards the tips of the branches, a fem. between 2 males towards the base. *Male fl.* symmetric; sepals suborbicular; petals valvate; stamens 6, anthers versatile; pistillode conical or columnar. *Fem. fl.* bibracteolate; sepals rounded, concave; petals longer, tips valvate; staminodes 4–6; ovary ovoid, stigmas 3, triangular, acute; ovule parietal. *Fruit* small, ovoid, stigmas terminal. *Seed* ovoid, obtuse, deeply grooved along the long linear hilum; albumen deeply ruminant; embryo basilar, oblong.—Species 3, Malayan.

1. **P. singaporensis**, Becc. in *Ann. Jard. Bot. Buitenz.* ii. 90, t. 126; *Males.* iii. 109; stem slender, leaflets about 1 ft. long very numerous, spadix slender 5–7-branched, rachis rusty furfuraceous, fruit ovoid. *Ptychosperma singaporensis*, Becc. *Males.* i. 61. *Rhopaloblaste singaporensis*, Hook. f. in *Gen. Pl.* iii. 892. *Drymophloeus singaporensis*, Hook. f. in *Kew Gard. Rep.* (1882) 1884, 55.

SINGAPORE; Maingay (*Kew dist.* 1536). JOHORE; on Gunong Pulai, Hullett (6000), Kunstler (230).

Stem 6–12 ft. by $1\frac{1}{2}$ in. diam., soboliferous. *Leaves* 3–6 ft., regularly pinnatisect; leaflets very many, alternate, straight, about 8 by $1\frac{1}{2}$ in., 3-nerved, upper shorter, midrib beneath scaly; petiole 2– $2\frac{1}{2}$ ft. and rachis very slender, furfuraceous. *Spadix* about 1 ft., 5–7-branched from the base; flowers yellow. *Fruit* nearly $\frac{3}{4}$ in. long by $\frac{1}{4}$ in. diam., ovoid or elliptic-ovoid, tip conical, slightly excentric. *Seed* free, elliptic-ovoid, rounded at both ends, raphe branches descending to the base.

2. **P. augusta**, Becc. in *Ann. Jard. Bot. Buitenz.* ii. 90; *Males.* iii. 110; trunk very tall, leaflets numerous 2-3 ft., spadix decomposed, fruit elliptic-oblong. *Areca augusta*, Kurz in *Journ. Bot.* 1875, 331, t. 170.

NICOBAR ISLANDS; in woods in Kamorta, Kurz.

Trunk slender, 80-100 ft. by 1 ft. diam. Leaves 8-12 ft.; leaflets sessile, narrowly linear, acuminate, 3-costate; petiole very short; rachis flat above, furfuraceously tomentose. Spadix decomposed, $2\frac{1}{2}$ - $3\frac{1}{2}$ ft. Male fl. bracts broad smooth; sepals broadly ovate; petals oblong, obtuse. Fem. fl. sepals and petals nearly alike, concave, imbricate. Fruit 1 in. long, elliptic-oblong, scarlet. Seed oblong.

6. CYRTOSTACHYS, Blume.

Stems slender, cœspitose, annulate. Leaves pinnatisect; leaflets linear-lanceolate, acuminate, 1-costate. Spathes 2, complete, caducous. Spadix infrafoliar, shortly peduncled, broadly paniculately branched; branches 1-2 ft. long, stout, spreading; flowers in spirally disposed clusters of 3, a fem. between 2 males. Male fl. symmetrical; sepals orbicular, imbricate; petals valvate; stamens 12-15, exserted; anthers short, versatile; pistillode 2-fid. Fl. fem.; sepals orbicular; petals longer, broadly imbricate, tips valvate; staminodes forming a membranous cup; ovary narrowly ovoid; stigmas subulate; ovule pendulous from the tip of the cell. Fruit small, ovoid, stigma terminal. Seed adherent to the endocarp, globose, hilum apical; albumen equable; embryo basilar.—Species 2, Malayan.

1. **C. Lakka**, Becc. in *Ann. Jard. Bot. Buitenz.* ii. 141; fruit conico-ovoid gradually narrowed to the tip, seed ovoid. *C. Lakka* var. *singaporensis*, Becc. l. c.

SINGAPORE; in humid jungles.—DISTRIB. Borneo.

A slender tall soboliferous Palm. Leaves about 4 ft.; leaflets about 20 by $1\frac{1}{4}$ in., upper shorter obtuse or toothed, green above, ashy grey beneath; sheath red. Fruit $\frac{1}{10}$ in. long, by about $\frac{1}{10}$ diam.—Very near *C. Rendak* of Sumatra, which has an ovoid fruit abruptly constricted at the tip, and a globose seed.

7. ONGOSPERMA, Blume.

Prickly palms. Leaves terminal, pinnatisect. Spathes 2, complete. Spadix infrafoliar, branched; branches with solitary male flowers above, and ternate flowers below (a fem. between 2 males). Male fl. asymmetric; sepals suborbicular, acute; petals obliquely ovate, valvate. Stamens 6-12; anthers elongate; pistillode columnar, 3-fid. Fem. fl. globose; sepals and petals orbicular, imbricate; staminodes 6; ovary obliquely ovoid, 1-3-celled; stigmas minute; ovule parietal. Fruit small, globose, stigmas lateral or basal. Seed suborbicular, raphe broad; albumen deeply ruminate.—Species 5-6, Malayan.

1. **O. filamentosa**, Blume, *Rumphia* ii. 97, t. 82, 103; stoloniferous, leaflets subequidistant drooping, male fl. hexandrous, fruit spherical $\frac{1}{10}$ in. diam. *O. cambodianum*, Hance in *Journ. Bot.* (1876) 261. *Areca nigillaria*, Jack in *Mal. Misc.* ii. vii. 88 (in *Calc. Journ. Nat. Hist.* iv. 12); Griff. in *Calc. Journ. Nat. Hist.* v. 423; *Palms Brit. Ind.* 157, t. 133 B. A. Nibung, Mart. *Hist. Nat. Palm.* iii. 173, 311, t. 153.

MALAY PENINSULA; in swamps.—DISTRIB. Borneo, Cochin China.

Trunk 30–40 ft., armed with long black spines. *Leaves* many, 10–12 ft., drooping; leaflets 2 ft., narrow, acuminate, pendulous, coriaceous, many-nerved, scurfy beneath; petiole armed, scurfy. *Spathes* boat-shaped, 2-keeled, outer armed, inner velvety. *Spadix* shortly produced, peduncle slightly armed, branches many, long, flexuous, upper simple; fruiting 1–2 ft., pendulous, red-purple. *Male fl.*; sepals cuspidate, keeled; petals suddenly acuminate, tip setiferous; filaments short; anthers deeply bifid below. *Fem. fl.*; sepals and petals fleshy.

2. ***O. horrida***, Scheff. in *Natuurk. Tijdsch. Ned. Ind.* xxxii. 189; in *Ann. Jard. Buitenz.* i. 159; stoloniferous, leaflets subequidistant spreading, male fl. hexandrous, fruit spherical $\frac{3}{4}$ –1 in. diam. *Areca horrida*, Griff. in *Calc. Journ. Nat. Hist.* v. 465; *Palms Brit. Ind.* 158, t. 233 C; *Mart. Hist. Nat. Palm.* iii. 312.

MALAY PENINSULA, Griffith.—DISTRIB. Borneo.

Trunk 30–40 ft., armed. *Leaves* few, spreading, 14–16 ft.; leaflets 2–3 ft., very narrow, acuminate, spreading, coriaceous. *Spathes* 2 complete, acutely margined, outer 1–1½ ft., armed, inner cuspidate. *Spadix* with the stout peduncle armed below; branches 1–2 ft., pendulous, flexuous; fruiting with pendulous branches 2–3 ft. long. *Fruit* purplish black.—Griffith, from whom the above descriptions are taken, says of this allied to *A. tillgiaria*, but very distinct in the spathes and fruit.

3. ***O. fasciculata***, Thw. *Enum.* 328; stoloniferous, leaflets fascicled tips drooping, flowers enneandrous, fruit $\frac{1}{2}$ in. diam. Scheff. in *Ann. Jard. Buitenz.* i. 160. *Caryota horrida*, Moon *Cat. Ceyl. Pl.* 64.

CEYLON; in the Central Province, ascending to 5000 ft.

Trunk 30–40 ft. and more, 5–6 in. diam., armed. *Leaves* 18 ft.; leaflets 12–18 by 1–1½ in., lanceolate, long-acuminate, costa scaly beneath; sheath 2½ ft., armed and scurfy. *Spathes* sparingly scurfy, unarmed. *Spadix* 2 ft., unarmed, paniculately branched, dense-fl. *Male fl.* $\frac{1}{4}$ in. long. *Drupe* black-purple.

8. **IGUANURA**, Blume.

Slender unarmed palms. *Leaves* terminal, entire or pinnatisect, with broad acute or præmorse leaflets. *Spathes* 2, persistent, short. *Spadix* inter- or infra-foliar, branches spreading; flowers spirally disposed, 3-nate (a fem. between 2 males), or the upper on the branches males. *Male fl.* symmetric; sepals orbicular, imbricate; petals connate below, ovate or lanceolate, valvate; stamens 6 or 9, anthers dorsifixed; pistillode trigonous. *Fem. fl.* subglobose; sepals and petals orbicular; staminodes of 6 teeth; ovary ovoid or oblong, 1–3-celled; stigmas sessile; ovule solitary, parietal. *Fruit* small, oblong ovoid or elongate conical, stigmas subbasilar. *Seed* suberect, hilum lateral; albumen equable or ruminate.—Species 8–10, Malayan.

* *Spadix* interfoliar, very long and long peduncled, simple or with 2–3 long equal pendulous branches.

1. ***I. geonomæformis***, Mart. *Hist. Nat. Palm.* iii. 229, 178; stem slender, leaves pinnate, leaflets 6–8 pairs obliquely acuminate or præmorse and erosely toothed, spadix furfuraceous, branches thick, fruit obovoid-oblong. *Slackia geonomæformis*, Griff. in *Calc. Journ. Nat. Hist.* v. 469; *Palms Brit. Ind.* 162, t. 234.

MALACCA, rather common in forests, Griff. (*Kew distrib.* 6406; 6407), on Mt. Ophir, Hullett (851).

Stem 2-4 ft. by $\frac{1}{2}$ in., annulate. *Leaves* 3-3 $\frac{1}{2}$ by 1-1 $\frac{1}{2}$ ft., linear-oblong; leaflets linear, 1 ft. by $\frac{1}{4}$ -2 in., 2- or more-keeled, terminal forked, lobes erose-dentate; petiole 1 ft., base scurfily pubescent; sheath a span long. *Spathes* subcoriaceous, lowest 2-keeled, upper conduplicate and spadix brown-pubescent. *Spadix* with a long slender erect peduncle, and 2 or more pendulous spongy spikes or branches 6-10 in. long, loosely covered with flowers; fruiting 1-1 $\frac{1}{2}$ ft. nodding; flowers inserted in pits with membranous margins. *Male fl.* in pairs; sepals oblong, striate; petals ovate-lanceolate; filaments inflexed in bud; pistillode stout, tip 3-lobed. *Fem. fl.* towards the base of the spike; sepals of the male; petals broad; ovary gibbous. *Fruit* over $\frac{1}{2}$ in. long by $\frac{1}{2}$ diam., black-purple. *Seed* erect; albumen ruminant.

2. ***I. malaccensis***, Becc. *Males*. iii. 102; stem slender, leaves pinnate, leaflets about 5 pairs, lower falcate caudate-acuminate upper broader, petiole pubescent, spadix simple filiform, finely tomentose.

MALAY PENINSULA; Selangore, *F. Keheding*; Perak, Larut, *King's Collector* (1869, 2994).

Closely allied to *I. geonomæformis*, differing in the fewer leaflets and simple not furfuraceous but finely tomentose spadix.

** *Spadix interfoliar*, long peduncled, with few subterminal short simple or forked branches or spikes.

3. ***I. Wallichiana***, Hook. f. in *Gen. Plant.* iii. 908; leaves simple or pinnatisect, fruit globosely obovoid. *Areca Wallichiana*, Mart. in *Wall. Gat.* 8600; *Hist. Nat. Palm.* iii. 178, 312; *Becc. Males*. iii. 100.

PENANG, *Porter*. SINGAPORE, *Lobb*.

Stem solitary, 2-12 ft., straight, slender. *Leaves* very variable in size, 10 in.-2 ft. long, simple and forked or more or less; pinnatisect, with long narrow leaflets. *Spathes* 2, lower 2 $\frac{1}{2}$ in., hidden in the leaf sheath, strongly compressed, acutely 2-keeled, tip 2-toothed; upper shorter, acuminate, rusty-pubescent. *Spadix* long-peduncled; peduncle 18-24 in., branches 3-7 variable in length. *Fruit* rather more than $\frac{1}{2}$ in. long by $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., red when ripe.—The following varieties are from Perak:—

Var. α *major*, Becc.; stem 10-12 ft. by 2 $\frac{1}{2}$ -3 $\frac{1}{2}$ in. diam., leaves 2-4 ft. undivided or pinnatisect, fruit about $\frac{9}{16}$ by $\frac{1}{16}$.—*King's Collector* (431, 8227, 3127).

Var. β *minor*, Becc.; stem 18-30 in., leaves about as long simple or pinnatisect, fruit rather smaller.—*King's Collector* (454, 7941, 7996, 7999).

*** *Spadix interfoliar*, very shortly peduncled.

4. ***I. brevipes***, Hook. f.; leaves pinnate, leaflets distant broadly trapezoidly cuneate or subquadrate præmorse many-nerved coarsely toothed, spathe long deeply grooved, spadix laxly paniculate, branches divaricate lax-fld.

PERAK, Larut, 3-4000 ft., *King's Collector* (2029).

Stem thicker than a swan's quill. *Leaf* 15 in., leaflets 5 pairs, 5-6 in. long by 1 $\frac{1}{2}$ -3 broad, inserted by a contracted but very broad base, upper margin subcaudate; rachis glabrous; sheath 5 in., many-ribbed. *Spadix* with the peduncle wholly included in the leaf-sheath, quite glabrous; primary branches 3-4, 3-4 in. long, sparingly again divided, rather slender, angled (when dry). *Male fl.* scattered, about $\frac{1}{16}$ in. long; sepals orbicular; petals broadly oblong, obtuse, very coriaceous; stamens 6, filaments inflexed, anthers linear-oblong; pistillode columnar, capitate.

**** *Spadix infrafoliar*, peduncle shorter than the spathe or shortly exceeding it.

5. ***I. diffusa***, Becc. mss.; leaves large, leaflets numerous equidistant

narrow, spadix with 8-10 very spreading slender branches of which the lower are twice or thrice forked, peduncle closely embraced by the spathe.

PERAK; on Gunong Tjok, *Scortechini*.

One of the largest of the genus. *Leaves* about 3-4 ft.; leaflets very numerous, alternate and opposite, 12-15 in. by 1-1½ in., obliquely præmorse, rachis glabrous. *Spadix* about 20 in., including the 10 in. peduncle, which is closely sheathed by the persistent spathe; branches 6-10 in., filiform, divaricate.—The specimen which is very imperfect may be a luxuriant state of *I. polymorpha*.

6. ***I. polymorpha***, *Becc. Males*. iii. 189; leaves pinnatisect, leaflets trapezoid subfalcate præmorse, spadix erect, peduncle sheathed by both the spathes with 3-9 simple branches at the apex, fruit ovoid or elongate conic straight or curved.

PERAK, *Scortechini*.

Stem 3-7 ft. *Leaves* oblong, 14-16 by 8-10 in.; leaflets 10-14 on each side, obliquely præmorse and toothed, 4-5-nerved. *Spadices* often two, 12-20 in. long, erecto-patent, branches filiform, angular; peduncle 5-6 in., slightly compressed.

Var. *typica*; spadix with 3-9 branches, flowers spirally disposed, male oblong subacute, fruit $\frac{3}{4}$ - $\frac{3}{4}$ in. by $\frac{1}{2}$ in. diam., others $\frac{1}{2}$ by $\frac{1}{2}$ in., ovoid or elliptic-ovoid.—*Scortechini* (318^b).

Var. *canina*, *Becc. l. c.* 190; spadix with 7-9 branches, flowers alternate subdistichous, male ovoid acute, fem. petals twice as long as the sepals, fruit $\frac{3}{4}$ by $\frac{1}{2}$ in. elongate conical curved.

7. ***I. corniculata***, *Becc. Males*. iii. 187; leaves pinnatisect, leaflets all similar cuneately trapezoid 3-5-nerved, tip very obliquely præmorse toothed, base constricted, spadix slender undivided, peduncle closely embraced by the very slender tubular spathe, spike furfuraceous, fruit narrow elongate conical tip incurved or involute.

PERAK, alt. 3-400 ft., *Kunstler* (3131).

Stem very slender, 3-4 ft., by $\frac{1}{2}$ in. diam. or less; internodes $\frac{3}{4}$ -1½ in. *Leaves* 10-12 by 6-8 in.; leaflets 5-6, spreading like a butterfly's wings $3\frac{1}{2}$ -4 by 1-1½ in., upper margin produced into a tail, 3-4-nerved, furfuraceous beneath along the folds; petiole slender, 3-4½ in., rustily furfuraceous, as is the sheath. *Spadix* about a foot long, including the peduncle of 3-4 in.; spike rusty scurfy; flowers subspirally disposed; males very small. *Fruit* granulate, $\frac{3}{4}$ - $\frac{3}{4}$ by $\frac{1}{2}$ in.—The fruit is in shape unique in the order.

8. ***I. parvula***, *Becc. mss.*; leaves small oblong tip forked margin undulate, spadix filiform sparingly branched, peduncle about as long as the petiole more than half embraced by the spathes.

PERAK, *Scortechini*.

Stem $\frac{1}{2}$ - $\frac{1}{2}$ in. diam. *Leaves* 8-10 by 3 in.; petiole 2-2½ in.—Described from a single specimen. Possibly a very small form of *I. polymorpha*.

9. ***I. bicornis***, *Becc. Males*. iii. 188; leaves pinnatisect, leaflets sigmoidly trapezoid, spathes deciduous, spadix erecto-patent very shortly peduncled, branches 5-8 slender diffuse, fruit oblong base narrowed tipped by 2 obtuse unequal bosses.

MALAY PENINSULA; Perak, *Scortechini* (n. 1188), at Larut, alt. 12-1300 ft.; *King's Collector* (6375), alt. 3-4000 ft.

Stems tufted 5-8 ft. by $\frac{1}{2}$ in. diam.; internodes $\frac{1}{2}$ -1½ in. *Leaves* 12-16 by 4-6 in., leaflets 2-4 pairs, with a deeply bifid terminal; petiole 3-4 in., glabrous,

sheath as long, tubular, mouth truncate. *Spadix* 4-3 in., peduncle $\frac{3}{4}$ -1 $\frac{1}{2}$ in., branches 3-6 in., scattered, filiform; flowers minute. *Fruit* $\frac{1}{2}$ by $\frac{1}{3}$ in.

9. **BENTINCKIA**, *Berry*.

Unarmed Palms. *Leaves* terminal, equally pinnatisect. *Spathes* many, 2 lower short incomplete, upper 2-fid. *Spadix* interfoliar, branched; flowers minute, monœcious or polygamous, solitary or 3-nate with the intermediate female, clustered in spirally arranged pits on the branches; bracts forming a 2-lipped mouth to each pit; bracteoles 2. *Male fl.* subsymmetric, glumaceous, often reduced to ciliate scales; sepals oblong, obtuse, connate below, imbricate; petals longer, connate below into a stipes, valvate; stamens 6, anthers versatile; pistillode conical. *Fem. fl.* ovoid; sepals broad, obtuse, imbricate; petals longer, convolute; staminodes 6, minute. *Ovary* 3-celled, 1-ovuled; stigmas minute. *Fruit* small, subspherical; stigmas subbasilar. *Seed* pendulous from the top of the cavity, sinuately grooved or ridged; albumen equable.—Species 2.

1. **B. Coddapanna**, *Berry*, in *Roxb. Fl. Ind.* iii. 621; stem slender 10-20 ft., fruit subspherical. *Mart. Hist. Nat. Palm.* iii. 165, 228, t. 139; *Kunth Enum.* iii. 228; *Griff. in Calc. Journ. Nat. Hist.* v. 467; *Palms Brit. Ind.* 160; *Append.* xxvi.; *Wight in Madv. Journ. Nat. Sc.* ii. 385. *Keppleria*, *Mart. mss. ex Endl. Gen. Pl.* 25.

TRAVANCORE, *Wight*, &c.

A slender palm; stem 1 in. diam. or more, annulate. *Leaves* 3-4 ft.; leaflets 2 ft. or more by 1 in. broad, close together, linear, 2-keeled, keels paleaceous, tip usually 2-fid; lobes 2-4 in., triangular. *Spathes* membranous, lower truncate, upper complete. *Spadix* 1-2 ft., male scarlet, fem. lilac or violet; peduncle 2-3 in.; branches few, again branched, ultimate 6-10 in.; bract at the base broad; pits on the branches 3-4-fld., flowers emerging and opening singly, the upper first. *Fruit* rather compressed, about $\frac{1}{2}$ in. diam.

2. **B. nicobarica**, *Becc. in Ann. Jard. Bot. Buitenz.* ii. 165; trunk tall 60-70 ft., fruit obovoidly oblong tip rounded. *Orania nicobarica*, *Kurz in Journ. Bot.* xiii. (1875) 331, t. 171, f. 19-25.

NICOBAR ISLANDS; Kamorta, *Kurz, E. H. Man.*

Trunk annulate, 9 in. diam. *Leaves* 5-8 ft.; leaflets $\frac{1}{2}$ -2 ft., sessile, linear, coriaceous, tip obtusely 2-lobed; petiole short and rachis glabrous. *Spadix* 1 $\frac{1}{2}$ -2 ft., decompound, glabrous, branches and branchlets inserted in woolly grooves of the rachis; bracteoles densely villous within. *Fem. fl.*; sepals and petals subsimilar, broadly ovate, obtuse, shining. *Fruits* tristichously arranged, globose (sub-ovoid when dry), the size of a cherry. *Seed* ovoid-oblong, ventrally flat, dorsally convex rugosely ribbed; albumen equable; embryo lateral and apical.

10. **WALLICHIA**, *Roxb.*

Soboliferous palms. *Leaves* pinnatisect; leaflets linear or oblong, irregularly toothed, base cuneate, unicostate, nerves flabellate. *Spathes* very many, tubular, clothing the peduncle of the spadix, upper large cymbiform. *Spadicæ* interfoliar, monœcious or polygamous; males ovoid, excessively branched and dense-fld.; fem. looser-fld. *Male fl.* symmetric; calyx cylindric or cupular, membranous, truncate; corolla cylindric, deeply 3-lobed, lobes oblong, valvate; stamens 6, on the corolla-tube; filaments short, anthers large; pistillode 0. *Fem. fl.* much smaller, subglobose;

sepals orbicular, coriaceous, imbricate; petals triangular valvate; staminodes few or 0; ovary 2-3-celled, stipitate; stigmas conic; ovules subbasilar. *Fruit* ovoid-oblong, 1-3-celled and -seeded. *Seeds* erect, plano-convex; albumen equable; embryo dorsal.—Species 3 or more, Indian and Malayan.

1. **W. densiflora**, *Mart. Hist. Nat. Palm.* ii. 190, & *Suppl.* 315; leaflets oblong or linear-oblong sinuately lobed acutely toothed white beneath, fem. fl. crowded 2-bracteate, male corolla twice as long as the calyx, mouth of calyx quite entire, fem. corolla shorter than the ovary. *Kurz For. Fl.* ii. 532; *Brandis For. Fl.* 549; *Bot. Mag.* t. 4584. *W. oblongifolia*, *Griff. in Calc. Journ. Nat. Hist.* v. 486; *T. Anders. in Journ. Linn. Soc.* xi. 6. *Harina oblongifolia*, *Griff. Palms Brit. Ind.* 175, t. 237 A, B, C. *W. caryotoides*, *Wall. Cat.* 8596 B.

TROPICAL HIMALAYA from Kumaon eastwards, ascending to 3000 ft. ASSAM, the KHASIA HILLS, and CHITTAGONG.

Stems very short or 0 (or often 8-15 ft. *Kurz*); trunk sheathed, scurfy, sheaths villous, resolving into strong fibres. *Leaves* 8-10 ft.; leaflets 1-2 ft., very many, alternate or the lower 2-4-nate, 1-costate and with many parallel nerves, bright green above; sheaths scurfy. *Spathes* purple. *Spadices* 12-18 in. long, branches of fem. very stout; flowers in many spiral series; *male fl.* yellow, solitary, or the lower in pairs with an intermediate fem.; filaments adnate to the petals; *fem. fl.* purplish; calyx very short, corolla-lobes obtuse. *Fruit* about $\frac{1}{2}$ in. long, dull purple.

2. **W. caryotoides**, *Rorb. Cor. Pl.* iii. t. 295; leaflets oblong or linear-oblong panduriformly excised and acutely toothed white beneath, fl. fem. distant 3-bracteate, male corolla half as long as the calyx, mouth of calyx 3-toothed, fem. corolla about twice as long as the ovary. *Mart. Hist. Nat. Palm.* ii. 180, t. 136; *Wall. Cat.* 8596 A; *Griff. in Calc. Journ. Nat. Hist.* v. 485; *Kurz For. Fl.* ii. 532; *Miq. Fl. Ind. Bat.* iii. 34. *Harina caryotoides*, *Ham in Mem. Wern. Soc.* v. 317; *Griff. Palms Brit. Ind.* 174, t. 237. *Wrightia caryotoides*, *Rorb. Hort. Beng.* 63; *Fl. Ind.* iii. 621.

CHITTAGONG, and BURMA, in hill forests, ascending to 4000 ft.

Habit of *W. oblongifolia*, and very similar in foliage and inflorescence, but differing in the characters given above and in the fruit, which *Kurz* describes as being as large as a nutmeg, ovoid-oblong, rarely 2-seeded.—(*Roxburgh* says as large as a coffee bean.)

3. **W. disticha**, *T. Anders. in Journ. Linn. Soc.* xi. 6; trunk tall stout, leaves distichous, leaflets fascicled linear narrowed to the base præmorse denticulate, male calyx cupular 3-lobed, corolla thrice as long, fem. corolla longer than the ovary. *W. Yomæ*, *Kurz For. Fl.* ii. 533. *Caryota mitis*, *Herb. Calcutt.*

SIKKIM HIMALAYA, in tropical gorges, *T. Anderson*, and probably eastwards. *PEGU*; *Kurz*.

Trunk 10-15 ft. by 5-6 in. diam., naked, annulate. *Leaves* 6-10 ft., alternate erect; leaflets narrowing from near the truncate apex to the base and with a large tooth on each side about the middle, 1-2 ft., by 2-2½ in., glaucous beneath; petiole and sheath short, scurfy. *Male spadix* 3-4 ft., very narrow, linear in outline, with innumerable recurved slender crowded branches. *Fem. spadix* 6-8 ft., pendulous; branches stout, simple; flowers disposed in many spiral series, green. *Fruit* oblong, top obscurely 2-3-lobed, reddish.—*Kurz* describes the leaves as disposed in a $\frac{1}{2}$ spiral.

11. **DIDYMOSPERMA**, *H. Wendl. & Drude.*

Small low palms. *Leaves* terminal, unequally pinnatisect; leaflets few, trapezoid, erose, uni-costate, nerves flabellate. *Spathes* many, sheathing the peduncle of the spadix. *Spadix* interfoliar, stout and simple, or slender and branched; monœcious or dioecious; flowers rather large. *Male fl.* symmetric; calyx cupular, 3-fid, imbricate; petals coriaceous valvate; stamens 10-30, anthers linear, erect; pistillode 0. *Fem. fl.* subglobose; sepals rounded, coriaceous; petals thick, triangular, incurved, valvate; staminodes 0. *Ovary* depressed, 3-gonous, 2-3-celled, stigmas conical; ovules basilar. *Fruit* ovoid or oblong, 1-2-celled and -seeded, stigmas terminal. *Seeds* erect, oblong, plano-convex; albumen equable; embryo dorsal.—Species 6, Malayan and Indian.

1. **D. Hookeriana**, *Becc. Males.* iii. 186; stem slender, leaves small long-petioled white beneath, some oblong from a cuneate base, some entire or lobed, others pinnatisect with obovate oblong or trapezoid long-tailed leaflets shortly ansate at the base, spadix filiform.

MALAY PENINSULA; Perak, *Scortechini*, No. 229b. 136b.) *King's Collector* (n. 2446).

Stem 3-4 ft., solitary or tufted, $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. *Leaves* extremely variable, 12-30 in. long; petiole slender; sheath furfuraceous. *Spadices* about 8 in. long, sheathed with 5-6 spathes; flowers spirally disposed in clusters of 3; *male fl.* oblong, subclavate, top rounded. *Fruit* unripe, globose.

2. **D. hastata**, *Becc. Males.* iii. 99.; stem slender, leaf-sheaths scurfily hispid, leaflets 6-7 terminal trapezoid, lateral petiolulate trapezoid caudate-acuminate, base hastate and ansate, spadices filiform nodding.

MALACCA, at Selangore, *F. Keheding*. PERAK, Larut, *King's Collector* (3125).

Stem 3 ft., solitary or sparingly tufted. *Leaves* $1\frac{1}{2}$ -2 ft.; terminal leaflet $4\frac{1}{2}$ -6 in. by 1-2 in., lateral rather longer and broader, lower margin straight, anterior sinuate-toothed. *Spadix* 1 ft. long; *male fl.* $\frac{1}{8}$ in.—Habit, &c., of *D. Hookeriana*, but the leaf-sheaths are brown scurfy, as are the leaflets more or less beneath, and the latter have broadly cuneate more or less ansate bases; petiolule 1 in. and more.

3. **D. nana**, *H. Wendl. & Drude in Kerchov. Palm.* 243; leaves pinnatisect, leaflets about 5, terminal flabelliform, lateral opposite obliquely trapeziformly lanceolate acuminate not caudate irregularly lobed and toothed, pale beneath, spadices erect very stout simple or sparingly branched rustily scurfy dense-fld. *Hook. f. Bot. Mag. t.* 6836. *Wallichia nana*, *Griff. in Calc. Journ. Nat. Hist. v.* 488; *Mart. Hist. Nat. Palm.* 190, t. 315; *Miq. Fl. Ind. Bat. iii.* 34. *Harina nana*, *Griff. Palms Brit. Ind.* 176, t. 238 A, B.

ASSAM and the KHASIA HILLS, ascending to 4000 ft.

Stem 3-5 ft., clothed with rusty leaf-sheaths, petioles and spathes. *Leaves* 18 in. -2 ft.; leaflets 1-3 pairs, terminal flabellate, variously lobed, lateral 7-10 by 3-5 in., also variously lobed. *Fem. fl.* $\frac{1}{3}$ in. diam. *Fruit* $\frac{1}{2}$ in. long, oblong, white.

4. **D. gracilis**, *Hook. f.*; stem very slender leafy upwards, leaflets 6-8 lateral broadly cuneate below the middle above it triangular or 3-lobed or truncate and acutely toothed, fem. spadix slender erect 3-branched; fruit elongate ovoid obtuse base rounded, seed elliptic-oblong concavo-convex.

ASSAM; Daphla hills, Booth.

Stem 2 ft., about as thick as a duck's quill. *Leaves* 8–18 in., rachis and petiole very slender; leaflets 1–3½ in. long and broad, white beneath. *Spadix* fruiting, 8 in., sheathed below the middle with narrow long terete glabrous striate spathes; lateral branches (or spikes) 3 in., terminal 4 in. long. *Fruit* ¾ by ½ in. diam. rather curved. *Seed* ¾ in. long, equally narrowed at both obtuse ends; raphe very obscure; albumen equable.—Apparently a very distinct species, found by Mr. Booth, Mr. Nuttall's collector in Assam.

12. ARENGA, Labill.

Tall stout palms, flowering first from an upper leaf-axil, and successively from lower; trunk densely clothed above with fibrous remains of the leaf-sheaths. *Leaves* terminal, long, pinnatisect; leaflets long, linear, usually præmorse, unicostate, base 1–2-auricled. *Spathes* many, clothing the peduncle of the spadix. *Spadices* interfoliar, large, much branched, peduncle short decurved, branches slender pendulous; male and fem. flowers usually solitary and in separate spadices, rarely 3-nate a fem. between 2 males. *Male fl.* symmetric; sepals orbicular, imbricate; petals oblong, valvate; stamens numerous, filaments short, anthers apiculate; pistillode 0. *Fem. fl.* subglobose; sepals accrescent; petals triangular, valvate; staminodes many or 0; ovary subglobose, 3-celled, stigmas conic. *Fruit* obovoidly globose, 2–3-seeded; stigmas terminal. *Seeds* compressed or plano-convex; albumen equable; embryo dorsal.—Species about 10, trop. Asia, Malaya and Australia.

1. *A. saccharifera*, Labill. in *Mem. Inst. Fr.* iv. 209; trunk tall very stout, leaflets 4-fariously fascicled linear lobed and variously toothed towards the tip, base 1–2-auricled white beneath, male buds obtuse. *Mart. Hist. Nat. Palm.* 191, t. 108 and 161, f. 4; *Miq. Fl. Ind. Bat.* iii. 35; *Kurz For. Fl.* ii. 534; *Griff. in Calc. Journ. Nat. Hist.* v. 472; *Palms Brit. Ind.* 164, t. 135 A. A. Griffithii, *Seem. ex H. Wendl. in Kerchov. Palm.* 232. *Saguerus Rumphii*, *Roxb. Fl. Ind.* iii. 626. *S. saccharifer*, *Wurmb. Verh. Bat. Genootsch.* i. 350; *Blume, Rumphia*, ii. 128, t. 123–4. *Gomutus saccharifer*, *Spreng. Syst.* ii. 622. *Borassus Gomutus*, *Lour. Fl. Cochinch.* ii. 759.

ASSAM, PEGU, BURMA, and the MALAY PENINSULA.—DISTRIB. E. Asia and Malaya.

Trunk 20–40 ft. *Leaves* very many, 20–28 ft.; leaflets up to 115 on each side, 3–5 ft. long, sessile, linear, coriaceous, costa stout, scurfy beneath; petiole scurfy. *Male spadix* 4–5 ft., simply branched, flowers oblong-clavate purple 1 in. long and less. *Fem. fl.* solitary, 1 in. diam. *Fruit* 2–2½ in. long, oblong-turbinate, base narrowed, top rounded or depressed.

2. *A. obtusifolia*, *Mart. Hist. Nat. Palm.* 191, t. 147, 148, 161; trunk tall very stout, leaflets bifarious linear narrowed and truncate 2-lobed or toothed at the tip white beneath, base 1- or ex-auricled, male buds acute. *Miq. Fl. Ind. Bat.* iii. 36. *A. Westerhoutii*, *Griff. in Calc. Journ. Nat. Hist.* v. 474; *Palms Brit. Ind.* 166, t. 235 B, C, D; *Mart. l. c.* 192; *Miq. l. c.* 37. *Saguerus Langkab*, *Blume Rumph.* ii. 131, t. 96, 125. *Gomutus obtusifolius*, *Blume mss.*

PENANG, *Lewes*. MALAY PENINSULA, at Naning, *Westerhout*.

Very nearly allied to *A. saccharifera*, distinguished by the arrangement of the leaflets, which according to Griffith are bifarious with deflexed tips, the upper alone

auricled and only on one side, the acute male buds, and by the oblong fruit narrowed at both ends.

3. **A. Wightii**, *Griff. in Calc. Journ. Nat. Hist.* v. 475; *Palms Brit. Ind.* 167, t. 235 E; trunk short stout soboliferous, leaflets alternate crowded linear 2-auricled at the base, tip narrowed unequally 2-lobed and toothed white beneath, male buds acute.

The DECCAN PENINSULA; Coimbatore, *Wight*; Nilghiri hills, alt. 3000 ft., *Gamble*.

Trunk 3-8 ft. *Leaves* 12-28 ft.; leaflets linear-ensiform, 3-3½ ft. by 1½-2 in., margins sparingly toothed from the middle upwards; lower auricle very large, overlapping the petiole; petiole 6-8 ft. *Spadices* 4 ft., peduncle 2 ft. *Fruit* about the size of a crab-apple, globose turbinate, broader than long.

13. **CARYOTA**, *Linn.*

Tall palms, soboliferous or not, flowering from the upper leaf-sheaths, and successively from lower (alternately male and fem.); trunk naked or sheathed. *Leaves* few, very large, broad, bipinnatisect; leaflets very obliquely dimidiately flabelliform, or cuneiform, præmorse or rounded at the tip, petiolules or bases swollen at the insertion. *Spathes* 3-5, incomplete; tubular. *Spadices* interfoliar, shortly peduncled, much fastigiate branched; branches slender, pendulous; flowers solitary and male, or 3-nate with the intermediate fem. *Fem. fl.* symmetric; sepals rounded, imbricate; petals linear-oblong, valvate; stamens very many, filaments very short, anthers long. *Fem. fl.* subglobose, sepals rounded, imbricate; petals rounded, valvate; ovary 3-celled, stigma 3-lobed, ovules erect. *Fruit* globose, 1-2-seeded, stigma terminal. *Seeds* erect; albumen ruminate; embryo dorsal.—Species about 10, tropical Asiatic, Malayan and Australian.

1. **C. urens**, *Linn. Fl. Zeyl.* 187; trunk stout tall not soboliferous, leaflets cuneiform very obliquely truncate acutely serrate-toothed, upper margin produced and caudate, male buds cylindric about 3 times as long as broad, stamens 40-45, fruit $\frac{3}{4}$ - $\frac{3}{4}$ in. diam., base apiculate, testa adherent. *Gærtn. fruct.* i. 20, t. 7; *Roxb. Fl. Ind.* iii. 625; *Mart. Hist. Nat. Palm.* 193, t. 107 and 108, and 162; *Griff. in Calc. Journ. Nat. Hist.* v. 479; *Palms Brit. Ind.* 160; *Thw. Enum.* 329; *Dalz. & Gibs. Bomb. Fl.* 278; *Miq. Fl. Ind. Bat.* iii. 41.—*Rheede Hort. Mal.* i. t. 11.

Throughout the HOTTER PARTS OF INDIA, from the Sikkim Himalaya and Assam southwards to Ceylon and Singapore—DISTRIB. Trop. Asia, Malaya.

Trunk 30-40 ft. 1 ft. diam., annulate. *Leaves* 18-20 by 10-12 ft., leaflets 5-6 ft., curved and drooping, pinnules 4-8 in., broadly cuneate, upper narrower, outer margin caudate; petiole very stout. *Spadix* 10-12 ft. long; *spathes* 1½ ft.; branches all reaching the same level; flowers 3-nate, a fem. between two males; male ½ in. long, or more. *Fruit* reddish.

2. **C. obtusa**, *Griff. in Calc. Journ. Nat. Hist.* v. 480; *Palms Brit. Ind.* 170; glabrous, trunk tall stout not soboliferous, leaflets very obliquely cuneiform crenate, upper margin not caudate, male buds about as long as broad, stamens very many, fruit $\frac{3}{4}$ -1 in. diam., base not apiculate. *Mart. Hist. Nat. Palm.* iii. 195. *C. obtusidentata*, *Griff. Palms Brit. Ind.* 236 A, B.

UPPER ASSAM; Mishni Mts., alt. 3-4000 ft., *Griffith*.

Habit and stature of *C. urens*, from which it differs in the more rounded and crenate apex of the leaflets, in the shorter unexpanded male flowers and slightly in the fruit.

Var. *æquatorialis*, Becc. mss.; pinnules more acute more deeply crenate or serrate, male fl. larger, stamens more than 100. ? *C. ochlandra*, *Hance in Journ. Bot.* 1879, 174.—Malay Peninsula; Perak, *Wray* (n. 1239). Malay Islands, China.

3. *C. mitis*, *Lour. Fl. Cochinch.* ii. 569; stem low soboliferous, petioles leaf-sheaths and spathes scurfily villous, leaflets very obliquely cuneiform erose and toothed, upper margin acute, spadix branches scurfy, male buds cylindric, stamens about 15–25. *Mart. Hist. Nat. Palm.* iii. 195; *Kunth Enum.* iii.; *C. sobolifera*, *Wall. Cat.* 8594; *Mart. l. c.* iii. 194, t. 107, f. 2; *Griff. in Calc. Journ. Nat. Hist.* v. 481; *Palms Brit. Ind.* 171, t. 236 C; *Miq. Fl. Ind. Bat.* iii. 41; *Kurz. For. Fl.* ii. 530. *C. urens*, *Jacq. Fragm.* 20, t. 12, f. 1. *C. nana*, *Wall. Cat.* 8595. *C. furfuracea*, *Blume in Mart. l. c.* 195; *Rumphia*, ii. 141 (*excl. var. caudata*). *C. propinqua*, *Blume in Mart. l. c.* 195, in *Rumphia l. c.* 138, t. 155 (*partim*) 162. *C. Griffithii*, *Becc. in Nuov. Giorn. Bot. Ital.* iii. 15.

BURMA; from Arracan southwards, and the MALAY PENINSULA, PENANG and the Andaman Islands.—DISTRIB. Malay Islands.

Stem 15–25 ft. by 4–5 in. diam. *Leaves* 4–9 ft., pinnules 4–7 in., irregularly toothed. *Spadix* as in *C. urens*, but much smaller, with fewer unequal scurfy branches, and much smaller flowers, the males about $\frac{1}{2}$ in. long. *Stamens* apiculate. *Staminodes* 3, tips glandular. *Fruit* $\frac{1}{2}$ in. diam., blueish black. *Seed* globose, testa loose.

14. ORANIA, Zippel.

Tall, stout, unarmed palms. *Leaves* terminal, equally and regularly pinnatisect; leaflets linear, tips obliquely lobed or torn, strongly uncostate; petiole stout, sheath short. *Spathes* 2, lower short, tubular, compressed; upper large, clavate, cleft longitudinally. *Spadix* interfoliar, elongate, shortly peduncled, branches slender fastigiate; flowers minute, upper or all male, lower or all 3-nate, a fem. between 2 males. *Male fl.* subsymmetric; calyx minute, 3-fid; petals oblong or lanceolate, valvate; stamens 3 or 6, filaments subulate, anthers erect slits extrorse; pistillode conic. *Fem. fl.* larger, ovoid; calyx membranous, 3-fid; petals ovate, obtuse, valvate; staminodes 3 or 6; ovary 3-gonous, 3-celled, stigmas recurved; ovules pendulous. *Fruit* globose, 1–3-celled, stigmas basilar. *Seed* globose, testa spongy, adherent to the endocarp; albumen equable; embryo dorsal.—Species about 5, tropical Asiatic and Malayan.

1. *O. macrocladus*, *Mart. Hist. Nat. Palm.* iii. 186, t. 177, f. 1; flowers all 3-nate, a fem. between 2 males, more or less distichously arranged, stamens 6. *Becc. in Ann. Jard. Bot. Buitenz.* ii. 152, 164, t. 13. *Macrocladus sylvicola*, *Griff. in Calc. Journ. Nat. Hist.* v. 489; *Palms Brit. Ind.* 177, t. 239 A, B.

MALAY PENINSULA; Malacca, in the Ching forests, *Griffith*.—DISTRIB. JAVA.

Trunk 40 ft.; crown densely leafy, subhemispheric. *Leaves* 12–15 ft., subovate in outline; leaflets 2½–3 ft. by 2 in., white and scurfy beneath; petiole 5 ft. *Spathes* and spadix scurfy. *Spadix*, paniculately branched, nodding, branches slender; flowers white. *Fruit* 1½–1¾ in. diam., smooth, whitish.

15. **NIPA**, *Wurm.*

A prostrate æstuarial gregarious palm; stem (or rootstock) branched. *Leaves* pinnatisect; leaflets lanceolate, plicate. *Spathes* many, sheathing. *Spadix* terminal, branched, erect, fruiting drooping; flowers monœcious, male in catkin-like lateral branches of the spadix, female in a globose terminal head, perianth glumaceous. *Male fl.* minute mixed with setaceous bracteoles; sepals linear, with broad truncate inflexed tips, imbricate; petals smaller; stamens 3, filaments cuneate, anthers linear basifixed; pistillode 0. *Fem. fl.* much larger; sepals 6, rudimentary, displaced; staminodes 0; carpels 3, tips free, each with an oblique stigmatic line; ovules 3, erect. *Fruit* large globose, syncarp of many obovoid hexagonal 1-celled 1-seeded carpels, with pyramidal tips and infra-apical stigmas, pericarp fleshy and fibrous, endocarp spongy and flowery. *Seed* erect, grooved on one side, testa coriaceous viscid within, and adherent to the endocarp, hilum broad; albumen equable, hollow; embryo basilar, obconic.

1. **N. fruticans**, *Wurm.* in *Verh. Bat. Genootsch.* i. 349; *ex Blume Rumph.* ii. 72; iii. 164, 165; *Mart. Hist. Nat. Palm.* iii. 305, t. 208; *Lam. Illustr.* t. 897; *Labill. in Mem. Mus. Par.* v. t. 21, 22; *Gaud. Voy. Bonite*, t. 67; *Kunth Enum.* iii. 110, 589; *Miq. Fl. Ind. Bat.* iii. 150; *Griff. Notul.* iii. 168; *lc. Pl. Asiat.* 244; *Roxb. Fl. Ind.* iii. 650; *Thw. Enum.* 327; *Kurz. For. Fl.* ii. 541.

From the SUNDERBUNDS, southwards to the MALAY PENINSULA. CEYLON.—DISTRIB. Malay Archip. and Australia.

Trunk or rootstock very stout. *Leaves* 15–30 ft.; leaflets 4–5 ft., rigid, glaucous beneath; petiole 4–5 ft., very stout. *Spadix* 4–7 ft.; peduncle 3–4 ft. *Fruit* as large as a man's head; carpels 4–6 in. long, smooth, brown.—Not recorded as existing in either coast of the Deccan Peninsula.

16. **PHŒNIX**, *Linn.*

Low or tall diœcious palms. *Leaves* pinnate; leaflets lanceolate or ensiform, sides induplicate. *Spadices* usually several, interfoliar, erect or drooping in fruit, branched; spathe basilar, complete, coriaceous: flowers small, yellowish, coriaceous. *Male fl.*, calyx cupular 3-toothed; petals 3, obliquely ovate, valvate; stamens 6 (3–9), filaments subulate, anthers erect, dorsifixed; pistillode minute or 0. *Fem. fl.* globose, calyx of the male, accrescent; petals rounded, imbricate; staminodes 6, or a 6-toothed cup; carpels 3, free, stigmas sessile, uncinat; ovules erect. *Fruit* oblong, terete, 1-seeded, stigma terminal, pericarp fleshy, endocarp membranous. *Seed* oblong, ventrally grooved; albumen equable or sub-ruminate, embryo dorsal or subbasilar.—Species 10 or 11, African and Asiatic.

The following attempt at diagnosing the Indian species of *Phœnix* is tentative, and awaits much further knowledge of the living plants before it can be accepted as trustworthy. The true Date, *P. dactylifera*, has been introduced into Sindh and N.W. India.—J. D. H.

* Embryo ventral.

† *Stem* tall, (or short in *P. zeylanica*).

1. **P. sylvestris**, *Roxb. Hort. Beng.* 73; *Fl. Ind.* iii. 787; trunk solitary stout, petiole spinous, leaflets 1-2 ft. fascicled 2-4-farious rigid glaucous green, male spadix 2-3 ft., fruit 1-1½ in. long, terete. *Mart. Hist. Nat. Palm.* iii. 276 (excl. syn. *Linn. & Kaempf.*) 326, t. 136. *Kunth Enum.* iii. 255; *Wall. Cat.* 8602; *Griff. in Calc. Journ. Nat. Hist.* v. 350; *Palms Brit.* 141, t. 228 A; ? *Dalz. & Gibs. Bomb. Fl.* 278; *Brund. For. Fl.* 554; *Kurz, For. Fl.* ii. 535; *Becc. Males.* iii. 347, 364, t. 43, f. 3. *Elate sylvestris*, *Linn. Sp. Pl.* 1189, in part. *Katon Indel, Ham. in Trans. Linn. Soc.* xv. 86.—*Rheede Hort. Mal.* iii. t. 22, 25.

Cultivated throughout the plains of INDIA and BURMA. Wild in the Indus basin, *Aitchison*.

Trunk 25-40 ft., clothed with the persistent bases of petioles. *Leaves* 10-15 ft., quite glabrous. *Spathes* 12-16 in., scurfy, petiole short. *Spadices* erect, fruiting inclined with spreading branches; branches of male filiform; male fl. ¼-½ in. long. *Fruiting peduncle* short, 6 in. or more. *Fruit* orange yellow, seed rounded at both ends, pale brown.—Very near *P. dactylifera* and possibly the origin of that plant, of which the leaflets point more forward and are of a brighter green, and the seeds are acute at both ends, but most variable in this respect and often imperfect. The Bombay Flora is cited above with doubt, as its authors imply that the leaflets are not fascicled. They say "Roxburgh says the leaflets are fascicled, this is surely a mistake." They mention another species as growing in the Hewra Garden, and brought from the Ghats, with a stem 6-8 ft. high, and leaves more slender and delicate than *sylvestris* and *acaulis*. The *Elate sylvestris* of *Linnæus* includes this and a Ceylon palm (see *P. zeylanica*).—*Griffith* observes that *Rheede's* figure represents the fruit as very much smaller and of a different shape from that of the Bengal plant. The whole subject wants a careful study.

2. **P. zeylanica**, *Trimen in Journ. Bot.* 1885, 267; *Syst. Cat. Zeyl. Fl.* 96; stem 14 ft. or less, leaflets subequidistant quadrifarious bright green rigid, fruiting spadix with long slender spreading branches, fruit scarlet then dark purple. *P. zeylanica*, *Hort; Hook. f. in Kew Report*, 1882, 63. *P. sylvestris*, *Thwaites Enum.* 329. *P. pusilla*, *Gærtner. Fruct. i.* 24, t. 9; *Mart. Hist. Nat. Palm.* iii. 273, 321, t. 136 (partly as to descr., and excl. figs. x, xi, in t. W., and 1-15 in t. 124). *Elate sylvestris*, *Linn. Sp. Pl.* 1189 (the Ceylon plant only).

CEYLON; in shady woods.

Stem 8-20 ft., rarely much shorter. *Leaves* rather short; leaflets very many, not fascicled, 7-10 in., pungent, spreading at right angles. *Fruit* ½ in. or rather more, ½ in. diam. *Seed* nearly as long, with the groove dilating into a canal of various forms.—(*Trimen's* appropriate name should replace *Gærtner's* misleading one, even if *Gærtner* had been right in assuming his plant to be the "*Palma dactylifera aculeata minima*" of *Plum. Gen. Amer.* 3, which he cites doubtfully as a synonym, and which is an American plant.—*J. D. H.*)

3. **P. rupicola**, *T. Anders. in Journ. Linn. Soc.* xi. 13; trunk solitary slender naked, leaflets 1½ ft. bifarious and not fascicled flaccid bright green, fem. spadix 3-4 ft. long peduncled, fruit ¾ in. long. *Becc. Males.* iii. 348, 395. *P. Andersoni*, *Cat. Hort. Calcut.* No. 119 (1886-7), p. 29 ?; *Gard. Chron.* 1877, ii. 45, fig. 4.—*Phœnicoidea*, *Griff. Journals*, 46.

SIKKIM HIMALAYA, alt. 400-1400 ft., *Anderson*. ASSAM and the MISHMI HILLS, *Griffith*.

Trunk 15-20 ft. by 8 in. diam. *Leaves* 10 ft., quite glabrous; petiole compressed. *Spadices* elongated, much compressed, females with a few fascicled spikes on the acute margins near the apex; *spathe* 1 ft. long. *Fruit* oblong, shining,

yellow. Seed $\frac{1}{2}$ – $\frac{2}{3}$ in. long; groove dilated inwards.—The numerous bright green decurved leaflets all in one plane, are peculiar to this beautiful species.

†† Stem normally very short or 0 (sometimes elongate in *P. humilis*).

4. *P. acaulis*, Buch. ex Roxb. *Fl. Ind.* iii. 783, *Hort. Beng.* 73; stem bulbiform, leaflets in subopposite fascicles multifarious subglaucous, spathes 6–8 in., rigid, spadix and its peduncle very short, and branches erect very stout, fruit $\frac{1}{2}$ in. long. *Ham. in Trans. Linn. Soc.* xv. 87; *Kunth Enum.* iii. 257; *Griff. in Calc. Journ. Nat. Hist.* v. 345; *Palms Brit. Ind.* 137, var. *melanocarpa*, *ll. cc.* 346, 138, t. 227; *Mart. Hist. Nat. Palm.* iii. 274, 321; *Dalz. & Gibs. Bomb. Fl.* 278; *Brandis, For. Fl.* 555; *Becc. Males.* 348, 397, t. 44, iv. f. 51–57; *Wall. Cat.* 8602 C.

NORTHERN and CENTRAL INDIA; from Kumaon eastwards to the KHASIA HILLS and BURMA.

Stem 6–10 in. diam., densely clothed with sheaths and bases of petioles. *Leaves* 2–6 ft.; pinnules $\frac{1}{2}$ –1 $\frac{1}{2}$ ft., very rigid; marginal nerve very strong; petiole 1 ft. or more with many spines. *Spadix* 6–10 in., compressed, rather longer than the lanceolate obtuse spathe, branches very stout; male fl. $\frac{1}{4}$ – $\frac{1}{2}$ in. long. *Fruit* elliptic-oblong, mucronate, bright red to blue black. *Seed* $\frac{1}{4}$ – $\frac{1}{2}$ in. long, groove broad.

5. *P. farinifera*, Roxb. *Cor. Pl.* i. 55, t. 74; *Hort. Beng.* 73; *Fl. Ind.* iii. 785; stem very short, leaflets subopposite 4-farious ensiform rigid pungent dark green, fruiting spadix 8–12 in., branches spreading, drupe small black. *Mart. Hist. Nat. Palm.* iii. 274 (excl. syn. *pusilla*); *Griff. in Calc. Journ. Nat. Hist.* v. 348; *Palms Brit. Ind.* 140 (excl. syn.); *Brand. For. Fl.* 556; *Stevens. in Proc. Agric. Hort. Soc. Madras*, N.S. iv: (1886) 346. ? *P. pusilla*, *Trim. in Journ. Linn. Soc.* xxiii. 173; *Becc. Males.* 349, 402, t. 44, f. 28–37.

COROMANDEL coast, not far from the sea. CEYLON, in the north part of the island.

Shrubby; stem at most 4 ft., thickly clothed with old leaf sheaths. *Petiole* with one or more pairs of spines. *Spathes* leathery smooth, marcescent. *Spadix* 8–12 in., much branched; male fl. $\frac{1}{2}$ in. long. *Fruit* the size of a large French bean, pulp sweet and mealy. *Seed* pretty smooth, brown, grayish within.—Roxburgh, who is the only sure authority for this species, does not give the length of the fruiting peduncle, of the spathe, or of the petiole. The stem, he says, has a farinaceous pith. Mr. Stevenson observes that the foliage is so spinous that it is impossible to walk through clumps of this species.

6. *P. humilis*, Royle *Ill.* 394, 397, 399; stems short tufted (and bulbiform?) rarely elongate, leaves subglaucous, leaflets scattered interruptedly fascicled, fruiting spadix long-peduncled, branches spreading rather slender, fruit oblong, pericarp thin. *Becc. Males.* iii. 347, 373.

Hilly districts of INDIA; from Kumaon eastwards to Burma, and southwards to Malabar.—DISTRIB. China, Cochin China.

Neither the published description nor available collections suffices to distinguish this satisfactorily by habit and foliage from *P. acaulis*, though it is doubtless a different species, and easily recognized when in flower and fruit. According to Royle (who gives no description) both inhabit Kumaon, as both do the Khasia hills. The following forms are referred to it by Beccari, besides the var. ϵ , *P. Hanceana*, of China, and his remarkable *Parusnath* var. γ , *robusta*, which I discovered in 1848, and which cannot, I think, be included.—*J. D. H.*

Var. *a*, *typica*, Becc. l.c. 347, 379, t. 44, and ii. f. 22-24; stem short or moderately long, leaflets elongate pale green in usually remote fascicles, fruiting peduncle usually very long, fruit rather long, groove of seed very short. *P. humilis*, Royle l.c. *P. Ouseleyana*, Griff. in *Calc. Journ. Nat. Hist.* v. 347; *Palms Brit. Ind.* 139. *P. sylvestris*?, Wall. Cat. 8602 B.—Outer Himalaya, alt. 1-5000 ft., from Kumaon eastwards. Assam (*Jenkins*), the Khasia hills and Central India; at Chota Nagpore, Cal. *Ouseley*.—Griffith describes *P. Ouseleyana*, from an Assam specimen, as having the ovoid bulbous stem of *P. acaulis*, a foot long by 6 in. diam., leaves $2\frac{1}{2}$ -3 ft., leaflets very narrow indeed and strongly conduplicate 1 ft. long by (owing to the conduplication) $\frac{1}{4}$ in. broad, lower spinescent, male spadix 1 ft. rather longer than the spathe, fem. spadix 2-2 $\frac{1}{2}$ ft. much longer than its spathe with few terminal long flexuose spikes, male fl. $\frac{1}{4}$ in. long (in Sikkim specimen). The seeds examined are from Sikkim, $\frac{3}{8}$ - $\frac{1}{2}$ in. long, with a broad groove.

Var. *b*, *Lourierii*, Becc. l.c. 348, 379, t. 44, ii. f. 16, 17; stem short or very short, leaflets subglaucous often approximate mostly falciform, fruiting peduncle elongate, fruit ovoid. *P. Loureirii*, *Kunth Enum.* iii. 257. *P. pusilla*, *Lour. Fl. Cochinch.* 614 (non *Gærtn.*). *P. Roeberlinii*, O'Brien, in *Gard. Chrou.* 1889, ii. 475, 758, fig. 68.—Assam, the Khasia Hills, Burma, Munnipore, Cochin China.

Var. *d*, *pedunculata*, Becc. l.c. 379, 387, t. 44, f. 13-15, 18-21, 25-27; stem short, pinnæ subglaucous more or less fascicled, spathe 8 in. long, margin fringed, fruiting peduncle very long, fruit small oblong-ovoid black, groove of seed usually dilating into a canal. *P. pedunculata*, *Palms Brit. Ind.* 139. *P. acaulis*, *Miq. Pl. Hohen. Nilg.* No. 1243.—Western Ghats, from the Concan southwards, ascending to about 6000 ft. on the Nilghiri hills, *Wight*, &c.—Griffith describes this as soboliferous, with leaves 4-5 ft., leaflets 1 ft., petiole bearing solitary or fascicled spines, male spadix about a span long, fem. a little longer, with a very long fruiting peduncle, fruit $\frac{1}{2}$ - $\frac{2}{3}$ in. by $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.—Mr. J. Steavenson (*in Journ. Agric. Hort. Soc. Madras*, N.S. (1866), 337), observes that this is a graceful pale green palm, with the stem never more than a foot or so high. The seeds described above are from Nilghiri specimens and are $\frac{1}{3}$ - $\frac{1}{2}$ in. long. Specimens, presumably of this var., sent by Mr. Talbot from N. Canara, have spathes 8 in. long, with a deep brown fringe of matted woolly hairs; fruit black; seeds $\frac{1}{2}$ - $\frac{3}{4}$ in. long groove narrow hardly dilated within.

** Embryo basilar.

7. *P. paludosa*, *Roxb. Hort. Beng.* 75; *Fl. Ind.* 789; gregarious, subarborescent, leaflets opposite and alternate bifarious ensiform with filiform tips whitish or farinose beneath, branches of spadix spreading, fruit ovoid black. *Mart. Hist. Nat. Palm.* iii. 272, 320, t. 136; *Kunth Enum.* iii. 256; *Wall. Cat.* 8603; *Griff. in Calc. Journ. Nat. Hist.* v. 353; *Palms Brit. Ind.* 144, t. 229 A, B; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 202; *For. Fl.* ii. 536; *Brandis, For. Fl.* 556; *Gamble, Man. Ind. Timb.* 419. *P. siamensis*, *Miq. Palm. Archip. Ind.* 14.

Aestuarial shores from BENGAL to BURMA and the ANDAMAN ISLANDS—DISTRIB. Siam, Cochin China.

Trunks 8-25 ft., often inclined, soboliferous, annulate, 12-18 in. diam. Leaves 8-10 ft., leaflets 1-2 ft.; petiole 3-5 ft., slender, scurfy, with many long spines, sheath fibrous. Male spadix with its peduncle $1\frac{1}{2}$ ft., compressed; spathe as long, scurfy; fem. spathe shorter; male fl. $\frac{1}{4}$ in. long; fem. subglobose with 6 staminodes. Fruit $\frac{1}{2}$ in. long, mucronate, black purple when fully ripe.

IMPERFECTLY KNOWN SPECIES.

8. *P. robusta*, *Hook. f.*; trunk 15-20 ft. as thick as a man's body closely clothed and appearing tessellated from the sheaths of the fallen leaves, leaves about 3 ft. long, leaflets fascicled quadrifarious strict,

strongly conduplicate, fruiting peduncle 2 ft. *P. humilis*, var. *robusta*, Becc. Males. 348, 384.

BEHAR; on Parasnath, alt. 4000 ft., *J. D. H.*, &c.

A very remarkable species from the great bulk of the trunks, and their tessellated appearance, due to the comparatively small size of the appressed old leaf-sheaths, of which, judging from excellent photographs procured for me by Mr. Clarke, there must be very many in a plane cutting the diameter of the trunk; they give to the trunk the appearance of a *Cycas*. The figure of *P. cycadifolia*, Regel, Gartenfl. 1879, 131, t. 974, a plant referred to *dactylifera*, strongly resembles *robusta* in the bulk and marking of the trunk.

17. CORYPHA.

Tall stout unarmed palms, dying after once flowering and fruiting. *Leaves* very large, orbicular or lunate, flabellately multifid; petiole spinous. *Spadix* very large, terminal, erect, paniculate; spathes many, tubular. *Flowers* small, bisexual. *Calyx* cupular, 3-fid. *Petals* 3, connate below in a stipes, ovate, acute, imbricate or subvalvate. *Stamens* 6, filaments subulate, anthers dorsifixed. *Ovary* 3-lobed, 3-celled; style short, subulate, stigma minute. *Fruit* of 1-3 globose fleshy drupes, styles basilar. *Seed* erect, globose or oblong; albumen equable; embryo spiral. —Species about 6, tropical Asiatic.

1. *C. elata*, Roxb. *Fl. Ind.* ii. 176; trunk spirally ridged, leaves lunate, petiole with black margins and curved spines, panicle rounded ovoid, branches spreading, drupe about 1 in. diam. stipitate. *Mart. Hist. Nat. Palm.* 233; *Kunth Enum.* iii. 236. *Griff. in Calc. Journ. Nat. Hist.* v. 314; *Palms Brit. Ind.* 112, t. 220 D. C. Gebanga, Kurz *For. Fl.* ii. 525, an *Blume*?

BENGAL and BURMA.

Trunk straight, 60-70 ft. high by 2 ft. diam. *Leaves* 8-10 ft. diam., 80-100-fid to about the middle; lobes ensiform, obtuse or 2-fid; petioles 6-12 ft., spirally arranged, auricled. *Spadix* about $\frac{1}{4}$ the height of the trunk, much narrower in span than the foliage, supradecomposed; spathes many. *Flowers* in scattered fascicles on the rather stout spreading branchlets of the spadix; calyx 3-toothed, petals reflexed; ovary suddenly contracted into the short style. *Drupe* very shortly stipitate, olive colrd., smooth; pericarp friable, endocarp adnate to the testa. —Griffith describes the leaves as nearly circular, 5-6 by 15 ft. broad, with narrower segments than in the other Indian species.

2. *C. umbraculifera*, Linn. *Sp. Pl. Ed.* ii. 1657; trunk annulate, leaves sublunate or circular palmately pinnatifid conduplicate above the middle, panicle pyramidal, primary branches piercing the spathes, drupes $1\frac{1}{2}$ in. diam. *Gærtn. Fruct.* i. 18, t. 7 (seed inverted); *Kunth Enum.* iii. 236; *Roxb. Fl. Ind.* ii. 177; *Mart. Hist. Nat. Palm.* iii. 232, t. 108, 127 (*partim*); *Griff. in Calc. Journ. Nat. Hist.* v. 319; *Palms Brit. Ind.* 116. *Thw. Enum.* 329; *Dalz. & Gibs. Bomb. Fl. Suppl.* 94; *Kurz For. Fl.* ii. 525; *Brand. For. Fl.* 549; *Wall. Cat.* 8615. —*Rheede Hort. Mal.* iii. t. 1-12.

MALABAR COAST and CEYLON.

Trunk 60-80 ft. diam. *Leaves* 6 ft. long by 13 broad, 80-100-fid to about the middle, segments obtusely 2-fid; petiole 7 ft., spines often in pairs. *Spadix* attaining 20 ft., pyramidal, branches spreading. *Calyx* broadly 3-lobed. *Ovary* suddenly contracted into the style. *Drupe* shortly stipitate.

3. *C. Talliera*, Roxb. *Cor. Pl.* iii. 251, t. 255, 256; *Fl. Ind.* ii. 174;

trunk obsoletely annulate, leaves subrotund complicate above the middle subglaucous, basal lobes overlapping, panicle pyramidal, branches axillary to the spathes spreading, secondary forked, drupes $1\frac{1}{2}$ in. diam. *Kunth Enum.* iii. 236; *Mart. Nat. Hist. Palm.* iii. 231; *Griff. in Calc. Journ. Nat. Hist.* v. 317; *Palms Brit. Ind.* 114, t. 220 E, F, *Wall. Cat.* 8616. *Talliera bengalensis Spreng. Syst.* ii. 18. T. Tali, *Mart. in Roem. & Sch. Syst.* vii. 1306.

BENGAL, Roxburgh.

Trunk about 30 ft., dark brown, rather rough. Leaves 6 ft. long by 15 broad, 90–100-fid, lobes deeper and broader than in *umbraculifera*, the central 3–3½ ft.; petiole 5–10 ft., not spirally arranged, binauricled, spinous. *Spadix* 20 ft. or more high; primary branches with ascending tips, secondary bifarious, drooping; flowers in close clusters. *Calyx* obscurely 3-lobed. *Ovary* suddenly contracted into the style. *Drupes* 1–3, dark olive or greenish-yellow.

4. *C. macropoda*, *Kurz in Journ. Beng. As. Soc.* xliii. ii. (1874) 197, t. 15; *For. Fl.* iir. 525; stemless, leaves palmately flabellate 12–20 ft. diam. divided to the middle 6–10 ft. long, petiole 18–25 ft. slender base as thick as the arm, spines black, drupe the size of a cherry smooth olive brown.

SOUTH ANDAMAN ISLDS., *Kurz*.

IMPERFECTLY KNOWN SPECIES.

5. *C. MARTIANA*, *Becc. mss.*; panicle hemispherical, branchlets pendulous, petiole armed with small strong black spines, calyx broadly 3-lobed, ovary conico-ovoid narrowed into the short style, drupe on a stipes $\frac{1}{10}$ in. long.

BURMA; Mergui? (*Hort. Calcutt.*).

6. *C. UMBRACULIFERA*, *Linn.*; *Wall. Cat.* 8615; branchlets of panicle about 2 ft., as in *C. Talliera*, calyx distinctly 3-lobed, ovary gradually narrowed into a short style.—*Hort. Carey* 1828, *Wallich*.

18. **NANNORHOPS**, *H. Wendl.*

A gregarious tufted low-growing glabrous palm, with prostrate branching robust rhizomes or stems. Leaves cuneately flabellate, rigid, plicate, split into curved 2-fid segments; petiole short. *Spadix* interfoliar, much branched; spathes tubular, sheathing, spathelets ochreate; flowers polygamous. *Calyx* tubular, membranous, unequally 3-lobed. *Corolla* 3-partite, segments valvate. *Stamens* in hermaph. fl. 6, in male about 9. *Ovary* trigonous; style short, stigma 3-toothed; ovules basilar. *Drupe* small, globose or oblong, 1-seeded, style basilar. *Seed* free, erect, ventrally hollowed; hilum small, albumen equable; embryo dorsal or subbasilar.

1. *N. Ritchieana*, *H. Wendl. in Bot. Zeit.* 1879, 148; *Aitchis. in Journ. Linn. Soc.* xix. 140, 141 and 187, t. 26. *Chamærops Ritchieana*, *Griff. in Calc. Journ. Nat. Hist.* v. 342; *Palms Brit. Ind.* 135; *Brand. For. Fl.* 547; *Gard. Chron.* 1886, 652, fig. 128, 129; *Mart. Hist. Nat. Palm.* iii. 252.

SINDH, and the WESTERN PANJAB; on the Salt Range and at Attok, *Aitchison*.—DISTRIB. Afghanistan.

Stem or rhizome 8–10 ft. long, as thick as a man's arm, dichotomously branched, covered with old leaf sheaths. Leaves 2–3 ft. long and broad, whitish, split to the middle or lower into rigid segments with often interposed fibres; petiole 6–12 in.; margins serrulate. *Spadix* pyramidal, 2–3 ft., branches ascending and recurved, branchlets slender; flowers in pairs within a membranous spathelets, one sessile

bracteate, the other pedicelled ebracteate. *Stamens* in the male fl. inserted in the corolla-tube; in the hermaph. fl. in its throat; anthers deeply sagittate. *Ovary* narrowed into the style. *Drupe* globose ellipsoid or oblong, from the size of a pea to a bullet.

19. LICUALA.

Low, rarely tall palms; stems annulate. *Leaves* more or less orbicular, or flabellate, plicate, deeply partite; petiole usually spinous. *Spadices* interfoliar, sheathed by tubular coriaceous persistent spathes, simple or branched, glabrous tomentose or scurfy; flowers usually small, scattered, hermaphrodite; bracts and bracteoles obscure or 0. *Calyx* cupular or tubular, mouth 3-fid. *Corolla-lobes* coriaceous, valvate. *Stamens* 6, filaments subulate; anthers cordate. *Ovary* of 3 free or nearly free truncate 1-ovuled carpels; styles filiform; ovules erect. *Drupe*s small; style terminal. *Seed* erect, globose, free, ventral face often hollowed; albumen equable, embryo dorsal.—Species about 45, trop. Asia, Australia and Pacific.

There are several unnamed Burmese and Malayan-Peninsular species in the Kew Herbarium, which I fail to identify with any of the Indian ones enumerated by Beccari. I refrain from describing them, as they are solitary specimens, and may be the same as known Malayan island species, of which I have seen no specimens.—*J. D. H.*

A. Flowers $\frac{1}{2}$ – $\frac{3}{4}$ in. long.

1. ***L. peltata***, Roxb. *Fl. Ind.* ii. 179; leaf orbicular 2–30-partite, petiole armed throughout with strong curved spines, spadix with many superposed branches tomentose and flowers tomentose. *Ham. in Mem. Wern. Soc.* v. 313; *Griff. in Calc. Journ. Nat. Hist.* v. 325; *Palms Brit. Ind.* 120, t. 222. *Mart. Hist. Nat. Palm.* 234, t. 162; *Kunth Enum.* iii. 238; *Wall. Cat.* 8617; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 204; *For. Fl.* ii. 527; *T. Anders. in Journ. Linn. Soc.* xi. 13; *Gard. Chron.* 1872, 1657, fig. 350.

SIKKIM HIMALAYA, ASSAM, the KHASIA HILLS, SILHET, BURMA and the ANDAMAN ISLANDS.

Stems 8–15 ft., usually gregarious. *Leaves* 3–5 ft. diam., segments variously connate, many-toothed at the apex, teeth $\frac{1}{2}$ –2 in.; very variable in length and breadth, obtusely 2-fid; petiole 3–4 ft., stout. *Spathes* tubular, 6–12 in. long by $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, mouth irregularly toothed or lobed. *Spikes* of tall stout spadix distant, 6–10 in., pendulous, fulvous-tomentose; flowers stipitate. *Calyx* campanulate, silkily pubescent, shortly lobed. *Petals* $\frac{1}{3}$ – $\frac{1}{2}$ in. long, lanceolate, very coriaceous. *Fruit* $\frac{1}{2}$ in. long, ellipsoid, narrowed equally at both ends, orange-colored. *Seed* with the intruded hilar process dilated within.

B. Flowers much less than $\frac{1}{2}$ in. long.

I; Spathes tubular, with entire or lacerate mouths.

* Spadix with 8–10 superposed branched inflorescences arising from special spathes.

2. ***L. paludosa***, *Griff. in Calc. Journ. Nat. Hist.* v. 233; *Palms Brit. Ind.* 118, t. 221, A, B, C; leaves flabelliform or orbicular 7–9-partite, lateral segments deeply acutely 3–4-lobed, the rest truncately 4–8-lobed, petiole unarmed above, flowers minute glabrous, petals very short. *Becc. Males.* iii. 74.

MALACCA; *Griffith*. PERAK, *Scortechini*, *King's Collector*, 7339, 8534.—
DISTRIB. Siam.

Stem 4–10 ft. 3–9 in. diam., smooth. *Leaves* 3 ft. diam.; petiole 1–2 ft., spines few short, recurved; sheaths very fibrous. *Spathes* $\frac{3}{4}$ in. broad, mouths lacerate. *Spadix* very stout; branches 4–8 in., spreading and recurved; flowers sessile. *Calyx* cup-shaped, $\frac{1}{10}$ in. broad. *Petals* ovate. *Fruit* spherical, $\frac{1}{4}$ in. diam.—*Griffith* observes that this species approaches *L. spinosa*, but is abundantly distinct by its smooth stem, which does not look much like the stem of a Palm, and by the small smooth turbinate flowers. I doubt *Kurz's* Andaman plant being the same, it has shortly tomentose branches of the spadix and flowers.

3. ***L. longipes***, *Griff. in Calc. Journ. Nat. Hist.* v. 330; *Palms Brit. Ind.* 125, t. 224 A, B; stem very short, leaves orbicular about 20-partite, segments cuneate crenate lateral obliquely truncate terminal about 11-toothed, crenatures 2-fid crenulate, petiole shortly armed, spathes short broad, spadices much shorter than the petioles, branches spreading and flowers glabrous or pubescent, calyx cylindric, base truncate, petals cordate-lanceolate, ovary villous. *Kurz in Journ. As. Soc. Beng.* xliii. 204; *For. Fl.* ii. 528.

TENASSERIM; forests in Mergui. MALACCA, *Griffith*, *Kurz*.

Leaves 3–4 ft. diam.; petiole 4–5 ft., trigonous, deeply channelled above, glabrous; spines very variable in size and number, but never long. *Spathes* 3–6 in. long by $\frac{1}{2}$ in. broad, compressed, deeply lacerate at the mouth. *Spadix* stout and flowers sparsely or sometimes densely pubescent; branches stout, curved and spreading; flowers sessile. *Calyx* shortly lobed, lobes 2-fid. *Petals* very short. *Ovary* villous. *Fruit* seated on the pedicel-like perianth.—The cylindric calyx with a broad truncate base is a good character.

** Spadix with 3–6 digitately branched or forked inflorescences.

† Branches of spadix and flowers pubescent or scurfy.

4. ***L. spinosa***, *Wurm. in Verh. Bot. Genootsch.* ii. 469; leaves orbicular-reniform sub 18-partite, lateral segments obliquely premore 3–4-lobed or 2-partite, median 10–11-lobed, petiole armed throughout, spadix with many finely pubescent dense-fld. spikes and flowers, fruiting calyx campanulate, petals very small, ovary glabrous, fruit obovoid. *Roxb. Fl. Ind.* ii. 181 ? (excl. syn. *Rumph.*); *Griff. in Calc. Journ. Nat. Hist.* v. 321; *Palms Brit. Ind.* 119; *Blume Rumph.* ii. 39, t. 82, 88; *Mart. Hist. Nat. Palm.* iii. 235, 318, t. 135, 1, 2; *Miq. Fl. Ind. Bat.* iii. 53; *Suppl.* 254. *Becc. Males.* iii. 74. *L. paludosa*, *Kurz in Journ. As. Soc. Beng.* xliii. 528; *For. Fl.* ii. 528. *L. ramosa*, *Bl. in Schult. Syst.* vii. 1303; *Rumphia*, ii. 39. *L. horrida*, *Blume Rumph.* ii. 41, t. 89, f. 1; *Mart. l. c.* 237, 318.

MALACCA, *Griffith*. ANDAMAN ISLANDS, *Kurz*, *Man.*—DISTRIB. Malay Islands.

Stems 8–10 ft., stout, 2–4 in. diam., densely tufted, rough with scars of fallen leaves. *Leaves* 4 ft. diam.; petiole obtusely trigonous, spines stout curved; ligule 1–1½ in., scarious. *Spathes* very long, scurfy, $\frac{3}{8}$ in. diam., mouths lacerate. *Spadix* rather longer than the leaves; branches 7–10, adnate to the rachis up to the mouth of the spathes; lower compound, spreading, generally secund; flowers 2–3-nate. *Calyx* lobed to the middle. *Petals* broadly lanceolate, acuminate. *Fruit* obovoid, $\frac{1}{4}$ in. long, pedicelled by the calyx-tube, red.—*Beccari* (mss.) refers *Kurz's* Andaman *L. paludosa* to *spinosa*, I think rightly (*J. D. II.*).

5. ***L. malayana***, *Becc. Males.* iii. 197; leaves peltately digitate, segments 20–26, teeth very short broad obtuse, petiole very long spinous at

the base only, spadix elongate, branches many 3-partite spreading pubescent, flowers solitary spirally disposed finely pubescent, calyx tubular campanulate hardly toothed, base truncate and intruded, petals rather longer acute, ovary glabrous, fruit globose.

PERAK, *Scortechini*; Goping, *King's Collector*, 469, 8127.

Stem 4-6 ft., $1\frac{1}{4}$ diam. *Leaves* about 3 ft. diam.; petiole 5-6 ft., slender. *Spathes* narrow, 4-6 in. long by $\frac{1}{2}$ in. broad, subfurfuraceous; lower acutely keeled, mouth shortly lacerate. *Spadix* $2\frac{1}{2}$ -3 ft., branches spreading and curved or flexuous; flowers inserted in small tubercles which (in the dried state) are sunk in the lobulate base of the calyx. *Staminal cup* deeply lobed. *Fruit* $\frac{1}{2}$ in. diam., rather longer than broad, tipped with the scale-like remains of the abortive carpels, dried pericarp chiefly lacemose.—Allied to *L. spinosa*, distinguished by the petiole armed only at the base, the form of the flowers, and the staminal cup deeply divided into large lobes.

6. *L. triphylla*, *Griff. in Calc. Journ. Nat. Hist.* v. 352; *Palms Brit. Ind.* 126, t. 225; stem very short, leaves few flabelliform 3-9-partite, segments broadly crenate, median narrowed into a petiolule, petiole very long and slender sparingly armed with small spines, spathes very slender, spadix short slender, branches few slender few-fld. and flowers puberulous, calyx turbinate, petals minute, fruit pisiform.

MALACCA; forests Ayer Punnus, *Griffith*. PERAK, *King's Collector* (2860, 3007).

Stem 3-4 in. *Leaves* with segments 8-10 in. long, of very various breadth, the tips of the central crenate with very short rounded notched lobes, the lateral obliquely premorse and notched; petiole 2 ft., not $\frac{1}{2}$ in. broad; spines $\frac{1}{2}$ in. *Spathes* $1\frac{1}{2}$ -2 in. long by $\frac{1}{8}$ - $\frac{1}{4}$ in. diam., mouth split. *Spadix* a foot long, very slender, branches short, flowers $\frac{1}{10}$ in. long, scattered, subsessile. *Petals* minute, acute. *Seed* with a curved internal process.

7. *L. ferruginea*, *Becc. mss.*; leaves orbicular 3-7-partite, segments broadly crenate, the central subpetiolulate, petiole very long armed almost throughout furfuraceous or glabrate, spathes large broad flattened furfuraceous, spadix and its branches very stout thickly furfuraceously tomentose, flowers sessile, calyx cupular, petals very small.

SINGAPORE, *Gaudichaud*, *Lobb*. PERAK, at Sunki, 100-800 ft., *King's Collector* (3041).

Leaves 3 ft. diam., young furfuraceous towards the base below, segments merely notched as in *L. triphylla*; petiole 3-4 ft. with concave face and sides, and rounded back, young villously furfuraceous along the margin between the short stout spines. *Spathes* 4-6 in. long by $1\frac{1}{2}$ -2 in. broad, compressed, 2-keeled, mouth lacerate. *Spadix* very stout, with stout rusty-tomentose branches 6-8 in. long; flowers sessile, $\frac{1}{10}$ in. diam., rusty pubescent. *Calyx* very short, lobes rounded. *Fruit* $\frac{1}{2}$ in. long, ellipsoidly obovoid, obscurely 3-ribbed when dry.

†† *Branches of spadix and flowers glabrous.*

8. *L. glabra*, *Griff. in Calc. Journ. Nat. Hist.* v. 329; *Palms Brit. Ind.* 124, t. 223; stem slender, leaves flabelliform 16-18-partite, segments linear-cuneate median 2-3-fid, tips with short bifid lobes separated by a broad sinus, petiole very slender almost unarmed, spathes glabrous, spadix slender elongate and flowers quite glabrous, branches adnate to the rachis far above the spathes 4-5-partite, calyx campanulate, petals lanceolate.

MALACCA; Mt. Ophir, *Griffith*, *Hullett* (852). PERAK; on Gunong Batu Pateh, alt. 3-4000 ft., *King's Collector* (8148); *Scortechini* (319^b, 593^b).

Stem 3-4 ft., 1-1½ in. diam. *Leaves* 2-3 ft. diam.; petiole 4-5 ft., plano-convex. *Spathes* 3-6 in. narrow, cylindric, the lower a little compressed, mouth oblique bifid, tips quite entire. *Spadix* 4 ft. (in King's specimens), perfectly glabrous throughout, rachis quite smooth, furrowed when dry; branches 4-6 in., divaricate; flowers subsessile. *Calyx* obscurely 3-lobed. *Petals* twice as long, acuminate. *Young fruit* ellipsoid, narrowed at both ends, keeled, ½ in. long, stipitate by the calyx tube and spreading petals, tipped by the remains of the abortive carpels.

II. *Spathes* compressed, split on one side (tubular in *L. Kingii*).

* *Spadix* with 2 or more superposed simple or branched inflorescences.

9. ***L. modesta***, Becc. *Males*. iii. 195; stem elongate, leaves semi-circular, segments very many narrowly cuneate, petiole very long spinous towards the base only, spathes flattened acutely 2-edged glabrous margins of mouth quite entire, branches of spadix and flowers fulvous pubescent, staminal cup 6-lobed, ovary glabrous.

PERAK; Maxwell hill, *Scortechini*, alt. 3300 ft.; Larut, *King's Collector* (1945, 1951, 1983, 2420, 3243).

Stem 2-10 ft. *Leaves* palmately multifid; segments 2-3 nerved; petiole 3-4 ft., spines short recurved. *Spathes* 4-6 long by ½ in. broad, flat, glabrescent. *Spadix* 16-30 in.; branches spreading; flowers seated on small tubercles; calyx campanulate, lobes very short tipped with hairs; corolla rather longer; style subulate. *Fruit* globose obovoid, about ½ in. long, pedicelled by the calyx.—Difficult to distinguish from *acutifida*.

10. ***L. Kunstleri***, Becc.; stem robust, leaves long-petioled, mid-segment not petiolulate, petiole armed at the base, spathe much compressed furfuraceous mouth not lacerate, branches of spadix very scurfily and rustily hairy, flowers pedicelled pubescent.

PERAK; on Ulu Bubong, *Kunstler* (10,205).

Stem 4 ft. by 4-5 in. diam. *Calyx* campanulate, base narrowed, pubescent; petals rather longer.—Only a solitary imperfect specimen seen, well characterized by the pedicelled flowers. Allied to *acutifida*, differing in the robust stem, much broader leaf-segments, and longer floral pedicels.

11. ***L. acutifida***, Mart. *Hist. Nat. Palm.* iii. 236, t. 135, f. 3, 4 (excl. Syn. Roxb.); stem slender, leaves many long-petioled, segments 15-20 very narrow terminating in long narrow bifid lobes, median petiolulate, petiole very slender shortly armed and furfuraceous towards the base, spadix spathes and flowers furfuraceously velvety, flowers seated on a rather prominent pedicel, calyx obconic. *Griff. in Calc. Journ. Nat. Hist.* v. 327; *Palms Brit. Ind.* 122, t. 222 A, B; *Wall. Cat.* 8618.

PENANG, *Lewis, Oxley*. SINGAPORE, *Lobb*.

Stem 15-20 ft., 1-2 in. diam. *Leaves* 1-2 ft. diam., segments 1-3-costate; terminal lobes ½-1 in.; petiole 18-48 in.; ligule elongate. *Spathes* paleaceous scurfy, 2-lobed, 4-6 in. long by ½ in. diam., silkily or silverily paleaceous. *Spadix* 12-18 in.; spikes 3-5 in., simple or forked, adnate to the rachis, lower flowers 2-nate, upper solitary; calyx obtusely 3-fid, pubescent; petals striate. *Ovary* obovoid, smooth; style filiform. *Fruit* ¾ in. diam., stipitate by the calyx. *Seed* pisiform.

12. ***L. pusilla***, Becc. *Males*. iii. 194; stemless, leaves palmately 9-fid, segments very narrow, median 3-fid on 3-partite shortly and obtusely toothed, lateral with very oblique tips having several short and one long

tooth, mouth of spathe lacerate, spadix nodding compressed, branches 3 simple subtomentose, flowers sessile, calyx campanulate pubescent, fruit very small pisiform.

PERAK; at Semhi, *King's Collector* (3028).

Closely allied to *L. triphylla*, but leaf-segments more numerous, mid-segment not petiolulate, and branches of the spadix simple. *Fruit* (dried) $\frac{1}{4}$ in. diam.—I have seen no flowers. *J. D. H.*

**** *Spadix bearing a solitary simple or digitately branched inflorescence.***

13. **L. Scortechini**, *Becc. Males*. iii. 192; leaves semicircular sub 17-partite, segments with long 2-fid teeth, mid-segments 9 lateral 1-3-nerved, spathes 2 acutely 2-keeled inflated above acute, spadix and flowers fulvously pubescent, branches 4-5 filiform digitately branched, calyx obconico-campanulate truncate, petals pubescent striate, staminal cup 6-toothed, ovary glabrous.

PERAK; *Scortechini*.

Described from a single leaf and flowering spadix.

14. **L. Kingiana**, *Becc. Males*. iii. 193; stem slender, leaves small semicircular 5-partite, segments broad obtusely obliquely toothed, median broadest sessile cuneiform, petiole very slender, spathes 2, outer tubular acuminate split at the side, upper very narrow mouth lacerate, spadix terminating in a solitary dense-fid. spike, calyx campanulate hairy, staminal cup 6-toothed, ovary glabrous.

PERAK; at Goping, *Kunstler* (471).

Stem about 5 ft. by 1 in. diam. *Leaves* 10-12 in. diam.; segments all cuneiform, many-toothed; teeth $\frac{1}{4}$ - $\frac{1}{2}$ in., obtuse, entire or 2-fid; petiole 18-20 in., armed from the lower third with small straight or recurved spines. *Spathes* very slender, $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., nearly glabrous. *Spadix* 6-10 in., erect, and spike (2-4 in.) tomentose. *Calyx* irregularly lobed. *Petals* broadly ovate, finely pubescent, not striate. *Ovary* turbinate, glabrous; style subulate. *Fruit* not seen.

20. **LIVISTONA**, *Br.*

Tall palms, trunk annulate. *Leaves* orbicular, flabellately plicate, split to the middle into 2-fid narrow lobes; petiole long, margins spinous. *Spadices* interfoliar, long peduncled, erect, fruiting pendulous, loosely paniced; spathes many, tubular, sheathing; flowers minute, 2-sexual. *Sepals* 3, rounded, imbricate. *Corolla* 3-lobed, coriaceous, lobes valvate. *Stamens* 6, filaments subulate, united in a ring; anthers cordate. *Ovary* of 3 nearly free carpels; styles short, free or coherent, stigmas minute; ovules basilar, erect. *Drupe* 1-3, globose oblong or ellipsoid; style subterminal. *Seed* erect, ventral face hollowed; albumen equable; embryo dorsal.—Species about 13, tropical Asiatic and Australian.

L. chinensis, *Br.* (*L. sinensis*, *Mart.*;) *Griff. Palms of Brit. Ind.* 131, t. 226 D; *Wall. Cat.* 8620, a Chinese and Japanese species, is cultivated in India, and may be recognized by its reniformly flabellate leaves with long pendulous deeply bipartite divisions and the olive-like drupe.

1. **L. cochinchinensis**, *Mart. Hist. Nat. Palm.* iii. 242; leaves 9-10 ft. diam. orbicular, lobes 2-partite, segments very long linear pendulous, tips filiform, drupe globose $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. *Becc. Males*. iii. 69. *L.*

spectabilis, *Griff. in Calc. Journ. Nat. Hist.* v. 336; *Palms Brit. Ind.* 130, t. 226 C. *Corypha Saribus*, *Lour. Fl. Cochinchin.* i. 212. *Saribus cochinchinensis*, *Blume Rumph.* ii. 49.

MALACCA, *Griffith.* PENANG, *Lewis.*—DISTRIB. Cochin China.

Trunk 50–60 ft., smooth. *Leaves* about 90-fid, divisions ensiform, central $2\frac{1}{2}$ –3 ft.; petiole obtusely trigonous, spiny throughout its length, spines stout compressed recurved. *Spadices* 4–5 ft., nodding; branches 1–1½ ft., spreading, much divided; spathes coriaceous, brown. *Flowers* sessile. *Calyx* cupular obtusely 3-toothed to the middle, corolla a little longer. *Carpels* cohering by their styles. *Drupe* pale blue; endocarp subopercous.

2. **L. Jenkinsiana**, *Griff. in Calc. Journ. Nat. Hist.* v. 334; *Palms Brit. Ind.* 128, t. 226 A, B; leaves 5–6 ft. diam. reniformly flabellate glaucous beneath, divisions very narrow straight shortly obtusely 2-toothed, drupe reniformly globose, $\frac{3}{4}$ –1 in. diam.

ASSAM, common, *Jenkins.*

Trunk 20–30 ft. by 6–7 in. diam. *Leaves* 5–6 ft. broad, 70–80-fid; petiole spinous throughout its length. *Spadices* 2–3 ft., branches dichotomous, simple or compound; spathes 2 ft., woody, scurfy. *Flowers* clustered on small tubercles, small, greenish, ebracteate; calyx cupular, base truncate intruded; corolla twice as long. *Drupe* $\frac{3}{4}$ –1 in. diam., leaden blue.

3. **L. speciosa**, *Kurz in Journ. Beng. As. Soc.* xliii. ii. (1874), 196, 204, t. 13, 14; *For. Fl.* ii. 526; leaves 6–7 ft. diam., palmately flabellate divisions very shortly 2-toothed, teeth lanceolate acuminate converging, drupe obovoid $\frac{3}{4}$ –1 in. long.

PEGU and TENASSERIM; *Kurz, Brandis.*

Trunk 50–70 ft. *Leaves* as broad as long, divisions linear; petiole with very strong sharp long recurved flattish black spines throughout its length. *Spadix* 2–4 ft., paniculate; spathes brown, smooth. *Flowers* solitary or in pairs on small tubercles; sepals and petals about $\frac{1}{12}$ in. *Drupe* $\frac{3}{8}$ in. long, dark blue.

4. **L. Kingiana**, *Becc. Males.* iii. 199; leaves 15 ft. diam. orbicular, divisions broadly lanceolate rigid 2-fid lobes triangular, drupe globose $1\frac{1}{2}$ –2 in. diam.

MALAY PENINSULA; Perak, *Kunstler* (3904).

Trunk 60–100 ft. by 12–18 in. diam. *Leaves* as broad as long, very coriaceous, divisions 2–2½ in. broad; petiole 6 ft., armed throughout its length with sigmoidly flexuous very large stout spines like shark's teeth and $\frac{2}{3}$ in. long. *Spadix* much branched, branchlets subulate slender. *Drupe* smooth, peculiarly fleshy, endocarp grumous and tessellated.

21. TRACHYCARPUS, H. Wendl.

Tall unarmed palms. *Leaves* suborbicular or reniform, plicately multi-fid, segments narrow, rachis 0. *Spadices* many, interfoliar, stout, branched; spathes many, sheathing, embracing the peduncle and branches of the spadix, coriaceous, compressed, tomentose; bracts and bracteoles minute; flowers small, polygamo-monœcious. *Sepals* 3, ovate. *Petals* 3, broadly ovate, valvate. *Stamens* 6, filaments free; anthers short, dorsifixed. *Carpels* 3; stigmas 3, recurved; ovules basilar. *Drupe* 1–3, globose or oblong, style subterminal. *Seed* erect, ventrally grooved, hilum basilar; albumen equable; embryo dorsal.—Species 2 or 3, Himalayan, Chinese and Japanese.

1. **T. Martiana**, *H. Wendl. in Bull. Soc. Bot. Fr.* viii. (1861) 429; trunk for the most part naked annulate, fem. fl. solitary sessile, drupe oblong equally rounded at both ends, seed grooved throughout its length embryo opposite the middle of the groove. *T. khasiana*, *H. Wendl. l. c.*; *Hook. f. Bot. Mag.* t. 7128. *Chamærops Martiana*, *Wall. Cat.* n. 8621; *Mart. in Wall. Pl. As. Rar.* iii. 5, t. 211; *Hist. Nat. Palm.* iii. 251, 320; *Royle Ill.* 394, 7, 9; *Griff. in Calc. Journ. Nat. Hist.* v. 339; *Palms Brit. Ind.* 133. *C. Griffithii*, *Lodd. Cat. Palm.* 1841; *Hort. Par. ex Rev. Hort.* 1879, 212, f. 43, ed. 1881, 143. *C. khasiana*, *Griff. in Calc. Journ. Nat. Hist.* v. 341; *Palms Brit. Ind.* 134, t. 227 A, B, C; *Brand. For. Fl.* 546; *Kurz in Journ. As. Soc. Beng.* xliii. 204; *For. Fl.* ii. 526; *Gamble Man. Ind. Timb.* 418; *Houllet in Rev. Hort.* 1879, 272 (with woodcut).

TEMPERATE HIMALAYA, alt. 6-8000 ft., from Nepal eastwards, the KHASIA HILLS, alt. 4000-5000 ft. MUNNIPORE, *Watt.* BURMA, alt. 4-6500 ft., *Kurz*.

Trunk 20-50 ft., slender; clothed beneath the crown with persistent leaf-sheaths; young parts softly furfuraceous hairy. *Leaves* 4-5 ft. diam., subglaucous beneath, cut about half way down into linear 2-lobed segments; rigidly coriaceous; petiole $1\frac{1}{2}$ -2 $\frac{1}{2}$ ft., margins denticulate; sheath leaving stiff erect fibres. *Spadix* 1-1 $\frac{1}{2}$ ft., nodding, glabrous; basal spathes 1 ft., coriaceous, split. *Flowers* yellow, ovaries villous. *Drupe* 1-3, $\frac{1}{2}$ in. long, blueish, "dirty blue" (*Kurz*) "yellow lepidote" (*Wall.*).

2 **T. excelsa**, *H. Wendl. in Bull. Soc. Bot. Fr.* viii. 429; trunk clothed throughout with old leaf-sheaths, flowers clustered 2-4 on a tubercle, drupe reniform, deeply hollowed on one side, embryo opposite the umbilicus. *T. Fortunei*, *Wendl. l. c.* *Chamærops excelsa*, *Thunb. Fl. Jap.* 130 (not var. β); *Mart. Hist. Nat. Palm.* iii. 251. *Miquel Prolus. Fl. Jap.* 329. *J. Gay in Bull. Soc. Bot. Fr.* viii. 410; *Franch. & Sav. Enum. Pl. Jap.* ii. 1; *Carrière in Rev. Hort.* 1877, 223. *C. Fortunei*, *Hook. Bot. Mag.* t. 5221.

UPPER BURMA, Yunnan, *T. Anderson*.—DISTRIB. China, Japan.

T. excelsa closely resembles *T. Martiana*, except in the trunk being clothed with old leaf-sheaths.

22. PHOLIDOCARPUS, Blume.

Trunk tall. *Leaves* orbicular, 4-5-partite; petiole spinous. *Fruit* globose or ovoid with a tessellated pericarp. *Seed* laterally inserted, hilum oval; albumen ruminant; embryo basilar.—Species 5, Malayan, all very imperfectly known.

1. **P. macrocarpa**, *Becc. Males.* iii. 90, 92, t. 9, f. 1-3; fruit globose obovoid 4-4 $\frac{1}{2}$ in. diam. distinctly tessellate, endocarp globose densely fibrous, fibres elongate. ?*P. Ihur*, *Miq. Fl. Ind. Bat.* 591 (non *Blume*). ?*Livistona Diepenhorstii*, *Teyssm. fid. Miq. l. c.*

MALAYAN PENINSULA; Klang, near Selangore, *Keheding*.

Nothing further of this species is known; it differs from the *P. Ihur* of Amboyna in the larger more deeply tessellated fruits, and the long fibres of the outer coat of the endocarp.

23. CALAMUS, Linn.

Armed, erect or scandent, tufted palms. *Leaves* alternate, pinnatisect; leaflets acuminate, nerves parallel, rachis often produced into an armed

flagellum; sheath armed, produced into a ligula or ochrea, and with or without a lateral armed flagellum. *Spadices* axillary, usually elongate, much branched, sometimes produced into a flagellum. *Spathes* tubular or open, persistent, sheathing the peduncle and branches of the spadix and passing into bracts and bracteoles (spathels and spathellules). *Flowers* small, polygamo-dioecious, in usually distichous often scorpioid spikelets solitary or binate (a fem. or male or both) in the bracteoles. **MALE FL.** *Calyx* cupular, 3-toothed. *Petals* 3, acute, coriaceous, valvate. *Stamens* 6, filaments short, anthers dorsifixed. **FEM. FL.** slightly accrescent, fruiting pedicelliform or explanate. *Calyx* of the male. *Corolla* tubular below, 3-fid, valvate. *Staminodes* forming a cup. *Ovary* incompletely 3-celled, clothed with retrorse scales; style short or rather long, stigmas 3; ovules basilar, erect. *Fruit* globose or ellipsoid; style terminal; pericarp thin, clothed with appressed deflexed closely imbricating polished scales. *Seed* subglobose or oblong, smooth or pitted; albumen equable or ruminant; embryo ventral or basal.—Species about 160–170 trop. Asiatic, Malayan, Australian and a few trop. African.

The following arrangement of the groups and species is taken from Beccari's mss. The diagnoses and descriptions of the species are from his rough notes and the works of Roxburgh, Griffith, Martius and Kurz, in all cases aided by specimens when I had access to them.—J. D. H.

GROUP I. *Leaves* with many equidistant leaflets. *Spathe* 1st, elongate-tubular, dilated and lacerate above; 2nd, tubular, infundibular. *Spadix* with the partial infl. and spikelets provided with a pedicellar portion included in their respective spathes. *Fruiting perianth* explanate. *Spathellule* of fem. fl. short, not pedicelliform. Sp. 1–9.

GROUP II. *Leaves* with very few radiating or digitate leaflets, rachis not flagelliferous; leaf sheath flagelliferous. *Spathe* 1st very long, tubular, mouth lacerate; 2nd, thick, inflated, lacerate. *Spadices* male and fem. simply decompound; partial infl. and spikelets with a pedicelled portion inserted at the mouth or back of their respective spathes. *Fruiting perianth* explanate. *Spathellules* of fem. fl. short, not pedicelliform. *Fruit scales* more than 12–15-seriate. *Seed* not ruminant; embryo basilar.—(Slender scandent species; stamens 2-seriate, filaments thickened at the base, tips not inflected). Sp. 10–12.

GROUP III. *Leaves* paripinnate, leaflets equidistant; rachis not flagelliferous, leaf-sheath flagelliferous. *Spathe* 1st, elongate-tubular, closely sheathing. *Partial* infl. and spikelets (inserted at the mouth and back of the spathe). *Fruiting calyx* explanate or hardly callous and pedicelliform. *Spathellules* of fem. fl. not pedicelliform. *Seeds* not dorsally ruminant-alveolate; embryo basilar. Sp. 13–31.

GROUP IV. *Rachis* of leaves not flagelliferous; leaf-sheath flagelliferous or not. *Spathe* 1st very long, at first tubular closed, at length longitudinally split open, loriform, laminar or foliaceous. *Seed* not superficially alveolate; albumen equable. Sp. 32–39.

GROUP V. *Rachis* of leaves not flagelliferous; sheath flagelliferous. *Spathe* 1st submembranous, at first elongate tubular at length longitudinally more or less split and partly sublaminar. *Fruiting calyx* more or

less pedicelliform. *Spathellules* of fem. fl. pedicelliform. *Seed* dorsally alveolate; albumen subruminate; embryo basilar. Sp. 40, 41.

GROUP VI. *Rachis* of leaves not flagelliferous; leaf-sheath flagelliferous. *Spathe* 1st tubular, coriaceous, narrow, not split or lacerate. *Spathellule* of fem. fl. exserted beyond the spathels, and as it were supported on a pedicel. *Fruiting perianth* pedicelliform. *Seed* superficially furrowed; albumen ruminant; embryo basilar. Sp. 42-43.

GROUP VII. *Rachis* of leaves not flagelliferous; leaf-sheath flagelliferous. *Spathes* tubular, strictly sheathing. *Spathellules* not pedicelliform. *Fruiting calyx* pedicelliform; albumen deeply ruminant. Sp. 44-47.

GROUP VIII. *Rachis* of leaf not flagelliferous; leaf-sheath flagelliferous. *Spathes* strict, tubular; spathellules distinctly pedicelliform. *Fruiting-perianth* pedicelliform. *Seed* with many plaits radiating from the centre to one face; embryo lateral. Sp. 48.

GROUP IX. *Leaf-sheaths* flagelliferous; leaflets broad, many-nerved, two terminal completely free with a very short interposed flagellum. *Spathe* strict, tubular; spathellules of fem. fl. not pedicelliform. *Fruiting-perianth* subpedicelliform. *Albumen* superficially ruminant; embryo basilar. Sp. 49.

GROUP X. *Rachis* of leaves flagelliferous; leaf-sheath not flagelliferous. *Spathe* elongate, tubular, narrow. *Spathellule* of fem. fl. not pedicelliform. *Fruiting calyx* pedicelliform. *Albumen* ruminant or not, embryo basilar or lateral. Sp. 50-56.

GROUP XI. *Rachis* of leaves flagelliferous; sheath not flagelliferous. *Spathe* narrow, elongate, tubular. *Spathellules* of fem. fl. not pedicelliform. *Fruiting-perianth* pedicelliform or not. *Albumen* not ruminant; embryo basilar. Sp. 57-63.

GROUP XII. *Rachis* of lower leaves or leaves of young plant not flagelliferous, of the adult plant or its upper leaves shortly flagelliferous; leaf-sheath flagelliferous. *Spathes* elongate, tubular, narrow; spathellules of fem. fl. not pedicelliform. *Fruiting calyx* distinctly pedicelliform. *Seed* strongly dorsally alveolate, at least superficially ruminant? embryo basilar. —Leaflets large or in any case with not fewer than 3 primary nerves. Sp. 64-70.

GROUP XIII. *Leaves* imparipinnate, subflagelliferous; sheath flagelliferous. *Spadix* contracted. *Spathes* tubular at the base, open dilated and auriculiform above; spathellules of fem. fl. not pedicelliform. *Fruiting-perianth* explanate. *Albumen* deeply ruminant; embryo basilar, excentric. Sp. 71, 72.

GROUP I. See p. 437.

* Albumen ruminant, embryo basilar.

1. *C. erectus*, Roxb. *Fl. Ind.* iii. 774; stems tall stout erect, leaflets concolorous subequidistant linear-lanceolate margins and midrib beneath remotely ciliate, spines of petiole and rachis and lower spathe in half whorls flat straight pale, spadices branched elongate ending

in a flagellum, spathe cymbiform acute, flowers $\frac{1}{3}$ in. long. *Mart. Hist. Nat. Palm.* iii. 332; *Griff. in Calc. Journ. Nat. Hist.* v. 35; *Palms Brit. Ind.* 43; *Walp. Ann.* iii. 438, v. 829; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 209, t. 23, 24 (excl. longisetus); *For. Fl.* ii. 516. *C. schizospathus*, *Griff. ll. cc.* 32 & 41, t. 187; *Mart. l. c.* 332; *Walp. ll. cc.* 482, 829; *T. Anders. in Journ. Linn. Soc.* xi. 7.

SIKKIM HIMALAYA, ASSAM, SILHET, CHITTAGONG, the KHASIA HILLS, MUNIPORE and PEGU, ascending to 4000 ft.

Stems densely tufted 12–18 ft. high, internodes 2–3 in. long, 1–1½ in. diam. *Leaves* 12–18 ft.; leaflets few, 1½–2 ft. by 1½–2 in., 1-nerved; young petiole furfuraceous, spines on the full-grown petiole $\frac{1}{2}$ in. and upwards. *Spadices* 1–2 ft.; spikes 6–10 in. by $\frac{1}{2}$ in. across the imbricating coriaceous spathels. *Calyx* acutely 3-toothed; corolla thrice as long. *Stamen* free, filaments broad, erect. *Fruit* about 1 in. long, ovoid-oblong, subtended by the spreading perianth; scales trapezoid, dark brown with a yellow base.

Var. β . *COLLINA*, *Becc.*; smaller, petiole with solitary or sparingly clustered spines, spadices shorter often depauperate shortly peduncled, tip not or shortly cirriferous, fruit ellipsoid. *C. collinus*, *Griff. in Calc. Journ. Nat. Hist.* v. 31; *Palms Brit. Ind.* 39 (excl. leaf), t. 186 (*spadix only*).—Khasia hills.

Var. γ . *MACROCARPA*, *Becc.*, fruits larger. *C. macrocarpus*, *Griff. in Mart. l. c.* 333, t. 176, f. x. *Griff. Palms Brit. Ind.* 40, t. 186, A. f. i. ii. *Walp. ll. cc.* 484, 880.—Sikkim, &c.

2. **C. flagellum**, *Griff. in Mart. Hist. Nat. Palm.* iii. 333, t. 176, f. ix.; stem stout at length scandent, leaflets subopposite linear-lanceolate concolorous margins and midrib beneath remotely setulose, petiole furfuraceous rachis and peduncle of the spike and upper spathes armed with short recurved spines, leaf-sheaths scurfy bearing a clawed flagellum armed with long and short spines and bristles. *Griff. Palms Brit. Ind.* 48; *Walp. Ann.* iii. 484, v. 830; *Anders. in Journ. Linn. Soc.* xi. 8. *C. Jenkinsianus*, *Griff. l. c.* 40, t. 186 A., f. iii. (not 89). ?*C. polygamus*, *Roxb. Fl. Ind.* iii. 780.

SIKKIM HIMALAYA, ASSAM, SILHET, and the KHASIA HILLS, ascending to 4000 ft.

Stem 1–1½ in. diam. *Leaves* 6–7 ft.; leaflets 2–2½ ft. by 1–1½ in. broad, concolorous; petiole 1–1½ ft. *Spathes* tubular, lowest 1½–2 ft., compressed, upper lacerate. *Spadix* 8–10 ft.; spikes 8–10 in., pendulous, unarmed; spathels very like *C. erectus*. *Flowers* $\frac{1}{2}$ in. long, decurved. *Calyx* 3-fid to the middle. *Corolla* twice as long. *Stamens* free. *Fruit* 1 by $\frac{3}{4}$ in., ovoid-oblong, cuspidately beaked, subtended by the spreading perianth; scales deeply furrowed, pale with a dark band down the middle.

** Albumen equable.

† Erect or scandent. No flagellum on leaf-sheath or spadix.

3. **C. arborescens**, *Griff. in Calc. Journ. Nat. Hist.* v. 33; *Palms Brit. Ind.* 42, t. 188 A, B, C; stem erect tufted stoloniferous, leaflets equidistant linear-lanceolate white beneath margins closely setulose, midrib beneath and sometimes above setose, petiole scurfy, armed with whorls or half whorls of long flat black spreading spines, spadix very long pendulous, spathels very short closely imbricate truncate. *Mart. Hist. Nat. Palm.* iii. 332; *Walp. Ann.* iii. 483, v. 829; *Miq. Fl. Ind. Bat.* iii. 113; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 208, t. 22; *For. Fl.* ii. 516. *C. hostilis*, *Hort. Calc.*

PEGU; in marshy places, *Griffith*.

Stem 15–20 ft., $2\frac{1}{2}$ in. diam.; internodes 7 in., crown densely leafy. *Leaves* 5–6 ft., decurved leaflets 8–18 in. by $1-1\frac{1}{4}$ broad; petiole naked except for the long usually very black spines $\frac{1}{2}$ –2 in. long. *Lower spathes* with many half-whorls of short black spines; upper short, unarmed. *Spadices* longer than the leaves, very graceful; spikes 4–6 in. long by $\frac{3}{4}$ in. across the flowers, which are nearly $\frac{1}{2}$ in. long, curved. *Calyx* trifold to the middle. *Petals* oblong-lanceolate, acute. *Stamens* shortly monadelphous.

4. **C. castaneus**, *Griff. in Calc. Journ. Nat. Hist.* v. 28; *Palms Brit. Ind.* 37, t. 185 A, B, C; stem very short stout, leaves very long, leaflets very many equidistant linear 3-costate margins and costæ beneath remotely prickly, petiole very stout and short, sheaths armed with very unequal scattered solitary or 2–3-nate rather short straight stout flattened pale spines, spadices erect or nodding very stout nearly unarmed, male decomposed, spathelets very short and broad. *Mart. Hist. Nat. Palm.* iii. 331; *Walp. Ann.* iii. 482; v. 829; *Miq. Fl. Ind. Bat.* iii. 112.

MALACCA, *Griffith*, *Maingay* (*Kew Distrib.* 1533); PERAK at Gopung, *King's Collector* (5880).

Stem 3–5 ft., with the sheaths 3–4 in. diam. *Leaves* with the petiole 12–15 ft.; leaflets 12–24 by $1-2\frac{1}{2}$ in., very dark green, young scurfy beneath; petiole as thick as the little finger, rounded with a channelled upper surface. *Spathes* generally unarmed. *Spadices* 2–3 ft., male panicle, elongate flexuous, fem. shorter, nearly as broad as long, simply branched; spikes of male 2–3 in., of fem. much larger, scorpoidly recurved, $\frac{1}{2}$ in. broad. *Male fl.* $\frac{1}{3}$ in. long. *Calyx* trifold to the middle. *Petals* hardly longer. *Stamens* inflexed in bud. *Fem. fl.* larger. *Fruit* 1 in. long, ellipsoid, embraced at the base by the erect perianth; strongly beaked, scales in 24–26 rows, minute, dark brown.

5. **C. Griffithianus**, *Mart. Hist. Nat. Palm.* iii. 332; closely allied to *C. castaneus*, and dwarf like it, in the leaflets spadices, &c., but the petioles are described as terete, and the fruits are larger more globose with fewer (18–20) rows of larger scales. *Walp. Ann.* iii. 482; v. 829; *Miq. Fl. Ind. Bat.* iii. 112. *C. castaneus* (partly) *Griff. in Calc. Journ. Nat. Hist.* v. 29. *C. castaneus*, var. α *Griff. Palms Brit. Ind.* 38.

MALACCA, *Griffith*. PERAK, *King's Collector* (3040, 3048).

Probably only a form of *castaneus*.

†† Scandent, stout. Leaf-sheath flagelliferous. Spadix long, often flagelliform. Spikelets much flattened.

6. **C. longisetus**, *Griff. in Calc. Journ. Nat. Hist.* v. 36; *Palms Brit. Ind.* 44, t. 189 A, B; scandent or erect? glabrous, leaflets lanceolate concolorous, lower fascicled 3-costate, margins and midrib above and beneath and lateral nerves beneath setulose, terminal connate, petiole and its sheath and lower spathes densely armed with whorls and half whorls of straight black flattened spines intermixed with scattered shorter ones, male spadices decomposed nodding, upper spathes unarmed, spathelets densely imbricate truncate, fruit ovoid-oblong narrowed into a very stout beak. *Mart. Hist. Nat. Palm.* iii. 333; *Walp. Ann.* iii. 483; v. 830; *Miq. Fl. Ind. Bat.* iii. 114. *C. tigrinus*, *Kurz in Journ. As. Soc. Beng.* xliii. ii. 211, t. xxiv. xxvi.; *For. Fl.* ii. 519.

PEGU, *Hort. Bot. Calc.*, *Griff.* (*Kew Distrib.* 6392), *McLelland*; BURMA, and the ANDAMAN ISLANDS, *Kurz*.

Stem upwards of 1 in. diam. *Leaves* 4–8 ft., rachis not flagelliferous; leaflets $1\frac{1}{2}$ –2

ft. by $\frac{3}{4}$ –2 in.; petiole and rachis pale, smooth, except for the spines; sheaths very strongly armed. *Male spadix* slender, branched, *fem.* much stouter and shorter. *Lower spathes* elongate, tubular, compressed, strongly armed, upper short, lacerate; *spathels* densely imbricate, scurfy, truncate, often lacerate. *Fruit* 1 in. stipitate by the erect perianth; scales $\frac{1}{4}$ in. long and broad, flat, thin, yellowish with a very broad lunate brown band across the middle and fimbriate margins (the whole fruit banded like a tiger-skin).—Griffith describes *longisetus* as erect, and *Kurz tigrinus* as scandent.

7. **C. Thwaitesii**, *Becc.*; differs from *C. longisetus* in the rachis of the petiole bearing very stout recurved claws with black tips, the upper spathes bearing scattered spinescent tubercles, and in the smaller fruits with fewer paler tumid scales erose or the margin channelled down the centre and with a narrow brown marginal band. *C. longisetus*, *Thw. Enum.* 330 (not of *Griff.*).

CEYLON; in the Central Province, *Thwaites*. CANARA, *Ritchie*, *Talbot*.

A Canara plant collected by *Ritchie* and *Talbot*, probably belongs here, the fruit is exactly similar to that of the Ceylon plant.

†† *Scandent*, slender. *Leaf-sheaths* flagelliferous. *Spikelets* short, scorpioid.

8. **C. leptospadix**, *Griff. in Calc. Journ. Nat. Hist.* v. 49; *Palms Brit. Ind.* 60, t. 194 A, B, C; leaflets very many close-set narrowly linear acuminate, margin and sometimes the 3 costæ beneath setulose or aculeolate, petiole terete and scurfy rachis with distant straight flattened spines and a few short claws at the base, sheath short scurfy sparingly armed, spadices very long slender pendulous, with very many distichous short recurved spines, lower spathes long slender densely armed with flat thin spikes and minute recurved ones upper shorter unarmed, flowers small, fruit small globose mucronate. *Mart. Hist. Nat. Palm.* iii. 335, f. ii.; *Walp. Ann.* iii. 485; v. 483. *T. Anders. in Journ. Linn. Soc.* xi. 8.

SIKKIM HIMALAYA, *J. D. H.*, &c.; KHASIA HILLS, *Griffith*, &c.; MUNNIPORE and NAGA HILLS, *Watt*.

Stem slender, scandent. *Leaves* 3–4 ft.; leaflets 8–10 by $\frac{1}{2}$ – $\frac{3}{4}$ in., thin, pale green; rachis armed with simple recurved spines. *Spathes* very slender, tubular. *Spadices* several feet long, branched, below and armed with hooked short spines, branches very long and slender, with 20–40 recurved spikelets $\frac{1}{2}$ –1 in. long, and $\frac{1}{2}$ in. diam.; flagellum of spadix very long, armed with 1–3-fid recurved claws. *Spathels* cupular, acute membranous. *Male fl.* $\frac{1}{2}$ in. long; calyx 3-fid to the middle; petals twice as long. *Fruit* $\frac{1}{2}$ in. diam., subtended by the spreading perianth; scales very small, broad, yellow with a red-brown margin.

9. **C. rivalis**, *Thw. ex Trimen in Journ. Bot.* xxiii. (1885), 268; (*Err. typ. nivalis*); habit of *C. leptospadix*, leaflets numerous equidistant linear-lanceolate setulose on the margins and three costæ beneath, sheaths copiously armed with straight flat pale spines, rachis with recurved ones, spadices very long slender armed with short recurved spines and terminated by a clawed flagellum, spikes very many short distant recurved, lower spathes or all armed with very short prickles, fruit small ovoid beaked. *C. rudentum*, *Mart. Hist. Nat. Palm.* iii. 340 (*non Lour.*).

CEYLON; *Walker*, &c.

Leaves about 3 ft long, leaflets 12–18 by $\frac{1}{2}$ – $\frac{3}{4}$ in., broader and more coriaceous than in *C. longisetus*; rachis scurfy. *Spathels* very obliquely cup-shaped, coriaceous. *Male fl.* crowded, calyx trifid to the middle. *Petals* and *stamens* stipitate. *Fem. fl.*

larger, less crowded. *Fruit* $\frac{1}{3}$ in. long, subtended by the spreading perianth; scales broader than long, pale yellow, not channelled, narrowly bordered with red-brown.

GROUP II. See p. 437.

10. **C. pachystemonus**, *Thw. Enum.* 431 (in part.); stem slender scandent, leaves pinnately 4-7-foliolate, leaflets elliptic acute or acuminate 3-5-costate, margins and costæ beneath setulose, petiole short and rachis armed with solitary stout recurved spines, sheath striate sparingly tubercled and armed with flat pale spines, ochrea very short truncate, spadices very slender elongate decompound, spikes very many recurved, male corolla slender.

CEYLON; *Walker*; near Galle, *Thwaites*.

The greater part of Thwaites *C. pachystemonus* including the fruiting specimens are *C. digitatus*, which differs in the longer petioles, few terminal longer oblanceolate leaflets and smaller curved male flowers.

11. **C. digitatus**, *Becc. mss.*; leaflets digitately 2-4-foliolate oblanceolate cuspidately acuminate 3-5-costate, petiole slender, sheath armed with long strong straight flat spines and conical short ones, ochrea ligulate, spadices very slender elongate decompound, spikes very many recurved, male corolla slender, fruit small globose. *C. gracilis*, *Thwaites Enum.* 330 (*not of Roxb.*).

CEYLON; in the southern parts of the island, *Thwaites* (C. P. 2334 in part). *Stems* very slender, scandent. *Leaflets* at the end of the short petiole, 8-12 by 1-2 in., concolorous, many-nerved; petiole 6-8 in., unarmed or with a few solitary recurved spines and small prickles; sheath copiously armed. *Spadices* 3-4 ft., branched below, male spikes $\frac{1}{2}$ in., fem. 1-2 in. *Lower spathe* elongate, cylindric; upper very slender, mouth truncate, entire; spathe cupular, truncate. *Male fl.* $\frac{1}{2}$ in. long; corolla very narrow, curved, twice as long as the calyx. *Stamens* 2-seriate, filaments thickened upwards. *Fruit* $\frac{1}{3}$ in. diam., subtended by the spreading perianth; scales pale yellow, very broad with narrow brown margins.

12. **C. radiatus**, *Thw. Enum.* 431; leaflets 6-7 subradiately disposed at the apex of a shortly spinous petiole linear acuminate, sheath densely armed with short straight spines and long bristles, spadices very long slender branched armed with small recurved spines, spikes many short recurved.

CEYLON; in the southern parts of the island. *Walker*, *Thwaites*.

Stems very slender, scandent. *Leaflets* 8-12 by $\frac{2}{3}$ -1 in., thin, midrib beneath and margins quite without bristles or spines; petiole 2-3 in. with scattered short recurved spines. *Spathes* few, very long and slender. *Peduncle* of spadix 2-3 ft. long, as slender as a sparrow-quill; spikes $\frac{1}{2}$ - $\frac{2}{3}$ in. long; spathe cup-shaped, not densely imbricate, deeply striate. *Fruit* $\frac{1}{2}$ in. diam., globose, shortly beaked; scales broader than long, triangular, pale yellow with a narrow brown entire border.

GROUP III. See p. 437.

* Fruiting calyx hardly callous below, indistinctly or not pedicelliform.

† *Leaflets* few broad; terminal large, often connate at the base.

13. **C. javensis**, *Blume Rumph.* ii. 137, iii. 62, var. *PENINSULARIS*, *Becc. mss.*; leaflets 3-6 inequidistant elliptic or oblong-lanceolate 7-9-costate,

basal pair reflexed on the sheath, petiole very short and rachis armed with short scattered recurved spines, sheath with short straight spines, spadix very long slender, fruit small subglobose ovoid shortly beaked, scales in 17-18 series. ?*C. penicillatus*, *Roxb. Fl. Ind.* iii. 781.

PENANG and the MALAY PENINSULA; Perak, alt. 300-3500 ft., *King's Collector* (1996 ♀, 2673 ♂).

Stem 10-25 ft., with the leaf-sheaths as thick as the little finger, scandent. *Leaves* 1½-2 ft.; leaflets 8-10 by 1½-2½ in., often opposite, the upper pair free or confluent, margins and costæ beneath quite smooth; sheaths and their short spines pale. *Spadices* very long and slender and long slender spathes armed with small hooked spines; spikes 2-3 in., slender, ¼ in. across the flowers; spathels densely imbricate, shallow, acute, striate and subscabrid; flowers ½ in. long. *Calyx* 3-fid to the middle. *Corolla* not striate; segments narrow. *Scales* in 12-18 series.—*C. javensis* is, as its name implies, a Javan species.

Subvar. *polyphyllus*, Becc.; as above, but leaflets 8-12 subequidistant, basal reflexed or spreading.—Perak, summit of Gunong Tambang Betall, *Scortechini* (657^b); *King's Collector* (6312).

Subvar. *intermedius*, Becc.; as above, but more slender, and with fewer inequidistant leaflets.—Perak, *Scortechini* (236).

Subvar. *tenuissimus*, Becc.; very slender, leaflets fewer (3-4) remote longer, petiole longer, fruit elliptic-obovoid moderately beaked, scales more than 15-seriate.—Perak, summit of Gunong Tambang Batok, *Scortechini* (648^b).

Subvar. ?*purpurascens*, Becc.; like the type, but leaflets few large basal much reflexed, sheath moderately spiny.—Penang, *Curtis*. Perak, *King's Collector* (7932).

Subvar. ?*penangiana*, Becc.; as in *purpurascens*, but sheath with strong spines.—Penang.

14. *C. filipendulus*, Becc. mss.

PERAK; *Scortechini*, 232^b; *King's Collector* (5659, 5773, 8019).

I have seen no specimens of this species, and fail to draw up a diagnosis of it as distinguished from *C. javensis*, from Beccari's notes, except as regards the fruit which he describes as ovoid-conic about ½ in. long, gradually narrowed into a very slender acute beak terminated by the recurved stigmas and with the scales in only 12 series. The terminal pair of leaflets are confluent, as they are sometimes in *C. javensis*.

†† *Leaflets many, narrowly ensiform; upper distinct or hardly connate at the base.*

15. *C. rugosus*, Becc. mss.; stem very slender, leaves long-petioled, leaflets very many equidistant narrowly lanceolate finely acuminate 3-costate, upper pair quite free, petiole rachis and spadix very slender armed with few scattered short recurved spines, sheath armed with short straight spines, spadices filiform, branches very distant with few slender spines, spathels scabrid.

PERAK; *Scortechini*.

Stem with the sheaths ½ in. diam. *Leaflets* 7-8 by about ½ in., concolorous, setulose on the margins and 3 costæ above and only on the median beneath, petiole 5-7 in., margins acute; sheath gibbous above, larger spines flat, others minute and seriate. *Spathes* 2, lower prickly, upper and spathels scabrid.—I have seen no specimen.—*J. D. H.*

16. *C. radulosus*, Becc. mss.; stem slender, leaves sessile, leaflets very many narrowly ensiform equidistant concolorous, margins naked, 3-costate

costæ beneath armed with rigid bristles, the central alone sparsely setulose above, rachis armed beneath and at the margins with short hooked scattered spines, sheath densely armed with scattered flat spines, lower spathe densely armed upper and spathels finely scabrid, spadices very long.

PERAK; *Scortechini* (468^b); Goping, *King's Collector* (8171).

A lofty climber; stem with the sheaths 1-1½ in. diam. *Leaves* 2-2½ ft.; larger leaflets 18 by 1 in., upper much shorter and shortly connate at the base. *Lower spathe* elongate-tubular, with short spines on the outer faces, upper scabrid and scurfy with a lacerate mouth. *Spadix* with the partial inflorescences very long, bearing many recurved spikelets. *Fruit* small, pisiform, long-beaked.—Well characterized by the armature of the sheath, the naked margins of the leaflets, and the scabridity of a portion of the spadix.

17. **C. viminalis**, Willd. *Sp. Pl.* ii. I. 203; var. *FASCICULATUS*, Becc. mss.; stem rather stout, leaflets many inequidistant or fascicled 3-costate, margins and costæ beneath spinulose, floccose rachis and petiole with scattered long straight spines, sheath and flagelli with scattered short hooked spines, spadix very long clothed with long spathes, tip flagelliferous, branches paniculate, spikes 4-5 in., lower spathes compressed with subulate spines, upper prickly, fruit small globose beaked. *C. fasciculatus*, *Rorb. Fl. Ind.* iii. 779 (*excl. cit. Rheede*); *Kunth Enum.* iii. 208; *Mart. Hist. Nat. Palm.* iii. 338, t. 116, f. iv.; *Walp. Ann.* 488, v. 831; *Griff. in Calc. Journ. Nat. Hist.* v. 52; *Palms Brit. Ind.* 62, t. 195 B (*excl. A. Roxburghii*), t. 190 A, f. ii.; *Miq. Fl. Ind. Bat.* iii. 127; *Palm. Archip. Ind.* 27; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 210, t. 27 B; *For. Fl.* ii. 517. *C. extensus*, *Mart. l. c.* iii. 210, Ed. 1, *partly*, t. 116, f. iv. 1 (reduced in Ed. 2 to *fasciculatus*). *C. Pseudo-Rotang*, *Mart. l. c.* 209, Ed. 1, t. 116, f. vi. (reduced in Ed. 2 to *fasciculatus*); *Griff. in Calc. Journ. Nat. Hist.* v. 42; *Palms Brit. Ind.* 53; *Kunth Enum.* iii. 207.—*Wall. Cat.* 8608, 8611.

LOWER BENGAL, ORISSA, and the CARNATIC, CHITTAGONG, BURMA, the ANDAMAN ISLANDS and PENANG, *Wail*.—DISTRIB. Cochiu China. (Of the type Malay Islands.)

A stout scrambling and climbing species. *Leaves* 2-3 ft.; leaflets 4-10 by 3-3½ in., pale green, young and rachis and sheath white-floccose, petiole short and rachis very stout, spines slender ½-1½ in. long, pale hardly flattened. *Spathes* coriaceous, mouth obliquely truncate; flagelli with hooked 2-3-fid claws. *Spadix* and its spreading branches rather stout, internodes (and truncate spathels) ½-¾ in. *Fruit* ¾-½ in. diam.; scales pale yellow, obscurely channelled down the middle.

18. **C. concinnus**, *Mart. Hist. Nat. Palm.* iii. 332; erect or stemless?, leaflets many subequidistant linear-lanceolate acuminate glossy above 3-costate, margins and costæ beneath setulose, rachis and spadix rusty tomentose sparingly armed with short stout straight deflexed spines, spadix stout decompound, spathes loose coriaceous armed with short spines, secondary lax membranous long acuminate, spathels annular, fruit small globose beaked. *Kunth Enum.* iii. 207; *Walp. Ann.* iii. 483, v. 829; *Griff. in Calc. Journ. Nat. Hist.* v. 49; *Palms Brit. Ind.* 59; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 214, t. 20 C.—*Wall. Cat.* 8607.

TENASSERIM, *Wallich*; at Mergui, *Helper* (*Kew distrib.* 6388, 6394, 6395).

Leaflets in the only specimens I have seen 10-18 by 1-1½, very shining on both surfaces. *Fruit* ½ in. diam.

19. **C. floribundus**, *Griff. in Calc. Journ. Nat. Hist.* v. 56; *Palms*

Brit. Ind. 66, t. 197; leaflets few inequidistant linear-lanceolate acuminate uppermost crowded at the end of the rachis and often connate, margins and costæ beneath setulose, petiole lower spathe and rachis armed with very short stout and long scattered flattened pale spines, sheath densely armed with needle-like setæ and spines, spadix elongate decomposed, internodes sheathed by truncate ciliate spatheles, spikes short spreading and recurved, lower spathe very long keeled, fruit globose shortly beaked. *Mart. Hist. Nat. Palm.* iii. 337; *Walp. Ann.* iii. 487, v. 831. *C. mishmiensis*, *Griff. Il. cc.* 55 and 65; *Mart. l. c.*; *Walp. Ann. Il. cc.* *C. multiflorus*, *Mart.*—*Wall. Cat.* n. 8613.

ASSAM, SILHET and the KHASIA HILLS, *Wallich*, &c. MISHMI HILLS, *Griffith*.

Stem as thick as the middle finger. *Leaflets* bright green, 10–18 by 1–1½ in.; spines of rachis ½–1 in. long, rather flattened and deflexed. *Lower spathe* 18 in., coriaceous, terete, mouth very oblique. *Spatheles* acuminate, and flowers almost floccose with long white hairs, striate. *Flagelli* with short or long simple or compound recurved claws and spines. *Fruit* ½ in. diam.; scales very pale yellow, channelled down the back.

20. ***C. pseudo-tenuis***, *Becc. mss.*; leaflets many equidistant linear-lanceolate minutely setulose on the margins setose or not on the 3 costæ beneath, rachis (young brown scurfy) armed with strong flattened straight and short recurved spines, sheath densely armed with flattened spreading pale spines, spadix very long decomposed, spikelets very short decurved, male flowers and spatheles minute quite glabrous, fruit small ovoid strongly beaked. *C. tenuis*, *Thw. Enum.* 330 (not of *Roxb.*).

CEYLON; in the hotter parts of the island. DECCAN PENINSULA; on the WESTERN GHATS; from Canara southwards.

Stem slender. *Leaflets* 10–18 by ¾–¾ in., upper free; rachis rather stout; petiole short; sheath ¾ in. diam. *Spatheles* flattened, lower 2-edged; spatheles elongate. *Spadix* 2–3 ft., branches 6–10 in.; spikes of male fl. very short, of fruits 4–6 in. *Male fl.* ⅓ in. long, shining, not striate. *Fruit* ½ in. diam.; scales rounded, pale with broad brown margins.—Readily distinguished from *viminalis* by the equidistant leaflets, glabrous spatheles, and ovoid fruit.—A plant collected by Talbot near the seashore at Marinagoa, Bombay, seems a very different plant, has black tipped claws on the rachis of the leaf and spadix and flagellum, and curved male flowers ¼ in. long.—*J. D. H.*

21. ***C. densiflorus***, *Becc. mss.*; leaves very shortly petioled, leaflets many equidistant linear-ensiform finely acuminate concolorous upper gradually smaller terminal very short margins setulose costæ 3 all spinulose above and sparsely setulose on the middle one only beneath, sheath strongly armed with pale flat horizontal spines, spadix very long, spikes elongate dense-fl., spatheles and spatheles scabridly pubescent, fruit small beaked ovoid.

PERAK; at Thaiping and Larut, *King's Collector* (8434, 5527).

Stem scandent, 1¼–1½ in. diam. with the sheaths. *Leaflets* rigidulous, larger 13–14 by about ½ in.; sheath with a long stout clawed flagellum, gibbous above, mouth truncate; rachis armed with strong claws. *Spadix* 5 ft., stout, clawed. *Lower spathe* strictly sheathing, prickly; upper unarmed glabrous truncate. *Spikes* 2½–3½ in.; spatheles and spatheles very short, striate. *Fruit* immature, with a distinctly pedicelliform perianth, about ¼ in. diam; scales scarcely channelled, pale margined with brown.—I have seen no specimens. *J. D. H.*

22. ***C. luridus***, *Becc. mss.*; leaflets rather numerous equidistant remote

elongate ensiform acuminate with 3 strong costæ beneath, terminal pair shortly adnate below, margins and costæ beneath more or less setulose, sheath closely armed with long flat horizontal unequal spines, spadix very long ending in a flagellum paniculately branched, lower spathes tubular strictly sheathing spiny on the outer side, upper smooth striate, fruit globosely ovoid.

PERAK, summit of Gunong, *Scortechini*; Malacca and Larut, *King's Collector* (2647, 6284, 6400, 7203).

Stem slender, scandent. *Leaflets* 14-16 by $1\frac{1}{2}$ in.; petiole 4-6 in. *Spadix* 8-12 in.; spikelets $1\frac{1}{2}$ - $2\frac{1}{2}$ in. *Calyx tube* short, corolla rather longer. *Fruiting perianth* very shortly pedicelliform, strongly striate.—I have seen no specimens. J. D. H.

23. **C. delicatulus**, *Thw. Enum.* 330, 431; leaflets very many equidistant linear-lanceolate finely acuminate margins and 3 costæ setose, petiole very short shortly spiny, rachis brown-scurfy when young clawed, sheath densely armed with short and long slender black flattened spines, male spadix very long filiform decompound, spathes unarmed long-ciliate at the tip, spikes very slender, flowers rather distant very minute.

CEYLON; at Galle and Hinidoon Pattoo, *Thwaites*.

Leaves 2-3 ft. *Leaflets* 8-10 by $\frac{1}{2}$ in., concolorous, shining, upper smaller, tips filiform; flagellum very long, slender, clawed. *Fruit* about $\frac{1}{2}$ in. diam., scales pale with a very narrow brown border.—Very near *C. Helferianus*, but the leaflets are not aggregate, the spikelets more slender, and flowers smaller.

24. **C. Helferianus**, *Kurz. in Journ. As. Soc. Beng.* xliii. ii. 213; *For. Fl.* 521; leaflets many scattered inequidistant in series of 2-8 on a side, narrowly linear finely acuminate 3-costate margins and lateral costæ above and median beneath setulose, rachis slender 3-gonous armed with short scattered recurved spines, spadix long very slender compound glabrous, spathes narrow tubular compressed and truncate partial sparingly shortly spiny or unarmed, spikes $1\frac{1}{2}$ -3 in., male spathellules very short crowded, fem. more remote, corolla twice as long as the stamens not striate.

TENASSERIM (or the Andaman Islands), *Helper* (6389 ♂, 6392 ♀).

Sparingly armed. *Stem* slender, scandent. *Leaves* without flagelli, leaflets 8-12 by $\frac{1}{2}$ - $\frac{3}{4}$ in., concolorous, uppermost quite free, costæ 3-5 strong beneath; rachis with naked intervals sometimes 4 in. long, on one or both sides; sheath not seen. *Spadix* several feet long, flexuous, as thick as a sparrow-quill; upper spike simple, lower panicked, males shortest and more slender. *Lower spathe* long, narrow, compressed, with a short erect limb and short spines on the keels, partial $1\frac{1}{2}$ -1 in. long. *Spathellules* of male fl. very short and crowded, of fem. $\frac{1}{2}$ in. long. *Male fl.* $\frac{1}{8}$ - $\frac{1}{2}$ in. long, calyx 3-fid. *Fruit* unknown.

25. **C. nicobaricus**, *Becc.*; leaflets very many equidistant linear-ensiform long-acuminate sparsely setose on the median costa only on both surfaces lateral costæ slender naked, petiole channelled above armed with long straight marginal spines and short claws on the back, sheath very pale at first scurfy densely armed with very unequal long flat spines and short claws.

NICOBAR ISLANDS, *E. H. Man*.

A very slender species, with varnished internodes $\frac{1}{6}$ - $\frac{1}{4}$ in. diam. *Leaflets* 7-8 $\frac{1}{2}$ by about $\frac{1}{4}$ in., shining above. *Spadix* and fruit unknown. *Flagelli* exceedingly slender.—Appears to be allied to *C. delicatulus*, from which it is distinguished by the leaflets being setose only on the median costa.—I have seen no specimen. J. D. H.

** Fruiting perianth distinctly pedicelliform.

26. **C. tenuis**, *Roxb. Fl. Ind.* iii. 780; leaflets very many equidistant uppermost gradually smaller linear-lanceolate acuminate 3 costæ all setose above, the median only below, petiole short margined with straight spines and rachis armed with one row of short recurved spines, sheaths flagelliferous sparingly armed with short flat spines, spadix very long decomposed flagelliferous, spathes elongate tubular lower with a short limb and scattered recurved spines, partial short unarmed young scurfy, spathellules densely crowded cymbiform, flowers very small, fruit subglobose. *Kunth Enum.* iii. 211; *Mart. Hist. Nat. Palm.* iii. (Ed. 1, 212), 335; *Griff. in Calc. Journ. Nat. Hist.* v. 46; *Palms Brit. Ind.* 57, t. 193 A, B, C; *Walp. Ann.* iii. 485, v. 830; *Miq. Fl. Ind. Bat.* iii. 118; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 212, t. 31 B; *For. Fl.* ii. 520. *C. Royleanus*, *Griff. ll. cc.* 40 and 53, t. 191; *Mart. l. c.* 335; *Walp. ll. cc.* 485 and 830. *C. amarus*, *Lour. i.* 210. *C. Heliotropium*, *Herb. Ham.*; *Mart. l. c.* 211, 334; *Kunth l. c.* 210; *Griff. ll. cc.* 51 and 61; *Walp. Ann. ll. cc.* 484 and 830.

TROPICAL HIMALAYA, from Kumaon eastwards, BENGAL, ASSAM, SILHET, CHITTAGONG and BURMA.—DISTRIB. Cochin.

Stems very long, scandent; internodes not thicker than a goose-quill. *Leaves* 1½–2 ft.; leaflets approximate, lower 8–12 by ¼–½ in., margins minutely setulose or spinulose, bristles on costæ ¼ in.; petiole pale, stout; spines with broad laterally compressed conical bases; flagelli filiform. *Lower spathes* 6–10 in. by nearly ¾ in. diam., upper shortly scurfy. *Lower spikes* paniced, 1½–4 in. long. *Male fl.* 1½ in. long, not distichous and spreading but secund in 3–4 series, imbricating, suberect. *Fruit* ½ in. diam., mucronate; scales pale with a shallow median channel and very narrow discoloured margins.

27. **C. diffusus**, *Becc. mss.*; leaflets many equidistant rigidulous upper shorter narrowly linear-lanceolate very long-acuminate margins naked slightly thickened, costæ 3 setose above the median spinulose beneath, rachis armed throughout with half whorls of hooked spines or 3-fid claws, male spadix diffusely supra-decomposed, branches of partial infl. spirally inserted, lower spathe tubular green smooth coriaceous armed with hooked spines on the outer surface, upper tubular-infundibular unarmed, spathels short broad, flowers rather distant, calyx campanulate striate, corolla twice as long.

SINGAPORE; *Lobb.*

Leaves apparently 2–3 ft.; leaflets 10–12 by ½–¾ in. *Male spikelets* 1–2 in.; flowers crowded, distichous, ½–¾ in. long; spathellules and calyx strongly ribbed; corolla twice as long as the calyx, not striate.—Fem. fl. and fruit unknown, position hence uncertain.

28. **C. Rotang**, *Linn. Sp. Pl.* Ed. 1, 325; Ed. 2, 463 (the Ceylon plant only); leaflets many equidistant linear-ensiform rarely subaggregate upper smaller, margins spinulose, petiole very short or 0, rachis armed beneath with short stout uniseriate claws, sheath armed with short straight conical based scattered spines, male spadix slender decomposed, spikelets ½–1 in. recurved, spathellules short, flowers crowded, corolla deeply striate, fem. spikelets much stouter and longer, flowers distant, fruit globose very pale. *Willd. Sp. Pl.* iii. 202 (*excl. Syn. Lour.*); *Lamk. Ill.* t. 770, f. 1; *Schult. f. Syst. Veg.* vii. ii. 1322 (*excl. all cit. but Linn. & Willd.*); *Roxb. Fl. Ind.* iii. 777; *Mart. Hist. Nat. Palm.* iii. 334, t. 116, f. 8; *Kunth Enum.* iii. 207; *Blume Rumph. iü.* 33; *Walp. Ann.* iii. 484, v. 830;

Miq. Fl. Ind. Bat. iii. 117. *C. Roxburghii*, *Griff. in Calc. Journ. Nat. Hist.* v. 43; *Palms Brit. Ind.* 55, t. 195 A (under *fasciculatus*) (and t. 112 ? *monoicus*, Roxb.); *Thw. Enum.* 330. *C. monoicus*, *Roxb. Fl. Ind.* iii. 783; *Mart. l. c.* (209, Ed. 1) 334 (excl. descr.) *Wall. Cat.* n. 8604 ?; *Griff. ll. cc.* 48 and 58; *Kunth l. c.* 208; *Walp. ll. cc.* 484 and 830. *C. scipionum*, *Lam. (in part) Encycl.* vi. 304 (*excl. Syn. Lour. & Rheede*).

THE DECCAN PENINSULA AND CEYLON.

Stem scandent, very slender. *Leaves* 2-3 ft.; leaflets 8-10 by $\frac{1}{2}$ - $\frac{3}{4}$ in., median costa unarmed on both surfaces or armed beneath only, lateral unarmed on both surfaces; in Madras specimens there is often a strong solitary spine above the base of the leaflet on the midrib beneath; sheath in Madras specimens with horizontally flattened spines. *Spadix* and its slender tubular spathes unarmed or nearly so. *Male fl.* biseriate, but not distichous, densely crowded, $\frac{1}{2}$ - $\frac{3}{4}$ in. long; spathe-lules acuminate. *Fruit* $\frac{3}{4}$ - $\frac{5}{8}$ in. diam.; scales with an obscure sometimes discoloured channel, margins not or faintly narrowly discoloured.

29. **C. Brandisii**, *Becc. mss.*; stem slender, leaflets few fascicled lanceolate ensiform naked beneath sparsely setose above on the 3 costæ, petiole slender with few very long slender straight spines, rachis with long stout solitary straight and recurved spines, sheath armed with solitary or aggregate slender flattened straight spines mouth with very long needle-shaped spinules, male spadix elongate shortly flagelliferous with few partial inflorescences, spathes narrow tubular upper funnel-shaped unarmed embracing the bases of the spikelets, flowers 4-seriate in bud.

TRAVANCORE; at Courtallam, alt. 3-5000 ft., *Brandis*.

I have seen no specimen of this species, which appears from a photograph to be remarkable for the long straight very slender spicules at the mouth of the leaf-sheath.—*J. D. H.*

30. **C. Feanus**, *Becc. mss.*; stem scandent, leaflets few remote subequidistant elliptic-lanceolate or oblanceolate 7-9-costate, petiole very short and rachis armed with short hooked spines, sheath flagelliferous coriaceous green marbled with black scurfy spots strongly armed with scattered long spreading or deflexed and short stout reflexed spines, male spadix decompound erect rigid with 7 partial inflorescences, lower spathe tubular 2-keeled mouth compressed keels armed with short stout spines, upper truncate obliquely, spikelets recurved, fruit broadly ovoid.

TENASSERIM; alt. 3-5000 ft., *L. Fea*.

Stem scandent; internodes $\frac{1}{3}$ - $\frac{1}{2}$ in. diam. *Leaves* rather short, about 3 ft. 3 in. long; sheath $\frac{1}{2}$ - $\frac{3}{4}$ in.; ochrea very short, truncate; leaflets 6-8, the larger 8-12 by 2-2 $\frac{3}{4}$ in., terminal free. *Male spadix* 1 $\frac{1}{2}$ in. *Fruit* about $\frac{1}{4}$ in. by $\frac{1}{4}$ diam., beak conical acute; scales about 15-seriate, not channelled on the back, where they are opaque and as if pulverulent with a broad rather discoloured band. *Seed* deeply pitted.—Near *acanthospathus*, but very distinct by the opaque not channelled scales of the fruit.

31. **C. acanthospathus**, *Griff. in Calc. Journ. Nat. Hist.* v. 39; *Palms Brit. Ind.* 50, t. 190 B (excl. A, f. 1); leaflets few large inequidistant elliptic-lanceolate strongly 5-7-costate usually unarmed on both surfaces, rachis and long petiole very stout scurfy and armed with 2-3 series of very stout recurved spines, sheath stout densely armed with long flattened and short stout straight or recurved spines, spadices very stout flagelliferous, peduncle armed with unequal subulate spines, lower spathe very stout tubular compressed with a lanceolate limb, back armed with conical based spines, upper spathes clavate unarmed, partial

inflorescence sheathed up to the spikelets, fruit obovoid or globose shortly beaked brown. *Mart. Hist. Nat. Palm.* iii. 333, t. 176, f. vi.; *Walp. Ann.* iii. 484, v. 830. *C. montanus*, *Anders. in Journ. Linn. Soc.* xi. 9.

EASTERN NEPAL, SIKKIM and BHOTAN HIMALAYA, ascending to 6000 ft., *J. D. H.*, &c. KHASIA HILLS, alt. 2-4000 ft., *Griffith*, &c.

Stem slender, scandent, as thick as a swan's quill. *Leaves* 2-3 ft.; leaflets 10-16 by 2-3 in., margins naked or spinulose, both surfaces quite naked or very rarely with a few small spines on the costæ of the upper surface; flagellum of the sheath 10-12 ft. *Spadix* 4-6 ft., erect, armed with short recurved spines; branches of fruiting spadix very stout; spikes 1-4 in., strongly recurved. *Lower spathe* 1 ft., scurfy, as thick as the thumb; uppermost glabrous. *Fruit* $\frac{3}{4}$ in. diam., pericarp thin; scales chesnut brown, obscurely channelled, shining; fruiting calyx large, cupular, $\frac{1}{2}$ in. diam., lobes very short. *Seed* deeply pitted.

GROUP IV. See p. 437.

32. **C. Guruba**, *Ham. in Mart. Hist. Nat. Palm.* iii. 206 and 330, t. 175, f. 1; leaflets alternate equidistant narrowly linear, margins and 3 costæ above setose midrib usually alone setose beneath, long slender petiole and rachis armed with long brown recurved and short conical spines below and on the margins, sheaths flagelliferous covered with long flattened spines and crowded smaller ones, spathes glabrous tube of lower compressed margins with long spines back with short ones, limb recurved, upper spathes nearly unarmed, male spadix elongate very slender decompound, spikes spreading very slender, spathellules very shallow, flowers distichous pointing forwards, fruit pisiform apiculate. *Griff. in Calc. Journ. Nat. Hist.* v. 42; *Palms Brit. Ind.* 54; *Kunth Enum.* iii. 210; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 214; *For. Fl.* ii. 522. *C. Mastersianus*, *Griff. ll. cc.* 76 and 84, t. 206. *Dæmonorops Guruba*, *Mart. l. c.* 330; *Walp. ll. cc.* 479 and 828; *Miq. Fl. Ind. Bat.* iii. 100.

BENGAL, ASSAM, the KHASIA HILLS, SILHET, CHITTAGONG and BURMA.

Tall, scandent, stem without the sheaths very slender. *Leaves* 5-6 ft.; leaflets 12-15 by $\frac{1}{2}$ - $\frac{2}{3}$ in., upper smaller free, sometimes quite naked on both surfaces; sheath with a long membranous lacerate ligule. *Spathes* with terete tubular bases and long flat thinly coriaceous obtuse brown laminæ, of the lower 12-18 long by 1-1 $\frac{1}{2}$ broad, flagellum very stout and stoutly armed. *Male spikes* 2-3 in., flexuous; spathellules very small membranous cups. *Flowers* $\frac{1}{2}$ in. long, calyx striate; corolla twice as long, polished. *Fruit* $\frac{1}{4}$ in. diam., abruptly beaked; scales very pale, obscurely channelled, margin brown.

33. **C. nitidus**, *Mart. Hist. Nat. Palm.* iii. 334; leaflets equidistant rigidulous close-set linear-lanceolate acuminate shining margins thickened, costæ 3 setulose on both surfaces or on the upper only, rachis with simple or compound recurved spines, spadices decompound, spathes glabrous, fruit globose, scales brown in the middle 17-18-seriate. *Kunth Enum.* iii. 211; *Griff. in Calc. Journ. Nat. Hist.* v. 49; *Palms Brit. Ind.* 59; *Miq. Fl. Ind. Bat.* iii. 117; *Walp. Ann.* iii. 484; v. 830; *Wall. Cat.* 8609.

TENASSERIM, *Wallich, Helfer (Kew distrib.)* (6390, 6396, 6398).

Very near to and probably not distinct from *C. Guruba*, but the leaflets are shorter 6-7 by $\frac{1}{3}$ - $\frac{1}{2}$ in., and the flowers smaller, about $\frac{1}{10}$ in. long.—The specimens are very insufficient.

34. **C. platyspathus**, *Mart. Hist. Nat. Palm.* iii. 210; leaflets few scattered alternate ensiform acuminate strongly 5-7-costate, margins
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costæ almost unarmed, rachis armed with straight and recurved strong solitary and binate spines with swollen bases, sheath armed with close-set straight subulate spines, male spadix long very slender sparsely shortly armed, inflorescences short subsessile paniculately branched, spikelets very short few-fl. upper spathes with very short sheaths and flat linear-oblong laminae, spathellules very short acute, corolla twice as long as the calyx not striate. *Griff. in Calc. Journ. Nat. Hist.* v. 75; *Palms Brit. Ind.* 83; *Kurz in Journ. As. Soc. Beng.* xl. 214. *C. polyspathos*, *Wall. Cat.* 8610. *Dæmonorops platyspathus*, *Mart. l. c.* Ed. 2, 206, 329; *Miq. Fl. Ind. Bat.* iii. 99; *Walp. Ann.* iii. 479, v. 828.

TENASSERIM, at Tavoy, *Gomez*.

Leaflets 10–12 by 1–1½ in., rigid, margins bristly towards the apex, young pale softly scurfy beneath, margins thickened with obscure distant asperities. *Upper spathes* 3–4 by ½–¾ in., flat. *Inflorescences* of male spadix as long as their spathes, very compound; spikelets ¼–½ in. *Flowers* ⅓ in. long, pale, close-set, pointing forwards. *Calyx* sharply toothed, striate. *Fem. spadix* and fruit unknown.

35. *C. paspalanthus*, *Becc. mss.*; leaflets equidistant close-set very narrow finely acuminate 3-costate costæ closely spinulose beneath more remotely above, margins nearly smooth, petiole very long white armed below with flat appressed long and short spines, rachis brown scurfy rounded beneath with short recurved single and trifid spines, lower spathe very long tubular armed with short spires, male spadix stout erect decomposed with erect branches and very short lacerate spathels, spikes erect very dense-fl., spathellules closely imbricating lunate very strongly nerved, flowers minute.

PERAK; at Goping, *King's Collector* (577).—DISTRIB. Borneo.

Leaves not flagelliferous; leaflets 4–10 by ½ in., shining, strict; petiole about 2 ft., white, but covered with a fine brown scurf when young; sheath flagelliferous. *Spadix* quite unlike any other, from the upright branches and spikes, and dilacerate short membranous spathels. *Spikes* ½–¾ in., strict, like those of some *Panicum*; spathellules very peculiar, flabellately nerved. *Male fl.* distichous, spreading horizontally, ⅓ in. long. *Calyx* cupular, striate, broadly obtusely lobed. *Corolla* not twice as long; petals broadly elliptic, obtuse, obscurely striate.—I have seen no complete spathe. Described from Borneo specimens collected at Sarawak by Lobb, which Beccari says are identical with those from Perak (which I have not seen). He adds that its affinities are uncertain, and it is perhaps allied to *C. leptospadix*.

36. *C. ramosissimus*, *Griff. in Calc. Journ., Nat. Hist.* v. 78; *Palms Brit. Ind.* 87, t. 207; leaflets very large scattered ensiform or elliptic-lanceolate acute coriaceous many-costate, margins and costæ smooth, petiole very stout armed below with scattered very long straight flat and many small spines, rachis very stout back rounded armed with broad short recurved solitary and 2–3-nate claws, male spadix ovoid decomposed erect densely branched, peduncle very stout tomentose, branches and spikes erecto-patent, spathes very large blade thickly coriaceous lower with a spinous tube, upper open, fem. spadix furfuraceous with very stout simple spikes, spathellules of both sexes very short. *Dæmonorops ramosissimus*, *Mart. Hist. Nat. Palm.* iii. 330; *Miq. Fl. Ind. Bat.* iii. 100; *Walp. Ann.* iii. 479, v. 828.

MALACCA? *Griffith*. PERAK; Larut, on Gunong Tjuk, *Scortechini* (51b, 1235); alt. 2500–3500 ft., *King's Collector* (2617, 2910, 6342, 7181).

Stem 20–30 ft., scandent, 1–1½ in. diam. *Leaves* 6–8 ft., dark green, glossy; leaflets 18–24 by 1½–2 in., 7–13-costate, almost plicate; rachis as thick as the little finger, plano-convex, spines ¼–½ in. long, recurved, longer spines on lower part of petiole 1½ in., on sheath 2–3 in. *Blade* of lower spathe 1–2 ft. by 1–2 in. *Inflo-*

rescences of male spadix 10–12 by 3–4 in., furfuraceous; peduncle as thick as the little finger, compressed; branches fastigate, strict, suberect; spikes distichous, 1–1½ in.; spathellules very shallow; flowers close-set, pointing forwards, ⅓ in. long, *Calyx* shortly tubular, obliquely acutely trifid, striate. *Corolla* twice as long, smooth. *Fem. spadix* sessile; spikes 1½–2½ in., brown scurfy, ⅓ in. diam. *Fruit* (young) globose with a very stout beak; scales all brown — Described from a Perak specimen, the male spadix of which does not resemble the slender lax flowered one of Griffith's t. 207.

37. **C. perakensis**, *Becc. mss.*; stem erect very short, leaves terminal, leaflets very numerous equidistant strictly ensiform acutely 3-costate above spinulose on 3 costæ above and only on the median beneath, petiole long armed with long stout horizontal marginal spines, male and fem. spadices subsimilar strict erect more or less sprinkled with white cottony tomentum, spathes unarmed much compressed shorter than their respective partial inflorescences, fem. spadix not very decomposed, flowers cylindric.

PERAK, *Scortechini* (317^b).

The above description is from Beccari's notes, who adds that it is a very distinct species, somewhat allied to *C. ramosissimus*.—I have seen no specimen. *J.D.H.*

38. **C. hypoleucus**, *Kurz For. Fl.* ii. 523; leaflets alternately and interruptedly approximate by twos on each side oblong-lanceolate acuminate ciliate towards the apex white beneath many-costate, petiole short armed with long and short conical straight and recurved spines, rachis with scattered recurved spines, sheaths densely spiny with unequal spines 1 in. long and less, fem. spadix small short, peduncle slender spinous, spathes oblong-lanceolate, spathels tubular small distant, flowers distichous, calyx ¼ in. shortly 3-lobed, corolla twice as long segments acute. *Dæmonorops hypoleucus*, *Kurz in Journ. As. Soc. Beng.* xliii. ii. 208 (*partim*), t. xviii. (excl. t. xix.).

BURMA; on Thoungyeen, *Brandis*.

Stem slender, scandent, as thick as a goose-quill without the sheaths. *Leaves* 2–3 ft., not flagelliferous; sheaths flagelliferous; leaflets 6–9 in. long. *Fem. spadix* 12 in. long; peduncle about 1 in. Male fl. and fruit unknown.—Description from *Kurz*. I have seen no specimen. *J.D.H.*

39. **C. myrianthus**, *Becc. mss.*; leaflets very long narrowly elliptic-lanceolate many-costate pale almost white beneath smooth on both surfaces or with minute bristles on the costæ beneath, margin obscurely aculeolate, rachis dorsally rounded shortly spinous, male spadix very long slender sparsely spinous, spathels tubular truncate, inflorescences laxly decomposed, branches very slender, spike ¼–½ in. zigzag almost filiform, spathellules minute, flowers minute pointing forward closely imbricate, calyx acutely 3-lobed striate, corolla twice as long acute estriate. *Dæmonorops hypoleucus*, *Kurz in Journ. As. Soc. Beng.* xliii. ii. 208 (*partim*) t. xix.

TENASSERIM; at Mergui, *Helfer* (*Kew distrib.* 6397).

The only materials for this species seen by me are Helfer's specimens, consisting of a portion of the rachis of a leaf with two leaflets, and portions of a male spadix; the leaflets are 30 by 2 in., very thin and pale beneath, with indistinct cross nervules. —Beccari has identified with it the plate xix. of *Kurz's C. hypoleucus* on the faith of some specimen supposed to be of *Kurz's* plant communicated by Dr. Brandis. That figure represents much shorter and broader leaflets than those of Helfer's plant, with distinct bristles on the margins and costæ beneath.—There is no evidence of Helfer's plant belonging to this section. *J.D.H.*

GROUP V. See p. 437.

40. **C. travancoricus**, *Beddome mss.*; leaflets in distant opposite groups of 3-5 narrowly oblanceolate acuminate thin, costæ 3 very slender naked above sparsely setulose beneath, rachis and petiole very slender armed with small straight and recurved spines, sheath armed with slender straight flattened prickles, spadix long slender flagelliferous, inflorescences shorter than the membranous flat spathes, male decompound, fem. with simple distichous spikes, upper spathes and spathelets tubular obliquely truncate, spatheletules short acute, calyx strongly striate, corolla estriate twice as long.—*Rheede Hort. Mal.* xii. t. 64.

DECCAN PENINSULA; from Malabar to Travancore, *Wight, Beddome*.

Stem very slender, scandent. *Leaves* 18-24 in.; leaflets 4-6 by $\frac{1}{2}$ - $\frac{3}{8}$ in., broadest about or above the middle and thence tapering to a capillary point, shining above; rachis scurfy when young; petiole 4-6 in., dorsally rounded, margins acute much compressed towards the base and there chiefly spiny. *Spadix* flagelliferous, 2-3 ft.; peduncle short, flattened, young white scurfy, margins shortly spiny. *Lower spathes* tubular, compressed at the base, with shortly spinous angles, produced into a long membranous sheathing lamina; upper with unarmed tubes. *Inflorescences* about 2 in. long, males with spreading very slender branches bearing short flexuous almost capillary spikes of flowers $\frac{1}{2}$ in. long; fem. with simple recurved spikes and rather larger flowers.—*Rheede's* figure is very good for its time.

41. **C. Rheedel**, *Griff. in Calc. Journ. Nat. Hist.* v. 73; *Palms Brit. Ind.* 36, 83; leaflets in very distant groups of 3 on a long rachis armed with scattered short recurved spines linear-lanceolate acuminate, fruiting spadix with the flat open acute spathes longer than the ovoid dense clusters of ellipsoid or oblong fruit. *Dæmonorops Rheedii*, *Mart. Hist. Nat. Palm.* iii. 330; *Miq. Fl. Ind. Bat.* iii. 100; *Walp. Ann.* iii. 479, v. 828.—*Rheede Hort. Mal.* xii. t. 65.

MALABAR, *Rheede*.

Of this species nothing is known beyond *Rheede's* rude plate, which is very inferior to that of *C. travancoricus*, from which it differs in the much longer leaf the leaflets being grouped in threes, one of each group apparently on one side of the rachis and 2 on the other; four leaflets terminate the rachis. The fruits are represented as $\frac{3}{8}$ in. long by $\frac{1}{2}$ in. broad and very shortly beaked. *Beccari* thinks that a *Calamus* fruit sent from Malabar to Kew by Major Campbell exactly corresponds to *Rheede's* figure.

GROUP VI. See p. 438.

42. **C. Huegelianus**, *Mart. Hist. Nat. Palm.* iii. 338; leaflets many equidistant elongate ensiform acuminate strongly 3-costate, margins smooth unarmed above beneath pale and with a very few long bristles on the lateral costæ, petiole stout young scurfy back rounded with very stout short recurved spines, sheath armed with very stout scattered long and short spines, fem. spadix stout erect, spathes sparingly armed with stout claws narrowly tubular truncate, fruiting branches 6-10 in. very stout, spikes recurved, calyx pedicelled cupular with spreading lobes, fruit globose black shining. *Walp. Ann.* iii. 488, v. 831. *C. Wightii*, *Griff. Palms Brit. Ind.* 102, t. 216 *C. melanolepis*, *H. Wendl. in Kerch. Palm.* 237. *Dæmonorops melanolepis*, *Mart. Hist. Nat. Palm.* iii. 331, t. 175, f. xi.; 342 under *C. dioicus* and tab. 116, f. xi.; *Walp. ll. cc.* 481, and 829.

NILGHIRI HILLS; alt. 5-6000 ft., at Sisparah, *Wight*, &c.; at Naduvatam, *Gamble*.

Apparently a stout scandent species. *Leaflets* 12–16 by $\frac{3}{4}$ –1 in., tips spinelously ciliate, margins below obscurely aculeolate, pale green, not shining, almost white beneath, the very distant bristles on the lateral nerves beneath sometimes absent, at others nearly $\frac{1}{2}$ in. long; rachis and petiole pale. *Fruit* $\frac{3}{4}$ – $\frac{3}{8}$ in. diam., very shortly beaked; scales subacute, with fimbriate margins, not channelled; fruiting calyx nearly $\frac{1}{2}$ in. diam.; petals acute.

43. **C. Gamblei**, *Becc. mss.*; leaflets as in *C. Huegelianus*, but with shorter scattered bristles on the 3 costæ of the lower surface and a few on the upper, fruiting spikes of the spadix recurved; calyx cupular long-pedicelled, lobes very short, fruit globose or broadly obovoid, scales pale yellow acute deeply channelled.

NILGHIRI HILLS; Makurti forests, alt. 5000 ft., *Gamble*.

A very distinct species differing from *Huegelianus* by the longer leaflets, 2–2½ ft., the more slender spathellules, longer pedicel of the more campanulate calyx which has shorter lobes, and by the pale fruit with deeply channelled scales.—A variety with spherical fruit is mentioned by Beccari.

GROUP VII. See p. 438.

44. **C. gracilis**, *Rorb. Fl. Ind. iii. 781 (excl. Syn. Hort. Mal.)*; leaflets few in opposite groups of 3–5 on each side of the slender rachis elliptic-lanceolate acuminate 3–7-costate, costæ very slender more or less setose above, petiole short and rachis and sheath armed with short hooked spines, fem. spadix elongate slender drooping flagelliferous spathes tubular acuminate sparingly spinous, upper unarmed, spathels not imbricate, fruiting calyx sessile shortly cylindric, lobes very short, fruit oblong, scales very pale ripe channelled. *Mart. Hist. Nat. Palm. iii. 338*; *Kunth Enum. iii. 209*; *Griff. in Calc. Journ. Nat. Hist. v. 54*; *Palms Brit Ind. 64, t. 196*; *Walp. Ann. iii. 488, v. 831*; *Kurz in Journ. As. Soc. Beng. xliii. ii. 212, t. 31 C*; *For. Fl. ii. 520*.

THE KHASIA HILLS, ascending to 4000 ft.; UPPER ASSAM, *Mann. Cachar, Keenan. CHITTAGONG, Kurz.*

Slender, scandent; naked stem not thicker than a quill. *Leaves* 2–3 ft.; leaflets 5–7 in., margins obscurely bristly except at the tip where the bristles are long; petiole very short and rachis fugaciously scurfy; sheaths green, glabrous. *Spathes* fugaciously brown-scurfy; spathels unarmed. *Corolla* three times as long as the calyx. *Fruit* $\frac{3}{4}$ in. long; scales straw-colored, with or without a narrow brown border; fruiting calyx pedicelliform. *Seed* wrinkled.—*Descript. chiefly from Kurz.*

45. **C. melanacanthus**, *Mart. Hist. Nat. Palm. iii. 333, t. 116, f. 13 (in part)*; leaflets many equidistant membranous linear with capillary tips 3-costate upper much shorter, shortly setose or naked on the costæ beneath, rachis with a single row of short recurved black spines, sheath with sub-whorled spines, fem. spadix decompound ending in a flagellum, spathes shortly sparsely spinous upper nearly unarmed, fruiting calyx sessile campanulate pedicelliform, fruit ellipsoid shortly beaked, scales very pale channelled, embryo lateral. *Kunth Enum. iii. 211*; *Griff. in Calc. Journ. Nat. Hist. v. 49*; *Palms Brit. Ind. 59*; *Walp. Ann. iii. 484, v. 830*; *Miq. Fl. Ind. Bat. iii. 119*; *Palm. Archip. Ind. 27*; *Kurz in Journ. As. Soc. Beng. xliii. ii. 215, t. xx. B.—Wall. Cat. 8606 B.*

TENASSERIM; at Chapnedong, *Wallich.*

Scandent. *Leaflets* 6–13 by $\frac{1}{2}$ in., upper 2–3 in., shining, tips sparsely bristly or naked. *Corolla* hardly longer than the (fruiting) calyx-lobes. *Fruit* $\frac{3}{4}$ in. long, greyish yellow with very narrow brown margins; lobes very short. *Albumen*

deeply ruminatè; embryo in the middle of the side, a very unusual position in the genus.—The specimens examined are of the portion of a leaf and of a fruiting spadix.

46. **C. Diepenhorstii**, *Miq. in Journ. Bot. Neerl. Ind.* i. 21; *Palm. Archip. Ind.* 27; *Fl. Ind. Bat.* 594; leaflets very many equidistant long narrow finely acuminate 3-costate, costæ naked or very sparsely setose above, margins thickened smooth, petiole very long armed with straight scattered spines, rachis angular armed with one row above and two below of short recurved spines, sheath copiously armed with long flat straight deflexed black spines, spadices very long supradecomound, fruiting calyx very short sessile cupular, fruit obovoid shortly beaked, embryo basal. *C. melanacanthus*, *Mart. (partim)*.—*Wall. Cat.* 8606 A.

PENANG, *Wallich, Curtis* (765). PERAK; on Gunong Tambang Batok, alt. 500–2000 ft., *Scortechini* (647^b). Larut and Gunong Malacca, *King's Collector* (7201, 2552).—DISTRIB. Sumatra.

Stem 20–30 ft., stout, scandent. *Leaves* 3–4 ft.; leaflets 18–20 by $\frac{2}{3}$ – $\frac{3}{4}$ in., straight, upper smaller; spines of sheath $\frac{1}{2}$ – $\frac{2}{3}$ in. long. *Fruiting spadix* 10–12 ft., slender. *Fruit* $\frac{3}{4}$ in. diam., orange-yellow when ripe (*King's collector*); fruiting calyx very short, sessile, lobes obscure; scales channelled, very narrowly bordered with brown.—Very distinct from *melanacanthus* in the much stouter petiole and rachis, long flat spines on the sheath, long leaflets with thickened margins, very long fem. spadix, with very long branches, and basal embryo.

¶ 47. **C. singaporensis**, *Becc. mss.*; leaflets many rather distant narrowly linear finely acuminate 3-costate, tips setose, margins and costæ on both surfaces unarmed or nearly so, upper part of rachis slender angled with 1–2 rows of short recurved black spines, male spadix very slender flagelliform decomound, spathes very slender tubular lower shortly spinous, upper ending in flat laminæ uppermost with oblique membranous mouths, spikes 1 in., spathellules densely imbricate short striate, flowers very young.

SINGAPORE; in the forest near the Bot. Garden, *Murton*.

Apparently a very slender species of doubtful position, known only by an upper portion of a leaf and young male spadix. *Leaflets* 10–12 by $\frac{1}{3}$ – $\frac{1}{2}$ in., margins hardly thickened.

GROUP VIII. See p. 438.

48. **C. exilis**, *Griff. Palms Brit. Ind.* 51 (axilis, 35); leaflets many equidistant narrow finely acuminate copiously setulose on the margins, costæ and often the intermediate nerves above and beneath, rachis scurfy setose and armed with a single row of hooked spines, petiole long flattened 2-edged with marginal straight slender spines, sheath scabrid and armed with short straight flattened spines, fem. spadix decomound scabrid all over as are the spathes, fruit linear oblong sharply beaked. *Mart. Hist. Nat. Palm.* iii. 333, t. 176, f. 7; *Walp. Ann.* iii. 484, v. 830; *Miq. Fl. Ind. Bat.* iii. 116.

MALACCA; on Gunong Ladang, *Fernandez*. PERAK, Larut and Ulu Bubong, alt. 4000 ft., *Scortechini* (657^b), *King's Collector* (2734, 6245, 8457) 10,259, *Herb. Calc.*).

Stem 15–20 ft., $\frac{3}{4}$ in. diam. *Leaves* 3–3½ ft.; leaflets 8–10 by $\frac{1}{2}$ – $\frac{3}{4}$ in., cross nervules strong; petiole scaberulous, with distant dorsal hooked spines and many marginal; sheath with coarse matted hairs at the mouth. *Lower spathes* 12–14 in., compressed and 2-edged with slender marginal spines below and smaller ones above, mouth oblique, upper spathes 4–6 in., tubular, armed with small scattered spines.

Branches of fem. spadix 6–8 in., coarsely scabrid, bearing short alternate few-fl. spikes; fruiting calyx pedicelled and pedicelliform, campanulate; lobes as long as the tube and as the petals. *Fruit* nearly 1 by $\frac{1}{2}$ in. diam., dirty yellow; scales margined with brown. *Seed* linear-oblong, transversely grooved; albumen not ruminate; embryo in the middle of the back.

GROUP IX. See p. 438.

49. **C. tomentosus**, *Becc. mss.*; sheath, rachis and flagellum softly almost flocculently white-tomentose, leaflets few distant or in distant pairs elliptic acuminate coriaceous strongly nerved, margin crisped or waved.

PERAK, *Scortechini* (431^b); alt. 2500–3000 ft., *King's Collector* (5332, 6993).

Stem 20–40 ft., $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., light grey. *Leaves* 2–3 ft.; leaflets 8–14 by 3–6 in., base narrowed, green on both surfaces or yellowish beneath with brown stripes above; nerves flabellate; sheath unarmed, ochrea annular very coriaceous, acute posteriorly; petiole short, very stout, subterete, armed with few distant 3-fl. short claws; flagellum 8–10 ft., ending in a long filiform prickly tip, armed with strong 3-fl. claws at about equal distances, towards the base the surface of the petiole is granulate when dry. A portion of a flowerless and fruitless spadix is terete with tubular spathes and bears distant spreading spikes 4 in. long, with rather distant coriaceous subcampanulate spathelets.—A remarkable plant of which the specimens are very imperfect. The description of the stem and colour of the leaflet is from notes by King's Collector; the rest from his specimens, one of which (5332), with smaller leaves is from Larut, "within 300 ft.," perhaps meant for 3000 (as in n. 6993).

GROUP X. See page 438.

50. **C. zeylanicus**, *Becc. mss.*; leaflets many long equidistant ensiform long acuminate 3–5-costate, margins minutely setulose or naked, costæ very sparingly setose above naked beneath, rachis very stout, male spadix decomposed, lower spathe acute armed with very short scattered prickles, upper striate smooth or sparsely aculeate, uppermost funnel-shaped truncate, branches of male spadix 6–10 in. clothed with short broad imbricate spathelets, spikelets very many distichous, spatheletules extremely short and densely imbricate, fem. spikes and spikelets much longer and laxer, fruit globose long-beaked. *C. rudentum*, *Thw. Enum.* 330 (*excl. syn.*) (*non Lour.*); *Hance in Journ. Bot.* 1874, 262.

CEYLON, *Walker*; Suffragam district, *Thwaites* (CP. 2874).

Stem very stout. *Leaves* probably 4–5 ft. long; leaflets $1\frac{1}{2}$ –2 ft. by 1–1 $\frac{1}{2}$ in., smooth; rachis pale, finely scurfy, with short appressed marginal spines above and lower down with 3-fl. claws beneath; flagellum very stout, with very broad claws of 3–6-nate recurved black spines. *Male spadix* with long spreading branches clothed with short spathelets and bearing short broad flat spikelets $\frac{1}{2}$ –1 in. long and $\frac{1}{4}$ broad of most densely imbricate short spatheletules and small flowers $\frac{1}{2}$ in. long. *Fem. spadix*; branches and spikes much longer; calyx sessile, very short, deeply 3-lobed; fruiting calyx sub-pedicelliform; petals as long, both striate. *Fruit* $\frac{3}{4}$ in. diam., dull yellow; scales deeply channelled, margins scarious pale. *Seed* globose; albumen deeply ruminate, embryo lateral.

51. **C. latifolius**, *Roxb. Fl. Ind.* iii. 7751; leaflets few large scattered or 2-nate elliptic or elliptic-lanceolate 3–9-costate tips setose, margins aculeolate, costæ naked on both surfaces, rachis flagelliferous very stout variously armed with scattered spines, sheath densely covered with very short broad whorled spines and a few very large straight flat solitary or whorled ones, spadix decomposed, spathes short subcompressed sparsely

spinous mouth oblique, spathe short, male spikes densely imbricate, fruiting calyx sessile, pedicelliform broadly campanulate lobes short, fruit subglobose pale. *Mart. Hist. Nat. Palm.* iii. 339, t. 160, f. 5: *Griff. in Calc. Journ. Nat. Hist.* v. 60; *Palms Brit. Ind.* 68, t. 198 (*excl. cit. Hort. Malab.*); *Kurz in Journ. As. Soc. Beng.* xliii. ii. 210 (*excl. t. 31 A*); *For. Fl.* ii. 518 (*partim*). *C. macracanthus et inermis*, *T. Anders. in Journ. Linn. Soc.* xi. 10, 11; ? *C. humilis*, *Roxb. Fl. Ind.* iii. 773.

From the SIKKIM HIMALAYA and ASSAM, ascending to 2000 ft., to TENASSERIM.

Stem stout, 1–2 ft., as thick as the thumb. *Leaves* with the flagellum 10–15 ft.; leaflets 1–2 ft. by 1–2½ in., upper sometimes flabellately clustered or connate at the base; cross nervules very many and close; petiole short or long, sometimes bearing the leaflets only far up the flagellum; base sometimes ¾ in. broad, smooth, biconvex, spines very various always scattered. *Spadix* very large; spathes and branches usually armed with scattered very short broad spines. *Fruit* (not quite ripe) nearly 1 in. long, rather narrower, pale dull yellow; scales convex, deeply channelled, shining, margin very narrowly scarious.—*C. humilis*, *Roxb.*, is probably founded on a very young plant of *C. latifolius* with undeveloped flagella.

52. *C. Doriaei*, *Becc. mss.*

BURMA; on Mt. Karin, *L. Fea*.

Only a portion of a spadix with fruit known. It appears to be nearly allied to *C. latifolius*, from which it is distinguished by the elongate fruit ¾–1 by ½ in.—I have seen no specimen. *J.D.H.*

53. *C. simplex*, *Becc. mss.*; leaves flagelliferous, leaflets very few large elliptic 3–6-costate, spadix supra-axillary quite simple elongate not flagelliferous bearing at every primary spathe a solitary simple spikelet or at most two from the lowest spathe, fruiting calyx callous shortly pedicelliform, fruit rather large broadly ovoid, seed globose, albumen deeply ruminant, embryo subbasilar.

PERAK; on Gunung Tambang Batak., *Scortechini* (432).

Differs from all other known species in the few divisions of the spadix.—I have seen no specimen. *J.D.H.*

54. *C. caesius*, *Blume Rumph.* iii. 57; leaves subsessile flagelliferous, leaflets very inequidistant in distant fascicles of 5–7 oblanceolate cuspidately acuminate glaucous or farinose beneath acutely 4-costate above and setulose, margins setulose acute, rachis armed with solitary and subwhorled spines, sheath not flagelliferous very gibbous above fugaciously scurfy armed with scattered long horizontal spines with broad callous bases and small acute tubercles. *Mart. Hist. Nat. Palm.* iii. 340; *Walp. Ann.* iii. 490, v. 832; *Miq. Anal. Bot. Ind.* i. 6; *Fl. Ind. Bat.* iii. 129; *Palm. Archip. Ind.* 28. *C. glaucescens*, *Blume, l.c.* 65; *Mart. l.c.* 339; *Walp. ll. cc.* 489, 830; *Miq. ll. cc.*

PERAK, *Scortechini*.—DISTRIB. Borneo.

A lofty climber. *Leaves* 2–3 ft.; leaflets 12–14 by 2–2½ in. *Fruit* unknown.—Appears to be allied to *C. melanoloma* of Java. I have seen no specimen. *J.D.H.*

55. *C. axillaris*, *Becc. mss.*; leaves shortly petioled, leaflets numerous very inequidistant above oblanceolately ensiform, margins smooth, rachis unarmed below armed above with scattered simple and ternate claws, spadix not flagelliferous elongate with several erect partial inflorescences, spathes 1st and 2nd fugaciously scurfy unarmed or the lower scarcely armed,

spikelets short scorpioid, 3rd spathe infundibular, limb open truncate margin fimbriate, spathels and spathellules striate margins ciliate, flowers distichous, calyx finely striate.

PERAK, *Scortechini*.

Described from a single specimen which I have not seen. The fruit, and hence the position of the species, is unknown. *J.D.H.*

56. **C. pallidulus**, *Becc. mss.*; leaves subsessile, leaflets inequidistant hardly fascicled ensiform acuminate, costæ 3 unarmed on both surfaces, margins sparsely spinulose, rachis strongly armed with uniform short black-tipped 3-fid claws, sheath with scattered short straight spines, spathes armed with short stout scattered simple conical spines, fruit spherical shortly beaked pale, seed deeply pitted, albumen ruminant.

PERAK; at Thaiping, *Wray* (2392, 3017).

Leaflets 8-10 in. The upper spathes are naked with much dilated obliquely truncate mouths. The fem. spikes 2-2½ in., strongly recurved; spathels strongly muricate. *Fruit* ¾ in. diam., very pale; scales obscurely channelled, margins hardly scarious, beak cylindric; fruiting calyx pedicelliform.—Described from two leaves, a small portion of a sheath, a fragment of a spadix with ripe fruit.

GROUP XI. See p. 438.

* *Fruiting perianth not pedicelliform.*

57. **C. ovoideus**, *Thw. ex Trimen in Journ. Bot.* 1885, 269; leaves petioled, leaflets equidistant broadly linear alternate 3-costate tip bristly, margin thickened smooth, costæ setose beneath, rachis fugaciously scurfy, margins prickly back rounded with solitary hooked spines, sheath densely armed with rings of flat deflexed often lacerate black spines, lower spathes armed with short broad flat reflexed spines, fruiting spadix with very stout recurved spikelets, fruiting perianth stellate, fruit obovoid strongly beaked.

CEYLON; Saffragam district, *Thwaites* (CP. 3925).

Stem stout, scandent. *Leaves* 14 ft. and more including the flagellum; leaflets 10-14 by ¾-1 in., bright green above, duller beneath. *Fruit* ¾-¾ in. long, strongly beaked, scales pale greyish yellow, strongly channelled, narrowly margined with orange-brown.—Described from Trimen l. c.

58. **C. andamanicus**, *Kurz in Journ. As. Soc. Beng.* xlii. ii. 211, t. xxvii. A, xxviii.; *For. Fl.* ii. 519; leaflets alternate equidistant linear subulate-acuminate 3-costate, margins thickened and costæ setose, petiole and rachis armed with stout recurved spines, petiole with blackish tuberous-based ones mixed with long black spines, sheath red brown covered with seriate whorls of capillary black and broad flat black spines, spadix compound nodding, spithes subcompressed armed with strong reflexed solitary and ternate spines, partial unarmed, fruit elliptic-ovoid acuminate, scales with long fimbriate tips.

ANDAMAN and NICOBAR ISLANDS, *Kurz, Man.*

Stem lofty, scandent, as thick as the arm (with the sheaths on). *Leaflets* 2-2½ ft. by 1 in. broad. *Fruit* distichous, uniformly brown, about ¼ in. long; scales rhomboid, greenish, bordered with chesnut-brown, rather flat, not furrowed, tips prolonged into a lanceolate pale brown opaque acute ciliolate membranous appendage, longer than the scale itself. *Seed* semiconvex, grooved; albumen equable.—(The above from *Kurz*.)

59. **C. palustris**, *Griff. in Calc. Journ. Nat. Hist.* v. 62; *Palms Brit. Ind.* 71, t. 199; leaves shortly petioled, leaflets alternate the median approximate in pairs broadly elongate-lanceolate acuminate with bristly tips 3-costate and many-nerved, margins not thickened and costæ smooth, petiole with 1-2 rows of short very broad fascicled or simple hooked spines with swollen bases, sheath green sparingly armed with short black or broad hooked spines, spathes tubular obliquely truncate armed with recurved spines, spathels glabrous, fruiting perianth stellate, fruit ellipsoid-oblong, scales obtuse. *Mart. Hist. Nat. Palm.* iii. 339; *Miq. Fl. Ind. Bat.* iii. 131; *Walp. Ann.* iii. 490, v. 831. *C. latifolius*, *Kurz (not Roxb.) in Journ. As. Soc. Beng.* xliii. ii. 210, t. 31 A; *For. Fl.* ii. 518 (partly).

TENASSERIM, *Griffith*. PERAK, *Scortechini* (50^b). ANDAMAN ISLANDS, *Kurz, Man.*

Stem scandent, everywhere glabrous, with the sheaths on 2-3 in. diam. *Leaves* 8-12 ft.; leaflets 1-2 ft. by 3-5 in., rather thin, uniformly green. *Spadix* bifariously decompound, elongate, drooping. *Fruit* about $\frac{1}{2}$ in. long, scales slightly biconvex, hardly channelled, pale brown with a blackish border. *Seed* almost semi-convex; grooved and irregularly wrinkled.—(Descript. from *Kurz*.)

**** Fruiting perianth more or less pedicelliform.**

60. **C. unifarius**, *H. Wendl. in Bot. Zeit.* xvii. (1839) 158; var. *Pentong*, *Becc. mss.*

NICOBAR ISLANDS. *E. H. Man.*

The plant referred as above consists of a leaf and a portion of a spadix with the fruit wanting. *C. unifarius* is a Javan plant, described as having rather few inequidistant lanceolate or oblong-lanceolate acuminate 7-costate leaflets; the fruit is subglobose about $\frac{1}{10}$ in. diam., with channelled scales and deeply sinuately furrowed seeds with a basal embryo.—I have seen no specimen. *J.D.H.*

61. **C. neglectus**, *Becc. mss.*

MALACCA, *Griffith* (Kew Distrib. 6399 bis).

This species is founded in the flagelliferous apex of a leaf and a portion of a fruiting spadix. The flagellum is very slender; the leaflets subequidistant, 4-6 in. by $\frac{1}{2}$ in., membranous, linear-lanceolate, finely acuminate, setaceous pointed, with 3 slender costæ and thickened setose margins; spathes coriaceous, tubular, obliquely truncate, armed with short scattered straight stout spines; fruiting calyx subpedicelliform, with broad spreading obtuse lobes; young fruit $\frac{1}{2}$ in. long, ellipsoid, scales dull pale yellow with broad scarious brown margins and tips, not channelled, beak stout.—I have seen no specimen. *J.D.H.*

62. **C. viridispinus**, *Becc. mss.*; leaf flagelliferous, leaflets in very distant fascicles variously grouped ensiform finely acuminate, costæ 3 strong sparingly setose above naked beneath, rachis trigonous smooth with few solitary very short hooked spines on the lateral angles, spadix elongate filiform, fem. spikes elongate with alternate remote horizontal flowers, young fruit oblong strongly beaked, fruiting calyx pedicelliform, petals small, albumen solid.

PERAK, *Scortechini* (316^b); at Larut, alt. 3500-4000 ft. (*Herb. Calcutt.* 4127).

Stem 20-25 ft. *Leaves* bright green; leaflets 10 by nearly 1 in.—I have seen only a fragment of a leaf, from Larut, and a spike of very young fruit. *J.D.H.*

63. **C. Oxleyanus**, *Teyssm. & Binnend. Cat. Pl. Hort. Bogor.* 1886, 75 (name only) erect, leaflets very many in subopposite distant fascicles linear-lanceolate acuminate, tip bristly, costæ 5 setose above naked

beneath, petiole long stoutly armed, sheath excessively armed with large seriate straight or deflexed spines and scattered short ones. *Miq. Palm. Archip. Ind.* 17, with fig. *C. Fernandezii*, *H. Wendl. in Kerchov. Palm.* 236. *Dæmonorops fasciculatus*, *Mart. Hist. Nat. Palm.* iii. 330; *Walp. Ann.* iii. 480, v. 829; *Miq. Fl. Ind. Bat.* iii. 101.—Rotang Pajare, *Griff. in Calc. Journ. Nat. Hist.* v. 89; *Palms Brit. Ind.* 95.

MALACCA, Fernandez, Oxley.—DISTRIB. Banca?

Stem with the sheaths about 1 in. diam. *Leaves* 10–11 ft. long exclusive of the long flagellum; leaflets 1 ft. by $\frac{3}{4}$ in.; petiole about 2 ft.; its lower part armed like the sheath; sheath with a very oblique mouth.—Description from Griffith.

GROUP XII. See p. 438.

64. **C. Martianus**, *Becc. mss.*—*C. paniculatus*, *Mart. Hist. Nat. Palm.* iii. 334 (not of Roxb.).

PENANG; Gaudichaud.

Stem scandent. *Leaflets* 4–5 in., equidistant, alternate, lanceolate, tip shortly acuminate and bristly 7–9-costate, margins and surfaces unarmed, petiole very short, rachis and slender flagellum armed with short spines, sheath with a short obliquely truncate ochrea. *Male spadix* decomposed, lower spathes subterete faintly 2-keeled and rachis armed with short scattered spines, upper unarmed, spikes slender spreading equalling or twice as long as their spathes.—Description from Martius, neither Beccari nor have I seen specimens.—*J.D.H.*

65. **C. spathulatus**, *Becc. mss.*; leaflets very few alternate distant uppermost pair connate at the base elliptic obtuse convex above, costæ 5–9 and margins quite smooth, petiole very short and slender, rachis copiously armed with large solitary and 2–3-nate recurved black-tipped spines, sheath flagelliferous elongate cylindric copiously armed with uniform short straight conical-based spines, fem. spadix slender flagelliferous, spathes slender terete armed with short hooked spines, fruiting calyx pedicelliform short contracted sessile, base broadly truncate, fruit (young) long-beaked very pale.

MALACCA, Lobb, Hervey.

Stem scandent; very slender. *Leaves* probably 2–3 ft. long; leaflets 4–7 by 2–2½ in., coriaceous, shining above, base acute, cross-nervules very many and close; petiole and rachis subterete, flagellum very slender; sheath as thick as the forefinger, thickly coriaceous, pale, smooth between the short flattened subseriate spines, flagellum very stout. *Fem. spadix* long, slender, with distant branches which are adnate to the rachis far above the slender closely appressed spathes; spathe of branches tubercled $\frac{1}{2}$ in. long; spikes 1–1½ in., spreading and recurved; spathe of branches very short. *Fruit* (young) $\frac{1}{2}$ in. long, shortly oblong or ellipsoid with a long cylindric beak; scales very pale straw-colored, faintly channelled.

Var. *robusta*, *Becc.*; spadix much larger, very stout.—Perak, Geelong-Malacca, *King's Collector* (7136).

66. **C. insignis**, *Griff. in Calc. Journ. Nat. Hist.* v. 58; *Palms Brit. Ind.* 69; leaflets few distant alternate uppermost pair connate at the base elliptic-oblong or -oblanceolate cuspidately subacute convex 7–9-costate margins thickened recurved and both surfaces quite smooth, rachis slender and terete petiole shortly very sparingly prickly, sheath long slender polished very sparingly armed with tubercular spines or conical tubercles, *Mart. Hist. Nat. Palm.* iii. 338; *Walp. Ann.* iii. 488, v. 831; *Miq. Fl. Ind. Bat.* iii. 128.

MALACCA, *Fernandez*. PERAK, *Scortechini*.

Stem scandent, as thick as a goose-quill, shining; internodes 2 in. *Leaves* 12-18 in.; leaflets 3-6 by 1-1½ in., polished above, cross-nervules very many and close set; petiole 3-5 in.; sheath not so thick as the little finger, very long, cylindric and smooth.—The leaflets resemble those of *C. spathulatus* but are smaller.—I have seen no Perak specimens, of which Beccari says that they are more robust, and have rather larger and more numerous leaflets with more distant transverse nerves. *J.D.H.*

67. *C. quinquenervius*, *Roxb. Fl. Ind.* iii. 777; scandent, leaves flagelliferous, leaflets alternate remote equidistant narrowly lanceolate, spines in belts slender, fruit spherical. *Kunth Enum.* iii. 209; *Mart. Hist. Nat. Palm* iii. 339; *Griff. in Calc. Journ. Nat. Hist.* v. 61; *Palms Brit. Ind.* 72.

SILHET, *Roxburgh*.

Climbing. *Stem* exclusive of the leaf-sheaths, about as thick as the middle finger, internodes 6-8 in.—Probably a well-known species, but not identifiable by the character given, nor recognized by Beccari or myself.

68. *C. ornatus*, *Blume in Rœn. & Sch. Syst.* vii. ii. 1326; *Rumphia*, iii. t. 148; *Mart. Hist. Nat. Palm.* iii. 208, t. 116, f. 2:—

Var. HORRIDA, *Becc. mss.* leaves petioled not flagelliferous, leaflets large equidistant narrowly ensiform acute 3-5-costate glaucous beneath, margin and costæ beneath caducously setulose, petiole and rachis shortly armed, sheaths with long flat spines, fem. spadix very long flagelliferous, spathes tubular armed with very long spines, branches few erect, spathels smooth, male spikes close set recurved very stout, spathellules broadly imbricating. *C. ornatus*, *Griff. in Calc. Journ. Nat. Hist.* v. 37; *Palms of Brit. Ind.* 46; *Miq. in Journ. Bot. Neerl. Ind.* i. 21; *Fl. Ind. Bat. Suppl.* 256. *C. ovatus* and *C. aureus*, *Reinw. ex Mart. l. c.* 208, 241.

MALACCA, *Fernandez*. PERAK; *Scortechini* (587^b) (*Herb. Calc.* 3931).—DISTRIB. Malayan Islands.

Stem robust; 50-80 ft., 1½ in. diam. without the sheaths; sheaths about 2 in. diam. *Leaves* 12-15 ft.; leaflets 2-2¼ ft. by 2¼ in. broad, tip rather obtuse often 2-fid, bristly; mid-costa above with stout bristles towards the tip; petiole 3 ft., 1½ in. diam., somewhat flattened, rusty-pubescent, much armed with broad strong flattened spines ¼ in. long; sheath copiously armed with whorled flat appressed often imbricating spines 1 in. long, and ⅓-½ in. broad at the base. *Spadix* 16-18 ft.; branches 2½ ft. apart; spathes tubular, armed like the sheaths; spikes 2-3 in.; spathels smooth, bracts and spathellules ciliate. *Male spikes* recurved, flattened, ⅔ in. across the distichous large spreading spathellules; *male fl.* broadly ovoid, terete, obtuse; calyx sessile, hemispheric, petals twice as long. *Calyx* oblong, shortly 3-toothed, fruiting pedicelliform. *Fruit* 2 in. long, obovoid; scales rufous, margins pale, lacerate.—*Descript.* chiefly from Griffith; of the fruit from Martius.—Beccari regards the Malacca plant as a var. (*horrida*) with glabrescent sheaths, seriate spines, and adult leaflets 3- or sub 5-costate and scarcely spinulose.

69. *C. giganteus*, *Becc. mss.*; very robust, leaves large flagelliferous, leaflets many equidistant broadly ensiform acuminate plicately sub 5-costate, costæ and margins unarmed, petiole long and rachis armed with short spines, sheath very stout woody smooth densely armed with very broad basal flat long scattered or subseriate spines and short scattered ones, male spadix supradecomposed, branches close together, spathes tubular shortly spiny, fruiting calyx pedicelliform, fruit large ellipsoid-ovoid, acute.

PERAK; *Scortechini*.

Apparently scandent, leaf-sheaths 2-3 in. diam. Leaves 8-10 ft. long; petiole 3 ft.; leaflets 2 ft. by $1\frac{1}{2}$ -2 in. Fruit above an inch long, suddenly contracted into a conical point; scales shining, straw-cold.—Very near *C. ornatus*, but more robust, and more densely armed; abundantly distinct in the non-flagelliferous spadix, longer branches, and armed secondary spathes.—I have seen no specimen. J.D.H.

70. *C. scipionum*, *Lour. Fl. Cochinch.* i. 210; leaves not flagelliferous, leaflets numerous firm equidistant upper gradually smaller elongate-lanceolate or subensiform aculeolate tips bristly, costæ 5-7 naked on both surfaces or sparsely aculeolate beneath, margins nearly smooth, uppermost pair connate at the base, rachis and petiole armed with very stout conico-subulate scattered recurved spines, spadices very long flagelliferous, lower spathes very long tubular unarmed or their keels armed, fruiting calyx very small pedicelliform, fruit small ovoid or globose abruptly mammillate brown. *Lam. Encycl.* vi. 304 (*non Illustr. & excl. syn.*); *Mart. Hist. Nat. Palm.* iii. 342; *Kunth Enum.* iii. 206; *Walp. Ann.* iii. 342; v. 832; *Griff. in Calc. Journ. Nat. Hist.* v. 35; *Palms Brit. Ind.* 43; *Miq. Fl. Ind. Bat.* iii. 138. *C. micranthus*, *Blume Rumph.* iii. 53 (*leaf only*), t. 157 (*excl. spadix & anal. fl.*).—Ching, *Griff. l.c. c.c.* 37 and 46.

MALACCA, *Griffith*. PERAK, *Scortechini* (501^b); at Gunong-Malacca, *King's Collector* (7171)—DISTRIB. BORNEO.

Stem 40-60 ft., sheath 2-3 in. diam. Leaves 4-5 ft.; flagellum 10-12 ft.; larger leaflets 18-20 by $1\frac{1}{2}$ -2 in., rather coriaceous, tips not produced; rachis as thick as the little finger, smooth except from the scattered spines, obtusely trigonous. Male spadix 20 ft.; fem. about 10 ft. long; lower spathe compressed, upper cylindric; spathels 1 in., tubular, truncate, smooth, unarmed, or with a few conical tubercles; branches of fem. spadix long; spikes 2-4 in., rather distant, spreading and recurved, stout; spathellules and bracts very short imbricate; fem. fl. sessile. Fruit calyx small, broadly urceolate, base truncate intruded, mouth much contracted, lobes very short; petals rather longer, broadly ovate. Fruit (young) $\frac{1}{2}$ in. long, scales brown shining tumid hardly channelled, with broad pale scarious margins. Seed (young) sub-obovoid, alveolate, embryo basilar.

GROUP XIII. See p. 438.

71. *C. conirostris*, *Becc. mss.*; leaf long-petioled shortly flagelliferous, leaflets numerous equidistant narrowly ensiform tips slender strongly setulose, costæ 3 more or less setulose above the median only beneath, rachis and flagellum armed with stout recurved 3-5-fid claws, petiole very stout, margins densely armed with subsolitary stout straight erect and spreading spines, sheath armed with very long and slender spines, spathes copiously armed with subseriate straight spines, fem. spadix very stout, spathels deusely spinous, spikes very short and stout, bracts large densely imbricate cupular, fl. large, fruit narrowly ovoid narrowed into a stout beak black.

PERAK; at Goping, alt. 500-1000 ft., *King's Collector* (4593, 5808).

Stem 15-20 ft., 1-1 $\frac{1}{4}$ in. diam. Leaves 6-8 ft. glossy; leaflets 10-18 ft. by $\frac{3}{4}$ -1 in.; upper smaller, membranous; petiole as thick as the middle finger, concave-convex, back sparsely shortly armed; upper spines of sheath 4 in. long, acicular. Fruit 1 $\frac{1}{4}$ in. long by $\frac{3}{8}$ in. diam., very smooth; scales flat, brown-black, quite smooth and polished, closely imbricating, the basal concealed part yellow; fruiting calyx $\frac{1}{4}$ in. diam., cupular, not pedicelliform; lobes large broad appressed; petals very small. Seed ovoid, rough; albumen cancellate throughout.

72. **C. Lobbianus**, *Becc. mss.*; leaflets equidistant linear-lanceolate caudate-acuminate membranous, clothed beneath with an appressed white substance (as if coated with lime), costæ 3 all naked or with a very few bristles beneath, spadix slender and rachis and upper spathes aculeate, male spikes crowded very short and broad with densely crowded distichous large flowers.

SINGAPORE, *Lobb, G. Panti* (210 *Herb. Calcutta*).

A small palm, stem 18 in., 6-8 in. diam. *Leaves* 5-6 fl.; leaflets 12-14 by 1-1½ in., rachis of the portion seen unarmed. *Spathes* (upper?) with a short keeled sheath and acuminate limb, armed with straight slender spines ¼-½ in. long on the sides and keel; branch of *male spadix* 3 in. long, oblong; spathellules most densely imbricate, ¼ in. diam. *Male fl.* nearly ½ in.; calyx cupular, with broad triangular lobes, not pedicelliform; petals twice as long, the lobes narrowly lanceolate.—I have seen only the branch of a male spadix and a fragment of a leaf with 7 leaflets, both from *G. Panti*. *J.D.H.*

DOUBTFUL SPECIES.

C. EXTENSUS, *Roxb. Fl. Ind.* iii. 777. Probably *C. palustris*.

C. HUMILIS, *Roxb. l. c.* 773, is possibly 51, *latifolius*.

C. METZIANUS, *Schlecht. in Linnæa*, xxvi. 727 from Canara (? = *C. rivalis*, Thw.).

C. PENICILLATUS, *Roxb. Fl. Ind.* iii. 781. If for 30-40 pair of segments in *Roxburgh's* description, 3-4 be substituted, this might apply to *C. javensis*, Bl.

C. POLYGAMUS, *Roxb. Fl. Ind.* iii. 780; *Mart. Hist. Nat. Palm.* 210; *Griff. in Calc. Journ. Nat. Hist.* v. 48; *Palms Brit. Ind.* 58, is not recognisable.

24. **DÆMONOROPS**, *Blume*.

Characters of *Calamus*, but outer sheaths or spathes cymbiform, deciduous, at first enclosing the inner; flowers often more pedicellate.—Species about 80. Distrib. as of *Calamus*.

Dæmonorops differs so little from *Calamus*, and by sectional rather than generic characters according to Griffith, Kurz and others, that it was united with the latter in the "Genera Plantarum." As, however, Beccari, the latest and best authority on Indian Palms, keeps them apart, and as the elaboration of the species no less than their nomenclature in this work owes so much to him, I think it right to follow his lead. The difficulty of separating them in practice, working upon herbarium specimens, is shown by the synonymy of various species of both.

Sect. I. **Cymbospathæ**. *Spathes* cymbiform, beaked, two outer completely enveloping the inner. *Male spadix* fusiform before flowering.

* *Stem scandent*.

1. **D. Jenkinsianus**, *Mart. Hist. Nat. Palm.* iii. 327; leaflets equidistant linear finely acuminate, costæ 3 all sparsely setose above with very long bristles, the central only beneath, margins setulose, petiole rachis and flagellum with many marginal and dorsal hooked spines or 3-5-fid claws, sheath armed with very long flat deflexed and shorter more slender spines, spadix elongate decompound, outer spathe flattish 2-keeled armed with flat spines narrowed into a long spinescent beak, fruiting calyx nearly flat, fruit globose apiculate. *Walp. Ann.* iii. 475; v. 827. *D. nutantiflorus*, *Mart. l.c.* 326; *Walp. l.l. c.c.* 474, 827. *Calamus Jenkinsianus*, *Griff. in Calc.*

Journ. Nat. Hist. v. 81; *Palms Brit. Ind.* 89 (*excl. fruit.* & t. 186 A. f. 3 (=C. Flagellum), *T. Anders. in Journ. Linn. Soc.* xi. 11. *C. nutantiflorus*, *Griff. in Calc. Journ. Nat. Hist.* v. 79; *Palms Brit. Ind.* 88, t. 208.

THE SIKKIM HIMALAYA, ASSAM, the KHASIA HILLS, BENGAL and CHITTAGONG.

Stem very stout, with the sheaths $1\frac{1}{2}$ in. diam., young parts grey-pubescent. *Leaves* large; leaflets 2 ft. by $\frac{3}{4}$ – $\frac{5}{8}$ in.; petiole 5–6 in.; spines of rachis many, short, scattered; of sheath 1– $1\frac{1}{2}$ in. long. *Outer spathe* 1–2 ft., spines $\frac{1}{2}$ – $\frac{3}{4}$ in.; inner 12–18 in., lanceolate, long acuminate, quite smooth. *Male spadix* thyriform, dense-fld.; calyx oblong, 3-toothed, and petals and bracts deeply grooved. *Fem. spadix* with spreading branches, fruiting erect; calyx cupular, not pedicelliform; petals twice as long. *Fruit* $\frac{3}{4}$ in. diam., pale yellow brown; scales deeply channelled, margins narrowly scarious. *Seed* subglobose, smooth; albumen punctate, or the surface ruminate by very slender channels.

2. *D. Manii*, Becc. mss.; leaflets very many and narrow naked beneath setulose on the 3 costæ above, spadix very long slender, peduncle compressed hardly armed, outer spathe very long gradually narrowed into a long pale dorsally-keeled beak, spines few large flat, inner lanceolate acuminate, fruiting spadix erect glabrous, fruit globose shortly mammillate scales pale slightly channelled margins pale, tip not discoloured.

ANDAMAN ISLANDS., *E. H. Man.*

Allied to *C. Jenkinsianus*.—I have seen no specimen. *J.D.H.*

3. *D. Kurzianus*; stem and petioles very stout, leaflets very many equidistant elongate ensiform acuminate margins minutely aculeolate, costæ 3–5 naked or with a few long bristles above, rachis semi-terete very stout flat above with short scattered spines on the margins, outer spathe with seriate spines inner linear, fruiting spadix erect branches very stout, fruiting calyx explanate, fruit globose very shortly beaked pale yellowish. *D. grandis*, *Kurz in Journ. As. Soc. Beng.* xliii. ii. 208 (*not of Mart.*). *Calamus grandis*, *Kurz For. Fl.* ii. 523 (*not of Griffith*).

SOUTH ANDAMAN ISLANDS., *Kurz*.

Stem with the sheath as thick as the arm. *Leaves* shortly petioled; leaflets 1–2 ft. by $1\frac{1}{4}$ in., tips ciliate; rachis enormously stout, $1\frac{1}{2}$ in. diam., dorsally convex and unarmed, ending in a clawed flagellum; petiole armed below with long flat and short recurved spines; sheath with whorled spines. *Outer spathe* cymbiform, scurfy, inner unarmed. *Fruit* $\frac{3}{4}$ in. diam., pale brownish yellow, scales deeply channelled, margins brownish with a very narrow scarious edge; fruiting calyx with a very short base and broad striate lobes; petals twice as long, striate. *Seed* subcompressed, albumen as in *C. Jenkinsianus*.—I have seen only a portion of a leaf with the enormous rachis described above, imperfect leaflets, and a very old fem. spadix with fruit. *J.D.H.*

4. *D. grandis*, Mart. Hist. Nat. Palm. iii. 327, t. 173; leaves and leaflets as in *D. Kurzianus*, but pale and subglaucous, costæ beneath naked or sparsely ciliate as are the margins, spathe as in *D. Kurzianus*, calyx subterete villously ciliate, fruit globose. *Miq. Fl. Ind. Bat.* iii. 88; *Teysm. & Binn. Cat. Hort. Bogor.* 74; *Walp. Ann.* iii. 476, v. 827. *Calamus grandis*, *Griff. in Calc. Journ. Nat. Hist.* v. 84; *Palms Brit. Ind.* 91, t. 210 A (PB et C), t. 216, f. iii. *Miq. Palm. Archip. Ind.* 28.

MALACCA, *Griffith*. PERAK, *Scortechini*.

Stem very stout, scandent, sheaths 2 in. diam. *Leaves* 15–16 ft.; leaflets 18–20 by $1\frac{1}{4}$ in.; petiole about 2 ft. *Lower spathes* 14–15 in. long, inner included, unarmed, rustily scurfy. *Male spadix* 15–18 in., decompound, spikes about

$\frac{1}{2}$ in., flexuous. *Calyx* oblong, shortly 3-toothed. *Fem. spadix* very stout, scurfy, branches ascending; spikes short. *Flowers* shortly pedicelled, calyx striate; petals $\frac{1}{2}$ longer. *Fruit* the size of a large marble. *Seed* erect, abounding in dragons' blood; albumen ruminant; embryo basilar.—Descript. chiefly from Griffith l.c.

5. ***D. hygrophilus***, Mart. *Hist. Nat. Palm.* iii. 204, t. 177, f. 11; robust, leaflets very many and narrow equidistant linear tip filiferous, margin and 3 costæ above bearing long bristles and a few on the mid costa beneath, sheath armed with long flat spines, outer spathe gradually narrowed into a long beak as long as the body dorsally armed with broad flat scattered spines and a few longer ones. *Miq. Fl. Ind. Bat.* iii. 90; *Walp. Ann.* iii. 476, v. 827. *Calamus hygrophilus*, *Griff. Palms Brit. Ind.* 96, t. 213 C.

MALACCA, Fernandez. PERAK, Scortechini.

Stem stout, sheaths $1\frac{1}{2}$ in. diam. *Leaflets* 12 by $\frac{1}{2}$ in.; petiole forming a thick ring around the sheath, armed with scattered spines below and with stout recurved ones above and on the rachis, young rusty woolly. *Spadix* nearly 2 ft. *Outer spathe* 2-keeled, inner unarmed.—Descript. from Griffith. I have seen no specimen. J.D.H.

6. ***D. angustifolius***, Mart. *Hist. Nat. Palm.* iii. 329; leaves shortly petioled, leaflets very many narrow and close set equidistant narrowly linear-lanceolate tip filiform, costæ 3 all and margins setulose or with the median only beneath, bristles very long, rachis $\frac{1}{2}$ -terete armed with straight and recurved trifid claws, petiole with small scattered flat spines, sheath armed with scattered flat spines, outer spathe narrow long-beaked armed like the sheaths, spadix thyriform scurfy. *Miq. Fl. Ind. Bat.* iii. 89; *Walp. Ann.* iii. 476, v. 827. *Calamus angustifolius*, *Griff. in Calc. Journ. Nat. Hist.* v. 89; *Palms Brit. Ind.* 95, t. 213 A, B.

MALACCA, Griffith.

Scandent. *Leaves* 5-5 $\frac{1}{2}$ ft., flagelliferous; leaflets 8-10 by $\frac{1}{4}$ - $\frac{1}{2}$ in.; petiole 3-4 in. *Outer spathe* about 14 in. long, the beak half its length, flat; 2nd spathe sparsely spinous. *Male spadix* with a slender sparingly armed peduncle; branches crowded, erect; spikes 1 in., flexuous, 8-10-fl.; flowers small, oblique; calyx cylindric-oblong, teeth small; petals thrice as long.—Descript. from Griffith, who describes it as in all respects a very distinct species, but I do not see how he distinguishes it by his description from *D. hygrophilus*. I have seen leaves only of which the flat spines of the leaf and brown scurfy sheath are erect, white, and closely appressed; the petiole is concave above at the base. J.D.H.

7. ***D. intermedius***, Mart. *Hist. Nat. Palm.* iii. 377, t. 175, f. viii.; leaves long-petioled, leaflets opposite or scattered linear-lanceolate acuminate, margin and 3-5 costæ on both surfaces more or less setulose, petiole armed with scattered and flattened spines, sheath with seriate black flat spines, outer spathe ovoid very long and stoutly beaked, its spines long slender deflexed, beak longer than the body. flowers and fruit as in *D. grandis*, but scales tipped with black. *Miq. Fl. Ind. Bat.* iii. 88; *Walp. Ann.* iii. 476, v. 827. *Calamus intermedius*, *Griff. in Calc. Journ. Nat. Hist.* v. 86; *Palms Brit. Ind.* 93, t. 211 A, B.

MALACCA, Fernandez. PERAK, Scortechini, King's Collector (7135).

Stem 15-20 ft., $\frac{3}{4}$ in. diam. *Leaves* 4-6 ft.; leaflets 18-20 by 1-1 $\frac{1}{2}$ in., membranous, dark green, median costa stout lateral very slender; rachis $\frac{1}{2}$ -terete, sparingly armed; petiole 1 ft. *Outer spadix* 18 in., beak twice as long as the body. *Spadix* thyriform. *Fruit* $\frac{2}{3}$ in. diam., suddenly contracted into a narrow beak; scales yellow, obscurely channelled; fruiting calyx not pedicelliform, broadly 3-lobed; petals much

longer, linear. *Seed* globose, muriculate; albumen foveolately ruminatè.—Griffith says “with difficulty distinguishable from *granilis*, and chiefly by the very slender more numerous deflexed spines of the spathe.”

8. **D. Sepal**, *Becc. mss.*; leaflets rather numerous equidistant narrowly linear finely acuminate setulose on the 3 costæ above and margins, rachis armed with 3-fid claws, petiole dorsally compressed armed with scattered and clustered short straight flattened spines, sheaths with subseriate flat spines their mouth with long spines, outer spathes long-beaked dorsally armed with flat slender and shorter clustered spines, fruiting spadix nodding or pendulous, fruit obovoid.

PERAK, alt. 3–4000 ft., *King's Collector* (4133); on Gunong Tambang, *Scortechini* (433^b).

Stem 20–30 ft., $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. *Leaves* 6–8 ft.; leaflets 8–12 by $\frac{1}{2}$ – $\frac{3}{4}$ in.; spines of sheath $\frac{3}{4}$ in. long, mixed at the juncture with the petiole with more slender shorter black ones. *Fruit* $\frac{2}{3}$ in. long, abruptly beaked, light brown, glossy; scales deeply channelled, margins brown; fruiting calyx pedicelliform, lobes broad; petals twice as long.

9. **D. Pseudosepal**, *Becc. mss.*; leaflets not numerous very long and narrow setiferous on the 3 costæ above and median beneath, petiole with scattered very short spines except at the base where longer and more slender, sheath with very long elastic flat seriate spines, mouth nearly naked, fem. spadix short, fruit globose with a short broad mucro.

PERAK; alt. 300 ft., *King's Collector* (7975); *Scortechini*.

Stem 10–15 ft., nearly $\frac{1}{2}$ in. diam. *Leaves* 3–4 ft.; leaflets inequidistant, dark green, $\frac{2}{3}$ – $\frac{3}{4}$ in. broad; petiole 15–18 in., armed on the back and margins. *Fruit* $\frac{2}{3}$ in. diam., pedicelled, dirty yellow; scales few, channelled, margins narrowly scarious, tips discoloured; fruiting calyx not pedicelliform.—Affinity doubtful from want of spathes.

10. **D. Lewisianus**, *Mart. Hist. Nat. Palm.* 327, t. 175, f. iv.; leaflets equidistant approximate linear bristle-pointed costæ 3 setulose above nearly naked beneath, margins appressedly setulose, petiole dorsally armed with hooked spines and long flat straight whorled and solitary ones, margins with shorter conical spines, sheath armed with solitary or seriate black flat spines, outer spathe shortly beaked armed with weak deflexed long black spines, inner with 2 rows of slender spines, spadix as in *D. intermedius*, but branches more slender and less scurfy, fruiting spadix erect, fruit spherical. *Calamus Lewisianus*, *Griff. in Calc. Journ. Nat. Hist.* v. 87; *Palms Brit. Ind.* 94, t. 212 A.

PENANG; *Lewis*.

Stem scandent with the sheaths about 1 in. diam. *Petiole* about 1 ft., base much swollen and then armed with scattered short deflexed spines, and above with spines $1\frac{1}{4}$ in. long; leaflets 13–15 by $\frac{3}{4}$ –1 in. *Outer spathe* 3–9 in.; peduncle armed with flat spines, beak one-third the length of the body. *Male* and *fem. spadix* as long as the spathe; flowers scurfy, males most so. *Male calyx* obtusely toothed, margins bearded; fruiting petals twice as long. *Fruit* pale yellowish; scales in 15 rows, blackish towards the margin.—Descript. chiefly from Martius and Griffith.

** *Stems erect or subscandent, upper leaves alone with flagella.*

11. **D. monticolus**, *Mart. Hist. Nat. Palm.* iii. 328, t. 175, f. v.; leaves petioled, leaflets equidistant alternate linear-subulate acuminate, costæ 3 all bristly above naked beneath except the median at the apex,

margin bristly, rachis unarmed, petiole armed with stout hooked spines, sheaths scurfy armed with long flat black deflexed seriate spines, outer spathe long-beaked dorsally armed with weak long deflexed flat spines, spadix unarmed scurfy, fruit globose cuspidate. *Miq. Fl. Ind. Bat.* iii. 90; *Walp. Ann.* iii. 4771, v. 827. *Calamus monticolus*, *Griff. in Calc. Journ. Nat. Hist.* v. 90; *Palms Brit. Ind.* 97, t. 214 A, B, C.

MALAY PENINSULA; on Goonong Miring, a spur of Mt. Ophir, alt. 1500–2030 ft., and PENANG HILL, half way up, *Griffith*.

Stem about 8 ft. *Petiole* 10 in.; leaflets 10–11 by $\frac{1}{2}$ in. *Outer spathe* very open, 16–17 in. long; beak 9–10 in., flat, sparingly armed except towards the apex. *Fruit* the size of a marble, tawny; scales channeled and with a dark brown intro-marginal line; fruiting calyx explanate, lobes broad; petals twice as long, ovate. *Seed* with a fleshy covering.—*Descript.* from *Griffith*. The Penang plant has much coarser spines on the spathe and the fruit is more narrowed into a beak; Beccari doubts its being conspecific with the Malaccan. I have seen only very imperfect specimens.

12. ***D. petiolaris***, *Mart. Hist. Nat. Palm.* iii. 326; slender, scurfy, leaves long-petioled, leaflets very long crowded equidistant very narrowly linear tips spinulose, costæ 3 setulose above the median only beneath, margins setulose, petiole armed below with seriate spines above with dorsal hooked spines, sheaths crinitely clothed with long close-set ascending slender seriate spines, outer spathe shortly beaked densely armed with long slender spines, spadix short fusiform, branches tomentose, male calyx cylindric 3-toothed. *Miq. Fl. Ind. Bat.* iii. 87; *Walp. Ann.* iii. 475, v. 827. *Calamus petiolaris*, *Griff. in Calc. Journ. Nat. Hist.* v. 93; *Palms Brit. Ind.* 101, t. 216, f. vii.; ? *Miq. Palm. Archip. Ind.* 28.

MALACCA, *Griffith*.

Stem erect. *Leaves* 4–5 ft., exclusive of the 5–7 ft. petiole; leaflets 15–17 by $\frac{1}{2}$ – $\frac{2}{3}$ in. *Spathe* 4–5 in., narrowly fusiform, scurfy, beak $\frac{1}{6}$ – $\frac{1}{3}$ the length of the body, or longer. *Petals* narrowly lanceolate.—*Griffith* says that probably two species are included here, differing in the length of the leaves; one with an unarmed rachis of the leaves, longer more tomentose spadices and longer spikes and a cylindric acutely shortly toothed calyx, but his definition of the two is not very clear.

13. ***D. tabacinus***, *Becc. mss.*; sheaths rachis and petiole of leaf and branches of spadix brown-furfuraceous, leaves long-petioled, leaflets very many equidistant narrowly linear tips spinulose, costæ 3 setulose above and on the median beneath, margins setulose, petiole subcylindric and sheath armed with small flat pale spines, outer spathe narrowed into a beak as long as the body or longer, crinitely clothed with long straight slender spines, fruit subglobose pale, beak conical.

PERAK; *King's Collector* (2537).

Stem erect, 2–3 ft. *Leaflets* 12–14 by $\frac{1}{2}$ – $\frac{3}{4}$ in. *Spathe* 6 in., its beak 3 in. *Fruit* $\frac{2}{3}$ in. diam., pale straw-cold., suddenly narrowed at both ends; scales channelled, tips dark-cold.; fruiting calyx subpedicelliform, lobes broad; petals twice as long.—Distinguished from *D. petiolaris* by the long beak of the spathe.

14. ***D. calicarpus***, *Mart. Hist. Nat. Palm.* iii. 326, t. 175, f. vi.; leaflets equidistant very many linear bristle-pointed, 3 costæ above setulose median or all beneath, margins setulose, petiole armed with long straight and short hooked spines, sheaths scurfy armed with long slender subseriate flat erect spines, outer spathe moderately beaked, crinite all over with long slender pale bristles, 2nd and 3rd bearded chiefly along the middle, male spadix much branched, margins of pedicels bearded,

spikes scurfy, fruit globose tawny. *Miq. Fl. Ind. Bat.* iii. 87; *Walp. Ann.* iii. 475, v. 827. *Calamus calicarpus*, *Griff. in Calc. Journ. Nat. Hist.* v. 92; *Palms Brit. Ind.* 99, t. 215 A, B, C, D, t. 116, f. v. vi.

MALACCA, *Griffith*. PERAK, *Scortechini*.

Stem erect or subscandent, with the sheaths 1 in. diam. *Leaves* 6-8 ft., upper small, with long flagella; leaflets 12-13 by $\frac{1}{2}$ - $\frac{1}{2}$ in.; petiole 1 ft., base not gibbous or puckered. *Outer spathe* 12-16 in., spines and hairs 1-1 $\frac{1}{2}$ in. long; beak 2-3 in., naked or bristly at the base only. *Male spadix* 6-16 in., much branched; spikes flexuous, scurfy; calyx subcylindric, 3-toothed; petals not twice as long. *Fem. spadix* shorter, 4-8 in., less but more stoutly branched; calyx ovoid, teeth bearded. *Fruit* cuspidately mammillate, $\frac{2}{3}$ in. diam., tawny, scales with a dark marginal band, deeply channelled; fruiting calyx explanate, lobes broad; petals rather longer. *Seed* globose; albumen deeply ruminant; embryo basilar.—*Descr.* chiefly from *Griffith*. Beccari says of it, very difficult to distinguish from *petiolaris* and *monticola* in the absence of complete specimens of all.

Sect. II. **Piptospathæ.** *Outer spathe* not completely enclosing the inner. *Spadix* diffusely branched.

* Spathes at first tubular, then open; all deciduous or the outer alone more persistent, armed with short stout spines. Spadix narrow and elongate before flowering, then paniculate.

† Mouth of sheath naked or armed with scattered spines pointing variously. *Fruit* resiniferous except *D. leptopus*.

15. **D. micracanthus**, *Becc. mss.*; leaflets alternate or distantly subopposite linear-lanceolate caudate-acuminate, costæ 3 minutely setulose on both surfaces, as are the margins, petiole very gibbous and transversely puckered at the base slender 2-edged biconvex armed with long rather distant small curved prickles on the back and here and there on the sides and on the rachis, sheath long slender glabrous armed with very short deciduous prickles, at length muriculate. *Calamus micracanthus*, *Griff. in Calc. Journ. Nat. Hist.* v. 62; *Palms Brit. Ind.* 72; *Mart. Hist. Nat. Palm.* iii. 339; *Miq. Fl. Ind. Bat.* iii. 128; *Walp. Ann.* iii. 489, v. 831 (*micranthus*).

MALACCA, *Griffith*.

The only specimen seen is of a leaf with a cylindric pale sheath a foot long, covered with scattered or subseriate minute tubercles; a rather slender petiole, 6 in. long, dilated at the base and gibbous, with small very scattered spines; the rachis more flagelliferous, very slender and smooth; the leaflets 8-10 by $\frac{1}{2}$ in., with very long filiform bristly tips.

16. **D. propinquus**, *Becc. mss.*; leaflets numerous equidistant linear-lanceolate, costæ 3 all sparsely setulose above the median alone beneath, margins setulose, rachis very stout with large flat solitary straight spines, petiole with stout dorsal and very long scattered lateral flat spines as has the sheath, spathes many imbricating almost woody with obtuse points and recurved margins outer armed with seriate deflexed spines, spadix erect fruiting nodding, fruit globosely ovoid strongly beaked red brown, scales deeply channelled. *Calamus Draco*, *Griff. in Calc. Journ. Nat. Hist.* v. 65; *Palms Brit. Ind.* 75 (*excl. Syn. Roxb.*), t. 201 A, B; *Mart. Hist. Nat. Palm.* iii. 175, f. 10, 3-8.

PENANG, *Griffith*, *Lewes*. PERAK, *Scortechini*.—DISTRIB. Sumatra.

Stem stout, erect, at length scandent. *Leaflets* 12-18 by $\frac{1}{2}$ - $\frac{3}{4}$ in.; petiole $\frac{1}{2}$ -terete, 1 in. diam. *Fruit* $\frac{2}{3}$ in. diam., exuding dragon's-blood copiously, stoutly

pedicelled; scales naturally whitish but incrustated with red gum. *Seeds* rarely 2, subconical, dorsally alveolate and tubercled with a deep lateral cleft.—The Perak fruits are accompanied by ensiform leaflets 2 ft. long by 2 in. broad with aculeolate margins. Beccari doubts their belonging to the same species as the fruits.—The seeds of Griffith's plant are globose and smooth. *J.D.H.*

17. *D. didymophyllus*, *Becc. mss.*; leaflets in distant opposite or alternate pairs broadly ensiform or elliptic, costæ and margins quite smooth, fruit as in *D. propinquus*, but with less resin.

PERAK, *Scortechini*; alt. 2500–3000 ft., *King's Collector* (2593, 5704, 6313). JOHORE, *Kurz*.—DISTRIB. Sumatra.

Stem 20–3 ft., scandent. *Leaves* 5–7 ft.; leaflets 8–16 by 1–2½ in., acute, many-nerved, quite smooth on both surfaces, as are the margins; petiole 2–3 ft., and rachis semiterete, both armed with scattered small short stout nearly straight spines and tubercles; rachis armed with distant solitary spines and 3-fid claws; sheaths scurfy, armed with very broad flat spines, mouth oblique naked. *Spathes* coriaceous, flat, lower 6–10 in., transversely armed with many series of confluent short irregular spines; upper persistent, smaller. *Spadix* erect; peduncle armed with strong straight flat scattered spines; spikes densely fascicled, slender, erect, flexuous. *Fruit* ¾ in. diam., cuspidate, red brown, and explanate calyx as in *D. propinquus*.

18. *D. leptopus*, *Mart. Hist. Nat. Palm.* iii. 206, 329; leaves long-petioled, leaflets many equidistant narrowly linear-lanceolate caudate-acuminate, costæ 3 all naked, or setulose beneath near the margins, rachis very stout armed with short stout simple and 2–3-fid claws, petiole armed with fascicled or seriate flat spines, outer spathe with revolute margins towards the open tip, keels 2 armed with stout spines, fruit ovoid or ellipsoid. *Miq. Fl. Ind. Bat.* iii. 99; *Walp. Ann.* iii. 479, v. 818. *Calamus leptopus*, *Griff. in Calc. Journ. Nat. Hist.* v. 73; *Palms Brit. Ind.* 87, t. 205, A, B.

MALACCA, *Griffith*. PERAK, *King's Collector* (4774, 5919); *Scortechini*.

Stem scandent, 20–30 ft., sheaths about 1 in. diam. *Leaflets* 15–16 by ¾–1 in., tip capillary bristly, rachis as thick as the thumb, subbiconvex; petiole about 2 ft., trigonous; lower spines 1 in. and upwards. *Spathes* coriaceous, lower 8–10 in., lanceolate, open, tip flat broad; upper open much longer than their inflorescences. *Spadix* 3–4 ft., very slender; peduncle stoutly armed, branches erect, unarmed spikes 1½–3 in., flexuous, flowers unilateral. *Calyx* rather large, teeth acute, corolla ventricose. *Fruit* ¾ in. long, pedicelled by the calyx and spathe, cinnamon brown, scales deeply channelled. *Seed* with a hard resinous coat, chalaza grooved; albumen ruminate; embryo basal.—The young spadix resembles *D. propinquus*, the mature is more like *D. Hystrix*.—Description chiefly from Griffith.

†† *Mouth of leaf-sheath armed with long flat erect spines; fruit not or sparingly resiniferous.*

19. *D. Hystrix*, *Mart. Hist. Nat. Palm.* iii. 205, 328, t. 176, f. 4, 3–4; leaflets very many equidistant narrow setaceous acuminate, margins and 3 costæ setulose on both surfaces, rachis clawed, petiole armed with scattered long straight and short spines, sheath swollen armed with very long (1 foot long) flat erect and shorter spines, lower spathe small elliptic thickly armed upwards with strong long spines, fruiting spadix with spreading branches and spikes, fruit ellipsoid long-pedicelled. *Miq. Fl. Ind. Bat.* iii. 91; *Walp. Ann.* iii. 477, v. 828. *D. hirsutus*, *Blume Rumph.* iii. 21 (*excl. descr. fruit*), t. 135, f. A, B, C (*excl. D, E oblongus*); *Miq. l. c.*

Suppl. 593. *Calamus Hystrix*, *Griff. in Calc. Journ. Nat. Hist.* v. 71; *Palms Brit. Ind.* 80, t. 204, A, B, C; *Miq. Palm Archip. Ind.* 28.

MALACCA, *Griffith*; at Ager Punnus, Maingay. PERAK, *Scortechini*, *King's Collector* (951).—DISTRIB. Java, Sumatra.

Stem scandent, with the very stout sheaths $1\frac{1}{4}$ in. diam. *Leaves* 7–10 ft.; rachis flagelliferous; leaflets 10–18 by $\frac{1}{2}$ – $\frac{3}{4}$ in., tips very slender, setulose costæ sometimes 5; petiole 1–2 ft.; sheath woody, scurfy, obliquely crossed with half-whorls of close set flat spines, of which the lower series are $\frac{1}{2}$ – $\frac{1}{4}$ in. long lanceolate very thin and appressed to the surface, the upper or oral enormously long, strict. *Lowest spathe* 4–5 in., almost woody, stoutly armed, not beaked; upper narrower, more or less armed. *Spadix* 2–3 ft., peduncle rather slender, armed; spikes 2–3 in., scurfy, ascending, flexuous; flowers pedicelled; calyx cupular, teeth obtuse villous-tipped; corolla twice as long, ovoid. *Fruit* about $\frac{3}{4}$ in. long by $\frac{1}{2}$ in. diam., pale brown, not shining, shortly mammillate; scales obtuse, channelled, margins of channels rather elevated. *Seed* oblong, pitted, pits resinous; albumen deeply ruminate; embryo basilar.—The enormous spines of the leaf-sheaths are a remarkable character.

Var. *minor*, Becc. mss.; stem 2–8 ft., with the sheaths $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., leaves 1–4 ft., leaflets 5–10 in., fruit much smaller.—Perak 300–1500 ft., *King's Collector* (5097, 5142, 5486).

20. **D. Kunstleri**, *Becc. mss.*; leaflets many equidistant linear setulose on the 3 costæ above and median beneath, margins setulose, petiole robust scurfy margins armed with long stout spreading spines, sheath with many oblique series of long stout flat spines alternating with shorter setiform ones, mouth with a few very long ones, lower spathe coriaceous softly scurfy keel spinous, peduncle of spadix long slender armed with whorls of spines, fruit globose top conical not beaked.

PERAK; *Scortechini* (652), *King's Collector* (10,204).

Stem erect, 2–3 ft., sheaths 3 in. diam. *Leaflets* 14–18 by $\frac{3}{4}$ – $\frac{1}{2}$ in., rachis armed with 3-fid. claws. *Peduncle* of spadix 8–10 in. *Fruit* $\frac{3}{4}$ in. diam., tawny, top suddenly contracted into a low cone; scales few, channelled, broad, margins not scarious and hardly discoloured; fruiting calyx small, explanate. *Seed* subglobose.—I have seen only a portion of a leaf and of a fruiting spadix.

21. **D. vagans**, *Becc. mss.*

PERAK; alt. 4000–5000 ft., *King's Collector* (4129).

Stem scandent, sheaths $\frac{3}{4}$ in. diam. *Leaflets* 14 by $\frac{3}{4}$ in., very narrow straight and finely acuminate. *Fruit* as in *Kuntsleri* but smaller.—I have seen only a portion of a leaf and fruit without calyx.

** Outer spathes at first tubular, then open, all deciduous or the outer more persistent, hardly spinous, but densely clothed with rigid needle-like spiculæ. Sheath of leaf with a spinulose membranous collar or ring. Spadix elongate before flowering, then paniculate.

22. **D. Sabut**, *Becc. mss.*; leaflets in fascicles of 9–10 in., the lower part of the rachis and 4–6 on the upper elongate oblanceolate suddenly narrowed to a setulose tip, margins and 3 costæ setulose above the median alone beneath, petiole very stout stoutly armed with short and long single and compound spines, sheath with a toothed setulose and spinular mouth.

PERAK, *Scortechini* (653^b).

Internodes 6–8 in., with a reversed membranous collar. *Flagellum* of rachis very short.—I have seen no specimen. *J.D.H.*

23. **D. oligophyllus**, *Becc. mss.*; leaflets 10-12 in distant fascicles elongate-oblancoelate with setulose tips, costæ 3 nearly naked on both surfaces, sheath densely filamentously scurfy, internodes with 2-3 membranous strongly nerved collars appressed to the sheath and densely crinite, petiole biconvex margins obtuse rather closely armed with claws.

PERAK, *Scortechini*.

Founded on two flowerless specimens, neither of which have I seen.—*J.D.H.*

24. **D. macrophyllus**, *Becc.*; leaflets 4 in 2 very distant pairs oblong-lanceolate 20 by 4-5 in. with 7-8 acute naked costæ, petiole 2 ft. biconvex, armed with 2-3-fid spines, sheaths $\frac{2}{3}$ - $\frac{3}{4}$ in. diam. with 3-4 membranous collars.

PERAK; *Scortechini*.

Founded on a single flowerless specimen, which I have not seen.—*J.D.H.*

25. **D. verticillaris**, *Mart. Hist. Nat. Palm.* iii. 329, t. 175, iii. t. 72, f. vi., vii.; leaflets many equidistant ensiform setaceously acuminate, margins and costæ very sparingly setulose, sheath armed with whorls of very long flat weak spines alternating with whorls of confluent black bristles, lower spathe thinly coriaceous densely crinite with series of fascicled black bristles, male spadix slender, spikes sub-erect slender, flowers minute densely crowded in two collateral series, fruit small sessile globose. *Miq. Fl. Ind. Bat.* iii. 99; *Walp. Ann.* iii. 478; v. 828. *Calamus verticillaris*, *Griff. in Calc. Journ. Nat. Hist.* v. 63; *Palms Brit. Ind.* 73, t. 200 A, B, C, D.

MALACCA, *Griffith*. PERAK, *Scortechini*; at Larut and Goping, *King's Collector* (576, 6388).

Stem 20-40 ft. scandent, sheaths about $1\frac{1}{2}$ in. diam. *Leaves* 5-15 ft.; leaflets 10-18 by $\frac{3}{4}$ -1 in.; rachis flagelliferous, armed dorsally with multifid claws; petiole stout, armed below with half whorls of pale flat weak spines 1-5 in. long, and short black bristles; sheath with similar long flat pale erect spreading or deflexed spines, closely alternating with comb-like whorls of densely compacted black-tipped bristles confluent into stiff lamina $\frac{1}{2}$ in. deep. *Lower spathe* 2-3 ft., with a long narrow point; bristles $\frac{1}{2}$ -1 in. long, in closely packed whorls, black, shining; upper spathe quite or nearly smooth. *Spadix* 2 ft. long, scurfy, decomposed, male rather contracted, fem. with spreading branches, peduncle unarmed. *Male spikes* $\frac{3}{4}$ -1 in.; spathellule cupular, acute. *Flowers* distichous, horizontal, most densely packed; calyx cupular, obscurely toothed; petals twice as long. *Fem. spikes* 3-4 in. *Fruit* $\frac{1}{2}$ in. diam., top conical, scales whitish faintly channelled, margins brown. *Seed* globose, albumen deeply ruminate.

*** Outer spathe acutely 2-keeled, keel alone setose. Leaf sheaths armed with flat spines confluent in an annular spinulose crest.

26. **D. geniculatus**, *Mart. Hist. Nat. Palm.* iii. 329; leaflets scattered or in groups of 3-7 elongate ensiform tips filiform very long, costæ 3-5 smooth or more or less setulose, margins smooth, petiole stout armed towards the base with simple and compound very long white flat stiff spines, mouth of sheath with a few similar spines and a brush of needle-like bristles below which is a thick ring of confluent bristles, outer spathe lanceolate, spadix much branched, male fl. densely crowded in collateral series, fruit subglobose shortly stoutly beaked. *Miq. Fl. Ind. Bat.* iii. 93; *Walp. Ann.* iii. 478, v. 828. *Calamus geniculatus*, *Griff. in Calc. Journ. Nat. Hist.* v. 67; *Palms Brit. Ind.* 77, t. 202, A, B; *Miq. Palm. Archip. Ind.* 28.

PENANG, *Lewes*. PERAK, alt. 2-3500 ft., *King's Collector* (2931, 2735, 6306, 7849). SINGAPORE, *Lobb*.

Stem stout 20-25 ft., scandent; nodes swollen. *Leaves* 10-14 ft.; leaflets 16-20 by $\frac{2}{3}$ -1 in., margins quite smooth, long tips setose; petiole stout, spines on lower portion often ternate with the central 6-7 in. long and slender but stiff. *Spathes* all deciduous, upper thinly coriaceous, unarmed. *Spadix* (geniculate, Griff.) 3 ft.; peduncle 6-12 in., flattened, with marginal spines, not 2-edged; spikes $\frac{1}{2}$ - $\frac{3}{4}$ in., spreading, with the flowers $\frac{1}{2}$ in. broad. *Male flowers* most densely imbricate, horizontal in two series, $\frac{1}{3}$ in. long and narrow; spathellules quite entire; calyx shortly cylindric, striate; corolla terete, four times as long, smooth, not striate, very narrow. *Fruit* $\frac{2}{3}$ in. long, shortly pedicelled; sometimes almost ellipsoid, pale dull yellowish brown; scales with a shallow channel and brown margin.—There may be more than one species included here, the fruiting spadices of Nos. 576 and 7849 look very different. No. 576 from Goping Perak has the slender fruiting spadix, with distant fruits, as in Griffith's figure. No. 2735 from Perak is a male plant and has the mouth of the sheath with needle-shaped spines. No. 2931 from Perak has the very long spires on the petiole. No. 7849 from Perak has the branches of the fruiting spadix as broad as long with very short stout internodes and stout spikes 4-6 in. long; it most resembles the Penang form.

**** Outer spathe lanceolate, slenderly 2-keeled, wholly deciduous after flowering. Leaf sheaths armed with isolated or confluent spines, not annular crests. Spadix elongate.

27. **D. longipes**, *Mart. Hist. Nat. Palm.* iii. 329, t. 176, f. v. 2, 3, leaflets equidistant linear-lanceolate or ensiform subulate-acuminate margins and tips bristly 3 costæ setulose above or on both surfaces, petiole convex below and armed with long irregular spines, channelled above, with toothed margins, rachis triangular with solitary short dorsal teeth, sheath armed with broad stout flat solitary or seriate spines mixed with bristles, spathes narrowly lanceolate long acuminate unarmed, spadix very long long-peduncled, spikes flexuous, fruit ovoid-oblong shortly stipitate, beak conical. *Miq. Fl. Ind. Bat.* iii. 93; *Walp. Ann.* iii. 478, v. 828. *D. strictus*, *Blume Rumph.* iii. 19, t. 163 A, B; *Mart. l. c.* 326. *Miq. l. c.* 86; *Suppl.* 255; in *Journ. Bot. Neerl.* i. 18; *Walp. l. c.* 474, 827. *Calamus longipes*, *Griff. in Calc. Journ. Nat. Hist.* v. 68; *Palms Brit. Ind.* 78, t. 203 A, B (*excl. syn. Rumph.*). *C. strictus*, *Miq. Palm. Archip. Ind.* 28.

MALACCA, *Fernandez, Maingay, Hervey*.—DISTRIB. Sumatra, Banca.

Leaves with the flagellum about 12 ft.; petiole 2 ft., young floccosely scurfy; leaflets 12-14 by $1\frac{1}{4}$ in. *Spathes* long and narrow, thinly coriaceous, nearly or quite unarmed, young scurfy. *Male spadix* nodding; peduncle 2 ft., 2-edged, unarmed or with a few marginal spines; branches decomposed; spikes $\frac{1}{2}$ -1 in., very slender and zig-zag, spathellules (or bracts?) very minute. *Flowers* $\frac{1}{6}$ in. long, erecto-patent; calyx obtusely toothed, quite glabrous, striate; petals hardly twice as long, not striate. *Fruiting spadix* large, very broad, much branched; branches not stout, scurfy; spikes 3-5 in. *Fruit* $\frac{1}{4}$ in. apart, $\frac{2}{3}$ in. long; calyx very shortly pedicelled, broadly campanulate, 3-lobed to the middle lobes appressed to the base of the fruit; scales pale yellow-brown, shining, concolorous, faintly channelled. *Seeds* oblong; albumen strongly ruminant; embryo basal.—Griffith describes *Calamus longipes* as having equidistant leaflets, his specimens are too imperfect to show this character. In Maingay's specimen they are inequidistant as described by Blume in his *D. strictus*. As in other species the costæ of the leaflets probably vary much as to being more or less setulose on one or both surfaces.

IMPERFECTLY KNOWN SPECIES.

Besides enumerating the above more or less imperfectly described species,

Beccari has indicated the existence of about 7 other new Malayan Peninsula ones, but these are in far too imperfect a condition to render it advisable to register here the names he has given them.

25. **ZALACCA**, Reinw.

Stemless, soboliferous, armed palms. *Leaves* pinnatisect, not flagelliferous; leaflets narrowly linear-lanceolate. *Spadix* interfoliar, pendulous, flowering branches catkin-like. *Spathes* persistent; lower sheathing, incomplete; bracteoles cupular, 2-celled; flowers coriaceous, densely crowded, polygamous. *Male fl.*, calyx tubular, 3-fid.; corolla tubular, segments valvate; stamens 6, anthers short. *Fem. fl.* larger; perianth accrescent; calyx trifid; corolla-lobes lanceolate, valvate; staminodes 3 or 6; ovary 3-celled, stigmas 3, subulate; ovules basilar. *Fruit* globose or obovoid, 1-3-seeded, clothed with reversed or spreading scales. *Seeds* 1-3, erect, top excavated, testa crustaceous, outer coat fleshy; albumen equable; embryo subbasilar.—Species 9 or 10, chiefly Malayan.

The species are for the most part imperfectly known. The Malayan *Z. edulis*, Reinw., not hitherto found in the Malayan Peninsula, has the leaflets white beneath.

1. **Z. secunda**, Griff. in *Calc. Journ. Nat. Hist.* v. 12; *Palms Brit. Ind.* 14, t. 177; leaflets straight concolorous acutely 3-costate margins setulose above the middle, costæ spinulose on the under face, male spadix compact, spikes much longer than their spathes peduncled, fem. spadix paniculately branched, spikes tomentose, fruit clothed with spreading lanceolate scales. *Becc. Males.* iii. 673. *Calamus collinus*, Griff. *Palms Brit. Ind.* t. 186 (leaf only).

UPPER ASSAM, Mann; in the Mishmi Mts., Griffith.

A very imperfectly known species, of which Griffith describes only the male spike. Mann's specimen consists of a leaflet, and young fruit; he describes the leaf as 30 ft. long; the leaflets as 33 in. long by nearly 3 broad, coriaceous, with three stout costæ acute on both surfaces and spinulose beneath.—Fruits received quite recently at Kew from Mr. Mann are unfortunately in too broken a condition to determine their form; they appear to have been ovoid, 2 in. ? long, ending in a stout cone as in *Eugeissonia*; the pericarp thin, clothed with spreading and ascending subulate-lanceolate recurved dark brown scales $\frac{1}{2}$ in. long and under; there is no appearance of a succulent endocarp. *Seeds* (1-3 ?) 1-1 $\frac{1}{4}$ in. long, very various in shape, from subglobose to hemispheric or trigonous with a convex back, and very rounded angles, dark brown, not polished, with a deep small apical hollow leading to the canal which extends more than half way into the dense albumen; embryo above the base dorsal or sublateral, indicated externally by a circular convexity with depressed margins $\frac{1}{4}$ in. diam. or less.

2. **Z. affinis**, Griff. in *Calc. Journ. Nat. Hist.* v. 9; *Palms Brit. Ind.* 12, t. 176, A, B, C; leaflets concolorous strongly falcate costæ 3 and margins not setulose, male spadix elongate, spikes small tomentose shortly exerted from the sides of their long spathes, fem. spadix compact with short interrupted spikes much shorter than their spathes, fruit ovoid smooth. *Becc. Males.* iii. 67.

MALACCA, Griffith. PERAK, at Larut, King's Collector (3448).—DISTRIB. Sumatra.

Leaves 12-13 ft.; petiole half the length, slender, armed with long slender spines, leaflets fascicled, 18-20 by 2 $\frac{1}{2}$ in.; costæ slender, acute beneath. *Male spadix* about 1 $\frac{1}{2}$ ft.; spathes imbricate lacerate. *Spikes* $\frac{3}{4}$ - $\frac{1}{2}$ in.; bracts membranous, 2-fd.;

bracteoles penicillate. *Fruit* $2\frac{1}{2}$ by $1\frac{3}{4}$ in., cuspidately mammillate; scales closely imbricate, chesnut brown. *Seeds* 1-3, plano-convex.—Descr. chiefly from Griffith.

3. **Z. conferta**, *Griff. in Calc. Journ. Nat. Hist.* v. 16; *Palms Brit. Ind.* 19, t. 180, A, B, C; leaflets linear-ensiform concolorous straight or slightly falcate, fem. spadix large copiously branched from the base very compact, spikes densely crowded much longer than their spathes, fruit turbinate not spinous. *Mart. Hist. Nat. Palm.* iii. 201, t. 173, 174; *Becc. Males.* iii. 67.

MALACCA, *Griffith.*—DISTRIB. Borneo.

Stems stout, less tufted than in others, forming an impenetrable jungle. *Leaves* 18-20 ft.; petiole half the length of the blade, stout, flattened above; spines short, white, fascicled; leaflets equidistant, alternate, 2 ft. by $2\frac{1}{2}$ in., subulate-acuminate, tip and margins setose, costæ of upper leaflets bristly on the upper surface. *Spadix* 8-12 in., crowded with cylindric spikes 6 in. long; male fl. in pairs; bracteoles villous. *Fruit* crowded in a formless mass; scales quite smooth, aspect waxy and shining, margins denticulate, tawny greenish; mesocarp white spongy. *Seed* broadly turbinate.—Distinguished by habit, direction of the leaflets their bristly costæ and slender short white spines and crowded thyriform fruiting spadixes.—Descr. from Griffith.

4. **Z. Wallichiana**, *Mart. Hist. Nat. Palm.* iii. 200, 325, t. 118, 119, 136; leaflets inequidistant falcate oblong-lanceolate with very long filiform setulose tips, costæ naked, male and fem. spadices very long fastigiate branched, spikes very distant much shorter than their spathes, fruit obovoid shortly imbricate, scales with long reflexed points. *Kurz in Natuurk. Tijdschr. Ned. Ind.* xxvii. (1864) 216; *For. Fl.* ii. 511; *Becc. Males.* iii. 66. *Z. edulis*, *Wall. Cat.* n. 5000; *Pl. As. Rar.* iii. 14, t. 222-224; *Z. Rumphii*; *Griff. in Calc. Journ. Nat. Hist.* v. 8; *Palms Brit. Ind.* 10, t. 175. *Blume Rumphia*, ii. 159. *Z. macrostachya*, *Griff. ll. cc.* 13, and 15, t. 178 A, B, C; *Becc. l. c.* 66.

BURMA, *Kurz*. MALACCA; at Ching, *Griffith*. PENANG and SINGAPORE.—DISTRIB. Siam, Banca.

Stem very short or 0. *Leaves* 15-20 ft.; leaflets approximate in groups of 2-4, and alternate, 2-3 ft. by $1\frac{1}{2}$ -2 in., spinulosely ciliate above the middle, upper confluent; petiole 8-10 ft. and rachis copiously armed with broken spirals of strong subreflexed spines. *Spadices* several feet long, rachis woolly. *Spikes* cylindric, villous, $1\frac{1}{2}$ -2 in. long; flowers small, rose-cold. *Spathes* variously ruptured, floral terminated by dense tufts of rose-cold. paleaceous hairs. *Fruit* in dense heads, 1 in. long or more, 1-3-celled; scales brown, tips terminating in a reflexed brittle bristle.—Descr. from *Kurz For. Fl. l. c.*—"Spadices dimorphic, one male only, with densely tomentose spikes; the other monœcious very dense-flid. and difficult to make out; each bract I find to correspond to a cluster of 3 flowers, a female between 2 males or neuters, and with two densely tomentose bracteoles."—*Beccari*. Griffith's *Z. macrostachya* referred to *Wallichiana* by Beccari (mss.) is a much stouter form, with oblanceolate leaflets and spikes 3 in. long and nearly 1 in. diam. In Griffith's figure of the whole plant (Tab. 178 C) the leaves have not the long tapering filiform tips of *Z. Wallichiana*.

5. **Z. glabrescens**, *Griff. in Calc. Journ. Nat. Hist.* v. 14; *Palms Brit. Ind.* 17, t. 179; leaflets close set slightly falcate concolorous, tips subulate filiferous, male spadix much branched, spikes much longer than their spathes, fem. spadix reduced to few branches each bearing a very large solitary long peduncled nodding glabrous spike clothed with broad glabrous imbricating bracts.

PENANG, *Lewes, Wray* (2435).

Leaves 12–15 ft.; petiole slender, trigonous, apparently armed with a simple row of spines on each face; leaflets equidistant, 20–22 by $2\frac{1}{2}$ in., margins setose towards the tips. *Spadices* much branched, less covered than usual in the genus by the primary spathes; branches entirely covered by loosely sheathing spathes; young spikes slender, looking as if annulate by the broad shallow bracts, glabrous externally. *Males* 3–4 in., slender, bracteoles obsolete or nearly so. *Fem. fl.* large, oblique. *Ovary* strigose with erect stout hairs, ovoid. *Fruit* (accompanying Wray's specimen) globose, 1 in. diam., suddenly contracted into a columnar beak $\frac{1}{2}$ in. long, clothed (including the beak) with small very dark brown scales in vertical series, each with a short recurved setose tip, and an obtuse keel on the back.—“Erroneously referred to *Z. edulis* in Malesia iii. 64.”—O.B.

6. **Z. Beccarii**, *Hook. f.*; leaflets strict concolorous elongate-ensiform acuminate, tips shortly filiform, margins spinulose setose, costæ 3 with few scattered long bristles beneath, rachis with short hooked black claws, fem. spadix very long, rachis brown woolly, lower spathes very long, upper twice as long as the large stout spikes, fruit-scales recurved spinescent.

RANGOON, *McLelland*.

Leaflets apparently equidistant, 18–24 by $1\frac{1}{2}$ in., shining on both surfaces, margins with strong straight setæ almost throughout their length, mid-costa stout, lateral slender; bristles $\frac{1}{4}$ – $\frac{1}{3}$ in. long, black; very young leaflets pale beneath with very long slender pale bristles on the costæ. *Fem. spadix* 3 ft. long or more; lower spathe 1 ft. long; upper 4–6 in. *Spikes* $2\frac{1}{2}$ in. long, $\frac{3}{4}$ in. diam.; bracts woolly; flowers $\frac{1}{2}$ in. long; sepals and petals subequal, broadly ovate, acute. *Fruit* (much broken) apparently small; scales pale chestnut, with broad bases and paler recurved spinous tips.—Very distinct from *Z. Wallichiana* in the long strict leaflets with long bristles, short tips, and margins armed throughout their length.

26. **KORTHALSIA**, *Blume*.

Scandent, spinous palms. *Leaves* pinnatisect; leaflets more or less cuneate or trapezoid and erose (except *K. echinometra*); rachis flagelliform; petiole short, sheath often produced into a large ligule (ochrea). *Spadix* axillary, loosely branched, pendulous, sheathed with tubular persistent spathes; bracts membranous; bracteoles reduced to hairs. *Flowers* bisexual, crowded in cylindric catkin-like spikes; sepals orbicular or oblong; petals ovate or lanceolate, valvate; stamens 6 or more, filaments short, anthers linear; staminodes 6 or more; ovary imperfectly 3-celled; ovules basilar. *Fruit* globose or ovoid, 1-seeded; pericarp thin, tessellate with recurved shining scales. *Seed* erect, top hollowed, chalaza lateral; albumen ruminant; embryo ventral.—Species about 20, Indian and Malayan.

The swollen ochrea of the first section form nidi for ants. The species are very imperfectly known.

* *Ochrea inflated*.

1. **K. echinometra**, *Becc. Males*. ii. 66, t. vii.; ochrea narrow elliptic-lanceolate armed with long flattened black spines, leaflets very narrowly linear-lanceolate finely acuminate mealy-white beneath more or less toothed towards the tip.

PERAK, *Scortechini* (n. 458^b).—DISTRIB. Borneo.

Stem about $\frac{3}{4}$ in. diam. *Leaves* flagelliferous; leaflets opposite, 12–15 in. long, 6–8 broad, acuminate, green and shining above, 3–4-nerved; petiole about 20 in.; spines short; rachis with stout claws; sheath armed with short flattened spines almost enveloped by the ochrea, which is 5–6 in. long, and armed with scattered spines 2–3 in. long.—Flower and fruit unknown.

2. **K. scaphigera**, *Mart. Hist. Nat. Palm.* iii. 211; ochrea cymbiform lanceolate armed with short conical spines, leaflets rhomboid-obovate or -cuneate acuminate erosely lobulate above the middle. *Miq. Fl. Ind. Bat.* iii. 750; *Palm. Archip. Ind.* 26; *Becc. Males.* 67, t. 5. K. Lobbiana, *H. Wendl. in Bot. Zeit.* xvii. 174; *Miq. ll. cc.* K. rostrata, *Blume, Rumph. ii.* 168. ? *Calamosagus scaphigera*, *Palms Brit. Ind.* 30, t. 184 A; *Kurz For. Fl.* ii. 513. *C. wallichiaefolius*, *Mart. Hist. Nat. Palm.* 1c. 211.

MALACCA, *Griffith.* PERAK, *King's Collector* (6833, 8144).—DISTRIB. Sumatra.

Stem slender, $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. *Leaves* $2\frac{1}{2}$ ft.; leaflets distant, sessile, glaucous beneath; sheath armed with a few scattered conical prickles and generally split along the back into a fibrous network; ochrea forming the upper $\frac{2}{3}$, boat-shaped, closely half embracing the next sheath; petiole roundish, back armed with claws.—Descr. from Griffith.

3. **K. Scortechinii**, *Becc. mss.*; ochrea elongate armed with short scattered spines, leaflets linear or cuneately oblanceolate 8–10 times longer than broad.

PERAK, *Scortechinii.*

Leaflets 14–16 by $1\frac{1}{2}$ –2 in., alternate and subopposite, equidistant, oblanceolate, white beneath, 5–7-nerved, acutely toothed; sheath and ochrea (6–8 in. long) armed.—Distinguished from *Z. scaphigera* by the much longer ochrea, and more numerous narrower leaflets.

4. **K. wallichiaefolia**, *H. Wendl. in Kerchoff Palm.* 248; leaflets many broadly cuneately obovate obtusely erosely toothed as long or twice as long as broad. *Becc. Males.* ii. 75. *Calamosagus wallichiaefolius*, *Griff. in Calc. Journ. Nat. Hist.* v. 24; *Palms Brit. Ind.* t. 184. *C. harinaefolius*, *Griff. l. c.* in text p. 29.

MALACCA (from the interior), *Griffith.*

A very little-known plant. Griffith describes the leaves as resembling those of *Z. laciniosa*, but with less deep more obtuse incisions; the spadix as covered with long smooth spathes with lacerate mouths; spikes (immature) a span long by $\frac{1}{2}$ in. diam.; lateral pedicels plano-convex, bearing a long spathe about the middle, which reaches the base of the spike; bractæ broad, longer than the dense wool.

** *Ochrea not inflated.*

5. **K. laciniosa**, *Mart. Hist. Nat. Palm.* iii. 212; leaflets rhomboid ovate or trapezoid about as long as broad acutely erosely toothed, ochrea dilacerate sparingly armed, spikes tomentose. *Kurz in Journ. As. Soc. xliiii.* pl. ii. (1874) 207; *Becc. Males.* ii. 74 (*excl. pl. Salangore*). K. scaphigera, *Kurz l. c.* 206 (*excl. all syns.*) t. 20, 21; *For. Fl.* ii. 513 (*not of Mart.*). K. andamanensis, *Becc. Males.* ii. 76. *Calamosagus laciniosus*, *Griff. in Calc. Journ. Nat. Hist.* v. 23, t. 1; *Palms Brit. Ind.* 27, t. 183.

BURMA, the ANDAMAN and NICOBAR ISLDS.

Stem slender, $\frac{1}{2}$ in. diam. *Leaves* 2–4 ft.; leaflets subapproximate, 4–7 in. long, terminal broadest, fugaciously white tomentose beneath; petiole $1\frac{1}{2}$ –2 ft., with

straight spines; rachis and flagellum with reversed claws. *Spikes* 3-4 in., tawny-tomentose, very compact; bracts smooth, a little longer than the villous bracteoles. *Fruit* $\frac{1}{2}$ in. long, obovoid, mucronate; scales with a broadly lacerate pale brown membranous border.—Descr. from Kurz (of his *scaphigera*) in *For. Fl. l. c.* referred here by Beccari.

6. ***K. ferox***, *Becc. Males.* ii. 73; leaflets shortly petiolulate trapezoid about as long as broad pale beneath obtusely erose toothed, sheath and ochrea thickly armed especially on the petiolar side with short spines, above fibrous-reticulate glabrous or finely scurfy.

Var. *malayana*, *Becc. mss.*; spines of the sheath and ochrea shorter, and covering the ventral face of the latter.

Var. *malayana*, PERAK, at Larut (*Hort. Calc.* 6563); at Gunong Tjick, Sept., 1844, *Scortechini*.

I have seen no specimen. The type is Bornean.

7. ***K. polystachya***, *Mart. Hist. Nat. Palm.* iii. 210, t. 172, f. 1; leaflets cuneiform or obliquely trapezoid glaucous beneath obtusely toothed, sheath and ochrea unarmed, spikes long slender flexuous. *Miq. Fl. Ind. Bat.* iii. 77; *Becc. Males.* ii. 74. *Calamosagus polystachyus*, *Griff. ex Mart. l. c.* 211. *C. ochriger*, *Griff. Palms Brit. Ind.* p. x. t. 216, f. 1.

MALACCA, *Griffith*.

Stem very slender, about $\frac{1}{2}$ in. diam., including the sheaths. *Leaves* about 2 ft., including the flagellum, subsessile; leaflets 10-12, irregularly alternate, ferruginously woolly, shortly petiolulate, 6 by 3 in.; rachis and flagellum armed with claws, young rusty-pubescent; ochrea short, truncate. *Spadices* from the terminal axils, together forming a panicle 3-3 $\frac{1}{2}$ ft. long, clothed with long closely appressed spathes; branches a span to a foot long. *Spikes* 5-7 in.; peduncle with a tertiary spathe; lower bracts empty; upper broad, 1-fl., and filled with stout wool.—Descr. from Griffith's *C. ochriger*. Beccari thinks that Kurz is mistaken in uniting this with *K. rigida*, Blume.

8. ***K. tenuissima***, *Becc. Males.* ii. 275; very slender, leaflets 3-6 obovate or oblanceolate acuminate subacutely toothed pale beneath, sheath sparingly armed, ochrea unarmed, spikes few, spathes tubular inflated dilated above.

MALAY PENINSULA; Perak, at Larut, *King's Collector* (4057).

Leaves with a very slender petiole; leaflets 1-4 in. long by 1-1 $\frac{1}{2}$ broad; petiole very short, base callous swollen. *Spikes* apparently glabrous from the bracts exceeding the calyx.

9. ***K. flagellaris***, *Miq. in Journ. Bot. Neerl.* 15; *Fl. Ind. Bat. Suppl.* 255, 591; leaflets numerous narrow elongate-cuneate rusty pubescent beneath acutely erose toothed, sheath armed dorsally unarmed on the petiolar side, ochrea armed only ventrally, spikes tomentose. *K. angustifolia*, *Miq. Palm. Archip. Ind.* 15, 26 (excl. sp. from Borneo and var. β) (not of Blume).

MALAY PENINSULA; Perak, *Scortechini*; at Assam Kumbung, *Wray* (n. 3127).

Resembles in the form of its leaflets and their colouring beneath *Z. rubiginosa*, which has longer straighter less cuneate leaflets with short not subulate teeth.

27. **CERATOLOBUS**, *Blume.*

Palms with the habit and foliage of *Korthalsia*, but with flagelliferous leaves. *Spadix* very slender, loosely panicked; branches filiform; peduncle very long, pendulous, prickly, usually adnate to the sheath of the leaf opposite; spathe small, solitary, membranous, narrow, flattened, beaked, at length split down the ventral face; flowers polygamous, in pairs, the upper ebracteate, the lower bracteate and bracteolate. *Male fl.* Calyx small, 3-fid; lobes triangular, valvate; stamens 6, on the bases of the petals, anthers linear; pistillode minute. *Fem. fl.* Calyx of the male; corolla 3-fid, valvate; ovary ovoid; ovules 3, basilar, erect. *Fruit* small, 1-celled, 1-seeded, pericarp as in *Korthalsia*. *Seed* globose, erect; testa fleshy; albumen ruminant; embryo basilar.—Species Malayan.

1. **C. lævigatus**, *Becc. mss.*; leaflets in inequidistant groups of 2-3 pairs narrowly linear- or ob-lanceolate acuminate suddenly contracted into a long straight point naked on both surfaces and margins, spadix shortly peduncled, fruit spherical broadly beaked. *Calamus lævigatus*, *Mart. Hist. Nat. Palm.* iii. 339; *Miq. Fl. Ind. Bat.* iii. 129. *Calami* sp. *Griff. in Calc. Journ. Nat. Hist.* v. 72, & *Palms Brit. Ind.* 72 (last 5 lines).

PERAK, *King's Collector* (575, 971, 5916); on Waterfall hill, *Wray* (2919).

Stem 15-20 ft., about $\frac{1}{2}$ in. diam. *Leaves* 18-30 ft.; leaflets concolorous, dark green, 5-9 by $\frac{1}{2}$ - $\frac{3}{4}$ in., thin; rachis slender, sparsely armed with solitary recurved spines; petiole very short, base tumid; sheath strongly ribbed, armed with scattered simple flattened spines. *Spadix* 4-8 in., very shortly peduncled, erect, narrow; branches slender, sparsely pubescent. *Spathe* 6-10 in., linear-lanceolate, coriaceous, smooth. *Male fl.* sessile, subglobose, $\frac{1}{2}$ in. diam.; calyx cupular, 3-lobed and broad petals and bracteoles deeply grooved. *Fruit* brown, subglobose or ovoid, narrowed to a broad conical beak; scales obscurely channelled. *Seed* obtusely tubercled. *Fruiting calyx* as in the male, but petals much narrower and longer.

Var. *angustifolia*, *Becc. mss.*; more slender, leaflets narrower gradually produced into a slender point, median costa setulose, spathe 4 in. long, much thinner and spadix much smaller, probably a different species. *Perak*; *King's Collector* (1879).

2. **C. Kingianus**, *Becc. mss.*; leaflets few large cuneately rhomboid or trapezoid, lobed and toothed in the upper half deeply plicate pale beneath, spadix sessile, fruit spherical shortly broadly beaked.

PERAK, *Hullett (Herb. Calc.* 2547, 2856, 5589); *Wray* (2869).

Stem 20-25 ft., about $1\frac{1}{2}$ in. diam. *Leaves* 3-4 ft.; leaflets 6-9 by 3-4 in., lower half triangular-cuneate; rachis stout armed with short solitary and 2-5-fid. claws; petiole 6-8 in., more or less muricate and armed with scattered short simple and compound spines; sheath transversely muricately ridged, unarmed, young white furfuraceous. *Spadix* 8-10 in., erect, narrow; branches short, glabrous. *Spathe* 8-12 in., elongate-oblong, flat, thickly coriaceous, quite smooth. *Male fl.* sessile, about $\frac{1}{2}$ in. long, narrowly oblong; calyx minute, cupular; petals narrow thrice as long, both deeply grooved. *Fruit* $\frac{3}{4}$ -1 in. diam., brown, scales hardly channelled. *Seed* nearly smooth. *Fruiting calyx* minute; petals broadly ovate.

28. **PLECTOCOMIA**, *Mart.*

Scandent monocarpic spinous palms, stem very long. *Leaves* flagelliferous; leaflets linear lanceolate. *Spadix* simply branched; branches very long, pendulous, clothed with closely imbricating distichous inflated coriaceous persistent spathelets which conceal the spicate dioecious flowers.

Spikelets short, male many-fl., fem. shorter few-fl.; bracts and bracteoles subulate. *Male fl.* Calyx cupular, 3-toothed; petals lanceolate, valvate; stamens 6-12, filaments cuneate below, anthers linear. *Fem. fl.* larger, perianth accrescent; corolla 3-fid, lobes valvate; staminodes 6. *Ovary* 3-celled; ovules basilar. *Fruit* globose, 1- rarely 3-seeded, beaked; pericarp thin, tessellated with reflexed shining scales. *Seed* erect; albumen equable, embryo basilar.—Species 6 or 7, Himalayan and Malayan.

1. **P. khasyana**, *Griff. in Calc. Journ. Nat. Hist.* v. 106; *Palms Brit. Ind.* 106, t. 218; leaflets strongly 3-costate finely furfuraceous beneath tip not filiferous, rachis of spadix glabrate, of spikelets white-tomentose, spathelets rusty-puberulous, male petals $\frac{1}{2}$ in. long elongate-lanceolate, fruit-scales ciliate and with deciduous recurved fimbriate tips. *Mart. Hist. Nat. Palm.* iii. 199. *P. assamica*, *Hook. Bot. Mag.* t. 1505 (*excl. syn.*).

KHASIA HILLS, alt. 4-5000 ft., *Griffith*, &c.

Stem 60-80 ft., as thick as the arm. *Leaves* 30 ft. including the flagellum; leaflets 8-16 by 2-3 in., broadly lanceolate; rachis armed beneath with very short digitate spines. *Male spadix* branched from the base; branches 3 ft. long by 2 ft. across the spathelets, which are $1\frac{1}{2}$ in. long, oblong, white with broad green acute or acuminate tips and a broad brown interposed band. *Spikelets* 1 in., many-fl. *Stamens* 8-12. *Fruit* $1-1\frac{1}{4}$ in. diam., globose, abruptly beaked.

2. **P. himalayana**, *Griff. in Calc. Journ. Nat. Hist.* v. 100; *Palms Brit. Ind.* 108, t. 218; leaflets concolorous tips filiform, spadix and spikelets scurfily tomentose, male petals $\frac{1}{2}$ in, fruit-scales fimbriate tips appressed. *Mart. Hist. Nat. Palm.* iii. 129; *T. Anders. in Journ. Linn. Soc.* xi. 12. *P. montana*, *Herb. Ind. Or. Hook. f. & Thoms.*

SIKKIM HIMALAYA, alt. 4-7000 ft.

Stem 1 in. diam. *Leaves* 6-8 ft. including the flagellum; leaflets 12-16 by $1-1\frac{1}{2}$ in., with 5 slender costæ, margins aculeolate, rachis scurfy and flagellum armed with recurved claws; petiole unarmed or margins spiny; sheath tubular, scurfy, spines whorled. *Spathes* conduplicate, scurfy. *Spadices* erect; branches 2-3 ft., drooping; spathelets 1-2 in., rhomboid, acute; spikelets 3-7-fl. *Calyx* (male and fem.) cupular, 3-toothed, petals ovate-lanceolate. *Fruit* $\frac{1}{2}$ in. diam., depressed globose; scales very small.

3. **P. Griffithii**, *Becc. mss.*; very stout, leaflets glaucous beneath, spathelets glabrous or scurfy towards the tips, male spikelets sparsely scurfy sessile, fem. fl. pedicelled, scales of fruit fimbriate and toothed. *P. elongata*, *Griff. in Calc. Journ. Nat. Hist.* v. 96; *Palms Brit. Ind.* 104, t. 217 A, B, C (*not of Blume*).

MALACCA, *Griffith*.

A gigantic species. *Stem* as thick as a man's leg. *Leaves* with the flagellum about 20 ft.; leaflets distant, 2-3 ft. by 2-3 in., decurved; rachis and flagellum armed as in other species. *Spadix* very large, branches many, 2-3 ft. *Spathelets* $1\frac{1}{2}$ in. broad. *Fruits* 3-5 in each spathelet, "size of a carbine bullet," in diam.—Allied to *P. elongata*, differing in the more numerous flowers of the fem. spikelet, and by the much smaller fruit, the scales of which are not striated.—I have seen no specimen. *J.D.H.*

4. **P. macrostachya**, *Kurz in Journ. Beng. As. Soc.* xliii. pt. ii. 207, t. 16, 17; *For. Fl.* ii. 514; leaflets white beneath, rachis of spadix scurfy, spathelets acute glabrous, male spikelets scurfy, flowers shortly pedicelled, margins of calyx-teeth densely tomentose.

TENASSERIM; on the Bithoko hills, alt. 3000 ft., *Kurz*, *Brandis*.

A lofty climber. *Leaflets* approaching in pairs, 12-18 in. long, linear-lanceolate, finely acuminate; petiole and rachis spinous, spines straight. *Branches of spadix* 4-5 ft.; *spathels* $1\frac{1}{2}$ -2 in. long, blackish towards the upper border. *Fruit* unknown. —I have seen no specimen. *J.D.H.*

5. ***P. assamica***, *Griff. in Calc. Journ. Nat. Hist.* v. 97; *Palms Brit. Ind.* 107, t. 218 a.a.; leaflets white and finely furfuraceous beneath, tip not thread like, costæ slender, branches of fruiting spadix very stout scurfy, *spathels* $2\frac{1}{2}$ in. long, sepals broadly ovate $\frac{1}{4}$ in. long, petals lanceolate $\frac{1}{4}$ in. long, fruit villous from the deeply ciliate split recurved points of the scales. *Mart. Hist. Nat. Palm.* iii. 199, t. 176, f. 11.

ASSAM; *Hort. Bot. Calc.*

Leaves very large; leaflets 18-24 by 2-2 $\frac{1}{2}$ in., lateral costæ marginal; petiole $1\frac{1}{2}$ in. broad, with short stout marginal spines and short seriate scattered clusters of more slender dorsal ones. *Branches* of fruiting spadix 4-5 ft. long by 4-5 in. across the large subacute nearly glabrous *spathels*; rachis rusty tomentose. *Spikelets* 8-10 fld. *Male calyx* cupular, 3-toothed; petals lanceolate, $\frac{3}{4}$ - $\frac{1}{2}$ in. long. *Fruiting sepals* broadly ovate, $\frac{1}{4}$ in. long; petals lanceolate, $\frac{1}{2}$ in. *Fruit* 1 in. diam., bright rusty red. —A mutilated spadix-branch of this or a nearly allied species, sent by the late Major Hannay from Debraghur to the Calcutta Gardens, has narrower *spathels*, brown mealy externally, ovate-lanceolate fem. sepals $\frac{1}{4}$ in. long and petals narrowly lanceolate $\frac{3}{4}$ in. long; the very young fruit is clothed with recurved lacerate scales.

6. ***P. elongata***, *Mart. in Roem. & Sch. Syst.* vii. 1333; *Hist. Nat. Palm.* 199, t. 114 and 116, f. 1; leaflets sparsely white furfuraceous beneath tip not filiferous, costæ 3 very slender, branches of spadix very long, *spathels* $1\frac{1}{2}$ in. sub-3-lobed acute glabrous, flowers very small, calyx of male minute 3-toothed, petals $\frac{1}{4}$ in. obliquely oblong-ovate acute, calyx of fem. larger urceolate 3-toothed, petals small linear-lanceolate, fruit 1 in. diam., densely villous from the long lacerate spreading tips of the scales. *Kunth Enum.* iii. 202; *Blume, Rumphia*, iii. 68, t. 158 and 163 A. *Calamus maximus*, *Reinw. ex Blume Cat. Hort. Bogor.* 59.

PENANG, *Jack, Wallich*; alt. 2500 ft., *Curtis*.—DISTRIB. Sumatra, Java.

Leaves very large; petiole stout; leaflets 1-1 $\frac{1}{2}$ ft. by 2 in. broad, rather membranous, lateral costæ marginal. *Branches* of spadix 3-4 ft., 2-3 in. across the spreading *spathels*, which have acutely angled sides.

29. **PLECTOCOMIOPSIS**, *Becc. mss.*

Characters of *Plectocomia*, but upper leaves reduced to sheaths with long flagella and no leaflets, *spathels* small, infundibular, and fruit clothed with very minute almost microscopic scales, arranged in vertical series. *Seed* globose, smooth; albumen equable; embryo basilar.—Species 3, Malayan.

1. ***P. geminiflorus***, *Becc. mss.*; leaves sessile, leaflets very many and narrow equidistant finely acuminate, spadices with long pendulous spikes, the lower branched, spikelets very short 2-3 fld., fruit subturbinate with more than 35 rows of minute scales. *Calamus geminiflorus*, *Griff. ex Mart. Hist. Nat. Palm.* iii. 338; *Palms Brit. Ind.* 70, t. 199 A. *Plectocomia geminiflora*, *H. Wen il. mss.*

MALAY PENINSULA; Malacca, *Fernandez*; Perak, *Scortechini* (No. 283b).

Stem slender, attaining 80 ft. *Sheaths* striate, sparsely prickly, uppermost unarmed. *Leaves* 6-10 ft.; leaflets 5-10 by $\frac{1}{4}$ in., finely acuminate, keel sparsely bristly above, smooth beneath. *Spadices* many, from the uppermost leaf-sheaths, which bear a simple armed flagellum and no leaflets; lower 4-5 in., with 4-5 pendulous spikes each 6-8 in. long. *Spathes* short, tubular, like the secondary spathes of *Calamus*. *Spikes* flexuous, rusty-pubescent; flowers 2-bracteolate, outer bracteole minute, inner auricular. *Fruit* immature; pericarp spongy; scales brown, with whitish fimbriate margins.

2. **P. Wrayii**, *Becc. mss.*; leaves petioled, fruit globosely ovoid shortly narrowed at the top with about 23 rows of scales.

MALAY PENINSULA; Perak, *Wray* (2421 ♀); *Herb. Hort. Calcutt.* (5282 ♀, 3447 ♂).

Very near *P. geminiflorus*; distinguished by the longer petiole and fruit.

3. **P. paradoxus**, *Becc. mss.*; leaves shortly petioled, leaflets lanceolate scattered in distant pairs shortly acuminate, spadices bifariously decomposed, spathels tubular, male spikelets exserted recurved. *Calamus paradoxus*, *Kurz in Journ. As. Soc.* xliii. (1874) ii. 213, t. 29, 30; *For. Flor.* ii. 521.

MARTABAN, *Kurz*.

Stem with the sheaths 1-2 in. diam. *Leaves* 5-7 ft.; leaflets 1-1½ ft. by 1 in., in alternate pairs, thin, obscurely remotely appressedly ciliate; petiole armed, sheath with pectinate spines; flagellum very long. *Spathes* tubular, smooth, obliquely truncate and acuminate; spathels similar, but much smaller, distichously imbricated; bracts spreading, glabrous. *Fem. fl.* and fruit unknown.

30. **MYRIALEPIS**, *Becc. mss.*

Characters as far as known of *Plectocomiopsis*, but the minute scales of the fruit are disposed without order.—Species 2, a Bornean and the following.

M. Scortechini, *Becc. mss.*

MALAY PENINSULA; Perak, *Scortechini* (n. 457b).

Leaves unknown. *Fem. fl.* solitary in the spathels; calyx 3-lobed; corolla rather longer. *Fruit* globose; scales acuminate, tips not recurved; mesocarp between spongy and corky. *Seed* globose; albumen horny, equable.—Differs from the Bornean species (*M. triqueter*, *Becc.*, *Calamus triqueter*, *Becc.*, Malesia, iii. 62) in the obtusely angled trigonous sparsely spinous leaf-sheaths. The specimens are very imperfect.

31. **EUGEISSONIA**, *Griff.*

Tufted monocarpic spinous palms. *Leaves* pinnatisect; leaflets lanceolate; rachis armed; not flagelliferous. *Spadix* terminal, erect, thyriform, clothed below with reduced flagelliferous leaf-sheaths; branches erect, clothed with subdistichous obtuse spathes passing into bracts and bracteoles. *Flowers* large, coriaceous, solitary or 2-3-nate, 1-2-sexual. *Male fl.* calyx cupular, 3-fid; petals elongate-lanceolate, pungent, valvate; stamens about 12, anthers elongate, basifixed. *Fem. fl.* larger; perianth accrescent; calyx of the male; petals with a dilated base and transverse crest of hairs; ovary oblong, 3-celled, stigmas flattened. *Fruit* ovoid, narrowed into a very broad obtuse beak, 1-celled, 1-seeded, scales minute; endocarp osseous. *Seed* ovoid, 6-12-grooved; albumen equable; embryo basilar.—Species about 6, Malayan.

E. tristis, *Griff. in Calc. Journ. Nat. Hist.* v. 101; *Palms Brit. Ind.* 109, t. 220 A; *Mart. Hist. Nat. Palm.* iii. 212, t. 179, 180; *Becc. in Nuov. Giorn. Bot. Ital.* iii. 28.

MALAY PENINSULA and PENANG, *Griffith*, &c.

Stems densely tufted, very short or 0. *Leaves* 15–20 ft.; leaflets many, 2–2½ ft., narrow-lanceolate, subulate, acuminate, midrib bristly above; petiole 7–10 ft., armed with flat brown spines. *Spadix* 4–6 ft., sheaths and spathes armed; flowers 1–1½ in. long, terminal on the flexuous branches of the spadix; bracts many, closely imbricating. *Fruit* the size of a hen's egg, beak clothed to the tip with scales.

32. METROXYLON, *Rottb.*

Stout monocarpic palms. *Leaves* equally pinnatisect, leaflets opposite. *Spadix* very large, paniced, clothed with coriaceous spinous spathes; spikes sessile, catkin-like, short, distichous, recurved; bracts broader than long, bracteoles cupular. *Flowers* polygamous, densely crowded; perianth coriaceous. *Male fl.* calyx 3-fid, funnel-shaped, nerved; corolla segments oblong, valvate; stamens 6, anthers dorsifixed; pistillode 3-partite. *Fem. fl.* like the males, perianth hardly accrescent; staminodes a membranous cup; ovary oblong, retrorsely scaly, imperfectly 3-celled; style conic, 3-toothed, ovules 3, basilar. *Fruit* ellipsoid or subglobose, 1-celled, 1-seeded, pericarp tessellate with reversed scales; endocarp spongy. *Seed* erect, subglobose, rough; albumen ruminant; embryo ventral. Species 6? Malayan and Pacific.

1. **M. Sagus**, *Rottb. in Nye Saml. K. Dansk. Vid. Skrift.* ii. 527; spathes unarmed. *Miq. Fl. Ind. Bat.* iii. 147; *Becc. in Nuov. Giorn. Bot. Ital.* iii. 29. *M. inermis*, *Mart. Hist. Nat. Palm.* iii. 215. *Sagus lævis*, *Rumph. Herb. Amb.* i. 76; *Blume Rumphia*, ii. 147, t. 86; *Griff. in Calc. Journ. Nat. Hist.* v. 20; *Palms Brit. Ind.* 24 (not t. 182). *S. Rumphii*, *Blume l. c.* t. 126, 227. ? *S. Koenigi*, *Griff. ll. cc.* 19 and 22, t. 181. *S. inermis*, *Roxb. Fl. Ind.* iii. 623.

MALACCA (wild or cult. ?) *Jack*, &c.—DISTRIB. Malay Islds.

Trunk about 20 ft. with many basal offshoots, as stout as that of the cocoa-nut, annulate, clothed above with old leaf sheaths. *Leaves* as in the cocoa-nut, but more erect, unarmed; leaflets linear, acute, keeled, smooth. *Infl.* appearing when the plant is about twenty years old. *Spadices* several, terminal, alternately branched, spikes 5–8 in. *Flowers* minute, sunk in rusty wool, hardly larger than a grain of mustard seed, bisexual. *Fruit* (takes three years to mature) globose, size of a small apple, scales shining, channelled.—Desc. from *Jack* in *Mal. Misc.*, but according to *Griffith* the Indian *Metroxylon* bears no resemblance to a Cocoa-nut Palm.—The Sago Palm.

2. **M. Rumphii**, *Mart. Nat. Hist. Palm.* iii. 213, 313, t. 102, 159; spathes armed with long spines. *Miq. Fl. Ind. Bat.* iii. 140; *Becc. in Nuov. Journ. Bot. Ital.* iii. 30; *Malesia*, i. 91. *Sagus Rumphii*, *Willd. Sp. Pl.* iv. 404; *Roxb. Fl. Ind.* iii. 623. *S. genuina*, *Blume Rumphia*, ii. 150. *S. farinifera*, *Gærtn.* ii. 186, t. 120, f. 3.—*Rumph. Herb. Amb.* i. 75, t. 17, 18.

MALACCA (wild or cult.).—DISTRIB. Malay Islds.

There appears to be great confusion in the synonymy of the two common species of this genus, and that here given may be open to correction. *Beccari* states that *M. Rumphii* is much less cultivated than *M. Sagus*.

33. BORASSUS, *Linn.*

A very tall dicæous palm; trunk stout, unarmed. *Leaves* terminal,
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fan-shaped, plicately multifid; petiole spinous, ligule short. *Spadices* very large, simply branched; peduncle sheathed with open spathes, males with stout cylindric branches that are densely clothed with closely imbricating bracts, enclosing spikelets of flowers which hence appear as if sunk in cavities of the branch; fem. spadix sparingly branched, bearing few scattered solitary flowers. *Male fl.* small, mixed with scaly bracts, second in two series in a small spikelet, and protruding one by one from the cavities of the branch of the spadix, as the rachis of the spikelet elongates; perianth glumaceous; sepals 3, narrowly cuneate, tip inflexed truncate, imbricate; petals shorter than the sepals, obovate-spathulate, imbricate; stamens 6, anthers subsessile large oblong; pistillodes of 3 bristles. *Fem. fl.* larger, globose; perianth fleshy greatly accrescent; sepals reniform, imbricate; petals smaller, convolute; staminodes 6-9; ovary globose, subtrigonus, entire or 3-4-partite, 3-4-celled; stigmas 3, sessile recurved; ovules basilar, erect. *Fruit* a large subglobose drupe with 1-3-obcordate fibrous pyrenes; pericarp thinly fleshy, stigmas terminal. *Seeds* oblong, top 3-lobed; testa adherent to the pyrene; albumen equable hollow; embryo subapical.

B. flabellifer, Linn. *Sp. Pl.* 1187; B. flabelliformis, Murr. *Syst. Ed.* xiii. 827; Roxb. *Cor. Pl.* i. 50, t. 71, 72; *Fl. Ind.* iii. 790; Griff. *Notul.* iii. 167; Mart. *Hist. Nat. Palm.* iii. 221, t. 108, 121, 162; Kunth *Enum.* iii. 222; Thw. *Enum.* 329; Brand. *For. Fl.* 544; Kurz *For. Fl.* ii. 529; Blume *Rumph.* ii. 88; Miq. *Fl. Ind. Bat.* iii. 45. B. dichotomus, White in *Grah. Cat. Bomb. Pl.* 226. B. æthiopum, Mart. *l.c.* 221. Lontanus domestica, *Rumph. Herb. Amb.* i. t. 10. Ham. in *Mern. Wern. Soc.* v. 314; Gærtn. *Fruct.* i. 21, t. 8.—Rheede *Hort. Mal.* i. t. 9, 10.

Cultivated throughout the plains of INDIA, BURMA and CEYLON.—DISTRIB. Malaya; Afr. trop.

Trunk 60-70 ft., very rarely branching, often swollen above the middle. *Leaves* 6-10 ft. diam., palmately fan-shaped, rigidly coriaceous; segments 2-4 ft., linear, 2-fid, margins spinulose. *Spadix* male and fem. several feet long and very stout. *Male fl.* small; fem. 1 in. diam. *Drupe* broadly obovoid, brown, 8 in. diam.

34. **COCOS**, Linn.

Unarmed, monœcious palms. *Leaves* pinnatisect; leaflets narrow. *Spadix* erect, at length drooping, simply paniced; branches bearing scattered fem. fl., often between 2 males towards their bases and males above. *Spathes* 2 or more, lower short, upper fusiform or clavate; bracts various; perianth coriaceous. *Male fl.* unsymmetric; sepals small, valvate; petals oblong, acute, valvate; stamens 6, filaments subulate, anthers linear, erect; pistillode minute or 0. *Fem. fl.* usually much larger, ovoid; perianth greatly accrescent; sepals imbricate; petals shorter, convolute with imbricate tips; disk annular or 0; ovary 3-celled, usually 1-ovuled; style short, stigmas recurved; ovules subbasilar. *Fruit* large, ovoid, terete or trigonus, 1-seeded, style terminal; pericarp thick, fibrous; endocarp bony or stony, with 3 basal pores, the remains of the 3 cells. *Seed* cohering with the endocarp; albumen solid or hollow, or merely lining the endocarp with a thick hard coat; embryo opposite one pore.—Species about 30, all American, one of them cosmopolitan in the tropics.

C. nucifera, Linn. *Sp. Pl.* 1188; Mart. *Hist. Nat. Palm.* iii. 123. t. 62, 75, 88; Kunth *Enum.* iii. 285; Roxb. *Cor. Pl.* i. 52, t. 73; *Fl. Ind.* iii.

614; *Thw. Enum.* 330; *Brand. For. Fl.* 556; *Kurz For. Fl.* ii. 540; *Blume Rumph.* iii. 82; *Miq. Fl. Ind. Bat.* iii. 64; *Hook. Journ. Bot.* ii. (1850), t. 1. *C. nana*, *Griff. Notul.* ii. 166.—*Rheede Hort. Mal.* i. t. 1-4.

Cultivated in the hot damp regions of India, Burma, and Ceylon, especially near the sea (indigenous in the Cocos Isld. and N. Andaman, *Kurz*).—DISTRIB. All tropical shores.

Trunk 40-80 ft., flexuous, annulate, base thickened. *Leaves* 12-18 ft.; leaflets 2-3 ft., coriaceous, flaccid; petiole 3-5 ft. stout. *Spadix* 4-6 ft., branches flexuous; lower spathe 2-3 ft., oblong, hard, splitting lengthwise; male fl. small; fem. 1 in. long, 2-bracteolate, disk annular. *Drupe* 4-10 in. long, trigonously obovoid or subglobose, green or yellowish; albumen lining the endocarp. *C. nana* is a small low var. grown in the Maldivé Islds. and Ceylon.

ADDENDUM TO PALMS.

TEYSMANNIA ALTIFRONS, *Reichb. f. & Zoll. in Linnæa* xxviii. 657; *Miq. Fl. Ind. Bat.* iii. 749.—Mr. Ridley (Singapore) informs that this noble Sumatran Palm is also a native of the Malay Peninsula. The genus is of doubtful affinity, but most probably belongs to the Tribe *Coryphææ*. It may be recognized by its almost stemless habit, and enormous erect elongate-rhombic plaited leaves.

ORDER CLXIV. PANDANÆ.

Small diœcious trees or shrubs, often scandent with aerial roots. *Leaves* usually trifarious, narrow, acuminate, coriaceous, margins and keel usually spinously toothed. *Spadices* axillary or terminal, simple or branched, clothed with leafy spathes; flowers small, crowded on a catkin-like spadix or its branches, bracts and bracteoles 0. *Perianth* 0. *Male fl.* stamens many, filaments free or connate; anthers erect, basifixed; pistillode 0 or small. *Fem. fl.* staminodes 0 or small; ovary 1-celled, free or connate with those of contiguous flowers; stigmas subsessile, papillose; ovules solitary and suberect, or many and parietal. *Fruit* a globose oblong mass of free or connate 1- ∞ -celled woody or fleshy angular drupes. *Seeds* minute, testa striated, albumen hard fleshy; embryo minute.

Stem erect or prostrate. Staminodes in fem. fl. 0. Carpels 1-ovuled. 1. *PANDANUS*.

Stem usually climbing. Staminodes of fem. fl. hypogynous. Carpels many-ovuled 2. *FREYCINETIA*.

1. *PANDANUS*, *Linn. f.*

Characters as above.—Species numerous, all tropical, chiefly Mascarene and Malayan.

I am compelled to be brief with the characters of the Indian species, very few of which are fully described; and of the Malayan especially, the available specimens are most unsatisfactory. I omit many usually cited references, and some synonyms which appear to me to be doubtful, and am by no means confident as to the value of much that remains.

* Carpels not united in groups.

† *Male fl.* of free stamens with very short filaments. *Drupe* with a pyramidal crown produced into a straight or curved spinescent style.

1. *P. foetidus*, *Roxb. Fl. Ind.* iii. 742; shrubby, leaves 4-6 ft. by 3-4 in., strongly spinous-toothed, anthers very long slender, fruit sub-solitary oblong or subglobose, crown of drupes smooth or nearly so. *Kunth*

Enum. iii. 98; *Kurz in Seem. Journ. Bot.* v. (1867) 101, t. 62, f. 4, 5, 6; & *For. Fl.* ii. 506; *Solms in Linnæa*, xlii. (1878) 8. *Frisquetia macrocarpa*, *Gaud. Voy. Bonite Bot.* t. iv. f. 2-8.—*Pandan. Wall. Cat.* 8591.

ASSAM and the KHASIA HILLS, and Eastwards to BURMA. The CONCAN?

A densely branched shrub. *Leaves* with large strongly incurved usually distant marginal spinules. *Spathes* pale yellow. *Anther* $\frac{1}{4}$ – $\frac{1}{2}$ in. long. *Fruit* very variable in size, from a hen's egg to a man's fist, red when ripe.

2. ***P. caricosus***, *Spreng. Syst.* iii. 897; shrubby, leaves 5–8 ft. by 2–2½ in. spinulose-toothed, spinules minute white, anthers very long slender, fruits spicate subglobose obovoid or broadly oblong, crown of drupes muricate. *Kunth Enum.* iii. 98; *Hassk. in Flora*, 1842, ii. *Beibl.* 13 & *Cat. Hort. Bogor.* 60; *Miq. Fl. Ind. Bat.* iii. 163, & *Ann. Mus. Lugd. Bat.* ii. 54; *Kurz in Seem. Journ. Bot.* v. (1867) 100, t. 62, f. 1–3 & in *Journ. As. Soc. Beng.* xxxviii. ii. (1869) 146, in *Flora* (1869) 450; *Solms in Linnæa* xlii. (1878) 7; *Carriere in Rev. Hortic.* (1878) 405, with ic. of male spadix. *P. atrocarpus*, *Griff. Notul.* iii. 160.

MALACCA, *Griffith*.—DISTRIB. Malay Islds.

Apparently closely allied to *fetidus*, and like it with fœtid yellow spathes, differing in the spicate dark coloured or even blackish fruits and muricate crowns of the drupes. I have seen no specimens. I do not cite *Rumph. Herb. Amb.* iv. 154, though it is the authority for the species, the description and plate not being sufficiently explicit. Nor are others of the authorities cited quite dependable.

** *Male fl. of many anthers umbellate on the connate filaments. Drupes with a low crown and subulate or flattened simple or forked stigma.*

3. ***P. furcatus***, *Roxb. Fl. Ind.* iii. 744; arboreous, leaves 15–20 ft., subglaucous beneath spinously toothed, spines curved, fruits solitary or racemed ellipsoid or oblong, drupes obconic crown convex, style very short flattened entire or 2–3-fid. *Spreng. Syst.* iii. 898; *Kunth Enum.* iii. 98; *Miq. Fl. Ind. Bat.* iii. 162, t. 37 male fl.; *Hassk. Pl. Jav. Rar.* 163; *Kurz in Seem. Journ. Bot.* v. (1867) 102, in *Journ. As. Soc. Beng.* xxxviii. ii. (1869) 147, in *Miq. Mus. Lugd. Bat.* ii. 54; in *Flora* (1869) 450, & *For. Fl.* ii. 507; *Solms in Linnæa*, xlii. (1878) 13; *Regel, Gartenfl.* 1878, 298; *Carr. in Rev. Hortic.* 1879, 290, with fig., and 1881, 174. *P. crassipes*, *Wall. mss.* *P. caricosus*, *Miq. Analect. Ind.* ii. 16. *P. spinifructus*, *Dennst. Schluess. Hort. Malab.* 23. *Ryckia furcata*, *De Vriese in Verhandl. Kl. Acad. Wet.* (1854); in *Twinn. Fl.* i. 161, & in *Hook. Kew Journ.* vi. (1854) 268. *Barroetia diodon*, *Gaud. Voy. Bonite Bot.* t. xiii. f. 15–24.—*Pandan. Wall. Cat.* 8951.

SIKKIM HIMALAYA, alt. 2–5000 ft. *J.D.H.* ASSAM, KHASIA and NAGA HILLS, and SILHET, alt. 0–4000 ft., CHITTAGONG and BURMA.—DISTRIB. Malay Islds.

Stem 30–40 ft., with aerial roots towards the base, as thick as the arm or leg, sparingly dichotomously branched above. *Leaves* 4 in. broad, marginal spines $\frac{1}{2}$ – $\frac{1}{3}$ in. long, flattened, lower curved. *Spathes* inodorous, 1½–2 ft., golden yellow, very coriaceous. *Stamens* 8–14, filaments united in a fleshy tube longer than the anthers, tips free or variously cohering. *Fruit* 6–9 in. long or less, very variable in size, red brown. *Drupes* rather fleshy, 5–6-angled; style shining.—In specimens from Churra in the Khasia and from Sikkim, the column of filaments is much broader and the free portion is much shorter than in those from Silhet.

4. ***P. ceylanicus***, *Solms in Linnæa*, xlii. (1878) 16; stems tall tufted very slender, leaves elongate margins with strong recurved spines, anthers very short crowded on a very short fleshy tube, fruit broadly oblong, crown conical narrowed into a nearly straight spinescent style notched at the tip. *P. furcatus*, *Thw. Enum.* 327.

CEYLON, *Thwaites*.

According to a photograph of this plant as growing in the Ceylon Botanical Gardens, it has the habit of *P. furcatus* but with a much more slender stem, more erect branches, and narrower leaves. In the dried specimens, the spathes are much smaller, with long slender tips, the anthers much shorter, and the combined filaments very short. The fruit resembles *P. fœtidus*, but the anthers are very different, about $\frac{1}{10}$ in. long.

5. *P. minor*, *Ham. in Wall. Cat.* 8592; dwarf, stem prostrate slender, leaves ensiform flat margins spinulose tips abruptly caudate, spathes navicular apiculate, filaments in palmate clusters, anthers minute, fruit solitary broadly oblong, drupes smooth, crown hemispheric with a small concave central claw-like style. *Solms in Linnæa*, xlii. (1878) 18. *P. unguifer*, *Hook. f. Bot. Mag.* t. 6347.

In hot valleys of the SIKKIM HIMALAYA, ASSAM, SILHET, CHITTAGONG and PEGU.

Stem 2-3 ft., as thick as the thumb. *Leaves* subdistichous, 18-24 by 1-2 in., flaccid, marginal spines distant. *Fruit* shortly peduncled, as large as the fist, yellow. *Drupe*s obovoidly clavate, very smooth; style red.—In young fruit, the style is flattened and often forked, much as in *P. furcatus*. *Male fl.* unknown.

** Carpels connate in groups. Stigmas sessile, peltate or reniform. Filaments connate, anthers apiculate or aristate.

6. *P. fascicularis*, *Lam. Encycl.* 372, t. i.; shrubby, rarely erect, densely branched with copious aerial roots, leaves 3-5 ensiform caudate-acuminate, margin with ascending spinules, anthers interruptedly spicate, fruit large drupes obconic. *Kunth Enum.* iii. 98; *Solms in Linnæa*, xlii. (1878) 38. *P. odoratissimus*, *Roxb. Cor. Pl.* i. 65, t. 94-96; *Fl. Ind.* iii. 738; *Kunth l. c.* 94, excl. some syn.; *Griff. Notul.* iii. 159; *l. c. Pl. Asiat.* t. 174; *Kurz For. Fl.* ii. 508; *Presl. Epimel.* 239. *P. Candelabrum*, *Kurz in Journ. Bot.* v. (1867) 127 [*non Beauv.*]. *P. odoratus*, *Salish. Prodr.* 3. *P. verus*, *Kurz in Seem. Journ. Bot.* v. (1867) 125, in *Flora*, 1869, 453. *P. Rheedii*, *Gaud. Voy. Bonite, Bot.* t. 22, f. 12. *P. leucacanthus*, *Hassk. in Flora*, 1842, ii. *Beibl.* 14.—*Pandanus*, *Wall. Cat.* 8590. *Hasskarlia leucacantha*, *Walp. Ann.* i. 753.—*Rheede Hort. Mal.* ii. t. 1-8.

Throughout the hotter moister parts of INDIA, and much planted for fences.—DISTRIB. MALAY ISLDS. and Mauritius, China, Polynesia.

Stem sometimes erect and 10-12 ft., usually much lower and branching from the base. *Leaves* drooping, glossy green. *Spathes* white, fragrant. *Fruit* 6-8 in. diam., orange yellow or brown. *Drupe*s confluent in groups of 5-20 rarely fewer, very woody, $1\frac{1}{2}$ -2 in. long, top rounded or suboblate with a depressed centre bearing a depressed small variously lobulate stigma.—I have given only a selection of the citations and synonyms of this widely diffused species. The *P. odoratissimus* of Vidal, *Fl. Forest. Filip. Atlas* xlii. t. 95 A appears to differ in the very small fruit and obtuse anthers. Possibly some of the plates of Rheede's "Perin Khaida Taddi," and especially t. 8, may belong to a different species, its carpels are all free; it is the *P. unipapillatus* of Dennst. *Schluss. Hort. Mal.* 23.

7 *P. andamanensium*, *Kurz. in Journ. As. Soc. Beng.* xxxviii. ii. (1869) 148; in *Flora* 1869, 452; *For. Flor.* iii. 507; trunk 60-70 ft. as thick as the human body, leaves 15-18 ft. by 4-5 in., marginal spines slender, fruit solitary large globose, drupes with a flat or depressed crown and an oblique lamelliform depressed style pungent when dry. *Solms in Linnæa*, xlii. (1878) 59. *P. Leram*, *Kurz in Seem. Journ. Bot.* v. (1867) 105.

ANDAMAN ISLDS., *Kurz*.

Habit of a gigantic *P. furcatus*; fruit as large as the human head or smaller,

orange yellow. *Drupe*s 2½–3 in. long, usually in groups of 3–5 in. one series but often more, epicarp fleshy.—Descr. from Kurz.

IMPERFECTLY KNOWN AND UNDESCRIBED SPECIES.

1. *P. ALBUS*, *Hort. ex Steud. Nom. Ed. 2*, ii. 251.—“Ind. Or.”

2. *P. GRAMINIFOLIUS*, *Kurz in Seem. Journ. Bot. v.* (1867) 104; *For. Flor.* ii. 507; leaves 12–18 by ¾–1 in., margins with minute straight spinules, young fruit erect ellipsoid, stigma sessile trigonous. *Solms in Linnæa*, xlii. (1878) 50.—Tenasserim, *Helper*.

3. *P. HUMILIS*, *Thwaites Enum.* 327 (excl. syn.); leaves 7 ft. by 1–1½ in., very coriaceous, with stout marginal spines, filaments very short, anthers very slender ½–¾ in. long, fruit globose spicate and drupes like those of *P. furcatus*.—Ceylon, *Thwaites*; CP. 3740 (used for fencing).

4. *P. HOULLETHI*, *Carriere in Rev. Hortic.* 1868, 210, f. 23; leaves 6 ft. 6 in. by 3–3½ in. abruptly caudate-acuminate reddish green above coppery red beneath, marginal spines distant incurved, male spadix 16 in. long, spikes 2½–4½ in., spathes coppery rose-colrd., stamens in compact bundles.—Singapore.

5. *P. INTEGRIFOLIUS*, *Lour. ex Steud. Nom. Ed. 2*, ii. 251.—“Ind. Or. China.”—I do not find this name in Loureiros Fl. Cochinch. or elsewhere.

6. *P. LAIS*, *Kurz in Nat. Tijdschr. Ned. Ind.* xxvii. (1864) 218; in *Ann. Mus. Bot. Lugd. Bat.* ii. 54; habit of *P. furcatus*, fruit solitary or racemose, crown flat or depressed, stigmas more slender incurved bifid. *Solms l. c.* *P. horridus*, *Reinw.* (fld. Kurz). *P. furcatus*, *Hassk. Pl. Jat. Rar.* 163; ? *Miq. Analect. Ind.* ii. 10, t. 11, pl. ♂? *P. furcatus* β *malesica*, *Kurz in Seem. Journ. Bot. v.* (1867) 102.—Singapore (Kurz), Sumatra, Java, &c.

7. *P. LAEVIS*, *Rumph.*; *Kurz For. Fl.* ii. 508; arboreous or shrubby much branched 20–25 ft., branches rooting, leaves elongate linear glaucous green 2–4 ft. by 2–2½ in. very acuminate without spines, male spadix very scented exactly as in *P. adratissimus*, but margins and midrib of the white spathes quite unarmed, stamens racemose connate, anthers mucronate, fruit unknown. ? *Wall. Cat.* 8588 B.—Burma, cultivated, *Kurz*; ? *Tavoy, Wallich*—Descr. from Kurz.

8. *P. LERAM*, *Jones in As. Research.* iii. (1799) 163, with two plates; a tall tree 40–50 ft., with the habit of *P. furcatus*, but very slender, and with much larger fruit, drupes aggregate. *Voigt Hort. Suburb. Culcutt.* 683; *Kurz in Journ. As. Soc. Beng.* xxxviii. (1869) 452; *For. Fl.* iii. 507; *Solms l. c.* 66. *P. Leram*, var. *macrocarpa*, *Kurz in Serm. Journ. Bot. v.* (1867) 106. *Roussinia indica*, *Gaud. Voy. Bonite Bot.* t. 21.—Nicobar Islds., *Fontana*; Andaman Islds., *Kurz*.

9. *P. LINNÆI*, *Gaud. Voy. Bonite Bot.* t. 22, f. 1–8; *Solms l. c.* 67.—India.—Of this *Solms* remarks, cf. *P. fascicularis*. According to *Gaudichaud*’s figure the drupes are very large, 3 in. long, in groups of 10 with rounded crowns and short stigmas grooved on one side; nothing is known of its origin.

10. *P. ORNATUS*, *Kurz in Journ. As. Soc. Beng.* xxxviii. (1869) 147; in *Flora*, 1869, 451; leaves very long caudate-acuminate acutely serrate, fruit solitary terminal long peduncled cylindric glaucous surrounded by very short scale-like spathes, drupes unripe small obconic densely crowded but not confluent in groups, crown polygonal glaucous narrowed into a spiniform slender upcurved style with a linear stigma. *Solms l. c.* 11. *Fisquetia ornata* and *militaris*, *Gaud. Voy. Bonite Bot.* t. 5; *Solms l. c.* 65.—Malacca and Singapore, *Gaudichaud*, *Griffith*.—Described chiefly from *Solms*, who examined *Gaudichaud*’s specimen and drawing. There are young fruits of it in the Kew Museum, from *Griffith*; they are spicate, cylindric, 3–4 in. long by 1–1½ diam., and remarkable for their glaucous surface.

11. *P. OVATUS*, *Kurz in Journ. As. Soc. Beng.* xxxviii. (1869) 147; in *Flora*, 1869, 451; a small species according to *Gaudichaud*’s figure, with leaves 18–24 by ¾ in., gradually narrowed into fine points, and small globosely oblong terminal

fruits 2 in. by $1\frac{1}{2}$ in. diam.; drupes with conical crowns passing into an upcurved subulate style. *Fisquetia ovata*, *Gaud. Bot. Bonite Voy.* t. 4, f. 1.—Malacca, *Gaudichaud*; Keddah Peak, Lt.-Col. Low.

12. *P. POLYCEPHALUS*, *Lam.*; *Wall. Cat.* 8589 A; leaves gradually finely acuminate, margins with stout distant incurved marginal spines in one specimen, and smaller closer ones in another, fruits spicate resembling those of *P. fœtidus*, carpels not in groups, but drupes with rather longer spinescent crowns.—Burma, at Amherst, *Wallich*.—Lamarck's description of *P. polycephalus*, founded, may apply to this.

13. *P. TURBINATUS*, *Lodd. ex Steud. Nom. Ed.* 2, ii. 251.—"Ind. Or."—Probably an undescribed plant of Loddige's Catalogue.

14. *P. YVANI*, *Solms in Linnæa*, xlii. (1878) 20; leaves linear-lanceolate caudate-acuminate more than 12 in. long serrulate, teeth pale, spathes concave elongate ovate, fem. fl. minute densely crowded narrowed into a simple upcurved shining spine.—Malacca, *Yvan* (*Herb. Delessert*).—The above characters (from Solms) are worthless for the identification of a *Pandanus*.

15. *PANDANUS* sp.; dwarf, stem about as thick as a swan's quill, leaves 12–18 by $1\frac{1}{4}$ – $1\frac{1}{2}$ in. flat ensiform rather abruptly caudate acuminate finely spinulose-serrate with erect spinules 1-nerved, fruit terminal solitary young globose $\frac{3}{4}$ in. diam. drupes not aggregate crown conical narrowed into a stout incurved spine.—Malacca, *Griffith*, *Kew Distrib.* 6373.—Apparently a very well marked species, closely resembling *ovatus* in fruit, but with very different leaves, and which more resemble those of *P. minor*. In the present chaotic condition of the genus I do not name it.

2. FREYCINETIA, Gaud.

Characters, see p. 483.—Species Malayan, Australian and Polynesian.

1. *F. angustifolia*, *Blume Rumph.* i. 159, t. 43; leaves linear 12–18 by $\frac{1}{2}$ – $\frac{1}{2}$ in. finely acuminate margins smooth or minutely serrulate, spadices racemose, fem. cylindric, filaments very short conic. *Kunth Enum.* iii. 587; *Miq. Fl. Ind. Bat.* iii. 17; *Kurz in Seem. Journ. Bot.* v. 134 in part; *Solms in Linnæa*, xlii. (1878) 81. *F. Brunoniana*, *Wall. Cat.* n. 3660. *F. Debregeana*, *Gaud. Voy. Bonite Bot.* t. 37, f. 1–11.—Pandaneæ, *Wall. Herb.* n. 9124 (not distributed).

TAVOY, *Gomes*; PENANG, SINGAPORE and MALACCA, *Wallich*, &c.—DISTRIN. Malay Islds.

Dicæcious. Stems climbing, as thick as a goose quill. Leaves grass like, costa very slender, nerves close set. Spadices 3–5, racemed on a short peduncle, males $\frac{1}{2}$ –1 in. by $\frac{1}{10}$ – $\frac{1}{8}$ in. diam., very dense-flid., fem. $\frac{3}{4}$ –1 by $\frac{1}{4}$ – $\frac{1}{2}$ in. diam.; staminodes minute; stigmas 3–4; spathes ovate-lanceolate, finely acuminate.

2. *F. pycnophylla*, *Solms in Linnæa*, xlii. (1878) 91; stem and leaves as in *F. angustifolia*, spadices in sessile umbels, fem. oblong, filaments elongate. *F. angustifolia*, *Kurz in Seem. Journ. Bot.* v. 134 in part.

CEYLON, *Walker*, *Thwaites* (CP. 366).

Very similar to *F. angustifolia*, but at once distinguished by the larger spathes, oblong male and fem. spadices forming a sessile umbel or stout pedicel $\frac{1}{2}$ – $\frac{3}{4}$ in. long, and their greater size; males $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{4}$ in. diam., fem. $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{3}{8}$ – $\frac{1}{2}$ in. diam.

3. *F. Walkeri*, *Solms in Linnæa*, xlii. (1878) 92; leaves elongate linear-lanceolate finely acuminate margins spinulose towards the base 18–24 by $\frac{1}{2}$ – $\frac{3}{8}$ in., spadices few in sessile umbels, fem. very stoutly pedicelled oblong, anthers subsessile.

CEYLON, *Walker*, *Thwaites*, CP. 2333. ? ANDAMAN ISLDS., on Mt. Harriet, *Kurz*.

Stem as thick as the middle finger. *Leaves* much longer broader and more coriaceous than in the preceding species. *Male spadices* in bad condition; fem. $1\frac{1}{2}$ –2 by $\frac{3}{4}$ –1 in. diam.; pedicel as long.

4. **F. Gaudichaudii**, *Bennet, Pl. Jav. Rar.* 31, t. 9; leaves 5–6 by $\frac{2}{3}$ – $\frac{3}{4}$ in. strict linear-lanceolate serrulate towards the caudate tip, spadices umbellate stoutly shortly peduncled, fem. stout cylindric, spathes short fleshy. *Kunth Enum.* iii. 102; *Miq. Fl. Ind. Bat.* ii. 170; *Kurz in Seem. Journ. Bot.* v. (1867) 134; *Solms in Linnæa*, xlii. (1878) 86.

MALACCA, *Maingay (Kew Distrib.* 1537).

Stem as thick as a swan's quill. *Leaves* coriaceous, flat; sheaths short, membranous. *Spathes* $1\frac{1}{2}$ –2 in., cymbiform. *Fem. spadix* $1\frac{1}{2}$ by $\frac{1}{2}$ in. diam. or more.—The fem. spadices appear longer stouter and upon much shorter pedicels than are represented in the figure cited, but no dependence can be placed on drawings and descriptions of a succulent inflorescence made from dried specimens.

5. **F. insignis**, *Blume Rumph.* 158, t. 42; leaves $1\frac{1}{2}$ –3 ft. by $\frac{3}{4}$ –1 in., acuminate spinulose-serrate on the margins and midrib beneath, spadices 2–3 peduncled erect, outer spathes greenish inner red, fruit 2–4 in. elongate-oblong green, berries free at the conical 3–5-cornered apex, stigmas 3–1 horse-shoe shaped. *Kunth Enum.* iii. 586; *Miq. Pl. Jung.* i. 166; *Fl. Ind. Bat.* iii. 170; *Kurz For. Fl.* ii. 509.

ANDAMAN ISLES, *Kurz*.—DISTRIB. JAVA.

A lofty sparingly branched climber.—I have seen no specimens; the characters are from *Kurz*.

ORDER CLXV. **TYPHACEÆ**. By J. D. Hooker.

Aquatic or marsh perennial herbs. *Leaves* linear, erect or floating. *Flowers* small or minute densely crowded in globose or cylindric unisexual bracteate spikes the upper of which are males; perianth of green scales or fine hairs. *Male fl.* Stamens 1–7, filaments free or connate, anthers basifixed. *Fem. fl.* Ovary superior, 1–2-celled, cells 1-ovuled, styles persistent, stigmas laterally papillose; ovule pendulous from the top of the cell. *Fruit* small, membranous or drupaceous. *Seed* pendulous, albumen fleshy or floury; embryo axile, cylindric, radicular end thickened, plumule in a lateral slit.—Genera 2, species about 15, cosmopolitan.

Perianth of slender hairs	1. TYPHA.
Perianth of green scales	2. SPARGANIUM.

1. **TYPHA**, *Linn.*

Marsh herbs. *Leaves* erect, spongy. *Flowers* in very dense superposed cylindric spikes (catkins), often intermixed with capillary bracteoles (hairs with dilated tips). *Perianth* of capillary hairs, or 0 in the male. *Stamens* 1 or more, tip of connective thickened. *Ovary* (often reduced to a clavate tipped hair) very minute, on a long capillary stipes, narrowed into a capillary style with a clavate or filiform stigma. *Fruit* very minute; pericarp membranous, indehiscent or laterally dehiscent; albumen floury.—Species about 10, temp. and trop.

In all the Indian species the male spike is more or less distant from the fem. I am very doubtful as to their limits and synonyms. I am indebted to the works referred to under the species of *Robrbach* and *Korner* for indications of some minute characters. The male fl. are sometimes replaced by clavate bodies.

1. **T. elephantina**, Roxb. *Fl. Ind.* iii. 566; stem 6–12 ft., leaves 1–1½ in. broad trigonous above the sheath, margins often undulate above the middle, flowers bracteolate, pollen 4-globate, stigma lanceolate. *Kunth Enum.* iii. 92; *Schnizl. Typha*, 26; *Kærner in Verh. Zool. Bot. Ges. Wien.* xxxix. 165, t. 5, f. 10; *Kurz in Journ. Bot.* v. 95; in *Journ. As. Soc. Beng.* xxxviii. i. 146. *T. latifolia*, Edgew. in *Proc. Linn. Soc.* vi. (1862) 194; *Kurz l. c.* *T. Maresii*, Baland. in *Bull. Soc. Bot. Fr.* 1887, 389.

Marshes from N.W. INDIA to ASSAM and southwards.—DISTRIB. Algiers.

Male spike 8–12 in., rachis clothed with short often forked hairs; bracts 3 or more; anthers 1–5, $\frac{1}{10}$ in. long. *Fem. spike* much stouter 6–10 by $\frac{1}{2}$ –1 in. diam.; flowers mixed with clavate pistillodes; bracteoles with fasciate tips much longer than the hairs, which are shorter than the stigmas.

2. **T. javanica**, Schnizl. in *Zolling. Verz. Ind. Arch. Pfl.* 77; stem 4–6 ft., leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. broad biconvex above the sheath, hairs of male fl. simple forked or toothed, bracteoles with subspathulate tips and hairs shorter than the linear stigmas, fem. fl. mixed with pistillodes, pollen simple. *Rohrb. in Verh. Bot. Ver. Brandenb.* 1869, 98; *Kærner in Verh. Bot. Zool. Ges. Wien.* xxxix. 157, t. v. f. 6. *T. angustifolia*, Thw. *Enum.* 331. *T. latifolia*, Moon *Cat. Ceyl. Pl.* 81.

CEYLON, Thwaites, &c.—DISTRIB. Ms. Mascarene and Malay Islands.

A smaller plant than *T. elephantina*, from which it differs in the form of the base of the leaf, simple pollen and linear stigma. *Fem. spike* 5–6 by $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. *Anthers* $\frac{1}{4}$ in.

3. **T. angustata**, Chaub. & Bory *Exped. Scient. Morée Bot.* 338; stem 6–10 ft., leaves $\frac{3}{4}$ –1 in. broad, semicylindric above the sheath, bracteoles of fem. fl. subspathulate equalling the linear stigmas, both longer than the hairs, fem. fl. mixed with clavate-tipped pistillodes, pollen simple. *Rohrb. in Verh. Bot. Ver. Brandenb.* 1869, 81; *Boiss. Fl. Orient.* v. 50; *Aitchis. in Trans. Linn. Soc. N.S.* iii. 120; *Kærner in Verh. Bot. Zool. Ges. Wien.* xxxix. 159, t. iv. f. 6, v. f. 1. *T. angustifolia*, *Kurz in Journ. Bot.* v. 95 (excl. syn.); *Roxb. Fl. Ind.* iii. 567; *Aitchis. in Journ. Linn. Soc.* xix. 188; *Wall. Cat.* 4989.

NORTHERN INDIA, from KASHMIR to MUNNIPORE and southwards to SCINDE and COROMANDEL.—DISTRIB. N. Asia and westward, N. Africa and S. Europe.

Closely resembles the common European *T. angustifolia*, Linn., which is distinguished by the bracteoles shorter than the stigmas.

4. **T. Laxmanni**, Lepech. in *Nov. Act. Acad. Petersb.* 84, 355 (excl. syn. DC.), t. 4.; dwarf, 2–3 ft. high, leaves slender semicylindric at the sheath, male spikes 1–2 in., fem. $\frac{3}{4}$ –1 in. by $\frac{1}{2}$ – $\frac{1}{4}$ in. diam., fem. fl. ebracteolate mixed with pistillodes, hairs very short much shorter than the subobtusate stigmas, pollen simple. *Kærner in Verh. Zool. Bot. Ges. Wien.* 167, t. iv. f. 3, v. f. 15. *T. minima*, *Kurz in Journ. Bot.* v. 96. *T. Martini*, *Aitchis. in Journ. Linn. Soc.* xix. 188. *T. stenophylla*, *Rohrb. in Verh. Bot. Ver. Brandenb.* 90; *Boiss. Fl. Orient.* v. 50.

KASHMIR, alt. 9000 ft., Thomson, Giles.—DISTRIB. N. Asia and westwards to Russia.

At once distinguished from all the previous species by its small size and slender leaves, but very closely allied in the European and Oriental *T. minima*, which, according to Kærner, has bracteoles.

2. SPARGANIUM, Linn.

Flowers in globose unisexual heads, subtended by leafy bracts.

Perianth of 3-6 membranous scales. *Stamens* 2-3, connective hardly produced at the tip. *Ovary* 1- rarely 2-celled; style very short, persistent, stigma unilateral; cells 1-seeded. *Drupe*s obovoid, spongy; endocarp bony, tip perforated. *Seed* adherent to the endocarp.—Species about 6.

1. ***S. ramosum***, *Huds. Fl. Angl.* 401; erect, leafy, leaves linear triquetrous at the base, heads sessile on the branches of a panicle, drupes sessile shortly beaked. *Kunth Enum.* iii. 89; *Boiss. Fl. Orient.* v. 48. *S. erectum*, *Kurz in Journ. Bot.* v. (1867) 96. *S. stoloniferum*, *Ham. in Wall. Cat.* 4990. *S. carinatum*, *Ham. ex Royle Ill.* 408.

NORTH WEST INDIA; from the plains to 5200 ft. in Kashmir. BURMA, *Griffith*.—DISTRIB. N. temp. regions.

Stems 1-4 ft. *Leaves* 2-5 ft., 1 in. broad or less; margins concave. *Male heads* olive-brown, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., deciduous; fem. 1 in. diam. in frt.; scales linear, tips spatulate. *Drupe* $\frac{1}{4}$ in. long, angled; stigma linear.

2. ***S. simplex***, *Huds. Fl. Angl.* 401; erect, leafy, leaves linear triquetrous at the base rarely floating, fem. heads racemose, male spicate, drupe shortly stipitate long-beaked. *Kunth Enum.* iii. 89; *Boiss. Fl. Orient.* v. 48. *S. erectum*, var. β *Linn. Sp. Pl.* 971; *Kurz in Journ. Bot.* v. (1867) 96.

SIKKIM HIMALAYA, alt. 7-9000 ft., *J.D.H. KHASIA HILLS*, alt. 5-6000 ft., *Griffith*, &c. BURMA, *Griffith*.—DISTRIB. N. temp. regions.

Stem 1-2 ft. *Leaves* narrower than in *S. ramosum*, margins flat. *Male heads* yellow. *Scales* linear-oblong, tips toothed. *Drupe*s fusiform, simple linear.

ORDER CLXVI. AROIDEÆ.

Perennial herbs with radical leaves, or scandent shrubs. *Leaves* alternate. *Flowers* 1-2-sexual, sessile on a spadix which is more or less enclosed in a green or coloured spathe; if unisexual the males usually towards the apex and fem. at the base of the spadix, with often neuters between them and above the males; perianth 0 or of scales. *Anthers* 2-4-celled, dehiscence dorsal or by pores; pollen various. *Ovary* sessile, 1-3-celled, style short or long, stigma discoid or lobed; ovules 1 or more, variously inserted. *Fruit* baccate. *Seeds* 1 or few, rarely many, often imbedded in pulp; testa various; albumen 0 or copious; embryo axile, or in exalbuminous genera, thick with the plumule in a lateral slit.—Genera about 100, species about 1000, for the most part tropical.

I am indebted to the studies of Mr. N. E. Brown for valuable notes on many of the Indian species entered in the Kew Herbarium, and for aid in the preparation of the following descriptions:—

SERIES A. *Flowers* monœcious (rarely dicœcious in *Arisæma*). *Perianth* 0.

Tribe I. ARINÆ. *Spadix* with a flowerless top (appendage) or 0 in *Pistia* and *Cryptocoryne*. *Stamens* free; anther-cells larger than their connective. *Fem. fl. Staminodes* 0. *Ovary* 1-celled, ovules orthotropous.

Submerged or marsh herbs. Ovaries in one whorl 1. CRYPTOCORYNE.

Marsh herbs. Ovaries spirally disposed 2. LAGENANDRA.

Floating stemless herb 3. PISTIA.

Terrestrial tuberous herbs:

Leaves compound; ovules basal 4. ARISÆMA.

Leaves pedatipartite, appearing after the flowering;

ovules basal 5. SAUROMATUM.

- Leaves undivided; ovules parietal 6. ARUM.
 Leaves various and flowers coetaneous; ovules
 basal 7. TYPHONIUM.
 Leaves pedatipartite; ovules basal and apical . . . 8. THERIOPHONUM.

Tribe II. PYTHONIÆ. *Spadix* with or without an appendage. *Stamens* free, anther-cells broader than their connective. *Ovary* 1- or more-celled; ovules anatropous or semianatropous.—Tuberous herbs, often flowering before leafing; leaves 3-sect, segments pinnatifid.

- Appendage naked; neuters 0 9. AMORPHOPHALLUS.
 Appendage slender, naked; neuters below the males . . 10. SYNANTHERIAS.
 Appendage covered with conical neuters 11. THOMSONIA.
 Appendage 0; neuters very large 12. PLESMONIUM.

Tribe III. COLOCASIEÆ. *Spadix* with or without an appendage, usually shorter than the spathe. *Anthers* sessile, densely crowded, prismatic or broad, free or connate, connective very thick. *Leaves* undivided, often peltate.

* *Tube of spathe not enclosing the fruit. Fem. infl. partially adnate to the spathe.*

- Ovary many-ovuled; stigma 4-6-cleft 13. ARIOPSIS.
 Ovary many-ovuled; stigma discoid 14. STEUDNERA.
 Ovary 1-ovuled; stigma discoid 15. HAPALINE.

** *Tube of spathe enclosing the fruit. Spadix wholly free from the spathe.*

- Limb of spathe refracted, open; ovules parietal . . . 16. REMUSATIA.
 Limb of spathe refracted, convolute; ovules basal . . 17. GONATANTHUS.
 Limb of spathe erect; ovules many parietal 18. COLOCASIA.
 Limb of spathe erect; ovules few basal 19. ALOCASIA.

Tribe IV. PHILODENDREÆ. *Spadix* without an appendage, usually shorter than the spathe. *Stamens* free, rarely connate in a prismatic body; connective usually broader than the cells. *Fruit* enclosed in the tube of the spathe.—Perennial herbs, flowering and leafing at the same time.

- Spathe deciduous; ovary 1-2-celled 20. AGLAONEMA.
 Spathe wholly persistent; ovary 2-4-celled 21. HOMALONEMA.
 Limb of spathe deciduous; ovary 1-celled 22. SCHISMATOGLOTTIS.

SERIES B. *Flowers* hermaphrodite, a few rarely unisexual. *Perianth* 0.

Tribe V. CALLEÆ. *Spadix* without an appendage. *Stamens* distinct; filaments flat, anther-cells terminal. *Ovary* truncate, stigma central.—Mostly climbers.

- Spadix* stipitate; ovule 1 basal; berries free 23. ANADENDRON.
Spadix sessile; ovule 1-basal; berries free 24. SCINDAPSUS.
Spadix sessile; ovary 1-2-celled, many-ovuled; berries
 confluent 25. RHAPHIDOPHORA.
Spadix sessile. *Ovary* 1-celled; ovules 2 or more
 (rarely 1) basal 26. EPIPREMNUM.

SERIES C. *Flowers* hermaphrodite. *Perianth* of 4-6 segments.

Tribe VI. ORONTIÆ. *Spadix* without an appendage.

* *Spadix* flowering downward; *ovary* 1-celled.

- Prickly rigid herbs; spathe many times longer than the sessile spadix 27. LASTIA.
 Prickly rigid herb; spadix stipitate 28. PODOLASIA.
 Prickly rigid herbs; spathes twice as long as the spadix 29. CYRTOSPERMA.
 Unarmed herbs; leaves membranous, pinnate . . . 30. ANAPHYLLUM.

** *Spadix* flowering upwards; *ovary* 1-3-celled.

- Stem scandent; leaves distichous 31. POTHOS.
 Stemless; leaves ensiform; spathe 0 32. ACORUS.

1. CRYPTO-CORYNE, Fisch.

Aquatic or marsh herbs, with creeping rootstock and short stem or 0. *Leaves* broad or narrow. *Tube of spathe* with connate margins and a transverse septum within. *Spadix* very slender, its tip adnate to the septum of spathe; male infl. cylindric; anthers 2-celled, cells with conical perforate tips, pollen vermiform; fem. infl. a single whorl of connate 1-celled many-ovuled ovaries with a few neuters; styles short, recurved; ovules erect, orthotropous. *Fruit* of coriaceous connate 2-valved many-seeded carpels. *Seeds* oblong, albuminous; embryo axile.—Species about 25, tropical Asiatic.

* Tube of spathe narrow, longer than the limb (or as long in *C. Griffithii*).

1. *C. ciliata*, Fisch. ex Schott Melet. 16; leaves linear-oblong or lanceolate, limb of spathe oblong densely fimbriate. *Kunth Enum.* iii. 12; *Schott Aroid.* 7; *Syn.* 2; *Prodr.* 15; in *Bonpland.* (1857), 222; *Wight Ic.* t. 775; *Wall. Cat.* 8914; *Griff. in Trans. Linn. Soc.* xx. t. 10-12; *Blume Rumph.* i. 86; *Engler Arac.* 624, and in *Beccari Males.* i. 297; *N. E. Br. in Journ. Linn. Soc.* xviii. 245. *C. elata*, *Griff. Notul.* iii. 134; *Ic. Pl. Asiat.* t. 170, 171 (alata). *C. drymorrhiza*, *Zipp. in Miq. Ann. Mus. Bot.* i. 122. *Ambrosinia ciliata*, *Roxb. Cor. Pl.* iii. 90, t. 294; *Fl. Ind.* iii. 491.

BENGAL, in ponds, &c. (in salt marshes, Kurz). MALACCA, *Griffith.*—DISTRIB. Malay Islds.

Tuberous, stoloniferous. *Leaves* 6-16 in., lower half sheathing, midrib stout. *Scape* very short. *Tube of spathe* 4-10 in.; limb 2-3 in., oblong, cuspidate, fimbriæ purple. *Ovaries* 5-7. *Fruit* long-peduncled, globose, 1 in. diam.; cells 6-8-seeded. *Embryo* polyphyllous, germinating in the fruit.—Javan specimens have leaves 14 by 3½ in.

2. *C. Walkeri*, Schott in *Bonpland.* (1857) 221; *Prodr. Aroid.* 15; leaves long-petioled oblong or oblong-lanceolate base cuneate or rounded, limb of spathe linear-lanceolate strongly twisted glabrous. *Engler Arac.* 625. *C. spiralis*, *Thw. Enum.* 334.

CEYLON, Walker.

Leaves 3-3 in., acute, thin; petiole 6 in., very slender. *Scape* very short. *Tube of spathe* 2 in.; limb 1½ in. *Ovaries* 4-5.

3. **C. retrospiralis**, Kunth *Enum.* iii. 12; leaves lanceolate to narrowly linear, tube of spathe and glabrous limb both closely twisted. *Wight Ic.* t. 772; *Schott Aroid.* 8; *Syn.* 2; *Prodr.* 18; in *Bonpland.* (1857) 222; *Engler Arac.* 625 & *Ic. ined.* No. 16. *Ambrosinia retrospiralis*, *Roxb. Fl. Ind.* iii. 492.

BENGAL, BURMA, CENTRAL INDIA and the DECCAN.

Leaves 3–12 by $\frac{1}{4}$ – $\frac{3}{4}$ in., narrowed into a short stout petiole, or sessile, finely acuminate, costa slender. *Spathe* subsessile, nearly as long as the leaves, deep green streaked with purple. *Ovaries* 5–6, 3- or more-ovuled; stigmas orbicular.

4. **C. consobrina**, *Schott in Bonpland.* (1857) 222; *Prodr.* 16; leaves oblong-lanceolate finely acuminate, petiole long, limb of spathe ovate long-caudate glabrous not twisted. *Engler Arac.* 626.

THE DECCAN PENINSULA, Perrottet, &c.

Leaves 4–6 by $\frac{3}{4}$ –1 in., midrib stout. *Spathe* about equalling the petiole, its tail about three times longer than the blade.

5. **C. cordata**, *Griff. Notul.* iii. 138; *Ic. Pl. Asiat.* t. 172; leaves long-petioled broadly ovate or oblong-ovate base cordate or emarginate, tube of peduncled spathe very long, limb small lanceolate not twisted glabrous. *Schott Syn.* 2; *Prodr. Aroid.* 14; in *Bonpland.* (1857) 220; *Engler Arac.* 626 & *Ic. ined.* No. 6; in *Beccari Males.* i. 298; *N. E. Br. in Journ. Linn. Soc.* xiii. 242.

MALACCA, Griffith.—DISTRIB. Java, Borneo.

Leaves 3–4 in., petiole usually much longer. *Spathe* very variable in length (according to depth of water); tube 10–12 in.; limb $1\frac{1}{4}$ in., purplish green, base contracted, peduncle 2–3 in. *Ovaries* 6–8; ovules many.

6. **C. Griffithii**, *Schott Syn. Aroid.* 1; *Prodr. Syst. Aroid.* 14; leaves broadly oblong or orbicular ovate subcordate petiole very long and slender, tube of spathe a little longer than the ovate cuspidate limb. *Engler Arac.* 631; *N. E. Br. in Journ. Linn. Soc.* xviii. 244. *Cryptocoryne*, sp. *Griff. Notul.* iii. 139; *Ic. Plant. Asiat.* t. 173, f. 3 (ovules).

MALACCA, Griffith.

Leaves coriaceous, obtuse, base very various, rarely rounded sometimes 2-auricled, green above purple beneath, nerves obscure; petiole 6–8 in. *Spathe* 2– $2\frac{1}{2}$ in., dark livid red and papillose within, and having a dimidiate hollow cone descending from the base of the convolute portion and enclosing the male fl. *Fruit* ovoid, rugose, reddish, few-seeded.

7. **C. Beckettii**, *Thw. ex Trim. in Journ. Bot.* xxiii. (1885) 269; leaves long-petioled oblong-lanceolate undulate base cordate, tube of small sessile spathe narrow straight about twice as long as the small tailed blade.

Ceylon; Matale east, Beckett.

Leaves 2 $\frac{1}{2}$ –4 in., subacute, 5–7-nerved; petiole 4–8 in. *Spathe* not 1 in. long, limb shortly tailed. *Stipes* of male infl. shorter than it. *Carpels* 5.—Descr. from Trimen.

8. **C. Wightii**, *Schott Prodr. Syst. Aroid.* 17; leaves narrowly linear narrowed at both ends strongly crisped and waved, tube of long-peduncled spathe very long, limb lanceolate acuminate not twisted glabrous. *Engl. Arac.* 627. *C. unilocularis*, *Schott in Bonpland.* 1857, 223 (not of Kunth).

MYSORE, Wight.

Leaves 6–10 by $\frac{1}{2}$ in.; petiole shorter. *Tube of spathe* 5–6 in., limb $1\frac{1}{2}$ –2 in.; peduncle 2–2 $\frac{1}{2}$ in. *Ovaries* 6–7, stigmas orbicular.

9. **C. affinis**, *N. E. Br. mss.* leaves petioled oblong-ovate base rounded or emarginate strongly bullate, spathe peduncled, tube about as long as the twisted limb, base inflated.

PERAK, *Scortechini* (586, 586b).

Leaves 1–2 $\frac{1}{2}$ in. by $\frac{1}{2}$ –1 in., subacute, purplish beneath, 5–7-nerved, margin subcrenate; petiole 1–3 in. *Spathe* 2 $\frac{1}{2}$ –3 in., with the peduncle lengthening after flowering, limb narrowly lanceolate dark-purple. *Appendage of spadix* sessile, ovoid. *Carpels* 6–7, very many-ovuled; stigmas oblong.

** Tube of spathe shorter than the limb.

† Limb of spathe transversely rugose or plicate within.

10. **C. spiralis**, *Fisch. mss. ex Wydler in Linnæa*, v. 428; leaves linear-lanceolate, spathe sessile, tube very short obconic, limb linear-lanceolate, strongly twisted at first. *Kunth Enum.* iii. 12; *Blume Rumph.* i. 84, t. 36 C.; *Wight. Ic.* t. 773; *Schott Melet.* 16; *Syn. Aroid.* 2; *Gen.* t. 1; *Prodr.* 18; *Aroid.* 8, t. 13; *Schnitz. Iconog.* 1, t. 72; *Engler Arac.* 628. *Ambrosinia spiralis*, *Roxb. Fl. Ind.* iii. 492. *Arum spirale*, *Retz Obs.* i. 30; *Bot. Mag.* t. 2220; *Lodd. Bot. Cat.* t. 525.

BENGAL, the DECCAN PENINSULA, &c.

Leaves 3–8 by $\frac{1}{2}$ – $\frac{3}{4}$ in., acute or acuminate, narrowed from the middle to both ends, costa slender, nerves parallel; petiole long or short. *Spathe* 3–5 in. long, at first ciliate, transversely lamellate within. *Ovaries* 5–6, several-ovuled; stigmas broadly elliptic.

11. **C. Huegelii**, *Schott Aroid.* 8, t. 12; *Prodr.* 18; petiole as long as the elliptic-oblong leaf-blade, spathe shortly peduncled, tube very short cylindric, limb linear-lanceolate long-acuminate, ovaries 4–2-ovuled. *Engl. Arac.* 628.

EAST INDIES, *Huegel in Herb. Vienna*.

I have seen no specimen of this species.

†† Limb of spathe smooth within.

12. **C. cognata**, *Schott in Bonpland.* 1857, 222; *Prodr.* 16; leaves oblong-lanceolate or linear-oblong margins undulate, limb of spathe much longer than the tube narrowed into a very long twisted tail. *Engl. Arac.* 629.

The CONCAN, *Law, &c.*

Leaves 6–10 by 1–1 $\frac{1}{2}$ in., narrowed and acute at both ends; midrib very broad; petiole very stout, shorter than the blade. *Spathe* 7–8 in., shortly peduncled, tube 2–2 $\frac{1}{2}$ in., limb 5–6 in.

13. **C. Roxburghii**, *Schott Prodr.* 18; leaves narrowly linear acuminate, spathe about as long as the leaves, limb much longer than the cylindric tube very slender closely twisted. *Engl. Arac.* 629. *C. Roxburghii*, *Dalz. & Gibs. Bomb. Fl.* 257. *C. unilocularis*, *Wight. Ic.* t. 774; *Kunth Enum.* iii. 13. *Ambrosinia unilocularis*, *Roxb. Fl. Ind.* iii. 493. *Arum spirale*, *Grah. Cat. Bomb. Pl.* 228.

NORTHERN CIRCARS and the CONCAN.

Leaves 8–12 by $\frac{1}{2}$ – $\frac{3}{4}$ in., ecostate, nerves parallel. Tube of spathe about $\frac{3}{4}$ in., blade 6–8 in. *Ovaries* 4–5, stigmas orbicular or oblong, close to the stipes of the spadix; ovules very many. Fruit conical, 5-celled, many-seeded.

14. **C. Thwaitesii**, Schott in Bonpland. 1857, 221; Prodr. 14; leaves broadly ovate or subobovate base cordate or emarginate, tube of spathe cylindric one-third shorter than the linear hardly twisted limb. Engler Arac. 630; Ic. ined. No. 7; Thw. Enum. 334.

CEYLON, in forests, Thwaites.

Leaves 2-2½ by 1½-1½ in., densely papillose above, petiole rather shorter than the blade, margin undulate. Spathe subsessile, 1½ in. long, limb oblong, gradually narrowed into a slender tail, tube hardly swollen at the base. Ovaries 6; styles rather long, stigmas oblong.

15. **C. Gomezii**, Schott in Bonpland. 1857, 221; Prodr. 14; leaves long-petioled ovate or ovate-oblong obtuse base cordate, spathe long-peduncled, limb broadly lanceolate not twisted three times as long as the oblong ovoid tube narrowed into a long tail. Engler Arac. 630.—Aroid. Wall. Cat. 8958.

SILHET, Gomez.

Leaves 2-3 by 1-1½ in., base often unequal-sided, tip obtuse acute or rounded. Tube of spathe ½-¾ in., limb 1¾-2 in., broad below and concave.

16. **C. elliptica**, N. E. Br. mss.; leaves orbicular- or ovate-cordate, tube of peduncled spathe 2-2½ times as long as the lanceolate limb, which is twisted and bent forward at the apex.

PERAK; at Larut, King's Collector.

Allied to *C. Griffithii*, but leaves smaller not so deeply cordate, and limb of spathe much smaller narrower and not papillose within. Leaves 1-1½ by 1½ in. obtuse fleshy, brown beneath; petiole 2-3 in., sheath short. Spathe with the peduncle hardly lengthening in fruit; tube white, 1¼ in., base slightly inflated; limb ½-¾ in., black within. Fruit 6-celled, stigmas small.

DOUBTFUL SPECIES.

C. DALZELLII, Schott. in Bonpland. 1857, 221; Prodr. 15; leaves lanceolate margin erosely serrulate, lateral nerves 4 on each side ascending, fruit ovoid 5-gynous, seeds biseriata oblong subtrigonus.—Bombay, Dalzell.

2. **LAGENANDRA**, Dalzell.

Habit and characters of *Cryptocoryne*, but the fem. inflor. consists of a spiral row of many free ovaries, with peltate or discoid stigmas, and the fruit is baccate and indehiscent.—Species 4, Indian.

1. **L. toxicaria**, Dalzell in Hook. Journ. Bot. iv. (1852) 289; v. (1853) t. 4; petiole as long as the oblong or elliptic-oblong obtuse or acute leaf, nerves very slender divergent from the stout costa, spathe lanceolate caudate-acuminate slightly twisted, tube much shorter than the long-tailed limb. Dalz. & Gibs. Bomb. Fl. 257; Schott Syn. Aroid. 3 (excl. syn.); Engler Arac. 621. L. ovata, Thwaites Enum. 334. *Cryptocoryne ovata*, Schott Melet. i. 16; Blume Rumph. i. 86; Kunth Enum. iii. 12, *Caladium ovatum*, Vent. in Roem. Arch. ii. 357. *C. montanum*, Herb. Heyne. Arum ovatum, Linn. Sp. Pl. 967.—Rheede Hort. Mal. xi. t. 23.—Aroid. Wall. Cat. 8966.

The SOUTH CONCAN, and BELGAUM, in marshes, Dalzell. CEYLON; common in the central provinces.

Rootstock creeping. Leaves with petiole 8-36 by 2-5 in., coriaceous, base acute or rounded; sheath of petiole elongate. Spathe longer than the compressed peduncle, 3-8 in. long; tube broad, limb lanceolate. Syncarp globose, 1½-2 in.

diam. ; carpels in many cycles, free, about $\frac{1}{2}$ in. long. *Seeds* several in each carpel, minute, basal.

2. ***L. Thwaitesii***, *Engler Arac.* 621; petiole longer or shorter than the oblong- or linear-lanceolate leaf, nerves diverging from the costa, spathe slender convolute at length open, tube very much shorter than the limb.

CEYLON, *Thwaites*.

Rootstock branched. *Leaves* 4-6 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., base acute or rounded; petiole 2-6 in., rather slender, sheath short. *Spathe* 1 $\frac{1}{2}$ -2 in., much longer than the peduncle; tube ovoid; appendage of spadix very short. *Carpels* in 8-9 cycles, connate at the base.—A much smaller species than *L. toxicaria*. The specimens are not very good.

3. ***L. lancifolia***, *Thw. Enum.* 334; petiole about equalling the lanceolate or ovate-lanceolate leaf, nerves diverging from the costa, spathe oblong beaked rugose within, tube obconic half as long as the limb. *Engler Arac.* 622. *Cryptocoryne lancifolia*, *Schott in Bonpland.* 1857, 221; *Prodr. Aroid.* 15 (in part); *Gen. t.* 1.

CEYLON; or banks of streams, *Thwaites*.

Leaves 2-4 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., dotted with white, sparsely above, densely beneath; base rounded or acute; sheath of petiole short. *Spathe* 1-2 in., dark purple; appendage of spadix very short. *Carpels* 30-40, in 5-6 cycles; stigma conical.

4. ***L. Koenigii***, *Thw. Enum.* 334; leaves subsessile narrowly linear-lanceolate acuminate, nerves at first parallel to the costa, peduncle long slender, spathe-tube several times shorter than the subulate limb. *Engler Arac.* 623; and *l.c. ined.* No. 15. *Cryptocoryne Koenigii*, *Schott in Bonpland.* 1859, 81; *Prodr.* 16.

CEYLON; in the Singhe-rajah forest, *Thwaites*.

Leaves 1-2 ft. by $\frac{1}{4}$ - $\frac{3}{4}$ in., dotted with white beneath; costa stout below evanescent above; petiole reduced to a short sheath. *Spathe* 3-3 $\frac{1}{2}$ in. long; peduncle 2-8 in. *Appendage of spadix* clavate. *Carpels* about 30, in many cycles, 1-ovuled. *Berries* smooth. *Seed* deeply grooved.

5. ***L. insignis***, *Trim. Cat. Pl. Ceyl.* 97; in *Journ. Bot.* i. (1885) 269; petiole as long as the ovate-lanceolate or oblong acuminate leaf, nerves very many and slender scurfily papillose divergent from the very stout costa, spathe very large, tube infundibular, limb very broad expanded abruptly caudate.

CEYLON; Pasdun Korle, *Trimen*.

Leaves 12 by 3-4 in., closely dotted beneath. *Spathe* stoutly peduncled, tube 1 $\frac{1}{2}$ -2 in.; limb 4-6 in. broad, drooping, crisped and undulate, membranous, purple with white veins (like an *Arisema*).

3. **PISTIA**, Linn.

A floating, gregarious, stemless, stoloniferous herb. *Leaves* sessile, obovate-cuneate, together forming an erect cup. *Spathe* small, shortly peduncled, tubular below, open above. *Spadix* adnate to back of the tube of the spathe, free above. *Male infl.* of few sessile connate stamens beneath the apex of the spadix, slits vertical, with a ring of confluent minute neuters below them. *Fem. infl.* a solitary conico-ovoid 1-celled ovary; style conical, stigma discoid; ovules many, orthotropous, basal or subparietal. *Fruit* membranous, few-seeded. *Seeds* oblong or obovoid, albuminous, testa at length rugose; embryo minute, apical, cuneiform.

P. Stratiotes, Linn. *Sp. Pl.* 963; *Rorb. Cor. Pl.* iii. 63. t. 269; *Fl. Ind.* iii. 131; *Griff. Notul.* 12, 211; *Ic. Plant. Asiat.* t. 260, 261; *Dalz. & Gibs. Bomb. Fl.* 281; *Bot. Mag.* t. 4564.—*Rheede Hort. Mal.* t. 32.

Throughout INDIA, and CEYLON; in still sweet water.—DISTRIB. tropics generally.

Roots of tufted simple white fibres clothed with fibrillæ. *Leaves* 1½–4 in. long in Indian forms, apex rounded or retuse, undulate, pubescent above and beneath; nerves raised beneath, flabelliform, converging within the margin. *Spathe* white, obliquely campanulate, ½ in. long, tomentose externally, gibbous and closed below, contracted about the middle, dilated and nearly circular above.

4. **ARISEMA**, Mart.

Tuberous herbs. *Leaves* 3-sect, pedatisect, or leaflets whorled. *Spathe* deciduous, tube convolute, limb often acuminate or tailed, usually incurved. *Spadix* included or exserted, appendage various often excessively long and filiform. *Male fl.* many, stipitate (sessile and connate in a continuous stratum in *A. flavum*), anthers 2–5 oblong or subglobose. *Fem. fl.* densely crowded; ovary 1-celled; style short or 0, stigma disciform; ovules 2 or more, basilar, orthotropous. *Neuters* 0, or a few above the males or females, or on the appendage, subulate. *Berries* 1–few-seeded. *Seeds* albuminous; embryo axile.—Species about 50, temp. and trop. Asia, and N. America.

The characters taken from the plants being mono- or diœcious are not absolute but very constant, as are those of leaves one or two.

A. TRISECTA. *Leaves* trifoliolate (Sp. 1–17).

* Appendage much shorter than the limb of the spathe.—Usually all diœcious.

1. **A. Roxburghii**, Kunth *Fnum.* iii. 18; leaves 2, leaflets ovate-lanceolate caudate-acuminate lateral subsessile median petiolulate, limb of spathe ovate-lanceolate acuminate incurved or involute, appendage very slender acute naked or with a few basal neuters. *Schott Syn. Aroid.* 27; *Prodr.* 33. *A. cuspidatum*, Engler *Arac.* 536. *Arum cuspidatum*, Roxb. *Fl. Ind.* iii. 506; *Wight Ic.* t. 784.

PENANG, *Roxburgh*; on Govt. Hill, alt. 2000 ft., *Curtis*. PERAK, *Scortechini, Kunstler*.—DISTRIB. Java (*Ic. Horsfield*.)

Rootstock horizontal, rooting all over. *Petiole* elongate sheathing the scape, 14–18 in., and peduncle mottled-green and pink; leaflets 4–10 by 1–5 in. *Spathe* pale yellow-green, tube 4 in., longer than the limb, margins not recurved around the mouth of the tube in *Roxburgh's* drawing, but distinctly in one of *Scortechini's*, which represents a much broader strongly incurved limb of the spathe with a caudate tip. *Male spadix* very slender, tapering into the short filiform appendage which bears a few subulate neuters.

2. **A. Kunstleri**, Hook. f.; leaf solitary, leaflets ovate or ovate-lanceolate subcaudately acuminate all or the median only petiolulate, limb of the green spathe suberect ovate-lanceolate acuminate about as long as the tube but broader, base dilated round the tube hardly recurved, male spadix very slender ending in a very slender naked finely acuminate appendage.

PERAK, *Kunstler (Ic. in Herb. Calcutt.)*. PENANG, *Kiny's Collector* (1653), on Govt. Hill, alt. 2000 ft., *Curtis*. ? KHASIA HILLS; Nya Bungalow, alt. 2000 ft. *Clarke*.

Root tuberous. *Petiole* and *peduncle* 4–10 in., slender, green, obscurely mottled with red. *Leaflets* membranous, 3–6 in., lateral unequal at the base, median acute or cuneate at the base, margins sometimes obscurely erose (when dry). *Spathe* 2–3 in. long.—Very near *A. laminatum*, Blume of Java, which has a white tube of the spathe, and the green limb is contracted at the base, and is not carried round the mouth of the tube.

3. *A. album*, *N. E. Br. in Journ. Linn. Soc.* xviii. 247; leaf solitary, leaflets petiolulate lateral dimidiate-ovate median elliptic base cuneate or acute, tube of white spathe about as long as the ovate-lanceolate acuminate limb, appendage filiform shorter than the spathe bearing towards the tip scattered subulate neuters. *Arisæma*, *Wall. Cat.* n. 8924.

KHASIA HILLS, alt. 4000 ft., *de Silva, Clarke*.

Tuber depressed. *Petiole* 10–12 in.; lateral leaflets about 8 by 4 in., base very unequal, tips filiform, median rhombic-ovate; petiolules $\frac{3}{4}$ –1 in. *Peduncle* about as long as the petiole. *Spathe* 3–4 in., tip filiform, margins below not revolute. *Spadix* (female) with scattered neuters on the base of the appendage, besides those towards its tip.

4. *A. petiolulatum*, *Hook. f.*; leaf solitary, leaflets all petiolulate ovate or ovate-oblong abruptly cuspidately caudate, tube of spathe equalling the lanceolate acuminate limb contracted at the base, appendage slender-cylindric erect obtuse naked.

KHASIA HILLS, alt. 4–5000 ft., *J.D.H. & T.T., Clarke*. MUNNIPORE, alt. 8800 ft., *Watt*.

Rootstock elongate, rooting all over. *Petiole* and shorter *peduncle* slender; leaflets subequal, 6–10 by $2\frac{1}{2}$ – $3\frac{1}{2}$ in., lateral cuneate or unequal-sided at the base, median with an acute base. *Spathe* with a funnel-shaped tube and purplish limb 5 in. long, twice as long as the slender male *spadix*.

5. *A. Wattii*, *Hook. f.*; leaves 2, leaflets subsessile finely acuminate, lateral dimidiate-ovate median elliptic-oblong, tube of spathe longer than the orbicular-ovate caudate-acuminate limb, appendage long-stipitate stout cylindric naked top rounded.

MUNNIPORE; at Mao, alt. 4000 ft., *Watt*.

Petiole 8–10 in., leaflets 5–8 in., lateral 2– $3\frac{1}{2}$ in. broad, inner half very narrow and evanescent below; nerves many, strong. *Peduncle* shorter than the petiole. *Spathe* 5–6 in. long, limb 2 in. broad, margins below surrounding the tube and recurved. *Appendage* $2\frac{1}{2}$ in., $\frac{1}{4}$ in. diam., stipes $\frac{1}{3}$ in.

6. *A. anomalum*, *Hemsl. in Journ. Bot.* (1887) 205; leaves solitary, leaflets petiolulate ovate acuminate tips filiform, limb of spathe broad ovate acuminate strongly incurved broader and rather shorter than the tube, appendage slender narrowed upwards naked. *N. E. Br. in Gard. Chron.* (1890) i. 321; *Bot. Mag.* t. 7211.

STRAITS OF MALACCA, Larut Islds., *Curtis*. PERAK, alt. 2500–3500 ft., *Scortechini, King's Collector*.

Rootstock deformed, lobed; lobes bearing solitary leaves or peduncles or both. *Petiole* slender, green, leaflets 4–6 by $1\frac{3}{4}$ in. *Peduncle* shorter than the petiole, purplish-green. *Spathe* 2 in. long, tube striped purplish-brown; limb dark brown purple, striped with white, lower margin forming a broad recurved border round the mouth of the tube. *Spadix* male or bisexual; male fl. often mixed with subulate neuters. *Stigma* penicillate.—There is in the Calcutta Herbarium a drawing of a closely allied plant from Penang, with a dull purplish tube and green limb of the spathe, and no neuters amongst the male fl.

** Appendage much longer than the spathe, tapering into a very long filiform pendulous tip.

† Appendage naked.

a *Limb of spathe broad, rounded truncate retuse or 2-lobed.—All diæcious.*

7. **A. verrucosum**, *Schott in Oestr. Bot. Wochenbl.* (1857) 341; *Prodr.* 29; leaf solitary, petiole sheath and peduncle warted, leaflets sessile rhomboidly orbicular or lateral ovate, limb of spathe very broad obcordate cuspidately acuminate decurved, base of appendage dilated into a lobed disc. *Engler Arac.* 537.

EASTERN TEMPERATE HIMALAYA, alt. 8–11,000 ft., *J.D.H. Clarke.*

Tuber large, depressed. *Petiole* 8–10 in., very stout, dull dark green, studded with minute warts; leaflets 2–7 in., dark-purple beneath, margins waved purplish, nerves stout beneath. *Peduncle* like the petiole. *Spathe* 5–7 in., tube white closely striped with dark purple; limb twice to five times as broad, reticulated with white and dark purple; apex $\frac{1}{2}$ –2 in. long. *Spadix* stout shortly stipitate, dark purple, base intruded, narrowed above it into a fusiform body that tapers into an exerted thread 12–18 in. long or more.—Very near to *A. utile*, from which the warted petiole and peduncle distinguish it. The colours are taken from a drawing of my own, and no doubt vary much.

8. **A. Griffithii**, *Schott Syn. Aroid.* 26; *Prodr.* 54; leaves 2, leaflets sessile all rhombic-orbicular acuminate crenate, limb of spathe galeate many times broader than the tube which it overhangs deeply 2-lobed, with a long linear interposed tail that embraces the filiform tail of the appendage. *Engler Arac.* 538; *Clarke in Journ. Linn. Soc.* xxi. 386; *Bot. Mag.* t. 6491. *A. Hookerianum*, *Schott in Oestr. Bot. Wochenbl.* (1857) 334; *Prodr.* 30. *A. Hookeri*, *Schott Gen. Aroid.* t. 6, f. 11–19. —*Pythonii Sp. Griff. Itin. Notes*, 201, No. 1179.

EASTERN TEMPERATE HIMALAYA; Sikkim, alt. 7–10,000 ft. BHOTAN, alt. 3–5000 ft., *Griffith.*

Tuber depressed, 3–5 in. diam. *Petiole* as thick as the middle finger, green, smooth; leaflets 6–10 in., sometimes broader than long, margins faintly yellow, nerves deeply sunk. *Peduncle* much shorter than the petiole. *Tube of spathe* 2–3 in., purple ribbed with white; limb 5–8 in. broad, incurved, head rounded, lobes forming two broad dull violet flaps, reticulate with green; sinus 2–3 in. deep; tail 2–4 in., purple. *Spadix* stout; appendage purple, stipitate, suddenly narrowed from a broad disciform lobed intruded base into a tortuous capillary tail 1–3 ft. long.—Variable in colour and size. *Clarke* observes that in ascending from 8000 to 12,000 ft. the spathe varies from 6–8 in. broad curved and ridged, to 1 in. broad scarcely dilated with obscure ridges; but possibly other species were confounded with *Griffithii*.

9. **A. utile**, *Hook. f. in Schott Prodr. Aroid.* 30; *Bot. Mag.* t. 6474; leaves solitary, leaflets sessile rhombic-ovate or obovate crenate, limb of spathe broadly obcordate or obovate oblong retuse or 2-lobed with a short interposed tail that embraces the filiform tail of the appendage. *Engler Arac.* 537 and *lc. ined.* No. 55.

TEMPERATE HIMALAYA, from Kashmir, alt. 7500 ft., *Clarke*, eastwards to Sikkim, alt. 9–13,000 ft., *J.D.H., &c.*

A smaller plant than *A. Griffithii* with the same habit, but with pale green leaves with undulate golden margins and a much narrower limb of the spathe 4 in. broad or less, which is not longer than the tube, is red brown or purplish and coarsely

reticulated. Appendage as in *A. Griffithii*, of which Clarke (*Journ. Linn. Soc.* xxi. 386) considers it a trifling variety. The Bot. Mag. figures, however, uphold the characters which I never failed to observe in Sikkim. Hybrids, of course, may occur. The Western specimens have longer petioles and peduncles and paler greener spathes. All my specimens are 1-leaved, but two are represented in the reduced figure of the Bot. Mag. drawing.

B. Limb of spathe lanceolate acuminate, or caudate.—Dioecious, except *A. Prazeri*.

10. ***A. speciosum***, *Mart. in Flora* (1831), 458; in *Wall. Cat.* 8923; leaf solitary, leaflets all petiolulate acuminate lateral dimidiate cordate median ovate, nerves broadly reticulate, limb of spathe ovate-lanceolate incurved caudate-acuminate, appendage cylindric or fusiform at the often inflated base, narrowed into a very long filiform tail, base not truncate or disciform. *Blume Rumph.* i. 101; *Kunth Enum.* iii. 18; *Schott Melet.* i. 17; *Syn.* 26; *Prodr.* 27; *Clarke in Journ. Linn. Soc.* xxiii. 390; *Bot. Mag.* t. 5964; *Engler Arac.* 539. *Arum speciosum*, *Wall. Tent. Fl. Nep.* 29, t. 20.

TEMPERATE HIMALAYA; from Kumaon, to Sikkim, alt. 7–8000 ft., and Bhotan 9–10,000 ft., *Griffith*.

Rootstock oblique, or shortly creeping and rooting; often 5 in. diam. *Petiole* very stout, green, smooth, often marbled with brown or purple; leaflets 16–19 in., edged with red or purple, median cuneate or rounded at the base; petiolule $\frac{1}{2}$ –2 in. *Peduncle* much shorter than the petiole. *Tube* of spathe 2–4 in., striped with purple; limb 2–6 in. long, banded white and purple. *Spadix* pink or yellowish tail 12–18 in., dark purple; base of appendage usually ovoid; anther-cells 4–5; ovaries ovoid, stigma sessile pulvinate.—Very variable in size and colouring. Schott made three species of it, reduced by Engler to two varieties, both founded on my drawings; they are *A. eminens*, Schott in *Æstr. Bot. Zeitschr.* (1875) 357; *Syst. Aroid.* 30, simply a gigantic specimen with the spathe 8 in. long; and *A. mirabile*, Schott l. cc. 366 and 31, with an abnormally inflated base of the appendage. Wallich's *Arisæma*, n. 8925 in fruit, from Tavoy, may be *speciosum*.

11. ***A. intermedium***, *Blume Rumph.* i. 102; leaves 1 or 2, leaflets sessile lateral dimidiate-ovate or -cordate median elliptic base acute or cuneate nerves broadly reticulate, limb of spathe lanceolate incurved narrowed into a filiform cusp, appendage substipitate subcylindric narrowed from a dilated fusiform base into a very long fusiform tip. *Kunth Enum.* iii. 18; *Schott Syn. Aroid.* 27; *Prodr.* 28; *Engler Arac.* 540. *A. Stracheyanum*, *Schott in Æstr. Bot. Zeitschr.* (1857), 533; *Prodr.* 27; *Engl. l. c.* and *l. c. ined.* No. 11. *A. dolosum*, *Schott in Bonpland.* (1859) 26; *Prodr.* 28.

TEMPERATE WESTERN HIMALAYA, alt. 7–9000 ft., from Simla to Kumaon.

A smaller plant than *A. speciosum*, with more membranous sessile leaflets, the median of which is elliptic with a very acute base. From *Wallichianum* it differs in the elliptic median leaflet. The nervation at once distinguishes it from *A. costatum*. *A. dolosum* and *Stracheyanum* in no way differ from *intermedium*.

12. ***A. Wallichianum***, *Hook. f.*; leaf solitary, leaflets sessile all rhombic-orbicular, bases cuneate, margins undulate, lateral subequal at the base, nerves broadly reticulate, limb of spathe oblong or lanceolate caudate-acuminate, appendage shortly stipitate, base dilated truncate or disciform narrowed into a very long filiform tail. *A. costatum*, *Wall. Cat.* 8922 non *Mart.* (not *Arum costatum*, *Tent. Fl. Nep.*).

TEMPERATE HIMALAYA; from Simla, alt. 6-8000 ft., to Sikkim, alt. 12-14,000 ft.

Tuber depressed. *Petiole* 6-12 in.; leaflets 3-8 in., and as broad, rather membranous. *Peduncle* shorter than the petiole. *Spathe* 3-8 in., narrow, striped with dark purple; limb suberect or slightly incurved, much longer than the tube, tip filiform.—The Sikkim specimens are much smaller than the Nepalese and western. A fine drawing of this made in Nepal by Wallich's native artists is in Kew Herbarium.

13. **A. propinquum**, Schott in *Æstr. Bot. Zeitschr.* (1857) 333; *Prodr. Aroid.* 29; leaves 2, leaflets sessile acuminate, lateral dimidiate-ovate, median rhomboidly orbicular base contracted subpetiolulate, nerves broadly reticulate, limb of spathe oblong or lanceolate caudate-acuminate, appendage stipitate fusiform above the dilated truncate lobulate base narrowed into a filiform shortly exerted tail. *A. intermedium*, var. *propinquum*, Engler *Arac.* 541.

SIKKIM HIMALAYA, alt. 12,000 ft., J.D.H., Clarke.

Rootstock depressed globose. *Petiole* very stout, 8 in. long, green, closely speckled and striate with dark green; leaflets 3-4 in. long and broad, succulent, shining, nerves strong beneath; basal sheaths long, irrorate with pink purple and green. *Peduncle* about equalling the petiole. *Spathe* very like *Wallichianum* and *speciosum*; limb suberect, striped with purple on the sides, reticulate towards the top. *Spadix* pink.—Described chiefly from a drawing of mine. The shortly exerted appendage seems to be a constant character and a great contrast to its allies. It has been regarded by Engler as a variety of *intermedium*, from which the two leaves and rhombic median leaflet distinguish it.

14. **A. costatum**, Mart. in *Flora* (1831) ii. 458; leaf solitary, leaflets sessile or subsessile lateral dimidiate-cordate median broadly ovate all caudate-acuminate, and with very close set parallel nerves, limb of spathe oblong-lanceolate incurved suddenly narrowed into a long filiform tip, appendage shortly stipitate subcylindric from a dilated lobulate base then narrowed into a very long filiform tail. *Blume Rumph.* i. 101; *Kunth Enum.* iii. 17; *Schott Syn. Aroid.* 26; *Prodr.* 29; *Engler Arac.* 541. *Arum costatum*, Wall. *Tent. Fl. Nep.* 28, t. 19.

NEPAL; Wallich.

Tuber depressed, 3-4 in. diam. *Petiole* 12-18 in., very stout, sheath embracing the stout green peduncle; leaflets 10-16 by 5-7 in., dark green. *Spathe* 4-6 in., white striped with dull purple.—Wallich's published figure in *Tent. Fl. Nep.*, and a fine coloured drawing made in Nepal, now in Kew Herbarium, from which it is taken, are the only authority for this species which in the nervation of the leaves differs from all its congeners.

15. **A. Prazeri**, Hook. f.; leaf solitary, leaflets ovate acute or acuminate, lateral subsessile median petiolulate, nerves very slender distant, tube of spathe short, limb much longer oblong-lanceolate acute contracted at the base, appendage slender twice as long as the spathe, base not swollen.

UPPER BURMA; Koni, J. C. Prazer.

Rootstock tuberous. *Petiole* 10-18 in., sheathing beyond the middle, or not; leaflets 3-4 by about 2 in., nearly symmetrical or lateral rather oblique with rounded or broadly cuneate bases; median more elliptic, less acute. *Peduncle* longer or shorter than the petiole, slender. *Spathe* 3½ in., tube 1 in., limb apparently erect, about ¾ in. broad. *Male fl.* very small, subsessile. *Ovaries* minute, contracted into a short style with disciform stigma.—A few male fl. occur on the stipes of the appendage.

16. **A. galeatum**, *N. E. Br. in Gard. Chron.* (1879) ii. 102; leaf solitary, leaflets all petiolulate, lateral dimidiate-ovate or -cordate acuminate crenulate, median elliptic or ovate, tube of green spathe cylindric top incurved galeate much longer than the ovate-lanceolate acuminate pendulous limb the lower margins of which are recurved, appendage gradually narrowed from an elongate conic truncate base into a long thread. *Bot. Mag.* t. 6457.

SIKKIM HIMALAYA; *Gammie (Hort. Kew)*.

Tuber small. *Petiole* 1-2 ft.; leaflets 7-14 in., median broadest, nerves broadly reticulate; petiolules 1-1½ in. *Peduncle* much shorter than the petiole. *Spathe* 4-5 in., striped with white; limb 1½ in., hanging half-way down the tube. *Spadix* white; appendage sessile in the fem., stipitate in the male, thread pale purple

†† Appendage of spadix far exerted bearing many neuters.

17. **A. fimbriatum**, *Masters in Gard. Chron.* (1884) ii. 680, f. 119; leaf solitary, leaflets subsessile broadly ovate caudate-acuminate, tube of purple spathe shorter than the large erect or incurved ovate-lanceolate limb, appendage filiform clothed with filiform neuters. *Regel Gartenfl.* (1886) 357, f. 40; *Bot. Mag.* t. 7150; *Journ. of Hortic.* 1886, f. 19.

LANGKAWI ISLDS., north of Penang (*Hort. Sander, Curtis*).

Rootstock tuberous. *Petiole* 6-10 in.; leaflets 5-7 in., nerves deeply sunk. *Peduncle* as long as the petiole. *Spathe* about 6-7 in., tube 2½ in., striped green and white, limb striped purple and white. *Spadix* very slender throughout; appendage twice as long as the tube, pendulous, red-purple, base not swollen; neuters nearly 1 in., flexuous; male fl. with a few ovaries scattered amongst the lower flowers. —The Philippine Isld. locality recorded in *Gard. Chron.* is probably an error.

B. PEDATISECTA. *Leaves* pedatisect. (Sp. 18-22.)

* *Appendage of spadix elongate, far exerted.*

18. **A. tortuosum**, *Schott Meletem.* i. 17; *Syn.* 29; *Prodr.* 36; leaves 2-3, leaflets 5-18 sessile or petiolulate ovate- or linear-lanceolate subcaudately acuminate, tube of green spathe about as long as the large incurved broadly cymbiform acuminate limb, appendage narrowed from the base to the tip erect then porrect and again erect. *Kunth Enum.* iii. 19; *Blume Rumph.* i. 105; *Engler l.c.* 545, and *l.c. ined.* n. 58. *A. curvatum*, *Kunth l.c.* 20; *Schott Syn.* 29; *Prodr.* 37; *Dalz. & Gibs. Bomb. Fl.* 258; *Bot. Mag.* t. 5931; *Engler l.c.* 544, and *l.c. ined.* No. 57. *A. Steudelii*, *Schott in Bonpland.* (1839) 26; *Prodr.* 37; *Engler l.c.* and *l.c. ined.* n. 61. *A. helleborifolium*, *Schott Syn.* 29; *Prodr.* 36. *A. commutatum*, *Schott in Bonpland.* (1859) 26; *Prodr.* 35. *Arum curvatum*, *Roxb. Fl. Ind.* iii. 506; *Wight Ic.* t. 788. *A. tortuosum*, *Wall. Pl. As. Rar.* ii. t. 10.—*Arisæma*, *Wall. Cat.* 8926, 8927.

TEMPERATE and SUBTROPICAL HIMALAYA, alt. 8000 ft., from Simla to Bhotan. The KHASIA HILLS, MUNNIPORE, the WESTERN GHATS, from the Concan to Malabar.

Tubers spheroidal, attaining 5 in. diam. *Petiole* 1-3 ft., green or with the sheaths mottled with purple; leaflets 8-18 in., distant or crowded, or almost radiately disposed. *Peduncle* 2-4 ft. *Spathe* 4-6 in., pale green or purplish, tube subcylindric, gaping, gradually dilating into the limb. *Spadix* uni- or bisexual; appendage like a rat's tail, quite smooth.—Very common and varying greatly in stature, the numbers and proportions and breadth of the leaflets, colour of the spathe, and monœcious or diœcious flowers. In *A. Steudelii* there are a few neuters above the male fl. The recorded Ceylon habitat is an error.

19. **A. Wrayi**, *Hemsl. in Journ. Bot.* (1887) 205; leaves 1-3, leaflets 5-9 petiolulate narrowly elliptic-lanceolate tips apiculate or filiform, tube of spathe open as long or longer, limb ovate obtusely acuminate dilated at the base with two large revolute auricles, appendage very long filiform pendulous. *N. E. Br. in Gard. Chron.* (1889) ii. 136; *Bot. Mag.* t. 7105.

PERAK, *Wray*; Larut, alt. 3-4000 ft., *Scortechini*.

Tuber subglobose, rooting all over. *Petiole* 12-18 in. and petiolules mottled green and white and dotted with red; leaflets 6-10 by 1-2 in., dark green, median longest with petiolule 1-2½ in. *Peduncle* taller than the petiole, slender. *Spathe* 5-7 in., erect; limb pale yellow green or lilac with darker stripes. *Spadix* very slender; fem. with scattered didymous bicuspidate anthers on long filaments on the base of the appendage. *Stigma* penicillate.

** *Appendage of spadix included or shortly exerted.*

20. **A. decipiens**, *Schott in Æstr. Bot. Zeitschr.* (1857) 373; *Prodr.* 34; dioecious, leaves 2, leaflets 5-7 elliptic-lanceolate caudate-acuminate, lateral sessile on a common petiolule, median long-petiolulate, tube of spathe as long as the lanceolate caudate incurved limb, tail as long as the rest of the spathe, appendage hardly longer than the tube subtruncate straight. *Engler Arac.* 542; *N. E. Br. in Journ. Linn. Soc.* xviii. 251.

KHASIA HILLS, alt. 5-6000 ft., *Griffith, &c.*

Rootstock horizontal, rooting, as thick as the thumb. *Petiole* 12-16 in., slender, sheaths very long, mottled; leaflets 6-10 in.; petiolule of median 1-1½ in.; lateral divaricate. *Peduncle* shorter than the petiole. *Spathe* 4-5 in., excluding the filiform tail which is 3-5 in., dull purple; lower margins not recurved. *Spadix* slender; appendage stipitate, cylindric, erect, rather thickened towards the base; male fl. subsessile.—The Javan habitat is an error.

21. **A. flavum**, *Schott Prodr.* 40; monœcious, leaves 2, leaflets 9-11, lateral sessile oblong or lanceolate acuminate, median sessile or petiolulate. spathe very short, limb ovate cuspidate or acuminate as long or twice as long as the subhemispheric tube, base not recurved, spadix included, appendix very short clavate. *Engler Arac.* 548. *A. abbreviatum*, *Schott in Æstr. Bot. Zeitschr.* (1857) 382; *Prodr.* 40; *Engler l. c.*, and *l. ined.* No. 7. *Dochafa flava*, *Schott Syn.* 24; *Gen. Aroid. App.* *Arum flavum*, *Forsk. Fl. Egypt. Arab.* 157.

TEMPERATE HIMALAYA AND WESTERN TIBET, alt. 5-9000 ft., from Kashmir to Kumaon. CHUMBI; N.E. of Sikkim, *King's Collector*.—DISTRIB. Afghanistan, Arabia.

Rootstock globose. *Petiole* 8-12 in., sheath usually very long; leaflets 2-4 in. *Spathe* 1-2 in., green, yellow, or the limb faintly purple below. *Spadix* conical; fem. infl. of a few rows of closely packed globose ovaries, in close contact with the male infl., which consists of a most dense layer of subsessile connate anthers, from the top of which emerges the appendage, which is about ½ in. long.—A highly curious plant, the spadix quite unlike that of any congener. I find no difference whatever between the Himalayan and Arabian specimens.

22. **A. Scortechini**, *Hook. f.*; dioecious, leaf solitary, leaflets 3-5 lanceolate acuminate, lateral subsessile, median petiolulate, tube of spathe cylindric, limb ovate or ovate-lanceolate erect, tip shortly filiferous, base dilated into two large rounded spreading auricles.

PENANG, *Curtis*. PERAK, *Scortechini*, *King's Collector*.

Rootstock horizontal, rooting all over. *Petiole* 2-6 in., slender, green; leaflets 4-6 in., dark green (with white along the middle in a drawing in Herb. Calcutt.), tips often shortly filiferous. *Spathe* 3 in., green; limb $1\frac{1}{2}$ in. long, erect, white towards the centre, auricles dull yellow-green. *Spadix* (male) dull purple, narrowly conical, tapering into the erect naked yellow obtuse appendage.

C. **RADIATISECTA**. Leaflets *whorled*. (Sp. 23 to end.)

* *Spadix* much longer than the spathe.

23. **A. neglectum**, Schott in *Bonpland*. (1859) 26; *Prodr.* 36; monœcious, leaflets 4-7 sessile elliptic or oblanceolate cuspidately acuminate, tube of spathe cylindric base swollen, limb about as long oblong-cymbiform acuminate top incurved, appendage twice as long as the spathe erect then porrect and again erect. *Engler Arac.* 554. *A. filiforme*, Thw. *Enum.* 334 (not of Bl.). *A. Wightii*, Bot. Mag. t. 5507 (not of Schott).

WESTERN GHATS; from the Concan to the Nilghiri hills, alt. 6000 ft. CEYLON; in the south part of the island, *Thwaites*, Huegel.

Tuber globose. *Leaves* 1 or 2; petiole green or clouded; leaflets usually broadest in the middle. *Spathe* 3-4 in., green; limb open, margins not recurved, base not dilated. *Spadix* rather stout, appendage sessile, remarkably like that of *A. tortuosum*.

** *Spadix* not longer than the spathe.

† *Diœcious* (rarely monœcious). *Fem. spadix* with neuters above the inflorescence.

24. **A. nepenthoides**, Mart. in *Flora* (1831), 458; in *Wall. Cat.* 8919; leaflets 5-sessile elliptic or oblanceolate acuminate, tube of spathe elongate, limb elliptic-ovate base dilated into two broad rounded recurved auricles, appendage erect subcylindric top rounded. *Schott Melet.* i. 17; *Syn.* 31; *Prodr.* 48; *Blume Rumph.* i. 94; *Kunth Enum.* iii. 16; *Bot. Mag.* t. 6446; *Engler Arac.* 551. *Arum nepenthoides*, *Wall. Tent. Fl. Nep.* 26, t. 18.

TEMPERATE HIMALAYA; alt. 9-11,000 ft.; Nepal, *Wallich*, Sikkim, *J.D.H.* &c.

Tuber globose, very large. *Leaves* 2; petiole peduncle and tube of spathe dull yellowish clouded with dark streaks. *Peduncle* shorter than the petiole. *Spathe* 6-8 in., tube 2-3 in., cylindric, base not swollen; limb 4 in., whitish within, yellow without; auricles nearly 1 in. broad-green spotted with brown and with a broad purplish-brown margin. *Spadix* whitish; appendage stipitate, much shorter than the spathe, contracted in the middle. *Ovaries* obovoid, contracted into a rather long style, stigma simple.—Lateral leaflets sometimes lobed at the outer base, showing a tendency to the pedate section.

25. **A. Leschenaultii**, *Blume Rumph.* i. 93; leaflets 5-11 oblanceolate acuminate serrulate, tube of spathe cylindric as long as the suberect cymbiform long caudate-acuminate limb, appendage stout cylindric or slightly clavate tip rounded. *Kunth Enum.* iii. 15; *Schott Syn. Aroid.* 30; *Prodr.* 51; *Engler Arac.* 552. *A. papillosum*, *Steud. ex Schott Prodr.* 46; *Thw. Enum.* 335; *Bot. Mag.* t. 5496 (excl. syn. *erubescens*); ? *A. erubescens*, *Dalz. & Gibs. Bomb. Fl.* 258. *A. Huegelii*, *Schott Syn.* 27; *Prodr.* 44.—*Arisæma*, *Wall. Cat.* 8921.

WESTERN GHATS, from the Concan southwards.

Tuber large, globose. *Leaf* solitary; petiole 1-2 ft., usually mottled and

banded with red and brown; leaflets 4-6 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in. *Spathe* 3-8 in., green with broad dark purple bands; tube narrow; limb leaning forward, margins below hardly recurved, tip straight obtusely acuminate, very variable in length. *Spadix* 4 in., nearly cylindric throughout, hardly stipitate; neuter fl. few short.

26. **A. consanguineum**, Schott in Bonpland. (1859), 27; Prodr. 52; leaflets about 15 (10-20) narrowly linear-lanceolate with long capillary tips, spathe green, limb about equalling the tube broadly ovate or ovate-lanceolate incurved with a long filiform tip margin recurved at the base, appendage stout cylindric obtuse.—*Arisæma*, Wall. Cat. 8915.

TEMPERATE HIMALAYA, alt. 5-7000 ft. from Garwhal to Sikkim. KHASIA HILLS, alt. 4-6000 ft. MUNNIPORE, Watt.

Tuber depressed globose, 1-5 in. diam. *Leaf* solitary; petiole 1-4 ft., often very stout and peduncle mottled dark pink and red or brown; leaflets 3-16 in., $\frac{1}{2}$ -2 in. broad, filiform tips 1-3 in. *Spathe* 3-7 in., excluding the filiform tip, margins more or less recurved below. *Spadix* hardly longer than the tube, appendage subsessile with a few neuters at the base.

27. **A. concinnum**, Schott in Bonpland. (1859) 27; Prodr. Aroid. 50; leaflets 7-11 subsessile narrowly lanceolate or oblanceolate acuminate, tube of spathe elongate cylindric, limb broadly ovate narrowed into a very long decurved tail margins below not or slightly recurved, spadix usually much shorter than the spathe, appendage very slender erect tip clavate truncate, base not thickened. *Engl. Arac.* 556; *Bot. Mag.* t. 5914; *N. E. Br. in Journ. Linn. Soc.* xviii. 254. *A. alienatum* & affine, Schott l. c. 26, 27; 45-51.—*Arisæma*, Wall. Cat. 8920.

TEMPERATE HIMALAYA, alt. 6-10,000 ft. from Garwhal to Bhutan.

Tuber globose. *Leaf* solitary; petiole 1-2 ft. and peduncle green or mottled with brown or purple; leaflets 8-12 in. *Peduncle* shorter than the petiole. *Spathe* green or purple striped with white, tube 2-3 in.; limb as long or shorter, open. *Spadix* slender; sometimes monœcious; appendage exerted beyond the tube, fem. with a few neuters at its base.—Very near *A. Leschenaultii*, differing in the slender appendage. A small state from Sikkim, alt. 10-11,000 ft., has more cuneately obovate cuspidately caudate leaves.

28. **A. pulchrum**, N. E. Br. in Journ. Linn. Soc. xviii. 252, t. 6; leaflets 8-12 cuneately oblanceolate cuspidate, tube of spathe elongate cylindric below infundibular and gaping above, limb broadly ovate suddenly narrowed into a decurved tail as long as the tube margins below revolute, appendage stout cylindric erect rather thickened below, tip rounded.

INDIA (*Hort. Bull.*).

Tuber globose. *Leaf* solitary; petiole and peduncle stout, clouded and speckled with pale red-brown; leaflets 4-6 in., dark green above, subglaucous beneath. *Spathe* 3 in., purplish striped with green, limb 2 in. broad. *Spadix* much shorter than the spathe, shortly exerted beyond the tube; appendage with an elongate ovoid base, and a few scattered neuters.

** *Diœcious*. Neuters 0.

29. **A. Jacquemontii**, Blume Rumph. i. 95; leaflets 5-7 elliptic- or obovate-lanceolate acuminate, tube of spathe narrow green, limb as long or longer oblong- or ovate-lanceolate incurved narrowed into a long acuminate erect or drooping tail, appendage elongate stipitate narrowed from the conical or truncate base to the slender forward curving tip. *Decne. in Jacquem. Voy. Bot.* 168, t. 168; *Kunth Enum.* iii.

16; *Schott Syn. Aroid.* 31; *Syst.* 43; *Engl. Arac.* 555. *A. cornutum*, *Schott in Bonpland.* (1859), 27; *Prodr.* 48; *Engler l. c.* 557.

TEMPERATE HIMALAYA, from Kashmiri alt. 7-8000 to Bhotan, alt. 10-12,000 ft.

Tuber subglobose. *Leaves* solitary or 2; petiole $\frac{1}{2}$ -3 ft., stout or slender; leaflets 2-6 by 1-2 $\frac{1}{2}$ in., almost caudate-acuminate but not filiferous. *Spathe* 3-5 in., striped with white, margins narrowly recurved below, tip often thread-like $\frac{1}{2}$ -3 in. long. *Appendage* stipitate, sometimes with a truncate base, at others slender from an ellipsoid base.—Very variable in size. In a specimen apparently of this species from Sikkim and another from Kumaon (*Duthie*, 6063) the appendage is 4 in. quite as long as the limb of the spathe (without its long point). The spathe is incurved above the middle and terminates in a very long erect horn.

30. *A. exile*, *Schott in Bonpland.* (1859), 26; *Prodr.* 42; leaflets 5-11 narrowly oblanceolate finely acuminate, spathe very narrow, tube elongate, limb as long lanceolate narrowed into a long thread, appendage stipitate very slender filiform as long as the tube of the spathe. *Engler Arac.* 554.—*Arisæma*, *Wall. Cat.* 8918.

TEMPERATE HIMALAYA; Nepal, *Wallich*.

Tuber small. *Leaves* solitary or 2; petiole 8-26 in., very slender; leaflets 3-6 in., minutely erose. *Peduncle* longer than the petiole. *Spathe* 4 in., limb hardly broader than the tube, pale green striped with white, slightly incurved, margins hardly recurved below, filiform tip 1-3 in. *Spadix* very slender; appendage stipitate, base ovoid.

31. *A. erubescens*, *Schott Meletem.* i. 17; *Syn.* 30; *Prodr.* 53; leaflets 9-12 narrowly oblanceolate acuminate glaucous beneath, tube of pink spathe cylindric, limb oblong or ovate-oblong or -lanceolate incurved narrowed into a long filiform tail, margins below recurved, appendage stout erect subcylindric from an elongate ovoid base, tip rounded. *Blume Rumph.* i. 93; *Kunth Enum.* iii. 16; *Engler Arac.* 557. *A. vituperatum*, *Schott in Bonpland.* (1859), 28. *Arum erubescens*, *Wall. Pl. As. Rar.* ii. 30, t. 135.—*Arisæma*, *Wall. Cat.* 8917.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim 6-8000 ft., *J.D.H.*

Tuber subglobose. *Leaf* solitary; petiole 12-18 in., and peduncle pale rose-colrd., streaked with red in bars; leaflets 5-7 in., margins undulate, tips not filiferous. *Spathe* about 4 in., excluding the filiform tail, white striped with rose; tube longer than the incurved rather broader limb. *Appendage* hardly exserted beyond the tube pale.—Differs from *A. exile* chiefly in the stout short appendage.

32. *A. echinatum*, *Schott Meletem.* i. 17; *Prodr.* 49; leaflets 7-9 narrowly lanceolate caudate-acuminate, tube of green spathe infundibular, limb ovate-lanceolate incurved tapering into a very long pendulous tail margins below revolute, appendage short cylindric top truncate rugose or echinulate. *Blume Rumph.* i. 94; *Kunth Enum.* iii. 16; *Engler Arac.* 555; *Wall. Cat.* 8916. *Arum echinatum*, *Wall. Pl. As. Rar.* ii. 30, t. 136.—*Pythonium*, *sp. Griff. Itin. Notes* 176; *Notul.* iii. 156; *l.c. Pl. Asiat.* t. 163.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 9-11,000 ft.—*J.D.H.*; Bhotan, *Griffith*.

Tuber small, globose. *Leaf* solitary; petiole 10-18 in., and peduncle all green or streaked with red-brown, leaflets 6-12 in. *Spathe* 6-10 in., greenish, striped with white and brown, or purple within, tail longer than the limb and tube. *Spadix* hardly exserted; appendage stipitate, contracted in the middle, white streaked with purple, base rather swollen rounded, tip green.

33. **A. filicaudatum**, *N. E. Br. in Journ. Linn. Soc.* xviii. 253; leaflets 5-7 shortly petiolulate oblanceolate cuspidately acuminate, tube of spathe short cylindric, limb about as long very broadly ovate abruptly caudate, tail very long and slender tip clubbed, spadix very slender, appendage slender exserted erect hardly thickened at the base tip clavellate smooth.

CEYLON, at Morowe Korle, alt. 3000 ft., *Thwaites*.

Leaf solitary; petiole 1 ft.; leaflets petiolulate, 6 by 2-2½ in., very thin. *Peduncle* about equalling the petiole. *Tube of spathe* 1½ in., limb short, incurved, tail filiform 6 in.. *Spadix* unisexual; male fl. scattered, subsessile.—Only one specimen seen.

34. **A. fraternum**, *Schott in Bonpland.* (1859), 26; *Prodr.* 45; leaflets 7-9 elliptic-lanceolate finely acuminate, tube of green spathe cylindric shorter than the broadly ovate erect cuspidately acuminate (not caudate) limb, appendage sessile stout subclavate top rounded. *A. Leschenaultii* (*in part*), *Engler Arac.* 552.

KHASIA HILLS; Churra, alt. 4000 ft. *Griffith*.

Tuber depressed globose. *Leaf* solitary; petiole 6-12 in., reddish barred with duller streaks; leaflets 3-5 in., sessile, tips not filiferous. *Peduncle* shorter than the petiole. *Spathe* 4-5 in., suberect, limb recurved at the base. *Spadix* very stout, shortly exserted, of male sessile, green.—Griffith's are the only specimens that I have seen, but there is a fine drawing in *Herb. Calcutt.* without a habitat.

35. **A. Wightii**, *Schott in Bonpland.* (1859), 26; *Prodr.* 43; leaflets 5-8 cuneately obovate cuspidately acuminate, tube of spathe as long as the ovate-lanceolate caudate acuminate limb margin below recurved, appendage stipitate slender, narrowed from a conical base to the tip. *A. Jacquemontii* (*in part*), *Engler Arac.* 555.

NILGHIRI HILLS, *Wight, King*.

Tuber spherical. *Petiole* 8-12 in.; leaflets 4-5 by 1½-2 in., sessile or shortly petiolulate. *Spathe* 4-6 in., apparently striped white and purple, limb rather broader than the tube, gradually narrowed into a tail ¾-2 in. long. *Male spadix* 2 in.

36. **A. ochraceum**, *Schott in Bonpland.* (1859), 27; *Prodr.* 49; diœcious, tube of spathe cylindric rather swollen below as long as the ovate cymbiform erect shortly cuspidate limb, appendage stipitate stout cylindric contracted in the middle tip rounded base swollen lobulate truncate intruded. *Engler Arac.* 559.

SIKKIM HIMALAYA; summit of Tonglo, alt. 10,000 ft.—*J.D.H.*

Leaves radiatisect. *Peduncle* stout and tube of spathe pale red streaked with brown. *Spathe* 5½ in. long; limb yellowish with brown stripes, lower margin not revolute. *Fem. spadix* stout, appendage nearly as long as the limb of the spathe, yellowish; ovaries green with purple stigmas.—Founded on a drawing of mine of a female spathe and spadix, and note as to the leaves being radiatisect.

*** *Monœcious or rarely diœcious. Neuters 0 or few.*

37. **A. Murrayi**, *Hook. Bot. Mag.* t. 4388; leaflets 5-9 ovate- or oblong-lanceolate acuminate, tube of spathe broadly cylindric base almost truncate, limb as long or longer broadly ovate cymbiform acute (not caudate) incurved lower margins dilated round the mouth of the tube, appendage curved narrowed from the base to the tip included or exserted. *Dalz. & Gibs. Bomb. Fl.* 258; *Schott Syn.* 31; *Prodr.* 44; *Engler Arac.* 552; *Fl. des Serres*, t. 1322. *Arum Murrayi*, *Grah. Cat. Bomb. Pl.* 229.

The CONCAN; in the Ghats, *Gibson*, &c.

Tuber large. *Leaf* solitary, maturing after the flowering; petiole 10–14 in. and subequal p duncle greenish mottled with red-brown; leaflets 4–6 in. *Spathe* 3–5 in., tube green striated, $\frac{3}{4}$ –1 in. diam.; limb rather broader, margins not recurved, except round the mouth of the tube. *Spadix* narrowed from the base upward; appendage 1–1½ in., sessile; male fl. scattered, with a few neuters above them.

38. **A. caudatum**, *Engler Monog. Arac.* 559; leaflets 7 cuneately elliptic acuminate with long capillary tips, tube of spathe elongate cylindric, limb incurved ovate-lanceolate rather abruptly narrowed into a very long subulate tail, margins below recurved, appendage rather short not thickened below included.

The CONCAN, *Stocks* (*Ic. in Herb. Kew*).

Tuber depressed globose. *Leaf* solitary; petiole stout, and peduncle irrotrately barred and streaked; leaflets petiolulate, 5 by 2 in. exclusive of the thread-like tips which are 1–3 in. long. *Peduncle* very short. *Spathe* 6 in., exclusive of the 3 in. caudate tip. *Spadix* androgynous; appendage shorter than the flowering portion, tip rounded.—Described from a drawing by *Stocks*; I have seen no specimen.

UNRECOGNIZED SPECIES.

A? **PENTAPHYLLUM**, *Schott Meletem.* i. 17; *Syn.* 28; *Prodr.* 59; *Kunth Enum.* iii. 20; *Blume Rumph.* i. 109; *Engler Arac.* 560. *Arum pentaphyllum*, *Linn. Sp. Pl.* 964.—Ind. Or.; China.

A? **HEPTAPHYLLUM**, *Blume Rumphia* i. 109; *Kunth Enum.* iii. 20. *Schott Syn.* 31; *Prodr.* 59; *Engler Arac.* 560.—Ind. Or.

5. **SAUROMATUM**, *Schott.*

Tuberous herbs, leafing after flowering. *Leaf* solitary, pedatipartite. *Spathe* shortly peduncled, tube cylindric short, margins connate below; limb very long, reflexed, narrow, open. *Spadix* sessile, very long; male and fem. infl. widely distant, short, dense fld., with a few large clavate scattered neuters close above the fem.; appendage slender, as long as the spathe. *Anthers* subsessile, 4-celled. *Ovaries* oblong, 1-celled; stigma sessile; ovules 1–2, basal, erect. *Berries* obpyramidal, 1-seeded.—Species tropical Asiatic and African.

S. guttatum, *Schott Meletem.* i. 17; *Prodr.* 71; *Blume Rumph.* i. 126; *Engler Arac.* 570. *S. pedatum*, *Schott Melet.* l. c.; *Gen.* t. 11; *Syn.* 24; *Prodr.* 70; *Blume l. c.*; *Kunth Enum.* iii. 28; *Engler l. c.* 569; *Bot. Mag.* t. 4465; *Regel Gartenfl.* (1866), 3, t. 495. *S. venosum*, *Schott Prodr.* 71. *S. sessiliflorum*, *Kunth l. c.*; *Schott l. c.*; *N. E. Br. in Journ. Linn. Soc.* xviii. 256. *S. simlense*, *Schott in Estr. Bot. Zeitschr.* (1858), i. 263; *Prodr.* 72; *N. E. Br. l. c.*; in *Gard. Chron.* (1880), ii. 134, 198. *S. punctatum*, *C. Koch in Berlin Wochenschr.* i. 263; *N. E. Br. in Gard. Chron.* l. c. *Arum guttatum*, *Wall. Pl. As. Rar.* ii. 10, t. 115. *A. pedatum*, *Willd. Enum. Suppl.* 54; *Link. et Otto Ic.* 19, t. 8. *A. sessiliflorum*, *Roxb. Fl. Ind.* iii. 507; *Wight Ic.* t. 800. *A. venosum*, *Lindl. Bot. Reg.* t. 1017. *A. clavatum*, *Desf. Cat. Hort. Par.* 385.

The PANJAB, UPPER GANGETIC PLAIN, and the HIMALAYA, from Nepál to Simla, ascending to 5000 ft. ? The CONCAN, *Herb. Stocks*.

Tuber large. *Petiole* stout, 12–18 in.; leaf 6–12 in. broad, segments or lobes 7–15, very variable, 2–15 by 1–3 in., lobes of young leaves sometimes rounded or the lateral dimidiate-ovate or cordate, when numerous oblong or lanceolate. *Peduncle* 1–2 in., very stout, green or spotted. *Spathe* 12–28 in., tube ovoid or subglobose;

limb linear-lanceolate, thick, green or yellowish with dark purple spots or blotches, margins usually purple and waved. *Spadix* as long as the spathe or nearly so; fem. infl. $\frac{1}{2}$ in.; neuters $\frac{1}{2}$ in. long, spreading; male infl. 3 in. above the fem., $\frac{1}{2}$ in. long; anthers densely packed; appendage 2-8 in., cylindric and obtuse, or narrowed from the base to a fine point, green or dark purple.—*S. guttatum* is confined to North-West India, except Stocks' specimens should prove to be from the Concan, of which there is no evidence.

6. **ARUM**, Linn.

Tuberous herbs. *Leaves* simple. *Spathe* deciduous or withering, tube convolute; limb cymbiform, erect. *Spadix* exserted, androgynous, with subulate suberect neuters between the male and fem. infl., and deflexed ones above the male; appendage subcylindric. *Anthems* sessile, pollen vermiform. *Ovary* 1-celled; stigma sessile; ovules many on 2-3 parietal placentas. *Berries* obovoid, many-seeded. *Seeds* albuminous, embryo axile.—Species about 20, Europe, N. Africa, W. Asia.

A. Jacquemontii, *Blume Rumph.* i. 118; leaves hastately sagittate or hastate, limb of spathe narrowly lanceolate acuminate or caudate. *Schott Prodr.* 99. *A. Griffithii*, *Schott Syn.* i. 15; *Prodr. l. c.*; *Boiss. Fl. Orient.* v. 38; *N. E. Br. in Journ. Linn. Soc.* xviii. 257.

N.W. INDIA, *Jacquemont*. KASHMIR; Gilgit, alt. 6-7000 ft., *Giles*.—DISTRIB. Affghan.

Tuber as large as a chesnut. *Leaves* 5-12 in.; petiole 5-16 in. *Peduncle* equaling or longer than the petiole. *Spathe* 3-7 in., white-greenish or purplish. *Ovaries* globose. *Berries* red.

7. **TYPHONIUM**, Schott.

Tuberous herbs. *Leaves* entire, 3-5-lobed or pedatisect. Tube of *spathe* short, convolute, mouth constricted, persistent; limb ovate-oblong lanceolate or linear, deciduous. *Spadix* exserted, male and fem. infl. distant with neuters above the fem. and sometimes below the males; appendage elongate, smooth. *Anthems* subsessile. *Ovaries* 1-celled; stigma sessile; ovules 1-2, basal, erect, orthotropous. *Berries* ovoid, 1-2-seeded. *Seeds* globose, albuminous; embryo axile.—Species about 13, tropics of the Old World.

* *Limb of spathe broadly ovate, open, narrowed into a long point.*

1. **T. trilobatum**, *Schott in Wien. Zeitschr.* iii. (1829) 72; *Aroid. i.* 12; t. 16; *Syn.* 18; *Prodr.* 108; leaves hastately 3-lobed or sub-3-partite, neuters above fem. infl. very many and long filiform curved, appendage stipitate base expanded truncate lobulate intruded. *Blume Rumph.* i. 132 (in part); *Kunth. Enum.* iii. 26 (in part); *Engler Arac.* 614; in *Bull. Soc. Tosc. Ort.* iv. 301; *N. E. Br. in Journ. Linn. Soc.* xviii. 261. *T. orixense*, *Schott in Wien. Zeitsch. l. c.*; *Wall. Cat.* 8829. *T. siamense*, *Engler l. c.* 615. *T. triste*, *Griff. Notul.* iii. 145. *Arum trilobatum*, *Linn. Sp. Pl.* 965; *Thw. Enum.* 334; *Grah. Cat. Bomb. Pl.* 223. *A. orixense*, *Roxb. Fl. Ind.* iii. 503; *Wight Ic.* t. 801; *Lodd. Bot. Cab.* t. 442; *Andr. Bot. Rep.* t. 356; *Bot. Reg.* t. 450; *Griff. Ic. Pl. Asiat.* t. 50 (anal.). ? *A. pumilum*, *Lamk. Engc.* iii. 8. ? *Arisema pumilum*, *Blume Rumph.* i. 107; *Kunth l. c.* 20; *Schott Syn.* 27; *Prodr.* 59.

LOWER BENGAL, BURMA, the EASTERN and WESTERN PENINSULA and CEYLON.
—DISTRIB. Siam, Malay Islds.

Tuber subglobose. *Leaves* 5–12 in. diam.; lobes ovate, acute; petiole 1 ft. or shorter. *Peduncle* 1–4 in. *Spathe* 3–12 in. long; limb $1\frac{1}{2}$ –4 in. broad, red purple inside, nearly flat, tip not twisted. *Appendage* bright red, stout or slender.

2. **T. Roxburghii**, *Schott Aroid. i.* 12, t. 17; *Prodr.* 106; leaves hastate or cordately triangular or 3-lobed or 3-partite with 1 rarely 2 veins in the sinus, neuters above the fem. infl. subulate crowded spreading and decurved, appendage very slender stipitate base truncate. *Saunders, Refug. Bot.* t. 283. *T. divaricatum* γ and δ , *Engler Arac.* 612. *T. javanicum*, *Miq. Fl. Ind. Bat.* iii. 193; *Ann. Mus. Lugd. Bat.* iii. t. 3 B, in *Bot. Zeit.* (1856) 563; *Schott Prodr.* 107; *Engler Ic. ined.* No. 13. *Arum trilobatum*, *Roxb. Fl. Ind.* iii. 505; *Wight Ic.* t. 803.—*Arisarum amboinense*, *Rumph. v.* 320, t. 110, f. 2.

SINGAPORE, *Kunstler (in Herb. Calcutt.)*, Ceylon, *Thwaites*.—DISTRIB. Java.

A smaller and more delicate plant than *A. trilobatum* with a very slender spadix and much shorter decurved neuters. The tip of the spathe is very slender and usually twisted in Ceylon specimens, as in Roxburgh's description; but not in Saunders' figure.

3. **T. Motleyanum**, *Schott Prodr.* 106; differs from *T. Roxburghii* in the presence of 2–3 veins in the sinus of the leaves which are considerably larger. *T. divaricatum* var. *Motleyanum*, *Engler Arac.* 612; *Ic. Arac. ined.* No. 130.

MALACCA, *Herb. Wight*; *Maingay*. PENANG, *King's Collector*.—DISTRIB. Borné.

Very near *T. Roxburghii*, with similar neuters, but leaves with much more numerous nerves.

4. **T. divaricatum**, *Decne. in Ann. Nat. Hist.* iii. (1834); leaves hastate or deeply cordately sagittate entire or sub-3-lobed, tip of spathe twisted, neuters above the fem. infl. short linear suberect, base of appendage rounded or truncate. *Wight Ic.* t. 790; *Blume Rumph.* i. 130, t. 36; *Kunth Enum.* iii. 26; *Schott Aroid. i.* 12, t. 18; *Gen. Aroid.* t. 17; *Syn.* 17; *Prodr.* 106; *Engler Arac.* 611 (excl. vars.) *Ic. ined.* No. 128; *Somokou Zoussets, Ed.* 2, xix. t. 4. *Arum divaricatum*, *Linn. Sp. Pl. Ed.* 2, 1369; *Roxb. Fl. Ind.* iii. 503; *Wall. Cat.* 8930; *Grah. Cat. Bomb. Pl.* 228. *A. trilobatum*, *Bot. Mag.* t. 339 and 2324.—*Rheede Hort. Mal.* xi. t. 20.

DECCAN PENINSULA, *Mootaloor, Herb. Wight (ex Wall. Cat.)*. CEYLON; at Colombo and Peradenya.—DISTRIB. Malay Islds., Japan, China.

Tuber curved. *Leaves* 2–5 by 2–4 in.; petiole 4–8 in. *Peduncle* 1–2 in. *Spathe* 4–7 by $1\frac{1}{2}$ –3 in., red brown, narrowed into a long tail sometimes twisted at the tip.

** *Limb of spathe linear-oblong.*

5. **T. diversifolium**, *Wall. Cat.* 8933; leaves ovate-lanceolate cordate sagittate or hastate to 3–5-lobed or pedatisect lateral lobes or all triangular to linear, spathe acuminate, neuters above the fem. infl. with clavate tips, appendage shorter than the spathe slightly swollen at the cuneate base obtuse. *Schott Ic. Aroid. i.* 13, t. 20; *Engler Arac.* 617; *N. E. Br. in Journ. Linn. Soc.* xviii. 261. *T. Huegelianum*, *Schott l. c.* t. 19. *T. foliolosum*, *Engler l. c.* 618. *Heterostalis diversifolia* & *foliolosa*, *Schott in Austr. Bot. Zeit.* (1857) 261; *Gen. Aroid.* t. 18; *Prodr.* 110. *H. Huegeliana*, *Schott l. c.*; *N. E. Br. in Gard. Chron.* (1879) ii. 76.—*Arisæma*? *Wall. Cat.* 8928 in part.

WESTERN HIMALAYA; Nepal and Kumaon, alt. 6-8000 ft., Wallich, &c. SIKKIM, alt. 7-10,000 ft. TEMPERATE HIMALAYA, alt. 6-11,000 ft., from Simla to Bhotan.

Tuber globose. *Leaves* extremely variable, 3-5 in. long, and as much across the lobes which vary from 3-7, from oblong to narrowly linear, and spread variously; petiole 3-12 in. *Peduncle* 2-9 in. *Spathe* erect, 2-8 in., acuminate, purplish. *Appendage* stout or slender.

*** *Limb of spathe narrowed from an ovate or lanceolate short base into a long tail.*

6. **T. brevipes**, Hook. f.; leaves pedately 5-7-partite, segments lanceolate long-acuminate, peduncle very short, spathe lanceolate produced into a narrow linear tail, neuters above the fem. infl. with clavate tips, appendage very long and slender, base not thickened. *T. pedatum*, Schott in *Æstr. Bot. Wochenbl.* (1857) 262 (in part).

SIKKIM HIMALAYA; near Darjeeling, alt. 7-8000 ft., on rocks and tree trunks, J.D.H., Clarke, Gammie.

Tuber depressed globose. *Leaves* membranous; segments 2-10 by $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; petiole 4-12 in. *Peduncle* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Spathe* with a tumid ellipsoid tube $\frac{1}{4}$ in. long, limb 4 $\frac{1}{2}$ in. long by $\frac{1}{2}$ in. broad, membranous. *Neuters* yellow on capillary stalks; appendage as long as the spathe very slender.—A curious species. I have seen but one spathe, collected by Mr. Gammie.

7. **T. bulbiferum**, Dalz. in Hook. *Kew Journ.* iv. (1852) 113; leaves triangular-hastate sagittate or cordate, spathe very slender from a short lanceolate base, neuters above the fem. infl. linear erect, appendage equaling the spathe filiform base rounded or cuneate. Schott *Prodr.* 106; Engler *Arac.* 611; *Ic. ined.* n. 129; Dalz. & Gibs. *Bomb. Fl.* 258.

SOUTHERN CANCAN, Stocks, &c.

Tuber $\frac{1}{2}$ - $\frac{1}{2}$ in. *Leaves* 2-4 in. long and often as broad across the lobes, angles acute; petiole 5-6 in., slender, usually with a pisiform tuber at the top. *Peduncle* 1-2 $\frac{1}{2}$ in. *Spathe* pale rose, 3-5 in., convolute. *Spadix* as long, slender, yellow; neuters in one series fleshy, rather incurved, yellow (acinaciform, Stocks).

8. **T. pedatum**, Schott. in *Æstr. Bot. Wochenbl.* (1857) 262 (in part); *Prodr.* 108 (non Engler); leaves pedatisect, segments lanceolate, spathe linear acuminate, neuters above the fem. infl. many crowded filiform erect, appendage slender, base not thickened. *N. E. Br. in Journ. Linn. Soc.* xviii. 260.

PEGU, McLelland.

Leaves about 4 in. broad; segments 7, linear-lanceolate, acuminate, about 4 by $\frac{3}{4}$ in., outer smaller, *Peduncle* 1 $\frac{3}{4}$ in. *Spathe* 2 $\frac{1}{4}$ in., longer than the spadix.—Founded on a single specimen. As pointed out by Mr. Brown, the Sikkim plant referred to this by Schott is another species (*T. brevipes*, H. f.), and that of Engler (*Arac.* 613) is *T. fallax*, *N. E. Br.*, a native of Java.

9. **T. cuspidatum**, Blume *Cat. Hort. Buit.* 101; *Rumph.* i. 133, t. 10, f. 1-3; leaves sagittately cordately or hastately ovate oblong or lanceolate, limb of spathe with a short lanceolate base produced into a very long slender tail, lower neuters above the fem. infl. clavate upper subulate, appendage produced into a long filiform tail equaling the spathe base conical. Decne. *Descr. Herb. Timor.* 39; *Kunth Enum.* iii. 26; Schott *Ic. Aroid.* i. 12; *Syn.* 19; *Miq. Fl. Ind. Bat.* iii. 194; Engler *Arac.* 616; *N. E. Br. in Journ. Linn. Soc.* xviii. 262. *T. flagelliforme*, Blume in Wall.

Cat. n. 8931. *Arum cuspidatum*, *Blume Cat. Hort. Euitenz.* 101. *A. flagelliforme*, *Lodd. Bot. Cab.* t. 396; *Roxb. Fl. Ind.* iii. 502; *Wight Ic.* t. 791; *Griff. Itin. Notes*, 13, No. 193; *Griff. Notul.* iii. 144 (*flagelliferum*). *A. angulatum*, *Griff. Notul.* iii. 143.—*Rheede Hort. Mal.* ii. t. 20.

LOWER BENGAL, the MALAYAN PENINSULA and BURMA.—DISTRIB. Malay Islds. *Tuber* subglobose. *Leaves* 1–7 in., sometimes almost 3-partite and 6 in. across the linear or oblong lobes, at others quite simple with a rounded or cordate base. *Petiole* 6–12 in. *Peduncle* slender, long or short. *Spathe* 4–8 in., lurid red, papillose within. *Appendage* as long as the spathe or a little longer.

10. **T. gracile**, *Schott Aroid.* i. 12; *Prodr.* 108; leaves pedately 3–5-partite, segments elliptic-oblong acuminate lateral lobed at the outer base, spathe very long and slender from a lanceolate base, neuters above the fem. infl. filiform recurved or revolute, appendage sessile as long as the spathe narrowed from the base to the very slender tip. *Engler Arac.* 613. *Arum gracile*, *Roxb. Fl. Ind.* iii. 505; *Wight Ic.* t. 793; *Grah. Cat. Bomb. Pl.* 228. ? *Arisæma gracile*, *Kunth Enum.* iii. 21.—*Rheede Hort. Mal.* xi. t. 21.

SILHET, *Roxburgh*; KHASIA HILLS, *Griffith (Kew Distrib.* 6000).—The PANJAB; Jhelum river, *Aitchison*.

Tuber globose. *Leaves* 4–6 in. broad across the segments, which are sessile or petiolulate, and from broadly oval to oblong or lanceolate, acuminate; petiole 6–12 in.; petiolules sometimes $\frac{1}{2}$ in. *Peduncle* 1–1 $\frac{1}{2}$ in. *Spathe* 6–8 in.

8. **THERIOPHONUM**, *Blume*.

Characters of *Typhonium*, but leaves always undivided cordate or sagittate, neuters all subulate, anthers didymous and the more numerous ovules broadly and pendulous from the top of the ovarian cell.—All Indian.

* *Anthers* beaked, opening by slits. *Neuters* many, all near the anthers.

1. **T. crenatum**, *Blume Rumph.* i. 128; spathe 4–5 in. subcylindric margins waved and crenate, anthers shortly beaked, neuters $\frac{1}{2}$ – $\frac{1}{3}$ in. *Miq. Fl. Ind. Bat.* iii. 196; *Schott in Œstr. Bot. Zeitschr.* (1858) 2; *Aroid.* i. 15, t. 21; *Prodr.* 102; *Engler Arac.* 607 (excl. var. *rostratum*); *N. E. Br. in Journ. Linn. Soc.* xviii. 259. *T. Kleinii*, *Schott in Œstr. Bot. Zeit.* 1858; l. c. 3; *Prodr.* 103. *Typhonium crenatum*, *Schott Melet.* i. 17. *Wall. Cat.* 8934. *Arum crenatum*, *Wight in Hook. Bot. Misc.* ii. 100; *Suppl.* t. 3; *Grah. Cat. Bomb. Pl.* 228.

The DECCAN, CONCAN and CARNATIC, *Heyne*, &c.

Tuber small. *Leaves* 3–4 in. long and often as broad, orbicular hastate or cordately sagittate; petiole 4–12 in. *Spathe* membranous, pale yellow-green; base of tube broadly truncate, intruded. *Spadix* half as long as the spathe; appendage cylindric, dark-purple.

2. **T. Wightii**, *Schott in Œstr. Bot. Zeitschr.* (1858) 3; *Prodr.* 103; spathe 4–6 in. linear-oblong acute, anthers long-beaked, lower neuters $\frac{1}{2}$ – $\frac{1}{3}$ in. *N. E. Br. in Journ. Linn. Soc.* xviii. 259. *T. crenatum*, var. *rostratum*, *Engler Arac.* 607 (excl. syn. *arum crenatum*). *Typhonium minutum*, *Schott ex Wall. Cat.* 8932 (not of *Blume*).

The CARNATIC, *Wight*.

Very near *T. crenatum*. *Leaves* sometimes 3-lobed.—Specimens indifferent.

3. **T. zeylanicum**, *N. E. Br. in Journ. Linn. Soc.* xviii. 258; spathe $2\frac{1}{2}$ – $3\frac{1}{2}$ in., anthers globose shortly beaked, lower neuters twice as long as the upper. Arum divaricatum, *Thw. Enum.* 334 (excl. syn.).

CEYLON; common in the hotter parts of the island, *Thwaites*.

Leaves hastate, $3\frac{1}{2}$ –7 in. long, lobes linear or median broader; petiole 4–12 in. Peduncle $1\frac{1}{2}$ –4 in. Spadix $1\frac{1}{2}$ –2 in. Ovaries few.

** Anthers not beaked, opening by pores. Lower neuters near the ovaries, upper few or 0.

4. **T. Dalzellii**, *Schott Aroid.* i. 15; *Syn.* 21; spathe 5–7 in. *Engler Arac.* 608. *Tapinocarpus Dalzellii*, *Schott Gen. Aroid.* t. 15; *Prodr.* 104. *T. indicus*, *Dalz. in Hook. Journ. Bot.* iii. (1851) 346.

The Southern CONCAN and Northern CANARA, *Stocks, Talbot*.

Tuber size of a walnut. Leaves 4–6 in., elliptic oblong or linear, base rounded hastate or sagittate; petiole 3–10 in., very stout. Peduncle stout; fruiting twisted and decurved to the ground. Spathe oblong-lanceolate, tube white; limb flat, dark purple. Appendage terete, twice as long as the infl.—Much the stoutest species.

5. **T. infaustum**, *N. E. Br. in Journ. Linn. Soc.* xviii. 260; spathe $1\frac{1}{2}$ –2 in. *T. Wightii*, *Engl. Arac.* 608 (not of Schott). *Calypetrocoryne Wightii*, *Schott in Estr. Bot. Wochenbl.* (1857) 262; *Prodr.* 105; *Gen. Aroid.* t. 16. *Typhonium minutum*, *Blume Rumph.* i. 134; *Engler, l. c.* 609. Arum minutum, *Willd. Sp. Pl.* iv. 484; *Grah. Cat. Bomb. Pl.* 228. *A. mucronatum*, in part, *Spreng. Syst.* iii. 769.—*Rheede Hort. Mal.* xi. t. 17 (small figure).

MALABAR (*Rheede*); Paul Ghat, *Wight*.

Leaves as in *T. Dalzellii*, but smaller with the basal lobes usually rounded. Spathe narrowly lanceolate, acute, white or purplish. Appendage stipitate, base elongate conical.

9. AMORPHOPHALLUS, *Blume*.

Tuberous herbs, flowering before leafing. Leaves 3-partite, segments pinnatisect. Spathe various; limb campanulate infundibular convolute or open, marcescent. Spadix exerted or included; appendage large, short or long; infl. cylindric, dense fld., male and fem. contiguous, neuters 0. Anthers 2–4, sessile, cells oblong, pores apical. Ovaries globose or obovoid, 1–4-celled; style short or long, stigma entire or 2–4-lobed; ovules solitary, subbasilar, anatropous. Berries subglobose or obovoid. Seeds exalbuminous; embryo macropodous.—Species about 30–40, tropics of the Old World.

* Style many times longer than the ovary.

1. **A. campanulatus**, *Blume ex Decne. in Ann. Mus. Hist. Nat. Par.* iii. (1834), 366 (excl. all syn. but Roxb.); peduncle very short and petiole rough, spathe campanulate limb suberect or recurved waved and crenulate, spadix hardly longer than the spathe, appendage globosely conoid or amorphous sinuously-lobed. *Thw. Enum.* 335. *Dalz. & Gibs. Bomb. Fl.* 259; *Engler Arac.* 309 (excl. many syns. & citations). *A. Chatty, André in Illustr. Hort.* (1872), 361. *A. virosus*, *N. E. Br. in Gard. Chron.* (1885) 759; *Bot. Mag.* t. 6978. *Candarium Roxburghii*, *Schott Melet.* i. 17. Arum campanulatum, *Roxb. Cor. Pl.* iii. 68, t. 272; *Fl. Ind.* iii. 509; *Wight Ic.* t. 785, and p 782.

PLAINS OF INDIA, from the PANJAB to BENGAL, the DECCAN, and CEYLON.

Tuber a depressed bulbiferous sphere 8–10 in. diam. *Leaves* 1–2, 1–3 ft. broad, segments simple or forked; leaflets oblong, acute; petiole dark green with pale blotches. *Peduncle* elongating in fruit; sheaths linear-oblong. *Spathe* 6–9 in. across the orbicular-ovate obtuse limb, coriaceous or fleshy, variable in colour, green, usually with white spots below, greenish purple above, rough and dark purple within towards the base. *Spadix* very stout; fem. infl. cylindric, male subturbinate; appendage dark-purple, sometimes 6 in. diam. *Berries* obovoid.—The geographical limits of this species are quite uncertain (owing to its being cultivated widely in the East for its tubers); and its synonymy is so mixed that I have withheld many supposed synonyms and all habitats but India. The name *campanulatus* first appeared under *Amorphophallus* in 1834, in Decaisne's paper cited above, as a Timor plant; and Roxburgh's *Arum campanulatum* is there given by Blume as its type, together with *Arum Rumphii*, Gaud. in Freyc. Voy. Bot. 127, t. 34, &c. Whether either of the above is the Timor plant has never been discovered, but the appended description applies to Roxburgh's species. In 1835 in Rumphia, Blume described, also as Roxburgh's *Arum campanulatum*, and giving the same diagnosis as in Decaisne) a very much larger Javanese plant, with a widely expanded spathe and longer spadix with a long conico-ovoid appendage. As Blume evidently all along believed that he was dealing with Roxburgh's Indian plant I think it best to name and limit the Indian species in accordance with his intentions and his and Roxburgh's diagnosis, and accept Dr. Prain's name for the Javanese plant (*A. Rex*) which, being also a native of the Andaman Islds., comes within the pale of the Brit. Ind. Flora. Wight gives copies of two drawings of Roxburgh's *A. campanulatus*, one, t. 785, the true plant; the other, t. 782, has a much larger broadly campanulate spathe, 15 in. diam., with recurved margins, more like that of *A. Rex*, but with a short broad appendage 8 in. diam. and about as tall. Of this Wight says he finds no description in Roxburgh's Flora; it is, however, no doubt to it that Roxburgh alludes in speaking of large plants with the appendage 6 in. diam.

2. ***A. Rex***, *Prain mss.*; peduncle very short and petiole rough, spathe broadly campanulate with waved revolute margins, spadix much longer than the spathe, appendage elongate conoid sinuously waved. *A. campanulatus*, *Blume Rumph. i.* 139, t. 32, 33 (*excl. syn.*).

ANDAMAN ISLANDS.; Narcondam Islds., *Prain*.—DISTRIB. Java.

A very much larger plant than *A. campanulatus*, with the depressed tuber attaining nearly a foot diam., the leaf blade 5 ft. diam., the alternate segments 6–10 in., the petiole attaining 5 ft., and stout peduncle 2–3 in. elongating to 30 in. in fruit. *Spathe* very broadly campanulate, 12–18 in. diam., with broad undulate revolute margins, sometimes produced on one side into a prolonged pendulous apex, pale red-purple. *Spadix*, &c., as in *A. campanulatus*, but much larger, with a sinuate appendage 10–14 in. long, that rises high above the spathe, is broadly conical and purple-brown or pale and spotted with brown.

3. ***A. dubius***, *Blume Rumph. i.* 142; petiole rough, spathe 3–5 in. diam. subsessile campanulate with a rather long oblong tube and ovate waved quite entire suberect or spreading limb, spadix shorter than the spathe, appendage globosely ovoid quite smooth. *Kunth Enum. iii.* 32; *Schott Syn.* 38; *Prodr.* 130; *Bot. Mag. t.* 5187; *Engler Arac.* 310. *Dracontium polyphyllum*, *Dent. Clav. Hort. Mal.* 38 (*not of Linn.*).—*Hort. Mal. xi.* t. 18.

MALABAR (*Rheede*), CEYLON, *Thwaites*.

Leaves as in *A. campanulatus*; petiole green with pale blotches. *Peduncle* very short; sheaths equalling the tube of the spathe, oblong, retuse, apiculate. *Spathe* with the tube 3 in. long, green without and within; limb ovate in outline, disk dull dark purple with a bright green narrow waved border. *Spadix* 4 in., male infl. nearly 1 in. diam.: fem. $\frac{1}{2}$ in.; appendage $1\frac{1}{2}$ in. diam., chestnut-brown, anthers

linear-oblong; stigma 2-fid.—Described from the figure in Bot. Mag. Rheede's figure represents fem. infl. much shorter than in *A. canipanulatus*.

4. **A. longistylus**, *Kurz Andaman Rep.* 50 (name); spathe long-peduncled, limb acute or acuminate hardly broader than the convolute ovoid tube, appendage cylindric narrowed to the tip many times longer than the infl. and spathe.

ANDAMAN ISLDS.; *Kurz*.

Tuber a depressed sphere, not bulbiferous. *Leaf* very large, leaflets 3–5 by 2–2½ in., broadly elliptic ovate or obovate, base contracted; petiole 2–3 ft., green spotted with purple; sheaths closely wrapping the base. *Spathe* 13 by 5 in., dull red purple with darker blotches, sides infolding above the middle convolute low down. *Spadix* sessile; infl. shorter than the spathe; male ½ in., fem. shorter; appendage 7 in., dark violet-purple. *Anthers* very short.—Described from a drawing in *Herb. Calcutt.*

** Style very short or 0.

† *Spadix* not or very little longer than the spathe.

5. **A. bulbifer**, *Blume Rumph.* i. 148; spathe long-peduncled tube broad turgid limb rather longer ovate cymbiform obtuse, spadix very stout shorter or a little longer than the spathe, appendage as long as infl. and broader than elongate conoid or oblong top rounded. *Kunth Enum.* iii. 34; *Regel Gartenfl.* (1871), t. 688; *Engler Arac.* 317, and *lc. ined.* No. 156. *Arum bulbiferum*, *Roxb. Fl. Ind.* iii. 510; *Bot. Mag.* t. 2072, 2508; *Grah. Cat. Bomb. Pl.* 229; *Wall. Cat.* 8935, 8936 (spathe). *A. occultatum* and *taccoides*, *Herb. Ham.* *Pythonium bulbiferum*, *Schott Melet.* i. 18. *Conophallus bulbifer*, *Schott Syn.* 34; *Gen.* t. 30; *Prodr.* 128.

EASTERN BENGAL, SIKKIM, the KHASIA HILLS, and BURMA, ascending to 5000 ft. The CONCAN, *Graham*.

Tuber globose. *Leaf* 12–18 in. diam., ultimately bulbiferous at the base, forks, and nerves above; leaflets 3–8 in., obovate or lanceolate; petiole 3–4 ft., and peduncle 8–10 in., green and pink streaked with green or black. *Spathe* 5–8 in., erect, pale pink or yellowish clouded with pink, rose-pink within. *Spadix* sessile; infl. 3 in. by ½ diam.; appendage 3–4 in., pale flesh-colrd. or white. *Anthers* short. *Stigma* 2-lobed.

6. **A. commutatus**, *Engler Arac.* 319; spathe long-peduncled erect ovate-lanceolate obtuse base shortly sheathing, spadix about as long as the spathe, appendage three or four times longer than the infl. but not stouter, tapering from the sessile base upwards. *Conophallus commutatus*, *Schott in Bonpland.* (1859), 28; *Prodr.* 128.

The CONCAN; *Stocks*.

Tuber and *leaf* unknown. *Peduncle* 1–3 ft. *Spathe* 6–10 by 1½–4 in., rough at the base within, tip obtuse. *Spadix* columnar, sessile; male infl. 1½–2 in., fem. ½–1½ in., both cylindric; appendage not contracted above the infl., smooth, tip obtuse. *Anthers* very shortly oblong. *Stigma* sessile, disciform.

7. **A. purpurascens**, *Kurz mss.*; leaflets elliptic-obovate, spathe small very long-peduncled cymbiform acute base shortly convolute, spadix shorter or rather longer than the spathe stout, appendage rather longer but little broader than the infl. stout elongate conoidal tip rounded.

PEGU, MARTABAN, and in the IRRAWADDY and SITANG VALLEYS, *Kurz*.

Tuber small, 2 in. diam., not bulbiferous. *Leaf* small, 10 in. diam., 3-sect with segments 3–5 by 1–2 in., petiole 18 in., pale green. *Peduncle* 16 in., red-purple,

striate; wrapped at the base by short sheaths. *Spathe* (perhaps immature) 3 in., dark green, blue at the sides with red margins. *Spadix* 3 in.; infl. cylindric, stout, male the longest; appendage nearly 2 in., not contracted at the base, white. *Anthers* very short. *Stigma* sessile, disciform, lobulate.

8. *A. chlorospathus*, *Kurz mss.*; leaflets linear, spathe cymbiform erect base shortly convolute, spadix shorter than the spathe stout, appendage rather longer but not broader than the infl. stout elongate conoidal tip rounded.

PEGU, the IRAWADY AND SITANG VALLEYS, *Kurz*.

Tuber a depressed sphere or hemisphere, 2 in. diam., not bulbiferous. *Leaf* 2 ft. diam., trisect, segments winged and pinnatifidly cut into finely acuminate leaflets 5-8 by $\frac{1}{2}$ - $\frac{3}{4}$ in.; petiole 18-20 in., green. *Peduncle* 16 in., stout, green, pale reddish-brown below; sheaths not long. *Spathe* 4 in., green, paler within. *Spadix* 2 $\frac{1}{2}$ -3 in., infl. cylindric, male longest; appendage not contracted at the base, white. *Anthers* very short. *Stigma* sessile, discoid.

9. *A. sparsiflorus*, *Hook. f.*; spathe with an ovate-oblong suberect acute limb the basal margins revolute round the mouth of the infundibular tube, spadix much shorter than the spathe, appendage fusiformly conoid as long as the infl., male and fem. fl. scattered.

PERAK; Maxwell's Hill, *Wray* (No. 111), *Kunstler*.

Tuber orange-shaped. *Leaf* bulbiferous at top of petiole, green, shaded with red or brown; leaflets 7, shortly petiolulate, 6-8 by $1\frac{1}{2}$ in., oblanceolate, acuminate. *Peduncle* 1-2 $\frac{1}{2}$ in., sheaths longer, linear. *Spathe* 5 in.; tube $1\frac{1}{2}$ in., pale red-brown spotted with purplish-brown. *Spadix* 3 $\frac{1}{2}$ in. *Anthers* minute, very short. *Ovaries* small, globose, style very short, stigma capitate.

†† *Spadix much longer than the spathe.*

10. *A. oncophyllus*, *Prain mss.*; spathe long-peduncled tube ovoid dilating into a large orbicular-ovate limb the lower margins of which are revolute round the open mouth of the tube, spadix far exerted, appendage as long as the infl. elongate conoid.

ANDAMAN ISLDS.; on Cocos Islets, *Prain*.

Tuber depressed, 5-9 in. diam., bulbiferous. *Leaf* 3 $\frac{1}{2}$ ft. broad; leaflets 6-8 in.; petiole 2-3 ft., dull green, blotched with greenish white. *Peduncle* 12-15 in., fruiting longer, very stout; sheaths 2-7 in. *Tube* of spathe 3 in. long and broad, whitish, obliquely streaked with green and spotted with dull green; limb 8 in. long by 5 broad, inclined, dull red-purple blotched with yellow. *Spadix* 8-18 in., sessile; male infl. about equalling the fem.; appendage creamy-yellow. *Anthers* short. *Stigma* 2-lobed.—A superb species, described from a drawing, dried specimen and a living plant at Kew.

11. *A. Prainii*, *Hook. f.*; spathe obliquely campanulate tube very broad subcylindric base truncate, limb short orbicular-ovate margins waved, spadix very stout, exerted appendage very large conoid smooth much longer and broader than the infl.

PERAK; Larut, *Scortechini*, *Kunstler*. PENANG (*l.c.* in *Herb. Kew*).

Tuber 6-10 in. diam., not bulbiferous. *Leaves* 4 ft. broad, leaflets 4-8, lanceolate, caudate-acuminate; petiole 3-5 ft., green mottled with grey, or white and red. *Peduncle* 8-5 in.; sheaths very large, 8-12 by 4 in., pinkish. *Tube* (or rather convolute parts) of spathe 2 in. long and as broad, pale green spotted with white; limb 6-8 in. diam., yellow, base within rough purple-brown. *Male* infl. sub-turbinate, fem. about as long, appendage 6-8 in. by 2-3 diam. cream-colrd. smooth. *Anthers* linear. *Stigma* 2-lobed.—Spathe and spadix more like *A. campanulatus* than are others with short styles.

12. *A. burmanicus*, *Hook. f.*; spathe broadly ovate from a short tumid oblong tube erect, spadix far exserted, appendage ovoid or cylindric-ovoid much shorter than the male infl.

BURMA; on the Karen Hills, alt. 3000 ft., *Kurz.*

Peduncle 4-6 in., much longer than the sheaths. *Spathe* 4-5 by 3-4 in., nearly smooth within, tube $1\frac{1}{2}$ in. long. *Spadix* 3-6 in., male infl. 1-2 in., fem. $\frac{1}{2}$ -2 in.; appendage $1\frac{1}{2}$ in., anthers short, prismatic. *Ovaries* depressed-globose, with a short stout style, stigma large, quite entire.—*Tuber* and leaf wanting.

13. *A. hæmatospadix*, *Hook. f.*; spathe campanulate convolute below dilating above into an ovate or ovate-lanceolate obtuse erect limb with margins revolute all round the mouth of the tube nearly to the tip, spadix stout exserted, appendage cylindric-clavate three times as long as the infl. blood-red tip rounded.

PENANG? *Curtis (Hort. Kew, 1892.)*

Tuber shortly turbinate, $2\frac{1}{2}$ in. diam. *Leaf* about 20 in. diam.; leaflets 5-7 in. oblong-lanceolate, finely acuminate; petiole 16 in., very stout, green, terete below, ribbed and keeled above. *Peduncle* 10 in., terete, brown, striated; sheaths appressed to the base, red-brown. *Spathe* 5 in., limb primrose-yellow, tube striate with pink, dark purple within. *Spadix* sessile, 7 in.; infl. $1\frac{1}{2}$ in., male 3 times as long as the few-fl. fem.; appendage $\frac{1}{2}$ in. diam. at the thickest part. *Anthers* very short. *Ovary* globose, narrowed into a short rather slender style, stigma small, capitate.

14. *A. elatus*, *Hook. f.*; peduncle very tall rough, spathe lanceolate acute erect sheathing for the lower half margins not revolute, spadix more than twice as long as the spathe very stout, appendage more than twice as long as the infl. narrowed from below the middle to the slender tip.

MALAY PENINSULA; Larut, Perak, *Kunstler.*

Tuber and *leaves* unknown. *Peduncle* 3-4 ft., and *petiole* variegated green brown white and red. *Spathe* 6 in., cream-colour, membranous, appressed to the spadix, apparently mottled; tube $1\frac{1}{2}$ in. diam., base rounded. *Spadix* a foot long, rather narrowed towards the base, about $\frac{1}{2}$ in. diam. in the thickest part, dark and light blue; male infl. 3 in.; fem. $1\frac{1}{2}$ in. *Anthers* small, very short. *Ovaries* globose; style very short, stout, stigma capitate.—A stately species, the colours are taken from *Kunstler's* notes. The specimen is unique in *Herb. Calcutta*; its nearest ally is perhaps *Blume's A. variabilis*.

IMPERFECTLY KNOWN AND EXCLUDED SPECIES.

A. GIGANTEUS, *Blume Rumph. i. 147, t. 34*, is not British Indian; and the reference under it to *Densl. Clav. Hort. Mal.* and *Rheede Hort. Mal.* should be struck out.

A. LYRATUS, *Engler Arac. 319 (Aram lyratum, Romb. Fl. Ind. iii. 508, Conopallus lyratus, Schott Syn. 35; Prodr. 130)* is according to *Roxburgh's* drawing *Tacca pinnatifida*, with the detached berry of an *Arisæma*?

A. TUBERCOLIGER, *Engler Arac. 317*; tuber small, leaf 3-sect, branches 1-2 in. pinnatifidly or pinnatisectly 3-5-foliolate, segments 3-4 by $1-1\frac{1}{2}$ in. sessile elliptic-lanceolate caudate-acuminate; petiole 10-12 in. bearing a pisiform bulbil at the top. *Conopallus tuberculiger, Schott, Bonpland. (1859), 78; Prodr. 129.*—*Khasia Hills*, alt. 3-4000 ft. *J. D. H. and T. T.*—Described by *Schott* from leaves only. *Engler* has added a description of the spathe of *A. bulbifer*, from the drawing of a *Sikkim* specimen of that plant which he supposed to be the same.

10. SYNANTHERIAS, *Schott.*

Characters of *Amormophallus*, but male and fem. infl. distant, with oblong depressed interposed neuters.

RHAPHIOPHALLUS, *Schott Gen. Aroid. t. 27; Syn. 125; Engler Arac. 321*, would appear from the characters given not to be separable from *Synantherias*. It was founded on a Canara plant collected by Hohenacker, of which I have seen no specimen; and is described and figured as having a few gibbous neuters, and a slender subulate appendage shorter than the spathe. In other respects it agrees with *S. sylvatica*.

S. sylvatica, *Schott Gen. Aroid. t. 28; Prodr. 176; Engler Arac. 320; Ic. ined. No. 155; Bot. Mag. t. 7190*. *Amorphophallus sylvaticus*, *Kunth Enum. iii. 34; Dalz. & Gibs. Bomb. Fl. 259*. *A. zeylanicus*, *Blume Rumph. i. 148; Thw. Enum. 335; Engler Arac. 314*. *Brachyspatha sylvatica*, *Schott Syn. 35*. *B. zeylanica*, *Schott Syn. 35; Prodr. 127*. *Arum sylvaticum*, *Roxb. Fl. Ind. iii. 511; Wight Ic. t. 802*.

The DECCAN PENINSULA, from the northern Circars to the Concan, and southwards to CEYLON.

Tuber subglobose, bulbilliferous. *Leaves* 1 or 2, $1\frac{1}{2}$ – $2\frac{1}{2}$ ft. diam.; divisions 1–2-pinnatifid; leaflets 2–6 in., lanceolate, long-acuminate; petiole and peduncle 1–2 ft., and spathe clouded barred and streaked with green and pale pink. *Spathe* 2–4 in., tube broad convolute, base truncate; limb very short, ovate, acute. *Spadix* stipitate; infl. as long as the spathe, terminating in a brown flexuous appendage 5–6 times as long; infl. cylindric, male narrowed; neuters sub 2-seriate, quite flat, pelately adnate, yellow-brown. *Male fl.* of scattered or fascicled minute sessile obconate anthers. *Ovaries* globose, style very short; stigma capitate; ovules subbasilar.

11. THOMSONIA, Wall.

Characters of *Amorphophallus*, but appendage clothed below with depressed neuters and all over above with tubercles.

T. nepalensis, *Wall. Pl. As. Rar. 83, t. 99; Blume Rumph. i. 150; Engler Arac. 306*. *T. Hookeri*, *Engler l. c. 307*. *Pythonium Wallichianum*, *Schott Melet. i. 17; Syn. 36; Gen. t. 25; Prodr. 123; Kunth Enum. iii. 30*. *Arum grandiflorum*, *Herb. Ham.—Aroid. Wall. Cat. n. 8949*.

TROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 2–6000 ft., *J. D. H. ASSAM, Hamilton*. KHASIA HILLS, alt. 1–5000 ft.

Tuber 4–5 in. diam., not bulbilliferous. *Leaf* 12–18 in. diam. or more; leaflets 3–5 in., ovate or oblong-lanceolate, caudate-acuminate; petiole 18 in. and very stout. *Peduncle* light green blotched with much darker, sheaths pink. *Spathe* 12–18 by 3–6 in. diam., oblong-cymbiform, shortly narrowly convolute at the base, erect, green. *Spadix* 5–10 in., exserted, very stout; male infl. 2–5 in., fem. $\frac{1}{2}$ –2 in.; appendage 3–4 in. and as long or shorter than the male infl., cylindric, green changing to yellow, top rounded. *Anthers* 3–5, substipitate, compressed, 2-celled, pollen vermiform. *Ovaries* globose, 2-celled; style stout; larger than the cells, up-curved, stigma discoid; obscurely lobed; ovule 1, basilar, erect, anatropous. *Fruit?*

T. Hookeri, *Engler Arac. 307* (*Allopythion*, *Hookeri Schott Gen. 24, t. 24; Prodr. 122*; founded on a very bad specimen of a Khasian plant (the leaf of which Mr. Brown thinks may be that of an *Arisæma*) is altogether doubtful. There is a drawing in *Herb. Kew* of a curious state of *T. nepalensis*, with a fan-shaped green foliaceous spathe, cut irregularly and deeply into lanceolate acuminate costate lobes.

12. PLESMONIUM, Schott.

Characters of *Amorphophallus*, but male and fem. infl. distant, with large obovoid pearl-like or turbinate neuters interposed, and no appendage.

P. margaritifera, *Schott Syn. 34; Gen. t. 26; Prodr. 124; Engler*

Arac. 303. *Amorphophallus margaritiferus*, *Kunth Enum.* iii. 34. *Arum margaritifera*, *Roxb. Fl. Ind.* iii. 512; *Wight Ic.* t. 795. *Caladium discretum*, *Herb. Ham.—Wall. Cat.* 8937 A.

HINDOSTAN; *Rozburgh.* BENGAL, at Dacca, *Clarke.*

Tuber 6 in. diam. or less, bulbiferous all over. *Leaves* $1\frac{1}{2}$ ft. diam., 3-sect; segments pinnatisect, lateral forked; leaflets few, 4–6 in., linear, acuminate; petiole $1\frac{1}{2}$ –2 ft., green. *Peduncle* 12–18 in., stout, pale green streaked with darker green. *Spathe* 5–6 in. by 4 broad, erect, broadly ovate, obtuse, concave, loosely convolute below the middle, pale yellow-green, flushed with pink within, dark purple at the base. *Spadix* very stout, stipitate, obtuse, as long as the spathe; male infl. much the longest; neuters as large as peas, white. *Anthers* crowded, very short, pores confluent. *Ovaries* scattered, globose, narrowed into a short style; stigma large, 2–3-lobed.—*P. dubium*, Schott (*Prodr.* 125; *Engler Arac. l. c.*) founded on a very imperfect spathe and spadix from Pegu (*McLelland*) is distinguished by its author by the neuters being (in a dried state) turbinate with acute margins all round.

13. **ARIOPSIS**, *Nimmo.*

Small tuberous herb. *Leaves* entire, peltate. *Spathe* small, cymbiform, open (tube 0) persistent. *Spadix* shorter than the spathe, appendage 0; male fl. cylindric; fem. adnate to the base of the spathe. *Male fl.* embedded in the tissue of the spadix; anthers connate in groups of 3, each 2-celled, surrounding a pore into which all open. *Ovaries* few, oblong, 1-celled; stigma sessile, 4–6-fid; ovules many, orthotropous, 2-seriate on 4–6 parietal placentas. *Berries* 3–6-angled, many-seeded, stigmas stellate. *Seeds* pendulous, albuminous; embryo axile.

This genus has hitherto been ascribed to Graham, in whose "Catalogue of the Plants of Bombay and its vicinity" it first appeared, and where the letter N. following the name was assumed by Schott and all subsequent authors to mean "Nobis." It really means "Nimmo," Graham's coadjutor in the work, an excellent botanist.

1. **A. peltata**, *Nimmo in Grah. Cat. Bomb. Pl.* 252; *Schott Syn.* 40; *Gen. t.* 85; *Prodr.* 135; *Bot. Mag.* t. 4222; *Engler Arac.* 528. A. protanthera, *N. E. Br. in Rep. R. Gard. Kew*, 1877, 57. *Remusatia vivipara*, *Wight Ic.* t. 900 (not of Schott). *Caladium?* ovatum, *Herb. Ham.—Aroid. Wall. Cat.* 8956, 8957.

WESTERN SUBTROPICAL HIMALAYA, from Nepal to Sikkim, alt. 4–6000 ft. BURMA; in the Karen Hills, *Kurz.* WESTERN GHATS; from the Concan to Travancore, *Heyne, &c.*

Tubers small, clustered. *Leaves* 1–6 in. diam., orbicular or cordate, tip rounded or acute, membranous, glaucous beneath; petiole 2–7 in., slender. *Peduncle* 1–4 in., very slender. *Spathe* 1 in., incurved, apiculate, violet with a green dorsal ridge, paler within. *Spadix* decurved; male infl. dark purple; fem. green, stigma yellow.—*A. protanthera*, owes its origin to the fact, that whereas all the Himalayan specimens then in Kew Herbarium from various collections showed that flowering had preceded leafing by a considerable interval; all those from the Western Ghats showed that those processes had been contemporaneous. Specimens of the Himalayan plant recently received from the Calcutta Herbarium, have invalidated the above character.

14. **STEUDNERA**, *C. Koch.*

Herbs; caudex stout. *Leaves* ovate, long-petioled, peltate. *Spathe* shortly convolute at the base, limb ovate-lanceolate, expanded, reflexed, marcescent. *Spadix* very short, dense-fid.; male infl. clavate or capitate;

fem. adnate below to the spathe. *Stamens* 3-6, connate in a peltate body with a flat crenulate crown; anther-cells globose. *Ovaries* mixed with clavate staminodes, subglobose, 1-celled; stigma 4-5-lobed; ovules many, parietal, orthotropous.—Species 6 or 8, Indian and Burman.

1. ***S. discolor***, *Hort. Bull.* (Cat. 1875, No. 75); leaves 10-12 in. ovate acute with dark blotches between the nerves, base retuse, spathe $4\frac{1}{2}$ in. ovate acuminate golden yellow on both surfaces, base within purple. *S. colocasiæfolia*, *Hook. f. Bot. Mag.* t. 6076 (copied in *Fl. des Serres*, xxi. t. 2201). *S. colocasiæfolia*, var. *discolor*, *Engl. Arac.* 452.

INDIA, *Hort. Bull.*

Stem short, stout, clothed with brown sheaths. *Leaves* dark green above, paler with dark blotches beneath. *Spadix* $1\frac{1}{2}$ in., pale; staminodes 4-5, clavate.

2. ***S. colocasiæfolia***, *C. Koch in Oestr. Bot. Wochenschr.* (1862), 114; leaves 10-12 in. ovate acute concolorous, base retuse, spathe 6 in. lanceolate caudate-acuminate golden yellow without dark purple within. *Schott in Bonpland.* x. (1862), 222; *Regel Gartenfl.* (1869), 323, t. 633; *André Ill. Hort.* xix. 33, t. 90; *Bot. Mag.* t. 6762; *Engler Arac.* 452, and *Ic. ined.* No. 141 (excl. var. *discolor* and *Hab.* Burma, and *Syn.* *Gonatanthus*).

MAETABAN, and the Karen Hills, *Kurz*.

Closely allied to *S. discolor*, but a larger coarser plant, with stronger nerves, a longer differently coloured spathe, and fewer staminodes.

3. ***S. assamica***, *Hook. f.*; leaves 7-8 in. ovate-oblong acute base rounded, spathe 3-3 $\frac{1}{2}$ in. lanceolate caudate-acuminate red purple on both surfaces. *Aroid. Wall. Cat.* 8953.

ASSAM; Duple Hills, *Lister* (*Ic. in Herb. Calcutt.*). CACHAR, *Keenan*.

Caudex as thick as the thumb, fibrous above. *Leaves* bright green, paler beneath; petiole 6-8 in., slender. *Peduncle* 3-5 in. *Spathe* erect. *Spadix* $\frac{1}{2}$ -1 in.; male infl. cylindric.—Wallich's specimen is without locality.

4. ***S. Griffithii***, *Schott in Bonpland.* (1862), 222; leaves 4-5 in. ovate-oblong acute or cuspidate base emarginate or shortly 2-lobed, spathe 2-3 in. ovate-lanceolate acuminate yellowish green on both surfaces brown purple below the middle within. *Gonatanthus Griffithii*, *Schott Prodr.* 143.—*Arum* sp. *Griff. Notul.* iii. 144; *Ic. Pl. Asiat.* t. 164, f. 1.

UPPER BURMA, *Griffith*, at Namtuseek (*Kew Distrib.* 5970).

Caudex prostrate, elongate, clothed with fibres, as thick as a swan's quill. *Leaves* deep green above, glaucous-white beneath. *Spadix* $\frac{1}{2}$ in., male infl. cylindric.

5. ***S. colocasioides***, *Hook. f.*; leaves 9-24 in. broadly ovate acute base broadly retuse, spathe 5-9 in. narrowly lanceolate acuminate tube convolute limb creamy-yellow, fem. infl. half free. *Aroid. Wall. Cat.* 8944, 8947.

SIKKIM HIMALAYA, *King* (*Ic. in Herb. Calcutt.*). SILHET, *De Silva*. CACHAR, *Keenan* (*Hort. Kew*).

Caudex elongate, $1\frac{1}{2}$ in. diam., fibrous above. *Leaves* thin in texture, light green above, glaucous beneath; petiole 12-18 in., green. *Peduncles* several, 5-7 in. *Spathe* erect, tube 1 in., ovoid, green; limb membranous. *Spadix* 2 in., fem. infl. cylindric above the middle; male as long as the fem. cylindric. *Ovaries* globose; staminodes very minute, clavate?—Very different from its congeners in size and spathe.

6. **S. capitellata**, *Hook. f.*; leaves 8-9 by 7-8 in. orbicular-ovate subacute base broadly retuse, spathe $3\frac{1}{2}$ -4 in. pendulous from the decurved peduncle lanceolate acuminate yellowish-brown without pale purple and striated within, male infl. globose.

BURMA; in evergreen forests, Tonkyaghet, *Kurz (Ic. in Herb. Calcutt.)*.

Caudex as thick as the little finger, densely fibrous; sheaths 4 in. *Leaves* pale green above, paler beneath, nerves about 5 pairs, strong, arched; petiole 1 ft., slender. *Peduncles* many (4 in the drawing), 4-5 in., very slender. *Spadix* $\frac{1}{2}$ -1 in., fem. infl. very long.

15. **HAPALINE**, *Schott*.

Small tuberous herbs. *Leaves* membranous, cordate or sagittate. *Spathe* long-peduncled, tube cylindric, decurrent tightly convolute, limb lanceolate or linear-oblong, flat. *Spadix* equalling the spathe; male and fem. infl. remote; male elongate; fem. adnate to the spathe, of few uniseriate ovaries. *Male fl.* an elongate hexagonal peltate shortly stipitate body, with 4-6 minute globose anther-cells pendulous from its margin. *Ovaries* ovoid, 1-celled, 1-ovuled; stigma disciform; ovule erect, anatropous.

1. **H. Benthamiana**, *Schott in Æstr. Bot. Wochenbl.* (1857), 85; *Prodr.* 162; leaves oblong-sagittate basal lobes narrow obtuse more than half as long as the anticus, spathe acuminate; *Engler Arac.* 489; *Kurz in Journ. As. Soc. Beng.* xlii. ii. (1873), 109, t. 9. *Hapale*, *Schott Gen. Aroid. t. 44.*—*Aroid. Wall. Cat.* 8953 A.

BURMA; banks of the Attran river, *Wallich*. PEGU and MARTABAN, in dry forests, *Kurz*.

Tuber small. *Leaves* few, 3-4 in. long; sinus deep, narrow; petiole and peduncle slender. *Spathe* 2-3 in. long, membranous, white.

2. **H. Brownii**, *Hook. f.*; leaves ovate acuminate deeply cordate, basal lobes rounded $\frac{1}{3}$ rd the length of the anticus, spathe oblong apiculate.

MALAY PENINSULA; Quedah, alt. 100-500 ft. *King's Collector*.

Habit of *H. Benthamiana*, differing in the basal lobes of the leaf and form of the spathe.—Named after Mr. N. E. Brown, assistant in the Kew Herbarium. (See p. 490).

16. **REMUSATIA**, *Schott*.

Tuberous herbs, flowering and leafing in alternate years? bearing long radical bulbilliferous shoots. *Leaf* solitary, entire, peltate. *Spathe* coriaceous; tube convolute, ovoid, accrescent over the fruit; limb broad or narrow, erect or spreading and reflexed, deciduous. *Spadix* very short, sessile, male and fem. infl. separated by neuters; appendage 0; male infl. clavate, of densely packed angular table-topped male fl. and neuters; fem. short, cylindric. *Stamens* with a fleshy connective bearing 2-3 small anther-cells opening by terminal slits. *Ovaries* ovoid, 1-celled; stigma sessile, disciform; placentas parietal; ovules many, orthotropous. *Berries* small. *Seeds* albuminous, embryo axile.

1. **R. vivipara**, *Schott Melet.* i. 18; *Syn.* 43; *Gen. Aroid. t.* 36; *Prodr. t.* 137; in *Ann. Gand.* (1846), t. 66; bulbilliferous shoots very stout suberect or ascending simple or very shortly branched, limb of spathe

reflexed broadly orbicular-obovate cuspidate. *Kunth Enum.* iii. 36; *Miquel Fl. Ind. Bat.* iii. 205; *Dalz. & Gibs. Bomb. Fl.* 259; *Grah. Cat. Bomb. Pl.* 228; *Wall. Cat.* 8939; *Engler Arac.* 496. *Caladium viviparum*, *Lodd. Bot. Cab.* t. 281. *Colocasia vivipara*, *Thw. Enum.* 336. *Arum viviparum*, *Rozb. Fl. Ind.* iii. 496; *Wight Ic.* t. 798.—*Rheede Hort. Mal.* xii. t. 9.

SUBTROPICAL HIMALAYA; alt. 2–3000 ft. from Kumaon to Sikkim. The KHASIA HILLS and BURMA. BEHAR, on Parasnath, alt. 4500 ft., *Clarke*. The WESTERN GHATS, and CEYLON.—DISTRIB. JAVA.

Tuber size of a hazel or walnut, viviparous shoots 6–11 in., bulbils squamosely crinite. *Leaf* 5 by $3\frac{1}{2}$ to 18 by 12 in. membranous, orbicular ovate or cordate, acute or acuminate; petiole 1 ft. or less. *Spathe* 4–5 in. long, tube green, limb 2–3 in. broad, golden yellow. *Spadix* 1– $1\frac{1}{2}$ in.

2. ***R. Hookeriana***, *Schott in Æstr. Bot. Wochenbl.* (1858), 133; *Prodr.* 187; bulbilliferous shoots slender prostrate or pendulous much branched, limb of spathe erect ovate-oblong acuminate. *Engler Arac.* 497.

TEMPERATE HIMALAYA; Simla to Sikkim, alt. 4–7000 ft.

Tuber as in *R. vivipara*. *Leaves* ovate-oblong, cordate, caudate-acuminate beneath between the nerves; petiole 2–9 in. *Spathe* $1\frac{1}{2}$ –2 $\frac{1}{2}$ in., limb $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, sometimes coppery, more or less convolute.

17. **GONATANTHUS**, *Klotzsch*.

Tuberous herbs, with the habit foliage and bulbilliferous shoots of *Remusatia*, but the shoots are branched and the spathe has a slender elongate convolute limb, there are no neuters between the male and fem. infl., and the ovules are numerous and basilar.

G. sarmentosus, *Klotzsch in Link & Kl. Ic. Pl.* i. 33, ii. 14; leaves ovate-cordate. *Kunth Enum.* iii. 36; *Schott Syn.* 44; *Gen.* t. 39; *Prodr.* 142; *Bot. Mag.* t. 5275; *Gartenfl.* (1868), 227, t. 588; *Engler Arac.* 571. *Caladium pumilum*, *Don Prodr.* 21. *Colocasia*? *pumila*, *Kunth Enum.* iii. 40.—Aroid. *Wall. Cat.* 8952.

TEMPERATE HIMALAYA; from Kumaon to Sikkim, alt. 4–6500 ft. KHASIA HILLS, alt. 4–5000 ft.

Tuber small and slender branched shoots with the small crinite bulbils of *Remusatia Hookeriana*. *Leaves* peltate, acuminate, dark green above; petiole 4–8 in. *Peduncle* 2–3 in. *Spathe* 6–10 in. long, tube $\frac{1}{2}$ – $\frac{3}{4}$ in., ovoid, green; base of limb as long or longer than the tube, inflated, reclined, the rest suberect, with a long recurved tip, golden yellow, contracted at the base, margins completely convolute. *Spathe* with the fem. infl. in the tube, the stipitate clavate red-brown male in the swollen base of the limb. *Spadix* 1– $1\frac{1}{2}$ in. long; stipes of male infl. angular and crown of anthers chocolate-brown; fem. infl. short, ovaries few closely packed, globose, stigma a disciform area. *Berries* yellow. *Seeds* on long funicles, ovoid; testa rough, with a fleshy yellow coat.

2. ***G. ? ornatus***, *Schott in Æstr. Bot. Zeitschr.* (1858), 121; leaves lanceolate or oblong-lanceolate base cordate.

SIKKIM HIMALAYA, *Thomson*. KHASIA HILLS, alt. 5000 ft., *J. D. H. & T. T.*

In the absence of inflorescence this is an altogether doubtful plant. It differs from *G. sarmentosus* in the much narrower leaves, 5–10 by $1\frac{1}{2}$ – $3\frac{1}{2}$ in., which in the originally described Khasia specimens were of a fine coppery-purple between the green nerves and the broad green margin. In specimens apparently of the same plant from both Sikkim and the Khasia Hills, the leaves are green and concolorous. No bulbilliferous shoots have been seen.

18. **COLOCASIA**, Linn.

Tall coarse herbs, tuberous or with a stout short caudex, flowering and leafing together. Leaves stontly petioled, peltate, ovate-cordate. Spathe stoutly peduncled; tube thick, accrescent, persistent, mouth constricted; limb erect, deciduous. Spadix shorter than the spathe, stout or slender; male and fem. infl. with usually interposed flat neuters; appendage cylindric subulate or 0. Ovaries and ovules as in *Remusatia*. Berries obsonic or oblong. Seeds oblong, sulcate, albumen copious; embryo axile.—Species 6 or 7 tropical Asiatic.

1. **C. Antiquorum**, Schott Melet. i. 18; Syn. 40; Prodr. 38; leaves large ovate with a broad triangular basal sinus, tube of spathe oblong 2–4 times shorter than the narrow lanceolate limb, appendage very variable. Miquel Fl. Ind. Bat. iii. 202; Kunth Enum. iii. 37; Thwaites Enum. 335; Benth. Fl. Austral. vii. 155; Engler Arac. 491 and Icon. ined. No. 251. *C. esculenta*, and *acris*, Schott Melet. i. 18; Kunth l. c. *C. nymphæifolia*, Kunth l. c. *C. Fontanesii*, Schott in Östr. Bot. Wochenbl. (1854), 409. *C. pruinipes*, Koch & Bouché, Ind. Sem. Hort. Berol. (1854), 4. *C. euchlora*, C. Koch. & Lindl. l. c. App. Caladium esculentum, Vent. Hort. Cels. 30; Willd. Sp. Pl. iv. 489; C. acre, Br. Prodr. 336; C. nymphæifolium, Vent. l. c.; Griff. Notul. iii. 144, t. 161 B. 2 (ovules). Arum Colocasia. Linn. Sp. Pl. 965; Roxb. Fl. Ind. iii. 494; Grak. Cat. Bomb. Pl. 228; Wight Ic. t. 786, f. 1. *A. nymphæifolium*, Roxb. & Grak. ll. cc.; Wight l. c. f. 2. *A. peltatum*, Lam. Encycl. iii. 13.—Colocasia, Wall. Cat. 8943—Rheede Hort. Mal. xi. t. 23.

Throughout the hotter parts of INDIA (up to 7600 ft. in the Himalaya) and CEYLON, in moist and dry places, wild or cultivated.—DISTRIB. cult. in all hot countries.

Leaves 6–16 in., dark green, dull, sometimes clouded with black; petiole stout, 3–4 ft., green or violet. Peduncles solitary or clustered and connate, much shorter than the petioles. Spathe 8–18 in., caudate-acuminate, erect, pale yellow. Spadix shorter than the spathe; fem. infl. as long as that of the staminodes, male infl. longer.—Very common and variable, Roxburgh distinguishes 3 varieties besides *nymphæifolia*, they are—1, a dark one from wet places in which the roots (base of stem?) never swell, but send out many suckers, and the leaves and petioles are more or less purple, it is much eaten; 2, one that grows on dry ground with dark purple or bluish clouds in the leaf; 3, one like the last but all green. Of *nymphæifolia*, which he describes as having repand leaves. He says that he doubts if it is anything but a large aquatic state, abundant wild on borders of lakes, with the subterraneous stem often as long and thick as a man's arm, reddish petioles peduncles and leaves, narrower leaves, and a short appendage; all parts are eaten.

2. **C. affinis**, Schott in Bonpland. (1859) 28; Prodr. 138; leaves ovate or orbicular-ovate base rounded retuse or cordate nerves very slender, tube of spathe cylindric 4–6 times shorter than the linear-lanceolate long acuminate limb, appendage as long or twice as long as the infl., stigma sessile disciform. Engler Arac. 492. Colocasia, No. 3, Herb. Ind. Or. Hf. & T. Alcasia Jenningsii, Veitch in Ill. Hort. (1869), t. 585; Gard. Chron. (1869), 136; Flora des Serres, xvii. 1818.—Aroid. Wall. Cat. 8952 B.

SIKKIM HIMALAYA, King. ASSAM, Hamilton. KHASIA HILLS, alt. 2–4000 ft. J. D. H. and T. T. BURMA, Prome Hills, Wallich.

Tuber small. Leaves 4–6 in. long and nearly as broad, membranous, green with dark blotches between the nerves, glaucous beneath, tip obtuse or acute; petiole slender, 6–8 in. Peduncle 3–5 in. Spathe 4–6 in., tube 1 in., tumid, green; limb primrose yellow. Spadix with a narrow neck between the male and fem. infl.

covered with flat neuters; appendage slender, narrowed to the tip, golden yellow.—In a fine drawing of this species in Herb. Calcutt. the stigma is represented as disciform.

3. *C. fallax*, Schott in *Bonpland*. (1859), 28; *Prodr.* 138; leaves orbicular-ovate base cordate or emarginate, nerves strong, tube of spathe 4-6 times shorter than the lanceolate limb, fruiting subspherical, style short, stigma disciform. *C. Wendlandii*, Engl. *Ic. ined.* No. 240.—Aroid. *Wall. Cat.* n. 8952 A.

SIKKIM HIMALAYA, alt. 1-3000 ft., Clarke. KHASIA HILLS, alt. 1-4000 ft. J. D. H. and T. T.

Tuber small. Leaves 4-6 by 3-5 in., largest 8 by 7 in., much thicker in texture and with much stronger nerves than *C. affinis*. Spathe and spadix much as in *affinis*, but usually with fewer neuters between the male and fem. infl. Anthers stellately crenate in both.

4. *C. virosa*, Kunth *Enum.* iii. 39 (in part); leaves large ovate subundulate and repand, base retuse, tube of spathe oblong much shorter than (but hardly distinct from) the narrowly lanceolate blade, spadix four times shorter than the spathe, appendage 0. Schott *Syn.* 41; *Prodr.* 139; Engler *Arac.* 494. *Calla virosa*, Roxb. *Fl. Ind.* iii. 517; Wight *Ic. t.* 808. *Zantedeschia virosa*, C. Koch *Ind. Sem. Hort. Berol.* (1854), App. 9.

BENGAL and the lower Provinces of India, Roxburgh.

Stem short, simple, cylindric. Leaves 1-2 ft. by 6-15 in.; petiole about as long, terete, smooth, green. Peduncles clustered. Spathe nearly straight, subulate, convolute. Spadix 3 in., obtuse, lower third female. Anthers peltate, 8-12-celled; ovaries broadly ovoid 1-celled, stigma large sessile peltate; placentas 3-4.—Descript. from Roxburgh; nothing further being known of this plant.

5. *C. Mannii*, Hook. f.; leaves oblong-ovate base sagittate lobes very obtuse sinus broad acute, spathe narrowly oblong cymbiform, spadix half as long as the spathe sub-acute, appendage 0.

UPPER ASSAM; at Makum, Mann.

Leaves 8-12 by 4-7 in., nerves 6-7 pairs, not stout, basal lobes 4 in.; petiole 1-3 ft. Peduncle rather slender. Spathe 6-7 in., tube 1 in. Spadix 1½-4 in.; male infl. 1 in. intermediate space ½ in.; male 1½-1¾, tip rounded. Anthers stellately crenate. Ovaries globose, stigma a discoid area.

6. *C. gigantea*, Hook. f. petiole pruinose, leaves very large ovate-cordate, spathe 6 in., limb oblong or elliptic-oblong cymbiform cuspidate, appendage very short acute. *C. indica*, Engler *Arac.* 494 (not Kunth). *Leucocasia gigantea*, Schott in *Æstr. Bot. Wochenbl.* (1857), 34; *Prodr.* 141 (excl. syn. pruinipes).

PERAK, Scortechini.—DISTRIB. Cochinchina, Java.

Leaves 18-20 by 14-18 in., base deeply cordate, margin repand; nerves 8-10 pairs, very stout; lobes 6-8 in., rounded, sinus open; petiole 2-3 ft. Peduncle very stout, tall. Spathe 5-6 in., coriaceous; tube 2½ in., glaucous, limb erect. Spadix yellow, fem. infl. 1½ in. conic; neuter infl. 1 in. slender; male stout, cylindric, terminating in a rudimentary conic appendage. Ovaries very numerous, narrow, stigma very broad, covering the whole ovary; ovules parietal, scattered.—The ovaries are quite unlike those of its congeners.

19. *ALOCASIA*, Schott.

Characters of *Colocasia*, but ovules few, basilar, erect.—Species perhaps 20 or 30, tropical Asiatic.

* *Leaves not or slightly peltate, lower nerves approximate and flabellately spreading.*

1. **A. cucullata**, Schott Melet. 18; in *Æstr. Bot. Wochenbl.* (1854), 410; *Syn.* 48; *Prodr.* 156; leaves subpeltate broadly ovate-cordate nerves 6-7 pairs, petiole very long, peduncles shorter subsolitary. *Engler Arac.* 498. *A. rugosa*, Schott in *Wochenbl.* l. c.; *Syn.* 49; *Prodr.* l. c. *Colocasia cochleata*, Miq. *Epimel. Sem. Hort. Amstelod.* (1853). *C. rugosa*, Kunth *Enum.* iii. 41. *C. cucullata*, Schott Melet. i. 18; *Wall. Cat.* 8940; *Kunth l. c.* 38; *Thw. Enum.* 336. *Caladium cucullatum*, Pers. *Syn.* ii. 575. *Arum cucullatum*, Lour. *Fl. Cochinch.* 656; *Roxb. Fl. Ind.* iii. 501; *Wight Ic.* t. 787.

BENGAL, Roxburgh (cultivated Clarke). The KHASIA HILL., alt. 4000 ft. J. D. H. and T. T. PEGU, Kurz. CEYLON (native?) Thwaites.

Rootstock 1-2 ft., with many suckers, branched, inclined. *Leaves* 6-12 by 4-7 in., $\frac{1}{2}$ -circular, nerves very stout; petiole 1-3 ft., green. *Spathe* 6-12 in. fleshy, tube 2-4 in.; limb narrowly cymbiform, margins convolute. *Spadix* shorter than the spathe, appendage short.

2. **A. montana**, Schott in *Æstr. Bot. Wochenbl.* (1854), 140; *Syn.* 47; *Prodr.* 154; leaves broadly ovate-cordate repand, nerves 5-6 pairs, petiole short stout, peduncles many connate below. *Miq. Fl. Ind. Bat.* iii. 209; *Engler Arac.* 499. *Colocasia? montana*, Kunth *Enum.* iii. 40. *Arum montanum*, Roxb. *Fl. Ind.* iii. 497; *Wight Ic.* t. 796.

NORTHERN CIRCARS, Roxburgh.—DISTRIB. Java,

Rootstock subcylindric, as thick as the wrist, with long suckers from the crown. *Leaves* 6-8 in., shining; petiole 8-10 in., sheathing half way up. *Spathe* 4-6 in., coloured, limb thrice as long as the tube. *Spadix* nearly as long as the spathe; appendage $2\frac{1}{2}$ in. *Stigma* 3-4-lobed.—I have seen no specimen.

3. **A. rapiformis**, Schott *Prodr.* 157; *Engler Arac.* 510. *Colocasia rapiformis*, Kunth *Enum.* iii. 40.

PEGU, Carey.

Differs, according to Roxburgh, from *A. montana* in having a tuberous turnip-shaped root.—I have seen no specimen.

** *Leaves not or hardly peltate, nerves pinnate.*

4. **A. indica**, Schott in *Æstr. Bot. Wochenbl.* (1854), 410; *Syn.* 46; *Prodr.* 144; leaves large ovate deeply sagittately cordate repand, lobes rounded sinus narrow, tube of spathe many times shorter than the very long linear-oblong subtruncate cuspidate limb, stigma sessile 3-4-cleft. *Miquel Fl. Ind. Bat.* iii. 206; *Engler Arac.* 501. *Colocasia indica*, Kunth *Enum.* iii. 39. *Arum indicum*, Roxb. *Fl. Ind.* iii. 498; *Wight Ic.* t. 794.—*Aroid. Wall. Cat.* 8948.

TROPICAL ASIA; native and cultivated.—DISTRIB. tropics (cult.).

Stem attaining 8 ft., stout, 3-8 in. diam., emitting bulbiferous suckers. *Leaves* 2-3 ft., tip a deflexed cusp, basal lobes sometimes very shortly connate, nerves about 8 pairs; petiole stout, transversely clouded. *Peduncles* (always in pairs, Roxb.) shorter than the petioles. *Spathe* 8-12 in., pale yellow-green. *Spadix* equalling the spathe; appendage longer than the infl. *Ovary* 1-celled.

5. **A. denudata**, *Engler Arac.* 507; leaves triangular-sagittate, shortly acuminate about a third as broad as long, basal lobes nearly as long as the anticones with the costæ marginal, petiole and peduncle long slender. *A. singaporensis*, Linden in *Gartenfl.* xiv. 292.

SINGAPORE, *Gaudichaud*.

I have seen only two leaves of a cultivated specimen of *A. singaporensis* which so conform to the description and habitat of *A. denudata*, that I conclude they are referable to that species, one has a triangular ovate hastate leaf with divaricate lobes, the other more sagittate with approximate lobes as long as the terminal.

*** *Leaves peltate, basal lobes connate for $\frac{1}{10}$ — $\frac{1}{3}$ (rarely $\frac{1}{2}$) their length.*

6. ***A. macrorrhiza***, *Schott in Estr. Bot. Wochenbl.* (1854), 409; *Syn.* 45; *Gen. t.* 40; *Prodr.* 146; leaves broadly ovate-sagittate repand basal lobes rounded connate for $\frac{1}{10}$ their length, sinus narrow, peduncles short, tube of spathe half as long as the coriaceous incurved cymbiform cuspidate limb, stigma subsessile disciform entire. *Miq. Fl. Ind. Bat.* iii. 205; *Engler Arac.* 502 & in *Mart. Fl. Bras.* iii. Pt. ii. 202, t. 46, 47. *A. odora*, *C. Koch Ind. Sem. Hort. Berol.* (1854), App. 5; *Engler Arac.* 503. *A. commutata*, *Schott in Estr. Bot. Wochenbl.* (1854), 409. *Colocasia macrorrhiza*, *Schott Melet.* i. 18; *Thw. Enum.* 336; *C. odora*, *Brongn. in Ann. Mus. Par.* iii. (1834), 145, t. 7; *Kunth Enum.* iii. 39. *C. odorata*, *Hook. Bot. Mag.* t. 3935. *C. mucronata*, *Kunth l. c.* 40. *Caladium macrorrhizon*, *Br. Prodr.* 336. *C. odorum*, *Lindl. Bot. Reg.* t. 641. *C. odoratis-simum*, *C. Koch in Berl. Allg. Gartenz.* (1857), 20. *C. glycirrhizum*, *Fraser in Hook. Bot. Misc.* i. (1830), 259. *Philodendron?* peregrinum, *Kunth l. c.* 51. *Arum macrorrhizon* and peregrinum, *Linn. Sp. Pl.* 965, 966. *A. odorum*, *Roxb. Fl. Ind.* iii. 499; *Wight Ic.* t. 797; *Lodd. Bot. Cat.* t. 416.—*Colocasia*, *Wall. Cat.* n. 8941.

TROPICAL and SUBTROPICAL INDIA, wild and cult. Cult. in the tropics generally.

Stem 6–16 ft., attaining 1 ft. diam. *Leaves* 2–4 by 6–18 in., nerves 10–12 pairs, very stout, basal lobes incurved; petiole 2–4 ft., base sometimes as thick as the arm. *Peduncles* 2 (or more?) in each axil, 6–8 in., stout. *Spathe* 6–10 in., limb hooded and cuspidate at the top. *Spathe* nearly as long as the spathe; appendage nearly equalling the infl., cylindric, obtuse, sinuously sulcate. *Ovary* incompletely 4-celled. *Berries* size of a cherry.

7. ***A. decipiens***, *Schott in Bonpland.* vii. (1859), 28; *Prodr.* 28; leaves oblong sagittate twice as long as broad cuspidate, posticous lobes half the length of the anticous united for $\frac{1}{2}$ — $\frac{1}{10}$ their length, petiole long slender, peduncles long, tube of spathe shorter than the oblong cymbiform acuminate limb, style short, stigma capitate entire.

PEGU, *McLelland*. ANDAMAN ISLES, *Prain*.

Leaves 9–18 by 4–9 in.; lobes 7 in., ovate-oblong, sinus broad open; nerves 6–7 pairs; petiole 2–3 ft. *Peduncle* 12–24 in. *Spathe* 4 in., tube $1\frac{1}{2}$ in.; appendage? *Ovaries* globose. *Fruiting* tube of spathe ellipsoid or pyriform, $1\frac{1}{2}$ in. *Seeds* $\frac{1}{8}$ — $\frac{1}{4}$ in diam.

8. ***A. fornicata***, *Schott in Estr. Bot. Wochenbl.* (1854), 410; *Syn.* 47; *Prodr.* 157; leaves ovate-lanceolate sagittate basal lobes much shorter than the anticous connate $\frac{1}{4}$ or $\frac{1}{3}$ their length obtuse or subacute sinus narrow acute, tube of spathe about half as long as the oblong cymbiform acuminate limb, ovary narrowed into a distinct style, stigma 3–4-lobed. *Engler Arac.* 506. *Colocasia?* fornicata, *Kunth Enum.* iii. 41. *Arum fornicatum*, *Roxb. Fl. Ind.* iii. 501; *Wight Ic.* t. 792 (not t. 789); *Griff. Notul.* iii. 130, 132, t. 167.—*Colocasia*, *Wall. Cat.* 8941, 8945.

BENGAL, SILHET, ASSAM and CHITTAGONG, *Roxburgh*, &c.

Stem 1-3 ft., inclined or prostrate, $1\frac{1}{2}$ in. diam. *Leaves* 8-12 by 4-5 in., acute or obtuse, slightly waved, nerves 6-8 pairs; petiole 8-12 in. and shorter peduncle clouded. *Spathe* 3-4 in., greenish yellow. *Spadix* nearly as long as the spathe; appendage $1\frac{1}{2}$ in., about as long as the infl. *Seeds* $\frac{1}{2}$ in. diam., globose.

9. **A. navicularis**, Koch & Bouché Ind. Sem. Hort. Berol. (1855), App. 2; in Ann. Sc. Nat. Ser. iv. i. 338, leaves broadly oblong sagittate contracted opposite the triangular obtuse divergent posticous lobes which are united for $\frac{1}{2}$ - $\frac{3}{4}$ their length, tube of spathe half as long as the oblong cymbiform acute limb, style very short, stigma disciform obscurely lobed. Engler Arac. 505 (excl. syn. fallax); Ic. Arac. No. 124. *Colocasia navicularis* Koch & Bouché l. c. (1853), 13.

KHASIA HILLS, alt. 1-4000 ft.—J. D. H. & T. T.

Stem short. *Leaves* 8-18 by 5-8 in., cuspidate; basal lobes 3-7 in., much shorter than the antioous, nerves 4-6 pairs; petiole 1-2 ft. *Spathe* 4-5 in.; spadix about 3 in.; appendage as long or longer than the infl., sinuously sulcate. *Seeds* turbinate, $\frac{1}{2}$ in. long.

10. **A. fallax**, Schott in Bonpland. vii. (1859), 28; Prodr. 150; leaves broadly ovate or orbicular-ovate sagittate basal lobes one-third as long as the antioous connate from $\frac{1}{2}$ - $\frac{3}{4}$ their length converging sinus narrow, tube of spathe oblong lanceolate cuspidate limb, ovaries narrowed into a rather long style, stigma 3-cleft.

SIKKIM HIMALAYA and KHASIA HILLS, alt. 2-4000 ft.; J. D. H. & T. T.

Leaves 12-20 by 9-12 in. or more; basal lobes 4-8 in.; nerves numerous, 7-9 pairs; petiole 1-2 ft. *Peduncle* 18 in. *Spathe* 5-6 in., membranous, yellow; fruiting tube 2-2 $\frac{1}{2}$, ellipsoid or pyriform. *Seeds* $\frac{1}{2}$ in. diam., globose.—Near *A. decipiens*, but seeds larger, and stigma very different, basal lobes of many-nerved leaves approximate. It is probably nearer *A. fornicata*.

11. **A. longiloba**, Miq. Fl. Ind. Bat. iii. 207; in Bot. Zeit. (1856), 564 leaves oblong-lanceolate caudate-acuminate sagittate, basal lobes obtusely triangular more than half as long as the antioous connate from $\frac{1}{2}$ -1 in., sinus triangular obtuse. Schott Prodr. 153; Engler Arac. 506. *A. amabilis*, Hort. Bull. *Caladium heterophyllum*, Presl. Plant. Jav. Zolling. n. 601.

SINGAPORE (Herb. DC), ?Wallich, without name, number or locality.—DISTRIB. Java, Borneo.

Leaves 12-20 by 4-5 in. across the insertion of the petiole. Limb of *spathe* 4 in., lanceolate, acuminate. *Spadix* 3 in. *Seeds* $\frac{1}{10}$ - $\frac{1}{8}$ in. diam.

**** *Leaves peltate, basal lobes connate for half or all their length.*

12. **A. acuminata**, Schott in Bonpland. vii. (1859), 28; leaves elongate-rhombic caudate-acuminate contracted opposite the basal lobes which are half as long as the antioous and connate for $\frac{3}{4}$ their length. Engler Arac. 450.—*Colocasia*? Wall. Cat. 8946.

CHITTAGONG, J. D. H. and T. T.; PEGU, Kurz. UPPER BURMA, Anderson; Saluen river, Wallich.

Caudex horizontal. *Leaves* 6-12 by 3-5 in., membranous, costal nerves 3-4 pairs, lobes nearly parallel, sinus narrow, obtuse.

13. **A. Beccarii**, Engler Arac. Spicileg. Born. e Pap. 14; leaves coriaceous oblong-ovate or lanceolate caudate-acuminate narrowed to the basal lobes which are connate throughout their length and $\frac{1}{2}$ - $\frac{3}{4}$ as long as

the anticus, tube of spathe as long as the cymbiform limb, appendage as long as the infl. *A. perakensis*, *Hemsl. in Journ. Bot.* xvii. (1887), 205.

PERAK; *Wray, Scortechini*.

Stem subsucculent, rooting, as thick as a swan's quill. *Leaves* thickly coriaceous or fleshy, nerves 3-4 pairs, slender, depressed, posticous lobes parallel; petiole 3-5 in., slender, sheath very short. *Peduncle* as long as the petiole. *Spathe* 2½ in., white or green, tube oblong; appendage cylindric, obtuse. *Ovaries* scattered, obovoid; style long, stigma diaciform, 3-lobed. *Seeds* globose, ½ in. diam.

DOUBTFUL AND EXCLUDED SPECIES.

A. ALBA, *Schott in Estr. Bot. Zeitschr.* (1852), 59; *Syn.* 48; *Prodr.* 149; is a Javan species, attributed to Ceylon on the faith of a specimen from Herb. Burmann (in *Herb. Delessert*.)

A. FORNICATA (*Caladium*), *Rozb. of Wight Ic.* t. 789 (not of *Fl. Ind. & Wight Ic.* t. 792).—*Ic. Rozb.* n. 1655.

Stem as thick as the wrist, annulate. *Leaves* ovate-cordate, acuminate, 6-7 by 5 in., basal lobes connate for $\frac{1}{10}$ of their length, sinus very acute, nerves 5-6 pairs; petiole 8-12 in., sheathing half way up. *Peduncles* binate, 6 in. *Spathe* 4 in., tube 1 in., ellipsoid, green; limb 1½ in. broad, obovate, cuspidate, open, yellow. *Spadix* as long as the spathe, pale yellow; appendage stout, conical, acuminate, as long as the infl. *Ovary* ovoid, narrowed into a style with a 3-fid stigma. *Seed* broadly ovoid.—I cannot identify this with any Indian species; it is probably one of Roxburgh's plants collected near Samulcottah in the Northern Circars.

ALOCASIA, sp. Malacca, *Griffith (Kew Distrib.* 6308, 6009), and *A. sp.*, Malacca, *Maingay (Kew Distrib.* 1549, 1549*) may both be new, but are not in a good state, and may be referable to Malayan species unknown to me.

20. **AGLAONEMA**, *Schott*.

Herbs, caudex erect or prostrate. *Leaves* ovate or oblong. *Spathe* erect, deciduous, tube convolute, limb cymbiform gaping or base shortly convolute. *Spadix* equalling the spathe, or shorter, stipitate; male and fem. infl. usually contiguous, with rarely neuters interspersed; appendage 0. *Stamens* 2-4, distinct, subclavate; anthers short, cells remote with apical pores. *Ovaries* few, 1-rarely 2-celled, stigma large or small, discoid or cupular; ovules solitary in the cells, anatropous, subbasilar. *Berries* capitate. *Seeds* exalbuminous; embryo macropodal.—Species about 20, Tropical Asiatic and African.

* Nerves of leaf numerous, close, parallel, all uniform, very slender. (See also 10. *A. pumilum*).

1. *A. Griffithii*, *Schott Syn.* 123; leaves 12-16 by 3-4 in. linear-oblong obtuse, petiole 2-3 ft., stigma cup-shaped. A palustre, *Teyssm. and Binnend. in Naturk. Tijdschr. Ned. Ind.* xxv. (1863), 305; *Kurz in Journ. As. Soc. Beng.* xiv. pt. ii. (1876), 153. *Aglaodorum Griffithii*, *Schott Gen.* t. 58; *Prodr.* 306; *Engler Arac.* 443.

MALACCA, *Griffith (Kew Distrib.* 5991).—*DISTRIB.* Sumatra.

Leaves coriaceous; petiole very stout. *Peduncle* 12-18 in., very stout. *Spatha* 2 in., oblong, cuspidate. *Ovaries* 2-celled.

2. *A. oblongifolium*, *Schott in Wien. Zeitschr.* iii. (1829), 892 (*c. Linnæa* vi. (1831), *Litterb.* 53); leaves 8-24 by 2-4 in. linear-oblong acu

minate base acute, petiole 4-6 in. sheathing to near the top, spathe 2-4 in. oblong cuspidate. *Kunth Enum.* iii. 55. *A. integrifolium*, *Schott Melet.* 20. *A. nitidum*, *Kunth l. c.* 56; *Schott Syn.* 122; *Prodr.* 302; *Engl. Arac.* 438. *Calla oblongifolia*, *Roxb. Fl. Ind.* iii. 516; *Wight Ic.* t. 806. *C. nitida*, *Jack. in Mal. Misc.* i., No. 1, 24. *Arum integrifolium*, *Link. Enum. Hort. Berol.* ii. 394.—Aroid. *Wall. Cat.* 8965.

PENANG, PERAK, and SINGAPORE, *Wallich, &c.*—DISTRIB. Borneo.

Caudex 1-3 ft. *Leaves* coriaceous, dark green, shining. *Peduncles* 4-8 in. *Spathe* green, margins white. *Spadix* stout, nearly as long as the spathe; male infl. subacute. *Ovary* 1-celled; stigma tabular, much broader than the ovary (ex *Ic. Scortechini*).

3. **A. Helferi**, *Hook. f.*; leaves 6-10 by 2-2½ in. oblong-lanceolate caudate-acuminate base acute, petiole 5-6 in. sheathing for the lower third, peduncles 2-3 in., spathe 1 in. oblong-lanceolate acute.

TENASSERIM, *Helfer (Kew Distrib.* 5994).

Caudex 6 in. and upwards, branched, as thick as a swan's quill, leafy upwards. *Leaves* thin, costa not very stout, nerves very slender. *Spadix* with the stipes nearly equal the infl. *Ovary* 1-ovuled, stigma disciform.

4. **A. Clarkei**, *Hook. f.*; scandent, leaves 7-9 by 2-3 in. elliptic-lanceolate caudate-acuminate base acute, petiole 8-9 in. slender sheathing at the base only, peduncle 5-6 in., seeds ¾-1 in., fusiform.

CHITTAGONG; at Kasalong, *Clarke*.

Near *Helferi*, but the petioles are much longer and more slender, the leaves of a firmer texture with stronger costa and nerves.

** Primary nerves much stronger than the intermediate or secondary.

† *Leaves* 8-12 in.

5. **A. Hookerianum**, *Schott in Bonpland.* vii. (1859) 30; *Prodr.* 301; leaves 8-11 by 3½-4½ in. elliptic-ovate or -oblong acuminate, base rounded or cuneate and unequal-sided, primary nerves 6-8 pairs arching, petiole 6-8 in. stout sheathing to about the middle or beyond it, spathe 1½-2 in. oblong cuspidate. *Engler Arac.* 438; *N. E. Br. in Gard. Chron.* (1882) iii. 333.

KHASIA HILLS, alt. 2-3000 ft., *Griffith, &c.* CACHAB, *Keenan*. CHITTAGONG, at Seetakoond, *H. f. & T., Lister*. ARAKAN; *Kurz*.

Caudex elongate, ½ in. thick, nodose. *Leaves* thinly coriaceous, dark green above; nerves very slender. *Spathe* cymbiform, dark green. *Spadix* long-stipitate. *Ovaries* few, flagon-shaped, narrowed into a conical style. *Seeds* ¼-1 in. long, cylindric.

6. **A. birmanicum**, *Hook. f.*; leaves 8-10 by 2½-3½ in. elliptic-oblong or -lanceolate caudate-acuminate, base rounded, primary nerves about 10 pairs erecto-patent slightly curved, petiole 2-5 in. sheathing to about the middle, peduncle very short, spathe 1½ in. linear-oblong caudate-acuminate.

UPPER BURMA; in low woods towards Nempuan, *Griffith*.

Caudex 2 ft., erect, probably as thick as the little finger, leafy at the top only; sheaths 1-2 in., red. *Leaves* thinly coriaceous, primary nerves distinct. *Peduncle* ½-1 in. *Spathe* greenish. *Spadix* white.—The less curved nerves and narrow caudate spathe are quite unlike any allied species.

7. **A. Schottianum**, *Miq. Fl. Ind. Bat.* iii. 316; in *Bot. Zeit.* (1856),

565; leaves 8-12 by $1\frac{1}{2}$ - $4\frac{1}{2}$ in. oblong acuminate or subcaudate, base acute rounded on cordate sometimes unequal-sided, primary nerves 9-12 pairs, petiole sheathing to $\frac{1}{2}$ - $\frac{1}{3}$ its length, peduncles short, spathe $1\frac{1}{2}$ in. oblong cuspidate. *Schott Prodr.* 303; *Engler Arac.* 440. *A. longecuspidatum*, *Schott l. c.* 304. *A. malaccense*, *Schott in Bonpland.* (1859) 30; *Prodr.* 302.—Aroid. *Wall. Cat.* 8961.

BURMA; from Pegu to Tenasserim, *Wallich*, &c. PERAK, *Scortechini*. MALACCA, *Griffith* (*Kew Distrib.* 5984, 5985).—DISTRIB. Java, Borneo.

Stem stout (climbing often 30-40 ft., *King's Collector*). *Leaves* subcoriaceous, usually 3 times as long as broad, with parallel sides, rarely ovate-lanceolate; lower nerves spreading and arching or nearly straight; petiole 3-7 in., stout. *Seeds* $\frac{1}{2}$ in. long.—The narrower leaved specimens represent the typical *Schottianum*.

8. *H. nicobaricum*, *Hook. f.*; leaves ovate or oblong shortly acuminate, base rounded equal or somewhat unequal-sided, principal nerves 7-9-pairs, petiole short sheathed to the middle, peduncles equalling or shorter than the petiole, spathe $1\frac{1}{2}$ in. oblong acuminate.

NICOBAR ISLANDS, *Kurz, King's Collector*.

Stem probably as thick as the little finger. *Leaves* 8-10 by 3 - $4\frac{1}{2}$ in., secondary nerves indistinct; petioles 3-5 in., rather slender.—The broad thin leaves with short points are very different from *birmanicum* and *malaccense*.

†† *Leaves* 3-4 in. long; petiole sheathing at the base only.

9. *A. Scortechinii*, *Hook. f.*; leaves ovate to elliptic-oblong acuminate, primary nerves 6-7 pairs arched strong beneath secondary few obscure, petiole $\frac{1}{2}$ -1 in. sheathing at the base only, spathe terminal, peduncle $\frac{1}{2}$ -2 in.

PERAK, *Scortechini*.

Stem erect, 6-12 in., as thick as a swan's quill. *Leaves* membranous, rather waved, "pustular beneath," *Scort.*). *Seed* ellipsoid, obtuse, $\frac{1}{3}$ by $\frac{1}{2}$ in.

10. *A. pumilum*, *Hook. f.*; leaves 3 - $4\frac{1}{2}$ in. ovate or ovate-lanceolate acuminate, base rounded, primary nerves very faint arched, petiole shorter than the limb, spathe $\frac{3}{4}$ in. oblong apiculate, peduncle slender nearly as long as the petiole. Aroid. *Wall. Cat.* 8960 B.

BURMA; Chappedong Hill, *Wallich*; Mergui, *Griffith*.

Caudex probably as thick as a goose-quill, rooting. *Leaves* thinly coriaceous, primary nerves sometimes undistinguishable from the secondary. *Seed* $\frac{1}{3}$ in. long, ellipsoid.

11. *A. minus*, *Hook. f.*; leaves 3-4 oblong or ovate-oblong acuminate, base rounded, primary nerves 3-4 pairs faint arched, petiole shorter than the limb, peduncle very short. *A. pictum*, *Engler Arac. in part* (not of *Kunth*).—Aroid. *Wall. Cat.* 8960 A.

SINGAPORE, *Wallich*.

Caudex erect, 6-7 in., as thick as a swan's quill. *Leaves* thinly coriaceous, brown when dry, primary nerves sometimes undistinguishable from the secondary; petiole slender. *Peduncle* $\frac{1}{2}$ - $\frac{3}{4}$ in.

12. *A. nanum*, *Hook. f.*; leaves 4-5 in. ovate- or oblong-lanceolate acuminate coriaceous, base subacute unequal-sided, primary nerves 5-6 pairs arched, sunk above prominent beneath, petiole shorter than the blade, peduncles 1 - $1\frac{1}{2}$ in., spathe $\frac{3}{4}$ in. oblong beaked.

PERAK; in dense Bamboo forests, alt. 4-600 ft., *King's Collector*.

Stem as in *A. minus*, but leaves much more coriaceous, with strong nerves,

secondary very indistinct. *Petiole* not half the length of the blade, slender. *Spathe* yellow-green. *Seed* $\frac{1}{2}$ in. long, linear-oblong.

13. **A. costatum**, N. E. Br. in *Gard. Chron.* 1892, i. 426; leaves 4-5 in. ovate acute or cuspidate, blotched with white base retuse or subcordate, primary nerves 7-9 pairs spreading and strongly arched, petiole stout, shorter than the blade, peduncle stout, spathe 1 in. obovoid, spadix protruding.

PERAK, Curtis (*Hort. Veitch*).

Leaves $2\frac{1}{2}$ -3 in. broad, dark green, costa stout, base rather unequal-sided; petiole $\frac{1}{2}$ in. diam., terete, sheath basal. *Spathe* light green, subacute. *Spadix* very large, the protruding male part $\frac{3}{4}$ in. long, $\frac{1}{2}$ in. diam.

21. HOMALOMENA, Schott.

Herbs, rhizome stout or 0. *Leaves* entire very variable in shape. *Spathe* usually erect, convolute, wholly persistent round the fruit. *Spadix* included; male and fem. infl. close together, cylindric; ovaries with or without clavate staminodes. *Stamens* distinct, in dense groups; anther-cells very short or oblong opening by pores or slits; connective thick. *Ovaries* ovoid or globose, perfectly or imperfectly 2-4-celled, stigma sessile; ovules 2-seriate or the placentas anatropous or $\frac{1}{2}$ -anatropous. *Berries* few- or many-seeded. *Seeds* small, ovoid, albuminous. *Embryo* axile.—Species about 30, tropical.

Chamæcladon, as constituted by Schott, cannot (as Mr. N. E. Brown had previously observed) be separated from *Homalomena* by the ovarian cells, or by any other character. A more natural generic division of the species of both would be into those with the spathe contracted above the fem. infl. and those with no such contraction; and I have adopted this as a sectional character. The further grouping of the species here described is artificial, and not very reliable, it is the best I could devise from Herbarium and often hardly sufficient specimens. *H. rostrata* differs from the generic character in having a vacant space in the spadix between the male and fem. infl.

* Spathe contracted above the female infl.

1. **H. sagittæfolia**, Jungh. ex Schott *Prodr.* 311; leaves ovately or deltoidly sagittate acuminate not much longer than broad, basal lobes usually spreading, sinus rounded at the base, spathes many 3-4 in. long, tube much shorter than the limb. *Miq. Fl. Ind. Bat.* iii. 212; *Engler Arac.* 334. ? *H. propinqua*, Schott in *Ann. Mus. Lugd. Bat.* i. 280; *Engler l. c.* 33.

PERAK; Scortechini, Wray, alt. 2500-3000 ft., King's Collector.—DISTRIB. Borneo.

Robust (stemless, *Scortech.*). *Leaves* 8-14 by 6-10 in., firm; lobes rarely conniving, sinus broad or narrow; nerves rather strong; petiole 1-1 $\frac{1}{2}$ ft., sheathing to the middle. *Peduncle* 6-9 in. *Tube of spathe* 1-1 $\frac{1}{2}$ in., limb 2-3 in. by 1 broad, white, pink when young. *Spadix* stipitate. *Male infl.* 3 in. by $\frac{1}{4}$ in. diam., fem. 1 in. *Stamens* in groups of 5-6. *Ovary* oblong, 3-celled; stigma pulvinate.—Descript. chiefly from notes by Scortechini.

2. **H. paludosa**, Hook. f.; leaves oblong-hastate usually twice as long as broad acuminate, basal lobes divaricate obtuse or rounded, sinus broad rather deep, base rounded, spathes numerous 3-4 in., tube as long as the limb.

PERAK; *Larut*, in very wet jungly places, *King's Collector*, *Scortechini*.

Leaves 7–10 by 2½–4 in.; primary nerves slender; petiole 8–12 in., sheathing to the middle. *Peduncles* 2–7, 6–7 in. when flowering, elongating to 12 in. *Spathes* white, striped with pale green. *Spadix* stout, stipitate, male infl. rather slender, about equalling the fem. *Ovary* 3-celled; stigma pulvinate, obscurely 3-lobed.

3. *H. rostrata*, *Griff. Notul.* iii. 154 (*err. typ. roshalum*); limb of leaves 12–20 by 3–6 in., oblong-lanceolate acuminate, petiole as long sheathing to beyond the middle, spathes many 4–6 in. *Schott Syn.* 119; *Prodr.* 312. *Chamæcladon sanguinolentum*, *Griff. l. c.* 147; *Schott Prodr.* 316.

MALACCA, *Griffith (Kew Distrib.* 5989, 5990).

Habit of *Calla aromatica* (*Griffith*). *Leaves* coriaceous, dark green, undulate, base acute or cuneate; primary nerves many, faint. *Peduncles* crowded, blood-red, 8–12 in. *Spathes* constricted below the middle, fleshy, green, margins white; tube narrow, limb convolute. *Spadix* shortly stipitate, slightly curved; male infl. about twice as long as fem. with a short naked space intervening; staminodes capitate. *Ovaries* subglobose, 2–4-celled; stigma pulvinate.

** *Spathes* not contracted above the fem. infl.

† *Leaves* 6–12 in. broad, deeply cordate sagittate or hastate. *Spathes* 2–4 in. long.

4. *H. rubescens*, *Kunth Enum.* iii. 57; leaves cordate or sagittately cordate acuminate, basal lobes semi-ovate or rounded approximate much shorter than the anticus, sinus narrow, spathes red. *Schott Syn.* 118; *Prodr.* 310; *Engl. Arac.* 336 (*excl. singaporensis*). *H. rubra*, *Hassk. ex Regel Gartenfl.* (1869), t. 634. *Zantedeschia rubens*, *C. Koch Ind. Sem. Hort. Berol.* 1854, *app.* *Calla rubescens*, *Roxb. Fl. Ind.* iii. 515; *Wight Ic.* t. 807.

SIKKIM HIMALAYA and KHASIA HILLS, *J. D. H. CHITTAGONG*, *Buchanan*.—*DISTRIB.* Java.

Caudex short, rooting, 1 in. diam. *Leaves* 6–12 in., usually tinged with red, sinus subacute or rounded at the red petiole, which is longer than the leaf, and sheathing for ½ its length. *Peduncles* several, 3–4 in., stout. *Spathes* 3 in., oblong, acute at base and top.—I am very doubtful as to the limits and habitats of this species, it being impossible to distinguish some forms of *cærulescens* from it. *Roxburgh*, perhaps by error, describes the petioles as 1–5 ft. long; he figures the sinus as more acute than in any of the specimens I refer to the species.

5. *H. aromatica*, *Schott Melet.* i. 20; *Syn.* 117; *Prodr.* 309; leaves as in *H. rubescens* but lobes divaricate and spathe green. *Engler Arac.* 335. *H. cordata*, *Schott Melet.* 20; *Syn.* 118; *Prodr.* 309; *Kunth Enum.* iii. 57; *Miq. Fl. Ind. Bat.* iii. 211. *H. Gaudichaudii*, *Schott in Miq. Ann. Mus. Lugd. Bat.* i. 280. *Zantedeschia aromatica*, cordata and foetida, *C. Koch Ind. Sem. Hort. Berol.* (1854), *app.* *Calla aromatica*, *Roxb. Fl. Ind.* iii. 513; *Bot. Mag.* t. 2279; *Wight Ic.* t. 805. *C. occulta*, *Lodd. Bot. Cab.* t. 12.

ASSAM; *Masters, Griffith (Kew Distrib.* 5966, 5967). *CHITTAGONG*, *Roxburgh*.

This is no doubt a different plant from *H. rubescens*, as living specimens would show; but except the green more obtuse spathe, as shown in *Roxburgh's* drawing, I find no diagnostic characters given, and I have seen no authentic specimens. *Roxburgh's* character of basal lobes rounded and divaricate is contravened by one of the leaves in his drawing, which accord in its deeply cordate base and very acute sinus with *H. rubescens*.

6. *H. cœrulescens*, *Jungh. ex Schott Prodr.* 310, leaves deltoidly ovate acute or acuminate, base subhastate or cordate with a broad shallow sinus, rarely sagittately cordate, lobes rounded at the tip, spathe 2½–3½ in. subacute pale yellow white within. *Miq. Fl. Ind. Bat.* iii. 212; *Engler Arac.* 339, *Ic. ined.* No. 67. *H. minus* and *majus*, *Griff. Notul.* iii. 152, 153; *Schott Syn.* 119, *Prodr.* 312; *Engler l.c.* 343. *H. Wallichii*, *Schott in Bonpland.* (1859), 30; *Prodr.* 311; *Engler l.c.* 335. *Caladium amboinense*, *Herb. Ham.*—Aroid. *Wall. Cat.* 8951.

PENANG, *Wallich.* PERAK, *Scortechini.* MALACCA; *Griffith (Kew Distrib.* 5965, 6011). *Maingay (Kew Distrib.* 1542).—DISTRIB. JAVA.

Rootstock short, as thick as the thumb or thicker. *Leaves* 5–12 in., and often as broad as long, nerves very many and close; petiole 8–36 in., sheathing for ¼ or ½ its length. *Peduncles* 6–10 in. *Spadix* shortly stipitate, very stout; fem. infl. about as long as the male.—In the usually divaricate basal lobes of the majority of the specimens, this accords with Roxburgh's character of *H. aromatica*, but the leaves are rather more membranous and the spathe usually larger. Living specimens are wanted to distinguish this, *aromatica*, and *rubescens*.

7. *H. pontederæfolia*, *Griff. mss.*; leaves 4–8 in. coriaceous hastately deltoid acuminate base truncate or subcordate, principal nerves strong, peduncles short stout, spathe 1½–2½ in. obtuse.

MALACCA; at Ayer Punus, in heavy forest, *Griffith (Kew Dist.,* 5964). PERAK, *Scortechini, Hervey.*

Stem short. *Leaves* nearly black when dry, principal nerves 6–7 pairs, intermediate very obscure; petiole 6–15 in., sheathing for ½ of its length. *Peduncles* several, 2–4 in., decurved after flowering.—In a sketch by Scortechini the spathe is represented as inflated and spadix shortly exerted.

†† Leaves rarely 6 in. broad, base acute or rounded rarely truncate.

§ *Limbof leaves usually as long as the petiole or longer, rarely shorter. Spadix sessile in all but H. Griffithii.*

8. *H. angustifolia*, *Hook. f.*; leaves 5–6 by ½–¾ in. narrowly linear-lanceolate acuminate at both ends coriaceous, nerves few straight nearly parallel to the margin, peduncle very short, spathe ¾–1 in. oblong apiculate ribbed. *Chamæcladon angustifolium*, *Schott in Bonpland.* (1858), 369; *Prodr.* 313? *Engler Arac.* 344; *Ic. ined.* No. 103. *Calla angustifolia*, *Jack in Mal. Misc.* i. No. 124.—Aroid. *Wall. Cat.* 8959 (*in part*).

PENANG, *Wallich.*

Rootstock as thick as a goose-quill, prostrate. *Leaves* with a thickened mucro; petiole 4–5 in. rather slender, sheathing from ¼ or ½ their length. *Peduncles* ½–1 in. *Spathe* thin. *Spadix* with the fem. infl. ½ the length of the male.

9. *H. lancifolia*, *Hook. f.*; leaves 6–9 by 1½–2½ in. narrowly elliptic lanceolate gradually acuminate at both ends, nerves many pairs erecto-patent, peduncles short, spathe ¾ in., linear-oblong cuspidately acuminate.

PERAK, *Scortechini.*

Rootstock suberect, rooting. *Leaves* rather coriaceous, nerves raised above; petiole 6–10 in., sheathing ¼–½ its length. *Peduncles* 1½–2 in. slender. *Spathe* membranous, striate. *Spadix* with the fem. infl. nearly half as long as the male.—Near *Cham. consobrina*, *Schott*, of Sumatra, but a much stouter plant.

10. *H. humilis*, *Hook. f.*; leaves 4–6 by 1½–2 in. elliptic-oblong acute

or acuminate, base rounded or cuneate, nerves 5-8 pairs erecto-patent arched, petiole slender sheathing half way up or less, peduncles many very short, spathe elliptic acuminate or cuspidate, fem. infl. $\frac{1}{4}$ - $\frac{1}{2}$ the length of the male. *Chamæcladon humile*, *Miq. Fl. Ind. Bat. iii.* 213; *Engler Arac.* 345; *Jc. ined.* No. 104. *Calla humilis*, *Jack in Mal. Misc.* i. No. 1, 22.—Aroid. *Wull. Cat.* 8959 (*in part*).

PENANG, Wallich, Porter. PERAK, *Scortechini*.—DISTRIB. Borneo.

Rootstock 2-3 in., as thick as a swan's quill. *Leaves* rather thin, margins often minutely crisped when dry; petiole 5-6 in.; costa and nerves beneath slender. *Peduncles* $\frac{1}{2}$ -1 in. *Spathe* rather membranous, not striate. *Spadix* sessile, $\frac{3}{4}$ in. long, obtuse; fem. infl. about $\frac{1}{2}$ in. with or without staminodes.—Engler figures the nerves as very numerous, but describes them correctly as 5-8 pairs.

11. *H. velutina*, *Scortechini mss.*; leaves $2\frac{1}{2}$ -5 by $1\frac{1}{4}$ - $2\frac{1}{2}$ in. broadly oblong or obovate-oblong acute, base rounded cuneate or cordate at the petiole, nerves 10-15 pairs strong beneath, petiole sheathing $\frac{1}{4}$ to $\frac{1}{2}$ of its length, peduncles many very short, spathes $\frac{1}{2}$ - $\frac{2}{3}$ in. narrow with a recurved cusp, spadix sessile, fem. infl. $\frac{1}{4}$ - $\frac{1}{2}$ the length of the male.

PERAK, *Scortechini*; at Sunga Ryah, *King's Collector*.

Rootstock as thick as the little finger, copiously rooting. *Leaves* rather coriaceous, rigid when dry, tip apiculate, or not, upper surface minutely papillose; nerves slender, raised on both surfaces; petiole 1-2 in.; rather stout. *Peduncles* $\frac{1}{2}$ - $\frac{1}{2}$ in. *Spathe* cylindric, blood-red. *Ovaries* with or without small staminodes, ovoid, stigma very large.—Name given by *Scortechini*, who describes the upper surface of the leaf as velvety (which is, I think, caused by minute papillæ) and the under surface as dotted with white. Probably a form of *H. humilis*, distinguished by the more numerous nerves of the leaf.

12. *H. Griffithii*, *Hook. f.*; leaves 4-7 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in. more or less obliquely elliptic-oblong or oblong-lanceolate tip curved subcaudate acuminate base rounded or cuneate, nerves 4-5 pairs erecto-patent slightly arched, petiole slender sheathing $\frac{1}{4}$ the way up, peduncles many very short, spathe $\frac{3}{4}$ - $1\frac{1}{4}$ in. ovoid acuminate or rostrate, spadix stipitate. *Chamæcladon Griffithii*, *Schott in Bonpland.* (1858), 369; *Prodr.* 315; *Engler Arac.* 346; *Jc. ined.* n. 113.

MALACCA, at Ayer Punus, *Griffith*.—DISTRIB. Borneo.

Rhizome as thick as the little finger, copiously rooting. *Leaves* rather thin, base usually unequal-sided, costa and nerves slender, tip mucronate red-brown; petiole 4-6 in. *Peduncle* 1-2 in. *Spathe* green. *Male infl.* rather longer than the fem. acuminate; fem. with many capitate staminodes amongst the ovaries.

13. *H. Scortechinii*, *Hook. f.*; leaves 5-7 by 1-2 in. elliptic- or oblong-lanceolate or oblanceolate acuminate base narrowed acute or obtuse, nerves 5-7 pairs erecto-patent arched very slender, petiole slender sheathing $\frac{1}{2}$ - $\frac{3}{4}$ way up, peduncles 2-3 in., spathe 1- $1\frac{1}{4}$ in. oblong with a curved beak, spadix sessile.

PERAK, *Scortechini*; on Mt. Bubong in bamboo forests, *King's Collector*.

Rootstock as thick as a swan's quill, rooting. *Leaves* rather thin, tip curved, base rarely unequal-sided; petiole 2-6 in. *Peduncle* rather slender. *Spathe* light green with a darker green center (*King's Coll.*); dark green "with (velvety gloss above," *Scortechini*). *Spadix* sessile, fem. infl. shorter than the slender male. *Ovaries* globose, stigma disciform.—Near *H. Griffithii*, but the leaves are narrower at the base, the peduncles much longer, the spathes larger, obtuse with a recurved beak, and the spadix is sessile.

14. *H. obliquata*, *Hook. f.*; leaves 4-6 by $1\frac{1}{2}$ -3 in. lanceolate or

ovate-lanceolate caudate-acuminate base obliquely acute rounded subtruncate or subcordate, nerves 6-10 pairs, petiole slender sheathing $\frac{1}{2}$ - $\frac{1}{4}$ way up, peduncles very short, spathe $\frac{1}{2}$ - $\frac{3}{4}$ in. oblong cuspidately beaked, spadix sessile, fem. infl. half as long or nearly as long as the male. *Chamæcladon obliquatum*, Schott in *Bonpland*. (1858), 369; *Prodr.* 315; *Engler Arac.* 347; *Wall. Cat.* n. 8963.

PENANG, Phillips, Wallich; MALACCA, Maingay.

Rootstock as thick as the thumb. *Leaves* very variable, usually broadest at the base with unequal rounded sides; nerves slender, nearly straight, except the basal where the base of the leaf is broad, tip with a thick long mucro. *Peduncles* $\frac{1}{2}$ -2 in. *Stigma* disciform. *Seeds* many, faintly sulcate, red brown.—Closely resembles *H. Griffithii*, but the spadix of that plant is stipitate.

15. *H. Kingii*, Hook. f.; leaves 4-5 by 2-2 $\frac{1}{2}$ in. oblong or ovate-oblong acute and mucronate, base rounded or subcuneate, nerves 4-5 pairs, petiole stout sheathing from $\frac{1}{2}$ - $\frac{1}{4}$ way up, peduncles short, spathes $\frac{3}{4}$ -1 in. oblong cuspidately beaked, fem. infl. nearly as long as the male.

SINGAPORE; in swamps, King.

Rootstock as thick as the little finger. *Leaves* thinly coriaceous, slightly unequal-sided; nerves erecto-patent, slightly arched, tip with a thick mucro; petiole rather stout. *Peduncle* $1\frac{1}{2}$ -1 $\frac{1}{2}$. *Berries* about 15-seeded. *Seeds* red-brown.

16. *H. truncata*, Hook. f.; leaves 3-4 by 1-1 $\frac{1}{2}$ in. oblong or triangular- or oblong-lanceolate acuminate from a broad truncate or subhastate base, nerves very slender, petioles slender sheathing from $\frac{1}{2}$ - $\frac{1}{4}$ their length, peduncles half as long as the petioles or shorter, spathes 1-1 $\frac{1}{2}$ in. oblong cuspidately beaked, fem. infl. half as long as the male or more, with many staminodes intermixed and below the infl. *Chamæcladon truncatum*, Schott in *Bonpland*. (1858), 369; *Prodr.* 314; *Engler Arac.* 347.

MERGUI, Griffith.—DISTRIB. Borneo?

Rootstock as thick as a goose-quill. *Leaves* very membranous; nerves many, nearly straight, except the basal, base usually unequal-sided, tip mucronulate. *Spathes* slightly curved, narrowly oblong in flower, broader in fruit. *Spadix* narrowed and few-fld. at the base but hardly stipitate. *Stigma* capitate. *Seeds* very many, striate.—The Bornean specimen included by Schott has identical leaves, but a larger narrower falcate finely acuminate spathe, a distinctly stipitate spadix, no (or obscure) staminodes, and furrowed seeds.

17. *H. pumila*, Hook. f.; leaves 1 $\frac{1}{2}$ -2 in. elliptic-ovate obovate or oblong subacute apiculate membranous nerves very faint, petiole very slender sheathing at the base, peduncles short slender, spathe $\frac{1}{2}$ - $\frac{3}{4}$ in. linear oblong cuspidately beaked, spadix sessile, fem. infl. $\frac{1}{2}$ the length of the acute male, staminodes few.

SINGAPORE, Maingay.

Rootstock creeping and copiously rooting, rather slender. *Leaves* green; nerves 3-5 pairs, arching. *Peduncles* $\frac{1}{2}$ - $\frac{1}{2}$ in. *Seeds* few in the berries, pale spotted with black.—Very near the Javan and Bornean *H. purpurescens* (*Chamæcladon*, Schott) but the leaves are green, of a very much more delicate texture, the petiole much more slender, and the fem. infl. shorter.

18. *H. nutans*, Hook. f.; leaves 4 $\frac{1}{2}$ -5 by 2-2 $\frac{1}{2}$ in. elliptic acuminate at both ends tip mucronate, nerves very faint, petiole sheathing for half its length, peduncles short decurved above, spathe cernuous broadly ovate with a recurved cusp, spadix stout sessile much shorter than the spathe, fem. infl. half as long as the broadly ovoid obtuse male.

PERAK; at Larut, alt. 100–1000 ft., *King's Collector*.

Rhizome as thick as the little finger, elongate, rooting. *Leaves* seriate on the rhizome (not tufted) coriaceous, pale beneath, primary nerves inconspicuous straight; petiole rather stout. *Peduncles* 1–2 in. *Spathes* rather turgid. *Spadix* about half the length of the spathe. *Ovaries* ovoid; stigma large, pulvinate; staminodes 0?—The spathe exactly resembles Engler's figure of that of *Schismatoglottis elongata*.

§§ *Petiole longer than the leaf blade. Spadix stipitate in all.*

19. **H. elliptica**, *Hook. f.*; leaves 3–4 by $1\frac{1}{4}$ –2 in. subfalcate elliptic-ovate acute or acuminate hardly mucronate many-nerved base cuneate, petiole slender sheathing for $\frac{1}{2}$ to $\frac{1}{4}$ its length, peduncles elongate, spathe $\frac{1}{2}$ –1 in. linear-oblong cuspidately beaked, spadix shortly stipitate, fem. infl. not $\frac{1}{2}$ the length of the male with intermixed staminodes.

PERAK; along watercourses, *Scortechini*.

Rootstock creeping, as thick as a swan's quill. *Leaves* more or less unequal-sided, coriaceous; nerves 7–8 pairs, rather strong, impressed above, slightly arched. *Peduncles* few, 3–4 in. *Spathe* nearly straight.

20. **H. ovata**, *Hook. f.*; leaves 6–7 by 3–4 in. ovate acuminate base rounded few-nerved, petiole rather longer than the blade sheathing less than half way up, peduncle 2–3 in., spathe $1\frac{1}{4}$ in. linear-oblong acute, spadix stipitate, fem. infl. half the length of the male, staminodes 0. *Chamæcladon ovatum*, *Schott in Bonpland*. (1859), 30; *Prodr.* 315; *Engler Arac.* 348.—Aroid. *Wall. Cat.* n. 8964.

SINGAPORE; *Wallich*. PENANG; *Herb. Delessert*.

Rootstock as thick as the middle finger. *Leaves* rather coriaceous, base unequal or not, nerves 5–6 pairs slightly arched, rather strong beneath, secondary obscure; petiole not very stout. *Spathe* 1– $1\frac{1}{4}$ in., straight. *Spadix* as long as the spathe; fem. infl. not half as long as the elongate conoidal acute male; ovaries subglobose, stigma subcupular obscurely lobed.

21. **H. trapezifolia**, *Hook. f.*; leaves 4–5 by $2\frac{1}{4}$ –4 in. trapezoidly or deltoidly ovate caudate-acuminate many-nerved, base cuneate or truncate and cuneate at the insertion of the long petiole which is sheathing $\frac{1}{4}$ – $\frac{1}{2}$ of its length, peduncle elongate, spathe 1 in. narrowly oblong acuminate, spadix stipitate, fem. infl. hardly half as long as the narrow male.

PERAK; *Scortechini*, *King's Collector*.

Rootstock creeping, as thick as the thumb. *Leaves* chartaceous, narrowed from a broad base with rounded angles to a fine slender curved apiculate tip, sides sometimes incurved; nerves about 10 pairs, rather strong, nearly straight, or the lower spreading and arched; petiole 6–14 in., slender. *Peduncles* 2–3 in., stout. *Staminodes* 0 or few and clavate. *Stigma* disciform.

22. **H. deltoidea**; leaves 6 by 4 in. deltoidly ovate or subhastate acuminate basal angles or lobes rounded, sinus very broad rounded not cuneate at the insertion of the petiole, peduncles short, spathe 2 in. narrowly ellipsoid narrowed into a long slender cusp.

PERAK, *Scortechini*.

Rootstock as thick as the little finger. *Leaves* chartaceous, very like those of *H. trapezifolia*, but not cuneate at the insertion of the petiole; nerves 4–5 pairs, with innumerable slender intermediates; petiole 12–14 in. sheathing for $\frac{1}{4}$ its length. *Peduncles* several. *Spathe* not constricted above the rem. infl., much longer than in *H. trapezifolia*, and spadix stouter. *Stigma* discoid.—I have seen only one specimen.

DOUBTFUL SPECIES.

H. SINGAPORENSIS, *Regel Ind. Sem. Hort. Petrop.* (1869), 18; in *Gartenfl.* (1870), 53; leaves 7-9 by 6-8 in., almost exactly deltoid acuminate, base truncate, basal angles rounded, petiole clouded sheathing half-way up, red at the base, spathes green without white within.—Singapore.

22. **SCHISMATOGLOTTIS**, *Zoll. & Morritz.*

Stotoniferous, herbs; stem short. *Leaves* entire, intramarginal nerve strong. *Spathe* cylindric, convolute, hardly constricted, limb deciduous. *Spadix* sessile, included in the spathe, appendage 0, with barren organs in the middle or top. *Inflorescences* contiguous or nearly so; male cylindric or clavate; stamens 2-3, distinct, filament flat; anthers truncate, prismatic or compressed, cells with large pores, connective warted at the tip; pollen vermiform. *Fem. Infl.* cylindric or conic; staminodes few, clavate, or 0. *Ovary* oblong, 1-celled; stigma discoid; ovules many, anatropous; parietal. *Berries* oblong, enclosed in the tube of the spathe, many-seeded. *Seeds* ellipsoid.—Species about 15, Malayan.

* Tube of spathe after flowering subcylindric.

† *Leaves rounded or if cordate not deeply lobed at the base.*

1. **T. Wallichii**, *Hook. f.*; limb of leaf 5-9 in. shorter or longer than the petiole lanceolate or oblong-lanceolate caudate-acuminate, nerves 8-10 pairs or more, petiole sheathing for $\frac{1}{3}$ its length, spathe long-peduncled narrowly linear-oblong acuminate, spadix with neuters in the middle and male at the top.—Aroid. *Wall. Cat.* 8962.

PERAK, *Scortechini*, *King's Collector*. SINGAPORE, *Wallich*. MALACCA; *Maingay*.

Leaves $1\frac{1}{2}$ - $2\frac{1}{4}$ in. broad, rather membranous, with slender reticulate secondary nerves between the primary, base rounded or subcordate; petiole 8-12 in. *Peduncle* 3-4 in. *Spathe* 3- $3\frac{1}{2}$ in., nearly straight, acuminate, white. *Spadix* rather slender; fem. infl. as long as the neuter, male shorter clavate; ovaries globose, stigma disciform.

VAR. *oblongata*; leaf 8-10 by $3\frac{1}{2}$ -4 in. more coriaceous cuspidately caudate base rounded, costa very stout, nerves obscure.—Perak, in marshy places, *Scortechini*, *King's Collector*. Perhaps a different species.

2. **S. brevicuspis**, *Hook. f.*; limb of leaf equalling or exceeding the petiole 4-6 by $1\frac{1}{2}$ -3 in. oblong-ovate acuminate with a very short subulate cusp, nerves many spreading arching, intermediates few, petiole sheathing for half its length, peduncles short, spathe 3 in. long-acuminate, spadix nearly equalling the spathe, fem. infl. elongate followed by a short neuter portion, male infl. elongate its conical tip sterile.

PERAK, *Scortechini*.

Rootstock as thick as a goose-quill, elongate, trailing. *Leaves* membranous, deep green above, the intermediate nerves forming areolæ between the primary. *Peduncle* 1-3 in. *Spathe* greenish. *Ovaries* oblong, 2-3-lobed; stigma subsessile, disciform.

3. **S. Scortechinii**, *Hook. f.*; limb of leaf about equalling the petiole

oblong or obovate obtusely acuminate not apiculate base rounded acute or subcordate, nerves many spreading and arched, petiole sheathing $\frac{1}{3}$ of its length, peduncles very short, spathe 2-2 $\frac{1}{2}$ in. cylindric acuminate, spadix stout, fem. infl. short, male twice as long with a few neuters at its base and terminated by a cylindric sterile cone as long as the whole infl.

PERAK, Scortechini.

Rootstock stout. *Leaves* 5-7 by 2 $\frac{1}{2}$ -3 in., coriaceous; costa stout; nerves 20-30 pairs, slender; petiole 5-7 in. *Peduncle* 1-2 in., very stout. *Spathe* slightly contracted above the fem. infl., sessile by a very oblique base. *Spadix* 1 $\frac{1}{2}$ -2 in. *Ovaries* turbinate, the top covered by the flat circular stigma.

4. *S. brevipes*, *Hook. f.*; limb of leaf longer than the petiole coriaceous ovate or oblong acute base cordate, nerves spreading and arching, petiole sheathing beyond the middle, peduncles few very short, spathe 1 $\frac{1}{2}$ in. much constricted above the fem. infl., spadix constricted in the middle, fem. infl. with a few capitate neuters intermixed, male infl. sterile above.

PERAK, Scortechini.

Rootstock as thick as a goose-quill. *Leaves* 3-5 by 1 $\frac{1}{2}$ -2 in., tip not apiculate, nerves 8-12 pairs. *Tube* of spathe $\frac{3}{4}$ in., ellipsoid. *Spadix* 1 $\frac{1}{2}$ in., sessile; fem. infl. about as long as the sterile portion of the male. *Ovaries* turbinate; stigma pulvinate.

5. *S. minor*, *Hook. f.*; limb of leaf small shorter than the petiole membranous oblong or ovate acute base cordate, nerves very slender spreading and arching, petiole slender sheathing for $\frac{1}{3}$ - $\frac{1}{2}$ its length or less, peduncle solitary slender, spathe oblong acute hardly contracted in the middle.

PERAK, Scortechini.

Rootstock very slender, as thick as a crow-quill, elongate, flexuous, rooting. *Leaves* 2-2 $\frac{1}{2}$ by 1-1 $\frac{1}{2}$ in., pale beneath, tip not apiculate, costa and nerves (7-8 pairs), papillose beneath; petiole 3-4 in. *Peduncle* 2-2 $\frac{1}{2}$ in. *Tube of spathe* $\frac{2}{3}$ in., limb ovate. *Spadix* with the fem. infl. adnate for nearly half its length to the spathe. *Ovaries* scattered below, globose, few-ovuled; placentas 2; stigma pulvinate, sessile. —The specimens are very scanty and contained but one spathe.

†† *Leaves deeply cordate at the base.*

6. *S. mutata*, *Scortechini mss.*; leaves ovate-cordate or subsagittate cuspidately acuminate membranous many-nerved, petiole sheathing for $\frac{1}{3}$ or $\frac{1}{2}$ its length, peduncles several, spathe $\frac{3}{4}$ -5 in. very narrow acuminate tip recurved slightly constricted much below the middle, spadix with the fem. and male infl. about equal each $\frac{1}{3}$ the length of the spadix with a narrow intervening constriction covered with neuters, male terminating in an elongate barren cone.

PERAK; Scortechini; at Goping, King's Collector.

Stem sometimes 2 ft., nearly 1 in. diam. (*King's Collector*). *Leaves* 6-9 by 4-5 $\frac{1}{2}$ in., tip not apiculate, sinus acute; basal lobes rounded, sometimes diverging and narrowed to the rounded tip; nerves 18-20 pairs, spreading and arched, intermediates very slender; petiole 5-12 in. *Peduncle* 2-4 in. *Spathe* yellow, tube 1 $\frac{1}{2}$ in., limb membranous. *Spadix* rather slender; male and fem. infl. each about 1 in., cylindric; sterile cone 1 in., covered with very large flat sinuous neuters.

7. *S. longipes*, *Miq. Fl. ind. Bat. iii. 214; in Bot. Zeit. (1856) 565;*

leaves cordately ovate or ovate-lanceolate caudate-acuminate membranous many-nerved, petiole sheathing for $\frac{1}{3}$ or $\frac{1}{4}$ its length, peduncles many, spathe 2–3 in. constricted about the middle, spadix with fem. infl. for half its length followed by a constriction with neuters, male infl. clavate, the upper half broadly conic sterile. *Schott Gen. Aroid. t. 55; Prodr. 321.*

PERAK, *Scortechini*.—DISTRIB. Java, Sumatra.

Rootstock elongate, as thick as a swan's quill, rooting. *Leaves* 5–7 by 2–3½ in., pale beneath, tip with a deciduous long mucro, costa stout; nerves 12–18 pairs, spreading and arching; petiole equalling or exceeding the limb. *Peduncles* 4–8 in. *Spathe* with an inflated acuminate limb, tube $\frac{3}{4}$ –1 in. *Ovaries* oblong; stigma pulvinate, obscurely lobed.—Reduced to *S. calyprata*, Zoll. and Morr. (Syn. Verz. Zoll. 83), by Engler, which is founded on *Calla calyprata*, Roxb. (Wight Ic. t. 799), an Amboyna plant with oblong leaves, short stout petioles and a capitate summit of the male infl.

8. **S. Kurzii**, *Hook. f.*; leaves 8–12 by 4–6 in. ovate deeply cordate many-nerved membranous, basalsinus very acute, petiole 12–14 in. broadly sheathed to the middle.

PEGU YOMAH, *Kurz*.

Resembles *S. mutata*, but a much larger leaved plant, with a very stout petiole. I have seen no spathe. It is interesting as the most northern species of the genus known in India.

** Tube of spathe after flowering broadly funnel-shaped. (RHYNCOPILE, *Engler*.)

9. **S. elongata**, *Engler in Bull. Soc. Ort. Tosc. iv. (1879) 298*; leaves elliptic-lanceolate or oblanceolate acute at both ends. Rhyncophyle elongata, *Engler in Beccari Males. i. 289, t. 23, f. 3–15; Ic. ined. n. 199.*

PERAK; sandy creeks, alt. 3000 ft., *Scortechini*.—DISTRIB. Borneo (or Sumatra).

Rootstock short. *Leaves* 4–8 by 1–2½ in., coriaceous, pale beneath, tip with a tubular mucro; nerves 7–8 pairs, nearly straight and costa beneath strong; petiole sheathing at the base. *Peduncles* equalling the petioles or shorter. *Spathe* 1½–2 in., erect or inclined, green, oblong, acute or acuminate. *Spadix* sessile, much shorter than the spathe, stout; fem. infl. shorter than the male, narrowed below, with tabular neuters below it; male rounded at the top; connective broad, pubescent. *Berries* very small, turbinate; stigma a small sessile disc. *Seeds* fusiform, with a transparent fleshy coat which is produced into a long tail at top and base.—Engler figures the spathe exactly as in *Homalomena nutans*, namely, broadly ovate and cernuous on a decurved peduncle.

23. **ANADENDRUM**, *Schott*.

Scandent shrubs rooting on trees. *Leaves* distichous, entire or pinnatifid, petiole geniculate at the tip; primary nerves many, secondary branching. *Spathe* ovate acuminate, deciduous. *Spadix* stipitate, elongate, cylindric; flowers crowded, bisexual; perianth 0, annular, or cupular. *Stamens* 4–6, filaments very short, flattened; anthers terminal, cells erect subreniform. *Ovary* obconic, truncate, 1-celled, crown flat; stigma small, sessile, linear; ovule solitary (or 2 in *A. medium*), basilar. *Berries* small, scattered; pericarp without intercellular needles. *Seed* exalbuminous, testa thick; embryo macropodal.—Species 4 or 5, Malayan.

* *Leaves entire.*

1. **A. montanum**, Schott in *Bonpland*. v. (1857); *Prodr.* 371; leaves drying black ovate-oblong or oblong-lanceolate, petiole slender, sheath very narrow. *Engler Arac.* 97; *l.c. ined.* No. 83. *Scindapsus montanus*, Kunth *Enum.* iii. 64; *Miq. Fl. Ind. Bat.* 184. *Pothos malayanus*, *Miq. l.c. Suppl.* 596. *P. elegans*, Wall. *Cat.* 4444. *Calla montana*, Blume *Cat. Hort. Buit. et in Flora* (1825), 147.

TENASSERIM; at Mergui, Helfer. PENANG, Wallich. PERAK, Scortechini-King's Collector. MALACCA, Griffith, Maingay.—DISTRIB. Malay Islands.

Stem as thick as a goose-quill, terete, smooth. *Leaves* 6–12 by 2½–4 in., coriaceous, base cuneate rounded or subcordate often unequal-sided; nerves very many, spreading; petiole 3–9 in., sheathed to the knee in young leaves, to a variable height in older; knee ¼–½ in. *Peduncles* 2–4 in., slender, rigid. *Spathe* 1½–2 in., beak long straight. *Spadix* 1–2 in.; stipes slender. *Perianth* cupular, nearly as high as the ovary. *Berries* pisiform.

Var. *longirostris*; beak of spathe as long as the body.—Perak, Wray,—Borneo.

2. **A. marginatum**, Schott in *Östr. Bot. Wochenbl.* (1857), 117; *Prodr.* 390; leaves drying green oblong-lanceolate acute or acuminate, petiole very broadly sheathing up to the knee. *Engler Arac.* 96. *Pothos marginatus*, Wall. *Cat.* 4443.

PENANG, Porter. PERAK, Scortechini, King's Collector.—DISTRIB. Sumatra.

Stem stout. *Leaves* 6–12 by 2–3½ in., base acute acuminate cuneate or rounded, usually unequal-sided; nerves very many, suberect or spreading; petiole 4–6 in., sheath ½–¾ in. broad, 2-auricled at the tip; knee short. *Peduncles* 3–5 in. *Spathe* 1½–2¾ in. long, as in *A. montanum*, white on pale yellow. *Perianth* annular.

3. **A. latifolium**, Hook. f.; leaves drying greenish broadly oblong cuspidately acuminate base acute, petiole rather slender, sheath very narrow.

PERAK; Scortechini, King's Collector.

Stem as thick as a swan's quill. *Leaves* 10–13 by 4½–5½ in., coriaceous; nerves about 12 pairs, strong, spreading and arched; petiole 7–10 in., narrowly sheathing for ⅔ its length. *Peduncle* 3–5 in. *Spathe* 2–3 in., white within, greenish without; beak ¼–½ the length of the body. *Spadix* 1–2 in., shortly stipitate. *Perianth* annular.

** *Leaves pinnatifid.*

4. **A. medium**, Schott in *Bonpland*. v. (1857) 45; *Prodr.* 392; *Rhapidophora Huegeliana*, Schott *ll. cc.* 45, 384. *Scindapsus medius*, Zoll. and Moritz *Syst. Verz.* n. 82; *Miq. Fl. Ind. Bat.* iii. 186. *Epipremnum medium*, *Engler Arac.* 250. *Pothos pinnatus*, Wall. *Cat.* 4438.

PERAK, Scortechini, King's Collector. SINGAPORE, Wallich, Maingay.—DISTRIB. Malay Islands.

Stem 20 ft., less than 1 in. diam. *Leaves* 6–14 in. long and broad, or broader than long, membranous, deeply pinnatifid or pinnatisect, often perforate towards the costa; lobes 2–4 pairs, obliquely truncate, upper angle acute, basal lobes dimidiate-ovate; petiole channelled, sheathing towards the base. *Peduncle* 4–6 in. *Spathe* 2–3 in., cymbiform, pale green without, white or cream-colour within. *Spadix* shorter than the spathe, yellow, stipes ½ in. *Ovary* 2-celled, according to Maingay, but Mr. Brown and I find but one cell with 2 erect basal ovules, and so it is represented in a drawing by Scortechini. *Berry* turbinate. *Seed* (judging by a figure of Scortechini) with a macropodal embryo.—Engler has referred this rather anomalous plant to *Epipremnum*, but the stipitate spadix, ovules, the want of

needles in the pericarp, and apparently macropodal embryo, all point to *Anadendrum*. There are needles in the tissue of the petioles, which I do not find in any other *Anadendrum*.

24. *SCINDAPSUS*, Schott.

Climbing shrubs with the characters of *Anadendrum*, but the spadix is sessile, there is no cupular perianth, and the pericarp of the berries abounds in intercellular needles.—Species about 10, tropical Asiatic, Australian and Polynesian.

See note under genus *Rhaphidophora*.

* *Leaves obliquely ovate elliptic or lanceolate.*

1. *S. officinalis*, Schott *Meletem.* i. 21; *Gen.* t. 81; *Prodr.* 395; branches wrinkled when dry, leaves 5–10 by 2½–6 in. ovate elliptic-ovate or nearly orbicular caudate-acuminate base rounded or slightly cordate, primary nerves distinct, petiole 3–6 in. broadly winged up to the knee, spathe 4–6 in. oblong subcylindrical beaked. *Kunth Enum.* iii. 63; *Miq. Fl. Ind. Bat.* i. 452; *Engler Arac.* 254. *Pothos officinalis*, *Roxb. Fl. Ind.* i. 431; *Wight Ic.* t. 778; *Wall. Cat.* 4436. *Calla ovata*, *Herb. Ham.*

TROPICAL HIMALAYA; from Sikkim eastwards. BENGAL, CHITTAGONG, BURMA, and the ANDAMAN ISLANDS.

Stem as thick as the little finger. *Leaves* dark green. *Peduncle* solitary, terminal, much shorter than the petiole. *Spathe* about 4–6 in. long, green without, yellow within, beak slender. *Spadix* equalling the spathe, elongating in fruit, greenish-yellow. *Stigma* elongate; fruiting hemispheric. *Berries*, few only ripening, fleshy. *Seed* ovate-cordate.—Fruiting spadix sometimes a span long.

2. *S. pictus*, Hassk. *Cat. Hort. Bogor.* (1841), 58; *Pl. Jav. Rar.* 159; branches angled and muriculate when dry, leaves 5–7 by 1½–5 in. falcately ovate-lanceolate to broadly ovate acute or acuminate, petiole 1–1½ in. winged to the knee, spathe 1½–2½ in. cymbiform beaked. *Miq. Fl. Ind. Bat.* iii. 183; *Schott Prodr.* 393; *Engler Arac.* 252. *S. pothoides*, *Schott l.c.* 394 (not of *Miq.*). *S. argyræa*, *Engler l.c.* 255.

PEBAK; King's Collector.—DISTRIB. JAVA, BORNEO.

Stem 6–8 ft., as thick as a goose-quill or more, 4–6-angled when dry through contraction of the tissues, and pale red-brown. *Leaves* thickly coriaceous, dull green; nerves very close and slender, primary and secondary hardly distinct. *Peduncles* equalling the petiole, very stout. *Spathe* white. *Spadix* green.—The leaves of young plants are orbicular-cordate, green blotched with white.

3. *S. Scortechinii*, Hook. f.; branches deeply wrinkled when dry not muriculate, leaves 3–6 by 1½–2½ in. ovate orbicular or falcately lanceolate, acute or acuminate, base rounded or subcordate, primary nerves very obscure, petiole 2–5½ in. broadly winged, spathe 1½–2½ in. ovate acute or acuminate.

PEBAK; *Scortechinii*, alt. 3–4000 ft., King's Collector; on Maxwell's Hill, Wray.

Stem scandent, as thick as a swan's quill or less, pale, wrinkled, otherwise quite smooth. *Leaves* thickly coriaceous; nerves very many, primary hardly distinguishable from the secondary; petiole winged to the knee or ¾ way up. *Peduncle* much shorter than the petiole. *Spathe* yellowish on both surfaces. *Spadix* much shorter. *Berries* about ¼ in. diam. across the crown.

4. **S. hederacea**, Schott in *Bonpland. v.* (1857), 45; *Prodr.* 395; branches terete smooth, leaves 5-8 by 1-2½ in. falcately lanceolate acuminate base acute, primary nerves indistinct, petiole 2-4 in. broadly winged up to the knee, spathe 2-2½ in. narrow long-beaked. *Engler Arac.* 253; *Ic. ined.* No. 13 (*young plant*). *S. pothoides*, *Miq. Fl. Ind. Bat.* iii. 184 (*not of Schott*). *S. inquinatus*, Schott in *Miq. Ann. Mus. Lugd. Bat.* 283.

PERAK; Scortechini, *King's Collector*. MALACCA; Griffith, *Maingay*.—DISTRIB. Java.

Stem climbing, 30-40 ft., as thick as a goose-quill or more. *Leaves* rather thinly coriaceous; petiole with pale sheaths. *Peduncle* 1-2 in., stout. *Spathe* much narrower than in any of the previous species, terete, slightly curved, pale yellow. *Fruiting spadix* 3-4 in., white. *Berries* about ¼ in. diam. across the crown.—*Leaves* broadly ovate cordate in young plants.

5. **S. perakensis**, Hook. f.; branches stout terete smooth, leaves 8-12 by 2-3 in. oblong-lanceolate or falcately lanceolate acuminate thinly coriaceous, base acute or rounded, primary nerves distinct beneath, petiole 4-7 in. broadly winged up to the knee, peduncle 3-6 in. very stout, spadix (after flowering) 3-5 in. cylindric or subclavate.

PERAK; Scortechini, *King's Collector*.

Stem 30-40 ft., 2-3 in. diam. (*King's Coll.*), pale when dry. *Leaves* coriaceous, costa rather slender; primary and secondary nerves undistinguishable above, nervules trabeculate; petiole sometimes 1 in. across the opened sheath. *Peduncle* 3-4 in. *Spathe* not seen. *Fruiting spadix* nearly 1½ in. diam.; carpels slaty blue, ½ diam. across the crown. *Seeds* lenticular, ½ in. diam., black.

** *Leaves* broadly or narrowly oblong, rarely ovate or sub lanceolate.

6. **S. crassipes?** *Engler in Bot. Jahrb.* i. 182; in *Beccari Males.* i. 4; *Ic. ined.* No. 1; branches as thick as the thumb terete smooth, leaves 8-10 by 2-3 in. oblong acute base rounded densely coriaceous, costa very thick, primary nerves obscure, petiole 1-2 in. broadly thickly winged, peduncle very stout.

PERAK, Scortechini.—DISTRIB. Borneo?

I have seen only an imperfect specimen and drawing by Scortechini, in which the leaves are narrower and petiole shorter than in Engler's figure. In Scortechini's drawing and specimen the stem is very stout; petiole 1 in. across the thick coriaceous wings; peduncle 2 in.; young fruit 6 in. by 1 diam. *Berries* ½ in. diam. across the crown.

7. **S. Beccarii?** *Engler Bot. Jahrb.* i. 182; in *Beccari Males.* i. 277; branches very stout, leaves 12-18 by 4-5½ in. oblong or linear-oblong acuminate-coriaceous, base acute, petiole 6-12 in. winged to the knee, primary nerves distinct beneath, peduncle included in the leaf sheath, spathe 3-3½ in. oblong terete acute.

PENANG and PERAK, Scortechini, *King's Collector*.—DISTRIB. Sumatra.

Differs from Engler's figures of *S. Beccarii*, in the petiole sheathing to the knee, and in the spathe emerging from the middle of the leaf sheath, and not from its apex. *King's Collector* describes the stem as 15-20 ft. and 1½-2 in. diam.; leaves dark glossy green; spathe waxy white; spadix cream-colrd. The ovaries are very narrow and laterally compressed, not ⅓ in. across the crown.

8. **S. cuscutaria**, Presl. *Epimel.* 242? stemless, leaves 12-18 by 4-7 in. caudate-acuminate, base acute or rounded, nerves very many and close

uniform anastomosing, petiole as long as the blade or longer stout winged to the knee, peduncle very stout, spathe 3 in. cymbiform acuminate, spadix stout. *S. marantæfolius*, *Miq. Fl. Ind. Bat.* iii. 187. *Cuscuaria marantifolia*, *Schott Gen. t.* 80; *Prodr.* 398; *Engler Arac.* 251. *C. spuria*, *Schott in Bonpland.* ix. (1861), 367. *Aglaonema?* *cuscuaria*, *Miq. l.c.* 217. *C. Rumphii*, *Schott in Miq. Ann. Mus. Lugd. Bot.* i. 130.

NICOBAR ISLDS.; (*Jelink. in Herb. Calcutt.*)—DISTRIB. Malay Islds.

Rootstock very stout. *Leaves* coriaceous, costa stout, base unequal-sided.—The only specimen is an imperfect one, but agrees so far with the Javan plant. I have taken the synonymy from Engler.

25. RHAPHIDOPHORA, Schott.

Habit and characters of *Anadendrum*, but spadix sessile, perianth 0, ovules many parietal; the many-seeded berries confluent and their tissue loaded with intercellular needles; seed albuminous, embryo axile.—Species about 30, tropical Asiatic, Australian and Polynesian.

I greatly doubt the value of characters taken from the stigmas of dried specimens of this genus, *Scindapsus* and *Epipremnum*, whether raised or sessile in the crown of the ovary, and whether orbicular or oblong, or linear; they appear to change in form with age, and certainly do so in drying. The nerves of the leaves which afford characters in the dried state are often invisible in the fresh.

* Leaves entire and imperforate (see also *R. pertusa*).

† Petiole not more than half the length of the blade (a rather variable character).

1. ***R. crassifolia***, *Hook. f.*; leaves 6–7 by $1\frac{1}{2}$ –2 in. subfalcately lanceolate acuminate thickly coriaceous base narrowed acute or rounded, nerves very obscure, petiole $1\frac{1}{2}$ –2½ in. slender channelled up to the blade, peduncle very short, spathe 3 in. cylindric apiculate, stigma raised.

PERAK, *King's Collector*.

Stem 20–30 ft. as thick as a goose-quill or thicker. *Leaves* very dark grey and opaque when dried, with recurved margins; costa rather slender, nerves sunk in the tissue, most obscure above and there marked only by superficial wrinkles, absolutely concealed beneath under the smooth epidermis. *Spathe* thickly coriaceous, cream-colored. *Ovaries* $\frac{1}{8}$ in. diam., with raised pulvinate central stigmas.—Closely resembles *R. angustifolia*, Schott, in form of foliage, but quite distinct in the texture and nervation of the leaves and in the large spathes. In the Calcutta collection of drawings is that of a plant named *Pothos ventricosa*, Wall. mss. from N. E. Bengal, which resembles this; the spathe is represented as purple.

2. ***R. Maingayi***, *Hook. f.*; leaves 6–8 by 2–2½ in. oblong-lanceolate acute shining above, base acute, nerves uniform and raised on the upper surface primary very slender but distinct beneath erecto-patent, petiole short, spathe sessile? $4\frac{1}{2}$ in. cylindric beaked, stigma circular depressed on the surface of the (dry) ovary.

MALACCA, on trees, *Maingay*.

The specimens are imperfect, the leaves being detached from a portion of apparently a tortuous branch as thick as the little finger. *Leaves* coriaceous, drying yellow brown, costa rather slender, the apparent difference between the nervation of the two surfaces is great, the nerves in the upper being raised through the shrinking of the tissues, whilst beneath the erecto-patent primaries are capillary, the secondaries

very obscure. *Spathe* remarkably thick-walled (at least $\frac{1}{4}$ in. thick). *Ovaries* narrow, $\frac{1}{10}$ in. across the crown.

3. **R. Wrayi**, *Hook. f.*; leaves 7-12 by $1\frac{1}{2}$ -2 in. narrowly lanceolate caudate-acuminate submembranous, base narrowed acute or rounded, nerves capillary on both surfaces, petiole 2-3 in. slender channelled up to the blade, spathe $1\frac{1}{2}$ -2 $\frac{1}{2}$ in. peduncled cylindric or ovoid beaked spadix as long as the spathe, stigma raised pulvinate.

PERAK; *Wray (with No. 662), Scortechini, King's Collector.*

Stem 30-40 ft., woody, as thick as a goose-quill or less, internodes $\frac{1}{2}$ -1 in., surface striate. *Leaves* drying greenish-brown and quite opaque; nerves erecto-patent, $\frac{1}{10}$ - $\frac{1}{8}$ in. apart with anastomosing nervules; petiole slender, stiff. *Peduncle* $\frac{1}{2}$ -1 $\frac{1}{2}$ in. *Spathe* terete, walls very thick, green, cream-cold. within. *Fruiting spadix* oblong, 2 $\frac{1}{2}$ in. long by 1 in. diam. *Stamens* 2. *Berries* $\frac{1}{8}$ in. across the crown.

4. **R. Lobbia**, *Schott in Bonpland. v. (1857), 45; Prodr. 379*; leaves 3-8 by $1\frac{1}{2}$ -3 in. ovate oblong linear-oblong or lanceolate acuminate or caudate thinly coriaceous. base acute or rounded, primary nerves distant and usually well marked beneath all spreading and arched, petiole 1-2 $\frac{1}{2}$ in. channelled up to the knee or limb, spathe small ($1-1\frac{1}{2}$) peduncled oblong beaked, stigma raised. *Engler Arac. 241.*

PERAK; *Scortechini, King's Collector. MALACCA; Griffith, Maingay. SINGAPORE; Lobb.—DISTRIB. Borneo, Java.*

Stem 20-30 ft. much branched, as thick as a goose-quill or less. *Leaves* greenish brown and opaque when dry; 8-10 primary nerves very indistinct above, undersurface very smooth. *Peduncle* 1 in. *Spathe* turgid. *Spadix* oblong. *Ovaries* $\frac{1}{10}$ in. diam. across the crown.—*Stamens* 6-8 and ovary 2-3-celled. *Maingay, mss.*

5. **R. minor**, *Hook. f.*; leaves 3-5 by $1\frac{1}{2}$ -1 $\frac{1}{2}$ in. elliptic-lanceolate acute or acuminate base acute or cuneate, primary nerves many slender erecto-patent raised on both surfaces, petiole 1-2 in. broadly channelled up to the blade, spathe peduncled 2-3 in. beak long slender, stigma raised pulvinate.

PERAK; *Scortechini. MALACCA; Griffith (Kew Distrib. 5988), Maingay.*

Branches as thick as a goose-quill or less, soft, striate, and foliage pale yellowish brown, not shining when dry. *Leaves* thinly coriaceous; nerves slightly arching. *Peduncle* 1-1 $\frac{1}{2}$ in., yellowish. *Spathe* coriaceous, apparently red, beak ending in a very slender point. *Spadix* cylindric. *Ovaries* $\frac{1}{2}$ in. diam. across the crown. *Berries* $\frac{1}{8}$ in. diam.

6. **R. Schottii**, *Hook. f.*; leaves 8-14 by 2-4 $\frac{1}{2}$ in. falcately lanceolate or oblong-lanceolate or oblanceolate caudate-acuminate coriaceous, base acute, nerves very many and slender uniform erecto-patent raised on both surfaces, petiole $1\frac{1}{2}$ -3 in. stout channelled to the middle of the knee, spathe 3 in. ovoid acuminate, spadix peduncled very stout, stigma raised pulvinate. *R. Peepla (in part), Schott in Bonpland. v. (1857), 45. Engler Arac. 242.*

ASSAM; *Masters. KHASIA HILLS; alt. 0-4000 ft., J. D. H. & T. T.*

Stem as thick as the little finger, smooth, terete, purple except the young branches. *Leaves* thinly coriaceous, in young plants distichous 3-4 in. ovate acute, base very oblique. *Peduncle* 1-4 in. *Spathe* yellow inside and out. *Spadix* reddish, when advancing to fruit 3 in. by 1 in. diam. *Ovaries* transversely elongate, $\frac{1}{8}$ in. diam. —In the dried spadix (Assam) advancing to fruit, the pulvinate stigmas are raised on a very short conical style; but in my drawing of the ovary, made in the Khasia Hills, it is a depressed areole in the centre of the flat crown of the ovary. The petioles

vary greatly in length.—Near *R. Peepla*, but a very much stouter plant, with larger, longer and narrower leaves.

7. *R. Scortechinii*, *Hook. f.*; leaves 10–12 by 3–4 in. ovate-lanceolate unequal-sided caudate-acuminate base cuneate submembranous, primary nerves 14–20 pairs strongly raised on both surfaces spreading and arched, petiole 4–6 in. broadly channelled up to the limb, peduncle 3–4 in., spadix 2 by $\frac{3}{4}$ in., stigma elliptic sessile.

PERAK; *Scortechinii*.

Stem creeping or stony, nearly as thick as the little finger. *Leaves* subcoriaceous, yellow undulate and opaque when dry.—The above is chiefly from Scortechinii's drawing and notes attached to his specimens. The nerves of the leaves are at least 14–20 pairs, united by oblique nervules. Scortechinii describes the seeds as winged, the lateral wings oblique, but he does not figure them so.

†† *Petiole more than half the length of the leaf-blade.*

8. *R. lancifolia*, *Schott in Bonpland*. (1857), 45; *Prodr.* 380; leaves 6–10 by $1\frac{1}{2}$ –3 in. falcately-lanceolate or ovate-lanceolate acuminate or caudate membranous, base acute or rounded unequal-sided, nerves very many raised on both surfaces erecto-patent, petiole 4–7 in. channelled to the knee, spathe peduncled 3–4 in. ovate-oblong long beaked, stigmas raised pulvinate. *Engler Arac.* 241; *Masters in Gard. Chron.* (1874), ii. 611; fig. 124.

The KHASIA HILLS and MUNNIPORE; alt. 3–6000 ft., *Griffith, Watt, &c.*

Stem scandent, rooting, as thick as a goose or swan's quill. *Leaves* thinly coriaceous, adult greenish-brown when dry, not shining above; nerves with anastomosing nervules; petiole slender. *Peduncle* 1–4 in. *Spathe* thickly coriaceous, pale or darker red within. *Spadix* $1\frac{1}{2}$ –2 in. (fruiting 3–4 in.); ovaries $\frac{1}{4}$ in. diam.—The 3–5 erecto-patent primary nerves described by Schott are with difficulty distinguished from the secondary, and in very few leaves only.

9. *R. Peepla*, *Schott in Bonpland*. v. (1857), 45 (*partly*); leaves 5–8 by 2–4 $\frac{1}{2}$ in. very unequal-sided obliquely ovate cuspidately acuminate coriaceous, base rounded or cuneate, nerves very many uniform raised on both surfaces, petiole 4–8 in. channelled up to the limb, peduncle 3–5 in. long, spathe 2 $\frac{1}{2}$ in. lanceolate narrowed into a straight beak, stigmas raised. *R. calophyllum*, *Schott l.c.*; *Prodr.* 242; *Engler Arac.* 242. *Scindapsus Peepla*, *Schott Melet.* i. 21; *Kunth Enum.* iii. 62. *Pothos Peepla*, *Roxb. Fl. Ind.* iii. 454; *Wight Ic.* t. 780 (*not of Wallich*). *Monstera Peepla*, *Schott (ex Linnæa)*, vi. (1831), *Litterat. Ber.* 52.

SIKKIM HIMALAYA and the KHASIA HILLS, alt. 4–6000 ft.; *Roxburgh, Griffith (Kew Distr., 5959)*. BURMA; on the Karen Hills, *Kurz*.

Stem as thick as a swan's quill, smooth, terete. *Leaves* coriaceous, drying pale yellowish-brown and shining above, nerves with rectangular nervules. *Spathe* greenish yellow. *Ovaries* creamy, $\frac{1}{4}$ in. diam.; stigma pulvinate on a very short conical style.—Roxburgh's figure represents a spathe 5 in. long and the leaves as having 5–7 pairs of primary arching nerves, which are not distinguishable in the dried specimens. I have seen no Ceylon specimens, for Thwaites' *R. Peepla* is *R. pertusa*.

10. *R. gracilipes*, *Hook. f.*; leaves 6–8 by 2–4 in. broadly or narrowly oblong-ovate unequal-sided cuspidately acuminate submembranous opaque, base rounded or cuneate, primary nerves 14–16 pairs raised beneath widely spreading and arching, petiole 5–10 in. very slender,

grooved channelled up to the limb, spathe 3-4 in. cylindric long-beaked, stigmas raised pulvinate.

PERAK; Larut, *Scortechini*, *King's Collector*.

(*Stem* 20-40 ft. by 1-1½ in. diam., branches ½ in. diam., *King's Collector*). *Leaves* pale greenish or yellowish-brown and undulate when dry; petiole pale. *Peduncle* 1-2½ in. *Spathe* yellow, cream-colour., or tinged with pink within. *Spadix* shorter than the spathe. *Ovaries* ⅓ in. diam.; stigmas orbicular.—In form the leaves closely resemble *R. Peepla*, but their texture and nervature are very different.

11. **R. Kunstleri**, *Hook. f.*; leaves 10-16 by 2½-5 in. oblong or oblong-lanceolate acuminate rather membranous, base acute or cuneate, primary nerves many spreading and arched prominent beneath, petiole 10-15 in. grooved channelled up to the blade, spathe 6-8 in. cylindric with a long stout beak, stigmas raised.

PERAK, at LABUT, *Kunstler* (*King's Collector*).

(*Stem* 40-60 ft., 3-4 in. diam. *Kunstler*), branches 5½ in. diam. *Leaves* rigidly undulate, opaque and dirty-brown when dry, sometimes very unequal-sided at the base, deep green when fresh, crowded at the tips of the branches; nervules oblique; petiole slender, pale. *Peduncle* 1-3 in., very stout. *Spathe* white, thick walled. *Ovaries* ⅓ in. diam., stigma minute.—The spathe is one of the longest in the genus.

12. **R. Hookeri**, *Schott in Bonpland*. (1857), 45; leaves 7-24 by 2½-12 in. membranous oblong cuspidately caudate-acuminate, base unequal-sided cuneate rounded or cordate, primary nerves very many spreading and arched, petiole 3-12 in. channelled up to the knee, spathe 2½-3½ in. ovoid-oblong turgid, beak long slender, stigmas very broad orbicular pulvinate. *Pothos Peepla*, *Wall. Cat.* 4444 (*in part*).

SIKKIM HIMALAYA, alt. 1-4000 ft., *J. D. H.* UPPER ASSAM, *Griffith*. SILHET and KHASIA HILLS, alt. 2-3000 ft., *Wallich*, &c. MUNIPORE, alt. 6000 ft., *Watt*.

A lofty climber; stem as thick as the thumb. *Leaves* the largest of the entire-leaved species, very thin in texture, dark green, drying a dull grey-brown, with a rather shining surface. *Petiole* pale, not deeply channelled. *Spathe* green, yellow within and along the outer margins, walls very thick, base rounded. *Spadix* short, stout. *Ovaries* ½ in. diam.; stigmas remarkably large for the genus.

** Leaves perforated, pinnatifid, or pinnatisect.

13. **R. Beccarii**, *Engler Bot. Jahrb.* i. 181; *in Beccari Males.* i. 271, t. 19, f. 6-9; leaves narrowed from the middle to an acute base entire or pinnatifid with falcate caudate-acuminate 1-many-nerved lobes, petiole 6-10 in. of young leaves broadly winged, peduncle 4-8 in., spathe 3-4 in. cylindric acuminate, stigmas orbicular or oblong raised. *Epipremnum Beccarii*, *Engler in Bull. Soc. Tosc. Ort.* 1879, 269.—*Wall. Cat.* 4438 B.

PERAK, *Scortechini*, *King's Collector*.—DISTRIB. Siam, Borneo.

Rootstock short, tufted, as thick as the little finger, creeping and rooting (or 15-20 ft., *King's Collector*). *Leaves* 10-15 by 4-8 in., unequal-sided, pale beneath; lobes very variable in breadth; petiole channelled up to the limb. *Spathe* dull cream-coloured.—The stigmas in a drawing by *Scortechini* are sessile, very small and oblong, but in his and other dried specimens they are large oblong or orbicular and often cupped. *Engler* figures them as oblong raised and cupped.

14. **R. pertusa**, *Schott in Bonpland*. v. (1857) 45; *Prodr.* 382; leaves 8-18 in. long and 6-10 in. broad, young small ovate entire, old pinnatifid to below the middle or perforate, base truncate or subcordate, lobes few

broad falcate acuminate, primary nerves 5-8 pairs, spathe 5-7 in. ovate-oblong beaked. *Miq. Fl. Ind. Bat.* iii. 185; *Engler Arac.* 244. *Scindapsus pertusus*, *Schott. Melet.* i. 21; *Kunth Enum.* iii. 62. *S. Peepla*, *Thw. Enum.* 336. *Pothos pertusas*, *Roxb. Fl. Ind.* i. 434, *Wight Ic.* t. 781. *P. officinalis*, *Wall. Cat.* 4436 G.—*Rheede Hort. Mal.* xii. t. 20, 21.

THE DECCAN PENINSULA; CoROMANDEL, Malabar, and southward to Ceylon.—
DISTRIB. Malay Islands.

A tall climber. *Leaves* usually with oblong holes on one side; petiole about as long as the blade, deeply channelled, young winged, wings not auricled at the top. *Spathe* shortly peduncled. *Spathe* yellow. *Ovaries* 4-angled; stigma sessile, pulvinate.

15. **R. glauca**, *Schott in Bonpland.* v. (1857) 45; *Prodr.* 382; leaves 6-10 in. long and broad glaucous beneath pinnatisect, segments falcate linear or broader caudate-acuminate 2-7-nerved, petiole as long as the blade slender channelled up to the blade, spathe 4-6 in. oblong or lanceolate cuspidate. *Engler Arac.* 245; *Ic. ined.* 101. *Scindapsus glaucus*, *Schott Melet.* i. 121; *Kunth Enum.* iii. 61. *Monstera glauca*, *C. Koch ex Schott.* *Pothos glaucus*, *Wall. Pl. As. Rar.* ii. 45, t. 156; *Cat.* 4440.

TROPICAL and SUBTROPICAL HIMALAYA; from Nepal, *Wallich*, eastwards to the KHASIA, NAGA, and MUNNIPORH HILLS, ascending to 7000 ft.

Stem as thick as the thumb, climbing lofty trees. *Leaves* of a fine glaucous blue beneath; young elliptic-ovate; segments 2-4 pairs, narrowed towards the base, 2-5-nerved; petiole 6-10 in. *Peduncle* 3-7 in. *Spathe* very variable in size, longer than the spadix, yellow on both surfaces. *Spadix* pale yellow. *Stigma* of fresh ovary a longitudinal slit, of the dried pulvinate and raised.

Var. ? *khasiana*; leaves 12-14 in., segments 3-7, 7-9 in. long.—Khasia Hills at Churra and Pomrang, *J.D.H. & T. T.*—Referred by Schott to *R. glauca*, with which it agrees in form of segments of leaf, and spathe and spadix, but the leaves are longer with more numerous and longer segments.

16. **R. eximia**, *Schott in Bonpland.* v. (1857) 45; *Prodr.* 387; leaves 1-2 ft. longer than broad oblong pinnatisect with 4-7 pairs of obliquely truncate acute 1-costate and many-nerved segments, petiole very stout, spathe a foot long oblong cuspidate, stigma raised on the conical top of the ovary. *R. grandis*, *Schott in Æstr. Bot. Zeit.* 1858, 394; *Prodr.* 386.

TROPICAL HIMALAYA; Kumaon, alt. 4000 ft., *Strachey & Winterbottom*; Sikkim, alt. 2-5000 ft., and KHASIA HILLS, alt. 0-4000 ft., *Griffith*, &c.

A lofty climber; stem as thick as a child's wrist. *Leaves* bright green on both surfaces. *Peduncle* 6-10 in., as thick as the thumb. *Spathe* orange-yellow, outside and in. *Spadix* shorter than the spathe, white.

17. **R. decursiva**, *Schott in Bonpland.* v. (1857) 45; *Prodr.* 385; leaves 1-3 ft. longer than broad oblong pinnatisect base, broadly cordate, segments 8-15 pairs falcately ensiform acuminate costate and with several lateral nerves, petiole very stout, spathe 5-7 in. subcylindrically cymbiform yellow beaked, stigma raised on the conical top of the ovary. *Engler Arac.* 246 (*excl. many syns.*); *Bot. Mag.* t. 7282. *Scindapsus decursivus*, *Schott Meletem.* i. 21; *Kunth Enum.* iii. 62; *Wight Ic.* t. 779; *Miq. Fl. Ind. Bat.* iii. 186; *Thw. Enum.* 336; *Bot. Mag.* t. 7282. *Monstera decursiva*, *Schott in Wien. Zeitschr.* 1829 (*Linnæa* (1831) *Literat. Ber.* 52). *Pothos decursiva*, *Roxb. Fl. Ind.* i. 436; *Wall. Pl. As. Rar.* ii. 83, *excl. the Attran plant*). *P. decurrens* (*error for decursivus*), *Wall. Cat.* 4437 A, *in part*.

SIKKIM HIMALAYA, alt. 2-5000 ft., J.D.H. KHASIA HILLS, alt. 0-4000 ft.

A lofty climber, stem as thick as a child's wrist. *Leaves* bright green on both surfaces, segments 6-18 by 1-2 in., tip sometimes almost truncate but always more acuminate than in *R. eximia*; petiole 1-2 ft., as thick as the little finger. *Peduncle* 3-6 in. *Spathe* bright yellow on both surfaces.

18. *R. affinis*, Schott in *Bonpland. v.* (1857) 45; *Prodr.* 385; leaves 1-2 ft. longer than broad oblong base broadly cordate pinnatisect or pinnate, segments many pairs falcately ensiform acuminate narrowed at the base 1-costate with very slender lateral nerves, spathe 5-6 in. oblong cymbiform purple cuspidate, stigma raised on the conical top of the ovary. *Engler Arac.* 247.

KHASIA HILLS, alt. 3-5000 ft., Griffith (*Kew Distrib.* 5952), &c.

Habit and characters of *R. decursiva*, and as robust, differing as far as my specimens and drawing tell, in the beautiful violet-purple spathe, and very slender lateral nerves of the narrower unicastate leaflets.

19. *R. Korthalsii*, Schott in *Miq. Ann. Mus. Lugd. Bat.* i. 129; leaves oblong 1-2½ ft. by 6-15 in. pinnatisect longer than their petioles, segments many pairs linear falcate truncate acute 2-4-costate and many-nerved, spathes crowded 6-8 in., stigmas slightly raised. *Engler Arac.* 247.

PENANG, Maingay (*Kew Distrib.* 1555). PERAK, Scortechini, King's Collector. —DISTRIB. JAVA.

Stem 30-40 ft., 2-3 in. diam., branching above, densely crinite below the uppermost leaves and inflorescences. *Leaves* dark green; segments 3-8 in., base not contracted; petiole as thick as the little finger, sheathed up to the knee. *Peduncles* 3-8 in., very stout. *Spadix* 6-7 in. cylindric. *Ovaries* very small.

20. *R. tetrasperma*, Hook. f.; leaves 5-7 in. long and broad broadly ovate or orbicular cordate sparingly pinnatifid lobes cuspidate or acuminate, petiole rather shorter than the blade, spathe 1½-2 in. turgidly cymbiform acute, placentas each 2-ovuled.

PERAK, Scortechini.

Stem ¼-½ in. diam., flexuous, terete, rooting at the nodes, which are 3-4 in. apart. *Leaves* often very unequal-sided; lobes 1-2, broad, acute, 1-2-costate; petiole channelled up to the knee. *Peduncle* 1-2 in., very stout. *Spathe* white. *Spadix* subclavate. *Stigma* a raised furrow on the top of the ovary. *Berries* full of intercellular needles.—Scortechini figures and describes the ovary as 2-celled, with an erect ovule in each cell; but Mr. Brown and I find 1 cell and 2 ovules on each placenta.

26. *EPIPREMNUM*, Schott.

Characters of *Rhaphidophora*, but the ovules are 1-3 anatropous on a nearly basal placenta, and the berries are not confluent.—Species about 8, Malayan and Polynesian.

This genus had better be merged in *Rhaphidophora*.

1. *E. giganteum*, Schott in *Bonpland. v.* (1857) 45; *Prodr.* 389; leaves entire oblong obtuse base cordate, nerves very many and close horizontal, spathe 6-10 in. subsessile fusiform falcate woody. *Engler Arac.* 249. *Scindapsus giganteus*, Schott *Meletem.* i. 21; *Kunth Enum.* iii. 63. *Monstera gigantea*, Schott in *Wien. Zeitsch.* (1829), ex *Linnaea*, 1831, *Litter. Ber.* 53. *Pothos giganteus*, Roeb. *Fl. Ind.* i. 434.

PENANG, Roxburgh. PERAK, Scortechini, King's Collector.

A lofty climber, over 100 ft.; stem 2-3 in. diam. Leaves 12-24 by 6-12 in., bright green (drying yellow-brown) very coriaceous, shining above; costa very stout, nerves trabeculate by the rectangular nervules; petiole as long as the blade, winged throughout its length. Peduncle solitary. Spathe ending in a curved beak. Spadix as long as the spathe. Stigmas on a style that rises from the hollow crown of the ovary.—Roxburgh describes the spathe as dirty dull purple, but it is dull green in his drawing. King's Collector says of the Perak spathe, green outside and yellow within, its walls are about $\frac{1}{2}$ in. thick.—A closely allied flowerless plant in Herb. Wallich (No. 4442, from Singapore), has leaves 18 in. long by $5\frac{1}{2}$ broad.

2. **E. mirabile**, Schott Gen. Aroid. t. 79; Prodr. 338; leaves entire pinnatifid or pinnatisect, base cordate, segments ensiform falcate truncate acute or acuminate 1-3-costate base rounded or broadly cordate, spathe $\frac{2}{3}$ in. cymbiform. Engler Arac. 249; N. E. Br. in Gard. Chron. 1882, i. 180, and Journ. Bot. (1882) 332. Rhaphidophora caudata, Schott in Bonpland. v. (1857) 45. R. Wallichii, Schott Prodr. 383; Engler l. c. 245. R. pinnata and pinnatifida, Schott in Bonpland. l. c.; Prodr. 384. R. lacera, Hassk. Cat. Hort. Bogor. 58; Pl. Jav. Rar. 155. R. Cunninghamii, Schott in Bonpland. ix. (1861) 367. Scindapsus caudatus, pinnatifidus and pinnatus, Schott Meletem. i. 21; Kunth Enum. iii. 62-63. S. candatus, Engl. l. c. 248. Pothos caudatus, Roxb. Fl. Ind. i. 436; Wall. Pl. As. Rar. ii. t. 192. P. decursivus, Wall. in As. Res. ii. 83, t. 192; Pl. As. Rar. ii. 83 (the Attran plant only). P. pinnatifidus, Roxb. Fl. Ind. i. 437. P. decurrens (error for decursivus), Wall. Cat. 4437 A (in part), B.—Monstera pinnatifida, Schott in Wien. Zeitschr. 1820; in Linnæa, vi. Litter. Ber. 52. Ramph. Herb. Amb. v. 489, t. 183, f. 2.

MARTABAN and TENASSERIM, Wallich, Falconer. PENANG, Roxburgh.—DISTRIB. Malaya, Australia, Polynesia.

A lofty climber; stem stout, 1 in. diam., clothed above with a network of the fibrous remains of the stipular sheaths. Leaves 12-20 by 7-12 in., always with small fenestrations or perforations along the region of the midrib, by which it may be distinguished from all allied plants; lobes 4-10 pairs, terminal trapezoid; petiole 8-15 in., knee 1-1 $\frac{1}{2}$ in. Spathe 4-4 $\frac{1}{2}$ in., green without, yellowish within. Spadix sessile, $\frac{2}{3}$ in. thick, obtuse, green. Ovaries 1-celled, placentas stretching half-way across the cell; stigma linear; ovules 1-3 at the base of the placentas.—Schott figures many arrested ovules which I do not find. Roxburgh says of the Penang plant growing in the Bot. Garden, that the extreme leafless shoots are long and pendulous, differing thus from all other species of Pothos known to him. This species (if the identifications are correct with the Pacific plant) is the Tonga drug, much lauded in cases of rheumatism. I am indebted to Mr. Brown for unravelling the intricate synonymy of *E. mirabile* and *Rhaphidophora decursiva*.

3. **E. humile**, Hook f.; dwarf, leaves entire ovate-cordate acuminate, nerves spreading and arched, spathe 1-1 $\frac{1}{2}$ in. cymbiform beaked. Anadryum humile, Schott in Miq. Ann. Mus. Lugd. Bat. i. 127; Engler Arac. 181; Ic. ined. No. 152.

PENANG, Maingay (Kew Distrib. 1560.) PERAK, Curtis. Scortechini.—DISTRIB. Sumatra.

Rootstock as thick as the little finger, creeping (climbing?). Leaves 4-7 by 3-4 $\frac{1}{2}$ in., coriaceous, acuminate, sinus deep narrow rounded at the base; nerves many, spreading, arched, and branching with the secondary; petiole 6-12 in., not sheathing. Peduncle solitary, 1 $\frac{1}{2}$ -2 in. Spathe erect. Spadix shorter. Stamens 4. Ovary obpyramidal, truncate, 1-celled; placenta parietal, stretching nearly across the cell, with one erect anatropous ovule on each side of its base; stigmas hemispheric.—The ovary is certainly 1-celled according to both Mr. Brown's and my own analyses, the ovules are detected with great difficulty. The habit is very unlike that of either *E. giganteum* or *mirabile*.

27. **LASIA**, *Lour.*

A stout spinous marsh plant; rhizome branched and petiole peduncle and leaf nerves beneath all prickly. *Leaves* long-petioled, hastate, entire or pedately pinnatifid. *Spathe* very long, narrow, fleshy, twisted, base convolute, deciduous. *Spadix* short, cylindric, dense-fld., flowering downwards. *Sepals* 4-6, obovate, tips truncate incurved. *Stamens* 4-6, filaments short, flat; anther-lobes parallel, slits extrorse. *Ovary* ovoid, 1-celled, 1-ovuled; style stout; stigma depressed; ovule pendulous from the top of the cell, anatropous or semi-anatropous. *Berries* obpyramidal, 6-sided, top warted or muricate. *Seed* compressed, rugose, exalbuminous; embryo macropodal.

L. heterophylla, *Schott Melet.* 21; *Kunth Enum.* iii. 67; *Miq. Fl. Ind. Bat.* iii. 176. *L. Zollingeri*, *Jenkinsii*, and *Hermannii*, *Schott in Bonpland.* v. (1857) 125. *L. desciscens*, *Schott in Ann. Mus. Lugd. Bat.* i. 127. *L. Roxburghii*, *Griff. Itin. Notes*, iii. 155; *Notul.* iii. 155. *L. spinosa*, *Thw. Enum.* 336; *Engl. Monog. Arac.* 273. *Pothos Lasia*, *Roxb. Fl. Ind.* i. 438; *Wall. Cat.* 4447. *P. heterophylla*, *Roxb. l. c.* 437; *Wight Ic.* t. 777. *P. spinosa*, *Ham. in Wall. Cat.* 4447. *Dracontium spinosum*, *Linn. Sp. Pl.* 967.

FROM TROPICAL SIKKIM HIMALAYA, ASSAM, BENGAL, and BURMA, southwards to SINGAPORE and Ceylon.—DISTRIB. Malay Islds., China.

Rootstock 1 in. diam. *Leaves* 6-18 in. long, rigidly coriaceous, young hastate or sagittate with broad or narrow basal lobes, older often broader than long, and deeply pinnatifid, base cordate, lobes 1-costate acuminate; petiole terete, 2-4 ft., sheathing towards the base. *Peduncle* about as long as the petiole, slender. *Spathe* 8-14 in., claret-coldr., opening at the base only. *Spadix* about 1 in., claret-coldr., fruiting 4-5 in. and 1 in. diam.

28. **PODOLASIA**, *N. E. Br.*

Habit and characters of *Lasia*, and like it prickly, but the leaves are always entire, the spathe short, open to the base, the ovule is laterally attached towards the base of the ovarian cells, and the berries are globose, quite smooth, and entirely exerted beyond the sepals.

P. stiptata, *N. E. Br. in Gard. Chron.* 1882, ii. 70.

PERAK, *Scortechini*, *King's Collector*.—DISTRIB. Borneo.

Rootstock as thick as the little finger or thicker, creeping. *Leaves* 8-14 in., broad or narrow, hastate or sagittate, 6-12 in. broad across the insertion of the petiole; basal lobes parallel divaricating or horizontal, $\frac{3}{4}$ -4 in. broad, acute or acuminate; petiole as long as the blade or shorter, slender. *Peduncle* shorter than the petiole, very slender. *Spathe* 3-5 in., narrowly cymbiform, deep red. *Spadix* about $\frac{3}{4}$ as long as the spathe, red; stipes $\frac{1}{4}$ - $\frac{1}{2}$ in. *Berries* $\frac{1}{2}$ in. diam., few on the spadix, red.

29. **CYRTOSPERMA**, *Griff.*

Perennial warted or prickly herbs. *Leaves* hastate. *Spathe* expanded, straight or twisted, base convolute or not, persistent. *Spadix* short, dense-fld., flowering downwards. *Sepals* 4-8, truncate, tip incurved. *Stamens* 4-8, filaments short, flat; anthers ovate-oblong, slits extrorse. *Ovary* 1-celled; stigma sessile, pulvinate; ovules 1 or more, semi-anatropous, pendulous by long funicles from near the middle of the cell. *Berries* crowded,

obovoidly globose, smooth, 1-7-seeded, scarcely longer than the accrescent sepals. *Seeds* compressed, crested; *albumen* scanty; *embryo* hooked.—*Species* about 10, tropical.

C. lasioides, *Griff. Itin. Notes* iii. 149; *Notul.* iii. 150; *Ic. Pl. Asiat.* t. 169; leaves sagittate, lobes caudate-acuminate, petiole and peduncle prickly, flowers 6-merous, ovules 2. *Schott Gen.* t. 84; *Prodr.* 403; *Engler Arac.* 270; *Ic. Ined.* No. 89.—*Wall. Cat.* 4447.

PERAK; in marshes, *Scortechini, King's Collector.* MALACCA, *Griffith.* SINGAPORE, *Gaudichaud, &c.*—**DISTRIB.** Borneo.

Rootstock stout. *Leaves* like those of *Lasia*, 2½–3 ft., basal lobes as long as the median, costa and nerves prickly beneath; petiole 2–8 ft., sometimes as thick as the middle finger. *Peduncle* shorter than the petiole. *Spathe* 1–5 in., lengthening to 8 in fruit, open to the base, flat, ovate or lanceolate, caudate-acuminate, many-nerved, white or yellow within, reddish-brown without striped with green. *Spadix* pink; stipes stout, dorsally adnate to the spathe. *Fruiting* spadix 4–6 by 1 in. diam. *Berries* closely packed.—Young plants are smaller in foliage and spathe.

30. **ANAPHYLLUM**, *Schott.* ..

A tall herb, with creeping rootstock, *Leaves* broad, membranous, pinnate or pedatipartite. *Spathe* large, broadly lanceolate, caudate, twisted, membranous, deciduous, base very shortly convolute. *Spadix* short, cylindric, stipitate, flowering downwards, base adnate to the spathe. *Sepals* 4, large, obovate, truncate, incurved. *Stamens* 4, filaments flat; anther-cells saccate, pores terminal. *Ovary* ovoid or oblong, 1-celled, 1-ovuled; stigma sessile, disciform; ovule semianatropous, parietal. *Berries* obovoid.

A. Wightii, *Schott Gen. Aroid.* t. 83; *Prodr.* 404; *Engler Arac.* 275.—*Wall. Cat.* 8968.

TRAVANCORE; Courtallam. *Wight.*

Leaves 1–2 ft. long or more; leaflets 2–6 pairs, sessile or petiolulate, 8–18 by 2–4 in., acuminate, 1-costate, base cuneate rounded or acuminate, terminal lobe simple or divided; petiole 3–4 ft., quite smooth. *Peduncle* longer than the leaf. *Spathe* 6–12 by 2–4 in. *Spadix* 1 in.

31. **POTHOS**, *Linn.*

Climbing branched shrubs, branches rooting. *Leaves* distichous. *Peduncles* terminal or axillary or from lateral shoots. *Spathe* small, reflexed, cymbiform, or elongate, persistent. *Spadix* sessile or stipitate, flowering upwards, stipes often decurved or flexuous. *Sepals* 6, tips incurved. *Stamens* 6, filaments flat; anther-cells ellipsoid, slits extrorse. *Ovary* 3-celled; stigma small; ovules 1 in the inner angle of each cell, anatropous. *Berries* 1–3-seeded. *Seeds* exalbuminous; *embryo* macropodal.—*Species* about 20, tropical Asiatic, Australia and Pacific, with one Madagascar.

A. Leaves with a broad flat truncate petiole, and short entire sheath. *Spadix* (in the Indian species) very short, globose oblong or pyriform, stipes long.

1. **P. scandens**, *Linn. Sp. Pl.* 968; leaves 2–4 in. obovate or lanceolate, peduncles ½–¾ in., bracts very small, spathe cymbiform cuspidate, spadix globose ovoid or shortly oblong. *Bot. Reg.* t. 133; *Hook. Ic. Pl.* t.

175; *Schott Meletem*. i. 21; *Aroid*. i. 22, t. 33; *Prodr.* 563; *Roxb. Fl. Ind.* ii. 457; *Kunth Enum.* iii. 65; *Grah. Cat. Bomb. Pl.* 229; *Dalz. & Gibs. Bomb. Fl.* 257; *Wall. Cat.* 4435; excl. D, E, F; *Engler Arac.* 84 (excl. var. β). *P. exiguiflorus* and *cognatus*, *Schott l.* cc. 21, 22, t. 41, 48, and 561, 562. *P. fallax*, *Schott Prodr.* 560. *P. decipiens*, *Schott in Bonpland.* (1859), 165; *Prodr.* 562. *P. Roxburghii*, *De Vriese in Plant. Jungh.* i. 103. —*Rheede Hort. Mal.* vii. t. 40.

Throughout India, on walls and tree trunks, from BENGAL eastward to BURMA, and southward to SINGAPORE; and from the CONCAN to CEYLON, and the ANDAMAN and NICOBAR ISLANDS.—DISTRIBUTION. Malay Islds., China.

Stem as thick as the little finger, much branched; internodes $\frac{1}{2}$ –1 in. *Leaves* very variable, $\frac{1}{2}$ –2 in. broad, acute apiculate or acuminate; base cuneate or rounded; petiole 1–3 by $\frac{1}{4}$ – $\frac{3}{8}$ in., base $\frac{1}{2}$ –amplexicaul. *Peduncles* equalling or exceeding the bracts, which are $\frac{1}{2}$ – $\frac{1}{2}$ in. long. *Spathe* $\frac{1}{2}$ – $\frac{1}{2}$ in. green. *Spadix* $\frac{1}{2}$ – $\frac{1}{2}$ in. diam., yellow, about as long as its stipes. *Berries* $\frac{1}{2}$ – $\frac{3}{8}$ in. long, oblong.—*P. cognatus*, distinguished by the short peduncle is not even a constant variety, and there are not a few other Schottian species, that must go under *P. scandens*.

2. ***P. Vriesianus***, *Schott Aroid.* 22, t. 36; *Prodr.* 565; characters of *P. scandens*, but bracts much larger, $\frac{1}{2}$ in. long and broad, spadix larger erect inclined or deflexed. *Engler Arac.* 80. *P. Roxburghii*, *Schott Aroid.* l.c. t. 37 (not of de Vriese). *Engler l.c.* 81. *P. scandens*, *Wall. Cat.* 4435?.

SIKKIM HIMALAYA, alt. 1–4000 ft., J. D. H. BHOTAN, Griffith; SILHET, Wallich.

Almost exactly intermediate between *P. scandens*, of which it has the foliage, &c., and *P. Cathcartii*; which has larger but quite similar spathes and spadix. De Vriese erred in supposing that Roxburgh's and Wight's plant differed from *scandens*.

3. ***P. Cathcarti***, *Schott Aroid.* i. 22, t. 44, 45; *Prodr.* 565; leaves 3–6 in. ovate oblong or lanceolate acute or acuminate, peduncle very stout $\frac{1}{2}$ – $\frac{2}{3}$ in., bracts large concave, spathe orbicular, spadix stoutly stipitate suberect or decurved oblong or globose. *Engler Arac.* 85. *P. scandens*, *Don Prodr.* 21; *Wall. Cat.* 4435, D, E, F.

TROPICAL HIMALAYA, ascending to 4000 ft. from Kumaon, Strachey & Winterbottom to BHOTAN, ASSAM, the KHASIA HILLS, MUNNIPORE and BURMA.

A very much larger plant than *P. scandens*, or *Vriesianus*, with thickly coriaceous bracts, the inner sometimes $\frac{1}{2}$ in. long, a spathe sometimes nearly an inch broad, and spadix $\frac{1}{2}$ – $\frac{1}{2}$ in. diam., on a stipes $\frac{1}{2}$ – $\frac{3}{8}$ in. long. *Berries* $\frac{1}{2}$ – $\frac{3}{8}$ in. long, obovoid or oblong, scarlet.

4. ***P. angustifolius***, *Presl. Epimel.* 242; leaves $1\frac{1}{2}$ –2 by $\frac{1}{2}$ – $\frac{1}{8}$ in. linear apiculate, peduncle very short, bracts small, spathe lanceolate, spadix suberect minute globose or ellipsoid. *Schott Aroid.* i. 21, t. 31; *Prodr.* 559; *Engler Arac.* 81.

TENASSERIM, Helfer, &c.

Stem much branched; branches short, as thick as a crow-quill; internodes $\frac{1}{2}$ – $\frac{1}{2}$ in. *Leaves* $\frac{1}{2}$ – $\frac{1}{2}$ in. broad; nerves parallel; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in. *Spathe* $\frac{1}{2}$ in. long. *Spadix* $\frac{1}{16}$ – $\frac{1}{8}$ in. diam.

5. ***P. Hookeri***, *Schott Aroid.* i. 23, t. 46; *Prodr.* 566; leaves 3–4 in. lanceolate acuminate, peduncle $1\frac{1}{2}$ – $2\frac{1}{2}$ in. decurved, bracts ovate acute, spathe cymbiform acuminate, spadix oblong. *P. scandens*, *Hook. Ic. Pl.* t. 175. *P. scandens*, var. *Hookeri*, *Engler Arac.* 84.

CEYLON, Walker.

Stem and foliage as in the common state of *P. scandens* and *Vriesianus*. *Peduncle* often longer than the petiole. *Spathe* $\frac{1}{2}$ – $\frac{3}{4}$ in. *Spadix* $\frac{1}{2}$ – $\frac{3}{4}$ in., its stipes about as long.

6. *P. macrocephalus*, Scott. mss.; leaves lanceolate apiculate, petiole as long as the blade, peduncle $1\frac{1}{2}$ –2 in. decurved, spathe ovate-cordate or orbicular cuspidate, spadix globose or shortly pyriform.

PERAK, *Scortechini*, King's Collector.

Climbing 60–80 ft.; branches as thick as a crow-quill, internodes $\frac{1}{2}$ – $\frac{3}{4}$ in. *Leaves* $2\frac{1}{2}$ – $3\frac{1}{2}$ by $\frac{1}{2}$ – $\frac{3}{4}$ in.; rather broader than the petiole. *Peduncle* rather stout; bracts very variable, sometimes few with the longest only $\frac{1}{4}$ in., at others many, and $\frac{1}{2}$ in. long. *Spathe* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., white; occasionally a second smaller superior spathe occurs. *Spadix* $\frac{1}{2}$ in. diam., or less, yellow.—This differs from *P. Junghunianus* and *macrophyllus*, de Vriese (in Plant. Jungh. i. 103, 104) of Java and Sumatra solely in the narrower leaves and great length of the petiole. I suspect that all there may prove forms of one.

B. Petiole (knee only) very short; sheath very long, split to the base. *Spadix* long, sessile or stipitate.

* *Spadix cylindric, dense-fld.; flowers not in clusters.*

7. *P. Kingii*, Hook. f.; stout, leaves 6–10 by 3–4 in. oblong or oblong-lanceolate caudate-acuminate, base narrowed rounded, bracts $1\frac{1}{2}$ –2 in., spathe 4–6 in. ovate-lanceolate.

PERAK; *Scortechini*, King's Collector; alt. 2–3000 ft.

Stem 6–10 ft., as thick as a swan's quill, branches 2–3 ft., pale. *Leaves* coriaceous, often unequal-sided, shining on both surfaces; petiole $\frac{1}{4}$ in.; sheath 3–4 in., margins membranous, at length fibrous, tip 2-auricled. *Spathe* dark purple within, pale without. *Spadix* half as long. *Ovary* oblong; style very short, stigma penicillate.

8. *B. Barberianus*, Schott Aroid. 24, t. 53; Prodr. 573; leaves 3–5 by $1\frac{1}{2}$ – $1\frac{3}{4}$ in. oblong- or ovate-lanceolate acuminate base rounded, sheath clasping the branch, peduncles terminal and axillary, spathe linear-lanceolate. *Engler Arac.* 90.

PERAK; on rocks, *Scortechini*, King's Collector.—DISTRIB. Borneo.

Stem slender, branches as thick as a crow-quill. *Leaves* thinly coriaceous, tip sometimes caudate; petiole $\frac{1}{2}$ in., sheath 2–3 in., by $\frac{1}{2}$ – $\frac{1}{4}$ in. broad, biauricled. *Peduncle* deflexed, 1– $1\frac{1}{2}$ in. *Spathe* $\frac{2}{3}$ –1 in., acuminate. *Spadix* as long, sessile. *Stigmas* plicate, sessile.

9. *P. Wallichii*, Hook. f.; leaves $3\frac{1}{2}$ –4 in. oblong-lanceolate acuminate, base cuneate or rounded, sheath divergent from the branch, peduncles axillary and terminal, spathe linear-lanceolate acuminate. *P. tenera*, Wall. Cat. 4439, B. (not Wall. in Roxb. Fl. Ind. Ed. Carey). *P. gracilis*, Schott Prodr. 572. *Engler Arac.* 91 (not of Roxb.)

PENANG, Porter, Curtis; PERAK, *Scortechini*.

Very similar to *B. Barberianus* in foliage, but a more slender plant, with the spreading leaf-sheaths not $\frac{1}{2}$ in. broad, the peduncle $1\frac{1}{2}$ –3 in. long much more slender, a shortly stipitate spadix, and a slender minute style with a very inconspicuous stigma.—In Carey's Edition of Roxburgh's Flora Indica, Wallich proposed the name of *P. tenera* for an Amboyna plant cultivated in the Calcutta Garden, named *P. gracilis* by Roxburgh in mss.

10. **P. lancifolius**, *Hook. f.*; leaves 4-7 by 1-1½ in. narrowly oblong-lanceolate caudate-acuminate base cuneate sheath divergent from the branch, peduncle terminal, bracts 0, spathe ovate-lanceolate acuminate.

PERAK; *Scortechini*.

A large climber, branches as thick as a crow-quill. *Leaves* thinly coriaceous, pale when dry, and undulate within the margin, tip slender; nerves erecto-patent; petiole ¾-1 in., sheath slender, tip bifid. *Peduncle* 1-1½ in., spreading or deflexed. *Spathe* 1½ in., lurid purple, striate. *Spadix* 1-1½ in., sessile, cylindric, obtuse, ½ in. diam. *Sepals* and *stamens* 6 each; filaments linear-oblong. *Stigma* minute.

** *Spadix* slender; flowers in small spirally disposed or whorled clusters.

11. **P. latifolius**, *Hook. f.*; leaves 5-7 by 2½-4 in. oblong or obovate-oblong acute or obtuse base rounded or cuneate, sheath divergent from the branch, peduncle terminal, bracts 0, spathe linear from a rounded base, tip emarginate mucronate in the sinus much shorter than the stipitate spadix.

PERAK; Larut, alt. 2-3000 ft., *King's Collector*.

Stem climbing, 10-15 ft.; branches rather stout, internodes 1-1½ in. *Leaves* coriaceous, nerves nearly horizontal, slightly arching; petiole ¾-1 in., sheath 3-4 in. *Peduncle* deflexed or sigmoid. *Spathe* 2½ in., pale green, reflexed, 5-nerved, mucro ½ in. long. *Spadix* 3-5 in., yellow, flowers in approximate equidistant whorls or spirally disposed.

12. **P. Maingayi**, *Hook. f.*; leaves 4-5 by 1-1½ in. narrowly oblong-lanceolate acuminate base cuneate or rounded, sheath divergent from the branch, peduncles terminal, spathe linear oblong^p much shorter than the slender stipitate spadix, flowers very minute laxly distantly whorled.

MALACCA, *Maingay*. (*Kew Distrib.* 1538, *P. gracilis*).

Branches as thick as a crow-quill, internodes ½-1 in. *Leaves* coriaceous, drying brown; nerves widely spreading, slightly arched; petiole ½ in.; sheath 2½-3 in. *Peduncle* 1½-2 in., usually tortuous. *Spathe* imperfect. *Spadix* 3 in., stipes ¼ in. *Stamens* very short.

13. **P. Curtisii**, *Hook. f.*; leaves 5-7 by 1½-2 in. oblong-lanceolate or linear-oblong acuminate base cuneate or rounded, sheath divergent from the branch, peduncles terminal, spathe narrowly linear from a dilated rounded base shorter than the slender stipitate spadix, flowers in crowded spirals.

PERAK; *Scortechini*; *King's Collector*. PENANG; *Curtis*.

Resembles *P. Maingayi* so closely that I hesitate to describe it as specifically different, but the flowers are more than twice as large as in that plant, and densely clustered on the much longer (often 6 in.) spadix; and the stamens are much longer. The narrow reflexed spathe is 2-2½ in. long.

14. **P. Kunstleri**, *Hook. f.*; leaves 8-12 by 2-3½ in. unequal-sided oblong or subfalcately oblanceolate caudate-acuminate, base cuneate or rounded, sheath divergent from the branch, peduncle terminal, spathe linear apiculate, spadix very slender, flowers spirally whorled.

PERAK; *King's Collector*.

Stem climbing 10-15 ft. *Leaves* coriaceous, very variable, the older or lower (like those of *P. latifolius*) are up to 3 in. broad, acuminate, base rounded, the younger are as long but only 2-2½ in. broad, with very long pointed tips and acute bases; nerves spreading and arching, much more close in the older leaves; sheaths

2-3 in. *Peduncle* $1\frac{1}{2}$ in., decurved or tortuous. *Spathe* $1\frac{1}{2}$ by $\frac{1}{2}$ in., tip obtuse apiculate. *Spadix* 5 in.; flowers solitary or clustered.

15. **P. remotiflorus**, Hook. *Ic. Pl.* t. 133; leaves 3-6 by $\frac{3}{4}$ -2 in. unequal-sided linear or oblong-lanceolate or oblanceolate caudate-acuminate, base acute or obtuse, sheaths very slender divergent from the branch, peduncles terminal and axillary, spathe linear-lanceolate apiculate, spadix very slender zigzag, flowers solitary. *Kunth Enum.* iii. 65; *Schott Aroid.* i. 25, t. 54; *Prodr.* 573; *Thw. Enum.* 337; *Engler Arac.* 92. P. elliptica, *Moon Cat. Pl. Ceyl.* 10 (name only); *Miq. Fl. Ind. Bat.* iii. 182.

CEYLON; *Walker*; up to 4000 ft., *Thwaites*.

Stem as thick as a sparrow-quill, much branched. *Leaves* coriaceous, tips filiform; nerves erecto-patent, arched; petiole $\frac{1}{4}$ in., very slender, sometimes in a straight line with the sheath, which is $\frac{1}{4}$ - $1\frac{1}{4}$ in. long. *Peduncle* 1 - $1\frac{1}{2}$ in., erect, decurved, or slender. *Spathe* $\frac{3}{4}$ - $2\frac{1}{2}$ in., striate, base rounded. *Spadix* 1 - $2\frac{1}{4}$ in.

C. *Petiole* very short, base semi-amplexicaul (sheath 0).

16. **P. Thomsonianus**, *Schott Aroid.* i. 24, t. 51; *Prodr.* 571; leaves 4-6 by $1\frac{1}{2}$ -2 in. elliptic- or oblong-lanceolate caudate-acuminate, base cuneate, peduncles lateral and terminal, spathe small oblong-lanceolate, spadix subsessile cylindric dense-fld.

The *CARNATIC*; *G. Thomson*.

Branches as thick as a duck's quill. *Leaves* thinly coriaceous, rather unequal-sided, drying yellowish; petiole $\frac{1}{2}$ - $\frac{1}{4}$ in. *Peduncle* 1 in., decurved. *Spathe* $\frac{1}{2}$ in. *Spadix* $\frac{3}{4}$ -1 in.—Formed parts of a herbarium made by collectors in the Carnatic employed by the late Gideon Thomson, Esq., of Madras, for his brother, the late Director of the Calcutta Bot. Garden.

INDETERMINABLE SPECIES.

P. *BIPARIUS*, *Wall. Cat.* 4445, from Singapore, young leaves only.

P. *OBLIQUUS*, *Wall. Cat.* 4446; from Tavoy, *Gomez*.

32. **ACORUS**, *Linn.*

Aromatic marsh herbs, rootstock creeping. *Leaves* distichous, ensiform, base equitant, nerves parallel. *Peduncle* leaf-like. *Spathe* the ensiform continuation of the peduncle. *Spadix* sessile, cylindric, dense-fld., flowering upwards. *Sepals* 6, orbicular, concave, tips incurved. *Stamens* 6, filaments linear flat; anther reniform, cells confluent above, slits extrorse. *Ovary* conical, 2-3-celled; stigma minute; ovules many, pendulous from the top of each cell, orthotropous. *Berries* few-seeded. *Seeds* oblong, micropyle often fimbriate, albumen fleshy, embryo axile.—Species 2 north temp. regions.

1. **A. Calamus**, *Linn. Sp. Pl.* 324; leaves 3-6 ft. midrib stout. *Roxb. Fl. Ind.* ii. 169; *Don Prodr.* 21; *Wall. Cat.* 196; *Grah. Cat. Bomb. Pl.* 230; *Dalz. & Gibs. Bomb. Fl. Suppl.* 96; *Thw. Enum.* 337; *Griff. Notul.* iii. 157; *Ic. Pl. Asiat.* t. 162. *Engler Arac.* 217. *A. Griffithii* and *nilaghiensis*, *Schott in Oestr. Bot. Zeitschr.* (1858), 357, and (1859), 101; *Prodr.* 580, and 579. *A. Belangeri*, *Schott in Ann. Mus. Lugd. Bat.* i. 284. *A. Casia*, *Bertol. Pl. Nuov. Asiat.* ii. (1865), 8.—*Rheede Hort. Mal.* xi. t. 48.

Throughout INDIA and CEYLON, in marshes, wild or cult., ascending the Himalaya to 6000 ft. in Sikkim. DISTRIB. north, temp. and warm regions.

Rootstock very aromatic. Leaves 3-6 ft. by $\frac{3}{4}$ -1 $\frac{1}{4}$ in., margins waved. Peduncle $\frac{1}{2}$ - $\frac{3}{4}$ in. broad. Spathe 6-30 in. long. Spadix 2-4 in. $\frac{1}{4}$ - $\frac{3}{4}$ in. diam., slightly curved. Sepals about equalling the ovary.—Sweet Flag.

2. **A. gramineus**, Soland. in Ait. Hort. Kew, i. 474; midrib 0. Schott Prodr. 580; Engler Arac. ii. 218. A Calamus, Benth. Fl. Hongk. 345. A. terrestris, Spreng. Syst. ii. 118; Schott l. c. 579. A. Tatarinovii, Schott in Estr. Bot. Zeitschr. (1859) 101. A. Calamus var. terrestris, Engler l. c. 217.

SIKKIM HIMALAYA, alt. 6000 ft. J.D.H. KHASIA HILLS, alt. 4-5000 ft., Griffith, &c.—DISTRIB. China, Japan.

Much more variable in size than *A. Calamus*, from 6 in. to 3 ft., with a shorter spathe and more slender spadix.

ORDER CLXVII. LEMNACEÆ.

Minute or small annual floating green scale-like plants, rootless or with capillary roots, propagated by budding or by hibernating bulbils, rarely by seed. Flowers 1-3, naked, or in a spathe; perianth 0. Stamens 1-2, anthers 1- or 2-celled. Ovary 1-celled; style short; stigma truncate, or funnel-shaped; ovules 1-7. Utricle bottle-shaped. Seeds 1- or more, testa coriaceous; albumen 0, or fleshy; embryo axile, cylindric.—Genera 2, or according to various authors 3 or 4. Species about 20, in all countries.

1. LEMNA, Linn.

Fronds with one or more roots, bearing the flowers in marginal clefts. Filaments slender; anthers 2-celled. Ovules 1-7.—Species 17, natives of all countries.

L. obcordata, Ham. in Wall. Cat. 5201, is a species of *Riccia*.

1. **L. minor**, Linn. Sp. Pl. 976; root solitary, frond symmetrical obovoid or oblong nearly flat on both surfaces, ovule solitary. Kunth Enum. iii. 4. Reichb. Ic. Fl. Germ. vii. t. 14. Hegelm. Lemnæ, 141, t. 9, 10; Boiss. Fl. Orient. v. 29; Kurz in Journ. Linn. Soc. ix. 266.

Throughout INDIA? WESTERN TIBET, to 9500 ft., Thomson.—DISTRIB. Cosmopolitan.

Frond $\frac{1}{2}$ - $\frac{1}{4}$ in. long; young sessile on the old, but soon detached, green above, epidermal cells with flexuous walls. Root-sheath not appendaged, cap obtuse. Spathe 2-lipped. Stamens 2 (each a male fl.). Style long. Seed horizontal, hemianatropal, albuminous.—Kurz (Journ. Linn. Soc. xi. 266) thinks that *L. minor* does not occur in India proper. If this be so, *L. paucicostata* has been mistaken for it, a point I must leave it for local botanists to clear up. Hegelmaier gives the Caucasus and W. Tibet as the only Asiatic habitats.

2. **L. paucicostata**, Hegelm. Lemnæ, 139, t. 8; root solitary, frond asymmetrical obovate or obovate-oblong nearly flat on both surfaces, ovule solitary. Boiss. Fl. Orient. v. 30. L. minor, Griff. Notul. iii. 216; Hegelm. in Seem. Journ. Bot. (1865), 112; Thw. Enum. 331.

In various parts of INDIA and CEYLON; ascending the Khasia Hills to 6000 ft.—DISTRIB. Cosmopolitan tropical.

Distinguished from *L. minor* by the asymmetric fronds, appendaged root-sheath, acute root-cap, and erect orthotropous seed.

3. **L. gibba**, Linn. Sp. Pl. 970; root solitary, frond orbicular or

obovoid tumid beneath, ovules 2-7. *Reichb. Ic. Fl. Germ.* vii. t. 14; *Boiss. Fl. Orient.* v. 30; *Hegelm. Lemnæ*, 145, t. 11-13. Telmatophace gibba, *Schleid. in Linnæa*, xiii. 391; *Kunth Enum.* iii. 6; *Kurz in Journ. Linn. Soc.* ix. 266.—*Lemna*, *Griff. Notul.* iii. 221 (2nd species), *Ic. Pl. Asiat.* t. 263.

Still waters throughout INDIA, ascending to 7000 ft. in the Himalaya.—DISTRIB. Cosmopolitan.

Fronde $\frac{1}{2}$ – $\frac{1}{3}$ in. diam., opaque, young sessile, cells beneath very large, epidermis with flexuous walls. *Root-sheath* elongate, cylindric, root-cap acute. *Stamens* 2. *Utricle* circumciss. *Seeds* erect, anatropous, albumen scanty or 0.

4. ***L. trisulca***, *Linn. Sp. Pl.* 970; root solitary, frond oblanceolate tip serrate young hastate persistent, ovule solitary. *Kunth Enum.* iii. 5; *Reichb. Ic. Fl. Germ.* vii. t. 15; *Hegelm. Lemnæ*, 134, t. 5, 6; *Boiss. Fl. Orient.* vi. 29; *Dalz. & Gibs. Bomb. Fl.* 281. *L. cruciata*, *Roxb. Fl. Ind.* iii. 566.—*Lemna*, *Griff. Notul.* 218; *Ic. Plant. Asiat.* t. 262.

PANJAB, *Stewart*. BENGAL, The CONCAN, MUNNEPORE, and BURMA.—DISTRIB. Temp. and trop. regions.

Fronde $\frac{1}{2}$ – $\frac{1}{3}$ in. long, young on one or both sides placed cross-wise to the old; epidermis 0. *Root-cap* acute. *Style* very short. *Seed* hemianatropous, horizontal; testa rough, grooved.

5. ***L. polyrrhiza***, *Linn. Sp. Pl.* 970; roots many, frond herbaceous broadly obovate or orbicular flat or nearly so 7-nerved, ovules 1-2 erect. *Reichb. Ic. Fl. Germ.* vii. t. 15; *Thw. Enum.* 331; *Kurz in Journ. Linn. Soc.* ix. 267. *L. orbiculata*, *Roxb. Fl. Ind.* iii. 565. *L. major*, *Griff. Notul.* iii. 216; *Ic. Plant. Asiat.* t. 264 (anal.). *Spirodela polyrrhiza*, *Schleid. in Linnæa*, xiii. 392; *Kunth. Enum.* iii. 7; *Hegelm. Lemnæ*, 151, t. 13-15; *Boiss. Fl. Orient.* v. 30.

Common throughout INDIA and CEYLON.—DISTRIB. Temp. and trop. regions.

Fronde $\frac{1}{2}$ – $\frac{1}{3}$ in. diam., dark green above, usually purplish beneath; epidermal cells with flexuous walls. *Spathe* 2-lipped. *Stamens* 2. *Ovules* 1-2, semianatropous.—*Kurz* describes a var. *concolor* with much larger fronds, green on both surfaces, as occurring under trees in Bengal.

6. ***L. oligorrhiza***, *Kurz in Journ. Linn. Soc.* ix. 267, t. 5; roots few, fronds membranous ovate or oblong 3-5-nerved. *Benth. Fl. Austral.* vii. 163. *Spirodela oligorrhiza*, *Hegelm. Lemnæ*, 147, t. 16. *S. melanorrhiza* and *pleiorrhiza*, *F. Muell. ex Kurz in Seem. Journ. Bot.* (1867) 115.

BENGAL, *Kurz*, and elsewhere in India.—DISTRIB. Trop. Asia, Australia, Polynesia.

Fronde $\frac{1}{2}$ – $\frac{1}{3}$ in. long by half as broad, thin, shining, collected in circinate groups, purple beneath. *Roots* 2-5, very long. *Flowers* as in *L. minor*.—*Kurz*, from whom the above characters are taken, says that he at first took it for an extreme form of *L. polyrrhiza*, in company of which he always found it in Bengal; but on discovering the fronds he considered it distinct. It has the general form and size of *L. minor*.

2. **WOLFFIA**, *Horkel*.

Fronde like grains of sand, rootless, proliferous, bearing the flowers on the upper surface. *Spathe* 0. *Anthers* sessile, 1-celled. *Style* short, stigma depressed; ovule 1, erect.

1. ***W. arrhiza***, *Wimm. Fl. Schles.* 140; fronds subglobose. *W. Micheli*, *Schleid. Beitr. Bot.* 233. *W. Delilii*, *Kurz in Journ. Linn. Soc.*

ix. 265 (*not of Schleid.*). *Lemna arrhiza*, Linn. Mant. 294. *L. globosa*, Roxb. Fl. Ind. iii. 565; *Grah. Cat. Bomb. Pl.* 252; *Dalz. & Gibs. Bomb. Fl.* 281. *Grantia globosa*, Griff. Notul. iii. 229; *Ic. Pl. Asiat.* t. 267, f. 2. *Bruniera vivipara*, Franchet in Billot. 1864, 25.

Common, probably throughout INDIA and CEYLON.—DISTRIB. Cosmopolitan.

Of this Kurz distinguishes two Indian varieties, a larger, *Delili* (*Grantia globosa*, Griff.), and a smaller with more cylindric fronds, the *Lemna globosa*, Roxb.

2. **W. microscopica**, Kurz in Journ. Linn. Soc. ix. 265; frond flat above, conical beneath and tapering into a root? *Hegelm. Lemnæ*, 127. *Grantia microscopica*, Griff. Notul. iii. 226; *Ic. Plant. Asiat.* t. 266–268.

BENGAL, Griffith.

Known only through Griffith's description and drawings.

ORDER CLXVIII. TRIURIDÆ.

Slender, leafless, coloured annuals. *Stem* subsimple, filiform, with a few distant scales. *Flowers* unisexual, small, in terminal corymbs or racemes; pedicels decurved, bracteate. *Perianth* inferior, 6–8-partite or -lobed; lobes ovate-lanceolate or subulate, valvate in bud. MALE FL. *Stamens* 2–6, hypogynous or perigynous, anthers free or immersed in a thick disk, cells 2, confluent, slits extrorse; pistillodes 3, subulate, or 0. FEM. FL. *Staminodes* 0 or few. *Carpels* many, sessile on a receptacle, 1-celled; style terminal lateral or basal, persistent; stigma acute, clavate, or penicillate. *Ovules* solitary, erect, anatropous. *Achenes* in a globose head, obovoid, coriaceous or fleshy, nucleus hard, embryo not seen.—Genera 2, tropical America and Asiatic.

SCIAPHILA, Blume.

Perianth 3–8-partite or -lobed. *Anthers* sessile at the base of the perianth. *Style* ventral or basilar.—Species about 14, Asiatic and American.

1. **S. erubescens**, Miers in Proc. Linn. Soc. ii. (1850) 74; in Trans. Linn. Soc. xxi. 48; raceme many-fl., perianth segments 6 broadly lanceolate naked style, clavate penicillate hardly longer than the ovary. *Thw. Enum.* 294; *Benth. in Hook. Journ. Bot.* vii. (1855) 10. *Aphyllia erubescens*, Champ. in Calcutt. Journ. Nat. Hist. vii. 468.

CEYLON; in shady woods at Galle, Champion; Colombo, Ferguson.

Stem 3–4 in. *Flowers* $\frac{1}{8}$ in. diam., hyaline, pale purplish, speckled with red streaks; pedicels $\frac{1}{8}$ in.

2. **S. secundiflora**, Thw. ex Benth. in Hook. Journ. Bot. vii. (1855) 10; *Enum.* 294; raceme secund, few-fl., perianth segments 6 subulate acuminate naked, style clavate penicillate hardly longer than the ovary.

CEYLON; forests near Sittawake, Thwaites.

Stem 6–14 in., purplish; bracts broad, acute. *Flowers* monœcious, pedicel $\frac{1}{10}$ – $\frac{1}{8}$ in.; perianth about $\frac{1}{8}$ in. diam. *Anthers* sessile, transversely oblong, white.

3. **S. janthina**, Thw. *Enum.* 294; flowers long-pedicelled, perianth segments 8 lanceolate, stamens 4, style subbasilar filiform much longer than the ovary. *Hyalisma janthina*, Champ. in Calc. Journ. Nat. Hist. vii. (1847) 466; Miers. in Trans. Linn. Soc. xxi. 49.

TRAVANCORE; Tinnevely, Beddome. CEYLON; in damp forests, Champion.

Stem 4-8 in.; bracts about $\frac{1}{2}$ in. *Flowers* alternate, opposite and whorled, mono- or dioecious, pedicel $\frac{1}{4}$ -1 in.; male $\frac{1}{8}$ in. diam., fem. $\frac{1}{4}$ in. *Anthers* sessile on a thick disk.

4. **S. khasiana**, *Hook. f. in Gen. Plant.* iii. 1003; perianth segments 4-5 ovate-acuminate, male fl. with 3 subulate pistillodes, style ventral filiform much longer than the ovary.

KHASIA HILLS, alt. 4000 ft., *J. D. H. & T. T.*

Plant red-purple. *Stem* 3-6 in., filiform or capillary, flexuous, simple or branched, naked or with a few scales, fem. much the stoutest. *Flowers* dioecious, racemose, male $\frac{1}{10}$ in. diam., fem twice as large and longer pedicelled; bracts of male minute, of fem. $\frac{1}{8}$ in., subulate; perianth papillose. *Anthers* very large, globose 4-lobed, white, dehiscence transverse; pistillodes erect, subulate, purple. *Carpels* many, papillose. *Achenes* reniformly obovoid, pericarp cellular, purple. *Seed* conform to the pericarp; testa chartaceous, yellow-brown, transversely strongly reticulate; nucleus oblong, cellular, homogeneous, white.—Described from drawings I made in the Khasia.

ORDER CLXIX. ALISMACEÆ.

Marsh or water plants of various habit. *Leaves* radical, entire. *Flowers* regular, uni- or bisexual. *Perianth segments* 6, 2-seriate, outer (sepals) herbaceous, inner petaloid rarely 0. *Stamens* 6 or more, hypogynous or perigynous; anthers erect, basifixed, 2-celled, slits lateral or dorsal. *Carpels* 3-6 or more, 1-celled, sessile or stipitate on a flat or raised receptacle; style short, long (or 0), subterminal or ventral, stigma simple; ovules 1 or more, insertion various. *Fruit* of small achenes or follicles. *Seeds* small, exalbuminous; embryo straight or conduplicate.—Genera 12, species about 60, cosmopolitan.

Tribe I. ALISMACEÆ. *Fruit* of 3 or more achenes.

Flowers bisexual. Stamens 6-9. Receptacle flat . . .	1. ALISMA.
Flowers polygamous. Stamens 6. Receptacle flat . . .	2. LIMNOPHYTON.
Flowers unisexual. Stamens many. Receptacle globose or oblong . . .	3. SAGITTARIA.
Flowers monœcious. Stamens 3	4. WISNERIA.

Tribe II. BUTOMÆ. *Fruit* of follicles.

Petals marcescent. Embryo straight	5. BUTOMUS.
Petals deciduous. Embryo hippocrepic	6. BUTOMOPSIS.

1. ALISMA, Linn.

Scapigerous herbs. *Leaves* lanceolate, cordate, or sagittate. *Flowers* bisexual in umbelled or paniced whorls, white or pink. *Sepals* 3, herbaceous, persistent. *Petals* 3, membranous, deciduous. *Stamens* 6 or 9, filaments filiform. *Carpels* few or many; receptacle small; stigma small, terminal; ovule solitary, anatropous, basilar. *Fruit* of few or many compressed or turgid, coriaceous or hard achenes. *Seeds* erect, testa membranous; embryo hippocrepic.—Species about 10, cosmopolitan.

1. **A. Plantago**, Linn.; leaves linear ovate-lanceolate or subcordate 5-7-nerved, fruiting sepals spreading, achenes membranous compressed, style slender deciduous. *Kunth Enum.* iii. 148; *Reichb. Ic. Fl. Germ.* vii. t. 57; *Micheli in DC. Monog. Phan.* iii. 32; *Boiss. Fl. Orient.* v. 9; *Wall. Cat.* 4998. ? *A. intermedium*, Griff. ex Voigt Hort. Suburb. Calcutt. 680.

Marshes, &c. of the LOWER HIMALAYA, alt. 1-7000 ft., from Kashmir to Munne-pore and Burma.—DISTRIB. N. and S. temp. regions.

Rootstock fleshy, swollen. *Leaves* 6-8 in., erect or spreading. *Scape* 1-4 ft. *Flowers* in panicle whorls, $\frac{1}{2}$ in. diam.; petals pink or rose with a yellow claw. *Achenes* 20-30, in a single whorl; style ventral.—A small state found in Kashmir, alt. 7000 ft., by Clarke, resembles *A. ranunculoides*, but the carpels are in one whorl, though irregularly disposed.

2. *A. reniforme*, *Don Prodr.* 22; leaves orbicular-cordate or reniform 13-17-nerved, fruiting sepals persistent, achenes 5-8 turgid, endocarp thick hard, style slender persistent. *Wight Ic. t.* 322; *Kunth Enum.* iii. 151; *Benth. Fl. Austral.* 186. *A. calophyllum*, *Wall. Cat.* 4997. *A. parnassifolium*, β majus, *Micheli in DC. Monog. Phan.* iii. 36.

Marshes, &c., throughout the plains and low country of India, ascending the hills to 5000 ft. (not in Ceylon).—DISTRIB. Australia.

Leaves coriaceous, $1\frac{1}{2}$ -4 in. (up to 7 in. broad), often broader than long, tip rounded or emarginate, nervules very fine and close. *Scape* 1-3 ft. *Flowers* white, $\frac{1}{2}$ in. diam., in very large whorled panicles; branches and pedicels long; sepals as long as the petals, at first erect in fruit, at length reflexed. *Achenes* not whorled, obovoid, dorsally ribbed, ribs smooth; style subterminal.—United by Micheli with the European *A. parnassifolium*, but differing much in the coriaceous very broad large leaves and in geographical distribution.

3. *A. oligococcum*, *F. Muell. Fragm. Phyt. Austral.* i. 23; leaves membranous broadly ovate-cordate with acute lobes and a narrow sinus punctate 11-17-nerved, bracts very large lanceolate, fruiting sepals reflexed, achenes 2-6 whorled turgid dorsally keeled keels tubercled, endocarp thick hard, style very short terminal deciduous. *Benth. Fl. Austral.* vii. 185; *Micheli, in DC. Monog. Phan.* iii. 37. *A. glandulosum*, *Thw. Enum.* 332. *A. apetalum*, *Ham. in Wall. Cat.* 4996.

Marshes, &c., in the plains of the PANJAB and BENGAL, but not common. CEYLON, *Thwaites*.—DISTRIB. Africa trop., Australia.

Leaves 3-6 in. long by 2-3 in. broad, nervules distant. *Panicle* 6-9 in. long and broad; bracts herbaceous, lower 1-3 in. long, lanceolate. *Flowers* of *L. Plantago*.

2. LIMNOPHYTON, Miquel.

An erect succulent marsh plant, with the characters of *Alisma*, except that the flowers are polygamous.

L. obtusifolium, *Miq. Fl. Ind. Bat.* iii. 242; *Micheli, in A. DC. Monogr. Phan.* iii. 39. *Alisma sagittifolium*, *Willd. Sp. Pl.* ii. 277; *Kunth. Enum.* iii. 151. *A. Kotschii*, *Hochst. in Flora*, 1843, 499. *A. obtusifolium*, *Thw. Enum.* 332. *Sagittaria obtusifolia*, *Linn.*; *Kunth. Enum.* iii. 158; *Roeb. Fl. Ind.* iii. 646; *Dalz. & Gibs. Bomb. Fl.* 249; *Wall. Cat.* 4992. *Dipseudochorion sagittifolium*, *Buchen. in Flora*, 1865, 241.—*Rheede Hort. Mal. xi. t.* 45.

The DECCAN; from the Concan southwards, in tanks, &c. CEYLON, *Thwaites*.—DISTRIB. Trop. Africa, Madagascar.

Usually very robust, but sometimes dwarf. *Leaves* 6-12 by 4-8 in., reniformly sagittate or triangular, with long tapering spreading lobes, many-nerved; petiole 2-3 ft. *Scape* 2-4 ft., stout, angled. *Flowers* many, $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., white, upper mostly male. *Sepals* reflexed after flowering. *Petals* obovate. *Stamens* 6, filaments of the male enlarged at the base. *Achenes* numerous, turbinate, turgid, epicarp fleshy; style ventral, stigma capitate.

3. **SAGITTARIA**, Linn.

Erect stemless, usually perennial water plants. *Leaves* long-petioled, elliptic cordate or sagittate. *Flowers* in paniced or spicate whorls, unisexual or polygamous. *Sepals* 3, herbaceous. *Petals* 3, membranous, deciduous. *Stamens* 6 or more; filaments filiform, compressed. *Carpels* very many, crowded on a large globose or oblong receptacle, laterally flattened; style ventral or apical, stigma papillose; ovules solitary, basilar. *Fruit* a globose or oblong head of flattened crested or winged achenes. *Seeds* erect, testa thin; embryo hippocrepic.—Species about 15, temperate and tropical.

1. **S. sagittifolia**, Linn.; leaves hastate or sagittate, achenes flat dorsally winged. *Kunth Enum.* iii. 156; *Roxb. Fl. Ind.* iii. 645; *Wall. Cat.* 4991; *Reichb. Fl. Germ.* vii. t. 53; *Boiss. Fl. Orient.* v. 11; *Micheli in A.D.C. Monogr. Phan.* iii. 66. *S. hermaphrodita*, Ham. in *Wall. Cat. l. c.* *S. hastata*, Don *Prodr.* 22. *S. Doniana*, Sweet, *Hort. Brit.* 1826.

In tanks, &c., throughout the plains of INDIA from the Panjab to Bengal and Munnipore.—DISTRIB. Europe, N. Asia, N. America.

Leaves obtuse or acute, 2–8 in. long, very rarely elliptic or lanceolate, lobes more or less diverging; petiole 8–18 in., trigonous. *Scape* 6–18 in., with 3–5 whorls of 3–5 flowers each $\frac{1}{2}$ in. diam.; lower whorls fem., upper male, with longer pedicels; bracts short, obtuse. *Flowers* $\frac{3}{4}$ in. diam.; petals white, claw often purple. *Achenes* obliquely obovate, apiculate, wings broad entire or subcrenate.

2. **S. guayanensis**, Humb. Bonpl. & Kunth, *Nov. Gen. & Sp.* i. 250; leaves floating broadly ovate deeply cordate obtuse, achenes flat surrounded by a broad toothed wing. *Kunth Enum.* iii. 161. *S. cordifolia*, Roxb. *Fl. Ind.* iii. 647; *Kunth l. c.* *S. Lappula*, Don. *Prodr.* 22. *S. parviflora*, Wall. *Cat.* (ex *Micheli*). *Alisma*? *Hamiltonianum* and *crisatum*, Wall. *Cat.* 4993, 4994, 4995. *A. stellatum* and *pubescens*, Ham. ex Wall. *Cat.* 4993, 4995. *Lophiocarpus guayanensis*, *Micheli in A.D.C. Monogr. Phan.* iii. 62.

In tanks and marshes, throughout the plains of INDIA, to BURMA and the MALAY PENINSULA, but not very common; (not in Ceylon).—DISTRIB. Malay Islands, China, trop. Australia.

Petioles, *scape*, and *pedicels* often more or less hairy. *Leaves* 1–2 in., membranous, lobes broad acute or obtuse, sinus broad or narrow; nerves radiating, obscure; petiole long or short. *Scape* 6–18 in., stout. *Flowers* $\frac{3}{4}$ in. diam., white, in few approximate irregular whorls; pedicels short, very stout; flowers of the lower whorls usually ternate, bisexual, 9–12-androus, of the upper more numerous, male, 6–10-androus. *Petals* obovate, erose. *Anthers* cordate at the base. *Achenes* very many.

4. **WISNERIA**, Micheli.

Scapigerous marsh or water herbs. *Leaves* long-petioled, filiform lanceolate or oblanceolate. *Flowers* minute, monœcious, in remote involucre whorls on a very slender rachis; involucre campanulate, truncate, membranous. *Sepals* 3, equal or one larger, persistent. *Petals* 2–4, equalling or smaller than the sepals. MALE FL. *Stamens* 3. *Pistillodes* subulate. FEM. FL. *Staminodes* setaceous. *Carpels* 3–6, erect, ovoid; receptacle small tumid; style 0, or terminal, short, stigma minute; ovule solitary, basilar. *Achenes* and *seed* subglobose or compressed; embryo conduplicate, hippocrepic.—Species 3, Trop. Asia, Africa, and Madagascar.

W. triandra, *Micheli in A.DC. Monog. Phan.* iii. 82; sepals and petals 3 each, achenes subglobose, stigma sessile. *Sagittaria triandra*, *Dalz. in Hook. Journ. Bot.* ii. (1850), 144; *Dalz. & Gibs. Bomb. Fl.* 249.

The CONCAN; in water holes, Malwan, *Stocks*.

Leaves with the petiole 9–16 in., narrowly linear-spathulate obtuse, $\frac{1}{4}$ – $\frac{1}{2}$ in. broad, midrib stout penni-nerved, lateral nerves slender submarginal. *Scape* shorter than the petiole. *Flowers* ternate, very shortly pedicelled, white; sepals linear-oblong; petals much larger, obovate. *Filaments* short, anthers didymous. *Achenes* few, subglobose or obovoid, smooth.

5. **BUTOMUS**, *Linn.*

A glabrous erect water plant, with a stout creeping rootstock. *Leaves* erect, linear, elongate, triquetrous, blade 0. *Scape* erect, terete. *Flowers* bisexual, in simple bracteate umbels, pink. *Sepals* and *petals* both coloured and persistent, coriaceous, erect. *Stamens* 9, hypogynous, filaments elongate-subulate; anthers linear, didymous after dehiscence. *Carpels* 6, whorled on a flat receptacle, connate below; stigma ventral elongate furrowed; ovules many, scattered, parietal, ascending. *Fruit* of 6 coriaceous beaked many-seeded follicles. *Seeds* linear-oblong, furrowed; embryo straight.

B. umbellatus, *Linn.*; *Kunth Enum.* iii. 164; *Reichb. Ic. Fl. Germ.* vii. t. 58; *Boiss. Fl. Orient.* v. 12; *Wall. Cat.* 7244.

The PANJAB and KASHMIR; in marshes, &c., alt. 1–5000 ft.—DISTRIB. Europe; N. Asia.

Leaves 3–4 ft. by $\frac{1}{2}$ in. broad, acuminate, base sheathing. *Umbel* many-fl., bracts 3; pedicels 2–4 in. *Flowers* 1 in. diam.

6. **BUTOMOPSIS**, *Kunth.*

An annual marsh herb with milky juice. *Leaves* elliptic, acute. *Flowers* in solitary or superposed bracteate whorls; perianth as in *Butomus*, but petals larger than the sepals, membranous, fugacious, white. *Stamen* 8–12; anthers oblong. *Follicles*, 6–7, erect; membranous. *Seeds* very many, minute, smooth.

B. lanceolata, *Kunth Enum.* iii. 165; *Dalz. & Gibs. Bomb. Fl.* 249; *Benth. Fl. Austral.* vii. 187; *Micheli in A.DC. Monog. Phan.* iii. 87. *B. ? latifolia*, *Kunth l.c.* *Butomus lanceolatus*, *Roxb. Fl. Ind.* ii. 315; *Wall. Cat.* 4999. *B. latifolius*, *Don Prodr.* 22. *B. Dobia*, *Ham. in Wall. l.c.* *Tæganocharis cordofana*, *Hochst. in Flora* (1841), 369.

PLAINS OF INDIA, from Rohilkund to Assam and the Deccan.—DISTRIB. tropics of the old world.

Very variable in stature and stoutness. *Leaves* 2–6 in., broad or narrow, 3–7-nerved, acute obtuse or apiculate. *Scape* as long as the leaves, stout or slender. *Umbels* 3–20-fl.; bracts few, short, scarious; pedicels 2–8 in., erect. *Flowers* $\frac{3}{4}$ –1 in. diam.; sepals ovate or orbicular; petals longer, obovate. *Stamens* 8–10, filaments rather slender, anthers oblong. *Follicles* 6–7, tapering into short beaks, membranous, connate below.

ORDER CLXX. **NAIADACEÆ.**

Aquatic or marsh herbs of various habit. *Rootstock* usually creeping. *Stems* usually elongate (short or 0 in *Triglochin*) branched. *Leaves* erect,

or submerged or floating, base sheathing; stipules 0 or within the sheath. *Flowers* inconspicuous, usually green, 1-2-sexual. *Perianth* 0, or tubular, or of 3-4 inferior valvate segments. *Stamens* hypogynous; anthers 1-2-celled. *Ovary* of 1-4 1-ovuled carpels, style long or short, stigma various; ovule erect or pendulous. *Fruit* of 1-seeded utricles achenes or drupelets. *Seed* exalbuminous; embryo straight or curved, radicular end very large.—Temperate and tropical; genera 16, sp. about 120.

* Stigmas discoid or decurrent on the ovary.

† *Perianth of sepals or scales. Flowers bisexual.*

Marsh herbs. Sepals 6, herbaceous green	1. TRIGLOCHIN.
Aquatics. Sepals 1-3, white, membranous	2. APONOGETON.
Aquatics. Sepals 4, herbaceous, green	3. POTAMOGETON.

†† *Perianth 0. Flowers uni- or bi-sexual.*

Aquatics. Stamen 2. Carpels stipitate	4. RUPPIA.
Aquatics. Stamen 1. Carpels sessile	5. ZANNICHELLIA.

** Stigmas subulate or capillary. Flowers unisexual.

Fresh or brackish aquatics. Perianth hyaline	6. NAIAS.
Marine. Perianth 0	7. CYMODOCEA.

1. **TRIGLOCHIN**, Linn.

Scapigerous marsh herbs. *Leaves* rush-like, flat or terete. *Flowers* small, bisexual, spicate or racemose, 2-bracteate. *Perianth-segments* 3 or 6, herbaceous, concave, deciduous. *Stamens* 6, inserted on the base of the segments; anthers didymous, slits extrorse. *Carpels* 6, 1-celled, 1-ovuled, 3 alternate often imperfect; styles short, often connate, stigmas penicillate; ovules basilar, erect, anatropous. *Fruit* of 3 or 6 free or connate achenes or follicles with recurved tips. *Seed* erect; embryo straight.—Genus cosmopolitan; species about 12.

1. **T. palustre**, Linn. *Sp. Pl.* 338; leaves $\frac{1}{2}$ -terete throughout, fruit clavate, carpels 3 slender attached to the axis by a point. *Kunth Enum.* iii. 143; *Reichb. Ic. Fl. Germ.* vii. t. 51; *Boiss. Fl. Orient.* v. 13.—*Trigloch*in, *Griff. Notul.* iii. 204; *Ic. Pl. Asiat.* t. 271.

TEMPERATE and ALPINE HIMALAYA, and WESTERN TIBET, alt. 8-15,000 ft.—DISTRIB. N. temp. regions and S. America.

Stem 6-24 in., tuberous and stoloniferous. *Leaves* 2-12 in., flaccid. *Scape* slender; raceme elongating after flowering, pedicels short. *Perianth* green, margins purplish. *Anthers* purple. *Fruit* $\frac{1}{4}$ in. long, appressed to the rachis; carpels dorsally terete.

2. **T. maritimum**, Linn. *Sp. Pl.* 339; leaves slightly flattened at the tip, fruit oblong of 6 separable carpels. *Kunth Enum.* iii. 145; *Reichb. Ic. Fl. Germ.* vii. t. 52; *Boiss. Fl. Orient.* v. 13.

TEMPERATE and ALPINE HIMALAYA, and WESTERN TIBET, from 12,000-16,000 ft.—DISTRIB. N. temp. regions.

Larger, stouter, and more tuberous at the base than *T. palustre*. *Scape* stout, curved; raceme longer, but not elongating so much in fruit; flowers larger; fruit $\frac{1}{2}$ in., not appressed to the scape, carpels grooved on the back.

2. **APONOGETON**, *Thumb.*

Submerged scapigerous plants; rootstocks tuberous. *Leaves* floating or erect, oblong. *Scape* long, bearing a single or twin sessile spikes of often unilateral or distichous bisexual flowers; the very young spikes enclosed in a conical deciduous sheath. *Perianth* 0, or of 1-3 equal or unequal white segments. *Stamens* 6 or more, filaments subulate, unequal, persistent; anthers didymous. *Carpels* 3-6, 2- or more-ovuled; style short, stigma discoid or decurrent persistent; ovules basilar, anatropous. *Fruit* of 3 or more coriaceous follicles. *Seeds* erect; embryo straight.—Species about 20, Asiatic, African and Australian.

1. **A. monostachyon**, *Linn. f. Suppl.* 214; leaves floating oblong 3-5-nerved opaque, cross nervules distinct, spike solitary, sepals 2 shorter than the 3 smooth 4-8-seeded follicles. *Roxb. Cor. Pl.* i. 58, t. 81; *Fl. Ind.* ii. 210; *Thw. Enum.* 333; *Dalz. & Gibs. Bomb. Fl.* 248; *Griff. Notul.* iii. 203; *Wall. Cat.* 5167, A, B, C, E.; *Andr. Bot. Rep.* vi. t. 406. *A. monostachys*, *Edgew. in Hook. Lond. Journ. Bot.* iii. (1844), 405, t. 17. *A. lucens*, *Herb. Madr.* *A. flavidum*, *Herb. Ham.* *Spathium monostachyum*, *Edgew. in Calc. Journ. Nat. Hist.* iii. (1843), 533, t. 16. *Potamogeton indicus*, *Roth ex Roem. & Sch. Syst.* iii. 576. *Saururus natans*, *Linn. Mant.* 227.—*Rheede Hort. Mal.* ii. t. 15.

Tanks, &c., throughout INDIA and CEYLON.—DISTRIB. Trop. Asia and Australia.

Leaves 3-6 in., acute or obtuse, herbaceous, base cuneate rounded or cordate. *Spike* 1-6 in., lax or dense-fl. *Sepals* obovate to lanceolate. *Stamens* 6. *Seeds* oblong.—Submerged leaves membranous transparent and with distinct cross-nervules as in *A. crispum*.

2. **A. crispum**, *Thunb. Nov. Gen.* i. 73; leaves submerged from linear-oblong to lanceolate 3-7-nerved membranous translucent cross-nervules distinct, spike solitary, sepals much longer than the 3-4 smooth 1-2-seeded follicles. *Thw. Enum.* 333. *A. undulatum*, *Roxb. Fl. Ind.* ii. 211; *Wall. Cat.* 5167, D. 5168; 5175, F.; *Aitchis. Cat. Panjab Pl.* 145. *Ouvirandra undulata*, *Edgew. in Hook. Lond. Journ. Bot.* iii. (1844), 405, t. 18. *Spathium undulatum*, *Edgew. in Calc. Journ. Nat. Hist.* iii. (1843), 533, t. 15.—*Limogeton*, *Edgew. ex Griff. Notul.* iii. 203.

Tanks throughout INDIA and CEYLON.—DISTRIB. Australia.

Leaves 1-3 ft., flat or undulate; base acute rounded or cordate. *Sepals* very variable in size, if two species be not confounded under this name. *Roxburgh* describes them "as in *monostachyon*," but in some specimens they are fully $\frac{1}{2}$ in. long.

3. **A. echinatum**, *Roxb. Fl. Ind.* ii. 210; leaves floating linear-oblong 3-5-nerved opaque cross-nervules obsolete, spike solitary, sepals shorter than the 3 echinate 2-seeded follicles.

Tanks in BENGAL, *Roxburgh*.

I have seen but one specimen of what I take to be this plant, in *Herb. Wight*, named *A. dispernum*. *Wight* says it quite resembles *A. monostachyon*, except in the follicles, which are larger, 2-seeded, more narrowed into a nearly straight beak, and they are dorsally irregularly ridged. *Roxburgh* describes *echinatum* as about 6-seeded; but he figures on the plate of *A. monostachyon*, apart from the enlarged 6-seeded follicles of that plant, 3 others carpels which are strongly echinate and 2-seeded, and to which he doubtless alludes under his description of the former,

saying, "There is a var. if not a distinct species with hedgehog 2-seeded capsules, but in all other respects the same."—It follows that he, by inadvertence, describes the follicles of *A. echinatum* as 6-seeded.

4. **A. microphyllum**, *Roxb. Fl. Ind.* ii. 211; leaves very small oblong long-petioled sides incurved, spike solitary, sepals much larger than the 3 smooth 1-2-seeded follicles, seeds globose. *Spathium microphyllum*, *Voigt Hort. Suburb. Calcutt.* 694.

BHUTAN Mts.; in damp places, *Roxburgh*.

I have seen no specimens, and *Roxburgh's* description differs much from a drawing in his collection. The latter represents a plant seven inches high, with a smooth naked tuber, four leaves with sheathing petioles $1\frac{1}{2}$ in. long, blade $\frac{1}{2}$ by $\frac{1}{4}$ in. concave recurved, apparently oblong acute, and quite opaque; spike $1\frac{1}{4}$ in., clothed with spreading white sepals $\frac{1}{4}$ in. long, and red-brown anthers. *Roxburgh*, on the other hand, describes the leaves as many times shorter than the spike, spreading close to the surface of the earth, 1 in. long by $\frac{1}{8}$ broad, and the spike as everywhere covered with beautiful blue flowers. The globose seeds are remarkable.

3. **POTAMOGETON**, *Linn.*

Submerged water-plants with creeping rootstock. *Leaves* submerged or floating, opposite or alternate, entire or toothed; stipules intrafoliaceous. *Flowers* small, spicate on a scape rising from a membranous spathe, ebracteate. *Perianth-segments* 4, concave, green, valvate. *Anthers* 4, sessile on the segments, didymous, slits extrorse. *Carpels* 4, sessile, 1-celled, 1-ovuled; stigma subsessile or decurrent, persistent; ovule inserted in the inner angle of the cell, campylotropous. *Drupelets* small, coriaceous or spongy. *Seed* subreniform; embryo macropodal.—Species about 50, cosmopolitan.

In determining the Indian species of *Potamogeton* I have had the invaluable aid of Mr. Arthur Bennett, F.L.S., whose knowledge of the genus is as full as it is accurate.

* *Upper or all the leaves floating.*

1. **P. indicus**, *Roxb. Fl. Ind.* i. 452; upper leaves floating oblong elliptic or elliptic-lanceolate coriaceous, lower submerged longer narrower membranous, stipules $1-1\frac{1}{2}$ in. free, spike dense-fld., drupelets small smooth. *Kunth Enum.* iii. 139; *Don Prodr.* 21; *Wall. Cat.* 5175 excl. F.; *Grah. Cat. Bomb. Pl.* 200; *Dalz. & Gibs. Bomb. Fl.* 248. *P. Roxburghianus*, *Schult. f. Mant.* iii. 367. *P. natans*, *Thw. Enum.* 333.

Throughout the plains of INDIA, ascending the Himalaya to 9000 ft. in Sikkim. BURMA, *Collett.* CEYLON, *Thwaites*.—DISTRIB. Malay and Sandwich Islds.

Stem terete. *Floating leaves* $3-4\frac{1}{2}$ by $1-2\frac{1}{2}$ in., alternate or uppermost opposite, base acute or rounded, opaque; stipules as long as the petioles or shorter. *Peduncle* stout or slender.—Differs from *P. natans* especially in the shorter stipules and smaller drupelets.

2. **P. natans**, *Linn. Sp. Pl.* 126; upper leaves floating oblong elliptic or elliptic-lanceolate biplicate at the insertion of the petiole, submerged few or 0, stipules 4-5 in. free spikes dense-fld., peduncle stout, drupelets dorsally keeled shortly beaked. *Kunth Enum.* iii. 127. *Reichb. Ic. Fl. Germ.* vii. t. 50; *Boiss. Fl. Orient.* v. 15; *Aitch. Cat. Panjab Pl.* 145. *P. rufescens*, *Aitch. l. c.* 145.

The PANJAB, Thomson. KASHMIR, alt. 5000 ft., Jacquemont, &c.—DISTRIB. widely diffused especially in temp. climates.

Stem terete. *Leaves* 2–6 in. ; submerged (if present) sessile, long, narrow, and without a limb. *Peduncle* stout. *Drupelets* $\frac{1}{2}$ in. long.

3. **P. oblongus**, Viv. *Fl. Ital.* 2, t. 13; floating leaves long-petioled elliptic or lanceolate thinly coriaceous, submerged narrowly lanceolate, stipules $1\frac{1}{2}$ in., peduncle and dense-fld. spike very slender, drupelets minute shortly beaked not keeled. *Engl. Bot.* t. 2849. *P. polygonifolius*, Pourr. in *Mem. Acad. Toul.* iii. (1788), 325; *Hook. f. Students' Brit. Fl. Ed.* 3, 431. *P. digynus* and *P. elegans*, Wall. Cat. 5177, 5178.

NEPAL, Wallich. KHASIA HILLS, alt. 4–5000 ft. J.D.H. & T.T. SINGAPORE ? Wallich.—DISTRIB. Temp. and trop. regions of the old world.

The more membranous leaves, shorter stipules, very slender peduncle and spike, smaller flowers and minute drupelets not $\frac{1}{10}$ in. long, distinguish this from *P. satans*.

4. **P. javanicus**, Hassk. in *Verh. Natuurk. Ver. Ned. Ind.* i. (1856), 26; floating leaves small ovate-oblong or elliptic acute at both ends 5–7-nerved longer than their petiole, submerged linear acuminate, stipules $\frac{1}{2}$ –1 in., peduncle slender, spike lax fld., drupelets $\frac{1}{2}$ -orbicular beaked, ribs often toothed or tubercled, beak hooked, *Miq. Fl. Ind. Bat.* iii. 750. *P. tenuicaulis*, F. Muell. *Fragn.* i. 90, 244; *Benth. Fl. Austral.* vii. 171. *P. parvifolius*, Buchen. in *Brem. Abhandl.* vii. (1880), 32. *P. heterophyllus*, Ham. in Wall. Cat. 5181. *P. hybridus*, Mich. ? *Herb. Ind. Or. Hf. & T.*

Plains of INDIA; ascending the Himalaya to 7000 ft., in the N. West, and 9000 ft. in Sikkim. KHASIA HILLS, alt. 6000 ft.—DISTRIB. Trop. Asia, Africa and Australia.

Stem very slender. *Leaves* $\frac{1}{2}$ –1 $\frac{1}{2}$ in. ; blade twice as long as the petiole or longer *Spike* $\frac{1}{2}$ – $\frac{1}{3}$ in. ; flowers very small, in interrupted whorls; peduncle as long or longer. *Sepals* orbicular-ovovate. *Drupelets* $\frac{1}{12}$ in., turgid, beak stout.

** *Leaves* all submerged, ovate oblong or broadly linear, translucent.

5. **P. perfoliatus**, Linn. *Sp. Pl.* 126; stem stout, leaves amplexicaul ovate-cordate entire 5–9-nerved, peduncle short stout, drupelets hardly keeled shortly beaked. *Kunth Enum.* iii. 133; *Reichb. Ic. Fl. Germ.* vii. t. 29; *Boiss. Fl. Orient.* v. 17; *Dalz. & Gibs. Bomb. Fl.* 248.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 4–8000 ft. WESTERN TIBET, alt. 8–14,000 ft.—DISTRIB. N. temp. regions, Australia.

Stem terete, dichotomous. *Leaves* 1–4 in., margins scaberulous, upper opposite; stipules small, caducous. *Peduncle* stout, not thickened upwards. *Spike* dense-fld. *Sepals* long-clawed. *Drupelets* $\frac{1}{10}$ in., compressed, beak straight.

6. **P. crispus**, Linn. *Sp. Pl.* 126; stem slender, leaves semiamplexicaul linear or linear-oblong crisped serrulate 3-nerved, peduncle curved tapering upwards, spike few-fld., drupelets obliquely ovoid long-beaked. *Kunth Enum.* iii. 133; *Reichb. Ic. Fl. Germ.* vii. t. 29, 30; *Boiss. Fl. Orient.* v. 17. *P. tuberosus*, Roxb. *Fl. Ind.* i. 472; *Wall. Cat.* 5174; *Grah. Cat. Bomb. Fl.* 200; *Dalz & Gibs. Bomb. Fl.* 248. *P. crenulatus*, Don *Prodr.* 22.

PLAINS OF INDIA and TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 4–6000 ft. MUNNIPORE, Watt.—DISTRIB. N. and S. temp. and subtrop. regions.

Stem dichotomous, compressed. *Leaves* 1–3 in., alternate and narrowed at the base, or opposite and amplexicaul, tip rounded; stipules small, caducous. *Peduncle*

long. *Spike* very short, few-fl.; flowers very small. *Drupelets* $\frac{1}{4}$ in., obliquely ovoid, compressed, ribs entire or toothed.

7. **P. lucens**, *Linn. Sp. Pl.* 126; stem stout, leaves large subsessile oblong-lanceolate cuspidate undulate serrulate many-nerved, peduncle stout thickened upwards, spike stout, drupelets small turgid shortly beaked. *Kunth Enum.* iii. 132; *Reichb. Ic. Fl. Germ.* vii. t. 36, 37, 40; *Boiss. Fl. Orient.* v. 16.

KASHMIR, alt. 5-6000 ft., *Jacquemont*, &c. KUMAON, alt. 6400 ft., *Strachey & Winterbottom*.—DISTRIB. N. temp. regions, Australia.

Stem branched. *Leaves* 4-10 in., very variable, upper opposite sometimes floating; stipules large, long, 2-winged or -keeled. *Drupelets* $\frac{1}{10}$ in., convex on both faces, obtusely beaked.

8. **P. mucronatus**, *Presl Epimel.* 245; leaves all submerged longer than their petioles, elliptic- or oblong-lanceolate acute or cuspidate membranous many-nerved base acute or obtuse, stipules much longer than the petiole lanceolate connate, peduncle very long, spike of interrupted groups or whorls of flowers. *P. malaianus*, *Miq. Ill. Fl. Archip. Ind.* 46. *P. lucens*, *Ham. in Wall. Cat.* 5176.

BENGAL; at Dinagepore and Kulna and Karnata, *Hamilton*.—DISTRIB. Borneo Philipp. Islds.

Leaves 3-5 by $\frac{1}{2}$ - $\frac{3}{4}$ in., 5-9 or more-nerved, blade twice or thrice as long as the petiole; stipules 1-1 $\frac{1}{2}$ in. *Spike* 1 $\frac{1}{2}$ -2 in.; flowers laxly crowded or whorled. *Sepals* suborbicular, very shortly clawed. *Fruit* $\frac{1}{2}$ -orbicular, shortly beaked.—Has a good deal the aspect of *P. lucens*, to which *Hamilton* referred it. The specimens are very poor, and insufficient for a satisfactory diagnosis.

*** *Leaves all submerged, very narrowly linear or filiform.*

9. **P. pectinatus**, *Linn. Sp. Pl.* 127; leaves filiform acute opaque 1-3-nerved, margins slightly thickened, stipules adnate to the leaf-sheath, drupelets large turgid smooth hardly beaked. *Kunth Enum.* iii. 137; *Reichb. Ic. Fl. Germ.* vii. t. 19; *Boiss. Fl. Orient.* v. 18; *Aitch. Cat. Panjat Pl.* 145. *P. marinus*?, *Ham. in Wall. Cat.* 5179 A, B in part. *Ruppia subsessilis*, *Thw. Enum.* 333, in part.

Plains of INDIA, the HIMALAYA, and WESTERN and EASTERN TIBET, alt. 12-17,000 ft. CEYLON, *Thwaites*.—DISTRIB. most regions.

Stem filiform, densely distichously branched. *Leaves* 3-8 by $\frac{1}{10}$ - $\frac{1}{8}$ in., lower sometimes 5-nerved. *Peduncle* not thickened upwards; flowers interruptedly whorled. *Drupelets* $\frac{1}{8}$ in., dimidiate-obovoid.

10. **P. pusillus**, *Linn. Sp. Pl.* 127; leaves narrowly linear or filiform acute usually 3-nerved membranous, stipules small free, peduncle long filiform, flowers few minute clustered, drupelets turgid stoutly beaked obtusely keeled. *Kunth Enum.* iii. 136; *Reichb. Ic. Fl. Germ.* vii. t. 22; *Boiss. Fl. Orient.* v. 18; *Wall. Cat.* 5180.

KASHMIR, alt. 5000 ft., *Thomson*.—DISTRIB. N. and S. temp. regions.

Stem filiform, densely distichously branched. *Leaves* $\frac{1}{2}$ -3 in., rarely acuminate, rarely 5-7-nerved. *Spike* 6-10-fl. *Drupelets* obliquely ovoid.

Subsp. *flabellatus*, *Hook. f.*, *Students' Brit. Fl.* 436; leaves $\frac{1}{2}$ in. broad 3-5-nerved. *P. flabellatus*, *Bab. in Proc. Linn. Soc. Ser. ii.* (1853), nom.; in *Phytologist*, iv. 1158. *P. marinus*? *Ham. in Wall. Cat.* 5179 B, in part.—Upper Bengal; Patna, *Wallich*. The Panjab, *Thomson*.—DISTRIB. Britain.

4. **RUPPIA**, Linn.

Submerged slender branched brackish-water plants. *Leaves* elongate, filiform, sheaths stipuliform. *Flowers* minute, bisexual, 2-6 together within the leaf-sheath on a short peduncle which usually elongates greatly after flowering, and is then straight or spirally twisted. *Perianth* 0. *Anthers* 2, sessile, opposite, 2-celled. *Carpels* 4, 1-ovuled, at length (in fruit) long-stipitate, stigma sessile; ovule pendulous. *Achenes* ovoid, obtuse or beaked. *Seed* uncinat, embryo macropodal.—Species temperate and subtropical.

R. rostellata, Koch in *Reichb. Ic. Crit.* ii. 66, fig. 306; *Ic. Fl. Germ.* vii. t. 25; peduncle straight after flowering, achenes obliquely ovoid acutely beaked. *Boiss. Fl. Orient.* v. 20. *R. maritima*, Griff. *Notul.* iii. 196; *Ic. Pl. Asiat.* t. 257-259.

THROUGHOUT INDIA and in CEYLON, in brackish water.—DISTRIB. Europe temp. and trop. Asia.

Stem 2 ft. and upwards. *Leaves* 1-3 in. *Fruiting peduncle* 1-6 in. *Achenes* $\frac{1}{2}$ in. long.

5. **ZANNICHELLIA**, Linn.

Submerged salt-water plants, with slender rootstock and stems. *Leaves* linear, sheaths stipular. *Flowers* minute, enclosed in the leaf-sheaths, a male and fem. in one membranous spathe. *Male fl.* a linear 2-3-celled anther, filament slender. *Fem. fl.* perianth cupular hyaline. *Carpels* 2-9, sessile; style long slender, stigma oblique peltate crenate; ovule solitary, pendulous, orthotropous. *Achenes* 4, sessile or stipitate, reniform, crested. *Seed* pendulous, testa thin; embryo subcylindric, cotyledonary end twice folded on itself.—Species 4-5, or forms of one.

Z. palustris, Linn. *Sp. Pl.* 969; *subsp.* PEDICELLATA; male peduncle short, achenes 2-4 subsessile, back crenate or tubercled, style as long as the body of the achene or longer, anthers 2-celled. *Aschers. Fl. Brandenb.* 668; *Boiss. Fl. Orient.* v. 15; *Micheli, Nov. Gen.* t. 34, f. 2. *Z. pedunculata*, *Reichb. Fl. Germ.* vii. t. 16; *Ic. Crit.* viii. t. 760. *Z. gibberosa*, *Reichb. l. l. c. c.* t. 16 and t. 759. *Ic. Fl. Germ.* vii. t. 21, 22. *Z. pedicellata*, *Ham. in Wall. Cat.* 5185; *Griff. Notul.* iii. 190; *Ic. Pl. Asiat.* t. 255, 256.

Salt marshes and lagoons throughout INDIA, ascends to 15,000 ft. in W. Tibet.—DISTRIB. (of *Z. palustris*), all regions but ? Australia.

I find the following forms amongst the Indian specimens: *a*, from Western Tibet; flowers sessile or very shortly peduncled, achenes stipitate, dorsally crenate, style shorter than the achene; *b*, from the Panjab and Behar; flowers sessile, achenes stipitate smooth or tubercled dorsally or ventrally or both, style very long; *c*, from Western Tibet, alt. 12-13,000 ft.; flowers sessile, achenes sessile very slender; *d*, from the Panjab; flowers subsessile, style as long as the achenes; *e*, from the Panjab and Behar; flowers peduncled, achenes small as long as their stalks, style shorter than the achene.

6. **NAIAS**, Linn.

Submerged plants; stem branched, filiform, smooth or muricate. *Leaves* opposite alternate or whorled, linear, entire or toothed. *Flowers* minute, axillary, monœcious or diœcious. MALE FL. *Perianth* an outer tubular or inflated entire or 4-fid tube and a hyaline inner. *Stamen* 1, adnate

to the inner perianth, apiculate or cuspidate, 1-4-celled. *Fem. perianth* 0, or hyaline and adherent to the carpel. *Carpel* 1, sessile, 1-ovuled; stigmas 2-4, slender; ovule basilar, erect, anatropous. *Achene* oblong. *Seed* erect, testa very thin; embryo straight.—Species about 10, temperate and tropical.

The Indian species of this genus require a very close examination, which I regret to say I have not materials in flower and fruit sufficient to enable me to undertake.

1. **N. major**, *All. Fl. Pedem.* ii. 221; stem terete toothed, leaves linear almost pinnatifidly toothed, teeth triangular, base hardly dilated, flowers solitary, anther 4-celled. *Kunth Enum.* iii. 112; *Nees Gen. Fl. Germ.* iii. t. x.; in *Linnaea*, ix. t. 7, and x. t. 1; *Boiss. Fl. Orient.* v. 27. *N. fucoides*, *Griff. Notul.* iii. 184; *Ic. Pl. Asiat.* t. 251, f. 1. *N. muricata*, *Del. Fl. Egypt.* 281. *N. spinosa*, *Ham. in Wall. Cat.* 5182.

Throughout India, in fresh and brackish water, ascending to 8000 ft. in Western Tibet. CEYLON.—DISTRIB. Europe, Asia, Africa.

Stem terete, branched. *Leaves* $\frac{1}{2}$ –1 $\frac{1}{2}$ in., teeth 4-8 on each side, dorsally spinous; sheath with rounded entire sides. *Flowers* diœcious; invol. of male oblong, 2-3-toothed. *Carpel* oblong, stigmas 2-3, filiform. *Achene* $\frac{1}{12}$ – $\frac{1}{8}$ in.

2. **N. graminea**, *Del. Fl. Egypt.* 282, t. 50, f. 3; leaves narrowly linear or subulate acuminate flaccid acutely many-toothed, basal auricles erect lanceolate toothed on both margins, flowers fascicled monœcious, anthers 4-celled. *Kunth Enum.* iii. 115; *Boiss. Fl. Orient.* v. 28; *A. Braun in Seem. Journ. Bot.* ii. (1864) 278, f. 5. *N. seminuda*, *Griff. Notul.* iii. 184; *Ic. Pl. Asiat.* t. 251, f. 2, and t. 253, 254. *N. semistipula*, *Balb. Fl. Ticin.* t. 15. *Caulinia alzanensis*, *Pollin. Fl. Veron.* iii. 49. *Fluvialis indica*, *Pers. ex Wall. Cat.* 5183 B.

Throughout INDIA in still fresh water, and CEYLON.—DISTRIB. the Old World generally.

Stem 1-2 ft. *Leaves* $\frac{3}{4}$ –1 in., usually whorled, broader, more transparent and more acutely toothed than is *N. minor*.

3. **N. minor**, *All. Fl. Pedem.* ii. 221; leaves very narrowly linear remotely toothed basal auricles rounded or truncate toothed rarely acute and entire, flowers fascicled monœcious, anther 1-celled. *Kunth Enum.* iii. 113; *Nees Gen. Fl. Germ.* iii. t. x.; *Boiss. Fl. Orient.* v. 28. *N. dichotoma*, *Roxb. Fl. Ind.* iii. 749. *N. ternata*, *Roxb. ex Griff. Notul.* iii. 183; *Griff. Ic. Pl. Asiat.* t. 252. *N. indica*, *Cham. in Linnaea*, iv. 501. *Caulinia indica*, and *fragilis*, *Willd. in Mem. Acad. Berl.* (1798) 89. *C. indica*, *Wall. Cat.* 5183, *in part*.

Throughout INDIA and CEYLON, in still sweet water.—DISTRIB. Old World generally.

Stem very slender, much branched. *Leaves* spreading, or the upper recurved, $\frac{1}{4}$ in. or less, hardly $\frac{1}{2}$ in. broad, green or brown when dry.—There may be two or more species in India under the above name. The other plant under Wallich's 5183 is a *Chara*.

4. **N. falciculata**, *A. Braun in Seem. Journ. Bot.* ii. (1864) 278, f. 4; stem rigid, leaves as in *N. minor*, but auricles falcately incurved entire or the inner margin entire the outer toothed.

MADRAS; at Tuticoreen, *Wight*.—DISTRIB. Philippine Islands.

I greatly doubt this being distinct from *N. minor*, amongst numerous specimens of which I find some with basal auricles very like those figured by Braun as *falciculata*.

INDETERMINABLE SPECIES.

N. TENUIS, A. Br. (not *Z. tenuis*, Reut. Cat. Jard. Gener., 1854) is a plant from Behar alluded to by Magnus in his "Beitrag. Gatt. Naias," Vorwort, p. vii., and refers probably to a form of *N. minor* as above diagnosed.

N. HETEROMORPHA, Griff. ex Voigt Hort. Suburb. Calcutt. 694. A Serampore specimen so named in Herb. Kew, by Griffith, has a very long laxly leafy stem, the long toothed leaves have no auricles, or most minute toothed ones. It is not in flower or fruit.

N. RIGIDA, Griff. Notul. iii. 181. I cannot identify any Indian species with this. It is a native of Serampore, described as blackish green when dry with fleshy rigid leaves. Some specimens included under *N. minor* answer to the colour.

7. *GYMODOCEA*, Koenig.

Submerged marine plants; rootstock rigid, jointed, creeping. Leaves oblong or linear; sheaths stipular. Flowers axillary, uni- or bi-sexual, in membranous sheaths. Perianth 0. MALE FL. Anthers 2, elongate, connate, stipitate, slits extrorse; pollen confervoid. FL. FEM. Carpels 2, subsessile, ovoid, compressed, 1-ovuled; style short, stigmatas subulate recurved; ovule pendulous, orthotropous. Fruit of 2 ovoid coriaceous or woody and externally succulent carpels. Seed pendulous; testa thick; embryo inflexed.—Species 4 or 5, Indian and Pacific Oceans.

As this sheet was passing through the press, I received from Dr. Trimen a list of the Ceylon Halophytes known to him, and in which I find *Cymodocea serrulata* (true) and *C. australis*. And amongst the *Hydrocharideæ*, there are to be added at p. 663 of vol. v., *Halophila Beccarii*, Asch., and *Thalassia Hemprichii*, Asch.

1. *C. ciliata*, Ehrenb. ex Aschers. in Sitzb. Ges. Naturf. Fr. Berl. (1867) 3; in Linnæa xxxv. 162; leaves 3–6 by $\frac{1}{2}$ – $\frac{3}{4}$ in. linear falcate, tip rounded ciliate-serrulate. Boiss. Fl. Orient. v. 23; Benth. Fl. Austral. vii. 178; Aschers. in Sitzb. Bot. Ver. Brandb. (1882) 28. *Thalassia ciliata*, Kön. Ann. Bot. ii. 97; Kunth Enum. iii. 120. *Posidonia serrulata*, Thw. Enum. 333. *Zostera ciliata*, Forsk. Fl. Ægypt. Arab. 157.

ANDAMAN ISLS., Prain. CEYLON, Gardner, Harvey.—DISTR. of the genus.

Stem or rhizome 3–12 in., woody, branched, covered with annular scars. Fl. and frt. unknown.

2. *C. serrulata*, Aschers. & Magn. in Sitzb. Ges. Naturf. Fr. Berl. (1867) 3; leaves 4–6 by $\frac{1}{2}$ – $\frac{1}{4}$ in. linear nearly straight, tip entire or denticulate. *Posidonia serrulata*, Spreng. Syst. i. 181.

CEYLON, Thwaites (C.P. 3056).—DISTRIB. of the genus.

I have seen no Ceylon flowering or fruiting specimens.

3. *C. isœtifolia*, Aschers. l.c.; in Linnæa, l.c. 163; and in Nuov. Giorn. Bot. ii. 182; stem short, leaves terete fleshy grooved tip 3-toothed. Boiss. Fl. Orient. v. 22; Benth. Fl. Austral. vii. 178. *C. æquorea*, Kunth Enum. iii. 118 (excl. Syn.); Thw. Enum. 333.

SOUTH CARNATIC; at Tuticoreen, Wight. CEYLON, Harvey, Glenie.—DISTRIB. Indian Ocean.

Leaves 3–5 by $\frac{1}{2}$ – $\frac{1}{10}$ in., glaucous. Flowers in dichotomous cymes.

4. *C. australis*, Trim. Cat. Ceylon Pl. 99; leaves 5–7 by $\frac{1}{2}$ – $\frac{1}{4}$ in., linear nearly straight tip rounded or truncate and 3-toothed. *Halodule australis*, Miq. Fl. Ind. Bat. iii. 227. *Diplanthera tridentata*, Steinh. in Ann. Sc. Nat. Ser. ii. ix. 98. *Zostera uninervis*, Forsk. Fl. Ægypt. Arab. cxx. and 157.

CEYLON, *fid. Ascherson.*—DISTRIB. of the genus.

I have seen no Ceylon specimens, and regard the identification of all the above enumerated species but *C. isatifolia*, as provisional only.

ORDER CLXXI. **ERIOCAULÆ.**

Marsh or aquatic scapigerous herbs. *Leaves* narrow. *Flowers* very minute, in involucrate heads, bracteate, unisexual, usually monœcious; perianth inferior. **MALE FL.** *Sepals* of 2-3 free or connate scales. *Petals* 2-3, equal or unequal, often very obscure, inserted on the top of a clavate elongate stipes. *Stamens* 6 or fewer, some often reduced to filaments, 3 opposite to or adnate to the petals; anthers dorsified. *Pistillode* minute or 0. **FEM. FL.;** *sepals* 2-3, caducous. *Petals* 3 (rarely 2 or 0) persistent, spathulate or oblanceolate, usually ciliate or villous, and with a black gland on the disk. *Ovary* 3, rarely 2-celled; style short, persistent, stigmas 2-3 slender, with sometimes interposed lobes or appendages; ovules solitary in the cells, pendulous, orthotropous. *Capsule* deeply 3-lobed, membranous; lobes globose, loculicidal. *Seeds* pendulous, testa coriaceous, striolate and often papillose; embryo outside the floury albumen.—Genera 6, species 6-700 chiefly tropical.

The Indian species all belong to the genus *Eriocaulon*, in which the anthers are didymous and 2-celled, the stigmas without appendages, and the inner involucre bracts are not radiating. They are most difficult of classification, presenting no good sectional characters, that of flowers trimerous or dimerous being quite deceptive. The leaves vary greatly in length, breadth and nervation; as do the scapes in length. The sheath of the scape is usually membranous at the tip, but sometimes green, which latter is, I think, a good character. The outer invol. bracts may be erect spreading or deflexed, in the latter case they are usually hidden under the flowers, but they are sometimes though hidden spreading. The male fl. are invariably pedicelled; the fem. usually so, and this appears to afford a pretty good character; as is that of the fem. petals and ovary being raised on a stipes above the sepals, or not. The 3 male sepals may be, in the same head, connate in a funnel-shaped sheath split on one side, or 2, or all free. The male petals are often obsolete, and the filaments very variable in number and length in the same head. The fem. sepals are normally 3, and are very caducous, but the anticous is usually smaller and flatter than the others, more caducous, and often easily overlooked, when the calyx appears to be dimerous. The fem. petals vary a good deal in breadth, length and hairiness, and especially in the size and position of the gland (if present), even in the same head. I can find no characters on the length of the stigmas and style, which, however, differ a good deal in different species. The seeds in some species vary a good deal in colour, from amber-yellow to red-brown; normally they are broadly oblong, striated, with often papillose ridges, and most minute transverse striations. The hairs of the head are of two kinds, white opaque stout obtuse bristles, and capillary transparent jointed ones; they are sometimes intermixed, and it is often difficult to say to which category the hairs should be referred.

In the following epitome of the Indian *Eriocaulons* (with which I am far from being satisfied) I have been obliged to propose a good many new species. Some of them may be described Malayan ones, of which I have seen no specimens, and the descriptions of which are too imperfect for their identification. I have minutely examined most of the old world species accessible to me, but find very few conspecific with the Indian.

ERIOCAULON, Linn.

A. Aquatics. *Stems* elongate, branched, submerged, densely leafy, upper branches floating. *Leaves* capillary. *Heads* very small. *Invol. bracts* very small, oblong or cuneate, glabrous. (See also *E. Dalzellii* at end of genus.)

1. ***E. setaceum***, *Linn. Sp. Pl.* 87; receptacle conical villous, fl. bracts cymbiform acute coriaceous glabrous black, seeds dark brown. *Kunth Enum.* iii. 550. *Steud. Syn. Pl. Cyp.* ii. 270; *Thw. Enum.* 341. *E. intermedium*, *Kærn. in Linnæa*, xxvii. 601.—*Rheede Hort. Mal.* xii. t. 63.

MALABAR; at Quilon, *Wight*. CEYLON; *Walker*, &c.

Stem 2–3 ft., stout or slender, flexuous. *Leaves* $1\frac{1}{2}$ –2 in., flexuous, 1-nerved. *Peduncles* very many, slender, $1\frac{1}{2}$ –3 in.; sheath $\frac{3}{4}$ –1 in., tip membranous. *Heads* $\frac{1}{8}$ in. diam. *Male petals* obscure; stamens 6; fem. sepals cymbiform, glabrous or nearly so; petals narrow, ciliate, with or without a gland. *Seeds* oblong, quite smooth.

2. ***E. capillus-naiadis***, *Hook. f.*; receptacle conical or convex villous, fl. bracts whitish membranous outer glabrous inner with long white dorsal hairs, seeds dark olive-green or black. *E. setaceum*, *Wall. Cat.* n. 6077; *Mart. in Wall. Pl. As. Rar.* iii. 29; *Kærn. in Linnæa*, xxvii. (excl. syn. *Linn.*).

BENGAL; Serampore, *Griffith*, Vicrampore, *Clarke*. KHASIA HILLS; at Nonkreem, *J. D. H. & T. T.* BURMA; Tavoy and Pegu, *Wallich*, &c. The CONCAN, *Stocks*.—DISTRIB. Cochii China.

Closely resembles *E. setaceum* in habit, foliage, &c. In the Burmese and Khasian specimens the fem. petals are ciliate with long hairs, in the Concan and Cochinese they are nearly glabrous.

3. ***E. bifistulosum***, *Van Heurck. Obs. Bot.* 105; receptacle conical glabrous, fl. bracts dark all with short dorsal bristles, seeds chesnut brown. *E. setaceum*, *Benth. Fl. Austral.* vii. 191.

KHASIA HILLS, at Myrung, alt. 5000 ft. *Griffith*.—DISTRIB. W. Africa, Australia.

This is closely allied to *E. capillus-naiadis* and *setaceum*, differing from both in the glabrous receptacle, and from the former in the very short hairs of the fl. bracts which are more mucronate and less membranous; the seeds too are much smaller. The fem. petals are narrow, glabrous, with minute apical glands, as in the Concan specimens of *E. capillus-naiadis*.

B. Terrestrial or marsh plants; stem rarely elongate.

* Petals of male fl. 3, one much the largest and protruded beyond the floral bracts, rarely subequal and all protruded. *Invol. bracts* globose in all; floral bearded.

† Heads more than $\frac{1}{2}$ in. diam. Receptacle villous.

4. ***E. robustum***, *Steud. Syn. Pl. Cyp.* 271; subcaulescent, scape subsolitary very stout, invol. bracts ovate-oblong or lanceolate acuminate pale shining, sepals and petals villously bearded, fem. fl. subsessile. *Kærn. in Linnæa*, xxvii. 674. *S. bracteosum*, *Steud. l. c.* 272.

NILGHIRI HILLS; alt. 6000 ft., *Wight*, &c.

Rootstock often as thick as the thumb. *Leaves* 1–9 by $\frac{1}{4}$ – $\frac{3}{4}$ in., narrowed to the obtuse or rounded tip, soft, thin, opaque, very many-nerved, striate, often shining. *Scape* 8 in.–3 ft., as thick as a crow-quill or less. *Heads* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; invol. bracts many-seriate, scarious; receptacle convex, villous; fl. bracts narrowly lanceolate, acuminate. *Flowers* 3-merous; sepals of both sexes 3, concave villous; stamens 6; fem. fl. with the ovary and petals stipitate above the sepals, stipes villous.—Much the stoutest Indian species.

5. ***E. caulescens***, *Hook. f. & Thoms. Herb. Ind. Or.*; caulescent, scape subsolitary from the stem or its branches, invol. bracts oblong outer

obtuse inner acute black shining, fem. fl. subsessile, sepals and petals villously bearded. *E. atratum*, β major, *Thw. Enum.* 341.

CEYLON; *Wight*; *G. Thomson*; central province, alt. 5-7000 ft., *Thwaites* (No. 131).

Stem simple, in young plants 3-4 in. long and as thick as the thumb, often copiously branched in old; branches 6-10 in. long, leafy throughout. *Leaves* 2-6 by $\frac{1}{2}$ - $\frac{3}{4}$ in., narrowed from the base to the obtuse tip, rigid, quite opaque; nerves very many, close, obscure. *Scape* stout or slender. *Heads* $\frac{1}{2}$ - $\frac{3}{4}$ in.; invol. bracts sub 3-seriate, scarious; receptacle flat, villous; fl. bracts oblanceolate, acute, dark, shortly bearded; 2 sepals of fem. fl. concave, the 3rd flat; petals very unequal, glands large; ovary with petals stipitate, stipes villous.—The only Indian much-branched species.

†† Heads $\frac{1}{2}$ in. diam. or less.

§ *Receptacle villous.*

6. *E. subcaulescens*, *Hook. f.*; stem short stout densely leafy, leaves linear acute concave thick opaque, scapes 2-3, bracts all yellowish, involucre broadly obovate scarious, floral cuneately oblanceolate acute bearded, fem. fl. sessile, petals oblanceolate villous, ovary with petals sessile.

CEYLON; Newera Ellia, *Gardner*, *Thwaites* (C.P. 61 and 789 in *Herb. Kew*).

Stem 3-4 in., as thick as the little finger. *Leaves* very many, 2-3 by $\frac{1}{4}$ - $\frac{1}{2}$ in., erect, very many-nerved, quite smooth on both surfaces; sheath slightly woolly at the base. *Scape* 12 in., slender. *Head* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., depressed spherical, pale; male and fem. sepals 2 concave, 1 flat, all bearded; fem. petals oblanceolate villous; ovary villous at the base. *Seed* sub-globose, smooth.—Closely resembles a Bornean species from Kina Balu, in which the male petals are shorter.

7. *E. longicuspis*, *Hook. f.*; stem short stout, leaves short linear-subulate acuminate flat thick opaque, scapes tall very slender, invol. bracts very small cuneately obovate scarious blackish, floral cuneate tip black rounded toothed and with a long black cusp, fem. fl. pedicelled, petals oblanceolate ciliate with the ovary long-stipitate. *E. cristatum*, var. *Thw. Enum.* 341.

CEYLON, *Thwaites* (C.P. 1002 in *Herb. Kew*; 789 in *Thw. Enum.*).

Rootstock as thick as a swan's quill. *Leaves* 2-2 $\frac{1}{2}$ in., narrowed from the base to the tip, many-nerved, obscurely striate; sheaths obscurely woolly at the base. *Scapes* 18-20 in., weak, flexuous. *Heads* $\frac{1}{2}$ in. diam., the black cusps of the fl. bracts contrasting with the white small petals; receptacle hemispheric; male fl. on slender pedicels; sepals 3, free, tips bearded; stamens 6; fem. petals very unequal, longer than the sepals, glands large.—I have seen only one specimen of this well-marked species.

8. *E. polycephalum*, *Hook. f.*; rootstock very stout, leaves elongate narrowly sword-shaped acuminate flat thin, scapes very many tall slender, invol. bracts very small cuneately obovate scarious blackish shining, floral oblanceolate long-cuspidate black softly bearded, fem. fl. shortly pedicelled, sepals and petals softly hairy, ovary subsessile.

CENTRAL INDIA; near Pachmarchi, *Duthie*.

Rootstock as thick as the middle finger. *Leaves* many, 2-8 by $\frac{1}{2}$ - $\frac{3}{4}$ in., lower recurved, very many-nerved, narrowed to the acuminate tip, rather glossy. *Scapes* 30 or more, 8-20 in. *Heads* $\frac{1}{2}$ - $\frac{3}{4}$ in., globose, ash-colrd., hairs flexuous; receptacle convex, shortly villous; tips and cusps of bracts black; male sepals 3, free; stamens 6; fem. sepals long, narrow; petals narrowly oblanceolate, ciliate with long soft hairs.—A very handsome species, closely allied to *E. longicuspis*, but very much larger with many scapes.

9. ***E. odoratum***, *Dalz. in Hook. Kew Journ.* iii. (1851), 280; leaves short subulate recurved 7-nerved, scapes many filiform, heads snow white, invol. bracts short obovate-oblong obtuse scarious dark, floral cuneately obovate bearded, fem. fl. pedicelled, sepals narrow subequal oblanceolate, petals oblanceolate villously ciliate, ovary with petals very shortly stipitate. *Dalz. & Gibs. Bomb. Fl.* 280; *Körn. in Linnæa*, xxvii. 683.

The CONCAN; prov. Malwan, in stagnant water, *Dalzell*.

Leaves 1 in., $\frac{1}{2}$ in. broad at base, narrowed thence to the finely acuminate tip, translucent. *Scapes* 6–10 in., deeply grooved; tip of sheath membranous. *Heads* $\frac{1}{2}$ – $\frac{1}{4}$ in. diam., globose; recept. hemispheric, shortly villous with brownish hairs; fl. bracts concealed by the male petals; fem. sepals longer than the petals.—Smells strongly of chamomile, *Dalzell*.

10. ***E. atratum***, *Körn. in Linnæa*, xxvii. 610; leaves very slender linear obtuse opaque; scape long solitary, invol. bracts cuneately obovate black shining inner acute, floral black shortly bearded outer orbicular-obovate very shortly cuspidate inner narrow cuneate acute, fem. fl. sessile, petals oblanceolate villous.

CEYLON; *Gardner* (n. 972).

Densely tufted. *Leaves* 4–6 in., erect or spreading from an erect base, $\frac{1}{16}$ – $\frac{1}{12}$ in. broad, sheaths woolly at the base, nerves very many, close. *Scapes* 1 ft. and under. *Heads* $\frac{1}{2}$ in. diam., hemispheric; invol. bracts convex, rigid, incurved; inner floral black above the middle; recept. hemispheric, densely villous; male fl. pedicelled, stamens 6; fem. subsessile; 2 sepals of fem. concave, narrow flat; ovary sessile, base hairy.—I am rather doubtful of this being *Körn. in Linnæa*'s *E. atratum*, which he describes from a specimen in the Berlin Herb. as being stouter than *E. cristatum*, and broader leaved. It is most like the Khasian *cristatum* of the Ceylon species.

§§ *Receptacle glabrous or nearly so (or villous in E. cristatum, var.)*.

11. ***E. cristatum***, *Mart. in Wall. Pl. As. Rar.* iii. 28; *Cat.* 6070; densely tufted, leaves erect 3–6 in. narrowly linear flat tip obtuse rigid opaque many-nerved striate, scapes 1 or more rigid about twice as long as the leaves, heads snow-white, invol. bracts cuneately obovate edged with black, floral dark broadly obcuneate acute very shortly bearded, fem. fl. shortly pedicelled, petals narrowly oblanceolate villously ciliate, ovary sessile. *Körn. in Linnæa*, xxvii. 609.

KHASIA HILLS; alt. 4–5000 ft., common.

Leaves $\frac{1}{2}$ – $\frac{1}{10}$ in. broad, narrowed to the obtuse tip; sheaths short, not woolly at the base. *Scapes* rigid, deeply grooved. *Heads* $\frac{1}{2}$ – $\frac{1}{3}$ in. diam., black and white; invol. bracts coriaceous; floral rather rigid; receptacle flat or convex, quite glabrous, or very sparsely hairy. *Seeds* oblong with papillose ridges.—The *E. cristatum* of Benth. Fl. Hongk. differs in the equal or subequal male petals.

Var. **MACKII**; leaves broader, receptacle densely villous.—Assam (probably Khasia) *Mrs. Mack*.—Perhaps a different species.

12. ***E. melaleucum***, *Mart. in Wall. Pl. As. Rar.* iii. 28; *Cat.* 6080; leaves 1–2 in. subulate acuminate 3–7-nerved opaque, scapes subsolitary, invol. bracts membranous black, outer obovate-oblong obtuse, acute, floral acuminate black thickly bearded, fem. fl. subsessile, petals linear villously ciliate tipped with short white bristles, glands 0, ovary with petals subsessile. *Kunth Enum.* iii. 568; *Körn. in Linnæa*, xxvii. 164. *E. leucomelas*, *Steud. Nom. Ed.* 2, i. 585; *Syn. Pl. Cyp.* 272; *E. quinqueangulare*, *Herb. Heyne*.

NILGHIRI HILLS, *Heyne*, *Schmidt*. ARRAKAN, *King*.

Leaves translucent, recurved, more opaque in *Schmidt*'s specimen; sheath glabrous at base. *Scape* strongly grooved. *Head* $\frac{1}{2}$ in. diam. black and white;

invol. bracts at length reflexed shining; receptacle subglobose; male sepals 3 free or 2 connate, odd petal shortly protruded; fem. sepals narrow, as long as the petals, 2 free concave 3rd flat; ovary and petals very shortly stipitate.—Very near *E. atratum* in which the recept. is villous, and the odd petal of male fl. not protruded. The specimens are few and poor, except King's. Kœrnicke describes the recept. as villous, but it is decidedly glabrous in Wallich's specimen.

13. *E. mitophyllum*, *Hook. f.*; densely tufted, leaves 2-3 in. almost filiform from a broad sheathing base acuminate flattened opaque, scape twice as long as the leaves, heads very small hemispheric, invol. bracts spreading obovate-oblong obtuse black, floral black cuneately obovate obtuse very shortly bearded, fem. fl. sessile, petals oblanceolate obtuse villously ciliate.

KHASIA HILLS; Myrung, alt. 5000 ft. *Griffith* (*Kew Dist.* 5578, 5580); Jaintea, alt. 4000 ft., *Clarke*.

Leaves flaccid, 5-7-nerved; sheath not woolly at the base. *Sheath* of scape not lacerate at the mouth. *Heads* $\frac{1}{2}$ – $\frac{1}{4}$ in. diam., white and black; invol. bracts 3-4-seriate, at length lacerate, not shining; receptacle globose; sepals of male 3, free; truncate tips bearded; odd petal shortly exerted; fem. sepals 2 concave 3rd flat; ovary very shortly stipitate.—Perhaps a form of *E. miserum*, but the large leaf-sheaths are very different, and the receptacle is globose.

14. *E. miserum*, *Kœrn. in Linnæa*, xxvii. 607; densely tufted, leaves very short capillary or 0, scape solitary very long filiform, heads very small globose, outer invol. bracts orbicular-oblong obtuse coriaceous lacerate pale brown or black, floral oblanceolate acute bearded, male petals subequal, fem. fl. sessile, petals subequal spatulate villous. *E. cristatum*, *Mart. in Wall. Pl. As. Rar.* iii. 28; and *Cat.* 6070 (*in part*).

SILHET; *Bruce* (*Herb. Wall.*); KHASIA HILLS, in river sand, alt. 2500 ft., *Clarke*.

Rootstocks matted, 1-2 in. long, slender clothed with capillary roots. *Leaves* few, 1-2 in., much shorter, or 0 in *Clarke's* specimens. *Scapes* 12-18 in. flexuous, not deeply grooved, tips of sheaths membranous. *Head* $\frac{1}{2}$ – $\frac{1}{4}$ in. diam., grey-white; fl. bracts concealed by the male petals; invol. bracts 2-3-seriate; receptacle slender, columnar; male sepals bearded, petals subequal or one longest; fem. sepals 2 oblong cymbiform 3rd flat, all bearded; ovary with petals sessile or very shortly stipitate.—Wallich's specimens are young and imperfect.

15. *E. Collettii*, *Hook. f.*; leaves short broadly subulate acuminate recurved many-nerved, scapes tall slender, heads globose snow-white, invol. bracts very small linear-oblong obtuse membranous pale, floral oblanceolate acute, petals of male fl. subequal, fem. fl. sessile, sepals much shorter than the petals which are villous and with the ovary shortly stipitate.

UPPER BURMA; Shan Hills, alt 4000 ft., *Collett*.

Leaves $1\frac{1}{2}$ by $\frac{1}{4}$ in., narrowed from the base to the tip, opaque, striate. *Scapes* several, 6-grooved; sheaths rather short. *Heads* $\frac{1}{2}$ – $\frac{1}{4}$ in. diam.; invol. bracts 2-seriate, pale or dark, at length reflexed and concealed under the flowers; receptacle convex; fl. bracts much shorter than the flowers, male sepals truncate bearded, one petal largest; fem. sepals much shorter than the petals, of which 2 are oblong obtuse concave tip bearded, the 3rd flat; petals oblanceolate, glands large.

16. *E. breviscopum*, *Kœrn. in Linnæa*, xxvii. 676; leaves (floating?) very long strap-shaped flat flaccid, scape solitary, head broadly hemispheric (or globose?) invol. bracts few very small oblong obtuse scarious dark, floral oblanceolate acute shortly bearded, fem. fl. subsessile, sepals villously bearded, petals oblanceolate villous with long hairs, ovary with petals shortly stipitate.

INDIA; Huegel. N. CANARA, Tinai Ghat, alt. 2000 ft., in streams and pools, Talbot.

Stem very short. *Leaves* 6–15 by $\frac{1}{3}$ – $\frac{1}{5}$ in., exactly linear, opaque, 7–11-nerved, nerves very slender. *Scape* shorter or longer than the leaves; sheath 2–2½ in., tip obtuse membranous. *Heads* $\frac{1}{3}$ in. diam., black and white, rather few-fl. ; receptacle convex, glabrous; invol. bracts green, much shorter than the floral; male sepals densely bearded, petals villous, one much largest; stamens 6; fem. sepals short oblong concave, tips truncate bearded; petals subequal, glands large. *Seeds* very minute, subglobose, pale yellowish, shining.—Male petals and stamens sometimes sessile between the sepals, the conical stipes being very short or 0.

** Petals of male fl. subequal, or one rather larger, often very obscure, none produced beyond the floral bracts.

† Involucral bracts woolly or hairy (sometimes glabrous in *E. Brownianum*). Receptacle villous in all.

17. **E. Wightianum**, Mart. in Wall. Pl. As. Rar. iii. 28; Cat. 6067; tall, stout, leaves broadly linear or ensiform, tips obtuse, heads globose snow-white, invol. bracts pale cuneiform reflexed tips truncate or rounded, floral oblanceolate acuminate strongly cuspidate villous, male petals small subequal, fem. fl. sessile, sepals narrow concave, bearded, petals obovate or oblanceolate villous with very long hairs, ovary sessile. Kunth Enum. iii. 563; Steud. Syn. Pl. Cyp. 271; Kœrn. in Linnæa, xxvii. 658 (excl. syn.) *E. sexangulare*, Herb. Heyne.

TENASSEMIM, Wallich, &c. PEGU, Kurz. The CONCAN, Stocks, &c. CEYLON, ascending to 7000 ft. (C.P. 378, 3382).

Rootstock often as thick as the thumb. *Leaves* 4–10 by $\frac{1}{4}$ in. (and scapes), glabrous or sparsely hairy, many-nerved. *Scapes* many, stout, ribbed and deeply grooved; sheaths with long free green tips. *Heads* $\frac{1}{2}$ in. diam., subsquarrose from the prominent tips of the fl. bracts; invol. bracts coriaceous at the base; receptacle convex villous; flowers pedicelled; male petals minute in the Tenasserim specimens, small subequal in the Concan; stamens 6. *Seeds* globosely oblong, dark red-brown, papillose.—Fem. fl. sometimes 4-merous.

18. **E. Brownianum**, Mart. in Wall. Pl. As. Rar. iii. 25, t. 248; Cat. 6066; tall, slender, leaves narrowly linear or ensiform acuminate glabrous or hairy, scapes solitary very tall, heads $\frac{1}{2}$ in. diam. globose or hemispheric snow-white, invol. bracts obovate-oblong or cuneiform rigid spreading at length reflexed, outer floral cuneiform inner spathulate obtuse, male petals small, fem. fl. pedicelled, petals narrow villous with very long straight hairs, ovary subsessile. Kunth Enum. iii. 562; Steud. Syn. Pl. Cyp. 271; Kœrn. in Linnæa, xxvii. 663. *E. nilagirens*, Steud. l. c.; Kœrn. l. c. 661.

KHASIA HILLS, alt. 4–6000 ft., common. MUNNIPORE, Watt. NILGHIEI HILLS, Wight, Gardner. CEYLON, Gardner, ascending to 7000 ft., Thwaites (C.P. 377, 1001).

Rootstock stout. *Leaves* 6–18 by $\frac{1}{2}$ – $\frac{1}{3}$ in., many-nerved, and scapes glabrous pubescent or copiously hairy. *Scape* 1–2 ft., ribbed and deeply grooved; sheath very long, tip acuminate green. *Heads* sometimes depressed and concave beneath, the stiff pale or dark invol. bracts $\frac{1}{4}$ – $\frac{1}{2}$ in. long, equalling the flowers; receptacle flat or convex; male sepals free or connate, tips bearded, petals subequal; fem. sepals cymbiform, dorsally hirsute, acute or cuspidate. *Seeds* oblong or subglobose, papillose and striate.—The hairs of the fem. petals are much longest in the Khasian plant.

19. **E. sericans**, *Mart. in Wall. Pl. As. Rar.* iii. 29; *Cat.* 6079; leaves short subulate, scapes 1-2 slender, heads $\frac{1}{4}$ in. diam. globose snow-white, invol. bracts oblong pale yellow scarious not reflexed tips rounded, floral cuneate-obovate acute pubescent tips of outer glabrous, male sepals small orbicular, fem. fl. pedicelled, sepals narrow concave, petals oblanceolate ciliate, ovary with petals very shortly stipitate or sessile. *Kunth Enum.* iii. 568; *Steud. Syn. Pl. Cyp.* 272. *E. gracile*, *Mart. l.c.*; *Wall. Cat.* 6079; *Kunth l.c.* 558. *E. infirmum*, *Steud. l.c.* 270.

BURMA; at Prome and Tavoy, *Wallich*.

Rootstock small. *Leaves* $\frac{1}{2}$ -1 in., erect and recurved, 3-5-nerved, opaque. *Scapes* 4-grooved; sheath short, tip acuminate green. *Heads* very pale; invol. bracts shining, pubescent; receptacle small, hemispheric; flowers pedicelled; male sepals 3, narrow, free or 2 connate bearded; petals unequal; fem. petals unequal, glands 0. *Seeds* globosely oblong, papillose.—I have no doubt as to the specific identity of *sericans* with *gracile*; *Körnig* unites the former with *Wightianum*, it is certainly very close, but the heads are much smaller; the male petals larger and fem. broader. The ovary with petals is sessile in *gracile* very shortly stipitate in *sericans*. The specimens are very few.

20. **E. lanceolatum**, *Miq. in Pl. Metz exsicc.* n. 131; leaves narrowly oblong-lanceolate many-nerved translucent, scapes many slender, sheath inflated above tip green, heads globose $\frac{1}{4}$ in. diam. snow-white, invol. bracts small pale quadrate or obovate scarious not reflexed, male petals obscure, fem. fl. sessile, sepals 2 deeply cymbiform 3rd flat all bearded, petals very unequal oblanceolate ciliate, ovary with petals sessile. *Steud. Syn. Pl. Cyp.* 271; *Körn. in Linnæa*, xxvii. 656.

The CONCAN and CANARA, *Metz, Stocks*.

Rootstock small. *Leaves* 1-2 $\frac{1}{2}$ by $\frac{1}{4}$ - $\frac{1}{2}$ in., acute or acuminate, flaccid, hardly sheathing. *Scapes* 4-6 in., not deeply grooved; sheath very slender below, inflated above the middle, tip acuminate. *Heads* very like those of *E. sericans*, as are the bracts and seeds.—One of the fem. sepals is sometimes winged at the back.

†† Involucral and floral bracts both glabrous or nearly so.

§ *Receptacle glabrous or sparsely hairy.*

21. **E. Sieboldianum**, *Sieb. & Zucc. ex Steud. Syn. Pl. Cyp.* 272; leaves short subulate or setaceous, scapes very many, heads small globose or ovoid, bracts all scarious, invol. oblong obtuse gradually passing into the oblong-lanceolate subacute shining floral, fem. fl. long-pedicelled, sepals 1-2 slender or 0, petals 0, ovary long-stipitate. *E. sexangulare*, *Mart. in Wall. Pl. As. Rar.* iii. 28. *E. hexangulare*, *Kunth Enum.* iii. 551; *Thur. Enum.* 341; *Steud. l.c.*; *Körn. in Linnæa*, xxvii. 613; *Dalz. & Gibs. Bomb. Fl.* 279; *Wall. Cat.* 6073. *E. setaceum*, *Herb. Heyne*. *E. nitidum* and *tenuë*, *Herb. Ham.*

THROUGHOUT INDIA; from Kashmir to Assam and Burma, and southward to CEYLON (C.P. 795).—DISTRIB. China, Japan, Mt. Philipp.

Annual. *Leaves* 2-4 in., 3-5-nerved, rarely $\frac{1}{10}$ in. broad, opaque or translucent. *Scapes* slender; sheath short. *Heads* $\frac{1}{2}$ in. diam., pale whitish or purplish; invol. bracts spreading or ascending, much shorter than the head; receptacle columnar, glabrous or sparsely hairy; fl. bracts imbricating upwards, closely appressed, often with a broad purplish central band; male sepals 3, petals minute, stamens 1-6; fem. fl. with a long stipes above the sepals which is jointed between the sepals and ovary. *Seeds* minute, red-brown, quite smooth.—Closely allied to Australian *E.*

cinereum, Br., which has a villous receptacle. As ascertained by Trimen (*Linn. Soc.* xxiv. 136) from the examination of Hermann's Herbarium, the *E. sexangulare* of Linneus is *E. Wallichianum* of Martius. In Herb. Linn. *E. sexangulare* bears its right name; where there is also a specimen of *E. Sieboldianum*, from Koenig, unnamed.

22. ***E. Duthiei*, Hook.f.**; leaves very short broadly subulate, scapes many very slender, heads $\frac{1}{4}$ in. diam. broadly ovate or hemispheric, invol. bracts spreading oblong obtuse scarious shining passing into the dark linear-oblong or oblanceolate acuminate glabrous glistening floral, fem. fl. shortly pedicelled, sepals 2 very narrow, petals 3 filiform.

CENTRAL PROVINCES; Bhimkund, in the Khandma district, *Duthie*.

Leaves $\frac{1}{2}$ – $\frac{3}{4}$ in., many-nerved. Scapes 2–5 in.; sheath short. Heads nearly black, glistening; fl. bracts strongly incurved, sometimes obscurely pubescent towards the tips; receptacle very tall and slender, quite glabrous; flowers shortly pedicelled; male sepals 2, narrow, subacute, glabrous; petals very obscure; stamens 6; ovary with the petals stipitate. Seeds broadly oblong, quite smooth, yellow.

23. ***E. alpestre*, Hook.f. & Thoms. Herb. Ind. Or.**; leaves broadly or narrowly subulate, scapes very many short stout, heads broadly obconic few-fl., invol. bracts suberect as long as the flowers cuneiform coriaceous, floral obovate-oblong, fem. fl. sessile, sepals oblong cymbiform obtuse glabrous, petals 3 subequal obovate coriaceous glabrous glands apical. *E. kiusianum*, Maxim. in *Herb. Hort. Petrop.*

SIKKIM HIMALAYA, alt. 8–12,000 ft., and KHASIA HILLS, alt. 5–6000 ft., *J. D. H., Clarke*.—DISTRIB. W. China, Japan.

Leaves very many, 1–5 by $\frac{1}{4}$ – $\frac{1}{2}$ in., narrowed from a broad base to the acute tip, few or many-nerved, usually spreading. Scapes shorter or longer than the leaves, often flexuous. Heads $\frac{1}{4}$ in. diam. or less; invol. bracts yellowish and black; floral black, coriaceous; receptacle small, convex, glabrous; male sepals 3, truncate, glabrous; petals obscure; stamens 6; fem. petals white, shortly clawed; ovary with petals sessile. Seeds large, oblong, yellowish or dark, quite smooth.—An unusually well-marked species by the glabrous coriaceous fem. petals.

24. ***E. truncatum*, Ham. ex Mart. in Wall. Pl. As. Rar.** iii. 29; *Wall. Cat.* 6076; leaves 1–2 in. subulate, scapes many stout, heads $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. hemispheric, invol. bracts cuneate spreading shining, floral scarious obovoid tip concave truncately rounded glabrous, fem. fl. pedicelled, sepals 2 narrow, petals 3 filiform or very narrowly oblanceolate ciliate, ovary with petals stipitate. *Kunth Enum.* iii. 555; *Steud. Syn. Pl. Cyp.* ii. 270; *Koern. in Linnæa*, xxvii. 631; *Thw. Enum.* 341 (excl. syn.). *E. cinereum*, *Ham. Leucocephala spathacea*, *Roxb. Fl. Ind.* iii. 613.

ASSAM, BENGAL, BURMA, and southward to MALACCA and CEYLON (C.P. 793).—DISTRIB. Malay and Philippine Islands, China.

Leaves $\frac{1}{2}$ in. broad at the base or less, acuminate, few- or many-nerved. Scapes 1–4 in. Heads glistening; invol. bracts sub-2-seriate; floral incurved and imbricating; receptacle conical, sparsely hairy; male sepals free or coherent; petals minute, ciliate; fem. fl. long-pedicelled, sepals concave or linear and flat; petals very variable in breadth. Seeds pale, ribs papillose.—This is unquestionably Roxburgh's *Leucocephala spathacea*, of which he had a good drawing made.

VAR. *malaccense*; floral bracts broader, flowers of both sexes sessile, petals broader and more coriaceous, gland apical, ovary with petals stipitate, seeds larger.—Malacca, *Griffith (Kew Distrib.* 5567); at K'wala Pehang, *Ridley*.—Possibly a different species.

§§ Receptacle more or less villous.

25. **E. oryzetorum**, Mart. in Wall. Pl. As. Rar. iii. 28; Wall. Cat. 6069; leaves ensiform, scapes many short or tall, heads yellow globose or ovoid, bracts all scarious hyaline, invol. oblong obtuse passing into the cuneate-obovate cuspidate densely imbricate floral, fem. fl. shortly pedicelled, petals slender. Kunth. Enum. iii. 552; Steud. Syn. Pl. Cyp. 270; Kærn. in Linnæa, xxvii. 639. E. Hamiltonianum, Mart. l. c. 29; Wall. Cat. 6075; Kunth l. c.

TROPICAL HIMALAYA, from Kumaon to Sikkim; ASSAM, SILHET, PEGU, CHOTA NAGPORE, SINGAPORE and PENANG.

Rootstock short, stout, or 0. Leaves 1-3 by $\frac{1}{2}$ - $\frac{1}{4}$ in., spongy, very many-nerved, narrowed to a truncate coriaceous tip. Scapes 8-18 in. (shorter in dwarf states), soft, flexuous. Heads $\frac{1}{2}$ - $\frac{1}{3}$ in. diam., straw-colrd., base intruded; receptacle conical or columnar, densely villous; male sepals 2, tips fimbriate or glabrous; petals minute or 0; stamens 6; fem. fl. pedicelled, sepals 3, slender, caducous; petals filiform to oblanceolate, naked or ciliolate, caducous; ovary with petals stipitate above the sepals. Seeds pale yellow, very minute, smooth.—E. Hamiltonianum is certainly an immature state of *oryzetorum*.

26. **E. stellulatum**, Kærn. in Linnæa, xxvii. 620; leaves membranous broadly subulate or linear, scapes many hairy, heads globose, bracts all many times longer than the flowers white scarious stellately spreading and finely acuminate, involucrel ovate-lanceolate, floral narrowly lanceolate, fem. fl. sessile, petals oblanceolate ciliate with long hairs, ovary with petals sessile.

The CONCAN, Hugel, Stocks. ? BENGAL (Herb. Kew).

Leaves 1-2 in. by $\frac{1}{4}$ - $\frac{1}{2}$ in. broad at the base, tapering to a point, very many-nerved. Scapes 2-7 in., hairs spreading; sheaths shorter than the leaves, tips long free acuminate. Heads $\frac{1}{2}$ - $\frac{1}{3}$ in. diam., perfectly glabrous except the conical receptacle and ciliate fem. petals; male sepals 2, free or connate, glabrous, hyaline; petals very short; stamens 6; fem. fl. sessile; sepals 3, dimidiate-ovate falcately incurved with long slender recurved points, dorsally crenately winged, petals narrowly oblanceolate, ciliate. Seeds dark chesnut, smooth.

27. **E. echinulatum**, Mart. in Wall. Pl. As. Rar. iii. 29; Wall. Cat. 6082; leaves subulate opaque finely acuminate, scapes many obscurely grooved, heads small globose, bracts all white rigid stellately spreading subulate-lanceolate, floral many times longer than the dimerous subsessile flowers, ovary with petals stipitate. Kunth Enum. iii. 568; Steud. Syn. Pl. Cyp. 272; Kærn. in Linnæa, xxvii. 519.

TAVOY; Mergui, Gomez, Griffith.—DISTRIB. Tonkin, China.

Leaves many, $\frac{1}{2}$ -1 in., erecto-patent, spongy. Scapes rather stout, 1-5 in., terete, shining; sheath short. Heads $\frac{1}{2}$ - $\frac{1}{3}$ in. diam., straw-colrd.; invol. bracts ovate, narrowed into a slender rigid point; floral longer, narrowed at the base; receptacle villous; male sepals connate, glabrous; petals minute, deformed; stamens 5-6; fem. sepals falcately lanceolate, clawed, dorsally crenately winged below the middle, margins spinulose-serrate; petals 0.

28. **E. minutum**, Hook. f.; very small, leaves subulate or filiform acute or obtuse, scapes very many, sheaths membranous and inflated above, heads minute subglobose few-fl. pale, invol. bracts erect ovate-lanceolate acuminate scarious, floral oblanceolate acute or cuspidate, fem. fl. subsessile, sepals falcate winged or keeled, petals 1-3 very slender or 0, ovary with petals sessile or substipitate.

The CONCAN, Law. MYSORE, Sir F. Adams. RAJPUTANA, on Mt. Abo, Stocks, Duthie.

Densely tufted. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., compressed, opaque, 3–5-nerved, base dilated and sparsely woolly within. *Scapes* $1\frac{1}{2}$ – $2\frac{1}{2}$ in., capillary, flexuous; sheath short. *Heads* $\frac{1}{10}$ in. diam., shining; invol. bracts much longer than the floral, which are glabrous or sparsely hairy; receptacle small, columnar, sparsely villous; male calyx infundibular, split on one side, tips bearded; petals minute; stamens 3–4; fem. sepals 2, with rarely a filiform 3rd, falcately incurved with recurved tips, glabrous, keel or wing spinulose. *Seeds* oblong.—Resembles *E. achiton*, but invol. bracts very different.

††† Involucral bracts glabrous, floral bearded villous or pubescent.

§ *Receptacle glabrous or sparsely hairy.*

29. ***E. sexangulare***, Linn. *Sp. Pl.* 87; tall, stout, leaves long, scapes many tall, heads conoid or hemispheric hard hoary base truncate, invol. bracts coriaceous subquadrate or orbicular, floral persistent densely imbricate spathulate cuspidate rigid, fem. fl. sessile, petals short filiform with a terminal pencil of hairs, ovary with petals subsessile. *E. Wallichianum*, Mart. in Wall. *Pl. As. Rar.* iii. 26, t. 249; *Cat.* 6068; *Kunth Enum.* iii. 564; *Nees in Nov. Act. Nat. Cur.* xix., *Suppl.* i. 449; *Steud. Syn. Cyp.* 271; *Kærn. in Linnæa*, xxvii. 687; *Thw. Enum.* 341; *Dalz. & Gibs. Bomb. Fl.* 280; *Trinca in Journ. Linn. Soc.* xxiv. 136. *E. quidrangulare*, Lour. *Fl. Cochinch.* 77.

TENASSERIM, southward to MALACCA; and the DECCAN PENINSULA, from CANARA southwards. CEYLON, *Macrae*, &c. (C.P. 220).—DISTRIB. Tropical Asia, Madagascar.

Rootstock as thick as the little finger or less. *Leaves* 4–12 in., $\frac{1}{4}$ – $\frac{3}{4}$ in. broad at the base, flat, narrowed up to the acuminate or subacute tip, many-nerved, opaque, striate, drying brown. *Scapes* up to 18 in., stiff; tips of sheaths acuminate, not membranous. *Heads* $\frac{1}{2}$ in. diam. or less; invol. bracts shining, horizontal, rigid, appressed; floral dark, rigid, with white tips; receptacle globose columnar or hemispheric, sparsely shortly pilose; flowers flat; male sepals free or connate, one sometimes dorsally winged, petals minute; fem. sepals 3, 2 cymbiform incurved acute dorsally crenately winged or not, 3rd linear, narrow. *Seeds* subglobose or oblong, the ridges papillose.—In some Concan specimens from Dalzell the leaves are $\frac{1}{8}$ – $\frac{1}{4}$ in. broad, linear, flaccid, quite translucent, and the heads very small. The Australian *E. australe*, Br., hardly differs.

VAR. longifolium; more slender, leaves often longer, fem. fl. dimerous, petals sparsely hairy from the middle upwards. *E. longifolium*, *Nees in Herb. Willd. ex Kunth l.c.* 567; *Steud. l.c.*; *Kærn. l.c.* 690. *E. sexangulare*, *Willd. Herb.*—Tenasserim, Malacca, the Andaman Islands, and Ceylon.

30. ***E. Dalzellii***, Kærn. in *Linnæa*, xxvii. 605; rhizome elongate, leaves very slender finely acuminate, scapes many, heads hemispheric white villous, invol. bracts scarious obovate- or cuneate-oblong, floral hyaline oblanceolate subacute, fem. fl. pedicelled, sepals 2 linear slender, petals 3 narrowly oblanceolate ciliate with flexuous hairs, ovary with petals stipitate. *E. rivulare*, Dalz. in *Hook. Kew Journ.* iii. (1851) 280; *Dalz. & Gibs. Bomb. Fl.* 280.

SOUTH CONCAN; in the Malwan Province, in streams, Dalzell.

Rootstock elongate, prostrate, densely clothed with tortuous capillary rootlets. *Leaves* in a terminal tuft, 4–10 by $\frac{1}{16}$ – $\frac{1}{10}$ in., flexuous, flattened, opaque, 7-nerved. *Scapes* 7–18 in., 10-grooved. *Heads* $\frac{1}{4}$ in. diam., base truncate or intruded; invol. bracts short, yellowish; receptacle hemispheric or columnar, sparsely hairy; fl. bracts incurved, hairs caducous; male sepals free or connate, tips villous, petals small elliptic subequal; stamens 6. *Seeds* globose, smooth, shining.—Some flowerless very

long leaved specimens have a leafy stem 2-3 in. long, as in Sect. A, but much stouter. *E. fluviatile*, Trim. (see end of genus) is probably allied.

31. **E. cuspidatum**, Dalz. in Hook. *Kew Journ.* iii. (1851) 281; leaves short linear-ensiform flaccid 7-9-nerved translucent, margins thickened, tip rounded and cuspidate, scapes several very long, heads globose or hemispheric white villous, invol. bracts cuneiform or rounded, scarious, floral membranous cuneate-obovate, fem. fl. sessile, sepals 3, 2 deeply cymbiform dorsally tubercled, ovary with petals sessile. Dalz. & Gibbs. *Bomb. Fl.* 280.

The SOUTHERN CONCAN; between Vingorla and Malwan, Dalzell.

Leaves 1-4 by $\frac{1}{2}$ - $\frac{1}{4}$ in., erect and recurved. Scapes few or many, 6-10 in., soft, shining, obscurely furrowed; sheath much longer than the leaves, tips membranous. Heads $\frac{1}{2}$ - $\frac{1}{4}$ in. diam., base intruded; invol. bracts yellow, passing into the hyaline floral; receptacle convex, quite naked; male sepals 2, narrow, free; petals small, subequal, fimbriate; stamens 6; fem. sepals coriaceous; petals 3, very narrow, fimbriately villous towards the tip. Seeds oblong, quite smooth.

32. **E. nepalense**, Prescott ex Bong. in Act. Acad. Petrop. Ser. vi. i. 610; leaves broadly subulate or ligulate many-nerved, scapes many slender, heads globose grey, invol. bracts cuneate-obovate scarious at length recurved, floral linear oblong dark obtuse or apiculate, fem. fl. shortly pedicelled, sepals cymbiform, petals very narrowly oblanceolate ciliate with the ovary stipitate. Kunth *Enum.* iii. 554; Steud. *Syn. Pl. Cyp.* 270. *E. viride*, Kærn. in *Linnæa*, xxvi. 637. *E. quinquangulare*, Wall. *Cat.* 6072 E.

TEMPERATE HIMALAYA; from Garwhal, alt. 5-6000 ft., to Sikkin, alt. 4-5000 ft. The KHASIA HILLS, alt. 4-6000 ft.

Rootstock small. Leaves 2-3 by $\frac{1}{2}$ - $\frac{1}{4}$ in., usually subulate and narrowed from the base to the acute tip, but often broader flaccid linear and obtuse or rounded at the tip, opaque or translucent, many-nerved. Scapes 4-9 in., soft; sheaths with membranous tips. Head $\frac{1}{2}$ in. diam.; receptacle convex or columnar, quite glabrous; floral bracts finely hairy; male sepals 3; petals minute; stamens 6; sepals very concave, tips ciliate. Seeds oblong, ribs papillose.—Very similar to *E. luzulaefolium* but the invol. bracts of the fully formed head are recurved, the receptacle is glabrous. The ligulate leaved specimens look different.

33. **E. gregatum**, Kærn. in *Linnæa*, xxvii. 606; dwarf, tufted, leaves very slender flat acute flexuous opaque, scapes subsolitary, heads very small hemispheric or globose white or hoary, invol. bracts spreading or erect cuneiform black, floral oblanceolate obtuse and subacute dark, male petals small subequal, fem. fl. sessile, sepals 2 dorsally bearded narrowly cymbiform 3rd flat, tips villous with stout hairs, petals spathulately oblanceolate densely villous, ovary with petals sessile.

KHASIA HILLS; alt. 5-6000 ft., on rocks in streams, Griffith, &c.

Roots of capillary fibres. Leaves 1-1 $\frac{1}{2}$ by $\frac{1}{10}$ in. Scapes slender, often flexuous, deeply 4- or 5-grooved; sheaths with membranous tips. Heads $\frac{1}{2}$ in. diam., white above the black involucre; receptacle columnar, glabrous; male sepals 3, free or connate; petals minute, obovate, subequal, villous; stamens 2-6; fem. petals with large black glands. Seeds broadly oblong, yellow.—Allied to *E. mitophyllum* and *miserum*, but the male petals are small and equal.

34. **E. Pumilio**, Hook. f.; leaves very short subulate acuminate, scape few short slender, sheath pale green not striate subinflated tip rounded, head $\frac{1}{10}$ in. diam. few-fl. hairy, invol. bracts 3-4 erect obovate

or cuneately oblong tips rounded, floral cuneately oblanceolate subacute, fem. fl. sessile, sepals 2 oblong concave tips ciliate flat, petals oblanceolate ciliate, ovary with petals sessile.

WESTERN HIMALAYA; Kumaon, 3-4000 ft. and Garwhal, alt. 8-9000 ft., Duthie.

Leaves $\frac{1}{2}$ - $\frac{3}{4}$ in., spongy, opaque, green. *Scapes* 1-1 $\frac{1}{2}$ in., obscurely 4-grooved; sheath as long as the leaves, tip membranous. *Heads* subglobose; invol. bracts scarious, glistening, pale or dark; floral dark, sprinkled with white hairs; receptacle small, conical, glabrous; male sepals free, tips ciliate; petals very minute; stamens 6. *Seeds* oblong, pale, with papillose ridges.—Near *E. achiton*, but the receptacle is quite glabrous.

§§ Receptacle villous.

35. *E. luzulæfolium*, Mart. in Wall. Pl. As. Rar. iii. 28; Cat. 6071; leaves short broadly subulate many-nerved, scapes many flexuous, head small hemispheric pubescent base truncate and intruded, invol. bracts spreading or erect (never reflexed) outer broadly cuneiform shining, floral cuneately oblanceolate obtuse, fem. fl. pedicelled, sepals slender concave tipped with bristles, petals 3 linear-lanceolate ciliate, ovary with petals stipitate. Kunth Enum. iii. 553; Schnizl. Icon. t. 46, f. 2, 5; Steud. Syn. Pl. Cyp. 270; Koern. in Linnæa xxvii. 636.

Throughout INDIA; from Bengal to Burma and the Concan, ascending the Khasia Hills to 6000 ft., common. CEYLON, Gardner.

Rootstock elongate and as stout as a swan's quill, or slender, densely fibrous. *Leaves* 1-3 by $\frac{1}{10}$ - $\frac{1}{2}$ in., narrowed from the base to the tip, opaque, rarely translucent. *Scapes* 3-12 in., slender; sheath obtuse. *Heads* $\frac{1}{2}$ in. diam., pale; invol. bracts coriaceously scarious; floral dark, shortly hairy, receptacle conical or columnar; male sepals 2-3, tips ciliate; petals minute, obscure; pedicel of fem. fl. slender. *Seeds* oblong, yellow.—Difficult to distinguish at sight from *E. trilobum* and *quinquangulare*.

36. *E. quinquangulare*, Linn. Sp. Pl. 87; leaves linear ensiform or subulate acute or acuminate, scapes many, heads globose grey or snow-white, invol. bracts very short scarious linear-oblong to broadly cuneate at length reflexed under the head, floral oblanceolate or spatulate hyaline acuminate or finely cuspidate, male petals minute, fem. fl. pedicelled, sepals slender, petals narrowly oblanceolate sparsely ciliate, ovary with petals stipitate or substipitate. Mart. in Wall. Pl. As. Rar. iii. 28; Cat. 6072; Kunth Enum. iii. 556; Steud. Syn. Pl. Cyp. 270, Dalz. & Gibs. Bomb. Fl. 280; Thw. Enum. 341. (excl. var.); Koern. in Linnæa, xxvii. 646. *E. argenteum*, Mart. l. c. *E. Martianum*, Wall. Cat. 7279 (proliferous state). *E. argyræum*, Steud. l. c. 271. *E. erythropodum*, Miq. in Hohen. Herb. Canara, n. 131. *Sphærochloa quadrangularis*, Beauv. ex Desv. in. Ann. Sc. Nat. Sc. xiii. 47. *Leucocephala graminifolia*, Roxb. Fl. Ind. iii. 612.

Throughout INDIA; from the Upper Gangetic plain to BURMA, and southward to CEYLON (C.P. 792).

Leaves 1-4 by $\frac{1}{2}$ - $\frac{3}{4}$ in.; usually narrowed from the base to the acuminate tip, few or many-nerved, opaque or subtranslucent, often bright red when dry. *Scapes* 1-4, rather stout and flexuous; sheath short, tip membranous. *Heads* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., grey when the fl. bracts are sparsely shortly villous, snow-white when they are many and densely villous; invol. bracts very variable in breadth, pale, glistening; receptacle globose or columnar; male sepals 3 or 2 or all connate, tips long-ciliate; petals very small; stamens 6. *Ovary* usually with the petals stipitate. *Seeds* oblong, smooth.—It is difficult to distinguish forms of this from *luzulæfolium* and

trilobum. It is said to be Australian, but I have seen no specimen from that country.

37. **E. trilobum**, *Ham. in Wall. Cat. n. 6072 D*; leaves broadly subulate or ensiform acute or acuminate many-nerved, scapes many, heads globose dark grey base intruded, invol. bracts small linear-oblong reflexed, floral spathulately oblanceolate obtuse or subacute, male petals minute, fem. fl. subsessile, sepals 3 dark cymbiformly oblanceolate, petals narrowly oblanceolate sparingly ciliate, ovary with petals sessile or subsessile. *E. quinquelobum*, *Wall. Cat. l.c.*; *Körn. in Linnæa*, xxvii. 645. *E. subulatum*, *Bojer ex Körn. l.c.* *E. Sollyanum*, *Royle Ill.* 409, t. 97. f. 1.

Throughout INDIA; from Kumaon, ascending to 4000 ft., to Bengal, the Concan and Malabar.

Habit of *E. quinquangulare*, from which it is often difficult to distinguish forms, but the heads are usually smaller, much darker in colour, the invol. bracts are narrow, the floral never acuminate or cuspidate, and the flowers are very shortly, if at all pedicelled, with broader concave fem. sepals that are strongly ciliate on the back. Ovary sessile or very shortly stipitate.—Mr. Law has sent specimens of a variety with broader leaves and the narrower lanceolate acute invol. bracts radiating and longer than the head; the fem. sepals too are narrower, these are accompanied with specimens in which the invol. bracts are normal, together with intermediates. I have seen no specimen with the conspicuous red foliage so common in *E. quinquangulare*.

38. **E. Helferi**, *Hook. f.*; leaves ensiform acute flaccid, scapes many, heads globose or hemispheric white, invol. bracts obovate-oblong scarious spreading or at length recurved, floral cuneately obovate acute dorsally tomentose, male sepals 3 glabrous, petals obscure, fem. fl. sessile, sepals 3 oblong, 2 concave obovate ciliate, ovary with petals sessile.

TENASSERIM, *Helfer (Kew Dist. 5584)*.

Leaves 3-4 by $\frac{1}{4}$ - $\frac{1}{2}$ in., translucent. Scapes 4-9 in., flexuous, young glabrous or hairy below; sheath acuminate. Heads $\frac{1}{2}$ in. diam., softly tomentose; receptacle densely villous; invol. bracts much shorter than the floral, which are much longer than the flowers; male fl. pedicelled; sepals concave, tip hooded; stamens 4-6; fem. petals remarkably broad, unequal. Ovary sessile. Seeds minute, dark red-brown, strongly striate and papillose.

39. **E. Walkeri**, *Hook. f.*; densely tufted, leaves narrowly subulate or linear few-nerved tips obtuse, heads globose snow-white, invol. bracts shorter spreading outer quadrate or cuneiform inner oblong, floral oblanceolate acute or mucronate, fl. fem. sessile, sepals narrowly oblong obtuse, petals oblanceolate villously ciliate with very long jointed spreading hairs and tipped with short stout obtuse white ones, ovary with petals sessile. *E. quinquangulare*, var. *argenteum*, *Thw. Enum.* 341.

CEYLON; at Caltura, *Macrae*; in paddy fields, *Thwaites* (C.P. 3562).

Leaves 1-2 by $\frac{1}{16}$ - $\frac{1}{10}$ in., glistening, opaque. Scapes 6-8 in., very slender. Heads $\frac{1}{8}$ - $\frac{1}{4}$ in. diam. or less; invol. bracts pale, scarious; floral white, membranous densely villous above the middle; receptacle hemispheric, hairs as long as the hyaline flowers; male sepals 3 (2 connate) long-bearded, petals 3 small orbicular subequal villous. Seeds broadly oblong, orange-yellow, shining, not striolate; chalaza very large.—A very distinct species, well characterized by the copious very long slender white hairs of the fem. petals, which appear to envelop the flower.

40. **E. Thwaitesii**, *Körn. in Linnæa*, xxvii. (1854), 627; leaves linear subulate or ensiform acuminate many-nerved, scapes many twice as long, head hemispheric dark sparsely mealy, involucre as broad as the heads,

bracts spreading and incurved obovate-oblong shining, floral oblanceolate acute tips hoary, male sepals glabrous, fem. fl. pedicelled, sepals cymbiform, petals short filiform penicillate above the middle with long spreading hairs, ovary with petals sessile.

NILGHIRI HILLS; *Schmidt*. CEYLON, *Walker, Thwaites* (C.P. 790, in part).

Leaves 1-2½ by ¼-½ in., few- or many-nerved, opaque. *Scapes* flexuous; tips of sheath acuminate, not membranous. *Heads* ½-¾ in. diam.; receptacle convex, densely villous; fl. bracts greenish-brown scarious; male sepals 3 (2 connate) glabrous or nearly so, petals very small, stamens 6; fem. sepals nearly glabrous, dorsally rounded or subcarinate. *Seeds* oblong with papillose striæ.—Well marked by the slender fem. petals, much like those of *E. sesangulare*. The Nilghiri specimens are much smaller and narrower leaved than the Cingalese.

41. *E. collinum*, *Hook. f.*; leaves short narrowly linear or subulate, scapes many, heads globose dark grey, invol. bracts small, outer very short cuneate-obovate, floral oblanceolate or spatulate acute acuminate or cuspidate dorsally hoary or the outer glabrous, male petals 3 small one often largest and exerted beyond the sepals but not beyond the bracts, fem. fl. pedicelled, sepals 2 cymbiform 3rd flat, petals narrowly oblanceolate ciliate, ovary and petals sessile or shortly stipitate. *E. luzulæfolium*, *Thw. Enum.* 341.

NILGHIRI HILLS, *Foulkes, Schmidt, Gardner*; Conoor, 7000 ft., *Clarke*. CEYLON; Newera Elia, *Gardner, &c.*, alt. 4000 ft. (C.P. 796, 1000).

Densely tufted. *Leaves* 1-2½ by ½-¾ in., obtuse, compressed, 1-9-nerved, opaque or translucent. *Scapes* 1½-12 in., rigid, flexuous; sheath stout, equalling or shorter than the leaves, tip obtuse membranous. *Heads* ¼ in. diam.; invol. bracts scarious, at length reflexed; receptacle hemispheric or columnar, densely villous; sepals of male and fem. dark.—The well developed male petals distinguish this species from the others of this section except *E. Walkeri*, in which they are subequal.—In Wight's Herbarium there are specimens (without habitat) of this or a closely allied plant, smaller in size, in which the male petals are equal.

42. *E. achiton*, *Kærn. in Linnæa*, xxvii. (1854), 630; small, leaves subulate, scapes twice as long, heads very small hemispheric few-fl., invol. bracts erect cuneiform pale, tip truncate or rounded, floral obovate-spatulate hirsute or hoary, fem. fl. shortly pedicelled, sepals 2 slender, petals 3 or 0, ovary with petals stipitate.

KHASIA HILLS; alt. 4-5000 ft., *Griffith (Kew Distrib.* 5376), *Clarke*.

Leaves ½-1 in., flattened, opaque, 3-5-nerved at the base. *Scapes* few, filiform; sheath finely acuminate, tip not membranous. *Heads* ⅓-½ in. diam.; invol. bracts few, coriaceous, shining; floral incurved, nearly glabrous; receptacle hemispheric, villous; flowers shortly pedicelled; male sepals 2, narrow; petals minute or obsolete; stamens few; fem. sepals filiform linear or dilated and concave towards the hairy tips, petals in the most developed heads 3, narrowly oblanceolate, ciliate. *Seeds* oblong, transversely striolate, red-brown.—Very near the *E. nigricans*, Br. of Australia.

43. *E. xeranthemum*, *Mart. in Wall. Pl. As. Rar.* iii. 29; *Wall. Cat.* 6084; dwarf, leaves subulate acuminate, scapes twice as long stout, heads broadly obconic, invol. bracts erect, outer much longer than the floral lanceolate acuminate, floral obovate-oblong or oblanceolate tips hirsute, fem. fl. subsessile, sepals 2 narrow tips ciliate, petals 3 narrowly oblanceolate ciliate, ovary with petals shortly stipitate. *Kunth Enum.* iii. 555. *Steud. Syn. Pl. Cyp.* 270; *Kærn. in Linnæa*, xxvii. 624. *E. pygmæum*, *Dalz. in Hook. Kew Journ.* iii. (1851), *Dalz. & Gibs. Bomb. Fl.* 280. *E. xeranthemoides*, *Heurck & Muell. Arg. Obs. Bot.* 103.

NEPAL, *Wallich*. BENGAL, SILHET, the KHASIA HILLS, and TENASSERIM, *Griffith*, &c. The CONCAN, *Stocks*. CHOTA NAGPORE, *Clarke*.—DISTRIB. trop. Afr.

Tufted, annual. *Leaves* $\frac{1}{4}$ – $1\frac{1}{4}$ in., many-nerved, often recurved. *Scapes* striate, hardly grooved; sheath tumid, tips membranous. *Heads* $\frac{1}{8}$ – $\frac{1}{4}$ in. diam.; invol. bracts scarious, stellately spreading, pale, shining, often lacerate; receptacle convex, villous; flowers subsessile; male sepals 3, free (or 2 connate); petals minute or obsolete; fem. sepals rarely 3, the third capillary. *Seeds* much narrower than in most other species, linear-oblong, papillose all over, pale yellow.

IM PERFECTLY KNOWN SPECIES.

E. fluviatile, *Trim.* in *Journ. Bot.* xxiii. (1885), 270; rootstock very slender, leaves scattered very slender, scape solitary, heads small depressed globose, invol. bracts roundish-oval brown, floral linear-oblong with coarse white hairs on the upper part, fl. diœcious? fem. sepals linear-spathulate, petals narrower membranous tipped with scanty white hairs.

CEYLON; Western province, in rapid stream, *Trimen*.

Submerged except the head; rootstock flexuous; roots copious, long. *Leaves* 8–10 by about $\frac{1}{2}$ in., solid, compressed, channelled, flaccid; sheath dilated, cottony within. *Scape* rather shorter than the leaves; sheath not dilated, tip acute. *Head* $\frac{1}{8}$ in. diam. (receptacle?).—*Descr.* from *Trimen*. The only specimen seen by me is in a very young state, with the flowers not available for analysis. Compare *E. Dalzellii*.

E. CEYLANICUM, *Kœrn.* in *Linnaea*, xxvii. 667; a foot high, stem very short, leaves 2–3½ in. tufted linear suddenly mucronate, scapes solitary 1 in., heads rather large cylindric-globose woolly white 4 in. long, invol. bracts obovate at length hidden under the head, floral cuneate-obovate submembranous pale, receptacle hairy, male sepals obtuse membranous, anticus petal much largest, fem. fl. sessile, sepals free acute like those of the males, petals 3 spatulate obtuse spongy anticus much the largest far longer than the sepals.—Hairs of bracts and perianths obtuse. Ceylon, *Herb. Berlin*.—Evidently near *E. atratum*, but leaves mucronate.

E. EURYPELON, *Kœrn. l.c.* 685; 2–3 in. high, leaves 3 in. tufted broadly linear narrowed upwards tip obtuse membranous, scapes crowded 4-winged $1\frac{1}{2}$ –3 in., heads subglobose $1\frac{3}{4}$ – $2\frac{1}{4}$ in. broad powdery pubescent and nigro-niveous, invol. bracts rigid powdery-pubescent olive-black much shorter than the heads, floral rhombic-cuneate olive-black rigid closely imbricate hiding the fl., receptacle hairy.—*Ind. Or.*

E. HETEROLEPIS, *Steud. Syn. Pl. Cyp.* 271; *Kœrn. l.c.* 572; tufted, stem very short, leaves lanceolate from a broad base subobtuse, hardly 1 in. long.—Bombay, *Roux*.

E. MINIMUM, *Lam. Encycl.* iii. 275; *Kunth Enum.* iii.; *Steud. Syn. Pl. Cyp.* 268; *A. Rich. Tent. Fl. Abyss.* ii. 347?; *Kœrn. l.c.* 635.—*Ind. Or.*, *Sonnerat.* (*Herb. Lamarek*). Male sepals 2, free, linear-oblong.—Perhaps a form of *E. truncatum*, fid *Kœrn.* more probably *E. Sieboldianum*.

E. NEESIANUM, *Kœrn. l.c.* 628.—Ceylon (*Herb. Berol.*).—Is likened to *truncatum* and *achiton* by its dimerous sepals, but the receptacle is shortly villous. Very like *E. viride* in the head, differs in the form and number of the perianth segments and the obtuse floral bracts, *Kœrn.*

ORDER CLXXII. CYPERACEÆ. By C. B. Clarke, F.R.S.

Grass- or rush-like herbs. *Stems* solid. *Leaves* 3-ranked, rarely 0; sheaths closed. *Flowers* 1–2-sexual, small or minute, solitary in the axils of the scales (glumes) of the spikes or spikelets that are solitary or variously disposed on the stem. *Perianth* 0, or of hypogynous bristles or scales. *Stamens* 1–3, rarely more; anthers linear, basifixed on the flattened fila-

ments. *Ovary* (in *Caricæ* enclosed in a utricule) 1-celled; style short or slender, 2-3-cleft, branches slender stigmatic; ovule 1, basal, erect, anatropous. *Fruit* a compressed or 3-gonous nut. *Seed* erect, free; embryo minute, inside the usually floury albumen.—Genera 60; species 3000, universally distributed.

The above Ordinal character applies especially to the Indian *Cyperaceæ*, and takes no account of exceptions to it, which occur in extra-Indian species.

I am indebted to Mr. C. B. Clarke, F.R.S., for the following account of the Indian *Cyperaceæ*. It will be observed that in it the citations of authors and of Floras have been almost restricted to those in which the species and their synonyms have been first indicated or described, and to the standard works of Kunth, Boeckeler and Stendel (and of Boott in the genus *Carex*), to a good figure when acceptable, and to the various Indian Floras, monographs, &c. The vast literature of the order, so many species of which are scattered over large areas of the globe and are hence described in many extra Indian works, renders this course unavoidable in the case of a "Flora" which, like that of British India, must have circumscribed limits. I have myself supplied the following clavis.—J. D. H.

A. CYPEREÆ. *Spikelets* of few or many glumes; lower 1-2 gl. always empty, uppermost male empty or imperfect, intermediate ones bisexual. *Remirea* is exceptional.

Tribe I. EUCYPEREÆ. *Fl. glumes* usually many, distichously arranged. *Hypogynous bristles* 0.

* *Style* 2-fid. (in *Juncellus* very rarely 3-fid.).

Rhachilla of spikelet deciduous.	1. KYLLINGA.
Rhachilla of spikelet persistent. Nut laterally compressed	2. PYCREUS.
Rhachilla of spikelet persistent. Nut dorsally compressed	3. JUNCCELLUS.

** *Style* 3-fid.

Rhachilla of spikelet persistent	4. CYPERUS.
Rhachilla of spikelet deciduous	5. MARISCUS.
Spikelet much flattened. Nut narrow, otherwise as <i>Mariscus</i>	6. COURTOISIA.

Tribe II. SCIRPEÆ. *Fl. glumes* usually many, spirally arranged. *Hypogynous bristles* often present.

* *Style-base* constricted or articulate above the nut. Leaves all near the base of the stem. Inflorescence umbelled.

Hypogynous bristles nearly always present. Leaves 0	7. ELEOCHARIS.
Hypogynous bristles 0. <i>Style-base</i> persistent, or if deciduous not leaving a tumour on the nut	8. FIMBRISTYLIS.
Hypogynous bristles 0. <i>Style-base</i> deciduous leaving a tumour on the nut. Leaves with long fine hairs	9. BULBOSTYLIS.

** *Style-base* passing gradually into the nut.

Hypogynous bristles 0-6, undivided, linear, rarely oblong	10. SCIRPUS.
Hypogynous bristles 6, divided to base into linear segments	11. ERIOPHORUM.
Hypogynous bristles 6 or 3, interior 3 broadly obovate (except in <i>F. Wallichii</i> , &c.	12. FUIRENA.
Hypogynous scales 2, hyaline, elliptic, enclosing the nut	13. LIPOCARPHA.

Tribe III. RYNCHOSPOREÆ. *Fl. glumes* 1 or 2, with several lower empty glumes and several upper empty or male glumes which are thinner and not keeled. *Hypogynous bristles* filiform, linear, or 0.

* *Style* 2-fid.

Style-base thickened not passing gradually into the nut . . . 14. RYNCHOSPORA.

**** Style 3-fid.**

- Lowest fertile gl. somewhat distant from the one above it. . . 15. SCHÆNUS.
 Spikelets paniced, 1-7-fid., lowest fl. alone perfect . . . 16. CLADIUM.
 Spikelets 3-4-fid., uppermost fl. alone perfect . . . 17. MICROSCHÆNUS.
 Spikelets 1-2-fid., uppermost fl. alone perfect; hypog. scales
 long . . . 18. LEPIDOSPERMA.
 Spikelets 1-2-fid., as in 18, hypog. scales 0 . . . 19. GAHNIA.

Anomalous genus.

- Spikelets sessile in dense digitate cylindric spikes; glumes 4,
 3 empty, uppermost with a perfect flower . . . 20. REMIREA.

B. HYPOLYTREÆ. *Spikelets* with one terminal fem. flower, two basal opposite male glumes, and 0-9 intercalated monandrous or empty spirally arranged glumes.

- Spikes corymbose; style 2-fid . . . 21. HYPOLYTREM.
 Spikes corymbose; style 3-fid . . . 22. THORACOSTACHYUM.
 Spikes congested; style 3-fid . . . 23. MAPANTIA.
 Spikes in an oblong panicle . . . 24. SCIEPODENDRON.
 Spikes in a unilateral dense spiciform panicle . . . 25. LEPIRONIA.

C. SCLERIEÆ. *Spikelets* 1-sexual or with one basal fem. flower and one or more male or empty glumes. *Nut* stipitate, osseous. *Hypogynous scales* or bristles 0. . . 26. SCLERIA.

D. CABICEÆ. *Spikelets* uni- or bisexual, monoëcious or dioëcious. *Nuts* enclosed in an entire or 2-fid sac (utricule).

- Utricle split down one side . . . 27. KOBRESIA.
 Utricle entire or 2-fid at the tip only . . . 28. CAREX.

1. KYLLINGA, Rottb.

Stem erect, simple, leafy below only, terminated by 1-3 sessile capitate spikes. *Spikes* ovoid or cylindric, dense, with numerous small compressed spikelets. *Glumes* 4-5, distichous, rhacheola disarticulating above the two lowest which are empty; gl. iii. bisexual; gl. iv. male or empty, rarely fertile; gl. v. rudimentary or 0 (rarely additional upper glumes occur). *Stamens* 1-3, anterior; anthers linear-oblong, mucous or nearly so. *Nut* compressed laterally; style linear, base continuous with nut; branches 2, linear.—Sp. 33; all hot and temp. regions except Europe.

* *Nut-bearing glume not winged in the upper half of its keel.*

1. K. triceps, Rottb. Descr. et Ic. 14, t. 4, fig. 6 (excl. cit. Rheedee); nearly glabrous, rhizome very short, stem thickened at base, spikes 3-1 (rarely 4-5) subcylindric whiteish, nut ultimately yellow-brown. *Rorb. Fl. Ind.* i. 181; *Nees in Wight Contrib.* 91; *Thw. Enum.* 345; *Boeck. in Linnæa*, xxxv. 413 (excl. var. β). *K. monocephala, Nees in Wight Contrib.* 91 (not of Rottb.). *K. brevifolia?* *Hb. Heyne.*—*Kyllingia, Wall. Cat.* 3443. *I. Lipocarpa, Wall. Cat.* 3445, partly.

From N.W. INDIA and SIND to BENGAL, BURMA, and CEYLON.—DISTRIB. Africa, China, Austral.

Stems 2-12 in., base tumid. *Leaves* as long (or half as long) as the stem, $\frac{1}{4}$ - $\frac{1}{2}$ in. broad. *Head* $\frac{1}{8}$ - $\frac{1}{2}$ in. in diam.; bracts 3-4, up to 2-3 in. *Spikelets* $\frac{1}{16}$ - $\frac{1}{8}$ in.

Fertile glume ovate, keel smooth green subexcurrent, sides 3-4-striate, straw-colrd. *Stamens* usually 2. *Nut* $\frac{2}{3}$ length of glume, ellipsoid, obtuse.

2. ***K. cylindrica***, *Nees in Wight Contrib.* 91, partly; nearly glabrous, rhizome very short, stem not thickened at base, spikes 3-1 sub-cylindric straw-colrd., nut yellow-brown ultimately black. *Boeck. in Linnæa*, xxxv. 415.—*Kyllingia*, *Wall. Cat.* 3442, partly, 3443 D, partly.

Scattered widely in INDIA, not plentiful anywhere. TROPICAL HIMALAYA, from Kumaon to Sikkim. *PARASNATH, T. Anderson.* CHITTAGONG, *H. f. & T. Th. NILGHERRIES, King.* SINGAPORE, *Hullatt.*—DISTRIB. *Afric., Austral.*

Stems 4-12 in. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, usually much shorter than stem. *Head* often of 3 spikes, median cylindric $\frac{2}{3}$ in. long, lateral much shorter, subovoid; bracts 3-4, up to 2-3 in. *Spikelets* $\frac{1}{10}$ - $\frac{1}{8}$ in. long. *Fertile glume* ovate, keel green scarcely excurrent, sides not glandular-papillose. *Nut* $\frac{2}{3}$ length of glume, ellipsoid, obtuse.

3. ***K. melanosperma***, *Nees in Wight Contrib.* 91; glabrous, rhizome thick very short, stem elongate, leaves short, head solitary ovoid, nut ultimately black. *Thw. Enum.* 345; *Boeck. in Linnæa*, xxxv. 419. *K. brevifolia*, *Nees l. c.* 91 (partly, not of *Rottb.*). *K. fuscescens*, *Boeck. l. c.* 421, partly. *K. vaginata* (and var. *major*), *Zoll. Verz. Ind. Archip.* ii. 63; *Miq. Fl. Ind. Bat.* iii. 290.—*Kyllingia*, sp. *Wall. Cat.* 3440.

NILGHERRIES, *Leschenault, &c.* CEYLON, *Thwaites, &c.* SINGAPORE, *Kurz.*—DISTRIB. *Java, S. Africa, Madagasc.*

Rhizome about 1 in. *Stems* 20 in., sharply triquetrous at top. *Leaves* often 4 by $\frac{1}{2}$ in., always much shorter than stem. *Spike* $\frac{2}{3}$ by $\frac{1}{4}$ in., thicker than in *K. cylindrica*; bracts up to 2-4 in., leaf-like. *Spikelets* $\frac{1}{8}$ in. long, usually with 1 rarely 2 nuts. *Fl. glume* ovate, acute, keel green scarcely scabrous, sides 3-4-striate fuscous. *Stamens* often 3. *Nut* $\frac{2}{3}$ length of glume, oblong-obovoid.

4. ***K. brevifolia***, *Rottb. Descr. et Ic.* 13, t. 4, fig. 3; glabrous, rhizome creeping elongate, leaves long or short, spikes 3-1 ovoid, fl. glume submucronate eglandular, keel upwards not winged, nut ultimately yellow-brown. *Nees in Wight Contrib.* 91 (partly); *Thw. Enum.* 345; *Boeck. in Linnæa*, xxxv. 424. *K. intermedia*, *Br. Prodr.* 219. *K. cruciata*, *Nees in Linnæa*, ix. 286. *K. monocephala*, *Thunb. Fl. Japon.* 35; *Miq. in Ann. Mus. Lugd. Bat.* ii. 142 (not of *Rottb.*). *K. sororia*, *Kunth Enum.* ii. 131; *Miq. Fl. Ind. Bat.* iii. 293 (partly). *K. gracilis*, *Kunth l. c.* 134; *Miq. l. c.* 292. *K. fuscata*, *Miq. l. c.* 294. *K. aurata*, γ *Hohenackeri*, *Boeck. l. c.* 423. *K. triceps*, *Thunb. Fl. Japon.* 35 (not of *Rottb.*). *Schoenus coloratus*, *Linn. Sp. Pl.* ed. 2, 64, and herb. propr.—*Kyllingia*, *Wall. Cat.* 3443, partly.

Throughout INDIA; from the Panjab to Assam, CEYLON, and MALACCA.—DISTRIB. All warm regions except the Mediterranean.

Rhizome 4-12 in. *Stems* 4-24 in. (or sometimes $\frac{1}{2}$ -2 in. curved). *Leaves* $\frac{1}{10}$ - $\frac{1}{8}$ in. broad, longer than the stems or very much shorter. *Head* $\frac{1}{8}$ - $\frac{1}{4}$ in. diam., green or brownish; spikes often 1; if 3, median ovoid, scarcely cylindric; bracts 3-4, up to 4 in. *Spikelets* $\frac{1}{8}$ - $\frac{1}{4}$ in., usually with 1 nut only. *Fl. gl.* ovate, keel green 3-nerved slightly excurrent or recurved, lower half setulose-scabrous, upper smooth or sparsely setulose, sides 3-4-striate. *Stamens* 3 or 2. *Nut* $\frac{2}{3}$ or $\frac{1}{2}$ the length of glume, ellipsoid, obtuse; style as long as half the nut.

** *Nut-bearing glume winged in upper half of keel.*

5. ***K. monocephala***, *Rottb. Descr. et Ic.* 13, t. 4, fig. 4; nearly glabrous, rhizome creeping elongate, spikes 1-3 ovoid, fl. glume submucronate

upper half of keel with a lunate crested glandular wing, nut yellow-brown. *Roxb. Fl. Ind.* i. 180; *Nees in Wight Contrib.* 91 (partly); *Miq. Fl. Ind. Bat.* iii. 291; *Thw. Enum.* 345; *Boeck. in Linnæa*, xxxv. 427. *K. triceps*, *Linn.f. Suppl.* 104 (partly, not of Rottb.). *K. sororia*, *Miq. Fl. Ind. Bat.* iii. 293 (partly, not of Kunth). *K. gracilis*, *Zoll. Verz. Ind. Archip.* ii. 63 (not of Kunth). *K. mindorensis*, *Steud. Syn. Pl. Cyp.* 67. *Scirpus Cephalotes*, *Jacq. Hort. Vind.* t. 97.—*Kyllingia*, *Wall. Cat.* 3443 A, F (partly), H (partly).

Throughout INDIA, common; from Kumaon to Assam, CEYLON and SINGAPORE.—DISTRIB. Hot and warm temp. regions of the Old World except the Mediterranean.

Closely resembles *K. brevifolia* except in the crest (usually straw-colrd. with scattered red circular resinous glands) on the upper part of keel of nut-bearing glume.

6. ***K. squamulata***, *Vahl Enum.* ii. 381; nearly glabrous, roots fibrous, spikes 1–3 ovoid, fl. glume scarcely acute its keel winged by a broad hyaline incise-toothed crest, nut brown. *Boeck. in Linnæa*, xxxv. 431. *K. Metzii*, *Steud. Syn. Pl. Cyp.* 70. *K. monocephala*, *Strachey Herb. Kumaon*, 74 (not of Rottb.).

Western India; KASHMIR, *Thomson*. GURWHAL, up to 5500 ft., *Duthie*. MT. ABOO, *King*. CANARA, *Metz*.—DISTRIB. Trop. Africa.

Stems tufted (annual), 2–12 in. *Leaves* often longer than stem, $\frac{1}{2}$ in. broad. *Head* $\frac{1}{2}$ in. in diam., green or brown. *Spikelets* $\frac{1}{2}$ in. long, maturing 1 nut only.

2. PYGREUS, Beauv.

Characters of 4 *Cyperus* but nut compressed laterally, and style branches 2.—Species 50, all warm and temp. regions.

* Outer superficial cells of nut (at least on its shoulders) longitudinally oblong or elliptic; nut often appearing transversely lineolate or imperfectly zonate (by reason of the narrow ends of the cells running into an undulating line).

1. ***P. flavescens***, *Nees in Linnæa*, ix. 283; annual, slender, umbel simple or reduced to 1 head, bracts spreading, spikelets linear $\frac{1}{10}$ in. wide yellow or pale, nut obovoid compressed shining black hardly half as long as the glume. *Cyperus flavescens*, *Linn. Sp. Pl.* 68 (not of *Linn. Herb.*); *Kunth Enum.* ii. 5; *Reichb. Ic. Fl. Germ.* viii. 31, t. 278, figs. 662–664; *Boeck. in Linnæa*, xxxv. 438, and in *Journ. Linn. Soc.* xviii. 104; *Clarke*, l. c. xxi. 36; *Boiss. Fl. Orient.* v. 364 (excl. *Cabul* sp.).

PUNJAB; Kurrum Valley, *Aitchison*, n. 964.—DISTRIB. N. temp. regions.

Stems 1–12 in. *Leaves* often $\frac{2}{3}$ length of stem, $\frac{1}{12}$ in. wide, grass-like. *Spikelets* clustered or very shortly spicate, spreading in fruit. *Nut* obtuse, with transverse white lines; black cells of surface longitudinally oblong.

2. ***P. stramineus***, *C. B. Clarke*; umbels reduced to 1 compound head of 5–12 straw-colrd. spikelets, bracts and spikelets (even in fruit) suberect (otherwise nearly as *P. flavescens*). *Cyperus stramineus*, *Nees in Wight Contrib.* 74; *Kunth Enum.* ii. 9; *Clarke in Journ. Linn. Soc.* xxi. 39. *C. capillaris*, *Hochst. ms.*; *Steud. Syn. Pl. Cyp.* 4 (not of *König.*). *C. coromandelinus*, *Boeck. in Linnæa*, xxxv. 480 (not of *Spreng.*). *C. filiformis*, *Heyne*; *Wall. Cat.* 3320 (partly).

Throughout INDIA, except the drier country, frequent, alt. 0–3000 ft.; from KHASIA, *H. f. & T. T.*, to CEYLON and TAVOY.

Roots aromatic (*J. D. Hooker*). *Spikelets* 15–40-fld., or often long, even up to 70-fld.

3. ***P. latespicatus***, *C. B. Clarke*; middle-sized, umbel simple or reduced to 1 head, spikelets spicate $\frac{1}{2}$ in. wide straw-colrd. more or less chestnut-red marked, nut obovoid compressed black hardly as long as $\frac{1}{2}$ glume. *Cyperus latespicatus*, *Boeck. in Flora*, xlii. 433 bis, and in *Linnæa*, xxxv. 467; *Clarke in Journ. Linn. Soc.* xxi. 40. *C. diaphanus*, *Schrad. ex Roem. & Sch. Syst.* ii., *Mant.* 477; *Kunth Enum.* ii. 9; *Boeck. in Linnæa*, xxxv. [1867–8] 437; *Clarke, l. c.* 80. *C. intermedius*, var. *indica*, *Boeck. l. c.* 451 (not of *Steud.*). *C. pseudo-bromoides*, *Boeck. l. c.* 464 (the *Nepal plant*). *C. angulatus*, *Strachey Cat. Pl. Kumaon*, 74; *Duthie in E. T. Atkinson Gaz.* x. [1876] 620 (not of *Nees*). *C. aphyllus*, *Boeck. l. c.* 450. *C. pauper*, *C. B. Clarke, l. c.* 44 (the *Himal. plant* not of *Hochst.*).—*Cyperacea*, *Griff. Itin. Notes*, 32, n. 506.

From KUMAON to KHASIA, alt. 3–6000 ft. BENGAL, CHOTA NAGPORE, and MALABAR.

Usually annual. *Stems* 4–16 in., occasionally 0. *Leaves* usually $\frac{1}{2}$ length of stem, $\frac{1}{2}$ in. wide, sometimes 0. *Spikelets* stouter than in *P. flavescens*, 20–60-fld. *Nut* with longitudinally oblong cells.—*Strachey's plants* are depauperated, filiform, bearing only 1 or 2 spikelets, and were formerly referred by me to *P. pauper*, an Abyssinian sp.

** Outer cells of the surface of nut all subquadrate hexagonal, none oblong.

† *Stem* decumbent at base, often clothed $\frac{1}{3}$ its length by leaf-sheaths.

4. ***P. sanguinolentus***, *Nees in Linnæa*, ix. 283; middle-sized (or depauperate and filiform), umbel simple or contracted into 1 head, spikelets linear or oblong generally red-marked, glumes loosely imbricate, nut obovoid biconvex almost turgid. *Cyperus sanguinolentus*, *Vahl Enum.* ii. 351; *Nees in Wight Contrib.* 75; *Thw. Enum.* 342; *Aitch. Cat. Punjab. Pl.* 156. *C. Eragrostis*, *Vahl l. c.* 322? (exclud. syn. *Retz.*); *Kunth Enum.* ii. 7; *Moritz. Verz. Zoll. Pfl.* 96; *Strachey Cat. Pl. Kumaon*, 74; *Boeck. in Linnæa*, xxxv. 443; *Clarke in Journ. Linn. Soc.* xxi. 57, and xxv. 80. *C. cruentus*, *Roxb. Fl. Ind.* i. 196 (not of *Rottb.*). *C. pumilus*, *Rottb. Desc. et Ic.* 29, t. 9, fig. 4 (not of *Linn.*). *C. atratus*, *Steud. in Zoll. Verz. Ind. Archip.* ii. 62, and *Pl. Cyp.* 12; *Miq. Fl. Ind Bat.* iii. 259; *Boeck. l. c.* 446. *C. concolor*, *Steud. Pl. Cyp.* 6. *C. Rehmanni*, *Boiss. Fl. Orient.* v. 364. *C. grossarius*, *Heyne ms.* *C. jeminicus*, *Heyne ms.* (not of *Rottb.*).—*Cyperus*, *Wall. Cat.* 3318 (mainly), 3335.

Throughout INDIA, ascending to 10,800 ft.; from KASHMIR to ASSAM, CEYLON, and SINGAPORE.—DISTRIB. Warm parts of the Old World.

Glabrous. *Rhizome* creeping, 4–10 in., or often flowering the first year. *Stem* 4–20 in. *Leaves* as long as stem or much shorter, $\frac{1}{10}$ in. wide. *Spikelets* shortly spicate or clustered, $\frac{1}{2}$ –1 by $\frac{1}{2}$ in., 6–24-fld. *Glumes* boat-shaped, ovate, obtuse, 3 green nerves on back, sides usually red- or chestnut-marked. *Nut* hardly $\frac{1}{2}$ length of glume, ashy-brown.—Belongs to a very small group of closely-allied species, which alone of all the *Cypereæ* have nodes (and sheaths and leaves) far above base of stem; usually a prominent character in *P. sanguinolentus*, but frequently absent. Sikkim

specimens from 10,000 ft., are 4-6 in. high with stem (and leaves) capillary, bearing 1 or 2 spikelets only, and may be a new species.

†† *Small or medium-sized, roots fibrous, leaves close to base of stem.*

5. **P. nitens**, *Nees in Linnæa*, ix. 233, and in *Nov. Act. Acad. Nat. Cur. xix., Suppl. i.* 43; small or scarcely middle-sized, umbel simple or reduced to 1 head, spikelets small clustered or shortly spicate linear or linear-oblong straw-colrd. or dusky, glumes minutely mucronate or nearly muticous, nut small obovoid. *Cyperus pumilus*, *Linn. Sp. Pl.* 69; *Gaertn. Fruct. i.* 9, t. 2, fig. 2; *Kunth Enum. ii.* 4 (in small part); *Roxb. Fl. Ind. i.* 196 (excl. syn. *Rotb.*); *Strachey Cat. Pl. Kumaon*, 74; *Clarke in Journ. Linn. Soc. xxi.* 43 (not of *Rotb.* or *Nees*). *C. nitens*, *Vahl Enum. ii.* 331; *Kunth Enum. ii.* 3; *Boeck. in Linnæa*, xxxv. 483 (not of *Retz.*). *C. membranaceus*, *Vahl. l. c.* 330; *Kunth l. c.* 3. *C. punctatus*, *Roxb. Fl. Ind. i.* 193 (excl. cit. *Pluk.*). *C. pulvinatus*, *Nees & Meyen in Wight Contrib. 74*; *Thw. Enum. 342*. *C. obstinatus*, *Steud. Syn. Fl. Cyp.* 10; *C. tortuosus*, *Herb. Roxb.*; *Wall. Cat. 3339*.—*Cyperus*, *Wall. Cat. 3312* (mainly).

Throughout INDIA, alt. 0-6000 ft., frequent; from the PUNJAB to ASSAM, CEYLON, and SINGAPORE.—DISTRIB. Warm regions of the Old World.

Annual. *Stems* tufted, 1-12 in. *Leaves* often as long as stem, $\frac{1}{10}$ in. wide, weak. *Umbel* rays 1-6 in. up to 2-4 in. long, usually shorter. *Spikelets* 5-30 in a spike, $\frac{1}{2}$ - $\frac{3}{8}$ by $\frac{1}{12}$ in., 8-44-fld.; rhachilla slender, persistent. *Glumes* boat-shaped, 3-5-nerved, back green, sides pale nerveless, keel (in the Indian form) nearly always excurrent recurved. *Stamen* in the Indian plant usually 1 (in large examples sometimes 2). *Nut* compressed, brown, nut $\frac{1}{2}$ as long as the glume.

6. **P. pumilus**, *Nees in Linnæa*, ix. 283; annual, umbel simple, spikelets spicate oblong 6-10-fld. much compressed, glumes on back 3-nerved green, sides 2-3-nerved pale, keel excurrent recurved, nut broad ellipsoid flattened. *Cyperus hyalinus*, *Vahl Enum. ii.* 329; *Kunth Enum. ii.* 3; *Miq. Fl. Ind. Bat. iii.* 254; *Boeck. in Linnæa*, xxxv. 482; *Clarke in Journ. Linn. Soc. xxi.* p. 46; *Ridley in Forbes East. Archip.* 520. *C. pumilus*, *Nees in Wight Contrib. 74* (excl. all syn.); *Kunth l. c.* 4 (in great part, not of *Linn.*) *C. strictus*, *Wight ms.* (not of *Roxb.*); *Wall. Cat. 3336*, *C* partly.

MADRAS; in rice-fields, *Wight, Leith.*—DISTRIB. Timor.

Stems 2-8 in. *Leaves* as long as stem, $\frac{1}{2}$ in. wide, weak. *Umbel* rays 3-7, up to 2 in. long. *Spikelets* 4-12 in a spikelet, not clustered, $\frac{1}{2}$ by $\frac{1}{2}$ in. *Glumes* almost glistening on their pale or yellowish nerved sides. *Nut* obtuse, ashy-black, more than $\frac{1}{2}$ length of glume.

7. **P. capillaris**, *Nees in Linnæa*, ix. 283 and in *Mart. Fl. Bras. ii. pars.* 1, 9; umbel apparently simple or condensed into 1 head, (see var. γ) spikelets clustered linear many-fld. much compressed straw-colrd., brown or black, nut small ellipsoid compressed apiculate chestnut-black. *Cyperus globosus*, *All. Fl. Pedem. Auctuar.* 49; *Reichb. Ic. Pl. Crit. iii.* 26, t. 229, and *Ic. Fl. Germ. viii.* 32, t. 279, fig. 665; *Boeck. in Linnæa*, xxxv. 458; *Clarke in Journ. Linn. Soc. xx.* 279 and *xxi.* 47. *C. flavidus*, *Decne. in Nouv. Ann. Mus. iii.* 359 (not of *Retz.* or *Roxb.*). *C. capillaris*, *Kœnig. ms.*; *Roxb. Fl. Ind. i.* 194; *Nees in Wight Contrib. 76*; *Dalz. & Gibs. Bomb. Fl.* 283. *C. Lamarckianus*, *Schultes in Roem. & Sch. Syst. ii. Mant.* 108; *Kunth Enum. ii.* 9. *C. vulgaris*, *Sieber ms.*; *Kunth l. c.* 4. *C. mucronatus*, *Moritz Verz. Zoll. Pfl.* 95 (not of *Rotb.*). *C. flaves-*

cens, *Thw. Enum.* 342; *Aitch. Cat. Pl. Punjab* 155. *C. polystachyus*, *Strachey Cat. Pl. Kumaon*, 74; *Duthie in E. T. Atkinson Gaz.* x. 620.—*Cyperus*, *Wall. Cat.* 3318.

N. INDIA; alt. 0-6000 feet, from KASHMIR to CHOTA NAGPORE and ASSAM.—DISTRIB. Temp. and trop. old world.

Glabrous. *Stems* tufted, 4-24 in. *Leaves* 4-12 by $\frac{1}{8}$ in., weak. *Umbel* rays up to 2½ in., usually very short; bracts 4-8 in. *Spikes* subglobose. *Spikelets* 5-50, $\frac{3}{8}$ by $\frac{1}{8}$ in., 40-fld. *Glumes* ovate, obtuse. *Stamens* 2; anthers small, muticous. *Nut* $\frac{1}{2}$ length of glume.—The Himal. plant is identical with the European; its spikelets are rather broad, ferruginous-green, and the glumes are (in fruit) rather loose, thin. In the Khasia Hills the glumes are often browner, chestnut, or very black, rigid, tightly imbricated.

Var. *β. nilagiricus*, C. B. Clarke in *Journ. Linn. Soc.* xxi. 49; spikelets narrower more rigid, glumes (even in fruit) rigidly imbricated not inflated straw-colrd. or brown or (more often) chestnut or black. *Cyperus nilagiricus*, *Hochst. ms.*; *Steud. Syn. Cyp.* 2; *Boeck. in Linnæa*, xxxv. 457. *C. atro-ferrugineus*, *Steud. l. c.* 2. *C. Junghuhnii*, *Miq. Fl. Ind. Bat.* iii. 260. *C. ater*, *Dalz. & Gibs. Bomb. Fl.* 283 (not of Vahl.). *C. lucidus* and *lividus*, *Heyne ms.* *C. Eragrostis*, *Rottler, ms.* *C. semiteres*, *Heyne ms.*, *Wall. Cat.* 3310.—The Deccan Peninsula and Ceylon.—DISTRIB. Afric., S.E. Asia, Austral.—This var. is founded on the narrower spikelets; colour is accidental.

Var. *γ stricta*, C. B. Clarke, l.c.; spikelets narrower straw-colour or yellow less compressed frequently short 6-12-fld. sometimes curved or twisted, glumes closely packed but loosely imbricated. *Cyperus strictus*, *Lam. Ill.* i. 146; *Roxb. Fl. Ind.* i. 200; *Kunth Enum.* ii. 12; *Miq. Fl. Ind. Bat.* iii. 258. *C. tortuosus*, *Kœnig ms.*; *Roxb. l. c.* 197; *Nees in Wight Contrib.* 75; *Kunth l. c.* 16. *C. divaricatus*, *Herb. Ham.*; *Wall. Cat.* 3312 (partly).—N. India, from the Punjab to Assam, Chittagong and Chota Nagpore.—DISTRIB. Asia, Afric.

8. **P. polystachyus**, *Beauv. Fl. Owar.* II. 48, t. 86, fig. 2; umbel apparently simple or contracted into 1 head, spikelets clustered even in fruit suberect (see var. *β*) linear many-fld. dusky straw-colour often red-marked, nut oblong nearly symmetric truncate. *Cyperus polystachyus*, *Br. Prod.* 214; *Roxb. Fl. Ind.* i. 193; *Nees in Wight Contrib.* 75; *Kunth Enum.* ii. 13; *Dalz. & Gibs. Bomb. Fl.* 281; *Thw. Enum.* 342; *Boeck. in Linnæa*, xxxv. 477; *Boiss. Fl. Orient.* v. 365; C. B. Clarke in *Journ. Linn. Soc.* xx. 280 and xxi. 51. *C. odoratus*, *Linn. Sp. Pl.* col. i. 46. *C. teretifructus*, *Steud. in Zoll. Verz. Ind. Archip.* ii. 62 and *Syn. Cyp.* 3. *C. strigosus*, *Wight ms.* *C. corymbosus*, *Roxb. ms.* (not of Rottb.). *C. filiformis*, *Herb. Heyne*, *Wall. Cat.* 3320 A. (partly). *C. bicarinatus*, *Herb. Heyne*, *Wall. Cat.* 3333.—*Cyperus*, *Wall. Cat.* 3340.

Near the coast of INDIA from SIND to SINGAPORE; common. SILHET, *Hook. f. & T. T.*—DISTRIB. all warm especially maritime regions.

Glabrous. *Stems* 12-30 in., sometimes 0. *Leaves* overtopping stem or much shorter, $\frac{1}{8}$ in. broad, weak. *Umbel* rays 1-7, up to 0-2 in.; spikes compound of 10-50 spikelets; bracts 3-6, spreading, up to 4-16 in. spikelets $\frac{3}{8}$ by $\frac{1}{16}$ in., 20-50-fld. *Glumes* boat-shaped, ovate, muticous, papery, not rigid. *Stamens* 2 (usually); anthers small, oblong. *Nut* compressed, biconvex, black, $\frac{1}{2}$ length of glume.

Var. *β. laeiflorus*, *Benth. Fl. Austral.* vii. 261; spikes more open, spikelets in fruit rectangularly spreading subsolitary, often more tinged with yellow red or brown. *Cyperus paniculatus*, *Rottb. Descr. et Ic.* 40. *C. plenus*, *Heyne ms.*; *Kunth Enum.* ii. 12. *C. geminatus*, *Heyne ms.* *C. Hookerianus*, *Arnott ms.* (not of Thwaites).

The DECCAN, and MALAY Peninsulas, and CEYLON, frequent.—DISTRIB. all hot regions.

9. **P. ferrugineus**, *C. B. Clarke*; spikelets rather broader redder, glumes more distant (otherwise as *P. polystachyus*, Var. β). *Cyperus ferrugineus*, *Poir. in Lam. Encyc.* vii. 261; *Kunth Enum.* ii. 11; *Baker Fl. Maurit.* 408. *C. polystachyus*, *Vars. ferruginea* and *macrostachya*, *Boeck. in Linnæa*, xxxv. 479, *Vars. ferruginea*, *micans* and *filicina*, *C. B. Clarke in Journ. Linn. Soc.* xxi. 54, 55. *C. strictus*, *Rotthler ms. Heyne ms. (not of Roxb.)*—*Wall. Cat.* 3331.

The DECCAN PENINSULA; *Rotthler, G. Thomson. CHITTAGONG*; *J. D. H.*—*DISTRIB.* *Afric. Americ.*

10. **P. sulcinus**, *C. B. Clarke*; as *P. polystachyus*, var. β , but spikelets longer, glumes more remote, nut unsymmetric its faces much compressed usually concave. *Cyperus sulcinus*, *C. B. Clarke in Journ. Linn. Soc.* xxi. 56 and xxv. 80.

BENGAL; up to 5000 feet, alt. frequent. ANAMALLAY MTS.; *Beddome. PEGU*; *Kurz. TENASSERIM*; *Helper (Kew Distrib. n. 6209, 4)*.—*DISTRIB.* *Afr. trop. Malaya.*

Slender. *Spikelets* up to 40–50-fl. Narrow edge of nut much flattened against the rhachecola.

††† *Robust, spikelets larger, yellow brown or red, leaves close to base of stem.*

11. **P. angulatus**, *Nees in Linnæa*, ix. 283; robust, umbel simple, spikelets yellow or brown-yellow (see also var. β) spicate, nut small obovoid $\frac{1}{4}$ – $\frac{1}{3}$ length of glume. *Cyperus unioloides*, *Br. Prod.* 216; *C. B. Clarke in Journ. Linn. Soc.* xxi. 60. *C. bromoides*, *Willd. ms.*; *Link Jahrb.* iii. 85; *Kunth Enum.* ii. 8; *Boeck. in Linnæa*, xxxv. 463. *C. angulatus*, *Nees in Wight Contrib.* 73; *Boeck. l.c.* 465.—*Cyperus*, *Wall. Cat.* n. 3324.

NEPAL; *Wallich. DINAJPORE*; *C. B. Clarke. KHASIA*; alt. 3–5000 feet, *Hf. & T. T.*, &c. *NILGHIRI HILLS*; *Wight. AYA*; *Wallich.*—*DISTRIB.* *tropics.*

Glabrous. *Rhizome* long, $\frac{1}{12}$ in. in diam., or often 0. *Roots* fibrous. *Stem* $1\frac{1}{2}$ –3 ft. *Leaves* often $\frac{2}{3}$ length of stem, $\frac{1}{2}$ in. broad. *Umbel* rays 3–8, up to 2–4 in. long (in depauperated a single few-spikeleted head); bracts 4–5, up to 8–12 in., leaf-like. *Spikes* of 3–20 spikelets, sometimes slightly compound; bracteoles inconspicuous. *Spikelets* $\frac{2}{3}$ by $\frac{1}{2}$ in., 22-fl. *Glumes* $\frac{1}{3}$ in., ovate, triangular-acute, loosely imbricate in fruit, 1–3-nerved, back green, sides shining yellow brown, margin crisped. *Stamens* 3; anthers oblong-linear. *Nut* compressed, black; style small, branches linear shortly exsert.

Var. β *Wightii*; umbel contracted into a subcompound head, spikelets larger shining chestnut-brown.

Deccan Peninsula; *Wight.*—A remarkable plant, only once collected. The spikelets are, in size and colour, unlike any Indian or other example of *P. angulatus*, while they most closely resemble *P. macranthus*, a Cape plant; but the nuts have the surface-cells subquadrate, while in *P. macranthus* these are longitudinally oblong.

12. **P. puncticulatus**, *Nees in Linnæa*, ix. 283; umbel compound or simple, spikelets red spicate, nut broad-ellipsoid truncate $\frac{1}{2}$ length of glume. *P. Baccha*, *Nees in Linnæa*, ix. 283. *Cyperus puncticulatus*, *Vahl Enum.* ii. 348; *Kunth Enum.* ii. 15; *Dalz. & Gibs. Bomb. Fl.* 283; *Thw. Enum.* 342; *Boeck. in Linnæa*, xxxv. 472 (excl. syn. *Roxb.*); *C. B. Clarke in Journ. Linn. Soc.* xxi. 68. *C. Baccha*, *Kunth l.c.* 115. *C. inundatus*, *Nees in Wight Contrib.* 76 (not of *Roxb.*). *C. procerus*, *Roxb.*

Fl. Ind. i. 203, chiefly. *C. flavidus*, *Herb. Heyne*; *Wall. Cat.* 3336, A. *C. tegetum*, *Herb. Wight*; *Wall. Cat.* 3355, B.

THE DECCAN PENINSULA; *Rottler, Wight, &c.* CEYLON; *Thwaites*.—DISTRIB. China.

Glabrous, annual. *Stem* erect at base, subsolitary, 1–2 ft. *Leaves* often as long as stem, $\frac{1}{2}$ in. broad. *Spikelets* $\frac{3}{4}$ by $\frac{1}{2}$ in., 7–30-fld., sides very parallel.

Var. β . *quingugintiflorus*, C. B. Clarke, l.c. 69; spikelets elongate up to 50-fld., anthers apiculate. *Cyperus macrostachyus*, *Vahl Enum.* ii. 349 (as to plant of *Rottler*, not of *Lam. or Poir.*). *C. longus*, *Herb. Heyne*; *Wall. Cat.* 3336 B.—*Madras, Heyne*.

13. ***P. albomarginatus***, *Nees in Mart. Fl. Bras.* ii. part 1, 9; umbel simple or compound, spikelets long yellow or ruddy brown, glumes obtuse white-edged in fruit spreading not imbricate, nut obovoid greatly compressed nearly as long as glume. *Cyperus Hochstetteri*, *Nees ms.*; *Krauss in Flora*, xxviii. 755 (in note); *Boeck. in Linnæa*, xxxv. 471; *C. B. Clarke in Journ. Linn. Soc.* xxi. 69. *C. flavicomus*, *Torrey Bot. Mexic. Bound.* 226; *Benth. Fl. Austral.* vii. 261 (excl. syn., not of *Michx.*).

CONCAN and MALABAR; *G. Thomson, &c.* RANGOON; *R. Scott, Kurz*.—DISTRIB. Tropics.

Glabrous, annual. *Stem* erect at base, subsolitary, 1–3 ft. *Leaves* often $\frac{3}{4}$ length of stem, $\frac{1}{2}$ in. broad. *Umbel* rays sometimes 11, up to 7 in. long, sometimes 2–3, only 1 in. long. *Spikelets* often large, 1 by $\frac{1}{2}$ in.

INDETERMINABLE SPECIES.

C. KAMPHÆVENERI, *Boeck. Cyp. Novæ*, i. (1888), 5; rhizome tuberous, style but little exserted shortly 2-fld.—NICOBAR ISLANDS; *Kamphævenér*.

3. JUNCCELLUS.

Stem erect, simple, leafy only near base. *Inflorescence* umbellate or capitate. *Spikelets* linear or oblong, compressed; rachaeola persistent. *Glumes* distichous, deciduous, concave, muticous, 2 lowest empty, 4– ∞ succeeding bisexual, uppermost 1–3 sterile or empty. *Stamens* 3–2, anterior; anthers oblong-linear. *Nut* plano-convex, broad plane face flat against rachaeola; style-base continuous with nut, not tumid; branches 2, linear.—Species 12, in all warm climates.

This genus is *Cyperus* Sect. *Juncellus* of Kunth, and differs from *Cyperus* by having a 2-fld style, and more or less compressed, not equilaterally trigonous nut. Several of the species have been considered by Boeckeler and others as forms with 2-branched styles of corresponding species of *Cyperus*.

* *Inflorescence* umbelled.

1. ***J. serotinus***, C. B. Clarke; stoloniferous, stout, stem at top triquetrous thick, leaves and bracts long, umbel compound, spikelets linear in dense spikes, glumes broad-ovate obtuse 7–9-nerved, nut longer than $\frac{1}{2}$ the glume. *Cyperus serotinus*, *Rotth. Descr. et Ic.* 31; *Kunth Enum.* ii. 19; *Boeck. in Linnæa*, xxxv. 492. *C. Monti*, *Linn. f. Suppl.* 102; *Host. Gram. Austr.* iv. 38, t. 67; *Reichb. Ic. Fl. Germ.* viii. 32, t. 279, fig. 666; *C. B. Clarke in Journ. Linn. Soc.* xxi. 72, t. 3, fig. 29; *Boiss. Fl. Orient.* v. 366. *C. japonicus*, *Miq. in Ann. Mus. Lugd. Bat.* ii. 140. *C. puncticulatus*, *Aitch. in Journ. Linn. Soc.* xix. 189 (not of *Vahl*).—*Monti, Bonon. Prodr.* 12, t. 1, fig. 2.

KASHMIR; alt. 1000 ft., Jacquemont, &c. PUNJAB; alt. 1000 ft., Thomson, &c.—DISTRIB. from Spain to Japan.

Glabrous, except sometimes rhachis of spikes. *Stems* solitary, 1–3 ft. *Leaves* often as long as stem, $\frac{1}{4}$ – $\frac{1}{2}$ in. broad. *Bracts* 3–5, up to 8–18 in. leaf-like. *Umbel* rays 3–6, up to 2–6 in. long, very unequal, rather stout; umbellules shortly corymbose or capitate; bracteoles short. *Spikes* of 5–40 spikelets. *Spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{10}$ – $\frac{1}{8}$ in., 12–30-fl. (or shorter 6–8-fl.), turgid; rhacheola robust, tetragonous, excavated, scarcely winged. *Glumes* approximate; margins narrowly scarious, in dried ripe examples incurred crisped. *Stamens* 3; anthers scarcely apiculate. *Style* short; branches about as long as nut. *Nut* obovoid, obtuse, smooth, dark-brown.—Much confused in herbaria with *Cyperus pilosus*, Vahl, which it generally resembles and has further the rhachis of the spikes minutely hairy, a rare character in *Cyperus*.

2. ***J. stylosus***, C. B. Clarke; stem at top trigonous slender, leaves and bracts rather short, glumes not striate towards their margins, style-branches very long, nut (not quite ripe) small; otherwise as *J. serotinus*. *Cyperus* Monti, var. β ? *stylosa*, C. B. Clarke in Journ. Linn. Soc. xxi. 73.

KHASIA HILLS; Griffith.

Leaves not half length of stem. *Bracts* scarcely overtopping inflorescence. *Rhachis* of spikes glabrous. *Glumes* chestnut-red, with very narrow white margins, inflated as in *J. serotinus*. *Spikelets* comose from the persistent long dark-red styles. *Nuts* perhaps all imperfect.

3. ***J. inundatus***, C. B. Clarke; stout, stem at top triquetrous thick, leaves and bracts long, umbel compound, spikelets in loose spikes, glumes obtuse 5–7-nerved, nut longer than $\frac{1}{2}$ the glume. *Cyperus inundatus*, Roxb. Fl. Ind. i. 201; Wall. Cat. 3342 A, B; C. B. Clarke in Journ. Linn. Soc. xxi. 31, 73 (not of Br. or Nees). *C. diluvialis*, Schultes in Roem. & Sch. Syst. ii. Mant. 124. *C. punctulatus*, Steud. Syn. Cyp. 10 (partly, not of Vahl).—*Cyperus*, Wall. Cat. 3355, C. 3359, F.

BENGAL; in swamps, from Sylhet to the sea, frequent.—DISTRIB. China.

Rhachis of spike glabrous, 1–2 in., spikelets often $\frac{1}{2}$ – $\frac{3}{4}$ in. apart. Differs little from *J. serotinus*, but by the open spikes. In herbaria it is more frequently mixed either with *Cyperus procerus* or *Pycreus puncticulatus*.

4. ***J. alopecuroides***, C. B. Clarke; large, leaves and bracts long, umbel large compound, spikes cylindric very dense, spikelets linear-oblong bearing 8–30 nuts, glumes concave dirty straw-colour, rhachilla rather stout subquadrangular not winged, nut small $\frac{1}{2}$ length of glume. *Cyperus alopecuroides*, Rottb. Descr. et Ic. (1773), 38, t. 8, fig. 2; Nees in Wight Contrib. 76; Kunth Enum. ii. 19; Thw. Enum. 342; Dalz. & Gibs. Bomb. Fl. 282; Miq. Fl. Ind. Bat. iii. 261; Boeck. in Linnæa, xxxvi. 322 (excl. var. a); Boiss. Fl. Orient. v. 367; C. B. Clarke in Journ. Linn. Soc. xxi. 30, 74, t. 2, fig. 13; King in T. E. Atkins. Gaz. x. (1876), 320. *C. compositus*, Br. Prodr. 217. *C. semidives*, Steud. Syn. Cyp. 36. *C. speciosus*, congestus, alopecuroides, Herb. Heyne; Wall. Cat. 3344, B, C.

Throughout India, from PESHAWUR, Griffith (Kew Distrib. 6150) to SILHET, Hook. f. & T. T., and CEYLON, Thwaites.—DISTRIB. Afric. and Austral. trop.

A large glabrous annual, 2–3 ft. *Leaves* often as long as stem, $\frac{1}{2}$ –1 in. broad. Rays of umbel 4–6 in.; bracts 12–18 in., leaf-like; raylets often 1 in. bearing at apex 2–4 ebracteolate spikes. *Spikes* 1–1 $\frac{1}{2}$ by $\frac{3}{4}$ in. *Spikelets* $\frac{1}{2}$ in., lanceolate, compressed. *Glumes* muticous or mucronulate. *Stamens* 3; anthers muticous. *Nuts* plano-convex, finally ashy-black (many imperfect pale); style as long as nut, branches longer, shortly exsert.—United by Boeckeler with

Cyperus exaltatus, Retz; but separated by the very crowded spikes and 2-fid style.

** *Stem with one head of spikelets.*

5. **J. pygmæus**, C. B. Clarke; annual, leaves and bracts long green flaccid, spikelets innumerable in a compound head linear often curved or twisted, nut plano-convex $\frac{1}{4}$ – $\frac{1}{2}$ length of glume. *Cyperus pygmæus*, *Rotb. Descr. et Ic.* 20, t. 14, figs. 4, 5; *Nees in Wight Contrib.* 72; *Kunth Enum.* ii. 18; *Miq. Fl. Ind. Bat.* iii. 261; *Boiss. Fl. Orient.* v. 368 (excl. syn. *Roxb.*); *Boeck. in Linnæa*, xxxv. 493 (excl. var. β); C. B. Clarke in *Journ. Linn. Soc.* xx. 282 and xxi. 28–30, 81, t. 2, figs. 10, 10a; *King in E. T. Atkinson Gaz.* x. (1876), 320. *C. squarrosus*, *Roxb. Fl. Ind.* i. 190. *C. monocephalus*, *Roxb. mss. (not Fl. Ind.)*. *Dichostylis pygmæa*, *Nees in Linnæa*, ix. 289. *Pycreus diffusus* and *pygmæus*, *Nees in Linnæa*, ix. 283.—*Isolepis?* *Wall. Cat.* 3495.

From KASHMIR to BURMA and Ceylon. All warm regions (excl. Europe).

Glabrous. *Stems* coespitose (often very many), 1–10 in. *Bracts* 3–6 in., spreading. *Head* $\frac{1}{4}$ – $\frac{3}{4}$ in. in diam. *Spikelets* often 100, $\frac{1}{4}$ in., 8–24-fld., greenish-white, finally pale brown. *Glumes* close-packed, boat-shaped. *Stamens* 2–1; anthers small, linear-oblong, muticous. *Nut* ellipsoid, brown, top pyramidal; style shorter than nut; branches shortly exsert.—Much confused (by Boeckeler finally united) with *Scirpus Michelianus*, Linn.; so that the synonymy cannot be completely extricated. In the young state it is difficult to distinguish the two apart; but when the spikelets of *J. pygmæus* are ripe, and the glumes (except a few of the top infertile) have fallen away, the scars on the rhacheola (and therefore the glumes and nuts) are seen to be exactly distichous; whilst the rhacheola of ripe *S. Michelianus*, shows the scars arranged spirally from the base of the spikelet. Rheede's Hort. Mal. xii. t. 54, on which alone several specific names are grounded, is usually referred here, but it is as likely to be *Fimbristylis argentea*, Vahl.

6. **J. lævigatus**, C. B. Clarke; rhizome creeping, leaves short or long, lower bract as though continuing stem, head lateral, spikelets 1–30 linear 16–40-fld. somewhat turgid, glumes close-packed obtuse, nut $\frac{1}{2}$ – $\frac{2}{3}$ length of glume. *Cyperus lævigatus*, Linn. *Mant.* 179; *Rotb. Descr. et Ic.* 19, t. 16, fig. 1; *Miq. Fl. Ind. Bat.* iii. 260; *Boeck. in Linnæa*, xxxv. 486; *Boiss. Fl. Orient.* v. 366; C. B. Clarke in *Journ. Linn. Soc.* xx. 282 and xxi. 77, t. 3, figs. 20, 21 and t. 4, fig. 33; *Aitch. in Trans. Linn. Soc. ser. 2; Bot.* iii. 121. *C. mucronatus*, *Rotb. l. c.* 19, t. 8, fig. 4; *Roxb. Fl. Ind.* i. 185; *Nees in Wight Contrib.* 72; *Kunth Enum.* ii. 17; *Reichb. Ic. Fl. Germ.* viii. 31, t. 278, fig. 661. *C. lateralis*, *Forsk. Fl. Æg. Arab.* 13; *Roxb. l. c.* 186; *Nees in Wight Contrib.* 73 (not Linn. f.). *C. Roxburghianus*, *Presl. in Oken Isis*, xxi. 271. *C. pleuranthus*, *Nees l. c.* 73. *C. acuminatus*, *Roxb. ms.* *C. mucronatus* and *C. niveus*, *Herb. Heyne*; *Wall. Cat.* 3311. *Pycreus lævigatus*, *Nees in Linnæa*, x. 130. *P. mucronatus* and *lateralis*, *Nees l. c.* x. 283.

Throughout WESTERN INDIA from the Punjab, Aitchison, and Bundelkund, Duthie, to SOUTH MADRAS, Wight.—DISTRIB. most warm climates.

Glabrous. *Rhizome* usually woody, $\frac{1}{2}$ in. in diam. internodes very short densely covered by chestnut or red scales, when floating sometimes 3–6 ft. with long internodes. *Stems* 4–24 in. *Leaves* sometimes as long as stem, $\frac{1}{2}$ in. broad, usually short, occasionally obsolete (i.e. sheaths terminated by a lanceolate process not green). *Spikelets* closely clustered, $\frac{1}{4}$ – $\frac{1}{2}$ in., rigid, often curved, straw-colrd. or tinged with chestnut or chestnut-red; rhacheola stout, tetragonous, hardly winged. *Glumes* concave, ovate, 7–11-nerved. *Stamens* 3; anthers yellow with a small

linear-lanceolate red scabrous crest. *Style* slender, hardly as long as nut; branches shortly exsert. *Nut* plano- or concavo-convex, top obtuse.

Var. *β. junciformis*; rigid, spikelets 1-6 rigid shining chestnut or black. *C. distachyos*, *All. Fl. Pedem. Auctuar.* 48, t. 2, fig. 5; *Boiss. Fl. Orient.* v. 367. *C. junciformis*, *Desfont. Fl. Atlant.* i. 42, t. 7, fig. 1; *Boiss. l. c.* *C. lævigatus*, var. *junciformis*, *C. B. Clarke in Journ. Linn. Soc.* xxi. 79.

Peshawur; *Stewart. Sind*; *Stocks.*—DISTRIB. Oriental.

4. CYPERUS, Linn.

Stem erect, simple, leafy only near base. *Inflorescence* umbellate or capitate. *Spikelets* linear or oblong, compressed; rhacheola persistent. *Glumes* distichous, 2 lowest empty, 4-∞ succeeding bisexual seriatim deciduous, uppermost 1-3 sterile or empty. *Stamens* 3-2, rarely 1; anther linear or oblong, sometimes crested. *Nut* triquetrous, trigonous or plano-convex, plane face flat against rhacheola; style-base continuous with nut, not tumid, branches 3 linear (occasionally 2 in upper fl. of *C. stoloniferus*, and in *C. Cephalotes*).—Species 300, all warm and temperate regions.

Subgenus I. ANOSPORUM (Genus), *Nees in Linnæa*, ix. 287. *Style* long, undivided or obscurely 3-2-toothed. *Hydroschoenus*, *Moritzi Verz. Zoll. Pfl.* 95. *Trentepohlia*, *Boeck. in Bot. Zeit.* xvi. 249.—(Sp. 1).

1. *C. Cephalotes*, *Vahl Enum.* ii. 311; leaves and bracts long, infl. of one compound dense head, nut stipitate below corky. *Kunth Enum.* ii. 48; *Miq. Fl. Ind. Bat.* iii. 271; *C. B. Clarke in Journ. Linn. Soc.* xxi. 25, 34, t. 1, figs. 1-6. *C. monocephalus*, *Roxb. Fl. Ind.* i. 188. *C. Hookerianus*, *Thv. Enum.* 342 (not of Arn.). *C. leucocephalus*, *Wight ms.* (not of Retz). *C. natans*, *Ham. ms.* *C. dubius*, *Rottler in Neue Schr. Gesell. Freunde Berlin*, iv. 193. in *Obs. Anosporum monocephalum*, *Nees in Linnæa*, ix. 287, and in *Wight Contrib.* 92; *Griff. Notul.* iii. 103; *Boeck. in Linnæa*, xxxvi. 411. *A. Cephalotes*, *Kurz in Journ. As. Soc. Beng.* xlv. pt. 2. p. 159. *Hydroschoenus kyllingioides*, *Zoll. & Mor. ms.*; *Moritzi Verz. Zoll. Pfl.* 95; *Miq. l. c.* 296. *Trentepohlia bifoliata*, *Boeck. in Bot. Zeit.* xvi. 249. *Ungeria monocephala*, *Nees ms.*—*Kyllinga*, *Wull. Cat.* 3441 (mainly). *Rheede Hort. Mal.* xii. t. 53.

From BENGAL to MADRAS and BURMA.—DISTRIB. China, Malaya, Austral.

Glabrous, floating in tanks; stolons slender. *Stems* 4-16 in. *Leaves* 2-5, as long as $\frac{2}{3}$ stem, $\frac{1}{8}$ in. broad. *Bracts* 3-5 up to 4-8 in., leaf-like. *Heads* $\frac{1}{8}$ - $\frac{1}{2}$ in. diam. *Spikelets* 10-70, $\frac{1}{4}$ - $\frac{1}{2}$ by $\frac{1}{8}$ in., compressed, rigid, often bent, 10-36-fl.; rhachilla stout, persistent, angular, hardly winged. *Glumes* closely packed, boat-shaped, green, more or less marked with red or chestnut. *Stamens* 3-2; filaments broadly ligulate; anthers large, linear-oblong, muticous. *Nut* $\frac{1}{2}$ length of glume, ovoid, unequally trigonous (i. e. somewhat plano-convex) passing gradually into the linear style $\frac{2}{3}$ length of nut.—In the *Cyperaceæ* which float in tanks that are never dry, a corky thickening of the cells especially towards the lower angles of the nut enables them to float, and hence vegetate among the rotting surface vegetation of the tank.

Subgenus II. PYCNOSTACHYS. *Inflorescence* umbellate throughout or capitate; spikelets digitate or clustered, not spicate. *Style-branches* linear, rarely linear-lanceolate. (Sp. 2-26.)

Sect. 1. *Natantes*. *Style-branches* linear-lanceolate. *Nut* corky below. —Tank floaters. (Sp. 2.)

2. **C. platystylis**, Br. *Prodr.* 214; leaves and bracts long, umbel compound, spikes near together often very numerous. *C. B. Clarke in Journ. Linn. Soc.* xxi. 27, 117, t. 1, figs. 7-9 (excl. syn. *C. caducus*). *C. pallidus*, Heyne ms.; Nees in *Linnæa*, ix. 284, and in *Wight Contrib.* 79; *Kunth Enum.* ii. 40; *Thw. Enum.* 343. *C. canescens*, Herb. Heyne, and *C. fuitans*, Herb. Ham.; Wall. *Cat.* 3337, 3359 D (partly). *Anosporum pallidum*, Boeck. in *Linnæa*, xxxvi. 412.

FROM BENGAL and BURMA to CEYLON and PENANG.—DISTRIB. Malaya, Austral.

Glabrous, floating in tanks. *Stolons* covered by ovate acute striate pale-brown scales. *Stems* solitary, 6-42 in. *Leaves* often as long as stem, up to $\frac{1}{2}$ - $\frac{1}{2}$ in. broad, coarse, cutting, nerves many, strong. *Umbel* 1-10 in. diam.; bracts 8-18 in., leaf-like, somewhat corymbose. *Spikelets* 5-1300, 1-6-together digitate, $\frac{1}{2}$ by $\frac{1}{2}$ in., 20-40-fld., brown pale or reddish; rachilla persistent, scarcely winged. *Glumes* very close-packed, boat-shaped, back with 3 green nerves. *Stamens* 3; filaments ligulate; anthers linear-oblong, crested with a small linear-lanceolate red mucro. *Nut* ellipsoid, $\frac{2}{3}$ length of glume, unequally trigonous, pale brown, corky cells of the angles straw-colrd.; style much shorter than nut, deciduous, branches as long as style.

Sect 2. *Amabiles*. Slender annuals. *Umbel* very rarely reduced to a single head. *Spikelets* small. *Glumes* mucronate. (Sp. 3-5.)

3. **C. amabilis**, Vahl *Enum.* ii. 318; spikelets linear, golden-brown, glumes truncate mucro short erect, stamen 1, nut obovoid $\frac{2}{3}$ length of glume. *Kunth Enum.* ii. 108; *C. B. Clarke in Journ. Linn. Soc.* xx. 283, and xxi. p. 85. *C. aureus*, H. B. K. *Nov. Gen. et Sp.* i. 205; *Kunth l. c.* 21. Boeck. in *Linnæa*, xxxv. 494.

KUMAON, King. MORADABAD, Thomson. CHOTA NAGPORE; up to 2000 ft., *C. B. Clarke*.—DISTRIB. Warm regions.

Glabrous. *Stems* caespitose, 2-8 in. *Leaves* $\frac{1}{2}$ - $\frac{1}{2}$ length of stem, $\frac{1}{2}$ in. broad, weak. *Umbel* often very compound, rays 4 in. long; sometimes reduced to 1 head (very variable in development); bracts up to 2 in., leaf-like. *Spikelets* 3-10 in a spike, up to $\frac{2}{3}$ by $\frac{1}{8}$ - $\frac{1}{2}$ in., 36-fld. (often much shorter). *Glumes* boat-shaped, back 3-5-nerved, sides nerveless, mucro variable (often very short). *Anthers* small, oblong. *Nut* fine brown; style as long as nut, branches 3, linear.

4. **C. castaneus**, Willd. *Sp. Pl.* i. 278; small, umbel rarely compound, spikelets linear chestnut or pale, glumes obtuse mucro conspicuous recurved, stamens 2-1, nut exactly oblong $\frac{1}{2}$ - $\frac{2}{3}$ length of glume (mucro excluded). *Roxb. Fl. Ind.* i. 195; Nees in *Wight Contrib.* 79; *Kunth Enum.* ii. 21; *Thw. Enum.* 343; Boeck. in *Linnæa*, xxxv. 496 (excl. Wall. 3376 B); *C. B. Clarke in Journ. Linn. Soc.* xxi. 87. *C. squarrosus*, Trimen *Cat. Ceylon Pl.* 100. *C. pusillus*, Herb. Wight; Wall. *Cat.* 3323.

FROM EAST NEPAL, J. D. Hooker, to CEYLON, Thwaites, and PERAK, King.—DISTRIB. Tonkin, Austral.

Glabrous. *Stems* $\frac{2}{3}$ -6 in. *Leaves* as long as stem, $\frac{1}{2}$ in. broad, or (usually) shorter. *Umbel* rays 0-2 in. rarely again divided, sometimes reduced to a single head; bracts often as long as inflorescence. *Spikelets* 3-20 in a cluster, black-chestnut in type form, $\frac{1}{2}$ - $\frac{1}{2}$ by $\frac{1}{8}$ in., 15-70-fld. *Glumes* boat-shaped, back 3-nerved, keel excurrent greenish-yellow. *Anthers* small, short-oblong. *Nut* red-black, sides exactly parallel; style much shorter than nut; branches small, linear.

5. **C. cuspidatus**, H. B. & K. *Nov. Gen. et Sp.* i. 204; glumes strongly 3-nerved, mucro conspicuous recurved, nut oblong-obovoid $\frac{1}{2}$

length of glume (mucro excluded) otherwise as *C. castaneus*. *Kunth Enum.* ii. 22; *Boeck. in Linnæa*, xxxv. 496; *C. B. Clarke in Journ. Linn. Soc.* xx. 284, and xxi. 88, and xxv. 80; *Trimen Cat. Pl. Ceylon*, 100. *C. angustifolius*, *Ham. ms.*; *Wall. Cat.* 3376 (mainly); *Nees in Wight Contrib.* 79; *Kunth Enum.* ii. 21. *C. castaneus*, *Hance in Journ. Linn. Soc.* xiii. 130; *Miq. Fl. Ind. Bat.* iii. 261 ("forma Sundaica"). *C. solutus*, *Steud. Syn. Cyp.* 14; *Miq. Fl. Ind. Bat.* iii. 263.

Throughout INDIA; from KASHMIR and ASSAM to CEYLON and PENANG.—DISTRIB. All warm regions.

The older botanists referred the chestnut-colrd. examples to *C. castaneus*, the ferruginous-brown to *C. cuspidatus*, and these are the prevalent colours of the spikelets. But the colour varies in both, and Boeckeler has distinguished them by the nut (which is broader upwards in *C. cuspidatus*) tolerably satisfactorily. *C. cuspidatus* is a very common plant, *C. castaneus* a rare one.

Sect. 3. *Difformes*. Small or middle-sized, annuals or biennials; rhizome 0, or in *C. Haspan* creeping. Leaves and bracts moderately long, narrow, weak. Inflorescence umbellate, sometimes reduced to a single head. Spikelets small, numerous. Glumes scarcely cuspidate. (Sp. 6-11.)

6. *C. fuscus*, *Linn. Sp. Pl.* 69; annual, small, umbel simple compound or reduced to a head, spikes clustered small linear-oblong, nut ellipsoid triquetrous apiculate $\frac{3}{4}$ — $\frac{4}{5}$ length of glume. *Host Gram. Austr.* ii. 49, t. 73; *Kunth Enum.* ii. 37; *Boeck. in Linnæa*, xxxv. 585; *C. B. Clarke in Journ. Linn. Soc.* xxi. 135; *Boiss. Fl. Orient.* v. 370.

KASHMIR and N.W. HIMALAYA, alt. 6000 ft., Thomson, &c.—DISTRIB. Westward to Britain.

Glabrous. Stems cæspitose, 2-16 in., weak. Leaves longer or shorter than stem, $\frac{1}{8}$ — $\frac{1}{2}$ in. broad, grass-like. Rays of umbel often 1-1 $\frac{1}{2}$ in., sometimes much longer; bracts usually exceeding inflorescence. Spikes $\frac{1}{2}$ — $\frac{3}{4}$ in. in diam. Spikelets 5-15, $\frac{1}{3}$ — $\frac{1}{2}$ by $\frac{1}{12}$ in., 16-36-fld., often reddish. Glumes boat-shaped, ovate, scarcely mucronate. Stamens usually 2; anthers oblong, obtuse. Nut equally or unequally triquetrous, pale brown. Style much shorter than nut, deciduous; branches linear.

7. *C. difformis*, *Linn. Sp. Pl.* 67; annual, middle-sized, umbel simple compound or reduced to 1 head, spikelets very small linear-oblong most densely crowded, glumes obovate truncate, nut broad ellipsoid nearly as long as glume. *Rottb. Descr. et Ic.* 24, t. 9, fig. 2; *Roxb. Fl. Ind.* i. 195; *Nees in Wight Contrib.* 88; *Kunth Enum.* ii. 38; *Dalz. & Gibs. Bomb. Fl.* 282; *Miq. Fl. Ind. Bat.* iii. 269; *Boeck. in Linnæa*, xxxv. 586; *Thw. Enum.* 344; *King in E. J. Atkinson Gaz.* x. (1876) 323; *Boiss. Fl. Orient.* v. 370; *C. B. Clarke in Journ. Linn. Soc.* xx. 290, and xxi. 133. *C. Goeringii*, *Steud. Syn. Cyp.* 24; *Miq. Fl. Ind. Bat.* iii. 271.—*Cyperus*, *Wall. Cat.* 3363 (mainly):

Throughout INDIA, alt. 0-8000 ft., universal throughout the Old World in rice-fields; Mexico (introduced?).

Glabrous. Stems 4-20 in., acutely triquetrous at top. Leaves usually somewhat shorter than stem, $\frac{1}{2}$ — $\frac{3}{4}$ in. broad, flaccid. Umbel usually contracted, rays up to 2 in., sometimes much larger; bracts 2-10 in., lowest often suberect (i.e. umbel lateral). Spikes $\frac{1}{2}$ — $\frac{3}{4}$ in. in diam., globose. Spikelets $\frac{1}{2}$ — $\frac{3}{4}$ by $\frac{1}{10}$ in., somewhat turgid, 10-30-fld. Glumes close-packed, concave, very obtuse, straw-colrd., sides more or less red. Stamens 1, rarely 2; anther small, oblong, mucous. Nut subseaisle, subequally trigonous, pale-brown; style much shorter than nut, branches linear short.

8. **C. silletensis**, *Nees in Wight Contrib.* (1834) 79; middle-sized or slender, stolons 0, umbel contracted or reduced to 1 head, spikes globose dense, spikelets small linear many-fl'd., glumes ovate-oblong, nut oblong-obovoid $\frac{1}{3}$ – $\frac{2}{3}$ length of glume. *Kunth Enum.* ii. 33; *Boeck. in Linnæa*, xxxv. 555; *C. B. Clarke in Journ. Linn. Soc.* xxi. 132.—*Cyperus*, *Wall. Cat.* 3363 F, 3536 (partly).

BENGAL, ASSAM, SIKKIM, and BURMA.

Stems 4–12 in., rather slender at top, flowering the first year, but often producing short lateral shoots from the base of stem. *Spikes* pale brown. *Glumes* at top subtriangular. Otherwise resembling *C. difformis*.—Seldom collected, but not rare.

9. **C. pulcherrimus**, *Willd. ex Kunth Enum.* ii. 35; middle-sized, stolons 0, umbel dense usually compound with innumerable spikes of 5–10 very small linear spikelets, glumes ovate-oblong, their oblong tip inflexed towards rhachilla, nut broadly ellipsoid $\frac{2}{3}$ length of glume. *Miq. Fl. Ind. Bat.* iii. 267; *Boeck. in Linnæa*, xxxv. 573; *C. B. Clarke in Journ. Linn. Soc.* xxi. 132; *Trimen Cat. Pl. Ceylon*, 100. *C. eumorphus*, *Steud. in Zoll. Verz. Ind. Archip.* ii. 63, and *Syn. Cyp.* 22; *Miq. l. c.* 268. *C. silletensis*, *Thw. Enum.* 343. *C. Haspan*, *Benth. Fl. Austral.* vii. 270 (partly).—*Cyperus*, *Wall. Cat.* 3357.

SIND, *Pinwill*. BENGAL, *Wallich*. ASSAM, *Griffith*, &c. CEYLON, *Thwaites*. PENANG, *Curtis*, n. 1954.—DISTRIB. JAVA, BORNEO.

Very near *C. silletensis*; dried examples are easily distinguished by the crisped incurved top of glume. Spikelets very like those of *C. flavidus*, which is a slender species.

10. **C. Haspan**, *Linn. Sp. Pl.* 66 (partly); middle-sized or small, pale or red not yellow, rhizome long-creeping but plant often flowering in first year, spikelets 2–6-digitate small linear, stamens 3–2, nut small ovoid or obovoid $\frac{1}{3}$ – $\frac{1}{2}$ length of obtuse glume. *Roxb. Fl. Ind.* i. 210; *Nees in Wight Contrib.* 80 (partly); *Kunth Enum.* ii. 34; *Dalz. & Gibs. Bomb. Fl.* 282; *Thw. Enum.* 343; *Boeck. in Linnæa*, xxxv. 574, var. *a* partly, and var. *β*; *C. B. Clarke in Journ. Linn. Soc.* xx. 287, and xxi. 119. *C. graminifolius*, *Poir. in Lam. Encyc.* vii. 267; *Kunth l. c.* 98. *C. pes-avium*, *Bertol. Misc. Bot.* viii. 30, t. 3, fig. 1. *Cyperus gracilis*, *Herb. Heyne, Wall. Cat.* 3369, D, E, F, 3372.—*Scirpus*, *Rottb. Descr. et Ic.* 58, t. 17, fig. 3 (excl. *Syn. Linn.*).

Throughout INDIA; abundant, especially in dibbled rice-fields.—DISTRIB. All warm regions.

Glabrous. *Rhizome* in typical form creeping, 6 in. and upwards, covered by ovate triangular scales and with distant solitary stems; but stems often caespitose on a very short rhizome or with fibrous roots only. *Stems* 4–30 in., sometimes stout, almost 3-winged at top, sometimes slender trigonous. *Leaves* short or longer and overtopping the stem, or 0. *Umbel* small or large, compound or simple, thin straggling with few spikes, or dense with innumerable spikes; bracts short or long and far overtopping umbel, (in *Khasia* examples) long, $\frac{1}{4}$ in. broad, tip triangular-lanceolate. *Spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{10}$ – $\frac{1}{15}$ in., 10–40-fl'd., varying much in development. *Glumes* close-packed, ovate, obtuse, obscurely (or not) mucronate. *Anthers* linear-oblong, often bristly at top. *Nut* trigonous, slightly compressed, minutely scabrid or smooth, pale brown (sterile white); style about as long as nut, branches linear slightly exsert.—This and many other species show that in *Cyperaceæ* stoutness of stem, length and breadth of leaves, development of umbel, length of bracts, are often futile characters.

11. **C. flavidus**, *Retz. Obs.* v. 13; slender, annual, ripe yellow or

finally blackening, stamen 1 (rarely 2), nut plano-convex (plane face against rhachilla), ripe marble-white (otherwise as *C. Haspan*). *Roxb. Fl. Ind.* i. 200; *Nees in Wight Contrib.* 80, in note; *Dalz. & Gibs. Bomb. Fl.* 283; *C. B. Clarke in Journ. Linn. Soc.* xx. 287, and xxi. 122 and xxv. 81. *C. Haspan*, *Rottb. Descr. et Ic.* p. 36, t. 6, fig. 2; *Boeck. in Linnæa*, xxxv. 574 (*Var. a partly*). *C. tenuispica* and *C. Fieldingii*, *Steud. Syn. Cyp.* 11. *C. microcarpus*, *Boeck. in Bremen Abhandl.* vii. 37. *C. strictus*, *Herb. Heyne*; *Wall. Cat.* 3365. *C. Haspan* and *C. hexangularis*, *Herb. Wight*; *Wall. Cat.* 3369, A, B, C.—*Cyperus*, *Wall. Cat.* 3313 (*partly*).

Throughout INDIA, abundant in rice-fields.—DISTRIB. Warm regions of the Old World.

Lives about 3 months. *Bracts* usually longer than stem. *Glumes* rather smaller than in *C. Haspan*. *Nut* very obtuse at top.

Sect. 4. *Nivei*. *Rhizome* woody, very short; rootlets wiry. *Inflorescence* of one head. (Sp. 12-14.)

12. *C. Teneriffæ*, *Poir. in Lam. Encyc.* vii. 245; stems at base cylindric thickened by coloured sheaths, spikelets 10-36-fld. much compressed red, glumes very acute conspicuously mucronate, nut $\frac{1}{3}$ length of glume. *C. nitens*, *Rottb. in Neue Schr. Ges. Freunde, Berlin*, iv. 193, in *Obs.* (not of Retz.). *C. coromandelinus*, *Spreng. Syst.* i. 217 (not of Boeck.). *C. pectiniformis*, *Roem. et Sch. Syst.* II., *Mant.* 128 (not of Nees). *C. pectinatus*, *Roxb. Fl. Ind.* i. 190 (not of Vahl). *C. Wightii*, *Nees in Wight Contrib.* 78; *Kunth Enum.* ii. 99; *Boeck. in Linnæa*, xxxv. 507. *C. rubicundus*, *Kunth l. c.* 49; *Webb et Berth. Phyt. Canar.* iii. 361, t. 240 (nut too acute); *C. B. Clarke in Journ. Linn. Soc.* xxi. 104 (not of Vahl). *C. arenarius*, *Herb. Heyne*; *Wall. Cat.* 3314, A (*partly*). *C. nitens*, *Herb. Madras*; *Wall. Cat.* 3314, B.

DECCAN PENINSULA, *Rottler, Wight*. POONA, *Woodrow*. NILGHIRIS, *Hohenacker*.—DISTRIB. Africa, Arabia.

Glabrous, whole plant usually more or less red; stolons 0. *Stems* 2-11 in. *Leaves* usually $\frac{2}{3}$ length of stem, $\frac{1}{8}$ — $\frac{1}{6}$ in. broad, weak; sheaths broad, usually scarious, inflated. *Bracts* 2, lower 1-1 $\frac{1}{2}$ in. *Spikelets* 3-20 in 1 head, $\frac{2}{3}$ by $\frac{1}{4}$ in. *Glumes* close-packed, much imbricated at base, 9-15-striate, keel very acute excurrent conspicuously. *Stamens* 3; anthers nearly mucous. *Nut* obovoid, triquetrous with concave faces, reticulate black and white; style as long as nut, branches linear.—*C. rubicundus*, Vahl, is a Puerto Rico plant; and the description can hardly (admitting error in habitat) refer to *C. Teneriffæ*, as Vahl does not describe the excurrent mucro of the glumes. Finally, even were our plant *C. rubicundus*, Vahl, it must take the earlier name of *Teneriffæ*. The name *C. nitens*, Rottler, is earlier; but *C. nitens*, Retz., cannot be set aside, because almost the only certain thing regarding it, is that it was not a *Pygæus*, and therefore not the *Cyperus nitens*, auctorum.

13. *C. niveus*, *Retz. Obs.* v. 12; culms at base nodose closely uniseriate, spikelets 3-12 in one head strongly compressed linear-oblong 20-40-fld. white or cinamomeous, glumes mucous, nut oblong-obovoid $\frac{1}{2}$ length of glume. *Roxb. Fl. Ind.* i. 191; *Nees in Wight Contrib.* 78; *Kunth Enum.* ii. 45; *Miq. Fl. Ind. Bat.* iii. 271; *Boeck. in Linnæa*, xxxv. 530; *Aitch. Cat. Punjab Pl.* 155, and in *Journ. Linn. Soc.* xix. 189; *C. B. Clarke l. c.* 108.—*Cyperus*, *Wall. Cat.* 3377.

From KASHMIR to UPPER BURMA, alt. 0-6000 ft. and southward to Calcutta and Hyderabad.—DISTRIB. Cabul, China.

Glabrous. *Rhizome* woody, almost wholly constructed of the nodose bases of

stems. *Stems* 8-16 in., slender. *Leaves* $\frac{1}{2}$ length of stem, $\frac{1}{2}$ - $\frac{1}{4}$ in. broad, weak. *Bracts* 2-3, up to 1-1 $\frac{1}{2}$ in. *Spikelets* commonly $\frac{2}{3}$ by $\frac{1}{4}$ in. (sometimes nearly twice as long). *Glumes* very close-packed, acutely keeled, many-nerved. *Nut* sessile, trigonous, black; style nearly as long as nut, branches linear.

14. **C. leucocephalus**, *Retz. Obs.* v. 11; stems slender nodose at base, with one dense globose white head, spikelets compressed, glumes oblong-obtuse obscurely 3-1-nerved, nut oblong $\frac{1}{2}$ - $\frac{2}{3}$ length of glume. *Kunth Enum.* ii. 97; *Boeck. in Linnæa*, xxxv. 590; *C. B. Clarke in Journ. Linn. Soc.* xxi. 107. *C. pulchellus*, *Br. Prodr.* 213. *C. sorostachys*, *Boeck. l. c.* 588. *Sorostachys kyllingioides*, *Steud. Syn. Cyp.* 71; *Miq. Fl. Ind. Bat.* iii. 296.—*Cyperus*, *Wall. Cat.* 3536 (partly). *Lipocarpha*, *Wall. Cat.* 3445, D.

Scattered from MONGHIE, *Wallich*, to MYSORE, *Law*, and MARTABAN, *Wallich*; (seldom collected).—DISTRIB. Tropics generally.

Glabrous. *Stems* 4-10 in., cæspitose on a very short woody rhizome. *Leaves* about $\frac{1}{2}$ length of stem, narrow. *Inflorescence* $\frac{1}{4}$ - $\frac{2}{3}$ in. in diam. *Spikelets* 6-50, in large forms nearly $\frac{1}{2}$ by $\frac{1}{6}$ in., up to 28-fld.; in small only $\frac{1}{2}$ in. long 6-8-fld. *Stamen* 1. *Nut* black, white reticulate; style much shorter than nut, branches linear small.

Sect. 5. *Conglomerati*. Rhizome woody, creeping; rootlets thick, often woolly. Inflorescence umbelled or with 1 head. (Sp. 15-19.)

15. **C. arenarius**, *Retz. Obs.* iv. 9; stems solitary distant on a much-divided creeping rhizome subterete at top 1-headed, spikelets elliptic-oblong 10-16-fld., glumes ovate obtuse, nut obovoid unequally trigonous $\frac{1}{2}$ length of glume. *Nees in Wight Contrib.* 77; *Kunth Enum.* ii. 46; *Dalz. & Gibs. Bomb. Fl.* 284; *Thw. Enum.* 342; *Boeck. in Linnæa*, xxxv. 536; *Aitch. Cat. Punjab Pl.* 154; *C. B. Clarke in Journ. Linn. Soc.* xxi. 106. *C. conglomeratus*, var. γ *Boiss. Fl. Orient.* v. 369 (not of *Rottb.*). *Robertia indica*, *Linn. Fl. Zeyl.* 17, & *Amœn. Acad.* i. 388; cf. *Trimen in Journ. Linn. Soc.* xxiv. 135.)—*Pluk. Almag.* 178, t. 300, fig. 7.—*Cyperus*, *Wall. Cat.* 3314 A. (partly), 3535.—*Scirpus glomeratus*, *Herb. Heyne*; *Wall. Cat.* 3460.

Seacoast from SIND to CEYLON and ORISSA. PUNJAB PLAIN; *Aitchison*, *Duthie*.—DISTRIB. Persia, Arabia.

Glabrous. Rhizome slender, roots not woolly. *Stems* 4-12 in. *Leaves* often overtopping stem, $\frac{1}{2}$ - $\frac{1}{4}$ in. broad. *Bracts* 2-3, lowest 2-4 in. long, suberect often as though continuing stem. *Spikelets* straw-colrd., finally brown. *Glumes* boat-shaped, strongly 3-nerved. *Nut* concavo-convex dusky black; style very short, branches linear longish.

16. **C. conglomeratus**, *Rottb. Descr. et Ic.* 21, t. 15, fig. 7; roots woolly, stems at base approximate somewhat thickened, spikelets linear rather large 8-16-fld., glumes minutely mucronate, nut obovoid unequally trigonous $\frac{1}{2}$ length of glume. *Decne. in Ann. Sc. Nat.* ser. 2, ii. 15; *Boiss. Fl. Orient.* v. 369 (var. α in great part). *C. Jeminius*, *Rottb. Descr. et Ic.* 25, t. 8, fig. 1 (not of *Retz.*). *C. pungens*, *Boeck. in Linnæa*, xxxv. 537 (except part of α elata); *C. B. Clarke in Journ. Linn. Soc.* xxi. 113. *C. proteinolepis*, var. β *pumila*, *Boeck. l. c.* 523.

SIND; *Lace.*—DISTRIB.; Westwd. to N. Africa.

Glabrous. Rhizome sometimes elongate, $\frac{1}{8}$ - $\frac{1}{4}$ in. in diam. *Stems* 4-24 in., somewhat robust. *Leaves* often $\frac{1}{2}$ length of stem and upwards. Umbel simple, not rarely contracted into 1 head; rays often 3-4, about 1 in. long.

17. **C. pachyrrhizus**, *Nees ex Boeck. in Linnæa*, xxxv. 545; stems long robust at top trigonous 1-headed, leaves often as long as stem rigid concave, bracts 3-4 long spreading, spikelets very numerous densely agglomerated (otherwise as *C. conglomeratus*). *C. B. Clarke in Journ. Linn. Soc.* xxi. 111; *Trimen Cat. Pl. Ceylon*, 100. *C. conglomeratus*, *Thw. Enum.* 343. *C. arenarius*, *Prain Laccadive Pl. in Ic. Mem. Med. Off. Army Ind.*, part v. (1890), 54 (not of Retz.). *C. leucocephalus*, *Wight ms. (partly)*.

CEYLON; *Thwaites, Wight*. LACCADIVE ISLANDS; *Hume*.

Roots densely woolly. Stems 12-20 in. Head more than 1 in. in diam. of 30-80 spikelets.—*Trimen* doubts (with reason) whether this is other than a large form of *C. conglomeratus*, *Rotb.*

18. **C. effusus**, *Rotb. Descr. et Ic.* 22, t. 12, fig. 3; spikelets linear compressed 20-60-fld., glumes most densely packed scarcely mucronate (otherwise as *C. conglomeratus*). *Kunth Enum.* ii. 47; *Edgew. in Journ. As. Soc. Beng.* xvi. 1220. *C. proteinolepis*, *Steud. Syn. Cyp.* 15; *Boeck. in Linnæa*, xxxv. 522; *C. B. Clarke in Journ. Linn. Soc.* xxi. 113. *C. conglomeratus*, var. *effusa*, *Boiss. Fl. Orient.* v. 369. *C. conglomeratus*, var. β major, *Boeck. l. c.* 544; *C. B. Clarke l. c.* 112. *C. curvulus*, *Boeck. l. c.* 541 (partly). *C. densus*, *Br. in Salt Abyss. Append.* 62.

SIND; *Pinwill*.—DISTRIB. Westwd. to N. Africa.

Spikelets $\frac{1}{2}$ -1 by $\frac{1}{8}$ - $\frac{1}{4}$ in. broad, much narrower than in *C. conglomeratus*.—*C. effusus* includes many plants differing greatly in size (as does *C. conglomeratus*) but all unlike *C. conglomeratus* in the exceeding closely packed glumes; the spikelets are not longer than in *C. conglomeratus*, but have twice as many flowers.

19. **C. Atkinsoni**, *C. B. Clarke in Journ. Linn. Soc.* xxi. 109; roots not woolly, stems thickened at base approximated on a short rhizome top nearly terete, umbel simple contracted, spikelets linear much compressed 20-30-fld. pale brown (otherwise as *C. effusus*.)

KASHMIR; *Bimbur, Atkinson*. N.W. HIMALAYA; *Kotgurb, Thomson*. SIND; *Kurrachee, Stocks*.

This plant is not very near *C. niveus* (where originally placed) differing not merely by the umbellate spikes but by the structure of the spikelet, which is very close to that of *C. effusus*. Though the character of woolly rootlets holds good in this group throughout a great series of herbarium material, *Schweinfurth* tells me that it is not to be relied on for the discrimination of species, as it is merely an adaptation for growth in sand.

Sect. 6. *Diffusi*. Tall or middle-sized perennials with green somewhat broad often 3-nerved leaves. Umbels compound, generally decompound. (Sp. 20-26.)

20. **C. diffusus**, *Vahl Enum.* ii. 321; spikelets 4-24-fld., glumes broadly ovate suddenly acute-mucronate in fruit somewhat distant upper margins not imbricate, nut broadly ellipsoid triquetrous subpyramidal at either end $\frac{2}{3}$ length of glume. *Nees in Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. 58; *Miq. Fl. Ind. Bat.* iii. 264. *C. elegans*, *Sw. Obs. Bot.* 30; *Kunth Enum.* ii. 28; *Boeck. in Linnæa*, xxxv. 533; *C. B. Clarke in Journ. Linn. Soc.* xx. 288 and xxi. 125 excl. tab. *Sloane (not Linn.)*. *C. longifolius*, *Decne. in Nouv. Ann. Mus.* iii. 359; *Ridley in Forbes East. Archip.* 520 (not *Poir.*). *C. mæstus*, *Kunth l. c.* 31. *C. nigro-viridis*, *Thw. Enum.* 344. —*Cyperus*, *Wall. Cat.* 3358, 3362, 3370, *A. Hypælyptum*, *Griff. Itin. Notes*, 17, n. 243.

Throughout INDIA, except the dry west, common from SIKKIM and ASSAM to CEYLON and PENANG.—DISTRIB. All warm regions.

Glabrous. *Rhizome* very short; roots wiry. *Stems* 8-30 in. *Leaves* often as long as stem, $\frac{1}{3}$ – $\frac{2}{3}$ in. broad, flat, green, 3-nerved. *Umbel* 4-12 in. in diam., decom-pound (depauperated examples with few spikes occur); bracts 4-10, up to 1-2 ft., leaf-like. *Spikelets* 3-9 together, digitate, $\frac{1}{3}$ – $\frac{1}{2}$ by $\frac{1}{8}$ – $\frac{1}{6}$ in. (sometimes much longer). *Glumes* boat-shaped, green, back 3-5-nerved; wings of rhachilla narrow, not deciduous. *Stamens* 3-2; anthers small, linear-oblong, often (when young) with a small linear-lanceolate crest. *Nut* dusky black; style much shorter than nut, sometimes hardly any; branches linear, shortly exsert.—One of the commonest of the genus, best known as *C. elegans*, Linn., but no part of Linnæus's *elegans*, whose type, his figure cited, and his description, are all of *C. viscosus*, Aiton. Nor can his description include *C. diffusus*, Vahl. Kunth, in transferring the name *C. elegans*, Linn., to this plant, followed Swartz and Willdenow.

21. ***C. pubisquama***, Steud. in Zoll. Verz. Ind. Archip. ii. 62 and Syn. Cyp. 20; spikelets very numerous rigid, glumes minutely mucronate often puberulous, their upper margins tightly imbricate even in fruit (otherwise as *C. diffusus*). *Miq. Fl. Ind. Bat.* iii. 266. *C. lagorensis*, Steud. Syn. Cyp. 36. *C. diffusus*, Kunth Enum. ii. 30; Boeck. in Linnæa, xxxv. 534; *C. B. Clarke* in Journ. Linn. Soc. xxi. 127 and xxv. 81; Trimen in Journ. Bot. xxiii. 140 (not of Vahl or Roxb.).—*Cyperus*, Wall. Cat. 3370, B.

From ASSAM and BURMA to PERAK and CEYLON.—DISTRIB. Malay Islds.

Differs, uniformly, from large examples of *C. diffusus*, Vahl in the tightly-packed glumes (even in fruit); but might be treated as a var.

22. ***C. Helferi***, Boeck. in Linnæa, xxxviii. 360; middle-sized, umbel middle-sized flaccid, glumes distant ovate-lanceolate shortly mucronate, nut $\frac{1}{2}$ length of glume (otherwise as *C. diffusus*). *C. B. Clarke* in Journ. Linn. Soc. xxi. 128.—*Fimbristylis*, Wall. Cat. 3528.

BURMA; Chappedong River, Wallich. PEGU; Kurz. MERGUI; Griffith (Kew Distrib. 6140). TENASSERIM or ANDAMANS, Helfer (Kew Distrib. 6140).

23. ***C. multispicatus***, Boeck. in Linnæa, xxxviii. 362; umbel very decom-pound, spikelets many solitary compressed slenderer, glumes densely imbricated minutely mucronate, nut $\frac{1}{2}$ length of glume (otherwise as *C. diffusus*). *C. B. Clarke* in Journ. Linn. Soc. xxi. 129 (and 14, *C. multistriatus*, by error).

CACHAR; Keenan. TENASSERIM or ANDAMANS; Helfer (Kew Distrib. 6163).

Umbel 12-16 in. across; spikelets innumerable, in Helfer's specimen nearly all pedicelled solitary, in Keenan's about half solitary half 2-3 together digitate. *Glumes* in fruit with upper margins imbricated.

24. ***C. Kurzii***, *C. B. Clarke* in Journ. Linn. Soc. xxi. 129; umbel very decom-pound secondary rays rigidly divaricate, spikelets 20-40-fl. wings of rhachilla broad persistent, glumes closely imbricate tip triangular acute scarcely mucronate (otherwise as *C. multispicatus*).

ANDAMAN ISLES; Phæacia, Kurz.

This does not match any of the foregoing closely-allied species (nn. 20-24 inclusive).

25. ***C. turgidulus***, *C. B. Clarke* in Journ. Linn. Soc. i. 130; stem at top triquetrous almost 3-winged, umbel dense secondary rays divaricate, spikelets few-fl. turgid sometimes almost terete clustered in small globose

heads (otherwise as *C. diffusus*). *Scirpus trialatus*, Boeck. in *Linnaea*, xxxvi. 721.—*Isolepis*, Wall. Cat. 3473.

From PEGU to PENANG and MALACCA, frequent, *Helper* (*Kew Distrib.* 6164), &c.—DISTRIB. S. China.

Stems 12–20 in. Umbels 3–4 in. in diam. Spikelets usually about 6-fld.

26. **C. radians**, Nees & Meyen ex Nees in *Linnaea*, ix. 285 (name) and in *Nov. Act. Nat. Cur.* xix. Suppl. 1, 63; umbel simple or compound rays longer than stem, spikelets 1–30 clustered compressed or nearly terete, glumes broad striate mucronate, nut broad ovoid $\frac{1}{2}$ length of glume. *Benth. Fl. Hongk.* 386; *Boeck. in Linnaea*, xxxv. 515; *C. B. Clarke in Journ. Linn. Soc.* xxi. 100. *C. radicans*, Kunth Enum. ii. 95. *C. Griffithii*, Steud. Syn. Cyp. 316; *C. B. Clarke*, l. c. 101. *C. macropus*, Miq. Fl. Ind. Bat. Suppl. 260, 599 (not of Boeck.). *C. sinensis*, Debeaur in Act. Linn. Soc. Bordeaux, xxxi. 14, t. 2, and xxxviii. 30.—*Cyperus*, Wall. Cat. 3371, B. (partly). *Rynchospora*, Wall. Cat. 3427.

MALAY PENINSULA. TENASSERIM, *Helper* (*Kew Distrib.* 6209); SINGAPORE, Wallich.—DISTRIB. China, Malaya.

Glabrous. Rhizome very short; stolons 0. Stems frequently less than 1 in. Leaves much exceeding stem, $\frac{1}{2}$ in. broad, rigid, not 3-nerved, often becoming brown. Rays of umbel always remarkably long (13 in. in *Maingay*, n. 1721). Spikes $\frac{3}{4}$ – $\frac{1}{2}$ in. in diam., sometimes globose, dense with 10–30 spikelets, sometimes in clusters of 2–5 spikelets, or occasionally spikelets mostly solitary pedicelled. Spikelets $\frac{1}{2}$ by $\frac{1}{2}$ in., 6–12-fld.; rhachilla not winged. Glumes closely imbricate, green usually marked with red, mucous. Nut and style much as in *C. diffusus*.—Ridley has proved *C. Griffithii* to be only a form of *C. radians*. This unmistakable species is not very closely allied to *C. diffusus*; but, unless a section is made for it alone, it is not clear where it can be better arranged than at the tail of the *Diffusi*.

Subgen. III. CHORISTACHYS. Infl. umbellate, spikes often more or less corymbd; spikelets (sometimes very shortly) spicate. Style-branches linear. (Sp. 27–61.) [N.B.—There is no line of separation between this subgenus and II. *Pycnostachys*.]

Series A. Rhachilla of spikelets not much winged. Leaves and bracts long (except in *C. malaccensis*). (Sp. 27–39.)

Sect. 1. *Compressi*. Annuals, or sometimes flowering the second year. (Sp. 27–31.)

27. **C. compressus**, Linn. Sp. Pl. 68; green, leaves and bracts long, umbel simple, spikes of 3–10 spikelets very shortly spicate, glumes boat-shaped keel acute excurrent, rhachilla of spikelets not winged, nut obovoid obtuse black acutely triquetrous with concave faces. *Burm. Fl. Ind.* 21; *Roxb. Fl. Ind.* i. 194; *Nees in Wight Contrib.* 76; *Kunth Enum.* ii. 23; *Miq. Fl. Ind. Bat.* iii. 263 and Suppl. 260, 599; *Dalz. & Gibs. Bomb. Fl.* 282; *Thw. Enum.* 342; *King in E. T. Atkinson Gaz.* x. 320; *Boeck. in Linnaea*, xxxv. 517; *C. B. Clarke in Journ. Linn. Soc.* xx. 284 and xxi. 97; *Boiss. Fl. Orient.* v. 372 (not of Jacq.). *C. pectiniformis*, Nees in *Wight Contrib.* 77 (excl. syn. *Roxb.*). *C. Meyenii*, Nees et Meyen in *Nov. Act. Nat. Cur.* xix. Suppl. i. 57.—*C. viridis*, *Herb. Roxb.*; Wall. Cat. 3308.

Throughout INDIA; from the Punjab and Assam to Ceylon and Singapore.—DISTRIB. All warm countries (except Australia).

Glabrous. *Stems* caespitose, 4-16 in., or (in the form *C. pectiniformis*, Nees) 0-2 in. *Leaves* often nearly as long as stem, $\frac{1}{2}$ - $\frac{1}{3}$ in. broad. *Umbel* rays 0-6 in.; bracts often longer than umbel, leaf-like. *Spikelets* $\frac{1}{2}$ -1 by $\frac{1}{2}$ - $\frac{1}{4}$ in. (in form *pectiniformis* up to $1\frac{1}{2}$ in. and 20-60-fld. *Glumes* densely, not rigidly, imbricated, ovate, many-nerved, mucro scarcely recurved. *Stamens* 3; anthers linear-oblong, scarcely apiculate. *Nut* $\frac{1}{2}$ length of glume, very broad; style shorter than nut, branches linear shortly exsert.

28. **C. glaber**, *Linn. Mant.* 179; umbels contracted, spikelets very closely spicate more or less red-tinged, glumes muticous or very nearly so, nut obovoid obtuse minutely conic-apiculate (otherwise as *C. compressus*). *Reich. Ic. Fl. Germ.* viii. 32, t. 280, fig. 669; *Boeck. in Linnæa*, xxxv. 517; *C. B. Clarke in Journ. Linn. Soc.* xxi. 104; *Boiss. Fl. Orient.* v. 371. *C. patulus*, *Kitaib. ex Host Gram. Austr.* iii. 49, t. 74; *Kunth Enum.* ii. 24; *Ledeb. Fl. Ross.* iv. 240 (not of Bieb.).

SIND; Pinwill.—DISTRIB. Westward to Sicily.

Umbel rays $\frac{1}{2}$ - $1\frac{1}{2}$ in. *Glumes* nearly always reddish on the sides (green in *C. compressus*).

29. **C. aristatus**, *Rottb. Descr. et Ic.* 23, t. 6, fig. 1; small, umbel nearly simple or reduced to 1 head, spikelets densely spicate 6-30-fld., glumes ovate-lanceolate many-striate over nearly their whole breadth acuminate into a recurved bristle, nut oblong or narrow-obovoid $\frac{1}{2}$ length of glume (bristle inclusive). *Roxb. Fl. Ind.* i. 190; *Kunth Enum.* ii. 23 (excl. syn. *Burm.*); *Strachey Cat. Pl. Kumaon* 74; *Miq. Fl. Ind. Bat.* iii. 262; *Thw. Enum.* 343 (excl. syn. *Ham.*); *Boeck. in Linnæa*, xxxv. 500; *C. B. Clarke in Journ. Linn. Soc.* xxi. 91; *Trimen Cat. Ceylon Pl.* 100. *C. squarrosus*, *Linn. Sp. Pl.* 66 (partly). *C. versicolor*, *Nees in Wight Contrib.* 78. *C. arenarius*, *Herb. Wight*; *Wall. Cat.* 3374, 3375.—*Isolepis echinulata*, *Kunth Enum.* ii. 205.

TROPICAL and TEMP. HIMAL.; alt. 0-8500 ft., and thence to Ceylon.—DISTRIB. Tropics.

30. **C. Iria**, *Linn. Sp. Pl.* 67 (excl. *Rheede*); leaves and bracts long, spikelets spicate or subracemose linear 6-20-fld., glumes obovate in fruit hardly imbricate, nut triquetrous nearly as long as glume. *Roxb. Fl. Ind.* i. 201; *Nees in Wight Contrib.* 87; *Kunth Enum.* ii. 38; *Miq. Fl. Ind. Bat.* iii. 269 and *Suppl.* 260; *Dalz. & Gibs. Bomb. Fl.* 282; *Edgew. in Journ. Linn. Soc.* ix. 319; *Boeck. in Linnæa*, xxxv. 595; *King in E. T. Atkinson Gaz.* x. 620; *Aitch. in Journ. Linn. Soc.* xix. 189; *Boiss. Fl. Orient.* v. 370; *C. B. Clarke in Journ. Linn. Soc.* xx. 289 and xxi. 137. *C. songaricus*, *Karel. et Kiril. in Bull. Soc. Mosc.* [1841] 859. *C. seminudus*, *Moritzzi Verz. Zoll. Pfl.* 96 (not of *Roxb.*). *C. diaphaniria* and *microiria*, *Steud. in Zoll. Verz. Ind. Archip.* ii. 62 and *Syn. Cyp.* 23. *C. microlepis*, *Baker Fl. Maurit.* 410 (not of *Boeck.*).—*Cyperus*, *Wall. Cat.* 3360, 3361.—*Cyperus*, *Coldstream, Grass. S. Punjab*, t. 38, A.

INDIA, general in rice-fields.—DISTRIB. Old world.

A glabrous shortlived weed. *Stems* caespitose, 4-20 in. *Leaves* often nearly as long as stem, $\frac{1}{2}$ in. broad, grass-like. *Umbel* 2-20 in. in diam., varying greatly in size, usually compound, 3-5, up to 4-12 in.; primary rays sometimes at apex corymbose sometimes again umbelled. *Spikes* very loosely spicate, rhachis $\frac{1}{2}$ -2 in. *Spikelets* 5-20, obliquely erect, yellow or brown (not red nor chestnut), $\frac{1}{2}$ - $\frac{1}{2}$ by $\frac{1}{2}$ in.; rhacheola not winged. *Glumes* 3-5-nerved on back, sides nerveless, muticous or scarcely apiculate. *Stamens* 2 or 3; anthers oblong, muticous. *Nut* triquetrous, black; style much

shorter than nut, branches linear shortly exsert.—*Rheede Hort. Malab.* xii. 105, t. 56, cited by Linnæus, &c., is *C. inundatus*, Roxb.

Var. *β paniciformis* (sp.) Franch. et Savat. Pl. Japon. ii. 103, 537; spikelets bearing 2–4 nuts, spikes (in the extreme typical form) drawn out into nearly linear racemes. *C. parviflorus*, Nees in *Wight Contrib.* 87 (excl. all syn.). *C. Iria*, Thw. *Enum.* 344.

From Kashmir to Ceylon and the Andamans.

31. **C. glomeratus**, Linn. *Sp. Pl.* 68; large, without stolons, leaves and bracts long narrow, umbel compound, spikelets in very dense short-cylindric spikes, glumes elliptic-oblong obtuse ferruginous finally brown, nut oblong $\frac{2}{3}$ length of glume, *Host Gram. Austr.* iii. 48, t. 71; *Kunth Enum.* ii. 77; *Reich. Ic. Fl. Germ.* viii. 33, t. 284, fig. 675, *Boeck. in Linnæa*, xxxv. 592; *C. B. Clarke in Journ. Linn. Soc.* xxi. 141; *Boiss. Fl. Orient.* v. 372.

KASHMIR; Sonamurg, alt. 6500 ft., Thomson.—DISTRIB. From Italy to China and Japan.

Glabrous. Stems 12–33 in. Leaves often as long as stems, $\frac{1}{2}$ – $\frac{1}{3}$ in. broad. Umbel, rays 3–8 up to 3–4 in. long, often concentrated nearly into 1 head; bracts 3–5, 6–12 in. long. Spikes $\frac{2}{3}$ by $\frac{2}{3}$ in. Spikelets 40–50, $\frac{1}{2}$ by $\frac{1}{8}$ in., compressed, 12–20-fld. Glumes scarcely keeled, in fruit loosely imbricated; rhacheola with narrow hyaline wings. Stamens 3; anthers small, oblong, muticous. Nut exactly oblong, pyramidal at either end, dusky black; style much shorter than nut, branches linear shortly exsert.

Sect. 2. Rhizome becoming woody; elongate stolons frequent. Large (or middle-sized). (Sp. 32–39.)

32. **C. distans**, Linn. f. *Suppl.* 103; umbel large compound, spikelets spicate narrow-linear 10–20-fld., glumes remote oblong-elliptic obtuse, nut oblong or narrowly ellipsoid $\frac{1}{2}$ – $\frac{3}{4}$ length of glume. *Jacq. Ic.* ii. t. 299; *Roxb. Fl. Ind.* i. 207; *Nees in Wight Contrib.* 88; *Kunth Enum.* ii. 93; *Thw. Enum.* 344; *Boeck. in Linnæa*, xxxv. 612; *Dalz. & Gibs. Bomb. Fl.* 283; *Duthie in E. T. Atkinson Gaz.* x. 620; *C. B. Clarke in Journ. Linn. Soc.* xx. 290 and xxi. 144. *C. elatus*, *Rotth. Descr. et Ic.* 37, t. 10 (not of Linn.). *C. nutans*, *Presl in Oken. Isis.* xxi. 271; *C. B. Clarke, l. c.* 291 and 143 (partly). *C. Jacquini*, *Schrad. in Linnæa*, xi., *Litt. Ber.* 87; *Steud. l. c.* 49. *C. graminicola*, *Steud. in Zoll. Verz. Ind. Archip.* ii. 63 and *Cyp.* 49. *C. Kurrui*, *Steud. Syn. Cyp.* 38; *Miq. Fl. Ind. Bat.* iii. 279.—*Cyperus*, *Wall. Cat.* 3350, 3366.

From the HIMALAYA, alt. 0–3000 ft., to CEYLON and SINGAPORE.—DISTRIB. All warm regions.

Glabrous. Stolons up to 2 by $\frac{1}{10}$ in. clothed by dark brown elliptic acute scales. Stems 1–3 ft. (depauperated less than 1 in.). Leaves often as long as stem, $\frac{1}{2}$ – $\frac{1}{3}$ in. broad. Umbel 8–12 in. in diam., from a single head 2½ in. diam. to an umbel with one ray 26 in. copiously 3–4 times compound; bracts rather longer than umbel, leaf-like. Rhachis of spike $\frac{1}{2}$ –2 in., glabrous. Spikelets $\frac{1}{2}$ –1 by $\frac{1}{10}$ in., young nodding, mature spreading at right angles, more or less red; wings of rhachilla narrow, hyaline, ultimately caducous. Stamens 3; anthers oblong, muticous. Nut dusky black; style much shorter than nut, branches shortly exsert.—The slender rhacheola of spikelet, apparently wavy from the very distant scars of the fallen glumes, usually marks this species.

33. **C. nutans**, *Vahl Enum.* ii. 363; large, spikelets racemose (i.e. loosely spicate) ripe suberect, glumes somewhat remote often minutely mucronate (otherwise as large examples of *C. distans*). *Kunth Enum.* ii.

94; *Miq. Fl. Ind. Bat.* iii. 286; *Boeck. in Linnæa*, xxxv. 597. *C. B. Clarke in Journ. Linn. Soc.* xxi. 143 (excl. syn. and Madag.). *C. exaltatus*, *Strachey Cat. Pl. Kumaon*, 74; *Duthie in E. T. Atkinson Gaz.* x. 620 (not of Retz). *C. distans*, β major, *Thw. Enum.* 432.—*Cyperus*, n. 54, *Herb. Ind. Or. H. f. et T. T.*

From the PUNJAB to CACHAR and CEYLON.

Usually 2–3½ ft. Umbel primary rays often 8–12 in.; spikes bowing on the ultimate rays. *Spikelets* in ripe fruit collapsing in a tassel (not spreading at right angles as in *C. distans*), rather broader than in *C. distans* with less remote glumes.—It is difficult to draw a line between this species and fine examples of *C. distans*.

34. **C. eleusinoides**, *Kunth Enum.* ii. 39; umbel large compound, spikelets densely spicate linear 20–40-fl., glumes not very remote often mucronulate, nut narrowly ellipsoid often curved $\frac{1}{2}$ – $\frac{3}{4}$ length of glume. *Miq. Fl. Ind. Bat.* iii. 270; *Boeck. in Linnæa*, xxxv. 596; *C. B. Clarke in Journ. Linn. Soc.* xxi. 142 and xxv. 81; *Boiss. Fl. Orient.* v. 371. *C. xanthopus*, *Steud. in Flora*, xxv. 595 and *Syn. Cyp.* 36; *Thw. Enum.* 344. *C. infra-apicalis*, *Nees mss.*; *Aitch. Cat. Punjab Pl.* 155, and in *Journ. Linn. Soc.* xix. 189. *C. racemosus*, *fastigiatus* and *mysurensis*, *Herb. Heyne*; *Wall. Cat.* 3346. *C. complanatus*, *Herb. Wight*; *Wall. Cat.* 3347.

From the PUNJAB to CEYLON, frequent; the Naga Hills, *C. B. Clarke*.—DISTRIB. Asia, Africa, Austral.

Glabrous. *Stems* 15–40 in., with short lateral shoots at base; no elongate stolons seen. *Spikelets* $\frac{2}{3}$ – $\frac{3}{5}$ by $\frac{1}{8}$ in., pale or testaceous, scarcely becoming red on chestnut-brown as in *C. distans* and *nutans*, to which species it is closely allied.

35. **C. Thomsoni**, *Boeck. in Linnæa*, xxxvi. 295; rhizome very short woody, umbel dense large compound or contracted nearly simple, spikelets somewhat large spicate linear 16–24-fl. pale, glumes loosely imbricate elliptic subacute, nut oblong or ellipsoid $\frac{1}{3}$ – $\frac{2}{3}$ length of glume, *C. B. Clarke in Journ. Linn. Soc.* xxi. 177.—*Cyperus* sp. n. 55, *Herb. Ind. Or. H. f. et T. T.*

SIKKIM TERAI, ASSAM, CACHAR and BENGAL.—DISTRIB. Tonkin.

Glabrous. *Stems* 12–20 in., robust. *Leaves* often as long as stem, $\frac{1}{3}$ – $\frac{1}{2}$ in. broad, strong. *Umbel* (in Hooker n. 263 ("type" of Boeckler) $4\frac{1}{2}$ in. in diam., but often much larger (primary rays up to 7 in.); bracts exceeding umbel. *Spikes* dense, rhachis $\frac{1}{3}$ – $\frac{2}{3}$ in.; glabrous. *Spikelets* 20–40 nearly 1 by $\frac{1}{4}$ in., moderately compressed; wings of rhacheola very narrow, persistent. *Glumes* with 7–9 very close dorsal nerves, sides nerveless. *Stamens* 3; anthers linear-oblong narrow, minutely tipped by red obtuse connective. *Nut* trigonous, black, top acutely pyramidal; style shorter than nut; branches linear, shortly exsert.

36. **C. malaccensis**, *Lam. Ill.* i. 146; rhizome creeping, culms robust almost 3-winged at top, spikelets spicate linear 6–12-fl., glumes obtuse when dry with margins incurved all round, nut very narrowly oblong $\frac{2}{3}$ length of glume. *Kunth Enum.* ii. 74; *Boeck. in Linnæa*, xxxv. 603; *C. B. Clarke in Journ. Linn. Soc.* xxi. 147; *Boiss. Fl. Orient.* v. 373 (excl. syn. *C. enodis*). *C. odoratus*, *Linn. Sp. Pl.* 46 (partly). *C. gangeticus*, *Roxb. ms.*; *Wall. Cat.* 3351 A (partly). *C. incurvatus*, *Roxb. Fl. Ind.* i. 196. *C. Pangorei*, *Roxb. l. c.* 202. *C. procerus*, *Roxb. l. c.* 203 (partly, i.e. at least tab. cited). *C. scoparius*, *Decne. in Nouv. Ann. Mus.* iii. 359; *Ridley in Forbes East. Archip.* 520 (not Poir.). *C. Wallichii*, *Nees in*

Wight Contrib. 83 (part of *Wall. n.* 3342 *C. with trifid style*). *C. spaniophyllus*, *Steud. Cyp.* 21; *Miq. Fl. Ind. Bat.* iii. 267. *C. tegetiformis*, *Benth. Fl. Austral.* vii. 279 mostly (not *Roxb.*). *C. Pangorei* and *Panimotha*, *Herb. Ham.*; *Wall. Cat.* 3329, *M. N.*—*Rheede Hort. Mal.* xii. 93, t. 50.

On brackish mud banks, from BENGAL to SINGAPORE. SIND; Pinwill.—DISTRIB. Asia, Austral., Polynes.

Glabrous. *Stolons* long, $\frac{1}{8}$ – $\frac{1}{2}$ in. diam., clothed by broad lax black-chestnut scales 1 in. long, hardening into woody creeping rhizomes. *Stems* 18–36 in., at top $\frac{1}{8}$ – $\frac{1}{2}$ in. in diam. with 3 concave faces. *Leaves* usually few, topmost 2–6 in. erect, green, sword-shaped, shortly caudate. *Umbel* 2–6 in. in diam., simple compound or congested; bracts 3–5, up to 6 by $\frac{2}{5}$ in., lowest usually erect (till fruit-time). *Spikes* of 4–10 spikelets, rhachis glabrous. *Spikelets* $\frac{1}{2}$ – $\frac{1}{2}$ by $\frac{1}{10}$ – $\frac{1}{5}$ in. *Glumes* about $\frac{1}{2}$ in., very concave, in dry examples loosely imbricated. *Stamens* 3; anthers linear-oblong, not crested. *Nut* trigonous, becoming black; style $\frac{1}{2}$ length of nut; branches linear, slightly exsert. —This perhaps from its short leaves is more nearly allied to *C. tegetiformis*, *Roxb.*, but differs in the very narrow wing to rhachilla. Easily recognized, when dry, by the glumes (though closely packed) being forced apart by their edges being crispidly incurved all round.—*Cyperus*, *Rottb. Descr. et Ic.* p. 40, t. 11, fig. 3, is adduced here by various authors; but I do not see how it differs from *C. polystachyus*, *Rottb.* (which may be anything except *Pycreus polystachyus*, *Beauv.*).

37. *C. pilosus*, *Vahl Enum.* ii. 354; stolons slender, stems at top acutely triquetrous, secondary umbels closely corymbed, rhachis of spikes scabrous-pilose (or in form *C. marginellus* and var. γ glabrous); spikelets linear 10–20-fld., nut ellipsoid apiculate $\frac{2}{3}$ length of glume. *Kunth Enum.* ii. 80; *Strachey Cat. Pl. Kumaon*, 74; *Thw. Enum.* 344; *Boeck. in Linnæa*, xxxv. 598; *Duthie in E. T. Atkinson Gaz.* x. 620; *C. B. Clarke in Journ. Linn. Soc.* xxi. 148 and xxv. 81. *C. paniculatus*, *D. Don Prodr.* 39 (cf. *Spreng. Syst. Cur. Post.* 29). *C. Donianus*, *Dietr. Sp. Pl.* ii. 290. *C. fimbriatus*, *Nees in Wight Contrib.* 86; *Kunth l. c.* 100; *W. Wats. in E. T. Atkinson Gaz.* x. 393. *C. marginellus*, *Nees in Wight Contrib.* 83; *Kunth l. c.* 75. *C. procerus*, *Roth. Catal. Bot.* iii. 5 and *Nov. Pl. Sp.* 35; *Nees l. c.* 83 (partly, not *Rottb.*). *C. honestus*, *Kunth l. c.* 74. *C. venustus*, *Moritz Verz. Zoll. Pfl.* 96 (not *Br.*). *C. subalatus*, *pauciflorus*, and *hebes*, *Steud. Syn. Cyp.* 31, 34, 315. *C. piptolepis*, *Steud. in Zoll. Verz. Ind. Archip.* ii. 63 and *Syn. Cyp.* 40. *C. Heyneanus*, *Boeck. in Flora*, xlii. 440 bis. *C. truncatus*, *Franch. et Savat. Pl. Jap.* ii. 105 (not of *Turcz.*). *C. Griffithianus*, *Boeck. in Linnæa*, xxxv. 601. *C. Wallichii*, *Wight ms.* (not *Nees*).—*Cyperus*, *Wall. Cat.* 3334, 3348, 3355 (partly).

Throughout INDIA, alt. 0–5000 ft., abundant.—DISTRIB. Trop. As., Afric., and Austral.

Glabrous, except the rhachis of spikes. *Stolons* scarcely $\frac{1}{10}$ in. diam., with distant nodes and scales $\frac{1}{2}$ – $\frac{1}{2}$ in. long, easily overlooked when young as roots, but afterwards thickening somewhat into a wiry rhizome. *Stems* from 3 ft. with umbel 16 in. across, to 4 in. with umbel reduced to 1 head. *Leaves* often $\frac{1}{2}$ length of stem, $\frac{1}{2}$ – $\frac{1}{2}$ in. broad; bracts overtopping umbel, leaf-like. *Rhachis* of spikes in most examples definitely pilose, often only more or less scabrous subpilose, in the form *marginellus* microscopically glabrous. *Spikelets* (commonly) $\frac{2}{3}$ by $\frac{1}{2}$ in., compressed, reddish or brown or straw-colrd., close or remote, when ripe spreading at right angles; rhacheola obscurely (or not) winged. *Glumes* ovate, muticous, scarcely keeled, 3–7-nerved on back, ultimately loosely imbricated. *Stamens* 3; anthers linear-oblong, muticous. *Nut* acutely trigonous, black; style shorter than nut; branches linear, moderately exserted.—Of all *Cyperæ* this has proved the most

dangerous to Cyperologists; many examples have the rhachis of the spikes distinctly scabrous-pilose, occasionally it is quite glabrous. Further, there are two plants exceedingly like *C. pilosus* in general aspect, viz. *Juncellus Monti* and *Cyperus procerus*, Rottb., and in both of these the rhachis of spikelets is occasionally scabrous-pilose.

Var. β *obliqua*, C. B. Clarke l. c. 151; spikelets with fewer (sometimes only 5-6) flowers, often pale and very far apart. C. obliquus, *Nees in Wight Contrib.* 86; *Kunth Enum.* ii. 60; *Boeck. in Linnæa*, xxxv. 611; *W. Wats. in E. T. Atkinson Gaz.* x. 383. C. quinqueflorus, *Hochst. ms.*; *Steud. Syn. Cyp.* 37 (*partly*).—INDIA; widely scattered, but very much less common than the type.—Java.

Var. γ *polyantha*, C. B. Clarke l. c.; umbel rays $2\frac{1}{2}$ in., secondary umbels corymbose, rhachis of spikes nearly glabrous, spikelets 1 in. 40-45-fld. chestnut-red.—Bengal; Mymensingh, C. B. Clarke.

38. **C. Babakensis**, *Steud. in Zöll. Verz. Ind. Archip.* ii. 62; umbel of few rays, secondary umbels condensed into oblong or square dense rigid compound-spikes, rhachis of spikes not pilose (scarcely scabrous), spikelets more robust than those of *C. pilosus*, glumes boat-shaped hispid-scabrous at the top of keel, nut hardly $\frac{1}{2}$ glume (otherwise as *C. pilosus*). *Boeck. in Linnæa*, xxxv. 521. C. Babakan, *Steud. Syn. Cyp.* 6 (*wrongly placed in Pycreus*). C. bengalensis and pilosus, var. δ Babakensis, C. B. Clarke in *Journ. Linn. Soc.* xxi. 151. C. Bacha, *Herb. Ham.*; *Wall. Cat.* 3336 E. (*partly*).

EAST BENGAL; *Griffith (Kew Distrib.* n. 6207); Nathpur, *Wallich*, n. 3336, E. (*partly*); Mymensingh, C. B. Clarke.—DISTRIB. Java.

Rays of umbel 3-6, lowest much longer than the others, erect, stout. Spikes 2 by $1\frac{1}{2}$ in. very dense. Spikelets $\frac{2}{3}$ by $\frac{1}{2}$ in., 14-40-fld., red-brown; rhacheola stout.

39. **C. procerus**, *Rottb. Descr. et Ic.* 29, t. 5, fig. 3; stout, glabrous (but see var. β), secondary umbels loosely corymbed of 1-5 spikes, spikelets remote large 20-46-fld., glumes broad obtuse, nut obovoid $\frac{1}{2}$ length of glume (otherwise nearly as large *C. pilosus*). *Nees in Wight Contrib.* 83 (*excl. syn.*); *Roxb. Fl. Ind.* i. 203 (*excl. cit. Rheede*) and *Kunth Enum.* ii. 72; *Thw. Enum.* 343; *Boeck. in Flora*, lviii. 84; C. B. Clarke in *Journ. Linn. Soc.* xxi. 152 (*excl. syn. Roth.*). C. ornatus, *Br. Prodr.* 217. C. carnosus, *Heyne ms.*; *Nees l. c.* C. amoyensis, *Hance in Ann. Sc. Nat.* ser. 5, v. 249. C. Heynei, *Boeck. in Linnæa*, xxxv. 600. C. carnosus and spadiceus, *Herb. Heyne*; *Wall. Cat.* 3355, A.

BENGAL TO CEYLON AND SINGAPORE; mostly near the sea, rarely alt. 0-3000 ft. in valleys.—DISTRIB. Amoy, Tonkin, Java.

Very like large forms of *C. pilosus*, but with open inflorescence, distant larger spikelets, often 1 by $\frac{1}{2}$ in., either straw-colour or red-tinged, sometimes high-red.—Though very closely allied to *C. pilosus*, it is seldom referred to it, because the rhachis of spikes is glabrous. From its red colour it has been confounded with *Pycreus puncticulatus*, *Nees*.

Var. β *lasiorrhachis*; axis of spikelets scabrous-pilose.—Chota Nagpore; alt. 2000 ft., C. B. Clarke.—Perhaps the plant collected by V. Ball in Chota Nagpore; cf. C. B. Clarke in *Journ. Linn. Soc.* xxi. 151, in note.

Series B. Rhachilla of spikelets (usually conspicuously) winged. (Sp. 40-end.)

Sect. 3. *Bulbosi*. Stolons slender, soon disappearing, terminating in tunicated bulbils.—Closely allied to *Mariscus* Sect. *Bulbocaulis*. (Sp. 40.)

40. **C. bulbosus**, Vahl *Enum.* ii. 342; coat of bulbils striated black splitting into elliptic very acute segments, leaves overtopping stem narrow flagellate, umbel contracted corymbiform lowest ray somewhat distant (spikelets nearly as in *C. rotundus*). *Nees in Wight Contrib.* 80; *Dalz. & Gibs. Bomb. Fl.* 284; *Boeck. in Linnæa*, xxxvi. 300; *Trimen in Journ. Bot.* xiii. (1884), 358. *C. jemenicus*, Retz. *Obs.* iv. 11 (*jeminicus*); *Roxb. Fl. Ind.* i. 191; *C. B. Clarke in Journ. Linn. Soc.* xxi. 175, t. 2, figs. 17, 18 (*var. β excl.*) and in *Journ. Bot.* xix. 18, cum fig. (*not of Retz.*). *C. geminatus*, Kœnig *ms.*; *Ainslie Mat. Med. Hind.* (1813), 250; *Moon Cat. Pl. Ceylon*, 6 (*not of Schrader*). *C. oleraceus*, *Roxb. ms.* *C. stoloniferus*, *Nees in Wight Contrib.* 81 (*partly, not of Retz.*). *C. hexastachyus β pendulus*, *Nees in Wight Contrib.* 82 (*partly*). *C. rotundus*, *Kunth Enum.* ii. 51 (*partly*); *Thw. Enum.* 343 (*partly*).—*Cyperus*, *Wall. Cat.* 3317, A. (*partly*).

SIND; Stocks, &c. ALIGURH; Duthie (n. 7670). THE DECCAN PENINSULA and CEYLON.—DISTRIB. Trop. Afric., As. and Austral.

Glabrous. *Stolons* $\frac{1}{2}$ – $2\frac{1}{2}$ in., thread-like; bulbils ovoid-conic, at first $\frac{1}{4}$ in., white, edible, ultimately larger with thick black coat. *Stems* 4–12 in., slender. *Leaves* numerous, subbasal, up to $\frac{3}{8}$ in. broad, tip long caudate. *Umbel* sometimes evolute, rays up to 2 in., usually contracted 1– $1\frac{1}{2}$ in. in diam. interruptedly subcorymbose; bracts overtopping inflorescence, similar to leaves. *Spikelets* 3–20 reddish, up to $\frac{3}{4}$ by $\frac{1}{2}$ in., 8–26-fld.; wings of rhachilla elliptic, persistent. *Glumes* boat-shaped, ovate, obtuse, 11-nerved. *Stamens* 3; anthers linear, muticous. *Nut* obovoid, obtuse, triquetrous, black, hardly $\frac{1}{2}$ glume; style shorter than nut, branches linear, somewhat long.—In the absence of roots this species can generally be discerned by the imperfection of the umbel i.e. lowest bract with its ray a little distant.

Sect. 4. *Brevefoliati*. Tall. Stolons long, hardening into creeping rhizomes. Leaves short, rarely $\frac{1}{2}$ length of stem. Glumes approximate, closely imbricate. (Sp. 41–44.)

41. **C. articulatus**, Linn. *Sp. Pl.* 66; stem robust terete, leaves hardly any, umbel compound of many spikes, bracts very short acute scale-like, spikes linear many-fld., nut oblong-ellipsoid $\frac{3}{4}$ length of glume *Kunth Enum.* ii. 53; *Nees in Wight Contrib.* 80; *Thw. Enum.* 343; *Boeck. in Linnæa*, xxxvi. 274; *C. B. Clarke in Journ. Linn. Soc.* xx. 291, and xxi. 155. *C. nudus*, *Roxb. Fl. Ind.* i. 187 (*not 209, nor H. B. & K.*). *C. gymnos*. *Roem. & Sch. Syst.* ii., *Mant.* 97. *C. diphyllos*, *Benth. Fl. Austral.* vii. 279 (*chiefly, not Retz.*).—*Cyperus*, *Wall. Cat.* 3364.

BENGAL to CEYLON.—DISTRIB. All warm regions.

Glabrous. *Stolons* $\frac{1}{8}$ – $\frac{1}{4}$ in. diam., clothed by ovate-lanceolate striate brown-black scales $\frac{2}{3}$ in. long. *Stems* 3–6 ft., often 2–4 in. apart on the thick woody rhizome, at top $\frac{1}{8}$ – $\frac{1}{4}$ in. in diam., terete or scarcely trigonous, when dry usually with false nodes $\frac{1}{2}$ in. apart; upper sheaths usually terminated by a subspathaceous lanceolate-cordl. limb, rarely by a small green leaf. *Umbel* rays often 10, up to 2–6 in.; bracts $\frac{1}{2}$ – $\frac{3}{4}$ in., ovate, striate, subtergurd at base hardly keeled, concave, margins not reflexed. *Spikelets* 5–15 together, shortly spicate, $\frac{1}{4}$ – $1\frac{1}{4}$ by $\frac{1}{4}$ in., 12–50-fld., straw-colrd., afterwards dusky. *Glumes* even in fruit imbricate, ovate, obtuse, concave, scarcely keeled, obscurely 3–5-nerved on back; wings of rhachilla oblong or elliptic, scarious, ultimately deciduous. *Stamens* 3; anthers linear-oblong, muticous. *Nut* trigonous, acute at either end, black; style shorter than nut; branches linear, shortly exsert.

42. **C. tegetiformis**, Roxb. *Hort. Beng.* 6, and *Ic. ined.* t. 1321; leaves hardly any, stem trigonous at top often triquetrous not (or obscurely) transversely septate, bracts short (rarely $\frac{1}{2}$ length of umbel) lowest green (not ovate at base) with margins recurved in dried examples (otherwise as *C. articulatus*). *Wall. Cat.* 3351 B (partly); *Kunth Enum.* ii. 56; *Arn. in Wight Contrib.* 89, in note; C. B. Clarke in *Journ. Linn. Soc.* xxi. 157. *C. nudus*, Roxb. *Fl. Ind.* i. 209, not 187 nor *H. B. K.* *C. bengalensis*, *C. Spreng. Neu. Entd.* iii. 101. *C. Gula-Methi*, Roem. & Sch. *Syst.* ii. *Mant.* 125. *C. corymbosus*, *Ic. Madras, Wall. Cat.* 3351 (largely).—*Cyperus* sp. n. 40, *H. f. & T. Th. Herb. Ind. Or.* (Chittagong example).

BENGAL and ASSAM, MADRAS and BUNDELCUND.—DISTRIB. China, Japan.

This has been confused with *C. malaccensis*, Lam., which differs by the very narrow wing to rhachilla of spikelets, by the loosely imbricated concave subinflated glumes, and by the apex of stem 3-winged.

43. **C. corymbosus**, Rottb. *Descr. et Ic.* 42, t. 7, fig. 4; stem at top obscurely trigonous, uppermost leaf short or 0, bracts $\frac{1}{2}$ – $\frac{3}{4}$ length of umbel or sometimes overtopping it, spikelets ferruginous or reddish (otherwise as *C. tegetiformis*). *Thw. Enum.* 344; C. B. Clarke in *Journ. Linn. Soc.* xxi. 158. *C. diphyllus*, Retz *Obs.* v. 11; *Kunth Enum.* ii. 54; Boeck. in *Linnæa*, xxxvi. 272. *C. Koenigii*, Vahl *Enum.* ii. 302; *Kunth l. c.* *C. monophyllus*, Vahl *l. c.* ii. 352 (fide Nees). *C. seminudus*, Roxb. *Fl. Ind.* i. 187; Nees in *Wight Contrib.* 80; *Kunth l. c.* 55 (not of Moritz.). *C. enodis*, Boeck. *l. c.* 271. *Papyrus Pangorei*, Nees *l. c.* 88 (partly).—*Fimbristylis*, *Wall. Cat.* 3525 E.

From KUMAON, Wallich, to ASSAM, BURMA, CEYLON.—DISTRIB. As., Afric., and Amer.

Stems 2–3 ft., when dry often more or less transversely septate. Uppermost leaf in the type example of Retz, nearly 6 in. long. Bracts leaf-like, green, not ovate at base, keeled, with margins recurved in the dry state, in the type of *C. diphylla*, Retz, much overtopping the inflorescence.

Var. β *Pangorei*, C. B. Clarke, *l. c.* 292, 159; spikelets 1 in. 18–36-fl. *C. Pangorei*, Rottb. *l. c.* 31, t. 7, fig. 3; *Kunth l. c.* 57. *C. corymbosus* var. *macrostachya*, Boeck. *l. c.* 277 (cf. Steud. *Syn.* Cyp. 31, note to *C. corymbosus*).—Deccan Peninsula, *Wall. Cat.* 3351 C, &c. (*Herb. Kew*).—Madagasc.

44. **C. scarlosus**, Br. *Prodr.* 216; stolons slender, stems long slender at top triquetrous, umbel slender contracted, spikelets linear pale straw-colour (very like those of *C. tegetiformis*). C. B. Clarke in *Journ. Linn. Soc.* xxi. 159. *C. pertenuis*, Roxb. *Fl. Ind.* i. 198; Nees in *Wight Contrib.* 83. *C. rotundus*, Thw. *Enum.* 343 (partly); Boeck. *ms.* partly, not of Linn.

BENGAL; Soondreebun, C. B. Clarke, common. PEGU, Kurz *ms.*, 683, 684 (*Herb. Calcutta*).—DISTRIB. Australia.

Glabrous. Stolons $\frac{1}{2}$ –2 by $\frac{1}{16}$ in., clothed by elliptic acute lax striate concolorous scales $\frac{1}{4}$ in. long. Stems 16–36 in., at top $\frac{1}{4}$ – $\frac{1}{8}$ in. in diam. Leaves (in the Indian as in Brown's examples) variable, usually short (less than $\frac{1}{2}$ stem), sometimes much longer, sometimes 0, narrow, weak. Umbel thin; rays slender, sometimes up to 3 in. long, sometimes not $\frac{1}{4}$ in.; bracts nearly always as the leaves, i. e. hardly any when leaves short, exceeding inflorescence when leaves longish.—Not very near *C. rotundus*; differs little from *C. tegetiformis*, but in the extreme slenderness of stem and umbel.

Sect. 5. *Subimbricatæ*. Tall. Rhizome very short, woody; stolons 0, i. e. lateral shoots from base of stem immediately ascending. Glumes

scarcely imbricate in fruit (in this differing from the *Brevifoliata* and *Rotunda*). (Sp. 45-47.)

45. **C. macer**, C. B. Clarke in *Journ. Linn. Soc.* xxi. 160; stems long slender, leaves few short, umbel loose irregular slender, spikelets linear 8-16-fld., glumes obtuse, nut obovoid $\frac{1}{2}$ - $\frac{2}{3}$ length of glume.

On rocks in rivers. PEGU, Kurz, n. 671. CHITTAGONG, C. B. Clarke. CENTRAL INDIA; Duthie, n. 9837.

Glabrous. Stems 2-3 ft., at top very slender triquetrous. Leaves inconspicuous, uppermost 4-6 (rarely 8-10) in. long, erect, narrow. Umbel rays 3-6, slender, 2-4 in. long, sometimes again divided; bracts $\frac{1}{2}$ -2 in., leaf-like. Spikelets $\frac{1}{2}$ by $\frac{1}{10}$ in.; wings of rhachilla narrow-oblong, hyaline, disappearing. Glumes somewhat remote, in fruit not imbricate, ovate-oblong, 3-5-nerved, back green, sides brown nerveless. Stamens 3; anthers linear-oblong muticous. Nut trigonous, ashy-black; style shorter than nut; branches linear, long.—Somewhat resembling slender forms of *C. tegetum*, but the narrow evanescent wing of rhacheola would remove it out of the present series altogether.

46. **C. tegetum**, Roxb. *Fl. Ind.* i. 208; stem robust at top trigonous or triquetrous, leaves usually short or 0 (sometimes pretty long), umbel compound or decompound usually large, spikelets shortly spicate linear many-fld. often coloured, wings of rhachilla strong caducous, glumes somewhat remote in fruit obliquely spreading, nut oblong-obovoid $\frac{1}{2}$ length of glume. Wall. *Cat.* 3332 A, 3352 mainly; C. B. Clarke in *Journ. Linn. Soc.* xxi. 160 (excl. syn. *C. Schimperianus*, and African plants), and xxv. 81. *C. corymbosus*, Kœnig ms.; Rottl. in *Neu. Schr. Gesell. Freunde, Berlin*, iv. 219 in Obs.; Boeck. in *Linnæa*, xxxvi. 276 (mostly); Duthie in *E. T. Atkinson, Gaz.* x. 620 (not of Rottb.). *C. dehiscens*, Nees in *Linnæa*, ix. 286; Kunth *Enum.* ii. 56 (excl. syn. Roxb.); Trimen *Cat. Pl. Ceylon*, 100. *C. Pangorei* (i. e. Pangorei), Wight ms.; Thw. *Enum.* 344 (not of Rottb.). *C. tegetiformis*, W. Wats. in *T. E. Atkinson Gaz.* x. (1876) 393 (not of Roxb.). *C. Pangorei* & *C. subulatus*, Herb. Heyne; Wall. *Cat.* 3330. *Papyrus dehiscens*, Nees in *Wight Contrib.* 89. *P. Pangorei*, Nees l. c. 88 (mostly). *P. corymbosus*, Nees l. c. 89 (excl. syn. Rottb.).

Throughout INDIA, alt. 0-6000 ft., from KASHMIR to CEYLON and BURMA.—DISTRIB. Cult. in Mauritius (*C. textilis*, Bojer).

Glabrous. Rhizome horizontal, stout, woody. Stems 3 ft. Leaves uppermost usually 4-8 by $\frac{1}{2}$ in.; often 0, occasionally 16 in. Umbel usually 4-12 in. in diam.; umbellules corymbose, spikes numerous. Spikelets $\frac{3}{4}$ by $\frac{1}{10}$ in., 10-20-fld., usually fine-brown or reddish. Glumes elliptic-oblong obtuse, 3-5-nerved, scarcely keeled. Wings of rhacheola ovate, acute, finally yellow or red-brown separating by a clean cut. Stamens, nut, and style much as in *C. macer*.

Var. β *ambigua*, C. B. Clarke l. c. (1884) 162; spikelets 1 $\frac{1}{2}$ in., glumes $\frac{1}{2}$ in., wings of rhacheola narrow hardly separating. Madras Peninsula, Wallich, n. 3329 F, in *Herb. Kew* (not *Herb. propr.*), and one of the two examples of n. 3330, in *herb. propr.*

47. **C. Zollingeri**, Steud. in *Zoll. Verz. Ind. Archip.* ii. (1854) 62, and *Syn. Cyp.* 17; culm elongate, leaves long narrow, umbel compound with long slender rays or sometimes reduced to 1 head, spikelets spicate long-linear yellow, glumes somewhat remote large, nut obovoid black $\frac{1}{2}$ length of glume. Boeck. in *Linnæa*, xxxvi. 352. *C. compressus*, var. Thw. *Enum.* 342. *C. rotundus*, Miq. *Fl. Ind. Bat. Suppl.* 260, 600. *C. rotundus*, var. *carinalis*, Benth. *Fl. Austral.* vii. 280. *C. tenuiculis*, Boeck. l. c. 286 (not of Flora, lxii. 554). *C. Wightii*, Hance in *Journ. Bot.*

xvi. 14 (not of *Nees*). *C. lucidulus*, *C. B. Clarke* in *Journ. Linn. Soc.* xxi. 99, and xxv. 80 (not of *Klein*, except by mixture).—*Cyperus*, *Wall. Cat.* 3321, 3367.

Throughout moist INDIA, alt. 500–5000 ft., plentiful, from NEPAL, *Wallich*, and ASSAM, *Griffith*, to CEYLON, *Thwaites*, and MALACCA, *Griffith*.—DISTRIB. Trop. As., Afric., and Austral.

Glabrous. *Rhizome* short, horizontal, woody. *Stems* solitary but not distant, of $1\frac{1}{2}$ –3 ft. (small examples under a foot occur), slender for their length, triquetrous. *Leaves* $\frac{2}{3}$ stem, $\frac{1}{8}$ in. broad. *Umbel* in well-developed examples large, straggling, rays 4–10 up to 9 in. with radioles of secondary umbels up to 3 in., but small 1-headed examples are frequent, with all intermediate forms; bracts as long as umbel or greatly overtopping it. *Spikes* large, open, rhachis glabrous. *Spikelets* 3–16, often 1 by $\frac{1}{8}$ in., 20-fl., compressed. *Glumes* boat-shaped, ovate, obtuse, 7–11-nerved, in fruit scarcely imbricated; rhachilla slender, in fruit flexuose, wings oblong hyaline separating. *Stamens* 3; anthers linear-oblong, mucicous. *Nut* triquetrous, obtuse; style shorter than nut, slender; branches linear, slender.

Sect. 6. *Rotundi*. Tall or medium plants, stoloniferous or rhizome woody. Leaves and bracts long. Rhachilla of spikelets winged. Glumes closely imbricated. (Sp. 48–55.)

48. *C. longus*, *Linn. Sp. Pl.* 67; rhizome somewhat thick creeping, stem rather robust at top subacutely trigonous, at base oblique or decumbent not nodosely thickened nor suddenly contracted into a wiry rhizome, spikelets shortly spicate linear-oblong 6–16-fl., nut ellipsoid $\frac{1}{3}$ – $\frac{1}{2}$ length of glume. *Kunth Enum.* ii. 60; *Boeck. in Linnæa*, xxxvi. 279, var. *a*; *Boiss. Fl. Orient.* v. 375, vars. β , γ ; *C. B. Clarke* in *Journ. Linn. Soc.* xxi. 164, excl. vars. β , γ .

QUETTA, *Hamilton*. MT. ABOO, *G. King*.—DISTRIB. Westward to the Atlantic. Glabrous. *Rhizome* $\frac{1}{10}$ – $\frac{1}{8}$ in. in diam., clothed by loose ovate triangular striated brown scales. *Stems* 1–3 ft. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ stem, $\frac{1}{8}$ in. broad. *Umbel* rays 3–10, 1–10 in. long. *Spikelets* $\frac{1}{2}$ by $\frac{1}{10}$ in., slightly compressed, greenish ferruginous or chestnut-red. *Glumes* ovate, obtuse, hardly keeled, 5–7-nerved, back green, margins narrowly scarious. *Stamens* 3; anthers linear-oblong, mucicous or scarcely apiculate. Wings of *rhacheola* elliptic, hyaline, persistent. *Nut* trigonous, black; style shorter than nut, branches linear shortly exsert.—Var. *tenuiflora*, *Boeck.*, the commoner Mediterranean form is not Indian, and is scarcely included in the above description.

49. *C. stenostachyus*, *Benth. Fl. Austral.* vii. 280; tall, stolons long with distant bulbous thickenings, umbel compound compact, spikelets densely spicate suberect (otherwise nearly as *C. longus*).—Australia.

Stolons long, $\frac{1}{12}$ in. in diam. *Stems* $2\frac{1}{2}$ ft., triquetrous, at base erect somewhat bulbous. Lowest bract 12–16 in., as though a continuation of stem.—This might be esteemed a var. of *C. longus* (as by *Boeckeler*), which has the stem at base decumbent, passing into the root without a bulbous thickening, and the spikelets rectangular spreading.

Var. β *indica*; lowest bract suberect very long, spikelets ferruginous brown. *C. longus*, *Linn.*, var. *gracilis*, *Boeck. in Linnæa*, xxxvi. 281. *C. denudatus*, *Heyne*, in *Wall. Cat.* 3349, 3329, F.—DECCAN PENINSULA, *Wallich*.

50. *C. rotundus*, *Linn. Sp. Pl.* 67 (not *Linn. Herb.*); stem at base nodosely thickened suddenly constricted into a wiry rhizome (otherwise nearly as *C. longus*). *Roeb. Hort. Beng.* 5, and *Fl. Ind.* i. 197; *Kunth Enum.* ii. 58 (excl. *C. bulbosus*, *Vahl*, and others); *Boeck. in Linnæa*, xxxvi.

283; *Dalz. & Gibs. Bomb. Fl.* 283; *Thw. Enum.* 343, partly; *C. B. Clarke in Journ. Linn. Soc.* xx. 292, and xxi. 167; *Aitch. & Hems. in Trans. Linn. Soc.* ser. 2, Bot. iii. 121. *C. hexastachyus*, *Rotth. Descr. et Ic.* 28, t. 14, fig. 2; *Nees in Wight Contrib.* 81 (partly). *C. leptostachyus*, *Griff. Itin. Notes*, 321 (not of *Nees*). *C. tenuiflorus*, *Royle Ill.* 412 (not *Rotth.*).—*Cyperus*, *Wall. Cat.* 3317 A (partly), 3322, 3353, 3373. *C. albidus*, *Herb. Heyne*; *Wall. Cat.* 3356; *Rumph. Herb. Amb.* vi. 1, t. 1.

INDIA, alt. 0–6000 ft., a pestiferous weed.—DISTRIB. All warm regions.

Glabrous. *Stolons* slender, up to 4–8 in., hardening into wiry roots, thickened into black woody ovoid tubers $\frac{1}{3}$ –1 in. in diam., not (or very obscurely) zoned. *Stems* subsolitary, 4–32 in., at top triquetrous. *Leaves* long, often overtopping stem, $\frac{1}{8}$ – $\frac{1}{2}$ in. broad. *Umbel* frequently compound, primary rays 2–8 in., spikes loosely spicate of 3–8 spikelets; but umbel sometimes large, sometimes reduced to 1 head and (in a common Calcutta form) to 1 spikelet. *Spikelets* in flower or fruit undistinguishable from *C. longus*.

Var. β *centiflora*, *C. B. Clarke in Journ. Linn. Soc.* xxi. 171; spikelets elongate many-fl. often curved or twisted. MONGHYR, *Wall. Cat.* 3373 (right-hand example). The DECCAN, *G. Thomson*, n. 258.—In this (n. 258) the spikelets are $3\frac{3}{4}$ in., with 118 flowers, but all forms intermediate between this and *C. rotundus* occur.

51. **C. stoloniferus**, *Retz Obs.* iv. 10; rhizome woody long-creeping, stems at top trigonous at base nodose, umbel simple contracted or subcapitate, spikelets terete shortly spicate, glumes close-packed concave obtuse, style-branches 3 long, nut obovoid unequally trigonous somewhat curved. *Nees in Wight Contrib.* 81; *Boeck. in Linnæa*, xxxv. 489 (excl. *syn. C. tuberosus* and var. β); *C. B. Clarke in Journ. Linn. Soc.* xx. 286, and xxi. 172. *C. littoralis*, *Br. Prodr.* 216. *C. tuberosus*, *Bojer. Hort. Maurit.* 379; *Kunth Enum.* ii. 50; *Dalz. & Gibs. Bomb. Fl.* 283. *C. rotundus*, part, *Kunth l. c.* 59. *C. bulboso-stoloniferus*, *Steud. in Zoll. Verz. Ind. Archip.* ii. 62, and *Syn. Cyp.* 18. *C. conjunctus*, *Steud. Syn. Cyp.* 18. *C. lamprocarpus*, *Boeck. l. c.* 490. *C. juncifolius*, *Klein ms.*; *Wall. Cat.* 3315, A. *C. Jemenicus*, *Heyne*; *Wall. Cat.* 3315, B. *C. arenarius*, *Hance ms.*—*Cyperus*, *Wall. Cat.* 3309, mixed.

Shores of INDIA, especially in sea sand; from Sind to Ceylon, Coromandel, and the Malay Peninsula.—Nilgiri Mts., *Foulkes*. DISTRIB. Mauritius, China, Malaya, Australia.

Stolons long, hardening into the creeping rhizome, not producing tunicated bulbils. *Stems* 4–8 in. *Umbel* rays 0–1 in.; bracts usually 3, varying in length as do the leaves. *Spikelets* $\frac{1}{2}$ by $\frac{1}{2}$ in., 8–20-fl.; glumes more closely packed than in *C. rotundus*, their margins often glistening hyaline.

52. **C. Fenzelianus**, *Steud. Syn. Cyp.* 33; tall, stolons long thickish, leaves and bracts elongate, umbel large compound, spikelets (young and old) straw-colour (otherwise as *C. longus* or large *C. rotundus*). *Boeck. in Linnæa*, xxxvi. 297. *C. pallescens*, *Boiss. Fl. Orient.* v. 375 (not of *Desfont*). *C. ochreoides*, *Steud. l. c.* 34. *C. tenuiflorus*, *Balfour Socotra*, 305 (not of *Rotth.*). *C. longus* var. *pallida*, *Boeck. l. c.* 280 (excl. *C. mitis*, not of *Boiss.*). *C. longus*, vars. β *pallescens* and ϵ *elongata* (partly). *C. B. Clarke in Journ. Linn. Soc.* xxi. 165, 166. *C. rotundus*, *Boeck. in Flora*, lxii. 554.

MADRAS; Chingapuna, *G. Thomson*, n. 383.—DISTRIB. Westwd. to N. Africa.

Stems 2–3 ft., robust, at base somewhat nodose then suddenly narrowed into a creeping rhizome $\frac{1}{2}$ – $\frac{1}{4}$ in. diam. *Leaves* often nearly as long as stems, $\frac{1}{2}$ in. broad,

fleshy sometimes almost spongy, when dry convolute.—Habit and general aspect of *C. longus*, but the root of large states of *C. rotundus*. Schweinfurth, who has studied this whole series of species alive, doubts if any line can be drawn between *C. longus* and *C. rotundus*.

53. **C. subcapitatus**, *C. B. Clarke*; stems and leaves long slender, umbel as though lateral of 24 spikelets contracted or subcapitate, lowest bract long narrow as though a continuation of the stem (otherwise nearly as *C. rotundus*). *C. polystachyus*, *Rottb. Descr. et Ic.* 39, t. 11, fig. 1? —*Cyperus*, *Wight in Wall. Cat.* n. 3316.

DECCAN PENINSULA; *Wallich*. NILGHIRI HILLS; alt. 2000 ft., *Gamble*.

Stem 20 in., at top less than $\frac{1}{10}$ in. in diam., at base oblique nodosely thickened then abruptly contracted into a long slender rhizome. *Leaves* somewhat shorter than stem, $\frac{1}{8}$ – $\frac{1}{6}$ in. broad. *Umbel* rays 0– $\frac{1}{2}$ in. *Spikelets* slender, ferruginous-brown.

54. **C. tuberosus**, *Rottb. Descr. et Ic.* 28, t. 7, fig. 1, *fide Boeck.*; stolons elongate rather slender, stem tall at base bulbous woody, umbel evolute rays slender (in form *C. tenuiflorus*, sp. *Roxb.*, very slender), spikelets linear (in form *C. tenuiflor.* very slender), glumes in fruit not closely imbricated (otherwise as (*C. rotundus*), *Roxb. Hort. Beng.* 5 & *Fl. Ind.* i. 199; *Kunth Enum.* ii. 50 (in small part); *Boeck. in Linnæa*, xxxvi. 285 (excl. the Cape plants and descrip. of nut). *C. Pangorei*, *Retz. Obs.* iv. 10 (not of *Rottb.* or *Roxb.*). *C. lucidulus*, *Klein; Link. Jahrb.* iii. 86 (not of *C. B. Clarke*). *C. rotundus*, *Benth. Fl. Austral.* vii. 279 (chiefly). *C. rotundus* (*tenuiflora*) *Thw. Enum.* 343. *C. rotundus*, var. *procerula*, *C. B. Clarke in Journ. Linn. Soc.* xxi. 172 (in great part). *C. rotundus*, var. *acuta*, *Boeck. l. c.* 230. *C. tenuiflorus*, *Roxb. l. c.* 199; *Nees in Wight Contrib.* 82 (Indian plant); *Dalz. & Gibs. Bomb. Fl.* 284; *W. Wats. in E. T. Atkinson Gaz.* x. (1876), 393; *Trimen in Journ. Bot.* xxiii. 140; *C. B. Clarke in Journ. Linn. Soc.* xx. (1883), 193 and xxi. 174 (not *Rottb.* or *Boeck.*). *C. procerulus*, *Nees in Wight Contrib.* 82; *Kunth Enum.* ii. 51. *C. Retzii*, *Nees l. c.*; *Kunth l. c.* 73; *Thw. Enum.* 343. *C. hexastachyus*, *Nees l. c.* (partly). *C. Roestelii*, *Kunth l. c.* 58. *C. pertenuis*, *Bojer Hort. Maurit.* 379 (not *Roxb.*). *C. longus*, *Baker Fl. Maurit.* 411. *C. mitis*, *Steud. Cyp.* 316 (cf. *Boeck. in Flora*, 1859, p. 447). *C. procerus*, *Herb. Roxb.; Wall. Cat.* 3329, A.

CEYLON; *Thwaites*, nn. 3750, 3966, Deccan Peninsula; *Wallich*, *Wight*. BENGAL; *Wallich*, *Griffith* (*Kew Distrib.* n. 6141).—DISTRIB. Mauritius, Austral.

Equal in size to the large forms of *C. rotundus*, but has slenderer rays and spikelets. It is *C. tuberosus* of herbs of *König*, *Rottler* and *Roxburgh*; the figure of *Rottboel* (*tuberosus*) does not agree very well; but, as it is satisfactory to *Boeckeler*, and as it is impossible to identify an old picture without analyses, it saves complication to accept his identification, rather than to separate further the *C. tuberosus* of *Rottler* (and others) from that of *Rottboell*.

55. **C. esculentus**, *Linn. Sp. Pl.* 67; stem at base erect, stolons lateral long very slender bearing tubers, leaves and bracts long, spikelets yellow or yellow-brown, glumes over nearly their whole breadth plicate-striate (otherwise as *C. rotundus*). *Kunth Enum.* ii. 61; *Boeck. in Linnæa*, xxxvi. 287; *C. B. Clarke in Journ. Linn. Soc.* xx. 293 and xxi. 178. *C. Tenorii*, *Presl.; Reichb. Ic. Fl. Germ.* viii. 32, t. 281, fig. 670. *C. pumilus* and *C. jeminicus*, *Herb. Heyne; Wall. Cat.* 3354.

From the PUNJAB, *T. Thomson*, to NILGHIRI MTS., *Hohenacker*, scattered, not common.—DISTRIB. S. Europe, Afric., Americ.

Stolons exceedingly slender, with small pale scales, often disappearing after the tubers are formed; tubers (ripe) woody, more regularly zoned than those of *C. rotundus*. *Glumes* in fruit slightly rigid, so that they are less closely imbricated (than in *C. rotundus*) the spikelets more turgid.—So close to *C. rotundus* that it is much mixed with it in many herbaria.

Sect. 7. EXALTATI. Tall. *Stolons* 0. *Leaves* and bracts long. *Umbel* large compound, spikes and spikelets many. *Rhachilla* of spikelets conspicuously winged. *Anthers* apiculate, not rarely crested. *Style* (with its 3 branches) small. *Nut* small, ashy black. (Sp. 56-61.)

56. *C. radiatus*, *Vahl Enum.* ii. 369; spikes digitate scarcely peduncled long-cylindric dense, spikelets linear 12-30-fld., glumes (even in fruit) closely imbricate, wings of rhachilla oblong persistent, anthers short-oblong not crested, *Kunth Enum.* ii. 71; *Boeck. in Linnæa*, xxxvi. 317; *C. B. Clarke in Journ. Linn. Soc.* xxi. 185. *C. involucratus*, *Poir. in Lam. Encyc.* vii. 253. *C. verticillatus*, *Roxb. Fl. Ind.* i. 206; *Kunth l. c.* 71; *Nees in Wight Contrib.* 87. *C. digitatus*, *Nees l. c.* 85 (not *Roxb.*). *C. Roylei*, *Arn. in Wight Contrib.* 85 (in note); *Kunth l. c.* 100. *C. obscurus*, *Nees in Hook. Kew Journ.* vi. 27. *Cyperus*, *Wall. Cat.* 3345.

From AGRA, *Munro* to PENANG, *Curtis*; plentiful in Bengal.—DISTRIB. As., Afric., Amer.

Glabrous. *Stems* 1-3 ft. *Leaves* often $\frac{3}{4}$ stem, $\frac{1}{2}$ in. broad. *Umbel* simple or compound; spikes 1 by $\frac{1}{2}$ in., very dense. *Spikelets* commonly $\frac{1}{2}$ by $\frac{1}{10}$ in., usually dull-colrd., not bright yellow or red-brown. *Glumes* broad ovate, keeled, obtuse, 3-5-nerved on back, mucicous or sometimes mucronate. *Nut* ovoid, $\frac{2}{3}$ - $\frac{1}{2}$ length of glume; style $\frac{1}{2}$ as long as nut, branches 3 linear small.

57. *C. exaltatus*, *Retz Obs.* v. 11; spikes (some) peduncled long-cylindric, spikelets very many (not tightly crowded) linear 8-20-fld., glumes (even in fruit) closely imbricate, wings of rhachilla oblong persistent, anthers oblong not crested, *Kunth Enum.* ii. 70; *Nees in Wight Contrib.* 84 (excl. *C. fastigiatus*); *Thw. Enum.* 343; *Boeck. in Linnæa*, xxxvi. 319; *C. B. Clarke in Journ. Linn. Soc.* xxi. 186 (incl. var. β *amæna*). *C. odoratus*, *Burm. Fl. Ind.* 20, t. 8, fig. 2 (not *Linn.*). *C. venustus*, *Br. Prodr.* 217; *Kunth l. c.* 68 (partly); *Thw. Enum.* 432. *C. umbellatus*, *Roxb. Fl. Ind.* i. 205; *Dalz. & Gibs. Bomb. Fl.* 284; *Arn. in Wight Contrib.* 85 in *Obs.* (not *Benth.*). *C. alopecuroides*, *Roxb. l. c.* 208. *C. acerosus*, *Roxb. ms.*; *Arn. l. c.* 84 (in note). *C. oryzeticola*, *Steud. Syn. Cyp.* 37. *C. racemosus*, *Heyne, ms.*; *Boeck. in Flora*, lxii. 555 (not *Boeck. in Linnæa*, xxxvi. 310). *C. parviflorus*, *Heyne, ms.*, *Wall. Cat.* n. 3343, B. (cf. *Kunth Enum.* ii. 115, not of *Nees*). *Papyrus venustus*, *Schrader in Mart. Fl. Bras.* ii. (part i.) 59 in note. *C. maximus*, *elatus*, *parviflorus*, *extensus*, *spicatus*, *Herb. Heyne*; *Wall. Cat.* 3343. *C. verticillatus*, *Herb. Wight & Herb. Ham.*; *Wall. Cat.* 3343, H, I.—*Cyperus*, *Wall. Cat.* 3327, 3328.

From the PUNJAB to ASSAM and CEYLON; common.—DISTRIB. Trop. and subtrop. regions.

Stem 3-6 ft.—Hardly to be distinguished from large forms of *C. radiatus*, but by the less dense spikes. *Spikelets* often brightly coloured.

Var. β *dives*, *C. B. Clarke l. c.* 187; umbel divaricate rigid, ripe spikelets rigid hard spreading at right angles somewhat turgid, style 3-fld. *C. dives*, *Delile Fl. Egypt*, 5, t. 4, fig. 3; *Kunth Enum.* ii. 71; *C. B. Clarke l. c.* 293. *C. alopecuroides*, *Boeck. in Linnæa*, xxxvi. 322.—N. India; from Sind, *Pinwill* to Chittagong, *J. D. Hooker*.—Africa.

58. **C. Oatesii**, *C. B. Clarke*; umbel large compound, spikes (at least some) peduncled cylindric, spikelets very many distant linear 14-fld., glumes obtuse white-edged slightly inflated incurved not tightly imbricated, wings of rhachilla linear yellow soon separating, anthers oblong not crested, nut small yet nearly $\frac{2}{3}$ length of glume. *C. exaltatus*, *var. Oatesii*, *C. B. Clarke in Journ. Linn. Soc.* xxi. 188.

BURMA; Thyat Myo, *Oates*.

Very like slender forms of *C. exaltatus*, but differing especially in the very narrowly lanceolate yellow deciduous wings of the rhachilla.

59. **C. digitatus**, *Roxb. Fl. Ind.* i. 205; stem tall at top triquetrous, umbel large compound rays divaricate, spikes cylindric, spikelets very many linear 6-40-fld., wings of rhachilla lanceolate yellow soon deciduous, anthers linear-oblong scarcely crested, nut oblong-obovoid $\frac{1}{2}$ length of glume. *C. auricomus*, *Benth. Fl. Austral.* vii. 286; *C. B. Clarke in Journ. Linn. Soc.* xxi. 188 (partly, scarcely of Sieber). *C. venustus*, *Nees in Wight Contrib.* 86 (descr. erroneous); *Kunth Enum.* ii. 68 (chiefly); *Boeck. in Linnæa*, xxxvi. 316 (partly) (not Br.). *C. Neesii*, *Kunth l.c.* 101 (excl. syn. *Linn.*); *Boeck. in Linnæa*, xxxvi. 315; *Trimen in Journ. Bot.* xxiii. 140. *C. racemosus*, *Retz* (??) (fid *Arn. in Wight Contrib.* 85 in *Obs.* *C. quinqueflorus*, *Steud. (Herb. propr.) Syn. Cyp.* 37 (partly). *C. tuberiferus*, *Schrad.*; *Steud. l.c.* 41. *Papyrus venustus*, *Nees in Linnæa*, x. 138.—*Mariscus*, *Wall. Cat.* 3429, 3438.

From the PUNJAB to ASSAM, CEYLON, and PENANG.—DISTRIB. Tropics.

Glabrous (even the rhachis of spikes). Stem $1\frac{1}{2}$ -4 $\frac{1}{2}$ ft. Leaves often as long as stem, $\frac{1}{2}$ - $\frac{2}{3}$ in. broad. Umbel 8-24 in. in diam.; bracts usually longer than umbel. Secondary umbels usually conspicuously bracteoid; spikes corymbose, shortly peduncled. Spikelets often $\frac{1}{3}$ - $\frac{1}{2}$ by $\frac{1}{10}$ - $\frac{1}{12}$ in., very variable in size, yellow golden rufous or brown. Glumes boat-shaped, ovate, scarcely mucronate.—The African *C. auricomus*, Sieber, with which this was united by Benckham, is very closely allied, but differs by the stem sub-3-winged at top, the irregular umbel and other small points.

Var. β Hookeri (sp.) *Boeck. in Linnæa*, xxxvi. 308; spikelets somewhat broader rigid very densely spicate ultimately bright brown, nut a little more acuminate at top. *C. Neesii*, *Thw. Enum.* 344; *C. B. Clarke in Journ. Linn. Soc.* xxi. 189 in *Obs.* (scarcely of *Kunth*). *C. auricomus*, *var. khasiana*, *C. B. Clarke l.c.* 188 and 81. *Papyrus elatus*, *Nees in Wight Contrib.* 88 (not *Cyperus elatus*, *Linna.*).—From the Khasia Hills, alt. 4000 ft., to Ceylon.

60. **C. elatus**, *Linn. Sp. Pl.* 67; tall, leaves and bracts long, broad, umbel large compound, spikes narrow cylindric dense with brown suberect spikelets, spikelets linear 14-fld., wings of rhachilla lanceolate yellow caducous, anthers narrow oblong, crest $\frac{1}{3}$ - $\frac{1}{2}$ length of anthers, nut $\frac{1}{3}$ - $\frac{2}{3}$ length of glume. *C. B. Clarke in Journ. Linn. Soc.* xxi. 189. *C. racemosus*, *Retz Obs.* vi. 20?; *Nees in Wight Contrib.* 85; *Kunth Enum.* ii. 100; *Boeck. in Linnæa*, xxxvi. 310.—*Cyperus*, *Wall. Cat.* 3341, A.

DECCAN PENINSULA; *Wight*. PENANG; *Wallich*.—DISTRIB. Malaya.

Stem 3-4 ft. Leaves nearly as long, $\frac{1}{2}$ in. broad. Primary rays of umbel 6 in.

Var. ? macronus, *C. B. Clarke l.c.* 190; larger, with still larger umbel, nut nearly as long as glume.—Bengal; Comilla, *C. B. Clarke*.—Leaves $\frac{3}{4}$ in. broad, two lateral nerves above strongly marked, keel beneath scabrous cutting. Primary rays of umbel 10 in.

61. **C. platyphyllus**, *Roem. & Sch. Syst.* ii. 876; very large, leaves

and bracts very long broad, umbel very large, spikes long linear-cylindric, spikelets linear subterete suberect dirty straw-colour, wings of rhacheola broad-lanceolate yellow separating, crest of anthers $\frac{1}{2}$ – $\frac{2}{3}$ length of cells. *C. B. Clarke in Journ. Linn. Soc.* xxi. 190. *C. elatus*, *Roxb. Fl. Ind. i.* 204 (not of Linn.). *C. maximus*, *Roxb. ms.* *C. fastigiatus*, *Rottl. in Neu. Schr. Gesell. Freunde Berlin*, iv. 210 (not of Rottb.). *C. eminens*, *Klein, ms.*; *Kunth Enum.* ii. 70; *Boeck. in Linnæa*, xxxvi. 312. *C. Roxburghii*, *Nees in Wight Contrib.* 84; *Kunth l.c.* 99; *Thw. Enum.* 843. *Papyrus latifolius*, *Willd. in Abhandl. Akad. Berol.* (1816), 74.—*Cyperus*, *Wall. Cat.* 3341, B.

DECCAN PENINSULA; *Rottler*, &c. CEYLON; *Thwaites* (n. 3041).

Stem 6 ft., sometimes more, at top triquetrous, scabrous, angles cutting. *Leaves* often 1 in. broad, two lateral nerves prominent above, whitish underneath, often scabrous on keel. *Primary rays of umbel* 8–10 in. *Spikes* 4 in.

RESIDUARY SPECIES.

C. BRUNNESCENS, *Boeck. Cyp. Nov.* ii. 3; robust, wholly brown-fuscons, umbel simple 6–8 in. diam., spikelets oblong obtuse, glumes 8–10-striate with recurved mucro, style very slender deeply 3-fid. Singapore; *Voight*.

C. CORONARIUS, *Kunth Enum.* ii. 44. (*Scirpus coronarius*, *Vahl Enum.* ii. 261. *Isolepis coronaria*, *Roem. & Sch. Syst.* ii. 113.) Bengal. Style trifid, *Kunth*; *bifid*, *Vahl*, “Resembles *Kyllingia monocephalæ*” *Vahl*.

C. CYLINDRICUS, *Boeck. in Flora*, xlii. 437 bis.—IND. ORIENT. “Very like *C. Wallichianus*, *Spreng.*,” *Boeckeler*. But *C. Wallichianus*, *Spreng.* has been inscrutable to botanists (see *Kunth Enum.* ii. 98) nor is it known where *Boeckeler* has elucidated it.

C. INDICUS, *Boeck. Cyp. Nov.* i. 6 (not of *Persoon*); 2 ft., umbel compound 6 in. diam., spikes dense cylindric, style deeply 3-fid, rhacheola narrowly winged.—Himalaya; Bulwascher Valley, alt. 2000 ft., and Jubbulpore, alt. 1000 ft., *O. Kuntze* (“Near *Cyp. chilensis*,” *Boeck.*).

C. PUSILLUS, *Vahl Enum.* ii. 303, i.e. *C. pygmæus*, *Retz. Obs.* iv. 9.—Traquebar.

C. RIGIDULUS, *Vahl Enum.* ii. 342.—Ind. Orient.

C. SETIFOLIUS, *Don Prodr.* 38.—Nepaul.

C. SPONGIOSO-VAGINATUS, *Boeck. Cyp. Nov.* i. 6; tall, umbel compound, spikelets loosely spicate, wings of rhachilla linear-oblong cuspidate yellow soon separating.—BENGAL; *O. Kuntze*.—Perhaps *C. digitatus* or *C. Oatesii*.

C. TENER, *Vahl Enum.* ii. 299.—Ind. Orient.—“*Isolepidis* sp. 2.” *Kunth*.

C. TRISULCUS, *Don Prodr.* 39.—Nepaul.

C. UMBELLATUS, *Burm. Fl. Ind.* 21, t. 9, fig. 1. (not *Roxb.*).—Perhaps grass.

C. WALLICHIANUS, *Spreng. Syst. Cur. Post.* 28 (*C. pulcher*, *Don Prodr.* 38).—Nepaul.

5. MARISCUS, *Vahl*.

Leaves and bracts grass-like. *Glumes* persistent, 2 lowest empty, 1–12 succeeding bisexual nut-bearing; rhacheola disarticulating above the 2 lowest empty glumes leaving a knob.—Otherwise as *Cyperus*.—Sp. 160, warm regions.

Subg. I. BULBOCAULIS. Base of stem oblong thickened by the turgid membranous coloured sheaths. (Sp. 1–2.)

1. **M. Dregeanus**, *Kunth Enum.* ii. 120; stolons 0, umbel contracted into 1 very dense ovoid head, spikelets ovoid bearing 2-6 nuts. *M. irroratus*, *Nees in Hook. Kew Journ.* vi. 28. *M. kyllingæformis*, *Boeck. in Flora*, xlii. 443, 496 (*style wrongly 2-fid.*). *Cyperus dubius*, *Rottb. in Neu Schr. Gesell. Freunde Berlin*, iv. 193; *Roxb. Fl. Ind.* i. 189. *Wall. Cat.* 3326; *Nees in Wight Contrib.* 85; *Thw. Enum.* 344; *Boeck. in Linnæa*, xxxvi. 336 (*in small part*); *C. B. Clarke in Journ. Linn. Soc.* xx. 285 and xxi. 197 (*not of Rottb.*). *C. kyllingæoides*, *Vahl Enum.* ii. 312; *Kunth Enum.* ii. 94. *C. cruentus*, *Boeck. l. c.* 338 (*not of Roxb.*). *Scirpus glomeratus*, *Linn. Sp. Pl.* 32. *Schœnus coloratus*, var. β *Linn. Sp. Pl.* ed. ii. 64. *Sch. niveus*, *Linn. Syst. Veget.* (ed. xiii.), 81.

LOWER BENGAL; *Wallich*. S. DECCAN; up to 5000 ft.; *Rottler, Wight*. CEYLON; *Thwaites*, C.P. 855, 2942, &c. MALAY PENINSULA; from Pegu, SINGAPORE. DISTRIB. *Afric.*, Borneo.

Glabrous. *Stems* 4-16 in., at top triquetrous, rather slender; lowest persistent as torn fibrils. *Leaves* often as long as stems, $\frac{1}{2}$ - $\frac{1}{3}$ in. broad, weak; sheath dilated, ferruginous or reddish. *Inflorescence* $\frac{1}{2}$ in. in diam.; bracts 3-5, up to 4-6 in. long, leaf-like. *Spikelets* numerous, $\frac{1}{2}$ - $\frac{1}{3}$ in. long, nearly terete; nodes of rachilla short with elliptic wings. *Nut-bearing glume* ovate, blunt, triangular, 14-19-nerved. *Stamens* 3-2; anthers linear-oblong, muticous. *Nut* oblong or somewhat obovoid, trigonous, ashy black, $\frac{2}{3}$ - $\frac{1}{2}$ length of glume; style shorter than nut; branches linear, somewhat long.—*Cyperus dubius*, *Rottb. Descr. et Ic.* 20, t. 4, fig. 5, brought here by all authors, is a *Kyllinga*, probably *K. brevifolia*, *Rottb.*; the general appearance of the head will not do for *M. Dregeanus*; also in *Kyllinga* the style is always 2-fid, in *Mariscus* always 3-fid.

2. **M. bulbosus**, *C. B. Clarke* (*not of Steud.*); stolons slender, umbel simple with short rays or subcapitate, spikes cylindric dense pale, spikelets broad-oblong, bearing 1 nut. *M. pictus*, *Nees in Wight Contrib.* 90 (*partly*). *Kyllinga bulbosa*, *Kœnig ms.*; *Vahl Enum.* ii. 376, *in note*; *Roem. & Sch. Syst.* ii. 247, *in Obs.* (*not of Beauv.*).—*Mariscus*, *Wall. Cat.* 3435 C (*mainly*). *Kyllinga*, *Wall. Cat.* 3441 A (*partly*).

DECCAN PENINSULA, *Rottler, Heyne*; Palavarum to Permacoil, in the hills, *Wight*; N. Canara, *Young*.

Glabrous. *Stems* 3-8 in., thickish, trigonous, striate; stolons elongate, $\frac{1}{5}$ in. in diam., clothed by oblong striate pale-brown scales. *Leaves* as long as stem, $\frac{1}{3}$ - $\frac{1}{2}$ in. broad; lower sheaths much inflated, striated, brown. *Spikes* about 7, on rays 0- $\frac{1}{2}$ in., up to $\frac{2}{3}$ by $\frac{1}{4}$ in.; bracts 5-7, up to 4-7 in., leaf-like. *Spikelets* $\frac{1}{2}$ - $\frac{1}{3}$ in., spreading at right angles. *Nut-bearing glume* ovate, acute, 11-17-striate, straw-colour. *Nut* ellipsoid, trigonous, black-chestnut, $\frac{2}{3}$ length of glume.

Subgen. II. EU-MARISCUS. Base of *stems* not oblong thickened by much dilated leaf-sheaths (though often shortly nodose). *Rhacheola* of spikelets only breaking up at one node, viz. that above the two lowest empty glumes.

Sect. 1. Umbellati. *Leaves green. Spikelets green or becoming yellow, bearing 1-2 (very rarely 3) nuts. Lowest glume of spikelet (bracteole of some) very acute, aristate.*—[Nearly all are considered by Bentham as varieties of his *Cyp. umbellatus*.] (Sp. 3-7.)

3. **M. paniceus**, *Vahl Enum.* ii., *partly*; stolons long slender, umbel simple, bracts 4-5 long, rays unequal usually short, spikes solitary cylindric dense ebracteate, spikelets small 1-fid., in fruit broad-lanceolate trigonous curved more or less recurved. *Nees in Wight Contrib.* 89;

Kunth Enum. ii. 119 (in small part). *M. Wallichianus*, *Kunth l.c.* 117. *M. Pullu*, *Steud. Syn. Cyp.* 66. *Kyllinga panicea*, *Rottb. Descr. et Ic.* 15, t. 4, fig. 1. *Cyperus paniceus*, *Boeck. in Linnæa*, xxxvi. 381 (fig. of *Rottler* only). *C. umbellatus*, *Thw. Enum.* 345 (not of *Roxb.*). *C. umbellatus*, var. *panicea*, *C. B. Clarke in Journ. Linn. Soc.* xx. 296, and xxi. 201.—*Mariscus*, *Wall. Cat.* 3433, 3435, partly, 3437 B, partly.

From LOWER BENGAL to CEYLON.—DISTRIB. Mauritius.

Glabrous, slender. *Stolons* 2–3 by $\frac{1}{25}$ in., clothed by lanceolate striate rich-brown scales. *Stems* 4–12 in., trigonous, nodose at base. *Leaves* often as long as stem, $\frac{1}{8}$ – $\frac{1}{6}$ in. broad, flaccid. *Rays* of umbel 0–1 $\frac{1}{2}$ in.; bracts often 4 in., leaf-like. *Spikes* $\frac{1}{2}$ by $\frac{1}{2}$ in., exactly cylindric, ultimately pale. *Spikelets* (ripe) $\frac{1}{8}$ by $\frac{1}{25}$ in., apparently 4-glumed; 2 lowest glumes empty, persistent; 3rd glume nut-bearing, ovate, deciduous, its upper margins broad scarious nerveless enclosing nut; 4th glume (really the rhacheola of the upper suppressed flower), lanceolate, tip rudimentary glume) elongated. *Nut* oblong, trigonous, black, $\frac{2}{3}$ length of glume.

Var. β *Roxburghiana*; larger, stems up to 2 ft., rays of umbel up to 2 in., bracts 5–7, spikelets larger $\frac{1}{2}$ in. long (1-fl.). *M. cyperinus*, *Nees in Wight Contrib.* 90, var. *a* (not of *Vahl*). *Kyllinga umbellata*, *Roxb. Ic. Ined.* t. 191. *Scirpus echinatus*, *Linn. Sp. Pl.* 50, the Ceylon plant, see *Trimen in Journ. Linn. Soc.* xxiv. 135.—*Mariscus*, *Wall. Cat.* 3434, 3435 B (partly).—From Simla to Ceylon.—DISTRIB. Java.—*Rhachilla* (above the nut-bearing glume) winged, as long as nut, terminated by a rudimentary glume or by a very small triangular-lanceolate plate.

4. ***M. cyperinus***, *Vahl Enum.* ii. 377; rhizome hardly any, umbel simple, bracts 5–7 long, rays short or curved, spikes solitary broad-cylindric dense, spikelets linear-lanceolate usually 2-fl. in fruit suberect brown-green. *Nees in Wight Contrib.* 90 (β only). *M. umbellatus*, *Moritzzi Verz. Zoll. Pfl.* 98; *Zoll. Verz. Ind. Archip.* ii. 63. *M. sundaicus*, *Miq. Fl. Ind. Bat.* iii. 289. *Kyllinga cyperina*, *Retz Obs.* vi. 21. *Cyperus umbellatus*, *Benth. Fl. Hongk.* 386; *Thw. Enum.* 345 (partly). *C. paniceus*, *Boeck. in Linnæa*, xxxvi. 381 (the 2-fl. Java plants). *C. umbellatus forma cyperina*, *C. B. Clarke in Journ. Linn. Soc.* xxi. 200.—*Mariscus*, *Wall. Cat.* 3431, 3435 A, partly, 3436.

NORTH-WEST INDIA; Moradabad, Thomson. COROMANDEL, *Roxburgh*, &c. CEYLON, *Thwaites*. MALAY PENINSULA, *Griffith*, &c.—DISTRIB. As. trop., Polynesia.

Glabrous. *Rhizome* perennial, hardly $\frac{2}{8}$ in. *Rays* of umbel 5–10, rigid, acutely triquetrous. *Spikes* $\frac{2}{3}$ by $\frac{1}{2}$ in., ebracteate. *Spikelets* $\frac{1}{2}$ by $\frac{1}{20}$ in., in fruit obliquely erect, dusky reddish-green.—Otherwise as *M. paniceus*.

Var. β *bengalensis*; umbel contracted into 1 head, spikes shortly cylindric or ovoid, spikelets linear bearing 2–4 nuts in fruit spreading at right angles. *C. Andersonianus*, *Boeck. in Engler Jahrb.* v. 502 (from *descript.*).—*Mariscus*, *Wall. Cat.* 3437 F. Bengal, alt. 0–4000 ft.; UPPER ASSAM, Sikkim, and KHASIA HILLS.—Stems 1–2 ft., stronger. *Inflorescence* $\frac{2}{3}$ –1 $\frac{1}{2}$ in. in diam. *Spikelets* $\frac{1}{2}$ by $\frac{1}{16}$ in.; glumes (with ripe nuts) somewhat distant.

5. ***M. pictus***, *Nees in Wight Contrib.* 90 (chiefly); rhizome short, umbel simple contracted, bracts long, spikes solitary cylindric dense, spikelets linear-oblong bearing 1 nut suberect yellow in fruit, rhacheola very short. *Cyperus pictus*, *Wallich ms.* *C. umbellatus*, *Thwaites Enum.* 345 (partly). *C. paniceus*, *Boeck. in Linnæa*, xxxvi. 327 (partly). *C. umbellatus*, var. *a* typical (partly), *C. B. Clarke in Journ. Linn. Soc.* xxi. 200 (not var. γ *picta*, 201).—*Mariscus*, *Wall. Cat.* 3435 A (partly).

DECCAN PENINSULA, *Heyne*, &c.

Resembles *M. cyperinus* or *paniceus* β , but differs much in the structure of

the spikelet; the nut is formed as usual in the 3rd glume, the rhacheola above its base is exceedingly short, while the 4th glume (usually containing a barren flower) is well developed.—The ripe nut thus is contained apparently by the 3rd and 4th glumes, not by the 3rd glume and the rhacheola.

6. *M. tenuifolius*, Schrad. in Mart. Fl. Bras. ii. (pars 1) 46; stolons slender, umbel simple contracted, spikes solitary cylindric or ovoid loose, spikelets usually bearing 2 nuts dusky-green ultimately suberect. *C. umbellatus*, Thw. Enum. 345 (partly). *C. umbellatus*, var. *laxata*, C. B. Clarke in Journ. Linn. Soc. xxi. 201.—*Mariscus*, Wall. Cat. 3432.

DECCAN PENINSULA, Wallich, &c. MONGHIB, Wallich. MALACCA, Griffith, Kew, n. 6241.

Stolons scarcely $\frac{1}{5}$ in. in diam., clothed by lanceolate striate scales. *Stems* slender. *Leaves* very narrow. *Rays* of umbel 0-1 in. *Spikelets* bearing 1-3 (mostly 2) nuts.—From the stolons this plant is usually mixed with *M. panicus*, but from the structure of the spikelets it must be more closely allied to *M. pictus*.

7. *M. Sieberianus*, Nees in Linnæa, ix. 286; rhizome short, umbel simple, bracts 5-10, rays 5-12 up to 1-4 in. ultimately straight, fruiting spikes exactly cylindric, fruiting spikelets linear-lanceolate (or lanceolate) bearing 2-1 nuts dense yellow or pale divaricate on all sides at right angles, nut linear-oblong or oblong (cf. the 3 vars.). *M. umbellatus*, Vahl Enum. ii. 376 (partly); Nees in Wight Contrib. 90 (chiefly); Kunth Enum. ii. 118 (chiefly); Strachey Cat. Pl. Kumaon, 74; E. T. Atkinson Gaz. x. [1876] 622; Dalz. & Gibs. Bomb. Fl. 285. *M. cyperinus*, Nees in Wight Contrib. 90, var. *a* (& var. *β* partly, i. e. plant of Sieber); Royle Ill. 412. *M. panicus*, Strachey, 74; E. T. Atkins. l. c. 622. *Scirpus cyperoides*, Linn. Mant. 181. *Kyllinga umbellata*, Roxb. Fl. Ind. i. 182 (scarcely of Rottb.). *Cyperus umbellatus*, Miq. in Ann. Mus. Lugd. Bat. ii. 142. *C. umbellatus*, var. *a* (partly) & *ε*, C. B. Clarke in Journ. Linn. Soc. xxi. 201. *C. ovularis*, Boeck. in Linnæa, xxxvi. [1869-70], var. *a* (partly, not of Torrey). *C. cylindrostachys*, Boeck. l. c. 383 (chiefly). *C. Stendelianus*, Boeck. in Engler Jahrb. v. [1884] 91.—*Mariscus*, Wall. Cat. 3437 (mainly).

From NORTH-WEST HIMALAYA, alt. 0-6000 ft., and ASSAM to CEYLON and SINGAPORE.—DISTRIB. Warm regions of Old World.

Glabrous. *Stems* 1-2½ ft. *Leaves* often nearly as long as stem, $\frac{1}{8}$ - $\frac{1}{6}$ in. broad, rather weak. *Umbel* 1-5 in. in diam; rays ultimately very straight (not curved as in *M. cyperinus*). *Spikes* solitary (see, however, var. *γ*), often 1 by $\frac{1}{2}$ in.; bracteoles inconspicuous. *Spikelets* sometimes 1—sometimes 2-fl., varying in length accordingly. *Nut* trigonous, chestnut-colrd., $\frac{2}{3}$ - $\frac{3}{4}$ length of glume.—*M. umbellatus* is *Kyllinga umbellata*, Rottb. Descr. et Ic. 15, t. 4, fig. 2, a plant abundant in Africa and very close to *M. Sieberianus*, but has smaller shorter more bracteate spikes, fuscous-green when ripe.

Var. *β evolution*; spikelets linear bearing 2-4 nuts. *M. corymbosus*, Boeck. in Flora, xli. 409? *Cyperus umbellatus*, var. *ε cylindrostachys*, C. B. Clarke, Journ. l. c. 201 (chiefly). *C. biglumis*, C. B. Clarke l. c. 199 (partly), (scarcely *Mariscus biglumis*, Guertner).—Throughout India (except Madras?).—DISTRIB. Tropics.

Var. *γ subcomposita*; spikes often digitate on the rays bracteolate. *M. biglumis*, Gaertn. Fruct. i. 12, t. 2, fig. 8; C. B. Clarke l. c. 199 (partly).—Kumaon, alt. 5000 ft., Strachey. MADRAS PENINSULA (?), Wall. Cat. n. 3437 E.—Japan, Polynesia.—Rheede Hort. Mal. xii. 119, t. 63, usually brought here differs by the spikes not exactly cylindric, the spikelets not spreading at right angles; and is, perhaps, *M. cyperinus* drawn a little too large.

Var. ? *δ khasiana*; spikelets small obtuse yellow bearing 1 deciduous nut.—East Bengal, *Griffith*; Khasia Hills; Shillong, alt. 4000 ft., *C. B. Clarke*.

Sect. 2. *Pseudo-cyperus*. *Glumes in fruit scarcely imbricate (but persistent)*. *Spikelets bearing 4 (or more) nuts*. (Sp. 8–10.)

8. **M. ischnos**, *C. B. Clarke*; umbel of 1–3 spikes nearly (or quite) agglomerated into 1 head, spikelets oblong bearing 4–7 nuts dirty-white, rhacheola very narrowly winged, nut oblong-ellipsoid $\frac{1}{2}$ length of glume. *Cyperus ischnos*, *Schlecht. in Bot. Zeit.* vii. 99; *Boeck. in Linnæa*, xxxvi. 280.

NILGHIRI and KURG HILLS, *G. Thomson* (the single Old World example).—DISTRIB. Trop. America.

Nearly glabrous. *Rhizome* short. *Stems* 1–2 ft., slender. *Inflorescence* $\frac{1}{4}$ in. in diam., ovoid, dense. *Spikelets* $\frac{1}{4}$ by $\frac{1}{12}$ in. Nut-bearing *glumes* elliptic-oblong, obscurely 9-nerved. *Style* short; branches 3, linear.

9. **M. Hookerianus**, *C. B. Clarke*; umbel of 7 cylindric dense spikes, rays scarcely any, spikelets oblong bearing 4 nuts dirty-white, wings of rhachilla lanceolate deciduous, nut oblong-ellipsoid as long as glume.

SIKKIM; in hot valleys, *J. D. Hooker*.

Glabrous. *Rhizome* (seen) horizontal, woody, rather slender. *Stems* approximate, 20 in. *Leaves* 8–12 by $\frac{1}{8}$ in. *Umbel* $1\frac{1}{2}$ in. in diam.; rays 0– $\frac{1}{4}$ in.; bracts 4, up to 6 in. *Spikes* $\frac{2}{3}$ by $\frac{1}{4}$ in. *Spikelets* $\frac{1}{2}$ by $\frac{1}{16}$ in., when ripe obliquely erect. Nut-bearing *glumes* obtuse, with 9–11 strong nerves. Nut trigonous; style-branches 3, linear.

10. **M. squarrosus**, *C. B. Clarke*; slender, annual, umbel subsimple spikes loose broad quadrate, spikelets divaricate linear 6–26-fld., glumes elliptic with long recurved mucro, style 3-fld, nut linear-oblong curved. *Cyperus squarrosus*, *Linn. Sp. Pl.* 66; *Rottb. Descr. et Ic.* 25, t. 6, fig. 3; *Nees in Wight Contrib.* 75; *Kunth Enum.* ii. 22; *Dalz. & Gibs. Bomb. Fl.* 281; *Boeck. in Linnæa*, xxxv. 501; *C. B. Clarke in Journ. Linn. Soc.* xx. 284, and xxi. 94 (excl. var. β). *C. maderaspatanus*, *Willd. Sp. Pl.* i. 278 (excl. syn. *Pluk.*). *C. hyalinus*, *Herb. Heyne*; *Wall. Cat.* 3313 A. *C. pusillus*, *Herb. Wight (partly)*. *Pycurus squarrosus*, *Nees in Linnæa* ix. 283.—*Cyperus*, *Wall. Cat.* 3312 D (partly).

FROM BENGAL to CEYLON, and MERGUI.—DISTRIB. Trop. Afric.

Glabrous. *Stems* 3–8 in., caespitose. *Leaves* often as long as stems, $\frac{1}{10}$ in. broad, weak. *Umbel* rays rarely up to 2 in.; bracts exceeding umbel, leaf-like. *Spikelets* 6–20 in a rather loose spike, in the common form $\frac{1}{4}$ in. 6–8-fld., sometimes nearly 1 in., 26-fld.; rhachilla dehiscing from a pulvinus above the two lowest empty glumes. *Stamen* 1. Nut about $\frac{1}{2}$ length of glume (excl. its long arista).—Rembles *Cyperus aristatus*, *Rottb.*, with which it was mixed by Linnæus, and by many authors since.

Sect. 3. *Turgiduli*. *Spikelets oblong or subovoid, hardly compressed*. *Umbels compound*. *Robust plants with coarse leaves*. (Sp. 11.)

11. **M. albescens**, *Gaud. in Freyc. Voy. Bot.* 415; leaves somewhat thick transversely lineolate, spikelets closely approximate hardly congested somewhat turgid oblong bearing 3–6 nuts, glumes obtuse, nut short broad ovoid. *Cyperus pennatus*, *Lam. Ill.* i. 144; *Kunth Enum.* ii. 80; *Thw. Enum.* 343; *C. B. Clarke in Journ. Linn. Soc.* xxi. 194. *C. canescens*, *Vahl Enum.* ii. 355 (excl. syn. *Rheede*); *Nees in Wight Contrib.* 84; *Kurz*

Veget. Andamans, 54; *Boeck. in Linnæa*, xxxvi. 340.—*Cyperus*, *Wall. Cat.* 3359 (mainly).—*Rheede Hort. Mal.* xii. 103, t. 55.

From BENGAL to CEYLON and SINGAPORE.—DISTRIB. Trop. Afric., Malaya, Austral., Polynes.—mostly near the sea.

Stems 1–3 feet. *Leaves* often nearly as long as stem, $\frac{1}{3}$ in. broad. Rays of *umbel* often 4 in. *Spikes* cylindric or ovoid, cinnamonaceous-red or brown or straw-colour.

Sect. 4. Flabelliformes. *Spikelets* subulate, bearing 4–14 nuts.

12. **M. microcephalus**, *Presl. Rel. Haenk.* i. 182; large, leaves and bracts spongy, umbel compound or decompound, spikes stellately globose brown, spikelets straight, glumes obtuse rather remote, nut narrowly obovoid top conic almost beaked. *M. dilutus*, *Nees in Wight Contrib.* 90. *M. giganteus*, *Boeck. in Flora*, xlii. 443. *Cyperus compactus*, *Retz Obs.* v. 10, *fide Kunth*. *C. dilutus*, *Vahl Enum.* ii. 357; *Kunth Enum.* ii. 92; *Thw. Enum.* 344; *Boeck. in Linnæa*, xxxvi. 354; *Kurz Rep. Andamans*, 54, and in *Journ. As. Soc. xlv.* (part 2) 158; *C. B. Clarke in Journ. Linn. Soc.* xxi. 193. *C. spinulosus*, *Roxb. Fl. Ind.* i. 203.—*Mariscus*, *Wall. Cat.* 3430, 3439.

Throughout INDIA, alt. C–3000 ft.; from MUSSOOREE and ASSAM to CEYLON and PENANG.—DISTRIB. Mauritius, China, Malaya.

Glabrous. *Rhizome* short. *Stems* 1–3 ft. *Leaves* nearly as long as stem, $\frac{1}{3}$ in. broad. *Umbel* often 8–12 in. in diam.; spikes of 20–40 spikelets. *Spikelets* sometimes $\frac{2}{3}$ by $\frac{1}{2}$ in., bearing 14 nuts, often much shorter bearing 4–8 nuts. Nut-bearing *glumes* boat-shaped with 9 faint nerves. Wings of *rhachilla* oblong, hyaline persistent.

Subg. III. TORULINIUM (*Gen. Desv.*). *Spikelets* bearing several nuts; *rhacheola* finally breaking up into joints each containing 1 nut.

13. **M. ferax**, *C. B. Clarke*; large or middle-sized, umbel usually large compound, spikelets numerous spicate linear bearing 4–16 small oblong black nuts, which fall off in the joints of *rhacheola* held by the persistent wings. *Cyperus ferax*, *L. C. Rich. in Act. Soc. Hist. Nat. Paris*, i. 106; *Kunth Enum.* ii. 89; *Boeck. in Linnæa*, xxxvi. 399; *C. B. Clarke in Journ. Linn. Soc.* xx. 295 (*excl. syn. C. lutens*), and xxi. 191. *C. odoratus*, *Forst. Prod. Ins. Austral.* 6; *Boeck. in Linnæa*, xxxvi. 407 (*not of Linn.*). *C. ferox*, *Vahl Enum.* ii. 357. *C. pennatus*, *Herb. Mus. Paris*; *Boeck. l. c.* 404 (*not of Lam.*). *Diclidium ferox*, *Schrad. in Mart. Fl. Bras.* ii., pars 1, 54.

BENGAL; Furidpore, *C. B. Clarke*. PEGU, *Kurz*, n. 2686. MERGUI, *Griffith (Kew Distrib.* nn. 6143, 6198).—DISTRIB. All warm regions.

Glabrous. *Stolons* 0; *rhizome* hardly any. *Stems* often 12–20 in., leaves nearly as long, $\frac{1}{3}$ in. broad; but small examples occur. *Umbel* very variable, from $\frac{3}{4}$ –24 in. in diam.; bracteoles (bracts to the secondary umbels) usually conspicuous, leaf-like, but sometimes (as in type of *L. C. Richard*) very small. Axis of *spikes* $\frac{1}{2}$ in. carrying about 20 spikelets which ultimately spread at right angles. *Spikelets* commonly $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{16}$ in., bearing 6–10 nuts, yellow or brown. *Glumes* quadrate-elliptic, hardly keeled, about 7-nerved; *rhachilla* (especially in fruit) usually flexuose; wings short, elliptic, ultimately becoming firmer, yellowish-brown, enfolding the nut. Nut oblong or ellipsoid, overtopping the wings; style hardly $\frac{1}{2}$ length of nut, slender; branches linear.—This abundant American species has, after several doubtfully-distinct forms have been split off as species, been described under 53 names.

6. **COURTOISIA**, *Nees*.

Glumes persistent, 2 lowest empty, 1-3 succeeding (in the Indian species) bisexual nut-bearing winged on keel; rhacheola disarticulating above the two lowest empty glumes. Otherwise as *Mariscus*.—Species 2 or 3, in Africa, Madagascar, India.

C. cyperoides, *Nees in Linnæa*, ix. [1834] 286, and in *Wight Contrib.* 92; umbel compound, spikes globose very dense yellow-brown, spikelets compressed very flat broad-elliptic containing 1-2 nuts, style 3-fid, nut narrow-oblong $\frac{2}{3}$ length of glume. *Arn. in Edinb. N. Phil. Journ.* xvii. 262; *Kunth Enum.* ii. 127; *Boeck. in Flora*, xlv. 335, and in *Linnæa*, xxxv. 434; *Benth. in Hook. Ic. Pl.* t. 1341. *Kyllinga cyperoides*, *Roxb. Fl. Ind.* i. 182. *Mariscus cyperoides*, *Dietr. Sp. Pl.* ii. 348. *Cyperus Kleinianus*, *Hochst. in Herb. Hohenack.*, n. 645. *C. glomeratus*, *Klein ms.*—*Wall. Cat.* 3537.

From SIKKIM and ASSAM to MADRAS and PEGU, alt. 0-6000 ft., frequent.—DISTRIB. Madagascar.

Glabrous, annual. *Stems* 3-16 in., caespitose. *Leaves* often as long as stem, $\frac{1}{2}$ in. broad, nearly smooth. *Umbel* rays 3-10, up to 1-4 in. long; bracts 3-7, up to 4-12 in. long; raylets of umbellules 3-5, up to 1 in.; bracteoles of umbellules often 1 in. *Spikes* $\frac{1}{4}$ - $\frac{1}{2}$ in. in diam. *Spikelets* $\frac{1}{6}$ in. *Glumes* boat-shaped, flattened; keel with a continuous glistening entire wing its whole length; sides not striate. *Stamens* 3; anthers oblong. *Nut* trigonous, acutely-pyramidal at top, almost beaked, chestnut black, smooth, outermost cells small, subquadrate. *Style* short, persistent; branches linear, much longer than style, exsert.

7. **ELEOCHARIS**, *R. Br.*

Glabrous. *Stems* simple, erect, without nodes. *Leaves* 0, sheaths few cylindric truncate or with a small unilateral subapical tooth, barren leaf-like stems often present. *Inflorescence* a single (rarely more) terminal spikelet. *Glumes* imbricate on all sides, obtuse; lowest "bract," (but not always empty), not longer than the spikelet. Lowest flower nut-bearing, perfect; many succeeding glumes usually nut-bearing, upper tabescent. Hypogynous bristles 8-5, rarely fewer (in *E. atropurpurea*, often small or 0). *Stamens* 3-1, anterior; anthers linear-oblong, not crested. *Style* linear, as long as the nut, branches 3 or 2, linear; style-base dilated, constricted or apparently articulated on the nut, but usually persistent. *Nut* obovoid, plano-convex (when style bifid) or trigonous (when style trifid).—Species 113, cosmopolitan.

Sect. I. LIMNOCHLOA, *Nees in Wight Contrib.* 114 (not of *Lestib.*); stems stout or medium; spikelets elongate, many-fid.; glumes subrigid, plano-concave, not (or scarcely) keeled, of one colour nearly.—All stoloniferous.

* *Nut* smooth (i.e. outer cells small, quadrate-hexagonal, inconspicuous). *Style* 2-3-fid.

1. **E. plantaginea**, *Br. Prod.* 224 (in note); stems robust terete transversely septate when dry, spikelet fuscous straw-colrd. hardly wider than stem, style 2-3-fid. *Mig. Fl. Ind. Bat.* iii. 302; *Thwaites Enum.* 352. *E. tumida*, *Roem. & Sch. Syst. Mant.* ii. 86. *Scirpus plantaginoides*, *Rottb. Descr. et Ic.* 45, t. 15, fig. 2. *S. plantagineus*, *Retz. Obs.* v. 14; *Roxb. Fl. Ind.* i. 212 ? *S. dubius*, *Roxb. l. c.* 215 (specimen imperfect).
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fect). *S. tumidus*, *Roxb. l. c.* *Limnochloa plantaginea* and *tumida*, *Nees in Wight Contrib.* 114. *Heleocharis plantaginea*, *Boeck. in Linnæa*, xxxvi. 474 in small part. *Eleocharis*, *Wall. Cat.* 3454 (*except B*).

From SIND, SAHARUNPORE and ASSAM to CEYLON and the MALAY PENINSULA.—DISTRIB. Tropics of Old World.

Stolons long, $\frac{1}{8}$ in. diam. *Stems* 1–3 ft., $\frac{1}{8}$ – $\frac{1}{4}$ in. diam.; slender (*Sc. plantagineus*, *Roxb.*), or stout (*Sc. tumidus*, *Roxb.*); sheaths membranous, soon torn. *Spikelet* $\frac{1}{2}$ – $1\frac{1}{4}$ by $\frac{1}{8}$ – $\frac{1}{3}$ in. (in some Madagascar examples $3\frac{1}{2}$ in. long). *Glumes* $\frac{1}{2}$ in., suberect, densely packed, obovate, with numerous striations on the back; 1–3 lowest empty persistent, lowest stouter appearing as though a continuation of the stem. *Bristles* 7, equalling or exceeding the nut, retrorsely scabrous, yellow-brown. *Nut* rather large, $\frac{1}{3}$ – $\frac{2}{5}$ of glume, biconvex or obscurely trigonous; style-base depressed conic, brown-black. The American plants referred to *plantaginea* by Boeckeler are very distinct (*E. interstincta*, Br.) (see Benth. Fl. Austral. vii. 292).

2. ***E. equisetina***, *Presl. Rel. Hænk.* i. 195; stems slender terete transversely septate when dry, spikelet fuscous straw-colrd. wider than the stem, style 2-fid.

CEYLON; *Walker, Thwaites* (C.P. 3777).—DISTRIB. N. Caledonia, Philippines.

Stems 1 foot, $\frac{1}{10}$ – $\frac{1}{8}$ in. diam.; uppermost sheath close-fitting, firm, terminated on one side by an oblong-triangular tooth. *Nut* obovoid, somewhat narrowed triangularly at top.—Perhaps a var. of *E. plantaginea*; I cannot distinguish the Ceylon from the Philippine examples.

** *Nut reticulate or trabeculate. Style 3-fid, rarely 2-fid.*

3. ***E. variegata***, *Kunth Enum.* ii. 153; stems robust nearly terete not transversely septate, glumes suberect laxly imbricate red-brown near their margin, bristles 7 retrorse scabrous about as long as the cancellate nut. *Heleocharis variegata*, *Boeck. in Linnæa*, xxxvi. 470.—Mascarene Isles.

Var. *laxiflora*, stems more slender, subtrigonus under narrower spikelet, glumes fuscous green not red brown near margin, bristles longer than finely trabeculate nut. *Scirpus laxiflorus*, *Thw. Enum.* 435.—*Eleocharis*, *Wall. Cat.* 3454, B (*partly*).

ASSAM; *Simons. SILHET*; *J. D. Hooker.* CEYLON; *Thwaites*, MALAY PENINSULA, frequent to SINGAPORE, *Kurz.*—DISTRIB. Malaya, China, Polynesia.

Stems 8–16 in.; uppermost sheath membranous, on one side ovate, subacute at top. *Spikelet* nearly 1 by $\frac{1}{2}$ in. *Glumes* $\frac{1}{2}$ in., lowest as though a continuation of the stem, persistent. *Style* 3-fid, or sometimes 2-fid. *Nut* slightly narrowed at apex, style-base conic; outer cells transversely oblong, small, superposed in 30–40 vertical series, the nut appearing longitudinally 30–40-striate.

4. ***E. ochrostachys***, *Steud. Syn. Cyp.* 80 (*not of Boeck.*); stems slender nearly terete not transversely septate many barren intermixed, spikelet slender scarcely broader than the stem, glumes suberect laxly imbricate dusky green, style 3-fid. *Heleocharis subulata*, *Boeck. in Flora*, xli. 412.

MALACCA; *Griffith.* SINGAPORE; *Ridley.*—DISTRIB. Java, Borneo.

Stems 8 by $\frac{3}{16}$ – $\frac{1}{4}$ in. *Spikelet* less than $\frac{1}{2}$ in.—This does not differ much from very slender examples of *S. variegata*, var. *laxiflora*, except by the numerous barren stems.

5. ***E. fistulosa***, *Schultes in Roem. & Sch. Syst.* ii. *Mant.* 89; stems robust not transversely septate triquetrous under the spikelet, spikelet

nearly an inch acute, bristles 6 as long as the cancellate nut retrorsely scabrous, style usually 3-fid. *E. acutangula* and *media*, *Schultes l.c.* 91. *E. planiculmis*, *Steud. Syn. Cyp.* 80; *Zoll. Verz. Ind. Archip.* ii. 62. *Scirpus fistulosus*, *Poir. Encycl.* vi. 749. *S. acutangulus* and *medius*, *Roxb. Fl. Ind.* i. 213. *Limnochloa media* and *acutangula*, *Nees in Wight Contrib.* 114. *Heleocharis fistulosa*, *Boeck. in Linnæa*, xxxvi. 472.—*Eleocharis*, *Wall. Cat.* 3453.

From NEPAL and ASSAM to BURMA and CEYLON.—DISTRIB. Tropics generally.

Stems 1–3 ft. by $\frac{1}{8}$ in. *Spikelet* scarcely broader than the stem, dusky green. *Glumes* $\frac{1}{8}$ in., suberect, obovate, rather laxly imbricate, dirty straw-colrd. *Nut* as long as $\frac{1}{2}$ glume, unequally biconvex, obovoid, top narrowed; style-base ovoid-conic; outermost cells transverse-oblong, superposed in 24–40 vertical series, nut hence longitudinally striate.

6. ***E. spiralis***, *Br. Prod.* 224 (*in note*); stems robust not transversely septate triquetrous under spikelet, spikelet $\frac{3}{4}$ –1 in. obtuse, glumes obtuse subtruncate, bristles much shorter than cancellate nut irregular smooth. *Thw. Enum.* 352 (*excl. syn. media*). *Scirpus spiralis*, *Rottb. Descr. et Ic.* 45, t. 15, fig. 1; *Roxb. Fl. Ind.* i. 212; *Wall. Cat.* 3454, B (*partly*). *S. mutatus*, *Roxb. mss.* *Limnochloa spiralis*, *Nees in Wight Contrib.* 114.

S. INDIA; not common; E. BENGAL; *Griffith*; *Kurz.* BOMBAY; *Salsette*, *Jacquemont.* DECCAN PENINSULA; *Wallich.* BURMA; *Griffith*, &c. CEYLON; *Thwaites*, &c.—DISTRIB. Mauritius?

Stems 2 ft. by $\frac{1}{8}$ – $\frac{1}{10}$ in. *Spikelet* $\frac{1}{2}$ – $\frac{1}{3}$ in. diam.; very dense, marked by a spiral line apparently i.e. the summits of the very erect close regular glumes. *Glumes* obovate, summit much depressed triangular nearly truncate. *Style* 2–3-fid. *Bristles* slender from $\frac{1}{4}$ – $\frac{1}{2}$ the length of the glume, half-obsolete. *Nut* half as long as glume; style-base often nearly confluent with nut; outermost cells shortly transversely oblong, superimposed in 36–40 vertical series, so that the nut exhibits 36–40 slender striations.

SECT. II. ELEOGENUS, *Nees in Wight Contrib.* 112 (Genus); stems slender or medium; spikelets many or few-fid., usually wider than the stems; glumes membranous, usually 1–3-nerved, keel green; style 2-fid.—*Heleocharis* (Genus), *Lestib. Essai Cyp.* 41.

7. ***E. atropurpurea***, *Kunth Enum.* ii. 151; roots fibrous, stems slender, spikelet small ovoid or subcylindric, bristles retrorsely scabrous white or 0, nut black smooth, style 2-fid base small depressed-conic white. *J. Gay in Flora* xxv. 641; *C. B. Clarke in Journ. Bot.* xxv. 269. *Scirpus atropurpureus*, *Retz. Obs.* v. 14; *Roxb. Fl. Ind.* i. 219; *Reich. Ic. Fl. Germ.* viii. 37, t. 295. *Eleogenus atropurpureus*, *Nees in Wight Contrib.* 113. *Heleocharis atropurpurea*, *Boeck. in Linnæa*, xxxvi. 454 (*excl. var. γ*).—*Isolepis*, *Wall. Cat.* 3489.

WEST HIMALAYA, alt. 3000 ft., to ASSAM and CEYLON.—DISTRIB. Tropics generally, except Malaya.

Stems 2–6 in. *Spikelet* $\frac{1}{2}$ – $\frac{1}{3}$ in., many-fid. *Glumes* broad, obtuse, black-chestnut, keel green. *Bristles* in the Indian tropical examples usually 7–5, as long as the nut, in the Himalayan (as in the European) examples 0 or very small. *Nut* minute, obovoid, compressed, as long as $\frac{1}{2}$ – $\frac{3}{4}$ glume.

8. ***E. capitata***, *Br. Prod.* 225; roots fibrous, stems somewhat slender, spikelet small dense obtuse, bristles as long as nut retrorsely scabrous brown or ferruginous, nut black smooth, style 2-fid base small depressed

pale. *Decne in Nouv. Ann. Mus.* iii. 361; *Thw. Enum.* 351'; *Dalz. & Gibs. Bomb. Fl.* 285; *Miq. Fl. Ind. Bat.* iii. 299. *Scirpus capitatus*, *Linn. (partly)*; *Roxb. F. Ind.* i. 215. *Eleogenus capitatus*, *Nees in Wight Contrib.* 112. *Heleocharis capitata*, *Boeck. in Linnæa*, xxxvi. 461.—*Isolepis*? *Wall. Cat.* 3486, 3487, A, 3493.

BEHAR and BENGAL to CEYLON and SINGAPORE, not common.—DISTRIB. Most warm countries.

Stems 2–14 in. *Spikelet* $\frac{1}{2}$ – $\frac{1}{2}$ in., pale. *Bristles* 7, or fewer. *Nut* as long as $\frac{2}{5}$ glume, compressed, obovoid.—Usually easily distinguished from *E. atropurpurea* by its larger size; but small examples can hardly be separated except by the coloured bristles (which are glistening-white in *E. atropurpurea*).

9. ***E. ovata***, *Br. Prod.* 224 (*in note*); roots fibrous, stems somewhat slender, spikelet small dense, bristles exceeding the nut retrorsely scabrous brown, nut straw-colrd. or brownish smooth, style 2-fid base broad triangular. *C. B. Clarke in Journ. Bot.* xxv. 268. *Scirpus ovatus*, *Roth. Catal.* i. 5. *Eleogenus ovatus*, *Nees in Linnæa*, ix. 294. *Heleocharis ovata*, *Boeck. in Flora*, xliii. 2, and in *Linnæa*, xxxvi. 462; *Boiss. Fl. Orient.* v. 387.

INDIA; *Wallich*, 3487 (*partly in Herb. Kew*).—DISTRIB. Tropics and temp. regions.

Very much resembles *E. capitata*, except in the colour of the nut, and the shape of the style-base.

10. ***E. palustris***, *Br. Prod.* 224 (*in note*); rhizome creeping, stems medium or stoutish, spikelet ellipsoid or cylindric dense-fld., nut yellow or brownish, style 2-fid base conical or ovoid, *Nees in Wight Contrib.* 113; *C. B. Clarke in Journ. Bot.* xxv. 267. *E. uniglumis*, *Nees l. c.* 113. *Scirpus palustris*, *Linn. Sp. Pl.* 70; *Reichb. Ic. Fl. Germ.* viii. 38, t. 297. *S. uniglumis*, *Link Jahrb.* iii. 77. *Heleocharis palustris*, *Boiss. Fl. Orient.* v. 386; *Boeck. in Linnæa*, xxxvi. 466 (excl. examples with 3-fid style).—*Eleocharis*, *Wall. Cat.* 3449, 3450, 3451, 3455.

From the W. HIMALAYA, ascending to 12,500 ft., to SIND and BENGAL.—DISTRIB. Cosmopolitan (not known from Australia, Oceania or Malaya).

Rhizome black or chestnut. *Stems* 4–20 by $\frac{1}{2}$ – $\frac{1}{2}$ in. diam.; uppermost sheath truncate, on one side sometimes triangularly produced. *Spikelet* $\frac{1}{2}$ –1 by $\frac{1}{2}$ in., chestnut or straw-colrd. *Glumes* obtuse, persistent, keel green, lowest empty about $\frac{1}{2}$ surrounding or (in form *uniglumis*) almost wholly surrounding stem. *Bristles* 6, as long as nut, retrorsely scabrous, rusty-brown, or (more frequently) reduced both in numbers and length. *Stamens* 3, but in flowers near the tabescent top of the spikelet, and in small depauperated examples, 2–1. *Nut* as long as $\frac{1}{2}$ glume, unequally biconvex, obovoid, much narrowed at top, sometimes to a very short beak; style-base contracted below on nut; outer cells of nut quadrate-hexagonal or shortly longitudinal oblong, obscure i.e. nut smooth; or very rarely cells more prominent, i.e. nut reticulated.

Sect. III. ELEOCHARIS proper.—As Sect. II. (*Eleogenus*), but style 3-fid.—*Limnochloa*, *Lestib. Essai Cyp.* 41 (*not of Nees*.)

* *Aciculares*. *Nut trabeculate* i.e. its outer transversely-oblong small cells superimposed in vertical series so that the nut appears longitudinally striate.

11. ***E. acicularis***, *Br. Prod.* 224 (*in note*); rhizome filiform, stems capillary, spikelet slender few-fld., style 3-fid, nut oblong-lanceolate straw-

colrd. *C. B. Clarke in Lond. Journ. Bot.* xxv. 270. *Scirpus acicularis*, *Linn. Sp. Pl.* 71 (partly); *Reich. Ic. Fl. Germ. t.* 294, *eleocharis*; *Boeck. in Linnæa*, xxxvi. 431. *Chætocyperus costulatus*, *Nees et Meyen Pl. Meyen*, 96.

MADRAS PENINSULA; *Rottler (Herb. Kew)*.—DISTRIB. Europe, N & E. Asia, America.

Stems 2-4 in. *Spikelet* $\frac{1}{2}$ in., with 4-6 (rarely 8-10) nuts. *Glumes* in the few-fl. spikelets subremote, lower 2-3-stichous, upper distinctly spiral. *Bristles* 3-4, white, feebly retrorse scabrid, variable in length, occasionally wanting. *Nut* as long as $\frac{1}{2}$ - $\frac{2}{3}$ the glume, polyhedral, subterete, with 12-15 longitudinal ribs; style-base small narrow bulbiform.

** *Chætariæ*. *Nut* coarsely prominently cancellate, i.e. its outer subquadrate large cells prominent.

12. **E. Chætaria**, *Roem. & Sch. Syst.* ii. 154 and *Mant.* ii. 90; roots fibrous, stems small, spikelet small few-fl., style 3-fl, nut triquetrous white truncate. *E. setacea*, *Br. Prod.* 224 (in note), not 225. *Cyperus setaceus*, *Retz. Obs.* v. 10; *Roxb. Fl. Ind.* i. 185. *Chætocyperus Limnocharis*, *Nees in Wight Contrib.* 96. *Ch. setaceus*, *Nees in Linnæa*, ix. 289; *Miq. Fl. Ind. Bat.* iii. 298; *Thw. Enum.* 351. *Heleocharis Chætaria*, *Boeck. in Linnæa*, xxxvi. 428.—*Isolepis*, *Wall. Cat.* 3485.

BENGAL to CEYLON and MALACCA.—DISTRIB. Tropics.

Rhizome 0, or sometimes nearly an inch, filiform, white. *Stems* usually 1-4 in., occasionally 6-10 in.; uppermost sheath lax, whitened, scarcely torn. *Spikelet* $\frac{1}{2}$ in., with 1-4 nuts. *Glumes* subdistichous, upper spiral. *Bristles* 6, as long as nut, retrorsely scabrous, pale, occasionally smaller or obsolete. *Nut* as long as $\frac{1}{2}$ glume, the acute angles sometimes excurrent at its shoulder, outer cells in each face in 6-10 series, sometimes perforated, style-base depressed-conic.

*** *Leiocarpicæ*. *Nut* smooth, i.e. outer cells quadrate-hexagonal or shortly longitudinal oblong obscure so that the nut is neither distinctly striated nor distinctly reticulated.

13. **E. subvivipara**, *Boeck. in Linnæa*, xxxvi. 424 (*Heleocharis*) caespitose, stems filiform, spikelet often proliferous, lower glumes 2-3-stichous, nut obovoid much narrowed at top, style 3-fl base linear-conic. *H. caespitosissima*, *Baker in Journ. Linn. Soc.* xxi. 450.

KHASIA HILLS; alt. 4-5000 ft., *C. B. Clarke*; NILGHIRI HILLS (fide *Boeckeler*).—DISTRIB. Madagascar.

Roots fibrous, or (fide *Baker*) slender stolons sometimes present. *Stems* 4-16 in.; uppermost sheath truncate. *Spikelet* $\frac{1}{4}$ - $\frac{1}{2}$ in., few-fl., sometimes longer clavate with many empty lower glumes. *Bristles* 6, as long as nut, retrorse-scabrous, pale ferruginous. *Nut* as long as $\frac{1}{2}$ - $\frac{2}{3}$ the glume, trigonous, olive, narrowed at top into an exceedingly short narrow neck; style-base very much narrower than nut, wider than neck of nut.

14. **E. afflata**, *Steud. Syn. Cyp.* 76; caespitose, stems slender uppermost sheath truncate spikelet dense sometimes proliferous, nut obovoid yellowish green, base large pyramidal, style 3-fl, *Miq. Fl. Ind. Bat.* iii. 299. *E. subprolifera*, *Steud. l. c.* 80; *Miq. Fl. Ind. Bat.* iii. 300. *Scirpus afflatus*, *Benth. Fl. Hongk.* 394. *Heleocharis subprolifera*, *Boeck. in Linnæa*, xxxvi. 426. *H. Thomsoni*, *Boeck. l. c.* 451. *H. ochrostachys*, *Boeck. l. c.* 452 (not of *Steud.*). *H. chlorocarpa*, *Boeck. in*

Flora, lxi. 1878, 34. H. Kuntzei, *Boeck. Cyp. Nov.* i. 14.—*Eleocharis* sp. n. 3, *Herb. Ind. Ord. H. f. & T. Th.*

KHASIA HILLS, alt. 0-6000 ft.; ASSAM; *Griffith*; MUNNIPORÉ, *Watt*; BURMA, *Griffith*, &c.—DISTRIB. E. Asia, Java.

Stems 4-16 in., 4-6-striate; uppermost sheath with an oblique triangular (scarcely mucronate) mouth. *Spikelet* $\frac{1}{2}$ - $\frac{3}{4}$ in., lower glumes in numerous spires. *Bristles* 6 or 5-4, as long as nut, retrorsely scabrous, pale brown. *Nut* as long as $\frac{1}{2}$ - $\frac{2}{3}$ glume, trigonous, top slightly narrowed truncate closely applied to style-base (not forming a minute neck under it).

15. ***E. congesta***, *Don Prodr.* 41; caespitose, stems slender, uppermost sheath truncate with a lateral tooth, spikelet dense sometimes proliferous, style 3-fid, nut obovoid narrowed at top yellowish brown, style-base bulbiform. *E. palustris* (? Br. vel. sp. nova) *Struchey Cat. Pl. Kumaon*, 73. *E. ovata*, *Thw. Enum.* 351 (not Br.). *Scirpus congestus*, *Spreng. Syst. Cur. post.* 27.—*Eleocharis purpurascens*, *Boeck. in Linnæa*, xxxvi. 455.

Throughout INDIA, alt. 3-6500 ft. (except Bengal). KASHMIR, *C. B. Clarke*; NEPAL, *Wallich*; CHOTA NAGPORE, *C. B. Clarke*; NILGHIRI HILLS, *Perrottet*; CEYLON; *Thwaites*.

Stems with many striations (hence nearly terete), not 4-6-striate angular (as *E. afflata*); mouth of uppermost sheath usually horizontal with a small tooth $\frac{1}{2}$ in. long excurrent horizontally below the margin then curving upwards.—Otherwise as *S. afflata*, of which this may be a Western var., often referred to *E. palustris*, from which species it widely differs in the fibrous roots, 3-fid style and trigonous nut.

16. ***E. tetraquetra***, *Nees in Wight Contrib.* 113; rhizome short, stems 4-3-quetrous, spikelet oblong-ellipsoid dense, bristles 6 longer than nut brown-red densely retrorse-scabrous subplumose, style 3-fid. *Thw. Enum.* 351. *E. erythrochlamys*, *Miq. Fl. Ind. Bat.* iii. 300. *Eleocharis tetraquetra*, *Boeck. in Linnæa*, xxxvi. 447. H. Wichurai, *Boeck. l. c.* 448. H. alta, *Boeck. Cyp. Nov.* i. 17. *Scirpus Wichurai*, *Franch. & Sav. Fl. Japon.* ii. 544 (not of *Boeck.*). S. Hakonensis and S. Onaei, *Franch. & Sav. l. c.* ii. 110, 111. S. petasatus, *Maxim. in Bull. Soc. Mosc.* liv. 64.—*Eleocharis*, *Wall. Cat.* 3452.

Throughout INDIA in the hills, alt. 1500-11,000 ft.; from KUMAON to SIKKIM, and the KHASIA HILLS to CEYLON and BURMA.—DISTRIB. E. Asia, Australia.

Rhizome usually descending, short; long slender stolons covered by scales, sometimes present. *Stems* 8 in. to nearly 3 ft.; uppermost sheath truncate, with sometimes a minute lateral tooth. *Spikelet* $\frac{1}{2}$ - $\frac{2}{3}$ in., often a fine brown. Retrorse barbs of the bristles much longer more densely placed than in other species, in evolute examples bristles quite plumose. *Nut* $\frac{1}{2}$ length of glume, trigonous, obovoid, yellowish, narrowed at top; style-base equalling $\frac{1}{2}$ - $\frac{2}{3}$ length of nut, ovoid, fuscous, scabrous.

8. **FIMBRISTYLIS**, *Vahl.*

Stems tufted, roots fibrous or woody, short; stolons 0 (except in *F. stolonifera* & *Pierotii*). *Leaves* only near base of stem. *Inflorescence* terminal, umbellate, corymbose or reduced to few (or one) spikelets. *Spikelets* solitary or clustered, many-fid. *Glumes* imbricate on all sides or (in Sect. *Abildgaardia*) lower distichous or subdistichous, uppermost nut-bearing spiral; 1-2 (rarely 3) lowest empty, several succeed-

ing with bisexual flowers deciduous, upper tabescent. *Stamens* 3 or 2-1, anterior; anthers not (or shortly) crested. *Bristles* 0. *Style* long or longish, often villous, 3- or 2-fid, deciduous (leaving no button), or persistent; style-base dilated, constricted below the dilatation. *Nut* obovoid (very rarely oblong), obtuse; gynophore more or less prominent, sometimes dilated at apex into an obscurely 3-lobed saucer.—Species 125, all warm regions.

CONSPECTUS OF THE SECTIONS (exceptions omitted).

- Sect. I. ELEOCHAROIDES. Stems with one spikelet Sp. 1-9.
- Sect. II. DICHELOSTYLIS. Style 2-fid.
 Series A. Spikelets solitary Sp. 10-26.
 Series B. Spikelets clustered Sp. 27-30.
- Sect. III. TRICHELOSTYLIS. Style 3-fid.
 Series A. Spikelets solitary Sp. 31-45.
 Series B. Spikelets clustered Sp. 46-51.
- Sect. IV. ABILDGAARDIA. Lower glumes distichous Sp. 52-58.

Sect. I. ELEOCHAROIDES, *Benth. Fl. Austral.* vii. 301. Lowest fertile glumes of the spikelet spirally imbricated; stems with 1 spikelet (1-3 in *F. polytrichoides*).

* *Style 2-fid*; *nut biconvex*.

† *Nut oblong, style subpersistent*.

1. ***F. tetragona***, *Br. Prod.* [1810] 226; stem nearly leafless, spikelet somewhat large conic dense-fld., style-branches 2 short, nut reticulate straw-cold. *Benth. Fl. Austral.* vii. 305. *F. cylindrocarpa*, *Kunth Enum.* ii. 222; *Boeck. in Linnæa*, xxxvii. 7; *Kurz in Journ. As. Soc.* xxxix. part 2. 85. *F. abjiciens*, *Steud. Syn. Cyp.* 107; *Miq. Fl. Ind. Bat.* iii. 316. *F. Arnottii*, *Thw. Enum.* 348. *Mischospora efoliata*, *Boeck. in Flora*, xliii. 113.—*Isolepis*?, *Wall. Cat.* 3490 F.

Throughout INDIA, except the North-West, alt. 0-3000 ft.; from NEPAL and BOMBAY to CEYLON and TAYOY.—DISTRIB. E. Asia, Australia.

Glabrous. *Stems* 4-24 in., tufted, obscurely quadrangular; uppermost sheath laterally mucronate or produced, sometimes up to 1-1½ in., lanceolate, coloured, hardly foliaceous. *Spikelet* ½-¾ in., terete, erect. *Glumes* oblong, truncate, scarcely mucronate, keeled, horizontally spreading; 2 or 3 lowest empty, ovate, much shorter than spike. *Stamens* 2 (rarely 3). *Style* long, flattened, villous nearly to the base. *Nut* as long as ½-¾ glume, linear-oblong, plane-convex, curved, deciduous with glume, stalked; outermost cells quadrate-hexagonal, conspicuous, in about 9 longitudinal series on each face of nut.

†† *Nut obovoid, transversely wavy wrinkled or ridged* (outermost cells longitudinally oblong).

2. ***F. acuminata***, *Vahl Enum.* ii. 285; stem leafless with one erect lanceolate spikelet, style 2-fid, nut obovoid transversely wavy wrinkled straw-cold. rarely becoming discoloured brown. *Nees in Wight Contrib.* 96; *Miq. Fl. Ind. Bat.* iii. 314; *Thw. Enum.* 348; *Boeck. in Linnæa*, xxxvii. 3. *F. acicularis*, *Br. Prod.* 226. *Scirpus scaber*, *Roeb. Fl. Ind.* i. 220. *Eleogiton scabra*, *Dietr. Sp. Pl.* ii. 99.—*Isolepis*?, *Wall. Cat.* 3487 B (*parily*), 3494.

Throughout INDIA, alt. 0-2000 ft., from KUMAON and ASSAM, to CEYLON and MALACCA.—DISTRIB. E. Asia, Malaya, Australia.

Glabrous. Stems 4-12 in., slender, obscurely quadrangular; uppermost sheath produced on one side, 0- $\frac{1}{2}$ in. Spikelet $\frac{1}{2}$ - $\frac{3}{4}$ in. Glumes ovate, scarcely mucronate, pale or chestnut with green keel; lowest 2-3 empty, much shorter than spikelet. Stamens usually 2. Style nearly as long as nut, flattened, slightly villous at top; branches shorter than style. Nut as long as $\frac{1}{2}$ - $\frac{1}{2}$ glume, biconvex, with 4-7 strong transverse ridges.

3. **F. setacea**, Benth. in Hook. Lond. Journ. Bot. ii. [1843] 239; stem bristle-like, leafless (see var.) with one slender erect lanceolate spikelet, style 2-fid, nut very small obovoid transversely wavy wrinkled white. *F. acuminata*, β minor, Miq. Fl. Ind. Bat. iii. 314; Boeck. in Linnæa, xxxvii. 4. *Isolepis cochleata*, Steud. Syn. Cyp. 100.

S. BURMA, Kurz. SINGAPORE, Kurz, Ridley.—DISTRIB. Amboyna, N. Australia.

Stem 4-6 in. Spikelet $\frac{1}{2}$ by $\frac{1}{12}$ in. Glumes pale, thin, almost (except keel) hyaline.—Differs from *F. acuminata* by its slenderness and very small nut.

Var. *brevifolia* (sp.) Steud. l. c. 72 (sub *Abildgaardia*); leaves more or less developed, sometimes nearly as long as stem.—Philippines, Australia.

4. **F. nutans**, Vahl Enum. ii. [1806] 285; stem nearly leafless, spikelet oblong or ovoid often oblique, style 2-fid, nut obovoid transversely wavy wrinkled white rarely discoloured. Nees in Wight Contrib. 96; Thw. Enum. 348; Boeck. in Linnæa, xxxvii. 5. *Scirpus nutans*, Retz Obs. iv. 12.

KHASIA HILLS, alt. 2500 ft., C. B. Clarke. BURMA, Griffith, &c. NICOBARS, Kurz. CEYLON, Thwaites, &c.—DISTRIB. Borneo, China, Australia.

Stem 8-20 in. Spikelet $\frac{1}{2}$ by $\frac{1}{2}$ in. Glumes rusty-brown, lowest a little larger, much shorter than the spikelet, deciduous.—Hardly differs from *F. acuminata* but by the rather broader, oblique spikelet.

††† Nut obovoid, smooth, reticulate (i.e. outermost cells arranged as brick-wall parenchyma).

5. **F. polytrichoides**, Vahl Enum. ii. [1806] 248; slender, glabrous, stem with 1 (rarely 2-3) ellipsoid-oblong obtuse spikelet, glumes ovate obtuse, style 2-fid, nut smooth brown-black often slightly white-scaly on shoulders. Nees in Wight Contrib. 96; Thw. Enum. 348. *F. sub-bulbosa*, Boeck. in Flora, xli. 598. *F. juncea*, Boeck. in Linnæa, xxxvii. 4 (not of Roem. & Sch.). *Scirpus polytrichoides*, Retz. Obs. iv. 11. *Isolepis*?, Wall. Cat. 3487 B (partly), C, 3532.—Rumph. Amb. vi. 17, t. 7, fig. 1.

From BENGAL to CEYLON and MALACCA, common near the sea.—DISTRIB. Tropics of Old World..

Stems 1 $\frac{1}{2}$ -8 in. Leaves about half as long as stem; sheaths glabrous or obscurely puberulous. Spikelet commonly $\frac{1}{2}$ by $\frac{1}{2}$ in. Glumes many, densely imbricate on all sides, fuscous brown; 2-3 lowest empty, often like the others, but lowest sometimes 1 in., as though a continuation of stem. Stamens 3-1. Style rather shorter than nut, glabrous, base little dilated. Nut as long as $\frac{1}{2}$ glume, obovoid, biconvex; outermost cells in about 30 rows on each face, ultimately marcescent scarious.

Var. *HALOPHILA* (sp.). Kurz ms.; stems and leaves stouter, spikelet up to $\frac{1}{2}$ by $\frac{1}{2}$ in.—BENGAL; Soondreebun, Kurz. MADRAS; Nellore, Gamble.

6. **F. tenuicula**, Boeck. in Linnæa, xxxviii. 385; stem bristle-like, sheaths hairy, spikelet cylindric-lanceolate, glumes ovate obtuse minutely

mucronate, style 2-fid, nut smooth brown obscurely white-scaly on shoulders.

SYLHET, *C. B. Clarke*. TENASSERIM, *Helper*.

Stem 4-8 in. Spikelet $\frac{1}{2}$ by $\frac{1}{10}$ in. Glumes suberect, dirty straw-colour, keel green, lowest like the others or if bracteiform shorter than spikelet. Stamens 1-2. Style below bifurcation glabrous or sparsely hairy. Nut less obtuse than that of *F. polytrichoides*; outermost cells larger, in about 15 longitudinal rows on each face of nut.—Otherwise as *F. polytrichoides*, from which it differs chiefly in its narrower acuter spikelet.

** Style 3-fid; nut trigonous.

7. ***F. pauciflora***, *Br. Prod.* 225; stem bristle-like, spikelet slender lanceolate pale, style 3-fid, nut obovoid white shoulders subtubercled. *Benth. Fl. Austral.* vii. 303. *F. filiformis*, *Kunth Enum.* ii. 221; *Miq. Fl. Ind. Bat.* iii. 314; *Boeck. in Linnæa*, xxxvii. 23. *F. pumila*, *Benth. in Hook. Lond. Journ. Bot.* ii. [1843] 239; *Miq. Fl. Ind. Bat.* iii. 315. *F. malaccana*, *Boeck. in Flora*, xli. 597. *Trichelostylis filiformis*, *Nees in Wight Contrib.* 102. *Isolepis* ? *Wall. Cat.* 3488.

From MERGUI, *Griffith*, to SINGAPORE, *Wallich*.—DISTRIB. E. Asia, Malaya, N. Australia.

Annual, glabrous. Stems 4-8 (rarely 12) in., tufted, leafless, or lower sheaths sometimes leaf-bearing (or fide Boeckeler uppermost sheath sometimes leaf-bearing). Spikelet $\frac{1}{2}$ by $\frac{1}{10}$ in. Glumes ovate, imbricate (somewhat loosely) on all sides, erect, concave, adpressed, white, subscarious, with rusty spots on the back, all falling; rhacheola scarcely hispid. Stamens frequently 2. Style below trifurcation nearly glabrous, deciduous together with its narrowly-pyramidal style-base. Nut as long as $\frac{1}{2}$ glume; outermost cells small, obscure.

8. ***F. Kingii***, *C. B. Clarke ms.*; *Boeck. Cyp. Nov.* ii. 40; stem slender hairy, spikelet ovoid-ellipsoid, glumes ovate obtuse, style 3-fid, nut obovoid dusky black minutely scabrid.

NILGHIRI HILLS, alt. 6-8000 ft.

Rhizome very short. Stems 4-12 in., tufted. Leaves as long as $\frac{1}{2}$ - $\frac{2}{3}$ stem, narrow, hairy. Spikelet $\frac{1}{2}$ in., terminal, erect, terete, dense-fid. Glumes imbricate on all sides, adpressed, concave scarcely keeled, chestnut-brown, slenderly 3-5-nerved, glabrous; lowest empty, like the others or more seldom bract-like $\frac{1}{2}$ -1 in. Stamens 3. Style long, slender, glabrous, deciduous together with its narrowly-pyramidal base; branches long. Nut as long as $\frac{1}{2}$ glume, trigonous; outermost cells small, subquadrate, lax, subpapillose, scarious.—Near the Australian *F. monandra*, *F. Mueller*.

9. ***F. subtrabeculata***, *C. B. Clarke*; stem slender, spikelet ellipsoid, glumes ovate obtuse, style 3-fid, nut obovoid straw-colrd. smooth subtrabeculate.

NILGHIRI HILLS; Pykara, alt. 5600 ft., *Gamble*.

Glabrous. Rhizome 0, or short, slender, descending nearly vertically. Stems 4-8 in., tufted. Leaves several, longish (often $\frac{1}{2}$ stem), bristle-like. Spikelet $\frac{1}{2}$ in., fine brown; bract 0 or shorter than spikelet. Glumes numerous, imbricate on all sides, concave, scarcely keeled, brown, 3-nerved, paler on back. Style long, glabrous, deciduous together with its narrowly-pyramidal base, branches long, linear. Nut as long as $\frac{2}{3}$ glume, obtuse, scarcely stalked, trigonous; outermost cells transversely oblong white not vertically superimposed in regular series; nut thus not longitudinally striate but irregularly conspicuously trabeculate.—This may be *F. sub-bulbosa*, *Boeck. Cyp. Nov.* ii. 39 (*non Flora* xli. 598) from description; but *Boeck.* says this is "allied to *F. juncea*, *Roem. & Sch.* with 2-fid style (sometimes 3-fid)."

Sect. II. DICHELOSTYLIS, *Benth. Fl. Austral.* vii. 309 (not *Dichostylis* [Genus] *Nees*). Lowest fertile glumes of the spikelet spirally imbricated; stems with many or several (depauperated examples not rarely with 1) spikelet; style 2-fid; nut biconvex; style usually flattened from front to back, often villous below its bifurcation.—This section contains all such species as are neither *Eleocharoides* nor *Abildgaardia*, and have only 2 branches to the style. In this section the style is *never* 3-fid (except *F. stolonifera*, var. β). Compare, among the species placed in *Trichelostylis*, *F. globulosa*, and *F. cymosa* in which 2-fid styles *sometimes* occur.

Series A. Spikelets all (or nearly all) solitary—*except* in *F. rigidula* often paired, in *F. diphylla* (and in other species) occasionally clustered; in *F. spathacea* the umbel is dense, sometimes congested into a head.

* Stem with few (often 3–1) spikelets.

10. ***F. schœnoides***, *Vahl Epum.* ii. 286; glabrous, stem with 1–3 middle-sized ovoid spikelets, style 2-fid, nut obovoid stalked biconvex smooth white rarely discoloured brownish. *Nees in Wight Contrib.* 97; *Thw. Enum.* 348; *Boeck. in Linnæa*, xxxvii. 5 (excl. var. β). *F. bispicata*, *Nees l. c.* 97 (mainly); *Boeck. l. c.* 6 (partly). *F. inconstans*, *Steud. Syn. Cyp.* 107. *F. polymorpha* var. *depauperata*, *Boeck. in Flora*, lviii. 111. *Scirpus schœnoides*, *Retz Obs.* v. 14. *S. monostachyus*, *Kœnig. ms.*; *Roxb. Fl. Ind.* i. 219. *S. bispicatus*, *Roxb. l. c.* 220. *Isolepis monostachya*, *Spreng. Neue Entdeck.* iii. 11. *I. bispicata*, *Roem. & Sch. Syst. Mant.* ii. 61. *I. rariflora*, *Schrad. in Roem. & Sch. l. c.* 65. *Eleogiton monostachya*, *Dietr. Sp. Pl.* ii. 97. *Abildgaardia nervosa*, *Presl. Rel. Haenk.* i. 180.—*Isolepis*?, *Wall. Cat.* 3490 (except *F*).

Throughout INDIA, alt. 0–6500 ft.—DISTRIB. S.E. Asia, N. Australia.

Rhizome 0, or rarely horizontal, very short. *Stems* 4–12 in., tufted, rather slender, striate, base often thickened. *Leaves* as long as $\frac{1}{2}$ – $\frac{3}{4}$ stem (occasionally longer than stem), narrow, edges incurved (when dry) most minutely scabrous. *Spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ in., dense-fl., pale or brown. *Glumes* ovate, obtuse, scarcely mucronate, adpressed, incurved, many-striate, rusty-brown rarely green on back; lowest empty, like the rest, or rarely bract-like with green nerve excurrent $\frac{1}{2}$ –1 in.; all caducous seriatim, leaving the rachilla minutely hairy by the ragged edges of the areoles. *Stamens* 3, rarely 2; anthers not crested. *Style* long, flattened, villous nearly to base; branches short. *Nut* as long as $\frac{1}{3}$ – $\frac{1}{2}$ glume; outermost cells very small, subquadrate obscure.—The large Khasi form, with rusty-brown spikelets $\frac{2}{3}$ in. long, is by Boeckeler added (perhaps rightly) to *F. sub-bispicata*.

11. ***F. sub-bispicata***, *Nees & Meyen, in Nov. Act. Acad. Nat. Cur. xix., Suppl.* i. 75; glabrous, stem with 1–3–6 large cylindric spikelets, style 2-fid, nut obovoid stalked biconvex smooth white or becoming brown. *Benth. Fl. Hongk.* 391. *F. japonica*, *Sieb. et Zucc. ms.*; *Steud. Syn. Cyp.* 107. *F. bispicata*, *Boeck. in Linnæa*, xxxvii. 6 (partly).

ORISSA; Pooree, *W. S. Atkinson*.—DISTRIB. China, Japan.

Stems 8–20 in. *Spikelets* up to 1 by $\frac{1}{2}$ in. *Nut* scarcely as long as $\frac{1}{4}$ glume.—The type of *Nees* and *Meyen* is an abundant East Asiatic plant near the sea, and appears distinct from *F. schœnoides* by its larger size and larger spikelet; but the species is scarcely otherwise separable, though admitted by *Bentham*.

** Stem with many or several spikelets [but, even in the case of species that have normally a compound umbel, small examples with few (sometimes with 1) spikelets occur.]

† *Nut linear-cylindric, curved.*

12. **F. dipsacea**, *Benth. in Gen. Pl.* iii. 1049; slender, umbel simple or compound of 12-1 spikelets, glumes aristate, squarrose, style longish branches 2 long. *Scirpus dipsaceus*, *Rottb. Descr. et Ic.* 56, t. 12, fig. 1; *Boeck. in Linnæa*, xxxvi. 736. *S. minimus*, *Roxb. Fl. Ind.* i. 219. *Echinolytrum dipsaceum*, *Desv. Journ. Bot.* i. 21, t. 1; *Nees in Wight Contrib.* 96. *Isolepis dipsacea*, *Roem. & Sch. Syst.* ii. 119; *Thw. Enum.* 350. *I. elachista*, *Roem. & Sch. Syst. Mant.* ii. 61. *I. verrucifera*, *Maxim. Prim. Fl. Amur.* 300.—*Isolepis*, *Wall. Cat.* 3478 A, 3479 (mainly).

From CENTRAL INDIA, BENGAL, and ASSAM, to BURMA and CEYLON.—DISTRIB. Afric., E. Asia.

Annual, nearly glabrous. *Stems* 1-6 in., tufted. *Leaves* often as long as stem, capillary. *Umbel* often 1-3 in. diam.; bracts several, often overtopping umbel. *Spikelets* $\frac{1}{2}$ in. diam., subglobose, dense with aristate glumes. *Glumes* elliptic, pale, nerve green long excurrent into a curved tail. *Stamen* 1 or 2; anthers small, oblong, not crested. *Style* slender, glabrous, branches longer than nut; style-base slightly bulbous, persistent or deciduous. Young *pistil* frequently ornamented by clavate glands, which usually disappear in fruit, but in *Wight*, n. 1865 (described in *Gen. Pl.* iii. 1049), are developed into ovoid processes nearly as wide as nut. *Nut* nearly as long as glume (omitting its arista), usually smooth pale brown, minutely transversely wavy-lined, but sometimes papillose scabrous by reason of the persistent glands.—Perhaps a distinct genus, for it is not closely allied to any other species. Most authors have placed it in *Scirpus*, Sect. *Micranthi*, to which it has little resemblance, except in the aristate squarrose glumes; the nut and style are wholly different. *Bentham* has placed it in *Fimbristylis* with which the inflorescence glumes and even nut fairly agree, but the style does not; it is often deciduous, and then sometimes leaves a minute button on the apex of nut, much as in *Bulbostylis*.

†† *Style-base with many long pendent hairs.*

13. **F. squarrosa**, *Vahl Enum.* ii. 289; slender, umbel compound, glumes shortly aristate more or less squarrose, style 2-fid, nut obovoid smooth straw-colrd. *Reichb. Ic. Fl. Germ.* viii. 44, t. 735; *Boeck. in Linnæa*, xxxvii. 10. *F. comata*, *Nees in Wight Contrib.* 102. *Scirpus aestivalis*, *Wall. in Roxb. Fl. Ind.* i. 230 (in note, not of *Retz.*). *Pogonostylis squarrosa*, *Bertol. Fl. Ital.* i. 312.—*Fimbristylis*, *Wall. Cat.* 3517 C, partly.

From KASHMIR and ASSAM to MT. ABOO and BURMA; especially in rice-fields. DISTRIB. All warm regions.

Annual; all parts pubescent, puberulous or glabrous. *Stems* 2-8 in., striate. *Leaves* as long as $\frac{1}{2}$ - $\frac{3}{4}$ stem. *Umbels* often 2-4 in. in diam., with many spikelets; bracts usually short, sometimes as long as umbel. *Spikelets* $\frac{1}{2}$ - $\frac{1}{4}$ by $\frac{1}{10}$ in. *Glumes* fuscous, keel 3-5-nerved, excurrent into a curved tail. *Stamens* often 2. *Style* small, hairy below bifurcation; from the margin of style-base hang 10-18 unicellular slender linear trichomes, as long as $\frac{1}{2}$ - $\frac{3}{4}$ nut, closely adpressed to it; style-base easily deciduous with the (then conspicuous) trichomes. *Nut* as long as $\frac{1}{4}$ glume, never conspicuously striate longitudinally.

††† *Nut obovoid, conspicuously longitudinally striate, trabeculate (by reason of the transverse short-oblong cells between the striations).*

14. **F. dichotoma**, *Vahl Enum.* ii. 287; umbel compound or decomposed, spikelets many solitary oblong angular, glumes ovate acute glabrous, style 2-fid, nut 5-9-striated on each face straw-colrd. or rarely discolrd. black-brown. *Nees in Wight Contrib.* 101; *Boeck. in Linnæa*,

xxxvii. 12 (excl. var. β , γ , *F. Royeniana* and American sp.); *Benth. Fl. Austral.* vii. 310 (excl. some syns.). *F. pallescens*, *Nees l. c.* 101; *Strachey Cat. Pl. Kumaon*, 73; *Thw. Enum.* 348. *Scirpus dichotomus*, *Linn. Sp. Pl.* 50; *Rotb. Descr. et Ic.* 57, t. 13, fig. 1. *S. annuus*, *Host Gram. Austr.* iii. 42, t. 63 (style wrongly 3-fid). *S. pallescens*, *Roxb. Fl. Ind.* i. 229.—*Fimbristylis*, *Wall. Cat.* 3511, 3515, 3516 B, 3517 A.

Throughout INDIA, alt. 0–4000 ft., especially in rice-fields.—DISTRIB. Warm regions of Old World.

Annual, pubescent or puberulous. Stems 2–10 in., tufted. Leaves often as long as stem, narrow. Umbel often 2–4 in. diam., sometimes with 9–5 spikelets only; bracts often as long as umbel. Spikelets $\frac{1}{2}$ by $\frac{1}{2}$ in., somewhat angular from the acute keels to glumes. Glumes boat-shaped, ferruginous, keel green 1–3-nerved, lowest empty more or less bract-like often pubescent. Stamens 2–1 (or 3 fide Boeckler). Style long, flattened, often villous nearly to base. Nut as long as glume, biconvex; outermost cells, shortly transversely oblong, conspicuous, vertically superimposed in 5–9 rows on each face of nut.—Closely allied to *F. diphylla*, in which the spikelets are terete, the glumes being much less keeled than in *F. dichotoma*.

15. ***F. diphylla***, *Vahl Enum.* ii. 289; tufted, roots fibrous, leaves as long as $\frac{3}{5}$ – $\frac{2}{3}$ stem, umbel compound or simple or reduced to 1 spikelet, spikelets ovoid-oblong terete, glumes glabrous, style 2-fid, nut 5–13-striated on each face straw-colrd., or rarely discolrd. brown, *Nees in Wight Contrib.* 100; *Thw. Enum.* 348. *F. laxa*, *Vahl Enum.* ii. 292. *F. tomentosa*, *Vahl l. c.* 290. *Nees l. c.* 100 & in *Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. (1843) 81. *F. glauca*, *Vahl l. c.* 288. *F. annua*, *Roem. & Sch. Syst.* ii. 95, and *Mant.* ii. 55; *Reichb. Ic. Fl. Germ.* viii. 44. *F. depauperata*, *Br. Prodr.* 227. *F. curvifolia*, *Steud. Cyp.* 116. *F. brachyphylla*, *Schultes in Roem. & Sch. Syst.* ii. *Mant.* 530. *F. foliosa*, *Link Hort. Berol.* i. 288. *F. cincta*, *Nees l. c.* 98 (in note). *F. Royeniana*, *Nees l. c.* 99. *F. ovalis*, *Nees l. c.* 98; *Thw. Enum.* 348. *F. podocarpa*, *Nees l. c.* (partly) & in *Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. (1843) 77 (partly); *Benth. Fl. Hongk.* 391. *F. communis*, *Kunth Enum.* ii. 234; *Strachey Cat. Pl. Kumaon*, 73 (excl. syns.). *F. Metzii*, *Steud. Syn. Cyp.* 127. *F. similis*, *Steud. Syn. Cyp.* 112. *F. spadicea*, *Boeck. in Flora*, xlii. 70 (not of *Vahl*). *F. pentastachya*, *Boeck. l. c.* xl. 36 & in *Linnæa*, xxxvii. 17. *F. Heynei*, *Boeck. in Flora*, xliii. 244. *F. polymorpha*, *Boeck. in Linnæa l. c.* 17 (excl. some syns.). *F. rigidula*, *Thw. l. c.* 348 (not of *Nees*). *Scirpus diphyllus*, *Retz Obs.* v. 15; *Roxb. Fl. Ind.* i. 227. *S. annuus*, *Allioni Fl. Pedem.* ii. 171, t. 88, fig. 5. *S. miliaceus*, *brevifolius*, *arvensis* and *glomeratus*, *Roxb. l. c.* 224, 226, 227. *Trichelostylis curvifolia*, *Nees l. c.* 105 (in note). *Isolepis curvifolia*, *Schrad. in Roem. & Sch. Syst.* ii. *Mant.* 70.—*Fimbristylis*, *Wall. Cat.* 3501, 3507 (mainly) 3508, 3539 (mainly) 3513, 3521 A.

Throughout INDIA, alt. 0–6000 ft.; common.—DISTRIB. All warm regions.

Glabrous or hairy. Rhizome none, or very rarely 0–1 in.; stolons 0. Stems 1–24 in.; striate, 3–5-angled (rarely compressed) under umbel. Leaves linear or filiform, obtuse or acute, glabrous or hairy, never reduced to sheaths. Umbels 1–8 in. diam.; bracts 3–4, sometimes short suberect, sometimes spreading much longer than umbel. Spikelets commonly $\frac{1}{2}$ – $\frac{3}{4}$ in. Glumes concave, glabrous (rarely minutely ciliate on margins), brown or reddish, rarely chestnut-colrd., back green; lowest 1–3 empty like the others, or rarely somewhat elongated bract-like. Stamens 3, 2 or 1. Style long, flattened, villous (at least in the upper half); branches rather short. Nut as long as $\frac{1}{2}$ glume, biconvex, obovoid, shortly stalked, smooth, almost glistening white, or in the Malay examples slightly tubercular on shoulders.—As

limited here, this is one of the most widespread weeds in the world.—The following varieties (among many others) have been esteemed species:—

Var. 1. *ANNUA* (sp.) *Roem & Sch.*; umbel with few (often with 3-1) ellipsoid obtuse spikelets.—Common in Europe, rare in Bengal.

Var. 2. *DEPAUPERATA* (sp.) *Br.*; stems very slender, flaccid, with few spikelets.—C. B. Clarke (n. 44119) from Assam, has a long slender stem, with a single lateral spikelet, overtopped by most slender leaves; recedes from the type *F. diphylla* more than does the Australian *F. depauperata*.

Var. 3. *PLURISTRIATA*, var. *C. B. Clarke* (*F. pilosa* of most authors not of Vahl); sheaths and leaves often hairy, nut 10-16-striate on each face often verrucose or tubercular on shoulders.—A very common southern, especially Malay form.

Var. 4. *SPIROSTACHYS* (sp.) *F. Muell.*; large, umbel large, spikelets large.—In Australia; but a Khasia form is equally large.

Var. *NILAGIRICA*; rhizome very short, creeping; stems 12 in. in a close linear series; leaves filiform.—Perhaps referable to *F. stolonifera*. Nilgiri Hills, Pykara, King.

16. ***F. stolonifera***, *C. B. Clarke*; stoloniferous, spikelets dark chestnut, otherwise as *F. diphylla*.—*Fimbristylis*, *Wall. Cat.* 3503, A, B (part) C.

KHASIA HILLS, alt. 2-5600 ft., common. MUNEYPOOR; *Watt.* NEPAL or BENGAL; *Wallich*.

Stolon breaking out horizontally from the base of stem, hardening into a long wiry rhizome clothed with lanceolate striate dusky scales. *Stems* subsolitary, 1-2 ft., slender. *Leaves* as long as $\frac{1}{2}$ - $\frac{2}{3}$ stem, erect, very narrow, tip obtuse, hairy or glabrate. *Umbel* nearly simple, sometimes depauperated with few spikelets. *Spikelets* $\frac{2}{3}$ by $\frac{1}{2}$ in.

Var. *ludens*; style-branches 3 or 4.—Khasia; alt. 6-7000 ft., *C. B. Clarke*.

+++ Nut obovoid, smooth, reticulate (not conspicuously striate longitudinally.)

17. ***F. æstivalis***, *Vahl Enum.* ii. 288; umbel compound or decom-pound, spikelets many solitary oblong subcylindric, glumes ovate acute submucronate, style 2-fid, nut smooth obscurely reticulate straw-colrd. *Nees in Wight Contrib.* 102; *Boeck. in Linnæa*, xxxvii. 11; *Trimen Cat. Pl. Ceylon*, 101 (excl. syn.). *F. Griffithiana*, *Steud. Syn. Cyp.* 110. *F. dichotoma*, *Boeck. in Flora*, xlii. 70 (not of Vahl). *F. tricholepis*, *Miq. Fl. Ind. Bat.* iii. 319. *F. Griffithii*, *Boeck. in Flora*, xliii. 241. *Scirpus æstivalis*, *Retz Obs.* iv. 12; *Roxb. Fl. Ind.* i. 227.—*Isolepis*, *Wall. Cat.* 3475.—*Fimbristylis*, *Wall. Cat.* 3516, A, 3517 B, D, E.

Throughout INDIA, alt. 0-3000 ft. (except the North-west), abundant.—DISTRIB. S. and E. Asia, Australia and a var. in America.

Annual, more or less pubescent or puberulous. *Stems* 2-10 in. *Leaves* often as long as $\frac{1}{2}$ - $\frac{2}{3}$ stem. *Spikelets* $\frac{1}{2}$ by $\frac{1}{10}$ in. *Glumes* keeled, glabrous or pubescent, erect or subsquarrose. *Stamens* 1-2. *Style* scarcely longer than nut, slightly compressed, usually villous; margin of style-base often minutely hairy (not with long pendent trichomes of *F. squarrosa*). *Nut* as long as $\frac{1}{2}$ glume; outermost cells quadrate-hexagonal, arranged in 12-16 vertical rows on each face of nut, but far less prominent than in *F. dichotoma*.

18. ***F. scaberrima***, *Nees in Wight Contrib.* 102; stems middle-sized compressed under umbel, leaves and bracts long, umbel compound

and decompound, style 2-fid, nut obovoid smooth straw-colrd. *Boeck. in Linnæa*, xxxviii. 409 (not xxxvii. 13.)—*Fimbristylis*, *Wall. Cat.* 3507, C.

SYLHET; *Wallich*.

Glabrous. *Roots* fibrous, stout. *Stems* 12–20 in. scabrous on edges at top. *Leaves* flat, robust, often overtopping stem. *Bracts* 3–4, two lower often 4–5 in. very scabrous on margins. *Spikelets* many, $\frac{1}{2}$ by $\frac{1}{10}$ in., 5–8-fld., acute, chestnut-brown. *Glumes* ovate, acute, adpressed-incurved. *Stamens* 3. *Style* long, scarcely compressed, nearly glabrous; branches long. *Nut* as long as $\frac{2}{3}$ glume, biconvex, scarcely stalked; outermost cells very small in 20–24 vertical series on each face.—From the flattened top of stem and small spikelets this has been sometimes referred to *F. complanata*.

19. ***F. podocarpa***, *Nees in Wight Contrib.* 98 (partly); nut smooth finely reticulated not longitudinally striated, gynophore very prominent obpyramidal, otherwise as *F. diphylla*. *Nees & Meyen in Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. (1843) 77, var. δ (and part α & β). *F. communis*, *Kunth Enum.* ii. 234 (partly). *F. polymorpha*, *Boeck. in Linnæa*, xxxvii. 14 (partly).—*Fimbristylis*, *Wall. Cat.* 3521 B.

From the W. Himalaya to UPPER ASSAM and DACCA; CHOTA NAGPORE, C. B. Clarke; KHASIA, *H. f. et T. T.* (*Fimbristylis* n. 33); &c.—DISTRIB. Malaya, China, Marianne Isles.

This is *F. podocarpa*, Munro ms. and *Herb. Hook. f.*; the type example of *F. podocarpa* in Wight named by Nees' hand is typical *F. diphylla*, Vahl.—In *F. podocarpa* (as here understood) the gynophore is obpyramidal, distinguishable from the nut, its apex is dilated sometimes into a 3-lobed saucer resembling much some *Sclerias*. The nut has the small outermost cells in 20–24 rows on each face.

20. ***F. fuscinox***, C. B. Clarke; nearly glabrous, stems middle-sized, leaves long, umbel large compound, glumes keeled acute puberulous, style 2-fid, nut obovoid smooth dusky finally black.

N. INDIA; Moradabad, *T. Thomson*; SIKKIM TERAI, C. B. Clarke.

Stems 8–20 in. *Leaves* as long as $\frac{1}{2}$ – $\frac{3}{4}$ stem, rigid, tip subobtuse. *Umbel* often 6 in. diam. *Spikelets* all solitary, ovoid, $\frac{1}{3}$ – $\frac{1}{2}$ in. long, somewhat angular by reason of the keeled glumes. *Glumes* glabrate, margins ciliate hairy, shoulders often puberulous, tips spreading not adpressed incurved (as in *F. ferruginea*).—From the large umbel and long leaves this has been referred to *F. diphylla*; it is nearer *F. ferruginea*.

21. ***F. albo-viridis***, C. B. Clarke ms. in *Herb. Calcutt.*; umbel somewhat lax, nut obovoid straw-colrd. shining smooth or with numerous obscure longitudinal striations—otherwise as *F. diphylla*.

E. BENGAL; *Griffith* (in *Herb. Calcutt.*); RIVER MEGNA, J. D. Hooker; UPPER ASSAM, *Jenkins*.

Stems 12–20 in. *Leaves* long, nearly glabrous. *Umbel* once or twice compound, pedicels long. *Spikelets* $\frac{1}{4}$ – $\frac{1}{2}$ in. long, greenish-white, sometimes tinged purple-chestnut. *Nut* often with minute scattered white scales; outermost cells small, in 25–30 longitudinal series on each face.—Very near *F. diphylla*, but all the examples agree closely, and the marking of the nut is unlike that of *F. diphylla*—much nearer that of *F. podocarpa*.

22. ***F. ferruginea***, *Vahl Enum.* 291; stems 8–30 in., leaves short sometimes none, glabrous or hairy, umbel simple or compound usually contracted, glumes often puberulous below tip, style 2-fid, nut obovoid smooth pale finally brownish. *Delile Fl. Ægypt*, 10, t. 6, fig. 3; *Nees in*

Wight Contrib. 97; *Dalz. & Gibs. Bomb. Fl.* 287; *Thw. Enum.* 348; *Boeck. in Linnæa*, xxxvii. 16. *F. arvensis*, *Vahl Enum.* ii. 291. *F. marginata*, *Labill. Ser. Austro-Caledon.* ii. t. 16, fig. 1. *F. Roxburghii*, *Dietr. Sp. Pl.* ii. 162. *F. confinis*, *Steud. Syn. Cyp.* 115. *F. trispicata*, *Steud. l.c.* 107. *F. cyrtophylla*, *Miq. Fl. Ind. Bat.* iii. 325. *F. ochreate*, *Boeck. in Flora xli.* 599 (*cf. xliii.* 177). *F. andamanica*, *Kurz S. Andaman Rep. Append. B.* 21. *Scirpus ferrugineus*, *Linn. Sp. Pl.* 74. *S. arvensis*, *Retz Obs.* iv. 11 (*not of Roxb.*). *S. globulosus*, *Roxb. Fl. Ind.* i. 217 (*not Fimbr. globulosa*, *Kunth*). *S. tristachyus*, *Roxb. l.c.* 221. *S. tranquebariensis*, *Roth. Catal. Bot.* iii. 6 (*see Boeck. in Flora*, xliii. 36). *Schœnus polymorphus*, *Rottb. Descr. et Ic.* 67.—*Fimbristylis*, *Wall. Cat.* 3506 (*mainly*), 3522, 3527.

Throughout INDIA, alt. 0–3000 ft., abundant near the sea.—DISTRIB. All warmer regions.

Rhizome none or hardly any. *Stems* 8–30 in., tufted, base slightly thickened, often clothed by shining hard rusty scales. *Leaves* usually hardly any, sometimes 4–6 in., very narrow. *Umbel* mostly of 5–10 spikelets, sometimes with 20 spikelets, rarely with 1–3 spikelets; bracts shorter than umbel, often very short. *Spikelets* $\frac{2}{3}$ in. *Glumes* obtuse scarcely mucronate, brown, tip incurved, keel green. *Stamens* 3 or 2; filaments ligulate; anthers not crested. *Style* longer than nut, flattened, villous below bifurcation. *Nut* as long as $\frac{1}{2}$ – $\frac{1}{3}$ glume, shortly stalked; outermost cells small, in numerous longitudinal series.

Var. ? *tenuissima*, stems 16 in. very slender slightly flattened with 1–3 small pale spikelets, glumes nearly glabrous, nut very smooth. CEYLON; *Mrs. Marriot (Herb. Delessert)*.—*Leaves* 1–6 in., very slender. *Bracts* $\frac{1}{2}$ in. *Spikelets* $\frac{1}{4}$ in., ellipsoid. *Glumes* with obscure round red glands. *Nut* as of *F. ferruginea*.—This looks like a distinct species, but only known by one sheet of specimens.

23. ***F. compressa***, *Boeck. in Linnæa*, xxxviii. 387 (*not of Roem. & Sch.*); stems long base slender, leaves longish, umbel twice or thrice compound, spikelets cylindrical, glumes dusky-brown puberulous, style 2-fid, nut obovoid smooth dusky-brown. *F. tenuifolia*, *Nees ms.* *F. gracilis*, *Arnott ms.* *Scirpus fuscus*, *Roxb. ms.*

MADRAS, *Roxburgh*, *Wight*. MERGUI, *Griffith*. TENASSERIM, *Helper*.

Stems 8–20 in., 3–5-angular under umbel, basal sheaths herbaceous. *Leaves* 8 in., very narrow, glabrous, sheaths often fimbriate hairy in mouth. *Umbel* often 4–5 in. diam. with 25–40 spikelets; bracts frequently overtopping umbel. *Spikelets* nearly $\frac{1}{4}$ in. long, glumes very densely imbricate. Otherwise as *F. ferruginea*, to which it is specifically very near.

24. ***F. longispica***, *Steud. Syn. Cyp.* 118; nearly glabrous, stems middle-sized, leaves long, umbel compound or decompound, spikelets cylindric-lanceolate rusty green, style bifid, nut obovoid smooth, minutely reticulate finally brownish. *Miq. Fl. Ind. Bat.* iii. 325. *F. Buergueri* and *F. ferruginea*, *Miq. in Ann. Mus. Lugd. Bat.* ii. 144. *F. spadicea*, var. β major, *Boeck. in Linnæa*, xxxvii. 20.

SINGAPORE; Pabang, *Ridley*.—DISTRIB.—Malaya, China, Japan. (The American *F. spadicea* is hardly separable).

Leaves as long as $\frac{1}{2}$ – $\frac{2}{3}$ stem, stout, flat. *Umbel* 1–3 in. diam.; branches suberect; lowest bract overtopping umbel. *Spikelets* $\frac{1}{2}$ by $\frac{1}{10}$ in., terete, hard. *Glumes* ovate, scarcely apiculate, erect, closely imbricate, horny, rusty brown with 3 green nerves on back. *Style* and *stamens* nearly as in *F. diphylla*. *Nut* as long as $\frac{2}{3}$ glume, very shortly stalked; outermost cells small, in about 20 series on each face, i.e. nut slenderly obscurely 20-striate on each face, subtrabeculate between the striations.

25. **F. rigidula**, *Nees in Wight Contrib.* 99; rhizome horizontal woody short, leaves longish, umbel once or twice compound, spikelets very obtuse solitary and paired, style 2-fid, nut obovoid smooth dirty straw-colrd. *F. Hanceana*, *Boeck. in Linnæa*, xxxviii. 394.—*Fimbristylis*, *Wall. Cat.* 3519 (partly).

From KUMAON, alt. 0-6000 ft. to Bengal, C. B. Clarke. MUNEYPOOR, Watt, SHAN HILLS, *Collett.*—DISTRIB. China, Philippines.

Stems 4-16 in., thickened at base, closely 1-seriate on rhizome. *Leaves* as long as $\frac{1}{2}$ culm, glabrous, or (with their sheaths) pubescent; tip subobtuse. *Umbel* 1-5 in. diam., somewhat lax; bracts short, *Spikelets* $\frac{1}{2}$ - $\frac{1}{2}$ in., ellipsoid or subglobose. *Nut* nearly as of *F. ferruginea*, but paler, less glistening; outermost cells in 20-30 series on each face, i.e. nut minutely reticulate, faintly 20-30 striate longitudinally. —Well-marked by the rhizome and paired subglobose spikelets. The *F. rigidula*, *Herb. Berol.* reduced to *F. diphylla* by Kunth and Boeckeler, is not the plant of Nees.

26. **F. spathacea**, *Roth. Nov. Pl. Sp.* 24; leaves short rigid, umbel compound with solitary spikelets often contracted sometimes subcapitate, glumes obtuse often notched, style 2-fid, nut obovoid smooth or somewhat tubercled dusky. *F. Wightiana*, *Nees in Wight Contrib.* 99; *Thw. Enum.* 349. *F. glomerata*, *Nees in Linnæa*, ix. 290; *Boeck. in Linnæa*, xxxvii. 47. *F. rigida*, *Kunth Enum.* ii. 231. *F. ciliolata*, *Steud. Syn. Cyp.* 109. *F. capitata*, *Zoll. Verz. Ind. Archip.* ii. 61 (not of Br.). *F. lævissima*, *Steud. l. c.* 117. *F. junciformis*, *Munro in Seem. Bot. Voy. Herald*, 422 (not of Kunth). *F. biumbellulata*, *Boeck. in Flora*, xli. 604 (see xlii. 34). *Scirpus glomeratus*, *Retz Obs.* iv. 11 (not of Roxb.). *S. strictus*, *Roxb. Fl. Ind.* i. 226.—*Cyperus*, *Wall. Cat.* 3300 (partly).

From SIND, and ORISSA, to CEYLON and SINGAPORE.—DISTRIB. Warm regions.

Stems 4-16 in., tufted, rigid. *Leaves* as long as $\frac{1}{2}$ stem (often much shorter), narrow, glabrous, margins incurved. *Umbel* 2 in. diam. in well-developed examples, usually somewhat dense with solitary but closely approximated spikelets; in less developed examples the spikelets are nearly or quite clustered, sometimes virtually in a single head; bracts short, broad. *Spikelets* $\frac{1}{2}$ - $\frac{1}{2}$ by $\frac{1}{10}$ in., cylindric or ellipsoid, up to 60 in an umbel. *Glumes* ovate, concave, incurved, margins scarious. *Stamens* usually 2. *Style* somewhat shorter than nut, often glabrous. *Nut* as long as $\frac{2}{3}$ glume, biconvex, shortly stalked.—This plant offers a transition to the next series (*F. argentea*, *sericea*, &c.) by the often clustered spikelets; Boeckeler appears only to know this contracted form (which is not Nees' type), and to have placed it (on account of such occasionally contracted heads) in the 3-stigma group of *F. cymosa*, *junciformis*, &c. In *F. spathacea*, the style is never 3-fid.

Series B. Spikelets, or some of them, clustered. (See also *F. spathacea*, *F. rigidula*, and occasionally *F. diphylla* in series A, B.)

* *Stems with only one head.*

27. **F. argentea**, *Vahl Enum.* ii. 294; stems leafy at base, spikelets linear-cylindric grey or whiteish, glumes scarcely acute, style 2-fid, nut obovoid pale smooth or obscurely transversely wavy-lined. *Nees in Wight Contrib.* 100; *Dalz. & Gibs. Bomb. Fl.* 287; *Thw. Enum.* 348; *Boeck. in Linnæa*, xxxvii. 8. *Scirpus argenteus*, *Rottb. Descr. et Ic.* 51, t. 17, fig. 6; *Roxb. Fl. Ind.* i. 223. *S. monander*, *Rottb. Descr. et Ic.* 50, t. 14, fig. 3 (not of Roxb.).—*Isolepis*, *Wall. Cat.* 3483.—*Rheede Hort. Mal.* xii. t. 54.

From BENGAL and CENTRAL INDIA to CEYLON.—DISTRIB. Mauritius, sive Boeckeler.

Stems annual, tufted, trigonous, 4–8 in. (or in Duthie n. 9860, stem 0, spikelets basal). *Leaves* usually shorter than stem, narrow, glabrous. *Spikelets* 4–20 in the head, $\frac{2}{3}$ by $\frac{1}{10}$ in., densely-fld.; bracts 2–4, much overtopping head. *Glumes* ovate, silver-grey, keel green. *Stamen* often 1. *Style* small, shorter than nut, nearly glabrous, deciduous with its base. *Nut* very small, about $\frac{1}{4}$ as long as glume, biconvex, almost margined; outer cells obscure.

28. **F. albicans**, *Nees in Wight Contrib.* 100; stems leafy at base, spikelets ellipsoid rusty grey, glumes scarcely acute, style 2-fid, nut obovoid straw-cold. smooth transversely minutely trabeculate. *Boeck. in Linnæa*, xxxvii. 9.—*Isolepis*, *Wall. Cat.* 3482.

DECCAN PENINSULA; *Wight, Wallich.*

Nearly glabrous. *Stems* 8–14 in., slender. *Leaves* narrowly ligulate, tip suddenly narrowed acute. *Spikelets* 4–15 in the head, $\frac{1}{4}$ by $\frac{1}{2}$ in. *Stamens* often 2. *Style* longer than nut, slender, glabrous, with long linear branches. *Nut* small, shining; outermost cells conspicuous, transversely oblong, not accurately superimposed in vertical series (so that the nut is scarcely striated longitudinally).—Otherwise as *F. argentea*.

** *Clusters of spikelets subumbellately corymbed.*

29. **F. Hookeriana**, *Boeck. in Linnæa*, xxxvii. 22; nearly glabrous, spikelets clustered and solitary linear-lanceolate, style 2-fid, nut obovoid yellow-brown squamose-tuberculate.

KHASIA HILLS, alt. 1500–4000 ft. CHOTA NAGPORE; alt. 2000 ft. *Clarke.*

Annual. *Stems* 4–10 in., tufted, compressed. *Leaves* often as long as stem, narrow, flat. *Umbel* often 4–6 in. diam.; branches oblique-erect; bracts like the leaves, often overtopping umbel. *Spikelets* 1–6 in a cluster, $\frac{1}{2}$ by $\frac{1}{12}$ – $\frac{1}{10}$ in., terete. *Glumes* rather remote, oblong, shortly acute, adpressed incurved, rusty-green, keeled, brown-scarious on sides. *Stamens* usually 2. *Style* longer than nut, scarcely flattened, slightly dilated at base, villous nearly its whole length, deciduous with style-base. *Nut* as long as $\frac{1}{3}$ – $\frac{1}{4}$ glume, biconvex, obtuse, very shortly stalked; outer cells transversely-oblong, regularly superimposed in 12–15 vertical series in each face (i.e. nut slenderly longitudinally 12–15-ribbed); shoulders of nut subtuberculate by small scales or papillæ.

30. **F. sericea**, *Br. Prod.* 228; leaves numerous, white silky strigose beneath, spikelets ellipsoid-oblong silvery grey, style 2-fid, nut obovoid smooth pale. *Boeck. in Linnæa*, xxxvii. 22. *F. decora*, *Nees & Meyen in Wight Contrib.* 101. *F. dasyphylla*, *Miq. Fl. Ind. Bat.* iii. 327. *F. velutina*, *Franch. in Bull. Soc. Bot. France*, xxvi. 87.

ORISSA; Poori, *W. S. Atkinson*; Ganjam, *Lawson*. SINGAPORE, *Ridley*.—DISTRICT. E. Asia, Malaya, Australia.

Rhizome descending or horizontal, woody, up to 3 in. long, sometimes divided, densely covered by leaves. *Stems* 4–8 in., rigid, striate. *Leaves* as long as $\frac{1}{4}$ – $\frac{1}{2}$ stem, rigid, curved, $\frac{1}{2}$ – $\frac{1}{4}$ in. broad. *Umbel* $\frac{2}{3}$ –3 in. in diam., simple or compound; bracts $\frac{1}{2}$ – $\frac{1}{4}$ in. *Spikelets* 2–6 in a cluster, $\frac{1}{4}$ by $\frac{1}{8}$ – $\frac{1}{10}$ in., somewhat densely-flowered. *Glumes* erect adpressed, ovate, keeled, scarcely acute, striate, dusky purple-green, pubescent by minute white hairs, margins scarious white. *Style* about as long as nut, slightly villous below bifurcation, deciduous with style-base. *Nut* as long as $\frac{1}{3}$ – $\frac{2}{3}$ glume, biconvex, scarcely stalked.

Sect. III. TRICHELOSTYLIS (Genus), *Lestib. Essai Fam. Cyp.* 40. Lowest fertile glumes of spikelet spirally imbricated; stems with many or several (rarely few or 1) spikelets. *Style* 3-fid (in *F. cymosa* and *F. globulosa*, the lowest flowers in a spike have often 3-fid style, the upper a 2-fid style).

Series C. Spikelets all (or nearly all) solitary.

* Stem with few (sometimes 3-1) spikelets.

31. **F. tenera**, Roem. & Sch. *Syst.* ii., *Mant.* 57; stems 8-12 in. slender, umbel lax subcompound, spikelets ellipsoid ultimately cylindric-lanceolate, glumes ovate acuminate submucronate glandular-puberulous, style 3-fid, nut obovoid white smooth or subtuberculate coarsely reticulate. *Boeck. in Linnæa*, xxxvii. 26. *F. muriculata*, *Benth. in Hook. Niger. Fl.* 554. *Scirpus tenellus*, *Roxb. Fl. Ind.* i. 224. *Trichelostylis tenella*, *Nees in Wight Contrib.* 103.

DECCAN PENINSULA, *Wight*.—DISTRIB. Trop. Africa.

Roots fibrous. *Stems* tufted, 4-5-angular under umbel, base sometimes thickened. *Leaves* as long as $\frac{1}{2}$ stem, $\frac{1}{10}$ – $\frac{1}{12}$ in. broad, flat, glabrous. *Umbel* 1-2 in. in diam., with 7-9 spikelets; bracts 2-3, bristle-like, up to 1 in. long. *Spikelets* $\frac{1}{4}$ by $\frac{1}{12}$ in., about 10-fid. *Glumes* adpressed, boat-shaped, chestnut-red, margins scarious. *Stamens* often 2. *Style* longer than nut, glabrous, deciduous with pyramidal style-base. *Nut* as long as $\frac{2}{3}$ glume, round-trigonus.—Described from Nees' type in *Herb. Wight*.

Var. *oxylepis*, (sp.) *Steud. Syn. Cyp.* 110; glumes glabrate, nut verrucose yellow-brown. *F. glabra*, *Steud. l.c.* 111. *Fimbristylis*, *Wall. Cat.* 3514 B, *l.*, partly, 3531.—From Lahore and Bengal to Madras.

Var. ? *obtusata*; leaves numerous $\frac{1}{3}$ in. broad obtuse, glumes glabrate not mucronate, nut verrucose yellow-brown (spikelets sometimes clustered).—Lower Bengal, *Wallich, Kurz.* Singapore, *Ridley*.—Borneo.

32. **F. monticola**, *Steud. Syn. Cyp.* 111; glabrous, stems 6-14 in. slender, umbel lax simple or hardly compound, spikelets oblong-lanceolate, glumes ovate acute, style 3-fid, nut broadly obovoid brown slightly tubercled. *F. tenuifolia*, *Thw. Enum.* 434—*Fimbristylis*, *Wall. Cat.* 3514 A.

SOUTH MADRAS AND CEYLON; Cannanore, *Campbell*. NILGHIRI HILLS, *Hohe-nacker*. ANAMALLAYS, *Beddome*.

Leaves bristle-like, margins (when dry) incurved. *Umbel* 1 in. in diam., with 4-8 spikelets; rays ultimately recurved deflexed. *Nut* as long as $\frac{1}{2}$ – $\frac{2}{3}$ glume, acutely trigonus; outermost cells transversely oblong, in 12-15 irregular vertical series.—Otherwise as *F. tenera*.

33. **F. merguensis**, C. B. Clarke; stems 1 ft. rather slender, leaves several short, umbel once compound, spikelets largeish lanceolate, style 3-fid, nut small obovoid straw-colrd. smooth. *F. Thwaitesii*, var. *Boeck. ms.* *Trichelostylis* sp., n. 21, *Herb. Ind. Or. H.f. & T. T.*

MALAY PENINSULA; Mergui, *Griffith*; Tenasserim, *Helper (Kew Distrib.* 6330).

Glabrous. *Roots* fibrous. *Stems* tufted, obscurely 3-4-angular under umbel. *Leaves* as long as $\frac{1}{2}$ – $\frac{3}{4}$ stem, narrow, flat, tip obtuse. *Umbel* 1-3 in. in diam., with 12 spikelets; bracts scarcely $\frac{1}{2}$ in. *Spikelets* nearly $\frac{1}{2}$ by $\frac{1}{8}$ in., terete, acute, fine rusty-brown. *Glumes* erect adpressed, rigid, ovate, shortly acuminate. *Stamens* 3-2. *Style* long, white, glabrous, deciduous with the narrowly pyramidal style-base. *Nut* as long as $\frac{1}{2}$ glume, trigonus, minutely mucronate.

34. **F. Pierotii**, *Miq. in Ann. Mus. Lugd. Bat.* ii. 145; stoloniferous, glabrous, stems 1 ft. somewhat slender, umbel simple or once compound, style 3-fid, nut obovoid straw-colrd. laxly reticulate smooth or somewhat tubercled. *Boeck. in Linnæa*, xxxvii. 32. *Trichelostylis* sp., n. 20, *Herb. Ind. Or. H.f. & T. T. (partly)*.

N.W. HIMALAYA, alt. 4-9000 ft. SIMLA, *T. Thomson, Gamble.* KUMAON, *Duthie.*—DISTRIB. Japan.

Stolons up to 2 in., densely clothed by lanceolate striate scales, finally hardening into a woody rhizome. *Leaves* as long as $\frac{1}{2}$ stem, flat, acute. *Umbel* 1-3 in. in diam., with 5-14 spikelets; bracts short. *Spikelets* $\frac{1}{2}$ by $\frac{1}{2}$ in., ellipsoid-lanceolate, 10-fld. *Glumes* adpressed, boat-shaped, ovate, shortly acuminate, chestnut or testaceous, usually with round glands in upper half, margins scarious. *Style* long, glabrous, deciduous with narrow style-base. *Nut* as long as $\frac{1}{2}$ - $\frac{2}{3}$ glume, tip subpyramidal.

** Stem with many spikelets (at least in fairly developed examples).

† *Nut* slenderly trabeculate (outermost cells transversely oblong).

35. **F. Arnottiana**, Boeck. in *Linnæa*, xxxvii. 28; stems a foot (at least), umbel decomposed, spikelets cuboid-ellipsoid one-cold., glumes ovate obtuse brown hardly keeled, style 3-fid, nut obovoid yellow-brown transversely lineate obscurely tuberculated.

DECCAN PENINSULA; Cannanore, *Campbell* (*Herb. Wight* propr., n. 1884, right-hand plant only).

Stems somewhat slender, 4-5-angular under umbel. *Umbel* 3-4 in. diam., glabrous, with 30 spikelets; bracts 3-4, up to $\frac{2}{3}$ in. long, very narrow. *Spikelets* $\frac{1}{2}$ by $\frac{1}{2}$ in., obtuse, 10-fld., styles conspicuously protruded. *Glumes* concave, adpressed incurved, scarcely striate. *Stamens* 2-3; anthers linear-oblong, scarcely apiculate. *Style* as long as nut, slender, glabrous, deciduous with the narrow style-base. *Nut* small, as long as $\frac{1}{2}$ - $\frac{2}{3}$ glume.—Founded on some upper portions of stems without leaves, pasted down (in *Herb. Wight*) with *F. quinquangularis*, to which it is closely allied.

36. **F. filifolia**, Boeck. in *Linnæa*, xxxvii. 32; stems 2 ft. quadrangular, leaves long narrow convolute or 0, umbel decomposed and supradecomposed, spikelets ellipsoid acute, style 3-fid, nut obovoid straw-yellow smooth obscurely transversely lineolate.—*Trichelostylis* sp., n. 14, *Herb. Ind. Or. H. f. & T.*

SIKKIM TERAI; Dulkajhar, alt. 500 ft., *C. B. Clarke.* KHASIA HILLS; Churra, alt. 4200 ft., *J. D. H.*, &c.

Glabrous. *Leaves* sometimes as long nearly as stem, often shorter, sometimes 0. *Umbel* 4-12 in. in diam., with many (sometimes 250) solitary spikelets; bracts $\frac{1}{2}$ -2 in. *Spikelets* $\frac{1}{2}$ by $\frac{1}{2}$ in., brown. *Glumes* ovate, obtuse, with 3 green nerves. *Style* as long as nut, slender, slightly villous below trifurcation, deciduous with the narrow pyramidal style-base; branches long linear. *Nut* as long as $\frac{2}{3}$ glume, round trigonous; outermost cells in about 12 longitudinal series on each face.—Resembles large examples of *F. diphylla*, but differs not only in the 3-fid style, but in the long linear style-branches.

37. **F. asperima**, Boeck. in *Linnæa*, xxxvii. 40; stems $1\frac{1}{2}$ -2 $\frac{1}{2}$ ft., leaves long, umbel decomposed with numerous spikelets, bracts acute often longer than umbel, style 3-fid, nut ellipsoid brown smooth transversely trabeculate smooth or slightly tuberculate. *F. chaetorrhiza*, *Thu. Enum.* 349 (partly, not of *Kunth*). *Isolepis dura*, *Moritz*, *Verz. Zoll. Pl.* 97. *Trichelostylis asperima*, *Nees ms.*—*Fimbristylis*, *Wall. Cat.* 3502 B (partly), 3525 (mixed).

CEYLON. *Thwaites*, &c. From TAVOY, *Wallich*, to SINGAPORE, *Ridley*, frequent.—DISTRIB. Malaya.

Stems either 5-angular or flattened under umbel. *Leaves* several, often as long as stem. *Umbel* large, sometimes with 150 solitary spikelets. *Spikelets*, *style*, and

nut much as in *F. complanata* (but nut more trabeculate).—Much resembles larger forms of *F. complanata*, Link, but differs by the long bracts. The Khasia plants referred here by Boeckeler were perhaps *F. Thomsonii*, Boeck.

38. ***F. quinquangularis***, *Kunth Enum.* ii. 229; stems 8–24 in., leafy at base or leafless, umbel decomposed or supradecomposed, spikelets small ellipsoid-lanceolate 6–14-fld., style 3-fid, nut obovoid transversely lineolate pale or brownish more or less tuberculate. *Thw. Enum.* 349; *Dalz. & Gibs. Bomb. Fl.* 287; *Boeck. in Linnæa*, xxxvii. 42 (excl. *F. Salbundia*). *F. Salbundia*, *Boeck. in Linnæa*, xxxvii. 44 (mostly, not of *Kunth*). *F. angularis*, *Steud. Syn. Cyp.* 116. ' *F. Boeckeleri*, *Steud. l. c.* 113 (partly, see *Boeck. in Flora*, xlii. 69). *F. tenera*, *Boeck. l. c.* 111 (not of *Roem. & Sch.*). *Scirpus quinquangularis*, *Vahl Enum.* ii. 279; *Roxb. Fl. Ind.* i. 229. *S. miliaceus*, *Linn. Herb.* (? *Sp. Pl.* i. 75). *S. pentagonus*, *Roxb. l. c.* 218. *S. Salbundius* (*Satbundius*), *Ham. ms.* (not *F. Salbundia*, *Kunth*). *Trichelostylis quinquangularis*, *Nees in Wight Contrib.* 104. *Isolepis angularis* and *I. ? pentagona*, *Roem. & Sch. Syst.* ii., *Mant.* 69.—*Fimbristylis*, *Wall. Cat.* 3499, 3512 (mainly).

Throughout INDIA, alt. 0–4000 ft., CEYLON, and MALAY PENINSULA.—DISTRIB. Malaya, China, Austral. Mauritius introd. ?

Glabrous, annual, very variable in size. Stems usually flattened at base with subdistichous sheaths, often 4–5-angular under umbel. Leaves often as long as $\frac{1}{2}$ stem, very variable in development. Umbel often 4–8 in. in diam. with 100 spikelets, sometimes small with 15–5 (larger than usual); bracts $\frac{1}{2}$ –1 $\frac{1}{2}$ in. Spikelets $\frac{1}{8}$ – $\frac{1}{2}$ in. long, more acute than in *F. miliacea*, subterete (not polygonal as in *F. Salbundia*, *Kunth*). Glumes ovate, subacute, 3-nerved. Style longer than nut, slender, slightly villous below trifurcation, deciduous with the narrow pyramidal style-base, branches long. Nut small, as long as $\frac{2}{3}$ glume.—Hardly separable from *F. miliacea* (see *Arnott in Wight Contrib.* 105).

Var. *crassa*; more robust, rhizome woody, stems stouter often 2–3 ft. leafless or nearly so, spikelets rather larger broadly ellipsoid. *F. aphylla*, *Steud. Syn. Cyp.* 114. *F. globulosa*, var. β *aphylla*, *Miq. Fl. Ind. Bat.* iii. 322.—Ceylon, *Thwaites* (n. 823, partly), &c. Nilgiri, alt. 5–8000 ft., plentiful.—Java, Tonkin.

39. ***F. miliacea***, *Vahl Enum.* ii. 287; stems 8–24 in., leafy at base or (rarely) leafless, umbel decomposed or supradecomposed, spikelets small globose (or ultimately cylindric) obtuse many-fld., style 3-fid, nut obovoid transversely lineolate pale or brownish more or less tuberculate. *Thw. Enum.* 348; *Dalz. & Gibs. Bomb. Fl.* 287; *Miq. Fl. Ind. Bat.* iii. 321; *Boeck. in Linnæa*, xxxvii. 43. *F. littoralis*, *Gaud. in Freyc. Voy. Bot.* 413. *F. benghalensis*, *Roem. & Sch. Syst.* ii. 94, and *Mant.* 530. *F. flaccida*, *Steud. Syn. Cyp.* 113; *Miq. Fl. Ind. Bat.* iii. 321. *F. flaccidula*, *Zoll. Syst. Verz. Ind. Archip.* ii. 61. *Scirpus miliaceus*, *Burm. Fl. Ind.* 22, t. 9, fig. 2; *Rottb. Descr. et Ic.* 57, t. 5, fig. 2 (not of *Roxb.*). *S. tetragonus*, *Poir. Encyc.* vi. 767; *Roxb. Fl. Ind.* i. 228. *S. benghalensis*, *Pers. Syn.* i. 68. *Isolepis ? tetragona*, *Roem. & Sch. Syst. Mant.* ii. 69. *I. miliacea*, *Presl. Rel. Haenk.* i. 188 (excl. var. β). *Trichelostylis miliacea* & *tetragona*, *Nees in Wight Contrib.* 103, 104.—*Fimbristylis*, *Wall. Cat.* 3500, 3524.

Throughout INDIA, alt. 0–6000 ft., abundant.—DISTRIB. All warm regions.

Hardly separable from *F. quinquangularis*, but by the obtuser spikelets. Outer cells (transverse) of nut translucent, appearing themselves longitudinally striolate.

†† Nut smooth verrucose or tubercular, not trabeculate.

40. ***F. globulosa***, *Kunth Enum.* ii. 231; stems 8–16 in., top sheath

leafless, spikelets cuboid-ellipsoid obtuse, glumes obtuse, style 3-fid (see var. *β*), nut obovoid verrucose pale brown. *Thw. Enum.* 349; *Boeck. in Linnæa*, xxxvii. 45. *F. umbellaris*, *Vahl Enum.* ii. 291. *F. efoliata*, *Steud. Syn. Cyp.* 109. *Scirpus umbellaris*, *Lam. Ill.* i. 141. *S. globulosus*, *Retz Obs.* vi. 19. *Isolepis globulosa*, *Roem. & Sch. Syst.* ii. 119. *Trichelostylis globulosa*, *Nees in Wight Contrib.* 105.—*Fimbristylis*, *Wall. Cat.* 3518, 3529.

CEYLON, *Thwaites*. From NEPAL, *Wallich*, ASSAM, *Griffith*, and SHAN HILLS, *Collett*, to PENANG, *Wallich*.—DISTRIB. Malaya, Tonkin, Polynes.

Glabrous. *Rhizome* none or scarcely any. *Stems* tufted, 4-5-angular under umbel. Lower sheaths bearing long leaves or leafless. *Umbel* sometimes 2 in. diam., with 20 spikelets; often smaller, sometimes with 2-1 spikelets; bracts rarely $\frac{1}{2}$ in. *Spikelets* $\frac{1}{2}$ by $\frac{1}{2}$ in., dense-fid., dusky-brown. *Glumes* concave, incurved, 3-nerved. *Stamens* often 2. *Style* as long as nut, deciduous with the narrowly pyramidal style-base; branches linear. *Nut* as long as $\frac{2}{3}$ glume, round trigonous; outermost cells lax (i. e. nut somewhat verrucose), shortly transversely oblong, superimposed in 12-15 vertical series in each face (i. e. nut slenderly longitudinally striate).—*Spikelets* sometimes barren at top, elongate-cylindric.

Var. *Torresiana* (sp.), *Gaud.* in *Frey. Voy. Bot.* 413; style 2-fid, nut biconvex. Assam, *Masters*. Bengal, *J.D.H.*—Marianne Islands.—No 3-fid styles could be found; the examples have the uppermost sheath leafless as in typical *F. globulosa*.

Var. *Vicaryi*; lower sheaths with long leaves, uppermost sheath with a green leaf $\frac{1}{2}$ — $\frac{2}{3}$ in. long, central sessile spikelet usually deficient. *Trichelostylis* sp., n. 16, *Herb. Ind. Or. H.f. & T.*—Banks of the Chenab, *Thomson*; Dehra Doon, *Vicary*.

41. ***F. insignis***, *Thw. Enum.* 349; stems 12-16 in. robust base leafy, umbel compound with about 10 large lanceolate spikelets, style 3-fid, nut small obovoid smooth white laxly reticulated. *Hance in Journ. Linn Soc.* xiii. 132 (excl. syn. *Trichelostylis*, n. 20). *F. Thwaitesii*, *Boeck. in Linnæa*, xxxvii. 34. *F. amblyphylla*, *Steud. Syn. Cyp.* 116 (the plant described in *Obs.*).

CEYLON, *Thwaites*.—DISTRIB. Borneo, China.

Glabrous. *Rhizome* short, descending. *Stems* obscurely 4-5-angular under umbel. *Leaves* several, as long as $\frac{1}{2}$ stem, narrowish, flat, tip suddenly narrowed. *Umbel* $1\frac{1}{2}$ — $3\frac{1}{2}$ in. in diam., sometimes simple with 4-5 spikelets; bracts 2-3, less than $\frac{2}{3}$ in. long. *Spikelets* $\frac{1}{2}$ — $\frac{2}{3}$ by $\frac{1}{2}$ in., hard, acute. *Glumes* $\frac{1}{2}$ in., boat-shaped, acute submucronate, brown-chestnut. *Stamens* 3. *Style* long, villous, white, tardily deciduous with the narrowly pyramidal style-base. *Nut* as long as $\frac{1}{2}$ — $\frac{1}{3}$ glume, triquetrous with concave faces, obtuse almost emarginate.

42. ***F. pentaptera***, *Kunth Enum.* ii. 229; stems 16-36 in. leafless hairy acutely 5-angular under umbel, umbel decomposed, bracts small, style 3-fid, nut obovoid shining brown smooth minutely reticulate. *Boeck. in Linnæa*, xxxvii. 30. *F. Salbundia*, *Thw. Enum.* 349 (not of *Kunth*). *S. quinquangularis*, *Boeck. in Linnæa*, xxxvii. 42 (as to *Thw. C.P.* 823). *Trichelostylis pentaptera*, *Nees in Wight Contrib.* 105.

Ceylon, up to 6000 ft., *Gardner, Thwaites*. Deccan Peninsula, *Wight* (n. 2904, in *Herb. Calcutt.*).

Rhizome short, horizontal, woody. *Stems* somewhat thickened at base; sheaths hard, yellow-brown. *Umbel* 2-5 in. in diam., with sometimes 40-85 spikelets. *Spikelets* $\frac{1}{2}$ by $\frac{1}{2}$ in., chestnut-cold. *Glumes* adpressed, ovate, scarcely acute. *Stamens* often 2. *Style* long, glabrous, deciduous with the narrowly pyramidal style-base. *Nut* as long as $\frac{1}{2}$ glume.—Easily recognized by the hairy stem.

43. **F. complanata**, Link Hort. Berol. i. 292; stems 8-24 in. flattened under umbel, leaves almost premorse, style 3-fid, nut minute obovoid pale more or less tuberculate. Thw. Enum. 349. *F. autumnalis*, var., Roth. Nov. Pl. Sp. 26; Boeck. in Linnæa, xxxvii. 38. *F. scabra*, Kunth Enum. ii. 245. *F. Boeckeleri*, Steud. Syn. Cyp. 113, partly. *Scirpus complanatus*, Retz Obs. v. 14; Roxb. Fl. Ind. i. 228. *S. anceps*, Willd. in Berl. Mag. ii. 288, t. 8, fig. 2; Roxb. l. c. 230. *Cyperus complanatus*, Willd. Sp. Pl. i. 270. *Isolepis complanata* & Willdenowii, Roem. & Sch. Syst. ii. 119, 120. *Trichelostylis complanata* & *T. scabra*, Nees in Wight Contrib. 103.—*Fimbristylis*, Wall. Cat. 3502 A, 3510, 3525 (partly).

Throughout INDIA in the warm region.—DISTRIB. All warm regions.

Glabrous. Rhizome hardly any, sometimes very short horizontal. Leaves often 4-8 by $\frac{1}{2}$ in. Umbel often 4 in. in diam., compound and supradecomound, sometimes with 180 spikelets; bracts 2, shorter than umbel (often suberect), similar to leaves, almost premorse. Spikelets $\frac{1}{2}$ by $\frac{1}{3}$ in. Stamens usually 3. Style longer than nut, glabrous; branches linear, long. Nut about $\frac{1}{2}$ length of glume; outermost cells short oblong transverse, in vertical series but obscure (i. e. nut scarcely striate).

Var. *microcarpa* (sp.), F. Muell. Fragm. Phyt. Austral. i. 200; stems slender hardly flattened under umbel, spikelets more slender, nut very small velate (i. e. outermost cells withering and partly peeling off). Benth. Fl. Austral. vii. 316. *F. tenera*, Boeck. in Flora, lviii. [1875] 111 (excl. var., not of Roem. & Sch.).—Kumaon, alt. 8000 ft., Strachey & Winterbottom, n. 2; Sikkim, alt. 9500 ft., J.D.H. Bombay, Dalzell.—Eastern Asia, Australia.

This species admitted by Bentham, comes between *F. complanata*, Link, and *F. autumnalis*, Roem. & Sch., species which Boeckeler unites.

Var. *Kraussiana*, (sp.) Hochst. in Flora, xxviii. 757; stems slender obscurely flattened under umbel, umbel more compact less compound often with 10-30 spikelets. *F. connectens*, Thw. Enum. 349.—Ceylon, Thwaites.—China, Malaya, Afric.

Var. *fenestrata*; spikelets larger rusty-brown, glumes large laxly subpatent obtuse shining, nut white fenestrate by the strongly reticulate persistent outermost cells.—Deccan Peninsula; Palimcottah, Wight (n. 2899).—Roots fibrous. Stems 12-16 in., tufted, conspicuously flattened at top. Leaves as long as $\frac{2}{3}$ stem, $\frac{1}{2}$ in. broad, tip subobtuse. Umbel and bracts nearly as in *F. complanata*, typ. Spikelets $\frac{2}{3}$ by $\frac{1}{2}$ in., many-fid.

44. **F. Thomsonii**, Boeck. in Linnæa, xxxvii. 37; stems 8-24 in., leaves flat tip obtuse, umbel compound and supradecomound, spikelets ellipsoid acute, style 3-fid, nut oblong-obovoid straw-colrd. verrucose or subtuberculate obscurely transversely lineolate. *F. complanata*, Benth. Fl. Hongk. 393.—*Trichelostylis*, sp. n. Herb. Ind. Or. H. f. & T.

N.E. INDIA, alt. 500-4000 ft., from SIKKIM, ASSAM and Chota Nagpore to MAITABAN and SHAN HILLS, common.—DISTRIB. Tonquin, China.

Glabrous. Roots fibrous. Stems upwards obscurely 4-angular, or sometimes subcompressed. Leaves sometimes short 2-4 in., sometimes a foot. Umbel 2-6 in. diam., with sometimes 80 spikelets; bracts 4-5, usually shorter than umbel. Spikelets $\frac{2}{3}$ by $\frac{1}{2}$ in. Nut as long as $\frac{2}{3}$ glume.—This species is near the large form of *F. complanata*, Link, from which it mainly differs by the thicker spikelets and larger nut (is probably often passed for *F. diphylla*, Vahl).

45. **F. Salbundia**, Kunth Enum. ii. 230; stems $1\frac{1}{2}$ -3 ft. leafless 4-5-angular, umbel decomound with 120 ovoid testaceous spikelets, glumes keeled rather lax, style 3-fid, nut obovoid yellow-brown opaque smooth or slightly tuberculate. *Trichelostylis Salbundia*, Nees in Wight Contrib.

105 (at least in part) not Scirp. Salbundius, *Ham. in Wall. Cat. n. 3499 A*, nor *F. Salbundia*, *Boeck.*—*Fimbristylis*, *Wall. Cat. 3499 C*. in *Herb. Berlin* (not in *Herb. Linn. Soc.*), 2526, 3527 (in *Herb. DC. not in Linn. Soc.*).

SILHET; *Wallich*. KHASIA HILLS, *Griffith*. AMHERST; *Wallich n. 3527* (in *Herb. DC.*).—DISTRIB. Australia.

Glabrous. *Rhizome* very short, obliquely descending. *Stems* tufted, acutely angular. *Umbel* 2–4 in. diam.; bracts scarcely an inch, bristle-like. *Spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ in., angular, about 10-fld. *Glumes* ovate obtuse, margins broadly scarious.—Has been greatly confused with the leafless form of *F. quinquangularis*, from which it is easily known by the testaceous spikelets, polygonal by reason of the acutely keeled glumes.

Series D. Spikelets clustered (some solitary often added).

46. **F. leptoclada**, *Benth. Fl. Hongk. 393* (not *Fl. Austral.*); stems 1 foot slender, leaves long narrow, spikelets small in 1–3 small clusters dark brown, glumes very obtuse tip ciliate, style 3-fld, nut obovoid yellow-brown verrucose. *F. retusa*, *Thw. Enum. 349*; *Boeck. in Linnæa, xxxvii. 46*; *Hance in Lond. Journ. Bot. xvi. 112*.

CEYLON; *Thwaites*. MALACCA; *Griffith*.—DISTRIB. Borneo, China.

Annual, glabrous. *Leaves* as long as $\frac{1}{2}$ stem (or all stem) $\frac{1}{2}$ – $\frac{1}{3}$ in. broad. *Umbel* $\frac{1}{2}$ –1 in., often congested into a head; bracts hardly $\frac{1}{2}$ in. *Spikelets* usually 3–8, $\frac{1}{2}$ in., ellipsoid, obtuse. *Stamen* often 1. *Style* as long as nut, glabrous, deciduous with the shortly pyramidal style-base; branches linear. *Nut* as long as $\frac{1}{2}$ glume, round trigonous.

47. **F. paupercula**, *Boeck. in Linnæa, xxxviii. 396*; stems 1 ft. slender, clusters of spikelets in a simple umbel, style 3-fld, nut obovoid with many longitudinal striations finally black.

DECCAN PENINSULA; *Pulney Mts.*; *Wight (n. 2896)*.

Nearly glabrous. *Rhizome* short, obliquely descending. *Stem* under umbel 5-angular, minutely scabrous pilose. *Leaves* as long as $\frac{1}{2}$ stem, narrow. *Umbel* rays 4–5, 1 in. long; bracts hardly $\frac{1}{2}$ in. *Spikelets* 2–7 to a cluster, $\frac{1}{2}$ in. long, ellipsoid, brown, about 6-fld. *Glumes* ovate, keel slightly excurrent as a mucro, glandular upwards, sometimes puberulous. *Nut* as long as $\frac{1}{2}$ glume, triquetrous, apex obtuse; outer cells shortly transversely elliptic, regularly arranged in about 16 vertical series on each face.—This is in *Herb. Calcutt., Paris, and Berlin*; but not in *Mus. Brit. or Kew*.

48. **F. junciformis**, *Kunth Enum. ii. 239*; stems 4–16 in., leaves several rigid, umbel compound and decompound, spikelets clustered, style 3-fld, nut obovoid nearly smooth or verrucose straw-colrd. or pale brown. *Boeck. in Linnæa, xxxvii. 49*. *F. Hænkei*, *Dietr. Sp. Pl. ii. 161*. *F. chætorrhiza*, *Kunth l. c. 240*; *Strachey Cat. Pl. ii. 73*. *F. falcata*, *Kunth l. c. 239*. *Scirpus falcatus*, *Vahl Enum. ii. 275*. *Isolepis falcata*, *Roem. & Sch. Syst. ii. 118*. *Trichelostylis junciformis* and *chætorrhiza*, *Nees in Wight Contrib. 106*.—*Fimbristylis*, *Wall. Cat. 3519 (partly), 3520*.

Throughout INDIA, alt. 1500–5000 ft., from KASHMIR and ASSAM to MADRAS and PEGU.—DISTRIB. Madagascar, Philippines.

Glabrous. *Rhizome* woody, short; or sometimes 2 in. long horizontal. *Stems* tufted, rigid, upwards 4–5-angular or obscurely flattened. *Leaves* usually short but sometimes as long as $\frac{1}{2}$ – $\frac{3}{4}$ stem, $\frac{1}{3}$ – $\frac{1}{2}$ in. broad, flat, margins incurved, tip obtuse. *Umbel* 1–4 in. diam., with 20–30 clusters, often much smaller with 3–5 clusters; bracts 2–4, short, rarely 1 in. *Spikelets* 2–5 to a cluster, with none or few solitary

spikelets in the typical form, but examples with many solitary few clustered spikelets occur, $\frac{1}{2}$ – $\frac{1}{4}$ in., brown or chestnut-colrd., many-fld. *Glumes* ovate, obtuse, margins conspicuously scariosus. *Stamens* 3. *Style* longer than nut, slender, slightly villous below trifurcation, deciduous with the small pyramidal style-base; branches long. *Nut* as long as $\frac{1}{2}$ glume, not (or obscurely) striate.—*F. Haenkei*, Dietr. is the older (but less certain) name for this species. The Californian habitat given by Boeckeler is probably erroneous.

Var. *abbreviata* (sp.) Boeck. in *Flora*, xli. 601; spikelets some paired but mostly solitary. *F. chaetorrhiza*, *Thw. Enum.* 349 (*partly*).—Ceylon; *Thwaites*, *Gardner*. Deccan Peninsula; *Wallich* n. 3520 A. (*partly*). Anamallay Mts.; *Beddome*.

Var. *latifolia* (sp.) Kunth l. c. 239; leaves $\frac{1}{2}$ –2 by $\frac{1}{2}$ in. flat curved and twisted, spikelets rather many (rarely all) solitary. *F. falcata*, *Boeck. in Linnæa*, xxxvii. 48. *F. torta*, *Kunth l. c. 24*; *Boeck. l. c. 31*. *Trichelostylis torta* and *T. latifolia*, *Nees in Wight Contrib.* 105, 106.—*Fimbristylis*, *Wall. Cat.* 3498.—Deccan Peninsula; *Wight*, *Wallich*. Ceylon; *Walker*.

49. ***F. nigrobrunnea***, *Thw. Enum.* 434; stems 8–20 in., leaves several stout obtuse, umbel simple compound or decompound, spikelets some clustered (rarely all solitary), glumes shining hard dark-brown lower few-ranked or obscurely distichous, style 3-fld, nut obovoid yellow-brown verrucose or nearly smooth. *F. subtetrastachya*, *Boeck. in Linnæa*, xxxvii. 50. *F. pycnostachya*, *Hance in Journ. Bot.* xv. 338. *Abildgaardia Eragrostis*, *Boeck. l. c. 55* (*partly, not of Nees & Meyen*).—*Fimbristylis*, *Wall. Cat.* 3523.—*Trichelostylis* sp. n. 20, *Herb. Ind. Or. H. f. & T*.

KHASIA HILLS, alt. 3–5000 ft. MUNEYPOOR; alt. 3500 ft., *Watt*. DECCAN PENINSULA; *Courtallum*, *Wight*. NICOBARS. CEYLON, *Thwaites*, &c.—DISTRIB. Cambodia.

Glabrous. *Rhizome* hardly any. *Leaves* as long as $\frac{1}{2}$ – $\frac{2}{3}$ stem, by $\frac{1}{2}$ in. broad. *Umbel* $\frac{1}{2}$ –6 in. diam.; bracts about $\frac{1}{2}$ in.; spikelets in the common Khasia form 2–10 to a cluster, in the Ceylon form solitary. *Spikelets* $\frac{1}{2}$ by $\frac{1}{2}$ in., or sometimes much smaller. *Glumes* ovate, acute, keeled, adpressed. *Stamens* generally 2. *Style* as long as nut, slightly villous below trifurcation. *Nut* as long as $\frac{2}{3}$ glume.—This species might perhaps be arranged in Sect. *Abildgaardia*.

50. ***F. uliginosa***, *Steud. Syn. Cyp.* 109; stems 4–8 in. slender, leaves almost bristle-like, spikelets clustered black-chestnut, style 3-fld, nut obovoid smooth pale slightly narrowed at top. *Boeck. in Linnæa*, 25, 25.

NILGHIRI HILLS; alt. 6–7000 ft., *Perrottet*, &c.

Leaves as long as $\frac{1}{2}$ – $\frac{1}{3}$ stem, $\frac{1}{10}$ – $\frac{1}{5}$ in. broad. *Umbel* simple or often reduced to a single cluster sometimes to a single spikelet.—Otherwise as *F. nigro-brunnea*, *Thw.*, of which this may be a small mountain state.

51. ***F. digitata***, *Boeck. in Flora*, lxi. 35; stems 2–5 in. bristle-like base bulbous, spikelets 3–8 straw-colrd. in a subterminal head, style 3-fld, nut obovoid smooth straw-colrd. or finally brownish. *Benth. & Hook. f. Gen. Pl.* iii. 1050. *Scirpus Lawianus*, *Boeck. in Linnæa*, xxxvi. 479. *Trichelostylis digitata*, *H. f. & T. ms.*

BOMBAY; *Dalzell*. CANARA; *Law*, *Young*; *Belekerri*, *Talbot*.

Glabrous. *Leaves* as long as $\frac{1}{2}$ stem, bristle-like. *Bracts* 2–1, shorter than head. *Spikelets* $\frac{1}{2}$ – $\frac{1}{4}$ by $\frac{1}{10}$ – $\frac{1}{5}$ in., 6–18-fld. *Glumes* ovate-oblong, scarcely acute, keeled, chaffy, nearly 1-colrd. *Style* nearly as long as nut, glabrous, deciduous, with small pyramidal style-base, branches linear. *Nut* as long as $\frac{1}{2}$ glume, sessile, round-trigonal, obtuse at top.

Sect. IV. ABILDGAARDIA (Genus) *Vahl Enum.* ii. 296. Lower glumes of spikelet distichous or nearly so, upper fertile glumes spirally placed. (See also *F. nigrobrunnea*, sp. n. 49 above.) Spikelets not clustered.

* *Spikelets pale, nut large triquetrous base much narrowed.*

52. **F. monostachya**, *Hassk. Pl. Jav. Rar.* 61; stems leafy at base with 1 (rarely 2-3) spikelet, nut-bearing glumes 2-3-stichous shortly mucronate, style 3-fid, nut somewhat large obovoid more or less tuberculate straw-colrd. or pale-brown. *Benth. Fl. Austral.* vii. 308. *Cyperus monostachyus*, *Linn. Mant.* 180; *Rottb. Descr. et Ic.* 18, t. 13, fig. 3. *C. indicus*, *Pers. Syn.* i. 65. *Scirpus schoenoides*, *Roxb. Fl. Ind.* i. 221. *Abildgaardia monostachya*, *Vahl Enum.* ii. 296; *Dalz. & Gibs. Bomb. Fl.* 286; *Thw. Enum.* 347; *Boeck. in Linnæa*, xxxvii. 53. *A. lævigata*, *Link Jahrb.* iii. 81. *A. Rottboelliana*, *Nees in Wight Contrib.* 95. *A. compressa*, *Presl. Rel. Hænk.* i. 179. *A. indica*, *Nees in Linnæa*, ix. 289.—*Abildgaardia*, *Wall. Cat.* 3491.

Throughout warmer INDIA.—DISTRIB. All warm regions.

Glabrous. *Rhizome* 0, or very short. *Stems* 2-16 in., tufted, slender, angular. *Leaves* as long as $\frac{1}{2}$ stem, narrow. *Spikelet* quasi-terminal (bract hardly any) $\frac{1}{2}$ by $\frac{1}{2}$ in., or in some of Wallich's collections nearly twice these dimensions, compressed with glumes distichous), or often twisted. *Glumes* ovate, acute, keel green, sides straw-colrd. or yellow. *Stamens* 3; anthers linear-oblong not crested. *Style* long, villous nearly to the base, deciduous with pyramidal style-base; branches rather short. *Nut* as long as $\frac{1}{3}$ -1 glume, base much contracted.

53. **F. tristachya**, *Thw. Enum.* 434 (not of Br. or Nees); stem stout leafy at base with 2-5 (rarely 1) large spikelets, nut-bearing glumes 2-3-stichous shortly mucronate, style 3-fid, nut large obovoid tuberculate ultimately brown-black. *Cyperus triflorus*, *Linn. Mant.* 62. *Schoenus cyperoides*, *Retz Obs.* iv. 8. *Abildgaardia tristachya*, *Vahl Enum.* ii. 297; *Nees in Wight Contrib.* 95; *Thw. l. c.* 347; *Boeck. in Linnæa*, xxxvii. 54. *A. monostachya*, var. *Hassk. Pl. Jav. Rar.* 61.—*Isolepis*?, *Wall. Cat.* 3492.

DECCAN PENINSULA, frequent; *Wight, &c.* CEYLON; *Thwaites*.—DISTRIB. Warmer Africa.

Stems 1-2 $\frac{1}{2}$ ft. *Leaves* as long as $\frac{1}{2}$ stem, rigid. *Spikelets* 1 in., compressed, often twisted.—This species is altogether larger than the common forms of *F. monostachya*; from the large form of *F. monostachya* it does not differ much except by its dark nut.

** *Spikelets brown, nut small base not much narrowed.*

54. **F. fusca**, *Benth. in Gen. Pl.* iii. 1048; leaves several short flat, umbel often compound, bracts short, glumes few-ranked boat-shaped acute brown puberulous, style 3-fid, nut obovoid pale smooth slightly verrucose. *F. cinnamometorum*, *Hance in Journ. Linn. Soc.* xiii. 132 (not Kunth). *F. Kamphœveneri*, *Boeck. in Engler Bot. Jahrb.* v. 505. *Gussonia pauciflora*, *Brongn. in Bot. Duperr. Voy.* 171, t. 34, B. *Abildgaardia fusca*, *Nees in Wight Contrib.* 95; *Boeck. in Linnæa*, xxxvii. 54. *A. pauciflora*, *Kunth Enum.* ii. 249. *Schoenus puberulus*, *C. A. Meyer Cyp. Nov.* 2, t. 1. *Rynchospora* ? *anomala*, *Steud. Syn. Cyp.* 149; *Miq. Fl. Ind. Bat.* iii. 337. *Isolepis longispica*, *Steud. l. c.* 104.—*Fimbristylis*, *Wall. Cat.* 3530.

NEPAL; *Wallich*. BURRAKUR; *Kurz*. PEGU; *Kurz*. PENANG; alt. 2500 ft., *Kunstler*.—DISTRIB. Malaya, China.

Rhizome very short, woody, horizontal, densely leafy. Stems about 1 ft., slender, angular, glabrous. Leaves scarcely as much as $\frac{1}{2}$ stem, $\frac{1}{2}$ in. broad, minutely pubescent or nearly glabrous, tip obtuse. Umbel 1-2½ in. diam., with about 10-20 spikelets; bracts $\frac{1}{2}$ - $\frac{3}{4}$ in., usually hairy. Spikelets $\frac{1}{2}$ - $\frac{3}{4}$ by $\frac{1}{8}$ in., flattened; lowest three glumes empty, lowest 2 shorter; nut-bearing glumes 2-6, subdistichous, upper glumes 3-6 male or sterile 3-several-ranked. Glumes submucronate, margins scarious, upwards often glandular. Stamens usually 2. Style long, slender, glabrous, deciduous with pyramidal style-base; branches linear. Nut as long as $\frac{1}{2}$ - $\frac{3}{4}$ glume, subacutely trigonous, obtuse; outermost cells somewhat lax, sometimes almost papillose.

55. **F. fulvescens**, *Thw. Enum.* 434; annual, glabrous, leaves as long as $\frac{1}{2}$ - $\frac{3}{4}$ stem, otherwise nearly as *F. fusca*, var. β *longifolia*. *Boeck. in Linnæa*, xxxvii. 55. *Abildgaardia fulvescens*, *Thw. l. c.* 347.

CEYLON; *Walker, Thwaites* (n. 679).

Stems tufted. Umbel nearly as in *F. fusca*, or sometimes more loose, with pale-cinnamon long-pedicelled spikelets; bracts ligulate scabrous. Spikelets $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, i.e. often rather broader than in *F. fusca*.

56. **F. cyperoides**, *Br. Prodr.* 228; leaves several long narrow, umbel compound, bracts short, glumes few-ranked boat-shaped acuminate brown glandular, style 3-fid, nut oblong-obovoid pale transversely trabeculate. *Benth. Fl. Austral.* vii. 317. *F. biflora*, *Boeck. in Linnæa*, xxxviii. 393. *Abildgaardia cyperoides*, *Nees in Wight Contrib.* 95 (in note). *Gussonea cyperoides*, *Presl. Rel. Hænk.* i. 183, t. 33 (see *Benth. & Hook. f. Gen. Pl.* 1049.)

N. AUSTRALIA, PHILIPPINE, CAROLINE ISLES.

Stems about 1 ft., slender (base thickened by horny sheaths) closely approximate on a very short rhizome. Leaves as long as $\frac{1}{2}$ - $\frac{3}{4}$ stem, glabrous or minutely hairy. Umbel 1-3½ in. diam., sometimes with 80 spikelets usually with much fewer, glabrous or minutely hairy; bracts $\frac{1}{2}$ -1 in. Spikelets $\frac{1}{2}$ by $\frac{1}{2}$ in., flattened; lowest 2-3 glumes empty, lowest 1-2 small; nut-bearing glumes 2-4, distichous, upper glumes 3-6, male or sterile, 3-several-ranked. Stamens often 3. Style long, slender, deciduous with its hairy pyramidal style-base; branches linear. Nut as long as $\frac{2}{3}$ glume, round trigonous.—California (*Presl.*) is an error for Manila.

Var. *cinnamometorum* (sp.) *Kunth Enum.* ii. 229; roots fibrous, stems tufted, nut shining somewhat polygonal, outermost cells transversely oblong superimposed regularly in 7-11 vertical series on each face (i.e. nut 7-11-ribbed on each of its 3 faces). *Boeck. in Linnæa*, xxxvii. 35. *F. glabra*, *Steud. Syn. Cyp.* 111, chiefly. *Scirpus cinnamometorum*, *Vahl Enum.* ii. 278. *Trichelostylis cinnamometorum*, *Nees in Linnæa*, ix. 290. *Abildgaardia cinnamometorum*, *Thw. Enum.* 347 (excl. syn. *fusca*).—Pegu and Ceylon; China.—*Steudel's F. glabra* is founded on *Hohenacker* n. 131, a, which is this "cinnamometorum," mixed with *F. tenera* var. *oxylepis*; *Steudel's* description regards mostly *cinnamometorum*.

57. **F. actinoschoenus**, *C. B. Clarke*; leaves hardly any, spikelets in one small dense head 4-1-fid., glumes about 6 few-ranked lower subdistichous, style 3-fid, nut small obovoid trigonous. *Actinoschoenus filiformis*, *Benth. in Hook. Ic. Pl.* xiv. 33, t. 1346. *Arthrostylis filiformis*, *Thw. Enum.* 352; *Boeck. in Linnæa*, xxxvii. 524.

CEYLON; *Thwaites* (n. 3469), *Beckett*.

Glabrous, perennial. Stems slender, 12-30 in. Leaves 0- $\frac{1}{2}$ in., setaceous, green, close to base of stem. Spikelets up to 20 in a globose head $\frac{1}{2}$ - $\frac{1}{2}$ in. diam.; bracts 0- $\frac{1}{2}$ in., setaceous. Spikelets $\frac{1}{2}$ in., usually 2-fid., lower flower alone perfecting a

nut ; but sometimes 4-fld., the three lower flowers perfect. Lowest 3 *glumes* smaller empty ; glume subaristate, with recurved point (but see var. β). *Style* deciduous ; base conic, dilated. *Nut* smooth, reticulate.

Var. β *chinensis* ; spikelets less numerous, points of fl.-glumes shorter suberect. *Arthrostylis chinensis*, *Benth. Fl. Hongk.* 397. *Actinoschoeni* sp. *Benth. in Hook. Ic. Pl.* xiv. 33.—Perak, alt. 6500 ft., *Wray*, n. 354, alt. 800 ft., *Kunstler* (n. 3373).—Hongkong.

58. **F. disticha**, *Boeck. in Linnæa*, xxxviii. 393 ; stems 4–10 in. slender base leafy, umbel 1–3 times divided slender lax, spikelets small narrowly oblong flattened, lower glumes distichous, style 3-fid, nut obovoid pale verrucose almost tuberculate.

TAVOY ; *Wallich*. MOULMEIN ; *Parish*. MERGUI ; *Griffith*.—DISTRIB. Cochin China.

Annual. *Stem* 5-striate, base thickened by numerous sheaths. *Leaves* in the type 2 in., often much longer, flat, glabrous, tip obtuse. *Umbel* 4 in., nearly glabrous, bracts $\frac{1}{2}$ in. *Spikelets* $\frac{1}{2}$ by $\frac{1}{16}$ in., pale brown, with about 15 flowers. *Glumes* boat-shaped, ovate, subobtuse, glabrous, margins minutely hairy, 1–2 lowest empty deciduous. *Stamens* often 3. *Style* long, glabrous, deciduous with pyramidal style-base, branches long. *Nut* as long as $\frac{1}{3}$ – $\frac{2}{3}$ glume, round-trigonous.

Var? *Kurzii* ; stouter, umbel denser, rays hairy, spikelets stouter, glumes distichous densely minutely hairy.—Sikkim Terai ; *Titaliya*, *Kurz*.

DOUBTFUL SPECIES OF *Fimbristylis*.

F. GAMBLEANA, *Boeck. Cyp. Nov.* ii. 40.—MADRAS ; alt. 3000 ft., *Gamble*.—"Allied to *F. tenera*," *Boeck*.

9. **BULBOSTYLIS**, *Kunth*.

Annuals. *Stems* slender, leafy only at base. *Leaves* very narrow and sheaths generally finely hairy. *Corymb* umbelliform or congested, sometimes reduced to 1 spikelet. *Spikelet* of numerous axillary perfect flowers, tabescent at top. *Glumes* imbricated on all sides, 2–1 lowest empty. *Hypogynous bristles* 0. *Stamens* 3–1, usually 2 ; anthers not crested. *Style* as long as nut, linear, glabrous ; branches 2, linear ; style-base very small, bulbiform ; style with style-base deciduous, leaving a minute button on apex of nut. *Nut* obovoid, obtuse, 3-gonous, scarcely stalked, smooth.—Species 70, all warm regions.

This genus comprises a large group of very closely allied species, easily recognized by the fine leaves and needle-like hairs, as well as by the peculiar button left on the nut (itself ultimately deciduous). They are placed in *Fimbristylis* by *Bentham*, who laid great stress in the *Cyperaceæ* on the inflorescence ; and by *Boeckeler* in *Scirpus*. They are really very closely allied to *Eleocharis* (of which genus one American species is *Bulbostylis nudipes*, *Kunth*), from which genus the few Indian *Bulbostylides* are easily distinguished by their leaves.

1. **B. barbata**, *Kunth Enum.* ii. 208 (see p. 205) ; stem glabrous with 3–20 spikelets in a globose head, style 3-fid, nut straw-colour obscurely reticulated or porose-punctate. *B. Wallichiana* and *Willdenowii*, *Kunth l. c.* 209, 210. *Scirpus barbatus*, *Rottb. Descr. et Ic.* 52, t. 17, fig. 4 ; *Boeck. in Linnæa*, xxxvi. 751 (excl. var. β). *S. antarcticus*, *Thunb. Fl. Cap.* 96 ; *Roxb. Fl. Ind.* i. 223 (not *Linn.*). *S. monander*, *Roxb. l. c.* 222. *S. puberulus*, *Boeck. l. c.* 767 (*armeroides* only). *Isolepis barbata*, *Br. Prodr.* 222 ; *Nees in Wight Contrib.* 109 ; *Strachey Cat. Pl. Kumaon*, 73 ; *Miq. Fl. Ind. Bat.* iii. 310 ; *Thw. Enum.* 350. *I. Wallichiana*, *Roem. &*

Sch. Syst. Mant. ii. 533. *I. capillaris*, *Don Prodr.* 39 (not *Roem. & Sch.*). *I. Cumingii* and *I. involuclata*, *Steud. Syn. Cyp.* 101. *I. subtristachya*, *Hochst.*; see *Boeck. l. c.* 752. *Fimbristylis monandra*, *Roem. & Sch. Syst. Mant.* ii. 59. *F. barbata*, *Benth. Fl. Austral.* vii. 321.—*Burm. Thes. Zeyl.* t. 47, fig. 2.—*Isolepis*, *Wall. Cat.* 3481, 3497.

Throughout INDIA, alt. 0–4000 ft., from KASHMIR and ASSAM to CEYLON and SINGAPORE.—DISTRIB. Warm regions.

Stems tufted, 2–10 in., bristle-like, striated. *Leaves* as long as $\frac{1}{2}$ stem; sheaths usually with needle-like hairs at least in their throat. *Capitulum* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; bracts shorter, or much longer, than head. *Spikelets* $\frac{1}{2}$ – $\frac{1}{3}$ in., oblong-lanceolate. *Glumes* boat-shaped, ovate, scarcely acute, rusty brown with green keel, margins minutely ciliate, sides puberulous or glabrate. *Nut* as long as $\frac{1}{2}$ glume.

Var. *pulchella* (sp.) *Thw. Enum.* 350 (under *Isolepis*); lower glumes ovate-lanceolate longer more rigid than in *B. barbata* type. *Scirpus Thwaitesii*, *Boeck. in Linnæa*, xxxviii. 380,—*Isolepis*, *Wall. Cat.* 3480, B. 3481 C.—South Madras. Pondicherry; *Perrottet*; Tuticorin; *Wight n.* 2891, *Wallich.* Ceylon; *Thwaites n.* 829, 3761), &c.—The type form of this var. looks a separable species, but there are intermediates which I cannot sort between the two; *Wight* regarded all as one species.

2. ***B. subspinescens***, *C. B. Clarke*; stem hairy with about 10 spikelets in an almost prickly head, style 3-fid, nut pale brown.

ORISSA; POORI, *W. S. Atkinson, Clarke.*

Whole plant pubescent. *Stems* 4 in., rigid, curved. *Leaves* as long as $\frac{1}{2}$ stem. *Spikelets* nearly $\frac{1}{2}$ in., hard, almost stellately spreading; bracts about as long as the head. *Glumes* scarcely keeled, densely pubescent.—Otherwise as *B. barbata*, of which it might be treated as a var. growing in sea sand.

3. ***B. capillaris***, *Kunth Enum.* ii. 212 (see p. 205); stem glabrous, spikelets nearly all solitary in a simple or compound umbel, style 3-fid, nut pale transversely undulate. *Scirpus capillaris*, *Linn. Mant.* 321.

Throughout AMERICA.

Var. *trifida* (sp.) *Kunth Enum.* ii. 213; nut smooth or often verrucose not transversely undulate. *Scirpus densus*, *Wall. in Roeb Fl. Ind.* (ed. Carey & Wall.) i. 231. *S. gracillimus*, *Boeck. in Linnæa* xxxvi. 761. *S. trifidus*, *Hance in Journ. Bot.* xvi. 112. *Isolepis trifida*, *Nees in Wight Contrib.* 108; *Strachey Cat. Pl. Kumaon*, 73; *Thw. Enum.* 350. *I. tenuissima*, *Don Prodr.* 40. *I. densa*, *Roem. & Sch. Syst. Mant.* ii. 71; *Nees in Wight Contrib.* 109. *I. trichokolea*, *Steud. Sen. Cyp.* 96; *Miq. Fl. Ind. Bat.* iii. 308. *Fimbristylis capillacea*, *Steud. l. c.* 111. *F. capillaris*, *Benth. Fl. Austral.* vii. 322 (partly); *Boiss. Fl. Orient.* v. 390.—*Isolepis*, *Wall. Cat.* 3476.

Very common from the HIMALAYA, alt. 0–8500 ft., to CEYLON.—DISTRIB. Warm regions of Old World.

Stems tufted, 4–10 in., slender, striate, glabrous under umbel. *Leaves* as long as $\frac{1}{2}$ – $\frac{2}{3}$ stem, bristle-like, nearly glabrous; sheaths with needle-like hairs at least in their throat. *Umbel* very variable; in form *densus* (sp. *Wall.*) umbel very compound dense with spikelets; in *trifida* (sp. *Kunth*) umbel with 3 or not rarely 2–1 spikelets. *Spikelets* in the Indian plants solitary, $\frac{1}{2}$ in., ellipsoid or oblong, 6–15-fid. *Glumes* boat-shaped, ovate, obtuse, brown or blackish, puberulous, keel green scarcely excurrent in a mucro. *Nut* as long as $\frac{2}{3}$ glume.—Some Indian specimens have stems 16 in. with large compound umbels.—I cannot separate this specifically from the American type *capillaris*; the shape of the outermost cells of the nut is identical in the two, the superficial difference in marking is often imperfectly developed.

4. ***B. puberula***, *Kunth Enum.* ii. 213 (see p. 205); stem pubescent or

puberulous under umbel, umbel often congested (sometimes lax) spikelets solitary, style 3-fid, nut pale transversely wrinkled. *Scirpus puberulus*, *Poir. Encycl.* vi. 767; *Boeck. in Linnæa*, xxxvi. 767. *S. Wightianus*, *Boeck. l.c.* 765 (*in great part*). *S. barbatus*, *Boeck. l.c.* 751 (*as to syn. Isolepis gracilis and Thwaites* n. 834). *I. gracilis*, *Nees in Wight Contrib.* 109 (*not Linnæa*, x. 161); *Kunth l.c.* 217; *Thw. Enum.* 350. *I. puberula*, *Steud. Syn. Cyp.* 103. *Cyperus pubescens*, *Steud. l.c.* 50.

DECCAN PENINSULA, *Wight*. CEYLON; *Thwaites* n. 834. MERGUI; *Griffith. MALACCA*; *Kunstler. SINGAPORE*; *Burbridge*.—DISTRIB. Trop. Africa, Malaya and Cochin China.

Very near *B. capillaris*; the spikelets are really solitary, but often closely packed in an umbel less than 1 in. diam. In *Wight* n. 1892 (type of *Isolepis gracilis*, *Nees*) the stems are long, very slender; the umbel is lax, some pedicels $\frac{3}{8}$ in. long.

10. **SCIRPUS**, Linn. (partly).

Herbs of very various habit, all glabrous (or the inflorescence slightly hairy). *Spikelets* usually many-fid. (lower glumes spirally imbricated) sometimes few-fid. (lower glumes subdistichous upper spirally imbricated). *Glumes* 1-2 (rarely 3) lowest empty, several (rarely 1) succeeding with perfect nut-bearing flowers, upper tabescent. Hypogynous bristles 7-1 setaceous, or 0, or (in *S. littoralis* and *S. Isolepis*) sometimes broad ovate. *Stamens* 3-1, anterior; anthers linear-oblong or oblong, crested or unappendaged. *Style* long or short, glabrous, 3-fid or 2-fid, base linear or linear-conic, continuous with apex of nut. *Nut* trigonous or plano-convex, sessile or nearly so.—Species 125, all regions.

This genus here includes (in several very dissimilar sections) all the scirpoid species left after the neighbouring genera have been taken out. *Eleocharis* and *Fimbristylis* differ by the enlarged style-base (separated from the nut by a constriction or a line); *Fuirena* and *Bulbostylis* have hairy leaves; *Eriophorum* has bristles ligulate, laciniatè (to the base in the Indian species).

Sect. I. MONOSTACHYI. Small or slender. Stems (or branches) with one spikelet. Style long.

1. **S. fluitans**, Linn. *Sp. Pl.* 71; stem weak elongate branched leafy upwards, bristles 0, style 2-fid, nut plano-convex obovoid smooth pale. *Reichb. Ic. Fl. Germ.* viii. 38, t. 298 (*excl. the triquetrous nut*); *Boeck. in Linnæa*, xxxvi. 485 (*excl. var. γ and part β*). *Isolepis fluitans*, *Br. Prodr.* 221; *Thw. Enum.* 350. *I. curvula*, *Kunth Enum.* ii. 189. *I. curvata*, *Zoll. Verz. Ind. Archip.* ii. 62. *Eleogiton fluitans*, *Link Hort. Berol.* i. 284. *E. curvulus*, *Nees in Wight Contrib.* 110.

KHASIA HILLS; alt. 1-3000 ft. NILGHIRI HILLS; *Perrottet, &c.*, with more rigid purple glumes (*var. spadicea*). CEYLON; *Thwaites, &c.*, with shortened curved nodes and clustered peduncles and leaves (*var. curvula*).—DISTRIB. Nearly all regions.

Root fibrous. *Stems* 2-12 in. long, flaccid, in water or on mud. *Leaves* $\frac{1}{2}$ -2 $\frac{1}{2}$ in., very narrow. *Peduncles* 1-4 in. *Spikelet* $\frac{1}{10}$ - $\frac{1}{2}$ in., many- or few-fid.; bract usually shorter than the spikelet, or 0. *Glumes* ovate, obtuse, concave. *Nut* as long as $\frac{1}{2}$ - $\frac{3}{4}$ glume; outermost cells small quadrate-hexagonal obscure (i.e. nut smooth or obsoletely reticulate).

2. **S. submersus**, *Sauvalle Fl. Cuba*, 175; stem weak elongate branched leafy upwards, bristles 6 overtopping nut, style 2-fid, nut (only

one in each spikelet) plane-convex lanceolate-obovoid smooth pale. *S. confervoides*, *Poir. Encyc.* vi. 755 (non *Boeck.*); *Kunth Enum.* ii. 173 partly (the *descript.* not the *diagnosis*). *Eleocharis*? *confervoides*, *Miq. Fl. Ind. Bat.* iii. 303. *Rynchospora ruppoides*, *Benth.* (*Rhynchospora*) in *Hook. Ic. Pl.* xiv. 31, t. 1344; *Trimen Cat. Ceylon Pl.* 103 and in *Journ. Bot.* xxiii. 140. *Websteria limnophila*, *S. H. Wright in Bull. Torrey Club*, xiv. [1887] 135.

CEYLON; *Thwaites* (C.P. 3936); Colombo, *Beckett*.—DISTRIB. Sporadic, tropical.

Floating. *Stems* 10–20 in. *Leaves* 2–4 in., clustered, capillary. *Spikelet* $\frac{1}{2}$ in., oblong-lanceolate. *Glumes* two lowest concave, elliptic-oblong, thin, enclosing the spikelet; upper glumes smaller, male or sterile, sometimes 0; lowest glume empty, the next supporting a perfect nut-bearing flower. *Bristles* setaceous, retrorse-scabrous, straw-colrd. *Nut* half as long as its glume, itself style and style-base exactly as in *S. fuitans*, but much larger.

3. ***S. pauciflorus***, *Lightf. Fl. Scot.* 1078; leafless, spikelet quasi-terminal few-fl'd., bristles 6–8, style 3-fid, nut trigonous obovoid smooth pale or somewhat brown; *Reichb. Ic. Fl. Germ.* viii. 38, t. 299; *Boeck. in Linnæa*, xxxvi. 479. *S. Bæothryon*, *Ehrh. Phytoph.* n. 31; *Linn. f. Suppl.* 103.

WEST TIBET; *Thomson*. KASHMIR; alt. 8000 ft., *C. B. Clarke*.—DISTRIB. N. temp. and cold regions.

Roots fibrous, but stolons sometimes added. *Stems* 2–10 in., leafy only near base, erect, clustered; uppermost sheath truncate, often marked by a brown transverse line, sometimes apiculate on one side. *Spikelet* $\frac{1}{2}$ – $\frac{1}{4}$ in., subebracteate, bearing about 5 nuts. *Glumes* ovate, obtuse, dusky chestnut. *Bristles* about as long as nut, retrorse-scabrous, straw-colrd. *Nut* as long as $\frac{2}{3}$ the glume; style-base narrowly pyramidal continuous with nut; outermost cells of nut small, subhexagonal, withering (i.e. nut smooth, lead-colrd., smooth or minutely reticulate, white-veiled).

4. ***S. pumilus***, *Vahl Enum.* ii. 243; leaves very short, spikelet quasi-terminal few-fl'd., bristles 0, style 3-fid, nut trigonous obovoid glistening black. *S. alpinus*, *Schleich. Cat.* 1821; *Reichb. Ic. Fl. Germ.* viii. 38, t. 300; *Boeck. in Linnæa*, xxxvi. 480; *Boiss. Fl. Orient.* v. 378. *S. cæspitosus*, *Boeck. in Linnæa*, xxxvi. 488 (the *Asiat.* examples and *syns.*). *Isolepis pumila*, *Roem. & Sch. Syst.* ii. 106. *I. oligantha*, *C. A. Meyer Cyp.* Nov. 3, t. 1.

KASHMIR; W. Tibet, Skardo and Hanle, alt. 14,000 ft. *Thomson*; Gurais, *Winterbottom*; Gilgit, *Giles*.—DISTRIB. N. temp. and cold regions.

Stolons slender, becoming wiry black creeping rhizomes. *Stems* 2–6 in., setaceous, green. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., setaceous, green. *Spikelet* scarcely $\frac{1}{2}$ in., ovoid.—Otherwise as *S. pauciflorus*, *Lightf.*, of which this species has been reckoned a var. (see *Roem. & Sch. Syst. Mant.* ii. 72 in *Obs.*); ripe examples are easily recognized by the shining black nut. The rhizome (most commonly 0 in *S. pauciflorus*) is here black, woody, though very thin.

Sect. 2. **ISOLEPIS** (Genus), *Br. Prodr.* 221. Small or middle-sized. *Stems* leafy only near the base. *Spikelets* usually in clusters. No trace of hypogynous bristles. *Style* long, 3-fid.

5. ***S. setaceus***, *Linn. Sp. Pl.* 73 (*partly*); small, stem bearing 1–3 spikelets in a quasi-lateral head, style 3-fid, nut longitudinally striate and transversely trabeculate between the striations, *Reichb. Ic. Fl. Germ.* viii. 39, t. 301. *Boeck. in Linnæa*, xxxvi. (*excl. var. β & γ*). *Isolepis setacea*, *Br. Prodr.* 222; *Nees in Wigt Contrib.* 107; *Strachey Cat. Pl. Kumaon*, 72 (*excl. syn. pygmæa*).

Temp. and Alpine HIMALAYA, alt. 8-13,000 ft., from Kashmir to SIKKIM.—DISTRIB. Throughout Europe, Asia; in Africa; in Australia.

Rhizome $\frac{1}{2}$ -3 in., almost filiform, or more often 0. *Stems* 1-8 in. *Leaf* usually about 1 in., setaceous, sometimes nearly as long as the stem. *Spikelets* $\frac{1}{2}$ - $\frac{1}{4}$ in., 6-20-fld.; bract as though a continuation of the stem. *Glumes* ovate, obtuse, keeled. *Nut* as long as half its glume, trigonous obovoid, obtuse, minutely apiculate; outermost cells transversely short-oblong, superimposed in 6-9 vertical series on each face, so that the nut appears on each face longitudinally 6-9-striate.—Much mixed in herbaria, and by many authors (even Boeckeler), with *S. cernuus*, Vahl (*S. Savii*, Sebast. & Mauri) which differs in the smooth nut, i.e. the outermost cells are quadrate-hexagonal, somewhat obscure, not arranged in vertical series (nut minutely reticulate not horizontally striate). *S. cernuus*, Vahl is a cosmopolitan species, except India and the adjacent countries.

6. **S. Holoschoenus**, Linn. *Sp. Pl.* 72; stems rather stout, umbel lateral (rarely reduced to a single head) of distant dense globes of numerous small spikelets, style 3-fid, nut trigonous obovoid smooth minutely reticulate leaden-black. Boeck. in *Linnæa*, xxxvi. 720; Boiss. *Fl. Orient.* v. 381. *Holoschoenus vulgaris*, Link *Hort. Berol.* i. 293. *H. filiformis* and *H. australis*, Reichb. in *Flora*, 1830, p. 499, 500, and *Ic. Fl. Germ.* viii. 44, 45, t. 316, 317 (erroneous as to setæ).

PUNJAB; Hazara, alt. 4000 ft., Stewart. SIND; Pinwill.—DISTRIB. Europ., Afric., W. Asia.

Rhizome horizontal, woody, covered by ovate chestnut scales; fibrous roots thick, often (when growing in sand) woolly. *Stems* 8-30 in., approximate, terete. *Leaves* all near the base of the stem, sometimes 6 in. long, usually shorter, or reduced almost to sheaths. *Umbel* simple or very compound of 1-80 usually (2-10) heads; lowest bract sometimes 4-8 in., sometimes $\frac{1}{2}$ -1 in. *Spikelets* scarcely $\frac{1}{2}$ in., ellipsoid, dense-fld. *Glumes* ovate, keel subexcurrent, tip hairy (rarely glabrous). *Stamens* 3; anthers red-crested. *Nut* small, as long as $\frac{1}{2}$ - $\frac{2}{3}$ glume, subtriquetrous, obtuse, minutely apiculate; outermost cells minute, quadrate-hexagonal, obscure, withering (nut more or less white-veiled by such withered fragments on the dark nut).—In one example in Herb. Calcutta (from the N.-W. Himalaya?) I found two lateral scales, very similar, and similarly placed to those occasionally found in *S. Isolepis*, Boeck., but much stouter, and which I suppose may represent 4 bristles dilated and connate in pairs. (See *Journ. Bot.* xxx. 321-323.)

Sect. 3. SCIRPUS PROPER. Large or middle-sized. Stems leafy only near the base. Inflorescence various, but spikelets not spicate. Hypogynous bristles often present. Style long.—Differs from *Sect. Isolepis* very little except in the frequent presence of bristles.

* *Nut more or less transversely muricated (the outer cells of the nut are longitudinal oblong, so that their thickened, often elevated, ends form a transverse wavy line).*

In these 6 closely allied species—spikelets clustered—clusters solitary or umbellate glumes entire, i.e. apex neither emarginate nor hispid—bristles simply scabrous or 0—anthers not crested—style 3-fid (or in *S. debilis* 2-fid.)

7. **S. supinus**, Linn. *Sp. Pl.* 73 (partly); stems medium terete, spikelets in a single lateral head (in var. heads few closely umbelled), glumes ovate keeled with suberect mucro, bristles 0, style 3-fid, nut obovoid triquetrous obtuse transversely scabrous-undulate black. Roxb. *Fl. Ind.* i. 217; Reichb. *Ic. Fl. Germ.* viii. 40, E, 302; Boeck. in *Linnæa*, xxxvi. 699 (excl. var. β and γ). *S. melanospermus*, A. C. Meyer, *Cyp. Nov.* t. 2. *Isolepis supina*,

Br. Prod. 221; *Nees in Wight Contrib.* 107; *Miq. Fl. Ind. Bat.* iii. 309. *Schœnus junceus*, Willd. *Phyt.* i. 2, t. 1, fig. 4.—*Scirpus*, *Wall. Cat.* 3461.

Throughout INDIA and CEYLON (except Assam), alt. 0–3000 ft.—DISTRIB. Old World generally, and in America.

Roots fibrous. *Stems* 2–12 in. *Leaves* short, usually less than an inch. *Head* of 7–1 spikelets, quasi-lateral; lowest bract as though a continuation of the stem, 1–4 in., terete, channelled (not triquetrous). *Spikelets* $\frac{1}{2}$ – $\frac{1}{2}$ in., many-fld., sub-pentagonous. *Nut* as long as half glume, acutely triquetrous, or slightly compressed.

Var. *uninodis*; heads umbellate, on 3–1 rays rarely so much as 1 in. *S. mucronatus*, *Roxb. Fl. Ind.* i. 216 (not of Linn.). *Isolepis uninodis*, *Delile Fl. Egypt.* 8, t. 6, fig. 1. *I. ambigua*, *Zoll. Syst. Verz. Ind. Archip.* ii. 62 (not of Steud.). *I. oryectorum*, *Steud. Syn. Cyp.* 96.—SIND; Pinwill. BENGAL; Wallich, J. D. H. COROMANDEL; Roxburgh; Wight. CEYLON; Leschenault, *Macrae*.—DISTRIB. Trop. Africa, Java, Austral.

8. *S. erectus*, *Poir. Encyc.* vi. 761; stems medium or elongate terete, spikelets in a single lateral head, glumes ovate concave incurved, bristles 6–5 rarely 0, style 2–3-fid, nut broadly obovoid plane-convex obtuse slightly transversely wavy black. *S. debilis*, *Pursh Fl. Am. Sept.* i. 55; *Benth. Fl. Austral.* vii. 232. *S. juncoideus*, *Roxb. Fl. Ind.* i. 216; *Miq. Fl. Ind. Bat.* iii. 303. *S. luzonensis*, *Presl. Rel. Hænk.* i. 193; *Nees in Wight Contrib.* 112. *S. Wallichii*, *Nees in Wight Contrib.* 112. *S. junciformis*, *Nees l. c.* 112 (not of Retz). *S. timorensis*, *Kunth Enum.* ii. 162. *S. supinus*, var. β and γ Boeck. in *Linnæa*, xxxvi. 600. *S. lateralis*, *Herb. Heyne* and *S. ternatus*, *Herb. Ham.*; *Wall. Cat.* 3462, 3468, 3469, 4471. *Eleocharis juncoideus*, *Schultes in Roem. & Sch. Syst. Mant.* ii. 90.

Throughout INDIA with CEYLON; alt. 0–3000 ft.—DISTRIB. Temp. Asia and N. Am., Austral.

This species united with *S. supinus* by Boeckeler has been again separated by Bentham l. c. on the characters of the bristles, style branches and nut. The two appear amply distinct; *S. supinus* has carinate glumes and angular spikelets, *S. erectus* has concave glumes and terete spikelets.

9. *S. articulatus*, *Linn. Sp. Pl.* i. 70; stems medium terete spongy leafless, spikelets in a single lateral dense head, glumes ovate acute, bristles 0, style 3-fid, nut obovoid triquetrous faintly transverse wavy brown summit subpyramidal. *Rottb. Descr. et Ic.* 53; *Roxb. Fl. Ind.* i. 214; *Boeck. in Linnæa*, xxxvi. 702. *S. fistulosus*, *Forsk. Fl. Egypt-Arab.* 14. *S. prælongatus*, *Poir. Encyc.* vi. 764 and *Suppl.* v. 91. *S. incurvatus* and *S. subarticulatus*, *Roxb. Fl. l. c.* 214, 215. *Isolepis articulata*, *Nees in Wight Contrib.* 108; *Thw. Enum.* 350; *Dalz. & Gibs. Bomb. Fl.* 286. *I. prolongata* and *I. incurvata*, *Nees in Wight Contrib.* 108. *Eleocharis incurvata*, *Schultes in Roem. & Sch. Syst. Mant.* ii. 92. *Holoschœnus incurvatus* and *H. subarticulatus*, *Dietr. Sp. Pl.* ii. 165, 166.—*Scirpus*, *Wall. Cat.* 3456, 3457, 3458, 3459.—*Rheede Hort. Mal.* xii. t. 71.

Throughout INDIA, alt. 0–3000 ft., from the HIMALAYA to CEYLON and MOULMEIN.—DISTRIB. Africa, Philippines, Australia.

Root fibrous. *Stems* 4–30 in., densely tufted, soft, often (when dry) transversely septate; sheaths at top membranous, soon torn. Lowest bract similar to the stem, appearing a continuation of it, and often longer than it. *Spikelets* $\frac{1}{2}$ – $\frac{1}{2}$ in. long, rusty or purple, usually many, but heads of few spikelets occur. *Glumes* slightly keeled, not notched at tip, margins neither fimbriate nor hairy. *Stamens* usually 3.

Style slender; branches 3, long. *Nut* nearly half as long as glume, almost symmetric-trigonus, faces concave.

10. *S. quinquefarius*, *Ham. in Wall. Cat.* 3465; stems medium or slender terete nearly leafless, spikelets 1-9 in a single lateral dense head, glumes broadly ovate acute inflated in fruit, bristles 0, style 3-fid, nut obovoid triquetrous faintly transversely wavy black. *Boeck. in Linnæa*, xxxvi. 701. *Isolepis lupulina* and *I. Roylei*, *Nees in Wight Contrib.* 107.

NORTHERN INDIA, from RAWUL PINDEE, *Aitchison*, SIND, *Pinwill*, and CENTRAL INDIA, *King*, to ASSAM, *Wallich & Griffith*.—DISTRIB. Turkestan, Cabul, Transvaal.

Root fibrous. *Stems* 2-12 in., often (when dry) transversely septate. *Spikelets* shining straw-brown. *Glumes* many-ribbed, sometimes laxly spiral, sometimes 5-ranked. *Nut* with interrupted paler transverse lines.—Very nearly allied to *S. articulatus*; but in the fruiting spikelets the glumes are looser inflated more shining, reminding *Nees* of hops (whence his name *lupulina*).

11. *S. mucronatus*, *Linn. Sp. Pl.* 73; stems medium or robust triquetrous nearly leafless, spikelets in a single lateral dense head, glumes ovate subacute, bristles 5 or 6 unequal, style 3-fid, nut obovoid trigonus shining black smooth scarcely transversely wavy. *Reichb. Ic. Fl. Germ.* viii. 40, t. 303; *Boeck. in Linnæa*, xxxvi. 703. *S. muticus*, *Don Prodr.* 41. *S. triangulatus*, *Roeb. Fl. Ind.* i. 217; *Nees in Wight Contrib.* 111. *S. javanus*, *Nees l. c.* 112. *S. sundanus*, *Miq. Fl. Ind. Bat.* iii. 304. *S. mysurensis*, *Herb. Heyne*; *Wall. Cat.* 3467.

Throughout INDIA, alt. 0-6000 ft.—DISTRIB. Europe, Madagascar, warmer Asia, Australia.

Roots fibrous or a short horizontal rhizome. *Stems* 8-30 in.; sheaths triangular-lanceolate membranous at top on one side. Lowest bract $\frac{1}{2}$ -4 in., as though a continuation of the stem, trigonus. *Spikelets* $\frac{1}{2}$ - $\frac{1}{2}$ in., pale or (especially in the hills) chestnut-colrd. *Glumes* keeled, many-ribbed, not notched at top, margins glabrous or minutely scabrous-hairy. *Bristles* retrorsely scabrous, two longer ones nearly as long as nut. *Nut* somewhat compressed, as long as $\frac{1}{2}$ glume.

12. *S. corymbosus*, *Heyne ex Roth. Nov. Sp. Pl.* 28; stems stout terete leafless, spikelets clustered on rays of a lateral umbel, glumes ovate acute mucronate, bristles 0, style 3-fid, nut obovoid trigonus black smooth or with faint transverse lines. *Boeck. in Linnæa*, xxxvi. 706. *S. inclinatus*, *Delile*; *Boiss. Fl. Orient.* v. 381. *S. bangalorensis*, *Herb. Heyne*; *Wall. Cat.* 3464. *Isolepis corymbosa*, *Roem. & Sch. Syst.* ii. 110, and *Mant.* ii. 65; *Nees in Wight Contrib.* 108. *I. inclinata*, *Barbey Levant*, t. 8, fig. 9.—*Isolepis*, *Wall. Cat.* 3471, 3472.

WESTERN INDIA; Sind, *Pinwill*. MOUNT ABOO and GOONAH, *King*. JUBBULPORE, *Beddome*. HYDERABAD, *Campbell*. BANGALORE, *Wallich*.—Africa, Madagascar.

Rhizome 2-4 in., horizontal. *Stems* approximate, 3 ft., at base $\frac{1}{2}$ in. in diam. *Umbel* simple or compound, rays usually short sometimes 5 in. long; lowest bract $\frac{1}{2}$ -4 in., suberect, hardly simulating a continuation of stem. *Spikelets* $\frac{1}{2}$ - $\frac{1}{2}$ in., rusty. *Glumes* faintly striate, glabrous, not notched at top. *Nut* scarcely $\frac{1}{2}$ as long as glume, pyramidal at top.—*S. supinus*, var. *uninodis* differs by having leaves and nut more obtuse.

** *Nut* smooth or obscurely reticulate (outer cells of nut subquadrate or, if longitudinally oblong, arranged as brick-wall parenchyma).—*Glumes* notched at top, except in *S. grossus*. *Bristles* 7-2, rarely 0.

13. **S. triqueter**, Linn. *Mant.* 29; stems stout triquetrous, leaves short, umbel subsimple lateral, spikelets clustered, bristles 3-6 retrorse-scabrous, style 2-fid, nut plane-convex smooth pale ultimately brown. *Reichb. Ic. Fl. Germ.* viii. 40, t. 305; *Benth. Fl. Austral.* vii. 334, in note. *S. Pollichii*, Gren. & Godr. *Fl. Franc.* iii. 374; *Boeck. in Linnæa*, xxxvi. 711.

KASHMIR and BALTISTHAN, alt. 6-8000 ft., *Jacquemont, Thomson, &c.*—DISTRIB. Europe, Central Asia to Japan, S. Africa.

Glabrous, except margin of glumes. *Rhizome* elongate, branching; scales ovate-triangular, striate, rusty-brown, often rubbed off. *Stems* 1-3 ft., two faces plane, third (flower-bearing) concave. *Leaves* $\frac{1}{2}$ -3 in. long, or hardly any. Lowest bract $\frac{1}{2}$ -2 in., triquetrous, as though continuing stem. Rays of umbel $\frac{1}{2}$ -2 in. with 2-8 clustered spikelets on each; or umbel congested nearly to a single head. *Spikelets* $\frac{1}{2}$ in. long, broad cylindric, rusty-brown (in the Himal. form). *Glumes* broadly ovate, keeled, notched at top with a short mucro in notch; margins scarious, ciliate, hairy. *Bristles* rigid, brown-red, often about as long as nut, incurved over its shoulders, scabrous with short white reflexed teeth (not plumose). *Stamens* 3, anthers with short red crests. *Style* fide Boeckeler sometimes 3-fid. *Nut* less than $\frac{1}{2}$ length of glume.—As to the specific name, Bentham has shown l. c. that this plant was *S. triqueter*, Linn., and that Boeckeler erred in discarding that name. It hardly differs from *S. lacustris* var. *carinata*, except by the more acutely triquetrous stem.

Var. *segregata*; ultimate rays of the umbel all (or nearly all) with one spikelet, bristles 3 (sometimes 2). ? *S. subulatus*, *Prain in Journ. As. Soc. Beng.* lx., part 2, 335.—Lower Bengal, especially the *Soondreebun*, C. B. Clarke.—New Guinea.—*Stolons* slender. Rays of the inflorescence sometimes again divided, sometimes $\frac{3}{4}$ in. long. *Bristles* 3 or 2 (usually 4 or more in *S. triqueter*, typ.), black-red.

14. **S. lacustris**, Linn. *Sp. Pl.* 72; stems stout terete or somewhat trigonous, umbels usually compound, spikelets clustered and solitary, bristles 6-5 retrorsely simply scabrous, style 2-3-fid, nut obovoid smooth finally black. *Reichb. Ic. Fl. Germ.* viii. 41, t. 306; *Boeck. in Linnæa*, xxxvi. 712; *Strachey Pl. Kumaon*, 73. *S. validus*, *Vahl Enum.* ii. 268. *S. Tabernæmontani*, *Gmel. Fl. Badens.* i. 101; *Reichb. l. c.* t. 307, 723. *S. carinatus*, *Sowerby Engl. Bot.* t. 1983. *S. Duvallii*, *Hoppe*; *Reichb. l. c.* 42, t. 308. *S. Meyenii*, *Nees in Linnæa*, ix. 293. *S. subulatus*, *Aitch. in Journ. Linn. Soc.* xix. 189. *Juncus zebrinus*, *Gard. Chron.* [1877] 399, t. 62.

KASHMIR, alt. 5500 ft., and LADAK, *Schlagintweit, &c.* Kumaon, alt. 4500 ft., *Thomson, Strachey & Winterbottom.* MUNEYPOOR, *Watt.*—DISTRIB. Europe, Africa, Australia, N. America.

Rhizome horizontal. *Stems* $1\frac{1}{2}$ -4 ft., often standing in water. *Leaves* hardly any, or sometimes 4 in., or (floating) 1-2 ft. *Umbel* usually once or twice divided, 4-6 in. in diam., sometimes reduced almost to a small head; lowest bract suberect, short. *Spikelets* $\frac{1}{2}$ in. long. *Glumes* ovate, notched at top with a small mucro in notch; margins membranous, pilose. *Bristles* as long as the nut or reduced, sometimes almost 0. *Stamens* 3, anthers crested. *Nut* $\frac{1}{2}$ - $\frac{3}{4}$ glume, plane-convex.—In type *S. lacustris*, the stem is terete, the style 3-fid; var. *Tabernæmontani* differs in style bifid; var. *carinata* in stem obscurely trigonous.—(*S. lacustris* of S. America is *S. riparius*, Presl.).

15. **S. maritimus**, Linn. *Sp. Pl.* 74; stems robust trigonous, leaves several long, umbel compound simple or capitate, glumes notched hairy at top mucronate, bristles 6-3 retrorse-scabrous rarely subobsolete, style 3-fid (see var.), nut obovoid smooth finally black. *Nees in Wight Contrib.* 111; *Reichb. Ic. Fl. Germ.* viii. 42, t. 310, 311; *Boeck. in Linnæa*, xxxvi.

722; *Dalz. & Gibs. Bomb. Fl.* 288. *S. corymbosus*, *Forsk. Fl. Ægypt. Arab.* 14 (not of Heyne). *S. tridentatus*, *Roxb. Fl. Ind.* i. 225.—*Fimbri-stylis*, *Wall. Cat.* 3504, 3505.

From KASHMIR, *Jacquemont*, KASHGAR, alt. 10,000 ft., *Scully*, and MORADABAD, *T. Thomson*, to MALABAR, *Law*, and MYSORE, *Heyne*.—DISTRIB. Old World, with vars. in Australia and America.

Rhizome creeping, woody, divided, nodes dilating into tubers. *Stems* 1½–6 ft., often covered some way up by sheaths. *Leaves* grass-like, harsh, often as long as stems. *Umbel* very variable in development, branches corymbose or subumbellate; spikelets 3–8 or solitary on each ray; or umbel rarely reduced to a head of 3–1 spikelets. Lowest *bract* often 4–10 in., sometimes much shorter. *Spikelets* large, commonly ½ in. in diam. *Glumes* erect, fine brown or chestnut-colrd. (but see var.); margins often subfimbriate. *Bristles* usually somewhat shorter than the nut, rigid, often unequal. *Stamens* 3; anthers red-crested. *Style* long. *Nut* very variable in size and shape at top; in the Indian form hardly more than ½ length of glume.

Var. affinis (sp.), *Roth. Nov. Pl. Sp.* 30; spikelets capitate usually 3–1, large ovoid lanceolate, glumes straw-colrd. sparingly hairy, bristles 4 as long as nut, style 2-fid, nut small. *Nees in Wight Contrib.* 111. *S. strobilinus*, *Roxb. Fl. Ind.* i. 219. *S. maritimus*, var. (sp. ?), *Maxim. Prim. Fl. Amur.* 299. *S. macrostachys*, *Boeck. Cyp. Nov.* i. 19. *S. Balna*, *Ham.*; *Wall. Cat.* 3463.—Throughout N. India, in the plains; from the Punjab, *Thomson*, and Bombay to Assam and Pegu.—N. Asia, Turkestan, N. China, Amurland.—Appears distinct from the typical *S. maritimus* by its few pale large spikelets and 2-fid style, but the American and Australian varieties connect it. The extreme state of *affinis* is the Burmese form, in which the stem is terminated by one very large spikelet 1½ by ¾ in.

16. ***S. littoralis***, *Schrad. Fl. Germ.* i. 142, t. 5, fig. 7; stems stout trigonous upwards, leaves short or 0, umbel lateral, spikelets mostly solitary, bristles 7–2 plumose brown, style 2-fid, nut obovoid smooth chestnut or black. *Reichb. Ic. Fl. Germ.* viii. 42, t. 309. *S. subulatus*, *Vahl Enum.* ii. 268; *Miq. Fl. Ind. Bat.* iii. 306; *Dalz. & Gibs. Bomb. Fl.* 288; *Boeck. in Linnæa*, xxxvi. 715. *S. fimbriatus*, *Delile Descr. Egypt.* 11, t. 7, fig. 1. *S. plumosus*, *Br. Prodr.* 223. *S. pectinatus*, *Roxb. Fl. Ind.* i. 218; *Thw. Enum.* 351. *S. triqueter*, *Gren. & Godr. Fl. Franc.* iii. 373; *Boeck. l. c.* 716 (not of Linn.). *Malacochæte littoralis*, *Nees in Linnæa*, ix. 292. *M. pectinata*, *Nees in Wight Contrib.* 110.—*Fimbristylis*, *Wall. Cat.* 3506 C (partly).

From KASHMIR, alt. 3500 ft., and BENGAL to CEYLON.—DISTRIB. Europe, Africa, W. Asia, Australia.

Glabrous, except margins of glumes. *Rhizome* hardly any; sometimes slender stolons are present. *Stems* 1½–2½ ft., terete at base. *Leaves* 1–2 in. long, membranous; or sometimes 4 in. long, green. *Umbel* compound or decomposed, often 4 in. diam.; branches suberect. Lowest *bract* 1–3 in. (sometimes 6 in.), erect. *Spikelets* up to ¾ by ½ in., subcylindric. *Glumes* ovate, obtuse, notched at top, mucronate in notch by excurrent green keel, rusty or brown, ultimately almost scarious. *Bristles* (or scales) ligulate (sometimes broad), plumose by spreading moniliform hairs, in the Indian plant often 4, somewhat longer than nut. *Stamens* 3 or 2; anthers red-crested. *Nut* ½ glume, compressed.—Easily recognized among the Indian *Scirpi* by the plumose bristles.

17. ***S. grossus***, *Linn. f. Suppl.* 104; very large, leaves only near base of stem long, corymb large compound depressed divaricate, spikelets very many solitary, glumes ovate not notched, bristles 6 simply scarious (see also var. β) sometimes small or 0, style 3-fid, nut trigonous obovoid smooth ashy-grey or black. *Roxb. Fl. Ind.* i. 231; *Thw. Enum.* 351; *Dalz. & Gibs. Bomb. Fl.* 288; *Boeck. in Linnæa*, xxxvi. 723. *S. maximus*, *Roxb.*

l. c. 231. *S. æmulans*, Steud. in Zoll. Verz. Ind. Archip. ii. 62, & Syn. Cyp. 87 (partly). *S. maritimus*, var. *æmulans*, Miq. Fl. Ind. Bat. iii. 306. *S. canaliculato-triqueter*, Steud. *l. c.* 318. *S. Griffithii*, Boeck., and *S. scaberrimus*, Boeck. in Flora, xli. 595. *Hymenochæte grossa*, Nees in Edinb. N. Phil. Journ. [1834] 264, & in Wight Contrib. 110. *H. maxima*, Nees in Linnæa, ix. 293. *Isolepis maxima*, Dietr. Sp. Pl. ii. 130.—*Scirpus*, Wall. Cat. 3470.

Throughout INDIA (except the N.W.), alt. 0–2000 ft.; from SIND and ASSAM to CEYLON and MALACCA.—DISTRIB. Malaya, Tonkin, Philippines.

Glabrous, or glumes with pedicels minutely puberulous-scabrous. Stem 3–9 ft., thick at base, roots fibrous often in water or mud; stolons not rarely added. Leaves often $\frac{2}{3}$ length of stem, stout, broad, keeled, serrate-edged. Corymb often 8–16 in. in diam., supradecomposed; bracts several, divaricate, lowest up to 3 ft., leaf-like. Spikelets sessile and pedicelled, $\frac{1}{2}$ in. long, ovoid, brown, dense-fld. Glumes ovate, obtuse with a minute mucro. Bristles 6 or fewer, in type as long as nut, linear, brown, scabrid or setose by short unicellular hairs, but not rarely bristles depauperated very short smooth, 0 in form *S. maximus*. Stamens 3; anthers scarcely crested. Style long. Nut scarcely $\frac{1}{2}$ glume, minutely beaked by style-base confluent with nut.

Var. KYSOOR (sp.), Roxb. *l. c.* 230; glumes more mucronate, bristles 6, villous or almost plumose by numerous multicellular hairs. *Rynchospora* Kysoor, Dietr. Sp. Pl. ii. 74. *Hymenochæte* Kysoor, Nees (cf. note in Wight Contrib. 110).—Assam, Jenkins. Bengal, Griffith, &c. Chota Nagpore, alt. 2000 ft., C. B. Clarke. Bombay, Dalzell.—Stolons fide Roxburgh Icon sometimes bearing black tubers $\frac{3}{4}$ in. in diam.

Sect. 4. BLYSMUS (Genus), Panzer in Roem. & Sch. Syst. Mant. ii. 41. Medium or slender plants. Spikelets closely spicate. Style long.

* Stem with leaf-bearing nodes above the base, style 2-fid.

18. **S. Caricis**, Retz Fl. Scand. 11; spikelets subdistichously closely spicate or densely subpaniculate, bristles 6 much longer than the nut, nut smooth ashy-black narrowed at both ends (but see var.). *S. compressus*, Pers. Syn. i. 66; Boeck. in Linnæa, xxxvi. 707. *Schœnus compressus*, Linn. Sp. Pl. 65. *Blysmus compressus*, Panzer in Link. Hort. Berol. i. 278; Reichb. Ic. Fl. Germ. viii. 36, t. 293. *Leptolepis tibetica*, Boeck. Cyp. Nov. heft. i. 31.

W. HIMALAYA and W. TIBET, alt. 7–15,000 ft.; from LEH, Stoliczka, to KUMAON, Duthie. PHAREE (N.E. Sikkim), G. King.—DISTRIB. Europe, W. and Centr. Asia.

Glabrous. Rhizome creeping, divided. Stems 4–8 in., leafy below, angular striate or terete. Leaves often as long as stems, linear. Spike, in type form, 1–2 in., dense; lowest bract short, or much overtopping spike. Spikelets usually distichous, sometimes on all sides the rhachis (lowest sometimes remote) $\frac{1}{2}$ in. long, 6–9-fld., brown. Glumes ovate-triangular, subacute, concave, several-nerved. Rhachilla of spikelet compressed at base, somewhat zigzag, lowest fl. somewhat distant from next above nearly as in *Schœnus*. Bristles slender, minutely retrorse-scabrous, red-brown. Stamens 3; anthers with a linear-lanceolate red crest. Style long, slender. Nut $\frac{1}{2}$ glume, compressed or plano-convex; outermost cells small, obscure.

Var. *brevifolia* (sp.), Decne in Jacquem. Voy. Bot. 173, t. 173; stems 1–2 ft. with nodes and leaves above the middle, spikelets scarcely distichous lowest somewhat distant. Strachey Cat. Pl. Kumaon, 73.—West Himalaya; Chini, Jacquemont. W. Tibet, alt. 13,000 ft., Stoliczka.—Glumes often scarcely striate. Bristles and nut as in *S. Caricis* type.—A trifling var.

Var. *sikkimensis*; stems 4-16 in., spikelets distichous, nut sessile ellipsoid, margins near its base thickened by large corky cells.—Sikkim; Lachen, alt. 8500 ft., J.D.H.—This would be an *Anosporum* of Boeckeler, as the nut probably germinates while floating in water.

Var. *dissita* (sp.), Duthie in Saharanpore Report, 1885; stem 14 in. bearing two long-peduncled distant spikes, spikelets densely panicle not distichous, nut sessile ellipsoid margins near its base thickened by large corky cells.—Kumaon; Kutti, alt. 12,500 ft., Duthie.—Very unlike the ordinary *S. Caricis*.

19. **S. rufus**, Schrad. *Fl. Germ.* i. 133, t. 1, fig. 3; spikelets subdistichously closely spicate, bristles 0 or very short slender, style 2-fid, nut ovoid acute smooth ashy or brown. Boeck. in *Linnæa*, xxxvi. 707. *Schœnus compressus*, var., *Lightf. Fl. Scot.* 1138, t. 24, fig. 2. *S. rufus*, Huds. *Fl. Angl.* 15. *Blysmus rufus*, Link. *Hort. Berol.* i. 278; *Reichb. Ic. Fl. Germ.* viii. 36, t. 293.

W. TIBET, Thomson.—Europe, Centr. Asia, Canada, Chili.

Very near *S. Caricis*, Retz, differing by the small bristles and the sessile nut. *Glumes* usually chestnut-black, but sometimes brown as of *S. Caricis*. *Bristles* usually rudimentary, smooth, sometimes nearly as long as nut and rough with microscopic papilli but not setulose.

** Nearly leafless, style 3-fid.

20. **S. subcapitatus**, Thw. *Enum.* 351; stems long slender with nodes only close to the base, spikelets 6-1 subcapitately spicate, style 3-fid. bristles 6 long, nut oblong smooth black. Boeck. in *Linnæa*, xxxvi. 704.

DECCAN PENINSULA, Wight. NILGHIRIS, Gardner. CEYLON, Thwaites, T. Anderson.—DISTRIB. Sumatra, China.

Glabrous. *Rhizome* woody, very short. *Stems* 8-20 in., rigid, terete, sheathed only near base. *Leaves* 0- $\frac{1}{2}$ in., subulate. *Bracts* short; lowest $\frac{1}{2}$ in., shorter than spike. *Spikelets* $\frac{1}{2}$ in., many-fld., brown. *Glumes* ovate, acute, concave, entire not notched, keel with 3 yellow nerves. *Bristles* very slender, much longer than nut, in fruit somewhat lengthened, red-brown, smooth, near tips slightly thickened papillose-scabrous. *Stamens* 3; anthers crested. *Style* long; branches 3, long. *Nut* $\frac{2}{3}$ glume, regularly trigonous, exactly oblong, shortly pyramidal at base and apex, ripe shortly acuminate at apex; outermost cells, minute, quadrate-hexagonal, nut hence smooth or minutely granular.—A remarkable species, placed on account of its spicate inflorescence with *Blysmus* to avoid making another section for it only. The nut and bristles are as in the next section *Sylvaticæ*.

Sect. 5. SYLVATICÆ. Stems tall with many leaf-bearing nodes in the upper part. *Panicle* long; corymbs decompound, large, spreading. *Bristles* (if any) undivided, more or less elongate in fruit.—SEIDLIA (Genus), *Opiz Natural.* Tausch. ix. 349.—Eriophori sp., *Benth in Gen. Pl.* iii. 1052.

21. **S. Eriophorum**, Mich. *Fl. Bor. Am.* i. 33; spikelets in clusters of 4-1 comose in fruit by elongate bristles, style 3-fid, nut trigonous ellipsoid acute smooth brown. Boeck. in *Linnæa*, xxxvi. 731. *S. Wichurii*, Boeck. l. c. 729. *Eriophorum cyperinum*, Linn. *Sp. Pl.* 77; *Benth. in Gen. Pl.* iii. 1052. *Trichophorum cyperinum*, Pers. *Syn.* i. 69.

KHASIA, alt. 2500-6000 ft., common. ASSAM, Jenkins. E. HIMALAYA, Griffith.—DISTRIB. E. Asia, N. America.

Glabrous, except pedicels. *Stems* 2-6 ft. *Leaves* up to 18 by $\frac{1}{2}$ inch. *Bracts* several, often longer than inflorescence. *Umbel* 4-12 in. in diam. *Spikelets* $\frac{1}{2}$ in., many-fld., ellipsoid, brown. *Glumes* small, ovate, acute. *Bristles* 6-5, ultimately

2-4 times nut, slender, brown, smooth below, near apex thickened papillose-scabrous. *Anthers* not crested. *Nut* small, $\frac{1}{4}$ - $\frac{3}{8}$ glume, shortly beaked.

22. **S. chinensis**, Munro in *Seem. Bot. Voy. Herald*, 423; spikelets clustered, bristles 3 slender or 0, style 2-fid, nut compressed ovoid apiculate smooth pale. *Benth. Fl. Hongk.* 395. *S. sylvaticus*, *Strachey Cat. Pl. Kumaon*, 73. *S. ternatanus*, *Reinw.*; *Miq. Fl. Ind. Bat.* iii. 307. *S. Eriophorum* var. *conglomeratus*, *Boeck. in Herb. Berol.*—*Hypolytrum*, *Wall. Cat.* 3404 D (*partly*).

From CHUMBA and KUMAON, alt. 0-5500 ft. *Strachey & Winterbottom* to MUNEYPOOR, *Watt*, and MAETABAN, *Wallich.*—DISTRIB. China, Bonin Isles.

Glabrous, except ultimate rays of umbel. *Stems* 2-7 ft., solitary, in swamps often stoloniferous. *Leaves* long, often overtopping stem, $\frac{1}{2}$ in. broad, scabrous on margins and keel. *Umbel* 4-8 in. diam., divaricate; bracts several, lowest up to 20 in. *Spikelets* in clusters of 3-15, small, about $\frac{1}{2}$ in., many-fid., ellipsoid, obtuse, brown. *Glumes* concave, ovate, obtuse. *Bristles* often 0, sometimes 3, rarely 5, overtopping nut, as long as glume, ultimately scarcely elongate not twisted (spikelets not comose), smooth, minutely papillose-scabrous near the top. *Stamens* 2, rarely 3; anthers scarcely crested. *Nut* $\frac{1}{2}$ glume, smooth or sometimes microscopically verrucose.—The leaf-sheaths are long, occasionally perforated at base by descending shoots (aerial stolons) covered with small ovate scales.

Sect. 6. MICHELIANI. Low, tufted, leafy. *Spikelets* small, in a single head, bracts long. *Glumes* scarcely acute, not notched. *Bristles* 0. *Style* long, or branches long, continuous with the smooth nut.

23. **S. kyllingioides**, *Boeck. in Linnæa*, xxxvi. 733; spikelets very small, style 3-fid, nut oblong-obovoid obtuse smooth brown or black. *Isolepis kyllingioides*, *A. Rich. Tent. Fl. Abyss.* ii. 502. *Kyllinga microcephala*, *Steud. Syn. Cyp.* 70 (*excl. the Obs.*).

DEHEA DHOON; *Vicary*. MT. ABOO, alt. 3000 ft., and GOONA, *King*. SAUGOR; *Vicary*. HYDRABAD; *Campbell*. CANARA; *Young.*—DISTRIB. Trop. Africa.

Glabrous. *Stems* 4-10 in., slender, base thickened, sometimes with slender long stolons. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ stem, very narrow, green. *Head* $\frac{1}{4}$ in. diam., of 5-15 spikelets; bracts 1-3 in., leaf-like. *Stamens* 2 (3 fide Boeckeler); filaments scabrous; anthers short oblong, not crested. *Style* slender, not longer than nut, branches long (sometimes 2 fide Boeckeler). *Nut* $\frac{1}{2}$ glume, equally trigonous or subcompressed, minute apiculate; outermost cells subhexagonal, ultimately often punctate.—Easily known from the next species by its small head of very small spikelets, but is very like a small *Kyllinga*.

24. **S. Michelianus**, *Linn. Sp. Pl.* 76; spikelets numerous densely compound-capitate, style 2-fid (very rarely 3-fid), nut oblong or narrowly obovoid subacute smooth yellow-brown. *Reichb. Ic. Fl. Germ.* viii. 43, t. 312; *Boeck. in Flora*, liv. 158, 159. *Isolepis Micheliana*, *Roem. & Sch. Syst.* ii. 114; *C. B. Clarke in Journ. Linn. Soc.* xxi. 29, 30, t. 2, fig. 11. *Cyperus pygmaeus*, var. β , *Boeck. in Linnæa*, xxxv. 494; *Benth. in Gen. Pl.* iii. 1044 (*partly*). *C. diffusus*, *Roxb. Fl. Ind.* i. 189 (*excl. syn.*). *C. musarius*, *Herb. Ham.*; *Wall. Cat.* n. 3325 A. *Dichostylis Micheliana*, *Nees in Wight Contrib.* 94.—*Isolepis*, *Wall. Cat.* 3484 A, B.

Throughout BRITISH INDIA; from Kashmir to Tenasserim, common.—DISTRIB. Europe, Asia, Algeria.

Annual, tufted, glabrous. *Stems* 1-8 in., triquetrous. *Leaves* often longer than stem. *Head* $\frac{1}{4}$ - $\frac{3}{4}$ in. diam., bracts several long leaf-like. *Spikelets* $\frac{1}{2}$ - $\frac{1}{2}$ in.; rachilla of spikelet marked spirally by the lozenge-shaped scars. *Stamens* usually 2; anthers hardly crested. *Style* about as long as nut. *Nut* $\frac{1}{2}$ glume, shortly pyramidal at

both ends; outer cells subhexagonal, ultimately lax hyaline (so that a nut appears microscopically hyaline-margined).—Ripe examples of this species, with fallen glumes, are easily seen to belong to *Scirpus* not *Cyperus*; but young small examples are difficult to distinguish from *Cyperus pygmaeus*.

Sect. 7. MICRANTHI. Small tufted annuals. *Stems* with few short leaves near base. *Spikelets* 1–4, capitate, lateral dense-fld. *Bristles* 0. *Style* very short, branches short, recurved. *Anthers* small, oblong.

25. **S. Isolepis**, Boeck. in *Linnaea*, xxxvi. 499; stem setaceous with one spikelet, glumes obovate obtuse, style 2-fid, nut oblong-obovoid smooth reticulate, black. *Hemicarpha Isolepis*, Nees in *Edinb. N. Phil. Journ.* xvii. 263, and in *Wight Contrib.* 92.

BENGAL; Griffith. BEHAR; J. D. H. CHOTA NAGPORE; alt. 2000 ft., C. B. Clarke. DECCAN PENINSULA; Wight.—DISTRIB. Africa.

Glabrous. *Stems* $\frac{1}{2}$ –4 in. *Leaves* 1–2, $\frac{1}{2}$ –1 in., linear. *Spikelet* $\frac{1}{10}$ – $\frac{1}{8}$ in., rectangularly divaricate, 20–40-fld.; bract $\frac{1}{2}$ –1 $\frac{1}{2}$ in., erect, as though continuing stem. *Glumes* rhomboid, deciduous, rarely minutely mucronate. A thin hyaline obovate irregular scale as long as nut (very rarely 2 scales) is sometimes present, oblique lateral between nut and glume. *Stamen* 1, lateral. *Style* less than $\frac{1}{4}$ nut, deciduous, style-base not dilated. *Nut* a little shorter than glume, biconvex.

26. **S. squarrosus**, Linn. *Mant.* 181; stem slender with few spikelets, glumes narrowly obovate long-caudate, style 3-fid, nut narrowly obovoid smooth reticulate yellow-brown or finally black. *Rottb. Descr. et Ic.* 49, t. 17, fig. 5; *Roxb. Fl. Ind.* i. 222; Boeck. in *Linnaea*, xxxvi. 734. *Isolepis squarrosa*, Roem. & Sch. *Syst.* ii. 111; Nees in *Wight Contrib.* 106; *Thw. Enum.* 350; Dalz. & Gibs. *Bomb. Fl.* 286. *Ascolepis tenuior*, Steud. *Syn. Cyp.* 105. *Lipocarpa microcephala*, Hance in *Ann. Sc. Nat.* ser. 5, v. 249.—*Isolepis*, Wall. *Cat.* 3477, 3478 B.—Rheede *Hort. Mal.* xii. 71, t. 38.

Throughout EASTERN PENINSULA, PUNJAB, alt. 0–6000 ft., and ASSAM to CEYLON.—DISTRIB. Trop. Africa, Madagasc., Java, China.

Glabrous. *Stems* 2–16 in. *Leaves* short, in the Indian specimens commonly 1–2 in., linear. *Spikelets* 1–10 (usually 2–4) capitate, divaricate, $\frac{1}{2}$ – $\frac{1}{2}$ in., densely softly echinulate from tails of glumes. *Glumes* very many, caducous, small, narrowly obovate, suddenly narrowed into the ligulate curved subobtuse tail. *Stamen* 1, sometimes 2; anthers not crested. *Style* scarcely $\frac{1}{4}$ nut, deciduous, style-base scarcely dilated. *Nut* a little shorter than glume (without its tail), nearly regularly trigonous.

DOUBTFUL SPECIES OF SCIRPUS.

S. QUADRANGULUS, Don *Prodr.* 40. Sc. Donianus, Spreng. *Syst. Cur. Post.* 28; perennial; stem $1\frac{1}{2}$ ft. strict, 4-gonal, base sheathed by 2–3 leaves; leaves linear erect often longer than the stem, channelled, keeled beneath, smooth below, scabridly toothed on the margin towards the apex; umbel compound, proliferous, not a little like *Juncus acutiflorus*, shorter than the 5-leaved involucre; spikelets small, ovate brown; few-fld. glumes ovate concave mucronulate; style not jointed on the ovary. Alps of Nepal, Wallich.

11. ERIOPHORUM, Linn.

Glabrous. *Stem* with leaves only near base. *Corymb* of few (or 1) spikelets, or compound umbelliform. *Spikelets* with numerous perfect flowers. *Glumes* imbricate on all sides. Hypogynous bristles 6, divided nearly to base, segments ligulate, finally elongate i.e. heads comose.

Stamens 3-1, on the anterior side of nut. *Style* slender, glabrous, deciduous, long (in Sect. *Lachnophorum* short); branches 3 (accidentally 2 or 4) long. *Nut* sessile, trigonous, smooth, dusky black, apex narrowed.—Species 10, Arctic or N. Temperate, except Sect. *Lachnophorum*.

The genus was well-marked, until Bentham (Gen. Pl. iii. 1052) removed the comose species of *Scirpus* (the *Sylvaticæ* Sect.) into it, on the ground that the hypogynous bristles are similar. But in each flower of *Eriophorum* the bristles are 20-40 (or with 20-40 segments), while in *Scirpus*, Sect. *Sylvaticæ* they are 6; and in their ligulate structure (see Fl. Dan. Suppl. t. 8) they differ greatly from *Scirpus*. Also, in *Scirpus* Sect. *Sylvaticæ*, the stems have leaf-bearing nodes in their upper half.—*E. filamentosum*, Boeck. in Engler Jahrb. v. is *Xerotes leucocephala*, Br.

Sect. I. *ERIOPHORUM* proper. *Leaves* moderately long. *Style* long.

1. ***E. Scheuchzeri***, Hoppe Taschenb. 104; stoloniferous, sheaths not lacerate, stem bearing 1 spikelet, bracts 0, style 3-fid, nut smooth. Reichb. Ic. Fl. Germ. viii. 35, t. 685; Boeck. in Linnæa, xxxvii. 92. *E. capitatum*, Host Gram. Austr. i. 30, t. 38. *E. vaginatum*, Curtis Fl. Lond. ii. t. 11. *E. humile*, Turcz. in Bull. Soc. Nat. Mosc. (1838), 103. *E. vaginatum*, var. *humile*, F. Nylander in Act. Soc. Sc. Fenn. iii. 13.

KASHMIR; alt. 13,000 ft., Lance; C. B. Clarke.—DISTRIB. Arctic and Alpine regions.

Stems 4-12 in., often covered some way up by sheaths. *Leaves* (except in dwarf examples) shorter than stem, edges (in dried specimens) much inrolled. *Spikelet* $\frac{1}{2}$ in., broad ellipsoid. *Glumes* ovate, scarious, and black. *Bristles* white, or ultimately brownish. *Anthers* not crested. *Style* longer than nut, very slender; branches 3, long. *Nut* $\frac{2}{3}$ glume, trigonous, cylindric ellipsoid or subovoid.

Sect. II. *LACHNOPHORUM*, F. Nylander in Acta Soc. Sc. Fenn. iii. 22. *Leaves* numerous, linear, long. *Glumes* keeled, acute. *Style* short (branches long).

2. ***E. comosum***, Wall. Cat. 3446 (excl. var. β); stems robust, umbel compound or decompound, spikelets numerous rusty brown, style 3-fid. Nees in Wight Contrib. 110 (excl. var. β); Miq. Fl. Ind. Bat. iii. 330; Boeck. in Linnæa, xxxvii. 98. *E. arundinaceum*, Wall. Cat. 3448; Nees l. c. *Scirpus comosus*, Wall. in Roxb. Fl. Ind. ed. Carey and Wall. i. 234. *S. elongatus*, Ham. ex Don Prodr. 40. *Trichophorum comosum* and *T. arundinaceum*, Strachey Cat. Pl. Kumaon, 73.—*Eriophorum*, Wall. Cat. 3447, *partim*.

Very common; from SIND and the HIMALAYA, alt. 0-10,000 ft. to SAUGOR, CHITTAGONG, and BURMA.—DISTRIB. Tonkin, China.

Glabrous. *Rhizome* hardly any. *Stems* 4-20 in., slender, tough. *Leaves* often overtopping stem, harsh, edges serrulate; lower sheaths chestnut-black, ultimately often lacerate. *Umbel* 2-8 in. diam.; spikelets mostly solitary, often 100; bracts very long, often 8-12 in. *Spikelets* $\frac{1}{4}$ - $\frac{1}{3}$ in., narrowly ellipsoid, many-fid. *Glumes* acute or obtuse, green on back. *Anthers* with lanceolate scabrous high-red crest. *Style* shorter than nut. *Nut* $\frac{1}{2}$ - $\frac{2}{3}$ glume, oblong-ellipsoid, trigonous, beaked, smooth, brown-black.—In Wallich Cat. n. 3447 the woolly rhizome of *Spodiopogon angustifolius*, Trin. is mixed; hence *Eriophorum cannabinum*, Royle Ill. 415 is *Spodiopogon angustifolius*.

3. ***E. microstachyum***, Boeck. in Linnæa, xxxviii. 399; stem 2-6 in. slender with 1-3, subcapitate chestnut-brown spikelets, style 3-fid. *E. comosum*, β *nanum*, Nees in Wight Contrib. 110.

ALPINE HIMALAYA, alt. 8-16,000 ft.; head of Jumna Valley, *Jacquemont*; Nynee Tal, *Thomson*; Chupcha in Bhotan, *Griffith*.

This may be regarded as a depauperated alpine form of *E. comosum*; but the examples are numerous, exactly alike, from distant localities; and there are wanting intermediate forms.

12. **FUIRENA**, *Rottb.*

Stem bearing leaves or leaf-like bracts even in its upper half. *Leaves* grass-like, base sheathing. *Spikelets* clustered, with numerous perfect flowers, tabescent at top. *Glumes* imbricate on all sides, strongly aristate, hairy in upper half. Hypogynous *bristles* 6 (3 in the position of sepals, 3 of petals) or much reduced, or 0; 3 sepals bristle-like, 3 petals (in the typical species) battledore-shaped. *Stamens* 3 anticonic, or 2. *Style* long, slender, glabrous, finally deciduous; branches 3, long. *Nut* small, obovoid, or ovoid, triquetrous, more or less stalked, smooth reticulated or trabeculate, usually narrowed at top often with a minute beak (which may be the persistent style-base).—Species 25, scattered all warm regions.

The spikelets with the stem leafy in upper half, are like no other sedges but the *Sylvaticæ* section of *Scirpus*, from which *Fuirena* is known by its strongly aristate glumes.

Sect. I. PSEUDO-SCIRPUS. Three inner hypogynous bristles (petals) linear or narrow, or more often 0.

1. **F. pubescens**, *Kunth Enum.* ii. 182; spikelets in a terminal cluster (axillary clusters not rarely added), hypogynous bristles 0 or rudimentary linear, style 3-fid, nut smooth white not (or most minutely obscurely) reticulated. *Boeck. in Linnæa*, xxxvii. 104 (excl. all Indian syns. and specimens). *Scirpus pubescens*, *Lam. Ill.* i. 139; *Desfont. Fl. Atlant.* i. 52, t. 10. *Carex pubescens*, *Poir. Voy. en Barb.* ii. 254. *C. Poiretii*, *Linn. Syst.* [ed. Gmelin] ii. 140. *Isolepis pubescens*, *Roem. & Sch. Syst.* ii. 118.

PUNJAB; *Thomson (Herb. Brit. Mus.)*.—DISTRIB. S.W. Europe, all Africa.

Rhizome creeping, short. *Stems* 12-20 in., triquetrous, glabrous except at top. *Leaves* 2-8 by $\frac{1}{4}$ in., glabrous or hairy. *Spikelets* in clusters of 5-1, ovate-oblong, $\frac{2}{3}$ in. long; bracts as long as spikelets (occasionally very much longer). *Glumes* lurid black or glaucescent, often somewhat regularly 5-ranked. *Nut* subsessile; beak pyramidal, minutely scabrous.

2. **F. Wallichiana**, *Kunth Enum.* ii. 182; spikelet-clusters corymbed, hypogynous bristles 0 or linear (see also var.), nut slenderly striate longitudinally finely trabeculate between striæ. *F. cuspidata*, *Kunth l. c.* 187; *Dalz. & Gibs. Bomb. Fl.* 286. *F. pubescens*, *Boeck. in Linnæa*, xxxvii. 104 (all Indian syns. and specimens, not of *Kunth*). *Scirpus cuspidatus*, *Roth. Nov. Pl. Sp.* 31.—*Fuirena*, *Wall. Cat.* 3545.

N.W. INDIA. Hurdwar, *Wallich*; Sutledge Valley, *Thomson*. CENTRAL INDIA; Goona, &c., *King*. KHANDWA; *Duthie*. POONA; *Jacquemont*. BOMBAY, *Dalzell*, &c.

Hardly distinguishable from *F. pubescens*, *Kunth*, but by the elegantly striate nut, and more compoundedly corymbose inflorescence. *Leaves* and sheaths glabrous. *Sepals* often $\frac{1}{4}$ - $\frac{2}{3}$ nut, linear, often unequal, retrorsely scabrous or smooth, often 0. *Petals* always 0 (except in var.). *Nut* ellipsoid, triquetrous, narrowed at both ends, yellow brown or testaceous; beak small, pyramidal, hardly scabrous; outermost cells transversely oblong, superimposed regularly in longitudinal series.

Var. *evoluta*; petals narrowly elliptic 3-nerved shortly stalked with long linear papillose-scabrous arista, overtopping nut.—Rajpootana; Merwar, *Duthie* (n. 4919).

Sect. 2. *FUIRENA proper*. Three inner hypogynous bristles (petals) obovate or subquadrate, broad-headed.

3. **F. glomerata**, *Lam. Ill.* i. 150; annual, clusters of spikelets 1-3 approximate, petals clawed with subquadrate heads, style 3-fid, nut ovoid smooth pale. *Miq. Fl. Ind. Bat.* iii. 328; *Thw. Enum.* 347; *Boeck. in Linnæa*, xxxvii. 107. *F. canescens*, *Vahl Enum.* ii. 385. *F. ciliaris*, *Roxb. Fl. Ind.* i. 180. *F. Rottboellii*, *Nees in Wight Contrib.* 94; *Miq. Fl. Ind. Bat.* iii. 329. *Scirpus ciliaris*, *Linn. Mant.* 182; *Rottb. Descr. et Ic.* 55, t. 17, fig. 1. *S. pilosus*, *Retz Obs.* vi. 19 (not of *Thunb.*). *S. aristatus*, *Willd. Sp. Pl.* i. 300.—*Fuirena*, *Wall. Cat.* 3544 (partly).

Throughout warmer INDIA, very common in rice-fields, from the HIMALAYA to CEYLON and the MALAY PENINSULA.—DISTRIB. Trop. Africa, S.E. Asia, and Australia.

Usually hairy, sometimes (except inflorescence) glabrate. *Stems* 4-16 in. *Spikelets* in clusters of 3-10, $\frac{2}{3}$ by $\frac{1}{2}$ in.; bracts not much overtopping clusters. *Sepals* linear, as long as nut or short, smooth or scabrous at top. *Petals* often as long as nut; lamina quadrate, cordate or hastate at base, 3-nerved, brown with 3 minute teeth at top, glabrous or minutely hairy at top. *Nut* triquetrous; beak cylindric, sometimes minutely hispid.

4. **F. uncinata**, *Kunth Enum.* ii. 184; annual, clusters of spikelets 1-3 approximate (one distant sometimes added), glumes strongly hooked-aristate, petals clawed broadly obovate pubescent on margin, nut ovoid smooth brown. *Boeck. in Linnæa*, xxxvii. 108 (not *Thw.*). *F. ciliaris*, *Nees in Wight Contrib.* 93; *Thw. Enum.* 347. *Scirpus uncinatus*, *Willd. Sp. Pl.* i. 300. *S. capitatus*, *Burm. Fl. Ind.* 21. *Isolepis uncinata*, *Roem. & Sch. Syst.* ii. 111.—*Fuirena*, *Wall. Cat.* 3544 A and D (partly).—*Pluk. Alm.* 190, fig. 7.

DECCAN PENINSULA; *Rottler, &c. CANARA; Thomson. CEYLON; Moon, Thwaites* (C.P. 3038), &c.

Stems 4-8 in., hairy upwards. *Sepals* linear, shorter than nut, minutely retrorse-scabrous or smooth. *Petals* nearly as long as nut, scarcely hastate at base.—Otherwise as *F. glomerata*, to which it is closely allied, but readily distinguished by the strong hooked bristles to the glumes.

5. **F. Trilobites**, *C. B. Clarke*; annual, clusters of spikelets 1-3 approximate, petals very long-clawed with lunate heads long retro-cuspidate at base on each side, style 3-fid, nut ovoid smooth pale.

DECCAN PENINSULA. Secunderabad; *Wight*; near Hyderabad, *Campbell*. (The same locality, and probably one collection.)

Noted by *Wight* as perhaps a var. of *Rottboellii* i.e. of *F. glomerata*, *Lam.*; the petals are different and remarkable. *Spikelets* rather slenderer (than in *F. glomerata*), glumes blacker with longer green aristæ. *Petals* as long as nut, their head at top semicircular entire, their two lower angles long-produced downwards, cuspidate.

6. **F. umbellata**, *Rottb. Descr. et Ic.* 70, t. 19, fig. 3; rhizome creeping woody, clusters of spikelets often many in an elongate panicle, petals obovate subsessile, style 3-fid, nut ovoid smooth pale or finally brownish.

Thw. Enum. 347; *Boeck. in Linnæa*, xxxvii. 110. *F. paniculata*, *Lam. Ill.* i. 150, t. 39. *F. pentagona*, *Nees in Wight Contrib.* 93; *F. quinqueangularis*, *Hassk. in Flora*, xxv. (1842) *Beibl.* 3. *F. uncinata*, *Thw. l. c.* 347 (not of Kunth).—*Fuirena*, *Wall. Cat.* 3542, 3543.

Throughout INDIA, except the drier North-west, alt. 0–3000 ft.—DISTRIB. All warm (not too dry) countries.

Stolons hardening into rhizomes, clothed by ovate-lanceolate striate scales. *Sepals* much shorter than nut, linear, glabrous or retrorse-scabrous, often 0. *Petals* nearly as long as nut, 3-nerved, minutely hairy, truncate at top and often notched sometimes with a minute mucro in the notch.—Generally known from *F. glomerata* by the more compound corymb—an unsafe character; when the rhizome is wanting, dried examples can be certainly distinguished only by the shape of petals.

13. LIPOCARPHA, Br.

Glabrous. *Stem* leafy only near base, bearing a single head of few (usually 1–6) spikelets. *Spikelets* with very many hermaphrodite flowers, tabescent at top. *Glumes* imbricated on all sides, deciduous leaving the persistent rhachilla marked by lozenge-shaped scars. *Squamellæ* 2, an anticus and posticus, hyaline, elliptic, as long as nut (formed out of coalescent hypogynous bristles). *Stamens* 3–1, anticus; anthers small, linear-oblong, mucous. *Style* small, slender, glabrous, shortly 2-fid (sometimes 3-fid) scarcely exsert. *Nut* small, oblong or ovoid, plano-convex, smooth, reticulated, finally brown-black.—Species 13, warm regions.

This genus in habit, inflorescence, rhachilla of spikelet, style and nut, is excessively like (and really closely allied to) *Scirpus* Sect. *Micranthæ*; from which it only differs in the squamellæ standing fore and aft, not laterally. These squamellæ are hyaline, cling to the nut, and are difficult to see.

1. *L. argentea*, Br. in *Append. Tuckey Congo*, 459; spikelets 1–8 pale or fuscous, nut much shorter than squamellæ, style linear 3-fid as long as $\frac{1}{2}$ – $\frac{2}{3}$ nut. *Thw. Enum.* 347; *Strachey Cat. Pl. Kumaon*, 73; *Boeck. in Linnæa*, xxxvii. 114 (excl. American examples). *L. lævigata*, *Nees in Wight Contrib.* 92. *Hypælyptum argenteum*, *Vahl Enum.* ii. 283. *Tunga lævigata*, *Roxb. Fl. Ind.* i. 183. *Kyllinga albenscens*, *Steud. Syn. Cyp.* 68; *Miq. Fl. Ind. Bat.* iii. 294.—*Lipocarpa*, *Wall. Cat.* 3445 F, G, H.

From the WESTERN HIMALAYA, alt. 0–6000 ft.; and ASSAM to CEYLON and SINGAPORE.—DISTRIB. Trop. and sub-trop. Old World.

Rhizome hardly any. *Stems* 4–24 in., obtusely trigonous, smooth. *Leaves* as long as stem or much shorter, $\frac{1}{10}$ in. broad. *Spikelets* up to $\frac{1}{2}$ by $\frac{1}{4}$ in.; bracts often 2 in. *Glumes* obovate, apex obtusely triangular incurved. *Nut* sessile, obovoid or ellipsoid obtuse.

2. *L. sphacelata*, *Kunth Enum.* ii. 267; spikelets 1–8 black-purple or if pale usually purple spotted, nut nearly as long as squamellæ, style very short 3-fid. *Thw. Enum.* 347; *Boeck. in Linnæa*, xxxvii. 116. *L. triceps*, *Nees in Wight Contrib.* 92. *Hypælyptum sphacelatum*, *Vahl Enum.* ii. 283. *H. ceylanicum*, *Nees in Linnæa*, ix. 288. *Tunga triceps*, *Roxb. Fl. Ind.* i. 183. *Scirpus hemisphæricus*, *Roth. Nov. Pl. Sp.* 29. *Hypelytrum triceps*, *Dietr. Sp. Pl.* ii. 363.—*Lipocarpa*, *Wall. Cat.* 3444.

Throughout INDIA (except the dry N.-West), alt. 0–2000 ft., from NEPAL and ASSAM to CEYLON and TAVOY.—DISTRIB. Trop. Africa and America.

Very like *L. argentea*, but can usually be distinguished by the more purple heads. It is largely confused in collections with *L. argentea*, but can be satisfactorily separated by the shorter squamellæ and style.

3. *L. microcephala*, *Kunth Enum.* ii. 268; spikelets 4-1 pale or fuscous squarrose, glumes acuminate tip excurrent recurved, style 3-fid, nut linear-oblong as long as squamellæ. *Boeck. in Linnæa*, xxxvii. 118; *Debeau Fl. Tchefou*, 146, t. 3, fig. 2. *L. Zollingeriana*, *Boeck. in Flora*, xlii. 100. *Hypælyptum microcephalum*, *Br. Prodr.* 220. *Ascolepis kyllingioides*, *Steud. Syn. Cyp.* 105.

SINGAPORE; *Ridley*.—DISTRIB. S.E. Asia, Australia.

Glabrous. Stems 4-10 in., slender. Leaves $\frac{1}{2}$ - $\frac{3}{4}$ length of stem, narrow, weak. Glumes ovate, scarcely obovate, acuminate. Spikelets smaller than in the two preceding species.

14. *RYNCHOSPORA*, *Vahl*.

Plants varying much in size and habit. Leaves long, narrow. Spikelets in 1 or more heads, or paniced, often clustered. Glumes often 7-8, lower more or less distichous, upper spirally imbricated; three lowest (sometimes more) empty, fourth usually longer containing a perfect nut-bearing flower; uppermost more or less tabescent, male or sterile, thinner in texture rounder on back than nut-bearing glume; above the fourth glume another (in *R. Sikkimensis* 2-4 more) similar nut-bearing glume follows. Hypogynous bristles often present. Stamens 3 (or 2-1), anterior. Style long, linear, glabrous, branches 2, long or short, style-base dilated. Nut oblong or ovoid, compressed, beaked by the persistent style-base (clearly distinguishable from nut).—Species 150, in the warmer regions of the world, specially numerous in America.

Series A. HAPLOSTYLEÆ, *Benth. & Hook. f. Gen. Pl.* iii. 1059. Style very shortly 2-fid, or almost undivided.

Division I. CAPITATÆ. Spikelets in a single terminal head. Stems with leaves only near the base.

Sect. I. SPHÆROSCHÆNUS (Genus), *Nees in Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. (1843), 97. Spikelet bearing one nut. Glumes subdistichous. Nut laterally compressed i.e. flattened with one edge next axis (as in *Pycneus*).

1. *R. Wallichiana*, *Kunth Enum.* ii. (1837), 289 (Rhynchospora); stems slender, head globose dense brown, bracts longer than head, style very shortly 2-fid, nut obovoid smooth or minutely scabrous on shoulders. *Benth. Fl. Hongk.* 396 and *Fl. Austral.* vii. 349; *Thw. Enum.* 352; *Boeck. in Linnæa*, xxxvii. 542 (excluding American examples). *R. Hænkei*, *Presl. Rel. Hænk.* i. 199. *Schœnus ruber*, *Lour. Fl. Cochinch.* i. 52. *Morisia Wallichii*, *Nees in Edinb. New Phil. Journ.* 1834 (n. 34) 265 and in *Wight Contrib.* 115. *Haplostylis Meyenii*, *Nees in Linnæa*, ix. (1834), 295, and in *Edinb. New Phil. Journ.* 1834 (n. 34) 265, and in *Wight Contrib.* 115 (partly). *Sphæroschœnus Wallichii*, *Arnott & Nees in Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. 97. *Cephaloschœnus parvus*, *Nees l. c.* 100. *Mariscus umbellatus* var. *procerior*, *Zoll. Verz. Ind. Archip.* ii. 63.—*Rynchospora*, *Wall. Cat.* 3422, 3428.

Throughout INDIA (except the North-west) alt. 0-5000 ft., common; from

NEPAL and ASSAM to CEYLON, NIOOBARS, *Kurz* and MALACCA.—DISTRIB. Trop. Africa, S.E. Asia to Japan, Malaya, trop. Australia.

Stems tufted, 4–24 in., trigonous, striate, smooth; stolons 0. *Leaves* several, $\frac{1}{2}$ stem, $\frac{1}{2}$ in. broad, flat, minutely scabrous, glabrous or sometimes hairy. *Spikelets* 20–50 in a head, $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; bracts 3–8, 1–3 in., glabrous or villous-ciliate. *Glumes* 6–7; 3 (or 4) lowest empty, ovate, scarcely acute; fourth longer containing a perfect flower, fifth containing a sterile (or no) flower; seventh glume (when present) narrow, thin, rudimentary. Hypogynous *bristles* sometimes 6 as long as nut, brown, scabrous (teeth pointing upwards) sometimes 6–4 half as long less scabrous, sometimes rudimentary or 0. *Stamens* 2, less often 3; anthers linear-oblong, crested. *Nut* $\frac{1}{2}$ glume; beak narrow conic, $\frac{1}{4}$ – $\frac{1}{2}$ nut, pale, smooth or rarely scabrous.

Sect. 2. HAPLOSTYLIS (Genus), *Nees in Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. (1843), 101. *Spikelet* bearing one nut. *Glumes* obscurely distichous. *Nut* dorsally compressed i.e. flattened with one face next axis (as in *Juncellus*).

2. **R. Wightiana**, *Steud. Cyp.* (1855), 148 (*Rhynchospora*); spikelets about $\frac{1}{2}$ in., hypogynous bristles 6 scabrous, style very shortly 2-fid, nut linear-oblong black minutely white dotted. *Boeck. in Linnæa*, xxxvii. (1873), 544. *Haplostylis Wightiana*, *Nees in Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. (1843), 101.

MADRAS PENINSULA, from POONA, *Jacquemont* and CHUNDA, *Duthie*, to QUILON, *Wight*.—DISTRIB. Cochin China. (Also a var. in Brasil.)

Stems tufted, 4–24 in., slender, trigonous, glabrous; stolons 0. *Leaves* several, $\frac{1}{2}$ – $\frac{3}{4}$ stem, $\frac{1}{10}$ in. broad, glabrous, or scarcely ciliate. *Spikelets* numerous, in a dense rusty brown head $\frac{1}{2}$ in. diam.; bracts 3–6, 2–6 in., ciliate on margins near base. *Glumes* 6–7; 3 (or 4) lowest small empty, fourth longer with perfect nut-bearing flower, upper male or rudimentary. *Bristles* rigid, as long as nut (sometimes twice as long), brown, minute teeth pointing upwards. *Nut* $\frac{2}{3}$ glume, sometimes ornamented by scattered papillæ; beak $\frac{1}{2}$ nut, pale, decurrent on margins of nut.

3. **R. longisetis**, *Br. Prodr.* (1810), 230 (*Rhynchospora*); spikelets nearly $\frac{1}{2}$ in., hypogynous bristles 3 scabrous 3 plumose, style very shortly 2-fid, nut linear-obovoid brown. *Boeck. in Linnæa*, xxvii. 541; *Benth. Fl. Austral.* vii. 350. *R. Prescottiana*, *Wall. Cat.* 3423. *Schoenus longisetis*, *Poir. Encycl. Suppl.* ii. 252. *Cephaloschoenus longisetis*, *Nees in Linnæa*, ix. 296. *C. longirostris*, *Nees? in Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. (1843), 101 in Obs.

BURMA; Prome, *Wallich* n. 3423; Karenia and Pegu, *Kurz*; Nummayan, *R. Scott*.—DISTRIB. North Australia.

Closely resembling *R. Wightiana*, but heads larger. Hypogynous *bristles* usually twice nut (exclusive of beak), in the upper half all are simply scabrous with teeth pointing upwards, in the lower half the 3 inner (petals) are nearly glabrous, the 3 outer (sepals) densely plumose. *Nut* nearly $\frac{1}{2}$ in., often minutely bristly on shoulders; beak $\frac{1}{2}$ nut, conic-oblong, not decurrent on nut. [There are several closely allied Australian species included under *R. longisetis* both by Bentham and Boeckeler.]

Division II. POLYCEPHALÆ. Spikelets in distant dense globose heads. Stems with nodes and leaves far above base.—[The other species of this division form the genus *Cephaloschoenus* proper of Nees, and have the nut dorsally compressed; but the single Indian sp. has the nut laterally compressed i.e. is closely allied to *R. Wallichiana*.]

4. **R. malasica**, C. B. Clarke; globose spikes 2-6 distant spiked or racemed, spikelets 1-fld., hypogynous bristles 5-6 twice as long as nut capillary smooth, style very shortly 2-fld., nut obovoid smooth chestnut-cold. beak narrowly conic pale.

MALAY PENINSULA; Malacca, *Griffith* (Kew n. 6359); Singapore, *Ridley*.—DISTRIB. Borneo.

Stems nearly 2 ft. *Leaves* often overtopping stem, $\frac{1}{2}$ in. broad, glabrous or scabrous pilose; bracts all similar to leaves, lowest sometimes 4 in. from the next. *Spikes* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. of about 15 spikelets. *Spikelets* $\frac{1}{2}$ in., constructed as in *R. Wallichiana*. *Nut* $\frac{1}{2}$ glume, biconvex; beak nearly as long as nut, smooth, base narrow.

Division III. PANICULATÆ. Paniculate. *Spikelets* solitary or clustered. *Stem* robust, with nodes and leaves (or bracts) far above base.—Calyptrostylis (Genus), *Nees in Linnæa*, ix. (1834), 295, is part of this Division.

5. **R. aurea**, *Vahl Enum.* ii. 229; robust, nearly glabrous, without stolons, spikelets numerous in several corymbs, style very shortly 2-fld., nut obovoid truncate, beak as long as nut, and nearly as broad at base. *Benth. Fl. Hongk.* 396, and *Fl. Austral.* vii. 349; *Miq. Fl. Ind. Bat.* iii. 336; *Thw. Enum.* 352; *Boeck. in Linnæa*, xxxvii. 626. *R. articulata*, *Roem. & Sch. Syst. Mant.* ii. 49; *Dalz. & Gibs. Bomb. Fl.* 288; *Miq. Fl. Ind. Bat.* iii. 337. *Scirpus corymbosus*, *Linn. Amœn. Acad.* iv. 303. *Schoenus articulatus*, *Roxb. Fl. Ind.* i. 184 [ed. Wall. 189]. *S. surinamensis*, *Rottb. Descr. et Ic.* 68, t. 21, fig. 1. Calyptrostylis florida, *Nees in Mart. Brasil Cyp.* 138, t. 13. *Cephaloschoenus articulatus*, *Nees in Edinb. New Phil. Journ.* (1834), 266, and in *Wight Contrib.* 115. —*Cyperus*, *Herb. Wight*; *Wall. Cat.* 3371 A.—*Rynchospora*, *Wall. Cat.* 3424, 3426.

Throughout INDIA (except the north-west), in the hot region, abundant; from SIKKIM and ASSAM to CEYLON and SINGAPORE.—DISTRIB. Warm regions of the globe.

Stems 2-3 ft., smooth or scabrous upwards, with leaves (or leaf-like bracts) their whole length. *Leaves* 1-2 ft. by $\frac{1}{2}$ –1 in., on margins (and often on keel beneath) scabrous. *Panicle* often 1 ft. long, composed of 3-5 corymbs. *Spikelets* mostly solitary, rusty-brown, about $\frac{1}{2}$ in. long. *Glumes* about 7; lowest 3 (or 4) smaller, ovate, sometimes mucronate; fourth glume longer, subobtusate, with perfect flower; upper glumes male or sterile. *Hypogynous bristles* 6, as long as nut simply scabrous, not rarely unequal or some deficient. *Style* exceedingly long, minutely bifid at tip. *Nut* $\frac{1}{10}$ – $\frac{1}{8}$ in., $\frac{1}{2}$ glume, smooth, reticulated or transversely wavy; beak pale, flattened, more or less grooved longitudinally on each face, rough, hardly exsert from glumes.—In the American forms the nut has usually two furrows on its shoulders and 2 pits (sometimes large) on its back; in the Asiatic plants these furrows and pits are often just “indicated,” often entirely absent.

6. **R. triflora**, *Vahl Enum.* ii. 232; somewhat robust, nearly glabrous, stolons often present, spikelets in loose corymbs, style very shortly 2-fld., nut ellipsoid truncate transversely undulate, beak longer than nut linear pyramidal. *Boeck. in Linnæa*, xxxvii. 625. *R. ceylonica*, *Kunth Enum.* ii. 294. *R. zeylanica*, *Thw. Enum.* 352. *Scirpus triflorus*, *Poir. Encycl. Suppl.* ii. 248. *Cephaloschoenus Zeylanicus*, *Nees in Edinb. New Phil. Journ.* 1834, 265, and in *Wight Contrib.* 115. *Ephiphorhynchium triflorum*, *Nees in Mart. Fl. Bras.* ii. (pars 1) 136 in note.

CEYLON; *Thwaites* n. 3036, *Macrae*.—DISTRIB. Tropical America.

Stolons rather slender, clothed by ovate striate straw-cold. scales. *Stems*, *leaves*,

spikelets as in *R. aurea*, but more slender; spikelets more clustered, less numerous, in a more straggling open panicle. Nut hardly $\frac{1}{2}$ in., brown, smooth or microscopically transversely muriculate; beak at base very narrowly pyramidal, much narrower than nut.

7. ***R. Hookeri***, Boeck. in *Linnæa*, xxxvii. 621 (Rhynchospora); somewhat robust, nearly glabrous, spikelets in loose corymbs, style very shortly 2-fid, nut obovoid chestnut-colrd. smooth suddenly narrowed into a very small cylindric neck, beak linear as long as nut. *Schœnus articulatus*, Buch. Ham. ms. ((not of Roxb.).—*Rhynchospora*, Wall. Cat. 3425.

N.E. INDIA; alt. 0-300 ft. ASSAM; Seeksagur, C. B. Clarke, &c. Sylhet Terai; J. D. Hooker. North Bengal; Nathpur, Hamilton, Wallich; Mudhpoor Jungle, C. B. Clarke; Pegu, Brandis (Herb. Calcutta).

Hardly stoloniferous, lateral shoots push out from base of stem. Stems, leaves, spikelets, nearly as in smaller examples of *R. aurea*, but corymbs much more straggling irregular, spikelets 1-5-clustered. Nut $\frac{1}{2}$ in. long, surmounted by the minute neck also chestnut-colrd.; beak greenish-straw-colrd.

Series B. DIPLOSTYLEÆ, Benth. & Hook. f. Gen. Pl. iii. 1059. Style deeply divided, branches 2 long-linear. [Stem with nodes bearing leaves (or leaf-like bracts) far above its base. Spikelets loosely corymbose or panicle].

8. ***R. gracillima***, Thw. Enum. 435 (Rhynchospora), not of Sauvalle; glabrous, very slender, spikelets solitary long-pedicelled panicle bearing often 2 nuts, hypogynous bristles 0, style-branches 2 long, nut broadly obovoid truncate transversely wavy-wrinkled, beak broad depressed. Boeck. in *Linnæa*, xxxvii. (1873), 597; Kurz in Journ. As. Soc. Beng. xlv. (1876), pt. i. 169. *R. Kamphœveneri*, Boeck. in Engl. Jahrb. v. 508.

CEYLON; Thwaites n. 3818. KHASIA; J. D. Hooker. NICOBARS; Kurz.—DISTRIB. Hongkong.

Roots fibrous. Stems 2 ft. Leaves 4-12 in., setaceous. Panicle 12 by 3 in., with 18 spikelets. Spikelets $\frac{1}{2}$ by $\frac{1}{2}$ in., dusky brown. Glumes 7-8, obtuse, 3 or 4 lowest empty shorter. Style long slender, branches 2 as long as style. Nut $\frac{3}{4}$ glume, pale ash-colour; beak as broad as nut, becoming black, saddle-shaped.

9. ***R. glauca***, Vahl Enum. ii. 233; glabrous, panicle narrow, corymbs rather small, spikelets numerous bearing 1-2 nuts, hypogynous bristles scabrous with teeth pointing upwards, style-branches 2 long, nut broadly obovoid truncate transversely wavy wrinkled, beak $\frac{1}{2}$ - $\frac{3}{4}$ nut. Boeck. in *Linnæa*, xxxvii. 585 (excl. the "larger" form). *R. gracilis*, Vahl Enum. ii. 234. *R. laxa*, Br. Prodr. 230; *R. laxa* β minor, Thw. Enum. 352 (not of Vahl). *R. chinensis*, Nees in Wight Contrib. 115; Boeck. l. c. 586 (the Khasia plants).—*Rhynchospora*, Wall. Cat. 3421.

KHASIA and NILGHIRI HILLS, alt. 4-6500 ft., NEPAL; Wallich. CEYLON, Thwaites C.P. n. 2396, &c.—DISTRIB. Warm regions of the globe.

Rhizome biennial or perennial, short, becoming woody; lateral shoots (hardly stolons) push out from base of stem. Stems tufted 1-2 $\frac{1}{2}$ ft., rather slender, nearly smooth, with nodes throughout their length. Leaves 8-20 by $\frac{1}{2}$ - $\frac{3}{4}$ in., nearly smooth. Panicle 12 by 1-2 in.; axillary corymbs often 2-3, distant, peduncled, $\frac{3}{4}$ in. diam. Spikelets shortly pedicelled or somewhat clustered $\frac{1}{2}$ in., with 6-7 glumes. Hypogynous bristles 6 or 5, rigid, brown, usually as long as nut rarely reaching top of beak. Stamens usually 2; anthers not crested. Nut $\frac{1}{2}$ - $\frac{3}{4}$ glume,

sessile, turgid, chestnut-brown, with 12-18 transverse wrinkles, beak (in the Old World examples) broadly conic, smooth or nearly so. [The names *glauca* and *gracilis* were published in the same volume. Many authors prefer the *gracilis* supposing the species to be Swartz's *Schœnus gracilis*. But Swartz says his *Schœnus gracilis* had a 3-fid style, so that it was no *Rynchospora* (except perhaps in small part by mixture); Mr. Bentham has hence adopted *glauca*.]

Var. *β chinensis* (sp.) Boeck. l. c. 586 (not of Nees & Meyen); spikelets longer up to $\frac{1}{2}$ in. often bearing 2 nuts, beak longer often equalling $\frac{1}{2}$ nut, hypogynous bristles usually reaching top of beak. *R. glauca*, Boeck. l. c. 585 (*partly*). *R. lamarum*, Hook. & Arn. Bot. Beech. Voy. 98 (not of Gaud.). *R. laxa*, Thwaites Enum. 352 (not of Vahl).—CEYLON; Thw. (C.P. 677, &c.). TENASSERIM; Helfer (Kew Distr. n. 6303), Griffith (Kew Distr. 6302).—DISTRIB. Sea-coasts of Madagasc., Borneo, China, Sandwich Isles. A maritime form.

10. ***R. Griffithii***, Boeck. in *Linnæa*, xxxviii. 404, nut narrowly obovoid ellipsoid rounded at top, beak $\frac{1}{2}$ nut, hypogynous bristles reaching top of beak scabrous; otherwise as *R. glauca*.

EAST BENGAL; Griffith (Kew Distr. 6303). ASSAM; Griffith. KHASIA; J. D. Hooker; alt. 4200 ft., C. B. Clarke.

Var. *β LEVISETIS*; hypogynous bristles 6 twice nut smooth. *R. chinensis*, "forma tenuis," Boeck. l. c. 587.—Upper Sikkim; Lachen and Lachong, alt. 10,000 ft., in wet meadows. J. D. H.—A remarkable form, an alpine state of *R. Griffithii*. The nut is narrow, so that Boeckeler's alliance of it with the sea-coast *R. chinensis* is not satisfactory.

11. ***R. sikkimensis***, C. B. Clarke; glabrous, panicle narrow, corymbs rather small, spikelets numerous bearing 3-6 nuts, hypogynous bristles 6 scabrous twice nut, style-branches 2 long, nut small narrowly obovoid truncate, beak ovoid longer and broader than nut smooth (otherwise as *R. Griffithii*).

UPPER SIKKIM; Catsuperri Lake, alt. 8000 ft.—J. D. H.

Spikelets $\frac{1}{2}$ in., fine brown, with 12-18 glumes and 3-8 pistilliferous flowers.—This plant may be the *R. chinensis* described by Boeck. in *Linnæa*, xxxvii. 587, which he says has about 5 fertile flowers to the spikelet; but it does not agree in this particular with *Thwaites* n. 677, which is Boeckeler's type of *R. Chinensis*.

UNDETERMINAL SPECIES OF RYNCHOSPORA.

Scirpus (*Rynchospora*?) **MOLLIS**, Wall. in Roxb. Fl. Ind. [ed. Carey and Wall.] i. 227; stems 1-2 ft. hairy, leaves few towards base of stem hairy, umbel 7-rayed, spikelets oblong, glumes ovate subaristate smooth, hypogynous bristles 3 long hairy, style compressed hairy and ciliate with broad cordate articulate base. *Fimbristylis*? mollis, Kunth Enum. ii. 246.

NEPAL; Wallich.

The style being compressed must be assumed to be 2-fid; this, joined to the 3 long hypogynous bristles, would fix the plant in *Rynchospora* (as suggested by Wallich), but it cannot be referred to any known Indian species of that genus.

15. **SCHÆNUS**, Linn. (*in part*).

Spikelets capitate or paniced; flowers axillary. *Glumes* (except the uppermost tabescent) distichous; 3 (or more) lowest empty, 1-4 following perfect, nut-bearing, somewhat remote. Hypogynous bristles often present, setaceous, not dilated at base. *Stamens* 3, anterior. *Style* 3-fid, gradually passing into the nut without any constriction below style-base. *Nut* in a

hollow of the zigzag persistent rhachilla, trigonous.—Species 59, chiefly Australian; with a few Cosmopolitan, Malayan, Japanese and Chilian.

1. **S. nigricans**, Linn. *Sp. Pl.* 64; stem without nodes except near base, spikelets almost capitate, hypogynous bristles $\frac{1}{2}$ – $\frac{1}{3}$ nut or nearly obsolete, style 3-fid, nut sessile ovoid smooth marble-white. *Boiss. Fl. Orient.* v. 393; *Aitch. in Journ. Linn. Soc.* xviii. 104. *Chætospora nigricans*, Kunth *Enum.* ii. 323; *Boeck. in Linnæa*, xxxviii. 290.

PUNJAB; Kurum Valley, Aitchison. SIND; Pinwill.—DISTRIB. Nearly cosmopolitan, except S. E. Asia and Australia.

Almost glabrous. *Rhizome* horizontal, woody; stolons 0. *Stems* 4–24 in., subterete. *Leaves* 4–12 in., often half stem, very narrow with incurved margins. *Spikelets* 1–15, $\frac{1}{2}$ – $\frac{1}{3}$ in. long, in a close distinctly compound head; lowest bract suberect, often 1–4 in. *Glumes* ovate, obtuse, microscopically hispid on keel, chestnut or brown; three lowest empty, 1–3 next nut-bearing. *Nut* $\frac{1}{10}$ in. ellipsoid, top acutely pyramidal.

2. **S. calostachyus**, Poir. *Encycl. Suppl.* ii. 251; stem with nodes throughout its length, spikelets nearly 1 in. long loosely paniced, hypogynous bristles $\frac{1}{2}$ nut white, style 3-fid, nut ovoid slightly tubercular or wrinkled chestnut-black. *Benth. Fl. Austral.* vii. 368. *Chætospora calostachya*, Br. *Prodr.* 233. *Cyclocampe waigouensis*, Steud. *Syn. Cyp.* 156. *Cyclocarpa waigouensis*, Miq. *Fl. Ind. Bat.* iii. 339.

SINGAPORE; Ridley.—DISTRIB. Malaya, Australia.

Rhizome short, horizontal, woody. *Stems* 1–2½ ft., rigid, rather slender, subterete. Lower leaves 4–12 by $\frac{1}{10}$ in., glabrous; sheaths at their mouth scarious, scarcely pubescent. *Panicle* 8–16 in. long, with 8–14 spikelets; lower bracts like the leaves, upper reduced nearly to sheaths. *Spikelets* elliptic-lanceolate, compressed, chestnut or brown. *Glumes* elliptic-lanceolate, scarcely acute, minutely hairy on margins; 4–8 lowest empty, densely packed; 3–2 following nut-bearing, distant on zigzag rhachilla. *Nut* $\frac{1}{2}$ in., subsessile, trigonous, curved.

16. CLADIUM, P. Browne.

Stout perennials, glabrous or inflorescence minutely hairy. *Stems* round or flattened, leafy or leafless. *Leaves* equitant, xiphoid or trigonous at top, or flat. *Spikelets* paniced, often in sessile clusters at the angles of zigzag branches, small, with 4–11 glumes. *Flowers* 1–7, axillary, lowest of each spikelet perfect, nut-bearing. *Glumes* imbricate on all sides; lowest 1–4 (usually 2–3) empty, smaller (or not larger) than succeeding 1–3 including perfect flowers; uppermost glumes male or sterile, tabescent. Hypogynous bristles slender, or small, or 0. *Stamens* 3–2. *Style* linear; branches 3, long; style-base dilated, fused with nut. *Nut* small or scarcely middle-sized; beak large pyramidal, or smaller umbonate, or undistinguishable from nut, or reduced to a speck.—Species 44; one cosmopolitan; the rest insular or maritime, in both hemispheres.

Subgenus I. EUCLADIUM, Benth. *Fl. Austral.* vii. 402. *Stems* tall, round with nodes carrying leaves (or leaf-like bracts) their whole length. *Leaves* flat, not distichous. *Panicle* oblong of several corymbs. *Spikelets* numerous, clustered, most 2-fid., the lower flower nut-bearing.

1. **C. Mariscus**, Br. *Prodr.* 236; stems 3–8 ft., leaves $\frac{1}{2}$ in. broad scabrous, glumes brown subobtusely, hypogynous bristles 0, style 3-fid. nut ovoid acute shining chestnut-colored. *Boeck. in Linnæa* xxxviii. 232. **C.**

germanicum, *Schrad. Fl. Germ.* i. 75, t. 5, fig. 7. *C. jamaicense*, *Crantz Inst.* i. 362. *Schoenus Mariscus*, *Linn. Sp. Pl.* i. 62.

KASHMIR; Lake, alt. 5200 ft., *Jacquemont*, &c.—DISTRIB. Cosmopolitan.

Glabrous, stoloniferous. *Leaves* often nearly equalling stem; teeth on margins and midrib beneath cutting. *Panicle* 1–2 ft. long or more; corymbs distant, several times corymbosely divided; lower bracts leaf-like. *Spikelets* usually in globose clusters of 4–12. $\frac{1}{2}$ – $\frac{3}{4}$ in., young lanceolate, ripe ovoid, uniform brown. *Glumes* 6–7, ovate, concave; 3–4 lower empty, smaller; rhachilla abbreviated, persistent. *Stamens* usually 2; anthers linear-oblong, crested. *Nut* scarcely $\frac{1}{2}$ in., hard; style-base ovoid, large, fused into nut, of which the cavity is carried up into style-base.

Subgenus II. *MACHERINA* (Genus), *Vahl Enum.* ii. 238. Clusters panicled, mostly sessile at the angles of zigzag branches. Hypogynous bristles small. *Nut* more or less stalked, rostrate.

2. *C. Maingayi*, *C. B. Clarke*; stems stout flattened, basal leaves equitant $\frac{3}{4}$ in. broad, spikelets dark-red, hypogynous bristles slender longer than nut, style 3-fid, nut turgid trigonous shortly stalked, beak long pyramidal hairy.

MT. OPHIE (Malacca), alt. 4250 ft., *Griffith (Kew Distrib.* 6304), &c.

Stems 1–3 ft. Basal leaves several, crowded, often as long as stem; stem leaves 0 or occasionally 1. *Panicle* 12–18 in., oblong; lowest branch often distant. *Spikelets* $\frac{1}{2}$ in., ovoid, usually bearing 2–4 nuts. *Glumes* ovate, tip triangular scarcely acute; 2–3 lowest empty. Hypogynous bristles 6, their upper half thinly clothed with short upward-pointing hairs. *Nut* $\frac{1}{2}$ in. long, on a short obpyramidal stalk.—Very near the West Indian *Machærina restioides*, *Vahl*.

3. *C. undulatum*, *Thw. Enum.* 353; stem long round-trigonous, leaves basal very narrow, spikelets brown, hypogynous bristles much shorter than nut, style 3-fid, nut sessile ovoid brown, beak very small. *Lepidosperma zeylanicum*, *Nees in Linnæa*, xxxviii. 232. *Tricostularia fimbriatylodes*, *Benth. Fl. Austral.* vii. 384. *Carpha junciformis*, *Boeck. in Linnæa*, v. 38, 267.

CEYLON, *Rottler, Thwaites*, &c. MALAY PENINSULA; Pahang, *Ridley*.—DISTRIB. Malaya, Australia.

Nearly smooth and glabrous. *Stem* 1–3 ft., somewhat slender, leafless except near base. *Leaves* 9–18 by $\frac{1}{2}$ in., convolute when dry. *Panicle* 2–12 in., greatly varying in development; branches flexuose or zigzag; lowest bract leaf-like or short. *Spikelets* in clusters of 2–5, $\frac{1}{2}$ in. long, ellipsoid, 1–2-fid.; lower flower perfect, nut-bearing. *Glumes* not distichous; two lowest smaller, empty. Hypogynous bristles 6, hardly $\frac{1}{2}$ nut, setaceous, base dilated white. *Nut* scarcely $\frac{1}{2}$ in., smooth; beak depressed, pyramidal or umbonate, not $\frac{1}{4}$ nut, hairy.—The hypogynous bristles are as of *Lepidosperma*, but the lower flower producing the nut does not suit that genus.—*Bentham (Fl. Austral.* vii. 384) considers the Ceylon, Borneo, and Australian plants here united as three species.

Subgenus III. *BAUMEA* (Genus), *Gaud. in Freycinet Voy. Bot.* 416, t. 29. Clusters of flowers panicled, mostly sessile at the angles of zigzag branches. Hypogynous bristles 0. *Nut* nearly or quite sessile, rostrate (in the Indian species).

4. *C. riparium*, *Benth. Fl. Austral.* vii. 405; stems obscurely flattened, cauline leaves few obscurely xiphoid or subterete, panicle elongate lax of many spikelets, style 3-fid, nut obovoid round-trigonous smooth, beak small conic minutely hairy. *Baumea riparia*, *Boeck. in Linnæa*, xxxviii. 246.

WEST AUSTRALIA.

Stolons long, densely clothed by lanceolate striate dirty-straw-colrd. scales. *Stems* 3 ft., trigonous, under panicle flattened biconvex. Basal *leaves* often as long as stem, hardly $\frac{1}{4}$ in. broad; in their upper half very variable in form, sometimes xiphoid (i.e. flat thick in middle without a central nerve), sometimes 3-4-angular or passing into nearly linear-conic. *Panicle* 8-12 in.; lower branches distant; lowest bract $1\frac{1}{2}$ in. long; secondary branches flexuose, minutely scabrous-puberulous. *Spikelets* in clusters of 1-5, $\frac{1}{2}$ in. long, 2-1-fld., brown; lowest flower perfect, nut-bearing. *Fl. glume* ovate-lanceolate, at least as long as the two lower empty glumes. *Nut* $\frac{1}{8}$ in., sessile, brown; beak $\frac{1}{2}$ nut.

Var. *crassa*; stems usually 6 ft.; spikelets rather larger, densely clustered, 2-4 flowers and 1-3 nuts; styles and filaments conspicuously exerted. *Baumea crassa*, *Thw. Enum.* 353; *Boeck. l. c.* 238—BENGAL; Soondreebun, *C. B. Clarke*. KHASIA, alt. 5000 ft., Shillong, *C. B. Clarke* (introduced?). Ceylon; Prov. Ambagamowa, *Thwaites*, *C. P.* 845.—In the Ceylon examples (*crassa* type), with which the Bengal agree, the roots are thick black (the plant probably not stoloniferous), the nuts are nearly twice as long as in the Australian plant shining brown. But in the Khasi plant, stolons are generally present and the nuts are like those of *C. riparium*, Benth. typ.

5. *C. glomeratum*, *Br. Prodr.* 237; medium-sized, leaves linear in upper half terete or subtrigonous not transversely septate, panicle elongate narrow interrupted, spikelets clustered, style 3-fld. nut oblong-ellipsoid obtusely trigonous, beak small ovoid hairy. *Kunth Enum.* ii. 304; *Benth. Fl. Austral.* vii. 404 (not *Baumea glomerata*, Gaud.). *Chapelliera glomerata*, *Nees in Lehm. Pl. Preiss.* ii. 76 in *Obs.*; *Miq. in Ann. Mus. Lugd. Bat.* ii. 146. *Baumea rubiginosa* & *Brownei*, *Boeck. in Linnæa*, xxxviii. 241, 242.

SINGAPORE, *Ridley*.—DISTRIB. China, Japan, Austral., and N. Zeal.

Stolons long, clothed by ovate striated scales. *Stems* 1-3 ft., nodose throughout their length. Basal *leaves* 8-20 in., cauline few, short or 0. *Panicle* 4-10 by 1-2 in.; lowest bract $\frac{1}{2}$ -1 $\frac{1}{2}$ in., hardly leaf-like. *Spikelets* 1-3 together (clusters often themselves clustered), $\frac{1}{2}$ in., rusty-brown, 2-4-fld. bearing 1 (rarely 2) nut. *Fl. glumes* ovate acute, keel upwards scabrid, margins conspicuously thinly villous.

17. MICROSCHENUS, *Gen. Nov.*

A very small, glabrous perennial. *Stems* with nodes, bearing narrow leaves. *Inflorescence* of 1-3 approximated spikelets. *Glumes* 6, imbricate on all sides, subsimilar; two lowest empty; 3 (or 2) following male, monandrous; uppermost lateral (appearing terminal) perfect, nut-bearing, monandrous. Hypogynous *bristles* 2, minute, rudimentary (perhaps reduced stamens). *Style* linear-cylindric, smooth, continuous with pistil; branches 3. *Nut* (not well ripe) ellipsoid, trigonous, smooth, pyramidal at base and top.

M. Duthiei, *C. B. Clarke*; stems 1-3 in.

WEST HIMALAYA; Gurwhal, Tibri, alt. 15,500 ft., *Duthie*.

Stems tufted; with very short stolons or short lateral shoots. *Leaves* 2 or 3 on each stem, about 1 in., grass-like; margins incurved, smooth; sheaths short. *Spikelets* about $\frac{1}{2}$ in., ellipsoid; lowest bract similar to leaves; upper bracts gradually shorter, passing into glumes. *Glumes* ovate-oblong, concave scarcely keeled, chestnut-red, hardly scarious on edges. *Anthems* linear-oblong, not crested, scarcely exerted.

18. **LEPIDOSPERMA**, Labill.

Glabrous, rigid, robust stoloniferous plants. *Stems* leafy only near base. *Panicle* of many spikelets, often oblong, contracted. *Spikelets* of 5-10 glumes, of 2-3 axillary flowers, rarely producing more than 1 nut, lowest flower being always sterile (i. e. male or pistil imperfect). *Fl. glumes* (even young) similar to the lower empty glumes. Hypogynous *bristles* 6, short, ovate with a triangular or setaceous tip. *Stamens* 3. *Style* with 3 long branches; style-base glabrous or nearly so, fused into the glabrous smooth trigonous nut.—Species 36, all Australasian except the present.

L. chinense, *Nees & Meyen in Linnæa*, ix. 302, and in *Nov. Act. Nat. Cur.* xix. (*Suppl.* i.) 117; stems robust terete, leaves mostly long terete, panicle oblong dense, spikelets clustered, glumes lanceolate acute subdistichous, style 3-fid, nut $\frac{1}{12}$ — $\frac{1}{10}$ in. obtuse. *Benth. Fl. Hongk.* 398; *Boeck. in Linnæa*, xxxviii. 329 (excl. *L. confine*).

MALACCA; Mt. Ophir, *Griffith (Kew Distrib.* 6115).—DISTRIB. S. China.

Stems 2-3 ft. *Leaves* stem-like. *Panicle* 2-4 by 1 in., very dense, base scarcely interrupted. *Glumes* 5-7, lower distichous, 1-2 highest spiral tabescent; flowers 3-2, lowest sterile, upper perfect nut-bearing. Hypogynous *bristles*, scarcely $\frac{1}{2}$ length of glume, easily overlooked in young flowers.—Bentham says, "Flowers 3, lowest fertile." Nees says, "Glumes empty except the penultimate which is male, and the terminal thin one" (which Nees supposes nut-bearing). The terminal thin glume is sterile, the penultimate perfect, nut-bearing.

19. **GAHNIA**, J. R. & G. Forst.

Coarse, usually scabrous, perennials. *Stem* with nodes, bearing leaves or leaf-like bracts throughout its length. *Panicle* copious, or linear-oblong. *Spikelets* clustered, often black or dark brown, 1-2-fld., upper alone nut-bearing. *Glumes* imbricated on all sides, lower 3-5 (or more) empty, keeled, often mucronate, hispid, upper gradually larger, unaltered in fruit; the top 3 (or 2) glumes heteromorphous, in young fl. very small (usually not $\frac{1}{2}$ length of uppermost keeled empty glume) subquadrate, scarcely nerved, in fruit enlarged rigid brown or black; lowest heteromorphous glume with 3-6 (often 4) stamens or empty, second heteromorphous glume with 3 stamens perfecting a nut, uppermost empty or 0. Hypogynous *bristles* 0. *Filaments* long (often elongated in fruit holding the nut); anthers crested. *Style* slender, glabrous; branches 3 (or 4) long; style-base continuous with pistil, often a small black conical point to the nut. *Nut* bony, round or trigonous, sessile.—Species 27, from Singapore to the Sandwich Isles, abounding in Australasia.

The structure of the spicula of *Gahnia* has been recently described by Colenso in *Trans. N. Zeal. Inst.* xviii. 278, and by Hillebrand in *Flora Hawaii*, 481. In those species (and specimens) which have but one flower in the spikelet, that flower appears terminal and the three small heteromorphous glumes (scales) appear as a perianth of 3 imbricated segments. But the cases where the above three glumes contain two flowers (both of which may be pistilliferous though only the upper nut-bearing), negative this explanation.

G. javanica, *Moritzi Verz. Zoll. Pfl.* 98; tall, leaves long narrow very scabrous, panicle oblong-linear dense, spikelets 2-1-fld. black, style 3-fld, nut linear-oblong shining brown black-tipped. *Boeck. in Linnæa*, xxxviii. 339. *Phakellanthus multiflorus*, *Zoll. Syst. Verz. Ind. Archip.* ii.

61. *Syzyganthus multiflorus*, Steud. *Syn. Cyp.* 153. *Schoenus paniculatus*, Hassk. *Cat. Hort. Bogor.* 296 (not of Burm.). *S. Hasskarlii*, Steud. l. c. 166.

MALAY ISLANDS; from Sumatra to Fiji.

Nearly glabrous. *Stem* often 3 ft., terete. *Leaves* often nearly as long as stem, $\frac{1}{3}$ – $\frac{1}{2}$ in. wide, tip caudate very scabrous. *Panicle* 12 by 3 in., dense; branches from each lower sheath usually several (sometimes 15); lower bracts long, similar to leaves. *Spikelets* nearly $\frac{1}{4}$ in., when young lanceolate; lower flower sterile or male or wanting. Lower *glumes* 3–4, keeled, mucronate; upper glumes 3–2, when young very small, ultimately enlarged hardened, $\frac{2}{3}$ as long as the uppermost keeled glume. *Stamens* in lower flower 4, in the upper 3; filaments persistent ultimately elongate and brown, often retaining the nut.

Var. *penangensis*; lowest bract shorter, often not half length of panicle, panicle looser, branches finally nodding (not in suberect clusters).—Penang, alt. 3000 ft., G. King. Perak, alt. 6500 ft., Wray. Malacca; Punnus, Griffith (*Kew Distrib.* 6305).

20. REMIREA, Aublet.

A glabrous perennial. *Stem* short, with numerous long leaves. *Spikes* digitately capitate; bracts long. *Spikelets* densely sessile, 1-fl. *Glumes* 4, imbricate laxly on all sides, small, ovate-triangular, three lowest empty green striate, uppermost nerveless containing a perfect quasi-terminal flower. Hypogynous bristles 0. *Stamens* 3, unilateral. *Style* linear, smooth; base not dilated; branches 3, linear. *Nut* oblong-ellipsoid, trigonous, smooth; style deciduous.

The flower is here really axillary, the continuation of the axis suppressed at an early stage. The plant is allied to the *Rynchosporæ*, as Bentham has it.

R. maritima, Aubl. *Pl. Guian.* i. 45, t. 16; stem nearly covered by sheaths of leaves (i.e. head sessile) or only covered near base (i.e. head peduncled). Beauv. *Fl. d' Owar.* ii. 22, t. 73; Kurz in *Journ. As. Soc.* xlv. (1876), pt. ii. 158; Boeck. in *Linnaea*, xxxv. 435. *R. pedunculata*, Br. *Prodr.* 236; Thw. *Enum.* 345. *R. Wightiana*, Nees in *Wight Contrib.* 92. *R. disticophylla*, Boeck. in *Flora*, xli. 410. *Mariscus capitatus*, Zoll. *Verz. Ind. Archip.* ii. 63. *Lipocarpa foliosa*, Miq. *Fl. Ind. Bat.* iii. 337; Kurz *Fl. Bangka*, 224.—*Cyperus*, Wall. *Cat.* 3378.

Sea-coasts. CANARA; Talbot. TENASSERIM; Helfer; MALACCA, Griffith; NICOBARS, Kurz; &c. CEYLON; Thwaites (C.P. 3227).—DISTRIB. All tropical sea-coasts.

Rhizome up to 2 ft. *Stems* distant, or tufted from the branched head of rhizome, 2–6 in., subtrigonous, smooth. *Leaves* often longer than stem, narrow, rigid, curved nearly smooth. *Bracts* 2–6, patent, 1–3 in., leaf-like. *Spikes* about $\frac{1}{2}$ in. long, ellipsoid, of about 30 spikelets, dirty straw-colrd. *Spikelets* $\frac{1}{2}$ in., ellipsoid. *Nut* $\frac{2}{3}$ glume, chestnut-colrd.; outermost cells minute, round-hexagonal, often porose (i.e. nut punctulate.)

21. HYPOLYTRUM, L. C. Rich.

Stem with some nodes far above the base. *Leaves* flat, somewhat thin, 3-nerved, narrowed gradually at each end. *Spikes* paniced, branches rigid; bracts long, leaf-like. *Spikelets* without glumes interposed between the two opposite basal males and the terminal pistil except in *H. turgidum*

and *H. longirostre*. Style continuous with ovary, persistent; branches 2 long. Nut small, but often overtopping bracteoles, biconvex, osseous, subsistent; style-base ultimately becoming a conical or ovoid beak.—Species 25, tropical and subtropical.

This and the following four genera, included under the division *Hypolytreæ* (see p. 587), or *Mapaniæ*, are so peculiar in structure that the following observations may prove useful.—*Spikelets* small, in spikes resembling the spikelets of a stout *Scirpus*; the (apparent) glumes being obtuse bracteoles. Spikelets containing one terminal fem. fl. (of a pistil only) and two opposite boat-shaped 1-glumed monandrous male fl. at its base; between these two basal males and the terminal female are placed 0-11 concave or nearly plane glumes unsymmetrically whorled, sterile or 1-6 monandrous; the three inner glumes (empty), often appearing nearly as sepals to the pistil. Glumes to the two lowest male flowers (squammellæ), acutely keeled, hairy on keel, placed laterally with respect to the bracteole. Stamens small; anthers not crested.

In *Hypolytrum* the spikelet might be regarded as a single flower, consisting of a bract, two opposite boat-shaped bracteoles, 2 stamens and a pistil. But in *Mapania* (and other genera) the number of male and barren glumes interposed between the squammellæ and the pistil shows that this flower is really an inflorescence, as in *Euphorbia*. The species are sometimes polygamo-dioecious, some plants producing only empty nuts with abnormal beaks. The seven Indian species here described might be treated as *H. latifolium* with five varieties.

1. *H. latifolium*, L. C. Rich. in Pers. Syn. i. 70; stems stout triquetrous upwards, leaves long often $\frac{1}{2}$ -1 in. broad, style 2-fid, nut (fertile) wrinkled brown or chestnut, beak small conical pale (large when nut is barren). Thw. Enum. 346 (ß and part a); Kurz in Journ. As. Soc. xxxviii. part 2, 72 (partly). H. giganteum, Wall. Cat. 3404 (partly); Nees in Wight Contrib. 93 (partly); Boeck. in Linnæa, xxxvii. 131. H. schoenoides, Nees in Linnæa, ix. 288. H. myrianthum, Miq. Fl. Ind. Bat. iii. 333. H. latifolium and diandrum, Dietr. Sp. Pl. ii. 365. Tunga diandra, Roxb. Fl. Ind. i. 184. Scirpus anomalus, Retz. Obs. v. 15. Albikkia scirpoides and schoenoides, Presl. Rel. Hænk. i. 185, t. 34, 35.—*Hypolytrum*, Wall. Cat. 3402, 3403, 3404 (mainly).

SIKKIM and ASSAM to SINGAPORE, TRAVANCORE, CEYLON, NICOBAR and ANDAMAN ISLDS.—DISTRIB. Malaya, China, Austral., Polynesia.

Rhizome perennial, short; roots thick, smooth, very tough. Stem 1-3 ft, smooth or slightly scabrous, bearing nodes and leaves above the base, often above the middle. Leaves often 6-13 in., scabrous on margins. Panicle 2-6 in. diam. pyramidal, compound-corymbose or as if depressed-umbellate, often dense, sometimes depauperated with few spikes; branches divaricate, scabrous, very rigid. Spikes nearly all solitary, young $\frac{1}{4}$ - $\frac{1}{2}$ in. oblong-obovoid, fruiting $\frac{1}{2}$ in. subglobose. Glumes (i.e. bracteoles) closely spirally imbricate, scarcely $\frac{1}{2}$ in. long, concave, elliptic, obtuse, membranous, 1-nerved, brownish. Squammellæ $\frac{2}{3}$ glume. Nut (without beak) a little longer than glume, sessile; beak about $\frac{1}{4}$ length of nut.—Wall. Cat. 3404 is this mixed with *Scirpus chinensis*, Munro, and a *Mapania*. In some specimens from the Khasia Terai the nuts are empty, their beaks inflated ovoid-conic twice as long as the nut; these Boeckeler (Linnæa, xxxvii. 130) calls the Indian *H. mauritianum*.—It is possible to refer the Mauritian plant to a var. of *latifolium*; but, if these two are kept distinct, it is not possible to arrange the Khasian plant under both.

2. *H. Wightianum*, Boeck. in Linnæa, xxxvii. p. 130; stems stout, leaves long $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, panicle compound dense, style 2-fid, nut (fertile) straw-colrd. or pale, beak conical pale $\frac{1}{2}$ - $\frac{3}{4}$ nut. H. giganteum, Nees in Wight Contrib. p. 93 (partly).—Rhede Hort. Malab. xii. t. 58.

CANARA; Dalzell. MALABAR OR CONCAN; Stocks. WYNAAD; Goodaloor, King. NICOBARS; Kurz.

Distributed in Herb. H. f. and T. as a local form of *H. latifolium*, which it closely resembles. The nut is usually glandular-punctate, pitted rugose or nearly smooth.

3. *H. turgidum*, C. B. Clarke; stem stout, leaves long $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, panicle compound dense, spikelets often of three glumes (besides the bracteole), style 2-fid, fertile nut large brown purple punctate, beak small or hardly any. *H. latifolium*, Thw. Enum. 346 (partly).

CEYLON, Central Province, alt. 3000 ft., Thwaites (C.P. 3).

Thwaites subsequently (in ms.) separated this as a distinct species. The two boat-shaped squamellæ are lateral (as in all the *Mapaniæ*); the third extra glume is flat concave thin without keel on the anterior side of the spikelet within the squamellæ. A similar extra glume occurs frequently in several of the large American *Hypolytræ*; thus indicating an approach to *Thoracostachyum*.

4. *H. penangense*, C. B. Clarke; stem stout, leaves long $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, panicle compound of 100 spikes, young spikes $\frac{1}{2}$ by $\frac{1}{10}$ in. linear cylindric.

PENANG; Maingay (Kew Distrib. 1720).

Imperfectly known from a young example; but the young spikes differ much from those of *H. latifolium* at the same point of development.

5. *H. trinervium*, Kunth Enum. ii. 272; stem somewhat slender, leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. broad, bracteoles broad-oblong obtuse entire brown not scarious-margined, style 2-fid, nut small black-purple, beak conical pale nearly as long as nut. *Miq. Fl. Ind. Bat.* iii. 332 and *Ill. Fl. Archip. Ind.* 59.

"EAST INDIES" (Herb. Willdenow).

Altogether slenderer than *H. latifolium*, to which Boeckeler refers it as a weak example.—Stem 16 in.; cauline leaves 1 or 2 remote. Panicle 1–1½ in. diam., with 25 spikes. Spikes in fruit scarcely $\frac{1}{2}$ in. diam., themselves their glumes (bracteoles) and nuts much smaller than in *H. latifolium*. Nut (with its beak) less than $\frac{1}{10}$ in.; beak straw-colrd., densely covered with round red glands.

6. *H. proliferum*, Boeck. in *Linnæa*, xxxvii. 126; stem somewhat slender, leaves $\frac{1}{4}$ – $\frac{1}{2}$ in. broad, bracteoles oblong-obovate brown upper margin conspicuously white-scarious lacerate, style 2-fid, nut small dusky brown, beak conical dusky brown rather shorter than nut.

SINGAPORE; Wichura, Ridley.—DISTRIB. Borneo.

Rhizome woody, obliquely descending (not "proliferous-branched" as described by Boeckeler). Stem 16 in., cauline leaves 1 or 2 remote. Panicle 1–1½ in. diam., with 20 spikes. Young spikelets $\frac{1}{2}$ by $\frac{1}{10}$ in., cylindric, glistening white (broad scarious margins of bracteoles covering up the brown bases). Spikelets in fruit $\frac{1}{4}$ diam., subglobose. Nut ovoid, scarcely $\frac{1}{10}$ in. long, nearly smooth.—Very like *H. trinervium*, except as to the conspicuously scarious bracteoles.

7. *H. longirostre*, Thw. Enum. 346; stem 12–20 in., corymb rigid, bracteoles hard subacute, one (or more) squamella often interposed between the two basal male squamellæ and pistil, style 2-fid, beak longer than nut conic acute pale not grooved. Kurz in *Journ. As. Soc. Beng.* xxxviii. pt. ii. 75; Boeck. in *Linnæa*, xxxvii. 128. *H. latifolium* γ minor, Kurz l. c. 74 (partly, not of L. C. Rich.).

CEYLON; Thwaites (C.P. 3468.)

Stolons long, slender, clothed by small red-brown scales, hardening into a

woody horizontal rhizome. *Stem* trigonous, nearly smooth, with few leaves upwards. *Leaves* often as long as stem, $\frac{1}{2}$ in. broad, gradually narrowed at both ends; margins scabrous. *Corymb* $1\frac{1}{2}$ in. diam., with 12–20 spikes; bracts often 6 in., resembling the leaves. *Spikes* $\frac{1}{4}$ in., ellipsoid, dirty straw-colored. *Bracteoles* (glumes) ovate, striate, falling with nuts. Lateral third *glume* to spikelet monandrous or sterile. *Nut* scarcely $\frac{1}{10}$ in., subglobose, olivaceous, wrinkled.

22. **THORACOSTACHYUM**, Kurz.

Leaves flat, 3-nerved, narrowed gradually at each end. *Spikes* paniced, branches rigid; bracts long, like the leaves. *Spikelets* small, with usually 4 glumes (of which lowest sometimes monandrous) interposed between the two opposite navicular basal male fl. and the terminal pistil. *Style* 3-fid. *Nut* osseous, shining; beak conic acute (not seen in *T. hypolytroides*).—Species 5, in Ceylon, Seychelles, Malaya, Australia.

1. **T. bancanum**, Kurz in *Tydsch. Nat. Vereen. Ned. Ind.* xxvii. 286, and in *Bot. Zeit.* xxiii. (1865), 204 (*Thoracostachys*, name only) and in *Journ. As. Soc. Beng.* xxxviii. pt. ii. 76; stem $1\frac{1}{2}$ –3 ft., corymb rigid, spikes short ellipsoid, style 3-fid, nut shining testaceous with 3 longitudinal grooves in its conical top. *Lepironia bancana*, *Miq. Fl. Ind. Bat. Suppl.* 604 and *Ill. Fl. Archip. Ind.* 63. *Hypolytrum borneense*, Kurz in *Journ. As. Soc. Beng.* xxxviii. pt. ii. 74; *Miq. Ill. Fl. Archip. Ind.* 59. *Mapania bancana*, *Benth. & Hook. f. Gen. Pl.* iii. 1055.—*Hypolytrum*, *Wall. Cat.* 3401, 3404 E.—*Cyperus*, *Wall. Cat.* 3371 B (partly).

SINGAPORE; Wallich, Ridley. MALACCA; Griffith (*Kew Distrib.* 6273).—DISTRIB. Malaya.

Stolons slender, hardening into a woody rhizome. *Stem* scabrous at top, remotely (or not) leaf-bearing upwards. *Leaves* often as long as stem, $\frac{2}{3}$ in. broad; margins (at least near tips) scabrous. *Corymb* 1–2 in. diam., with sometimes 50 spikes; bracts often 6 in., leaf-like. *Spikes* $\frac{1}{2}$ in. diam., ultimately $\frac{1}{4}$ in., beaks of persistent nuts spreading on all sides. *Bracteoles* hardly $\frac{1}{10}$ in., ovate, obtuse, striate, horny. *Nut* about $\frac{1}{10}$ in., beak none, or rather completely fused with nut; grooves very narrowly spatulate.

Var. *longispica*; spikes $\frac{1}{2}$ in. oblong smutted, nuts perfect—Malacca; Griffith, *Kew Distrib.* n. 6357).—The abnormal elongation of the spikes is supposed due to the *Ustilago*.

2. **T. hypolytroides**, C. B. Clarke; very large, panicle large decompound with 800 spikes, glumes (bracteoles) membranous elliptic, 4 glumes intercalated between two basal male fl. and pistil, style 3-fid. *Hypolytrum Pandanophyllum* and *Pandanophyllum hypolytroides*, *F. Muell. Fragm.* ix. 16. *Mapania hypolytroides*, *Benth. Fl. Austral.* vii. 341. *M. Pandanophyllum*, *Schum. & Holtr. Kaiser Wilhelms Land*, 25.

MALAY PENINSULA; Johore, Ridley n. 4093.—DISTRIB. N. Guinea, Queensland. *Stem* 3–5 ft. *Bracts* 32 by 1 in., 3-nerved. *Panicle* 12 by 8 in. *Spikes* solitary $\frac{1}{2}$ in., cuboid-ellipsoid, of very many spikelets.

23. **MAPANIA**, Aubl.

Stem very short; inflorescence congested on scapes. *Leaves* long, often tough and coarse. *Spikelet* of 6 (or 5) glumes besides the bracteole, viz. two lowest boat-shaped, opposite, monandrous; third (on the anterior side of spikelet) plane-concave, not keeled, thin, sterile or monandrous; three

upper as though in a whorl, narrow-oblong, thin, empty. *Style* continuous with ovary, persistent; branches 3, long. *Nut* osseous, small or large, dry or succulent, beaked or obtuse.—Species 33, Tropical, cosmopolitan.

Sect. I. HALOSTEMMA (Genus, Wall. ex Benth. in Gen. Pl. iii. 1070 (by a misreading of bad lithography)). *Leaves* long narrowed at both ends. *Lateral scape* long or short. *Spikes* capitate in a single head, distinct, of many spikelets; bracts shorter than spikes. *Spikelets* often $\frac{1}{2}$ in. *Nut* dry, buried in the chaffy bracteoles and glumes; beak small conic, or hardly any.

1. **M. silhetensis**, C. B. Clarke; scape 1–2 ft. smooth upwards with 1–6 spikes, leaves often 1 in. broad scarcely scabrous on the keel beneath, bracteoles $\frac{1}{2}$ in. 3–5-striate, style 3-fid, nut ovoid much narrowed at base almost stalked. *Pandanophyllum palustre* β silhetana, Kurz in Journ. As. Soc. Beng. xxxviii. pt. ii. 79 (partly).—Cyperacea, Wall. Cat. n. 4474.

UPPER ASSAM; alt. 300 ft., Jenkins, C. B. Clarke. SYLHET; Wallich.

Rhizome long, nearly $\frac{1}{2}$ in. diam. *Leaves* 1–3 ft., margins scabrous. *Scape* robust, sheathed at base by some horny scales, naked upwards. *Spikes* $\frac{3}{4}$ in., ellipsoid; bracteoles $\frac{1}{2}$ in., chaffy, elliptic-oblong, dirty straw-colour, persistent. *Squamellæ* and glumes linear-oblong, nearly as long as bracteoles; 3rd lateral glume sterile. *Style* long, slender, branches 3 long. *Nut* $\frac{1}{2}$ in., ashy black; beak very small, fused with nut.

2. **M. palustris**, Benth. in Gen. Pl. iii. 1070; scape 1–2 ft. glandular-scabrous upwards with 10–50 spikes, leaves often $1\frac{1}{2}$ in. broad acutely scabrous on keel beneath, bracteoles $\frac{1}{2}$ in. lacerate at top often sub-bifid, style 3-fid, nut ovoid little narrowed at base. *Pandanophyllum palustre*, Boeck. in Linnæa, xxxvii. 138; Kurz in Journ. As. Soc. Beng. xxxviii. part 2, 78 (var. malesica) (not of Hassk.). *Lepironia palustris*, Miq. Ill. Fl. Archip. Ind. 63, t. 25.

SINGAPORE; Ridley.—DISTRIB. Malaya.

Rhizome long, nearly $\frac{1}{2}$ in. diam. *Leaves* 3–4 ft., margins scabrous. *Scape* robust, sheathed at base by some horny scales. *Heads* $1\frac{1}{2}$ –2 in. diam. *Spikes* $\frac{1}{2}$ in. ellipsoid, bracteoles chaffy, persistent. *Squamellæ* and glumes linear-oblong, nearly as long as bracteoles, 3rd lateral glume sterile. *Nut* $\frac{1}{2}$ in., ashy-black, beak small conic.—*Pandanophyllum palustre*, Hassk. (in Tydsch. Nat. Vereen. Ned. Ind. x. 119, 297) had a bifid style and 3–5 spikelets, so that it cannot be present plant (according to a specimen in the British Museum from Teysmann it was *Cephaloscirpus*, Kurz, with which the general description of Hasskark coincides).

3. **M. Kurzii**, C. B. Clarke; scape 4–16 in. smooth upwards with 1–15 spikes, leaves 1 in. broad aculeate on keel beneath, bracteoles $\frac{2}{3}$ in. strongly 13-striate reddish-brown.

MALACCA; Griffith (Kew Distrib. 6356). PERAK; alt. 1750 ft., King. PENANG, on Government Hill, alt. 1750 ft., Maingay, King.

Rhizome thick. *Leaves* densely equitant, very rigid, harsh, as of a Pandanus; tips long attenuate, trigonous, aculeate. *Inflorescence* 1 in. diam., rigid; bracts short, ovate, brown. *Spikes* $\frac{1}{2}$ in., ellipsoid, brown. *Bracteoles* ovate, obtuse, rigid, incurved, entire at apex. *Squamellæ* nearly as long as bracteole, brown. *Nut* not seen.—Closely allied to *M. palustris*; spikes and spikelets rather smaller.

4. **M. andamanica**, C. B. Clarke; scape 4–12 in. smooth upwards, leaves broad almost flaccid smooth on keel beneath, bracteoles $\frac{2}{3}$ in.

slenderly striate pale brown. *Pandanophyllum zeylanicum*, *Kurz in Journ. As. Soc. Beng.* xxxviii. part ii. 80 (*partly*).

ANDAMAN ISLANDS.; *Helper* (*Kew Distrib.* 6298), *Kurz*.

Stolon long, rather slender, covered by ovate striate lax scales. *Scales* at base of *culm* up to 2 in., very lax, striate, pale brown, with an ovate-oblong limb on one side sometimes nearly 1 in. long. *Leaves* much softer than in *M. Kurzii*; margins remotely scabrous or almost smooth. *Infl.* of *M. Kurzii*, but much less rigid; bracteoles loosely imbricate. *Nut* not seen.—Closely allied to *M. palustris*.

5. *M. multispicata*, C. B. Clarke; scape 6 in. with head of 10–50 spikes, leaves 3–4 ft. by $\frac{1}{2}$ – $\frac{2}{3}$ in. margins strongly scabrous cutting, bracteoles $\frac{1}{2}$ in. dark-brown, nut very small obovoid. *Pandanophyllum humile*, *Zoll. Verz. Ind. Archip.* ii. 61; *Miq. Fl. Ind. Bat.* iii. 33† (*not of Hassk.*). *Hypolytrum compactum*? *Moritzii Verz. Zoll. Pfl.* 98. *H. humile*, *Boeck. in Linnæa*, xxxvii. 128 (*mainly*).

SINGAPORE; *Ridley*.—DISTRIB. JAVA.

Head very much smaller than in the preceding species, about $\frac{1}{2}$ in. diam. when young. The species appears more allied to *Sect. Pandanophyllum*, but the spikes are distinct in the head.

Sect. III. PANDANOPHYLLUM (Genus), *Hassk. in Tydsch. Nat. Vereen. Ned. Ind.* x. 118 (*partly*). *Stem* very short, leaves long. *Lateral scapes* short or longish. *Inflorescence* (a corymb) congested into one ovoid or oblong head [a second head rarely added in *M. longa*]; bracts shorter or little longer than spikes. *Spikes* of few (sometimes 1) spikelets; upper bracts passing into bracteoles. *Nut* as in *sect. Halostennum*.

* *Leaves gradually narrowed at base and apex.*

6. *M. Wallichii*, C. B. Clarke; scape 4–6 in. stout covered for $\frac{1}{3}$ its length with scales, inflorescence a dense head 1–1½ in., ovoid or ellipsoid, partial spikes all containing one spikelet only. *Pand. palustre* (“*inflorescentia juveni*” contained ripe nuts), *Kurz in Journ. As. Soc. Beng.* xxxviii. pt. ii. 79 (*not of Hassk.*).—*Wall. Cat.* 3541.

SINGAPORE, *Wallich*.—DISTRIB. BORNEO.

Leaves equitant, up to 3 ft. by $\frac{2}{3}$ in., margins aculeolate. *Bracts* ovate-oblong, obtuse, thick, shorter than *infl.* *Bracteoles* $\frac{1}{2}$ in., elliptic, obtuse, chaffy, tough. *Squamellæ* and glumes a little shorter than bracteole, narrow-oblong. *Nut* $\frac{1}{3}$ in., ovoid, ashy-black, beak hardly any.

7. *M. zeylanica*, *Benth. in Gen. Pl.* iii. 1056; scapes 4–12 in. with few scales close to base, leaves aculeate on margin to base, mature *infl.* broad ovoid more or less compound, i.e. basal spikes containing several spikelets, upper spikes with one spikelet. *Pand. zeylanicum*, *Thw. Enum.* 345; *Kurz in Journ. As. Soc. Beng.* xxxviii. pt. ii. 80 (*excl. Andaman sp.*); *Boeck. in Linnæa*, xxxvii. 138. *Lepironia ceylanica*, *Miq. Ill. Fl. Archip. Ind.* 61, t. 22 (*spikes very young*).

CEYLON, *Thw.*, C.P. 3029. E. IND. PENINS., *Rottler*.—DISTRIB. BORNEO.

Resembles *M. Wallichii*, but spike shorter more compound. *Leaves* 2–3 ft. by $\frac{1}{3}$ in., aculeate on keel beneath, long-attenuate linear, margins aculeolate. *Infl.* in *frt.* rather more than $\frac{1}{2}$ in. diam. *Spikelets*, glumes, and nut, as in *M. Wallichii*. *Style* 3-fid and nut subglobose; or (*Boeckeler*) 2-fid.

8. *M. immersa*, *Benth. in Gen. Pl.* iii. 1056; scapes 1–2½ in. clothed throughout by lanceolate leaf-like scales, leaves (except tip) only slightly

scabrous, infl. ovoid partial spikes rarely containing more than one spikelet. Pand. immersum, *Thw. Enum.* 433; *Kurz in Journ. As. Soc. Beng.* xxxviii., pt. ii. 83.

CEYLON, *Thwaites* (C.P. 3819).

Leaves numerous, equitant, $2\frac{1}{2}$ ft. by $\frac{3}{4}$ in., tip caudate. Upper scales of scape up to $1-2\frac{1}{2}$ in. long, linear-lanceolate; lower bracts similar to upper scales often overtopping infl.; upper bracts shorter, lanceolate, passing into bracteoles. Partial (lateral) spikes, all (or nearly) of one spikelet. Nut nearly as in *M. zeylanica*, but more narrowed at base (shortly stalked).

9. *M. tenuiscape*, C. B. Clarke; scapes 4-6 in. very slender with scales only close to base, leaves narrow margins aculeate nearly throughout, infl. in fruit ovoid more or less compound, i.e. basal partial spikes containing more than one spikelet. Pand. Miquelianum, *Kurz in Journ. As. Soc. Beng.* xxxviii., pt. ii. 81 (partly). *P. angustifolium* (sp.), *Kurz ms.* (correcting himself).

MALACCA, *Griffith* (*Kew Distrib.* 6299). JOHORE, *Ridley*.—DISTRIB. Sumatra.

Similar to *M. zeylanica*, but infl. and spikes smaller. *Leaves* numerous, equitant, up to $2\frac{1}{2}$ ft. by $\frac{3}{4}$ in., long attenuate at both ends, aculeate on midrib beneath. *Inflorescence* (in fruit) hardly $\frac{1}{2}$ in. in diam. *Squamellæ* 6, $\frac{1}{2}$ in. long, hardly shorter than bracteole. Nut as of *M. zeylanica*, or scarcely smaller.

10. *M. longa*, C. B. Clarke; scapes 10-25 in., naked except close to base, leaves elongate, infl. of 1 (rarely 2) large ovoid head, partial spikes rarely containing more than one spikelet.

SINGAPORE, *Ridley*.—DISTRIB. Borneo.

Leaves 3 ft. by $\frac{3}{4}$ in., tip attenuate, margins aculeate nearly throughout, keel beneath smooth except towards tip. Infl. in fruit $\frac{3}{4}$ by $\frac{1}{2}$ in.; bracts much shorter than infl. Nut $\frac{5}{8}-\frac{1}{2}$ in., obovoid, beak short.—Perhaps better referred to *Sect. Halostemma*.

** *Leaves* broad, suddenly narrowed at base into a quasi-petiole, at top into a linear tail.

11. *M. humilis*, *Naves & Villar in Blanco Fl. Filip. Append.* 309; scapes 2-5 in. clothed by scales at base, leaves $1-1\frac{1}{2}$ in. broad, infl. of one head $\frac{3}{4}-1$ in. *M. lucida*, *N. E. Br. in Illustr. Hort.* xxxii. 77, t. 557. Pand. humile, *Hassk. in Tydsch. Nat. Vereen. Ned. Ind.* x. 119; *Kurz in Journ. As. Soc. Beng.* xxxviii., pt. ii. 82. *P. Zippelianum*, *Kurz in Tydsch. Nat. Vereen.* xxvii. 126, & in *Bot. Zeit.* xxiii. 204. *P. Wendlandi*, *Gard. Chron.* xxi. [1884] 711. *Lepironia cuspidata*, *Miq. Fl. Ind. Bat. Suppl.* 603. *L. humilis*, *Miq. Ill. Fl. Archip. Ind.* 61, t. 23.

PENANG, *Curtis*. PERAK, *King*. MALACCA, *Griffith* (*Kew Distrib.* 6300), *Hervey*. SINGAPORE, *Ridley*.—DISTRIB. Malaya.

Rhizome short, woody, obliquely descending, passing upwards into a short stem terminated by a crown of densely equitant leaves; from the apex of rhizome lateral ascending shoots break out. *Leaves* $1\frac{1}{2}-3$ ft., 3-nerved, aculeate on margins and on keel beneath at least at top; quasi-petiole 2-12 in., dilated at base. Scapes axillary in the lower leaves, rather stout, smooth trigonous upwards; basal scales ovate-lanceolate, hard, striate, green with brown-scarious margins. Infl. young, oblong, mature ovoid; bracts shorter than head, similar to scales at base of scape. Lower partial spikes nearly always compound, i.e. containing a few spikelets; bracteoles $\frac{1}{2}$ in., ovate, obtuse, striate. *Squamellæ* 6, hardly shorter than bracteole, linear, brownish. *Anthers* linear-oblong, yellow, not crested. *Style* long; branches 3. Nut $\frac{1}{2}$ in., ellipsoid, sessile, dusky-black; style-base (in pistil and in half-ripe nut) conical, beak-like, in ripe nut nearly completely absorbed.

24. **SCIRPODENDRON**, Kurz.

Stem stout, with nodes upward, terminating in an oblong panicle. *Basal leaves* very long, narrowed at both ends. *Spikes* clustered, ellipsoid, of many spikelets. *Spikelets* of 8-11 glumes beside the bracteole, viz. 2 lowest boat-shaped, opposite, monandrous; 3 uppermost quasi-whorled, narrow-oblong, thin, empty; 3-6 intermediate, monandrous, or sterile. *Style* long linear, branches 3, base continuous with ovary. *Nut* large, osseous, coarsely 6- (or more-) ribbed longitudinally, dusky-black, obtuse.

S. costatum, Kurz in *Journ. As. Soc. Beng.* xxxviii., pt. ii. 85; basal leaves 3-8 ft. by 1 in., narrowed gradually at both ends aculeate on margins and midrib beneath upwards. *Benth. Fl. Austral.* vii. 341; *Goebel in Ann. Jard. Bot. Buitenz.* vii. 122, t. 14, fig. 1-11. *S. sulcatum*, *Miq. Ill. Fl. Archip. Ind.* 65, t. 28. *Hypolytrum costatum*, *Thw. Enum.* 346. *Pand. costatum*, Kurz in *Journ. As. Soc. Beng.* xxxviii., pt. ii. 85, in *Obs.* *Scleria macrocarpa*, *Wall. Cat.* 3538.

CEYLON, Kœnig, *Trimen.* PENANG and SINGAPORE, Wallich. MALACCA, Griffith (*Kew Distrib.* n. 6134).—DISTRIB. Java, Austral., Samoa.

Rhizome woody. *Stem* 1-2 ft., at top $\frac{1}{2}$ in. in diam. trigonous, smooth. *Panicle* 4-6 in. long; branches clustered, thick, short; lower bracts leaf-like, upper very short. *Spikes* $\frac{3}{4}$ in. long; spikelets $\frac{1}{4}$ - $\frac{1}{2}$ in.; bracteole (outermost glume) as long as spikelet, ovate, obtuse, striate, chaffy, dirty straw-colrd. *Squamellæ*, two outer not much shorter than bracteole, hairy on keel; inner narrower, rather shorter. *Nut* $\frac{2}{3}$ in. long, $\frac{1}{2}$ in. in diam., woody, with succulent epicarp (eaten in Samoa by natives).

25. **LEPIRONIA**, L. C. Rich.

Stem long, simple, leafless except a few scales at base. *Spike* (apparently) simple, lateral, oblong-ellipsoid, of many spikelets. *Spikelets* of 8-11 glumes beside the bracteole, viz. 2 lowest boat-shaped, opposite, monandrous; 3 uppermost quasi-whorled, narrow-oblong, thin, empty; 3-6 intermediate, monandrous or sterile. *Style* rather short, linear, branches 2, linear. *Nut* ellipsoid, much compressed, acutely keeled on margins, smooth dry.

L. mucronata, L. C. Rich. in *Pers. Syn.* i. 70; stem $1\frac{1}{2}$ -3 ft., terete, lower bract as though a continuation of stem. *Miq. Ill. Fl. Archip. Ind.* 60, t. 20; *Thw. Enum.* 346; Kurz in *Journ. As. Soc. Beng.* xxxviii., pt. ii. 77; *Boeck. in Linnæa*, xxxvii. 140; *Goebel in Ann. Jard. Bot. Buitenz.* vii. 126, t. 14, fig. 12, 13. *Scirpus confertus*, *Poir. Encyc.* vi. 756, and *Suppl.* v. 90. *Restio articulatus*, *Refz. Obs.* iv. 14. *Chondrachne articulata*, *Br. Prodr.* 220. *Choricarpa aphylla*, *Boeck. in Flora*, xli. 20.

MALACCA, Gaudichand, Griffith. SINGAPORE, Lobb. CEYLON, Thwaites, &c.—DISTRIB. Madagascar, Malaya, Queensland, Viti (China cult. only, fide Hance).

Rhizome horizontal, woody, clothed by ovate subacute striate ferruginous scales. *Stems* approximate, $\frac{1}{2}$ in. in diam., when dry apparently transversely septate; scales often covering base of stem for 4-8 in.; uppermost produced on one side, lanceolate not green. *Spike* usually $\frac{1}{2}$ -1 in. long, occasionally much larger, brown or chestnut, lowest bract often 1-2 in. *Bracteoles* (apparently flower-glumes) spirally imbricated, $\frac{1}{2}$ in., ovate, obtuse, rigid, not striate, ultimately deciduous with nut. Two outer *squamellæ* scarcely shorter than glume, hairy on keel. *Nut* $\frac{1}{2}$ - $\frac{3}{4}$ in., obscurely longitudinally striate; linear style-base persistent.

26. **SCLERIA**, Berg.

Perennial or annual. *Stems* erect, leaf-bearing. *Leaves* narrow, sub-3-nerved, often serrate cutting severely; base sheathing. *Panicle* often stout, elongate, compound, sometimes narrow or reduced nearly to a spike; primary bracts leaf-like, secondary narrow often setaceous. *Flowers* all unisexual. *Spikelets* unisexual, rarely bisexual; bisexual spikelet with one fem. fl. below, and a few males above; fem. spikelet similar, but upper male portion reduced to a small rudiment pressed laterally against the nut or occasionally 0 (when the fem. fl. appears terminal). *Glumes* usually 2-4 empty below the fem. glume, or in the male spikelets 2 below the male glumes; fem. glume concave, margins not united at base round the pistil. *Stamens* 3-1; anthers linear-oblong, often mucronate. *Nut* osseous, often shining; style linear, not dilated at base, deciduous; branches 3, linear. *Gynophore* usually prominent under the nut, apex dilated, often into a 3-toothed saucer.—Species 150, in moist warm countries.

Subgenus I. **HYPOPORUM** (Genus), *Nees in Linnæa*, ix. 303, character widened. Bisexual spikelets many.

1. **S. pergracilis**, *Kunth Enum.* ii. 354; very slender, nearly glabrous, roots fibrous, spikelets clustered on a linear interrupted spike, style 3-fid, nut white tubercled fenestrate, disc obsolete. *Strachey Cat. Pl. Kumaon*, 73; *Thw. Enum.* 354; *Boeck. in Linnæa*, xxxviii. 438. *Hypoporum gracile*, *Nees in Edinh. Phil. Journ.* xvii., p. 267, and in *Wight Contrib.* p. 118.—*Scleria*, *Wall. Cat.* 3406.

Widely scattered from GURWHALE, alt. 5600 ft., *Duthie*, to SYLHET, *Wallich*. BEHAR, *Kurz*. CHOTA NAGPORE, *T. Anderson*. DECCAN PENINSULA, *Wight*. CEYLON, *Thwaites*.—DISTRIB. Trop. Africa.

Stem 10-20 in. *Leaves* 4-10 by $\frac{1}{8}$ in. *Spike* 2-6 in.; clusters (of 2-5 spikelets) $\frac{1}{3}$ - $\frac{2}{3}$ in. apart; bract ovate-lanceolate, hardly longer than clusters. Bisexual spikelets scarcely $\frac{1}{2}$ in., numerous, terminal, with sometimes a male spikelet close beneath. *Fem. glume* boat-shaped, ovate-lanceolate, greenish; glume below it similar, subopposite; superior male glumes thinner, brownish, more obtuse, not keeled. *Nut* $\frac{1}{10}$ in. in diam., ovoid, trigonous, base narrow trigonous.—Dr. Trimen writes: "The lemon-scented leaves are used to drive away mosquitoes."

2. **S. lithosperma**, *Sw. Prodr.* 18, and *Fl. Ind. Occid.* 92, in note; slender or medium, nearly glabrous except the sheaths, rhizome woody, panicle thin straggling, style 3-fid, nut white smooth (except in var. β), disc nearly obsolete. *Nees in Wight Contrib.* 117; *Dalz. & Gibs. Bomb. Fl.* 288; *Thw. Enum.* 354; *Boeck. in Linnæa*, xxxviii. 451; *Kurz in Journ. As. Soc.* xlv., pt. ii. 159 (not Roxb.). *S. tenuis*, *Retz. Obs.* iv. 13; *Roxb. Fl. Ind.* iii. 574. *S. Wightiana*, *Steud. Syn. Cyp.* 176. *Scirpus lithospermus*, *Linn. Sp. Pl.* [ed. 1] 51. *Schœenus lithospermus*, *Linn. Sp. Pl.* [ed. 2], 65. *Olyra orientalis*, *Lour. Fl. Cochinch.* ii. 674. *Hypoporum lithospermum*, *Nees in Mart. Fl. Bras. Cyp.* 172.—*Scleria*, *Wall. Cat.* 3417, 3418, 3419.—*Rheede Hort. Mal.* xii. t. 48.

Throughout INDIA (except the West arid area), alt. 0-3000 ft., common, from SIKKIM to CEYLON and MALACCA. ANDAMANS and NICOBARS, *Kurz*.—DISTRIB. All warm regions except Continental Africa.

Rhizome elongate, horizontal. *Stems* $1\frac{1}{2}$ -3 ft., not tufted. *Leaves* 6-12 by $\frac{1}{2}$ in.; sheaths usually hairy. *Panicle* (fully developed) a ft., distant primary branches 4 in., ascending, again divided; but often very thin with few spikelets.

Spikelets much clustered, many bisexual $\frac{1}{8}$ in. long, nearly smooth and glabrous, very similar to those of *S. pergracilis* but larger. *Nut* $\frac{1}{10}$ in. long (sometimes much smaller) ellipsoid, trigonous, base narrow trigonous.

Var. β (*Roxburghii*), Thw. Enum. 354; rather stouter, nut rather larger with pyramidal subacute apex, transversely wrinkled by ferruginous glands (at least when young). Hypoporum *Roxburghii*, *Nees* ms.—Ceylon, *Thwaites*; Deccan Peninsula, *Wight*.—Partial panicles much more rigid, subpyramidal, clusters of spikelets more numerous and dense.—This might be esteemed a species, but too much regard must not be paid to the reticulation or wrinkling of the nut in *Scleria*, which arises from irregularities in drying, &c. The outer cells of the nut in *Scleria* are in every species small, quadrate-hexagonal, obscure.

3. *S. corymbosa*, *Roxb. Fl. Ind.* iii. 574; robust, coarse, nearly glabrous, panicle long copious of several compoundedly-corymbose axillary partial panicles, style 3-fid, nut white, smooth, disc very small. *S. androgyna*, *Nees in Linnæa*, ix. 303, & *Wight Contrib.* 117; *Thw. Enum.* 353; *Boeck. in Linnæa*, xxxviii. 536. *S. majus*, *Moon Cat. Pl. Ceyl.* 62. *S. corymbifera*, *Boeck. l. c.* 537.—*Scleria*, *Wall. Cat.* 3412.

Warm moist region, sparsely scattered from KHASIA TERAI, *J.D.H.*, to CEYLON, *Thwaites*, and MALACCA, *Griffith*.

Rhizome horizontal, often $\frac{1}{2}$ in. in diam., clothed with brown scales. *Stems* 3-8 ft., stout; sheaths triquetrous, not winged. *Leaves* 20 by 1 in.; margins scabrous. *Infl.* 1-2 ft. by 4-6 in.; lower peduncles exserted 1-4 in., rigid. *Spikelets* $\frac{1}{2}$ in. long, nearly all bisexual, clustered and solitary, usually brown or straw-colrd., sometimes more or less chestnut-colrd., constructed nearly as in *S. lithosperma* but stouter; stamens often 3. *Nut* nearly $\frac{1}{8}$ in. long, ellipsoid, subtrigonous, much narrowed at base. *Disc* slightly dilated, scarcely 3-lobed, yellow-brown; margin (inner disc of authors) very short, subtriangular, glandular, often dark red.

4. *S. Ridleyi*, *C. B. Clarke*; slender, nearly glabrous, panicle of few small very distant axillary corymbs, style 3-fid, nut white smooth apiculate, disc very small.

SINGAPORE; Pular Buru, *Ridley* (n. 1641).—DISTRIB. Hongkong.

Rhizome horizontal, $\frac{1}{4}$ in. in diam., clothed by small ovate striate dark-red scales. *Stem* 2 ft., $\frac{1}{10}$ in. in diam., triquetrous, scabrous; sheaths very narrowly winged; ligule almost truncate, margin narrow scarious hardly hairy. *Leaves* 12 by $\frac{1}{4}$ in. Partial panicles scarcely 1 in. in diam., lowest 4-8 in. from the next, with about 8-20 spikelets. Nut-bearing spikelets usually with male fl. at top, other male spikelets also added. *Nut* (rather more pointed) and disc as in *S. corymbosa*, *Roxb.*, to which Boeckeler has referred it and which is the true affinity; but the difference in stoutness, stem-leaves, and panicle is very great.

Subgenus II. *SCLERIA proper*. Bisexual spikelets none or few.

Sect. I. TESSELLATÆ. Slender (sometimes tall) plants. *Roots* fibrous, or the rhizome very short not thick. *Leaves* not caudate-setaceous at tip. *Panicle* narrow, the lower axillary panicles often remote, reduced to spikes, sometimes very short.

* *Nut tessellated*.

5. *S. tessellata*, *Willd. Sp. Pl.* iv. 315 (*excl. cit. Rumph.*); slender sometimes tall, hairy or glabrate, roots fibrous, panicle elongate thin lower branches remote, style 3-fid, nut tessellate, lobes of disc-margin short ovate erect thin pale. *Nees in Wight Contrib.* 118; *Thw. Enum.* p. 354 (var. β only); *Boeck. in Linnæa*, xxxviii. 470. *S. propinqua* &

parvula, *Steud. Syn. Cyp.* 169, 174. *S. uliginosa*, *Boeck. l. c.* 471.—*Scleria*, *Wall. Cat.* 3405 A.

Throughout INDIA (except the West arid area), alt. 0–8000 ft., frequent; from NEPAL and MUNEYPOOR to CEYLON and PEGU.—DISTRIB. Malaya, China, Japan, Austral.

Roots often black-red. *Stems* 1–2 ft. *Leaves* 4–10 by scarcely $\frac{1}{4}$ in., lanceolate, subobtuse (not acutely setaceous) at tip, perhaps scabrous, with white hairs or glabrate; sheaths conspicuously winged or not. *Panicle* commonly straggling, lower partial panicles on peduncles 0–5 in., narrow or condensed 1–2 in. long, but sometimes evolute more rigid subpyramidal. *Fem. spikelets* $\frac{1}{2}$ in. long, ferruginous-green, glabrous. *Nut* scarcely $\frac{1}{2}$ in. in diam., at first white, the raised reticulations covered with minute ferruginous hairs, at last often nearly smooth shining white shallowly reticulated. *Disc* small, salver-shaped, 3 lobes of margin triangular (rarely lanceolate) reaching to $\frac{3}{4}$ height of nut.

6. *S. biflora*, *Roxb. Fl. Ind.* iii. 573; slender, nearly glabrate, roots fibrous, panicle elongate thin lower branches remote, style 3-fid, nut tessellate, lobes of disc-margin lanceolate acute or subulate erect stout ferruginous-brown. *S. Steudeliana*, *Miq. Fl. Ind. Bat.* iii. 344; *Boeck. in Linnæa*, xxviii. 475. *S. tessellata*, *Benth. Fl. Hongk.* 399; *Thw. Enum.* 354, a (not B); *Kunth Enum.* ii. 343 (partly).—*Scleria*, *Wall. Cat.* 3405 B.

LOWER BENGAL, *Wallich*; Calcutta, *C. B. Clarke*; Mudhopoor Jungle, *C. B. Clarke*. CACHAR, *Keenan*. CEYLON, *Walker*.—DISTRIB. Malaya, S. China.

Usually glabrous except the (so-called) ligule of leaf. *Fem. glume* scabrid on its keel upwards, or smooth. Lobes of disc-margin reaching to $\frac{1}{2}$ – $\frac{3}{4}$ height of nut.—This may be regarded as a var. of *S. tessellata* (which it altogether resembles), only differing in the lobes of the disc-margin.

7. *S. Stocksiana*, *Boeck. in Linnæa*, xxxviii. 474; nearly glabrous, panicle elongate thin lower branches remote, style 3-fid, nut tessellate, lobes of disc-margin short ovate ferruginous their edges reflexed auriculate. *S. tessellata* (part), *Herb. Ind. Or. Hook. f. & T.*

BOMBAY, *Law*.

The examples show only panicles, without leaves or roots. *Nut* rather larger and more glabrous than of *S. tessellata*. *Disc* dark red, glandular.—May have a horizontal rhizome, and be more nearly allied to *S. junciformis*.

** *Nut smooth or very obscurely reticulated.*

8. *S. annularis*, *Kunth Enum.* ii. 359; slightly hairy, rhizome 0, panicles axillary remote oblong rigid, style 3-fid, nut ovoid stoney-white, disc-margin truncate. *Boeck. in Linnæa*, xxxviii. 456. *Hypoporum annulare*, *Nees ms. (fide Kunth)*.

N.-WEST INDIA, *Royle*. BENGAL, *Griffith*. CENTRAL INDIA; Chunda, *Duthie*. MALABAR, *Law*.—DISTRIB. China.

Roots fibrous, dark-red. *Stems* 1–2 ft., slender or medium; sheaths 3-winged, hairy or glabrous. *Leaves* 4–8 by $\frac{1}{2}$ in., lanceolate, tip subobtuse. *Panicles* axillary, often 1 by $\frac{1}{2}$ in., subspicate, secondary bracts conspicuously exsert. *Spikelets* glabrous, very like those of *S. tessellata*. *Nut* $\frac{1}{10}$ in., not apiculate, very smooth. *Disc* obconic, as long as contracted nut-base, smooth, chestnut or reddish.—A well-marked species, externally very like *S. tessellata*.

9. *S. zeylanica*, *Poir. Encycl.* vii. 3 (excl. Madagasc.); slender, nearly glabrous or thinly hairy, rhizome hardly any, panicles axillary distant small, fem. glumes glabrous, style 3-fid, nut small (mature) white

smooth or obscurely reticulate, disc-margin subentire. *Nees in Wight Contrib.* p. 118. *S. ceylanica*, *Kunth Enum.* ii. 358; *Thw. Enum.* 435. *S. Thwaitesiana*, *Boeck. in Linnæa*, xxxviii. 454. *S. lateriflora*, *Boeck. l. c.* 455; *Kurz in Journ. As. Soc.* xlv, pt. 2, 159. *S. hebecarpa*, *Thw. Enum.* p. 354, 435.

TENASSEERIM, *Helfer*. NICOBARS, *Kurz*. CEYLON, *Thwaites*.—DISTRIB. Borneo.

Stems 1 ft., connected at base on a very short slender lignescenscent rhizome *Leaves* with scattered slender needle-white hairs or glabrescent, tip lanceolate subobtuse (not setaceous-caudate). *Spikelets* small, as of *S. tessellata*. *Nut* scarcely $\frac{1}{8}$ in. in diam., dried young reticulate, mature osseous smooth or nearly so. *Disc-margin* coloured, glandulose, not (or obscurely) 3-lobed.—*S. lara*, R. Br., hardly differs but by its strictly fibrous roots.

10. *S. flaccida*, C. B. Clarke (*non Steud.*); slender, softly hairy all over, roots fibrous, panicles axillary small distant, fem. glumes hairy, style 3-fid, nut small ovoid smooth white, disc-margin subentire coloured glandular.

ASSAM (in Seebisagur), C. B. Clarke. PEGU, *Kurz*.

Stems flaccid, 1–2 ft. *Leaves* $\frac{1}{2}$ in. broad, lanceolate, subobtuse at tip. *Panicles* axillary, $\frac{1}{2}$ in. long. *Spikelets* small, all unisexual, fem. $\frac{1}{2}$ in. long usually containing the depauperated sterile apex of the spikelet as a lateral compressed rudiment (of two glumes) about $\frac{2}{3}$ length of nut. *Nut* broad, obtuse not apiculate.—Might stand as a var. of the Australian *S. rugosa*, Br., which however has a reticulated subtuberculated nut.

*** *Nut smooth, white, fluted longitudinally.*

11. *S. caricina*, *Benth. Fl. Austral.* vii. 426; annual, very slender, nearly smooth and glabrous, panicle of several remote small axillary clusters, fem. glume sub-3-toothed, style 3-fid, nut very small, disc-margin obsolete. *S. axillaris*, *Moon Cat. Pl. Ceylon*, p. 62. *Diplacrum caricinum*, Br. *Prodr.* 241; *Endl. Iconogr.* t. 25; *Thw. Enum.* 354; *Boeck. in Linnæa*, xxxviii. 434. *D. tridentatum*, *Brongn. in Duperr. Voy.* t. 26. *D. zeylanicum*, *Nees in Wight Contrib.* p. 119. *Olyra malaccensis*, *Kœnig in Herb. Heyne*.—*Wall. Cat.* 3540.

INDIA, frequent; from the SIKKIM TERAI and ASSAM to CEYLON and TENASSEERIM.—DISTRIB. Malaya, China, Australia.

Roots fibrous, slender. *Stems* 1–12 in., tufted. *Leaves* 2 by $\frac{1}{2}$ – $\frac{1}{3}$ in., lanceolate, tip subobtuse; sheaths trigonous, not winged. *Primary bracts* (floral leaves) altogether leaf-like tuft usually of very small subsessile clusters just exserted from their sheaths, but in evolute examples, lower clusters are sometimes paniculate with branches 1 in. long. *Spikelets* all unisexual, fem. $\frac{1}{12}$ in. long with 1 or 2 smaller male spikelets closely applied to its base. *Fem. spikelet*: lowest glume ovate boat-shaped obtuse; 2nd glume (sterile) rather longer, boat-shaped, apex deeply emarginate (from the centre of the emargination the midrib is produced as a linear-triangular point), smooth, 2-ribbed on each side; 3rd glume similar to 2nd and subopposite to it, containing fem. flower; no rudiment of an upper glume. *Nut* scarcely $\frac{1}{10}$ in. in diam.; disc small obpyramidal, margin most minute, white, truncate.—See Goebel in *Ann. Jard. Bot. Brit.* vii. 132, t. 15, figs. 21–29, who considers the female flower truly terminal, and therefore places the species among the American *Cryptangieæ*.

**** *Nut covered by conical tubercles hairy at their tips.*

12. *S. Neesii*, *Kunth Enum.* ii. 358; small, hairy, rhizome hardly any, panicle of 2–1 distant axillary clusters (in Ceylon one terminal head),

spikelets somewhat large lanceolate hairy, style 3-fid, nut small globose as though softly glochidiate. *Thw. Enum.* 354; *Boeck. in Linnæa*, xxxviii. 449. *S. stricta*, *Moon. Cat. Pl. Ceyl.* 62. *Hypoporum capitatum*, *Nees in Linnæa*, ix. 303, & in *Edinb. Phil. Journ.* xvii. 267, & in *Wight Contrib.* 118.

CEYLON, *Macrae*, &c.—DISTRIB. Borneo.

In the Ceylon specimens—*Stems* 4–8 in. *Leaves* lanceolate, tip subobtuse. *Head* globose, of about 12 spikelets. *Spikelets* all unisexual (not a *Hypoporum*), nearly $\frac{1}{2}$ in. long, ferruginous; female glume mucronate. *Nut* about $\frac{1}{15}$ in. *Disc* minute, patent, margin as long as contracted base of nut, pale, truncate scarcely 3-lobed.—The Ceylon specimens (not plentiful) have uniformly small 1-headed specimens, but are a small form of a Borneo plant, which is a foot high with the lower axillary head of spikelets remote.

Sect. 2. *Elatæ*. Robust plants with thick (except in *S. psilorrhiza*) woody horizontal rhizome. *Leaves* (in many) caudate-setaceous at tip. Partial panicles rigid, often pyramidal. Lobes of disc-margin entire [or slightly digitate in *S. multifoliata*].

* *Sheaths* (of middle stem-leaves) winged (sometimes in *S. elata*, and *S. chinensis* obscurely).

13. *S. hebecarpa*, *Nees in Linnæa*, ix. 303, and in *Wight Contrib.* 117; scarcely robust, slightly hairy (see also var. β), panicle thin scarcely rigid, style 3-fid, nut minutely velvety, lobes of disc-margin lanceolate thin brown concavely applied to nut. *Thw. Enum.* 435; *Boeck. in Linnæa*, xxxviii. 478. *S. alata*, *Moon Cat. Pl. Ceyl.* 62. *S. scrobiculata*, *Zoll. Verz. Archip. Ind.* ii. 61 (not of *Nees*). *S. stipularis*, *Thw. Enum.* 353, 435 (not of *Nees*).—*Scleria*, *Wall. Cat.* 3415.

Throughout INDIA (except the N.W. arid region), alt. 0–5000 ft., and CEYLON, common.—DISTRIB. Malaya, China, Japan, Australia, Polynesia.

Rhizome $\frac{1}{2}$ in. in diam., clothed by ovate striate dark-red scales. *Stems* usually 2–3 ft., occasionally taller; sheaths (or some of them) usually distinctly 3-winged. *Leaves* 1 ft., margins scabrous (cutting) in dried specimens more or less revolute, usually long acuminate, occasionally subobtuse. *Panicle* 1 ft. long, oblong; partial panicles usually thin lax of few spikelets, but sometimes stouter pyramidal, their bracts often much exsert conspicuous, but sometimes short. *Spikelets* all unisexual; fem. $\frac{1}{2}$ in., slightly scabrous scarcely hairy; fem. glume mucronate; superior sterile rudiment usually present. *Nut* $\frac{1}{10}$ in. long, ovoid, obscurely trigonous, narrowed at apex, straw-colrd. or brown, nearly always obscurely reticulated, margins of reticulations microscopically brown-hispid, or finally glabrate almost shining. Lobes of disc margin as much as $\frac{1}{4}$ – $\frac{1}{3}$ height of nut.

Var. *pubescens* (sp.), Steud. Syn. Cyp. 168; more hairy, sometimes softly villous. *Benth. Fl. Hongk.* 400. *S. vestita*, *Boeck. l. c.* xxxviii. 482. *S. villosula*, *Wall. Cat.* 3414. *S. sumatrensis*, var. β , *Miq. Fl. Ind. Bat.* iii. 344 (not of *Retz.*).—From Sikkim and Assam to Chota Nagpore, Malaya, China.—*Leaves* often softly villous beneath. *Rhachis* of panicles very hairy. *Spikelets* sometimes hairy.

14. *S. Thomsoniana*, *Boeck. in Linnæa*, xxxviii. 479; robust, glabrous (even rhachis of panicle), partial panicles remote narrow slenderly peduncled, style 3-fid, nut tessellated minutely hairy, lobes of disc-margin 3 very short thickened reflexed yellow-brown. *S. khasiana*, *Boeck. Cyp. Nov.* ii. 29.—*Scleria*, sp. 12, *Herb. Ind. Or. H. f. et T. T.*

KHASIA HILLS; on the southern slope, alt. 0–3000 ft., from Chela to Lakhat, *J. D. H. & T. T.*, &c. MUNEYPOOR, alt. 2500 ft., *C. B. Clarke*.

Rhizome $\frac{1}{4}$ in. thick. *Stems* 3 ft.; sheaths broadly 3-winged, sometimes obscurely winged; ligule glabrate or not, rarely densely hairy. *Panicle* often tinged red; lowest peduncle often 6 in. *Spikelets* like those of *S. hebecarpa*; disc margin almost spongy shortly reflexed as three ears.—Most easily distinguished from *S. elata* by the *glabrous* rhachis of the panicles.

15. *S. alta*, Boeck. in *Linnæa*, xxxviii. 485; robust, glabrous (even rhachis of panicle), partial panicles narrow somewhat remote, style 3-fid, nut tessellated minutely hairy, lobes of disc-margin 3 united at base appressed to the nut pale green rounded crenate at summit.

EAST BENGAL; Foot of Khasia Hills, Griffith, J. D. H. & T. T.; Mudhopoor Jungle, C. B. Clarke.

Very near *S. Thomsoniana*, except the lobes of disc-margin; secondary bract longer, more conspicuous.

16. *S. elata*, Thw. Enum. 353, a (excl. C.P. 825); robust, more or less hairy (at least rhachis of panicle), partial panicles distant rigid pyramidal, style 3-fid, nut tessellated minutely hairy, lobes of the disc-margin short obtuse or scarcely obtuse-triangular. Boeck. in *Linnæa*, xxxviii. 487. *S. lithosperma*, Roxb. Fl. Ind. iii. 574 (not of Willd.). *S. Hasskarliana*, Boeck. in Engler Jahrb. v. [1884] 511. *Diaphora cochinchinensis*, Lour. Fl. Cochinch. 709.—*Scleria*, Wall. Cat. 3408, A, C.

Throughout INDIA (except the N.W. arid region), alt. 0–2000 ft., and CEYLON.—DISTRIB. Java, China.

Descr. of Thwaites, C.P. 3030.—*Stem* 3 ft. by $\frac{1}{4}$ in. in diam., glabrous. *Leaves* 1–2 ft. by $\frac{1}{4}$ in., tip attenuated, margins scabrous, cutting the hand, when dry recurved; sheath 3-winged, wings broad or narrow, two wings often much broadest; ligule depressed-ovate, hairy. *Panicle* 1 ft. by 4 in.; partial panicles 4 by 3 in., branches rectangularly divaricate, red, hairy. *Spikelets* numerous, all unisexual, male and fem. scattered in all parts of infl.; panicle dense, but spikelets scarcely clustered. *Fem. spikelets* $\frac{1}{2}$ in.; fem. glume shortly mucronate, glabrous, sterile superior glumes tabescent (generally present). *Nut* $\frac{1}{8}$ – $\frac{1}{10}$ in., as of *S. hebecarpa*, and similarly becoming glabrate ultimately, white or dusky; lobes of disc-margin scarcely attaining $\frac{1}{4}$ height of nut, ferruginous or red.—Thwaites says of his *S. elata* “sheaths not winged,” whereas Boeckeler puts it in his section having “trilobate sheaths.” The explanation is that Thwaites described *S. elata* mainly from C.P. n. 825 (which is *S. chinensis*, Kunth, var. β), while Boeckeler describes C.P. 3030, which is the very common *S. elata*. Thwaites may, however, have rightly treated this (winged leaf-sheaths) as of small importance.

Var. latior; stouter, stems often 6–9 ft. very thick, sheaths conspicuously winged, panicles large dense, spikelets clustered dusky, nut larger white.—N.E. India, alt. 0–3500 ft., common.

Var. decolorans; robust, panicle dark-red, nuts larger early discoloured, finally black-purple as are glumes.—Sikkim, Khasia, Muneypoor, alt. 3–6000 ft., common.

17. *S. chinensis*, Kunth Enum. ii. 357; similar to *S. elata*, but ligules with an ovate-oblong scarious brown elongation of their margin $\frac{1}{8}$ – $\frac{1}{4}$ in. long. Boeck. in *Linnæa*, xxxviii. 486. *S. ciliaris*, Nees in Wight Contrib. 117 (not of Mich.). *S. scrobiculata*, Moritzi Verz. Zoll. Pfl. 98 (not of Nees).

SINGAPORE, Ridley (n. 1556).—DISTRIB. China, Malaya, N. Australia.

Var. biauriculata; wings of leaf-sheaths narrow or sometimes obsolete, scarious margin of ligule shorter ($\frac{1}{8}$ – $\frac{1}{2}$ in. long), broad obtuse very fragile biauriculate at base. *S. elata*, Thw. Enum. 353, partly. *S. exaltata*, Boeck. in Engler Jahrb. v., p. 511.—Ceylon, Thwaites. Singapore, Ridley (n. 1556).

18. **S. Radula**, *Hance in Ann. Sc. Nat.* ser. 4, xviii. 232; robust, scabrous, very slightly hairy, partial panicles several peduncled pyramidal, secondary bracts long setaceous conspicuous, style 3-fid, nut smooth white, lobes of disc-margin small ovate. *S. lævis*, var. *scaberrima*, *Benth. Fl. Hongk.* 400 (not *S. levis*, Retz). *S. aspera*, *Boeck. in Linnæa*, xxxviii. 483.

MALAY PENINSULA. PERAK, alt. 300 ft., *King's Collector* (n. 1929).—DISTRIB. Hongkong.

Closely allied to robust forms of *S. elata*, Thwaites, but differs by being very scabrous, by the rhachis and rhacheolæ being scabrous (scarcely hairy), and by the nut being smooth (scarcely tessellate).

19. **S. psillorrhiza**, *C. B. Clarke*; robust, nearly glabrous, rhizome wiry slender, panicle contracted nearly to a linear-oblong dense spike, style 3-fid, nut large smooth white, lobes of disc-margin 3 very short obtuse thick subreflexed.

Herb. Kew "a *CALCUTTA* communicata;" specimen in fine fruit.—There is what I take to be a young example of the same species from Cambodia.

Rhizome creeping, $\frac{1}{8}$ in. in diam., clothed by distant ovate striate red scales. *Stems* 2 ft., scabrous. *Leaves* 1 ft. by $\frac{1}{4}$ in.; sheath 3-winged; ligule ovate, obtuse glabrous. *Panicle* 2-2½ by $\frac{3}{8}$ in., stout, rhachis somewhat hairy; lower branches 0-½ in., secondary bracts ½-1 in. filiform. *Spikelets* all unisexual, as of *S. hebecarpa* and *S. elata*; fem. glume aristate. *Nut* ½ in. long, ovoid, scarcely at all trigonous or hairy; disc obpyramidal, rigid, purpurescent, margin very narrow with rigid yellowish lobes.—Quite unlike the five last sp., and is perhaps more allied to *S. Stocksiana*.

20. **S. oryzoides**, *Presl Rel. Haenk.* i. 201; robust, glabrous, panicle one terminal nearly bractless dense with numerous long suberect branches, spikelets solitary spicate, style 3-fid, nut smooth white, disc truncate. *Nees in Wight Contrib.* 116; *Thw. Enum.* 353. *S. latifolia*, *Moon Cat. Pl. Ceyl.* 62. *S. orizoides*, *Boeck. in Linnæa*, xxxviii. 492.—*Wall. Cat.* 3539.

S.E. INDIA; from ASSAM to CEYLON and to MALACCA.—DISTRIB. Zanzibar, Malaya, Philippines, Australia.

Stolons long, terete, $\frac{1}{8}$ in. in diam., usually without scales (because in water). *Stems* 3-6 ft., scabrous. *Leaves* up to 3 ft. by $\frac{3}{8}$ in., margins very scabrous, tip suddenly narrowed; sheath 3-winged or not rarely nearly wingless; ligule 0. *Panicle* long-peduncled, 6 by 3-4 in.; branches often once divided, secondary 2 in., simple. *Spikelets* unisexual; some plants are nearly male; in others the fem. spikelets (much less fewer than the males) are near base of spikes. *Fem. spikelets* ½ in.; fem. glume scarcely mucronate. *Nut* ½ in. in diam., globose; lobes of disc extremely short reflexed (Nees by some error says the perigynium is profoundly 3-lobed adpressed to the nut).

** *Sheaths* (of middle stem-leaves) *triquetrous*, not, or very obscurely, *winged*.

† *Leaves* (that is those next below the bracts) almost regularly *alternate*.

21. **S. Hookeriana**, *Boeck. in Linnæa*, xxxviii. 498; robust, more or less hairy, partial panicles 1-3 lanceolate or ovoid branches erect, spikelets chestnut-cold., style 3-fid, nut very obscurely reticulated, lobes of disc-margin (obscurely 3) broad obtuse thick reflexed.—*Scleria* sp., n. 13, *Herb. Ind. Or. H. f. et T. T.*

KHASIA and NAGA HILLS, and MUNEYPOOR, alt. 4-6000 ft., *J. D. H. & T. T.*, *C. B. Clarke, Watt.*

Rhizome $\frac{3}{8}$ – $\frac{1}{2}$ in. in diam., covered by small ovate striate black-red scales. *Stems* 3 ft., glabrous. *Leaves* up to 1 ft. by $\frac{1}{4}$ in., tip setaceous, glabrous or hairy; sheath usually wingless or occasionally distinctly 3-winged. *Spikelets* nearly as in *S. elata*. *Nut* $\frac{1}{2}$ in. long, young white shallowly tessellate, mature smooth shining.—Most easily known from the *S. elata* by the panicle-branches ascending (not rectangularly divaricate). In the specimen Hooker sent to Berlin, the panicle is contracted into a dense ellipsoid-oblong compound spike, and Boeckeler founded the species on this character; but in well evolute examples, the panicle is large compound—the lower partial panicles several, 8 in. apart.

22. *S. khasiana*, *C. B. Clarke* (not of Boeck.); robust, softly hairy all over, partial panicles 1-3 lanceolate or subovoid branches erect, style 3-fid, nut reticulate hairy, lobes of disc-margin short ovate erect minutely apiculated.

KHASIA HILLS, alt. 4500-5750 ft., *C. B. Clarke.*

Similar and allied to *S. Hookeriana*, but less robust, more hairy, nut more reticulated, lobes of disc-margin erect, lanceolate-candate. *Leaves* long-setaceous at tip, very hairy; sheaths densely (usually retrorsely) hairy. *Spikelets* (except bracteoles) nearly glabrous, often brown sometimes chestnut. *Nut* $\frac{1}{10}$ in. long, ultimately reticulated hairy; tails of lobes of disc-margin reaching to $\frac{1}{5}$ height of nut.—*S. khasiana*, Boeck., is *S. Thomsoniana*.

23. *S. junciformis*, *Thw. Enum.* 354 (not of Kunth); medium-sized, hairy, rhizome short branched, panicle narrow, spikes distant, style 3-fid, nut largeish obtuse obscurely reticulate, disc-margin truncate lobes very short reflexed. *S. hirsuta*, *Moon Cat. Pl. Ceyl.* 62; *Trimen, Cat. Pl. Ceyl.* 103 (not of Boeck.). *S. pilosa*, Boeck. in *Linnæa*, xxxviii. 473. *Cylindropus junciformis*, *Nees in Linnæa*, ix. 303, & in *Edinb. Phil. Journ.* xvii. 266, and in *Wight Contrib.* 118.

CEYLON; Reingan Corle, *Thwaites* (C.P. 3225).

Rhizome $\frac{1}{2}$ in. in diam., contorted. *Stem* nearly 3 ft., rather slender. *Leaves* up to 18 by $\frac{1}{4}$ in., tip lanceolate subobtus. *Panicle* very slender; lowest partial panicle (spike-like) 1 in., nodding on a slender peduncle 2-4 in. *Spikelets* nearly $\frac{1}{2}$ in., ferruginous, almost glabrous, no bisexual spikelets seen. *Nut* $\frac{1}{8}$ in. long, as of *S. tessellata*.—Approaches *S. tessellata* by its subobtus leaves and infl., but the rhizome differs.

24. *S. melanostoma*, Boeck. in *Linnæa*, xxxviii. 514; nearly glabrous except rhachis of panicle, leaves at nearly regular distances, sheaths not winged, ligule short narrowly scarious-margined, partial panicles distant pyramidal, nut tessellated pale or often becoming fuscous-black, disc-lobes very short depressed ovate. *S. Hasskarliana* and *S. Plœmii*, Boeck. in *Engler, Jahrb.* v. 511, 513. *S. melanosperma*, *Nees & Arn. ms. in Herb. Wight*, n. 2377.—*Scleria* sp. 15, *Herb. Ind. Or. H.f. & T. T.*

BENGAL and KHASIA HILLS, frequent, *Griffith, &c.* DECCAN PENINSULA; *Cour-tallum, Wight*.—DISTRIB. JAVA.

This species is *S. elata*, without wings to the leaf-sheaths, and like it varies from 1 to 8 ft. As to the colour of the nut, white and discoloured blackish nuts occur often in one panicle.—Some of Hooker's *Scleria*, n. 15, is *S. elata*, and it was all formerly so named by Boeckeler.

†† *Leaves* (that is those next below the bracts) imperfectly (falsely) opposite or ternate.

25. *S. bancana*, *Miq. Fl. Ind. Bat. Suppl.* 602; robust, nearly glabrous, partial panicles dense approximate subcoalescent branches ascending, spikelets dusky stramineous, style 3-fid, nut ovoid apiculate reticulate, lobes of disc-margin 3 ovate-triangular auricles reflexed. *S. macrophylla*, *Presl. Rel. Haenk.* i. 200; *Nees in Wight Contrib.* 116. *S. malaccensis*, *Boeck. in Linnæa*, xxxviii. 507.—*Scleria*, *Wall. Cat.* 3409.

TENASSERIM, *Kurz.* MALACCA, *Griffith.* SINGAPORE, *Wallich.*—DISTRIB. Borneo, Tonkin.

Rhizome woody, $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. *Stems* 2–4 ft. *Leaves* (upper approximated in pairs) 12–18 by $\frac{1}{2}$ in., tip lanceolate subobtuse; sheath triquetrous sometimes narrowly 3-winged. *Panicle* uninterrupted in Indian examples (in Borneo lowest partial panicle is sometimes 5 in. distant); secondary bracts long, linear, conspicuously exsert. *Spikelets* nearly as of *S. elata*. *Nut* $\frac{1}{10}$ in. in diam., white or straw-colrd., minutely hairy, ultimately glabrate; lobes of disc-margin reaching to $\frac{1}{4}$ height of nut, adpressed, pale.

26. *S. multifoliata*, *Boeck. in Linnæa*, xxxviii. 510; robust, nearly glabrous or (var.) hairy, partial panicles pyramidal red (except var.), style 3-fid, nut reticulate hairy often finally discoloured, lobes of disc-margin 3 triangular attaining $\frac{1}{2}$ – $\frac{1}{2}$ height of nut.—*Scleria*, *Wall. Cat.* 3407 (partly) 3410 ((partly), 3411 (partly)).

RANGOON and TAVOY, *Wallich.* SINGAPORE, *Griffith, &c.*—DISTRIB. Malay Islds.

Leaves (next below lowest bract) in (false) whorls of 2 or 3, tip setaceous, margins scabrous cutting the hand; sheaths not winged. Nut-bearing spikelets somewhat obovoid. *Nut* $\frac{1}{10}$ in. long, rather narrower than in adjacent species, often ultimately dark red, shining or subviscid. Margin of disc cup-shaped at base, its 3 lobes thick red adpressed sometimes entire often crenulate occasionally their edge cut into short oblong blunt lobes terminated by glands (approaching sub-gen. *Schizolepis*).—Most readily distinguished from *S. sumatrensis* by the narrowed base of the fruiting spikelet.

Var. *pilosula*; more hairy, leaves beneath densely softly hairy, panicles and spikelets fuscous stramineous. *S. pubescens*, *Zoll. Verz. Ind. Archip.* ii. 61 (not of *Steud.*).—Penang, *King's Collector, &c.* Java.—Plant 3–6 ft.; spikelets greenish white (King); lower bracts subopposite (like the upper leaves); panicle only slightly hairy.

Var. *ophirensis*; panicles fuscous, lower peduncles long, male spikelets narrow, lobes of disc-margin shorter (than in *S. multifoliata* type), pale.—Malacca; summit of Mt. Ophir, alt. 5000 ft., *Hullett* (n. 869).—A very coarse rigid form, which might be treated as a species.

27. *S. sumatrensis*, *Retz. Obs.* v. 19, t. 2; robust, nearly glabrous, partial panicles pyramidal brown or red, style 3-fid, nut globose reticulate often finally discoloured, lobes of disc-margin very large attaining $\frac{1}{2}$ – $\frac{1}{2}$ height of nut obtuse. *Nees in Wight Contrib.* 116; *Thw. Enum.* 353; *Boeck. in Linnæa*, xxxviii. 513; *Kurz in Journ. As. Soc.* xlv., part 2, 159. *S. setigera*, *Roxb. Fl. Ind.* iii. 575. *S. purpurascens*, *Steud. Syn. Oyp.* 169.—*Scleria*, *Wall. Cat.* 3407 (partly), 3408 B, 3413.

S. BENGAL to SINGAPORE, frequent. NICOBARS, *Kurz.* PENANG, *Wallich.* CEYLON.—DISTRIB. Java.

Resembles *S. multifoliata*, *Boeck.*, and most easily distinguished by the broad rounded base of the fruiting spikelets.—Secondary bracts 1 in., filiform, often conspicuous. *Nut* $\frac{1}{10}$ – $\frac{1}{8}$ in. diam., mature glabrate, pale or brown, or often dark red shining. Lobes of disc-margin sometimes nearly enveloping the nut, truncate sometimes crenulate undulate.

28. *S. levis*, *Retz Obs.* iv. 13; robust, nearly glabrous, partial panicles pyramidal rigid brown, style 3-fid, nut globose smooth white, lobes of disc-margin 3 ovate pale spreading attaining scarce $\frac{1}{2}$ height of nut. *S. lævis*, *Willd. Sp. Pl.* iv. 314; *Roxb. Fl. Ind.* iii. 575; *Nees in Wight Contrib.* 117; *Thw. Enum.* 354; *Boeck. in Linnæa*, xxxviii. 512; *Kurz in Journ. As. Soc.* xlv., part 2 [1876] 160. *S. zeylanica*, *Mom Cat. Pl. Ceyl.* 62 (*vide Trimen, not of Poiret*).—*Scleria*, *Wall. Cat.* 3410 (*partly*), 3411 (*partly*).

From ASSAM to SINGAPORE, alt. 0-1000 ft. NICOBARS, *Kurz*. CEYLON.—DISTRIB. Java, Hongkong.

Similar to *S. sumatrensis* and *S. multifoliata*, but generally easily distinguished by the globose white nut.—*Panicle* usually slenderer than in *S. sumatrensis*, secondary bracts less conspicuous. *Glume* to the nut broadly ovate at base, shortly acute. *Nut* $\frac{1}{16}$ – $\frac{1}{8}$ in. in diam., depressed-globose, somewhat trigonous; lobes of disc-margin somewhat thick, white with green nerves; at tip entire or slightly crenate-toothed.

Sect. 3. SCHIZOLEPIS (Genus), *Nees in Mart. Fl. Bras.* ii. (pars. 1) 158, 186 (char. extended). Character of *Elatæ*, but rim of disc-margin with numerous triangular or lanceolate teeth.

29. *S. bracteata*, *Cav. Ic.* v. 34, t. 457; robust, hairy, partial panicles several upper male with numerous small spikelets, lower fem. with fewer larger spikelets (1-sexual plants also occur), style 3-fid, nut globose verrucose, rim of disc truncate rigid crenulate or scarcely toothed. *Boeck. in Linnæa*, xxxviii. 515. *Macrolomia bracteata*, *Nees l.c.* 182, t. 24.

TROPICAL AMERICA, abundant.

Var. β *assamica*; nut tessellate scarcely verrucose, rim of disc with many triangular (sometimes narrow almost lanceolate) teeth.—*Scleria*, n. 6, *Herb. Ind. Or. H.f. & T.*—Assam, *Masters (in Herb Kew)*.—This Assam plant cannot be separated from *Schizolepis*. It is not easy to conjecture how it could be introduced into Assam; but I believe it to be only a form of the purely American *S. bracteata* nevertheless.

UNDETERMINED SPECIES OF *Scleria*.

SCLERIA RINKIANA, *Boeck. Cyp. Nov.* ii. 30.—PENANG, alt. 2500 ft., *Rink.*—"Allied to *S. tessellata*, Willd.," *Boeck.*

27. KOBRESIA, Willd.

Glabrous, nearly smooth, perennials. *Stem* simple, bearing grass-like leaves near base only and one cylindric or oblong terminal spike, or (in sect. 4) leaves and several loosely panicked spikes. *Spikes* (apparently often simple) 1-sexual, or 2-sexual (when fem. spikelets inferior). *Spikelets* male, or fem. 1-fid., or bisexual with one fem. fl. at base. *Fem. glumes* (the bracteole to spikelet) homologous with utricle of *Carex*, its margins in their lower half more or less connate in their upper half free, forming thus frequently an imperfect utricle (which in bisexual spikelets encloses rhachilla of male 1-4-fid. upper portion of spikelet). *Style* 3-fid (in *K. macrantha* 2-fid). *Nut* usually as long as glume, oblong or narrowly obovoid, trigonous (in *K. macrantha* flat).—Species 20, N. temp. region.

Sect. I. HEMICAREX (Gen.) *Benth. in Gen. Pl.* iii. 1072 (*chiefly*). *Stem* with 1 apparently simple linear or oblong spike. *Fem. spikelets* 1-fid., with sometimes the rudiment of rhachilla within fem. glume. *Style* 3-fid.

1. **K. seticulmis**, Boeck. in *Linnæa*, xxxix. 3 partly (*char. reform.*); stems slender 2-8 in., vernal leaves flat linear-lanceolate tipped, spikes $\frac{3}{4}$ -1 in. linear fem. or fem. at base male at top, fem. glume deeply split, style 3-fid, nut (including exserted beak) $\frac{1}{2}$ in. *Hemicarex Hookeri*, C. B. Clarke in *Journ. Linn. Soc.* xx. 383 (partly). *Carex* (better *Kobresia*) *mutans*, Boott ms.—*Elyna* sp. 2, *Herb. Ind. Or. H. f. & T. T.*

SIKKIM; alt. 12-13,000 ft., Lachen Valley, at Monay, J. D. H.

Rhizome very short, woody; roots long, thick, tough. *Stems* caespitose. Vernal leaves 2 by $\frac{1}{2}$ in., summer 5-8 in., tip long-caudate, filiform, scabrous; sheath testaceous, becoming brown, not fimbriated. *Spikes* $\frac{1}{2}$ in. broad; bracteoles (corresponding to "glumes" of *carex*) rhomboid-ovate, brown, yellow on back, lower often more or less aristate, upper obtuse. *Glume* (i.e. utricle), subspathiform, at top obliquely truncate, with 2 green ribs; a minute rudiment of rachilla is sometimes within it. *Nut* linear-oblong, brown, as long as glume; beak $\frac{1}{2}$ - $\frac{3}{4}$ length of nut, exsert.—Boeckeler united with *K. seticulmis*, *filicina*, and his description of *seticulmis* is mainly drawn from *filicina* (he had only a scrap of *K. seticulmis*.)

2. **K. Hookeri**, Boeck. in *Linnæa*, xxxix. 4; stems rather slender 4-12 in., vernal leaves flat linear-lanceolate tipped, spikes (all fem. at base male at top but see var. β) $1\frac{1}{2}$ - $1\frac{3}{4}$ in. linear, narrower interrupted at base, fem. glume deeply split, style 3-fid, nut (including exserted beak) $\frac{1}{2}$ in. *Carex Esenbeckii*? Boott ms. (*not of Kunth*). *Hemicarex Hookeri*, C. B. Clarke in *Journ. Linn. Soc.* xx. 383 (partly), t. 30, figs. 3, 4.

SIKKIM, alt. 11-13,000 ft.; Lachen, J. D. H.; Singale-lah, C. B. Clarke.

Closely allied to *K. seticulmis*, but larger in all its parts. *Leaves* $\frac{1}{2}$ in. broad; summer leaves 1 foot long caudate-tipped.—In this group, the stems in flower are short, surrounded by lanceolate-tipped leaves; in fruit the stems are greatly elongated, with long-caudate summer leaves.

Var. ? β *dioica*; spikes (very many seen) unisexual.—SIKKIM; Namdee, alt. 12,000 ft., *Pantling*.—Male spikes 2 by $\frac{1}{2}$ in. Fem. spikes 2-2 $\frac{1}{2}$ in., in two examples branched. These are spring examples, and may be *K. Hookeri*, or a new species allied thereto.

3. **K. angusta**, C. B. Clarke; stems slender 1-5 in., all leaves very narrow, spikes diœcious males short (on short stems) sub lanceolate fem. (on elongating stems) linear-filiform interrupted at base, style 3-fid, nut nearly as in *K. seticulmis*, but beak shorter.

SIKKIM; Sundukphoo, alt. 12,000 ft., C. B. Clarke.

Vernal leaves 2 by $\frac{1}{5}$ in.; summer leaves 4-5 in. *Male stems* 1-2 in.; male spikes $\frac{1}{2}$ - $\frac{2}{3}$ by $\frac{1}{8}$ - $\frac{1}{10}$ in.; male bracteoles elliptic-lanceolate, brown, back green, edges scarious. *Fem. stems* ultimately 4-5 in.; fem. spikes (young) $1\frac{1}{2}$ by $\frac{1}{5}$ in.

4. **K. vaginosa**, C. B. Clarke; culms 4-8 in. clothed some way up by withered sheaths, leaves all filiform, spikes (mostly diœcious) male linear-oblong fem. linear with distant bracteoles, style 3-fid, nut linear-oblong, beak $\frac{1}{2}$ length of nut.

SIKKIM; Lachen Valley, at Momay, alt. 15,000 ft., J. D. H.

Stems covered up to $\frac{1}{2}$ - $\frac{2}{3}$ their length by scarious flaccid sheaths. *Leaves* 2-6 in., at base scarcely $\frac{1}{10}$ in. broad. *Male stems* about as long as female. *Male spikes* $\frac{2}{3}$ by $\frac{1}{10}$ in. *Fem. spikes* (sometimes having male spikelets at top) 1 in., most of the bracteoles (except a few at top) not imbricated.

5. **K. trinervis**, Boeck. in *Linnæa*, xxxix. 548, in note; stems 2-8 in. rather slender, summer leaves very long not long-caudate, spikes (usually diœcious) fem. 2 $\frac{1}{2}$ in. linear, male bracteoles elliptic-oblong obtuse

cinnamon colour, style 3-fid. *C. trinervis*, *Nees in Wight Contrib.* 120 (not of *Degland*). *C. Esenbeckii*, *Kunth Enum.* ii. 522; *Strachey Cat. Pl. Kumaon*, 73; *E. T. Atkins. Gaz.* x. 618 (not of *Boott*). *C. linearis*, *Boott Carex*, i. 51 (partly). *Hemicarex trinervis*, *C. B. Clarke in Journ. Linn. Soc.* xx. 382 in small part (was chiefly *C. linearis*, *Boott*).

WESTERN NEPAL; *Royle* n. 138. GURWHAL; alt. 10,000 ft., *Strachey & Wierbottom* n. 19.

Leaf-sheaths testaceous or somewhat chestnut-colour, lacerate. Summer leaves 12-16 by $\frac{1}{2}$ – $\frac{1}{3}$ in. flat. Male spikes $\frac{2}{3}$ –1 by $\frac{1}{2}$ in. Fem. spikes with occasionally a few male spikelets at top.—This does not greatly differ from *K. Hookeri*; in which the summer leaves are shorter, long-caudate. It hardly differs from *Carex linearis*, *Boott*, but by the "utricle" being split $\frac{2}{3}$ the way down to base.

6. *K. foliosa*, *C. B. Clarke*; diœcious, stems 20 in. somewhat robust, summer leaves 20 by $\frac{1}{2}$ in. not caudate-setaceous, female spikes $1\frac{1}{2}$ in. linear, male bracteoles elliptic-lanceolate acute yellow-brown keel green, style 3-fid.

GURWHAL; alt. 11-13,000 ft., *Duthie* (nn. 57, 4494).

Rhizome oblique, stout, thick with lacerate leaf-sheaths.—Closely allied to *K. trinervis*, but larger.

7. *K. fissiglumis*, *C. B. Clarke*; female stems 4-5 in, summer leaves 4-5 by $\frac{1}{10}$ – $\frac{1}{8}$ in. not caudate-setaceous, fem. spikes 1 in. linear black-purple, fem. glume split down to base margins quite free, style 3-fid.

WESTERN NEPAL; alt. 12,500 ft., *Duthie* (n. 6092).

Stems slender, not thickened at base; leaf-sheaths tight, brown, not lacerate. Fem. spikes lax, somewhat interrupted at base; upper bracteoles elliptic-oblong, obtuse, black with green back. Pistil distinctly stalked.—Specimens all female; a male plant sent by *Duthie* under the same number appears not to belong to this species (possibly *K. foliosa*).

8. *K. pygmæa*, *C. B. Clarke*; stems $\frac{1}{2}$ – $1\frac{1}{2}$ in., leaves $\frac{1}{2}$ – $1\frac{1}{2}$ in. setaceous, spikes $\frac{1}{2}$ – $\frac{1}{3}$ in. oblong, style 3-fid, beak of nut very short, hardly exsert from glume. *Hemicarex pygmæa*, *C. B. Clarke in Journ. Linn. Soc.* xx. 383. —*Elyna* sp. n. 7, *Herb. Ind. Or. H. f. et T. T.*

WESTERN TIBET; Ladak, alt. 12-15,000 ft., *Thomson*. KUNAWUR; *Jacquemont*, n. 1783. SIKKIM; Momay and Kangra Lama, 13-15,000 ft., *J. D. H.*; Phari; *G. King*.

Stems in dense tufts; leaf-sheaths testaceous, little torn. Leaves numerous, channelled. Spikes unisexual. Bracteoles ovate-oblong, scarcely acute, fem. brown, male paler. Fem. spikelets 4-6 in each spike. Fem. glume having margins united toward base. Nut $\frac{1}{10}$ in., oblong-ellipsoid, pale, apiculate, hardly beaked.

Sect. 2. *ELYNA* (Gen.) *Schrad. Fl. Germ.* i. 155. Stem with 1 apparently simple linear or oblong spike. Fem. spikelets (at least several of lower ones) with rhachilla (within fem. glume) bearing 1-4 male fl. Style 2-fid. [Glume (i.e. homologue of utricle in *Carex*) split down to base.]

9. *K. filicina*, *C. B. Clarke*; slender, fem. spikes 1- $1\frac{1}{2}$ in. narrow linear neither rigid nor dense, style 3-fid, nut small narrow oblong, beak exsert often ultimately recurved. *K. seticulmis*, *Boeck. in Linnæa*, xxxix: 3 (partly). *Hemicarex filicina*, *C. B. Clarke in Journ. Linn. Soc.* xx. 384. —*Elyna* sp. n. 1, *Herb. Ind. Or. H. f. & T. T.*

N.W. HIMALAYA, alt. 10,000 ft.; Simla, *Thomson*; Kumaon, *Duthie*.

Stems 2-10 in. Leaves 4-6 by $\frac{1}{2}$ in., tip caudate. Spike very slender, $\frac{1}{8}$ in. broad, green ultimately brown. Upper bracteoles $\frac{1}{2}$ in., elliptic-lanceolate, acute.

Lower spikelets mostly 2-fld. i.e. lower fem., upper male. *Nut* nearly as long as glume; beak $\frac{2}{3}$ length of nut.

10. **K. Duthiei**, C. B. Clarke; stems medium-sized rigid, spikes linear dense green, style 3-fld, nut small narrowly obovoid, beak short scarcely overtopping glume.

KUMAON, alt. 11–16,000 ft., *Duthie* (nn. 3461, 6093, 6094) and Gurwhal (n. 5016).

Stems densely cæspitose, 4–8 in., striate; lower sheaths tight, not lacerate. *Leaves* many, $\frac{1}{2}$ – $\frac{2}{3}$ length of stem, $\frac{1}{16}$ in. broad, flat, tip caudate. *Spikes* 1 by $\frac{1}{12}$ in., very rigid; bracteoles $\frac{1}{8}$ in. ovate, closely spirally imbricated. *Spikelets* mostly 2-fld. upper flower male. *Nut*, including beak, about as long as glume; beak $\frac{1}{2}$ length of nut.

11. **K. capillifolia**, C. B. Clarke in *Journ. Linn. Soc.* xx. 378; somewhat slender, leaves linear-setaceous, sheaths chestnut-colour somewhat torn, spikes linear, bracteoles obtuse erect margins scarious, style 3-fld, nut ellipsoid (scarcely obovoid) narrowed at top into linear style. *K. scirpina*, Boeck. in *Journ. Linn. Soc.* xviii. 104 and xix. 90. *K. elata* and *K. brunneascens*, Boeck. *Cyp. Nov.* i. 32, 40. *Elyna capillifolia*, *Decne. in Jacquem. Voy. Bot.* 173, t. 174. *E. spicata*, Boiss. *Fl. Orient.* v. 394.—*Elyna*, sp. n. 6, *Herb. Ind. Or. H. f. & T. T.*

KASHMIR to GURWHAL, alt. 10–12,000 ft., frequent, *Jacquemont*, *T. Thomson*, &c. KURRUM VALLEY; alt. 12,500 ft., *Aitchison*.

Stems 2–12 in. *Spikes* $\frac{2}{3}$ –1 by $\frac{1}{8}$ – $\frac{1}{4}$ in., brown chestnut-colour or yellow; bracteoles $\frac{1}{2}$ in. *Spikelets* mostly 3–4-fld. *Nut* shorter than glume.—Very near the European *K. scirpina*, Willd., but is a finer plant, with a brighter thicker spike.

12. **K. schœnoides**, Boeck. in *Linnaea*, xxxix. 7; stems stout rigid, leaves linear channelled incurved, sheaths shining brown very little torn, spikes oblong dense, bracteoles $\frac{1}{2}$ in. elliptic oblong obtuse, style 3-fld, nut obovoid obtuse, beak small linear. *Aitch. in Journ. Linn. Soc.* xix. 190; C. B. Clarke in *Journ. Linn. Soc.* xx. 378 (not of *Henders.*). *K. sibirica*, Boeck. in *Linnaea*, xxxix. 7. *K. Royleana*, *Henders. Yarkand* 39 (not *Trilepis Royleana*, *Nees*). *Elyna schœnoides*, C. A. Meyer in *Ledeb. Fl. Alt.* iv. 235 (in note); *Kunth Enum.* ii. 534; *Strachey Cat. Pl. Kumaon*, 73; *Boiss. Fl. Orient.* v. 394. *E. Sibirica*, *Turcz. in Bull. Soc. Imp. Mosc.* (1838) 103.

HIMALAYA; alt. 10–16,000 ft. from W. TIBET, *Thomson*, to SIKKIM, *J. D. H.*—DISTREB. Caucasus, Central Asia, Siberia.

Rhizome woody, short. *Stems* 4–24 in., $\frac{1}{16}$ – $\frac{1}{8}$ in. diam. *Leaves* as long as stems, to scarcely $\frac{1}{2}$ of stem, $\frac{1}{16}$ – $\frac{1}{8}$ in. broad, *Spikes* $\frac{1}{2}$ –1 by $\frac{1}{4}$ in.; bracteole chaffy, loosely imbricated, suberect. *Spikelets* 1–5-fld., lowest fl. fem., or towards top of spike wholly male. *Nut* $\frac{1}{12}$ in., ashy black.

13. **K. nitens**, C. B. Clarke in *Journ. Linn. Soc.* xx. 379, t. 30, fig. 7; stems rigid, leaves linear channelled incurved, sheaths testaceous-brown scarcely lacerate, spike ellipsoid dense, bracteoles $\frac{1}{2}$ in. ovate obtuse shining, style 3-fld, nut obovoid obtuse, beak very short scabrous.

WEST. HIMALAYA, alt. 12–15,000 ft.; Kashmir, C. B. Clarke; Kumaon and Gurwhal, *Duthie*.

Stems 2–10 in. *Leaves* overtopping stem. *Spikes* $\frac{1}{2}$ by $\frac{1}{4}$ in. *Bracteoles* shining chestnut-colour, paler on back, margins often white-scarious. *Nut* $\frac{1}{12}$ in., very like that of *K. schœnoides*.

Sect. 3. **EUKOBRESIA**. *Spike* on each stem 1, linear oblong or ovate, compound subpaniculate, dense or interrupted at base (but smaller simple spikes occur in most species occasionally). *Lower spikelets* bisexual except in *C. uncinoides*. *Style* 3-fid.—*Trilepis*, *Nees in Edinb. N. Phil. Journ.* xvii. 267 (as to type species).

14. **K. Royleana**, *Boeck. in Linnæa*, xxxix. 8; stems somewhat stout, leaves linear flat when dried, spikelets medium-sized purple-green or ferruginous-brown, style 3-fid, nut ellipsoid attenuated into beak. *K. stenocarpa*, *C. B. Clarke in Journ. Linn. Soc.* xx. 380. *K. schœnoides*, *Henders. Yarkand*, 339 (not of *Boeck.*). *Trilepis Royleana*, *Nees in Edinb. N. Phil. Journ.* xvii. 267 and in *Wight Contrib.* 119; *Kunth Enum.* ii. 535; *Strachey Cat. Pl. Kumaon*, 73. *Elyna stenocarpa*, *Karel & Kiril. in Bull. Soc. Imp. Mosc.* xv. (1842), 526.

ALPINE HIMALAYA, alt. 10–16,000 ft.; from W. TIBET, *Thomson*, to SIKKIM, *J. D. H.*, frequent.—DISTRIB. North Cabul, Central Asia.

Stem in Royle's specimens scarcely 4 in., in Thomson's 2 ft. *Leaves* sometimes as long as stem, often very much shorter, very variable in width ($\frac{1}{12}$ – $\frac{1}{4}$ in.). *Spikes* (in Royle's) $\frac{3}{4}$ by $\frac{1}{2}$ in.; in Thomson's up to 2½ in., panicled, branches suberect with many spikelets, ferruginous brown. *Lower spikelets* $\frac{1}{2}$ in., often 3–4 fid. *Nut* $\frac{1}{12}$ in.—The large series of dried examples appears to unite Royle's (the type) with the fine collections of Thomson. Closely allied to the English *K. caricina*, Willd., but has, in general, much larger brighter spikes.

15. **K. uncinoides**, *C. B. Clarke*; robust, infl. oblong dense compound (a second panicle on remote long peduncle occasionally added), spikes in large part 1-sexual, lower spikelets fem. 1-nutted; fem. glume long utriculate deeply split down, style 3-fid, nut oblong fine brown, style-base linear. *Carex uncinoides*, *Boott Carex*, i. 8, t. 23; *Boeck. in Linnæa*, xxxix. 109.—*Triticoides*, *Griff. Itin. Notes*, 140.

SIKKIM; alt. 10–16,000 ft., *J. D. H.*, &c. BHOTAN; *Griffith*.—DISTRIB. Tibet.

Glabrous. *Rhizome* 3 in. by $\frac{1}{2}$ in. diam., woody, densely scarred. *Stems* 1–2 ft., striate. *Leaves* sub-basal, very much shorter than stem. *Infl.* 3 by $\frac{3}{8}$ in., straw-yellow, somewhat interrupted at base. *Glume* to fem. spikelet $\frac{3}{8}$ in. by $\frac{1}{16}$ in., brown, delicately striate, microscopically pubero-ciliate, mouth whitened shallowly lacerate on one side split down below the top of nut sometimes even in young state nearly to base of nut. Rudiment of the spicula exsert out of mouth of utricular glume.—Boott shows the utricle nearly complete; the margins of the slit fold over as in several other *Kobresia*, and escaped his artist's microscopic power. It is a typical *Kobresia* very like *Royleana* (except the linear style-base); it hardly differs from *Elyna kokanica*, Regel (*Descr. Pl. fasc.* 8. 23) except in its larger size.

Sect 4. **HEMICAREX** (Genus), *Benth. in Gen. Pl.* iii. 1072 (partly). *Spikes* loosely panicled; lowest bract long, leaf-like. *Style* 3-fid.

16. **K. laxa**, *Boeck. in Linnæa*, xxxix. 6; stems 8–24 in. rather slender, spikes 1- or 2-sexual (lowest spikelet fem.), style 3-fid, nut narrow oblong apiculate scarcely beaked. *K. pseudo-laxa*, *C. B. Clarke in Journ. Linn. Soc.* xx. 381. *Cobresia laxa*, *Nees in Wight Contrib.* 119. *Elyna*? *laxa*, *Kunth Enum.* ii. 534. *Hemicarex laxa*, *Benth. Gen. Pl.* iii. 1072; *C. B. Clarke l. c.* 385, t. 30. *Carex impunctata*, *Boeck. in Linnæa*, xl. (1876), 343 (the *Himal. plant*).

ALPINE HIMALAYA, alt. 6500–12,000 ft.; from N.W. KASHMIR, *Giles*, to SIKKIM, *J. D. H.*

Rhizome creeping, short. *Leaves* as long as stem, $\frac{1}{2}$ in. broad, grass-like. *Panicle* 2-4 in. long, narrow, branches slender erect; sometimes wholly fem., rarely wholly male. *Fem. spikes* long, slender, with lanceolate distant spikelets; bracteoles not imbricated, style-branches conspicuous exsert. *Fem. spikelets* usually 1-fl., sometimes an upper male fl. added. *Male spikelets* 3-several-fl. *Style* linear, hardly $\frac{1}{2}$ length of nut; branches 3, linear very long.

17. **K. curvirostris**, C. B. Clarke; stems 4-6 in. slender, spikes (all seen fem.) densely paniced, nut narrowly oblong, beak cylindric exsert curved. *Hemicarex curvata*, C. B. Clarke in *Journ. Linn. Soc.* xx. 384.—*Elyna* sp. n. 10, *Herb. Ind. Or. Hf. & T. T.*

SIKKIM; Tungu, alt. 13,000 ft., J. D. H.

Leaves as long as stem, $\frac{1}{2}$ in. broad. *Panicle* 1 by $\frac{1}{2}$ in.—Resembling, and closely allied to, *K. laza*.

Sect. 5. PSEUDOKOBRESIA. *Style* 2-fl. *Nut* flat.

18. **K. macrantha**, Boeck. *Cyp. Nov.* i. 39; spike ovoid compound, spikelets clustered mostly 3-5-fl. lowest flower female, glume split to base, margins not overlapping. *K. filifolia*, C. B. Clarke in *Journ. Linn. Soc.* xx. 381. *Elyna filifolia*, Turcz *Fl. Baical. Dahur.* ii. part i. 288 (*from descript.*).

W. TIBET; Nubra, *Schlagintweit* (n. 2424) and Ladak (n. 1344).—DISTRIB. Central Asia.

Rhizome short. *Stems* caespitose, 2-7 in. *Leaves* many, $\frac{1}{2}$ length of stem, $\frac{1}{2}$ in. broad, flat; sheaths pale, not torn. *Spike* $\frac{3}{4}$ by $\frac{1}{2}$ in. *Bracteoles* $\frac{1}{2}$ in., ovate-oblong, obtuse, nearly flat, brown with green back. *Fem. glume* elliptic-oblong, obtuse, concave, open (nowise utricle-like.) *Nut* $\frac{1}{8}$ in., obovoid, obtuse, brown; style linear, $\frac{3}{4}$ length of nut; branches 2, long, linear.

28. CAREX, Linn.

Characters of Kobresia, but utricle enclosing nut bottle-shaped, mouth of its beak entire notched or shortly slit.—Species 1100 throughout the world, less abundant in dry or very hot regions.

The so-called “glumes” of *Cariceæ* are not homologous with the fl. glumes of *Scirpeæ*. The male spike is here considered homologous with the female spike; i.e. not as by Eichler and others who consider in *C. dioica* the male plant to bear a simple spike, the fem. plant to bear a compound spike.

CONSPECTUS OF SECTIONS OF CAREX (exceptions omitted).

Subgenus I. VIGNEA. *Style* 2-fl.

Sect. I. *Muricatæ*. Terminal spike fem. at base, male at top.

* Spikes short, ovoid or oblong (*C. muricata*, &c.) . . . sp. 1-10

** Spikes linear-cylindric (*C. brunnea*, &c.) . . . sp. 11-14

Sect. 2. *Remotæ*. Terminal spike male at base, fem. at top.

* Spikes short, ovoid or oblong (*C. remota*, &c.) . . . sp. 15-18

** Spikes linear-cylindric (*C. teres*, &c.) . . . sp. 19-22

Sect. 3. *Vulgares*. Terminal spike wholly male (*C. vulgaris*,

&c.) . . . sp. 23-33

Subgenus II. EUCAREX. Style 3-fid.

Sect. 4. *Raræ*. Stem with 1 spike, fem. at base (*C. rara*, &c.) sp. 34-39Sect. 5. *Indicæ*. Terminal spike fem. at base, male at top;
or, when spikes very numerous many male at top, terminal spike sometimes wholly male.* Subscapose, basal leaves long (*C. cyrtostachys*, &c.) . . . sp. 40-42** Spikes short, very numerous (*C. cruciata*, &c.) . . . sp. 43-66*** Spikes long-cylindric. Peduncles mostly solitary (*C. Myosurus*, &c.) . . . sp. 67-73**** Spikes long-cylindric. Peduncles often several from each lower sheath. Terminal spike sometimes wholly male (*C. polycephala*, &c.) . . . sp. 74-84***** Species not easily placed in any one of the preceding 4 subsections (*C. curticeps*, *C. speciosa*, *C. fragilis*, &c.) . . . sp. 85-91Sect. 6. *Atrata*. Terminal spike male at base fem. at top (*C. atrata*, &c.) . . . sp. 92-98Sect. 7. *Proprie*. Terminal spike wholly male (in the first group occasionally fem. at top). Spikes not very numerous, occasionally up to 12.

* Utricle glabrous, beak short . . . sp. 99-105

** Utricle glabrous, beak long (*C. japonica*, &c.) . . . sp. 106-125*** Utricle hairy or minutely setulose (*C. hirtella*, &c.) . . . sp. 126-142Subgenus I. VIGNEA (Genus) Beauv. in *Lestib. Essai Cyp.* 22. Styles 2-fid; in *C. stenophylla* rarely 3-fid.[N.B.—In Subgen. *Eucarex*, in the Indian species, 2-fid styles occur in 2 or 3 species in the upper part of the spike, or in poorly-developed spikelets.]Sect. 1. MURICATÆ. Terminal spike (and usually some or many of the others) fem. at base male at top. [Spikelets in *C. fluviatilis* all or mostly 1-sexual, monœcious or diœcious.]

* Spikes short, ovoid or oblong, sessile or nearly so; infl. a dense or interrupted compound spike. [The series of species proceeds from the dense to the more interrupted.]

1. ***C. incurva***, *Lightf. Fl. Scot.* ii. 544, t. 24, fig. 1; rhizome descending, stems short, spikes ovoid androgynous male at top forming one ovoid compound spike, glumes brown slightly scarious-edged, style 2-fid, utricles ellipsoid-acuminate inflated thin plicate scarcely nerved, beak short minutely scabrous on margins. *Schk. Riedgr.* i. 27, t. Hh. fig. 95; *Kunth Enum.* ii. 375; *Reichb. Ic. Fl. Germ.* viii. 4, t. 199, fig. 533; *Boott Carex*, iv. 210; *Boeck. in Linnæa*, xxxix. 48. *C. juncifolia*, *Allioni Fl. Pedem.* ii. 264, t. 92, fig. 4 (not of *Schk.*). *Vignea incurva*, *Reichb. Fl. Germ. Excurs.* 56.

N. W. HIMALAYA, from Kunawur and Kashmir to the Karakorum, alt. 11-15,500 ft., *Thomson, &c.*—DISTRIB. Mountain and cold regions.

Stems up to 6 in. (in India), often several clustered on top of ascending rhizome. *Leaves* sometimes as long as stem, narrow, often (when dry) incurved sometimes flat. *Infl.* about $\frac{1}{2}$ in. diam.; lowest bract $\frac{1}{2}$ in. *Glumes* obtuse, margins shining, yellowish, not broadly white scarious. *Utricle* rather longer than glume, larger than nut, withering with folds on it; beak shortly 2-fid, hyaline ultimately at top. *Nut* $\frac{2}{3}$ utricles, plano-convex, obtuse, shining-chestnut. *Style* $\frac{1}{2}$ nut, branches long exsert.

2. ***C. stenophylla***, *Wahlenb. in Kong. Vet. Akad. Handl. Stockh.* [1803] 142; rhizome descending, stems short, spikes ovoid androgynous male at top forming one ovoid or oblong compound spike, glumes strongly scarious-

edged, style 2-fid, utricule ellipsoid acuminate ultimately thick crustaceous blackish obscurely nerved, beak short scabrous on margins. *Kunth Enum.* ii. 374; *Reichb. Ic. Fl. Germ.* viii. 5, t. 200, fig. 534; *Boott Carex*, iv. 200 and *Ic. Ined.* 676; *Boeck. in Linnæa*, xxxix. p. 50 and in *Journ. Linn. Soc.* xviii. (1881), 105. *C. juncifolia*, *Schk. Riedgr.* i. (1801), 26 and ii. 8, t. 6, fig. 32 (*non Allioni*), *C. glomerata*, *Host Gram. Austr.* i. 34, t. 44 (*non Thunb.*). *C. Hosti*, *Schk. Riedgr.* ii. 7, t. li, fig. 32. *C. duriuscula*, *C. A. Meyer in Mem. Sav. Etrang. Petersb.* i. 214, t. 8; *Kunth Enum.* ii. 374. *C. arctica*, *Deinb.*; *Fries Novit. Fl. Suec. Mant.* iii. 135; *Anderss Cyp. Scand.* 70, t. 3, fig. 13. *C. Deinbolliana*, *J. Gay in Ann. Sc. Nat. ser. 2*, xi. 183. *Vignea stenophylla*, *Reichb. Fl. Germ. Excurs.* 56. *Kobresia hyalinolepis*, *Boeck. Cyp. Nov.* i. 39. *Elyna capillifolia*, *Henders. Yarkand*, 339.—*Carex* sp. *Griff. Itin. Notes*, 239, nn. 310, 311.

N. W. HIMALAYA, and W. TIBET from Piti and Kashmir to the Karakorum, alt. 8-14,000 ft.—DISTRIB. Mountain and cold Northern regions.

Very near *C. incurva*, Lightf.; in good fruit distinguished therefrom by black thick-walled utricule nearly filled by nut, in a younger state often distinguishable by prominent glistening white edge of glumes. But there are examples referred to *C. stenophylla*, Wahl. by Boott that are here placed under *C. incurva*, Lightf. or *C. divisa*, Hudson. Many examples of *C. stenophylla* are referred in herbaria to *Kobresia* (which is separated by the 3-fid style, but a 3-fid style occurs in *Carex stenophylla*.)—In a Himalayan example (Lance n. 285 in Herb. Kew) the ripe fruiting spikes are elongate, the lowest spike $\frac{1}{2}$ inch distant, but the shining margins of glume and the black crustaceous nuts are exactly as in *C. stenophylla*. The characters taken from roughness of stem, breadth and incurving of leaves, &c., mentioned carefully by European authors, were found not to be valid by Boott.

3. *C. divisa*, Huds. Fl. Angl. 348; rhizome horizontal, spikes ovoid androgynous male at top forming one ovoid or oblong or interrupted compound spike, glumes brown, style 2-fid, utricule ovoid acuminate stout moderately nerved, beak short scabrous on margins. *Good. in Trans. Linn. Soc.* ii. 157, t. 19, fig. 2; *Kunth Enum.* ii. 372; *Reichb. Ic. Fl. Germ.* viii. 7, t. 205, fig. 545; *Boott Carex*, iv. 186 and *Ic. Ined.* 631; *Boeck. in Linnæa*, xxxix. 55 and in *Journ. Linn. Soc.* xviii. 105. *C. rivularis*, *Schk. Riedgr.* i. 30, t. Cc. fig. 87. *C. austriaca*, *Schk. l. c.* ii. 10, t. Qqq, fig. 157. *C. Bertolonii*, *Schk. l. c.* ii. 5, t. D fig. 18 and t. Rrrr, fig. 202. *C. coacta*, *Boott in Proc. Linn. Soc.* i. (1846), 285 and in *Trans. Linn. Soc.* xx. 133. *C. curaica*, var. γ *coarcta*, *Boott Carex* iv. 204. *C. curaica*, *Boiss. Fl. Orient.* iv. 402.

W. HIMALAYA (*Boott.*)—DISTRIB. Cabul to Britain.

Stems 1-2 ft., or in some Cabul examples 3-6 in. Leaves often $\frac{1}{2}$ stem, narrow, margins usually incurved when dry. Infl. 2 by $\frac{1}{2}$ in., interrupted at base (in well-developed examples). Lowest bract usually $\frac{1}{2}$ inch, but sometimes overtopping infl. Fem. glumes ovate, hardly mucronate, brown, scarious margin narrow. Utricule greenish or yellowish, ultimately brown, somewhat thickened; nerves 5-7 on plane face, slender, 11-13 on convex face rather stronger; beak shortly bifid.—Much stouter than *C. incurva* and *C. stenophylla*, and utricles longer. Resembles generally *C. foliosa* and *C. nubigena*, Don; the plane face of the utricule is in *C. foliosa* hardly striate at all; in *C. nubigena* strongly multistriate; the utricule of *C. divisa* comes between the two. *C. divisa*, Huds. can generally be distinguished by its shorter bracts, browner glumes, and more creeping rhizome.—The Kuram Valley examples of Aitchison were collected [alt. 10,000 ft.] just outside the then frontier, and the Kashmir examples of Jacquemont cited by Boott are referred here to *C. vulpinaris*, Nees, but *C. divisa*, Huds. is almost certain to occur within British India.

4. *C. vulpinaris*, *Nees in Wight Contrib.* 121; nearly as *C. divisa*, but utricle smaller elliptic-lanceolate membranous obscurely nerved. *Kunth Enum.* ii. 383; *Boeck. in Linnæa*, xxxix. 63. *C. curaica*, var. β *Boott Carex*, iv. 204. *C. divisa*, *Boott l. c.* iv. 186 (partly). *C. Henning-siana*, *Boeck. Cyp. Nov.* i. 42.

KUNAWUB; Royle n. 73. GURWHAL; alt. 11,000 ft., *Duthie* (n. 55). LAHOUL; Schlagintweit (n. 2813). KASHMIR; Baramulla, *Jacquemont* (nn. 338, 362).—DISTRIB. Cabul.

Leaves $\frac{1}{2}$ in. broad. Infl. dense. Glumes acute or almost acuminate, brown. Utricle slender, very thin; beak somewhat winged on scabrous margins.—Stems 15 in. type form; *Jacquemont's* are identical, with stems 5-9 in.; one is marked by *Boott C. divisa*, *Hudson*, the other *C. stenophylla*, *Wahl.*?

5. *C. curaica*, *Kunth Enum.* ii. 375; rhizome long-creeping, culms distant somewhat stout, spikes ovoid androgynous male at top forming one ovoid compound spike, style 2-fid, utricle ellipsoid lanceolate nearly nerveless, beak minutely or obsoletely scabrous on margins. *Boott Carex*, iv. 204 in small part. *C. ovata*, *C. A. Meyer in Ledeb. Fl. Alt.* iv. 207 and *Jc. Pl. Ross*, iv. 10, t. 323. *C. incurva*, var. β , *Trev. in Ledeb. Fl. Ross.* iv. 270 (excl. syn.). *C. stenophylla*, *Benth. in Henders. Yarkand* 338.

KASHMIR; Barzil; alt. 10,500 ft., *C. B. Clarke*. Lower Karakash, alt. 14,000 ft., *Henderson* n. 367.—DISTRIB. Central Asia.

Very like large states of *C. stenophylla*; stems 8-10 in., stouter, leaves broader; margins of glumes less shining scarious. Ripe utricle very convex, hardly inflated, yellowish, nerveless on the plane face, very obscurely nerved on the convex face. This plant is (as *C. A. Meyer* states) near *C. fœtida*, *Allioni*. The *C. curaica* of *Turczan.*, *Maxim.*, and others is largely (or wholly) founded on *C. pycnostachya*, *Karel. et Kiril.* (in *Bull. Soc. Mosc.* xv. 522) which is of similar appearance, and with utricles of similar shape but strongly many-nerved.

6. *C. nubigena*, *D. Don in Trans. Linn. Soc.* xiv. 326 and *Prodr.* 42; rhizome short or 0, leaves long narrow incurved when dry, spikes ovoid androgynous male at top forming an ovoid oblong or interrupted linear compound spike, style 2-fid, utricle ellipsoid narrowed into an oblong-linear beak many-nerved on both faces. *Nees in Wight Contrib.* 120; *Kunth Enum.* ii. 385; *Strachey Cat. Pl. Kumaon*, 73; *Thw. Enum.* 355; *Boott Carex*, i. 1, t. 2; *Boeck. in Linnæa*, xxxix. 90. *C. fallax*, *Steud. in Zoll. Verz. Ind. Archip.* ii. 60 and *Cyp.* 189; *Boeck. l. c.*—*Carex*, *Wall. Cat.* 3396.

HIMALAYA; alt. 5-13,000 ft., abundant. KHASIA to MUNEYPOOR, alt. 4-6000 ft., abundant. SIND; *Pinwill*. NILGIRI, Anamallays, and CEYLON; alt. 5-8000 ft., common.—DISTRIB. Cabul, Malaya, China, Japan.

Stems 6-30 in., caespitose on a tough perennial rhizome. Lower leaves long. Infl. from $\frac{1}{2}$ in., dense, ovoid, to 5 in. linear interrupted, greenish becoming brown; lowest bract usually much overtopping infl., sometimes not $\frac{1}{2}$ in. Spikes $\frac{1}{2}$ in., dense. Fem. glumes ovate scarcely apiculate, shorter than utricle. Anthers linear-oblong, very shortly apiculate. Style occasionally 3-fid, fide *Boott*. Utricle small, of thin texture, plano-convex, green or pale brown, 9-11-nerved on plane face, 11-15 on convex; small red glands frequently scattered all over utricle between the nerves; beak not winged, commonly quite smooth, not rarely scabrid, sometimes almost hispid. Nut hardly $\frac{1}{2}$ utricle, compressed, obtuse, brown.—General aspect of *C. muricata*, *Linn.* var. *foliosa*, but may be generally separated by the narrower involute leaves. Well distinguished from all allied Indian species by the utricle many-nerved on both faces. *C. leiophylla*, *C. A. Meyer Mem. Sav. Etrang. Petersb.* i. 217, t. 9, a Central Asian plant, differs only by the leaves being rather broader,

flat when dry, and by the utricles having in their upper half only many larger orange-red glands. Though kept distinct by Boott and Boeckeler it should probably be esteemed only a form of *C. nubigena*.

7. *C. muricata*, Linn. *Sp. Pl.* 1382; rhizome short or 0, leaves not incurved, spikes ovoid androgynous male at top forming an oblong or interrupted linear compound spike or very narrow panicle, style 2-fid, utricle ovoid narrowed into a narrow conic beak, nerveless on plane face. *Schk. Riedgr.* i. 20, tt. E. 22, and Ee. 91; *Kunth Enum.* ii. 384; *J. Gay in Ann. Sc. Nat. ser.* 2, x. 355; *Reichb. Ic. Fl. Germ.* viii. 9, t. 215; *Boott Carex*, iv. 192; *Boeck. in Linnæa*, xxxix. 86. *C. divulsa*, Gooden. in *Trans. Linn. Soc.* ii. 160; *Schk. l.c.* tt. Dd. 89 and Ww. 89; *Kunth l.c.* ii. 385; *Reichb. Fl. Ic. Fl. Germ.* viii. 11, t. 220. *Vignea muricata* (and *divulsa*), *Reichb. Fl. Germ. Excurs.* 57 (and 59.)

KASHMIR; alt. 6-9000 ft., *C. B. Clarke*.—DISTRIB. Asia, colder N. regions.

The Kashmir examples resemble ordinary large European typical ones. *Stems* 20 in. *Leaves* $\frac{1}{2}$ – $\frac{1}{2}$ in. broad, flat when dry. *Infl.* 2-3 in. by $\frac{1}{2}$ in., consisting of 4-8 globose spikes, lower shortly distant. *Anthers* with a linear crest. *Utricle* large, $\frac{1}{2}$ in. long, yellowish, with a few irregular nerves on convex face, otherwise nearly nerveless, beak bifid $\frac{1}{2}$ its length, margins closely minutely scabrid or nearly smooth. *Nut* $\frac{1}{2}$ utricle, subquadrate-ovoid compressed, not at all trigonous.—The form *C. divulsa* is in *infl.* and general aspect nearer the subjoined var.

Var. β *foliosa* (sp.) D. Don in *Trans. Linn. Soc.* xiv. 327 and *Prodr.* 42; inflorescence pale of many spikelets at base often subcompound, utricle smaller. *Nees in Wight Contrib.* 121; *Boott Carex* i. 1, t. 3; *Kunth l.c.* 384; *Strachey Cat. Pl. Kumaon*, 73; *Boeck. l.c.* 88. *C. notoleia*, *Nees l.c.*; *Kunth l.c.* 388. *C. Wallichiana*, *Spreng. Syst.* iii. 812 (not of Prescott). *C. muricata*, var. *indica*, *Boott Carex*, iv. 193.—*Carex*, *Wall. Cat.* 3387.—Himalaya; alt. 6-9000 ft., from Kashmir to Upper Sikkim frequent. Sind; Pinwill. Khasia hills; alt. 4000 ft., *Griffith*. PUNEY and NILGIRI HILLS; *Wight*.—Resembles shorter examples of the European *C. divulsa*. Boott finally reduced the whole series under *C. muricata*, Linn. The Indian var. *foliosa* has the crested anthers and flat leaves of *muricata*, and is thus easily distinguished from *nubigena* even when young. Some of the Indian plants referred here are hardly separable from the American *C. stipata*, Muhl. which extends to Japan and Amurland.

8. *C. Thomsoni*, *Boott Carex*, i. 1, t. 1; stem lignescent with many nodes, spikes ellipsoid androgynous male at top forming a close linear compound spike long overtopped by leaves, style 2-fid, utricle ovoid-triangular thinly obscurely many-nerved with numerous red glands throughout. *Boeck. in Linnæa*, xxxix. 93.

HIMALAYA and KHASIA, alt. 1-5000 ft., from Kumaon, Thomson, to UPPER BURMA, Griffith, frequent, only on river margins.—DISTRIB. Tonkin.

Stems 1 ft., densely caespitose, very rigid, black in age, and often shining, perennial, not rarely rooting at top and throwing thence a cluster of stems the next season. *Leaves* numerous, infolded when dry, narrow, far overtopping the *infl.* *Infl.* often by 4-5 by $\frac{1}{2}$ in., dense, of 25-30 regularly placed brownish spikes. *Utricle* small, brownish, plano-convex, hardly narrowed into the triangular shortly-notched beak.—The younger examples have been mixed with *C. nubigena*, Don, which has the *infl.* sometimes dense and regular; but in *C. nubigena* the *infl.* is less overtopped by leaves, and the utricle is more narrowed into the beak.

9. *C. fluviatilis*, *Boott Carex*, iv. 172, t. 582; leaves long narrow equalling the green stem, spikes ellipsoid androgynous male at top numerous forming a close linear compound spike, style 2-fid, utricle ovoid

many-nerved without glands acuminate into a short rough-edged beak. *Boeck. in Linnæa*, xxxix. 93.

UPPER BURMA; Wullaboom in Hookhoom, *Griffith (Kew Distrib. n. 6103)*.—DISTRIB. China, Japan.

Rhizome woody. *Stems* 1-2 ft. *Infl.* 4-6 by $\frac{1}{2}$ - $\frac{3}{4}$ in., dense, of 40-70 spikes; lowest bract scarcely 1 in. *Spikes* nearly $\frac{1}{2}$ in., straw-colrd. *Utricle* (larger than in *Thomsoni*) plane-convex; nerves 8 on the plane, 12 on the convex face; beak minutely scabrous on edges.—Very near *C. Thomsoni* but much less rigid; the infl. in fruit resembles that of *Setaria italica*. It is sometimes completely dioecious; in other cases the infl. has male spikes in the middle fem. at both ends (or at top only) as occurs in *C. disticha*.

10. *C. teretiuscula*, *Good. in Trans. Linn. Soc. ii. 163 (excl. tab. cited)*; stems 2 ft. scabrous at top, leaves nearly as long as stems narrow, spikes ovoid or ellipsoid androgynous male at top green variegated brown forming a linear oblong interrupted compound spike, style 2-fid, utricule small stalked slightly spongy ovoid conical-beaked gibbous few-nerved on convex face, margins of beak serrate subhyaline almost winged. *Schk. Riedgr. i. 30, tt. D. 19, & T. 69; Kunth Enum. ii. 390; Boeck. in Linnæa, xxxix. 104. C. teretiuscula, var. β major, Boott Carex, iv. 145, t. 466. C. mitis, Boeck. l. c. 104.*

KASHMIR, alt. 6-7000 ft., *Thomson*. BHOTAN, *Griffith, n. 2663 (Kew Distrib. n. 6104)*.—DISTRIB. Cooler N. Hemisphere.

Griffith's example shows no root, but is in ripe fruit; the utricule has a ridge on the nerveless face and about 4 nerves on the middle of the turgid gibbous face, exactly as in European *C. teretiuscula*. *Thomson's* Kashmir plant has numerous stems closely placed on an intricately branched short weak rhizome; the young utricles are stalked and show the subulate margins of the beak. I put these two plants together, for they must be very closely allied; *Mr. J. G. Baker* says that neither of them matches exactly *C. teretiuscula*.

** Spikes linear-cylindric, peduncled, inflorescence loose.

11. *C. longipes*, *Don in Trans. Linn. Soc. xiv. 329, & Prodr. 43; infl. long very lax, lowest peduncle solitary usually 1-spiked long, fem. glumes mucronate some aristate, style 2-fid, utricles green or fully ripe yellowish. Nes in Wight Contrib. 124; Kunth Enum. ii. 418; Drejer Symb. Caric. 24, t. 10; Boott Carex, iv. 190, Ic. Ined. t. 644; Boeck. in Linnæa, xl. 376 (not of Thwaites).*—*Carex, Wall. Cat. 3388.*

NEPAL, SIKKIM, and KHASIA, alt. 4-12,000 ft., common.—DISTRIB. China.

Rhizome short, woody, divided. *Stems* 6-24 in., slender. *Leaves* $\frac{2}{3}$ the stem, $\frac{1}{2}$ in. broad. *Cauline sheaths* distant, lowest often near base of stem. *Lowest peduncle* usually exsert 2-8 in. (but see var. γ), almost filiform, nodding. *Spikes* 3-10 on each stem, 1-3 in., green or yellowish, usually solitary or lowest with 1 or 2 smaller near base. *Male glumes* obtuse with a minute rough excurrent mucro; anthers subnuticous. *Fem. glumes* ovate, acuminate, mucro produced into a rough bristle often overtopping utricule. *Utricles* much flattened, ovoid or ellipsoid, suddenly narrowed into a long beak, distinctly 7-9-nerved on each face, glabrous or scabrous on margin sometimes also on two marginal nerves (see var. β); beak narrowly oblong, deeply bifid, lobes lanceolate erect, scabrous or rarely glabrous on margins. *Nut* much flattened, $\frac{2}{3}$ utricule (with beak), ovoid, obtuse, dark brown; style little thickened, exsert branches shorter than utricule.

Var. β *nepalensis*, *Boott Carex, iv. 190; utricles scabrous-pilose over both faces. C. macrolepis, Don in Trans. Linn. Soc. xiv. 329, & Prodr. 42 (not of DC.). C. nepalensis, Spreng. Syst. iii. 811; Nes in Wight Contrib. 125; Drejer Symb.*

Carex. 23, t. 9; *Kunth Enum.* ii. 391.—*Carex*, *Wall Cat.* 3388 (*largely*).—Nepal, *Wallich.*—Kept up as a species by Drejer and Nees, working with one or two pieces only. A good series of material shows a transition from the perfectly glabrous utricle (through forms with one or two marginal nerves scabrous) to the very scabrous utricle; and both Boeckeler and Boott unite the two.

Var. *γ dissitiflora*; stouter with broader leaves and longer utricles, lowest peduncle usually very shortly exsert, spikes elongate very slender the lower utricles solitary, distant.—Nilghiri, alt. 6-7000 ft., *Wight*, *C. B. Clarke*. Anamallays, *Beddome*. Khasin, alt. 5-6000 ft., *C. B. Clarke*.—Perhaps a distinct sp., according to *Drejer Symb. Caric.* 24. Lowest peduncle often carrying 2 or 3 spikes. The Nilghiri plant appears a distinct species; but the Khasia series shows a complete transition from var. *γ dissitiflora* to typical *C. longipes*.

12. **C. brunnea**, *Thunb. Fl. Japon.* 38; infl. long lax, lowest peduncle often several-spiked often 2 or more from one sheath, fem. glumes acute or scarcely mucronate, style 2-fid, ripe utricle brown ellipsoid much flattened pilose (in Indian examples) striate, beak linear, exsert portion of stigmas about as long as utricle. *Schk. Reidgr.* ii. 16, t. Xx. fig. 111; *Kunth Enum.* ii. 392; *Boeck. in Linnæa*, xxxix. 145. *C. gracilis*, *Br. Prodr.* 242; *Boott Carex*, i. 59, tt. 154, 155, 156 [excl. syn. *C. lachnosperma*, *Wall.*]; *Thw. Enum.* 355. *C. flexilis*, *Don Prodr.* 42, not of Rudge. *C. lenta*, *Don in Trans. Linn. Soc.* xiv. 327; *Kunth l.c.* 418. *C. nepalensis*, *C. B. Clarke in Journ. Linn. Soc.* xxv. 82, not of Spreng.

N.W. HIMALAYA, alt. 4500-6000 ft., frequent. MUNEYPOOR, alt. 3750 ft., *C. B. Clarke*. ASSAM, *Griffith*. SIND, *Pinwill*. PULNEY and NILGHIRI HILLS, alt. 6-7000 ft., *Wight*, &c. CEYLON, alt. 5000 ft., *Thwaites*.—DISTRIB. The Mascarene Isles, Australia, Japan, Sandwich Islds.

Rhizome oblique. *Stems* 1-3 ft., slender. *Leaves* $\frac{2}{3}$ stem, $\frac{1}{8}$ in. broad. *Cauline sheaths* somewhat distant, lowest usually above middle of plant. *Peduncles* often several from each sheath, lowest exsert 1-8 in., slender, nodding, sometimes bearing 3-10 spikes. *Spikes* $1\frac{1}{2}$ -2 in., slender. Male *glumes* obtusely triangular, reddish-brown. Fem. *glumes* ovate, apex triangular, ultimately ferruginous-brown. *Utricle* rather small, not parallel-sided, 9-15-nerved on each face, minutely hairy on nerves, suddenly narrowed into a beak about $\frac{1}{2}$ utricle; beak shortly bifid, lobes erect. *Nut* much flattened, ovoid, suddenly narrowed at top, yellow-brown, nearly filling utricle except beak. *Style* about as long as beak, slightly swollen, contracted at base; branches long very brown, but much shorter than in the two following species.—Limits and geographic range uncertain. In many of the non-Indian examples the utricles are glabrous, or there are several peduncles even from the middle sheaths of the inflorescence.

13. **C. teinogyna**, *Boott Carex*, i. 60, t. 158; infl. long lax, peduncles often 2 or more from one sheath bearing 1 or few spikes, fem. glumes acute often mucronate, ripe utricle brown oblong much flattened striate, beak linear long deeply bifid, style 2-fid branches longer than utricle. *Boeck. in Linnæa*, xxxix. 145.

KHASIA and JAINTIA HILLS, alt. 3-5000 ft., *Griffith*, &c.

Resembling *C. brunnea*, *Thunb.*, but a slenderer plant with narrower leaves. *Utricle* remarkably parallel-sided, suddenly narrowed into a linear beak nearly as long as itself, many-nerved on both faces, often minutely scabrous pilose on all the nerves, the minute hairs sometimes only on the margins or near the top very rarely wanting; lobes of beak erect. *Nut* oblong, filling utricle. Branches of *style* 2, very long, brown red, persistent on ripe fruit.

14. **C. longicruris**, *Nees in Wight Contrib.* 124; infl. long lax, peduncles often 2 or more from one sheath bearing 1 or few spikes, fem.

glumes lanceolate acute, style 2-fid, ripe utricle ferruginous much flattened ovate-lanceolate acuminate into beak glabrous except green margins, beak slightly notched with the green scabrous margins incurved, exsert portion of style-branches fully as long as utricle. *Kunth Enum.* ii. 417; *Boott Carex*, i. 59, t. 157; *Boeck. in Linnæa*, xxxix. 148. *C. longipes*, *Thw. Enum.* 355.

W. HIMALAYA; from Kishtwar, alt. 4000 ft., *C. B. Clarke*, to Nepal, *Wallich*. NILGHIRIS, *Perrottet*, *Wight*, alt. 8000 ft., *C. B. Clarke*. CEYLON, *Thwaites* (C.P. 2749).

Very similar to *C. longipes*, *brunnea*, and *teinogyna*, but distinct by the utricle. Utricle long, triangular-acuminate, the strictly linear portion of beak short; plane face 7-9-nerved, convex face 15-nerved, bright ferruginous yellow with two scabrous green margins, margins in lower half of beak incurved over the plane face. Fem. glumes shorter than utricle. Branches of style 2, nearly as long as in *C. teinogyna*.

Sect. 2. REMOTÆ. Terminal spike male at base fem. at top (or rarely fem. in the middle male at both ends or accidentally wholly male), the other spikes male at base or the lower often wholly fem.

* Spikes short, sessile or nearly so, ovoid or oblong, dense. Glumes pale.

15. **C. remota**, *Linn. Sp. Pl.* 1383; infl. elongate, lower spikes distant, lowest bract long usually overtopping infl., style 2-branched, utricle ellipsoid flattened narrowed into an oblong beak slenderly many-nerved on both faces. *Schk. Riedgr.* i. 46, & ii. 22, t. E, fig. 23; *Nees in Wight Contrib.* 121; *Kunth Enum.* ii. 404; *Reichb. Ic. Fl. Germ.* viii. 8, t. 212, figs. 556, 557; *Boott Carex*, iv. 198, & *Ic. Ined.* 669, 670; *Boeck. in Linnæa*, xxxix., p. 129. *C. axillaris*, *Linn. Sp. Pl.* 1382. *Vigna remota*, *Reichb. Fl. Germ. Excurs.* p. 58.

N. TEMPERATE HEMISPHERE.

Glabrous. Rhizome short, slender, without stolons. Stems clustered, 1-2½ ft., slender. Leaves ¾ stem, scarcely ½ in. broad, weak. Infl. often half length of plant, lower spikes solitary 1-3 in. apart; lowest bract 4-10 in., very narrow, weak. Spike ½-¾ in., ellipsoid, greenish. Glumes ovate, acute, keel green, sides pale. Anthers linear, mucous. Utricle small, glabrous, scabrous on margin; beak 2-fid, lobes erect; margins scabrous. Nut subovoid, flattened, ¾ utricle excluding beak.

Var. *β Rochebruni* (sp.), *Franch. et. Savat. Pl. Japon.* ii. pp. 126, 555; utricles nerveless on plane face, very slenderly 3-5-nerved on convex face, gradually narrowed upwards into a narrow-triangular beak.—Temperate Himalaya; from Kashmir, alt. 7-8000 ft., to Sikkim, alt. 7-12,000 ft., &c., and KHASIA HILLS, alt. 4500 ft.—Beak of utricle is, in all Indian material, more or less winged, in this (as in the nerveless plane face) showing an approximation to 17. *C. alta*. In general appearance, it matches well typical European *C. remota*.

16. **C. canescens**, *Linn. Sp. Pl.* 1383; infl. linear, spikes short cylindric approximate, bracts short lowest much shorter than infl., style 2-branched, utricle ovoid flattened narrowed into a short triangular beak slenderly 8-10-nerved on both faces. *Reichb. Ic. Fl. Germ.* viii. 7, t. 206, figs. 546, 547; *Boott Carex*, iv. 154, t. 496; *Boeck. in Linnæa*, xxxix. 122. *C. curta*, *Gooden. in Trans. Linn. Soc.* ii. [1794] 145; *Schk. Riedgr.* i. 43, & ii. 21, t. C, fig. 13; *Kunth Enum.* ii. 403. *Vigna canescens*, *Reichb. Fl. Germ. Excurs.* 58.

KASHMIR, alt. 6-12,000 ft., *C. B. Clarke*.—DISTRIB. Cooler parts of globe.

Glabrous. *Rhizome* short, slender, without stolons. *Stems* clustered, 2 ft. *Leaves* $\frac{2}{3}$ stem, $\frac{1}{8}$ – $\frac{1}{5}$ in. broad. *Infl.* 2–5 in., lower spikes solitary, 1 in. apart; lowest bract setaceous, about 1 in. long. *Spikes* $\frac{1}{4}$ – $\frac{1}{2}$ in., greenish. *Utricle* small, glabrous, often nearly smooth on margin; beak triangular, hardly notched, minutely glandular-scabrous.

17. **C. alta**, Boott in *Proc. Linn. Soc.* i. 254, & in *Trans. Linn. Soc.* xx. 130, & *Carex*, i. 59, t. 153; larger and stouter in all its parts than *C. remota* beak of utricle strongly winged, so that utricle is widest in its upper half, but small not filling utricle (otherwise as *C. remota*). Boeck. in *Linnæa*, xxxix. 126. *C. Brizopyrum*, Kunze *Suppl.* 169, t. 43.

KHASIA; Molim, alt. 5800 ft., C. B. Clarke. MUNEYPOOR, alt. 5–6000 ft., Watt. —DISTRIB. JAVA.

Altogether resembles a large *C. remota*. *Leaves* and *bracts* up to $\frac{1}{2}$ – $\frac{1}{4}$ in. broad. *Spikes* often $\frac{1}{2}$ in., cylindric. *Utricle* in outline elliptic with a short point, scabrous almost serrulate on the green shoulders formed by the wings of the beak, with a groove on the plane face below the termination of the slit of the beak.

18. **C. cooptanda**, C. B. Clarke; small, leaves linear, spikes 2 cylindric short dense close together, upper male at base pale brown, bracts hardly any, style 2-branched, utricle ovoid flattened narrowed into a short conical subterite beak nerveless smooth.

KHASIA HILLS; Griffith.

Glabrous. *Rhizome* slender, creeping, divided. *Stems* 6 in., slender. *Leaves* 4 by $\frac{1}{16}$ in. *Spikes* $\frac{1}{2}$ in. apart, upper $\frac{1}{2}$ by $\frac{1}{8}$ in., lower rather smaller female. *Glumes* as long as utricles, ovate, obtuse, brownish with scarious margin upwards. *Utricle* $\frac{1}{16}$ in. long, without glands; exert part of stigmas as long as utricles.—There are three excellent specimens, exactly like each other, and very unlike any other Indian *Carex*, with the note of Boott on them in Herb. Hooker stating that they were collected by Griffith in Assam.

** Spikes long-cylindric or linear, lower peduncled. Glumes coloured.

19. **C. prælonga**, C. B. Clarke; tall, leaves long, spikes 4–9 linear nodding, styles 2-fid, utricle broadly ovoid compressed nerveless smooth suddenly narrowed into a very short linear subterite beak. *C. phacota*, β minor, C. B. Clarke in *Journ. Linn. Soc.* xxviii. 141.

SIKKIM, alt. 7–9000 ft., frequent, C. B. Clarke.

Glabrous, tufted, lower sheaths shining, brown. *Stems* 2–3 ft. *Leaves* 18 by $\frac{1}{4}$ – $\frac{1}{2}$ in. Lowest spike $\frac{1}{4}$ –3 in. distant; peduncle $\frac{1}{2}$ –3 in. long; bract overtopping infl., not sheathing. *Spikes* 4 by $\frac{1}{2}$ in. terete; terminal male at base, fem. in middle, fem. or male (sometimes branched) at top. Fem. *glumes* as long as utricles, 3-nerved, green on back, black-purple on side, emarginate or acuminate, excurrent green tip often scabrous. *Utricle* $\frac{1}{2}$ in., obovate turgid, yellow-brown, whole surface minutely yellow-glandular-punctate; beak exactly linear, granular-glandular, becoming very white when quite ripe, shortly notched; stigmas shortly exert. Nut obovoid, biconvex, very smooth, nearly filling utricle.

Var. β *angustior*; stems 12–18 in. slender more scabrous, leaves scarcely $\frac{1}{2}$ in. broad, spikes 3–1 in.—Khasia Hills, alt. 4–6000 ft., C. B. Clarke. Burma; Shan States, alt. 5000 ft., Collett.—Terminal spike occasionally wholly male. There are still 16 Sikkim and 34 Khasi specimens of this species in my collection, which show that Boott was right in attaching moderate importance to the sex of the terminal spike.

20. **C. teres**, Boott *Carex*, i. 62, t. 167 (excl. lower utricle); tall, leaves long, spikes 4–9 linear nodding, styles 2-fid, utricle ellipsoid compressed

nerved smooth gradually passing into a conical entire beak. *Boeck. in Linnæa*, xl. 393.

SIKKIM, alt. 8-9000 ft.; Sinchul, *J. D. H.*; Tonglo and Sundukphoo, *C. B. Clarke*, &c.

Glabrous, tufted, lower sheaths shining brown. *Stems* 3 ft. *Leaves* 18 by $\frac{1}{4}$ in. Lowest *spike* $\frac{1}{2}$ -4 in., distant; peduncle 2-4 in. long; bract overtopping infl., not sheathing. *Spikes* 5 by $\frac{1}{4}$ in., terete; terminal male at base, fem. in middle and usually at top. Fem. *glumes* as long as the utricles, oblong-lanceolate, aristate, broadly 3-nerved, green on the back, sides black-purple, bristle green scabrous. *Utricles* $\frac{1}{2}$ in., turgid, fuscous, 7-11-nerved on each face, whole surface minutely yellow-glandular-punctate; beak scarcely granular, hardly notched; stigmas very shortly exsert. *Nut* ovoid, somewhat narrowed upwards.—This species, from the root to the glumes, is extraordinarily like *C. prælonga*, but rather stouter; the fruiting spikes and utricles are totally unlike.

21. *C. sikkimensis*, *C. B. Clarke*; tall, leaves long narrow, spikes 4-7 linear clavate, styles 2-fid, utricle ellipsoid compressed most slenderly nerved brown smooth narrowed into a conico-linear entire beak.

SIKKIM; Jongri, alt. 12-13,000 ft., *C. B. Clarke*.

Lowest *spike* 2-3 in. distant; peduncle 2-3 in. long; lowest bract overtopping the infl., not sheathing. *Spikes* 2 by $\frac{1}{4}$ in., terminal usually fem. at top clavate, sometimes fem. only in the middle, sometimes wholly male. Fem. *glumes* as long as utricles, oblong-lanceolate, not or scarcely mucronate, black-purple, back pale yellow. *Utricle* $\frac{1}{2}$ in., stalked, not glandular; beak oblong from a conical base, glandular-scabrous; stigmas exsert $\frac{2}{3}$ the length of utricle. *Nut* ellipsoid, $\frac{1}{4}$ the length of whole utricle.—Not closely allied to the preceding species; it has the utricle identically of *C. notha* from which it differs not only in the fem. top of the terminal spike, but in its larger size and much larger spikes.

22. *C. cernua*, *Boott Carex*, iv. 171, t. 578; leaves long, spikes 4-8 cylindric very dense, styles 2-fid, utricle broadly ovate much compressed nerveless densely glandular subscabrous to base rich-brown, beak conical entire.

ASSAM; to Sudiya, *Jenkins*, *Simons*, *Griffith* (*Kew Distrib.* 6099).—DISTRIB. Tonkin, Japan.

Stems 12-18 in. *Leaves* as long as stem, up to $\frac{1}{4}$ in. broad. Lowest *spike* $\frac{1}{2}$ -2 in. distant; peduncle $\frac{1}{2}$ -2 in. long; bract overtopping infl., not sheathing. *Spikes* up to $2\frac{1}{2}$ by $\frac{1}{2}$ in.; terminal one male at base (sometimes fem. in middle male at both ends). Fem. *glumes* as long as utricle, 3-nerved, green on back, bristle lanceolate excurrent rough. *Utricle* scarcely $\frac{1}{2}$ in., stalked; conical beak undistinguishable from utricle with no (or hardly any) linear termination.—In *C. prælonga* the whole utricle is sprinkled with minute yellow translucent glands sunk in the substance of utricle; in *C. cernua* the glands are very thick, white, almost depressed papillæ. *C. cernua* appears really nearer *C. phacota* than *C. prælonga*, but differs from both in the densely packed utricles.

Sect. 3. *Vulgares*. Terminal spike male, the others fem. or male at top, solitary.

23. *C. phacota*, *Spreng. Syst.* iii. 826; spikes 3-11 lower nodding on slender peduncles linear-cylindric, fem. glumes with an excurrent green scabrous tip, styles 2-fid short, utricle ovoid flat nearly nerveless glandular to the base, beak short triangular with hardly any linear prolongation. *Nees in Wight Contrib.* 126; *Kunth Enum.* ii. 420; *Drejer Symb. Caricol.* 15, t. 4 (excl. *C. punctata* & *notha*); *Boott Carex*, i. 63, t. 168; *Thw. Enum.* 356; *Boeck. in Linnæa*, xl. 434. *C. lenticularis*, *Don in Trans. Linn. Soc.*

xiv. 331, & *Prodr.* 43 (not of Mich.). *C. platycarpa*, Hochst. *Steud. Syn. Cyp.* p. 214.—*Carex*, Wall. *Cat.* 3394 (type sheet), 3395 A, partly.

HIMALAYA, alt. 4-7000 ft., from Gurwhal to Bhotan, frequent. KHASIA HILLS, alt. 2-6000 ft., and PATKOY MTS., Griffith. ASSAM; Luckimpore at 300 ft. TENASSERIM, alt. 3500 ft. PACHMARI, PULNEYS, NILGHIRIS, and CEYLON, alt. 4-6000 ft.—DISTRIB. Malaya, Japan.

Glabrous. *Rhizome* woody, short. *Stems* closely tufted, 1-2½ ft., triquetrous. *Leaves* often as long as stem, ¼ in. wide. *Infl.* usually 4-6 in., lowest spike 1-2 in. distant; lowest bract usually far overtopping the infl., but sometimes shorter than it, not sheathing. *Fem. spikes* 1-2 in. (sometimes longer) by ½ in., in fruit appearing purple with green linear marks (glumes); male spike 1-2 in., rather slender lax, pale ferruginous. *Fem. glumes* narrow, rather longer than utricle, green 3-nerved on back, sides pale ferruginous or scarious. *Utricle* about ½ in., usually dark purple with a green margin, densely granular with red-purple glands throughout; mouth of beak entire.—The large quantity of this common species now to hand leaves hardly any absolute characters to distinguish it from the two following. In some, the bracts are slender, shorter than the infl.; in others, the beak of the utricle has a distinct linear prolongation nearly as in the very close *C. Arnottiana*. The colour of the plant glumes and spikes varies much from the type; the Ceylon examples have the spikes a rich brown (as in *C. Arnottiana*). The most general characters for *C. phacota* appear to be the rough excurrent green tip of the fem. glume with the utricle dense with glands to its base.

24. **C. pruinosa**, Boott in *Proc. Linn. Soc.* i. 255; *Trans. Linn. Soc.* xx. 131, & *Carex*, i. 65, t. 174; spikes broader laxer than in *C. phacota*, utricle larger ½ in. long, obscurely 3-5-nerved; otherwise as *C. phacota*, of which Boeckeler esteems it a form.

EAST BENGAL, Griffith (*Kew Distrib.* n. 6106). KHASIA HILLS, alt. 4200 ft., C. B. Clarke.—DISTRIB. Java.

Boott (*Carex*, iv. 198, Ic. Ined. 667) has brought here his *C. picta* from Japan, which has nerveless utricles.

25. **C. Arnottiana**, Nees ms.; Drejer *Symb. Caricol.* 16, t. 5; ex-current tip of glume smooth, utricle glandular in its upper half, beak short triangular with a minute linear prolongation, otherwise as *C. phacota*. Boott *Carex*, iv. 178, Ic. Ined. 607 (not in *Trans. Linn. Soc.* xx. 129); *Thw. Enum.* 356; Boeck. in *Linnæa*, xl. 435.—*C. socia*, Boott in *Proc. Linn. Soc.* i. 254, & in *Trans. Linn. Soc.* l. c. 128.

CEYLON; elevated parts of Central Province, Walker, Thwaites.

26. **C. notha**, Kunth *Enum.* ii. 421; spikes 3-7 lower on slender peduncles linear-cylindric, fem. glumes obtuse or minutely mucronate, styles 2-fid shorter than utricle, utricle ellipsoid plane-convex slenderly 3-5-nerved minutely glandular narrowed suddenly into a short linear beak. Boott *Carex*, i. 8, t. 24; Boeck. in *Linnæa*, xl. 433. *C. Victorialis*, Nees in *Wight Contrib.* 126 (style erroneously 3-fid); Kunth *Enum.* ii. 516. *C. punctata*, Nees l. c. 127 (not of Gaudin). *C. Benthamiana*, Boott in *Royle Himal.* 412. *C. phacota*, Drejer *Symb. Caricol.* 15 (partly).

HIMALAYA, alt. 5-11,000 ft., from Chini, Jacquemont, and Gurwhal, Thomson, to Bhotan, Griffith.

Male spikes 2 in., brown. Lowest bract hardly so long as infl. Glumes green, obscurely 3-nerved on back, often quite mucous; if a small mucro it is quite unlike *C. phacota*, in which the whole green width of the glume is produced as an oblong-linear flat tip. Utricle exceeding the glume about ½ in., with round or linear, yellow or brown, scattered sunk glands; beak slightly notched, minutely granular.—Otherwise as *C. phacota*.

27. *C. fucata*, *Boott ms.*; spikes dense blackish, styles 2-fid exsert about $\frac{1}{2}$ length of utricle, utricle nerveless, otherwise nearly as *C. notha*.

SIKKIM; Lachen, alt. 9–12,000 ft., *J. D. H.*

Lowest bract far overtopping infl. Spikes much more densely packed, and thicker than in *C. notha*; glumes rather longer, black with a linear green mark on back. Lowest spike 3–10 in. distant in some examples.

28. *C. rubro-brunnea*, *C. B. Clarke*; spikes 4–8 close together nearly sessile, styles 2-fid persistent very long red-brown, utricle ellipsoid plane-convex very slenderly 3–5-nerved or nerveless minutely glandular narrowed suddenly into a short linear beak. *C. heterolepis*, *Boott in Perry Exped. Japan*, ii. 327, not of Bunge.

KHASIA HILLS, alt. 2–6000 ft., very common, *C. B. Clarke*. MUNEYPOOR, *Watt.*—DISTRIB. China, Japan.

Glabrous. Rhizome woody, short. Stems clustered, 1–2 ft. Leaves numerous, often as long as culm, scarcely $\frac{1}{2}$ in. broad. Spikes 2–3 by $\frac{1}{8}$ – $\frac{1}{6}$ in., brown-red, often comose by long persistent styles; male spike paler; lowest spike rarely 1 in. distant; lowest bract much overtopping inflorescence. Fem. glumes ovate-triangular, muticous or nearly so, rich brown with yellow keel. Utricle very nearly as of *C. fucata* (or *C. notha*), but exsert part of style-branches much longer than utricle.

29. *C. Prescottiana*, *Boott in Proc. Linn. Soc. i.* 286, & in *Trans. Linn. Soc. xx.* 135, & *Carex*, i. 45, t. 115 (*excl. Hawaii plant*); spikes 3–6 lower peduncled 4–6 in. long slender, styles 2-fid, utricle small compressed ovoid slightly nervose smooth eglandular beakless. *C. producta*, *Boott in Herb. Hook.* *C. teres* ? partly, *Boott Carex*, i. 62, t. 167 (*lower utricle only*).—*Carex*, *Wall. Cat.* 3386.

NEPAL, *Wallich*. KHASIA HILLS, alt. 4500 ft.; Myrung and Nunklow, *J. D. H.*—DISTRIB. Japan.

Glabrous. Stems $1\frac{1}{2}$ –2 $\frac{1}{2}$ ft. Leaves nearly as long as stem, up to $\frac{1}{2}$ in. broad. Lowest spike 1–5 in. distant, peduncle $\frac{1}{2}$ –2 in.; lowest bract equalling infl., not sheathing; terminal spike 2 $\frac{1}{2}$ in. by $\frac{1}{2}$ in., male, with a short second male spike often added. Fem. spikes nodding, wavy, $\frac{1}{2}$ in. broad, yellow brown in fruit. Fem. glumes about as long as utricles with a short excurrent tip or obtuse. Utricle scarcely $\frac{1}{8}$ in., slightly inflated, irregularly 3–5-nerved on each face, with a very few scattered sunk obscure glands, suddenly narrowed at top to a small entire mouth, hardly microscopically a beak.—Very near *C. praelonga*, but the utricles are smaller, less nerved, without linear beak; and in all the specimens seen the terminal spike is wholly male.—In his “*Carex*” i. 62, t. 167 (and herbarium), *Boott* mixed this with *C. sandwicensis*, *Boeck*. (*C. Prescottiana*, *H. Mann*) from the Sandwich Isles of which the utricle differs materially. I think it probable that *C. Prescottiana*, *Boott*. was *C. heterolepis*, *Bunge*, *Enum. Pl. Chin. Var.* [1831] 69 (*not of Boott*); for *Bunge* says his *C. heterolepis* resembled *C. pendula*, but had a bifid style.

30. *C. cæspititia*, *Nees in Wight Contrib.* 127; spikes 4–10 lowest subsessile or erect on a short peduncle cylindric dense rigid, styles 2-fid, utricle ovoid compressed irregularly few-nerved smooth eglandular suddenly narrowed into a minute entire beak. *Kunth Enum. v.* 2, p. 412; *Boott Carex*, iv. 133, t. 428, fig. 3; *Boeck. in Linnæa*, xl. 437.—*Carex*, *Wall. Cat.* 3392.

SYLHET, *Wallich*, *C. B. Clarke*.

Glabrous, 2 ft. high, habit of *C. rigida*, *Gooden.*, but with a most irregular infl. Terminal male spike sometimes 4 in. usually 0–2 in. above the next, 2 in. long,

pale, slender, or shorter thicker purple-chestnut. Fem. spikes often 1 by $\frac{1}{4}$ in., often 2-7 fascicled with 1 or 2 remote below, frequently with 1-6 rectangularly divaricate short branches. Utricles greyish with green margins, and 1-4 irregular green nerves.—Appears *always* thus irregular; the rhizome is usually woody, short, but sometimes the stem at base appears slender decumbent rooting in mud. Easily recognized, as being the only low-level Indian species at all resembling *C. rigida*.

31. *C. rigida*, Gooden. in *Trans. Linn. Soc.* ii. 193, t. 22, fig. 10; stems 4-8 (rarely 10-12) in., leaves (dried) flat or margins near base slightly recurved, spikes 3 or 4 close together cylindric short dense, bracts not overtopping the infl., styles 2-fid, utricle ellipsoidal flattened smooth nearly nerveless apiculate by minute entire beak. *Schk. Riedgr.* i. 56, & ii. 25, t. U, fig. 71; *Reichb. Ic. Fl. Germ.* viii. 12, t. 225, fig. 578; *Boeck. in Linnæa*, xl. 414. *C. saxatilis*, *Schk. l. c.* 54, & ii. 25, tt. i., fig. 40, & tt. fig. 40; *Kunth Enum.* ii. 410. *C. vulgaris*, var. *alpina*, *Boott Carex*, iv. 167, tt. 568-574. *C. orbicularis*, *Boott in Proc. Linn. Soc.* i. 254, & in *Trans. Linn. Soc.* xx. [1851] 134.

ALPINE HIMALAYA and W. TIBET, alt. 9-13,000 ft., from Gilgit, *Giles*, to Sikkim, *J. D. H.*—DISTRIB. Cooler parts of the World.

Stoloniferous. Leaves often curved. Spikes $\frac{1}{2}$ - $\frac{3}{4}$ by $\frac{1}{8}$ - $\frac{1}{4}$ in. Fem. glumes ovate-triangular, acute scarcely mucronate, chestnut-purple.—In the original *C. orbicularis* Boott, the utricles are unusually large, but not larger than in some European forms.

32. *C. vulgaris*, *Fries Nov. Mant.* iii. 153, & *Summ. Veg.* 230; stems often 10-20 in., leaves (dried) conduplicate, spikes less close longer, utricle more or less slenderly nerved, otherwise as *C. rigida*. *Reichb. Ic. Fl. Germ.* viii. 13, tt. 226, 227; *Boott Carex*, iv. 166, tt. 557-567; *Boeck. in Linnæa*, xl. 416. *C. cæspitosa*, *Schk. Riedgr.* i. 57, & ii. 27, figs. A a, t. 85, a, b, & B b, t. 85, c, d, e; *Kunth Enum.* ii. 411.

N.W. HIMALAYA and W. TIBET, alt. 10-13,000 ft., from Gilgit, *Giles*, to Lahoul, *Jaeschke*, frequent.—DISTRIB. Cooler parts of the World.

Some of the material Mr. Baker considers good Yorkshire *C. vulgaris*, but there are many examples which he considers do not match either *C. vulgaris*, *Fries*, or *C. rigida*, *Gooden*.

Var. β *distracta*; spikes less close, lowest 2-7 in. distant.—Kashmir; *Gurais*, alt. 8000 ft., *C. B. Clarke*.—Altogether unlike any European form, *J. G. Baker*.

33. *C. erostrata*, *Boott ms.*; utricles obovoid compressed beakless, otherwise as *C. rigida*, *Strachey Cat. Pl. Kumaon*, 73; *Duthie in T. E. Atkins. Gazetteer*, x. 618.

KUMAON; Barji Kang Pass, alt. 14,500 ft., *Strachey & Winterbottom (Carex*, n. 22).

Instead of a minute beak there is a triangular notch at the top of the utricle. "I cannot recollect ever seeing any *C. rigida* like it," *J. G. Baker*.

Subgenus II. *CAREX proper*. Style-branches 3 (see also 2. *C. stenophylla*).

Sect. 4. RARÆ. Stem with 1 spike (see also 42. *C. radicalis*), fem. at base. Seta (i.e. rudiment of the suppressed upper part of spikelet) often present within utricle. Bract hardly longer than fem. glumes.

34. *C. microglochin*, *Wall. in Handl. Kong. Akad. Stockh.* 140, & *Fl. Lapp.* 224; spike $\frac{1}{4}$ - $\frac{1}{2}$ in., style-branches 3, utricles lanceolate acu-

minate glabrous striate, ripe deflexed with seta protruded. *Schk. Riedgr.* 32, t. Ssss, fig. 110; *Kunth Enum.* ii. 424; *Reichb. Ic. Fl. Germ.* viii. 3, t. 196; *Boott Carex*, iv. 174, t. 589; *Boeck. in Linnæa*, xxxix. 32. *Uncinia microglochin*, *Spreng. Syst.* iii. 830; *C. B. Clarke in Journ. Linn. Soc.* xx. 401. *U. europæa*, *J. Gay in Flora* [1827] 28. *Leptolepis tibetica*, *Boeck. Cyp. Nov.* i. 31 (partly, i. e. *Schlagintweit*, n. 6450).

N.W. HIMALAYA and W. TIBET, alt. 11–15,000 ft.; from the Karakorum, *Thomson*, to *Kuuawur*, *Jacquemont*, frequent.—DISTRIB. N. Europe, Asia, Greenland.

Glabrous. *Rhizome* slender, very short. *Stems* 6–12 in., slender. *Leaves* scarcely $\frac{1}{2}$ length of stems, setaceous. *Spike* pale brown, in flower hardly $\frac{1}{10}$ in. broad. Fem. *glumes* ovate, obtuse, obscurely nerved, shorter than utricule. *Utricle* about $\frac{1}{10}$ in. (includ. exsert rigid seta often more than $\frac{1}{4}$ in.); beak terete, mouth entire. *Nut* oblong-ellipsoid, brown, about $\frac{1}{2}$ utricule.—In fruit the seta hardens into a straight smooth yellow linear cone filling the mouth of the utricule; at its apex is often a curved point articulated which sometimes is a rudimentary male fl.—*Uncinia* differs from *Carex* only by the hooked end of the seta, but the hook is as much developed in *C. microglochin* as it is in *U. Kingii*; and the only reason for not putting *C. microglochin* into *Uncinia* is that the latter genus is very nearly confined to the S. Hemisphere.

35. **C. parva**, *Nees in Wight Contrib.* 120; spike $\frac{1}{4}$ – $\frac{3}{4}$ in., style-branches 3, utricles lanceolate acuminate long-beaked glabrous striate, ripe deflexed with seta included. *Kunth Enum.* ii. 419; *Boott Carex*, i. 56, t. 418; *Boeck. in Linnæa*, xxxix. 38. *C. macrorrhyncha*, *Karel. et Kiril. in Bull. Soc. Mosc.* iii. [1842] 521.

HIMALAYA, alt. 11–12,000 ft., from KASHMIR (Deosai), *Winterbottom*, to SIKKIM (Lachen), *J. D. H.*—DISTRIB. Central Asia.

Resembles *C. microglochin*, but stouter in all its parts. *Spike* brown or chestnut. Fem. *glumes* ovate, acute, lower aristate, lowest empty sometimes $\frac{1}{2}$ in. (a bract). *Utricle* usually $\frac{1}{2}$ in. and more (much like that of *C. microglochin* reckoning in the seta); beak slender terete with oblique subentire mouth. *Seta* sometimes carrying a rudimentary minutely hairy glume, but included.

36. **C. linearis**, *Boott Carex*, i. 51, t. 136; spike 2–3 in. linear, style-branches 3, utricule oblong complete glabrous nerveless beak linear-conic as long as nut with a slit on posticous face extending $\frac{2}{3}$ length of beak. *Boeck. in Linnæa*, xxxix. 36. *C. Esenbeckii*, *Boott in Proc. Linn. Soc.* i. 285, & in *Trans. Linn. Soc.* xx. 133 (mainly, not of *Nees*). *C. elynoides*, *J. Gay ms.* *Hemicarex* sp., *Benth. in Gen. Pl.* iii. 1072. *H. trinervis*, *C. B. Clarke in Journ. Linn. Soc.* xx. 382, chiefly (not *Kobresia trinervis*, *Boeck.*). *Uncinia nepalensis*, *Nees ms.*

HIMALAYA, alt. 11–14,000 ft.; from KASHMIR, *Levinge*, to SIKKIM (Lachen), *J. D. H.*

Glabrous. *Rhizome* short, woody. *Stems* densely tufted, clothed at base with testaceous or subcastaneous sheaths becoming torn and funbrillate; stems ultimately 1–2 ft., in flower often only a few inches. *Leaves* in flower often 2 or 3 in., subsequently 1 ft., setaceous. *Spike* nearly always bisexual, $\frac{1}{2}$ in. broad, loose at base. Fem. *glumes* elliptic-oblong, greenish then pale brown, obtuse, lower distant aristate bract-like. *Utricle* $\frac{1}{2}$ in. long, thin, passing into the beak. *Nut* filling utricule, exactly oblong, trigonous, pale brown, one angle pressing against posticous face of utricule.—Confounded by *Boott* originally with *C. Esenbeckii* (i. e. *Kobresia trinervis*, *Boeck.*), and by *Beutham* and myself. *Boott's* figure is correct, but in his *Herb.* he has *Kobresia trinervis* still partly mixed, nor has he perhaps discussed the synonymy quite satisfactorily. Most of the material is easily sorted, because *K. trinervis*

abounds in spikes wholly male, whereas in *C. linearis* the spikes are fem., at top male. But in *K. trinervis* there occur fem. spikes shortly male or barren at top, and these exactly resemble spikes of *C. linearis*. The only diagnostic difference appears to be that in *K. trinervis*, the bracteole (homologous with utricle of *Carex*) is split on the posticous face nearly to its base so that the nut is partially protruded; in *C. linearis* the beak of the utricle is split on the posticous face nearly (not quite) to its base, so that the nut is completely inclosed in the utricle. The habit of *C. linearis* is entirely that of a *Kobresia*, and the two genera touch at this point.

Var. *β. elachista*; stems (with nearly ripe fruits) scarcely 2 in., leaves exceeding stems, spikes in fruit $\frac{1}{2}$ in., very slender all bisexual 2-4-nutted.—W. Nepal, alt. 11-12,000 ft., *Duthie* (n. 6000).—This looks like a distinct species; but there is little of it, and except in size no distinction between it and *C. linearis* has been discovered.

37. *C. vidua*, *Boott* ms.; spike 1 in. linear, style-branches 3, utricle (including beak) oblong-ellipsoid glabrous without nerves, beak as long as nut with a slit on posticous face extending $\frac{1}{2}$ length of beak.

SIKKIM; Lachen, alt. 13,000 ft., *J. D. H.*

Glabrous. *Stems* 6 in., rigid, clustered, at base covered by dark-chestnut shining fimbriate sheaths. *Leaves* nearly as long as stems, setaceous. *Spikes* seen wholly fem., about $\frac{1}{2}$ in. broad, denser, more rigid, than in *C. linearis*. Fem. *glumes* ovate, obtuse, brown, yellow-backed, lowest hardly aristate. *Utricle* with beak $\frac{1}{2}$ - $\frac{1}{4}$ in. long; utricle proper obovoid, scarcely longer than the obovoid, nut passing imperceptibly into an ovoid compressed beak of same length and width, scabrous on margins, top obtuse.—A strange plant marked by *Boott* "dioica," the $\frac{1}{2}$ spikes seen have some sterile glumes at top.

38. *C. rara*, *Boott* in *Proc. Linn. Soc.* i. 284, & in *Trans. Linn. Soc.* xx. 139, & *Carex*, i. 44, t. 109; rhizome very short slender, stems and leaves very slender, spike $\frac{1}{2}$ - $\frac{3}{4}$ by $\frac{1}{8}$ - $\frac{1}{4}$ in. dense, style 3-branched, utricle ovoid-pyramidal many-ribbed glabrous. *Thw. Enum.* 354; *Boeck. in Linnaea*, xxxix. 36. *C. nana*, *Boott* in *Mem. Amer. Acad. N. S.* vi. 418, & *Carex*, iv. 139, t. 449, fig. 2. *C. capillacea*, *Benth. Fl. Austral.* vii. 438 (scarcely of *Boott*).

BHOTAN, *Griffith*. KHASIA HILLS, *Griffith*, alt. 6000 ft., *C. B. Clarke*. CEYLON, alt. 6000 ft., *Thwaites*.—DISTRIB. Japan, Borneo, Austral.

Glabrous. *Stems* 4-20 in., tufted. *Leaves* often half as long as stems, setaceous. *Spikes* nearly all bisexual, terminal male portion shining ferruginous, very narrow. Fem. *glumes* ovate, obtuse, 3-nerved, shorter than utricles. *Utricle* in fruit close, spreading at right angles, with no linear tip to beak or a most minute subrecurved mucro, strongly closely ribbed without glands, or in Khasi examples sometimes with fewer weaker ribs and scattered large glands between (= the Japan *C. nana*, *Boott*).

39. *C. capillacea*, *Boott* *Carex*, i. 44, t. 110; rhizome 0, stems and leaves capillary, spike $\frac{1}{4}$ - $\frac{1}{3}$ by $\frac{1}{10}$ - $\frac{1}{8}$ in. dense, style 3-branched, utricle ovoid-pyramidal many-ribbed glabrous. *Boeck. in Linnaea*, xxxix. 37.

SIKKIM, alt. 9-12,000 ft., *J. D. Hooker*, &c. BHOTAN, *Griffith*.—DISTRIB. Japan.

Stems 4-10 in., tufted.—Smaller in all its parts than *C. rara*, but I see no other difference.—The Australian plant called by *Bentham* *C. capillacea* has leaves and spikes as wide as *C. rara*, and I refer it to *rara* accordingly; it might be all treated as one.

Sect. 5. INDICÆ. Terminal spike fem. at base male at top; or, when spikes very numerous many male at top, terminal (1 or few) sometimes wholly male.

* Subscapose, basal leaves long, cauline leaves and bracts very short.

40. **C. cyrtostachys**, Brongn. in Bot. Voy. Coquille 152, t. 25; infl. compound, spikes linear-oblong lax pale, style 3-fid, utricle ellipsoid-trigonus many-nerved minutely hairy, beak scarcely $\frac{1}{4}$ utricle. Kunth Enum. ii. 513; Moritzi Verz. Zoll. Pfl. 98; Boott *Carex*, ii. 103, t. 310; Boeck. in Linnæa, xl. 327.—*Carex*, Wall. Cat. 3383.

PENANG; Wallich. PRAK; alt. 3500 ft. King's Collector, SINGAPORE, Ridley.—DISTRIB. Malaya, China.

Glabrous, except utricle. Rhizome horizontal, thick. Leaves many, subradical, 1-2 ft. by $\frac{1}{2}$ – $\frac{1}{2}$ in., flat, tough, many-nerved. Scares numerous, 4-9 in., with sheaths and peduncles nearly throughout their length; bracts 0- $\frac{1}{2}$ in., linear; peduncles exert 0-1 in., 1-5-spiked. Spikes $\frac{3}{4}$ by $\frac{1}{2}$ – $\frac{1}{2}$ in. Fem. glumes ovate, acute, scarcely mucronate, shorter than utricle. Utricle $\frac{1}{2}$ in.; beak scarcely notched. Style with its 3 branches short, style-base linear. Nut "distorted by depressions," Boott, gynophore small yellow, there are two main lateral excavated patches. (The only Indian species that has a strongly excavated-distorted nut.)

41. **C. Helferi**, Boeck. in Linnæa, xl. 365; basal leaves long up to 1 in. broad, scape with 4-6 distant peduncles each carrying one dense ovoid-cylindric pale head, infl. minutely hairy, style 3-fid, utricle ovoid triquetrous beak linear $\frac{3}{4}$ utricle.

TENASSERIM; Helfer (Kew Distrib. 6111, 2).

Rhizome stout. Leaves 20 in., flat, sub 3-nerved. Scape 10-14 in.; bracts 2-3 by $\frac{1}{2}$ in., sublancoolate; peduncles exert, 4-1 in., minutely hairy. Spikes $\frac{1}{2}$ – $\frac{1}{2}$ in., oblong or (fruiting) ovoid, 4-1-nutted, ferruginous. Fem. glumes ovate, bristle exceeding beak of utricle. Utricle $\frac{1}{2}$ in. and upwards, pyramidal at both ends, slenderly many-nerved, minutely hairy; beak slender, mouth very small, base minutely bulbous to hold slightly bulbous style-base.—An unmistakable species.

42. **C. (?) pandanophylla**, C. B. Clarke; leaves long broad, spikes in numerous fascicles on branches of scape female at base male at top, glumes elliptic obtuse minutely scabrous-hairy long cuspidate. Scleria pandanophylla, Kurz ms.

PEGU; Yomah, Kurz.

Very stout. Rhizome oblique, woody. Leaves subradical many, 1-2 ft. by 1-1 $\frac{1}{2}$ in., flat, striated, glabrous, as though petioled, petiole dilated at base. Scape stout, 9 in., branches 2-3 in., minutely hairy. Spikes $\frac{1}{2}$ – $\frac{1}{2}$ by $\frac{1}{2}$ in.; bracteoles $\frac{1}{2}$ in. setaceous. Glumes closely imbricated on all sides, chestnut-coldr. with narrow white margin.—Very young; at Calcutta where the material is little more advanced, the minute "flowers" in the lower axils of a spike appeared utricular; but they might represent the youngest stage of a Mapanioid inflorescence; the leaves are altogether like those of *Mupania*.

** Spikes short, very numerous (not scapose).

43. **C. indica**, Linn. Mant. 574; leaves subbasal very long, infl. elongate, of distant peduncled pyramidal compound panicles, young spikes $\frac{1}{2}$ – $\frac{3}{4}$ in. linear pale long-bracteoid, glumes aristate, style 3-fid, utricle subglobose trigonus many-striate glabrous suddenly contracted into an oblong-linear beak. Boott *Curex*, ii. 87, tt. 250. 252-254; Boeck. in Linnæa, xl. 347 (excl. Wallich n. 3420, not Kunth, or Nees.) C. Moritzi, Steud. in Zoll. Verz. Ind. Archip. ii. 60; Boeck. in Linnæa, xl. 350. C. longiaristata, Boott ms.; Kurz in Journ. Asiat. Soc. Beng. xlv. (pars. 2), 160. C. fissilis, Boott ms.

EASTERN PENINSULA; from SIKKIM TERAI (Dulkajhar) C. B. Clarke, & CACHAR,

Thomson, to SELANGOR, *Kunstler*. NICOBARS; *Jelinek*.—DISTRIB. Cochinchina, Java.

Glabrous, except secondary panicle-branches. *Rhizome* coarse; woody, with harsh black bristles* (remains of sheaths). *Stems* 2-2½ ft. *Leaves* numerous, 2-3 ft. by ½ in., coarse, margins scabrous, nerves very numerous strong, 2 lateral prominent on upper face. *Infl.* 18 in.; lower peduncles often 5 in. exsert; bracts usually as long as infl: *Spikes* (young) ½ in. diam., distant, in fruit divaricate, pale brown with about 6 divaricate utricles. *Utricle* fuscous green, obscurely inflated, 20-30-nerved; beak oblique, sometimes sparsely setose, ½-¾ utricule, mouth small oblique scarcely bifid. *Nut* ellipsoid, triconous; style-base somewhat bulbous.—This is usually recognized among this critical group by the linear pale spikes and the frequent conspicuous subulate ¼ in. bracteoles at their base. *C. divaricata*, *Wall. Cat.* 3533 from Saluen River, very young, has been supposed to be *C. indica*, but it wants the characteristic setaceous bracteoles.

Var. ? *β*, *laetebrunnea*; spikes ½ in. fine brown, male glumes scarcely aristate young brown, utricles ripe brown obliquely erect not divaricate, style-base on ripe nut not bulbous. *C. Thwaitesi*, *Boott ms.* (not Hance). *C. bengalensis*, *Thw. Enum.* 355 (not Roxb.). *C. indica* (partly), *Boeck. in Linnæa*, xl. 347; *Boott Carex*, t. 251.—CEYLON; *Thwaites* (C.P. n. 2628). ?MERGUI; *Griffith* (*Kew Distrib.* nn. 6135, 6137, but specimens too young for determination).

Var. *Milnei* (sp.) *Boott ms.*; slenderer with narrower leaves, spikes ¼-½ in. male part short, glumes pale strongly aristate. *Carex*? *Wall. Cat.* 3533.—Pahang, *Ridley* (n. 2143, a.) Borneo, New Caledonia, Polynesia.—Stems 1 foot; leaves ½ in. broad; bracteoles setaceous, less prominent than in *C. indica* type.

44. *C. distracta*, *C. B. Clarke*; leaves sub-basal very long, infl. elongate of distant peduncled pyramidal thin panicles, spikes ¼-½ in. linear-oblong solitary brown slenderly bracteate, fem. glumes truncate aristate, style 3-fid. *C. fissilis*, *Boott ms.* (not *Boott Carex*).

ASSAM; *Herb. Kew.*

Habit and infl. of *C. indica*, *Linn.* Partial panicles compound but lax, spikes mostly ½ in. apart, early divaricate; bracteoles hair-like, ¼ in., inconspicuous. *Utricle* (young) nearly glabrous.—The closest affinity of this plant may not be with *C. indica*, but it is exceedingly unlike *Boott's C. fissilis* from Aucteum, of which the type figured is in *Herb. Boott*.

45. *C. cruciata*, *Wahl. in Kongl. Vetensk. Acad. Stockh.* xxiv. 149; not of *Nees*); leaves very long, infl. elongate of distant peduncled pyramidal compound panicles, spikes ¼ in. linear-oblong ferruginous 3-6-nutted, style 3-fid, utricule ellipsoid trigonous strongly-ribbed suddenly contracted into beak ¼-½ utricule. *C. bengalensis*, *Roxb. Fl. Ind.* iii. 572; *Boott Carex*, ii. 85 partim (t. 243); *C. B. Clarke in Journ. Linn. Soc.* xxv. 82. *C. valida*, *Nees in Wight Contrib.* 123; *Kunth Enum.* ii. 513. *C. indica*, *Munro in Seem. Bot. Voy. Herald* 423; *C. B. Clarke l.c.* xv. 119, in *Obs.* (not of *Linn.*). *C. vacua*, *Boott ms.*; *Boeck. in Linnæa*, xl. 343 (partly). *C. Bruceana*, *Boott ms.* [cf. *Boott Carex*, ii. 85.] *C. condensata*, *Boott ms.* (*Griffith, Kew distrib.* n. 6049, &c.) *C. canaliculata*, *Boott ms.*—*Carex*, *Wall. Cat.* 3400 B.

SIKKIM; alt. 4-6000 ft., *J. D. H.*, &c. BHOTAN; alt. 6000 ft., *Griffith*. KHASIA; alt. 0-5000 ft., frequent. CACHAR; *J. D. H.* PERAK; alt. 3-600 ft.; *King's Collector*.—DISTRIB. China, Madagascar.

Glabrous except the secondary panicle-branches and sometimes utricles. *Rhizome* woody, horizontal. *Stem* 2-3 ft., stout. *Leaves* often as long as stem, ½-¾ in. broad, flat, many-atriate, caudate-acuminate; 2 lateral nerves often manifest; basal sheaths usually shining yellow-brown, rarely much fimbriate into black tough

fibres. Infl. 12–20 in.; lower peduncles often 2–3 in. exsert, bracts usually as long as infl., leaf-like. Spikes in fruit divaricate on the stiff divaricate panicle-branches. Glumes (from middle female flowers) much shorter than utricule, ovate, minutely or not mucronate, 3–1-nerved on back, ferruginous, lineolately marked. Utricle $\frac{1}{10}$ in., ferruginous or brown, prominent in fruiting panicle, scarcely inflated, rarely glandular-dotted, quite smooth or minutely scabrous towards neck; ribs about 12, thick; beak usually sparsely scabrous, with elliptic mouth on one side. Nut fitting pretty closely utricule, ellipsoid, substipitate, pyramidal at top; style-base scarcely dilated.

Var. β *nagporensis*; secondary panicles with suberect branches scarcely pyramidal sometimes very slender, ripe utricule scarcely inflated fuscous-green often with black or red dots in upper half, beak subconic at base $\frac{1}{2}$ – $\frac{2}{3}$ utricule.—Chota Nagpore; alt. 2–4000 ft., common from the Kolhan to the summit of PARASNATH.—A great variety of forms is here included, all undoubtedly one species and no one matching *C. cruciata*, Wahl. typ. One form is large, with the secondary panicles long-peduncled large dense branches in fruit very stout rigid erect; another has very narrow leaves, panicles slender the lower with only 5–8 spikes. There is every gradation between. The utricles are sometimes nearly glabrous, sometimes intensely scabrous with large linear-conic points.

Var. γ *argocarpus*; secondary panicles pyramidal often very dense, ripe utricule glistening white inflated conspicuous. *C. bengalensis*, Boott *Carex*, ii. 85 (*chiefly*) tt. 240–242; Boeck. in *Linnaea*, xl. 346 (*partly*). *C. vacua* and *C. condensata*, Boott *ms.* (*partly*).—Abundant in INDIA, from the E. Nepal, J. D. H., to Khasia and Assam, Tonkin.—A plant collected by Boott on the Brahmapootra bank, having fuscous-green utricles much less conspicuously ribbed, is supposed a plains form of var. *argocarpus*. Most of the glistening-white fruits are fuscous in the herbarium.

46. *C. parvigluma*, C. B. Clarke; leaves very long, stem short, infl. usually of one pyramidal compound panicle, spikes as of *C. cruciata*, style 3-fid, utricule globose trigonous many-striate glabrous suddenly narrowed into a linear beak $\frac{2}{3}$ utricule.

ASSAM; Luckimpore, alt. 1500 ft., C. B. Clarke.

Glabrous, except panicle-branches. Rhizome horizontal, woody. Leaves 2–3 ft. by $\frac{1}{2}$ in. Stem including infl. 5–8 in. Infl. 3 by $1\frac{1}{2}$ in., resembling much a single peduncled panicle of *C. cruciata*; in one example a small nearly-basal panicle is added. Fem. glumes exceedingly small, elliptic, aristate. Utricle not inflated, rather larger, and nerves 15–18, slenderer than in *C. cruciata*, to which it is nearly allied, but differs by the short stem, and very small glumes.

47. *C. condensata*, Nees in *Wight Contrib.* 123 (Royle, n. 83 *only*, not of Kunth); leaves very long, infl. elongate of distant peduncled oblong panicles, spikes $\frac{1}{4}$ – $\frac{3}{8}$ in. clustered ferruginous 3–6-nutted, style 3-fid, utricule narrow-ellipsoid trigonous irregularly ribbed not inflated, beak $\frac{1}{3}$ length of utricule 2-fid. Boott *Carex*, ii. 86, tt. 247, 248; Duthie in *E. T. Atkinson Gaz.* x. 616. *C. bengalensis*, Boeck. in *Linnaea* xl. 347 (*chiefly*). *C. indica*, var. *condensata*, Strachey *Cat. Pl. Kumaon*, 73. *C. indica*, Nees in *Wight Contrib.* p. 123 (Royle n. 85).—*Carex*, Wall. *Cat.* 3400 A.

SIND; Pinwill. HIMALAYA, alt. 1–10,000 ft., common; from Dalhousie to Bhotan. KHASIA HILLS, alt. 4–5000 ft., abundant.

Separated from *C. cruciata* by the less pyramidal partial panicles, and the utricule, which is smaller with linear-oblong shorter beak, less nerved (often nearly nerveless on the plane face), frequently black- or red-dotted in the upper half. The utricule is more or less scabrous-pilose, but sometimes glabrate. The panicle (when dry) is always between cinnamomeous and brown.

48. **C. vesiculosa**, Boott *Carex*, iii. 107, t. 323; infl. irregularly paniced, spikes rarely clustered, style 3-fid, utricle small narrow-ellipsoid trigonous irregularly ribbed not inflated, beak $\frac{1}{2}$ utricle with narrow bifid mouth (otherwise as *C. condensata*). Boeck. in *Linnaea*, xl. 345. *C. diffusa*, Boott ms.—*Carex*, Wall. Cat. 3400 β .

SIKKIM HIMALAYA; alt. 4000 ft., C. B. Clarke. BHOTAN; Griffith. KHASIA HILLS, alt. 4-6000 ft., very common.

Leaves rarely $\frac{1}{4}$ in. broad, usually narrower than in *C. condensata*. Fem. glumes ovate-lanceolate (hardly mucronate) nearly as long as ripe utricle, more enclosing utricle than in preceding species. Beak of utricle longer than in *C. condensata*, more narrowed at top. Infl. (in dried plants) usually rich-brown, sometimes paler, cinnamonaceous.—Hardly separable from *C. condensata*.

Var. β *paniculata*; inflorescence a compound loose rich-brown panicle, utricle $\frac{1}{10}$ in. (larger than in *C. vesiculosa*, Boott type).—Sikkim; alt. 700-2500 ft. (Herb. Griffith), C. B. Clarke.

49. **C. continua**, C. B. Clarke; leaves sub-basal very long narrow, infl. elongate cylindric nearly continuous, spikes numerous solitary fine brown, fem. glume with bristle as long as utricle, style 3-fid, utricle small oblong-ellipsoid trigonous strongly many-nerved hairy narrowed into short deeply bifid beak. *C. Bruceana*, Boott ms. (in small part.)

NEPAL; Wallich. SIKKIM HIMALAYA; alt. 500-1100 ft., plentiful, C. B. Clarke.

Tufted. Rhizome woody, short. Stems 8-16 in. Leaves numerous, much overtopping stems, $\frac{1}{4}$ - $\frac{1}{2}$ in. wide, tough. Infl. 4-8 by $1\frac{1}{2}$ in., scarcely interrupted at base; bracts long, overtopping inflorescence. Spikelets $\frac{1}{2}$ - $\frac{3}{4}$ in., 3-7-nutted, numerous and close together, not clustered as in *C. vesiculosa*. Utricle $\frac{1}{2}$ in., narrow, brown, with 15-20 regular close strong nerves.—The utricle is not unlike that of *C. vesiculosa*, the infl. is different, somewhat resembling small forms of *C. cruciata*, with which latter Boott arranged it.

50. **C. stramentitia**, Boott ms.; Boeck. in *Linnaea*, xl. 351; infl. young pale straw-colrd. ripe dirty-straw-colrd. not brown, style 3-fid, utricle rather large globose-trigonous many-striate glabrous not inflated, beak linear $\frac{1}{3}$ utricle very shortly 2-fid. *C. condensata*, Boott ms. (partly). *C. condensata*, β *flava*, Nees in *Wight Contrib.* 123. *C. Wightiana*, Boott ms. (partly.) *C. filicina*, Boeck. ms in *Herb. Schlagintweit* n. 14702.—*Carex*, Wall. Cat. 3398.

From NEPAL to extreme E. ASSAM, alt. 500-3000 ft.; common in lower SIKKIM, J. D. H., &c. GARO, KHASIA and MIKIR HILLS, on Assam face. CHOTA NAAGPORE; BEHAR; on Parasnath, alt. 4000 ft., C. B. Clarke.

Glabrous except the secondary panicle-branches. Rhizome stout, woody. Leaves 2-3 ft., often $\frac{1}{2}$ - $\frac{3}{4}$ in. broad. Panicle often 12-16 in., linear-oblong; partial peduncles compound, lower distant; spikes fascicled, resembling those of *C. condensata*. Utricle $\frac{1}{2}$ in. and upwards, rather acute, trigonous, fuscous green, very suddenly narrowed into beak; nerves 15-20, slender but well-marked.—From its habit, this plant has been mixed with *C. condensata*, from which its large utricle entirely separates it. It is really very near *C. indica*, Linn., and closely resembles it in the utricle; but the spikelets are shorter, whiter, and the characteristic conspicuous setaceous bracteoles of *C. indica* are wanting.

51. **C. filicina**, Nees in *Wight Contrib.* 123; leaves very long, infl. elongate of distant pyramidal compound panicles, spikes small often very many on slender branches not congested, female glumes small not (or scarcely) mucronate, style 3-fid, utricle small narrow ellipsoid or

ovoid definitely nerved glabrous (very rarely thinly minutely setulose) beak linear about as long as utricule [but see vars. β , γ .] *Kunth Enum.* ii. 510; *Boott Carex*, iii. 105 (vars. α and γ) tt. 311, 312; *Boeck. in Linnæa*, xl. 352; (*J. B. Clarke in Journ. Linn. Soc.* v. 82. *C. meiogyna*, *Nees in Wight Contrib.* 123, var. β (*Wight n.* 1915, b.) *C. cruciata*, *Thw. Enum.* 355 (partly.) *C. nilagirica*, *Hochst.*; *Steud. Syn. Cyp.* p. 207.

Throughout the KHASIA and NAGA HILLS, alt. 1500–6000 ft.; NILGHIRI and PULNEY HILLS; alt. 4–7000 ft. CEYLON; *Thwaites* (*C. P.* 820, partly), &c.—DISTRIB. China, Java.

Glabrous, except the minutely hairy panicle branches. *Rhizome* very woody, short (no long stolons). *Stems* 1–3 ft. *Leaves* often as long as stems, and in *Nees'* type rather broad (often $\frac{1}{2}$ in. and more) flat, thin. *Panicle* usually more than $\frac{1}{2}$ stem; partial panicles often very dense; branches much slenderer than in *C. cruciata* or *condensata*. *Fem. glumes* commonly small, ovate, as long as utricule (without beak), sometimes elliptic-lanceolate, glabrous or minutely hairy, chestnut in S. Indian form, often paler or ferruginous in the Khasian. *Utricle* $\frac{1}{10}$ in., trigonous, fitting the black nut very closely, about 15-nerved, tapering or suddenly narrowed at top; beak oblique, curved, subrecurved or straight, more or less scabrous-hairy, mouth very small, shortly bifid.—Here are included the *C. filicina*, α , of *Nees* and *Boott*, and the Khasia var. γ *pallida* of *Boott* which has usually (not always) paler glumes. The utricles in the Khasia plant are often shorter and more ovoid than in the S. Indian.

Var. β *meiogyna*, *Strachey Cat. Pl. Kumaon* 73; leaves often narrower, beak shorter from $\frac{2}{3}$ to $\frac{1}{2}$ utricule. *Duthie in T. E. Atkins. Gaz.* x. 616; *Boott Carex* iii. tt. 313–316. *C. meiogyna* (sp.) *Nees in Wight Contrib.* p. 123 (only *Royle n.* 82). *Cyperus caricinus*, *Don Prodr.* 39.—From N.-W. Himalaya to Bhutan, alt. 3–9000 ft., very common.—Considered here as a stouter form of this (as by *Boott* dubiously and *Boeckeler*) with the same distribution is *C. cruciata*, *Nees in Wight Contrib.* 123 (α only); *Strachey Cat. Pl. Kumaon*, 73; *Boott Carex* ii. 319, 320; *Duthie in T. E. Atkins. Gaz.* x. 616, also marked by *Boott* = *C. ramosa*, *Schk.* (a *Mascarene* sp.) which it is near; but it is nearer the true *C. cruciata* above, from which it differs in the slenderer panicle-branches and spikes.

Var. γ *minor*, *Boott Carex*, iii. 10; tt. 317, 318; leaves very narrow, spikes small pale densely clustered, glumes ferruginous, utricule very small, beak hardly $\frac{1}{2}$ utricule.—N. Sikkim; alt. 7500–10,000 ft., *J. D. H.*, &c.—A very similar plant is found in Khasia, alt. 6000 ft., but with the beak of utricule much longer; it must be a var. of *C. filicina*, *Nees*.

Var. ? δ *microgyna*; leaves very narrow, spikes very slender, glumes very small ovate obtuse dark brown, utricule very small fuscous, beak hardly $\frac{1}{2}$ utricule.—*Carex*, *Wall. Cat.* 3399. Kurg and Ceylon. Chittagong; Arracan and Ava.

52. **C. plebeia**, *C. B. Clarke*; leaves narrow, partial panicles pyramidal slender, spikes brown, fem. glumes ovate acute scarcely mucronate, style 3-fid, utricule (for the plant rather large) narrow ellipsoid acutely trigonous strongly many-nerved hairy fuscous-brown, beak scarcely $\frac{1}{4}$ length of utricule.

CHOTA NAGPORE; alt. 1500–2000 ft., throughout the province, *C. B. Clarke*.

This may be esteemed another var. of *C. filicina*, *Nees*. It was in cultivation in 1879 in the Calcutta Bot. Garden under the traditional name of *C. bengalensis*, *Roxb.* It is the only *Carex* that *Roxburgh* would know at his old Samulcottah station, and the only species convenient for introduction at Calcutta. But *Roxburgh* describes his *C. bengalensis* as having come from Sylhet; and it is probable that *Roxburgh* would not have differentiated a low-level Khasia plant of *C. cruciata*, *Wahl.* from *C. plebeia*. I have therefore thought it more convenient to reduce *C. bengalensis*, *Roxb.* to *C. cruciata*, than to introduce a great change in the names of this critical group.

53. **C. leptocarpus**, *C. B. Clarke*; leaves subbasal very long, infl. elongate, partial panicles distant long-peduncled pyramidal compound thin, spikes $\frac{1}{2}$ in. distant 3-6-nutted, style 3-fid, utricle very distant ellipsoid tapering-lanceolate much recurved strongly-nerved glabrous greenish, beak linear conic $\frac{2}{3}$ utricle.

MUNEYPOOR; *Watt* (n. 6728.)

Glabrous (panicle branches minutely scabrous hairy). *Stems* 2-3 ft., stout. *Leaves* as long as stem, $\frac{1}{3}$ - $\frac{1}{2}$ in. broad, harsh, two lateral nerves conspicuous. *Infl.* 1- $1\frac{1}{2}$ foot; lowest peduncle exsert, 6 in.; partial panicles 3 by 2 $\frac{3}{4}$ in.; bracteoles $\frac{1}{4}$ in., filiform. Young *spikelets* linear, pale-brown; ripe spikelets rather wide from the strongly divaricate utricles. *Fem. glumes* elliptic-lanceolate, mostly bristle-pointed. *Utricles* $\frac{1}{10}$ - $\frac{1}{12}$ in. apart, $\frac{1}{12}$ - $\frac{1}{10}$ in. long, slender (not well ripe).—From the remote utricles this species does not resemble any of the other allies of *C. cruciata*, *Wahl.*

54. **C. mercarensis**, *Hochst. ms.*; *Steud. Syn. Cyp.* 194; partial panicles oblong or scarcely pyramidal, fem. glumes aristate ferruginous (otherwise as *C. filicina*). *C. cruciata*, var. β *Nees in Wight Contrib.* 124. *C. amœna*, *Boott Carex*, iii. 106, t. 321; *Boeck. in Linnæa*, xl. 354. *C. ramosa*, *Boott Carex*, iii. 105, t. 322 (*excl. Maurit. pl., not Schkuhr*). *C. Lindleyana*, *Herb. Ind. Or. H. f. & T. (partly)*. *C. glaucina*, *Boeck. in Linnæa*, xl. 353 *excl. Hohen. n. 629 (which Boeckeler never saw)*.

NILGHIRI and PULNEY Mts.; frequent, from COURTALLUM, *Wight*, to Ooty, alt. 8000 ft., *C. B. Clarke*.

A nearly glabrous form, branches of panicle only minutely scabrous on angles. *Utricle* nearly $\frac{1}{4}$ in., ellipsoid-trigonal, 15-nerved, glabrous, pale, tapering into oblique linear beak about as long as utricle.—Hardly differs from the Madras *C. filicina* growing with it, but by the pale ferruginous-green colour, the rather larger utricles, and (especially) the definitely aristate female glumes. *C. ramosa*, *Schkuhr*, a Mauritius plant, with which *Boott* combined it, has hairy utricles and distant spikelets laxly paniced.

Var. β *major*, *Steud. Syn. Cyp.* p. 194; spikelets $\frac{1}{2}$ - $\frac{3}{4}$ in. linear with 6-10 distant scabrous-hairy utricles. *C. ramosa*, *Schk.?* *Boott ms.*—Canara, *Hohenacker* (n. 629); *Anamallays, Beddome*.—This has been greatly confused, having, on account of its number (*Hohenacker*, n. 629) been taken in *Herb. Kew* for *C. glaucina*, *Boeck.*, and “written up” accordingly. But *Boeckeler's C. glaucina* is founded on *Wight*, n. 1293 = *Boott*, tab. 322, which is *not* exactly = *Hohenacker* n. 629; but here is treated as a form of it.

55. **C. raphidocarpa**, *Nees in Wight Contrib.* 122; leaves minutely hairy, panicle-branches densely hispid (otherwise as *C. mercarensis*). *Kunth Enum.* ii. 512; *Boott Carex*, ii. 85, t. 244; *Boeck. in Linnæa*, xl. 363 (*raphiocarpa*).

PULNEY HILLS, *Wight*, n. 1911 (*one collection*).

A rather stouter plant than *C. mercarensis*, with rather larger fruits, that might be esteemed merely a larger hairy form of it.

56. **C. ceylanica**, *Boeck. in Linnæa*, xl. 341; glabrous (panicle-branches minutely scabrous), leaves rather short not caudate, utricle rather large shining brown (otherwise as *C. filicina*, *Nees*). *C. cruciata*, *Thu Enum.* 355 (*partly*).

CEYLON; alt. 6000 ft., *Thwaites* (C.P. 820 *partly*).

Leaves not exceeding 5 in., tip sword-shaped (very unlike all the *C. filicina* group). *Fem. glumes* brown-red, ovate-lanceolate, not aristate. *Utricles* $\frac{1}{4}$ in., ellipsoid-trigonal, 15-nerved, minutely hairy in upper part, tapering into an oblique

linear beak $\frac{3}{4}$ utricle.—Boott never named this, but left it in his *C. filicina* packet. Munro notes that it looks like *C. Lindleyana*.

57. **C. Wightiana**, *Nees in Wight Contrib.* 122; leaves subbasal very long, infl. elongate, lower panicles distant peduncled oblong often simply spicate, spikes $\frac{1}{2}$ in. often 6–8-nutted pale suberect in fruit, bracteoles inconspicuous, style 3-fid, utricle ellipsoid-trigonus many-nerved greenish scabrous-hairy, beak linear $\frac{3}{4}$ utricle. *Kunth Enum.* ii. 512; *Boott Carex*, i. 11, t. 30 (*excl. Khasia plant*); *Boeck. in Linnæa*, xl. 366. *C. meiogyna*. *Nees l. c.* 123 (*all the Madras material, Wight, n. 1915, &c.*). *C. indica*, *Nees ms. in Herb. Wight n. 1914*, and in *Wight Contrib.* 123.—*Carex*, *Wall. Cat.* 3400, *C. (partly)*.

SOUTH MADRAS; Courtallum, *Wight*.

Glabrous, except panicle-branches and utricles. *Rhizome* stout, horizontal. *Stems* 2–2½ ft. *Leaves* often as long as stem, $\frac{1}{2}$ – $\frac{1}{3}$ in. broad. *Infl.* often 12 by 3 in.; lower panicles in fruit 2 by $\frac{1}{2}$ in. *Young spikes* linear, green, somewhat ferruginous. *Fem. glumes* ovate, acute, pale, often shortly aristate. *Utricles* $\frac{1}{2}$ – $\frac{1}{3}$ in., nerves 20 or more; beak nearly straight, mouth slender 2-fid.—A very homogeneous series of specimens, apparently all from one neighbourhood, though *Nees* described it under three names.

58. **C. ecostata**, *C. B. Clarke*; leaves narrow, infl. elongate dark brown, lowest panicle distant slenderly peduncled narrow oblong (nearly reduced to a spike), fem. glumes ovate-triangular not mucronate, style 3-fid, utricle ellipsoid trigonus nearly nerveless glabrous, beak slightly oblique $\frac{2}{3}$ utricle.

EAST ASSAM; Jakpho Summit, alt. 9900 ft., *C. B. Clarke*.

Closely resembles in general appearance and infl. the Indian *C. Wightiana*, but the utricles are almost nerveless; they usually have one face quite nerveless, the other faces with 1 or 2 irregularly-placed thin nerves on each.

59. **C. repanda**, *C. B. Clarke*; panicles very distant small pyramidal, spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. 4-nutted pale divaricate in fruit, bracteoles long conspicuous, utricle narrow-ellipsoid many-nerved pale glabrous, beak linear curved $\frac{1}{2}$ – $\frac{3}{4}$ utricle (otherwise as *C. Wightiana*). *C. Wightiana*, *Boott Carex*, i. 11 (var. *perigyniis glabris*, *Boott, ms.* i.e. the Khasian plant).

KHASIA HILLS, alt. 3000–5500 ft., *J. D. H., C. B. Clarke*.

60. **C. perakensis**, *C. B. Clarke*; leaves subbasal long narrow, infl. elongate, partial panicles linear-oblong erect, spikes oblong 1–4-nutted white, style 3-fid, utricle ellipsoid trigonus many-nerved hairy, beak straight linear about $\frac{1}{2}$ utricle.

PERAK; *Wray*.

Glabrous (panicle branches minutely scabrous scarcely hairy). *Rhizome* stout, woody. *Stem* 2 ft. *Leaves* rather longer than stem, $\frac{1}{2}$ in. broad, tough, sub-3-nerved. *Infl.* 8 by 1½ in.; lowest peduncle 3 in. distant; bracts far overtopping inflorescence. Partial panicles with erect connivent branches in fruit, the dark-red styles prominent over the white glumes and white-green utricles. *Fem. glumes* as long as utricle, exclusive of short bristle. *Utricle* (with beak) nearly $\frac{1}{2}$ in., beak shortly bifid.

61. **C. sanguinea**, *Boott in Proc. Linn. Soc.* i. 285, & *Trans. Linn. Soc.* xx. 137, & *Carex*, ix. 157, t. 515; leaves shorter than infl. narrow, infl. elongate, partial panicles oblong with irregularly capitate dark-red spikes, style 3-fid, utricle narrow ellipsoid trigonus narrowed at

both ends minutely scabrous hairy, beak scarcely $\frac{1}{2}$ utricle. *Boeck. in Linnæa*, xl. 374; *Boiss. Fl. Orient.* v. 406.

W. HIMALAYA; alt. 3000-6000 ft.; Kunaor, *Royle*; Hazara, *Stewart*; Murree, *Fleming*, *Trotter*.

Glabrous (panicle branches minutely scabrous, hardly hairy). *Rhizome* woody, branched, with several approximate stems. *Stems* including infl. 8-18 in. *Leaves* numerous, scarcely $\frac{1}{2}$ in. broad. *Infl.* often occupying $\frac{1}{2}$ the plant; lower peduncles exsert; bracts finely caudate, shorter or longer than inflorescence. *Spikes* $\frac{1}{2}$ - $\frac{1}{3}$ in., 4-8-nutted, comose from the long red style-branches. *Fem. glumes* ovate-triangular, not aristate, much shorter than utricle. *Utricle* $\frac{1}{8}$ - $\frac{1}{12}$ in., narrowed at both ends, red-marked, obscurely nerved. *Nut* stipitate, narrowed into the linear persistent style-base.—The exsert part of style-branches is longer than utricle, and longer than as shown in *Boott's* picture. This species does not seem very closely allied to the *S. India* *C. Lindleyana*, &c.; it should perhaps stand next *C. vesiculosa*, *Boott*.

62. *C. rhizomatosa*, *Steud. in Zoll. Verz. Ind. Archip.* ii. (1854), 60 and *Syn. Cyp.* 206; leaves shorter than infl. narrow, infl. linear, peduncles distant slender nearly simple, spikes ovoid 1-4-nutted brown in irregular heads, style 3-fid, utricle broadly ellipsoid trigonous scabrous hairy, beak scarcely $\frac{1}{2}$ utricle 2-fid. *Miq. Fl. Ind. Bat.* iii. 349. *C. Gunningiana*, *Steud. Syn. Cyp.* 206; *Boott Carex*, iii. 107, tt. 324, 325; *Boeck. in Linnæa*, xl. 367; *Vidal Pl. Vasc. Filip.* 286. *C. capitulata*, *Boott ms.*

ASSAM; Gowhatty, *Boott*. KHASIA HILLS; N. face, alt. 2-3000 ft., frequent, *C. B. Clarke*. MUNEYPOOR; *Watt*. PATKOYE MTS.; *Griffith*.—DISTRIB. Tonkin, Java, Philippines.

Glabrous (except utricles). *Rhizome* very tough, covered with black fibres of torn sheaths (it grows where the grass is burnt annually). *Stems* tufted, 6-18 in. *Leaves* usually 3-6 in. by $\frac{1}{2}$ in., not caudate. *Infl.* 6-10 by scarcely $\frac{1}{2}$ in.; upper bracts about as long as infl. *Heads of spikes* 1- $\frac{1}{2}$ in. diam., usually only one on each peduncle, but peduncles often 2 from one sheath. *Fem. glume* ovate-lanceolate, brown, often mucronate; male glumes mucronate. *Utricle* fuscous brown, obscurely 8-15-nerved.

63. *C. Lindleyana*, *Nees in Wight Contrib.* 121; leaves subbasal long narrow, infl. elongate lower peduncles distant, partial panicles condensed oblong brown-green, style 3-fid, utricles oblong-ellipsoid many-nerved glabrous, beak linear straight deeply bifid $\frac{1}{2}$ utricle. *Kunth Enum.* ii. 512; *Boeck. in Linnæa*, xl. 362. *C. thyrsiflora*, *Boott Carex*, i. 12, t. 34. *C. cruciata*, *Thw. Enum.* 355 (partly).

NILGHIRI HILLS; alt. 6-8000 ft., *Wight*, frequent. CEYLON; alt. 5-8000 ft., *Thw.* (C.P. 3161, &c.)

Stems 1-2 $\frac{1}{2}$ ft. *Leaves* $\frac{1}{2}$ in. broad, not overtopping infl., not caudate. *Fem. glumes* ovate, sometimes shortly mucronate, many-nerved. *Utricles* not much differing from those of *C. cruciata*, *Wahl.*, with which *Thwaites* united it. Partial panicles 1 $\frac{1}{2}$ by $\frac{1}{2}$ in., dense, unlike the pale pyramidal partial panicles of *C. cruciata*.

64. *C. leucantha*, *Arnott ex Boott in Proc. Linn. Soc.* i. 257, and in *Trans. Linn. Soc.* xx. 135, and *Carex*, i. 10, t. 28; leaves very long narrow, infl. elongate depauperated, peduncles few distant very short carrying 1 or 2 small whitish heads, style 3-fid, utricles broad-ellipsoid trigonous many-nerved hairy not inflated, beak linear $\frac{2}{3}$ utricle. *Thw. Enum.* 355; *Boeck. in Linnæa*, xl. 369.

SOUTH DECCAN; Courtallum, *Wight*. CEYLON; not rare up to 2000 ft. *Thwaites* (C.P. 2631, &c.).

Stems 1-2 ft., rather slender. *Leaves* overtopping infl., $\frac{1}{2}$ in. broad. *Lower*

peduncles often 6-8 in. distant, exsert 1-2 in.; heads depauperated, $\frac{1}{2}$ in. diam. of 1-6 spikes. *Spikes* $\frac{1}{2}$ in., ovoid (in fruit), 4-8-nutted. *Fem. glumes* ovate, acuminate, cuspidate (cusp not overtopping beak of utricle), nearly glabrous except at top. *Utricle* (with beak) $\frac{1}{2}$ in., nerves 20 not strong; beak rather deeply bifid, very little conic-dilated at base.

65. **C. malaccensis**, *C. B. Clarke*; heads pyramidal rigid $\frac{3}{4}$ in. diam. white, female glumes minutely hairy, utricle strongly-nerved glabrous subinflated narrowed into conico-linear flattened beak scabrous on margins, otherwise as *C. leucantha*.

MALACCA; Langkawi, *Ridley* (n. 1669).

Bracts under terminal head 4 by $\frac{1}{2}$ in., leaf-like, horizontally spreading (in *C. leucantha*, weak suberect very narrow). Beak of utricle curved inwards trigonous compressed with two acute very scabrous margins (in *C. leucantha* nearly terete).—The long narrow leaves and few depauperated remote white heads are very like *C. leucantha*.

66. **C. spicigera**, *Nees in Wight Contrib.* 121; leaves very long narrow, infl. oblong panicle fuscous, lower peduncles 1-2 in. distant, partial panicles oblong interrupted, style 3-fid, utricle ellipsoid trigonous many-nerved hairy, beak oblong scarcely $\frac{1}{4}$ utricle. *Kunth Enum.* ii. 512; *Boott Carex*, i. 10, t. 29; *Thw. Enum.* 355; *Boeck. in Linnæa*, xl. 368.

CEYLON; "Central Province up to 6000 ft.," *Thwaites* (C.P. n. 822), &c.

Stems 1-1 $\frac{1}{2}$ ft. *Leaves* overtopping infl., $\frac{1}{4}$ - $\frac{1}{2}$ in. broad. *Infl.* 3 by 1 in.; partial panicles $\frac{1}{2}$ by $\frac{1}{4}$ in., dense. *Spikes* in fruit ovoid, 4-nutted. *Fem. glumes* ovate, often aristate, shorter (including bristle) than utricle. *Utricle* $\frac{1}{10}$ in., brown-red; beak scarcely notched.

Var. δ *minor*, *Thw.* l.c. 355; very slender, infl. 1 by $\frac{1}{2}$ in. *E. Gardneri*, *Boott ms.*—CEYLON (C.P. n. 824), *Gardner*. *Stems* 8-10 in., almost capillary. *Leaves* scarcely $\frac{1}{8}$ in. broad. Inflorescence reduced to a sessile interrupted spike.

Var. γ *rubella* (sp.) *Boott Carex*, iv. 176, t. 599; infl. a single terminal pyramidal dense head $\frac{3}{4}$ in. diam.—Ceylon (C.P. 2629).

Var. ? δ *rostrata*, *Boeck. in Linnæa*, xl. 369; utricles nearly twice as long narrower evidently beaked nearly smooth, glumes muticous. [Cf. *Thw. Enum.* 355].—CEYLON; *Thw.* (C.P. 2629).—This appears from description scarcely a var. of *C. spicigera*, but I have failed to find it among *Thwaites* C.P. 2629.

*** *Spikes* long-cylindric. Peduncles mostly solitary, sometimes 2, in each sheath (cf. *C. arridens*, n. 78.). [Terminal spike sometimes wholly male in *C. desponsa* and *C. præstans*.]

67. **C. baccans**, *Nees in Wight Contrib.* 122; robust, leaves and bracts long, panicle oblong or linear-oblong, fem. glumes striate nearly throughout their width, style 3-fid, utricle ovoid-trigonous gibbous finally berried, beak short ultimately minute. *Kunth Enum.* ii. 513; *Thw. Enum.* 355; *Boott Carex*, ii. 83, tt. 234-236 and 238, 239; *Boeck. in Linnæa*, xl. 339; *C. B. Clarke in Journ. Linn. Soc.* xxv. 82. *C. curvirostris*, *Kunze Suppl.* 79, t. 20; *Miq. Fl. Ind. Bat.* iii. 350. *C. recurvirostris*, *Steud. in Zoll. Verz. Ind. Archip.* ii. 60, and *Cyp.* 207. *C. dolichophylla*, *Link ms.* (fide *Boeckeler*).

SIKKIM and KHASIA to the NAGA HILLS; alt. 2500-7000 ft. MALABAR GHATS to CEYLON; alt. 3-6000 ft.—DISTRIB. Java, Sumatra, China, Philippines.

Glabrous. *Rhizome* very stout, short, horizontal, with approximate stems. *Stems* often 3 ft. *Leaves* often overtopping inflorescence, $\frac{1}{2}$ in. broad. *Infl.* 12-18

by 3-4 in. (small examples occur); bracts much overtopping infl.; lowest peduncle usually distant, exsert; partial panicle often 2-5 by 1-2 in. Spikes $1\frac{1}{2}$ by $\frac{1}{4}$ in., male portion dark-red when young. *Fem. glumes* ovate or obovate, acute or obtuse, often cuspidate sometimes (even in large examples) mucous. *Utricle* in the fully developed state $\frac{1}{10}$ in. diam., nearly globose, wall thickened more or less succulent, red, nearly glabrous rarely obscurely scabrous-hairy near top; utricles in the half-ripe state usually olivaceous with more prominent recurved beak. *Nut* ellipsoid-trigonal, pyramidal at both ends, black, much narrower than utricles; style-base linear.

Var. ? *β siccifructus*; *fem. glumes* 3-5-nerved close to the keel, ripe utricles ovoid somewhat inflated strongly many-nerved pale scabrous hairy near top, beak straight short bifid. *C. baccans* (an var. au sp. nova?) *Boott Carex*, t. 237.—Khasia; near Cherra, alt. 3500 ft., *J. D. H.*, *C. B. Clarke*.—Appears nearer *C. Myosurus*, &c., than *C. baccans*; the utricles get more or less red occasionally.

68. **C. Myosurus**, *Nees in Wight Contrib.* 122; robust, leaves and bracts long, panicle elongate usually ample, spikes long many tailed by male portion, style 3-fid, utricles oblong attenuated at both ends nerved slightly hairy, beak short slightly notched nearly straight. *Kunth Enum.* ii. 507; *Boott Carex*, ii. 87, tt. 229, 230, 232; *Boeck. in Linnæa*, xl. 334. *C. macrophylla*, *Hochst. ms. ex Steud. Syn. Cyp.* p. 207. *C. æquata*, *Nees ms.*—*Carex*, *Wall. Cat.* 3384 B.

NILGHIRI & PULNEY HILLS; alt. 5-7000 ft., common. Courtallum; *Wight*.

Glabrous except utricles. *Rhizome* stout, short. *Stems* 2-3 ft. *Leaves* often as long as stem, $\frac{1}{4}$ - $\frac{1}{2}$ in. broad, scabrous, caudate. *Panicle* 1 foot, lax (see remarks under var. *β*); branches scabrous, scarcely hairy. *Spikes* 3 by $\frac{1}{8}$ in., many male $1\frac{1}{2}$ in., pale or more rarely deep brown. *Fem. glumes* ovate, often cuspidate, sometimes mucous. *Utricle* exceeds $\frac{1}{2}$ in. in Nilghiri type, pale, much stipitate; nerves 12-15, not strong. *Nut* narrowly ellipsoid, trigonal, stipitate, filling utricles; style-base not dilate.

Var. *β eminens* (sp.), *Nees in Wight Contrib.* 122; utricles shorter broader, beak often rather deeply bifid. *Kunth l. c.* 506. *C. floribunda*, *Boeck. l. c.* 335. *C. Myosurus*, *Nees l. c.* 122 (Himal. pl.). *C. scoparia*, *Wallich, ms. Carex, Wall. Cat.* 3382, 3397, 3384 A.—Throughout Himalaya, alt. 2500-7500 ft., from Kashmir to Bhotan.—Varies greatly in development; spikes sometimes 6 only, in *C. B. Clarke*, n. 24,938 are 210 in the part of panicle preserved. The spikes are usually deep-brown in the Himal. plant). The utricles are always considerably shorter (and usually broader) in var. *β* than in the Nilghiri plant; in *C. eminens*, *Nees*, the common Himal. plant the beak is deeply bifid; in some Sikkim and Bhotan plants (*C. floribunda*, *Boeck.*) the beak is not more notched than in the Nilghiri plant (the utricles is much broader). In *Wallich*, n. 3384, A, the whole of the upper part of the infl. is male.

Var. *γ ratongensis*; panicle narrow 10-15-spiked, *fem. glumes* mucous deep brown, utricles very small oblong ellipsoid, beak very short lightly notched.—“*C. Myosurus* ? *potius quam C. baccans*,” *Boott ms.*—Upper Sikkim, alt. 6-8000 ft., Ratong Valley, *J. D. H.*—Is taken here as an extreme high level state of *C. Myosurus*, *Nees* (forma *floribunda* (sp.) *Boeck.*).

69. **C. præstans**, *C. B. Clarke*; tall, very long, lower peduncles very distant solitary long, spikes long many of the upper wholly male or with 1 or 2 *fem.* only at base, *fem. glumes* elliptic-lanceolate scarcely mucronate pale overtopping utricles, style 3-fid, utricles ovoid trigonal minutely hairy at top, beak conic-linear $\frac{1}{3}$ the length of utricles. *C. Myosurus*, *Duthie ms.*

KUMAON; alt. 7-8000 ft., *Duthie* (n. 6118).

Glabrous. *Stem* 3 ft. *Leaves* and *bracts* as in *C. Myosurus*. *Infl.* 2 ft. long;

lowest peduncle exsert 5 in. *Partial panicles* 4 by $1\frac{1}{2}$, appearing as if simple with distant whorls of sessile spikes. *Spikes* $1\frac{1}{2}$ in., throughout the plant many male, many with only one basal fem. *Utricle* with many, not prominent, nerves.—This may be a sexual (nearly male) state of *C. Myosurus*, as Duthie regarded it.

70. *C. spiculata*, Boott in *Proc. Linn. Soc.* i. 288, and in *Trans. Linn. Soc.* xx. 139 and *Carex*, i. 3, t. 7; leaves narrow, spikes denser with obliquely ascending fruits, panicle more rigid (otherwise as *C. Myosurus*, var. β).

SIKKIM; alt. 1-2000 ft., common. KHASIA HILLS, alt. 250-6000 ft., very common.

Utricle ellipsoid, trigonous; lanceolate upwards; beak as though short cylindric, the strong margins of the utricle carried up the beak as winged margins.—Boott says separable from *C. Myosurus* by the glabrous utricles, but in Boott's own material the utricle is more or less hairy—just as in *C. Myosurus*.

Var. *nobilis* (sp.) Boott *Carex*, i. 4, tt. 9, 10, 11; infl. large compound, ripe utricle more spreading their short beaks somewhat recurved. *C. pandata*, Boott *ms.*—Jaintea Hills; alt. 3500-5000 ft., J. D. H., C. B. Clarke.—This local form is very striking, and is named *C. nobilis* by Boott in *Herb. Hook.*; but the *C. nobilis* Boott, tt. 9, 10, 11, appear large forms of *C. spiculata*, leading on to the Jaintea plant.

71. *C. composita*, Boott *Carex*, i. 3, t. 8; leaves long narrow, panicle long narrow, spikes in fruit dense, fem. glumes brown-margined cuspidate often overtopping beak of fruit, style 3-fid, utricle small obovoid pyramidal-compressed at top hairy nearly or quite nerveless beak very small. Boeck. in *Linnæa*, xl. 328; C. B. Clarke in *Journ. Linn. Soc.* xxv. 82. *C. Myosurus*, Boott *ms.* (partly).

From BHOTAN, Griffith, to MERGUI, Griffith, KHASIA HILLS; alt. 3-6000 ft., J. D. H., &c., and east to NAGA HILLS.

Glabrous, except utricles. *Rhizome* creeping; stolons often 3-6 in. by $\frac{1}{2}$ in. diam. *Stems* 2 ft. *Leaves* usually (with bracts) overtopping stems, $\frac{1}{2}$ in. broad, caudate-setaceous rough-tipped. *Infl.* 6-12 in., narrow, 6-15-spiked; lowest peduncle usually short 4-1-spiked, occasionally more distant long filiform. *Spikes* usually $1-1\frac{1}{2}$ in., sometimes nearly 3 in., and much broader with very long fem. glumes. *Utricle* short-stalked, green then stramineous.—Primarily distinguishable from *C. Myosurus* and *C. spiculata* by the nerveless utricles.

72. *C. desponsa*, Boott *Carex*, ii. 82, t. 228; leaves long narrow, peduncles 3-7 very distant 1-spiked, terminal spike with fem. at base or wholly male, fem. glume small ovate cuspidate, style 3-fid, utricle large ellipsoid trigonous nervose glabrous, beak linear $\frac{2}{3}$ utricle.

KHASIA HILLS, alt. 5-6000 ft., Moflong and Mairung Woods, J. D. H.

Glabrous. *Rhizome* woody, horizontal. *Stems* 12-20 in. *Leaves* numerous overtopping stem, $\frac{1}{2}$ - $\frac{3}{4}$ in. broad; lower spikes 3-6 in. apart, long-peduncled. *Spikes* $1\frac{1}{2}$ by $\frac{1}{2}$ in., lax, ferruginous green. *Utricle* (including beak) $\frac{1}{2}$ in., ferruginous or brown-red, beak sparsely scabrous with 2 small teeth.—Boott likens this to *C. longipes*, Don in general habit. It does not seem really allied to *C. Myosurus*, and the terminal spike being not rarely wholly male, its true affinity is perhaps not with the Sect. *Indicæ*.

73. *C. scitula*, Boott *Carex*, iv. (1867), 177, t. 600; stems slender tufted, leaves overtopping infl. linear, spikes 3-7 oblong cylindric dense comose from brown-red stigmas, fem. glumes lanceolate acuminate, style

3-fid, utricles very small ellipsoid trigonous nerveless minutely hairy, beak short conic. *Boeck. in Linnæa*, xl. 385.

MISHMEE HILLS; Paen Panee (Khosha's), *Griffith (Kew Distrib. 6037)*.

Glabrous. *Stolons* long, slender, becoming woody. *Stems* 6-10 in. *Leaves* $\frac{1}{2}$ in. broad. *Spikes* $\frac{3}{4}$ by $\frac{1}{2}$ in. *Fem. glumes* $\frac{1}{2}$ in., brown-red. *Utricle* nearly white, narrowed into beak, beak included much shorter than glume. *Style-branches* 3, exsert part much longer than utricles, persistent.

*** *Spikes* long cylindric. *Peduncles* often several from one sheath.

74. **C. insignis**, *Boott Carex*, i. 5, t. 14; cauline leaves many shorter than infl. narrow, their sheaths concealing nearly whole stem, infl. long narrow, peduncles several or many from each sheath, spikes long linear lax dark green, style 3-fid, utricles ellipsoid trigonous nerveless nearly glabrous, beak conic-linear $\frac{2}{3}$ utricles. *Boeck. in Linnæa*, xl. 337.

From EAST NEPAL, *J. D. H.*, eastwards to ASSAM and the KHASIA HILLS, alt. 3500-7000 ft., common.

Glabrous. *Stolons* stout, elongate, covered by torn scales. *Stems* 2-3 ft., lowest 6-12 in. covered by nearly leafless red sheaths. *Leaves* 6-12 by $\frac{1}{2}$ - $\frac{3}{4}$ in., flat. *Infl.* often 12 by 2 in.; lower bracts similar to the leaves, not overtopping infl. *Spikes* $1\frac{1}{2}$ -2 in. by $\frac{1}{2}$ - $\frac{3}{4}$ in., mostly shortly male at top, terminal one sometimes wholly male. *Fem. glumes* ovate, obtuse, cuspidate, shorter (cusp included) than utricles. *Utricles* (beak included) $\frac{1}{2}$ in., sometimes hispid-scarious on angles and margins of beak, otherwise glabrous. *Nut* closely filling utricles; style-base linear.

75. **C. polycephala**, *Boott Carex*, i. 4, t. 12; leaves long, infl. elongate oblong dense, peduncles fascicled, spikes large oblong-cylindric dense straw-colored, fem. glumes elliptic acute, style 3-fid, utricles ellipsoid trigonous few-nerved glabrous, beak linear as long as utricles. *Boeck. in Linnæa*, xl. 333.

SIKKIM HIMALAYA, alt. 7-10,000 ft., *J. D. H.*, &c.

Glabrous. *Rhizome* stout; *stolons* elongate. *Stems* 12-18 in., robust. *Leaves* exceeding infl. $\frac{1}{2}$ - $\frac{3}{4}$ in. broad. *Infl.* 10 by 2-3 in. *Spikes* numerous, solitary (many long-pedicelled), $\frac{3}{4}$ by $\frac{1}{2}$ - $\frac{3}{4}$ in.; terminal spike (always as seen) female at base. *Fem. glumes* acute-triangular, scarcely mucronate, 1-nerved, bright straw-colored. *Utricles* $\frac{1}{2}$ in. (or rather more), green finally black, not inflated, nerves 6-8, suddenly narrowed at top; beak smooth, shortly 2-fid. *Nut* ellipsoid, trigonous, pyramidal at either end, dark-brown; style-base not dilated.

76. **C. Walkeri**, *Arnott ms. ex Boott in Proc. Linn. Soc.* i. 257 and in *Trans. Linn. Soc.* xx. 129, and *Carex*, i. 2, t. 4; leaves nearly as long as stem, infl. elongate narrow interrupted, peduncles fascicled, spikes long linear, fem. glumes oblong-obovate cuspidate, style 3-fid, utricles oblong trigonous attenuate at either end glabrous, beak conic-linear length of utricles. *Thw. Enum.* 335; *Boeck. in Linnæa*, xl. 333.

NILGHIRI HILLS; alt. 5-7500 ft., frequent, *C. B. Clarke*. CEYLON; alt. 7000 ft., *Thwaites (C. P. n. 2751)*, &c.—DISTRIBUTION. JAVA.

Glabrous. *Stems* 2-3 ft. *Leaves* often $\frac{3}{4}$ stem, $\frac{1}{2}$ - $\frac{3}{4}$ in. wide. *Infl.* 20 by 2-3 in.; lowest bract often not reaching halfway to its top. *Spikes* 2 by $\frac{1}{2}$ in., dark-brown in Ceylon examples, pale ferruginous-green in Nilgiri; terminal and upper spikes often wholly male or with only 1 or 2 utricles at base. *Fem. glumes*, cusp included, shorter than utricles. *Utricles* $\frac{1}{2}$ - $\frac{3}{4}$ in., scarious on 3 angles and on beak, attenuated into beak, nerves not prominent. *Nut* oblong-ellipsoid trigonous.

77. **C. decora**, *Boott Carex*, i. 5, t. 15; stout, leaves and bracts long, infl. long narrow, peduncles often clustered, spikes large linear

purple-red, several terminal frequently wholly male, fem. glumes ovate obtuse or retuse, style 3-fid, utricles long narrow-ellipsoid trigonous nerveless glabrous, beak $\frac{1}{2}$ utricule. *Boeck. in Linnæa*, xl. 338.

SIKKIM HIMALAYA; alt. 9–12,000 ft., *J. D. H.*, &c., abundant.

Glabrous. *Rhizome* woody; lateral shoots strong. *Stems* 2–3 ft. *Leaves* often overtopping infl., $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, coarse. *Infl.* 18 by 3 in.; lower peduncles sometimes 8 in. exsert, 6 in. long, 5-spiked. Terminal *spike* with a few fem. at base, or sometimes 6–10 top spikes wholly male $1\frac{1}{2}$ by $\frac{1}{10}$ in. *Fem. glumes* $\frac{1}{8}$ – $\frac{1}{4}$ in., dark-red, scarious-edged, lower often distant. *Style* long, base conic, branches 3 long. *Utricles* $\frac{1}{8}$ – $\frac{1}{4}$ in., attenuate at both ends, greenish, not inflated; beak conic-linear, often minutely scabrous, teeth 2 long linear.—Varies greatly in size of glumes and utricles; a large form with utricles more than $\frac{1}{4}$ in. long and clusters of wholly male spikes has been taken for a distinct species.

78. **C. arridens**, *C. B. Clarke*; robust, leaves overtopping stem, infl. elongate, peduncles 2–1 from each sheath bearing many spikes, spikes linear-lanceolate dark-red with few fem. at base or wholly male, style 3-fid, utricule ovoid trigonous nerveless hairy, beak linear hairy longer than utricule.

PRGU; Nattoung, alt. 4000 ft., *Kurz*. PERAK; alt. 3000 ft., *Kunstler*.

Glabrous, except utricles. *Rhizome* oblique, woody, stout. *Stem* 18 in. *Leaves* (subbasal) numerous, $\frac{1}{2}$ in. broad, coarse, strongly striate. *Infl.* 12 by 2 in.; lower peduncles distant, exsert 2 in., stout, erect. *Spikes* $\frac{1}{2}$ – $\frac{3}{4}$ in., rather stout. *Male glumes* oblong-obovate, obtuse, scarcely mucronate, red-brown with scarious margin. *Fem. glumes* ovate, acuminate, scarcely mucronate, much shorter than utricles (beak included). *Utricle* covered with golden hairs in upper part suddenly narrowed into beak, beak slender 2-fid into two large lips. *Nut* ellipsoid, trigonous, pyramidal at both ends, dark-brown, style-base linear.—*C. diraricata*, Wall. Cat. 3533 from Saluen is very young; it may be this.

79. **C. Daltoni**, *Boott Carex*, i. 5, t. 16; large, leaves long, infl. long compound peduncles clustered, spikes linear, fem. glumes cuspidate, style 3-fid, utricule small narrow ellipsoid trigonous nerveless hairy, beak oblong-linear $\frac{2}{3}$ the length of utricule. *Boeck. in Linnæa*, xl. 331. *C. crassipes*, *Boeck. l. c.* 329.

UPPER SIKKIM; alt. 7–10,000 ft., *J. D. H.*, *Pantling*. BHOTAN; *Griffith*.

Glabrous. *No stolons* seen. *Stems* 2–2 $\frac{1}{2}$ ft., stout; lower sheaths horny, yellow or chestnut-colour, grooved. *Leaves* many, overtopping the stem, $\frac{1}{2}$ in. broad, stout, striate. *Infl.* 18 in. by 6; peduncles in lowest sheath sometimes 6–20, 7 in. long, slender. *Spikes* 2 by $\frac{1}{2}$ in., chestnut or pale-yellow or intermediate; terminal spikes often nearly (sometimes wholly) male. *Fem. glumes* ovate, subobtusely, cusp reaching to top of beak of utricule. *Utricles* becoming chestnut-red almost shining when fully ripe, narrowed into beak (yet nut is obovoid rather obtuse); beak not hairy, scabrid on the bifid teeth.

80. **C. inæqualis**, *Boott ms.*; medium sized, leaves long very narrow, infl. long compound, peduncles clustered, spikes linear, glumes shortly cuspidate, style 3-fid, utricles small narrow ellipsoid trigonous nerveless hairy, beak oblong-linear $\frac{2}{3}$ utricule.

KUMAON, alt. 8–9000 ft., *Duthie*. SIKKIM HIMALAYA; Lachen, 9–11,000 ft., *J. D. H.*

Stems slender, 12–15 in. *Leaves* as long as stem, hardly $\frac{1}{2}$ in. broad. *Infl.* 7 by 1 in. *Spikes* $\frac{3}{4}$ by $\frac{1}{2}$ in., chestnut or pale; terminal spike sometimes wholly male.— Closely allied to *C. Daltoni*; the utricles turn shining chestnut-red when fully ripe, and (what is unusual in *Carex*) though the utricule is attenuated into the beak, the

nut is obtuse at top.—The difference in size, stoutness, and breadth of leaves between this and *C. Daltoni* is great.

81. **C. Winterbottomi**, *C. B. Clarke*; leaves and bracts narrow slightly overtopping infl., infl. long narrow of 19 spikes whereof 6 terminal wholly male, peduncles clustered, fem. glumes elliptic acute pale, style 3-fid, utricule ellipsoid trigonous nerveless hairy, beak bifid $\frac{1}{2}$ length of utricule. *C. setigera*? var. *fasciculata*, *Strachey Cat. Pl. Kumaon*, 73; *Duthie in T. E. Atkinson Gaz.* x. 616.

KUMAON; alt. 8000 ft., *Strachey & Winterbottom* (n. 16).

Glabrous. *Rhizome* creeping, woody. *Stems* approximate, 10 in. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, rather rigid. *Infl.* 6 by 1 in.; peduncles shortly exserted, little divided. Terminal 6 spikes male, 1 by $\frac{1}{10}$ in.; glumes pale brown, acute, not cuspidate, margins white shining. Lower spikes $\frac{3}{4}$ by $\frac{1}{10}$ – $\frac{1}{8}$ in., with 4–8 basal females. *Style-branches* 3, rather long. *Fem. glumes* pale, 1 nerved, exceeding utricles.

82. **C. pulchra**, *Boott Carex*, i. 4, t. 13; leaves shorter than infl. narrow, infl. oblong, peduncles short clustered, spikes rather numerous linear, chestnut-brown, fem. glumes very small not cuspidate, style 3-fid, utricule small narrow ellipsoid trigonous nerveless glabrous red-brown, beak conic-linear $\frac{3}{4}$ length of utricule shortly bifid. *Boeck. in Linnæa*, xl. 336.

SIKKIM HIMALAYA; alt. 10–14,000 ft., Lachen, *J. D. H.* EAST NEPAL; Tambur River, *J. D. H.*

Glabrous. *Stolons* slender. *Stems* approximate 8–16 in., slender. *Leaves* scarcely $\frac{1}{2}$ in. broad, 1 or 2 cauline often present. *Infl.* 4 by 1 in.; spikes mostly fem. with a few males at top, terminal sometimes wholly male; peduncles often 6 or more clustered, not rarely divided. *Spikes* 1 by $\frac{1}{10}$ – $\frac{1}{12}$ in., much slenderer than in *C. inæqualis* or *Daltoni*. *Fem. glumes* $\frac{2}{10}$ in., about as long as utricule.—This species differs from all (except *C. munda*, Boott) by the very small glumes and utricles, and very slender spikes.

83. **C. munda**, *Boott Carex*, i. 7, t. 20; leaves about as long as infl. narrow, infl. very lax, peduncles distant long lower often paired, spikes oblong-linear straw-colrd., fem. glumes elliptic triangular-tipped, styles 3-fid, utricule ellipsoid-trigonous nerveless glabrous green-yellow, beak $\frac{1}{2}$ utricule nearly entire. *Boeck. in Linnæa*, xl. 383.

SIKKIM HIMALAYA, alt. 10–14,000 ft., *J. D. H.*, &c., frequent.

Glabrous. *Stolons* slender. *Stems* 10–18 in., very slender. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, weak. *Infl.* of few scatte 1 distant solitary spikes; lower peduncles often exsert 3–6 in. *Spikes* mostly fem. at base (terminal sometimes wholly male), $\frac{3}{4}$ by $\frac{1}{8}$ in. *Utricule* $\frac{1}{12}$ – $\frac{1}{10}$ in.—Closely allied to *C. pulchra*, Boott; spikes and utricles larger (though small). *Rhacheola* not rarely developed inside utricule. Possibly a form of *C. Stracheyi*; the utricles are rather smaller, glabrous, the terminal spike usually fem. at base.

84. **C. Stracheyi**, *Boott*; *Strachey Cat. Pl. Kumaon*, 73; spikes 20–30 loosely paniced on slender long peduncles, uppermost 2 male, lower fem. slender cylindric pale, style 3-fid, utricule ellipsoid-lanceolate setulose narrowed into a linear-conic beak. *Duthie in T. E. Atkinson Gaz.* x. 618.

N.W. HIMALAYA; Kumaon, alt. 8000 ft. (Mudhari Pass), *Strachey & Winterbottom* (n. 18). GURWHAL, alt. 12–13,000 ft., *Duthie*.

Glabrous. *Stems* 12–18 in. *Leaves* as long as the stems, $\frac{1}{2}$ in. broad. *Panicle* commencing at 8 in. from base of stem. *Peduncles* 2–5 from one sheath, 3–7 in.,

nearly capillary; bracts not overtopping panicle. *Spikes* solitary (rarely a small second added) $\frac{3}{4}$ by $\frac{1}{10}$ in.; two upper male (in one case with a disjunct fem. at base) ferruginous, the others fem. often shortly male at top. Fem. *glumes* ovate, acute, (lower often mucronate), pale, shorter than utricle. *Utricle* small, less than $\frac{1}{2}$ in., yellow-green, obscurely nerved, setulose-scabrous at least in the upper half, granular or subscabrous below; beak shorter than utricle, setulose, scabrous, shortly notched; exsert style-branches much shorter than utricle. *Nut* fitting the utricle, ellipsoid, triquetrous, brown.—Very like *C. munda*, Boott.

**** Species of Sect. "INDICÆ" not easily placed in any one of the preceding four subsections.

85. *C. curvata*, Boott *Carex*, i: 2, t. 5 (non Knaf); small, leaves filiform, infl. compound oblong yellow dense, spikes very small ovoid 4-6-nutted with few males at top, utricle ellipsoid plano-convex 3-nerved, glabrous, beak very short oblong bifid, style 3-fid. Boeck. in *Linnaea*, xxxix. 110.

SIKKIM HIMALAYA; Tungu, alt. 12-13,000 ft., J. D. H. Pharee, *Dunghoo*.

Glabrous. *Rhizome* woody. *Stems* densely caespitose, 2-6 in., sometimes curved. *Leaves* overtopping the short stems, often curved, edges inrolled. Infl. $1\frac{1}{2}$ by $\frac{1}{2}$ in., lowest bract often overtopping it. Lowest *partial* panicle subsessile (peduncle included in the short sheath), nearly $\frac{1}{2}$ in. with 2-6 spikes. *Spikes* $\frac{1}{2}$ in., nearly entirely fem. Fem. *glumes* ovate, acute, scarcely mucronate, yellow, back green, about as long as utricle. *Utricle* $\frac{1}{8}$ in., sessile, almost concavo-convex, yellow with 3 green longitudinal bands; beak bifid, nerves of utricle running up into its teeth. *Rudiment* of the *spicula* usually present, as long as utricle, flat, green, 3-striate, applied to the posticous face of nut, often (as observed by Boott) splitting the utricle down.—Boott was unable to indicate the affinities of this species; Boeckeler has placed it in the middle of *Vigneæ*; it has several points in common with *Kobresia*.

86. *C. inclinis*, Boott *ms.*; stems 4-9 in. slender 4-6-spiked, leaves much overtopping infl. narrow, spikes solitary nearly all male at top terminal usually fem. at base, style 3-fid, utricle narrow-ellipsoid trigonous nearly nerveless, beak $\frac{1}{2}$ - $\frac{1}{3}$ length of utricle. *C. setigera*, var. δ *inclinis*, Boott *ms.*

SIKKIM HIMALAYA; Tonglo, alt. 10,000 ft., and Lachen, alt. 12-13,000 ft., J. D. H., &c.

Glabrous, except minutely hairy utricles. *Rhizome* creeping; stolons elongate, rather slender. *Leaves* numerous, 1 ft. (and upwards) by $\frac{1}{2}$ in.—Out of 17 terminal *spikes* 2 are wholly male, 15 fem. (usually only a few distant utricles) at base. *Spikes* solitary $\frac{3}{4}$ by $\frac{1}{4}$ in.; male glumes dark red. Fem. *glumes* ovate-lanceolate, mucronate, not quite reaching beak of utricle.—Technically near *C. composita*, Boott.

87. *C. fragilis*, Boott *Carex*, i. 7, t. 21; stem very slender, leaves about as long as stem narrow, peduncles 3-6 very distant filiform, spikes pale basal fem. distant, style 3-fid, utricle (unripe) oblong-obovoid minutely scabrous-hairy, beak linear $\frac{1}{2}$ - $\frac{3}{8}$ utricle. Boeck. in *Linnaea*, xl. 383.

SIKKIM HIMALAYA, alt. 11,000 ft.; Lachen and Lachoong, J. D. H.

Glabrous, except utricles. *Rhizome* very short, horizontal. *Stems* densely uniseriate, 8-14 in. *Leaves* $\frac{1}{2}$ in. broad, lower 1-3 in. long, upper up to 12 in. Lowest *peduncle* 3-4 in., capillary, uppermost 1-2 in. *Spikes* sometimes 1 by $\frac{1}{2}$ in. with 10 fems. at base; sometimes 6-8-fid., very slender the 2 or 3 basal fems. distant. Fem. *glumes* elliptic, 3-nerved, emarginate, often muticous. *Utricle* very obscurely few-nerved.—Extremely like *C. inclinis*, collected at the same place by J. D. H.; the material of both being scanty, and the fruits of *C. fragilis* only half ripe, it is not

safe to unite them. *C. fragilis* differs by the extreme slenderness of the infl. and peduncles, and by lowest bract not (or scarcely) overtopping infl.

88. **C. munipoorensis**, *C. B. Clarke*; short, leaves and bracts narrow overtopping infl., spikes all fem. at base oblong solitary straw-colour not very numerous, lower peduncles 2-3-clustered, glumes elliptic-lanceolate elongate, style 3-fid, utricle oblong glabrous beaked.

MUNIPOOR; Jopoo, alt. 9500 ft., *Watt* (n. 6894).

Glabrous. *Rhizome* woody. *Stems* approximate, 6-8 in. *Leaves* subbasal, numerous, up to 11 in. by $\frac{1}{2}$ in., rather tough. *Infl.* 3 by 1 in., a solitary long-peduncled spike sometimes added near base of stem. *Spikes* 12-14 on 1 stem, $\frac{3}{4}$ by $\frac{1}{2}$ in., dense. *Male glumes* very elongate, not cuspidate; fem. glumes similar, rather less elongate, shining, irregularly 3-5-nerved. *Utricle* not ripe.

89. **C. speciosa**, *Kunth Enum.* ii. 504; leaves long, spikes 3-1 very remote linear fem. at base, style 3-fid, fem. glumes short ovate muticous, utricle ovoid-pyramidal many-striate green puberulous hardly beaked. *Boott Carex*, i. 53; *Boeck. in Linnæa*, xl. 388; *C. B. Clarke in Journ. Linn. Soc.* xxv. 82. *C. concolor*, *Nees in Wight Contrib.* 125 (not *R. Br.*). *C. peduncularis*, *Wallich ms.* *C. courtallensis*, *Nees ms.*; ex. *Boott Carex*, i. 52, t. 138.

Widely distributed in INDIA, alt. 1-7000 ft.; from Nepal to Sikkim, and Khasia Hills to Muncypoor; also Kajmahl, Parasnath, and Mts. of S. India.—DISTRIB. Borneo.

Glabrous. *Rhizome* woody, short, with tough fibres (remains of lower sheaths). *Stems* 1-2 ft., slender but tough. *Leaves* (subbasal) often exceeding stem, sometimes scarcely $\frac{1}{2}$ in. wide, tough, many-striate, sometimes $\frac{1}{2}$ in. broad, flat. *Peduncles* usually very short, often not exerted from sheath, but basal often 4-10 in. long (perhaps a stem); bracts like the leaves usually not overtopping infl. *Spikes* 1-3 in. by $\frac{1}{4}$ in. *Fem. glume* triangular-tipped, muticous, shorter than utricle. *Utricles* $\frac{1}{2}$ in., trigonous, not inflated, mouth nearly entire. *Nut* oblong-obovoid, $\frac{2}{3}$ utricle, black; style (and its 3 branches) short, style-base scarcely dilated.

90. **C. radicalis**, *Boott Carex*, i. 56, t. 147; leaves subradical many exceeding the slender stems, spikes 2-1 very remote broad ovoid $\frac{1}{4}$ in. diam., style 3-branched, utricle ovoid many-ribbed hairy. *Boeck. in Linnæa*, xxxix. 40.

SIKKIM HIMALAYA; Lachen, alt. 10-11,000 ft., *J. D. H.*

Glabrous, except utricle. *Rhizome* oblique woody. *Leaves* 10 by $\frac{1}{10}$ in., many. *Stems* almost capillary, sometimes 2 from one sheath, sometimes with a leaf and peduncle in the middle. *Spike* irregular, sometimes of 2 or 3 obscurely fused into one head, pale. *Fem. glumes* ovate-triangular 1-nerved, lower mucronate, lowest bract-like sometimes 1 in. *Utricle* few, small, with no linear beak, dull green.

91. **C. curticeps**, *C. B. Clarke*; leaves as long as stem narrow, spikes 2-14 very long approximate several terminal often male or with few fem. at base, fem. glumes ovate usually cuspidate, style 3-fid, utricle $\frac{1}{2}$ in. and upwards elongate-lanceolate nerveless glabrous, beak $\frac{1}{2}$ as long as utricle.

SIKKIM HIMALAYA, alt. 10-12,000 ft., common, *C. B. Clarke*.

Glabrous. *Stems* 1-2 ft. *Leaves* rarely more than $\frac{1}{2}$ in. broad. *Infl.* $\frac{1}{2}$ -2 $\frac{1}{2}$ in. long. *Fruiting spikes* 2-3 $\frac{1}{2}$ in. long; glumes $\frac{1}{2}$ in. apart, $\frac{1}{2}$ in. long. *Utricle* altogether resembling that of *C. decora*, but sometimes $\frac{1}{2}$ in. long.—Closely allied to *C. decora*, but the infl. is uniform and very different.

Sect. 6. **ATRATÆ**. Spikes few (1-8), terminal male at base fem. at top. Glumes dark-chestnut or black except keel.

[See also *C. melanantha*, *C. ustulata*, and *C. alopecuroides* in the next section.]

92. **C. alpina**, Sw. in *Liljeb. Svensk. Fl.* ed. ii. 26; slender, spikes (3-4) cuboid or short cylindric approximate short-peduncled, style 3-fid, utricle obovoid-ellipsoid trigonous granular pale obscurely nerved smooth or very nearly so, beak very small oblong emarginate, nut nearly filling utricle. *Boott Carex*, iii. 112 (incl. var. β *infuscata*, partly), tt. 356, 357, 358; *Boeck. in Linnæa*, xl. 394, & in *Journ. Linn. Soc.* xviii. 104. *C. VahlII, Schkuhr. Riedgr.* ii. 46, t. Ppp. fig. 154; *Reichb. Ic. Fl. Germ.* viii. 16, t. 235; *Kunth Enum.* ii. 431. *C. infuscata*, *Nees in Wight Contrib.* 125 (partly); *Kunth Enum.* ii. 431. *C. Lehmanni*, *Boott ms.*; *Strachey Cat. Pl. Kumaon*, p. 73; *Boott Carex*, iii. 113 (partly); *Duthie in E. T. Atkinson, Gaz.* x. 618.

WEST HIMALAYA, alt. 8-15,000 ft., from KASHMIR to KUMAON, common; Sikkim; Yeumtung, alt. 15,000 ft., *J. D. H.*—DISTRIB. Cold N. Hemisphere.

Glabrous. *Rhizome* short, woody, slender. *Stems* 4-26 in., tufted. *Leaves* usually much shorter than stem, near its base, narrow ($\frac{1}{10}$ in.), weak, nearly smooth; not rarely a node with leaf is added 1-2 in. below the infl. *Spikes* $\frac{3}{4}$ - $\frac{1}{2}$ by $\frac{1}{4}$ in., often sessile in a head, lowest scarcely $\frac{1}{4}$ in. distant; lowest rarely 1 in. distant, then on a peduncle $\frac{1}{2}$ -1 in.; lowest bract usually about as long as infl. *Glumes* dense, $\frac{3}{8}$ in., ovate, triangular-tipped, yellow keel very variable in width, often 0. *Utricle* about $\frac{1}{10}$ in., yellow or ultimately pale brown, nerveless or irregularly obscurely few-nerved, loose subinflated but fitting nut; oblong part of beak cylindric, short or scarcely any, granular, quite smooth or very sparsely scabrid; style-branches 3, protruded part about half length of utricle.—*C. VahlII, Schkuhr*, referred here by *Boott* and others, is described and figured with utricles hairy all over, and in my opinion should be excluded. As to the W. Nepal plants referred by *Boott* to *C. Lehmanni*, see remarks under that plant.

Var. β *erostrata*; *Boott*, l. c. 71, t. 194, fig. 2; beak of utricle 0.—*Kunawur, Royle. Tibet*, alt. 15,000 ft., *Strachey & Winterbottom*.

Var. γ *gracilentia* (sp.), *Boott ms.*; *Strachey, Cat. Pl. Kumaon*, p. 73; very slender, leaves scarcely $\frac{1}{8}$ in. broad, spikes small. *Boeck. l. c.* 185; *Duthie l. c.* 618. *C. alpina*, β *infuscata* (partly), *Boott Carex*, iii. 113, t. 359; *Boeck. l. c.* 394. —Kumaon, alt. 10,000 ft., *Strachey & Winterbottom* (n. 20). Sikkim; Lachen, alt. 11-14,000 ft., *J. D. H.*—*Stems* 2-16 in. *Spikes* $\frac{1}{4}$ by $\frac{1}{8}$ in., considerably smaller than in the usual Himalayan form (*C. infuscata*, (sp.) *Wight*), but not different from many European examples of *C. alpina*. Though *Boeckeler* keeps this up as a species, *Boott* finally accepted *Spach's* opinion that it is only a form of *C. alpina*.

93. **C. Lehmanni**, *Drejer, Symb. Caricol.* 13, t. 2; lowest spike sometimes 1-3 in. distant, lowest bract usually much overtopping infl., spikes and utricle smaller than those of *C. alpina*, otherwise as *C. alpina*, Sw. *Strachey Cat. Pl. Kumaon*, 73; *Boott Carex*, iii. 113, t. 361; *Boeck. in Linnæa*, xl. 395. *C. infuscata*, β *microcarpa*, *Nees in Wight Contrib.* 125; *Kunth Enum.* ii. 431.—*Carex, Wall. Cat.* 3381.

HIMALAYA, alt. 11-13,500 ft.; from KUMAON, *Strachey & Winterbottom*, to Sikkim, *J. D. H.*, frequent.

Exceedingly near *C. alpina*, Sw. *Stems* sometimes rather stouter, acutely triquetrous, scabrous, but not rarely slender nearly as in *C. alpina*. *Utricle* scarcely $\frac{1}{2}$ in., often scabrous on the shoulders, whence spikes often oblong, narrower than

in *C. alpina*.—Strachey & Winterbottom, n. 21, the plant in Herb. Kew inscribed by Boott as *C. Lehmanni*, Drejer, is, in my opinion, fairly typical *C. alpina*.

94. **C. obscura**, Nees in *Wight Contrib.* 126; spikes (3-7) oblong or cylindric approximate short-peduncled erect dense, style 3-fid, utricles oblong narrowed to each end trigonous granular yellow smooth, beak pyramidal scabrid emarginate, nut nearly filling utricles. *Kunth Enum.* ii. 515; *Strachey Cat. Pl. Kumaon*, 73; *Boott Carex*, i. 70, t. 192; *Boeck. in Linnæa*, xl. 395. *C. infusata*, Nees in *Wight Contrib.* 125 (partly). *C. hæmatostoma*, *Herb. Jacquem.*

WEST HIMALAYA, alt. 8-10,500 ft., from Kashmir, *C. B. Clarke*, to Kumaon, *Strachey & Winterbottom*.

Glabrous. Stoloniferous. *Stems* 1-2 ft., rather slender. *Leaves* often overtopping stem, $\frac{1}{2}$ in. broad, flat, weak (the leaf so commonly seen 1-3 in. below the infl. in *C. alpina* never (?) occurs here). *Spikes* often very close, subsessile, or lowest sometimes 2 in. distant on a 1 in. peduncle, $\frac{3}{4}$ by $\frac{1}{2}$ in., dark chestnut or black, terminal occasionally wholly male; lowest bract usually overtopping infl. *Glumes* ovate, triangular-tipped, dark chestnut, often yellow on keel. *Utricle* $\frac{1}{10}$ in. as long as glume, less than $\frac{1}{10}$ in. broad, very obscurely inflated, nerves irregular or obscure; beak none, except hollow elongate pyramidal part of utricles. *Style-branches* shorter than the utricles.—The plant here described as typical *C. obscura* is Royle's, n. 118 (*C. hæmatostoma*, *Herb. Jacquem.*), which is *C. obscura*, Munro and Boott, but was *C. infusata* of Nees. *C. parvibracteata*, Nees, referred here by Boott (*Carex*, iii. 108), is = *C. psycrophila*, Nees.

Var. β *brachycarpa*; utricles much shorter obovoid-ellipsoid narrowed very suddenly into a short-oblong beak scabrous on shoulders granular (not shining yellow) when ripe.—Himalaya, alt. 10-12,000 ft., from Simla, *Duthie*, to Sikkim, *J. D. H.*, &c.—This is Boeckeler's *C. obscura*.—Utricle usually nerveless or nearly so. Basal sheaths a shining horny-brown. Spikes often uniform black.

95. **C. atrata**, *Linn. Sp. Pl.* 1387; spikes 3-6 large approximate cylindric dense lowest peduncled nodding, glumes ovate acuminate, style 3-fid, utricles large ovoid or ellipsoid inflated yellow-brown smooth beakless nearly nerveless, nut sessile much smaller than utricles. *Schkuhr Riedgr.* i. 52, & ii. 42, t. X. fig. 77; *Kunth Enum.* ii. 433; *Reichb. Ic. Fl. Germ.* viii. 16, t. 237; *Boott Carex*, iii. 114, t. 362-364; *Boeck. in Linnæa*, xl. 398. *C. aterrima*, *Hoppe in Sturm Fl. Deutsch.* [xvi. 3] 12; *Kunth l. c.* 434; *Reich. l. c.* t. 236. *C. caucasica*, *Stev. in Mem. Soc. Mosc.* iv. 68; *Kunth l. c.* 433.

KASHMIR, alt. 11,000 ft., frequent, *C. B. Clarke*. SIKKIM, alt. 11-17,000 ft., *J. D. H., King*.—DISTRIB. Cold N. Hemisphere.

Glabrous. Stoloniferous. *Stems* 1 in. apart on the creeping rhizome, 2 ft., medium stout, triquetrous scabrous at top. *Leaves* often as long as stem, $\frac{1}{2}$ - $\frac{1}{2}$ in. broad. *Spikes* $\frac{3}{4}$ -1 by $\frac{1}{2}$ - $\frac{1}{2}$ in.; lowest $\frac{1}{2}$ -2 in. distant, sometimes compound; lowest peduncle 1-2½ in., rather slender; lowest bract usually overtopping infl. *Glumes* $\frac{1}{2}$ - $\frac{1}{2}$ in., fem. often nearly uniformly black except margin, sometimes with yellow keel, male paler usually with yellow keel. *Utricle* $\frac{1}{2}$ by $\frac{1}{2}$ in., plane-convex, shining, triangular at both ends, slightly granular, finally shining; mouth small, round, entire or with a short slit on one side. *Style-branches* much shorter than utricles, occasionally the entire protruded part of style is nearly as long as the branches. Nut ellipsoid or obovoid, trigonous, less than half the length of nut and about half its breadth.—Much of Boott's Indian *C. atrata* is *C. nivalis*, Boott.

96. **C. Duthiei**, *C. B. Clarke*; spikes approximate, lowest very shortly peduncled, glumes acuminate linear-tipped, utricles narrow oblong, nut small stalked nearly filling utricles, otherwise as *C. atrata*.

GURWHAL; alt. 13-14,000 ft., *Duthie* (n. 4499), SIKKIM; alt. 11-15,000 ft., *J. D. H.* &c.

May be esteemed a var. of *C. atrata*, but the utricle is not $\frac{1}{2}$ the breadth, so that the nut though smaller than that of *C. atrata*, nearly fills it. The lowest peduncle is usually less than $\frac{1}{4}$ in., the glumes are acuminate to a long linear obtuse black point exceeding the utricles.

Var. β *glacialis*; stems 2-6 in., leaves much shorter than stems, spikes very small (sometimes $\frac{1}{2}$ by $\frac{1}{2}$ in.), utricles small very little inflated. *C. atrata*, var. *glacialis*, *Boott Carex*, iii. 114, t. 365.—N. Sikkim; alt. 15-17,000 ft., *J. D. H.*

97. *C. nivalis*, *Boott in Proc. Linn. Soc.* i. 256 and in *Trans. Linn. Soc.* xx. 136 and *Carex*, i. 13, t. 35 (*partly*); terminal spike wholly male or fem. at top, utricle broad much compressed often of thin texture with minute beak, nut stalked exceedingly small (otherwise as *C. atrata*). *Strachey Cat. Pl. Kumaon*, 73; *Boeck. in Linnæa*, xl. 400. *C. cinnamomea* & *Griffithii*, *Boott in Proc. Linn. Soc.* l. c. 257, 286, and in *Trans. Linn. Soc.* l. c. 136, 138. *C. Oliveri*, *Boeck. in Flora*, lxiii. 455, and in *Journ. Linn. Soc.* xviii. 104.

HIMALAYA and W. TIBET, alt. 11-17,000 ft., common; from the KAKAKORUM, *Thomson*, &c., to SIKKIM, *J. D. H.*—DISTRIB. Cabul, Central Asia.

Boott states (*Carex*, i. 13) that he finally doubted whether this was distinct from *C. atrata*, and it is certainly not, unless *Boott's* sorting is altered. In *C. nivalis*, the utricle has concavo-convex very acute margins; its texture is very thin becoming often scarious purple or pale. The colour of the glumes varies excessively, being black-red in the type plant, cinnamomeous in the N.-W. Himalaya, yellow-brown in Katakorum, becoming pale yellow or green yellow in the extreme form; the utricles in all these forms are concolorous (or nearly so) with the glumes. In *C. nivalis* (as in *C. atrata*) there occur alpine forms with stems 2-3 in. high. It appears from *Fischer's* collections that *Ledebour*, *Turczaninow*, &c., must have included this under *C. atrata*.—*C. Griffithii*, *Boott* is founded on *Griffith*, n. 78, which has, in the four infl. of this number, the terminal spike wholly male, and is so described by *Boott*. Subsequently *Boott* mixed with this (undoubtedly correctly) both in *Kew Herb.* and in his own *Griffith* n. 142 (from Cabul also) which has in the five infl. seen by me the terminal spike (decisively) fem. at top. This is exactly the plant published as *C. Oliveri* by *Boeckeler*, who relying on the terminal spike supposed it must be different from *C. Griffithii*. From the large quantity seen by me I should say the terminal spike was about as frequently female at top as wholly male. In his "Ill. *Carex*" *Boott* reduces his *C. cinnamomea* to his *C. nivalis*, but does not refer to his *C. Griffithii*.

98. *C. psychrophila*, *Nees in Wight Contrib.* 127; spikes approximate cylindric lowest peduncled, style 3-fid, utricles ellipsoid trigonous smooth pale green suddenly narrowed into a linear-oblong scabrous beak not inflated. *Kunth Enum.* ii. 463; *Strachey Cat. Pl. Kumaon*, 73; *Boott Carex*, i. 70, t. 191 (*excl. Royle*, n. 112); *Boeck. in Linnæa*, xl. 402. *C. asperula*, *Nees l. c.* 124; *Kunth l. c.* 433 (*not of Turcz.*). *C. parvibracteata*, *Nees l. c.* 125; *Kunth l. c.* 433. *C. celsa*, *Boott l. c.* iii. 108, t. 330.

HIMALAYA; from KASHMIR, alt. 8-10,000 ft., C. B. Clarke, to SIKKIM, alt. 12,000 ft., *J. D. H.*; frequent.

Glabrous. Rhizome creeping. Stems 1-2 ft., rather slender. Leaves $\frac{3}{4}$ as long as stems, $\frac{1}{2}$ - $\frac{3}{4}$ in. wide, weak. Spikes $\frac{1}{2}$ - $\frac{3}{4}$ by $\frac{1}{4}$ in. (in fruit), dense; terminal spike nearly always fem. at top, occasionally wholly male; lowest spike often 1-2 in. distant, on a peduncle $\frac{1}{2}$ -1 $\frac{1}{2}$ in. Glumes small, ovate, triangular-tipped, chestnut, with or without a yellowish keel. Utricle small, obscurely nerved, thin; nut-black, nearly filling utricle; exsert part of the 3 style-branches much shorter than utricle (beak included), beak about $\frac{2}{3}$ utricle, rather deeply 2-fid.—Not nearly allied to the

preceding group; perhaps near *C. alopecuroides*.—Boott has included Royle, n. 112 (the sole foundation of *C. obscura*, Nees) in his *C. psychrophila*. Subsequently Boott (*Carex*, iii. 108 in Obs.) reduces *C. parvibracteata*, Nees (which is *C. psychrophila*) to *C. obscura*, Nees.

Sect. 7. PROPRIÆ. Terminal spike wholly male. (In *C. ustulata* and *C. alopecuroides* frequently, in some others very rarely, there occur terminal spikes male at base fem. at top.)

* Utricle glabrous (or scabrous on margins); beak 0 or very short.

99. **C. melanantha**, *C. A. Meyer ex Ledeb. Fl. Alt.* iv. 216 and *lc. Pl.* iv. 8, t. 317; spikes 3–6 approximate subsessile (lowest peduncle rarely $\frac{1}{2}$ in.) dense, glumes black-red triangular-tipped, style 3-fid, utricles obovoid-ellipsoid nerveless granular usually dark-red upwards, beak hardly any. *Kunth Enum.* ii. 432; *Boott Carex*, iv. 211; *Turcz. Fl. Baikal. Dahur.* ii. (pars. 1) 269 a only; *Boeck. in Linnæa*, xl. 399. *C. nigra*, var. β *Trevir. in Ledeb. Fl. Ross.* iv. 288. *C. nigra*, var. *orientalis*, *Regel Descr. Pl. fasc.* viii. 28. *C. atrata* *Boott ms.* (partly). *C. Moorcroftii*, var. *Boott ms.* *C. nivalis*, *Boeck. ms.* (partly).

KASHMIR; alt. 9–12,000 ft., Thomson, &c., *C. B. Clarke*.—DISTRIB. Central Asia, Cabul.

Stoloniferous. Stems 6–24 in. Leaves numerous, often nearly as long as the stem, $\frac{1}{2}$ in. broad; lower sheaths very pale brown. Infl. usually 1–2 in., longer than lowest bract. Spikes $\frac{1}{2}$ by $\frac{1}{4}$ in. Glumes nearly uniform black red or with a narrow pale keel. Utricle shorter than glume, slightly scabrous on shoulders, trigonous, slightly winged; exsert part of stigmas rather shorter than utricule.—The original description of this species states the terminal spike to be male at base fem. at top, as in the type specimens, but in hardly any others; the Indian examples have the terminal spike male, and Turczaninow and Regel say this is so very generally in the Central Asian plant. Boeckeler and Boissier say that *C. nigra* mainly differs by not being stoloniferous; but *C. nigra* is plentifully stoloniferous. Treviranus therefore unites *C. melanantha* with *C. nigra*; it has the same general aspect, but *C. nigra* has a totally different much-compressed utricule. *C. parviflora*, *C. A. Meyer* (Enum. Pl. Cauc. p. 30) which includes *C. sabulosa*, Turcz. and *C. melanocephala*, Turcz., is also exceedingly like *C. melanantha* in general aspect; it is common in Central Asia, and very likely to occur in British India, and to have been overlooked. It differs from *C. melanantha* in having the utricule more acuminate into a short (but much more definite) linear beak.

100. **C. Moorcroftii**, *Falconer ms. ex Boott in Proc. Linn. Soc.* xx. (1851), 140, and *Carex*. i. 9, t. 27; spikes larger brighter than in *C. melanantha*, glumes black-red or paler, terminal spike often pale, utricule larger pale upwards, otherwise as *C. melanantha*. *Strachey Cat. Pl. Kumaon*, 73; *Boeck. in Linnæa*, xli. 179. *C. melanantha*, β *baicalensis*, *Turcz. Fl. Baikal Dahur.* i. 270. *C. melanantha*, var. *Boott ms.*

HIMALAYA and TIBET, alt. 12–16,000 ft., from the KARAKORUM to TIBET (N. of Sikkim), alt. 16–17,000 ft., *J. D. H. and Phari, King*.—DISTRIB. Central Asia.

Appears like a fine bright-colrd. form of *C. melanantha* as the Russian botanists (and apparently Boott at last) esteemed it. The fruiting spikes look very different as pale-yellow utricles alternate with dark-chestnut glumes; whereas in *C. melanantha*, the dull black-red tops of utricles are concolorous with glumes. *C. Moorcroftii* is sometimes nearly 2 ft. high, with spikes $\frac{1}{2}$ in. in diam.

101. **C. supina**, *Wahl. in Handl. Vet. Acad. Stockh.* 158; small, rhizome slender creeping, spikes approximate sessile small, one terminal

slender male, 2-3 subglobose female 4-10-fruited, style 3-fid, utricles rather large trigono-globose nerveless glabrous not inflated, beak minute linear. *Kunth Enum.* ii. 444; *Reichb. Ic. Fl. Germ.* viii. 25, t. 259; *Strachey Cat. Pl. Kumaon*, 73; *Duthie in E. T. Atkinson Gaz.* x. 618. *C. glomerata*, *Schkuhr Riedgr.* i. 79, t. fig. 41. *C. Schkuhrii*, *Willd. Sp. Pl.* iv. 264; *Schkuhr l. c.* ii. 51, t. Qqq, fig. 158. *C. obesa*, *var. γ supina*, *Boott Carex*, iv. 161, t. 535; *Boeck. in Linnæa*, xli. 184.

KUMAON, alt. 14-15,000 ft.; Bugdwar, *Strachey & Winterbottom* (n. 17); Kutti Yangti Valley, *Duthie* (n. 6098).—DISTRIB. Central Asia, Alpine Europe.

Glabrous. *Stems* 3-6 in. *Leaves* 3-6 by $\frac{1}{2}$ in. Terminal *spike* $\frac{1}{2}$ in., very slender; fem. spikes $\frac{1}{2}$ in. in diam. *Fem. glumes* ovate, triangular-tipped, chestnut-colored. *Utricle* obscurely irregularly nerved at base, suddenly contracted, scarcely scabrous at top, nearly filled by nut, green-yellow to pale-brown; beak slightly 2-fid.—*C. obesa Allioni* (*Fl. Pedemont.* n. 270) differs by its larger size, lowest spike cylindric peduncle, utricles distinctly nerved on their posticous face, more acuminate into a more definite beak.

102. *C. ustulata*, *Wahl. in Handl. Acad. Stockh.* 156; middle-sized or small, spikes 2-5 approximate, terminal male or variously bisexual, lowest nodding on slender peduncle, fem. glumes elliptic-oblong black-red, style 3-fid, utricles ellipsoid nerveless glabrous acuminate into a very short scabrous beak inflated much larger than nut. *Kunth Enum.* ii. 462; *Reichb. Ic. Fl. Germ.* viii. 22, t. 250, fig. 615; *Boott Carex*, i. 70, 71, t. 193, figs. 1, 2, and t. 194, fig. 1; *Boeck. in Linnæa*, xli. 260. *C. atrofusca*, *Schk. Riedgr.* i. (1801), 106, t. Y fig. 82. *C. coriophora*, *Fischer ms. ex Kunth l. c.* 463; *Strachey Cat. Pl. Kumaon*, 73. *C. frigida*, *Wall. ms.*—*Carex*, *Wall. Cat.* 3389, A.

HIMALAYA and TIBET, alt. 12-17,000 ft.; from the Karakorum, *Thomson*, to SIKKIM, *J. D. H.*—DISTRIB. Cold N. Hemisphere.

Glabrous. *Rhizome* creeping; scales pale. *Stems* 4-16 in. (taller are called *C. coriophora*, *Fisch.*). *Leaves* usually $\frac{1}{2}$ - $\frac{3}{4}$ length of stem; a node, with a leaf 1-3 in., often occurs $\frac{3}{4}$ -1 in. below the infl. *Infl.* 1-4 in.; lowest spike sometimes 1-2 in. distant on peduncle 1-1 $\frac{1}{2}$ in.; lowest bract much shorter than infl., and when distant usually sheathing. *Spikes* $\frac{1}{2}$ - $\frac{3}{4}$ by $\frac{1}{4}$ - $\frac{1}{2}$ in., short-cylindric or ovoid, dense; terminal spike in the Europ. and sometimes in the Himal. plants male at base fem. at top, or (not rarely) wholly fem., or frequently fem. with a few males at top, or male at both ends fem. in the middle, or fem. at both ends male in the middle. *Utricle* about as long as glume, more or less black-red, compressed, quite flat when the nut does not ripen, otherwise trigonous with two marginal wings; beak very short, 2-fid or distinctly emarginate. *Nut* stalked, small; style-branches shortly exsert from utricles.

103. *C. cruenta*, *Nees in Wight Contrib.* 128; closely allied to *C. ustulata* but larger in all its parts, spikes 5-12 remote, peduncle of lowest usually 3-6 in. *Kunth Enum.* ii. 463; *Strachey Cat. Pl. Kumaon*, 73; *Boott Carex*, ii. 75, tt. 201, 202, 203; *Boeck. in Linnæa*, xli. 261.—*Carex*, *Wall. Cat.* 3389, B.

HIMALAYA, alt. 8-15,000 ft., common; from GILGIT, *Giles*, to SIKKIM, *J. D. H.*—DISTRIB. Central Asia?

Stems often 2 ft. and more; infl. nearly a foot. *Fem. spikes* often 1 in.; lowest peduncle not rarely divided, i.e. with 1-3 spikes; terminal spike (sometimes 2) wholly male in the copious material, except a quantity collected by Levinge at Sonamurg (large typical *cruenta*) where the terminal spikes are all male at base fem. at top. *Fem. glumes* often mucronate. *Utricle* longer narrower than those of *C. ustulata*, less inflated, more or less red-black.—Generally easily recognized, but many

small specimens Boott could not sort between *C. cruenta* and *C. ustulata*. These are very near *C. fuliginosa*, Schkur, which looks different by reason of its paler utricles. *C. cruenta* no doubt extends to Central Asia, but it is not known under what name the Russian botanists record it.

104. **C. maculata**, Boott in *Trans. Linn. Soc.* xx. 128 and *Carex*, i. 9, t. 26; stems 8–24 in. slender, spikes 3–10 cylindric dense rigid dark terminal one male paler, lowest remote, style 3-fid, utricle ovoid-triangular nervose dark brown glabrous granular beakless gland-dotted to base. *Thw. Enum.* 355; Boeck. in *Linnæa*, xl. 191. *C. micans*, Boott in *Mem. Am. Acad.* (N. s.) vi. 419.

KHASIA; alt. 4000 ft., C. B. Clarke, &c. NILGHIRI HILLS; alt. 5000 ft., C. B. Clarke, &c. CEYLON; alt. 5000 ft., Thwaites. DISTRIB. Korea, Japan, Australia.

Glabrous. Rhizome creeping; stems 1–3 together. Leaves nearly as long as stem, narrow (hardly more than $\frac{1}{8}$ in. broad). Fem. spikes nearly 1 in. by $\frac{1}{8}$ – $\frac{1}{4}$ in. in diam.; lowest (sometimes very remote), peduncled (peduncle often 2–4 in.), upper fem. often clustered erect, male slenderer sessile bright brown; bracts overtopping the infl., leaf-like. Fem. glumes $\frac{1}{2}$ in., narrow triangular, sub-3-nerved, pale brown with a green centre. Utricles unequally trigonous, 5–8-nerved on each face. Nut sessile, $\frac{1}{2}$ – $\frac{3}{8}$ utricle.

105. **C. vicinalis**, Boott *Carex*, iv. 133, t. 428, fig. 2; three upper spikes male, fem. 3 distant long-cylindric dense lowest peduncled, style 3-fid or occasionally 2-fid, utricle ovoid beakless glabrous minutely granular.

NILGHIRI HILLS; Schmidt,

Apparently 3 ft high. Lowest bract about 1 foot, much overtopping infl., not sheathing. Male spikes $\frac{1}{2}$ in., pale bright brown, close together. Fem. spikes $1\frac{1}{2}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in., erect; lowest peduncle 2 in.; lowest spike 3 in., distant. Fem. glumes elliptic, obtuse, dark purple with green back. Utricle (unripe) $\frac{1}{2}$ in. long, dusky grey, obscurely 3–5-nerved on convex face, triangular at either end; style-branches hardly $\frac{1}{2}$ length of utricle.—Boott compares this species with *C. caespititia*, Nees; but the style in *C. vicinalis* appears generally 3-fid. The only specimen consists of the top of one stem, as figured by Boott.

** Utricle glabrous, beak long.

106. **C. Jackiana**, Boott in *Proc. Linn. Soc.* i. 260 and in *Trans. Linn. Soc.* xx. 132 and *Carex*, i. 9, t. 25; spikes 3–9 distant, uppermost one male, others cylindric-lanceolate, style 3-fid, utricle rather large ellipsoid-lanceolate strongly many-nerved glabrous lurid green gradually narrowed into conic beak. *Miq. Fl. Ind. Bat.* iii. 353. *C. instabilis*, Boott *ms. ex Boeck. in Linnæa*, xli. 246. *C. papulosa*, Boott in *Mem. Am. Acad.* vi. n.s. 418.

KHASIA HILLS; alt. 3–6000 ft., Griffith (*Kew Distrib.* 6090), &c.—DISTRIB. Java, Japan.

Glabrous. Stems 2 ft., triquetrous, stoutish, scabrous at top. Leaves nearly as long as stem, $\frac{1}{2}$ in. broad. Spikes 1 by $\frac{1}{2}$ in., lower usually 3–4 in. apart, then erect on short stout peduncle, but rarely a peduncle near base of stem (then of course long slender) is added; spikes lax-fld., sometimes 2–3 in. long with lower flowers remote; bracts overtopping infl. Fem. glumes ovate, acute, pale, scarious, acute or mucronate. Utricle $\frac{1}{2}$ in., subtrigonous, slightly inflated, very strongly nerved; beak as long as nut, notched. Nut obovoid, triquetrous, pale.—The Khasian plant agrees very closely with the Javan.

Var. ? *minor*; much slenderer, spikes few often few-fld. ovoid, utricle ovoid slightly nerved suddenly narrowed into a linear beak. *C. Jackiana*, *Thw. Enum.*

356 (excl. var. β); Boeck. in *Linnaea*, xli. 277—NILGHIRI HILLS; alt. 7000 ft., C. B. Clarke, n. 11,061. CEYLON; alt. 5000 ft., Thwaites (C.P. 3198).—Stems 2–10 in., very slender. Leaves overtopping stem, $\frac{1}{2}$ in. broad. Spikes shorter, reduced sometimes to 2–4 flowers. Utricle wider than in *C. Jackiana* type, stretched tight on the large nut, shining not lurid, obscurely striate, base obconic, beak narrow minutely scabrid.—This differs a good deal from *C. Jackiana*, and is regarded by Boeckeler (who transposed the name) as specifically different from the Khasian species. Boott subsequently marked the plant as *C. Jackiana*, but he had of it only immature examples.

107. *C. fusiformis*, Nees in *Wight Contrib.* 128; spikes 6–12 loosely paniced, uppermost one male, lower female long linear lax interrupted, female glumes pale mucronate, style 3-fid, utricule ellipsoid rather suddenly narrowed into oblong-linear beak glabrous slenderly striated. *Kunth Enum.* ii. 471; *Strachey Cat. Pl. Kumaon*, 73; *Boott Carex*, i. 44, t. 111; *Duthie in T. E. Atkinson Gaz.* x. 616; Boeck. in *Linnaea*, xli. 248.

TEMPERATE HIMALAYA; Mussoorie, Royle, n. 88; Kumaon, alt. 7000 ft., *Strachey & Winterbottom*. Sikkim; Lachen, alt. 10–12,000 ft., J. D. H.

Glabrous. Stems 1–1 $\frac{1}{2}$ foot. Leaves 12 by $\frac{1}{2}$ in., flat. Lower fem. spikes often 3–4 in. apart, peduncled, solitary, 2 in.; bracts about as long as infl. Fem. glumes ovate, very distant, those near middle of spike aristate. Utricle $\frac{1}{2}$ – $\frac{3}{4}$ in., slender, green, inconspicuously 10-nerved; beak as long as utricule, with a few microscopic scabrous points, notched. Nut ellipsoid, filling the utricule, pale; style branches shortly exsert.—General appearance of *C. sylvatica*.

108. *C. finitima*, Boott *Carex*, i. 44, t. 112; female glumes (from the middle of the female spike), elliptic-obtuse with a very short lanceolate point not aristate (otherwise nearly as *C. fusiformis*). Boeck. in *Linnaea*, xli. 247.

SIKKIM HIMALAYA, alt. 9–12,000 ft., frequent, J. D. H., C. B. Clarke.—DISTRIB. China.

Stems 1–3 ft. Spikes more numerous than in *C. fusiformis*, often several from one sheath; terminal not rarely fem. in the middle. Utricle hardly nerved, somewhat suddenly contracted into a long linear beak.

Var. β *attenuata*; slender, leaves shorter $\frac{1}{2}$ in. wide, spikes fewer about 1 in., utricles rather smaller.—Khasia Hills, Vale of Rocks, alt. 4500 ft., C. B. Clarke (n. 43,675).—Stems 8–12 in. Leaves much shorter than stems. This appears more different from *C. finitima* than is *C. fusiformis*.

109. *C. breviscapa*, C. B. Clarke; stem very short far outtopped by leaves, spikes 8–14 linear greenish uppermost one male, glumes distant obtuse, style 3-fid, utricule broad lanceolar very angular many-nerved glabrous, nut narrow rhomboid truncate at top. C. Jackiana, var. β , *breviculmis*, *Thw. Enum.* 356; *Trimen Cat. Pl. Ceylon*, 104 (not of Boott).

CEYLON; Ambagowa District, Thwaites (C.P. 3781.)

Glabrous. Stems 1–2 in., excl. of infl. 2–5 in. Leaves 2 ft. by $\frac{1}{2}$ in., tough, many-nerved. Infl. narrow; lower peduncles 1 $\frac{1}{2}$ inch, erect, carrying 2–4 spikes; bracts overtopping. Fem. spikes 1 by $\frac{1}{2}$ in.; male $\frac{1}{2}$ – $\frac{3}{4}$ in., very slender. Fem. glumes much shorter than utricule, elliptic, yellowish with green back. Utricles $\frac{1}{2}$ in., green, passing gradually into conic deeply-notched beak. Nut trigonous, elongate-rhomboid, truncate at top, closely fitting utricule.—Much more like *C. finitima* than *Jackiana*; but the nut is distinctive, and impresses its peculiarities on the utricule.

110. *C. japonica*, Thunb. *Fl. Japon.* 38; stolons long slender, stems medium almost 3-winged, spikes about 5 close together uppermost one male

(occasionally fem. at base) small, lower fem. cylindric very dense rigid pale, style 3-fid, utricule ovoid glabrous suddenly contracted into a linear-conic beak. *Schk. Riedgr.* i. 115, t. Ww, fig. 110; *Kunth Enum.* ii. 517. *C. japonica*, β minor, *Boott Carex*, ii. 88. *C. chlorostachys*, *Don in Trans. Linn. Soc.* xiv. 330 and *Prodr.* 43. *C. Doniana*, *Spreng. Syst.* iii. 825; *Nees in Wight Contrib.* 128; *Kunth l.c.* 503; *Boott in Perry Exped. Jap.* ii. 327 (Donniana). *C. Motoskei*, *Miq. in Ann. Mus. Lugd. Bat.* ii. 148. *C. trichostyles*, *Franch. et Savat, Pl. Japon.* ii. 152, 581.—*Carex*, *Wall. Cat.* 3395.

NEPAL; *Wallich*. SIKKIM HIMALAYA; *Herb. Griffith (Kew Distrib.* n. 6079) KHASIA HILLS, alt. 5500–6000 ft., frequent, *C. B. Clarke*.—DISTRIB. Japan.

Description of Khasian plant.—Glabrous. *Rhizome* often 8 in. very slender, with pale brown scales. *Stems* 6–15 in., rather stout, very acutely triquetrous. *Leaves* often as long as stem, $\frac{1}{4}$ – $\frac{1}{2}$ in. broad. *Fem. spikes* $\frac{1}{2}$ –1 by $\frac{1}{2}$ in., very short-peduncled, suberect, green or yellowish, when young almost comose from the brown-red styles; terminal spike small, almost concealed among the fem. spikes; bracts far overtopping infl. *Fem. glumes* ovate-lanceolate, aristate, green with scarious margins, hardly so long as utricule. *Utricles* $\frac{1}{2}$ in., very close-packed, obliquely ascending, trigonous, 8-nerved, beak narrow, notched, glabrous or most minutely scabrous. *Nut* ellipsoid, subacute at both ends, filling the utricule.—None of the Khasian specimens match the original *C. japonica*, described by Thunb. “*spicis ovatis*,” and figured by Schkuhr (= *C. aphanolepis*, *Franch. et Savat.*). The Indian *C. japonica* is *C. chlorostachys*, *Don*, which is near the following var.

Var. *β alopecuroides* (sp.) *Don in Trans. Linn. Soc.* xiv. 332 & *Prodr.* 43; tall, spikes 2 in. long linear-cylindric, male spike often as long as female frequently female at top, utricule ellipsoid passing almost gradually into oblong beak. *Nees in Wight Contrib.* 128; *Boott Carex*, ii. 88, t. 258; *Boeck. in Linnæa*, xli. 172. *C. emodorum*, *Spreng. Syst.* iii. 818; *Kunth Enum.* ii. 516. *C. japonica*, *Boott Carex*, ii. 88, t. 257 (excl. var. β); *Boeck. l.c.* 283. *C. Doniana*, *Drejer Symb.* 26, t. 13. *Carex*, *Wall. Cat.* 3395 A (partly) B.

SIKKIM HIMALAYA; alt. 5–7000 ft., *J. D. H.* KHASIA HILLS; Nunklao, alt. 4–5000 ft., *J. D. H.*, *C. B. Clarke*. MUNEYPOOR: alt. 8500 ft., *Watt*.—DISTRIB. Japan.

Out of 31 spikes collected by me at Nunklao 14 have the terminal spike (mostly plentifully) fem. at top. *Stems* much less 3-winged than in the Khasia *C. japonica*. Both *Boott* and *Boeckeler* have reduced this plant to *C. japonica*, *Thunb.*, but it is very unlike it in general aspect; the principal difference I find in the male spike which is in *C. japonica* short occasionally female at base, in var. (?) *alopecuroides* long, frequently fem. at top.

111. *C. diluta*, *M. Bieb. Fl. Taur. Caucas.* ii. p. 388; iii. 614; spikes 3–10 distant, terminal one male, lower fem. cylindric dense rusty green, glumes shorter than utricule rough-tipped, style 3-fid, utricule ellipsoid obscurely striate glabrous green narrowed into a short-oblong notched beak. *Kunth Enum.* ii. 448; *Boott Carex*, iv. 139, t. 448; *Boeck. in Linnæa*, xli. 235; *Boiss. Fl. Orient.* v. 425. *C. punctata*, *Gaudin Agrost.* ii. (1811), 152 & *Fl. Helvet.* vi. 106, t. 2; *Kunth l.c.* 448; *Reichb. Ic. Fl. Germ.* viii. 22, t. 251; *Boott Carex*, iv. 155, t. 500; *Boeck. l.c.* 271. *C. lævicaulis*, *Kunze Suppl.* 31, t. 6, fig. 2. *C. rigidifolia*, *Seub. Fl. Azor.* 21, t. 2, fig. 1.

N. KASHMIR; Indus Valley, alt. 7650–9000 ft., frequent, *C. B. Clarke*. KUNAWUR; alt. 11,000 ft., *Munro*.—DISTRIB. Cabul and Central Asia to Lapland and the Azores.

Glabrous. *Stolons* 0. *Stems* caespitose, 6 in. to 3 ft. *Leaves* very variable (in Indian examples) sometimes less than $\frac{1}{2}$ length of stems $\frac{1}{2}$ in. broad, sometimes 20

by $\frac{1}{4}$ in.; bracts similarly varying. Lower *spikes* always distant, peduncle sometimes hardly exsert from the sheath with erect rigid spike, sometimes much longer with nodding spike (in Kunawur examples capillary with slender spike); 3-5 upper spikes not rarely fascicled. Male *spike* $\frac{3}{4}$ -1 $\frac{1}{2}$ in., pale brown, glumes hardly mucronate. Fem. *spikes* commonly $\frac{3}{4}$ -1 by $\frac{1}{4}$ in., dense, not rarely slenderer (in Kunawur hardly $\frac{1}{8}$ in. wide, much looser). Fem. *glumes* shorter than utricule, ovate, thin, pale brown, linear-triangular back green excurrent in a scabrous cusp. *Utricle* $\frac{1}{2}$ in., trigonous, irregularly nerved, herbaceous, often "punctate" with ferruginous dots (often missing in Europ. and Cent. As. examples); oblong portion of beak about $\frac{1}{4}$ - $\frac{1}{2}$ length of utricule, glabrous or slightly minutely scabrous. *Nut* filling utricule, obovoid-ellipsoid, trigonous.—The identification of *C. punctata*, Gaudin, with *C. diluta*, M. Bieb. is due to Trevirarus (Bull. Soc. Nat. Mosc. 1863, i. 541); and is accepted by Trautvetter, while Regel (*Act. Hort. Petrop.* vii. 573) and Boissier admit both species in Asia. The common Indus Valley plant appears to me identical with the European *C. punctata*, Gaudin.

112. **C. Munroi**, *Boott ms.*; tall slender, leaves narrow, spikes 5-6, lowest very remote on filiform peduncle, topmost male with one utricule at the base linear lax pale brown, female glumes ovate acute scarcely mucronate, style 3-fid, utricule ellipsoid trigonous imperfectly nerved thin glabrous, narrowed into a short oblong-linear beak. *C. chinensis*, *Munro ms.* *C. diluta*, var. *Boott ms.*

KUNAWUR; alt. 11,500 ft. *Munro* (n. 2431).

Glabrous. *Stems* 3 ft. *Leaves* 18 by $\frac{1}{2}$ in., flat. Lowest *peduncle* 2 in., distant 11 in. from the next. *Spikes* $\frac{3}{4}$ -1 $\frac{1}{4}$ by $\frac{1}{8}$ - $\frac{1}{4}$ in., drooping, rather lax. Fem. *glumes* shorter than utricule, ferruginous brown, green 3-nerved on back. *Utricle* $\frac{1}{10}$ in., subsessile, wall of thin loose texture pale; beak very shortly bifid, smooth.—Perhaps allied to *C. Chinensis*, which has erect less distant spikes and hairy utricles. The texture and character of the utricule is much like that in *C. diluta*, M. Bieb. In both the examples preserved there is a utricule at base of the terminal male spike.

113. **C. ferruginea**, *Scop. Fl. Carniol.* ii. 225; spikes 3-7 distant, terminal one male, lower fem. cylindric long-peduncled nodding brown, glumes equalling utricule ovate acuminate, style 3-fid, utricule ellipsoid glabrous beak lanceolate longish notched scabrous on edges. *Reichb. Ic. Fl. Germ.* viii. 21, t. 248; *Boott Carex*, iv. 207; *Boeck. in Linnæa*, xli. 228. *C. Mieliichhoferi*, *Schk. Riedgr.* ii. 66, t. Mmmm, fig. 198; *Kunth Enum.* ii. 466.

KASHMIR; Pir Pinjul, alt. 11,000 ft., C. B. Clarke.—DISTRIB. Alpine Europe and (if *C. Scopoliiana*, Willd. be included) Central Asia.

Glabrous, brownish. *Stems* 1 ft. *Leaves* nearly as long as stem, in. broad, flat. *Spikes* all distant, $\frac{3}{4}$ -1 in.; bracts sheathing. *Glumes* (male and fem. similar) castaneous-red with green backs, often mucronate. *Utricle* quite glabrous in the Indian example (as in Scopoli's description and in Schkuhr's *C. Mieliichhoferi*); beak lanceolate-linear triangular, plane, subconcave on posticous face, glabrous but very scabrous on edges.—*C. Scopoliiana*, *Schk. Riedgr.* ii. 77, t. Nnnn, fig. 199 has utricule hispid somewhat subovoid suddenly narrowed into a small oblong beak. This is united (perhaps rightly) with *C. ferruginea*, Scop. (not Schk.) by Boott and Boeck.).

114. **C. tristis**, *M. Bieb. Fl. Taur. Cauc.* iii. 615; leaves flat, spikes 6-8 cylindric, uppermost 3 usually male, lower fem. distant peduncled suberect, fem. glumes ovate hardly mucronate, style 3-fid, utricule ellipsoid trigonous glabrous fulvous-hispid on angles suddenly narrowed into linear shortly-notched beak. *Kunth Enum.* ii. 465. *C. sempervirens*, *Villars*, var. γ , *Boott Carex*, iv. 218; *Boeck. in Linnæa*, xli.

227. *C. Schottii*, Boiss. *Diagn.* ser. 2, iv. 123. *C. macrogyna*, Turcz. (not of Boott, cf. Turcz. *Fl. Baical. Dahur.* ii. 284).

N. KASHMIR to the KARAKORUM; alt. 13–15,000 ft., C. B. Clarke.—DISTRIB. Central Asia.

Glabrous. *Stolons* 0. *Stems* 1–2 ft., rather slender, trigonous. *Leaves* rarely $\frac{1}{2}$ the stem, $\frac{1}{8}$ – $\frac{1}{4}$ in. broad. *Spikes* chestnut-purple, fem. $\frac{3}{4}$ by $\frac{1}{4}$ in.; lowest peduncle often 3–5 in. distant, exsert 2–4 in.; bracts not overtopping infl. Fem. *glumes* chestnut with scarious edges, shorter than utricule; keel green-yellow or concolorous. *Utricle* $\frac{1}{10}$ in. (beak excluded), green, prominently 8-nerved; beak $\frac{3}{4}$ length of nut, compressed, setose-scarious on margins. *Nut* filling utricule, shortly-stalked, style scarcely microscopically pubescent.

115. *C. flava*, Linn. *Sp. Pl.* 1384; spikes 3–6 approximate (or lowest somewhat distant) terminal one male, lower fem. short-cylindric dense, fem. glumes ovate, style 3-fid, utricule ovoid subinflated ribbed glabrous flavescent suddenly narrowed into oblong linear beak. Schk. *Riedgr.* i. 72 and ii. 56, t. H. fig. 36; Kunth *Enum.* iii. 446; Reichb. *Ic. Fl. Germ.* viii. 30. t. 273; Ledeb. *Fl. Ross.* iv. 299; Boeck. in *Linnæa*, xli. 272. *C. patula*, Host *Gram. Austr.* i. 48, t. 64. *C. Cederi*, Willd. in *Act. Berol.* 44, t. 1, fig. 2 (fide Kunth); Reichb. *l. c.* 29, t. 272. *C. lepidocarpa*, Tausch. *ms.*; Kunze *Suppl.* 52, t. 13, fig. 2; Reichb. *Ic. Fl. Germ.* viii. 29, t. 272.

KASHMIR; alt. 6–11,000 ft., Jacquemont, Thomson, &c.—DISTRIB. N. temp. regions, Tasmania (?).

Glabrous. *Stolons* 0. *Stems* caespitose, $1\frac{1}{2}$ –20 in. *Leaves* often $\frac{3}{4}$ length of stem, $\frac{1}{8}$ – $\frac{1}{2}$ in. broad. *Spikes* commonly all approximate, sessile sheath hardly any; or, if one spike is distant, that is peduncled in a distinct sheath (the rule throughout the genus). Fem. *spikes* commonly $\frac{1}{4}$ – $\frac{1}{2}$ by $\frac{1}{8}$ in., sometimes larger; often much smaller; beaks of ripe fruit stellately spreading or deflexed, rarely obliquely erect. Fem. *glumes* ovate, shorter than utricles, pale often yellowish, muticous or rarely mucronate. *Utricles* with 8 or 9 thick ribs about half as long as utricule; beak with an oblique small mouth or shortly notched. *Nut* not nearly filling utricule, obovoid, trigonous.—Boott has not touched *C. flava* & *C. Cederi*. The Indian examples show the same range of variation as the European; in size from $1\frac{1}{2}$ to 20 in., the spikes varying greatly in size, the beaks of the ripe fruit spreading, or deflexed, or rarely obliquely erect.

116. *C. songorica*, Karel. et Kiril. in *Bull. Soc. Mosc.* iii. 525; spikes 3–5 distant erect, uppermost 1 (or 2) male, lower fem. cylindric dense, fem. glumes ovate cuspidate shorter than utricule, style 3-fid, utricule ovoid or ellipsoid inflated corky shining red-brown narrowed into short 2-fid beak sessile subtruncate at base. Boott *Carex*, iv. 200; Boiss. *Fl. Orient.* v. 430. *C. Gebleri*, Prescott *ms. ex Boott in Proc. Linn. Soc.* i. 261 & in *Trans. Linn. Soc.* xx. 141. *C. nutans*, Boeck. in *Journ. Linn. Soc.* xviii. 105 & (var. *microcarpa*) in *Linnæa*, xli. 297.

N. KASHMIR; alt. 8–10,000 ft., C. B. Clarke.—DISTRIB. Cabul, Central Asia, Mandschuria.

Glabrous. *Rhizome* short, horizontal, woody. *Stems* 1–2 ft. *Leaves* often $\frac{1}{2}$ stems, $\frac{1}{8}$ – $\frac{1}{2}$ in. broad. Male *spikes* often pale, narrow, sometimes dark brown much broader (as in *C. nutans*, Host). Lower *spikes* usually nearly sessile, sheath short; sometimes peduncle $1\frac{1}{2}$ in., sheath $\frac{3}{4}$ in. Fem. *spikes* $1\frac{1}{4}$ by $\frac{1}{4}$ in., or smaller. Fem. *glumes* pale or brown with green back, margins usually scarious white. *Utricle* often more than $\frac{1}{2}$ in., ellipsoid (as long as in *C. nutans*, Host) but typically shorter, remarkably truncate, sessile; teeth of beak deep, spreading curved. *Nut* long, ellipsoid, pyramidal at both ends, trigonous, dark-brown.—If Boeckeler be followed in treating *C. songorica* as a var. of *nutans*, Host, all the Indian (and neighbouring) material will belong accurately to that var.

117. **C. rostrata**, *Stokes in With. Brit. Pl. ed. ii.* 1059; spikes 3-6 distant erect, uppermost 1 (or 2-3) male, lower fem. cylindric dense, fem. glumes lanceolate not aristate, style 3-fid, utricle ovoid or ellipsoid much inflated thin narrowed suddenly into short beak, nut very small. *C. ampullacea*, *Gooden. in Trans. Linn. Soc. ii.* 207; *Kunth Enum. ii.* 494; *Reichb. Ic. Fl. Germ. viii.* 31, t. 277; *Boott Carex, iv.* 156, t. 501.

KASHMIR; Jacquemont, alt. 10-11,000 ft., *Thomson*, alt. 8-13,000 ft., *C. B. Clarke*. LAHOL; *Jaeschke*.—DISTRIB. Cool Northern regions.

Glabrous. Stoloniiferous. Stems 2-3 ft., robust. Leaves often $\frac{3}{4}$ the stem, $\frac{1}{4}$ in. broad, scabrous near tip. Male spike $1\frac{1}{4}$ by $\frac{1}{8}$ in. Lowest fem. spike $1-1\frac{1}{4}$ by $\frac{1}{4}$ in., often 3 in. distant, on a peduncle $0-\frac{1}{2}$ in. Fem. glumes purple-chestnut with narrow pale back (in the Indian examples, often pale in the European). Utricles (fertile) $\frac{1}{2}$ in. long, ellipsoid, longer than glume, but many of the utricles are ovoid more inflated (with sterile nut) shorter than glume; ribs of utricle 6-8, inconspicuous (till the nut is taken out and the wall of utricle looked through); beak in sterile utricles about $\frac{1}{4}$ as long as utricles linear-conic, in fertile utricles much shorter, shortly 2-fid with erect teeth. Nut (perfect) very small, not $\frac{1}{2}$ length or breadth of utricle, obovoid, dark-brown.—This Indian *C. rostrata* is so referred by Boott, and is conspicuous by the narrow chestnut-purple glumes imperfectly covering the pale (nearly white) utricles; the beak of the front is very little split. Mr. Baker says "it is not at all good *C. ampullacea*."

118. **C. vesicaria**, *Linn. Sp. Pl.* 1388 (partly); spikes longer than in *C. rostrata*, fem. glumes ovate-lanceolate mucronate or short-aristate pale, utricle rather larger than in *C. rostrata*, beak deeply notched with 2 conspicuous shining lanceolate rigid teeth (otherwise as *C. rostrata*). *Kunth Enum. ii.* 494; *Reichb. Ic. Fl. Germ. viii.* 30, t. 276; *Boott Carex, iv.* 162, tt. 536, 537; *Boeck. in Linnæa, xli.* 319.

KASHMIR; Margan Pass, alt. 11,500 ft., *W. S. Atkinson*.—DISTRIB. Cold temp. N. regions.

Male spikes $2\frac{1}{2}$ in., and up to $1\frac{1}{2}$ in. apart (in the Kashmir examples). Fem. spikes up to 3 by $\frac{1}{2}$ in., both glumes and utricles pale stramineous.—*Atkinson's* collection is copious, though not fully ripe; Mr. Baker says it is "satisfactory *vesicaria*."

119. **C. pseudo-cyperus**, *Linn. Sp. Pl.* 1387; spikes 3-7 moderately near together, terminal one male pale, lower fem. cylindric dense nodding, female glumes linear-oblong aristate pale, style 3-fid, utricle ellipsoid-lanceolate subinflated thin pale smooth strongly ribbed, beak 2-fid in two erect whitened almost prickly teeth. *Kunth Enum. ii.* 501; *Reichb. Ic. Fl. Germ. viii.* 30, t. 275; *Boott Carex, iv.* 140, tt. 451, 452; *Boeck. in Linnæa, xli.* 321.

KASHMIR; alt. 6000 ft., *Thomson*; Pir Punjal, alt. 11,000 ft., *Levinge*.—DISTRIB. Cool N. regions.

Glabrous. Stolons 0. Stems $2\frac{1}{2}$ ft. Leaves often longer than stem, $\frac{3}{4}-\frac{1}{2}$ in. broad, flat. Spikes 1-3 in. long, lowest 1-3 (rarely 4-6) in. distant. Utricles $\frac{1}{2}$ in., ultimately divaricate, green or yellowish; beak about half as long as utricle, deeply notched. Nut ovoid, somewhat narrower than utricle, and about half as long, brown.

120. **C. acutiformis**, *Ehrh. Beitr. iv.* 43; spikes 3-7 distant erect, uppermost 3-2 male chestnut-red, fem. cylindric dense, fem. glumes elliptic-lanceolate not aristate, style 3-fid, utricle ovoid or ellipsoid inflated thin obliquely erect fuscous glabrous obscurely nerved, beak short, nut very small. *Boeck. in Linnæa, xli.* 289. *C. spadicea*, *Roth Tent. ii.*

461. *C. paludosa*, Gooden. in *Trans. Linn. Soc.* ii. 202; Nees in *Wight Contrib.* p. 129; Anderss. *Cyp. Scand.* 17; Kunth *Enum.* ii. 487; Reichb. *Ic. Fl. Germ.* viii. 28, t. 266; Boott *Carex*, iv. 214. *C. Kochiana*, DC. *Hort. Monsp.* 89; Reichb. *l. c.* t. 271.

KASHMIR, alt. 7000 ft., Thomson. NEPAL, Royle (n. 130).—DISTRIB. Cool N. temp. regions.

This differs from *C. rostrata* and *C. vesicaria* by the thick dark-colrd. male spikes, the suberect (not divaricate) ripe utricles, the fuscous lurid grey colour of utricles with shorter beak.—In Jaeschke's Lahoul collections is a young *Carex* with 11 spikes, the lower peduncles carrying 3-4 spikes, style 3-fid, utricle glabrous; it is too young for determination, and resembles generally *C. acuta* rather than *C. acutiformis*, but the style is 3-fid so that it must be placed here.

121. *C. tumida*, Boott *Carex*, i. 66, t. 181; spikes 5-6 suberect, terminal one male long linear, lower fem. short-peduncled distant long-cylindric dense, fem. glumes lanceolate short aristate pale, style 3-fid, utricle ellipsoid fuscous glabrous suddenly narrowed into a conic-linear shortly-notched beak. Boeck. in *Linnæa*, xli. 243.

SIKKIM HIMALAYA, alt. 9000 ft., J. D. H., alt. 5000 ft., C. B. Clarke. KHASIA HILLS; Shillong, alt. 6000 ft., C. B. Clarke.

Glabrous. Stems 12-18 in. Leaves longer than stem, $\frac{1}{4}$ - $\frac{1}{2}$ in. broad. Terminal spike 2 in., very narrow, pale. Lower spikes fem. 2-3 by $\frac{1}{4}$ in., ripe fruits obliquely suberect. Fem. glumes narrow-lanceolate, 3-nerved, stramineous, shorter than utricle, aristate or muticous; bracts much overtopping infl. Utricle $\frac{1}{2}$ in., not inflated, thin, obscurely nerved, lurid slate-colrd.; beak nearly as long as utricle its lower half conic. Nut obovoid-ellipsoid, trigonous, filling utricle.—The swelling in the middle of the beak, figured and insisted on by Boott, is taken from a single (not well-ripe) collection; in well-ripened fruits the lower half of the beak is conic the upper narrow oblong; it is hardly possible to describe it as tumid in the middle.

122. *C. olivacea*, Boott in *Proc. Linn. Soc.* i. 286, & in *Trans. Linn. Soc.* xx. 138, & *Carex*, i. 56, t. 149; spikes 4-8 suberect, terminal one male, lower fem. somewhat distant short-peduncled long-cylindric dense, fem. glumes lanceolate aristate pale, style 3-fid, utricle ovoid inflated fuscous glabrous finally deflexed suddenly narrowed into a short linear notched beak. *C. confertiflora*, Boott in *Mem. Am. Acad. N. S.* vi. [1859] 418, & *Carex*, iv. 184; Franch. & Savat. *Pl. Japon.* ii. 151, 578.

SIKKIM; Terai, J. D. H. ASSAM, alt. 300-1000 ft., frequent, C. B. Clarke, &c. CACHAR, Keenan.—DISTRIB. Java, Japan.

Taller and stouter than *C. tumida*, Boott; leaves in Hooker's examples up to $\frac{3}{4}$ in. broad. Stolons long. Terminal spike 2-4 by $\frac{1}{2}$ in., glumes obtuse purple with green keel. Fem. spikes (not quite ripe) up to 7 by $\frac{1}{4}$ in. in Hooker's examples, usually shorter thicker denser. Young utricle ovoid-conic, gradually narrowed upwards, when ripe much inflated; teeth of beak short, linear, finally spreading not very prominent. Nut ellipsoid or ovoid, much smaller than utricle.—Usually larger than *C. tumida*; it is easily told from it when young by the much thicker deeply-colrd. male spike, when ripe by the inflated deflexed utricles.

123. *C. lobulirostris*, Drejer *Symb. Caric.* 27, t. 14; spikes 4-6 approximate large cylindric erect, terminal one male dark brown, glumes lanceolate aristate dark brown fem. much smaller, style 3-fid, utricle ovoid somewhat inflated black red glabrous nervose suddenly narrowed into a linear shortly-notched beak. Boott *Carex*, iv. 190; Thu. *Enum.* 356; Boeck. in *Linnæa*, xli. 244. *C. Arnottiana*, Boott in *Proc. Linn. Soc.* i.

260, & in *Trans. Linn. Soc.* xx. 129 (not of Drejer). *C. Neesiana*, Arnott ms. (not of Endl.).

CEYLON, *Gardner, &c.*, alt. 6-7000 ft., *Thwaites*.

Glabrous. *Stems* 2-3 ft., rather stout. *Leaves* often overtopping stem, $\frac{1}{2}$ in. broad. *Spikes* very close together, subsessile; lowest sometimes $1\frac{1}{2}$ in. distant on a 1 in. peduncle; bracts very long. *Fem. spikes* 2 by $\frac{1}{4}$ - $\frac{1}{2}$ in., rigid. *Utricle* $\frac{1}{2}$ in., spreading, hardly deflexed, longer than glumes, thin but somewhat succulent; beak concolorous less than $\frac{1}{2}$ length of utricule. *Nut* ellipsoid, trigonous, subsessile, pyramidal at top, shortly apiculate, dark-brown.

124. ***C. lurida***, *C. B. Clarke*; spikes 4-5 distant cylindric, terminal 2-3 male purple, lower fem. erect peduncled dense, fem. glumes elliptic aristate, style 3-fid, utricule ovoid inflated thin lurid glabrous suddenly narrowed into a deeply bifid beak with 2 spreading prominent linear teeth. *C. rostrata*, *Boeck. in Linnæa*, xli. 317 (the *Sikkim plant*). *C. ampullacea*, var. Boott ms.—*Caricis* sp. (n. 1067), *Griff. Itin. Notes*, 194.

SIKKIM HIMALAYA; Lachen, alt. 9-12,000 ft., *J. D. H. BHOTAN*; Chupcha, alt. 8000 ft., *Griffith (Kew Distrib.* n. 6066).

Male glumes purple-red with green keel, triangular tipped. *Fem. glumes* purple-red on sides, the 3-nerved yellow back excurrent in a rigid scabrous arista, about as long as utricule. *Utricles* in size and shape about equalling those of small examples of *C. rostrata*, but different in colour; beak 2-fid very deeply into linear teeth finally stellately divaricate, conspicuous.—Boott observes that he has never seen such fem. glumes as these in *C. rostrata*.

125. ***C. fuscifructus***, *C. B. Clarke*; spikes 3-6 suberect somewhat distant, terminal one male greenish, lower fem. cylindric dense short-peduncled, fem. glumes lanceolate acute mucronate pale, style 3-fid, utricles ovoid fuscous many-nerved glabrous, beak oblong conic very long shortly 2-fid.

ASSAM; Luckimpore, alt. 300 ft., *C. B. Clarke*.

Glabrous, stoloniferous. *Stems* 15 in., rather stout. *Leaves* overtopping stem, scarcely $\frac{1}{4}$ in. broad. Lowest spike sometimes as much as 3 in. distant on a 2 in. peduncle, usually much closer; bracts 1 ft. Male spike $1\frac{1}{2}$ in., glumes very green on back, aristate. *Fem. spikes* $1\frac{1}{2}$ by $\frac{1}{4}$ - $\frac{1}{2}$ in.; glumes 3-nerved, rather shorter than utricles, scabrous-pointed. *Utricle* nearly $\frac{1}{2}$ in., conically narrowed at base, somewhat inflated; exerted part of style-branches hardly $\frac{1}{2}$ utricule.

*** *Utricle hairy, or minutely setulose.*

126. ***C. flacca***, *Schreb. Spicil. Fl. Lips. Append.* n. 669; spikes 4-6 distant long-cylindric, terminal 3-2 male, fem. glumes ovate acute, style 3-fid rarely 2-fid, utricule ellipsoid turgid obtuse puberulous-scabrous, beak minute subentire. *Host Gram. Austr.* i. 66, t. 90; t. P, fig. 57, & t. Zz, fig. 113. *C. glauca*, *Scop. Carn.* ii. 223; *Kunth Enum.* ii. 459; *Reichb. Ic. Fl. Germ.* viii. 29, t. 269; *Drejer Symb. Caric.* 20, t. 6; *Boeck. in Linnæa*, xli. 187.

SIND, *Pinwill*.—Temp. N. Hemisphere.

Glabrous, glaucous. *Stolons* long, hardening into a creeping branching rhizome 15 in. long in a Sind example. *Stems* 8-18 in. *Leaves* $\frac{2}{3}$ stem, $\frac{1}{2}$ in. broad, harsh. *Fem. spikes* $1\frac{1}{2}$ by $\frac{1}{2}$ in., dense in fruit; male spikes often longer $1\frac{3}{4}$ in. in Sind examples. Lowest spike short-peduncled, erect, or if very remote long-peduncled long-sheathed; bracts usually about as long as infl. *Utricle* small, about $\frac{1}{10}$ in. in the Sind plant, obscurely trigonous.

127. **C. setigera**, Don in Trans. Linn. Soc. xiv. 330, & Prodr. 43; stoloniferous, spikes 4–8 cylindric distant, terminal 1 (or 2–3) male, lowest fem. peduncled erect, fem. glumes ovate often aristate, style 3-fid, utricles ovoid hispid suddenly narrowed into small oblong notched beak. *Nees in Wight Contrib.* 126; *Kunth Enum.* ii. 515 (partly); *Boeck. in Linnæa*, xli. 189 (excl. Boott, t. 6, cited). *C. hymenolepis*, *Nees l.c.* 126; *Kunth l.c.* 505. *C. setigera*, var. *minor*, *Strachey Cat. Pl. Kumaon*, 73 (not Boott).—*Carex*, *Wall. Cat.* 3385.

HIMALAYA, alt. 7–10,000 ft., frequent, from Mussoorie, Jacquemont, to Sikkim, *J. D. H.*, and Phari, *G. King*.

Glabrous. *Rhizome* long, creeping, $\frac{1}{10}$ in. in. diam. *Stems* 1–2 ft. *Leaves* nearly as long as stem, $\frac{1}{2}$ – $\frac{3}{4}$ in. broad. *Spikes* $1\frac{1}{2}$ –2 in. long (in the typical *C. hymenolepis*, hardly half as much in the var. *chronolepis*, Drejer), fem. up to $\frac{1}{2}$ in. broad (but not more than $\frac{1}{2}$ in. broad in smaller forms referred here); lowest fem. spike often male at top, rather lax, often interrupted at base. Fem. *glumes* as long as utricles, with a bristle much overtopping utricles in the standard form (which is often small or disappears) usually with bright brown sides and scarious margins (but the colour of male and fem. glumes varies widely). *Utricle* $\frac{1}{10}$ – $\frac{1}{12}$ in., brown-green, very hispid, nerveless, strongly 2-edged, the concave face only obscurely ridged by the angle of nut, margined by the incurved edges. *Nut* ellipsoid, trigonous, narrowed much at base, dark brown; style slender, glabrous, base not dilated; exsert part of branches about as long as utricles.

128. **C. Schlagintweitiana**, *Boeck. Cyp. Nov.* i. 48; stoloniferous, spikes 3–6 very small cylindric distant pale, terminal 1 (or 2) male, lowest fem. peduncled erect, fem. glumes ovate often mucronate, style 3-fid, utricles very small ovoid hispid suddenly narrowed into small oblong notched beak. *C. setigera*, var. β minor, *Boott Carex*, i. 2, t. 6, fig. 1 (not fig. 2).

N.W. HIMALAYA, alt. 6–10,000 ft.; Kashmir, *C. B. Clarke*; Nynce Tal, *Thomson*; Simla, *Schlagintweit* (n. 5039), &c. SIND, *Pinwill*.—DISTRIB. Yarkand.

Stolons numerous, long. *Stems* 4–10 in., slender. *Leaves* overtopping stem, $\frac{1}{2}$ in. broad. Fem. *spikes* (in fruit) $\frac{1}{2}$ by $\frac{1}{10}$ – $\frac{1}{8}$ in., weak. *Utricles* hardly $\frac{1}{10}$ in. long.—Otherwise as *C. setigera*, Don, from which this differs mainly in size.

129. **C. inanis**, *Kunth Enum.* ii. 522; spikes 4–12 cylindric approximate, terminal one male, fem. glumes ovate sometimes mucronate, style 3-fid, utricles small ovoid trigonous hispid suddenly narrowed into a small notched beak. *C. setigera*, β minor, *Boott Carex*, i. 2, t. 6 (mostly, i. e. fig. 2). *C. setigera*, γ humilis, *Nees in Wight Contrib.* 126. *C. setigera*, var. *fascicularis*, *Strachey Cat. Pl. Kumaon*, 73. *C. setigera*, *Kunth Enum.* ii. 515 (partly).—*Carex* sp. (*Royle*, n. 122), *Nees in Wight Contrib.* p. 120.

HIMALAYA, alt. 7–10,000 ft.; from Kashmir, *C. B. Clarke*, to Sikkim, *J. D. H.*

Rhizome divided, short, i. e. arises from lateral offsets not from elongate stolons. *Stems* 2–15 in., slender. *Leaves* overtopping stem, narrow. *Bracts* very long, conspicuously overtopping infl. *Spikes* (in fruit) $\frac{3}{4}$ by $\frac{1}{2}$ in., dense, grey-green, upper often fascicled, lowest sometimes a little distant, short-peduncled, occasionally carrying 3–4 spikes. Fem. *glumes* frequently mucicous, the midrib sometimes shortly excurrent. *Utricle* much smaller than in *C. setigera*, Don, more turgid, without one face concave.—Spikes much denser than those of *C. setigera*, Don.

130. **C. kashmirensis**, *C. B. Clarke*; spikes 3–6 short-cylindric approximate, terminal 1–3 male, fem. glumes ovate mucicous, style 3-fid, utricles ellipsoid lanceolate trigonous hispid acuminate into oblong deeply bifid beak. *C. hirtella*, *Boott ms.* (partly).

KASHMIR, alt. 10-15,000 ft., Thomson, frequent, C. B. Clarke.

Resembles generally *C. præcox* or *C. pilulifera*, but has an oblong beak to utricle ending in two scarious lanceolate teeth. *Rhizome* short, creeping, divided. *Stems* 8-16 in., slender. *Leaves* all nearly basal, $\frac{3}{8}$ length of stem, $\frac{1}{2}$ in. broad, flat. *Infl.* usually 1-1 $\frac{1}{2}$ in.; bracts not (or scarcely) overtopping infl. *Spikes* very close, nearly sessile; lowest fem. occasionally 1-1 $\frac{1}{2}$ in. distant, then shortly peduncled. *Spikes* $\frac{1}{2}$ - $\frac{3}{4}$ in., ferruginous; fem. with 8-20 utricles. *Utricle* $\frac{1}{2}$ in. long (much smaller than in *C. hirtella*), greenish, about 8-ribbed. *Nut* filling utricle, dark brown, oblong-ellipsoid; style microscopically scabrous-pilose, exsert branches about as long as utricle.—The preceding *C. inanis*, Kunth, is distinguished from the present sp. by its very long bracts.

131. *C. hæmatostoma*, Nees in Wight Contrib. 125; spikes 4-10 linear-cylindric, uppermost 3-1 male, lower fem. somewhat distant short-peduncled suberect, fem. glumes ovate, style 3-fid, utricle much compressed ovoid tip triangular-oblong deeply 2-fid hairy, nut stalked, style hairy. Kunth Enum. ii. 514; Strachey Cat. Pl. Kumaon, 73; Boott Carex, i. 72, t. 196; Boeck. in Linnæa, xli. 302. *C. macrogyna*, Boott l. c. 7, t. 22; Boeck. l. c. 223 (not of Turcz.).

HIMALAYA and W. TIBET; N. Sikkim, alt. 12-17,000 ft., J. D. H., &c. Kumaon, alt. 10-13,000 ft., Duthie, &c. KUNAWUR, alt. 7-9000 ft., Royle, &c. NUBRA, alt. 15-17,000 ft., Thomson.—DISTRIB. Central Asia.

Glabrous, except spikes. *Rhizome* short; no stolons seen. *Stems* 8-30 in., unusually terete. *Leaves* 4-20 by $\frac{1}{2}$ in., weak, flat when dry. *Spikes* sometimes 2 $\frac{1}{2}$ by $\frac{1}{2}$ in. (or in some high-level Sikkim examples $\frac{3}{4}$ by $\frac{1}{2}$ in. few-fid.), chestnut-purple. Fem. glumes shorter than utricle, mucronate, dark chestnut with or without a broad green back, in the large Sikkim examples brown-pilose, in Royle's plant nearly (sometimes quite) glabrous. *Utricle* $\frac{1}{2}$ - $\frac{3}{4}$ in., with few obscure nerves, usually browned upwards. *Nut* oblong-obovoid, trigonous, obtuse, with short oblong apiculus.

132. *C. hirtella*, Drejer Symb. Caric. 21; leaves very narrow en-rolled when dry, utricle ellipsoid-lanceolate very long—otherwise as *C. hæmatostoma*, Nees. Boott Carex, i. 11, t. 31; Boeck. in Linnæa, xli. 209, & in Journ. Linn. Soc. xviii. 105. *C. tenuis*, Nees in Wight Contrib. 128; Kunth Enum. ii. 516.

KASHMIR, alt. 9-13,000 ft., very common. KUNAWUR, Royle. GURWHAL, alt. 9-10,000 ft., Duthie (n. 62).

The full form has utricles 4- $\frac{1}{2}$ in. long and is very marked; but eastern examples have smaller utricles, and are hardly distinguishable from *C. hirtella* by their very narrow inrolled leaves. The utricles in both species are triangular at tip without any definite beak; the terete stems, the much-stalked nut, and the very hairy style are characteristic of both species. The spikes in *C. hirtella* are (usually) 3 male, 3-2 fem.; the glistening margins of the glumes are sometimes very prominent, sometimes not more so than in *C. hæmatostoma* and many sp.

133. *C. cardiolepis*, Nees in Wight Contrib. 127; spikes 3-5 distant cylindric, terminal one male, fem. glumes ovate truncate mucronate pale-backed, style 3-fid, utricles obovoid-ellipsoid trigonous scabrous bristly suddenly narrowed into minute oblong beak. Kunth Enum. ii. 516; Strachey Cat. Pl. Kumaon, 73; Boeck. in Linnæa, xli. 200 & in Journ. Linn. Soc. xviii. 105; Boiss. Fl. Orient. v. 409.

N.W. HIMALAYA, alt. 8-11,000 ft., frequent; from Kumaon to Kashmir.—DISTRIB. Cabul.

Glabrous. *Stems* 6-18 in., caespitose on a tough short rootstock. *Leaves* often nearly as long as stem, $\frac{1}{10}$ in. broad, flat. Lowest fem. spike in fruit 1 by $\frac{1}{2}$ in.,

on peduncle $1\frac{1}{2}$ in.; bract sheathing, its free portion very short (rarely 1 in.). Fem. glumes rather large, conspicuous by the strongly-ribbed broad green back; male glumes sometimes similar but often chestnut-red. Utricle $\frac{1}{2}$ in., shorter than glume, round-trigonal, obscurely nerved; beak hardly notched. Nut obovoid, trigonal, filling utricule; style very short, base slightly swollen, branches as long as utricule.

134. **C. Halleriana**, *Asso Syn.* 133, t. 9, fig. 2; spikes 3, terminal one oblong-cylindric male, fem. 2 close to it short few-fl'd., fem. glumes ovate green, style 3-fid, utricule somewhat large ovoid strongly-ribbed green minutely glandular-pilose tip triangular shortly notched. *Boott Carex*, iv. 128, tt. 415, 416; *Boeck. in Linnæa*, xli. 201. *C. alpestris*, *Allioni Fl. Pedem.* ii. 270; *Kunth Enum.* ii. 479. *C. gynobasis*, *Vill. Dauph.* ii. 206; *Reichb. Ic. Fl. Germ.* viii. 25, t. 259. *C. diversiflora*, *Host Gram. Austr.* i. 53, t. 70.

SIND, *Pinwill.* — DISTRIB. Westward to Europe. Also (subspecies) in N. America.

Glabrous. Stems 6–12 in., cæspitose on a harsh short rhizome. Leaves usually many, often as long as stem, scarcely $\frac{1}{10}$ in. broad. Terminal male spike $\frac{1}{2}$ by $\frac{1}{2}$ in., dense, pale brown. Lowest fem. spike rarely 1 in. distant, usually ovoid close to the upper fem.; bract very short. (Slender subbasal stems carry often 1 spike wholly female or male at top; there is no line to be drawn between this state and the common form of 1 male spike with 2 shorter female spikes at its base.)

135. **C. læta**, *Boott Carex*, i. 69, t. 188; slender, spikes 2–3 distant cylindric, terminal 1 male, fem. glumes broadly obovate chestnut-purple, style 3-fid, utricule obovoid-ellipsoid trigonal pilose tip short-triangular beakless. *Boeck. in Linnæa*, xli. 199.

SIKKIM HIMALAYA; Tengu, alt. 12–13,000 ft., *J. D. H.*

Glabrous. Stems 4–6 in., cæspitose on a small tough woody rootstock. Leaves $\frac{1}{2}$ – $\frac{3}{4}$ stem, $\frac{1}{12}$ – $\frac{1}{10}$ in. broad, flat. Lowest fem. spike $\frac{1}{2}$ by $\frac{1}{2}$ in., on peduncle $1\frac{1}{2}$ in.; bract sheathing, its free extremity very short. Fem. glumes very broad, tip depressed-triangular, keel narrowly green. Utricle scarcely $\frac{1}{10}$ in., terminated by a small round hole. Nut obovoid, triangular, filling utricule; style short.—Boeckeler cites this as "*C. pellucida*, Hook. f. et T. Thoms., not of Turcz." *C. pellucida*, Turcz., was never published, nor does Boeckeler say what it was: the name was sent Boott (by Fischer on an example) who affixed it in ms. to Hooker's Tengu plant. Turczaninow subsequently published his ms. *C. pellucida* as *C. Kirilowii* [*Fl. Baical-Dahur*, ii. (pars. 1) 275]; it is very near indeed to *C. læta* but has more acute fem. glumes, and Boott subsequently referred it to *C. pediformis*, C. A. Mey.

136. **C. setosa**, *Boott Carex*, iii. 108, tt. 327, 328, 329; spikes 2–5 distant slender cylindric, terminal one male, fem. glumes elliptic acute or truncate, style 3-fid, utricule oblong-obovoid trigonal setose narrowed rather suddenly into a short oblong scarcely-notched beak. *Boeck. in Linnæa*, xli. 303.

HIMALAYA, alt. 10–12,000 ft. Sikkim, *J. D. H.*, &c. GURWHAL, *Duthie*. KASHMIR, *C. B. Clarke*.

Glabrous. Stems cæspitose on a woody horizontal rhizome, 8–12 in., medium in the Sikkim plant, filiform in the Kashmir. Leaves hardly $\frac{1}{2}$ stem, $\frac{1}{4}$ – $\frac{1}{2}$ in. broad, flat. Terminal male spike more than 1 in. in the Sikkim plant, $\frac{1}{4}$ – $\frac{1}{2}$ in. in the Kashmir, pale. Fem. spikes 2 by $\frac{1}{2}$ in. (in the Sikkim type) dense, on a 2–3 in. erect peduncle; in the Kashmir plants, fem. spikes $\frac{1}{4}$ – $\frac{1}{2}$ in., delicate, lax, on filiform wavy peduncles. Fem. glumes likewise vary from narrow ovate acute (in Sikkim) to truncate in Kashmir. Utricle small, shining brown, with few scattered long fulvous setæ in Hooker's type plant (whence name *setosa*); in the perfectly ripe Kashmir plant utricles are green thin with rather copious short pubescence.—The Gurwhal

examples since Boott (collected by Duthie) are intermediate between the Sikkim and Kashmir. The Kashmir plant, both in the truncate glumes and utricles, is near *C. cardiolepis*, Nees, but the spikes and utricles are much slenderer.

137. **C. oligocarya**, *C. B. Clarke*; slender, spikes 4-1 terminal 1 male, fem. spikes peduncled with 4-1 utricles, style 3-fid, utricle obovoid-ellipsoid pilose suddenly narrowed into a long deeply-notched beak.

N.W. TIBET; Dras to the Karakorum, alt. 12-13,000 ft., *C. B. Clarke*.

Glabrous except utricles. *Rhizome* stout, horizontal. *Stems* 6-10 in. *Leaves* numerous, much shorter than stem, $\frac{1}{10}$ in. broad, flat. *Spikes* $\frac{1}{4}$ - $\frac{1}{2}$ in., terminal one male often with a fem. close to its base or may be termed "androgynous male at top." Lowest fem. *spike* 1-2 in. distant, on a 1-1 $\frac{1}{2}$ slender peduncle; bracts shorter than infl. Fem. *glumes* elliptic-lanceolate, hardly mucronate, shorter than fruit. *Utricle* (beak included) $\frac{1}{8}$ - $\frac{1}{6}$ in., trigonous, about 8-ribbed, brown-green; beak $\frac{2}{3}$ length of body. *Utricle* ending in two long lanceolate white glabrous teeth. *Nut* ellipsoid, trigonous, filling utricle; base of style not dilated, branches long.—The European and Asiatic few-utriculate species compared have all a much shorter beak than this.

138. **C. breviculmis**, *Br. Prodr.* 242; slender, spikes 2-5 oblong rather small, terminal one male pale, fem. with 8-14 utricles, fem. glumes with long bristle much exceeding utricles, style 3-fid base dilated, utricle small ellipsoid trigonous slightly hairy, tip pyramidal. *Kunth Enum.* ii. 522; *Boott Carex*, iv. 181; *Boeck. in Linnæa*, xli. 209. *C. Royleana*, *Nees in Wight Contrib.* 127; *Kunth l. c.* 441; *Boott Carex*, i. 6, t. 19. *C. leucochlora*, *Bunge in Peters Mem. Sav. Etrang.* ii. 142. *C. Langsdorffii*, *Boott in Trans. Linn. Soc.* xx. 144. *C. puberula*, *Boott in Perry Exped. Jap.* ii. 234.

N.-W. HIMALAYA, alt. 6-10,000 ft., *Royle, &c.* SIND; *Pinwill.* KHASIA HILLS, alt. 4500-6300 ft., *C. B. Clarke.* MUNEYPOOR; alt. 6000 ft., *Watt.* NILGIRI HILLS; alt. 7000 ft., *C. B. Clarke*.—DISTRIB. Japan, China, Austral., N. Zealand.

Glabrous, except utricles. *Rhizome* creeping. *Stems* caespitose, 4-16 in. *Leaves* often $\frac{2}{3}$ stem, $\frac{1}{2}$ in. broad, flat. *Spikes* usually approximate, subsessile; lowest fem. sometimes 6 in. distant on 2 in. peduncle; fem. ripe spikes $\frac{1}{2}$ by $\frac{1}{6}$ in. *Style* at base dilated green, sometimes forming a button as in the nuts of *Eleocharis*.

139. **C. nemostachys**, *Steud. in Flora*, xxix. 23 and *Cyp.* 218; robust, stolons long, spikes 3-8 approximate long-cylindric very dense, terminal one male, style 3-fid, female glumes linear-caudate, utricle ovoid trigonous somewhat hairy beak long conic-linear. *Miq. in Ann. Mus. Lugd. Bat.* ii. 150, 211; *C. excurva*, *Boott Carex*, i. 57, t. 150; *Boeck. in Linnæa*, xli. 245. *C. Zollingeri*, *Boeck. l. c.* 242.—*Carex* sp., *Griff. Itin. Notes*, 86 (n. 1256).

KHASIA and Jaintea Hills, alt. 3-5000 ft., everywhere very common, *J. D. Hooker, &c.* GARO HILLS; alt. 1200 ft., *C. B. Clarke*.—DISTRIB. China, Japan.

Glabrous, except utricles. *Stolon* very long, stout. *Stems* 3-1 ft., at top triquetrous scabrous. *Leaves* often as long as stem, $\frac{1}{2}$ in. broad, flat, margins scabrous, cutting; sheaths often fimbriated. Male *spike* sometimes 4 $\frac{1}{2}$ by $\frac{1}{2}$ in., always long; fem. spikes erect (peduncles hardly $\frac{1}{2}$ in.) 3 by $\frac{1}{2}$ in., dense, appearing hispid from the linear beaks spreading in all directions and the long persistent style-branches. Fem. *glumes* from a very short triangular base, linear as long as utricles, finally whitening. *Utricle* (beak included) about $\frac{1}{2}$ in.—An unmistakable plant that cuts severely.

140. **C. Wallichiana**, *Prescott in Wall. Cat.* 3380; glabrous except utricles, stolons long, leaves (all sub-basal) long, spikes 4-8 distant long-cylindric dense, 3-1 terminal male, style 3-fid, utricle ovoid-ellipsoid densely hairy, beak very short divided nearly to base into two lanceolate prickly teeth. *Nees in Wight Contrib.* (1834), 129; *Kunth Enum.* ii. 483; *Strachey Cat. Pl. Kumaon*, 73; *Boott Carex*, i. 6, t. 18; *Boeck. in Linnæa*, xli. 310 (partly); *Aitch. Cat. Punjab. Pl.* 152. *C. Fedia*, *Nees l. c.* 129; *Kunth Enum.* ii. 483. *C. hirta*, *Boiss. Fl. Orient.* v. 431; *Boeck. in Journ. Linn. Soc.* xviii. 105 (not of Linn).—*Carex*, *Wall. Cat.* 3390.

N. INDIA, generally from Rawul Pindee, *Aitchison*, to BURMA, *Griffith*, and from DELHI CANAL, alt. 800 ft., *Edgeworth*, to Sikkim, alt. 9000 ft., *King*.—DISTRIB. Cabul.

Stems 6-30 in. *Leaves* often $\frac{2}{3}$ stem, $\frac{1}{4}$ in. broad, sheaths often fimbriate. *Spikes* often $1\frac{1}{2}$ in.; terminal males pale rather thick, often 3-2, sometimes 6-4, rarely 1; fem. $\frac{1}{4}$ in. thick, ashy, lowest often 3-7 in. distant on erect peduncle; bracts usually overtopping infl. Fem. *glumes* ovate, acute, often mucronate, fuscous, shorter than utricles. *Utricle* (beak included) $\frac{1}{8}$ - $\frac{1}{6}$ in. long, 8-10-nerved; teeth of beak ultimately whitening spreading.—United with *C. hirta*, Linn., both by Boeckeler and Boissier; to which it is undoubtedly allied. *C. hirta* differs in the sheaths (or the "ligules" at least) hairy, the male spike smaller, the utricles larger more acuminate into a longer beak.—*C. Wallichiana*, Boeck., was founded partly on Falconer's n. 1164 which is *C. ligulata*, Nees.

141. **C. ligulata**, *Nees in Wight Contrib.* 127; stems with nodes and leaves throughout their length, leaves $\frac{1}{4}$ - $\frac{1}{2}$ in. wide, spikes 6-8 cylindric distant, terminal one male slender, style 3-fid, utricle densely hairy ovoid acuminate into a short 2-fid beak. *Kunth Enum.* ii. 516; *Strachey Cat. Pl. Kumaon*, 73; *Boott Carex*, i. 45, t. 113; *Boeck. in Linnæa*, xli. 305. *C. breviculmis*, *Thw. Enum.* 356 not Br.). *C. Thwaitesii*, *Hance in Journ. Bot.* v. 235 (cf. *Trimen Cat. Pl. Ceylon*, 104). *C. Wallichiana*, *Boeck. in Linnæa*, xli. 310 (partly, not of Prescott). *C. lachnosperma*, var. β major, *Nees in Wall. Cat.* 3379 (partly) (3379 β *Wall. Herb. propr.*).—*Carex*, *Wall. Cat.* 3394 (second sheet).

KASHMIR; *Falconer to NEPAL, Wallich*, alt. 5-7000 ft. KHASIA HILLS, alt. 5-6000 ft., *Griffith*, *C. B. Clarke*. NILGIRI HILLS; alt. 5-7000 ft., *C. B. Clarke*. CEYLON; alt. 4-5000 ft., *Thwaites*.—DISTRIB. China, Japan.

Sheaths and leaves (partly) minutely hairy. *Rootstock* woody, short, knotted, not thick. *Stems* 12-30 in. *Lower leaves* short; those springing from middle of stem about as long as infl., flat, striate. *Terminal spike* $\frac{2}{3}$ by $\frac{1}{10}$ in., brown. Fem. *spikes* $1\frac{1}{2}$ by $\frac{1}{2}$ in., erect on short peduncles, pale or fuscous. Fem. *glumes* ovate, acute, mostly mucronate, shorter than utricles. *Utricle* (beak included) $\frac{1}{10}$ in.

142. **C. hebecarpa**, *C. A. Meyer in Petersb. Mem. Sav. Etrang.* i. 223, t. 12; leaves and lower bracts very close together scarcely $\frac{1}{4}$ in. broad much overtopping infl., fem. spikes slender with distant utricles, fem. glumes whitening (otherwise as *C. ligulata*, Nees). *Kunth Enum.* ii. 471; *Boeck. in Linnæa*, xli. 301. *C. Wallichiana*, *C. B. Clarke in Journ. Linn. Soc.* v. 25, 83 partly, not of Prescott). *C. lachnosperma*, *Wall. Cat.* 3379, A.

NEPAL; *Wallich*. MUNEYPOOR; alt. 5800 ft., *C. B. Clarke*.

Beak of utricle rather longer and slenderer than in *C. ligulata*, Nees.

Var. β *lachnosperma* (sp.) *Nees in Wight Contrib.* 124 (excl. syn.); leaves close together $\frac{1}{4}$ in. broad, fem. spikes dense $\frac{1}{2}$ - $\frac{3}{4}$ in. broad. *Kunth l. c.* 505. *C. Kunthii*, *Drejer Symb. Caricol.* 22. *C. gracilis*, *Boott Carex*, i. 59 (partly). *C. Maubertiana*, *Boott l. c.* 45, t. 114. *C. ligulata*, *Nees*, var. minor and angustifolia, *Boott ms.*

NEPAL; Wallich. KHASIA HILLS; alt. 4500 ft., Griffith (Kew Distrib. 6063), J. D. H. MUNEYPOOR; alt. 4000-5000 ft., C. B. Clarke.—DISTRIB. Cochinchina.

Appears exactly intermediate between *C. ligulata*, Nees and *C. hebecarpa*, C. A. Meyer; but it grows mixed with the latter in such a way both in Wallich's collections and in Muneypoor, that it must not be separated from it. This raises a presumption that the whole series of plants included under *C. ligulata*, Nees, and *C. hebecarpa* should be regarded as one species. Boott was much puzzled by the intermediate form, and gave it various names; but in reducing it to *C. gracilis*, he forgot that the style in *gracilis* is 2-fid.

UNDETERMINED INDIAN CAREX.

1. *C. AITCHISONI*, Boeck. in *Flora*, lxiii. 456. Kurrum Valley (British Afghanistan); Aitchison. Allied to *C. microlepis*, Boeck. & *C. punctata*, Gaud., fide Boeckeler.

2. *C. CYLOCISTIS*, Boeck. *Cyp. Nov.* I. 47. Tibet; Schlagintweit, n. 8860 (partly) and (n. 7045). Allied to *C. pulla*, fide Boeckeler.

3. *C. DIMORPHA*, Boeck. l. c. 45. W. Himalaya; Schlagintweit n. (4175). Allied to *C. alpina*, fide Boeckeler.

4. *C. EXIGUA*, Boeck. in *Engl. Jahrb.* v. 514. Ceylon; Wichura (n. 2690). Allied to *C. acicularis* & *C. Archeri*, fide Boeckeler.

5. *C. HETEROLEPIS*, Boeck. *Cyp. Nov.* I. 48 (not of Boott). Spiti; Schlagintweit (n. 6972). Allied to *C. magellanica*, fide Boeckeler.

6. *C. LONGEPEDICELLATA*, Boeck. *Cyp. Novæ*, i. 41. Ladak; Schlagintweit (n. 1642). Allied to *C. stenophylla*, *C. incurva*, fide Boeckeler.

7. *C. LONGICUSPIS*, Boeck. l. c. 49. Balti; Schlagintweit (n. 6088). Allied to *C. fuliginosa*, *C. frigida*, fide Boeckeler.

8. *C. MACRANTHA*, Boeck. l. c. 49. Tibet; Schlagintweit (n. 7017). Allied to *C. ustulata*, fide Boeckeler.

9. *C. MELANOLEPIS*, Boeck. l. c. 47. Lahoul; Schlagintweit (n. 2869) (partly). Allied to *C. pulla*, fide Boeckeler.

10. *C. MINUTIFLORA*, Boeck. l. c. 51. W. Himalaya; alt. 6000-7300 ft., Schlagintweit (n. 4919). Allied to *C. hebecarpa*, C. A. Meyer, fide Boeckeler.

11. *C. POLYGYNA*, Boeck. l. c. 40. Kishtwar; Schlagintweit (n. 3840). Allied to *C. leiocarpa*, fide Boeckeler.

12. *C. PSEUDO-BICOLOR*, Boeck. l. c. 44. W. Himalaya; Schlagintweit (n. 8643). Allied to *C. bicolor*, fide Boeckeler.

13. *C. TIBETICA*, Boeck. l. c. 46. Spiti; Schlagintweit (n. 6960). Allied to *C. Lehmanni*, fide Boeckeler.

14. *C. TRISPICULATA*, Boeck. l. c. 45. Gurwhal; alt. 10,000-10,600 ft., Schlagintweit (n. 10, 56). Allied to *C. bicolor* and *C. pseudo-bicolor*, fide Boeckeler.

15. *C. UNCINIIFORMIS*, Boeck. l. c. 40. Kumaon; alt. 11,000-12,000 ft., Schlagintweit (n. 9640). Allied to *C. linearis*, Boott, fide Boeckeler.

LASIOLEPIS, Boeck. (in *Flora*, lvi. 90, and in Linnæa, xxxviii. 542), referred by its author to *Cyperaceæ*, is, as pointed out in *Gen. Plant.* (iii. 1043) identical with *Eriocaulon*. The description of the only Indian species, *L. brevifolia*, is too incomplete for identification with any previously described *Eriocaulon*, but answers to several common ones.

INDEX OF GENERA, SPECIES AND SYNONYMS.

The Synonyms and Species incidentally mentioned are printed in italics.

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* Err. typ. for *Cnemidia curculigoides*, read *Tropidia curculigoides*.

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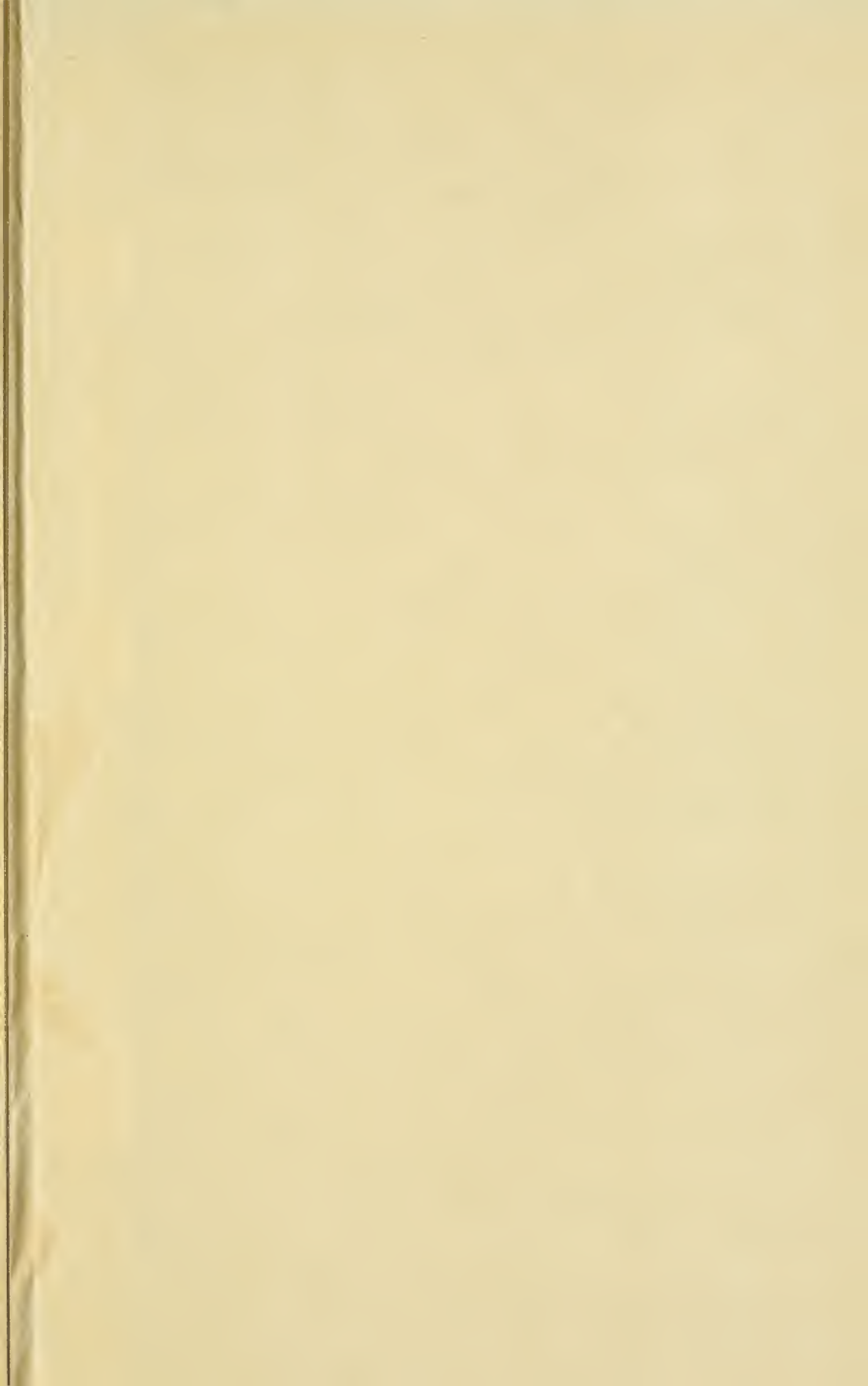
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FLORA
OF
BRITISH INDIA.

THE
FLORA OF BRITISH INDIA.

BY
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ASIATIC SOCIETY OF BENGAL.

ASSISTED BY VARIOUS BOTANISTS.

VOL. VII.

CYPERACEÆ, GRAMINEÆ, AND GENERAL INDEX.

PUBLISHED UNDER THE AUTHORITY OF THE SECRETARY OF STATE FOR
INDIA IN COUNCIL.



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PREFACE TO VOL. VII.

THE length of time, upwards of a quarter of a century, occupied in the publication of the Flora of British India, has resulted in the later volumes containing a far more complete account of the families of plants to which they are devoted than do the earlier volumes of theirs.

For this there are two reasons, the extension of the area of British India in the interval, and the many collections that have been transmitted to Kew from wholly or imperfectly explored regions of India during the same interval.

The extension of area has been : on the East, Munnepore, and by far the greater part of Burma, adding many Indo-Chinese genera and species to the flora ; on the West, British Beluchistan and other trans-Indus hills and valleys, adding Oriental genera and species. Neither of these extensions have, however, added so much to the Indian flora as might have been expected ; for, as regards Burma, extensive materials were already available from Pegu, Martaban, Tenasserim, and the upper and lower Irawaddy valleys ; and as regards the West, the low country Oriental flora is represented in the plains of Sind and the Panjab, and the upland and alpine in the trans-Indus valleys, Western Tibet, and the Kashmir Himalaya.

On the other hand, the collections received from previously unexplored and partially explored regions of India proper have been numerous and full of novelty and interest. Of these the first in importance are Mr. C. B. Clarke's, whether for their extent, the knowledge and judgment with which the specimens were selected, ticketed, and preserved, or for the valuable observations which accompany them. They were obtained over a greater extent of India than had been traversed by any other Indian botanist, and at all elevations, up to 18,500 ft., from the bend of the Indus at Gilgit, Kashmir, and Western

Tibet, in the extreme West; from Sikkim, Bengal, Assam, and Munne-pore in the East; from Behar, Central India, and Chota Nagpur in the centre; and from the Nilghiri Hills in the South. Next in importance are the Malay Peninsula collections made by Father Scortechini, the Messrs. Curtis, Wray, Hervey, Hullett, Merton, and Ridley, and by collectors sent by Dr. King from the Botanic Gardens of Calcutta. These latter have added several hundred species to the genera described in the first volume alone of this Flora, and have been published by Dr. King in the Journal of the Asiatic Society of Bengal. Thirdly rank Mr. Duthie's copious and excellently preserved collections made in Kashmir, Western Tibet, Garwhal, Kumaon, Rohilkund, Rajmahal, and Central India, and Dr. Aitchison's from the Kurrum and other valleys west of the Indus.

Of the works upon Indian Botany that have appeared during the publication of Flora of the British India, the more important are Mr. C. B. Clarke's "*Compositæ Indiæ*" (1876); Mr. Kurz's "*Forest Flora of Burma*" (1876); Dr. Brandis' "*Forest Flora of N.-W. and Central India*" (1874); Col. Beddome's "*Flora Sylvatica of Southern India*," vols. i. and ii. (1869-73), and his "*Icones Plantarum Indiæ Orientalis*," vol. i. (1874); Dr. Trimen's "*Handbook of the Ceylon Flora*," Parts i.—iii. (1893-5); and Dr. King's "*Annals of the Botanic Gardens, Calcutta*," vols. i.—vii. (1888-1897), which include illustrated monographs by himself and other Indian botanists of the Indian species of *Ficus*, *Quercus*, *Pedicularis*, *Magnoliaceæ*, *Anonaceæ*, *Bambusæ*, &c.

In the Preface to the first volume of this work I have stated that it was proposed to include in it the Ferns and their allies. This intention has been abandoned, owing to the appearance of excellent available works describing the Indian species, especially Hooker and Baker's "*Synopsis Filicum*" (1874); Col. Beddome's "*Review of the Ferns of N.-W. India*" (1880), and his "*Handbook of the Ferns of British India*" (1883), with Supplement (1892).

Having regard to this "*Flora of British India*," I must remind those who may use it that it has no pretensions to give full characters of the genera and species contained in it. It aims at no more than being an attempt to sweep together and systematize within a reasonable time and compass, a century of hitherto undigested materials scattered through a library of botanical books and monographs, and preserved in vast collections, many of which latter had lain unexamined for half a

century in the cellars of the India House and in public and private herbaria. It is a pioneer work, which, besides enabling botanists to name with some accuracy a host of Indian plants, may, I hope, serve two higher purposes, to facilitate the compilation of local Indian floras and monographs of the large Indian genera; and to enable the phytographer to discuss the problems of the distribution of plants from the point of view of what is perhaps the richest, and is certainly the most varied botanical area on the surface of the globe, and one which, in a greater degree than any other, contains representatives of the floras of both the Eastern and Western Hemispheres.

J. D. HOOKER.

November, 1897.

ADDENDUM.

Vol. vii. p. 416, under 2. *S. chilianthum*, insert habitats:

Singapore, *Wallich*; Malacca, *Stevens*. DISTRIB.: Java, Sumatra.

FLORA OF BRITISH INDIA.

ORDER CLXXIII. GRAMINEÆ.

ERECT decumbent or creeping herbs, or in Tribe *Bambuseæ* shrubs or trees. *Stem* terete or compressed, jointed; internodes solid or hollow. *Leaves* simple, usually long and narrow, entire, parallel-nerved, with a sheathing base distinct from the blade; sheath split to the base (very rarely entire) with often a transverse hyaline erect appendage (*ligula*) at the union with the blade, facing the latter. *Inflorescence* terminal, rarely also from the upper sheaths, consisting of spicate racemed capitate or paniced spikelets. *Spikelets* of three or more alternate distichous bracts (*glumes*), of which the two lowest are normally empty, and the succeeding, if more than one, are arranged on an axis (*rachilla*), and are all or some of them flowering; within each flowering glume and opposite to it is an erect narrow 2-nerved scale (*palea*), the margins of which are infolded towards the glume and enclose at the base the true flower. *Flowers* uni- or bisexual, consisting of 2, rarely 3 or 6 microscopic scales (*lodicules*) representing a perianth, and stamens or a pistil, or both. *Stamens* 3, rarely 1, 2, 6, or very rarely many, hypogynous; filaments capillary; anthers versatile, fugacious, of two parallel cells, with no apparent connective; pollen globose. *Ovary* entire, 1-celled; styles 2, rarely 3, free or united at the base, usually elongate, and exerted from the sides or top of the spikelets, clothed with simple or branched stigmatic hairs; ovule erect, anatropous. *Fruit* a seed-like utricle (*grain*) free within the fig. glume and palea, or adherent to either or both; pericarp very thin, rarely thick or separable from the seed. *Seed* erect; albumen copious, mealy; embryo minute, at the base of and outside the albumen; cotyledon scutelliform, bearing on its face an erect conical plumule, and descending conical radicle.

Genera about 300; species estimated at about 3000, but many are doubtful, and more mere varieties; natives of all climates and regions.

In working up the grasses for this Flora, I find the multiplication of species to have passed all bounds, and their nomenclature to be involved in a corresponding degree. This has arisen from two principal causes, from authors not taking into account the wide area over which the individual species of grasses range,* and from the imperfection of the descriptions of the earlier and many later authors. It is sixty-two years since Kunth published his "*Agrostographia Synoptica* (Tubingen, 1833), which is an uncritical sweeping up of all previously known supposed genera and species, with imperfect descriptions and synonyms. It was succeeded (in 1835) by a second volume, in which a few hundred species of the first volume are very fully and accurately described, and valuable notes upon others are added. In 1855 Steudel's "*Synopsis Graminum*" appeared. It in no respect advances, and in many ways retards the student of the Order. Of more recent works on *Gramineæ*, three only are of great mark, namely, Munro's very able Monograph of the *Bambuseæ* (Trans. Linn. Soc. vol. xxvi. (1868); Bentham's revision of the genera, Gen. Plant. vol. iii.

* It is a fact familiar to every one who examines collections of plants from hitherto unexplored countries, that novelties amongst the grasses are very few indeed, compared with what occurs in other natural families.

(1883), a work of remarkable completeness and accuracy, considering the chaotic condition in which the author found the Order; and Hackel's admirable monograph of the *Andropogoneæ* in A. de Candolle "Monogr. Phanerog." vol. vi. (1889), the largest and most difficult Tribe of grasses.

I have cited synonyms to a much greater extent in this than in any other Order described in the "Flora of British India" (except the "Cyperacæ" by Clarke) with the view of aiding the researches of future authors. Many of these synonyms had never been fixed with any approach to exactness, and many were for the first time identified during Mr. Jackson's and my labours on the "Index Kewensis." I cannot expect that all will prove to have been satisfactorily reduced, and still less that all have been brought to light.

Referring to the classification of the Indian genera, I have been compelled to diverge somewhat from Benthani's arrangement, and to abandon some of his Tribes and Subtribes, in many cases following Hackel's more recent and well-considered views. These divisions throughout the Order are of very unequal value, and are as difficult of delimitation as of definition upon any fixed principles. They are, indeed, in some cases arbitrary, and in others more or less artificial. In this matter, and in the description or revision of some of the very difficult genera, I have derived great aid from Dr. Stapf, Assistant in the Herbarium of the Royal Gardens, who has lately been instructed by the Director of Kew to study and name the materials in that Herbarium critically. As Dr. Stapf shares my views as to the wide ranges of the species, and the undue multiplication of their synonyms, his labours may be expected to yield far-reaching results, taxonomic, morphological and geographical, and to modify some of the conclusions arrived at in the following attempt to methodize the Indian *Gramineæ*. As affecting the numbers and synonyms taken from "Wallich's List," I have to observe that for some of them I have had to depend on the ticketed duplicates in Herb. Hook. and Benth., the types being wanting in the Wallichian collection in the rooms of the Linnæan Society.

Series A. **Panicacæ.** Spikelets articulate on their pedicels, or deciduous with them, 1-2-fl., upper fl. alone (if 2) fruiting.

Exceptions. Spikelets inarticulate on their pedicels in *Arundinella* and *Isachne*. Spikelets articulate on their pedicels, or with articulate pedicels occur in *Poaceæ*, in *Alopecurus*, *Cyathopus*, *Polypogon*, *Fingerhuthia*, and *Lophatherum*. Upper flower alone fertile in Tribe *Phalaridæ* of *Poaceæ*, and in *Tristachya*.

I. Rachis of infl. inarticulate, or subarticulate in *Stenotaphrum*. Fl. gl. usually coriaceous or herbaceous.

Tribe I. PANICEÆ. *Spikelets* 2-fl., upper fl. bisexual, lower male or neuter, rarely both fertile. (*Spinifex* is diœcious.)

* Spikelets articulate on their pedicels, except *Isachne* and *Arundinella*.

† Spikelets not involuclate by bristles.

§ *Spikelets not awned (gl. II and III beaked or awned in Pan. Crus-galli).* (See also *Tricholæna* and *Arundinella*.)

Spikelets dorsally flattened, base not thickened; gls. 3, with very rarely a minute fourth (lowest).

1. PASPALUM.

Spikelets of *Paspalum*, but with a thickened basal callus.

2. ERIOCHLOA.

Spikelets subglobose, panicked; gls. 4, I and II separately deciduous, subequal.

3. ISACHNE.

Spikelets panicked or spicate, gls. 4 (2 in *P. subeglime*)

4. PANICUM.

I and II very rarely subequal, II and III awned in *P. Crus-galli*, IV rarely very shortly awned.

5. ICHNANTHUS.

Spikelets of *Panicum*, but gl. IV. narrowed into a short, flattened stipes, or with 2 appendages near the base.

Spikelets innumerable, very minute, hairy, densely crowded in the capillary branches of a very large panicle.

6. THYSANOTÆNA.

- Spikelets panicled, branches of panicle produced beyond the uppermost spikelets; gl. I minute, hyaline . . . 7. CHAMERAPHIS.
- Dioecious, male spikelets in clustered spikes, fem. solitary . . . 8. SPINIFEX.
- §§ *Spikelets awned, except in some sp. of Tricholæna and Arundinella.*
- Spikelets of *Panicum*, but nerves of gl. II broadly fimbriate, and palea of III deeply cleft, IV awned . . . 9. AXONOPUS.
- Spikelets silky; gl. I 0, or minute and distant from II and III with usually capillary awns . . . 10. TRICHOËNA.
- Spikelets solitary or fascicled on a simple rachis or the branches of a panicle; gl. I long awned . . . 11. OPLISMENUS.
- Spikelets persistent on the pedicels, or gls. I and II separately deciduous, IV deciduous; usually awned, awn bent . . . 12. ARUNDINELLA.
- †† Spikelets each surrounded by an involucre of bristles . . . 13. SETARIA.
- ** Spikelets persistent on their pedicels, at least the fertile, or deciduous with their pedicels.
- † *Spikelets in involucrelled deciduous fascicles.*
- Involucre of bristles . . . 14. PENNISETUM.
- Involucre of spines connate at the base . . . 15. CENCHRUS.
- †† *Spikelets not involucrelled.*
- Spikelets 2-seriate on a flat subarticulate rachis . . . 16. STENOTAPHRUM.
- Spikelets (at least the fertile) 1-seriate on an inarticulate flat rachis, the base of which dilates and encloses a fruiting spikelet . . . 17. THUAREA.
- Tribe II. ORYZEÆ. *Spikelets* 1-fl., articulate on their pedicels and deciduous from them. *Palea* 1-3-nerved. *Stamens* 6 or fewer.
- Spikelets 2-sexual, awned or not; gls. 4, I and II minute or setaceous . . . 18. ORYZA.
- Spikelets 2-sexual, awnless; gls. 2, broad, thin . . . 19. LEERSIA.
- Spikelets 2-sexual, awned; gls. 2, narrow, thin . . . 20. HYGRORHIZA.
- Spikelets 1-sexual; fruiting gl. inflated; leaves broad . . . 21. LEPTASPI.
- Tribe III. ZCYSIEÆ. *Spikelets* 1-fl., deciduous with their pedicels, 2-sexual, or some imperfect.
- * *Spikelets fascicled.*
- Spikes geminate; fascicles unilateral . . . 22. TRACHYS.
- Spikes solitary; fascicles quaquaversal; gl. III echinate . . . 23. TRAGUS.
- ** *Spikelets solitary, rarely 2-nate.*
- Racemes slender; pedicels flattened; gl. I and II mucate . . . 24. LATIPES.
- Raceme slender; spikelets minute, base of gl. I saccate . . . 25. LOPHOLEPIS.
- Spike very slender; spikelets narrow; gl. I and II awned . . . 26. PEROTIS.
- Spike rigid; spikelets appressed to the rachis, not awned . . . 27. ZOYSIA.

II. Rachis of inflorescence usually articulate.

Tribe IV. ANDROPOGONEÆ. *Spikelets* usually 2-nate, or the terminal in the infl. 3-nate, pairs homo- or heterogamous. *Fl. gl.* smaller than the empty, hyaline, often awned or reduced to an awn.

Subtribe I. MAYDEÆ. *Spikelets* spicate, all 1-sexual; male spikes in terminal panicles, or continuous with the fem spike.

- Fruiting spikelets enclosed in a stony, nut-like polished bract 28. COIX.
 Fruiting spikelets, having all the inner gl. concealed within the greatly enlarged hardened outer 29. POLYTOCA.
 Fruiting spikelets densely crowded on a cylindric spongy rachis, grain exposed 29*. ZEA.

Subtribe II. DIMERIEÆ. *Spikelets* homogamous, secund on a slender inarticulate rachis, 1-fld., diandrous 30. DIMERIA.

Subtribe III. SACCHAREÆ. *Spikelets* homogamous, in compound racemes or panicles (except *Pollinia*); gl. I not sunk in a hollow of the rachis.

* *Rachis* not or rarely fragile.

- Spikelets in a cylindric silvery thyrsus, 1-fld., not awned 31. IMPERATA.
 Spikelets paniced, 2-nate, 1-fld., awned 32. MISCANTHUS.

** *Rachis* fragile.

- Spikelets in paniced racemes, 2-fld., awned 33. SPODIOPOGON.
 Spikelets in geminate digitate or fascicled spikes 34. POLLINIA.
 Spikelets in a thyrsus of spiciform racemes, 1-fld., awnless 35. SACCHARUM.
 Spikelets in a thyrsus of spiciform racemes, 1-fld., awned 36. ERIANTHUS.

Subtribe IV. ISCHEMÆ. *Spikelets* many, in solitary digitate or fascicled spikes, usually heteromorphous; gl. I not sunk in a hollow of the rachis. (See *Pollinia* in *Sacchareæ*; *Vossia* in *Rottboellieæ*.)

* *Margins* of gl. I of sessile spikelet inflexed.

- Spikes rarely solitary; spikelets 2-nate, 2-fld., awned 37. ISCHÆMUM.
 Spikes solitary; spikelets 1-fld., gl. I pectinate 38. EREMOCHLOA.

** *Margins* of gl. I of sessile spikelet not inflexed.

- Spikes solitary; spikelets 2-nate, 1-2-fld., 2-awned 39. POGONATHERUM.
 Spikes solitary or 2-nate; spikelets 2-fld., diandrous; gl. I very broad, truncate 40. APOCOPIS.
 Spikes 2-nate or digitate; spikelets 1-fld. 41. ARTHRAXON.
 Spikes digitate; spikelets 2-fld.; gl. I tubercled 42. THELEPOGON.
 Spikes 2-∞-nate; spikelets 2-nate, upper alone awned 43. LOPHOPOGON.

Subtribe V. AFLUDEÆ. *Spikelets* 3 on an inarticulate rachis 44. AFLUDA.

Subtribe VI. ROTTBOELLIEÆ. *Spikelets* homo- or hetero-gamous, 1-2-fld., solitary, or 2- rarely 3-nate on the internodes of an articulate spike or raceme, not awned (gl. I caudate in *Vossia*); gl. I not keeled, adnate to or sunk in a depression formed by the internode and pedicel of the upper spikelet; gls. of sessile spikelet 4.

- Spikelets 2-nate, gl. I caudate 45. VOSSIA.
 Spikelets 2-nate, gl. I flat 46. ROTTBOELLIA.
 Spikelets 2-nate, gl. I globose 47. MANISURIS.
 Spikelets solitary, gl. I convex 48. OPHIURUS.

Subtribe VII. RATZEBURGIEÆ. *Spikelets* homogamous, 3-nate on the slender internodes of a solitary flattened fragile spike, two perfect, 1-fld., third imperfect; gls. 4 49. RATZEBURGIA.

Subtribe VIII. EUANDROPOGONEÆ. *Spikelets* heterogamous, 1-fld., 2- rarely 3-nate on the whorled articulate branches of simple or compound racemes or panicles (solitary in *Cleistachne*); gls. 4, I not keeled, IV usually awned.

- Spikelets 2-3-nate, in a simple spike, gl. I with tubercled penicillate ribs 50. ELIONURUS.
- Spikelets solitary, terminacing the branches of a thyrsoid panicle 51. CLEISTACHNE.
- Spikelets capitate, male sessile, 2-fld., forming an involucriform whorl round the pedicelled fem. 52. GERMAINIA.
- Spikelets 2-nate, or the uppermost 3-nate, spicate, or paniced 53. ANDROPOGON.
- Spikelets in 2 superposed series; upper series of heterogamous pairs, and a terminal male, lower a whorl of 4 persistent males or neuters 54. ANTHISTIRIA.
- Spikelets as in *Anthistiria*, but male and neuter spikelets deciduous with the fem.; callus 0 55. ISEILEMA.

Series B. **Poaceæ.** *Spikelets* continuous (not articulate with) their pedicels, 1- many-fld.; rachilla articulate at the base, and often between the fig. gls.; lowest fl. always fruiting, upper often male or neuter.

Exceptions. Upper fl. alone bisexual in *Phalarideæ*. *Spikelets* articulate on their pedicels, or gl. I and II separately deciduous occur in *Alopecurus*, *Melica*, *Fingerhuthia*, *Cyathopus*, and *Sphærocaryon*.—See under *Panicaceæ* some genera with spikelets inarticulate at the base.

Tribe V. PHALARIDÆ. *Spikelets* with a terminal perfect fl., and one or more imperfect male or neuter below it; rachilla not produced beyond the perfect fl.

- Panicle contracted or spiciform; spikelets awnless 56. PHALARIS.
- Panicle spiciform; gls. 6, III and IV neuter, awned; stamens 2 57. ANTHOXANTHUM.
- Panicle lax; gls. 6, III and IV male, awned or not 58. HIEROCHLOA.

Subtribe VI. AGROSTIDÆ. *Spikelets* 1-fld.; rachilla jointed at the base, produced or not beyond the fig. gl.; gls. 3, I and II empty, III fig. awned.

Exceptions. *Spikelets* sometimes 2-fld. in *Sporobolus* and *Muehlenbergia*.

Subtribe I. STIFÆ. *Spikelets* paniced; rachilla not produced beyond gl. III; fl. gl. rigid or hard, awned (except *Milium*).

- Gl. III narrow, awn 3-fld. 59. ARISTIDA.
- Gl. III narrow, awn entire, grain terete 60. STIPA.
- Gl. III broader, awn entire, grain dorsally compressed 61. ORYZOPSIS.
- Gl. III obovoid, awn 0, grain oblong 62. MILIUM.

Subtribe II. PHLEOIDÆ. *Spikelets* in spiciform or subspiciform panicles, gl. III hyaline, loosely wrapping the grain; stigmas exserted from the top of the spikelet.

* *Rachilla* produced beyond the fig. gl.

- Gl. I and II shorter than III 63. HELEOCHLOA.
- Gl. I and II longer than III 64. PHLEUM.

** *Rachilla* not produced.

- Gl. I and II longer than III; panicle cylindric 65. ALOPECURUS.
- Gl. I and II minute; panicle laxly subspiciform 66. PHIPPSIA.

Subtribe III. EUAGROSTÆ. *Spikelets* usually small, in open or contracted many-fld. panicles; gls. usually thin or membranous; stigmas laterally exserted from the spikelet. *Spikelets* rarely 2-fld. in *Sporobolus* and *Muehlenbergia*.

* Rachilla not produced beyond gl. II.

† *Spikelets articulate on their pedicels, or gl. I and II separately deciduous, or pedicel articulate in the middle.*

- Spikelets oblong; gl. I and II 3-nerved, III 5-nerved, awnless 67. CYATHOPUS.
 Spikelets very narrow; gl. I and II 3-nerved, III faintly 1-3-nerved, usually awned 68. GARNOTIA.
 Spikelets compressed; gl. I and II subequal, awned, nerved 69. POLYPOGON.
 Spikelets subglobose; gl. I nerveless, II and III 1-nerved, awnless 70. SPHÆROCARYUM.

†† *Spikelets and pedicels inarticulate, gl. I and II persistent.* -

- Gls. all awnless; I and II 1-nerved, pericarp of grain loose 71. SPOROBOLUS.
 Gl. I and II subequal, 1-nerved, awnless, awn of III dorsal or 0 72. AGROSTIS.
 Gl. I and II unequal, awnless, 1-nerved, awn of III terminal 73. MUEHLENBERGIA.
 Gl. I and II 3-nerved, awnless, base of III penicillate with long hairs 74. CALAMAGROSTIS.

** Rachilla produced beyond gl. III usually penicillate with long, silky hairs; gl. I and II 3-nerved. 75. DEYEUXIA.

Tribe VII. AVENÆ. *Spikelets* 2- or more fld., paniced, very rarely spicate, or panicle subspiciform; fl. gls. usually awned, awn geniculate and often twisted, rarely straight or 0; rachilla produced or not beyond the upper fl. gl.

Subtribe I. AIRÆ. *Spikelets* 2-fld.; gls. membranous; rachilla not produced.

- Gl. I acute, many-nerved; fl. gl. long-ciliate 76. ERIACHNE.
 Spikelets minute; rachilla and keel of fl. gl. ciliate 77. ZANKERIA.
 Spikelets awnless; gl. III largest 2-sexual, IV male 78. COELACHNE.
 Spikelets 3-nate; gl. I and II awnless, III male, cleft, awned in the cleft 79. TRISTACHYA.
 Gl. I and II awnless, III and IV bisexual, hyaline, dorsally awned 80. AIRA.

Subtribe III. EUAVENÆ. *Spikelets* 2- or more fld.; rachilla produced.

- Spikelets 2-fld., both bisexual, awned 81. DESCHAMPSIA.
 Spikelets 2-fld., lower fl. bisexual awnless, upper male or neuter awned 81*. HOLCUS.
 Spikelets 2-6-fld.; fl. gl. awned, awn subterminal or dorsal 82. AVENA.
 Spikelets 3- or more-fld.; fl. gl. deeply cleft, awned in the cleft 83. DANTHONIA.

Tribe VIII. CHLORIDÆ. *Spikelets* 1- or more-fld., 2-seriate (sometimes very distantly) and secund on an inarticulate spike or on the spiciform branches of a slender panicle; fl. all or the lower only bisexual; rachilla produced or not beyond the upper fl. gl.

* *Spike solitary, terminal (see also Chloris).*

- Spikelets minute, 1-fld., awnless 84. MICROCHLOA.
 Spikelets 1-2-fld., in pedicelled deciduous articulate clusters, awned 85. GRACILEA.
 Spikelets 1-2 fld., in sessile inarticulate clusters, awned 86. ENTEROPOGON.
 Spikelets many-fld.; fl. gl. 3-awned 87. TRIPOGON.

** *Spikes or spiciform branches digitate, racemed or paniced (or solitary in Chloris).*

- Spikes digitate, 1-fld., upper imperfect fl. 0 88. CYNODON.
 Spikes solitary, spicate or racemed; spikelets 2- or more-fld., upper fl. imperfect 89. CHLORIS.
 Spikes digitate or whorled; spikelets 3-6-fld., densely crowded, awnless 90. ELEUSINE.
 Spikes racemed on a long rachis; spikelets 2-3-fld., awned 91. DINEBRA.
 Spikes paniced, filiform; spikelets very minute, alternate, 1- or more fld., awnless 92. LEPTOCHLOA.
 Spikes very long, filiform, simple or divided; spikelets very few, distant, 1-fld., awned 93. DICHÆTARIA.

Tribe IX. FESTUCACEÆ. *Spikelets 2- or more-fld., pedicelled, rarely sessile, in effuse or contracted rarely spiciform, panicles; rachilla articulate at the base and often at the base of the fl. gls., always produced beyond the uppermost fl. gl.*

Subtribe I. PAPPOPHOREÆ. *Spikelets few- or many-fld.; gls. many-nerved, fl. gls. many-awned or 4-5-lobed.*

- Spikelets spicate, 2-5-fld.; empty gls. 4, 2 upper and fig. 4-lobed; fl. gl. with a dorsal awn 94. POMMERËULLA.
 Spikelets in simple or branched spikes; fl. gl. many-awned 95. PAPPOPHORUM.

Subtribe II. ARUNDINEÆ. *Spikelets paniced, 2- many-fld.; gls. very narrow, fig. penicillate with long silky hairs on the callus or sides or both, lowest fl. gl. sometimes male or neuter.*

- Rachilla elongate, glabrous; fl. gl. silkily hairy 96. ARUNDO.
 Rachilla very short; fl. gls. glabrous, callus with long silky hairs 97. PHRAGMITIS.

Subtribe III. SESLERIÆ. *Spikelets in spiciform panicles, or in spicate clusters with (in the Indian species) many imperfect spikelets of imbricating gls. at the base of the spike or of the clusters, 1- or more-fld. (Cynosurus has dimorphous spikelets).*

- Spikelets in a cylindric spike, articulate on very short pedicels; gl. I and II awned 98. FINGERHUTHIA.
 Spikelets very minute, in globose clusters on an elongate simple rachis 99. ELYTROPHORUS.
 Spikelets in a dense unilateral panicle, uppermost of each branchlet 1-fld., concealed by the longer lower empty gls. 100. LAMARCKIA.
 Spikelets in spiciform clusters, uppermost of each cluster 2-5-fld., lower of distichous subulate empty pectinately arranged gls. 101. CYNOSURUS.

Subtribe IV. ERAGROSTEÆ. *Infl. various. Spikelets 2-many-fld.; fl. gls. 1-3-nerved, entire, 3-toothed, 3-lobed or 3-awned.*

- Panicle spiciform; spikelets 2-5-fld.; fl. gls. scarious, secund, mucronate or shortly awned 102. KOELERIA.
 Panicle effuse; spikelets 2-4-fld.; gl. I very short, 3-nerved, sub 3-toothed, fl. gl. broadly truncate, 3-nerved 103. CATABROSA.
 Infl. various; spikelets many-fld.; empty gls. shorter than the lowest fl. gl., 1-nerved; fl. gls. 3-nerved; grain very minute, terete 104. ERAGROSTIS.
 Infl. pyramidal; spikelets many-fld.; empty gl. longer

- than the lowest, gl. II subulate, 1-nerved; flg. gls. 3-nerved; grain broad, concave 105. MYRIOSTACHYS.
- Infl. subpanicled; spikelets many-flid.; empty gl. shorter than the lowest flg. gl. I 3-nerved, II 5-nerved; rachilla silky; flg. gls. 3-nerved, grain grooved 106. HALOPYRUM.
- Infl. capitate in the (Indian sp.); spikelets few or many-flid.; empty gls. shorter than the flg., I 1-3-nerved, II 5-nerved; fl. gls. 3-nerved, villous; grain broad, concave 107. COELACHYRUM.
- Spikelets sessile on the spiciform branches of a tall, broad panicle, many-flid.; fl. gls. 3-4-toothed 108. DIPLACHNE.

Subtribe V. MELICEÆ. *Spikelets* usually panicled, 1- or more-flid.; gls. many, upper smaller, empty, convolute in a clavate mass.

- Gl. I and II separately deciduous 109. MELICA.

Subtribe VI. CENTOTHECEÆ. *Spikelets* 1- many-flid., 1-2-seriate on the rachis of a simple spike or on the long slender branches of a simple panicle. —Leaves broad, tessellately nerved.

- Spikelets 1-flid., secund and articulate at the base; upper gls. empty, convolute with setiform tips 110. LOPHATHERUM.
- Spikelets 3- or more-flid., secund, persistent; fruiting gls. with reflexed submarginal bristles 111. CENTOTHECA.
- Spikelets 1-4-flid., secund, 2-seriate on the rachis of a simple spike 112. STREPTOGYNE.

Subtribe VII. EUFESTUCEÆ. *Spikelets* usually panicled, 2- or more-flid.; fl. gls. 5- many- (very rarely 3-) -nerved, upper empty or 0; styles short (except *Duthiæa*). (*Spikelets* of *Brachypodium* in long very lax spikes of *Æleuopus* in crowded spikes.)

- Spikelets many-flid., subspicately crowded; fl. gl. broad, many-nerved. Prostrate, leaves rigid, pungent 113. ÆLEUOPUS.
- Spikelets few-flid., in close secund clusters; gl. I and II shorter than the mucronate or awned flg. 114. DACTYLIS.
- Spikelets on a short panicle, subsessile, compressed; fl. gls. keeled, tips membranous. Annuals 115. SCLEROCHLOA.
- Spikelets very small, in a narrow panicle with erect branches, awnless. Annuals 116. SCHISMUS.
- Spikelets ovate, in a lax pyramidal panicle, pendulous; gls. inflated, awnless, closely imbricate, many-nerved, dorsally convex 117. BRIZA.
- Spikelets laxly panicled, few-flid.; gls. keeled, 5-nerved (3- in *P. persica*), awnless, nerves rarely meeting at the tip 118. POA.
- Spikelets laxly panicled, 1-2-flid., awnless; gls. hyaline, flg. very broad, truncate, 5-nerved, lateral nerves very short 119. COLPODIUM.
- Spikelets panicled, many-flid., awnless; gls. obtuse, dorsally rounded, 5-9-nerved, lateral nerves short 120. GLYCERIA.
- Spikelets panicled, many-flid.; fl. gls. acute or awned, dorsally rounded, top of ovary naked or hairy 121. FESTUCA.
- Spikelets panicled, 3- many-flid.; fl. gls. mucronate or awned, dorsally rounded, 5-9-nerved, top of ovary lobed villous 122. BROMUS.
- Spikelets few, sub-capitate, 3-5-flid.; fl. gls. 7-11-nerved, 2-flid; style very long, 2-flid 123. DUTHIÆA.
- Spikelets spicate, many-flid., mucronate or awned 124. BRACHYPODIUM.

Tribe X. HORDEÆ. *Spikelets* 1- or more-fl., sessile, 1-2 or more seriate on the rachis of a simple spike, or partially sunk in cavities of the same; rachilla usually articulate and produced beyond the flg. gls. into a naked or glumiferous bristle; gls. awned or not, I and II opposite or subcollateral, persistent or separately deciduous, I sometimes absent or very minute.

Subtribe I. LOLIÆ. *Spikelets* solitary at the nodes of the spike; plane of the spikelets radial to the rachis.

- Spikelets 3- many-fl.; gls. coriaceous, I absent, except in the terminal spikelet 125. LOLIUM.
 Spikelets 1-2-fl.; gl. I, minute or 0, II much longer than the hyaline III; spike cylindric, rachilla glabrous 126. LEPTURUS.
 Spikelets 1-3-fl.; gl. I, minute or 0, II about as long as the hyaline III; spike compressed, rachilla hairy 127. OROPETIUM.

Subtribe II. TRITICÆ. *Spikelets* solitary at the nodes of the spike; plane of spikelets tangential to the rachis.

- Fl. gls. 5-9-nerved, lateral nerves not conniving, short or ending in teeth or awns 128. TRITICUM.
 Fl. gls. 5-7-nerved, lateral nerves conniving or confluent with the single terminal awn 129. AGROPYRUM.

Subtribe III. ELYMÆ. *Spikelets* 2 or more, collateral or fascicled at the nodes of the spike; plane of spikelets tangential to the rachis.

- Spikelets 1-fl.; empty gl. subulate, rigid 130. HORDEUM.
 Spikelets 2- many-fl.; empty gl. subulate, linear or oblong 131. ELYMUS.

Tribe XI. BAMBUSEÆ. Shrubby or arboreous grasses. *Leaves* flat, jointed on the sheath. *Spikelets* 1- ∞ -fl.; lower 2- or more gls. empty, gradually increasing in size up to the flowering, with sometimes small terminal imperfect ones. *Palea* usually large, 2-keeled (in *Melanocanna*). *Lodicules* usually 3. *Stamens* 3, 6, or ∞ . *Styles* 2-3.

Subtribe I. ARUNDINARIÆ. *Palea* 2-keeled; stamens usually 3; pericarp thin, adnate to the seed.

- Spikelets 1- many-fl., racemed or paniced; empty gls. 1-2 132. ARUNDINARIA.
 Spikelets 1-4-fl., spicate; spathes bracteate; empty gls. 2-3 133. PHYLLOSTACHYS.

Subtribe II. EUBAMBUSEÆ. *Palea* usually 2-keeled; stamens 6; pericarp thin, adnate to the seed.

- Filaments free; paleas entire or slightly cleft, all 2-keeled 134. BAMBUSA.
 Filaments free; paleas deeply cleft, uppermost not keeled 135. THYRSACANTHUS.
 Filaments connate. Spikelets ∞ -fl.; paleas all 2-keeled 136. GIGANTOCHLOA.
 Filaments connate. Spikelets few-fl.; palea of upper fl. 0 or glume-like, not keeled 137. OXYTENANTHERA.

Subtribe III. DENDROCALAMÆ. *Palea* 2-keeled; stamens 6; pericarp fleshy or crustaceous; seed free.

- Spikelets 2- ∞ -fl., 1 only usually fertile, usually capitate in the branches of the panicle; ovary hirsute at the top, pericarp crustaceous 138. DENDROCALAMUS.

- Spikelets 2-fl. as in *Dendrocalamus*; ovary glabrous at the top, fruit large, pericarp fleshy 139. MELOCALAMUS.
- Spikelets 1-fl., loosely spiked on the branches of the panicle, bracteate; fruit small, depressed-globose; pericarp crustaceous 140. PSEUDOSTACHYUM.
- Spikelets 1-fl. as in *Pseudostachyum*; fruit elongate beaked, pericarp crustaceous 141. TEINOSTACHYUM.
- Spikelets 1-fl., bracteate, crowded in globose heads; fruit oblong, beaked, pericarp thick, separable 142. CEPHALOSTACHYUM.
- Subtribe IV. MELOCANNEÆ. Spikelets 1-fl. Palea 0 or glume-like. Stamens 6-∞. Pericarp crustaceous or fleshy, seed free.
- Spikelets in clusters on the branches of the panicle, rachilla produced far beyond the fl. gl.; fruit small, pericarp hard 143. SCHIZOSTACHYUM.
- Spikelets very minute, clustered on the branches of the panicle, rachilla not produced; lodicules 0 144. DINOCHLOA.
- Spikelets bracteate, crowded in unilateral spikes, rachilla not produced; fruit very large, fleshy 145. MELOCANNA.
- Spikelets large, capitate or subspicate; stamens 6 or more; fruit very large, pericarp fleshy 146. OCHLANDEA.

EXCLUDED GENUS.

PRIONANTHIUM, Desv. *Opusc.* 65 t. 4, is a S. African grass, erroneously described as Indian. It was subsequently published by Nees as *Prionachne Ecklonii*.

Tribe I. PANICEÆ. (See p. 2.)

1. PASPALUM, Linn.

Annual or perennial grasses. Spikelets 1-fl., secund in simple spikes or spike-like branches of a simple panicle or raceme, articulate on the pedicel but not thickened and callous at the base, never awned. Glumes 3 (homologous of II III and IV in *Panicum*), with rarely a very minute lowest fourth (I of *Panicum*); I and II subequal, membranous, both sometimes very small or I (at the back of the fl. gl.) absent; II. epaleate; III more coriaceous, paleate, bisexual. Stamens 3. Styles 2, free. Grain free within the hardened glume.—Species perhaps about 160, natives of all warm regions.

As above defined, *Paspalum* includes the *Digitaria* section of *Panicum*, which appears to me to be artificially placed in the latter genus, because of the occasional presence of a very minute scale-like glume at the base of what is the 3rd gl. of *Panicum* (that opposite the fig.). This minute glume which is present or absent even in the same species, is nerveless and never embraces that above it, as the lowest gl. always does in *Panicum* proper. One Indian species alone of *Panicum* (*P. subeglume*) has only 3 glumes, but its decompound panicle and the form of its spikelets and its affinities are with *Panicum*.

* Spikelets orbicular or broadly oblong, ovate-oblong in *P. distichum*.

1. *P. scrobiculatum*, Linn. *Mant.* i. 29; spikelets about as broad as the flat rachis $\frac{1}{2}$ – $\frac{1}{3}$ in. diam. 2–4-ranked plano-convex or hemispheric, gl. I 3-nerved, II 5-nerved. *Fluegge Monogr. Gram.* 86 (*Paspalus*); *Trin. Diss.* ii. 122, *Gram. Panic.* 56, *Sp. Gram. Ic.* t. 143; *Kunth Enum. Pl.* i. 53; *Steud. Syn. Gram.* 21; *Roxb. Fl. Ind.* i. 278; *Grah. Cat. Bomb. Pl.* 234; *Dalz. & Gibs. Bomb. Fl. Suppl.* 97; *Thw. Enum. Pl. Zeyl.* 357; *Trim. Cat. Pl. Ceyl.* 104; *Aitchis. Cat. Panjab Pl.* 104; *Wall. Cat. n.* 8753; *Wight Cat. n.* 1601; *Duthie Field and Gard. Crops*, 8 t. 27; *Grasses N.W. Ind.* 1; *Indig. Fodd. Grass.* t. 1; *Fodd. Grass. N. Ind.* 1; *Miq. Fl. Ind. Bat.* iii. 430; *Benth. Fl. Hongk.* 408, *Fl.*

Austral. vii. 460. *P. alternans*, *Steud. l. c.* 26. *P. auriculatum* & *cartilagineum*, *Presl Rel. Haenk.* i. 217, 216. ? *P. bifarium*, *Edgew. in Journ. As. Soc. Beng.* xxi. (1853) 178. *P. coloratum*, *Rich. ex Doell in Mart. Fl. Bras.* ii. 11. 78. *P. Commersoni*, *Lamk. Illustr.* i. 175. *P. coromandelianum*, *Lamk. l. c.*; *Kunth l. c.* 55; *Steud. l. c.* 32. *P. dissectum*, *Linn. Syst.* ii. 86. *P. dimidiatum*, *Linn. Syst. Ed. x.* 855. *P. firmum*, *Trin. Gram. Panic.* 105, *Sp. Gram. Ic.* t. 125; *Kunth l. c.* 60. *P. flexuosum*, *Klein ex Presl l. c.* 215; *Kunth l. c.* 54; *Miq. Fl. Ind. Bat.* iii. 432. *P. frumentaceum*, *Rottb. ex Roem. & Sch. Syst.* ii. 296; *Koen. ex Trin. Gram. Panic.* 57; *Kunth l. c.* 53. *P. hirsutum*, *Retz. Obs.* ii. 7; *Kunth l. c.* 33; *Miq. l. c.* 433. *P. Houttynii*, *H. C. Hall ex de Vriese in Pl. Ind. Bat. Reinw.* 113. *P. Kora*, *Willd. Sp. Pl.* i. 332; *Host Gram. Austr.* t. 74; *Beauv. Fl. Owar.* ii. 5, t. 61; *Roxb. l. c.*; *Grah. l. c.*; *Duthie Indig. Fodd. Grass.* t. 2. *P. longifolium*, *Roxb. l. c.* 280; *Trin. Sp. Gram. Ic.* t. 138; *Wight Cat. n.* 1602, *Herb. n.* 1600. *P. mauritanicum*, *Nees ex Steud. l. c.* 26. *P. metabolon*, *P. Metzii*, and *P. mollipilum*, *Steud. l. c.* 19, 21, 29. *P. orbiculare*, *Forst. Prodr.* 7; *Fluegge l. c.* 88. *P. polystachyum* and *P. pubescens*, *Br. Prodr.* 188; *Kunth l. c.* 54, 55. *P. puberulum*, *Roem. & Sch. Syst.* ii. 316 (*Paspalus*). *P. sumatrense*, *Roth Nov. Sp.* 35; *Kunth l. c.* 55. *P. Thunbergii*, *Kunth ex Steud. l. c.* 28; *Franch. & Sav. En. Pl. Jap.* 159. *P. venustum*, *Forst. f. ex Roem. & Sch. l. c.* 297. *P. Zollingeri*, *Steud. l. c.* 28. *Panicum dissectum*, *Linn. Sp. Pl.* 57.—*Paspalum*, *Wall. Cat. n.* 8754. —*Rheede Hort. Mal.* xii. t. 84.—*Sloane Hist. Jam.* i. t. 69, f. 2.

Throughout hotter INDIA (wild or cultivated), from the Panjab eastwards and southwards to Singapore and Ceylon.—DISTRIB. All warm countries.

Annual, erect or base very shortly decumbent, 1-6 ft. high, leafy, glabrous, rarely hairy. *Leaves* acuminate; ligule short, membranous. *Peduncle* rather slender. *Spikes* 2-8, 1-3 in. long, alternate, erect or spreading; rachis $\frac{1}{12}$ – $\frac{1}{10}$ in. broad, margins ciliate or serrulate. *Spikelets* in 2, rarely 3-4 rows, imbricate, glabrous or sparsely pubescent, sometimes geminate on a common pedicel; gl. I convex; II flat with two submarginal strong nerves, along the inner margins of which the gl. is sometimes marked with shallow transverse pits (whence the specific name); gl. III. with inflexed auricled margins.—I find it impossible to classify the large series of specimens of this variable plant under available varieties. Roxburgh regarded the Indian forms as 3 species, *scrobiculatum*, *Kora*, and *longifolium*. Between the first two of these he gives no differential characters, beyond that of *scrobiculatum* having erect stems 2 ft. high and being a cultivated form, whereas *Kora* is indigenous, growing on the banks of watercourses and attaining 8 ft. (? error for 3 ft., as in the description that follows) and has the stem decumbent at the base. *P. longifolium* he separates by the creeping stems, geminate terminal spikes and pitted seeds, but as Trinius describes the pitting is microscopic (as in other forms of the species). Having regard to the specimens before me, I recognize with more or less confidence (1) a form with larger dorsally tumid spikelets, which I assume to be the cultivated form (including *orbiculare*, *frumentaceum*, *Kora*, *coromandelianum*, and *hirsutum*); its gl. II is either pitted or not; and (2) a form with rather smaller spikelets, often in 3-4 rows, and gl. II never pitted, to which I refer *longifolium*, *Zollingeri*, and *dissectum* (which latter is the earliest name (under *Panicum*) of the species). It abounds all over India, and is the only form of which I have seen Malayan specimens. Besides the synonyms adduced above, as to which I am pretty well assured, there may be perhaps many more to be added.

2. *P. conjugatum*, *Berg. in Act. Helvet.* vii. (1772) 129, t. 8; spikes 2 terminal or subterminal very slender, spikelets $\frac{1}{12}$ in. sessile orbicular nearly flat, gl. II hyaline margins villously ciliate. *Sw. Fl. Ind. Occ.* i. 133; *Fluegge Monogr. Gram.* 102 (*Paspalus*); *Beauv. Fl. Owar.* 56, t. 92, f. 2; *Trin. Panic. Gen.* 54, *Sp. Gram. Ic.* t. 102; *Kunth Revis. Gram.* 25, *Enum. Pl.* i. 51; *Trim. Cat. Ceyl. Pl.* 104. *P. bicurulum* et

bierurum, *Saltzm. ex Doell in Mart. Fl. Bras.* ii. II. 55. *P. ciliatifolium*, *Trin. in Mem. Acad. Petersb. Ser. vi. iii. II.* (1835), 340. *P. ciliatum*, *Lam. Illustr.* i. 175. *P. dolichopus*, *Trin. ex Steud. Nom.* ed. 2, ii. 271. *P. erio-phorum*, *Willd. ex Nees Agrost. Bras.* 56. *P. hirsutum*, *Poir. Encycl.* v. 28. *P. longissimum*, *Hochst. ex Steud. Syn. Gram.* 19. *P. nutans*, *Lam. Illustr.* i. 175. *P. Renggeri*, *Steud. l. c.* 17. *P. protensum*, *Trin. Gram. Panic.* 108. *P. pubescens*, *Muhl. ex Willd. Enum. Hort. Berol.* 89. *P. supinum*, *Bosc. ex Poir. Encycl.* v. 29. *P. tenue*, *Gærtn. Fruct.* ii. 2, t. 80. *Digitaria conjugata*, *Schult. Mant.* ii. 262.—*Paspalus*, *Wall. Cat.* n. 8756.

CACHAR, *Keenan*. PENANG, *Curtis, &c.* SINGAPORE, *King*. CEYLON, *Thwaites* ("introd. from W. Indies.")—DISTRIB. Trop. and subtrop. regions.

Annual. *Stems* 1–2 ft., creeping and branching below. *Leaves* 4–6 by $\frac{1}{4}$ in., or less, margins of sheath above, and mouth ciliate. *Peduncle* very slender. *Spikes* 3–7 in., usually geminate and divergent, rachis glabrous. *Spikelets* imbricate, very pale, plano-convex; glumes with marginal, villous nerves, and an obsolete median; III coriaceous, apiculate, white.—A very elegant grass.

3. ***P. compactum***, *Roth Nov. Sp.* 36; dwarf, hairy all over, spikes forming a pyramidal raceme, rachis slender triquetrous, spikelets $\frac{1}{10}$ in. hemispheric. *Kunth Enum. Pl.* i. 61; *Steud. Syn. Gram.* 31. *P. costatum*, *Hochst. in Herb. Hohenack.* n. 635. *P. miliaria*, *C. Muell. in Bot. Zeit.* xix. (1861), 325. *P. porrigens*, *Arn. in Herb. Wight*. *Panicum Canaræ*, *Steud. l. c.* 58. *Pan. imperfectum*, *Roxb. ex Kunth l. c.*

KHASIA HILLS, in wet places, alt. 3–5500 ft., *Griffith, &c.* RAJPUTANA; Mt. Aboo, *Duthie*. The CONCAN and CANARA, *Jacquemont, &c.* NILGHIRI HILLS, *Lawson*.

Stem 6–10 in., decumbent, and branched below; roots stiff, wiry. *Leaves* 1–2 by $\frac{3}{8}$ – $\frac{1}{2}$ in., ovate-lanceolate, acuminate, hairy on both surfaces. *Raceme* 2–4 in.; spikes many, upper gradually shorter; axils usually ciliate. *Spikelets* rather turgid, close-set, but not imbricate, pendulous by short pedicels; gl. I orbicular, obscurely 3-nerved; II narrower, margins broadly hyaline; III plano-convex, white, coriaceous, tip rounded.

4. ***P. distichum***, *Linn. Amœn. Acad.* v. 391; stem creeping and rooting, leaves narrow distichous, spikes geminate, spikelets $\frac{1}{2}$ in. ovate-oblong, appressed to the rachis, gl. I and II equal acute membranous, III acute. *Burm. Fl. Ind.* 23; *Sw. Obs.* 35, t. 2, f. 1; *Gærtn. Fruct.* ii. 2, t. 80; *Kunth Enum. Pl.* i. 52; *Benth. Fl. Austral.* vii. 460; *Baker Fl. Maurit.* 431. *P. brachiatum*, *Trin. ex Nees Agrost. Bras.* 62. *P. depressum*, *Steud. Syn. Gram.* 20. *P. didactylum*, *Saltzm. ex Steud. l. c.* *P. digitaria*, *Poir. Encycl. Suppl.* iv. 316. *P. distachyon*, *Willd. ex Doell in Mart. Fl. Bras.* ii. II. 73. *P. Fernandesianum*, *Colla in Mem. Acad. Turin.* xxxix. (1836), 27. *P. fissifolium*, *Nees ex Doell l. c.* 104. *P. furcatum*, *Fluegge Gram. Monogr.* 114 (*Paspalus*). *P. geniculatum*, *Heyne in Herb. Rottl.* *P. Kleinianum*, *Presl Rel. Hænk.* i. 209; *Steud. l. c.* 19. *P. Koia*, *Forst. ex Spreng. Syst.* i. 244. *P. littorale*, *Br. Prodr.* 188; *Trin. Diss.* ii. 95, *Sp. Gram. Ic.* t. 112; *Kunth Enum. l. c.* 51. *P. longiflorum*, *Retz. Obs.* iv. 15, *ex Roxb. Fl. Ind.* i. 279; *Beauv. Fl. Ovar.* ii. 46, t. 85, f. 2; *Grah. Cat. Bomb. Pl.* 231. *P. maculosum*, *Trin. Gen. Panic.* 98, *Sp. Gram. Ic.* t. 113. *P. Michauxianum*, *Kunth Revis. Gram.* i. 25. *P. notatum*, *Fluegge l. c.* 106. *P. obtusatum*, *Nees ex Doell, l. c.* 103. *P. obtusifolium*, *Trin. Sp. Gram. Ic.* t. 115. *P. platycaule*, *Willd. ex Steud. Nom.* ed. 2, ii. 272. *P. repens*, *Ic. Roxb.* n. 779. *ined.* *P. reptans*, *Poir. ex Doell l. c.* 75. *P. serpentinum*, *Hochst. ex Steud. l. c.* 22. *P. tristachyum*, *Leconte in Journ. Phys.* xii. (1820), 285. *P. vaginatum*, *Sw. Prodr. Veg. Ind. Occ.* 21; *Fluegge l. c.* 108 (*Paspalus*); *Beauv. l. c.* ii. 53, t. 92; *H. B.*

& *K. Nov. Gen. & Sp.* i. 91; *Trin. Diss.* ii. 94, *Panic. Gen.* 53, *Sp. Gram. Ic.* t. 120; *Kunth Enum.* 52; *Steud. l. c.* 20. *Panicum polyrhizum*, *Presl l. c.* i. 296. *Pan. vaginatum*, *Gren. & Godr. Fl. Fr.* iii. 462.—*Paspalus*, *Wall. Cat. n.* 8757?—*Rheede Hort. Mal.* xii. t. 44.

N. W. INDIA, *Duthie*. SUNDERBUNDS, *Roxburgh*, *J. D. H.* & *T. T.* MALABAR, *Rheede*. CARNATIC, *Heyne*. MALACCA, *Griffith*. ANDAMAN ISLDS., *Praun*.—DISTRIB. warm countries.

Stems 1–6 in., erect or inclined from the long creeping base, usually stout, compressed below. *Leaves* 2–4 in., strict, flat or involute, glabrous or sparsely hairy towards the flattened sheath. *Spikes* close together, 1–1½ in., rachis narrower than the 2-seriate spikelets. *Glumes* faintly nerved.—Apparently a rarer plant in India than in most tropical countries. Andaman Isld. specimens have a stout, woolly, creeping stem, with thickened nodes, and very short, erect flowering branches, with distichous, subulate, spreading leaves, and spikes partially exserted from the uppermost sheath.

** Spikelets ovoid, ellipsoid, or lanceolate.

† Spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in. long, with often a minute scale-like gl. at the base of gl. II. (DIGITARIA, *Auct.*).

5. ***P. sanguinale***, *Lamk. Illustr.* i. 176; spikes few or many, spikelets $\frac{1}{16}$ – $\frac{1}{10}$ in. oblong or lanceolate acute or acuminate, gl. I. = $\frac{2}{3}$ III or shorter or 0, II 5-nerved with or without a minute basal gl., III and its palea oblong-lanceolate acuminate. *D.C. Bot. Gall.* iii. 16. *P. ægyptiacum*, *Poir. Encycl. Suppl.* iv. 314. *P. bicorne*, *Lam. l. c.* 176; *Poir. Encycl.* v. 29, *Suppl.* 306. *P. blepharophorum*, *Roem. & Sch. Syst.* ii. 292. *P. ciliare*, *DC. Fl. Fr. Suppl.* 250. *P. consanguineum*, *Kunth Enum. Pl.* i. 46. *P. corymbosum*, *Kunth Enum.* 48; *Revis. Gram.* i. 28. *P. distans*, *Nees ex Trin. Gram. Panic.* 83. *P. filiforme*, *Steud. Nom. ed.* i. 586. *P. inæquale*, *Link. Enum. Hort. Berol.* i. 103. *P. oxyanthum*, *Steud. Syn. Gram.* 27. *P. reimarioides*, *Brongn. Bot. Voy. Coquillo*, t. 20. *Panicum sanguinale*, *Linn. Sp. Pl.* 57; *Schreb. Besch. Graes.* t. 16; *Fl. Dan.* t. 388; *Host Gram. Austr.* ii. t. 17; *Lamk. Encycl. Bot.* t. 849; *Knapp Gram. Britt.* t. 12; *Trin. Sp. Gram. Ic.* t. 93, 94, 144; *Thw. Enum. Pl. Zeyl.* 358; *Trim. Cat. Ceyl. Pl.* 104; *Aitchis. Cat. Panyab. Pl.* 161; *Duthie Indig. Fodd. Grass.* t. 8, *Grass. N.W. Ind.* 2; *Benth. Fl. Hongk.* 410, *Fl. Austral.* vii. 469; *Baker Fl. Maurit.* 435; *Boiss. Fl. Orient.* v. 433. *Pan. ægyptiacum*, *Retz. Obs.* iii. 8; *Roeb. Fl. Ind.* i. 293; *Dalz. & Gibs. Bomb. Fl.* 291; *Griff. Notul.* iv. 17, *Ic. Pl. Aisat.* t. 139, f. 131. *Pan. adpressum*, *Willd. in Ges. Naturf. neue Schrift.* iv. (1803), 193; *Kunth Enum. Pl.* i. 84. *Pan. bicorne* and *biforme*, *Kunth Revis. Gram.* i. 33; *Enum.* i. 83, 84. *Pan. ciliare*, *Retz. Obs.* iv. 16; *Kunth Enum.* i. 82; *Host Gram. Austr.* iv. t. 15; *Br. Prodr.* i. 192; *Roeb. Fl. Ind.* i. 290; *Dalz. & Gibs. l. c.* 290; *Thw. Enum.* 358; *Griff. l. l. c. c.* 32, t. 139, f. 65; *Duthie Indig. Fodd. Grass.* t. 9; *Pan. commutatum*, *Nees in Linnæa*, vii. (1832), 274; *Benth. Fl. Hongk.* 410. ? *Pan. corymbosum*, *Roeb. l. c.* 292. *Pan. didactylum*, *Kunth l. l. c. c.* 33, 84; *Baker Fl. Maurit.* 435. *Pan. eriogonum*, *Schrad. Pl. Hort. Goett. fasc.* i. ex *Schult. Mant.* ii. 253; *Kunth l. l. c. c.* 33, 82. *Pan. filiforme*, *Jacq. Obs.* iii. 18, t. 70. *Pan. horizontale*, *Mey. Prim. Fl. Esseq.* 54; *Kunth Enum.* i. 81. *Pan. Linkianum*, *Kunth Revis. Gram.* i. 33. *Pan. pabulare*, *Aitch. & Hemsl. in Journ. Linn. Soc.* xix. (1832), 190; *Boiss. Fl. Orient.* v. 434. *Pan. pruriens*, *Fisch. ex Trin. Diss.* ii. 77, *Gen. Pan.* ii. 77, *Sp. Gram. Ic.* t. 92; *Kunth Enum.* i. 83. *Pan. radicosum*, *Presl Rel. Hænk.* i. 297; *Kunth l. c.* 81. *Pan. Rottleri*, *Kunth Revis. Gram.* i. 33; *Enum. l. c.* 82. *Digitaria ægyptiaca* & *biformis*, *Willd. Enum. Hort. Berol.* 92, 93. *D.*

australis, Willd. ex Trin. in Mem. Acad. Petersb. Ser. vi. iii. (1835), II. 201. D. ciliaris, Pers. Syn. i. 85: Ledeb. Fl. Ross. iv. 468; T. Nees Gen. Fl. Germ. Monoc. n. 16; Reichb. Ic. Fl. Germ. i. t. 27; Miq. Fl. Ind. Bat. iii. 436; Ledeb. Fl. Ross. iv. 468. D. commutata, Schult. Mant. ii. 262. D. didactyla, Willd. l. c. 91. D. distachya, Bojer Hort. Mauriti. 363; Lamk. Illustr. t. 43, f. 2. D. eriantha, Steud. in Flora, xii. (1829), 468. D. eriogona Link Enum. Hort. Berol. i. 227, in Flora, l. c. D. horizontalis, Willd. l. c. 92. D. linearis, Pers. l. c. D. marginata, Link. l. c. 102. D. nervosa, Roem. & Sch. Syst. ii. 473. D. nodosa, Webb & Berth. Phyt. Canav. iii. III. 384, t. 246. D. pruriens, Büse in Pl. Jungh. 379; Miq. l. c. 436. D. radicata, Miq. l. c. 437. D. repens, Willd. ex Kunth l. c. 81. D. Rottleri, Roem. & Sch. l. c. 471. D. sanguinea, Scop. Fl. Carniol. 72; Weber in Willd., Prim. Fl. Holsat. 6. D. sanguinalis, Scop. l. c. ed. 2, i. 52; Reichb. l. c. t. 87; Parlat. Fl. Ital. i. 125 (with full citations). D. sanguinoleuta, Edgew. ex Aitch. Cat. Panjab. Pl. 161. D. setigera, Roth ex Roem. & Sch. l. c. 474. Dactylon sanguinale, Vill. Delph. ii. 69. Phalaris velutina, Forsk. Fl. Æg. Arab. 17. Syntherisma vulgare, Schrad. Fl. Germ. i. 161. S. ciliare, Schrad. l. c. t. 3, f. 7. ? Axonopus corymbosus, Schult. Mant. ii. 77.

Throughout INDIA, in dry and moist situations, ascending the Himalaya to 6000 ft. (cult. in the Khasia Hills).—DISTRIB. all warm countries.

Annual or perennial. Stem 2 in. to 3 ft., erect or ascending from a creeping, branching base. Leaves very variable, 1–12 by $\frac{1}{8}$ – $\frac{1}{2}$ in.; sheaths rarely hairy, except at or near the mouth. Spikes 1–3 in., rarely more, usually strict; rachis trigonous or flattened, stout or slender, or winged, wings green, rarely more than twice the breadth of the midrib, margins smooth or ciliate. Spikelets geminate, loosely or closely imbricate, rarely scattered; gls. often silkily hairy along the margins and nerves. The hairs in the upper spikelet of var. *ciliare* sometimes abnormally developed into a long beard or brush of curved cilia; there is every gradation between the most densely bearded and almost glabrous spikelets (see also *P. heteranthum*); gl. I (at the back of the fig. gl.) variously developed from an obscure tuft of hairs to nearly as long but not quite so broad as III, 3–5-nerved, usually silky; II 5-nerved, lateral nerves marginal, rarely all close together, and with the interspaces thickened, when the gl. appears many-nerved; III lanceolate or oblong-lanceolate, smooth.—The above definition embraces a wide range of forms, which I believe are all referable to *P. sanguinale*. The species is one of the very commonest plants in India, and in all warm countries. A form (var. *commutatum*) is cultivated in the Khasia Hills, of which fact I find no notice in any work on Indian food grains. The following attempt to classify the Indian forms is founded on a close study of an enormous collection of specimens from all parts of India, amongst which those of Mr. C. B. Clarke are especially noteworthy. As to the result, I am satisfied that no two botanists working independently over the same materials would arrive at the same, or agree in any other; and that the results of working over a large collection from any other country would again be different. I have made no attempt to deal with the American forms, at which I have only glanced; they suggest no modification of my arrangement of the Indian.

Var. 1. *cruciatum*; spikes several 2–3 in. usually horizontal, rachis slender trigonous narrowly or rather broadly winged, spikelets ovate-oblong acute or cuspidately acuminate rather loosely imbricate quite or nearly glabrous purple or green, gl. II half as long as III ovate-oblong obtuse 3-nerved, III ovoid or obovoid rather turgid cuspidately acuminate. Panicum cruciatum, Nees ex Steud. Syn. Gram. 39. P. sanguinale, Wall. Cat. n. 8681. K.P.—Panicum, Wall. Cat. n. 8728. Digitaria cruciata, Nees ex Herb. Strach. v. Winterb. No. 3.—Himalayan region, alt. 5–8500 ft., from Iskardo and Kashmir to Sikkim and the Munnipore

hills.—This form appears to me to be most nearly allied of any in habit and spikelets to *Pasp. ambiguum*.

Var. 2. *commutatum*; usually tall, stout or slender, tufted or prostrate and widely creeping below, leaves rather long, spikes few or many (up to 20) 3–6 in. long fastigiate or subcorymbosely arranged, lower often whorled or fascicled, rachis slender narrowly winged, spikelets broad rather crowded shortly pedicelled, gl. I lanceolate rather shorter and narrower than III, II with the lateral nerves glabrous or pubescent, and with usually a minute gl. at the base, III lanceolate acuminate. *Pan. commutatum*, *Nees in Herb. Royle*; *Digit. ciliaris?* *Wight Cat.* n. 1609, *Herb.* n. 3033; *Pasp. paniculatum*, *Herb. Jacquemont.* *Pan. sanguinale*, *Herb. Strach. & Wint.* n. 1. *P. ciliare*, *Thwaites* (C.P. n. 861, 862).—*Panicum*, *Wall. Cat.* n. 8681 A (racemosum, *Herb. Heyne*) B.C. (filiforme, *Herb. Heyne*) E.F.H.I.M.N.O.P.; *P. filiforme* and *tenuifolium*, *Heyne in Herb. Rottl. l.c.* ? *P. corymbosum*, *Roxb. l.c.* *P. filiforme*, *Roxb. Ic. ined.*—Throughout India, especially in the hills, ascending to 7000 ft. along the Himalaya, and to 10,000 in Western Tibet.—(Asia, Africa.) This is the typical S. African *Pan. commutatum*, *Nees*, but I am doubtful as to its being the *P. corymbosum*, *Roxburgh*, which is described as found “only in valleys of the Circars, growing to a great size in standing waters, with culms creeping, or floating with their erect extremities above water; when found on dry ground it is in general 1–4 ft. high, *Roxb.*” A specimen of var. *commutatum* in *Herb. Kew* is labelled *Pan. filiforme* in *Roxburgh’s* handwriting, but probably the ticket is misplaced.

Var. 3. *ciliare*; usually tall, slender, spikes few (2–6) 3–6 in. long, rachis slender narrowly winged, gl. I long or short ciliate, gl. II of lower spikelet, with glabrous or sparingly villous, marginal nerves, of upper spikelet with the marginal nerves densely villous or bearded with soft spreading hairs that are much broader than the gl. and often hooked at their tips. *P. ciliare*, *Retz.*; *Wall. Cat.* n. 8682).—*Digitaria ciliaris*, var. *quadristachya*, *Wight Herb.* n. 3034. *D. commutata*, *Herb. Strach. & Winterb.* n. 2. The bearded glumes may occur in other of the varieties here enumerated (as in var. *debile* from the Nicobars) as it is only when the spikelet is well advanced that the beard appears to be fully developed.—Very common.

Var. 4. *pabulare*; perennial, tall, strict, erect, spikes very many 3–7 in., rachis slender trigonous, spikelets rather distant narrowly lanceolate acuminate silkily villous white, gl. I as long as III 3-nerved, II with approximate nerves and usually a minute accessory gl. at its base, III very narrow acuminate. *Pan. pabulare*, *Aitchis. & Hemsl. l.c.*—The lower hills of the Panjab, Afghanistan, and Beluchistan, *Jacquemont*, &c.

Var. 5. *pruriens*; erect, glabrous, or sheaths hirsute, spikes many 3–5 in., rachis slender trigonous, spikelets narrowly lanceolate acuminate nearly glabrous, gl. I nearly as long as III, II very narrow, with approximate nerves and a minute basal gl., III very narrow acuminate. *Pan. pruriens*, *Fisch. l.c.*—Bengal, *Wallich* (*Cat.* n. 8681, L.). Burma, *Griffith*, Malacca, *Cuming* (n. 2397), *Maingay* (*Kew Distrib.* 1729), (Java, &c.).—Hardly different from var. *extensum*.

Var. 6. *Griffithii*; spikes several 2–4 in. long very slender often drooping, rachis filiform trigonous, spikelets linear-lanceolate solitary or in distant pairs glabrous or ciliate, pedicel of upper often longer than the spikelets, gl. I nearly as long as III narrow 5-nerved ciliate, II with ciliate lateral nerves, III narrow acuminate. *Panicum Griffithii*, *Arn. in Herb. Wight*. *Pan. corymbosum*, *Thw. Herb.* (C.P. 3800). *Pan. dissitiflorum*, *Nees & Arn. in Wight Cat.* n. 2341 (not of *Steud.*). *Pan. sanguinale*, *Wall. Cat.* n. 8681, D.G. and 8748. *Pan. Rottleri*, *Kunth* (nervosum, *Willd.*) *Herb. Wight.* n. 1610 (not of *Kunth Revis. Gram.*) —*Panicum?* *Wall. Cat.* n. 8748.—Madras, Burma, Ceylon.—This resembles *Pan. commutatum*, but has filiform spikes of scattered, longer pedicelled spikelets. It occurs in S. Africa, and no doubt elsewhere. There is no locality on *Arnott’s* ticket of *Griffithii*, which is doubtless from the Madras peninsula, he has added to it, *Wight Cat.* n. 2057, which is *Pan. horizontale*, var. *macanthum*, *Nees*, of which I have seen no specimen.

Var. 7. *extensum*; stout or slender, sheaths glabrous or hirsute, spikes few or

many, rachis narrowly winged, spikelets oblong-lanceolate acuminate more or less ciliate, gl. I half the length of III or less or minute ciliate. *Pan. extensum*, *Nees & Arn. in Wight Cat.* n. 2340 (which is *Pan. dilatatum*, *Steud. l.c.* 39). *Pan. nervosum*, *Rottler in Ges. Naturf. Fr. Neue Schrift.* iv. (1803), 194 (not *Roxb*). *P. filiforme*, *Herb. Roxb.*—Common. This resembles a slender form of *var. commutatum*, with reduced gl. I.

Var. 8, debile; small or dwarf, 4–10 in. high, much branched from the tufted or prostrate or creeping base, glabrous or hairy, spikes 2–5 1–3 in. digitate or nearly so slender, wings of rachis narrower than the midrib, spikelets lanceolate acuminate, gl. I. from minute to nearly as long as III ciliate, II 5-nerved glabrous or ciliate. *Pasp. debile*, *Potr. Encycl.* v. 34 (excl. syn.); *Roem. & Sch. Syst.* ii. 303. *Pan. debile*, *Desf. Fl. Atlant.* i. 59; *Bertol. Fl. Ital.* ii. 778; *Trin. Panic. Gen.* 117. *Digitaria debilis*, *Willd. Enum. Hort. Berol.* i. 91; *Parlat. Fl. Ital.* i. 127.—Plains and low hills, from Bengal to Burma, Malacca, and the Andaman and Nicobar Islds. Ceylon (C.P. n. 856, 857).—*Wall. Cat.* 8683 (spikes longer, more slender). A very common dwarf form in low ground or poor soil, passing into *var. commutatum*, and the following. The specimens with gl. I nearly as long as III are typical *Pan. debile* of the Mediterranean region, but there is a gradual shortening of that gl. to a mere fimbriate scale. A minute accessory gl. at base of gl. II is present or absent. The Nicobar specimens have the bearded upper spikelet of *var. ciliare*.

Var. 9, Rottleri, characters of *var. debile*, but rachis of spike stouter broader green, the wings two or three times broader than the midrib, glumes broader as in *commutatum*, of which it is a dwarf form.—It resembles Host's and Reichenbach's figures of *ciliare*. *Pan. Rottleri*? and *P. ciliare*, *Wight Herb.* n. 3032 (not *Cat.* 1610), and 3033.—Common in the plains of India.

7. P. heteranthum, *Hook. f.*; stem stout, spikes many 6–12 in., rachis very stout rigid trigonous, spikelets $\frac{1}{2}$ in. very distant, upper long-pedicelled lanceolate, gls. rigid finely acuminate, I and II longer than III, of lower spikelet glabrous of upper villous. *Panicum barbatum*, *Kunth Revis. Gram.* i. 33; *Enum. Pl.* i. 84; *Steud. Syn. Gram.* 43. *Benth. Fl. Hongk.* 410. *Pan. elyptroblepharum*, *Steud. in Zoll. Syst. Verz.* 54. *Pan. eminens*, *Steud. l.c.* 43. *Pan. heteranthum*, *Nees et Meyen in Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843), 174; *Steud. l.c.* 43. *Digitaria barbata*, *Willd. Enum. Hort. Berol.* 91. *D. elyptroblephara*, *Miq. Fl. Ind. Bat.* iii. 439.

MALAY PENINSULA; Pahang, *Ridley*.—DISTRIB. Java, China.

A very remarkable species, of which I have seen only one Malayan specimen. The spikes appear to be irregularly produced, being leafy where their bases meet; rachis strict or flexuous, margined with green. Lower spikelet of each pair with very strongly nerved, acuminate, glabrous gls., and no small basal gl., upper with a rigid pedicel and minute, orbicular, naked, basal gl., its other gls. densely villous; gls. of the upper spikelet at length spreading, hairs very long, with hooked tips.—Perhaps only an extreme form of *P. saguinale*, *var. ciliare*. I have seen no authentic specimen of *P. elyptroblepharum*, but Miquel's description of it accords with the Malayan plant, and he cites *P. eminens* as a synonym.

8. P. pennatum, *Hook. f.*; spikes 8–10 radiating elongate filiform ciliate, spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. solitary or binate narrowly lanceolate subsilky, gl. I as long as III 3–5-nerved, II with or without a minute basal one nerves, 5 equidistant, III narrowly elliptic-lanceolate acuminate. *Panicum pennatum*, *Hochst. in Flora*, xxxviii. (1854), 197.

SIND; at Kurrachee, *Stocks*. BELUCHISTAN, *Frere*.—DISTRIB. Arab., Abyssin.

Stem 1–2 ft., branching from the suberect or prostrate base, slender. Leaves 1–6 by $\frac{1}{8}$ in., glabrous, or sheaths and sometimes margins and both surfaces hairy, ciliate with long hairs towards the base; ligule rather long, membranous. Spikes 3–6 in.; rachis almost capillary, trigonous, very rarely branched, cilia very long. Spikelets erect, pedicel of the upper almost as long as the gls.

9. **P. ambiguum**, DC. *Fl. Franc.* iii. 16; stems diffusely decumbent or ascending, spikes 2-4 subdigitate spreading, rachis narrowly winged, pedicels nearly glabrous, spikelets imbricate $\frac{1}{2}$ in. elliptic subacute silkily pubescent with slender hairs or glabrate, gl. I nearly = III, II 5-nerved, III ovate-oblong acute. *Panicum ambiguum*, Lapeyr. *Hist. Abr. Pl. Pyr.* 31; *Fig. & Not. in Act. Tor.* (1854) 336, t. 11; *Sang. in Atti Linc. Ser. I.* xviii. (1865) 219, t. 421. *Pan. arenarium*, Bieb. *Fl. Taur. Cauc.* i. 52. *Pan. distichum*, Gaudin ex Steud. *Nom. Ed.* II, ii. 255. *Pan. glabrum*, Gaudin. *Agrost. Helvet.* i. 22; *Fl. Helvet.* i. 155; *Trin. Diss.* ii. 83; *Sp. Gram. Ic.* t. 149; *Kunth Enum. Pl.* i. 83; *Boiss. Fl. Orient.* v. 433; *Steud. Syn. Gram.* 1. *Pan. humifusum*, Kunth *Revis. Gram.* i. 33. *Pan. Ischæmum*, Schreb. ex Schweigg. *Spec. Fl. Erlang.* 16. *Pan. lineare*, Krock *Fl. Siles.* i. 95. *Pan. sanguinale*, Pollich. *Hist. Pl. Palat.* i. 57. *Digitaria filiformis*, Koel. *Descr. Gram.* 26; *Reichb. Ic. Fl. Germ.* t. 27. *D. glabra*, Beauv. *Agrost.* 160; *Ledeb. Fl. Ross.* iv. 468; *Parlat. Fl. Ital.* i. 127. *D. humifusa*, Pers. *Syn. i.* 85; *Engl. Bot.* t. 2613. *D. linearis*, Rostaf. in *Verh. Bot. Zool. Ges. Wien.* xxii. (1872) 99. *D. procumbens*, Hort. ex Steud. *Nom. Ed.* II, i. 508. *Syntherisma glabrum*, Schrad. *Fl. Germ.* i. 163.

WESTERN HIMALAYA, alt. 5-10,000 ft.; Kashmir, Stewart; Simla, Thomson. WESTERN TIBET, alt. 8-10,000 ft., Thomson.—DISTRIB. Europe, N. Asia.

Stems 6-12 in., usually diffusely spreading, rarely erect. *Leaves* linear-lanceolate, acute, glabrous; mouth of sheath hairy. *Spikes* 2-6, 1-2 in. long, suberect or divaricate, green or reddish. *Spikelets* variable in hairiness; the hairs often with slightly clavate tips; gl. II with rarely a minute one at the base; III quite smooth.—Very similar to var. *cruciatum* of *P. sanguinale*, but has smaller broader not acuminate spikelets, and gl. IV is never acuminate. Even more like *P. ternatum*, which is best distinguished by the bristle-like hairs on the pedicel, and short clavate ones on the outer gls.

10. **P. ternatum**, Hook. f.; stems erect or decumbent below, spikes 2-3 subdigitate erect or spreading, rachis narrowly winged ciliolate, spikelets $\frac{1}{2}$ — $\frac{1}{6}$ in. geminate imbricate elliptic subacute villous with clavellate hairs, pedicels setulose, gl. I nearly = III or shorter, II 5-nerved nerves equidistant, III ovate-oblong acute. *P. humifusum*, Heyne ex Wall. *Cat.* n. 8755. *Panicum ternatum*, Hochst. in *Flora*, xxiv. (1841) i. *Intell.* 19; *Steud. Syn. Gram.* 40. *Cynodon ternatum*, A. Rich. *Tent. Fl. Abyss.* ii. 405.

WESTERN GHATS; Bababudan Hills, Heyne; Belgaum, Ritchie. KHASIA HILLS; Pomraug, alt. 4-5000 ft., J. D. H. & T. T.—DISTRIB. Abyssinia.

Habit of *P. ambiguum*. *Leaves* 2-5 in., linear-lanceolate or linear; sheath glabrous or with a few hairs, mouth ciliate; ligule short, membranous, truncate. *Spikes* 2-3 in., silvery-white. *Spikelets* pale, pedicels short, hispid with stiff hairs, the upper hairs half as long as the spikelet; gl. I and II with the hairs forming a dense fringe along the margins.—The Belgaum and Khasian specimens are tall and long leaved; the Bababudan ones very short. Said by Schimper to be a pest in cultivated land in Abyssinia. It so closely resembles *P. ambiguum*, that without microscopical examination of the hairs of the spikelets it is very difficult to distinguish it from that species. A Ceylon plant, from Thwaites (C.P. 2573), with larger spikelets than *P. longiflorum* (to which I doubtfully refer it), cannot be distinguished from *P. ternatum* except by the structure of the hairs of the spikelet.

†† *Spikelets* $\frac{1}{4}$ — $\frac{1}{8}$ in., with no minute gl. at base of II.

11. **P. longiflorum**, Retz. *Obs.* iv. 15 (*non Trin.*); stems procumbent below rarely erect from the base, spikes 2- many subterminal erect or

spreading, rachis filiform, spikelets $\frac{1}{8}$ – $\frac{1}{4}$ in elliptic-oblong silky with slender (not clavellate) crisped hairs, pedicels glabrous or nearly so, gl. I and II subequal or I shorter or obsolete, II 5-nerved, III ovate acuminate. *Wall. Cat. n. 8751, C.*; *Wight Cat. n. 1603*; *Baker Fl. Maurit. 431. P. bifarium, Edgew. in Journ. As. Soc. Beng. xxi. (1853) 157 nomen. (ex Thw. Enum. Pl. Zeyl. 358).* *P. brevifolium, Fluegge Gram. Monog. 150 (excl. Syn.)*; *Kunth Enum. Pl. i. 48*; *Wight Cat. n. 1603, 1604*; *Steud. Syn. Gram. 41*; *Benth. Fl. Hongk. 408, Fl. Austral. vii. 461*; *Franch. & Sav. En. Pl. Jap. ii. 159. P. chinense, Nees in Hook. & Arn. Bot. Beech. Voy. 231*; *Steud. l. c. P. filiculme, Nees ex Thw. l. c.*; *Wight Cat. n. 1604*; *Trim. Cat. Ceyl. Pl. 104*; *Franch. & Sav. l. c.*; *Duthie Grass. N.W. Ind. 1. P. granulare, Trin. in Spreng. N. Entdeck. ii. 47*; *Kunth l. c. 50. P. minutiflorum, Steud. l. c. 17*; *Benth. l. c. P. nematodes, Schult. Mant. ii. 71*; *Kunth l. c. 65. Panicum argyrotichum, Anderss. in Peters Reise Mossamb. Bot. 548. Pan. lineare, β Pseudo Duroa, Nees in Herb. Wight. Pan. longiflorum, Gmel. Syst. 158*; *Wall. Cat. n. 8751 A. Pan. parvulum, Trin. Pan. Gen. 117, in Mem. Acad. Petersb. Ser. vi. iii. II (1835) 305. Pan. propinquum, Br. Prodr. 193. Pan. Pseudo-Duroa, Nees Fl. Afr. Austr. 21*; *Wight Cat. n. 1608. Pan. tenuiflorum, Br. l. c.*; *Kunth l. c. 85*; *Duthie Grass. N.W. Ind. 7, Fodd. Grass. N. Ind. 13. Digitaria linearis, Schult. Mant. ii. 264 (ex Miquel). D. longiflora, Pers. Syn. i. 85. D. Pseudo-Duroa, Miq. Fl. Ind. Bat. iii. 439. D. Roxburghii, Spreng. Syst. i. 270. D. tenuiflora, Beauv. Agrost. 51. Milium filiforme, Roxb. Fl. Ind. i. 314*; *Wight Cat. n. 1604, a.b.c. M. radiatum, Herb. Rottl. M. setaceum, Herb. Koen. in Mus. Brit. M. triracemosum, Roxb. Ic. Ined. n. 315. Agrostis lenta, Ait. Hort. Kew, i. 96. A. triracemosa, Herb. Roxb.—Paspalum, Wall. Cat. n. 8751, 8752 B.D.E.*

Throughout INDIA, from Kashmir eastwards and southwards to Ceylon (C.P. 860) and Malacca; ascending the Himalaya to 6000 ft.—DISTRIB. Trop. and sub trop. regions of the Old World.

Annual or perennial? *Stems* tufted, 6–18 in., simple or branched below and rooting with ascending branches or prostrate. *Leaves* very various, 1–1½ in. long lanceolate and divaricate, or 6–8 in. long, linear erect or spreading; sheath smooth or hairy; ligule short, truncate, membranous. *Spikes* 1–4 in., subdigitate or alternate, usually silvery-white. *Spikelets* geminate, a subsessile and pedicelled, pale green or purplish; gl. III pale, or dark brown.—The extreme forms of this species are very dissimilar, the most marked are *P. longiflorum*, proper (*brevifolium*, Fluegge), with often prostrate stems spreading from the root or creeping and rooting from 6–12 in. with short lanceolate leaves, and 2–3 divaricate spikes, and *P. minutiflorum*, Steud., with slender erect stems, narrow linear leaves and many long erect spikes, exactly as *P. Royleanum*. The hairs on the spikelets seen under the microscope are very slender and as it were crisped or wrinkled, quite unlike those of *P. ternatum* and *Royleanum*. Thwaite's CP. n. 2573 is a puzzling plant, tall, with much longer spikelets, approaching those of *P. ambiguum*. Though in this species and its allies there is no distinct gl. at the base of II, a microscopical rudiment of one may often (always?) be detected.

12. ***P. Royleanum***, *Nees ex Thw. Enum. Pl. Zeyl. 358*; erect or shortly decumbent below, leaves usually erect, spikes 2–10 erect, rachis filiform, spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in. oblong, gl. I and II densely crisply white-tomentose with clavellate hairs, pedicel setulose, gl. I = $\frac{3}{4}$ III or shorter or obsolete, II broadly oblong subacute 5-nerved, III oblong subacute quite smooth. *Trim. Cat. Pl. Ceyl. 158*; *Herb. Strach. & Winterb. Pasp. n. 2*; *Duthie Grass. N.W. Ind. 1. P. filiculme, Herb. Strach. & Winterb. n. 3*

(non Nees). *P. trachyanthum*, Nees in *Herb. Wight*. *Panicum puberulum*, Kunth *Revis. Gram.* i. 32; *Enum. Pl.* i. 81; *Steud. Syn. Gram.* 41. *Digitaria puberula*, Link *Enum. Hort. Berol.* i. 223. *Milium ovatum*, Heyne ex Wall. *Cat. n.* 8752. *Agrostis villosa*, Koen. in *Herb. Mus. Brit.* *Zoysia Codia*, Ham. in Wall. l. c.—*Paspalum*, Wall. l. c. n. 8684, 8752, A.C.

Hilly districts of INDIA, from Kashmir eastwards to Munnipore, and southwards to Ceylon; ascending the Himalaya to 7000 ft.—DISTRIB. Africa trop.

Habit of the tall forms of *P. longiflorum*, almost always erect with long leaves, except in starved specimens; well distinguished from that plant (as Dr. Stapf first pointed out to me) by the short clavellate thick walled hairs of the spikelets, and the usually setulose pedicels, the longer hairs of which are sometimes half as long as the spikelet, as also by the shorter broader gl. III, which is (as in *longiflorum*) pale yellowish or dark brown and shining. Gl. I is often reduced to a tuft of hairs; II always = III.—This species was referred by Munro to *P. ischnocaulon*, Trin., a grass erroneously attributed to India, by its author in *Sp. Gram.* l. c. t. 126, but corrected to America in the corrigenda at the end of that work. Some specimens have been referred by Munro to *P. concinnum*, Steud. (*Syn. Gram.* 19), a very doubtful species of unknown origin. In the Ceylon specimen, C.P. 859, the pedicels are hardly setulose. In African specimens, apparently of this species, they are remarkably developed and longer than the spikelets. Specimens from Poona are tall, 2 ft. high, very robust, and branched from the base. Steudel's *P. Royleanum* is according to his description a very different plant, and judging by his reference of it to Wall. *Cat. n.* 8700 B. is *Panicum auritum*.

13. ***P. pedicellare***, Trin. ex Steud. *Nom. Ed.* II, ii. 272; erect, spikes alternate approximate erect or spreading, spikelets $\frac{1}{20}$ in. geminate or 3–5-nate, upper of each pair half as long as their pedicels elliptic acute, gls. membranous, I and II subequal 5-nerved, III elliptic-oblong acuminate pale. *P. granulare*, Trin. in Spreng. *Neue Entdeck.* ii. 47; *Spreng. Syst. i.* 244; *Kunth Enum. Pl.* i. 50; *Steud. Syn. Gram.* 16. *P. pedicellatum*, Nees & Arn. in *Wight Cat.* 2310, & *Herb. n.* 3027; *Duthie Grass. N.W. Ind.* 1. *Milium capillaceum*, Koen. ex Steud. *Nom. Ed.* II, ii. 145. *M. punctatum*, Koen. in *Herb. Mus. Brit.* *M. sanguinale*, Roxb. *Fl. Ind.* i. 315 (excl. *Syn. Burm.*). *M. setaceum*, Koen. in *Herb. Banks.*; Jacq. ex Trin. l. c. *M. striatum*, *Herb. Ham. ex Wall. Cat. n.* 8747 A.—? *Paspalum*, No. 3, *Griff. Notul.* iii. 14 (in part), *Ic. Pl. Asiat.* t. 146, f. 1.—*Panicum*, Wall. *Cat. n.* 8747.

THROUGHOUT INDIA, in the plains and low hills from the N.W. Provinces to Bengal. NILGIRI HILLS, alt. 5000 ft., *Beddome*. UPPER BURMA, *Collett*.

Stem 6–18 in., branched from the base. Leaves 2–6 by $\frac{1}{8}$ – $\frac{1}{2}$ in., finely acuminate; ligule short, scarious. Spikes 3–10, 1–4 in., subterminal on the very slender peduncle, spreading; rachis capillary, trigonous; pedicels $\frac{1}{2}$ – $\frac{1}{8}$ in.; gls. slightly hairy.—Munro identifies Griffiths' *Pasp.* 3 with this; it differs in the flattened rachis, red prostrate stem, and pale red spikelets, which I have never seen in *pedicellatum*. Roxburgh's excellent drawing (as *Milium sanguinale*) shows pale spikelets.

14. ***P. jubatum***, Griseb. in Goett. *Nachr.* (1868) 84 (*Gesamm. Abhandl.* 301); erect, rather stout, leaves long, spikes very many lower whorled, spikelets $\frac{1}{20}$ in. in scattered pairs pale or dark purple elliptic acute, gls. finely tomentose, I rather shorter than III 3-nerved, II 5-nerved, III elliptic-lanceolate acuminate.

The KHASIA HILLS; in wet places, alt. 5–6000 ft., *J. D. H. & T. T.*, &c.

Stem 2–4 ft., shining, internodes long. Leaves 6–10 by $\frac{1}{8}$ – $\frac{1}{2}$ in., smooth; sheath very long; ligule short rounded. Spikes 4–7 in., very unequal; rachis slender,

trigonus. *Spikelets* subsessile; gls. thin, shining.—Pale spikes and spikelets occur on the same plant with the dark coloured.

15. **P. Perrottetii**, *Hook. f.*; stem creeping below, spikes in a pyramidal panicle lower often whorled, rachis capillary, spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in. oblong-lanceolate acute brown, upper of each pair long-pedicelled, gl. I and II subequal many-nerved, III elliptic-lanceolate acuminate. *Panicum Wallichianum*, *Wight & Arn. in Wight Cat. n. 1607, Herb. 3085; Steud. Syn. Gram. 41; Thw. Enum. Pl. Zeyl. 358; Trim. Cat. Ceyl. Pl. 104.* *Pan. multibrachiatum*, *Hochst. ex Steud. l. c. 74.* *Pan. Perrottetii*, *Kunth Revis. Gram. ii. 395, t. 3; Enum. Pl. i. 96.* *Milium minutiflorum*, *Trin. Panic. Gen. 33.*

NILGHIRI HILLS, *Wight, &c.*, alt. 6000 ft., *Lawson.* CEYLON, in the Central Province, *Thwaites.*—DISTRIB. N. Africa.

Very variable in height, 6–24 in., much branched below. *Leaves* 1–6 by $\frac{1}{8}$ – $\frac{1}{4}$ in., glabrous or ciliate; sheaths 1– $1\frac{1}{2}$ in.; ligule rounded, scarious. *Panicle* 2–3 in., peduncle filiform. *Spikes* erecto-patent, lowest $\frac{1}{2}$ – $\frac{3}{4}$ in., upper gradually smaller; rachis trigonus. *Spikelets* geminate, lower sessile or pedicelled.—The panicked inflorescence is very different from that of *P. pedicellare*.

DOUBTFUL SPECIES.

P. GRIFFITHIANUM, *C. Mull. in Bot. Zeit. xxix. (1861) 325.* “Foot of Khasia Hills, *Griffith.*”—There is no Indian *Paspalum* that at all resembles the description of this, which, according to its author, is an ally of *P. fluitans*, Ell., and other American species. There is probably an error as to the habitat and collector.

2. **ERIOCHLOA**, *H. B. & K.*

Annual or perennial grasses. *Leaves* flat. *Spikelets* secund on the spiciform branches of a raceme or panicle, base thickened and articulate on the thickened top of the short pedicel. *Glumes* 3, I and II subequal, membranous; III shorter, apiculate, hardened in fruit. *Lodicules* truncate. *Stamens* 3, anthers linear. *Styles* free. *Grain* oblong, free within the hardened glume.—Species few, tropical.

The thickened base of the spikelet alone distinguishes *Eriochloa* from *Paspalum*.

1. **E. polystachya**, *H. B. & K. Nov. Gen. & Sp. i. 95, f. 31*; spikes panicked, spikelets $\frac{1}{8}$ in. long erect ovoid acute, gl. I & II silky or glabrous 3–5-nerved. *Lam. Encycl. t. 909; Kunth Enum. Pl. i. 72, Suppl. 53; Trim. Cat. Ceyl. Pl. 104; Duthie, Indig. Fodd. Grass. t. 41, Fodd. Grass. N. Ind. 2.* *E. annulata*, *Kunth Rev. Gram. i. 30, Enum. i. 73; Aitchis. Cat. Panjab. Pl. 158; Duthie Grass. N.W. Ind. 2; Benth. Fl. Hongk. 409, Fl. Austral. vii. 463.* *E. punctata*, *Ham. Prodr. Fl. Ind. Occ. 5; Kunth Enum. i. 72, Suppl. 54. Miq. Fl. Ind. Bat. iii. 441; Benth. Fl. Austral. vii. 462.* *E. sudaica*, *Miq. l. c. Suppl. 606.* *E. succincta*, *Kunth l. c. i. 73.* *Helopus annulatus*, *Nees in Mart. Fl. Bras. ii. 17; Wight Cat. n. 1605; Wall. Cat. n. 8750.* *H. lævis*, *Trin. ex Spreng. Neue Entdeck. ii. 49, fig. 4.* *H. pilosus*, *Trin. Fund. Agrost. 104, fig. 4.* *H. acrotrichus*, *Steud. Syn. Gram. 100.* *Paspalum punctatum*, *Fluegge l. c. 127 (Paspalus); Trin. Sp. Gram. Ic. t. 155.* *P. annulatum*, *Fluegge l. c. 133 (Paspalus); Trin. l. c. t. 133.* *P. succinctum*, *Trin. Diss. ii. 19; Sp. Gram. Ic. t. 156.* *Milium Carar & M. Languchinia*, *Herb. Ham. ex Wall. Cat. n. 8750, F. G. M. polystachyum, Spreng. Syst. i. 251. M. punctatum, Linn. Amœn. Acad. v. 392, Sp. Pl. 91; Br. Prodr. 188. M.*

orixense, Roxb. *Ic. ined.* n. 818. *M. ramosum*, Retz. *Obs.* vi. 22; Roxb. *Fl. Ind.* i. 316; Griff. *Notul.* iii. 15, *Ic. Pl. Asiat.* t. 139, f. 60. *Piptatherum punctatum*, Beauv. *Agrost.* 18, t. 5, f. 1. *P. confine*, Schult. *Mant.* ii. 184 (ex Kunth). *P. annulatum*, Raddi *Agrost. Bras.* 30. *Agrostis punctata*, Lamk. *Encycl.* i. 58. *Cedipachne punctata*, Link *Enum. Hort. Berol.* i. 51.

PLAINS OF INDIA; from the Punjab to Bengal, Burma, Central India, and southward to Malacca and CEYLON.—DISTRIB. All hot countries.

Stems 1–5 ft., ascending from a creeping base. *Leaves* 3–10 by $\frac{1}{8}$ – $\frac{1}{4}$ in., glabrous or hairy, ligule very short. *Spikes* forming a narrow secund compound panicle 2–6 in. long; rachis trigonous and branches pubescent villous or nearly glabrous. *Spikelets* shortly pedicelled; gl. I and II usually silky, sometimes villous, III much shortest, punctulate, very shortly awned.

3. ISACHNE, Br.

Perennial grasses. *Spikelets* small or minute, loosely paniced, not or obscurely articulate with the pedicel, subglobose or obovoid, 1–2-fl. *Glumes* 4, often all separately deciduous from a minute rachilla; I and II subequal, convex, herbaceous, empty; III and IV paleate, equal and both convex, or III larger flatter thinner; III male, rarely 2-sexual; IV articulate and often stipitate on the rachilla, hemispheric, coriaceous, fem. or bisexual. *Lodicules* very minute. *Stamens* 3, rarely 4–6. *Grain* free within the hardened gl. and pale.—Species about 25, tropical and sub-tropical.

The 2-fl. spikelets not articulate on the pedicel, with usually subequal convex empty gls., and gl. IV being articulate on the rachilla, distinguish *Isachne* from *Panicum*. I find great varieties in the persistence of the empty glume on the pedicel. Mr. Rendle informs me that he has seen traces of a fifth glume and palea in *I. australis*, which favours the claim of the genus to be referred to *Poaceæ*; and he has shown me a most minute prolongation of the rachilla at the base of the palea of gl. IV in the same species. Many of the species so run into their allies, that I regard the following limitation of most as open to question. The smooth hispid or bristly empty gls. affords no specific character, nor does the glabrous or pubescent fl. gl.

* Spikelets $\frac{1}{20}$ – $\frac{1}{10}$ in long.

† Glumes I and II longer than IV, cuspidate or acuminate.

1. **I. Kunthiana**, Wight & Arn. in *Wight Cat.* n. 1659; *Thw. Enum. Pl. Zeyl.* 362; stem 6–10 in. more or less hairy, leaves ovate or ovate-oblong, panicle 2–2½ in., branches few, gl. I and II subacute or subcuspidate 7–9-nerved. *Miq. Fl. Ind. Bat.* iii. 460; *Trim. Cat. Ceyl. Pl.* 104. *I. dispar*, *Herb. Wight.* *I. Metzii*, *Hochst. in Hohen. Pl. Ind. Or.* n. 1276. *I. Neesiana*, Arn. ex *Steud. Syn Gram.* 96. *Panicum cuspidiglume*, *Steud. Kunthianum*, *Wight & Arn. & Metzii*, *Hochst. ex Steud. l. c.* 96, 95. *P. obliquum*, *Moritz. ex Miq. l. c.*, *Steud. l. c.* *P. Burmanni*, et *P. marginatum*, var. *Heyne ex Wall. Cat.* n. 8734, A.

NILGHIRI and TRAVANCORE HILLS, alt. 6–8000 ft., Heyne, &c. SINGAPORE, Ridley. CEYLON; in elevated districts.—DISTRIB. Java, Borneo.

Stem ascending, geniculate, branched. *Leaves* $\frac{1}{2}$ –2½ in., striate, spreading, smooth or scaberulous above, base cordate, midrib and nerves obscure; ligule of hairs. *Panicle* 2–2½ in.; branches short, rather stout, at length horizontal, pubescent or glabrous. *Spikelets* $\frac{1}{20}$ – $\frac{1}{10}$ in., very shortly pedicelled; gl. I and II smooth

hispid or bristly; III and IV subequal or III rather the largest, glabrous or puberulous.—*I. Neesiana*, is rather more glabrous, and has rather more unequal gls. III and IV, but these characters are too variable to found a distinct variety upon.

Var. *latifolia*; stem 12-16 in. stouter, leaves 2-3 by $\frac{1}{4}$ - $\frac{3}{4}$ in. and sheaths sparsely hairy, midrib and 2-3 pairs of principal nerves distinct.—Nilghiri Hills, alt. 6000 ft., *Lawson*; Anamallay Hills, *Beddome*.—Almost intermediate between *I. Kunthiana* and *elatior*.

2. ***I. elatior***, *Hook. f.*; nearly glabrous, stem 2-4 ft., nodes tomentose, leaves 3-4 in. ovate-lanceolate acuminate thin scabrid above, panicle 5-7 in., branches many slender, gl. I and II subcuspidate 5-9-nerved.

CEYLON, *Gardner*; Newera Ellia, *Thwaites* (CP. 314).

Included by *Thwaites* under *I. Kunthiana*, possibly correctly, but a very different looking plant, from its great size, thin leaves and much larger many-fl. panicle, with longer branches.

3. ***I. Lisboa***, *Hook. f.*; glabrous, stem creeping, branches ascending, leaves thin oblong-lanceolate, panicle with few horizontal stout hispidly setulose branches, gl. I and II 5-nerved hispid, III and IV equal.

The CONCAN; Mahableshtar, *Lisboa*.

Stem creeping for several inches with long wiry roots, then ascending, and 6 in. high, rather stout. Leaves 1-2 in. by $\frac{3}{8}$ in., recurved, thin, acute or obtuse, finely striate; base rounded, margins ciliate; sheaths loose; ligule 0. Panicle with the rachis quite smooth. Spikelets $\frac{1}{10}$ in. diam., secund on the lower surface of the branches, sessile or shortly pedicelled; gl. I and II hemispheric, 5-ribbed, tip obtusely cuspidate, a little larger than III which is glabrous.—I have seen but one specimen of this species, which probably varies like its congeners in the smoothness or hispidity of the spikelets. The 5-ribs of gl. I and II are good characters.

†† Glumes I and II much shorter than IV.

4. ***I. multiflora***, *Trim. Cat. Ceyl. Pl.* 104. *I. australis*, var. *multiflora*, *Thw. Enum. Pl. Zeyl.* 361.

CEYLON; Oova district, alt. 5000 ft., *Thwaites*.

Stem 1-2 ft. or more, branched, and sheaths smooth. Leaves 4-6 by $\frac{1}{4}$ - $\frac{1}{2}$ in., smooth, deeply striate, margins hardly thickened, nerves obscure. Panicle 4-7 in.; branches many, long, suberect, and very short pedicels subcapillary. Spikelets $\frac{1}{10}$ in., glabrous, glistening, purplish; gl. I oblong-ovate, 7-nerved; II as long, glabrous; III oblong-lanceolate, empty; IV much shorter, broadly oblong, obtuse, glabrous.

††† Glumes I and II about equalling IV.

§ Glumes III and IV usually equal and similar, both hemispheric and coriaceous.

5. ***I. albens***, *Trin. Sp. Gram. Ic.* t. 25; tall, erect, leaves and sheaths smooth, panicle large pyramidal effuse, spikelets $\frac{1}{10}$ - $\frac{1}{8}$ in. rather shortly pedicelled, globose. *Kunth Enum. Pl.* i. 137; *Miq. Fl. Ind. Bat.* iii. 459. *Duthie Grass. N.W. Ind.* 2 (excl. *Syn.*), *Fodd. Grass. N. Ind.* 3. *Panicum albens*, *saxatile* & *Zollingeri*, *Steud. Syn. Gram.* 96, 97.—*Isachne*, *Wall. Cat.* n. 8658.

TEMPERATE and SUBTROPICAL HIMALAYA and the KHASIA HILLS, alt. 2-6000 ft. from Simla eastward; ascending to 9000 ft. in Sikkim. BURMA, *Griffith*. PERAK, alt. 4600 ft. *Wray*.—DISTRIB. China, Malaya.

Stem 1-4 ft., branched. Leaves 2-8 in., very variable ($\frac{1}{2}$ -1 in.) in width, linear

or linear-lanceolate, glabrous or sparsely hairy beneath; margins thickened, scaberulous; midrib and 3-5 pairs of principal nerves distinct, mouth of sheath ciliate. *Panicle* 3-14 in. long, branches and pedicels capillary; gl. I and II obtuse, glabrous or sparsely setulose, usually pale green, faintly many-nerved; III and IV glabrous or pubescent, both often bisexual.

Var. *hirsuta*; leaves broad, sheaths hirsute.—*Isachne*, Wall. Cat. n. 8657.—Silhet, de Silva. Cachar, Keenan.

6. **I. scabrosa**, Hook. f.; leaves suberect, sheaths scabrid, panicle 2-3 in. pyramidal, spikelets $\frac{1}{2}$ – $\frac{1}{8}$ in.

KHASIA HILLS, alt. 4500-5000 ft. Clarke.

Stem rambling below, then suberect, 1-3 ft., stiff, sparingly branched. *Leaves* 3-6 by $\frac{1}{2}$ – $\frac{1}{2}$ in., linear-lanceolate, scabrid on both surfaces, pale and strongly-nerved beneath, margin thickened; mouth of sheath sparingly ciliate. *Panicle* very shortly peduncled; branches erecto-patent, 1-1 $\frac{1}{2}$ in. long; pedicels capillary, smooth, tips not swollen. *Spikelets* sparsely setulose, tips rounded; gl. I and II glabrous or sparsely setose, many-nerved.—Easily distinguished from *P. albens* and *himalaica* by the scabrid leaf-sheaths; but most nearly allied to the latter.

7. **I. himalaica**, Hook. f.; erect, leaves linear or linear-lanceolate strict scaberulous above, margins slightly thickened, sheaths smooth, panicle pyramidal, spikelets $\frac{1}{8}$ – $\frac{1}{4}$ in. globose, pedicels long capillary tips hardly thickened, gl. I and II faintly many-nerved. I. *australis*, Aitchis. Cat. Punjab. Pl. 761; Herb. Ind. Or. Hf. & T. (the Khasian plant); Duthie Grass. N.W. Ind. 2, Fodd. Grass N. Ind. 3. I. *muricata*, Munro in Herb. Strach. & Winterb. No. 2. ?*Panicum montanum*, Duthie Grass. N.W. Ind. 4.—*Isachne*, Wall. Cat. n. 8656, D E.

WESTERN TEMPERATE and SUBTROPICAL HIMALAYA; in wet places, ascending to 6000 ft.; KUMAON, Strach. & Winterb. NEPAL, Wallich. PRASHAWUR, Aitchison. RAJAORI, Jacquemont. KHASIA HILLS, in marshes, alt. 4-5.00 ft. common.—DISTRIB. Afghanistan.

Stem 1-2 ft., erect from the base, stout or slender, stiff. *Leaves* always narrow ($\frac{1}{2}$ – $\frac{3}{4}$ in.), nearly ensiform; nerves 9-11 pair, usually very strong, margins thickened; mouth of sheath stiffly ciliate. *Panicle* with erecto-patent branches 1-1 $\frac{1}{2}$ in. long. *Spikelets* green or purplish; gl. I and II glabrous scabrous or bristly, III sometimes longer and flatter than IV.—Very like *I. australis*, but a larger and more rigid plant, with gl. II and III usually equal, and both hemispheric.

In a note in Munro's herbarium this is referred to the Javan *I. virgata*, Nees (Miq. Fl. Ind. Bat. iii. 462 = *Panicum rhabdinum*, Steud.), but that is described as being fastigiate spikelets, and glumes with narrowed obtuse mucronate points. It closely resembles a Sumatran plant from Beccari (n. 198).

8. **I. elegans**, Dalzell mss.; erect, tufted, flaccid, glabrous or nearly so, leaves 2-5 in. very narrowly linear acute soft smooth on both surfaces or scaberulous above, margins thickened, panicle subsessile contracted, branches erect, spikelets $\frac{1}{2}$ – $\frac{1}{10}$ in. pedicels short, tips rounded, gl. I and II many-nerved.

The CONCAN, Dalzell, Stocks, in wet places between Poonah and Carli, Jacquemont (n. 143), Woodrow (n. 175).

Stems 8-12 in., densely tufted, soft. *Leaves* $\frac{1}{2}$ – $\frac{1}{2}$ in. broad, principal nerves 0 or 1-2 on each side, margins thickened, smooth or serrulate, rarely with a few scattered bristles beneath; sheath quite smooth, mouth ciliate. *Panicle* 3-5 in., glabrous; branches $\frac{1}{2}$ –1 in., smooth; pedicels rarely longer than the spikelets, which are hispid green or blueish, gls. III and IV pubescent, usually equal and both hemispheric, but III sometimes longer and flatter.—The tufted flaccid habit is quite unlike *I. australis*, but may be due to local conditions.

9. **I. javana**, *Nees ex Miq. Pl. Jungh.* 376, & *Fl. Ind. Bat.* iii. 462; stout, erect, leaves 2-3 in. acute or obtuse stiff glaucous beneath, margins much thickened, panicle lax, branches and pedicels very long and slender tips obconic, spikelets obovoid $\frac{1}{4}$ - $\frac{1}{2}$ in. long. *Panicum batavicum*, *Steud. Syn. Gram.* 96.

UPPER BURMA, *Herb. Hort. Calcutt.* MALACCA, *Maingay*; Mr. Ophir, *T. Lobb, Hullett.* PERAK; on Gunong Bubu, alt. 5000 ft. *Wray*.—DISTRIB. Java, Borneo.

Habit of *I. himalaica*. Stem 2-3 ft., quite smooth, stiff; nodes ciliate. Leaves erect or erecto-patent, strict, nearly smooth on both surfaces, or sparsely hairy beneath, with 9-11 pairs of often very obscure nerves, margin smooth or serrulate; sheaths quite smooth, margins glabrous or ciliate, mouth bearded. Panicle 2-4 in., glabrous, lower branches 2-3 in.; pedicels more thickened at the tip than in most other species. Spikelets broad, smooth; gl. I and II often polished; nerves many, obscure; III and IV usually equal and both hemispheric; III rarely larger and flattened, usually male; IV fem or bisexual; sometimes both III. and IV. are triandrous or hexandrous, in one spikelet III was triandrous and IV tetrandrous.—A much larger plant than *I. australis*.

10. **I. Clarkei**, *Hook. f.*; stem short very slender, leaves 1-2 in. ovate-lanceolate acute very thin, margins thickened serrulate, panicle 2-3 in. pyramidal, branches horizontal and pedicels capillary tips slightly thickened, spikelets $\frac{1}{3}$ - $\frac{1}{2}$ in.

SIKKIM HIMALAYA; meadows in the Lachoong valley, alt. 8-11,000 ft.—*J. D. H. MUNNIPORE*; on Kohima, alt. 5800 ft. *Clarke*.

Stems 6-12 in., almost filiform, base prostrate. Leaves spreading, almost membranous, nerves many faint, midrib obscure; sheath and its mouth often strongly ciliate. Panicle long-peduncled, branches 1 in. and less. Spikelets scattered, hispid, green or purplish; gl. IV. hispidly pubescent.—Apparently a distinct little species with very small spikelets, but possibly a small state of *I. albens*.

11. **I. rigida**, *Nees ex Steud. Syn. Gram.* 95; stems rigid much branched from the base, leaves $\frac{1}{2}$ -1 in. rigid spreading and recurved ovate to ovate-lanceolate almost pungent scabrid base cordate margins thickened, panicle small pyramidal glandular, spikelets few $\frac{1}{2}$ -1 in., pedicels long slender tip subclavate. *Miq. Fl. Ind. Bat.* iii. 461. *I. Myosotis*, *Benth. Fl. Hongk.* 415 (not of *Nees*). *Panicum rhignon*, *Steud. l. c.* *P. piluliferum*, *Nees ex Steud. l. c.* 24 (*vide Herb. Munro*).

TENASSERIM, *Helper*. NICOBAR ISLDS., *Kurz*.—DISTRIB. Java, Borneo, China.

Stems 6-16 in., generally very long decumbent and naked below, internodes 1-1 $\frac{1}{2}$ in., naked. Leaves deeply striate, with finely acuminate acicular tips, margins smooth ciliate or serrulate; sheaths $\frac{1}{4}$ in., smooth scabrid or bristly. Panicle 1 in., peduncle stout; branches horizontal. Spikelets few, hispid; gl. I and II many-nerved, III and IV glabrous.—I take this to be the Javan *I. rigida*, *Nees*, from *Steudel's* description. It further agrees well enough with the descriptions of *I. firmula* and *I. monticola*, *Buse*.

§§ Glume III usually flatter and thinner, and often longer than IV.

12. **I. australis**, *Br. Prodr.* 196; stems tufted ascending, leaves short lanceolate or linear-lanceolate acute margins not or very slightly thickened, sheath smooth, panicle ovoid or pyramidal, spikelets globose $\frac{1}{4}$ - $\frac{1}{2}$ in. glabrous or setose, tips of pedicels hardly thickened. *Kunth Enum. Pl.* i. 136; *Thur. Enum. Pl. Zeyl.* 361 (in part, excl. *Syn.*); *Trim. Cat. Ceyl. Pl.* 104; *Miquel Fl. Ind. Bat.* iii. 461; *Benth. Fl. Hongk.* 414, *Fl. Austral.* vii. 625; *Hook. f. Handb. N. Zeal. Fl.* 324; *Buchan. Grasses*

N. Zeald. t. 12; *Bailey Grasses Queensl.* t. 1; *Franch. & Sav. En. Pl. Jap.* ii. 164. *I. atro-vivens*, *Trin. Gram. Panic.* 251. *I. lepidota*, *Steud. in Flora*, xxix. (1846) 19; *Walp. Ann.* i. 924. *Panicum antipodum*, *Spreng. Syst.* i. 314; *Steud. Syn. Gram.* 94. *P. atro-vivens*, *Trin. ex Spreng. Neue Entdeck.* ii. 88, *Syst. Veg.* i. 318; *Kunth l. c.* 127. *P. australis*, *Rasp. in Ann. Sc. Nat. v.* (1825) 299. *P. lepidotum*, *Steud. in Flora*, xxix. (1846) 19. *P. nodibarbatum*, *Hochst. Pl. Hohenack.* n. 127; *Steud. l. c.* 95. *P. violaceum*, *Kleine ex Thiele in Linnæa*, ix. (1834) 307. *Aira ischæmoides*, *Koen. ex Kunth l. c.* 127. *Milium globosum*, *Thunb. Fl. Jap.* 49.—*Isachne*, *Wall. Cat.* n. 8656, A B C F.

Hotter parts of INDIA, from Assam and Burma to Central India and southward to CEYLON.—DISTRIB. Austral., N. Zeald.

Stem 8–18 in. from a creeping branching base; nodes glabrous or sparsely bearded. *Leaves* 1–3 in., rarely more, subscaberulous above or on both surfaces, margins ciliolate, nerves 0 or 2–3 very slender pairs, midrib obscure; sheaths smooth. mouth and often margins ciliate. *Panicle* 1–3 in., contracted and ovoid or pyramidal and open; branches glabrous or obscurely scaberulous, and as the pedicels very variable in length. *Spikelets* green or purplish, obtuse, smooth and polished or scabrid or setulose; gl. I and II faintly many-nerved; III and IV usually very unequal, III longer, flatter, thinner, shining; IV coriaceous, glabrous or pubescent, orbicular or broadly ellipsoid.—*I. mauritiana*, *Kunth*, is a very closely allied species, but has gl. III and IV equal and similar; it is *Panicum dubium* and *biflorum*, Lamk.

Var. *effusa*, *Trin. Cat. Ceyl. Pl.* 104; panicle pyramidal, branches longer, and pedicels spreading capillary, spikelets rather smaller.—Ceylon; Peradeniya, *Trimen*.

13. ***I. miliacea***, *Roth Nov. Pl.* 58; stems very slender prostrate widely creeping and branched below then ascending, leaves small ovate-lanceolate acute margins not or faintly thickened, panicle small contracted or spreading lax-fld. spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in., pedicels short tips hardly thickened. *Kunth Enum. Pl.* i. 136; *Miq. Fl. Ind. Bat.* iii. 459 (excl. some syns.). *I. Meneritana*, *Poir. Encycl. Suppl.* iii. 185 (excl. Syn.); *Br Prodr.* 196. *I. minutula*, *Kunth Revis. Gram.* ii. t. 117, *Enum. Pl.* i. 137, *Suppl.* 99. *I. adstans*, *Miq. l. c.* 461. *I. polygonoides*, *Doell in Mart. Fl. Bras.* ii. II 273. *I. geniculata & stigmatosa*, *Griff. Notul.* iii. 41, 42, *l. c. Pl. Asiat.* t. 139 f. 206, 148, f. 2. *Panicum æquatum*, *Nees ex Steud. l. c.* 98. *P. adstans*, *Steud. l. c.* 94. *P. Benjamini*, *Steud. l. c.* 96, ex *Miq. l. c.* 459. *P. Meneritana*, *Spreng. Syst.* i. 321. *P. minutulum*, *Gaud. in Freyc. Voy. Bot.* 410; *Steud. l. c.* *P. polygonoides*, *Lam. Encycl.* iv. 742; *Decne in Nouv. Ann. Mus. Par.* iii. 352. *P. patens*, *Roxb. Fl. Ind.* i. 305; *Kunth l. c.* 126; *Hohenack. Pl. Ind. Or.* n. 202. *P. gonatodes*, *Steud. l. c.* 95. *Neurachne Meneritana*, *Roem. & Sch. Syst.* ii. 475 (excl. syn.). *Aira cœrulea*, var. *Herb. Heyne*.—*Isachne*, *Wall. Cat.* n. 8655.

Low marshy ground, from the SIKKIM TERRAI, BENGAL and SILHET to BURMA and southward to MALACCA, the NICOBAR ISLANDS, and CEYLON.—DISTRIB. China, the Malay and Pacific ISLANDS, S. America.

Very variable in size; stem rarely 6–8 in. high, nodes of stem glabrous or ciliate; sheaths glabrous or sparsely hairy. *Leaves* flaccid or rather stiff, usually spreading, nerveless or nearly so, glabrous or sparsely hairy on both surfaces. *Spikelets* as in *I. australis*, but usually smaller, glabrous, rarely sparsely setose; gl. I and II 5- or more-nerved; IV glabrous or pubescent.—The small states of this plant look very different from typical *I. australis*, but larger appear to unite them by many intermediates. *Trimen* refers *I. Meneritana* to *I. australis*, Mr. Rendle, who has carefully compared the types of each in the British Museum, agrees with me that it goes best with *miliacea*. He also informs me that Burman's *Thes.*

Zeyl. 110, t. 47, f. 3, is not an *Isachne*, but resembles an *Eragrostis*; and that Plukenet's Phyt. t. 300, f. 2. (in *Herb. Sloane*) is *E. ciliaris* from the Malabar Coast. Trimen has pointed out (*Journ. Bot. xxxiii.* (1885) 271) that the "Meneritana of the Cingalese is not an *Isachne*, but is applied to *Panicum miliare* and *psilopodium*.

14. **I. dispar**, *Trin. Sp. Gram. Ic.* t. 6; stem short ascending from a branched creeping base, leaves $\frac{1}{2}$ –1 in. ovate-cordate to lanceolate acuminate scaberulous margins thickened, panicle oblong at length pyramidal, spikelets $\frac{1}{4}$ – $\frac{1}{2}$ in., pedicels short tips thickened. *Kunth Enum. Pl.* i. 136; *Duthie Grass. N.W. Ind.* 2; *Miq. Fl. Ind. Bat.* iii. 460. *I. muricata*, *Nees in Wight. Cat. (ex Miq. l.c.)*. *Panicum dispar*, *Steud. Syn. Gram.* 96. *?P. muricatum*, *Retz. Obs.* v. 18.

NEPAL, *Wallich*. SIKKIM TERA, *Clarke*. RAJPOOTANA, on Mt. Aboo, *King, Duthie*. NILGHIRI HILLS, alt. 5000 ft. *Clarke*.

Stems 2–6 in. *Leaves* spreading, rather rigid, striated; midrib slender. *Spikelets* as in *I. australis*; pedicels smooth or rough; gl. I and II scabrid or setulose, nerves many, faint; III glabrous; IV pubescent.—This again is perhaps a var. of *I. australis*, of lower stature with more rigid scaberulous strongly margined leaves, sometimes ciliate at the base, and smaller panicles with shorter pedicels.

** Spikelets $\frac{1}{2}$ – $\frac{3}{4}$ in. long.

15. **I. Walkeri**, *Wight & Arn. ex Thw. Enum. Pl. Zeyl.* 361; tall, slender, leaves linear-lanceolate acuminate margins thickened, panicle very lax branches and pedicels very long capillary, gls. I and II subequal 7–9-nerved. *I. nilagirica*, *Hochst. Pl. Hohenack.* n. 1280; *Trim. Cat. Ceyl. Pl.* 104. *Panicum Walkeri*, *Steud. Syn. Gram.* 97.

NILGHIRI HILLS; Khoondah Ghat, *Wight*; Conoor, alt. 6000 ft., *Clarke, &c.* CEYLON; forests of the Central Province, *Walker, Thwaites* (C.P. 282).

Stem 2–3 ft., as thick as a crow-quill, decumbent below. *Leaves* 4–6 by $\frac{1}{2}$ – $\frac{3}{4}$ in., rigid, smooth above, hairy beneath with a distinct midrib and 3–5 pairs of primary nerves, base narrow rounded; sheath smooth, margins above and mouth bearded. *Panicle* 8–12 in.; branches $1\frac{1}{2}$ –3 in., sparingly divided. *Spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ in., few, very distant; gl. I and II persistent, oblong, obtuse; III and IV oblong, obtuse, glabrous.

16. **I. Gardneri**, *Benth. in Gen. Pl.* iii. 1100; tall, slender, leaves lanceolate acuminate margins hardly thickened, panicle very lax, branches and pedicels very long filiform, gl. I much shorter than II 3-nerved, II 5-nerved. *I. nilagirica*, *Trim. Cat. Pl. Ceyl.* 104 (non *Hochst.*). *Panicum Gardneri*, *Thw. Enum. Pl. Zeyl.* 359.

NILGHIRI HILLS; Madawattan, alt. 6000 ft., *Lawson*. ANAMALLAY HILLS, *Beddome*. CEYLON; Central Provinces, alt. 4–6000 ft., *Gardner, Thwaites, &c.*

Stem 2–3 ft., slender, quite smooth, decumbent below. *Leaves* 2–3 by $\frac{1}{2}$ – $\frac{3}{4}$ in., thin, glabrous or sparsely hairy beneath, base broad cordate, principal nerves 3–4 pairs, very slender; mouth of sheath ciliate. *Panicle* with widely spreading sparingly divided branches; tip of pedicel thickened. *Spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ in., few, distant, oblong; gl. I and II obtuse glabrous or sparsely setose, I ovate; II ovate-oblong; III and IV elliptic-oblong, acute, quite smooth.

4. **PANICUM**, *Linn.*

Annual or perennial grasses. *Leaves* various. *Spikelets* small, 1–2-fl., terete or dorsally or laterally compressed, articulate on their pedicels, very rarely awned, never silkily villous; glumes 4, I and II empty, epaleate;

I smallest and fewest nerved; II. and III usually subequal, 3-∞-nerved oblong ovate or lanceolate; III paleate or not, triandrous or neuter; IV paleate, bisexual, oblong ovate or lanceolate, hardened in fruit, glabrous, dorsally convex; palea 2-nerved, membranous or hardened in fruit. *Lodicules* 2, cuneate or quadrate, rarely 0. *Stamens* 3, apically exserted. *Grain* free within gl. IV and palea.—Species very many; all warm countries.

Exceptions. In *P. subglume*, gl. I and II are absent. In *P. Crus-galli* gl. III is sometimes produced into a rigid long or short awn. In *P. notabile*, *ambiguum* and *javanicum*, gl. IV is crowned with a short awn that is concealed by gls. II and III.

Under *Paspalum* (p. 10), I have given my reasons for removing to that genus the group *Digitaria*, which has hitherto been referred to *Panicum*; those for excluding *Tricholena* and *Axonopus* will appear under the respective genera. *Ichnanthus* is excluded on less satisfactory grounds.

KEY TO THE SECTIONS.

A. Spikelets terete or dorsally compressed.

I. *Branchlets of panicle not produced beyond the terminal spikelets into awn-like bristles.*

Sect. I. PASPALOIDEÆ. *Spikelets* 2-seriate, close-set on the under-surface of the flat rachis of a simple spike, globose or ovoid; awn 0; gl. I very small, IV more or less rugose.—Perennials. *Spikes* alternate forming a simple raceme. (*Sp.* 1-4.)

Sect. II. ECHINOCHLOA. *Spikelets* 3-4-seriate (2-seriate in *P. notabile*) crowded on the undersurface of a simple or rarely branched spike, globose or ovoid; gl. I half as long as III or shorter, II and III strongly nerved cuspidate or rigidly awned, IV hard in fruit.—Annuals. *Spikes* alternate or crowded in usually a simple raceme. (*Sp.* 5-7.)

Sect. III. BRACHIARIA. *Spikelets* irregularly 1-2- (rarely 3-) seriate on the slender or spiciform branches of a simple raceme, solitary or geminate, distant or crowded, ovoid or obovoid; gl. I not half as long as III (except in *P. ambiguum*), II and III subequal, awn 0, or IV with a very short awn concealed by gls. II and III. (*Sp.* 8-18.)

Sect. IV. HYMENACHNE. *Spikelets* small, crowded in spiciform panicles (except *P. auratum* and *curvatum*) ovoid or lanceolate, sometimes decurved; gls. usually strongly ribbed, I much shorter than III, IV usually much shorter than III, narrow, white. (*Sp.* 19-25.)

Most of the species of this section are very variable.

Sect. V. BREVIGLUME. *Spikelets* very small, in pairs or fascicles on the filiform branches of a lax panicle or simple rachis, dorsally much compressed; gl. I and II both much shorter than IV, III and IV lanceolate. (*Sp.* 26, 27.)

Sect. VI. EFFUSÆ. *Spikelets* solitary, rarely binate, sessile or pedicelled on the slender branches of a decompound usually open panicle. (See also *P. auratum* and *curvatum* in Sect. *Hymenachne*.) (*Sp.* 28-47.)

II. *Branchlets of panicle often produced beyond the terminal spikelet into a rigid awn-like bristle.*

Sect. VII. *PTYCHOPHYLLUM*. *Spikelets* solitary, sessile or pedicelled on the slender branches of a decompound open panicle. *Leaves* plicate. (See also *Setaria Forbesiana*.) (*Sp.* 48, 49.)

B. *Spikelets strongly laterally compressed.*

Sect. VIII. *GIBBOSÆ*. *Spikelets* very minute, panicled; gl. IV semilunar. Perennial very slender grasses. (*Sp.* 50-54.)

Sect. IX. *PSEUDECHINOLÆNA*. *Spikelets* rather large, distant, subsessile on a slender simple or sparingly divided rachis, often glandular. (*Sp.* 55.)

Sect. I. *PASPALOIDEÆ*. (See p. 27.)

1. **P. Isachne**, *Roth Nov. Sp.* 54; spikes many longer than the internodes, spikelets $\frac{1}{3}$ in. suberect oblong acute villous, gl. I minute, II and III equal faintly 3-nerved, II = IV, III paleate empty, IV oblong rounded at both ends quite smooth. *Roem. & Sch. Syst.* ii. 458; *Schult. Mant.* ii. 252; *Kunth Enum. Pl.* i. 97; *Steud. Syn. Gram.* 57. *P. eruciforme*, *Sibth. Fl. Græc.* i. t. 59; *Sibth. & Sm. Prodr. Fl. Græc.* i. 40; *Roem. & Sch. l. c.* 426; *Kunth l. c.* 78; *Thw. Enum. Pl. Zeyl.* 359; *Trim. Cat. Ceyl. Pl.* 104; *Duthie Grass. N.W. Ind.* 3, *Indig. Fodd. Grass.* t. 43, *Fodd. Grass. N. Ind.* 6; *Baker Fl. Maurit.* 434; *Parlat. Fl. Ital.* i. 119; *Boiss. Fl. Orient.* v. 437. *P. Koenigii*, *Herb. Wight ex Nees Fl. Afr. Austr.* 30. *P. caasicum*, *Trin. in Mem. Acad. Petersb. Ser.* 6 (1835) iii. 237, *Sp. Gram. Ic.* t. 262, *Panic. Gen.* 149; *Steud. l. c.* *P. Crus Galli*, *Roxb. ex Wight Cat. n.* 1616 (*non Fl. Ind.*) *P. pubinode*, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 363; *Steud. l. c.* 57. *P. Wightianum*, *Arn. & Nees. ex Nees Fl. Afr. Austr.* 30. *P. Wightii*, *Nees l. c.* 29; *Trin. Pan. Gen.* 148; *Steud. l. c.* 58. *Brachiaria eruciformis*, *Griseb. in Ledeb. Fl. Ross.* iv. 469. *Echinochloa eruciformis*, *Reichb. Ic. Fl. Germ.* t. 29; *C. Koch, in Linnæa*, xxi. (1848) 437.—*Panicum*, *Wall. Cat. n.* 8693.

Plains of INDIA; in watery places, from Kashmir, alt. 6000 ft., and the Panjab, to Bengal, and southward to CEYLON.—DISTRIB. Westward to Italy and N. Africa.

Stems 1-2 ft., slender, ascending from a decumbent base, much branched; nodes often bearded. *Leaves* 1-2½ in. by ¼-½ in., glaucous, linear-lanceolate, acuminate, flat, glabrous or softly hairy, base rounded; mouth of sheath with long hairs. *Spikes* 8-12, ½-1 in. long, erect or suberect; rachis narrower than the spikelets, ciliate. *Spikelets* subsessile, very pale; gls. membranous, I cordate; II about ¾ shorter than IV, which is white.

2. **P. flavidum**, *Retz. Obs.* iv. 15; spikes erect shorter than the internodes, spikelets $\frac{1}{8}$ - $\frac{1}{10}$ in. divaricate gibbously globose glabrous, gl. I = about ½ III suborbicular 3-nerved, II nearly = IV 7-nerved tip rounded, III oblong obtuse 3-5-nerved paleate neuter, IV broadly ovate cuspidate reticulately punctulate. *Br. Prodr.* 190; *Kunth Revis. Gram.* i. 211, t. 17, *Enum. Pl.* i. 78, *Suppl.* 60; *Trin. Panic. Gen.* 151; *Nees Agrost. Bras.* ii. 116; *Griff. Notul.* iii. 33, *Ic. Pl. Asiat.* t. 139, fig. 67; *Duthie Grass. N.W. Ind.* 3, *Indig. Fodd. Grass.* t. vi, *Fodd. Grass. N. Ind.* 7; *Wight Cat. n.* 1613, & *Herb. n.* 3059; *Wall. Cat. n.* 8692 (*excl. B, & H*

partim); *Benth. Fl. Austral.* vii. 474. *P. brizoides*, *Jacq. Eclog. Gram.* 2, t. 2; *Trin. Diss.* ii. 128, *Sp. Gram. Ic.* t. 158, 159; *Kunth Enum. Pl.* i. 78; *Roxb. Fl. Ind.* i. 293; *Dalz. & Gibs. Bomb. Fl.* 290; *Thw. Enum. Pl. Zeyl.* 359; *Trim. Cat. Ceyl. Pl.* 159; *Duthie Grass. N.W. Ind.* 2; *Miq. Fl. Ind. Bat.* iii. 445; *Aitchis. Cat. Panjab Pl.* 159; *Nees Agrost. Bras* 115; *Baker Fl. Maurit.* 433. *P. distans*, *Trin. Sp. Gram. Ic.* t. 172. *P. brizoides*, *var. distans*, *Trin. Ic.* t. 159 B. *P. flaccidum*, *Koen. mss. in Herb. Mus. Brit.* *P. floridum*, *Royle Ill. Bot. Himal.* 420. *P. granulare*, *Lam. Ill.* i. 170, *Encycl.* iv. 740; *Trin. Diss.* ii. 129. *P. Sama*, *Ham. ex Wall. Cat.* 8692 F.

Plains of India; in watery places from the Panjab to Assam and Burma, ascending to 5000 ft. in Nepal and Kumaon, and southward to CEYLON.—DISTRIB. Trop. Asia and Africa.

Stem 1–4 ft., compressed, leafy, branched from the decumbent base. *Leaves* bifarious, 3–5 by $\frac{1}{2}$ – $\frac{1}{4}$ in., linear-lanceolate acuminate, or ligulate with a rounded tip; sheaths compressed, lower tumid, mouth hairy; ligule 0. *Spikes* few or many, distant, $\frac{1}{2}$ –1 in. *Spikelets* 2–20, very pale, sessile. *Glumes* membranous, white with green nerves; III neuter or male; IV sometimes almost orbicular, white or brownish, very minutely rough.—The *var. distans* of Trinius is a depauperate state, and occurs on the same plant as the normal. A still more depauperate form, densely tufted, with stems and leaves 2–3 in. long and very few spikelets, is Wall. Cat. 8692 D from Herb. Wight, also found in Bengal. Mr. Reudle informs me that the name *flavidum* may be a mistake for *flaccidum*, under which Koenig sent it to Retzius from Herb. Mus. Brit. where it is named *flaccidum*.

3. *P. punctatum*, *Burm. Fl. Ind.* 26; spikes longer than the internodes tip usually excurrent setiform, spikelets $\frac{2}{3}$ – $\frac{1}{2}$ in. plano-convex erectopatent glabrous, gl. I very short truncate, II = about half IV suborbicular 3-nerved tip rounded or truncate, III ovate acute 3–5-nerved neuter, IV ovate cuspidately acuminate granulate. *P. fluitans*, *Retz. Obs.* iii. 8 (not v. 18); *Roxb. Fl. Ind.* i. 293; *Griff. Notul.* iii. 25, *Ic. Pl. Asiat.* 139, f. 231; *Dalz. & Gibs. Bomb. Fl.* 290; *Thw. Enum. Pl. Zeyl.* 339; *Trim. Cat. Ceyl. Pl.* 104; *Aitchis. Cat. Panjab. Pl.* 159; *Duthie Grass. N.W. Ind.* 4, *Indig. Fodd. Grass.* t. 44, *Fodd. Grass. N. Ind.* 7; *Baker Fl. Maurit.* 433; *Boiss. Fl. Orient.* v. 437; *Steud. Syn. Gram.* 59; *Nees Agrost. Bras.* 115. *P. brizoides*, *Retz. l.c.*; *Rottl. in Naturf. v. l. Ges. Neue Schrift.* iv. (1803), 211; *Wall. Cat.* n. 8690; *Wight Cat.* n. 1614. *P. fluitans*, *Herb. Madr. Wall. Cat.* n. 8692 B. *P. granulare*, *Bojer Hort. Maurit.* 364. *P. mucronatum*, *Roth Nov. Sp.* 45; *Steud. l.c.*; *Nees Agrost. Bras.* 116. *P. paspaloides*, *Wall. l. c. n.* 8691 A (*partim*), B.

Marshes throughout INDIA, from the Panjab to Assam, and southwards to Malacca and CEYLON.—DISTRIB. Malaya, Mauritius, trop. and N. Africa.

Perennial, quite glabrous. *Stem* 2–4 ft., base floating, rooting at the nodes; lower internodes very stout, spongy. *Leaves* 4–8 in., linear, acute or acuminate; lower sheaths dilated; ligule a ring of hairs. *Spikes* many, $\frac{1}{2}$ –1 in., distant, sessile, secund, appressed to the glabrous rachis, very pale; rachis about $\frac{1}{16}$ in. broad, margin quite smooth, tip free acicular as long as the upper spikelet. *Spikelets* $\frac{1}{2}$ – $\frac{1}{3}$ in. long, imbricate, sessile, ovate-oblong. *Glumes* membranous, IV as long as III.—Mr. Rendle informs me that he has examined in the British Museum the specimen (in Herb. Sloane) on the figure of which Burman founded *P. punctatum*, and that it is the same as *P. fluitans*, Retz. And further, that the name *fluitans* is a ms. one of Koenig, and was no doubt sent by him to Retz, who says that he received the plant from Koenig. As to the rival claims of *punctatum* and *fluitans* for adoption, the former (published in 1768) has a quarter of century's priority; but whereas the *P. fluitans* has had more than a century of recognition in all countries, *P. punctatum*

has never till now been recognized, nor could it have been from Burman's description only. Under these circumstances, and taking into consideration the facts, that Retz described two different plants under the name of *fluitans*, and that *punctatum* has been applied to no other species, I have adopted the latter.

4. **P. paspaloides**, Pers. Syn. i. 81 (*paspalodes*); spikes erect longer than the internodes, spikelets $\frac{1}{2}$ – $\frac{1}{8}$ in. erecto-patent subglobose glabrous, gl. I very short suborbicular retuse, II nearly = IV strongly 5-nerved tip rounded, III broadly ovate acute 5-nerved paleate neuter, IV oblong subacute nearly smooth. Kunth Enum. Pl. i. 77; Trin. Pan. Gen. 153. Wall. Cat. 8691 (*in part*); Steud. Syn. Gram. 60; Boiss. Fl. Orient. v. 436. P. affine, Nees Agrost. Bras. 113. P. appressum, Doell in Mart. Fl. Bras. ii. II 184. P. beckmanniæforme, Mikan ex Trin. in Spreng. Neue Entdeck. ii. 83; Spreng. Syst. i. 309. P. brizæforme, Presl Rel. Hænk. 302; Steud. l.c. 60. P. brizoides, Lamk. Ill. i. 170 (*not Trin. or Jacq.*). P. carnosum, Saltzm. ex Steud. l.c. P. fluitans, Retz. Obs. v. 18; Miq. Fl. Ind. Bat. iii. 455. P. numidianum, Sieb. ex Schult. Mant. ii. 267 (*not Lamk.*). P. truncatum, Trin. Diss. ii. 130, Sp. Gram. Ic. t. 168 (*not t. 172*). Paspalum adpressum, Pers. Syn. i. 85; Rich. ex Lamk. l.c. 176. Digitaria affinis, Roem. and Sch. Syst. ii. 470.

KUMAON, Strachey & Winterbottom, alt. 5000 ft. UPPER GANGETIC PLAIN; Delhi, Clarke. BUNDELKUND, Duthie. SCIND, the CONCAN, MALABAR and TRANQUEBAR, Heyne, &c. CEYLON, Walker, &c.—DISTRIB. Afghanistan, Arabia, Afric. and Amer. trop.

Perennial, stem glabrous; prostrate, usually floating below and rooting at the nodes. Leaves spreading, linear, acuminate acute or obtuse, lower sheaths dilated. Spikes $\frac{1}{2}$ –1 in., appressed to the narrow, compressed, setulose rachis. Spikelets subsessile, turgid. Glumes membranous.—Habit of *P. punctatum*, which it closely resembles, but differs in the rachis of the spikes not produced at the tip with a few imperfect terminal spikelets, in the size of gl. II, in paleate III, and smooth IV.—*P. brizoides*, Lamk., is the earliest name, but it has been so promiscuously applied that it is better abandoned.

Sect. II. ECHINOCHLOA. (See p. 27.)

5. **P. Crus-galli**, Linn. Sp. Pl. 56; stem erect, leaves linear flat glabrous or scaberulous, raceme contracted or pyramidal, spikes many 2–4 in. often secund simple or subcompound, rachis setulose, spikelets $\frac{1}{2}$ – $\frac{1}{8}$ in. (*excl. awn*) subglobose hispid or scabrid rarely glabrous, gl. I = $\frac{1}{4}$ – $\frac{1}{3}$ III acute 3–5-nerved, II = III mucronate or shortly awned, III paleate male or neuter awned, awn short or long rigid scabrid, IV ovoid obtuse or cuspidate and palea coriaceous shining white. Fl. Dan. t. 852, & t. 1564; Host Gram. Austr. ii. 15, t. 19; Encycl. Bot. t. 276; Knapp Gram. Britt. t. xi.; Reichb. Ic. Fl. Germ. t. 29; Trin. Sp. Gram. Ic. t. 161, 162; Wall. Cat. n. 8687 (*excl. I.*); Thw. Enum. Pl. Zeyl. 359 (*excl. Syn. colonum*); Trim. Cat. Ceyl. Pl. 104; Duthie Grass. N.W. Ind. 3, Indig. Fodd. Grass. t. 5, Fodd. Grass. N. Ind. 4; Miq. Fl. Ind. Bat. iii. 464; Benth. Fl. Hongk. 411, Fl. Austral. vii. 479; Boiss. Fl. Orient. v. 435; Franch. & Sav. En. Pl. Jap. ii. 160; Griseb. Fl. Brit. W. Ind. 546. P. Burmanni, Bieb. Fl. Taur. Cauc. iii. 57, ex Link. Hort. Berol. i. 204. P. corvipes, Stokes Bot. Mat. Med. i. 141. P. digitatum, Gilib. Exercit. 517. P. dubium, Sieb. ex Steud. Nom. Ed. II, ii. 256, Syn. Gram. 46. P. echinatum, Willd. Enum. Hort. Berol. 1032; Trin. Sp. Gram. Ic. t. 162; Jacq. Eclog. Gram. ii. 28, t. 20. P. hirtellum, Walt. Fl. Carol. 72. P. hirti-

calycinum, *Steud. Nom. Ed. II, ii. 257*. *P. hispidulum*, *Lamk. Encycl. iv. 744 (non Del.)*; *Retz Obs. v. 18*; *Roxb. Fl. Ind. i. 303 (fid. Ic. Pict.)*; *Wall. Cat. 8688 A.*; *Wight Cat. n. 2042*; *Steud. Syn. Gram. 47*; *Franch. & Sav. l. c. 160*. *P. hispidum*, *Forst. Prodr. 7*; *Nees Agrost. Bras. 257*. *P. horridum*, *Saltzm. ex Steud. l. c. 47*. *P. Hosti*, *Bieb. l. c.* *P. limosum*, *Presl ex Nees l. c.* *P. longisetum*, *Torr. in Am. Journ. Sc. Ser. I iv. (1822) 58*. *P. mirabile*, *Braun Del. Sem. Hort. Carlsruhe (1846)*. *P. muricatum*, *Michx. Fl. Bor. Am. i. 47*. *P. oryzinum*, *Gmel. Syst. i. 157*; *A. Braun in Ind. Sem. Hort. Berol. 1851*. *P. pilosum*, *Dalz. & Gibs. Bomb. Fl. Suppl. 98*. *P. sabulicolum*, *Nees Agrost. Bras. 258*. *P. scabrum*, *Lamk. Ill. i. 171*; *Wight Cat. n. 1648*; *Steud. l. c. 47*. *P. stagninum*, *Retz. Obs. v. 17*; *Host Gram. Austr. iii. t. 51*; *Koen. in Naturf. l. c.*; *Roxb. Fl. Ind. i. 295*; *Nees in Mart. l. c. 26*; *Griff. Notul. iii. 17*; *Wall. Cat. n. 8688*; *Wight Cat. n. 1649*. *P. Walteri*, *Pursh Fl. Am. Sept. i. 66*. *Oplismenus Crus-galli*, *Dum. Obs. Gram. Belg. 138*; *Kunth Revis. Gram. i. 44*, *Enum. Pl. i. 143*; *Host l. c. ii. t. 19*; *Trin. Sp. Gram. Ic. t. 161*; *Dalz. & Gibs. Bomb. Fl. 292*. *O. Crus-pavonis*, *H. B. & K. Nov. Gen. & Sp. i. 108*. *O. ? dubius*, *Kunth Rev. Gram. i. 44*, *Enum. i. 143*. *O. limosus*, *Presl Rel. Hænk. i. 321*; *Kunth Enum. i. 144*. *O. longisetus*, *Kunth Revis. Gram. l. c.* *O. muricatus*, *Kunth l. c. 44*. *O. sabulicolus*, *Kunth Enum. i. 145*. *O. scaber*, *Kunth Rev. Gram. i. 44*. *O. stagninus*, *Kunth Revis. l. c.*, *Enum. l. c.*; *Dalz. & Gibs. l. c.*; *Aitchis. Cat. Punjab Pl. 161*; *Miq. l. c. 464*. *Echinochloa commutata*, *Schult. Mant. ii. 267*. *E. Crus-corni*, *Beauv. Agrost. 53*. *E. Crus-galli*, *Beauv. l. c.*; *T. Nees Gen. Fl. Germ. Monocot. I t. 21*; *Reichb. Ic. Fl. Germ. t. 29*. *E. ? dubia*, *Roem & Sch. Syst. i. 479*. *E. hispida*, *Schult. l. c.* *E. hispidula*, *Nees in Royle Ill. Bot. Himul. 416, 420*; *Dalz. & Gibs. l. c. Suppl. 98*. *E. stagnina*, *Beauv. l. c.* *Orthopogon Crus-galli & Retzii*, *Spreng. Syst. i. 307*: *Ischæmum abbreviatum & fasciculatum*, *Herb. Ham. ex Wall. Cat. n. 8688*. *Digitaria hispidula*, *Willd. Enum. Hort. Berol. 91*. *Milium Crus-galli*, *Moench. Meth. 202*.

Throughout INDIA, especially in wet places and rich soils—DISTRIB. all warm countries.

Annual. Stem 1–3 ft., stout or slender, erect or decumbent below, simple or branched. Leaves flat, up to an inch broad, glabrous or hairy; ligule 0. Raceme 4–8 in., usually inclined, or drooping. Spikes sessile or subsessile, upper gradually shorter, erect erecto-patent or rarely decurved. Spikelets densely packed in 3–5 rows, turgid; gl. I not awned; II and III subequal, usually 5-nerved, awn of III sometimes $1\frac{1}{2}$ in. long; IV from orbicular to broadly oblong.—Amongst the innumerable varieties of *P. Crus-galli*, I find it impossible to find characters constant enough for their limitation. Of exceptional states one with almost glabrous spikes is *Echinochloa glabrescens* (Munro mss.); it has large spikelets and cuspidate gls. It is Wallich's n. 8687 E. B. C. H., and has been collected in the Western Himalaya, Khasia Hills and elsewhere. Another is *Ischaemum glabrescens*, Ham. ex Wall. Cat. n. 8688 D, with the stem nearly as thick as the little finger, solitary or 2-nate spikes, and spikelets with tubercle-based bristles. Thwaites CP. 900 and 3237, from Ceylon is a third, it has very broad leaves, and the rachis of the spikes is villously hairy. *P. mirabile*, Braun, is a remarkable plant, with 3-fld spikelets, the lower fl. palcate and neuter, two upper hermaphrodite. Some forms with cuspidate, very short y awned spikelets pass into *P. colonum*, through var. *frumentaceum*, and it is not unlikely that some of the synonyms placed under *P. Crus-galli* should be transferred to *P. colonum*, and vice versa.

Var. *frumentaceum*; tall, robust, spikes thickened incurved sometimes corymbose with densely crowded unawned spikelets, otherwise as *P. Crus-galli*. *P. frumentaceum*, *Roxb. Fl. Ind. i. 304*; *Schult. Mant. ii. 230*; *Trin. Sp. Gram. Ic. t. 164*; *Diss. ii. 132*; *Wall. Cat. n. 8686*; *Wight Cat. n. 1617*; *Duthie Grass. N.W. Ind. 4*,

Field & Gard. Crops 3, t. 24, *Fodd. Grass*. N. Ind. 8; *Franch. & Sav. En. Pl. Jap.* ii. 161. *P. Crus-galli*, *Wall. Cat.* n. 8687, C. G. *P. Crus-galli*, var. *frumentaceum* *Trim. Cat. Ceyl. Pl.* 104. *P. grossum*, *Salisb. Prodr.* 18. *P. segetale*, *Herb. Roxb.* *Oplismenus frumentaceus*, *Kunth Revis. Gram.* i. 45, *Enum. Pl.* i. 146; *Dalz. & Gibs. Bomb. Fl. Suppl.* 98. *Echinochloa frumentacea*, *Link Enum. Hort. Berol.* i. 204; *Aitchis. Cat. Panjab Pl.* 161; *Miq. Fl. Ind. Bat.* iii. 465.—Cultivated in the hotter parts of Asia and Africa.—*Roxburgh (Fl. Ind. l. c.)* says of *P. hispidulum*, which is undoubtedly referable to *P. Crus-galli*, "it comes very near my *P. frumentaceum*, and may probably be the same in its wild state."

6. ***P. colonum***, *Linn. Syst. Ed.* x. 870; stem rather slender decumbent or shortly creeping below, leaves narrow scaberulous, raceme contracted, spikes suberect 1-1½ in. usually distant, rachis pilose, spikelets $\frac{1}{10}$ - $\frac{1}{8}$ in. acute or subcuspidate glabrous or hispidulous, gl. I = $\frac{1}{2}$ III or shorter acute 3-5-nerved, II and III subequal acute, III paleate, IV ovoid or oblong obtuse or acute and palea coriaceous white. *Jacq. Eclog. Gram.* t. 32; *Ehret. Ic. Sel.* t. 3, f. 3; *Beauv. Agrost.* t. x. f. 6; *Trin. Sp. Gram. Ic.* t. 160; *Steud. Syn. Gram.* 46; *Wall. Cat.* n. 8685; *Trim. Cat. Ceyl. Pl.* 104; *Duthie Grass. N.W. Ind.* 3, *Indig. Fodd. Grass.* t. 4, *Fodd. Grass. N. Ind.* 4; *Benth. Fl. Hongk.* 411, *Fl. Austral.* vii. 478; *Boiss. Fl. Orient.* v. 435; *Franch. & Sav. En. Pl. Jap.* ii. 160; *Griseb. Fl. Brit. W. Ind.* 545. *P. arabicum*, *Nees ex Steud. Nom. Ed.* II, ii. 251, *Syn. Gram.* 63. *P. brizoides*, *Linn. Mant.* i. 184. *P. cæsum*, *Nees in Hook. & Arn. Bot. Beech. Voy.* 235; *Steud. l. c.* 47. *P. confertum*, *Herb. Rottl. ex Wall. Cat.* n. 8687 B. *P. Crus-galli*, *Wall. Cat.* n. 8687 I; var. *colonum*, *Coss. Expl. Alger.* 28; var. *minor*, *Thw. Enum. Pl. Zeyl.* 359. *P. cuspidatum*, *Roxb. Fl. Ind.* i. 298; *Duthie Grass. N.W. Ind.* 3; *Steud. l. c.*; *Fig. & de Not. in. Mem. Acad. Tor.* (1854) 340, t. xiii. f. 1-16. *P. Daltoni*, *Parlat. ex Webb in Hook. Niger Fl.* 185; *Steud. l. c.* *P. flaccidum*, *Wall. Cat.* n. 8692 H (*in part*). *P. grossarium*, *Griff. Notul.* iii. 36, *Ic. Pl. Asiat.* t. 139, f. 113. *P. hæmatodes*, *Presl Fl. Sic.* i. 43; *Steud. l. c.* *P. numidianum*, *Presl Cyp. & Gram. Sic.* 19. *P. Petiveri*, *Kotsch. ex Griseb. Fl. Brit. W. Ind.* 545. *P. pictum*, *Kæn. in Naturf. xxiii.* (1788) 204; *Wight Cat.* n. 1648; *Nees in Mart. Fl. Bras.* ii. 120? *P. Pseudo-colonus*, *Roth Nov. Sp.* 147; *Steud. l. c.* 46. *P. semiverticillatum*, *Herb. Rottl. (non Rottl. in Ainsl. Mat. Med.)*. *P. tetrastichum*, *Forsk. Fl. Æg. Arab.* 19. *P. zonale*, *Presl Prodr. Fl. Sic.* i. 82. *Oplismenus colonus*, *H. B. & K. Nov. Gen. & Sp.* i. 108; *Kunth Enum. Pl.* i. 142; *Dalz. & Gibs. Bomb. Fl.* 291; *Aitchis. Cat. Panjab Pl.* 161. *O.?* *cuspidatus*, *Kunth Revis. Gram.* i. 45, *Enum.* i. 147. *O. Pseudo-colonus*, *Kunth l. l. c.* 44, 142. *Digitaria?* *cuspidata*, *Schult. Mant.* ii. 265.—*Panicum*, *Wall. Cat.* n. 8694, 8726.—*Sloane Hist. Jam.* i. t. 64, f. 3.

Throughout INDIA and Ceylon, ascending the Himalaya to 6000 ft.—DISTRIB. all warm countries.

In its typical form *P. colonum* differs from *Crus-galli* by the characters given above, but there is a gradual transition of one into the other; and the cultivated var. *frumentaceum* has been assigned to both, having the unawned spikelets of the former, and the broad leaves robust habit and long crowded spikes with crowded spikelets of the latter. I find it very difficult in many cases to decide whether to refer certain specimens to the one or to the other, and am not at all confident that the synonymy of the two is in all cases right. Both Cosson and Thwaites regard *colonum* as a form of *Crus-galli*.

7. ***P. notabile***, *Hook. f.*; spikes much longer than the internodes, rachis scabrid, spikelets $\frac{1}{8}$ in. 2-3-seriate silkily hairy, gl. II subaristately

acuminate, III paleate male, IV orbicular-oblong rugulose shortly awned. —*Panicum*, *Wall. Cat. n. 8723*.

BURMA; Petroleum wells of the Irawaddi, *Wallich*.

Stem 18–24 in., robust and foliage of *Crus-galli*, nodes pubescent. *Leaves* 3–5 in., finely acuminate, ciliate towards the base; sheaths sparsely hairy; ligule 0. *Panicle* 5 in., rachis flattened and angular, much narrower than the spikelets. *Spikelets* erect, imbricate, pale, sparsely silky pubescent; gls. membranous, I= $\frac{1}{2}$ III, broadly ovate, obtuse, 3-nerved; II ovate, finely beaked, 5-nerved, hirsute; III very broadly obovate, cuspidately acuminate, the inflexed margins densely ciliate with long erect hairs; awn of IV as long as itself, strict, scabrid.—A very remarkable grass, with the habit of *P. Crus-galli*, but with the rugulose awned gl. IV of *P. javanicum*, and hence intermediate between the sections *Echinochloa* and *Brachiaria*.

Sect. III. BRACHIARIA. (See p. 27.)

See *P. turgidum* in Sect. EFFUSÆ.

* Gl. I nearly as long as III; IV shortly awned.

8. ***P. ambiguum***, *Trin. Gen. Panic.* 155; leaves narrow hairy base rounded, spikes few suberect, spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in., glabrous, gl. I ovate acute 5-nerved, II ovate-lanceolate acuminate 7-nerved, III epaleate, IV oblong minutely rugulose. *Steud. Syn. Gram.* 61. *P. infidum*, *Trim. Cat. Ceyl. Pl.* 104 (non *Trin.*). *P. javanicum*, *Thw. Enum. Pl. Zeyl.* 358. *P. sanguinale*, *Burm. Fl. Ind. t. 10, f. 2* (non *descr.*). *Urochloa paspaloides*, *Presl Rel. Hænk. i. 318* (*fid. Trin.*); *Kunth Enum. Pl. i. 75*.

BURMA; Mergui, *Griiffith*. CEYLON, *Gardner*, *Thwaites* (CP. n. 858, 3244).—DISTRIB. Mascarene, Malay and Pacific Islds.

Annual. *Stems* 1–2 ft., slender, much branched from the base; nodes glabrous or puberulous. *Leaves* 3–6 by $\frac{1}{2}$ – $\frac{1}{3}$ in., acuminate; sheaths glabrous or margins ciliate; ligule a tuft of hairs. *Spikes* 3–4, 1–2 in.; rachis slender, triquetrous, glabrous or with a few hairs at the nodes. *Spikelets* 2-seriate, alternate, suberect; palea of IV with green nerves; awn of IV concealed by II and III.—The subequal gls. I and III will distinguish this from all other species of the *Brachiaria* section. *P. ambiguum*, Fig. & de Notar. is a very different plant. Presl describes two varieties in the Philippines; a lower gl. hardly half as long as the others; β glumes subæquilong. I have seen no Indian or other specimens answering to α .

** Gl. I much shorter than III; IV often abruptly apiculate.

§ Spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in.

9. ***P. prostratum***, *Lamk. Illustr. i. 171, Encycl. iv. 745*; leaves short, base broad amplexicaul and sheaths ciliate, spikes usually crowded suberect, rachis trigonous, pedicels with long cilia, spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. crowded subsessile 2–3-seriate ellipsoid glabrous, gl. I very short semilunar, II ovate acute 5–7-nerved, III 5-nerved paleate, IV obovate apiculate minutely rugulose. *Trin. Diss. ii. 150, Panic. Gen. 158, Sp. Gram. Ic. t. 184, 185; Kunth Enum. Pl. i. 89, Suppl. 68; Steud. Syn. Gram. 62; Thw. Enum. Pl. Zeyl. 359; Trim. Cat. Ceyl. Pl. 105; Aitchis. Cat. Panjab. Pl. 160; Duthie Grass. N.W. Ind. 6, Indig. Fodd. Grass. t. 45, Fodd. Grass. N. Ind. 11; Benth. Fl. Austral. vii. 476; Griseb. Fl. Brit. W. Ind. 540. P. barbatum, Lamk. Illustr. l. c. P. cæspitosum, Sw. Fl. Ind. Occ. i. 146. P. crispum, Llanos Fragment. 42. P. hirsutum, Heyne ex Wall. Cat. n. 8734 B. P. marginatum. Vahl ex Herb. Rotth. et ex Wall. Cat. n. 8732*

B. P. procumbens, *Nees Agrost. Bras.* 109; *Herb. Wight*, n. 3052. *P. repens*, *Burm.* var. alt. *Fl. Ind.* t. 11, f. 1; *Rottl. in Neue Schrift.* iv. (1803) 182. *P. setigerum*, *Herb. Roxb. ex Wall. Cat.* n. 8733 A. D. *P. Sieberi*, *Link. Hort. Berol.* i. 207. *P. viaticum*, *Saltzm. ex Doell. in Mart. Fl. Bras.* ii. II 155.—*Panicum*, *Wall. Cat.* n. 8733 A—D. 8734 B. C. D. *Gramen panicum minus*, &c. *Petiv. ex Scheuchz. Agrost.* 51 (non *P. Petiverii*, Trin.).

PLAINS OF INDIA, from the Panjab to Assam and Burma, and southward to CEYLON.—DISTRIB. Tropics generally.

Annual or perennial, usually small; stem 4–18 in., creeping below; nodes glabrous. *Leaves* 1–2 in., up to $\frac{3}{4}$ in. broad, ovate-lanceolate, acuminate; sheaths ciliate; ligule 0. *Panicle* usually shortly peduncled. *Spikes* subsecund, at length spreading; rachis scabrid and hairy. *Spikelets* pale, rather turgid; pedicels with cilia longer than the spikelets; gl. I nerveless or 3-nerved; palea of III oblong, acute.—A common Bengal plant, of which and *P. villosum* I find it impossible to unravel the synonymy with confidence. *Nees (Agrost. Bras.* 109) includes under *procumbens*, *repens*, *Burm.* & *Roxb.* (not *Linn.*), *prostratum*, *B. Lamk.*, *setigerum*, *Retz & Roxb.*, *umbrosum*, *Retz & Roxb.*, *grossarium*, *Koen.* (not *Linn.*), *barbatum*, *Lamk.*, & *subcordatum*, *Roth.* *Wight (Cat.)* includes under *procumbens*, *Nees*, besides most of the above, *P. hirtum*, *Roth (Rothii, Spreng.)* which is *Oplismenus compositus*. *Mr. Rendle* informs me that *Petiver's* plant, which *Trinius* cites as the type of his *P. Petiverii*, is *P. prostratum*, *Lamk.*, but that the *P. Petiverii* of *Trinius' Icones* is *P. grossarium*, *Koen.*, not *Linn.*), which I refer to the *P. ramosum*.

Var. rigidum; stem very stout wholly prostrate much branched, leaves $\frac{1}{2}$ in. triangular-ovate rigid pungent ciliate with long hairs.—*Wall. Cat.* n. 8723 (in part). *Calcutta, Clarke?* *Burma, Wallich.* (The specimen has evidently been misplaced in the sheet of *P. notabile*.)

Var. burmanicum; leaves sparsely hairy beneath, gl. II and III puberulous.—*Burma, Collett.*

10. *P. villosum*, *Lamk. Illustr.* i. 173, *Encycl.* iv. 745; leaves ovate-oblong obtuse or acute densely pubescent on both surfaces base rounded, spikes secund erect tomentose, spikelets $\frac{1}{2}$ – $\frac{1}{8}$ in. ellipsoid glabrous or tomentose, gl. I very short semi-lunar nerveless, II ovate acute 7-nerved, III ovate-oblong acute paleate, IV obovate abruptly apiculate minutely rugulose. *Kunth Enum. Pl.* i. 98; *Herb. Wight* n. 3053. ?*P. Careyana*, *Nees Agrost. Bras.* 118. *P. coccospermum*, *Steud. Syn. Gram.* 62; *Thw. Enum. Pl. Zeyl.* 359; *Trim. Cat. Ceyl. Pl.* 105. *P. grossarium*, *Roxb. Fl. Ind.* i. 297; *Hochst. in Herb. Hohen.* n. 919. *P. nanum*, *Nees in Herb. Royle, ex Steud. l. c.*; *Duthie Grass. N.W. Ind.* 5. *P. nilagiricum*, *Steud. l. c.* *P. procumbens*, *B. (setigerum, Roxb.) Wight Cat.* n. 3053. *P. repens*, *Roxb. Fl. Ind.* i. 299. *P. vestitum*, *Nees in Herb. Royle ex Steud. l. c.*; *Aitchis. Cat. Panjab. Pl.* 160; *Duthie Grass. N.W. Ind.* 7, *Fodd. Grass. N. Ind.* 13.—*Panicum*, *Wall. Cat.* n. 8733 E, 8735.

Subtropical and tropical HIMALAYA, from the Chenab to Sikkim, alt. 3–6000 ft. KHASIA HILLS, alt. 2–6000 ft. NILGIRI HILLS. BURMA, *Wallich.* CEYLON, *Gardner.*—DISTRIB. Tonkin, China.

Annual. Habit of *P. prostratum*, with which it has been confounded, but is a hill plant, distinguished by its hairy leaves and much more hairy spike and spikelets.

†† Spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in.

§ Spikelets usually close together, more or less imbricating.

10*. *P. muticum*, *Forsk. Fl. Aeg. Arab.* 20; stout, nodes bearded,

leaves long, base subcordate, panicle deltoid glabrous, spikes alternate, rachis narrow flattened, spikelets $\frac{1}{2}$ in. crowded ovoid acute glabrous, gl. I = $\frac{1}{4}$ of III ovate acute 1-nerved, II and III subequal 5-nerved, III paleate male, IV ellipsoid obtuse margins narrowly incurved. *Schult. Mant.* ii. 225; *Kunth Enum. Pl.* i. 93; *Steud. Syn. Gram.* 40. *P. amphibium*, *Steud. l. c.* 61; *Zoll. Pl. Rar. Jav.* 416. *P. barbinode*, *Trin. Gram. Panic.* 168, *Sp. Gram. Ic.* t. 318; *Thw. Enum. Pl. Zeyl.* 361; *Steud. l. c.* 67; *Duthie Grass. N.W. Ind.* 2. *P. equinum*, *Saltzm. ex Steud. l. c.* *P. leiogonum*, *Sieb. Pl. Egypt exicc.*; *Link. Hort. Berol.* i. 206; *Steud. l. c.* 79. *P. Meyerianum*, *Nees Fl. Afr. Austr.* i. 32; *Steud. l. c.* 61. *P. molle*, *Griseb. Fl. Brit. W. Ind.* 547 (*excl. Syn.*) *non Sw.*; *Baker Fl. Maurit.* 436; *Trin. Cat. Ceyl. Pl.* 105 (*non Sw.*). *P. numidianum*, *Lamk. Ill.* i. 122, *Dict. iv.* 749; *Desf. Fl. Atlant.* i. 60, t. 11; *Trin. Sp. Gram. Ic.* t. 174; *Steud. l. c.* 345; *Doëll. in Mart. Fl. Bras.* ii. II. 187. *P. pictiglume*, *Steud. l. c.* 73. *P. paraguayense*, *Steud. in Pl. Rengz (name only)*. *P. punctulatum*, *Arn. ex Wight Cat. n.* 2039; *Steud. l. c.* 62. *P. purpurascens*, *Raddi ex Opiz. in Flora*, v. (1822) 266; *Nees Agrost. Bras.* 240; *Steud. l. c.* 57. *P. sarmentosum*, *Hassk. Pl. Jav. Rur.* 17 (*non Roxb.*). *Paspalum mollicomum*, *Kunth l. c.* 47; *Steud. l. c.* 31. *Digitaria mauritiana*, *Wall. mss (l. c. in Herb. Kew)*.—*Panicum*, *Wall. Cat. n.* 8724.

BENGAL and CEYLON, in marshes, cultivated or naturalized.—DISTRIB. Java, Africa, America.

Stem ascending, 6–8 ft. high; nodes softly bearded, rarely glabrescent. *Leaves* 6–10 by $\frac{1}{2}$ – $\frac{2}{3}$ in., and sheaths glabrous or hairy; ligule short, ciliate. *Panicle* erect, 3–5 in.; rachis stiff, scabrid. *Spikes* rather distant, stout, simple or divided below, lower 2–4 in., upper gradually shorter, rachis $\frac{1}{16}$ in. broad subhispid. *Spikelets* turgid, sometimes solitary and alternate throughout the spike, green or purplish; gl. IV obscurely dotted or roughened.—The Water-grass of the Mauritius and Ceylon. I find gl. III to be always male, but being described as neuter by others it no doubt varies in this respect, as do so many other *Panica*. It is very near the American *P. molle*, Sw., and is often confounded with it, and the English names given above apply to both. It is distinguished from *P. molee* by the glabrous panicle and 1-nerved (not 3-nerved) gl. I.

11. ***P. javanicum***, *Poir. Encycl. Suppl.* iv. t. 274; pubescent or hairy, leaf-base rounded or cordate, spikes 6–12, spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in., biseriate alternate or upper scattered ovate acute, gl. I not = $\frac{1}{2}$ II 3-nerved, II 7-nerved acute, III like II 5-nerved paleate. IV oblong rugulose shortly abruptly awned. *Trin. Pan. Gen.* 155; *Baker Fl. Maurit.* 434. *P. Helopus*, *Trin. in Spreng. N. Entdeck.* ii. 84, *Pan. Gen.* 150, *Sp. Gram. Ic.* t. 183; *Nees Agrost. Bras.* 117; *Steud. Syn. Gram.* 7; *Duthie Grass. N.W. Ind.* 4, *Indig. Fodd. Grass.* t. 7, *Fodd. Grass. N. Ind.* 8 (*excl. some Syn.*); *Benth. Fl. Austral.* vii. 476 (*in note*). *P. japonicum*, error for *javanicum*, *Kunth Revis. Gram.* i. 205, *in syn.* *P. hirsutum*, *Koen. ex Roxb. Fl. Ind.* i. 300, & *Wight Cat. n.* 1620; *Aitchis. Cat. Panjab. Pl.* 159. *P. Koenigii*, *Spreng. Syst.* i. 311. *P. papillosum*, *Fenzl ex Steud. l. c.* 100. *P. paspaloides*, *Herb. Heyne, ex Wall. Cat. n.* 8729. *P. repens*, *Herb. Roxb. ex Wall. l. c. n.* 8731 A (*non Fl. Ind.*). *P. trichopus*, *Hochst. in Flora*, xxvii. (1844) 254. *Oplismenus*? *hirsutus*, *Schult. Mant.* ii. 271. *O. javanicum*, *Roem. & Sch. Syst.* ii. 891. *Helopus trichopus*, *Hochst. ex Steud. l. c.* 100. *Setaria*? *hirsuta*, *Kunth Revis. Gram.* i. 47, *Enum. Pl.* i. 157. *S. pilifera*, *Spreng. Syst.* iv. *Cur. Post.* 33. *Urochloa panicoides*, *Beaux. Agrost.* 52, t. 11, f. 1; *Kunth l. c.* i. 205, t. 14, *Enum.* 74 (*excl. Syn. Roxb.*); *Schult.*

Mant. iii. 595. *U. pubescens*, *Kunth l. l. c.* 31, 74. *U. mauritiana*, *Bojer Hort. Maurit.* 363.—*Panicum*, *Sp. Wall. Cat.* n. 8729.

Plains of INDIA, from Kashmir to Bengal, and southward to CEYLON.—DISTRIB. Tropics generally.

Annual. *Stem* 1–2 ft., decumbent and rooting below, nodes pubescent. *Leaves* 1–5 by $\frac{1}{2}$ – $\frac{3}{4}$ in., flat or undulate, very variable in breadth and form of base, lanceolate, acuminate and loose sheath laxly hairy; ligule a beard. *Spikes* $\frac{3}{4}$ –2 in. long, secund, spreading; rachis 3-gonous, pubescent and with a few long hairs. *Spikelets* $\frac{1}{2}$ in., geminate or upper solitary, usually pubescent, pale; pedicels very short; gl. I acute or obtuse; III male, palea oblong; IV rounded at the tip.—*Kunth* (*Revis. Gram. i.* 206) says, under *Urochloa panicoides*, that he has examined in Desfontaine's Herbarium the type of Poiret's *P. javanicum*, and identified it, which he cites as a syn. of *Urochloa panicoides*, but his figure of which again quite accords with a narrow-leaved form of *P. Helopus*, Trin. This requires the adoption the name *javanicum* (by misprint *japonicum* in *Kunth Revis.*), for the species. Benthams, on the other hand (*Fl. Austral. vii.* 477), says that Munro has seen an authentic specimen of *javanicum*, and that it is quite distinct from *P. Helopus*. I have no means of verifying either authority.

12. ***P. ramosum***, *Linn. Mant.* i. 29; suberect, glabrous or pubescent, leaves amplexicaul, spikes many often crowded suberect, rachis scabrid and hairy, spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in. 1–2-seriate elliptic ovoid or obovoid glabrous or pubescent, gl. I = $\frac{1}{2}$ III ovate 3–5-nerved margins overlapping, II 7-nerved, III 5–7-nerved neuter, palea narrow, IV subobovoid apiculate transversely rugulose. *Kunth Enum. Pl. i.* 125; *Steud. Syn. Gram.* 97; *Wall. Cat.* n. 8727 A. *P. arvense*, *Kunth Revis. Gram. ii.* 391, t. 109; *Enum. Pl. i.* 93; *Steud. l. c.* 67. *P. aquariorum*, *Bansium* & quinqueangulare, *Ham. ex Wall. Cat.* n. 8727 C, 8725 A. B. *P. canescens*, *Wight Cat.* n. 1622 (*non Roth.*). *P. fluitans*, *Herb. Heyne ex Wall. Cat.* n. 8727 B. *P. grossarium*, *Koen. in Naturf.* xxiii. (1788) 205 (& *Heyne & Roxb. in Herb. Banks.*). *P. Kotschyianum*, *Hochst. in Flora* xxv. (1842) *Beibl.* i. 33; *Steud. l. c.* 68. *P. nudiglume*, *Hochst. l. c.* xxvii. (1844) 33; *Steud. l. c.* *P. Petiverii*, *Trin. Diss. ii.* 144, *Pan. Gen.* 171, *Sp. Gram. Ic. t.* 176 A. B.; *Kunth Enum. Pl. i.* 91; *Nees Agrost. Bras.* 111; *Steud. l. c.*; *Wight Cat.* 1, 1622, *Herb.* n. 1628, *in part.*, & n. 3226; *Aitchis. Cat. Panjab Pl.* 160; *Duthie Grass. N.W. Ind.* 6, *Fodd. Grass. N. Ind.* 11; *Boiss. Fl. Orient.* 439. *P. psilopodium*, *Koen. ex Trin. Pan. Gen.* 217. *P. semiverticillatum*, *Wight Cat.* n. 1125. *P. umbrosum*, *Retz. Obs. iv.* 16; *Roxb. Fl. Ind. i.* 297, *Ic. pict.* 103, 797.—*Panicum*, *Wall. Cat.* n. 8725 A, B, 8727 A, B, C, and D. *in part.*

Plains of INDIA, from Scind and the N.W. Provinces to Behar and southward to Madras.—DISTRIB. Affghan.

Annual? *Stem* 1–3 ft., decumbent and branched below; branches erect, leafy. *Leaves* 3–4 by $\frac{1}{4}$ –1 in., lanceolate, acuminate, thin, glabrous or pubescent, base rounded and usually deeply lobed, margins minutely ciliate; sheath glabrous or pubescent, mouth usually ciliate; ligule short. *Panicle* 2–6 in., inclined, oblong, glabrous or pubescent; rachis angular. *Spikes* 1–2 in., erecto-patent, rather distant, sometimes divided at the base. *Spikelets* alternate, close or distant, often in pairs a sessile and pedicelled, pale green or yellowish, turgid; pedicel usually with long cilia.—I think this is certainly *P. umbrosum*, *Retz & Roxb.*

13. ***P. setigerum***, *Retz. Obs. iv.* 15; leaves ovate-lanceolate with long cilia towards the amplexicaul base margins below crenulately wrinkled, spikes alternate, pedicels with scattered long hairs, spikelets $\frac{1}{2}$ in. biseriate alternate imbricate subsessile ovate acuminate glabrous or pubescent, gl. I

= $\frac{3}{4}$ III obtuse 3-nerved, II ovate-lanceolate acuminate 7-nerved, III 5-nerved neuter, palea as broad acuminate, IV broadly oblong mucronate or shortly awned finely rugulose. *Roxb. Fl. Ind.* i. 299; *Kunth Enum. Pl.* 90 (excl. some *Syns.*); *Herb. Ham. ex Wall. Cat.* n. 8730 B. *P. affine*, *Poir. Encycl. Suppl.* iv. 273 (ex *Kunth*). *P. grossarium*, *Roxb. Ic. Ined.* t. 798 (not *Fl. Ind.*). *P. Helopus*, *Trin.* (hirsutum, *Koen.*), *Wight Cat.* n. 1620. *P. lanceolatum*, *Herb. Heyne ex Wall. Cat.* n. 8730 A. *P. nutans*, *Herb. Rottl.* *P. prostratum*, forma major, *Thw. Enum. Pl. Zeyl.* 359. *P. prostratum*, var. *horizontale*, *Trim. Cat. Ceyl. Pl.* 105. *P. repens*, *Herb. Wight ex Wall. Cat.* n. 8730 C. *P. subcordatum*, *Herb. Wight ex Wall. Cat.* 8730 D. *P. Oplismenus prostratus*, *Edgew. in Journ. Linn. Soc.* vi. (1862) 195.—*Panicum*, *Wall. Cat.* n. 8727 D, in part, 8730.

BENGAL; common. The CONCAN and SOUTH DECCAN, *Rottler*, &c. CEYLON, *Thwaites* (C.P. 3236).

Stem 2–3 ft., slender, prostrate and widely straggling below; lower internodes long; nodes rooting, tomentose. *Leaves* 3–5 by $\frac{1}{4}$ – $\frac{1}{2}$ in., finely acuminate, flat, margins crispedly wrinkled below, or to beyond the middle; sheath with ciliate margins; ligule a few hairs. *Spikes* 3–6, suberect or spreading, rather distant; angles of rachis scaberulous. *Spikelets* solitary or geminate, suberect, very acuminate.—It is impossible to recognize this species from *Retz*'s description, but the name attached to three different specimens in *Rottler*'s Herbarium leaves little doubt as to his plant. *Roxburgh* describes *setigerum* as having the stem almost woody towards the base, which is hardly the case in the specimens I have seen. *Edgeworth* cites *P. setigerum*, *Roxb.*, for his *Oplismenus prostratus*, but it may well be doubted if he knew *Roxburgh*'s plant.

Var. *tomentosum*, leaves 6–7 in., margins and sheaths with very long hairs, spikelets larger $\frac{1}{2}$ in. long tomentose, awn longer.

14. ***P. distachyum***, *Linn. Mant.* i. 138; slender, quite glabrous, or panicle sparsely hairy, leaves linear or lanceolate base rounded, spikes 2–4 distant spreading, spikelets $\frac{1}{4}$ – $\frac{1}{2}$ in. solitary subsessile 1–2-seriate ellipsoid glabrous, gl. I = $\frac{1}{2}$ II 5–7-nerved, II ovate acute 7-nerved, III 5-nerved, IV ellipsoid obscurely rugulose top rounded. *Retz. Obs.* iii. 17; *Lamk. Ill.* t. 43, f. 2; *Kunth Enum. Pl.* 91; *Steud. Syn. Gram.* 41; *Wight Cat.* n. 1612; *Thw. Enum. Pl. Zeyl.* 359; *Trim. Cat. Ceyl. Pl.* 104; *Aitchis. Cat. Panjab. Pl.* 159; *Duthie Grass. N.W. Ind.* 3, *Indig. Fodd. Grass.* t. 42, *Fodd. Grass. N. Ind.* 6; *Benth. Fl. Austral.* vii. 478. *P. distachyon* & *marginatum*, *Herb. Madr. ex Wall. Cat.* n. 8732 A. B. *P. dimidiatum*, *Heyne ex Wall. Cat.* n. 8732 D. *P. subquadriparium*, *Trin. Gram. Panic.* 145, *Sp. Gram. Ic.* t. 186; *Kunth l. c.* 80; *Steud. l. c.* 60. *P. repens*, *Herb. Roxb. ex Wall. l. c.* 8731 A. *Digitaria distachya*, *Pers. Syn.* i. 85.—*Panicum*, *Wall. Cat.* n. 8731, 8732.

Plains of INDIA, from the Panjab to Upper Assam and Burma, and southward to Malacca and CEYLON. GREAT COCOS Isld. (Ind. Ocean), *Prain*.—DISTRIB. China, Malaya, Australia.

Stems 1–2 ft., branched, straggling and creeping below. *Leaves* 2–6 by $\frac{1}{4}$ – $\frac{1}{2}$ in., flat, margins of sheath ciliate or not, mouth hairy. *Spikes* 1–2½ in., rarely more than 4, erect, at length spreading; rachis slender, glabrous. *Spikelets* variable in size, pale green; gl. I with overlapping margins below; II paleate or not, palea if present narrow, neuter.

Var. *brevifolium*, *Wight & Arn.* in *Wight Cat.* n. 1612 a; leaves $\frac{1}{2}$ –1 in., ovate-lanceolate, spikes shorter, rachis broader, spikelets 2-seriate.—Drier places.

§§ *Spikelets more or less remote.*

15. ***P. semiverticillatum***, Rottler in Ainslie, *Mat. Med. Hindost. Ed. I.* 219 (*name only*); stem stout erect branched, leaves broad base woolly, panicle large pubescent, spikes distant long alternate or whorled lax-fld., rachis slender, spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. ovoid obtuse glabrous, gl. I much shorter than III very broad obtuse 5-nerved, II obtuse 7-nerved, III 5-nerved, palea narrow hyaline, IV ovate-oblong obtuse minutely granulate. *Steud. Syn. Gram.* 62. *P. semiverticillatum*, *Wight Cat. n.* 3050 ?, 3051. *P. Petiverii*, *Zhw. Enum. Pl. Zeyl.* 359.

SOUTH DECCAN, Coimbatore, Rottler, Wight; Anamallay Hills, Beddome. CEYLON, at Damboul, Gardner (C.P. 895).

Stem tall, erect, or base shortly decumbent; nodes and often internodes below them tomentose. *Leaves* 5–8 by $\frac{1}{2}$ – $\frac{1}{3}$ in., linear-lanceolate, finely acuminate, flat, glabrous except at the narrow base; sheath tomentose above; ligule a tuft of wool. *Panicle* 4–8 in., subpyramidal; *Spikes* 1–2 $\frac{1}{2}$ in.; rachis triquetrous, glabrous or pubescent. *Spikelets* pale, often solitary, upper shortly pedicelled.—Possibly a cult. form of *P. ramosum*. Described by Ainslie as a grain cultivated by the poor at Coimbatore and in other grain countries. I assume it to be Rottler's plant, relying on Wight, who had resided at Coimbatore. *P. semiverticillatum*, *Herb. Rottler*, from Jaffna in Ceylon is *P. colonum*.

16. ***P. remotum***, Retz. *Obs.* iv. 17; very slender, leaves long narrow and sheaths quite glabrous, spikes few distant slender spreading, spikelets $\frac{1}{10}$ in. distant subsolitary ellipsoid obtuse glabrous, gl. I = $\frac{1}{3}$ – $\frac{1}{2}$ III obtuse or subacute 3-nerved, II obtuse 5–7-nerved. III 5-nerved, palea narrow, IV elliptic obtuse minutely rugulose. *Kunth Enum. Pl.* i. 125; *Steud. Syn. Gram.* 68. *P. grossarium*, *Koen. var. Herb. Rottler*. *P. Petiverii*, *Tri-v. Sp. Gram. Ic. t.* 176, f. C. *P. relaxatum*, *Nees ex Steud. Nom. Ed.* 11. ii. 262; *Wight Cat. n.* 1623 a, and β depauperatum.

ORISSA, *Herb. Calcutt.* SOUTH DECCAN, Rottler; Courtallam, Wight; Anamallay Hills, Beddome.

Stem 1–2 ft., much branched, decumbent, flaccid. *Leaves* 2–4 by $\frac{1}{4}$ – $\frac{1}{2}$ in., finely acuminate, membranous, base quite glabrous; ligule very short, lacerate. *Spikes* 6–8, 2–4 in. long; rachis very slender, almost capillary, triquetrous, quite glabrous. *Spikelets* solitary or in distant pairs, sessile, or the upper long-pedicelled; glumes thin, pale with green nerves.—I find no difference between Nees' two vars. of *relaxatum*.

17. ***P. Kurzii***, Hook f.; slender, leaves short lanceolate base cordate, margins of sheaths ciliate, spikes few very slender naked or with few hairs, spikelets $\frac{1}{10}$ in. ovoid acute glabrous, gl. I = $\frac{1}{3}$ – $\frac{1}{2}$ III 3–5-nerved, II ovate acuminate 7-nerved, III 5-nerved, palea broad, IV elliptic-oblong minutely rugulose, tip rounded apiculate.—*Panicum*, *Wall. Cat. n.* 8745.

LOWER BENGAL, Wallich, Griffith; Seebpore, Kurz; Vicrampore and Dacca, Clarke. BEHAR; top of Parusuath, J. D. H.

Annual, decumbent and rooting below, flaccid. *Leaves* 2–3 by $\frac{1}{2}$ – $\frac{2}{3}$ in., acuminate, margins crisped towards the usually ciliate base; sheath with villous margins; ligule bearded. *Panicle* 2–6 in. long; spikes few, very distant, 2–3 in. long, with rarely a short branch bearing 2–3 spikelets towards the base of the lower. *Spikelets* pale, subsessile or pedicelled.—This Lower Bengal plant found at Seebpore close to the Calcutta Bot. Garden, should be one of Roxburgh's species, but I cannot identify it. It is very closely allied to *P. remotum* and altogether like that plant in habit, differing chiefly in the short leaves and the ciliate margins of the leaf-sheaths and in habitat. A doubtful specimen from Baidyanath (Santal Pergunnahs) collected by Clarke, has the narrow leaves of *remotum*.

18. **P. latifolium**, Linn. *Sp. Pl.* 58; stem prostrate and rooting below, leaves lanceolate acuminate base rounded or cordate, panicle lax, branches distant stout, rachis scaberulous, spikelets large $\frac{1}{2}$ in. very distant second solitary or in pairs, glumes coriaceous 5-nerved, tips thickened, I = $\frac{1}{2}$ II or longer, II and III subequal, III broadest triandrous, palea narrow, IV ovoid acuminate quite smooth. *Willd. Sp. Pl.* i. 350; *Kunth Enum. Pl.* i. 117; *H. B. & K. Nov. Gen. & Sp.* i. 100. *P. Balbisanum*, Schult. *Mant.* ii. 254; *Steud. Syn. Gram.* 76. *P. grandiflorum*, Trin. ex Nees *Agrost. Bras.* 154. *P. oryzoides*, Sw. *Prodr.* 23, *Fl. Ind. Occ.* i. 161; *Kunth l. c.* 129; *Nees Agrost. Bras.* 154; *Steud. l. c.* 80; *Arduin. Animadv.* ii. t. 5; *Griseb. Fl. Brit. W. Ind.* 547. *P. Pseudo-oryzoides*, *Steud. l. c.* 75. *P. Ridleyi*, Hack. in *Trans. Linn. Soc. Ser. II. Bot.* iii. 401 (name). *P. zizanoides*, *H. B. K. l. c.*; *Steud. l. c.* 75.—*Panicum*, *Griff. Notul.* iii. 31, n. 17.—*Wall. Cat.* n. 8706.—*Gram. Virgin. &c. Moris. Hist. Pl.* iii. 196, t. 8, f. 4.—*Sloane Hist. Jam.* i. 114, t. 71, f. 3.

BENGAL, SILHET, CACHAR, BURMA, and the MALAY PENINS.—DISTRIB. Eastern trop. Asia and America.

Stem 6–24 in., rather stout, extensively creeping, glabrous, or nodes tomentose. *Leaves* 1–6 by $\frac{1}{4}$ – $\frac{1}{2}$ in., subdistichous, flat, glabrous; sheaths smooth; ligule short, ciliate. *Panicle* 1–6 in., erect, contracted; branches simple or sparingly divided, having short 3-fld. branchlets at the base; rachis stiff, angular. *Spikelets* turgid, very obscurely jointed on the short stiff pedicels, pale green; gls. all broadly ovate, their thickened tips laterally compressed, lateral nerves on each side close together; III empty or imperfectly triandrous.—The compressed thickened tips of the glumes are very characteristic.

Var. majus; stem stout 4–6 ft., internodes 4–6 in. rigid, nodes tomentose, leaves $\frac{3}{4}$ in. broad, margins thickened, base narrowed, panicle nearly 12 in. long.—Malay Peninsula, at Goping, *King's Collector*.

Sect. IV. HYMENACHNE. (See p. 27.)

19. **P. myurus**, *H. B. & K. Nov. Gen. & Sp.* i. 98 (excl. *Syn. Lamk.*); stem tall stout spongy below, leaves long flat base cordate, panicle narrow very compound often interrupted, branches closely appressed, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. erect narrowly lanceolate, gl. I = $\frac{1}{3}$ III, II 3-nerved, III much longer than II 3–5-nerved, IV small thin lanceolate. *Kunth Revis. Gram.* i. 33, *Enum. Pl.* i. 86, *Suppl.* 65; *Thw. Enum. Pl. Zeyl.* 361; *Trim. Cat. Ceyl. Pl.* 104; *Duthie Fodd. Grass. N. Ind.* 10 (excl. *Syn.*); *Benth. Fl. Austral.* vii. 480 (excl. *Syn. interruptum*)—*Excl. in all Syn. Lamk. Rudge, Richard, Trin. P. acutiglumum*, *Steud. Syn. Gram.* 66. *P. auritum*, *Hassk. Pl. Rar. Jav.* 22 (non Presl.). *P. cynosuroides*, *Herb. Rottl.* *P. Hasskarlii*, *Steud. in Zoll. Syst. Verz.* 54, *Syn. Gram.* 70; *Miq. Fl. Ind. Bat.* iii. 456. *P. myurum*, *Meyer Fl. Esseq.* 50 (excl. *Syn. Lamk. & Rudge*). *P. mangaloricum*, *Steud. l. c.* 78. *P. serratum*, *Herb. Ham. in Wall. Cat.* n. 8699. *P. serrulatum*, *Roxb. Fl. Ind.* i. 307; *Kunth Enum. Pl.* i. 126. *Hymenachne myuros*, *Beauv. Agrost.* 49, t. 10, f. 8 (excl. *Syn. Lam.*); *Nees Agrost. Bras.* 275; *Griseb. Fl. Brit. W. Ind.* 553 (excl. *Syn.*); *Steud. l. c.* *Agrostis alopecuroides*, *Vahl. mss.*, & *A. monostachys*, *Poir. Encycl. Suppl.* i. 256, ex *Kunth l. c.*—*Panicum*, *Wall. Cat.* n. 8699.

Marshes in Upper and Lower BENGAL, ASSAM, SILHET, the DECCAN, MALAYAN PENINSULA and CEYLON.—DISTRIB. Trop. As. Austral. and Amer.

Stem erect, 2–6 ft., leafy, rooting at the nodes of the prostrate base, which is often as thick as a swan's quill. *Leaves* 12–18 by $\frac{3}{4}$ –1 in., tapering from a broad cordate base to a fine point, margin serrulate; sheath smooth, glabrous; ligule very

short, rounded. *Panicle* 6-12 in., rarely 1 in. diam., often interrupted, sometimes quite cylindric. *Spikelets* erect, very shortly pedicelled, pale green; gl. I broadly ovate, acuminate; III tapering into a long rigid erect beak, palea 0 or imperfect.—Generally cited as *P. myurus*, of Lamk, but as Nees has pointed out (*Agrost. Bras. l.c.*) Lamk's plant is Richards' *P. myosurus* (= *P. indicum*). In Muoro's herbarium *P. myurus* is, perhaps rightly, referred to *P. amplexicaule*, Rudge (*Pl. Gui. i. 21*), which is a much broader leaved plant.

20. ***P. assamicum***, *Hook. f.*; slender, erect, leaves narrow base rounded, panicle spiciform cylindric very narrow interrupted, spikelets $\frac{1}{2}$ in. densely crowded on the appressed branches, gl. I = $\frac{1}{2}$ III 3-nerved, II and III lanceolate 5-nerved, III rather longer than II epaleate, IV ovate-lanceolate thin smooth.

ASSAM, *Masters, Griffith*; DACCA, *Clarke*.

Stem 12-18 in. or more, ascending, as thick as a sparrow's quill, lower nodes rooting. *Leaves* 2-4 in., narrowed from the base to the acute tip, margins quite smooth, involute (when dry); sheath glabrous or mouth slightly hairy; ligule a narrow membrane. *Panicle* 3 in., hardly $\frac{1}{2}$ in. diam., pale green, quite glabrous. *Spikelets* very shortly pedicelled; glumes thin.—I advance this species with hesitation. It is nearest to *P. myurus*, differing in size, narrow leaves, very narrow panicle, smaller spikelets, and shorter glume III.

21. ***P. auritum***, *Presl ex Nees Agrost. Bras. 176*; tall, erect, leaves linear-lanceolate base broadly cordate, panicle long contracted or more or less effuse much fastigiately branched, branches erect, spikelets $\frac{1}{16}$ – $\frac{1}{10}$ in. crowded on short branchlets solitary sessile or shortly pedicelled oblong or ovate-oblong subacute, gl. I = $\frac{1}{2}$ III obtuse or acute nerves 3-5 arching II and III subequal acute or acuminate 5-nerved, III paleate neuter, IV lanceolate acuminate smooth. *Presl Rel. Hænk. i. 305*; *Trin. Pan. Gen. 176*; *Kunth Enum. Pl. i. 113*; *Steud. Syn. Gram. 70*; *Thw. Enum. Pl. Zeyl. 361*; *Trim. Cat. Ceyl. Pl. 105*; *Baker Fl. Maurit. 437*; *Miq. Fl. Ind. Bat. iii. 456*. *P. insulicola*, *Steud. l.c. 73*. *P. javanum*, *Nees & Bühse in Miq. Pl. Jungh. 376*; *Miq. Fl. Ind. Bat. l.c. 453*. *P. maximum*, *Wall. Cat. n. 8715 F.* *P. patens*, *Bojer Hort. Maurit. ex Baker l.c.* *P. secundum*, *Herb. Rottl.* *Hymenachne myurus*, *Herb. H.f. & T. (in part)*.—*Panicum*, *Wall. Cat. n. 8701, 8707*.

Marshes from BENGAL and the CONCAN to BURMA, TRAVANCORE, the MALAY PENINSULA, and CEYLON.—DISTRIB. Malaya, China, Mauritius?

Perennial. *Stem* 3-6 ft., sometimes as stout as a goose-quill, soft. *Leaves* 8-14 by $\frac{3}{4}$ – $1\frac{1}{2}$ in., glabrous or sparsely hairy beneath, as is the sheath; mouth villously bearded; ligule very narrow. *Panicle* 8-18 in., green, rachis scaberulous, branches 2-5 in., branchlets and fascicles of spikelets subsecund. *Spikelets* green, glabrous, nerves strong; gl. I broadly ovate; II and III ovate-oblong; palea of III small; IV as long as III, white, thinly coriaceous.—The Ceylon specimens have longer ($\frac{1}{10}$ – $\frac{1}{8}$ in.) narrower and more acuminate spikelets than the normal.

22. ***P. interruptum***, *Willd. Sp. Pl. i. 341*; stem tall very stout spongy below, leaves long flat base rounded or subcordate, panicle very narrow almost reduced to a spike, spikelets (many imperfect) $\frac{1}{4}$ – $\frac{1}{2}$ in. fascicled very shortly pedicelled ovoid rather turgid, gl. I = $\frac{1}{2}$ III orbicular hyaline 5-nerved, II = III ovate-oblong obtuse strongly 9-nerved, III ovate-oblong obtuse, palea small, IV much smaller lanceolate acuminate polished white. *Nees Fl. Afr. Austr. 51*; *Kunth Enum. Pl. i. 87*; *Roxb. Fl. Ind. i. 286*; *Wall. Cat. n. 8695 Excl.C.*; *Thw. Enum. Pl. Zeyl. 361*; *Trim. Cat. Ceyl. Pl. 104*; *Wight Cat. n. 1640*; *Griff. Notul. iii. 26, Ic. Pl. Asiat.*

t. 139, f. 221 & t. 146, f. 2.; Dalz. & Gibs. *Bomb. Fl.* 316. *P. caudatum*, Thunb. *Fl. Cap.* i. 393. *P. inundatum*, Kunth *Revis. Gram.* i. 34; *Enum. Pl.* i. 88. *P. spiciforme*, Hochst. ex A. Rich. *Tent. Fl. Abyss.* ii. 359. *P. stagninum*, Herb. Ham. ex Wall. *Cat. n.* 8695 D (non Retz). *P. turritum*, Thunb. in Mus. Nat. Acad. Upsal. x. 148. *P. uliginosum*, Roth Nov. Pl. Sp. 50. *Hymenachne interrupta*, Bükse in Miq. *Pl. Jungh.* i. 377; Miq. *Fl. Ind. Bat.* iii. 458; Steud. l. c. 101.

Swamps; from the UPPER GANGETIC PLAIN to ASSAM and BURMA, and southward to CEYLON—DISTRIB. China, Malaya, Afr. trop.

Stem 3–5 ft., lower internodes often as thick as the thumb, rooting. Leaves 6–12 by $\frac{1}{4}$ – $\frac{1}{2}$ in., many-nerved, base hardly contracted; sheath smooth; ligule short, membranous. Spike 6–10 in. by $\frac{1}{2}$ in. diam., strict; rachis stout, terete, channelled. Spikelets spreading, much longer than their pedicels, green, herbaceous.—Very near the American *P. vilfoides*, Trin. (*fluviatile*, Nees). Bentham reduces *P. interruptum* to *P. myurus*, but they are very different plants.

23. *P. indicum*, Linn. *Mant.* ii. 184; stem slender, leaves linear glabrous or hirsute base narrow, panicle spiciform oblong or cylindric dense fld. branches very short, spikelets longer than their pedicel $\frac{1}{10}$ – $\frac{1}{8}$ in. crowded ovoid or oblong subacute straight or curved glabrous or hispid, gl. I = about $\frac{1}{2}$ III 3-nerved, II ovoid cymbiform obtuse or subacute 7–9-nerved, III as long as II oblong obtuse 7–9-nerved, palea minute, IV minute ovoid subacute. Retz. *Obs.* iii. 9; Kunth *Enum. Pl.* i. 133; Steud. *Syn. Gram.* 84; Trin. *Diss.* ii. 170, *Pan. Gen.* 84, *Sp. Gram. Ic.* 197; Roxb. *Fl. Ind.* i. 285; Thw. *Enum. Pl. Zeyl.* 361 (excl. CP. 909); Trim. *Cat. Ceyl. Pl.* 104; Benth. *Fl. Hongk.* 413, *Fl. Austral.* vii. 480; Franch. & Sav. *En. Pl. Jap.* ii. 163. *P. angustum*, Trin. *Sp. Gram. Ic. t.* 334; Wight *Cat. n.* 1642; Steud. l. c. *P. arcuatum*, Br. *Prodr.* 189; Kunth l. c. 77; Griff. *Notul.* iii. 39, 40, *Ic. Pl. Asiat.* t. 147, f. 1; Duthie *Grass. N.W. Ind.* 5, Fodd. *Grass N. Ind.* 9. *P. contractum*, Wight & Arn. ex Nees in *Herb. Wight*; Steud. l. c. 84. *P. conglomeratum*, Herb. Rottl.; ? Linn. *Mant.* 324; Kunth l. c. 133. *P. interruptum*, Wall. *Cat. n.* 8695 C. *partim.* *P. Johannæ & incurvum*, Herb. Linn. ex Munro in *Journ. Linn. Soc.* vi. 39. *P. microstachyum*, Lamk. *Ill.* i. 170, *Encycl.* iv. 739; Kunth l. c. 88. *P. myosurus*, Rich. in Act. Soc. Hist. Nat. Par. i. (1792) 106. *P. myurus*, Lamk. *Ill.* i. 172. *P. phalaroides*, Roem. & Sch. *Syst.* ii. 452. *P. phleoides*, Br. ex Kunth l. c. *Hymenachne indica*, Bükse ex Miq. *Fl. Ind. Bat.* iii. 458. H. ? *phalaroides*, Nees *Agrost.* 276; Steud. l. c. 202. ? *Aira indica*, Linn. *Sp. Pl. Ed.* 2. 94. *Panicum*, Wall. *Cat. n.* 8696 B. C. (*in part*) D. E. F. (*in part*) G. H., 8697, & 8698.

Tropical and subtropical INDIA (ascending 6000 ft. in the Himalaya) from Garwhal eastwards and southwards. CEYLON.—DISTRIB. Trop. Asia and Australia. (Mexico, an alien).

P. indicum appears to pass insensibly into *P. interruptum* and *P. myosuroides*, the former of which differs in its stouter habit, the latter in its caudiform spike and more minute rounded spikelets. Though so abundant in the Plains to the eastward of the Jumna, I have seen no specimens from the west of that river; nor from Africa. The following are the principal Indian forms, in describing which I have used the word spike in a conventional sense.

Var. *indicum proper*; stem 6–18 in. erect or decumbent at the base, leaves narrow, spikes $\frac{1}{2}$ –2 in. cylindric green whitish or blue-purple, spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in. ovate-lanceolate acute straight or decurved glabrous or sparsely setose.—The common Plains form. *P. phalaroides*, Roem. & Sch. is a common state with more setose spikelets; it is *P. indicum*, β , Wight *Cat.* 1641 B.

Var. elatum; glabrous, stem 3-4 ft. stout erect, leaves 6-10 in. by $\frac{1}{2}$ in., spike 3-6 in. rather stout, spikelets $\frac{1}{2}$ in. erect oblong-ovate acute violet blue rarely greenish.—Khasia hills, in wet places alt. 5-6000 ft. The nearest form to *P. interruptum*.

Var. pilosum; like *var. elatum*, but not so tall, more flaccid, leaves hirsute with spreading hairs.—Khasia hills, alt. 4-5000 ft.

Var. villosum; softly silkily villous, stem 1-2 ft., leaves quite erect, spike 2-6 in., spikelets $\frac{1}{2}$ - $\frac{1}{2}$ in. green or purplish ovate-oblong glabrous.—*Panicum*, No. 39, *Herb. Ind. Or. Hook. f. & T.*—Khasia hills, alt. 5-6000 ft.

Var. gracile; stem 1-2 ft. very slender simple or branched, leaves 4-6 by $\frac{1}{8}$ - $\frac{1}{2}$ in. flaccid, spikes 2-4 in. pale, spikelets $\frac{1}{2}$ in. ovoid subacute glabrous spreading.—Nepal, Kumaon, Sikkim, &c.

Var. angustum; whole plant very slender spike of very minute loosely packed spikelets $\frac{1}{10}$ in. long.—This, the *P. angustum* Trin., is a starved form.

Var. turgidum; stem 6-12 in., spike short cylindric or oblong very pale often proliferous, spikelets $\frac{1}{2}$ - $\frac{1}{2}$ in. oblong turgid setulose.—*Panicum*, *Wall. Cat. n.* 8697, 8698.—In wet places. Perhaps a diseased form.

24. ***P. myosuroides***, *Br. Prodr.* 189; slender, leaves narrow, spikelets innumerable $\frac{1}{18}$ - $\frac{1}{12}$ in. densely crowded in an elongate cylindric curved caudiform panicle broadly obovoid or subglobose obtuse, gl. I about $\frac{1}{3}$ III 3-nerved, II very convex and III 5-7-nerved, III oblong obtuse palea minute, IV minute ovate-oblong. *Kunth Enum. Pl. i.* 77; *Steud. Syn. Gram.* 56; *Benth. Fl. Austral. vii.* 480 (*excl. syn. angustum*); *Duthie Fodd. Grass. N. Ind.* 11. *P. arcuatum*, *Wight Cat. n.* 1639 (*non Br.*). *P. angustum*, *Wight l. c.* 1642 (*non Trin.*); *Wight Cat. n.* 164. *P. curvatum*, *Roxb. Fl. Ind. i.* 286 (*non Linn.*); *Kunth l. c.* 87 (*excl. syn.*). *P. indicum*, *Herb. Wight n.* 3042; *Thw. Enum. Pl. Zeyl.* 361 (*in part*). *P. interruptum*, *var. contigua*. *Steud. in Pl. Ind. Or. Hohen. n.* 1606 (*non Willd.*). *P. multiflorum*, *Roxb. Ic. Pict. ined. t.* 782. *P. nervosum*, *Herb. Heyne ex Wall. Cat. n.* 8696 A.—*Panicum*, *Wall. Cat. n.* 8696 A. C. F. (*in part*) G.—*Sporobolus*, *Wall. Cat. n.* 3766 *ex Wight. Cat. n.* 1642.

Throughout the hotter parts of India from NEPAL eastward to ASSAM and BURMA, and southward to the MALAY PENINSULA and CEYLON.—DISTRIB. China, Austral. Afric. trop.

Stem erect or shortly creeping. *Leaves* rarely $\frac{1}{2}$ in. broad. *Spiciform* or rather caudiform panicle sometimes 8 inches long, tapering from base to tip, with rarely a short branch abruptly breaking out from near the base. *Spikelets* longer than their pedicels, green or purplish.—This is unquestionably *P. myosuroides*, Br., and Roxburgh's *P. curvatum*, but I hesitate to cite all the authors who have taken up these names, in some cases probably from forms of *P. indicum*. In its ordinary state it is a very distinct grass, from its elegant tail-like inflorescence and minute obtuse spikelets, but I find it impossible to separate specimens with short spikes from states of *P. indicum*. *P. angustum*, Trin., is such a state, and is referred to *myosuroides* by Benthams, but its larger spikelets are rather those of true *indicum*.

25. ***P. curvatum***, *Linn. Syst. Nat. xii.* 730; stem very slender, and narrow leaves flaccid, spikelets in a lax panicle with capillary flexuous branches, spikelets gibbously ovoid-oblong decurved, nerves very strong, gl. I minute, II cymbiform or almost galeate, III shorter than II ovate, palea linear-oblong, IV minute. *Wight Cat. n.* 1636; *Thw. Enum. Pl. Zeyl.* 360; *Trim. Cat. Ceyl. Pl.* 105; *Nees Agrost. Bras.* 207, *Fl. Afr. Austr.* 50. *P. costulatum*, *Bojer, mss.* *P. coryophorum*, *Kunth Revis. Gram.* 93, t. 107; *Enum. Pl.* 88; *Suppl.* 66.—*Panicum*, *Wall. Cat. n.* 8742.

SOUTH DECCAN PENINSULA; Heyne, &c., Courtallam, Wight. CEYLON, Walker, Thwaites.—DISTRIB. Madagascar, S. Africa.

Stem 6-18 in., prostrate, much branched, remotely leafy, nodes glabrous. *Leaves* 2-3 by $\frac{1}{8}$ in., flat, sometimes sparsely hairy; sheath long, slender; ligule hardly any. *Panicle* 1-4 in., branches alternate, quite glabrous. *Spikelets* $\frac{1}{12}$ - $\frac{1}{10}$ in., very strongly nerved, except gl. I, which is transversely oblong; II very strongly 11-nerved; III 3-5-nerved; IV ovoid, obtuse.—A very elegant small grass. Steudel (Syn. Gram. 85) has referred Sprengel's *P. madagascarense* (Syst. i. 317) to this, but Sprengel's character "glumes obsolete nerved" is irreconcilable.

Sect. V. BREVIGLUMÆ. (See p 27.)

26. ***P. canaliculatum***, Nees in Wight Cat. n. 1624; stems very slender flaccid branched, leaves narrow, spikelets $\frac{1}{10}$ - $\frac{1}{8}$ in. solitary or few together clustered on distant very short branchlets along a capillary simple rachis ovate-oblong very shortly pedicelled, gls. membranous, I and II not = $\frac{1}{2}$ III broadly ovate subequal, III ovate acute paleate male, IV as long as III lanceolate acuminate thin muciculate tip minutely 2-toothed and mucronulate. Steud. Syn. Gram. 55. *P. myurum*, Wight ex Steud. l.c. *P. stenostachyum*, Thw. Enum. Pl. Zeyl. 436; Trim. Cat. Pl. Ceyl. 105. *Aira interrupta*, Rottl. ex Steud. Syn. Gram. 55.

Southern DECCAN PENINSULA, Wight. CEYLON; Jaffna, Herb. Rottler; Trincomalee, Glenie.

Quite glabrous. *Stems* 2-3 ft., many from a small woody branched nodulose rootstock, erect or decumbent at the base. *Leaves* 3-10 by $\frac{1}{8}$ - $\frac{1}{4}$ in., thin, flat, quite smooth, nerves very slender, tips setaceous, base narrow; sheaths smooth; ligule obscure, ciliate. *Spike* 3-8 in., almost capillary. *Spikelets* solitary, binate, or in clusters of 3-6, on a very short branch, sessile or subsessile, pale, glistening; gl. I and II very broadly ovate, acute or obtuse; I 3-nerved; II rather the longest, 5-nerved; III faintly 5-7-nerved, its palea large, obtuse with broadly inflexed margins and green nerves at the smooth angles, which are faintly produced at the tips; IV very pale, dorsally flattened and channelled, 5-nerved; palea acute. *Lodicules* quadrately cuneate. *Anthers* linear. *Style* long, stigma short.—A very peculiar species.

27. ***P. nodosum***, Kunth Enum. Pl. i. 97; stem creeping and rooting below, leaves linear base rounded or cordate, panicle broad rachis very slender scaberulous, branches very long filiform striate bearing remote racemose or solitary spikes of few second elliptic-oblong acute spikelets $\frac{1}{3}$ - $\frac{1}{4}$ in. long, gl. I not = $\frac{1}{2}$ III 3-5-nerved, II rather longer than I 5-nerved, III 5-7-nerved epaleate, IV elliptic-lanceolate acute thin smooth. Steud. Syn. Gram. 59; Benth. Fl. Hongk. 412; Thw. Enum. Pl. Zeyl. 360; Trim. Cat. Ceyl. Pl. 105. *P. Arnottianum*, Nees in Wight Cat. n. 1611, Herb. n. 3068; Steud. l.c. *P. multinode*, Presl Rel. Hænk. i. 303 (non Lamk.). *P. violaceum*, Llanos Fragm. 42.

BENGAL, ASSAM, and southwards to MALACCA, TRAVANCORE and CEYLON.—DISTRIB. Malaya, China.

Stems 1-2 ft., slender, leafy. *Leaves* 2-5 by $\frac{1}{4}$ - $\frac{1}{2}$ in., flat, thin, and as well as their sheaths glabrous pilose or hirsute, base ciliate; ligule very short. *Panicle* 4-6 in., branches 2-3 in., solitary or fascicled. *Spikelets* pale green, sessile or very shortly pedicelled, glabrous or slightly hairy; gl. IV. as long as III, dorsally flattened.

Sect. VI. EFFUSÆ. (See p. 27.)

* Gl. I as long as III or nearly so. (The three following species are in no way allied.)

28. **P. æquilume**, *Hook. f.*; slender, leaves linear-lanceolate base narrow, panicle ovate lax, branches lax in alternate fascicles or whorls spreading laxly few-fl'd. and branchlets and pedicels capillary smooth, spikelets $1\frac{1}{2}$ in. solitary oblong obtuse faintly nerved, I=III oblong obtuse white nearly flat faintly 5-nerved deciduous, II broadly ovate subacute 9-nerved convex, III shorter than II oblong paleate male or neuter nerveless, IV much shorter than II stipitate broadly ovate obtuse sparsely pilose above or glabrous white.

NILGHIRI HILLS; Goodadoor Ghats, alt. 5000 ft., in a wood, *Lawson*.

Stem 1-2 ft., apparently geniculately ascending, smooth, purplish; nodes glabrous. *Leaves* 2-3 by $\frac{1}{2}$ - $\frac{3}{4}$ in., flat, green, smooth, 5-7-nerved and striate, midrib slender; base rounded or narrowly cordate; sheath purple, margin fimbriately ciliate; ligule a row of hairs. *Panicle* 4 in., branches in 6-8 rather distant fascicles of two or three, lowest $2\frac{1}{2}$ in. long. *Spikelets* very pale; gl. I very deciduous (so that the mature spikelet appears 3-glumed), but leaving a distinct scar; II more coriaceous, nerves more distinct; III and its palea sometimes very small and empty.—A very curious grass.

29. **P. ovalifolium**, *Poir. Encycl. Suppl. iv.* 279; stem slender decumbent and rooting below, leaves 1-2 in. ovate acuminate amplexicaul, panicle ovoid excessively branched, rachis branches and pedicels capillary, spikelets solitary $1\frac{1}{6}$ - $1\frac{1}{5}$ in. ovate subacute, gl. I. nearly = III, II hemispheric pubescent or hirsute 5-nerved, III flat obtuse, palea large, IV oblong acute dorsally rounded smooth, margins narrowly inflexed. *Beauv. Fl. Owar. ii.* 79, t. 110, f. 1; *Kunth Enum. Pl. i.* 113; *Steud. Syn. Gram.* 84; *Benth. Fl. Hongk.* 413; *Thw. Enum. Pl. Zeyl.* 359; *Trim. Cat. Ceyl. Pl.* 105; *Duthie Grass. N.W. Ind.* 6. *P. amplexicaule*, *Poir. (teste Beauv.) ex Kunth l.c.* *P. arborescens*, *Linn. Sp. Pl.* 59 (in part) (cf. *Trim. in Journ. Linn. Soc.* xxiv. 135). *P. brevifolium*, *Roxb. Fl. Ind. i.* 306, & *Herb. Linn.* *P. guineense*, *Desv. mss. ex Poir. Encycl. Suppl. iv.* 279. *P. tricarınatum*, *Steud. Nom. Ed. II ii.* 264, *Syn. Gram.* 94. *Isachne tricarınata*, *Roth Nov. Sp.* 57; *Kunth Enum. Pl. i.* 136.—*Panicum*, *Wall. Cat.* 8737.

SIKKIM HIMALAYA, alt. 4000 ft.; KHASIA HILLS, alt. 2000 ft.; MUNNEPORE, BURMA, the MALAY PENINSULA and CEYLON.—DISTRIB. Malaya, China, trop. Afr.

Stem geniculate and ascending below, leafy usually up to the panicle. *Leaves* membranous and sheaths glabrous ciliate or hairy above or all over; ligule very short, ciliate. *Panicle* ovoid. *Spikelets* variable in size; gl. II very persistent.—Resembles *Sphærocaryum elegans* and often mixed with it in Herbaria. As Trimen has pointed out (*Journ. Linn. Soc. l.c.*) this, according to *Herb. Linn. & Fl. Zeyl.* is *P. arborescens*, *Linn.*, described as being as high as the loftiest trees. This error has no doubt originated from its having been accidentally assorted with an *Arundinaria* in *Herb. Linn.*

30. **P. turgidum**, *Forsk. Fl. Æg. Arab.* 18; shrubby, rootstock very stout creeping, stem woody, branches alternately or proliferously fascicled at the sheathed nodes, leaves short rigid, panicle erect glabrous branches solitary distant simple or sparingly divided, spikelets solitary $1\frac{1}{5}$ - $\frac{1}{4}$ in. subglobose pale, gls. coriaceous cymbiform, I = III or nearly so orbicular 5-7-nerved, II broadly ovate acute 7-nerved; III acumi-

nate 9-nerved paleate male, IV small ovoid acute quite smooth polished. *Del. Fl. Egypt. Ill.* 51, t. 9, f. 2; *Nees Agrost. Bras.* i. 172 (in note); *Trin. Pan. Gen.* 221, *Sp. Gram. Ic.* t. 227; *Kunth Enum. Pl.* i. 97; *Steud. Syn. Gram.* 88; *Duthie Fodd. Grass. N. Ind.* 13.

SIND and CENTRAL INDIA, *Duthie l. c.*—DISTRIB. Beluchistan and westward to Egypt.

Rootstock sometimes as thick as the little finger, root fibres—strong woolly; branches 2–4 ft., hard, solid, smooth, sometimes as thick as a goose-quill, clothed at the base with imbricating scarious scales, and the nodes higher up with long scarious leaf sheaths, branches sometimes forming dense subglobose fascicles at the nodes 2–3 in. diam., with many short reduced panicles. *Leaves* at the base of the stem 2–3 in. long, flat, coriaceous linear-lanceolate, acuminate, smooth, at the upper nodes reduced to brown chartaceous open sheaths with a deciduous setiform blade, ligule a row of short hairs. *Panicles* very variable, 1–5 in. long; rachis and branches slender, subscaerulous; pedicels short, tips cupular. *Spikelets* subsecund, young ovate-lanceolate acute, mature turgid; palea of gl. III broad with ciliate keels; of IV coriaceous like the gl. and shining. *Anthers* purple. *Styles* short, stigmas short, primrose-purple. — A remarkable grass, intermediate between *Brachiaria* and *Effusa* allied to no other Indian, with something of the habit of *Spinifex*. *Duthie* is my authority for the Indian habitats of this fine species; that of Sind is natural, the Central Indian I doubt exceedingly. As a species it is unmistakable. I should be disposed to refer it to the *Brachiaria* section, but *Trinius* places it under his section *Miliaria*, which answers to *Effusa*.

** Gl. I much shorter than III.

† Annual erect leafy grasses.

31. **P. miliaceum**, *Linn. Sp. Pl.* 58; leaves linear acuminate and sheaths clothed with long spreading hairs, base not cordate, panicle thyriform usually decurved or nodding, branches long slender suberect, spikelets $\frac{1}{2}$ – $\frac{3}{4}$ in. ovate-oblong cuspidately acuminate glabrous, glumes channelled between the nerves I = $\frac{2}{3}$ III 5–7-nerved, II and III subequal 7–11-nerved, III paleate neuter, IV broadly ovate turgid 3–5-nerved polished. *Host Gram. Austr.* ii. 16, t. 20; *Kunth Enum. Pl.* i. 104, *Suppl.* 81; *Trin. Diss.* ii. 186, *Pan. Gen.* 194, *Sp. Gram. Ic.* t. 221; *Steud. Syn. Gram.* 77; *Reichb. Ic. Fl. Germ.* t. 82; *Roxb. Fl. Ind.* i. 310; *Wall. Cat. n.* 8716; *Trim. Cat. Ceyl. Pl.* 105; *Aitchis. Cat. Panjab. Pl.* 158; *Duthie Grass. N.W. Ind.* 5, *Field & Gard. Crops.* t. 23, *Fodd. Grass. N. Ind.* 9; *Franch. & Sav. En. Pl. Jap.* 165. P. asperillum, *Fisch. Cat. Hort. Gorenk. ex Jacq. Eclog. Gram.* 46, t. 31; *Nees Agrost. Bras.* 199; *A. Rich Tent. Fl. Abyss.* ii. 374; *Steud. l. c.* P. callosum, *Hochst. ex A. Rich l. c.* P. densepilosum, *Steud. l. c.* 72, ex *Miq. Prolus Fl. Jap.* 275. P. Miliun, *Pers. Syn.* i. 83. P. pilosum, *Herb. Roxb. & Herb. Heyne ex Wall. Cat. l. c.* P. striatum, *Spreng. Syst.* i. 318. Miliun esculentum, *Moench Meth.* 203. M. Panicum, *Mill. Gard. Dict. Ed.* 8, n. 1.

Cultivated or naturalized (Wild ?) throughout the hotter parts of INDIA, AFRICA, and other hot countries.

Annual; stems tufted, 2–4 ft., stout, branching, leafy up to the panicle, often as thick as the little finger below. *Leaves* 6–12 by $\frac{1}{2}$ –1 in., glabrous ciliate or hirsute, base narrow, margin scabrid often ciliate; sheaths lax, deeply grooved, clothed with very long spreading or reflexed hairs; ligule of long hairs. *Panicle* 6–12 in., branches filiform, fascicled, densely crowded, scaerulous; pedicels often much longer than the spikelets, but sometimes much shorter. *Spikelets* green, erect, turgid; gl. IV pale, sometimes dorsally 5-streaked.—Closely allied to *P. miliare* and *P. psilopodium* with which it possibly hybridizes, but with much larger spikelets. I am

far from satisfied that I have not erred in the synonyms cited for these three species, which are almost inextricably mixed. For a learned discussion on the Millet, the cultivation of which in Europe dates from prehistoric times, see A. de Candolle's "Origine de Plantes Cultivées," p. 302. Munro has attached the following to a specimen from Bombay (Woodrow, No. 89), "I believe this to be an uncultivated form of *P. miliaceum*"—it has spinulosely toothed scabrid leaves, and a perfectly erect panicle with very long erect branches, and few spikelets.

32. ***P. miliare***, Lamk. *Ill. Gen.* 173; leaves linear hairy base rounded, panicle contracted or thyrsiform much branched erect or nodding, branches slender erect alternate, spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in. solitary or geminate usually shorter than their pedicels turgidly ovoid or ellipsoid acute, gl. I = $\frac{1}{3}$ III broadly ovate acute 3–5-nerved, nerves arching, II ovate-lanceolate 11–13-nerved, III 9-nerved paleate neuter, IV from oblong to broadly ovate acute shining often 3–5-streaked dorsally. *Rottl. in Neue Schrift. Ges. Naturf. Berl.* iv. (1803) 83; *Roxb. Fl. Ind.* i. 309; *Wall. Cat.* 8712 C. *in part*, F. G. H. I.; *Wight Cat.* n. 1629; *Kunth Enum. Pl.* i. 104; *Trim. Cat. Ceyl. Pl.* 105; *Aitchis. Cat. Panjab Pl.* 159; *Nees Fl. Afr. Austr.* 40; *Duthie Grass. N.W. Ind.* 5, *Field. & Gard. Crops.* 7, t. 26, *Indig. Fodd. Grass.* t. 46, *Fodd. Grass. N. Ind.* 10. *P. attenuatum*, Willd. *Enum. Hort. Berl.* 1033; *Nees Agrost. Bras.* 173; *Trin. Diss.* ii. 226. *P. brevifolium*, Balb. *ex Nees Fl. Afr. Austr.* 40. *P. Menieri*, Koen. *ex Nees l. c.* *P. miliaceum*, Thw. *Enum. Pl. Zeyl.* 360. *P. miliaceum*, var. *Rottl. in Neue Schrift. l. c.* *P. musciparum*, Herb. *Linn. ex Munro in Journ. Linn. Soc.* vi. (1862) 39. *P. psilopodium*, *Wight Cat.* n. 1633a. *P. simplex*, *Rottl. ex Trin. Gram. Panic.* 216; *Steud. Syn. Gram.* 67. *P. sumatrense*, *Roth Nov. Sp.* 50; *Kunth l. c.*—*Panicum*, *Wall. Cat.* n. 8718 B, 8720.

Cultivated or naturalized (or native?) throughout INDIA and CEYLON.—DISTRIB. Tropics cult.

Annual. *Stem* 1–3 ft., rather slender, erect or base geniculate, simple or branched, usually leafy up to the panicle. *Leaves* 1–2 ft. by $\frac{1}{2}$ –1 in., flat, and sheaths rarely hirsute with tubercle-based hairs, acute or acuminate; ligule a narrow row of hairs. *Panicle* 2–10 in., lower branches long, pedicels of spikelets sometimes $\frac{1}{2}$ in. *Spikelets* glabrous, rather flattened, usually green or purplish; gl. I variable, white, membranous, margins overlapping at the base, nerves arching and anastomosing; II and III herbaceous; palea of III as long as its gl.—If I remember aright *P. miliare* was conjectured by Munro to be a cultivated form of *P. psilopodium*; and except in the greater size, more contracted panicle, rather larger spikelets and usually shorter pedicels of *P. miliare* I fail to find characters whereby to separate them, and these are not very reliable. In its common state the grain of *miliare* is broader than in any form of *psilopodium* and much darker colored. *P. simplex*, *Rottl.* is a weak flaccid form from Tranquebar, growing in shade. Trinius distinguishes it from *P. psilopodium*, by the scabrid pedicels of the spikelets, but they are quite glabrous in Rottler's specimens of *simplex*. I am not at all satisfied that I have rightly identified the synonymy of this and *P. psilopodium*.

Var. *hirtum*, upper leaf-sheaths with long spreading hairs. *P. hirtum*, *Wall. mss. in Herb. Linn. Soc. Panicum*, *Wall. Cat.* n. 8718 (*in part*).—Burma, *Wallich*.—Wallich's sheet has three different looking plants; viz. 8718 A, from Malloon, with the panicle of *psilopodium*, and hirsute sheaths; B from the banks of the Irawaddy with hirsute sheaths and the panicle of *miliare*; along with these is a plant with a similar panicle to the last but with glabrous sheaths.

33. ***P. psilopodium***, *Trin. Gram. Panic.* 217; leaves narrow glabrous base rounded, panicle effuse branches capillary at length spreading, spikelets $\frac{1}{12}$ – $\frac{1}{8}$ in. geminate ovate-lanceolate acute, pedicels capillary usually

longer than the spikelets, gl. I = $\frac{1}{2}$ III or less broader than long 3-5-nerved tip obtuse or rounded, II ovate acuminate 11-nerved, III as long as II 9-nerved paleate neuter, IV oblong obtuse apiculate. *Nees Agrost. Bras.* 199; *Kunth Enum. Pl.* i. 100; *Steud. Syn. Gram.* 83; *Thuwaites Enum. Pl. Zeyl.* 360; *Trim. Cat. Ceyl. Pl.* 105; *Aitchis. Cat. Panjab. Pl.* 161; *Duthie Grass. N.W. Ind.* 6, *Field & Gard. Crops.* i. t. 23. *Fodd. Grass. N. Ind.* 10 (in note). *P. Chintaman, Herb. Hum. ex Wall. Cat.* 8712 D. *P. glabrum, Herb. Heyne ex Wall. Cat. n.* 8712 C (in part). *P. miliare, var. Meneri, Herb. Mudr. ex Wall. Cat. n.* 8712 B. *P. miliare, Wall. Cat. n.* 8712 A (in part) B (in part) D. *P. mucronatum, Wall. Cat. n.* 8717 (in part). *P. ramosum, Koen. ex Herb. Banks.* *P. Royleanum, Nees ex Duthie Grass. N.W. Ind.* 6. *P. virgatum, Roxb. mss. ex Steud. Nom. Ed.* II ii. 265.—*Isachne, Wall. Cat.* 8659 B (in part).

Hotter parts of INDIA, ascending to 4000 ft., BURMA; MALACCA and CEYLON.

Annual. *Stem* 1-2 ft., rather slender, simple or branched, usually leafy up to the panicle. *Leaves* 3-12 by $\frac{1}{8}$ - $\frac{1}{2}$ in., flat, acute or acuminate, usually glabrous; sheaths glabrous or hirsute, mouth with a few hairs; ligule a narrow row of hairs. *Panicle* 2-8 in.; lower branches long; pedicels sometimes $\frac{1}{2}$ in. long. *Spikelets* rather flattened, dorsally green or purplish; gl. I variable, membranous, white, margins overlapping at the base, nerves 3-5 anastomosing; II and III herbaceous, palea of III as long as the gl.; IV shining—*Nees (Agrost. Bras.)* describes gl. II as 7-nerved probably by error. Diseased states occur with gl. IV enlarged exerted flattened. *Trinius* describes the spikelets as elliptic and mucronate, and the panicle as contracted below and lax above, but this latter is a matter of development. *Trinius* gives as a character of *P. psilopodium* glumes open, which is a conspicuous one in *P. trypheron*, but I do not recognize it in this. He further says that he has seen this species in Herb. Lindley under the names of *P. ramosum*, *Koen.* and *P. virgatum*, *Roxb.* I have in vain tried to verify this in Lindley's Herb., and conclude that for Herb. Lindley Herb. Mus. Brit. is intended. *Duthie, Fodd. Grass. N. Ind.* 10 (in note) says that he is unable to distinguish *P. psilopodium* from *P. miliare*. *Dr. Stapf*, who has carefully reviewed a multitude of specimens of *P. miliare* and *psilopodium*, is disposed to think them separable, though the former is probably a cult. form of the latter. The true *psilopodium* he thinks has nearly always glabrous leaves, smaller spikelets and a shorter gl. I.

Var. coloratum; panicle violet or purple.—*Simla and Garwhal*, up to 6000 ft., *Mt. Abu, Duthie*; *Shan Hills, Burma, Collett.*

34. ***P. trypheron*, Schult. Mant. ii. 244**; leaves narrow, panicle effuse, branches long stiff filiform divaricate scaberulous, spikelets $\frac{1}{10}$ - $\frac{1}{8}$ in. often geminate, pedicels capillary, gls. divergent strongly nerved I, II and III broadly ovate, I = $\frac{1}{2}$ III or longer acuminate 5-nerved, II and III subequal recurved subcuspidate 9-nerved, III paleate neuter, IV broadly oblong obtuse shining often 5-nerved. *P. coloratum, β hirsutum, Nees in Herb. Lindl. (ex Steud.).* *P. confine, Hochst. in Schimp. Pl. Abyss. n.* 1230; *A. Rich. Tent. Fl. Abyss. ii.* 373; *Steud. Syn. Gram.* 72. *P. jumentorum, A. Rich. l. c.* 373 (non Pers.). *P. miliare, Wall. Cat. n.* 8712 A (in part) E. *P. miliare, β simplex, Herb. Royle.* *P. mucronatum, Heyne in Wall. Cat. n.* 8717 (in part). *P. notatum, Duthie Grass. N.W. Ind.* 6. *P. Neesianum, Wight & Arn. ex Steud. l. c.* 74. *P. porphyrrhizos, Steud. l. c.* *P. rigidum, Herb. Heyne ex Wall. Cat. n.* 8714 A (in part). *P. Roxburghii, Spreng. Syst. i.* 320; *Kunth Enum. Pl. i.* 126; *Steud. l. c.* 98. *P. tenellum, Roxb. Fl. Ind. i.* 306; *Duthie l. c.* 7.—*Panicum, Wall. Cat. n.* 8713, 8714 A (in part).

The PANJAB and GANGETIC PLAIN to CHITTAGONG and southward to MADRAS. KUMAON, up to 5000 ft.—DISTRIB. China, Borneo, Afr. trop.

Annual. Stem 6 in. 3 ft., tufted, erect or geniculate below, leafy chiefly near the base; nodes rarely rooting. Leaves 3-10 by $\frac{1}{8}$ - $\frac{1}{4}$ in., usually flat, thin, acuminate, glabrous hairy or hirsute on both surfaces or beneath only; ligule short, fimbriate. Panicle 4-10 in., erect, often as broad as long. Spikelets green, yellow or purplish; gl. IV. variable in breadth, and in colouring, from pure white to greenish-brown, with 3-5 darker dorsal stripes.—Nees Fl. Afr. Austr. 51 has referred *P. trypheron*, Sch. to *P. curvatum*, L., a very different plant, and not a native of Bengál.

35. *P. humile*, Nees ex Steud. Syn. Gram. 84; dwarf, slender, leaves very narrow glabrous base narrow, panicle broad effuse lax-fl'd., branches subsolitary long spreading naked few-fl'd., branchlets capillary, spikelets $\frac{1}{8}$ in. pedicelled ovate acute glabrous, gl. I = $\frac{2}{3}$ III broadly ovate acuminate 3-nerved, II longest ovate-lanceolate acuminate 3-nerved, III ovate acute 3-5-nerved paleate neuter, IV much shorter broadly oblong obtuse pale shining. Thw. Enum. Pl. Zeyl. 360 (CP. 3243); Trim. Cat. Ceyl. Pl. 105; Duthie Grass. N.W. Ind. 4, Fodd. Grass. N. Ind. 9. *P. tenellum*, Griff. Notul. iv. 21, Ic. Pl. Asiat. t. 139, f. 194 (non Roxb.).

THE PANJAB. Thomson; BENGAL, ASSAM, SIKKIM, ARRACAN, and southward to CEYLON.—DISTRIB. Borneo.

Annual. Stem 2-24 in., erect or geniculate below, much branched and often flowering from the base. Leaves 2-8 by $\frac{1}{8}$ - $\frac{1}{6}$ in., flat, base hardly cordate; sheath glabrous, or mouth sparsely hairy. Panicle 1-3 in., often as long as the whole plant, very laxly and diffusely branched. Spikelets minute, pale or reddish.

36. *P. hydaspicum*, Edgew. in Journ. Linn. Soc. vi. (1862) 207; dwarf, leaves linear-lanceolate hirsute base narrow, panicle effuse much branched glabrous, branches erecto-patent alternate rarely opposite and branchlets and pedicels filiform, spikelets $\frac{1}{10}$ - $\frac{1}{15}$ in. equalling or shorter than their pedicels solitary ovate acute glabrous, gls. membranous, nerves strong, I = $\frac{2}{3}$ III ovate acuminate 5-nerved, II and III subequal ovate subacute 5-7-nerved, III paleate, IV elliptic obtuse brown shining. Aitchis. Cat. Panjab. Pl. 159; Duthie Grass. N.W. Ind. 4. *P. humile*, Aitchis. l. c.

THE PANJAB and UPPER GANGETIC PLAIN; from the Ravee to the Indus. Edgeworth, &c. CENTRAL PROVINCES, Duthie.

Annual. Stem 6-18 in., geniculately ascending, rather stout below, branching from the very base. Leaves and sheaths clothed more or less thickly with long white hairs; sheaths inflated in some states. Leaves 1-2 by $\frac{1}{8}$ - $\frac{1}{2}$ in., flat, soft, acute; ligule a row of hairs. Panicle 2-4 in., peduncled, erect, ovoid rachis, and branches quite smooth, hardly flexuous. Spikelets pale green, except the dark brown gl. IV; palea of III smaller than the gl., oblong.

37. *P. cæsium*, Nees in Hook. Kew Journ. ii. (1850) 97; erect, stout, hairy, leaves linear base narrow subcordate, panicle large erect subthyrsiform much branched, branches suberect lower fascicled, spikelets $\frac{1}{2}$ - $\frac{1}{6}$ in. subsessile except the terminal broadly ovoid turgid nerves anastomosing, gl. I = $\frac{1}{4}$ - $\frac{1}{3}$ III ovate obtuse 5-nerved, II and III subequal ovate acute 7-9-nerved, palea linear, IV = II elliptic-ovate obtuse pale smooth shining. *P. reticulatum*, Thw. ex Trimen Cat. Ceyl. Pl. 105 (non Griseb.).—*Panicum*, Wall. Cat. n. 8744.

BENGAL, in the Jheels, J. D. II. & T. T. CACHAR, Keenan. MALACCA, Griffith. NICOBAR ISLDS., Kurz. CEYLON; Pasdoon Corl, Thwaites (CP. 3890).—DISTRIB. Borneo, N. Guinea, Philippines.

Annual. *Stems* 2-3 ft., densely tufted, erect from the root. *Leaves* 6-10 by $\frac{1}{4}$ - $\frac{1}{2}$ in., flat, soft, and sheaths more or less densely clothed with soft white spreading hairs; ligule a ridge of hairs. *Panicle* 10-18 in. long; branches angular, scaberulous. *Spikelets* solitary or geminate, red-brown. *Glumes* rather soft; II deciduous; IV pale yellow or brownish, sessile, margins narrowly incurved.—The Bornean and Philippine specimens are more slender and less hairy than the Indian.

†† Perennials.

§ Glume I very small, suborbicular, white, nerveless; (0 in *P. subeglime*); III 3-9-nerved, paleate or not.—Spikelets usually very shortly pedicelled.

36.* **P. maximum**, Jacq. *Ic. Pl. Rar. i. t. 13; Coll. i. 76*; tall, stout, erect, leafy, leaves long broadly linear or linear-lanceolate glabrous, panicle large decompound, lower branches whorled usually hairy, pedicels unequal capillary, spikelets $\frac{1}{10}$ - $\frac{1}{12}$ in. solitary or in pairs elliptic-oblong acute or obtuse glabrous, gl. I = $\frac{1}{4}$ III white 0-3-nerved, II and III subequal 3-7-nerved, III paleate male, IV elliptic subacute transversely rugulose. *Sw. Fl. Ind. Occ. i. 170; Nees Agrost. Bras. 166, Fl. Afr. Austr. 36; Trin. Gram. Panic. 221; Pan. Gen. 180; Steud. Syn. Gram. 72; Wall. Cat. n. 8715 A. B (in part) D.; Trim. Cat. Ceyl. Pl. 105; Aitchis. Cat. Panjab Pl. 159; Griseb. Fl. Brit. W. Ind. 549; Baker Fl. Maurit. 436; Boiss. Fl. Orient. v. 439. P. altissimum, Brouss. Elench. Hort. Monsp. (1805) 42; Dalz. & Gibs. Bomb. Fl. Suppl. 98. P. confusum, Trin. ex Steud. Nom. Ed. II ii. 254. P. eburneum, Trin. Pan. Gen. 180; Steud. Syn. Gram. 73. P. Equisetum, Nees, ex Doell in Mart. Fl. Bras. ii. II, 206. P. fasciculatum, "Pl. Carib. non Sw.," Griseb. Fl. Brit. W. Ind. 549. P. gongyloides, Jacq. Eclog. Gram. 30, t. 21. P. jumentorum, Pers. Syn. i. 83; H. B. & K. Nov. Gen. & Sp. i. 104; Thw. Enum. Pl. Zeyl. 361; Duthie Grass. N.W. Ind. 5, Fodd. Grass. N. Ind. 9. P. læve, Lamk. Ill. i. 172. P. longipes, Wight & Arn. in Wight Cat. n. 1638. P. megiston, Schult. Mant. ii. 248. P. pamplemoussense, Steud. l. c. 71. P. polygamum, Sw. Prodr. Veg. Ind. Occ. 24. P. praticolum, Saltzm. ex Doell in Mart. Fl. Bras. ii. II, 203. P. trichocondylum, Steud. l. c. 74. P. tuberculatum, Presl Rel. Hænk. i. 307.*

Cultivated in many parts of INDIA.—Native of Africa.

Perennial? 8-10 ft. high; stem branching, branches erect, nodes naked or bearded. *Leaves* 1-2 ft. by $\frac{1}{2}$ -1 in., gradually narrowed from a small rounded or auricled base to a long filiform point, quite smooth, nearly glabrous; sheaths long, mouth villous; ligule of long hairs. *Panicle* 1-2 ft., quite erect, branches erect, filiform, smooth; pedicels usually shorter than the spikelets, glabrous or very sparsely pubescent, bright green, glistening, gl. thin.—This grass is described both as an annual and a perennial. Trinius' description of *P. eburneum* I think refers it to *maximum*; it is described as from Nepal.

Var. β , Boiss. l. c.; spikelets shortly hairy, gl. III neuter.—Peshawur, Aitchison. Affghan.—Apparently a smaller plant than typical *P. maximum*.

37. **P. repens**, Linn. *Sp. Pl. Ed. 2, 87*; stem creeping and stoloniferous below, leaves distichous linear-lanceolate flat or convolute glaucous, panicle usually contracted irregularly branched, branches 2-3-nate strict, spikelets $\frac{1}{10}$ in. sessile or shortly pedicelled ovate-lanceolate acute white, gl. I = $\frac{1}{4}$ III orbicular, II and III subequal ovate acute sub-5-nerved, III paleate or not male or neuter, IV ovate acute smooth. *Sibth. Fl. Græc. i. t. 61; Nees Agrost. Bras. 171; Kunth Enum. Pl. i. 103; Trim. Cat. Ceyl. Pl. 105;*

Aitchis. Cat. Punjab Pl. 160; *Duthie Grass. N.W. Ind.* 6, *Fodd. Grass. N. Ind.* 11; *Boiss. Fl. Orient.* vii. 440; *Benth. Fl. Hongk.* 412. *P. airoides*, *Br. Prodr.* 190; *Kunth l.c.* 122. *P. aquaticum*, *A. Rich. Tent. Fl. Abyss.* ii. 373. *P. arenarium*, *Brot. Fl. Lusit.* i. 82, *Phyt. Lusit.* i. 15, t. 6; *Nees Agrost. Bras.* i. 170, *Fl. Afr. Austr.* 37; *Trin. Pan. Gen.* 181. *P. coloratum*, *Cav. Ic.* ii. 6, t. 110. *P. convolutum*, *Beauv. ex Spreng. Syst.* i. 319. *P. hygrocharis*, *Steud. l.c.* 72. *P. ischæmoides*, *Retz. Obs.* iv. 17; *Rottl. in Neue Schrift* iv. (1803) 185; *Steud. l.c.* 98; *Wight Cat.* n. 1627; *Wall. Cat.* n. 8710. *P. multinode*, *Lamk. Encycl.* iv. 747 (*ex Nees Agrost. Bras.*). *P. paludosum*, *Hochst. ex Steud. l.c.* 72 (*not of Roxb.*). *P. polystachion*, *Ucria, Hort. Reg. Panorm.* 54. *P. psilopodium*, *Trin. ex Wight Cat.* n. 1633 C.; *Herb. Strach. & Winterb.* No. 5. *P. Roxburghianum*, *Schult. Mant.* ii. 245. *P. sarmentosum*, *Hb. Wight ex Wall. Cat.* 8710 C. ?*P. uliginosum*, *Roxb. Fl. Ind.* i. 308; *Wall. Cat.* n. 8710 A; *Kunth l.c.* 126.—*Panicum*, *Wall. Cat.* n. 8714 E, 8746.

Throughout INDIA, by banks of streams and in dry places, from the Panjab eastwards and southwards. CEYLON, *Walker, Gardner*.—DISTRIB. S. Europe, Asia, Afr., Amer.

Stems 2–6 ft., erect or ascending from a stout creeping rootstock, leafy, simple or branched below, nodes rooting. *Leaves* 3–6 in., strict, often glaucous, usually narrow and involute, smooth, glabrous or hairy on the upper surface, margins sometimes toothed towards the ciliate rounded base; sheaths with ciliate margins; ligule a narrow coriaceous ring. *Panicle* 3–8 in., branches usually erect, very slender, angular, scaberulous; pedicels short, tip cupular. *Spikelets* erect, quite glabrous; gl. I membranous, nerveless or 3-nerved; palea of III truncate; IV shortly broadly stipitate, pale. *Anthers* red.—Roxburgh distinguishes his *P. uliginosum* from *P. paludosum* (proliferum, *Lamk.*) by the tetragonous smooth branches of the panicle, whereas in *P. paludosum* these are trigonous with acute hispid angles. I have seen no authentic specimens of his *P. uliginosum*, but his figure of “Gundru” (the native name which he gives for it) does not show this character of the panicle.

38. ***P. proliferum***, *Lam. Encycl.* iv. 747; stem erect from a floating base, leaves linear or ensiform acute serrulate usually flat, panicle with long virgate spreading branches bearing short few-fld. branchlets and solitary sessile or shortly pedicelled spikelets which lie parallel to the branchlet, spikelets $\frac{1}{2}$ – $\frac{1}{6}$ in. lanceolate, gl. I = $\frac{1}{6}$ – $\frac{1}{4}$ III orbicular, II ovate acuminate 9-nerved, III lanceolate 9-nerved paleate or not, IV oblong acuminate smooth. *Nees Agrost. Bras.* 170; *Kunth Enum Pl.* i. 100; *Steud. Syn. Gram.* 71; *Muell. Fragment.* viii. 191 (*the King's Creek plant*). *P. aurantiacum*, *Ham. ex Wall. Cat.* n. 8714 B. *P. gongylodes*, *Jacq. Eclog. Gram.* iii. t. 21. ?*P. decompositum*, *Duthie Grass. N.W. Ind.* 3. *P. decompositum*, *var. paludosum*, *Trin. Cat. Ceyl. Pl.* 105. *P. elephantipes*, *Nees Agrost. Bras.* 165. *P. Elliottii*, *Trin. ex Nees l.c.* 170. *P. fistulosum*, *Hochst. ex Steud. l.c.* 71. *P. natans*, *Koen. ex Trin. Panic. Gen.* 237. *P. paludosum*, *Roxb. Fl. Ind.* i. 307; *Wall. Cat.* n. 8711; *Nees Fl. Afr. Austr.* 35; *Kunth l.c.* 126; *Griff. Notul.* 37, *Ic. Pl. Asiat.* t. 139, f. 127; *Duthie Fodd. Grass. N. Ind.* 11. *P. repens*, *Thw. Enum. Pl. Zeyl.* 360; *Trin. Cat. Ceyl. Pl.* 105; *Trin. Pan. Gen.* 179. *P. rigidum*, *Heyne in Herb. Rottl.*—*Panicum*, *Wall. Cat.* n. 8714A. (*in part*) B. C. D.

Marshes and still waters throughout the low countries of INDIA, from the Panjab to Assam and southward. CEYLON.—DISTRIB. Tropics generally.

Perennial. *Stem* 2–3 ft. or more; lower nodes spongy, as thick as the little finger. *Leaves* 6–12 by $\frac{1}{4}$ – $\frac{3}{8}$ in., base broad but hardly cordate; sheaths loose;

ligule a ridge of hairs. *Panicle* 6–10 in., often nearly as broad, lower branches whorled and fascicled, trigonous, scaberulous. *Spikelets* green, variable in size, terete, palea of gl. III 0, or minute, or linear, neuter or male rarely bisexual.— Closely allied to (if not a more luxuriant aquatic form of) *P. repens*, and confused with it as to synonymy; but a coarser plant, with a more spreading panicle, more acuminate spikelets and a more oblong gl. IV. Further, *P. repens* has normally shorter glaucous narrower convolute leaves, and a more irregularly branched panicle. Also very near the Australian *P. decompositum*, Br., which has normally a decom-pound panicle with more slender spreading branches and branchlets, and distant solitary spikelets.

Dr. Stapf has made for me a careful analysis of the spikelets of a large series of specimens, and I have made many myself, with the view of testing the value of the absence or presence of the palea in gl. III, and its sexuality. As examples he finds in 9 spikelets taken promiscuously 3 epaleate and 6 with reduced paleas. In 5 others all are paleate and male, in 3 others all paleate but neuter. In 9 others all epaleate. In a branch with 10 spikelets, 9 of them had gl. III paleate, 1 epaleate. Of 6 spikelets from near the base of a branch, 3 epaleate, 2 male with a rudimentary ovary, 3 paleate and female. Of 8 spikelets from a branch in the lower part of a panicle, 2 lowest epaleate, 6 paleate and bisexual.

39. **P. subeglume**, *Trin. Pan. Gen.* 204; stem slender, leaves linear, base narrowed, panicle large effuse, rachis and branches flexuous capillary, spikelets $\frac{1}{2}$ in. pedicelled elliptic-oblong subacute, gl. I and II absent, III and IV equal, III 5–7-nerved glabrous or silky, IV elliptic-oblong or lanceolate cuspidate. *Steud. Syn. Gram.* 84. *P. arcuatum*, *Br. ex Nees in Wight Cat.* n. 1639 (non *Br. Prodr.*). *P. Brownianum*, *Wight & Arn. ex Steud. l. c.* 98. *P. Torreyanum*, *Wight et Arn. ex Steud. Nom. Ed.* II, ii. 264; *Wight Cat.* n. 1634. *Milium capillare*, *Roth Nov. Sp.* 39; *Kunth Enum. Pl.* i. 67. *M. tomentosum*, *Koen. ex Rottl. in Ges. Naturf. Fr. Neue Schr.* iv. (1803) 220; *Steud. Syn. Gram.* 34; *Kunth l. c.* 66.— *Isachne*? *Wall. Cat.* n. 8659.

SOUTHERN DECCAN, *Heyne*; Madura, *Rottler*; Palaveram, *Wight*.

Perennial. *Stem* 1–2 ft., soft. *Leaves* 3–6 by $\frac{1}{2}$ in. or less, finely acuminate, and sheaths glabrous softly hairy or tomentose; ligule short, membranous. *Panicle* 3–7 in., spreading, glabrous; lower branches suberect, alternate, divided from the base. *Spikelets* much shorter, than their pedicels, erect, dorsally compressed. *Grain* linear-oblong, obtuse.—The absence of gl. I and II are characters of *Paspalum*, but the habit and inflorescence are those of a *Panicum*.

§§ Gl. I = $\frac{1}{3}$ to $\frac{2}{4}$ III, 5–7-nerved.

α Spikelets acute or acuminate. (See also *P. auritum*.)

40. **P. incisum**, *Munro ex Clarke in Journ. Linn. Soc.* xxv. (1890) 84, t. 33; stem slender, leaves long linear-lanceolate base narrow, panicle effuse very lax, rachis branches and pedicels very slender subscaberulous, pedicels very long, spikelets $\frac{1}{6}$ in. remote solitary elliptic acuminate, gl. I about = $\frac{2}{3}$ III ovate acute 1–3-nerved, II and III subequal, II 5-nerved, III 7-nerved, palea short, IV elliptic acuminate quite smooth polished margin narrowly inflexed. *Munro Cat. Pl. Griffith, &c., ined.* p. 56.

UPPER ASSAM; Naga hills, *Griffith*; Nambre forest, alt. 400 ft., *Clarke*.

Perennial. *Stem* 1–2 ft., quite glabrous. *Leaves* 5–10 by $\frac{1}{2}$ – $\frac{3}{4}$ in., finely acuminate; ligule elongate-oblong, scarious. *Panicle* 3–6 in., usually sessile as it were on the upper leaf sheath. *Spikelets* many times shorter than their pedicels, obscurely articulate at the base; glumes distant on a distinct inarticulate rachaeola; II furcious; IV rather shorter than II, brown.—Altogether resembles an *Isachne* in habit,

and in the spikelet being obscurely jointed on the pedicel. A very closely allied plant collected by Beddome in the Anamallay hills has a much broader rounded and cordate leaf-base, the spikelets are too immature for description.

41. **P. antidotale**, Retz. Obs. iv. 17; tall, glabrous, branching, leaves linear flat base rounded, panicle large effuse or contracted, branches slender glabrous lower fascicled divided from the base, spikelets $\frac{1}{10}$ in. shortly pedicelled solitary or clustered ovoid acute, gl. I and II with broad membranous margins, I = $\frac{1}{2}$ III broadly ovate acute 5-nerved, II and III subequal strongly 5-7-nerved, II obtuse, III paleate, IV ovate or oblong acute smooth. *Trin. Gram. Pan.* 227, *Pan. Gen.* 195; *Nees Agrost. Bras.* 201; *Kunth Enum. Pl. i.* 125; *Steud. Syn. Gram.* 77; *Wight Cat.* n. 1630; *Thw. Enum. Pl. Zeyl.* 360; *Trim. Cat. Ceyl. Pl.* 105; *Aitchis. Cat. Panjab Pl.* 158; *Duthie Grass. N.W. Ind.* 2, *Indig. Fodd. Grass. t.* 3, *Fodd. Grass. N. Ind.* 4; *Benth. Fl. Austral.* vii. 483; *Boiss. Fl. Orient.* v. 440. *P. maximum*, Wall. *Cat.* n. 8715 B (in part) C (in part). *P. polygamum*, *Herb. Madr. ex Wight Cat.* n. 1630. *P. pruinatum*, *Bernh. ex Trin. Pan. Gen.* 191. *P. subalbidum*, *Kunth Revis. Gram.* ii. 397, t. 112, *Enum.* 101. *P. tenue*, *Rowb. ex Wight Cat.* (sub n. 1628 non *Fl. Ind.*). *Milium arundinaceum*, *Koen. ex Wight Cat. l. c.*

The PANJAB and UPPER GANGETIC plain, and southward to the S. DECCAN and Ceylon.—DISTRIB. Affghan., Afric., trop. Austral.

Perennial, sometimes shrubby, with a stout creeping rootstock bearing villously sheathed stolons; branches as thick as a crow-quill; internodes solid, woody, terete, smooth; nodes thickened. *Leaves* 6 by $\frac{1}{8}$ in., narrowed from the base to the slender tip, flat, rather rigid, smooth on both surfaces, base narrow rounded, midrib distinct; nerves many, slender; sheaths quite smooth; ligule a ridge of hairs. *Panicle* 6 in. high, branches filiform, lower nearly 2 in. long, sparingly divided; branchlets rather short; capillary. *Spikelets* quite glabrous; gls. rather thin, pale green; palea of III nearly as long as the gl., 2-toothed, nerves strong or slender; IV shorter than III, shortly stipitate, coriaceous, margins incurved; palea as large as the gl. *Lodicules* minute, orbicular. *Filaments* very short; anthers linear-oblong. *Ovary* narrow; styles short, free, stigmas broad.—Roxburgh describes *P. tenue* as having "seeds ovate transversely waved," whereas they are quite smooth in *P. antidotale*.

42. **P. elegantissimum**, Hook. f.; tall, erect from the base, very slender, leaves subradical very long narrow softly pubescent base narrow, peduncle very long and slender, panicle effuse very broad laxly few-flid., branches long alternate distant solitary naked below and branchlets capillary quite smooth, spikelets $\frac{1}{10}$ in. few on each branchlet shortly pedicelled ovate acuminate, gl. I about $\frac{1}{2}$ III ovate mucronate 5-7-nerved, II and III stipitate subequal ovate cuspidately acuminate, II 7-nerved 5 of the nerves strong above, III nerves 7 slender, palea small ovate, IV elliptic-oblong obtuse as long as II white shining smooth.

MALAY PENINSULA; Perak, Ridley.

Perennial. *Stem* 2-3 ft., tufted and branched at the very base, stiff. *Leaves* chiefly subradical, 10-18 by $\frac{1}{8}$ in., gradually narrowed from the base to the slender tip, strict, suberect, softly hairy all over; mouth of sheath villous; ligule a fascicle of hairs. *Panicle* 12-18 by 6-12 in., scaberulous; branches 1-3 in. apart. *Spikelets* very few and remote, reddish; gl. I inserted much below the others; IV sessile by a broad base.—A most elegant grass.

43. **P. acroanthum**, Steud. Syn. Gram. 87; glabrous, erect, very slender, leaves narrow base contracted, panicle broad very effuse lax-flid.,

branches subsolitary naked below, and long spreading few-fl. naked branchlets capillary, spikelets $\frac{1}{2}$ in. long-pedicelled ovate-oblong acute glabrous or sparsely puberulous, gl. I = $\frac{1}{2}$ III ovate obtuse 1-nerved, II and III subequal subacute 5-nerved, III epaleate, IV elliptic-oblong subacute palea quite smooth. *Miq. Prolus. Fl. Jap.* 163; *Franch. & Sav. En. Pl. Jap.* ii. 162.

UPPER ASSAM; Mishmi Hills, *Griffith*.—DISTRIB. China, Japan.

Perennial. *Stem* 2–3 ft., erect, not or rarely branched; nodes glabrous. *Leaves* 3–5 by $\frac{1}{8}$ – $\frac{1}{4}$ in., thin, flat, glabrous, as are the sheaths; ligule a few hairs. *Panicle* 3–4 in. long and broad, very lax, open, with few scattered brownish or greenish spikelets; branches branchlets and pedicels perfectly smooth, gl. I II & III membranous; IV thinly coriaceous, sessile.—I find no trace of a palea in gl. III of any specimen. No other species of this group has sparsely pubescent spikelets, except var. β of *P. maximum*.

β . Spikelets obtuse or subacute.

* *Gl. III. epaleate*.

44. ***P. montanum***, *Roxb. Fl. Ind.* i. 313 (*excl. descr. gl. IV.*); stem tall firm, leaves long lanceolate base broad deeply cordate, panicle large loose, rachis branches and pedicels very long capillary smooth, spikelets $\frac{1}{16}$ – $\frac{1}{2}$ in. solitary oblong obtuse or subacute, gl. I = $\frac{1}{4}$ III ovate 5-nerved, II and III subequal obtuse 5-nerved, III epaleate. IV ovate subacute smooth. *Kunth Enum. Pl.* 126; *Benth. Fl. Hongk.* 412; *Thw. Enum. Pl. Zeyl.* 360; *Trim. Cat. Pl. Ceyl.* 105. *P. barbatulum*, *Wall. ms.* *P. courtallense*, *Nees & Arn. ex Wight Cat.* n. 2342, *Herb.* 1362, 3049; *Steud. Syn. Gram.* 83. *P. euchroum*, *Steud. l. c.* 98. ? *P. notatum* (*montanum*, *Roxb.*), *Wight Cat.* 1362 (*non Retz.*). *P. trinanalium*, *Hb. Ham. ex Wall. Cat.* n. 8722 A.—*Panicum*, *Wall. Cat.* n. 8719, 8722, 8739.

Hotter hilly parts of INDIA, from the lower Himalaya in Garwhal, *Duthie*, to Sikkim, Burma, the Khasia Hills, and southward to Penang and CEYLON.—DISTRIB. Malaya, China, Philippines.

Perennial. *Stem* 3–4 ft. or more. smooth, hard, sparingly branched. *Leaves* 5–7 by $\frac{3}{4}$ – $1\frac{1}{4}$ in., thin, glabrous or pilose, smooth or scaberulous beneath, striate, base ciliate, midrib sometimes excentric; sheath glabrous or pubescent, mouth hairy; ligule obscure. *Panicle* 8–18 by 8–10 in.; branches whorled or alternate, axils sometimes glandular, lower strict and unbranched from 1–3 in. *Spikelets* terete, glabrous or faintly hairy; gl. II fugacious.—I do not find gl. IV to have 3 stripes as described and figured by Roxburgh, nor is it as broad as in his figure; but that the plant I have described is Roxburgh's is confirmed by a specimen so named by himself. *P. montanum* has been referred by Wight to the Sumatran *P. notatum*, *Retz* (Obs. iv. 18), but that plant is described as having scabrid branches of the panicle, purple spikelets, and acute glumes. The black spots at the axils of the panicle seen in dried specimens of both species, are probably due to a glandular secretion. Wallich's n. 8739, from Ava, has very long pedicels and broad glumes, and a broader gl. IV, but the latter is narrower than in Roxburgh's figure. *Duthie* (*Grass. N.W. Ind.* 5) gives Stewart as authority for this grass being found in marshes near Peshawur, but I suspect that *Isachne himalaica* was taken for it.

45. ***P. humidorum***, *Ham. in Wall. Cat.* n. 8721; tall, slender, leaves linear base narrowly cordate, panicle large loose, rachis branches and (rather short) pedicels capillary smooth, spikelets $\frac{3}{10}$ in. ellipsoid obtuse glabrous, gl. I = $\frac{2}{3}$ III obtuse 3-nerved, II and III obscurely 5-nerved, III epaleate, IV ovate or oblong smooth.

ASSAM; Goalpara, *Hamilton*. SILHET, CACHAR, the KHASIA and NAGA HILLS, and the JHEELS.

Perennial. Gregarious in water (*Clarke*). Habit of *P. montanum*, but much more slender, with narrower leaves 4-8 by $\frac{1}{4}$ - $\frac{1}{2}$ in., a smaller panicle, with shorter pedicels and much smaller spikelets. *Gl.* II fugacious.

Var. ? *perakense*; stem robust nearly as stout as a goose-quill below, leaves $\frac{1}{2}$ in. broad, spikelets broader, nerves stronger. Perak, *King's Collector* (n. 2546).—Probably a different species.

46. **P. khasianum**, *Munro mss.*; tall, leaves linear or linear-lanceolate base narrowly cordate, panicle very large branches very long slender smooth, pedicels long or short, spikelets subsolitary $\frac{1}{16}$ - $\frac{1}{12}$ in. ellipsoid subacute glabrous, gl. I minute much shorter than III, nerves 0 or 3 obscure, II and III subequal 5-nerved, III epaleate, IV elliptic-oblong subacute smooth.

E. NEPAL and SIKKIM, alt. 4-7000 ft., *J. D. H., Clarke*. KHASIA HILLS, in marshes, alt. 4-6000 ft., *Griffith, &c.*

Perennial. Stem prostrate and creeping below, then erect, 3-6 ft. Leaves 6-12 by $\frac{3}{8}$ - $1\frac{1}{4}$ in., thin, glabrous hairy or subscabrid, many-nerved, base usually contracted with incurved auricles, not or obscurely ciliate; sheath smooth or hispidly hairy, mouth bearded; ligule very short, ciliate. Panicle 6-12 in., often as broad; lower branches nearly as long, solitary or fascicled, unbranched below.—Near *P. montanum*, differing in the narrower leaf-base, very short, gl. I, and in gl. II not fugacious. Also near *P. sarmentosum*, from which the minute gl. I distinguishes it.

** *Gl. III paleate.*

47. **P. sarmentosum**, *Roxb. Fl. Ind. i.* 308; tall, branched, scandent, leaves long base narrow rounded, panicle pyramidal or ovoid loosely branched glabrous, rachis smooth, branches half-whorled capillary, spikelets $\frac{1}{8}$ - $\frac{1}{6}$ in., sessile or shortly pedicelled ovoid tips obtuse ciliolate, gl. I = $\frac{1}{2}$ III or more obtuse or subacute 3-5-nerved, II and III subequal orbicular nerves 5 broad, III palea small narrow, IV small ellipsoid subacute dorsally rounded smooth. *Kunth Enum. Pl. i.* 126; *Steud. Syn. Gram.* 98. *P. micrognostum* & *P. vacillans*, *Steud. l. c.* 75; *Miq. Fl. Ind. Bat. iii.* 456. *P. concinnum*, *Nees in Hook. Kew Journ. ii.* (1850) 97; *Steud. l. c.* 78; *Miq. l. c.* 457. *P. incomptum*, *Trin. Diss. ii.* 200, *Gram. Panic.* 200, *Sp. Gram. Ic. t.* 232; *Kunth l. c.* 112; *Steud. l. c.* 88; *Nees in Mart. Fl. Bras. ii.* 207; *Herb. Wight (Kew Distrib. n.* 6492). *P. maximum*, *Wall. Cat. n.* 8715 E. *P. tjiocoyaense*, *Steud. l. c.* 70. ? *P. incomptum*, *Duthie Grass. N.W. Ind. 4.*—*Panicum*, *Wall. Cat. n.* 8709.

ASSAM, SILHET, CACHAR, and the KHASIA HILLS, ascending to 5000 ft., CHITTAGONG, BURMA, and the MALAY PENINSULA.—DISTRIB. Malay Islds., China, Tonkin.

Perennial. Stems attaining 50 ft., often as thick as a goose-quill, solid, pubescent or glabrous, with whorls of long wiry slender branching roots at the bearded nodes below, whence the flowering branches issue. Leaves 12-15 by $\frac{1}{2}$ - $1\frac{1}{4}$ in., linear-lanceolate, finely acuminate, base rounded or subcordate, smooth or hairy on both surfaces or beneath especially, many-nerved; sheaths smooth or sparsely hairy; ligule a brush of hairs. Panicle 6-12 in., very variable, branches erect or spreading, long or short, branchlets often creeping and entangling, straight or flexuous. Spikelets erect or spreading.—Duthie gives *P. incomptum* as a native of Garwhal, alt. 4-5000 ft., but I have not seen *P. sarmentosum*, *Roxb.* from the westward of Assam, and I suspect that *P. montanum* is the plant intended. Of *P. concinnum*, which is

Cuming's n. 2284, Miquel says, stem villous under the panicle. Benth. (Fl. Hongk.) refers *concinnum* to *sarmentosum*, and includes *incomptum*. I do not find the Hongkong specimen in Herb. Kew. There are no specimens of this in Herb. Linn. Soc. and Wallich's ticket No. 8709 has A. Hb. Fialaysou, B. Silhet, C. Penang, D. Tavoy, E. Singapore.

Sect. VII. PTYCHOPHYLLUM. (See p. 28.)

48. **P. plicatum**, Lamk. *Encycl.* iv. 736; perennial, leaves plicate from linear-lanceolate to elliptic-oblong, panicle elongate lax-fl., branchlets often ending in a stiff bristle, gl. I = $\frac{1}{2}$ III or more orbicular-ovate 5-nerved, II = $\frac{1}{2}$ IV or longer 5-7-nerved obtuse, III = IV dorsally flattened acute 5-9-nerved, IV ovate-lanceolate rugulose. Jacq. *Eclog. Gram.* i. t. 1; Trin. *Gram. Panic.* 183, *Gen. Pan.* 161, *Sp. Gram. Ic.* t. 223; Kunth *Enum. Pl.* i. 94; Wall. *Cat.* n. 8705; Griff. *Notul.* iii. 24, *Ic. Pl. Asiat.* t. 139, fig. 229; Thw. *Enum. Pl. Zeyl.* 360 (excl. *P. costatum*); Trim. *Cat. Ceyl. Pl.* 105; Duthie *Grass. N.W. Ind.* 6, Fodd. *Grass. N. Ind.* 11; Benth. *Fl. Hongk.* 411; Anderss. in Walp. *Ann.* vi. 944. *P. amplissimum*, Steud. *l.c.* 54. *P. asperatum*, Kunth *Revis. Gram.* i. 39, *Enum. Pl. l.c.* 39; Miquel *Fl. Ind. Bat.* iii. 456. *P. excurrens*, Trin. *Pan. Gen.* 131, 249, *Sp. Gram. Ic.* t. 49; Kunth *Enum.* i. 94; Benth. *Fl. Hongk.* 412, excl. syn. *P. Kleinianum*, Nees ex Anderss. in Walp. *Ann.* vi. 946. *P. l-ne*, Steud. *l.c.* 54. *P. mauritanium*, Willd. ex Spreng. *Syst.* i. 305. *P. nepalense*, Spreng. *l.c.* 321; Kunth *Enum.* i. 94; Dalz. & Gibs. *Bomb. Fl.* 291; Aitchis. *Cat. Panjab Pl.* 160; Miq. *l.c.* 448. *P. nervosum*, Roxb. *Fl. Ind.* i. 311; Wall. *Cat.* n. 8702. *P. neurodes*, Schult. *Mant.* ii. 228; Wight *Cat.* n. 1647; Anderss. *l.c.* 945; Duthie *Grass N.W. Ind.* 5. *P. paucise-ctum*, Steud. *l.c.* 52. *P. palmifolium*, Koen. in *Naturforsch.* xxiii. (1788) 208; Kunth *Enum.* 93; Anderss. *l.c.* 945. *P. Wallichianum*, Nees *Fl. Afr. Austr.* 49; Miq. *l.c.* 449.—*Panicum*, Wall. *Cat.* n. 8703.

Throughout the moister hilly parts of India, from KUMAON in the Himalaya eastward, ascending to 5000 ft. in SIKKIM, the Shan Hills in BURM^a, the NILGIRIS, alt. 6000 ft., the MALAY PENINSULA, and CEYLON.—DISTRIB. China, Malay Islands.

Stem 1-8 ft., erect or ascending from a woody branched stock, from the thickness of a sparrow's to a swan's quill, leafy. *Leaves* 6-24 by $\frac{1}{4}$ -4 in., finely acuminate, sessile on the sheath or petioled, membranous or chartaceous, glabrous or sparsely hairy; sheath sometimes hispid, mouth ciliate; ligule short. *Panicle* thyrsoid, striate and erect with short branches, or effuse and drooping, 1-2 ft. long, with branches 2-4 in. long (spiciform in reduced states); branches, pedicels and their setiferous scabrid tips green or purplish. *Spikelets* $\frac{1}{2}$ in., ovoid; gl. I = $\frac{1}{2}$ III or less, very broadly ovate, obtuse or acute, 5-7-nerved, paleate or not, male or neuter; IV acuminate, coriaceous, more or less rugulose.—After a study of an immense suite of specimens of this species from all parts of India, I am unable to follow Andersson (in Walp. *Ann.* l. c.) in his separation of it into *plicatum*, *palmifolium*, *neurodes* and the seven vars. of the latter. These are, I think, all forms chiefly dependent on climate and age. Lamark's *P. plicatum* was described (1797) from a cultivated specimen of uncertain origin (Mauritius or St. Domingo), but Jacquin's excellent figure of it leaves no doubt of its identity with the Indian plant, for it resembles no American one. It has been widely cultivated for nearly a century, and a garden specimen in Bentham's Herb. supports the identification. I doubt *P. palmifolium* of Poiet being specifically different, it is described from an E. Indian specimen, though Grisebach (Fl. Brit. Ind. 547) identifies it with the W. Indian *P. sulcatum*, Aubl. Grisebach distinguishes *palmifolium* from *plicatum* by gl. II of the latter shorter than IV, and longer in *palmifolium*, but I find this a most variable character and not borne out by the

material that Grisebach worked upon. He also describes gl. IV as ellipsoid, but it is ovate-lanceolate in both. Whether *P. sulcatum* is specifically different may be doubted. *P. excurrens*, Trin., is a small narrow-leaved flaccid (perhaps young) state, with a very slender panicle and erect branches; it is Wall. Cat. n. 8703, and a common Himalayan form. Wall. Cat. n. 8705 is a gigantic form from Silhet, where I found it abundantly.

48.* **P. flavescens**, Sw. *Prodr. Veg. Ind. Occ.* 23, *Fl. Ind. Occ.* i. 158; annual, leaves plicate linear-lanceolate, panicle erect branches spreading simple pubescent and bristly, spikelets subsecund, gl. I = $\frac{1}{4}$ – $\frac{1}{3}$ III orbicular obtuse 3-nerved, II = $\frac{1}{2}$ IV apiculate 5-7-nerved, III = IV 5-7-nerved paleate male, IV ellipsoid acuminate transversely rugulose. *Kunth Enum. Pl.* i. 128; *Steud. Syn. Gram.* 80; *Griseb. Fl. Brit. W. Ind.* 547. *P. barbatum*, Telf. ex Wall. Cat. n. 8689 D. *P. costatum*, Roxb. *Fl. Ind.* i. 312; *Wall. Cat. l. c.*; *Kunth l. c.* 93; *Steud. l. c.* 64; *Anderss. in Walp. Ann.* vi. 947. *P. fasciculatum* β , *Nees Agrost. Bras.* 152. *P. mauritianum*, *Herb. Willd. ex Spreng. Syst.* i. 305. *P. paractaenioides*, Trin. in *Mem. Acad. Petersb.* Ser. 6, iii. II (1835) 219. *P. Thouarsianum*, *Nees ex Steud. l. c.* 62. *P. plicatum* var. *costatum*, *Baker Fl. Maurit.* 437. *Setaria mauritiana*, *Spreng. Syst.* i. 305 (ex Baker).

Cultivated in HORT. BOT. CALC., Wallich. SIAM? *Herb. Finlayson*.—DISTRIB. Trop. Amer.

Stem 3-6 ft., slender above, stout branched creeping and rooting below. *Leaves* 5-8 by $\frac{1}{2}$ -1 in., finely acuminate, narrowed to the very narrow base, thin, flaccid, softly hairy on both surfaces; sheath with hispidly ciliate margins towards the contracted mouth; ligule obscure. *Panicle* 3-5 in., ovate-oblong, branches 1-1 $\frac{1}{2}$ in. *Spikelets* $\frac{1}{10}$ in., subsessile, green.—This grass is described as annual by Grisebach, and as perennial by other authors.

49. **P. rhachitrichum**, *Hochst. in Flora*, xxvii. (1844) 254; annual, nodes of stem pubescent, leaves plicate, panicle subpyramidal, branches slender spreading and pedicels laxly hairy, gl. I minute membranous, II and III subequal ovate-oblong obtuse, III paleate neuter, IV ellipsoid rugulose tip rounded. *Parlat. in Hook. Niger Flora*, 187; *Steud. Syn. Gram.* 63. *P. chamaeraphis*, *Nees ex A. Braun, Ind. Sem. Hort. Berol.* (1853), *App.* 20; *Anderss. in Walp. Ann.* vi. 947. *P. homonymum*, *Steud. l. c.* 48; *Duthie Grass. N.W. Ind.* 4 (homogynum).

SUBTROPICAL HIMALAYA; Dehra Dhun, Royle; Chamba, alt. 5000 ft., Clarke; Kumaon, Duthie; Sikkim, alt. 6000 ft. CHOTA NAGPUR and CALCUTTA, Clarke. DISTRIB. Africa trop.

Stems tufted, erect, 8-18 in., leafy. *Leaves* 6-8 by 1-1 $\frac{1}{4}$ in., flaccid, glabrous or sparsely hairy, base rounded; margins and mouth of sheath villous. *Panicle* 2-6 in., branches alternate spreading; rachis very slender, flexuous, bristle of pedicel twice as long as the spikelet. *Spikelets* $\frac{1}{10}$ in., secund, 1-2-seriate, loosely or densely imbricate, sometimes fascicled in the Calcutta specimens, dorsally compressed; gls. membranous, pale, nerves green; I 1-3-nerved; II 5-6-nerved, obtuse; III 5-nerved, palea minute.

Sect. VIII. GIBBOSÆ. (See p. 25.)

* *Spikelets usually shortly pedicelled.*

50. **P. trigonum**, Retz. *Ols.* iii. 9 (excl. *Syn. Burm.*); leaves 1-2 in., panicle contracted, branches short, spikelets $\frac{1}{8}$ in. very shortly pedicelled

hispidulous, gl. I = about $\frac{1}{2}$ III obtuse or acute 3-nerved, III 5-nerved. *Kunth Enum. Pl.* i. 116; *Nees Agrost. Bras.* 206; *Roxb. Fl. Ind.* i. 305; *Thw. Enum. Pl. Zeyl.* 359 (in part); *Trim. Cat. Ceyl. Pl.* 205. *P. difforme*, *Roth Nov. Sp.* 52. *P. gibbum*, *Steud. l. c.* 87. *P. radicans*, *Bühse in Mig. Pl. Jungh.* 375; *Miq. Fl. Ind. Bat.* iii. 453 (non Retz). *P. repens* and *Burmanni*, *Heyne ex Herb. Wight.* *Aira repens*, *Hb. Heyne ex Wall. Cat.* n. 8743 A.—*Panicum*, *Wall. Cat.* 8743 A. C.

LOWER BENGAL, *Wallich.* The DECCAN PENINSULA, *Heyne, &c.* CEYLON, *Walker, &c., Thwaites* (C.P. n. 878).—DISTRIB. JAVA.

Perennial. Stem as thick as packthread, decumbent branching and interlaced below; branches erect. Leaves linear-lanceolate, glabrous or laxly hairy; sheath glabrous or margin ciliate; ligule rounded. Panicle 1–1½ in., rachis and short suberect branches glabrous; gl. I–III pale brown; tip of IV naked or bearded.

51. *P. pilipes*, *Nees & Arn. ex Büse in Mig. Pl. Jungh.* iii. 376; tall, leaves 2–6 in., panicle contracted, branches short with often slender hairs on the pedicels, spikelets $\frac{1}{8}$ in. very shortly pedicelled glabrous, gl. I = about $\frac{1}{2}$ III obtuse 3-nerved, III 5-nerved. *Wight Cat.* n. 2343; *Miq. Fl. Ind. Bat.* iii. 453; *Trim. Cat. Ceyl. Pl.* 105. *P. hermaphroditum*. *Steud. Syn. Gram.* 67; *Benth. Fl. Austral.* vii. 485. *P. oxyphyllum*, *Hochst. ex Steud. l. c.* 65. ? *P. carinatum*, *Presl Rel. Haenk.* i. 309 (ex *Hack. in Engl. Bot. Jahrb.* vi. (1885) 235).—*Panicum*, *Wall. Cat.* n. 8743 B. D.

SIKKIM TERAÍ, *Clarke.* KHASIA HILLS, alt. 0–2500 ft., common. BURMA, CENTRAL PROVINCES, NILGHIRI HILLS, alt. 4000 ft., the MALAY PENINSULA, NICOBAR ISLANDS, and CEYLON (C.P. 100, 709, 891).—DISTRIB. Tonkin, Malaya, Australia, Pacific Islds., Mascarene Islds. and Madagascar.

Perennial. Stem 1–2 ft., geniculately ascending from a slender creeping branching base, lower nodes rooting, upper subpubescent. Leaves $\frac{3}{4}$ –1½ in. diam., glabrous or sparsely hairy above, puberulous beneath, finely acuminate, base narrow; sheath glabrous or ciliate, mouth hairy; ligule rounded. Panicle 3–5 in.; branches rather remote, erect or spreading with short fastigiate branchlets; spikelets brown; gl. IV white, its palea narrow, patent, hard.—The Madagascar and Seychelle Islds. *P. multinode*, Lamk, is very closely allied, if not the same, in which case that name takes priority. In Nicobar specimens the spikelets are sparsely pubescent. Thwaites regarded *pilipes* as a form of *P. trigonum*.

** *Pedicels capillary, much longer than the spikelets.*

52. *P. patens*, *Linn. Sp. Pl.* 86; stem creeping and rooting below, leaves ovate to linear-lanceolate glabrous or ciliated below with tubercle-based hairs, panicle contracted or effuse, rachis branches and pedicels capillary, gl. I = $\frac{1}{3}$ – $\frac{2}{3}$ III ovate obtuse 3-nerved, II and III glabrous or with ciliate tips. *Burm. Fl. Ind.* t. 10, f. 2; *Spreng. Syst.* i. 322 (excl. syn. multinode); *Kunth Enum. Pl.* i. 126 (excl. syn. *Roxb.*). *P. accrescens*, *Trin. Sp. Gram.* Ic. t. 88, & corrigend. vol. iii.; *Kunth l. c.* 116. *P. obliquum*, *Roth Nov. Sp.* 51; *Kunth l. c.* 103; *Miq. Fl. Ind. Bat.* iii. 452. *P. radicans*, *Retz. Obs.* iv. 18; ? *Trin. Pan. Gen.* 218; *Nees Agrost. Bras.* 206; *Kunth l. c.* 216; *Wight Cat.* n. 2344. *P. trigonum*, in part, *Thw. Enum. Pl. Zeyl.* 359. *P. velutinum*, *Willd. Herb. ex Spreng. l. c.*—*Panicum*, *Wall. Cat.* n. 8738, 8740.

Throughout India, from the LOWER HIMALAYA in Garwhal to Sikkim, and the KHASIA HILLS, ascending to 3000 ft., southward to the MALAYAN PENINSULA and CEYLON.—DISTRIB. E. tropical Asia and the Malay and Pacific Islds.

Stem 1–3 ft., branched below, leafy; nodes glabrous. Leaves 2–6 by $\frac{1}{4}$ – $\frac{1}{2}$ in..

thin, finely acuminate; margins and mouth of sheath ciliate; ligule rounded. *Panicle* 2-5 in., usually inclined with spreading glabrous or puberulous branches naked below, and very long distant spreading branchlets. *Spikelets* $\frac{1}{2}$ in. long.—Very variable in the size of the whole plant and of its leaves and panicle. The smaller forms agree with the specimens of *P. patens* in the Linnean Herbarium, and are Wallich's n. 8740, and n. 8738 C.; the larger are *P. accrescens* of Trinius (referred by himself to *obliquum*, Roth.), and are Wallich's 8738 A. B. D. A small variety? with larger spikelets, nearly $\frac{1}{3}$ in. long, occurs in the Nilghiris (*Herb. Wight* n. 3047); at Goodavery Ghats, *Lawson*; and in Ceylon, at Newera Elia (C.P. n. 886).

53. ***P. longipes***, *Wight et Arn. in Wight Cat.* n. 1638; tall, leaves 4-10 in., panicle 5-10 in. fastigiatly supra-decompound, branches and long pedicels capillary, spikelets $\frac{1}{2}$ in. glabrous, gl. I nearly = III ovate acuminate 3-nerved, II and III acute. Aira capillaris, *Heyne in Herb. Rottler, & in Wall. Cat.*—*Panicum*, *Wall. Cat.* n. 8741.

NILGHIRI and PULNEY HILLS, *Heyne, &c.*; Karkun Ghat, alt. 2000 ft., *Lawson*.

Stem 2-3 ft. and upwards, as thick as a crow-quill, quite smooth, base decumbent. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, finely acuminate, narrowed and sparsely hairy at the base, finely puberulous beneath; sheath nearly glabrous; ligule rounded. *Panicle* sub-fastigiatly branched; branches simple sometimes naked below for an inch and more, then fastigiatly branched. *Spikelets* pale brown; gl. II and III with sparingly ciliate tips.—Distinguished from *P. patens* by the greater size, robuster habit, and much larger spikelets with acute glumes. What may be a small state of it was found at Golaghat, Seesagur, by *Clarke*. Compare also the form of *P. patens* with larger spikelets.

54. ***P. sparsicomum***, *Nees ex Steud. Syn. Gram.* 83; stem filiform diffusely branched, leaves 1-2 $\frac{1}{2}$ in. softly pubescent, panicle effuse of few long capillary branches and branchlets, spikelets $\frac{1}{8}$ in. oblong glabrous, gl. I = $\frac{1}{2}$ III faintly 3-nerved, II longest and III ovate-lanceolate acute 5-nerved, IV thin pale. *Wight Cat.* n. 1635 (name). *Agrostis zeylanica?* *Herb. Wight.*; *Klein ex Steud. l. c.* 83.

CEYLON; Coogle or Cocklaj, Jan. 23rd, 1796, *Heyne in Herb. Rottl.*

Stems 6-18 in., almost capillary, rooting at the nodes. *Leaves* $\frac{1}{8}$ - $\frac{1}{4}$ in. broad, acuminate, hairy on both surfaces; sheaths and their mouths hairy. *Panicle* on a filiform peduncle, 3-4 in. long and broad. *Spikelets* few, distant; gl. IV not so strongly laterally compressed and gibbous as in its allies.—A very distinct species, I think, but not easily characterized.

Sect. IX. PSEUDECHINOLÆNA. (See p. 28.)

55. ***P. uncinatum***, *Raddi Agrost. Bras.* 41; *Trin. Gram. Panic.* 174, *Sp. Gram. Ic. t.* 216; *Kunth Enum. Pl. i.* 172; *Steud. Syn. Gram.* 60; *Thun. Enum. Pl. Zeylan.* 359; *Trim. Cat. Ceyl. Pl.* 105. *P. echinatum*, *Willd. ex Doell in Mart. Fl. Bras. ii.* II, 193. *P. glandulosum*, *Nees ex Trin. Gram. Panic.* 174. *P. heteranthum*, *Link Enum. Hort. Berol. i.* 212. *P. nemorosum* β , *Trin. l. c.* 174. *P. Trinii*, *Mor. Syst. Verz. Zoll.* 102. *Echinolæna polystachya*, *H. B. & K. Nov. Gen. & Sp. i.* 119, t. 679; *Kunth l. c. i.* 172, *Suppl.* 127. *Cenchrus lappaceus*, *Herb. Heyne.* ? *Lappago aliena*, *Spreng. Neue Entdeck. iii.* 15.—*Echinolæna*, *Wall. Cat.* n. 8661.

EASTERN HIMALAYA; from Nepal to Sikkim, alt. 3-6000 ft. KHASIA, NAGA,

and MUNNEPORE HILLS, alt. 2-5000 ft. SOUTH DECCAN, on the Shivagerry Hills, Wight. CEYLON, common.—DISTRIB. Trop. Asia and America.

Perennial. Stem decumbent, straggling and branched below; branches 4-18 in., leafy, slender. Leaves 2-4 in., ovate-lanceolate, membranous, flat, base narrow oblique; sheath ciliate; ligule oblong, scarious. Panicle 1-3 in.; branches 2-6, distant, spiciform, flexuous, scaberulous. Spikelets $\frac{1}{2}$ - $\frac{1}{2}$ in.; solitary or 2-nate, dimidiate-ovate; pedicels very short, uncinate, scabrid; gl. I oblong-lanceolate, acuminate, keeled, 3-nerved, tip scabrid; II gibbously cymbiform, acute, 7-nerved, pale dull red, hispid, hairs sometimes hooked; III broadly ovate, obtuse, 7-nerved, paleate, male, green, sides centre and obtuse tip broadly hyaline, lateral nerves approximate; IV cymbiform, shorter than III, laterally compressed, thinly coriaceous. Lodicules 0.

DOUBTFUL AND EXCLUDED SPECIES.

P. ABLUDENS, Roem. & Schult. Syst. ii. 457; Roth Nov. Sp. 53. P. ramosum, Heyne mss. ex Roth l.c. P. paradoxum, Rottl. mss. ex Roem. & Sch. l.c., is evidently a *Paspalum*.

P. ACICULARE, Desv. in Poir. Encycl. Suppl. ii. 274; Nees Agrost. Bras. 235; Kunth Enum. Pl. i. 116; Steud. Syn. Gram. 82, is, I suspect, an American species, erroneously described as E. Indian. There is no Indian *Panicum* at all answering to it.

P. ANGUSTATUM, Edgew. in Journ. Beng. As. Soc. xxi. (1852) 157; name only.

P. ARANEOSUM, Edgew. in Index Kewensis, is an error for *Pennisetum araneosum*, Edgew. (= *Penn. lanuginosum*).

P. CONCINNUM, Edgew. l.c. 157, 179, 187; the description will apply to various species.

P. FESTUCOIDES, Poir. Encycl. Suppl. iv. 283; Kunth Enum. Pl. i. 131 is undeterminable.

P. FLEXUOSUM, Retz. Obs. iii. 9, and iv. 16; Steud. Syn. Gram. 83, described as an Indian Plant of Koenig's by Retz., is doubtfully referred to the Brazilian *Isachne ventricosa* by Doell in Mart. Fl. Bras. ii. II, 274. Retz describes it as being like *capillare*, Linn., but with the nodes bearded by reflexed hairs.

P. FUGAX, Koen. in Naturf. xxiii. (1788) 209; Gmel. Syst. 162; Kunth l.c. 134, is undeterminable.—Mr. Rendle informs me that this probably refers to a plant alluded to by Koenig in his correspondence (now in the British Museum) as "a decumbent *Panicum* growing in rice-fields, in which the panicle flowered almost before it had left the sheath, often a larva is found in the flower when the latter perishes otherwise it is caducous." A diseased *Panicum* (possibly *P. psilopodium*) bearing the name *P. insectiferum*, Koen. mss. in Herb. Mus. Brit. is presumably the plant.—I find diseased spikelets to be frequent in *P. psilopodium*.

P. HEYNI, Roth Nov. Sp. 49; Kunth l.c. 130; Steud. l.c. 80; branches of oblong panicle strict divided, base hairy, lowest whorled with fascicled flexuous scabrid branchlets, pedicels solitary alternate, gl. I cordate obtuse embracing the spikelet, leaves sharply serrate, margins and mouth of sheath hairy.

P. INFIDUM, Steud. Syn. Gram. 63, is probably a *Paspalum*.

P. KUNTHII, Steud. Nom. Ed. II, ii. 258. P. orthum, Voigt Hort. Suburb. Calcutt. 701; P. pseudostricta, Steud. Syn. Gram. 39; Digitaria stricta, Roth Nov. Sp. 38; Setaria? stricta, Kunth Revis. Gram. i. 47, Enum. Pl. i. 157. I have failed to identify this plant. It is possibly a *Paspalum*.

P. REPENS, Roxb. Ic. ined. t. 111, 112, 796. Three plants of the section *Brachiaria* thus named are in Roxburgh's collection of drawings, none of them answering to his description of *repens* in Fl. Ind. (which I take to be *P. vestitum*), nor to the *P. repens*, Linn. All are represented as perfectly glabrous, with stem 12-18 in. high, creeping below; leaves flat, 4-5 in., strict, narrowed from a rounded base to the top; panicle 4-6 in.; spikes 10-20, 1- $\frac{1}{2}$ in.; spikelets sessile, about $\frac{1}{2}$ in., close set, sometimes obscurely paired, green; gl. I $\frac{1}{2}$ - $\frac{1}{2}$ III, 5-nerved. In t. 111 the spikes are about 10, distichously spreading. In t. 112 there are about 20 dis-

tichously spreading spikes. In t. 796 there are 10, all secund. The grain of t. 111 is ovate-lanceolate, acuminate, with three dorsal lines; of t. 212 ovate-lanceolate, acuminate; of t. 796 elliptic-oblong, acute.—It is evident that in this as in other cases, Roxburgh had not named his *Icones* in accordance with the descriptions prepared for the “*Flora Indica*.”

P. SERICEUM, *Soland. in Ait. Hort. Kew*, 88, is a West Indian plant erroneously entered as from “*Ind. Or.*” by Steudel.

P. SIMPLICISSIMUM, *Koen. in Neue Schrift. Naturf.* xxiii. (1788) 209 (*ex Index Kewensis*). There is no such species described in the work cited, but Mr. Rendle has pointed out to me that at the bottom of the page Koenig mentions a very fine grass sent by him to Dr. Solander, adding, “*Er hat eine Paniculam simplicissimam.*”

P. TENUE, *Roxb. Fl. Ind.* i. 310; stem 1-6 ft. erect, ramous, panicle thin, spikelets binate on a common hairy pedicel with unequal partial pedicels, gl. III paleate, grain ovate transversely waved.—Wild in the Circar Mts. (*Roxb.*).—Stem sometimes prostrate and rooting. Leaves large, upper surface hairy, margins with very sharp points; sheaths shorter than the internodes, hairy, mouths bearded. Panicle erect, till fruiting, then bowing as in *P. miliaceum*, of alternate compound nearly secund racemes; rachis 4-5-angled, branchlets 3-angled, flexuous hairy. Spikelets smooth, gls. many-nerved, III male in luxuriant plants.—I have altered Roxburgh’s phraseology to bring it into harmony with that of this work. I have seen no plant answering to the above description except perhaps a small state of *P. maximum*.

P. TRACHYPUS, *Trin. Panic. Gen.* 170; rays subracemiform, shortly compound from the base alternate, raylets spreading, pedicels very short, spikelets lineal obovate submucronulate pubescent, gl. I 3-4 times shorter than the spikelet, 3-nerved, II 5-nerved, 4 mucronate rugose. Leaves glabrous lanceolate from a cordate base.—Nepal.

P. TRIFLORUM, *Edgew. in Journ. As. Soc. Beng.* xxi. (1853), 157, 179; *Duthie Grass. N.W. Ind.* 7, *Fodd. Grass. N. Ind.* 13; Edgeworth’s description will apply to various species.

5. *ICHNANTHUS*, Swartz.

Annual or perennial branching grasses. Leaves broad. Spikelets 1-2-fld., long panicle, ovate or lanceolate, terete, articulate (but often persistent) on their pedicels. Glumes 4, I II and III subequal or II longest, strongly nerved; III paleate or not, male or neuter; IV much shortest, stipitate, paleate, bisexual, oblong or oblong-lanceolate, stipes with an anticous simple or 2-fid or 2 lateral appendages. Lodicules 2, minute. Styles free, exserted apically. Stamens 3. Grain coriaceous, acute or acuminate, polished, articulate at the base of the stipes.—Species about 20, tropical.

This genus differs from *Panicum* in the appendaged base of gl. IV.

1. *I. pallens*, *Munro in Benth. Fl. Hongk.* 414; stem slender elongate, leaves broadly lanceolate, panicle open, rachis and subsecund branches slender, gls. spreading, I ovate-lanceolate acuminate, III paleate neuter or male, IV when mature exposed, turned on one side, oblong obtuse, appendages 2 adnate to its sides. *Thw. Enum. Pl. Zeyl.* 361; *Trim. Cat. Ceyl. Pl.* 105. *Panicum pallens*, *Swartz Prodr.* 23, *Fl. Ind. Occ.* i. 164; *Kunth Enum. Pl.* i. 89; *Nees Agrost. Bras.* 137; *Trin. Sp. Gram. Ic.* t. 211; *Griseb. Fl. Brit. W. Ind.* 550. *P. vicinum*, *Baily Syn. Queensland Fl.* iii. 82. *Apluda Zeygites*, *Aubl. Pl. Guian.* ii. 933 (*excl. Syn.*). ? *Agrostis nutans*, *Poir. Encycl. Suppl.* i. 255.

SIKKIM HIMALAYA; ascending to 3500 ft. KHASIA HILLS, alt. 1-4000 ft., ASSAM, and BENGAL.—CEYLON, alt. 4000 ft.—DISTRIB. Tropics generally.

Stem 1-2 ft., weak, decumbent; loosely branched, more or less pubescent. *Leaves* 3-6 by $\frac{1}{2}$ -1 in., broadly-lanceolate, thin, flat, caudate-acuminate, scaberulous; base rounded or cordate, ciliate; sheath lax; ligule a few hairs. *Panicle* 3-4 in., unilateral; branches erect or spreading, and pedicels scaberulous. *Spikelets* $\frac{1}{2}$ in. long, green; gl. I-III persistent, keels scabrid; I more than $\frac{1}{2}$ III, ovate-lanceolate, subaristate, 3-nerved, II acuminate 5-nerved; III obtuse 5-nerved, palea large; IV = $\frac{1}{2}$ III deciduous, smooth, pale, turned half round so that the long diam. is at right angles to the plane of the spikelets; appendages obscure.—The oblique position of the grain is very peculiar.

2. ***I. foliolosus***, *Munro in Herb. Kew*; dwarf, hispidly hairy, fastigiately branched from the base, leaves short almost subulate, spikelets $\frac{1}{2}$ in. in short panicles half immersed in the leafy tips of the short branches erect, gl. I nearly = III 5-nerved, II longer than III subaristate, III epaleate 5-nerved, IV ellipsoid acute, appendage minute anticus 2-lobed. *Panicum foliolosum*, *Wall. Cat. n. 8680*.

BURMA; Ava, *Wallich*; Mengoon, *J. Anderson*.

Densely tufted, 6-8 in. high, stiff, branches suberect or prostrate to the tips. *Leaves* 1-1 $\frac{1}{2}$ by $\frac{1}{10}$ - $\frac{1}{8}$ in., flat, strongly many-nerved, clothed like the short sheaths and panicles with spreading hairs; ligule of rigid hairs. *Panicles* with short erect angular branches. *Spikelets* green, tips scabrid; gl. IV much shorter than III, stipitate, base truncate.—A very peculiar species.

6. **THYSANOLAENA**, *Nees*.

A very large glabrous grass; stem solid. *Leaves* broad, flat. *Panicle* very large, effuse, with myriads of crowded long filiform compound suberect branches and branchlets bearing innumerable subsecond very minute 1-fl. spikelets which are jointed on very short pedicels. *Glumes* 4; I and II minute, concave, obtuse, awnless; I shortest nerveless; II nerveless; III much longer, epaleate, empty, coriaceous, acuminate, 1-nerved, hardening; IV rather shorter membranous, oblong, acute, clothed with white erect hairs, palea short, truncate. *Stamens* 2-3, anthers short. *Styles* free. *Grain* most minute, free within the hardened glumes.

T. Agrostis, *Nees in Edinb. new Phil. Journ. xviii (1835) 180*; *Steud. Syn. Gram. 119*. *T. maxima*, *Herb. O. Kuntze*. *T. acarifera*, *Arn. & Nees in Nov. Act. Nat. Cur. xix. Suppl. i. (1843) 181*; *Wall. Cat. n. 8882*; *Lisboa in Journ. Bomb. Nat. Hist. Soc. v. (1890) 347*; *Duthie Grass N.W. Ind. 13*, *Fodd. Grass. N. Ind. 21*. *Panicum acariferum*, *Trin. Sp. Gram. Ic. t. 87*; *Baker Fl. Maurit. 437*; *Miq. Fl. Ind. Bat. iii. 517*. *P. Amlisa*, *Herb. Ham. ex Wall. l. c. O*. *Myriachaeta arundinacea*, *Zoll. & Mor. Syst. Verz. Zoll. 101*; *Steud. Syn. Gram. 404*. *M. glauca*, *Mor. ex Steud. l. c. 404*; *Zoll. Syst. l. c. Melica latifolia*, *Roxb. Fl. Ind. i. 328*. *Agrostis maxima*, *Roxb. l. c. 317*. *A. latifolia*, *Heyne in Herb. Rottl. (non Trevir.)*. *A. scoparia*, *Koenig ex Herb. Rottl. (non Steud.)*. *Arundo montana*, *Herb. Ham. ex Wall. l. c. B*.

SUBTROPICAL HIMALAYA, from Kumaon eastwards and the KHASIA HILLS, alt. 4-5000 ft. BEHAR; on Parus-nath. The DECCAN, BURMA; NICOBAR IsL.s., and PENANG.—DISTRIB. Eastw. to New Guinea.

Stem 4-12 ft., sometimes as thick as the little finger. *Leaves* 1-2 ft. by 2-4 in., coriaceous, tapering to a fine point, base cordate; mouth of sheaths hairy; ligule

short, ciliate. *Panicle* 1-2 ft., soft, quite glabrous. *Spikelets* $\frac{1}{10}$ in., pale yellow, rather shining, very obscurely jointed on the pedicels which are jointed on the branches.—*Myriachaeta glauca*, Mor., was founded on the erroneous supposition that its gl. IV was hairless. The spikelets are sometimes viviparous.

7. CHAMAERAPHIS, Br.

Glabrous marsh or aquatic grasses. *Leaves* linear or lanceolate. *Spikelets* 1-2 fld., subsessile and subsecund on the branches of a simple panicle which are produced in an awn-like bristle beyond the terminal spikelet, obscurely articulate on their pedicels, narrowly lanceolate. *Glumes* 4, I very small, truncate, hyaline, nerveless; II longest, acuminate or narrowed into rigid awn, 5-many-nerved; III lanceolate acute or aristately acuminate paleate male or neuter; IV very small, oblong, hyaline, fem., or bisexual; palea hyaline. *Lodicules* of male fl. cuneiform. *Stamens* 3. *Styles* free. *Grain* linear-oblong, compressed, free within the gl.—Species 5-6, trop. As. and Austral.

Besides the spikelets on the branches of the panicle, there are often one or more on the peduncle below the panicle, which are appressed, and sometimes somewhat sunk in a groove of the peduncle. The species are very variable.

1. *C. spinescens*, *Poir. Encycl.* ii. 189; stems elongate rather stout, panicle pyramidal or contracted, branches with one few or many spikelets each $\frac{1}{6}$ – $\frac{1}{4}$ in., glume III aristately acuminate many-nerved, IV obtuse. *Benth. Fl. Austral.* vii. 499; *Trim. Cat. Ceyl. Pl.* 106. *C. aspera*, *Nees in Wall. Cat. n.* 8679; *Wight Cat. n.* 1655; *C. paradoxa*, *Poir. l. c.*, *Kunth Enum. Pl. i.* 148, *Suppl.* 105. *C. spinosa*, *Beauv. ex Schult. Mant.* ii. 253. *Panicum asperum*, *Koen. in Naturf. xxiii.* (1788) 209; *Wight ex Steud. Syn. Gram.* 49; *Thwaites Enum. Pl. Zeyl.* 436. *P. spinescens*, *Br. Prodr.* 193; *Kunth Enum. Pl. i.* 131. *P. ischæmoides*, *Heyne ex Wall. l. c.* *P. squarrosus*, *Lam. Encycl.* iv. 743; *Kunth Enum. Pl. i.* 131. *Andropogon squarrosus*, *Linn. Herb.* *Echinochloe squarrosa*, *Roem. & Sch. Syst.* ii. 479. *Orthopogon squarrosus*, *Spreng. Syst.* i. 307. *Setaria longiflora*, *Desv. Opusc.* 81.

MARWAR; on Mt. Aboo, *King*. BANDA, *Duthie*. LOWER BENGAL, *Roxburgh, Griffith, &c.* SOUTH DECCAN PENINSULA, *Heyne, Wight, &c.* CEYLON, *Ferguson Glennie*.—DISTRIB. China, Malaya, Australia.

Floating in much branched masses, with leafy stems 1-3 ft., and panicles 2-4 in. long, varying very much in the number and size of their spikelets. *Leaves* 1-3 in., and their somewhat inflated sheaths smooth or scaberulous. *Spikelets* $\frac{1}{6}$ – $\frac{1}{4}$ in. long.

Var. *Brunoniana*; spikelets one or two on the branches of the panicle $\frac{1}{2}$ – $\frac{1}{3}$ in. long. *Panicum Brunonianum*, *Griff. Ic. Pl. Asiat. t.* 145 and 139, f. 107. *P.* (*Chamaeraphis*) *intermedium*, and *Pseudoraphis Brunoniana*, *Griff. Notul.* iv. 29. *Holcus natans*, *Herb. Roxb.*—Lower Bengal, *Roxburgh, Griffith*.—Tonkin, Australia.

Var. *depauperata*; slender, leaves very short, panicle short contracted, spikelets $\frac{1}{6}$ in. *C. depauperata*, *Nees in Wight Cat. n.* 1654; *Steud. Syn. Gram.* 49; *Trim. Cat. Ceyl. Pl.* 106. *Panicum sordidum*, *Thw. Enum. Pl. Zeyl.* 443.—Jheels of Bengal, the Deccan and Ceylon.

2. *C. gracilis*, *Hack. in Engl. Bot. Jahrb.* vi. 326; branches of panicle many simple with many minute spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in. long.

LOWER BENGAL; *Clarke*. CACHAR, *Keenan*. BURMA, *Kurz*.—DISTRIB. Tonkin.

Stems 6-8 in., decumbent and rooting at the nodes, geniculately ascending,

branches slender; internodes 1-2 in. *Leaves* 1-1½ by ¼-½ in., spreading, striot, linear, acute, striate, base rounded, glabrous or sparsely hairy; sheaths broad, loose, membranous, compressed, 2-auricled, glabrous; ligule short, hyaline, toothed. *Panicle* shortly exerted beyond the upper sheath, 1-2 in. long, rachis and erectopatent subsimple branches capillary, smooth. *Spikelets* very shortly pedicelled, green or brownish; gl. I truncate; II straight, sometimes long-acuminate or almost beaked, glabrous or obscurely sparsely hairy, nerves close, strong; III ¼-½ shorter than II, subacute; IV about ½ III.—Very near the Australian *C. abortiva*, Poir. (*C. spinescens* var. *parvispicula*, Benth.) which has a lax panicle with few branches and spikelets.

8. **SPINIFEX**, Linn.

Stout, rigid, bushy, polygamo-dioecious grasses. *Leaves* long, rigid, involute. **MALE SPIKELETS** 2-fld., subsessile, articulate on rigid peduncled spikes, which are collected in umbels surrounded by spathaceous leafy bracts; glumes 4, membranous, not awned; I and II empty; III and IV paleate, triandrous. **FEM. SPIKELETS** collected in large globose heads of stellately spreading very long rigid rod-like rachides, surrounded by shorter subulate bracts; each spikelet solitary, and articulate at the very base of a rachis, lanceolate, 2-fld. *Glumes* I, II, III, as in the male, but larger; III paleate, empty or triandrous; IV fem. *Lodicules* 2, large, nerved. *Styles* long, free; stigmas shortly feathery. *Grain* free within the hardened glumes.—Species 4; an Indian and 3 Australasian.

S. squarrosus, Linn. *Mant.* ii. 300; glabrous, glaucous, leaves pungent, male spikes 2-3 in., spikelets distant, fem. spikelets concealed by the bracts. *Lamk. Illust.* t. 840; *Kunth Enum. Pl.* i. 175; *Wall. Cat.* n. 8631; *Steud. Syn. Gram.* 113; *Thw. Enum. Pl. Zeyl.* 362; *Trim. Cat. Ceyl. Pl.* 106; *Elliott Fl. Adrh.* 163; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1890) 339; *Duthie Grass. N.W. Ind.* 11; *Benth. Fl. Hongk.* 415; *Miq. Fl. Ind. Bat.* iii. 474. *S. dioicus*, Ham. ex Pritz. *Icon. Index*, 1058. *Stipa littorea*, Burm. f. *Fl. Ind.* 29. *S. spinifex*, Linn. *Mant.* i. 84. —*Rheede Hort. Mal.* xii. t. 75.

Sandy coasts of both PENINSULAS, BURMA, and CEYLON.—DISTRIB. Java, China.

A squarrose gregarious bush, several feet high and broad. *Leaves* 4-6 in.; sheaths often imbricating; ligule very short, hirsute. *Peduncles* of male 2-3 in.; scaberulous, tips naked, pungent. *Male spikelets* ½-¾ in.; gls. thin, all glabrous, I and II subequal, oblong-lanceolate, acuminate, 7-9-nerved, nerves scaberulous; III rather longer, 5-nerved, paleate; IV shorter, ovate-lanceolate, acuminate, 5-nerved; paleas of III. and IV. narrowly lanceolate, keels ciliate. *Fem. spikelets* ¾ in., narrowly lanceolate; gls. all glabrous, I oblong-lanceolate, acuminate, many-nerved, nerves scaberulous; II rather shorter, acute, 7-nerved; III like II, 5-nerved; IV ovate-lanceolate, abruptly narrowed above the middle and acuminate, 5-nerved; palea shorter but broader than the gl., acute, 2-nerved, keels smooth, style very long, branches slender.

9. **AXONOPUS**, Beauv.

Perennial grasses. *Spikelets* 2-fld., articulate with the pedicel, sessile or subsessile in whorled or digitate spikes, awned. *Glumes* 4, I shortest, ovate, acuminate or cuspidate, glabrous, 3-nerved; II ovate-lanceolate, acuminate or awned, 5-nerved, lateral nerves marginal villous; III oblong, acute, 5-nerved, paleate, male, palea very short 2-fld or 2-partite; IV = II,

oblong or ovate, coriaceous, narrowed into a straight subulate awn; palea oblong, coriaceous, 2-nerved. *Lodicules* cuneate. *Stamens* 3, anthers long. *Styles* distinct. *Grain* small, suborbicular, free within the glumes.

A natural genus, remarkable for the small cleft palea of gl. III. It was established by Beauvois on *Panicum cimicinum*, Retz., to which other grasses having no affinity with it were added. Kunth erred in taking up Beauvois *Urochloa* (which is *Panicum javanicum*, Poir.) and placing *A. cimicinum* in it.

1. ***A. cimicinus***, Beauv. *Agrost.* 12; leaves ovate or ovate-lanceolate, spikes subverticillate. *Panicum cimicinum*, Retz. *Obs.* iii. 9; *Rattl. in Neue Schrift. Ges. Naturf. Freund.* iv. (1803) 191, 194; *Roxb. Fl. Ind.* i. 295; *Thw. Enum. Pl. Zeyl.* 358; *Trim. Cat. Ceyl. Pl.* 104. *P. conjugatum*, Dalz. & Gibs. *Bomb. Fl.* 291. *Urochloa cimicina*, Kunth *Revis. Gram.* i. 31, ii. 56, t. 103, *Enum. Pl.* i. 74, *Suppl.* 56; *Dalz. & Gibs. Bomb. Fl.* 289. *Coridochloa cimicina*, Nees in *Edinb. N. Phil. Journ.* xv. (1833) 381. *C. fimbriata*, Nees ex Wight *Cat.* 1656; *Wall. Cat. n.* 8749; *Aitchis. Cat. Panjab Pl.* 158. *Milium cimicinum*, Linn. *Mant.* 184.

Throughout INDIA, in the plains and lower hills, BURMA, PENANG and CEYLON. —DISTRIB. Malaya, China.

Stem 1–2 ft., tufted, stout or slender, erect, or decumbent and geniculate at the base, and leaves hirsute with long spreading white hairs, rarely glabrescent. *Leaves* 1–3 by $\frac{1}{2}$ –1 in., acute or obtuse, flat, green, striate, ciliate, base deeply cordate, ligule obsolete. *Spikes* 3–8 in a whorl, 1–6 in. long; rachis filiform, simple or divided, scaberulous; flowerless below. *Spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, solitary or clustered, very shortly pedicelled, dorsally compressed, pale, rather shining; gl. I acuminate; II mucronate or shortly awned; III acute; IV with a setiform awn.

2. ***A. semi-alatus***, Hook. f.; leaves long linear, spikes few subdigitate. *Panicum semi-alatum*, Br. *Prodr.* i. 192; *Benth. Fl. Austral.* vii. 472; *Thw. Enum. Pl. Zeyl.* 358; *Trim. Cat. Ceyl. Pl.* 104. *P. viaticum*, Griff. *lc. Pl. Asiat.* t. 145, f. 2. *Bluffia Eckloniana*, Nees in *Lindl. Introd. Nat. Syst. Ed.* II 447. *Coridochloa semi-alata*, Nees in *Edinb. New Phil. Journ.* xv. (1833) 381. *Urochloa semi-alata*, Kunth *Revis. Gram.* i. 311, *Enum. Pl.* i. 74. *Oplismenus semi-alatus*, Desv. *Opusc.* 81. *Arundinella Schultzei*, Benth. *l. c.* 545. *Aira viatica*, Griff. *Notul.* iii. 54. *Holotetrum philippinense*, Steud. *l. c.*—*Coridochloa*, Wall. *Cat. n.* 8758.

SUBTROPICAL HIMALAYA, alt. 4–6500 ft., from Kumaon to Sikkim. The KHASIA HILLS, alt. 4–5000 ft.; MUNNEPORE; BURMA, Collet; BEIHAR on Parusnath 3–5000 ft. CEYLON up to 5000 ft.—DISTRIB. Mauritius, S. Africa, China, Philippines, Australia.

Stems 1–3 ft., densely tufted, bases thickly clothed with the woolly remains of old leaf-sheaths. *Leaves* 8–12 by $\frac{1}{8}$ – $\frac{1}{4}$ in., glabrous or pubescent, finely acuminate; ligule obscure. *Spikes* 2–5, 3–6 in. long; rachis slender subflexuous, smooth or hairy. *Spikelets* $\frac{1}{4}$ in., pale or brown, solitary or in distant pairs, sessile or pedicelled.

10. **TRICHOLÆNA**, Schrad.

Erect, tufted, annual or perennial grasses. *Leaves* narrow. *Spikelets* 1–2 fld., articulate on their pedicels, panicle, laterally compressed, clothed with long silky hairs, callus stipitiform. *Glumes* 3 or 4, I if present very small, often inserted much below III; II and III subequal, membranous, broadly ovate, mucronate or awned, dorsally rounded; III paleate, triandrous; IV very thin, shining, fem. or bisexual. *Lodicules* 2, minute, dolabriform. *Grain* loose within the gls.—Species many, chiefly S. African.

A genus the characters of which cannot be satisfactorily determined till a great many indetermined species are examined. It differs from *Panicum* in the villous or silky awned spikelets with membranous glumes. The two Indian species differ remarkably in the form of gl. IV.

1. **T. Teneriffæ**, *Parlat. in Webb & Berth. Phyt. Canar.* iii. 425, *Fl. Ital.* i. 130; perennial, gl. I minute or obsolete, IV sessile ovate-lanceolate acuminate margins incurved. T.-micrantha, *Schrad. in Sch. Mant.* ii. 163; *Nees in Ann. Sc. Nat. Ser. II* vi. (1836) 106. *Panicum plumosum*, *Presl Fl. Sic.* i. 43. *P. saccharoides*, *Trin. Gram. Panic.* 245. *P. Teneriffæ*, *Br. Prodr.* 189; *Kunth Enum. Pl.* i. 98, *Suppl.* 75. *P. villosum*, *Presl Gram. & Cyp. Sic.* 18. *Saccharum Teneriffæ*, *Linn. f. Suppl.* 106; *Jacq. f. Eclog. Gram.* 51, t. 34 (*excl. Syn.*); *Biv. Bern. Stirp. Sic. Rar.* iv. 5, t. 1. *Sibth. Fl. Græc.* i. t. 53 (*excl. Anal.*). *Agrostis plumosa*, *Ten. Fl. Nap. Prodr. Suppl.* i. 59.

Western Panjab, *Falconer*; alt. 3500 ft., *Stewart*. SCIND, *Stocks*.—DISTRIB. Westward to Sicily and N. Africa.

Stems many from a woody stock, geniculate below, slender, rigid. *Leaves* very slender, convolute, rigid, glabrous; mouth of sheath bearded; ligule, a narrow membrane. *Panicle* 2-4 in. rather open, branchlets and pedicels capillary. *Spikelets* $\frac{1}{10}$ – $\frac{1}{8}$ in., white or purplish, silky with spreading hairs; gls. II and III ovate acute or mucronate, concave; IV articulate at the base, white or brown, shining.

2. **T. Wightii**, *Nees & Arn. ex Steud. Syn. Gram.* 93; annual, gl. I very small linear, IV ellipsoid obtuse convolute. *Nees in Wight Cat.* n. 2345; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1890) 347. T.-micrantha, *Schrad. in Sch. Mant.* ii. 163; *Schmidt Beitr. Fl. Cap. Verd.* 153. T. tuberculosa, *Hack. mss.* *Rhynchelytrum Wightii*, *Duthie Fodd. Grass. N. Ind.* 21. *Panicum megalanthum*, *Steud. Syn. Gram.* 93. *Saccharum Teneriffæ*, *Parl. in Hook. Niger Flora*, 183 (*excl. Syn.*). *Aira chinensis*, *Retz. Obs.* iii. 10.—*Tricholæna*, *Wall. Cat.* n. 8660.

RAJPOOTANA; Ajmeer and Oodeypore, *Duthie*. The DECCAN, *Heyne, Wight*.—DISTRIB. Arabia, Cape Verd Islds.

Stems 6-18 in., tufted, stout or slender. *Leaves* 1-3 in., linear, acuminate, flat, and sheaths glabrous or hairy; ligule obsolete. *Panicle* 2-4 in., very narrow; branches and pedicels capillary, flexuous. *Spikelets* very variable in size, $\frac{1}{8}$ – $\frac{1}{2}$ in. long; stipitiform callus gibbous, bearded; gl. I $\frac{1}{12}$ – $\frac{1}{10}$ in. linear-oblong, obtuse, concave spreading; II and III tumid below, subrostrate, awned below the acute or obtuse tip, nerves smooth or tubercled; awn very slender, not twisted, longer than the gl. or shorter, palea of III narrow, keels ciliate; IV very thin, margins often overlapping.—The great variability in the size of the spikelets is very deceptive. It is not known where in the Deccan Heyne's and Wight's specimens were collected.

11. **OPLISMENUS**, Beauv.

Weak grasses; stems decumbent below, leafy. *Leaves* thin, flat, ovate to lanceolate; ligule a ridge of hairs. *Spikelets* 1-fl., sessile or subsessile, fascicled on a simple terminal spike or on panicle spikes. *Glumes* 4, I short, 3-nerved, long-awned, awn straight; II short, awn short or 0; III longest, 5-nerved, paleate or not, empty; IV lanceolate, terete and with its palea hardened. *Stamens* 3, anthers linear. *Styles* distinct. *Grain* free within the glumes.—Species few, very variable.

Of the 30 or more reputed species of *Oplismenus*, *Burmanni* and *compositus* seem

to be the most distinct, for *undulatifolius*, though constant over wide areas, is only a form of *compositus* with the branches of the panicle represented by one or a few sessile or subsessile spikelets.

1. *O. undulatifolius*, Beauv. *Agrost.* 54; spikelets solitary or clustered in a simple terminal spike. *Kunth Revis. Gram.* i. 44, *Enum. Pl.* i. 139, *Suppl.* 101; *Parlat. Fl. Ital.* i. 123; *Boiss. Fl. Orient.* v. 442; *Franch. & Sav. Fl. Japon.* ii. 654; *T. Nees Gen. Fl. Germ. Monoc.* i. n. 28; *Duthie Grass. N.W. Ind.* 8. *O. acuminatus*, Nees ex Steud. *Syn. Gram.* 45. *O. æmulans*, flaccidus & imbecillis, Roem. & Sch. *Syst.* ii. 487. *O. æmulus*, *Kunth Revis.* i. 44. *O. latifolius* (error for *undulatifolius*) *Herb. Strach. & Winterb.*; *Aitchis. Cat. Panjab Pl.* 161; *Duthie l. c.* 8. *O. parvifolius*, *Kunth* 45. *O. setarius*, Roem. & Sch. l. c. *Orthopogon gonyrrhizus*, *Miq. Fl. Ind. Bat.* iii. 443; *Orth. hirtellus*, æmulus & flaccidus, *Br. Prodr.* 194. *Orth. setarius*, *Spreng. Syst. Veg.* 306; *Griseb. Fl. Brit. W. Ind.* 545. *Orth. undulatifolius*, *Spreng. Syst.* i. 306; *Reichb. Fl. Germ. Excurs.* i. 23, *l. c. Fl. Germ.* i. t. 28. *Orth. undulatus*, *Link Hort. Reg. Berol.* i. 203. *Panicum barbifolium*, *Hochst. Pl. Hohenack. n.* 1279, ex *Schlecht. in Linnæa*, xxxi. 307. *P. Burmanni*, *Schrenk Pl. Eszicc. Cent.* iii. n. 68; *Balb. Misc. Bot.* i. 8. *P. gonyrrhizum*, *Steud. l. c.* 44. *P. hirtellum*, *All. Fl. Pedem.* ii. 240. *P. imbecille*, *Trin. l. c. t.* 191; *Wulf. in Jacq. Collect.* i. 263; *Schrad. Fl. Germ.* i. 242. *P. setarium*, *Lamk. Ill.* i. 170; *Poir. Encycl.* iv. 741; *Pers. Syn.* i. 82. *P. undulatifolium*, *Arduin. Sp. Alt.* 14, t. 4; *Gaud. Agrost. Helvet.* i. 28; *Trin. Sp. Gram. l. c. t.* 192; *Koch Syn. Fl. Germ. Ed.* ii. 892. *P. Setaria hirtella*, *Schult. Mant.* ii. 276.

TEMPERATE HIMALAYA, alt. 6-9000 ft., from Kashmir to Sikkim. KHASIA HILLS, alt. 4-5000 ft., NILGHIRI HILLS.—DISTRIB. Central and S. Europe, warm regions generally.

Stem 1-2 ft., usually very slender, simple or branched below. *Leaves* $1\frac{1}{2}$ -6 by $\frac{1}{2}$ -1 in., from ovate to narrow lanceolate, finely acuminate, glabrous or sparsely hairy; sheaths glabrous or hirsute. *Spike* 2-5 in.; rachis glabrous or pilose with spreading hairs; lower clusters of spikelets rarely produced into a very short spike. *Spikelets* $\frac{1}{2}$ - $\frac{3}{4}$ in. (excl. awns), solitary with a second reduced to an awn, or clustered, glabrous or nearly so. *Gl.* I 3-nerved, ciliate; awn $\frac{1}{2}$ in. or less; II usually awned, 5-nerved; III acute or shortly awned, 7-nerved, palea narrow or 0.—Though as observed under the genus, this grass is only a form of *compositus*, it keeps its characters of the inflorescence throughout its distribution, and may hence be regarded as distinct. The Nilghiri form (*acuminatus*, Nees) has very narrow leaves, 3-4 by $\frac{1}{2}$ - $\frac{1}{2}$ in. It is remarkable that no specimen of this species should exist in the Wallichian Herbarium.

2. *O. compositus*, Beauv. *Agrost.* 54; stem usually tall from a decumbent base, leaves 2-7 in. lanceolate, spikes 4-10 1-6 in. long or more, spikelets usually loosely imbricate, awns rather stout pale or dark. *Kunth Enum. Pl.* i. 141; *Trin. Sp. Gram. l. c. t.* 188, 189, 190; *Benth. Fl. Austral.* vii. 491; *Trim. Cat. Ceyl. Pl.* 105; *Aitchis. Cat. Panjab. Pl.* 161; *Duthie Grass. N.W. Ind.* 81. *O. brasiliensis*, *Raddi Agrost. Bras.* 40. *O. bromoides*, *Baker in Journ. Linn. Soc.* xxi. (1885) 452. *O. Burmanni*, *Thw. Enum.* 358; *Hochst. Pl. Hohen.* n. 368 (non Beauv.). *O. decompositus*, Nees in *Endl. Prodr. Fl. Norfolk.* 19. *O. elatior* & *loliaceus*, Beauv. l. c.; *Kunth l. c.* 142. *O. hirtellus*, Roem. & Sch. *Syst.* ii. 481. *O. indicus*, *Willd. in Act. Acad. Nat. Cur.* iv. 224. *O. Jacquini*, *Kunth Revis. Gram.* i. 44, 45, *Enum.* i. 140, 146. *O. lanceolatus*, *Kunth ll. cc.* 45. 146; *Wall. Cat.* n. 8676; *Dalz. & Gibs. Bomb. Fl.* 292. *O. latifolius*, *Hænke ex Steud. Nom.*

Ed. II ii. 220. *O. pratensis*, *Schult. Mant.* ii. 597. *O. sylvaticus*, *Roem. & Sch. l.c.* 481; *Kunth Revis.* i. 44, *Enum.* i. 139, *Suppl.* 101. Orthopogon compositus, *Br. Prodr.* 194; *Miq. Fl. Ind. Bat.* iii. Orth. Junghuhnii, *Nees ex Miq. l.c.* 444. Orth. longeracemosus & sylvaticus, *Miq. l.c.* Orth. pratensis, & loliaceus, *Spreng. Syst.* i. 306. Orth. remotus, *Trin. Fund. Agrost.* 181. Panicum aristatum, *Retz. Obs.* v. 17. P. bidentatum & certificandum, *Steud. l.c.* 44, 45. P. compositum, *Linn. Sp. Pl.* 57; *Trin. Sp. Gram. Ic. t.* 187; *Steud. l.c.* 44; *Thw. Enum. Pl. Zeyl.* 379; *Benth. Fl. Hongk.* 411; *Baker Fl. Maurit.* 439. P. composito-proximum, *Rottl. Ges. Naturf. Fr. Neue Schrift.* iv. (1804) 224. P. elatius, *Linn. f. Suppl.* 107. P. lanceolatum, *Retz. Obs.* v. 17; *Roxb. Fl. Ind.* i. 294; *Steud. l.c.* 48. P. longeracemosum, *Steud. l.c.* 45. P. peninsulanum, *Steud. l.c.* 44. P. sylvaticum, *Lamk. Encycl.* iv. 733; *Trin. Sp. Gram. Ic. t.* 190 A.; *Steud. l.c.* 45. P. undatum, *Steud. Nom. Ed.* II ii. 264. P. unguinosum, *Herb. Banks ex Roxb. Fl. Ind.* i. 294. Echinochloa lanceolata, *Roem. & Sch. l.c.* 476. PE. hirta, *Schult. Mant.* ii. 270. Hekaterosachne elatior, *Steud. l.c.* 118. Digitaria composita, *Willd. Enum. Berol.* i. 91. Andropogon undatus, *Jacq. Coll.* iii. 237, t. 631.—Orthopogon sp. *Griff. Notul.* iii. 43.

Throughout INDIA, from Kashmir to Upper Assam, Munne pore, and Burma (up to 8000 ft. in Sikkim) and southward to the Andaman and Nicobar Islds., Penang and CEYLON.—DISTRIB. most trop. regions (except Australia).

Stem 1–3 ft., stout or slender, branched from the base and sometimes upwards. *Leaves* very variable, $1\frac{1}{2}$ – $1\frac{3}{4}$ in. broad; sheaths glabrous, pilose or hirsute. *Racemes* 2–6 in., stout or slender; rachis glabrous, pilose or hispid; spikes $\frac{1}{2}$ –3 in. long, erect or spreading, green or purplish. *Spikelets* $\frac{1}{2}$ – $\frac{1}{3}$ in. (excl. awns) solitary or in rather distant pairs or fascicles, appressed to the rachis or spreading, glabrous or with few or many bristles longer than the glumes at the base, rarely softly hairy; gls. pale green or reddish purple, I short, 3-nerved, ciliate, awn $\frac{1}{2}$ in. to nearly $\frac{3}{4}$ in., slender flexuous, pale yellowish or dark stouter and stiff; II longer or shorter than I, 5–7-nerved, acute, awn much shorter than of I or 0; III longer and broader than II; IV acute or obtuse, 7–9-nerved, tip hispid, palea narrow or 0; lanceolate, terete, acuminate, and its hardened palea yellowish shining.—I am unable to group the Indian form of this most variable grass under practicable varieties. The following are indications of prevalent states, of which 6 is very aberrant.

1. Tall, stout, leaves 4–6 in., sheaths glabrous or hirsute, spikes and stout rachis of panicle more or less hirsute with long cilia, stout dark purplish awns often black. *Wall. Cat.* 8676 D. G. A. (*left-hand specimen*). Pan. elatius, *Heyne & P. decompositus*, *Nees*, in *Herb. Wight* n. 222, 1651. Andropogon undatus, *Jacq.*—Sikkim, Assam, Silhet, Burma and the Deccan.

2. Dwarf, branches short stout decumbent, leaves $\frac{3}{4}$ –1 in. ovate green or purplish, sheaths hirsute, panicle erect, spikes erect stout glabrous or pubescent, and spikelets green or purple, awns short $\frac{1}{2}$ – $\frac{1}{4}$ in. stout.—Oudh forests, Assam, Chittagong.

3. Slender, leaves 2–3 in., ovate-lanceolate, sheaths hirsute, panicle long very slender drooping rachis and very slender spikes finely pubescent, spikelets distant subsilky, awns very slender.—Sikkim alt. 1–3000 ft. Munne pore 4750 ft.

4. Tall, stout and much branched, or slender, leaves 4–7 in. lanceolate, sheaths glabrous, spikes many long stout or slender erect or drooping, rarely dark-colored, spikelets rather distant very many glabrous or sparingly setose at the base, awn stout or slender. *O. lanceolatus*, *Kunth*, *Wall. Cat.* 8676 A. B. C. H. L. *O. compositus*, *Kunth*, &c.—The commonest form.

5. Same as 4, but always slender, with glabrous sheaths and rachis of panicle, fewer very slender smooth spikes, with few distant quite glabrous spikelets, awns slender pale. *O. indicus*, *Wight Herb.* n. 63, 1652 and lanceolatus, n. 2332. *O. lanceolatus*, *Wall. Cat.* 8676 E. F. M.—A reduced form of 4, and quite as common.

6. Slender, diffusely branched below; spikes few, distant, very slender; spikelets few, silkily villous, pale green, gl. I 3-5-nerved; II 5-7-nerved; III 7-9-nerved, its palea narrow tip ciliate.—Of this there are three forms or varieties, *a*, stem 2 ft., rather stout, leaves 3-4 in. linear-lanceolate, spikes 2-3 in., awns $\frac{1}{2}$ in.—Penang, *Curtis*, n. 1102.—*b*, Very slender, leaves 1-1 $\frac{1}{2}$ in., awns shorter. *O. indicus*, *Wight Cat.* n. 1652.—Ceylon, *Thwaites* (CP. 3963)—*c*, very slender, leaves $\frac{3}{4}$ -1 in., spikes 2-3, short, gl. I as long as its awn.—Ceylon, *Thwaites* (CP. 3964).

3. ***O. Burmannii***, *Beauv. Agrost.* 54; decumbent, flaccid, leaves $\frac{1}{2}$ -1 in., spikes 3-5 short, spikelets second closely imbricate awns pale capillary. *Roem. & Sch. Syst.* ii. 484. *Kunth Revis. Gram.* i. 44, *Enum.* i. 139, *Suppl.* 101; *Trin. Sp. Gram. Ir.* t. 193; *Dalz. & Gibs. Bomb. Fl.* 291; *N.E. Br. in Gard. Chron.* (1886) ii. 776; *Franch. & Sav. Enum. Pl. Jap.* ii. 160; *Wight Cat.* n. 1650; *Duthie Grass. N.W. Ind.* 8, *Indig. Fodd. Grass.* t. 47, *Fodd. Grass. N. Ind.* 13. *O. africanus*, *Beauv. Fl. Owar.* ii. 15, t. 68, f. 1; *Kunth Enum.* i. 141. *O. albus*, *Roem. & Sch. Syst.* ii. 890. *O. brasiliensis*, *Raddi Agrost. Bras.* 400. *O. bromoides*, *Beauv. Agrost.* 54; *Bojer Hort. Maurit.* 366. *O. Humboldtianus*, *Nees Agrost. Bras.* 264; *Presl Rel. Hænk.* i. 322. *O. indicus*, *Roem. & Sch. l. c.* 484; *Duthie Grass. N.W. Ind.* 8. *Orthopogon Burmanni*, *Br. Prodr.* 194; *Miq. Fl. Ind. Bat.* iii. 442; *Reichb. Ic. Fl. Germ.* i. t. 28. *Orth. albus*, *Nees ex Steud. l. c.* 44; *Miq. l. c.* *Panicum Burmanni*, *Retz. Obs.* iii. 10; *Roxb. Fl. Ind.* i. 298; *Trin. Sp. Gram. Ic.* t. 193; *Baker Fl. Maurit.* 438. *P. album & africanum*, *Poir. Encycl. Suppl.* iv. 274, 275. *P. bromoides*, *Lamk. Ill.* i. 170, *Encycl.* iv. 742. *P. hirtellum*, *Burm. Fl. Ind.* 24, t. 13, f. 1 (*non Linn*); *Steud. l. c.* 44. *P. japonicum*, *Steud. in Flora xxix.* (1846) 18. *P. multisetum*, *Hochst Pl. Schimp. Abyss.* p. 1469; *A Rich. Tent. Fl. Abyss.* ii. 377. *Echinochloa hirtella*, *Schult. Mant.* ii. 269.—*Oplismenus*, *Wall. Cat.* 8677, 8678.

PLAINS OF INDIA, from Rohilkund to Bengal, Silhet and Chittagong, ascending the Himalaya in Sikkim to 5000 ft. BEHAR and CENTRAL INDIA, CEYLON, Jaffna (Herb. Rottl.); *Ferguson*.—DISTRIB. Malay Islds., China, Japan, Afr. trop.

Diffusely branched and rooting below, stems often almost filiform. Leaves always small, sheaths glabrous or hairy. Panicle 1-4 in., inclined or nodding; spikes rarely 1 in., very pale, rachis glabrous or pubescent. Spikelets $\frac{1}{10}$ - $\frac{1}{8}$ in. (excl. awns); gl. I ciliate, 1-3-nerved, awn $\frac{1}{2}$ in. or less; II 3-5-nerved, awned; III 5-9-nerved, shortly awned, palea 0.—Usually very distinct from *O. compositus*, but I have found specimens growing in the Jheels, with spikes nearly two inches long and stouter awns, forming a transition to that plant. Wall. Cat. 8678 is a very small Silhet form, with ovate leaves $\frac{1}{4}$ - $\frac{1}{2}$ in. Clarke found it also in Silhet.—*O. africanus* is the earliest name for the species under *Oplismenus*, but *Burmannii* is of universal adoption, and is the earliest specific name; both were given by Beauvois, *O. africanus* in 1807, *O. Burmannii* in 1812.

DOUBTFUL SPECIES.

O. ? DUBIUS, *Kunth Revis. Gram.* i. 44; *Enum. Pl.* i. 143.

12. **ARUNDINELLA**, *Raddi*.

Annual or perennial erect grasses. Leaves narrow. Spikelets panicle, not jointed on the pedicels, 1-2-fld. Glumes 4, membranous or subcoriaceous, I ovate acute or acuminate, rather shorter than II, 3 or 5-nerved; II lanceolate or ovate-lanceolate, acuminate or subaristate, 5-rarely 7-nerved;

III equalling I or rather longer, oblong, subacute or narrowly truncate 5- or 7-nerved, paleate, triandrous or neuter; IV much the smallest, bisexual, articulate at the base and deciduous, membranous and oblong in flower, lanceolate subcoriaceous and scaberulous when mature, and awnless or with one terminal subgeniculate awn more or less twisted at the base, and with sometimes 2 lateral shorter capillary awns; base usually bearded. *Anthems* long. *Styles* 2, free or connate below; stigmas long. *Grain* free within gl. IV.—Species about 30, tropical.

A very well marked genus, referred by Baillon (Bull. Soc. Linn. Paris (1893) 1023, 1083, 1093) to *Panicum*, from which it differs in the inarticulate spikelets with the small thin gl. IV articulate at the base, as also in gl. IV being awned in many species and bearded at the base. The species are most difficult of determination, the Peninsular especially, which have not been so collected as to provide sufficient material for satisfactory study. I greatly doubt the value of the characters afforded by the awns.

* Gl. IV with 3 awns, the lateral short, capillary. (MILIOSACCHARUM, Nees.)

1. **A. avenacea**, Munro ex Thw. Enum. Pl. Zeyl. 362; annual, leaves short, panicle $\frac{1}{2}$ –1 in. ovoid compact, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. subsessile, gl. I and II awned, III awned acuminate, IV hispid or bearded, median awn flattened and strongly twisted at the base. *Lisboa* in Journ. Bomb. Nat. Hist. Soc. v. (1891) 345; Trim. Cat. Ceyl. Pl. 106. A. Campbelliana, Lisboa l.c. 346. *Avena malabarica*, Heyne ex Herb. Rottl.—Arundinella? Wall. Cat. 8670.—Aira, No. 3, Griff. Notul. iii. 55, Ic. Pl. Asiat. t. 146, f. III.

KHASIA HILLS, in wet places, alt. 3–4000 ft. Griffith, &c. DECCAN PENINSULA, from the Concan southward. BURMA, Pegu, Rurz; Moulmein, Griffith. CEYLON, in swamps, at Ratnapoora, Thwaites.

A weak straggling slender grass. Leaves 1–2 in., ovate-lanceolate, acute, glabrous or pilose, base amplexicaul and subpectinately ciliate; sheaths slender; ligule membranous, ciliate. Panicle pale green, branches short glabrous or hairy. Glumes I and II glabrous hairy or with tubercled-based bristles; I 3–5-nerved; II $\frac{1}{2}$ longer, 5-nerved; III acute or acuminate, 5-nerved, paleate, male or neuter; IV linear-oblong, more or less hispidly pilose or with lateral beards, base with long hairs; lateral awns triangular at the base, median about twice as long as the spikelet, geniculate above the twisted portion.

2. **A. tuberculata**, Munro ex Lisboa in Journ. Bomb. Nat. Hist. Soc. v. (1891) 344; annual, erect, hispid with long white tubercled-based hairs, panicle lax, spikelets $\frac{1}{2}$ in. shortly pedicelled, gl. I 3-nerved shortly awned, II nearly twice as long 5-nerved narrowed to a long beak, III male obtuse, IV glabrous, median awn slender twisted or not below.

The CONCAN; Poona, Stocks, &c. CENTRAL INDIA, King.

Stem 12–18 in., sheaths leaves and panicle clothed with white spreading stiff hairs. Leaves 1–3 in., linear-lanceolate, base rounded; ligule a ridge of hairs. Panicle 3–6 in., narrowly oblong; branches $\frac{1}{2}$ –1 in., suberect, scaberulous. Spikelets ovoid, single or geminate, beak of gl. II as long as the rest of the gl.; III as long as I, narrow, glabrous, 5-nerved; IV lanceolate, scabrid when ripe, base pilose, median awn about twice as long as the spikelet, lateral acicular.

3. **A. mesophylla**, Nees ex Steud. Syn. Gram. 115; Nees & Arn. ex Wight Cat. n. 2347; annual, erect, pubescent or hirsute, leaves narrow, branches of compressed panicle spiciform short simple, spikelets sessile imbricate sub 4-ranked bifarious, gl. I subawned 3 nerved, II rather longer

5-7-nerved, narrowed into a long beak, III obtuse male, IV lanceolate base pilose, median awn about $\frac{1}{3}$ longer than the spikelet slender hardly twisted.—*Arundinella*, Wall. Cat. n. 8663 B.

TRAVANCOR; Pulney Mts. and Courtallam, Wight.

Stem 1-2 ft., branching from the base, slender. Leaves 3-4 by $\frac{1}{8}$ - $\frac{1}{4}$ in., base narrowed; ligule obscure. Panicle 2-4 in., hirsute, branches $\frac{1}{2}$ - $\frac{3}{4}$ in., sessile (i.e. flowering to the base), rachis hairy; spikelets distichously spreading. Gl. I hardly awned, ovate; II about $\frac{1}{4}$ longer, lanceolate; III glabrous, narrowly oblong; IV not seen ripe, base bearded.

4. *A. nervosa*, Nees in Wall. Cat. n. 8662; annual, leaves narrow, softly hairy with spreading hairs, panicle much branched, branches capillary laxly many-fld., spikelets $\frac{1}{2}$ in. pedicelled, gl. I acuminate 3-nerved, II nearly twice as long 5-nerved narrowed into a long straight beak, III obtuse, IV ovate-lanceolate scaberulous, median awn slender. Steud. Syn. Gram. 115; Wight Cat. n. 2387, 1669 α β γ . *Holcus nervosus*, Roxb. ex Wight Cat. n. 1669 (non Roxb. Fl. Ind.) *Ischæmum melicoides*, Koen. ms. in Herb. Wight. *Andropogon hirsutum* & *scoparium*, Heyne in Herb. Rotl. *Agrostis scoparia*, Koen. ex Steud. l. c. *Anemagrostis Neesiana*, Wight & Arn. ex Steud. l. c.—*Arundinella*, Wall. Cat. n. 8665.

SOUTHERN DECCAN PENINSULA; Heyne, Wight, &c.

Stem 12-18 in., slender, branched from the base. Leaves 4-8 by $\frac{1}{8}$ - $\frac{1}{2}$ in., and sheaths usually copiously hairy on both surfaces with long white spreading hairs, base narrow; ligule membranous, ciliate. Panicle 6-10 in.; branches 2-4 in., fascicled and whorled, erect, flexuous, smooth, glabrous. Spikelets suberect, glabrous or nerves of gl. I and II more or less setose; gl. III neuter or male; IV slightly bearded at the base, median awn more or less twisted at the very slender base.—Wight's β *laxior* (Cat. 1669 b) is only a slender form.—Lisboa (in Journ. Bomb. Nat. Hist. Soc. v. (1891) 344) gives Concan, Coromandel and Ceylon as habitats, but without seeing specimens it is not safe to cite an authority in so difficult a genus. *A. nervosa*, Duthie Grass. N.-W. Ind. 13, from the Himalaya is probably one of the forms of *brasiliensis*.

5. *A. setosa*, Trin. Diss. ii. 63, Panic. Gen. 245; perennial, tall, leaves usually narrow, panicle 6-12 in., branches subsolitary slender erect laxly many-fld., spikelets $\frac{1}{2}$ - $\frac{1}{4}$ in. subsecund pedicelled, gl. I and II aristately acuminate glabrous or setose, I = $\frac{2}{3}$ - $\frac{3}{4}$ II 3-nerved, II elongate lanceolate 5-nerved, III shorter obtuse or subacute 5-7-nerved, IV = $\frac{1}{2}$ III lanceolate scaberulous. Steud. Syn. Gram. 114; Duthie Grass. N.W. Ind. 13. *A. hirsuta*, Nees ex Steud. l. c. 115, & Hochst. in Hohen. Pl. Ind. Or. n. 920. *A. setifera*, Steud. l. c. 115. *A. stricta*, Nees in Hook. Kew Journ. ii. (1850) 102; Dalz. & Gibs. Bomb. Fl. 292. *Milium cimicinoides*, Roxb. mss.—*Arundinaria* sp. nov. Lisboa in Journ. Bomb. Nat. Hist. Soc. v. (1891) 343.

WESTERN HIMALAYA; alt. 5-8000 ft., from Dalhousie to Nepal, Wallich, &c. KHASIA HILLS, alt. 3-6000 ft. BEHAR, on the Soane river, J. D. H. CENTRAL INDIA, Clarke. NILGHIRI HILLS, alt. 6000 ft., Schmidt, &c. CEYLON; at Trincomalee, Ferguson.—DISTRIB. Tonkin, China, Philippines.

Stems densely tufted on a hard rootstock, 1-3 ft., stout or slender, leafy. Leaves 6-10 in., convolute, glabrous pubescent or villous; ligule obscure. Panicle 2-6 in., sometimes corymbiform; branches 2-5 in., usually naked below. Spikelets often in pairs, pedicels with sometimes a few hairs near the tip. Median awn of gl. IV about as long as the spikelet.—The name *hirsuta* is attached to a specimen in Herb. Royle, so named no doubt by Nees.

6. **A. khaseana**, *Nees ex Steud. Syn. Gram.* 115; tall, robust, leaves narrow, panicle 6-18 in. branches long or short erect scabrid, spikelets $\frac{1}{2}$ - $\frac{3}{4}$ in. setose with long tubercled based bristles, gl. I and II aristately acuminate, I = $\frac{3}{4}$ II 5-nerved, II 5-nerved, III acuminate or subaristate, IV oblong-lanceolate nearly smooth. *Arundinella?* *Wall. Cat.* n. 8672.

KHASIA HILLS; alt. 4-6000 ft., common.

Stem 3-6 ft., from a woody tufted rootstock, as thick as a swan's quill or less, nodes pubescent or bearded. *Leaves* 6-12 in., and sheaths glabrous pilose or villous; ligule a ridge of hairs. *Panicle* effuse or contracted or thyrsiform; branches 1-6 in. long. *Spikelets* pedicelled, crowded or distant, dark green; gl. IV. with the median awn variable in length, strongly twisted at the stout base, lateral awns short.

** Awn solitary, longer than the spikelet.

† *Spikelets* about $\frac{1}{12}$ - $\frac{1}{10}$ in. long.

7. **A. agrostoides**, *Trin. Sp. Gram. Ic. t.* 265; annual, villous or glabrescent, leaves broad flat flaccid, panicle contracted, branches fascicled suberect, spikelets glabrous or setose, gl. I = $\frac{3}{4}$ II ovate acuminate 3-5-nerved, II subaristately acuminate 5-nerved, III subacute 3-5-nerved, IV oblong-lanceolate scabrid. *Steud. Syn. Gram.* 116. *A. holcoides*, *Trin. in Bull. Sc. Acad. Petersb. i.* (1836) 71. *Brandtia holcoides*, *Kunth Revis. Gram.* ii. 129, t. 170; *Steud. l. c.*—*Arundinella?* *Wall. Cat.* n. 8671.

SOUTH DECCAN, and the CONCAN, &c., *Wight, &c.* TENASSERIM, *Wallich, Helfer.*—DISTRIB. Philippines.

Stem 6-18 in., stout or slender. *Leaves* 1-4 in., up to $\frac{1}{2}$ in. broad, narrowed to the base, and sheaths usually clothed with long soft hairs; ligule a ridge of hairs. *Panicle* 1-9 in., always contracted; branches $\frac{1}{4}$ -1 in., capillary, suberect, sparingly divided; gl. I and II rarely without bristles; III male or neuter; column of awn exserted, twisted.

Var. ciliata; panicle more copiously setose, spikelets rather larger. *Arundinella ciliata*, *Nees in Wight Cat.* n. 1666. *A. pilosa*, *Hochst. in Hohen. Pl. Ind. Or. n.* 647 & 935; *Miq. in Verh. Nedel. Ind. iii. iv.* (1851) 30. *Holcus ciliatus*, *Roxb. Fl. Ind. i.* 318. *Andropogon paniceus*, *Heyne ex Wall. l. c. & in Herb. Rottl.* *Perotis polystachya*, *Herb. Heyne ex Wall. l. c.* The Deccan Peninsula, from the Concan southward. Moulmein, *Griffith.*—*Arundinella*, *Wall. Cat.* n. 8664.

8. **A. tenella**, *Nees ex Steud. Syn. Gram.* 115; annual, glabrous, leaves flaccid lanceolate, panicle very large effuse copiously branched, rachis and branches capillary spreading, spikelets $\frac{1}{4}$ - $\frac{1}{2}$ in. solitary long-pedicelled glabrous or sparsely setose, gl. I = $\frac{3}{4}$ III 3-nerved, II ovate-lanceolate acuminate 5-nerved, III 5-nerved, IV oblong, awn twice as long as the spikelet. *Wight Cat.* n. 1668; *Dalz. & Gibs. Bomb. Fl.* 292; *Duthie Grass. N.W. Ind.* 13; *Lisboa in Journ. Bomb. Nat. Hist. Soc. v.* (1891) 345. *A. pumila*, *Steud. l. c.* 114; *Lisboa l. c.* *Acrathierum pumilum*, *Hochst. ex A. Rich. Tent. Fl. Abyss. ii.* 414, t. 100. *Anemagrostis tenella*, *Wight ex Steud. l. c.*

WESTERN HIMALAYA; Garwhal, alt. 4000 ft. RAJPOOTANA, on Mt. Abu, &c. BEHAR and CENTRAL INDIA, alt. 3-4000 ft. The KHASIA HILLS, the CONCAN and PEGU.—DISTRIB. Abyssinia.

Stem 6-20 in., erect, soft, leafy, very sparsely hairy. *Leaves* from ovate and 2-4 in. long, to linear-lanceolate and 14 in. long, often $\frac{3}{4}$ in. broad, acuminate, membranous, many-nerved, base narrow; sheath rarely hairy; ligule short, hairy. *Panicle* 2-10 in.; rachis slender, strict, erect; branches alternate or the lower

subverticillately fascicled, each with widely spreading capillary branches and branchlets. *Spikelets* the smallest of the genus, usually shorter than their capillary pedicels; gl. IV scabrid above; column of awn slightly twisted.

9. *A. pygmaea*, Hook. f.; annual, very small, slender, leaves chiefly radical narrow hispidly hairy nerveless except the midrib margins serrulate, panicle erect effuse, branches few capillary, spikelets few $\frac{1}{2}$ in. setose, gl. I = $\frac{2}{3}$ II ovate acute 3-nerved, II ovate-lanceolate long-acuminate 5-nerved, III obtuse obscurely 5-nerved, IV oblong truncate, awn twice as long as the spikelet.

NORTH CANARA, *Lisboa*.

Whole plant 6 inches high and very slender.—Closely allied to *A. tenella*, but very much smaller, with very slender stem, narrow chiefly radical leaves 1-1½ in. by $\frac{1}{10}$ in., sparsely clothed with long bristles, and a very sparingly divided panicle with few larger spikelets on very long capillary pedicels.—The specimens are very poor, and the character given may hence require modification.

10. *A. Metzii*, Hochst. ex Miq. in *Verh. Ned. Inst.* III lv. (1851) 31; tall, glabrous, leaves linear, panicle 3-10 in. effuse erect or inclined branches alternate or fascicled elongate, spikelets $\frac{1}{2}$ - $\frac{1}{10}$ in. subsecund, long or short pedicelled glabrous or sparsely setulose, gl. I = $\frac{2}{3}$ II ovate acuminate 3-nerved, II ovate-lanceolate acuminate 5-nerved, III acute 5-7-nerved, IV oblong truncate obtuse or retuse scaberulous, awn about twice as long as the spikelet. *Steud. Syn. Gram.* 116 (excl. *Syn. Roxb.*); *Hochst. in Herb. Hohenack.* n. 257. *A. agrostoides*, Trin. var. *tenella*, *Herb. Ind. Or. Hf. & T.* *Agrostis fusca*, Heyne ex Wall. *Cat. & in Herb. Rottler.*—*Arundinella*, Wall. *Cat.* n. 8668.

NILGHIRI HILLS; the Wynaad, Heyne. The CONCAN and CANARA, Law, Metz, Thomson, Woodrow, &c.

Annual? 1-3 ft. high. Leaves 4-6 by $\frac{1}{4}$ - $\frac{1}{8}$ in., scaberulous and sheath more or less hairy or glabrous. Panicle 1-8 in.; rachis slender, smooth or subscaberulous; branches 1-4 in., uniformly flowering. Spikelets green or purplish, solitary or 2-nate, longer or shorter than their pedicels which are sometimes $\frac{1}{2}$ in. long; gl. I nerves sometimes scabrid; IV very obscurely bearded at the base, awn straight.—Hohenacker's specimens appear to be annual, Heyne's have a small hard rootstock. This is certainly not Roxburgh's *Holcus nervosus*, which Steudel cites for it. The panicle varies greatly in length, breadth and composition; in small specimens it is short and triangular with spreading nearly simple branches, in taller it is more effuse with long flexuous branches and much longer pedicels.

†† *Spikelets more than $\frac{1}{10}$ in. long.*

11. *A. villosa*, Arn. ex Steud. *Syn. Gram.* 115; stems tufted villous below the very narrow panicle, rachis villous, branches spiciform short simple hirsute, spikelets $\frac{1}{2}$ - $\frac{1}{4}$ in. secund crowded setosely hirsute, gl. I = $\frac{2}{3}$ II ovate acuminate 3-5-nerved, II subaristately acuminate 5-nerved, III acute 5-nerved neuter or male, IV oblong-lanceolate very minutely scaberulous, awn not twice-as long as the spikelet. *Thw. Enum. Pl. Zeyl.* 362; *Trim. Cat. Ceyl. Pl.* 106.

EASTERN HIMALAYA, the KHASIA HILLS, CENTRAL INDIA, the DECCAN PENINSULA & CEYLON.

Stem 12-16 in., slender, stiff, leafy at the villous base. Leaves 4-8 by $\frac{1}{12}$ - $\frac{1}{10}$ in., strict, rather rigid, glabrous tomentose or villous; ligule of long hairs. Panicle 2-4 in., spiciform; branches $\frac{1}{2}$ - $\frac{2}{3}$ in., brown. Spikelets subdistichously crowded, spreading or erect; column of awn included twisted.—Nees, according to Steudel, describes gl. IV. as 2-toothed. I find it to be usually rounded at the tip, but 2-toothed in

var. *himalaica*. Gl. III is more acute than is usual in the genus and its palea larger.

Var. *Wightii*; leaves very narrow convolute, basal sheaths woolly.

Var. *Heyne*; taller, stouter, basal sheaths nearly naked, leaves longer broader and flat 12 by $\frac{1}{2}$ in., panicle 4 in. long. *Andropogon paniceus*, *Herb. Heyne ex Wall. Cat. n. 8663 A.*—Courtallam, *Wight*.

Var. *himalaica*; basal sheaths naked, leaves 2-6 by $\frac{1}{4}$ - $\frac{1}{2}$ in. flat, spikes sometimes shortly peduncled, gl. IV 2-toothed. *A. Hookerii*, *Munro ms.*—Bhotan, E. Nepal and Sikkim Himalaya, alt. 6-11,000 ft., *Griffith, J. D. H., Clarke*.

12. *A. birmanica*, *Hook. f.*; annual, stout, stem glabrous, leaves linear-lanceolate flat hirsute, panicle linear-oblong interrupted, branches sessile simple or sparingly divided, rachis ciliate and scaberulous, spikelets $\frac{1}{2}$ - $\frac{1}{3}$ in. densely crowded subsessile glabrous or with a few setae, gl. I = $\frac{2}{3}$ II ovate subaristately acuminate 5-nerved, II ovate-lanceolate long-acuminate 5-nerved, III acute 5-nerved, IV oblong-lanceolate scabrid, awn not twice the length of the spikelet.

BURMA; Rangoon, *M'Lelland, Scott, Kurz*.

Stem tufted, 1-2 ft., stout, soft, leafy, nearly as thick as a goose-quill, nodes bearded. Leaves 4-8 by $\frac{1}{2}$ - $\frac{2}{3}$ in., base subcordate, sheath hirsute; ligule a narrow ciliate membrane. Panicle 3-7 in., very pale, branches or spikes 1-2 in sessile, erect; gl. III male female or neuter, awn of IV with twisted included column.—Near *A. villosa*, but annual, with soft stems and leaves much smaller and hardly setose spikelets, stem glabrous below the panicle.

13. *A. brasiliensis*, *Raddi, Agrost. Bras. 37, t. i. fig. 3*; stem erect stout or slender, leaves broad or narrow, panicle pyramidal subcorymbose or thyrsiform sparingly or copiously branched, spikelets $\frac{1}{2}$ - $\frac{1}{3}$ in. subsecund longer than their pedicels usually quite glabrous, gl. I = $\frac{2}{3}$ II ovate-lanceolate acuminate 3-nerved, II lanceolate finely acuminate 5-nerved, III subacute 5-nerved, IV oblong-lanceolate acute scaberulous, awn twice as long as the spikelet. *Trin. Diss. ii. 62, Panic. Gen. 246, Sp. Gram. Ic. t. 266; Doell in Mart. Fl. Bras. ii. II, 298, t. 38. A. Ecklonii, Nees Fl. Afr. Austr. 80. A. martinicensis, Trin. Diss. ii. 62; Panic. Gen. 246; Griseb. Fl. Brit. W. Ind. 556. A. Mikani, Nees Agrost. Bras. 465. A. nepalensis, Trin. Diss. ii. 62; Panic. Gen. 335, Sp. Gram. Ic. t. 268; Duthie Grass. N.W. Ind. 13; Steud. Syn. Gram. 115; Lisboa in Journ. Bomb. Nat. Hist. Soc. v. (1891), 343. A. pallida, Nees Agrost. Bras. 465. A. rigida, Nees Fl. Afr. Austr. 80. A. Ritchiei, Munro ex Lisboa l. c. A. stricta, Nees in Hook. Kew Journ. ii. (1850), 102; ? Dalz. & Gibs. Bomb. Fl. 293. Acratherum miliaceum, Link Hort. Berol. i. 320. Orthopogon agrostoides, Trev. ex Steud. Nom. Ed. II. ii. 234. Aira brasiliensis, Spreng. Syst. Veg. i. 278. Goldbachia Mikani, Trin. in Spreng. Neue Entdeck. ii. 81. Ischæmum hispidum, H. B. & K. Nov. Gen. & Sp. i. 194; Kunth Revis. Gram. i. 373, t. 100; Enum. Pl. i. 515. Riedelia Mikani, Trin. ex Kunth Enum. l. c. Holcus nervosus, Roxb. Fl. Ind. i. 318. Thysanachne scoparia, Presl Nov. Pl. Gen. Diss. 1829, cum Ic. Rel. Hænk. i. 253. Andropogon hispidus, Willd. Sp. Pl. iv. 908. A. ? epiphyllus, Wall. Cat. n. 8667 A. A. virens, Spreng. Syst. i. 287.—Airacea, Griff. Notul. 53, Ic. Pl. Asiat. t. 141, f. 11.—*Arundinella*, *Wall. Cat. n. 8666, 8667*.*

Throughout the hilly parts of INDIA, from the Himalaya, ascending to 7000 ft., to BURMA and CEYLON.—DISTRIB. China, Malaga, Australia, S. Africa, trop. America.

Perennial; rootstock stout, hard, creeping and sending out stout sheathed branches sometimes as thick as a goose-quill, or tufted and intricately branched.

Stems 1-5 ft., from the thickness of a sparrow's to a goose quill, simple or branched, nodes glabrous or pubescent. *Leaves* 6-12 by $\frac{1}{4}$ - $\frac{3}{8}$ in., usually ciliate at the narrow base; ligule of soft hairs. *Panicle* 4-18 in.; branches 1-10 in., few or many, fascicled or subverticillate, densely or laxly imbricating, usually slender and undivided. *Spikelets* distant or crowded, green or purplish; gl. I sometimes very sparingly setose; III male or neuter, rarely imperfectly bisexual; IV always bearded at the base, column of awn more or less twisted.—An abundant grass in many parts of India, but so variable that it is difficult to formulate a character for it that will not include other species. Dr. Stapf has aided me in the examination of a mass of Indian specimens, including many hundreds collected by Clarke over the length and breadth of India; and especially in the more important matter of identifying *A. nepalensis* with the American *A. brasiliensis*, and various others here brought together as synonyms. The largest form is Wallich's 8666 A, with a stout creeping woody rhizome, sheathed surculi as thick as a goose-quill, a stout stem 5 ft. high, broad often hirsute leaves, and a large panicle 6-12 in. long of spikelets $\frac{1}{4}$ in. long; it is a tropical and subtropical plant extending in the Himalaya from Kumaon eastward, and is common in the Khasia Hills. Wallich's 8666 B (from the Calcutta Bot. Gardens?) is a tall much more slender plant, with matted roots, very narrow leaves with tubercle-based hairs, and a slender thin panicle. His 8667 A. B. from Burma, is a tall plant with soft hairy leaves $\frac{1}{4}$ - $\frac{1}{2}$ in. broad, and an effuse subpyramidal panicle with fascicled capillary branches and smaller spikelets about $\frac{1}{2}$ in. long. It is common throughout the lower Himalaya and Khasia Hills. Another variety, with a straggling branching rootstock, proliferously fascicled branches sheathed at the base, short or long glabrous or hairy linear-lanceolate leaves, and small oblong panicles with few slender branches and few spikelets, occurs at elevations of 4-6000 ft. Lastly, there is a common Himalayan slender form from the Panjab eastwards, six inches to a foot high, with tufted roots, very narrow leaves, a small oblong panicle, and small spikelets. *A. Ritchiei*, Munro, is a tall stout Concan form, 2 $\frac{1}{2}$ ft. high, with a shortly creeping rootstock, narrow obscurely hairy convolute leaves, a very narrow panicle, and pale small spikelets.

14. *A. fuscata*, Nees ex Buese in *Miq. Pl. Jungh.* 359; perennial, stout, rather short, leaves short flat hirsute, panicle oblong dense-fl'd. usually purplish, rachis stout pubescent or villous, branches crowded erect, spikelets $\frac{1}{8}$ - $\frac{1}{2}$ in. secund crowded sessile or shortly pedicelled glabrous or sparsely setose, gl. I = $\frac{3}{4}$ II broadly ovate acuminate 3-5-nerved, II ovate-lanceolate acuminate 5-nerved, III obtuse or truncate 5-nerved, IV oblong-lanceolate emarginate scabrid, awn short. *Steud. Syn. Gram.* 114; *Wight Cat.* n. 1667; *A. purpurea*, *Hochst. ex Steud. l. c.* 115; ?*Lisboa* in *Journ. Bomb. Nat. Hist. Soc.* v. (1891) 345. *Acratherum fuscatum*, Nees ex *Steud. l. c.*

The CONCAN (*Lisboa*). NILGHIRI HILLS, *Heyne*; Ootacamund, alt. 6000 ft., *Wight, Lawson, King*. PEGU, at Rangoon, *Kurz*.

Stem 1-2 ft., stiff, glabrous or pubescent below the panicle. *Leaves* 1-8 by $\frac{1}{4}$ - $\frac{1}{2}$ in., lanceolate, tapering from the base to the tip, coriaceous, strongly nerved; sheath hirsute; ligule very short, ciliate. *Panicle* 2-5 in., erect; rachis and subsimple branches stiff, angular, scaberulous. *Spikelets* stouter and glume much broader than in any form of *brasiliensis*.—*Heyne's* specimens are more slender than *Lawson's*. I have seen no specimens from the Concan. The Rangoon plant has a very pale panicle.

15. *A. capillaris*, *Hook. f.*; perennial, very slender, leaves narrow glabrous or hairy, panicle oblong branches alternate slender flexuous naked below, spikelets $\frac{1}{2}$ in. distant solitary glabrous shorter than their pedicels, gl. I = $\frac{3}{4}$ II ovate-lanceolate acuminate 3-5-nerved, II lanceolate acuminate 5-nerved, III not exceeding I obtuse 5-nerved, IV lanceolate acute scabrid, awn about twice as long as the spikelet. *A. mutica*, Nees ex *Steud. Syn. Gram.* 116; ?*Lisboa* in *Journ. Bomb. Nat. Hist. Soc.* v. (1891)

8. *Andropogon capillaris*, *Herb. Heyne*.—*Arundinella* sp., *Wall. Cat. n.* 8665 A.

The DECCAN, *Heyne*. PULNEY HILLS, *Herb. Wight* (n. 3338).

Stem erect from a tuberous rhizome which is clothed with the woolly bases of leaf-sheaths. *Leaves* 6–12 by $\frac{1}{2}$ – $\frac{3}{4}$ in., acuminate, base rather narrow; upper sheaths glabrous; ligule a ridge of hairs. *Panicle* 5–7 in., flexuous; rachis filiform, scaberulous; branches few, 4–6 in., naked below except a solitary long-pedicelled axillary spikelet; pedicels capillary.—An obscure plant. *Nees* describes the leaves as with sparsely setulose margins, and gl. IV as mucronate, from which it is evident that the awn has fallen away in his specimen. This latter suggested the name *mutica*, which, being misleading, I have replaced by *Heyne's* of *capillaris*. *Wight's* Pulney specimens have a slightly hairy panicle 3 in. long, with more numerous close-set branches and closer spikelets. *Lisboa* (*Journ. Bomb. Nat. Hist. Soc. v.* (1890) 344) gives *mutica* as a common plant all over Bombay, but without seeing specimens I cannot confirm this.

16. *A. laxiflora*, *Hook. f.*; very slender, glabrous, leaves narrow, panicle effuse, branches spreading capillary solitary alternate or opposite or the lower fascicled, branchlets spreading, spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. solitary shorter than their capillary pedicels, gl. I = $\frac{2}{3}$ II ovate acuminate 3-nerved, II ovate-lanceolate 5-nerved, III longer than I oblong acute, IV longer than III oblong-lanceolate scaberulous, awn 0 or shortly exserted. *A. nervosa*, *Thw. Enum. Pl. Zeyl.* 362 (*excl. Syn.*); *Trim. Cat. Ceyl. Pl.* 106.

CEYLON, *Gardner*; Central Province, alt. 3–5000 ft., *Thwaites* (C.P. 919).

Annual? glabrous. *Stem* 12–30 in., tufted, geniculately ascending, nodes glabrous. *Leaves* 4–8 by $\frac{1}{2}$ – $\frac{3}{4}$ in., finely acuminate; ligule narrow, membranous, ciliate. *Panicle* 4–6 in., green. *Gl.* I scabrid on the keel or not; IV bearded at the base or not; column of awn twisted.—The open panicle with long capillary pedicels of the spikelet and quite acute gl. III which is $\frac{1}{4}$ longer than I, characterize this species. One specimen (*Gardner*, n. 1007) has no trace of an awn.

*** Awn 0, or very short and hardly exserted (see also *A. laxiflora*).

17. *A. Wallichii*, *Nees ex Steud. Syn. Gram.* 114; perennial, stout, erect, panicle elongate contracted strict, branches 1–1 $\frac{1}{2}$ in. stout stiff spiciform, spikelets 3–4-seriate ovoid secund densely imbricate very stoutly pedicelled setose, gl. I nearly = II ovate acute 3–5-nerved, III oblong obtuse 5-nerved, IV ovoid subacute nearly smooth, awn 0 or very short. *Duthie Grass. N.W. Ind.* 13. *Panicum strictum*, *Roxb. Fl. Ind. i.* 303. *P. bengalense*, *Spreng. Syst. i.* 311; *Steud. Syn. Gram.* 48. *P. pyramidale*, β ? *Herb. Ham. ex Wall. Cat. n.* 8700.—*Panicum*, *Wall. Cat. n.* 8700.—*Arundinella*? *Wall. Cat. n.* 8669.

TROPICAL HIMALAYA; on dry banks from Simla to Sikkim, alt. 1–6000 ft. BENGAL, BEHAR, the KHASIA, NAGA and SATPURA HILLS. BURMA; Shan Hills, *Manders*.—DISTRIB. Tonkin.

Stem 1–3 ft., from a woody creeping or tufted hard rhizome; nodes bearded or not. *Leaves* 12–18 by $\frac{1}{2}$ – $\frac{3}{4}$ in., all radical in small forms, glabrous hairy or villous, lanceolate, acuminate; sheath smooth scabrid or villous; ligule a ridge of hairs. *Panicle* 6–12 in. (the stoutest of the Indian species); branches $\frac{1}{2}$ –1 in., lower sometimes whorled, erecto-patent, flowering to the base; rachis angular, scabrid. *Spikelets* green or purplish; gl. IV naked at the base; awn not twisted.

18. *A. Clarkei*, *Hook. f.*; tall, very stout, leaves very long, panicle very large subcorymbiform, branches 3–8 in. fascicled erect very slender simple upper much longer than the rachis, spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in. 1–2-seriate secund shortly pedicelled, gl. I = $\frac{3}{4}$ II ovate acute 5-nerved, II ovate-

lanceolate acute 5-nerved, III oblong obtuse, IV ovate-lanceolate, awn very shortly exserted base twisted.

SIKKIM TERAI, Clarke.

Stem 6 ft. or more, stouter than a swan's quill above. *Leaves* 2-3 ft. by 1 in., coriaceous, hairy beneath; sheath long, margins fimbriate; ligule a ridge of hairs. *Panicle* 12-18 by 4-6 in.; rachis stout, erect, angular, nearly smooth; branches rarely divided, filiform, scaberulous. *Spikelets* solitary or 2-nate, pale, usually longer than their pedicels.—The great size, large panicle with long branches, the upper far exceeding the rachis, will characterize this gigantic species.

19. **A. leptochloa**, *Hook. f.*; tall, slender, leaves narrow, panicle pyramidal or subcorymbiform often interrupted, branches short simple slender alternate whorled or fascicled, spikelets $\frac{1}{10}$ in. 1-2-seriate secund sessile or pedicelled glabrous, gl. I = $\frac{3}{4}$ II ovate acuminate 3-nerved, II ovate-lanceolate acuminate 5-nerved, III ovate-oblong subacute 5-nerved, IV lanceolate scaberulous base naked, awn minute or 0. *Panicum leptochloa*, *Nees ex Steud. Syn. Gram.* 62; *Wight Cat.* n. 1621; *Steud. Syn. Gram.* 62; *Thw. Enum. Pl. Zeyl.* 360; *Trim. Cat. Ceyl. Pl.* 105. *P. zeylanicum*, *Arn. mss.* *Leptochloa* ? *panicoides*, *Herb. Wight*, n. 125, *ex Steud. l. c.* *L. pectinata*, *Steud. l. c.*

MALABAR; at Quilon, *Wight*. **CEYLON**, not uncommon, *Thwaites*.

Stem 2-4 ft., from a woody rootstock, as thick as a crow-quill or less; nodes glabrous. *Leaves* 6-10 in., rarely $\frac{1}{2}$ in. broad, glabrous or hairy; sheath smooth or hairy; ligule obscure. *Panicle* 2-14 in., rachis faintly scaberulous; branches 1-4 in., suberect, rarely spreading, slender, not flexuous; axils bearded or ciliate. *Spikelets* rarely longer than their pedicels; gls. thin, nerves of I scabrid.

Var. *gracillima*; more slender, leaves narrower, panicle pyramidal, branches alternate very distant, spikelets more distant very shortly pedicelled.—Cochin, *Johnstone*, in wet places. Nilambar, *Lawson*.

20. **A. Lawsoni**, *Hook. f.*; tall, stout, leaves linear-lanceolate acute scabrid above, panicle tall pyramidal, rachis scabrid, branches fascicled or subverticillate erecto-patent filiform strict simple or lower branched, spikelets $\frac{1}{2}$ in. solitary or 2-nate glabrous about equalling their pedicels, gl. I = $\frac{3}{4}$ II ovate acuminate 3-5-nerved, II ovate-lanceolate acuminate 5-nerved, III obtuse 5-7-nerved, IV lanceolate scaberulous base naked, awn 0.

NILGHIRI HILLS; in swamps at Goodaloor, alt. 3000 ft., *Lawson*.

Stem erect, 3-4 ft. high, nearly as thick as the little finger below. *Leaves*, lower few, 8-12 by $\frac{3}{4}$ in., narrowed from the base to the acuminate tip, flat, rigid, upper very narrow; midrib slender; nerves very many and close, margins scabrid; sheath hairy; ligule 0. *Panicle* dull blue-purple; rachis strict and branches scaberulous; branches alternate or fascicled, lower 4-6 in. branching at the base. *Spikelets* glabrous, sessile or pedicelled, longer or shorter than their slender pedicels; gls. rather coriaceous, nerves strong.—A very distinct-looking plant, unlike any known to me, but I have seen only one specimen, and it may prove to be a form of *A. leptochloa*.

21. **A. gigantea**, *Dalz. in Dalz. & Gibs. Bomb. Fl.* 293; tall, stout, upper leaves 1-1 $\frac{1}{2}$ in. broad lanceolate base rounded or subcordate, panicle subcorymbosely thyriform, rachis stout, branches 2-4 in. densely crowded slender simple erect angular, spikelets $\frac{1}{2}$ in. 2-3 seriate secund very shortly pedicelled, gl. I = $\frac{3}{4}$ II broadly ovate acute 3-nerved, II ovate acuminate

5-nerved, III rather longer than I, obtuse 5-nerved, IV lanceolate base naked, awn 0.

The CONCAN, *Stocks*; Kineshwur, at the foot of the Ghats, *Dalz. & Gibs.*

Stem 6 ft., branched below, as thick as a goose-quill at 18 in. below the panicle, nodes swollen. *Leaves* 12-24 in., finely acuminate, subcoriaceous, many-nerved, scabrid above, glabrous or sparingly hairy, margins smooth; sheath sparingly hairy; ligule a narrow glabrous membrane. *Panicle* 5-7 in. long by 2-3 broad, brush-like, branches uniform, quite concealing the angular scabrid rachis. *Spikelets* brownish, short and broad, keel of gl. I scabrid.—A distinct-looking plant, nearest perhaps to *A. Clarkei* in inflorescence.

22. **A. blephariphylla**, *Trim. mss.*; tall, stout, leafy; leaves long broad thin smooth, margins setosely serrulate, panicle broadly oblong, branches laxly whorled spreading filiform, spikelets $\frac{1}{2}$ in. subsolitary as long as their pedicels glabrous, gl. I = $\frac{2}{3}$ II broadly ovate acute 3-nerved, II ovate acuminate 5-nerved, IV oblong subacute 5-nerved, IV lanceolate scaberulous base naked, awn 0.—*Panicum blephariphyllum*, *Trim. in Lond. Journ. Bot.* xxii. (1885) 272, *Cat. Ceyl. Pl.* 105.

CEYLON; margins of woods by the sea at Resanwelle, *Ferguson, Trimen.*

Annual? *Stem* 3 ft. and upwards, nodes glabrous. *Leaves* 12-18 by nearly 1 in., rather membranous; sheath loose; ligule obscure. *Panicle* 4-6 in.; rachis strict, nearly smooth; branches spreading or subrecurved; axils hairy.—The specimens are few, but the species appears to be a distinct one, nearest to *A. leptochloa*, which has narrower more coriaceous leaves and smaller spikelets.

23. **A. Thwaitesii**, *Hook. f.*; very slender, glabrous, leaves very narrow, panicle oblong effuse, branches capillary solitary alternate or the lower fascicled, branchlets spreading, spikelets $\frac{1}{2}$ in. solitary shorter than their capillary pedicels, gl. I = $\frac{2}{3}$ III very broadly ovate acute 3-5-nerved, II broadly ovate acuminate 5-nerved, III as long as II acute 7-nerved, IV lanceolate acute, awn 0. *A. nervosa*, var. *Thwaites mss.*

CEYLON, *Walker?*; Ambagamowa district, *Thwaites* (C.P. 3782).

Stem 2-3 ft., strict, erect; nodes glabrous. *Leaves* 4-8 by $\frac{1}{4}$ - $\frac{1}{2}$ in., finely acuminate; ligule a short ciliate membrane. *Panicle* 3-5 in., branches naked at the base. *Spikelets* more turgid and coriaceous than usual in the genus, with shorter, broader, shorter pointed, purplish glumes; IV naked at the base.—Nearly allied to *A. laxiflora*, but has much broader glumes, of which III is longer than I and about as long as II.

UNDETERMINABLE SPECIES.

A. INDICA, *Trin. mss. ex Steud. Nom. Ed.* II i. 143 = *Agrostis biseta*, *Herb. Spreng.*—Name only.

A. SPICATA, *Dalz. in Dalz. & Gibs. Bomb. Fl.* 293; stem 1 ft., leaves 1-1 $\frac{1}{2}$ by $\frac{1}{2}$ in. ensiform and sheaths hispid, spike 1 $\frac{1}{2}$ in. cylindric (as in *Setaria*) dense-flid. gl. I $\frac{1}{2}$ in. lanceolate subulate subpilose 3-nerved, upper $\frac{1}{2}$ in. long-attenuated and folded concealing the awn.—THE CONCAN, on the Mahableshwur Hills, common.

A. JAPONICA, *Duthie Grass. N W. India* 13.

13. **SETARIA**, Beauv.

Spikelets 1- rarely 2-flid., not awned, clustered on the very short branches of a spike-like or narrowly pyramidal panicle, articulate on very short pedicels which bear a persistent involucre of few or many scabrid or barbed bristles (barren branchlets). *Glumes* 4, membranous; I = about

$\frac{1}{2}$ III; II = or shorter than IV; III neuter, rarely paleate and male, 5-7-nerved; IV coriaceous, plano-convex, bisexual, triandrous. *Styles* distinct. Grain free within the hardened gl. and palea.—Species about 10, temperate and tropical.

Distinguished from *Panicum* by the involucl, but connected with it by *P. plicatum* and *S. Forbesiana*; and from *Pennisetum* by the persistent involucl and articulate deciduous spikelets. The species are for the most part difficult of limitation, and much of the synonymy requires revision.

1. ***S. italica***, Beauv. *Agrost.* 51; leaves broad, panicle dense inclined or nodding simple and cylindric or lobed or compound, bristles few smooth or with minute spreading barbs, gl. 1 oblong or subglobose nearly smooth. *Kunth Revis. Gram.* 146, *Enum. Pl.* i. 153, *Suppl.* 108; *Reichb. Ic. Fl. Germ.* t. 47; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 22; *Wall. Cat.* n. 8643; *Trim. Cat. Cevl. Pl.* 107; *Aitchis. Cat. Panjab. Pl.* 162; *Duthie Grass. N.W. Ind.* 8, *Field & Gard. Crops*, 5, t. 25, *Fodd. Grass. N. Ind.* 15; *Miq. Fl. Ind. Bat.* iii. 467; *Griseb. Fl. Brit. W. Ind.* 554. *S. asiatica*, *Hort. ex Reichb. Fl. Germ. Excurs.* 29. *S. compacta*, *Schur. Enum. Pl. Transylv.* 967, *Index.* *S. erythrosperma*, *flavida*, *persica* & *violacea*, *Hornem. ex Reichb. l. c.* *S. germanica*, Beauv. *Agrost.* 51, t. 13. *S. globularis*, *Presl. Rel. Haenk.* 407; *Miq. l. c.* *S. macrochaeta*, *Sch. Mant.* ii. 274. *S. maritima*, *R. & S. Syst.* ii. 492. *S. melinis*, *Link. ex Steud. Nom. Ed.* II. ii. 574. *S. panis*, *Jessen Deutschl. Graes.* 248. *Panicum ægyptiacum* & *sibiricum*, *Hort. ex Roem. & Sch. Syst.* ii. 493. *P. asiaticum*, *mel-frugum*, & *serotinum*, *Hort. ex Schult. Mant.* ii. 598, 599. *P. attenuatum*, *setaceum* & *setosum*, *Hort. ex Trin. Gram. Panic.* 166. *P. brevisetum*, *Doell Fl. Grossh. Bad.* 233. *P. compactum*, *Kit. in Schult. Ester. Fl. Ed.* II. i. 212. *P. elongatum*, *Salisb. Prodr.* 18. *P. germanicum* & *indicum*, *Mill. Gard. Dict. Ed.* 8, n. 1 & 3. *P. globulare*, *Steud. Nom. l. c.* 51; *Syn. Gram. l. c.* *P. glomeratum*, *Moench. Meth.* 207. *P. intermedium* & *erythrospermum*, *Vahl ex Hornem. Hort. Hafn.* i. 82. *P. italicum*, *Linn. Sp. Pl.* 56, *Host l. c.* t. 314; *Trin. Sp. Gram. Ic.* t. 188, 189; *Roxb. Fl. Ind.* i. 302; *Steud. Syn. Gram.* 51; *Dalz. & Gibs. Bomb. Fl. Suppl.* 98; *Wight Cat.* n. 1645. *P. miliaceum*, *Blanco Fl. Filip. Ed.* I. 39. *P. maritimum*, *Hort. ex Lamk. Encycl.* iv. 737. *P. pumilum*, *Link Enum. Hort. Berol.* 76. *P. vulgare*, *Wallr. in Linnæa*, xiv. (1840) 542. *Pennisetum macrochaetum*, *Jacq. Eclog. Gram.* iii. 36, t. 25; *Kunth Enum.* i. 152.—*Setaria*, *Wall. Cat.* n. 8651.—*Rheede Hort. Mal.* xii. t. 79.

HAB. Cult. throughout India, and up to 6000 ft. in the Himalaya.—DISTRIB. Most warm, temperate and tropical countries.

Stem 2-5 ft., usually branched, tufted, rooting towards the base, often robust.

Annual. *Leaves* often long broad, margins retrorsely hispid, sheath smooth, mouth bearded. *Spiciform* panicle 3-5 in. long, very variable in diameter, number and length of bristles of involucl, and size and form of gl. IV.—Possibly a cultivated form of *S. viridis*, but nothing is known of its origin, which reaches back to the period of the Swiss Lake-dwellings. It has from time immemorial been cultivated in Asia, and one form is regarded by the natives as indigenous in Japan and China (see Du Candolle l'Origine des Plantes Cultivées, p. 303). Duthie and Stewart regard some small forms as indigenous in India, but they are more probably escapes or their progeny.

2. ***S. glauca***, Beauv. *Agrost.* 51; panicle spiciform cylindric, involucl of 6-12 bristles with spreading or erect barbs, gl. IV transversely rugose. *Kunth Enum. Pl.* i. 149, *Suppl.* 106; *Wall. Cat.* n. 8639; *Griff. Notul.* 44, *Ic. Pl. Asiat.* t. 149, f. 1; *Dalz. & Gibs. Bomb. Fl.* 293; *Aitchis.*

Cat. Panjab. Pl. 162; *Trim. Cat. Ceyl. Pl.* 105; *Miq. Fl. Ind. Bat.* iii. 466; *Duthie Grass. N.W. Ind.* 8, *Indig. Fodd. Grass. t. x.*, *Fodd. Grass. N. Ind.* 14; *Griseb. Fl. Brit. W. Ind.* 554; *Benth. Fl. Austral.* vii. 492; *Reichb. Ic. Fl. Germ.* t. 47; *Boiss. Fl. Orient.* v. 442; *Baker Fl. Maurit.* 442. *S. aurea*, *Hochst. ex A. Br. in Flora*, xxiv. (1841) 276. *S. auricoma*, *Link. ex Loud. Hort. Britt.* 25. *S. chrysantha*, *Heynh. Nom.* ii. 661. *S. flava*, *Kunth Rev. Gram.* i. 46. *S. helvola*, *Roem. & Sch. l. c.*; *Miq. l. c.* 467. *S. humifusa & rubicunda*, *Dum. Obs. Gram. Belg.* 139. *S. pumila*, *Sch. Mant.* ii. 274. ? *S. sciuroidea*, *C. Muell. in Bot. Zeit.* xix. (1861) 316. *S. tejucensis*, *Kunth Enum. Pl.* i. 150. *S. Ventenatii*, *Kunth Rev. Gram.* i. 251, t. 37. *S. dasyura*, *Hort. Hal. ex Schlecht in Linnæa*, xxvi. (1853) 463. *S. penicillata*, *Nees in Wall. Cat. n.* 8640 A. B. C. E. *Panicum alopecuroides*, *Koen. ex Trin. Gram. Panic.* 162. *P. chrysanthum*, *Steud. Nom. Ed. 2*, ii. 254. *P. flavescens*, *Moench. Meth.* 206. *P. glaucum*, *Linn. Sp. Pl.* 56; *Host Gram. Austr.* ii. t. 16; *Trin. Sp. Gram. Ic.* t. 195; *Roeb. Fl. Ind.* i. 285; *Thw. Enum.* 361; *Wight Cat. n.* 1643; *Benth. Fl. Hongk.* 411; *Nees Fl. Afr. Austr.* 55, *Agrost. Bras.* 241. *P. helvolum*, *Linn. f. Suppl.* 107. *P. holcoides*, *Jacq. Eclog. Gram.* t. 22. *P. lævigatum*, *Ell. Sketch.* i. 112. *P. lutescens*, *Weig. Obs.* 20. *P. luteum*, *Guldenst. Reis.* ii. 58. *P. minimum*, *Wall. Cat.* 8641 B. *P. penicillatum*, *Willd. ex Nees Agrost. Bras.* 242; *Willd. β* (or *P. helvolum*, *Linn.*) *Wight Cat. n.* 1644. *P. polystachyum*, *Herb. Heyne ex Wall. Cat.* 8639 E. *P. pumilum*, *Poir. Encycl.* iv. 273 (ex *Kunth l. c.*). *P. Ventenatii*, *Steud. Nom. Ed. II*, ii. 265. *P. verticillatum*, *Rottl. ex Spreng. Syst.* i. 304. *P. viride*, *Poll. Hist. Pl. Palat.* i. 55. *Pennisetum glaucum & helvolum*, *Br. Prodr.* 195.

Throughout INDIA, especially in cult. ground.—DISTRIB. All warm, temp. and trop. regions.

Annual. *Stem* 1-2 ft. erect or ascending, simple or branched. *Leaves* broad or narrow, sometimes 18 by $\frac{1}{4}$ in., flat, glabrous or sparsely hairy, margins scabrid. *Spiceform panicles* cylindric, 1-7 in., dense-fld., usually yellow, rarely purplish or green, rarely interrupted; sometimes reduced to an ovoid head with very few spikelets; bristles of involucl 6-12, very variable in length, from a little longer to four times as long as the ovoid spikelet; gl. I minute; II rather shorter than III, subacute; III usually empty, sometimes paleate and male; IV broadly ovoid, very convex.

Var. macrocarpa; gl. III and IV equal and subsimilar in the ripe state, forming a subglobose crustaceous rugose sphere $\frac{1}{2}$ in. diam., III paleate empty, IV fem., bristles of involucl $\frac{1}{2}$ in. pale rufous.—The Panjab, *Aitchison*, Western Bengal and Behar, *Kurz*.—A remarkable form, but passing into the ordinary state of the plant by intermediates.

Var. parviflora, *Munro mss.*; stems 6-10 in. branched and decumbent below, leaves smaller, spiciform panicle $\frac{1}{2}$ -1 in., ovoid nearly white, bristles of involucl $\frac{1}{4}$ - $\frac{1}{2}$ in., gl. IV much less strongly rugose.—? *S. imberbis*, *Roem. & Sch.* ii. 891; *Wall. Cat. n.* 8641 A in part, B-F. *Panicum Codaea*, *Herb. Ham. in Wall. Cat. l. c.*—Kumaon, alt. 4-5000 ft., *Duthie*. Khasia Hills, alt. 5000 ft., *Clarke*. The Concan, Madras and Burma, *Wallich*.—Probably the *S. imberbis*, of Africa, &c., but a smaller plant, with very small spikes, differing in this respect and in the less rugose gl. IV from *S. glauca*.

3. ***S. intermedia***, *Roem. & Sch. Syst.* ii. 489; panicle narrowly pyramidal subspiciform or very slender with segregate clusters of involucl, bristles of involucl with spreading or suberect barbs, gl. IV small oblong subrugulose. *Kunth Enum. Pl.* i. 150; *Aitch. Cat. Panjab. Pl.* 162; *Trim. Cat. Ceyl. Pl.* 105; *Duthie Grass. N.W. Ind.* 9, *Fodd. Grass. N. Ind.* 14; *Miq. Fl. Ind. Bat.* iii. 466. *S. verticillata*, *Wall. Cat. n.* 8642 (D. in

part) *G. S. glauca*, *Hochst. Pl. Hohenack*. n. 937. *Panicum intermedium*, *Roth Nov. Sp.* 47; *Thw. Enum.* 361.

Plains and lower hills of INDIA, but not common. HIMALAYA, the PANJAB, to BENGAL, CENTRAL INDIA, and the NILGHIRI HILLS. CEYLON, in shady places, *Thwaites*.—DISTRIB. Temp. and trop. regions.

Undistinguishable from *S. verticillata* except by the barbs of the bristles of the involucl not being reversed. It is probably a common but overlooked grass.

4. ***S. verticillata***, *Beauv. Agrost.* 51; panicle subpyramidal or spiciform, lower involuclis in segregate clusters, bristles with reversed barbs, gl. IV minutely rugulose. *Kunth Enum. Pl.* i. 152; *Wall. Cat.* n. 8642 A. B. C. D in part; E. F.; *Dalz. & Gibs. Bomb. Fl.* 294; *Aitch. Cat. Panjab Pl.* 162; *Trim. Cat. Ceyl. Pl.* 105; *Duthie Grass. N.W. Ind.* 9, *Fodd. Grass. N. Ind.* 15; *Benth. Fl. Austral.* vii. 494; *Host Gram. Austr.* t. 13; *Reichb. Ic. Fl. Germ.* t. 47; *T. Nees Gen. Fl. Germ. Monoc.* n. 22. *S. floribunda*, *Spreng. Syst.* i. 305; *Wall. Cat.* n. 8642 E. *S. nubica*, *Link. Hort. Berol.* i. 220. *S. respiciens*, *Hochst. ex Miq. Fl. Ind. Bat.* iii. 467. *S. verticilliformis*, *Dum. Fl. Belg.* 150. *S. Rottleri*, *Spreng. Syst. Veg.* i. 304; *Steud. Syn. Gram.* 153. ? *S. tomentosa*, *Kunth Revis. Gram.* i. 47; *Enum. Pl.* i. 157. *Panicum Aparine*, *Steud.* 52. *P. adhaerens*, *Forsk. Fl. Egypt. Arab.* 20. *P. asperum*, *Lamk. Fl. Fr.* iii. 577. *P. floribundum*, *Willd. ex Spreng. Syst.* i. 306. *P. humile*, *Trin. Gram. Panic.* 167. *P. italicum*, *Ucria, Hort. Reg. Panorm.* 54. *P. respiciens*, *Hochst. ex Steud. l. c.* 52. *P. rude*, *Lamk. ex Steud. Nom. Ed.* 1, 589, 772. ? *P. tomentosum*, *Roeb. Fl. Ind.* i. 301. *P. verticillatum*, *Linn. Sp. Pl. Ed.* II, 82; *Roeb. Fl. Ind.* i. 301; *Thw. Enum.* 361; *Trin. Sp. Gram. Ic.* t. 202. *P. viride*, *Desf. Fl. Atlant.* i. 58. *Pennisetum verticillatum*, *Br. Prodr.* 195. *Penn. respiciens*, *A. Rich. Tent. Fl. Abyss.* ii. 379.

Throughout INDIA, in shady places, ascending the Himalaya to 6000 ft. CEYLON, not very common.—DISTRIB. Temp. and trop. regions.

Annual. Habit of *S. glauca* but usually more flaccid. Leaves sometimes 1 in. broad, scaberulous. Panicle 2–7 in. long, erect or curved, green; bristles of involucl one or few, about $\frac{1}{2}$ in. long, flexuous. Spikelets $\frac{1}{4}$ –12 in.; gl. I about = $\frac{1}{2}$ III; II about = IV which is nearly smooth and shining.

5. ***S. viridis***, *Beauv. Agrost.* 51; panicle spiciform cylindric often interrupted, bristles of involucl 3–6 with erect or spreading barbs, gl. IV oblong minutely punctulate or subrugulose. *Kunth Enum.* i. 151; *Aitch. Cat. Panjab. Pl.* 162; *Miq. Fl. Ind. Bat.* iii. 467; *Host Gram. Austr.* ii. t. 14; *Fl. Dan.* t. 352; *Reichb. Ic. Fl. Germ.* t. 47; *Boiss. Fl. Orient.* v. 443; *Benth. Fl. Austral.* vii. 494; *Griseb. Fl. Brit. W. Ind.* 554; *Duthie Grass. N.W. Ind.* 9. *S. affinis*, *Schult. Mant.* ii. 275. *S. ambigua*, *Guss. Fl. Sic. Syn.* i. 114. *S. chlorantha*, *Schur Enum. Pl. Transs.* 723. *S. decipiens*, *C. Schimp, ex Nym. Conspect.* 787. *S. imberbis* & *Weinmanni*, *Roem. & Schult. Syst.* ii. 891, 490. *S. nana*, *Dum. Obs. Gram. Belg.* 139. *S. penicillata*, *Wall. Cat.* n. 8640 D. *S. villosa*, *Beauv. Agrost.* 51. *Panicum bicolor*, *Moench. Meth.* 206. *P. cynosuroides*, *Scop. Fl. Carn. Ed.* II. i. 50. *P. humile*, *Thunb. ex Trin. Gram. Panic.* 164. *P. imberbe*, *Poir. Encycl. Suppl.* iv. 272. *P. lævigatum*, *Lam. Fl. Fr.* iii. 578. *P. psilocaulum*, *Steud. Syn. Gram.* 50. *P. purpurascens*, *Opiz. in Flora*, v. 266; *Raddi ex Nees Agrost. Bras.* 240. *P. quale* *Linnæi*, *Krock Fl. Siles.* i. 88. *P. reclinatum*, *Vill. Hist. Pl. Dauph.* ii. 64. *P. tejucense*, *Nees ex Trin. Gram. Panic.* 166. *P. virescens*, *Salzm. ex Doell in Mart. Fl. Bras.* ii. II, 157. *P. viride*, *Linn.*

Syst. Ed. x. 870; *Trin. Sp. Gram. Ic.* t. 203. Pennisetum viride, *Br. Prodr.* 195.

TEMPERATE HIMALAYA and WESTERN TIBET, ascending to 11,000 ft., but not common; rare on the plains of India. NILGHIRI HILLS? (perhaps introduced) *Heyne* (in *Herb. Wallich.* n. 8640 D.).—DISTRIB. Temp. and subtrop. regions of the Old World.

Annual. Habit of *S. glauca*, but spike-like panicle more interrupted; bristles of involucrel 3-6, usually short, green or reddish; spikelets larger and more ovoid, and gl. IV nearly smooth. *Gl.* I = about $\frac{1}{2}$ III, acute; II and III subequal, 5-7-nerved.

6. *S. gracillima*, *Hook. f.*; leaves long narrow pubescent, peduncles elongate filiform scaberulous, spike-like panicle elongate rachis capillary villous or pubescent, spikelets minute solitary or in distant shortly pedicelled clusters of 2-3, bristles 1-2 capillary most minutely scaberulous, gl. IV transversely rugulose.

CEYLON, *Gardner* (n. 968).

Whole plant 18 in. high, flaccid, very slender; stems densely tufted. *Leaves* 8-12 by $\frac{1}{2}$ in., finely acuminate, pubescent on both surfaces, base narrow; sheath narrow, mouth villous. *Peduncles* 3-4 in., quite erect, rachis hardly flexuous, pedicels pubescent, bristles erect, often solitary. *Spikelets* subglobose, glabrous, green; gl. I = $\frac{1}{2}$ III, broadly ovate, 3-nerved; II shorter than IV, 5-7-nerved; III as long as IV, subacute, 5-nerved, palea large hyaline; IV pale, coriaceous, acute.—Quite unlike any other species.

7. *S. Forbesiana*, *Hook. f.*; perennial, tall, erect, leaves linear-lanceolate base rounded, panicle narrowly pyramidal, branches short or elongate, bristles few very rigid, spikelets ovoid, glumes strongly nerved, IV minutely transversely rugulose. *Setaria macrostachya*, *Duthie Grass. N.W. Ind.* 9; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1890) 2; *Herb. Ind. Or. Hook. f. & Thoms. (vix H. B. & K.).* Panicum Forbesianum, *Nees ex Steud. Syn. Gram.* 98; *Anderss. in Walp. Ann.* vi. 948.—Panicum, *Wall. Cat.* n. 8704.

TEMPERATE HIMALAYA; from Nepal, *Wallich*, to Mishmi, *Griffith*, ascending to 5000 ft. KHASIA HILLS, alt. 2-4000 ft. The CONCAN, *Lisboa*.

Stems 3-5 ft., tufted, as thick as a duck's quill, quite smooth. *Leaves* 12-18 by $\frac{1}{2}$ - $\frac{3}{4}$ in., finely acuminate, flat, nearly smooth except the margins; sheath glabrous or margins and mouth villous; ligule of long silky hairs. *Panicle* 5-12 in., strict, rachis stout, either narrowly pyramidal with erecto-patent lower branches $\frac{1}{2}$ -1 $\frac{1}{2}$ in. long, or spiciform with short branches. *Involucrel* of few green or purple stout bristles, $\frac{1}{2}$ in. long or less. *Spikelets* $\frac{1}{10}$ - $\frac{1}{8}$ in., sessile, ovoid, green; gl. I = $\frac{1}{2}$ III, acute or obtuse, 3-nerved; II shorter than IV, orbicular, subacute or obtuse, 9-nerved; III = IV, 7-9-nerved, paleate, male or neuter; IV oblong-ovoid, subacute turgid, white.—Very near *Setaria macrostachya*, H. B. & K. of tropical America and Australia, which differs more in habit than any other characters, having a much denser panicle and the leaves very much narrowed at the base. Both are closely allied to *Panicum plicatum*, but the leaves are not plicate.

UNDETERMINABLE, &c., SPECIES.

S. ? CANESCENS, *Kunth Rev. Gram.* i. 47, *Enum.* i. 157 = *Panicum canescens*, *Roth Nov. Sp.* 54; *Steud. Syn. Gram.* 54.

S. FIELDINGII, *C. Muell. in Bot. Zeit.* xix. (1861) 323. Not an Indian grass.

S. HIRTA, *Kunth Rev. Gram. & Enum. U. c.c.* = *Panicum hirtum*, *Roth l. c.* 46. P. Rothii, *Spreng. Syst.* i. 310. Oplismenus? hirtus, *Roem. & Sch. Syst.* ii. 485. Echinochloa? hirta, *Schult. Mant.* ii. 270.

S. LUXURIANS, Willd. *Herb. ex Spreng. Syst.* i. 305; *Kunth Enum.* i. 156 = *Panicum Willdenowii*, Steud. *nom. Ed.* II. ii. 265, *Syn. Gram.* 54.

S. ASPERA, Miq. *Fl. Ind. Bat.* iii. 469.

14. PENNISETUM, Pers.

Annual or perennial grasses. Infl. of involuclate spikelets articulate (in Indian species) on the rachis of a simple spike; involucels of unequal scabrid or plumose filiform simple or branched bristles. Spikelets 1-3 in each involucl, sessile or very shortly pedicelled, inarticulate at the base and persistent, 1-2-fld., ovoid, glabrous or sparsely hairy. Glumes 3-4, I-III hyaline; I smallest or 0, II and III 5-nerved, subequal or II shortest, rarely absent; III paleate or not, male or neuter; IV coriaceous, bisexual or fem., articulate at the base and deciduous. Stamens 3, anthers long. Styles long, free or connate below. Grain free within the gl., oblong, orbicular or pyriform.—Species probably 30-40 of all warm countries.

The synonymy of the species is almost inextricable, and as here given for the Indian species is open to correction in some cases. Dr. Stapf has kindly revised them with me.

Sect. I. PENICILLARIA. Anther-cells with bearded tips. Styles connate.

P. TYPHOIDEUM, Rich. in Pers. *Syn.* i. 72; Del. *Fl. Egypt.* 17, t. 8, f. 3; Trin. *Diss.* ii. 71 (typhoides); Boiss. *Fl. Orient.* v. 447; Trim. *Cat. Ceyl. Pl.* 106; Duthie *Grass. N.W. Ind.* 11, *Field & Gard. Crops*, 30, t. 71, *Fodd. Grass. N. Ind.* 18; Lisboa, in *Journ. Bomb. Nat. Hist. Soc.* v. (1891) 339. P. alopecuroides, Spreng. *Syst.* i. 303 (in part). P. cereale, Trin. in *Mem. Acad. Petersb. Ser.* vi. iii. II (1835) 185. P. cylindricum, Sw. ex Trin. *Diss.* ii. 70. P. giganteum, Tenore ex Steud. *Nom. Ed.* II. ii. 297. P. Linnaei, Kunth *Revis. Gram.* i. 49. P. megastachyum, Steud. *Syn. Gram.* 108. P. spicatum, Roem. & Sch. *Syst.* ii. 499. P. violaceum, Rich. in Pers. *Syn.* i. 72. Penicillaria alopecuroides, Sweet *Hort. Brit. Ed.* I. 440; A. Braun *Ind. Sem. Hort. Berol.* (1855), *App.* 25. Penic. ciliata, Willd. *Enum. Hort. Berol.* 1037. Penic. chinensis, Nees ex A. Br. l. c. 26. Penic. cylindrica, Roem. & Sch. l. c. 498 (non Nees). Penic. fallax, Fig. & Not. in *Mem. Acad. Tör.* II, xii. (1852) 371. Penic. involucrata, Schult. *Mant.* ii. 283; Schlecht. in *Linnæa*, xxv. (1852), 565. Penic. nigritarum & Sieberiana, Schlecht. l. c. 561, 565. Penic. Plukeneti, Link *Enum. Hort. Berol.* i. 221; Nees *Fl. Afr. Austr.* 72. Penic. Roxburghii, A. Br. & Bouché *Ind. Sem. Hort. Berol. l. c.* 26. Penic. typhoidea & Raddiana, Fig. & Not. l. c. 371, 373. Penic. solitaria, Stokes *Bot. Mat. Med.* i. 129. Penic. spicata, Willd. l. c.; Beauv. *Agrost.* 58, t. 13, f. 4; Wall. *Cat. n.* 8644; Anderss. in *Walp. Ann.* vi. 966; Kunth *Enum. Pl.* i. 165, *Suppl.* 120, t. 11, f. 1; Jacq. *Éclog. Gram.* t. 17; Aitchis. *Cat. Panjab. Pl.* 163. *Panicum spicatum*, Roxb. *Fl. Ind.* i. 283. *Pan. americanum*, Linn. *Sp. Pl.* 56. *Cenchrus alopecuroides*, Thunb. *Prodr. Fl. Cap.* 24. C. paniceus, Heyne ex Wall. *Cat. n.* 8650. C. spicatus, Cav. *Descr.* 304, 614. *Holcus paniciformis*, Roxb. *Ic. ined.* n. 896. H. racemosus, Forsk. *Fl. Æg. Arab.* 175. H. spicatus, Linn. *Syst. Ed.* x. 1305; Grah. *Cat. Bomb. Pl.* 238; Dalz. & Gibs. *Bomb. Fl. Suppl.* 99. *Alopecurus indicus*, Linn. *Syst. Ed. Murray* 92 (excl. *Syn. Pluk.*). A typhoides, Burm. f. *Fl. Ind.* 27.—Penicillaria, Wall. *Cat. n.* 8644, 8650.

Throughout the hotter parts of INDIA, cultivated or an escape; also all Africa and S. Europe.

Annual. Stem 3-6 ft., erect, simple, or branched from the root, slender or stout, sometimes as thick as the middle finger at the base, solid, leafy, upper nodes glabrous or woolly, lower rooting. Leaves 1-3 ft. by $\frac{1}{4}$ -2 in., lanceolate, spreading and drooping, flat, more or less hairy; midrib stout or slender; sheath rather inflated; ligule of hairs. Peduncle more or less woolly below the spike. Spike 6-12 in. by $\frac{1}{4}$ -1 $\frac{1}{2}$ in. diam., erect, cylindric, dense-fld.; rachis hairy or woolly, branchlets 1-8-fld., concealed by the densely packed spikelets; bristles of involucl more or less unilateral, as long as the spikelets or longer, scabrid and ciliate, white or cold. Spikelets $\frac{1}{6}$ - $\frac{1}{3}$ in., usually solitary in the involucl, oblong ovate or ovate-lanceolate, pedicelled, pedicel ciliate; gl. I minute or 0, $\frac{1}{2}$ -orbicular or subquadrate, 1-3-nerved; II very variable in length, sometimes absent, usually $\frac{1}{2}$ - $\frac{1}{2}$ IV, subquadrate, truncate, obtuse or retuse 3-nerved, very rarely as long as IV and coriaceous; III ovate-oblong, obtuse or truncate and apiculate, 5-nerved, epaleate or paleate, and male or neuter, rarely bisexual; IV coriaceous or herbaceous, ovate, acute, 5-7-nerved; palea very broad, truncate, ciliate at the tip and dorsally, nerves 2 approximate excurrent. Lodicules 0. Anthers linear. Grain oblong, obovoid, or pyriform, smooth, free, and top exposed.—Only known in cultivation or as an escape, and it is difficult to say whether the many known forms originated in one or more species. Alph. De Candolle unfortunately does not include it in his "Origine des Plantes Cultivées." Its abundance throughout Africa would point to that continent as its source. There are very great differences in the number, sizes, and shapes of the glumes, of I and II especially, which are not unfrequently both absent. The materials are not sufficient to enable me to attempt a classification of the numerous forms cultivated or growing as escapes in India. To do this would require an exhaustive examination of the African forms, of which there are legions. I can only refer to Schlechtendahl's paper in the *Linnæa*, xxv. (1852) 530, to Kornicke & Werner's *Handb. der Getreidebaues* (i. 291), and to Braun's descriptions of 22 cultivated forms, chiefly African, in *Walp. Ann.* vi. 961. Roxburgh alludes to five varieties as cultivated in India, but does not distinguish them. The following five are selected as noteworthy.

1. Tall, very stout, leaves broad, spike very stout (Typha-like), 8-12 by 1-1 $\frac{1}{2}$ in. diam., involucl on long ciliate pedicels with sometimes a superposed one, bristles much longer than the spikelets, dark brown; spikelets clustered in the involucl or chiefly in the upper involucl if present, ovoid or oblong, gl. I minute semilunar or 0, II 0 or like I or larger and quadrate truncate 3-lobed 3-nerved, III = IV 5-nerved, paleate, palea very broad quadrate entire or 2-fld. 2-nerved dorsally villous, IV 7-nerved emarginate apiculate, palea as in III.—The largest cult. form. *Wall. Cat.* n. 8644.

2. Spike cylindric 7 by $\frac{3}{4}$ in., involucl shortly pedicelled, bristles shorter than the spikelet pale, spikelets 1-3 $\frac{1}{10}$ in., gl. I and II minute semilunar, III broadly oblong paleate and 3-nerved, palea dorsally villous, IV 7-nerved nerves and margins ciliate, palea as in III.—N.W. India, *Royle*.

3. Tall, erect, spike 4-5 in., stem densely villous towards the top, involucl shortly pedicelled, bristles longer than the spikelets pale or purplish, spikelets subsolitary $\frac{1}{2}$ in. elliptic-lanceolate, gls. 3, I 0, II = $\frac{1}{2}$ - $\frac{2}{3}$ IV oblong truncate 5-nerved paleate, III ovate cuspidate 5-nerved.—A very common cult. form. Lahore, *Stewart*.—*Alopecurus indicus*, *Hb. Heyne*.

4. Stem slender 12-18 in., leaves very narrow, spike 1 in. rather slender, involucl shortly pedicelled, bristles longer than the spikelet, pale, spikelets subsolitary ovate, gls. 3, I minute semilunar, II = $\frac{1}{2}$ III subquadrate 3-nerved, III ovate tip truncate and mucronate strongly 5-nerved, nerves and tip ciliate.—Monghyr.

5. Spike 4-7 in., involucl shortly pedicelled, bristles much longer than the spikelets very pale, spikelets $\frac{1}{4}$ - $\frac{1}{2}$ in. narrowly lanceolate, glumes 3 all membranous, I minute, II = $\frac{1}{2}$ III oblong truncate 3-nerved, III elliptic-lanceolate strongly 3-nerved tip emarginate mucronate, palea narrow oblong-lanceolate smooth, anther cells most minutely bearded, ovary produced into a flexuous compressed twisted

awn an inch long. *Penicillaria cylindrica*, R. & S.; *Wight Cat.* n. 1662.—A diseased form.

Sect. II. *PENNISETUM* proper. Anther-cells not bearded.

* Bristles of involucl all free to the base, slender.

† Bristles branched.

1. ***P. lanatum***, Klotzsch in *Bot. Erg. Waldem. Reise*, 65, t. 93. *P. sericeum*, Munro mss. *P. nepalense*, Griseb. in *Goett. Nachr.* (1868) 302 (non Spreng.)

WESTERN HIMALAYA, alt. 7–9000 ft.; from Kashmir to Garwhal, and WESTERN TIBET, Jacquemont, &c.

Perennial; rootstock often stout, woody, creeping and branching; stem 1–3 ft. Leaves 6–18 by $\frac{1}{2}$ – $\frac{1}{2}$ in., flat, glabrous hairy or silkily villous. Spikes 2–5 in., $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., pale green; peduncle and rachis more or less villous; involucl pedicelled, densely imbricate. Spikelets $\frac{1}{2}$ in., solitary in the involucl, rather shorter than the scabrid and sparsely ciliate branching bristles; gl. I = $\frac{1}{4}$ III, ovate, acute; II = $\frac{1}{2}$ IV, oblong, obtuse, 3-nerved, III and IV lanceolate, acuminate, 5-nerved.

†† Bristles unbranched, scaberulous, not or sparingly ciliate.

2. ***P. Alopecuros***, Steud. *Syn. Gram.* 102 (non Jacq.); peduncle and rachis of spike glabrous, spikelets $\frac{1}{2}$ in. solitary narrowly lanceolate, gl. I minute, II = $\frac{1}{3}$ III oblong obtuse 1–3-nerved, III lanceolate acuminate 7–11-nerved, IV subulate-lanceolate 5-nerved. Duthie *Grass. N.W. Ind.* 10; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1890) 338. *P. Hohenackeri*, Hochst. ex Steud. l. c. 103. *P. aureum*, Dalz. & Gibs. *Bomb. Fl.* 294; ? *Link. Hort. Berol.* i. 215. *Gymnothrix Alopecuros*, Nees in *Wight Cat.* n. 1663; Steud. l. c. *G. cenchroides*, Roem. & Sch. *Syst.* ii. 499; *Kunth Enum. Pl.* i. 155; *Wight ex Steud. Syn. Gram.* 102. *Cenchrus hordeiformis*, Herb. *Rottl. ex Steud. l. c.* 102 (non Thunb.). *Panicum helvolum*, Herb. *Madr. ex Wall. Cat.* n. 8652 A. *Pan. hordeiforme*, Thunb. *Fl. Japon.* 46 (partly). —*Gymnothrix* ? *Wall. Cat.* n. 8652.

RAJPUTANA; swamps on Mt. Abu, Duthie. The CONCAN, Stocks, &c. NILGIRI HILLS, alt. 5500 ft.

Perennial. Stems 2–3 ft., stout, erect, densely tufted below, subdistichously branching upwards; branches strict, erect. Leaves 12–18 by $\frac{1}{10}$ – $\frac{1}{8}$ in., coriaceous, convolute, glabrous, base and flattened distichous sheath often villous; ligule of hairs. Spikes 5–7 in., usually pale green; rachis flexuous; involucl very shortly pedicelled; bristles few, very unequal, nearly straight, longest 2–3 times as long as the spikelet, bases quite free; gl. I suborbicular.—Habit of *P. compressum*. The *P. aureum* of the Bombay Flora is, I do not doubt, *P. Alopecuros*, but what *P. aureum* of Link may be is uncertain.

3. ***P. flaccidum***, Griseb. in *Goett. Nachr.* (1868) 86; peduncle and rachis of spike glabrous, spikelets $\frac{1}{2}$ in. solitary ovate-lanceolate, gl. I very small orbicular or 0, II = $\frac{2}{3}$ IV lanceolate 5-nerved, III and IV ovate-lanceolate subsetaceously acuminate 5-nerved. Duthie *Grass. N.W. Ind.* 10. *P. mongolicum*, Franch. mss. *Gymnothrix flaccida*, Munro ex Aitchis. *Cat. Panjab. Pl.* 163.

Temperate and alpine HIMALAYA, alt. 5–11,000 ft.; from Kashmir to W. Nepal and WESTERN TIBET.—DISTRIB. Affghan., Central Asia.

Perennial. Stem 6–24 in., densely tufted, creeping below, branching at the base only, slender above. Leaves 5–10 by $\frac{1}{2}$ – $\frac{1}{4}$ in., flat, glabrous or sparsely hairy, base

contracted, mouth of the often ciliate sheath bearded. *Spikes* 2-6 in., rather slender, very pale, often flexuous; involuclers subsessile; bristles nearly straight or flexuous, one often very much the longest, all free to the base.

4. **P. compressum**, Br. *Prodr.* 193; tip of peduncle and rachis of spike more or less villous, spikelets $\frac{1}{4}$ in. solitary lanceolate, gl. I minute or 0, II = $\frac{3}{5}$ III ovate-lanceolate acute or obtuse 1-nerved, III ovate acuminate 5-7-nerved epaleate, IV = III 5-nerved. *Schrad. in Linnæa*, xii. (1838) 431; *Benth. Fl. Austral.* vii. 495; *Steud. Syn. Gram.* 102. *P. alopecuroides*, *Spreng. Syst.* i. 303 (in part). *P. chinense*, *Steud. l.c.* 108. *P. cynosuroides*, *Wall. Cat.* n. 8653. *P. hordeiforme*, *Spreng. Syst.* i. 302. *P. nigricans*, *Trin. ex Steud. Nom. Ed. II.* ii. 297, *Syn. Gram.* 103. *P. japonicum*, *Trin. in Spreng. Neue Entdeck.* ii. 76, *Diss.* ii. 63, *Pan. Gen.* 88, *Sp. Gram. Ic.* t. 19; *Franch. et Savat. Enum. Pl. Jap.* ii. 164. *Penicillaria chinensis*, *Nees ex Steud. l.c.* *Gymnothrix compressa*, *Brongn. Voy. Cog. Bot.* 103. ? *G. cenchroides*, *Roem. & Sch.* i. 499 (in part). *G. hordeiformis*, *Nees in Linnæa*, vii. (1832) 276. *G. japonica*, *Kunth Enum. Pl.* i. 158. *G. nigricans*, *Presl Rel. Haenk.* i. 315. *G. purpurascens*, *Sw. ex Trin. Diss.* ii. 64, *Pan. Gen. l.c.* ? *Cenchrus hordeiformis*, *Thunb. Prodr. Pl. Cap.* 24. *C. purpurascens*, *Thunb. in Trans. Linn. Soc.* ii. (1794) 329. *Setaria compressa*, *Kunth Revis. Gram.* 46, *Enum.* i. 150. *Panicum alopecuroides*, *Linn. Sp. Pl.* 55. *P. aristidoides*, *Willd. ex Spreng. Syst.* i. 302. *Pan. asperum*, *Link. Enum. Hort. Berol.* i. 75 (non *Sch. l.*). *Pan. hordeiforme*, *Thunb. Fl. Jap.* 46, t. 9 (excl. cit. Afr.). ? *Alopecurus hordeiformis*, *Linn. Sp. Pl.* 60.—*Gymnothrix*, *Wall. Cat.* n. 8653.

BURMA; Taong Dong, *Wallich*; Shan Hills, alt. 4000 ft., *Manders*.—DISTRIB. China, Japan, Tonkin, Australia.

Perennial; stem 1-2 ft., densely tufted. *Leaves* 12-18 in., very narrow, convolute, silkily villous towards the base; sheath glabrous or ciliate; ligule obscure. *Spikes* 2-4 in., purplish in Indian specimens; involuclers pedicelled, pedicels villous; bristles few, very unequal, one or two much longer than the rest and an inch long, all free at the base.—*Trinius* refers to *P. compressum*, the *Alopecurus hordeiformis*, *Linn.* (*Cenchrus hordeiformis*, *Thunb.*, *Gymnothrix cenchroides*, *R. & S.*), which appear to me to be more probably *P. Alopecurus*.

5. **P. dichotomum**, *Delile Fl. Egypt.* 159, t. 8, f. 1; stem dichotomously branched rigid, peduncle and rachis glabrous, spikelets $\frac{1}{4}$ in. usually solitary lanceolate, gl. I = $\frac{3}{5}$ III ovate-lanceolate acuminate, II = III lanceolate acuminate 5-7-nerved, III = IV both 5-nerved. *Trin. Diss.* ii. 66, *Pan. Gen.* 94; *Kunth Enum. Pl.* i. 161, *Suppl.* 110; *Steud. Syn. Gram.* 105; *Boiss. Fl. Orient.* v. 444; *Aitchis. Cat. Panjab. Pl.* 162; *Duthie Grass. N.W. Ind.* 10. *P. phalaroides*, *Schult. Mant.* ii. 147; *Nees Agrost. Bras.* 283. *Gymnothrix longiglumis*, *Munro in Cat. Griff. &c. Pl.* 56 (name). *Cenchrus ramosissimus*, *Poir. Encycl.* vi. 51; *Dalz. & Gibs. Bomb. Fl.* 294. *Phalaris setacea*, *Forsk. Fl. Egypt. Arab.* 20. *Panicum dichotomum*, *Forsk. l.c.*; *Steud. l.c.* 105.

PANJAB and the N.W. PROVINCES (fid. *Duthie*). PESHAWUR, *Aitchison*. SIND and GUZERAT; on sand hills, *Stocks*.—DISTRIB. Affghan. and westwards to N. Africa.

Perennial, quite glabrous, bushy. *Stems* distantly branched; internodes long, rigid, polished; branches sometimes fascicled. *Leaves* short, rigid, convolute. *Spikes* 3-5 in., cylindric, pale, nearly white; rachis scabrid; bristles of sessile involucler, very many, slender, flexuous, pale, the longer nearly twice as long as the spikelet, inner stouter somewhat plumose, all free at the base.—I have seen no specimens from the Panjab or the N.W. Provinces.

6. **P. parviflorum**, *Trin. Diss.* ii. 65, *Sp. Gram. Ic.* t. 288; annual, erect, peduncle and rachis glabrous, spike very narrow purple, spikelets $\frac{1}{2}$ in. solitary narrowly lanceolate, gl. I minute suborbicular, II longest truncate cuspidate 5-nerved, III = $\frac{3}{4}$ II truncate toothed 5-nerved paleate male, IV = III lanceolate obtuse nerveless shining. *Steud. Syn. Gram.* 103. *P. imberbe*, *Edgew. in Journ. Linn. Soc.* xxi. (1852) 181 (name); *Steud. Syn. Gram.* 104; *Duthie Grass. N.W. Ind.* 10, *Indig. Fodd. Grass.* t. 50, *Fodd. Grass. N. Ind.* 18. *Gymnothrix hordeoides*, *Kunth Revis. Gram.* i. 48, *Enum.* i. 60. *Panicum hordeoides*, *Poir. in Lam. Illust.* i. 170. *Alopecurus rubicundus*, *Herb. Ham. ex Wall. Cat.* n. 8646 B.

RAJPUTANA; at Oodeypore, Wingate (*Herb Duthie*). BEHAR, on Parusnath, and at Hazaribag¹, *Clarke*.—DISTRIB. tropical Africa.

Stem 2-3 ft., branching upwards, leafy, branches erect. *Leaves* 4-10 by $\frac{1}{2}$ - $\frac{3}{4}$ in., flat, base and mouth of sheath ciliate. *Spikes* 3-5 by $\frac{1}{4}$ - $\frac{1}{2}$ in. diam.; rachis very slender, strict, as it were crenate from the projections between the close-set spikelets; bristles of sessile involucl very slender, quite free, a few 4-6 times as long as the spikelet.—Closely allied to *P. setosa*. Probably not indigenous in India.

†† *Bristles unbranched, inner copiously ciliate or lanate.*

7. **P. orientale**, *Rich. in Pers. Syn.* i. 72; perennial, rachis of spike hairy, spikelets 2-5 in each pedicelled involucl $\frac{1}{6}$ in. lanceolate, gl. I = III ovate or oblong nerveless, II shorter than IV ovate-lanceolate acuminate 3-nerved, III longest aristately acuminate 5-nerved, IV oblong-lanceolate aristate shining. *Trin. Diss.* ii. 69; *Kunth Enum. Pl.* i. 162, ii. 117; *Griseb. in Ledeb. Fl. Ross.* iv. 472; *Coss. & Dur. Fl. Alger.* ii. 39; *Boiss. Fl. Orient.* v. 445; *Duthie Grass. N.W. Ind.* 10. *P. araneosum*, *Edgew. in Journ. Beng. As. Soc.* xxi. (1852), 180; *Steud. Syn. Gram.* 105; *Aitchis. Cat. Panjab Pl.* 162; *Duthie Grass. N.W. Ind.* 10. *P. asperifolium*, *Kunth Revis. Gram.* i. 49, *Enum. Pl. l.c.* *P. elatum*, *Hochst. ex Steud. Nom. Ed.* II. ii. 297. *P. fasciculatum*, *Trin. in Mem. Acad. Petersb. Ser.* 6, iii. II. (1835) 181. *P. Griffithii*, *Munro Cat. Pl. Griff. &c. ined.* 56. *P. macrostachyum*, *Fresen. in Mus. Senkenb.* ii. 135 (non *Trin.*). *P. persicum*, *Boiss. & Buhse in Nov. Mem. Soc. Nat. Mosc.* xii. (1860) 232. *P. phalariforme*, *Steud. Syn. Gram.* 106 (ex *descript.*). *P. Ruppellii*, *Steud. Nom. l.c.* 298. *P. sinaicum*, *Decne in Ann. Sc. Nat. Ser.* 2, ii. (1834) 11; *Aitchis. l.c.* *Duthie l.c.* *P. tenue & variabile*, *Fig. & Notar. in Mem. Accad. Torin Ser.* 2, xii. (1852), 246, 248. *P. tiberiadis*, *Boiss. Diagn. Ser. I. xiii.* 43. *Cenchrus asperifolius*, *Desf. Fl. Atlant.* ii. 388. *C. hordeiformis*, *Pers. l.c.* 71 (non *Lamk.*). *C. orientalis*, *Willd. ex Trin. Diss.* ii. 69; *Kunth l.c.* 162. *Panicum orientale*, *Willd. Enum. Hort. Berol.* ii. 1031.

WESTERN HIMALAYA, from Kashmir to Kumaon, alt. 3-6000 ft. The PANJAB, SINDH, the CONCAN and BEHAR (on Parusnath, alt. 2000 ft., *Clarke*).—DISTRIB. Westward to Asia Minor and N. Afr.

Stem 2-6 ft., erect or ascending from a densely tufted often stout creeping branching rootstock. *Leaves* 1-2 ft. by $\frac{1}{2}$ - $\frac{1}{2}$ in., narrowly linear, flat or subconvolute, glabrous or hairy. *Spike* 5-16 in.; rachis stout, subterete, not grooved or notched; pedicels of involucl hispid; bristles $\frac{3}{4}$ - $\frac{1}{2}$ in., all very slender, flexuous, often purplish, very unequal, villous below, quite free at the base; spikelets on the short branches of a hispid pedicel, outer often imperfect.

Var. triflorum, *Stapf mss.*; spike elongate dense-flowered. *P. triflorum*, *Nees in Herb. Royle*; *Steud. l.c.* 107.

8. **P. pedicellatum**, *Trin. in Mem. Acad. Petersb. Ser.* vi. iii.

II. (1835) 184; annual, spikes dense-fld., rachis glabrous, spikelets $\frac{1}{2}$ in. solitary or geminate shortly pedicelled in the sessile involucl., bristles densely villous, gl. I very small oblong woolly, II broadly oblong apiculate 7-nerved, III = IV truncate 5-nerved tip toothed, IV lanceolate acute smooth shining. *P. lanuginosum*, *Hochst. in Flora* xxv. (1842), *Beibl.* i. 133; *A. Rich. Tent. Fl. Abyss.* ii. 385; *Steud. Syn. Gram.* 107; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1891) 339. *P. amoenum*, *A. Rich. l.c.* 386. *P. lanatum*, *Herb. Ham. ex Wall. Cat. n.* 8647. *P. implicatum*, *Steud. l.c.* 107 (*ex descr.*). *P. intertextum*, *Schlecht. in Bot. Zeit.* ix. (1851) 878. *Eriochaeta densiflora*, *nervosa* & *secundiflora*, *Fig. et De Not. in Mem. Acc. Torin. Ser. II. xiv.* (1854) 375-378.—*Pennisetum*, *Wall. Cat. l.c.*

RAJPOOTANA and BANDA; on Mt. Abu, *Duthie*. BEHAR, at Monghyr, *Hamilton*; Hazaribagh and on Parusnath, *Clarke*.—DISTRIB. Afr. trop.

Stems 1-3 ft., branched from the base and above, leafy. *Leaves* 6-10 by $\frac{1}{8}$ - $\frac{1}{2}$ in., flat, flaccid, glabrous or sparsely hairy. *Spikes* 2-5 in.; rachis notched; involucl. quite sessile; outer bristles short, inner $\frac{1}{2}$ in. long, densely villous below the middle, flexuous, very unequal, pale. *Spikelets* with the pedicel and often the base of the lower glumes woolly; tip of gl. IV hispid.

9. *P. setosum*, *Rich. in Pers. Syn.* ii. 729 (*excl. syn.*); annual, peduncle and rachis of spike glabrous, spikelets $\frac{1}{10}$ in. solitary in the sessile involucl., bristles $\frac{1}{4}$ - $\frac{1}{3}$ in. sparsely ciliate, gl. I minute or 0, II oblong cuspidate 5-nerved, III shorter than II oblong truncate 3-toothed 5-nerved, IV ovoid tip ciliate. *Trin. Diss.* ii. 66, *Pan. Gen.* 95, *Sp. Gram. Ic. t.* 20; *Nees in Mart. Fl. Bras.* ii. II. 305; *Griseb. Fl. Brit. W. Ind.* 555; *Baker Fl. Maurit.* 441. *P. barbatum*, *Schult. Mant.* ii. 147; *Nees Agrost. Bras.* 283; *Kunth Enum. Pl.* i. 163; *Steud. Syn. Gram.* 108. *P. breve*, *Nees l.c.* 281. *P. ciliatum*, *Parl. in Hook. Niger Flora*, 184. *P. ciliaries*, *Herb. Ham. ex Wall. Cat. n.* 8640 A. *P. dasystachyum*, *Desv. Opusc. (ex descr.)* 76. *P. elegans*, *Nees ex Steud. l.c.* 105. *P. flavescens*, *Presl Rel. Hænk. i.* 316 (*ex descr.*). *P. hirsutum*, *Nees Agrost. Bras.* 284. *P. holcoides*, *Schult. l.c.* 148; *Duthie Grass. N. W. Ind.* 10, *Indig. Fodd. Grass. t.* 49, *Fodd. Grass. N. Ind.* 17. *P. gracile*, *Benth. in Hook. Niger Fl.* 564. *P. intertextum*, *Herb. Ham. ex Wall. Cat.* 8648. *P. myurus*, *Parl. in Atti Riun. Ott. Sc. Ital.* 586. *P. pallidum*, *Nees Agrost. Bras.* 185 (*ex descr.*). *P. polystachyum*, *Schult. l.c.* 146; *Nees in Hook. Niger Fl.* 563. *P. purpurascens*, *H.B. & K. Nov. Gen. & Sp.* i. 113; *Nees l.c.* 282; *Kunth l.c.* 160. *P. Richardi*, *Kunth Revis. Gram.* i. 49, 255, t. 39, *Enum.* 161. *P. Sieberi*, *Kunth Revis. i.* 49 (*ex parte*) ii. 877. *P. tenuispiculatum*, *Steud. l.c.* 107 (*ex descr.*) *P. triticoides*, *Roem. & Sch. Syst.* ii. 877. *P. uniflorum*, *H.B. & K. l.c.* t. 34. *P. violaceum*, *Hort. ex Trin. Diss.* ii. 67 (*non Rich.*). *Gymnothrix Thouarii*, *Herb. Ham. ex Wall. Cat. n.* 8645 A. (*non Beauv.*). *Penicillaria ciliaris*, *Herb. Ham. l.c.* n. 8646 A. *Panicum Alopecuroides*, *Lamk. Ill. i.* 169; *Encycl. iv.* 739. *Pan. barbatum*, *Roxb. Fl. Ind. i.* 282; *Wall. Cat. n.* 8646 C. *Pan. cenchroides*, *Rich. in Act. Soc. Hist. Nat. Par. i.* (1792) 106. *Pan. densispica*, *Poir. Encycl. Suppl. iv.* 273. *Pan. holcoides*, *Roxb. l.c.* 285, *Ic. ined. n.* 784. *Pan. polystachyum*, *Schult. Mant.* ii. 146. *Pan. triticoides*, *Poir. l.c.* 274. *Setaria cenchroides*, *Roem. & Sch. Syst. ii.* 495. *Cenchrus setosus*, *Sw. Prodr. Veg. Ind. Occ.* 26 (*excl. syn.*).—*Penniseti* sp., *Wall. Cat. n.* 8646, 8648.

UPPER GANGETIC PLAIN, at Cawnpore (*Herb. Wight*). The CIRCARS; in cultivated ground among the mts., *Roxburgh*. BENGAL, BEHAR, and CHOTA NAAGPORE. —DISTRIB. Afric. and Amer. trop.

Stem erect, often stout and fastigiately branched at the nodes, green or purplish. *Leaves* 6–10 by $\frac{1}{4}$ – $\frac{1}{2}$ in., flat, flaccid, glabrous or hairy. *Spikes* few or many, 2–4 in., usually purplish brown; rachis slender, deeply pitted; involucels close-set, at length spreading; bristles laxly but copiously ciliate below the middle, all slender and free at the base; gl. II. suddenly or gradually cuspidate; III with two obtuse lateral teeth at the tip and an acute median. *Styles* free at the base.—Possibly not indigenous in India.

10. **P. borbonicum**, *Kunth Revis. Gram.* i. 259, t. 41, *Enum. Pl.* i. 162, *Suppl.* 118; habit, &c. of *P. setosum*, but spikes longer 1 in. diam. across the bristles, spikelets $\frac{1}{2}$ in., gl. II much longer than III acuminate. *Gymnothrix Thuarii*, *Beauv. Agrost.* 59. *G. Thouarii*, *Steud. Nom. Ed.* II.; 386. *Panicum longisetum*, *Poir. Encyc.* iv. 275 (*Excl. Syn. Beauv.*).—*Pennisetum* sp. *Wall. Cat.* n. 8645.

BENGAL; at Serampore, *Carey*; margins of fields, &c., *Kurz*. SILHET, *Griffith*.—DISTRIB. Bourbon.

A very doubtful native of India.

** Inner bristles of involucl dilated below, their bases confluent in a coriaceous disk.

11. **P. cenchroides**, *Rich. in Pers. Syn.* i. 72; peduncle and rachis of spike glabrous, spikelets $\frac{1}{2}$ in. 1–3 in each pedicelled involucl, gl. I = $\frac{1}{2}$ III ovate acuminate nerveless, II = $\frac{1}{2}$ IV ovate acuminate 1-nerved, III oblong truncate 5-nerved, IV lanceolate truncate or cuspidate. *Beauv. Agrost.* 59, t. 13, f. 5; *Trin. Fund. Agrost.* 171, t. xv., *Diss.* ii. 69, *Pan. Gen.* 93; *Nees Agrost. Bras.* 184, *Fl. Afr. Austr.* 70, in *Linnæa*, vii. 162; *Kunth Enum. Pl.* i. 162; *Suppl.* 119; *Parlat. Fl. Ital.* i. 108, in *Webb. & Berth. Phyt. Canar.* iii. III. 380, t. 244; *Steud. Syn. Gram.* 105; *Boiss. Fl. Orient.* v. 445; *Baker Fl. Maurit.* 441; *Wall. Cat.* n. 8649; *Aitchis. Cat. Panjab.* Pl. 162; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1891) 338; *Duthie Grass. N.W. Ind.* 10, *Indig. Fodd. Grass.* t. 12, 13, *Fodd. Grass. N. Ind.* 17. *P. ciliare*, *Link. Hort. Berol.* i. 213; *Coss. & Dur. Fl. Alger.* ii. 38. *P. incomptum*, *Nees ex Steud. l. c.* 105 (*ex descr.*). *P. distylum*, *Guss. Ind. Sem. Hort. Bocc.* 8, *Fl. Sic. Prodr.* i. 12; *Bertol. Fl. Ital.* i. 393. *P. petreum*, *Steud. l. c.* 106. ?*P. Vahl.*, *Kunth Revis.* i. 49. *P. rufescens*, *Spreng. Syst.* i. 302; *Kunth l. l. c. c.* 162, ii. 117. *Steud. l. c.* *Cenchrus Anjania*, *Herb. Ham. ex Wall. Cat.* n. 8649 B. *C. ciliaris*, *Linn. Sp. Pl.* 302; *Desf. Fl. Atlant.* ii. 387. *C. digynus*, *Schreb. ex Boiss. l. c.* 449. *C. longifolius*, *Hochst. ex Steud. l. c.* *C. mutabilis*, *Wight. Herb.* *C. pennisetiformis*, *Hochst. et Steud. ex Boiss. l. c.* 448. *C. rufescens*, *Desf. l. c.* 388. *Panicum vulpinum*, *Willd. Enum. Hort. Berol.* 1031.

Plains and low hills throughout WESTERN INDIA, from Kashmir to the Upper Gangetic plain and southwd. (Absent from Ceylon).—DISTRIB. Westwd. to Sicily, trop. Afr. and the Canaries.

Stems tufted, 6–18 in., erect or decumbent and much branched from the base, stout or slender, leafy, or ascending from a branching often nodose rootstock, the sheaths of which are often woolly. *Leaves* 6–10 by $\frac{1}{4}$ – $\frac{1}{2}$ in., glabrous hairy or villous. *Spikes* $1\frac{1}{2}$ –4 in., pale, rarely purplish; peduncle often flexuous; rachis scaberulous; involucels subsessile, outer bristles slender, squarrosely spreading; inner twice as long as the spikelets, thickened and ciliate below, filiform flexuous and scabrid above. *Spikelets* 3, polygamous, gl. III male or sometimes fem. with an obcordate ovary; IV coriaceous; styles nearly free at the base.

Var. *echinoides*; inner bristles of the involucl shortly connate above the basal disk. *Cenchrus echinoides*, *Wight ex Steud. Nom. Ed.* II. i. 317; *Syn. Gram.* 109.

C. bulbosus, *Fresen. ex Steud. l. c.* *C. pennisetiformis*, *Hochst. ex Steud. l. c.* 109. *C. setigerus*, *Herb. Heyne ex Wall. Cat. n. 8649 A.*; *Aitchis. Cat. Panjab. Pl.* 162. *O. lappaceus*, *Tausch in Flora XX.* (1837) 57.—The Panjab, Upper Gangetic Plain, and Deccan Peninsula, Arabia, Africa, Madeira. A nearer approach to *Cenchrus* than *P. cenchroides*, but at once distinguishable from that genus by the filiform tips of the bristles of the involucrel. It occurs here and there in the same areas as *P. cenchroides*, and passes into it.

12. **P. Prieurii**, *Kunth Revis. Gram. ii.* 411, t. 119, *Enum. Pl. i.* 162, *Suppl.* 119; habit of *P. cenchroides*, but involucrel nearly twice as large, the longer bristles $\frac{3}{4}$ in. long, the spikelets one or two sessile and gl. I minute or 0. *Steud. Syn. Gram.* 105. *Cenchrus macrostachyus*, *Hochst. ex Steud. l. c.* 109.

The PANJAB; *Drummond (Herb. Duthie)*. RAJPUTANA; at Jeypoor, *Duthie*.—DISTRIB. Afr. trop.

Quite glabrous. Stems tall, slender, erect, or short prostrate stout and much branched, with geniculate leafy branches. Leaves 1–8 in., rigid, narrow with filiform tips, scaberulous; sheath inflated; ligule of very fine hairs. Spikes on long exserted or short included peduncles, 2–4 in. long, $1\frac{1}{2}$ in. diam. across the bristles, very pale; rachis slender, geniculately flexuous, compressed, quite smooth; involucrels subsessile; bristles 1 in. flexuous, dilated and ciliate below. Spikelets $\frac{1}{2}$ in.; gl. I 0; II = III both ovate-lanceolate, cuspidately acuminate, 5-nerved; IV like III, but rather longer, 5-nerved; palea like the gl., 2-nerved. Anthers linear. Grain broadly orbicular-oblong, cuspidate, flattened.

DOUBTFUL SPECIES.

P. NEPALENSE, *Spreng. Syst. i.* 303 (to which Grisebach refers *lanatum*, Kl.) differs according to the description from *lanatum* in the coloured setæ, which are not described as branched, and in the habitat, Nepal, which is far to the east of the range of *lanatum*. Sprengel's specimen is in all probability from Wallich, who alone had distributed plants from Nepal at that time.

15. CENCHRUS, Linn.

Characters of *Pennisetum*, but involucrels composed of subulate hard spines without filiform tips, connate below into a short coriaceous cup, which is surrounded by erect or squarrose bristles.—Species few, tropical and subtropical.

1. **C. biflorus**, *Roxb. Fl. Ind. i.* 233; involucrels rounded at the base, inner spines subulate-lanceolate erect puberulous dorsally flat with thickened margins, outer short or long erect or sub-squarrose. *Kunth Enum. Pl. i.* 167; *Steud. Syn. Gram.* 110; *Wight Cat. n.* 1664; *Dalz. & Gibs. Bomb. Fl.* 294; *Aitchis. Cat. Panjab. Pl.* 163 (triflorus); *Duthie Grass. N.W. Ind.* 9. *C. bulbifer*, *Hochst. ex Boiss. Fl. Orient. v.* 448. *C. echinatus*, *Wall. Cat. n.* 8854 B.C. *C. montanus*, *Nees in Royle Ill. Himal. Pl.* 416 (name); *Steud. l. c.* 111; *Boiss. l. c.* *Aitchis. l. c.*; *Duthie Grass. N.W. Ind.* 9, *Indig. Fodd. Grass. t.* 48, *Fodd. Grass. N. Ind.* 16. *C. quinquevalvis*, *Herb. Ham. ex Wall. l. c.* *C. C. Schimperii*, *Hochst. ex Steud. Nom. Ed. II. i.* 317. *C. tripsacoides*, *Br. in Salt Voy. Abyss. App.* 62 (nomen). *C. uniflorus*, *Ehrh. ms. ex Boiss. l. c.*

The PANJAB and UPPER GANGETIC PLAIN, *Royle, &c.* The CONCAN and SCIND, *Stocks*. RAJPOOTANA, *Duthie*. COROMANDEL, *Rowburgh, &c.*—DISTRIB. Beluchistan, Arabia, Africa.

Annual? Stem erect, 6–24 in., simple. Leaves narrow, glabrous or hairy, mouth of sheath hairy. Spikes 2–4 in., solitary, cylindric, green; rachis flexuous,

angular, smooth; involuclers loosely imbricate, spines sometimes hooked at the tip, inner $\frac{1}{4}$ – $\frac{1}{2}$ in. long, as long as the sessile spikelets.

2. *C. catharticus*, *Delile Cat. Hort. Monsp.* 1838, in *Linnaea* xiii. (1839) *Litterb.* 103; base of involuclers turbinate or truncate, inner spines squarrosely spreading subulate dorsally deeply grooved, margins ciliate or scaberulous, outer spreading or reflexed. *Steud. Syn. Gram.* 130; ?*Duthie Grass. N.W. Ind.* 9, *Indig. Fodd. Grass. t. xi., Fodd. Grass. N. Ind.* 15; *Boiss. Fl. Orient.* v. 448. *C. annularis*, *Anderss. in Peters. Reise Mossamb. Bot.* 553. *C. echinatus*, *A. Rich. Tent. Fl. Abyss.* ii. 389; *Wall. Cat. n.* 8654, *A.D. Aitchis. Cat. Panjab. Pl.* 163; ?*Duthie Grass. N.W. Ind.* 9 (non *Linn.*). *C. Lapeta*, *Herb. Ham. ex Wall. l.c.* D. *C. niloticus*, *Fig. & Notar. in Mem. Accad. Torin.* (1854), 380. *Elymus Caput Medusæ*, *Forsk. Fl. Æg. Arab.* 25 (non *Linn.*).

The PANJAB and UPPER GANGETIC PLAIN, *Hamilton, Royle, &c.*—DISTRIB. Arabia, Afric. trop.

Quite glabrous. *Stem* geniculately ascending, branched from the base, leafy. *Leaves* 1–3 in., lanceolate, finely acuminate, scaberulous; sheath inflated. *Spikes* 1–6 in., usually more or less enclosed in the uppermost leaf-sheath; rachis flexuous, smooth; involuclers $\frac{1}{4}$ – $\frac{1}{2}$ in. across the spreading spines. *Spikelets* $\frac{1}{2}$ in., 1–2-fl.; gl. I membranous; II and III hyaline, ovate, acuminate, 5-nerved; IV ovate-lanceolate, cuspidately acuminate.—Resembles *Pennisetum cenchroides*, but at once recognized by the rigid involucler spines. *Duthie's* figures under the names of *catharticus* and *montanus* are not recognizable. The widely distributed *C. echinatus*, *Linn.*, is very closely allied, but should be recognized by the broader spines of the involucler. I doubt its being distinct.

16. *STENOTAPHRUM*, *Trin.*

Coarse grasses. *Stem* flattened. *Leaves* distichous. *Spikelets* spicate, partially sunk in one face of a broad flat herbaceous rachis, usually biserrate, ovate, acuminate, 1-fl., dorsally flattened, sometimes on short flat appressed branches of the rachis; rachis simple or jointed, tip acute. *Glumes* 4; I short, broad, rarely 0; II convex, empty; III as long as II, flat, paleate, empty or triandrous; IV equalling III, coriaceous, bisexual; palea large, ovate, acute, coriaceous. *Anthers* linear. *Styles* free. *Grain* broad, flattened, free within the hardened glume and pale.—Species 2 or 3 tropical.

1. *S. glabrum*, *Trin. Fund. Agrost.* 176, *Gram. Panic.* 60; gl. I very short truncate membranous nerveless. *Nees Agrost. Bras.* 92; *Doell in Mart. Fl. Bras.* ii. II. 301, t. 39. *S. americanum*, *Schrank Pl. Rar. Hort. Monac.* 98, t. 98, in *Flora*, vii. (1824) *Beib.* 27, 28; *Kunth Enum. Pl.* i. 138; *Benth. Fl. Austral.* vii. 501; *Griseb. Fl. Brit. W. Ind.* 544. *S. complanatum*, *Schrank in Flora l. c.* 26; *Kunth Enum. l. c.* 137; *Nees l. c.* 93; *Thwaites Enum. Pl. Zeyl.* 361; *Trim. Cat. Ceyl. Pl.* 106; *Baker Fl. Maurit.* 440. *S. dimidiatum*, *Brong. Bot. Voy. Coq.* 127; *Wight Cat. n.* 1606. *S. glabrum*, *Trin. l. c.* 175; *Nees l. c.* *S. Koenigii*, *Schrank l. c.* *S. madagascariense*, *Kunth Revis. Gram.* ii. 163, t. 211; *Enum. Pl.* i. 524, *Suppl.* 99; *Steud. l. c.* 118. *S. sarmentosum*, *Nees in Mart. Fl. Bras.* ii. 93; *Fl. Afr. Austr.* 63. *S. Swartzianum*, *Nees Fl. Afr. Austr.* 62. *Rottboellia complanata*, *Sw. in Ges. Fr. Naturf. Berl. Mag.* iv. (1810) 89, t. 5; *Schrank l. c.* *R. compressa*, *Beauv. Agrost.* 109, t. 21, f. 8.

R. dimidiata, Thunb. *Prodr. Fl. Cap.* 23. *R. paleacea*, Steud. ex Doell in *Mart. Fl. Bras.* ii. II. 301. *R. tripsacoides*, Lamk. *Illustr.* i. 205, t. 48, f. 1. *Panicum dimidiatum*, Linn. *Syst. Ed.* xiii. 90; Willd. *Sp. Pl.* i. 339; Retz. *Obs.* vi.; Roxb. *Fl. Ind.* i. 287. *P. poæforme*, Bojer Hort Maurit. 365. *Diastemanthe platystachys*, Steud. *l. c.* 360. *Ischæmum secundatum*, Walt. *Fl. Carol.* 249.—*Stenotaphrum*, Wall. *Cat.* 8673.

PLAINS throughout INDIA.—DISTRIB. Tropics generally.

Stem stout, creeping below; branches 2 in. to 2 ft. high. *Leaves* 3–6 in. by $\frac{1}{2}$ in. broad or less; sheath broad, flat; ligule a ring of fine hairs. *Spike* erect, 2–4 by $\frac{1}{2}$ – $\frac{1}{4}$ in., not or obscurely jointed; branches when present $\frac{3}{4}$ in. by $\frac{1}{2}$ in., erect. *Spikelets* $\frac{1}{2}$ in. long; gl. I about $\frac{1}{2}$ II, orbicular; II thin, ovate, acuminate, 7-nerved; III lanceolate, acuminate, margins thickened obscurely incurved.—Very variable in the number and arrangement of the spikelets.

2. **S. Helferi**, Munro in *Cat. Pl. Griff. Falc.*, &c. (1865) *ined.*; gl. I half as long as III ovate-oblong strongly 3–5-nerved.—*Panicum dimidiatum*, Heyne in *Herb. Rottl.*

TENASSERIM, *Helfer*. MALAY PENINSULA; Plus river, Wray; Quedah, King's Collector; "Hengeiturei, Feb. 12th, 1796," Heyne? in *Herb. Rottler*.—DISTRIB. Tonkin.

Stem 1–2 ft., as thick as a crow-quill or thicker, base decumbent geniculate. *Leaves* 6–10 by $\frac{1}{2}$ – $\frac{1}{4}$ in., strap-shaped, upper acuminate, lower obtuse apiculate; sheath broad, flat; ligule a ring of short hairs. *Rachis* of spikes 3–6 by $\frac{1}{2}$ – $\frac{3}{4}$ in., straight or flexuous, not jointed; spikes $\frac{1}{2}$ – $\frac{1}{4}$ in.; spikelets 3–6, imbricate, $\frac{1}{2}$ – $\frac{1}{4}$ in. long, ovate, acute; gl. I obtuse; II lanceolate, thin, 7-nerved; III = II, 5-nerved, paleate, male; IV chartaceous, dorsally flattened ovate, beaked, smooth.—Heyne's specimen is probably from the Malay Peninsula, from whence he received plants; it is accompanied by one of *S. glabrum*.

17. **THUAREA**, Pers.

A small much-branched prostrate leafy littoral grass. *Leaves* short, flat. *Spike* terminal, included in a leaf-sheath; rachis flat, herbaceous, base at length accrescent and enveloping the spike. *Spikelets* uniseriate, jointed on one face of the rachis, 4–6 upper male, 2-fld.; 1–2 lower fem. or bisexual. *Glumes* 3–4; I small, hyaline, or in males 0; II empty; III and IV subequal, triandrous in the males; IV of the lower spikelets rigid, thin, bisexual, paleate. *Anthers* linear. *Styles* distinct. *Grain* free within the glume, but with the rest of the spikelets closely enveloped by the thick hardened base of the rachis, which forms an obconic caducous nut with a free deflexed and incurved beak.

T. sarmentosa, Pers. *Syn.* i. 110; Kunth *Revis. Gram.* i. 247, t. 35, *Enum. Pl.* i. 174, *Suppl.* 128; Beauv. *Agrost.* 127, t. 22, f. 9; Steud. *Syn. Gram.* 112; Thw. *Enum. Pl. Zeyl.* 363; Trim. *Cat. Pl. Ceyl.* 106; Benth. *Fl. Hongk.* 415, *Fl. Austral.* vii. 502. *T. latifolia* and *media*, Br. *Prodr.* 197; Kunth *Enum. l. c.* 173, 174. *T. involuta*, Br. *l. c.*; Miq. *Fl. Ind. Bat.* iii. 473. *Ornithocephalochloa arenicola*, Kurz in *Trin. Journ. Bot.* iv. (1875) 332, t. 171. *Ischæmum involutum*, Forst. *Prodr.* 73.

CEYLON, the LACCADIVE and NICOBAR ISLANDS.—DISTRIB. Malay Islds., Madagascar, Australia, Polynesia.

Leaves 1–2 in., linear-oblong, acute, glabrous or silky; sheaths broad, silky; ligule of hairs. *Spikes* $\frac{1}{2}$ –1 in. *Spikelets* $\frac{1}{2}$ in. *Glumes* obtuse, ciliate, I minute; II ovate-oblong, 5-nerved; III much broader, 5-nerved; IV oblong-lanceolate, tip

ciliate. *Fruit* $\frac{1}{2}$ in. long and broad, trigonously obconic or turbinate, obscurely ribbed, with a deep depression on one side of the crown.

Tribe II. ORYZEÆ. (See p. 3.)

18. **ORYZA**, Linn.

Leafy tall grasses. *Leaves* long, flat. *Spikelets* jointed on the slender branches of an elongate rarely spiciform panicle, 1-fl., oblong, laterally compressed, pedicels annular at the top. *Glumes* 2-3, I and II much the smallest, empty, scale or bristle-like, rarely 0; III chartaceous, obtuse acute or awned, strongly 3-5-nerved; palea as long as the gl., keeled. *Lodicules* 2, 2-lobed, rarely entire. *Stamens* 6, anthers linear. *Styles* short, free; stigmas laterally exserted. *Grain* narrow, free or adnate to the gl. and palea.—Species 5-6, tropical.

The gl. IV of most authors, is here considered to be a palea, as is indicated by the positions of the lodicules and stamens in relation to it.

1. **O. sativa**, Linn. *Sp. Pl.* 333; ligule long 2-partite, spikelets loosely panicle $\frac{1}{2}$ – $\frac{3}{4}$ in. long, gl. I and II $\frac{1}{4}$ – $\frac{1}{2}$ the length of III lanceolate, III hispid above dorsally spinescently ciliate, awn very long. *Gærtn. Fruct.* ii. 5, t. 80, f. 5; *Host Gram. Austr.* iv. t. 325; *Lamk. Encycl.* t. 264; *Kunth Enum. Pl.* i. 7, *Suppl.* 4; *T. Nees Gen. Fl. Germ. Monocot.* i. 2; *Steud. Syn. Gram.* 3; *Roxb. Fl. Ind.* ii. 200; *Wall. Cat.* n. 8632; *Griff. Notul.* iii. 5, *lc. Pl. Asiat.* t. 139, f. 149; *Dalz. & Gibs. Bomb. Fl. Suppl.* 98; *Duthie Grass. N.W. Ind.* 12, *Field & Gard. Crops*, 15, t. 4, *Fodd. Grass. N. Ind.* 20; *Miq. Fl. Ind. Bat.* iii. 368; *Doell in Mart. Fl. Bras.* ii. II. 7, t. 1; *Benth. Fl. Austral.* vii. 550. *O. fatua*, Koen. ex Trin. in *Mem. Acad. Petersb. Ser.* 6, ii. II. (1839) 177. *O. rufipogon*, *Griff. l.l.c.c.* & t. 145, f. 2, & t. 139, f. 147. *O. palustris*, *Salisb. Prodr.* 25. *O. repens* & *palustris*, *Herb. Ham. ex Wall. l.c. Fl. ex Steud. l.c.* *O. segetalis*, *Russ. ex Wall. l.c. B.* *O. sorghoides*, *Steud. l.c.*

Indigenous in marshes of RAJPOOTANA, SIKKIM, BENGAL, the KHASIA HILLS, CENTRAL INDIA, The CIRCARS and PEGU. CEYLON, *Ferguson*.—DISTRIB. Austral. trop.

Annual. *Stems* 2-10 ft., creeping or floating. *Leaves* 1-2 ft. by $\frac{1}{4}$ – $\frac{1}{2}$ in. or more, flat, striated, 1-nerved, scaberrulous; sheaths smooth. *Panicle* at length drooping. *Spikelets* not imbricating, awn 3-5 in. long, yellow or reddish, shining.—I have described above the plant which Roxburgh and other Indian authors consider to be the indigenous Rice, and who have collected it as such in the localities mentioned above, as I have in hot valleys of Sikkim and the Khasia Hills. It resembles in all essentials a commonly cultivated awned sort. I have seen no specimens of Griffith's *O. rufipogon*, which he describes as a very different-looking plant, but his characters are not diagnostic, and a memorandum by Munro (in *Herb. Kew*) states that he can find no real distinction for it. For the cultivated varieties of Rice in India, see Watt. "Dictionary of the Economic Products of India," vol. v. —The awnless *O. denudata*, *Steud. Nom. Ed.* I. 577 (*O. mutica*, *Steud. l.c.*; *Lour. Fl. Cochinch.* i. 267, *O. sativa*, var. *submutica*, *Miq. Fl. Ind. Bat.* iii. 369), is a cultivated form.

2. **O. latifolia**, Desv. *Journ. Bot.* i. (1813) 77; ligule very short, branches of panicle very long often whorled, spikelets subimbricate oblong beaked, gl. I and II = $\frac{1}{4}$ – $\frac{1}{2}$ III lanceolate, III hispid finely granulate awn

as long or twice as long as the gl. *Kunth Revis. Gram. i. 185, t. 4, Enum. Pl. i. 7, Suppl. 4.* *O. officinalis, Wall. & montana, Ham. Wall. Cat. n. 8635, 8633.* *O. platyphylla, Sch. f. Syst. vii. II. 1364.*

Low valleys in SIKKIM, ASSAM, SILHET, CACHAR, MUNNEPORE, CENTRAL INDIA, and BURMA.—DISTRIB. Trop. As. Afr. and Amer.

Stems up to 6 ft., tufted, as thick as a swan's quill below. *Leaves* 1-2 ft. by $\frac{1}{2}$ -1 $\frac{1}{2}$ in., nearly smooth, many-nerved; midrib slender, shining beneath; sheath very long. Branches of *panicle* 4-8 in., very slender; pedicels and branchlets bearded at the base. *Spikelets* $\frac{1}{2}$ - $\frac{3}{4}$ in.; gl. III and palea hairy.

Var. *collina*; gl. I and II minute or 0. *O. sativa, Thwaites Enum. Pl. Zeyl. 357.* *O. sativa var. collina, Trim. mss.*—Ceylon; hills about Colombo and in the Western Provinces.

3. *O. granulata*, Nees et Arn. in Wight Cat. n. 2354, ex Wall. Cat. n. 8634; ligule very short, spikelets in simple racemes obtuse awnless; gl. I and II minute or 0, III and palea glabrous granulate. *Steud. Syn. Gram. 3.* *O. filiformis, Herb. Ham. ex Wall. l. c.* *O. triandra, Herb. Heyne ex Steud. l. c.* *Padia Meyeriana, Zoll. & Mor. Verz. 103; Miq. Fl. Ind. Bat. iii. 373; Steud. l. c. 3.*

In dry woods; SIKKIM HIMALAYA, the KHASIA, and BEHAR HILLS. MALABAR and MADURA, *Heyne, Wight, &c.* CEYLON; at Rambukkana, *Trimen.*—DISTRIB. Java.

Stems 2-3 ft., slender, tufted. *Leaves* 3-6 by $\frac{1}{2}$ in., thin, midrib beneath and nerves distinct; sheath very long. *Racemes* very slender, on very long slender peduncles; rachis flexuous, rarely with a short branch at the base. *Spikelets* shortly pedicelled, $\frac{1}{2}$ - $\frac{3}{4}$ in. long.

4. *O. Ridleyi*, Hook. f.; very slender, leaves thin nerves distinct, ligule long, panicle with solitary alternate branches, spikelets $\frac{1}{2}$ - $\frac{3}{4}$ in., gls. I and II setaceous, III thinly chartaceous scabrid narrowly oblong dorsally spinulose-ciliate narrowed into an awn of about its own length.

MALAY PENINSULA; Pahang, in dense thickets, *Ridley.*—DISTRIB. Borneo.

Stem 2-3 ft., weak, as thick as a crow's quill below. *Leaves* 12 by $\frac{1}{2}$ in., nearly smooth; sheath long, slender. *Panicle* 12 in.; branches sometimes 6 in. and rachis very slender; pedicels $\frac{1}{10}$ - $\frac{1}{8}$ in.—Habit of *O. granulata*, but spikelets more like *O. coarctata*.

5. *O. coarctata*, Roxb. Fl. Ind. ii. 206; tall, stout, leaves coriaceous caudate-acuminate spinulose-serrate nerves obscure, ligule very short, panicle spiciform, branches few-fl., spikelets $\frac{1}{2}$ - $\frac{3}{4}$ in., gl. I and II setaceous, III narrowly dolabriform quite smooth dorsally winged tip narrowed into a short rigid awn quite smooth. *Wall. Cat. n. 8646; Griff. Notul. iii. 8, Ic. Pl. Asiat. t. 142, f. 1; Miq. Fl. Ind. Bat. iii. 371.* *O. triticoides, Griff. Notul. l. c.* *Sclerophyllum coarctatum, Griff. l. c.*

SUNDEBUNDS, Hamilton, Roxburgh, &c. SCIND, at Shikarpur (*Herb. Duthie*).

Stem 4-6 ft., erect from a stout creeping rhizome, branching, smooth, hard, polished. *Leaves* 6-12 by $\frac{1}{2}$ - $\frac{3}{4}$ in., unequal-sided, rigid, smooth or scaberulous, nerves and midrib obscure, tips long slender; sheath long, undulately reticulate, polished. *Panicle* 4-6 in., rachis and branches trigonous, stiff, quite smooth; pedicels clavate at the top and then contracted below the dilated cupular tip. *Spikelets* laxly imbricate, rigidly chartaceous; gl. I and II not half as long as III, erect; III strongly laterally often obliquely compressed, keeled, keel dilated above into a rounded wing, obscurely 7-9-nerved, lateral nerves submarginal; palea chartaceous, as long as the gl., oblong-lanceolate, acuminate, plicate, 5-nerved, median

nerve faint, two intermediate very stout, lateral more slender. *Lodicules* large, membranous, subquadrate or trapeziform. *Anthers* very long and slender. *Ovary* narrow, elongate. *Grain* not seen.—A very remarkable species. In *Gen. Plant* (iii. 1117) this is by oversight stated to be Himalayan.

19. **LEERSIA**, Sw.

Characters of *Oryza*, but empty gls. 0; fl. gls. thinner not awned, keel and margin ciliate; stamens 6, 3 or fewer.—Species 7, chiefly American.

1. **L. hexandra**, Sw. *Prodr. Veg. Ind. Occ.* 21, *Fl. Ind. Occ.* i. 131; panicle contracted, stamens 6. *Fl. Dan.* t. 1744; *Kunth Enum. Pl.* i. 6; *Host Gram. Austr.* t. 35; *Engl. Bot.* t. 2908; *Reichb. Ic. Fl. Germ.* i. t. 52; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 1; *Wall. Cat.* n. 8637; *Thw. Enum.* 356; *Trim. Cat. Ceyl. Pl.* 106; *Duthie Grass. N.W. Ind.* 12; *Miq. Fl. Ind. Bat.* iii. 367; *Benth. Fl. Austral.* vii. 549. *L. australis*, Br. *Prodr.* 210; *Kunth l. c.* 6. *L. ciliata*, Roxb. *Fl. Ind.* ii. 207; *Aitchis. Cat. Panjab. Pl.* 157; *Duthie l. c.*, *Fodd. Grass. N. Ind.* 21. *L. ciliaris*, Griff. *Notul.* iii. 2. *L. glaberrima*, Trin. *Oryz.* 7; *Miquel l. c.* 368. *L. mexicana*, H. B. & K. *Nov. Gen. & Sp.* i. 195; *Kunth l. c.* 6, & ii. 2, *Suppl.* 2; *Revis. Gram.* 178, t. 1. *Zizania ciliata*, Spreng. *Syst.* ii. 136; *Kunth Revis. Gram.* i. 8; *Griff. Notul.* iii. 1. *Oryza ciliata*, Herb. Ham. ex Wall. *Cat.* n. 8637 B. *O. hexandra*, Doell in Mart. *Fl. Bras.* ii. II, 10. *Pharus ciliatus*, Retz. *Obs.* v. 23. *Pseudoryza ciliata*, Griff. *Ic. Pl. Asiat.* t. 144, f. 1. *Turraja napalensis*, Wall. *Cat.* 8637 D. *Blepharochloa ciliata*, Endl. *Gen.* 1352; *Steud. l. c.* 4.

LOWER HIMALAYA; in marshes, from Nepal eastward to Assam and Burma, and southward to the Malay Peninsula and CEYLON.—DISTRIB. Trop. Afric., Amer., and Austral.

Stem 2–4 ft., weak, base rooting; nodes villous. *Leaves* erect, 8–12 in. by $\frac{1}{2}$ – $\frac{1}{4}$ in., flat; ligule truncate. *Panicle* 2–4 in., oblong, branches suberect or spreading flexuous, few-fld. *Spikelets* $\frac{1}{2}$ in., dimidiate-oblong, smooth or scaberulous, pale green; keel of gl. and palea rigidly ciliate.

2. **L. oryzoides**, Sw. *Prodr. Veg. Ind. Occ.* 21, *Fl. Ind. Occ.* i. 132; panicle effuse, stamens 3. *Host Gram. Austr.* i. t. 35; *Kunth Enum. Pl.* i. 5, *Suppl.* 1; *Reichb. Ic. Fl. Germ.* i. t. 52. *Oryza clandestina*, A. Br. ex Aschers. *Fl. Brandenb.* 799. *Asprella oryzoides*, Lamk. *Ill.* i. 167; Roem. & Sch. *Syst.* ii. 266. *Homalocenchrus oryzoides*, Mieg. ex Poll. *Hist. Pl. Palat.* i. 52. *Phalaris oryzoides*, Linn. *Sp. Pl.* 55 (excl. cit.); Schreb. *Beschr. Græse*, vi. t. 22.

KASHMIR, Falconer, Thomson.—DISTRIB. Trop. and temp. regions.

Stem 2–3 ft., nodes villous. *Leaves* glaucous, scaberulous; sheath compressed; ligule lacerate. *Panicle* 3–7 in., base embraced by the upper leaf-sheath. *Spikelets* few, remote, $\frac{1}{2}$ in. long.

20. **HYGRORHIZA**, Nees.

A floating glabrous grass. *Leaves* short, broad, flat. *Spikelets* few, lanceolate, 1-fld., shortly pedicelled on the few branches of a broad spreading panicle, articulate on the annulate tip of the pedicel. *Glume* solitary (empty gls. 0), flg. membranous, lanceolate, narrowed into a long awn, 5 nerved, keel and nerves ciliate; palea acuminate, 3-nerved, keel scabrid. *Lodicules* 2, gibbous. *Stamens* 6, anthers very long. *Styles* short, free, stigmas

laterally exserted. *Grain* narrowly oblong, free within the membranous glumes.

H. aristata, *Nees in Edinb. New Phil. Journ.* xv. (1833) 380; *Steud. Syn. Gram.* 5; *Thw. Enum. Pl. Zeyl.* 356; *Trim. Cat. Ceyl. Pl.* 106; *Duthie Grass. N.W. Ind.* 12, *Fodd. Grass. N. Ind.* 20; *Aitchison Cat. Panjab Pl.* 157; *Wall. Cat. n.* 8638; *Wight Cat. n.* 1739. *Leersia aristata*, *Roxb. Fl. Ind. ii.* 207; *Griff. Notul. iii.* 3; *Steud. l. c.* *Pharus aristatus*, *Retz. Obs. v.* 23. *P. natans*, *Herb. Russel, ex Wall. l. c.* *Zizania aristata*, *Kunth Revis. Gram. i.* 8, *Enum. Pl. i.* 10. *Z. Retzii*, *Spreng. Syst. ii.* 136. *Potamochloa Retzii*, *Griff. Notul. iii.* 3, 8, *l. c.* *Pl. Asiat. t.* 139, f. 147, & t. 140.—*Rheede Hort. Mal. x. t.* 12.

UPPER and LOWER GANGETIC PLAINS, ASSAM, CHITTAGONG, PEGU, the DECCAN and CEYLON.—DISTRIB. Tonkin.

Stem as thick as a crow-quill, 12–18 in. long, with feathery whorled roots at the nodes. *Leaves* 1–3 by $\frac{1}{2}$ – $\frac{3}{4}$ in., ovate-lanceolate to linear-oblong, scaberulous above; base and tip rounded, or tip acute and base cordate; sheath broad, inflated, compressed, mouth auricled; ligule 0. *Panicle* 2–3 in. long, and broad triangular, branches few, spreading, slender, lower whorled, often deflexed. *Spikelets* $\frac{1}{2}$ in. long, pale green, pedicels articulate with a red annulus below the middle. *Glume* dorsally convex; palea as long, awn longer than the gl.

21. LEPTASPIS, Br.

Tall monœcious grasses. *Leaves* petioled, elliptic-oblong, flat, nervules trabeculate. *Panicle* terminal, erect; branches whorled, long, stiff, bearing a raceme of spikelets at their tips, of which the upper are male. *Spikelets* not jointed on the very short pedicels. MALE, glumes 3, I and II small, ovate, empty, 5–7-nerved, spreading; III paleate, hexandrous; filaments short, anthers long. FEM. a utricle open at the top, enclosing the ovary and a linear palea, the tip of which is exserted. *Lodicules* small, truncate. *Styles* 3, very long. *Grain* free within the inflated accrescent utricle.—Species 3 or 4, tropical Asia, Africa, and Australia.

1. **L. urceolata**, *Br. in Benn. Pl. Jav. Rar.* 23, t. 6; leaves 7–12 in. long-petioled elliptic-lanceolate or oblanceolate, branches of panicle many stout, utricles turbinate-pyriform. *Wall. Cat. n.* 8901; *Miq. Fl. Ind. Bat. iii.* 374; *Steud. Syn. Gram.* 8; *Thw. Enum. Pl. Zeyl.* 357; *Trim. Cat. Ceyl. Pl.* 106. *L. zeylanica*, *Nees ex Steud. l. c.* *L. manillensis*, *Steud. l. c.* *Pharus urceolatus*, *Roxb. Fl. Ind. iii.* 611.

PENANG, *Roxburgh.* JOHORE, *King's Collector.* CEYLON, *Thwaites.*—DISTRIB. Java, Sumatra.

Rootstock creeping; stem 2–3 ft. *Leaves* subdistichous, 2–4 in. broad, abruptly acuminate; petiole $\frac{1}{2}$ –2 in.; sheath 3–10 in., flattened. *Panicle* 6–12 in. long; lower branches 6–10 in. *Fem. spikelets* $\frac{1}{2}$ in. long.

2. **L. cochleata**, *Thw. Enum. Pl. Zeyl.* 357; leaves 4–10 in. shortly petioled oblong-lanceolate, branches of panicle few slender, utricles oblong incurved 5-ribbed tomentose with hooked hairs. *Trim. Cat. Ceyl. Pl.* 106.

CEYLON; in the Central Province, alt. 4000 ft., *Thwaites.*

Stems 2–3 ft. from a procumbent base. *Leaves* $1\frac{1}{2}$ – $1\frac{3}{4}$ in. broad, acuminate; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in.; sheath 1–3 in. *Panicle* 6–8 in.; branches 3–4 in., ternately whorled. *Fem. spikelets* $\frac{1}{10}$ in.; glumes broadly ovate, acuminate. *Utricle* $\frac{1}{2}$ in. long. *Grain* not seen.

TRIBE III. ZOYSIÆ. (See p. 3.)

22. **TRACHYS**, Pers.

An annual diffuse softly villous grass. *Spikes* 2- rarely 3-nate, terminal, flattened, rigid, flexuous, jointed. *Spikelets* 1-fl., in alternate subsessile fascicles which are jointed on the under surface of the spikes, and are formed of 1-3 perfect sessile spikelets mixed with squarrose flowerless gls. *Glumes* of perfect spikelets 4, I minute, triangular, coriaceous, nerveless; II narrow, linear-lanceolate, membranous, 3-5-nerved, nerves ciliate below the middle; III much the largest, broadly obovate-oblong, cuspidately acuminate, rigidly coriaceous, 9-nerved epaleate; IV much smaller, ovate-lanceolate, cuspidately acuminate, chartaceous, 1-nerved; palea lanceolate, chartaceous, nerveless. *Lodicules* very minute, hyaline. *Stamens* 3, anthers linear. *Styles* long, free, stigmas long. *Grain* broadly oblong, compressed, free within the gl. and pale.

The above description differs from any that I have met with. Gl. III of the perfect spikelet is much larger than any of those of the imperfect spikelets, which form a squarrose tuft around the perfect.

T. mucronata, Pers. *Syn.* i. 85; Beauv. *Agrost.* 107, t. 21, f. 7; Kunth *Enum. Pl.* i. 168, *Suppl.* 123; Thw. *Enum. Pl. Zeyl.* 362; Trim. *Cat. Ceyl. Pl.* 106; Miq. *Fl. Ind. Bat.* ii. 472; Wall. *Cat. n.* 8674; Wight *Cat. n.* 1660. T. muricata (error for mucronata), Steud. *Syn. Gram.* 112. *Cenchrus muricatus*, Linn. *Mant.* 302; Schreb. *Beschr. Graes.* ii. 69, t. 34. *C. tripsaceus*, Herb. Linn. ex Munro in *Journ. Linn. Soc.* vi. (1862) 55. *Trachystachys geminata*, A. Dietr. *Sp. Pl.* ii. 16. *Tripsacum distachyum*, Herb. Linn. ex Munro l. c. *Trachyzus muricata*, Steud. l. c. 112. *Panicum dimidiatum*, Burm. *Fl. Ind.* 25, t. 8, f. 3. P. squarrosus, Retz. *Obs.* iv. 15, v. t. 1; Roxb. *Cor. Pl.* iii. 4, t. 206; *Fl. Ind.* i. 288.

THE DECCAN PENINSULA; sandy ground near the sea; Heyne, Roxburgh, &c. CEYLON; Jaffna, Gardner.

Stems 1-2 ft., weak, geniculate, rooting at the nodes. *Leaves* 2-6 by $\frac{1}{4}$ - $\frac{1}{2}$ in., linear-lanceolate, acuminate, flaccid, rarely nearly glabrous, margins often crisped; mouth of sheath hairy; ligule obscure. *Peduncle* long or short. *Spikes* 2-3 in., sessile or shortly peduncled, costa of rachis stout, margins broad, green; joints concave subquadrate. *Spikelets* (perfect) $\frac{1}{2}$ in. long, sessile or very shortly stoutly pedicelled, pale, shining, terminal one on the spike solitary; gl. II very much narrower than III, and not overlapping the base of the latter or hardly, epaleate; III nearly flat, with the margins incurved; IV with the palea terete, margins strongly incurved over the palea.—The structure of gl. II is very peculiar; at first sight it may be taken for a narrow membranous palea of III, its lower insertion to which and exterior position are difficult to distinguish.

23. **TRAGUS**, Haller.

A low rigid perennial grass. *Leaves* small. *Spikelets* 1-fl., 2-5-nate in narrow spikes, not articulate on the pedicels; rachis slender. *Glumes* 2; I thickly coriaceous, oblong-lanceolate, 5-ribbed, ribs with long recurved spines embracing II which is chartaceous, oblong, apiculate, 1-nerved, scaberulous; palea hyaline, obtuse, involute, faintly 2-nerved below. *Stamens* 3, anthers very long. *Styles* short, distant, stigmas short. *Grain* linear, free within the glumes.

T. racemosus, *Scop. Introd. Hist. Nat.* 73; *Desf. Fl. Atlant.* ii. 386; *T. Nees Gen. Fl. Germ. Monoc.* i. n. 25; *Trimen Cat. Ceyl. Pl.* 106; *Duthie Grass. N.W. Ind.* 13, *Indig. Fodd. Grass. t.* 14, *Fodd. Grass. N. Ind.* 22. *T. muricatus*, *Moench Meth.* 53. *T. alienus*, *biflorus*, & *Berteronianus*, *Schult. Mant.* ii. 205. *T. brevicaulis*, *Boiss. Diagn. Ser. I.* xiii. 44. *T. occidentalis* & *orientalis*, *Nees Agrost. Bras.* 286; *Doell in Mart. Fl. Bras.* ii. II. 286, t. 28. *T. Halleri*, *Doell l. c.* 122. *T. biflorus*, *Nees ex Wight Cat.* 1661. *Lappago racemosa*, *Honck. Syn. Pl. Germ.* i. 440; *Host Gram. Austr.* i. t. 36; *Sibth. Fl. Græc.* ii. t. 101; *Kunth Enum. Pl.* i. 169, *Suppl.* 124; *Steud. Syn. Gram.* 112; *Reichb. Ic. Fl. Germ.* i. t. 30; *Wall. Cat.* n. 8675; *Thw. Enum. Pl. Zeyl.* 362; *Aitchis. Cat. Panjab. Pl.* 163; *Benth. Fl. Austral.* vii. 506; *Miq. Fl. Ind. Bat.* iii. 473. *L. biflora*, *Roxb. Fl. Ind.* i. 281; *Grah. Cat. Bomb. Pl.* 234. *L. aliena*, *Spreng. Neue Entdeck.* iii. 15, *Syst. Pl.* i. 266; *Steud. l. c.*; *Dalz. & Gibs Bomb. Fl.* 295. *L. occidentalis*, *Nees in Schimp. Pl. Arab. Fel. Ed.* ii. n. 793. *Cenchrus racemosus*, *Linn. Sp. Pl.* 1049; *Schreb. Besch. Graes.* 45, t. 4. *C. linearis*, *Lam. Fl. Franc.* iii. 631. *C. muricatus*, *Herb. Russ. ex Wall. l. c.* A. *Phalaris muricata*, *Forsk. Fl. Æg. Arab.* 302. *Aira malatrina*, *Herb. Ham. ex Wall. l. c.* D.

Dry plains of INDIA; from Kashmir to Upper Bengal, and southward to CEYLON. BURMA, *Wallich*.—DISTRIB. Warm regions generally.

Stems erect in the first year, 4–8 in. high, leafy nearly to the spikes, then sending from the base rooting and leafing flg. stolons all round. *Leaves* very variable, smooth or scaberulous, ovate and $\frac{1}{2}$ in. long, or narrower and $1-1\frac{1}{2}$ in. long, acuminate, margins and mouth of sheath ciliate. *Spikes* 1–4 in., rachis and very short pedicels pubescent. *Spikelets* $\frac{3}{4}-\frac{1}{2}$ in., crowded, in pairs face to face, simulating one spikelet with 2 equal spinous glumes. Gl. II with broad hyaline margins towards the tip.—In all Indian specimens I find the spikelets in pairs, each with 2 gl. I have not seen the fascicled spikelets described in *Gen. Plant.* A small lower gl. is described as sometimes present, and 5 spikelets as occurring on a single pedicel.

24. LATIPES, Kunth.

A perennial rather rigid grass. *Leaves* subulate, convolute. *Spikelets* 1-fl., in simple subspiciform racemes, biseriate (one usually imperfect) persistent on the flattened truncate spreading articulate pedicels; rachis flexuous. *Glumes* 3, I and II empty, thickly coriaceous, I usually longest, narrow, recurved, 3-nerved, subspinously pectinate, dorsally smooth; II lanceolate, spinously tubercled, embracing III (fig.), which is shorter, hyaline, oblong, acute, ciliate; palea minute, linear-oblong, nerveless. *Lodicules* 2, hyaline. *Stamens* 3, anthers oblong. *Styles* free. *Grain* free, obliquely ovate-lanceolate.

L. senegalensis, *Kunth Revis. Gram.* i. 261, t. 42, *Enum. Pl.* i. 171, *Suppl.* 125; *Duthie Grass. N.W. Ind.* 13, *Fodd. Grass. N. Ind.* 22. *Lappago Latipes*, *Steud. Syn. Gram.* 112. *T. senegalensis*, *J. Gay ex Kunth Enum. l. c.*

SCIND, at Kurrachee, *Stocks*. BELUCHISTAN, *Frere*.—DISTRIB. Arabia, Abyssinia, Senegal.

Stems 3–10 in. wiry, creeping with many erect or spreading branches, leafy up to the racemes. *Leaves* 1–3 in.; lower sheaths short, mouth hairy; ligule 0. *Racemes* 2–6 in.; rachis glabrous; pedicels distant, narrowly cuneiform, margins winged ciliate. *Spikelets* $\frac{1}{2}-\frac{1}{4}$ in., reddish-brown.—The Indian specimens are small. The pedicels are flattened and bear normally 2 spikelets, one well developed and fertile, the other imperfect with gl. I and II narrower of equal length and irregularly spinously tubercled.

25. **LOPHOLEPIS**, Decne.

An annual tufted erect grass. *Leaves* short, flat. *Spikelets* minute, 1-fl., jointed but persistent on the very short spreading pedicels of an elongate simple spiciform raceme, exactly like a bird's head; pedicels jointed on the rachis. *Glumes* 3; I incumbent, oblong, acute, strongly incurved above the base, produced above into a globose boss with a pectinate crest, and with a pectinate wing on the mesial line beyond it; II shorter, narrower, with often a dorsal pectinate wing; III flg. much shorter, hyaline, ovate, acute; palea hyaline. *Lodicules* quadrate. *Stamens* 2; anthers short, most minute. *Styles* short; stigmas feathery. *Grain* subulate, base gibbously incurved, free within the rigid glumes.

L. ornithocephala, Steud. *Syn. Gram.* 112; Decne in *Archiv. Mus. Par. i.* (1839) 147; Wall. *Cat. n.* 8881. *Holboellia ornithocephala*, Wall. in *Hook. Bot. Misc. ii.* 144, t. 76; *Wight Cat. n.* 1741; *Kunth Enum. Pl. i.* 171.

Southern Provinces of the DECCAN PENINSULA, Madura, Tinnevely, &c., Koenig, &c. CEYLON; Northern Province, Trimen.

A rather stiff grass, 6-18 in. high; roots wiry. *Leaves* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., ovate to oblong-lanceolate, acuminate, margins ciliate; lower sheaths short; ligule 0. *Racemes* 2-4 in., columnar, $\frac{1}{2}$ in. diam.; rachis slender, strict, and the horizontal rather stout grooved pedicels green and scabridly ciliate. *Spikelets* $\frac{1}{6}$ - $\frac{1}{2}$ in. long, red-brown in age, horizontal or slightly deflexed from the pedicel.—One of the most singular Indian grasses.

26. **PEROTIS**, Ait.

A slender grass, with short broad leaves and a crinite spike. *Spikelets* subsessile, 1-fl., jointed on a slender simple unjointed rachis, very narrow, callus conical. *Glumes* 3; I and II empty, subequal, narrowly linear, 1-nerved, tapering into long capillary awns; III very minute, flg.; palea hyaline. *Lodicules* short, hyaline. *Stamens* 3, anthers very short. *Styles* very short, united at the base, stigmas very short. *Grain* much longer than its glumes, narrow.

P. latifolia, Ait. *Hort. Kew*, i. 85; Beauv. *Agrost. t.* 4, f. 9; 6 (laxifolia), *Kunth Revis. Gram. i.* 357, t. 92, *Enum. Pl. i.* 471, *Suppl.* 380; Steud. *Syn. Gram.* 186; Roxb. *Fl. Ind. i.* 239; Wall. *Cat. n.* 3783; *Wight Cat. n.* 1740; *Grah. Cat. Bomb. Pl.* 237; Dalz. & Gibs. *Bomb. Fl.* 296; *Thw. Enum. Pl. Zeyl.* 369; *Trim. Cat. Ceyl. Pl.* 106; *Duthie Grass. N.W. Ind.* 13; *Benth. Fl. Hongk.* 418; *Miq. Fl. Ind. Bat. iii.* 479. *P. Burmanni*, Steud. *Nom. Ed. I.* 605. *P. cubana*, Wright in *Sauv. Fl. Cub.* 202. *P. glabrata*, Steud. *Syn. Gram.* 186. *P. hordeiformis*, Nees ex Steud. *Nom. Ed. II. ii.* 306; *Syn. Gram. l. c.*; *Trin. in Mem. Acad. Petersb. Ser. VI. vi. II.* (1845) 267. *P. longiflora*, Nees in Hook. & Arn. *Bot. Beech. Voy.* 247; Steud. *Syn. Gram.* 186. *P. patula*, Nees ex Steud. *Nom. l. c.*; *Trin. Fund. Agrost. ii.* 266; Steud. *Syn. Gram.* 186. *P. rara*, Br. *Prodr.* 172; *Benth. Fl. Austral. vii.* 509. *P. scabra*, Willd. ex *Trin. Diss. ii.* 172. *P. spicæformis*, Beauv. ex Steud. *Nom. Ed. I.* 605. *Perotis laxifolia*, Beauv. *l. c.* 6. *Saccharum spicatum*, Linn. *Sp. Pl.* 54. *S. brevifolium*, Herb. *Ham. ex Wall. l. c.* B. *Agrostis spicæformis*, Linn. f., *Suppl.* 108; Willd. *Sp. Pl. i.* 362. *Anthoxanthum indicum*, Linn. *Sp. Pl.* 28. *Xystidium barbatum*, Presl *Rel. Hænk. i.* 228. *X. maritimum*, Trin. *Fund. Agrost.* 102, t. 2.—Rheede *Hort. Mal. xii. t.* 62.

LOWER HIMALAYA, ascending to 5000 ft., from Kunawur to Sikkim. PLAINS OF INDIA from the Panjab to Burma and the Malay Peninsula and southwards to CEYLON.—DISTRIB. Affghan., Trop. Asia, and Africa.

Stems stout and branching at the base, then ascending, 3–10 in., leafy. *Leaves* $\frac{1}{2}$ –1 in., ovate or lanceolate, base cordate; sheath short; ligule ciliate. *Spikes* 1–8 in. *Spikelets* $\frac{1}{10}$ – $\frac{1}{6}$ in., contracted into a callus above the joint. *Glumes* scaberulous; awn very variable in length.—Bentham is, I think, right in his suggestion that *P. rara*, Br., is not different from *P. latifolia*, and that there is but one species of *Perotis*, varying greatly in the size of all its parts.

27. ZOYSIA, Willd.

A small, much branched, rigid, glabrous grass. *Leaves* subulate, pungent. *Spikelets* small, ovoid, 1-fl., spicate, subimbricate, jointed on and appressed to a rigid notched unjointed rachis, sessile or shortly pedicelled. *Glumes* 2; I empty, coriaceous, laterally compressed, shining, nerveless, margins connate below, hyaline; II much smaller, membranous, linear-oblong, obtuse, complicate; palea short, nerveless, hyaline or 0. *Lodicules* 0. *Stamens* 3, anthers long. *Styles* very long, distinct, stigmas elongate. *Grain* free within the glumes.

Z. pungens, Willd. in *Ges. Naturf. Fr. N. Schr.* iii. (1801) 441; *Br. Prodr.* x. 208; *Kunth Enum. Pl.* i. 471, *Suppl.* 381; *Beauv. Agrost.* i. t. 4, f. 1; *Steud. Syn. Gram.* 414; *Wall. Cat. n.* 3763; *Wight Cat. n.* 1728; *Thw. Enum. Pl. Zeyl.* 370; *Trim. Cat. Ceyl. Pl.* 106; *Miq. Fl. Ind. Bat.* iii. 478; *Hook. f. Fl. New Zeal.* i. 312; *Benth. Fl. Austral.* vii. 506; *Buchanan Grasses, N. Zeal.* t. 13 A.; *Baker Fl. Maurit.* 442. *Z. aristata*, Brownii, Griffithiana, & sedoides, C. Muell. in *Bot. Zeit.* xiii. (1855) 272, 273, 274. *Z. japonica*, Wendl. ex *Steud. l. c.* 414. *Z. sinica*, Hance in *Journ. Bot.* vii. (1869) 168, & in *Journ. Linn. Soc.* xiii. (1873) 134. *Z. setacea*, Nees ex *Steud. Nom. Ed. II.* ii. 801. *Z. tenuifolia*, Trin. in *Mem. Acad. Petersb. Ser. VI.* iv. *Sc. Nat.* ii. (1836) 96. *Matrella juncea*, Pers. *Syn.* i. 78. *Panicum Crinum-ursi*, Bory ex *Steud. Nom. l. c.* 255. *Milium maritimum*, Koen. ex *Wall. l. c.* *Ophiurus erectus*, Herb. *Wight. ex Wall. l. c.* B. *Agrostis Matrella*, Linn. *Mant.* ii. 185; *Roxb. Fl. Ind.* i. 317.

Sandy shores of INDIA, MALACCA, and CEYLON.—DISTRIB. Trop. Asia, Austral., and Maurit.

Rootstock rigid, wiry; branches interlaced and rooting, sending up short leafy stems, 6–10 in. high. *Leaves* 1–3 in., coriaceous, usually spreading, margins incurved; sheath short, mouth ciliate. *Spikes* 1–1½ in. *Spikelets* $\frac{1}{2}$ – $\frac{1}{3}$ in.

Tribe IV. ANDROPOGONEÆ. (See p. 3.)

28. COIX, Linn.

A tall annual or perennial grass. *Leaves* long, broad. *Spikes* numerous, axillary and terminal; lower spikelets solitary, fem., enclosed in an at length hardened polished unt-like bract, through the apex of which the pedicelled male portion protrudes. *Male spikelets* 2–3-nate at each node of the rachis, one sessile and one or two pedicelled, lanceolate; glumes 4, I and II subequal, empty, rigid, or herbaceous; I keeled along the inflexed margins; III and IV hyaline, paleate, triandrous or empty. *Fem. spikelets* ovoid, acuminate; glumes 4, I chartaceous; II–IV successively

thinner; IV paleate. *Staminodes* minute. *Lodicules* 0. *Ovary* ovoid, styles 2, free slender. *Grain* orbicular, ventrally furrowed, enclosed in the hardened globose ovoid or cylindrical involucre.

C. Lachryma-Jobi, Linn. *Sp. Pl.* 972; *C. Lachryma*, Linn. *Syst. Ed.* x. 1261; *Lamk. Ill.* t. 750; *Kunth Enum. Pl.* i. 20, *Suppl.* 16, t. 3, 4; *Beauv. Agrost.* t. 24, f. 5; *Bot. Mag.* t. 2479; *Steud. Syn. Gram.* 9; *Webb. Phyt. Canar.* t. 242, 243; *Roxb. Fl. Ind.* iii. 568; *Grah. Cat. Bomb. Pl.* 240; *Wall. Cat.* n. 8623; *Griff. Notul.* iii. 10; *Thw. Enum. Pl. Zeyl.* 375; *Trimen Cat. Ceyl. Pl.* 106; *Dalz. & Gibs. Bomb. Fl.* 289; *Aitchis. Cat. Panjab. Pl.* 157; *Duthie Grass. N.W. Ind.* 11, *Fodd. Grass. N. Ind.* 18; *Miq. Fl. Ind. Bat.* iii. 476, t. 41 B. *C. agrestis*, Lour. *Fl. Cochinch.* 551. *C. arundinacea*, Lamk. *Encycl.* iii. 422. *C. exaltata*, Jacq. *Eclog. Gram.* 6, t. 40. *C. ovata*, Stokes *Bot. Mat. Med.* iv. 342. *C. pendula*, Salisb. *Prodr.* 28. *C. puellarum*, Balans. in *Journ. de Bot.* iv. (Paris, 1890), 77. *C. stigmata*, Koch & Bouché, *Ind. Sem. Hort. Berol.* (1855) 9. *Lithagrostis Lacryma-Jobi*, Gærtn. *Fruct.* i. 7, t. i. f. 10.

Throughout the hotter and damper parts of INDIA, wild or cultivated (not wild in Ceylon).—DISTRIB. Trop. Asia, cult. in Africa and America.

Stem 3–5 ft., stout, leafy, rooting at the lower nodes. *Leaves* 4–18 by 1–2 in., wavy, base cordate; sheaths smooth; ligule very short, glabrous. *Spikes* 2–3 in., suberect, peduncled; male spikelets 3, or 2 with an imperfect one, $\frac{1}{3}$ in. long; gl. I narrowly winged. *Fruit* ovoid or spherical, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, osseous, bluish gray.

VAR. gigantea, Stapf mss.; perennial, attaining 15 ft. high, leaves narrower more strict, male spikelets 3-nate at the internodes, often forming long cylindric drooping spikes, gl. I broadly winged, fruit as in the type. *C. gigantea*, Roxb. *Fl. Ind.* iii. 569; *Wall. Cat.* n. 8624, 8625. *Aitch. Cat. Panjab. Pl.* 157; *Duthie Grass. N.W. Ind.* 11; *Fodd. Grass. N. Ind.* 18. *C. lingulata*, Hack. in *Estr. Bot. Zeitschr.* (1891) 5.—Rheede *Hort. Mal.* xii. t. 70—Hot valleys from the N.W. Provinces to Assam and southwards to the Malay Peninsula and Travancore.—Afghanistan.

VAR. stenocarpa, Stapf mss.; fruit subcylindric $\frac{1}{4}$ – $\frac{1}{2}$ in. long white osseous. *C. stenocarpa*, Balans. l. c. *C. tubulosa*, Hack. in *Engl. Bot. Jahrb.* iii. 260?—Upper Assam, Bruce. Mergui, Griffith. Karen Hills, Wallich.—Tonkin, N. Guinea.

VAR. Ma-yuen, Stapf mss.; annual, fruit crustaceous or chartaceous. *C. Ma-yuen*, Roman. in *Bull. Soc. Acclim. Paris.* Ser. 3, viii. (1881) 442. Sikkim and the Khasia hills, ascending to 5000 ft. (cult.). Burma, Watt.—Cochinchina, Borneo, Ins. Philipp.

DOUBTFUL SPECIES.

C. AQUATICA, Roxb. *Fl. Ind.* iii. 571; floating and creeping from 50–100 ft., leaves linear most acute, margins hispid, male spikes drooping many-fl., flowers 3-fold, middle one pedicelled fem., corolla 6–7-valved, seeds turbinate." "Floating in margins of lakes in Lower Bengal," Roxb. This species is unknown to me and to the officers of the Calcutta Bot. Gardens.

29. **POLYTOCA**, Br.

Tall branching grasses; nodes bearded; flg. branches fascicled, spathaceous. *Leaves* long, flat. *Spikes* solitary or paniced, bisexual and fem. below, or the upper male only, rachis jointed; spikelets geminate, a sessile and a pedicelled. *Male spikelets* lanceolate, 2-fl.; gls. 4, I many-nerved, 2 keeled; II 5–7-nerved; III and IV hyaline, paleate, triandrous; anthers very long. *Lodicules* cuneate. *Fem. spikelets* imbricate, the pedicelled imperfect, its pedicel confluent with the rachis; gls. of sessile spikelet 4, I oblong, coriaceous, margins inflexed

embracing the rachis, at length crustaceous; II thin, acuminate; III hyaline, epaleate; IV hyaline, paleate, fertile. *Staminodes* and *lodicules* 0. *Ovary* minute; styles long, stigmas slender. *Grain* very small, orbicular, enclosed in the hardened outer gls.—Species 8, tropical Asiatic and Australian.

* *Infl. mostly compound; male spikelets terminal, superposed, hairy; fem. 3-7. Pedicelled fem. spikelets of one bract-like gl. terminating the joint of the rachis.—Spathes always tightly closed.*

1. **P. bracteata**, Br. in Bennett Pl. Rav. Jav. 20, t. 5; male spikes rather stiff, pedicelled spikelets mostly (nearly all) rudimentary and adnate to the rachis. Steud. Syn. Gram. Coix heteroclita, Roxb. Fl. Ind. III. 572; Wall. Cat. n. 8627.

SIKKIM TERRAI, ASSAM and the KHASIA HILLS, ascending to 5000 ft. BURMA, on the Shan hills, Collett.—DISTRIB. Tonkin.

Stem 3-5 ft., stout or slender; sheaths and leaves glabrous, or hirsute with tubercled-based hairs. *Leaves* 1½-2 ft. by ¾-1 in., margins rough, base contracted. *Inflorescence* 3-6 in., usually long-pedicelled and digitate; lower branches spreading or deflexed; rachis hairy. *Male spikelets* ¼ in., glabrous or pubescent; *fem. spikelets* less than ¼ in., pale, shining; rudimentary pedicelled spikelets lanceolate, ¼-1 in. long, at length spreading; gl. I oblong, obtuse or emarginate, 2-keeled.

2. **P. Wallichiana**, Benth. in Journ. Linn. Soc. xix. (1881) 52; male spikes slender flexuous, pedicelled spikelets free. Cyathorhachis Wallichiana, Nees ex Steud. Syn. Gram. 403.—Gen. Nov. Wall. Cat. n. 8629.

BURMA; Prome and Tenasserim, Wallich; Pegu, M'Lelland, &c.; Tenasserim, Wallich, Helfers.

Stem leaves and sheaths glabrous or hispid with tubercle-based bristles. *Leaves* 2-3 ft. by 1-1½ in., lower narrowed from the middle to the base. *Terminal infl.* often long peduncled, branches 2-2½ in.; lateral more or less enclosed in the spathe; rachis hairy. *Male spikelets* ¼ in.; *fem.* as long, pale, shining; rudimentary pedicelled spikelets ¾ in., lanceolate, at length spreading.

** *Terminal infl. only compound; male not spathaceous, fem. spathaceous, spathe at length expanded, lateral of simple spikes. Pedicelled fem. spikelets of 2 gls., pedicels adnate to the rachis.*

3. **P. Cookii**, Stapf in Hook. Ic. Pl. t. 2333; male infl. very fragile, spikes 2-3 in., pedicelled spikelets free, *fem. spikelets* glabrous, gl. 1 3-lobulate at the tip.

N. CANARA and the CONCAN, Jacquemont, &c.

Annual. Stem 3 ft. and leaves more or less hispid with tubercle-based hairs. *Leaves* 1½-2 ft. by 2-3 in., margins thickened. *Male infl.* often long-peduncled, rachis villous; spikelets ¼ in. *Fem. spikes* 1 in. long; spathe 1-1½ by ½-¾ in., at length open above; rachis glabrous; spikelets ¼ in.; rudimentary gl. like I and II of male, but smaller.

** *All infls. of simple bisexual spikes; spikelets glabrous.*

4. **P. semiteres**, Benth. in Gen. Plant. iii. 1113. Spathes 1-1½ in. always closed, *fem. spikelets* 2 or more. Chionachne Wightii, Munro ex Benth. in Gen. Plant. l. c. Tripsacum? semiteres, Wall. Cat. n. 8628.

THE DECCAN PENINSULA; Palamcotta, Wight. BURMA; Taong-dong hills, Wallich.

Rootstock creeping; stems 2-2½ ft., stiff, glabrous. *Leaves* 8-10 by ½-¾ in., rigid, tip setaceous, margins thickened; sheaths glabrous or hairy. *Spathe* 1-1½ in. *Spikes* 1½-3 in., male part stout, rachis glabrous; spikelets ¼-¾ in. glabrous;

pedicelled spikelets adnate to the rachis; fem. spikelets rather longer, gl. of pedicelled 0 or minute.

5. **P. barbata**, *Stapf mss.*; branches of infl. many umbelled, spathes $\frac{1}{2}$ in. at length open, fem. spikelets solitary, margins of gl. I keeled tip entire. *C. arundinacea*, *Koen. ex Willd. Sp. Pl.* iv. 203 (*non Lamk.*). *Coix barbata*, *Roxb. Fl. Ind.* iii. 569; *Wall. Cat. n.* 8626; *Dalz. & Gibs. Bomb. Fl.* 289. *C. crypsoides*, *C. Muell. in Bot. Zeit.* xix. (1861) 334. *C. gigantea*, *Herb. Russ. ex Wall. Cat. l. c.* *C. Koenigii*, *Spreng Syst.* i. 228; *Thw. Enum. Pl. Zeyl.* 357. *Chionachne barbata*, *Br. in Benn. Pl. Rar. Jav.* 18; *Trim. Cat. Ceyl. Pl.* 106; *Aitchis. Cat. Panjab. Pl.* 157; *Duthie Grass. N.W. Ind.* 11, *Fodd. Grass. N. Ind.* 19. *Ch. Koenigii*, *Thw. Enum. Pl. Zeyl.* 369.

Hot and damp parts of INDIA, from the Panjab to Assam and Munneopore, and southward to CEYLON.—DISTRIB. Java.

Stems 3–5 ft., glabrous or with the leaves and sheaths bristly with tubercle-based hairs. *Leaves* 1–2 ft. by $\frac{1}{4}$ – $\frac{3}{8}$ in., finely acuminate, margin thickened. *Spikes* 1– $1\frac{1}{2}$ in., rachis usually glabrous. *Male spikelets* $\frac{1}{4}$ in., glabrous or softly pilose, keels ciliolate; *fem.* $\frac{1}{2}$ in., glabrous, pale; gl. of pedicelled minute or 0.

6. **P. punctata**, *Stapf mss.*; branches of infl. few unequal, terminal subumbellate, outer spathes long green, gl. I of fem. spikelets constricted in the middle, then suddenly dilated into an ovoid obtuse claw, keels broad. *Sclerachne punctata*, *Br. in Benn. Pl. Rar. Jav.* 15, t. 4. *Chionachne Massii*, *Balans. in Journ. de Bot.* (Paris, 1890), 78. *Coix sulcata*, *Herb. Rottl.*

THE DECCAN PENINSULA, *Rottler*.—DISTRIB. Java, Tonkin?

Stem slender, branched, glabrous, and leaves glabrous or sparsely hairy. *Leaves* 6–8 by $\frac{1}{4}$ in., linear-lanceolate, flaccid. *Spathes* of lower outer branches long, lanceolate. *Spikes* $\frac{1}{2}$ in.; *male spikelets* one pair, $\frac{1}{2}$ in., glabrous; *fem.* $\frac{1}{2}$ in., pale; gl. of pedicelled minute.

29*. **ZEÄ**, *Linn.*

A tall stout annual monœcious grass. *Leaves* broad, flat. *Spikelets* unisexual, males in terminal racemed spikes; fem. in solitary axillary stout sheathed spikes, rachis thick, inarticulate, spongy. *Male spikelets* 2-fld., 2-nate, a sessile and a pedicelled at each of the alternating teeth of the inarticulate rachis; glumes 4, acute; I and II subequal, membranous, empty; I enclosing the hyaline paleate III and IV. *Lodicules* fleshy. *Stamens* 3, anthers linear. *Fem. spikelets* 1-fld., sessile, densely crowded in many vertical series on the thick cylindric rachis; glumes 4, membranous, I and II very broad, obtuse or emarginate; III hyaline, paleate, empty; IV hyaline, often 2-fld. *Lodicules* 0. *Ovary* obliquely ovoid, plano-convex; style very long, 2-fld, arms papillose. *Grain* large, subglobose or flattened, surrounded by the marcescent gls.

Z. Mays, *Linn. Sp. Pl.* 971; *Beauv. Agrost.* 136, t. 24, f. 3; *Kunth Enum. Pl.* i. 19, *Suppl.* 15; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 3, 4. *Bonafous Hist. Nat. Mays* (Paris, 1836), t. 1–19; *Doell in Mart. Fl. Bras.* ii. II, 30, t. 11; *Roxb. Fl. Ind.* iii. 349; *Grah. Cat. Bomb. Pl.* 240; *Duthie Field & Gard. Crops.* 25, t. 5; *Miq. Fl. Ind. Bat.* iii. 477. *Z. alba*, *americana* & *vulgaris*, *Mill. Gard. Dict. Ed.* viii. n. 1, 2, 3. *Z. segetalis*, *Salisb. Prodr.* 28. *Mays zeä*, *Gærtn. Fruct.* i. 6, t. i. f. 9.

Cultivated throughout the hotter parts of INDIA.—Native of Peru.

30. **DIMERIA**, Br.

Slender annual or perennial grasses. *Leaves* narrow. *Spikelets* 1-fl., unilateral on a single terminal spike or several racemed spikes, sessile or pedicelled, rachis inarticulate. *Glumes* 4, I linear, rigid; II broader compressed; III smaller, hyaline, empty; IV hyaline, bisexual, entire or 2-lobed, keeled, 1-nerved, usually awned; awn terminal or in the sinus, capillary, twisted at or below the middle. *Lodicules* minute or 0. *Stamens* 2, filaments short; anthers small. *Styles* distinct, stigmas short. *Grain* linear, laterally compressed, free.—Species 12 or 14, tropical Asiatic and Australian;—all want revision with more copious material.

* Spike solitary; spikelets conniving; gl. I erect, II not appressed to the rachis of the spike.

1. **D. pusilla**, *Thw. Enum. Pl. Zeyl.* 369; stem filiform, leaves short, rachis very slender compressed-trigonus, spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. long sessile or pedicelled, gl. II acuminate awned. *Hack. Monogr. Androp.* 78; *Trim. Cat. Ceyl. Pl.* 107.

THE DECCAN PENINSULA and CEYLON (CP. 957.)

Very variable, 6–18 in. high.—Amongst the many forms the following appear the most distinct. I cannot satisfactorily identify them with Hackel's descriptions.

D. pusilla, proper; stems 6–8 in. filiform, rachis of spike filiform trigonous smooth or scaberulous on the angles, spikelets pedicelled, pedicel usually naked below villous upwards. *D. pusilla*, *Thw. l.c.* ?*Hack. Monogr. Androp.* 78. Ceylon; at Kokotodua, *Gardner* (CP. 957 in part).—This and the following I have described from Thwaites' type specimens.

Var. *pallida*, *Thw. mss.*; stem as in *D. pusilla* proper, spikelets all sessile, or the lowest on the spike pedicelled, awn of gl. I shorter. ?*D. Thwaitesii*, *Hack. l.c.*—Ceylon at Damboul, *Thwaites* (CP. 3955).

Var. *elatior*; stem 12 in., stouter, somewhat branched, spike longer, rachis as broad as the shortly pedicelled spikelets keeled down the centre margins scaberulous, awn of gl. I sometimes as long as the gl.—CEYLON; at Trincomalee; *Glenie* (CP. 957).

Var. *Lawsoni*, stem short leafy, spike inclined, rachis broader than the sessile villous spikelets, margins ciliate, glume II shortly awned.—Malabar; Wynaad, *Lawson*.

2. **D. Kurzii**, stem 10–18 in. erect, rachis of spike rather broader than the sessile spikelets strongly ciliate, gl. II acute not awned, more or less ciliate.

BURMA, *Kurz* (n. 2741); Mergui, *Griffith*.

Much stouter than any form of *D. pusilla*, which the spike closely resembles; but the spikes are longer, $\frac{3}{4}$ –2 in.; spikelets $\frac{1}{10}$ in. long.—The spikes are sometimes inclined or recurved as in the species with several on the peduncle, hence two spikes may occur. *Kurz's* specimens are very slender, 12–18 in. long; *Griffith's* solitary one is in a very young state, with broader leaves sheathing the spike.

** Spikes 2–3; erect spreading or involute; gl. I erect or spreading; II usually closely appressed to the rachis.

† *Rachis capillary*.

3. **D. Hohenackeri**, *Hochst. ex Miq. in Verh. Ned. Inst.* III. iv. (1851) 35, stem capillary, spikes very slender, rachis filiform trigonous, spikelets distant narrow pedicelled, gl. II acuminate dorsally ciliate. *Hack. Monogr. Androp.* 79; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891), 189.

Psilostachys Hohenackeri, Steud. Syn. Gram. 413; *Hochst. in Flora* (1856), 90.

N. CANARA and MANGALORE, in rice fields, *Hohenacker, Talbot*.

Stem 6–8 in. Leaves short, upper sheathing. Spikes 1–1½ in.; rachis with scabrid angles. Spikelets ½ in., awns twice as long; gl. I. very narrow, acuminate, nearly glabrous, at length divaricate.

†† *Rachis trigonous or linear, sometimes as broad or broader than gl. II, joints much shorter than the spikelets.*

4. **D. ornithopoda**, Trin. Fund. Agrost. 167, t. 14; spikes very slender, rachis flexuous, spikelets ⅙ in. sessile or subsessile, glume II linear acute dorsally ciliate. Hack. Monogr. Androp. 81. D. filiformis, *Hochst. in Hohenack. Pl. Ind. Or.* n. 231. D. stipæformis, *Miq. Prolus. Fl. Jap.* 176; *Franch. & Sav. Enum. Pl. Jap.* i. 187. ?D. diandra, *Griff. Notul.* iii. 71, *Ic. Pl. Asiat.* t. 157, f. 2. D. psilobasis, *F. Muell. Fragm.* vii. 104. D. tenera, Trin. in Mem. Acad. Petersb. Ser. vi. ii. (1833), 335; *Benth. Fl. Austral.* vii. 523. Didactylon simplex & ramosum, *Zoll. & Mor. Syst. Verz.* 100. Andropogon filiformis, *Roxb. Fl. Ind.* i. 256; *Steud. l. c.* 372. A. Roxburghianus, *Schult. Mant.* ii. 451. A. stipæformis, *Steud. l. c.* 377. *Psilostachys filiformis*, *Dalz. & Gibs. Bomb. Fl.* 305.—*Dimeria*, *Wall. Cat.* n. 8839, 8840.

Throughout INDIA; from Nepal and the Khasia Hills to the Deccan, Burma and the Nicobar Islds. (not in Ceylon).—DISTRIB. Malay Islds., Japan, Trop. Austral.

Annual, much branched, leafy. Leaves 1–3 in., erect; sheaths glabrous or pilose. Spikes 2, rarely 3; rachis about as broad as the spikelets, margins scaberrulous, costa strong. Spikelets linear, acuminate, callus villous; gl. I slender, nearly glabrous; III short, acute; palea 0.—Hackel has 6 varieties of this species, of which more might be made.

5. **D. Woodrowii**, Stapf in *Hook. Ic. Pl.* t. 2312; spikes 2 circinate involute, rachis rigid glabrous, spikelets very shortly pedicelled, callus shortly bearded, gl. I and II subequal acute, III linear hyaline, IV shortly awned.

The CONCAN; Ratnagherry district, and near Goa, *Woodrow*.

Annual. Stem 3–6 in. slender, leafy to the top, simple or sparingly branched; upper internode (or peduncle) with its leaf abruptly deflexed after flowering. Leaves 2–3 in., linear, acuminate, erect, strict, glabrous or sparsely hairy; ligule very short, hyaline. Spikes ¾–1 in., at first erect, rachis dorsally convex, concave ventrally. Spikelets few, rather distant, suberect, divergent as the rachis incurves; gl. I glabrous or sparsely hairy; awn of IV about twice as long as its glume; palea 0.—A very peculiar species, at once recognized by the two spikelets forming together a hoop.

6. **D. connivens**, Hack. Monogr. Androp. 689; annual, rachis of spike nearly as broad as the spikelets ciliate, spikelets ½ in. subsessile, callus minutely villous, gl. I very slender ciliate, II oblong-lanceolate acuminate dorsally ciliate.

CHOTA NAGPORE, alt. 2000 ft., *Clarke*.

Stems ascending, 6–10 in. Leaves short, erect. Spikes 1–1½ in.; rachis nearly straight, costate. Spikelets erect, closely imbricating; gl. I slender, sparsely ciliate; awn twice as long as the spikelet.

7. **D. Lehmanni**, Hack. Monogr. Androp. 82; spikes slender spreading, rachis undulate scabrid or ciliate, spikelets sessile ½ in. long, callus very shortly bearded, gl. I and II subacute, I narrowly linear, keel ciliate,

III oblong. *D. ornithopoda*, *Thw. Enum.* 369. *Pterygostachyum Lehmanni*, *Nees ex Steud. Nom. Ed.* II. ii. 412, *Syn. Gram.* 413.

CEYLON, *Macrae, Walker, Thwaites*.

Annual, branched, 8-10 in. high. *Leaves* erect, flat, acuminate.

Var. α ; glabrous, rachis of spike ciliate, spikelets awned. (C.P. 952.)

Var. β ; rachis of spike scaberulous, spikelets not awned. (C.P. 955.)

8. *D. pubescens*, *Hack. Monogr. Androp.* 83; spikes stout spreading, margins of broad straight rachis ciliate, spikelets $\frac{1}{2}$ in. sessile silky, gl. I and II shortly acuminate, I narrowly linear with membranous margins $\frac{1}{2}$ longer than III. *D. ornithopoda*, var. γ , *Thw. Enum. Pl. Zeyl.* 369.

CEYLON, *Gardner*; Pasdoon Corle, *Thwaites* (C.P. 956).

Perennial, branched from the base, glabrous to villously hairy. *Racemes* 2-2 $\frac{1}{2}$ in., often solitary and inclined; rachis flat, $\frac{1}{2}$ in. broad or less. *Spikelets* densely imbricate; gl. I and II silky all over; awn twice as long as the spikelet or longer.

9. *D. fuscescens*, *Trin. in Mem. Acad. Petersb. Ser.* VI. ii. (1833) 335; spikes stout spreading, rachis undulate margins smooth or scaberulous, spikelets $\frac{1}{2}$ - $\frac{1}{4}$ in. sessile, callus minute or 0, gl. I and II acute or acuminate, I narrowly linear much longer than III, margins of II broadly membranous. *Hack. Monogr. Androp.* 84; *Trim. Cat. Ceyl. Pl.* 107; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 189. *D. ornithopoda*, var. β , *Thw. Enum. Pl. Zeyl.* 369.—*Dimeria*, *Wall. Cat. n.* 8841.

NEPAL, *Wallich*. KHASIA HILLS, alt. 4-5000 ft., *Griffith, &c.* TENASSERIM, *Helfer*. The CONCAN, *Lisboa*. CEYLON, *Gardner, Thwaites* (C.P. 3256).

Perennial, 2-3 ft. high, stout, simple or branched. *Leaves* glabrous or hairy. *Spikes* 2-4 in.; rachis compressed trigonous. *Spikelets* reddish-brown; awn twice as long as the gls.—The Tenasserim specimens are small and in a poor state.

10. *D. alata*, *Hook. f.*; spikes 2-3 rather stout, spikelets $\frac{1}{10}$ in. sessile glabrous callus naked, gl. I scaberulous, II dimidiate-ovate keel broadly winged, III nearly as long as II, awn 0. *D. ornithopoda* δ mutica, *Thw. (in part)*.

CEYLON, *Thwaites* (C.P. 955 of 1864).

Annual. *Stems* 6-18 in., tufted, slender, erect. *Leaves* 6-12 by $\frac{1}{4}$ - $\frac{1}{2}$ in., erect, strict, narrowed to the base, and sheaths hirsute with long spreading hairs. *Spikes* 3 in., strict, spreading; rachis $\frac{3}{10}$ in., stout, straight, margins scaberulous. Gl. I divaricate; II appressed to the rachis, broadly hyaline; wing opaque, strongly ciliate; III oblong, ciliate, 1-nerved; IV obovate-oblong, ciliate.—The small glabrous spikelets and broadly winged gl. II distinguish this species from *D. fuscescens*.

*** Spikes 4-10 (rarely 3) digitate or fascicled.

11. *D. gracilis*, *Nees ex Steud. Syn. Gram.* 413; leaves not contracted above the sheath, spikes 3-10 long slender flexuous quite glabrous, rachis filiform subtrigonous, spikelets $\frac{1}{4}$ - $\frac{1}{2}$ in., pedicels long slender glabrous, callus bearded. *Hack. Monogr. Androp.* 88; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 190. *D. laxiuscula*, *Thw. ex Trim. in Journ. Bot.* xxiii. (1885), 272, *Trim. Cat. Ceyl. Pl.* 107.

The CONCAN, *Law*; on the Ghats, *Lisboa*. CEYLON, *Macrae, Thwaites, &c.* (C.P. 3863).

Perennial, 1-2 ft. high, stout or slender. *Spikes* 1 $\frac{1}{2}$ -3 in., pale red-brown; gl. I and II, lanceolate, ciliate; I scabrid above the middle or all over; II with narrowly membranous margins; awn twice as long as the spikelet.

12. *D. leptorhachis*, *Hack. Monogr. Androp.* 89; leaves contracted

above the sheath, spikes slender, rachis filiform ciliate at the nodes, spikelets $\frac{1}{2}$ – $\frac{3}{4}$ in., pedicels very short thickened, callus bearded. *D. pilosissima*, *Thw. Enum. Pl. Zeyl.* 369; *Trim. Cat. Ceyl. Pl.* 107 (not of *Trin.*).

TENASSERIM, *Helper, Griffith (Kew distrib.* 6799). Ceylon; on Adam's Peak (C.P. 24, 3261).

Perennial, stout. *Leaves* glabrous or villous. *Racemes* 2–6 in.; rachis straight or flexuous; internodes $\frac{1}{2}$ – $\frac{3}{4}$ in. in Tenasserim specimens, much shorter in Ceylon ones. *Spikelets* pale or dark, red-brown; gl. I and II acuminate, ciliate in Ceylon, scaberulous in Tenasserim; II with narrowly membranous margins.

31. IMPERATA, *Cyrill.*

Perennial, erect, often tall grasses. *Spikelets* 1–2-fl., in spiciform or thyrsiform silvery-silky panicles, binate, both pedicelled, upper fl. perfect, lower imperfect or 0. *Glumes* 4, membranous, awnless; I and II lanceolate, hairy; III much smaller, hyaline, glabrous; IV still smaller, hyaline, glabrous; palea hyaline, glabrous. *Stamens* 1–2; anthers large, linear. *Styles* connate at the base, stigmas linear. *Grain* small, oblong, free.—Species 5, tropical, chiefly American; 2 Asiatic, one also European.

1. *I. arundinacea*, *Cyrill. Pl. Rar. Neap. Fasc.* ii. 26, t. 11; panicle very narrow spiciform, branches short appressed, gl. I 5–9-nerved, stamens 2. *Br. Prodr.* 204; *Kunth Enum. Pl.* i. 477; *Hack. Monogr. Androp.* 92; *Steud. Syn. Gram.* 405; *Reichb. Ic. Fl. Germ.* t. 55; *Boiss. Fl. Orient.* v. 452; *Thw. Enum. Pl. Zeyl.* 369; *Trim. Cat. Ceyl. Pl.* 106; *Duthie Grass. N.W. Ind.* 14, *Indig. Fodd. Grass.* t. 15, *Fodd. Grass. N. Ind.* 22; *Aitchis. Cat. Punjab. Pl.* 173. *I. Allang*, *Jungh. in Tijdschr. Nat. Gesch.* vii. 295; *Steud. l.c.* 405 (*Alang*). *I. condensata*, *Steud. l.c.* 431. *I. cylindrica*, *Beauv. Agrost.* 165. *I. filifolia*, *Nees ex Steud. l.c.* *I. Koenigii*, *Beauv. Agrost.* 165; *Wall. Cat. n.* 8850. *I. pedicellata*, *Steud. in Flora*, xxix. (1846) 22, *Syn. Gram. l.c.* *I. Sieberi*, *Opiz. Natural.* x. (1825) 190. *I. Sisca*, *Beauv. ex Steud. Nom. Ed.* II. i. 805. *I. Thunbergii*, *Nees ex Wall. Cat. n.* 8851. *Saccharum cylindricum*, *Lamk. Encycl.* i. 594; *Roxb. Fl. Ind.* i. 234; *Grah. Cat. Bomb. Pl.* 239; *Griff. Notul.* iii. 80. *S. diandrum*, *Koen. ex Retz. Obs.* v. 16. *S. europæum* & *S. indum*, *Pers. Syn.* i. 103. *S. Koenigii*, *Retz. Obs.* v. 16. *S. spicatum*, *Burm. ex Kunth l.c.* *S. laguroides*, *Pourr. in Mem. Acad. Toul.* iii. (1788) 326. *S. Ravennæ*, *Bieb. Fl. Taur. Cauc.* iii. 51. *Lagurus cylindricus*, *Linn. Syst. Nat. Ed.* x. 878. *Calamagrostis Lagurus*, *Koel. Descr. Gram.* 112; *Host Gram. Austr.* iv. t. 40.

Hotter parts of INDIA, from the Panjab southward and eastward to Malacca and Ceylon —DISTRIB. All warm countries.

Rootstock creeping. *Stem* 1–3 ft., solid, nodes glabrous or bearded. *Leaves* erect, often exceeding the stem. *Panicle* 3–8 in., silvery with dark anthers and stigmas. *Spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ in., callus-hairs about twice as long as the gls.; gl. I rather thickened towards the base, dorsally hairy, tip obtuse; II as long as I, 3–7-nerved; III = $\frac{1}{2}$ – $\frac{3}{4}$ II, oblong, irregularly toothed, nerveless; IV ovate, acute, toothed, faintly 1-nerved or nerveless; palea about half as long as the gl., quadrate, retuse or toothed, nerveless, glabrous.—Hackel distinguishes the Indian form as var. *Koenigii*, having villous nodes and broader less rigid leaves, but some of the Indian specimens appear to me quite like the Western.

Var. *latifolia*; stem 3–4 ft. very robust, nodes glabrous, leaves long $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, palea of gl. IV with long-ciliate lobes.—Tropical Himalaya, from Kumaon to Assam.

2. **I. exaltata**, Brongn. *Voy. Coq. Bot.* 101 (*excl. Syn.*); panicle thyriform, lower branches elongate, gl. I 3-5-nerved, stamen 1. *Hack. Monogr. Androp.* 99. *I. caudata*, Trin. in *Mem. Acad. Petersb. Ser. vi. ii.* (1833) 331. ? *I. jaculatoria*, Roem. & Sch. *Syst. ii.* 289. *I. ramosa*, Anderss. in *Effvers. Vet. Akad. Stockh.* (1855) 158. *Saccharum Alopecurus*, Nees in *Hook. Kew Journ. ii.* (1850) 100; *Steud. Syn. Gram.* 406. *S. caudatum*, Mey. *Prim. Fl. Esseq.* 68. *S. confertum*, Presl *Rel. Hænk. i.* 346. *S. contractum* & *dubium*, H. B. & K. *Nov. Gen. et sp.* 182, 183. ? *S. jaculatorium*, Lour. *Fl. Cochinch.* 53; *Poiret Encycl. Suppl. ii.* 70. *S. macilentum*, Chauv. ex *Steud. l. c.* *S. negrosense*, *Steud. l. c.* *Anatherum porto-ricense*, Spreng. *Syst. i.* 290. *A. caudatum*, Schult. *Mant. ii.* 445. *Syllepis polystachya*, Fourn. ex *Hack. in Mart. Fl. Bras. ii. III.* 251.

SINGAPORE, Cuming. BURMA; Mergui, Griffith.—DISTRIB. Malaya, N. Hebrides, Am. trop.

Stem tall, up to 7 ft., slender, fistular, glabrous, nodes glabrous. *Leaves* 2-3 ft. by $\frac{3}{4}$ -1 in., linear, finely acuminate, smooth, glabrous or sparsely pubescent; sheath glabrous; ligule very short. *Panicle* 12-18 in., 4-5 in. broad at the base, narrowly subpyramidal; rachis slender; lower branches 3-4 in. long, branchlets and pedicels ciliate. *Spikelets* $\frac{1}{2}$ - $\frac{3}{4}$ in., like those of *I. arundinacea*, but gl. I and II fewer nerved; III = $\frac{1}{2}$ II oblong, deeply irregularly toothed above the middle, glabrous, nerve very slender; IV cuspidately lanceolate from an ovate base, quite entire, glabrous; palea quadrate, many-toothed, glabrous.

32. **MISCANTHUS**, Anderss.

Tall perennial grasses. *Spikes* long, simple and branched, very slender, crowded at the top of the peduncle into a nodding fan-shaped corymb; rachis obscurely jointed. *Spikelets* very numerous, in unequally pedicelled pairs, 1-fld., dorsally subcompressed, one or both usually awned, callus with long silky hairs. *Glumes* 4; I chartaceous, nearly flat with narrow incurved margins; II similar but more convex; III hyaline, ovate, epaleate; IV hyaline, 2-fld or 2-toothed, with a long awn (rarely short or 0) in the sinus; palea minute. *Lodicules* cuneate. *Stamens* 2-3. *Styles* free, stigmas rather short. *Grain* linear-oblong, free.—Species 5-6, Asiatic and Polynesian.

1. **M. nepalensis**, Hack. *Monogr. Androp.* 104; spikes very many densely crowded 5-7 in., hairs of callus much longer than the spikelet. *Eulalia nepalensis*, Trin. in *Mem. Acad. Petersb. Ser. vi. ii.* (1833) 333, *Sp. Gram. Ic. t.* 332. *Pollinia nepalensis*, Benth. ex Duthie *Grass. N.W. Ind.* 16.—*Erianthus*, Wall. *Cat. n.* 8848.

TEMPERATE HIMALAYA; from Garwhal to Bhotan, alt. 5-7500 ft., Wallich, &c. KHASIA HILLS, alt. 4-5000 ft. NAGA HILLS, Prain.

Stem 3-6 ft., as thick as a goose-quill in large plants. *Leaves* 6-18 in. by $\frac{1}{2}$ - $\frac{3}{4}$ in., margins smooth, midrib stout; ligule rounded. *Spikes* flexuous; rachis capillary, glabrous; pedicels $\frac{1}{4}$ in. *Spikelets* $\frac{1}{4}$ in. long, purplish or golden yellow, shining; gl. I and II minutely 2-toothed.

2. **M. nudipes**, Hack. *Monogr. Androp.* 109; spikes few 2-3 in., hairs of callus not longer than the spikelet. *Erianthus nudipes*, Griseb. in *Nachr. Akad. Wiss. Goett.* (1868) 52.

SIKKIM HIMALAYA, alt. 9-12,000 ft., J. D. H. UPPER ASSAM; Mishmi Hills, Griffith.

Much smaller than *M. nepalensis*, 2-3 ft. high, with leaves 4-10 in. long, the margins of which are smooth as in that plant; spikelets very much longer, $\frac{1}{2}$ - $\frac{1}{3}$ in. long, and narrower.

33. **SPODIOPOGON**, Trin.

Tall grasses. *Leaves* often long-petioled. *Spikelets* 1-2-fl., panicle, laterally compressed or subterete, 2-3-nate, lower sessile male, upper bisexual, rachis jointed. *Glumes* 4; I and II subequal; I lanceolate, 5-9-nerved, tip acuminate or toothed; II membranous, lanceolate, 3-7-nerved; III hyaline, paleate or not, 3-androus or empty; IV 2-fid or 2-partite with a very slender exerted awn in the sinus; palea shorter. *Lodicules* cuneate. *Anthers* linear. *Stigmas* linear. *Grain* free, narrowly fusiform.—Species about 5, Asiatic.

1. **S. albidus**, Benth. in Journ. Linn. Soc. xix. (1881) 66; decumbent, leaves long-petioled broad flaccid, panicle narrow, spikelets 2-fl. laterally compressed, silkily villous, gl. I membranous. Hack. Monogr. Androp. 185. Andropogon albidus, Hb. Heyne. A. rhizophorus, Steud. Syn. Gram. 381; Duthie Fodd. Grass. N. Ind. 26.—Andropogon? Wall. Cat. n. 8821.

RAJPOOTANA; on Mt. Aboo, Duthie. DECCAN PENINSULA, from the Concan to Travancore.

A weak struggling tufted branched annual?, 2-4 feet; stem very slender, much branched, leafy. *Leaves* 6-10 by $\frac{1}{4}$ - $\frac{3}{4}$ in., flaccid, linear-lanceolate, acuminate, 1-nerved, usually suddenly narrowed into a slender petiole 1-3 in. long; sheath 3-5 in.; ligule oblong, glabrous. *Panicle* at first enclosed in a long narrow spathaceous leaf-sheath; rachis compressed, ciliate. *Spikelets* about $\frac{1}{2}$ in. long, white; shortly pedicelled. Gl. I minutely 2-mucronate, 7-nerved; II broader, much compressed; III truncate tip erose.

2. **S. dubius**, Hack. Monogr. Androp. 186; erect, leaves sessile long narrow and sheaths softly hairy, panicle narrow, spikelets 1-fl. silkily villous, gl. I chartaceous 7-9-nerved.—Andropogon, n. 16, Herb. H. f. & T.

TEMPERATE HIMALAYA; from Kashmir to Garwhal, alt. 6-8000 ft., Thomson, &c.

Perennial. *Stem* 2-4 ft., solid, as thick as a goose-quill, quite smooth. *Leaves* 12-18 by $\frac{1}{4}$ - $\frac{1}{2}$ in., smooth hairy or villous, base villous, margins scaberulous, base villous, midrib broad, white; sheath glabrous; ligule densely villous. *Panicle* 6-8 in., narrowly oblong, erect, very dense-fl., pale; pedicels very short. *Spikelets* $\frac{1}{2}$ in.; gl. I acuminate, dorsally convex, margins narrowly incurved; II as long, subchartaceous, 3-5-nerved, hairy dorsally, sometimes obtuse and apiculate; III oblong, obtuse, hyaline, 1-nerved ciliate; IV shorter than II, cleft into lanceolate segments with a slender interposed awn as long as the spikelet, 3-nerved below the middle; palea lanceolate, 2-fid.

3. **S. cotulifer**, Hack. Monogr. Androp. 187; tall, erect, leaves long sessile and petioled, panicle lax effuse branches and long capillary pedicels short subclavate, spikelets 1-fl. lanceolate terete sparsely hairy, gl. I and II coriaceous strongly nerved. *Eulalia cotulifera*, Munro ex Miq. Probus. Fl. Jap. 177; Franch. & Sav. En. Pl. Jap. ii. 189. *Miscanthus cotulifer*, Benth. in Journ. Linn. Soc. xix. (1881) 65. *Eccoilopus andropogonoides*, Steud. Syn. Gram. 124. *Andropogon cotulifer*, Thunb. Fl. Jap. 41.

WESTERN TEMPERATE HIMALAYA, alt. 4-6000 ft., from Kashmir, Clarke, to

Garwhal, *Jacquemont, Duthie.* KHASIA HILLS, alt. 3-4000 ft., *J. D. H. & T. T.*—DISTRICT. China, Japan.

Perennial. *Stem* 3-8 ft. or more from a woody branched stock, as thick as a swan's quill or less. *Leaves* 2-3 ft. by $\frac{1}{2}$ - $\frac{3}{4}$ in.; sheath long, grooved; ligule short. *Panicle* 6-12 in., rachis slender, terete, branches whorled, capillary, lower 1-3 in., lax-fld., flowering towards the ends; pedicels $\frac{1}{10}$ - $\frac{1}{8}$ in., clavellate, tips cupped. *Spikelets* $\frac{1}{2}$ in., green; tall callus bearded; gl. I and II very strongly 7-9-nerved, nerves scaberulous, tips 2-dentate and very shortly awned; III oblong, tip rounded, scaberulous above the middle, not ciliate; palea lanceolate, subciliate; IV glabrous, cleft to below the middle into setiform lobes, awn twice as long as the spikelet; palea large, broadly ovate, obtuse, ciliate, nerveless.—A peculiar grass very unlike the other species.

34. **POLLINIA**, *Trin.*

Annual or perennial grasses. *Spikes* subdigitately approximate or fascicled, hirsute silky or ciliate, rachis fragile. *Spikelets* binate a sessile and pedicelled rarely both pedicelled, 1-fld. or the sessile 2-fld. *Glumes* 4, I membranous or coriaceous, dorsally flattened or concave, truncate often narrowly, or tip 2-toothed, margins narrowly inflexed throughout its length; II as long, usually laterally compressed, keeled, acute, rarely awned; III hyaline, ciliate, rarely neuter or male, paleate (sometimes represented by a gl.-like palea); IV very short, hyaline, entire 2-fld or 2-auricled or reduced to a dilated base of the long twisted exerted awn; palea small or 0. *Lodicules* obliquely truncate. *Stamens* 3, rarely 2. *Stigmas* long. *Grain* free.—Species about 30, tropical and subtropical of the Old World.

The characters by which *Pollinia* is distinguished from *Ischæmum* are very unsatisfactory. The colour of the hairs of the spikes in Sect. *Eulalia* cannot be altogether depended upon; nor can the sexuality of the spikelets and presence or absence of gl. III be in Sect. *Leptatherum*. The apparent replacement of gl. III in some species by a palea as long as gl. I and concave towards it, first observed and commented on by Hackel (*Androp.* 171) is a very curious departure from the normal condition of the spikelet in *Andropogonæ*. It is not confined to *Pollinia*.

Sect. I. *Stem* erect. *Leaves* not conspicuously constricted or petioled above the sheath. Gl. I as long as II, narrowly truncate; II not broadly truncate; III or its palea present.

* Glume II of sessile spikelets awned. Basal sheaths of stem naked.

1. **P. articulata**, *Trin. in Bull. Sc. Acad. Petersb.* (1836) 71; annual, very slender, leaves usually filiform, spikes usually very many, hairs of rachis white, spikelets $\frac{1}{2}$ - $\frac{1}{6}$ in. brown, gl. I narrowly truncate, keels villous below with white hairs, II glabrous except the margins, III (♀ palea of gl. IV) ovate obtuse, IV narrowly oblong 2-fld or 2-toothed, awn very long ciliate, palea short broad. *Hack. Monogr. Androp.* 153; *Benth. Fl. Hongk.* vii. 525. *P. setifolia*, *Nees in Hook. Kew Journ.* ii. (1850) 101. *Pogonatherum contortum*, *Brongn. Bot. Voy. Coq.* 90, t. 17. *Erianthus articulatus*, *F. Muell. Fragm. Phyt. Austral.* viii. 118. *Eulalia concinna*, *Nees ex Steud. Syn. Gram.* 412. *Andropogon koretrostachys*, *Trin. in Mem. Acad. Petersb. Ser.* vi. ii. (1833) 273. *A. brunneus*, *Heyne in Herb. Rottler. A. asthenostachys*, *Steud. l. c.* 381.—*Andropogon*, *Wall. Cat.* n. 8813, 8814.

Plains of lower Gangetic Valley and Behar, ascending to 3000 ft. SIKKIM and KHASIA HILLS. CHOTA NAGPUR, *Gamble*. NILGIRI HILLS; the Wynaad, *Heyne*. BURMA, *Wallich*.—DISTRIB. Malaya, China, Australia.

Stem 1–2 ft., erect, tufted, nodes glabrous. *Leaves* 6–18 in., erect, flexuous, $\frac{1}{10}$ – $\frac{1}{6}$ in. broad (except in Wallich's n. 8813), glabrous. *Peduncle* filiform. *Spikes* $\frac{3}{4}$ –2½ in., fascicled, very slender, erect. *Spikelets* amongst the smallest of the genus; gl. IV very variable in length and in depth of lobing, sometimes subentire, awn sometimes 1 in. long.—Hackel has two subspecies, one with the nodes of the spike longer and not disarticulating, which includes the Burmese plant of Wallich, n. 8814, and the Sikkim plant; the other has fragile spikes with much shorter nodes, to which Wallich's Burmese, n. 8813 belongs; this latter is a much taller stouter plant with leaves $\frac{1}{4}$ in. broad and stems thicker than a crow-quill.—What Hackel describes as gl. III appears to me to be the palea of gl. IV, for it surrounds the ovary.

Var. β , *pedicellata*, Hack. mss.; both spikelets long pedicelled. Kumaon, *Duthie*.

2. ***P. pallens***, *Hack. Monogr. Androp.* 156; leaves very slender, spikes 5–10 silkily hairy white, rachis slender, spikelets $\frac{1}{2}$ in., gl. I narrow membranous bicuspidate shortly villous, II laxly villous, III oblong obtuse ciliate, IV narrow 2-fid, awn 2–3 times as long as the spikelet.

KHASIA HILLS, alt. 5000 ft., *Griffith*, &c.—DISTRIB. China.

Stem 2–3 ft., slender; nodes glabrous. *Leaves* 12–20 by $\frac{1}{10}$ – $\frac{1}{8}$ in., hairy beneath, margins revolute, tips filiform. *Spikes* 2–4 in., slender, silkily hairy. *Spikelets* narrowly lanceolate. Gl. I 2-nerved; II with the capillary awn very variable in length, keel and margins ciliate; III oblong, obtuse, ciliate; IV ciliate, oblanceolate, adnate portion of awn forked about half-way down; palea broadly ovate or orbicular, entire, not ciliate.

** Glume II of sessile spikelet not awned.

† Basal sheaths of stem naked.

§ *Spikelets* $\frac{1}{2}$ – $\frac{1}{4}$ in.

3. ***P. quadrinervis***, *Hack. Monogr. Androp.* 158; spikes 3–6 and pedicels villous with long silvery-grey hairs, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. oblong-lanceolate subacute, gl. I dorsally concave 4-nerved (often obscurely), III glabrous, IV short broadly deeply obcordate, awn 3–4 times as long as the spikelet, palea short broad. *P. villosa*, *Munro in Benth. Fl. Hongkong*, 420 (*non Spreng.*). *Erianthus tristachyus*, *Nees in Hook. & Arn. Bot. Beech. Voy.* 241; *et in Pl. Meyer.* 183 (*excl. Syn.*).—*Andropogon*, *Wall. Cat.* n. 8808.

SUBTROPICAL HIMALAYA; from Simla to Sikkim, the MISHMI, and KHASIA HILLS, alt. 3–5000 ft., *Clarke*. PEGU, alt. 4–6000 ft., *Kurz*.—DISTRIB. China.

Stem 1–2 ft., leafy upwards, nodes glabrous. *Leaves* narrow, glabrous or hairy beneath, or on both surfaces, or with the sheath hirsute, tips finely acuminate; ligule oblong. *Spikes* 3–5, 2–6 in., erect or flexuous. *Spikelets* pale yellow-brown; callus hairs long white; gl. I with hispid keels above, tip contracted minutely truncate, margins rather broadly inflexed; II acute, minutely apiculate, sub 3-nerved, keel smooth, margins ciliate; III linear-oblong, long-ciliate above; IV with the adnate awn forked towards the base, lobes rounded ciliate; palea lanceolate, ciliate. —Nees, as Hackel observes, errs in describing the base of the stem as rufous-haired. The Khasia plant has softly villous foliage and has paler spikes, and closely resembles *P. speciosa*, var. *heterotricha*.

Var. *Wightii*; stem tall stout silky below the panicle, leaves $\frac{1}{2}$ in. broad acute, spikes 3–7 in., spikelets nearly $\frac{1}{2}$ in., gl. I 2–4-nerved, IV cuneately obovate broadly

2-lobed.—Pulney Mts., *Wight*. Possibly a species, differing from *quadrinervis* in the broad leaves which have not setaceous tips and in the broad gl. IV.

4. **P. hirtifolia**, *Hack. Monogr. Androp.* 165; spikes few, rachis and pedicels villous with long pale violet hairs, spikelets $\frac{1}{2}$ in. linear-oblong, gl. I dorsally slightly concave obscurely 4-nerved, keels laxly villous with long hairs, gl. IV short broadly obovate-oblong 2-lobed, awn several times longer than the spikelet glabrous, palea minute.

WESTERN TEMPERATE HIMALAYA, alt. 5500–8000 ft., from Simla, *Huegel*, to Kumaon, *Strachey & Winterb.* (n. 925).

Stem 2–3 ft., leafy, nodes glabrous. *Leaves* 8–18 in., very narrow, more or less hirsute beneath or on both surfaces, tips filiform; ligule very short, long-bearded. *Spikes* 3–8, rather distant, 3–7 in. long, joints and pedicels rather stout, hairs shorter than the pale brown spikelets; gl. I chartaceous, shining, tip entire, obtuse or truncate, keels ciliate aculeate above; II obtuse, glabrous except the ciliate margins, keel smooth; III lanceolate, ciliate, nerveless; IV ciliate 3-nerved; palea broadly ovate, glabrous.—The joints of the rachis are decidedly obliquely truncate. Very near *P. quadrinervis*, of which it may be a variety.

5. **P. Thwaitesii**, *Hack. Monogr. Androp.* 163; stems short, leaves chiefly radical very slender subdistichous, spikes 2–3, rachis and pedicels villous with white hairs, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. lanceolate, gls. I concolorous acute 2-nerved, IV linear 2-fid lobes narrow acute, awn more than twice as long as the spikelets, palea minute. *P. tristachya*, var. *Thw. Enum.* 368; var. *distachya*, *Trim. Cat. Ceyl. Pl.* 106.

CEYLON; in swamps, alt. 7000 ft., *Gardner, Thwaites*.

Stem short, lengthened downwards and nodose, above densely clothed for 1–3 in. with subdistichously imbricating leaf-sheaths, 1–2 in. long, which are produced into slender wiry erect convolute leaves 6–12 in. long; ligule minute. *Spikes* 2–3 in. long. *Gl.* I pale brown to the tip, dorsally concave, margins narrowly incurved; keels villous; II lanceolate, acute, keel hairy below scaberulous above; III linear-lanceolate, acute, convolute, obsoletely 2-nerved, tip ciliate; IV nearly as long, glabrous; palea ovate, ciliolate.

6. **P. mollis**, *Hack. Monogr. Androp.* 161; spikes usually many, rachis and pedicels villous with very long silvery-white hairs, spikelets $\frac{1}{2}$ – $\frac{1}{6}$ in. narrowly lanceolate acuminate dorsally flat faintly 2-nerved, IV narrow shortly 2-fid or 2-toothed, awn 3- or more times longer than the spikelet, palea minute. *Erianthus mollis*, *Griseb. in Goett. Nachr.* 1868, 92. *Eulalia mollis*, *Munro mss.*

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 5–8000 ft.

Stem 10–12 in., slender, tufted, leafy chiefly at the base. *Leaves* 2–3 in., narrowly lanceolate; sheath glabrous or ciliate; ligule very short, bearded. *Spikes* 3–10, 1–2 in. long, crowded, flexuous, joints and pedicels slender beautifully silvery-silky with very long hairs. *Spikelets* pale; gl. I thin, villous, hairs much longer than itself, lower half dark brown, upper pale, tip obscurely notched or 2-mucronate; II subacute, dorsally sparsely hairy, keel smooth, margins ciliate; III lanceolate, hyaline and ciliate in the upper half, 1-nerved; IV much shorter, awn very slender; palea glabrous.—Almost intermediate between *Pollinia* and *Erianthus*, *Hack. l. c.* 162.

§§ *Spikelets* $\frac{1}{10}$ – $\frac{1}{8}$ in.

7. **P. argentea**, *Trin. in Bull. Sc. Acad. Petersb.* i. (1836) 71; spikes many, rachis and pedicels villous with silvery hairs, spikelets $\frac{1}{10}$ in. linear-oblong pale, gl. I dorsally flat nerveless membranous above the middle

villous or glabrate below it, IV linear 2-fid, lobes narrow acute, awn several times longer than the spikelet ciliate, palea 0. *Hack. Monogr. Androp.* 162. *P. tristachya*, *Thw. Enum. Pl. Zeyl.* 368 (in part); *Benth. Fl. Austral.* vii. 527. *Duthie Fodd. Grass. N.W. Ind.* 26, t. 53. *Eulalia argentea*, *Brongn. Voy. Cog. Bot.* 92. *Erianthus rufus*, *Nees ex Steud. Syn. Gram.* 409 (partim). *E. hexastachyus*, *Hochst. in Hohen. Pl. Ind. Or. n.* 279; *Miq. Anal. Bot. Ind.* ii. 35. *E. Roxburghii*, *F. Muell. Fragm. Phyt.* viii. 117. *E. tristachyus*, *Nees in Herb. Strach. & Winterb.* No. 4; in *Hook. & Arn. Bot. Beech. Voy.* 241. *Saccharum rufum* & *tristachyum* (in part), *Steud. l.c.* 408. *Andropogon minutiflorus* & *hexastachyus*, *Steud. l.c.* 379, 380. *A. trispicatus*, *Schult. Mant.* ii. 452. *A. tristachyus*, *Roxb. Fl. Ind.* i. 256.—*Andropogon*, *Wall. Cat.* n. 8811.

TROPICAL HIMALAYA, alt. 1–5000 ft., from Kumaon eastwards to the KHASIA HILLS, BENGAL, BEHAR and southward to CEYLON.—DISTRIB. Malaya, Australia.

Stem 2–3 ft. high, leafy, or in small specimens leafy at the base chiefly. *Leaves* 12–18 in., rarely $\frac{1}{2}$ in. broad, glabrous or sparsely hairy; ligule very short, bearded. *Spikes* 2–12, $1\frac{1}{2}$ –6 in. long, flexuous; rachis and pedicels slender. *Gl.* I thin, pale brown below, pale yellow above the middle; II and III as in *P. hirtifolia*, but IV longer and narrower.—*Roxburgh* describes this as an annual delicate beautiful species, but most of the specimens appear to be perennial. The very small spikelets resemble those of *P. articulata*.

8. *P. fimbriata*, *Hack. Monogr. Androp.* 164; stems very slender shining, leaves very narrow, spikes 2–4 villous with white hairs, joints very short slender, spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in., gl. I lanceolate truncate nerveless dorsally smooth depressed, keels ciliate, II obtuse, III oblong-lanceolate ciliate, IV narrow 2-fid, awn much longer than the spikelets ciliate, palea very minute or 0.

WESTERN HIMALAYA, Simla, alt. 7–8000 ft., *Thomson*. MALABAR and CONCAN, *Stocks, &c.* PEGU, *M'Lelland*.

Annual. Stem 1–2 ft., internodes much longer than the sheaths, nodes glabrous. *Leaves* 6–10 by $\frac{1}{2}$ in., flaccid, sparsely hairy above; sheath glabrous; ligule a ciliate ridge. *Spikes* 1–3 in., long-peduncled, flexuous, pale; rachis slender, joints densely villous; gl. I with villous keels above, obscurely 2-toothed; IV with oblong ciliate lobes.—*Hackel* describes gl. IV. as epaleate, but I find a minute palea. He suspects that *Andropogon conjugatus*, *Roxb.* (*Fl. Ind.* i. 255) to be closely allied, but *Roxburgh* describes his plant as the smallest of the genus, with minute leaves, the two spikes as exactly paired and touching one another; which is not the case in *P. fimbriata*.

†† Basal sheaths of stem villous or woolly.

9. *P. phæothrix*, *Hack. Monogr. Androp.* 168; basal sheaths rusty-tomentose, leaves very slender, spikes 2–4, spikelets $\frac{1}{8}$ – $\frac{1}{2}$ in., gl. I broadly or narrowly truncate nerveless or faintly 2-nerved dorsally hispidly villous, IV short deeply 2-fid segments narrow, palea small obovate ciliate. *P. Cumingii*, *Thw. Enum. Pl. Zeyl.* 368; *Trim. Cat. Ceyl. Pl.* 106 (non *Nees*). *P. argentea*, *Balans. in Journ. de Bot. (Paris, 1890)* 81. *Erianthus aureus*, *Nees in Wight Cat. n.* 1690 (excl. syn.); *Steud. Syn. Gram.* (sub *Eul. nepalensis*). *E. Cumingii*, *F. Muell. Fragm.* viii. 118. *E. tristachyus*, *Nees l.c.* n. 1691. *Andropogon pilosus*, *Willd. ex Wight l.c.* 1690. *A. brunneus*, *Heyne in Herb. Rottl.*

NILGHIRI HILLS, alt. 6–7000 ft. *Wight, &c.* CEYLON, in the Central Provinces.—DISTRIB. Tonkin.

Stem 18–24 in., slender; peduncle silky under the panicle. *Leaves* 6–18 in.,

rarely $\frac{1}{2}$ in. broad, acute, short and filiform in some Nilghiri specimens, glabrous or hairy; ligule short, bearded. *Spikes* 1-3 in., stout, dark brown, rather distant, joints about $\frac{1}{2}$ as long as the spikelets. *Spikelets* linear-oblong; gl. I dorsally densely villous chiefly at the sides and above; II tip narrowly truncate, keel obscure hairy about the middle; III as long as I, nerveless, ciliate above the middle; IV half as long, awn stout inserted in the cleft, broadening out and vanishing.—A Tonkin specimen is $3\frac{1}{2}$ ft. with broader leaves and white hairs on the rachis.

10. *P. birmanica*, Hook. f.; tall, stout from a very stout rootstock with rusty-woolly basal sheath, leaves narrow glabrous, spikes few 3-6 in. strict erect, rachis stout villous, spikelets $\frac{1}{2}$ in. oblong, gl. I narrowly truncate nerveless, IV very narrow 2-fid eciliate.

BURMA; Yomah, Kurz.

Rootstock as large as a walnut. *Stem* 4-5 ft., villous below the panicle; nodes pubescent. *Leaves* 10-18 in., smooth, glabrous. *Spikes* closely appressed to the rachis, villous with golden-brown hairs; joints as long as the spikelet, obliquely truncate. *Spikelets* dark brown; gl. I dorsally flat, sparsely villous, sides copiously so, margins rather broadly incurved from base to apex; II narrowly oblong, obscurely keeled, sides villous; III oblong-lanceolate, hyaline, ciliate; IV very small, awn $\frac{3}{4}$ in. long; palea orbicular-ovate, long-ciliate.—Possibly only a very large form of *P. phæothrix*, with a stout rootstock, and rachis of the spikes narrower.

11. *P. spectiosa*, Hack. *Monogr. Androp.* 159; tall, stout, basal sheaths clothed with pale yellow-brown wool, leaves narrow usually villously hirsute, spikes 3-5 often very long slender flexuous villous with pale yellow-brown hairs, spikelets $\frac{1}{2}$ in. oblong, gl. I narrowly truncate faintly 4-nerved back and sides villous, IV narrowly 2-fid lobes acute eciliate, awn tortuous and twisted, palea very small suborbicular. *Erianthus speciosus*, Debeaux in *Act. Linn. Soc. Bord.* xxxii. (1878) 53.—*Erianthus*, No. 9, *Herb. Ind. Or. Hf. & T.*

KHASIA HILLS, alt. 5-8000 ft., common. NAGA HILLS, Prain.—DISTRIB. China.

Stems 3-4 ft., densely tufted, peduncle silky below the panicle. *Leaves* 12-18 by $\frac{1}{2}$ - $\frac{3}{4}$ in., densely villously tomentose on both surfaces in the Khasia specimens (var. *heterotricha*, Hack. mss.), tips filiform; ligule a long beard. *Spikes* 3-8 in., joints slender = $\frac{1}{2}$ the spikelet. *Spikelets* with sometimes parti-coloured hairs, those of the callus white or concolorous; gl. I narrowly oblong-lanceolate; II subacute, dorsally sparsely hairy, margins ciliate; III linear-oblong, ciliate; IV shorter, linear-oblong, lobes shorter than the gl.; awn several times longer than the spikelet, vanishing downwards in the gl. *Lodicules* 2-fid, ciliate.—The Naga Hill specimen has glabrous leaves like the Chinese. Closely resembles *P. hirtiflora* and *quadrinervis*, differing in the woolly basal sheaths, colour of hairs of spike, and narrow gl. IV. In Sampson's Chinese specimens preserved at Kew (the plant described by Hackel) the base of the stem is wanting; but in fine ones collected at Ichang by Henry, the basal sheaths are woolly, exactly as in the Khasian plant.

12. *P. velutina*, Hack. *Monogr. Androp.* 169; tall, stout, basal sheaths villous with long silky hairs, leaves narrow glabrous, spikes 3-8 long, villous with long pale yellow-brown hairs, spikelets $\frac{1}{2}$ in. oblong, gl. I narrowly truncate 2-cuspidate 4-nerved, back and sides villous, IV narrowly 2-fid or 2-toothed eciliate, awn tortuous and twisted, palea broadly ovate shortly ciliate.

KHASIA HILLS, alt. 4-5000 ft. J. D. H. & T. T., Clarke.

Except in the silky villous clothing of the basal sheaths of the stem, this hardly differs from glabrous states of *P. speciosa*; but whereas the leaves of *speciosa* are

(as far as has been observed) always hirsutely villous in the Khasia, those of *velutina* are always glabrous. Gl. IV varies in the breadth and depth of its lobes which are obtuse or acute.—Duthie (Grass. N.W. Ind 15) gives this as a N.W. plant, but I have seen no specimens from west of the Khasia Hills.

Sect. II. *Stem* decumbent below. *Leaves* not contracted or petioled on the sheath. Gl. I shorter than II, truncate; II broadly truncate; III absent or present.

13. **P. Cumingii**, *Nees in Hook. Kew Journ.* ii. (1850) 98; leaves short flat, spikes 2-4 distant slender densely villous with red-brown hairs, spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in. oblong, gl. I dorsally hairy hairs longer than the gl., III 0, IV minute 2-fid, awn very slender 3-4 times as long as the gl., palea minute. *Hack. Monogr. Androp.* 167 (excl. var. *fulva*). *Steud. Syn. Gram.* 373. *P. fulva*, var. *leptophylla*, *Benth. Fl. Austral.* vii. 526. *Andropogon aureo-fulvus*, *Steud. l. c.* 373. *A. Leschenaultianus*, *Decne. Herb. Timor. Descr.* 29.

UPPER GANGETIC PLAIN; Moradabad, Thomson. KUMAON; at Dehra-dun, Duthie. SIKKIM TERAI, Clarke.—DISTRIB. E. ASIA, Malaya, Australia.

Stem 12-18 in., hardly thicker than a sparrow's quill, tufted, decumbent below with ascending leafy branches; nodes sometimes proliferous. *Leaves* 2-4 in., linear-lanceolate, finely acuminate; lower sheaths hairy; ligule 0 or obscure, hairy. *Peduncle* filiform. *Spikes* slender, $1\frac{1}{2}$ -2 in., subdigitate; joints villous, shorter than the spikelets. *Spikelets* with a shortly bearded callus; gl. I truncate, often 2-cuspidate, 2-nerved or nerveless, margins and tip ciliate; II longer and broader than I, truncate, keel ciliate above the middle, sometimes shortly awned; III absent in all the specimens which I have examined; IV very variable, narrow with subulate lobes in the Moradabad specimen, most minute and 2-toothed in the Sikkim and Kumaon ones, with lanceolate subulate lobes in Tonkin ones.

14. **P. Ridleyi**, *Hack. in Ester. Bot. Zeitschr.* xl. i. (1891) 7; spikes 3-6 digitate, spikelets $\frac{1}{2}$ in., gl. I broadly truncate entire or 3-toothed densely villous with dark brown hairs shorter than the gl., II cuneate-obovate, III present or absent, IV short linear-oblong abruptly awned, awn twice as long as the spikelet or imperfect, palea minute or 0.

MALAY PENINSULA; Pahang and Johore, Ridley, *Feilding*.—DISTRIB. Borneo.

Stem compressed, 6-10 in., creeping below. *Leaves* 6-20 by $\frac{1}{10}$ – $\frac{1}{8}$ in., sub-distichous, rigid, flat or convolute; sheath glabrous. *Spikes* $1\frac{1}{2}$ -2 $\frac{1}{2}$ in., erect, rather stout, joints and pedicels = $\frac{1}{2}$ the spikelets, stiffly ciliate. *Spikelets* linear-oblong; gls. dark; I ciliate at the truncate apex, dorsally flat; II sub 3-nerved; III if present hyaline, obscurely 3-nerved, with an oblong palea larger than itself; IV half as long as II.—Habit of *P. Cumingii*, but the leaf-sheaths are all glabrous, the spikes fewer digitate much darker coloured, the hairs of gl. I are much shorter and paler.

Sect. III. LEPTATHERUM. *Stem* prostrate or decumbent. *Leaves* conspicuously contracted at the base or petioled; basal sheaths naked. Gl. I often deeply channelled dorsally; III present or absent, empty or male; when absent the palea is sometimes as long as gl. I, hyaline or rigid, faintly 2-nerved or nerveless.

* *Triandrous*; *anthers* long narrow.

15. **P. eucnemis**, *Nees ex Steud. Syn. Gram.* 409; leaves subpetioled, spikes few or many more or less villous with purple hairs, joints short clavate, spikelets $\frac{1}{2}$ in. oblong, gl. I dorsally sulcate truncate keels shortly

ciliate, IV shortly 2-fid, palea minute. *Hack. Monogr. Androp.* 173.—*Andropogon*, *Wall. Cat.* n. 8812.

BURMA; near Prome, *Wallich*; Popan district, *Collett*; PEGU, *Scott, Kurz*.—*DISTRIB.* Celebes.

Stems elongate, diffusely branched, stout or slender, smooth, polished; nodes glabrous; sheaths much shorter than the internodes. *Leaves* 2–10 in., from elliptic to lanceolate, acute, tips setaceous, nerves slender, and sheath sparsely hairy; ligule short, ciliate. *Spikes* 6–20, densely fascicled, 3–5 in. long, rather stout, pale; joints half as long as the spikelets, often pyriform, margins densely ciliate with purple hairs. *Spikelets* shining, callus shortly bearded; gl. I truncate, strongly ciliate, dorsally scaberulous; II 2-toothed, shortly awned; III 0, or very slender, ciliate, with a lanceolate acuminate glabrous 2-nerved palea as long as gl. I, triandrous or neuter; IV minute, oblong, acutely 2-toothed; awn very slender $\frac{1}{4}$ – $\frac{3}{4}$ in.

16. **P. Stapfi**, *Hook. f.*; branches tall from the distant smooth internodes of a long prostrate stem, leaves elliptic-lanceolate acuminate, spikes erect densely fascicled shortly stipitate thickly softly hirsute with fulvous brown hairs each with imperfect naked spikelets at the base, joints and pedicels very stout hollow, gl. I dorsally flat truncately 2-toothed hirsute all over 5–7-nerved, II dorsally convex hirsute aristulate, III 0, IV minute 2-toothed, awn very slender, palea very small, pedicelled spikelet very small awned.

ARRACAN; on low hills of sandstone at Akyab, *Kurz*.

Stem prostrate and ascending, 12–18 in. long and more, rooting at the lower swollen nodes, as thick as a crow-quill, fistular; internodes 2 in. long, quite smooth; branches 2–3 ft. high, again branched, erect, internodes much longer than the sheaths, the lower of which are open and scarious. *Leaves* 4–6 by $\frac{1}{4}$ – $\frac{1}{2}$ in., flat, flaccid, very thin, setaceously acuminate, sparsely hairy, midrib slender, margins smooth; ligule membranous, truncate, ciliate. *Spikes* 2–3 in., erect; joints $\frac{1}{4}$ shorter than the spikelets and nearly as broad as the sessile one, very stout, truncate, plano-convex, hirsute all over the back and sides; pedicel of upper as large as the joint but rather shorter. *Sessile spikelet* concealed between the joint and pedicel, $\frac{1}{4}$ – $\frac{1}{2}$ in.; callus short, hirsute; gl. I oblong, flat, sub 2-toothed, 5-nerved, nerves sometimes anastomosing, margins narrowly incurved from base to tip, copiously ciliate; II cymbiform, 1-nerved, 2-toothed; IV and its nerveless oblong palea eciliate; awn = spikelet or longer, very slender, column twisted. *Pedicelled spikelets* = about $\frac{1}{4}$ the sessile, elliptic, shortly hirsute, fem. or neuter, gls. 4. *Basal spikelets* of the spikes smaller than the perfect, sessile, closely appressed to the rachis, sparsely hairy or nearly glabrous, gl. I dorsally more or less channelled.

17. **P. vagans**, *Nees ex Steud. Syn. Gram.* 410; leaves sessile, spikes 3–5, joints slender shortly ciliate, spikelets $\frac{1}{8}$ – $\frac{1}{6}$ in. linear-oblong, gl. I obovate-oblong dorsally sulcate glabrous ciliate, IV very minute 2-toothed, awn twice as long as the spikelet, palea minute toothed. *Hack. Monogr. Androp.* 173.—*Andropogon*, *Wall. Cat.* n. 8807 B.

NEPAL, *Wallich*.

Stem laxly branched; slender, glabrous. *Leaves* 2–4 in., very narrow, setaceously acuminate, scaberulous, glabrous. *Spikes* very slender, rachis glabrous. *Spikelets* reddish, callus shortly bearded; gl. I chartaceous, dorsally smooth; II membranous, subacute, keel above and margins ciliate; III usually 0, if present male or neuter; palea larger than its gl., oblong, obtuse, rather shorter than gl. I, membranous, 2-nerved, ciliate; IV smaller than its small subquadrate 3–4-toothed palea.

18. **P. grata**, *Hack. Monogr. Androp.* 175; nodes of stem pubescent, leaves sessile, spikes few or many densely fascicled, joints subclavate

shortly densely ciliate, spikelets $\frac{1}{8}$ – $\frac{1}{6}$ in. oblong, gl. I dorsally channelled keels rigidly ciliate towards the truncate or 2-toothed tip, II mucronate or aristulate, III 0, palea ovate-lanceolate bisexual ciliate, IV minute 2-toothed, awn long or short, palea small ovate. P. ciliata, *Nees in Pl. Meyen*. 186. ?P. montana, *Nees ex Steud. Syn. Gram.* 409. Ephebopogon, *gratus*, *Nees mss. ex Hack. l. c.*

SIKKIM HIMALAYA, the KHASIA and MISHMI HILLS, alt. 1–5000 ft., *Griffith*, &c.—DISTRIB. Java, China.

Stem rather stout, 3–5 ft., pubescent or scaberulous below the nodes. *Leaves* 4–8 by $\frac{1}{8}$ – $\frac{1}{4}$ in., linear, setaceously acuminate, scaberulous and sparsely hairy; sheath bearded at the nodes; ligule obscure. *Spikes* $2\frac{1}{2}$ –4 in., pale or dark, joints = $\frac{2}{3}$ spikelet, rather longer than the pedicels; gl. I dorsally smooth or scaberulous.—This resembles *P. eucnemis* more than any other species, but has more numerous and darker spikes with more slender joints, and the nodes are pubescent. In some spikelets I find no gl. III or its palea, only an ovary and the ciliate palea of gl. IV.

?Var. *hirsuta*; leaves $\frac{1}{2}$ in. broad pubescent, sheath clothed with very long spreading and reflexed hairs, gl. IV all but reduced to the awn. Pegu, *Kurz*.

19. **P. ciliata**, *Trin. in Mem. Acad. Petersb. Ser. vi. ii.* (1833) 306; leaves sessile, spikes very many, joints slender compressed rather shorter than the spikelets shortly ciliate, spikelets $\frac{1}{8}$ in. narrow pale, gl. I lanceolate deeply grooved dorsally keels scabrid below ciliate towards the forked tip, II awned or mucronulate, III 0, palea empty or male, IV minute lanceolate or broader and 2-toothed, awn long or short, palea minute. *Hack. Monogr. Androp.* 176; *Steud. Syn. Gram.* 410. P. Wallichiana, *Nees ex Steud. l. c.*; *Thw. Enum. Pl. Zeyl.* 369; *Trim. Cat. Ceyl. Pl.* 107. P. lancea & laxa, *Nees ex Steud. l. c.* P. tristachya, *Thw. l. c.* 368 (*in part*). Andropogon biaristatus, *Steud. l. c.* 379. A. fasciculatus, *Linna. Sp. Pl.* 1047.—Andropogon, *Wall. Cat. n.* 8815 B, 8822, 8823.—Batrathrum, ? *Wall. l. c. n.* 8831 *in part*.

TROPICAL HIMALAYA, alt. 2–5000 ft., from Kumaon to the Mishmi and Khasia Hills. BEHAR, on Parusnath, *Clarke*. NILGHIRI HILLS, *Wight*. CEYLON, *Thwaites*.

Stems 2–4 ft., much branched below, straggling, glabrous or sheaths sparsely hairy; peduncle very slender. *Leaves* very variable, usually small, 1–4 by $\frac{1}{4}$ – $\frac{1}{2}$ in., narrowed at both ends, finely acuminate, sometimes petioled. *Spikes* flexuous. Gl. I minutely scaberulous; II sometimes with the awn longer than itself; IV variable, as is its palea, both in breadth and length. *Anthems* very long.—I am puzzled with various forms of the glumes of this plant. Hackel has four varieties: a. *genuina* (P. ciliata, *Trin.*, P. lancea, *Nees*) with linear-oblong spikelets, gl. I entire, keels pectinately ciliate, II mucronulate, IV 2-toothed long awned;—b. *laxa* (P. laxa, *Nees*) with linear-lanceolate spikelets, gl. I pectinately ciliate, II awned, IV entire long awned;—c. *Wallichiana* (*Nees Sp.*), spikelets linear-oblong, gl. I entire rigidly pectinately ciliate, II long-awned, IV entire, awn imperfect;—d. *seminuda*, spikelets linear-lanceolate, gl. I bimucronate, keels scabrid, II long-awned, IV entire, awn imperfect.—Ceylon (C.P. 411 *in part*).

20. **P. monantha**, *Nees ex Steud. Syn. Gram.* 410; very slender, spikes 4–6 slender flexuous joints shorter than the spikelets subclavate, spikelets $\frac{1}{4}$ – $\frac{1}{10}$ in., 1-fl., gl. I narrow ciliate dorsally channelled, II truncate apiculate, III 0, IV minute rounded 2-toothed, awn about twice as long as the spikelet, palea very minute ovate. *Hack. Monogr. Androp.* 174. P. miscantha (*error for monantha*), *Herb. Ind. Or. Hf. & T.*—Andropogon, *Wall. Cat. n.* 8819.

SUBTROPICAL HIMALAYA; Garwhal, alt. 5000 ft., *Duthie*. SIKKIM TERAI,

J.D.H. KHASIA HILLS, alt. 4000 ft., *J.D.H. & T.T. BURMA*, Trongdong, *Wallich*; Rangoon, *M Lelland*; King's Isld., *Helfer*.

Stems 1-3 ft., nodes naked. *Leaves* 3-6 in., base contracted, flaccid. *Spikes* 3-6, 2-4 in. long, very slender, pale green or yellowish brown; joints compressed, broader upwards, ciliate. *Glumes* usually widely spreading; I subacute or narrowly truncate, keels scaberulous or shortly ciliate above; II with villous margins towards the mucronate or aristulate tip; IV very minute, rounded. *Anthers* linear, half as long as the gl. or more.—Resembles *P. ciliata*, but the spikelets are much smaller.

21. *P. delicatula*, *Hook. f.*; stem very slender vaguely geniculate branched leafy, leaves linear-lanceolate acuminate base very narrow, spikes 3-5 fascicled slender pale, joints linear, margins shortly ciliate, spikelets $\frac{1}{2}$ - $\frac{1}{3}$ in., callus stellately bearded, gl. I thin linear-oblong truncate dorsally convex shining, keels ciliate above the middle, II apiculate keel ciliate, III 0, IV awn simple or minutely dilated at the base.

Pegu, M'Lelland, Kurz.

Stems 1-2 ft., straggling, as thick as a sparrow's quill or less, smooth. *Leaves* $2\frac{1}{2}$ -5 by $\frac{1}{4}$ - $\frac{1}{2}$ in., flat, thin, sparsely ciliate chiefly towards the base, tip capillary, margins smooth, base a mere point, midrib slender; sheath very slender; ligule minute. *Spikes* 2-1 $\frac{1}{2}$ in., erect, flexuous, pale green, joints truncate. *Gl. I.* of sessile spikelet 0-5-nerved, tip more or less 2-toothed; II obtuse, 3-nerved; IV awn capillary about = the spikelet. *Pedicelled spikelet* like the sessile or reduced, awned or not, male or neuter. *Stamens* 3, imperfect only seen, filaments short.

** *Triandrous, anthers minute, filaments very long.*

22. *P. imberbis*, *Nees ex Steud. Syn. Gram.* 410; stem very slender grooved, spikes solitary or few and racemose very slender, joints compressed, spikelets $\frac{1}{6}$ - $\frac{1}{4}$ in. lanceolate, gl. I narrow subtruncate keels minutely scabrid, II acute nearly glabrous, III-0, IV minute ovate-lanceolate, palea ovate, awn short. *Hack. Monogr. Androp.* 177; *Duthie Grass. N.W. Ind.* 16. *P. japonica*, *Franch. & Sav. Enum. Pl. Jap.* ii. 608 (*non Mig.*). *P. Willdenowiana*, *Benth. in Journ. Linn. Soc.* xix. (1881) 67. *Andropogon vimineus*, *Trin. in Mem. Acad. Petersb. Ser.* vi. ii. (1883) 268. *Microstegium Willdenowianum*, *Nees ex Steud. l.c.* 411.—*Arthraxon*, *Wall. Cat. n.* 8838.—*Batrachium*? *Wall. Cat. n.* 8832.

TEMPERATE HIMALAYA; Simla, *Gamble*; Nepal, *Wallich*; Sikkim, alt. 4-7000 ft., *J.D.H., Clarke*. KHASIA HILLS, alt. 4-5000 ft.—DISTRIB. China, Japan.

Leaves narrowed to the base, flaccid, smooth or subscaberulous. *Spikes* 1-3 in., not fascicled, green, joints more or less ciliate, hardly clavate; callus naked; gl. I concave dorsally, 2-6-nerved, nerves sometimes anastomosing; II 1-3-nerved; awn of IV sometimes capillary, and very short (var. *Willdenowiana*, *Hack.*); sometimes (var. *genuina*, *Hack.*) it is longer, stouter, with a twisted base.—Very variable in size; small Nepal specimens have filiform stems 6-12 in., with oblong-lanceolate acute leaves an inch long, and solitary spikes; some large Khasian specimens have stouter much branched stems 2-3 ft. long, with acuminate linear-lanceolate leaves 3-6 in. long, and 6-7 spikes.—The minute persistent didymous anthers are those of *Arthraxon*, and differ from those of all other Indian species of *Pollinia*.

*** *Diandrous, anthers linear-oblong.*

23. *P. nuda*, *Trin. in Mem. Acad. Petersb. Ser.* ii. (1833) 307; very slender, spikes few racemed very slender, joints slender terete, spikelets $\frac{1}{2}$ - $\frac{1}{3}$ in. narrowly lanceolate, gl. I bicuspidate very narrow keels scaberulous, II acuminate, III as long as II hyaline ciliate or 0, IV lanceolate, palea

minute truncate, awn short. *Hack. Monogr. Androp.* 178; *Steud. Syn. Gram.* 410. *P. japonica*, *Miq. Ann. Mus. Lugd. Bat.* ii. 290. *Leptatherum Royleanum*, *Nees in Proc. Linn. Soc.* i. (1841) 93; *Franch. & Sav. Enum. Pl. Jap.* ii. 609.—*Batratherum*? *Wall. Cat.* n. 8831 in part.

TEMPERATE HIMALAYA; from Chamba to Upper Assam, alt. 4–7000 ft. (to 10,000 in Kumaon), KHASIA HILLS, alt. 4–5000 ft., *Griffith*, &c.—DISTRIB. China, Japan, S. Africa.

Stem 2–3 ft., grooved. *Leaves* 1–4 in., lanceolate, very variable in breadth, acuminate, flaccid; sheath hairy; ligule glabrous. *Spikes* 3–5, rarely more, 1–4 in. long, flexuous, green; joints longer or shorter than the spikelets, glabrous or ciliolate. *Spikelets* sometimes distant, callus nearly naked or villous; gl. I rarely truncate or obtuse, often strongly forked, dorsally concave, glabrous or most minutely scaberulous, margins rarely ciliate; II nearly glabrous; III if present narrow, glabrous or sparsely ciliate, nerveless; IV variable in size, never = $\frac{1}{2}$ III, 3-nerved.

EXCLUDED SPECIES.

P. JAPONICA, *Benth. ex Duthie Grass. N.W. Ind.* 16.—Duthie gives this grass which is no doubt *Euriantus fulvus*, as a native of the Panjab and N.W. Himalaya up to 9000 ft. I find no authority for the name. *P. japonica*, *Franch. & Sav.* is *P. imberbis*, *Nees*, and *P. japonica*, *Miq.* is *P. nuda*; both are Japanese and Himalayan plants. There is also *Eulalia japonica*, *Trin. (Mischanthus sinensis, Anderss.)*, which is not Himalayan.

35. SACCHARUM, Linn.

Tall perennial grasses. *Infl.* a large silky much and densely branched panicle, with spreading at length erect articulate capillary branches and branchlets (spikes). *Spikelets* minute, awnless, 1-fld., binate, a sessile bisexual and pedicelled, fem., rarely both pedicelled and bisexual. *Glumes* 4, all membranous, or I strongly chartaceous, or I and II rarely coriaceous; III empty; IV shortest, rarely 0; palea hyaline nerveless or 0. *Lodicules* cuneate. *Stamens* 3. *Stigmas* laterally exerted. *Grain* oblong.—Species about 12, tropical, chiefly Asiatic.

Sect. I. EUSACCHARUM. *Rachis* of spike fragile. *Spikelets* of each pair subequal, sessile and pedicelled, both fertile. *Stem* solid.

S. OFFICINARUM, *Linn. Sp. Pl.* 54; stem solid glabrous below the panicle, upper leaves long margins scabrid, joints of spikes and pedicels glabrous, hairs of callus about twice as long as the spikelet, gl. I glabrous subchartaceous, IV very narrow or 0, palea small lanceolate. *Roxb. Fl. Ind.* i. 237; *McFad. in Hook. Bot. Misc.* i. (1830) 95, t. 26; *Steud. Syn. Gram.* 405; *Hack. Monogr. Androp.* iii. 111; *Miq. Fl. Ind. Bat.* iii. 507. *Morris in Journ. Linn. Soc.* xxviii. (1890) 197. t. 23. *S. sinense*, *Roxb. l. c.*

Cultivated in the hotter parts of INDIA.—Native country unknown. For history and cultivation of the sugar-cane in India see Watts' "Dictionary of the Economic Products of India," and for its origin A. de Candolle "L'Origine des Plantes Cultivées."

1. *S. spontaneum*, *Linn. Mant.* ii. 183; stem silky below the panicle, upper leaves long margins smooth, hairs of callus many times longer than the spikelet, gl. I thickened below, IV usually 0, palea ciliate. *Roxb. Fl. Ind.* i. 235; *Kunth Enum. Pl.* i. 475, *Suppl.* 384; *Wight Cat.* n. 1682; *Griff. Notul.* iii. 73, *l. c. Pl. Asiat.* t. 139, f. 63; *Dalz. & Gibs. Bomb. Fl.* 304; *Thw. Enum. Pl. Zeyl.* 369; *Trim. Cat. Ceyl. Pl.* 106.

Aitchis. Cat. Panjab. Pl. 172; *Duthie Grass. N.W. Ind.* 15, *Indig. Fodd. Grass.* 57, *Fodd. Grass. N. Ind.* 25; *Steud. Syn. Gram.* 405; *Hack. Monogr. Androp.* 113; *Anderss. in Evers. Vet. Akad. Handl. Stockh.* (1885) 156; *Miq. Fl. Ind. Bat.* iii. 512. *S. ægyptiacum*, *Willd. Enum. Hort. Berol.* i. 82; *Boiss. Fl. Orient.* v. 454. *S. bengalense*, Boga, Casi, Lola & tennius, *Herb. Ham. ex Wall. Cat. n.* 8854. *S. biflorum*, *Forsk. Fl. Æg. Arab.* i. 16. *S. caducum*, *Palisotii* & *speciosissimum*, *Tausch in Flora* (1836) 527; *Steud. l. c.* 406, 405, 407. *S. canaliculatum*, *Roxb. l. c.* 246; *Wight Cat. n.* 1682; *Duthie Grass. N.W. Ind.* 14; *Steud. l. c.* 406. *S. chinense*, *Nees in Hook. & Arn. Bot. Beech. Voy.* 241. *S. Glaza*, *Reinw. ex Blume Gew. Buitenz.* 38. *S. insulare*, *Brongn. Voy. Cog. Bot.* 99; *Steud. l. c.* 406. *S. Kлага*, *Jungh. ex Tijdschr. Nat. Gesch.* vii. 296; *Steud. l. c.* (Klagha). *S. punctatum*, *Schum. Besch. Pl. Guin.* 46. *S. propinquum*, *Steud. l. c.* *S. spontaneum*, var. *Kлага*, *Trin. Fund. Agrost.* t. 15, p. 1-6. *S. semidecumbens*, *Roxb. l. c.* 236; *Duthie l. c.* *Steud. l. c.* 406; *Wall. Cat. n.* 8854 A. *Imperata spontanea*, *Beauv. Agrost.* 8; *Roem. & Sch. Syst.* ii. 289; *Miq. Fl. Ind. Bat.* iii. 512.—*Saccharum*, *Wall. Cat. n.* 8854.

Throughout the warmer parts of INDIA and CEYLON, ascending to 6000 ft. in the Himalaya.—DISTRIB. S. Europe and warm regions of the Old World. East Australia.

Stem 5-20 ft., erect from a stout rootstock. *Leaves* erect, very long, narrow, margins convolute or incurved; mouth of sheath woolly; ligule membranous. *Panicle* 1-2 ft.; branches whorled, spreading; branchlets fragile; joints filiform, dorsally long-ciliate. *Spikelets* $\frac{1}{2}$ - $\frac{3}{4}$ in., lanceolate; gl. I 2-nerved; II lanceolate, subkeeled; III ovate-lanceolate, subacute, ciliate; IV very variable.—Hackel recognized two subspecies and several varieties of them.

Subsp. *indicum*; slender, leaves narrow, ligule ovate subacute, spikes slender lax-fld., spikelets $\frac{1}{2}$ - $\frac{3}{4}$ in. 4-6 times shorter than the snow-white villi.—All parts of India.

Subsp. *ægyptiacum*; slender, leaves broadly linear, ligule truncate, spikes stouter more dense-fld., spikelets longer $\frac{1}{2}$ - $\frac{3}{4}$ in., villi shorter.—Almost confined to Africa, except var. *nepalense*, with spikelets only $\frac{1}{2}$ in.—N.W. India, *Royle* (n. 197).

2. *S. arundinaceum*, Retz. Obs. iv. 14; stem glabrous below the panicle, upper leaves long margins hispidly ciliate, joints and pedicels glabrous or ciliate, hairs of callus silky much shorter than the spikelet, gl. I chartaceous acuminate dorsally villous, IV broadly lanceolate. *Kunth Enum. Pl.* i. 475; *Hack. Monogr. Androp.* 117; *Steud. Syn. Gram.* 407. ? *S. benghalense*, *Retz. l. c.* 16. *S. ciliare*, *Anderss. in Evers. Vet. Akad. Handl. Stockh.* (1855) 155; *Hack. l. c.* 118 (*excl. vars. β. γ.*). *S. exaltatum*, *Roxb. Fl. Ind.* i. 245; *Wight Cat. n.* 1681; *Grah. Cat. Pl. Bomb.* 239; *Steud. l. c.* *S. Moonja*, *Royle Ill. Himal. Pl.* 416. *S. Munja*, *Roxb. l. c.* 246. *S. procerum*, *Roxb. l. c.* 243; *Steud. l. c.*; *Trim. Cat. Ceyl. Pl.* 106; *Duthie Grass. N.W. Ind.* 15. *S. Sara*, *Roxb. l. c.* 244; *Kunth l. c.*; *Steud. l. c.* 406; *Aitchis. Cat. Panjab. Pl.* 172; *Duthie Grass. N.W. Ind.* 15, *Indig. Fodd. Grass.* t. 50, *Fodd. Grass. N. Ind.* 15; *Boiss. Fl. Orient.* v. 453; *Hack. l. c.* 118; *Wall. Cat. n.* 8353, A. D. *S. Surpata*, *Hb. Ham. ex Wall. Cat.* 8853 D.—*Saccharum*, *Wall. Cat. n.* 8852, 8853.—*Rheede Hort. Mal.* xii. t. 46.

Throughout the Plains and low Hills of INDIA. CEYLON, at Colombo, *Trimen*.—DISTRIB. China.

Perennial. *Stem* 10-20 ft. erect from a stout rootstock, branching after the second year. *Leaves* 3-5 ft. by 2-3 in., broadest about the middle, tapering to a slender point, midrib white; sheath bearded about the mouth; ligule short, hairy,

Panicle 1-2 ft., erect, ovoid or oblong; branches half-whorled, clothed with soft cream-colrd. rarely purplish hairs. *Spikes* 1-3 in., rachis capillary. *Spikelets* $\frac{1}{10}$ in., lanceolate, pale green violet or brownish; gl. I dorsally flat or depressed, nerveless except the keels; II lanceolate, shortly acuminate; III oblong-lanceolate; IV mucronate.—Hackel includes under *S. ciliare*, *S. Griffithii*, Munro, which is regarded by Dr. Stapf and myself as an *Erianthus*, gl. IV being clearly awned. *S. benghalense* is a doubtful plant, wanting, according to Hackel, in Retz's Herbarium.

3. **S. Narenga**, *Ham. in Wall. Cat. n. 8856; stem slender silky below the panicle, nodes bearded, leaves scabrid above uppermost subulate, branchlets of panicle clothed with purple hairs, pedicels clavellate hispidulous, hairs of callus rigid, gl. I coriaceous glabrous or hairy below, II oblong coriaceous tip membranous. *Hack. Monogr. Androp.* 119; *Duthie Grass. N.W. Ind.* 14. *Eriochrysis Narenga*, *Nees ex Steud. Syn. Gram.* 411; *Aitchis. Cat. Panjab Pl.* 172.—*Saccharum*, *Wall. Cat. l. c.**

TROPICAL HIMALAYA, from Garwhal, alt. 3-4000 ft., to the KHASIA HILLS, UPPER and LOWER BENGAL, ASSAM, SILHET, CENTRAL INDIA, and BURMA.—DISTRIB. Tonkin, China.

Stem 6-8 ft.; internodes often longer than the sheaths, nodes stellately bearded. *Leaves* 1-2 ft. by $\frac{1}{4}$ in., linear, base narrow, flat; sheath with tubercle-based hairs; ligule rounded. *Panicle* 12-18 in., narrow; rachis scaberulous, bearded at the nodes; branches 2-4-nate, appressed to the fragile rachis, branchlets fascicled. *Spikelets* $\frac{1}{10}$ in., callus minute, hairs longer or shorter than the spikelet; gl. I ciliate; IV linear-oblong, ciliate.—Hackel has two varieties: *a. genuinum*, Himalayan, with gl. I and II of the sessile spikelet obtuse, glabrous; *β. khasianum*, with the corresponding gl. subacute, densely hairy below.

Sect. II. SCLEROSTACHYA (*Anderss.*). *Rachis* of spike tenacious. Both spikelets of each pair pedicelled. *Stem* fistular.

4. **S. fuscum**, *Roxb. Fl. Ind. i.* 236; stem stout silky or villous below the panicle, rachis of panicle villous, spikes nodding, hairs of callus about $\frac{1}{2}$ the length of the oblong or obovoid spikelets, gl. I obtuse, keels ciliate, III and IV ciliate. *Hack. Monogr. Androp.* 121; *Kunth Enum. Pl. i.* 474, *Suppl.* 385; *Steud. Syn. Gram.* 406; *Duthie Grass. N.W. Ind.* 14. *S. Modhara*, *Ham. in Wall. Cat. n. 8855* C. *Tricholæna? fusca*, *Schult. Mant. ii.* 164. *Eriochrysis fusca*, *Trin. in Mem. Acad. Petersb. Ser. vi.* (1833) II. 315; *Steud. l. c.* 411. *E. fusca & attenuata*, *Nees ex Steud. l. c.* *Miscanthus fuscus*, *Benth. in Journ. Linn. Soc. xix.* (1881) 65.—*Saccharum*, *Wall. Cat.* 8855.

UPPER and LOWER GANGETIC PLAINS, ASSAM, the KHASIA HILLS, the WESTERN GHATS, and BURMA.

Stem 5-8 ft. or more, as thick as the little finger. *Leaves* 3-4 ft. by 1-2 in., linear-lanceolate, rigid, glabrous, margins scabrid; margins of sheath fimbriate; ligule rounded. *Panicle* 1-2 ft., narrow, branches whorled or fascicled or subsolitary, nodes bearded; spikes or branchlets nodding, slender, flexuous; joints trigonous, glabrous. *Spikelets* $\frac{1}{4}$ in., brown, upper and lower alike; gl. I entire, margins narrowly inflexed, dorsally flat smooth shining; II subacute, keeled, 1-nerved; III ovate-oblong, obtuse, nerveless, ciliate above; IV like III but shorter, ciliate with rigid hairs; palea much shorter ovate, ciliate. *Grain* obovoid, smooth, brown.

5. **S. Ridleyi**, *Hack. in Oestr. Bot. Zeitschr. xli.* (1891) 6; stem glabrous below the long narrow panicle, rachis of panicle glabrous, spikes erect very long filiform lax-fld., hairs of callus $\frac{1}{2}$ the length of the oblong-

lanceolate spikelets, gl. I 2-toothed keels minutely spinulose, III and IV pectinately ciliate with very long hairs.

MALAY PENINSULA; Pahang, *Ridley*.

Stem several feet high. *Leaves* 2-3 ft. by $\frac{1}{2}$ - $\frac{3}{4}$ in., linear, rigid, green, glabrous, margins scabrid; sheath terete, glabrous; ligule very short, truncate. *Panicle* 2 ft. long, erect; rachis angular, subgeniculate at the distant bearded nodes; branches fascicled, very long, filiform; spike 3-5 in., firm, flexuous, lax-fl., glabrous except the bearded axils; joints and pedicels slender, glabrous, terete. *Spikelets* both pedicelled equal and perfect, $\frac{1}{2}$ in. long, yellowish-brown; pedicel of lower = $\frac{1}{2}$ the length of the upper which is about $\frac{1}{2}$ shorter than the joint; gl. I chartaceous, dorsally flat, sides incurved and base sparsely hairy, 2-3-nerved besides the keels; II chartaceous, acute, 3-nerved, sparsely hairy; III nearly equal II, nerveless, margins incurved the long hairs crossing; IV rather shorter, broadly ovate, nerveless, its long hairs up-curved; palea variable, small or minute, ciliate.

DOUBTFUL SPECIES.

S. BRUNNEUM, Desv. *Opusc.* 65, is a species of *Tricholaena*, according to Hackel (*Monogr. in Index*, p. 707), but as that genus is suppressed and the only Indian plant referred to it is *S. fuscum* (q. v.), it follows that *S. brunneum* may be that plant, and if so Lesvaux's name has priority.

36. *ERIANTHUS*, Michx.

Habit and characters of *Saccharum*, but gl. IV awned, rarely awnless. Species about 16, temperate and tropical.

I find no characters whereby to distinguish *Erianthus* from *Saccharum* except that given above, which is all but illusory, and a re-examination of both genera may lead to a better disposition of their species under two or more genera or sections. *Pollinia* differs chiefly in the digitate spikes (see *E. fastigiatus*).

A. Lower branches of the panicle much shorter than the rachis.

* Panicle decompose; ultimate branchlets (spikes) very short, of 3-4 joints; awn of gl. IV short or obsolete.

1. *E. Ravennæ*, Beauv. *Agrost.* 14; leaves flat, ligule very short, panicle oblong, hairs of callus as long as the gls., spikelets $\frac{1}{2}$ - $\frac{3}{4}$ in. linear-lanceolate, gl. I membranous lanceolate acuminate tip 2-mucronate keels subspinulose scabrid, IV rather shorter than I ovate-lanceolate narrowed into a slender awn of its own length or shorter. *Kunth Enum. Pl. i.* 479, *Suppl.* 389; *Hack. Monogr. Androp.* 139; *T. Nees Gen. Fl. Germ. Monocot. n.* 90; *Reichb. Ic. Fl. Germ. t.* 55; *Ledeb. Fl. Ross. iv.* 475; *Boiss. Fl. Orient. vi.* 455; *Duthie Grass. N.W. Ind.* 15, *Fodd. Grass. N. Ind.* 26. *E. jamaicensis*, Anders. in *Ævers. Vet. Akad. Handl. Stock.* (1855) 163. *Saccharum Ravennæ*, *Murray Syst. Ed. xiii.* 88; *Sibth. & Sm. Fl. Graec. i.* 38, t. 52; *Steud. Syn. Gram.* 48. *S. jamaicense*, *Trin. in Mem. Acad. Petersb. Ser. vi. ii.* (1833) 312. *Andropogon Ravennæ*, *Linn. Sp. Pl. Ed. II.* 1481; *Host. Gram. Austr. iii.* 1, t. 1. *Bipidium Ravennæ*, *Trin. Fund. Agrost.* 169.

WESTERN HIMALAYA and WESTERN TIBET, alt. 6-9000 ft., from Kashmir to Kumaon, the PANJAB and UPPER GANGETIC PLAIN, from the Indus to Delhi.—DISTRIB. Westward to the Mediterranean.

Stem 6-10 ft., nodes glabrous. *Leaves* 2-3 ft. by 1-1 $\frac{1}{2}$ in., linear, scaberulous on both surfaces, bearded at the base with golden hairs, margins scabrid; midrib broad;

sheath hairy; ligule silkily villous. *Panicle* 1-3 ft., erect or inclined, greyish-white with silkily villous hairs; spikes (terminal branchlets) about $\frac{1}{2}$ in., joints and pedicels filiform, half as long as the spikelets or more, ciliate with long hairs. *Spikelets* pale; gl. I with one or both margins incurved, nerves 1-3 between the keels; II rather longer, acuminate or aristulate, 3-nerved, keel scabrid; III lanceolate, ciliate, 1-nerved, hyaline; IV glabrous or ciliolate, 3-nerved, rarely awnless; palea shorter, ovate-lanceolate, glabrous. *Pedicelled spikelet*, gl. I strongly 2-3-nerved, villous below as is gl. II.—A very variable grass in stature, colour of the hairs of the panicle, size of the spikelets, and length of the awn.

Var. *purpurascens*, Hack. l. c.; spikelets more or less tipped with violet or purple. *E. purpurascens*, Anderss. l. c. 161.—Common in N.W. India.

2. *E. Griffithii*, Hook. f.; leaves very narrow rigid semiterete concave above, ligule long, panicle oblong very pale, callus densely villous with spreading hairs as long as the lanceolate acuminate or acute spikelet, gl. I and II dorsally villous, keels spinulose, IV ovate-lanceolate ciliate narrowed into the short awn. *Saccharum Griffithii*, Munro ex Aitchis. in Journ. Linn. Soc. xix. (1882) 191 (name only). *S. ciliare*, var. β . *Griffithii*, Hack. Monogr. Androp. 119. *S. Sara*, Aitchis. l. c. ex Hack. l. c.

PESHAWUR, Stewart. WESTERN TIBET; below Rondu, Thomson.—DISTRIB. Afghanistan, Beluchistan.

Stem tall, tufted, glabrous, solid, as thick as a swan's quill, quite glabrous, pale, polished. *Leaves* 2-3 ft. by $\frac{1}{2}$ – $\frac{3}{4}$ in., thickly coriaceous, rigid, quite smooth, dorsally rounded, upper surface concave, margins scaberulous; sheath smooth, polished, shining; ligule long, ciliate with long hairs. *Panicle* 6-12 in., contracted, thyrsiform, inclined, pale yellow when dry; rachis glabrous; lower branches 1-2 in., joints about $\frac{1}{2}$ as long as the spikelets and pedicels villous with long pale hairs. *Spikelets* pale, often tipped with purple; callus hairs about as long as the spikelets, or shorter, white or pale brownish; gls. I and II subequal; I 3-nerved, margins narrowly incurved, scabrid; II rather longer, acuminate; III lanceolate, 1-nerved, hyaline, margins long-ciliate; IV as long as III, 3-nerved, narrowed into a short ciliate or shortly exerted awn; palea much shorter than the g., more or less ciliate.—Referred to *Saccharum ciliare* (*arundinaceum*) by Hackel, from which the awned gl. IV at once distinguishes it, and much more closely allied to *Erianthus Ravennæ*, differing in the pale straw-colour of its stem, leaves and panicle, rigid $\frac{3}{4}$ -terete leaves concave on the upper surface, long ligule, and dorsally hairy gl. I and II. *Griffith*, *Itinerary Notes*, 317 (n. 1193) describes this as a large grass, 6-7 ft. high, with white spikes, very common at 5000 ft. at Jugdulluk (Afghanistan).

3. *E. elephantinus*, Hook. f.; gigantic, leaves broad flat, panicle very large supradecompound, spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in., hairs of callus as long as the gls. or longer, grey or purplish, gl. I narrowly ovate-lanceolate dorsally sparsely hairy keels scabrid, II lanceolate acuminate subaristate 1-nerved, IV shorter than I ovate-lanceolate 3-nerved eciliate narrowed into a shortly exerted awn.

ASSAM, *Griffith*, *Simonds*.

Stem very tall and stout, as thick as the middle finger below the panicle, quite smooth, glabrous. *Leaf* (upper) two or more feet long by $\frac{1}{2}$ in. broad, quite smooth on both surfaces, margins serrulately scabrid; sheath several feet long; ligule of long straight hairs. *Panicle* 14 in. long, oblong, inclined; rachis as thick as the little finger below, glabrous, polished; lower nodes 4 in. apart, branches numerous, lower fascicled and half-whorled 6-8 in. long. *Spikes* few-fl., capillary, fragile; joints and pedicels half as long as the spikelets or longer, villously ciliate, tops cupular. *Spikelets* ovate-lanceolate, pale; gl. I and II subequal, membranous; I lanceolate, acuminate, tip minutely 2-toothed, dorsally flat, with one median nerve, margins narrowly incurved; II ciliate; III as long as I, hyaline but stiff, 1-nerved, ciliate, margins incurved; IV shorter than III, quite glabrous; palea nearly as long as the

gl., lanceolate from a crowded concave base.—Evidently a gigantic species of which I have seen only one specimen of leaves and panicle from the Calcutta Herbarium, and a scrap of a panicle from Griffith.

** Branches of panicle long simple much or sparingly divided; spikes many-jointed; awn of gl. IV more than twice as long as the spikelet, rarely (in *sikkimensis* and *chysotrix*) shorter or 0.

† Gl. IV entire, narrowed into the awn.

4. **E. fulvus**, *Nees ex Steud. Syn. Gram.* 409; stem silkily villous below the long narrow silkily villous panicle, spikelets $\frac{1}{10}$ – $\frac{1}{12}$ in. narrowly oblong much shorter than the fulvous purplish or reddish hairs of the callus, gls. I and II hyaline above the middle, IV very narrow. *Hack. Monogr. Androp.* 147. *E. rufipilus, Griseb. in Goett. Nachr.* (1868) 93; *Duthie Grass. N.W. Ind.* 15. *E. japonicus, Herb. Strach. & Winterb.* n. 2, & *Herb. H.f. & T. Saccharum rufipilum, Steud. l.c.*—*Erianthus, Wall. Cat.* n. 8849.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 5–7000 ft. KHASIA and NAGA HILLS, alt. 5–5500 ft.

Stem 6–8 ft., stout; nodes glabrous or pubescent. *Leaves* 2–3 ft. by $\frac{1}{4}$ –1 in., flat, glaucous and scaberulous beneath and on the margins; margins of sheath hairy; ligule rounded, ciliate. *Panicle* 8–18 in., erect, decomposed; rachis villous; spikes crowded; joints 8–10 and pedicels filiform, villous, half as long as the spikelets or more. *Spikelets* concealed by the hairs of the callus and joints, usually brownish; gl. I chartaceous below, tip suddenly acute, quite entire, 1–3-nerved, dorsally flat, glabrous; margins not incurved or below the tip only, ciliolate above; II rather longer, acute or 2-mucronate, glabrous, margins ciliate; III lanceolate, ciliate, acuminate or shortly awned; IV much shorter, ovate-lanceolate, glabrous, 1-nerved; awn $\frac{1}{4}$ – $\frac{1}{2}$ in., palea as long as the gl. or shorter or 0? *Pedicelled spikelets* hardly different from the sessile.—The name *fulvus* is not appropriate.

5. **E. sikkimensis**, *Hook. f.*; stem very slender silkily villous below the very narrow stiff panicle, spikelets $\frac{1}{5}$ – $\frac{1}{4}$ in. lanceolate longer than the white hairs of the callus, gl. I tip broadly 2-fid sides villous with long hairs hyaline above the middle, IV very narrow.

SIKKIM HIMALAYA; Lachen Valley, alt. 6000 ft., *J. D. H.*

Stem 1–2 ft., as thick as a dove's quill. *Leaves* narrow, rigid, flat, hairy towards the base, margins scabrous; sheaths glabrous or sparsely pubescent above; ligule rounded ciliate. *Panicle* 4–6 in., sparingly branched; spikes strict, erect, appressed to the villous rachis, joints and pedicels nearly as long as the spikelet, glabrous. *Spikelets* erect; gl. I oblong-lanceolate, coriaceous below the middle, dorsally glabrous, sides with long silky hairs, tip bifid with a broad sinus, margins inflexed, keels scabrid, nerves 5 between the scabrid keels vanishing upwards, tips often anastomosing; II chartaceous below the upper hyaline third, keeled, 3-nerved, margins ciliate; III as long as II, thinly chartaceous, 3-nerved, margins incurved ciliate; IV nearly = III, linear-lanceolate, 1-nerved, subciliate, narrowed into a short straight awn; palea nearly = the gl. subulate-lanceolate ciliolate.—Specimens very imperfect.

†† Gl. IV 2-toothed or 2-lobed.

§ Gl. I. dorsally glabrous or nearly so.

6. **E. filifolius**, *Nees ex Steud. Syn. Gram.* i. 409; stem pubescent below the narrow panicle, leaves filiform, spikelets $\frac{1}{4}$ – $\frac{1}{2}$ in. lanceolate rather longer than the hairs of the callus, gl. I of sessile spikelet membranous acute keels scabrid, IV entire or minutely 2-toothed, awn much longer than the spikelet, gl. I of pedicelled spikelet 6–7-nerved. *Hack. Monogr. Androp.*

146. *Saccharum filifolium*, Steud. *Syn. Gram.* 409; *Duthie Grass. N.W. Ind.* 14.

TEMPERATE WESTERN HIMALAYA, from Chamba to Kumaon, alt. 5-8000 ft., Royle, &c.

Stem 2-3 ft., rootstock woody, nodes pubescent. *Leaves* 8-12 in., rigid, glabrous, convolute below, narrowed to the hair, tip capillary; sheath glabrous; ligule very short, obtuse, ciliate. *Panicle* 6-8 in., red-purple; joints and pedicels = about half the spikelet, ciliate. *Spikelets* surrounded with dense white hairs; gl. I minutely 2-toothed, margins broadly inflexed, dorsally glabrous with 3-4 unequal intracarinal nerves; II like I, 3-nerved, keel smooth; III lanceolate, 2-mucronulate, sub 2-nerved, margins inflexed ciliate; IV shorter, linear-lanceolate, 1-nerved, glabrous; palea short, lanceolate, glabrous.

7. *E. versicolor*, Nees ex Steud. *Syn. Gram.* 409; stem glabrous below the lanceolate panicle, leaves flat, spikelets $\frac{1}{4}$ - $\frac{1}{2}$ in. linear-lanceolate concealed by the dense white hairs of the callus, gl. I of sessile spikelet variegated chartaceous below reddish and membranous above, keels smooth, IV cuspidately 2-toothed ciliate, awn twice as long as the spikelet or more, gl. I of pedicelled spikelet 3-nerved between the keels. *Hack. Monogr. Androp.* 144; *Duthie Grass. N.W. Ind.* 16.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 2500-7000 ft.

Stem tall, pubescent below the nodes. *Leaves* 8-16 by $\frac{1}{4}$ - $\frac{1}{2}$ in., smooth, margins scabrid; sheath glabrous or mouth sparingly hairy; ligule broadly ovate, glabrous. *Panicle* 8-10 in., rachis and branches opposite, glabrous, axils bearded; joints of spike 5-7 and pedicels $\frac{2}{3}$ as long as the spikelet or longer, shortly ciliate with stiff white hairs. *Spikelets* usually green and violet below the middle, reddish above it; gl. I tip subacute obtuse or 2-denticulate, nerves 2-3 between the keels vanishing upward; II linear-oblong, entire, 1-nerved, keel scaberulous; III linear-oblong nerveless, tip ciliate; IV = $\frac{1}{4}$ II, cuspidately 2-toothed; palea $\frac{1}{2}$ shorter, linear-lanceolate acute, glabrous.—I very much doubt this being distinct from *E. filifolius* and the following; and amongst the numerous specimens of Himalayan *Erianthi* which I have examined, and which must include these, I find it impossible to refer many with precision to any of these three.

Var. pallens, stem slightly pubescent below the pale lanceolate panicle, leaves flat, spikelets $\frac{1}{2}$ in. oblong $\frac{1}{4}$ shorter than the dense white hairs of the callus, gl. I membranous tip hyaline keels smooth, IV cuspidately 2-toothed ciliate, awn 3-4 times as long as the spikelet, gl. I of pedicelled spikelet shortly 1-nerved between the keels. *E. pallens*, *Hack. Monogr. Androp.* 145.

8. *E. longisetosus*, Anderss. ex Benth. in *Journ. Linn. Soc.* xix. (1881) 67; stem naked below the ovate-oblong panicle, sessile spikelets $\frac{1}{2}$ - $\frac{1}{2}$ in. lanceolate equalling or rather shorter than the red-brown hairs of the callus, gl. I oblong-lanceolate chartaceous bicuspidate 2-nerved between the smooth keels sides sparsely ciliate, IV narrow 2-fid, awn 4 or 5 times as long as the spikelet, gl. I of pedicelled spikelet 6-7-nerved. *Hack. Monogr. Androp.* 143; *Clarke in Journ. Linn. Soc.* xxv. (1889) 85, t. 34. *E. mishmensis*, Munro mss.—*Erianthus*, *Wall. Cat.* n. 8846.

TROPICAL HIMALAYA, alt. 1-3000 ft., from Nepal to the Mishmi, Naga and Munnepore Hills, ASSAM, SILHET and CHITTAGONG.

Stem 6-8 ft., stout, nodes pubescent. *Leaves* 1-3 ft. by $\frac{1}{4}$ - $1\frac{1}{2}$ in., glabrous except at the base within, many-nerved, quite smooth, base often much narrowed; sheath smooth; ligule rounded. *Panicle* 6-18 in., of many long densely packed solitary or binate long divided soft drooping spikes clothed with pale reddish or golden-brown hairs, rachis glabrous, joints and pedicels slender about as long as the spikelets densely ciliate with long hairs. *Spikelets* brown below, pale above; gl. I with rather broadly inflexed margins; II oblong-lanceolate, chartaceous, apiculate or

aristulate from a notched tip, 3-nerved, keel smooth, margins villous; III oblong, hyaline, copiously ciliate; IV variable in length, 1-nerved; palea usually half as long as the gl., very narrow.—In *Journ. Linn. Soc. l. c.* the authority for the name *longisetosus* is by oversight given as Thos. Anderson (late Director of the Calcutta Bot. Gardens.)

§§ *Gl. I dorsally villous at the base or all over.*

9. **E. Hookeri**, *Hack. Monogr. Androp.* 142; stem pubescent below the linear-lanceolate panicle, sessile spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. oblong-lanceolate rather longer than the reddish hairs of the callus, gl. I chartaceous acute tip membranous dorsally flat densely villous below the middle, 1-nerved between the scabrid keels, IV obtusely 2-toothed, awn twice or thrice as long as the spikelet, gl. I of pedicelled spikelet 5-nerved villous all over.

SIKKIM HIMALAYA, alt. 1–3000 ft., *J.D.H., Clarke.* BHOTAN, *Herb. Calcutta.*—DISTRIB. Yunnan.

Stem 2–3 ft., often branched below. *Leaves* 2–4 ft. by $\frac{1}{4}$ – $1\frac{1}{4}$ in.; sheath puberulous, villous at the top; ligule rounded, ciliate. *Panicle* 10–18 in., rachis pubescent, branches short, 2–3-nate; spikes unequal, joints and pedicels = $\frac{1}{2}$ the spikelet, ciliate with long hairs. *Spikelets* rusty red; gl. I villous with white hairs, margins inflexed above the middle, nerves often anastomosing; II oblong, chartaceous, 3-nerved, keel scabrid above; III shorter, lanceolate, nerveless, ciliate, tip dilated; IV awn brown subdorsally inserted; palea minute, long-ciliate.—Very near *E. longisetosus*, and *versicolor*; hardly distinguishable except by gl. I being dorsally villous below the middle.

10. **E. chrysothrix**, *Hack. in Œstr. Bot. Zeitschr.* xli. (1891) 6; stem rusty tomentose below the large panicle, spikes long hairy joints villous with rusty hairs, sessile spikelets $\frac{1}{2}$ in. linear-oblong, gl. I chartaceous narrowly truncate, dorsally villous all over, IV oblong 2-fid, awn very short or 0. *Saccharum longifolium*, *Munro ex Benth. in Journ. Linn. Soc.* xix. (1861) 66. *S. fallax* β , *Balansa in Journ. de Bot. (Paris)*, 1890) 81. *Eriochrysis longifolia*, *Munro mss.*

KHASIA and NAGA HILLS, alt. 2–4000 ft., *Griffith, &c.*—DISTRIB. Tonkin, Borneo.

Stem 8–10 ft., as thick as the middle finger, solid, smooth. *Leaves* 2–3 ft., glabrous or hirsute; sheaths with tubercle-based hairs; ligule short. *Panicle* 1–2 ft., erect, contracted, dense-fid., sometimes rustily villous; rachis angular, hairy, fragile; spikes whorled, 2–3 in.; joints and pedicels half as long as the spikelet, villous. *Spikelets* brown; gl. I 2-nerved, dorsally flat, keels ciliate; II keeled, truncate, 3-nerved; III shorter, oblong-lanceolate, ciliate; IV = $\frac{1}{2}$ III, ovate or linear-oblong, acutely 2-fid, ciliate; awn in the cleft, $\frac{1}{2}$ – $\frac{1}{4}$ in.; palea minute, broad, truncate, ciliate with long hairs.—Very unlike any other Indian species.

B. Lower branches of the panicle almost as long as the rachis.

11. **E. fastigiatus**, *Nees ex Steud. Syn. Gram.* 409; stem silky below the panicle, spikes crowded subdigitately fascicled, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. lanceolate much longer than the white hairs of the callus, gl. I chartaceous purplish-brown base dorsally and margins sparsely villous, keels above aculeolate, IV oblong or lanceolate 2-denticulate, awn terminal as long as the spikelet or longer. *Hack. Monogr. Androp.* 150. *Saccharum fastigiatum*, *Steud. l. c.*—*Saccharum*, *Wall. Cat. n.* 8847.

TROPICAL SIKKIM, the KHASIA and MISHMI HILLS, ASSAM, SILHET, CHITTAGONG, CHOTA NAGPORE, *Clarke, Belgaum, Ritchie.*

Stem 2–8 ft., stout or slender. *Leaves* 1–2 by $\frac{1}{6}$ – $\frac{1}{4}$ in., linear from a narrow

base, rigid, flat, smooth, margins scabrid; sheath glabrous, mouth fimbriate; ligule very short, truncate. *Panicle* oblong or fan-shaped; rachis hairy; spikes crowded, lower 3-5 in. strict slender, joints many and pedicels = $\frac{1}{2}$ spikelet or shorter, villous with long white hairs. *Spikelets* dark cold. below paler above; gl. I dorsally subchannelled, scaberulous, ciliate upwards, 1-nerved between the keels; II chartaceous, lanceolate, margins hyaline, III = I, linear-lanceolate, base membranous coloured, hyaline above; IV = $\frac{1}{2}$ II, hyaline, 3-nerved; palea small, ovate, obtuse, glabrous.—Hardly different from a *Pollinia*.

UNDESCRIBED SPECIES.

E. vulpinus, *Nees in Royle Ill. Pl. Himal.* 417.

37. **ISCHÆMUM**, Linn.

Annual or perennial grasses. *Spikelets* usually 2-fld., in solitary digitate or fascicled articulate fragile spikes, binate, a sessile and pedicelled. *Sessile spikelets*, *Glumes* 4, I oblong or lanceolate, flat, with inflexed margins, truncate or 2-cuspidate, awnless; II as long as I but narrower, concave, acute obtuse or awned; III hyaline, rarely chartaceous, paleate, triandrous, palea narrow ciliate; IV hyaline, bisexual or fem., usually cleft, awned (rarely awnless), awn inserted in the cleft, or by a minute point below it, branching into 3-nerves; palea linear-lanceolate. *Pedicelled spikelet*, like the sessile, or broader, often imperfect. *Lodicules* cuneate-quadrate. *Anthers* linear. *Styles* long, stigmas long or short.—Species about 40, chiefly tropical.

Ischæmum differs from *Pollinia* in the much larger gl. IV. of the sessile spikelet which is usually cleft into lanceolate lobes, and, except in *I. angustifolium*, in the longer palea of that gl. I find that Hackel's sectional character founded on the shape of the joints is unworkable.

Sect. I. **EUISCHÆMUM**. *Spikes* 2-3, rarely more. *Gl. I* of sessile spikelets dorsally flat, not deeply channelled or depressed along the mesial line. (See also *I. robustum*.)

* Margins of gl. I narrowly inflexed or incurved from base to apex.

† Leaves rounded at the base, sessile on the sheath.

§ *Pedicel of upper spikelet not $\frac{1}{2}$ the length of the lower spikelets.*

1. **aristatum**, Linn. *Sp. Pl.* 1049 (*in part*); perennial, leaves sessile long narrow, spikes 2-3 2-5 in., gl. I of sessile spikelet nearly flat oblong obtuse or notched with 2-4 marginal nodules or low transverse ridges, IV deeply 2-fld, awn geniculately inserted at the cleft, upper spikelet dimidiate-ovate. *Kunth Enum. Pl.* i. 512, *Suppl.* 421; *Hack. Monogr. Androp.* 202. *I. imberbe*, Retz. *Obs.* vi. 35.—*Spodiopogon*, Wall. *Cat.* 8861 (= vars. *imbricatum* & *elatum*).

Throughout the Plains and lower Hills of INDIA, from Sikkim and Bengal to Burma, and southwd. through the Deccan Peninsula to CEYLON.—DISTRIB. China, Malaya.

Stem 1-4 ft., stout or slender, erect or decumbent at the base, simple or branched above. *Leaves* 4-10 in. by $\frac{1}{4}$ -1 $\frac{1}{2}$ in., finely acuminate, glabrous or silkily hairy, base rounded or narrowed rarely subpetiolate; sheath naked or hirsute; ligule short or 0. *Spikes* stout or rather slender, internodes much shorter than the spike-

lets, fragile. *Spikelets* $\frac{1}{2}$ to nearly $\frac{1}{2}$ in., pale or dark, glabrous to villous; gl. I from broadly oblong with a rounded tip to oblong-lanceolate, symmetrical or slightly curved or subdimidiate-oblong, upper $\frac{1}{2}$ or $\frac{1}{4}$ usually herbaceous nerved and with a narrow ciliate wing on one or both sides; II acute or acuminate; IV about $\frac{1}{2}$ shorter than II, 3-nerved below the insertion of the slender pale awn, which is rarely twice the length of the spikelet; upper spikelet not awned, pedicel very short.—In Hohenacker's specimen of var. *mangaloricum* gl. IV is cleft $\frac{1}{2}$ way down. In a small form from Salsette (Bombay) Jacquemont n. 374, the keel of gl. II is notched about the middle, winged and serrulate thence to the tip.

The following is Hackel's grouping of some of the more distinct forms of this variable plant. It has the advantage of bringing the authorities and synonyms into some order, but does not include all the definable forms, of which I have added two:—

Subsp. *imberbe*, Hack. l. c. 203; spikelets glabrous, except the callus. I. *aristatum*, Burm. *Fl. Ind.* t. 21, f. 3 (bad). *Meoschium aristatum*, Beauv. *Agrost.* 111.—Var. *imbricatum*; stout, erect, ligule rather long, gl. I of sessile spikelet 2-noduled on each side, of pedicelled smooth. *Meoschium imbricatum*, Munro *ms.* Andropogon *imberbis*, Steud. *Syn. Gram.* 378. Bengal, the Khasia Hills, Ceylon (CP. 869).—Var. *mangaloricum*, Hack. l. c. 204; stout, erect, ligule short, gl. I of lower spikelet surmounted by a broad scarious claw 3-4-noduled on each side, IV deeply cleft. I. *geniculatum*, Hochst. in *Hohen. Pl. Ind. Or.* n. 184 (non Roxb.) *Meoschium Arnottianum*, Nees in *Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843) 198. Andropogon *geniculatus*, Steud. l. c.—The Concan and Malabar.—Var. *fallax*, Hack. l. c.; stem slender, base decumbent, ligule minute, gl. I of lower spikelets 3-4-noduled on each side. *Meoschium Arnottianum*, Nees in *Herb. Wight.* n. 3077. M. *monostachys*, Wt. & Arn. ex Steud. l. c. 369. Andropogon *monostachyus*, Steud. l. c. Central India, the Deccan and Ceylon.

Subsp. *barbatum*, Hack. l. c. 204; spikelets more or less villous, gl. I of lower spikelet 3-4-noduled on each side, the opposite nodules sometimes united by a low ridge. I. *barbatum*, Retz. *Obs.* vi. 35; Kunth *Enum. Pl.* i. 513. Benth. *Fl. Hongk.* 425; Thwaites *Enum. Pl. Zeyl.* 364; Trim. *Cat. Ceyl. Pl.* 107. *Meoschium barbatum*, Beauv. *Agrost.* 111. Andropogon *barbigerus*, Steud. l. c. 376.—Var. *elatum* Hack. l. c. 205; tall, branched, sheaths hirsute, ligule $\frac{1}{2}$ - $\frac{1}{4}$ in. *Meoschium elatum*, Nees ex Steud. l. c. 376. M. *Neesianum*, Arn. ex Steud. l. c. 375. Andropogon, *Esenbeckii*, and *elatus*, Steud. l. c. 375, 376.

Subsp. *Koenigii*, Hook. f.; tall, very robust, stem as thick as a swan's quill, leaves 1- $\frac{1}{2}$ in. broad, spikes 3 very stout 4 in. long, spikelets $\frac{1}{2}$ in., gl. I of lower oblong-lanceolate acute, IV shortly 2-fid lobes narrow. I. *fasciculatum*, Rottler *ms.*—Deccan Peninsula, Koenig.—Probably a distinct species.

Subsp. *Rottleri*, Hook. f.; stem stout much branched, spikelets $\frac{1}{2}$ in. closely imbricate, gl. I of lower linear-oblong, of upper very broad broadly winged on one side nerves of both with anastomosing tips, gl. IV of lower cleft nearly to the base, awn inserted in the cleft, of upper oblong bidentate mucronate in the notch. I. *barbatum*, Herb. Rottler.—Probably from the Deccan. This also may be a distinct species.

2. *I. rugosum*, Salisb. *Ic. Stirp. Rar.* i. t. 1; annual, erect, leaves narrow base contracted, spikes 1-2, gl. I subdimidiate oblong obtuse very convex, coriaceous below and closely transversely ridged membranous above, IV cleft to below the middle awn geniculately inserted at the cleft dorsally lobes lanceolate. *Gærtn. f. Fruct. Suppl.* i. t. 181; Roxb. *Fl. Ind.* i. t. 320; Hack. *Monogr. Androp.* 206; Thwaites *Enum. Pl. Zeyl.* 364; Trim. *Cat. Ceyl. Pl.* 107; Duthie *Grass. N.W. Ind.* 18, Fodd. *Grass. N. Ind.* 31; Rendle in *Journ. Bot.* xxxii. (1894) 103. I. *Colladoa*, Spreng. *Syst.* i. 298. I. *corrugatum*, Herb. Ham. in *Wall. Cat.* n. 8864 E. I. *Royleanum*, Miq. *Fl. Ind. Bat.* iii. 498; Duthie *Grass. N.W. Ind.* 18. I. *segetum*, Trin. in *Mem. Acad. Petersb. Ser.* vi. ii. (1883) 294. *Meoschium Griffithii*, Nees & Arn. in *Ann. & Mag. Nat. Hist.* i. (1838) 284. M. *Arnottianum*, Nees,

elegans, Arn. & Nees, *rugosum*, Nees, & Wightianum, Nees in *Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843) 199, in *Pl. Meyen.* 200. *M. Royleanum*, Nees ex Steud. *Syn. Gram.* 375. *M. rugosum*, Wall. *Cat.* n. 8864. *M. Wightii*, Nees in *Wight Cat.* n. 1719. *Andropogon Arnottianus*, Griffithsiae, segetum & Tong-dong, Steud. *l. c.* 375, 376. *Apluda rugosa*, *Herb. Russ. ex Wall.* *l. c.* 8864 A. *Colladoa distachya*, Cav. *l. c.* 37, t. 460.

Throughout INDIA from the Lower Himalaya southwd. to Burma, and the Malay Peninsula, Andaman Islds., and CEYLON.—DISTRIB. China, Malaya.

Stems 1-2 ft., tufted, nodes glabrous or puberulous. *Leaves* 4-10 in.; ligule short. *Spikes* 1-3 in., pale yellow; joints = $\frac{2}{3}$ spikelets, very stout, ciliate. *Spikelets* $\frac{1}{2}$ - $\frac{3}{4}$ in., pale yellow; gl. I veined in the upper membranous third; ridges of lower $\frac{2}{3}$ often imbricating like folds; II acute, keeled, scaberulous; III lanceolate, acute, hyaline, paleate; IV nearly = II; awn short or long, very slender, glistening, palea ovate-lanceolate. *Pedicelled spikelets* like the sessile, or imperfect.—Hackel has 3 vars., but I fail to limit them with copious suites of specimens. There are, however, two recognizable forms; one with glabrous joints and pedicels, a glabrous or shortly hairy callus, and imperfect awn, the other with more ciliate nodes and pedicels, a more bearded callus and longer awn.

3. ***I. magnum***, Rendle in *Journ. Bot.* xxxii. (1894) 102; tall, stout, leaves linear-lanceolate from a narrow base, spikes 2 appressed 4-7 in. nearly glabrous, gl. I of sessile spikelet oblong-lanceolate very coriaceous and deeply transversely channelled below the middle thinner above and 3-5-nerved with one keel narrowly winged, IV ovate-lanceolate entire apiculate awn 0.

SINGAPORE; at Blakan Mate, Feilding.

Stem 6 ft., branched above; branches slender, nodes hairy. *Leaves* 12-20 in., finely acuminate, glabrous above, sparsely hairy beneath; sheaths above villous and scabrid; ligule $\frac{1}{2}$ - $\frac{3}{4}$ in., 2-auricled. *Spikes* stout, pale; joints 3-gonous, ciliolate on the outer angle, = $\frac{1}{2}$ shorter than the sessile spikelet, tips very shortly bearded; pedicel of upper spikelet very short stout. *Sessile spikelets* $\frac{1}{2}$ in., oblong, convex, pale yellowish polished, tumid between the transverse channels; II coriaceous, acutely keeled, margins incurved; III lanceolate, acuminate, hyaline, 3-nerved, paleate, palea as long 2-nerved; IV rather shorter, hyaline, ovate-lanceolate, 3-nerved; palea as long, narrowly lanceolate, 2-nerved. *Pedicelled spikelet* as long as the sessile, obliquely convolute, inner margin with 2-3 nodules, outer narrowly winged.

4. ***I. molle***, Hook. f.; tall, stout, branched, leaves sessile, spikes 1-2 stout densely silkily villous with white hairs, joints broad half as long as the spikelets, gl. I broadly ovate-oblong obtuse smooth dorsally villous all over many-nerved, II obtuse silky keel narrowly winged from the middle upwards, IV shorter cleft to the middle, lobes acuminate ciliate, awn geniculately inserted at the cleft. *I. aristatum* var. *intermedium*, Hack. mss.

The CONCAN? *Herb. Dalzell*. CENTRAL PROVINCES; Chanda district, Duthie.

Stem 3-4 ft., soft, solid, quite smooth, leafy. *Leaves* 6-10 by $\frac{1}{4}$ - $\frac{1}{2}$ in., finely acuminate, base rounded and cordate, sparsely hairy on both surfaces; sheaths 4-6 in., smooth, glabrous or sparingly hairy above, mouth villous. *Spikes* axillary and terminal, 3-5 in.; joints stout, 3-gonous or concavo-convex, ciliate, tips truncate. *Spikelets* $\frac{1}{2}$ - $\frac{3}{4}$ in.; callus very short, broad; gl. I thinly coriaceous, margins narrowly incurved obscurely waved at the base; II chartaceous, wing ciliolate, margins ciliate; III hyaline, ovate, obtuse, 3-nerved, ciliate; palea as long, narrower, obtuse, 2-nerved; IV about $\frac{1}{2}$ shorter than III, awn 2-3 times as long as the gls., golden yellow and shining with a brown column; palea like that of III but smaller. *Upper spikelet* smaller than the lower, awnless, pedicel = $\frac{1}{2}$ of lower spikelet.

§§ *Pedice*l of upper spikelet $\frac{1}{2}$ the length of the lower spikelet or more.

5. **I. diplopogon**, *Hook. f.*; annual, branching upwards, leaves lanceolate from a narrow base, upper sheaths spathiform, spikes 2 pale, peduncle flexuous, joints dorsally ciliate, sessile spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in., gl. I oblong 2-cuspidate glabrous shining, II awned 3-nerved lateral nerves pectinately ciliate with stiff hairs above the middle, IV very short 2-fid lobes acute eciliate awned in the cleft.

BOMBAY; near Bhorkus, *Woodrow*.

Stems 12–18 in. or more, branched from the base and upwards, smooth, stout or slender, internodes long, nodes glabrous. *Leaves* 4–6 by $\frac{1}{4}$ – $\frac{3}{8}$ in., acuminate, narrowed from below the middle to the base, dark green, rather shining above, margins smooth, nerves 3–4 pairs and midrib very slender; sheath glabrous, of upper leaves open; ligule very short, glabrous. *Peduncles* many from the upper spathiform sheaths, solitary, filiform; spathes 1–3 in., compressed, lanceolate. *Spikes* 1–1 $\frac{1}{2}$ in., compressed; pedicelled spikelets divergent; joints and pedicels = $\frac{1}{2}$ the lower spikelets or longer, subclavate, dorsally rounded, ventrally concave. *Sessile spikelets* white; gl. I nerves obscure, margins narrowly incurved; II dorsally smooth, awn as long as itself; III linear-oblong, 1-nerved, eciliate; IV 3-nerved, awn $\frac{1}{2}$ in. capillary, palea very small, oblong. *Pedicelled spikelets* often imperfect, not awned; gl. I elliptic, 2-cuspidate, green, margins white; II acuminate.

6. **I. Kingii**, *Hook. f.*; annual, leaves ovate-lanceolate base rounded or subcordate, hairy beneath, sheaths of uppermost spathiform, spikes 2 ovate pale villous, joints and pedicels very stout densely ciliate tops 3-lobed, sessile spikelet $\frac{1}{5}$ – $\frac{1}{4}$ in., gl. I oblong or oblong-lanceolate 2-cuspidate or 2-aristulate dorsally glabrous shining, sides bulging at about the lower $\frac{1}{2}$ keels ciliate above, II awned dorsally rounded with a broad pencil of stiff hairs on the upper third, IV 2-fid lobes stoutly awned between the lobes.

RAJPOOTANA; Mt. Aboo, *King*.

Stem 10–12 in., ascending, glabrous. *Leaves* 1–2 by $\frac{1}{3}$ – $\frac{1}{2}$ in., acuminate, rather thin, margins scaberulous, midrib and nerves very slender; sheaths lax, upper open, glabrous; ligule short, membranous. *Peduncles* sheathed, sometimes up to the spikes, slender. *Spikes* 2 in.; joints shining. *Sessile spikelets* with a short rounded bearded callus; keels of gl. I minutely scaberulous; II scabrid, tip 2-toothed; III lanceolate 1-nerved; IV much shorter, 3-nerved, lobes triangular-ovate, eciliate; palea about as long, ovate-lanceolate, 2-nerved, eciliate; awn about 1 in. long. *Pedicelled spikelets* variable, much smaller; gl. I elliptic, acute, many-nerved, flat, margins not incurved; II shortly awned, dorsally nearly naked.

7. **I. angustifolium**, *Hack. Monogr. Androp.* 241; base of stem woolly, leaves long narrow rigid subpungent, spikes 2–4 on axillary and terminal filiform peduncles, gl. I of sessile spikelet lanceolate 2–3-toothed dorsally convex with a tuft of hairs strongly 3-nerved margins not inflexed, II lanceolate 2-toothed aristulate, IV linear entire or 2-toothed shortly awned. *Oliver in Hook. Ic. Pl. t. 1773; Kew Bulletin*, 1888, 157. *I. sparteum*, *Ham. ex Wall. Cat. n. 8845. Spodiopogon angustifolius, Trin. in Mem Acad. Petersb. Ser. vi. ii. (1833) 300, Sp. Gram. Ic. t. 336. S. laniger, Nees in Royle Ill. Himal. Pl. 416; Steud. Syn. Gram. 373. S. notopogon, Nees ex Steud. l. c. Pollinia eriopoda, Hance in Journ. Bot. iv. (1866) 173; Dyer in Journ. Linn. Soc. xx. (1883) 409. Andropogon binatus, Retz. Obs. vi. 21. A. involutus, notopogon & obvallatus, Steud. l. c. —Eriantho affine, Wall. Cat. n. 8845.*

LOWER HIMALAYA; from Kashmir to Sikkim, ascending to 7000 ft. in Garwhal, *Duthie*. The PANJAB. RAJPOOTANA, on Mt. Aboo. The SATPURA HILLS. BEHAR

on Parasynth. CENTRAL INDIA. (Cult. in Bengal, *Kurz*.)—DISTRIB. Afghanistan, China, Philippines.

Stems 2-3 ft., tufted, sparingly branched, slender, grooved on one side, smooth. *Leaves* 1-2 ft. by $\frac{1}{10}$ - $\frac{1}{4}$ in., concave or convolute, base obtuse fimbriate, margins scaberulous; sheath glabrous, old basal forming with the wool a thickened mass; ligule a ridge of hairs. *Spikes* 1-2 in., close together or placed apart, erect, golden or rusty villous; joints and pedicels = $\frac{1}{2}$ the lower spikelet, slender, shortly ciliate, bearded at the base. *Spikelets* $\frac{1}{4}$ - $\frac{1}{2}$ in., lanceolate, callus hairs short; gl. I sub-chartaceous, margined with long rufous hairs; II rather longer, 3-5-nerved, ciliate, keel bearded below; III oblong, obtuse, tip ciliate, nerveless, paleate; palea entire or 2-lobed, tip ciliate; IV = II, 1-nerved, awn as long as the spikelet; palea short, ovate, obtuse, tip fimbriate. *Pedicelled spikelets* like the sessile.—Hackel points out that except for the inflorescence this is more a *Spodiopogon* or *Pollinia* than an *Ischæmum*, and should perhaps form a genus. The woolly stem-base recalls *Pollinia velutina* and *phaethrix*.

8. ***I. pilosum***, Hack. *Monogr. Androp.* 240; tall, robust, leaves narrow, spikes 2-6 villous, gl. I of sessile spikelet lanceolate bicuspidate translucent dorsally flat or depressed hairy 6-nerved keels scabrid and ciliate, II longer keel ciliate above, IV = III oblong-lanceolate 2-fid, awn short slender inserted between the lanceolate lobes. *Duthie Fodd. Grass. N. Ind.* 31; *Lisboa in Bomb. Journ. Nat. Hist.* vi. (1891) 199. *Spodiopogon pilosus*, Nees ex Steud. *Syn. Gram.* 373; *Wight Cat.* n. 1692. *Andropogon pilifer*, Steud. l.c. *A. pilosus*, Klein ex Willd. *Sp. Pl.* iv. 920.—*Andropogon*, Wall. *Cat.* n. 8817.

AJMEER; at Neemuch, *Jacquemont*. CENTRAL PROVINCES, *Duthie*. The DECCAN PENINSULA, *Heyne*, &c.

Stem very stout, extensively creeping; stolons sheathed; branches 2-3 ft., much divided at the base, nodes glabrous. *Leaves* 6-12 in., flat or convolute, often wiry, coriaceous, glaucous, finely acuminate, glabrous, base and mouth of sheath bearded; ligule membranous, rounded. *Spikes* fascicled, $\frac{1}{2}$ -1 $\frac{1}{2}$ in., yellow or brownish, rachis hairy, joints and pedicels slender, compressed, subclavate, shorter than the sessile spikelets, sparsely ciliate. *Sessile spikelets* $\frac{1}{4}$ - $\frac{1}{2}$ in.; callus minute, bearded with long hairs; gl. I chartaceous, narrowed from the middle upwards, dorsally hairy, nerves anastomosing, margins inflexed from base to tip; II rather longer, chartaceous, laterally compressed, acuminate, 5-nerved; III linear-oblong, obtuse, ciliate above, paleate, male, palea glabrous; IV = III, 3-nerved, lobes ciliate, awn variable in length; palea narrow or broad, ciliate. *Peduncled spikelets* smaller but like the sessile, or imperfect, sometimes reduced to a single gl.

†† Leaves hastate or cordate at the base, often petioled.

§ *Pedicel of upper spikelet not $\frac{1}{2}$ the length of the lower spikelet.*

9. ***I. semisagittatum***, Roxb. *Fl. Ind.* i. 320; annual, slender, prostrate below, leaves oblong- or linear-lanceolate from a broad cordate or sagittate base, spikes 2 villous or glabrescent, joints very short and stout, gl. I of sessile spikelet oblong obtuse flat glabrous transversely undulate or ridged or margins nodulose, II lanceolate acuminate villous or pubescent, IV cleft to the middle or higher, awn dorsal below the cleft. *Kunth Enum. Pl.* i. 513; *Hack. Monogr. Androp.* 208; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 197. *I. conjugatum*, Thw. *Enum. Pl. Zeyl.* 365; *Trim. Cat. Ceyl. Pl.* 107; *Hack. l.c.* 205 (non Roxb.). *Meoschium semisagittatum*, Schult. *Mant.* ii. 435. *Spodiopogon semisagittatus*, Voigt *Hort. Suburb. Calc.* 706. *Andropogon semisagittatus*, Steud. *Syn. Gram.* 376.

BENGAL, *Roxburgh*. The DECCAN, CONCAN, and CANARA, *Stocks*, Talbot. CEYLON, *Thwaites* (C.P. 3263).

Stem 12–24 in., slender, flaccid, leafy, pale, internodes long, nodes glabrous or hairy. *Leaves* 3–5 in., finely acuminate, flaccid, 3–5-nerved, glabrous or sparsely hairy, margins smooth, costa slender, lower with a filiform petiole $\frac{1}{2}$ –1 $\frac{1}{2}$ in. long; sheaths long, upper often ventricose and open, margins and ligule ciliate. *Spikes* 1–2 $\frac{1}{2}$ in., more or less villous with white or grey hairs; joints trigonous, clavate. *Sessile spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ in., gl. I thin, green, dorsally villous, margins narrowly inflexed chiefly below the middle; II lanceolate, acuminate, dorsally rounded; III lanceolate, 1-nerved, paleate; IV glabrous or lobes ciliate, 3-nerved, awn $\frac{1}{2}$ – $\frac{2}{3}$ in.; palea longer than the gl. *Pedicelled spikelets* very shortly broadly pedicelled; gl. I 7–9-nerved, winged above on one side.—I have not seen Huegel's specimens which alone Hackel describes, and for which no habitat is given. The leaf-margins of the specimens I have seen are scarcely "scaberrimæ." Hackel has two vars.: *a. genuinum*, spikelets glabrous, joints dorsally smooth; *β. dasyanthum*, gl. I at least of upper spikelet appressedly villous, joints scabrid with hairy margins and dorsal keel.

Var. *glabrescens*; spikes more slender, joints shortly villous, gl. I shining glabrous transversely undulate below the middle, IV bicuspidate, awn sometimes inserted half-way between the base and sinus, or bipartite and awn geniculately inserted at the cleft.

10. ***I. conjugatum***, Roxb. *Fl. Ind.* i. 321; annual, prostrate below, leaves short base hastate or broadly deeply cordate, spikes 2 short villous, joints very short ciliate, gl. I of sessile spikelet oblong obtuse flat 2-toothed villous even or lower margins obscurely nodose, II lanceolate acuminate puberulous, IV cleft to about the middle, awn dorsally inserted at or below the cleft. *Kunth Enum. Pl.* i. 513; *Hack. Monogr. Androp.* 205. *Spodiopogon conjugatus*, Voigt *Hort. Suburb. Calc.* 706. *Andropogon cordatifolius*, Steud. *Syn. Gram.* 376.

BENGAL; near Calcutta, Roxburgh. The CONCAN, Stocks. CEYLON (naturalized) Trimen.

Stem spreading from the root and creeping, then geniculately ascending, 12–18 in. high, slender, stiff, purplish, repeatedly branching upwards. *Leaves* 1–1 $\frac{1}{2}$ in., acuminate, broadest at the base, rather rigid, striate, lower petioled; sheath of the upper ventricose and often open; ligule short, glabrous. *Spikes* 1–1 $\frac{1}{2}$ in., sessile; joints quadrately clavate, plano-convex. *Spikelets* $\frac{1}{2}$ in., pale; gl. I more or less villous from below or above the middle to nearly the top, margins narrowly inflexed not winged, upper half often greener; II strongly keeled, puberulous; III paleate; IV awn slender about twice as long as the spikelet. *Pedicelled spikelets* subsessile, almost awnless; gl. I as in the sessile.—I have seen only Concan specimens, they agree with Roxburgh's character and figure, except in the nodes being hardly villous.

§§ *Pedicel of upper spikelets* = $\frac{1}{3}$ the length of the lower spikelet, or longer.

11. ***I. commutatum***, Hack. *Monogr. Androp.* 209; slender, prostrate below, leaves short cordate lower petioled, spikes 2, gl. I of sessile spikelet oblong obtuse or acute 2-toothed flat dorsally undulate tip faintly winged margins obscurely nodulose, II acuminate keeled, IV cleft to the middle, awn inserted by a broad base between the ciliate lobes. *Trim. Cat. Ceyl. Pl.* 107. *I. semisagittatum*, Thw. *Enum. Pl. Zeyl.* 365 (non Roxb.).

NILGHIRI HILLS; Conoor, alt. 7000 ft., Clarke. CEYLON; Ambagamówa district, Thwaites (C.P. n. 2625).

Stem 6–12 in., branching upwards from a decumbent base, nodes glabrous. *Leaves* 1–3 in., linear-lanceolate, acute, softly hairy, margins scabrid; sheath smooth or hairy and keeled above; ligule rounded. *Spikes* 1–1 $\frac{1}{2}$ in.; joints = about $\frac{1}{2}$ the sessile spikelet, shortly ciliate. *Sessile spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ in., green or dark-colrd.; callus

bearded; gl. I coriaceous, keels glabrous narrowly winged above; II ovate-lanceolate, keel obtuse smooth; III lanceolate, 3-nerved, paleate; IV shorter, oblong, glabrous, awn $\frac{1}{2}$ – $\frac{3}{4}$ in., palea minute. *Pedicelled spikelets* smaller, awnless; gl. I 5–7-nerved, winged on one side.

12. **I. impressum**, *Hack. Monogr. Androp.* 210; slender, prostrate below, leaves ovate- or oblong-lanceolate cordate lower narrower petioled, spikes 2 villous, gl. I of sessile spikelets linear-oblong flat dorsally broadly irregularly depressed with shallow subsemilunar pits in the lower $\frac{2}{3}$ above it winged and 2-cuspidate, II dorsally rounded with a median gibbosity and an auricle-like wing above it, IV cleft to above the middle, awn short geniculately inserted at the cleft.

INDIA, *Huegel. The CONCAN? Herb. Dalzell.*

Stem 4–8 in., quite glabrous, branching upwards. *Leaves* 2–3 in., upper $\frac{2}{3}$ in. broad, sparsely hairy beneath, margins thickened, scaberulous, sometimes crenulate; sheath compressed, glabrous; ligule oblong. *Spikes* yellow; joints and pedicels stout, clavate, ciliate with rigid hairs, forked at the top. *Sessile spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ in., shining; callus short, broad, bearded; gl. I narrowed and margins subnodulose at the base, wings erose; II obtuse, chartaceous, ciliate; III oblong-lanceolate, hyaline, 3-nerved, ciliate; IV much shorter, glabrous; awn 1–1 $\frac{1}{2}$ in., with very stout column and golden tip; palea oblong, obtuse, glabrous. *Pedicelled spikelets* smaller than the sessile; gl. I obtuse, glabrous, many-nerved, winged on one margin; II 7-nerved; IV mucronate.—I have seen only a fragmentary specimen in Dalzell's Herbarium. The sculpturing of gl. I probably varies.

13. **I. Feildingianum**, *Rendle in Journ. Bot.* xxii. (1894) 101; stem robust branched above, leaves lanceolate cordate, spikes 2 appressed silkily hairy of gl. I, sessile spikelets broadly oblanceolate flat coriaceous and glabrous below the middle hairy above with 6–8 nerves anastomosing at their tips, keels scaberulous, II 6-nerved keeled aristulate, IV deeply 2-fid, awn inserted between the broad obtuse lobes.

MALAY PENINSULA; Mt. Ophir, *Feilding.*

Upper leaves 4–5 by $\frac{1}{2}$ – $\frac{3}{4}$ in., narrowed from the base to the acuminate tip, rigid, pubescent beneath, 16–20-nerved; sheath pubescent; ligule short, truncate. *Spikes* 3–3 $\frac{1}{2}$ in., erect, fragile, peduncle villous towards the tip; joints and pedicels stout, trigonous, about $\frac{1}{4}$ – $\frac{1}{2}$ shorter than the spikelet, angles and excised hollow tips long-ciliate. *Sessile spikelets* $\frac{1}{4}$ in., narrowed to the base; callus cuneiform, densely bearded; gl. I obtuse or 2-toothed, keels very narrowly winged towards the tip; II rather longer than I, scabrid above and narrowed into the short recurved awn; III ovate-oblong, obtuse, hyaline, faintly 3-nerved; palea as long, lanceolate, subchartaceous, with broad rounded hyaline wings; IV hyaline, subscaberulous, awn about $\frac{1}{2}$ in.; palea as long as the gl., lanceolate, 2-nerved. *Pedicelled spikelets* smaller, keels of gl. I winged on one side; IV not awned.

** Margins of gl. I of sessile spikelet broadly incurved below the middle.

† *Keel of gl. II winged above the middle (see also I. murinum).*

14. **I. muticum**, *Linn. Sp. Pl.* 1049; glabrous, creeping, branches erect leafy, leaves ovate to lanceolate rigid, spikes 2 short stout glabrous, gl. I of sessile spikelet oblong 2-toothed smooth keels narrowly winged above, II acuminate keel winged above the middle, IV oblong shortly 2-fid shortly awned between the acute ciliate lobes. *Gærtn. f. Fruct. Suppl.* 1, t. 181; *Kunth Enum. Pl.* i. 512; *Hack. Monogr. Androp.* 212; *Wall. Cat.* n. 8865; *Wight Cat.* n. 1716, *Herb.* n. 3078; *Thw. Enum. Pl.*

Zeyl. 364; *Trim. Cat. Ceyl. Pl.* 107; *Benth. Fl. Austral.* vii. 520. *I. glabratum*, *Presl Rel. Hænk.* i. 328. *I. repens*, *Roxb. Fl. Ind.* i. 323; *Wight Cat.* n. 1715. *Andropogon muticus*, polymorphus, relictus & repens, *Steud. Syn. Gram.* 374, 375, 377, 374.

The DECCAN PENINSULA, from Canara southwd. BURMA, the MALAYAN PENINSULA and LACCADINE ISLDS. CEYLON, common.—DISTRIB. China, Malaya, Australia.

Rootstock very stout, creeping for several feet in sand; branches 2-10 in., stout, usually leafy up to the spike; nodes glabrous. *Leaves* 1-6 in., rarely more, sessile or subsessile, flat, stiff, base rounded or cordate, brown when dry; sheath smooth; ligule obscure. *Spikes* 1-1½ in., joints and pedicels stout, 3-gonous, = about half the sessile spikelet, truncate, shortly ciliate. *Sessile spikelets* ½-¾ in., glabrous, callus very large, smooth; gl. I acute, thickly coriaceous, shining, obscurely many-nerved, dorsally ciliate above the middle, margins below broadly incurved; II larger, rigid, glabrous, 5-nerved; III oblong, obtuse, glabrous, palea with a narrow hyaline wing; IV = II, chartaceous, convolute, 5-nerved; palea oblong-lanceolate, keels ciliate. *Pedicelled spikelets* laterally compressed; gl. I with the margin on one side inflexed and broadly winged, concave, hairy; gl. IV usually bisexual.

15. ***I. Lisboæ***, *Hook. f.*; stem creeping below, leaves oblong acute and open sheaths villously tomentose, spikes 2 softly tomentose, gl. I of sessile spikelets oblong 2-fid convex keels with broad auricular ciliate wings, II coriaceous scabridly awned keel winged above the middle, IV oblong, obtusely 2-lobed, awn slender inserted between the rounded lobes.

NORTH CANARA, *Lisboa*.

Stem very stout, rooting at the thickened nodes; branches ascending 8-14 in., glabrous. *Leaves* on the creeping stem 1-2 in., closely imbricating in two series, the blades reflexed at right angles to the erect short open sheaths, softly tomentose on both surfaces; lower sheaths ¾-1 in., villous; ligule short, bearded with very long hairs. *Spikes* 2 in., joints and pedicels about half as long as the spikelets, stout, concavo-convex, shortly villous, truncate. *Sessile spikelets* ½ in., callus very large, glabrous; gl. I thickly coriaceous, dorsally convex, ciliate above the middle, margins broadly incurved below the middle; II rather longer, rigid, dorsally rounded below the wing; III ovate-oblong, obtuse, margins ciliate, paleate, male; palea chartaceous, obovate, 2-nerved, nerves meeting at the tip with very broad hyaline wings above the middle; IV = ¾ II, 3-nerved below the middle, awn about twice as long as the spikelet; palea lanceolate, nerves ciliate. *Pedicelled spikelets* laterally compressed; gl. I convex, broadly winged, villous; IV shortly awned or awnless.—The habit of the only good specimen I have seen is very peculiar.

16. ***I. ciliare***, *Retz. Obs.* vi. 36; erect or decumbent below, leaves linear, spikes 2-3 villous, gl. I oblong or obovate-oblong convex 5-7-nerved 2-lobed or 2-fid from the keels ending in 2 terminal wings, II acuminate or awned dorsally rounded keeled and winged above the middle, IV obovate-oblong cleft to the middle awned in the cleft. *Kunth Enum. Pl.* i. 513 (*excl. syn.*); *Hack. Monogr. Androp.* 225; *Trim. Cat. Ceyl. Pl.* 107; *Wight Cat.* n. 2322. *Duthie Fodd Grass. N. Ind.* 30; *Benth. Fl. Austral.* vii. 520 (*var.?* *podostachyum*). *I. aristatum*, *Willd. Sp. Pl.* iv. 939; *Roxb. Fl. Ind.* i. 319. *I. barbatum*, *Herb. Ham. ex Wall. Cat.* n. 8860 A. *I. geniculatum*, *Roxb. Fl. Ind.* i. 322. *I. scrobiculatum*, *Wight & Arn. ex Steud. l. c.* 373. *I. tenue*, *Herb. Ham. ex Wall. Cat.* n. 8860. *Spodiopogon ciliaris*, *Nees ex Steud. Nom. Ed.* II. ii. 625; *Wight Cat.* n. 1693. *S. obliquivalvis*, *Nees in Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843) 185, *Thw.*

Enum. Pl. Zeyl. 365; *Wight Cat.* n. 1693; *Wall. Cat.* n. 8588; *Duthie Grass. N.W. Ind.* 16; *Benth. Fl. Hongk.* 426. *S. scrobiculatus*, *Nees in Wight Cat.* n. 1694, & *zeylanicus*, *Nees ex Steud. l. c.* 373, 377. *S. villosus*, *Nees in Hook. & Arn. Bot. Beech. Voy.* 242. *Andropogon bifidus*, *incertus*, *Macræi*, *simillimus*, *patenti-villosus*, & *Retzii*, *Steud. l. c.* 373–377. *A. Macræi*, *Steud. l. c.* 377. *A. malacophyllus*, *Hochst. ex Steud. l. c.* 372.—*Spodiopogon*, *Wall. Cat.* n. 8859, 8860, 8862.

BENGAL and the LOWER HIMALAYA, from Nepal to Assam, SILHET and BURMA, and southwd. to TRAVANCORE, the LACCADINE ISLANDS, *Alcock*, and GT. COCOS ISLD., *Prain*. CEYLON.—DISTRIB. China, Malaya, Australia.

Stem 6 in. 2 ft., stout or slender, tufted, leafy, sometimes creeping; nodes glabrous or bearded. *Leaves* 2–6 in., glabrous pubescent or villous; sheath glabrous or hirsute; ligule short, ciliate. *Spikes* 1½–2 in., rather stout; joints and pedicels = about ½ the spikelets, straight or incurved, ciliate, truncate. *Spikelets* ½–1 in.; gl. I polished, glabrous or villous, sometimes pitted, upper part scrobiculate or not, terminal wings erose or ciliolate, scaberulous, margins broadly inflexed below; II glabrous, or dorsally ciliate, aristulate; III oblong, 1–3-nerved, ciliate, paleate, male; palea with a chartaceous lanceolate centre, and broad hyaline wings; IV glabrous or ciliolate, awn very slender, about twice as long as the spikelet. *Pedicelled spikelets* rather smaller than the sessile, gl. I acute.—A very common and variable plant, of which Hackel has 3 varieties and 4 Indian subvarieties as follows:—

Var. *a. genuinum*, Hack.; joints and pedicels diverging at the base, spikelets continuous with the callus, gl. IV of pedicelled spikelets usually awned.—1, *prorepens*, stem creeping, branches erect, gl. I not scrobiculate; 2, *scrobiculatum*, habit of *a*, spikelets smaller, gl. I scrobiculate.—3, *malacophyllum*, tall, gl. I broadly winged at the tip, keel of II ciliate.—4, *villosum*; leaves and sheaths villous.

Var. *β. Wallichii*, Hack.; tall, joints and pedicels not divergent at the base, sessile spikelet suddenly constricted at the long bearded callus, gl. IV of pedicelled spikelet imperfectly awned.

Var. *γ. longipilum*, Hack.; joint and pedicels as in *β*. Spikelets glabrous with a long bearded callus, pedicelled spikelet long-awned.

17. **I. heterotrichum**, Hack. *Monogr. Androp.* 220; stem prostrate then ascending, leaves linear-lanceolate from a rounded base, spikes 2 stout erect, gl. I of sessile spikelet rhombic-lanceolate upper part triangular acute dorsally smooth glabrous 4-nerved tip membranous 2-toothed keels broadly winged, II subcoriaceous keel winged above, III ovate 3-nerved, IV shorter broadly oblong shortly 2-toothed awned in the notch. ?*Andropogon comorensis*, *Steud. Syn. Gram.* 431.

NICOBAR ISLANDS., *Jelinek*.—DISTRIB. Madagascar, Seychelles.

Stem about 20 in. high, slender, compressed, quite glabrous. *Leaves* 2–6 by ½–1½ in., glabrous or base fimbriate, margins undulate, scabrid, base contracted at the junction with the compressed loose keeled sheath; ligule very short, truncate, ciliate. *Spikes* 2–2½ in., erect, compressed, joints and pedicels half as long as the spikelet, bearded. *Sessile spikelet* ½ in.; callus bearded at the base; gl. I tip membranous 2-toothed, 4-nerved above, margins involute below the middle; II mucronulate, margins ciliolate; III shorter, chartaceous, ovate, acuminate, 3-nerved ciliate, paleate; IV short, ciliolate, awn more or less imperfect confluent with the gl. *Pedicelled spikelets* ½ in., gl. I winged from below the middle upwards, 7-nerved glabrous.—Descript. from Hackel. In a Seychelle Isld. specimen which I have examined the keel of gl. II is not dorsally winged, and gl. IV is hyaline 5-nerved with lanceolate acuminate ciliate lobes.

†† *Keel of gl. II. not winged (or winged in I. murinum).*

18. *I. murinum*, Forst. Fl. Ins. Austr. Prodr. 73; slender, erect or prostrate below, much branched, leaves narrowly linear, spikes 2-3 slender villous, gl. I of sessile spikelets oblong acuminate 2-cuspidate or 2-mucronate faintly 5-7-nerved, keels rounded not winged, II long-beaked awned, IV cleft to the middle, awn long stout inserted between the large ciliate lobes. *Kunth Enum. Pl. i. 571, Suppl. 419*; *Hack. Monogr. Androp. 223*. *Andropogon murinus*, *Steud. Syn. Gram. 377*.—*Spodiopogon*, sp. 9, *Herb. Ind. Or. Hook. f. & T.*

MYSORE or the CARNATIC, *G. Thomson*.—DISTRB. Tanna Isld. (New Caledonia).

Stems 1-2 ft., very slender, erect or prostrate and geniculate at the base, branching upwards; nodes bearded. *Leaves* 2-4 by $\frac{1}{2}$ - $\frac{1}{4}$ in., sessile, flaccid, setaceous acuminate, narrowed to the rounded base, midrib vanishing upwards; sheath scaberulous; ligule oblong, membranous. *Spikes* 1-1 $\frac{1}{2}$ in., often sheathed by the upper leaves, drying red-brown; joints and pedicels = $\frac{1}{2}$ spikelet, rather slender, trigonous, long-ciliate, tops 3-toothed concave. *Sessile spikelets* $\frac{1}{2}$ in., red-brown; callus long, stout, unilaterally stiffly bearded; gl. I dorsally polished, sparsely ciliate with long stiff hairs above the middle, margins ventricosely incurved below the middle; II longer than I, inserted below it on the callus, dorsally convex, faintly 3-nerved, beak 2-toothed with a long or short very slender awn, keel above shortly winged or not; III male, oblong-lanceolate, acute, 1-nerved, margins incurved; palea as long 2-nerved, nerves convergent in the tip scaberulous with broad hyaline wings, IV = II, female, glabrous, awn dilating at its insertion into a semilunar ridge; palea as long as the gl., ovate, lanceolate, 2-nerved at the base. *Styles* very long, stigmas short. *Pedicelled spikelets* nearly as the sessile.—This species is contained in an extensive Herbarium formed by G. Thomson, Esq. (brother of the late Superintendent of the Calcutta Botanical Gardens). The flowers in each spikelet are strictly unisexual.

19. *I. hirtum*, Hack. Monogr. Androp. 228; stout, suberect, leaves long, spikes few or many, gl. I of sessile spikelet lanceolate acuminate or 2-cuspidate 6-9-nerved villous above or glabrate, II aristulate dorsally rounded, IV oblong acutely 2-lobed ciliate awned in the cleft. *I. rivale*, *Hack. l. c.* *Spodiopogon rivalis*, *Thw. mss.*

BENGAL, BEHAR and the KHASIA HILLS, alt. 4-6000 ft. CHOTA NAGPORE and CENTRAL INDIA. NILGHIRI HILLS, alt. 5000 ft. CEYLON; Mateke East, *Beckett*.

Stem 2-3 ft., nodes glabrous or sparsely bearded. *Leaves* 4-8 by $\frac{1}{2}$ -1 in., finely acuminate, base narrowed or rounded, glabrous or sheath sparsely hairy; ligule short, ciliate. *Spikes* 2-20, 1-4 in., joints and pedicels subequal, rather slender, trigonous, ciliate. *Spikelets* $\frac{3}{4}$ - $\frac{1}{2}$ in.; callus long-bearded; gl. I more or less herbaceous, 6-9-nerved above the middle, margins broadly incurved below; II inserted below I on the callus, sometimes 2-dentate, 3-5-nerved, villous or glabrate; III oblong-lanceolate, acuminate, faintly 3-nerved, ciliate, paleate, male or neuter; palea oblong, centre chartaceous with hyaline ciliate wings; IV ciliate; awn very slender, $\frac{1}{2}$ - $\frac{1}{4}$ in., confluent with the gl., base semilunar; palea as long as the gl. *Pedicelled spikelets* gl. I awned, narrowly winged or not.—The Nilghiri plant is a very tall stout form, with long leaves, and a corymbiform fascicle of more than 20 spikes, its gl. IV is more deeply cleft, and the awn is not produced downwards in the body of the gl.

Hackel, who was not aware how widely spread and variable a species it is, keeps *I. hirtum* and *rivale* as distinct species, thus distinguished:—*I. hirtum*, leaves hirsute on both surfaces, spikes 2-3, gl. I of sessile spikelet entirely chartaceo-herbaceous with 7-9 percurrent nerves, densely hirsute in the upper half.—Khasia Hills. *I.*

rivale, leaves quite glabrous, spikes about 4, gl. I. chartaceous 6-7-nerved in the upper glabrous with the margins sparsely hairy.—Ceylon.

20. **I. timorense**, *Kunth Revis. Gram.* i. 369, t. 98, *Enum. Pl.* i. 512, *Suppl.* 419; slender, decumbent below, leaves sessile and petioled, spikes 2-3 sparingly villous, gl. I ovate or ovate-lanceolate acuminate bicuspidate 5-9-nerved base ventricose, II longer acuminate or aristulate dorsally rounded, IV short 2-lobed awn in the cleft very slender. *Hack. Monogr. Androp.* 229; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 198. I. *tenellum*, *Roxb. Fl. Ind.* i. 323. *Spodiopogon Blumii*, *Nees ex Steud. Syn. Gram.* 373. *Andropogon Asthenos*, *Steud. l. c.* A. *timorensis*, *Steud. l. c.* 376.—*Ischæmum* n. 4, *Griff. Notul.* 91, *l. c.* *Pl. Asiat.* t. 148, f. 1.—*Spodiopogon*, *Wall. Cat.* n. 8863.

BENGAL, *Roxburgh*, *SILHET*, *Clarke*. CHITTAGONG, *J. D. H. & T. T.* BURMA, *Wallich*. CANARA and the CENTRAL PROVINCES, *Duthie*, &c. MALAYAN PENINSULA. CEYLON, *Thwaites* (C.P. 963, 3168).—DISTRIB. Malay and Pacific Islds.

Stem 6-18 in., branched and straggling, nodes glabrous or sparingly bearded. *Leaves* 1-4 in., linear-lanceolate, acuminate, glabrous or sparsely hairy, base of upper rounded, of lower narrowed; sheath lax, mouth hairy; ligule obscure. *Spikes* 1-2 in., rather slender; joints and pedicels about half as long as the spikelet, nearly equal, shortly ciliate. *Sessile spikelets* $\frac{1}{10}$ — $\frac{1}{8}$ in., greenish, or with green nerves; callus narrow, long-bearded; gl. I margins broadly involute below, subauricled, dorsally convex, polished, nerves strong; II recurved, 3-5-nerved, tip 2-toothed, dorsally usually ciliate; III lanceolate, paleate, palea linear-oblong; IV glabrous, awn very slender shortly exerted. *Pedicelled spikelets* like the sessile, awned.—A very variable plant, in the form of the leaves especially. Hackel gives four varieties founded on inconstant characters of the leaves and length of the awn. I have little doubt that *I. tenellum*, *Roxb.*, is *I. timorense*. Hackel doubtfully refers it to *ciliare*, of which it has none of the marked characters.

Sect. II. SEHIMA (Forsk. Gen.). *Spikes* solitary. Gl. I of sessile spikelet deeply channelled or depressed along the median line (except *I. notatum*).

21. **I. laxum**, *Br. Prodr.* 205; perennial, leaves linear scaberulous base narrowed, gl. I of sessile spikelet linear-oblong glabrous 2-cuspidate with a broad membranous translucent depression bounded by two strong flexuous submarginal nerves, nodose in the upper half, II awned, IV 2-fid awned between the lanceolate ciliate lobes, *Hack. Monogr. Androp.* 243; *Trim. Cat. Ceyl. Pl.* 107; *Duthie Fodd. Grass. N.W. Ind.* 31, t. 58; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 199; *Benth. Fl. Austral.* vii. 522. I. *insculptum*, *Hochst. in Flora* (1844) 247; *A. Rich. Tent. Fl. Abyss.* ii. 472. I. *macrostachyum*, *Hochst. ex A. Rich. l. c.* I. *montanum*, *Herb. Russ. ex Wall. Cat.* n. 8818 A. I. *nervosum*, *Thw. Enum. Pl. Zeyl.* 365. I. *Sehima*, *Spreng. Syst. Veg.* i. 298. *Hologamium nervosum*, *Nees in Edinb. N. Phil. Journ.* xviii. (1835) 185; *Wight Cat.* n. 1689. *Sehima ischæmoides*, *Forsk. Fl. Æg. Arab.* 178. S. *Kotschy*, *Hochst. l. c.* S. *macrostachyum*, *Hochst. in Schimp. Pl. Abyss.* n. 1705. *Pollinia striata*, *Spreng. Pugill.* ii. 12. *Andropogon Brownii*, *Kunth Revis. Gram.* i. 163. A. *lineatus*, *Robertianus*, *Sehima & taczensis*, *Steud. l. c.* 369. A. *macrostachyus & insculptus*, *Adhams in Schweinf. Beitr. Fl. Æthiop.* 310. A. *nervosus*, *Rottl. in Ges. Naturf. Fr. N. Schrift.* iv. (1863) 218; *Steud. l. c.* A. *striatus*, *Klein ex Willd. Sp. Pl.* iv. 903; *Br. Prodr.* 201; *Spreng. l. c.* 298. A. *schangulensis*, *Rupr. in Kotschy Hist. Æthiop.* n. 581; *Steud. l. c.* 369.—*Andropogon*, *Wall. Cat.* n. 8818.

RAJPOOTANA and the CENTRAL PROVINCES, *Duthie*. The DECCAN, *Heyne*, &c. BURMA, *Wallich*, &c. CEYLON, *Thwaites*.—DISTRIB. eastwd. to Australia, and westwd. to the Cape Verd Islds.

Stems 2-3 ft., tufted on a short stout creeping rootstock, stout or slender, nodes glabrous. *Leaves* 6-10 in., glaucous, tips filiform, nerves strong; sheath ribbed glabrous or hairy; ligule of silky hairs. *Spikes* 2-5 in., erect, pale, joints rather coherent; pedicels rather slender, compressed, 2-angled, ciliate, about half as long as the sessile spikelet. *Sessile spikelets* $\frac{1}{3}$ - $\frac{1}{4}$ in., callus shortly bearded; gl. I narrow, nearly flat, nerves very strong especially upwards, those between the lateral irregular in position and length, often anastomosing, margins narrowly incurved; II elliptic, 2-toothed, keel narrowly winged below the slender awn; III linear-oblong or lanceolate, acute, ciliate, palea as long glabrous 2-nerved; IV = $\frac{1}{2}$ III, oblong, 3-nerved, ciliate; awn $1\frac{1}{4}$ -2 in., column stout; palea = the gl., linear-lanceolate, 2-nerved, ciliate. *Pedicelled spikelets*; gl. I ovate-lanceolate, 2-cuspidate, green or purplish, keels narrowly margined, nerves 5-7 very strong scaberulous, lateral pairs close to the margin; II lanceolate, 3-nerved, acuminate; IV awnless.

22. ***I. sulcatum***, *Hack. Monogr. Androp.* 248; stem simple or branched from the base, leaves linear or lanceolate scaberulous, base rounded or subcordate, gl. I of sessile spikelet narrowly linear-lanceolate glabrous, tip acuminate 3-cuspidate dorsally convex with a narrow deep median channel margins incurved, nerves obscure, II linear-lanceolate 2-cuspidate awned, IV 2-fid awned between the lobes.

The CONCAN, DECCAN and CENTRAL PROVINCES, &c.

Stems 8-18 in., usually much branched with many solitary terminal spikes, slender, glabrous, nodes glabrous, peduncles very slender. *Leaves* 2-10 in., glaucous, scaberulous above, setaceously acuminate, strongly nerved; sheath slender, smooth; ligule a ciliate membrane. *Spikes* 2-3 in., strict or curved, green; joints and pedicels = $\frac{1}{2}$ the lower spikelet, slender, ciliate, tips obliquely truncate. *Sessile spikelets* $\frac{1}{2}$ in.; callus short, bearded; gl. I scaberulous, tip setiform, keel narrowly margined or winged towards the tip on one side, or simply scaberulous, nerves 2 on each side the furrow; II chartaceous, keel scabrid and margins ciliate above the middle, awn capillary; III = $\frac{2}{3}$ I, hyaline, acute, paleate, ciliate, palea as long truncate; IV linear-oblong, 3-nerved; awn $\frac{3}{4}$ -1 $\frac{1}{4}$ in., column stout, brown; palea = the gl. 2-nerved. *Pedicelled spikelets* smaller than the sessile, neuter, awnless; gl. I lanceolate, 2-cuspidate, 7-nerved, not channelled, margins incurved, keels margined or winged; II not awned; III as in the sessile spikelet; IV acute not awned.—Varies greatly in habit from a single ascending stem with one spike to a copiously branched one with many spikes. Hackel describes gl. IV of the sessile spikelet as narrowed into the awn, not 2-fid as I find it.

23. ***I. ramosissimum***, *Hack. Monogr. Androp.* 249; stem erect excessively paniculately branched, spikes short in leafy panicles glabrescent, gl. I of sessile spikelet linear-oblong very obtuse emarginate 8-10-nerved deeply channelled between the median nerves margins involute not keeled aculeolately ciliate above, II obtuse mucronulate 5-nerved keel scabrid above with a pencil of hairs, III linear obtuse 3-nerved ciliate paleate, IV = II narrowly linear 1-nerved glabrous narrowed into a stout awn.

E. INDIES? *Huegel*.

Stem 3-4 ft. *Leaves* linear-lanceolate, glaucous, glabrous, margins scabrid; ligule chartaceous, truncate. *Spikes* 1-1 $\frac{1}{2}$ in., straw-colrd., joints linear, compressed, shortly rigidly ciliate, tips excised. *Sessile spikelets* $\frac{1}{2}$ in. *Pedicelled spikelets* $\frac{1}{2}$ - $\frac{3}{4}$ in., linear-lanceolate; gl. I flat acuminate many-nerved; II linear, obtuse, 5-nerved; IV awnless.—The two lowest pair of spikelets are imperfect and awnless. I know nothing of this plant.

24. *I. spathiflorum*, Hook. f.; tall, stout, much branched above, spikes enclosed in long narrow spathes very slender, joints and pedice's long, sessile spikelets $\frac{3}{4}$ in. narrowly linear-lanceolate, gl. I of sessile spikelet dorsally deeply channelled densely silky villous to above the middle, keels rounded scabrid above, II truncate and mucronulate, IV linear-oblong, awn slender inserted between 2 subulate teeth. *Trachypogon fasciculatus*, *Munro mss.*

BOMBAY; hills of Salsette Isld. in stony places, *Jacquemont* (n. 797).

Stem 3-4 ft., as thick as a goose-quill below, leafy above, branches erect, nodes glabrous. *Leaves* 12-18 by $\frac{3}{4}$ in., finely acuminate, narrowed from the middle to the base, almost petioled, thin, sparsely hairy above and beneath, margins smooth, midrib stout pale, nerves obscure; sheath of lower 6 in. and upwards, terete, quite glabrous, of upper passing into compressed lanceolate flg. spathes 3-4 in. long, which alternate in very slender axillary branchlets, the lower with leafy tips; ligule short, scarious. *Spikes* about 2 in. long, more or less exserted from the spathes, very slender, pale straw-colrd.; joints and pedicels more than half as long as the sessile spikelet, compressed, one angle ciliate. *Gl. I* of sessile spikelet white with silky hairs, thinly coriaceous, nerveless, dorsal channel slender transparent forming a ridge ventrally, margins equally involute from base to 2-fid or truncate 2-cuspidate tip; callus very short, bearded; II chartaceous, dorsally convex, nerveless but with a nerve-like fold towards the ciliate margin, keel with long cilia above the middle, scabrid towards the emarginate tip; III shorter, hyaline, oblong-lanceolate, obtuse, 3-nerved, margin above with reflexed hairs; palea lanceolate, 2-nerved, anthers imperfect; IV as long as III, linear, 3-nerved; awn $1\frac{1}{2}$ in., yellow, rather testaceous, palea 0. *Pedicelled spikelets* longer, $\frac{1}{2}$ in.; gl. I dorsally convex (not sulcate), shortly silky, narrowed into a long bisetose glabrous awn.—A very curious species, of which the materials are in rather a young state; it should form a section by itself of *Sehima* were that genus to be restored.

25. *I. notatum*, Hack. Monogr. Androp. 246; stems tall tufted, leaves linear narrowed from the base upwards, rigid substrigose, spikes rather stout fragile, gl. I of sessile spikelets oblong, gl. I ovate-oblong glabrous, tip membranous 2-cuspidate dorsally flat with 2 carinal nerves and 2-3 intermediate short green anastomosing ones, keels margined or winged, II 3-nerved shortly awned, IV shorter oblong 2-fid ciliate awned in the cleft.

WESTERN HIMALAYA, alt. 4-7000 ft., from Chamba, *Thomson*, to Kumaon, *Strachey & Winterbottom*.

Stem erect, naked or pubescent below the spike, nodes glabrous. *Leaves* 6-10 by $\frac{1}{2}$ - $\frac{3}{4}$ in., setaceous acuminate, green or hoary; sheath bearded at the tip; ligule of long hairs. *Spikes* 3-8 in., strict or curved, fragile, puberulous; joints and pedicels subclavate, half as long as the sessile spikelet, villously ciliate, tips obliquely truncate. *Sessile spikelets* $\frac{1}{2}$ in., callus short bearded; gl. I obliquely ovate-oblong, tip membranous, margins very narrowly inflexed, keels one or both narrowly winged; II chartaceous, entire, 3-nerved, keeled and narrowly winged in the upper third; III oblong, obtuse, ciliate, 2-nerved, palea 2-nerved eciliate; IV 3-nerved, awn $\frac{3}{4}$ -1 in.; palea linear-lanceolate. *Pedicelled spikelet*, gl. I lanceolate, acuminate, 2-cuspidate, 7-9-nerved; II lanceolate, acute, glabrous; III as in the sessile; IV awnless.

Sect. III. Spikes few or many, subracemose. *Gl. I* of sessile spikelet deeply or obscurely channelled along the mesian line.

26. *I. petiolare*, Hack. Monogr. Androp. 238; tall, stout, leaves long narrowed at the base or petioled, spikes many subpaniculately fascicled, gl. I linear-oblong keels narrowly winged towards the 2-toothed truncate tip dorsally deeply channelled, II cymbiform acuminate or mucronate, IV

cleft to below the middle, awn very short inserted in the cleft. ? *Lisboa* in *Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 198. *Spodiopogon petiolaris*, Trin. in *Mem. Acad. Petersb. Ser.* vi. ii. (1833) 301. S. Lehmanni, Griseb. in *Goetting. Nachr.* (1868) 91. *Pollinia* Lehmanni, Wight & Arn. ex Nees *Pl. Meyer*, 186; *Duthie Grass. N.W. Ind.* 16. *Andropogon petiolaris*, Steud. *Syn. Gram.* 398. ? *A. petiolatus*, Dalz. & Gibs. *Bomb. Fl.* 303.—Wall. *Cat.* 8807 A.

SUBTROPICAL HIMALAYA, alt. 5-8000 ft., from Garwhāl to Nepal. KHASIA HILLS, alt. 4-5000 ft. ? The CONCAN, Dalzell, *Lisboa*. BURMA; Karen Hills, Kurz.

Stem 2-3 ft., simple or branched, pubescent below the spikes; nodes pubescent. *Leaves* 8-12 by $\frac{3}{4}$ - $1\frac{1}{4}$ in., setaceously acuminate, more or less hairy, margins scabrid; sheath glabrous or margins ciliate; ligule stiff, oblong, truncate. *Spikes* 8-20, $\frac{1}{2}$ - $1\frac{1}{2}$ in., simple or divided, rachis glabrous, axils bearded; joints and pedicels flattened, subtrigonus, about as long as the spikelets, shortly ciliate. *Spikelets* $\frac{1}{2}$ - $\frac{1}{2}$ in., oblong-lanceolate, pale greenish; callus minute, shortly bearded; gl. I chartaceous, 6-8-nerved to the tip, margins rather broadly inflexed from base to tip; keels scabridly ciliate; II chartaceous, keel scabrid, 3-nerved; III = I, oblong, obtuse, hyaline, ciliate, 3-nerved, paleate, male, palea oblong-lanceolate 2-nerved ciliate; IV = $\frac{1}{2}$ III, glabrous, 3-nerved, lobes acute, awn $\frac{1}{4}$ - $\frac{1}{2}$ in.; palea = the gl., lanceolate, 2-nerved, glabrous. *Pedicelled spikelet* like the sessile, but gl. I hardly channelled; III epaleate; IV male.—As Hackel remarks, this has the habit of a *Pollinia* sect. *Leptatherum* (where I should have been disposed to place it) with the spikelets more of an *Ischænum*. I have seen no Concan specimen.

27. **I. robustum**, Hook. f.; tall, stout, leaves long narrow coriaceous softly tomentose on both surfaces, spikes few racemed strict erect, joints very stout obliquely truncate lower minutely puberulous, sessile spikelets $\frac{1}{2}$ - $\frac{3}{4}$ in. ovate- or oblong-lanceolate acute coriaceous awnless dorsally flat quite glabrous with 6-9 broad low nerves, keels scabrid above the middle, II coriaceous 7-9-nerved, III 3-nerved paleate male, IV oblong apiculate awnless.

N.W. HIMALAYA; "Pauni, in Bursahir, alt. 7000 ft.," Brandis (*Herb. Calcutt.*).

Stem several feet high from a hard rootstock, hard, solid, nearly as thick as a goose-quill, naked below. *Leaves* 12-18 by $\frac{1}{2}$ - $\frac{3}{4}$ in., narrowed from the base to the long acuminate tip, sides incurved scaberulous, midrib very stout; sheath long, finely pubescent; ligule a brush of long hairs. *Spikes* 4-5 in., lower stipitate; peduncle stout, glabrous; joints $\frac{1}{2}$ shorter than the spikelets, dorsally rounded, ventrally deeply concave. *Sessile spikelets* quite glabrous, appressed to the rachis, upper in the spike smaller than the lower; callus very short, stout; gl. I sometimes channelled in the middle, very variable in the number and position of the rib-like nerves, tip minutely toothed, margins narrowly incurved; II as long as I, eciliate; III shorter, male; palea, ovate-lanceolate, 2-nerved, eciliate; IV as long as III, rigidly membranous, 3-nerved; palea nearly as long, 2-nerved, both eciliate. *Pedicelled spikelet* $\frac{1}{2}$ smaller than the sessile; gl. I oblong-lanceolate, acuminate, other gls. and palea as in the sessile, but both fig.—Very unlike any other N. Indian species.

DOUBTFUL SPECIES.

I. COROLLATUM, Nees ex Steud. *Syn. Gram.* 369; *Duthie Grass. N.W. Ind.* 18; *Hack. Monogr. Androp.* 252. *Andropogon corollatus*, Steud. l.c.—Mussoorie, Royle.

I. HUGELII, Hack. *Monogr. Androp.* 252; annual, glabrous, decumbent and branched below, leaves 1-12 by $\frac{1}{4}$ in. flat flaccid, upper sessile cordate-lanceolate, lower shortly petioled, spike solitary $1\frac{1}{2}$ -2 in. rather stout, joints clavate dorsally convex, gl. I of sessile spikelets oblong obtuse coriaceous below with often interrupted ridges about the middle glabrous or dorsally ciliate, margins narrowly inflexed scabrid, II ovate deeply keeled, III oblong hyaline glabrous paleate, IV linear-

lanceolate acute 1-nerved awnless glabrous, palea as long as the gl. *Pedicelled spikelet* awnless, pedicel very short; gl. I linear-lanceolate, flat, acuminate many-nerved.—The Panjab, at Busahir, *Huegel*.—Hackel describes this as very like *I. semisagittatum*, and makes of it a subgenus of *Ischæmum*, characterized by the solitary spike, stout joints, and awnless spikelets, closely connecting *Ischæmum* with *Rottboellia*.

I. LONGISPICATUM, *Munro ex Duthie Grass. N.W. Ind.* 18, name only.

*38. EREMOCHLOA, *Buse*.

Perennial grasses. *Leaves* more or less equitant, rigid. *Spikelets* 1-fl., flat, secund, solitary, sessile at each internode of a terminal narrow compressed spike, with a rudimentary pedicelled. *Glumes* 4, I nearly flat, oblong, smooth, coriaceous, not awned, margins pectinate; II ovate-lanceolate, acuminate, chartaceous, 3-nerved; III hyaline, oblong, obtuse, paleate, male; IV smaller, hyaline, oblong, obtuse, 1-nerved, fem. or bisexual; palea oblong-lanceolate. *Lodicules* obliquely truncate. *Stamens* 3, anthers long. *Stigmas* short, feathery.—Species 8, E. Asia and Australia.

1. *E. muricata*, *Hack. Monogr. Androp.* 262; gl. I broadly ovate-oblong with 2 fan-shaped terminal wings. *Ægilops ciliaris*, *Koen. in Neue Schrift. Ges. Nat. Berl.* iv. (1810) 210; *Roem. & Sch. Syst.* ii. 772; *Griff. Notul.* iii. 110, *Ic. Pl. Asiat.* t. 158 (excl. 4 upper left-hand figs.). *Æ. muricata*, *Retz. Obs.* ii. 27. *Ischæmum pectinatum*, *Trin. in Mem. Acad. Petersb. Ser.* vi. ii. (1833) 296; *Wall. Cat.* n. 8847; *Thwaites Enum. Pl. Zeyl.* 436; *Trim. Cat. Ceyl. Pl.* 107. I. ciliare, *Nees in Herb. Wight.* n. 1717 (not of *Wight Cat.*). *Andropogon pectinatus*, *Steud. Syn. Gram.* 369. *Rottboellia muricata*, *Retz. l. c.* iii. 12.

SOUTH DECCAN PENINSULA, *Koenig, &c.* CEYLON; Trincomalee, *Glenie*.—DISTRIB. Australia.

Quite glabrous. *Stem* 6–18 in., compressed. *Leaves* 3–6 by $\frac{1}{2}$ – $\frac{1}{4}$ in., tips rounded apiculate. *Spike* 2–5 in., linear; rachis glabrous, brittle, not excavated. *Spikelets* $\frac{1}{2}$ in.; gl. I nearly orbicular, dorsally slightly convex, many-nerved, wings crenate; spines very many, upcurved, nearly as long as the gl. is broad. *Pedicelled spikelet* a single lanceolate acuminate coriaceous nerved gl. with thin indexed margins.

2. *E. bimaculata*, *Hack. Monogr. Androp.* 265; gl. I elliptic subacute with 2 small low rounded terminal wings, spines shorter than the gl. is broad. *Ischæmum pectinatum*, *Benth. Fl. Austral.* vii. 521.

UPPER BUENIA; near the Serpentine Mines, *Griffith*.—DISTRIB. Australia.

Habit, &c. of *E. muricata*, but leaves much narrower, narrowed at the obtuse tip; spikes more slender; spikelets much narrower, with fewer nerves and shorter spines, callus puberulous.

3. *E. zeylanica*, *Hack. Monogr. Androp.* 263; gl. I elliptic obscurely winged at the subacute tip, spines longer than the gl. is broad. *Trim. Cat. Ceyl. Pl.* 107. *Ischæmum pectinatum*, *Wight Cat.* n. 1717. I. falcatum, *Thw. Enum. Pl. Zeyl.* 436.

CEYLON, *Walker, Thwaites* (C.P. 3327). ? DECCAN PENINSULA, *Wight*.

Habit, size of spikelets, &c. as in *bimaculata*, of which it is probably only a variety, differing chiefly in the long spines of gl. I and glabrous callus.

4. *E. leersoides*, *Hack. Monogr. Androp.* 264; gl. I narrowly oblong acute, spines suberect longer than the gl. is broad. *Ischæmum leersoides*, *Munro in Proc. Amer. Acad.* iv. (1864-5) 363; *Benth. Fl. Hongk.* 425.

PEGU, Kurz.—DISTRIB. China, Tonkin.

Very near *E. zeylanica*, but gl. I is smaller and narrower with the long spines of *E. muricata*.

5. **E. Helferi**, Munro ex Hack. *Monogr. Androp.* 266; gl. I broadly ovate subacute, spines longer than the gl. is broad, upper spikelet a scabrid pedicelled bristle. *E. ciliatifolia*, Hack. l. c.

TENASSERIM, Griffith, *Helper*.

Leaves 4-6 by $\frac{1}{4}$ - $\frac{1}{2}$ in. (broader than in the other species), flat, ciliate, tip rounded. *Spike* 1-1 $\frac{1}{2}$ in. *Spikelets* $\frac{1}{2}$ in.; gl. I 5-nerved, nerves anastomosing above.

39. **POGONATHERUM**, Beauv.

Delicate annual or perennial grasses with capillary peduncles. *Leaves* erect. *Spikelets* 1-2-fl., binate (usually a sessile bisexual and pedicelled fem.) imbricate on the fragile rachis of a solitary terminal capillary spike, 2-awned; awns capillary, often interlaced. *Glumes* 4, membranous; I oblong, concave, tip truncate or rounded, long ciliate; II as long as I or rather longer, tip acute or 2-toothed, awn terminal; III (in the upper spikelet 0) hyaline, paleate, male; IV hyaline, narrow, 2-fid, long-awned, palea oblong glabrous. *Lodicules* 0. *Stamens* 1 or 2, anthers long. *Stigmas* slender. *Grain* oblong, free.

The following three species are probably forms of one, being united by many intermediates; they are however for the most part readily distinguishable in India.

1. **P. saccharoideum**, Beauv. *Agrost.* 56, t. 11, f. 7; spikelets $\frac{1}{10}$ - $\frac{1}{8}$ in., gl. I truncate retuse or tip rounded, II ciliate above the middle, stamens 2 rarely 1. *Thw. Enum. Pl. Zeyl.* 365; *Trim. Cat. Ceyl. Pl.* 107; *Duthie Grass. N.W. Ind.* 16, *Fodd. Grass. N. Ind.* 27. *P. saccharoideum*, a. genuinum, Hack. *Monogr. Androp.* 193. *P. polystachyum*, Roem. & Sch. *Syst.* ii. 497; *Wight Cat. n.* 1679; *Wall. Cat. n.* 8844. *Pollinia polystachya*, Spreng. *Syst.* i. 288; *Kunth Revis. Gram.* 493, t. 162. *Perotis polystachya*, Willd. *Sp. Pl.* i. 324. *Saccharum paniceum*, Lamk. *Encycl.* i. 595, *Illust.* t. 40, f. 31.

Throughout the hilly parts of India, in dry places, from the PANJAB eastward to BHOTAN, MANIPUR and BURMA, ascending the Himalaya to 4000 ft., and southward to CENTRAL INDIA and CEYLON.—DISTRIB. China, Malaya.

Stem 6-18 in. usually densely tufted, nodes glabrous or bearded. *Leaves* 1-3 in. *Spikes* $\frac{1}{2}$ -1 in. *Hairs of callus* shorter than the spikelet.

2. **P. crinitum**, Trin. *Fund. Agrost.* 166; spikelets $\frac{1}{14}$ - $\frac{1}{12}$ in., gl. I truncate, II glabrous or nearly so, stamens 1 rarely 2. *Kunth Enum. Pl.* i. 478, *Suppl.* 380, *Aitchis. Cat. Panjab. Pl.* 173, *Franch. & Sav. Enum. Pl. Jap.* ii. 189 (excl. cit. Beauv.). *P. saccharoideum*, var. β . monandrum, Hack. *Monogr. Androp.* 193. *P. polystachyum*, Kunth *Revis. Gram.* 493 (in part) t. 161. *P. refractum*, Nees in Hook. & Arn. *Bot. Beech. Voy.* 239; in Pl. Meyen. 182. *Pollinia monandra*, Spreng. *Syst.* i. 288. *Pogonopsis tenera*, Presl *Rel. Hænk.* i. 133, t. 46. *Homoplitis crinita*, Trin. *Fund. Agrost.* 166. *Ischæmum crinitum*, Trin. in *Mem. Acad. Petersb. Ser.* vi. ii. (1833) 298. *Andropogon crinitus*, Thunb. *Fl. Jap.* 40, t. 7. *A. monandrus*, Roxb. *Fl. Ind.* i. 260; *Steud. l. c.* 368.—*Pogonatherum*, Griff. *Notul.* iii. 81, *l. c. Pl. Asiat.* t. 145, f. 2.

Throughout INDIA, extending to the Malay Peninsula, usually at lower elevations and in hotter places than *P. saccharoideum*.—DISTRIB. Affghan, China, Malaya, N. Hebrides.

A different looking plant from the common form of *P. saccharoideum*, with paler more flexuous squarrose awns, much smaller spikelets, and the hairs of the callus longer than the callus, but intermediates occur, and I could have followed Hackel in uniting them had he included the following.

3. ***P. rufo-barbatum***, Griff. *Notul.* iii. 81, *Ic. Pl. Asiat.* t. 145, f. 11; spikelets $\frac{3}{8}$ – $\frac{1}{4}$ in., gl. I broadly 2-lobed. III villous above the middle, IV and its palea ciliate, stamens 2. *Hack. Monogr. Androp.* 193. *P. majus*, Griseb. in *Goett. Nachr.* (1868) 92.

KHASIA HILLS; by streams, alt. 3–5000 ft., Griffith, &c.

Stem 10–24 in.; nodes glabrous. *Leaves* 2–4 in., sometimes $\frac{1}{2}$ in. broad. *Spikes* 1–2 $\frac{1}{2}$ in.; hairs of callus shorter than the spikelet; gl. I, 2-lobed but hardly 2-auricled (as described by Hackel).—Only, I think, a large form of *saccharoideum* growing in wet places.

40. **APOCOPIS**, Nees.

Annual or perennial grasses. *Leaves* short. *Spikelets* 2-fld. (lower fl. bisexual, upper fem.) solitary or the upper reduced to a pedicel, distichously imbricate on solitary or digitate articulate spikes, dorsally compressed. *Glumes* 4, I broad, cuneiform, coriaceous, many-nerved, tip rounded ciliate; II thinner, truncate, 2-keeled; III narrow, hyaline, paleate; IV hyaline, entire or 2-fld, awned or reduced to an awn dilated at the base; palea very short, convolute, truncate, tip ciliate, or 0. *Lodicules* 0. *Stamens* 2–3. *Styles* very short, stigmas long. *Grain* terete, free.—Species 3–4, Eastern Asiatic.

1. ***A. Royleanus***, Nees in *Proc. Linn. Soc.* i. (1894), *et in Ann. & Mag. Nat. Hist.* vii. (1841) 220; perennial, gl. IV oblong 2-fld, awn short or 0. *Hack. Monogr. Androp.* 257; *Duthie Grass. N.W. Ind.* 16. *Ischæmum paleaceum*, Trin. in *Mem. Acad. Petersb. Ser.* 6, ii. (1833) 293; *Sp. Gram.* Ic. t. 333. *Andropogon paleaceus* & *himalayensis*, Steud. *Syn. Gram.* i. 376, 377. *Ischæmum denticulatum*, *Herb. Ham. ex Wall. Cat.* n. 8857.—*Wall. Cat.* n. 8843.

SUBTROPICAL HIMALAYA; alt. 3–4000 ft., from Kumaon to Bhotan. KHASIA HILLS, alt. 4000 ft. MUNNEPORE, alt. 4–5000 ft., Watt.—DISTRIB. Borneo.

Stem erect, 10–24 in., usually simple. *Leaves* 2–4 in., narrowly lanceolate, acuminate, and sheaths glabrous or softly hairy. *Peduncle* long, slender; spikes 1–2, rarely 3, erect, 1–1 $\frac{1}{2}$ in.; rachis rusty-villous, brittle. *Spikelets* about $\frac{1}{2}$ in., much longer than the joints; gl. I truncate, dark red-brown with a broad yellow tip; IV awn very slender, included or if exerted not twice the length of the spikelet.

2. ***A. Wightii***, Nees ex Steud. *Syn. Gram.* 377; annual, gl. IV linear entire or 2-dentate, awn long. *Wight Cat.* n. 2352; *Hack. Monogr. Androp.* 258; *Thwaites Enum. Pl. Zeyl.* 365; *A. Wrightii*, Munro in *Proc. Am. Acad.* iv. 363, *et in Benth. Fl. Hongk.* 421. *A. Beckettii*, Thw. ex Trim. *Cat. Zeyl. Pl.* 107. *Amblyachyrum mangaloreense*, Hochst. ex Hohenack. *Pl. Ind. Or.* n. 231 & in *Flora*, xxxix. (1856) 26.

BEHAR, CENTRAL INDIA, throughout the DECCAN PENINSULA, BURMA, and CEYLON.

Stem tall, erect like *A. Royleanus*, or low and densely tufted. *Leaves* 1-3 in., glabrous or hairy. *Spikes* $\frac{1}{2}$ -1 $\frac{1}{2}$ in., slender or stout. *Spikelets* $\frac{1}{8}$ - $\frac{1}{2}$ in.; gl. I yellow with red-brown tips, or dark brown with yellowish tips, glabrous or clothed with red-brown shiny hairs, tips retuse ciliate with minute or long hairs; II 3-nerved or nerveless, sides sharply inflexed, angles smooth or scabrid; III nearly = I, tip ciliate; IV very narrowly oblong or almost linear, awn two to six times as long as the spikelet; palea very short and convolute.—Very variable, and doubtfully separable from *Royleanus* which is stouter with stouter spikes. Wight's original specimen (Cat. n. 2352) is 18-20 in. high, very slender, leafy upwards, with slender pale spikes, and glabrous gl. I; it strongly resembles some specimens of *Royleanus*, and is I suspect perennial. This and a var. *zeylanicus* (Wightii, Thw.) with more hairy, darker gl. I, forms Hackel's Subsp. *genuinus*. His Subsp. *mangalorensis* includes short densely tufted states, with shorter red-brown densely hairy and long-ciliate gl. I; it is the common Deccan form, and includes Thwaites' *A. Beckettii*. The difference between the narrow gl. IV of all states of *A. Wightii*, and the much broader hyaline one of *A. Royleanus*, is one of degree only.

Var. *vaginata*; spikes more or less included in the long spathiform sheaths of the uppermost leaves. *A. vaginatus*, Hack. in *Æstr. Bot. Zeitschr.* xli. (1891) 8.—Hazaribagh, Clarke.

3. *A. pallida*, Hook. f.; annual, gl. IV reduced to a slender awn.

NILGHIRI HILLS, Foulkes.

Stems slender, stiff, widely creeping and rooting, with short geniculate ascending flg. branches, 2-6 in. high. *Leaves* 1-2 in., linear, acuminate, smooth, sparsely hairy, margins thickened, subscaberulous; sheath open; ligule 0. *Spikes* $\frac{1}{2}$ -1 in. $\frac{1}{8}$ in. diam., very pale; rachis slender, ciliate. *Spikelets* $\frac{1}{10}$ in.; gl. I broadly cuneiform, ciliate with long hairs, 7-9-nerved; II oblong, obtuse, 3-nerved, lateral nerves submarginal, keels ciliate; III oblong or lanceolate, glabrous, nerveless; IV awn $\frac{1}{2}$ -1 in., brown, not dilated at the base; palea 0. *Pedicelled spikelets*, gl. I spatulate, truncate, villous, sides recurved; II as in the sessile spikelets.

41. *ARTHRAUXON*, Beauv.

Annual or perennial slender grasses. *Leaves* short, broad, deeply cordate. *Spikelets* 1-flid., solitary or with a rudimentary pedicelled second, sessile on binate digitate or fascicled jointed spikes. *Glumes* 4, I largest, usually strongly tubercled, not embracing the inner; II keeled, 3-nerved; III small, hyaline; IV shortest, lanceolate, keeled, hyaline, with usually a long dorsal or basal awn; palea minute or 0. *Lodicules* subquadrate. *Stamens* 2-3. *Styles* short or 0, stigmas long, laterally exerted. *Grain* narrowly linear.—Species 8, tropics of Old World.

Sect. I. PLEUROPLITIS. Joints of rachis of spike rectangularly truncate.

* *Stamens* 3, *anthers* large, nearly as long as gl. IV.

1. *A. lanceolatus*, Hochst. in *Flora*, xxxix. (1856) 188; spikelets linear-lanceolate, gl. I linear dorsally convex smooth margins hyaline inflexed, marginal nerves armed with very strong curved teeth. Hack. *Monogr. Androp.* 347; *Duthie Grass. N.W. Ind.* 17. *A. echinatus* & *serrulatus*, Hochst. l.c. *Batratherum echinatum*, Nees in *Edinb. Phil. Journ.* xviii. (1835) 181; *Wall. Cat. n.* 8829; *Aitchis. Cat. Panjab Pl.* 174. *B. lanceolatum*, Nees l.c.; *Wight Cat. n.* 1684. *B. serrulatum*, Hochst. ex *A. Rich. Tent. Fl. Abyss.* ii. 458. *Andropogon echinatus*, Herb. Heyne ex *Wall. Cat. n.* 8829; *Steud. Nom. Ed.* II. i. 191; *Edgew. in Journ. As. Soc.*

Beng. xxi. (1853) 182; *Duthie Grass. N.W. Ind.* 16. *A. lanceolatus*, *Roem. Fl. Ind.* i. 257; *Kunth Enum. Pl.* i. 498. *A. prionodes*, *Maxim. in Bull. Soc. Nat. Mosc.* liv. (1879) 68 (*non Steud.*). *A. serrulatus*, *Link Enum. Hort. Berol.* i. 241; *A. Rich l.c.* *Thelepogon elegans*, *Roth Nov. Sp.* 62 (*char. fals*), *ex Roem. & Sch. Syst.* ii. 788; *Wight Cat. n.* 1684.—*Batratherum*, *Wall. Cat. n.* 8830.

WESTERN HIMALAYA, alt. 5–8000 ft. from Kashmir to Nepal. Plains of the PANJAB and RAJPOOTANA. BEHAR, on Parusnath, alt. 4000 ft., *Clarke*. COROMANDEL, *Roxburgh*. SIND, *Stocks*.—DISTRIB. Abyssinia, Tonkin, China.

A tall much-branched suberect or subscandent grass 1–3 ft. high with rigid stems thicker than a crow-quill. *Leaves* very variable, from broadly ovate and $\frac{1}{2}$ –3 in. by $\frac{1}{4}$ – $1\frac{1}{2}$ in., to narrowly lanceolate and 1–4 by $\frac{1}{8}$ – $\frac{1}{2}$ in., candate-acuminate, flaccid or rigid, glabrous or hairy, margins serrulate or ciliate with stiff hairs, nerves obscure; ligule rounded. *Spikes* few or many, $\frac{1}{2}$ –2 in., rachis sparsely hairy, joints about half as long as the spikelet, margins ciliate. *Spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ in., very narrow; gl. I acute, tip hyaline 5–7-nerved, dorsally smooth or muriculate; II lanceolate, 3-nerved; III shorter, linear-oblong, acute; IV hyaline, awn about 1 in. long. *Pedicelled spikelets* linear-lanceolate, keels hispidulous; anthers perfect.—Hackel has 5 varieties and subvarieties of this species, but I fail to limit them after studying copious materials.

2. *A. rudis*, *Hochst. in Flora*, xxxix. (1856) 188; spikes few, spikelets ovoid, gl. I ovate acute convex 7-nerved, nerves above armed with a few irregular spinescent tubercles, margins hyaline narrowly incurved IV paleate. *Hack. Monogr. Androp.* 348. *Andropogon rudis*, *Steud. Syn. Gram.* 383; *Thwaites Enum. Pl. Zeyl.* 368; *Trim. Cat. Ceyl. Pl.* 107. *A. castratus*, *Griff. Notul.* iii. 89. *Batratherum rude*, *Nees ex Steud. l.c.*—*Arthraxon*, *Wall. Cat. n.* 8834, 8837.

UPPER ASSAM; Suddiya, *Griffith*. SILHET, *de Silva*. CEYLON; in the Central Province, *Thwaites* (C.P. 866).

Stem 1–2 ft., erect from a geniculate branched rooting (blood-red, *Griff.*) base, rigid, as thick as a crow-quill or less. *Leaves* 2–4 in., lanceolate, acuminate, glabrous or sparsely hairy, margins strongly ciliate. *Peduncle* long, slender, naked. *Spikes* 1, 2, or few, $\frac{1}{2}$ –1 in., peduncled; peduncle and rachis rather stout smooth, with sometimes an empty glume. *Spikelets* $\frac{1}{2}$ in. (red-brown, *Griff.*), coriaceous; gl. I 9-nerved; II 3-nerved, acute; III hyaline, oblong, ciliate, 1-nerved; IV lanceolate, ciliate, awn inserted below the middle, about twice as long as gl. II, palea linear-oblong, ciliate.—The only species in which I have seen a palea to gl. IV.

3. *A. breviaristatus*, *Hack. Monogr. Androp.* 350; spikes many, spikelets ovate-lanceolate, gl. I oblong-lanceolate subacute convex nerves 7 pair tubercled nearly to the base, II acute keel ciliate margins with deflexed cilia, awn short. *Batratherum khasianum*, *Munro mss.* *B. echinatum*, *Herb. Ind. Or. Hf. & T. (in part)*.

KHASIA HILLS, alt. 5000 ft., *Griffith, &c.*

Stems 2–4 ft., geniculately branched below, about as thick as a dove's quill. *Leaves* 1–2½ in., ovate or ovate-lanceolate, finely acuminate and sheaths glabrous or hairy. *Peduncle* long, usually naked, slender. *Spikes* 10–20; 1–3 in.; rachis and pedicels nearly glabrous. *Spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ in., purplish; gl. I variable in the number and size of tubercles on the nerves; IV not much shorter than II, awn subbasal, shortly exserted. *Anthers* very large (sometimes 2 only?)—Resembles a very large *A. ciliaris*.

4. *A. submuticus*, *Hochst. in Flora*, xxxix. (1856) 188; spikes few short pale, spikelets all sessile very small linear-oblong terete, gl. I

7-nerved, nerves more or less muriculate, II acute keel ciliate, IV with a very short included basal awn or 0. *A. ciliaris*, *Subsp.* 6, submuticus, *Hack. Monogr. Androp.* 356. *Batratherum submuticum*, *Nees ex Steud. Syn. Gram.* 382; *Duthie Grass. N.W. Ind.* 17. *Andropogon submuticus*. *Steud. l. c.*—*Arthraxon*, *Wall. Cat.* n. 8835 B (*in part*) & 8836.

WESTERN HIMALAYA; from Garwhal to Central Nepal, alt. 2–6000 ft., *Wallich*, &c. TAVOY, *Gomez*.—DISTRIB. China, Loochoo Islds.

Annual. *Stems* 6 in.–3 ft., slender, much-branched and rooting below, as thick as a sparrow's quill. *Leaves* $\frac{3}{4}$ –1 $\frac{1}{2}$ in., broadly ovate-cordate, acuminate, and sheaths glabrous or hairy, margins strongly ciliate. *Peduncle* filiform, usually long and naked. *Spikes* 3–5, $\frac{1}{2}$ –1 in. long, very slender; rachis quite glabrous, flexuous. *Spikelets* $\frac{1}{2}$ in., pale, all sessile (male?). *Stamens* as long as gl. IV.—A puzzling plant, and possibly the male of an unrecognized form of *ciliaris* from which species it differs in the 3 stamens as long as gl. IV, as well as in the minute flowers, and usually the want of an awn, though a very short one is sometimes present. One very long specimen (*Herb. J. S. Lace*) has besides the terminal naked peduncle, very short sheathed lateral ones.

5. ***A. spathaceus***, *Hook. f.*; slender, panicles (always?) in long spathiform narrow sheaths, spikes few, spikelets oblong-lanceolate, gl. I of sessile spikelet oblong-lanceolate 5–7-nerved, nerves covered throughout their length with a row of acute tubercles, awn of gl. IV dorsal.—*Batratherum*, *Herb. Wight* n. 3257.

DECCAN PENINSULA; Gunde Cottah Hill fort, Cuddapah, *Wight Herb.* 357.

Stems 1–2 ft., not thicker than a sparrow's quill, branched. *Leaves* 1–2 in., oblong-lanceolate, acuminate, flaccid, ciliate and sheaths sparsely hairy; floral sheaths terminal, erect, 1 $\frac{1}{2}$ –2 in. by $\frac{1}{4}$ – $\frac{1}{2}$ broad, membranous, green, usually overtopping the panicle. *Spikes* $\frac{3}{4}$ – $\frac{1}{2}$ in., very pale; pedicels and joints sparsely hairy. *Upper spikelets* male; gl. I quite smooth, striate; II hyaline; IV awnless. *Stamens* more than half as long as gl. IV., linear.—A well-marked species by the spathe and tubercles of gl. I. A specimen from Belgaum (*Ritchie*, n. 796 in *Herb. Muuro*) closely resembles this in the tubercled gl. I; it has only 2 very small imperfect anthers and no pedicelled spikelets.

6. ***A. inermis***, *Hook. f.*; spikelets solitary (pedicelled 0) oblong-lanceolate, gl. I dorsally convex obtuse strongly 7–9-nerved unarmed margins (not incurved) and nerves scabrid.

The CONCAN, *Woodrow*.

Stems very slender, much geniculately branched. *Leaves* 1–2 in., ovate, broadly amplexicaul, caudate-acuminate, tips setaceous, glabrous or puberulous above, ciliate with long hairs beneath, margins smooth; sheath hairy. *Spikes* few, short, green, irregularly sparingly divided; peduncle slender, naked, branches $\frac{1}{2}$ in., very slender, ciliolate. *Spikelets* $\frac{1}{10}$ in., all sessile, rather distant; gls. thin, I strongly nerved; II as long as I, obovate-oblong when spread out, obtuse, emarginate, apiculate, 3-nerved, hardly keeled, nearly smooth; III 0 (or palea of IV) shorter than II, lanceolate; awn basal, twice as long as the spikelet; palea oblong, obtuse, glabrous. *Anthers* very large.

** *Stamens* 2 or 3; *anthers* not half the length of gl. IV.

7. ***A. ciliaris***, *Beauv. Agrost.* 3, t. xi. f. b; peduncles glabrous below the spikes, spikes many $\frac{1}{2}$ –3 in. subflexuous, joints = $\frac{2}{3}$ the spikelets in length or longer glabrous or shortly ciliate, gl. I entire at the tip, nerves scabrid or echinate above the middle, II acute or acuminate. *Hack. Monogr. Androp.* 354; *Benth. Fl. Austral.* vii. 524 (*excl. syn.*).

Hance in Journ. Linn. Soc. xiii. (173) 134. *Andropogon Retzii* & *incertus*, *Steud. Syn. Gram.* 375.—*Arthraxon*, *Wall. Cat.* n. 8833. 8835 A. (B. in part) 8836.

Hilly districts of INDIA from Kashmir eastwards to Burma, ascending the Himalaya to 5500 ft., and southward to the Nilghiri Hills and Ceylon.

Stems tall or short, weak, rarely as thick as a crow-quill, tufted and branched from the base, or with long creeping stems and ascending leafy branches. *Leaves* 1-3 in., ovate to lanceolate, glabrous or laxly hairy, margins ciliate; sheath with ciliate margins. *Spikes* few or many, on long naked or spathaceously sheathed glabrous peduncles, pale green or purplish. *Spikelets* $\frac{1}{2}$ – $\frac{1}{3}$ in., lanceolate or linear-lanceolate, callus naked or shortly bearded; gl. I scaberulous, 7-10-nerved; II obscurely 3-nerved; III much shorter, oblong acute; IV usually awned. *Stamens* variable in length never = $\frac{1}{2}$ gl. IV.—I give below Hackel's grouping of the two principal forms of this protean plant and their synonymy. For his elaborate subdivision of these into 4 subspecies and 9 varieties I must refer to his work. These are founded on characters of unequal value, and subject to diverse limitations. After a long study of the mass of materials at Kew I recognize the following widely distributed leading Indian forms:—1, *A. violaceus*; rather robust, spikes 6-20 1-2 in. long, spikelets $\frac{1}{2}$ in. more or less purple, awns twice as long as the spikelet or shorter; 2, *nudus*, usually tall and widely straggling, spikes many 1-2 in. very slender rachis capillary, sparsely hairy, spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in. narrow very pale, stamens as often 3 as 2; 3, *plumbeus*, stems shortly straggling much branched, leaves small, spikes 2-3 rarely more $\frac{1}{2}$ – $\frac{3}{4}$ in. long, rachis capillary nearly glabrous, spikelets $\frac{1}{10}$ in. usually purple, approaches nearest to *A. microphyllus*; 4, *muriculatus*; habit of *plumbeus*, but nerves of gl. I echinulate nearly to the base.—N.W. India.

Hackel's two leading groups to which I have added a third:—

a. *Joints of rachis glabrous, or with a few scattered hairs towards the tip.*

A. ciliaris, Beauv. l. c. *A. gracilis* & *lasiocoleos*, Hochst. in *Flora*, xxxix. (1856) 188, 189. *A. japonicus*, Miq. *Ann. Mus. Bot. Lugd. Bat.* ii. 288. *A. lanceolatus* & *nudus*, Hochst. in *Flora*, xxxix. (1856) 159. *A. Langsdorffianus*, Hochst. l. c.; Boiss. *Fl. Orient.* v. 455. *A. nudus*, Benth. ex Clarke in *Journ. Linn. Soc.* xxv. (1889) 86. *Batratherum nudum*, Nees ex Steud. *Syn. Gram.* 383. *Pleuroplitis centro-asiatica*, Griseb. in *Ledeb. Fl. Ross.* iv. 477. *P. Langsdorffiana*, Trin. *Fund. Agrost.* 175, t. 16. *Lucaea gracilis*, Kunth *Revis. Gram.* ii. 489, t. 159, *Enum.* i. 472. *L. Langsdorffiana*, Steud. l. c. 413. *Lasiolytrum hirtum*, Steud. in *Flora* (1846) 18; *Syn. Gram.* 12. *Las. pilosum*, Steud. ex Jord. in *Num. Soc. Sc. Nat. Cherb.* v. (1857) 299. *Pollinia ciliaris*, Spreng. *Syst. l.* 289. *Andropogon amplexifolius*, Trin. in *Mem. Acad. Petersb. Ser. VI.* ii. 1833, 274. *A. lasiocoleos* & *nudus*, Steud. l. c. 383. *Phalaris hispida*, Thunb. *Fl. Jap.* 44. *Deyeuxia japonica*, Spreng. l. c. 254.

b. *Joints of rachis, at least the upper, more or less ciliate.*

A. coloratus, major, Schimper, Schmidtii & *violaceus* Hochst. l. c. 188. *Batratherum plumbeum*, Munro ex Duthie in *Atkinson Gazette*, 640. *Pleuroplitis ciliata*, Schmidt *Beitr. Fl. Cap. Verd. Ins.* 152. *P. plumbea* & *violacea*, Steud. l. c. 414. *P. Quartiniiana*, Regel in *Bull. Acad. Petersb.* v. (1866) 757, *Wight Cat.* n. 1683. *P. caucasica*, Rupr. ex Regel in *Bull. Acad. Petersb.* x. (1866) 373. *Lucaea ciliata*, major, *plumbea* & *violacea*, Steud. l. c. 414. *Andropogon Alektoridia*, Steud. l. c. 383. *A. violaceus*, Heyne ex Steud. l. c. 414. *Alectoridia Quartiniiana*, A. Rich. *Tent. Fl. Abyss.* ii. 448, t. 99.—*Wall. Cat.* n. 8833 A.

c. *Spikes silkily villous, spikelets $\frac{2}{3}$ – $\frac{1}{2}$ in., gl. I acu'e entire or minutely 2-toothed, awn $\frac{1}{2}$ in. or more.*

A. cuspidatus, Hochst. in *Flora* (1856) 188; Hack. *Monogr. Androp.* 353. *A. micans*, Hochst. l. c. *Batratherum micans*, Nees in *Ann. & Mag. Nat. Hist.* vii. (1835) 220. *Pleuroplitis major*, Regel in *Bull. Acad. Petersb.* v. (1866) 750 (excl. *Syn. Lucaea major*). *Andropogon cuspidatus*, Hochst. ex A. Rich. *Tent. Fl. Abyss.* ii. 456. *A. lanceolatus*, Baker *Fl. Maurit.* 444 (non Roxb.). *A. micans*, Steud. *Syn. Gram.* 382.—N.W. Himalaya, Nilghiri Hills, Mauritius, Afr. trop.

8. **A. microphyllus**, *Hochst. in Flora*, xxxix. (1856) 188; peduncles puberulous beneath the spikes, rachis of spikes strict, joints = $\frac{1}{2}$ the spikelets in length or shorter ciliate with long hairs, spikelets $\frac{1}{5}$ – $\frac{1}{4}$ in., nerves of gl. I scaberulous above the middle tip 2-toothed or 2-aristulate, II acuminate or awned, IV obtusely 2-toothed, awn very slender. *Hack. Monogr. Androp.* 353. *A. lancifolius*, *microphyllus*, & *minor*, *Hochst. in Flora* xxxix. (1856) 188. *Batratherum molle*, *Nees & Arn. in Mæg. Nat. Hist. l. c.* 181; *Wight Cat. n.* 1686; *Aitchis. Cat. Panjab Pl.* 174. *B. Schimper*, *Nees ex Hochst. l. c.* 177. *Pleuroplitis lancifolia*, *microphylla* & *Schimperi*, *Regel in Bull. Acad. Petersb. x.* (1866) 747-756. *Lucæa Schimper*, *Steud. Syn. Gram.* 414. *Andropogon microphyllus*, *Trin. in Mem. Acad. Petersb. Ser. VI. ii.* (1833) 275. *A. lancifolius*, *Trin. l. c.* 271; *Thw. Enum. Pl. Zeyl.* 368; *Trim. Cat. Ceyl. Pl.* 108. *A. minor*, *Hochst. l. c.* 188. *A. molle*, *Duthie Grass, N. W. Ind.* 17. *A. muralis*, *Herb. Ham. ex Wall. Cat. n.* 8828. *A. multicaulis*, *Steud. l. c.* 383. *Psilopogon Schimper*, *Hochst. ex A. Rich. Tent. Fl. Abyss. ii.* 447. *Ps. Figarci*, *Figar. Ind. Sem. Hort. Gen.* (1852), in *Ann. Sc. Nat. Ser. III. xix.* (1853) 370. *?Pogonatherum tenue*, *Edgew. in Journ. As. Soc. Beng.* (1853) 181. —*Batratherum*, *Wall. Cat. n.* 8828.

TEMPERATE HIMALAYA, from Kashmir, alt. 4–5000 ft. to Sikkim, alt. 5–11,000 ft.; the KHASIA HILLS and southwd. to the NILGHIRIS. BURMA, *Collett.* CEYLON, *Thwaites*.—DISTRIB. Tonkin, Afr. trop.

Except in the smaller size, hairy peduncles and rachis of the shorter spikes, small spikelets, and toothed tip of gl. I, there is little to distinguish this from some of the states of *A. ciliaris*. Hackel indeed says that these are very closely allied.

Sect. II. TRICHATHERUM, *Hack. Joints* of rachis of spike obliquely truncate. Awn 10 in. long, capillary, flexuous.

9. **A. jubatus**, *Hack. Monogr. Androp.* 358.

The CONCAN ? *Stocks*.

Annual, decumbent, glabrous; stems slender, ascending, branching, 6–12 in. long. *Leaves* 1–2 by $\frac{1}{4}$ – $\frac{1}{3}$ in., lanceolate from a convolute amplexicaul base, acuminate, flat, flaccid, pubescent or villous; sheaths lax, pubescent, upper spathiform leafless; ligule short. *Floral spathes* $1\frac{1}{2}$ – $2\frac{1}{2}$ in., linear-lanceolate, membranous, green, enclosing the spikes, pubescent. *Spikes* binate on a common peduncle, a subsessile and a pedicelled, pedicel slender pubescent, fragile; joints about 4, half as long as the spikelet, and shorter pedicels of upper spikelet clavate, compressed, pectinately ciliate. *Spikelets* binate, a sessile and pedicelled at each joint, and a terminal male. *Sessile spikelets* $\frac{1}{4}$ in., membranous, linear-lanceolate, 2-nerved, deeply inflexed in the middle line, tip 2-mucronate, margins hyaline; II as long, linear-lanceolate, laterally compressed, 1-nerved, keel scabrid; III shorter, linear, nerveless, glabrous; IV = $\frac{1}{2}$ III, lanceolate acute, glabrous, with the immensely long awn attached to its base, palea 0. *Pedicelled spikelets* about $\frac{1}{2}$ in., awnless.

UNDETERMINABLE SPECIES.

BATRATHERUM, *Wall. Cat.* 8827 (*Andropogon minutissimus*, *Herb. Heyne*) is a dwarf or very immature state and unrecognizable.

41. **ISCHNOCHLOA**, *Hook. f.*

(Genus not in the clavis, p. 4.)

A small, slender, straggling, flaccid, leafy annual. *Leaves* elliptic-lanceolate, acute at both ends. *Spikes* solitary, simple, shortly exserted from the uppermost leaf-sheaths; rachis very slender, linear, flattened,

with thickened margins, inarticulate. *Spikelets* 1-fl., minute, binate, a sessile and a pedicelled, lanceolate, both awned and bisexual; callus minute, ciliate. *Glumes* 3 (III absent) I linear-oblong, subcoriaceous, 5-6-nerved, dorsally flattened, tip broadly hyaline truncate irregularly 2-toothed, margins incurved, keels ciliate; II oblong, keeled, obtuse or truncate, 3-nerved, ciliate towards the tip; IV much shorter, very narrow, cleft to the middle, lobes subulate; awn in the cleft, capillary, geniculate, palea 0. *Lodicules* cuneate. *Stamens* 3, anthers oblong. *Styles* short, free. *Grain* subfusiform, terete, grooved one side.

A remarkable genus, with the habit of *Arthraxon* (closely resembling *A. microphyllus*), next which it may be provisionally placed, but not nearly related to it, differing in the inarticulate flat rachis of the simple spike, bisexual awned pedicelled spikelets, and absence of gl. III.

I. Falconeri, Hook. f. in Hook. Ic. Pl. t. 2466.

NORTH WESTERN HIMALAYA; growing amongst moss, *Falconer*.

Stems 6-8 in., very slender, sparingly branched, leafy to the tips, filiform; internodes concealed by the leaf-sheaths. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in., flat, acute or acuminate; sheath deeply furrowed, glabrous; ligule a few hairs. *Spikelets* $\frac{1}{2}$ -1 in., very slender, green, peduncle capillary as long as the leaf-sheath; rachis exactly linear, flexuous, quite glabrous, not disarticulating at the transverse glabrous nodes. *Spikelets* $\frac{1}{10}$ in. long, rather longer and broader than the internodes; gl. I with the 2 lateral (carinal) nerves only reaching the tip; II with a stout median nerve and 2 very slender lateral ones anastomosing with it below the tip.

42. THELEPOGON, Roth.

A coarse perennial grass. *Leaves* lanceolate, base cordate, amplexicaul. *Spikelets* few or many, corymbosely fascicled, peduncled, lower whorled, upper distant; rachis flexuous, fragile; joints more or less deeply excavated. *Spikelets* solitary at the joints, with the rigid pedicel only of an upper, ovoid, acute. *Glumes* 4, I thickly coriaceous, convex, beaked, transversely rugose ridged or tubercled; II sunk in the cavity of the joint, rigid, sparingly tubercled, acuminate; III shorter, hyaline, paleate, usually male; IV bisexual, hyaline, deeply bifid, with a long twisted awn in the sinus; palea narrow. *Lodicules* broad. *Anthers* 3, very long. *Styles* free, stigmas short. *Grain* narrowly oblong, free.

T. elegans, Roth. ex Roem. & Sch. Syst. ii. 788. Nov. Pl. Sp. 62; Hack. Monogr. Androp. 267. Andropogon Princeps, A. Rich. Tent. Fl. Abyss. ii. 471, t. 102. Rhinischne Princeps, Hochst. ex Steud. Syn. Gram. 360 (in Syn.). Jardinea abyssinica, Steud. Syn. Gram. 360.

CENTRAL INDIA, the CONCAN and MALABAR.—DISTRIB. Afr. trop.

Stems 6 in. 3 ft., tufted and branching from the base, or woody as thick as a crow-quill below and geniculately branching upward; roots stout, rigid. *Leaves* 3-10 by $\frac{1}{2}$ - $\frac{3}{4}$ in., linear, acuminate, rather thin, and sheaths glabrous scabrid or hispid with tubercle-based hairs, margins denticulate; ligule very short. *Spikelets* 1-3 $\frac{1}{2}$ in., peduncle slender, stiff; rachis compressed, much narrower than the spikelets, of upper spikelets tubercled; joints as long as the spikelets, subclavate, scaberulous, top orbicular cupped. *Spikelets* $\frac{1}{4}$ - $\frac{1}{2}$ in., yellow or brown; callus annular, bearded; gl. I very thick, hard, beak echinate; II with usually one transverse row of tubercles; III broad, 2-nerved, glabrous; palea narrow, acute, nerveless; IV ovate-lanceolate, 3-nerved, glabrous; lobes lanceolate, 1-nerved; awn=3-4 gl. in

length; palea as long as the gl., oblong, acuminate, 2-nerved. *Pedice*l of arrested spikelets flat, scabrid.—Gl. III and its palea would appear to have exchanged their character of nervation. A curious gigantic state? collected by Ritchie at the Kola Nuddi Waterfall (in the Concan?) has the upper spikelets densely softly villous, gls. I and II thin hardly tubercled, the lower spikelets appear to be binate but are very imperfect.

43. **LOPHOPOGON**, Hack.

Small perennial densely tufted grasses. *Leaves* very narrow. *Spikes* very short, solitary 2-nate or fascicled on the ends of capillary branches, very fragile; joints very short, slender, tips cupular. *Spikelets* small, homogamous or heterogamous, 1-2-fld., 2-3-nate, one sessile, callus conical villous. *Glumes* 4, I and II chartaceous, I oblong, broadly truncate, irregularly 3-4-toothed, 7-nerved, dorsally convex; II longer than I, lanceolate, narrowed into a straight awn, 3-5-nerved, hispidly villous on the sides, and with tufts of hairs dorsally below the middle; III hyaline, oblong-lanceolate, acute or aristulate, ciliolate, 1-nerved, 1-2-androus or neuter, palea linear 2-nerved; IV nearly as long as III, fem. or bisexual and diandrous, linear-oblong, 2-fld, lobes setiform and margins hispidulous; awn in the cleft, much longer than the gls. tortuous and twisted; palea minute, quadrate, lobulate, 2-nerved. *Lodicules* 0. *Anthers* narrow. *Styles* combined below, stigmas very long.—Species 2, Indian and a 3rd? Australian.

In *L. tridentatus* the lower spikelets sometimes form a whorl at the apex of the peduncle as in *Germainia*. In this species also the upper spikelet is usually male or neuter. Hackel suggests the probability of Retz's *Andropogon incurvatus* (Obs. v. 21 non Trin.) from Tranquebar, Koenig, being a *Lophopogon*.

1. ***L. tridentatus***, Hack. in *Engl. & Prantl. Nat. Pflanzenfam.* ii. II 56, *Monogr. Androp.* 254, t. i. f. 14; stem subsimple, spikes more or less closely sheathed. *Lisboa* in *Bomb. Journ. Nat. Hist.* vi. (1891) 201; O. Kuntze, *Revis. Gen.* i. 197. *Andropogon tridentatus*, Roeb. *Fl. Ind.* i. 257; *Steud. Syn. Gram.* 372. *Saccharum tridentatum*, Spreng. *Syst.* i. 283.—Gen. Nov. Wall. *Cat.* n. 8842.

The CONCAN and CANARA, Heyne, &c. CENTRAL PROVINCES, Khandua, Duthie.

Stem 4-6 in. *Leaves* 2-4 in., rigid, 3-nerved; sheath short, upper ventricose; ligule obscure, ciliate. *Heads of spikes* $\frac{1}{2}$ - $\frac{1}{2}$ in.; sheaths ovoid, flattened, membranous, caudate-acuminate. *Spikes* $\frac{1}{2}$ -1 in. *Spikelets* $\frac{1}{2}$ - $\frac{1}{2}$ in., brown when dry; gl. I of lower spikelet dorsally naked, of upper with tufts of long bristles below the middle; II back and margins villous, with a pencil of hairs on each side about the middle.

O. Kuntze, l. c. has two varieties: α . *Wrightii*, Nees mss., with red hairs at the base of gl. I., and β . *Munroi*, with none.

2. ***L. Kingii***, Hook. f.; stem subcorymbosely branched above, spikes long-peduncled.

BEHAR; at Monghir, *Herb. Hort. Calcutt.*

Foliage and spikelets nearly as in *L. tridentatus*, but habit very different. The subcorymbose branches of the stem bear subulate leaves and capillary peduncles 1-2 in. long embraced by almost filiform sheaths with acicular tips. *Spikes* solitary or few together, $\frac{1}{2}$ in. long, pale yellow-brown, fragile.—More materials are wanting for a trustworthy description of the inflorescence.

44. **APLUDA**, Linn.

A leafy perennial grass. *Stems* geniculately ascending from a creeping or decumbent base, sometimes scandent, paniculately branched. *Leaves* petioled, flat; sheaths of upper spathiform. *Inflorescence* of very many solitary small simple spikes, terminating the stem and branches, each enclosed in a special membranous peduncled spathe, together forming a leafy panicle. *Spikes* of one linear joint gibbously bulbous at the base, and jointed on the peduncle at the base of the spathe by a minute curved pedicel; rachis (joint) smooth. *Spikelets* 3, a sessile 2-fl. bisexual with a pedicelled imperfect (reduced to a small gl.) at the base of the rachis, and a terminal male or neuter, rarely bisexual; sessile spikelet seated on the bulbous base of the rachis (callus of authors); gls. 4, I chartaceous convolute many-nerved margins not inflexed, II compressed 5-7-nerved dorsally gibbous keeled, III ovate-lanceolate hyaline male paleate, IV much smaller bisexual ovate paleate entire or 2-toothed, awned or not. *Lodicules* 2, cuneate. *Stamens* 3, anthers short. *Styles* free. *Grain* oblong, embryo large.

In the above description I consider what Hackel describes as the pedicel of the upper spikelet to be the rachis of the uninodal spike; and his callus of the sessile spikelet to be a bulbous inflation of the base of the rachis.

A. varia, Hack. *Monogr. Androp.* 196. **A. aristata** and **mutica**, Auct.—*Apluda*, Wall. *Cat. n.* 8760, 8761.

Throughout INDIA and BURMA, ascending the Himalaya to 8000 ft. CEYLON, up to 4000 ft.—**DISTRIB.** E. trop. Asia, Malaya, Australia, Ins. Pacific.

Stem 1-7 ft. or more, solid, as thick as a crow-quill below; branches flexuous; roots wiry. *Leaves* 4-18 in., subbifarious, linear-lanceolate, cuspidately acuminate, base narrowed usually petioled, above and margins scaberulous, glaucous beneath, upper gradually shorter; sheaths glabrous, rarely hairy, upper shorter and dilated into spathes with subulate tips; ligule short, rounded. *Spathes* of the flg. branches about 4 in. long, cymbiform, thin, many-nerved; of the spikes smaller, very variable in length, longer or shorter than their almost capillary peduncles. *Spikes* $\frac{1}{4}$ – $\frac{1}{2}$ in., green or pale violet. *Sessile spikelet* $\frac{1}{2}$ – $\frac{3}{4}$ in.—The following is Hackel's arrangement of the very unstable Indian varieties of this polymorphous plant. It is especially useful as approximately classifying its intricate synonymy.

Subsp. **MUTICA**, Hack.; gl. IV very rarely awned; I straight glabrous; II dorsally gibbous keel depressed above the gibbosity acute glabrous; panicle usually lax, ultimate flg. branchlets usually half as long as the sheath.—**A. mutica**, Linn. *Sp. Pl.* 82; *Gærtn. Fruct.* ii. t. 175; *Lamk. Ill. t.* 841, f. 1; *Anderss. in Cefvers. Vet. Akad. Stockh.* (1855) t. 5, f. 6. **A. gigantea**, Spreng. *Syst. i.* 290. ?**A. glauca**, Schreb. *Beschr. Græs.* 99. **A. geniculata**, Roxb. *Fl. Ind. i.* 325. *Andropogon glaucus*, Retz. *Obs. v.* 20. *Calaminea gigantea*, Beauv. *Agrost.* 15, t. 23, f. 1.

Var. **humilis**; clusters of spikes distant, spathe of spike $\frac{1}{2}$ – $\frac{1}{4}$ in., sessile spikelet $\frac{1}{2}$ – $\frac{1}{3}$ in., callus $\frac{1}{10}$ in., gl. I entire, imperfect spikelet hirsute. **A. humilis**, Kunth *Enum. Pl. i.* 517. **A. Cumingii**, Buse ex de Vriese *Pl. Reinw.* 105. **A. inermis**, Regel in *Act. Hort. Petrop.* vii. (1880) 658. **A. mucronata**, Steud. *Syn. Gram.* 404. *Calamina humilis*, Roem. & Schult. *Syst. ii.* 810.

Subsp. **ARISTATA**, Hack. gl. IV of sessile spikelet cleft to the middle; I chartaceous; II dorsally less gibbous, keel sometimes scabridly ciliate often 2-mucronate; panicle dense, ultimate flg. branchlets shorter than the spathes, clusters of spikes close or confluent. **A. aristata**, Linn.

Cent. ii. 7; *Schreb. Besch. Græs.* 93. *Lamk. Ill.* t. 841, f. 1; *Steud. Syn. Gram.* 403; *Roxb. Fl. Ind.* i. 324; *Dalz. & Gibs. Bomb. Fl.* 303; *Thw. Enum. Pl. Zeyl.* 364; *Trim. Cat. Ceyl. Pl.* 108; *Aitchis. Cat. Panjab Pl.* 174; *Duthie Fodd. Grass. N. Ind.* 44, t. 29. *A. Gryllus, Beauv. Agrost.* 133 (*cf. corrigend. in Suppl.*) t. 23, f. 5.

Var. aristata proper; spathe rather shorter than its spike, sessile spikelet $\frac{1}{8}$ – $\frac{1}{5}$ in., bulbous base $\frac{1}{10}$ – $\frac{1}{8}$ in., gl. I glabrous nerves scabrid, terminal spikelet = sessile, pedicelled spikelet minute. *A. microstachya, Nees in Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843) 194. *A. scabra, Anderss. l. c.* 179. *Ischæmum involueratum, Hb. Russ. in Wall. Cat. n.* 8794 A.

Var. ciliata; tall, robust, flg. spathes glabrous or hairy, spathe half as long as its spike, sessile spikelet $\frac{1}{4}$ – $\frac{1}{3}$ in., bulbous base $\frac{1}{12}$ – $\frac{1}{10}$ in., gl. I and rachis puberulous, spathe glabrous or with tubercle-based hairs. *A. ciliata, Anderss. l. c.* 177–179.—“Hardly a distinct variety,” Hackel.

Var. villosula; spathe half as long as its spike, sessile spikelet $\frac{1}{4}$ in., bulbous base of rachis $\frac{1}{12}$ in., gl. I and pedicel scabrous-pubescent, terminal spikelet shorter than the sessile, pedicelled spikelet $\frac{1}{12}$ in. ciliate. *A. communis, Nees & Arn. in Nov. Act. l. c.* 194; *Anderss. l. c.* 177, t. 5, 2. *A. villosa, Schreb. Besch. Græs.* 98?—*Wight Cat. n.* 1713.

Var. rostrata; spike strongly incurved far exserted beyond the spathe, spikelet $\frac{1}{2}$ in., callus $\frac{1}{2}$ – $\frac{1}{5}$ in. *A. rostrata, Arn. & Nees l. c.* 194. *Wight Cat. n.* 1714.—*Apluda, Wall. Cat. n.* 8762.

45. VOSSIA, Wall. & Griff.

A gigantic floating grass. *Spikes* terminal, solitary or 2- (rarely 3-6-) nate, stout; rachis narrow, compressed, flexuous, jointed. *Spikelets* 2-flid., imbricate, 2-nate, longer than the subexcavate joints, one sessile by a very broad callus; the other smaller pedicelled. *Glumes* 4, I very broad, ovate, flattened, coriaceous, smooth, narrowed into a long rigid green tail; II chartaceous, ovate-lanceolate, acute, 3-nerved, keeled above; III hyaline, 2-nerved, paleate, male; IV hyaline, oblong, 3-nerved, tip ciliate, palea 2-nerved. *Lodicules* large, toothed. *Anthers* 3, long. *Styles* distinct, stigmas short. *Grain* unknown.

V. procera, Wall. & Griff. in *Journ. As. Soc. Beng.* v. (1836) 573, t. 23; *Wall. Cat. n.* 8878; *Grant in Trans. Linn. Soc.* xxix. 175, t. 116; *Hack. Monogr. Androp.* 270. *V. cuspidata, Griff. Notul.* iii. *Index p.* xii., *l. c. Pl. Asiat. Index p.* v. t. 153. *Ischæmum cuspidatum, Roxb. Fl. Ind.* i. 324; *Kunth Enum. Pl.* i. 516; *Griff. Notul.* iii. 70. *I. ensiforme, Herb. Ham. ex Wall. Cat. l. c.*

Jheels of BENGAL, SILHET and ASSAM.—DISTRIB. Afr. trop.

Stem 6–12 ft., spongy, as thick as the thumb, rooting at the lower nodes. *Leaves* 1–2 ft., linear, acuminate, hispidulous, midrib stout; sheath large; ligule densely ciliate. *Spikes* 6–8 in., nearly terete; rachis narrower than the gls., margins ciliate; joints $\frac{1}{4}$ in., and pedicels cupped at the tip. *Spikelets* 1–1 $\frac{1}{2}$ in. with the spreading ciliate tail of gl. I, green, callus annular.—Hardly generically different from *Ischæmum*.

46. ROTTBOELLIA, Linn. f.

Tall, annual or perennial grasses. *Spikes* few or many, subsolitary or paniced rarely racemose or paniced; rachis usually fragile, joints usually excavate at the tip. *Spikelets* 2- rarely 3-nate, one (rarely two)

sessile and both or one only perfect, the other pedicelled imperfect, with the pedicel often adnate to the joint. *Sessile spikelets*, glumes 4, I coriaceous, flat or slightly convex, obtuse or acute, rarely 1-2-awned; II thinner, keeled; III hyaline, neuter or male; IV hyaline, 1 or 3-nerved, usually paleate, palea usually 2-nerved. *Lodicules* 2, truncate. *Stamens* 3. *Styles* distant. *Grain* oblong or obovoid, subcompressed dorsally.—Species about 30, temperate and tropical.

I have followed Hackel for the most part in the disposition of the species of the first four sections of the genus. For my departure from him in the fifth see remarks under *Ophiurus* (p. 160).

A. Sessile spikelets solitary in all the joints of the spike.

Sect. I. PHACELURUS, *Hack.* *Spikes* digitately racemed (rarely solitary), rachis fragile, tips of joints flat, not hollowed. *Spikelets* 2-fl.—*Phacelurus*, *Griseb.* (gen.)

1. **R. speciosa**, *Hack. Monogr. Androp.* 282; perennial, spikes solitary or alternate or subdigitately fascicled 2-3½ in. long, spikelets ½-¾ in. 1-fl., gl. I flat 11-13-nerved. *Ischæmum speciosum*, *Nees ex Steud. Syn. Gram.* i. 375. *Andropogon speciosus*, *Steud. l. c.* *Vossia speciosa*, *Benth. in Journ. Linn. Soc.* xix. (2881) 70; *Duthie Grass. N.W. Ind.* 18, *Fodd. Grass. N. Ind.* 32.

WESTERN TEMPERATE HIMALAYA, alt. 5500-9000 ft., from Kashmir to Garwhal, *Royle, &c.*

Stems tufted, 1-4 ft., stout or slender, simple above. *Leaves* 6-12 by ¼-½ in., linear, hispid or glabrate, margins scabrid; sheath glabrous or margins above hairy; ligule a ciliate border. *Spikes* 3-6 in., rarely solitary, glabrous, green or purplish; joints about as long as the spikelets, subclavate, trigonous, angles ciliate. *Spikelets* lan eolate, glabrous; gl. I obtuse, tip oblique, margins narrowly inflexed, keels scaberulous; II navicular, acute; III lanceolate, 3-5-nerved; IV elliptic-lanceolate, 1-nerved.

Sect. II. THYRSOSTACHYS, *Hack.* *Spikes* panicle, lower whorled, peduncled; rachis fragile, tips of joints hollowed. *Spikelets* 1-fl.

2. **R. Zea**, *Clarke in Journ. Linn. Soc.* xxv. (1889) 86, fig. 38; panicle thyrsoform or pyramidal, spikes smaller upwards, spikelets ½ in., gl. I scabrid 1-3-nerved. *Hack. Monogr. Androp.* 690. *R. thyrsoidea*, *Hack. l. c.* 283.

KHASIA HILLS, alt. 2-3000 ft., *J. D. H. & T. T., Clarke.* MUNNEPORE, alt. 3500 ft., *Clarke.* UPPER BURMA; at Camein on the Mogaung river, *Griffith.*

Stem tall, 6-8 ft., very stout, as thick as the forefinger below, erect, simple or sparingly branched, nodes silky. *Leaves* large, 2-3 ft. by 1-1½ in., linear, flat or complicate, glabrous, margins scabrid; sheaths subcompressed; ligule short, truncate. *Panicle* 10-20 in. long, long-peduncled, rachis very stout, strict. *Spikes* erectopatent, lower branched, sometimes distichously; rachis stout, flexuous or zigzag, joints about as long as the spikelets, subclavate, glabrous. *Spikelets* glabrous; gl. I obtuse, dorsally scabrid, 1-3-nerved, margins narrowly inflexed, keels scaberulous; II ovate, acute, 3-nerved; III lanceolate; IV oblong, obtuse.

Sect. III. HEMARTHRIA, *Hack.* *Spikes* solitary or fascicled, compressed; joints coherent or subfragile, tips obliquely or transversely truncate, not hollowed. *Spikelets* of each pair similar, pedicel of upper usually adnate to the joint of the rachis.—*Hemarthria*, *Br. (Gen.)*.

3. **R. compressa**, Linn f. *Suppl.* 114; rachis of spike coherent, sessile spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in., callus distinct, gl. I of sessile spikelets coriaceous obtuse or acute 7–9-nerved, gl. II of pedicelled acuminate or shortly awned 7–9-nerved.

Throughout the hotter parts of INDIA, generally in wet places, Burma and CEYLON.—DISTRIB. Westwards to Spain and the Canaries, and in most warm climates.

Erect or decumbent below, usually branched throughout, leafy; nodes glabrous or pubescent. Leaves short or long, linear, acute, margins and sometimes the upper surface scaberulous; mouth of sheath hairy. Spikes solitary or fascicled, $2\frac{1}{2}$ –5 in. long, slender, erect, rarely branching; gl. I of pedicelled spikelets subulate or narrowly lanceolate, tip scabrid.—A polymorphous grass, whose Indian varieties are disposed of as follows by Hackel:—

Var. *a. genuina*, Hack. l. c.; stems creeping below, then erect, scandent, 5–20 ft. long (Roxb.), spikes slender solitary or 2–3-nate, spikelets $\frac{1}{8}$ – $\frac{1}{4}$ in., gl. I broad ovate-lanceolate obtuse not constricted below the tip. *R. glabra*, Roxb. *Fl. Ind.* i. 353; *Wall. Cat.* n. 8871 A. *R. anceps* & *quarterna*, *Herb. Ham. ex Wall.* l. c. B. C. *Hemarthria compressa*, *Kunth Enum.* i. 465 (*in part*); *Grah. Cat. Bomb. Pl.* 233; *Thw. Enum. Pl. Zeyl.* 364; *Trin. Cat. Ceyl. Pl.* 107; *Aitchis. Cat. Panjab. Pl.* 172; *Duthie Grass. N.W. Ind.* 18, *Fodd. Grass. N. Ind.* 30. *H. coromandelina*, *Steud. Syn.* 358.—Common in India.—Hackel does not notice Roxburgh's description of this grass as scandent, and attaining 20 ft. in length.

Var. *β. fasciculata*, Hack. l. c.; stem 2–5 ft. creeping, then erect, upper spikes usually fascicled longer stouter often curved, spikelets $\frac{1}{8}$ – $\frac{1}{4}$ in., gl. I of sessile constricted below the tip. *R. altissima*, *Poir. Voy. Barb.* ii. 105. *R. compressa*, Linn f. *Suppl.* 114; *Retz. Obs.* iii. 12; *Roxb. Fl. Ind.* i. 354. *R. fasciculata*, *Lamk. Ill.* i. 204; *Desf. Fl. Atlant.* t. 36. *R. spathacea*, *Ten. Fl. Nap. Prodr.* p. xi. *Lodicularia capensis*, *Nees Fl. Afr. Austr.* 128. *L. fasciculata*, *Beauv. Agrost.* 108; *Wight Cat.* n. 1721. *L. fastigiata*, *Herb. Beauv. (non Agrostogr.)*. *L. laxa*, *Nees ex Steud. l. c.* 358. *L. peruviana*, *Meyen Reise*, ii. 71. *Lepturus fasciculatus*, *Trin. Fund. Agrost.* 123. *Hemarthria capensis*, *Trin. in Mem. Acad. Petersb. Ser. VI.* ii. (1833) 248. *H. caudiculata*, *Steud. l. c.* 359. *H. fasciculata*, *Kunth Revis. Gram.* i. 153, *Enum.* i. 465; *Benth. Fl. Hongk.* 418; *Hack. in Mart. Fl. Bras.* ii. 111, 314, t. 72, f. 2; *Duthie Grass. N.W. Ind.* 13, *Fodd. Grass. N. Ind.* 30. *H. laxa*, *Steud. l. c.* 358. —*Hemarthria*, *Wall. Cat.* n. 8871 (*in part*).—Common especially on the borders of pools often climbing amongst bushes.

Var. *δ. japonica*, Hack. l. c. 288; leaves with setaceous tips, upper spikes sub-fascicled stout, spikelets $\frac{1}{4}$ – $\frac{1}{2}$ in., gl. I sessile hardly constricted below the subobtusely tip 7–11-nerved, of pedicelled lanceolate not subulate.—Hackel says of this Japan plant that “Wallich's n. 8868 B is exceedingly like it.” But that number of Wallich's *Herb.* is *Ratzeburgia pulcherrima*, and there is no B under it.

4. **R. protensa**, Hack. *Monogr. Androp.* 289; rachis of spike firm, sessile spikelet $\frac{1}{2}$ in. lanceolate, callus obscure, gl. I subacute many-nerved, gl. II of pedicelled spikelet lanceolate narrowed into a long slender awn 1–3-nerved. *R. repens*, *Roxb. mss. ex Wall. Cat.* *Hemarthria protensa*, *Steud. Syn. Gram.* 359. ?*H. vaginata*, *Bühse Pl. Jungh.* iii. 354 (*ex Hack.*).—*Hemarthria*, *Wall. Cat.* n. 8872, 8910.

ASSAM, BENGAL, SILHET, CACHAR and the KHASIA HILLS, in marshes. ? LACCADIVE ISLANDS, A. B. Hume.

Stem 3–6 ft., erect from a decumbent base, stout, leafy, flowering from all the nodes. Leaves 3–12 by $\frac{1}{2}$ – $\frac{1}{4}$ in., linear-lanceolate, acuminate, narrowed from below the middle to the base, surfaces and margins smooth, glabrous; sheath glabrous or hairy. Spikes 4–8 in., slender, joints shorter than the sessile spikelets, top transversely truncate; pedicels adnate to the joints. Sessile spikelets linear-lanceolate; gl. I

narrowed from the middle upwards; II more or less usually wholly adnate to the joint, IV very short or 0. *Pedicelled spikelets*, gl. I 7-nerved; II $\frac{1}{2}$ – $\frac{3}{4}$ in., keel excentric.—Very nearly allied to *R. compressa*. “The only Androp. grass in which fruiting spikelets are not detached, hence there can be no dissemination except from the whole spike,” Hackel. The Laccadive Islds. specimens are very slender with narrow leaves and quite erect strict lanceolate finely acuminate spikelets, rather longer than the joints.

Var. *Hamiltoniana*; callus of sessile spikelets bearded with short hairs. ? *R. Hamiltoni*, *Trin. mss. ex Steud. Nom. Ed. II. ii. 474*. *R. compressa*, *Wall. Cat. n. 8870 A. C.* *R. compressa* var. *Hamiltoniana*, *Hack. Monogr. Androp. 288*. *Hemarthria Hamiltoniana*, *Steud. Syn. Gram. 358*. *Lodicularia Hamiltoniana*, *Nees ex Steud. l. c. 359*.—Lower Gaugetic Plain; Nathpur, *Hamilton*.—Referred to *compressa* by Hackel, but I think nearer to *protensa*.

5. *R. longiflora*, *Hook. f.*; spikes short, rachis firm, sessile spikelets $\frac{1}{2}$ – $\frac{3}{4}$ in. lanceolate narrowed into a long point, callus obscure, gl. II rather longer subaristate, pedicelled spikelets like the sessile.

TENASSERIM; at Mergui, *Griffith*. ASSAM, *Herb. Munro*.

Stem 1–2 ft., erect, leafy, stout, spongy; nodes glabrous or pubescent. *Leaves* 3–6 by $\frac{1}{4}$ – $\frac{1}{2}$ in., linear-lanceolate from a rounded base, flaccid, smooth, glabrous, margins smooth; sheath inflated; ligule short, membranous. *Spikes* 4–6 in., sheathed below, stout, nearly $\frac{1}{4}$ in. across the spikelets; rachis subtetragonous. *Spikelets* twice as long as the joints, the pedicelled rather longer and longer awned than the sessile; gl. II adnate to the joint; III of sessile spikelet oblong, obtuse, nerveless; IV like III, palea small. *Lodicules* quadrate, broader than long, membranous. Gl. IV of *pedicelled spikelet* narrower than the sessile, paleate, with imperfect stamens and pistil.—Resembles a very large state of *R. protensa*.

Sect. IV. PELTOPHORUS and CÆLORHACHIS, *Hack*. *Spikes* solitary or fascicled, fragile, terete or compressed; joints transversely (rarely obliquely) truncate, deeply hollowed, dorsally convex, ventrally excavate; pedicel of upper spikelet free or adnate to the joint of the rachis, tip hollowed. *Peltophorus*, *Desv. (Gen.)*.

* *Gl. I of sessile spikelets broadly winged*.

6. *R. Myurus*, *Benth. in Journ. Linn. Soc. xix. (1881) 68*; perennial, gl. I of sessile spikelet panduriform dilated above the middle into an orbicular wing, and towards the base into two auricles joined by a transverse ridge. *Hack. Monogr. Androp. 290*. *Manisuris Myurus*, *Linn. Mant. ii. 300*; *Desv. ex Beauv. Agrost. 14, t. 1*; *Rottl. in Neue Schrift. Nat. Fr. Berl. iv. (1803) 191*; *Roxb. Corom. Pl. ii. 10, t. 117, Fl. Ind. i. 351*; *Schreb. Besch. Graese, t. 43*; *Kunth Enum. Pl. i. 470*; *Griff. Notul. iii. 100*; *Miq. Fl. Ind. Bat. iii. 410*. *Peltophorus Myurus*, *Desv. in Nouv. Bull. Soc. Philom. ii. (1810) 188, Journ. Bot. i. (1813) 73*; *Beauv. Agrost. 119, t. 21, f. 11*; *Wall. Cat. n. 5880*; *Wight Cat. n. 1725, Herb. n. 3071*. *Ischæmum Myurus* & *Ægilops sanguinea*, *Herb. Linn.*

The Deccan Peninsula, *Heyne, Wight, &c.*, in dry places.

Stem creeping and rooting, with ascending compressed branches 6–28 in. high. *Leaves* 2–6 in., spreading, linear, acute, flat, glabrous; sheath compressed, margins ciliate; ligule short, ciliate. *Spikes* 1–2 in., solitary, terminal and axillary, shortly exserted; joints scaberulous, shorter than the spikelets, excavate on each side leaving a pore between the spikelet and joint. *Sessile spikelets* $\frac{1}{10}$ in., brown, callus minute; gl. I scaberulous, 5-nerved, wing scarious; II ovate, acute, 3-nerved; III oblong, obtuse, empty; IV lanceolate, nerveless; palea obsolete. *Pedicelled spikelets*; gl. I oblong, obtuse, 5-nerved, winged on one side; II navicular, 3-nerved; III 3-nerved, paleate; IV oblong, obtuse, male; pedicel free or adnate to the joint.

7. **R. acuminata**, Hack. *Monogr. Androp.* 291; annual, spikes short, gl. I of sessile spikelet broadly ovate acuminate winged above the middle, coriaceous below it with 3 to 6 dorsal transverse echinulate or warted ridges.

The DECCAN PENINSULA, *G. Thomson*; N. Canara; Carwar, *Talbot*.

Stem 3–12 in., ascending from a creeping base, compressed, leafy. *Leaves* flaccid, lower 2–3 in., linear-lanceolate from a narrow base, acuminate, upper shorter spreading and recurved; sheath turgid, compressed, keeled, mouth hairy; ligule short, truncate, glabrous. *Spikes* 1–2 in.; joints subclavate, much shorter than the sessile spikelets, base not excised. *Sessile spikelets* $\frac{1}{4}$ – $\frac{1}{2}$ in., callus obscure; gl. I 5-nerved in the narrow coriaceous part between the wings; II elliptic-lanceolate, acute, 3-nerved; III elliptic, paleate, male; IV short, oblong, obtuse; palea small, 2-lobed, nerveless. *Pedicelled spikelet*; gl. I winged on one side, 5-nerved, base not tubercled; II 3-nerved; IV male, lanceolate, many times longer than the joint.

Var. *Stocksii*; diffusely branched from the root, gl. I of pedicelled spikelet $\frac{1}{2}$ in. subulate-lanceolate erect or recurved narrowed into a slender scaberulous awn not or obscurely winged.—Malwar, *Stocks*.—The long gls. of the pedicelled spikelets give this variety a very different appearance, but intermediates occur, and the specimens were mixed with those of *R. acuminata* proper.

8. **R. divergens**, Hack. *Monogr. Androp.* 293; annual, spikes short, gl. I of sessile spikelet crossed below the middle with echinulate ridges ovate 2-mucronate or 2-aristate with broad hyaline wings above the middle. *Lisboa* in *Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 195.

EAST INDIES, *Huegel*. The CONCAN and CANARA; Belgaum, *Ritchie*; Satara and Mahableshwar, *Lisboa*.

Stem 4–10 in., erect or ascending, slender, terete, nodes 2–3 all with 2-nate flowering branches. *Leaves* $1\frac{1}{4}$ – $1\frac{1}{2}$ in., narrowly linear, hairy beneath and on the margins; sheath compressed, naked, hairy; ligule short, membranous, rounded. *Spikes* about $\frac{2}{3}$ in., slender, erect, pale; joints shorter than the spikelets, subclavate, excised, outer margins of the cavities ciliate. *Sessile spikelets* $\frac{1}{10}$ – $\frac{1}{2}$ in., broadly oblong, dorsally with 7 lines of small pits (Hækel) or rugose with long or short transverse tubercled or echinate ridges or crests, mucros or awns erect scabrid sometimes as long as the spikelet; II shorter, ovate, acute, keeled, 3-nerved, III broadly ovate, nerveless, empty; IV=III, ovate-oblong, obtuse, nerveless. *Pedicelled spikelets* lanceolate; gl. I smooth, 5-nerved, broadly inflexed on one side with a winged keel, on the other produced into a mucro; II lanceolate, acute, keel winged; pedicel adnate.—The ridges on gl. I of the sessile spikelet are very variable, and are sometimes replaced as it were by vertical rows of incurved spinules on the nerves.

9. **R. Talboti**, Hook. f. (*non Lisboa*); annual, leaves linear, spikes solitary short, gl. I of sessile spikelet lanceolate narrowed into a slender scabrid awn, and with 3 transverse ciliolate ridges towards the base broadly winged above it, pedicel of upper spikelet adnate to the joint of the rachis.

GOA DISTRICT, *Talbot*.

Stems 6–8 in., slender, erect or base geniculate, subsimple. *Leaves* 2–3 in., narrow, smooth; sheath glabrous; ligule short, membranous. *Peduncles* 2–3 in., very slender, flexuous. *Spikes* $\frac{1}{2}$ in. diam., green, joints very short, tumid, excavate opposite the spikelet, top broad, cavity very large, margins thick hispidulous. *Spikelets* closely imbricating, $\frac{1}{2}$ in. long including the awn; callus annular, ciliolate; gl. I of sessile spikelet many-nerved on the coriaceous disk; II much shorter, hyaline, ovate-oblong, acute, 1-nerved; III broadly oblong, tip rounded, faintly 3-nerved, male; IV small, oblong, obtuse, nerveless, palea as long nerveless. *Pedicelled*

spikelets as long as the sessile; gl. I very unequally winged, dorsally smooth, awn as in the sessile; pedicel wholly adnate to the joint of the rachis.

10. **R. Clarkei**, *Hack. in Estr. Bot. Zeitschr.* xli. (1891) 8; annual, leaves lanceolate base cordate, spikes solitary short, gl. I of sessile spikelet orbicular-oblong dorsally gibbous and scabrid below the middle winged above it, tip notched, pedicel of upper spikelet quite free. *R. gibbosa*, *Hack. ex Lisboa in Bomb. Journ. Nat. Hist.* vi. (1891) 195. *R. Talboti*, *Lisboa mss. l. c.*

BEHAR, on Parusnath; and Hazaribagh, in CHOTA NAGPORE, alt. 2000 ft., *Clarke*. BOMBAY; N. Kundra District, *Talbot, Lisboa*.

Stem 6-8 in., branched, erect, compressed. *Leaves* 3-5 by $\frac{1}{4}$ - $\frac{1}{2}$ in., acuminate, glabrous or hairy; sheath ciliate; ligule of hairs. *Spikes* $\frac{1}{2}$ -1 in., erect, rachis fragile, joints clavate shorter than the spikelets, tips ciliolate, side not hollowed. *Spikelets* $\frac{1}{10}$ - $\frac{1}{8}$ in., closely imbricating. Gl. I of sessile spikelet with a coriaceous 3-5-nerved disk and ciliate hyaline wings; II much smaller, ovate, 1-nerved; III ovate, obtuse, hyaline, nerveless; IV much smaller, broadly oblong, obtuse, nerveless, sides incurved, palea like the gl. nerveless. *Pedicelled spikelet* like the sessile, but smaller and less gibbous; pedicel pyriformly clavate, truncate, top scaberulous.

** *Gl. I of sessile spikelet winged at the tip only or narrowly on the margins.*

11. **R. exaltata**, *Linn. f. Suppl.* 114; annual, leaf-base narrow rounded tip setaceous, gl. I of sessile spikelet very coriaceous about as long as the joint obtuse hardly margined or winged dorsally flat smooth, pedicels of upper spikelet shorter than the joints. *Kunth Enum. Pl.* i. 466; *Hack. Monogr. Androp.* 294; *Steud. Syn. Gram.* 361; *Roxb. Corom. Pl.* ii. 30, t. 157, *Fl. Ind.* i. 354; *Grah. Cat. Bomb. Pl.* 233; *Thw. Enum. Pl. Zeyl.* 364; *Trim. Cat. Ceyl. Pl.* 107; *Aitchis. Cat. Panjab. Pl.* 172; *Duthie Grass. N.W. Ind.* 17; *Lisboa in Bomb. Journ. Nat. Hist.* vi. (1891) 196; *Miq. Fl. Ind. Bat.* iii. 406; *Br. Prodr.* 206; *Benth. Fl. Austral.* vii. 513; *Baker Fl. Maurit.* 457; *Wall. Cat. n.* 8875; *Wight Cat. n.* 1724, *Herb. n.* 3286. *R. arundinacea*, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 444; *Steud. l. c.* 362. *R. denudata*, *Steud.*; *Miq. l. c.* 408. *R. gymnorhiza*, *Herb. Ham. ex Wall. Cat. n.* 8875. *R. hispida*, *Herb. Roxb.* *R. setosa*, *Presl Rel. Hænk.* i. 329. *Ophiurus appendiculatus*, *Steud. l. c.* 359. *Stegoasia cochinchinensis*, *Lour. Fl. Cochinch.* 51.

Plains and lower hills of INDIA, from the N.W. Provinces to ASSAM and BURMA (ascending the HIMALAYA in Garwhal to 7000 ft.), and southward to Travancore and CEYLON. ANDAMAN ISLANDS., *Prain*.—DISTRIB. China, Malaya, Australia, Africa.

Stems 6-10 ft., stout, erect, spongy within, as thick as the little finger below and hispid. *Leaves* 6-24 by $\frac{1}{4}$ -1 in., linear-lanceolate, setaceously acuminate, scabrid or hispid above, margins scabrid; sheath hispid with tubercle-based hairs or glabrate. *Spikes* 3-6 in., stout, cylindric below, much narrowed with imperfect spikelets above; joints smooth, scaberulous. *Sessile spikelets* $\frac{1}{2}$ - $\frac{1}{3}$ in.; gl. I ovate-oblong, 2-fld., keels scaberulous narrowly winged, entire or emarginate; II broadly ovate, chartaceous, convex, 9-11-nerved, keel scabrid; III elliptic, 3-nerved, male, margins inflexed; IV shorter, convex, ovate, acute or mucronate. *Pedicelled spikelets* with the pedicel usually adnate by one margin to the joint, 1-2-fld. or neuter.

Var. robusta; leaf-base more cordately confluent with the sheath, spikes stouter below, slender above the middle, spikelets in upper half distichously imbricate longer than the joints, fertile nearly to the tip, palea of gl. IV auricled at the base.—Malabar and at Palamcotta, *Wight Herb. n.* 3286; *Wall. Cat. n.* 8875 E. Poona, *Woodrow*.

12. **R. nigrescens**, *Thw. Enum. Pl. Zeyl.* 364; leaf-base cordate, spike fragile, gl. I of sessile spikelet ovate-oblong very obtuse or 3-lobulate dorsally tessellately foveolate obscurely 2-winged in the upper third or tip. *Hack. Monogr. Androp.* 296; *Trim. Cat. Ceyl. Pl.* 107.

CEYLON; Central Province, alt. 4000 ft., *Thuaites*.

Stem tall, suberect, slender, glabrous. *Leaves* 4-8 in., linear-lanceolate, glabrous or sparsely hairy, margins scabrid, base ciliate; sheath glabrous or sparsely hirsute; ligule rounded, ciliate. *Spikes* 2-3 in., solitary or 2-nate, axillary and terminal; joints as long as the spikelet, stout, margins smooth. *Sessile spikelets* $\frac{1}{2}$ in., ovate-oblong; gl. I ovate, 9-nerved, wings scarious; II elliptic, obtuse, gibbous, keel winged below the tip; III hyaline, oblong, obtuse, paleate, nerveless; IV elliptic, obtuse, emarginate. *Pedicelled spikelets*; gl. I smooth, striate, winged above on one side, 7-9-nerved; II 5-nerved, keel excentric, winged; III and IV as in the sessile spikelet; pedicel adnate to the joint.

13. **R. striata**, *Nees ex Steud. Syn. Gram.* 361; leaf-base narrowed, spikes fascicled, often on very long peduncles, gl. I of sessile spikelet oblong-lanceolate shortly winged below the tip dorsally smooth with 4-6 often interrupted grooves below the middle. *Hack. Monogr. Androp.* 301.—*Wall. Cat.* n. 8876, 8877.

SIKKIM HIMALAYA, alt. 1-4000 ft., *J. D. H., &c.* SILHET and the KHASIA HILLS, *Wallich, &c.* BURMA and SINGAPORE, *Wallich, &c.*

Stem 3-4 ft., slender, thickened under the spikes, smooth, branched above. *Leaves* 2-4 ft. by $\frac{1}{2}$ -2 in., linear-lanceolate, setaceously acuminate, flat, midrib broad; sheath glabrous, upper spathiform; ligule very short, membranous. *Spikes* 1-2 in., pale, slender, terete, glabrous. *Sessile spikelets* as long as the joints; callus annular, glabrous; gl. I obtuse, convex, many-nerved within, keels smooth; II chartaceous, ovate, subacute, acutely keeled, 1-nerved; III ovate, acute, hyaline, nerveless, paleate; IV ovate, faintly 1-nerved. *Pedicel of upper spikelet* linear, flattened, free or $\frac{1}{2}$ or wholly adnate to the joint, tip hollowed, circular or compressed. *Hackel* has two subspecies.

Subsp. *genuina*; leaves 1-2 ft. by $\frac{1}{2}$ - $\frac{3}{4}$ in., spikes in a simple lax panicle, joints of rachis scaberulous, sessile spikelets $\frac{1}{2}$ in., pedicelled spikelets of one long obtuse glume winged on one side.—Of this there are two vars., *a. glabrior*, stems and surfaces of leaves quite glabrous, margin of leaves and sheaths ciliate.—Singapore and Tavoy; and *β . pubescens*, stem above and surfaces of leaves pubescent.—Khasia Hills.

Subsp. *khasiana*; stem very tall much branched, leaves 3-4 ft. by 1-2 in., spikes 1-1 $\frac{1}{2}$ in. in a compound panicle; joints smooth, sessile spikelets $\frac{1}{2}$ in., gl. I more broadly winged, pedicelled spikelet $\frac{1}{2}$ in., oblong. *R. khasiana*, *Munro mss.*—Sikkim and the Khasia Hills.

14. **R. glandulosa**, *Trin. in Mem. Acad. Petersb. Ser.* 6, ii. (1833) 250; perennial, spikes fragile, sessile spikelets ovate-lanceolate, gl. I narrowly winged in the upper third, dorsally scaberulous, margins below with on each side 5-7 upcurved mucros or tubercles. *Hack. Monogr. Androp.* 302; *Miq. Fl. Ind. Bat.* iii. 408. *Cœlorachis muricata*, *Brongn. in Duperr. Voy. Bot.* i. 65, t. 14. *Ophiurus muricatus*, *Steud. in Zoll. Syst. Verz.* 57, *Syn. Gram.* 360.—*Rottboellia*?, *Wall. Cat.* n. 8887 B.

BURMA, *Wallich.* MALAY PENINSULA; Singapore, *Wallich*; Malacca, *Griffith*; Perak, *King's Collector*; Pahang, *Ridley.*—DISTRIB. Java, Philippines.

Stem 3-8 ft., tall, stout, branched, nodes pubescent or bearded. *Leaves* 2-3 ft. by $\frac{1}{2}$ -1 in., linear, caudate-acuminate, base usually fimbriate, margin scabridly serrulate; sheath bearded at the mouth; ligule densely hairy. *Spikes* many, 2 $\frac{1}{2}$ -4 in., slender, terete, pale or violet. *Sessile spikelets* $\frac{1}{2}$ - $\frac{3}{4}$ in., 1-fl., rather shorter than the glabrous joints; gl. I flat, obtuse, dorsally scaberulous; II charta-

ceous, elliptic-lanceolate, ciliolate; III ovate-oblong, obtuse; IV hyaline, 3-nerved; palea truncate, nerveless. *Pedicelled spikelets* reduced to a solitary gl. winged on one side, rarely with a second; pedicel adnate to the joint of the rachis.—A solitary specimen of a closely allied, I think, undescribed, species from Rangoon, *McLelland*, has caudate acuminate leaves, solitary spikes, sessile spikelets longer than the joints, gl. I narrowly oblong, margins smooth.

15. **R. Helferi**, *Hook. f.*; perennial, spikes solitary fragile subsessile in the sheaths, joints very short pyriform, sessile spikelets longer than the joints, gl. I ovate obtuse narrowly winged above the middle, back and sides smooth.

TENASSERIM, *Helfer*.

Stem 1–2 ft., slender, erect, from a nodose stock, sparingly branched above; nodes faintly bearded. *Leaves* 1–2 ft. by $\frac{1}{2}$ – $\frac{1}{3}$ in., erect, linear from a hardly narrowed base, finely acuminate, hairy on both surfaces; sheath glabrous, bearded at the tip. *Spikes* 1–4 in., slender, erect; joints $\frac{1}{2}$ in., excavate on one side, base shortly hairy. *Spikelets* $\frac{1}{2}$ in.; gl. I broadly ovate, narrowed suddenly above the middle, smooth, glabrous, or slightly pubescent on the sides below, wings serrulate; II ovate, acuminate, chartaceous, 1-nerved, keeled, faintly obliquely winged above, III broadly ovate, obtuse, hyaline, faintly 3-nerved, palea small 2-toothed; IV ovate, obtuse or subacute; palea broad, truncate, 2-nerved. *Pedicel* of upper spikelet longer than the joint, linear, flattened, strongly 2-nerved, ciliolate at the base; spikelet reduced to a minute ovate glume.

B. Sessile spikelets geminate in all but the uppermost joints of the spike.

Sect. V. MNESITHEA, *Kunth* (genus).

16. **R. perforata**, *Roxb. Pl. Corom.* ii. 43, t. 182, *Fl. Ind.* i. 356; leaves very narrow, spikelets glabrous, pedicelled spikelets reduced to a minute gl. *R. lævis*, *Retz. Obs.* iii. 11; *Steud. Syn. Gram.* 362. *Ophiurus perforatus*, *Trin. in Mem. Acad. Petersb. Ser.* 6, ii. (1833) 246; *Hack. Monogr. Androp.* 319. *O. lævis*, *Benth. in Journ. Linn. Soc.* xix. (1881) 69; *Trim. Cat. Ceyl. Pl.* 107; *Duthie Grass. N.W. Ind.* 17, *Fodd. Grass. N. Ind.* 29; *Lisboa in Bomb. Journ. Nat. Hist.* vi. (1891) 193. *Mnesithea lævis*, *Kunth Revis. Gram.* i. 154, *Enum. Pl.* i. 466, *Suppl.* 375, t. 18, f. 3; *Thw. Enum. Pl. Zeyl.* 364; *Wall. Cat. n.* 8873; *Wight Cat. n.* 1722; *Aitchis. Cat. Panjab. Pl.* 172. *Hemarthria?* *perforata*, *Kunth l.c.* 453, *Enum.* i. 465. *Diperium cylindricum*, *Desv. Opusc.* 76, t. 6, f. 3. *Thyridostachyum læve*, *Nees in Lindl. Introd. Nat. Syst. Ed.* II. 379. *Ægilops cuneata*, *Herb. Roxb.*

Throughout INDIA, from the INDUS to BURMA and southward to CEYLON.—
DISTRIB. Afghan., Java.

Stem 2–4 ft., rather slender, simple or branched above; nodes few. *Leaves* 6–30 by $\frac{1}{2}$ in., flat (conduplicate in veneration), linear from a narrow base, glabrous or base hairy, upper acute, lower obtuse, margins scaberulous; sheath terete; ligule very short. *Spikes* 4–8 in., shortly exserted, joints semi-cylindric, excavate on opposite sides with the pedicel of the imperfect spikelets between the opposite fertile spikelets. *Spikelets* $\frac{1}{2}$ – $\frac{1}{3}$ in.; gl. I oblique, smooth or pitted above the base.

17. **R. merguensis**, *Hook. f.*; leaves $\frac{1}{2}$ – $\frac{1}{3}$ in. broad, spikelets glabrous, pedicelled spikelet minute imperfect.

TENASSERIM; Mergui, *Griffith, Helfer.*

Habit of *R. perforata*, but at once distinguished by its greater size, and broad leaves which attain an inch in breadth with the tip finely acuminate, base rather narrowed, margins ciliate below the middle or towards the base only, both surfaces glabrous; sheath with glabrous or ciliate margins. *Spikes* 2-3 in., long peduncled; top of peduncle slightly clavate; joints $\frac{1}{2}$ in., about as long as the spikelets, clavate, quite smooth. *Sessile spikelets* ovate-oblong, winged at the top, quite smooth or with a few linear impressed pits, margins naked or obscurely ciliate.

18. *R. geminata*, *Hack. in Cestr. Bot. Zeit.* xli. (1891) 48; gl. I of sessile spikelets hirsute below with tubercle-based hairs.

MALAY PENINSULA; Pahang, *Ridley.*

Stems upwards of 2 ft. high, sparingly branched and flowering above; nodes bearded with reflexed hairs. *Leaves* 12 by $\frac{1}{8}$ - $\frac{1}{4}$ in., linear, acuminate, rigidulous; sheaths appressed, mouths bearded; ligule short, membranous. *Spikes* about 2 $\frac{1}{2}$ by $\frac{1}{2}$ in., green, fragile; joints about $\frac{1}{4}$ in., shorter and as broad as the spikelets, clavate, dorsally convex, ventrally and the tops deeply hollowed. *Spikelets* $\frac{1}{2}$ in., separated by the narrow pedicel of the withering upper spikelets, dimidiate-ovate, glabrous, callus annular; gl. I coriaceous, acuminate, narrowly winged at the top on each side, margins narrowly inflexed, nerves many very slender, hairs white; II as long as I, ovate, subulate-acuminate, keeled, chartaceous; III shorter, hyaline, ovate, acuminate, empty, nerves 0; IV 1-nerved; palea like its gl.—Description from *Hackel*; I have not seen it.

UNDETERMINABLE SPECIES.

R. villosa, *Poir. Encycl.* vi. 313; is, according to *Hackel (Monogr. Androp.* 313), probably an *Ischænum* or *Andropogon*.

47. MANISURIS, Sw.

Annual, erect, much branched grasses. *Leaves* cordate at the base. *Spikes* terete, solitary, axillary and terminal, peduncles often confluent in a leafy spiciform panicle; rachis fragile; joints short, deeply excavate, tips with 2 pits. *Spikelets* 1-2-fl., in dissimilar pairs, one globose, sessile, bisexual; the other ovate, pedicelled, neuter, pedicel adnate to the joint of the rachis. *Sessile spikelet*; glumes 4, I hard, globose, foveolate, with an oblong opening opposite the rachis; II chartaceous, immersed in the cavity of I and filling the opening; III hyaline, empty; IV and its palea hyaline. *Lodicules* 2, broadly cuneate. *Anthers* minute. *Styles* free, stigmas short, exserted from the opening in gl. I. *Grain* subglobose.—Species 2, tropical.

1. *M. granularis*, *Linn. f. Nov. Gram. Gen.* 37, f. 7, fig. 4-7; sessile spikelets globose deeply pitted smooth between the pits, gl. II 1-nerved. *Sw. Prodr. Veg. Ind. Occ.* 25 (*partim*), *Fl. Ind. Occ.* i. 186; *Gærtn. Fruct.* ii. 468, t. 175; *Beauv. Agrost.* 119, t. 21, f. 10; *Roxb. Pl. Corom.* ii. 11, t. 118; *Kunth Enum. Pl.* i. 469; *Hack. Monogr. Androp.* 314; *Steud. Syn. Gram.* *Grah. Cat. Pl. Bomb.* 234; *Dalz. & Gibs. Bomb. Fl.* 300; *Griff. Notul.* iii. 101; *Thw. Enum. Pl. Zeyl.* 364; *Trim. Cat. Ceyl. Pl.* 107; *Duthie Grass. N.W. Ind.* 18, *Fodd. Grass. N. Ind.* 29, t. 46; *Lisboa in Journ. Bomb. Soc. Nat. Hist.* vi. (1891) 196; *Benth. Fl. Austral.* vii. 511; *Miq. Fl. Ind. Bat.* iii. 409; *Griseb. Fl. Brit. W. Ind.* 557; *Doell. in Mart. Fl. Bras.* ii. II. t. 46; *Wall. Cat. n.* 8879; *Wight Cat. n.* 1726. *M. polystachya*, *Beauv. Fl. Owar. & Ben.* i. 24, t. 14. *M. hirta*, *Herb. Russ. ex Wall. Cat. l. c.* *Cenchrus granularis*, *Linn. f. Mant.* ii. *App.* 575.

Throughout the hotter parts of INDIA, from the Panjab eastward to Burma, and southward to CEYLON.—DISTRIB. Most tropical countries.

Stem 1–2½ ft. and leaves softly hairy, leafy to the top, as thick as a crow-quill. *Leaves* 4–10 by ¼–½ in., flaccid, flat, acuminate; sheaths hirsute, inflated; ligule a raised ciliate margin. *Spikes* ¼–1 in.; peduncle filiform. *Sessile spikelets* ⅓ in. diam., superposed like minute beads on the rachis, and each as it were bracteate by the upper spikelet of the pair below it.

2. *M. porifera*, Hack. in *Estr. Bot. Zeitschr.* xli. (1891) 48; sessile spikelets broadly oblong truncate deeply broadly pitted, gl. I 5-nerved between transverse longitudinal ridges, II 3-nerved.

SIKKIM HIMALAYA; Dikeeling, alt. 3000 ft., Clarke. TENASSERIM, Helfer.

Habit and foliage, &c. of *M. granularis*. *Spikelets* ⅓–½ in., brownish; callus smooth or foveolate; gl. I excised at the base on both sides, leaving a rounded pore between it and the rachis.—There is a specimen of this in Herb. Wight, without name or locality.

48. *OPHIURUS*, Gærtn.

Annual or perennial grasses. *Spikes* solitary or fascicled, terete, fragile; joints excavate, top concave. *Spikelets* 2-fl., solitary and sessile in the joints (with no upper or pedicel of one), not awned. *Glumes* 4, I thickly coriaceous, convex, obtuse; II almost membranous, concave, keeled; III elliptic, obtuse, hyaline, faintly 2-nerved, margins infolded, paleate, male; IV as long as III, oblong, obtuse, -nerved, paleate bisexual, palea narrow; IV oblong, obtuse. *Lodicules* 2, cuneate. *Stamens* 3. *Grain* oblong, free.—Species one or two. Tropical Asiatic and African.

Ophiurus, as defined by Hackel and Benth, is an artificial genus, of which the original species, *O. corymbosus*, has solitary sessile 2-fl. spikelets on each joint of the spike, with no obvious traces of a second, by which character it differs from *Rottboellia*. Of other Indian plants referred to it, *O. perforatus* (*Rottboellia perforata*, Roxb.) has 2 sessile 1-fl. spikelets on each joint of the spike, with a long interposed pedicel of a second perfect or imperfect one. It is the genus *Mnesithea* of Kunth. Two admitted species of *Rottboellia* have the same structure as *O. perforatus*, namely, *R. hirsuta*, Forsk., and *R. geminata*, Hack. These three should form either a separate genus (*Mnesithea*), or a section of *Rottboellia*, which latter course I have adopted. Hackel describes the joints of *O. corymbosus* as being thickened on one side by the presence of the confluent pedicel of a second spikelet, but I find no trace of this (nor can Dr. Stapf), and he describes *R. perforatus* as with one sessile spikelet on each joint, or with two on the lower joints only; but I find that in all the specimens two sessile spikelets is the normal condition almost throughout the spikes, the uppermost joints alone having but one.

O. corymbosus, Gærtn. f. *Fruct.* iii. 4, t. 181, f. 3 a (*Ophiuros*); *Kunth Enum. Pl.* i. 464; *Hack. Monogr. Androp.* 317; *Steud. Syn. Gram.* 359; *Wall. Cat. n.* 8874; *Wight Cat. n.* 1723; *Duthie Grass. N.W. Ind.* 17, *Fodd. Grass. N. Ind.* 29, t. 55; *Lisboa in Bomb. Journ. Nat. Hist.* vi. (1891) 193; *Benth. Fl. Austral.* vii. 512. *Rottboellia corymbosa*, Linn. f. *Suppl.* 114; *Roxb. Pl. Corom.* ii. 42, t. 181, *Fl. Ind.* i. 355; *Grak. Cat. Bomb. Pl.* 233. *R. punctata*, Retz. *Obs.* iii. 11. *Ægilops exaltata*, Linn. *Mant. ii. App.* 575; *Retz. l. c.* ii. 27.

Dry hills, ascending to 3500 ft. in the HIMALAYA and KHASIA HILLS, and southward to the DECCAN PENINSULA (not in Ceylon).—DISTRIB. Tonkin, Australia.

Perennial. *Stems* erect from a tuberous base, 5–6 ft., as thick as a goose-quill

below, solid, branching upwards, leafy throughout. *Leaves* $\frac{1}{2}$ –2 ft. by $\frac{1}{2}$ –1 in., flat (convolute in vernation), linear-lanceolate from a rounded base, finely acuminate, hairy above, margins spinulose; sheaths short, terete, upper leafless; ligule very short. *Spikes* corymbosely fascicled, 2–5 by $\frac{1}{2}$ in. diam., erect, often in very dense fascicles, shortly peduncled; joints as long and broad as the spikelets, tips obliquely truncate. *Spikelets* ovate-oblong, obtuse, glabrous; gl. I smooth or scrobiculate, at length recurved.

49. RATZEBURGIA, Kunth.

A tufted slender perennial grass. *Spikelets* 1-fl., superposed in opposite pairs on a slender simple compressed subfragile spike, each pair sessile on a joint of the rachis, dorsally strongly compressed and appressed face to face (looking like one), rachis prolonged along the margins of the pairs on one side, and with the rachilla of a neuter along the opposite edges. *Glumes* 4, I thickly coriaceous, flat, oblong, deeply pitted, terminated with 2 erect coriaceous wings, margins strongly tubercled; II thinly coriaceous, lanceolate, acute, glabrous; III oblong, obtuse, hyaline, epaleate; IV smaller, epaleate. *Lodicules* obliquely quadrate. *Anthems* 3, short. *Stigmas* long.

R. pulcherrima, Kunth *Revis. Gram.* ii. 487, *Enum. Pl.* i. 468; Wall. *Pl. As. Rar.* iii. 253, t. 273 (*Aikinia*), *Cat.* n. 8868; Hack. *Monogr. Androp.* 321. *Ophiurus auriculatus*. Trin. in *Mem. Acad. Petersb. Ser. VI.* ii. (1833), 246. *Aikinia elegans*, Wall. l. c.

BURMA; at Pagan and the Petroleum Wells, Wallich; Upper Burma, Collett.

Stoloniferous; stem 6–18 in., geniculate and leafy below. *Leaves* 1–3 in., narrow, flat, margins thickened, tip rounded; sheath compressed; ligule short. *Spike* 1–2 in., $\frac{1}{2}$ in. broad; peduncle very slender with 2–3 long-sheathed leaves below; joints and pedicels of neuter alike, incurved, obtusely angled, bearded along the inner angle and the hammer-headed top. *Spikelets* about $\frac{1}{2}$ in.; wings of gl. I earlike, sublobed.

50. ELIONURUS, Humb. & Bonpl.

Aromatic grasses. *Spikes* solitary, subsimple, clothed with silky hairs, rachis flattened, jointed, fragile. *Spikelets* 2-nate, a sessile and pedicelled; joints compressed, margins thickened, tips obliquely truncate. *Sessile spikelets* dorsally compressed, 1-fl.; glumes 4, I coriaceous, entire or 2-fl., embracing II by its margins; II narrower, membranous; III hyaline, empty, paleate or not; IV small, hyaline, paleate or not, awn 0. *Lodicules* obliquely quadrate. *Anthems* 3, short. *Styles* short, free. *Grain* narrow, plano-convex, free.—Species about 15, tropical and subtropical.

Hackel observes that *Elionurus* differs from *Rottboellia* and agrees with *Euanthropogonea* in the entire sessile spikelet falling away with the joint, whereas in *Rottboellia*, gl. I is removable and II and III persistent in the hollow of the joint. The Aromatic oil of *Elionurus* is contained in the glumes.

1. **E. Royleanus**, Nees ex A. Rich. *Tent. Fl. Abyss.* ii. 471; annual, dwarf, spikes corymbosely each sheathed, gl. I of sessile spikelet lanceolate narrowed into a 2-flid beak, margins with penicillate tubercles, III and IV epaleate. Hack. *Monogr. Androp.* 343; Duthie *Grass. N.W. Ind.* 17, Fodd. *Grass. N. Ind.* 28, t. 54. E. Grisebachii, Schmidt *Beitr. Fl. Ins. Cap. Verd.* 154. *Rottboellia elegantissima*, Hochst. & Steud. ex Steud. *Nom. Ed. II.* ii. 474. *Andropogon elegantissimus* & Grisebachii, Steud. *Syn. Gram.* 364, 365. *Ratzeburgia Schimperii*, Steud. *Nom. l. c.* 439.

UPPER GANGETIC PLAIN, *Royle*; Agra and Ettawah, *Duthie*; Delhi, *Clarke*.—
DISTRIB. Arabia, Abyssinia, Cape Verd Islds.

Stems 4–12 in., slender, leafy, geniculate. *Leaves* 4–10 in., narrow, flat or convolute, glabrous or sparsely hairy, base fimbriate; lower sheaths terete, upper spathiform; ligule very short. *Spikes* 1–2 in., erect, clustered towards the top of the stem, stout, green or purple, each enclosed in a long narrow flattened acute sheath; joints bearded below the tip. *Sessile spikelets* $\frac{1}{2}$ in., erect; callus densely bearded; gl. I deeply 2-fid at the top, lobes linear ciliate divergent, sides with a row of large tubercles each carrying a pencil of long hairs; II membranous, linear-lanceolate, acuminate, 1-nerved; III shorter, oblong, acute, nerveless, glabrous, epaleate; IV much shorter, oblong, obtuse, 1-nerved or nerveless. *Pedicelled spikelets* $\frac{1}{2}$ in., narrowed almost from the base into a long subulate ciliate blade; II cymbiform, glabrous, narrowed into a scabrid awn; III and IV 0, pedicel with one margin shortly ciliate.

2. *E. hirsutus*, *Munro ex Benth. in Journ. Linn. Soc.* xix. (1881) 68; perennial, spikes peduncled naked, gl. I of sessile spikelet narrowed into a long narrow flat 2-fid beak margins villous, gl. III and IV paleate. *Boiss. Fl. Orient.* v. 466; *Duthie Grass. N.W. Ind.* 17, *Fodd. Grass. N. Ind.* 28, t. 17. *Rottboellia hirsuta*, *Vahl Symb.* i. 11; *Del. Fl. Egypt.* t. 14, f. 1; *Kunth Enum. Pl.* i. 467; *Hack. Monogr. Androp.* 311. *Ischæmum hirsutum*, *Nees ex Steud. Syn. Gram.* 361. 1. *mastucatum*, *Trin. in Mem. Acad. Petersb. Ser. VI.* ii. (1833), 298. *Coelorachis hirsuta*, *Brongn. in Duperr. Voy. Bot.* 68. *Lasiurus hirsutus*, *Boiss. Diagn. Pl. Or.* II. iv. (1859) 146. *Saccharum hirsutum*, *Forsk. Fl. Egypt. Arab.* 16.

NORTHERN PANJAB; Jelalpoor on the Jhelum, *Jacquemont*; Peshawur, alt. 3500 ft., *Stewart*. RAJPOOTANA; Multan, *Edgeworth*; Sind, *Stocks*.—DISTRIB. Westward to N. Africa.

Rootstock woody, branched. *Stems* 1–2½ ft., ascending from a branching base, stout, smooth, rigid. *Leaves* narrow, coriaceous, sheaths white. *Peduncle* 6–10 in., slender. *Spike* solitary, stout, 2–4 in., silvery silky all over. *Spikelets* imbricating, appressed to the rachis; gl. I of lateral spikelet divergent, narrowly lanceolate, coriaceous, 7–9-nerved; II $\frac{1}{2}$ shorter, chartaceous, 5-nerved, aristately acuminate, awn scabrid; III hyaline, oblong, obtuse, faintly nerved, neuter, palea lanceolate, nerves scaberulous; IV oblong, obtuse, faintly 5-nerved, palea as of gl. III but smaller. *Pedicelled spikelet* smaller, erect; gls. shorter, flowerless.—Regarded by *Hackell* as an anomalous *Rottboellia*, and nearer to *Ischæmum* than to *Elionurus*, but neither in habit nor characters does it approach the *Rottboellia*; and is naturally, I think, an *Elionurus*, from other species of which it only differs in the paleate gls. III and IV.

51. CLEISTACHNE, *Benth.*

Tall perennial grasses. *Leaves* long, narrow, flat. *Spikelets* solitary, 1-fld., in an oblong contracted much branched panicle, linear-oblong, terete, hirsute, jointed on the branchlets of the panicle. *Glumes* 4, I and II narrow, rigidly coriaceous, obtuse, completely enveloping III and IV; III much smaller, narrow, hyaline, 2-nerved, margins inflexed ciliate; IV very short, hyaline, with a terminal stout twisted awn; palea minute, hyaline, ciliate. *Lodicules* cuneate, ciliate. *Anthers* 3, large, linear. *Styles* free, stigmas short. *Grain* obovate-oblong, compressed, free.—Species 3, the following and 2 African.

The affinities of this genus and of *Germainia* are with *Anthistiria*.

C. Stocksii, *Hook. f.*; ligule oblong, spikelets dark brown, margins of gl. IV entire, palea ovate obtuse.

MALABAR; on the Bababoodan Hills, *Stocks, Ritchie.*

Stem tall, stout, simple. *Leaves* 12-.6 by $\frac{1}{2}$ in., finely acuminate, softly hairy, midrib stout, margins slightly thickened ciliate; sheath terete; ligule coriaceous. *Panicle* 6-8 in., long-peduncled, suberect; rachis and branches sparsely ciliate, branchlets (pedicels of spikelets) strigose with bright yellow hairs. *Spikelets* $\frac{1}{2}$ in., crowded; callus short, bearded; gl. I dark brown, obscurely many-nerved, hirsute, shining; II like I but narrower, nearly glabrous; III 2-nerved, margins infolded, tip hispid; IV a twisted awn $\frac{3}{4}$ -1 in. long, dilated at the base into a hyaline 3-nerved membrane embracing the minute palea.—Very closely allied to the African *C. sorghoides*, Benth., which differs in its very short ligule, golden yellow spikelets, usually 2-fid gl. IV, and transversely oblong ciliate palea.

52. GERMAINIA, Balans. & Poitrass.

Rigid perennial grasses. *Leaves* narrow. *Peduncles* erect, bearing terminal narrowly oblong naked heads of 4 male spikelets, forming an involucriform whorl round a few long-awned females. Male spikelets sessile, 2-fid., glumes 4; I linear-oblong, very coriaceous, truncate, many-nerved, dorsally convex; II rather longer but much narrower, membranous, narrowly lanceolate, 3-nerved; III hyaline, narrowly lanceolate, 1-nerved, diandrous, its palea (if present) as long as itself; IV hyaline, lanceolate, diandrous; palea as long. *Fem. spikelets* much smaller than the male, cylindric, obliquely inserted on a pedicel by an obconical bearded callus; glumes 3, I chartaceous, linear, truncate, convolute round the others; II similar, but shorter; III the long twisted awn which is slightly dilated at the very base; palea short, very broad, tip erose. *Lodicules* 0. *Anthers* 2, very long. *Styles* slender, stigmas long narrow. *Grain* closely wrapped in the glumes.—Species 3 or 4, Indian, African and Chinese.

1. *G. khasiana*, Hack. in *Æstr. Bot. Zeitschr.* xli. (1891) 50; leaves short linear-lanceolate quite glabrous, male spikelets sessile on the contracted tip of the peduncle, gl. I entire retuse or notched.

KHASIA HILLS; at Nurtiung and Poorung, alt. 4-4500 ft., *Clarke.*

Stems densely tufted, a foot high, erect, leafy, terminating in long slender peduncles. *Leaves* 1-2 in., narrow, acuminate, coriaceous, 1-nerved; ligule hardly any. *Heads* $\frac{1}{2}$ - $\frac{3}{4}$ in. long. *Gl.* I of male fl. polished, tip ciliate; gl. I of bisexual spikelet scaberrulous, tip ciliate; awn of III 2 in. long.—Very near *G. capitata*, Bal. & Poitr. of China, and probably only a form of that plant, which has rather larger heads and its gl. I has a semicircular retuse tip with a sharp tooth on each side.

2. *G. lanipes*, Hook. f.; leaves very long and narrowly linear sheaths at the base of the stem clothed with silvery wool, male spikelets superposed on a very short rachis.

TENASSERIM, *Helper.*

I have examined very scanty material of this curious species, which differs from *G. khasiana* in the short stout rootstock with very thick roots, clothed for an inch or more with snowy wool, and radical leaves a ft. long by $\frac{1}{2}$ in. broad.

52.¹ COELARTHON, Hook. f.

(Genus not in *Clavis*, p. 5.)

A very slender, straggling, nearly glabrous grass. *Leaves* small, elliptic, acute at both ends. *Spikelets* 1-fid., binate, a sessile bisexual and a minute often imperfect pedicelled, secund and imbricating on the fragile rachis of

a solitary erect spike; lowest pair on the spike imperfect; joints of rachis shorter than the sessile spikelet, clavate, tubular, tip truncate open, mouth entire compressed. *Sessile spikelets* dorsally flattened; callus very short, bearded; gl. I ovate-oblong, tip narrowly truncate, dorsally glabrous with a deep median channel, margins narrowly inflexed above broadly incurved below, keels subpectinately ciliate above the middle; II cymbiform, 1-nerved, awned; III oblong, 1-nerved; IV very small, 2-fid, 3-nerved, awn slender, twisted; palea minute. *Lodicules* 2, cuneate-quadrangle. *Stamens* 3. *Styles* 2. *Grain* fusiform. *Pedicelled spikelets* = $\frac{1}{2}$ the sessile or less, male or neuter gls. 2-3, not awned; pedicel linear, flat.

A remarkable grass, differing from *Andropogon* in the second spikelets, hollow joints of the rachis, deeply channelled gl. I of the sessile spikelet (as in *Sect. Sekima* of *Ischæmum*), and the reduced pedicelled spikelets.

C. Brandisii, Hook. f. in Hook. Ic. Plant. ined.

BURMA; high ground, generally with Teak, *Brandis*.

Stems very weak, branching, struggling, rooting at the nodes, white; with ascending filiform 1-2-leaved flowering branches. *Leaves* 1-2 by $\frac{1}{6}$ - $\frac{1}{4}$ in., inserted on the sheath by a mere point; acute or acuminate at both ends, membranous, flaccid, surfaces and margins quite smooth, midrib and nerves very slender; sheath glabrous; ligule oblong, obtuse. *Spike* 1-1 $\frac{1}{2}$ in., strict or incurved, quite white. *Sessile spikelets* $\frac{1}{2}$ in.; gl. I with a strong median keel on the ventral surface; II notched at the tip, awn as long as the gl. or shorter, very slender, recurved; III flat, ciliate; awn of IV $\frac{3}{4}$ in., very slender, geniculate, column brown twisted, upper half very pale.

53. **ANDROPOGON**, Linn.

Grasses of various habit. *Leaves* usually narrow, base rarely rounded or cordate. *Inflorescence* of solitary binate digitate fascicled or panicle spikes (which are sometimes reduced to 3 spikelets), rachis articulate, usually fragile. *Spikelets* binate, a sessile fem. or bisexual, and a pedicelled male or neuter. *Sessile spikelet* 1-fld., glumes 4, I dorsally rarely laterally more or less compressed, margins inflexed or incurved, usually keeled; II as long as I, usually laterally compressed, awned or not; III hyaline, empty, 2-nerved or nerveless, epaleate; IV hyaline, broad or narrow, 2-fid and awned in the cleft or reduced to an awn more or less dilated at the base, paleate or not. *Lodicules* cuneate-quadrangle. *Stamens* 3. *Stigmas* laterally exerted. *Grain* free. *Pedicelled spikelets* various, gls. 3-4, IV awnless.—Species about 200, chiefly tropical.

In this most difficult genus I have followed Hackel as closely as I could, not venturing to depart far from his grouping of the Indian species, to attempt which with any prospect of success would demand a revision of the whole genus. Hackel's two principal groups (Series), *Isozygi* and *Heterozygi*, unfortunately separate widely subgenera of close affinity in habit and in all other characters, except that adopted to distinguish between these groups. Thus the first two or even 4 subgenera of *Isozygi* are closely related to *Cymbopogon* amongst *Heterozygi*, and not to those that immediately follow them in the series. Added to this, on the one hand the characters drawn from the form, sexuality, &c., of the lower sessile spikelets of the *Heterozygi* as distinguishing them from those of *Isozygi* are often variable and very difficult of detection; and on the other hand the same characters do occur here and there in several subgenera of the latter group. With regard to Hackel's subgenera, they appear to me to be on the whole well constructed and natural, though often depending on characters, some inconstant, others difficult of detection or appreciation. Of the best defined I should, following older authors, have preferred to have treated

them as genera, especially *Chrysopogon*, *Cymbopogon* and *Heteropogon*; and his section *Pseudanthistiria* of subgen. *Hypoginium*, should certainly rank as a genus closely allied to *Anthistiria*.—The following is Hackel's grouping:—

Series I. ISOZYGI. Sessile spikelets of all the pairs alike in sex and form throughout the spikes.

* Peduncle of spikes enclosed in spathiform leaf-sheaths.

† Joints of rachis and pedicels of upper spikelets clavate or trumpet-shaped, top cupular with toothed margins.

§ Spikes solitary on the peduncle.

Pedicelled spikelets smaller than the sessile 1. SCHIZACHYRIUM.

Peduncled spikelets larger than the sessile 2. DIETOMIS.

§§ Spikes 2 or more on the peduncle 3. AETHROLOPHIS.

†† Joints of rachis and pedicels of upper spikelets slender, top obliquely truncate cupped or not 4. HYPOGINIUM.

** Peduncles of spikes not enclosed in spathiform leaf-sheaths; joints of rachis slender.

Joints of rachis and pedicels of upper spikelets linear compressed with usually a central translucent channel and thickened margins 5. AMPHILOPHIS.

Joints of rachis very few, filiform, opaque; lodicules ciliate; grain dorsally compressed 6. SORGHUM.

Joints of rachis many, stout or slender, opaque 7. VETIVERIA.

Joints of rachis few; spikes articulate on the obliquely truncate bearded tips of the branches of the panicle 8. CHRYSOPOGON.

Series B. HETEROZYGI. Lowest one or more sessile spikelets differing from all those above it in sex or form.

Spikes many (rarely 1 or few) on the peduncle digitate, sessile spikelets dorsally compressed 9. DICHANTHIUM.

Spikes binate on the peduncle which is enclosed in a spathiform sheath; sessile spikelet dorsally compressed 10. CYMBOPOGON.

Spikes solitary, lower pairs of spikelets very unlike the upper; upper sessile spikelets cylindric 11. HETEROPOGON.

Subgen. I. SCHIZACHYRIUM, *Benth.* Spikes solitary; peduncle in a spathiform leaf-sheath; joints and pedicels clavate or bucciniform, mouths broad cupular irregularly toothed. Sessile spikelets dorsally compressed, callus short; gl. I keeled; II not awned; IV hyaline, 2-fid, awned in the cleft. Pedicelled spikelets usually small, imperfect and withering.

* *Annuals.*

- 1. *A. brevifolius*, *Sw. Prodr. Veg. Ind. Occ. 26, Fl. Ind. Occ. i.* 209; glabrous, stems slender straggling much branched leafy, leaves divaricate linear obtuse or subacute, spathes very narrowly linear spreading, spikes glabrous or sparsely hairy. *Kunth Revis. Gram. ii.* 563, t. 196, *Enum. Pl. i.* 488, *Suppl.* 399; *Steud. Syn. Gram.* 366; *Hack. Monogr. Androp.* 363; & in *Mart. Fl. Bras. ii.* III. 302; *Benth. Fl. Hongk.* 423; *Duthie Grass. N.W. Ind.* 19, *Fodd. Grass. N. Ind.* 34; *Griseb. Fl. Brit. W. Ind.* 538. *A. debilis*, *Kunth l.c.* *A. flaccidus*, *A. Rich. Tent. Fl. Abyss. ii.* 452. *A. floridus*, *Trin. in Mem. Acad. Petersb. Ser. VI. ii.* (1833) 265. *A. fragilis*, *Br. Prodr.* 202; *Kunth Enum. l.c.* *A. obtusifolius*, *Poir. Encycl. Suppl. i.* 583. *A. parviflorus*, *Roxb. Fl. Ind. i.* 274. *A. tenellus*, *Presl Rel. Hænk. i.* 335. *Pollinia fragilis & brevifolia*, *Spreng. Syst. i.* 288, 289. *P. vaginata*, *Spreng. Pugill. ii.* 11. *Schizachyrium brevifolium*, *Nees Agrost. Bras.* 332.—*Andropogon*, *Wall. Cat. n.* 8824–5–6. *Batratherum*, *Wall. l.c.* n. 8827.

TROPICAL HIMALAYA, from Kumaon to Sikkim, BEHAR, CENTRAL INDIA,

CHITTAGONG, BURMA, the NICOBAR ISLANDS, and the MALAY PENINSULA.—DISTRIB. Tropics.

Stems 8-24 in., very many from the root, filiform, flaccid, geniculate, leafy throughout. *Leaves* 1-3 in., $\frac{1}{8}$ - $\frac{1}{4}$ in. broad, flat, glabrous, margins and nerves beneath scabrid. *Spikes* numerous; peduncle capillary; spathes 1-1 $\frac{1}{2}$ in., flat; joints 5-10 as long as the sessile spikelet, and pedicels clavate, tips 2-toothed. *Sessile spikelets* $\frac{3}{8}$ in., linear-oblong; gl. I coriaceous, tip 2-fid; awn $\frac{1}{2}$ - $\frac{1}{2}$ in. *Pedicelled spikelet* reduced to a long-awned glume.

2. **A. axilis**, *Hochst. in Flora*, xxvii. (1844) 241; slender, erect, fastigiate branched above, leaves very narrow acuminate, spathe erect narrowly lanceolate, spikes silkily villous. *Hack. Monogr. Androp.* 365. *A. fragillimus*, *Steud. Syn. Gram.* 384. *A. fragilissimus*, *Hochst. in Schimp. Pl. Abyss.* n. 2057. *A. Petitianus*, *A. Rich. Tent. Fl. Abyss.* ii. 451.

BENGAL, Chota Nagpore, and the Central Provinces, *Clarke, Duthie, &c.*—DISTRIB. Afric. trop.

Stems short stout and densely tufted, or lax erect and 12-18 in. high, leafy. *Leaves* 1-3 in., erect, glabrous or sparsely hairy. *Spathes* 1-1 $\frac{1}{2}$ in., slender; peduncles $\frac{1}{4}$ -1 in., compressed. *Spikes* very slender; joints 8-12, about $\frac{1}{4}$ in. long, silkily ciliate, and pedicels thickened upwards, tips lunate. *Sessile spikelets* as long as the joints, subulate lanceolate; gl. I coriaceous, dorsally silkily villous, tip very slender bifid; II linear-lanceolate, 1-nerved, tip with a short bristle; IV bifid; awn $\frac{1}{2}$ - $\frac{3}{4}$ in., very slender. *Pedicelled spikelet* subulate, silky; gl. I shortly awned, whole plant reddish when dry.

** *Perennials*.

3. **A. impressus**, *Hack. in Estr. Bot. Zeit.* xli. (1891) 49; very slender, sparingly branched, leaves very narrow, joints of spikes 3-5 and pedicels very stout densely ciliate, gl. I of sessile spikelets glabrous lanceolate acuminate, deeply impressed between the scaberulous keels.

N.W. HIMALAYA; Kishtwar, *Clarke*, alt. 4000 ft.

Perennial. *Stems* erect; flowering branches distant. *Leaves* 4-8 in., setaceous acuminate; sheath short, smooth; ligule rounded. *Spathes* slender. *Spike* about 1 in., scarcely exserted; peduncle glabrous; joints and pedicels subclavate, shorter than the sessile spikelets, densely ciliate, tips obliquely cupped. *Sessile spikelets* $\frac{1}{2}$ in., linear-lanceolate, greenish, callus nearly glabrous; gl. I chartaceous, glabrous, tip 2-toothed, margins rather broadly inflexed; II lanceolate, acute, keeled, 3-nerved scabrid above; III oblong, obtuse, nerveless, ciliolate; IV oblong, cleft to below the middle, lobes glabrous; awn $\frac{1}{2}$ - $\frac{3}{4}$ in., very slender, pale. *Pedicelled spikelets* very narrow, gl. I linear-lanceolate, acuminate, purplish, 9-11-nerved; II 3-nerved, acute; III 2-nerved, obtuse; IV 0.—Near *A. Alopcurus*, *Hack.* (of the Mauritius), which differs in the many-jointed spikes, in the 6-7-nerved gl. I which is more deeply channelled in the middle. The habit is that of a *Cymbopogon*.

4. **A. bootanensis**, *Hook. f.*; tall, stout, leaves very long, joints of spike few and pedicels long-ciliate, gl. I of sessile spikelets glabrous linear-oblong truncate dorsally convex keels obscurely winged above.

BHUTAN HIMALAYA; Tassangsee, alt. 5-6000 ft., *Griffith*.

Perennial. *Leaves* 2-3 ft. narrowly linear, coriaceous, and sheaths smooth and glabrous. *Spike* $\frac{1}{2}$ - $\frac{3}{4}$ in., peduncle subexserted from the very narrow spathe; joints and peduncles half as long as the sessile spikelet, rather slender, tips toothed. *Spikelets* red-brown, $\frac{1}{2}$ in.; callus bearded; gl. I nerves obscure; II coriaceous, acute, 1-nerved; III linear-oblong, ciliate, nerveless; IV short, lobes ciliate; awn very slender short; palea minute, ovate. *Pedicelled spikelet* like the sessile.—I

have seen but one specimen, it is allied to *A. impressus*, but is a much stouter plant, 3-4 ft. high.

5. *A. hirtiflorus*, *Kunth Revis. Gram.* ii. 569, t. 198, *Enum. Pl.* i. 489; erect, stiff, leaves linear rigid, spathes long-peduncled, spike 2-5 in. glabrous or nearly so, sessile spikelets $\frac{1}{2}$ - $\frac{3}{4}$ in. narrowly lanceolate. *A. Pseudograyia*, *Steud. Syn. Gram.* 365; *Hack. Monogr. Androp.* 370. *A. zeylanicus*, *Arn. ex Benth. Fl. Hongk.* 423; *Thw. Enum. Pl. Zeyl.* 368; *Trim. Cat. Ceyl. Pl.* 107. *A. semiberbis*, *Kunth Enum. l. c.* *Rottboellia sanguinea*, *Retz. Obs.* iii. 25. ?*Pollinia fulta*, *Desv. Opusc.* 69; *Hack. l. c.* 392. *Thelepogon sanguineus*, *Spreng. Syst.* i. 299. *Schizachyrium zeylanicum*, *Arn. l. c.* *S. hirtiflorum* and *semiberbe*, *Nees. Fl. Afr. Austr.* 334, 336.

KHASIA HILLS, alt. 4-5000 ft., *J. D. H. & T. T., Clarke.* BURMA, *Kurz.* CENTRAL PROVINCES, alt. 3-4000 ft. CEYLON.—DISTRIB. Tonkin, China, Madagascar, Trop. and S. Africa and America.

Perennial. *Stems* tufted, 1-4 ft., simple or sparingly branched upwards, as thick as a crow-quill or less, smooth, shining. *Leaves* chiefly radical, 2-6 in. by $\frac{1}{2}$ - $\frac{3}{4}$ in., obtuse acute or acuminate; sheath compressed. *Spathes* 1-2 in., linear-lanceolate, acuminate. *Spike* stout, very narrow, subterete; rachis stout, shining, joints shorter than the sessile spikelets, outer or both margins ciliate, tip hollowed strongly toothed. *Sessile spikelets* $\frac{1}{2}$ in., very narrow, half sunk in the concave faces of the joints; gl. I narrowly lanceolate, bicuspidate, dorsally rounded, faintly 5-nerved; II lanceolate, acuminate, with a gibbous base, and a narrow ciliate dorsal wing above the middle; III linear-oblong, acute, fimbriate; IV lobes narrow, acuminate, awn about $\frac{1}{2}$ in. *Pedicelled spikelets*, gl. I flat, subulate, awned, margins inflexed; II short, oblong.—Dr. Stapf has identified the Indian *A. Pseudograyia* with its American and African species cited above, of which I have not given all the synonyms, which will be found in Hackel's Monograph.

Subgen. II. *DICTOMIS*, *Hack.* *Spikes* solitary; peduncle in the axil of a spathiform leaf-sheath, joints and pedicels bucciniform, mouths toothed. *Sessile spikelets* laterally compressed, callus short; gl. I accumbent, keeled, II much broader long-awned; IV 2-toothed, awned in the sinus. *Pedicelled spikelet* twice as long and broad as the sessile and concealing it.

6. *A. fastigiatus*, *Sw. Prodr. Veg. Ind. Occ.* 26, *Fl. Ind. Occ.* i. 207; *Hack. Monogr. Androp.* 393; *Griseb. Fl. Brit. W. Ind.* 559. *A. diatherus*, *Hochst. in Schimp. Pl. Abyss. n.* 2013 (non *Steud.*). *A. Hochstetteri*, *Steud. Syn. Gram.* 384. *Dictomis fastigiata*, *H. B. & K. Nov. Gen. & Sp.* i. t. 64 (excl. *Syn. Beauv.*); *Kunth in Mem. Mus. Par.* ii. (1815) 69; *Nees Agrost. Bras.* 340 (non *Beauv.*); *Hack. in Mart. Fl. Bras.* ii. II. 303. *Pollinia fastigiata*, *Spreng. Pugill.* ii. 13. *Heteropogon Hochstetteri*, *Anderss. in Schweinf. Beitr. Fl. Ethiop.* 310.

BERAR; near Gya and Chota Nagpore, *Clarks, Duthie.* TENASSERIM, *Helper.* —DISTRIB. Tonkin, China, Afr. and Amer. trop.

Perennial. *Stem* erect 6 in. to 3 ft., or decumbent below and fastigiately branched upwards, leafy. *Leaves* 3-12 in., narrowly linear, acuminate, scabrid; ligule elongate, acute. *Spathes* 2-3 in., linear-lanceolate, often very slender; peduncle variable, tip cupular. *Spikes* solitary, 1-2 in., fragile, joints much shorter than the spikelets, villous with white hairs, tip broad strongly toothed. *Sessile spikelet* $\frac{1}{2}$ - $\frac{3}{4}$ in., oblong; callus hairs = $\frac{1}{2}$ the spikelets; gl. I linear-lanceolate, bicuspidate and keeled, margins thickened, ciliate towards the top; II shorter, cymbiform, 2-fid, awned between the short obtuse lobes, dorsally keeled and ciliate above, awn much longer than the spikelets; III linear-oblong, margins ciliate; IV cymbiform, 2-toothed, with a stout dorsal awn from below the tip; palea minute, hyaline. *Pedicelled*

spikelets neuter; gl. I ovate-lanceolate, twisted, acuminate, 2 cuspidate and awned, ciliate, green, many-nerved; II much smaller, thin, acuminate, awned, III still smaller, oblong, hyaline.—I have examined spikelets of the type of *Homæatherum chinense*, Nees in Hook. & Arn. Bot. Beech. Voy. 239, which is certainly not *Androp. apricus*, as supposed by Hackel, but very close to *A. fastigiatus*, if not the same.

Subgen. III. *HYPOGYNIUM*, Hack. *Spikes* solitary, peduncled in the axil of a spathiform leaf-sheath; joints and pedicels slender, tops obliquely truncate. *Sessile spikelets* dorsally compressed; gl. I with inflexed or involute keeled margins; II keeled, awnless; III hyaline or 0; IV a simple awn (in the Indian species). *Pedicelled spikelets* like the sessile.

Hackel's section *Pseudanthistiria* forms one of the most distinct genera of *Andropogoneæ*, with characters of inflorescence and spikelets totally at variance with his characters of *Hypogynium*. He however observes its affinity with *Anthistiria*, near to which genus I place it.

7. **A. foveolatus**, Del. Fl. Egypt. 16a, t. 8, f. 2; densely tufted, basal sheaths silkily villous, spikes 3-6 elongate erect, gl. I of sessile spikelet smooth with usually a deep dorsal pit. *Kunth Enum. Pl. i.* 490; *Hack. Monogr. Androp.* 402; *Duthie Grass. N.W. Ind.* 20, *Fodd. Grass. N. Ind.* 34, t. 21; *Aitchis. Cat. Panjab. Pl.* 176. *A. strictus*, Roeb. Fl. Ind. i. 260. *A. Orthos*, Schult. Mant. ii. 455. *A. monostachyus*, Spreng. Pugill. ii. 9. *A. ramosus*, Heyne ex Wall. Cat. n. 8802.—*Andropogon*, Wall. Cat. 8802.

Drier parts of INDIA, from the Panjab and Sind to Bengal, CHOTA NAGPORE, CENTRAL PROVINCES, CIRCARS and COROMANDEL.—DISTRIB. Westwards to the Cape de Verd Islds.

Stem 1-2 ft., simple or subfastigiately branched above, as thick as a sparrow's quill; nodes sparingly bearded. *Leaves* very narrow, sometimes almost filiform, rigid, scaberulous beneath, sheaths shorter than the internodes, scabrous or glabrous; ligule short, truncate, hyaline, ciliate. *Spikes* 1-1½ in.; peduncles capillary, erect, usually far exserted beyond the very slender spathe; joints and pedicels slender, villous. *Sessile and pedicelled spikelets* subequal ¾-1 in., linear-oblong, subacute, purplish, glabrous except the shortly villous callus, shining; gl. I flat, 4-7-nerved, keels scabrid; II as long, 3-nerved, acute; III much shorter, glabrous, nerveless; IV awn ¼-¾ in. long, very faintly margined towards the base. *Pedicelled spikelet* rufous or purplish, neuter; gls. 2, I subacute, dorsally pitted or not, keels scabrid, 5-nerved, glabrous; II linear-lanceolate, acute, 3-nerved.

8. **A. tuberculatus**, Hack. *Monogr. Androp.* 404; tall, stout, basal sheaths glabrous, spikes solitary long-peduncled erect, gl. I of sessile spikelet lanceolate keels and nerves tubercled not pitted.

CENTRAL PROVINCES; in the Khandua and Betul districts, *Duthie*; Asinagarh, *Kuntze*.

Stem 4-6 ft., stout, stiff, pale yellow, shining, paniculately branched, nodes glabrous. *Leaves* 1-2 ft. by ½ in., rather rigid, glaucous, strongly closely nerved, setaceously acuminate, base narrowed, scabrid, midrib very broad; sheath quite smooth; ligule large, membranous, auricled. *Spikes* 1-1½ in. *Panicle* leafy; spathes very narrow, scabrid with tubercle-based hairs; peduncle 2-4 in., strict, scabrid; joints and pedicels very slender, ciliate with long hairs. *Sessile spikelets* ½ in., linear-lanceolate, callus shortly bearded; gl. I lanceolate, tip narrowly truncate, dorsally flat, 3-7-nerved, margins narrowly inflexed, keels and nerves tuberculate; II membranous, lanceolate, acute, 1-nerved, ciliate; III linear, acute,

glabrous; IV awn $\frac{1}{2}$ – $\frac{2}{3}$ in. *Pedicelled spikelets* male, gl. I strongly nerved; IV 0.—A very handsome grass.

Subgen. IV. ARTHROLOPHIS. *Spikes* 2-nate digitate or subpaniculate, on a common peduncle arising from a spathiform sheath; joints few or many, clavate or bucciniform (slender in *A. tristis*), tips cupular with toothed margins. *Sessile spikelets* dorsally compressed; gl. I not awned, margins inflexed, keeled; II dorsally keeled, awned or not; III hyaline; IV small, 2-fid with an interposed awn, or reduced to a simple awn. *Pedicelled spikelets* usually unlike the sessile; gl. I awned or not.—A heterogeneous assemblage.

* Joints of spikes and pedicels of upper spikelets rather slender; gl. II of sessile spikelet not awned.

9. *A. tristis*, *Nees ex Hack. Monogr. Androp.* 439; spikes 3–6 unequal stipitate or subsessile on the peduncle, gl. I of sessile spikelet lanceolate deeply depressed between the thickened sides, IV very narrow 2-fid.

TEMPERATE WESTERN HIMALAYA, alt. 8–1000 ft., from Kashmir to Garwhal.

Stems 2–3 ft., compressed, tufted on a stout short or creeping rootstock, slender or rather stout, erect or geniculate below, branching above; nodes glabrous. *Leaves* 6–10 by $\frac{1}{2}$ – $\frac{3}{4}$ in., narrowly linear, scaberulous, rather rigid, hairy at the base; lower sheaths broad, compressed; ligule oblong, membranous. *Spikes* 1–3 in., livid green; peduncle 2–6 in., spathe very narrow; joints and pedicels = $\frac{2}{3}$ the sessile spikelet, hardly clavate, shortly ciliate. *Spikelets* loosely imbricate, sessile $\frac{1}{2}$ in., very narrow; callus hairs very short; gl. I more or less scaberulous margins broadly inflexed; II narrowly oblong, apiculate, ciliate, keel subsaberulous; III lanceolate, 2-nerved, ciliate; IV awn short or 0; palea minute, quadrate. *Pedicelled spikelets* as long as the sessile, gl. I 3–7-nerved; II 1–5-nerved; III hyaline; IV 2-fid and mucronate or 0, paleate or not.

** Joints of spikes and pedicels of upper spikelets clavate or bucciniform.

† *Gl. II of sessile spikelets awned.*

10. *A. apricus*, *Trin. in Mem. Acad. Petersb. Ser. VI. iv.* (1836) 83; tall, slender, leaves very narrow, spikes 2–5 hispidulous, joints and pedicels bucciniform, gl. I of sessile spikelets linear 2-cuspidate or 2-aristulate, II long-awned, IV bifid awned between the ciliate lobes. *Hack. in Mart. Fl. Bras. ii.* II 304. *A. apricus var. indicus*, *Hack. Monogr. Androp.* 457. *A. ascinioides*, *Clarke in Journ. Linn. Soc. xxv.* (1889) 87, t. 36.

KHASIA HILLS, alt. 2–3500 ft., *J. D. H. & T. T. (Herb. Ind. Or. Androp. n. 4)*. MUNNEPORE, on Jackpho, alt. 7500 ft., *Clarke*. PEGU; in the Eng forest, *Kurz.*—DISTRIB. Trop. Africa and America.

Stem 3–5 ft., strict, sparingly branched upwards, quite smooth, nodes glabrous. *Leaves* 1–3 ft. by $\frac{1}{8}$ – $\frac{1}{6}$ in., erect, coriaceous, glabrous except a few hairs at the base; sheaths very long, narrow, upper spathiform, very slender, tips setaceous, lower open; ligule oblong, obtuse, chartaceous. *Inflorescence* subpanicled; peduncle 2–4 in., filiform, puberulous, sheathed almost up to the spikes. *Spikes* $\frac{1}{2}$ –1 in., very unequal in each fascicle, very shortly stipitate, hairs or cilia rigid setiform brownish, joints and pedicels half as long and as broad as the sessile spikelets, cuneately campanulate, base narrow, dorsally rounded, glabrous or scaberulous, sides ciliate with long hairs. *Sessile spikelets* $\frac{1}{2}$ – $\frac{1}{3}$ in.; callus conical, rigidly bearded; gl. I deeply channelled dorsally, keels scabrid above the middle, thickened below, nerves 2-nate at the keels; II 1-nerved, margins ciliate, keel setulose at the top, tip 2-fid, awn as long as itself; III linear, hyaline, broadly ciliate; IV shorter, oblong, 1-nerved;

awn 1 in. slender; palea small, linear-oblong, ciliate. *Pedicelled spikelets* narrower and rather smaller than the sessile, purplish; gl. I ovate-lanceolate, 2-cuspidate, keels long ciliate above the middle; II and III as in the sessile spikelet.—According to Hackel the Indian plant differs from the African in the longer hairs of the joints and pedicels and in the more exerted peduncle of the spikes, but I find that these and other minute characters are very inconstant. *Homœatherum chinense*, Nees, included under *A. apricus*, is, I think, certainly *A. fastigiatus*.

11. *A. longipes*, Hack. in *Flora* (1885) 138; annual, stem slender ascending, leaves linear and sheaths sparsely hirsute, spikes 2 both stipitate, peduncle naked (spathe 0), joints many and pedicels rather stout subclavate tips cupped shortly ciliate, sessile spikelets $\frac{1}{3}$ in. dorsally compressed oblong-lanceolate, gl. I broadly unequally winged above the middle aristulate, II long-awned, IV obovate cleft to the middle, awned between the lobes.

NILGHIRI HILLS, *Perrottet*.

Stems 12-16 in., decumbent below, nodes glabrous. *Leaves* 4-6 by $\frac{1}{8}$ - $\frac{1}{2}$ in., hairs tubercle-based; ligule very short. *Spikes* 2-3 in., rather stout, dense-fld., green; joints and pedicels = $\frac{1}{2}$ the sessile spikelet, concavo-convex, margins rounded. *Spikelets* imbricating, callus short, obtuse, bearded; gl. I dorsally sparsely hairy and depressed or convex, many-nerved, wing produced beyond the summit serrulate; II ciliate, 3-nerved, lateral nerves submarginal, tip 2-toothed, keel scaberulous, awn as long as the gl.; III hyaline, 2-nerved, copiously ciliate; IV as long as III; lobes lanceolate, acuminate; awn $\frac{3}{4}$ in., glabrous. *Pedicelled spikelets* as long as the sessile, male; gl. I shortly awned, 6-7-nerved; II membranous, 3-nerved; III and IV linear-oblong, ciliate.—I have seen only one specimen. This, I think, is a doubtful member of the subgenus, the peduncle not arising from a distinct flattened spathe.

†† *Glume II of sessile spikelets not awned.*

12. *A. pumilus*, Roxb. *Fl. Ind.* i. 273; stem paniculately branched, leaves narrow, spikes in pairs, joints and pedicels clavate or trumpet-shaped, sessile spikelets dorsally compressed, gl. I very narrow lanceolate deeply channelled between the thickened keels, IV very narrow bisetose. *Kunth Enum. Pl.* i. 492; *Steud. Syn. Gram.* 388. *A. demissus*, *Steud. l. c.* *A. geminatus*, *Herb. Russ. ex Wall. Cat. n.* 8798 C. *A. humilis*, *Wight Cat. n.* 1701. *A. caesius a*, *Nees ex Wight l. c. n.* 1700. *A. hirtus*, *Heyne in Herb. Roth.* *A. pachyarthrus*, *Hack. Monogr. Androp.* 449; *Duthie Grass. N.W. Ind.* 21, *Fodd. Grass. N. Ind. t.* 39.—*Andropogon*, *Wall. Cat. n.* 8798, *A. B. C.*, 8799.

Drier parts of INDIA. NEPAL, *Wallich*, &c.; from Banda in RAJPOOTANA, and Surat to the CENTRAL PROVINCES and COROMANDEL.

Annual or perennial? *Stem* 6-18 in. high, slender, suberect or geniculate and decumbent below; nodes glabrous. *Leaves* 3-5 in., rarely $\frac{1}{2}$ in. broad, sometimes almost filiform, acuminate, glabrous; sheath compressed, keeled; ligule short, truncate. *Spikes* $\frac{1}{2}$ - $\frac{3}{2}$ in., in pairs terminating a very slender peduncle which arises from a narrow flattened glabrous spathe $\frac{1}{4}$ - $\frac{1}{2}$ in. long; joints 6-8 and pedicels shortly ciliate on one margin, tops dilated cupped with 2-3-toothed margins. *Sessile spikelets* $\frac{1}{2}$ in.; callus glabrous; gl. I membranous, acuminate, bicuspidate, lateral ribs often ending below in 2 tubercles; II as long, narrowly lanceolate, mucronate, coriaceous; III shorter, linear, hyaline, 2-nerved; IV very narrow, cleft into two capillary-lobes with an interposed capillary awn $\frac{1}{4}$ - $\frac{1}{2}$ in. long; palea minute, oblong. *Pedicelled spikelets* $\frac{1}{2}$ - $\frac{1}{4}$ in., ovate-lanceolate, acuminate, 5-nerved; gls. 3. —An excellent figure amongst Roxburgh's drawings attests Hackel's *A. pachyarthrus* being *A. pumilus*. The peduncle of the spike is sometimes 2 in. long. *Wallich's n.* 8799 is very tall and slender, as if drawn up amongst other plants.

13. **A. Munroi**, *Clarke in Journ. Linn. Soc.* xxv. (1889) 87, t. 37 (*char. reform.*); tall, slender, leaves very narrow, spikes in a small open subsimple panicle terminating solitary capillary sheathed peduncles, joints and pedicels clavate shortly silkily ciliate, sessile spikelets lanceolate, gl. I acuminate deeply hollowed between the thickened keels, IV very narrow bisetose.

NORTH MUNNEPORE, alt. 3500 ft., *Clarke*.

Stem 2-3 ft., sparingly branched upwards, slightly compressed, nodes glabrous. *Leaves* 6-10 by $\frac{1}{16}$ in., rather coriaceous, smooth, glabrous, nerves close-set, glaucous beneath with prominent midrib; sheath terete, smooth keeled; ligule rather long. *Spathe* 1-2½ in., very slender, terete, acuminate. *Panicle* 1-1½ in., as broad as long, of few irregular spreading branches. *Spikes* 4-8, $\frac{1}{4}$ - $\frac{3}{4}$ in. long, very shortly stipitate, solitary or 2-3-nate, divaricate or drooping, peduncle and pedicels of spikes smooth, glabrous; joints and pedicels of upper spikelets with irregularly toothed cupular tips; lowest pair of spikelets sometimes imperfect or male. *Spikelets* 4-6 pairs, $\frac{1}{8}$ in. long, laxly imbricating; sessile, callus shortly softly bearded; gl. I coriaceous, glabrous, shining, margins incurved, keels minutely scaberulous, nerves 0, or one vanishing below the middle; II acuminate, 3-nerved, keel ciliate above the middle; III hyaline, ovate-oblong, 2-nerved, glabrous; IV as long as III, lobes subulate, awn $\frac{1}{4}$ - $\frac{3}{4}$ in., capillary; palea minute, truncate. *Pedicelled spikelets* male, gl. I linear-oblong, convex, subacute, 7-9-nerved; III acuminate, 3-nerved, glabrous; III as in the sessile spikelets; IV lanceolate.—The figure in *Journ. Linn. Soc.* gives the habit of the plant, but the description and analysis are very wrong. The former also errs in citing *Androp.* No. 4, *Herb. Ind. or Hf. & T.* under *A. Munroi*, it is *A. apricus*.

Subgen. V. AMPHILOPHIS, *Trin.* *Spikes* 2 or more fascicled or paniced, with many or few joints; joints and pedicels of upper spikelets narrow, linear, flattened, usually channelled and translucent between the thickened sides along the mesial line, terete and opaque in 21. *A. concanensis*, 27. *fascicularis*, and 28. *venustus*, tips simply truncate. *Sessile spikelets* dorsally compressed; callus short; gl. I acutely 2-keeled; II keeled, awnless; III hyaline, epaleate; IV an awn with the base acute or very rarely dilated and 2-toothed or 2-fid. *Pedicelled spikelets* usually as long as the sessile, but narrower, many-nerved, and male.

A. Spikes with many pairs of spikelets.

* Pedicels of upper spikelets and joints of rachis slender, strongly compressed, with thickened margins and translucent centre.

† Spikes digitate or fascicled, not paniced, lower longer than the rachis of the inflorescence. (See also 24. *A. intermedius*.)

§ *Glume I of sessile spikelets more or less villous below the middle.* (See also 19. *A. pertusus*.)

14. **A. Ischæmum**, *Linn. Sp. Pl.* 1047; leaves narrowly linear, sheaths compressed, spikes 3-20 slender silky rachis glabrous, sessile spikelets $\frac{1}{8}$ - $\frac{1}{2}$ in., callus shortly bearded, gl. I oblong minutely truncate not pitted 5-7-nerved more or less appressedly hairy below the middle, keels rigidly ciliate. *Kunth Enum. Pl.* i. 499; *Host Gram. Austr.* ii. 3, t. 3; *Reichb. Ic. Fl. Germ.* t. 54; *Nees Gen. Fl. Germ. Monocot.* i. t. 92; *Steud. Syn. Gram.* 379; *Hack. Monogr. Androp.* 474; *Aitchis. Cat. Panjab Pl.* 176; *Duthie Grass. N.W. Ind.* 20, *Fodd. Grass. N. Ind.* 35, t. 23; *Benth. Fl. Austral.* vii. 531. *A. angustifolius*, *Sibth. & Sm. Prodr. Fl. Græc.* i. 47. *A. annulatus*, *F. Schmidt Fl. Cap. Verd.* 157. *A. radicans*,

Lehm. Ind. Sem. Hort. Hamb. 1828; *Nees Fl. Afr. Austr.* 106. *A. villosus*, a, *Lamk. Fl. Fr.* iii. 364.

NORTH WEST INDIA, from Kashmir and West Tibet to Kunawur, ascending to 12,000 ft.—DISTRIB. Westward to S. Europe, and tropics generally or sporadically.

Stems 2-3 ft., erect or geniculately ascending, subsimple, naked above; nodes naked or shortly bearded. *Leaves* 1-2 ft. by $\frac{1}{10}$ - $\frac{1}{8}$ in., glabrous or hairy above, especially towards the base, glaucous, scaberulous above, base rounded; sheath loose; ligule very short. *Spikes* unequal, $1\frac{1}{2}$ -3 in., shortly stipitate, usually purplish. *Sessile spikelets*, gl. I dorsally flat; II lanceolate, mucronulate, keels scabrid above; III oblong-lanceolate, acute, ciliate; IV awn $\frac{1}{2}$ - $\frac{3}{4}$ in. *Pedicelled spikelets* usually darker than the sessile, male; gl. I lanceolate, 9-nerved, glabrous, keels ciliate above; II linear-lanceolate, 5-7-nerved; III linear-oblong, obtuse, ciliate; IV very narrow.

15. ***A. Pseudischæmum***, *Nees ex Steud. Syn. Gram.* 380; tall, nodes bearded, leaves narrow pruinose beneath, sheaths terete, spikes 4-6 stipitate slender flexuous, rachis smooth, joints and pedicels a little shorter than the spikelets silky, sessile spikelets $\frac{1}{2}$ - $\frac{1}{4}$ in. lanceolate, callus hairs very short, gl. I imperforate sparsely silkily villous below the middle 7-9-nerved, keels ciliate. *Hack. Monogr. Androp.* 477. *A. annulatus* & *quinqueflorus*, *Heyne in Herb. Rottl.* *A. Ischæmum*, *Roxb. Fl. Ind.* i. 264. *A. oryzetorum*, *Hack. l. c.* *A. pentastachyus* & *undulatus*, *Heyne ex Wall. Cat. n.* 8815 *A. scandens*, *Thw. Enum. Pl. Zeyl.* 368 (*non Roxb.*); *Trim. Cat. Ceyl. Pl.* 107.

THE DECCAN PENINSULA, *Heyne*, &c. COROMANDEL, *Roxburgh*. CEYLON, *Thwaites*.

Stem 2-3 ft., terete glabrous. *Leaves* 6-10 by $\frac{1}{6}$ - $\frac{1}{3}$ in., glabrous or fimbriate with long hairs towards the base, upper surface and margins scabrid, lower glaucously pruinose, lateral nerves prominent; upper margins of the sheath membranous; ligule very short, ovate, membranous. *Spikes* flexuous or erect, 2-4 in. long, dull green, subracemose, common rachis smooth, axils bearded, special peduncles $\frac{1}{4}$ - $\frac{1}{2}$ in.; joints and pedicels slender. *Sessile spikelets* $\frac{1}{2}$ - $\frac{1}{3}$ in.; gl. I minutely truncate, tip hyaline, keels closely ciliate and with a few long marginal hairs; II ciliate, 3-nerved; III hyaline, oblong, ciliate, 2-nerved or nerveless; IV awn $\frac{1}{2}$ - $\frac{3}{4}$ in., base obscurely dilated, palea 0. *Pedicelled spikelets* longer than the sessile, lanceolate, gl. I 9-nerved, glabrous dorsally, keels scaberulous and ciliate; II 5-7-nerved; III ovate-oblong; IV minute or 0.—The spikelets vary a good deal in size. The pruinose undersurface of the leaves is a very marked character. *Roxburgh's* figure of his *A. Ischæmum* has awns an inch long, but allowance must be made for native artists' work. I have seen only a single specimen of *A. oryzetorum*, the spikes are very long and flexuous. *Hackel* distinguishes it from *Pseudischæmum* by the leaves being scabrous on both surfaces, which they are not in the specimen I have examined.

16. ***A. compressus***, *Hook. f.*; stem tall robust compressed, nodes glabrous, leaves long broad flat, sheaths compressed keeled, spikes very many densely subcorymbosely panicked pale flexuous silky, joints and pedicels very slender, sessile spikelets $\frac{1}{2}$ in. ovate-lanceolate, callus hairs = $\frac{1}{2}$ - $\frac{1}{3}$ the spikelet, gl. I imperforate 5-7-nerved villous below the middle, keels minutely scabrid.

THE DECCAN, *Lisboa* (No. 6. *A. odoratus*), *Woodrow*.

Stem 3-4 ft., as thick as a goose-quill at the base, erect, sparingly branched, leafy. *Leaves* 1-1½ ft. by $\frac{1}{4}$ - $\frac{1}{3}$ in., finely acuminate, slightly scaberulous on the margins and both surfaces, a little hairy towards the base; sheaths strongly compressed and acutely keeled, uppermost forming a lanceolate spathe 4-6 in. long to the base of the panicle; ligule a ciliate membrane. *Fascicles of spikes* 4-5 in. long,

erect, branches slender, lowermost $\frac{1}{2}$ in. long, and rachis smooth. *Spikes* 1-2 in. branched at the base, firm, nearly white, callus-hairs $\frac{1}{2}$ the length of the spikelet. *Sessile spikelets*, joints and pedicels about = $\frac{1}{2}$ spikelet, centre hyaline, upper hairs reaching the top of the sessile spikelet; gl. I, thin, margin narrowly incurved, tip truncate, hyaline; II ovate, 1-nerved, tip hyaline; III shorter, ovate obtuse glabrous nerveless; IV awn about $\frac{1}{2}$ in., inconspicuously margined below. *Pedicelled spikelets* narrower than the sessile, hairs of callus half their length; gl. I 9-11-nerved; II 3-nerved; III oblong, long-ciliate, nerveless.—Sent by Lisboa as *A. odoratus*, but apparently very different from the description of that plant and from the specimens received in the strongly compressed and acutely keeled sheaths, broad leaves and inflorescence.

17. *A. Woodrovii*, Hook. f.; stems tall erect compressed, nodes glabrous, leaves long, sheaths compressed, spikes erect stipitate fascicled strict silky, joints and pedicels slender ciliate with long erect hairs, sessile spikelets $\frac{1}{5}$ – $\frac{1}{6}$ in. oblong-lanceolate, callus hairs = $\frac{1}{4}$ of the spikelet, gl. I of sessile spikelet 8-12-nerved silky below the middle, tip truncate hyaline, keels ciliate.

BOMBAY; Mawal, Woodrow (*Herb. Bombay*, n. 27).

Stems 3-4 ft., tufted on a woody rootstock, thicker than a goose-quill at the base and obtusely 2-edged, solid, stiff, branched above. *Leaves* 1-2 ft. by $\frac{1}{8}$ – $\frac{1}{10}$ in., rigid, surfaces and margins scabulous, not pruinose beneath; sheath loose, keeled, quite smooth; ligule a truncate ciliate membrane. *Spikes* 3-5, $\frac{1}{2}$ –1 in. long, pale, on slender but stiff smooth proper peduncles, $\frac{1}{8}$ – $\frac{1}{2}$ in. long; joints and pedicels linear, margins silky, upper hairs half as long as the spikelet. *Sessile spikelets*, callus rather long, obtuse; gl. I coriaceous, glabrous above the middle, margins narrowly incurved, nerves slender; II chartaceous, 3-nerved, ciliate; III ovate, acute, nerveless, glabrous; IV a simple awn $\frac{1}{2}$ – $\frac{2}{3}$ in. *Pedicelled spikelets* narrower than the sessile; gl. I 9-nerved, glabrous, keels scabrid; II 3-nerved, ciliate; III obovate, ciliate, nerveless; IV 0.—Apparently a very distinct species, of which better specimens are much wanted, the spikes being much broken. Mr. Woodrow observes that the odour is that of camphor.

§§ *Glume I of sessile spikelets usually quite glabrous (or hairy below the middle in A. pertusus).*

18. *A. pertusus*, Willd. Sp. Pl. iv. 922; erect or ascending, nodes more or less bearded, leaves linear, sheaths terete, spikes 3-7 usually purple 1-2 in. digitately fascicled shortly stipitate slender silky, rachis fragile, joints and pedicels silkily ciliate, sessile spikelets $\frac{1}{4}$ – $\frac{1}{2}$ in. oblong-lanceolate minutely truncate usually shining glabrous or sparsely hairy below the middle 5-9-nerved usually 1-2-pitted dorsally callus shortly bearded, keels spinulosely ciliate above. *Beauv. Agrost.* 131, t. 23, f. 2; *Br. Prodr. Fl. Austral.* 201; *Roxb. Fl. Ind.* i. 258; *Kunth Enum. Pl.* i. 498; *Steud. Syn. Gram.* 364; *Hack. Monogr. Androp.* 479; *Wight Cat.* n. 1696; *Thw. Enum. Pl. Zeyl.* 367 (excl. Syn.) 437; *Trim. Cat. Ceyl. Pl.* 108; *Aitchis. Cat. Panjab. Pl.* 176 (excl. Syn.); *Duthie Grass. N.W. Ind.* 21 (excl. Syn.), *Fodd. Grass. N. Ind.* 38, t. 25; *Lisboa in Bomb. Journ. Nat. Hist.* vi. (1891), 202; *Nees Fl. Afr. Austr.* 107; *Benth. Fl. Austral.* vii. 530; *Baker Fl. Maurit.* 445 (excl. some Syn.); *Boiss. Fl. Orient.* v. 464. *A. angustifolius*, *Parl. Fl. Palerm.* i. 269. *A. panormitanus*, *Parl. Fl. Ital.* i. 140. *A. punctatus*, *Aitchis. in Journ. Linn. Soc. xviii.* (1881) 111 (not of *Roxb.*). *Lepeocercis pertusa*, *Hassk. Pl. Jav. Rar.* 52. *Eleonurus pertusus*, *Nees mss. ex Steud. l.c.* *Holcus pertusus*, *Linn. Mant.* ii. 301.—*Andropogon*, *Wall. Cat.* n. 8804 A. B. C. D.

Drier parts of INDIA; from the Panjab to Burma, and southward to CEYLON.—
DISTRIB. Westwards to Sicily; trop. Asia, Africa, and Australia.

Very variable in habit and stature, rarely 12 in. high, tufted, annual or perennial; stem sometimes creeping and rooting, usually ascending from a leafy base, slender, even filiform; nodes sometimes densely bearded. *Leaves* 2-12 by $\frac{1}{2}$ – $\frac{3}{8}$ in., acute or acuminate, glabrous except at the ciliate base, rarely hairy, surfaces scaberulous, dull green; sheath hardly compressed, glabrous or villous; ligule short, membranous, truncate. *Spikes* pale or purplish; joints and pedicels very slender = $\frac{1}{2}$ the sessile spikelet; gl. I of sessile spikelet subacute, coriaceous; II 1-3-nerved; III linear-oblong, obtuse, glabrous; IV, awn $\frac{1}{2}$ – $\frac{3}{4}$ in., capillary, base slightly dilated; palea minute or 0. *Pedicelled spikelets* like the sessile, male or neuter; gl. I 7-13-nerved, glabrous, pitted or not, keels ciliate throughout their length; II lanceolate, 5-nerved, ciliate; III linear-oblong, glabrous; IV short or 0.—Lisboa describes the spikelets as aromatic when crushed. Hackel has the following Indian varieties, all of which, except *longifolius*, are united by various intermediates.

a. genuinus; gl. I thin not shining more or less villous below the middle, spikes 3-9.—Common.

B. Wightii; sheaths villous, nodes long bearded, spikes about 15.—“Panvanasum,” *Wight Cat.* n. 1696.

c. longifolius; tall, erect, stout from a woody stock, 2-4 ft. high, nodes densely bearded, leaves 12-18 by $\frac{1}{2}$ in. hairy, sheaths hirsute, lower spikes branched, spikelets quite glabrous, gl. I of lower spikelet coriaceous. A. Arnottianus, *Nees in Wight Cat.* n. 2338.—*Andropogon*, *Wall. Cat.* n. 8803.—Ceylon? *Wight*.—A very different looking plant from the other forms of *A. pertusus*.

g. insculptus; sheaths glabrous, gl. I of sessile spikelets 1-2-pitted truncate, keels longer ciliate. A. insculptus, A. Rich. *Tent. Fl. Abyss.* ii. 458. A. bifoventolatus & subunifoveolatus, *Steud. Syn. Gram.* 380.—Not uncommon.

19. **A. Foulkesii**, *Hook. f.*; stem erect or ascending very slender, nodes glabrous, leaves narrowly linear, sheaths terete, spikes 3-6 1-1 $\frac{1}{2}$ in. long digitately fascicled long-stipitate slender purplish, joints and pedicels shortly ciliate, sessile spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. oblong-lanceolate dorsally depressed in the middle line imperforate 7-nerved glabrous keels pectinately ciliate.

NILGHIRI HILLS, *Wight*; Kaity, *Foulkes*; Pykora, *King*.

Perennial. *Stem* 12-18 in. *Leaves* 6-10 by $\frac{1}{2}$ – $\frac{3}{8}$ in., finely acuminate, glabrous or hispid on both surfaces with spreading hairs, midrib very strong; sheath glabrous, mouth and ligule villous with long hairs. *Spikes* 1-1 $\frac{1}{2}$ in., special peduncles $\frac{1}{4}$ –1 in., very slender, axils bearded with long soft hairs; joints and pedicels slender, flat with thickened margins and diaphanous centre. *Sessile spikelets* $\frac{1}{2}$ – $\frac{1}{3}$ in., tip 2-toothed, callus bearded; gl. I dorsally flattened or convex, nerves obscure or distinct; II acuminate, 3-nerved, keel scaberulous above, margins ciliate; III shorter, lanceolate, nerveless; IV awn $\frac{1}{2}$ – $\frac{3}{4}$ in., capillary, palea 0. *Pedicelled spikelet* longer and narrower than the sessile; gl. I strongly 9-nerved.—Resembles *A. Ischaemum*, differing in the much shorter hairs of the joints and pedicels and glabrous spikelets.

20. **A. concanensis**, *Hook. f.*; slender, erect, leafy, leaves very narrow sheaths terete, nodes glabrous, spikes 5-8 2-2 $\frac{1}{2}$ in. long loosely fascicled long-stipitate slender flexuous pale, joints and pedicels slender compressed not deeply sulcate sparsely shortly ciliate, spikelets $\frac{1}{2}$ in. ovate- or oblong-lanceolate narrowly truncate glabrous 7-nerved keels very shortly ciliate.

BOMBAY, *Woodrow (Herb. Bomb.* n. 28).

Perennial. *Stems* many from a nodose stock, 28-24 in., firm, smooth, terete, leafy. *Leaves* 8-10 by $\frac{1}{2}$ – $\frac{3}{8}$ in., finely acuminate, smooth on both surfaces; sheaths

smooth; ligule a ridge. *Spikes* very pale, rachis and proper peduncles filiform, glabrous, the latter $\frac{1}{2}$ – $\frac{3}{4}$ in. long, axils slightly bearded; joints and pedicels = $\frac{1}{2}$ the lower spikelet, compressed, hardly grooved and not translucent in the centre, sides not thickened. *Sessile spikelets* small, callus hairs = $\frac{1}{4}$ the gls.; gl. I thin, nerves very slender, keels ciliate with stiff very short bristles; II lanceolate, acuminate, ciliate, nerves 3 faint; III much smaller, oblong, obtuse, nerveless; IV, awn $\frac{1}{2}$ in., capillary, base slightly dilated. *Pedicelled spikelets* narrower than the sessile, gl. I 9-nerved; II and III as in the sessile; IV small, oblong, often unequally 2-fid, ciliate, nerveless.—Although the pedicels of the upper spikelets and joints of the rachis are not as in typical *Amphilophis*, this appears to be the position of *A. concanensis*.

21. **A. Kuntzeanus**, *Hack. Monogr. Androp.* 478; tall, nodes thickly bearded, leaves narrowly linear smooth, sheaths terete glabrous, spikes 12–15 $\frac{3}{4}$ –2 in. long densely fascicled slender silky purplish, joints and pedicels plumosely ciliate with long hairs, sessile spikelets $\frac{1}{2}$ in. linear-lanceolate, callus hairs = $\frac{1}{2}$ the spikelets, gl. I pitted or not 7–9-nerved keels subpectinately ciliate towards the 2-toothed tip.

The CONCAN and CENTRAL PROVINCES, *Kuntze, Duthie*.

Stem 3–5 ft., as thick as a goose-quill below, with 2–3 slender flowering branches above, terete, smooth. *Leaves* 10 in. and upwards by $\frac{1}{6}$ – $\frac{1}{4}$ in., glabrous, glaucous, smooth, margins scaberulous, upper cauline short, rigid. *Spikes* corymbose, slender, flexuous, proper peduncles $\frac{1}{4}$ – $\frac{1}{2}$ in., slender, glabrous; joints and pedicels = $\frac{1}{2}$ the lower spikelet or more, translucent in the middle line. *Sessile spikelets* narrow; gl. I quite glabrous, thin; II lanceolate, acuminate or mucronate, margins ciliate; III lanceolate, glabrous; IV awn about $\frac{1}{2}$ in., base somewhat dilated. *Pedicelled spikelets* narrower than the sessile, male; gl. I strongly 9–11-nerved, keels ciliate scabrid at the entire tip; II 5-nerved; III ovate-oblong ciliate, nerveless; IV small, linear, or 0.

22. **A. ensiformis**, *Hook. f.*; stem erect stout compressed, nodes glabrous, leaves erect strict narrowly ensiform acuminate, sheath strongly compressed, spikes many in a thyrsiform fascicle shortly stipitate, joints and pedicels silky with long hairs, sessile spikelets $\frac{1}{2}$ in. ovate-oblong, callus hairs = $\frac{1}{2}$ the spikelet, gl. I membranous dorsally flat 5–7-nerved very sparsely silkily villous towards the base, tip truncate keels minutely ciliate.

The CONCAN? *Dalzell*.

Stems 2 ft. and upwards, densely tufted, base as thick as the thumb, with stout roots, clothed with the compressed equitant leaf-sheaths. *Leaves* 8–10 by $\frac{1}{4}$ – $\frac{1}{2}$ in., rigid, strongly nerved, glabrous or sparsely hairy, tips acicular, margins and both surfaces scaberulous; sheaths smooth, lower equitant; ligule short, scarious. *Spikes* $\frac{1}{2}$ – $\frac{3}{4}$ in., in an erect narrow thyrsus 3 in. long, pale purplish, proper peduncles $\frac{1}{6}$ – $\frac{1}{4}$ in.; joints and pedicels very slender, flat with a translucent channel, ciliate with very long erect hairs. *Sessile spikelets*, callus small; gl. I thin, shining, margins rather narrowly incurved, keels slender; II ovate-oblong, acute, 3-nerved, ciliate, not keeled; III narrowly oblong, ciliate; IV a very narrow entire or 2-toothed membranous dilatation of the base of the slender awn, which is $\frac{1}{2}$ – $\frac{3}{4}$ in. long. *Pedicelled spikelets* as long as the sessile, linear-oblong; callus naked; gl. I convex, many-nerved; II 5-nerved; III linear-oblong, ciliate; IV 0.—I have seen only a single specimen from the Herbarium of the late Mr. A. Dalzell, with no locality marked. The straight sword-shaped leaves are remarkable.

†† Spikes racemed or paniced, lower much shorter than the rachis of the inflorescence.

23. **A. intermedius**, *Br. Prodr.* 20; inodorous, tall, leaves narrowly

linear, sheaths terete, rachis and branches of panicle glabrous, spikes fragile, joints and pedicels slender densely ciliate, sessile spikelets $\frac{1}{2}$ – $\frac{3}{4}$ in. oblong-lanceolate acute, callus hairs very short, gl. I of sessile spikelets glabrous or sparsely hairy or hispid below pitted or not, keels scabrid towards the tip. *Kunth Enum. Pl.* i. 500; *Steud. Syn. Gram.* 392; *Hack. Monogr. Androp.* 485; *Lisboa in Bomb. Journ. Nat. Hist.* iv. (1889), & vi. (1891) 69, 202. *A. pertusus*, *Thw. Enum. Pl. Zeyl.* 367 (in part). ? *A. Pseudischæmum*, *Duthie Grass. N.W. Ind.* 21, *Fodd. Grass. N. Ind.* 88. *A. fascicularis*, *Thw. l. c.* 437; *Trim. Cat. Ceyl. Pl.* 108; *Benth. Fl. Austral.* vii. 531. *Holcus montanus*, *Herb. Hom. ex Wall. Cat. n.* 8805 C.—*Andropogon*, *Wall. Cat. n.* 8804 E, 8805, 8806, 8815 C.

Throughout INDIA, from the Panjab (ascending the Western Himalaya to 8000 ft.) to Bengal and Arracan and southward to CEYLON.—DISTRIB. Westward to the Caucasus, China, Malaya, and the Pacific. Trop. Africa.

Perennial. *Stem* 3–5 ft., stout or slender, slightly flattened on one side; nodes glabrous or hairy. *Leaves* 6–18 by $\frac{1}{2}$ – $\frac{3}{4}$ in., flat, glaucous, setaceous acuminate, ciliate towards the base; sheath hairy at the top; ligule very short, truncate. *Panicle* very variable in form and density, pyramidal thyrsiform or subcorymbose, rachis and branches glabrous the latter usually in opposite pairs; spikes variable in length. *Spikelets* pale green or purplish; gl. I rather thin, obtuse or narrowly truncate, 4–7-nerved; II oblong or lanceolate, 3-nerved, keel smooth, margin glabrous; III = $\frac{1}{2}$ I, oblong, glabrous, nerveless; IV a slender awn, 1–1 $\frac{1}{2}$ in. long, palea 0.—*Pedicelled spikelets* linear-oblong or -lanceolate; gl. I 5–9-nerved, glabrous, keels ciliate; II lanceolate, 3-nerved, ciliate; III shorter, oblong, glabrous, nerveless; IV 0.—A variable plant, nearest perhaps to a *Kuntzeanus* from which the paniculate inflorescence and smaller spikelets distinguish it. In some specimens the spikes are reduced to a few, and then the paniculate character disappears.

The following are Hackel's varieties of the Indian plant, which a larger series of specimens than he had access to tends to invalidate.—Roxburgh's *A. punctatus* and *A. glaber* (*Anatherum glabrum*, *Schult. Mant.* ii. 446) of both which there are good original drawings, do not fall under any of Hackel's vars. Both have pitted gl. I; *A. glaber* has few spikes on the branches of the panicle, *A. punctatus* has many long quite simple spikes on a rather short rachis. Hackel has given a plant of Duthie's from Simla, 7–8000 ft., the mss. name of var. *himalayensis*; it is, I think, referable to var. *caucasicus*.

Var. *genuinus*; panicle 4–5 in. subsimple, branches with one or few spikes, gl. I not pitted appressedly hairy below, keels rigidly ciliate. *A. Vachelii*, *Nees in Hook. & Arn. Bot. Beech. Voy.* 243. *Kumaon*, *Duthie (ex Hackel)*.

Var. *Hænkii*; panicle 5–6 in. compound, branches with 4–8 spikes, sessile spikelets $\frac{1}{2}$ in., gl. I rarely pitted slightly depressed along the middle line, keels rigidly ciliate. *A. Hænkii*, *Presl Rel. Hænk.* i. 340. *A. Vachelii*, β , *Hook. & Arn. l. c.* *A. leptanthus*, *Steud. Syn.* i. 391. *Rhaphis stricta*, *Nees in Hook. Kew Journ.* ii. (1850) 99.—Ceylon (C.P. n. 411 in part).

Var. *caucasicus*; panicle 3–4 in. subsimple, branches simple or subdivided, sessile spikelets $\frac{1}{2}$ in., gl. I not pitted sparsely hispid below the middle. *A. caucasicus*, *Trin. in Mem. Acad. Petersb. Ser. VI.* ii. (1833) 286. *Sorghum caucasicum*, *Griseb. in Ledeb. Fl. Ross.* iv. 476.—Black Mts., *Duthie*.

Var. *punctatus*; panicle 4–6 in. compound, branches with many spikes, sessile spikelets $\frac{1}{2}$ – $\frac{3}{4}$ in., gl. I pitted sparsely hairy below the middle, keels rigidly ciliate. *A. punctatus*, *Trin. Sp. Gram. Ic. t.* 328; *Steud. Syn. Gram.* 391 (an *Roxb.*?). *A. perfosus*, *Nees ex Steud. l. c.*—Common.

¶ 25. ***A. montanus***, *Roxb. Fl. Ind.* i. 267 (non *Benth. & Hackel*); tall, ascending from a stout creeping base, leaves long slender, panicle tall pyramidal, branches subverticilled capillary strict bearing one or several very slender elongate spikes, joints and pedicels sparsely hairy, spikelets

minute, gl. I not pitted sparsely hairy. *Kunth Enum. Pl.* i. 506. ? *A. saccharoides*, *Roxb. l. c.* 263 (*non Sw.*).

NORTHERN CIRCARS, *Roxburgh.*

Stem 3-4 ft., as thick as a large crow-quill, creeping and nodose below. *Leaves* remarkably long, a little hairy on the upper side near the base only; mouth of sheath bearded. *Panicle* 4-8 in., pale green.—There are two excellent drawings of this plant in *Roxburgh's* collection (Nos. 90 and 889) both marked *A. montanus*, in which the lower branches of the panicle are 3-nate, the rest alternate, all bearing several spikes of about an inch long. Two other of *Roxburgh's* drawings, n. 890 and 2017, of which the latter bears the name of *saccharoides*, represent a plant differing apparently from *montanum* only in the panicle being composed of simple shortly pedicelled much longer spikes. The difference between the two forms is analogous to what occurs in *A. intermedius*, from which *A. montanus* differs in the much more slender pale green panicle, and spikes with minute spikelets, and in the capillary joints and pedicels not being represented as compressed and as being laxly covered with distant long spreading hairs. As to this latter character, which is uniform in all four drawings, allowance must be made for native artists' work. I have seen no plant resembling this species, which is a native of a region botanically unexplored since *Roxburgh's* day. It has obviously no affinity with that which *Hackel*, following *Bentham*, has described as *montanus*, *Roxb.*, and which plant *Roxburgh* probably never saw.

26. *A. odoratus*, *Dna. Lisboa in Journ. Bomb. Nat. Hist. Soc.* iv. (1889) 123, *cum Ic.* & vi. (1891) 68, 203; aromatic, stem stout, nodes villous, leaves long broad, sheaths compressed, spikes few or many densely fasciated stipitate silky purplish, rachis and branches glabrous, sessile spikelets $\frac{1}{8}$ - $\frac{1}{2}$ in., callus densely silky, gl. I oblong-lanceolate truncate 7-nerved rarely pitted villous below the middle keels scaberulous.

THE DECCAN; Khandeish, Poona, &c., *Lisboa.*

Stem 3-4 ft., as thick as a swan's quill at the base, sparingly branched, leafy. *Leaves* 1-2 ft., by $\frac{1}{8}$ - $\frac{1}{2}$ in., flat, acuminate, scaberulous on both surfaces and on the margins, bright green, nerves strong; sheath long, glabrous, smooth, upper sheathing the base of the inflorescence; ligule membranous, truncate. *Panicle* 2-4 in.; branches filiform and spikes 1-2 in. suberect, slender, flexuous; spikes rather tenacious, joints and pedicels flattened with a translucent centre, tips truncate. *Sessile spikelets*, callus-hairs half as long as the gls.; gl. I thin, rarely pitted, nerves slender, tip truncate, hyaline, nerveless; II keeled, thin, obtuse or truncate, ciliate; III shorter than II, ovate-lanceolate, eciliate, nerveless; awn about $\frac{1}{2}$ in., faintly dilated towards the base. *Pedicelled spikelets* as long as the sessile or rather longer; gl. I narrow, many-nerved, dorsally glabrous; II 3-nerved, ciliate; III shorter, oblong, obtuse, nerveless, ciliate.—The compressed sheaths, panicked spikes, villous gl. I of the sessile spikelets, and aroma, seem to distinguish this from *A. Kuntzeanus*, which it strongly resembles in a dry state.

** Pedicels of upper spikelets and joints of rachis subterete, not or obscurely channelled, with no translucent centre. (See also 20. *canensis*.)

27. *A. fascicularis*, *Roxb. Fl. Ind.* i. 265; annual, slender, leaves linear, sheaths hardly compressed, panicle oblong, branches subsolitary flowering almost to the base sparingly divided, spikes slender subsessile, joints and pedicels linear subterete or compressed not channelled shortly rigidly ciliate, sessile spikelets $\frac{1}{8}$ - $\frac{1}{2}$ in., gl. I ovate-lanceolate flat smooth scabrous or shining 7-9-nerved keels shortly ciliate towards the

truncate tip. *Steud. Syn. Gram.* 392; *Hack. Monogr. Androp.* 541. *A. gangeticus*, *Hack. l.c.* 539.—*Andropogon*, *Wall. Cat.* n. 8816.

TROPICAL HIMALAYA, from Garwhal to Sikkim. LOWER BENGAL, ASSAM, the CENTRAL PROVINCES, and BURMA.—DISTRIB. Tonkin.

Stem 2-3 ft., decumbent and branched below, leafy, nodes glabrous or nearly so. *Leaves* 12-16 by $\frac{1}{2}$ – $\frac{3}{4}$ in., glabrous or hairy, base narrowed, setaceous acuminate, scaberulous; sheath hirsute or subglabrous, mouth bearded; ligule shortly ovate. *Panicle* 1-2 in., long-peduncled, usually narrow, green or purplish; rachis slender, glabrous or nodes bearded; branches erect, lower usually binate covered to the base with spikes. *Spikes* $\frac{1}{4}$ – $\frac{1}{2}$ in.; joints few, flattened but not 2-ribbed, ciliate with white or purple hairs. *Sessile spikelets* dorsally flattened, callus bearded; gls. thin, I glabrous on back and sides, margins involute, nerves very slender; II chartaceous, acute, 5-7-nerved; III lanceolate, 2-nerved, ciliate; IV much shorter, 2-fid, lobes triangular, ciliate; awn $\frac{1}{2}$ in. long; palea 0, or minute, broadly ovate. *Ovary* glabrous. *Pedicelled spikelets* neuter, narrower than the sessile; gl. I many-nerved, keels scaberulous; II acute, 7-nerved; III obovate-oblong, ciliate.—A good character of this species is the branches of the panicle bearing spikelets down close to the rachis. Hackel (who doubtfully places this in his subgenus *Sorghum*) describes gl. IV of the sessile spikelet as having a lanceolate acuminate glabrous nerveless palea as long as the gl.; no doubt an error.

28. *A. venustus*, *Thw. Enum. Pl. Zeyl.* 367; stems tall, leaves narrow, sheaths hardly compressed, panicle elongate interrupted, rachis and spreading opposite and alternate branches capillary glabrous, spikes small, joints 3-8 and pedicels very slender glabrous terete not channelled, sessile spikelets narrowly lanceolate acute, gl. I dorsally compressed nerveless tip 2-toothed, keels scabrid above the middle, II very shortly awned, keel smooth or scabrid upwards. *Hack. Monogr. Androp.* 545; *Trim. Cat. Ceyl. Pl.* 108.

CEYLON; Central Province, alt. 4000 ft., *Thwaites*.

Stem 2-4 ft., strict, subsimple, as thick as a goose-quill below and clothed with short pubescent sheaths. *Leaves* 12-16 in., smooth or scaberulous above, midrib very broad and prominent beneath; sheath subcompressed, smooth; ligule a ridge of hairs. *Panicle* 12-16 in., dull purplish, much branched. *Spikes* narrow, lax-fid., joints 3-8 and pedicels = $\frac{1}{3}$ the sessile spikelets. *Sessile spikelets* $\frac{1}{2}$ in., slightly curved; callus small, stellately bearded with white hairs; gl. I quite smooth, flat or rather convex dorsally; II chartaceous, linear-lanceolate, acuminate, 3-nerved, keel acute; III smaller, ovate, acuminate or aristulate, ciliate above, 1-3-nerved; IV linear, 2-fid, awn very slender. *Pedicelled spikelets* longer than the sessile and more acuminate, nearly glabrous, male; gl. I 7-nerved, 3 towards the margin on each side; II and III as in the sessile; IV narrow, glabrous, awn 0.—Hackel, who places this in subgen. *Vetiveria*, describes gl. I of the pedicelled spikelet as 5-nerved. The habit spikelets and glumes are those of subgen. *Amphilophis*, but the joints and pedicels are not channelled. Duthie (*Grass. N.W. Ind.* 22) gives the Jhelum Valley, *Stewart*, as a habitat, doubtless erroneously.

B. *Spikes* small, of 1-3- rarely 4 pairs of spikelets, often reduced to 3 spikelets, a sessile and 2 pedicelled. *Panicle* more or less pyramidal, rachis and branches capillary.

29. *A. micranthus*, *Kunth Revis. Gram.* i. 165, *Enum. Pl.* i. 504; stem erect or ascending simple or nearly so, leaves linear base hardly narrowed sheaths closed, spikes of 2-3 pairs of spikelets, joints and pedicels shortly ciliate or subglabrous, sessile spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in., gl. I linear-oblong dorsally channelled glabrous scaberulous or villous, keels minutely subpectinately ciliate. *Steud. Syn. Gram.* 396; *Hack. Monogr.*

Androp. 488; *Lisboa* in *Journ. Bomb. Nat. Hist. Soc.* iv. (1889), vi. (1891) 69. *A. alternans*, *Presl Reliq. Hænk.* i. 342; *Kunth Enum. l. c.* 502. *A. cœrulescens*, *Kunth l. c.* 504. *A. capilliflorus*, *Steud. in Zoll. Syst. Verz.* 58. *A. parvispica*, *Steud. l. c.* 397. *A. serratus*, *Miq. Prolus. Fl. Jap.* i. 192. *Anatherum parviflorum*, *Spreng. Syst. i.* 290. *Chrysopogon violascens*, *Trin. in Mem. Acad. Petersb. Ser. VI. ii.* (1893) 319. *Sorghum parviflorum*, *Beauv. ex Roem. & Sch. Syst. ii.* 840. *Rhaphis cœrulescens*, *Desv. Opusc.* 69. *R. microstachya*, *Nees ex Steud. l. c.* 397. *Holcus cœrulescens*, *Gaud. in Freyc. Voy. Bot.* 411, t. 27. *H. parviflorus*, *Br. Prodr.* 199.

WESTERN HIMALAYA, from the Ravi to Kumaon, alt. 4-6000 ft. KHASIA HILLS, alt. 5000 ft., *Clarke*. The NILGHIRI, CONCAN and DECCAN HILLS.—DISTRIB. E. Asia and Malaya, Australia, S. Africa.

Stem 2-3 ft., as thick as a crow-quill or thicker, terete, nodes more or less bearded. *Leaves* 6-12 by $\frac{1}{2}$ - $\frac{1}{4}$ in., setaceously acuminate, flat, more or less hairy with tubercle-based hairs, surfaces and margins scaberulous, base rounded; sheaths tight; ligule short, truncate. *Panicle* 2-6 in., oblong or pyramidal; rachis and branches spreading, perfectly smooth, flexuous. *Spikes* $\frac{1}{2}$ - $\frac{3}{4}$ in., pale yellow violet or red-brown, joints and pedicels slender often ciliate on one margin only. *Spikelets* small, callus stellately bearded; gl. I narrowly truncate, 4-6-nerved, scaberulous in all the specimens I have examined; margins narrowly inflexed; II lanceolate, acuminate or mucronate, scaberulous, 1-3-nerved; III short, obtuse, eciliate, nerveless; IV awn $\frac{1}{2}$ - $\frac{3}{4}$ in. *Pedicelled spikelets* male, callus naked; gl. I oblong, 7-nerved, margins hardly inflexed; II oblong, obtuse, 3-5-nerved; III oblong, hyaline; IV narrow, awnless.—Spikes often reduced to 3 spikelets, a sessile and 2 pedicelled males.—I have not cited Hackel's synonymy and authorities for the non-Indian forms with more spikelets in each spike. It is very difficult to distinguish *A. micranthus* from small forms of *A. assimilis*. I have seen no specimens from Lisboa.

Var. villosulus, *Hack. l. c.* 490; usually much stouter, sheaths bearded at the nodes and leaves hispidly hairy, gl. I of sessile spikelets often hispidulous. *A. villosulus*, *Steud. Syn. Gram.* 397; *Lisboa* in *Bomb. Journ. Nat. Hist.* vi. (1891) 69 —(*villosus*). *Chrysopogon villosulus*, *Nees ex Duthie Grass. N.W. Ind.* 23 (*excl. some Syn.*). *C. montanus*, *Duthie Fodd. Grass. N. Ind.* 40. *Rhaphis villosula*, *Nees ex Steud. l. c.*—Kumaon, *Royle*, &c. Rajputana, Mt. Aboo, *Duthie*. Behar, on Parusnath, *J. D. H.*, &c. Khasia Hills, *Griffith*.

30. ***A. assimilis***, *Steud. in Zoll. Syst. Verz.* 58; *Syn. Gram.* 397; suffruticose, fastigiately branched from a decumbent base, leafy, leaves linear-lanceolate much narrowed to the base, lower sheaths open, branches of pyramidal panicle capillary at length widely spreading, joints and pedicels shortly ciliate, sessile spikelets $\frac{1}{10}$ - $\frac{1}{8}$ in., gl. I oblong or linear-oblong narrowly truncate glabrous or silky villous below the middle 2-5-nerved between the shortly pectinately ciliate keels. *Miq. Fl. Ind. Bat.* iii. 489. *A. montanus*, *Benth. Fl. Hongk.* 423 (*excl. Syn.*); *Hack. Monogr. Androp.* 491 (*excl. Syn.*); *Lisboa* in *Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 203. *A. capillaceus*, *Wall. mss.* *A. glaucopsis* & *subrepens*, *Steud. l. c.* *Chrysopogon pictus*, *Hance in Ann. Sc. Nat. Ser. 5, v.* (1866) 252. *C. glaucopsis*, *Duthie Grass. N.W. Ind.* 22. *Rhaphis repens*, *Nees ex Steud. l. c.*—*Chrysopogon*, *Wall. Cat.* n. 8781, 8786, 8787, 8790.

TEMPERATE HIMALAYA, from Kashmir to Sikkim, ascending to 5000 ft. The KHASIA and MUNNPORE HILLS. BEHAR; on Parusnath, alt. 4000 ft. BURMA, *Wallich*. RAJPOOTANA, *Duthie*. The DECCAN and CENTRAL INDIA, *King*, &c.—DISTRIB. Java, China, Japan.

Stems 6 to probably 12 ft. or more; as thick as a goose-quill at the base, hard, shining, sometimes proliferously branched here and there, nodes more or less bearded.

Leaves $2\frac{1}{2}$ –6 by $\frac{1}{10}$ – $\frac{1}{8}$ in., setaceously acuminate, rather flaccid, glabrous or sparsely hairy on both surfaces, margins subserrulate; sheaths usually bearded at the mouth, upper appressed, lower open and often divaricate; ligule obscure. *Panicle* 2–5 in., triangular, ternately branched; rachis and branches capillary, glabrous, axils more or less bearded. *Spikes* $\frac{1}{4}$ – $\frac{1}{2}$ in., joints and pedicels very slender, hairs not longer than the joint. *Spikelets* pale green; gl. I membranous, margins incurved sometimes ciliate with a few very long hairs, flat or concave towards the centre; II acute, margins nearly glabrous, keel flattened ciliate above; III ovate, obtuse, glabrous; IV awn $\frac{1}{2}$ – $\frac{1}{4}$ in., slender, base acute. *Pedicelled spikelets* larger than the sessile, male or neuter; gl. I linear-lanceolate, green or reddish, glabrous or ciliate, 7-nerved, keels ciliate; II 3–5-nerved; III $\frac{1}{2}$ shorter, oblong, glabrous, nerveless; IV 0.—I have seen no Javanese or other authentic specimens, and hence assume the correctness of Hackel's identification of the Indian plant with it. It is certainly not Roxburgh's *A. montanus*.

31. **A. Hugelii**, *Hack. Monogr. Androp.* 492; stem erect branching from the base, nodes bearded, leaves much narrowed below or petioled linear scaberulous, panicle ovate-oblong, spikes with 2–3 pairs of spikelets, joints shortly ciliate, sessile spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in., gl. I oblong or oblong-lanceolate glabrous or villous below the middle 7-nerved tip truncate keels ciliate with long hairs, III minute ovate. *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 69.

WESTERN HIMALAYA? *Huegel*. RAJPOOTANA, on Mt. Aboo, King, &c. CENTRAL INDIA and the CENTRAL PROVINCES, *Duthie*, &c.

Stem shortly creeping or suffrutescent below, often red, branches $2\frac{1}{2}$ –3 $\frac{1}{2}$ ft. *Leaves* 4–10 by $\frac{1}{4}$ – $\frac{1}{2}$ in., acuminate, puberulous beneath, margins scaberulous sometimes ciliate with long hairs; sheath slightly compressed; ligule short, membranous, ciliate. *Panicle* 2–3 $\frac{1}{2}$ in., shining, branches capillary, axils softly bearded. *Spikes* about $\frac{1}{2}$ in. long, green or purplish; gl. I of sessile spikelets truncate, chartaceous, dorsally polished, margins narrowly incurved, cilia of keels very variable in length; II glabrous, truncate, apiculate, ciliate, keel much thickened; III minute, ovate, glabrous; awn of IV $\frac{1}{2}$ – $\frac{2}{3}$ in., base very slender. *Pedicelled spikelets* rather longer than the sessile, lanceolate, green or purple; gl. I 9–11-nerved, keels and back ciliate; II as long, acuminate, 5-nerved, ciliate; III nearly as long, hyaline, oblong, obtuse, glabrous; IV very narrow.—I have seen no typical specimen of this plant which Hackel described from Huegel's specimens, of which the habitat is unknown. The gl. III he describes as absent, an oversight, as it is present in spikelets of the type kindly procured from Vienna for me by Dr. Stapf, and in those collected by King, Duthie and others. *Lisboa* l. c. 69 describes a var. *fætidus*, Hack. mss. as common all over the Bombay Presidency, and as having a soft and very pleasant smell. I fail to find any characters in the specimens I have examined, or in the descriptions given, to distinguish it from *A. Hugelii*, except that according to *Lisboa* the pedicelled spikelet of *fætidus* has no gl. IV.

32. **A. Schmidii**, *Hook. f.*; stems subsimple or branching below, ascending leafy, nodes bearded, leaves lanceolate acuminate rigid scabrid above base suddenly contracted, sheaths terete smooth, panicle contracted, branches short erect, sessile spikelets broadly oblong obtuse convex 5–7-nerved between the very shortly ciliate and sparsely hairy keels, margins narrowly incurved, II broadly oblong glabrous 3-nerved, III very small ovate, IV a slender awn.

NILGHIRI HILLS; *Schmid*; Nadavatam, in pastures, alt. 6000 ft., *Lawson*.

Stem 3–4 ft., rather stout, red-brown, smooth. *Leaves* 3–5 by $\frac{1}{8}$ – $\frac{1}{4}$ in., finely acuminate, midrib strong, scabrid above with sometimes tubercle-based bristles, scaberulous beneath, margins scaberulous; sheath long, mouth bearded; ligule obscure. *Panicle* 2–4 in., loosely or densely branched; branches and branchlets

smooth. *Spikelets* brown or dull green, callus short, broad, shortly bearded; gl. I rather coriaceous, dorsally shining, smooth or scaberulous; II chartaceous; III broadly ovate, obtuse, nerveless; IV awn $\frac{1}{2}$ in., very slender. *Pedicelled spikelets* narrower; pedicels shortly ciliate; gl. I 9-nerved, ciliate all over; II narrowly lanceolate, 5-nerved, margins ciliate; III oblong; IV 0.—A stouter grass than the foregoing, with very scabrid leaves and much broader spikelets. Allied to *A. micranthus*, differing conspicuously in the rigid scabrid foliage.

33. *A. filiculmis*, Hook. f.; annual, stem elongate filiform flaccid much branched, nodes bearded, leaves 2–4 in. linear-lanceolate finely acuminate flaccid base suddenly narrowed, sheaths lax lower open, panicle long-peduncled lax-flid., rachis and branches capillary, pedicels of upper spikelets ciliate with long hairs, sessile spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in. oblong-lanceolate obtuse 5–7-nerved between the keels villous below the middle or all over. keels ciliate with long slender hairs.

The DECCAN; Poonah, in rocky places, Jacquemont (n. 310); MAWAR; Dhombha, Woodrow (*Herb. Bomb.* n. 26.)

Stems 2–3 ft., apparently decumbent and interlaced, copiously geniculately branched throughout, quite glabrous, very weak, internodes long pubescent. *Leaves* pale green, $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, tip filiform, glabrous or sparsely hairy beneath, margins smooth ciliate towards the very narrow base, costa and nerves very slender; sheaths long, narrow, spreading at the ramifications, glabrous, bearded at the top; ligule broad, membranous, ciliate. *Panicle* 1–2 in., branches few of extreme slenderness. *Spikelets* pale green or white; callus densely shortly villous; gl. I of sessile membranous, nerves faint; II oblong, truncate, mucronate, 3-nerved, glabrous; III very small, ovate, nerveless, eciliate; IV, awn $\frac{1}{2}$ – $\frac{3}{4}$ in., column brown twisted. *Pedicelled spikelets* narrower than the sessile; gl. I lanceolate, tip truncate mucronate, 7–9-nerved, ciliate; with long hairs; II as long, ovate-lanceolate, acute, strongly 5–7-nerved; III broadly oblong, hyaline, nerveless; IV 0.—A very delicate grass. The sessile spikelets of Jacquemont's specimens are nearly glabrous, of Woodrow's densely villous, with snow-white hairs.

34. *A. pteropechys*, Clarke in *Journ. Linn. Soc.* xxv. (1889) 88, t. 38; stem very slender, nodes bearded, leaves very narrow, upper sheath spathiform, panicle subpyramidal, branches few capillary villous beneath the few pale brown spikes, spikelets 3–5, joints and pedicels shortly ciliate, sessile spikelets $\frac{1}{2}$ in., gl. I oblong obtuse 9-nerved glabrous keels pectinately ciliate for the upper $\frac{2}{3}$. Hack. *Monogr. Androp.* 690.

MUNNEPORE; on Jakpho and Kohima, alt. 5500–7500 ft., Clarke.

Perennial. *Stem* 2–3 ft. erect from a creeping rootstock, sparingly branched, leafy upwards, nodes thickly bearded. *Leaves* 3–6 by $\frac{1}{4}$ – $\frac{1}{2}$ in., finely acuminate, narrowed towards the base, above and margins scaberulous; beneath sparsely hairy; sheaths closed, glabrous; ligule very short, ciliate. *Panicle* 2–3 in.; branches 3–6, ascending, flexuous, glabrous except below the spikes where they are villous with brown hairs. *Spikes* $\frac{1}{2}$ – $\frac{3}{4}$ in.; pedicels of upper spikelets very slender, = $\frac{1}{2}$ the sessile spikelets and joints grooved. *Spikelets* erect, callus hairs = $\frac{1}{2}$ the spikelet; gl. I dorsally quite glabrous; II ovate-lanceolate, acute, 3-nerved, ciliate; III small, ovate, nerveless; awn $\frac{1}{2}$ in., capillary, base acute. *Pedicelled spikelets* narrower than the sessile; gl. I 9–11-nerved; II 3-nerved; III oblong, obtuse, glabrous, nerveless.

Subgen. VI. *Sorghum*, Hack. *Spikes* paniced, tips of branchlets of panicle not bearded, joints I or few and pedicels filiform not or obscurely grooved ventrally, tips truncate. *Spikelets* few, often large, more or less dorsally compressed, broadly oblong ovoid or lanceolate; callus short; gl. I of sessile spikelets coriaceous, often shining, margins narrowly inflexed

above, involute below; II awnless; III hyaline, 2-nerved; IV entire or 2-fid and awned in the cleft, rarely awnless. *Lodicules* (in the Indian species) ciliate.

35. **A. halepensis**, *Brot. Fl. Lusit.* i. 89; perennial, tall, stout or slender, panicle decompound, rachis of spike fragile, joints bearing a circular scar with entire margins, pedicelled spikelets usually male about as long but narrower than the sessile, pedicel = $\frac{1}{2}$ the sessile spikelet. *Sibth. Fl. Græc.* i. t. 68; *Kunth Enum. Pl.* i. 502, *Suppl.* 412, t. 40, f. 1; *Steud. Syn. Gram.* 394; *Thw. Enum. Pl. Zeyl.* 366. *A. arundinaceus*, *Scop. Fl. Carn. Ed.* ii. 274. *A. avenaceus*, *H. B. & K. Nov. Gen. & Sp.* i. 189. *A. controversus & dubitatus*, *Steud. Syn. Gram.* 391, 394. *A. laxus*, *Roxb. Fl. Ind.* i. 271 (*non Willd.*). *A. miliaceus*, *Roxb. l.c.* 272; *Hack. Monogr. Androp.* 541. *A. miliformis*, *Schult. Mant.* ii. 448. *A. Sorghum*, subsp. *halepensis*, *Hack. l.c.* 501. *Sorghum capense*, *Herb. Heyne ex Wall. Cat. n.* 8778 C. *S. dubium*, *C. Koch in Linnaea*, xxi. (1848) 443. *S. giganteum*, *Edgew. in Journ. As. Soc. Beng.* (1852) 181. *S. halepense*, *Pers. Syn.* 101; *Reichb. Ic. Fl. Germ.* t. 54; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 54, t. 91; *Nees Fl. Afr. Austr.* 88; *Griseb. Fl. Brit. W. Ind.* 560; *Benth. Fl. Austral.* vii. 540; *Wall. Cat. n.* 8778; *Trim. Cat. Ceyl. Pl.* 108; *Aitchis. Cat. Panjab. Pl.* 175; *Duthie Grass. N.W. Ind.* 23, *Fodd. Grass. N. Ind.* 40, t. 27. *S. saccharatum*, *Hohen. Pl. Nilghiri*, n. 1284 (*non Pers.*). *S. Schreberi*, *Tenore Fl. Neap. Syll. App.* iv. 4. *Blumenbachia halepensis*, *Koel. Descr. Gram.* 29. *Trachypogon avenaceus*, *Nees Agrost. Bras.* 354. *Holcus halepensis*, *Linn. Sp. Pl.* 1047; *Host Gram. Austr.* i. t. 1; *Schreb. Besch. Græs.* i. t. 18; *Jacq. Eclog. Gram.* t. 48. *H. decolorans*, *Willd. Sp. Pl.* iv. 931. *H. Catamucha*, *Ham. ex Wall. Cat. n.* 8778 F.

Throughout INDIA, BURMA and CEYLON in open places.—DISTRIB. Most warm countries.

Roots creeping, stoloniferous. *Stem* 3–15 ft., erect, leafy, simple or branched, nodes pubescent. *Leaves* 8–18 in., or more, up to 3 in. broad, narrowed to the rounded base, tip filiferous, glabrous except towards the often villous base, flat or waved, midrib broad, margins scabridly serrulate; sheath terete; ligule rounded. *Panicle* 6 in. 2 ft., very variable in form and amount of ramification, typically pyramidal with long suberect or spreading or drooping whorled branches, axils often bearded. *Spikes* of 1–3 rarely 5–7 pairs of spikelets, sometimes reduced to a triplet of a sessile fertile and 2 pedicelled male rarely neuter spikelets, joints of rachis and pedicels angular or compressed, glabrous or shortly ciliate. *Sessile spikelets* $\frac{1}{2}$ to nearly $\frac{1}{2}$ in., usually lanceolate, green or purplish, callus sparsely bearded; gl. I with involute sides embracing the others, more or less silky hairy, rarely glabrous, 5–11-nerved above, there keeled and ciliate tip depressed or not hyaline; II subcoriaceous, chartaceous and keeled above, margins ciliolate; III shorter, elliptic-oblong, hyaline 2-nerved; IV smaller, ovate, obtuse, entire or 2-fid, awned or not, awn $\frac{1}{4}$ – $\frac{1}{2}$ in. or shorter; palea linear-oblong, obtuse, ciliate. *Pedicelled spikelets* linear-lanceolate, gl. I glabrous, 5–9-nerved, margins inflexed, keels subpectinately ciliate; II lanceolate, 3–5-nerved; III and IV, if present, hyaline.—I have restricted the synonymy of this grass chiefly to Indian names, and those under which good figures are given. It is no doubt the wild form of the following (*A. Sorghum*) and its grain has long been used by natives of India. But whether the *Sorghum* form originated from cultivation of the wild in India, or in Africa, where both are very common, can be only a matter of conjecture. Both seem to be now cultivated in India according to Watt (*Dict. of Economic Products of India*) and others, and transition forms are frequent. *Hackel*, who treats *A. halepensis* as a subspecies of *A. Sorghum*, subdivides it under 5 varieties and 6 subvarieties, founded on characters too variable for use. *Dr. Stapf*, who has studied the African species as well as the Indian, proposes 2 varieties, or

rather prevalent forms, between which transitions occur, both vary in habit and in having awned mucronate or awnless spikelets; they are a. *genuinus*, of which *miliaceus*, Roxb., may be regarded as the type with sessile spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. long, it is *Wall. Cat. n. 8778 A. B. C.* And b. *effusus*, with sessile spikelets $\frac{1}{2}$ nearly $\frac{1}{4}$ in., it includes *A. laxus*, Roxb., *A. halepensis*, Wight Cat. n. 1672, and *Wall. Cat. n. 8778 D. E. F. H.*

36. *A. SORGHUM*, *Brot. Fl. Lusit. i. 88*; annual, tall, usually very robust, panicle decompound usually thyriform with crowded whorls of erect branches and branchlets and spikes rarely subeffuse, rachis of spike tenacious, joints when forcibly separated leaving a ragged scar at the tip, pedicelled spikelets usually neuter, pedicels short. *Roxb. Fl. Ind. i. 273*; *Kunth Enum. Pl. i. 581*; *Steud. Syn. Gram. 393*. *A. Sorghum*, *subsp. sativus*, *Hack. Monogr. Androp. 505*. *Holcus Sorghum*, *Linn. Sp. Pl. 1047*; *Gærtn. Fruct. ii. 2, t. 80*; *Lamk. Encycl. t. 838*; *Grah. Cat. Bomb. Pl. 238*; *Dalz. & Gibs. Bomb. Fl. Suppl. 99*.

Cultivated throughout the warmer parts of Europe, Asia and Africa.—Introduced into America, Australia, &c.

Under *A. halepense* I have alluded to *A. Sorghum* as the cultivated form of that plant. Of the early history of its culture nothing is recorded, it having no Sanskrit name, and there is no evidence of its being known to the ancients of Europe or the East. Variable as it is, its forms appear to be much less fixed than those of wheat and barley, which gives rise to the suspicion that they are of comparatively recent origin. Many authors have endeavoured to limit by botanical characters some or all of its known varieties, and more have applied specific names to forms they could not, or did not try to identify with known ones. The result is a redundancy of names, and an inextricable synonymy. Watt's "Dict. of Economic Products of India" has treated in great detail the culture of many varieties, but under names that have little or no significance. Hackel has essayed to clean this Augean stable, and has devoted 15 pages of his Monograph to the forms of *A. Sorghum*, of which he describes 37 varieties and 12 subvarieties. His earnest and meritorious attempt has the great advantage of approximately harmonising most of the Indian citations and synonyms, and I therefore give a précis of it. It, however omits characters of the glumes which Dr. Stapf, in working up the African forms, has studied, and which characters appear to be of far more importance than those relied on by Hackel. Unfortunately it is not possible to combine the two classifications, for the obvious reason that Stapf's characters have been neglected in the descriptions of previous investigators, and it remains for the Indian botanists in this case, as in that of *Pennisetum typhoideum*, and indeed many other cultivated plants, to remove this reproach to Indian botany. Hackel's Indian varieties are as follow:—

Var. *Roxburghii*, *Hack. l. c. 510*; panicle lax ovate-oblong, rachis elongate, branches drooping, sessile spikelets ovate awnless, gl. I keeled in the upper third, grain white.—*A. saccharatus*, *Roxb. Fl. Ind. i. 271*; *Dalz. & Gibs. Fl. Suppl. 99* (*non Kunth*).

Var. *Wightii*, *Hack. l. c. 511* characters of var. *Roxburghii*, but panicle more dense, branches scabrid, spikelets broadly elliptic, gl. I hairy in the upper half. *Herb. Wight n. 185*.

Var. *vulgaris*, *Hack. l. c. 515*; panicle dense, branches erect or erecto-patent, sessile spikelets $\frac{1}{2}$ in. obovoid or subglobose obtuse awned; *A. Sorghum*, *Roxb. l. c. 269*; *Sorghum vulgare*, *Pers. Syn. i. 101*; *Reichb. Ic. Fl. Germ. t. 80*; *Duthie Grass. N.W. Ind. 23*, *Field & Gard. Crops. 25, t. 6*, *Fodd. Grass. N. Ind. 41*; *Holcus Sorghum*, *Linn.*

Var. *cernuus*, *Koern. Handb. Getreit. i. 314*; very robust, panicle drooping ovoid obtuse compact, rachis and appressed branches short suberect subvillous, sessile spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. broadly obovoid or rhomboid obtuse awned whitish densely silkily villous or glabrescent dorsally, grain globose white with a black

hilum. *A. cernuus*, Kunth l. c. (excl. Syn. Roxb.). *A. compactus*, Brot. l. c. 88; *Sorghum cernuum*, Host Gram. Austr. iv. t. 3; Reichb. Ic. Fl. Germ. t. 80. *Holcus cernuus*, Ard. in Sag. Sc. e Lett. Acad. Padua, i. 12, t. 3, f. 1, 2.—*S. saccharatum*, Strachey & Winterbottom, from Kumaon, alt. 5000 ft. is a profliferous state.

Var. *glabrosus*, Hack. l. c. 517; panicle ovoid compact at length straw-colrd., sessile spikelet $\frac{1}{2}$ in. suborbicular not awned villous.—Serampore, Voigt (in Herb. Copenhagen.)

Var. *milliformis*; (not *A. milliformis*, Schult.); panicle dense, sessile spikelets $\frac{1}{2}$ in. suborbicular at length straw-colrd. strigosely hairy, gl. IV with an exerted mucro, grain dark brown or violet brown.

Var. *bicolor*, Hack. l. c. 519; panicle very dense, sessile spikelets $\frac{1}{2}$ in. obtusely hexagonal awnless at length black, gl. I coriaceous below the middle, then deeply rugg'd, upper part striate hairy, grain almost twice as long as the gl. white. ?*A. bicolor*, Kunth l. c. 501, non Roxb.; ?*A. cernuus*, Roxb. Fl. Ind. i. 270. ?*Sorghum bicolor*, Willd. Enum. Hort. Berol. 1036. ?*Holcus bicolor*, Linn. Mant. ii. 301.—Deccan Peninsula, Herb. Wight n. 185 B.

Dr. Stapf's arrangement of the Indian forms (including many of the African) is the following. I do not cite the habitats and synonyms of the varieties given by Hackel, for to do so might include plants to which the characters adopted by Dr. Stapf may not apply:—

* Glume I of sessile spikelets not depressed below the tip.

Var. *hians*, Stapf; gls. I and II divaricate exposing the white grain, tip of gl. I coriaceous.—*S. vulgare*, Pers. B. Wight Cat. n. 1670 (not in Hackel.)

Var. *Roxburghii*; Hack. l. c. 510; tip of gl. I hyaline, nerves obscure, sessile spikelets $\frac{1}{2}$ in. ovate acuminate awnless.—Wall. Cat. n. 8777 D. (the right hand specimen) F. H.

Var. *saccharatus*, Koern.; spikelets $\frac{1}{2}$ in. ellipsoid acute or apiculate awned, tip of gl. I hyaline, nerves obscure.

Var. *Thomsoni*, Stapf; spikelets $\frac{1}{2}$ in. ovate, gl. I strongly nerved below the tip.—A single specimen from Upper Gangetic Plain, Thomson.

** Glume I of sessile spikelets depressed below the tip, nerves distinct up to or near to the base.

Var. *nervosus*, Stapf; Hack. l. c. 513.—S. India, Herb. Rottler.

*** Glume I of sessile spikelets depressed below the tip, nerves distinct below the tip only.

Var. *obovatus*, Hack. l. c. 514; panicle very loose, gl. I and II at length more or less black and shining.—Wall. Cat. n. 8777 E. J. L.

Var. *vulgaris*, Hack. l. c. 515; panicle erect contracted, gl. I of sessile spikelets $\frac{1}{2}$ in. acute depressed and triangular for the upper $\frac{1}{3}$.—Wall. Cat. n. 8777 A; C is a form with smaller spikelets, only $\frac{1}{2}$ in. long.

Var. *milliformis*, Hack. l. c. 518 (not *A. milliformis*, Schult.); panicle erect contracted, gl. I of sessile spikelets $\frac{1}{2}$ in. truncate depressed part very narrow reddish.

Var. *cernuus*, Koern.; Hack. l. c. 576; very robust, panicle forming a dense ovoid or oblong cernuous or decurved head, sessile spikelets small almost orbicular usually tomentose.—Wall. Cat. n. 8777 B. G. K.

37. **A. Stapfi**, Hook. f.; annual, stems short branching from the leafy base, leaves 2–3 in. linear-oblong acute base cordate, panicle erect slender loose, branches few short erect, spikelets few $\frac{1}{2}$ – $\frac{1}{4}$ in. ovoid erect acute silkily villous with white hairs, gl. I ovate 9–11-nerved tip 2-toothed, and II very coriaceous.

TINNEVELLY, at Palamcottah, Wight.

Stems many, 12–16 in., spreading from the fibrous roots; geniculately ascending,

quite smooth. *Leaves* $\frac{1}{4}$ – $\frac{1}{3}$ in. broad, flaccid, flat, margins smooth, nerves 3–5 on each side of the slender midrib; sheaths of lower short open, of the upper long rather loose, quite glabrous; ligule very short, membranous, glabrous. *Panicle* 2–4 in.; rachis and branches stiff, angular, subscaberulous, rather stout, green. *Spikes* of 1–3 pairs of rather distant white spikelets; joints = $\frac{2}{3}$ the sessile spikelet, stout, shortly villous truncate, pedicels = $\frac{1}{2}$ the spikelet, more slender. *Sessile spikelet* terete; callus very short, stellately bearded with white hairs; gl. I and II very coriaceous both with strongly incurved sides, nerves very slender with many cross-nervules; III oblong, truncate, hyaline, 2-nerved, ciliate; IV short subrhomboidal, cleft to the middle into triangular acute ciliate lobes; awn in the cleft $\frac{3}{4}$ in., smooth, slender; palea linear-oblong, ciliate, nerveless. *Anthers* long. *Pedicelled spikelets* very narrow, imperfect, neuter, gl. I lanceolate, 9-nerved, bicuspidate; II shorter, 5-nerved.—A closely allied species, with similarly densely silky white spikelets, has been collected by Lunt in Southern Arabia, where it is stated to be cultivated. It is a stout plant with much larger leaves and the habit of the ordinary *Sorghum*. The spikelets are shorter and broader than in *A. Stapfi*, and are collected in a dense oblong panicle.

38. ***A. serratus***, *Thunb. Fl. Jap.* 41; tall, erect, leaves narrowly linear, base narrow, lower branches of subsimple narrow elongate panicles whorled, spikes solitary 2–8-jointed, joints pedicels and callus shortly villous with rufous or purple hairs, sessile spikelets $\frac{1}{4}$ – $\frac{1}{2}$ in. ovoid ellipsoid or lanceolate, gl. I rufously hirsute towards the pale tip and sides, IV shortly awned or awnless. *Hack. Monogr. Androp.* 520; *Grah. Cat. Bomb. Pl.* 238.

Throughout INDIA, on the hills and plains from the Panjab to Burma, and southward to Ceylon and the NICOBAR ISLANDS.—DISTRIB. Asia and Austral trop.

Perennial. *Stem* 3–4 ft., subsimple, nodes bearded. *Leaves* 4–20 by $\frac{1}{4}$ – $\frac{1}{2}$ in., setaceous acuminate, glabrous or sparsely hairy on both surfaces, hairs often tubercle-based, midrib broad; sheaths terete below keeled upward, more or less hairy; mouth silkily villous; ligule very short, truncate. *Panicle* 4–12 in., oblong, rachis glabrous; branches capillary, about equalling the spikes, glabrous or scaberulous, whorls distant. *Spikes* $\frac{1}{4}$ – $1\frac{1}{2}$ in., red-brown; joints and pedicels = $\frac{1}{2}$ the sessile spikelets, margins shortly villous. *Sessile spikelets*, callus acute; gl. I coriaceous, dark brown or nearly black, glabrous and polished on the middle dorsally, tips pale; II rather longer, lanceolate, acute, 1-nerved, hairy upwards; III shorter, lanceolate, acute; IV small, oblong, entire or 2-lobed, awned or not. *Lodicules* ciliate. *Pedicelled spikelets* narrower than the sessile, paler, hairy; gl. I 7-nerved; II 3-nerved; III and IV linear, ciliate.—Roxburgh does not seem to have known this grass.

Var. *genuinus*, Hack.; gl. IV of sessile spikelet 2-lobed, awned in the cleft. *A. serratus*, *Thunb. l. c.* (non Retz). *A. laxus*, *Willd. Sp. Pl.* iv. 907 (non Roxb.); *Steud. Syn. Gram.* 391. *A. tropicus*, *Spreng. Syst. Veg.* i. 287; *Kunth Enum. Pl.* i. 503 (non Kunth); *Thw. Enum. Pl. Zeyl.* 366; *Benth. Fl. Hongk.* 423. *A. dichroanthus*, *Steud. in Zoll. Syst. Verz.* 58. *Sorghum fulvum*, *Beauv. ex Roem. & Sch. Syst.* ii. 840; *Benth. Fl. Austral.* vii. 541; *Trim. Cat. Ceyl. Pl.* 108. *S. Junghuhnii*, *Miq. Fl. Ind. Bat.* iii. 783. *Holcus fulvus*, *Br. Prodr.* 199.

Var. *nitidus*, Hack.; gl. IV. of sessile spikelet entire not awned. *A. consimilis* and *pedicellatus*, *Steud. Syn. Gram.* 394. *A. fuscus*, *Presl Rel. Hænk.* i. 342; *Kunth l. c.* 502. *A. nigrum*, *Herb. Ham. in Wall. Cat. n.* 8777 E. *A. nitidus*, *Kunth Revis. Gram.* i. 166, *Enum. l. c.* 510. *Sorghum halepense*, *Wall. Cat.* 8878 E. G.; *Wight Cat. n.* 2350. *S. muticum*, *Nees in Herb. Wight; Aitchis. Cat. Panjab. Pl.* 175; *Duthie Grass. N.W. Ind.* 23. *Chrysopogon fuscus*, *Trin. ex Steud. Nom. Ed.* II. i. 360. *Holcus quinqueflorus*, *Herb. Ham. ex Wall. Cat. n.* 8778 G.—*Andropogon*, *Wall. Cat. n.* 8879.

39. ***A. purpureo-sericeus***, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 469; annual, robust, upper nodes villous, branches of subsimple panicle

few or many in a whorl flexuous, spikes subsolitary, joints pedicels and callus villous with long white or red brown hairs, sessile spikelets $\frac{1}{2}$ in. oblong-ovate, gl. I 5-7-nerved villous all over tip acute, II 2-fid, awn long stout. *Hack. Monogr. Androp.* 524. *Sorghum purpureo-sericeum*, *Asch. & Schweinf. Beitr. Fl. Æthiop.* 310. *S. Ritchiei*, *Munro mss.*

The DECCAN; Belgaum, *Ritchie*. N. Canara, *Woodrow*. CENTRAL PROVINCES, *Duthie*.—DISTRIB. Abyssinia.

Stem 3-4 ft., erect; stout or slender. *Leaves* 8-10 by $\frac{1}{4}$ - $\frac{1}{2}$ in., linear, finely acuminate, sparsely hairy, margins hardly scabrid; sheath, ribbed, glabrous or margin fimbriate, mouth villously silky; ligule very short, ciliate. *Panicle* 4-10 in., erect; rachis glabrous; branches $\frac{1}{2}$ -1 in., capillary. *Spikes* 1-1 $\frac{1}{2}$ in., rarely of 3 joints, sometimes of one sessile and 2 pedicelled spikelets, joints about $\frac{1}{2}$ the sessile spikelet. *Spikelets* erect or spreading or pendulous, dorsally flattened; gl. I coriaceous, margins involute from base to apex, keels rounded, villi red-brown or snow-white; II as long as I, acuminate or aristulate, dorsally rounded, coriaceous; III hyaline, epaleate, 2-nerved, ciliate; IV very fragile, 3-nerved, below the middle ciliate with long hairs; awn 1-1 $\frac{1}{4}$ in., column stout red-brown twisted glabrous; palea minute, ciliate. *Pedicelled spikelets* usually shorter paler and narrower than the sessile; gl. I thinner, 7-nerved, shortly silky; II and III as in the sessile; IV lanceolate, acuminate, 1-nerved, ciliate, male.—The Indian differs from the African plant in having rather smaller spikelets, in gls. I and II of the sessile not or less scarious at the tip. The pubescence of the spikelet is more copious and pure white in a Deccan specimen from Woodrow, and in a Panjab? one from Stewart. Hackel has named Duthie's specimens *A. purpureo-sericeus* var. *variegatus*.

Subgen. VI. VETIVERIA, *Hack.* *Spikes* paniced, branches of panicle many, whorled; joints 3 or more and pedicels linear filiform dorsally convex not channelled, tip truncate. *Sessile spikelets* laterally or dorsally compressed, awned or not; gl. I coriaceous, narrow, margins inflexed or involute, keels muricate; II awned or not; III hyaline; IV entire or 2-fid, awned. *Lodicules* glabrous.

But distinguished from *Chrysopogon* by the absence of a beard of rigid hairs on the tip of the branchlets, seen after the fall of the spike. *A. venustus* is removed to *Amphilophis*.

40. **A. squarrosus**, *Linn. f. Suppl.* 433; stem stout, leaves long rigid, sheaths strongly compressed, panicle narrow, branches simple strict, spikes many-jointed joints and pedicels glabrous, sessile spikelets linear-oblong glabrous, gl. I coriaceous acute dorsally flat, margins broadly inflexed muricate, IV linear-oblong mucronate or shortly awned. *Vahl Symb.* iii. 9; *Hack. Monogr. Androp.* 542; *Lisboa in Bomb. Journ. Nat. Hist.* vi. (1891) 67. *A. muricatus*, *Retz. Obs.* iii. 43, v. 21; *Kunth Enum. Pl.* i. 505, *Suppl.* 416; *Roxb. Fl. Ind.* i. 265; *Wall. Cat.* n. 8759; *Grah. Cat. Bomb. Pl.* 238; *Griff. Notul.* iv. 84, *lc. Pl. Asiat.* t. 139, f. 57, t. 155, f. 1; *Thw. Enum. Pl. Zeyl.* 368; *Trim. Cat. Ceyl. Pl.* 108; *Dalz. & Gibs. Bomb. Fl.* 302; *Duthie Grass. N.W. Ind.* 90, *Fodd. Grass. N. Ind.* 36, t. 24. *A. festucoides*, *Presl Rel. Hænk.* i. 340. *A. nigritanus*, *Benth. in Hook. Niger Fl.* 573; *Steud. l. c.* 394. *Anatherum muricatum*, *Beauv. Agrostog.* 150, t. 22, f. 10; *Spreng. Pugill.* ii. 15. *Vetiveria odorata*, *Virey in Journ. Pharm. Soc.* I. xiii. 499. V. arundinacea & muricata, *Griseb. Fl. Brit. W. Ind.* 559, 560. *Mandelorna insignis*, *Steud. l. c.* 359. *Agrostis verticillata*, *Lam. Dict.* 59, *Ill. Gen.* n. 162, *Suppl.* i. 255. *Phalaris zizanioides*, *Linn. Mant.* ii. 183. *Holcus* ? *Viranae*, *Herb. Ham. ex Wall. l. c.*—*Virana*, *Jones in As. Research.* iv. 306.

Throughout the Plains and Lower Hills of INDIA, BURMA and CEYLON, ascending to 4000 ft.—DISTRIB. Java, Afr. trop.

Stems 2-5 ft., in large, dense tufts with stout spongy aromatic roots, sparingly branched, as thick below as a goose-quill. *Leaves* 1-2 ft., subbifarious, narrow acute, erect, keeled, glabrous, margins scabrid; sheaths equitant, glabrous; ligule obscure. *Panicle* 4-12 in., conical, erect, rachis stout and erecto-patent filiform flexuous branches glabrous or scaberulous. *Spikes* slender, joints and pedicels about = the sessile spikelets. *Sessile spikelets* grey green yellow or purplish, $\frac{1}{4}$ - $\frac{1}{2}$ in., slightly curved, glabrous, callus obscurely bearded; gl. I coriaceous, acute, 2-4-nerved; II coriaceous, 1-nerved, margins hyaline, keel muricate; III lanceolate, acuminate, 2-nerved, margins inflexed ciliate; IV = III, ciliate; palea very small, obtuse, glabrous. *Pedicelled spikelets* like the sessile but gl. I smooth, IV awnless.—Khus-khus grass.

41. **A. Lawsoni**, *Hook. f.*; stem erect from a stout rootstock, leaves narrowly linear curved acute or obtuse tips serrulate, sheaths compressed, panicle narrow elongate branches erect, spikes pale, joints 6-8 and pedicels slender obliquely truncate, gl. I linear rigid keels muricate dorsally flat scaberulous margins inflexed, II awned keel pectinately ciliate above the middle, IV 2-toothed awned.

MYSORE; at Bandypore, alt. 3000 ft., in moist ground, *Lawson*.

Rootstock horizontal; stems simple, slender, internodes very long. *Leaves* chiefly subradical, 2-5 by $\frac{1}{2}$ in., exactly linear, rigid, base not contracted, margins ciliate, nerves 4-8 strong; sheath of lower very short, of cauline very long, striate; ligule a ridge of hairs. *Panicle* 6-7 in., branches or peduncles of spikes opposite and fascicled, and branchlets slender puberulous with a white scurf. *Spikes* $\frac{1}{4}$ - $\frac{1}{2}$ in., pale reddish, erect; joints very obliquely truncate, tips obscurely ciliate, and pedicels nearly = spikelet, slender, compressed. *Sessile spikelets* $\frac{1}{2}$ in., linear-lanceolate, callus bearded with silky hairs; gl. I coriaceous, tip obtuse, bristly; II cymbiform, tip 2-fid, awn longer than the gl., base ciliate; III oblong, ciliate, nerveless; IV arched, linear, obtusely 2-toothed, awn very slender; palea oblong, ciliate, nerveless. *Anthers* long. *Pedicelled spikelets* male, longer and narrower than the sessile, callus naked, gl. I 3-nerved, awned, keels pectinately ciliate; II acuminate, awned; III and IV oblong, obtuse, ciliate.—The tips of the branchlets bearing the spikes have a few short unequal bristles, showing an approach to those of *Chrysopogon*.

Subgen. VII. CHRYSOPOGON, *Hack*. *Spikes* of 3 spikelets, solitary or subsolitary (1-4 in *C. Gryllus*) on the capillary whorled branches of an erect or inclined panicle; branches with obconic obliquely truncate tips crowned with a ring or beard of stiff hairs. *Spikelets* 3-nate, a sessile bisexual, and 2 pedicelled males or neuters. *Sessile spikelets* narrow, laterally compressed; gl. I narrow, linear, rigid, erect, 4-nerved, usually laterally compressed; II broader, laterally compressed, obtusely keeled, 3-nerved, tip 2-lobed awned or not; III hyaline, 2-nerved; IV the narrow hyaline 1-3-nerved base of a long awn. *Pedicelled spikelets* dorsally compressed; gls. I and II awned or not.—*Ligule* of minute hairs in all.

The only subgenus with the tips of the branches of the panicle bearded, as best seen after the fall of the spike. The genus has a better claim to be retained than most of *Andropogonææ*. The species are, with the exception of the first two, very difficult of definition, and must be regarded as merely provisionally established.

* Pedicels of the upper spikelets half as long as the sessile spikelet or longer.

† Pedicels of the upper spikelets glabrous or nearly so.

42. **A. Gryllus**, *Linn. Cent. Pl. ii. 33*; stem simple, panicle large,

branches long capillary spreading simple or branched and bearing 2-4 spikes, sessile spikelets $\frac{1}{2}$ - $\frac{3}{4}$ in., gl. I 2-toothed dorsally rounded with 2 mucronate or mamillate keels or channels, II mucronate or aristulate keel and sides bristly above the middle. *Kunth Enum. Pl.* i. 504; *Hack. Monogr. Androp.* 550; *Steud. Syn. Gram.* 395; *Host Gram. Austr.* ii. 1, t. 1; *Sibth. Fl. Græc.* i. t. 67; *Duthie Grass. N.W. Ind.* 22, *Fodd. Grass. N. Ind.* 40. *A. echinulatus*, *glabratus* & *Royleanus*, *Steud. l.c.* 395, 397. *A. pallidus*, *Kunth Revis. Gram.* i. 165. *A. paniculatus*, *Lam. Fl. Fr. Ed.* 2, iii. 633; *Ill. Gen.* 840, f. 1. *Chrysopogon Gryllus*, *Trin. Fund. Agrost.* 188; *Nees Gen. Fl. Germ. Monocot.* i. t. 93; *Benth. Fl. Austral.* vii. 537; *Aitchis. Cat. Panjab. Pl.* 176. *C. glabratus*, *Trin. in Mem. Acad. Petersb. Ser.* VI. ii. (1833) 318. *Rhaphis Gryllus*, *Desv. Opusc.* 69. *R. Royleana*, *Nees ex Steud. l.c.* 397. *R. echinulata*, *Nees in Royle Illustr. Bot. Himal.* 417. *Pollinia Gryllus*, *Spreng. Pugill.* ii. 10; *Reichb. Ic. Fl. Germ.* t. 54. *P. pallida*, *Roem. & Sch. Syst.* ii. 829. *Apluda Gryllus*, *Presl Cyp. & Gram. Sic.* 55. *Holcus Gryllus* & *pallidus*, *Br. Prodr.* 199.—*Chrysopogon*, *Wall. Cat.* n. 8792 B. C. D.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 4-9000 ft. KHASIA HILLS, alt. 4-5000 ft.—DISTRIB. Eastwards to S. Europe and N. Africa, Australia.

Stems forming dense hard tufts, erect, 6 in. to 5 ft. high, as thick as a goose-quill below; nodes smooth. Leaves 6-18 by $\frac{1}{4}$ - $\frac{1}{2}$ in., linear, acute, glabrous or hirsute, margins serrulate; sheath keeled above, glabrous or pubescent. Panicle 3-8 in.; rachis angular, scabrid, axils bearded; branches 2-4 in., usually very many in a whorl, tips obliquely truncate densely bearded. Sessile spikelets; callus straight, acute; gl. I coriaceous, shining, smooth or scaberulous, margins broadly involute; II chartaceous, lanceolate, hyaline, margins ciliate, awn = the spikelet or shorter; III linear-oblong, obtuse, nerveless; IV linear, minutely 2-toothed, awn minute or $\frac{1}{4}$ - $1\frac{1}{2}$ in.; palea small, oblong, glabrous. Pedicelled spikelets rather longer than the sessile, terete, lanceolate, acuminate; pedicels glabrous or ciliolate; gl. I acuminate or aristulate, 5-9-nerved, keels ciliate above; II lanceolate, acuminate, ciliate; III and IV narrower, ciliate; awn of IV = $\frac{1}{2}$ the glume.—Hackel has 5 subspecies, of which 3 are Indian. 1. *genuinus*; callus about $\frac{1}{2}$ in. hairs rusty-brown, awn of gl. IV $1\frac{1}{2}$ in. stout. 2. *echinulatus*, callus hairs pale yellow, awn $\frac{1}{2}$ - $\frac{3}{4}$ in. slender. 3. *glabratus*, awn of gl. II minute.

43. *A. aciculatus*, *Retz. Obs.* v. 22; stem creeping and branching below, leaves short, sheaths terete, panicle very narrow, branches strict erect, spikes solitary, sessile spikelets very narrow, callus very long acicular, gl. I linear acute or minutely 2-cuspidate convex margins broadly inflexed smooth below keels scabrid aculeolate above, II acuminate aristulate, keel ciliate above. *Roxb. Fl. Ind.* i. 262; *Grah. Cat. Bomb. Pl.* 238; *Hack. Monogr. Androp.* 562. *A. acicularis*, *Willd. Sp. Pl.* iv. 906; *Kunth Enum. Pl.* i. 505, *Suppl.* 417. *A. javanicus*, *Steud. Syn. Gram.* 396. *A. subulatus*, *Presl Rel. Hænk.* i. 341. *Chrysopogon aciculatus*, *Trin. Fund. Agrost.* 188; *Wall. Cat.* n. 8780; *Wight Cat.* n. 1674; *Thw. Enum. Pl. Zeyl.* 366; *Trim. Cat. Ceyl. Pl.* 108; *Duthie Grass. N.W. Ind.* 22 (*acicularis*), *Fodd. Grass. N. Ind.* 39; *Benth. Fl. Hongk.* 424, *Fl. Austral.* vii. 538. *C. subulatus*, *Trin. ex Steud. Nomencl. Ed.* II. ii. 360; *Miq. Fl. Ind. Bat.* iii. 491. *C. trivalvis*, *Arn. & Nees in Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843) 171. *Rhaphis acicularis*, *Desv. Opusc.* 69. *R. javanica*, *Nees ex Steud. Syn. Gram.* 396. *R. trivalvis*, *Lour. Fl. Cochinch.* 553; *Trin. Sp. Gram. Ic.* t. 8, 9. *Centrophorum chinense*, *Trin. Fund. Agrost.* 106, t. 5.—*Holcus*, *Griff. Notul.* iii. 12, *Ic. Pl. Asiat.* t. 141, f. 1 (*aciculatus*).—*Rheede Hort. Mal.* xii. t. 43.

Plains and lower hills of INDIA, from Kumaon to Sikkim in the Himalaya, the Khasia Hills and southward to the Nicobar Islds. and CEYLON.—DISTRIB. Trop. Asia, Australia, and Polynesia.

Stem woody leafy and extensively creeping below, then erect, 1-2 ft., slender. *Leaves* densely tufted, 1-5 by $\frac{1}{2}$ - $\frac{1}{3}$ in., flat, obtuse or acute, often undulate, glaucous, glabrous, margins spinulose; sheath terete; ligule a very narrow ciliate membrane. *Panicle* 1-3 in., pale or purplish; branches capillary, scaberulous or villous below the spikelets, tips obliquely truncate. *Sessile spikelets* $\frac{1}{2}$ in.; callus nearly as long as the glumes, acicular, shortly bearded; gl. I chartaceous, obscurely 2-3-nerved or nerveless; II lanceolate, acuminate or aristulate, 1-nerved; III linear-oblong, 2-nerved; IV linear, acuminate; awn $\frac{1}{2}$ - $\frac{1}{3}$ in., scabrid; palea small, linear, obtuse, glabrous, nerveless. *Pedicelled spikelets* purple, much longer and narrower than the sessile; pedicels slender, scaberulous; gl. I subulate-lanceolate, aristulate, 3-nerved, ciliate; III and IV shorter, ciliate; palea minute, cuspidate.

†† Pedicels of upper spikelets villous with rusty rarely pale hairs.

§ *Glume I of pedicelled spikelets long-awned, II not or very shortly awned.*

44. **A. verticillatus**, Roxb. *Fl. Ind.* i. 263; tall, stout, leafy, leaves long very hairy, panicle broad of many whorls of many long simple smooth spreading arching branches terminated by solitary drooping spikelets, sessile spikelets $\frac{1}{4}$ in., callus rather long glabrous in front, gl. I setulose beneath the tip only strongly compressed above, II glabrous keel ciliate beneath the long awn, awn of IV $1\frac{1}{2}$ in., pedicelled spikelets $\frac{1}{2}$ in. narrowly lanceolate glabrous 5-nerved keels ciliate at the tip only. *Kunth Enum. Pl.* i. 506; *Hack. Monogr. Androp.* 555. *Chrysopogon verticillatus*, Trin. *ex Steud. Nom. Ed.* II. i. 360.

Mountainous Regions (of the N. Circars probably), Roxburgh.

Root woody, perennial. *Stem* 4-6 ft., terete, solid towards the base, smooth, as thick as a small goose-quill. *Leaves* approximate, 18 by $\frac{1}{2}$ in., particularly hairy on the inside towards the base, margins spinulose. *Panicle* conical, lax, 8-10 in.; branches 2-3 in. *Spikes* narrow, pale. *Sessile spikelets* about twice as long as the pedicels; callus $\frac{1}{10}$ in. long; gl. I 4-nerved, tip hyaline, acute; II narrow, tip 2-fid, awn as long as itself; III oblong, obtuse, margins retusely ciliate; IV the very narrow 3-nerved hyaline base of the awn, tip obscurely 2-lobed. *Pedicelled spikelets* pale, shining, pedicels abruptly truncate rather laxly ciliate on the margins and dorsally; gl. I with the 2 lateral nerves nearer the margin, awn longer than itself; II lanceolate, acuminate, ciliate, 3-nerved; III very narrow, ciliate, 2-nerved; IV linear, 1-nerved, 2-fid.—I have seen only a single very slender leafless specimen of what I take to be Roxburgh's plant, bearing the name in Arnott's handwriting on a ticket with Roxburgh's name in that botanist's writing in the corner. The description of the habit, leaves, &c., is taken from Roxburgh. Hackel, who does the same, describes the spikelets from a specimen also named by Arnott, and sent to him from Nees' Herbarium.

45. **A. asper**, Heyne in *Herb. Rottler* (asperum); leaves broadly linear acute base cordate midrib beneath spinulose, sheaths broad compressed laxly hirsute, panicle narrow of many whorls of short simple smooth erect branches bearing solitary rarely 2 erect spikes, sessile spikelets $\frac{1}{2}$ in., callus long villous all round, gl. I hispid beneath the tip strongly compressed above, II keel and sides more or less hispid above the middle, awn of IV $1\frac{1}{2}$ -2 in., pedicelled spikelets $\frac{1}{2}$ in. narrowly lanceolate 7-nerved keels ciliate.—*Chrysopogon asper*, Heyne *ex Wall. Cat.* n. 8784.

MADRAS; Pulicat Hills, Heyne.

Stem 2-3 ft., leafy below, very slender above. *Leaves* distichous, 12-18 by $\frac{1}{2}$ - $\frac{3}{4}$ in., exactly linear, coriaceous, flat, smooth, midrib very slender, 11-nerved, margins spinulose serrulate, and with a few long tubercle-based cilia towards the broad semi-amplexicaul base, midrib beneath serrulate; lower sheaths $\frac{1}{2}$ in. broad, keeled, armed with scattered tubercle-based hairs. *Panicle* 7 in., rachis smooth; branches unequal, those of the lowest whorl the longest, about 1 in., usually with only one spike, tips very shortly bearded. *Sessile spikelets* pale, coriaceous; callus $\frac{1}{16}$ - $\frac{1}{12}$ in.; awn of II as long as itself or shorter; III shorter than II, narrow, obtuse, 2-nerved, ciliate; IV the linear hyaline 3-nerved base of the awn. *Pedicelled spikelets* pale, shining, pedicels very shortly rufous-villous on both margins, excised at the tip in a semicircle; gl. I thin, tip 2-toothed, nerves strong subequidistant, or the 3 lateral on each side submarginal, margins narrowly incurved, keels ciliate from base to tip; II lanceolate, acuminate, 3-nerved, ciliate; III linear-oblong, 2-nerved, ciliate; IV narrowly lanceolate, 1-nerved.—I have seen only two specimens of this plant, that in Herb. Wallich, and another sent by Heyne to Rottler named *A. asperum* in his own handwriting. Very closely allied to *A. verticillatus*, but differing totally in habit and foliage according to Roxburgh's drawing and description of that plant, and coming from a very different part of India.

46. **A. lancearius**, Hook. f.; stem tall leafy, leaves narrowly lanceolate acuminate narrowed towards the base quite glabrous flat smooth midrib beneath quite smooth, sheaths imbricate compressed, panicle narrow of many whorls of short simple smooth erect branches bearing solitary erect spikes, sessile spikelets $\frac{1}{4}$ in., callus short glabrous in front, gl. I glabrous or minutely ciliate at the strongly compressed tip, II keel and sides above the middle more or less hispid, awn of IV $1\frac{3}{4}$ in., pedicelled spikelets $\frac{1}{2}$ in. narrowly lanceolate 7-nerved keels ciliate except at the tip.

SIKKIM HIMALAYA; at the foot of the hills, Punkabaree, Kurz. CHOTA NAGPORE; Ramghur, Ghat, 1750 ft., Clarke.

Stem 2-3 ft. or more, leafy upwards. *Leaves* 12-14 by $\frac{1}{2}$ - $\frac{1}{2}$ in., rather thin, narrowed from below the middle to the base, quite smooth on both surfaces, midrib broad white above, nerves many very slender, margins minutely spinulose; sheaths keeled, quite glabrous; ligule a row of very fine short hairs. *Panicle* 6 in., quite like that of *A. asper*, from which this plant differs in the leaves, in the callus glabrous in front, in the much more hairy gl. II of the sessile spikelet, and in the ciliate keels of gl. I of the pedicelled spikelets.—The Chota Nagpore specimen has been named *A. verticillatus* by Hackel in a letter to Mr. Clarke, from which it differs in the form of the panicle and glabrous leaves; its gl. IV of the pedicelled spikelets is 2-fid, but that of the Sikkim plant is lanceolate and aristately acuminate. I have examined a specimen of what may prove to be a form of this plant collected at Gya in Behar (Herb. Hort. Calcutt.) in which gls. II and IV of the pedicelled spikelets are both awned, the awn of the latter (IV) being sometimes as fully developed as that of the sessile spikelet! The specimen is in too imperfect a condition to be described fully: the gl. I of the pedicelled spikelet is quite glabrous with a 2-toothed tip. In all other respects it agrees with *A. lancearius*.

47. **A. Hamiltoni**, Hook. f.; tall, stout, leaves very long linear gradually acuminate smooth above scaberulous beneath margins nearly smooth, panicle large ovoid dense of many long smooth erect branches in many closely approximate whorls each bearing 1-3 spikelets, spikes erect, sessile spikelets $\frac{1}{4}$ in., callus very short villous all round, gl. I minutely hispid at the strongly compressed tip, II keel ciliate close under the long awn, awn of gl. IV $2\frac{1}{2}$ in., pedicelled spikelets $\frac{1}{2}$ in. linear-lanceolate, gl. I 7-9-nerved ciliate close to the tip only. Holcus Carar, Ham. in Wall. Cat. n. 8792 A.—Chrysopogon, Wall. Cat. l. c.

BEHAR; Monghir, Hamilton.

Stem several feet high, stout, terete, leafy, quite smooth. *Leaves* $1\frac{1}{2}$ ft. or more by $\frac{1}{4}$ – $\frac{1}{2}$ in., flat, rather thin, many-nerved, beneath and midrib quite smooth, base rather contracted; sheath terete, smooth, glabrous; ligule a ridge of minute hairs. *Panicle* 6 by $2\frac{1}{2}$ in., peduncle stout as thick as a duck's quill; rachis stout, terete; branches very unequal, longest 2–3 in., each with usually 2–3 spikes. *Sessile spikelets*, callus $\frac{1}{10}$ in.; gl. I 4-nerved, polished; II 2-lobed, awn as long as itself, margins not ciliate; III oblong, obtuse, hyaline, 2-nerved; III the linear hyaline 3-nerved eciliate base of the awn. *Pedicelled spikelets* pale green, pedicels sparsely villous on the margins and back with short rufous hairs, unequal, $\frac{1}{2}$ and $\frac{1}{4}$ shorter than the sessile spikelet; gl. I narrowed into an awn often as long as itself, lateral 3 nerves on each side submarginal; II and III lanceolate, acuminate, retrorsely ciliate, II 3-nerved, III 2-nerved.—The specimen in Herb. Wallich consists of a portion of a stem a foot long, a panicle fully emerged from a leaf-sheath, with suberect branches which will probably spread later on, and several leaves. Another in Hamilton's Herbarium (now at Edinburgh) corresponds precisely. It is nearly related to *asper*, but a very robust tall plant, the branches of the panicle are much more numerous and longer, the leaves glabrous and not spinulosely margined, the spikelets much larger, the callus shorter, and the margins of gl. II of the sessile spikelet eciliate. It may prove to be a form of *A. verticillatus*.

§§ *Glumes I and II of pedicelled spikelets both awned.*

48. **A. Wightianus**, Steud. *Syn. Gram.* 395; leaves linear acute glabrous or pubescent spinulosely serrulate, lower sheaths compressed, rachis and branches of panicle minutely hairy, sessile spikelets $\frac{1}{2}$ in., callus long densely bearded all round, gl. I laterally compressed above, minutely truncate glabrous below hispid above, II long-awned hispid above on the keel and sides, awn of IV 2– $2\frac{1}{2}$ in., pedicelled spikelets lanceolate pubescent much longer than the sessile. *A. aristulatus*, Hochst. ex Steud. *Syn. Gram.* 397; Hack. *Monogr. Androp.* 556. *A. brevistaratus*, Steud. *l. c.* 396. *Chrysopogon Esenbeckii*, Wight *Cat. n.* 1805 (*non Steud.*). *C. Wightianus*, Nees ex Steud. *l. c.*; Wight *Cat. n.* 1676, *Herb.* 3398. *Rhaphis orientalis*, Desv. *Opusc.* 69. *R. Wightianus*, Nees ex Steud. *l. c.*—*Chrysopogon*, Wall. *Cat. n.* 8785 C. D.

MADRAS, Wight, Griffith, &c. NILGHIRI HILLS, Schmid, Kuntze. BURMA, Kuntze (Hackel).—DISTRIB. Anam.

Variable in habit; stems short or tall, erect or ascending from a short stout creeping stock. *Leaves* 3–10 in., rigid, from glabrous to pubescent on both surfaces and with sometimes tubercle-based hairs; sheath glabrous; ligule very short, villous. *Panicle* 3–5 in., contracted, lower branches long, few in a whorl. *Spikes* solitary, green or brownish. *Sessile spikelets* subcylindric; callus long, hairs rusty; gl. I obscurely 4-nerved, tip 2-dentate; II chartaceous, tip 2-lobed, awn as long as the gl. or shorter; III linear-oblong, 2-nerved, ciliate; IV awn with a narrowly dilated 2-lobed base, column hispid. *Pedicelled spikelets* nearly $\frac{1}{2}$ in.; pedicel truncate, margins shortly villous; gl. I glabrous or pubescent, 7-nerved, awn longer than the gl., keels ciliate; II lanceolate, 3-nerved, awn as long as the gl. or shorter; III oblong, 2-nerved, ciliate; IV very narrow, ciliate, nerveless.—I have seen no Ceylon specimen of this species; Thwaites' C.P. n. 3248 in Herb. Kew, is a starved specimen of *A. zeylanicus*. Nor have I seen Burmese or Anam ones.

49. **A. distichopyllus**, Hook. *f.*; stem stout fastigiately branched, leaves distichous erecto-patent narrowly linear rigid smooth, sheaths terete, panicle very long-peduncled narrow, branches very unequal erect smooth with one terminal spike, sessile spikelets $\frac{1}{2}$ in. callus elongate shortly villous all round, gl. I 2-cuspidate quite glabrous, II glabrous, awn of gl. IV $2\frac{1}{2}$ in., pedicelled spikelets longer than the sessile lanceolate, gl. I glabrous 7-nerved keels ciliate at the tip only.

SOUTHERN BURMA; on the coast at Kobok, *Kurz*.

A perennial, apparently of bushy habit several feet high, branches rigid terete glabrous. *Leaves* 4-6 by $\frac{1}{10}$ - $\frac{1}{8}$ in., striate, complicate, subpungent, margins smooth, ciliate towards the base; sheath appressed, smooth. *Panicle* 5-6 in.; peduncle 12 in.; rachis slender, smooth; branches strict, in distant fascicles rather than whorls, tips very oblique with erect beards; lower 1 in. long, rarely with 2 distant spikes. *Sessile spikelets* very narrow; callus $\frac{1}{4}$ in.; gl. I 4-nerved; II narrow, complicate, 3-nerved, tip 2-lobed, awn as long as itself; III linear-oblong, obtuse, ciliate; IV the very narrow hyaline 3-nerved base of the awn. *Pedicelled spikelets* nearly $\frac{1}{2}$ in.; pedicels $\frac{1}{2}$ shorter than the sessile spikelet, tip retuse, margins ciliate; gl. II 3-nerved, ciliate, shortly awned; III as in the sessile spikelet; IV 0.—I have seen but one specimen of this very distinct-looking plant.

§§§ *Glume I of pedicelled spikelets not awned, II not or very shortly awned.*

50. **A. zeylanicus**, *Nees ex Steud. Syn. Gram.* 397; leaves very long and narrow, panicle ovate-oblong, branches in few whorls spreading with 1-3 terminal spikes, rachis scaberulous, sessile spikelets $\frac{1}{2}$ in., callus long naked in front, gl. I not laterally compressed above, dorsally with 2 rows of cilia or spicules above the middle tip truncate, awn of gl. IV $\frac{3}{4}$ -1 $\frac{1}{2}$ in., pedicelled spikelets much longer than the sessile lanceolate 5-nerved glabrous keels eciliate. *A. nodulibarbis*, *Hochst. ex Steud. Syn. Gram.* 396; *Hack. Monogr. Androp.* 553. *A. peninsulae*, *Steud. l.c.* *Chrysopogon Arnottianus*, *Nees ex Steud. l.c.* 396. *C. Wightianus*, *Thw. Enum. Pl. Zeyl.* 366 (C.P. 3248) (*exl. var. β*); *Trim. Cat. Ceyl. Pl.* 108 (*non Nees*). *C. zeylanicus*, *Thw. l.c.* (C.P. 996) (*non Steud.*). *Rhaphis zeylanica*, *Nees ex Steud. l.c.*—*Chrysopogon*, *Wall. Cat. n.* 8785 A. B.

NILGHIRI HILLS, alt. 7-8000 ft., *Wight, &c.* Ceylon, ascending to 6000 ft., *Walker, &c.*

Stems 1-3 ft., tufted, stout or slender. *Leaves* many from the base of the stem, 12-16 by $\frac{1}{2}$ - $\frac{1}{8}$ in., flexuous, rather coriaceous, margins more or less laxly ciliate with rather long hairs; lower sheaths short, flattened, keeled; ligule of short hairs. *Panicle* 5-8 in., contracted or effuse, with long naked unequal lower branches. *Spikes* green or blueish. *Sessile spikelets*, callus $\frac{1}{10}$ in., hairs yellow or rusty brown; gl. I coriaceous, tip ciliate, often 2-toothed; nerves 2 pairs, obscure; II 3-nerved, tip 2-lobed, keel spinulose ciliate above the middle; III oblong, obtuse, 2-nerved, retrorsely ciliate; IV the very narrow sub-2-lobed, 3-nerved, eciliate dilatation of the base of the awn. *Pedicelled spikelets* $\frac{3}{4}$ in.; pedicels truncate, margins shortly densely or laxly ciliate on one or both margins; gl. I narrowly lanceolate, keels minutely ciliate, nerves subequidistant or the lateral pairs submarginal; II acuminate, 3-nerved, retrorsely ciliate; III oblong, obtuse, 2-nerved, retrorsely ciliate; IV smaller, ovate-lanceolate, 1-3-nerved, ciliate.

** Pedicel of upper spikelets not half as long as the sessile spikelets.

51. **A. monticola**, *Schult. Mart. iii.* 665; stem erect or ascending usually very slender, leaves very narrow glabrous, lower sheaths compressed, panicles rather short of several whorls of few or many capillary flexuous very unequal branches bearing solitary spikes, sessile spikelets pale, callus short, gl. I compressed glabrous or keel ciliate above the middle, II dorsally more or less ciliate with short or long rigid bristles, awn of IV $\frac{1}{2}$ -1 in. capillary, pedicelled spikelets lanceolate awned or not 7-nerved, pedicels = $\frac{1}{4}$ - $\frac{1}{2}$ the sessile spikelet margins more or less villous.

WESTERN HIMALAYA, from Kashmir to Nepal, ascending to 6000 ft. Hilly

districts, from the PANJAB to BEHAR and southwd. to CEYLON. BURMA, Collett.—DISTRIB. Afghanistan, S. Africa.

Stems tufted, 1-3 ft., simple or branched, usually almost filiform, rarely as thick as a crow-quill or stouter. *Leaves* 6-18 in., rarely more than $\frac{1}{2}$ in. broad, finely acuminate, quite smooth above and beneath, margins minutely scaberulous; upper sheaths terete, lower more or less compressed, sometimes very much so and membranous. *Panicle* 2-4 in., rarely more; rachis flexuous; branches in whorls of 3-12, rarely more, smooth or scaberulous, lowest $\frac{1}{2}$ -1 in. or more, upper shorter; all quite smooth, or in the lower part together with the rachis scaberulous, rarely scaberulous throughout. *Spikes* very variable in size; the green blue and purplish or brown pedicelled always longer than the pale sessile. *Sessile spikelets* $\frac{1}{4}$ - $\frac{1}{2}$ in.; callus hairs short or long, from white to rusty red; gl. I narrow, strongly compressed, margins membranous, tip rounded; II broader, tip 2-fid, with a short recurved awn, keel obtuse from glabrous to hirsute for a greater or less part of its length, with rigid or flexuous rufous or white bristles, margins membranous hardly ciliate; III hyaline, oblong, obtuse, ciliate; IV the long narrow hyaline 3-nerved eciliate dilatation of the awn. *Pedicelled spikelets* $\frac{1}{2}$ - $\frac{3}{4}$ in., neuter or male, from ovate- to linear-lanceolate, acuminate; pedicels cuneate, margins sparsely or densely villous, the upper hairs in some of the most densely villous nearly equalling the spikelet from dark rusty red to white; gl. I thin, acute acuminate or awned, the awn equalling or shorter than the gl., glabrous or pubescent; nerves always 7, sub-equidistant, or 2 on each side sub-carinal; margins narrowly incurved, spinulose ciliate or smooth; II lanceolate, acuminate, ciliate; III hyaline, oblong, obtuse, 2-nerved or nerveless; IV shorter, narrower, hyaline, 1-3-nerved.—I am unable to classify the varieties of this common and variable plant in accordance with geographical areas or other considerations. This, if possible, must be effected by field botanists in India. There is every gradation from the coarsely hirsute keel of *monticola*, to the perfectly smooth of some states of *Trinii*; from the awnless to long awned gl. I of the pedicelled spikelets, and from the glabrous to the pubescent of the same organ; the colour of which affords no character; nor does its length, or that of the cilia on its keels.

Var. monticola proper; gl. II of sessile spikelet villous for more or less of its length with long flexuous usually rufous rigid bristles. *A. monticola*, *Schultes l.c. Kunth Enum. Pl. i.* 506; *Steud. Syn. Gram.* 395; *Hack. Monogr. Androp.* 557 (excl. *var. villosus*). *A. aciculatus*, *Herb. Wight ex Wall. Cat. n.* 8782 B. *A. montanus*, *Koen. in Herb. Banks. A. Sprengelii, Kunth Revis. Gram.* 166. *Chrysopogon montanus*, *Trin. in Spreng. N. Entdeck. ii.* 93; *Trim. Cat. Ceyl. Pl.* 108. *Pollinia fulva*, *Spreng. Pugill. ii.* 93.—*Chrysopogon*, *Wall. Cat. n.* 8782.

Var. Trinii; gl. II of sessile spikelets glabrous or shortly ciliate, hairs of callus and pedicels often very pale reddish or white. *A. Trinii*, *Steud. Syn. Gram.* 395; *Hack. Monogr. Androp.* 558. *A. ciliolatus*, cœruleus, and increscens, *Steud. l.c. Chrysopogon ciliolatus*, *Boiss. Fl. Orient. v.* 458 (excl. *var. β.*); *Duthie Grass. N. W. Ind.* 22. *C. cœruleus*, *Duthie l.c.* 23. *Fodd. Grass. N. Ind.* 39, t. 60. *C. increscens*, *Nees ex Steud. l.c.* 396. *C. Wightianus*, *var. leucanthus*, *Thw. Enum. Pl. Zeyl.* 366; *Trim. Cat. Ceyl. Pl.* 108. *C. serrulatus*, *Trin. in Mem. Acad. Petersb. Ser. VI. ii.* (1833) 318, *Sp. Gram. Ic. t.* 331; *Duthie l.c.* *Rhaphis ciliolata* and cœrulea, *Nees ex Steud. l.c.* 396, 395.—*Chrysopogon*, *Wall. Cat. n.* 8788, 8791.

Var. robustus, stem tall stout 2-4 ft. and upwards, as thick as a goose-quill below, leaves 8-10 by $\frac{1}{4}$ in., rather coriaceous, tapering from the base to the tip, scaberulous above, glaucous beneath; upper sheath 4-6 in. loose, terete keeled, panicle 6 in., sessile spikelets $\frac{1}{2}$ in. keel of gl. II hispidly ciliate from base to apex, awn of gl. IV $1\frac{1}{2}$ in., pedicelled spikelets $\frac{1}{2}$ - $\frac{3}{4}$ in. lanceolate awned, gl. I awned dorsally pubescent, keels ciliate. *Chrysopogon serrulatus*, *Herb. Strach. & Winterb.*—Central India, Goona (*Herb. Hort. Calcutt.*) Kumaon, alt. 5500 ft. *Strachey & Winterbottom.*

52. **A. Hackelii**, *Hook. f.*; stem tall stout, leaves narrow finely acuminate, panicle oblong, rachis strict, branches smooth crowded in many superposed whorls short very unequal smooth spreading simple each with a solitary spike, sessile spikelets $\frac{1}{8}$ – $\frac{1}{6}$ in. golden yellow, callus very short beard fulvous brown, gl. I obtuse glabrous, II glabrous awned, awn of IV $\frac{3}{4}$ –1 in., pedicelled spikelets rather shorter than the sessile, gl. I oblong acute quite glabrous 5–7-nerved not awned keel eciliate, II shortly awned.—*Chrysopogon*, *Wall. Cat. n. 8783. Wight Herb. n. 1030 (in Herb. Kew).*

TRAVANCORE, *Wight*. NILGHIRI HILLS; Gondaloo Ghat, alt. 4500 ft., *Lawson*.

Stem 4–5 ft., or more, as thick as a goose-quill below, leafy, quite smooth, branching upward, branches erect. *Leaves* 2–3 ft., by $\frac{1}{4}$ – $\frac{1}{2}$ in. coriaceous, smooth, pale glaucous green, striate, margins sub-scaberrulous; sheath subterete, keeled, smooth, glabrous; ligule a ridge of hairs. *Panicle* 4–6 in.; branches in 6–10 whorls, $\frac{1}{4}$ – $\frac{3}{8}$ in. apart, the longest about 1 in. long, rather stiff, tips hardly oblique, beard of spreading rufous hairs. *Spikes* solitary. *Sessile spikelets* yellow; gl. I 4-nerved, polished; II subcymbiform, tip 2-lobed, 3-nerved, margins ciliate, keel rounded and thickened, awn shorter than the gl.; III linear-oblong, obtuse, hyaline, ciliate, nerveless; IV very narrow, 1–3-nerved, hyaline, base and column of awn brown. *Pedicelled spikelets* pale green; yellow or purplish, male, pedicels = $\frac{1}{3}$ nearly $\frac{1}{2}$ the sessile spikelets truncate, margins densely villous with long rufous hairs, the upper of which = half the spikelets, gl. I thin, nerves subequidistant, or 2–3-nate pairs submarginal margins narrowly incurved; II lanceolate, 3-nerved ciliate; III oblong, 2-nerved, ciliate; IV narrowly lanceolate, 1-nerved ciliate.—A very handsome plant with a bright golden panicle. *Wight's n. 1030* (which is not a catalogue number) is referred by Hackel to *A. Trinii* var. *increscens*, with the locality Courtallam, taken from Steudel. It differs from the n. 1030 in *Herb. Kew* in the villous sheaths with tubercle-based hairs, the leaves hairy on both surfaces and panicle branches 4–8, and is no doubt rightly referred to *Trinii*.

53. **A. velutinus**, *Hook. f.*; stem not tall compressed, leaves linear broad flat acuminate puberulous on both surfaces, sheaths strongly compressed keeled, panicle with flexuous rachis and short flexuous scaberrulous branches minutely bearded at the truncate tips, sessile spikelets pale, callus very short rufous bearded, gl. I compressed keel ciliate above the middle, keel of II hirsute, awn of IV 1 in., pedicelled spikelets oblong truncate strongly 7-nerved not awned keels ciliate dorsally glabrous or hirsute, pedicels very short. *Chrysopogon velutinus*, *Arnott in Herb. Wight n. 2314*.

MYSORE; at Cuddapah, *Wight*.

Stems 18 in. high, rather stout, soft, tufted, leafy from the base. *Leaves* 6–10 by $\frac{1}{4}$ – $\frac{1}{2}$ in., distichous, flaccid, 5–9-nerved, slender midrib beneath and margins spinulosely ciliate and with a few long hairs at the base; lower sheaths equitant, $\frac{1}{2}$ in. broad, strongly compressed and keeled, keel spinulosely ciliate, upper sheaths finely pubescent. *Panicle* (imperfect) 2½ in., branches $\frac{1}{2}$ –1 in. *Sessile spikelets* $\frac{1}{2}$ in., pale yellow; gl. I with minutely ciliate margins; II margins eciliate, gls. III and IV in both sessile and pedicelled spikelets as in *A. monticola*.—I have seen only one specimen of this plant which differs widely in habit and foliage from any form of *A. monticola*, in the broad flat flaccid pubescent leaves and sheaths. It is a native of a botanically unexplored district.

54. **A. polyphyllus**, *Hack. mss. in Herb. Duthie*; stem simple or fastigiatly branched quite glabrous, leaves many long narrow rigid acuminate flat pale glaucous-green glabrous coriaceous, sheaths terete,

panicle oblong subsecund dense-fl. very pale, branches many short in many closely approximate whorls smooth, sessile spikelets $\frac{1}{8}$ in., callus long obtuse bearded at the very base only with long fulvous hairs, gl. I obtuse glabrous, keel ciliate towards the tip, II not awned keel glabrous or ciliate, awn of IV $\frac{3}{8}$ – $\frac{1}{2}$ in. nearly straight pale, pedicelled spikelets narrowly lanceolate acuminate glabrous 7-nerved eciliate not awned, pedicels naked villous at the tip only. *A. Aucheri*, var. *polyphyllus*, Hack. in *Herb. Duthie*.

CENTRAL PROVINCES; Khandua, Chanda, and Jubbulpore districts, by the Nerbudda and Indravati rivers, &c., *Duthie*.

Stem 2–3 ft., stiff, as thick as a crow-quill or more. *Leaves* crowded, or not, 6–10 by $\frac{1}{16}$ – $\frac{1}{8}$ in., pale glaucous-green and smooth on both surfaces, midrib and nerves very slender, margins minutely scaberulous; sheaths appressed, hard. *Panicle* 4–5 in.; branches $\frac{1}{4}$ – $\frac{1}{2}$ in., very unequal; peduncle slender, quite glabrous. *Spikes* drooping, white or pale purplish. *Glumes* as in *A. monticola*. *Pedicelled spikelets* rather longer than the sessile; pedicels = about $\frac{1}{3}$? the sessile spikelets.—*Habit*, foliage and second panicle very unlike *A. monticola*, and remarkable for the stout naked callus about $\frac{1}{16}$ in. long with a long-bearded base, and the naked pedicels villous at the tip only with erect fulvous hairs half as long as the spikelets. It differs from *Aucheri*, in the tall habit, long-glabrous glaucous foliage, glabrous peduncle and branches of the panicle, callus, pedicels, awnless pedicelled spikelets, and the very short awn of gl. IV of the sessile spikelet.

55. *A. Aucheri*, Boiss. *Diagn. Ser. I. v. 7*; densely tufted, basal sheaths silky, leaves short linear pubescent, sheaths terete very pale silky peduncle pubescent below the oblong panicle, branches in approximate whorls short very unequal scaberulous, sessile spikelets $\frac{1}{8}$ – $\frac{1}{2}$ in. callus long villous all over with long pale silky hairs, gl. I glabrous or keel and tip ciliate, keel of II hirsute, awn of IV $\frac{3}{8}$ –1 in. pale, pedicelled spikelets longer than the sessile narrowly lanceolate 5–7-nerved, keels ciliate and with a long ciliate awn, pedicels = $\frac{1}{3}$ the sessile spikelet silkily villous. *A. Aucheri*, *a. genuinus*, Hack *Mnog. Androp.* 560. *Chrysopogon ciliolatus* β . *Aucheri*, Boiss. *Fl. Orient.* v. 458.

SCIND; near Kurrachee, *Stocks*.—DISTRIB. Afghanistan, N. Africa.

Stem 6–18 in., simple or sparingly branched, base thickened, leafy. *Leaves* 2–4 by $\frac{1}{16}$ – $\frac{1}{8}$ in., sometimes undulate, acute or acuminate, pale green, often ciliate towards the base, margins scaberulous; sheath very pale. *Panicle* 2–3 in., erect, long-peduncled, rachis scabrid. *Spikes* usually crowded, rarely binate on a branch. *Sessile spikelets*; callus obtuse; gl. I compressed, with sometimes long terminal bristles; II awned or not, awn hirsutely ciliate; III and IV as in *A. monticola*. *Pedicelled spikelets* $\frac{1}{8}$ – $\frac{1}{2}$ in., pedicels silkily villous from base to apex; gl. I sparsely ciliate dorsally, and with very long cilia on the keels towards the tip, awn pale hirsute.—I have confined the description to the Scind plants. Hackel describes the species, which extends to Persia, Arabia, Morocco, and S. Africa as extraordinarily variable, no two specimens agreeing in all points, and the spikelets varying in the same specimen. These remarks would probably apply to all the allied species of *Chrysopogon*, in whose stability I have no confidence.

Subgen. IX. *DICHANTHIUM*, Hack. *Spikes* digitate, rarely solitary or paniced, subsessile or stipitate on the peduncle, joints many and pedicels linear filiform dorsally flat compressed; lower 1–4 pairs of spikelets homogamous (except sometimes in *A. annulatus*) male or neuter. *Sessile spikelets* dorsally compressed; gl. I with the margins usually inflexed and

keeled above and involute or not below; II keeled, awnless; III hyaline; IV a naked awn, its base rarely narrowly hyaline, or 2-fid and awned in the cleft. *Pedicelled spikelets* like the sessile, but male or neuter, awnless.

* *Glume IV of sessile spikelets a simple awn, acute at the base.*

56. **A. caricosus**, Linn. *Sp. Pl. Ed.* ii. 1480 (*excl. Syn. Rumph.*); stem erect or decumbent below, leaves narrowly linear, sheaths compressed, spikes 1-4 in. solitary binate or subdigitately paniced, spikelets closely subdistichously imbricate, joints and pedicels $\frac{3}{4}$ shorter than the sessile spikelets $\frac{1}{2}$ - $\frac{1}{3}$ in., gl. I of sessile spikelets obovate or oblong tip truncate denticulate dorsally more or less villous, keels with ciliate wings, II obtuse 3-nerved, III ovate-oblong ciliate. *Hack. Monogr. Androp.* 756.

Plains and low hills of India, from Scind to Burma and the Andaman Islds. (not in N.W. India) and southwd. to CEYLON.—DISTRIB. Mauritius, China.

Stem 1-2 ft., erect or ascending from a creeping base, often much branched, stout or slender, even capillary, grooved on one side, leafy; nodes bearded or not. Leaves 6-8 by $\frac{1}{10}$ - $\frac{1}{4}$ in., finely acuminate, glabrous or ciliate, margins scabrous, sheaths smooth; ligule membranous. Spikes inclined, often flexuous, $\frac{3}{4}$ -1 in. broad, silvery, lower sometimes stipitate; joints and pedicels = $\frac{1}{2}$ the spikelet, ciliate on one margin; callus short, broad. Sessile spikelets 5-7-nerved, margins gl. I broadly incurved below, narrowly above; II narrow, 3-nerved, apiculate, margins ciliate, keel scaberulous; III ovate-oblong, hyaline, nerveless; IV awn $\frac{3}{4}$ -1 in., column scabrid. Pedicelled spikelets smaller than the sessile; gl. I broadly oblong, silkily ciliate; II ovate-lanceolate, acute, ciliate.—A very variable grass, of which there are two principal forms.

Var. *genuinus*, Hack.; stem glabrous below the usually solitary spike, gl. I smooth above hairy towards the base. *A. caricosus*, Linn.; *Trim. Cat. Ceyl. Pl.* 108. *A. binatus* & *tenellus*, Roxb. *Fl. Ind.* i. 254, 255; *Steud. Syn. Gram.* 372, 371. *A. filiformis*, Pers. *Syn.* i. 103. *A. serratus*, Retz. *Obs.* v. 21; *Trin. Sp. Gram. Ic.* t. 329; *Roxb. Fl. Ind.* 253; *Steud. l. c.* 366. *Lepeocercis serrata*, Trin. *Fundam. Agrost.* 203; *Wight Cat.* n. 1687, *Herb. Prop.* n. 1687. *Heteropogon concinnus*, Thw. *Enum. Pl. Zeyl.* 368.

Var. *mollicomus*, Hack.; stem pubescent below the spikes, gl. I 3-toothed dorsally hairy all over. *A. australis*, Poir. *Encycl. Suppl.* i. 585. *A. barbatus* & *pertusus*, Herb. Ham. ex Wall. *Cat.* n. 8809 B. C. *A. curvatus*, Herb. Russ. ex Wall. *Cat.* n. 8809 A. *A. incurvatus*, Kæn. ex Trin. in Spreng. *Entdeck.* ii. 91. *A. Koenigii*, Steud. *Syn. Gram.* 381. *A. mollicomus*, Kunth *Revis. Gram.* i. 365, *Enum. Pl.* i. 497. *Lepeocercis digitatus*, Royle Ill. Bot. Himal. 416. *Dichanthium nodosum*, Usteri *Annal.* xviii. (1796) 11. *Diplasanthera lanosum*, Desv. *Opusc.* 67, t. 5, f. 1.—*Andropogon*, Wall. *Cat.* n. 8809, 8810 F. H. *Wight Cat.* n. 1687.

57. **A. annulatus**, Forsk. *Fl. Æg. Arab.* 173; densely tufted, leaves narrowly linear, sheaths terete, spikes subdigitately fascicled, peduncles glabrous, joints and pedicels slender laxly ciliate, sessile spikelets $\frac{1}{2}$ - $\frac{1}{3}$ in., gl. I oblong obtuse or truncate flat or convex 5-9-nerved keels ciliate above not winged glabrous or more or less villous with long spreading hairs, II acute, keel smooth except below, III oblong obtuse glabrous. *Del. Fl. Egypt.* iii. t. 7, f. 2; *Kunth Enum. Pl.* i. 498 (*excl. Syn.*); *Steud. Syn. Gram.* 380; *Hack. Monogr. Androp.* 570; *Wight Cat.* n. 1697; *Aitchis. Cat. Panjab.* Pl. 175; *Duthie Fodd. Grass. N. Ind.* 33, t. 20; *Benth. Fl. Austral.* vii. 531; *Boiss. Fl. Orient.* v. 463. *A. Bladhii*, Retz. *Obs.* ii. 27; *Kunth l. c.* 498; *Trin. Sp. Gram. Ic.* t. 325; *Roxb. Fl. Ind.* i. 259; *Wight Cat.* n. 1698; *Aitchis. l. c.*; *Duthie Grass. N.W. Ind.* 19. *A. comosus*, Link *Enum. Hort. Berol.* i. 239. *A. garipensis*, Steud. *l. c.* 379. *A. Ischæmum*, Roxb. ex Wight *Cat.* n. 1697. *A. obtusus*, Nees

in *Hook. & Arn. Bot. Beech. Voy.* 243 (excl. *Syn. Roxb.*). *A. scandens*, *Roxb. l. c.* 258; *Kunth l. c.* 498; *Grah. Cat. Bomb. Pl.* 238; *Dalz. & Gibs. Bomb. Fl.* 301; *Duthie l. c.* 21. *Lepeocercis annulata*, *Nees Fl. Afr. Austr.* 98.—*Andropogon*, *Wall. Cat. n.* 8810 C. E. G.

Throughout the hills and plains of INDIA, from Kashmir westward to Bengal and southward (not in Ceylon).—DISTRIB. Trop. Africa, China, Australia, Pacific.

Stems usually woody at the base with strong wiry roots and tufted leaves, then geniculately ascending, 6-36 in.; nodes bearded or not. *Leaves* 3-12 in., rigid, glaucous, glabrous or hairy above with tubercle-based hairs, margins scabrid; sheath bearded at the tip; ligule oblong, obtuse. *Spikes* 1-2½ in., straight or flexuous, usually inclined, pinkish or nearly white, joints and pedicels = ½ the spikelets, slender, rigid, margins shortly ciliate. *Spikelets* very variable in size, closely imbricating; callus shortly bearded; gl. I thin, nerves strong or faint, not reaching the tip; II lanceolate, 3-nerved, glabrous or ciliolate; III narrow, glabrous; IV awn ¼-1 in., column scabrid. *Pedicelled spikelets* about = the sessile; gl. I obtuse or acute, 7-11-nerved, keels bristly; II narrower, 3-nerved; III ciliate; IV minute or 0.—A very common Indian grass, of which Hackel distinguishes three Indian varieties, to which I have added a fourth:—

Var. *genuinus*; spikes 3-10, gl. I of sessile spikelets beset with rigid tubercle-based hairs, of pedicelled dorsally hairy all over.

Var. *decalvatus*; gl. I of sessile spikelets glabrous, of pedicelled often papillose.

Var. *Bladhii*; spikes many, lower long-stipitate, gl. I of sessile spikelets glabrous or loosely hairy.

Var. *papillosus*; spikes 3-8 decurved, gl. I of sessile spikelets with a transverse row of tubercle-based hairs below the tip. *A. papillosus*, *Hochst. ex A. Rich. Tent. Fl. Abyss. ii.* 457; *Hack. l. c.* 573.—Behar on Parusnath, *Clarke*.—Afr. trop.

58. **A. Clarkei**, *Hack. in Oesterr. Bot. Zeitschr.* xli. (1891) 49; annual, very slender, much branched, leaves 2-4 in. linear-lanceolate, spikes solitary on capillary peduncles from spathiform sheaths, joints and pedicels slender silkily villous sulcate, spikelets subdistichous, sessile silkily villous with white hairs, gl. I elliptic-oblong flat truncate 2-toothed, keels scaberulous, IV a simple awn, gl. I of pedicelled spikelets rather larger narrower red-brown glabrous.

BEHAR; on Parusnath, alt. 4200 ft., *Clarke*.

Stems 12-18 in., leafy, nodes bearded. *Leaves* flat, finely acuminate, base contracted, quite smooth, nerves very slender; sheaths long, slightly tumid, mouth contracted; ligule of hairs. *Spikes* ¾-1 in. long, flattened, joints and pedicels sulcate, slender. *Spikelets* 6-8 pairs; two lowest pairs neuter. *Sessile spikelets* ½ in.; callus very short; gl. I thinly chartaceous, 7-nerved, margins narrowly inflexed; II narrowly cymbiform, acuminate, 3-nerved, margins ciliate; III oblong, obtuse, hyaline, ciliate; IV the slender awn ¼-1 in. long. *Pedicelled spikelets* ½ in., dark brown; gl. I obtuse or emarginate, many-nerved; II 3-nerved; III smaller.—The white sessile and dark pedicelled spikelets are a marked feature.

59. **A. armatus**, *Hook. f.*; annual, tufted, erect, leaves linear copiously hairy, spikes 2-5 subdigitate long-peduncled, joints and pedicels slender not grooved, spikelets 10-20 pairs, gl. I of sessile oblong obtuse sometimes alveolate dorsally densely silky below the middle keels ciliate, IV a simple awn, gl. I of pedicelled spikelet armed with spreading submarginal tubercle-based bristles twice or thrice its own length.

The CONCAN, *Stocks*.

Stems 12-18 in., as thick as a sparrow's quill, simple or branched above; nodes bearded. *Leaves* 4-6 by ¾-1 in., flaccid, nerves slender, base rather contracted, softly hairy on both surfaces and with long tubercle-based bristles at the base;

sheaths lax, upper smooth pale spathiform; ligule 0. *Spikes* $\frac{1}{2}$ – $1\frac{1}{2}$ in., flexuous, nodding or cernuous silvery-green, lowest pairs of spikelets male; peduncles $\frac{1}{5}$ – $\frac{1}{2}$ in., capillary, axils with whorls of long white hairs; rachis and pedicels slender, terete, silkily ciliate, upper hairs long. *Sessile spikelets* $\frac{1}{2}$ in.; callus very short, silkily bearded; gl. I thin, pale, nerveless, with often a large deep dorsal pit, margins narrowly incurved; II acute, nerveless, dorsally silkily villous; III oblong or linear, flat, hyaline, obtuse, nerveless; IV, awn about 1 in., slender, nearly smooth, base acute. *Pedicelled spikelets* $\frac{1}{2}$ in. rather narrower than the sessile; gl. I slightly convex, quite smooth between the bristles, keels ciliate, many-nerved; II ovate-oblong, 3-nerved, ciliate; III oblong, obtuse, eciliate; IV very narrow.

60. **A. mucronatus**, Anderss. ex Hack. *Monogr. Androp.* 577; stem tall stout, internodes alternately flattened, sheaths terete, leaves linear-lanceolate acuminate pubescent, spikes 5–10 flabellately paniced, sessile spikelets $\frac{1}{2}$ in. twice as long as the joints and ciliate pedicels, callus hairs half as long as the glumes, gl. I coriaceous obovate-lanceolate obtuse glabrous shining 6-nerved pitted in the middle, keels setose above the middle, II as long lanceolate acute glabrous except the ciliate margin 3-nerved, IV a stout awn, gl. IV of pedicelled spikelets awned or mucronate.

INDIA? *Hugel*.

Stem 3–4 ft. or taller, simple, nodes 4, bearded. *Leaves* flat, base fimbriate; sheaths smooth; ligule rounded, ciliate. *Spikes* solitary or opposite, shortly peduncled, lower pair of spikelets male. *Spikelets* yellow-green; gl. I not hyaline at the tip; II obscurely keeled, dorsally shining; III linear-lanceolate, nerveless, ciliate; IV awn $\frac{3}{4}$ in. long, stout; palea minute. *Pedicelled spikelets* rather longer and broader than the sessile; gl. I obliquely elliptic-oblong, violet-colored, keels setosely ciliate nearly to the base, 13-nerved; II narrower, lanceolate, acute, 5-nerved, ciliate; III obovate-oblong, 1-nerved, ciliate; IV as long, linear, 1-nerved, glabrous.—Description from Hackel, who says it is a peculiar species, not allied to the preceding, but rather to *A. polytychus*.

** *Gl. IV of sessile spikelet 2-fid, awned in the cleft.*

61. **A. polytychus**, Steud. *Syn. Gram.* 380; stem slender erect simple or branched below only, leaves erect strict softly hairy acuminate, sheaths subcompressed, spikes 4–6 digitate simple or forked, joints and ciliate pedicels half as long as the sessile spikelets, gl. I of sessile spikelets narrowly elliptic-oblong obtuse 4–7-nerved nearly flat glabrous, margins narrowly incurved, keels strongly ciliate above, II as long mucronate 3-nerved ciliate, IV very narrow with 2 setaceous or lanceolate lobes. *Thwaites Enum. Pl. Zeyl.* 367; *Trim. Cat. Ceyl. Pl.* 108; *Hack. Monogr. Androp.* 578.

CEYLON; at Pedrotallagalla, alt. 7000 ft., *Thwaites*.

Stems densely tufted, 2–3 ft., as thick as a crow-quill below, smooth. *Leaves* 8–16 in. by $\frac{1}{10}$ – $\frac{1}{4}$ in., rigid, erect; ligule short, rigid. *Spikes* usually 3, very fragile, 2 in. long, shortly peduncled, joints and pedicels not furrowed; axils hairy; spikelets closely imbricate, lowest pair male or neuter. *Sessile spikelets* $\frac{1}{2}$ in., callus very short, shortly bearded; gl. I not winged, sometimes depressed on the median line; II 3-nerved, glabrous except the margins, acute or aristulate; III oblong-lanceolate, acute, 1-nerved; IV rather shorter, nearly glabrous, awn $\frac{1}{2}$ – $\frac{3}{4}$ in. very slender; palea minute, broadly ovate, ciliate. *Pedicelled spikelets* broader than the sessile; gl. I convex, many-nerved, narrowly winged on one side, tip membranous, keels ciliate; II oblong, acute, 1-nerved, ciliate; III and IV small, oblong, obtuse, 1-nerved, shortly ciliate.

62. **A. nitidulus**, *Hook. f.*; annual, very slender, branched, leafy, leaves long narrow flaccid scaberulous base contracted, spikes very few very unequal on a long capillary peduncle white, rachis tenacious, sessile spikelets ovate-oblong 9-nerved dorsally flat glabrous or scabrid towards the hyaline truncate tip, keels ciliate towards the tip, II 5-7-nerved acuminate, IV short broadly 2-lobed, awn very slender.

N.W. HIMALAYA; on the Sewalik Hills; and Chanda in the CENTRAL PROVINCES, *Duthie*.

Stems 3-4 ft., loosely tufted, very slender from the naked base upwards, nodes glabrous. *Leaves* 8-12 by $\frac{1}{2}$ - $\frac{1}{4}$ in., acuminate, thin, margins scaberulous ciliate towards the base, midrib slender smooth, nerves very slender; sheath smooth; ligule oblong, membranous, ciliate. *Spikes* quite white, the terminal on the peduncle 1- $1\frac{1}{2}$ in., lower rather distant, sessile, much shorter; peduncle 4-8 in.; joints and pedicels = about $\frac{2}{3}$ the sessile spikelet, very slender, ciliate with long white silky hairs, tips truncate, joints terete, pedicels flattened (almost as in *Sect. Amphilophis*). *Spikelets* few, in rather distant pairs, homogamous pairs one or two. *Sessile spikelets* $\frac{1}{2}$ in., callus very short, stellately bearded with white hairs; gl. I thin, greenish, dorsally polished, margins narrowly incurved; II chartaceous lanceolate, 5-7-nerved, margins broadly incurved, ciliate; III smaller, lanceolate, 2-nerved, ciliate; lobes of IV ovate, acute, divergent, ciliate; awn about $\frac{1}{2}$ in., slender, column quite smooth. *Anthers* short. *Pedicelled spikelets* rather longer than the sessile, narrowly lanceolate, green, neuter; gl. I membranous, 9-nerved, glabrous, margins incurved, ciliate towards the tip only; II 7-nerved; III rudimentary or 0.

Subgen. X. HETEROPOGON, *Hack*. *Spikes* solitary, joints many and pedicels not channelled; lowest pairs or 2-8 pairs of spikelets closely imbricate, male or neuter. *Sessile spikelets* subcylindric, gl. I subcylindric or oblong, II obtusely keeled, not awned; III hyaline; IV a long awn with a stout column and often a hyaline base. *Pedicelled spikelets* very unlike the sessile and concealing them.

* *Ligule* membranous; *column of awn* hirsute; *callus of sessile fem. spikelets* pungent.

63. **A. contortus**, *Linn. Sp. Pl.* 1045; leaves scabrid above, ligule truncate ciliolate, spikes $1\frac{1}{2}$ -3 in., sessile fem. spikelets $\frac{1}{2}$ in., callus long rufous-bearded, gl. I dorsally flat, margins smooth involute, awn 3-5 in., pedicelled spikelets $\frac{1}{3}$ - $\frac{2}{3}$ in., gl. I obliquely lanceolate obtuse. *Lamk. Encyc.* t. 840; *All. Fl. Pedem.* 260, t. 91; *Kunth Enum. Pl.* i. 486; *Steud. Syn. Gram.* 367; *Hack. Monogr. Androp.* 585 (excl. *A. polystachyus*, *Roxb.*); *Roxb. Fl. Ind.* i. 253; *Grah. Cat. Bomb. Pl.* 238; *Dalz. & Gibs. Bomb. Fl.* 300; *Wall. Cat.* n. 8800; *Wight Cat.* n. 1688, 2321, in part; *Baker Fl. Maurit.* 444. *A. Allionii*, *DC. Fl. Franc.* iii. 97. *A. messanensis*, *Biv. Pl. ined.* 5. *A. Bellardi*, *Bub. in Nuov. Giorn. Bot. Ital.* (v. 1873) 317. *A. besukiensis*, *Steud. l.c.* 307. *Heteropogon Allionii*, *Roem. & Sch. Syst.* ii. 835; *T. Nees, Gen. Fl. Germ. Monocot.* i. 94; *Reichb. Ic. Fl. Germ.* t. 53. *H. contortus*, *Beauv. ex Roem. & Sch. l.c.* 836; *Benth. Fl. Austral.* vii. 517; *Aitchis. Cat. Panjab. Pl.* 176; *Duthie Grass. N.W. Ind.* 19, *Fodd. Grass. N. Ind.* 32, t. 19. *H. firmus*, *Presl. Rel. Hænk. i.* 334. *H. glaber*, *Pers. Syn.* ii. 533; *Beauv. Agrost.* 24, t. 23, f. 8. *H. hirtus*, *Pers. l.c.*; *Thw. Enum. Pl. Zeyl.* 368; *Trim. Cat. Ceyl. Pl.* 107; *Benth. Fl. Hongk.* 424. *H. hirsutus*, *Beauv. Agrost.* 134. *H. hispidissimus*, *Steud. Syn. Gram.* 367. *H. Hohenackeri*, *Hochst. ex Miq. Anal. Bot. Ind.* ii. 24. *H. messanensis*, *Guss. Fl. Sic. Syn.* i. 164. *H. polystachyus*, *Nees Agrost. Bras.*

364; *Wight Cat.* n. 2321 (*non Roxb.*). *H. Roxburghii*, *Arn. ex Nees in Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843) 183.

Throughout INDIA, BURMA, and CEYLON to the Straits of Malacca, ascending the Himalaya to 5000 ft.—DISTRIB. Mediterranean region and tropics generally.

Stems 1–5 ft., erect or decumbent below, densely tufted, simple or fastigiately branched, compressed towards the base. *Leaves* 6–18 in., narrow, glabrous or hairy especially near the base, rather glaucous, rigid, margins and upper surfaces scabrid; sheaths compressed, keeled. *Spikes* with the lower 2–6 pairs of spikelets male with coherent joints; joints of upper (fem.) portion very short and curved callus bearded with brown hairs. *Sessile (fem.) spikelets* $\frac{1}{2}$ in.; gl. I coriaceous, glabrous or hispid, many-nerved, tip membranous; II coriaceous, 3-nerved; III oblong, hyaline, embracing the long slender ovary, tip ciliate; IV awn stout, column hirsute. *Pedicelled spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ in.; pedicel very short; gl. I lanceolate, obliquely twisted, herbaceous, keels margined or unequally winged; II membranous, acute, 3-nerved, ciliate; palea minute, ciliate. *Sessile spikelets* of the homogamous pairs, like the pedicelled, more or less covered with tubercle-based hairs.—Hackel has 2 varieties and 5 subvarieties (excluding *polystachyus*) of this widely distributed plant, founded chiefly on the number and position of the tubercle-based bristles of the male spikelet. They appear to me to be too inconstant for definition.

64. **A. melanocarpus**, *Ell. Sketch. Bot. S. Carolin.*, &c., i. 146; tall, stout; leaves scabrid above, sheaths of upper with scrobiculate keels and often nerves, ligule rounded glabrous, spikes $\frac{1}{2}$ –1 in., sessile fem. spikelets $\frac{1}{2}$ in. terete hirsute, callus long rufous bearded, gl. I dorsally flat, awn 2–4 in., pedicelled spikelets $\frac{3}{4}$ –1 in. costa scrobiculate. *A. polystichus*, *Hochst. ex Steud. Syn. Gram.* 369. *A. polystictus*, *Hochst. in Schimp. Pl. Abyss.* n. 2012. *A. scrobiculatus*, *Kunth Enum. Pl.* i. 507. *A. segænsis*, *Steud. l. c.* 367 (*excl. cit. Wall.*) *Heteropogon acuminatus*, *Trin. in Mem. Acad. Petersb. Ser.* VI. ii. (1883) 254. *H. melanocarpus*, *Benth. in Journ. Linn. Soc.* xix. (1881) 71; *Duthie Grass. N.W. Ind.* 19. *H. polystictus*, *Hochst. in Flora*, xxxix. (1856) 28. *H. Roylei*, *Nees ex Steud. l. c.* 367. *H. scrobiculatus*, *Fourn. ex Hack. in Mart. Fl. Bras.* ii. III. 268.

UPPER GANGETIC PLAIN, *Royle*, &c. KUMAON, up to 5000 ft.—DISTRIB. Trop. and subtrop. Afric. and Amer.

Stem 4–6 ft., as thick as a swan's quill below, fastigiately branched above. *Leaves* 1–2 ft. by $\frac{1}{4}$ – $\frac{3}{4}$ in., setaceously acuminate, rigid, green, margins scaberulous, glabrous or with long hairs at the base; sheaths compressed, glabrous, upper spathæform, flattened. *Spikes* green, peduncle stout, in a narrow spathe 3–5 in. long, lower 1–3 pairs of spikelets male or neuter with coherent glabrous joints, upper pairs with fragile bearded joints. *Sessile (fem. or bisexual) spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ in., callus long bearded; gl. I obscurely 9-nerved, not furrowed dorsally, margins smooth involute; II coriaceous, linear-oblong 3-nerved, keel hispid; III shorter, oblong, nerveless; IV awn stout, column hirsute. *Pedicelled spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ in., obliquely lanceolate, acuminate, pedicel very short; gl. I many-nerved, glabrous, keels ciliate-serrulate; II lanceolate, acute; III much shorter, nerveless, ciliate; IV minute, linear. *Sessile spikelets* of homogamous pair like the pedicelled.

65. **A. triticeus**, *Br. Prodr.* 201; tall, stout, leaves sparsely hairy, sheaths of upper smooth, ligule very short, spikes 3–6 in., sessile fem. spikelets $\frac{1}{2}$ in. terete, callus long rufous bearded, gl. I dorsally deeply channelled silkily pubescent, awn 3–6 in., pedicelled spikelets $\frac{3}{4}$ –1 in. smooth. *Hack. Monogr. Androp.* 588; *Steud. Syn. Gram.* 368. *A. ischyranthus* & *liananthus*, *Steud. l. c.* 367. *Heteropogon insignis*, *Thw. Enum. Pl. Zeyl.* 437; *Trim. Cat. Ceyl. Pl.* 107; *Benth. Fl. Austral.* vii. 517.—*Andropogon*, *Wall. Cat.* n. 8801.

The CONCAN, *Stocks, Woodrow*. CENTRAL PROVINCES; Khandwa, *Duthie*. BURMA, at Segae, *Wallich*. CEYLON; Mateke East, *Thwaites*.—DISTRIB. Malaya, Australia.

Stem 6–10 ft., as thick as a swan's quill below, hard, smooth, leafy. *Leaves* 1–2 ft., narrowly linear, acuminate, glaucous, above and margins scabrid; sheaths compressed, keeled, smooth; ligule ciliate. *Spikes* $\frac{1}{2}$ – $\frac{1}{2}$ in., very stout, green; lower 12–15 pairs of spikelets homogamous, male or neuter, joints very short. *Sessile spikelets* $\frac{1}{2}$ in., cylindric, obtuse, callus long-bearded with rufous silky hairs; gl. I truncate; II obtuse; III glabrous; IV awn hirsute, very stout. *Pedicelled spikelets* $\frac{3}{4}$ in., green, pedicel very short; gl. I more or less twisted, lanceolate, many-nerved, one keel winged; II linear-lanceolate, margins ciliate; III and IV hyaline, short, glabrous. *Sessile spikelets* of the homogamous pair like the pedicelled.

**** Ligule of hairs; column of awn usually bearded; callus long.**

66. **A. bellariensis**, *Hack. in Flora* (1885) 123; stem tall sheathed to the top, leaves very narrow, sheaths terete, ligule of 2 rows of hairs, spikes 2–2 $\frac{1}{2}$ in. slender partially sheathed, sessile fem. spikelets $\frac{1}{2}$ in., callus acute bearded with white hairs, gl. I linear-oblong dorsally channelled 6-nerved glabrous, awn 1–1 $\frac{1}{2}$ in. base dilated and 2-toothed, pedicelled spikelets $\frac{1}{2}$ in. glabrous. *Heteropogon polystachyon*, *Arn. in Wight Cat.* n. 2321.

The DECCAN; near Bellary, *Wight* (*Cat.* n. 2321 in part).

Stem 2 ft., ascending, branched above, terete, glabrous. *Leaves* 6 in. or more, by $\frac{1}{4}$ – $\frac{1}{8}$ in., rigid, green, quite smooth, puberulous above, setaceous acuminate; sheath glabrous. *Spikes* 2–3 in., slender, green, joints and pedicels shortly ciliate, lower 2–4 pairs of spikelets homogamous, male. *Sessile fem. spikelets* pale, callus straight pungent; gl. I chartaceous, glabrous, 6-nerved margins narrowly inflexed, keels scabrid, tip entire hyaline; II oblong-lanceolate, obtuse, 5-nerved, margins inflexed; III linear, nerveless, glabrous; IV awn stout, column ciliate with white hairs. *Pedicelled spikelets* $\frac{1}{2}$ in., lanceolate, shortly pedicelled; gl. I lanceolate, 7-nerved, glabrous; II narrower, 5-nerved, ciliate; III and IV very narrow, glabrous. *Sessile spikelet of homogamous pair* like the pedicelled.

67. **A. Ritchiei**, *Hook. f.*; leaves scabrid, ligule a row of stiff bristles connate below, spikes $\frac{3}{4}$ –1 in. green, hispid, sessile fem. spikelets $\frac{1}{2}$ in., callus short hirsute, gl. I oblong, terete rufous villous dorsally not channelled, nerves obscure, IV awn 1 $\frac{1}{2}$ –2 in. scabrid base acute, pedicelled spikelets $\frac{1}{4}$ – $\frac{1}{2}$ in. very shortly pedicelled green, gl. I narrowly lanceolate acuminate many-nerved and with a marginal series of long spreading golden tubercle-based bristles.

The DECCAN; Belgaum, *Ritchie*.

Stem 4–6 ft. (one only seen). *Leaves* 1 ft. by $\frac{1}{4}$ in., coriaceous, linear from a narrow base, acuminate, flat, rigid, shortly hairy on both surfaces hairs fine tubercle-based, margins spinulosely serrulate; sheath smooth; ligule membranous? *Spikes* with peduncles shorter than the very narrow sheaths, stout; lower 1–2 pairs of spikelets homogamous. *Sessile fem. spikelets* softly villous; gl. I not channelled dorsally; II linear, 3-nerved, with a coriaceous hispid centre and membranous wings; III smaller, hyaline, nerveless; IV awn slender, tortuous, red brown, column pubescent. *Pedicelled spikelets* male, pedicels very short glabrous, gl. I narrowly equally winged, glabrous, except for the bristles, II lanceolate, 3-nerved; IV oblong, hyaline.—I have seen only the top of a branch with a single leaf of this remarkable species. The ligule is imperfect.

68. **A. oliganthus**, *Hochst. ex Steud. Syn. Gram.* 368; dwarf, annual, leaves subsensiform acuminate softly hairy margins thickened, spikes short,

joints and pedicels about half as long as the sessile spikelet long-ciliate, sessile spikelet $\frac{1}{2}$ in. oblong, callus short obtuse, gl. I obtuse chartaceous dorsally villous toward the base not dorsally channelled shining faintly-nerved keels ciliate towards the truncate tip, II obtuse apiculate, III very short broadly oblong ciliate, IV column of awn glabrous. *Hack. Monogr. Androp.* 591.

NILGHIRI HILLS; *Wight, Hohenacker, &c.*

Stems 3-6 in., tufted, slender, sometimes creeping below, geniculate. *Leaves* 2-3 in., quite flat, margins cartilaginous; sheaths compressed; ligule very short, membranous. *Spikes* usually very shortly exserted from the long narrow glabrous spathes; peduncle curved, puberulous. *Spikes* $\frac{1}{2}$ - $\frac{3}{4}$ in. long, with 3-6 pairs of glumes, lower spikelets neuter. Gl. I of sessile spikelets with narrowly involute margins, callus bearded; awn of IV $1\frac{1}{2}$ in. long, shining. *Pedicelled spikelet* larger than the sessile; gl. I obovate-oblong, obtuse, many and strongly nerved, margins ciliate hardly incurved: II smaller, membranous, obtuse, 1-3-nerved, ciliate; palea of IV very small.—Hackel observes that this species is intermediate between *Dichanthium* and *Heteropogon*, but nearer the latter in the dorsal furrow of the sessile spikelet (which furrow I do not detect).

69. **A. polystachyos**, *Roxb. Fl. Ind.* i. 261; dwarf, erect, corymbosely branched, leaves slender short erect strict hairy, spikes $\frac{1}{2}$ -1 in. on slender strict naked peduncles, sessile fem. spikelets $\frac{1}{2}$ in., callus densely bearded on one side with brown hairs, gl. I terete pubescent, awn $1\frac{1}{2}$ -2 in. base simple acute, pedicelled spikelets oblong many-nerved broadly winged glabrous. *Steud. Syn. Gram.* 367. *A. pumilus*, *Roxb. Ic. ined.* t. 2021 (*non Fl. Ind.*).

PENINSULA OF INDIA, *Roxburgh, Wight.*

Stem 6-10 in., slender, leafy above. *Leaves* 2-4 by $\frac{1}{10}$ - $\frac{1}{8}$ in., lower flat, upper convolute, acuminate, ciliate with long flexuous hairs, margins thickened; sheaths terete, lower keeled; ligule a line of hairs. *Spikes* pale brown (when dry), peduncle 2-4 in., with a very slender sheath and minute leaf about the middle; 5 or 6 lowest pairs of spikes neuter. *Sessile fem. spikelets* dark; gl. I rigid, many-nerved; II linear, coriaceous with broad hyaline margins; III shorter, oblong, ciliate; IV awn rather slender, column shortly hirsute. *Pedicelled spikelets* $\frac{1}{4}$ in.; gl. I with a coriaceous many-nerved centre and broad hyaline infolded wings; II lanceolate, ciliate, 5-nerved, 2 pairs submarginal. *Neuter spikelets*; gl. I like the pedicelled, but broader, tip 2-toothed; II lanceolate, 3-nerved, ciliate; III and IV oblong, 1-nerved, ciliate.—A curious little species, of which I have seen only indifferent specimens of Wight. In Roxburgh's *Icones* this and *A. pumilus*, *Roxb.*, are figured on the same sheet with the names transposed. *Heteropogon polystachyon*, *Arn.* (*Wight Cat.* 2321) under which is cited Roxburgh's *A. polystachyon* is *A. bellariensis*, *Hack.*

Subgen. XI. CYMBOPOGON, *Hack.* *Spikes* 2, both sessile or a sessile and shortly stipitate terminating a peduncle which is more or less sheathed by a proper spathe, often divaricate or deflexed; joints and pedicels plano-convex, clavate bucciniform or linear, top concave with usually dilated toothed margins. *Spikelets* several pairs, lowest pair or pairs of one or both spikes homogamous, male or neuter; sessile spikelets fem. or bisexual, oblong to lanceolate, dorsally compressed; gl. I dorsally flat excavate or pitted, awnless, margins inflexed; II cymbiform, acute, keeled, awned or not; III oblong, hyaline, nerveless or 2-nerved; IV smaller, narrow, hyaline, 2-cleft, awned in the cleft, awn capillary, rarely 0; palea minute or 0. *Pedicelled spikelets* male or neuter, dorsally strongly compressed.

A. Column of awn of gl. IV glabrous (rarely awn 0).

* Peduncle of spikes shorter than the proper spathe.

† Joints of spikes and pedicels of upper spikelets copiously villous on the sides and back, hairs more or less concealing the sessile spikelet.

70. **A. Iwarancusa**, *Jones in Asiat. Research.* iv. (1795) 109; stem short or tall, leaves flat or convolute, panicle subsimple or decompose, joints of rachis and pedicels of upper spikelets subclavate tops toothed, sessile spikelets $\frac{1}{2}$ in. linear-lanceolate acute, gl. I dorsally flat glabrous, keels scaberulous or ciliate.

Plains of N.W. INDIA, from the Jumna westwd., and southwd. to Scind. The WESTERN HIMALAYA, from Kashmir to Kumaon, and WESTERN TIBET, ascending to 8000 ft. N. CANARA and the DECCAN.—DISTRIB. Westwd. to N. Africa.

Stems tufted, on an annulate creeping rootstock, 6 in. to 6 ft. high; whole plant usually of a pale often glaucous green. *Leaves* 6 in.—2 ft., narrowly linear, tips capillary, rigid or flexuous, glabrous or scaberulous, glaucous or pruinose beneath, midrib slender; sheaths glabrous, lower dilated; ligule shortly oblong, membranous, ciliate. *Panicle* very variable, branches distant or crowded, subsimple or much densely or loosely branched; proper spathes $\frac{1}{2}$ — $\frac{3}{4}$ in., longer than the peduncle of the spikes, narrowly lanceolate. *Spikes* $\frac{1}{4}$ — $\frac{3}{4}$ in., unequal; spikelets 3—4 pairs. *Sessile spikelets* pale, sometimes reddish; gl. I thin, keels hardly margined not winged, nerves 0 or 2—4 between the carinal; II cymbiform, acute, 3-nerved; III 2-nerved; IV narrow, lobes subulate, ciliate. *Pedicelled spikelets* as long as or rather longer than the sessile, purplish, narrowly lanceolate; gl. I 7—9-nerved, keels scaberulous; II margins ciliate; III broadly oblong, hyaline, fimbriate.—*Roots* aromatic. There are no limits between *A. Iwarancusa* and *laniger*. The former is usually the larger plant, with broader leaves and often split sheaths, and is the most Eastern form. The authority for the name *Iwarancusa* as a specific one is not very clear. Blane describing his *Nardus indica* says that Sir J. Banks regarded it as a species of *Andropogon*. Jones incidentally gives *Irawancusa* as the specific name; possibly he may have taken it from Banks.

Subsp. 1. *A. IWARANCUSA* proper; tall, much branched, leaves long flat, lower sheaths deciduous splitting into flat often tortuous laminæ, panicle narrow compound. *Kunth Enum. Pl.* i. 493; *Steud. Syn. Gram.* 388. *Hack. Monogr. Androp.* 599; *Roxb. Fl. Ind.* i. 275; *Ainslie Mat. Med. Ind.* ii. 114; *Wall. Cat. n.* 8793; *Trin. Sp. Gram.* Ic. t. 326; *Duthie Grass. N.W. Ind.* 19. *Cymbopogon Iwarancusa*, *Schult. Mant.* ii. 458.—*Nardus indica*, *Blane in Phil. Trans.* lxxx. (1790) 284, t. 16.—Common in N. India. I have seen no N. African specimens with the lower leaf-sheaths of this form, a character which is, however, very inconstant.—*Khuskus* grass.

Subsp. 2. *A. LANIGER*, *Desf. Fl. Atlant.* ii. 379; stem short subsimple, leaves junceiform, lower sheaths hardened persistent, panicle narrow subsimple. *Kunth Enum. Pl.* i. 493; *Steud. Syn. Gram.* 386; *Hack. Monogr. Androp.* 598; *Aitchis. Cat. Panjab.* Pl. 174; *Duthie Grass. N.W. Ind.* 20, *Fodd. Grass. N. Ind.* 35, t. 23; *Lisboa in Bomb. Journ. Nat. Hist. Soc.* vi. (1891); *Boiss. Fl. Orient.* vii. 465. *A. Arriani*, *Edgew. in Journ. Linn. Soc.* vi. (1862) 208 (Arriani). *A. circinnatus* *Hochst. & Steud. ex Steud. l. c.* 387. *A. criophorus*, *Willd. Sp. Pl.* iv. 90. *A. Olivieri*, *Boiss. Diagn.* v. 76; *Steud. l. c.* 387. *A. commutatus*, *Aitchis. in Journ. Linn. Soc.* xix. (1882) 191 (non *Steud.*). *Cymbopogon arabicus*, *Nees ex Steud. l. c.* *A. circinnatus*, *Hochst. in Schimp. Pl. Arab. exsicc. Ed.* 2 (1844) n. 783. *C. Arriani*, *Aitchis. l. c.* *A. laniger*, *Duthie in Atkins. Gaz. N.W. Ind.* 640. *Gynanthelia lanigera*, *Anderss. in Schweinf. Brit. Fl. Æthiop.* 300.—*A. laniger* is the N. African form of the species, also common in N. India. Edgeworth's *A. Arriani* is certainly this. The *A. commutatus* of Afghanistan and Scind (*Stocks*) is also

this; whether the African plant of that name is the same is doubtful. I have not seen the Scind specimens of *A. commutatus* alluded to by Hackel (Monogr. 613); it is not probable that they differ from Stocks' plant.

†† Joints of spikes and pedicels of upper spikelets villous or ciliate on the sides, hairs not concealing the sessile spikelets, dorsally glabrous or sparsely rarely copiously hairy.

§ *Leaf-sheaths terete.*

71. **A. Schœnanthus**, Linn. *Sp. Pl.* 1046; sessile spikelets ovate- or obovate-oblong dorsally flat or nearly so with a deep narrow longitudinal cleft in the centre usually below the middle and answering to a ventral median rib, keels narrowly winged from or from above the middle, II acute keel with a serrulate wing above the middle; *Kunth Enum. Pl.* i. 493; *Grah. Cat. Bomb. Pl.* 238; *Duthie Grass. N.W. Ind.* 21, *Fodd. Grass. N. Ind.* 38, t. 26.

Hotter parts of INDIA, wild or cultivated, from the Panjab to Burma and southwd. to Travancore and CEYLON.—DISTRIB. Westwd. to tropical Africa.

Annual? *Stem* 3–6 ft., erect. *Leaves* long, broad or narrow, finely acuminate glaucous or pruinose, smooth or margins scaberulous, base rounded or cordate and amplexicaul; sheath glabrous; ligule oblong, scarious. *Panicle* elongate, 1–2 ft. long, dense or lax, compound or decomposed, rarely subsimple; proper spathes as long as the spikes, which are as long as the peduncle or shorter. *Spikes* unequal, one 3–4-jointed, the other 4–6-jointed; joints and pedicels narrowly clavate, half as long as the sessile spikelet, tips dilated and toothed, margins villously ciliate with long hairs. *Sessile spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ in., callus obtuse shortly bearded; gl. I tip obtuse often irregularly toothed, dorsally 2-nerved or nerveless; II lanceolate, 3-nerved, ciliate, III oblong, ciliate; IV small, narrow, 2-fid, lobes subulate glabrous or ciliate; awn slender, twice as long as the gl. or longer. *Pedicelled spikelets* oblong-lanceolate, acute or obtuse; gl. I glabrous or puberulous, keels hardly ciliate; II ovate, acute, 3-nerved; III oblong, ciliate, 2-nerved.—As in the case of *A. Nardus*, this grass has been so extensively cultivated in India that it is impossible to say where it is wild, and its synonymy is so mixed up with that of *A. Nardus*, and the descriptions of both are so inexact, that until the whole subject of their culture and distribution has been botanically investigated by a skilled observer in various parts of India, their history must remain obscure. Botanically, *A. Schœnanthus* is remarkable for the extraordinary difference between its broad and narrow leaved varieties. Some forms of the narrow leaved closely resemble states of *A. Nardus*, and can only be distinguished from it by the narrow cleft in the centre of gl. I of the sessile spikelet and its corresponding rib in the ventral face of that glume. The figure given by Ventenat (*Hort. Cels.* t. 89) is unreliable for any grass. I give below Hackel's classification of the varieties with their synonymy, adding one which he does not appear to have seen. I am quite unable to distinguish his vars. *genuinus* and *versicolor*.—"Geranium grass, Rusa oil grass, Oil of Ginger grass." Watt.

Subsp. *genuinus*, Hack. l.c. 609; panicle linear-oblong, secondary branches usually simple, spikes $\frac{1}{2}$ – $\frac{3}{4}$ in., dorsal cleft of gl. I hardly reaching the middle of the gl., gl. IV cleft $\frac{1}{2}$ – $\frac{1}{3}$ way down, awn perfect, pedicelled spikelets glabrous. *Wall. Cat.* 8794 L.

Var. *Martini*, leaf-base cordate and $\frac{1}{2}$ -amplexicaul, spathes and spikelets pale or spikelets reddish. *A. Schœnanthus*, Linn. l.c.; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* iv. (1889) 120. *A. Martini*, Roxb. *Fl. Ind.* i. 277; *Aitchis. Cat. Panjab. Pl.* 175; *Wight. Cat. n.* 1702. *A. giganteus*, Hochst. in *Flora* (1844) 242. *A. nardoides a.*, Nees *Fl. Afr. Austr.* 116. *A. pachnodes*, Trin. in *Mem. Acad. Petersb. Ser. VI.* ii. (1824) 284, *Sp. Gram. Ic.* t. 337. *Gymnanthelia Martini*, Anderss. in *Schweinf. Beitr. Fl. Æthiop.* 310.

Var. *filiculmis*, Hook. f.; stem 12–16 in., very slender, leaves $\frac{1}{2}$ – $\frac{1}{6}$ in. broad, spikes reddish-brown.—Upper Burma, Fort Stedman, *Herb. Hort. Calcutt.*—Probably only a depauperate form.

Var. *versicolor*, Hack. l. c. 610; leaf-base cordate semi-amplexicaul, spathes dull violet and red, spikelets more or less variegated or the pedicelled violet. *A. versicolor*, Nees in *Wight Cat.* n. 1705; *Lisboa* in *Journ. Bomb. Nat. Hist. Soc.* iv. (1889) 120, vi. (1891) 65. *A. aromaticus*, Sieb. *Fl. Maurit.* (*Herb. Exsicc.*) n. 38. *A. connatus*, Hochst. in *A. Rich. Tent. Fl. Abyss.* ii. 464. *A. excavatus*, Hochst. in *Flora* (1846) 116. *A. foliatus* & *polyneuros*, Steud. *Syn. Gram.* 385, 389. *A. nardoides*, β , Nees l. c. *A. pachynodes*, β , Nees *Pl. Meyen.* 190. *A. pruinosis*, Nees ex Steud. l. c. 388. *A. Schœnanthus*, Wall. *Cat.* 8794 C.N., 8795, *Baker Fl. Maurit.* 446; *Trim. Cat. Ceyl. Pl.* 107; ?*Vent. Hort. Cels.* t. 89. *A. versicolor*, Nees ex Steud. l. c.; *Thw. Enum. Pl. Zeyl.* 367. *Gymnanthelia connata*, Aschers & Schweinf. in *Schweinf. Beitr. Fl. Æthiop.* 310.

Var. *cæsius*, Hack. l. c.; whole plant more or less glaucous, stem slender, leaves very narrow base not dilated, panicle subsimple, gl. I narrowly winged. ?*Δ. bicornis*, Forsk. *Fl. Æg. Arab.* 173. *A. cæsius*, Nees in *Hook. & Arn. Bot. Beech. Voy.* 244, in *Pl. Meyen.* 189; *Wight Cat.* n. 1700, 1700a. *A. Martini*, Benth. *Fl. Hongk.* 424. *A. Iwarancusa*, Boiss. *Fl. Orient.* v. 466. *Andropogon*, Wall. *Cat.* n. 8796.

Var. *gracillimus*, Hook. f.; glaucous, stem very slender, leaves 2–4 by $\frac{1}{8}$ in., panicle simple, joints of rachis of spikes and pedicels nearly glabrous, gl. I of sessile spikelet truncate dorsal channel deep or shallow. *Andropogon*, Wall. *Cat.* n. 8796 (*Herb. Wight*). *Trachypogon cæsius* var. *a*, Nees in *Herb. Wight*.

Subsp. *clandestinus*, Hack. l. c. 612; habit of var. *cæsius*, but gl. I and II of the pedicelled spikelet pubescent. *A. clandestinus*, Nees ex Steud. l. c. 388. *Andropogon*, Wall. *Cat.* n. 8794 I K.—Burma, *Wallich*; Upper Burma, *Herb. Hort. Calcutt.*

72. **A. Nardus**, Linn. *Sp. Pl.* 1046; stem tall paniculately branched leafy, leaves narrow flat, panicle subsimple to decompose, spikes in densely or loosely compacted sheathed fascicles or subsolitary, joints and pedicels rather slender tips dilated toothed, sessile spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. oblong or lanceolate, gl. I 2-toothed, dorsally flat or with shallow depressions or concave towards the base, margins winged or narrowly margined and scaberulous above the middle.

Throughout the hotter parts of INDIA, BURMA, the MALAY PENINSULA and CEYLON, wild or cultivated.—DISTRIB. Trop. Asia, Africa, Australia.

In its common form it is difficult to distinguish *A. Nardus* from the narrow leaved form of *A. Schœnanthus*, except by the cleft in the gl. I of the sessile spikelet of the latter; and not always very clearly by that. Both are cultivated in India and elsewhere, and *A. Nardus* is (except in foliage never having the broadly cordate leaf-base) quite as variable as its ally. I have been unable satisfactorily to correlate all of the Kew Indian forms with the elaborate classification of varieties established by Hackel. Both his and my conclusions must be regarded as provisional and as certain to be disturbed by a study of additional materials, or by a study of all the forms in their native localities by a specialist who has grasped the history of the species wild and cultivated, over a large area of its distribution. One of Hackel's varieties, *distans*, regarded as a species by Nees, should, I think, be restored to that rank (excluding a Ceylon plant included under it by Hackel); it is exclusively a Himalayan form, not found below 4000 ft., and is very constant in habit and foliage.

The var. *genuinus*, Hack., is founded on an awnless form of the plant, which I believe (with Roxburgh) to be a cultivated state, having seen no awnless specimens in the forms known to be wild. The name is therefore inappropriate botanically, whether or no it represents the first described state of the plant, and better suppressed.

A. *NARDUS* proper; rootstock stout, stem tall stout leafy, leaves long narrow, panicle large often supra-decompound oblong or subpyramidal more or less interrupted, branches loosely or closely packed erect at length often drooping, spathes laxly or closely imbricate lanceolate, proper spathes $\frac{1}{2}$ – $\frac{3}{4}$ in., spikes with 4–5 pairs of spikelets, joints and pedicels rather slender densely or laxly ciliate, sessile spikelets $\frac{1}{2}$ – $\frac{3}{4}$ in. lanceolate awned, gl. I narrowly winged, awn long or short. A. *Nardus*, *Bentl. & Trim. Medic. Pl. t.* 297; *Trim. Cat. Ceyl. Pl.* 107. A. *Nardus*, *var. grandis*, *Hack. (in part)*. A. *cæsius*, *Nees in Wight Cat. n.* 1700c. A. *Schœnanthus*, *Wall. Cat. n.* 8794 D. E. F. H.—From the Himalaya to Burma and southwd. to Ceylon and Malaya. *Mergui, Griff. (Kew Distrib. 6762)*. Bengal, *Griff. (K. D. 6760, 6761)*.

Forma culta; gl. I of sessile spikelet, dorsally flat or deeply hollowed, awn 0 or very short included in the glumes. A. *Nardus*, *auct. plur.* A. *Schœnanthus*, *Roxb. Fl. Ind. i.* 274; *Wall. Cat. n.* 8794 E. A. *Roxburghii*, *Nees in Wight Cat. n.* 1693; *Steud. l. c.* 395. A. *Martini*, *Thw. Enum. Pl. Zeyl.* 367. A. *Nardus*, *var. genuinus*, *Hack. Monogr. Androp. 662 in part*.

Forma abnormis, spathes empty. A. *cæsius*, *Nees in Wight Cat. n.* 1700d. *Anthistiria*, *Wall. l. c. n.* 8768.

Var. nilagiricus, *Hack. l. c.* 604; tall, stem very robust sometimes as thick as the little finger, leaves 2–4 ft. by $\frac{1}{2}$ – $\frac{2}{3}$ in. glaucous beneath, ligule coriaceous, panicle 10–12 in. narrow, proper spathes about $\frac{1}{2}$ in. broadly lanceolate cymbiform acuminate, sessile spikelets $\frac{1}{2}$ – $\frac{3}{4}$ in. dorsally flat smooth or with shallow depressions hardy winged nerves obscure, lobes of gl. IV subulate, awn short or long. A. *nilagiricus*, *Hochst. in Hohen. Pl. Ind. Or. (1851) n.* 932. A. *confertiflorus*, *Steud. l. c.* 385. A. *Nardus*, *var. glomeratus*, *Hack. l. c.* A. *Schœnanthus*, *Wall. Cat. 8794 B in part*. Nilgiri Hills, *Wight (Herb. n.* 3087) &c.; Conoor, alt. 6000 ft. *Gamble*. Ceylon.—The spathes are normally broader than in *Nardus* proper.

Var. luridus, *Hook. f.*; stem 5–6 ft., leaves long, panicle elongate rather broad decompound branches or narrow with sparingly divided branches, spikes in large rounded crowded fascicles drying of a very dark purplish brown, spathes cymbiform, outer $\frac{1}{2}$ – $\frac{1}{4}$ in., proper $\frac{1}{2}$ – $\frac{3}{4}$ in. shorter than the purplish black shortly peduncled spikes, pedicels and joints slender sparsely ciliate with long spreading hairs, sessile spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. lanceolate, gl. I dorsally flat or concave especially below, keels winged above the middle, lobes of gl. IV long ciliate.—Nilgiri Hills, *Schmid*. Ceylon, *Gardner, Maxwell*.—Thwaites, *A. distans* may be this or *A. nilagiricus*.

Var. khasianus, *Hack. l. c. (in part)*; tall, leaves 2–3 ft., panicle elongate 1–3 ft. narrow, branches short compound or decompound, spathes narrowly lanceolate outer $\frac{3}{4}$ – $1\frac{1}{4}$ in., proper $\frac{1}{2}$ – $\frac{3}{4}$ in., spikes $\frac{1}{2}$ – $\frac{3}{4}$ in., joints and pedicels slender shortly villous, sessile spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. oblong-lanceolate obtuse, gl. I dorsally flat or with very shallow depressions, very rarely channelled down the centre (as in *A. Schœnanthus*) keels broadly winged above the middle, nerves 2–5 between the keels usually well marked from the middle or above it to near the top, IV rather broadly linear lobes long ciliate. A. *khasianus*, *Munro mss.*—Khasia Hills, alt. 3–5000 ft., *Griffith (Kew distrib. 6759, 6764, 6765)*; Munneopore, alt. 3500 ft., *Clarke*.—*Wall. Cat. n.* 8794 H. referred here by Hackel has no nerves or wings to gl. I of the sessile spikelets and is, I think, a form of *normalis*.

Var. grandis, *Hack. l. c.* 605 (*in part*); tall, stout, leaves 2–3 ft. by $\frac{1}{2}$ – $\frac{1}{2}$ in., panicle narrow loosely branched, branches distant often drooping, outer spathes $1\frac{1}{2}$ –3 in., proper spathes 1 – $1\frac{1}{2}$ in., joints and pedicels shortly ciliate, sessile spikelets $\frac{1}{2}$ – $\frac{1}{2}$ in. oblong-lanceolate obtuse dorsally flat or slightly concave below keels margined or winged above the middle nerves obscure, keel of II sometimes shortly winged above the middle, lobes of gl. IV ciliate, awn $\frac{1}{2}$ – $\frac{1}{2}$ in. A. *Schœnanthus*, *Wall. Pl. As. Rar. iii. t.* 280, *Cat. n.* 8794 (*in part*). ?A. *pendulus*, *Nees ex Steud. l. c.* 388.—Nepal, *Wallich*. Sikkim, Terai and hot valleys, *J. D. H.*, &c. Bengal, *Griffith (Kew distrib. n.* 6773). Rajmahal, *Herb. Hort. Calcutt.*—The very long outer spathes are seen in no other variety, but they are found shortening in some specimens to the ordinary length of *khasianus* and others.

Var. coloratus; stem subsimple, leaves chiefly radical $\frac{1}{2}$ – $\frac{1}{2}$ in. broad glaucous

beneath, branches of panicle few, spathes and spikes densely fascicled red-brown when dry, proper spathes about $\frac{3}{4}$ in. very narrow, sessile spikelets as in *A. Nardus* proper, of which this is a small state with highly coloured spathes. *A. coloratus*, *Nees ex Wight Cat.* n. 1703. *Wall. Cat.* n. 8794 B (*in part*).—S. India, *Heyne, Wight*.

Var. *flexuosus*, Hack. l. c. 603; stem slender, panicle decompound, branches very slender flexuous almost zigzag, proper spathes about $\frac{1}{2}$ in. narrow divergent, spikes very short with 2-4 pairs of spikelets, joints and peduncles slender: laxly ciliate with spreading hairs, sessile spikelets $\frac{1}{4}$ – $\frac{1}{2}$ in. lanceolate, gl. I acuminate 2-cuspidate dorsally flat nerveless keels margined scabrid, gl. IV ciliate, awn short. *A. flexuosus*, *Nees ex Wight Cat.* n. 1704; *Steud.* l. c. 388.—Southern India, *Heyne, Wight*.

Var. *microstachys*, Hook. f.; tall, very slender, leaves narrow, panicle very long slender erect bearing few distant solitary or subsolitary erect filiform branches with one or few very small deflexed spikes, sheaths very narrow tubular erect $\frac{1}{2}$ – $\frac{3}{4}$ in., spikes $\frac{1}{2}$ – $\frac{1}{4}$ in., joints 2-3, pedicels rather stout shortly ciliate, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. ovate-oblong or lanceolate, gl. I dorsally flat or concave below the middle, keels margined or winged nerves obscure or 0, IV very narrow lobes ciliate.—Forests of Oudh, *Thompson*. Garo Hills, *Mann*.—A very distinct-looking plant, from the long erect lower branches and narrow sheaths of the very long slender panicle, short spikes and small spikelets. In the Oudh specimen gl. I is rather broadly winged, and awn short; in the Garo one gl. I is scarcely margined and the awn $\frac{1}{2}$ in. long. In some respects it approaches 74, *A. microtheca*.

Var. *easertus*, Hack. l. c. 608; stem not tall slender, leaves very long and narrow, panicle elongate very narrow, branches short distant, spikes few subsolitary long-peduncled, proper spathes about 1 in., spikes $\frac{1}{2}$ –1 in., joints 5-6 and pedicels rather slender shortly villous, sessile spikelets $\frac{1}{2}$ in. ovate or oblong 2-toothed dorsally flat or slightly concave 1-2-nerved keels margined or shortly winged, IV eciliate awned. *A. Schenanthus*, *Wall. Cat.* n. 8794 M.—Hort. Bot. Calc., *Wallich*. Bengal, *Griffith* (*Kew distrib.* n. 6763, *probably Hort. Calc.*).—Probably a form of *A. Nardus* altered by culture.

Var. *Stracheyi*, Hook. f.; tall, slender, leaves long narrow, panicle strict erect very narrow lax-fld., branches short with few spikes, proper spathes about $\frac{1}{2}$ in. cymbiform, spikes $\frac{1}{2}$ –1 in. brown, joints 6-8 and pedicels subclavate shortly ciliate, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. lanceolate or linear-lanceolate, gl. I bicuspidate, dorsally flat or more or less hollowed nerveless keels hardly margined, IV broad lobes elongate strongly ciliate, awn $\frac{1}{2}$ in. *A. Martini*, *Herb. Strach. & Winterb.* n. 2.—Kumaon, at Kalenath, alt. 6000 ft., *Str. & W.* Kunawur, Pangi, *Stolizka*.

73. ***A. distans***, *Nees ex Steud. Syn. Gram.* 387; rootstock 0, roots fibrous, stem 1-2 ft., leaves almost filiform flexuous, proper spathes $\frac{3}{4}$ –1 in., spikes 1-1 $\frac{1}{2}$ in. solitary or few together scattered forming a subsimple panicle, joints and pedicels narrowly clavate silky ciliate, sessile spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. narrowly lanceolate dorsally flat 5-7-nerved between the narrowly winged keels, keels of II winged above the middle, lobes of IV ciliate. *Duthie Grass. N.W. Ind.* 19. *A. Nardus* var. *distans*, *Hack. Monogr. Androp.* 608.

TEMPERATE HIMALAYA, alt. 4-7000 ft. (to 9000 ft. in Garwhal, *Duthie*), from Kashmir to Kumaon, *Royle, &c.*

A very distinct odoriferous form or species, confined to elevations above 4000 ft. on the Himalaya, conspicuous for its almost simple (not paniculately branched) stems, leaves very narrow and tufted at their bases, distant large pale or reddish long deflexed spikes and very narrow long spikelets with strong nerves on gl. I of the sessile, tips of gl. I of the sessile spikelets more or less, sometimes deeply 2-cuspidate, margins of gl. II pubescent, IV broader than in *A. Nardus* pro-

per with long subulate-lanceolate ciliate lobes.—Specimens collected by Falconer and by Duthie, at 8900 ft. in Garwhal, have filiform flexuous or tortuous leaves. The Ceylon *A. distans*, Thwaites, from Newera Elia, is a much longer leaved plant, has very dark spikes and is a dwarf starved state of *A. nilagirica*, I suspect. Lisboa (Jour. Bomb. Nat. Hist. Soc. vi. (1891) cites *A. distans* as a native of *N. Canara*, but I have no means of confirming the identification.

74. *A. microtheca*, Hook. f.; tall, panicle elongate narrow decompound, branches very slender erect elongate, spikes $\frac{1}{2}$ – $\frac{1}{4}$ in. solitary rarely fascicled shortly peduncled deflexed, proper spathes $\frac{1}{2}$ in. narrowly lanceolate divaricate, spikes very short, joints few and pedicels clavate or bucciniform mouth toothed margins very shortly ciliate, sessile spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in., gl. I ovate-lanceolate or lanceolate dorsally deeply concave with thickened margins, pubescent in the hollow.

EAST NEPAL; hot valleys, alt. 3–4000 ft., J. D. H.

Stem 3–4 ft., slender. *Leaves* long, narrow. *Panicle* leafy below; leaves on the flowering branches short, erect, strict, appressed to the branches, bearing in their axils the very small peduncled proper spathes which project horizontally; peduncle of spikes about half the length of the proper spathe and wholly concealed in it, the very small few-fl. spikes alone being exerted; proper spathes $\frac{1}{2}$ – $\frac{3}{4}$ in., narrowly lanceolate, acuminate, strict, glabrous. *Gl. I* of sessile spikelets variable in breadth, rarely flat dorsally, keels scaberulous above the middle, tip minutely 2-cuspidate; *II* acute, keel scaberulous below the tip; *III* ovate-oblong, acute, 2-nerved, ciliate; *IV* narrow, 2 fl. lobes subulate eciliate, awn $\frac{1}{4}$ in.; palea minute, oblong or orbicular. *Pedicelled spikelets* (sometimes fem.), ovate-oblong, subacute, gl. I 7-nerved, keels scaberulous; *II* acuminate, 3-nerved; *III* oblong, obtuse; *IV* linear, tip 2-fl. 1-nerved nerve excurrent; palea minute, ovate.—The long slender branches of the panicle, with rather distinct spikes, and divergent proper spathes, short stout pedicels and joints, and minute spikelets (the smallest of the Indian *Cymbopogons*) characterize this species. Its nearest ally is *N. Nardus* var. *microstachys*. Munro had given the mas. name of *Hookeri* to it; but it is not his *A. Hookeri* of Bhotan, nor that described by Hackel. The pedicelled spikelets described above are abnormal in being female.

75. *A. Gidarba*, Ham. ex Wall. Cat. n. 8797; stem slender subsimple, leaves narrow, panicle narrow elongate, branches rather distant short, joints and pedicels clavate, sessile spikelets $\frac{1}{2}$ – $\frac{1}{5}$ in., gl. I linear-lanceolate 2-toothed dorsally deeply concave below the middle with a boss at the base of the cavity, keels scaberulous neither winged nor margined. *Steud. Syn. Gram.* 387; *Hark Monogr. Androp.* 613; *Duthie Grass. N.W. Ind.* 20.—*Andropogon*, Wall. Cat. n. 8797, 8798 D.

WESTERN HIMALAYA, Falconer, &c.; Simla, alt. 7–8000 ft., Duthie. BEHAR, at Monghir, Hamilton; Gya, Herb. Calcutt.

Stem 4–6 ft., erect. *Leaves* 1–2 ft., finely acuminate, glabrous on both surfaces or puberulous above, midrib slender, margins smooth ciliate towards the base; sheath terete, glabrous; ligule short, truncate. *Panicle* very slender, branches simple or the lower divided; proper spathes $\frac{3}{4}$ –1 in., narrowly lanceolate, about twice as long as the peduncle. *Spikes* $\frac{1}{2}$ –1 in., strict, at length deflexed; joints and pedicels shortly villous. *Sessile spikelets* pale or dark green, with sometimes a dorsal circular pit above the middle, margins raised; *II* cymbiform, acute, 1-nerved; *III* lanceolate, 2-nerved; *IV* narrow, 2-cleft, lobes subulate ciliate; awn $\frac{1}{4}$ – $\frac{1}{2}$ in., capillary. *Pedicelled spikelets* rather longer than the sessile, lanceolate, acute, glabrous.—Odour described as terebinthine.

§§ *Leaf-sheaths compressed, keeled.*

76. **A. Hookeri**, *Munro ex Hack. Monogr. Androp.* 614; tall, slender, leaves long linear, panicle linear interrupted, branches suberect nearly simple, proper spathes $\frac{3}{4}$ – $1\frac{1}{4}$ in., joints and pedicels of spikes stout clavate, sessile spikelets $\frac{1}{4}$ in. dull violet dorsally deeply concave puberulous keels scabrid.

BHOTAN? *Griffith (Kew Distrib. n. 6767 ex Hack.)*.

Leaves 12–16 by $\frac{1}{10}$ – $\frac{1}{8}$ in., rather rigid, smooth, margin scabrid, midrib broad keeled below; ligule obtuse, membranous, glabrous. *Panicle* 12–16 in.; primary branches of 1–2 nodes giving off solitary secondary. *Spikes* subequal, joints and pedicels dorsally glabrous, margins sparsely villous, tips 2–3-lobed. *Sessile spikelets*, gl. I coriaceous-chartaceous, acute, minutely 2-toothed, keels not margined or winged obscurely 2-nerved; II lanceolate, acute, keel scabrid, margin eciliate; IV 2-cleft, lobes slender eciliate; awn about $\frac{3}{4}$ in. *Pedicelled spikelets* equalling the sessile, linear-lanceolate, glabrous,—I have not recognized the above amongst Griffith's plants in the Kew Herbarium. The Bhotan plant bearing the number 6767 in that Herbarium and named by Munro *A. Hookeri*, is not a *Cymbopogon*, but probably a *Schizachyrium*, in too imperfect a state for determination. Munro has also attached the name *A. Hookeri* to my *A. microtheca*, which was appropriate for a plant first found by myself.

** Peduncle of spikes longer than the proper spathe.

77. **A. lividus**, *Thwaites Enum. Pl. Zeyl.* 367; erect, leaves narrow rigid, spikes long-peduncled, pedicels and joints clavate, sessile spikelets $\frac{1}{4}$ in., gl. I lanceolate obscurely 2-toothed keels with narrow scaberulous wings, II shortly awned with a dorsal serrulate wing above the middle, IV deeply 2-fid segments villously ciliate. *Hack. Monogr. Androp.* 615; *Trim. Cat. Ceyl. Pl.* 107.

NILGHIRI HILLS, *Schmid. CEYLON*; Mountains, alt. 7000 ft., *Thwaites*, (C.P. 953).

Stems 1–2 ft., tufted, strict, smooth, rigid. *Leaves* 4–6 in., strict, erect, acuminate, strongly nerved, nearly smooth; lower sheaths short; ligule oblong. *Peduncles* 1–4, terminal and axillary; spikes 1–2 in., erect, dull reddish-brown; joints and pedicels about half as long as the sessile spikelet, margins ciliate with silky hairs, tips cupped and toothed. *Sessile spikelet*, callus very short; gl. I flat, glabrous, margins broadly incurved below, nerves obscure; II narrow, ciliate, dorsally rounded; III oblong, ciliate, 2-nerved; IV as long as III; awn very slender, about twice as long as the spikelet; palea 0. *Pedicelled spikelets* as long as the sessile, linear-oblong, subacute, dorsally convex, glabrous, many-nerved, keels scaberulous, margins broadly incurved; II ovate-oblong, acuminate, sub 3-nerved, ciliate; III as in the sessile; IV as long, hyaline.—*Schmid's Nilghiri specimen* was distributed by Dr. Stahl mixed with *A. pertusus*, which it strongly resembles.

B. Column of awn hirsute.

78. **A. filipendulus**, *Hochst. in Flora*, xxix. (1846) 115; *Steud. Syn. Gram.* 389 (filipendulinus). *Hack. Monogr. Androp.* 634; *Trim. Cat. Pl. Ceylon*, 107. *A. finitimus*, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 465; *Steud. l. c.*; *Hack. l. c.* 637; *Baker Fl. Maurit.* 446. *A. Griffithii*, *Munro in Cat. Pl. Griffith, Falconer, &c.* 58 (ined.). *A. lachnatherus*, *Benth. Fl. Austral.* vii. 434. *A. procerus*, *F. Muell. Fragm.* viii. 124 (non Br.). *Hyparrhenia finitima*, *Anderss. in Schweinf. Beitr. Fl. Æthiop.* 310. *Anthistiria fasciculata*, *Thw. Enum. Pl. Zeyl.* 366.

KHASIA HILLS, *Griffith, Clarke*. CEYLON; Badulla district, alt. 3000 ft., *Thwaites*.—DISTRIB. Trop. Asia, Afr., and Austral.

Stems 3–4 ft., erect, leafy, subsimple or branching from the base, nodes glabrous. *Leaves* 2–3 ft. by $\frac{1}{10}$ – $\frac{1}{2}$ in., linear, setaceously acuminate, scaberulous or smooth, margins scabrid; sheath terete, smooth, glabrous or mouth hairy; ligule short, membranous. *Panicle* 1–2 ft., narrow, compound, branches slender, nodes glabrous or pubescent. *Spathes* 1–3 in., linear-lanceolate, acuminate, or tips setaceous, glabrous ciliate or hairy. *Peduncle* much shorter than the spathe, bearded above with white hairs. *Spikes* $\frac{1}{2}$ – $\frac{3}{4}$ in., one subsessile with one pair of homogamous spikelets, the other $\frac{1}{10}$ – $\frac{1}{2}$ in. long with two (rarely 0) homogamous pairs; heterogamous spikelets 1–3 pairs; joints and pedicels very short, linear, ciliate or villous, tips very oblique. *Gl. I of sessile spikelets* $\frac{1}{2}$ – $\frac{1}{3}$ in.; callus acute, bearded; gl. I membranous, truncate, 5–7-nerved, glabrous or villous, dorsally slightly channelled or not; II oblong, obtuse, keel glabrous or ciliate, 3-nerved; III linear-oblong, obtuse, hyaline, ciliate; IV shorter, 2-toothed, glabrous; awn 2–2 $\frac{1}{2}$ in., column hispid with rufous hairs. *Pedicelled spikelets* linear-lanceolate, gl. I acute, 7–9-nerved, keels setulose; II oblong, keeled; III and IV. hyaline or 0.—*Homogamous spikelets* not awned.—Hackel has 4 varieties under *A. filipendulus*, depending chiefly on the relative length of the spathe and peduncle, and the number 1. or 2 of the heterogamous spikelets. Of these γ . *Thwaitesii* is the Ceylon plant, with one pair of heterogamous and two of homogamous on the stipitate spike. *A. finitimus* has normally 2–3 pairs of heterogamous spikelets on each spike.—These and two other African species, *A. Barteri*, Hack., and *A. familiaris*, Steud., are very closely allied, and regarded by Hackel as probably subspecies of *filipendulus*.

DOUBTFUL AND EXCLUDED SPECIES OF *Andropogon*.

A. CITRATUS, DC. *Cat. Hort. Monsp.* 78, name only.—May be either *A. Nardus* or *A. Schœnanthus*, ex Hack. *Monogr. Androp.* 608.

A. CYMBACHNE, Hack. *Monogr. Androp.* 450. *Cymbachne ciliaris*, Retz. *Obs.* vi. 36. *Rottboellia Cymbachne*, Willd. *Sp. Pl.* i. 465. ? *Arthrostachys gracilis*, Desv. *Opusc.* 74, t. 6, f. 2.—Bengal, Kœnig.—An obscure plant, described by Hackel from an incomplete specimen in the Copenhagen Herbarium, and referred to the section *Anthrolepis*.

A. CYMBARIUS, Linn. *Mant.* ii. 303; Hack. *l. c.* 629. An African plant, stated by Linnæus to have been found in India by Kœnig.

A. DACTYLOIDES, Steud. ex Duthie Grass. *N.W. Ind.* 19. ? *Lepeocercis digitata*, Nees.—Doab, and banks of the Jumna, Royle.—*A. dactyloides*, Steud., is *Trachypogon polymorphus*, Hack., not an Indian plant, and *Lepeocercis digitata*, Nees ex Royle, is a name only, not taken up by Hackel.

A. DEPAUPERATUS, Kunth *Revis. Gram.* i. 166, *Enum. Pl.* i. 509; Hack. *l. c.* 565. *Pollinia depauperata*, Spreng. *Pugill.* ii. 11, *Syst. Veg.* i. 289.—Bengal.—An indeterminable species of subgen. *Chrysopogon*.

A. DIVERSIFLORUS, Steud. in Zoll. *Syst. Verz.* 58, is *Polytrias præmorsa*, Hack. (*Androp.* 189), a Javanese plant not hitherto found in British India.

A. FLABELLIFORMIS, Roxb. ex Spreng. *Pugill.* ii. 9, *Syst. Veg.* i. 283; Kunth *l. c.* 509; Hack. *l. c.* 651.—Bengal.—Is indeterminable.

A. FULVUS, Spreng. *Pugill.* ii. 8, *Syst. l. c.* 287; Kunth *l. c.* 503; Hack. *l. c.* 565.—Bengal.—Is indeterminable.

51. *ANTHISTIRIA*, Linn.

THEMEDA, Forsk.

Tall, annual or perennial grasses. *Leaves* long, narrow. *Spikes* many, short, crowded in spathaceous panicle fascicles, each in a proper spathe, very shortly peduncled, inarticulate at the base. *Spikelets* 6–11; 4 lowest

male or neuter, involucriform, awnless, in superposed pairs or whorled round a jointed rachis which bears one or more sessile bisexual or fem. usually awned spikelets, each with one or if more than one then the uppermost with pedicelled male or neuter awnless spikelets inserted on its callus. *Bisexual (or fem.) spikelets* linear-oblong; callus long or short; gl. I terete, or dorsally compressed or channelled, coriaceous, at length hardened, margins incurved not keeled; II as long, coriaceous, 3-nerved, keeled, keel broad, margins thin incurved; III oblong, hyaline, 1-nerved; IV the very slender sometimes narrowly hyaline base of an awn, rarely awnless; palea 0. *Lodicules* cuneate. *Stamens* 3. *Styles* free, and stigmas long. *Grain* oblong. *Pedicelled spikelets* lanceolate, dorsally compressed; pedicels slender, compressed; gls. 1-3, I many-nerved, margins inflexed, keels often winged; II as long as I, 1-3-nerved, hyaline, or 0; III smaller or 0.—Species about 10; warm regions of the Old World.

The species of this genus are most difficult of discrimination, of which the best proof is the irreconcilable conclusions of two excellent botanists, both experts in the Order of *Gramineæ*, Andersson (*in Nov. Act. Upsal.* III. ii. (1856), and Hackel (*Monogr. Androp.*).

Hackel has restored Forskahl's name of *Themeda* because of its having four years of priority, and of Linnæus' description of *Anthistiria* being very inaccurate. The claim of priority is obvious, but if that of inaccurate description is admitted, it should invalidate the recognition of a host of the genera of old authors. Against both claims stands the fact, that *Anthistiria* had for upwards of a century been adopted by all botanical writers.

* Involucrant spikelets inserted on a level, all sessile; glumes 3, solitary in *A. arguens*.

1. ***A. arguens*, Willd. Sp. Pl. iv. 901**; annual, spikes in lax nodding heads, outer spathes 3-5 in. very narrow base hirsute, proper spathes $\frac{1}{2}$ -1 in., involucri. spikelets 2-4 $\frac{1}{4}$ - $\frac{1}{2}$ in. unequal, glume solitary. *Kunth Enum. Pl. i. 482*; *Steud. Syn. Gram. 401*. *A. frondosa*, *Br. Prodr. 200*; *Benth. Fl. Austral. vii. 542*. *A. arundinacea*, *Hassk. in Tijdschr. Nat. Gesch. x. 115 (non Roxb.)*. *A. ciliata* var. *Junghuhniana*, *Büse ex Miq. Fl. Ind. Bat. iii. 504*. *A. pilifera*, *Steud. in Zoll. Syst. Verz. 58, Syn. Pl. Gram. 400*. *A. Junghuhniana*, *Nees in Jung. Jav. ex Anderss. in Nov. Act. Upsal. Ser. III. ii. 233*. *Aristaria barbata*, *Jungh. in Tijdschr. Nat. Gesch. vii. 296*. *Themeda arguens*, *Hack. Monogr. Androp. 657*. *Stipa arguens*, *Linn. Sp. Pl. Ed. II. 117*.

MALACCA, *Griffith*. ANDAMAN ISLDS., *Prairie*.—DISTRIB. Malaya, Australia.

Stems tall or short, sometimes 10 ft. high, stout or slender. *Leaves* 10-16 by $\frac{1}{4}$ in. or narrower, and sheaths glabrous or sparsely hairy; ligule rounded. *Heads* of spikes flabelliform, long-peduncled; spikes with often imperfect scattered linear hyaline spikelets on the peduncle. *Invol. spikelets* very irregular, often only 2, linear-lanceolate, hyaline, 5-6-nerved. *Bisexual spikelets* $\frac{1}{4}$ - $\frac{1}{2}$ in., solitary, cylindric, with a long pungent dorsally brown-bearded callus, brown when ripe, obscurely nerved, smooth and dotted below, scabrid and hispid towards the tip. *Awn* very stout, often 3 in. long, dark brown.—The Malaccan specimens are small (1-2 ft.), and weaker than the insular.

2. ***A. imberbis*, Retz. Obs. iii. 11**; perennial, spikes in globose or fan-shaped fascicles, spathes glabrous or sparsely hairy, outer 1-2 in., proper about $\frac{1}{2}$ in., invol. spikelets $\frac{1}{2}$ - $\frac{1}{3}$ in. glabrous or ciliate with tubercle-based hairs gls. 3, bisexual spikelets solitary $\frac{1}{4}$ - $\frac{1}{2}$ in. with 2 pedicelled

scabrid towards the tip only, callus long pungent. *Kunth. Enum. Pl. i.* 481; *Steud. Syn. Gram.* 401. *A. Forskahlia*, *Kunth Revis. Gram. i.* 162, *Enum l. c.* 483; *Steud. l. c.* 402. *A. vulgaris*, *Hack. in Engl. & Prantl. Natürl. Pflanzenf. ii.* II. 29. *Themeda triandra*, *Forsk. Fl. Ægypt. Arab.* 178. *T. polygama*, *Gmel. Syst.* 149. *T. Forskahlia*, *Hack. Monogr. Androp.* 659; *Duthie Fodd. Grass. N. Ind.* 43.—*Anthistiria*, *Wall. Cat. n.* 8764, *A. C. E. F.*

Hotter drier parts of INDIA, from Upper Bengal to Travancore, ascending the Himalaya to 3–4000 ft. (Var. *Roylei* to 10,000 ft.). BURMA. CEYLON, ascending to 4000 ft.—DISTRIB. Warm regions of the Old World.

Stem 1–6 ft., stout or slender, subsimple or branched. *Leaves* 3–10 in., linear, rather rigid, glabrous or sparsely hairy, green or subglaucous beneath; ligule short, ciliate. *Head* of fascicles of spikes few or many, long- or short-peduncled; spathes glabrous or ciliate with usually very small tubercle-based hairs; proper spathes longer than the spikes, cymbiform, tips acute or subacute. *Involucr. spikelets* $\frac{1}{2}$ in., oblong-lanceolate, acute or acuminate, red brown, dorsally hispidly ciliate or glabrous, glumes 3. *Bisexual spikelets* cylindric, obtuse, with long brown hairs; gl. I terete, dorsally rounded, ripe polished dark brown, hispidulous towards the tip only; awn $\frac{1}{2}$ –2 in. long, base capillary. *Pedicelled spikelets* very narrow, glabrous or ciliate with a few tubercled-based hairs, keels ciliate.—A very variable grass, some states of which are with difficulty distinguishable from *A. ciliata*. The earliest names of this plant are *Themeda triandra*, Forsk., and *Anthistiria imberbis*, Retz. Hackel has abandoned both, substituting first *Anthistiria vulgaris*, and then *Themeda Forskahlia*, on the ground that *A. imberbis* was perhaps not Forskahl's *T. triandra* (why then call it *Forskahlia*?) of which no type specimen exists, and because *triandra* indicates a character of no individual value in grasses. In so doing he overlooked Gmelin's * name of *T. polygama* (Syst. 149). Having regard to the wide range of *A. imberbis*, from Australia to Africa, its presence in Arabia might well be anticipated; and that it is a native of that country is now proved by Schweinfurth's finding Hackel's var. *glauca* in that country. This makes the var. (which is local, and not Indian) the type of the species, and, if Forskahl's name of *Themeda* is to be retained, necessitates a rearrangement of the varieties. To me it appears most expedient to retain Retz's name which applies to the prevalent form over the area of distribution as the specific one.

The following is Hackel's arrangement of the Indian forms which may be variously reduced or added to. It has the great merit of systematizing the authorities fairly well. Of these I have kept up var. *laxa* as a species, following Andersson, though not without doubts. Of others, as *A. polystachya*, I am doubtful, judging from Roxburgh's description and its being an annual, I suspect it may be a state of *ciliata*. Andersson included it under *A. arguens*, which it certainly is not.

* *Stem* 1–3 ft. *Leaves* 2–8 by $\frac{1}{10}$ – $\frac{1}{8}$ in. *Panicle* 6–12 in., nodes 2–3, lower branches simple below. Gl. I of *invol. spikelets* not winged or narrowly on one side only.

Var. *vulgaris*, Hack. l. c. 660; spikelets with many tubercle-based hairs. *A. ciliata*, Retz. l. c. (non Linn. f.); Lamk. Ill. t. 841, f. 2; Cav. Ic. t. 459; Roxb. Fl. Ind. i. 247; Wight. Cat. n. 1708; Anderss. in Nov. Act. Sc. Upsal. ii. (1856), in Walp. Ann. vi. 1057; Griseb. Cat. Bomb. Pl. 239; Dalz. & Gibs. Bomb. Fl. 304; Thw. Enum. Pl. Zeyl. 366 (excl. var. major); Trim. Cat. Ceyl. Pl. 108; Benth. Fl. Austral. vii. 542. ? *A. polystachya*, Roxb. l. c. 248; Kunth Enum. Pl. i. 481; Steud. l. c.

Var. *imberbis*, Hack. l. c. 661; invol. spikelets glabrous or very sparingly hairy. *A. ciliata* var. *imberbis*, Nees in Linnæa vii. (1832) 284. *A. ciliata* var.

* Gmelin has, by oversight probably, assumed the first word of Forskahl's brief diagnosis to be his specific name.

major, *Thw. l. c.* 366. *A. ciliata*? *Munro in Herb. Griff. (Kew distrib. n. 6808).* *A. australis*, *Br. Prodr.* 200; *Kunth l. c.*; *Steud. l. c.*; *Anderss. l. c.* 13; *Walp. l. c.* 1058. *A. arguens*, *Wight Cat. n.* 1709. *A. imberbis*, *Retz. Obs.* iii. 11; *Kunth l. c.* 481 (*excl. Syn.*).—*Anthistiria*, *Wall. Cat.* 8764, *A. E. F.*

**** Stems** 3–5 ft. **Leaves** 8–16 by $\frac{1}{6}$ – $\frac{1}{2}$ in. **Panicle** 16–24 in.; nodes 5–6; lower branches usually compound. **Gl.** I of *invol. spikelets* with often broad scarious margins.

Var. major, *Hack. l. c.* 662; proper spathes and *invol. spikelets* hirsute with green or white tubercle-based hairs. *A. ciliata*, *Thunb. Fl. Jap.* 40; *Wight Cat. n.* 1708. *A. puberula*, *Anderss. l. c.* 12; *Walp. l. c.* 1038 (see *Var. Roylei*).

***** Annual?** *Stem* very slender, unbranched; leaves very narrow.

Var. Roylei, *Hook. f.*; spikes few in peduncled axillary fascicles, spathes glabrous outermost 2–3 in. proper rather longer than the spikes, *invol. spikelets* $\frac{1}{2}$ in. naked or with a few cilia, bisexual $\frac{1}{2}$ – $\frac{3}{4}$ in. hispid towards the tip, pedicelled longer glabrous, keels not ciliate. *A. puberula*, *Anderss. l. c.* 12; *Walp. l. c.* 1058. *A. ciliata*, *β*, *Nees in Herb. Royle.*—*N. W. Himalaya*, *Royle*; Simla Hills, *Thomson*. Kumaon, alt. 7500 ft., *Strach. & Winterb. (A. ciliata)*.—A very distinct form, and the only temperate one of *A. imberbis*. It closely resembles *A. Hookeri*, the only other temp. Himalayan species, which has superposed pairs of much larger *invol. spikelets*, solitary spikes and short spathes. The glabrous spikelets and larger sessile spikelets hispid at the top distinguish it from *ciliata*.

3. ***A. laxa***, *Anderss. in Nov. Act. Sc. Upsal. Ser. III. ii.* (1856) 243; perennial, stem tall stout leafy proliferously branched, panicles of spikes small of few spikelets in a long lax subsimple leafy panicle shortly peduncled, outer spathes $\frac{1}{2}$ –1 in., proper spathes nearly glabrous hardly longer than the spikes, *involuc. spikelets* $\frac{3}{4}$ – $\frac{1}{2}$ in. nearly glabrous gls. 3, bisexual spikelets $\frac{1}{2}$ – $\frac{3}{4}$ in. solitary with 2 pedicelled, callus short, pedicelled spikelets glabrous or nearly so, awn 1–1 $\frac{1}{2}$ in. *Walp. Ann. vi.* 1059. *Themeda Forskahl.*, *var. ? laxa*, *Hack. Monogr. Androp.* 663.—*Anthistiria*, *Wall. Cat. n.* 8775.

NEPAL, *Wallich*. BHOTAN, *Griffith*. CENTRAL PROVINCES; Khandwa, *Duthie*.

Intermediate between *A. imberbis* and *ciliata*, with very stout erect polished stems 2–3 ft. high, as thick as a goose-quill, and very small nearly glabrous heads of spikes. The panicle is leafy and all the leaves are very narrow. There is a specimen in the Kew Herbarium from Roxburgh, but without habitat. It may prove to be a form of *A. imberbis*, with small spikelets, or of *strigosa*, with unarmed spathes and spikelets.

4. ***A. ciliata***, *Linn. f. Nov. Gram. Gen.* 35; annual, spikes in globose or fan-shaped fascicles, outer spathes 1–3 in. glabrous or sparingly ciliate, proper spathes and spikelets usually copiously clothed with tubercle-based bristles, *invol. spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ in. gls. 3, bisexual spikelets $\frac{1}{2}$ – $\frac{3}{4}$ in. usually solitary with 1 or 2 pedicelled spikelets scabrid, callus short obtuse, awn 1–1 $\frac{1}{2}$ in. *Gærtn. Carp. ii.* 465, t. 175; *Lamk. Illustr. t.* 841, f. 1; *Beauv. Agrost. t.* 23, f. 7; *Steud. Syn. Gram.* 401; *Duthie Grass. N.W. Ind.* 42; *Baker Fl. Maurit.* 448. *A. barbata*, *Desf. in Journ. Phys.* xl. 294, t. 2. *A. scandens*, *Roxb. Fl. Ind. i.* 248. *A. semiberbis*, *Nees Fl. Afr. Austr.* 125. *Themeda ciliata*, *Hack. Monogr. Androp.* 664. *Andropogon nutans*, *Linn. Mant. ii.* 303. *A. quadrivalva* (*err. typog.*) *Linn. Syst. Veg. Ed. xiii.* 758.—*Anthistiria*, *Wall. Cat. n.* 8764 B. D.

N. W. INDIA, *Royle*, Kumaon, ascending to 7500 ft., Nepal, *Wallich*. BENGAL, Roxburgh. BEHAR, *J. D. H.* The CONCAN, CENTRAL PROVINCES, MALABAR and TENASSERIM.—DISTRIB. Mascarene Islds.

In habit and size *A. ciliata* often resembles the ordinary states of *A. imberbis* and it

varies quite as much as that species does. The diagnoses given above serve to distinguish them, especially the small size of the spikelets of *A. ciliata*, its annual habit and the large size of the tubercles on which the far more copious rigid bristles are inserted. Roxburgh describes it as perennial and scandent, with stems many feet long, rooting at the nodes, but Hackel has pointed out that Roxburgh's description is that of an annual; and as I have seen it growing in Bengal, it is rather a scrambler amongst bushes than scandent in a strict sense. The stems are also often erect with a geniculate base.

Var. *Helferi*; dwarf, spikes in more compact globose heads. *A. Helferi*, *Munro mss.* Themeda *Helferi*, *Hack. l. c.* 665.—Tenasserim, *Helfer*.—I think this is only a dwarf variety of *A. ciliata*, specimens of which accompany it in *Helfer's* herbarium.

5. *A. strigosa*, *Ham. mss.*; perennial, stem tall rather stout, spikes in small dense shortly peduncled heads arranged in a long very narrow panicle with filiform leaves, spathes very short glabrous, invol. spikelets $\frac{3}{8}$ – $\frac{1}{2}$ in. gls. 3 dorsally clothed with very rigid tubercle-based bristles, bisexual spikelets 1–2 $\frac{1}{4}$ – $\frac{1}{2}$ in. hispidulous towards the tip, callus short obtuse, awn very short capillary.—*Anthistiria*, *Wall. Cat. n.* 8766.

LOWER ASSAM, *Hamilton*. BEHAR; Monghyr, *Herb. Calcutt.*

Stem 3–4 ft., erect, as thick as a small goose-quill, polished. *Leaves* 1 ft. by $\frac{1}{8}$ – $\frac{1}{4}$ in., smooth, tips filiferous; sheaths polished, terete, keeled; ligule a narrow ciliate membrane. *Panicle* 1–2 ft., with one or two lower long axillary branches; leaves of panicle 6–10 in., flexuous; fascicles of spikes triangular, about $\frac{1}{2}$ in. broad, outer spathes hardly longer than the fascicles cymbiform with very slender tips, glabrous. *Invol. spikelets* gl. I margins narrowly winged; II as long, acuminate, 3-nerved; III lanceolate, hyaline, 1-nerved. *Bisexual spikelets* terete; callus bearded with white hairs; gl. II coriaceous, notched, awned; III shorter, hyaline, 1-nerved; IV the very narrow bifid hyaline margin of an excessively slender awn $\frac{1}{4}$ in. long; palea minute. Gl. I of *pedicelled spikelets* lanceolate, keels with long stiff tubercle-based hairs.—The long panicle and very small heads with short spathes, and the strongly armed gls. of the invol. and pedicelled spikelets distinguish this from *A. imberbis*, and ally it to *ciliaris* with which it agrees in the size and armature of the spikelets.

** Involucrant spikelets in superposed pairs, glumes 3 or 4.

† *Callus of bisexual spikelets short, obtuse.*

6. *A. tremula*, *Nees ex Steud. Syn. Gram.* 401; tall, slender, panicle sparingly branched, spikes in subfibrilliform fascicles $\frac{1}{2}$ –1 in. broad, outer spathes $\frac{1}{2}$ –1 in., invol. spikelets softly hairy, bisexual spikelets 1 or 2 hispidulous deeply dorsally channelled, awn $\frac{1}{2}$ – $\frac{3}{4}$ in. *Thw. Enum. Pl. Zeyl.* 366; *Trim. Cat. Ceyl. Pl.* 108. *A. arguens*, *Heyne ex Wall. Cat. n.* 8765. *Androscepia tremula*, *Anderss. in Nov. Act. Upsal. Ser. III. ii.* (1856) 247. Themeda *tremula*, *Hack. Monogr. Androp.* 667.—*Anthistiria*, *Wall. Cat. l. c.*

THE DECCAN PENINSULA; from the Concan and Central Provinces southward. CEYLON, *Walker, Thwaites* (C.P. 961 in part).

Perennial? *Stem* tufted, 1–3 ft., rarely thicker than a crow-quill. *Leaves* 6–12 in., finely acuminate, nearly smooth, margins scaberulous, upper often exceeding the panicle; ligule a narrow membrane. *Panicle* 1–2 ft., subsimple, of many usually distant compound fascicles of spathes and spikes on flexuous capillary peduncles $\frac{1}{2}$ –1 in. long; lower branches sometimes elongate and again panicked; fascicles red brown when dry, the larger sometimes semiglobose; outer spathes usually hardly longer than the fascicles, proper spathes not twice as long as the spikes, sides and keel ciliate.

Invol. spikelets $\frac{1}{4}$ in.; gls. 3, ovate-lanceolate, acuminate, margins with narrow scarious wings, dorsally copiously ciliate with tubercle-based hairs; II as long, lanceolate, acuminate, membranous, 3-nerved; III as long, hyaline, lanceolate, acuminate, 2-nerved. *Bisexual spikelets* $\frac{1}{2}$ in., usually 2, lower with one pedicelled spikelet, upper with two; callus hairs rusty. *Pedicelled spikelets* lanceolate, gls. 3; I lanceolate, dorsally ciliate with long hairs and one margin winged; II and III as in the involucrent spikelets.

7. **A. Thwaitesii**, *Hook. f.*; tall, very stout, nodes glaucous, panicle leafy, spikes in dense subflabelliform fascicles 1–1½ in. broad, outer spathes 1–2½ in., bisexual spikelets 2 hispidulous dorsally channelled, awn 1 in.

CEYLON, *Thwaites* (C.P. 961 in part).

Perennial? *Stem* probably 5–6 ft., thicker than a goose-quill, polished. *Leaves* 1–2 ft. by $\frac{1}{4}$ – $\frac{3}{8}$ in., finely acuminate, tips setaceous; ligule a ciliolate narrow membrane. *Panicle* 12 in. or more; rachis stout, leafy; leaves 6–10 in. long. *Fascicles* of spikes as in *A. tremula*, but larger and less hairy.

8. **A. Cymbaria**, *Roxb. Fl. Ind. i. 251 (excl. Syn.)*; tall, stout, panicle supradecomposed thyrsiform, spikes innumerable glabrous densely crowded in small long peduncled narrow fascicles $\frac{1}{4}$ – $\frac{1}{2}$ in. long, proper spathes $\frac{1}{2}$ – $\frac{3}{4}$ in. linear-lanceolate, invol. spikelets $\frac{1}{2}$ – $\frac{3}{4}$ in. acuminate glabrous gls. 4, bisexual spikelets solitary (rarely 2) awned, callus hairs white soft = $\frac{1}{2}$ the spikelet. *Kunth Enum. Pl. i. 482, excl. Syn., Suppl. 396*; *Steud. Syn. Gram. 399*; *Grah. Cat. Bomb. Pl. 219*; *Dalz. & Gibs. Bomb. Fl. 304*; *Thw. Enum. Pl. Zeyl. 436*; *Trim. Cat. Ceyl. Pl. 108*. *Andropogon serratifolius*, *Herb. Heyne ex Wall. Cat. n. 8771 B*. *Themeda Cymbaria*, *Hack. Monogr. Androp. 668*. *Anthistiria*, *Wall. Cat. n. 8771*.

NILGHIRI HILLS, *Wight, Schmid.* MYSORE or the CARNATIC, *Herb. G. Thomson.* CEYLON; Matelle East, *Thwaites* (C.P. 3257, 3803).

Perennial. *Stem* 3–8 ft., as thick as a swan's quill below, puberulous beneath the nodes. *Leaves* 2–4 ft. by $\frac{1}{8}$ – $\frac{1}{4}$ in., not overtopping the panicle, scaberulous above, glaucous beneath, margins scabrid; sheaths subcompressed, keeled; ligule very short. *Panicle* tall, 1–2 ft., branches smooth or scaberulous; spikes in oblong fascicles $\frac{1}{2}$ – $\frac{1}{2}$ in. long. *Invol. spikelets*, red or blueish, keels scabrid. *Bisexual spikelets* linear-oblong; gl. I shining below, scaberulous above; awn $\frac{1}{4}$ – $\frac{3}{4}$ in., slender.

9. **A. anathera**, *Nees ex Royle Ill. Bot. Himal. 417 (name)*; upper leaves erect exceeding the elongate subsimple panicle, spikes few in pedicelled fascicles, involucre spikelets $\frac{1}{2}$ – $\frac{3}{4}$ in., glumes 4, keels of gl. I with tubercle-based hairs, bisexual spikelets 2–3 linear-lanceolate not awned, keels of gl. I ciliolate. *Steud. Syn. Gram. 402*; *Aitch. Cat. Panjab Pl. 173*; *Duthie Grass. N.W. Ind. 23*, *Fodd. Grass. N. Ind. 42*; *Boiss. Fl. Orient. v. 460*. *Androscepia anathera*, *Anderss. in Nov. Act. Sc. Upsal. Ser. III. ii. (1856) 249*. *Themeda anathera*, *Hack. Monogr. Androp. 669*.—*Anthistiria*, *Wall. Cat. n. 8773*.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 4500–7000 ft., and to 9000 ft. in Garwhal, *Duthie*.—DISTRIB. Afghanistan.

Perennial. *Stem* erect, 1–4 ft., slender, leafy. *Leaves* very narrow, $\frac{1}{4}$ – $\frac{1}{8}$ in. broad, rigid, glaucous, margins and upper surface scabrous, scaberulous beneath; sheaths glabrous; ligule oblong, obtuse. *Panicle* 1–2 ft., narrow, glabrous; proper spathes $\frac{1}{2}$ –1 in., linear-lanceolate, acute. *Spikes* glabrous. *Involucre spikelets* more or less hispid, one of each pair shortly stipitate.—Wallich's habitat for his n. 8773, "Bengal, near the Calcutta Bot. Garden," is either an error or the plant was an escape from cultivation. Andersson has two varieties, *a. hirsuta*, invol. spikelets

wholly and pedicelled partially covered with tubercle-based hairs, and β . *glabrescens*, more glaucous, leaves pruinose, invol. spikelets dorsally glabrous or scabrous above, pedicelled glabrous.

§§ *Callus of bisexual spikelets acute.*

10. **A. Hookeri**, Griseb. in *Goetting. Nachr.* (1868) 91; stem slender simple or sparingly branched above, spikes (with their proper sheath) axillary solitary long-peduncled glabrous, invol. spikelets $\frac{1}{3}$ – $\frac{2}{3}$ in. sessile linear-lanceolate acuminate gls. 3, bisexual spikelets 1 or 2 scabrid above the middle dorsally rounded, awn $\frac{3}{4}$ –1 in. *A. gigantea* subsp. *caudata*, in part, Hack. *Monogr. Androp.* 676. *Androscepia glabrata*, Anderss. in *Herb. Kew.*

SIKKIM HIMALAYA; interior ranges, alt. 6500–9000 ft., J. D. H., Gammie.

Stem 1–2 ft., shortly creeping at the base, erect or geniculately ascending, as thick as a crow-quill or less. *Leaves* very narrow, rarely $\frac{1}{8}$ in. broad, quite smooth, subglaucous beneath, tips filiform; sheath smooth; ligule short ciliolate. *Spikes* axils in the long erect very slender leaves, rarely geminate in one short outer spathe, $\frac{2}{3}$ in. long, laterally compressed (without an outer spathe exceeding the proper), peduncle 1–2 in., filiform, enclosed sometimes up to the spike in a very slender spathe with a subulate tip; proper spathe linear-lanceolate, acuminate. *Rachis* of spike usually exceeding the invol. spikelets and proper spathe, nearly glabrous. *Invol. spikelets* quite glabrous, keels smooth, very narrowly winged. *Bisexual spikelets* like those of *A. imberbis* in form and colour of gl. I, and in the conic acute callus densely villous with rusty-red hairs; gl. II scabrid towards the tip; awn geniculate, narrowed below to a capillary base; lodicules membranous. *Pedicelled spikelets* much longer than the bisexual, narrowly lanceolate, acuminate, glabrous, keels hardly scaberulous; pedicels slender, glabrous except at the base.—Though nearest allied to *A. gigantea*, which is a thoroughly tropical grass, this species most resembles *A. imberbis*, and especially its var. *Roylei*, from which it is at once distinguished by wanting the long outer spathe, and by the superposed invol. spikelets.

11. **A. gigantea**, Cav. *Ic. t.* 36; tall, usually stout, spikes few in narrow pedicelled fascicles terminating the branches of a compound or decompound inclined or nodding rarely subsimple panicle, proper spathes rather longer than the spikes, involucr. spikelets linear-lanceolate, one of each pair deciduous, bisexual spikelets 1–3 rufously hirsute dorsally channelled. *Themeda gigantea*, Hack. *Monogr. Androp.* 672.

LOWER HIMALAYA; from Kumaon eastwards, to ASSAM, BEHAR and the KHASIA HILLS, ascending to 4000 ft.—DISTRIB. China, Malaya, Australia, N. Caledon.

Stem 8–16 ft., often nearly 1 in. diam. below, erect, solid, terete, glabrous, simple below, branching above, leafy. *Leaves* 4–8 ft. by $\frac{1}{2}$ –1 in., linear, setaceous acuminate, scaberulous above, glaucous beneath, margins scabridly serrulate, base narrowed, midrib broad, lower bifarious; lower sheaths compressed; ligule short, membranous, ciliolate. *Panicle* 1–3 ft., oblong, rarely simple, inclined, branchlets flexuous; spikes often pendulous; spathes narrowly cymbiform, keel and nerves scabrid. *Spikes* as long as the proper spathes or shorter; peduncle much shorter than the spathe, filiform, erect or divaricate. *Invol. spikelets* $\frac{1}{3}$ – $\frac{2}{3}$ in.; gl. I linear-lanceolate, setaceous acuminate, glabrous or hirsute with fulvous hairs, keels scabrid; II shorter, acuminate, ciliate; III and IV still shorter, linear-oblong or lanceolate, ciliate. *Bisexual spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ in., linear-lanceolate; callus $\frac{1}{2}$ – $\frac{3}{4}$ in. villous with long brown hairs; gl. I coriaceous, acute or acuminate, dorsally 1–3-channelled, more or less villously hirsute all over or below the middle with brown hairs; II acute in the awnless spikelets, obtuse in the awned; III oblong-lanceolate, 1-nerved; IV = III, linear-lanceolate in the awnless spikelets, acute, 1-nerved in

the awned; IV the hyaline base of the awn.—Hackel classifies the form of this protean plant under 6 subspecies and 12 varieties. Of these the Indian (exclusive of intermediates) may be grouped as follows. They do not affect definite areas, and some of them may be different states of one variety.

Subsp. *genuina*, Hack. l. c. 672; panicle decompound, branches branchlets and peduncle of spike villous with rusty hairs, proper sheaths 1-1½ in., spikelets ¾-1 in. or more dorsally hirsute with rusty-brown hairs, bisexual spikelets 1-3 in each raceme ½ in. awned or not. *A. gigantea*, Cav. l. c. *A. vulpina*, Anderss. in Nov. Act. Sc. Upsal. III. ii. (1856) 245. *Androscepia gigantea*, var. *a*, Brongn. in Voy. Coq. Bot. 78; Kunth Enum. Pl. i. 484 (excl. Syn.). *Calaminea gigantea*, Roem. & Sch. Syst. ii. 810 (non Beauv.). *Perobachne secunda*, Presl. Rel. Hænk. i. 348, t. 48; Kunth l. c. 485.

Subsp. *arundinacea* (including subsp. *intermedia*), Hack. l. c. 674; panicle compound dense or lax, branches and branchlets glabrous, proper spathes 1½-2 in. ciliate, invol. spikelets ¾-1 in. dorsally hirsute with golden or rusty hairs, bisexual spikelets 1 rarely 2 in each spike about ½ in long, awn 1½-4 in. *A. arundinacea*, Roxb. Fl. Ind. i. 251; Kunth Revis. Gram. i. 363, t. 95, Enum. 482, Suppl. 394; Steud. Syn. Gram. 401; Duthie Grass. N.W. Ind. 23, Fodd. Grass. N. Ind. 42. *A. subsericans*, Nees ex Steud. l. c. *Cymbopogon arundinaceum*, Schult. Mant. ii. 457.—*Anthistiria*, Wall. Cat. n. 8763, 8772, 8774 B.—Subsp. *intermedia*, differs from *arundinacea* in the less hirsute male spikelet and in the awn reduced to a bristle.

Subsp. *villosa*, Hack. l. c.; panicle large decompound, branches and branchlets glabrous or scaberulous, proper spathes 1-1½ in., spikes erect or divaricate, invol. spikelets ¾-1 in. glabrous smooth or scaberulous, bisexual spikelets ½-1 in., awn ½-1 in. or 0. *A. villosa*, Poir. Encycl. Suppl. i. 396; Lamk. Ill. t. 841, f. 3; Steud. l. c. *A. mutica*, Steud. l. c. *Androscepia gigantea* & *mutica*, Anderss. l. c. 248 (excl. Syn.), t. 3 (*gigantea*). Andr. *gigantea*, var. *sundaica*, Buese Pl. Jungh. i. 364. *Aristaria mutica*, Hassk. in Tijdschr. Nat. Gesch. x. 117, in Ann. Sc. Nat. Ser. 3, iv. 178. *Heterolytron scabrum*, Jungh. l. c.—*Anthistiria*, Wall. Cat. n. 8776.—Assam, Khasia Hills, Malacca, Java.

Subsp. *caudata* & *longispatha*, Hack. l. c. 676, 677; panicle lax-fld. subsimple or decompound, branches and branchlets glabrous, proper spathes 1-1½ in., spikes often divergent, invol. spikelets ¾-1 in., keels scabrid glabrous, bisexual spikelets 2-3 in each spike, awn ½ in. *A. caudata*, Nees in Hook. & Arn. Bot. Beech. Voy. 245; Steud. l. c. 402. *Androscepia gigantea*, var. *himalayensis*, Rupr. ex Anderss. l. c. 248. Andr. *gigantea*, v. *armata*, Anderss. l. c.—*Anthistiria*, Wall. Cat. n. 8774 A.

Var. *longispatha*, Hack. l. c. 677; leaves glaucous beneath smooth except the scabrid margins, stems and sheaths quite glabrous, panicle broad compressed, branches scaberulous, pedicelled spikelets nearly smooth except the scabrid keels, involucre spikelets about ¾ in.—Terai of the Himalaya, Kuntze.—I have seen no authentic specimen.

DOUBTFUL SPECIES.

ANTHISTIRIA sp. ? an imperfect specimen from Chota Nagpur, Dr. Wood (Herb. Calcutt.) with the invol. gls. of *A. gigantea*, var. *villosa*, but with very broad leaves deeply cordate and amplexicaul at the base.

55. *ISEILEMA*, Hack.

Differs from *Anthistiria* in each spike being jointed below the involucre spikelets on the top of its peduncle, and falling away from it as a whole after flowering; whereas in *Anthistiria* the involucre spikelets are persistent and the rest of the spike deciduous. In the former case, as Hackel observes, the dispersal of the species is by the wind, in the latter

by the callus of the bisexual spikelets piercing the skin or becoming otherwise attached to animals.—Species 5, tropical Asiatic and Australian.

* *Keel and submarginal nerves of the spathes granulate or tubercled.*

1. **I. Wightii**, *Anderss. in Nov. Act. Soc. Sc. Upsal. Ser. 3, ii. 251*; panicle decompound rather dense, spathes linear-lanceolate shorter or rather longer than the peduncle, invol. spikelets $\frac{1}{2}$ in. almost concealing the bisexual. *Hack. Monogr. Androp.* 679; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 218. *Anthistiria prostrata*, *Willd. Sp. Pl.* iv. 901; *Roxb. Fl. Ind.* i. 250. *A. cimicina*, *Edgew. in Journ. As. Soc. Beng.* (1852) 182 (*in Bot. Zeit.* (1852) 860); *Steud. Syn. Gram.* 400; *Duthie Grass. N.W. Ind.* 24. *A. Wightii*, *Nees ex Steud. l. c.*; *Duthie l. c.* *A. Linnæana*, *Steud. l. c.* *Andropogon prostratus*, *Linn. Mant.* ii. 304. *Cymbopogon glandulosus*, *Spreng. Pugill.* ii. 14.—*Anthistiria*, *Wall. Cat.* n. 8770.

Throughout INDIA; from the Panjab eastwards to Burma, and southwards to Malabar and Mysore.

Perennial; stem 6 to 3 ft., erect or base decumbent, rarely as stout at the base as a goose-quill, usually slender; nodes often bearded. *Leaves* 4–8 in., narrow, smooth or scaberulous, floral scabrid with tubercled margins, upper glabrous or hairy; ligule membranous, truncate. *Panicle* long or short, more or less compound; branches crowded or distant, strict or geniculate; nodes bearded; lower spathes foliaceous, floral $\frac{1}{4}$ – $\frac{1}{2}$ in., keels and margins tubercled. *Involucr. spikelets* male or neuter, pedicelled, oblong-lanceolate; gl. I 5-ribbed, scaberulous. *Bisexual spikelets*, gl. I bicuspidate; II 3-nerved; IV a slender awn three times as long as the spikelet or longer.—Very variable in stature, length of leaves and habit of the panicle.

2. **I. argutum**, *Anderss. l. c.* 252; panicle linear elongate very lax, spathes elliptic-lanceolate about three times as long as the peduncle of the spike, invol. spikelets $\frac{1}{4}$ in. shorter than the bisexual. *Hack. Monogr. Androp.* 681. *Anthistiria arguta*, *Nees ex Steud. Syn. Gram.* 401.—*Anthistiria*, *Wall. Cat.* n. 8769.

BURMA; at Prome, *Wallich*.

Stem 2–3 ft., very slender, leafy at the base, compressed below. *Leaves* 3–6 in., narrowly linear, coriaceous, smooth except towards the spinulose rounded tips, deeply striate, midrib broad, floral with spinulose margins and ciliate base; sheath compressed; ligule a very short membrane. *Panicle* almost filiform, flexuous, with distant almost capillary branches; nodes ciliate; spathes $\frac{1}{2}$ – $\frac{3}{4}$ in., keels and nerves granulate or tubercled. *Invol. spikelets* shortly stoutly pedicelled, linear-lanceolate; glumes 2, I 5-ribbed scaberulous, keels ciliate, tubercled; II 3-nerved. *Bisexual spikelets* linear-lanceolate; gl. I long-beaked, beak scabrid; IV a slender awn.—The materials are scanty; more specimens may modify the above characters.

** *Keel and submarginal nerves of spathe not granulate or tubercled.*

3. **I. laxum**, *Hack. Monogr. Androp.* 682; panicle slender, spikes erect, invol. spikelets with short filiform pedicels covering the fem. glumes 3 glabrous, bisexual spikelet narrowly lanceolate pedicelled glabrous. *Duthie Fodd. Grass. N. Ind.* 43; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 218. *T. prostratum*, *Anderss. in Nov. Act. Soc. Sc. Upsal. Ser. 3, ii. 251 (excl. Syn.)*, t. 111. *Anthistiria prostrata*, *Willd.*, β . *glaucescens*, *Nees in Wight Cat.* n. 1711 b. *Andropogon parviflorus*, *Herb. Wight ex Wall. Cat.* 8767 C. *A. prostratum*, *Herb. Russ. ex Wall. Cat. l. c. D.*—*Anthistiria*, *Wall. Cat.* n. 8767 A (*in small part*), B. C. D.

UPPER GANGETIC PLAIN; Patna, *Wallich*. THE DECCAN PENINSULA, from the Concan southward, *Wight*, &c.

Stems tufted, 8-36 in., erect or ascending. *Leaves* narrow, 3-10 in., linear, obtuse, base ciliate; sheaths lax; ligule membranous, truncate. *Panicle* flexuous, narrow; branches short, distant; spathes $\frac{1}{2}$ in., elliptic-lanceolate, reddish, keel and nerves scabrid. *Invol. spikelets* $\frac{1}{2}$ in.; pedicels glabrous; gl. I oblong-lanceolate subacute, 5-nerved; II 3-nerved; III linear. *Bisexual spikelets*; pedicel ciliate; gl. I chartaceous, lanceolate, acuminate, tip truncate; II acuminate, 1-nerved; IV awn $\frac{1}{2}$ - $\frac{3}{4}$ in., very slender.

4. ***I. anthephoroides***, *Hack. Monogr. Androp.* 683; panicle crowded leafy, racemes divergent, invol. spikelets very shortly broadly pedicelled glumes 2, I with 5 strong villous ribs, bisexual spikelet subsessile. *Anthistiria prostrata*, var. spic. masc. longe ciliatis, *Wight Cat.* n. 2335. *Anthistiria*, *Wall. Cat.* n. 8767 A.

The SOUTHERN DECCAN PENINSULA, *Wight, &c.*

Nearly allied to *T. laxum*, but a shorter stouter plant, with more crowded branches of the panicle and racemes.

551. **PSEUDANTHISTIRIA**, *Hook. f.*

Not in Clavis, p. 5.

Annual grasses, with the habits and characters of *Anthistiria*, but wanting the involucrent spikelets of that genus.—DISTRIB. India.

Pseudanthistiria was regarded by Hackel as an anomalous section of his subgenus *Hypogynium* of *Andropogon*, with the habit of *Anthistiria*. As I have pointed out above (p. 168) it is a remarkably distinct genus of *Andropogoneæ* with characters totally at variance with those of *Hypogynium* as given in the "Monogr. Androp." I think that it is one of a natural group with *Anthistiria*, *Iseilema*, *Heteropogon* and *Germainia*. I am doubtful as to the specific value of some of the following, more copious material of all collected by good observers is wanting in this, as in so many other genera of grasses.

1. ***P. heteroclita***, *Hook. f.*; leaves 6-12 in. linear glabrous or more or less ciliate nerves distinct, fascicles of spikes about $\frac{1}{2}$ in. broad, proper spathes $\frac{1}{4}$ in. hardly longer than the spikes, sessile spikelets $\frac{1}{2}$ - $\frac{1}{3}$ in. hispidulous all over, awn $\frac{2}{3}$ in. base lanceolate. *Andropogon heteroclitus*, *Nees Fl. Afr. Austr.* 115; *Steud. Syn. Gram.* 389; *Hack. Monogr. Androp.* 400. A. monomeros, *Hochst. in Hohen. Pl. Ind. Or.* n. 183. *Anthistiria heteroclita*, *Roxb. Fl. Ind. i.* 249; *Kunth Enum. Pl. i.* 483.

BENGAL; pastures near Calcutta, *Roxburgh*. The CONCAN and CANARA, *Law, Thomson, &c.*

Stem 1-2 ft., geniculate, slender, rarely as thick as a crow-quill, smooth, subsimple or branched. *Leaves* $\frac{1}{2}$ - $\frac{1}{4}$ in. broad, ciliate on both surfaces together with the sheaths and margins with long tubercled-based hairs in Calcutta specimens, nearly glabrous in Western ones; sheaths much shorter than the internodes; ligule short, membranous. *Panicle* not large, leafy, compound, with many shortly peduncled fascicles; proper spathes and pedicelled spikelets with a few long tubercle-based bristles; keel ciliate; base of awn linear-lanceolate.—I have seen no Bengal specimens, but the excellent figure in *Roxburgh's "Icones pictæ"* leaves no doubt in my mind as to its being of the same species as the western plant, only more copiously ciliate. A specimen in Herb. Kew from Hackel was communicated as *Anthistiria tremula*, the likeness between these two plants being so deceptive.

2. ***P. hispida***, *Hook. f.*; leaves 6-10 in. linear and sheaths ciliate with long hairs or glabrescent, nerves distinct, fascicles of spikes $\frac{2}{3}$ in. broad copiously hirsute with tubercle-based bristles, outer spathes $1\frac{1}{2}$ -2 in. long,

proper spathes much longer than the spikes, sessile spikelets $\frac{1}{2}$ in., gl. I terete glabrous except as to the scabrid summit, awn $1-1\frac{1}{2}$ in.

The Concan, *Stocks, Law, Dalsell, &c.* CENTRAL PROVINCES; Khandwa, *Duthie* (No. 8478).

Stem 1-2 ft., rather stout, erect. *Leaves* $\frac{1}{2}-\frac{3}{4}$ in. broad, base narrowed, scaberulous above and on the margins. *Panicle* elongate, simple, leafy.—Closely allied to *P. heteroclita*, and perhaps only a variety of it, but a stouter more hispid plant of a pale green colour, with much longer fascicles of spikelets with longer spathes and glabrous sessile spikelets.

3. *P. umbellata*, *Hook. f.*; stem filiform straggling, leaves 1-2 in. glabrous linear-oblong acute base rounded sessile or petiolulate, nerves very slender, fascicles of spikelets few axillary $\frac{1}{4}-\frac{1}{2}$ in. broad with few sparingly ciliate spathes and spikes, outer spathes $\frac{1}{2}-1$ in., proper spathes rather longer than the spikes, sessile spikelets $\frac{1}{10}-\frac{1}{8}$ in. scaberulous, pedicelled naked, awn $\frac{1}{2}-\frac{3}{4}$ in. *Andropogon umbellatus*, *Hack. Monogr. Androp.* 401. *Anthistiria heteroclita*, β foliis glabris, *Wight Cat. n.* 1706.

DECCAN PENINSULA, *Wight*; Cochin, *Johnstone*. CEYLON, *Gardner, &c.*

A very slender glabrous plant, with prostrate creeping stems rooting at the nodes. *Leaves* distant, with a few scattered cilia on both surfaces, nearly smooth; sheaths shorter than the blade. *Fascicles* of spikelets axillary, glabrous or with a few tubercle-based cilia, on simple rarely branched capillary peduncles shorter than the leaves; lower peduncles sometimes elongate 1-3 in. long and bearing several fascicles; outer spathes $\frac{1}{2}-\frac{3}{4}$ in. long. *Spikes* 3-6 in a fascicle, proper spathe glabrous. Gl. I of sessile spikelet dorsally concave; base of awn as in *P. heteroclita*.

4. *P. burmanica*, *Hook. f.*; stem filiform straggling, leaves 1-2 in., linear-oblong or lanceolate glabrous, nerves very slender, fascicles of spikelets few axillary very narrow with few sparsely ciliate spathes and spikes, outer spathes $1-1\frac{1}{2}$ in., proper spathes longer than the spikes, sessile spikelets $\frac{1}{10}-\frac{1}{8}$ in. scaberulous, pedicelled naked, awn $1-1\frac{1}{2}$ in. base subulate-hastate.

* *PREU, Kurz.*

Habit of *P. umbellata* (of which it is possibly a variety) but leaves narrower, fascicles of spikelets $1-1\frac{1}{2}$ in. long, very narrow, with much longer awns, the base of which is suddenly dilated and hastate or sagittate at the dilatation.

Tribe V. PHALARIDÆ. (See p. 5.)

56. PHALARIS, *Linn.*

Annual or perennial grasses. *Leaves* flat. *Spikelets* 1-flid., in contracted or spiciform panicles, laterally compressed, rachilla with 1 or 2 minute scales (imperfect gls.) below gl. III, beyond which it is not produced, jointed at the base. *Glumes* (perfect) 3, I and II subequal, empty, persistent, keels winged or not; III much smaller, bisexual, 3-5-nerved, thin, at length coriaceous; palea like the gl. 2-nerved. *Lodicules* 2. *Stamens* 3. *Styles* 2, free. *Grain* ovate or oblong, free within the gl.—Species 9 or 10 temperate and tropical.

The uppermost glume alone being flowering should technically refer this genus to the Series of *Panicaceæ*; but its affinities are with *Poaceæ*. *P. canariensis*, *Linn.* (Canary Grass) is given as a N.W. India Grass by *Duthie* and others, but I have seen no specimens; it closely resembles *P. minor*, differing in the quite entire wings of the gl's. *P. paradoxa*, *Linn. fil.*, is stated by *Duthie* Grass. N.W. Ind. to

be Indian on the authority of Wallich (Nepal), and Stewart (The Panjab); but in Fodd. Grass. N. Ind. he says that he has not seen specimens; nor have I. It is a Mediterranean plant.

* PHALARIS proper. *Spikelets* in a dense cylindric or ovoid spiciform panicle; gls. I and II with winged keels.

1. **P. minor**, Retz. Obs. iii. 8; Kunth Enum. Pl. i. 32; Trin. Diss. ii. 254, Sp. Gram. Ic. t. 79; Steud. Syn. Gram. ii.; Wight Cat. n. 1738; Duthie Grass. N.W. Ind. 25, Fodd. Grass. N. Ind. 45; Aitchis. Cut. Panjab Pl. 158; Ledeb. Fl. Ross. iv. 455; Boiss. Fl. Orient. v. 472. P. ambigua, Fig. & Notar. in Mem. Acad. Turin. Ser. II. xii. (1852) 326, t. 10, f. 6. P. aquatica, Ait. Hort. Kew. i. 56. P. bulbosa, Desf. Fl. Atlant. i. 35 (non Linn.). P. canariensis, Wall. Cat. n. 3782 (non Linn.). P. capensis, Thunb. Prodr. Fl. Cap. 19. P. nepalensis, Trin. Sp. Gram. Ic. t. 80; Kunth l. c. 33; Steud. l. c. 10; Duthie l. c. Alopecurus otiporensis, Griff. Notul. iii. 94, Ic. Pl. Asiat. t. 143, f. 1.

Plains of WESTERN INDIA, and the HIMALAYA from Kashmir to Nepal, ascending to 5000 ft.—DISTRIB. Westwd. to the Canaries, S. Africa, Austral.

Annual. Stem 1–3 ft., stout or slender, leafy. Leaves long, linear, acuminate; sheath smooth; ligule oblong, scarious. Panicle small and ovoid, or longer and cylindric, $2\frac{1}{2}$ – $3\frac{1}{2}$ in. long by $\frac{3}{4}$ in. diam., green. Spikelets $\frac{1}{2}$ in. broad, very shortly pedicelled, shining; gls. I and II acuminate, wings irregularly crenate or serrulate; III ovate, acute, silky, with one bristle-like imperfect gl. at its base.

** DIAGRAPHIS, Trin. (Gen.). *Spikelets* in a thyrsiform panicle; gls. I. and II. not winged.

2. **P. arundinacea**, Linn. Sp. Pl. 55; Fl. Dan. t. 259; Host Gram. Austr. ii. t. 33; Engl. Bot. t. 2160; Kunth Enum. Pl. i. 33, Suppl. 23; Steud. Syn. Gram. 11; Boiss. Fl. Orient. v. 474. P. americana, Ell. Sketch. i. 101. P. colorata, Beauv. Agrost. 172. P. intermedia, Bosc ex Poir. Encycl. Suppl. i. 800. P. picta, Hort. ex Steud. Nom. Ed. I. 609. Digraphis arundinacea, Trin. Fund. Agrost. 127; Ledeb. Fl. Ross. iv. 454. D. americana, Loud. Hort. Brit. 27. Baldingera arundinacea, Dumort. Obs. Gram. Belg. 130. B. colorata, Gærtner. Mey. & Scherb. Fl. Wett. i. 96. Calamagrostis colorata, DC. Fl. Franc. iii. 26. Arundo colorata, Ait. Hort. Kew. i. 116; Engl. Bot. t. 402; Knapp. Gram. Brit. i. 98.

KASHMIR; Wolar Lake, alt. 5550 ft., Falconer, &c.—DISTRIB. N. temp. and Arctic regions.

Perennials. Rootstock creeping. Stems 2–6 ft., stout, erect. Leaves long, $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, finely acuminate; sheaths smooth; ligule large. Panicle 4–8 in., suberect; branches 1–2 in., spreading in flower. Spikelets $\frac{1}{2}$ in., densely crowded on the scabrid branchlets, very shortly pedicelled; gl. I and II glabrous, lanceolate, acuminate; I nerveless; II 3-nerved; III ovate-lanceolate, sparsely hairy, with 2 minute linear gls. on the rachilla. Lodicules silky.

DOUBTFUL SPECIES.

P. PECTINATA, Roth. Nov. Sp. 34; Kunth Enum. Pl. i. 34; panicle cylindric spiciform, gl. I and II navicular margins membranous oiliate-pectinate, outer corolla 2-valved villous.

57. ANTHOXANTHUM, Linn.

Annual or perennial sweet-scented grasses. *Spikelets* 2-fld, narrow; in a spiciform panicle, persistent on the short pedicels. Glumes 5, I and II herbaceous, empty, persistent, acute or mucronate; I small, 1-nerved; II longest, 3-nerved, III and IV very short, keeled, hairy, 2-fld, with a

dorsal bent awn; V flg., minute, hyaline, broad, obtuse, glabrous, awnless, 5-7-nerved; palea narrow, 1-nerved. *Lodicules* 0. *Anthers* 2, large. *Ovary* glabrous; styles long. *Grain* terete, acute, free within the shining gl. and palea.—Species 4 or 5, native of temperate regions.

A. ODORATUM, *Linn. Sp. Pl.* 28; *Kunth Enum. Pl.* i. 38, *Suppl.* 28, t. 8; *Host Gram. Austr.* t. 5; *Fl. Dan.* 666; *Reichb. Ic. Fl. Germ.* 106; *T. Nees Gen. Fl. Germ. Monocot.* i. t. 16; *Knapp. Gram. Brit.* t. 1; *Engl. Bot.* t. 647; *Trin. Sp. Gram. Ic.* t. 14; *Ledeb. Fl. Ross.* iv. 408; *Boiss. Fl. Orient.* v. 470.

Occasionally found in the Hill districts of INDIA, but only as introduced by man or as an escape from cultivation.—Native of Europe and N. Asia.

Perennial, sweet-scented, especially when dry. *Stem* 6-18 in., tufted, erect or ascending. *Leaves* flat, hairy. *Panicle* 1-5 in., pubescent or villous. *Spikelets* $\frac{1}{4}$ - $\frac{1}{2}$ in., fascicled, sometimes squarrosely, green; gl. I ovate, acute; II lanceolate; III and IV curved, obliquely truncate.—The glumes are often described as 6. The sixth, though 1-nerved, is, I think a palea, analogous to the 1-nerved palea of *Hierochloa* and of a few other grasses, the nerves being theoretically formed of two confluent ones.

58. **HIEROCHLOA**, *Gmel.*

Perennial, erect, sweet-scented grasses. *Leaves* flat. *Spikelets* 1-3-fl., laterally compressed, paniced, not jointed or their pedicels, rachilla not produced above gl. V. Glumes 5; I and II equal or unequal, 1-3-nerved, hyaline or scarious, shining, keeled; III and IV usually similar, awned, 2-3-androus or neuter; palea 2-nerved or 0; V fem. or bisexual, palea 1- (rarely 2-) nerved. *Lodicules* 2, small. *Anthers* linear. *Styles* free. *Grain* oblong, free within the gls.—Species 8-10, of temp. and cold regions.

* Panicle effuse. *Spikelets* long-pedicelled; gl. III IV and V hirsute and ciliate, III and IV paleate, palea narrow, male; V smaller; rachilla produced between the gls.

1. **H. laxa**, *Br. in Wall. Cat.* n. 3796; leaves ensiform acute, spikelets $\frac{1}{4}$ in. long, gl. I and II equal or subequal faintly nerved, III and IV truncate very shortly awned, V hirsute above the middle not awned. *Duthie Grass. N.W. Ind.* 25.

WESTERN HIMALAYA, from Kashmir, alt. 10-12,000 ft., to Kumaon, alt. 12-16,000 ft.

Stem 1-2 ft., ascending from a stout creeping rootstock. *Leaves* 6-10 by $\frac{1}{4}$ - $\frac{1}{2}$ in., quite smooth; ligule large, oblong. *Panicle* 3-5 in., lax, oblong, inclined; branches solitary or geminate and pedicels capillary. *Spikelets* much compressed, brown; gl. I 1-nerved; II faintly 3-nerved; IV sometimes fem. and diandrous; palea of V sometimes distinctly 2-nerved, but usually 1-nerved, more or less hispid.

2. **H. flexuosa**, *Hook. f.*; leaves narrowly linear, spikelets $\frac{1}{4}$ in. long, gl. I and II subequal acuminate 3-nerved, III 2-toothed very shortly awned, III acutely 2-fl awn longer than the gl., IV not awned villous in the upper half, palea 1-nerved.

SIKKIM HIMALAYA; Bijean, *King's Collector*.

Stem 2-2 $\frac{1}{2}$ ft., erect, very slender. *Leaves* about $\frac{1}{4}$ in. broad; ligule oblong. *Panicle* 2-3 in. long and broad, very lax-fl.; rachis branches and pedicels all capillary and flexuous. *Spikelets* much compressed, brown; gl. I and II lanceo-

late, III and IV with a ring of hairs on the callus; V 5-nerved; palea 2-toothed, hairy above the middle.

** *Panicle* contracted. *Spikelets* shortly pedicelled or sessile; gls. III and IV hirsute, paleate or epaleate, male or neuter; V much smaller, convolute, ovoid, glabrous, its palea linear, concave, 1-nerved; rachilla not produced between gl. II and IV.

3. **H. Hookeri**, *Clarke mss.*; spikelets $\frac{1}{4}$ – $\frac{1}{2}$ in. long ovoid, gl. I and II very unequal acuminate, III shortly 2-fid shortly awned in the sinus paleate male, IV almost 2-partite epaleate neuter, segments lanceolate acute, awn in the sinus twice as long as the gl.—*Ataxia Hookeri*, *Griseb. in Goett. Nachr.* (1868) 77.

E. NEPAL and SIKKIM HIMALAYA; in marshes, alt. 9–11,000 ft., J. D. H., *Gammie*.

Stem 6 in. 2 ft., erect, ascending or geniculate below, sometimes as thick as a crow-quill. *Leaves* long, narrow, smooth; ligule oblong. *Panicle* 5–7 in. long; branches erect, subsecund; pedicels very short. *Spikelets* greenish; gl. I 1-nerved; II 3-nerved; III and IV sessile; V stipitate, thinly coriaceous, subacute.

4. **H. gracillima**, *Hook. f.*; very slender, panicle small, spikelets $\frac{1}{8}$ – $\frac{1}{4}$ in. gl. I and II very unequal, III and IV epaleate neuter, III shortly bifid awn in the sinus very short, IV tip obtusely 2-toothed, awn nearly basal twice as long as the gl., palea of V 1-nerved.

SIKKIM HIMALAYA, alt. 10–11,000 ft., J. D. H.

A much more slender grass than *H. Hookeri*, with short very narrow leaves 2–4 in. long, narrowed from the base to the tip. *Panicle* $1\frac{1}{2}$ –2 in. long, drooping; rachis flexuous; branches very short and few-fid. *Spikelets* yellow or purplish, very shortly pedicelled.

5. **H. khasiana**, *Clarke mss.*; slender, panicle very narrow, spikelets $\frac{1}{2}$ in. long ovoid, gl. I and II subequal acuminate, III and IV epaleate neuter, III 2-fid to the middle, awn in the sinus as long as the gl. or shorter, IV 2-fid to the middle awn exceeding the gl.

KHASIA HILLS, alt. 4500–6000 ft., *Clarke*.

Stem 1–2 ft., ascending from a shortly creeping base. *Leaves* 4–6 by $\frac{1}{8}$ – $\frac{1}{4}$ in., tapering from the base to the tip; ligule oblong. *Panicle* 1–4 in., very narrow; branches short, erect, few-fid. *Spikelets* greenish-brown, erect.

6. **H. Clarkei**, *Hook. f.*; tall, slender, panicle very narrow, spikelets $\frac{1}{2}$ in. long oblong, gl. I and II very unequal ovate-oblong acute, III shortly 2-fid shortly awned in the sinus paleate neuter, IV bifid to below the middle epaleate neuter, awn in the sinus twice as long as the gl.

KHASIA HILLS, at Lailan Kote, alt. 5500 ft., *Clarke*.

Stem 2 ft., slender, geniculate below. *Leaves* 6–8 by $\frac{1}{8}$ – $\frac{1}{4}$ in., narrowed from the base to the tip; ligule short. *Panicle* as in *H. khasiana*, but spikelets nearly twice as large and narrower in proportion, and gl. IV with a long exerted awn.

Tribe VI. AGROSTIDÆ. (See p. 5.)

59. **ARISTIDA**, *Linn.*

Annual or perennial grasses. *Leaves* usually convolute. *Spikelets* paniced, 1-fid., rachilla (or callus of fl. gl.) articulate at the base. *Glumes* 3, I and II empty, very narrow, keeled, persistent; III narrow, rigid,

cylindric, convolute, acuminate, tip produced into a long 3-partite (very rarely simple) naked or feathery awn twisted below the branches; palea very narrow, embraced by the gl., sometimes minute or 0. *Lodicules* 2. *Stamens* 3. *Styles* distinct. *Grain* narrow, free within the closely convolute gl.—*Species* (assumed) about 100, natives of warm countries.

The species and synonymy as given below have been revised by Dr. Stapf with the Oriental and African.

Sect. I. CHÆTARIA. *Awn* tripartite from the base, not or imperfectly articulate with the top of the gl., persistent, glabrous.

1. **A. Cumingiana**, *Trin. & Rupr. in Mem. Acad. Petersb. Ser. VI. vii.* (1849) 134; annual, dwarf, panicle very slender, spikelets (without the awns) $\frac{1}{2}$ – $\frac{1}{10}$ in., awn inarticulate at the base. *Steud. Syn. Gram.* 140; *Miq. Fl. Ind. Bat.* iii. 381; *Hance in Journ. Linn. Soc.* xiii. (1873) 135. *A. capillacea*, *Cuv. Ic.* v. 43, t. 468, f. 1 (non *Lamk.*); *Steud. l. c.* 134. *A. delicatula*, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 293; *Steud. l. c.* 139. *A. tenella*, *Kurz in Herb. Calcutt.* *A. trichodes*, *Walp. Ann.* iii. 753; *Miq. l. c.* 380; *Steud. l. c.* 140. *Chætaria trichodes*, *Nees in Hook. Kew Journ.* ii. (1850) 101.

W. BENGAL, *Kurz*. CHOTA NAGPORE, *Clarke*. PEGU, *Kurz*; on the Shan Hills, *Collett.*—DISTRIB. China, Philippines, Afr. trop.

Stem 3–10 in., tufted, very slender. *Leaves* filiform. *Panicle* subcylindric, narrow, loosely branched, rachis branches and pedicels capillary, scaberulous. *Spikelets* green or purplish; gls. acuminate, II longest; III as long as I, scaberulous; arms of awn twice as long as the gls., capillary, median longest.

2. **A. Adscensionis**, *Linn. Sp. Pl.* 82 (excl. *Syn. Sloane*); annual or perennial, panicle contracted, branches short or elongate and naked below, spikelets (excl. awns) $\frac{1}{2}$ – $\frac{1}{2}$ in. acute, gl. I acuminate not awned, II obtuse or emarginate and mucronate, awn inarticulate at the base. *Kunth Enum. Pl.* i. 190; *Steud. Syn. Gram.* 139.

Throughout the Plains and low Hills of INDIA, BURMA and CEYLON, ascending to 8000 ft. in Kashmir.—DISTRIB. Most warm countries.

Stems 6 in.—3 ft., tufted, usually almost filiform, rarely as thick as a crow-quill, smooth. *Leaves* very narrow, smooth or scaberulous. *Panicle* 3–12 in., subsimple or compound, rachis and capillary branches nearly smooth; branches very short with subsessile fascicles of spikelets, or longer, and erect or spreading. *Spikelets* pale green or purplish; gl. I $\frac{1}{2}$ – $\frac{1}{2}$ in., acute; II $\frac{1}{2}$ – $\frac{1}{2}$ in., tip truncate mucronulate; III $\frac{1}{2}$ – $\frac{1}{2}$ in., smooth or scabrid; middle branch of awn $\frac{1}{2}$ – $\frac{1}{2}$ in., rarely 1 in.

Dr. Stapf, who has reviewed the whole genus, informs me that besides the following synonyms, which apply to Old World forms, there are in the New World 11 others under *Aristida*, and 14 under *Chætaria*.

Var. *typica*, Stapf. mss.; gl. III about as long as II. *A. abyssinica*, *Trin. & Rupr. in Mem. Acad. Petersb. Ser. VI. vii.* (1849) 134. *A. cærulescens*, *Desf. Fl. Atlant.* i. 109, t. 21, f. 2; *Kunth l. c.* 191, *Suppl.* 146; *Steud. l. c.* 138. *Boiss. Fl. Orient.* v. 491; *Duthie Grass. N.W. Ind.* 26. *A. canariensis*, *Willd. Enum. Pl.* 99. *A. chætophylla*, *modatica*, *simplicissima* & *Teneriffæ*, *Steud. l. c.* 139, 420. *A. curvata*, *Nees ex A. Rich. Tent. Fl. Abyss.* ii. 392. *A. depressa*, *Retz. Obs.* iv. 22; *Roxb. Fl. Ind.* i. 351; *Wall. Cat. n.* 3786; *Kunth l. c.* 190, *Suppl.* 146; *Thw. Enum. Pl. Zeyl.* 370; *Trim. Cat. Ceyl.* Pl. 108; *Dalz. & Gibb. Bomb. Fl.* 295; *Aitch. Cat. Panjab Pl.* 164 (excl. *Syn. setacea*); *Benth. Fl. Austral.* vii. 563; *Duthie l. c. & Fodd. Grass. N. Ind.* 47, t. 30. *A. divaricata*, *Jacq. Eclog. Gram.* 7, t. 6 (non *Willd.*). *A. elatior*, *Cav. Ic.* vi. 65, t. 589, f. 1; *Kunth l. c.* i. 191. *A. festucoides*, *Hochst. et Steud. ex Trin. & Rupr.* (non *Poir.*). *A.*

gigantea, Linn. f. *Suppl.* 113; Kunth l. c. 194, *Suppl.* 150. *A. Jacquiniana*, Tausch. in *Flora* (1836) 508. *A. Heymannii*, Regel in *Act. Hort. Petrop.* vii. (1880) 649. *A. Hystrix*, Duthie Fodd. Grass. N. Ind. 47, t. 31 (not of Linn. fil.). *A. nutans*, Willd. *Hort. Berol.* ex Steud. *Nomencl.* Ed. II. i. 131. *A. paniculata*, Forsk. *Fl. Æg. Arab.* 25 (ex *descript.*). *A. pusilla*, Trin. et Rupr. in *Mem. Acad. Petersb.* Ser. VI. vii. (1849) 140. *A. setacea*, Trin. l. c. i. (1831) 84 (non Retz.); Wall. *Cat. n.* 3785; Steud. l. c. 139. *A. vulgaris*, Trin. & Rupr. in *Mem. Acad. Petersb.* l. c. 131 (with 10 vars.) Steud. l. c. 138. *Chætaria Ascensionis*, cœrulescens, canariensis, depressa, elatior, & gigantea, Beauv. *Agrost.* 30. *C. curvata* & mauritiana, Nees *Fl. Afr. Austr.* 186, 188. *C. Hystrix*, Wight *Cat. n.* 1737 (non Beauv.).

Var. *A. æthiopica*, Trin. & Rupr. l. c. 167. *A. Ehrenbergii*, Trin. & Rupr. *Stipac.* 136; Steud. l. c. 138. *A. festucoides*, Poir. *Encycl. Suppl.* i. 453 (ex Trin.); Kunth *Enum. Pl.* i. 197. *A. mutabilis*, var. *æquilonga*, Trin. & Rupr. in *Mem. Acad. Petersb.* Ser. VI. vii. (1849) 150. *A. pumila*, DCne in *Ann. Sc. Nat.* Ser. II. iv. (1835) 85; Boiss. l. c. 496; Steud. l. c. 138. *A. spicigera*, Trin. & Rupr. l. c. 136; Steud. l. c. *A. vulgaris*, Trin. & Rupr. l. c. in part (with 6 vars.). — *Aristida* Wall. *Cat. n.* 3788.

3. *A. setacea*, Retz. *Obs.* iv. 22; perennial, panicle contracted, spikelets (excl. awn) $\frac{1}{2}$ – $\frac{2}{3}$ in., gl. I and II long-awned, awn inarticulate at the base, middle branch $\frac{1}{2}$ – $1\frac{1}{2}$ in. Kunth *Enum. Pl.* i. 191 (excl. *Syn. depressa*), *Suppl.* 148; Steud. *Syn. Gram.* 141; Roxb. *Fl. Ind.* i. 349; Wall. *Cat. n.* 3785 *A. B* in part; Grah. *Cat. Bomb. Pl.* 218; Dalz. & Gibs. *Bomb. Fl.* 295; Duthie Grass. N.W. Ind. 27. *A. adscendens*, Trim. *Cat. Ceyl. Pl.* 108. *A. arundinacea*, Roem. ex Retz. l. c. (non Linn.). *A. cœrulescens*, Thw. *Enum. Pl. Zeyl.* 370. *A. Hystrix*, Baker *Fl. Maurit.* 451 (excl. *Syn.*). *A. quinqueseta*, Steud. l. c. 420. *Chætaria setacea*, Beauv. *Agrost.* 36. *C. depressa*, Herb. Wight *propr. n.* 1735.

WESTERN INDIA; from Behar and the Concan southwd. CEYLON; Walker, &c.—DISTRIB. Mascarene Islds.

Stem 3–4 ft., sometimes as thick at the base as a goose-quill, stout, erect, simple, or subfastigiately branched with open sheaths at the ramifications. Leaves filiform, convolute, scaberulous. Panicle 6–12 in., inclined; branches short, subsecund, scaberulous, usually fascicled and erect. Spikelets green or purplish; gl. I narrowed into a short awn; 2 minutely 2-toothed, awn short; III nearly smooth; beard of callus copious, white, silky.

4. *A. cyanantha*, Steud. *Nom. Ed.* II. i. 131; *Syn. Gram.* 141; tall stout, panicle effuse, branches flexuous widely spreading, spikelets (excl. awns) $\frac{1}{2}$ – $\frac{1}{2}$ in., gls. I and II shortly awned, awn of III not articulate with the gl. branches very long flexuous middle one up to $2\frac{1}{2}$ in. Trin. in *Act. Acad. Sc. Petrop.* Ser. VI. v. (1842) 150; Boiss. *Fl. Orient* v. 492; Duthie Grass. N.W. Ind. 26 (excl. *Syn.*). *Chaetaria cyanantha*, Nees in Royle *Ill. Bot. Himal.* 424.

WESTERN HIMALAYA, alt. 3–5000 ft., from Kashmir to Kumaon; and low hills of the PANJAB.—DISTRIB. Afghanistan.

Perennial. Stem 3–6 ft., attaining the thickness of a swan's quill below. Leaves 6–12 by $\frac{1}{2}$ – $\frac{1}{3}$ in., at length convolute, quite smooth, glaucous; sheaths smooth. Panicle 12–18 in., very variable in amount of branching; branches 4–12 in., solitary or 2–3-nate, usually naked for 2–6 in., scaberulous. Spikelets usually dark purple; gls. I and II with nearly smooth keels, tip of II fimbriately toothed; III, callus hairs very few; awn minutely scaberulous.

5. *A. Hystrix*, Linn. f. *Suppl.* 113; perennial, panicle as broad as long branches distant rigid widely spreading, spikelets (excl. awns) $\frac{1}{2}$ – $\frac{2}{3}$ in.,

gls. I and II. finely acuminate or awned, awn of III not articulate with the gl. branches very long rigidly flexuous middle one 1-2 in. *Trin. Diss. i.* 187, in *Act. Petrop.* (1829) 83, (1836) 47; *Kunth Enum. Pl. i.* 350, *Suppl.* 147; *Roxb. Fl. Ind. i.* 350; *Wall. Cat. n.* 3784; *Grah. Cat. Bomb. Pl.* 335; *Dalz. & Gibs. Bomb. Fl.* 295; *Steud. Syn. Gram.* 141. *A. tripilis*, *Thunb. Fl. Ceyl. Diss. 2, ex Trin. & Rupr. in Mem. Acad. Petersb. Ser. VI. vii.* (1849) 147. *Chaetaria Hystrix*, *Beauv. Agrost.* 30.

The DECCAN PENINSULA, from the Concan and Central Provinces southward. CEYLON (*Thunberg*).

Stem 6 in.-2 ft., as thick as a crow-quill or less, stiff, stout and erect or long inclined or prostrate and proliferously branched with open sheaths at the ramifications. *Leaves* 2-4 in., narrow, convolute, glaucous. *Panicle* 4-6 in.; rachis stout flexuous and angular, branches and branchlets smooth. *Spikelets* straw-colrd.; gls. I and II membranous or subchartaceous, keels smooth; II most minutely toothed at the base of the awn; III smooth, callus naked, awns most minutely scaberulous.—I have seen no Ceylon specimens, for which habitat *Thunberg* (fd. *Trinius*) is the authority.

6. *A. mutabilis*, *Trin. & Rupr. in Mem. Acad. Petersb. Ser. VI. vii.* (1849) 150 (excl. var. *æquilonga*); annual, panicle very narrow subcylindric, branches very short crowded, spikelets (excl. awns) $\frac{1}{4}$ in., gls. I and II shortly awned, awn of III obscurely articulate with the gl., column long, branches rather short, middle one about $\frac{1}{2}$ in. *Steud. Syn. Gram.* 141. *A. articulata*, *Edgew. in Journ. Linn. Soc. vi.* (1862) 209; *Aitch. Cat. Panjab Pl.* 164; *Duthie Grass. N.W. Ind.* 26, *Fodd. Grass. N. Ind.* 47. *A. Kunthiana & meccana*, *Trin. & Rupr. l. c.* 151 (ex descr.) 152; *Steud. l. c.* 141. *A. Schweinfurthii*, *Boiss. Fl. Orient. v.* 493. *A. spicata*, *Rottl. mss.* *A. tenuis*, *Hochst in Flora, xviii.* (1855) 200.

The PANJAB & RAJPOOTANA; Multan, *Edgeworth*; Jodhpore, *King*. SOUTHERN INDIA, *Heyne, Wight, &c.*—DISTRIB. Arabia, Africa trop.

Stems 6-12 in., many ascending from the root, simple or proliferously branched, slender. *Leaves* 1-3 in., very slender, curved, convolute, rigid, smooth. *Panicle* 3-6 in., branches all very short and crowded, or with sometimes a few remote lower down or the stem ascending from a naked base and bearing a dense oblong fascicle of spikelets, rachis smooth, branches scaberulous. *Spikelets* very shortly pedicelled, pale green or straw-colrd.; gl. I $\frac{1}{2}$ in., keel scaberulous; II $\frac{1}{4}$ in., tip 2-toothed below the awn; III scaberulous, callus shortly bearded; column of awn nearly as long as the gl., slender, smooth, branches capillary.—*King's* specimens from Jodhpore are in a starved state and mixed with *A. Adscensionis*.

Sect. II. ARTHRATHERUM. *Column of awn* long, twisted, articulate on the glume (obscurely in *A. redacta*), branches glabrous, rarely 0.

7. *A. funiculata*, *Trin. & Rupr. in Mem. Acad. Petersb. Ser. VI. vii.* (1849) 159; annual, very slender, panicle lax narrow, branches very short, gls. I and II $\frac{1}{2}$ -1 in. subequal awned, column of awn 1 in. or less, branches capillary 1-3 in. *Steud. Syn. Gram.* 142; *Aitchis. Cat. Panjab Pl.* 164; *Boiss. Fl. Orient. v.* 492 (in part); *Duthie Fodd. Grass. N. Ind.* 47. *A. funicularis*, *Trin. ex Steud. Nomencl. Ed. II. i.* 131; *Edgew. in Journ. As. Soc. Beng. xxi.* (1852) 160, 163 (tœnicularis). *A. Kotschyi*, *Hochst. ex Steud. Syn. Gram.* 142. *A. macrathera*, *A. Rich. Tent. Fl. Abyss. ii.* 393; *Steud. l. c.* 142; *Boiss. l. c.* 493 (macranthera). *A. mallica*, *Edgew. in Journ. Linn. Soc. vi.* (1862) 209; *Aitch. l. c.*; *Duthie l. l. c. c.* *A. murina*, *Aitchis. l. c.* 164 (non Cav.); *Duthie Grass. N.W. Ind.* 26. *A. paradoxa*, *Schmidt Fl. Cap. Verd.* 140. *A. pilosa*, *Herb. Heyne (non Labill.)*. *A. Royleana*, *Trin. & Rupr. in Mem. Acad. Petersb.*

VI. vii. (1849) 160; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1892) 358. *A. stipacea*, Ehrenb. & Hempr. ex Trin. & Rupr. l. c. *Chaetaria murina*, Nees ex Trin. & Rupr. l. c. 160. *C. murina*, β . *villosa*, Nees ex Wight Cat. n. 1736. *C. Royleana*, Nees ex Steud. Syn. Gram. 143. *Arthratherum Kotschy*, Hochst. ex Trin. l. c.—*Aristida*, Wull. Cat. n. 3787.

Plains of the PANJAB from the Sutlej westward. RAJPOOTANA, and from the CONCAN southward.—DISTRIB. Beluchistan, Arabia, Trop. Africa.

Stems many, geniculately ascending, 10 in.—2 ft. *Leaves* very slender, flat or convolute, base ciliate with long hairs. *Panicle* 4–10 in., branches erect capillary. *Spikelets* variable in length, pale; gl. I rather shorter than II, keels scaberulous; III smooth, callus sparsely bearded or naked; column of awn very slender, minutely scaberulous, twisted, branches straight capillary.

Var. *Royleana*, leaves eciliate, spikelets smaller, on more distant spreading flexuous branches, gl. I $\frac{1}{2}$ in. or less, column of awn $\frac{1}{2}$ – $\frac{1}{4}$ in., branches more unequal, longest $\frac{3}{4}$ in.—*A. Royleana*, Trin. & Rupr. l. c. 160; *Steud.* l. c. 143. *Chaetaria Royleana*, Nees ex Steud. l. c. *Arthratherum Royleanum*, Edgew. ex Aitchis. l. c.—The Panjab, Kangra, alt. 3000 ft., Clarke.

Var. ? *Stocksii*; gl. I = $\frac{1}{2}$ II.—Concan ? *Herb. Stocks*.

8. *A. hystricula*, Edgew. in Journ. Linn. Soc. vi. (1862) 208; dwarf, very slender, 1–2 in. high, panicle very small narrow much shorter than the awns, gls. I and II $\frac{1}{5}$ in. subequal or I shorter aristately acuminate, column of awn $\frac{1}{4}$ in. twisted, branches subequal $\frac{1}{2}$ – $\frac{3}{4}$ in. *Aitchis. Cat. Panjab Pl.* 164; *Duthie Grass. N.W. Ind.* 26, *Fodd. Grass. N. Ind.* 47. *A. funiculata*, Boiss. Fl. Orient. v. 493 (the Beluchist plant only).

The PANJAB; Multan, Edgeworth. SCIND; near Kurrachee, Stocks.—DISTRIB. Beluchistan.

Annual. *Stems* very many from the root, $\frac{1}{2}$ –1 in., densely crowded. *Leaves* subulate, curved, convolute, acuminate, glabrous. *Panicle* without the awns $\frac{1}{2}$ –1 in.; branches few, short, erect. *Spikelets* erect; gls. I and II very narrow; callus of III minute, glabrous; column of awn capillary, twisted, smooth, branches of extreme tenuity.

9. *A. redacta*, Stapf in Kew Bullet. (1892) 85; stems tufted, tall or short, panicle large effuse, branches spreading, gls. I and II subequal shortly awned about $\frac{1}{2}$ in. long, II deciduous, column of awn capillary twisted, branches 0 or very short. *A. depressa*, Retz. Herb. Ind. Or. Hf. & T. in part. *Stipa aristoides*, Stapf ex Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1892) 358.

LOWER BENGAL; Burdwan, Clarke. The CONCAN, CENTRAL INDIA, and the CENTRAL PROVINCES, Stocks, Law, &c.—DISTRIB. S. Persia.

Annual. *Stems* 6 in.—2 ft., rather stout or slender, densely tufted, simple, or proliferously branched in robust specimens. *Leaves* 4–8 in., very slender, convolute, ciliate with long hairs at the base. *Panicle* 6–12 in., rachis slender smooth; branches usually binate, capillary, flexuous, smooth, erect or spreading, each with one or few spikelets. *Spikelets* on short or long capillary pedicels, green or purplish; column of awn gradually dilating below, 3-nerved, convolute and passing into the glume from the top of which it separates readily but without an indication of the joint.

Sect. III. STIPAGROSTIS. Awn feathery.

10. *A. hirtigluma*, Steud. Nom. Ed. II. ii. 231, Syn. Gram. 144; very slender, panicle narrow strict or flexuous, branches very short, gl. I and II unequal, III muriculate, awn capillary plumose middle branch $1\frac{1}{2}$ in. lateral much shorter naked of extreme tenuity. Trin. & Rupr. in Mem. Acad. Petersb. Ser. VI. v. (1842) 171; *Aitchis. Cat. Panjab Pl.* 164;

Duthie Grass. *N.W. Ind.* 26, *Fodd. Grass. N. Ind.* 47; *Boiss. Fl. Orient.* v. 496. *A. ciliata*, *Steud. & Hochst. ex Steud. Nom. Ed.* II. i. 131 (*non Desf.*). *A. decorata*, *Steud. Syn. Gram.* 421. *A. paradisea*, *Edgew. in Journ. As. Soc. Beng.* xvi. (1847) ii. 1219. *A. pogonoptila*, *Boiss. l. c.* *A. Schimperii*, *Hochst. et Steud. ex Steud. l. c.* 143. *Arthratherum ciliatum*, *Nees in Linnæa*, vii. (1832) 287, *Fl. Afr. Austr.* i. 182. *Arth. elatum*, *Boiss. Diagn. Ser. II.* iv. 128. *Arth. hirtiglume & pogonoptilum*, *Jaub. & Spach, Ill. Pl. Orient.* iv. 52, 56. *Arth. Schimperii*, *Nees Fl. Afr. Austr.* 178.

The PANJAB, Jacquemont, Falconer, &c. PESHAWUR, &c., Stewart. SCIND, *Herb. Calcutt.*—DISTRIB. Westward to Egypt and Abyssinia.

Perennial. *Stem* stout at the base, slender and 1-2 ft. high. *Leaves* 3-8 in., convolute, filiform, flexuous, tips capillary. *Panicle* very slender, branches very short, erect, capillary. *Spikelets* pale green or straw-colord.; gls. I and II not or hardly awned, hairy or glabrous; I $\frac{1}{2}$ in.; II rather shorter; III muriculate, callus bearded; awn straight, articulate in the gl., column twisted; plumose as well as the middle branch.

11. ***A. plumosa***, *Linn. Sp. Pl. Ed.* II. 1666; stem slender, panicle narrow, branches very short, gls. I and II subequal, III glabrous smooth, awn capillary middle branch 2-3 in. plumose above naked below, lateral much shorter naked of extreme tenuity. *Vahl Symb.* i. 11, t. 3; *Trin. Diss.* i. 181, ii. 26; *in Act. Petrop.* (1829) 89; *Trin. & Rupr. l. c. Ser. VI.* v. (1842) 165; *Kunth Enum. Pl.* i. 195, ii. 151; *Steud. Syn. Gram.* 143; *Aitchis. Cat. Panjab Pl.* 164; *Boiss. Fl. Orient.* v. 495; *Duthie Grass. N.W. Ind.* 26, *Fodd. Grass. N. Ind.* 47. *A. brachypoda* & *Forskahlii*, *Tausch. in Flora* (1836) 506; *Boiss. l. c.* 495, 496. *A. lanata*, *Forsk. Fl. Ægypt. Arab.* 25. *A. Raddiana*, *Savi in Mem. Moden.* (1837) 198; *Steud. l. c.* 144. *Arthratherum plumosum*, *Nees Fl. Afr. Austr.* i. 182.

WESTERN TIBET; Iskardo, alt. 7700 ft., Clarke.—DISTRIB. Turkestan, Persia, N. Africa.

Perennial. *Stem* 1-2 ft., from a stout branching woody stock with stout rigid roots. *Leaves* 2-6 in., rigid, filiform, convolute, flexuous. *Panicle* 2-3 in. (excl. the awns) very narrow. *Spikelets* erect; gls. I and II $\frac{1}{2}$ in., not awned; III callus bearded, column of awn $\frac{1}{2}$ in., very slender, hardly twisted, glabrous; middle branch strict, silvery, lower $\frac{1}{2}$ naked, lateral about $\frac{1}{2}$ in. long.

UNDETERMINABLE SPECIES.

A. RIGNESCENS, *Roem. & Schult. Syst.* ii. 400; *Steud. Syn. Gram.* 141. *A. rigida*, *Heyne ex Roth. Nov. Sp.* 42 (*non Cav.*); *Kunth Enum. Pl.* i. 197. *Arthratherum rigidum*, *Schult. Mant.* ii. 212).—May be *A. Hystris*.

60. **STIPA**, *Linn.*

Tufted perennial grasses. *Leaves* usually convolute. *Spikelets* loosely panicle, terete, 1-fld., rarely dorsally compressed, rachilla forming a thickened or narrow callus below gl. III. *Glumes* 3, I and II empty, persistent, keeled, acute, rarely awned; III rigid, convolute, terete, narrowed into an entire or notched or 2-fid tip, with a long terminal bent usually deciduous awn, column of awn twisted rarely straight; palea 2-nerved, closely embraced by the gl. *Lodicules* 3, large. *Stamens* 1-3, tips of anther-cells bearded or naked. *Grain* narrow, terete, free within but tightly embraced by the gl. and palea.—Sp. about 100, temperate and tropical.

Dr. Stapf has aided me greatly in this difficult genus.

A. Column of awn twisted.

* Awn plumose or hairy throughout its length or nearly so.

1. **S. orientalis**, *Trin. ex Ledeb. Fl. Alt.* i. 83; panicle narrow more or less embraced by the dilated sheath of the uppermost leaf, spikelets $\frac{1}{2}$ in., gls. I and II about twice as long as the silky hairy III. *Ledeb. Ic. Fl. Ross.* t. 223; *Trin. in Act. Acad. Petersb.* VI. i. (1830) 79; *Kunth Enum. Pl.* i. 185; *Steud. Syn. Gram.* 131; *Boiss. Fl. Orient.* v. 504; *Duthie Grass. N.W. Ind.* 27. *S. Semenovii*, *Krassn. Descr. Pl. Thiansch. in Script. Bot. Hort. Univ. Petrop.* ii. 22. *S. Szovitziana*, *Duthie l. c.* 27 (*non Trin.*). *S. tartarica*, *Jacquem. mss.*

WESTERN TIBET, alt. 10-15,000 ft., *Jacquemont, &c.*—DISTRIB. Westward to Persia. Altai Mts.

Stems 6-14 in., forming dense hard tufts, clothed below with shining sheaths. *Leaves* 4-10 in., filiform, tips long capillary; sheath of uppermost, 4-6 by $\frac{1}{2}$ - $\frac{1}{4}$ in. broad. *Panicle* elongate, branches and pedicels short, erect. *Gls.* I and II hyaline, $\frac{1}{2}$ - $\frac{1}{4}$ in. long, tips slender; I 1-nerved or 3-nerved at the base; II 3-nerved; III cylindric, callus = about $\frac{1}{2}$ of the gl., bearded; awn plumose throughout its length, nearly straight, column about $\frac{1}{4}$ of its length.—Probably a form of *S. barbata*. Said to be the commonest grass on the Pamir.

2. **S. basi-plumosa**, *Munro mss.*; panicle very narrow, branches and pedicels very short, spikelets purple, gl. I and II $\frac{1}{2}$ - $\frac{1}{4}$ in., III about $\frac{1}{2}$ shorter than II sparsely hairy, awn capillary twice or thrice as long as the spikelet very densely bearded towards the base.

WESTERN TIBET; Nubra, and the Lanak Pass, alt. 15-17,000 ft., *Thomson.*

Stems 6-16 in., densely tufted, slender, strict. *Leaves* 4-6 in., convolute, filiform, slightly scabrid. *Panicle* 2-6 in., sometimes sheathed; branches and spikelets distant; gl. I and II ovate-lanceolate finely acuminate, tip and margins white hyaline; I 3-nerved at the base; II 3-nerved; callus of IV = about $\frac{1}{2}$ of the gl.; awn very delicately plumose upwards with spreading hairs, column slightly twisted.

Var. longe-aristata, *Munro mss.*; gl. I and II $\frac{1}{2}$ in., awn $1\frac{1}{2}$ in.—Western Tibet, *Thomson.*

3. **S. purpurea**, *Griseb. in Goett. Nachr.* (1868) 82; spikelets few purple on long capillary sigmoidly flexuous pedicels, gl. I and II $\frac{3}{4}$ -1 in., III about $\frac{1}{2}$ shorter than II softly hairy, awn $2\frac{1}{2}$ -3 in. flexuous. *S. Rich-teriana*, *Herb. Ind. Or. Hf. T.*; *Duthie Grass. N.W. Ind.* 27 (*not Kar. & Kir.*). *Lasiagrostis tremula*, *Ruprecht Sert. Thiansch.* 35.

WESTERN TIBET; Gnari Khorsum, alt. 17,000 ft., *Schlagintweit*; Lake Rukshun, 15,000 ft., *Lance.*—DISTRIB. Thianschal Mts., in Central Tibet, alt. 16,000 ft., *Thorold.*

Stems densely tufted, 6-10 in., filiform, sheathed below the panicle. *Leaves* 2-4 in., filiform, convolute; ligule elongate. *Spikelets* very few, hardly forming a panicle, branches and pedicels $\frac{1}{2}$ in. or more, sometimes zigzag. *Gls.* I and II narrowly lanceolate, dark purple with slender hyaline tips; III callus = $\frac{1}{2}$ of the gl., villous. *Anther-tips* naked.

4. **S. mongolica**, *Turcz. ex Trin. in Bull. Sc. Acad. Petersb.* i. (1836) 67; panicle open with few distant widely spreading capillary flexuous branches, spikelets $\frac{1}{2}$ - $\frac{3}{4}$ in. ovate dorsally compressed, gls. I and II purple below the middle hyaline above it, III hairy, awn about twice as long as the gls. *Steud. Syn. Gram.* 132; *Duthie Grass. N.W. Ind.* 27. *Lasiagrostis mongolica*, *Trin. ex Rupr. in Mem. Acad. Petersb. Ser. VI. Sc.*

Nat. v. (1842) 87. *L. alpina*, *F. Schmidt Reise Amurl.* 73. *Ptilagrostis mongolica*, *Griseb. in Ledeb. Fl. Ross.* iv. 447, in *Goett. Nachr.* (1868) 82.

ALPINE HIMALAYA; Kumaon, alt. 14,000 ft., *Strachey & Winterbottom.* N. Sikkim, alt. 14–16,000 ft., *J. D. H.* WESTERN TIBET; Ladak, alt. 13,000 ft., *Thomson, Lance.*—DISTRIB. Altai Mts. Mongolia.

Stems 1–2 ft., densely tufted, very slender. *Leaves* 4–6 in., almost capillary, flexuous. *Panicle* 4–6 in., branches solitary, lower 1–3 branching at the ends. *Spikelets* ovoid, pedicels $\frac{1}{2}$ in.; gls. I and II oblong-lanceolate, acute; I 1-nerved or 3-nerved below; II nerves 3, very slender; III about $\frac{1}{2}$ shorter than II, hairy all over; awn twice as long as the spikelets or more, hairy to the tip. *Anther-cells* with bearded tips.

5. ***S. concinna***, *Hook. f.*; panicle small few-fl. contracted, branches and pedicels short erect, spikelets $\frac{1}{2}$ in. ovoid dorsally compressed purple, gls. I and II ovate acute tips hyaline, III glabrous, awn about twice as long as its gl.

SIKKIM HIMALAYA, in the Tibetan Region, alt. 14–16,000 ft., *J. D. H.*

Stem 6–10 in., rather stout. *Leaves* 2–4 in., filiform, flexuous. *Panicle* 1–1 $\frac{1}{2}$ in., solitary, branches and pedicels erect. *Gl.* I and II acuminate; I 1-nerved II 3-nerved; awn hairy to the tip. *Anther cells* with bearded tips.

** Awn plumose above the column only.

6. ***S. pennata***, *Linn. Sp. Pl.* 78; panicle narrow sheathed, gl. I and II subequal cuspidately awned, III = $\frac{1}{2}$ II glabrous above, awn 6–9 in. flexuous plumose above the column only. *Host Gram. Austr.* iv. 19, t. 33; *Engl. Bot. t.* 1356; *Trin. in Act. Petrop.* (1829) 32; *Trin. & Rupr. l. c.* vii. (1842) 80; *Kunth Enum. Pl. i.* 179; *Reichb. Ic. Fl. Germ.* 46; *T. Nees Gen. Fl. Germ. Monocot. i. n.* 26; *Ledeb. Fl. Ross.* iv 450; *Boiss. Fl. Orient. v.* 502. *S. aperta*, appendiculata, gallica & tauricola, *Janka ex Celak in Estr. Bot. Zeitschr* xxxiii. (1883) 317, 319, 349. *S. eriocaulis*, *Boerb. in Estr. Bot. Zeitschr.* xxxiii. (1883) 401. *S. Grafiana*, & *Tirsa*, *Stev. in Bull. Soc. Nat. Mosc.* xxx. ii. 115, 116. *S. pulcherrima*, *C. Koch in Linnæa*, xxi. (1848) 440.

WESTERN TIBET; Gilgit, alt. 9–10,000 ft., *Giles.*—DISTRIB. Westwd. to the Atlantic. N. Asia.

Stem 2–3 ft., densely tufted. *Leaves* 12–18 in., rigid, convolute, sheaths smooth or rough; ligule oblong. *Panicle* few-fl., branches short. *Spikelets* about 1 in. long; gl. I and II hyaline, tips almost capillary; III hirsute, callus $\frac{1}{2}$ in. long; awn twisted and glabrous from the lower third.

*** Awn glabrous or scaberulous, or hairy on the column only.

† *Tip of gl. III* entire.

7. ***S. capillata***, *Linn. Sp. Pl. Ed. II.* 116; panicle very narrow sheathed, spikelets 1 in., gl. II longer than I, III = about $\frac{1}{2}$ II glabrous above, awn 6–8 in. flexuous smooth glabrous throughout. *Host Gram. Austr.* iii. 4, t. 5; *Reichb. Ic. Fl. Germ. t.* 46; *Kunth Enum. Pl. i.* 180, *Suppl.* 133; *Trin. & Rupr. in Act. Petrop. Ser. VI. v.* (1842) 72, t. 55; *Ledeb. Fl. Ross.* iv. 449; *Steud. Syn. Gram.* 130; *Boiss. Fl. Orient. v.* 500. *S. capillaris*, *Gronov. ex Trautv. in Act. Hort. Petrop.* ix. (1848) 350. *S. erecta*, *Hort. Madr. ex Trin. Diss. i.* 186, in *Mem. Acad. Petersb.* vi. I. (1829) 81. *S. juncea*, *Lamk. Illust. i.* 157. *S. Lagascae*, *Guss. Pl. Rar.* 48, *Fl. Sic.*

Prodr. i. 132 (ex Bertol.). *S. sareptana*, Beck. in *Bull. Soc. Nat. Mosc.* lvii. (1882) 52. *S. ucranica*, Steud. *Nom. Ed.* I. 816. *S. ucranensis*, Lamk. l. c. *S. Varonini*, Krassn. in *Script. Bot. Hort. Univ. Petrop.* ii. 22.

WESTERN HIMALAYA; Kashmir, alt. 9–11,000 ft., Jacquemont, &c.—DISTRIB. Westwd. to Spain. Dahuria. China.

Stem 2–3 ft., rather stout. *Leaves* 1–2 ft., filiform, convolute, scaberulous; ligule lanceolate. *Panicle* very narrow, more or less enclosed in a sheath, which is 6–10 in. long with a filiform blade often as long as itself; branches and pedicels short. *Spikelets* white, glistening, hyaline, gl. I and II very narrow, with finely acuminate tips; I 5-nerved below; II 5-nerved; III $\frac{1}{2}$ in. long, nerves pubescent below, above and palea quite glabrous; callus nearly half as long as its gl., scabrid, top bearded. *Anther* cells with naked tips.—Dr. Stapf informs me that the N. America *S. comata*, Trin. & Rupr. might be referred here.

8. *S. sibirica*, Lamk. *Illustr.* i. 158; tall, leaves long flat, panicle elongate very narrow branches erect, spikelets $\frac{2}{3}$ – $\frac{1}{2}$ in. green lanceolate, gls. I and II oblong-lanceolate, III hairy, awn about twice as long as the spikelet rather stout hairy towards the base only. *Kunth Enum. Pl.* i. 185; *Trin. in Act. Petrop.* (1829) 78; *Trin. & Rupr. l. c.* 1842, 59; *Ledeb. Fl. Ross.* iv. 448, *l. c.* *Fl. Ross.* t. 99; *Steud. Syn. Gram.* 129; *Boiss. Fl. Orient.* v. 499; *Duthie Fodd. Grass. N. Ind.* 27. *Avena sibirica*, Linn. *Sp. Pl.* 79; *Gmel. Fl. Sibir.* i. t. 12.

WESTERN TEMPERATE HIMALAYA, from Kashmir to Kunawur, alt. 8–9000 ft., Falconer, &c.; Black Mts., Duthie.—DISTRIB. Affghan. Siberia to Korea.

Stem 2–3 ft., as thick as a duck's quill or more, simple or branched. *Leaves* 1–2 ft. by $\frac{1}{2}$ – $\frac{1}{3}$ in., smooth; ligule oblong. *Panicle* 6–12 in., inclined; branches erect and appressed, rarely spreading, scaberulous; pedicels usually shorter than the terete spikelet. *Gls.* I and II subhyaline, III nearly as long as II, terete or slightly dorsally flattened; palea as long as its gl., linear, obtuse, dorsally hairy; callus short, conical. *Anther-tips* bearded.

Var. pallida; very slender, leaves filiform, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. pale, gl. III half as long as II, awn capillary three to four times as long as the spikelet. *S. pallida*, Munro ex Duthie *Grass. N.W. Ind.* 27 (name). *S. sibirica*, Linn. *var. Herb. Strachey & Winterbottom.*—Tibet, N. of Kumaon, alt. 15,000 ft., *Strach. & Winterb.*—The specimens are very scanty and want radical leaves.

9. *S. tortilis*, Desf. *Fl. Atlant.* i. 99, t. 31; annual, panicle partially sheathed dense-fl. almost spiciform, spikelets fascicled, gl. I and II subequal much longer than IV setaceous linear, III linear hairy or scabrid, awn 2–4 in. straight column only hairy, callus long acute. *Trin. in Act. Petrop.* (1829) 78, 185, *Trin. & Rupr. l. c.* VI. v. (1842) 64; *Kunth Enum. Pl.* i. 180; *Steud. Syn. Gram.* 130; *Boiss. Fl. Orient.* v. 500. *S. capensis*, Nees *Fl. Afr. Austr.* i. 170. ?*Thunb. Prodr. Pl. Afr. Austr.* 109. *S. humilis*, Brot. *Fl. Lusit.* i. 86 (non Cav.). *S. paleacea*, Sibth. & Sm. *Prodr. Fl. Græc.* i. 65; *Fl. Græc.* i. t. 86 (non Vahl). *S. seminuda*, Vahl ex Hornem. *Hort. Hafn.* i. 76.

THE PANJAB; Peshawur and Wazuristan, Stewart.—DISTRIB. Westwd. to the Atlantic. S. Africa.

Stem very slender, tufted, 4–6 in. *Leaves* filiform. *Panicle* 1–4 in., sheath sometimes $\frac{1}{2}$ in. broad or more. *Spikelets* $\frac{2}{3}$ –1 in.; gl. I and II 3-nerved; callus of III = $\frac{1}{2}$ of the gl. bearded at the top only; column of awn hairy throughout its length. *Anthers* with bearded tips.

†† *Tip of gl. III 2-fid or 2-toothed.*

10. **S. Jacquemontii**, *Jaub. & Spach, Ill. Pl. Or.* iv. 60, t. 639; leaves convolute filiform, panicle narrow rachis and lax-fld. branches filiform, spikelets $\frac{1}{3}$ – $\frac{1}{4}$ in. linear-lanceolate, gl. I and II subequal lanceolate acuminate, III half as long as II terete villous, awn capillary geniculate 3–4 times as long as the spikelet villous at the base. *Lasiagrostis Jacquemontii*, *Munro ex Boiss. Fl. Orient.* v. 506.

N. W. HIMALAYA; Kashmir, Astor, Tilail, &c., alt. 8–9000 ft., *Jacquemont*, &c. WESTERN TIBET; Piti, *Thomson*.—DISTRIB. Afghanistan.

Stems densely tufted, erect, 10–18 in., very slender. *Leaves* 6–10 in., erect, subflexuous; ligule a very short membrane. *Panicle* 4–6 in. long, erect or slightly inclined, branches erect few-fld. *Spikelets* erect, green or purplish, pedicels rather shorter than the spikelets; gl. I and II 3-nerved; III $\frac{1}{2}$ in., terete, villous all over; tip 2-toothed; awn 1–1 $\frac{1}{4}$ in. twisted below the knee; callus very short, conical, villously bearded; palea much shorter than the gl. *Anther-tips* bearded.

11. **S. Duthiei**, *Hook. f.*; tall, very slender, leaves very long and narrow, panicle long narrow few-fld., rachis and long pedicels capillary, spikelets $\frac{1}{3}$ – $\frac{1}{2}$ in., very narrow, gl. I and II subequal very narrowly lanceolate, III sparsely hairy, awn capillary nearly straight about twice as long as the spikelet.

WESTERN HIMALAYA; Garwhal, alt. 12–13,000 ft., *Duthie* (n. 273).

Stem 3–5 ft., tufted. *Leaves* 12–18 in. or more, $\frac{1}{2}$ – $\frac{1}{10}$ in. broad, flat, or the lower convolute; ligule large, oblong, obtuse. *Panicle* 8–10 in., branches bearing one or two erect spikelets at the extremity, lower branches 3 in. *Spikelets* pale, glistening; gl. I 3-nerved; II 5-nerved; III about $\frac{1}{2}$ shorter than II, tip minutely 2-fid; awn $\frac{2}{3}$ in., hairy at the twisted base; callus short, conical, oblique, bearded; palea nearly as long as the gl., glabrous. *Anther-tips* bearded.

12. **S. Hookeri**, *Staff in Journ. Linn. Soc.* xxx. (1894) 121; tall, robust, leaves convolute, panicle oblong loosely branched, branches many-fld., spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. longer than their pedicels, gl. I and II subequal oblong-lanceolate acute minutely scaberulous, IV sparsely hairy or villous, awn about as long as the gl. scaberulous. *S. robusta*, *Duthie Grass. N.W. Ind.* 27 (name). *Lasiagrostis robusta*, *Munro mss. ex Duthie l.c. (name)*.

WESTERN TIBET; in wet places, alt. 10–14,000 ft., *Jacquemont*; Nubra, *Thomson*. TIBETAN SIKKIM, alt. 15–16,000 ft., *J. D. H.*—DISTRIB. Central Tibet, alt. 14,800 ft., *Thorold*.

Stems 3–4 ft., densely tufted, as thick as a swan's quill at the base, hard, leafy upwards. *Leaves* 1–2 ft., smooth or scaberulous; ligule $\frac{1}{2}$ in., oblong. *Panicle* 3–10 in., inclined; branches 2–4-nate, suberect, and rachis and pedicels smooth. *Spikelets* yellowish or purplish; gl. I broadest, 1–3-nerved; II 3-nerved; III rather shorter than II, terete, 5-nerved; awn more or less curved, slender, hardly twisted towards the base; palea nearly as long as the gl., hairy; callus small, conical, bearded. *Anther-tips* naked or minutely bearded.—In the specimen from Northern Sikkim the stem at the base is as thick as the thumb, the leaves and stems shorter, and panicle sometimes contracted oblong and dense-fld., the short branches crowded, and the spikelets very shortly pedicelled; their gl. III is deeply 2-fid, with equal or unequal setaceous-pointed lobes.

B. Column of awn not twisted. (See also *S. Hookeri*.)

13. **S. splendens**, *Trin. in Spreng. Neue Entdeck.* ii. 54; *Diss.* i. 183, in *Act. Petrop.* (1830) i. 76; tall, robust, leaves convolute, panicle

very large effuse or contracted, spikelets $\frac{1}{2}$ in. sessile or shortly pedicelled, gls. I and II oblong-lanceolate unequal, III tip 2-fid, awn $\frac{1}{4}$ – $\frac{1}{2}$ in. *Duthie Grass. N.W. Ind.* 27; *Steud. Syn. Gram.* 132. *S. altaica*, *Trin. ex Ledeb. Fl. Alt. i.* 80, in *Act. Acad. Petrop.* 1829, 74; *Ledeb. Ic. Fl. Ross. t.* 222; *Kunth Enum. Pl. i.* 184. *Lasiagrostis splendens*, *Kunth Revis. Gram. i.* 58, *Enum. Pl. i.* 178; *Trin. Sp. Gram. Ic.* 89; *Griseb. in Goett. Nachr.* 82. *Agrostis longiaristata*, *Herb. Ross. ex Kunth Enum. l. c.*

WESTERN TIBET, alt. 8–12,000 ft., *Falconer, &c.*—DISTRIB. Siberia.

Stem 3–5 ft., as thick as a goose-quill below, yellow, shining; roots very stout, vermiform. Leaves 6–12 in., and sheaths smooth or scaberulous, acuminate, lower sheaths long loose; ligule elongate. Panicle 12–18 in., pyramidal when open; rachis slender, smooth; branches semi-verticillate, capillary, 4–10 in., simple below, branched above. Spikelets white or dull purplish; gl. I and II subacute; I 1-nerved; II longest, 3-nerved, III and palea villous; callus short, conical; awn $\frac{1}{4}$ – $\frac{1}{2}$ in., not twisted. Anther-tips bearded. Lodicules 3, oblong, very minute.—A small state collected in Balti by Schlagintweit and in the Karakoram, alt. 9000 ft. by Clarke, is only 18 in. high, with an open panicle 3–6 in. long, and pale purple spikelets.

14. **S. Orthoraphium**, *Steud. Syn. Gram.* 131; stem slender, leaves flat or convolute, panicle very narrow, branches few erect few-fld., spikelets $\frac{1}{3}$ – $\frac{1}{4}$ in., gl. III as long as II sparsely hairy tip entire, awn glabrous with 2 or more deflexed spinules towards the base. *Orthoraphium Roylei*, *Nees in Proc. Linn. Soc. i.* (1841) 94, in *Ann. & Mag. Nat. Hist.* (1841) 221. —*Streptachne?* *Wall. Cat. n.* 3795.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 7–11,000 ft., *Wallich, &c.* NAGA HILLS, alt. 10,000 ft., *Clarke.*

Stems densely tufted, 18–24 in. Leaves 6–12 in., $\frac{1}{10}$ – $\frac{1}{8}$ in. broad, and sheaths quite smooth; ligule short, ciliate. Panicle 6–10 in., rachis erect; branches solitary or binate, lower 1–3 in. bearing few distant, narrow, terete, pedicelled spikelets; gls. subequal, 1- or faintly 3-nerved, obtuse or tips sub-dentate; III very narrow, subrostrate; callus short, obconic, bearded; awn 1 in., rather stout, not twisted, nearly smooth, jointed on the gl. but persistent. Lodicules 3, large, oblong, obtuse.

DOUBTFUL SPECIES.

S. breviflora, *Griseb. in Goett. Nachr.* (1868) 82; stems 1–1 $\frac{1}{2}$ ft., leaves short convolute, ligule short obtuse, panicle narrow base sheathed, branches 1–2-nate distant, gls. I and II linear-lanceolate acuminate, III seriatly hairy, awn 2 in., hairs towards its base shorter.—Western Tibet, Gnari Khorsum, *Schlagintweit*. Probably *S. orientalis*, *Trin.*

61. **ORYZOPSIS**, *Michx.*

Perennial grasses. Leaves flat or convolute. Spikelets loosely paniced, ovoid or lanceolate, dorsally compressed, 1-fld. Glumes 3, I and II equal or subequal, acute or subrostrately acuminate, very thin; I 5-nerved; II sub 3-nerved; III shorter, coriaceous, articulate by a short broad glabrous basal callus, lanceolate or oblong-lanceolate, more or less pubescent, tip minutely 2-toothed, with a very slender often caducous untwisted awn; palea oblong, coriaceous, as long as the gl., glabrous or hairy. Lodicules 2, ovate, thin. Stamens 3, anther-tips minutely bearded. Grain dorsally compressed, oblong, free within the hardened gl. and palea. —Species about 16, N. temp. regions.

The species are very variable, and great as is dissimilarity between the average states of the following, apparent intermediates between them occur.

1. *O. lateralis*, *Stapf*; very slender, leaves short filiform convolute, panicle very narrow strict, branches short erect few-fl'd., spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. ovoid subrostrately acuminate, gl. I longer than II, awn of III $\frac{1}{10}$ – $\frac{1}{8}$ in. very caducous. *Piptatherum laterale*, *Munro ex Regel in Act. Hort. Petrop.* vii. (1880) 645; *Aitchis. in Journ. Linn. Soc.* xviii. (1881) 21, 106. *P. molinioides*, *Boiss. Fl. Orient.* v. 509 (*The Afghan. pl.*). *P. soongaricum*, *Munro in Herb. Kew.* *P. strictum*, *Munro in Cat. Pl. Griff. Falcon., &c.* 56 (*ined.*). *Milium laterale*, *Regel. l. c.*

WESTERN HIMALAYA; from Kashmir to Kunawur and WESTERN TIBET, alt. 12–14,000 ft.—DISTRIB. *Affghanist.*?

Stems densely tufted, forming a stout branching base, very slender, smooth. *Leaves* 2–4 in., smooth or nearly so, acuminate, strict or flexuous; ligule oblong, hyaline. *Panicle* 4–10 in., thin, rachis smooth, branches and pedicels scaberulous. *Spikelets* ovoid or ovate-lanceolate, green or tipped with red-purple; gls. I and II subrostrately acuminate, faintly 5-nerved, pair next the midrib arching and anastomosing with the median, outer pair similarly arching the last lower down; II more obscurely 3–5-nerved; III about $\frac{1}{2}$ shorter than II, lanceolate, finely subsilicily pubescent, tip minutely 2-toothed; awn usually very short, very slender, not twisted. *Lodicules* 2, ovate, hyaline. *Anther-cells* minutely bearded. *Grain* oblong.

Var. *effusa*, lower branches of panicle larger $\frac{1}{2}$ –1 in. long. *O. effusa*, *Hack. ex Herb. Duthie.*—Hazara and Baltistan, alt. 9–10,000 ft., *Duthie.* Karakoram, alt. 10,000 ft., *Clarke.*

2. *O. Munroi*, *Stapf*; tall, stem stout or slender, leaves narrow flat, panicle effuse lower branches long many-fl'd. towards the ends, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. ovoid rostrately acuminate, gls. I and II equal, awn of III $\frac{1}{4}$ – $\frac{1}{3}$ in. *O. divulsa*, *Herb. Clarke.* *O. kashmirensis*, *Hack. ms. ex Herb. Duthie.* *Piptatherum soongaricum*, *Duthie in Atkins. Gaz. N.W. Ind.* 626 (*name*). *P. holciforme*, *Herb. Ind. Or. Hf. & T.*

WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 7–11,000 ft. WESTERN TIBET; Ladak, Nubra and Zaskar, alt. 10–13,000 ft.—DISTRIB. *Affghan.*

Stem 2–4 ft., about as thick as a crow-quill. *Leaves* 4–10 by $\frac{1}{10}$ – $\frac{1}{8}$ in., finely acuminate, hardly scaberulous, margins nearly smooth; ligule oblong, hyaline. *Panicle* 6–12 in., branches in distant pairs, filiform, nearly smooth; lower naked for 1–3 in., then branching shortly and bearing shortly pedicelled spikelets. *Spikelets* variable, from ovate to lanceolate; gls. I and II green or tipped with purple or wholly purple; III and its palea pubescent. *Lodicules*, *stamens* and *grain* as in *lateralis*, but larger.—The larger broader glumes longer awn and great size of the plant distinguish this from var. *effusa* of *lateralis*.

3. *O. æquiglumis*, *Duthie Grass. N.W. Ind.* 27; tall, rather stout, leaves long flat, panicle long effuse or contracted, lower branches long many-fl'd. towards the ends, spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. ovoid acuminate, gl. I and II equal, awn $\frac{1}{4}$ – $\frac{1}{3}$ in. ?*O. cœrulescens*, *Duthie Grass. N.W. Ind.* 28 (*name*). *O. Duthiei*, *Hack. ex Herb. Duthie.* *Piptatherum æquiglume*, *Munro ex Duthie in Atkins. Gaz. N.W. Ind.* 626 (*name*).—*Pipt. n.sp.* *Herb. Strach. & Wint.* n. 2.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 6–10,000 ft.

Very closely allied to *O. Munroi*, but usually a stouter plant, and taller, spikelets larger often of a dark or dull green mixed with purple, gls. I and II not so beaked, leaves longer, awn and anthers longer. It may be a state of that plant from moister or warmer localities. I have seen no specimen of *O. cœrulescens*, *Duthie*, which was collected at Gungotri, alt. 9–10,000 ft.

62. **MILIUM**, Linn.

Annual or perennial grasses. *Leaves* flat. *Spikelets* loosely paniced, not jointed on their pedicels, ovate, dorsally compressed, 1-fl., rachilla not produced. *Glumes* 3, I and II subequal, thin, 3-nerved, persistent; III oblong or obovoid, dorsally compressed, coriaceous, shining, not awned; callus very short, broad, naked; palea 2-nerved. *Lodicules* 2. *Stamens* 3. *Styles* short, free. *Grain* ovoid or oblong, free within the gl. and palea.—Species 5 or 6, N. temp. regions.

M. effusum, Linn. *Sp. Pl.* 61; perennial, panicle effuse, spikelets glabrous. *Fl. Dan.* t. 1143; *Host Gram. Austr.* iii. t. 22; *Engl. Bot.* t. 1106; *Knapp Gram. Britt.* t. 19; *Kunth Enum. Pl.* i. 66, *Suppl.* 44, t. 10, f. 1; *Reichb. Ic. Fl. Germ.* t. 45, vii. t. 73; *T. Nees Gen. Fl. Germ. Monoc.* i. n. 17; *Steud. Syn. Gram.* 34; *Ledeb. Fl. Ross.* iv. 510; *Aitch. Cat. Panjab Pl.* 158; *Duthie Grass. N.W. Ind.* 28. *M. ascendens*, Roxb. *Hort. Beng.* 8 (name). *M. dubium*, Jacquem. mss. *Agrostis effusa*, Lamk. *Encycl.* i. 159.

WESTERN HIMALAYA, alt. 7–11,000 ft., from Kashmir, Jacquemont, &c., to Kumaon, *Strachey & Winterb.*—DISTRIB. N. Temp. and Arctic regions.

Perennial. *Stem* 2–4 ft., erect, smooth, shining, leafy. *Leaves* 6–12 by $\frac{1}{8}$ – $\frac{1}{2}$ in. acute, minutely, scaberulous or smooth above; ligule oblong, truncate, torn. *Panicle* 5–10 in., close or effuse; branches capillary, fascicled or subverticillate, naked below, at length spreading or deflexed. *Spikelets* $\frac{1}{2}$ in., green.

DOUBTFUL INDIAN SPECIES.

M. PHLEOIDES, Sweet, *Hort. Brit. Ed.* 2, 555.

63. **HELEOCHLOA**, Host.

Rigid annual or perennial erect or prostrate grasses. *Leaves* flat or convolute. *Spikelets* 1-fl., densely imbricate in cylindric spikes or spiciform panicles, laterally compressed; rachilla not produced above gl. III. *Glumes* 3, hyaline, I and II subequal or I shorter, keeled, 1-nerved, persistent; III = II or longer, lanceolate or oblong, 1-nerved; palea oblong, obtuse or 2-fid, 2-nerved. *Lodicules* 2 (or 0?). *Stamens* 2 or 3. *Styles* elongate. *Grain* ovoid, loose in the gl. and palea.—Species few, Oriental.

Crypsis aculeata, Ait., a grass resembling *Hel. schoenoides* in habit, but with capitate spikelets, is recorded as Indian by Aitchison (*Cat. Panjab. Pl.* 157), Boissier (*Fl. Orient.* v. 475) and other works, but no doubt by mistake for *Heleocholea schoenoides*. I have seen no specimen of *Crypsis*, which is an Eastern and Siberian plant from India, or even from Affghauistan.

1. **H. schoenoides**, *Host Gram. Austr.* i. 23, t. 30; annual, stems compressed prostrate spreading in a circle from the root, panicle ovoid-oblong sessile on the greatly dilated sheath of the uppermost leaf. *Boiss. Fl. Orient.* v. 476; *Duthie Fodd. Grass. N. Ind.* 48. *Crypsis aculeata*, *Duthie Grass. N.W. Ind.* 25, *Fodd. Grass. N. Ind.* 45, t. 62. *C. schoenoides*, *Lamk. Illust.* i. 166, t. 42, f. 1; *Kunth Enum. Pl.* i. 22, *Suppl.* 17, t. 5, f. 1; *Ledeb. Fl. Ross.* iv. 459; *Steud. Syn. Gram.* 152; *Duthie Grass. N.W. Ind.* 25. *C. compacta*, *Steud. l. c.* 151. *C. nilaica*, *Fresen. & Notar. in Mem. Acad. Tor. Ser. II.* xiv. (1854) 322. *C. vaginiflora*, *Opiz Natural.* viii. (1824) 83; *Steud. l. c.* 152. *Phalaris vaginiflora*, *Forsk. Fl. Egypt. Arab.*

18. *Phleum schoenoides*, Linn. *Sp. Pl.* 60; *Jacq. Fl. Austr. v. App.* 29 t. 7 *lc.* i. 2 t. 15; *Cav. Ic.* i. t. 52, f. 5. *Spartina phleoides*, Roth. *Neue Beytrag.* i. 101. *Pechea sub-cylindrica*, *Pourr. Chlor. Narbon.* n. 103.

The PANJAB, WESTERN HIMALAYA, and WESTERN TIBET; Kashmir, *Jacquemont*. Iskardo, alt. 7000 ft., *Thomson*. BANDULKUND, *Duthie*. ? SIKKIM; at Dorjiling, *Herb. Griffith*.—DISTRIB. Westward to the Atlantic.

Glaucous. *Stems* many, 1-10 in., prostrate with ascending tips, leafy, rigid. *Leaves* 1-2 in., narrowly lanceolate, acuminate; sheaths deeply furrowed, margins glabrous or ciliate; ligule a short ring of hairs. *Panicle* $\frac{1}{2}$ -2 in. by $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., green. *Spikelets* $\frac{1}{2}$ in.; gl. all 1-nerved, keels ciliate; I and II narrowly lanceolate, acuminate; I shortest; III ovate-lanceolate, acuminate; palea oblong, truncate, nerveless. *Lodicules* 2, oblique, cuneate. *Stamens* 2-3, filament very long; anthers small.—The Bandulkund specimens are very small and pale, almost silvery white, with very small spikes hardly emerging from the leaf-sheath. The Sikkim habitat is probably due to a misplaced ticket.

2. *H. dura*, Boiss. *Fl. Orient. v.* 477; perennial, minutely pubescent, stem stout ascending, leaves involute pungent, panicle elongate cylindric narrow. *H. alopecuroides*, *Duthie Fodd. Grass. N. Ind.* 48 (non Boiss.). *Crypsis dura*, Boiss. *Diagn. Ser. II. iv.* 125. *C. phalaroides*, *Duthie Grass. N.W. Ind.* 25 (non M. Bieb.). *Vilfa setulosa*, *Trin. in Mem. Acad. Petersb. Ser. VI. v. ii.* (1840) 55; *Steud. Syn. Gram.* 154.

SCIND, *Stocks*, in salt water.—DISTRIB. Arabia.

Whole plant pale, and clothed with a very fine velvety pubescence. *Stems* 6-10 in., densely fastigiate from a woody inclined base which is clothed with leaf-sheaths, ascending, stout, as thick as a crow-quill, hard, few-leaved. *Leaves* 3-6 in., quite terete, rigid, pungent; sheaths short, coriaceous; ligule 0. *Spikes* 2-4 in. by $\frac{1}{2}$ - $\frac{1}{4}$ in. diam. *Spikelets* $\frac{1}{2}$ in., membranous, gl. all 1-nerved and with ciliate keels, I and II narrowly oblanceolate, acuminate; III half as long again, oblong, mucronate; palea oblong, bifid, 2-nerved, lobes obtuse ciliate. *Lodicules* 2, obliquely cuneate, acute. *Stamens* 2; filaments very long; anthers short. *Ovary* ovoid; styles very long, slender.—Boissier cites Griffith by error, for Stocks, under the habitat of Scind.

64. **PHLEUM**, Linn.

Annual or perennial grasses. *Leaves* flat. *Spikelets* 1-flid., with rarely a rudimentary 2, imbricated on cylindric or oblong spiciform panicles, strongly laterally compressed, not jointed on the very short pedicels; rachilla sometimes produced beyond gl. III. *Glumes* 3, I and II equal, keeled, awned or mucronate; III much smaller, hyaline, awned or not, 3-5-nerved, toothed; palea small. *Lodicules* 2. *Stamens* 3. *Ovary* glabrous; styles long. *Grain* compressed, free within the gl. and palea.—Species about 10, temp. and Arctic.

Phleum pratense, Linn. (Timothy grass) is mentioned by Royle (III. Bot. Himal. 417, and Duthie Grass. N.W. Ind. 28) as a native of the N.W. Himalaya (Urukta & Chur), but this has never been confirmed.

1. *P. alpinum*, Linn. *Sp. Pl.* 59; perennial, upper sheaths inflated, panicle ovoid or oblong, gl. I and II truncate as long as their awns keels hispid, III 3-nerved. *Fl. Dan.* t. 213; *Host Gram. Austr. iii.* t. 10; *Kunth Enum. Pl. i.* 29; *Trin. Sp. Gram. Ic.* t. 21; *Engl. Bot.* t. 519; *Knapp Gram. Brit. t.* 7; *Reichb. Ic. Fl. Germ. t.* 50; *Ledeb. Fl. Ross. iv.* 458; *Steud. Syn. Gram.* 150; Boiss. *Fl. Orient. v.* 484; *Wall. Cat. n.* 3779; *Duthie Grass. N.W. Ind.* 28. *P. Hænkeanum*, *Presl Rel. Hænk. i.* 245;

Steud. l. c. 150. *P. nigricans*, Willd. ex Trin. in Mem. Acad. Petersb. Ser. VI. v. II (1840) 123. *P. ovatum*, Jacquem. mss.

Temperate and Subalpine HIMALAYA, alt. 10–13,000 ft., from Kashmir eastwards, in wet places.—DISTRIB. Arctic and Alpine regions. Fuegia.

Stem solitary, 6–18 in., ascending from a creeping base, smooth, stiff. *Leaves* short, spreading; ligule short. *Panicle* $\frac{1}{2}$ –1 $\frac{1}{2}$ in., green or purplish; gl. I and II $\frac{1}{6}$ in. with the awn.

2. ***P. arenarium***, Linn. *Sp. Pl.* 60; annual, upper sheaths inflated, panicle cylindric or oblong narrowed at the base, gl. I and II lanceolate finely acuminate hardly awned keels ciliated above, III very small hairy. *Fl. Dan.* t. 915; *Kunth Enum. Pl.* i. 28; *Reichb. Ic. Fl. Germ.* t. 50; *Ledeb. Fl. Ross.* iv. 456; *Steud. Syn. Gram.* 151; *Boiss. Fl. Orient.* v. 481; *Aitchis. Cat. Panjab Pl.* 158; *Duthie Grass. N.W. Ind.* 28. *P. ramosum*, Gilib. *Exercit.* ii. 519. *Phalaris arenaria*, Willd. *Sp. Pl.* i. 328; *Engl. Bot.* t. 222; *Knapp Gram. Britt.* t. 4. *Crypsis arenaria*, Desf. *Fl. Atlant.* i. 63. *Chilochloa arenaria*, Beauv. *Agrost.* 37. *Achnodon arenarius*, Link *Enum. Hort. Berol.* i. 65. *Achnodonton arenarium*, Trin. *Diss.* i. 166.

THE PANJAB AND WESTERN HIMALAYA; in Kashmir and Kishtwar, ascending to 9000 ft., Jacquemont, &c.—DISTRIB. Westward to the Atlantic.

Stems 6–14 in., tufted, glabrous, leafy. *Leaves* flat, sheaths smooth; ligule elongate, oblong. *Panicle* 1–2 $\frac{1}{2}$ by $\frac{1}{2}$ – $\frac{3}{4}$ in., glaucous, sometimes lobed. *Spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ in., rachilla produced beyond gl. III; gls. I and II punctulate; III 3-nerved.—Var. *Thomsonii*, Griseb. in Goett. Nachr. (1868) 83. I find no character whereby to distinguish this from the common form.

3. ***P. asperum***, Jacq. *Collectan.* i. 110, *Ic. Rar.* t. 14; annual, panicle long slender cylindric, gl. I and II cuneately obovate truncate cuspidate, keels scabrid above, III oblong obtuse pubescent. *Vill. Fl. Delph.* ii. 61, t. 2, f. 4; *Kunth Enum. Pl.* i. 28; *Steud. Syn. Gram.* 151; *Boiss. Fl. Orient.* v. 481; *Aitchis. Cat. Panjab Pl.* 158; *Duthie Grass. N.W. Ind.* 28. *P. viride*, All. *Fl. Pedem.* ii. 232. *P. paniculatum*, Huds. *Fl. Angl.* 23 (excl. Syn.); *Engl. Bot.* t. 1077; *Knapp Gram. Britt.* t. 8. *P. ventricosum*, Moench *Meth.* 177. *P. viride*, All. l.c. *Phalaris aspera*, Retz. *Obs.* iv. 14; *Host Gram. Austr.* ii. t. 37. *Phal. paniculata*, Ait. *Hort. Kew.* i. 87. *Chilochloa aspera*, Beauv. *Agrost.* 37; *Reichb. Ic. Fl. Germ.* t. 51.

THE PANJAB HIMALAYA, Royle, &c. KUNAWUR (*Herb. Munro*). KASHMIR, alt. 5–6000 ft., Jacquemont, &c. THE SALT RANGE, Aitchison.—DISTRIB. Westward to the Atlantic.

Stem 6–18 in., tufted, stout, rigid. *Leaves* broad, margins scabrid. *Panicle* 1–4 $\frac{1}{2}$ by $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. *Spikelets* green, $\frac{1}{2}$ – $\frac{3}{4}$ in.; gl. I and II rigid, glabrous or scabrid, the sinus between them rounded, 3-nerved, dilated above with gibbous membranous margins, III membranous = $\frac{2}{3}$ of I and II.—Scent of *Anthoxanthum*.

65. **ALOPECURUS**, Linn.

Annual or perennial grasses. *Leaves* flat. *Spikelets* 1-fl., strongly laterally compressed, imbricating in a cylindric or oblong spiciform panicle, jointed on the tumid tip of the very short pedicels, rachilla not produced beyond gl. III. *Glumes* 3, I and II subequal, strongly compressed, keeled, often connate by their margins below; III as long as I and II, hyaline, convolute, with usually a basal or median dorsal awn; palea 0 (in Indian sp.). *Lodicules* 0. *Stamens* 2 or 3. *Ovary* glabrous. *Grain* laterally compressed, free.—Species about 20, temp. and cold regions.

* *Perennials. Panicle ovoid or oblong.*

1. **A. himalaicus**, *Hook. f.*; upper leaf-sheaths inflated, panicle oblong or subcapitate, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in., gls. I and II lanceolate subaristately acuminate hirsute with spreading hairs longer than the spikelet is broad, III much shorter than I and II, awn twice as long as the spikelet or more.

KASHMIR and DRAS, alt. 10–14,500 ft., *Falconer, &c.*

Stem 6–18 in., subsolitary, erect from a creeping base, rather stout. *Leaves* 3–5 in., erect or spreading, upper shorter lanceolate acuminate; upper sheaths 3–5 in., lower appressed; ligule large, scarious, toothed. *Panicle* 1–1½ in., grey-green or purplish. *Spikelets* membranous, hairs flaccid; gls. I and II connate below, tips dark; III $\frac{1}{2}$ shorter than I or II, obtuse, apiculate.—Most nearly allied to *A. phalaroides*, Schur, of Hungary, which is hardly distinguishable from *A. brachystachyus*, Bieb., of Siberia; but the spikelets of *A. himalaicus* are much larger than in those species, from which its acuminate gls. I and II and short III at once distinguish it.

2. **A. arundinaceus**, *Poir. Encycl. viii.* 766; rootstock creeping, panicle cylindric, spikelets $\frac{1}{2}$ in., gl. I and II connate below acute keel ciliate with long hairs, awn short. *Boiss. Fl. Orient. v.* 487; *Steud. Syn. Gram.* 150. *A. altissimus*, Schur in *Estr. Bot. Zeitschr. ix.* (1859) 13. *A. elatior*, *Jacquem. mss.* *A. muticus*, *Kar. & Kir. in Bull. Soc. Nat. Mosc. xv.* (1842) 527; *Steud. l.c.* 148. *A. nigrescens*, *Jacq. Eclog. Gram. ii.* t. 13. *A. nigricans*, *Hornem. Hort. Hafn. i.* 68; *Kunth Enum. Pl. i.* 24. *A. pratensis*, *Aitchis. Cat. Panjab Pl.* 158; *Duthie Grass, N.W. Ind.* 26, *Fodd. Grass. N. Ind.* 46 (non Linn.). *A. pratensis, var. ruthenicus*, *Trin. Sp. Gram. Ic. t.* 45. *A. repens*, *Bieb. Fl. Taur. Cauc. iii.* 54. *A. ruthenicus*, *Weinm. in Fl. Dan. t.* 2881. *A. sibiricus*, *Hort. Vind. ex Roem. & Sch. Syst. ii.* 271. *A. ventricosus*, *Pers. Syn. i.* 80.

WESTERN HIMALAYA, alt. 8–12,000 ft., from Kashmir to Garwhal.—DISTRIB. Westward to Europe, N. Asia.

Stem 2–4 ft., erect, slender. *Leaves* 6–10 in., acuminate; upper sheaths slightly inflated, 4–6 in. long; ligule rounded. *Panicle* 1–3 in. by $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., green, soft. *Spikelets* subsilky; gl. I and II lanceolate, acuminate, more or less connate at the base or to above it; III acute, tip scaberulous; awn subbasal.—I doubt this being more than a form of *A. pratensis*, L.

** *Annuals or subperennials. Panicle cylindric.*

3. **A. aristulatus**, *Michx. Fl. Bor. Am. i.* 43; stems slender geniculately ascending, leaves glaucous, panicle slender, spikelets $\frac{1}{2}$ – $\frac{1}{10}$ in. oblong, gls. I and II hyaline obtuse softly ciliate, III truncate, awn median-dorsal short, anthers oblong bright yellow. *A. fulvus*, *Sm. Engl. Bot. t.* 1467; *Fl. Dan. t.* 1804; *Kunth Enum. Pl. i.* 24; *Reichb. Ic. Fl. Germ. t.* 49; *Ledeb. Fl. Ross. iv.* 464; *Boiss. Fl. Orient. v.* 487; *Steud. Syn. Gram.* 407. *A. geniculatus*, *Poll. Hist. Pl. Pul. n.* 66; *Host Gram. Austr. ii. t.* 32 (non Linn.). *A. paludosus*, *Beauv. ex Mert. & Koch. Fl. Germ. i.* 481. *A. subaristatus*, *Pursh. Fl. Am. Sept. i.* 66.

WESTERN HIMALAYA; Kashmir, in marshes, alt. 6–14,000 ft., *Clarke, Duthie*.—DISTRIB. Europe, N. Asia, N. America.

Stem 6–18 in., creeping below, flaccid. *Leaves* 4–8 in., linear, flat; upper sheaths somewhat inflated; ligule elongate. *Panicle* 1–2 in. by $\frac{1}{8}$ – $\frac{1}{4}$ in. diam., green. *Gls.* I and II free or connate at the very base, elliptic, obtuse.—Regarded by various authors as a variety of *A. geniculatus*, L.

4. **A. geniculatus**, Linn. *Sp. Pl.* 60; stems erect or geniculate below, leaves not glaucous, spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in. oblong, gls. I and II connate at or above the base subacute or obtuse hyaline ciliate, III truncate, awn subbasal, anthers linear orange-yellow. *Engl. Bot.* t. 1250; *Knapp Gram. Brit.* t. 18; *Kunth Enum. Pl.* i. 24, *Suppl.* 18, t. 7, f. 1; *Trin. Sp. Gram. Ic.* t. 42; *Steud. Syn. Gram.* 147; *Aitchis. Cat. Panjab Pl.* 157; *Duthie Grass. N.W. Ind.* 25, *Fodd. Grass. N. Ind.* 46; *Benth. Fl. Hongk.* 408, *Fl. Austral.* vii. 555. *A. australis*, Nees in *Hook. Journ. Bot.* ii. (1843) 412; *Steud. l. c.* 148. ? *A. diandrus*, *Griff. Notul.* iii. 11, *Ic. Pl. Asiat.* t. 142, f. 2. *A. paniceus*, O. Muell. in *Fl. Dan.* t. 861. *A. ramosus*, *Poir. Encycl.* viii. 776; *Steud. l. c.* 146.—*Alopecurus*, *Wall. Cat.* n. 3750 C.

Temperate and Subtropical HIMALAYA, alt. 3–7000 ft., from Kashmir to Bhotan. ? Assam, *Griffith*.—DISTRIB. Most temp. regions.

Stems 6–18 in., stout or slender. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in. broad; upper sheaths more or less inflated; ligule oblong. *Panicle* 1–3 in. by $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., greenish-yellow. *Spikelets* larger than in *A. aristulatus*, not so membranous; gl. III with the truncate tip sub-erose. *Stamens* 2 or 3.—Of Griffith's *A. diandrus*, there are under the same number (Kew distrib. 2693) slender narrow-leaved specimens from Rydang in Bhotan, quite like the western Indian plant, but also a much larger one from the sandy banks of the Burrampooter in Assam, with many stout stems from the root, much broader leaves, with more ventricose upper sheaths, and rather stouter panicles (it is n. 6463 Kew distrib.). Griffith, in his *Itinerary Notes* (158, n. 801, and *Notulæ l. c.*), says the stems and young sheaths are glaucous, and he figures the anthers as oblong and yellow, which are characters of *aristulatus*; but the habit and spikes are those of *geniculatus*. It may prove to be a distinct species.

5. **A. agrestis**, Linn. *Sp. Pl. Ed.* II. 89; stem erect or geniculate below, spikelets $\frac{1}{2}$ in. gl. I. and II. connate to or below the middle obtuse, keels narrowly winged, III narrowly oblong tip truncate, awn subbasal twice as long as the spikelet recurved. *Fl. Dan.* t. 697; *Host Gram. Austr.* iii. t. 12; *Engl. Bot.* t. 848; *Knapp Gram. Brit.* t. 16; *Kunth Enum. Pl.* i. 23; *Trin. Sp. Gram. Ic.* t. 37; *Reichb. Ic. Fl. Germ.* t. 19; *Ledeb. Fl. Ross.* iv. 465; *Steud. Syn. Gram.* 149; *Boiss. Fl. Orient.* v. 485; *Duthie Grass. N.W. Ind.* 25, *Fodd. Grass. N. Ind.* 46; *Benth. Fl. Hongk.* 407, *Fl. Austral.* vii. 555. *A. myosuroides*, *Huds. Fl. Angl.* 23.

Temperate and Subtropical HIMALAYA; Kashmir, &c. The PANJAB. KHASIA HILLS, alt. 3000 ft., *Clarke*. MUNNEPORE, alt. 3000 ft., *Watt*.—DISTRIB. Europe. W. and N. Asia. Introd. elsewhere.

Stem 6–10 in., or more. *Leaves* scaberulous, upper sheaths slightly inflated; ligule oblong. *Panicle* 1–3 in. by $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., pale green. *Spikelets* loosely imbricate, rather narrow, glabrous except the keels of gl. I and II; gl. III narrowly oblong, truncate, tip toothed; awn rather stout. *Anthers* long, narrow.—Possibly not indigenous in India. *Watt* describes it as found in rice-fields in Munne pore.

6. **A. nepalensis**, *Trin. ex Steud. Syn. Gram.* 148; stem erect or geniculately ascending, spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in. obovate, gl. I and II connate to the middle subacute keels narrowly winged scabrid, III narrowly oblong, tip truncate exserted, awn subbasal very short or 0.—*A. navicularis*, *Ham. ex Wall. Cat.* n. 3780 A.—*Alopecurus*, *Wall. Cat. l. c.* A. B.

UPPER GANGETIC PLAIN; Oude, *Hamilton*. The PANJAB; Lahore, *Thomson*; Garwhal, *Jacquemont*.

Perhaps only a form of *A. agrestis*, which it closely resembles, but the spikelets are much smaller and very closely imbricate, less contracted at the base, and the keel of the glume is not ciliate. *Stamens* 3, anthers long.

66. **PHIPPSIA**, Br.

Very small perennial grasses. *Leaves* narrow. *Spikelets* minute, laterally compressed, in sparingly branched subspiciform panicles, not jointed on their pedicels; rachilla not produced beyond gl. III. *Glumes* 3, membranous, all persistent, I and II very short, obtuse, nerveless; III terminating the stipitiform rachilla, oblong, obtuse or tip rounded, nerves 0 or 1-3; palea as long or longer than the gl., tip 2-fid, nerves very faint. *Lodicules* 2, hyaline. *Stamens* 1-3. *Styles* very short, free, plumose to the base. *Grain* oblong, loose.—Species 2, an Arctic and the following.

This genus should perhaps be placed near to *Colpodium*.

P. himalaica, Hook. f.; palea much longer than its gl.

ALPINE WESTERN HIMALAYA; Kumaon, Barji-Khang Pass, alt. 14,500 ft., *Strachey & Winterbottom*; Garwhal, on the Duder Glacier, alt. 13-14,000 ft., *Duthie*.

Densely tufted, 6-8 in. high, very slender. *Leaves* 2-4 by $\frac{1}{8}$ in., linear, obtuse; ligule long. *Fanicle* 1-1 $\frac{1}{2}$ in., sometimes almost reduced to a spike; rachis slender, smooth; branches very few, short, erect and appressed to the rachis, bearing 2-3 spikelets. *Spikelets* $\frac{1}{10}$ in. long, pale brown; gl. I shortest, ovate, obtuse; II almost orbicular, concave, = about $\frac{1}{4}$ III, nerveless, tip rounded; III raised on a short cylindric naked rachilla, concave, obtuse, nerveless, sparsely hairy on the back towards the base; palea longer than the gl. and nearly as broad, concave, tip 2-fid, keels ciliate. *Lodicules* 2, ovate-lanceolate. *Stamen* 1, filament very long; anther nearly as large as gl. III. *Ovary* narrow; stigmas broadly plumose.—Differs from the Arctic *P. algida*, in the much narrower leaves, in the fewer very shortly pedicelled larger spikelets not crowded on lateral branches, in the narrower gl. III, long palea, very large anther, broadly plumose stigmas, and long ligule.

67. **CYATHOPUS**, Stapf.

A slender perennial grass. *Leaves* flat. *Spikelets* 1-flid., very small, subterete, singly pedicelled on the branches of a decompound narrow panicle, articulate on the cupular tip of the pedicel, rachilla not produced beyond the flg. gl. *Glumes* 3, I and II subequal, oblong, beaked, persistent, strongly 3-nerved; III rather shorter, membranous, obtuse, 5-nerved below the middle; palea lanceolate, acute, keels smooth. *Lodicules* 2, ovate-lanceolate. *Stamens* 3, anthers short. *Styles* distinct, stigmas short.

C. sikkimensis, Stapf in Hook. Ic. Pl. t. 2395. *Hymenachne*, n. 3. *Herb. Ind. Or. Hf. & T.* *Milium Treutleri*, Kuntze Rev. Gen. Pl. 780 (in part).

SIKKIM HIMALAYA; Lachoong Valley, alt. 7-10,000 ft., J. D. H.

Stem 2-3 ft. high, from a creeping stoloniferous base. *Leaves* 6-10 by $\frac{1}{4}$ - $\frac{1}{2}$ in., finely acuminate, many-nerved, scaberulous, margins thickened smooth; sheaths deeply striate; ligule elongate, scarious. *Panicle* 8-12 in., oblong, or pyramidal; rachis and branches flexuous, terete, scaberulous; branches fascicled or subverticillate, lower 2-4 in. long, naked below. *Spikelets* $\frac{1}{12}$ - $\frac{1}{10}$ in., scaberulous, shortly pedicelled, pale green; gls. I and II stoutly subaristately beaked, scaberulous; nerves scabrid; III oblong, nerves slender; callus obconical; palea linear-oblong, 2-nerved. *Anthers* and stigmas short.—Munro regarded this very distinct grass as forming a new genus near the *Hymenachne* section of *Panicum*. Dr. Stapf has, I think, rightly referred it to near *Garnotia*.

67¹. **WOODROWIA**, Stapf.(Genus not in *Clavis*, p. 7.)

Annual. *Leaves* narrow, flat. *Spikelets* 2-5, 1-fl., subdigitately paniced at the top of a slender peduncle, articulate on a fragile rachis, laterally compressed, rachilla not produced beyond the fl. gl. *Glumes* 3, I and II strongly laterally compressed, empty, acute, dorsally rounded and there sometimes much thickened, 1-nerved, I $\frac{1}{2}$ longer than II; III = II, hyaline, 1-nerved, 2-lobed with a slender interposed geniculate awn; palea obovate-oblong, hyaline. *Lodicules* 2, cuneate, lobulate. *Stamens* 2, anthers linear. *Styles* free and stigmas very slender. *Grain* slender, cylindric, free within the gls.

W. diandra, Stapf in Hook. Ic. Pl. t. 2447.The DECCAN; Poonah District, *Woodrow*.

Stem 12-18 in., slender, branched, nodes hairy. *Leaves* 3-4 by $\frac{1}{12}$ - $\frac{1}{8}$ in., acuminate, hirsute, margins scabrid; sheaths appressed, glabrous or hairy at the mouth; ligule short, ciliolate. *Spikes* 1-2 in., rachis slender, hairy. *Spikelets* rather distant, $\frac{1}{4}$ in. long, green or blueish; gl. I dorsally hairy, margins ciliolate; keel of II densely ciliate; awn of III 1 in., column shorter than the upper part, spirally ciliate.—This interesting plant arrived at Kew after the printing of the key, p. 7.

68. **GARNOTIA**, Brongn.

Erect, perennial rarely annual grasses. *Leaves* flat or convolute. *Spikelets* very small, 1-fl., paniced, solitary or geminate, jointed on the pedicels, narrowly-lanceolate; rachilla not produced beyond the fl. gl. *Glumes* 3, I and II empty, subequal, 3-nerved, acuminate, equalling or longer than III, awned or not; III bisexual, 1-3-nerved, triandrous, very narrow, terete, tip acuminate or notched, awned, rarely awnless or 3-awned; awn straight or base twisted, rarely geniculate or recurved; sides of palea auricled at the base. *Lodicules* 2. *Styles* free. *Grain* linear or oblong, free.—Species about 20, Asiatic and Polynesian.

In the disposition and description of the species I have been aided by Dr. Stapf, who has drawn up an account of the whole genus.

A. *Stems* densely tufted, uppermost internode exceeding the rest of the stem. *Leaves* long, stiff, erect, not articulate on the sheath; basal sheaths equitant, flattened.

* *Leaves* narrow, complicate (triangular on section); margins of lower sheaths woolly, at length glabrate.

† *Awn of gl. III reflexed from the twisted base.*

1. **G. Thwaitesii**, Stapf. mss.; stem very tall stout, panicle 1-2 ft. much branched, branches long slender, spikelets $\frac{1}{4}$ - $\frac{1}{5}$ in. base shortly hairy, gl. I and II acuminate or shortly awned. *G. scoparia*, *Thwaites Enum. Pl. Zeyl.* 363; *Trim. Cat. Ceyl. Pl.* 106. *Berghausia scoparia*, *Munro ex Thw. l. c.*

CEYLON; hotter parts of the island, *Thwaites*.

Stem 2-4 ft. and more, often as thick as a goose-quill below, compressed. *Leaves* 1-3 ft., about $\frac{1}{8}$ in. broad, wiry; lower sheaths strongly compressed and keeled, margins above woolly; ligule very short, ciliate. *Panicle* very variable in length

and breadth, copiously effuse. *Gl.* I and II entire or notched with a short awn in the notch; III tip notched or entire, awn rarely twice as long as its gl.—Steudel refers Koenig's *Agrostis scoparia* to *Arundinella nervosa*, Nees. A specimen so named in Rottler's Herbarium is a grass 10 ft. high with flat leaves $\frac{3}{8}$ in. broad and panicle $2\frac{1}{2}$ ft. long, the spikelets have all fallen away. It is probably *Thysanotæna*.

†† Awn not reflexed from the twisted base, bent above, 0 in *G. tectorum*.

2. ***G. Schmidii***, *Hook. f.*; stem 1-3 ft. simple or branched above, leaves very narrow flexuous, panicle 6-10 in. narrow, spikelets $\frac{1}{2}$ in. pale or dark brown, base bearded, glumes I and II notched and awned, III nearly as long as I notched, awn twice as long as the glume.

NILGHIRI HILLS, *Schmid*; Gondaloor Ghat, alt. 4500 ft., *Lawson*.

Stems tufted, base with the distichous leaf-sheaths an inch broad. Leaves $\frac{1}{2}$ in. broad, shorter than the peduncle. Panicle erect, branches 1-1 $\frac{1}{2}$ in., erect.—*Schmid*'s specimens are small, 1 ft. high with a rather loose panicle and almost red-brown spikelets. *Lawson*'s is a very much larger plant with longer leaves and denser panicle and paler spikelets.

3. ***G. tenuiglumis***, *Stapf. mss.*; stem tall stout, leaves very narrow, panicle 2 ft. very narrow, spikelets $\frac{1}{2}$ in., base nearly glabrous, glumes thin, II 1-nerved, awn of III short capillary base twice or thrice twisted. *Chrysopogon muricatus*, *Herb. Wight*, n. 3247.

WESTERN PENINSULA, *Wight*.

Stem 3-4 ft., as stout as a goose-quill, solid, upper internode 10-16 in. Leaves 12-16 in., exceeding the stem, glabrous except towards the very base; sheaths subcompressed, margins above woolly; ligule a ridge of hairs. Panicle strict, rachis stout, terete; branches 2-3 in., filiform, in distant clusters, strict, erect. Spikelets pale yellow-brown, appressed to the branchlets; gl. I aristulate; II subhyaline; awn of III rather longer than the spikelets.

4. ***G. scoparia***, *Stapf. mss.*; stem 3 ft., leaves very narrow plicate or keeled, panicle 16-20 in. long narrow branches very long, spikelets $\frac{1}{2}$ in. base shortly bearded, glumes firm, II 3-nerved, awn of III about as long as the spikelet, base twisted. *Berghausia scoparia*, *Munro in Herb. Ind. Or. H. f. & T.* B. *elata*, *Arn. ex Miq. Analect. Bot.* ii. 20. *Miquelia elata*, *Arn. ex Nees in Wight Cat.* n. 2600, *ex Miq. l.c.* *Agrostis scoparia*, *Koen. et Aristida arundinacea*, *ex Wall. Cat.* n. 8912 A. A. *laxa et Aristida montana*, *Herb. Rottl. ex Wall.* 8912 B.—*Gramin. Wall. Cat.* n. 8912.

MYSORE; at Chitaldrug, *Heyne*; Mysore & Kurg, *G. Thomson*.

Stem nearly as thick as a goose-quill below. Leaves erect, very narrow, glabrous or margins towards the base hairy; sheath with woolly margins; ligule a ridge of hairs. Panicle very narrow, branches 6-8 in., filiform, erect. Spikelets pale yellow; gl. I and II subsimilar, I subaristately acuminate, III 2-dentate, awn geniculate.

5. ***G. tectorum***, *Hook. f.*; stem very tall stout, leaves long $\frac{1}{2}$ in. broad, panicle 1-2 ft. narrowly oblong branches lax-fld. at length spreading, spikelets $\frac{1}{2}$ in. base obscurely pubescent, gl. all subequal acuminate or mucronate not awned. *G. stricta*, *Thw. Enum. Pl. Zeyl.* 363 (*excl. Syn.*); *Trim. Cat. Ceyl. Pl.* 106. *Berghausia mutica*, *Munro in Proc. Amer. Acad.* iv. (1864) 362.

CEYLON; in elevated parts of the Island, *Gardner, &c.*

Stem 3-4 ft., as thick as a goose-quill below, strict. Leaves 2 ft., linear, acute, base plicate, more or less hairy; sheath hirsute above or glabrous; ligule very short,

truncate, ciliate. *Panicle* 8-18 in.; rachis stout, strict; branches slender, rigid. *Spikelets* rather few and distant, geminate, lower subsessile, upper on capillary pedicels.

B. Leaves scattered, linear or very narrowly lanceolate. flaccid, articulate on the sheath.

6. **G. polypogonoides**, *Munro ex Oliver in Hook. Ic. Pl. t. 1481*; stem 6-12 in. slender, leaves $\frac{1}{10}$ - $\frac{1}{4}$ in. broad lanceolate from a narrow base, panicle contracted flexuous, spikelets $\frac{1}{2}$ in. base bearded, gl. I and II entire one or both long-awned, III 3-awned. G. polygones, *Duthie Grass. N.W. Ind. 12*. Berghausia Emodi, *Endl. ex Miq. Analect. Bot. II. 20*. Miquelia Emodi, *Arn. & Nees in Nov. Act. Nat. Cur. xix. Suppl. I. (1843)* 179; *Steud. Syn. Gram. 119*.—*Gen. Nov. Wall. Cat. n. 8884*.

TEMPERATE HIMALAYA; from Garwhal to Sikkim, alt. 6-9000 ft.

Stem tufted, rarely branched, about as thick as a crow-quill. *Leaves* 4-6 by $\frac{1}{2}$ - $\frac{1}{4}$ in., hirsute towards the base; sheath with glabrous or pubescent margins; ligule very short, fimbriate. *Panicle* 2-5 in.; branches subscaberulous. *Spikelets* green or brown; gl. I narrowly lanceolate, 3-nerved; II broader; III dark brown, 2 lateral nerves excurrent as minute bristles, median awn many times longer than its gl., base twisted.

7. **G. stricta**, *Brongn. in Duperr. Voy. Bot. 132, t. 21*; stems 2-3 ft. tufted, leaves $\frac{1}{10}$ - $\frac{1}{2}$ in. broad, lower lanceolate from a narrow base, panicle 2-10 in. very narrow, branches in distant fascicles, spikelets $\frac{1}{10}$ - $\frac{1}{2}$ in. base sparsely hairy, gl. I and II finely acuminate or II notched below the awn, III entire or notched awned or not, awn shorter or longer than its gl. G. ascendens & Griffithii, *Munro in Cat. Pl. Griff. Helf. &c. ined.* G. angustata, *Hack. mss.* G. sandvicensis, *Hillebr. Fl. Hawaii, 513*. ? Berghausia pallens & B. tenella, *Arn. ex Miquel Analect. II. Bot. 21, 22*. B. ascendens, *Munro mss.* Andropogon adscendens, *Heyne ex Wall. Cat. n. 8906*. — Chrysopogon?, *Wall. Cat. n. 8789*. — Tripogon?, *Wall. l.c. n. 8891*. — Gramin. *Wall. l.c. n. 8906*. — Aira, *Griff. Notul. iii. 56, l.c. Pl. Asiat. t. 145*.—*Herb. Wight, n. 3243, 3244*.

SUBTROPICAL and TEMPERATE HIMALAYA, from Garwhal to Mishmi and BURMA, alt. 4-9000 ft. KHASIA HILLS, alt. 4-6000 ft. BEHAR; on Parusnath, *Clarke*. CHOTA NAGPORE and WESTERN GHATS, from the Concan southward, *Wight, &c.* (*Kew distrib. 6780, 6781, 6787*).—DISTRIB. Sandwich Islds.

Annual? *Stem* usually geniculate and branched at the base, rarely thicker than a crow-quill, stiff, nodes glabrous or pubescent. *Leaves* 6-10 in., lanceolate or linear-lanceolate, flat or margins involute, glabrous or hirsute or scabrid above; sheath glabrous or hirsute above; ligule short, truncate. *Panicle* strict or flaccid, branches scaberulous. *Spikelets* pale; gl. I and II 3-nerved, median nerve sometimes excurrent, III 1-nerved or nerveless, median awn $\frac{1}{2}$ in. or less.—Probably *G. patula*, *Munro*, of China and Tonkin, which has densely tufted leaves, is this species.

Var. *hasiana*, *Stapf*; stout, 3 ft. high, leaves sometimes nearly 1 in. broad, panicle a foot long.

Var. *breviuristata*, *Stapf*; gl. I and II not awned.

8. **G. arundinacea**, *Hook. f.*; stem branched, leaves lanceolate from a rounded or subcordate base flat acuminate, panicle 4-6 in. nodding, branches fastigiate capillary, spikelets $\frac{1}{2}$ - $\frac{1}{3}$ in., gl. I and II notched and awned, awn of III twice as long as its gl. Andropogon arundinaceus *Heyne in Herb. Rottler*.

NILGHIRI HILLS, alt. 2-6000 ft., *Heyne, &c.*

Stem reedy, as thick as a pigeon's quill, branches ascending. *Leaves* 2-3 in. by

$\frac{3}{4}$ in. broad at the base; sheath villous at the top; ligule very short, pubescent. *Panicle* flexuous, branches and capillary pedicels scaberulous. *Spikelets* pale, base sparsely hairy; awns variable in length, median very slender, not twisted.

9. **G. Fergussonii**, *Trim. in Journ. Bot.* xxvii. (1889) 170; stem 1-3 ft., leaves linear densely bearded at the base, panicle 4-6 in. oblong, branches at length spreading, spikelets often in dimorphic pairs, upper $\frac{1}{2}$ - $\frac{1}{3}$ in. base obscurely bearded, gl. I and II entire awned or not, III entire or tip 2-fid, awn twisted at the base at length deflexed. *G. patula*, *Thw. mss.* (C.P. 3947); *Trim. Cat. Ceyl. Pl.* 106. *Andropogon Beckettii*, *Thw. mss.*

CEYLON; Matale district, *Beckett*; Knuckle's Mts., alt. 5-6000 ft., *Fergusson*.

Stems smooth, branched. *Leaves* 4-8 by $\frac{1}{2}$ - $\frac{1}{4}$ in., and sheath glabrous or sparsely hairy; ligule short, truncate. *Panicle* pale green or purplish, branches smooth. *Spikelets* in pairs, the upper often reduced to a glume; gl. I and II oblong-lanceolate, awn short or 0; III with a single awn about $\frac{1}{2}$ in. long.

10. **G. courtallensis**, *Thwaites Enum. Pl. Zeyl.* 363; stem 8-18 in. slender, leaves linear not densely bearded at the very narrow base, panicle 1-3 in. lax, branches at length spreading, spikelets sometimes in dimorphic pairs $\frac{1}{2}$ in. base obscurely hairy, gl. I and II lanceolate awnless or mucronate, III entire or tip notched, awn geniculate twisted below the knee. *Trim. Cat. Ceyl. Pl.* 106. *Miqelia courtallensis*, *Arn. ex Nees in Nov. Act. Nat. Cur.* xix. *Suppl. i.* (1843) 179; *Steud. Syn. Gram.* 119. *Berghausia courtallensis*, *Nees ex Miq. Analect. Bot.* II. 20.—*Wight Herb.* n. 2376.

NILGHIRI and TRAVANCORE HILLS, *Wight, &c.*, alt. 6000 ft., *Lawson*. CEYLON; Adam's Peak, alt. 4000 ft., *Gardner, &c.*

Stems simple or branched. *Leaves* rarely 3 in. long, lanceolate, acuminate, spreading, membranous, more or less hairy, as are the sheaths; ligule very short. *Panicle* pale; branches smooth or slightly scaberulous. *Spikelets* few, shortly pedicelled; gl. I and II broader than usual in the genus, I thin, 3-nerved.—*Batratherum*, *Wall. Cat. n.* 8827, *Andropogon minutissimus*, *Herb. Heyne*, referred here by *Steudel*, is a totally different plant (see p. 147).

11. **G. micrantha**, *Thwaites Enum. Pl. Zeyl.* 363; stem 1-3 ft. branched and often creeping below, leaves linear-lanceolate from a narrow base, panicle 2-10 in. contracted lax-fld., branches capillary, spikelets $\frac{1}{2}$ - $\frac{1}{3}$ in. subsolitary, gl. I and II acuminate, III shortly awned or mucronate. *Trim. Cat. Ceyl. Pl.* 106.

CEYLON; Central Province, alt. 2-4000 ft., *Thwaites* (C.P. 945).

Stems elongate, branched, tufted and ascending, or creeping below. *Leaves* 4-6 by $\frac{1}{2}$ - $\frac{1}{4}$ in., sparsely hairy beneath; sheath glabrous except at the tip; ligule very short, truncate. *Panicle* pale green, at first contracted; branches scaberulous, at length spreading. *Spikelets* obscurely hairy at the base; awn about $\frac{1}{2}$ in., strict, not twisted.

Var. *nana*, *Stapf*; stem short very slender, panicle $1\frac{1}{2}$ -2 in., gl. III not awned. *Berghausia mutica*, var. *nana*, *Munro mss.* Ceylon (C.P. 944).

12. **G. fuscata**, *Thwaites Enum. Pl. Zeyl.* 363; stems short tufted and creeping, base leafy, leaves short linear, panicle narrow few-fld., spikelets $\frac{1}{2}$ in. base shortly bearded, gl. I and II with setaceous tips, III with a long awn compressed and once twisted at the base. *Trim. Cat. Ceyl. Pl.* 106.

CEYLON; Saffragam district, alt. 4000 ft., *Thwaites*.

Stem 1-4 in., compressed and leafy at the base; branches ending in a slender peduncle a foot long or less with one or two subulate leaves. *Leaves* chiefly radical, 1 by $\frac{1}{2}$ in., rather thick in texture, lanceolate, acute, flat, smooth, margins smooth thickened, cauline convolute; sheath very short, compressed, mouth bearded; ligule truncate. *Gl.* I and II strongly 3-nerved.—The specimens are insufficient for a satisfactory description. The species is quite unlike any other.

69. **POLYPOGON**, Desf.

Annual or perennial grasses. *Leaves* flat. *Spikelets* 1-fl'd., minute, jointed (but persistent) on their pedicels, laterally compressed, keeled, densely crowded on the short branches of a spiciform or lobed panicle; rachilla not produced beyond gl. III. *Glumes* 3; I and II equal, concave, keeled, 2-fl'd notched or entire, with a slender awn below the tip or in the sinus; III much smaller, hyaline, sessile, truncate, toothed, awned or not; palea small, 2-nerved. *Lodicules* 2, falcate. *Stamens* 1-3, anthers small. *Ovary* glabrous; styles free. *Grain* obovoid, free within the gl. and palea.—Species few, natives of all warm regions.

1. **P. monspeliensis**, Desf. *Fl. Atlant.* i. 66; annual, panicle spiciform oblong or cylindric, gl. I and II oblong scaberulous ciliate tip obtuse or notched, awn from the sinus or beneath it as long to many times as long as the gl., III 2-toothed shortly awned. *Beauv. Agrost.* 17, t. vi. f. 8; *Mutel Fl. Fr.* t. 76, 77; *Kunth Enum. Pl.* i. 232, *Suppl.* 181, t. xiii. f. 7; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 32; *Reichb. Ic. Fl. Germ.* t. 31; *Ledeb. Fl. Ross.* iv. 443; *Steud. Syn. Gram.* 184; *Boiss. Fl. Orient.* v. 520; *Benth. Fl. Austral.* v. 546; *Doell in Mart. Fl. Bras.* II. iii. 44, t. 126; *Thw. Enum. Pl. Zeyl.* 370, 444; *Trim. Cat. Ceyl. Pl.* 108; *Aitchis. Cat. Panjab. Pl.* 165; *Duthie Grass. N.W. Ind.* 30, *Fodd. Grass. N. Ind.* 50. *P. cruentus*, *Duthie l. c.* (error for *crinitus*). *P. maritimus*, *Duthie l. c.* (not Willd.). *P. nepalensis*, *Nees ex Steud. Nom. Ed.* II. ii. 378, *Syn. Gram. l. c.*; *Trin. in Mem. Acad. Petersb. Ser. VI.* iv. ii. (1845) 255; *Duthie l. c.* 30. *P. fugax*, *Nees ex Steud. l. c.*; *Duthie Fodd. Grass. N. Ind.* 51. *P. paniceus*, *Lag. Gen. & Sp. Nov.* 3. *P. polysetus*, *Steud. in Flora*, xii. (1829) 467. *P. zeylanicus*, *Nees ex Steud. Syn. Gram.* 182. *Agrostis alopecuroides*, *Lamk. Illustr.* 812. *A. crinita*, *Moench Meth.* 178. *A. panicea*, *Willd. Sp. Pl.* i. 128; *Engl. Bot.* t. 1704; *Moon, Cat. Pl. Ceyl.* 8. *A. P. Rora*, *Herb. Ham. ex Wall. Cat.* n. 3777 B. *A. triaristata*, *Knapp Grom. Britt.* t. 23. *Cynosurus paniceus*, *Linn. Sp. Pl.* 73. *Phleum crinitum*, *Schreb. Gram.* i. 151, t. 20, f. 3; *Sm. Fl. Græc.* i. 46, t. 22; *Roxb. Fl. Ind.* i. 313. *P. monspeliense*, *Koel. Descr. Gram.* 57. *Alopecurus aristatus*, *Gouan Hort. Munsp.* 37; *Huds. Fl. Angl.* 28. *Al. monspeliensis*, *Linn. Sp. Pl.* 61. *Al. paniceus*, *Linn. l. c. Ed.* ii. 90. *Phalaris cristata*, *Forsk. Fl. Æg. Arab.* 17.—*Agrostis*, *Wall. Cat.* n. 3777.

Throughout CONTINENTAL INDIA (not seen from Burma and the E. Peninsula). WESTERN TIBET, ascending to 9000 ft., and CEYLON.—DISTRIB. Trop. and Temp. regions.

Stems tufted, 6 in.-2 ft., stout or slender, leafy, base geniculate, filiform and erect in starved states from Tibet, with very small spikes and very short awns. *Leaves* 3-6 by $\frac{1}{2}$ - $\frac{1}{4}$ in., green, ligule oblong. *Panicle* $\frac{1}{2}$ -6 in. long, $\frac{1}{4}$ -1 in. broad, pale yellowish-green, silky, sometimes lobulate. *Spikelets* $\frac{1}{10}$ - $\frac{1}{2}$ in., very shortly pedicelled. *Gl.* I and II very variable in breadth, obovate-oblong, sides scaberulous, keels scabrid, margins ciliate, tip entire notched or very shortly 2-fl'd; awns from the length of the gl. to $\frac{1}{2}$ in. long, excessively delicate; III very small, oblong,

glabrous, 2-fid, awned or not; palea oblong, tip notched. *Anthers* very minute, short. *Ovary* ovoid.—The starved Tibetan specimens are the *P. fugax*, Nees, they pass insensibly into the larger form. I have not found *P. maritimus* from any part of India. It may be distinguished by the deeply cleft gl. I and II.

2. *P. littoralis*, Sm. *Compend. Fl. Brit.* 13, *Engl. Bot.* t. 1251; annual or perennial, panicle lobed, gl. I and II subentire or notched, awn twice as long as the gl. or less, III awned or not. *Kunth Enum. Pl.* i. 233; *Reichb. Ic. Fl. Germ.* t. 31, vii. t. 75; *Steud. Syn. Gram.* 184; *Benth. Fl. Hongk.* 427; *Boiss. Fl. Orient.* v. 521; *Duthie Grass. N. W. Ind.* 30. *P. elongatum*, *Lagasc. Gen. & Sp. Nov.* 3 (non *Kunth*). *P. Lagascæ*, *Roem. & Sch. Syst.* ii. 226; *Trin. Diss.* 1, 170. *P. demissus*, *Steud. l. c.* *Agrostis littoralis*, *Knapp. Gram. Britt.* t. 22. *A. lutosæ*, *Poir. Encycl. Suppl.* i. 249; *Roem. & Sch. l. c.* i. 358. *Santia elongata*, *Parlat. in Webb. Phyt. Canar. Sect.* iii. 393.

TEMPERATE HIMALAYA, alt. 4–10,000 ft., from Kashmir to Bhotan and Muunepore. WESTERN TIBET; Iskardo, *Thomson*.—DISTRIB. Temp. and subtemp. regions.

Except by the uniformly shorter awns of the spikelets and usually broader lobed panicle, I find it very difficult to distinguish the annual form of this species from the common one of *P. monspeliensis*. In India *P. littoralis* does not descend to the plains, nor does it in the hills assume the filiform starved state of *P. monspeliensis*. In Europe it is always described as perennial, and as usually a littoral plant with a creeping root. The following forms occur in India.

P. littoralis proper; perennial, stem decumbent creeping and rooting below.

Var. *Higegaweri*; annual, stems tufted ascending. *P. Higegaweri*, *Steud. Syn. Gram.* 422; *Griseb in Goett. Nachr.* (1868) 82.

Var. *muticus*; perennial, stems creeping and rooting, gls. I and II apiculate, III awnless.—*Kunawur, Thomson*.

70. SPHÆROCARYUM, Nees.

A dwarf annual. *Stem* creeping and ascending, leafy throughout. *Leaves* ovate-cordate, acute, amplexicaul. *Spikelets* 1-fid., very minute, ovoid, pedicelled on the close-set capillary branches of a pyramidal panicle which is sessile in the axil of the uppermost leaf, jointed on the pedicels; rachilla jointed at the base, not produced beyond gl. III. *Glumes* 3, cymbiform; I and II glabrous, hyaline; I nerveless; II longest, 1-nerved; III hirsute, 1-nerved; palea as long as the gl., oblong, obtuse, keels distant. *Lodicules* 2, very minute. *Stamens* 3, anthers linear. *Ovary* narrowly ellipsoid; styles short, free. *Grain* ovoid, free, pericarp adherent to the seed.

S. elegans, Nees ex *Steud. Nom. Ed.* II. ii. 620. *Sphærocarpum elegans*, Nees ex *Steud. l. c.* 256. *Grayia elegans*, Nees in *Wight Cat.* n. 2033; *Steud. Syn. Gram.* 119. *G. zeylanica*, Arn. ex *Steud. Nom. Ed.* II. i. 705. *Isachne pulchella*, Roth. Nov. Sp. 58; *Kunth Enum. Pl.* i. 136; *Thw. Enum. Pl. Zeyl.* 362; *Trim. Cat. Ceyl. Pl.* 104; *Benth. Fl. Hongk.* 414. *Panicum elegans*, Wight & Arn. ex *Steud. Nom. Ed.* II. ii. 256. *P. malaccense*, Trin. *Gram. Panic.* 204; Nees *Agrost. Bras.* 212; *Kunth l. c.* 113; *Miq. Fl. Ind. Bat.* iii. 457. *P. pulchellum*, Spreng. *Syst.* i. 322. *Agrostis malaccensis*, Koen. ex Heyne in *Herb. Rottl.* *Andropogon Grayia*, *Steud. Nom. l. c.* i. 91.—*Panicum*, Wall. *Cat.* n. 8736.

SILHET and the KHASIA HILLS, in marshes, Wallich, &c. MERGUI, Griffith. SINGAPORE, Ridley. CEYLON, Macrae, &c.—DISTRIB. China.

Stem 6–12 in., as thick as a sparrow's quill, prostrate and rooting below, then erect, rarely branched, nodes bearded. Leaves all alike in size and form, $\frac{1}{3}$ – $\frac{1}{2}$ in. long, acute or acuminate, ciliate-serrulate, subcoriaceous, ecostate, nerves very close-set; sheaths much shorter than the internodes, glabrous or hirsute; ligule of close-set white hairs. Panicle 1– $1\frac{1}{2}$ in., solitary and terminal, with very rarely 1–2 lower on the stem; peduncle very short; concealed in the leaf-sheath; rachis rather stout; branches very many, opposite and alternate, capillary, spreading. Spikelets $\frac{1}{10}$ – $\frac{3}{10}$ in.—This is undoubtedly Roth's *Isachne pulchella*. The habit is that of *Panicum ovalifolium*, Poir, with the leaf-nerivation of an *Isachne*. It differs from *Agrostis* in habit, and in the spikelets jointed on the pedicels (as in *Panicææ*); and from *Sporobolus* in habit, foliage, and the adnate pericarp of the grain.

71. SPOROBOLUS, Br.

Perennial, rarely annual grasses. Leaves flat or convolute. Spikelets small or minute, 1–rarely 2-fl., in effuse or close or spiciform panicles, jointed on their pedicels, awnless; rachilla very short, jointed at the base, not produced beyond the flg. gl. Glumes 3, nerveless or 1–3-nerved, membranous; I and II unequal, persistent or singly caducous; III longer or shorter than I or II, 1-nerved; palea often splitting between the 2 very close nerves. Lodicules very minute or 0. Stamens 2–3, anthers short. Styles short, free. Grain loose within the gl. and palea, pericarp or its epidermis loose, deciduous, rarely adherent.—Species about 80, chiefly tropical.

* Glumes I and II both much shorter than III.

1. *S. diander*, Beauv. *Agrost.* 25; panicle narrowly pyramidal, branches capillary in scattered fascicles, spikelets $\frac{1}{20}$ – $\frac{1}{18}$ in., gl. I and II hyaline truncate nerveless, grain oblong or obovoid-oblong. Jacq. *Eclog. Gram.* t. 28; *Link Enum. Hort. Reg. Berol.* i. 87; *Kunth Enum. Pl.* i. 213; *Wall. Cat. n.* 3765; *Griff. Notul.* iii. 46, *Ic. Pl. Asiat.* t. 139, f. 85; *Dalz. & Gibs. Bomb. Fl.* 296; *Thw. Enum. Pl. Zeyl.* 370; *Trim. Cat. Ceyl. Pl.* 108; *Aitchis. Cat. Panjab Pl.* 165; *Duthie Grass. N.W. Ind.* 29, *Fodd. Grass. N. Ind.* 40, t. 63; *Miquel Fl. Ind. Bat.* iii. 375; *Benth. Fl. Austral.* vii. 622. *Vilfa diandra*, *Wight Cat. n.* 1744 (*non Trin.*). *V. erosa*, *Trin. in Mem. Acad. Petersb. Ser. vi. Sc. Nat.* v. II. (1840) 86; *Steud. l. c.* 159. *V. Retzii*, *Steud. Nom. Ed. II.* ii. 768, *Syn. Gram.* 162. *Agrostis contracta*, *Herb. Heyne ex Wall. Cat. n.* 3765 A. *A. diandra*, *Retz. Obs.* v. 19; *Roxb. Fl. Ind.* i. 317. *Panicum secundum*, *Herb. Heyne ex Wall. l. c.*—*Sporobolus*, *Wall. Cat.* 3766, 3768.—*Sporobolus*, *Griff. l. c.* 44, *Ic. t.* 149, f. 2.

Throughout INDIA and BURMA, ascending the Himalaya to 5500 ft. CEYLON.—DISTRIB. Asia and Austral. trop.

Stems 1–3 ft., slender. Leaves densely tufted, 3–10 in., very narrow, flat or convolute, margins entire; ligule a few hairs. Panicle 4–10 in., rachis very slender, sometimes capillary, strict; branches $\frac{1}{4}$ –1 in., sometimes flowerless at the base. Spikelets sessile or very shortly pedicelled; gl. I and II not half as long as III, broadly truncate and usually erose; III obtuse or subacute, obscurely 1-nerved. Stamens 2–3. Grain subtruncate, pericarp rather adherent.

2. *S. indicus*, Br. *Prodr.* 170; stem stout, panicle very narrow branches short appressed covered to the base with crowded spikelets $\frac{1}{18}$ – $\frac{1}{14}$

in. long, gl. I and II obtuse hyaline 1-nerved, III opaque, grain broadly obovoid. *Link Hort. Reg. Berol.* i. 87; *Kunth Enum. Pl.* i. 211; *Thw. Enum. Pl. Zeyl.* 370; *Trim. Cat. Ceyl. Pl.* 108; *Duthie Fodd. Grass. N. Ind.* 49; *Benth. Fl. Hongk.* 426, *Fl. Austral.* vii. 622; *Griseb. Fl. Brit. W. Ind.* 533. *S. angustus*, *Buckl. in Proc. Acad. Sc. Philad.* (1862) 88. *S. elongatus*, *Br. Prodr.* 170; *Hook. Handb. N. Zeal. Fl.* 327; *Miq. Fl. Ind. Bat.* iii. 376; *Duthie Grass. N. W. Ind.* 29. *S. Lamarckii*, *Desv. in Ham. Prodr. Fl. Ind. Occ.* 4. *S. minor*, *Kunth Enum. Pl.* i. 212. *S. tenacissimus*, *Beauv. Agrost.* 26; *Kunth l. c.* 212, *Suppl.* 167; *T. Nees Gen. Fl. Germ. Monoc.* i. n. 28; *Duthie Fodd. Grass. N. Ind.* 49. *Vilfa capensis* & *elongata*, *Beauv. Agrost.* 16; *Trin. Gram. Diss.* i. 154; *Steud. Syn. Gram.* 159. *V. exilis*, *Trin. in Mem. Acad. Petersb. Ser. vi. Sc. Nat.* v. II. (1840) 89; *Steud. l. c.* 159. *V. indica*, *Trin. ex Steud. Nom. Ed.* II. ii. 767, *Syn. Gram.* 162; *Baker Fl. Maurit.* 449. *V. tenacissima*, *H. B. & K. Nov. Gen. & Sp.* i. 138; *Nees Agrost. Bras.* 393; *Trin. Sp. Gram. Ic.* t. 60; *Steud. l. c.* 160. *P. rupestris*, *Trin. Diss.* ii. 22; *Steud. l. c.* 161. *Agrostis elongata*, *Lamk. Illustr.* i. 142. *A. fertilis*, *Steud. l. c.* 170. *A. indica*, *Linn. Sp. Pl.* 63. *A. tenacissima*, *Jacq. Collect.* i. 85, *Ic. Rar.* 3, t. 16 (*excl. Syn.*). *A. tenuissima*, *Spreng. Syst.* i. 258.—*Sporobolus*, *Wall. Cat. n.* 3766, *B.* 3767.

Throughout INDIA, ascending the Himalaya to 5000 ft., BURMA and CEYLON.—DISTRIB. All warm countries.

Stem 2–3 ft., sometimes as thick as a small goose-quill at the base. *Leaves* 8–24 in., convolute or flat, rarely $\frac{1}{2}$ in. diam., margins smooth; ligule a few hairs. *Panicle* 6–18 in., often interrupted; rachis stout, erect, or curved; branches erect, $\frac{1}{2}$ in. or longer, often whorled, densely clothed usually to or near the base with green spikelets, which are erect and imbricate. *Spikelets* larger than in *S. diander*. *Gl.* I = about $\frac{1}{2}$ III; II not twice as long; III acute. *Pericarp* adherent.—It is not always easy to distinguish this from *S. diander*, which is much the most common in India. In its normal state *indicus* is a far more robust plant, with a stout rachis and branches of the panicle, larger and more herbaceous more crowded spikelets, and a broader grain; but both vary greatly in the panicle.

3. *S. minutiflorus*, *Link Enum. Hort. Berol.* i. 88; tall, slender, leaves long, panicle very large effuse supra-decompound, branches capillary, spikelets $\frac{1}{30}$ in., gl. I minute subquadrate, II = $\frac{1}{2}$ III orbicular-ovate obtuse, grain broadly obovoid. *Kunth Enum. Pl.* i. 214. *Vilfa capillaris*, *Wight & Arn. ex Wight Cat. n.* 2036 (*non Miq.*). *V. minutiflora*, *Trin. Diss.* i. 158; *Steud. Syn. Gram.* 158. *V. mangalorica*, *Hochst. ex Miq. Analect. Bot.* ii. 24; *Steud. l. c.* 159. *V. tenuissima*, *Schult Mant.* ii. 479. *Panicum tenuiflorum*, *Hort. Monac. ex Link. l. c.* *P. tenuissimum*, *Mart. ex Schrank in Denkschr. Bot. Ges. Regensb.* ii. (1822) 26.

The DECCAN PENINSULA, *Wight*. CANABA, *Hohenacker*.

Stem 2–3 ft. *Leaves* narrow, flat, finely acuminate, margins quite smooth; ligule of minute hairs. *Panicle* 12–18 in., erect; rachis quite smooth, very slender; branches innumerable, 1–2 in., spreading, and branchlets excessively slender, flowering at the tips. *Spikelets* ellipsoid, dark cold.; gl. I truncate; II broadly ovate, obtuse, nerveless; III ovate-oblong, obtuse, nerveless; palca shorter, broad, truncate. *Stamens* 2.

4. *S. Wallichii*, *Munro mss.*; very tall, erect, leaves long, panicle tall oblong or subpyramidal decompound branches capillary, branchlets divaricate few-fld., spikelets $\frac{1}{10}$ in., gl. I minute truncate, II = $\frac{1}{2}$ III or

longer ovate acuminate, grain broadly obliquely obcordate. *Sporobolus*, Wall. *Cat.* n. 3769 A.

BEHAR; Rajmahal Hills, Wallich. PEGU, Kurz. CEYLON; between Trincomalee and Kantalla, Ferguson.

Perennial? Stem 3-4 ft., as thick as a crow-quill, strict, sparingly leafy. Leaves 1-2 ft. by $\frac{1}{4}$ - $\frac{1}{2}$ in., quite smooth; upper sheaths very long; ligule 0. Panicle 12-18 in. by 4-5 broad, branches opposite and whorled, branchlets flowering towards the tips. Spikelets pale brown; gls. II and III faintly 1-nerved; palea oblong, truncate, as long as its gl. Stamens 3.—Habit of *S. minutiflorus*, but spikelets very different.

5. *S. ioclados*, Nees *Fl. Afr. Austral.* 161; leaves short, panicle oblong or subpyramidal effuse, branches capillary, spikelets $\frac{1}{16}$ - $\frac{1}{12}$ in. scattered, gl. I lanceolate = $\frac{1}{3}$ III, II = $\frac{2}{3}$ III oblong-lanceolate obtuse, grain linear-oblong truncate. Vilfa ioclados, Nees ex Trin. in *Mem. Acad. Petersb. Ser. VI. Sc. Nat.* v. II. (1840) 65.

SCIND, Stocks.—DISTRIB. S. Africa.

Stems 10-18 in., densely tufted, rather stout. Leaves 2-3 in., narrow, densely tufted, sheath short; ligule obscure. Panicle 3-7 in., branches opposite and alternate, spreading. Spikelets oblong, pale.—A very elegant grass.

** Glume I as long as III or nearly so. Panicle contracted.

6. *S. virginicus*, Kunth *Revis. Gram.* i. 67, *Enum. Pl.* i. 210, *Suppl.* 167; stems erect from a decumbent woody creeping base, leaves strict distichous convolute pungent, panicle elongate narrow interrupted branches very short, spikelets $\frac{1}{16}$ - $\frac{1}{12}$ in. subsessile crowded, gls. I and II oblong-lanceolate acute, I shorter than II, grain broadly obovoid. *Trim. Cat. Ceyl. Pl.* 108; *Benth Fl. Austral.* vii. 621; *Griseb. Fl. Brit. W. Ind.* 533. *S. littoralis*, Kunth *l. l. c. c.* 68, 213. Vilfa barbata, Beauv. *Agrost.* 16. *V. littoralis*, Beauv. *l. c.*; *Steud. Syn. Gram.* 162. *V. murina*, Sieb. ex *Steud. l. c.* 157. *V. orientalis*, Wight *Cat. n.* 1745 (in part). *V. virginica*, Beauv. *l. c.*; *Trin. Diss.* i. 155; *Sp. Gram. Ic.* t. 48; *Steud. l. c.* 157; *Baker Fl. Mauriti.* 449. *Agrostis barbata*, Pers. *Syn. i.* 75. *A. littoralis*, Lamk. *Illustr.* 161. *A. pungens*, Pursh *Fl. Am. Sept.* 64. *A. virginica*, Linn. *Sp. Pl.* 63; *Labill. Pl. Nov. Holl.* i. 20, t. 23. *Podosemum virginicum*, Link *Enum. Hort. Berol.* i. 85. *Calotheca sabulosa*, Steud. in *Flora*, xii. (1829), II. 488. *Crypsis maritima*, Munro ex Macowan in *Cape Monthly Mag. N.S.* iii. (1871), *Suppl.* 7.

CEYLON; common on the shores, Heyne? *Trimen.*—DISTRIB. Westwd. to tropical Africa and America; eastwd. to Australia.

Perennial. Stem as thick as a duck's quill, branched, hard and often tortuous at the base, then erect or ascending 6-10 in. high. Leaves close-set, erecto-patent, 1-3 in. long or more, narrow and almost terete from the involute margins, very pale, glabrous or scaberulous above, striate; sheaths terete, short or long; ligule of long soft hairs. Panicle 1-4 in., subspiciform, very pale, narrow but more or less interrupted. Spikelets very shortly pedicelled; gls. all 1-nerved, keels glabrous or obscurely scabrid towards the tip; palea oblong, narrowly truncate. Grain with the pericarp loosened if moistened.—Trinius' figure represents gl. I as shorter than in the Ceylon specimens and others that I have examined. It is remarkable that this grass should have no certain habitat on the shores of continental India. There is a specimen from Heyne in Rottler's herbarium, marked "Nawulus, 21st Aug., 1794," a word which sounds more Cingalese than Indian. There is another in Wight's herbarium, where *S. orientalis*, *spicatus*, *tremulus* and *virginicus* are all fastened on the same sheet as No. 1745. *S. pungens*, Kunth, of the Mediterranean

region, from Spain to Egypt and Arabia, is a slight variety with a stouter dense panicle, which Dr. Stapf and I have independently sought in vain to distinguish by any other character, and this is of the slightest.

7. **S. glaucifolius**, *Hochst. in Flora*, xxv. (1842) I. *Bieb.* 123; slender, glaucous, leaves short strict narrow flat or undulate glaucous not pungent, panicle elongate contracted white, branches very short erect, spikelets $\frac{1}{16}$ in. subsessile crowded, gls. I and II subequal ovate-lanceolate acuminate as long as III or rather longer. *Vilfa glaucifolia Steud. Syn. Gram.* 154. *V. scabrifolia, Hochst. ex Edgew. in Journ. Linn. Soc.* vi. (1862) 196; *Aitchis. Cat. Panjab Pl.* 165. *Agrostis barbata*, β , *senegalensis, Pers. Syn.* i. 76. *A. littoralis* β , *Lamk. Illustr.* 161; *Poir. Encycl. Suppl.* i. 251.

The PANJAB. Dhara Ismael Khan, *Duthie*; Multan, *Edgeworth*. SCIND, *Stocks*.—DISTRIB. Afr. trop.

Perennial; stems 12–18 in., densely tufted. *Leaves* 2–5 by $\frac{1}{10}$ – $\frac{1}{8}$ in., narrowed from the cordate base to the finely acuminate tip, margins smooth, somewhat hairy towards the base; ligule a ridge of minute hairs. *Panicle* 3–5 in., interrupted, very pale yellowish. *Spikelets* very shortly pedicelled; gls. all 1-nerved; I and II hyaline, punctulate; I rather shorter and narrower than II.—Of the synonymy cited above that of *V. littoralis* β , and the two sp. of *Agrostis* are taken from J. Gay's mss. on a Senegal specimen in Herb. Kew. Of *V. scabrifolia* I know nothing, nor where Edgeworth gets the name (which is not in the "Kew Index," but from his citing Stock's number (667) as the same plant, there is no doubt that *S. glaucifolius* is that meant. Edgeworth (l.c. 182) mentions this amongst other plants of which the seeds are swept up for food by the poorer classes of the desert.

*** Glume I shorter than II and III.

† *Panicle contracted. Perennials, except S. piliferus.*

8. **S. tremulus**, *Kunth Revis. Gram.* i. 67, *Enum. Pl.* i. 210, *Suppl.* 166; stoloniferous, leaves short subulate or filiform flat or convolute pungent margins smooth, spikelets $\frac{1}{16}$ in., gl. I shorter than III lanceolate, II as long as III or longer, grain oblong. *S. geniculatus, Nees ex Aitchis. Cat. Panjab Pl.* 165. *S. orientalis, Trim. Cat. Ceyl. Pl.* 108 (*non Kth.*). *Vilfa geniculata, Nees ex Steud. Syn. Gram.* 156; *Herb. Wight n.* 3307. *V. orientalis, Wight Cat. n.* 1745 (*in part*). *V. tremula, Trin. Diss.* i. 155; *Steud. l.c.* 160. *Agrostis juncea, Lamk. Encycl.* i. 60, *Illustr.* t. 41, f. 2. *A. Phuldubha, Herb. Ham. ex Wall. Cat. n.* 3770. *A. tenacissima, Roxb. Fl. Ind.* i. 316 (*excl. Syn.*). *A. tremula, Willd. Sp. Pl.* i. 372 (*excl. Syn.*). *Zoysia? tremula, Beauv. Agrost.* 148.—*Sporobolus, Wall. Cat. n.* 3770, 3771.

Plains of INDIA, from the Panjab to Bengal and southwd. PEGU, *Kurz. Ceylon, Trimen*.—DISTRIB. Tonkin, Cambodia.

Stems 2–6 in., many from a hard knotted stoloniferous stock, erect or prostrate, wiry; stolons 6–18 in., stout or slender, leafy, flexuous. *Leaves* $\frac{1}{2}$ –2 in., rigid, narrowed from the usually hairy base to the tip; ligule a few hairs. *Panicle* 1–4 in., subspiciform, sometimes longer flexuous and interrupted, branches short rarely a few spreading; pedicels short. *Spikelets* crowded, subsistent on the very short pedicels, very pale; glumes all 1-nerved; palea as long as its gl. *Stamens* 3.—A very common and variable pasture grass. *Vilfa geniculata* is a large state from Madras, with almost woody stems 12–18 in. long and flat leaves.

9. **S. spicatus**, *Kunth Revis. Gram.* i. 67, *Enum. Pl.* i. 210; stoloniferous, leaves short rigid, panicle slender cylindric, spikelets $\frac{1}{16}$ in.,

gl. I minute, II lanceolate acute, grain obliquely oblong. *Boiss. Fl. Orient.* v. 512. *S. orientalis*, *Herb. Wight* n. 3303, 3304, *Cat.* n. 1745 (*in part*). *Vilfa spicata*, *Beauv. Agrost.* 16; *Trin. Diss.* 1, 152, *Sp. Gram. Ic.* t. 12; *Steud. Syn. Gram.* 160. ?*Agrostis involuta*, *Poir. Encycl. Suppl.* i. 252. *A. spicata*, *Vahl Symb.* i. 9; *Del. Fl. Egypt.* 20, t. 10. f. 1. *A. virginica*, *Forsk. Fl. Æg. Arab.* 20 (*ex Kunth*).—*Sporobolus*, *Wall. Cat.* n. 3773.

THE DECCAN PENINSULA, *Heyne*; Palamcottah, *Wight*.—DISTRIB. Arabia, Egypt, trop. Africa.

Stem 6–12 in., from a hard stoloniferous rootstock, stiff, strict above the geniculate base. *Leaves* 1–2 in., divaricate, pungent, scabrid above; ligule 0. *Panicle* spiciform, 2–3 in. by $\frac{1}{10}$ – $\frac{1}{8}$ in. diam. *Spikelets* sessile, persistent on the branchlets, pale. *Glumes* hyaline, I rounded; II 1-nerved; III ovate-lanceolate; palea as long as the gl. *Grain* obliquely oblong or orbicular-oblong.—*Agrostis involuta*, *Poir.*, referred here by *Sprengel*, is a Marocco plant, which may be *S. virginicus* or *pungens*.

10. *S. orientalis*, *Kunth Enum. Pl.* i. 211; stoloniferous, leaves pungent, margins serrulate, panicle narrowly oblong, spikelets $\frac{1}{4}$ – $\frac{1}{2}$ in., subsessile, gl. I = $\frac{1}{2}$ III or shorter tip rounded, II = III or longer obtuse, grain obovoid. *Dalz. & Gibs. Bomb. Fl.* 295. *S. humifusus*, *Trim. Cat. Ceyl. Pl.* 108 (*non Kunth*). *Vilfa diandra*, *Trin. Diss.* i. 154 (*excl. Syn. Retz.*). *V. orientalis*, *Nees ex Trin. in Mem. Acad. Petersb. Ser. vi. Sc. Nat.* v. II. (1840), 65; *Wight Cat.* n. 1745 (*in part*); *Steud. Syn. Gram.* 156. *Agrostis elongata*, *Roth. Nov. Sp.* 41. *A. orientalis*, *Nees Agrost. Bras.* 393 (*excl. Syn. Roxb.*). *A. pungens*, *Herb. Heyne ex Wall. Cat.* n. 3772. *A. tenacissima*, *Linn. f. Suppl.* 107 (*excl. Syn. Jacq.*).—*Sporobolus*, *Wall. l. c.*

THE DECCAN PENINSULA, *Heyne*, *Wight*. CEYLON, at Calpentyn, *Trimen*.

Stem 6–18 in., base stout, hard, branching, branches and flowering stems usually geniculate below. *Leaves* very variable, 1–6 in., suberect or spreading, more or less pungent, glabrous or hairy above; ligule 0. *Panicle* $1\frac{1}{2}$ –4 in., erect, subspiciform or more open with here and there short horizontally spreading branches that are naked below, usually pale. *Spikelets* closely packed; gl. I nerveless, II and III 1-nerved.—The Ceylon and Heyne's specimens are 12–18 in. high with long flat leaves and narrow open panicles, *Wight's* are shorter and stouter with spiciform panicles, and closely resemble states of *S. tremulus*, from which the short obtuse gl. I at once distinguishes it. Although in *Herb. Wight Prop.* the four species mentioned in the notes to *S. virginicus* are all included under No. 1745, *S. orientalis*, the latter alone bears that number in *Herb. Hook.* and *Herb. Benth.*

11. *S. piliferus*, *Kunth Enum. Pl.* i. 211 (var. α); annual, leaves hairy serrulate, panicle linear branches very short erect, spikelets $\frac{1}{10}$ – $\frac{1}{6}$ in., gl. I $\frac{1}{2}$ – $\frac{2}{3}$ III lanceolate, II longer than III oblong-lanceolate, III oblong, grain oblong compressed. *S. ciliatus*, *Munro in Herb. Ind. Or. Hf. & T.*; *Duthie Grass. N.W. Ind.* 29 (*non Vilfa ciliata, Presl.*). *Vilfa pilifera*, *Trin. Diss.* i. 157, ii. 23, *Sp. Gram. Ic.* t. 58. *Triachyum nilagiricum*, *Steud. in Hohen. Pl. Ind. Or.* n. 931.—*Sporobolus*, *Wall. Cat.* n. 3774.

WESTERN HIMALAYA; from Kashmir to Nepal, alt. 3–8000 ft., *Wallich*, &c. THE KHASIA HILLS, alt. 5000 ft. MYSORE, at Belgaum, *Ritchie*. NILGHIRI HILLS, *Wight*, &c. MALACCA, *Hervey*.

Stems 3–12 in., densely tufted, erect, roots fibrous. *Leaves* 1–4 in., chiefly radical, narrowed from the base to the tip, flat or convolute, sparsely hairy above and at the mouth of the sheath, margins serrulate below or nearly to the tip; ligule 0. *Panicle* 1–3 in., strict, erect, dense-fl., often interrupted. *Spikelets* brown; gl. I nerveless; II and III 1-nerved, callus minute; palea oblong. *Stamens* 2, anthers very short.—*Trinius* figures this plant from a Brazilian and a Nepalese specimen.

The latter from Wallich is a very dwarf form, which is not uncommon in the Himalaya. The Brazilian is Kunth's *β. major*, is a much larger specimen, and may or may not be specifically the same. *S. ciliatus*, Presl, to which *S. piliferus* was referred by Munro, is a Panama plant, and is, I think, from the description different.

†† *Panicum open, effuse.*

12. ***S. arabicus***, Boiss. *Diagn. Pl. Or. Ser. I. xiii. 47*; perennial, stems many from a woody stoloniferous base, leaves rigid narrow, panicle pyramidal, spikelets $\frac{1}{16}$ in. crowded subsessile at the ends of the branches, gl. I minute ovate, II ovate-oblong acute as long as III. *S. pallidus*, Boiss. *Fl. Orient. v. 514 (non Lindl.)*; *Aitch. Cat. Panjab Pl. 165 (excl. Syn.)* ? *Duthie Grass. N.W. Ind. 29*, Fodd. *Grass. N. Ind. 50*. *Vilfa pallida*, Nees ex Trin. in *Mem. Acad. Petersb. Ser. VI. Sc. Nat. v. ii. (1840) 62*; *Steud. Syn. Gram. 155. V. arabica, Steud. l. c. 241.*

PANJAB PLAINS; Royle, &c. WAZURISTAN, ascending to 7000 ft., Stewart-ROHILKUND, Duthie. SCIND, Stocks.—DISTRIB. Arabia, Beluchistan.

Woody base of the stem sometimes as thick as the middle finger, sending out rigid often geniculate stolons, and stout or slender flowering branches 6–24 in. high. *Leaves* 1–10 in. by $\frac{1}{8}$ – $\frac{1}{4}$ in., narrowed from the rounded base to the tip, flat or convolute, scaberulous above, finely ciliate-serrulate; ligule 0. *Panicle* 2–6 in. long, branches whorled, capillary, naked below. *Spikelets* subspicate on the branchlets, oblong, pale; gl. II and III obtuse, 1-nerved; palea as long as its gl. *Grain* subglobose.—The synonymy of this plant is perplexing, owing to the double use of the specific name *pallidus*, and to the fact of *Vilfa* being now regarded as a synonym of *Sporobolus*. This name (*pallidus*) was applied by Nees in 1840 to the Arabian plant described above, under *Vilfa*; and by Lindley in 1848 to a very different Australian one, under *Sporobolus*. Bentham (*Fl. Austral. vii. 623*) assuming that Nees had referred his plant to *Sporobolus*, renamed Lindley's *S. Lindleyi*. Lastly, Boissier, when he founded his *S. arabicus*, was not aware that it was Trinius's *Vilfa pallida*, which he erroneously cites in *Fl. Orient.*, under *Sporobolus pallidus*, Trin. In this case the proper course appears to me to be to retain the name *Sp. pallidus*, Lindl., for the Australian plant, and *Sp. arabicus*, Boiss., for the Arabian and Indian.

13. ***S. pulchellus***, Br. *Prodr. 170*; annual, slender, leaves narrowly lanceolate flat spinulosely serrulate, panicle oblong, branches whorled capillary few-fld. towards the tips, spikelets $\frac{1}{16}$ in. shortly pedicelled, gl. I = $\frac{1}{2}$ II obtuse, keels of both ciliate, II = III broadly ovate acuminate. *Kunth Revis. Gram. ii. 106, t. 123, Enum. Pl. i. 215, Suppl. 171*; *Benth. Fl. Austral. vii. 623*. *S. capillaris*, Arn. ex Miq. *Ann. Bot. Ind. II. 25 (non Vilfa capillaris, Wt. & Arn.)*. *Vilfa pulchella, Trin. Diss. i. 160*. *Agrostis pulchella, Roth. Nov. Sp. 41*. *Panicum montanum, Ham. ex Wall. Cat. n. 8883*.—*Sporobolus, Wall. l. c.*

BEHAR, Wallich, Thomson. CHOTA NAGPORE, Clarke.—DISTRIB. Australia.

Stem 6 in.–2 ft., filiform or capillary, strict, erect from the base or nearly so, distantly leafy. *Leaves* 2–5 in., gradually narrowed from the rounded base to the finely acuminate tip, margins with tubercle-based cilia below; ligule 0. *Panicle* 2–6 in., loose, whorls of many branches at regular intervals. *Spikelets* reddish-brown? glumes almost hyaline, obtuse. *Grain* globose; pericarp loose, hyaline.—Bentham observes that Kunth's figure is of an unusually narrow-leaved form with the remarkable cilia not represented.

14. ***S. coromandelianus***, Kunth *Revis. Gram. i. 681, Enum. Pl. i. 213*; annual, leaves lanceolate flat spinulosely serrulate, panicle pyramidal branches whorled capillary, spikelets $\frac{1}{16}$ in., gl. I minute

oblong or lanceolatē, II = III both ovate-lanceolate acuminate. *Dalz. & Gibs. Bomb. Fl.* 296; *Trim. Cat. Ceyl. Pl.* 208; *Wall. Cat. n.* 3764. *S. commutatus*, *Kunth Enum. i.* 214; *Miq. Fl. Ind. Bat. iii.* 376 (excl. *Syn. pulchellus*); *Boiss. Fl. Orient. v.* 513; *Aitch. Cat. Panjab Pl.* 165; *Duthie Grass. N.W. Ind.* 29. *S. discosporus*, *Nees Fl. Afr. Austr.* 158. *Vilfa commutata*, *Trin. Diss. i.* 156; *Wight Cat. n.* 1743. *V. coromandeliana*, *Beauv. Agrost.* 15; *Trin. Sp. Gram. Ic. t.* 11 (gl. I omitted); *Steud. Syn. Gram.* 153. *V. discospora*, *Trin. in Mem. Acad. Petersb. Ser. VI. Sc. Nat.* ii. (1841) 59. *V. Roxburghii*, *Nees ex Trin. l. c.* *V. Roxburghiana*, *Nees ex Wight Cat. n.* 1742; *Steud. Nom. Ed. II. ii.* 59. *Triachyrum cordofanum*, *Hochst. ex Steud. Syn. Gram.* 176. *T. discosporum*, *Steud. l. c.* *Agrostis coromandeliana*, *Retz. Obs. iv.* 19; *Vahl Symb. i.* 10; *Roxb. Fl. Ind. i.* 316. *A. indica*, *Forsk. Fl. Æg. Arab.* 104. *A. Rura*, *Hb. Ham. ex Wall. l. c.* B.

Plains of INDIA, from the Punjab eastward to Burma, and southward to CEYLON. —DISTRIB. Affghan. N. and S. Africa. (Texas and Mexico, introd. ?).

Stems many, 4–12 in., spreading from the root, leafy. *Leaves* 1–3 by $\frac{1}{2}$ – $\frac{1}{4}$ in., narrowed from the subcordate base to the finely acuminate tip, spinulose toothed especially towards the base; mouth of sheath villous. *Panicle* very large for the size of the plant, 2–6 by 1–4 in., branches 4–6 in subsecund whorls, $\frac{1}{2}$ –2 in. long, branchlets drooping 1–2-fld. *Spikelets* subglobose; glumes hyaline, all 1-nerved or 1 nerveless. *Stamens* 2, anthers very short. *Grain* obliquely oblong or subglobose. —*Nees Fl. Afr. Austr.* refers *Agrostis pulchella*, *Roth.*, to *Sp. commutatus*, as var. β . *Trinianus*, *Arn. et Nees Glum. Ind. Or. ined.*, with panicle ovate and gl. I 5–6 times shorter than *commutatus*.

Var. *Collettii*; panicle narrowly pyramidal or conical 2–3 in. long by 1–1 $\frac{1}{4}$ in. across the lower branches, spikelets bright red-brown. —Shan Hills, *Collett*.

DOUBTFUL SPECIES.

Vilfa rigidifolia, *Trin. in Mem. Acad. Petersb. Ser. vi. Sc. Nat. v. II.* (1840) 80. —E. Indies, *Herb. Thouars*. —Described by Trinius as having spikelets 2 (French) lines long, which is twice as long as any Indian species known to me.

72. AGROSTIS, Linn.

Perennial, rarely annual grasses. *Leaves* usually flat. *Spikelets* small, 1-fld., in effuse or contracted panicles with capillary whorled branches, not jointed on their pedicels; rachilla not produced beyond gl. III. *Glumes* 3, I and II equal or unequal (sub-awned in *A. subaristata*), keeled, 1–rarely 3-nerved; III membranous, 5-nerved, truncate, glabrous, awn dorsal or 0, callus glabrous or with few minute hairs; palea nearly as long as its gl. or shorter or 0, 2-nerved or nerveless. *Lodicules* 2. *Stamens* 3, anthers long or short. *Grain* free within the gl. —Species about 100, chiefly in N. temp. regions.

The genera *Agrostis*, *Calamagrostis*, and *Deyeuxia* are, as all authors agree, separated by artificial characters and are not well limited by these. It therefore becomes a question of expediency how to limit them, and the addition of many hitherto undescribed Himalayan species has not tended to aid this operation. Many authors make of *Deyeuxia* a section of *Calamagrostis*. Bentham keeps them distinct, but confines *Calamagrostis* to species with gl. I and II longer than III. After much study, I conclude that for taxonomic purposes, the most practical arrangement is to confine *Agrostis* to species with no elongation of the rachilla, and a naked or almost naked callus of gl. III (a character appreciated by most authors); to refer to *Calamagrostis* those with a villous callus but with no elongation of the rachilla,

and to *Deyeuxia*, those with both a villous callus and the rachilla elongate beyond gl. III and (with a few exceptions) penicillate. I know of no species of *Agrostis* with the last-mentioned character of *Deyeuxia*, but there are species of *Agrostis* with longer hairs than normal in the callus, and of *Calamagrostis* with shorter hairs than normal; there are also species of the latter genus with a minute elongation of the rachilla, and of *Deyeuxia* in which that organ is short. There is no Indian *Agrostis* except *A. myriantha* with the tall coarse habit of several species of *Calamagrostis* and *Deyeuxia*, but many species of these two genera have the slender habit of *Agrostis*, and can only be distinguished from it by the minute characters given above. The species of *Calamagrostis* with the gl. III hairy all over form a peculiar section, well limited by this character; their habit is altogether that of *Agrostis*.

* Palea half as long as gl. III or longer, rarely minute.

1. ***A. alba***, Linn. *Sp. Pl.* 63; ligule oblong, flowering panicle spreading fruiting contracted, branches nearly smooth, spikelets $\frac{1}{2}$ in., gl. I and II subequal acute, III about $\frac{1}{2}$ shorter rarely awned, tip truncate crenate, callus quite glabrous. *Kunth Enum. Pl.* i. 219, *Suppl.* 175; *Boiss. Fl. Orient.* v. 514; *Schrad. Fl. Germ.* t. 2; *Fl. Dan.* x. t. 1623; *Engl. Bot.* t. 1189; *T. Nees Gen. Fl. Germ. Monoc.* i. n. 29; *Reichb. Ic. Fl. Germ.* t. 33-36; *Ledeb. Fl. Ross.* iv. 436; *Aitchis. Cat. Panjab Pl.* 165; *Duthie Grass. N.W. Ind.* 29. *A. diffusa*, *Host Gram. Austr.* iv. t. 55. *A. Michauxii*, *Herb. Strach. & Winterb.* *A. mutabilis*, *Knapp Gram. Britt.* t. 28. *A. Wightii*, *Schmid. Coll. Pl. Nilgh.*; *Herb. Wight Propr.* 1746 (in part). *A. Royleana*, *Trin. Agrost.* ii. 125.

WESTERN HIMALAYA and WESTERN TIBET, alt. 6-11,500 ft., from Kashmir to Kumaon. SIKKIM, alt. 7500 ft. (introd. ?). NILGHIRI HILLS (introd.).—DISTRIB. N. temp. regions.

Stems 1-3 ft., stoutly ascending from a tufted base, erect, slender. *Leaves* rather short, flat, nearly smooth; ligule variable in length. *Panicle* 2-8 in. long, pyramidal. *Spikelets* green or purplish, usually shining; palea = about $\frac{1}{2}$ of gl. III.—The above description applies to the common Himalayan form of *A. alba*, and accords with the European. I have not cited its multitudinous synonyms, of which 50 are recorded in the "Kew Index," for many apply to obscure forms or varieties none of which occur in India; except var. *stolonifera* (*A. stolonifera*, *Host Gram. Austr.* t. 57) of which there are Nilghiri specimens, but no doubt introduced. The awned variety *γ. aristata*, *Boiss.* l. c., a widely distributed European, American, and Asiatic plant is noted as Tibetan by Boissier, but I have seen no specimens. It is a tall form with broad leaves. Boissier describes the branches of the panicle as rough in *alba*, but they are smooth in all Indian specimens. Wight's n. 1746 has a minute palea.

2. ***A. verticillata***, Vill. *Fl. Delph.* 74; leaves scabrid, ligule very short truncate, panicle ovate or oblong contracted or expanded dense fld., branches scabrid, spikelets $\frac{1}{2}$ in., gls. I and II subequal subacute scaberulous keels strongly scabrid, III about $\frac{1}{2}$ shorter not awned tip truncate toothed, palea nearly = gl., callus quite glabrous. *Ledeb. Fl. Ross.* iv. 438; *Boiss. Fl. Orient.* v. 513; *Trin. Diss.* i. 195, *Sp. Gram. Ic.* t. 36; *Reichb. Ic. Fl. Germ.* t. 35. *A. adscendens*, *Lange in Kjoeb. Vidensk. Meddel.* (1860) 33. *A. anatolica*, *C. Koch. in Linnæa*, xxi. (1848) 379. *A. densa*, *Bieb. Fl. Taur. Cauc.* i. 56. *A. diffusa*, *Bess. Prim. Fl. Gallic.* i. 68. *A. Muelleri*, *Presl Bot. Bemerk.* 120. *A. refracta*, *Moench. Meth. Suppl.* 60. *A. stolonifera*, *Linn. Herb. non Sm.*; *Bieb. l. c.* iii. 62 (ex *Ledeb. l. c.* 439). *A. Villarsii*, *Poir. Encycl. Suppl.* i. 251.

THE PANJAB; Hursa, *Aitchison*. KASHMIR; Chittapani Valley, *Levinge*. SIMLA, alt. 2-4600 ft. (*Griseb.*).—DISTRIB. N. temp. regions.

Stem long slender creeping, then ascending to 10-15 in. high. *Leaves* rather

broad. *Panicle* 2-3 in., lobed, branches very short with densely fastigiate branchlets, and crowded very shortly pedicelled green spikelets.—Described as annual by Grisebach in Ledeb. Fl. Ross., but as perennial by other authors.

3. **A. subaristata**, *Aitch. & Hemsl. in Journ. Linn. Soc. xix.* (1882), 192, t. 29; leaves scabrid, ligule long, panicle elongate contracted or subeffuse, branches short scaberulous, spikelets $\frac{1}{12}$ in., gl. I and II subequal scaberulous tips aristulate, keels scabrid, III about $\frac{1}{3}$ shorter, tip truncate toothed, awn 0 or minute, palea nearly as long as the gl., callus quite glabrous. *Boiss. Fl. Orient. v.* 514.

KASHMIR, *Falconer*; at Sreenuggur and Nowgunji, alt. 5-6000 ft., *Clarke*.—DISTRIB. Afghanistan.

Stem long creeping and rooting below (as in *vulgaris*) then ascending, stout or slender. *Panicle* 3-6 in., dense- or lax-fl'd., branches flowering to the base. *Spikelets* pale, very shortly pedicelled, often densely packed. Gl. I and II membranous, with the median nerve sometimes produced into a very short awn; III dorsally awned in Afghan specimens.—Apparently a very distinct species, strongly resembling *A. vulgaris* in habit; the awned gl. I and II are found in no other Indian species. The Afghan specimens have larger and more scabrid subhispid spikelets.

4. **A. peninsularis**, *Hook. f.*; tall, very slender, erect, leaves very narrow strict, ligule short, panicle as broad as long very lax and open, branches 2-4-nate and branchlets long capillary simple in the lower half or more then very sparingly branched and few-fl'd., spikelets $\frac{1}{2}$ in., gl. I and II subequal, III nearly = II strongly 4-nerved tip truncate 2-aristulate, awn basal exserted, callus very shortly bearded, palea = gl. III lanceolate 2-nerved, anther as long as the gl. *A. Hookeriana*, *Herb. Wight*.

DECCAN PENINSULA, *Wight* (*Cat. n.* 1746, *in part*); ? Pulney Mts., *Wight*.

Stem 2 ft. or more, erect from the very base, stiff, leafy upwards. *Leaves* flat, 3-4 by $\frac{1}{2}$ in., erect, finely acuminate, nearly smooth. *Panicle* 3-4 in., branches in distant whorls, perfectly smooth. *Spikelets* green or purple. *Anthers* very large, purple, tips of cells almost beaked.—The Pulney plant has narrower more acuminate gl. I and II than the others, and III is shorter in proportion, but it is otherwise identical; its stamens are imperfect. Closely resembles *Calamagrostis pilosula*.

** Palea short or 0.

† Gl. III awned.

5. **A. canina**, *Linn. Sp. Pl.* 62; radical leaves narrow convolute cauline very narrow, ligule oblong, panicle oblong or ovate spreading in fl. contracted in frt., branches lax-fl'd., spikelets $\frac{1}{12}$ — $\frac{1}{10}$ in., gl. I and II unequal lanceolate acute or acuminate, III $\frac{1}{4}$ shorter tip truncate 4-toothed, awn median to basal, palea 0, callus glabrous, anthers long. *Kunth Enum. Pl. i.* 222; *Host Gram. Austr. iv.* t. 53; *Engl. Bot. t.* 1856; *Knapp Gram. Britt. t.* 21; *Reichb. Ic. Fl. Germ. t.* 33; *T. Nees Gen. Fl. Germ. Monocot. i.* n. 29; *Duthie Grass. N.W. Ind.* 29; *Ledeb. Fl. Ross. iv.* 440; *Boiss. Fl. Orient. v.* 516. *Trichodium caninum*, *Schrad. Fl. Germ. i.* 198. *Agraulis caninus*, *Beauv. Agrost. 5, t.* 4, f. 7.

WESTERN HIMALAYA and WESTERN TIBET: Kashmir, alt. 9-12,000 ft., *Clarke*, *Duthie*; Lahul, *Hay*. NILGHIRI HILLS, alt. 8000 ft., *Clarke* (introd. ?).—DISTRIB. N. temp. regions.

Stem 1-2 ft. very slender, rarely stoloniferous. *Leaves* $\frac{1}{16}$ — $\frac{1}{10}$ in. broad. *Panicle* 2-4 in.; branches capillary, scaberulous or nearly smooth. *Spikelets* green, pale or purple; awn exserted, geniculate; callus sometimes minutely scabrid.—There are upwards of 30 recorded synonyms of this plant.

6. ***A. brachiata***, *Munro mss.*; tall, very slender, leaves long, ligule very small, panicle effuse, branches branchlets and pedicels capillary divaricate, spikelets $\frac{1}{16}$ in. few distant very long-pedicelled, gl. I and II subequal oblong subacute, III nearly as long narrowly truncate, callus quite glabrous, awn median.—*Sporobolus*, *Wall. Cat. n.* 3769 B.

BEHAR; at Monghyr, *Wallich*.

Stem 2-3 ft. high or more, as slender as a sparrow's quill, weak and probably decumbent on bushes, internodes 6 in. long. *Leaves* 6-8 by $\frac{1}{8}$ - $\frac{1}{4}$ in., finely acuminate, contracted towards the base, thin and flaccid. *Panicle* 6-12 in., quite smooth, branches 2-2 $\frac{1}{2}$ in. long, opposite or in distant whorls of 3-5, horizontal; pedicels $\frac{1}{8}$ - $\frac{1}{4}$ in. *Gl.* I and II equal, cymbiform; III as long as I and II, 5-nerved, mid-nerve reaching half way up; palea minute. *Grain* oblong, compressed, as long as the gl.—An extraordinarily delicate species, quite unlike any other and more resembling a *Sporobolus*. The specimens are advanced, in frt., and I have seen no awn, or any other indication of one except the shortened median nerve.

7. ***A. filipes***, *Hook. f.*; very slender, leaves short very narrow, ligule very short, panicle very narrow elongate, branches short alternate and 2-3-nate erect smooth, spikelets $\frac{1}{14}$ - $\frac{1}{12}$ in. shortly pedicelled erect, gl. I and II unequal acute, III $\frac{1}{3}$ shorter tip truncate nearly entire, callus quite glabrous, awn dorsal from above the middle geniculate, palea minute.

KHASIA HILLS, alt. 5-6000 ft., in several places, *Clarke*.

Stem 8-15 in., erect or geniculate below, densely tufted, base hard. *Radical leaves* many, tufted, 1-2 in., subulate, cauline rather longer and broader. *Panicle* 2-4 in., interrupted; branchlets $\frac{1}{4}$ - $\frac{3}{4}$ in., capillary, shortly naked below, smooth. *Spikelets* green or pale reddish; gl. I and II with scabrid keels; awn shortly exserted. *Anthers* very short. *Grain* ovoid, acute.—Nearest to *A. canina*, but the long very narrow interrupted panicle is constant in all the specimens from five distant localities at different elevations.

Var. ? palea 0, grain linear-oblong. *A. nervosa*, *Nees, var. aristata*, *Munro in Herb. Kew.*—Sikkim; at Lachoong, alt 9000 ft.

8. ***A. Hookeriana***, *Clarke mss. (non Munro)*; very slender, leaves very narrow flaccid, ligule oblong, panicle broad with rather distant whorls of few very long flexuous capillary branches naked and unbranched for half their length, spikelets $\frac{1}{16}$ - $\frac{1}{8}$ in., gl. I and II unequal lanceolate acuminate, III about $\frac{1}{3}$ shorter tip truncate denticulate, callus glabrous or minutely hairy, awn dorsal.

SIKKIM HIMALAYA, alt. 9-11,000 ft., in meadows, *J. D. H. Cummins* (in *Herb. Clarke*).

Stem 1-2 ft. *Leaves* 2-6 in., flat, $\frac{1}{12}$ in. broad. *Panicle* 2-6 in., branches 2-3 in., minutely scaberulous; pedicels as long as the spikelets or longer. *Spikelets* green, rather distant; awn exserted; callus sometimes distinctly but minutely bearded. *Anthers* linear. *Grain* oblong.—Spikelets very much larger than in the foregoing species. This is not *A. Hookeriana*, *Munro ex Duthie Grass. N.W. Ind.* 30, nor *Lachnagrostis Hookeriana*, *Nees ex Steud. Syn. Gram.* 192.

†† *Gl. III not awned*.

9. ***A. micrantha***, *Steud. Syn. Gram.* 70; tall, rather slender, leaves narrow, ligule oblong, panicle elongate inclined contracted in fl., branches long capillary smooth spreading in fruit, spikelets $\frac{1}{16}$ - $\frac{1}{12}$ in., gl. I and II unequal oblong-lanceolate acute, III $\frac{1}{4}$ - $\frac{1}{3}$ shorter tip truncate crenate callus

quite naked, nerves very faint, palea = about $\frac{1}{4}$ gl., anthers about $\frac{1}{3}$ gl.—*A. Wightii*, *Munro in Herb. Hook. f. & T. in part.*—*Agrostis*, *Wall. Cat.* n. 3776.

CENTRAL HIMALAYA, alt. 4–6000 ft., from Garwhal to Sikkim. ?Khasia Hills, alt. 5000 ft., *Clarke*.

Stem 2–3 ft., tufted, rather stout below in Wallich's specimens. *Leaves* 3–6 in., by $\frac{1}{10}$ – $\frac{1}{8}$ in., rarely broader, scaberulous. *Panicle* 4–10 in., lax-flid., slightly scaberulous, branches naked till towards the tips, lower whorled or fascicled; top of pedicels clavate. *Spikelets* green, gl. III 5-nerved, nerves all very slender or evanescent, the median sometimes arrested half way. *Grain* linear-oblong.—*Steudel* describes the palea as long as the gl., but it never exceeds $\frac{1}{4}$ of that organ. The Khasian specimens have a much reduced panicle and much smaller palea.

10. *A. myriantha*, *Hook. f.*; stems stout leafy, leaves broadly linear-lanceolate, ligule short, panicle 4–12 in. inclined contracted many- and dense-flid., rachis rather stout, branches fascicled or whorled often fig. to the base, spikelets $\frac{1}{20}$ – $\frac{1}{10}$ in., gl. I and II subequal oblong subacute, III nearly as long tip truncate crenate, nerves very faint, callus quite naked, palea = $4\frac{1}{3}$ gl., anthers $\frac{1}{3}$ – $\frac{2}{3}$ gl.—*Agrostis*, n. 7 *Herb. Hook. f. & T.*

SIKKIM HIMALAYA; alt. 9–12,000 ft., common. Khasia Hills, alt. 4–6000 ft., common.

Stem 1–5 ft., suberect or geniculate below. *Leaves* 4–12 by $\frac{1}{8}$ – $1\frac{1}{2}$ in., scaberulous. *Panicle* 6–12 in., contracted in flower, less so in frt.; branches very many in many fascicles, strict, erect, sometimes naked for half their length. *Spikelets* pale green, or brownish shortly pedicelled; gl. I and II scaberulous on the keels; III 5-nerved, nerves anthers palea and grain as in *A. micrantha*.—Very near *A. micrantha*, but a much more leafy species, with shorter and broader gl. I and II, and III longer in proportion.

Var. *sikkimensis*; stem 1–2 ft., leaves 4–8 by $\frac{1}{8}$ – $\frac{1}{6}$ in., ligule oblong, anthers = $\frac{1}{3}$ the gl.—Sikkim, common in woods.

Var. *khasiana*; stem 3–5 ft., sometimes as thick as a goose-quill below, leaves 6–12 by $\frac{1}{4}$ – $\frac{1}{2}$ in., ligule often 0, panicle up to 12 in., anthers = $\frac{2}{3}$ the gl.—Khasia Hills, abundant.

11. *A. Clarkel*, *Hook. f.*; very slender, leaves very narrow, ligule short, panicle broadly pyramidal, branches capillary spreading sparingly divided, spikelets $\frac{1}{12}$ – $\frac{1}{10}$ in., gl. I and II very unequal narrowly lanceolate acuminate, III much shorter than II 5-nerved nerves slender, tip truncate crenate, callus quite glabrous, palea very minute or 0. *A. canina*, *Munro in Herb. Ind. Or. Hf. & T. (in part).*

WESTERN HIMALAYA; *Herb. Royle*; Sikkim, alt. 9–11,000 ft., *J. D. H., Clarke, Cummins*.

Stem 6–14 in., suberect. *Lowest leaves* filiform, upper flat, all very narrow, scaberulous. *Panicle* $1\frac{1}{2}$ –7 in., branches spreading in fl. and frt., smooth or nearly so, naked below, lower geminate or in whorls of 3–5. *Spikelets* narrow, green purplish or very dark purple; gl. I $\frac{1}{4}$ or more longer than II, very finely acuminate, keel scabrid; III short and broad.—Regarded by Mr. Clarke as an awnless form of *A. canina*, but besides wanting the awn, gl. I and II are narrower and more acuminate, and III much shorter.

12. *A. inæquiglumis*, *Griseb. in Goett. Nachr.* (1868) 80; stems 4–6 in. densely tufted stiff stout, leaves filiform or nearly so, ligule short, panicle spiciform dense-flid., branches very short, spikelets $\frac{1}{14}$ – $\frac{1}{10}$ in., gl. I and II unequal ovate-lanceolate acute, III $\frac{1}{4}$ shorter than II tip narrowly

truncate crenate, callus quite naked, palea minute or 0, anthers short. *Agrostis* n. 10, *Herb. Ind. Or. Hook. f. & Thoms.*

SIKKIM HIMALAYA; alt. 12–16,000 ft., J. D. H., Clarke, &c.

Stem 4–6, rarely 8 in. *Leaves* usually convolute, upper sometimes flat, not $\frac{1}{12}$ in. broad; lower sheaths green or purple. *Panicle* 1–2 in., strict, branches stout densely imbricating, flg. to the base. *Spikelets* very shortly and stoutly pedicelled, green or dark purple.—A very common alpine grass, constant in habit at all elevations.

13. ***A. divaricata***, Griseb. in Goett. *Nachr.* (1868) 82; stems 4–6 in. densely tufted capillary, leaves capillary, panicle small with widely spreading divaricate sparingly divided branches and capillary pedicels, spikelets $\frac{1}{18}$ – $\frac{1}{16}$ in., gl I and II very unequal ovate-lanceolate, I acute, II acuminate, III about $\frac{1}{4}$ shorter than II tip truncate crenulate, nerves very faint, callus quite glabrous, palea most minute orbicular, anthers short. *Herb. Ind. Or. Hf. & T. No.* 11.

SIKKIM HIMALAYA, Yeumtong, on moist banks, alt. 13,000 ft., J. D. H.

The most delicate little species known to me, resembling *Aira caryophyllea* in size and slenderness, but growing in dense tufts. *Leaves* about 1 in., convolute, flexuous; ligule short, oblong. *Panicle* about 1 in. long and broad, branches geminate, quite smooth. *Spikelets* remote, purple, keels of gl. I and II scabrid, pedicels rather long. *Grain* oblong.—A single specimen of a Sikkim *Agrostis* in Herb. Calcutta (n. 663 in part) without further habitat, resembles this in the small stature and panicle, but has a much stouter stem, and flat leaves about $\frac{1}{10}$ – $\frac{1}{8}$ in. gl. I and II are more obtuse. More specimens of both are much wanted.

DOUBTFUL SPECIES.

A. NERVOSA, Nees ex Trin. in Mem. Acad. Petersb. Ser. VI. vi. II (1845) 328; Steud. Syn. Gram. 165; Duthie Grass. N.W. Ind. 30; leaves flat, ligule very short, panicle 4 in. lower branches 4-nate naked below, gl. I and II subequal hardly $\frac{1}{12}$ in. acute, III $\frac{1}{3}$ shorter, awn 0, palea rather shorter than the ovary, callus very shortly retrorsely pilose.—Nepal. (See *Calamagrostis pilosula*).

A. PROCERA, Retz. Obs. iv. 19. ? *Thysanolaena Agrostis*.

A. WIGHTII, Nees ex Steud. l. c. 168; leaves flat margins scabrous, ligule ovate, panicle long capillary, branches 2–4-nate, branchlets 2–3-chotomous scabrid, gl. I and II equal subobtuse, keel scabrid III = II 3-denticulate, palea rather longer than the ovary ovate-lanceolate acute. *Vilfa vulgaris*, Wight Herb. 78 (ex Steud.).

A. ZENKERI, Steud. l. c. 170; stem exceedingly slender scaberulous above, leaves 1–1½ in. erect strict convolute retrorsely scabrid, ligule obtuse, panicle pyramidal, rays 2-nate widely spreading, spikelets 1½ line purple, gl. I and II equal acute, III as long shortly denticulate 5-nerved awn 0, palea as long 2-nerved, callus hairy all over.—*Nilghiri Hills*.

73. **MUEHLENBERGIA**, Schreb.

Annual or perennial very slender grasses. *Leaves* narrow, flat. *Spikelets* very numerous and minute, 1-fl., paniced, terete, not jointed on their pedicels; rachilla jointed at the base, not produced. *Glumes* 3, I and II persistent, equal or unequal, 1-nerved; III as long or longer than I and II, terete, membranous, 3-nerved, hairy below the middle, tip

acute or minutely 2-toothed awned, awn very slender not twisted; palea oblong, as long as the gl. or longer, 2-nerved, nerves almost meeting in the tip; callus minute. *Lodicules* 2, very minute. *Anthers* short or long. *Styles* free, stigmas short. *Grain* cylindric, free in the gl. and palea.—Species about 60 chiefly temp. American.

The above character applies to the Indian species; of the American some have only one empty gl., in others gl. III is awnless or 5-nerved.

1. *M. sylvatica*, Torr. & Gr. ex Trin. in *Mem. Acad. Petersb. Ser. VI. vi. II.* (1845) 292 (excl. syn. *viridissima*); panicle erect contracted interrupted, branches very short flg. to the base, spikelets very shortly pedicelled, gl. I and II $\frac{1}{12}$ – $\frac{1}{10}$ in. lanceolate acuminate, III about as long, awn $\frac{1}{8}$ – $\frac{1}{2}$ in. *Steud. Syn. Gram.* 179; *A. Gray Man. Bot. N. U. St.* 612, t. 8; *Duthie Grass. N.W. Ind.* 28. *M. Duthiæana*, Hack. in *Herb. Duthie. Agrostis diffusa*, Muehlb. *Descr. Gram.* 64. *A. sylvatica*, Torrey *Fl. N. Am.* i. 87 (non Linn.).

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 4–9000 ft., Royle, &c.—DISTRIB. Japan, N. Am.

Stem 1–3 ft., very slender, branched, decumbent and creeping below. *Leaves* 3–5 by $\frac{1}{10}$ – $\frac{1}{8}$ in., smooth or scaberulous; ligule very short, lacerate. *Panicle* 4–6 in., pale green or violet; rachis and very short erect branches and pedicels scabrid. *Spikelets* crowded, erect; gls. I and II subequal, 1–3-nerved, keels scabrid; III minutely notched at the tip, hairs much shorter than the gl.; palea about as long as its gl.

2. *M. viridissima*, Nees ex Steud. *Syn. Gram.* 178; panicle elongate much fastigiately branched flexuous interrupted branches and pedicels slender, gls. I and II $\frac{1}{20}$ – $\frac{1}{16}$ in. equal or unequal, III twice as long or longer, awn $\frac{1}{8}$ –1 in. *Duthie Grass. N.W. Ind.* 28. *M. Huegelii*, Trin. in *Mem. Acad. Petersb. Ser. VI. vi. II.* (1845) 293. *M. geniculata*, Nees ex Steud. *Syn. Gram.* 178; *Duthie l. c.*—*Podosaemum*, Wall. *Cat. n.* 3778.

TEMPERATE HIMALAYA, alt. 3–9000 ft., from Kashmir to Sikkim and the KHASIA HILLS.

Habit of *M. sylvatica*, but usually a larger grass, with longer broader leaves and a loose interrupted flexuous bright green panicle often a foot long. *Spikelets* shortly pedicelled; gls. I and II very variable, both ovate-lanceolate 1-nerved and shortly awned with scabrid keels and awn, or I much smaller oblong or orbicular erose and nerveless.

3. *M. himalayensis*, Hack. in *Herb. Duthie n.* 10,128; panicle elongate much fastigiately branched interrupted, branches and pedicels slender, gls. I and II $\frac{1}{8}$ – $\frac{1}{6}$ in. subequal lanceolate acuminate or subaristate, III as long as I and II or rather longer, awn $\frac{1}{2}$ –1 in.

WESTERN HIMALAYA, alt. 6–7000 ft., from Chamba to Simla, Thomson, Madden, &c.

Stem 12–18 in., very slender, decumbent or ascending, branched. *Leaves* narrow, flaccid; ligule oblong. *Panicle* 3–6 in., very narrow, slender, flexuous, flaccid, branches distant. *Spikelets* bright green, glistening, larger than in *sylvatica* and *viridissima* to which latter it is most nearly allied, differing in being more slender with narrower leaves, in the laxer, fewer fld. panicle, in the larger spikelets, and in gl. III not being much longer than I and II.

74. **CALAMAGROSTIS**, *Adans.*

Stout or slender grasses. *Leaves* narrow. *Spikelets* in narrow or effuse panicles, 1-fl., not jointed on the pedicels; rachilla jointed at the base, not produced beyond gl. III. *Glumes* 3, I and II equal or unequal, lanceolate, acuminate, glabrous or scaberulous; III shorter, hyaline, truncate, crenate or cleft, glabrous or hairy, awned, paleate; palea often minute, rarely 0; callus bearded with long or short hairs.—Species about 15? natives of cold and temp. climates.

See remarks under *Agrostis* (p. 253). See also *Deyeuxia abnormis*, which is intermediate between that genus and *Calamagrostis*.

* Glume III glabrous.

† Hairs of callus longer than gl. III.

§ *Glume III dorsally awned at the middle or below it.*

1. **C. epigejos**, *Roth. Tent. Fl. Germ.* i. 34; stem stout creeping below, leaves glaucous scaberulous, ligule long acute, panicle dense, branches scaberulous, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in., gl. I and II subequal subulate-lanceolate, III = $\frac{1}{2}$ II tip 2-fl., awn dorsal at or near the middle, palea = $\frac{1}{2}$ – $\frac{2}{3}$ gl. III, hairs of callus as long as gls. I and II. *Kunth Enum. Pl.* i. 237, *Suppl.* 184; *Host Gram. Austr.* iv. 24, t. 42. *Reichb. Ic. Fl. Germ.* t. 43; *Ledeb. Fl. Ross.* iv. 432; *Boiss. Fl. Orient.* v. 525; *Duthie Grass. N.W. Ind.* 30. *C. georgica* & *thyrsoides*, *C. Koch in Linnæa*, xxi. (1848) 387, 388. *C. glomerata*, *Boiss. et Böhse in Mem. Soc. Nat. Mosc.* xii. (1860) 229. *C. lithuanica* & *vilneensis*, *Schult. Mant.* iii. 602. *C. lanceolata*, *Stokes in With. Arr. Brit. Pl. Ed. III.* ii. 122. *C. glauca* & *Huebneriana*, *Reichb. Fl. Germ. Excurs.* 27, *Ic. Fl. Germ.* t. 43. *C. rigens*, *Fries Summ. Veg. Scand.* 240. *Arundo epigejos*, *Linn. Sp. Pl.* 81; *Engl. Bot.* t. 402; *Fl. Dan.* t. 2165; *Knapp Gram. Britt.* t. 97.

KASHMIR, alt. 8–14,000 ft., *Falconer*, &c.—DISTRIB. N. Asia. Europe. S. Africa.

Stem 2–4 ft., erect, usually stout. *Leaves* long, narrow, finely acuminate, scaberulous, more or less glaucous; ligule oblong, rather long, acute. *Panicle* 6–12 in. or more, oblong or lanceolate, much branched, branches usually erect. *Spikelets* shortly pedicelled, erect, green or light or dark purple; gl. I and II subequal or II the longest, 1-nerved or II 3-nerved, keel and often margins scaberulous; III glabrous, smooth or scaberulous, awn equalling its gl.

2. **C. decora**, *Hook. f.*; stems tall tufted very slender, leaves very long flat, panicle loosely branched, spikelets $\frac{1}{2}$ in., gls. I and II subequal lanceolate, scaberulous, III = $\frac{2}{3}$ – $\frac{3}{4}$ I truncate 4-cuspidate, awn subbasal exserted, palea as long as the gl., callus hairs rather longer than gl. III.

KASHMIR; Astor Valley, alt. 9–10,000 ft., *Duthie* (n. 12,660).

Stem 4–5 ft. or more. *Leaves* 12–18 by $\frac{1}{4}$ in., scaberulous, pale green; sheath smooth; ligule large, oblong, rounded. *Panicle* 3–8 in., pale green, rachis slender and fascicled branches scaberulous, branches naked below. *Spikelets* shortly pedicelled, suberect; gls. I and II hardly membranous, finely acuminate, keels scaberulous, I 3-nerved; III glabrous, except the callus; awn shortly exserted. *Anthers* linear.

§§ *Glume III awned in the upper third or tip.*

3. **C. emodensis**, Griseb. in Goett. Nachr. (1868) 80; stem stout creeping below, leaves long broad flat glaucous scaberulous, panicle dense or effuse much-branched, spikelets $\frac{1}{2}$ in. crowded, gl. I and II unequal subulate-lanceolate, III = $\frac{1}{2}$ I cleft to about the upper $\frac{1}{3}$ awned in the cleft, awn exserted, palea = $\frac{3}{4}$ its gl. *C. nepalensis*, Herb. Strach. & Winterb. (in part). *Calamagrostis*, Wall. Cat. n. 3781 B.

TEMPERATE HIMALAYA, alt. 7–12,000 ft., from Kashmir to Bhotan, Falconer, &c.

Stem 3–5 ft., as thick as a goose-quill below. *Leaves* 12–18 by $\frac{1}{4}$ – $\frac{3}{8}$ in., thinly coriaceous, pale glaucous green, many-nerved; sheath nearly smooth or scaberulous; ligule oblong, membranous. *Panicle* 6–10 in., inclined or nodding, very soft, shining and silky, pale grey; branches branchlets and very short pedicels capillary, smooth, or minutely scaberulous. *Glumes* I and II very thin, smooth, keels scaberulous, I 1-nerved; II 3-nerved; III glabrous, hyaline, usually cleft from the upper third into two lanceolate subulate-acuminate lobes; but the lobes are sometimes irregularly lacerate at the tip; nerves 5, faint.

4. **C. littorea**, DC. Fl. Franc. v. 255; stem stout or slender creeping below, leaves narrow scaberulous often convolute, ligule oblong, panicle dense or effuse, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in., gl. I and II unequal subulate-lanceolate scaberulous, III = $\frac{1}{2}$ – $\frac{3}{8}$ I tip truncate erose or toothed, awn terminal in a notch or short cleft or dorsal below the tip included, palea nearly as long as the gl. *Kunth Enum. Pl. i.* 237; *Reichb. Ic. Fl. Germ. t. 42*; *Boiss. Fl. Orient. v.* 524; *Steud. Syn. Gram.* 187. *C. glauca*, *Reichb. Fl. Germ. Excurs.* 27. *C. lanceolata*, *Aitchis. in Journ. Linn. Soc. xviii.* (1880) 107 (non Roth.). *C. laxa*, *Host Gram. Austr. iv.* 25, t. 43; *Ledeb. Fl. Ross. v.* 432; *Herb. Ind. Or. Hf. & T. (in part)*; *Griseb. in Goett. Nachr.* (1868) 80. *C. nepalensis*, *Nees ex Steud. Syn. Gram.* 193; *Duthie Grass. N.W. Ind.* 30; *Aitchis. in Trans. Linn. Soc. Ser. II. Bot. iii.* 124. *Arundo glauca*, *M. Bieb. Fl. Taur. Cauc. i.* 79. *A. laxa*, *Roem. & Sch. Syst. ii.* 502. *A. littorea*, *Schrad. Fl. Germ. i.* 212, t. 4, f. 2.—*Calamagrostis*, Wall. Cat. n. 3781 A.

TEMPERATE HIMALAYA, alt. 6–10,000 ft. from Kashmir to Sikkim. WESTERN TIBET, alt. 10–12,000 ft.—DISTRIB. Europe, N. and W. Asia.

Stem 2–5 ft., erect, as thick as a crow-quill or small goose-quill, but sometimes very slender. *Leaves* 12–18 by $\frac{1}{12}$ – $\frac{1}{8}$ in., firm, smooth or scaberulous, flat or convolute; sheaths smooth; ligule linear-oblong. *Panicle* very variable in form and composition, erect or inclined, green or purple, rachis and branches scaberulous. *Spikelets* rarely $\frac{1}{2}$ in. long, sometimes only $\frac{1}{8}$ in., when the outer glumes are broader; gl. I and II with scaberulous keels, I usually about $\frac{1}{4}$ longer than II, but sometimes subequal, I 1-nerved and II 3-nerved at the base, but both sometimes 3-nerved; III glabrous, smooth or faintly scaberulous, faintly 5-nerved; awn very slender, variable in length, rarely longer than its gl.—A very difficult plant to define satisfactorily so much do the spikelets vary in size, in the breadth of the empty gls., and in the incision of the top of gl. III, which is either rounded and obtusely 2-toothed with an awn in the sinus, or truncate with a terminal awn, or 2-lobed nearly $\frac{1}{2}$ way down with lobes irregularly incised and the awn in the sinus, or finally the awn may be strictly dorsal below the truncate tip. Dr. Stapf, who has revised the whole of the Indian material which I had referred to this species, confirms the above view of its variation, and agrees with me in referring it to the European *C. littorea*.

Var. *tartarica*; stem shorter stouter, leaves convolute, panicle strict narrowly

oblong dense-fld., spikelets usually dark purple. *C. tartarica*, Jacquem. mss. *C. laxa*, var. *robustior*, Herb. Hf. & T.—Common in the drier districts especially in Western Tibet.

5. ***C. Stolizkai***, Hook. f.; stem short stout, leaves erect convolute, panicle short oblong contracted dense, spikelets $\frac{1}{2}$ in. shortly pedicelled, gl. I and II subequal lanceolate acuminate scaberulous, III about $\frac{1}{3}$ shorter than II tip truncate 4-aristulate, awn terminal exserted, palea as long as its gl., hairs of callus rather longer than gl. III shorter than I and II.

WESTERN TIBET; Zanskar, on the Pensi-la, alt. 12–15,000 ft., *Stolizka*.

Stem 18–24 in., erect. *Leaves* 3–6 by $\frac{1}{8}$ – $\frac{1}{4}$ in., very scabrid above; sheaths scaberulous; ligule oblong. *Panicle* 4 in.; branches short, erect or suberect, scabrid. *Spikelets* erect, crowded, pale, shining; gl. I and II hyaline, sub 3-nerved; III glabrous, hairs of callus unequal in length; awn about twice as long as the spikelet, straight, shortly exserted.—I have seen only two specimens.

6. ***C. debilis***, Hook. f.; very slender, leaves short very narrow, panicle narrow, branches few rather short laxly flowering and pedicels capillary, spikelets $\frac{1}{2}$ in. pale, gls. I and II unequal lanceolate acuminate keels quite smooth, III about $\frac{1}{3}$ shorter than II or less, tip truncate erose, awn dorsal in upper third of the gl. exserted, palea as long as its gl., hairs of callus = gl. I and II.

SIKKIM HIMALAYA; Chola, alt. 11,000 ft., J. D. H.

Stem 12–18 in., tufted, geniculate below. *Leaves* distant, 1–2 by $\frac{1}{16}$ – $\frac{1}{12}$ in., flat, quite smooth, upper shorter spreading; sheath smooth; ligule oblong. *Panicle* 2–5 in., branches and branchlets smooth. *Spikelets* pale purplish brown, long-pedicelled; gl. I and II 1-nerved; III glabrous, 5-nerved. *Anthers* very small.—I found this very delicate species only once and then late in the season, the very small anthers are peculiar.

†† Hairs of callus much shorter than gl. III.

7. ***C. tripilifera***, Hook. f.; very slender, leaves short narrow flat, panicle of few very long wide spreading 2–3-nate branches sparingly divided towards the ends, spikelets $\frac{1}{2}$ in. long-pedicelled, gls. I and II subequal lanceolate acuminate, III firm $\frac{1}{3}$ shorter than I tip truncate with 2 short lateral awns and a median dorsal exserted awn, palea $\frac{1}{3}$ shorter than its gl., hairs of callus very unequal.

SIKKIM HIMALAYA; in the drier interior, alt. 10–13,000 ft. J. D. H., Clarke, King's Collector.

Stem tufted, 8–18 in., erect, hardly thicker than pack-thread. *Leaves* 4–6 by $\frac{1}{10}$ – $\frac{1}{8}$ in., rather flaccid, quite smooth; sheaths smooth; ligule oblong. *Panicle* with few whorls of few quite smooth capillary branches 1–2 in. long each bearing 3–5 glistening pale yellow on dull purplish spikelets on pedicels longer than themselves; gls. I and II 1-nerved, quite smooth, even the keels; III glabrous, rather strongly 4-nerved, tip with mucros between the lateral and middle awns, the latter of which is stiff and nearly twice as long as its gl.; callus hairs nearly half as long as gl. III.

Var. *Cumminsii*; panicle contracted, branches much stouter appressed to the rachis, spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in.—N.E. Sikkim, Cummins.—Perhaps a different species, but the stems, about a span long, being curved in a semicircle, show that the plant has grown under unfavourable conditions.

** Glume III hairy all over; callus hairs shorter than gl. III.

† *Palea* of gl. III nearly as long as its gl.

8. **C. Munroana**, Boiss. *Fl. Orient.* v. 523; very slender, leaves long narrow, panicle effuse or contracted, spikelets $\frac{1}{6}$ – $\frac{1}{10}$ in., gls. I and II subequal oblong-lanceolate acute 1-nerved, keels nearly smooth, III = $\frac{3}{4}$ I broadly truncate crenate, awn short infra-median included or 0, callus shortly hairy, anthers short. *Agrostis ciliata*, *Herb. Strachey & Winterbottom*; *Herb. Ind. Or. Hf. & T. in part*; ?*Duthie Grass. N.W. Ind.* 29 (non Nees). *A. Munroana*, Aitch. & Hemsl. in *Journ. Linn. Soc.* xix. (1882) 192. *A. pilosula*, Hack. in *Herb. Duthie* n. 6231 (non Trin.). *A. Royleana*, *Duthie l. c.* 30.

WESTERN HIMALAYA, from Kashmir to Kumaon, alt. 8–12,000 ft., Royle, &c. —DISTRIB. Affghan.

Stems 6–18 in., tufted, roots fibrous. *Leaves* 2–8 in., scaberulous or nearly smooth, flaccid, or in high altitudes strict; sheaths nearly smooth; ligule variable. *Panicle* 2–5 in., oblong or pyramidal; branches capillary, erect or spreading, lower fascicled or 2–3-nate, smooth or minutely scaberulous, lower often long spreading and naked below. *Spikelets* pedicelled, green or purplish; gl. I and II very thin, smooth; III hairy all over; palea as long as its gl. or $\frac{1}{4}$ shorter.—A very variable plant, one of two (the other is *C. pilosula*) which have been referred by Munro and others to *Agrostis Royleana*, Trin., a plant described by Trinius as having the bearded rachilla proper to *Deyeuxia* (see end of genus). I have in vain sought to identify *Munroana* with any other of the Roylean species, none of which are accurately described.

Var. *stricta*; stem 6–10 in. strict, leaves very narrow rather stiff erect, panicle contracted, branches short erect or spreading, pedicels very short, spikelets green or purple, gl. III always awned. *Agrostis* No. 4, *Herb. Strach. & Winterb.*—Common at altitudes of 11–15,000 ft. Though differing entirely in habit from the lax open paniced form of *Munroana*, I feel sure that this is only the alpine form of that plant from intermediates occurring between them. It resembles *Agrostis inaequiglumis*, Griseb.

9. **C. Griffithiana**, Hook. f.; tall, erect, leaves long narrow subcoriaceous, panicle long narrow branches suberect, spikelets $\frac{1}{2}$ in., gl. I and II subequal lanceolate acute, III narrow tip truncate with 4 short bristles the lateral longest, awn subbasal to median exserted, hairs of callus very short, anthers linear. *C. Hookeriana*, var. *aspera*, *Munro in Herb. Hf. & T.* *Agrostis Royleana*, *Munro in Herb. Strach. & Winterb.* n. 2. *Lachnagrostis Griffithiana*, *Munro Cat. Pl. Griff. Falc. &c.* 67 ined. *Deyeuxia Griffithii*, *Munro l. c.* 56.

WESTERN HIMALAYA; Kumaon, alt. 5500 ft., *Strachey & Winterb.* KHASIA HILLS, alt. 5000 ft., *Griffith (Kew distrib. n. 6598)*, *Hf. & T. &c.*

Stem 2–3 ft., quite erect, as thick as a crow-quill. *Leaves* 6–10 by $\frac{1}{4}$ – $\frac{1}{2}$ in., and sheaths smooth or subscaberulous; ligule very short. *Panicle* erect; branches 2–4 in., 2–5-nate, naked for half their length, then with crowded branchlets and shortly pedicelled green or purplish spikelets. *Spikelets* $\frac{1}{2}$ in., III hairy all over; palea nearly as long as its gl.—A much taller and stouter plant than any form of *C. Munroana*, with much larger spikelets, short callus hairs, and linear anthers. A fourth imperfect gl. sometimes occurs.

†† *Palea* of gl. III very short, rarely = $\frac{1}{2}$ its gl.

10. **C. pilosula**, Hook. f.; stem very slender erect, leaves long

narrow flat, panicle effuse or contracted, branches long or short sub-erect or spreading, spikelets $\frac{1}{6}$ – $\frac{1}{8}$ in., gl. I and II subequal oblong-lanceolate acute or acuminate 1-nerved smooth, III oblong tip truncate erose or crenate with sometimes 4 minute setulae, awn subbasal exserted, hairs of callus = $\frac{1}{3}$ gl. III or shorter, anthers linear. *Agrostis pilosula*, *Trin. in Mem. Acad. Petersb. Ser. VI. vi. II.* (1845) 372.

TEMPERATE and ALPINE HIMALAYA, alt. 6–14,000 ft., from Kashmir to Sikkim. NILGHIRI HILLS, alt. 3–6000 ft., *Wight, Schmid, Jacquemont, &c.* CEYLON, alt. 6–8000, *Walker, &c.*

Stems 1–3 ft. or more, tufted, 6–10 in. in alpine specimens, erect from a short inclined base. Leaves variable in breadth, up to $\frac{1}{4}$ in., but usually very narrow, flaccid, smooth or subscaberulous; sheath smooth; ligule very variable, longest in the upper leaves. Panicle very variable, large and effuse with spreading branches 1–4 in. long naked below and with loosely crowded spikelets at the extremities, or contracted with suberect shorter branches, or short broadly ovate or triangular; branches branchlets and pedicels minutely scabrid. Spikelets membranous, green and glistening in the larger forms, purple in others and more herbaceous in the alpine; gl. I and II smooth or subscaberulous, I rather the shortest, keels near or quite smooth, rarely scabrous; III $\frac{1}{4}$ – $\frac{1}{3}$ shorter than I, hyaline, hairy all over, nerves often indistinct; palea usually very minute, rarely nearly half as long as its gl.; awn more or less exserted.—A very variable grass of which Wallich's No. 3775 A from Nepal, with spikelets $\frac{1}{2}$ in. long may be regarded as the type; his B has rather larger spikelets, but is not otherwise different. I am far from supposing that I have succeeded in unravelling its synonymy which is inextricably confused with *C. Munroana* *Agrostis alba* and others. The following are marked forms in their typical states as defined, but they pass into one another.

Var. *Wallichiana*; very slender, leaves narrow sometimes filiform smooth, panicle 2–3 in., branches spreading lax-flid., spikelets green or purple. *Agrostis ciliata*, β , *Nees in Herb. Royle. A. Hookeriana*, *Munro in Herb. Kew (non Steud.)*. *A. Neesii*, *Steud. l. c.* 293. *A. nervosa*, var. *aristata*, *Munro in Herb. Hook. f. & T. & Herb. Falconer. A. Royleana*, *Duthie Grass. N.W. Ind. 30 (non Trin.)*. *A. Wallichiana*, *Steud. Syn. Gram.* 174. *Lachnagrostis ciliata*, *Munro in Herb. Jacquem. n.* 215. *L. Hookeriana*, *Munro mss.* *Arundinella Hookeriana*, *W. & A. ex Arn. in Herb. Kew (Ceylon)*.—*Agrostis Wall.* *Cat. n.* 3775.—*Agrostis n.* 5, *Herb. Strachey & Winterb.*—A common form.

Var. *scabra*; stem 2–4 ft. stout, leaves 6–12 by $\frac{1}{4}$ – $\frac{1}{2}$ in., panicle very large effuse with long spreading horizontal capillary branches sometimes 4–5 in. long in distant whorls or fascicles, spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. pale green, gl. III with the truncate tip sometimes minutely 2–4-mucronulate. *Agrostis bicuspidata*, *Hack. in Herb. Duthie n.* 10,088. *A. Royleana*, *Hack. l. c. n.* 7583. *Lachnagrostis scabra*, *Nees in Herb. Royle*.—In woods at about 7–10,000 ft. from Kashmir to Sikkim.

Var. *alpestris*; stem 6–18 in. strict, leaves narrow strict, panicle shorter narrow or broad, spikelets smaller $\frac{1}{3}$ – $\frac{1}{10}$ in. dark purple rarely green, gls. I and II oblong-lanceolate, palea sometimes = $\frac{1}{2}$ its gl. *Agrostis nervosa*, *Nees in Herb. Royle*; ?*Trin. in Mem. Acad. Petersb. Ser. VI. vi. II.* (1845) 328. *A. Royleana*, *Nees l. c. (non Trin.)*. *A. ciliata*, β , *nervosa*, *Nees in Herb. Royle. A. Roylei*, *Trin. ex Hack. in Herb. Duthie n.* 6229.—Kashmir to Sikkim, alt. 11–15,000 ft.—A common grass at high elevations.

Var. *ciliata*; panicle narrow effuse, rachis flexuous, spikelets $\frac{1}{6}$ in. shortly pedicelled pale shining, palea = $\frac{1}{4}$ its gl. *Calamagrostis ciliata*, *Steud. Syn. Gram.* 193. *Agrostis ciliata*, *Trin. l. c.* 373. *Lachnagrostis ciliata*, *Nees ex Steud. l. c.*—N.W. India, *Royle*. An obscure plant of which I have seen a single specimen from Herb. Royle.

11. **C. Schmidli**, *Hook. f.*; stem very slender erect, radical leaves tufted on a woody branched rootstock linear-lanceolate rigid narrowed into

a slender petiole, cauline filiform convolute, panicle short broad, branches few and long pedicels capillary, spikelets few $\frac{1}{8}$ – $\frac{1}{6}$ in., gl. I and II unequal lanceolate, III truncate bicuspidate from the outer pair of nerves, awn subbasal exserted, callus hairs short, anthers linear.

NILGHIRI HILLS; Ootacamund, *Schmid*.

Rootstock as thick as a crow-quill. *Stem* filiform. *Radical* leaves 2–3 in., glabrous, nerves strong; petiole very slender stiff; sheaths of old basal leaves clothing the base of the new, lacerate, about an inch long; ligule long, linear, membranous. *Panicle* broad, rachis and few distant branches quite smooth. *Spikelets* pale purplish, gl. I and II membranous, 1-nerved, keels scaberulous; III hyaline, 5-nerved, hairy, awn twice as long as the spikelet; palea very minute, subbicucular.

I have seen only one poor specimen of this curious species, which should at once be recognized by its rootstock, and the slender rigid petioles of the leaves, long ligule, and tufted lacerate old leaf-sheaths about an inch long, crowning the rootstock. There is, however, in Herb. Kew a specimen of what may be the same species collected by Clarke at Conoor (in the Nilghiris) alt. 7000 ft., with a very slender stem 2–3 ft. long, and narrow flat sessile cauline leaves with a short ligule; its spikelets quite accord with those of *C. Schmidii*, but the base of the stem and lower leaves are wanting.

12. **C. Jacquemontii**, *Hook. f.*; tall, slender, leaves very narrow, ligule oblong, panicle narrow drooping, branches erect naked below, spikelets few $\frac{1}{5}$ – $\frac{1}{4}$ in. long-pedicelled erect, gl. I and II subequal lanceolate sub 3-nerved, III = about $\frac{1}{2}$ II tip truncate 4-toothed, awn supra-basal exserted, palea minute, callus hairs = $\frac{1}{2}$ gl. III, anthers long.

KASHMIR; moist places on the Pyr Panjal, *Jacquemont* (n. 97).

Stems apparently tufted, 18 in. high, geniculate below. *Leaves* 5–6 by $\frac{1}{4}$ in., scaberulous; sheaths quite smooth; ligule oblong. *Panicle* 4–5 in., lower branches fascicled, 1–1 $\frac{1}{2}$ in., scaberulous. *Spikelets* pale yellowish; keels of gl. I and II smooth, III hairy all over.—I have seen only two specimens. The long spikelets distinguish it. This approaches var. *ciliata* of *C. pilosula*, but the spikelets are considerably larger.

DOUBTFUL SPECIES.

C. **HOOKERIANA**, *Steud. Syn. Gram.* 292. *Lachnagrostis Hookeriana*, *Nees ex Steud.*—A Ceylon plant described as having the palea as long as its gl. which occurs in no Ceylon specimen of the genus known to me.

C. **ROYLEANA**, *Steud. Nom. Ed. II. i.* 251. *C. Roylei*, *Steud. Syn. Gram.* 193. *Agrostis Royleana*, *Trin. in Act. Acad. Petersb. Ser. VI. vi. Sc. Nat. II.* (1845) 371. *Lachnagrostis Royleana*, *Nees in Herb. Royle ex Steud. Nom. l. c.* L. Hookeri, *Nees ex Steud. Syn. l. c.*—Trinius founded this species on three plants, an Indian of Royle, a Nilghiri of Zenker, and a Ceylon one from “Herb. Whytt.” One of his characters is the presence of a “bearded rudiment,” which refers the plant to *Deyeuxia*. I know of no *Deyeuxia* in Ceylon or the Nilghiris.

75. **DEYEUXIA**, *Clar.*

Characters of *Calamagrostis*, but with the rachilla of the spikelet produced beyond gl. III and usually penicillate with silky hairs; gl. III glabrous; hairs of callus usually short.—Species enumerated about 120.

See remarks under *Agrostis* (p. 253). In *D. Treutleri* the produced portion of the rachilla is most minute and naked, in *D. abnormis* it is awnless and the rachilla

is very minute or absent, but the hairs of the callus are more or less crowded at the base of the palea.

A. Rachilla bearded or penicillate.

* *Awn of glume III basal or subbasal.*

1. **D. sylvatica**, Kunth *Revis. Gram.* i. 77, *Enum. Pl.* i. 243, *Suppl.* 188, t. xiv. f. 5; tall, leaves long scabrid beneath, panicle contracted at length open, spikelets $\frac{1}{2}$ in., gl. I and II subequal ovate-lanceolate, III rather shorter than I tip shortly lacerate, callus loosely bearded, awn about twice as long as its gl., palea rather shorter than its gl., rachilla shortly bearded. *Calamagrostis sylvatica*, DC. *Fl. Fr.* v. 253; *Host Gram. Austr.* iv. 28, t. 48; *Trin. Gram. Unifl.* 223, t. 4; *Reichb. Ic. Fl. Germ.* t. 38; *Ledeb. Fl. Ross.* iv. 427; *Boiss. Fl. Orient.* v. 526. *C. arundinacea*, Roth. *Tent. Fl. Germ.* i. 33. *C. pyramidalis*, *Host l. c.* 28, t. 49; *Reichb. l. c.* *Arundo sylvatica*, Schrad. *Fl. Germ.* i. 218, t. 4, f. 7. *Agrostis arundinacea*, Linn. *Pl. Sp.* 61.

WESTERN HIMALAYA; Kunawur, alt. 8000 ft., Thomson; Kashmir, alt. 10–11,000 ft., Duthie.—DISTRIB. Europe, Reg. Caucas.

Stem 3–5 ft., from a creeping base. *Leaves* linear, 1–2 ft. by $\frac{1}{4}$ – $\frac{1}{2}$ in., finely acuminate; ligule short. *Panicle* erect or drooping; branches short, scabrid. *Spikelets* green or purplish; gl. I 1-nerved; II 3-nerved; awn of III shortly exserted.—I have seen only two Indian specimens, which I think belong to *D. sylvatica*, Kunth, one from Thomson, with a very large panicle 16 in. long has the callus hairs scanty, about $\frac{1}{2}$ the length of the gl., the other from Duthie has a shorter panicle, a much shorter rachilla, and the callus hairs are more copious and twice as long. I do not venture upon further citations than are given above, the synonymy of both *Deyeuxia* and *Calamagrostis* being in great confusion.

2. **D. elatior**, Hook. f.; very tall, stout, leaves long, panicle 1–2 ft. pyramidal branches long spreading, spikelets $\frac{1}{2}$ in., gl. I and II subequal lanceolate acuminate, III rather shorter than II tip truncate erose, callus laxly bearded, palea rather shorter than its gl., awn exserted, rachilla very short its hairs about half the length of the gl. or longer. *Calamagrostis scabrescens*, var. *elatior*, Griseb. in Goett. *Nachr.* (1868) 79.—*Deyeuxia*, No. 7, *Herb. Ind. Or. Hf. & T.*

KHASIA HILLS, alt. 5–5500 ft., Griffith, &c.

Stem 5–6 ft., as thick as a swan's quill below. *Leaves* 2–3 ft. by $\frac{1}{2}$ – $\frac{2}{3}$ in., coriaceous, closely nerved, midrib prominent beneath, glabrous or hairy beneath; sheaths hirsute or glabrescent; ligule short, scarious. *Panicle* 4–8 in. broad when expanded; branches scabrid, lower fascicled. *Spikelets* subscaberulous; gl. I and II thin, keels and upper margin of II scabrid; III membranous, callus hairs sometimes = the gl.; awn subbasal, twice as long as its gl. *Grain* linear-oblong.—Grisebach in reducing this to a variety of *D. scabrescens*, has overlooked the great difference in size and habit, and the different position of the awn which is subbasal.

3. **D. triaristata**, Hook. f.; very slender, leaves narrow, panicle flexuous contracted, rachis and branches capillary, spikelets $\frac{1}{4}$ in. few, gl. I and II subequal narrowly lanceolate, III $\frac{1}{4}$ shorter than I truncate, two lateral nerves produced into long awns, two intermediate mucros; median awn exserted, palea = $\frac{1}{2}$ its gl., hairs of callus = $\frac{1}{4}$ gl. III.

SIKKIM HIMALAYA; in woods, Yeumtong, alt. 12,000 ft., J. D. H.

Stem 12–18 in., geniculately ascending from a slender creeping base, weak. *Leaves* 6–8 in., narrowly linear, finely acuminate, smooth, flaccid; ligule short. *Panicle* 5–6 in.; branches few, lower 2–3 in. long, and pedicels smooth. *Spikelets*

pale green, shining; gl. I and II quite smooth on the sides and keels; 'III hyaline, lateral awns more than half as long as the gl., dorsal awn inserted $\frac{1}{4}$ above the base capillary, about twice the length of the gl.; rachilla short; callus hairs scanty short.

4. **D. compacta**, Munro ex Duthie Grass. *N.W. Ind.* 30 (name only); stem short, leaves very narrow, panicle open or spiciform, spikelets $\frac{1}{2}$ in., gl. I and II subequal oblong-lanceolate apiculate, III truncate tip erose, palea nearly as long as its gl., awn basal, hairs of callus short. ?*Calamagrostis holciformis*, Jaub. & Spach. *Ill. Pl. Orient.* iii. 61, t. 340.

WESTERN TIBET, Jacquemont; Nubra valley, alt. 14–16,000 ft., Thomson; N. of Kumaon, alt. 15,000 ft., Strachey & Winterb. (Deyeuxia, No. 1).

Stems 6–18 in., densely tufted, rather stout, sometimes slender. Leaves 1–3 in., flat or convolute; ligule short. Panicle 1–2 in., branches very short, scaberulous. Spikelets purplish; gl. I and II membranous, nearly smooth; III $\frac{1}{4}$ – $\frac{1}{2}$ shorter than II, minutely scaberulous, strongly 4-nerved, callus hairs short lax.—In Jacquemont's and all other specimens in Herb. Kew, the panicle is oblong spiciform, with very short branches, and not as represented in the figure cited of *Calamagrostis holciformis* which is taken from a specimen collected by Jacquemont and in which the panicle is quite open. The glumes I and II are represented in the same plate as narrowly lanceolate tapering to a point, and scabrid, none of which characters agree with these specimens. Lastly, the date of collection is given as 1830, and that of the Kew specimen 1831. Nevertheless having regard to the great variability of these alpine grasses, I am disposed to think both referable to one species.

5. **D. nivicola**, Hook. f.; stem short, leaves obtuse or acute, panicle contracted spiciform, branches very short, spikelets $\frac{1}{4}$ in. very narrow, gls. I and II unequal lanceolate smooth, III truncate tip 4-mucronate, palea nearly = the gl., awn included? rachilla half as long as the gl. shortly plumose, callus shortly bearded. Deyeuxia n. 4, *Herb. Ind. Or. Hf. & T.*

SIKKIM HIMALAYA; Momay, alt. 15,000 ft., J. D. H.

Stem 5–7 in., densely tufted, erect or ascending, stout. Leaves as long as the stem or shorter, flat or subconvolute, $\frac{1}{10}$ – $\frac{1}{8}$ in. broad; ligule short, truncate. Panicle 1–1 $\frac{1}{2}$ in., strict, erect, green and purplish. Spikelets erect, appressed; gl. I about $\frac{1}{2}$ longer than II, both 1-nerved, acuminate; III about half as long as I, hardly scaberulous, nerves 4, strong; awn basal, not twice as long as the gl., erect.

** Awn of gl. III inserted above the middle of the glume (awn 0 in *D. abnormis* and rachilla very minute or obsolete).

6. **D. scabrescens**, Munro ex Duthie in Atkins. *Gaz. N.W. Ind.* 628; tall, stout, leaves long, panicle long contracted, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in., glumes all scaberulous, I and II subequal 1-nerved, III tip narrowed obtuse truncate crenulate or 2-fid, awn submedian, palea linear, callus shortly bearded. Duthie Grass. *N.W. Ind.* 31; Clarke in *Journ. Linn. Soc.* xxv. (1889) 89, t. 39. *Calamagrostis scabrescens*, Griseb. in Goett. *Nachr.* (1868) 79.

TEMPERATE HIMALAYA, alt. 10–13,000 ft., from Kashmir to Bhotan. MUNNEPORE, alt. 9900 ft., Clarke.

Stem 2–5 ft. Leaves 6–18 by $\frac{1}{8}$ – $\frac{1}{4}$ in., flat or convolute, scaberulous; sheath smooth; ligule membranous, lacerate. Panicle 6–10 in., erect or inclined, dense-fid., branches scaberulous; pedicels long or short. Spikelets green or purplish; gl. I and II linear-lanceolate, acuminate, margins smooth or villously ciliate; III scarious, tip usually 2-fid, awn inserted rather above the middle about twice as long as the gl., slightly bent, rachilla = $\frac{1}{2}$ – $\frac{1}{4}$ gl. III, sparingly or copiously bearded.

Grain narrowly oblong.—I do not find the awn to be twisted, as in the description cited, and it is inserted lower than in the figure in the Linnæan Journal.

Var. *humilis*, Griseb. l. c.; smaller, stems weaker, leaves $\frac{1}{6}$ – $\frac{1}{2}$ in. broad, panicle small lax-flid., spikelets green, gl. III hardly scaberulous, palea shorter. *Deyeuxia* No. 2, *Herb. Ind. Or. Hf. & T.*—Sikkim Himalaya; Lachen Valley, alt. 11–12,000 ft., *J. D. H.*

7. **D. filiformis**, *Hook. f.*; stem very slender, leaves short, panicle short, spikelets $\frac{1}{2}$ in., gl. I and II subequal subscaberulous, II 3-nerved, III hyaline asperulous, tip truncate 4-cleft, awn capillary submedian exerted palea = $\frac{1}{2}$ – $\frac{3}{4}$ its gl., hairs of rachilla about = the gl., hairs of callus short. *Calamagrostis filiformis*, *Griseb. in Goett. Nachr.* (1868) 79.

SIKKIM HIMALAYA; Lachen Valley, alt. 10–12,000 ft., *J. D. H.*

Stem 12–18 in., terete, tufted. *Leaves* 2–4 in., narrow, nearly smooth; ligule membranous. *Panicle* 2–3 in. long and nearly as broad, pyramidal; branches few, very slender, nearly smooth. *Spikelets* shortly pedicelled, pale purplish; gl. I and II sometimes both 3-nerved; III strongly 4-nerved, irregularly 4-cleft at the apex, the lobes almost setaceous; awn inserted a little above the middle of the back.

8. **D. pulchella**, *Hook. f.*; stem short stout, panicle 1–2 in. oblong or ovate, spikelets $\frac{1}{2}$ in. crowded dark purple, gl. I and II scaberulous finely acuminate, III scaberulous irregularly 4-toothed or sub 4-aristate, awn supra-median to sub-apical included, palea $\frac{1}{2}$ – $1\frac{1}{2}$ as long as its gl., rachilla densely penicillate hairs = gl. III, callus shortly bearded. *Calamagrostis pulchella*, *Griseb. in Goett. Nachr.* (1868) 78.

ALPINE and SUBALPINE HIMALAYA; from Kumaon and Garwhal, alt. 10–15,000 ft., to Sikkim, alt. 14–16,000 ft.—DISTRIB. Tibet. W. Szechuen, *Pratt.*

Stems densely tufted, strict, erect. *Leaves* 3–5 in., rarely more, $\frac{1}{10}$ – $\frac{1}{2}$ in. broad, smooth or scaberulous, usually flat; ligule short, membranous. *Panicle* variable in size and form; branches minutely scabrid, sometimes elongate and spreading. *Spikelets* smaller than in *D. scabrescens* and not so strongly scaberulous, I and II rather unequal; III split at the tip into almost setiform lobes; insertion of awn most variable, but never quite terminal, capillary, as long as its gl. or shorter.—A very variable plant; the N.W. specimens have large looser more open panicles than the Sikkim. In one specimen from Garwhal, alt. 10–13,000 ft. (No. 143 and 245 Duthie) the panicle is very open) and I find occasionally a gl. terminating the rachilla.

9. **D. abnormis**, *Hook. f.*; tall, leaves narrow flat, panicle broad or narrow, branches in distant whorls of 3–6 divided and flg. toward the ends, spikelets $\frac{1}{2}$ – $\frac{1}{10}$ in. long-pedicelled, gls. I and II subequal oblong-lanceolate acute, III rather shorter than I tip narrowly truncate crenulate, awn 0, palea = about $\frac{1}{2}$ its gl., rachilla very minute or obsolete, callus hairs = $\frac{1}{4}$ – $\frac{1}{2}$ the gl. *Agrostis abnormis*, *Munro Cat. Pl. Griff. Helfer, &c.*, 57, *ined.* *Calamagrostis capillacea*, *Clarke mss.*—*Agrostis* No. 11 & 12, *Herb. Ind. Or. Hf. & T.*

SIKKIM HIMALAYA; Lachoong Valley, alt. 9000 ft., *J. D. H.* KHASIA HILLS, alt. 5–5500 ft., common, *Griffith, &c.*

Stem 6–18 in., densely tufted, erect strict and slender with a narrow panicle, or rambling with stout branching stems 3–4 ft. long and a very effuse panicle; upper internodes sometimes scaberulous. *Leaves* 6–8 by $\frac{1}{4}$ – $\frac{1}{2}$ in., rather rigid, scaberulous, as are the sheaths; ligule short, rounded. *Panicle* 4–6 in., rachis very slender strict; branches and branchlets capillary, quite smooth. *Spikelets* pale brown; gl.

I and II 1-nerved; III glabrous, nerves faint; hairs of callus longest under the palea.—Resembles *Agrostis alba*, from which the long callus hairs at once distinguish it.

B. Rachilla minute, glabrous; callus hairs very short.

10. **D. Treutleri**, *Stapf in Hook. Ic. Plant.* t. 2396; tall, slender, panicle elongate lax-fl., spikelets $\frac{1}{2}$ – $\frac{1}{10}$ in., gl. I and II very unequal lanceolate subacute scaberulous, III longer than II coriaceous obtuse scaberulous, palea as long as the gl., rachilla very small styliform, callus minutely hairy. *Milium Treutleri*, O. Kuntze *Rev. Gen. Plant.* 780 (*partim*).

SIKKIM HIMALAYA, alt. 7–12,000 ft., in woods, J. D. H., *Treutler, Clarke*.

Stem 2–4 ft., leafy nearly to the top. *Leaves* 8–10 by $\frac{1}{4}$ – $\frac{1}{2}$ in., linear-lanceolate, acuminate, flaccid, scaberulous beneath; ligule oblong. *Panicle* ovate, flaccid, at length rigid, scaberulous; branches in distant whorls. *Spikelets* narrowly ovoid, pale; gl. I ovate-lanceolate, acute, 1-nerved; II longer, subacute, 1-nerved; III longer than II, laterally compressed, keeled; palea about as long as the gl. *Grain* oblong, laterally compressed, tightly wrapped in the gl. and palea.—A very anomalous species.

Tribe VII. AVENÆ. (See p. 6.)

76. **ERLACHNE**, Br.

Rigid, densely tufted grasses. *Leaves* filiform, convolute. *Spikelets* few, 2-fl. (both fl. perfect), not jointed on their long pedicels; rachilla jointed at the base, not produced beyond gl. IV. *Glumes* 4, I and II empty, subequal, persistent, keeled, many-nerved; III and IV subequal, narrow, at length rigid, awned or not; palea rigidly coriaceous, 2-cuspidate or 2-aristate, nerves obscure. *Lodicules* 2, oblong, truncate. *Stamens* 2–3. *Styles* free, stigmas plumose. *Grain* free within the rigid gl. and palea.—Species about 22 Australian, and 2 Asiatic.

1. **E. trisetia**, *Nees ex Steud. Syn. Gram.* 237; gl. I and II linear-lanceolate, III and IV long-awned, palea long-awned. *Trim. Cat. Ceyl. Pl.* 108; *Steud. Syn. Gram.* 237. *Megalachne zeylanica*, *Thwaites Enum. Pl. Zeyl.* 372, 444.

TENASSERIM; Mergui, *Griffith, Helfer*. CEYLON; Colombo, *Thwaites*.

Stems $1\frac{1}{2}$ –2 ft., slender, erect, branched below. *Leaves* 3-nerved; ligule very short, ciliate. *Panicle* 2–4 in. *Spikelets* with the awns $\frac{1}{2}$ – $\frac{3}{4}$ in. long, purple; gl. I and II subaristate, glabrous; III and IV narrow, silky; callus long.

2. **E. pallescens**, Br. *Prodr.* 184; gl. I and II ovate acuminate, III, IV. and palea bicuspidate. *Kunth Enum. Pl.* i. 310; *Steud. Syn. Gram.* 237. *Benth. Fl. Austral.* vii. 630. *E. chinensis*, *Hance in Ann. Sc. Nat. Ser. IV.* xv. (1861) 228, in *Journ. Linn. Soc.* xiii. (1873) 136. *E. Hookeri*, *Munro in Journ. Linn. Soc.* vi. (1862) 42, name. *Aira effusa*, *Spreng. Syst.* i. 278.

CHITTAGONG, J. D. H. & T. T. PAHANG, *Ridley*. NICOBAR ISLDS., *Kurz*.—DISTRIB. Borneo, Tonkin, China, Australia.

Stem 1–2 ft. *Leaves* glabrous or slightly hairy. *Panicle* very lax. *Spikelets* with the awns $\frac{1}{4}$ in.; gl. I and II slightly hairy; III and IV narrow and palea villously hirsute, awns of III and IV about = the gl., of palea very short.—Bentham describes the palea as entire, but in the Indian specimens they terminate in two short rigid spines.

77. **ZENKERIA**, Trin.

Tall, perennial, long-leaved grasses. *Spikelets* small, panicked, 2-fld. (both fl. perfect), not jointed on their pedicels; rachilla jointed at the hairy base, not produced beyond gl. IV. *Glumes* 4, I and II empty, subequal or unequal, 1-nerved, keeled, acute, persistent; III and IV equal, obtuse or acuminate, many-nerved; palea as long as its gl., broad, keels strongly ciliate or hirsute. *Lodicules* 2, ovate, denticulate. *Stamens* 3. *Styles* short, distinct. *Grain* unknown.—Species the following.

1. **Z. elegans**, Trin. in *Linnæa*, xi. (1837) 150, t. 3; leaves long narrow, panicle thyrsiform, branches erect, gl. I and II unequal, III and IV acuminate much longer than II. *Trim. Cat. Ceyl. Pl.* 108. *Amphidonax Heynii*, Nees in *Wight Cat.* n. 1747; *Steud. Syn. Gram.* 97; *Thwaites Enum. Pl. Zeyl.* 370. *A. tenella*, Wight & Arn. ex *Steud. l.c.*—*Pappophorum*? *Wall. Cat.* n. 8903.

SOUTHERN DECCAN PENINSULA, Heyne, &c. BURMA, Kurz. CEYLON, Thwaites, &c.

Stem 2–3 ft., as thick as a crow-quill, rigid, base woody. *Leaves* as long as the stem or longer, strict, coriaceous, convolute, rarely flat, glabrous or sparsely hairy; sheaths coriaceous; ligule rounded. *Panicle* 6–8 in.; rachis flexuous; branches filiform, smooth. *Spikelets* $\frac{1}{10}$ – $\frac{1}{8}$ in., pedicelled, white; gl. I and II ovate, hyaline, 1-nerved; I shortest, midrib very strong, excurrent; III and IV lanceolate, sparsely villous, 7–9-nerved; IV longest and most acuminate; callus bearded with long straight hairs; palea as broad as the gls., hirsute. *Anthers* long, narrow.

2. **Z. obtusiflora**, Benth. in *Journ. Linn. Soc.* xix. (1881) 93; leaves broadly linear-lanceolate narrowed at both ends, panicle pyramidal, branches widely spreading, gl. I and II unequal or subequal, III and IV obtuse not longer than II. *Trim. Cat. Ceyl. Pl.* 108. *Amphidonax obtusiflora*, Thwaites *Enum. Pl. Zeyl.* 370.

CEYLON; at Ratnapoora, Thwaites.

Stems 3–5 ft., glabrous. *Leaves* 2 ft. by $\frac{3}{4}$ –1 in., acuminate, pungent, glabrous, coriaceous; ligule very short, densely hairy. *Panicle* 6–8 in.; branches capillary, solitary or 2-nate; pedicels longer than the spikelets, with a glandular callus at the base. *Spikelets* $\frac{1}{12}$ – $\frac{1}{10}$ in., as broad as long; gl. I and II ovate, apiculate by the strong excurrent nerve, glabrous; III and IV rather longer, sides and callus villous; palea as in *Z. elegans*.

78. **COELACHNE**, Br.

A small leafy very variable marsh grass. *Leaves* short, flat or convolute. *Spikelets* 2-fld. (both fl. perfect or upper imperfect) in open or contracted or spiciform panicles, not jointed on the pedicels, not awned; rachilla jointed at the base, produced between gl. III and IV but not beyond IV. *Glumes* I and II broad, concave, obtuse, persistent, empty, I the largest; III much longer, subsessile, coriaceous, glabrous, except the shortly bearded callus; palea as long, coriaceous; IV much smaller and palea more or less hairy. *Lodicules* 0? *Stamens* 3; anthers long, narrow. *Ovary* ovoid. stigmas free. *Grain* free within the gl. and palea.

C. pulchella, Br. *Prodr.* 187.

NEPAL, Wallich, KHASIA and MUNNEPORE HILLS, alt. 4–6000 ft., BURMA, CENTRAL and SOUTHERN INDIA, and CEYLON.—DISTRIB. Trop. Asia, Australia, and Madagascar.

Stem 6-18 in., flaccid, decumbent or ascending, slender or rather stout, leafy up to the panicle. Leaves uniform throughout the stem, $\frac{1}{2}$ -1 in., lanceolate, subulate, acuminate, distant or subequitantly sheathing, ecostate, minutely scaberulous above, nerves striate; ligule a few hairs. Panicle very various. Spikelets $\frac{1}{20}$ - $\frac{1}{10}$ in., sessile or pedicelled, globose or ovoid; gl. I and II suborbicular or hemispheric, many-nerved, membranous or herbaceous; III hermaphrodite, coriaceous, dorsally rounded, nerves 0 or very obscure; palea coriaceous, margins incurved; IV much the smallest, often imperfect, neuter or fem.—After a long study of a multitude of specimens from all the countries mentioned above, I conclude that there is but one known species of this genus. If there are two, the second is one to include vars. *gracillima* and *perpusilla*, in which case the latter name would be very inappropriate for both.

Var. *pulchella* proper; stems filiform decumbent and ascending, leaves lanceolate flat, panicle with distant spreading filiform branches, spikelets $\frac{1}{20}$ - $\frac{1}{18}$ in. subglobose, gl. I and II hemispheric, III broadly ovoid, IV faintly hairy or glabrous. C. *pulchella*, Br. l. c.; Endl. Iconogr. t. 2; Kunth Revis. Gram. ii. t. 143, Enum. Pl. i. 371; Steud. Syn. Gram. 284; Benth. Fl. Austral. vi. 626. Gramin, Wall. Cat. n. 8909.—Burma; source of the Chappedong River, Wallich. Australia.

Var. *brachiata*, Munro in Herb. Kew; stem stout or slender suberect or ascending, panicle 2-4 in. long, branches shorter than in *pulchella* proper, spikelets $\frac{1}{20}$ - $\frac{1}{15}$ in. like those of *pulchella* proper but sessile. C. *brachiata*, Munro ex Benth. Fl. Austral. vii. 626 (partim).—Tenasserim, Griffith (Kew Distrib. 6675) Helfer.

Var. *simpliciuscula*; stem suberect or creeping and rooting rather stout, leaves flat, panicle elongate narrow, branches short stiff, spikelets $\frac{1}{15}$ in. ovoid sessile crowded on the branches or in fascicles on the main rachis, gl. I and II unequal, III ovate-lanceolate. C. *simpliciuscula*, Munro ex Benth. in Journ. Linn. Soc. xix. (1881) 93, Fl. Austral. vii. 626. C. *infirmata*, Buse Pl. Jungh. i. 350; Miq. Fl. Ind. Bat. iii. 399. C. *pulchella*, Thw. Enum. 273; Benth. Fl. Hongk. 430. C. *brachiata*, Trim. Cat. Ceyl. Pl. 108. C. *madagascariensis*, Baker, in Journ. Linn. Soc. xxv. (1890) 348. Isachne *brachyglumis*, Hochst. in Hohen. Pl. Nilgh. n. 1283 (name). Panicum *simpliciusculum*, Wight & Arn. ex Steud. Syn. Gram. 96.—Khasia and Naga Hills, alt. 4-5000 ft. J. D. H. & T. T., Clarke. Nilghiri Hills, Wight, &c. Ceylon, Walker, Thwaites (CP. 884).—Java, Tonkin, China, Madagascar.—Intermediate between *brachiata* and *spicata*.

Var. *spicata*; stem short stout suberect, leaves flat, spikelets $\frac{1}{20}$ - $\frac{1}{18}$ in. ovoid in dense spiciform panicles subsessile, gl. I and II orbicular subequal membranous, III broadly ovate.—Nepal, Wallich (Cat. n. 8908). Chota Nagpore, Clarke. S. India, Wight (Herb. n. 3376).—China.

Var. *gracillima*, stems 6-12 in. capillary or filiform, leaves flat, panicle very slender, branches short spreading, spikelets few $\frac{1}{10}$ - $\frac{1}{10}$ in. pedicelled, gl. I and II very unequal, III and IV lanceolate. C. *perpusilla*, Thw. Enum. 373 (in part).—Nilghiri Hills, Schmid. Ceylon, Adam's Peak and Newera Elia, in swamps, Thwaites (C.P. 130).

Var. *perpusilla*, stems capillary densely tufted, leaves filiform, panicles as in *gracillima* but with fewer branches and spikelets. C. *perpusilla*, Thw. l. c. in part (C.P. 450). Trim. l. c. (in part). Isachne *perpusilla*, Wight & Arn. ex Wight Cat. n. 2043.—Ceylon, Walker, Adam's Peak, Thwaites.

Var. *Gardneri*; stem 12-18 in. stout flexuous, clothed throughout with subulate-lanceolate erect sheathing leaves, panicle stiff with few short spreading branches, spikelets $\frac{1}{12}$ - $\frac{1}{10}$ in. sessile, gl. I and II subequal, III ovate.—Ceylon, Gardner (n. 1018, 1019).

79. TRISTACHYA, Nees.

Perennial grasses. Leaves various. Spikelets 2-fl. (lower fl. male upper fem. or perfect), paniced, not jointed on their pedicels; rachilla villous, produced between gl. II and III but not beyond IV, jointed at the base. Glumes 4; I and II unequal, not awned, persistent, empty, lanceolate,

acuminate, glabrous; III lanceolate, acuminate, membranous, awn 0; IV deeply 2-fid with a long twisted awn in the sinus (copiously bearded above the middle in the Indian sp.); palea narrow, acute. *Lodicules* minute, cuneate, fleshy. *Anthers* long. *Styles* long, slender. *Grain* narrow, free.—Species 8, chiefly tropical.

T. barbata, *Nees ex Steud. Syn. Gram.* 238; *Boiss. Fl. Orient.* v. 552; *Duthie Grass. N.W. Ind.* 32. *T. Stocksii*, *Boiss. l.c.*; *Munro in Aitchis. Cat. Panjab. Pl.* 168; *Duthie Fodd. Grass. N. Ind.* 51. *Loudetia barbata*, *A. Braun in Flora*, xxiv. (1841) ii. 714. *Sorghum barbatum*, *Hochst. et Steud. Pl. Arab. Exsicc.* n. 788.

SCIND; *Stocks*.—DISTRIB. Arabia, Nubia.

Stem 6-18 in. branched and woody below, geniculately ascending, base clothed with tomentose sheaths, slender and wiry above; nodes bearded. *Leaves* 1-3 in., lanceolate from a rounded base, finely acuminate, pungent, rigid, glaucous, many-nerved, margin thickened subserulate; sheaths smooth; ligule 0. *Panicle* sparingly branched, 1-2 in. long and broad; branches solitary and 2-nate, capillary, flexuous, subscaberulous, branchlets 1-3-fid. *Spikelets* $\frac{1}{2}$ in., pale yellowish; gl. I and II 3-nerved, II $\frac{1}{4}$ - $\frac{1}{2}$ longer than I; III much longer than I, interruptedly 7-nerved, and its callus glabrous; IV with a very short broad lamina, margins involute, lateral lobes lanceolate, aristate, 3-nerved, rather longer than the hairs; median awn about twice as long as the gl.—I find no character for *T. Stocksii*.

80. **AIRA**, *Linn.*

Annual or perennial grasses. *Leaves* narrow. *Spikelets* 2-fid. (both fl. perfect) paniced, branches capillary; rachilla jointed at the base, not produced beyond gl. IV. *Glumes* 4, hyaline; I and II subequal, 3-nerved, acute, empty, persistent; III and IV smaller, often 2-toothed; awn dorsal, capillary, usually twisted below; callus naked; palea hyaline, 2-nerved. *Lodicules* 2. *Anthers* small. *Grain* minute, free or adhering to the hyaline gl.—Species 4 or 5, Europe and temp. Asia.

A. caryophyllea, *Linn. Sp. Pl.* 66; annual, very slender, leaves setaceous, ligule lanceolate, panicle broad erect capillary trichotomously branched, spikelets long-pedicelled. *Kunth Enum. Pl.* i. 289, *Suppl.* 241, t. 18, f. 2; *Fl. Dan.* t. 382; *Lamk. Encycl.* t. 44; *Host Gram. Austr.* ii. 33, t. 44; *Svensk. Bot.* t. 508; *Reichb. Ic. Fl. Germ.* t. 94; *Engl. Bot.* t. 812; *Knapp Gram. Britt.* t. 35; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 44; *Steud. Syn. Gram.* 221; *Ledeb. Fl. Ross.* iv. 424; *Boiss. Fl. Orient.* v. 529; *Duthie Grass. N.W. Ind.* 31. *A. canescens*, *Host l.c.* iv. 21, t. 36. *A. Cupaniana*, *Guss Fl. Sic. Syn.* i. 145. *A. curta*, *patulipes* & *plesiantha*, *Jord. ex Bor. Fl. Centr. Fr. Ed.* III. ii. 701. *A. divaricata*, *Pourr. in Mem. Acad. Toul.* iii. (1788) 307. *A. multiculmis*, (*multicaulis*, *Kunth*), *Dumort. Agrost. Tent.* 121, t. 7, f. 28. *A. purpureo-argentea*, *Gilib. Exercit.* ii. 526. *A. rigida*, *Dulac Fl. Haute-Pyren.* 82. *A. Todari*, *Tenore ex Tod. Ind. Sem. Hort. Panorm.* 1859; *Linnæa*, xxx. (1859) 783. *A. triaristata*, *Clarke Trav.* ii. 452. *Avena caryophyllea*, *Weber in Wigg. Prim. Fl. Hols.* 10. *Fussia caryophylla*, *Schur Enum. Pl. Transs.* 754.

N.W. HIMALAYA; Kashmir, *Vicary*, *Stewart*, *Kohat*, and *Lahul*, *Hay*, &c. WESTERN TIBET, alt. 12,000 ft., *Stolizka*.—DISTRIB. N. Africa, temp. Asia (introd. elsewhere).

Stems 2-10 in., tufted, filiform, scabrid above. *Leaves* obtuse and sheaths

scabrid, ligule long. *Panicle* 1-2 in. long and broad. *Spikelets* $\frac{1}{2}$ - $\frac{1}{10}$ in., ovoid, shining, gl. I and II ovate, exceeding II and III, keels scabrid; tips of flg. gls. 2-setose; awn twice as long as the gls., bent.

81. **DESCHAMPSIA**, Beauv.

Perennial grasses. *Leaves* flat or convolute. *Spikelets* 2- (rarely 3-) fld. (both fl. perfect) panicle, not jointed on their pedicels; rachilla jointed at the base, produced beyond gl. IV as a naked or penicillate stipes rarely bearing a male fl. Glumes 4; I and II empty, subequal, or II largest, persistent, keeled, acute, membranous, shining; III and IV subhyaline, tip toothed or lobed; awn dorsal, slender, straight or twisted; palea narrow, 2-nerved. *Lodicules* ovate, fleshy. *Stamens* 3. *Styles* distinct. *Grain* oblong, free within the gl.—Species about 20, of temp. regions.

1. **D. cæspitosa**, Beauv. *Agrost.* 91, t. 18, f. 3; stem short or tall, panicle effuse or contracted, spikelets variable in size, gl. I and II ovate-lanceolate acute subequal or II rather longer, IV hardly exceeding II, awn about equalling the gl., straight not twisted. *Kunth Enum. Pl.* i. 286, *Suppl.* 241; *Ledeb. Fl. Ross.* iv. 421; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 43; *Boiss. Fl. Orient.* v. 531; *Benth. Fl. Austral.* vii. 587; *Hook. f. Fl. Nov. Zel.* i. 301; *Duthie Grass. N.W. Ind.* 31. *Aira cæspitosa*, *Linn. Sp. Pl.* 64; *Fl. Dan.* ii. t. 240; *Engl. Bot.* t. 1453; *Knapp Gram. Britt.* t. 33; *Trin. Sp. Gram. Ic.* t. 253, 256; *Reichb. Ic. Fl. Germ.* t. 96. *A. Kingii*, *Hook. f. Fl. Antarct.* 376, t. 135. *A. major*, *Syme Engl. Bot. Ed.* III. xi. 63. *A. micans*, *Jacquem. mss.* *Triodia splendida*, *Steud. Syn. Gram.* 249.—*Deschampsia*, *Wall. Cat.* n. 3802; *Gramin. Wall. l. c.* n. 8911.

TEMPERATE and ALPINE HIMALAYA and WESTERN TIBET, in swamps from Kashmir to Bhotan, alt. 10-16,500 ft.—DISTRIB. N. and S. temp. and cold regions.

Stem 6 in. to nearly 3 feet high, stout or slender, smooth, shining, leafy upwards or in small states at the base chiefly. *Leaves* short or long, flat, rather softly coriaceous, quite smooth; sheaths smooth, upper very long; ligule obtuse. *Panicle* 4-8 in., short dense-fld. and erect, or lax-fld. effuse and inclined, sparingly branched; branches and pedicels capillary, smooth or minutely sparsely scaberulous. *Spikelets* $\frac{1}{2}$ - $\frac{1}{10}$ in., white and silvery or fulvous purplish; rachilla slender, hairy; gl. I and II concave, subacute, nerveless, or II which is broadest sub-3-nerved; III and IV truncate, erose, crenate or irregularly toothed, callus silkily hairy; awn dorsal, sub-basal.—I have not attempted to give all the synonymy of this almost cosmopolitan (in temperate regions) and very variable plant which, I think, includes fully a dozen supposed species of the N. temperate and Arctic zones. Wallich's n. 8911 "*Aira coerulea*, *Hb. Madr.*" was long a puzzle to me. It is accompanied with the ticket "*Aira coerulea*, Blå tå tel," which latter word Dr. Stapf recognized as the Swedish for *Molinia coerulea*. No doubt the specimen, which is of *Deschampsia cæspitosa*, is a Swedish one, and was introduced by accident into the Madras Herbarium.

Var. colorata, Griseb. *Spicil. Fl. Rumel.* ii. 457; stem short strict 4-6 in., leaves short basal, panicle small broadly ovate dense-fld., pedicels and branchlets very short, spikelets dark bronzy-yellow, sometimes 3-fld., *Boiss. l. c.* *D. Biebersteinianus*, *Sch. f. Mant.* ii. 380. *D. brevifolia*, *Br. in Parry Voy. App.* 191. *Aira brevifolia*, *Bieb. Fl. Taur. Cauc.* iii. 63. *A. triflora*, *Trin. in Flora*, i. (1836) 433. *A. Wilhelmsii*, *Steud. Syn. Gram.* 219.—Western Tibet; Balch Pass, alt. 16,500 ft., *Strach. & Winterb.* Sikkim, alt. 14-16,000 ft., *J. D. H.*

2. **D. koelerioides**, Regel in *Bull. Soc. Nat. Mosc.* xli. (1868) 299; stem short, leaves basal linear erect, panicle short ovoid or subspiciform,

spikelets very shortly pedicelled imbricating brownish-yellow, gls. III and IV broad more or less 2-lobed lobes irregularly toothed.

KASHMIR and BALTISTAN, DRAS, and ISKARDO, alt. 10-14,500 ft., *Clarke Duthie*.—DISTRIB. Turkestan.

Stem 6-18 in., leafy below, rather stout, strict, erect. *Leaves* 2-5 by $\frac{1}{16}$ - $\frac{1}{8}$ in., linear, acute, flat, nearly smooth; ligule oblong. *Panicle* 1-1 $\frac{1}{2}$ in., erect. *Spikelets* $\frac{1}{8}$ - $\frac{1}{2}$ in.; gl. I shorter than II, sometimes 2-lobed nearly $\frac{1}{2}$ way down with erose lobes, at others hardly lobed but unequally rather deeply toothed.—Perhaps only a form of *D. cæspitosa*, the fig. glumes of which vary much in breadth and toothing. Regel describes the leaves of *kaleriodes* as narrow setaceous and scabrid above, which is totally at variance with his specimens, which are even broader than those of the Indian plant.

81*. HOLCUS, Linn.

Annual or perennial tomentose grasses. *Leaves* usually flat. *Spikelets* paniced, laterally compressed, oblong, 2-fld. (both fl. bisexual, or upper male or neuter), not jointed on their pedicels; rachilla articulate at the base produced into a short stipes beyond gl. IV. *Glumes* 4; I and II empty, persistent, obtuse or acute, keeled, I 1-nerved; II 3-nerved; III and IV shorter than I and II, membranous; III not awned, at length hardened; IV with a slender dorsal awn; palea narrow, 2-keeled. *Lodicules* 2, cuneiform. *Stamens* 3. *Styles* very short, distinct. *Grain* oblong, free within the hardened gl.—Species about 8, European and African.

H. LANATUS, Linn. *Sp. Pl.* 1047; perennial, softly tomentose, panicle spreading pale green, spikelets $\frac{1}{2}$ in., awn of gl. IV hardly exserted. *Fl. Dan.* t. 1181; *Host Gram. Austr.* i. p. 275, t. 2; *Engl. Bot.* t. 1169; *Knapp Gram. Britt.* t. 17; *Kunth Enum. Pl.* i. 34, *Suppl.* 24, t. 9, f. 2; *Ledeb. Fl. Ross.* iv. 410; *Reichb. Ic. Fl. Germ.* t. 105; *Boiss. Fl. Orient.* v. 532.

SIKKIM HIMALAYA; Darjeeling, alt. 7000 ft., *Clarke*, apparently naturalized.—DISTRIB. Europe, temp. Asia.

Stems 1-3 ft., densely tufted, roots fibrous, nodes villous. *Leaves* 6-10 in.; upper sheaths inflated; ligule short, oblong. *Panicle* 2-5 in., branches 2-3-nate. *Spikelets* pale green or reddish; gl. I and II acute or apiculate, strongly-nerved; II often retuse and mucronulate; III smooth and shining in fruit.—*H. mollis*, L., an almost equally common European grass, may be expected to be introduced into the hills of India; it closely resembles *H. lanatus*, but has a creeping rootstock and the awn of gl. IV is longer and exserted.

82. AVENA, Linn.

(Including TRISETUM, Beauv.)

Annual or perennial grasses. *Leaves* usually flat. *Spikelets* 2- or more-fld., in effuse contracted or spiciform panicles, not jointed on their pedicels; rachilla jointed at the base and sometimes between the fig. glumes. *Glumes* dorsally rounded, I and II empty, subequal or unequal, thin, persistent, few- or many-nerved; fl. gls. ovate or lanceolate, entire 2-toothed or -cleft, lobes awned or not, 3-7-nerved, lateral nerves sometimes obsolete; awn dorsal below the cleft, usually long and geniculate or reflexed with a twisted base, rarely straight; palea narrow, keels scabrid or ciliate. *Lodicules* usually 2-fld. *Ovary* glabrous or top villous; styles short, free. *Grain* various, free or (in some sp. with villous top) adherent to the palea.—Species many, chiefly N. temperate.

Having regard to the Indian species of *Avena* and *Trisetum*, I find it impossible to separate them by characters of the fl. gls., there being all transitions in *A. aspera* from the entire gl. of *Avena* to the 2-aristate lateral lobes of *Trisetum*. There are two distinct types of ovary in both genera, the perfectly glabrous, and that with a broad hirsute or villous crown, characters which may suggest a better means of breaking up *Avena*. The following arrangement is provisional only. It is difficult to diagnose *Avena* from *Bromus* & *Koeleria* (q.v.).

Sect. I. EUAVENA. Annual. *Spikelets* pendulous; gl. I and II 5-7-nerved, lobes of fl. gls. awned or not; awn cylindric, column 2-grooved, conoidally twisted. *Ovary* with a villous top.—The determinations of the species of this section are by Dr. Stapf.

* Flowering glumes glabrous or hairy at the base only, rachilla tenacious or tardily disarticulating at the base.

A. SATIVA, Linn. *Sp. Pl.* 79.

Cult. in NORTHERN INDIA, from Bengal to the Indus; and in the HIMALAYA up to 12,000 ft.

There are few specimens of the common oat in Indian collections. These represent two varieties.

Var. *sericea*; branches of panicle spreading equally all round, spikelets 2-fld., both fl. perfect, gls. III and IV silkily hairy at the base, rachilla silkily villous.—Bhotan, *Griffith*. Sikkim Himalaya, cult. at Yeumtong, alt. 12,000 ft., *J. D. H.* Beluchistan and Afghanistan; wild in cult. fields in the Kurrum Valley, *Aitchison* (n. 24).

Var. *orientalis*; branches of panicle more or less secund, spikelets 2-3-fld. the lower only perfect, gl. III with stiff hairs at the base, IV and rachilla glabrous. *A. orientalis*, *Schreb. Spicil. Fl. Lips.* 52; *Host Gram. Austr.* iii. 31, t. 44; *Kunth Enum. Pl.* i. 302, *Suppl.* 255; *Boiss. Fl. Orient.* v. 541. *A. sterilis*, *Royle Illustr. Himal. Bot.* 417.—N.W. India, *Royle*. Soane Valley, *J. D. H.* Murshidabad, *Clarke*.

** Flowering glumes hairy to and beyond the middle; rachilla freely disarticulating at the base, more tardily above it; gl. III and IV firm, shortly 2-fld., scaberulous.

1. *A. fatua*, Linn. *Sp. Pl.* 80; panicle branches equally spreading all round, gls. I and II subequal 9-nerved, III and IV firm scaberulous shortly 2-fld. clothed below with long fulvous hairs. *Host Gram. Austr.* ii. 42, t. 58; *Fl. Dan.* t. 1629; *Engl. Bot.* t. 2221; *Knapp Gram. Britt.* t. 93; *Kunth Enum. Pl.* i. 302, *Suppl.* 256; *Reichb. Ic. Fl. Germ.* t. 103; *Steud. Syn. Gram.* 230; *Ledeb. Fl. Ross.* iv. 412; *Boiss. Fl. Orient.* v. 543; *Royle Ill. Himal. Bot.* 416; *Duthie Grass. N.W. Ind.* 31, *Fodd. Grass. N. Ind.* 51. *A. byzantina*, *C. Koch in Linnæa*, xxi. (1848) 392. *A. sterilis*, *Del. ex Boiss. l. c.*; *Duthie l. c.* 32 (*non Linn.*)? *A. pilosa*, *M.B. Griseb. in Goett. Nachr.* (1868) 78.

The PANJAB, N.W. HIMALAYA, and WESTERN TIBET, in cult. fields, ascending to 9000 ft. SIKKIM HIMALAYA, alt. 9000 ft., *Gammie*.—DISTRIB. Temp. Europe, N. Africa, and N. Asia.

Stem 1-3 ft., stout, nodes hairy. *Leaves* flat, scaberulous; sheaths smooth; ligule short, torn. *Panicle* 6-10 in.; branches and pedicels scabrid. *Spikelets* about 1 in.; rachilla hairy. *Callus* of gl. III short, obtuse, setulose; awn stout, longer than the gls.

2. *A. barbata*, *Brot. Fl. Lusitan.* i. 108; softly tomentose, panicle

subsecund, spikelets 2-fld., gls. I and II 9-nerved, III and IV thin not scaberulous 2-fld with awned lobes densely hirsute below the middle. *Ledeb. Fl. Ross.* iv. 413; *Boiss. Fl. Orient.* v. 543; *Griseb. in Goett. Nachr.* (1868) 78. *A. athenanthera*, *Presl Gram. & Cyp. Sic.* 30. *A. hirsuta*, *Roth. Catalect. Bot.* iii. 19; *Kunth Enum. Pl.* i. 302; *Webb. Phyt. Canar.* iii. 400, t. 247; *Steud. Syn. Gram.* 230; *Royle Ill. Himal. Pl.* 417. *A. hirtula*, *Lag. Gen. & Sp. Nov.* 50; *Kunth l. c. & Suppl.* 256.

WESTERN HIMALAYA; Kumaon, *Thomson*.—DISTRIB. Mediterranean region, W. and N. Asia.

Habit of *A. fatua*, from which its hairy leaves, &c. distinguish it.—These Avenaceous weeds of cultivation have not been much collected in India, where the above and others no doubt abound.

Sect. II. Annual, dwarf. *Spikelets* erect, gl. I 1-nerved, II 3-nerved, top of fl. gl. 2-aristate. *Ovary* glabrous, narrow.

3. ***A. Cavanillesii***, *Koch Syn. Fl. Germ. Ed. I.* i. 797; leaves flat or convolute, panicle spiciform, spikelets 2-fld. *A. Loefflingiana*, *Cav. Ic.* i. t. 45, f. 1; *Gaud. Agrost. Helvet.* i. 327; *Balb. Misc. Bot.* i. 12 (non Linn.). *A. valesiaca*, *Nym. Syll. Fl. Europ.* 414. *Trisetum Cavanillesii*, *Trin. in Mem. Acad. Petersb. Ser. VI.* i. (1831) 63 (excl. *Syn. Cav.*); *Kunth Enum. Pl.* i. 297; *Steud. Syn. Gram.* 225. *T. Gaudinianum*, *Boiss. Voy. Esp.* 653, *Fl. Orient.* v. 535; *Parlat. Fl. Ital.* i. 259. *T. Loefflingianum*, *Beauv. ex Duthie Grass. N.W. Ind.* 31. *T. valesiacum*, *Boiss. ex Nym. Conspect.* 814.

BRITISH BELUCHISTAN; at Killa Abdulla, *Duthie*. PESHAWUR, *Stewart* (ex *Duthie*).—DISTRIB. Westward to Spain.

Stems 4–6 in., densely tufted. *Leaves* $\frac{1}{2}$ –1 in., linear, obtuse, sparsely hairy, rather thick; ligule oblong, hyaline. *Panicle* 1–2 in., oblong; branches and pedicels very short, smooth. *Spikelets* $\frac{1}{2}$ in., shining, green with purplish awns, 2-fld. and with a third imperfect; rachilla densely villous, hairs longer than the gl.; gl. I and II very unequal, keels smooth; I lanceolate; II oblong, acute; III much shorter than II, lanceolate, hyaline above and 2-nerved, the nerves ending in lateral awns as long as the gl.; callus bearded; dorsal awn nearly twice as long as the gl.; palea narrowly linear, nerveless.

Sect. III. Perennial. *Spikelets* erect. *Fl. gls.* 5–9-nerved. *Ovary* hirsute.

4. ***A. pratensis***, *Linn. Sp. Pl.* 80; panicle contracted, spikelets 5–7-fld., gl. I and II 3-nerved, flg. gls. entire rounded notched or erose at the tip. *Fl. Dan.* t. 1083; *Host Fl. Austr.* ii. 38, t. 51; *Engl. Bot.* t. 1204; *Knapp Gram. Britt.* t. 91; *Reichb. Ic. Fl. Germ.* i. t. 99; *Kunth Enum. Pl.* i. 300, *Suppl.* 254; *Steud. Syn. Gram.* 231; *Ledeb. Fl. Ross.* iv. 414; *Boiss. Fl. Orient.* v. 546; *Duthie Grass. N.W. Ind.* 31. *A. alpina*, *Sm. in Trans. Linn. Soc. x.* (1811) 335; *Kunth l. c.* 301; *Griseb. in Goett. Nachr.* (1868) 78. *A. argæa*, *Boiss. l. c.* *A. bromoides*, *Mert. & Koch in Roehl. Fl. Deutschl. Ed. III.* i. 570. *A. secunda*, *Jacquem. mss.* (non *Salisb.*). *Heuffelia præusta & pratensis*, *Schur Enum. Pl. Transs.* 780. *H. australis*, *Fourn. in Ann. Soc. Linn. Lyon, N.S.* xvii. (1869) 183.

WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 9–15,000 ft.—DISTRIB. Europe, Asia Minor.

Stems 10–18 in., densely tufted, rather stout, strict, leafy below. *Leaves* 6–10 by $\frac{1}{2}$ – $\frac{1}{3}$ in., erect, coriaceous, scaberulous above, margins thickened; sheath nearly smooth; ligule oblong, lacerate. *Panicle* 3–4 in., erect or inclined; branches short, erect, and pedicels scaberulous. *Spikelets* $\frac{1}{2}$ – $\frac{3}{4}$ in., narrow, glistening, green or

coppery-brown; rachilla penicillate; gl. I and II scarious, nerves scaberulous; I linear-oblong; II oblong-lanceolate; fl. gls. oblong, scarious above the middle, strongly 7-9-nerved, tip and margins broadly hyaline, margins and nerves scaberulous; awn median-dorsal, twice as long as the gl., bent just above the top of the gl.; keels of palea smooth.—Hackel (in litt.) refers the Kashmir plant to *A. argaea*, Boiss., which the latter author distinguishes from *A. pratensis* by the short leaves, very short branches of the short few-fl. panicle, and golden-brown spikelets, characters all of which may be traced in Kashmir and European *A. pratensis*.

5. *A. aspera*, Munro ex Thw. Enum. Pl. Zeyl. 372; tall, slender, panicle elongate contracted flexuous inclined or nodding, branches sub-erect naked below, spikelets 3-4-fl. scattered, gl. I and II very unequal scarious, I 1-3-nerved, II 5-nerved, fl. gls. coriaceous smooth or scabrid 5-7- (rarely 3-) nerved tip entire erose 2-fl. or 2-aristate, keels of palea closely pectinately ciliate. Trimen Cat. Ceyl. Pl. 109; Griseb. in Goett. Nachr. (1868) 78.

SIKKIM HIMALAYA, alt. 9-10,000 ft., J. D. H., Clarke. KHASIA HILLS, alt. 5-6000 ft., Griffith, &c. NILGHIRI HILLS, Schmid, Maxwell. CEYLON, alt. 6000 ft., Thwaites.

Stem 2-5 ft., slender or rather stout, erect or inclined, glabrous, or nodes slightly pubescent. Leaves 6-12 in. or more, flat or convolute, rarely $\frac{1}{2}$ in. diam.; sheaths smooth, glabrous or pubescent; ligule short, truncate, membranous. Panicle 8-16 in., usually nodding, rachis and branches smooth or faintly scabrid; lower branches 1-6 in., solitary geminate or fascicled. Spikelets $\frac{1}{2}$ - $\frac{2}{3}$ in. long, glistening, green, oblong; rachilla penicillate, slender; gl. I narrowly lanceolate, acuminate; II $\frac{1}{2}$ longer, oblong-lanceolate, rather shorter than III; fl. gls. ovate-lanceolate, glabrous, from entire to 2-dentate or cleft nearly $\frac{1}{2}$ way down; callus bearded; awn dorsal rather above the middle but below the cleft of the gl., and twice to thrice its length, slender, column twisted then bent and more or less recurved; keels of palea with long close-set fine cilia. Lodicules narrow, cleft. Anthers linear. Ovary obovoid or pyriform, top densely hirsute.—A very variable plant. Some of the Khasian specimens have stems 5 ft. high, and as thick as a goose-quill below, others are much smaller and very slender. The fl. gl. are most scabrid in Ceylon and Peninsular specimens, least so in Sikkim ones which pass into var. *Roylei*. The nearest European species is *A. Besseri*, Gmel. (*A. sempervirens*, Bess. non Vill.) of Hungary, a rigid species with narrower scabrid leaves, usually longer spikelets and obtuse erose fl. glumes.

A. ASPERA, PROPER; leaf sheaths smooth, panicle glabrous, fl. gl. more or less scaberulous entire 2-dentate or 2-fl., lobes not awned.—Sikkim, the Khasia and Nilghiri Hills and Ceylon.

Var. *Roylei*, Hook. f.; leaf-sheaths glabrous or softly pubescent, panicle glabrous or puberulous, fl. gls. quite smooth tip entire 2-toothed or 2-fl. almost to the awn into acuminate or long-awned lobes, or tip split into 3-4 short unequal bristles.

A. aspera, Griseb. l. c. *A. pubescens*, Royle Ill. Himal. Pl. 417; Duthie l. c. 32. *Trisetum virescens*, Nees ex Steud. Syn. Gram. 226; Duthie Grass. N.W. Ind. 31 (non Regel).—Avena, Wall. Cat. n. 3793.—Kashmir to Nepal, alt. 6-12,000 ft. A very common grass, often 4-5 ft. high with leaves half an inch broad.

Var. *parviflora*, Hook. f.; sheaths villously pubescent, branches of panicle short scabrid, spikelets crowded shortly pedicelled $\frac{1}{2}$ in. long, gl. II 3-nerved, fl. gls. 2-dentate smooth.—Sikkim, on Singalela, alt. 11,000 ft., Clarke.

Var. ? *Schmidii*, Hook. f.; stem slender, leaves chiefly radical, sheaths softly hairy, panicle very contracted, rachis short branches and very short pedicels puberulous or scaberulous, spikelets $\frac{1}{2}$ in. 2-3-fl., fl. gls. very scabrid 5-nerved tip 2-aristate, keels of palea shortly ciliate.—Nilghiri Hills, Schmid; Ootacamund, alt. 7500-8000 ft., Clarke.—Possibly a distinct species. One specimen has 7-nerved fl. gls.

6. *A. polyneura*, Hook. f.; panicle pyramidal, branches long few-fl.

lower horizontally spreading, spikelets $\frac{3}{4}$ in. long, glumes opaque all with very strong close-set raised nerves, I 1-3-nerved, II 5-nerved, fl. gls. ovate-lanceolate tip 2-dentate 7-9-nerved, keels of palea pectinately ciliate.

NILGIRI HILLS; Dodabetta, alt. 8000 ft., *Gamble*.

Stem 2-3 ft., rather stout, strict. *Leaves* strict, narrow, convolute; sheaths deeply grooved, lower sparsely hairy; ligule very short, truncate. *Panicle* 8 in., and nearly as broad; branches 2-3-nate, smooth. *Spikelets* reddish-brown.—Possibly only a state of *aspera*, as more specimens may prove; but of a very different habit and conspicuous for the large spikelets and opaque ribbed glumes.

Sect. IV. Perennials. *Spikelets* erect. *Fl. gls.* 3-5-nerved. *Ovary* quite glabrous.

7. **A. subspicata**, *Clairv. Man. Herb.* 17; pubescent or tomentose, ligule oblong, panicle spiciform or ovoid strict erect dense-fl. rarely effuse, spikelets $\frac{1}{2}$ – $\frac{3}{4}$ in. 2-3-fl. ovoid-oblong very shortly pedicelled, gl. I and II subequal or II longest, fl. gls. ovate or ovate-lanceolate 2-cuspidate or shortly 2-aristate 1- or faintly 3-nerved, awn reflexed rather longer than the gl. *Svensk Bot. t.* 722; *Reichb. Ic. Fl. Germ. i. t.* 98; *Griseb. in Goett. Nachr.* (1868) 78; *Ledeb. Fl. Ross. iv.* 418. *A. airoides*, *Koel. Gram. Gall. & Germ.* 208. *A. mollis*, *Mich. Fl. Am. Bor. i.* 72. *A. phleoides*, *Urv. in Mem. Linn. Soc. Par. iv.* (1826) 601. *A. tolucensis*, *H. B. & K. Nov. Gen. & Sp. i.* 148. *Trisetum airoides*, *Roem. & Sch. Syst. ii.* 666. *T. andinum*, *Benth. Pl. Hartw.* 261; *Steud. l. c.* 228. *T. antarcticum*, *Trin. in Mem. Acad. Petersb. Ser. VI. i.* (1831) 61 (*non Nees*). *T. groenlandicum & labradoricum*, *Steud. Syn. Gram.* 228. *T. molle*, *Kunth Rev. Gram. i.* 101, *Enum. Pl. i.* 296; *Torrey Fl. N. York, ii.* 452, t. 154; *Steud. l. c.* *T. phleoides*, *Kunth l. l. c.* 101, 295 (*non Trin.*). *T. spiciforme*, *Dulac Fl. Haut. Pyren.* 86. *T. subspicatum*, *Beauv. Agrost.* 88; *Kunth Enum. i.* 295, *Suppl.* 248; *Duthie Grass. N.W. Ind.* 31; *Hook. Fl. Bor. Am. ii.* 244; *Hook. f. Fl. Antarct. i.* 97, ii. 396, *Handb. N. Zeal. Fl.* 335; *Benth. Fl. Austral. vii.* 588; *Steud. l. c.* 225. *T. tolucense*, *Kunth Revis. l. c.* 297, t. 60, *Enum. l. c.* 296; *Steud. l. c.* *Aira spicata*, *Linn. Sp. Pl. Ed. II.* 95 (*non Ed. I.*); *Fl. Dan. t.* 228. *Aira subspicata*, *Linn. Syst. Ed. X.* 873; *Host Gram. Austr. ii.* 33, t. 45; *Wulf. in Jacq. Collect. iii.* t. 19, f. 3. *Koeleria aristata*, *Loisel. Fl. Gall. Ed. II. i.* 66. *K. spicata*, *Willk. & Lange Prodr. Fl. Hisp. i.* 72. *K. subspicata*, *Mart. ex Reichb. Fl. Germ. Excurs.* 49.

ALPINE and SUBALPINE HIMALAYA and TIBET, alt. 10-18,000 ft. (18,500 ft. in *Kunawur, Jacquemont*).—DISTRIB. Alpine, Arctic, and Antarctic regions.

Stems densely tufted, 6-24 in., strict, stout or slender, always pubescent or tomentose. *Leaves* flat, soft, hairy, rarely glabrate, lower sheaths loose. *Panicle* 2-4 in., from shortly oblong to cylindric, rarely interrupted or lobed with a few very short spreading lower branches. *Spikelets* yellowish-green, purplish, or white, densely imbricating; rachilla short, hairy; gl. I and II more or less unequal, nearly as long as III, keels scaberrulous; I 1-nerved; II 3-nerved; fl. gls. glabrous or puberulous, tip sometimes almost entire; callus bearded; awn inserted $\frac{1}{3}$ – $\frac{1}{6}$ way below the tip, column slightly twisted but sometimes awn shorter than the gl. and straight; keels of palea scabrid. *Lodicules* oblong, 2-fl. *Anthers* short. *Ovary* fusiform, glabrous. *Grain* fusiform, compressed.

8. **A. Clarkel**, *Hook. f.*; stem very slender and branches of panicle pubescent or tomentose, ligule very short, panicle slender spiciform interrupted, spikelets narrow $\frac{1}{6}$ – $\frac{1}{4}$ in. 2-3-fl. glabrous sessile or shortly pedicelled, gl. I and II unequal, fl. gls. narrowly lanceolate acuminate tip

2-aristulate 1- or sub 3-nerved, awn longer than the gl. recurved or reflexed column not twisted.

KASHMIR; at Laka and Budrawur, alt. 10-11,000 ft. CHAMBA; Dalhousie, alt. 8700 ft., *Clarke*.

Stem 1-2 ft. *Leaves* 4-8 in., flaccid, softly hairy on both surfaces; sheath with spreading or reflexed soft hairs. *Panicle* 3-5 in., erect or inclined, rachis slender; lower branches solitary or fascicled, rarely 1 in. long. *Spikelets* erect, pale brown, shining, rachilla penicillate with very long hairs; gls. hyaline as in *A. subspicata*, but longer and narrower.—Very near *A. subspicata*, but much more slender, with a longer loose panicle of shining much narrower spikelets, with obsolete side nerves.

9. *A. micans*, *Hook. f.*; stem and rachis of panicle pubescent or tomentose, leaves glabrous, ligule short lacerate, panicle contracted elongate ovoid or linear interrupted dense fld., branches short flowering to the base, spikelets $\frac{1}{2}$ in. densely imbricate silvery hyaline 3-5-fld. quite glabrous, gl. I and II very unequal 3-nerved, fl. gls. lanceolate obscurely 5-nerved, tip acuminate shortly 2-aristate, awn inserted $\frac{1}{2}$ way from the tip very slender as long as the gl. column not twisted.

WESTERN HIMALAYA; Garwhal, banks of the Ganges, alt. 8-10,000 ft., *Duthie*.

Stems 12-18 in., densely tufted, rather stout, leafy. *Leaves* 6-12 in. flat, narrow, rigid, finely acuminate strongly nerved, smooth or scaberulous; sheath quite smooth; ligule reniform, membranous. *Panicle* 3-4 in. by $\frac{1}{2}$ -1 $\frac{1}{2}$ broad, erect or inclined, strict or subflexuous; lower branches solitary, densely flowering to the base. *Spikelets* very pale greenish yellow; rachilla slender, ciliate; gl. I lanceolate, II $\frac{1}{2}$ longer than I oblong-lanceolate, keels of both scaberulous; fl. gls. with bearded calli; awn straight or recurved; keels of palea minutely scabrid. *Lodicules* narrow, cleft. *Anthers* linear. *Ovary* obovoid, quite smooth, style bases close together.—Quite unlike any other Indian species, but very near *A. virescens*, Regel of Turkestan which has flaccid leaves and an entire tip of fl. gls.

10. *A. flavescens*, *Linn. Sp. Pl.* 80; tall, slender, quite glabrous, ligule long, panicle effuse flexuous inclined or nodding branches capillary few-fld. naked below, spikelets $\frac{1}{2}$ in. 2-3-fld brown shining rachilla slender, gls. spreading, I and II unequal hyaline narrow I 1-nerved, II 3-nerved, fl. gls. narrowly lanceolate 3-nerved tip acuminate 2-aristate, awn stout inserted $\frac{1}{2}$ - $\frac{1}{3}$ way below the tip, twice as long as the gl. base twisted. *Fl. Dan.* t. 1507; *Host Gram. Austr.* iii. 27, t. 38; *Engl. Bot.* t. 952; *Knapp Gram. Britt.* t. 89; *Reichb. Ic. Fl. Germ.* t. 99; *Ledeb. Fl. Ross.* iv. 417; *Griseb. in Goett. Nachr.* (1868) 78. *Trisetum flavescens*, *Beauv. Agrost.* 88; *Kunth Enum. Pl.* i. 298, *Suppl.* 252, t. 19, f. 2; *Roiss. Fl. Orient.* v. 537.

TEMPERATE HIMALAYA; Sikkim, alt. 12-13,000 ft., *J. D. H.*—DISTRIB. Europe N. Asia, Japan, N. Africa.

Stem 2-3 ft. *Leaves* 6-18 in., flat, finely acuminate, more or less hairy; sheaths smooth; ligule elongate, membranous, lacerate. *Panicle* 3-5 in., quite glabrous, lower branches solitary or 2-nate. *Spikelets* larger than in most other species of this section, the awn longer; rachilla nodose below the fl. gls., penicillate with long hairs; gls. I and II lanceolate, acuminate; fl. gls. chartaceous with hyaline margins and tips, keels scaberulous as are the keels of the palea. *Lodicules* short, 2-lobed. *Anthers* small. *Grain* narrow.

11. *A. aenea*, *Hook. f.*; stem glabrous, ligule short rounded, panicle spiciform dense-fld. oblong or linear simple or lobed, branches very short, spikelets $\frac{1}{2}$ - $\frac{1}{3}$ in. 2-3-fld. densely imbricating sessile or very shortly pedicelled dark or pale brown shining, glumes hyaline I 1-nerved, II 1-3-

nerved, fl. gls. ovate faintly 5-nerved tip acuminate 2-aristate, awn twice as long as the gl. or less reflexed, column twisted. Trisetum aureum, *Nees ex Steud. Syn. Gram.* 225 (non Tenore); *Duthie Grass. N.W. Ind.* 3. *T. aeneum*, *Hack. mss.*

WESTERN HIMALAYA, alt. 11–12,000 ft., from Kashmir to Kumaon.

Stem erect, 1–2 ft., stout or slender. *Leaves* 6–10 by $\frac{1}{2}$ – $\frac{1}{4}$ in., glabrous or hairy, as are the sheaths. *Panicle* 3–4 by $\frac{1}{2}$ –1 in. diam., erect, strict, or very narrow looser-fld. and flexuous; rachis branches and pedicels quite glabrous. *Spikelets* erect; rachilla penicillate; glumes not widely spreading, all acuminate; I lanceolate; II $\frac{1}{2}$ longer, oblong-lanceolate; fl. gls. rather longer than II, keel scaberulous as are the keels of the palea. *Grain* fusiform, compressed.

12. **A. sikkimensis**, *Hook. f.*; tall, slender, stem and panicle quite glabrous, ligule short rounded, panicle narrow elongate effuse nodding flexuous, branches few-fld. capillary, spikelets $\frac{1}{4}$ – $\frac{1}{3}$ in. 3–4-fld. sessile or shortly pedicelled pale or brown, rachilla not long, gls. I and II unequal acute hyaline glistening, fl. gls. coriaceous ovate 2-aristate, 1–3 nerved, chartaceous smooth, awn inserted $\frac{1}{6}$ – $\frac{1}{3}$ way below the tip as long or nearly twice as long as the gl. reflexed column twisted.

SIKKIM HIMALAYA; Lachen and Lachoong Valleys, alt. 10–11,000 ft., *J. D. H.*

Stem 2–3 ft. *Leaves* 6–12, by $\frac{1}{4}$ – $\frac{1}{2}$ in., more or less hairy, flat, flaccid; sheaths glabrous except near the mouth. *Panicle* 6–10 in.; branches subsecund, fascicled, $\frac{1}{2}$ –1 in. long, naked below. *Spikelets* usually 4-fld., sometimes nearly as brown as in *A. flavesens*.

13. **A. flaccida**, *Hack. mss.*; very slender, quite glabrous, panicle small open, branches few capillary spreading, spikelets few pedicelled 3-fld. $\frac{1}{4}$ in. long white and rose-colrd., rachilla long slender scaberulous, gls. I and II very unequal subulate-lanceolate, I and II 3-nerved, fl. gls. ovate-lanceolate acute 5-nerved, awn inserted a little below the tip as long as the gl. straight column not twisted.

The PANJAB; Black Mts., alt. 8–9000 ft., *Duthie* (n. 7609 in part).

A foot high. *Leaves* 4–6 by $\frac{1}{8}$ – $\frac{1}{4}$ in., quite glabrous; ligule short, rounded. *Panicle* 3 in. long, branches rather distant. *Spikelets* erect; gl. I much shorter and narrower than II; fl. gls. smooth, glabrous, chartaceous, white in the lower half pale rose in the upper, margins and tip hyaline, nerves very slender; awn very delicate; keels of narrow palea smooth. *Lodicules* lanceolate. *Ovary* pyriform, quite smooth, style bases rather distant.—Described from a single insufficient specimen.

DOUBTFUL SPECIES.

A. BENGHALENSIS, *Schwaegr. Breit. ex Steud. Nom. Ed.* I. 94. I have no clue to this plant, which is not taken up in *Ed. II* of Steudel's Nomenclator.

A. PILOSA, *M. Bieb. Fl. Taur. Cauc.* iii. 84; *Griseb. in Goett. Nachr.* (1868) 78 Tibet, *Schlagintweit*.—I have seen no Tibetan specimen of this, for which Griesbach is the authority.

83. **DANTHONIA**, DC.

Annual or perennial grasses. *Spikelets* 2- or more fld. (fls. all perfect or the uppermost male) panicle, erect, not jointed on their pedicels; rachilla hairy and jointed at the base and between the fl. gls., produced beyond

the uppermost gl. *Glumes* 5 or more, I and II empty, subequal, as long as the whole spikelet, persistent, keeled, acute or acuminate; fig. gls. dorsally rounded, ciliate, 7-9-nerved, 2-fid, lobes acute at the base or awned and with a rigid twisted awn in the sinus; palea broad. *Lodicules* 2, fleshy. *Stamens* 3. *Styles* free. *Grain* free within the membranous or hardened gl. and palea.—Species about 100 enumerated.

1. **D. himalaica**, *Hook. f.*; leaves as long as the stem wiry, panicle 3-4 in. contracted few-fld., branches and pedicels very short, spikelets few $\frac{3}{4}$ -1 in., 5-6-fld., gls. I and II unequal 6-7-nerved, fig. gls. sparsely hairy 9-nerved, lateral awns 0.

KUNAWAR; Jaunsar, on Lokardi Peak, alt. 8-9000 ft., *Duthie*.

Stems 12-18 in., densely tufted, filiform. *Leaves* convolute, erect, quite smooth, deeply ribbed in the inner surface; sheath short, smooth; ligule $\frac{1}{2}$ in., hyaline, lacerate. *Panicle* of 4-8 erect spikelets; rachis and short erect pedicels, smooth, glabrous. *Gls.* I and II pale brown, much longer than the fig. gls., finely acuminate, margins hyaline, I 6-7-nerved; II longest, 7-nerved; fig. gls. $\frac{1}{2}$ - $\frac{3}{4}$ in., pale green, 2-fid; awn straight, base strongly twisted; callus silkily villous; palea short, obtusely 2-lobed, keels scabrid. *Lodicules* clavellate. *Anthers* as long as the palea. *Ovary* ovoid, hirsute, styles short, stigmas long.

2. **D. exilis**, *Hook. f.*; stem and leaves filiform, panicle short contracted racemiform few-fld., branches and pedicels very short, spikelets $\frac{1}{2}$ in. 3-5-fld., gl. I and II unequal 1-3-nerved, fl. gls. villous, lateral awns very short.

KASHMIR; Tilail and Bargil, alt. 9-11,000 ft., *Clarke*; Gurail, alt. 8-9000 ft., *Duthie*.

Stem 3-10 in., densely tufted, very slender. *Leaves* 3-5 in., convolute; ligule short. *Panicles* $\frac{1}{2}$ -1 in., erect or cernuous, 6-10-fld., green or brownish, branches and pedicels smooth. *Spikelets* erect; rachilla very short between the upper gls.; gl. I and II scarious, lanceolate, acuminate, 1-nerved or obscurely 3-nerved at the base, I the shortest; fig. gls. much shorter than II, oblong, coriaceous, faintly 7-nerved, cleft nearly to the middle, lateral awns as long as their gl., median twice as long erect; callus densely bearded; palea linear-lanceolate, 2-toothed, sparsely hairy; nerves strong, scabrid. *Grain* obovoid, smooth, glabrous.

3. **D. cachemyriana**, *Jaub. & Sp. Illustr. Pl. Orient.* iv. 46, t. 331; stems ascending from a stout woody stock, leaves very long narrow convolute, panicle contracted, spikelets $\frac{3}{4}$ - $\frac{3}{2}$ in., gl. I and II subequal 3-7-nerved, fig. gls. sparsely hairy, lateral awns much longer than gl. II. *D. kashmiriana*, *Duthie in Atkins. Gaz. N.W. Ind.* 630, *Grass. N.W. Ind.* 32; *Griseb. in Goett. Nachr.* (1868) 78.

TEMPERATE and ALPINE HIMALAYA, and W. TIBET, alt. 10-14,000 ft.

Stem 1-2 ft., densely tufted, or creeping below and clothed with shining sheaths. *Leaves* as long as the stem or longer, erect, flexuous, wiry, glabrous; sheaths glabrous, or lower rarely tomentose; ligule a pubescent ridge. *Panicle* most variable in number and disposition of the spikelets, erect, 4-5 in. long, with 30 or more close erect spikelets $\frac{3}{4}$ in. long, or more lax with fewer (3-4 or more) spikelets on longer or shorter rarely spreading branches and pedicels, the latter smooth hairy or scabrid. *Spikelets* 2-5-fld., erect, pale, rather shining; rachilla more or less hairy; gls. I and II membranous, sometimes purple, rarely very sparsely hairy, keels smooth; I rather the smallest, nerves very variable, more or less trabeculate; fig. gls. much smaller, linear-lanceolate, cleft about $\frac{1}{2}$ way down, 9-nerved; lateral awns as long as the gl. or longer, exserted, median strongly twisted often to

the tip, variable in length, about twice that of gl. II; callus bearded; palea as long as the gl., linear, obtuse, keels nearly smooth. *Anthems* linear. *Grain* narrowly oblong, glabrous.—A very variable plant in panicle but constant in habit. Jaubert and Spach's figure is of a very starved small form, and I have not found in Jacquemont or other specimens the whorl of hairs at the top of the pedicel (base of gl. I and II) which they represent. The nervation of gl. I and II varies remarkably. I find both 3-nerved in Sikkim specimens, both 5-nerved in many Western Himalayan; both sub 7-nerved in Kunawur ones; both 4-nerved in Simla ones; I 3-nerved, II 5-nerved in some Western; I 5-nerved, II 7-nerved in Garwhal; I 5-nerved and II sub 6-nerved in Jacquemont's n. 260, in which the awn is twisted to the tip; both are very sparsely hairy in a few specimens. The lower sheaths are villous in Simla (Hattu) specimens.

Var. *minor*; stems 6–8 in. very slender, leaves filiform, panicle often recurved, spikelets 4–8, gl. I and II often purple 5–7-nerved. *Danthonia* No. 2. *Herb. Strach.* & *Winterb.*—Alpine Himalaya, from Garwhal to Sikkim, alt. 12–14,000 ft.

4. ***D. Cumminsii*, Hook. f.**; stem ascending, leaves filiform, panicle small, rachis and pedicels villous, spikelets 3–6 $\frac{1}{2}$ in. long very shortly pedicelled, lateral awns of gl. III very short, median not twice as long as gl. II hardly twisted.

BHOTAN; Gnatong in the Sikkim frontier, alt. 12,000 ft., *Cummins*.

Possibly a form of *D. cachemyriana*, but the characters are marked. The specimens are curved in a semi-circle, no doubt from growing amongst rocks, as was the case with *Calamagrostis tripilifera*, var. (p. 262).

DOUBTFUL SPECIES OF DANTHONIA.

D. GRIFFITHIANA, C. Muell. in *Bot. Zeit.* xiv. (1856) 374.—Khasia Hills, *Griffith*.—Judging by the description this is not a *Danthonia*, but I have formed no idea of what it may be.

84. **DUTHIÆA**, Hack.

No. 123 in *Clavis*, p. 8.

Tufted perennial erect glabrous grasses. *Leaves* linear, subconvolute. *Spikelets* 3–5-fld., often bracteate, in a short simple unilateral raceme, laterally subcompressed, not jointed on the pedicels, uppermost fl. imperfect; rachilla articulate. *Gls.* I and II empty, persistent, lanceolate, acuminate, 7–11-nerved, dorsally rounded; fl. gls. herbaceous, oblanceolate, 7–11-nerved, 2-fld, awned in the sinus, margins membranous, awn half-twisted; palea 2-keeled, keels scabrid, excurrent. *Lodicules* 0. *Stamens* 3. *Ovary* hispid, narrowed into a slender style; stigmas very long, papillose, exerted from the top of the spikelets. *Grain* oblong, crowned with the style, hirsute.—Species 2, Western Himalaya and Afghanistan.

***D. bromoides*, Hack.** in *Verhandl. Zool. Bot. Ges. Wien.* (1895) 200; spikelets 3–5-fld., rachilla hairy, gl. I and II 7–11-nerved margins narrowly hyaline, fl. gls. obtusely 2-lobed dorsally hairy below, style about as long as the stigmas. *Stapp* in *Hook. Ic. Pl.* t. 2474.

KASHMIR, alt. 12–13,000 ft., *Jacquemont*, *Duthie*. WESTERN TIBET, alt. 12,000 ft., *Thomson*, *Clarke*. Brenda Pass, KUNAWUR (*Herb. Saharunpore*).

Stems 18–24 in., slender, compressed, scaberulous above. *Leaves* 6–12 in., rather rigid, cauline very short, flat, acute; sheaths compressed, of uppermost inflated embracing the raceme; ligule oblong. *Raceme* 1–2 in., inclined, rachis scabrid. *Spikelets* 5–6, subsessile, ovoid, about $\frac{1}{2}$ in. long (without the awns) green; bracts

scarious; gl. I often faintly nerved; II 7-nerved, subaristate; fig. gls. oblanceolate, hairy below the middle, lobes obtuse; awn $\frac{2}{3}$ -1 in., scabrid, obscurely geniculate. *Ovary* narrow, style $\frac{1}{2}$ - $\frac{3}{4}$ in. long.—A remarkable grass, the character and affinities of which are discussed at length by Hackel, who places it next to *Bromus*, where it will be found (No. 123) in the clavis of this work, p. 8. The recognition by Dr. Stapf of a second species, *D. oligostachya*, Stapf (*Avena oligostachya*, *Munro in Journ. Linn. Soc.* xviii. (1880) 108, name only, *Aitchison l. c.* xix. (1882) 193, t. 30) proves the position of the genus to be near *Danthonia*, where I had placed it, before its publication by Hackel, when I deferred to that author's high authority.

Tribe VIII. CHLORIDEÆ. (See p. 6.)

84. MICROCHLOA, Br.

Slender perennial grasses. *Leaves* filiform, convolute. *Spikelets* very narrow, 1-fl., minute, 2-seriate, unilateral on a solitary terminal filiform curved spike, not jointed at the base, awnless; rachilla jointed at the base, not produced beyond gl. III. *Glumes* 3, I and II empty, membranous, 1-nerved, keeled, persistent; III very small, oblong, hyaline, awnless; palea as long as the gl., keels ciliate. *Lodicules* 2, truncate. *Anthers* linear. *Styles* distinct. *Grain* oblong, fusiform, glabrous, free within the hyaline gls.—Species 3, two confined to Africa and the following.

M. setacea, Br. *Prodr.* 208; *H. B. & K. Nov. Gen. & Sp.* i. 84, t. 22; *Beauv. Agrost.* 115, t. 20, f. 8; *Nees Agrost. Bras.* 441; *Fl. Afr. Austr.* 247; *Kunth Enum. Pl.* i. 258, *Suppl.* 201; *Doell in Mart. Fl. Bras.* ii. III. 76, t. 21; *Steud. Syn. Gram.* 202; *Benth. Fl. Hongk.* 428, *Fl. Austral.* vii. 608. *M. elongata*, Br. in *Wall. Cat. n.* 3807. *Rottboellia setacea*, *Roxb. Corom. Pl.* ii. 18, t. 132, *Fl. Ind.* i. 357. *Nardus indica*, *Linn. f. Suppl.* 105.

BENGAL, *Roxburgh*, on walls. NEPAL, *Wallich*. KHASIA HILLS, alt. 4-6000 ft., *J. D. H. & T. T., Clarke*. CENTRAL PROVINCES; Chanda, *Duthie*. NILGIRI HILLS, *Perrottet*.—DISTRIB. Tropics of Old and New World.

Stems tufted, 6-10 in., wiry. *Leaves* as long as the stem, curved, glabrous or sparsely hairy; ligule very short, ciliate. *Spike* 2-10 in., with the spikelets $\frac{1}{10}$ - $\frac{1}{8}$ in. diam.; rachis slender, dorsally rounded. *Spikelets* $\frac{1}{15}$ in., close-set, alternating in two unilateral rows, erect; gls. I and II subequal, lanceolate, acute, twice as long as III, which is obtuse, hairy, nerveless; palea lanceolate, 2-toothed.

85. GRACILEA, Koen.

Small grasses. *Leaves* short. *Spikelets* 1-2-fl. (fl. unisexual?) collected in turbinate awned deciduous spicate clusters which are secund sessile and jointed on a filiform or capillary flexuous terminal rachis; rachilla not jointed, sometimes produced beyond gl. IV and bearing an imperfect fl. *Glumes* 4-6; I and II narrow, rigid, ciliate with long hairs, narrowed into long rigid scabrid awns, I narrowest; II with broad hyaline margins; III and IV broadly ovate, membranous, scaberulous, 3-nerved, shortly awned, tip entire or 2-cuspidate; palea as broad as the gl., 2-cuspidate. *Lodicules* cuneiform. *Anthers* small. *Grain* oblong, free.—Species, 2 Indian and African.

1. **G. nutans**, Koen. in *Ges. Naturf. Fr. Neue Schrift.* iv. (1803) 218; perennial? leaves lanceolate. *Melanocenchris Rothiana*, *Nees in*

Proc. Linn. Soc. i. (1841) 95; *Wight Cat. n.* 1768; *Dalz. & Gibs. Bomb. Fl.* 297. *M. Perrottetii*, *Jaub. & Sp. Ill. Pl. Or. IV.* 39, t. 326. *Pommereulla monoeca*, *Rottl. l. c.*; *Roth. Nov. Sp.* 33 (monoica); *Kunth Enum. Pl. i.* 321; *Wall. Cat. n.* 8905 excl. D.

MYSORE and the CARNATIC, *Heyne*, &c. CEYLON; Mannar district, *Trimen*.

Stems 6–8 in., stout and decumbent below, erect or geniculately ascending. *Leaves* $\frac{3}{4}$ –1 in., narrowed from the subcordate base to the acute tip, rigid, margins setosely serrulate; ligule of short hairs. *Spikes* and clusters of spikelets as in *G. Royleana*, but tip of gl. III entire, IV bicuspidate.

2. ***G. Royleana***, *Hook. f.*; annual, leaves filiform. *Melanocenchris Royleana*, *Nees in Proc. Linn. Soc. i.* (1841) 95; *Aitchis. Cat. Panjab Pl.* 168 (excl. *Syn.*); *Duthie Grass. N.W. Ind.* 33, *Fodd. Grass. N. Ind.* 54, t. 67; *Lisboa in Journ. Bomb. Nat. Hist. Soc. viii.* (1893) 370. *M. Jacquemontii*, *Jaub. & Sp. Ill. Pl. Or. iv.* 36. *Pommereulla monoica*, *Wall. Cat. n.* 8905 D. *P. Royleana*, *Steud. Nom. Ed. II. ii.* 379. *Amphipogon humilis*, *Herb. Ham. ex Wall. Cat. l. c.*—*Roylea*, *Nees ex Steud. l. c.* 475.

THE PANJAB PLAIN, *Hamilton, Royle, &c.*, eastwd. to Delhi, *Clarke*. RAJ-POOTANA, CENTRAL INDIA, the CONCAN, CANARA, and SCIND.—DISTRIB. Socotra, Nubia.

Stems 3–8 in., densely tufted, very slender. *Leaves* 1–2 in., flat or convolute, glabrous or margins below and sheaths setulose; ligule a ridge of hairs. *Spikes* filiform, 1–2 in., flexuous, often reclined or recurved; rachis 3-gonous, smooth; clusters of spikelets $\frac{1}{4}$ – $\frac{1}{2}$ in. long including the awns, green or purple; awns of gl. I and II longer than the gls., of III very short.

Var. plumosa; clusters of spikelets $\frac{1}{2}$ in. including the awns. *M. plumosa*, *Jaub. & Sp. l. c.* 37; *Hochst. in Flora* (1855) 273, 417. *Pennisetum plumosum*, *Hochst. ex Steud. Syn. Gram.* 201. *Ptilonema plumosum*, *Steud. l. c.* *Eutriana abyssinica*, *Br. ex Fresen. in Mus. Senkenb. ii.* (1837) 142.—The Panjab, Jhelum River, *Aitchison*. Scind, *Stocks*. Arabia, Abyssinia.

86. ENTEROPOGON, *Nees*.

Slender perennial grasses. *Leaves* long, very narrow. *Spikelets* very narrow, 1–2-fld. (lower fl. perfect upper if present male or neuter) unilateral in a solitary terminal slender spike, not jointed at the base; rachilla jointed at the base. *Glumes* 3 or 4; I and II unequal, narrow, hyaline, 1-nerved, persistent; III much larger, linear, rigid, scabrid, dorsally rounded, 3-nerved, tip entire, or acutely 2-fld with a short erect awn in the cleft; callus bearded; palca lanceolate, 2-toothed, keels scabrid. *Lodicules* 2. *Anthers* very long. *Styles* distinct. *Grain* narrow, free within the hardened gls.—Species, an African, and the following.

E. melicoides, *Nees in Lindl. Introd. Nat. Syst. Ed. II.* 449; *Wall. Cat. n.* 8893; *Wight Cat. n.* 1757; *Trim. Cat. Ceyl. Pl.* 109. *Eutriana enteropogon*, *Steud. Syn. Gram.* 216. *Ischæmum melicoides*, *Koen. ex Rottl. in Ges. Naturf. Neue Fr. Schrift. iv.* (1803) 211. *Ctenium seychellense*, *Baker Fl. Maurit.* 452. *Festuca mysorensis*, *Heyne ex Roem. & Sch. Syst. ii.* 600. *Pottboellia triacantha*, *Roth. Nov. Sp.* 43. *R. pilosa*, *Roth. in Roem. & Sch. l. c.* 785.

MYSORE, *Heyne*, *Wight*. BURMA; Shan Hills, *Collett*. CEYLON, *Trimen*.—DISTRIB. Seychelle Islds.

Stems 1-3 ft., densely tufted, wiry. *Leaves* nearly as long as the stem, up to $\frac{1}{2}$ in. broad, flat or convolute, tip capillary; ligule of long hairs. *Spikes* 6-10 in., flexuous or curved, rachis dorsally rounded. *Spikelets* $\frac{1}{2}$ - $\frac{3}{4}$ in., loosely imbricate, rarely 2-seriate; gls. I and II glistening; III opaque, with a very thick raised midrib; awn about = the gl.

87. **TRIPOGON**, Roth.

Slender densely tufted grasses. *Leaves* usually convolute. *Spikelets* many-fld. (fl. all but 1-2 terminal perfect), 2-seriate and unilateral on a very slender terminal spike, not jointed at the base; rachilla produced between the glumes, jointed at the base. *Glumes* many, I and II unequal, distantly superposed, 1-nerved, empty, persistent; I usually lodged in a furrow of the rachis, and toothed or lobed on one side; II entire or notched below the mucronate or apiculate tip; III and following ovate, dorsally convex, 2-fld, and awned in the cleft, or 4-fld with the outer lobes awned, the inner membranous and rarely awned; palea broad or narrow, complicate. *Lodicules* 2. *Stamens* 3. *Styles* very short. *Grain* very narrow, free.—Species about 10, trop. and subtrop. Asia and Africa.

The species of *Tripogon* are very closely allied, and though dissimilar in many respects, are so variable in all, that they form an almost inextricable plexus. The most distinct are *T. capillatus*, *pauperculus*, *Wightii*, and *abyssinicus*, of which the latter almost passes into *Jacquemontii*. Glume I is remarkable from being in most species inæquilateral, one margin being deeply notched, or dilated suddenly below the middle into a wing or lobe or segment, which is sometimes displaced and appears as a small 3rd or lowest empty glume. The subequal symmetrical glumes of *T. pauperculus* and *Wightii* are unusual in the genus.—The length of the awns, and of the lobes of the gl. III vary in each species; and there is every intermediate between the species with two simple awned lobes one on each side of the median awn, as in *T. trifidus*, and the quadrifid top of the gl. of *T. filiformis*.—The species grow promiscuously on rocks or trunks of trees.

* Flg. glumes simply 2-fld with an interposed awn, the lobes awned or not.

† Awn as long or longer than its glume.

1. **T. capillatus**, Jaub. & Spach. *Illustr. Fl. Orient.* iv. 47, t. 332; gl. I and II narrowly lanceolate acuminate or awned, III villous at the base, awn many times longer than its gl. flexuous. *T. capitatus* (err. typ.) *Lusboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 371.

BEHAR; on Parasnath, J. D. H., Clarke. WESTERN GHATS; from the Concan to the Nilghiri Hills, Jacquemont, &c.

Stem very slender. *Leaves* 6-10 in., convolute. *Spike* 6-12 in., filiform or capillary, flexuous. *Spikelets* remote, $\frac{1}{10}$ - $\frac{1}{2}$ in., few-fld., green; gl. I sometimes very minute, at others nearly as long as II both sometimes awned, membranous with a broad defined nerve; lateral teeth of III shortly awned; median awn so slender as to be barely visible.

2. **T. pauperculus**, Stapf in Hook. *Ic. Pl.* t. 2442; dwarf, stems capillary, gl. I and II lanceolate subaristately acuminate symmetrical, III villous at the base, lateral lobes long-awned median-awn not twice as long as the gl.

WESTERN GHATS; near Poona, on stems of trees, Woodrow.

Stems 2-3 in., densely tufted, leafy to the tip. *Leaves* setaceous, involute, upper

much longer than the spike, acute; sheaths striate, lower lax; ligule ovate, obtuse. *Spikelets* 1-3, remote, 1-4-fld.; gl. I and II 1-nerved, gl. I shorter than II; flg. gls. 1-4 with 1-2 empty above them, linear-oblong, 3-nerved; lateral lobes with capillary awns; median awn twisted at the base; palea oblong, keels ciliolate. *Anthers* minute, subglobose. *Grain* narrowly linear, cylindric.

3. **T. trifidus**, *Munro, ex Stapf in Kew Bulletin* (1892) p. 85; spikelets $\frac{1}{2}$ - $\frac{1}{2}$ in., gl. I lobed on one side, II narrowly lanceolate acuminate entire or notched below the tip, III villous at the base, awn twice as long as the gl. or longer.

SIKKIM HIMALAYA, alt. 5-6000 ft., *J. D. H. MISHMI HILLS, Griffith. KHASIA HILLS*, alt. 4-5500 ft., *Griffith. (Kew Distrib. n. 6633, 6634).*—DISTRIB. Tonkin.

Stem 8-18 in. *Leaves* 6-10 in. *Spikes* 2-12 in., stout or slender. *Spikelets* 3, close or distant, 4-10-fld.; gl. I lanceolate, acuminate or aristate, broadly lobed on one side, the lobe sometimes detached; II much longer, lanceolate, acuminate or 2-toothed with a short awn; III and following bearded at the base; lateral lobes simple, lanceolate, and awned or irregularly toothed in the inner margins, or rarely with a small tooth at its inner base; awn usually twice or thrice as long as the glume, erect and flexuous, or recurved; palea elliptic-oblong, obtuse, keels scabrid.—In the Sikkim specimens gl. I and II are sometimes very long lanceolate aristately acuminate with the lobe of I placed lower down, in others gl. I is much shorter than II, with a broad lateral lobe towards its base; in others again gl. I is deeply notched on one side towards the tip only; gl. II is 2-toothed below the tip and has 5 contiguous strands on the thickened disk; gl. III and its palea are longer and narrower than in any Khasia form, where, however, the plant is so variable that I hesitate to regard the Sikkim one as a different species.

4. **T. Wightii**, *Hook. f.*; spikelets 1-1 $\frac{1}{2}$ in. 10-30-fld., gl. I and II subequal linear-oblong tip 2-toothed and mucronate, awn recurved as long or twice as long as its gl.

MYSOKE; at Bellary (1834) *Wight* (n. 1793?).

Spikes 6-8 in., rachis as stout as a sparrow's quill. *Spikelets* 10-12, from $\frac{1}{2}$ -1 $\frac{1}{2}$ in. apart; gl. I and II linear-oblong, membranous, hyaline, with a strong defined midrib; III rather narrow, base bearded, lateral lobes lanceolate not awned; palea oblong, keels obscurely scabrid.—A very distinct species, of which there are only spikes in Wight's Herbarium. Bellary is a botanically unexplored district.

†† *Awn shorter than its gl*

5. **T. Lisboæ**, *Stapf in Kew Bulletin* (1892) 86; spikelets $\frac{1}{2}$ - $\frac{1}{2}$ in. 5-12-fld., gl. I lanceolate obtusely toothed on one side, II twice as long linear-oblong coriaceous apiculate, awn of III very short. *Leptochloa tripogonoides*, *Munro mss. ex Lisboa l.c.* *Tripogon*, n. 5, *Herb. Ind. Or. H.f. & T.* *Tripogon* sp. nov., *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 370.

RAJPUTANA; Mt. Abu, *Duthie*. The CONCAN, CANARA, and MYSOKE, *Jacquemont, &c.*

Stem stout or slender, in Jacquemont's specimen 3 ft. high and as thick as a duck's quill below. *Leaves* 1-2 ft. by $\frac{1}{2}$ - $\frac{1}{2}$ in., quite smooth, flat or convolute. *Spikes* 6-10 in.; rachis stout or slender, strict. *Spikelets* usually densely crowded; glumes coriaceous; lobes of III short membranous not awned, base very shortly bearded; awn $\frac{1}{2}$ the length of its gl. or shorter; palea oblong, keels scaberulous.—The difference in stoutness of stem and spike, and of size of the spikelets is remarkable.

6. **T. Jacquemontii**, *Stapf in Kew Bulletin* (1892) 85; spikelets $\frac{1}{2}$ - $\frac{3}{4}$ in. 10-20-fld., gl. I lanceolate lobed on one side, II $\frac{1}{2}$ longer ovate-

lanceolate coriaceous nerve broad or narrow 2-toothed below the tip, awn half as long as its gl. or shorter. *Lisboa* in *Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 370. *T. bengalensis*, *Munro mss.*

BENGAL; *Griffith* (*Kew Distrib.* n. 6636). MALWA, the CONCAN and DECCAN, *Jacquemont*, &c.

Stem very slender, 1–2 ft. *Leaves* filiform. *Spikes* 6–10 in., slender. *Spikelets* crowded or not; glumes subcoriaceous, uppermost flowerless; lobes of III ovate, acute, not awned, base shortly bearded; awn straight, variable in length; palea oblong, keels scaberulous.

Var. *submuticus*; gl. I subulate-lanceolate slightly oblique towards the base very much smaller and narrower than II, awn hardly longer than the lobes of the gl. *T. submutica*, *Hack. in Herb. Duthie*.—Western Himalaya; below Kotgurb, *Thomson*. Simla, alt. 7–8000 ft., *Duthie*.—The habitat is far removed from that of all other species. *Duthie's* specimen has the excessively slender habit and all other characters of the type but those above given. *Thomson's* are much shorter, with shorter leaves, and are intermediate between *Jacquemont's* and the following.

7. ***T. abyssinicus***, *Nees ex Steud. Syn. Gram.* 301; dwarf, very slender, spikelets $\frac{1}{8}$ – $\frac{1}{6}$ in. 6–8-fld., gl. I very small ovate or subulate-lanceolate unequal or lobulate-sided, II coriaceous linear-oblong 2–3-toothed below the tip, III 2-toothed at the truncate tip, awn minute. *T. minimus*, *Hochst. ex Steud. l.c.* *T. bromoides*, *Benth. in Gen. Pl.* iii. 1200; *Duthie Grass N.W. Ind.* 33 (not of *Roth.*). *T. festucoides*, *Clarke ex Duthie l.c.* *Danthonia leptophylla*, *A. Rich. Tent. Fl. Abyss.* ii. 421. *Festuca filiformis*, *Steud. l.c.* *Catapodium filiforme*, *Nees ex Steud. l.c.* *C. fusiforme*, *Benth. in Journ. Linn. Soc.* xix. (1881) 128 (error for *filiforme*).

WESTERN HIMALAYA; from Kashmir to Simla, alt. 5–7000 ft., *Royle*, &c. WESTERN PANJAB, *Stewart*, &c.—DISTRIB. Affghan., Tropical Africa.

Stem 6–10 in. *Leaves* 2–6 in., filiform. *Spikelets* always very small and usually rather distant; glumes rather thin, narrow; I membranous, nerve strong; II linear-oblong, with a narrow membranous margin, base bearded, tip sometimes erose and 2-mucronate.

** Fl. glumes 4-fid, outer lobes awned or not, inner membranous sometimes very short or truncate.

8. ***T. bromoides***, *Roth. Nov. Sp.* 49; spikes long or short, spikelets $\frac{1}{6}$ – $\frac{1}{2}$ in. few- or many-fld., gl. I ovate or lanceolate deeply notched on one side, II oblong-lanceolate bifid with a short awn in the cleft, III with small awned outer lobes broad ovate acute, inner and median awn shorter than the gl. *Wall. Cat.* n. 8887; *Wight Cat.* n. 1793; *Steud. Syn. Gram.* 301; *Stapf in Kew Bullet.* (1891) 85. *T. festucoides*, *Jaub. & Spach Ill. Fl. Orient.* iv. 49, t. 333. *T. Griffithii*, *Wight & Arn. ex Wight Cat.* n. 2658; *Nees ex Steud. l.c.* 301. *T. lanatus*, *Hochst. ex Steud. l.c.* *T. Neesianus*, *Wight & Arn. ex Wight Cat.* n. 2059. *T. zeylanicus*, *Nees ex Wight Cat.* n. 2360; *Steud. l.c.*; *Thwaites Enum.* 374; *Trim. Cat. Ceyl. Pl.* 109. *Triathera bromoides*, *Roth. ex Kunth l.c.* *Bromus Myurus* & *Festuca mysorensis*, *Herb. Heyne*. *Plagiolytrum calycinum*, *Nees in Proc. Linn. Soc.* i. 95; *Wight Cat.* n. 1793 & 2059. *Avena mysorensis*, *Spreng. Syst.* i. 337.

MALABAR GHATS; from Belgaum southward, alt. 4–7000 ft. CEYLON; in the elevated districts.

Stems 6–18 in., stout or slender. *Leaves* usually short, but sometimes as long as the stem, flat or convolute, and filiform. *Spike* 3–8 in. *Spikelets* very variable, close or distant. *Gl.* I membranous, nerve stout; II membranous, or coriaceous

with broad membranous margins, more deeply notched or bifid at the apex than in any other species; III and following bearded at the base, broadly ovate, strongly 3-nerved, cleft half way down, outer lobes small placed low down and margined with their awns half as long as the gl. or longer, inner lobes often half as long as the gl., much larger than in any other species; awn rarely as long as its gl.

Var. *major*, Stapf mss.; stem 2-4 ft., leaves 5-6 in. narrow flat spreading, spike 4-6 in., spikelets $\frac{3}{4}$ in. bifarious 16-20-fl.—Nilgiri Hills, Nadavattam, alt. 6000 ft., Lawson. Pulney Hills, Wight.

Var. *longifolius*; stem 2 ft., leaves filiform as long as the stem, spike 3 in., spikelets $\frac{1}{2}$ in. secund 8-10 fl.—Nilgiri and Pulney Hills.

9. **T. filiformis**, Nees ex Steud. Syn. Gram. 301; very slender, leaves filiform as long as the stem, spikes 3-10 in., spikelets $\frac{1}{2}$ - $\frac{3}{4}$ in., gl. I ovate broadly lobed on one side, II linear-oblong or lanceolate 2-toothed below the tip, III with small shortly awned outer lobes, and short or long obtuse acute or awned inner, median awn twice as long as its gl. or longer. Duthie Grass. N.W. Ind. 33. *T. semitruncatus*, Nees, & *T. unidentatus*, Nees ex Steud. l. c.; Duthie l. c. *Plagiolytrum filiforme* and *unidentatum*, Nees in Proc. Linn. S. i. 95. *Catapodium filiforme*, Nees ex Duthie l. c.—*Tripogon*, Wall. Cat. 8888, 8889.

TEMPERATE HIMALAYA, from Dalhousie to Bhotan, alt. 5-10,000 ft. KHASIA HILLS, alt. 5-5500 ft., Wallich, &c.

Habit of *T. trifidus* and only to be distinguished by the acute obtuse or awned long or short teeth or lobes between the 3 awns of gl. III, and perhaps only a form of that plant. The longer awns and minute teeth of the top of gl. II best distinguish it from *T. bromoides*.

VAR. *tenuispica*; spike very slender, rachis filiform, spikelets very small pale, awn of gl. III long and slender. *Tripogon*, Wall. Cat. n. 8892.—N.W. Himal., Sikkim and the Khasia Hills.

88. **CYNODON**, Pers.

Perennial creeping grasses. Leaves narrow, flat. Spikelets minute, 1-fl., 1-2-seriate, unilateral on 3-6 digitate slender spikes, not jointed at the base; rachilla jointed at the base, not produced beyond gl. III or at its back only. Glumes 3, I and II empty, thin, keeled, persistent or separately deciduous; III broader, membranous, awnless; palea as long, 2-nerved. Lodicules 2, short. Anthers large. Styles distinct. Grain oblong, free within the gls.—Species 4, 3 Australian and the following.

C. dactylon, Pers. Syn. i. 85; gl. I and II shorter than III, rachilla produced at the base of gl. III dorsally as a minute bristle. Kunth Enum. Pl. i. 259; Suppl. 203, t. 16, f. 1; Reichb. Ic. Fl. Germ. t. 26; T. Nees Gen. Fl. Germ. Monocot. i. n. 19; Wall. Cat. n. 3803; Dalz. & Gibs. Bomb. Fl. 297; Griff. Notul. iii. 50, Ic. Pl. Asiat. t. 139, f. 204; Thwaites Enum. Pl. Zeyl. 371; Trim. Cat. Ceyl. Pl. 109; Aitchis. Cat. Panjab. Pl. 160; Duthie Grass. N.W. Ind. 32, Fodd. Grass. N. Ind. 52; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 366; Benth. Fl. Hongk. 428; Fl. Austral. vii. 609. *C. erectus*, Presl Rel. Hænk. i. 290, Kunth l. c. 260. *C. filiformis*, Voigt Hort. Suburb. Calc. 712. *C. linearis*, Willd. Enum. Hort. Berol. 90; Wight Cat. n. 1750. *C. maritimus*, H. B. & K. Nov. Gen. & Sp. i. 170. *C. occidentalis* & *portoricensis*, Willd. ex Steud. Nom. Ed. II. i. 463. *C. radiatus*, Roth. Nov. Pl. Sp. 38; Kunth l. c. 260. *C. repens*, Dulac Fl. Haut. Pyren. 76. *C. sarmentosus*, S. F. Gray Nat. Arr. Brit. Pl. ii. 100. *C. stellatus*, Willd. Enum. Hort. Berol. 90; Kunth l. c. 260. *C. virgatus*,

Nees ex Steud. Syn. Gram. 213. *Chloris Cynodon, Trin. Gram. Unifl.* 229. *Chlor. maritima, Trin. l. c.* 226. *Fibichia umbellata, Koel. Gram. Gall. & Germ.* 308. *Dactylon officinale, Vill. Hist. Pl. Dauph. ii.* 69. *Digitaria Dactylon, Scop. Fl. Carn. Ed. II. i.* 52. *D. littoralis, Salisb. Prodr.* 19. *D. maritima & radiata, Spreng. l. c.* 272. *D. stolonifera, Schröd. Fl. Germ. i.* 165, t. 3, f. 9. *Panicum dactylon, Linn. Sp. Pl.* 58; *Host Gram. Austr. ii.* 15, t. 18; *Sibth. Fl. Græc* 45, t. 60; *Engl. Bot. t.* 840; *Knapp Gram. Britt. t.* 13; *Grah. Cat. Bomb. Pl.* 236; *Roxb. Fl. Ind. i.* 289. *P. lineare, Burm. Fl. Ind.* 25, t. 10, f. 2. *Paspalum dactylon, DC. Fl. Franc. iii.* 16. *Pasp. præcox, Walt. Fl. Carol.* 75. *Pasp. umbellatum, Lam. Illust. i.* 177. *Agrostis bermudiana, Tusac ex Kunth l. c.* 259. *A. filiformis, Koen. ex Kunth l. c.* 261. *A. linearis, Retz. Obs. iv.* 19. *A. stellata, Willd. Sp. Pl. i.* 376.—*Rheede Hort. Mal. xii. t.* 47.

Throughout INDIA, BURMA and CEYLON, ascending to 5000 ft. in the Himalaya. —DISTRIB. All warm countries.

Stem prostrate, often widely creeping and forming matted tufts with short ascending branches. *Leaves* short, subulate, glaucous; ligule hairy. *Spikes* 2-5, 1-2 in., radiating, green or purplish; rachis very slender. *Spikelets* about $\frac{1}{3}$ - $\frac{1}{5}$ in.; gl. I and II spreading, ovate, acute, keels scabrid; III much larger cymbiform, keel and margin scabrid. *Grain* laterally compressed.—This plant is absent in Herb. Wallich. (Cat. n. 3803).

89. CHLORIS, Sw.

Perennial rarely annual grasses. *Leaves* flat or convolute. *Spikelets* 1-fl., 2-seriate, unilateral on solitary geminate fascicled digitate or whorled terminal erect or radiating spikes, not jointed at the base; rachilla jointed at the base, sometimes produced beyond gl. III and bearing one or more empty gls. *Glumes* 3 (with 1 or more upper neuter), I and II unequal, 1-nerved, narrow, keeled, acute mucronate or II awned; III 1-3-nerved, acute obtuse or 2-fl., usually awned; palea rather shorter, 2-nerved, complicate. *Lodicules* 2. *Anthers* small. *Styles* free. *Grain* narrow, free. Species about 40, warm regions.

This genus is wanting in the Wallichian Herbarium at the Linnean Society.—I find no character by which *Schœnefeldia*, Kunth, can be separated generically from *Chloris*.

Spikelets 1-fl. with no rudiment of another. *Rachis* of spike flattened.

1. *C. pallida, Hook. f.*; annual, very slender, spikes 1-3 $\frac{1}{2}$ in. broad, awn very long capillary. *Schœnefeldia pallida, Edgew. in Journ. As. Soc. Beng. xxi.* (1852) 161, 183; *Aitchis. Cat. Panjab Pl.* 166; *Duthie Grass. N.W. Ind.* 32, *Fodd. Grass. N. Ind.* 52, t. 64. *S. gracilis, Kunth Revis. Gram. i.* 283, t. 53; *Enum. Pl. i.* 258; *Lisboa in Journ. Bomb. Nat. Hist. Soc. vii.* (1893) 365.

BUNDEIKUND, Edgeworth. CENTRAL INDIA, King.

Stem 10-18 in., simple or branched, almost filiform. *Leaves* 6-8 in., very narrow, flaccid, tips capillary; ligule a few hairs. *Spike* 3-5 in., golden-yellow, erect; rachis flattened, serrulate. *Spikelets* $\frac{1}{2}$ in., subsessile, gl. I and II ovate-lanceolate, subaristately acuminate, 1-nerved, keels ciliate; I $\frac{1}{4}$ shorter than II; III rather longer than I, sessile, ovate, 1-nerved, hairy, base bearded, tip minutely notched; awn $\frac{1}{2}$ -1 in. long, capillary, curved; palea narrow, keels ciliate, tip 2-toothed. *Grain* very slender, acute, pericarp loose.—I have seen no authentic

specimen of Edgeworth's plant, but have received one so named from Dr. Kirg. It agrees with Edgeworth's characters except in respect of an obscure passage in that author's description which reads as if gl. III was much shorter than II.

2. *C. myosuroides*, Hook. f.; annual, spikes solitary or geminate $\frac{1}{8}$ in. broad, awn very long capillary.

GANGETIC PLAIN; ravines near Etawah, Duthie.

A much smaller plant than *C. pallida*, 6-12 in. high, with very narrow spikes 2-3 in. long, often recurved, smaller spikelets and shorter awns, $\frac{1}{4}$ - $\frac{3}{8}$ in. long, but perhaps only a variety.

** Spikelets 1-fl., rachilla produced beyond the flg. gl. and bearing one or two awns. Rachis of spike terete or angular.

3. *C. delicatula*, Clarke mss.; annual, spikes 5-10 capillary $1\frac{1}{2}$ -2 in. long alternate on the tip of the stem, awns $\frac{1}{8}$ - $\frac{1}{2}$ in. straight.

CHOTA NAGPORE; Mandu, Hazarabagh, Clarke. Pegu-Yomah, Herb. Kurz.

Stem 3-12 in., erect, slender, wiry, subsimple. Leaves $\frac{1}{2}$ -1 in., all cauline, spreading, subulate, concave or convolute; ligule of hairs. Spikes erect. Spikelets about $\frac{1}{10}$ - $\frac{1}{8}$ in.; gl. I very narrow, almost subulate; II $\frac{1}{2}$ longer, rather broader, both setaceously acuminate, keels scaberulous; III oblong, finely hairy, tip 2-lobed; rachilla produced and half as long as the gl., bearing 2-3 capillary awns; palea narrow, 2-toothed, keels glabrous. Grain very narrow, cylindric.—The Pegu specimens are larger than Clarke's.

4. *C. incompleta*, Roth. Nov. Sp. 60; tall, perennial, spikes 4-10 whorled 4-6 in. long, awns $\frac{1}{4}$ in. straight. Steud. Syn. Gram. 207. *C. digitata*, Steud. l.c.; Duthie Grass. N.W. Ind. 23; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 369 (excl. Syn.). *C. radiata*, Heyne ex Roth. l.c. 61; Thw. Enum. Pl. Zeyl. 371; Trim. Cat. Ceyl. Pl. 409. *C. Roxburghii*, Edgew. in Journ. As. Soc. Beng. xxi. (1853) 160, 183; Duthie Fodd. Grass. N. Ind. 54, t. 65; Lisboa l.c. 368. *C. tetrameris*, Trin. Gram. Unifl. 235; Steud. l.c. 206. *Digitaria elongata*, Spreng. Syst. i. 271. *Gymnopogon digitatus*, Nees in Wight Cat. n. 1753; Steud. Nom. Ed. II. i. 713. *Melica digitata*, Roxb. Fl. Ind. i. 326; Kunth Enum. Pl. i. 37. *Ctenium digitatum*, Spreng. Syst. i. 274. *Cynodon elongatus*, Trin. in Spreng. N. Entdeck. ii. 64; Kunth l.c. *Agrostis filiformis*, Koenig in Herb. Banks. ex Trin. l.c.

Throughout the PLAINS of INDIA, from the Panjab to Burma and southward. CEYLON. ANDAMAN ISLDS., Kurz.—DISTRIB. Affghan., China.

Stem 2-3 ft., or more, stout or slender, often branched, straight or geniculate. Leaves 6-12 by $\frac{1}{2}$ - $\frac{1}{2}$ in., flat; ligule of long hairs. Spikes very slender, spreading. Spikelets very variable, $\frac{1}{2}$ - $\frac{1}{2}$ in., narrowly lanceolate, green; gl. I not $\frac{1}{4}$ of II which is narrowly lanceolate notched and shortly awned at the tip; III as long as II, ovate-lanceolate, tip 2-toothed, base bearded; palea very narrow, keels nearly smooth; rachilla produced to half the length of the gl., bearing a very minute long awned gl. that is bearded at the base.

*** Spikelets 1-fl.; rachilla produced beyond the flg. gl., and bearing 1-3 reduced empty gls. (In *C. villosa*, the gl. IV contains imperfect anthers.)

† Spikes 1-3; gl. III broadly cuneiform.

5. *C. tenella*, Roxb. Fl. Ind. i. 329; annual, slender, spike solitary, spikelets 3-4-awned, gl. III broadly cuneiform, upper margin truncate naked. Kunth Enum. Pl. i. 267; Spreng. Neue Entdeck. iii. 126; Steud.

Syn. Gram. 204; *Dalz. & Gibs. Bomb. Fl.* 296; ? *Duthie Fodd. Grass. N. Ind.* 54, t. 66; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 368. *C. triangulata*, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 409; *Steud. l. c.* 203; *Duthie Grass. N. W. Ind.* 33. *Otenium indicum*, *Spreng. Syst.* i. 274. *Tetrapogon triangularis*, *Hochst. Pl. Arab. Schweinf.* n. 967.

RAJPOOTANA; Oodeypore, *Wingate (Herb. Duthie)*. SCIND, *Sticks*. KHANDEISH, *Dalzell*. SOUTH INDIA, *Roxburgh. Wight*.—DISTRIB. Arabia, Abyssinia.

Stem 10–18 in., weak, branched from the base. *Leaves* 6–10 by $\frac{1}{2}$ – $\frac{1}{4}$ in., flaccid; ligule short, truncate. *Spike* 1–2½ in., erect, flat. *Spikelets* large, $\frac{1}{2}$ in. long and more, bifarious; gls. 5 or 6, I and II ovate-lanceolate, hyaline; I acute; II $\frac{1}{2}$ longer, shortly awned; III as long as II, coriaceous, nerves distant from the margin and keel villous; awn subdorsal, straight, spreading; keels of palea finely hairy; IV half as long as III, narrower; V and VI still smaller, fan-shaped, awned.

†† *Spikes* 1–3; *gl. III* ovoid, hirsute all over.

6. *C. villosa*, *Pers. Syn.* i. 87; perennial, stout, spikes 1–3, spikelets 4-awned, *gl. III* ovoid acute hirsute all over with long hairs, margins hyaline. *Kunth Enum. Pl.* i. 267, *Suppl.* 217, t. 16, f. 3; *Jaub. & Spach Ill. Pl. Orient.* iv. 40, t. 327; *Coss. & Dur. Fl. Alger.* 87; *Steud. Syn. Gram.* 204; *Aitchis. Cat. Panjab Pl.* 167. *C. tetrapogon*, *Beauv. Agrost.* 158. *Tetrapogon villosus*, *Desf. Fl. Atlant.* ii. 388, t. 255; *Trin. Fund. Agrost.* 760; *Boiss. Fl. Orient.* v. 555; *Duthie Grass. N. W. Ind.* 33, *Fodd. Grass. N. Ind.* 55, t. 68.

The PANJAB; Peshawur, *Stewart*; Rawul Pindu, *Aitchison*. RAJPOOTANA; Oodeypore, *King*. Multan, *Edgeworth*.—DISTRIB. Westward to the Canaries.

Stem 6–10 in., from a densely-tufted stout woody base, which is clothed with equitant leaf-sheaths. *Leaves* 1–3 in., very narrow, acute, flat or twisted, rigid; ligule obscure. *Spikes* $1\frac{1}{2}$ –2½ in. by $\frac{1}{2}$ – $\frac{1}{4}$ in. broad, erect, pale yellow. *Spikelets* $\frac{1}{2}$ in., obconic; gls. 5, I and II lanceolate, shortly awned; I acuminate; II $\frac{1}{2}$ – $\frac{1}{4}$ longer, tip 2-toothed; III about as long as II, coriaceous, with broad hyaline margins bounded by the lateral nerves, imperfectly triandrous, tip entire or minutely 2-toothed, hairs much longer than the gl. silky; awn spreading, keels of palea scaberulous; IV not half as long as III, also hirsute; V very small, cuneate; VI reduced to an awn.

††† *Spikes* 4–10; *gl. III* bearded at the base and on the margins above the middle.

7. *C. virgata*, *Sw. Fl. Ind. Occ.* i. 203; spikes 6–9, spikelets 2-awned, *gl. II* tip 2-fid awned in the sinus, III ovate bearded with long hairs above the middle, IV narrowly cuneiform. *Trin. Gram. Unifl.* 136; *Doell in Mart. Fl. Bras.* ii. III. *C. compressa*, *DC. Cat. Hort. Monsp.* (1813) 94; *Trin. Gram. Unifl.* 230; *Nees Agrost. Bras.* 421, *Fl. Afr. Austr.* 240; *Steud. Syn. Gram.* 204. *C. caudata*, *Trin. ex Bunge Enum. Pl. Chin. Bor.* 70. *C. cryptostachys*, *Steud. in Schmidt, Fl. Cap. Virid.* 148. *C. decora*, *Nees in Herb. Royle*; *Steud. l. c.* 205. *C. elegans*, *Kunth Enum. Pl.* i. 264. *C. meccana*, *Hochst. & Steud. ex Schult. Ind. Sem. Hort. Hal.* (1843) 7; *Steud. l. c.*; *Boiss. Fl. Orient.* v. 554; *Duthie Grass. N. W. Ind.* 33. *C. montana*, *Griseb. in Goett. Nachr.* (1868) 84, *Abhandl.* 300; *Duthie l. c. (non Roxb.)*. *C. pallida*, *Link Hort. Berol.* i. 56, ii. 223. *C. penicillata*, *Hort. ex Nees l. c. (non Poir.)*. *C. polydactyla*, *Durand Diss. Chlorid.* (1808) 14, 22; *Jacq. Eclog. Gram.* 12, t. 9 (non Sw.). *C. tetrastachys*, *Hack. mss. (ex Herb. Duthie)*. *Heterolepis elegans*, *Ehrt. ex Boiss. l. c.*; *Rabdochloa virgata*, *Beauv. Agrost.* 84.—*Chloris*, *Wall. Cat.* 3212 (in *Herb Benth.*).

RAJPOOTANA, and UPPER and LOWER GANGETIC PLAINS, and southward to BEHAR, and CENTRAL and SOUTHERN INDIA. WESTERN TIBET, *Thomson*. BURMA, *Wallich*.—DISTRIB. Westward to Algeria; China, Mongolia, Trop. and S. Africa and America.

Stem rather stout, flattened, 8–12 in. high, usually leafy, decumbent and much proliferously branched below. *Leaves* rather broad, flat, acute; upper sheaths more or less inflated.—Australian specimen of this in *Herb. Kew* from *Mueller*, are ticked *C. barbata*, *Muell.*, var. with one empty gl. The Western Tibet habitat is remarkable; there are two specimens collected by *Thomson*, dated by himself at a time he was in Ladak, at an elevation not less than 12,000 ft.

8. ***C. barbata***, *Sw. Fl. Ind. Occ. i.* 200; spikes 4–20, rachis scabrous, spikelets 3-awned. *Jacq. Eclog. Gram. 10, t. 8*; *Kunth Enum. Pl. i.* 264, *Suppl.* 209; *Durand de Chlorid. 13, 22*; *Trin. Diss. i.* 232, *Sp. Gram. Ic. v.* 306; *Nees Agrost. Bras. 421*; *Steud. Syn. Gram. 204*; *Roxb. Fl. Ind. i.* 331; *Grah. Cat. Bomb. Pl. 234*; *Wight Cat. n.* 1764; *Aitch. Cat. Panjab Pl. 167*; *Thw. Enum. Pl. Zeyl. 371*; *Trim. Cat. Ceyl. Pl. 109*; *Duthie Grass. N.W. Ind. 33*, *Fodd Grass. N. Ind. 53, t. 34*; *Lisboa in Journ. Bomb. Nat. Hist. Soc. vii.* (1893) 367; *Griseb. Fl. Brit. W. Ind. 539*; *Benth. Fl. Hongk. 429, Fl. Austral. vii.* 613 (*excl. Syn. decora*); *Doell in Mart. Fl. Bras. ii. III.* 67. *Andropogon barbatus, Linn. Pl. Jam. Pugill. 30, Mant. ii.* 302.—*Chloris, Wall. Cat. n.* 3812.—*Rheede Hort. Mal. xii. t.* 51.

Throughout the plains of INDIA, BURMA, and CEYLON.—DISTRIB. Tropics generally.

Stem 1–3 ft., stout, erect from a geniculate or from a creeping proliferously branched base, simple or branching above, nodes with often large tufts of leaves having compressed equitant sheaths. *Leaves* 6–18 long, flat; mouth of sheaths ciliate; ligule obscure. *Spikes* $\frac{1}{2}$ –4 in., suberect, strict or flexuous. *Spikelets* $\frac{1}{10}$ – $\frac{1}{8}$ in., green or red-purple; gls. I and II acuminate, II much the longest; III ovate, more or less densely bearded above the middle and dorsally, tip acute or notched; awn $\frac{1}{4}$ – $\frac{1}{3}$ in.; III cuneiform, at length globose, ciliate; IV much smaller, globose, awned.—Extremely variable in size and habit.

9. ***C. polystachya***, *Roxb. Fl. Ind. i.* 330; spikes many, rachis glabrous, spikelets very minute 3-awned. *Kunth Enum. Pl. i.* 265; *Spreng. Neue Entdeck. iii.* 127; *Grah. Cat. Bomb. Pl. 235*; *Wight Cat. n.* 1763; *Duthie Grass. N.W. Ind. 33*, *C. Roxburghiana, Schult. Mant. ii.* 239; *Steud. Syn. Gram. 206*.—*Chloris, Wall. Cat. n.* 3811 (*ex Wight l. c.*).

DECCAN PENINSULA, *Roxburgh, Wight*.

Stem 1–2 ft., ascending from a procumbent base. *Spikes* about 16, 2–3 in. long; gls. I and II lanceolate, acuminate; II much the longest; III ovate, acute, margins ciliate above or nearly glabrous; awn flexuous, IV like III but very much smaller, glabrous; V a minute-awned gl.—*Wight's* is the only specimen I have seen, it is very much smaller than in *Roxburgh's* drawing.

10. ***C. montana***, *Roxb. Fl. Ind. i.* 329; spikes 2–6, rachis glabrous, spikelets 4-awned. *Kunth Enum. Pl. i.* 265; *Spreng. Neue Entdeck. iii.* 127; *Steud. Syn. Gram. 204*; *Lisboa in Journ. Bomb. Nat. Hist. Soc. vii.* (1893) 369. *C. decora, Thw. Enum. 371 (excl. syn.)*. *C. barbata, var. decora, Trim. Cat. Ceyl. Pl. 109*. *Tetrapogon tetrastachys, Hack. in Herb. Duthie (in part) n.* 7759. *Andropogon tetra-aristatus, Roxb. Ic. ined. n.* 882.—*Chloris, Wall. Cat. n.* 3810.

Mountain districts of COROMANDEL, *Roxburgh*. UPPER and LOWER GANGETIC PLAINS, and southward to CEYLON.

Stem erect or geniculately ascending from a creeping base, 4 in. to 2½ ft., simple

or branched. *Leaves* 3-8 in., narrow, finely acuminate; mouth of sheath ciliate; ligule very short. *Spikes* 1-3 in., erect, very pale. *Spikelets* $\frac{1}{2}$ - $\frac{3}{4}$ in.; gl. I and II both finely acuminate, or II which is much the largest obtuse and shortly awned; III ovoid, acute, upper margins more or less thickly bearded; IV and V cuneiform, glabrous or ciliate; VI minute, awned.—Very variable in the length of the spikes and size of the spikelets.

11. **C. Wightiana**, *Nees in Wight Cat.* n. 1766; *Steud. Syn. Gram.* 206; spikes 3-5, rachis villous, spikelets 4-awned.—*Chloris*, *Wall. Cat.* n. 3809.

SOUTHERN INDIA, *Wight*.

Stem 4-6 in., stout, much branched, decumbent and leafy below, sometimes creeping. *Leaves* 2-4 by $\frac{1}{2}$ - $\frac{3}{4}$ in., flat, linear, acuminate and sheaths pubescent; ligule of hairs. *Spikes* red-brown, stout. *Spikelets*, gl. I and II ovate-lanceolate; I acuminate; II $\frac{1}{2}$ longer, tip notched mucronate; III as long as II, obliquely broadly ovate in profile, suddenly narrowed into the terminal awn, lateral nerves marginal above and keel villously bearded; palea very broad, keels ciliate; IV like III but smaller; V subglobose, glabrous, VI very minute.

DOUBTFUL AND REJECTED SPECIES.

C. MONOSTACHYA, *Poir. Encycl. Suppl.* ii. 238.—*C. distachya* (*Kunth Rev. Gram.* i. 291, t. 57. *Eleusine monostachya*, *Spreng. Syst.* i. 249. *Leptochloa*? *monostachya*, *Reaum. & Sch. Syst.* ii. 580. *Cynosurus monostachyas*, *Vahl Symb.* ii. 20) is a Mauritian grass, not found hitherto in India.

C. PENICILLATA, *Pers. Syn.* i. 87; *Kunth Enum. Pl.* i. 268; *Steud. Syn. Gram.* 206. *Cynosurus penicillatus*, *Vahl Symb.* ii. 21. *Eleusine penicillata*, *Spreng. Syst.* i. 350.—*Vahl's* description does not enable me to identify this.

90. **ELEUSINE**, *Gaertn.*

Annual or perennial grasses. *Leaves* long or short. *Spikelets* 3-12-fl. (fl. all but terminal perfect) sessile, 2-3-seriate and secund, forming digitate capitate or whorled spikes, laterally compressed, not jointed at the base; rachilla continuous between the fl. glumes. *Glumes* few or many, keeled, I and II shorter than the flg., subequal or unequal, persistent; I lanceolate; II lanceolate, acute or acuminate, or very broadly ovate, or didymous with a short stout recurved awn; flg. gls. like the empty 3-nerved; palea complicate, keels strong. *Lodicules* 2, cuneate. *Anthers* 3, short. *Styles* short, distinct. *Grain* free, pericarp hyaline, loose. *Seed* rugose.—Species about 7, all warm countries.

The specimens of this genus are absent from the Wallichian Herbarium in the Linnean Society's rooms; the tickets alone existing there.

I. ELEUSINE proper. *Spikelets* densely imbricate, pointing forward. Gl. II obtuse acute or acuminate.

1. **E. indica**, *Gaertn. Fruct.* i. 8; annual, erect, leaves flat, spikes digitate elongate, glumes subacute glabrous. *Lamk. Ill.* i. 203, t. 48; *Kunth Enum. Pl.* i. 273, *Suppl.* 224, t. 16, f. 4; *Steud. Syn. Gram.* 211; *Roxb. Fl. Ind.* i. 345; *Grah. Cat. Bomb. Pl.* 235; *Griff. Notul.* iii. 52, 53, *lc. Pl. Asiat.* t. 119, f. 156 & t. 150, f. 1; *Thw. Enum. Pl. Zeylan.* 371; *Trimen Cat. Ceyl. Pl.* 109; *Aitchis. Cat. Panjab Pl.* 168; *Duthie Grass. N.W. Ind.* 34, *Fodd. Grass. N. Ind.* 57, t. 69; *Miq. Fl. Ind. Bat.* iii. 385; *Wall. Cat.* n. 3816; *Wight Cat.* n. 1758; *Boiss. Fl. Orient.* v. 555; *Benth. Fl. Hongk.* 429, *Fl. Austral.* vii. 615; *Nees Agrost. Bras.* 439, *Fl. Afr. Austr.* 251; *Griseb. Fl. Brit. W. Ind.* 540. *E. distachya*, *Trin. ex Steud.*

Nom. Ed. II. i. 549. *E. distans*, *Mœnch. Meth.* 210. *E. domingensis*, *Sieb. ex Schult. Mant.* ii. 323. *E. Gouini*, *inæqualis*, *rigidifolia*, & *scabra*, *Fourn. ex Hemsl. Biol. Centr. Amer.* iii. 565. *E. gracilis*, *Salisb. Prodr.* 19. *E. marginata*, *Lindl. in Mitch. Three Exped.* i. 319; *Steud. Syn. Gram.* 212. *E. tristachya*, *Lamk. l. c.*; *Kunth Revis. Gram.* i. 92, *Enum.* i. 273; *Steud. l. c.* *Cynosurus indicus*, *Linn. Sp. Pl.* 72. *C. Ara*, *Herb. Ham. ex Wall. Cat.* n. 3816 I. ?*C. pectinatus*, *Lamk. Encycl.* ii. 188. ?*Leptochloa pectinata*, *Kunth Revis. Gram.* i. 91, *Enum. Pl.* 272; *Steud. l. c.* 210. *Paricum compressum*, *Forsk. Fl. Æg. Arab.* 18. *Paspalum dissectum*, *Kniphof. Cent. Bot. in Orig.* t. 11. *Triticum geminatum*, *Spreng. Syst.* i. 326. *Agropyrum geminatum*, *Schult. Mant.* iii. 655.—*Rheede Hort. Mal.* xii. t. 69.

Throughout the low country of INDIA (ascending to 5000 ft. in the Himalaya) to PENANG and CEYLON.—DISTRIB. Tropical Old World; introd. into the New.

Stem 1-2 ft., stout, soft. *Leaves* distichous, narrow, flaccid, acuminate; sheaths flattened, ciliate; ligule obsolete. *Spikes* 5-7, 2-5 in. long, all in a terminal whorl, or with sometimes 1 or 2 lower down. *Spikelets* very variable in size, $\frac{1}{2}$ – $\frac{1}{2}$ in., 3-5-fl.; quite glabrous; gl. I small, 1-nerved; II 3-nerved; III and succeeding ovate, subacute. *Grain* oblong; pericarp loose, but persistent; seed oblong rugose.

CULT. FORM. *E. CORACANA*, *Gaertn. Fruct.* i. 8, t. 1; stem stout 2-5 ft. often as thick as the thumb, leaves broad, spikes very stout up to 6 in. long by $\frac{1}{2}$ in. broad straight or incurved, grain globose. *Lamk. Illustr.* t. 28; *Schreb. Gram.* ii. t. 35; *Trin. Sp. Gram. Ic.* t. 70; *Steud. Syn. Gram.* 211; *Panz. in Muench. Denkschr.* iv. (1811) t. 8; *Nees Fl. Afr. Austr.* 251; *Kunth Enum. Pl.* i. 273, *Suppl.* 225; *Roeb. Fl. Ind.* i. 342; *Wall. Cat.* n. 3817; *Grah. Cat. Bomb. Pl.* 235; *Aitchis. Cat. Panjab Pl.* 168; *Trim. Cat. Ceyl. Pl.* 109; *Duthie Grass. N.W. Ind.* 34, *Fodd. Grass. N. Ind.* 57, t. 69, *Field & Gard. Crops*, 15, t. 28; *Miquel Fl. Ind. Bat.* iii. 386; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 373. *E. cerealis*, *Salisb. Prodr.* 19. *E. sphærosperma*, *Stokes Bot. Mat. Med.* i. 49. *E. stricta*, *Roeb. l. c.* 343; *Kunth l. c.*; *Steud. l. c.* *E. Tocussa*, *Fresen. in Mus. Senkenb.* ii. (1847) 141. *Cynosurus coracanus*, *Linn. Syst. Ed.* II. 875.—*Rheede Hort. Mal.* xii. t. 78.—Cultivated in all parts of India.

2. *E. flagellifera*, *Nees in Linnæa*, xvi. (1842) 220; perennial, prostrate, proliterously branched, leaves very short glaucous, spikes digitate, gl. II lanceolate mucronate or aristulate, III hairy acute. *Steud. Syn. Gram.* 211; *Duthie Grass. N.W. Ind.* 34, *Fodd. Grass. N. Ind.* 57, t. 37; *Boiss. Fl. Orient.* v. 655. *E. arabica*, *Hochst. ex Steud. l. c.*; *Aitchis. Cat. Panjab Pl.* 167; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 377. *E.?* *stolonifera*, *Br. in Salt Abyss. App.* 63. ?*Ochthocloa dactyloides*, *Edgew. in Journ. As. Soc. Beng.* xi. (1842) 27.

PLAINS of the PANJAB, Royle, Jacquemont, &c. SCIND, Stocks, &c.—DISTRIB. Affghan. and westward to N. Africa.

Stems stout or slender, smooth, stiff, widely spreading, rooting at the distant thickened leafy nodes, and sending up slender branches; internodes 4-8 in. *Leaves* $\frac{1}{2}$ – $1\frac{1}{2}$ in., rigid, recurved, flat or tortuous; ligule hairy. *Spikes* 3-6, 1– $1\frac{1}{2}$ in. long, very variable in breadth, $\frac{1}{2}$ – $\frac{1}{2}$ in.; rachis pubescent. *Spikelets* imbricate, sub-pedicelled, $\frac{1}{2}$ – $\frac{1}{2}$ in. long, 4-6-fl., green or brownish; gl. I small, ovate, acute, membranous; II twice as large, coriaceous with membranous margins; III ovate-lanceolate, acuminate, chartaceous, 3-nerved, mid-nerve compound, sides and membranous margins below hairy; palea elliptic-oblong, keels hairy.—*Ochthocloa dactyloides*, *Edgew.*, is a doubtful plant of which I have seen no specimens. It is not included in any of Duthie's works on the Grasses of N.W. India. It might be traced by its habitat. Loodiana, Jassowala, on tumuli with *Capparis aphylla*.

3. *E. brevifolia*, *Br. in Wall. Cat.* n. 3815; annual, stems short

creeping and rooting, leaves small lanceolate acuminate, spikes very many short crowded in globose heads, flg. gls. and palea villously bearded. *E. oligostachya*, *Herb. Wight*, n. 3332. *E. Wallichii*, *Munro mss.* *Koeleria brevifolia*, *Spreng. Pugill.* ii. 21. *K. lagopoides*, *Panz. ex Spreng. l.c.* *Dactylis brevifolia*, *Koen. ex Willd. Sp. Pl.* i. 410 (excl. *Syn.*); *Roxb. Fl. Ind.* i. 341; ?*Steud. Syn. Gram.* 298. *D. cynosuroides*, *Koen. ex Roth. Nov. Sp.* 74 (non *Linn.*). *D. geniculata*, *Roxb. Ic. Pict. ined.* t. 346 (non *Burm.*). *Poa brevifolia*, *Kunth Revis. Gram.* i. 111, *Enum. Pl.* i. 324. *P. lagopoides*, *Nees ex Wight Cat.* n. 1790. *Æluropus brevifolius*, *Nees ex Steud. Nom. Ed.* II. i. 30; *Herb. Wight Prop.* 1792. *Æ. lævis*, *Trin. Fund. Agrost.* 143, t. 12. *Æ. pubescens*, *Steud. Nom. l.c.* *Eragrostis brevifolia*, *Benth. in Hook. Ic. Pl.* xiv. 51. *Triodia cynosuroides*, *Spreng. Syst. Veg.* i. 331. *Cyperus Coracana*, *Herb. Heyne ex Wall. l.c.*

Sandy shores of the COROMANDEL and CARNATIC coasts, *Heyne*, &c.

Annual. Stems many, spreading from the root, 2-4 in. long, stout or slender. Leaves 1-2 in., flaccid or rigid, lanceolate, acuminate, serrulate; ligule obsolete. Heads of spikes quite globose, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., of many (rarely few) 4-10-fl. ovate sessile spikelets $\frac{1}{4}$ - $\frac{1}{2}$ in. long; gl. I and II subequal, margins hyaline, broadly ovate, acuminate or cuspidate, glabrous; I 1-3-nerved; II 3-5-nerved, nerves close to the middle line; III and following very broadly ovate, cuspidately acuminate, 3-nerved, keel and nerves and keels of ovate palea all villous below the middle. Anthers minute. Styles long, slender. Grain orbicular.—See remarks under *Æluropus*.

4. *E. verticillata*, *Roxb. Fl. Ind.* i. 346; annual, erect, leaves flat, spikes scattered or whorled very many-fl., glumes acute glabrous. *Steud. Syn. Gram.* 211; *Aitchis. Cat. Panjab Pl.* 168; *Duthie Grass. N.W. Ind.* 34, *Fodd. Grass. N. Ind.* 58, t. 70; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 377; *Benth. Fl. Austral.* vii. 616. *E. racemosa*, *Heyne in Roth. Nov. Sp.* 80. *Leptochloa*? *racemosa* & *verticillata*, *Kunth Revis. Gram.* i. 91, *Enum. Pl.* i. 272; *Steud. l.c.* *Aerachne eleusiuoides*, *Wight & Arn. in Wight Cat.* n. 1760; *Nees ex Steud. l.c.* *A. verticillata*, *Lindl. Introd. Nat. Syst. Ed.* II. 381.—*Eragrostidi* affine, *Wall. Cat.* n. 3882, *ex Wight Cat. l.c.*

Plains of INDIA; in pasture ground, *Roxburgh*, &c. KASHMIR, *Clarke*.—DISTRICT. Trop. Asia, Africa, and Australia.

Stem 1-3 ft., stout or slender, simple or branched, soft. Leaves rather broad, flaccid, acuminate, glabrous; sheath compressed; ligule a few hairs. Spikes few or many, $\frac{1}{2}$ -3 in. long, in tiers or whorls, or opposite or alternate, suberect, rachis slender. Spikelets $\frac{1}{2}$ - $\frac{3}{4}$ in., 8-12-fl., shining; glumes small; I and II broadly ovate, finely acuminate or aristulate; flg. gls. $\frac{1}{2}$ in., very broadly ovate, 3-nerved, keel excurrent, lateral nerves ending in small teeth. Grain rugose, pericarp caducous.

II. DACTYLOCTENIUM, *Willd. (Gen.)*. Spikelets erect, at right angles to the rachis of the spike. Glume II short, suborbicular, abruptly shortly awned.

5. *E. ægyptiaca*, *Desf. Fl. Atlant.* i. 85; annual, leaves flat, spikes digitate, glumes rigid cuspidate glabrous. *Roxb. Fl. Ind.* i. 344; *Wall Cat.* n. 3818; *Griff. Notul.* iii. 51, *Ic. Pl. Asiat.* t. 139, f. 79; *Trim. Cat. Ceyl. Pl.* 109; *Benth. Fl. Austral.* vii. 615; *Duthie Grass. N.W. Ind.* 34, *Fodd. Grass. N. Ind.* 56, t. 35. *E. ciliata*, *Rafin. in Desv. Journ. Bot.* iv. (1814) 273. *E. cruciata*, *Lamk. Illustr.* i. 203, t. 48, f. 2. *E. mucronata*, *Stokes Mat. Med.* i. 150; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 376. *E. pectinata*, *Moench Meth. Suppl.* 68. *E. prostrata*, *Spreng. Syst.* i. 350.

E. radulans, Br. *Prodr.* 186. *Dactyloctenium ægyptiacum*, Willd. *Enum. Hort. Berol.* 1029; *Beauv. Agrost.* 72, t. 15, f. 2; *Kunth Enum. Pl.* i. 261, *Suppl.* ii. 204; *Steud. Syn. Gram.* 211; *Grah. Cat. Bomb. Pl.* 235; *Dalz. & Gibs. Bomb. Fl.* 297; *Thw. Enum. Pl. Zeyl.* 371; *Aitch. Cat. Panjab Pl.* 167; *Miq. Fl. Ind. Bat.* iii. 384; *Boiss. Fl. Orient.* v. 556; *Griseb. Fl. Brit. W. Ind.* 540; *Baker Fl. Maurit.* 452. *D. distachyum*, Bojer *Hort. Maurit.* 370. *D. Figarei*, Notar. in *Ann. Sc. Nat. Ser. III.* ix. (1848) 325. *D. meridionale*, Ham. *Prodr. Pl. Ind. Occ.* 6. *D. mucronatum*, Willd. *l. c.*; *Trin. Sp. Gram. Ic.* t. 69; *Steud. l. c.*; *Wight Cat.* n. 1761. *D. prostratum*, Willd. *l. c.*; *Steud. l. c.* *D. radulans*, *Beauv. Agrost.* 72; *Kunth l. l. c. c.* 262. 204; *Steud. l. c.* *Cynosurus ægyptius*, Linn. *Sp. Pl.* 72. *C. Cavara & Macara*, *Hb. Ham. ex Wall. l. c. B. C.* *C. distachyus*, Rottl. ex *Steud. Nom. Ed.* II. i. 465. *Chloris mucronata*, Mich. *Fl. Am. Bor.* i. 59. *Cenchrus ægyptius*, *Beauv. Agrost.* 157. *Rhabdocola mucronata*, *Beauv. l. c.* 84. *Ægilops saccharinus*, Walt. *Fl. Carol.* i. 249;—*Rheede Hort. Mal.* xii. t. 69.

Throughout the low country of INDIA and BURMA, to MALACCA and CEYLON.—
DISTRIB. Warm regions of the Old World, introd. into the New.

Stem erect, 6–18 in. high, or prostrate spreading and rooting, often proliferously branched at the thickened nodes. *Leaves* distichous, acute or acuminate, ciliate; sheaths compressed; ligule 0. *Spikes* solitary or 2–5, $\frac{1}{2}$ –1 in. long, all terminal, stout, rachis mucronate at the tip by the thickened excurrent midrib. *Spikelets* densely crowded, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, 3–4-fld., glabrous; glumes almost pungent; I ovate, acute; II broadly ovate, obliquely cuspidately awned, as are the following, cusps recurved; palea very broad, 2-fld, keels hispid. *Grain* globose, very rough, pericarp evanescent.—Specimens in Herb. Rottler named "*Cynosurus ciliaris*, *C. distachyus*, nob, an *C. ægyptii*, var. :—sandy shores of the Ocean," are somewhat intermediate between *ægyptiaca* and *aristata*, having the foliage of the former and habit of the latter. This and Wight's n. 1761 b. "*Dactyloct. mucronatum*, β . *repens* = *D. prostratum*, Willd.," are the same.

6. *E. aristata*, Ehrenb. ex Boiss. *Fl. Orient.* v. 557; perennial, slender, prostrate, proliferously branched, leaves short glaucous, spikes very short capitate, gl. II abruptly shortly awned. *E. glaucophylla*, Munro ex Benth. in *Journ. Linn. Soc.* xix. (1881) 107. *E. scindica*, Duthie Fodd. *Grass. N. Ind.* 58, t. 36; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 377. *Dactyloctenium glaucophyllum*, Courb. in *Ann. Sc. Nat. Ser. IV.* xviii. (1862) 133. *D. scindicum*, Boiss. *Diagn. Ser. II.* iv. 131, *Fl. Orient.* l. c.

THE PANJAB, RAJPOOTANA, MALWA, SCIND, and BRITISH BELUCHISTAN.—
DISTRIB. Affghan., Arabia, Nubia.

Stem smooth, stiff, widely spreading, rooting at the distant thickened woody leafy nodes, and sending up very slender branches 4–12 in. long; internodes 2–4 in. *Leaves* 1–1½ in., acuminate or pungent, margins ciliate with long tubercle-based hairs; basal sheaths hairy; ligule obsolete. *Spikes* 3 or more, $\frac{1}{2}$ – $\frac{3}{4}$ in. long, spreading or decurved, ciliate or bearded at the base, midrib of rachis excurrent. *Spikelets* short, 3–4-fld., rachilla glabrous; gl. I and II coriaceous, 1-nerved, margins membranous, I small, broadly oblong, apiculate; II very broad, sometimes didymous when spread open; awn stout, subulate, incurved or recurved; III and following longer than II, very broadly ovate, subacute, glabrous; palea broad, keels scaberulous. *Grain* ovoid, rugose.—Habit of *E. flagellifera*.

91: **DINEBRA**, Jacq.

An annual leafy grass. *Leaves* flat. *Spikelets* 2–3-fld., small, crowded, biseriate on one side of slender spreading or deflexed spikes that are

collected in narrow pyramidal racemes, not jointed at the base; rachilla slender, jointed at the base, produced beyond the fl. gls. and bearing an imperfect gl. *Glumes* 4-5, I and II empty, persistent, much longer than III and IV, lanceolate, awned, 1-nerved, keeled; II $\frac{1}{2}$ longer than I; III and IV very small, broadly ovate, subacute, hyaline, 1-nerved; palea hyaline. *Lodicules* 2. *Anthers* 3, small. *Styles* free. *Grain* ovoid, trigonous, wrinkled, free.

D. arabica, Jacq. *Fragment*. 77, t. 121, f. 1; *Beauv. Agrost.* 98, t. 16, f. 2 (Dineba); *Trim. Cat. Ceyl. Pl.* 109; *Duthie Grass. N.W. Ind.* 34, *Fodd. Grass. N. Ind.* 55; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 372. *D. ægyptiaca*, Del. *Fl. Egypt.* 25, t. xi. f. 3 (Dinaeba). *D. retroflexa*, Panz. in *Denksch. Acad. Muench.* iv. (1813) t. 12; *Boiss. Fl. Orient.* v. 557. *Leptochloa arabica*, Kunth *Revis. Gram.* i. 91; *Enum. Pl.* i. 271, *Suppl.* 221; *Wight Cat. n.* 1756; *Aitch. Cat. Panjab Pl.* 167. *L. calycina*, Kunth *l. l. c. c.* 91, 272; *Steud. l. c.* 210; *Dalz. & Gibs. Bomb. Fl.* 297. *L. coromandeliana*, *Steud. l. c.* 209. *Eleusine calycina*, Roxb. *Fl. Ind.* i. 346. *Cynosurus coromandelianus*, *Herb. Rotth.* *C. paniculatus*, *Herb. Roxb.* *C. retroflexus*, *Vahl Symb.* ii. 20. *Dactylis paspaloides*, *Willd. Enum. Hort. Berol.* 111. *D. cynosuroides*, *Koen. mss. in Herb. Mus. Britt.* *D. madraspatensis*, *Herb. Roxb.*—*Dinebra*, *Wall. Cat. n.* 3814.

WESTERN PENINSULA, from Khandeish and the Carnatic southward. CEYLON, *Trimen* (introduced).—DISTRIB. Affghan. and westward to Senegal.

Stems 1-3 ft., tufted, branching from the base, erect or geniculately ascending, leafy throughout. *Leaves* flat, 3-8 in., flaccid, finely acuminate, sparsely hairy; ligule short. *Racemes* 4-12 in., erect; rachis strict, stout, smooth. *Spikes* $\frac{1}{2}$ -2 $\frac{1}{2}$ in., opposite alternate or whorled, sessile, green or pale yellow, shining, at first erect, at last deflexed. *Spikelets* closely imbricate, about $\frac{1}{8}$ in. long; gl. I and II with straight terminal awns.—*Dinebra verticillata*, Wight ex *Steud. Syn. Gram.* 209, is *Myriostachys Wightiana*.

92. **LEPTOCHLOA**, Beauv.

Annual grasses. *Leaves* flat or involute. *Spikelets* very minute, compressed, 1-many-fl., sessile or shortly pedicelled, alternate and unilateral on the very slender spike-like branches of a lax panicle, not jointed at the base; rachilla produced between the flg. gls., jointed at the base. *Glumes* 3-many, membranous; I and II unequal, oblong or lanceolate, 1-nerved; III and following broadly ovate, subacute or obtuse, 3-nerved, nerves usually hairy, 2 lateral near the margin; palea nearly as long as the gl., 2-keeled. *Lodicules* 2, cuneate. *Anthers* 3, short. *Styles* free. *Grain* subglobose oblong obovoid or 3-gonous, closely invested by the gl. and palea.—Species about 12, tropical and subtropical.

I have had great difficulty in disposing of the synonymy of this genus, the species of which are in a chaotic condition, and I regard the result here attained as tentative only, some of the synonyms adopted being little better than guesses, though the results of much study. The genus is absent in the Wallichian Herbarium of the Linnean Society.

* *Leaves* short, broad, membranous.

1. **L. uniflora**, Hochst. ex *A. Rich. Tent. Fl. Abyss.* ii. 409; spikelets 1-fl., gl. I and II linear-lanceolate, III ovate acuminate. *Trim. Cat. Ceyl. Pl.* 109. *L. gracilis*, Wight ex *Steud. Syn. Gram.* 213. *Cynodon gracilis*, Nees ex *Steud. l. c.*; *Thw. Enum. Pl. Ceyl.* 371; *Wight Cat. n.*

1752. *Poa chinensis*, *Burm. Fl. Ind.* 27, t. xi. f. 3 (non Linn.). *Agrostis montana*, *Herb. Rottler*.—*Leptochloa*, *Wall. Cat.* n. 8895.

TINNEVELLY; at Palamcottah, *Rottler*. CEYLON, dry parts of the island.—DISTRIB.—Trop. Afric.

Stem 1–2 ft., very slender, geniculately ascending from a creeping base. *Leaves* 1–3 by $\frac{1}{2}$ – $\frac{3}{8}$ in., elliptic-lanceolate, acute and apiculate, very thin, flaccid, base narrowed; ligule short, hyaline, lacerate. *Panicle* 6–8 in., very slender; spikes capillary, 2–3 in. *Spikelets* about $\frac{1}{8}$ in.; nerves of gl. III and palea fringed with long hairs. *Grain* not seen.—Judging from Burmann's figure of the leaf his *Poa chinensis* is, I think, *L. uniflora*.

** *Leaves long, narrow.*

2. *L. polystachya*, *Benth. Fl. Austral.* vii. 617 (non Kunth); panicle elongate contracted, spikes 1–1½ in. crowded erect, spikelets 1-fl. *L. Neesii*, *Benth. in Journ. Linn. Soc.* xix. (1881) 108; *Trim. Cat. Ceyl. Pl.* 109. *Cynodon Neesii*, *Thw. Enum. Ceyl. Pl.* 371. *C. polystachyus*, *Br. Prodr.* 187. *C. virgatus*, *Nees ex Wall. Cat.* n. 8894; *Wight Cat.* n. 1751; *Steud. Syn. Gram.* 213. *Agrostis virgata*, *Herb. Rottl. & Herb. Madr. ex Wall. l. c.*; *A. chinensis*, *Koen. ex Herb. Rottl.*

The Carnatic, *Rottler*, *Wight*. CEYLON; Trincomallee, *Glenie*.—DISTRIB. Australia.

Stems erect, 2–3 ft., stout or slender, sometimes proliferously branched below; lower nodes glabrous or bearded. *Leaves* 12–18 in., convolute, rarely flat, finely acuminate. *Panicle* 6–10 in., flexuous; branches filiform. *Spikelets* $\frac{1}{5}$ in., close-set, pale; gls. I and II unequal, ovate-lanceolate, rather longer than III, pale green; III broadly ovate, subacute, 3-nerved, nerves and keels of palea ciliate. *Grain* oblong, deeply grooved on one side.—The form of the panicle differs much from that of the following; but the spikelets and glumes are very much alike. *L. polystachya*, Kunth, an American plant, is a species of *Diplachne*.

3. *L. filiformis*, *Roem. & Sch. Syst.* ii. 580; spikes 2–3 in., spikelets 2–3-fl. *Kunth Enum. Pl.* i. 270, *Suppl.* 220; *Steud. Syn. Gram.* 209; *Wight Cat.* n. 1754; *Thw. Enum. Pl. Zeyl.* 271; *Trim. Cat. Ceyl. Pl.* 109; *Duthie Grass. N.W. Ind.* 192; *Aitchis. Cat. Panjab. Pl.* 167; *Miq. Fl. Ind. Bat.* iii. 389. *E. chinensis*, *Duthie Fodd. Grass. N. Ind.* 59, t. 71. ? *E. filiformis*, *Pers. Syn.* i. 87. *Aira filiformis*, *Roxb. Fl. Ind.* i. 326; *Herb. Ham. ex Wall. Cat.* n. 3804. *Poa malabarica*, *Klein ex Steud. Nom. Ed.* ii. 303, 60. *P. chinensis*, *Herb. Rottler*. *P. contracta* & *panicea*, *Retz. Obs.* iii. 11. *P. virgata*, *Roth. Nov. Sp.* 66; *Wight l. c.* *Festuca tenuis* & *F. ? Basnia*, *Herb. Ham. ex Wall. Cat.* n. 3805 C. D.—*Leptochloa*, *Wall. Cat.* 3804, 3805.

Throughout INDIA and BURMA in the low country. CEYLON; Colombo, *Ferguson*.—DISTRIB. Trop. Asia, Africa and America.

Stem 1–2 ft., slender, geniculately ascending. *Leaves* 4–10 in., flat, flaccid, finely acuminate; ligule short. *Panicle* 4–8 in., contracted or diffuse, branches very many almost capillary; spikelets $\frac{1}{5}$ in., gl. I and II oblong-lanceolate, acute; III and IV broadly ovate, nerves and palea ciliate. *Grain* oblong, closely invested with the gl. and palea.—I have followed my predecessors in referring this Indian grass to *Leptochloa filiformis*, R. & S., though that plant is described as American, and as having glabrous flowers; a character apparently confirmed by Jacquin's drawing of its synonym *Eleusine filiformis*, Pers. (*Jacq. Eclog. Gram.* t. iv.) and by an observation of Doell in *Mart. Fl. Bras.* ii. III. 93. On the other hand, I find the nerves of gl. III to be invariably hairy in American specimens corresponding with Jacquin's plate and the description of *L. filiformis*, and hence must suspect that this very inconspicuous character (except under a good magnifying power) has been overlooked.

Amongst other grasses referred to *filiformis*, but which from want of materials or descriptions or both I refrain from citing, is *L. tenerrima*, R. & S., which is described as having a 2-lobed tip of gl. III, a character which is approached only in *L. obtusiflora*, but which is easily produced in the very concave glume by a slight force in analyzing that organ. Benth. *Fl. Hongk.* and *Fl. Austral.* refers it to *L. chinensis*, to which its few (2-3-) fld. spikelets is opposed. It is probably a weak state of *L. filiformis*. With regard to *Aira filiformis*, Koen., in *Roxb. Fl. Ind.*, Mr. Rendle informs me that there are in the British Museum a specimen so named by Koenig himself, and another authenticated by Roxburgh, and that both are the Indian *L. filiformis*. Roxburgh's characters of "leaves ensiform" and "calyx large" are therefore erroneous.

4. ***L. chinensis***, *Nees in Syll. Ratisb.* i. (1824) 4, *Agrost. Bras.* 432; stem tall stout, spikes 2-4 in.; spikelets 4-6-fld., gl. iii. obtuse and apiculate. *Miq. Fl. Ind. Bat.* iii. 389 (excl. *Syn. Burm.*). *Steud. Syn. Gram.* 209; *Benth. Fl. Hongk.* 430, *Fl. Austral.* vii. 617; *Thw. Enum. Pl. Zeyl.* 371; *Trim. Cat. Ceyl. Pl.* 109; *Wall. Cat. n.* 8896; *Wight Cat. n.* 1755; *Duthie Grass. N.W. Ind.* 35 (excl. syn.), *Fodd. Grass. N. Ind.* 59, t. 71; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 372 (excl. *Syn. tenerrima*). *E. decipiens* & imbecilla, *Steud. l. c.* 279. *Cynodon virgatus*, *Nees in Wight Cat. n.* 1751. *Poa as henes*, *Roem. & Sch. Syst.* ii. 574. *P. decipiens*, *Br. Prodr.* 181. *P. chinensis*, *Linn. Sp. Pl.* 69 (excl. *Syn. Burm.*); *Roxb. Fl. Ind.* i. 332. *P. malabarica*, *Retz. Obs.* v. 19. *P. secundaria*, *Heyne in Herb. Rottl.*

Throughout INDIA and BURMA, in moist places. CEYLON, Atakalam Corle, *Thwaites*.—DISTRIB. China, Japan, Malaya, Australia.

Stem erect, or geniculately ascending, 2-4 ft., often as thick as a goose-quill. Leaves 6-18 in., flat or convolute, scaberrulous; sheaths loose; ligule short, lacerate. Panicle 6-18 in.; branches opposite or alternate, suberect or spreading. Spikelets about $\frac{1}{16}$ in.; nerves of gl. III and keels of palea pilose. Grain loose, obtusely trigonous, subrugose.—A much more robust species than *L. filiformis*, but some of its forms are quite as slender as is that plant.

5. ***L. obtusiflora***, *Horst. in Flora*, xxxviii. (1835) 203; stem stout tall, panicle branches few erect, spikelets $\frac{1}{2}$ in. 6-fld., gl. III oblong-ovate tip truncately rounded or retuse erose, grain obovoid triquetrous. *Steud. Syn. Gram.* 209. *Poa maysorensis*, *Rottler mss.*

SOUTHERN INDIA; Cochin, at Ayacotta, *Rottler*. (June 10th, 1808).—DISTRIB. Afr. trop.

Stem 2 ft. and upwards, erect, branched, leafy. Leaves narrow. Panicle of 9-12 simple erect branches 2-3 in. long. Spikelets alternate, sessile, as in *L. chinensis*, but larger with fl. glumes $\frac{1}{12}$ in. long, more oblong, with broad more or less truncate toothed tips, sometimes emarginate or retuse with an apicalus; keels of palea quite smooth. Grain larger than in *chinensis*, triquetrous, ventrally depressed.—*Rottler's* specimen is imperfect; he has labelled it "*Poa species malabarica proxima, P. maysorensis, nob.*" and added the above description of the stem leaves and panicle, which exactly accord with African ones. It is very near *L. chinensis*, but of the great many plants of that species which I have examined none have the large spikelets and glumes of this. The habitat is an old fortified town near Cochin, that had great trade with Africa, whence the plant was probably introduced with merchandise.

DOUBTFUL INDIAN SPECIES.

L. CYNOSUROIDES, *Roem. & Sch. Syst.* ii. 579; *Kunth Enum. Pl.* i. 270; *Steud. Syn. Gram.* 208. *L. filiformis*, *Beauv. Agrost.* 71. *Cynosurus filiformis*, *Vahl Symb.* ii. 20. *Chloris filiformis*, *Poir. Encycl. Suppl.* ii. 238. *Pollinia filiformis*,

Spreng. Syst. Veg. i. 288; spike solitary, spikelets 3-flid.—Probably not a *Leptochloa*.

93. **DICHÆTARIA**, Steud.

A tall slender perennial grass. *Leaves* long, narrow, flat. *Spikelets* 1-flid. with the very long filiform gl. of a 2nd, sessile or shortly pedicelled, distantly scattered along a very long filiform rachis, very narrow, terete, not jointed at the base; rachilla not produced beyond gl. III, jointed at the base. *Glumes* 4, I and II unequal, empty, separately deciduous, narrowly lanceolate, acuminate or dorsally rounded, subaristate, entire or minutely 2-toothed below the tip, 3-nerved; III linear, terete, coriaceous, 3-nerved, tapering into a very long rigid recurved awn with two erect setæ at its base; IV, a filiform, awn-like, recurved glume, minutely 2-aristate above the middle; palea very narrow, 2-cuspidate, keels scaberulous. *Lodicules* large, obliquely cuneiform, fleshy. *Anthers* 3, very slender. *Styles* distinct, stigmas slender. *Grain* narrow.

D. Wightii, *Nees ex Steud. Syn. Gram.* 145. *Gymnopogon rigidus*, *Thw. Enum. Pl. Zeyl.* 372, 444; *Trim. Cat. Ceyl. Pl.* 109. *Aristida linearifolia*, *Rottl. mss.*—*Herb. Wight* n. 1035.

SOUTHERN INDIA; Tranquebar, *Rottler*; probably Travancore, *Herb. Wight*. CEYLON, in dry parts of the island, *Thwaites*.

Stems, erect, 2–3 ft., tufted on a creeping woody rootstock. *Leaves* as long as the stem, $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, quite glabrous, margins smooth; ligule of hairs. *Panicle* 12–18 in., rachis and few short branches filiform, quite smooth. *Spikelets* with the awns $1\frac{1}{2}$ in. long, green; gl. I shorter than II, which is about $\frac{1}{2}$ in. long and about $\frac{2}{3}$ as long as III below the short lateral bristles; rachilla below III bearded.—I think Steudel was right in separating this grass from *Gymnopogon*, all the species of which are American, and from which it differs totally in habit, and in the form of the spikelets, gl. III of which greatly exceeds I and II.

Tribe IX. FESTUCACEÆ. (See p. 7.)

94. **POMMEREULLA**, Linn. f.

A short stout perennial creeping grass. *Leaves* short, strap-shaped. *Spikelets* 2–3-flid., distichously racemed, narrowly turbinate, villous, not jointed on their pedicels; rachilla stipitiform, narrowly obconic (resembling a callus), villous, jointed at the acute base, crowned by empty deformed fl. gls. *Glumes* 5–7, I and II narrow, persistent, empty; I lanceolate, 1-nerved; II longer, oblong-lanceolate, 3–5-nerved; III and IV embracing V and VI, empty, flabelliform, 4-lobed, dorsally shortly awned; V–VII flg. cuneate-obovate, 3-lobed; palea ovate, acute, nerves 2, pubescent. *Lodicules* 2, membranous. *Stamens* 2–3, anthers small. *Styles* distinct. *Grain* oblong, compressed, free.

P. Cornucopiæ, *Linn. fl. Diss. Nov. Gram.* 31, & *Suppl.* 105; *Vahl Enum. Pl.* ii. 393; *Beauv. Agrost.* 91, t. 18, f. 6; *Roxb. Pl. Corom.* ii. 17, t. 131, *Fl. Ind.* i. 331; *Roth. Nov. Sp.* 33; *Kunth in Ann. Sc. Nat. Ser. I.* xxiii. (1831) t. 7, *Enum. Pl.* i. 321; *Steud. Syn. Gram.* 249; *Trimen Cat. Ceyl. Pl.* 109; *Wall. Cat. n.* 8904; *Wight Cat. n.* 1769. *P. elongatum*, *Wight & Arn. in Wight Cat. n.* 1770. *Pennisetum Cornucopiæ*, *Heyne ex Wall. l. c.*

MYSORE and the CARNATIC, Heyne, Wight. CEYLON; Northern Province, Trimen.

Stem as thick as a crow-quill, rooting at the nodes; branches erect, stout, leafy, flattened. *Leaves* 1-3 in., distichous, flat, exactly linear, coriaceous, tip rounded, margins sparsely ciliate; sheath long or short, broad, flattened; ligule a ciliate ridge. *Raceme* $\frac{1}{2}$ -2 in., usually half sunk in the uppermost sheath, rarely with an exserted naked peduncle and sometimes 2 erect branches. *Spikelets* $\frac{1}{10}$ - $\frac{1}{8}$ in., shortly pedicelled, white, tomentose, awns shortly exserted; gls. I and II much shorter than the spikelet, keels nearly smooth, bases narrowed; II inserted much above I, its base tightly embracing the rachilla; III and IV narrowed into a tomentose stipes, embracing V and VI, 4-lobed with a short dorsal awn, disk coriaceous, margins and lobes hyaline; V-VII cuneately obovate, 3-lobed.—A very curious grass. The turbinate spikelets resemble clusters of those of *Gracilea*, but are not jointed at the base, and their structure is totally different. The above characters are drawn from many analyses, but they will no doubt be found to vary in a more extended suite of specimens.

95. PAPPOPHORUM, Nees.

Perennial grasses. *Leaves* narrow. *Spikelets* 1-3-fl., in contracted or spiciform panicles, not jointed at the base; rachilla jointed at the base. *Gl.* I and II membranous, keeled, 3- many-nerved, persistent; III and IV much shorter (except the awns), coriaceous, orbicular, concave, obscurely many-nerved, cleft into 9 or more equal or alternately longer long-ciliate erect awns; IV and V usually imperfect; palea small, broad, 2-keeled. *Lodicules* 2, dolabriform. *Stamens* 3. *Sty'es* short, distinct; stigmas plumose. *Grain* ovoid, or oblong, free.—Species about 20, in warm regions.

The synonymy of the species of this genus is in a most unsatisfactory condition; I am doubtful of the nomenclature of some here described, and the Indian materials of others, not here alluded to, are insufficient for reliable determination or descriptions.

1. *P. elegans*, Nees in *Wight Cat.* n. 1771; gl. I 9-nerved, II 7-nerved, awns of fl. gl. nearly equal about thrice as long as their gl. *Wall. Cat.* n. 8902; *Steud. Syn. Gram.* 199; *Duthie Grass. N.W. Ind.* 35. *Ischæmum papposum*, *Herb. Rottler.* *Enneapogon dipsaceus*, *Wall. mss.* *Calotheca elegans*, *Wight & Arn. ex Steud. l. c.*

PESHAWUR, Stewart. SCIND, Stocks. MYSORE and the CARNATIC, Heyne, Wight, &c. BURMA, Wallich, &c.

Stem 3-18 in., very slender, wiry, erect or ascending from a woody often thickened base; nodes glabrous or tomentose. *Leaves* very narrow, flat or convolute; ligule a ridge of hairs. *Panicle* 1-3 in., branches very short and rachis villous. *Spikelets* with the awns $\frac{1}{6}$ - $\frac{1}{4}$ in., sessile and pedicelled, softly tomentose, nearly white; gl. I and II oblong-lanceolate, acuminate, I $\frac{1}{2}$ shorter than II; awns of III and IV ciliate below the middle; keels of palea pubescent.

2. *P. Aucheri*, *Jaub. & Spach Ill. Pl. Orient.* iv. 32, t. 323; gl. I and II 7-nerved, awns of fl. gls. three to four times as long as the gl. 4 much shorter than the others. *Steud. Syn. Gram.* 200; *Duthie Grass. N.W. Ind.* 35. *P. turcomanicum*, *Trautv. in Act. Hort. Petrop.* i. (1871) 27. *P. persicum*, *Steud. l. c.*; *Boiss. Fl. Orient. v.* 558; ? *Edgew. in Journ. Linn. Soc.* vi. (1862) 196; *Aitchis. Cat. Panjab. Pl.* 106. *Enneapogon persicum*, *Boiss. Diagn. i. V.* 71.

WESTERN PANJAB and MOOLTAN, *Aitchison, Stewart, Edgeworth, &c.* WESTERN TIBET, alt. 3-7600 ft., *Clarke, Duthie, &c.*—DISTRIB. Affghan., Persia, Turkestan.

Stem 6-12 in., erect or ascending, slender, puberulous. *Leaves* 2-8 in., narrow, flat or convolute and filiform; sheaths smooth, or lower tomentose; ligule a pubescent ridge. *Panicle* 2-5 in., cylindric, silvery-yellow, with sometimes purple awns; rachis pubescent. *Spikelets* including the awns, $\frac{1}{2}$ - $\frac{1}{2}$ in. *Gls.* I and II narrowly lanceolate, finely pubescent; II rather the longest; III very short, villous, awns softly silky below the middle, the longer four times as long as the gl. and about $\frac{1}{2}$ longer than the intermediate; palea as in *P. elegans*.—I am doubtful about the identification of Edgeworth's Mooltan plant, of which the only specimens I have seen are very bad, consisting of tall very slender much branched rigid stems 12-18 in. high, with long very narrow rigid leaves, and a spiciform slender flowerless panicle 6 in. long, together with a spike of very immature spikelets. It is ticketed as from the Shah Kot Hills.

3. ? ***P. brachystachyum***, *Jaub. & Spach Ill. Pl. Orient.* iv. 34, t. 324; dwarf, tomentose, spike very short, gl. I and II faintly 3-5-nerved below the middle, awns of fl. gl. about twice as long as their gl., 4 shortest. *Steud. Syn. Gram.* 200; *Boiss. Fl. Orient.* v. 558. ? *P. arabicum*, *Hochst. ex Steud. l. c.* 199; ? *Edgew. in Journ. Linn. Soc.* vi. (1862) 196; *Aitchis. Cat. Panjab Pl.* 166; *Duthie Grass. N.W. Ind.* 35. ? *P. nanum*, *Steud. l. c.*; *Edgew. l. c.*; *Aitchis. l. c.*; *Duthie l. c.* *P. vincentianum*, *Schmidt ex Duthie l. c. (in Syn.)*

The PANJAB; Multan, *Edgeworth*. RAJPOOTANA; at Jodhpur, *King*.—DISTRIB. Arabia, N. Africa.

I am very doubtful about this plant, *King's* specimens of which resemble a small state of *P. Aucheri*, with much shorter awns, the four shorter of which are not so short as in the figure cited of *P. brachystachyum*. *Edgeworth's* specimens of *P. arabicum* and *P. nanum* are insufficient for identification.

4. ***P. robustum***, *Hook. f.*; stem stout, gls. I and II 3-nerved, awns of III nearly equal, about twice as long as their gls.

UPPER GANGETIC PLAIN; Hissar, *Drummond (Herb. Duthie)*.

Stem 18 in.-3 ft., erect, or geniculately ascending, as thick as a crow-quill, pubescent; nodes tomentose. *Leaves* 6-10 by $\frac{1}{2}$ - $\frac{1}{2}$ in., flat; lower sheaths pubescent; ligule a ridge of hairs. *Panicle* 2-5 in., silvery-grey, dense-fl., cylindric. *Spikelets* sessile, $\frac{1}{2}$ in. with the awns, villous; gl. I $\frac{1}{2}$ shorter than II, ovate-lanceolate; II lanceolate; III and palea as in *P. elegans*, but awns shorter, and as in that species with long cilia below the middle.

96. **ARUNDO**, *Linn.*

Tall stout perennial grasses. *Leaves* flat. *Spikelets* few-fl. in large decompound panicles, laterally compressed, fls. mostly bisexual; rachilla jointed at the base and between the flg. gls., glabrous or shortly hairy. *Glumes* 6 or more, I and II subequal, empty, narrow, acute or acuminate, glabrous, scarious, persistent, 3-nerved; flg. gls. lanceolate, acuminate, or 2-fid with a short awn, 3-nerved, dorsally hairy all over below the middle; palea hyaline, 2-nerved. *Lodicules* 2, obovate. *Stamens* 3. *Ovary* glabrous, styles distinct, stigmas plumose. *Grain* oblong.—Species 6 or 7, temp. and trop.

A. Donax, *Linn. Sp. Pl.* 81; stem creeping below, leaf-base amplexicaul, panicle erect thyriform, spikelets 3-4-fl., gls. I and II oblong-lanceolate 3-nerved, tip of flg. gls. minutely 2-toothed shortly awned.

Host Gram. Austr. iv. 22, t. 38; *Kunth Enum. Pl.* i. 246, *Suppl.* 159; *Reichb. Ic. Fl. Germ.* t. 109; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 36; *Ledeb. Fl. Ross.* iv. 394; *Boiss. Fl. Orient.* v. 564; *Aitchis. Cat. Panjab Pl.* 166; *Duthie Grass. N.W. Ind.* 35, *Fodd. Grass. N. Ind.* 60. *A. benghalensis* & *bifaria*, *Retz. Obs.* iv. 22, & v. 20; *Roxb. Fl. Ind.* i. 347, 348; *Kunth Enum. Pl.* i. 247. *A. longifolia*, *Salisb. Prodr.* 24. *A. sativa*, *Lamk. Fl. Fr.* iii. 616. *A. triflora*, *Roxb. Ic. Pict.* t. 853. *Donax arundinaceus*, *Beauv. Agrost.* 78, t. 16, f. 4. *D. benghalensis*, *Beauv. l. c.* 78. *D. bifarius*, *Trin. in Spreng. Neue Entdeck.* ii. 73. *Amphidonax bengalensis*, *Nees ex Steud. Syn. Gram.* 197; *Wight Cat.* n. 1748. *A. bifaria*, *Nees ex Steud. Syn. Gram.* 410; *Miq. Fl. Ind. Bat.* iv. 410. *Scolochloa arundinacea*, *Mert. & Koch Fl. Germ.* i. 529. *Aira benghalensis*, *Gmel. Syst.* i. 174.—*Arundo*, *Wall. Cat.* n. 5018, *excl. F.*, 5020.

LOWER HIMALAYA; from Kashmir to Nepal, ascending to 3500 ft.; and from the PANJAB to SILHET, the NAGA HILLS, alt. 5–8000 ft., and BURMA. The CIRCARS, NILGHIRI, and KURG HILLS.—DISTRIB. Westward to Europe, N. Africa, N. Asia.

Stem 6–10 ft., fistular. *Leaves* 1–2 ft., tapering from the base to the apex, smooth, bifarious, drooping; ligule a ridge of hairs. *Panicle* 1–2 ft., branches scaberulous, erect or drooping. *Spikelets* $\frac{1}{2}$ in., green or yellowish; gls. I and II acute or obtuse and apiculate.—A curious branched small-leaved apparently dwarf form named *A. bambusifolia*, *mss.*, was collected by Griffith on the summit of Thumathaya (Mishini Mts.), and is alluded to in his Journals, p. 45, as “an *Arundo festucoidea*.” Grisebach (in Goett. Nachr. (1868) 76) describes a form of *A. Pliniana*, Turra, with the mouth of the sheath ciliate, as a native of the Himalaya (Simla, alt. 3–9000 ft.). The above character is found in Indian specimens of what I cannot distinguish from *A. Donax*. *A. Pliniana* appears to Dr. Stapf and myself to be a mere form of *Donax* with small *r* spikelets, which organs in Indian specimens vary from $\frac{1}{4}$ – $\frac{1}{2}$ in. The plants with the smaller spikelets are, I presume, the *A. mauritanica*, Poir. (a synonym of *Pliniana*) of *Duthie Grass. N.W. Ind.* 35, *Fodd. Grass. N. Ind.* 60.

97. PHRAGMITES, Trin.

Tall perennial grasses. *Leaves* long. *Spikelets* 3–7-flid. in decomposed panicles, not jointed on the pedicels, laterally subcompressed; rachilla jointed between the flg. gls. and above gl. III, silkily penicillate with very long hairs, not produced beyond the fl. gls. *Glumes* all glabrous, I and II unequal, oblong-lanceolate, 3-nerved, membranous, persistent; III much longer, narrowly oblong-lanceolate, acute, 3-nerved, male or neuter, persistent; flg. gls. subulate-lanceolate, subaristate, hyaline; palea much shorter. *Lodicules* 2, obtuse. *Stamens* 1–3. *Styles* 2, terminal, free, stigmas plumose. *Grain* oblong, terete.—Species few, temp. and trop.

1. **P. communis**, Trin. *Fund. Agrost.* 134; stem 6–10 ft., and leaves withering in winter, leaf-margins rough, panicle 6–18 in. subsecund, inclined, branches not widely spreading, gl. III $\frac{1}{2}$ – $\frac{3}{4}$ in. *Kunth Revis. Gram.* i. 277, t. 50; *Enum. Pl.* i. 251, *Suppl.* 193; *Fl. Dan.* t. 2664; *Reichb. Ic. Fl. Germ.* t. 108; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 37; *Steud. Syn. Gram.* 195; *Franch. & Sav. Enum. Pl. Japon.* ii. 170; *Boiss. Fl. Orient.* v. 563; *Benth. Fl. Austral.* vii. 636; *Duthie Grass. N.W. Ind.* 35, *Fodd. Grass. N. Ind.* 60. *P. chilensis*, *Steud. Nom. Ed.* II. ii. 234. ? *P. Emodi*, Arn. & *Nees in Nov. Act. Cur.* xix., *Suppl.* i. (1843) 174. *P. hispanica*, *Nees l. c.* *P. humilis*, *Not. in Cat. Hort. Genuen.* (1846) 27. *P. longivalvis*, *Steud. l. c.* 196. *P. mauritanica*, *Kunth Revis.* i. 80, 277, t. 50, *Enum.* i. 251.

P. pumila, Griseb. in Goett. Nachr. (1868) 76 (un Willk.?). *P. vulgaris*, Trin. Fund. Agrost. 134. *Arundo graeca*, Link in Linnæa, ix. (1834) 136. *A. maxima*, Forsk. Fl. Æg. Arab. 24. *A. Phragmites*, Linn. Sp. Pl. 81; Host Gram. Austr. iv. 23, t. 39; Engl. Bot. t. 401; Knapp Gram. Britt. t. 95; Ledeb. Fl. Ross. iv. 393; Aitchis. Cat. Panjab Pl. 266. ?*A. tecta*, Blanc, Fl. Philipp. 48. *A. vulgaris*, Lamk. Fl. Franc. iii. 615. Czernya arundinacea, Presl Cyp. & Gram. Sicil. 22.

KASHMIR LAKE, alt. 5-6000 ft., Jacquemont, &c. GARHWAL, alt. 4-5000 ft., Duthie. WESTERN TIBET, alt. 9-10,000 ft., Thomson, &c.—DISTRIB. N. and S. temp. regions.

Stem erect from a stout creeping rootstock, leafy up to the panicle, fistular. Leaves distichous, linear to broadly lanceolate, tip subulate, base rounded, not amplexicaul; ligule a ridge of short hairs. Panicle usually brownish purple; branches very slender, smooth, hairy; peduncle often silkily hairy at the very base of the panicle, sometimes densely. Spikelets $\frac{1}{2}$ – $\frac{3}{4}$ in.; gls. spreading in frt. and exposing the long silky hairs of the rachilla, I and II longer than the flg.—Very variable; in dry situations in Tibet and Scind the stems are very short, straggling, with ovate-subulate concave rigid pungent leaves 1-2 in. long, and a reduced panicle. This starved state is the *Cenchrus frutescens*, Sieb. in Bot. Zeit. ix. (1822) 14. *P. pumila*, Griseb., is another reduced condition of *P. communis*, from Tibet, in which gl. III is as short as in *P. Karka*. Grisebach in Goett. Nachr. (1868) 76, has also var. *isiaca* (*P. isiaca*, Reicheb.) as a native of Tibet. I have not seen his specimens, but neither Dr. Stapf nor I can find a valid character for this variety in European specimens.

2. ***P. Karka***, Trin. ex Steud. Nom. Ed. ii. 324; stems very tall stout and leaves perennial, panicle $\frac{1}{2}$ –2 ft. erect, branches widely spreading, gl. III rarely more than $\frac{1}{2}$ in. *P. Roxburghii*, Steud. l. c.; Nees in Nov. Act. Nat. Cur. xix., Suppl. i. (1843) 178; Thwaites Enum. Pl. Zeyl. 370; Trim. Cat. Ceyl. Pl. 109; Benth. Fl. Hongk. 428; Duthie Grass. N.W. Ind. i. 35, Fodd. Grass. N. Ind. 60; Franch. & Sav. Enum. Pl. Jap. ii. 170; Lisboa in Journ. Bomb. Nat. Hist. Soc. vii. (1893) 378. *P. bifaria*, Wight Herb. n. 3310. *P. nepalensis*, Nees ex Steud. Syn. Gram. 196. *Arundo Karka*, Retz. Obs. iv. 21; Roxb. Fl. Ind. i. 348. *A. Roxburghii*, Kunth Revis. Gram. i. 79, Enum. Pl. i. 248; Griff. Notul. iii. 47, Ic. Pl. Asiat. t. 139, f. 243. *A. Roxburghiana*, Kunth ex Steud. Nom. l. c. *A. tibialis*, Roxb. Ic. Pict. (ined.), t. 854, & in Wall. Cat. n. 5017 G. *A. Donax*, Herb. Ham. ex Wall. l. c. B. *A. Corea*, Herb. Rottl. Oxyanthe japonica, Steud. l. c. 197. *Sericura japonica*, Steud. in Flora, xxix. (1846) 20. *Trichoon Karka*, Roth. Catalect. ii. 2.—*Arundo*, Wall. Cat. n. 5017, 5018 F., 5019.—*Arundo*, Griff. l. c. 48.

Throughout INDIA; from the Panjab to Burma, and southward to Ceylon, ascending the Himalaya in hot valleys to 3000 ft.—DISTRIB. Affghan., Japan, Trop. Asia, Africa, and Australia.

Except by its greater size, larger more spreading panicle with rather smaller spikelets, more spreading glumes, and shorter gl. III, I can point out no character whereby herbarium specimens of *P. Karka* can be distinguished from *P. communis*, and none of those are constant. In both dwarf or very slender states occur with almost filiform leaves and greatly reduced panicles. Dr. Stapf, who has carefully revised my separation of the great pile of Indian specimens into the two species, is equally at a loss to point out any other characters than those given above whereby to distinguish them, except that the rachilla appears to him to be rather longer and more slender in *P. Karka* and the glumes hence more widely apart; and the glumes also are rather narrower. The perennial duration of the stems and leaves of *P. Karka* requires verification. These organs are undoubtedly annual in the northern form of

P. communis, and F. Mueller observes (in a letter to Benth) that they are so in the Tasmanian *P. communis*; whereas in the tropical Australian plant which Benth includes under it they are evergreen.

Var. *cincta*; spikelets scaberulous, pedicels villous with silky hairs. *P. cincta*, Clarke mss.—Near Calcutta; Salt Lakes, Kurz; Mutlab, Clarke.—The specimens are in a very young state of flower. The glumes are identical with those of *P. Karka*, in which latter the pedicels of specimens from all parts of India are quite glabrous.

97*. **NEYRAUDIA**, Hook, f. (*Genus not in clavis*).

A tall perennial leafy grass. *Leaves* long, flat. *Spikelets* small, 4-8 fld., in an effuse decompound nodding panicle, laterally compressed, lowest flg. gl. sometimes glabrous epaleate and neuter; rachilla shortly bearded below the flg. gls., jointed at the base (above the neuter gl. if present) and between the flg. gls. *Glumes* all membranous; I and II unequal, empty, lanceolate, 1-nerved; flg. gls. elongate-subulate, more or less recurved, ending in a very slender tip with 2 setaceous points and a scabrid interposed awn, 3-nerved, lateral nerves submarginal, penicillate with long hairs; palea oblong, keels scaberulous. *Lodicules* 2, obovate or cuneate. *Stamens* 3, anthers long linear. *Ovary* shortly stipitate, oblong; styles terminal, stigmas feathery. *Grain* linear, terete, loose in the gl.

N. madagascariensis, Hook. f.; *Arundo madagascariensis*, Kunth Revis. Gram. i. 273, t. 48, Enum. i. 247, Suppl. 190; Benth. Fl. Hongk. 427; Duthie Grass. N.W. Ind. 35 (excl. Syn.), Fodd. Grass. N. Ind. 60. A. Reynaudiana, Kunth Revis. l.c. 275, t. 49, Enum. l.c.; Steud. Syn. Gram. 194; Clarke in Journ. Linn. Soc. xxv. (1889) 89. A. Zollingeri, Buese in Miq. Pl. Jungh. 243; Miq. Fl. Ind. Bat. iii. 411. Phragmites Zollingeri, Steud. in Zoll. Cat. 55; Syn. Gram. 196. Donax Thouarii, Beauv. Agrost. 78, t. 16, f. 5.—Arundinacea, Griff. Notul. iii. 49, n. 6; Ic. Pl. Asiat. t. 156, f. II.—Arundo, Wall. Cat. n. 5021, 5022.

The PANJAB and TROPICAL HIMALAYA, from Chamba to Sikkim, ascending to 5000 ft. SILHET and the KHASIA HILLS, ASSAM. PENANG and BURMA.—DISTRIB Tropical E. Asia and Malaya. Trop. Africa, Madagascar.

Stem 6-8 ft. (or more?) up to $\frac{1}{2}$ in. diam., leafy to the panicle or near it, polished, solid, glaucous at the nodes. *Leaves* 1-2 ft., from filiform and convolute to 1 in. broad and flat, smooth, rather soft, margins smooth or nearly so, midrib and few nerves slender, base subamplexicaul; sheaths polished; ligule a villous ridge. *Panicle* 1-3 ft., rachis and filiform fascicled and whorled branches smooth or subscaberulous, ultimate branchlets capillary. *Spikelets* $\frac{1}{4}$ - $\frac{1}{2}$ in. (including the awns), shortly pedicelled, pale brown, 4-8 fld.; gl. I and II shining, I $\frac{1}{2}$ shorter than II; neuter gl. if present $\frac{1}{8}$ - $\frac{1}{2}$ in., about twice as long as I, strict, spreading, oblong-lanceolate, suberect, 3-nerved, sides convolute, quite glabrous; flg. gls. longer than the empty, more or less recurved, very slender, narrowed into the more or less recurved not twisted scaberulous awn with two bristles at its base; palea hyaline, 2-toothed, keels minutely ciliolate; callus, the upper portion of each internode of the rachilla, jointed with the latter, densely shortly bearded.—A much more elegant grass than any Indian species of *Arundo* or *Phragmites*, but like these extremely variable in habit and size, depending on place of growth. I can find no difference whatsoever between the specimens with and those without the empty gl. III; specimens with filiform leaves occur in both. Their habitats are as follows:—

1. *madagascariensis* proper; neuter gl. 0. Western Himalaya; from Kashmir to Kumaon, Rangoon, Prome.—Africa, Madagascar.

2. *Zollingeri*; neuter gl. present. *Arundo* Reynaudiana, Kunth l.c.—Sikkim Himalaya, Assam, Bengal, the Khasia Hills, Chittagong, Tenasserim, Penang.—Java.

98. **FINGERHUTHIA**, *Lehm.*

Erect, rigid, annual or perennial grasses, with the habit of *Phleum*. *Leaves* narrow. *Spikelets* crowded in a spiciform panicle, 1-3-fl., lowest in the panicle reduced to subulate glumes, laterally compressed, jointed on the very short pedicels; lower fl. bisexual or male, upper if present male, uppermost an empty gl. *Glumes* I and II subequal, rigidly membranous, keeled, 1-nerved, awned; III as long as II, oblong-lanceolate, obtuse, 5-nerved, mucronate or dorsally shortly awned; palea rigid, 2-keeled. *Lodicules* 2, obcordate. *Anthers* 3, linear-oblong. *Styles* long, free, stigmas plumose. *Grain* elliptic or oblong, free.—Species 2, a S. African, and the following.

A genus of doubtful affinity, with certain characters of *Alopecurus*, and of *Melica* in the spikelets jointed on their pedicels; the imperfect basal spikelets form a sort of involucre to the spiciform panicles as in *Sesleria*.

F. affghanica, *Boiss. Fl. Orient. v.* 569; spikelets 3-fl., lowest fl. fem., intermediate male, upper neuter, gls. I and II shortly awned keels and margins ciliate. *F. africana*, *Aitchis. in Journ. Linn. Soc. xix.* (1882) 193 (*non Lehm.*).

WESTERN PANJAB; Peshawur, alt. 3500 ft., *Stewart*.—DISTRIB. Afghan.

Stem 12-18 in., tufted, slender, leafy. *Leaves* very narrow, flat, glaucous, glabrous, smooth; sheath glabrous, mouth bearded; ligule a ridge of soft hairs. *Spike* $\frac{3}{4}$ -1 in., oblong, obtuse, long-peduncled, pale green. *Spikelets* $\frac{1}{2}$ in., closely imbricate; gls. I and II lanceolate, narrowed into straight awns as long as themselves, keels and margins ciliate with long hairs; III chartaceous, mucronate, keel smooth, margins ciliate; keels of palea ciliate; IV hardly awned; V an empty gl. *Grain* elliptic-oblong, acute at both ends.—The only Indian specimen is a very poor one.

99. **ELYTROPHORUS**, *Beauv.*

An annual erect grass. *Leaves* narrow, flat. *Spikelets* very minute, 3-5-fl., in globose sessile clusters that are densely packed along a simple rachis forming a long cylindric often lobed or interrupted spike; each cluster consists of very many densely crowded sessile compressed spikelets with awned glumes subtended by many empty glumes, not jointed at the base; rachilla smooth, jointed at the base and between the flg. gls. *Glumes* (of perfect spikelets), I and II subequal, empty, membranous, mucronate, keeled, 1-nerved, persistent; flg. gls. rather larger, narrowed into short awns, 3-nerved, uppermost empty; palea complicate, one or both keels winged. *Lodicules* 2, obliquely oblong. *Anthers* 1-3, minute. *Styles* free, stigmas long hairy. *Grain* obliquely oblong, beaked, free.

E. articulatus, *Beauv. Agrost. 67, t. 14, f. 2; Kunth Revis. Gram. ii.* 481, t. 154, *Enum. Pl. i.* 391, *Suppl.* 325; *Thw. Enum. Pl. Zeyl.* 374; *Trim. Cat. Ceyl. Pl.* 189; *Aitchis. Cat. Panjab Pl.* 171; *Wall. Cat. v.* 3825; *Durkie Grass. N.W. Ind.* 36, *Fodd. Grass. N. Ind.* 61, t. 72; *Lisboa in Journ. Bomb. Nat. Hist. Soc. vii.* (1893) 379; *Miquel Fl. Ind. Bat. iii.* 400; *Benth. Fl. Austral. vii.* 638. *Echinalysium articulatum & strictum, Trin. Fund. Agrost. 142.* *Dactylis spicata, Willd. in Ges. Naturf. N. Schrift. iii.* (1801) 416. *Sesleria spicata, Spreng. Pugill. ii.* 21. *Eleusine calycina, Herb. Ham. ex Wall. l. c.*

From the SUTLEJ to BENGAL, ASSAM, the DECCAN PENINSULA, BURMA, and CEYLON.—DISTRIB. Trop. Asia, Africa, and Australia.

Whole plant 6-18 in. high, strict, glabrous; flowering part often longer than the rest. *Leaves* as long as the stem and spikes or shorter, very narrow; sheath loose; ligule obscure. *Spiciform panicle* 2-8 in. by $\frac{1}{2}$ - $\frac{1}{2}$ in. diam., pale green or white, rarely branched below. *Spikelets* $\frac{1}{2}$ in., empty gls. ciliate, hyaline, nerve green; fig. gls. ovate, membranous, tips and awns scaberulous; palea hyaline, 2-fid.

100. **LAMARKIA**, Moench.

A small annual tufted grass. *Leaves* flat. *Spikelets* dimorphic, fertile and neuter, crowded on the drooping branches of a simple secund nodding panicle, terminal spikelet of each branchlet fertile of few gls. surrounded by empty gls., and by neuter spikelets of many obovate convolute erose gls. *Fertile spikelet*; glumes IV, I and II membranous, subequal, subulate-lanceolate, 1-nerved, subaristate, persistent; III shorter, ovate, convolute, dorsally awned below the 2-fid tip; IV terminating the slender rachilla, neuter, long-awned; palea of III narrow, 2-fid, 2-keeled. *Lodicules* very minute. *Stamens* 3, anthers linear. *Styles* distinct, stigmas slender, hairy. *Grain* elliptic-oblong, closely wrapped in the gls. and palea.

L. aurea, Moench *Meth.* 201; *Kunth Enum. Pl.* i. 389, *Suppl.* 324; *T. Nees Gen. Fl. Germ. Monoc.* i. n. 77; *Boiss. Fl. Orient.* v. 570; *Ai'chis. Cat. Panjab Pl.* 170; *Duthie Grass. N.W. Ind.* 36, *Fodd. Grass. N. Ind.* 61. **L. Hookeriana**, *Griff. Notul.* iii. 94, *Ic. Pl. Asiat.* t. 143, f. 2. *Chrysurus aureus*, *Beauv. Agrost.* 123, t. 22, f. 5; *Reichb. Ic. Fl. Germ.* t. 58. *C. cynosuroides*, *Pers. Syn.* i. 80. *Pterium elegans*, *Desv. Journ. Bot.* i. (1813) 76. *Tinæa elegans*, *Garzia Rel. Acc. Zel. Acic.-Reale, Ann.* 3-4, 24, *ex Parlat. Fl. Palerm.* i. 138. *Cynosurus aureus*, *Linn. Sp. Pl.* 73; *Host Gram. Austr.* iii. t. 4; *Sibth. Fl. Græc.* i. t. 79.—Gramin. *Griff. Ilin. Notes*, 349, n. 106.

WESTERN PANJAB; Peshawar, *Vicary*, *Stewart*, *Aitchison*.—DISTRIB. Westwd. to Spain and the Canaries.

Stem 4-8 in., stout or slender, leafy. *Leaves* broadly linear, acuminate; ligule oblong. *Panicle* 1-4 in., golden-yellow, shining; branches crowded, $\frac{1}{2}$ - $\frac{1}{2}$ in. long, covered with fascicles of pendulous scaberulous spikelets. *Flowering spikelets* $\frac{1}{10}$ - $\frac{1}{8}$ in.; awns variable in length, $\frac{1}{2}$ - $\frac{1}{2}$ in.—A very beautiful grass.

101. **CYNOSURUS**, Linn.

Annual or perennial tufted grasses. *Leaves* flat. *Spikelets* dimorphic, fascicled, fascicles collected in a dense unilateral spiciform terminal panicle, the 1-2 terminal of each fascicle 2-3-fld., the lower 1-2 of many neuter distichous pectinately spreading subulate glumes, persistent on an unjointed rachilla. *Glumes* of fertile spikelet 4-5; I and II narrow, acute or subaristate, 1-nerved; III and IV awned or mucronate, 1-3-nerved, uppermost imperfect; palea narrow, 2-toothed, keels ciliate. *Lodicules* 2, acuminate. *Stamens* 3. *Styles* short, free. *Grain* elliptic or oblong, glabrous, adherent to the gl. and palea.—Species 3-4, in N. temp. regions.

C. cristatus, *Linn. Sp. Pl.* 72; perennial, fertile spikelets 3-5-fld. *Fl. Dan.* t. 238; *Host Gram. Austr.* ii. t. 96; *Kunth Enum. Pl.* i. 388,

Suppl. 323; *Engl. Bot.* t. 316; *Knapp Gram. Britt.* t. 64; *Reichb. Ic. Fl. Germ.* t. 7; *T. Nees Fl. Germ. Monocot.* i. n. 96; *Beauv. Agrost.* 66; *Steud. Syn. Gram.* 299; *Ledeb. Fl. Ross.* iv. 348; *Boiss. Fl. Orient.* v. 570; *Duthie Grass. N.W. Ind.* 36.

WESTERN HIMALAYA; Drankar, in Piti, alt. 12–14,000 ft., *Stolizka* (introd.?)
—DISTRIB. Europe, As. Min. (introd. elsewhere).

Perennial. *Stem* 1–2 ft., slender, simple, wiry, strict, stoloniferous, naked above. *Leaves* very narrow, slightly hairy; ligule 2-fid. *Panicle* 1–3 in., semi-cylindric, strict, rigid, oblong or linear; rachis flexuous. *Spikelets* about $\frac{1}{2}$ in., the outer pectinately arranged, forming an involucre to each fascicle; flg. glumes I and II oblong, scabrid above, very shortly awned; neuter gls. rigid, cuspidate, concave, scabrid, pungent.—I have seen no Indian specimen of this common European grass. According to Boissier its Eastern limit is the Caucasus.

102. KOELERIA, Pers.

Annual or perennial tufted grasses. *Leaves* narrow. *Spikelets* 2–7-fld. (uppermost flg. sterile), densely crowded in subspiciform panicles, strongly laterally compressed, very shortly pedicelled; rachilla jointed between the fl. gls., and produced beyond the upper. *Glumes* I and II unequal, empty, persistent, keeled, acute or acuminate; fl. gls. broadly scarious, 3–5-nerved, mucronate acuminate or bifid and shortly awned in the sinus; awn straight scabrid; palea hyaline, 2-toothed. *Lodicules* 2. *Stamens* 3. *Stigmas* subsessile, plumose. *Grain* oblong, laterally compressed, free.—Species about 12, of N. temp. regions.

Sect. I. AIROCHLOA, Link. (Gen.). Perennial. *Flg. glumes* entire, not awned.

1. **K. cristata**, Pers. *Syn.* i. 97; leaves short, panicle shining, spikelets 2–4-fld. I 1-nerved, II longest, 1–3 nerved; flg. gls. acute or mucronate. *Fl. Dan.* t. 2223; *Kunth Enum. Pl.* i. 381, *Suppl.* 315; *Reichb. Ic. Fl. Germ.* t. 93; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 64; *Steud. Syn. Gram.* 292; *Duthie Grass. N.W. Ind.* 36, *Fodd. Grass. N. Ind.* 61; *Aitchis. Cat. Panjab Pl.* 170; *Ledeb. Fl. Ross.* iv. 402; *Boiss. Fl. Orient.* v. 571; *Benth. Fl. Austral.* vii. 639. *K. glauca*, DC. *Cat. Hort. Monsp.* p. 117; *Ledeb. l. c.* *K. gracilis*, Pers. *l. c.* *K. Linkii*, *Kunth l. c.* *K. lobata*, Roem. & Sch. *Syst.* ii. 620. *K. nitida*, Nutt. *Gen. Am.* i. 74. *K. valesiaca*, Gaud. in *Alpina* iii. 47, *Agrost.* i. 149. *Aira cristata*, Linn. *Sp. Pl.* 63; *Engl. Bot.* t. 648; *Knapp Gram. Britt.* t. 30. *A. glauca*, Spreng. *Nachtr. Bot. Gart. Halle*, i. 10; *Fl. Dan.* t. 1566; *Kunth l. c.* i. 381. *Airochloa cristata*, *valesiaca*, pubescens, & *gracilis*, Link *Enum. Hort. Berol.* i. 127, 128, ii. 228. *Dactylis cristata* & *lobata*, Bieb. *Fl. Taur. Cauc.* i. 67. *D. paleacea*, Linn. *Herb. ex Munro in Journ. Linn. Soc.* vi. (1862) 44. *Poa cristata*, *Withering Arr. Brit. Pl.* 145; *Host Gram. Austr.* ii. 54, t. 75. *P. nitida* & *pyramidata*, Lamk. *Illustr.* i. 182, 183. *Festuca cristata*, Vill. *Hist. Pl. Dauph.* ii. 93. *F. dactyloides*, & *F. glaucescens*, Roth. *Nov. Sp.* 78.

TEMPERATE and ALPINE HIMALAYA, and WESTERN TIBET; from Kashmir to Nepal, alt. 5–13,000 ft.—DISTRIB. N. temp. regions.

Densely tufted, stoloniferous. *Stem* 1–3 ft., slender, glabrous or pubescent. *Leaves* narrow, flat or involute, glabrous or the lower ciliate; old sheaths not lacerate; ligule obscure. *Panicle* 1–4 in., linear-oblong or lanceolate; branches very short, scabrid; peduncle glabrous or tomentose. *Spikelets* $\frac{1}{2}$ – $\frac{1}{3}$ in., shining, green,

purplish, or silvery with a green keel; gls. I and II acute, broadly hyalina, glabrous pubescent or scabrid, keel subsclaberrulous, rachilla scabrid; fig. gls. lanceolate, acute or submucronate.—The synonymy given above includes but a few of the names given to this variable grass, the determination of the species of which would involve great labour. In India there are two prevalent forms, both common European ones, which following Boissier may be thus defined.

Var. *tenuifolia*, Boiss. Fl. Orient. v. 575; stems 6–10 in., leaves very short narrow convolute, panicle 1–3 in., spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. green or purplish. *K. brevis*, Stev. in Bull. Soc. Nat. Mosc. xxx. (1857) II. 110.—Koeleria, Wall. Cat. n. 3792.—Subalpine and alpine situations, alt. 9–13,000 ft.

Var. *grandiflora*, Boiss. l. c.; leaves longer broader flat, panicles 3–5 in. white often interrupted or branched below, spikelets $\frac{1}{2}$ in. *K. glauca*, Ledeb. Fl. Ross. iv. 402. *K. grandiflora*, Bertol. ex Schult. Mant. ii. 345.—Temp. regions, alt. 5500–11,000 ft.

Sect. II. LOPHOCOLEA, Reichb. (Gen.). Annual. Flg. glumes 2-fid, awned.

2. **K. phleoides**, Pers. Syn. i. 97; leaves soft flat glabrous or hairy on the margins and towards the base, panicle cylindric pale or dull green lobulate or not, spikelets 3–7-fid., gl. I and II unequal acute or aristately acuminate glabrous pubescent or hirsute, fig. gls. 2-fid awned in the sinus, awn $\frac{1}{2}$ – $\frac{1}{3}$ as long as the gl. rarely longer. Kunth Enum. Pl. i. 383, Suppl. 317, t. 28, f. 1; Steud. Syn. Gram. 294; Ledeb. Fl. Ross. iv. 403; Boiss. Fl. Orient. v. 572; Duthie Grass. N.W. Ind. 36, Fodd. Grass. N. Ind. 61; Aitchis. Cat. Panjab. Pl. 170; Benth. Fl. Austral. vii. 639. *K. berythea*, Boiss. & Bl. Diagn. Ser. II. iv. 135. *K. brachystachya*, DC. Cat. Hort. Monsp. 120. *K. cristata*, Bertol. Amoen. Ital. 67. *K. dactyloides*, Spreng. Syst. 332. *K. Figarei*, de Notar. in Ann. Sc. Nat. Ser. III. ix. (1848) 325. *K. obtusiflora*, Boiss. l. c. I. vii. 131. *K. trapezuntina*, C. Koch in Linnæa, xxi. (1848) 396. *Festuca cristata*, Linn. Sp. Pl. 76. *F. phleoides*, Vill. Fl. Delph. 7, Hist. Pl. Delph. ii. 95, t. 2; Host Gram. Austr. iii. t. 21. *Lophochloa phleoides*, Reichb. Fl. Germ. Excurs. 42, Ic. Fl. Germ. 73; T. Nees Gen. Fl. Germ. Monocot. i. n. 63. *Wilhelmsia caucasica*, C. Koch in Linnæa, xxi. (1848) 400. *Dactylis caudata*, & cylindracea, Brot. Fl. Lusit. i. 99, 100. *D. pungens*, Hornem. Enum. Hort. Hafn. ex Kunth (1804) 9. *D. spicata*, Brot. ex Spreng. Syst. i. 332. *Trisetum phleoides*, Trin. in Mem. Acad. Petersb. Ser. VI. i. (1831) 65. *Poa phleoides*, Lamk. Illustr. i. 132. *Bromus alopecuroides*, Lagasc. Gen. & Sp. Nov. 4. *B. dactyloides*, Roth Nov. Sp. 60. *Rostraria pubescens*, Trin. Fund. Agrost. 149.

PLAINS of the PANJAB, from Lahore westwards. The SALT RANGE, &c. KASHMIR, Clarke.—DISTRIB. Westwd. to the Atlantic. (Australia, introd.)

Stems 6–12 in., erect or ascending. Leaves as long or shorter, erect, acuminate; sheaths smooth; ligule short, truncate. Panicle $\frac{1}{2}$ –3 in., by $\frac{1}{4}$ – $\frac{1}{3}$ in. diam., sometimes lobed or branched at the base. Spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in., hardly shining, gls. I and II unequal, shorter than the fig., keels scabrid or smooth; I oblong-lanceolate, 1-nerved; II longer, oblong, acuminate, 3-nerved; fig. gls. elliptic-oblong, 5-nerved, at length tubercled, awn short or long, rachilla hairy.—A variable plant in the glumes, of which Boissier has 4 varieties. As with *K. cristata*, I have confined the synonyms of *K. phleoides* to those I am pretty sure of. Probably a dozen others might be cited.

3. **K. argentea**, Griseb. in Goett. Nachr. (1868) 77; leaves flat glabrous, panicle interrupted elongate, spikelets 2–3-fid. silvery white

glabrous shining, tip of gl. I 2-toothed, awn of flg. gl. very short dorsal above the middle of the gl.

WESTERN TIBET, and Kishtwar, alt. 10-13,000 ft., *Falconer, Thomson, &c.*

Stem 12-18 in., tufted, tomentose below the panicle. *Leaves* 3-5 in., very narrow, glabrous, flat or convolute; ligule short, lacerate. *Panicle* $1\frac{1}{2}$ -3 $\frac{1}{2}$ in., rachis tomentose. *Spikelets* $\frac{1}{2}$ in., shining, gls. I and II subequal or I rather the shortest, both 1-nerved; rachilla laxly villous; awn of flg. gls. a little exceeding the gl. itself.

103. **CATABROSA**, Beauv. (by O. Stapf).

Perennial soft grasses; stem erect or creeping below; innovations extra-vaginal. *Leaves* flat. *Spikelets* very small, 2- (rarely 3-4)-fld., loosely panicle, oblong or obconic, awnless, subarticulate on their pedicels; rachilla jointed at the base, produced beyond the flg. gl. *Glumes* 4 or more, uppermost usually imperfect; I and II very unequal, hyaline, empty, persistent, 0-3-nerved; I obtuse or truncate; II broadly obcuneate or orbicular; III and IV longer than II, broadly cuneate or flabelliform, 3-5-nerved; truncate, crenate; palea as long as the gl., very broad, keels smooth, glabrous or hairy. *Lodicules* 2, minute, fleshy. *Stamens* 3. *Stigmas* subsessile, feathery. *Grain* obovate or oblong, free, glabrous.—Species 10-12, natives of cold or temperate regions.

Under *Phippsia* (p. 240), I indicated the affinity of that genus with *Colpodium*, and a further examination of the Indian plants referred to the latter, suggested to me the possibility of these, together with *Dupontia*, forming one genus. I accordingly drew Dr. Stapf's attention to the group, and requested him to give me his opinion. This he has done, confirming my hypothesis and drawing up a systematic account of the Indian species to be included under *Catabrosa*. As to *Phippsia algida*, the solitary arctic type of that genus, it differs from the other plants of the *Colpodium* group in the empty gls. being minute or obsolete, and may hence be considered as forming a section by itself, whilst *P. himalaica*, with larger empty gls., enters that of *Colpodium*. The position of *Catabrosa* is after *Poa*, replacing 119. *Colpodium* in the Key to the Genera.

§ 1. **CATABROSA** proper. Empty gls. almost nerveless; flg. gls. strongly 3-nerved, rarely with 2 intermediate fainter nerves.—Aquatic or subaquatic plants, rooting at the lower nodes, and with usually long creeping or ascending branched stolons.

1. **C. aquatica**, Beauv. *Agrost.* 97, t. 19, f. 8; stem compressed, leaves linear obtuse, panicle oblong or pyramidal, lower branches at length deflexed, spikelets 2 rarely 3-fld., gl. III erose, nerves subpercurrent.—*Kunth Enum. Pl.* i. 369, *Suppl.* 306, t. 25, f. 1; *Ledeb. Fl. Ross.* iv. 387; *T. Nees Gen. Fl. Germ. Monoc.* i. n. 58; *Boiss. Fl. Orient.* v. 576. ? *C. frigida*, *Phil. Fl. Atac.* 55. *C. ochroleuca*, *Guss. Fl. Sic. Syn.* i. 100; *Dumort. Obs. Gram. Belg.* 108. *Aira aquatica*, *Linñ. Sp. Pl.* 64; *Fl. Dan.* t. 381; *Host Gram. Austr.* ii. t. 41; *Engl. Bot.* t. 1557; *Knapp. Gram. Britt.* t. 29. *Colpodium aquaticum*, *Trin. Fund. Agrost.* 136. *Glyceria airoides*, *Reichb. in Moessl. Handb. Ed.* II. iii. 1827, *Ic. Fl. Germ.* t. 78. *G. aquatica*, *J. & C. Presl. Fl. Cech.* 25 (non *Wahlb.*); *Steud. Syn. Gram.* 286. *Molinia aquatica*, *Wibel Prim. Fl. Werth.* 116. *Poa airoides*, *Koel Descr. Gram.* 194.

BRITISH BELUCHISTAN; Quetta (*Duthie*).—DISTRIB. N. Temp. and Arctic regions.

Stem 6-24 in., erect from the creeping sometimes floating base, sheathed nearly up to the panicle; stolons creeping or ascending, branches long or short. *Leaves* 1-6 by $\frac{3}{4}$ - $\frac{1}{2}$ in., linear, obtuse, flat, subflaccid, smooth; sheaths tight, smooth, of young branches closed to near the mouth but easily split to the base; ligule ovate or truncate, hyaline. *Panicle* up to 8 in., open, loose, rachis smooth, lower branches 5-10-nate, slender, very unequal, subscaberulous, the longer 4 in., branching; lateral pedicels very short. *Spikelets* pale green or yellowish, rarely purple; rachilla smooth; gls. very thin broad and obtuse; I about $\frac{1}{4}$ in., nerveless or 1-nerved; II $\frac{1}{2}$ in., 1-sub-3-nerved; fl. gls. nearly $\frac{1}{10}$ in., obovate to broadly oblong, truncate, shortly hairy below; palea broad, very obtuse, keels hairy below. *Lodicules* obliquely ovate. *Anthers* $\frac{2}{3}$ in. *Grain* $\frac{3}{10}$ in., oblong, subacute at both ends or top rounded, laterally subcompressed, hilum punctiform.—I have seen no Indian specimens, but am informed by Mr. Duthie that his was named by Hackel.

Var. *augusta*, Stapf; dwarf, tufted, with or without stolons, panicle narrow contracted, branches very short, gls. I and II nerveless or nearly so, fl. gls. $\frac{1}{12}$ - $\frac{1}{14}$ in. C. aquatica, Duthie Grass. N.W. Ind. 36.—Western Tibet; Lanuk Pass, alt. 15-16,000 ft., Thomson.

2. **C. sikkimensis**, Stapf; stem short, stolons long, leaves $\frac{1}{2}$ -1 in., panicle $1\frac{1}{2}$ in. narrow loose, branches 2-nate subsimple, spikelets $\frac{1}{10}$ in. 2-fl., gl. I minute, fl. gls. 5-nerved, nerves ending below the hyaline margin, lateral rather strong.

ALPINE SIKKIM; alt. 17,000 ft., Gamnie.

Stem up to 6 in., prostrate or ascending; stolons with short fascicles of few short complicate leaves. *Spikelets* dark purple, variegated with yellow; gl. I up to $\frac{1}{10}$ in. nerveless, broadly ovate to oblong, II up to $\frac{1}{10}$ in., broader, sub-1-nerved; fl. gls. $\frac{1}{14}$ in., truncate, erose, glabrous; palea broad, very obtuse, keels smooth.—The specimens are very scanty, and have all the appearance of being reduced forms, growing on wet soil on the upper limits of vegetation. Specimens from a lower altitude may require modification of the above characters.

§ 2. COLPODIUM, Trin. (Gen.). Empty gls. 1-3-nerved; fl. gls. 5-3-nerved, nerves faint, lateral short, intermediate often suppressed or represented by a single spiral vessel.

* Empty gls. about half as long as the flg.

3. **C. himalaica**, Stapf; panicle erect spiciform dense-fl., spikelets $\frac{1}{10}$ - $\frac{1}{8}$ in. 1-2-fl. Colpodium subspicatum, Hack. mas. Phippsia himalaica, Hook. f. ante, p. 240. Vilfa, sp. 2, Herb. Strachey & Winterb.

From Kashmir to Kumaon, alt. 13-14,500 ft.

Stems 3-8 in., tufted, erect, smooth, nodes 1-2. *Leaves* complicate or the cauline flat; sheaths tight, closed almost to the mouth; ligule very short. *Panicle* continuous or interrupted; rachis and branches smooth. *Spikelets* obovoid to oblong, rachilla glabrous; gls. very thin, nerves obscure; I very shortly 1-nerved; II with short obscure side-nerves; III with very short obscure side-nerves, keel and nerves shortly hairy; keels of palea ciliate. *Lodicules* connate at the base. *Grain* elliptic-oblong, compressed.—For further description see p. 240. Duthie's n. 12,160 has more acute empty glumes with sometimes erose margins, but does not otherwise differ.

4. **C. Thomsoni**, Hook. f.; panicle erect open lax-fl., spikelets $\frac{1}{8}$ - $\frac{1}{4}$ in. 2-4-fl.

WESTERN TIBET; Nubra Valley, alt. 10-11,000 ft., Thomson.

Stems 4-6 in., tufted, very slender, erect, smooth, nodes 3-5. *Leaves* $\frac{1}{2}$ - $1\frac{1}{2}$ in., linear, acute, flat, few-nerved; sheaths closed to $\frac{1}{10}$ - $\frac{1}{8}$ in. of the mouth, thin, tight;

ligule broadly ovate, rounded. *Panicle* 1 in., ovate, erect; rachis smooth; branches spreading or deflexed, filiform, with few spikelets; lateral pedicels very short. *Spikelets* oblong, pale green; rachilla smooth, tip setiform; gls. thin, obtuse, I 1-nerved; II longer with 2 short lateral nerves; III 5-nerved, lateral nerves very faint and keel hairy; palea 2-fld, keels with long hairs. *Anthers* oblong. *Lodicules* connate near the base. *Grain* obliquely oblong, compressed.

5. **C. nutans**, Stapf; panicle open or contracted flaccid, spikelets $\frac{1}{4}$ – $\frac{1}{2}$ in. 2–5-fld. *Colpodium nutans*, Griseb. in Goett. Nachr. (1868) 76. *Graphaphorum nutans*, Munro ex Duthie Grass. N.W. Ind. 41.

ALPINE HIMALAYA; from Kashmir to Garwhal, alt. 10–14,000 ft., Jacquemont, &c.

Stems 12–18 in., tufted, erect, smooth, nodes 2–3. *Leaves* very variable in length and breadth, up to 6 in. by $\frac{1}{2}$ in., flat flaccid, many-nerved; sheaths of innovations closed nearly to the mouth; ligule $\frac{1}{4}$ in. *Panicle* 2–5 in., nodding or flexuous; rachis smooth; branches subcapillary, lowest 2–3-nate, sparingly divided beyond the middle; lateral pedicels half as long or as long as the spikelets. *Spikelets* broadly obovate, variegated, rachilla glabrous; gls. very broad, thin, obtuse and erose; I 1–3-nerved, II longer, $\frac{1}{10}$ in., with 2 short lateral nerves; III obovate, 3–5-nerved, lateral nerves very short, all hairy; keels of palea hairy. *Lodicules* lanceolate, connate near the base. *Anthers* linear. *Grain* oblong, subterete, with a shallow ventral groove.

** Empty gls. as long as the flg. or longer. *Dupontia*, Br. (Gen.).

6. **C. Wallichii**, Hook. f.; panicle subracemose few-fld., spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in. 1–2-fld.—Gramin., Wall. Cat. n. 8907.

NEPAL, Wallich. SIKKIM; Kankola Pass, alt. 14–15,000 ft., J. D. H.

Stem 6–18 in., from a shortly creeping base, slender or rather stout, smooth, nodes 1–2. *Leaves* 1–3 in., narrowly linear or filiform; ligule $\frac{1}{10}$ in. oblong, obtuse. *Panicle* 1–2 in., very narrow, usually reduced to a few-fld. raceme, erect; rachis smooth; branches with 1–3 spikelets, capillary, flexuous. *Spikelets* pendulous, green or purplish; rachilla with a setiform tip; gls. very thin, obtuse; I oblong 1–3-nerved; II broader, more obtuse, 3-nerved, side-nerves reaching about the middle; III broadly elliptic-oblong, 5-nerved, inner side-nerved very faint, glabrous or nearly so, outer and keel shortly hairy, keels of palea ciliate. *Lodicules* lanceolate, connate to the middle or below it. *Anthers* linear-oblong. *Grain* oblong, compressed.—The Sikkim specimens have somewhat smaller and paler spikelets than the Nepalese.

104. **ERAGROSTIS**, Beauv. (by O. Stapf.)

Annual or perennial grasses. *Stem* erect or geniculately ascending, very rarely prostrate. *Leaves* narrow. *Spikelets* many- (rarely 1–2-) fld., in open or contracted panicles, rarely in simple spikes, not articulate at the base (except *E. cynosuroides*), usually strongly laterally compressed; rachilla firm or subarticulate between the flg. glumes, not produced beyond the uppermost gl. *Glumes* many, broad, obtuse acute or mucronate, never awned, dorsally rounded and keeled; I and II much shorter than the spikelet, equal or unequal, empty, persistent or separately deciduous, 1-nerved or II 3-nerved; flg. glumes imbricating, at length deciduous from the rachilla, 3-nerved, all bisexual or the uppermost and rarely the lowest imperfect; palea broad, membranous, deciduous with its gl. or persistent on the rachilla, keels 2 ciliate scabrid or smooth. *Lodicules* 2, very minute. *Stamens* 2 or 3. *Ovary* glabrous; styles 2, stigmas

plumose. *Grain* minute, globose oblong ovoid or obovoid, free in the gl. and palea.—Species about 100, of warm countries.

The Asiatic and African species of this very difficult genus have been studied by Dr. Stapf, to whom I owe the classification and diagnoses of the Indian. With regard to their synonymy, and the citation of authorities, we have together endeavoured to determine these; but from the want of authentically named specimens of the species described by Roxburgh (under *Poa*) and by older authors, and of those enumerated in more recent works, we cannot hope to have attained complete accuracy in these respects.—J. D. H.

A. Spikelets panicle; panicle open contracted or spiciform.—Species 1-25.

Sect. I. CATACLASTOS. *Rachilla* of spikelets more or less jointed, and breaking up from above downwards.—Species 1-7.

* *Panicle spiciform, rachis bearded at the nodes; margins of flg. glumes ciliate.*

1. **E. phleoides**, Stapf; perennial, panicle compact subclavate, spikelets $\frac{1}{8}$ – $\frac{1}{4}$ by $\frac{1}{12}$ – $\frac{1}{8}$ in. 12- or fewer fld., flg. gls. mucronate, keels of palea long-ciliate. *Dactylis phleoides*, Klein ex Steud. Nom. Ed. II. i. 478. *D. phleoides & spicata*, Herb. Heyne ex Wall. Cat. n. 5015.—*Eragrostoides*, Wall. l. c.

SOUTHERN INDIA, Heyne.

Stems 1-3 ft., densely tufted, erect or geniculately ascending, very slender. *Leaves* 3-5 in., linear-lanceolate, finely acuminate, spreading, flat, glabrous, base rounded; sheath bearded close below the mouth; ligule a few hairs. *Panicle* 1-3 in. by $\frac{1}{8}$ – $\frac{3}{8}$ in. diam., pale, rather shining; branches very short, villous at the nodes. *Spikelets* moderately compressed; gls. I and II subequal, acute; flg. gls. $\frac{1}{10}$ – $\frac{1}{8}$ in., membranous, minutely scaberulous; nerves slender, prominent; palea $\frac{1}{4}$ shorter than its gl. *Anthers* $\frac{1}{80}$ in. *Grain* $\frac{1}{100}$ – $\frac{1}{50}$ in., elongate-ellipsoid.

2. **E. ciliata**, Nees Agrost. Bras. 512; perennial, panicle cylindric compact, spikelets $\frac{1}{10}$ – $\frac{1}{8}$ in. or smaller much compressed 6-12-fld., flg. gls. cuspidately acuminate, keels of palea long-ciliate. *Wight Cat.* n. 1788; *Steud. Syn. Gram.* 265; *Dalz. & Gibs. Bomb. Fl.* 298. *E. rupestris*, Steud. l. c. *Poa ciliata*, Roxb. *Fl. Ind.* i. 334. *P. cylindrica*, Herb. Heyne & incurvata, Rottl. ex Wall. Cat. n. 5014. *P. duplo-ciliaris*, Roxb. *Ic. Pict. ined.* t. 831. *P. rupestris*, Roth. Nov. Pl. Sp. 71.—*Eragrostid.* Wall. l. c.

BOMBAY; at Domus, Dalz. & Gibs. CHOTA NAGPORE, Clarke. SOUTHERN INDIA, Heyne.—DISTRIB. Cochinchina.

Stems 2-4 ft., erect or geniculately ascending from a nodose base clothed with hard sheaths, smooth. *Leaves* linear-lanceolate, finely acuminate, widely spreading, flat or convolute, rarely $\frac{1}{4}$ in. broad, smooth, glabrous; sheath bearded close below the mouth; ligule a few hairs. *Panicle* 2-3 by $\frac{1}{2}$ in. diam.; branchlets hirsute. *Gls.* I and II acute, ciliate; flg. gls. $\frac{1}{16}$ – $\frac{1}{8}$ in., membranous or subhyaline, minutely scaberulous, nerves prominent; palea $\frac{1}{2}$ shorter than its gl. *Anthers* about $\frac{1}{16}$ – $\frac{1}{15}$ in. *Grain* ovoid to ellipsoid, $\frac{1}{50}$ in., terete.—I have not seen Bombay specimens.

3. **E. coarctata**, Stapf; perennial, panicle elongate subspiciform often lobed or lax-fld., spikelets $\frac{1}{2}$ – $\frac{1}{6}$ by $\frac{1}{2}$ – $\frac{1}{4}$ in., slightly compressed 5-10-fld., flg. gls. obtuse, keels of palea long-ciliate. *E. cylindrica*, Aitch. Cat. Panjab Pl. 169 (non Steud.).—*Eragrostis*, Wall. Cat. n. 5003 (in part).

From the UPPER GANGETIC PLAIN, Moradabad, Thomson, to SIKKIM, BEHAR, CHITTAGONG, ARRACAN and BURMA. CENTRAL PROVINCES & CHOTA NAGPORE, Clarke.

Stems in small or large tufts, 4-18 in. high, geniculately ascending from a nodose branched stock, base clothed with short hard sheaths. *Leaves* linear, spreading horizontally, more or less convolute, finely acuminate, glabrous, sometimes flat and $\frac{1}{4}$ in. broad, quite smooth, glaucous; sheath rather tight, smooth, bearded below the mouth; ligule very short. *Panicle* 2-6 in. by $\frac{1}{2}$ - $\frac{3}{8}$ in. broad, sometimes very narrowly pyramidal, white, branches hispid; gls. I and II subequal; flg. gls. $\frac{1}{10}$ in., membranous, nerves prominent. *Anthers* $\frac{1}{10}$ in. *Grain* shortly ovoid, $\frac{1}{10}$ in. — Dwarf states 2-3 in. high occur; and tall ones 2-3 ft. high from the Sikkim Terai and Arracan, with leaves $\frac{1}{2}$ in. broad and a long lax narrow panicle 6 in. long.

** *Panicle open or more or less contracted or spiciform; margins of flg. gls. ciliate.*

4. **E. aspera**, Nees *Fl. Afr. Austr.* 408; annual, panicle large thyrsiform, at length expanding, branches and pedicels long, spikelets linear-oblong $\frac{1}{2}$ by $\frac{1}{4}$ in. erect 4-16-fl'd., empty gls. subequal, flg. gls. obtuse nerves prominent, keels of palea scaberulous, stamens 3. *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 336. *E. tenella*, Nees in *Wight Cat.* n. 1783 (non Linn. nec Benth.). *E. paniculata*, Steud. *Syn. Gram.* 278. *Poa aspera*, Jacq. *Hort. Vind.* iii. 32. *P. paniculata*, Rorb. *Fl. Ind.* i. 340.—*Eragrostis*, Wall. *Cat.* n. 3841.

SOUTHERN INDIA; Dindygul, Wight. BANGALORE, Puckle (*l.c.* in *Herb. Kew*), N. and S. CONCAN, *Lisboa*.—DISTRIB. Afr. trop. Isle of France.

Stem with the long panicle 2-4 ft., stout, suberect, branched, smooth. *Leaves* 8-18 in., flat, keeled, smooth; sheath villously bearded; ligule of long hairs. *Panicle* 10-20 in. by 4-6 broad, oblong to obovate-oblong, rachis scaberulous, bearded at the nodes with long white hairs; branches solitary or pseudo-whorled, capillary, divided from the base or nearly so, suberect; pedicels much longer than the small, rather scattered spikelets. *Flg. gls.* hardly $\frac{1}{10}$ in.; palea obscurely 3-lobed, lobes very obtuse, keels scabrid. *Anthers* $\frac{1}{10}$ in. *Grain* subglobose, about $\frac{1}{10}$ in.—Panicle quite unlike that of any other Indian species.

5. **E. ciliaris**, Link *Enum. Hort. Berol.* i. 192; annual, panicle spiciform rarely open, branches and pedicels very short glabrous, spikelets about $\frac{1}{10}$ in. long and broad 6-12-fl'd. strongly compressed, empty gls. subequal acute, flg. gls. widely spreading mucronulate, lateral nerves submarginal, keels of palea very long-ciliate, stamens 3.

PLAINS of N. and S. INDIA (not in Ceylon).—DISTRIB. Reg. trop.

Stem 1-2 ft., procumbent below and geniculately ascending, slender. *Leaves* very narrow, flat; mouths of sheath with very long hairs. *Panicle* 3-6 in., interrupted or lobed below, appearing hairy from the long cilia of the palea, branches very short (except var. *Clarket*) divided from the base, glabrous; nodes of glabrous rachis naked. *Spikelets* very pale, as broad as long, much compressed; flg. gls. subhyaline, scaberulous, often slightly recurved and elegantly distichous; rachilla of spikelet persistent. *Anthers* $\frac{1}{10}$ in. *Grain* elongate ovoid, about $\frac{1}{10}$ in.

Var. *ciliaris proper*, Stapf; panicle spiciform more or less lobed or interrupted. *E. ciliaris*, Boiss. *Fl. Orient.* v. 582; Baker *Fl. Maurit.* 456; Duthie *Grass. N.W. Ind.* 37, Fodd. *Grass. N. Ind.* 62; Aitchis. *Cat. Panjab.* Pl. 169; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 386; Griseb. *Fl. Brit. W. Ind.* 532. *E. lobata*, Trin. in *Mem. Acad. Petersb. Ser. VI.* i. (1831) 396. *E. lepidota*, Hochst. ex A. Rich. *Tent. Fl. Abyss.* ii. 424. *E. plumosa*, Boiss. *Fl. Orient.* v. 582 (excl. *Syn.*); Benth. *Fl. Hongk.* 431. *E. pulchella*, Parl. in Hook. *Niger Flor.* 186. *Mega-*

stachya ciliaris, Beauv. *Agrost.* 74.—*Eragrostis*, Wall. *Cat.* n. 5009, 5003 (in part).—N. India from the Panjab to Burma.—Westwd. to trop. Africa and America.

Var. *brachystachya*, Boiss. *Fl. Orient.* v. 582; panicle short compact cylindric. *E. arabica*, Jaub. & Spach *Ill. Pl. Orient.* iv. 31, t. 322. *E. riparia*, Nees in *Herb. Royle*.—Upper Gangetic Plain, Scind & the Concan.—Arabia, Afr. trop.

Var. *Clarkei*, Stapf; panicle open as in *E. tenella*.—Delhi, Clarke.

6. ***E. tenella***, Roem. & Sch. *Syst.* ii. 576 (excl. β) (*non aliorum*); panicle variable, spikelets $\frac{1}{20}$ – $\frac{1}{6}$ in. by $\frac{1}{24}$ in. broad or less, not strongly compressed 3–9-fld, empty gls. subequal or unequal, flg. gls. oblique not mucronate lateral nerves remote from the margins, keels of palea usually obscurely ciliate, stamens 3, grain ovoid.

Throughout INDIA, in the plains and lower hills, from the PANJAB to MALACCA and CEYLON. The NICOBAR ISLANDS.—DISTRIB. Trop. Asia, Africa.

Very variable, from 6–18 in. high, stems usually slender, many from the root and densely tufted. Leaves narrow. Panicle 2–8 in. long, contracted or spreading, pale green or purplish, excessively branched, oblong ovate or cylindric, never with the long interrupted rachis and pseudo-verticillate branches of *E. interrupta*.

Var. *plumosa*, Stapf; panicle open often flexuous branches capillary nodes bearded, spikelets $\frac{1}{16}$ – $\frac{1}{6}$ in. long or short-pedicelled 3–9-fld, empty gls. unequal I $\frac{1}{2}$ – $\frac{1}{5}$ shorter than II, rachilla subarticulate, flg. gls. $\frac{1}{10}$ in., anthers very minute, grain ovoid about $\frac{1}{10}$ in. *E. despicens*, Schult. *Mant.* ii. 318. *E. elegantula*, Nees & Wight *Cat.* n. 1781b. *E. laxa*, Baker *Fl. Maurit.* 456. *E. plumosa*, Link *Enum. Hort. Berol.* i. 192 (*non Boiss.*); Wight *Cat.* n. 1786; Thw. *Enum. Pl. Zeyl.* 373; Trim. *Cat. Ceyl. Pl.* 109; Duthie *Grass. N.W. Ind.* 38, Fodd. *Grass. N. Ind.* 64, t. 38, 77; Aitchis. *Cat. Panjab Pl.* 175; Lisboa in *Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 385. *E. tenella*, Roem. & Sch. *l. c.*; Steud. *Syn. Gram.* 266. *Poa amabilis*, Linn. *Sp. Pl.* 68. *P. capillaris*, Roxb. *l. c. Pict. ined.* t. 837. *P. despicens*, Link *Enum. Hort. Berol.* i. 88. *P. hirsuta*, Herb. *Rottl.* *P. plumosa*, Retz. *Obs.* iv. 20; Kunth *Enum. Pl.* i. 338; Roxb. *Fl. Ind.* i. 337. *P. tenella*, Linn. *l. c.* 69. *Burm. Fl. Zeyl.* t. 47, f. 3; Retz. *Obs.* v. 19; Kunth *Rev. Gram.* ii. 467, t. 147, *Enum. Pl.* i. 338, *Suppl.* 294.—*Eragrostis*, Wall. *Cat.* n. 5007.—Throughout India, Burma & Ceylon (C.P. 926, 70).

Var. *riparia*, Stapf; panicle contracted very narrow flaccid, rachis glabrous, branches subfiliform or capillary, spikelets as in var. *plumosa*, empty gls. unequal I = $\frac{1}{2}$ shorter than II, flg. gls. $\frac{1}{25}$ in., anthers about $\frac{1}{100}$ in., grain $\frac{1}{10}$ in. ovoid. *E. plumosa* (in part) Thw. *Enum. Pl. Zeyl.* (CP. 927, 928). *E. riparia*, Steud. *Syn. Gram.* 265; Nees in Wight *Cat.* n. 1787; Duthie *Grass. N.W. Ind.* 38. *E. ciliaris*, β , Trin. in *Mem. Acad. Petersb. Ser. VI.* i. (1831) 397. *E. plumosa*, var. *maritima*, Trin. *Cat. Ceyl. Pl.* 109 (CP. 927). *Poa incurva*, Herb. *Rottl.* (in part). *P. riparia*, Willd. in *Ges. Naturf. Fr. Berl. N. Schrift.* iv. (1803) 185. *P. setacea* & *laevis*, Herb. *Rottl.* *P. tenella*, Roxb. *Fl. Ind.* i. 337; Grah. *Cat. Bomb. Pl.* 236.—*Eragrost.* Wall. *Cat.* n. 5011.—Lower Bengal, and southwd. Laccadive I-lds. CEYLON (CP. 927, 928).

Var. *viscosa*, Stapf; stem and rachis of panicle below viscid, panicle stiff stouter with firmer more strongly nerved glumes than in vars. *plumosa* & *riparia*, oblong to linear open contracted or compact, branches filiform often very short, nodes glabrous or obscurely bearded, spikelets few–16-fld. often purplish, empty gls. subequal or I slightly shorter, fl. gls. $\frac{1}{25}$ – $\frac{1}{15}$ in., anthers about $\frac{1}{100}$ in., grain ovoid $\frac{1}{10}$ – $\frac{1}{15}$ in.—Subvar. *a*, *aperta*, Stapf; panicle oblong or pyramidal open, branches distinctly lengthened. *E. viscosa*, Trin. in *Mem. Acad. Petersb. Ser. VI.* i. (1831) 397; Wight *Cat.* n. 1785; Lisboa in *Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 386. *Poa ciliaris*, Roxb. *l. c. pict. ined.* t. 832, 856. *Herb. Madr.* Wall. *Cat.* n. 5008 A. *P. glutinosa*, Herb. *Roxb.* *P. plumosa* & *malabarica*, Herb. *Heyne ex Wall.* *Cat.* n. 5008 C. D. E. *P. Telphulia*, Herb. *Ham. ex Wall.* *Cat.* n. 5008 B. *P. viscosus*, Retz. *Obs.* iv. 20; Roxb. *Fl. Ind.* i. 336; Grah. *Cat. Bomb. Pl.* 236; Kunth *Enum. Pl.* i. 336.—*Eragrost.* Wall. *Cat.* n. 5008, 5010.—From the Gangetic Plains & Bombay

southwd.—Trop. & S. Africa.—Subvar. *β. lasiantha*, Stapf; stem 2½ ft. erect branched, nerves of fl. gls. ciliate. E. terebinthacea, *Kurz mss.*—Pegu, *Kurz*. Burma, *Collett*.—Subvar. *γ. contracta*, Stapf; panicle compact spiciform lobed or interrupted, branches very short. E. mangalorica, *Hochst. ex Steud. Syn. Gram.* 265. E. viscosa, *β. minor*, *Nees in Wight. Cat. n.* 2359. ? E. viscosa, *Dalz. & Gibs. Bomb. Fl.* 298. *Poa incurva*, *Herb. Rottl. (in part)*.—Deccan Peninsula.

Var. *breviculmis*, Stapf; stems 1–3 in. usually ascending from a prostrate base, panicle 1–1½ in. by 3–4 lines broad oblong to ovate-oblong rather dense but not compact, rachis bearded or not, empty gls. subequal, flg. gls. $\frac{3}{4}$ in., anthers $\frac{1}{15}$ – $\frac{1}{10}$ in. or less, grain $\frac{1}{10}$ in.—From the Panjab to Behar and Central India.

7. *E. interrupta*, Beauv. *Agrost.* 71 (non Roem. & Sch. nec Trin.); panicle very variable usually stiff interrupted, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. ovate to linear few or many-fl., flg. gls. obtuse nerves slender, keels of palea scaberulous, stamens 2, grain obovoid.

Throughout INDIA, BURMA, CEYLON.—DISTRIB. Mesopot., Afr. trop.

Very variable, from 2–6 in. high with slender stems and ovate panicle to 3 ft. high and branched with the stem as thick as a small goose-quill, and a panicle 1–2 ft. long either contracted with appressed branches or interrupted with many tiers of rather short spreading subwhorled branches. Spikelets usually very minute, from $\frac{1}{10}$ in. with 2–3 flg. gls. to about $\frac{1}{4}$ in. with many flg. gls., green or pale brown, rarely coloured.

Var. *Koenigii*, Stapf; panicle long narrow with short dense pseudowhorls, spikelets shortly pedicelled usually 6–14-fl., flg. gls. $\frac{1}{2}$ – $\frac{1}{3}$ in. or less. E. *Koenigii*, *Link Enum. Hort. Berol.* ii. 294; *Steud. Syn. Gram.* 266. E. *hapalautha*, *Trin. in Mem. Acad. Petersb. Ser.* VI. i. (1839) 409 (in part). E. *minutiflora*, *Presl Rel. Hænk. i.* 274 (excl. *Syn.*); *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 386. E. *mossulensis*, *Steud. l. c.* 264. E. *nutans*, *Nees, in Wight Cat. n.* 1776; *Steud. Nom. Ed. II. i.* 563; *Duthie Grass. N.W. Ind.* 38, *Fodd. Grass. N. Ind.* 63, t. 76; *Aitchis. Cat. Panjab Pl.* 169; *Lisboa l. c.* 381; *Boiss. Fl. Orient. v.* 583. E. *Rothii*, *Steud. Syn. Gram.* 267. E. *stricta*, *Steud. l. c.* 264. E. *verticillata*, *Nees in Wight. Cat. n.* 1784. *Poa Corana*, & *P. diandra*, *Herb. Ham. ex Wall. Cat. n.* 3850 F. D. *P. interrupta*, *Lamk. Ill. i.* 185; *Poir. Encycl. v.* 87; *Heyne ex Roth. Nov. Sp.* 67; *Koen. ex Roxb. Fl. Ind. i.* 335. *P. Koenigii*, *Kunth Enum. Pl. i.* 346. *P. latifolia*, *Wall. Cat. n.* 5001 E. *P. nutans*, *Koen. ex Roth. Nov. Sp.* 64; *Roxb. Fl. Ind.* 335 (non Retz.).—*Eragrostis*, *Wall. Cat. n.* 3850 A. D. E.—1. 5005, 5006.—All India. Ceylon, *Trimen*. Eastwd. to Egypt. As. and Afr. trop.

Var. *diarrhena*, Stapf; panicle long linear-oblong, branches 1–2 in. hardly whorled simple at the base, spikelets 10–14-fl., flg. gls. $\frac{1}{2}$ in. E. *diandra*, *Aitchis. Cat. Panjab Pl.* 169 (non *Steud.*); *Duthie Grass. N.W. Ind.* 37; *Griseb. in Goett. Nachr.* (1868) 76. E. *diarrhena*, *Steud. Syn. Gram.* 266. *Poa diandra*, *Roxb. Fl. Ind. i.* 336 (non Br.). *P. diarrhena*, *Schult. Mant.* 616.—*Eragrostis*, *Wall. Cat. n.* 3850 K. L., 5002, 5004.—Sirmore, Bengal, Mysore, Carnatic.

Var. *diplachnoides*, Stapf; stem tall stout branched, panicle long effuse or contracted flaccid, branches solitary or 2–3 in a whorl elongate simple or if branched the whorl rarely overtopped by 1 or 2 branches 2–5 in. long, ultimate branches not divaricate, spikelets 6–12-fl., flg. gls. very obtuse rarely $\frac{1}{3}$ in. E. *diplachnoides* & *Hochstetteri*, *Steud. Syn. Gram.* 268. E. *nutans*, *Thw. Enum. Pl. Zeyl.* 373; *Trim. Cat. Ceyl. Pl.* 109. *Diplachne elongata* & *poæformis*, *Hochst. ex Steud. l. c.*—Central India, eastwd. to Afr. trop., *Clarke*, *Duthie*. Ceylon, *Walker*, *Thuaites* (CP. 933 (in part) 3259).

Var. *tenuissima*, Stapf; panicle long loose narrow usually stiff, branches $\frac{1}{2}$ –2 in. pseudo-whorled spreading ramified from the base, branchlets and pedicels divaricate filiform to capillary, spikelets few-fl., fl. gls. very obtuse $\frac{1}{3}$ in. E. *aurea*, *Steud. Syn. Gram.* 267. E. *caudata*, *Nees ex Steud. l. c.* 264; *Duthie Grass. N.W. Ind.* 37. E. *japonica*, *Trin. in Mem. Acad. Petersb. Ser. VI. i.* (1831) 405. E. *tenella β*, *Roem. & Sch. Syst. ii.* 356. E. *tenella*, *Benth. Fl. Hongk.* 431; *Fl.*

Austral. viii. 613 (non Beauv.); *Duthie Fodd. Grass. N. Ind.* 65, t. 78. *E. tenellula*, Steud. *Syn. Gram.* 279. *E. tenuissima*, Schrad. ex Nees *Fl. Afr. Austr.* 409, 410. *Poa japonica*, Thunb. *Fl. Jap.* 31. *P. hyemalis*, Laka, & speciosa, Herb. Ham. ex Wall. *Cat. n.* 3850 C.B. *P. tenella*, Br. *Prodr.* 181 (non Beauv.); Roxb. *Fl. Ind.* i. 337, Ic. *Pict. ined.* t. 837. *P. tenellula*, Kunth *Enum. Pl.* i. 338.—*Eragrostis*, Wall. *Cat. n.* 3850 B. C. H. 5001 A—D.—Temp. & trop. Himal. from the Panjab eastwd. and southwd. to Ceylon; ascends the Himalaya to 7000 ft.—Trop. As.

Sect. II. PTEROESSA. *Rachilla* of spikelet tough, persistent; flg. glumes falling away from its base upwards.—Species 8–24.

* Spikelets always flat, usually elliptic-ovate to oblong; lateral nerves of flg. gls. very prominent, straight, almost percurrent; palea deciduous with their glumes.

8. ***E. amabilis***, Wight & Arn. ex Nees in Hook. & Arn. *Bot. Beech. Voy.* 251 (excl. *Syn. Linn.*) annual, panicle oblong or ovoid-oblong open or contracted, branches solitary ramifying from near the base, spikelets $\frac{1}{2}$ – $\frac{1}{2}$ in. ovate rarely oblong or linear-oblong up to 50-fl., empty gls. subequal acute 1-nerved, flg. gls. very close set distichously spreading broadly elliptic shortly acuminate, palea elliptic keels winged scabrid. *Wight Cat. n.* 1777; *Wall. Cat. n.* 3838; *Nees in Act. Acad. Nat. Cur.* xix. *Suppl. i.* (1843) 205. *E. polymorpha*, Trin. ex Steud. *Nom. Ed.* II. i. 364, 562. *E. rubens*, Hochst. ex Miq. *Analect. Bot.* ii. 26; *Steud. Syn. Gram.* 265. *E. unioloides*, Nees ex Steud. *l.c.* 264; *Thw. Enum. Pl. Zeyl.* 373; *Trim. Cat. Ceyl. Pl.* 109; *Duthie Grass. N.W. Ind.* 38, *Fodd. Grass. N. Ind.* 65; *Aitchis. Cat. Panjab Pl.* 170; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 383; *Griseb. in Goett. Nachr.* (1868) 76. *Poa amabilis*, Herb. *Rottl. (non Linn.)*. *P. multiflora*, Roxb. *Fl. Ind.* i. 338. *P. polymorpha*, Br. *Prodr.* 180. *P. pseudamabilis*, Roxb. *Ic. Pict. ined.* t. 843. *P. rubens*, Lamk. *Illustr.* i. 184, t. 45, f. 2; *Kunth Enum. Pl.* i. 335. *P. unioloides*, Retz. *Obs.* v. 19; *Roxb. Fl. Ind.* i. 330; *Kunth l.c.*; *Grah. Cat. Bomb. Pl.* 236. *Briza rubra*, Lamk. *Ill.* i. 187; *Kunth l.c.* 371. *Uniola indica*, Spreng. *Syst.* i. 349; *Dalz. & Gibs. Bomb. Fl.* 298. *Megastachya polymorpha*, Beauv. *Agrost.* 74.

PLAINS OF INDIA and LOWER HIMALAYA, from Kashmir (ascending to 6000 ft.), eastwd. to Burma and southwd. to CEYLON (CP. n. 930).—DISTRIB. As. trop.

Stem 6–18 in., rather slender. *Leaves* usually short, flat; mouth of sheaths naked. *Panicle* 2–4 in., branches filiform, not very numerous or long, rachis and nodes glabrous. *Spikelets* broad or narrow, pale or purplish; rachilla tough, internodes very short, $\frac{1}{10}$ in.; empty gls. $\frac{1}{2}$ – $\frac{1}{2}$ in. 1-nerved; flg. gls. nearly $\frac{1}{2}$ in. long, mucronulate; palea $\frac{1}{2}$ – $\frac{1}{2}$ shorter than its gl. *Stamens* 3, anthers $\frac{1}{10}$ – $\frac{1}{5}$ in. *Grain* obovoid or ellipsoid, laterally compressed, about $\frac{1}{2}$ by $\frac{1}{2}$ in.

** Spikelets usually linear or linear-oblong, less compressed and with less prominent nerves than in *, or if strongly compressed and nerved then with persistent paleas.

† Spikelets more or less fascicled on the primary or secondary branches or shortly pedicelled in narrower racemes.

9. ***E. malayana***, Stapf; annual, panicle ovoid, branches solitary at length spreading flowering to the base, pedicels as long as the spikelets or shorter, spikelets $\frac{1}{10}$ – $\frac{1}{5}$ in. linear-oblong 10–30-fl., rachilla almost straight internodes very short, gls. all broad closely imbricate, sides

convex, empty gls. unequal broadly ovate acute, flg. gls. ovate shortly acuminate keel curved, keels of palea scaberulous.

PERAK, *Wray*. MALACCA, *Hervey*.—DISTRIB. BORNEO, Banca.

Stems densely tufted, 10–18 in., erect or geniculately ascending, very slender. *Leaves* 2–3 in., very narrow, strict, finely acuminate, convolute; mouth of sheath with long hairs. *Panicle* 2–3 in., open or contracted, branches ramified from near the base, branchlets short contracted filiform, rachis glabrous. *Spikelets* slightly compressed, rachilla tough; gl. I $\frac{1}{2}$ in.; II $\frac{1}{2}$ in.; flg. gls. $\frac{1}{2}$ in., mucronulate, lateral nerves inconspicuous; palea obovate-oblong, rather shorter than its gl., keels narrow. *Grain* $\frac{1}{5}$ in., ovoid or ellipsoid, slightly laterally compressed.

10. **E. stenophylla**, *Hochst. ex Miquel Analect. Bot. Ind.* ii. 27; branches of panicle much ramified from above the base, pedicels short filiform, spikelets $\frac{1}{6}$ – $\frac{1}{3}$ in. linear 30–40-flid., rachilla zigzag, empty gls. subequal subacute 1-nerved, flg. gls. ovate acute sides convex, keel curved, palea caducous with the gl. keels scabrid. *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 385. *E. Brownei*, *Nees in Wight Cat.* n. 1780 *partim* (non *Steud.*). *E. elegantula*, *Nees l.c.* 1781, α , β (non *Steud.*); *Duthie Grass. N.W. Ind.* 37, *Fodd. Grass. N. Ind.* 63, t. 74. *E. gangetica*, *Steud. Syn. Gram.* 266. *E. ovina*, *Nees ex Steud. l.c.* 268. ?*E. Willdenovii*, *Steud. Nom. Ed.* II. i. 565. *P. amabilis* & *nutans*, *Herb. Heyne ex Wall. Cat.* n. 3847 A. *Poa amabilis*, *Herb. Rottl.* (non *Linn.*). *P. atroviridis*, *Herb. Ham. ex Wall. Cat.* n. 3814 *partim* (non *Desf.*). *P. gangetica*, *Roxb. Fl. Ind.* i. 340. *P. nutans*, *Retz. Obs.* iv. 19 (non *Roxb.*); *Thwaites Enum. Pl. Zeyl.* 373. *P. procera*, *Hb. Wight ex Wall. Cat.* n. 3831 C. *P. ovina*, *A. Rich. Tent. Fl. Abyss.* ii. 428. *P. viscosa*, var. *Wall. l.c.* n. 3831.—*Eragrostis*, *Wall. Cat.* n. 3030 A, 3831 B. C. D., 3832 A. (in *part*) 3043 E., 3844, 3847.

Throughout INDIA and BURMA. CEYLON, *Thwaites* (CP. 925, 932).—DISTRIB. Trop. Asia and Africa.

Annual or subperennial. *Stems* many, densely tufted, 12–18 in. high, geniculately ascending. *Leaves* rather short, smooth, usually strict and convolute; sheaths smooth. *Panicle* ovate or oblong or sublinear, subflexuose, inclined; branches rather distant, alternate, obliquely spreading when ripe, ramifications short, contracted. *Spikelets* crowded, blue grey, rachilla tough; gl. I $\frac{1}{2}$ in.; II $\frac{1}{2}$ in. or shorter; flg. gls. $\frac{1}{5}$ to $\frac{1}{10}$ in. or more, lateral nerves slender; palea rather shorter than its gl., gently curved. *Stamens* 3, anthers minute about $\frac{1}{12}$ – $\frac{1}{10}$ in. *Grain* about $\frac{1}{10}$ in., globosely oblong to subglobose.

11. **E. elegantula**, *Steud. Syn. Gram.* 266 (non *Nees*); perennial, panicle oblong, branches solitary short, pedicels very short, spikelets $\frac{1}{5}$ – $\frac{1}{4}$ in. linear to linear-oblong 8–30-flid., rachilla tough, empty gls. subequal acute 1-nerved, flg. gls. ovate acute sides convex, palea caducous with the gls. keels scabrid. *Griseb. in Goett. Nachr.* (1868) 75; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 384. *E. Brownei*, *Nees ex Wight Cat.* n. 1780; *Aitchis. Cat. Panjab. Pl.* 169; *Duthie Grass. N.W. Ind.* 36, *Fodd. Grass. N. Ind.* 62. *E. luzoniensis*, *Steud. l.c.* 266. *Poa*; *atroviridis*, *Ham. ex Wall. Cat.* n. 3843 A. *P. convoluta*, *Heyne in Herb. Rottl.*; *Wall. Cat.* n. 831 E. *P. Chariis*, *Schult. Mant.* i. 314. *P. diandra* & *cernua*, *Herb. Wight ex Wall. Cat.* n. 3843 B. C. *P. distans* & *laevis*, *Hb. Heyne ex Wall. l.c.* n. 3840. *P. elegantula*, *Kunth Revis. Gram.* i. 340, *Enum. Pl.* i. 346. *P. elegans*, *Roxb. Fl. Ind.* i. 338. *P. viscosa*, var. *Herb. Heyne in Wall. Cat.* 3831 A.—*Eragrost. Wall. Cat.* n. 3830 B. C., 3831 A, 3832 B, 3833, 3840, 3843, 3845 A (in *part*).

Throughout INDIA, BURMA and CEYLON (*Wallich, Gardner*).

Stem tall, 1-3 ft., suberect from a spreading base, usually stout and branching, but sometimes slender and short, smooth. *Leaves* few, short, smooth, flat or subconvolute; mouth of sheath bearded. *Panicle* nodding, branches rather distant, spreading, ramifying from above the base, sometimes abbreviated and the spikelets clustered on the rachis, rachis glabrous. *Spikelets* purplish or green; empty gls. $\frac{5}{8}$ in.; flg. gls. $\frac{1}{3}$ — $\frac{1}{4}$ in, lateral nerves slender; internodes of rachilla $\frac{7}{10}$ — $\frac{8}{10}$ in.; palea rather shorter than its gls. *Stamens* 3, anthers about $\frac{1}{32}$ in. *Grain* oblong, $\frac{3}{32}$ by $\frac{7}{10}$ — $\frac{8}{10}$ in.

12. ***E. elongata***, *Jacq. Eclog. Gram.* 3, t. 3; perennial, panicle very variable, branches usually simple, spikelets very shortly pedicelled rather crowded subparallel linear $\frac{1}{2}$ — $\frac{1}{10}$ in. 10-25-fl., rachilla rather stout, empty gls. ovate-lanceolate acute, I 1-nerved, II 1-3-nerved, flg. gls. ovate-lanceolate very acute nearly flat, keel almost straight, palea strongly curved, keels very stout scabrid. *E. bahiensis*, *Hance in Journ. Linn. Soc.* xii. (1873) 136; *Griseb. in Goett. Nachr.* (1868) 76 (non *Schrad.*). *E. Browneana*, *Nees in Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843) 205. *E. Brownii*, *Nees Fl. Afr. Austr.* 396; *Steud. Syn. Gram.* 279; *Thwaites Enum. Pl. Zeyl.* 373; *Trim. Cat. Ceyl.* Pl. 109; *Benth. Fl. Hongk.* 432, *Fl. Austral.* vii. 646 (in part). *E. Cumingii*, *Steud. l. c.* 266. *E. interrupta*, *Steud. l. c.* 279 (non *Beauv.*) *E. orientalis*, *Nees in Nov. Act. l. c.* 206; *Thw. l. c.* 373; *Trim. l. c.* 109. *E. pubescens*, *Steud. l. c.* *E. Willdenoviana*, *Nees in Hook. & Arn. Bot. Beech. Voy.* 252. *E. zeylanica*, *Nees & Mey. in Nov. Act. l. c.* 204; *Thwaites l. c.*; *Trim. l. c.* *Poa Brownei*, *Kunth Revis. Gram.* i. 112, *Enum. Pl.* i. 333. ? *P. dependens*, *Hornem. Enum. Hort. Hafn. Suppl.* 2. *P. elongata*, *Willd. Enum. Hort. Berol.* i. 108; *Kunth Enum.* i. 384. *P. interrupta* & *polymorpha*, *Br. Prodr.* 180. *P. pulchella*, *Wall. mss.* *Megastachya elongata* & *polymorpha*, *Beauv. Agrost.* 74, 167. —*Eragrost.* *Wall. Cat.* n. 3836, 3845 (in part).

LOWER BENGAL, CHITTAGONG, BURMA, the NICOBAR ISLDS., and CEYLON (C.P. 931, 3047, 3251).—DISTRIB. Asia trop., Malaya, Australia, N. Caledon.

Stems tufted, stiff, tall or short, stout or slender, simple or branched. *Leaves* narrow, strict, flat or convolute; mouth of sheath bearded. *Panicle* oblong or ovate, with solitary distant spreading filiform branches, or from the shortening of these subspiciform, rachis glabrous. *Spikelets* acute, dark brown or reddish; gl. I $\frac{1}{2}$ — $\frac{1}{10}$ in.; II $\frac{1}{17}$ in.; flg. gls. usually $\frac{1}{2}$ in., firm, lateral nerves rather prominent; rachilla rather stout, internodes $\frac{7}{10}$ in.; palea $\frac{1}{2}$ — $\frac{1}{3}$ shorter than its gl. *Anthers* $\frac{1}{10}$ — $\frac{1}{10}$ in. in the Indian specimens. *Grain* ovoid to subglobose, $\frac{7}{10}$ in.

†† Spikelets not fascicled, usually more or less divaricate when ripe.

§ *Spikelets* $\frac{1}{2}$ — $\frac{1}{4}$ in. broad; flg. gls. broad, more or less ob'use, $\frac{1}{15}$ — $\frac{1}{10}$ in. long, lateral nerves strong.—*Annuals*.

13. ***E. barbulata***, *Stapf*; leaf-margins eglandular, panicle oblong very loose, branches solitary, pedicels very slender, spikelets few $\frac{1}{2}$ — $\frac{2}{3}$ in. ovate-oblong or linear narrowed upwards 10-25-fl., empty gls. subequal ovate obtuse, rachilla stout nodes bearded, fl. gls. close-set very broadly ovate obtuse, palea broadly ovate persistent keels scabrid, grain subglobose. —*Eragrostis*, *Wall. Cat.* n. 3839.

LOWER BURMA; road to the Petroleum Wells, *Wallich*.

Annual, erect, 3-4 ft. high, branched. *Leaves* 12-18 in., up to $\frac{1}{4}$ in. broad, usually very narrow, subconvolute, and sheaths pubescent or villous below the middle. *Panicle* 6-12 in.; nodes of rachis woolly at the axils; branches very

distant, scaberulous, spreading, flexuous, simple at the base; pedicels as long or longer than the pale olive-green spikelets. *Gl.* I 1-nerved; II 1-3-nerved; rachilla tough, internodes about $\frac{1}{10}$ – $\frac{1}{8}$ in.; flg. gls. $\frac{1}{10}$ in., nerves strong. *Stamens* 3; anthers linear, about $\frac{1}{20}$ in. *Grain* $\frac{1}{10}$ in. long.—A stately species.

14. **E. tremula**, *Hochst. ex Steud. Syn. Gram.* 269; leaf-margins eglandular, panicle large ovate very loose branches solitary, pedicels very slender, spikelets versatile 1 in. or more linear narrowed upwards 10-70-fl., empty gls. subequal subobtusely, rachilla tough glabrous, flg. gls. close-set very broadly ovate subobtusely, palea obovate-oblong persistent keels scabrid, grain globose. *Duthie Fodd. Grass. N. Ind.* 65, t. 79; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 382; *Boiss. Fl. Orient.* v. 581. *E. multiflora*, *Trin. in Mem. Acad. Petersb. Ser. VI. i.* (1841) 401; *Dalz. & Gibs. Bomb. Fl.* 298; *Duthie Grass. N.W. Ind.* 38; *Aitchis. Cat. Panjab. Pl.* 169. *E. rhachitricha*, *Hochst. ex Miquel Analect. Bot. Ind.* ii. 25. *Poa curvata*, *Hb. Heyne ex Wall. Cat. n.* 3849. *P. multiflora*, *Roxb. Fl. Ind.* i. 338 (non *Forsk.*). *P. tremula*, *Lamk. Illust.* i. 185; *Kunth l. c.* 332.—*Eragrost. Wall. Cat. l. c.*

Northern India; from the PANJAB to BENGAL and BURMA, and southward to the CARNATIC.—DISTRIB. Affghan., Africa trop.

Annual. *Stems* densely tufted, suberect, 6-24 in., leafy chiefly at the sometimes hardened base. *Leaves* few, short, very narrow; mouth of sheath slightly hairy. *Panicle* often as long as the rest of the plant and 8 in. broad, nodding; rachis glabrous, axils bearded, branchlets and pedicels roughish; pedicels longer or shorter than the spikelets which are pale green or purplish. *Empty gls.* $\frac{1}{8}$ – $\frac{1}{2}$ in., 1-nerved; internodes of rachilla $\frac{1}{10}$ in., thickened upwards; flg. gls. $\frac{1}{16}$ – $\frac{1}{12}$ in., nerves strong; palea a little shorter than its gl. *Stamens* 3, anthers $\frac{1}{10}$ in. *Grain* hardly $\frac{1}{10}$ in. diam.

15. **E. major**, *Host Gram. Austr.* iv. 14, t. 24; leaf-margins (in Indian specimens) glandular, panicle oblong to ovate-oblong stiff, branches subsolitary spreading, pedicels very short, spikelets $\frac{1}{8}$ – $\frac{1}{3}$ in. ovate-oblong or linear few to 50-fl., empty gls. ovate acute, rachilla tough, flg. gls. broadly ovate subacute, palea broadly obovate much curved, keels scabrid or ciliolate, grain globose. *E. flexuosa*, *Steud. Syn. Gram.* 266; *Duthie Grass. N.W. Ind.* 37. *E. megastachya*, *Link Enum. Hort. Berol.* i. 187; *Kunth Enum. Pl.* i. 333; *Reichb. Ic. Fl. Germ.* t. 91; *Wight Cat. n.* 1778; *Thwaites Enum. Pl. Zeyl.* 373; *Trim. Cat. Ceyl. Pl.* 109; *Aitchis. Cat. Panjab Pl.* 169; *Duthie Grass. N.W. Ind.* 38, *Fodd. Grass. N. Ind.* 63, t. 75; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 382; *Ledeb. Fl. Ross.* iv. 382; *Boiss. Fl. Orient.* v. 580. *E. multiflora*, *Aschers. ex Boiss. l. c.* *E. poaeoides*, *Trin. in Mem. Acad. Petersb. Ser. VI. i.* (1831) 404. *E. vulgaris var. megastachya*, *Coss et Dur. Fl. Alger.* 148. *Poa cilianensis*, *Atl. Fl. Pedem.* ii. 246, t. 91, f. 2. *P. elegans*, *Herb. Wight & Herb. Ham. ex Wall. Cat. n.* 3828 C. D. *P. Eragrostis*, *Cav. Ic.* i. 63, t. 92; *Sibth. Fl. Græc.* t. 73. *P. flexuosa*, *Roxb. Fl. Ind.* i. 339. *P. multiflora*, *Forsk. Fl. Æg. Arab.* 21. *P. polymorpha*, *Koen. ex Wall. l. c. n.* 3828 A. *P. Roxburghiana*, *Schult. Mant.* ii. 315. *P. subsecunda*, *Herb. Ham. ex Wall. l. c. n.* 3828 D. *P. tortuosa*, *Spreng. Syst. Veg.* i. 345. *Megastachya Eragrostis*, *Beauv. Agrost.* 74. *Briza Eragrostis*, *Linn. Sp. Pl.* 70; *Schreb. Besch. Græs.* ii. 74. *B. oblonga*, *Moench. Meth.* 185.—*Eragrostis*, *Wall. Cat. n.* 3828, 3837.

Throughout the PLAINS and lower HILLS of INDIA and BURMA, ascending to 5200 ft. in the Himalaya. CEYLON, (C. P. 3163).—DISTRIB. Westward to S. Europe, Asia trop. and subtrop.

Annual. *Stem* 1-2 ft., usually stout and branched, but very variable. *Leaves* flat, smooth, flaccid, narrow, rarely $\frac{1}{2}$ in. broad; sheath sparingly bearded. *Panicle* 2-8 in., sometimes contracted, rachis glabrous, branches stiff or flexuous, ramifying from or near the base. *Spikelets* slightly narrowed upwards, dark olive-grey; Gl. I, 1- or sub-1-3-nerved; II 3-nerved; flg. gls. $\frac{1}{2}$ in., uppermost usually empty and smaller, nerves strong; palea $\frac{1}{4}$ - $\frac{1}{3}$ shorter than its gl. *Anthers* about $\frac{1}{60}$ in. *Grain* $\frac{1}{50}$ - $\frac{1}{35}$ in., loose within the turgid gl.

§§ Spikelets $\frac{1}{6}$ - $\frac{1}{3}$ in.; fl. gls. less than $\frac{1}{16}$ in. or if longer then narrower and more or less acute.

† *Panicle* rather stiff, branches and lateral pedicels usually short lateral nerves of flg. gls. strong.—*Leaf-margins* often glandular.

16. **E. minor**, *Host Gram. Austr.* iv. 15, *Fl. Austr.* i. 135; leaf-margins glandular, panicle ovate or oblong rather stiff, branches solitary capillary ramifying from near the base, pedicels short, spikelets $\frac{1}{6}$ - $\frac{1}{3}$ in. linear to ovate up to 12-fld., empty gls. subequal acute 1-nerved, flg. gls. broadly ovate obtuse, grain globose or ellipsoid-globose dorsally convex. *E. poaeiformis*, *Link Hort. Berol.* i. 188; *Reichb. Ic. Fl. Germ.* t. 91; *T. Nees Gen. Fl. Germ. Monocot.* n. i. 55. *E. poaeoides*, *Beauv. Agrost.* 76; *Griseb. in Goett. Nachr.* (1868) 74; *Duthie Grass. N.W. Ind.* 38, *Fodd. Grass. N. Ind.* 65; *Aitchis. Cat. Panjab Pl.* 170; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 387; *Ledeb. Fl. Ross.* iv. 380; *Boiss. Fl. Orient.* v. 580. *E. poaeoides* β, *Trin. in Mem. Acad. Petersb. Ser. VI.* i. (1831) 404. *Poa Eragrostis*, *Linn. Sp. Pl.* 68 (in part); *Kunth Enum. Pl.* i. 332; *Schreb. Besch. Græs.* ii. t. 38; *Host Gram. Austr.* ii. 50, t. 69. *Briza Eragrostis*, *Vill. Fl. Delph.* ii. 50 (non *Linn.*).

PLAINS OF NORTHERN INDIA, ascending the Himalaya to 8000 ft., from the Panjab eastwards to Bengal. The CONCAN, *Jacquemont*, &c. WESTERN TIBET; Ladak, alt. 12-13,000 ft., *Thomson*.—DISTRIB. Westward to S. Europe, N. Asia.

Annual. *Stems* 6-18 in., densely tufted, slender. *Leaves* rather short, flat; mouth of sheath slightly bearded. *Panicle* 2-6 in., rachis glabrous, branches spreading when ripe. *Spikelets* pale green to dark purplish or olive-grey, glistening; rachilla tough; gls. I and II $\frac{1}{2}$ - $\frac{1}{8}$ in., keel scabrid; flg. gls. $\frac{1}{16}$ rarely $\frac{1}{35}$ - $\frac{1}{12}$ in., lateral nerves strong; palea $\frac{1}{6}$ shorter than its gl., obovate-oblong, keels scabrid or subciliate. *Stamens* 3, anthers $\frac{1}{100}$ in. *Grain* $\frac{1}{50}$ in. or more, dorsally rounded or slightly flattened.—The glands are a very constant character. A single Bombay specimen is eglandular, but placed here from its strong resemblance to glanduliferous specimens also from Bombay. The Tibetan specimens are very small, 1-6 in. high.

17. **E. Rottleri**, *Stapf*; leaf-margins eglandular, mouth of sheath naked, panicle oblong open rather stiff, branches solitary or lower geminate ramifying from near the base, pedicels of lateral spikelets very short, spikelets $\frac{1}{4}$ - $\frac{1}{2}$ in. linear 6-12-fld., empty gls. subequal, rachilla tough, flg. gls. oblong subacute, palea persistent, grain terete. *E. viscosa*, *Wight Herb. propr.* n. 1785, in part. *Poa pauciflora*, *Herb. Rottl.*

The CARNATIC; at Tranquebar, *Heyne*, *Rottler*, *Wight*.

Leaves 1-7 in., flat or more or less convolute. *Panicle* 2-6 in., rachis naked, branches filiform to capillary. *Spikelets* pale brown or white; empty gls. about $\frac{1}{35}$ in.: flg. gls. $\frac{1}{16}$ - $\frac{1}{8}$ in., lateral nerves strong; palea rather shorter than its gl., keels scabrous. *Stamens* 3, anthers about $\frac{1}{100}$ in. *Grain* $\frac{1}{50}$ in.—*Rottler's P. pauciflora* is a tall form with few spikelets. *Wight's* specimen has the stem viscid

below the panicle as in *E. tenella* var. *viscosa*, with certain forms of which *P. Rottleri* has much in common. The persistent rachilla with deciduous glumes of *E. Rottleri* are as in *E. minor*, as are the scabrid not ciliate keels of the palea.

18. ***E. Willdenoviana***, *Nees in Wight Cat.* n. 1779 (non in *Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843) 205); leaf-margins rarely glandular, panicle short ovate stiff open, branches solitary capillary, pedicels short, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. by $\frac{1}{2}$ in. linear pale up to 25-fld., empty gls. very unequal, I minute hyaline nerveless, fl. gls. broadly elliptic acute, palea oblong persistent, grain truncate at both ends dorsally grooved. *E. poaeoides*, *Trim. Cat. Ceyl. Pl.* 109; *Herb. Ind. Or. H. f. & T.* (the Carnatic plant). *Poa glabra & lævis*, *Rottl. mss.* ? *P. polymorpha*, *Koen. ex Rottl. in Schrift. Naturf. Fr. Berl.* iv. (1803) 194.—*Eragrostis*, *Wall. Cat.* n. 3848.

MYSORE, *Rottler*, *Heyne*; Dindygul, *Wight*. CEYLON; Trincomalee, *Glenie* (C.P. 3944).

Annual. Stems 4–18 in., very slender, smooth, rigid, erect or geniculately ascending. Leaves short, flat, narrow, erect, rather rigid; mouth of sheath naked. Panicle 1–3 in., branches spreading when ripe, ramifying from near the base; pedicels (except sometimes the terminal) shorter than the spikelets. Spikelets olive-grey or greenish; gl. I $\frac{1}{50}$ – $\frac{1}{30}$ in.; II ovate, acute, $\frac{1}{5}$ in., 1-nerved; flg. gls. $\frac{1}{15}$ – $\frac{1}{20}$ in., lateral nerves strong; palea $\frac{1}{3}$ – $\frac{1}{4}$ shorter than its gl., keels scaberulous. Stamens 3, anthers about $\frac{1}{100}$ in. Grain oblong, $\frac{3}{5}$ – $\frac{2}{3}$ in., dorsally flattened and grooved.—This may prove to be *E. polymorpha*, *Roem. & Sch. Syst.* ii. 575. *Rottler's* specimen was named *P. polymorpha*, but that name was crossed out and replaced by *P. glabra*, *Nob. E. Willdenoviana*, *Nees in Hook. & Arn. Bot. Beech. Voy.* (of China) is *E. elongata*.

††. Panicle very loose, ramifications very slender often flexuous or flaccid; lateral nerves of flg. gls. usually faint.—Leaves eglandular.

19. ***E. tenuifolia***, *Hochst. in Flora*, xxiv. (1841) i. *Intell.* 20, name only; ex *Steud. Syn. Gram.* 268; perennial, panicle oblong to ovate very open, rachis glabrous, branches solitary or 2-nate distant, spikelets $\frac{2}{5}$ – $\frac{1}{12}$ in. by $\frac{1}{2}$ in. linear 5–15-fld., empty gls. very unequal, I minute hyaline, rachilla tough, fl. gls. ovate acute, subacute or apiculate, palea $\frac{1}{3}$ shorter than its gl. strongly curved persistent, grain obovate-oblong. *E. collocarpa*, *K. Schum. in Engl. Pflanzenw. Deutsch-Ost. Afr.* C. 114. ? *E. mucronata*, *Roem. & Sch. Syst.* ii. 577. *E. parviglumis*, *Hochst. ex Steud. l.c.* 267. *Poa tenuifolia*, *A. Rich. Tent. Fl. Abyss.* ii. 425.

NILGHIRI HILLS, *Hohenacker*. BELGAUM, *Ritchie*; Satpura Hills, *Thompson*.—DISTRIB. Africa trop.

Stem 2–3 ft., erect, slender, branched. Leaves long, very narrow; mouth of sheath naked. Panicle 3–5 in.; branches ramifying from near the base and branchlets rather distant, spreading, filiform, stiff, shorter than in *E. nigra*. Spikelets olive-grey; gl. I $\frac{1}{50}$ – $\frac{1}{30}$ line nerveless; II remote from I, about $\frac{1}{30}$ in., ovate, subacute, nerveless or faintly 1-nerved; flg. gls. $\frac{1}{2}$ in., keels of palea scabrid. Stamens 3, anthers $\frac{1}{25}$ in. Grain $\frac{1}{12}$ in., slightly compressed, dorsally grooved.

20. ***E. papposa***, *Steud. Nom. Ed.* II. i. 564; perennial, panicle ovoid very delicate lax open sparingly branched, rachis glabrous, branches solitary rarely 2-nate branchlets stiff divaricate, pedicels long capillary, spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. linear 7–23-fld., empty gls. subequal or I shorter hyaline, rachilla tough, flg. gls. broadly ovate margins above hyaline, palea obtuse denticulate persistent, grain obovoid. *Willk. & Lange Prodr. Fl. Hispan.* i. 83; *Griseb. in Goett. Nachr.* (1868) 75. *E. atro-virens*, *Lange in Koebj.*

Vedinsk. Meddel. (1860) 47 (*non Desf.*). *E. rigidifolia*, *Hochst. Herb. Mem. Div. Forsk. (nomen.)*. *E. speirostachya*, *Coss. et Dur. ex Lange l. c.* *E. verticillata*, *Coss. ex Lange l. c. (non Cav.)*. *E. vulgaris*, *var. speirostachya*, *Coss. et Dur. Fl. Alger.* 148. *Poa nigra*, *Clem. ex Willk. & Lange Prodr. Fl. Hisp.* i. 83. *P. papposa*, *Desf. in Roem. & Sch. Syst.* ii. 585. *Megastachya?* *papposa*, *Roem. & Sch. l. c.*

N.-EASTERN PANJAB; common in the Trans-Indus districts; Rawul Pindi, &c., *Stewart, Aitchison*.—DISTRIB. Westward to Arabia, N. Africa, and Spain.

Stem 12–18 in., very slender, simple. *Leaves* short, strict, very narrow, convolute; mouth of sheath bearded with long silky hairs. *Panicle* 4–8 in.; rachis filiform; branches spreading, alternate, almost capillary, naked below, loosely branched beyond the middle with capillary spreading branchlets. *Spikelets* very pale yellow or dark or pale olive-grey; gl. I $\frac{1}{35}-\frac{1}{25}$ in. or less, nerveless; II $\frac{1}{25}-\frac{1}{20}$ in., faintly 1-nerved; flz. gls. about $\frac{1}{17}$ in.; palea rather shorter, keels scabrid. *Stamens* 3, anthers $\frac{1}{100}$ in. *Grain* $\frac{1}{50}-\frac{1}{36}$ in., dorsally grooved.—A very elegant species, with usually quite pale very narrow spikelets.

21. *E. pilosa*, *Beauv. Agrost.* 71; annual, panicle oblong to pyramidal flaccid open or contracted, rachis glabrous or hairy, branches usually more or less whorled and branchlets very slender, pedicels longer or shorter than the spikelets which are $\frac{1}{5}$ in. linear 5–12-fl., empty gls. unequal hyaline, rachilla tough, flg. gls. ovate acute, palea subsistent keels scabrous, grain ellipsoid. *Reichb. Ic. Fl. Germ.* t. 91; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 55; *Thw. Enum. Pl. Zeyl.* 373; *Trim. Cat. Ceyl. Pl.* 209; *Wight Cat.* n. 1784, 1784b.; *Duthie Grass. N.W. Ind.* 38, *Fodd. Grass. N. Ind.* 64; *Aitchis. Cat. Panjab Pl.* 170; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 381, *Ledeb. Fl. Ross.* iv. 382; *Boiss. Fl. Orient.* v. 881; *Benth. Fl. Hongk.* 432, *Fl. Austral.* vii. 645; *Baker Fl. Maurit.* 455; *Griseb. Fl. Brit. W. Ind.* 532. *E. elegantula*, *a. Nees in Wight Cat.* n. 1782. *E. indica*, *Steud. Syn. Gram.* 264. *E. parviflora*, *Trin. in Mem. Acad. Petersb. Ser. VI. i.* (1831) 411. *E. pellucida*, *Steud. l. c.* 279. *E. punctata*, *Link. ex Steud. Nom. Ed. II. i.* 561, *Syn. Gram.* 264. *E. verticillata*, *Roem. & Sch. Syst.* ii. 575; *Reichb. Ic. Fl. Germ.* t. 9; *Aitchis. Cat. Panjab Pl.* 170. *Poa amabilis*, *Herb. Heyne ex Wall. Cat.* n. 3829 B. *P. indica*, *Koen. ex Rottl. in Ges. Naturf. Fr. Berl. Neue Schrift.* iv. (1803) 194. *P. nutans*, *Herb. Wight ex Wall. Cat.* n. 3829 D. *P. parviflora* & *pellucida*, *Br. Prodr.* 180. *P. Phullica*, *Herb. Ham. ex Wall. l. c.* 3829 C. & 5012 (*Phulcia*). *P. pilosa*, *Linn. Sp. Pl.* 68; *Host Gram. Austr.* ii. 168, t. 68; *Kunth l. c.* 329. *P. punctata*, *Linn. f. Suppl.* 109; *Kunth Enum. Pl.* i. 330; *Roxb. Fl. Ind.* i. 338. *P. tenella*, *Herb. Heyne ex Wall. l. c.* 3829 B. *P. verticillata*, *Cav. Ic. i.* 63, t. 93; *Kunt! Enum.* 329. *Milium tenerum*, *Herb. Heyne ex Wall. l. c.* 3829 B.—*Eragrostis*, *Wall. Cat.* n. 3829.

Throughout INDIA and BURMA; ascending the Himalaya to 5000 ft. or more. CEYLON; common (C.P. 929).—DISTRIB. S. Europe and most warm countries.

Stem 3 in.–3 ft., tufted, erect, usually very slender and simple, rarely stout and branched. *Leaves* short, narrow, flaccid or strict and convolute, rarely elongate; mouth of sheath bearded. *Panicle* very variable in size and form, erect inclined or nodding; rachis hairy or not at the nodes; branches filiform or capillary, fascicled or sub-whorled, simple below, lower sometimes 6 in. long. *Spikelets* usually grey tipped with purple; empty gls. nerveless or II faintly 1-nerved; flg. gls. $\frac{1}{16}-\frac{1}{8}$ in. *Stamens* 3, anthers $\frac{1}{50}$ in., violet. *Grain* $\frac{1}{18}-\frac{1}{15}$ in., base laterally apiculate.—Dwarf specimens 2–4 in. high look very different from the ordinary state of the plant.

22. **E. nigra**, *Nees ex Steud. Nom. Ed. II. i. 563, Syn. Gram. 267*; perennial, basal sheaths narrow terete or obscurely compressed, panicle oblong to ovate large open lax-flid., branches usually many in whorls or fascicles rarely solitary or geminate, spikelets up to $\frac{1}{2}$ in. linear to oblong 3-9-flid., empty gls. subequal acuminate strongly 1-nerved, flg. gls. ovate acute, palea obtuse denticulate persistent, grain short truncate at both ends. *Griseb. in Goett. Nachr. (1868) 75*; *Duthie Grass. N.W. Ind. 38*. *E. atropurpurea, Hochst. ex Steud. Syn. Gram. 267*. *E. amabilis, Willd. non Linn. ex Ham. in Wall. Cat. n. 3842*. *E. paniculata, Thwaites Enum. Pl. Zeyl. 373 (non Steud.)*.—*Eragrostis, Wall. Cat. n. 3834, 3835, 3842, 3846*.

Temp. and trop. HIMALAYA, ascending to 9000 ft. from Simla to Sikkim and the KHASIA HILLS, and southward throughout the DECCAN PENINSULA. CEYLON, *Thwaites (C.P. n. 2626)*.

Stem 6 in.-3 ft., erect, stout or slender, usually stout and leafy at the base, simple or branched. *Leaves* in small forms chiefly basal and flat, in taller elongate; mouth of sheath bearded. *Panicle* up to 2 ft. long and broad, very copiously but loosely branched except in small specimens, rachis glabrous at the nodes, branches simple below, pedicels usually longer than the spikelets. *Spikelets* olive-grey; empty gls. membranous, keels scabrid; flg. gls. $\frac{1}{16}$ – $\frac{1}{14}$ in. *Stamens* 3, anthers $\frac{1}{10}$ in. *Grain* $\frac{1}{8}$ in. or smaller, dorsally slightly grooved.—*Habit* as variable as of *E. pilosa*.

23. **E. ferruginea**, *Beauv. Agrost. 71*; perennial?, basal sheaths broad compressed keeled, panicle oblong, branches solitary or 2-nate filiform rather stiff, pedicels longer than the spikelets, spikelets $\frac{1}{4}$ in. linear to ovate 3-11-flid., empty gls. unequal acute 1-nerved, rachilla tough, flg. gls. ovate acute or acuminate, palea obtuse much shorter than its gl. persistent keels scabrid, grain obovoid truncate at both ends. *Franch. & Sav. Enum. Pl. Jap. ii. 177*; *Miq. Prolus. Fl. Jap. 188*. *E. orientalis, Trin. in Bunge Enum. Pl. Chin. Bor. 71, in Mem. Acad. Petersb. Ser. VI. iv. II. (1838) Suppl. 73*. *Poa ferruginea, Thunb. Fl. Jap. 50*.

SIKKIM HIMALAYA; Lachoong Valley, alt. 9000 ft., in meadows with *E. nigra*, J. D. H.—DISTRIB. N. China, Japan.

Stem with the panicle in the Sikkim specimen 18 in., erect. *Leaves* 3-5 in., narrow, or the lower broad at the base; sheath naked at the mouth. *Panicle* 4-6 in., shorter than in *E. nigra*, with stouter branches and fewer spikelets; branches rather wiry, bearing few dark spikelets. *Spikelets* dull green to violet. *Gl.* I about $\frac{1}{8}$ in., shorter than II; flg. gls. $\frac{1}{11}$ – $\frac{1}{6}$ in. *Stamens* 3, anthers $\frac{1}{12}$ in. or less. *Grain* $\frac{1}{12}$ in., slightly grooved or flattened dorsally.—I have seen only a poor Indian specimen, but it seems to be identical with the Chinese and Japanese plant. Bunge says that the same plant is cultivated in Hort. Petrop. from Nepal seeds.

B. Sect. III. DESMOSTACHYA, Stapf. *Spikelets* much compressed, imbricate, secund, sessile and jointed on the very short densely crowded branchlets of a tall narrow racemiform panicle, deciduous, acute; rachilla subarticulate.

24. **E. cynosuroides**, *Beauv. Agrost. 71, 162*; perennial, tall, branched from the base, leafy, panicle linear-elongate, branches very short crowded, densely covered from the base with sessile imbricating much compressed deflexed spikelets $\frac{1}{2}$ in. long up to 30-flid., empty gls. very unequal, rachilla tough, flg. gls. broadly ovate acute, palea shorter than its gl. *Steud. Syn. Gram. 264*; *Wight Cat. n. 1774, 1774b*; *Trin. in Mem. Acad. Petersb. Ser. VI. i. (1831) 415*; *Dalz. & Gibs. Bomb. Fl. 298*; *Aitchis*

Cat. Panjab. Pl. 169; *Duthie Grass. N.W. Ind.* 37, *Fodd. Grass. N. Ind.* 62, t. 40; *Boiss. Fl. Orient.* v. 583; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 387. *Poa cynosuroides*, Retz. Obs. iv. 20; *Roxb. Fl. Ind.* i. 333; *Del. Fl. Egypt.* 159, t. 10; *Grah. Cat. Bomb. Pl.* 236; *Kunth Enum. Pl.* i. 227. *Leptochloa bipinnata*, *Hochst. in Flora*, xxxviii. (1855) 422. *Briza bipinnata*, *Linn. Syst. Nat.* x. 875. *Cynosurus durus*, *Forsk. Fl. Egypt. Arab.* 71. *Dactylis interrupta*, *Herb. Rottl.* *Uniola bipinnata*, *Linn. Sp. Pl. Ed. II.* 104.—*Eragrost. affine* & *Eragrostoides*, *Wall. Cat.* n. 3821, 5016.

PLAINS OF INDIA, from Peshawur and Sind to Burma and southward, in moist places. (Not in Ceylon).—DISTRIB. Westward to Syria and N. Africa.

Rootstock stout, creeping; *stolons* very stout clothed with shining sheaths; stems 1-3 ft., tufted, smooth, erect, stout. *Leaves* many, basal fascicled, very long, rigid, long acuminate tips filiform, margins hispid; mouth of sheath with long hairs; ligule 0. *Panicle* 6-18 in. by 1 rarely 2 in. broad, strict, erect, narrowly pyramidal or columnar, often interrupted; rachis puberulous, branches $\frac{1}{4}$ -1 in., very many crowded; branchlets rigid, glabrous or hispidulous, spreading. *Spikelets* unilateral, 2-seriate and crowded, deflexed, pale brown, rather shining; internodes of rachilla very short; gl. I $\frac{1}{10}$ in.; II about $\frac{1}{15}$ in., obtuse; flg. gls. $\frac{1}{10}$ - $\frac{1}{12}$ in., coriaceous; palea $\frac{1}{6}$ shorter than its gl., rather coriaceous, keels minutely scabrid. *Stamens* 3, anthers $\frac{1}{8}$ in. *Grain* less than $\frac{1}{10}$ in., obliquely ovoid, laterally compressed, obscurely trigonous.

C. Sect. IV. PLAGIOSTACHYA, *Benth.* Spikelets secund distichously spreading in a long simple slender terminal spike.

* *Keels of palea distinctly winged.*

25. *E. leioptera*, *Stapf.*; perennial, leaves convolute wiry, spikelets $\frac{1}{3}$ - $\frac{1}{2}$ in. oblong compressed 10-20-fld., glumes tumid, I $\frac{1}{4}$ in. acute, wings of keels of palea $\frac{1}{100}$ in. broad ciliate.

KHASIA HILLS, alt. 4-5000 ft., *Griffith, &c.*

Stems 1-2 ft., densely tufted, erect, very slender, strict. *Leaves* 8-12 in., glabrous, stout, terete, pungent; sheaths short. *Spike* 6-10 in., erect, strict; rachis angular, smooth. *Spikelets* not crowded, suberect; empty glumes $\frac{1}{4}$ in. subequal, or I shorter; I acutely keeled; II dorsally rounded; flg. gls. broadly ovate, obtuse or subacute, $\frac{1}{10}$ in.; wings of palea hyaline. *Anthers* about $\frac{1}{8}$ in. long.—The more tumid glumes at once distinguish this from *E. bifaria*.

26. *E. bifaria*, *Wight ex Steud. Nom. Ed. II.* i. 562, *Syn. Gram.* 264, *Suppl.* 282; perennial, leaves flat or complicate and keeled, spikelets $\frac{1}{4}$ - $\frac{3}{4}$ in. ovate-oblong rarely linear much compressed 6-40-fld., wings of keels of palea about $\frac{1}{100}$ in. broad ciliate. *Wall. Cat.* n. 3827 B. C.; *Wight Cat.* n. 1773; ? *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 387. *E. thraulostachys*, *K. Schum. ined.* *Poa bifaria*, *Vahl Symb.* ii. 19; *Roxb. Fl. Ind.* i. 331; *Kunth Revis. Gram.* i. 334, t. 80, *Enum. Pl.* i. 327, *Suppl.* 282.

THE DECCAN PENINSULA, *Heyne, &c.*—DISTRIB. Africa trop.

Stem 1-3 ft., densely tufted, erect, simple, subcompressed, glabrous, base clothed with the soft fibres of old sheaths. *Leaves* 2-2 $\frac{1}{2}$ in., linear, wiry, sometimes $\frac{1}{2}$ in. broad, flexuous, acute, rigid, smooth; sheaths scaberulous, keeled; ligule a ciliate line. *Spike* 10-12 in., ovate to oblong and 15-20-fld., rarely linear flexuous and up to 40-fld., erect, rachis smooth, subcompressed. *Spikelets* spreading, lower fewer-fld., olive-grey or -green; gl. I very acute or acuminate; II almost $\frac{1}{2}$ in., keel very stout, rounded; flg. gls. $\frac{1}{8}$ in., broadly ovate, subacuminate, keel scaberulous above, nerves faint. *Stamens* 3, anthers $\frac{1}{8}$ in.

27. **E. Collettii**, *Stapf*; perennial, leaves filiform convolute, spikelets $\frac{1}{4}$ – $\frac{1}{3}$ in. linear or oblong-linear slightly compressed 6–12-fld., glumes tumid, wings of keels of palea about $\frac{1}{20}$ in. broad minutely ciliate.

BURMA; Pinmona, *Abul Huk*; Meiktalla, *Collett*.

Stems 18–20 in., densely tufted, very slender, bases densely clothed with a brush of soft filiform fibres $\frac{3}{8}$ in. long. *Leaves* 2–4 in., glabrous or sparsely hairy. *Spike* 5–7 in., erect, strict or slightly curved; rachis slender, terete, smooth. *Spikelets* purplish, erect, close-set, almost imbricating; empty gls. subequal, $\frac{1}{10}$ – $\frac{1}{8}$ in., I acutely keeled; II dorsally rounded; flg. gls. $\frac{1}{12}$ in. or less, turgid, broadly ovate, obtuse or acute with incurved tips; palea almost as long as the gl., dorsally pubescent. *Anthers* almost $\frac{1}{5}$ in.

** *Keels of palea not or obscurely winged*

28. **E. nardoides**, *Trin. in Mem. Acad. Petersb.* VI. i. (1831) 415; perennial leaves 3–9 in. almost capillary convolute with tufts of hairs on the surface below the middle, spike very long slender, spikelets $\frac{1}{3}$ – $\frac{1}{2}$ in. and upwards oblong to linear 20–32-fld., glumes turgid. *E. bitaria*, *Wall. Cat. n.* 3827 D. F.; *Duthie Grass. N.W. Ind.* 36; *Fodd. Grass. N. Ind.* 61, t. 73; *Griseb. in Goett. Nachr.* (1863) 76; *Steud. Syn. Gram.* 266.

OUTER HIMALAYA, from the Panjab to Nepal, up to 5500 ft. BEHAR, on Parasnath, and CHOTA NAGPORE, *Clarke, J. D. H.*

Stems 12–18 in., densely tufted, filiform. *Leaves* as long as the stem or shorter. *Spike* 6–10 in., very slender, straight or subflexuous; rachis terete, smooth. *Spikelets* erecto-patent, close-set, laterally compressed, olive-green; empty gls. subequal or I slightly shorter, acutely keeled; II $\frac{1}{12}$ in. or less, obtusely keeled; flg. gls. nearly $\frac{1}{12}$ in., ovate, acute or subobtuse, nerves faint, keel smooth or nearly so. *Anthers* $\frac{1}{25}$ in. *Grain* $\frac{1}{10}$ in. or more, narrowly ellipsoid or subovoid, subterete or obscurely trigonotrous, epicarp finely reticulate.

29. **E. coromandelina**, *Trin. in Mem. Acad. Petersb.* VI. i. (1831) 415; perennial, leaves 1–3 in. filiform convolute puberulous above, spikelets $\frac{1}{8}$ – $\frac{1}{4}$ by $\frac{1}{12}$ in. oblong to linear 10–32-fld. *Steud. Syn. Gram.* 264. *E. cretacea*, *Nees in Ann. Nat. Hist.* i. (1838) 284. *Poa coromandelina*, *Koen. ex Rotth. in Ges. Naturf. Fr. Berl. Neue Schrift.* iv. (1803) 191; *Roth. Nov. Pl. Sp.* 71; *Kunth Enum. Pl.* i. 327. *P. secunda*, *Roxb. Ic. pict. ined.* t. 827.

PLAINS OF INDIA; from Rajputana to Behar, and southwards. CHOTA NAGPORE, *Wood.* UPPER BURMA, *Abdul Huk.*

Stem 12–18 in., rather stout. *Leaves* short, rarely nat, spreading and recurved. *Spike* 4–8 in., interrupted; rachis slender, terete, smooth. *Spikelets* close-set, erecto-patent, laterally compressed, olive-grey or -green; empty gls. equal or I slightly shorter, acutely keeled; II $\frac{1}{12}$ in. or less, usually obtusely keeled; flg. gls. up to $\frac{1}{12}$ in., ovate, acute or subobtuse, nerves faint, keel smooth or nearly so; palea almost as long as its gl., keels sometimes obscurely winged scabrid. *Stamens* 3, *anthers* $\frac{1}{32}$ in. *Grain* $\frac{1}{10}$ – $\frac{1}{8}$ in., shortly ellipsoid or subovoid, obtusely 3-quetrous, epicarp loosely reticulate.

30. **E. secunda**, *Nees ex Steud. Syn. Gram.* 264; perennial, leaves 1–18 in. convolute or flat minutely puberulous above, spike very slender flaccid, spikelets $\frac{1}{2}$ in. linear-oblong up to 10-fld., empty gls. unequal. *E. bifaria*, *Thwaites Enum. Pl. Zeyl.* 373 (excl. *Syn.*); *Trim. Cat. Ceyl. Pl.* 109.

CEYLON, ascending to 5000 ft., *Walker, Thwaites* (C.P. 60).

Spikelets secund or distichous, laterally compressed, olive-grey or straw-colrd.; empty gls. unequal, I about $\frac{1}{12}$ in. acutely keeled; II $\frac{1}{4}$ in., dorsally rounded; flg. gls.

$\frac{1}{2}$ in., ovate, acute; palea with rather narrow scabrid keels. *Anthers* $\frac{1}{16}$ in. long. *Grain* almost $\frac{1}{25}$ in., elongate ovoid or ellipsoid, almost terete.—The materials for this species consist of only two specimens, one from Thwaites (C.P. 60), with leaves 6-7 in. convolute, erecto-patent; the other, from Walker, with much longer flat or subconvolute leaves 8-10 in. long.

31. **E. brachyphylla**, *Stapf*; perennial leaves $2\frac{1}{3}$ -4 in. linear plicate glabrous above. spikelets $\frac{1}{4}$ - $\frac{3}{4}$ in. oblong to linear about 20-fl., empty gls. subequal. *E. bifaria*, *Wall. Cat. n. 3827 A. E. E. bifaria*, β . minor, *Wight & Arn. in Wight Cat. n. 1773 C. & Herb. n. 3528*, 3356. *Poa secunda*, *Roxb. ex Wall. Cat. l. c. A. P. bifaria*, *Vahl*, & *P. coromandelina*, *Roth. ex Wight Cat. n. 1773b*.

From BEHAR and the CENTRAL PROVINCES, southward to the Nilghiris, *Wight*, *Perrottet*.

Stem densely tufted, 10-18 in., slender. *Leaves* coriaceous, acute, rarely flat and $\frac{1}{10}$ in. broad. *Spikes* 3-6 in., slender. *Spikelets* close-set, usually second, slightly compressed, olive-green; empty gls. up to $\frac{1}{12}$ in., I acute, acutely keeled; II obtuse, dorsally rounded; flg. gls. up to $\frac{1}{12}$ in., broadly ovate, obtuse, keel scaberrulous below the tip; keels of palea narrow, scabrid. *Anthers* $\frac{1}{32}$ in. *Grain* $\frac{1}{50}$ - $\frac{1}{30}$ in., shortly ellipsoid, obscurely triquetrous, almost terete, epicarp coarsely reticulate.

INDETERMINABLE SPECIES RECORDED AS INDIAN.

E. cernua, *Steud. Syn. Gram. 266. Poa cernua*, *Willd. in Ges. Naturf. Fr. Berl. Neue Schrift. iv. (1803) 182*.

E. confinis, *Nees ex Steud. l. c. 265*.

105. **MYRIOSTACHYA**, *Hook. f.*

A tall stout perennial glabrous grass. *Leaves* very long, flat. *Spikelets* 4-20-fl., racemed on the short branchlets of a narrow elongate panicle, pedicels jointed at the base; rachilla stout; flexuous, naked, at length jointed at the base and between the fl. gls. *Glumes* coriaceous, dorsally rounded, I and II very small, ovate, 1-nerved, keeled, long-awned; flg. gls. ovate, cuspidately acuminate, keeled, 3-nerved; palea coriaceous, as long as its gl., tip 2-toothed, keels close together stout scabrid-ciliate. *Lodicules* very minute, obliquely cuneate, retuse. *Stamens* 3, anthers very small. *Ovary* globose, styles united at the very base, stigmas long penicillate. *Grain* obliquely ovoid, obtuse, subterete, scutellum large.—*Eragrostis*, *Sect. Myriostachya*, *Benth. in Journ. Linn. Soc. xix. (1881) 117*.

M. Wightiana, *Hook. f.* *Eragrostis Wightiana*, *Benth. in Hook. Ic. Pl. xiv. 62, t. 1381. Leptochloa Wightiana*, *Nees ex Steud. Syn. Gram. 209; Wight Cat. n. 1757. Dinebra verticillata*, *Wight ex Steud. l. c. Festuca nataus*, *Ham. in Wall. Cat. n. 3823*.—*Eragrost. affine*, *Wall. l. c.*

Marshes in the SUNDERBUNDS, *Hamilton, Griffith, &c. S. INDIA? Herb. Wight. TENASSEMIM, Helfer.*

Stem 6-10 ft., densely tufted, erect from a stout sheathed sometimes floating rootstock with long branching roots, as thick as the thumb at the base, smooth, simple or sparingly branched. *Leaves* several feet long, up to $\frac{1}{2}$ in. broad, linear, finely acuminate, quite smooth; sheath very long, narrower than the blade, of lower leaves broad and compressed; ligule 0. *Panicle* 1-2 ft. by 2-3 in. broad; rachis quite smooth; branches 1-1 $\frac{1}{2}$ in., very many, crowded fascicled and whorled erecto-

patent, flowering to the base. *Spikelets* $\frac{1}{4}$ – $\frac{1}{2}$ in., 4–8-fl., compressed, quite smooth; pedicels short; gls. I and II unequal, keels scaberrulous, awn $\frac{1}{2}$ in. or more stiff stout.—In many respects *Myriostachya* is allied to *Eragrostis cynosuroides*, having a very similar inflorescence, and spikelets jointed on the branchlets of the panicle; but differs in the spikelets being pedicelled, in the long awned gls. I and II, and in its great size.

Var. *longispicula*; spikelets longer, up to $\frac{1}{2}$ in. and 8–20-fl.—Penang, *Curtis*. Ceylon; at Kottiyar, *Trimen*.

106. **HALOPYRUM**, Stapf.

A tall stout perennial glabrous grass, with a branching creeping sheathed rootstock. *Leaves* narrow, rigid, convolute. *Spikelets* large, many-fl., sessile or shortly pedicelled on the short alternate branches of an elongate panicle, ovate, strongly laterally compressed, not jointed on their pedicels, nor are the pedicels on the branches; rachilla jointed at the base and between the flg. glumes, silkily hairy. *Glumes* many, closely distichously imbricate, dorsally rounded, coriaceous, keeled, I and II subequal, empty, ovate-lanceolate, acuminate or apiculate; I 3-nerved, II 5-nerved; flg. gls. 6–10, rather shorter than the empty, mucronulate, 3-nerved; palea as long as the gl., subacute, 2-keeled. *Lodicules* 2, obcordate. *Stamens* 3. *Styles* short, free, stigmas elongate. *Grain* ellipsoid, compressed, deeply hollowed anticusly, free.

H. mucronatum, Stapf in Hook. Ic. Pl. t. 2448. *Brizopyrum mucronatum*, Nees in Wall. Cat. n. 8898; *Wight Cat.* n. 2386. *Desmazeria unioloides*, Desf. Voy. Yemen, 220. *Eragrostis mucronata*, Trim. Cat. Ceyl. Pl. 109 (non Roem. & Sch.). ? *Uniola mucronata*, Linn. Sp. Pl. 104; *Kunth Enum. Pl.* i. 425; *Steud. Syn. Gram.* 281. *Triticum repens*, Thwaites Enum. Pl. Zeyl. 376.—*Eluopus*, Aitchis. Cat. Panjab Pl. 169.—*Eragrostis* sp. Sect. *Sclerostachya*, Benth. in Gen. Plant. iii. 1187.

Coasts of INDIA from Sind to Cape Comorin and Tinnevely. CEYLON, *Gardner*, &c.—DISTRIB. Westward to Arabia and E. trop. Africa.

Stem below creeping, as thick as a crow-quill, hard, smooth, woody, with strict vermiform roots, sending up rigid slender flowering stems 12–18 in. high, and shorter leafing ones. *Leaves* 8–12 in., flat or convolute, very narrow, wiry, glaucous, finely acuminate, glabrous, sheath terete, appressed, striate, hard, mouth villous; ligule a few hairs. *Panicle* 12–16 in., erect or inclined; branches short with few spikelets and rachis quite smooth. *Spikelets* $\frac{1}{2}$ in. long, sessile or shortly pedicelled, smooth, white or pale yellowish; rachilla very short, hairs half as long as the gls.; gl. I hardly longer than the lowest flg. gl., ovate-lanceolate, apiculate, 5-nerved towards the centre; II $\frac{1}{2}$ longer, strongly 5-nerved.—There being no specimen of *Uniola mucronata* in Linnaeus's Herbarium its citation here is doubtful.

107. **COELACHYRUM**, Nees.¹ (See p. 8.)

108. **DIPLACHNE**, Beauv.

Tall perennial grasses. *Leaves* flat or convolute, narrow. *Spikelets* many-fl., spicate on the slender simple branches of a tall simple panicle,

¹ This genus was erroneously supposed to be Indian when the Key was drawn up.

not jointed at the base; rachilla jointed at the base and beneath each flg. gl., not produced beyond the uppermost gl. *Glumes* many, I and II unequal, obtuse, membranous, 1-nerved, persistent; flg. gls. rather longer, oblong, 1-3-nerved, tip 2-4-toothed, mucronate or awned; palea linear. *Lodicules* 2, broad. *Stamens* 3, anthers short. *Styles* distinct, stigmas plumose. *Grain* ovoid-oblong, subtrigonus, free within the gls. and palea. —Species about 14, of warm regions.

A second Indian species has lately been brought from Chitral, and will shortly be published by Dr. Stapf in the Kew Bulletin as *D. Gatacrei*.

D. fusca, Beauv. *Agrost.* 163; tall, leaves convolute, panicle long, spikelets $\frac{1}{4}$ – $\frac{1}{2}$ in. linear 4–10-fl. *Benth. Fl. Austral.* vii. 619; *Boiss. Fl. Orient.* v. 561; *Trim. Cat. Ceyl.* Pl. 109. *D. indica*, *Spreng. Syst.* i. 351. *Uralespis fusca*, *Steud. Syn. Gram.* 247; *Thwaites Enum. Pl. Zeyl.* 372. *U. Drummondii*, *Steud. l.c.* *Triodia ambigua*, *Br. Prodr.* 183. *Tridens indicus*, *Nees in Wight Cat.* n. 1794. *Leptochloa? fusca*, *Kunth Revis. Gram.* i. 91, *Enum. Pl.* i. 271. *Festuca fusca*, *Linn. Sp. Pl.* 109; *Del. Fl. Egypt.* 24, t. xi. f. 1. *F. indica*, *Retz. Obs.* iv. 21; *Kunth Enum.* 412. *F. reptatrix*, *Linn. Sp. Pl. Ed.* II. 108; *Kunth l.c.* 410. *Eragrostis procera*, *Steud. l.c.* 266. *Poa procera*, *Rowb. Fl. Ind.* i. 332; *Kunth l.c.* 345. *Bromus polystachios*, *Forsk. Fl. Æg. Arab.* 23. *Eragrostis*, *Wall. Cat.* n. 5013.—*Rheede Hort. Malab.* xii. t. 45.

UPPER GANGETIC PLAIN to BENGAL and southward to CEYLON.—DISTRIB. Egypt, Trop. Asia, Africa, and Australia.

Stem tufted, 3–5 ft., stout, erect, or geniculately ascending, often branched, clothed with leaf-sheaths. *Leaves* long, narrow, flat or convolute, smooth; sheaths smooth; ligule large, membranous, lacerate. *Panicle* 10–18 in., oblong, nodding; rachis smooth; branches 2–3 in., erect, filiform, smooth or scaberulous. *Spikelets* distant, very shortly pedicelled, pale or dark green; rachilla smooth or scaberulous; callus hairy; gls. I and II 1-nerved, tips erose, keels nearly smooth; I lanceolate; II $\frac{1}{2}$ longer, oblong; flg. gls. thinly coriaceous, 3-nerved, lateral nerves submarginal, tip 4-toothed, mucronate by the percurrent median nerve.

109. MELICA, Linn.

Perennial erect grasses. *Leaves* narrow. *Spikelets* in open or spiciform or racemiform panicles, laterally compressed, jointed or not on their pedicels, 1-3-fl. and with small convolute neuter gls. forming a clavate or narrow body terminating and jointed on the elongate rachilla. *Glumes* 4 or more, membranous, hyaline or with hyaline tips and margins; I and II equal or unequal, empty, I 1-3-nerved; II 5-nerved, persistent or separately deciduous; flg. gls. solitary, or 2-3 then distant on the rachilla, 5-9-nerved, lowest stipitate; palea 2-keeled. *Lodicules* 2, connate, often most minute or 0. *Stamens* 3. *Styles* free, stigmas plumose. *Grain* oblong fusiform or subcylindric.—Species probably 20 or 30, of temp. regions.

* *Panicle spiciform or racemiform; spikelets more or less jointed on their pedicels; lodicules most minute or 0.*

1. **M. Cupani**, *Guss. Fl. Sicul. Prodr. Suppl.* 17; panicle subspiciform, flg. gl. solitary clothed all over with long silky hairs. *Boiss. Fl. Orient.* v. 590; *Parlat. Fl. Ital.* i. 301. *M. ciliata*, *Duthie Grass. N.W. Ind.* 39 (non Linn.). *M. Jacquemontii*, *Decne in Jacquem. Voy. Bot.* 174, t. 175: *Duthie l.c.* *M. Hohenackeri*, *Boiss. Diagn. Ser. I.* xiii. 54. *M.*

micrantha, Boiss. & Heldr. var. *inæqualis*, Griseb. in Goett. Nachr. (1868) 76. *M. persica*, Kunth Revis. Gram. i. 351, t. 89, Enum. Pl. i. 375, Suppl. 311; Ledeb. Fl. Ross. iv. 398; Duthie l. c.; Griseb. l. c. 76, 77. *M. trachyantha*, Boiss. Diagn. Ser. I. vii. 124.

WESTERN HIMALAYA; in the drier regions from Kumaon westwards, alt. 7–11,000 ft. WESTERN TIBET, alt. 8–11,000 ft.—DISTRIB. Westwards to Spain and N. Africa.

Stems 8–18 in., densely tufted, creeping below, very slender. Leaves 2–8 in., very narrow, flat or convolute, and as well as the sheaths glabrous puberulous or tomentose with spreading or reflexed hairs; ligule oblong, short, or 0. Panicle 2–4 in.; rachis filiform, smooth; branches very short and pedicels scaberulous. Spikelets more or less secund, $\frac{1}{3}$ – $\frac{1}{2}$ in. long, suberect or spreading, pale straw-colrd. or dark purple; rachilla glabrous, very short slender and geniculate below the flg. gl., stouter and strict beyond it, articulate beneath the neuter gls. Glumes all scaberulous, I $\frac{1}{2}$ – $\frac{2}{3}$ shorter than II, ovate, subacute, 1–3. rarely 5-nerved; II lanceolate, acute, 5-nerved; flg. gl. about as long as II, clothed with straight hairs nearly as long as itself that spread when dry, 7-nerved; palea oblong, 2-toothed, scaberulous, keels ciliolate; lower neuter gls. coriaceous, glabrous scabrid hispidulous or rarely sparsely hairy, usually obliquely clavate and truncate, rarely oblong, strongly nerved. Lodicules 0 or most minute. Grain fusiform.—A most variable plant, presenting, according to Boissier, eight varieties, and under which are ranged fourteen species of his own and other authors. The Indian specimens may be roughly classed under two very distinct-looking forms, which, but for Boissier's wider experience and authority, I should have been disposed to regard as species; though I find specimens which seem to be intermediate between them. These are, *M. Cupani*, Guss. (which includes *trachyantha*, Boiss.) with stems 12–18 in. high, pale straw-colrd. spikelets $\frac{1}{4}$ – $\frac{1}{2}$ in. long, with gl. II usually only about $\frac{1}{2}$ longer than I; and *M. persica*, Kunth (including *Jacquemontii*, Decne.), with stems 6–12 in. high, purple (rarely pale yellowish) spikelets $\frac{1}{3}$ – $\frac{1}{2}$ in. long, and gl. II almost twice as long as I. In both the leaves or their sheaths or both, are glabrous or tomentose, and the club-shaped neuter gls. from nearly smooth to scabrid.

2. *M. nutans*, Linn. Sp. Pl. 66; panicle racemiform very lax, spikelets 2-fld., gls. I and II cymbiform very obtuse, III quite glabrous. Fl. Dan. t. 962; Host Gram. Austr. ii. 9, t. 10; Gærtn. Fruct. ii. 5, t. 80, f. 4; Schreb. Gram. ii. 62, t. 6, f. 2; Engl. Bot. t. 1059; Knapp Gram. Britt. t. 42; Kunth Enum. Pl. i. 376; Cav. Ic. t. 175; Reichb. Ic. Fl. Germ. t. 72; Steud. Syn. Gram. 291; T. Nees Gen. Fl. Germ. Monocot. i. n. 60; Ledeb. Fl. Ross. iv. 399; Boiss. Fl. Orient. v. 568.

KASHMIR, Falconer; at Hirpoor, alt. 8000 ft., Clarke.—DISTRIB. Europe, N. Asia.

Stem 10–18 in., very slender, inclined, from a long stoloniferous rootstock. Leaves 6–10 in., very narrow, acuminate, sparsely hairy; ligule very short or 0. Panicle long, nodding or drooping, rachis and few branches secund, capillary. Spikelets $\frac{1}{2}$ in. long, few, distant, very shortly pedicelled, pendulous, broadly oblong; gls. I and II subequal, scarious, green or purplish; III oblong, strongly many-nerved, scaberulous. Lodicules minute, connate. Grain fusiform.

** Panicle with spreading branches; spikelets not jointed on their pedicels; gl. I and II persistent; neuter gls. forming a small oblong body; lodicules 2, connate.

3. *M. scaberrima*, Hook. f.; branches of panicle elongate opposite alternate or 3-nate, spikelets 3–5-fld., gls. I and II ovate-lanceolate, flg. gls. narrowly lanceolate. Festuca scaberrima, Nees ex Steud. Syn. Gram. 316. Glyceria scaberrima, Steud. l. c.: Duthie Grass. N.W. Ind. 41. Poa Zizania, Jacquem. mss.

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 6-10,000 ft.

Stem 3-5 ft., very slender, flaccid, smooth. *Leaves* 8-10 by $\frac{1}{8}$ - $\frac{1}{3}$ in., more or less scabrid; sheaths scabrid, hirsute on the upper margins; ligule short, truncate, 2-auricled. *Panicle* very variable, rarely reduced to a subsimple raceme; rachis filiform; branches 2-5 in., at length horizontal, often 2 in. apart, smooth or scabrid. *Spikelets* often irregularly disposed, shortly pedicelled, crowded on short branchlets, or distantly scattered, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, pale green; rachilla slender, scaberulous; gl. I and II ovate-lanceolate, I 1-nerved; II 3-nerved; flg. gls. distant, lowest about twice as long as II, narrowly lanceolate, strongly 7-9-nerved, tip quite entire; palea shorter than its gl., keels scaberulous. *Lodicules* very minute. *Anthers* variable in length. *Grain* subcylindric or fusiform.—Closely allied to the Afghan *M. secunda*, Regel (*M. gracilis*, Aitch. & Hemsl.) a native of Afghan. and Turkestan.

Var. *micrantha*; spikelets $\frac{1}{3}$ in., leaf-sheaths nearly smooth, ligule hardly auricled.—Kishtwar, alt. 6000 ft., Clarke.

110. **LOPHATHERUM**, Brongn.

Tall slender leafy perennial grasses. *Leaves* petioled, lanceolate, acuminate, nerves tessellate. *Spikelets* 1-fl., narrowly lanceolate, terete, solitary, secund and jointed on the long strict alternate branches of a lax panicle; rachilla not jointed at the base, produced beyond the flg. gl. and bearing several closely sheathing awned empty gls. *Glumes* dorsally rounded, I and II empty, oblong, obtuse, margins membranous, 5-nerved, deciduous with the flg. gl.; III much longer, coriaceous, ovate-oblong, 7-9-nerved, mucronate or shortly awned; keels of palea narrowly winged, smooth. *Lodicules* 0. *Stamens* 3. *Styles* connate at the base, stigmas long. *Grain* oblong, free.—Species 1 or 2, trop. Asia.

L. gracile, Brongn. in Duperr. Voy. Bot. 50, t. 8; Kunth Enum. Pl. i. 391; Steud. Syn. Gram. 300; Benth. Fl. Hongk. 433; Thwaites Enum. Pl. Zeyl. 374; Trim. Cat. Ceyl. Pl. 109; Miq. Fl. Ind. Bat. iii. 400. *L. elatum*, Zoll. & Mor. Syst. Verz. Zoll. 102. *L. japonicum*, multiflorum and dubium, Steud. Syn. Gram. 300. *L. Lehmanni*, Nees ex Steud. l. c. *Acroelytrum japonicum*, Steud. in Flora, xxix. (1846) 21. *Allelothea Urvillei*, Steud. Syn. Gram. 117.—Centothecæ affine, Wall. Cat. n. 8900. —Griff. Ic. Pl. Asiat. t. 152, f. 2.

TROPICAL HIMALAYA, from Sikkim eastwards; the KHASIA and NAGA HILLS, BURMA, CEYLON (up to 4000 ft.), and the MALAYA PENINSULA.—DISTRIB. China, Japan, Malaya, N. Guinea.

Stem 2-5 ft., ascending from a branched woody rootstock. *Leaves* 4-10 by $\frac{1}{2}$ - $1\frac{1}{4}$ in., narrowed into a slender petiole $\frac{1}{4}$ - $\frac{1}{2}$ in. long; sheaths smooth; ligule minute. *Panicle* of few distant strict stiff smooth branches, 6-18 in. long. *Spikelets* $\frac{1}{2}$ - $\frac{3}{4}$ in., including the short awns of the closely imbricate upper empty glumes, which form a pencil of short erect or spreading bristles projecting from the apex of the tightly rolled flg. gls.—It is remarkable that this plant has not been observed in the Deccan Peninsula.

DOUBTFUL SPECIES.

L. DUBIUM, Steud. Syn. Gram. 300.—Herb. Wight. n. 1090. The description is of leaves only, and quite unrecognizable.

111. **CENTOTHECA**, Desv.

Tall perennial grasses. *Leaves* broadly lanceolate, tessellately nerved. *Spikelets* 1-2-fl., secund on the long branches of a lax subsimple panicle,

not jointed on the very short pedicels; rachilla jointed at the base and between the flg. gls. *Glumes* 5, I and II oblong-ovate, keeled, 3-5-nerved, empty, persistent; flg. gls. oblong, acute, dorsally rounded, 7-nerved, naked or the upper bearing soft erect at length deflexed tubercle-based spines above the middle; palea shorter than the gl., keels ciliolate. *Lodicules* 0. *Stamens* 2-3, anthers short. *Styles* free. *Grain* ovoid, acute, terete, free.—Species 1 or 3?, Trop. Asia, Africa, Australia.

C. lappacea, Desv. in *Nouv. Bull. Soc. Philom.* ii. (1810) 189, & in *Journ. Bot.* i. (1813) 70; *Beauv. Agrost.* 69, t. 14, f. 7; *Kunth Revis. Gram.* i. 317, t. 70, *Enum. Pl.* i. 366, *Suppl.* 302; *Steud. Syn. Gram.* 116; *Thw. Enum. Pl. Zeyl.* 374; *Trin. Cat. Ceyl. Pl.* 109; *Wall. Cat. n.* 3826; *Griff. Notul.* iii. 62, *l.c. Pl. Asiat.* t. 152, f. 1; *Miq. Fl. Ind. Bat.* iii. 398; *Benth. Fl. Austral.* vii. 640; *Hochst. in Bot. Zeit.* (1857) 33; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 388. *C. latifolia*, *Trin. Fund. Agrost.* 141. *C. parviflora*, *Anderss. in Peters. Reise Mosamb. Bot.* 559. *Hierochloa*? *latifolia*, *Kunth Revis. Gram.* i. 21. *Holcus latifolius*, *Osbeck. Iter.* 247; *Linn. Syst. Ed.* x. 1305. *Oplismenus*? *magellanicus*, *Roem. & Sch. Syst.* ii. 485. *Melica lappacea*, *Rasp. in Ann. Sc. Nat. Ser. I. v.* (1825) 443. *M. diandra* & *refracta*, *Roeb. Fl. Ind.* i. 327. *Poa latifolia*, *Forst. f. Prodr.* 8; *Vahl Symb.* ii. 18. *P. malabarica*, *Linn. Sp. Pl.* 69; *Burm. Fl. Ind.* 27, t. 11, f. 2. *P. nemoralis*, *Heyne ex Wall. Cat. n.* 3826. *A. Torresia*? *latifolia*, *Beauv. l.c.* 165. *T. biflora*, *Roem. & Sch. Syst.* ii. 515. *Uniola lappacea*, *Trin. in Act. Petrop.* VI. i. (1831) 358, *Sp. Gram. l.c.* t. 298. *Cenchrus lappaceus*, *Linn. Sp. Pl. Ed.* II. 1488. *Festuca latifolia*, *Roth. Nov. Pl. Sp.* 75. *F. blepharophora*, *Roem. & Sch. Syst.* ii. 728. *F. ciliaris*, *Heyne ex Roem. & Sch. l.c.* *F. ciliata*, *Hb. Heyne ex Wall. Cat. n.* 3826. *A. F. virgata*, *Heyne ex Steud. Nom. Ed.* II. i. 633. *Panicum festuciforme*, *Hochst. Pl. Ind. Or. Hohenack.* n. 363.—*Panicum*, *Wall. Cat. n.* 8708.

TROPICAL SIKKIM HIMALAYA, the KHASIA HILLS, MUNNIPORE, BURMA, CENTRAL INDIA, and southward to MALACCA, the ANDAMAN ISLDS., and CEYLON.—DISTRIB. Malaya, China, Polynesia, Africa trop.

Stem 1-3 ft., stout, erect from a branched woody rootstock, with stout root-fibres. *Leaves* 4-10 by 1-1½ in., many-nerved, glabrous or sparsely hairy, base narrow obtuse or subcordate, midrib oblique; sheath glabrous or hairy; ligule short, lacerate. *Panicle* 8-10 in. long and broad, branches smooth. *Spikelets* ½-¾ in., green; rachilla scaberulous; palea often decurrent on the rachilla below the gl.—The number of flg. gls. varies, but 5 is, I think, a normal; I and II are rather distant at the base. In one spikelet I find 6 gls., of which III was empty naked and epaleate, IV naked and paleate, V and VI with stout reversed tubercle-based spines; not unfrequently the fem. spikelet has only a single strongly-armed gl. and a produced rachilla. *Kunth* (l. c. *Suppl.* 302) describes gl. III and IV as complete and bisexual, V minute and imperfect. I suspect that this grass is polygamous.

112. **STREPTOGYNA**, Beauv.

A tall erect perennial grass. *Leaves* petioled, flat; nerves tessellate. *Spikelets* 1-4-fld., narrow, terete, subsessile, not jointed on the long, rigid, strict, unilateral spike; rachilla elongate and jointed between the fl. gls. *Glumes* 3-6, very narrow, I and II empty, persistent; I small, 3-nerved; II longer, convolute, acute, awnless, many-nerved; III longer, rigid, tightly convolute, many-nerved, acuminate and awned; IV-VI empty; palea embraced by the gl., narrow, 2-fld. *Lodicules* 3, subulate. *Stamens*

2-3. *Styles* filiform; *stigmas* 2-3, very long, at length spirally twisted. *Grain* linear, terete, free but closely embraced by the gl. and palea.

S. crinita, Beauv. *Agrostogr.* 80, t. 16, f. 8; *Poir. Encycl. Suppl.* t. 912; *Kunth Enum. Pl.* i. 427, *Suppl.* 349; *Doellin Mart. Fl. Bras.* ii. 111. 171, t. 46; *Steud. Syn. Gram.* 339; *Griseb. Fl. Brit. W. Ind.* 528; *Thw. Enum. Pl. Zeyl.* 374; *Trim. Cat. Pl. Ceyl.* 110; *Wight Cat. n.* 2362. *S. guianensis*, Rich. ex Roem. & Sch. *Syst.* ii. 614. *Streptia crinita* & *secunda*, *Herb. Rich.*

TRAVANCORE; Courtallam, Wight, Beddome. CEYLON; Matele district, Gardner. DISTRIB. Africa and America trop.

Stem 4-6 ft., smooth. *Leaves* often as long as the stem, lanceolate, gradually narrowed to the base and apex, membranous; sheath long, open; ligule short. *Spikes* terminal, 8-16 in. long, with a spathiform basal sheath; rachis compressed, smooth, produced beyond the spikelets, with often an imperfect glume. *Spikelets* 1 in., quite smooth and glabrous; gls. subcoriaceous; I lanceolate, finely acuminate; III narrowed into the very slender awn, $\frac{1}{2}$ - $\frac{3}{4}$ in. long. *Anthers* very long and narrow.

113. **ÆLUROPUS**, Trin. (ex parte).

Low much branched rigid leafy perennial grasses. *Leaves* distichous, usually spreading and convolute, rigid and pungent, rarely flat. *Spikelets* 6-many-fl., sessile or subsessile in oblong spiciform panicles or capitate, densely crowded, laterally compressed, villous, not jointed on their pedicels; rachilla jointed at the base and between the flg. gls. internodes very short. *Glumes* many, oblong, membranous, dorsally rounded, apiculate cuspidate or mucronate, I and II shorter than the flg. gls., I 1-3-nerved; II 5-7-nerved; fl. gls. closely imbricate, 7-9-nerved, longer than the empty gls.; palea as long and broad as its gl., broader upwards, truncate, keels ciliate. *Lodicules* 2, obliquely truncate. *Stamens* 3, anthers small. *Styles* free, stigmas plumose. *Grain* ovoid to oblong, free.—Species few, Reg. Mediter. Oriental and Indian.

Parlatore (*Fl. Ital.* i. 462) has, under *Æl. littoralis*, pointed out that two plants have been referred to *Æ. levis*, Trin., namely, *Dactylis brevifolia*, Koen., and *D. littoralis*, Willd. The former of these is an Indian species, on which alone Trinius founded the genus, the latter being subsequently referred to it by Steudel (*Nom. Ed.* II. i. 30); but Parlatore was not aware of *D. brevifolia* being a species of *Eleusine*, and that therefore *Æluropus*, Trin., has no foundation. That this is so is evidenced both by Trinius's citation of Koenig's plant by name as his *levis*, and by his figure of the fruit (*Agrost. Fund.* t. 12), which is conclusive. It would, however, appear from C. A. Meyer (*Verz. Pfl. Cauc.* 18 (1831) that Trinius may have included both *D. brevifolia* and *littoralis* under his *A. levis*; for that author, quoting no doubt from the St. Petersburg Herbarium, cites *levis* and *villosus* as species of Trinius, giving (by error) *D. littoralis* as the authority for *levis*, and *Poa repens*, Bieb., for *villosus*. Under these circumstances it appears to me that the best course to adopt, is to retain *Æluropus* as "Trin. ex parte," for *D. littoralis* and other plants described by later authors under that generic name. The alternatives are either to coin a new name for the latter, or to adopt for these *Calotheca*, Spreng. (*Syst.* i. 342 (1825), which is a mixture of several genera, including *Æluropi*, and which name is better avoided, inasmuch as there is an earlier *Calotheca* (Desv. 1810), likewise made up of several genera of grasses. It remains to say that the synonyms of *Eleusine brevifolia* (see p. 295), and of *Æluropus littoralis* and *villosus* are almost inextricably involved; and I am far from being satisfied with my attempt to disentangle the first and last of them.

Æ. villosus, *Trin. ex C. A. Mey. Verz. Pfl. Cauc.* 18; spikelets in short heads. *Aitchis. Cat. Panjab. Pl.* 169. *Æ. arabicus*, *Steud. Nom. Ed. II. i.* 30. *Æ. brevifolius*, *Wall. Cat. n.* 8897; *Wight Cat. n.* 1792 (*non Herb. Wight & excl. Syn. Dactylis brevifolia, Linn.*); *Duthie Grass. N.W. Ind.* 39. *Æ. concinnus & siniacus*, *Fig. et Notar. in Mem. Acad. Torin. Ser. II. xii.* (1852) 257. *Æ. lagopodioides*, *Trin. ex Thw. Enum. Pl. Zeyl.* 374. *Æ. lagopoides*, *Trin. ex Trim. Cat. Ceyl. Pl.* 110. *Æ. littoralis*, *var. repens*, *Coss. & Dur. Expl. Sc. Alger.* 155; *Boiss. Fl. Orient. v.* 594. *Æ. mucronatus*, *Aschers. in Schweinf. Beitr. Fl. Æthiop.* 297; *Boiss. l. c.* 595. *Æ. niliacus*, *Steud. Nom. Ed. II. i.* 30. *Æ. niloticus*, *Edgew. in Journ. Linn. Soc. vi.* (1862) 196. *Æ. pubescens*, *Trin. ex Steud. l. c. in part ?* *Æ. pungens*, *C Koch. in Linnæa*, xxi. (1848) 408. *Æ. repens*, *Parl. Fl. Ital. i.* 462; *Edgew. l. c.* *Dactylis lagopodioides*, *Dalz. & Gibs. Bomb. Fl.* 298 (*excl. Syn.*). *D. lagopoides*, *Linn. Mant.* 33; *Burm. Fl. Ind.* 28, t. 12, f. 2. (*the right hand portion*), *Roxb. Fl. Ind. i.* 340; *Grah. Cat. Bomb. Pl.* 236 (*excl. Syn.*). *D. massaviensis*, *Steud. Syn. Gram.* 298. *D. repens*, *Desf. Fl. Atlant. i.* 79, t. 15. *Poa lagopodioides*, *Kunth Revis. Gram. i.* 111, *Enum. i.* 325. *P. massavensis*, *Fresen. in Mus. Senkenb. ii.* (1837) 143. *P. repens*, *Bieb. Fl. Taur. Cauc. iii.* 69. *P. tunetana*, *Spreng. Pugill. ii.* 20. *Calotheca arabica*, *niliaca & repens*, *Spreng. Syst. Veg. i.* 347, 348. *Duthie l. c.* (*err. typ. miliacea*). *Kœleria lagopodioides*, *Panz. in Denkschr. Acad. Muench. K. brevifolia*, *Herb. Wight ex Wall. Cat. n.* 8897 C. *Sesleria lagopodioides*, *Spreng. Pugill. ii.* 22. *Festuca mucronata*, *Forsk. Fl. Ægypt. Arab.* 22. *F. pungens*, *Vahl Symb. i.* 10, t. 2. *Uralepis ? pungens*, *Kunth Revis. Gram. i.* 108, *Enum. i.* 319.

Sandy shores of the DECCAN PENINSULA and CRYLON. Salt plains of the PANJAB and SCIND.—DISTRIB. Reg. Mediterr., Arabia, Persia, Affghan., Reg. Casp.

A rigid perennial herb, with long wiry roots. *Stems* 6-12 in., densely tufted, branched, hard, smooth, erect, or prostrate with long often creeping stolons, base slightly swollen, clothed with rigid glabrous or hairy sheathing scales, above clothed with leaves, and terminating in a naked glabrous or pubescent slender peduncle 1-4 in. long. *Leaves* $\frac{1}{2}$ -1 in., erect or spreading and recurved, subulate-lanceolate or acicular, coriaceous, pungent; convolute, rarely flat, striated with close-set nerves, base rounded, glabrous or sparsely hairy, midrib obscure, margins smooth or scaberulous; sheaths short, terete, inflated or dilated, glabrous or ciliate; ligule a ridge of short hairs. *Heads* $\frac{1}{4}$ - $\frac{2}{3}$ in. diam., globose ovoid or oblong. *Spikelets* $\frac{1}{15}$ - $\frac{1}{10}$ in., 4-many-fld., crowded, sessile, villous with soft hairs, pale green or white; gls. closely imbricate, ovate-oblong, apiculate, concave, margins hyaline, nerves strong; I 3-5-nerved; II longer, 7-9-nerved; flg. gls. rather longer than the empty, many-nerved, lower 2-4 sometimes neuter; palea broadly truncate or 3-lobed, keels villous. *Ovary* obovoid. *Grain* $\frac{1}{10}$ in., obovate-oblong, compressed dorsally.—A very variable grass in habit, foliage and size of the heads and spikelets. Regarded by *Cosson* and others as a form of *Æ. littoralis*, in which the panicle is elongate.

114. **DACTYLIS**, *Linn.*

Stiff erect tufted perennial grasses. *Leaves* flat. *Spikelets* 3-10-fld. compressed, subdistichously crowded in short unilateral spikes forming a terminal unilateral panicle, not jointed at the base; rachilla continuous, glabrous. *Glumes* I and II unequal, scarious, lanceolate, acuminate or mucronate, keeled, empty, persistent; I 1-nerved, II 1-3-nerved; flg. gls. rather longer, rigid, 5-nerved, subaristate, keel scabrid; palea 2-fld, keels ciliolate. *Lodicules* 2, 2-lobed, fleshy. *Stamens* 3, anthers long. *Styles* free, terminal, stigmas plumose. *Grain* oblong, acute, trigonous, dorsally

subcompressed, ventrally channelled, glabrous.—Species few, Europe temp. Asia and Africa.

D. glomerata, Linn. *Sp. Pl.* 86; leaves keeled, sheaths compressed, ligule long laciniate, panicle erect or inclined, branches short or the lower long erecto-patent naked below, spikelets 3-5-fld., keels of flg. gls. ciliate-scabrid. *Beauv. Agrost.* 85, t. 17, f. 5; *Fl. Dan.* t. 743; *Host Gram. Austr.* ii. 67, t. 94; *Kunth Enum. Pl.* i. 386, *Suppl.* 320, t. 29, f. 1; *Engl. Bot.* t. 335; *Knapp Gram. Britt.* t. 62; *Reichb. Ic. Fl. Germ.* t. 59 (excl. f. 1520); *T. Nees Gen. Fl. Germ. Monocot.* i. n. 65; *Webb. Phytog. Canar.* t. 249; *Wall. Cat.* n. 8899; *Duthie Grass. N.W. Ind.* 39; *Ledeb. Fl. Ross.* iv. 355; *Boiss. Fl. Orient.* v. 596. *Festuca glomerata*. *All. Fl. Pedem.* ii. 252.

NORTH-WESTERN HIMALAYA from Kashmir to Kumaon, and WESTERN TIBET, alt. 8-10,000 ft.—DISTRIB. Europe, N. Africa, W. and N. Asia (an alien elsewhere).

Stem 2-3 ft. from a short creeping stock, smooth. *Leaves* subglaucous, glabrous or hairy towards the base, margins scabrid; sheath much flattened or 2-edged. *Panicle* 1-6 in., strict, green or purplish; lower branches sometimes 2-3 in. long. *Spikelets* $\frac{1}{2}$ - $\frac{1}{4}$ in., ovate; gls. I and II pale with green nerves, subaristately acuminate, terminal flg. gl. sterile.—There are many synonyms of this commonly variable European plant, but the whole genus must be studied before the species can be disentangled.

115. **SCLEROCHLOA**, Beauv.

A small annual prostrate grass. *Spikelets* minute, 3-6-fld., compressed, biserially crowded on the branches of a second subspiciform panicle; rachilla thickened under the flg. gls. *Glumes* 5-8; I and II very unequal, membranous, concave, emarginate, empty, persistent, I 3-nerved; II 5-8-nerved, unequal-sided; fl. gls. larger, complicate, keeled, strongly 5-nerved, tip obtuse, margins hyaline; palea hyaline, 2-fld, keels spinulosely ciliate. *Lodicules* 2, hyaline, ovate, 2-4-toothed. *Stamens* 3. *Styles* short, free, stigmas plumose. *Grain* oblong, free, subconcavo-convex, glabrous, tip 2-fid.

S. dura, Beauv. *Agrost.* 98, t. 14, f. 4; *Reichb. Ic. Fl. Germ.* t. 50, *Ledeb. Fl. Ross.* iv. 367; *Boiss. Fl. Orient.* v. 635; *Griseb. in Goett. Nachr.* (1863) 293. *Poa dura*, Scop. *Fl. Carn.* i. 70; *Host Gram. Austr.* ii. 53, t. 73. *Sesleria dura*, *Kunth Revis. Gram.* i. 110, *Enum. Pl.* i. 323, *Suppl.* 278. *Cynosurus durus*, Linn. *Sp. Pl.* 72; *Pollich Hist. Palat.* i. 98, *Fig. 1*. *Mesline dura*, Lamk. *Illust.* i. 203. *Festuca dura*, Vill. *Hist. Pl. Dauph.* ii. 94. *Amblychloa dura*, Link in *Linnæa*, xvii. (1843) 399.

Kashmir Valley, alt. 5000 ft., Thomson.—DISTRIB. Europe, N. Asia.

Stems 4-6 in., tufted, compressed, leafy throughout. *Leaves* linear, acute; sheath open; ligule oblong. *Panicle* 1-2 in., ovate-oblong, rigid, green; pedicels very short, stout, trigonous. *Spikelets* $\frac{1}{4}$ - $\frac{1}{2}$ in., spreading or appressed to the rachis; gl. I ovate-oblong, obtuse, keeled, margins hyaline; II twice as long; flg. gls. ovate-oblong, herbaceous, compressed above; palea shorter, oblong.

116. **SCHISMUS**, Beauv.

Small annual grasses. *Leaves* narrow. *Spikelets* many-fld., in a subspiciform panicle, with very short erect branches and pedicels, not jointed

at the base; rachilla elongate, jointed at the base and between the flg. gls. *Glumes* 6-10; I and II large, empty, subequal, lanceolate, acute, concave, persistent, herbaceous, margins scarious, I broadest, 5-7-nerved; II 3-nerved; flg. gls. much shorter, oblong or obovate, 2-fid, many-nerved, mucronate or not between the hyaline lobes; palea spatulate with 2 submarginal diverging basal nerves. *Lodicules* 2, hyaline, truncate. *Stamens* 3, anthers minute. *Styles* terminal, long, stigmas plumose. *Grain* minute, broadly obovoid, compressed, free.—Species 2 or 3, Europ. Asia, N. Africa.

S. marginatus, Beauv. *Agrost.* 74, t. 15, f. 4; *Kunth Enum. Pl.* i. 385, *Suppl.* 318, t. 28, f. 2; *Ledeb. Fl. Ross.* iv. 403; *Duthie Grass. N.W. Ind.* 39. *S. calycinus*, C. Koch in *Linnæa* xxi. (1848) 397; *Coss. & Dur. Expl. Sc. Alger.* 138, in *Bull. Soc. Bot. Fr.* iv. (1857) 399; *Boiss. Fl. Orient.* v. 599. *S. hirsutus*, Trin. *Fund. Agrost.* 148. *Festuca calycina*, Loebl. *It. Hispan.* 116; *Cav. Ic.* i. 88, t. 44, f. 2; *Lamk. Illustr.* t. 46, f. 5. *Koeleria calycina*, DC. & DuRoi. *Bot. Gall. Suppl.* 271. *Hemisacris gonatodes*, Steud. in *Flora*, xii. (1829) 490. *Electra calycina* & *nitida*, Panz. in *Muench. Denkschr.* iv. (1813) 299 *cum* *Ic. Trisetum Loefflingianum*, *Duthie Grass. N.W. Ind.* 31 (*non* Beauv.).—Griff. *Notul.* 96 (*gramen pusillum*, &c.), *Ic. Pl. Asiat.* t. 154, f. ii.

UPPER PUNJAB; Peshawur, Stewart. WESTERN TIBET, alt. 9-11,000 ft., Nubra and Dras, Thomson, Iskardo, Clarke.—DISTRIB. Westwd. to the N. Atlantic, N. Asia.

Stems 2-8 in., densely tufted, filiform. *Leaves* glabrous or sparsely hairy, $\frac{1}{10}$ in. broad; ligule of hairs. *Panicle* $1\frac{1}{2}$ -2 in., green, glistening, pedicels scabrid. *Spikelets* $\frac{1}{4}$ in.; gl. I and II glabrous; flg. gls. hairy, cleft to about $\frac{1}{2}$ of their length; lobes ovate, acute.

117. **BRIZA**, Linn.

Annual or perennial erect grasses. *Leaves* flat or convolute. *Spikelets* many-fld., laterally compressed, pendulous, in lax rarely contracted or spiciform panicles not jointed on the pedicel; rachilla jointed at the base. *Glumes* many, scarious, cymbiform or saccate, closely imbricate; I and II subequal, empty, 3-5-nerved, persistent; fl. gls. broader, obtuse acute or shortly awned, 5- or more-nerved, terminal often empty or imperfect; palea often small, broad, flat, hyaline, 2-nerved. *Lodicules* 2, ovate-lanceolate. *Stamens* 3. *Styles* free. *Grain* ovoid, dorsally compressed, closely invested by the palea.—Species about 10, of temperate regions.

B. maxima, Linn., has been found as an escape in several parts of India. It may be recognized by the very large spikelets. *B. minor*, L., with very small spikelets may be also expected to occur.

B. media, Linn. *Sp. Pl.* 70; perennial, panicle erect, branches spreading, spikelets ovate 5-9-fld., gl. I and II shorter than III. *Fl. Dan.* t. 258; *Host Gram. Austr.* ii. t. 29; *Knapp. Gram. Britt.* t. 60; *Engl. Bot.* t. 340; *Trin. Sp. Gram. Ic.* t. 291; *Reichb. Ic. Fl. Germ.* i. t. 92; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 59; *Kunth Enum. Pl.* i. 371, *Suppl.* 307, t. 25, f. 2; *Ledeb. Fl. Ross.* iv. 365; *Boiss. Fl. Orient.* v. 502; *Duthie Grass. N.W. Ind.* 39.

WESTERN HIMALAYA; from Kashmir to Garwhal, and WESTERN TIBET, alt. 9-13,000 ft. SIKKIM, at Gnatong, Cummins.—DISTRIB. Europe, N. Asia. (An alien elsewhere.)

Stem 1-3 ft., very slender, creeping below and stoloniferous. *Leaves* flat, smooth or scaberulous; sheaths smooth, upper inflated; ligule short. *Panicle* pyramidal; branches long, capillary, horizontal. *Spikelets* $\frac{1}{4}$ - $\frac{1}{2}$ in., green or purplish, shining, orbicular-ovate; fl. gls. cordate, imbricate.

118. POA, Linn. (by O. Stapf).

Annual or perennial grasses. *Leaves* flat or convolute. *Spikelets* 2-6-fld., in lax or close rarely spiciform panicles, laterally compressed; rachilla jointed at the base and between the fl. gls., glabrous or sparsely hairy, upper fl. usually imperfect. *Glumes* 4 or more, acute or obtuse, usually thinly herbaceous; I and II empty, persistent, 1-3-nerved, keeled; flg. gls. obtuse or acute, 5-7- very rarely 3-nerved, nerves converging towards the top, callus often bearded with long wool; palea shorter than the gls., 2-keeled. *Lodicules* 2. *Stamens* 3. *Styles* short, free, stigmas plumose. *Grain* ovoid oblong or linear, free or adherent to the palea. —Species about 80, temperate and cold regions, rarely tropical.

The Indian *Poae* have been worked up by Dr. Stapf, who has kindly given me his mss., from which the characters given below are taken. The nomenclature agrees closely with that of Hackel in a very extensive series of North Indian grasses collected by Mr. Duthie. The names of early distributed collections including those of Dr. Thomson and myself were given by Genl. Munro after a cursory examination, and should be disregarded.

Subgen. I. PSEUDOPOA, C. Koch. *Fl. gls.* 3-nerved, often very faintly.

1. **P. persica**, Trin. in Mem. Acad. Sc. Petersb. Ser. VI. i. (1831) 373; Kunth Enum. Pl. i. 358; Boiss. Fl. Orient. v. 610; Steud. Syn. Gram. 255. *P. parvula*, Herb. Un. Itin. ex Steud. l. c. *P. pamphylica*, Boiss. Diagn. Ser. I. xiii. 58. *Nephelochloa persica*, Griseb. in Ledeb. Fl. Ross. iv. 366, in Goett. Nachr. (1868) 74. *Festuca persica*, heptantha, & polygama, C. Koch in Linnaea, xxi. (1848) 409, 410. F. Amherstiana, Royle Ill. Himal. Bot. 417 (name only).—*Poa*, n. 19, 20, Herb. Ind. Or. H. f. & T.

WESTERN HIMALAYA; from Kunawur to Kashmir and WESTERN TIBET, alt. 7-12,000 ft.—DISTRIB. Westwd. to Asia Minor, Soongaria, Altai Mts.

A very slender erect, quite glabrous, usually flaccid annual, 1-18 in. high, most variable in habit; from a simple capillary stem with few or contracted panicle, to a tall strict herb, with a pyramidal or oblong copiously branched panicle 6-8 inches long, and sometimes 6 in. across the spreading branches. *Leaves* narrowly linear, rarely $\frac{1}{2}$ in. diam., quite smooth, flat; ligule lanceolate. *Panicle-branches* 2-9 in a whorl, pedicels capillary, often very long and divaricate. *Spikelets* $\frac{1}{16}$ - $\frac{1}{4}$ in. long, 2-15-fld., green, rachilla slender; gls. I and II lanceolate, acuminate, I very small, II 3-nerved; flg. gls. longer than II, linear-oblong, acute acuminate or obtuse and mucronate, smooth or obscurely puberulous, tip and margins more or less broadly scarious and shining; palea 2-toothed, keels scaberulous. *Lodicules* ovate-oblong. *Anthers* minute. *Grain* narrow, linear, subadherent.

The following are divergent forms with many intermediates of this extremely variable grass. In India they do not seem to affect special localities. All seem to occur in Western Tibet, where the plant is very abundant.

P. PERSICA proper; rather tall, spikelets many-fld., fl. gls. acute or acuminate very narrowly scarious.

Var. *soongarica*; spikelets 1-3-fld., flg. gls. acuminate, margins broadly scarious. var. *oxymeris*, Boiss. Fl. Orient. l. c. *P. soongarica*, Boiss. l. c. 611. *P. paradoxa* & *P. subtilis*, Kar. & Kir. in Bull. Soc. Nat. Misc. (1841) 464, (1842) 532. *P. diaphana* (error for *diaphora*), Trin. in Bull. Sc. Acad. Petersb. i. (1836) 69.

Nepheleochloa altaica & *soongarica*, Griseb. in Ledeb. Fl. Ross. iv. 367. *Glyceria soongarica*, Schrenk in Fisch. & Mey. Enum. Pl. Schrenk. i. 1. *Aira altaica*, Trin. in Bunge Verz. Suppl. Fl. Altaic. 8.

Var. *alpina*, Boiss. l. c. 610; 1-2 in. high, fastigiately branched, panicle depressed amongst the leaves, rachis short, branches crowded spreading subsquarrosely and decurved, spikelets 2-3-fld. fl. gl. acute. Var. *minor*, Boiss. in Bourg. Pl. Lycia (1860).

Var. *major*, Boiss. l. c.; tall, panicle spreading, spikelets few or many-fld., flg. gls. truncate or rounded at the tip mucronate, margins very narrowly scarious. *Nepheleochloa tripolitana*, Boiss. & Blanch. Diagn. Ser. II. iv. 133.

Subgen. II. EUPOA. Flg. gls. 5-nerved, lateral pairs sometimes obscure.

* Stem bulbously thickened at the base.—§ *Arenariæ*.

2. **P. bulbosa**, Linn. Sp. Pl. 70, var. *elanata*, Stapf; densely tufted, leaves linear acute flat, ligule ovate or oblong, panicle oblong, lower branches binate, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. 4-7-fld. subsessile crowded often viviparous, gl. I ovate acute margin broadly hyaline, flg. gls. oblong acute, upper $\frac{1}{2}$ – $\frac{1}{3}$ hyaline silkily hairy below the middle, nerves obscure, wool 0 or very scanty, keels of palea scabrid. *P. bulbosa*, Duthie Grass. N.W. Ind. 40; Griseb. in Goett. Nachr. (1868) 74.

WESTERN HIMALAYA; from Kashmir to Zanskar, alt. 5-9000 ft., Falconer, &c. WESTERN TIBET, alt. 9-13,000 ft.—DISTRIB. (of *P. bulbosa*) temp. Europe and Asia.

Stems 6-16 in., terete, smooth. Leaves chiefly subradical, margins smooth, shortly acute, lower 2-2 $\frac{1}{2}$ in., upper much shorter, $\frac{1}{2}$ in. broad, of the surculi very narrow; sheaths lax, often open, upper more appressed shorter than the internodes; ligule $\frac{1}{2}$ – $\frac{1}{3}$ in., or shorter in reduced forms. Panicle 1-2 in., rarely ovate, lobed, contracted, lower branches nearly smooth; branchlets short, scaberulous. Spikelets shortly pedicelled or subsessile, oblong or ovate-oblong, pale green; gl. I $\frac{1}{2}$ – $\frac{1}{3}$ in., ovate, acute, 3- rarely 2-nerved, margins denticulate, nerves rough; II similar but larger, more acuminate, 3-nerved; fl. gls. $\frac{1}{2}$ – $\frac{1}{3}$ in., oblong, acute, sometimes mucronulate, upper $\frac{1}{2}$ – $\frac{1}{3}$ hyaline; nerves obscure; palea $\frac{1}{2}$ shorter. Anthers $\frac{1}{15}$ – $\frac{1}{12}$ in.—Differs from typical *bulbosa* in the absence or scantiness of wool in the spikelets. Kashmir specimens are unusually tall and stout, with many broad leaves and sometimes a laxer habit. Zanskar ones are typical in all respects but the absence of wool. The viviparous state is very common.

** Stem not bulbously thickened at the base.

+ Spikelets broadly ovate; gls. thin, broad, dorsally strongly arched, fl. gl. base silkily hairy, wool 0.—§ *Alpinæ*.

3. **P. alpina**, Linn. Sp. Pl. 67; deusely tufted, surculi clothed with short distichous thickish sheaths, leaves short broadly linear firm acute, panicle broadly ovate, lower branches mostly binate, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. 3-6-fld. broadly ovate, gls. all thin arched, I ovate acute margin broadly hyaline, flg. gls. ovate-oblong obtuse upper $\frac{1}{2}$ hyaline silky-hairy below the middle nerves obscure, wool 0, keels of palea ciliate below the middle. Host Gram. Austr. ii. 49, t. 67; Engl. Bot. t. 1003; Knapp Gram. Britt. t. 50; Reichb. Ic. Fl. Germ. t. 83; Ledeb. Fl. Ross. iv. 370; Boiss. Fl. Orient. v. 605; Griseb. in Goett. Nachr. (1868) 74; Duthie Grass. N.W. Ind. 40.

WESTERN HIMALAYA and WESTERN TIBET; from Kashmir to Garwhal, alt. 10-16,000 ft.—DISTRIB. N. temp. and Arctic regions.

Stem 4-16 in., terete, smooth. Leaves chiefly crowded at the base of the stem; rarely more than $\frac{1}{2}$ in. broad, flat or of the surculi plicate, firm, margins rough; lowest sheaths and of the surculi distichous, the thickened bases enclosing the stem, upper

much longer, up to 2-4 in., smooth, open or not, uppermost remote from the panicle; ligule of the lower and of the surculi very short, truncate, ciliolate, of the upper longer, ovate, sparingly coarsely denticulate. *Panicle* up to $2\frac{1}{2}$ by 2 in., lax or dense, lower branches more or less spreading, usually naked in the lower half; branchlets short, scaberulous. *Spikelets* crowded, usually parti-coloured, the lower shortly upper longer-pedicelled; gls. thin, I $\frac{1}{2}$ in., 3-nerved, lateral nerves faint or one obsolete, margins subentire, keel rough; II similar, but rather broader; fl. gls. $\frac{1}{8}$ - $\frac{1}{2}$ in., often emarginate; palea hardly shorter, keels ciliate below the middle, serrulate above it. *Anthers* $\frac{1}{8}$ in., oblong.

†† Spikelets narrower, gls. all or flg. especially firmer, I and II lanceolate or oblong-lanceolate.

a. *Gls. all firm; I & II acute or subacuminate, I 1- or sub 3-nerved; anthers* $\frac{1}{18}$ - $\frac{1}{12}$ in.—*Rather tall robust or subrobust species, stoloniferous when flg.; stems smooth.*—§ *Pratenses.*

4. ***P. tibetica***, Munro & Duthie *Grass. N.W. Ind.* 41; tall, stout, stoloniferous, leaves linear acute firm, ligule short truncate, panicle contracted or spiciform, lower branches 2-4-nate unequal smooth, spikelets $\frac{1}{5}$ - $\frac{1}{4}$ in. 4-6-fld. pedicelled crowded pale, gl. I ovate-lanceolate margin hardly hyaline, II ciliate on the margins towards the base, fl. gls. oblong, tips only hyaline, keel alone silkily hairy, lateral nerves obscure, wool 0.

WESTERN TIBET, alt. 9-16,000 ft.; Piti, *Jacquemont*; saline plains of Ladak, &c., *Thomson*. PLAINS OF TIBET N. of Kumaon, alt. 15,000 ft., *Strachey & Winterbottom* (*Poa*, n. 1.)

Stem 12-20 in., stout, terete, smooth, closely sheathed below, 1-2-leaved much below the panicle. *Leaves*, lower 8 in., upper 2-3 by $\frac{3}{8}$ - $\frac{1}{2}$ usually plicate, glabrous, smooth; sheaths firm, upper very long, smooth; ligule $\frac{1}{2}$ in., firm, ciliolate. *Panicle* about $1\frac{1}{2}$ in. long, narrow, interrupted; lower branches 2-nate, the longer appressed to the rachis, and branchlets smooth. *Spikelets* crowded, all pedicelled, oblong, pale; gls. firm, I $\frac{3}{8}$ - $\frac{1}{2}$ in., subacuminate, sub 3-nerved, keel minutely scaberulous, margins hardly hyaline; II rather larger, more oblong; fl. gls. $\frac{1}{2}$ - $\frac{1}{4}$ in., subacute, ciliate on the margin towards the base, lateral nerves obscure; palea rather shorter, keels subserrulate. *Anthers* $\frac{1}{10}$ in., linear.

Var. *aristulata*, Stapf; gls. more acuminate often very shortly aristulate.—Eastern Tibet, N. of Sikkim, alt. 16-17,000 ft.—*J. D. H.*

5. ***P. pratensis***, *Linn. Sp. Pl.* 67; tall, stout, stoloniferous, leaves usually flat acute upper much the shortest, ligule truncate or subobovate, panicle ovate or oblong lower branches usually 5-nate, spikelets $\frac{1}{2}$ - $\frac{1}{3}$ in. 3-5-fld. ovate acute crowded green, gl. I ovate-lanceolate acute, flg. gls. oblong upper $\frac{1}{5}$ - $\frac{1}{3}$ hyaline nerves prominent, keel and lateral nerves silkily hairy to the middle or above it, wool copious, keels of palea scabrid-serrate.—*Host Gram. Austr.* ii. 44, t. 61; *Engl. Bot.* t. 1073; *Knapp Gram. Britt.* t. 55; *Kunth Enum. Pl.* i. 352, *Suppl.* 297; *Steud. Syn. Gram.* 251; *Reichb. Ic. Fl. Germ.* t. 88; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 56; *Ledeb. Fl. Ross.* iv. 378; *Boiss. Fl. Orient.* v. 601; *Griseb. in Goett. Nachr.* (1868) 74; *Duthie Grass. N.W. Ind.* 40. *P. alpina*, *Griseb. l.c.* (*Herb. Schlagintw. n.* 2772.)

WESTERN HIMALAYA; from Kashmir to Kumaon, and WESTERN TIBET, alt. 5-15,000 ft. BHOTAN, *Griffith*.—DISTRIB. North temp. regions.

Stems 6-20 in., smooth, terete. *Leaves* crowded at the base of the stem, linear, rarely plicate or subinvolute, firm (flaccid in shade), margins asperulous, glabrous or rarely sparsely hairy, lower very variable in length, upper $\frac{1}{2}$ -1 in. by $\frac{1}{10}$ - $\frac{1}{4}$ in.; lowest sheaths firm, close; upper much longer, 4 in. and upwards, smooth; ligule rarely more

than $\frac{1}{2}$ in. *Panicle* up to $4\frac{1}{2}$ in., lax or contracted; lower branches rarely 2-3-nate, erect or spreading, naked below or rarely branched to the base, smooth or asperulous. *Spikelets* shortly or terminal longer-pedicelled, green; gl. I $\frac{1}{13}$ – $\frac{1}{10}$ in., 3- or 2-1-nerved, keel asperulous, margins hyaline denticulate; II rather larger, 3-nerved; gls. $\frac{1}{5}$ – $\frac{1}{4}$ in., acute, nerves prominent; palea shorter. *Anthers* $\frac{1}{15}$ – $\frac{1}{12}$ in. linear.—There are many forms, characterized by narrow almost setaceous or by very short leaves, by very narrow and contracted panicles, by shorter spikelets, or by various combinations of these characters; but these are all so intricately connected, and in many cases so evidently the product of conditions of habitat, and are so independent of geographical distribution, that it is impossible to define them satisfactorily. The two extreme forms are—

Var. *angustifolia*, Sm. Fl. Britt. i. 105; Gaud. Agrost. Helvet. i. 214; leaves extremely narrow often setaceous. *P. angustifolia*, Linn. Sp. Pl. 67. *P. strigosa*, Hoffm. & setacea, Hoffm. *P. compressa* & *trivialis* (in part) Herb. Ind. Or. Hf. & T.—Occurs with the type and passes directly into it.

Var. *alpigena*, Blytt Norg. Flora, 130; stem 3-8 in., leaves short plicate, ligule $\frac{1}{5}$ – $\frac{1}{4}$ in., panicle $\frac{3}{4}$ – $1\frac{1}{2}$ in. ovate, lowest branches solitary or 2-5-nate glabrous more or less flexuous spreading sometimes deflexed, branches sparingly asperulous or glabrous, spikelets 3-2-fld. variegated. *P. bulbosa*, Herb. Strach. & Winterb. n. 4. *P. variegata*, Jacquem. mss. *P. alpina*, Herb. Ind. Or. Hf. & T. (in part).—Western Tibet, alt. 13-17,700 ft., Topidhunga in Kumaon, alt. 14,500 ft., Strach. & Winterb.—A very distinct variety, with the habit of *P. alpina*, and confounded with it in various collections.

6. ***P. pseudo-pratensis***, Hook. f.; stem tall stoloniferous, leaves acute or acuminate usually plicate lowest usually shortest, ligule ovate acute or truncate, panicle ovate or oblong lax-fld. lower branches usually binate branches very long flexuous scaberulous, spikelets $\frac{1}{4}$ – $\frac{1}{3}$ in. 3-2-fld., gl. I ovate-oblong acute margin hardly hyaline, flg. gls. oblong tips alone hyaline base silkily hairy nerves prominent. wool scanty or 0, keels of palea ciliate below.—*Festuca*, Wall. Cat. n. 3798 (partly). *P. pratensis* & *P. flexuosa*? Herb. Ind. Or. Hf. & T. (in part.)

CENTRAL & EASTERN HIMALAYA; Nepal, Wallich; Sikkim and W. Bhotan, alt. 10-12,000 ft., J. D. H., Cummins.

Stems 8-20 in., smooth, terete. *Leaves* crowded at the base of the stem, 1-3 $\frac{1}{2}$ by $\frac{1}{8}$ in., lowest shorter, cauline far distant, of the surculi longer, linear, gradually narrowed into the sheath, glabrous smooth or minutely scaberulous; lowest sheaths short, firm, scarious, loose, upper much longer up to 6 in., membranous, smooth; ligule $\frac{1}{5}$ in. *Panicle* up to 8 in., branches 3-5-nate, about 2-3 in. long, naked except towards the ends, all spreading or suberect, flexuous, smooth or asperulous, branchlets rough. *Spikelets* $\frac{1}{4}$ – $\frac{1}{3}$ in., blueish, crowded, shortly or the terminal longer-pedicelled, ovate-oblong; rachilla pilose; gls. firm, I $\frac{1}{4}$ in., 1-nerved, with rarely a lateral pair, keel roughish, margins minutely denticulate; II rather larger, more acuminate; fl. gls. $\frac{1}{2}$ – $\frac{3}{4}$ in., oblong, acute, tip spotted with yellow, keel and outer nerves silky beyond the middle, intermediate at the base only; palea rather shorter, ciliate below, and scabridly serrulate above or in the whole length. *Anthers* $\frac{1}{15}$ – $\frac{1}{12}$ in., linear.

β . *Glumes* all, or the flg. especially somewhat firm, I & II acuminate, I always distinctly 3-nerved; *anthers* $\frac{1}{25}$ – $\frac{1}{12}$ in.—Low or more often tall slender species, stems when flowering surrounded by buds or short stolons, or fascicled with longer stolons.—§ Nemorales.

7. ***P. attenuata***, Trin. in Bunge Verz. Suppl. Fl. Alt. 9; stems tufted erect rigid 1-2-leaved above, leaves narrowly linear plicate or involute, sheaths white scarious, ligule ovate, panicle contracted dense-fld., lower branches solitary or 2-nate short appressed scaberulous branching from

the base, spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. 2–5-flid. subsessile, gl. I ovate-lanceolate acuminate margins narrowly hyaline, flg. gls. sparsely hairy below, wool 0 or scanty. *Ledeb. Fl. Ross.* iv. 371; *Boiss. Fl. Orient.* v. 608. *P. attenuata* & *P. altaica*, *Griseb. in Goett. Nachr.* (1868) 74. *P. laxa*, *Duthie Grass. N.W. Ind.* 40. *P. laxa* & *trivialis partim* *Herb. Ind. Or. Hf. & T.* *P. flexuosa* γ. *humilis*, *Herb. Royle.* *P. sterilis*, *Bieb. ex Duthie l. c.*

ALPINE HIMALAYA & WESTERN TIBET, alt. 13–17,000 ft.—DISTRIB. Persia, Turkestan, N. Asia.

Stems 4–6 in., densely tufted, not stoloniferous, bearing axillary surculi. *Leaves* 1–2 by $\frac{1}{15}$ in., firm, smooth or nearly so; lower sheaths mostly scarious, white, upper up to 2 in.; ligule $\frac{1}{2}$ – $\frac{1}{3}$ in., acute. *Panicle* $\frac{3}{4}$ – $1\frac{1}{2}$ in., strict, continuous or sub-interrupted, lower branches rarely 3-nate, $\frac{1}{2}$ – $\frac{3}{4}$ in., erect, often stout. *Spikelets* green, often variegated; gls. close together, firm, I hardly $\frac{1}{4}$ in. 3-nerved, keel nearly smooth or roughish; II rather longer, broader in the middle; flg. gls. $\frac{1}{2}$ in., oblong, upper $\frac{1}{2}$ hyaline, minutely scaberulous, tip usually erose; nerves 5, slender, obscure, keel and outer nerves silky at the very base only or subglabrous, rarely with longer hairs; palea rather shorter, keels serrulately scabrid. *Anthers* $\frac{1}{16}$ in.—*Grisebach's P. altaica* (Goett. Nachr. l. c.) is a stunted depauperate form.

8. *P. nemoralis*, *Linn. Sp. Pl.* 69; stem not stoloniferous when flg., but bearing at the base surculi or leaf-buds 2–4-leaved above the base smooth or scaberulous, leaves very narrowly linear, ligule very short ovate or longer and oblong, panicle contracted or open, lower branches usually binate usually branching to the base and branches scaberulous, spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. long-pedicelled 2–4-flid., gls. crowded I ovate-lanceolate acuminate margins hyaline, flg. gls. oblong upper $\frac{1}{2}$ or $\frac{3}{4}$ hyaline nerves obscure and keel at the base silky-hairy, wool 0 or scanty, keels of palea scaberulous. *Fl. Dan.* t. 709; *Engl. Bot.* t. 1265; *Host Gram. Austr.* ii. 5, t. 71; *Reichb. Ic. Fl. Germ.* t. 86; *Steud. Syn. Gram.* 251; *Ledeb. Fl. Ross.* iv. 375; *Boiss. Fl. Orient.* v. 607; *Duthie Grass. N.W. Ind.* 40.

TEMPERATE & ALPINE HIMALAYA & WESTERN TIBET, alt. 5–15,500 ft.—DISTRIB. Europe, N. Asia, N. Am.

Stem 1–2 ft., erect, rigid or flaccid, smooth or scaberulous above, lower internodes hidden in the sheaths or nearly so, uppermost more or less exserted. *Leaves* cauline 2–5 by $\frac{1}{12}$ in., flat pliate or involute, firm or flaccid, erect or spreading, smooth or minutely scaberulous above; sheaths appressed, uppermost up to 4 in.; ligule truncate, up to $\frac{1}{2}$ in., often closely denticulate. *Panicle* lax, rigid flexuous or flaccid, lowest branches solitary to 3-nate, slender, erect or spreading, asperulous. *Spikelets* loosely disposed, green or variegated; rachilla smooth scaberulous or pilose; gls. close or rather distant, firm or rather thin, I $\frac{1}{2}$ – $\frac{3}{4}$ in., 3-nerved, keel roughish, margins narrowly or broadly hyaline; II rather longer and broader; flg. gls. $\frac{1}{2}$ in., subobtus (or subacute in profile) upper $\frac{1}{2}$ – $\frac{3}{4}$ hyaline and sometimes erose, nerves 5, slender, interspaces sometimes puberulous; palea rather shorter. *Anthers* $\frac{1}{16}$ – $\frac{1}{10}$ in.—An extremely variable species in habit and length of ligule especially, which is usually short in European examples. The form with a long ligule forms a link with *P. attenuata*, Trin., which has usually a more contracted habit. Most of the described varieties of *nemoralis* are also Indian.

Var. *Linnæi*, Stapf; ligule very short about $\frac{1}{16}$ in. long.—From Kashmir to Kumaon, alt. 5–9000 ft., rarely higher.

Var. *ligulata*, Stapf; ligule elongate $\frac{1}{5}$ – $\frac{1}{3}$ in. *P. attenuata*, *Griseb. in Goett. Nachr.* (1868) 75. (*Schlagintw.* n. 2791) & *P. botryoides* (*Schlag.* 7068, 7196). *P. flexuosa*, *Herb. Royle, & Strach. & Winterb.* n. 7. *P. laxa*, *Herb. Ind. Or. Hf. & T.* (*the Sikkim plant*). *P. serotina*, var. *botryoides*, *Griseb. l. c.* (*Herb. Schlag.* n. 7562). *P. variegata*, *Jacquem. mss. (partim)*.—From Kashmir to Sikkim, alt. 7–15,000 ft.

γ. Glumes all thin, I & II acute or subacute, I 1-nerved or with a very slender 2nd; anthers $\frac{1}{2}$ – $\frac{1}{3}$ in.—Stem slender, densely caespitose with fascicled basal surculi, or more loosely & stoloniferous; panicle slender, branches capillary.—§ Glareosæ.

9. *P. polycolea*, Stapf; stems fascicled wiry smooth, leaves narrowly linear or subsetaceous, lower sheaths very lax white scarious, ligule very short, panicle contracted or effuse, lower branches 2–5-nate capillary, branchlets and pedicels long, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. loosely 3-fld., gl. I acute or subacute margins hyaline, flg. gls. oblong upper $\frac{1}{2}$ – $\frac{1}{4}$ hyaline, nerves and keel sparsely silky hairy or glabrous, keels of palea minutely scabrid. *P. serotina*, *Herb. Strach. & Winterb.* n. 11. *Poa* n. 15, *Herb. Ind. Or. Hf. & T.*

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 8–12,000 ft.

Stem 6–12 in., erect or ascending, rather strict, lowest internodes loosely sheathed, uppermost rather far exserted. *Leaves* lower 8 in., long-acuminate, flat or more or less convolute, subflaccid, glabrous, smooth or margins and nerves beneath asperulous; uppermost sheaths up to $3\frac{1}{2}$ in. *Panicle* $2\frac{1}{2}$ –4 in., pyramidal, rigid or flaccid, lowest branches 2–3 in., flexuous, lower $\frac{1}{2}$ or $\frac{1}{3}$ naked, then loosely branched; branches rather long, roughish; pedicels of spikelets up to $\frac{1}{2}$ in. *Spikelets* loosely disposed, oblong, bright green or variegated; gls. thin, I $\frac{1}{2}$ – $\frac{1}{4}$ in., lanceolate, 1-nerved, keel roughish; II longer, oblong, 3-nerved; flg. gls. $\frac{1}{2}$ – $\frac{1}{3}$ in., acute or subacute; nerves slender, prominent or obscure, outer and keel glabrous or sparsely silky; wool 0 or hardly any; palea rather shorter. *Lodicules* unequally 2-lobed. *Anthers* $\frac{1}{2}$ in., linear.

10. *P. Falconeri*, Hook. f.; stem tall leafy, leaves narrowed from the middle scaberulous above and beneath, upper equalling or exceeding their sheaths, ligule ovate, panicle narrow very lax, lower branches binate, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. 2–3-fld., gl. I oblong-lanceolate acute, II subovate-oblong, flg. gls. acute or subacute tip shortly hyaline, nerves obscure sparingly pubescent, wool 0, keels of palea finely serrulate.

WESTERN HIMALAYA, *Falconer*; Garwhal, alt. 12–13,000 ft. *Duthie* (n. 288).

Stem 2– $2\frac{1}{2}$ ft., erect, smooth, terete, 4–5-leaved above the base; internodes short, or the upper more or less elongate and exserted. *Leaves* about 6 by $\frac{1}{2}$ in., subflaccid, linear, glabrous, flat or subplicate, upper about equalling their sheaths; lower sheaths lax, upper adpressed, firm, uppermost 3–6 in.; ligule $\frac{1}{2}$ – $\frac{1}{3}$ in. *Panicle* about 4 in., narrow, very lax, flexuous and flaccid; lower branches flexuous, erect, sparingly and loosely again branched, smooth or nearly so, branchlets roughish. *Spikelets* as long as or shorter than their pedicels, oblong, green or purplish below, gls. thin, I $\frac{1}{2}$ – $\frac{1}{4}$ in., 1-nerved, margin broadly hyaline, keel minutely asperulous; II rather longer, 3-nerved; flg. gls. $\frac{1}{2}$ in., oblong, nerves very slender, pilose on the side at the base only; palea rather shorter than the gl. *Lodicules* unequally 2-fld. *Anthers* about $\frac{1}{10}$ – $\frac{1}{8}$ in.

11. *P. flexuosa*, Wahlb. Fl. Carp. 22, Fl. Suec. 57 (ex parte); stems usually very slender tufted stoloniferous, leaves narrowly linear acute or acuminate flat plicate or involute, cauline sometimes deflexed, panicle pyramidal lax, lower branches 2- rarely 3-nate or solitary, branches and pedicels scaberulous, spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. 2–3-fld., gls. thin I oblong-lanceolate 1–3-nerved margin broadly hyaline, II rather longer, fl. gls. broadly oblong upper $\frac{1}{2}$ or $\frac{1}{3}$ hyaline base shortly silky-hairy, nerves obscure or slender and prominent, wool scanty or 0, keels of palea scabrid. *Reichenb. Ic. Fl. Germ.* t. 84; *Blytt Norg. Fl.* 126. ?*P. cenisia*, *Duthie Grass. N.W. Ind.* 40; ?*Griseb. in Goett. Nachr.* (1868) 75. *P. cenisia*, var. β . *flexuosa*, *Hartm.*

Handb. Skand. Fl. 262; *Anders. Gram. Skand.* t. 4, f. 41. *P. flexuosa*, var. *a. effusa*, *Herb. Royle*.—*Poa* No. 9, *Herb. Strach. & Winterb.*—*Poa* No. 7, & *P. flexuosa* (of *Sikkim*), *Herb. Ind. Or. Hf. & T.*

ALPINE HIMALAYA, alt. 10–17,000 ft., from Kashmir to Sikkim.—DISTRIB. N. temp. and Arctic regions.

Stem 8–16 in., erect or with the branches geniculately ascending, smooth; lowest internodes short, laxly or closely clothed with short sheaths, the following 2–4 elongate, uppermost exserted. Leaves 2–5 by $\frac{1}{2}$ in., glabrous, smooth or nearly so, flaccid or rather firm; lower sheaths scarious, uppermost about 4 in.; ligule $\frac{1}{2}$ – $\frac{1}{3}$ in., ovate. Panicle 2–4 in., erect or inclined; lower branches capillary, flexuous, often spreading or deflexed, naked except towards the tips smooth. Spikelets shortly or the terminal longer pedicelled, green, generally suffused with purple; gl. I $\frac{1}{2}$ – $\frac{1}{3}$ in., sub-obtuse or -acute, margins broadly hyaline, keel smooth or roughish; II rather longer, ovate-oblong, sub-obtuse, 3-nerved, lateral nerves often short; flg. gls. $\frac{1}{2}$ – $\frac{1}{3}$ in., nearly glabrous or keel and nerves at the base silky, smooth or minutely rough; palea rather shorter than the gl., dorsally most minutely puberulous between the keels. Anthers $\frac{1}{2}$ – $\frac{1}{3}$ in., linear.

δ. *Glumes I & II thin, acute or acuminate, I 1-nerved, or with a very slender 2nd, rarely 3-nerved; anthers very minute; rarely $\frac{1}{10}$ in. long.—Usually perennial, sometimes flg. in the first year, or truly annual; leaves & often stem flaccid; stems loosely tufted or on a slender rhizome & with more or less elongate lower internodes, hardly stoloniferous when flowering.—*§ *Micrantheræ*.

‡ Ligule very short; keels of palea serrulately scabrid.

12. ***P. khasiana***, *Stapf*; stem slender erect or ascending, leaves linear long-acuminate, ligule very short truncate, panicle narrowly pyramidal, lower branches 3–5-nate and branchlets scaberulous, spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. 3–4-fld., gls. rather distant, I oblong-lanceolate acute margins very narrowly hyaline, II ovate-lanceolate, fl. gls. minutely granulate, nerves prominent base nearly glabrous, wool copious or scanty, keels of palea scabrid.—*Poa himalayana* & *Poa* n. 17, *Herb. Ind. Or. Hf. & T.*

SIKKIM HIMALAYA, alt. 11–14,000 ft., *J. D. H., King's Collector*. KHASIA HILLS, alt. 4–6000 ft., *J. D. H. & T. T., Clarke*.

Stems loosely tufted, 1–2 ft., suberect from a rooting base, internodes 5–6, upper gradually longer, loosely or rather tightly sheathed, or the upper shortly exserted. Leaves up to 4–6 by $\frac{1}{2}$ – $\frac{1}{3}$ in., flaccid, flat, smooth or margins roughish; sheaths smooth, uppermost up to 5 in., usually longer than the blade; ligule erose. Panicle 4–6 in. long, lax, sometimes subsecund; lower branches subrigid or flexuous, slender, at length spreading or deflexed, unbranched except the tips or loosely branched almost from the base. Spikelets ovate-oblong, pale green; gls. firm; I $\frac{1}{2}$ in., 1-nerved, keel rough; II rather longer and broader, 3-nerved; flg. gls. $\frac{1}{2}$ – $\frac{1}{3}$ in., oblong, obtuse, tip shortly hyaline, nerves 5 distant, keel and outer nerves sparsely silky or subglabrous. Anthers $\frac{1}{2}$ – $\frac{1}{3}$ in.—Differs from *P. annua* var. *sikkimensis* in being taller, with leaves long-attenuate, ligule very short, branches of panicle 3–5-nate, in the wool, and in the keels of the palea not ciliate; and from *P. annua* var. *nepalensis*, in the 3–5-nate more flexuous branches, rather larger spikelets, narrower firmer gls. with more prominent nerves, rough keels of the palea and rather longer anthers.

‡‡ Ligule long; keels of palea ciliate.

1. *Spikelets obovate; gl. I & II equalling the flg. or rather shorter.*

13. ***P. hirtiglumis***, *Hook. f.*; stem stout, lower internodes usually

short, upper elongate, lower sheaths lax scarious, leaves linear flat or plicate acute flaccid, panicle pyramidal, lower branches binate spreading or deflexed, spikelets $\frac{1}{2}$ in. obovate 2-fld., flg. gls. broadly oblong obtuse, base copiously silky-hairy, wool 0, keels of palea long-ciliate. *P. alpina* partly, & *P. flexuosa*, ?partly *Herb. Ind. Or. Hf. & T.*

SIKKIM HIMALAYA, alt. 16-18,000 ft.; ?Lachooing Valley, alt. 11,000 ft., *J. D. H.*

Stems 8-12 in., from a slender evanescent rhizome, forming lax stoloniferous tufts with the surculi, smooth, terete; internodes mostly very short, the penultimate = $\frac{1}{2}$ - $\frac{3}{4}$ the stem, uppermost up to 6 in., exserted. *Leaves* 2-3 by $\frac{1}{12}$ - $\frac{1}{10}$ in., chiefly crowded towards the base of the stem, with 1-2 shorter higher up, or all short, glabrous, smooth with roughish margins; lower sheaths lax, scarious, upper up to 3 in., membranous, smooth; ligule $\frac{1}{2}$ - $\frac{1}{10}$ in., ovate, obtuse. *Panicle* up to 2 in., lax, lower branches $1\frac{1}{2}$ in. shorter, naked for most of their length, smooth, branchlets roughish. *Spikelets* shortly or the terminal longer pedicelled, loosely disposed or the terminal crowded, green or suffused with violet, rachilla pilose; gls. firm, I $\frac{1}{2}$ in., acute, 1-nerved, keel roughish; II rather larger, acute, 3-nerved; flg. gls. rather longer than II, upper $\frac{1}{2}$ hyaline, nerves obscure. *Lodicules* unequally 2-lobed. *Anthers* $\frac{1}{5}$ in., linear. *Grain* elliptic-oblong, laterally compressed.

2. *Spikelets ovate or oblong; gls. I & II distinctly shorter than the flg.*

14. ***P. himalayana***, *Nees ex Steud. Syn. Gram.* 256; stem tall erect or ascending slender weak, leaves linear flat long-acuminate rather flaccid, ligule ovate or oblong, panicle contracted or effuse, lower branches 2- rarely 3-4-nate long capillary flexuous, spikelets $\frac{1}{2}$ - $\frac{1}{3}$ in. 3-4-fld., gls. distant, gl. I lanceolate acuminate margin hardly hyaline, flg. gls. narrow tip alone hyaline, base scantily silky-hairy, keels of palea long-ciliate. *Duthie Grass. N.W. Ind.* 40.—*Deschampsia*, *Wall. Cat.* n. 8885.—*Poa* n. 18, *Herb. Ind. Or. Hf. & T.*

TEMPERATE & ALPINE HIMALAYA, from Kashmir to Bhotan, alt. 7-13,000 ft., *Royle, Wallich, Griffith, &c.*

Stems 12-18 in., loosely tufted, smooth, internodes 5-6, gradually longer upwards, mostly exserted. *Leaves* $1\frac{1}{2}$ -3 by $\frac{1}{12}$ - $\frac{1}{10}$ in., rarely broader, narrowly linear, roughish above, glabrous beneath; sheaths appressed, smooth, upper about 4 in.; ligule about $\frac{1}{12}$ in., ovate or oblong. *Panicle* up to 6 in., rather flaccid, very lax, rachis smooth; lower branches about 2 in., loosely forked at the tips only, branchlets roughish. *Spikelets* $\frac{1}{2}$ - $\frac{1}{3}$ in., rather distant, oblong, pale green; gls. thin; I $\frac{1}{2}$ - $\frac{1}{3}$ in., 1-nerved, keel roughish; II rather larger, 3-nerved, lateral nerves long; flg. gls. $\frac{1}{2}$ - $\frac{1}{3}$ in., oblong, subobtuse; nerves 5, slender, elongate, sometimes prominent, outer pair & keel or the keel only silky-hairy, wool scanty. *Lodicules* minute, unequally 2-fld. *Anthers* about $\frac{1}{30}$ in., linear.

15. ***P. tremula***, *Stapf*; stem rooting at the base ascending, leaves flat or of the surculi plicate acute flaccid, sheaths of upper largest, ligule oblong, panicle pyramidal, lowest branches solitary or binate, spikelets lax oblong $\frac{1}{2}$ - $\frac{1}{3}$ in. 3-6-fld., gl. I oblong-lanceolate, II acuminate 3-nerved, flg. gls. with upper $\frac{1}{2}$ hyaline, wool rather copious, keels of palea shortly ciliate. *P. altaica*, *Munro in Herb. Jacquemont* (n. 277). *P. nepalensis*, & *memoralis*, *Herb. Ind. Or. Hf. & T. (in part)*. *P. trivialis* *Griseb. in Goett. Nachr.* (1868) 75; *Duthie Grass. N.W. Ind.* 41.—*Festuca*, *Wall. Cat.* n. 3798.

TEMPERATE & ALPINE HIMALAYA; from Kashmir, alt. 8-15,000 ft., *Jacquemont, &c.*, to Garwhal, *Duthie*. WESTERN TIBET; Ladak, *Thomson, Schlagintweit.*

Stems 15–20 in., stoloniferous, erect or ascending from a prostrate rooting base; internodes 5–7, gradually lengthening upwards, all but the upper included in the sheaths. *Leaves* 4–8 by $\frac{1}{4}$ in., linear, acute, smooth or nearly so, glabrous, flaccid, upper often longer than their sheaths; lower sheaths lax, upper about 6 in., smooth; ligule $\frac{1}{8}$ – $\frac{1}{4}$ in., obtuse, or shorter in the surculi. *Panicle* up to 10 in., pyramidal, often elongate, very lax and flaccid, rachis smooth; lower branches often 6 in., capillary, flexuous, loosely branched and at the tips only, nearly smooth, branchlets roughish. *Spikelets* distant, oblong, pale green; rachilla glabrous or hairy; gls. thin, rather distant; I $\frac{1}{2}$ – $\frac{1}{4}$ in., acute or acuminate, 3–1-nerved, margins hyaline, keel roughish; II rather larger, broader in the middle, lateral nerves sometimes short; flg. gls. $\frac{1}{8}$ – $\frac{1}{4}$ in., oblong, subobtuse, keel and all the obscure nerves and interspaces or the outer only silky-hairy; palea $\frac{1}{4}$ shorter, keels ciliate especially towards the base. *Lodicules* unequally 2-lobed. *Anthers* $\frac{1}{5}$ – $\frac{1}{8}$ in., elongate-oblong.

Var. *micranthera*, Stapf; fl. gls. less hairy, anthers smaller, gls. I and II usually thinner, lateral nerves sometimes obscure.—Kashmir, alt. 12–13,000 ft., Clarke, Duthie.

16. **P. Gammieana**, Hook. f.; stem leafy throughout, leaves broadly linear long-acuminate, ligule oblong, panicle contracted or at length open, lower branches binate or solitary, spikelets $\frac{1}{2}$ – $\frac{1}{3}$ in. 3–2-fld., gls. firm, I lanceolate acute, II narrowly oblong, fl. gls. oblong tip only hyaline, nerves prominent outer and keel silky-hairy, keels of palea shortly ciliate, wool scanty.

SIKKIM HIMALAYA; Tankra Mts., alt. 12,000 ft., Gammie.

Stems 1–2 ft., terete, smooth, leafy; internodes 7–8. *Leaves* up to 4 by $\frac{1}{4}$ in., scattered along the whole stem up to the panicle, flat or plicate, glabrous, smooth, except the margins and midrib, upper shorter; lower sheaths lax, median $2\frac{1}{2}$ – $3\frac{1}{2}$ in., asperulous or nearly smooth, except the margins; ligule $\frac{1}{8}$ – $\frac{1}{4}$ in., acute, dorsally roughly puberulous. *Panicle* up to $4\frac{1}{2}$ in., narrow, lower branches capillary, flexuous, loosely branched at the tips only; branches and branchlets smooth. *Spikelets* $\frac{1}{2}$ in. and upwards, shortly or the terminal longer pedicelled, oblong, acute, pale green; gls. firm, I $\frac{1}{2}$ in., 3-nerved, margin entire hardly hyaline; II rather longer, narrowly oblong, 3-nerved; fl. gls. $\frac{1}{2}$ in., acute or subobtuse, keel and outer nerves prominent silky-hairy, palea rather shorter. *Lodicules* subquadrate, shortly 2-lobed. *Anthers* $\frac{1}{2}$ in., oblong.

17. **P. annua**, Linn. *Sp. Pl.* 68; stem shortly creeping and rooting stoloniferous, leaves flat flaccid acute, panicle ovate or oblong sometimes subsecund lower branches at length spreading or deflexed, spikelets 3–7-fld., gls. I and II oblong-lanceolate obtuse, flg. gls. prominently 5-nerved margins and tip broadly or narrowly scarious, keel and nerves below more or less silky ciliate, keels of palea long-ciliate, anthers minute. *Host Gram. Austr.* ii. t. 64; *Fl. Dan.* t. 1686; *Engl. Bot.* t. 1141; *Knapp Gram. Britt.* t. 52; *Reichb. Ic. Fl. Germ.* t. 82; *Ledeb. Fl. Ross.* iv. 377; *Boiss. r. l. Orient.* v. 601; *Griseb. in Goett. Nachr.* (1868) 75; *Wight Cat.* n. 1789; *Thw. Enum. Pl. Zeyl.* 372; *Trim. Cat. Ceyl. Pl.* 110; *Aitchis. Cat. Panjab Pl.* 168; *Duthie Grass. N.W. Ind.* 40, *Fodd. Grass. N. Ind.* 67. *P. alpina*, *Herb. Strach. & Winterb.* n. 12. *P. Royleana*, *Nees ex Steud. Syn. Gram.* 256. *Herb. Strach. & Winterb.* n. 3; *Duthie l. c.*; *Griseb. in Goett. Nachr.* (1868) 75.

Throughout the TEMPERATE & SUBALPINE HIMALAYA, & WESTERN TIBET, alt. 6–12,000 ft., the KHASIA and NILGHIRI HILLS, alt. 5–7000 ft. (introduced?). CEYLON (introduced?)—DISTRIB. Europe, Temp. Asia.

Annual or perennial; stolons slender. *Stems* 6–12 in., erect, usually geniculate, slightly compressed, smooth; internodes gradually lengthening upward, upper

exserted or not. *Leaves* 2-4 in., rarely more, by $\frac{1}{2}$ – $\frac{1}{3}$ in., linear, smooth, margin roughish; sheaths up to 2 in., lax, subcompressed, usually longer than the blade, margins roughish; ligule ovate or oblong, up to $\frac{1}{4}$ in., shorter in the lower leaves. *Panicle* up to 3 $\frac{1}{2}$ in., rigid, lower branches up to 1 $\frac{1}{2}$ in., 2- rarely 3-5-nate or solitary, spreading, naked to the middle and branchlets smooth. *Spikelets* $\frac{1}{2}$ – $\frac{1}{3}$ in., subsessile or shortly pedicelled, more or less crowded, ovate or oblong-ovate, green or purplish; gl. I $\frac{1}{12}$ – $\frac{1}{10}$ in., lanceolate, acute, 1-nerved, with sometimes 2-slender lateral nerves, keel minutely scaberrulous; II rather longer, 3-nerved; fig. gls. $\frac{1}{4}$ in., obtuse, rarely subacute. *Anthers* $\frac{1}{30}$ in. *Grain* $\frac{1}{25}$ – $\frac{1}{12}$ in., oblong.

Var. *nepalensis*, Griseb. in Goett. Nachr. (1868) 75, perennial, stem 20 in., leaves 12-20 in., ligule shorter, panicle up to 5 in., lower branches almost capillary, upper and branchlets subscaberrulous, spikelets more distant longer pedicelled glaucous green, keel and outer nerves of fl. gl. silky-hairy to the middle, wool often copious.—*P. annua*, β . *Nees in Herb. Royle*. *Poa nepalensis*, Wall. ex *Duthie Grass. N.W. Ind.* 40.—*Poa*, Wall. Cat. n. 3791. Western Himalaya, from Dalhousie to Nepal.

Var. *sikkimensis*, Stapf; perennial, rootstock slender giving off stems surculi and stolons at the nodes, leaves up to $\frac{1}{2}$ in. broad, ligule $\frac{1}{8}$ – $\frac{1}{4}$ in. denticulate, panicle 3-6 in., branches slender flexuous and branchlets subscaberrulous, glumes firmer, fig. gls. nearly glabrous, wool 0. *P. alpina* & *nepalensis* (in part), *Herb. Ind. Or. Hf. & T.*—Eastern Himalaya, alt. 11-15,000 ft., J. D. H., &c., W. Bhotan, *Cummins*. Some specimens approach *P. himalayana* in their slender habit and narrower leaves, but the ligule is much larger.

UNKNOWN SPECIES.

P. HANSIANA, Royle *Ill. Bot. Himal.* 416 (name).—Hansi & Saharunpore, Royle. Probably, from the localities, *P. annua*.

119. COLPODIUM, Trin.

See 103. **Catabrosa**, Beauv. p. 310.

120. GLYCERIA, Br.

Perennial, rarely annual grasses. *Leaves* linear, flat or convolute. *Spikelets* few or many-fl., in contracted or effuse panicles; rachilla jointed between the fig. gls. rarely hairy, uppermost fl. usually imperfect. *Glumes* I and II hyaline, empty, persistent, 1-5-nerved; fig. gls. broadly oblong obovate or fan-shaped, dorsally rounded, 3-9-nerved, nerves often obscure vanishing below the broadly hyaline obtuse rounded (rarely subacute) or truncate tip; keels of palea smooth or scaberrulous. *Lodicules* 2, minute or well developed. *Stamens* 3. *Styles* short, distinct. *Grain* terete or compressed, free or subadherent to the palea—Species about 30 enumerated.

Sect. I. HYDROCHLOA. *Flg. glumes* strongly 7-nerved. *Lodicules* minute.

1. **G. tonglensis**, Clarke in *Journ. Linn. Soc.* xv. (1876) 119; very slender, leaves narrow smooth, panicle elongate slender, branches few erect at length spreading unequal lower up to 4 in. erect at length deflexed, spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. 4-8-fl., gls. I and II 1-nerved. *G. caspica*, Griseb. in Goett. Nachr. (1868) 76 (non Trin.) *G. fluitans*, Duthie Grass. N.W. Ind. 41 (non Br.). *G. rivularis*, Jacquem. mss.—*Poa* n. 24, *Herb. Ind. Or. Hf. & T.*

TEMPERATE HIMALAYA, from Kashmir, alt. 7-9000 ft., and Kumaon, alt. 4-5000 ft., to Sikkim, alt. 7-12,000 ft. Manipore, alt. 9000 ft., Watt.

Stems widely creeping in wet places, more tufted in drier, 4-18 in., ascending,

slender. *Leaves* 3-8 by $\frac{1}{10}$ - $\frac{1}{8}$ in., flat, tips obtuse; sheaths smooth, closed to the mouth; ligule short, rounded or truncate, 2-auricled. *Panicle* very variable, 4-8 in. long; rachis slender; branches few-fld. *Spikelets* pale-green or purplish, rarely more than 4-fld.; rachilla flexuous, glabrous; glumes glabrous, I and II ovate or ovate-oblong, hyaline, obtuse or subacute, I = about $\frac{1}{2}$ II; fig. gls. chartaceous, ovate-oblong, tip rounded hyaline, nerves 7 very prominent; palea rigid, incurved, keels strong scaberulous. *Anthers* very small, linear-oblong. *Grain* long, slender.—Very near *G. fluitans*, Br., of which it may be a variety, but differs from it in the much smaller and fewer-fld. spikelets. Some luxuriant specimens from marshy woods in Sikkim have larger 6-10-fld. spikelets nearly $\frac{1}{2}$ in. long.

Sect. II. ATROPIS. *Fl. gls.* 5-nerved. *Lodicules* large, hyaline.

2. *G. distans*, Wahlenb. *Fl. Upsal.* 36; leaves linear flat or convolute smooth, panicle erect pyramidal or contracted lower branches up to $2\frac{1}{2}$ in. at length deflexed, spikelets $\frac{1}{2}$ - $\frac{1}{3}$ in. 4-6-fld., gls. I and II very unequal scarious obtuse, fig. gls. broadly ovate-oblong or cuneate tip rounded or retuse and mucronulate crenate. *Fl. Dan.* t. 2222; *Reichb. Ic. Fl. Germ.* t. 79; *Duthie Grass. N.W. Ind.* 41. *Poa distans*, Linn. *Mant.* 32; *Host Gram. Austr.* ii. t. 63; *Fl. Dan.* t. 251; *Engl. Bot. t.* 986; *Knapp Gram. Britt.* t. 47. *Atropis distans*, Griseb. in Ledeb. *Fl. Ross.* iv. 388, in Goett. *Nachr.* (1868) 76; *Boiss. Fl. Orient.* v. 615. *Festuca distans*, Kunth *Revis. Gram.* i. 129, *Enum. Pl.* i. 393, *Suppl.* ii. 303.

WESTERN TIBET, alt. 10-16,000 ft., abundant, Thomson, &c.—DISTRIB. Europe, N. Asia.

Stems densely tufted with copious fibrous roots, 4-24 in. high, erect or ascending, stout or slender, leafy upwards or at the base only. *Leaves* very various, flat and $\frac{1}{2}$ in. broad in large specimens, quite smooth; sheaths open for $\frac{1}{2}$ of their length, lower membranous shining; ligule short, scarious. *Panicle* 3-6 in., rachis and branches smooth, lower branches 2-5-nate. *Spikelets* minute, green, more or less shining, minutely scaberulous; gl. I oblong, 1-nerved; II almost twice as large, usually 1-nerved; fig. gls. very variable, base minutely hairy, margins and tip broadly hyaline, nerves reaching $\frac{1}{2}$ - $\frac{2}{3}$ from the base; keels of palea ciliate. *Lodicules* oblong, toothed. *Anthers* $\frac{3}{10}$ - $\frac{1}{4}$ in.

Var. *convoluta*, Boiss. l. c.; stem taller very slender, leaves all convolute, panicle long narrow, branches shorter erect. *G. convoluta*, Fries *Mant.* iii. 176. *Festuca convoluta*, Kunth *Revis. Gram.* i. 129; *Enum. Pl.* 393. *Atropis tenuiflora*, Griseb. in Ledeb. *Fl. Ross.* iv. 389, in Goett. *Nachr.* l. c. 76.—Tibet common, N. Europe and Asia.—A different-looking plant from *G. distans* in its Tibetan form, being much more slender, with narrower more ovate fig. gls.; but very variable, and with intermediates.

3. *G. Thomsoni*, Stapf; leaves rigid asperulous above smooth beneath, lowest branches of panicle 2-3 in. spikelets up to $\frac{1}{2}$ in. oblong 3-5-fld., gl. I $\frac{1}{10}$ in. oblong-lanceolate subacute, II $\frac{1}{2}$ in. elliptic-oblong obtuse, fig. gl. $\frac{1}{6}$ in. tip subacute and margins hyaline yellow. *Poa compressa*, Griseb. in Goett. *Nachr.* (1868) 75.

WESTERN TIBET, Rupchu above Pugha, alt. 15,500 ft., Thomson.

Tufted, innovations erect. *Stem* rather stout, compressed, glabrous, sheathed throughout. *Leaves* up to 6 in., tapering to an acute or subobtuse point, upper short, pale green, thick, rigid, nerves 7-9 strong; sheaths more or less compressed, not keeled, smooth, striate, loose above; ligule broadly ovate, obtuse, scarious. *Panicle* ovate-oblong or contracted, erect or inclined; rachis scaberulous or smooth below; branches geminate, filiform, sparingly divided at length spreading, naked to about the middle; lateral pedicels short. *Spikelets* pale green or variegated; rachilla glabrous; gl. I 1-nerved, margin broadly hyaline; II 3-nerved, tip and margins

hyaline; flg. gls. smooth, glabrous, 5-nerved, outer nerves short. *Lodicules* obliquely ovate, acute. *Anthers* $\frac{1}{10}$ in. *Ovary* obliquely ovoid; styles very short, subterminal. —The long subacute flg. gls. are characteristic.

4. **G. poaeoides**, *Stapf*; leaves complicate scabrid above, longest branches of panicle 1-1½ in., spikelets $\frac{1}{5}$ - $\frac{1}{4}$ in. 2-4-fld., gl. II about $\frac{1}{10}$ in., flg. gls. $\frac{1}{8}$ in. obtuse tip broadly hyaline.

WESTERN TIBET; Rupchu, grassy plains at the head of the Salt Lake, *Thomson*.

Stems 1-1½ ft., tufted, erect; innovation extravaginal erect, their sheaths open to near the base. *Leaves* 2-4 in., linear subacute, rather thick, smooth beneath, ligule triangular ovate acute. *Panicle* 2-4 in., erect or inclined, rachis scabrid; branches 2-4-nate, filiform, erect, sparingly divided, scaberulous, lowest very unequal, lateral pedicels clavate. *Spikelets* oblong rather loose, pale green or purplish, rachilla glabrous, disarticulating; gls. thin, finely ciliate-serrulate; callus glabrous; I ovoid acute, 3-nerved, side nerves faint short; II similar with stronger side-nerves; flg. gls. broadly elliptic-oblong, quite glabrous, dorsally rounded, nerves obscure except with transmitted light; keels of palea scantily shortly ciliate. *Lodicules* obliquely ovoid. *Anthers* $\frac{1}{15}$ in. *Ovary* pyriform, glabrous.

121. **FESTUCA**, *Linn.* (by O. Stapf.)

Perennial, rarely annual grasses. *Leaves* flat convolute or setaceous. *Spikelets* 3- many-fld., in open or contracted sometimes spiciform panicles. uppermost fl. imperfect; rachilla jointed below the flg. gls. not produced beyond the uppermost imperfect. *Glumes* 5 or more; I and II subequal or unequal, empty, persistent, keeled; I 1- very rarely 3-nerved, II 3- very rarely 5-nerved; flg. gls. narrow, acute acuminate or awned, 5-7-nerved, dorsally rounded, or keeled towards the tip only; palea 2-keeled. *Lodicules* 2. *Stamens* 3. *Ovary* glabrous or crown more or less hairy, not or slightly enlarged; styles terminal, rarely subterminal, stigmas plumose. *Grain* ventrally concave or grooved rarely flat, glabrous or crown hairy, free or more or less adherent with the palea, rarely with the gl., hilar area elongate. —Species many, chiefly of temp. climates.

The species are for the most part extremely difficult of discrimination.

Sect. I. EU-FESTUCA. Perennial. *Empty gls.* subequal. *Stamens* 3.

A. Vernation of all the leaves conduplicate permanently, or cauline more or less flat, always very narrow.

* Flg. gls. strongly involute, tightly embracing the grain firm, scabrid or if smooth not shining; ovary glabrous, innovations always intravaginal. their leaf-sheaths usually open to or near to the base, or middle in *F. Cumminsii*.

1. **F. valesiaca**, *Schleich. ex Gaud. Agrost. Helvet. i.* 242; slender, rigid, erect, leaves 2-6 in., panicle 1-2 in. narrow usually stiff, branches very short, spikelets $\frac{1}{5}$ - $\frac{1}{4}$ in. 3-4-fld., awn much shorter than its gl., anthers linear $\frac{1}{30}$ - $\frac{1}{14}$ in., grain adherent to palea and often to the gl. *Kunth Enum. Pl. i.* 401, *Suppl.* 334; *Reichb. Ic. Fl. Germ. t.* 63; *Steud Syn. Gram.* 306. *F. duriuscula*, & *parviflora*, *Hack. in Herb. Duthie*, & var. *tenuis*, *Hack. Monogr. Fest. Europ.* 288. *F. ovina*, L., var. *Pseudovina*, *Hack. l. c.* *F. ovina*, *Host Gram. Austr. ii.* 62, t. 86 (non *Linn.*). *F. stricta*, *Herb. Royle*. *F. dubia* & *F. filiformis*, *Jacquem. mss.*—*F. n. sp.* *Herb. Strach. & Winterb. n.* 2.

TEMPERATE and ALPINE HIMALAYA, alt. 10-16,000 ft., from Kashmir to Sikkim. —DISTRIB. Central and Eastn. Europe, Orient, Central Asia, Rocky Mts.

Stems 4-14 in. tufted, nodes 2, both in the lower $\frac{1}{4}$ of the stem. *Leaves* 2-6 in., setiform to capillary, 3-5-nerved, green or glaucous, rarely rough, bands of sclerenchyma distinct; sheaths of innovs. tight, smooth, open to near the base, persistent when dry; ligule very short, obscurely auricled. *Panicle* contracted; branches erect, solitary or 2-nate; lateral pedicels shorter than the spikelets. *Spikelets* oblong, broadly obovate when open, pale green or purplish; gl. I $\frac{1}{3}$ in., lanceolate, acute or subacute; II similar $\frac{1}{2}$ in.; flg. gls. $\frac{1}{3}$ - $\frac{1}{2}$ in., smooth to scaberulous, pruinose, 5-nerved; palea oblong-lanceolate, sub-2-toothed, keels scabrid. *Lodicules* minute, obliquely ovoid. *Anthers* $\frac{1}{30}$ - $\frac{1}{4}$ in., linear. *Ovary* glabrous. *Grain* $\frac{1}{15}$ in., ventrally grooved, hilum almost as long as itself.—As represented in India *F. valesiaca* is a very well defined species.

Var. *tibetica*, Stapf; stem 2-6 in., sheaths entire below the middle, panicle $\frac{1}{2}$ -1 in. long up to $\frac{1}{2}$ in. broad, flg. gls. $\frac{1}{2}$ in., more or less purplish black and scabrid in the upper $\frac{1}{3}$, awn minute, anthers $\frac{3}{8}$ - $\frac{1}{10}$ in. F. ovina, var. alpina, Griseb. in Goett. Nachr. (1868) 73. Tibet N. of Sikkim, alt. 17-19,000 ft. Differs from F. ovina, var. Halleri, to which it is referred by Hack. l. c. 112, in the sheaths being open to the middle and in the very minute anthers.

2. **F. Cumminsi**, Stapf; stem slender, leaves $\frac{3}{4}$ -4 in., sheath open to below the middle, panicle 2-4 in. narrow nodding or flexuous, branches distant erect and flexuous, spikelets $\frac{1}{4}$ - $\frac{1}{2}$ in. elliptic or (open) obovate awned, rachilla scabrid, flg. gls. oblong-lanceolate, palea 2-fid, anthers elliptic $\frac{1}{30}$ - $\frac{1}{25}$ in., grain free. F. duriuscula, Herb. Ind. Or. Hf. & T. (in part).

SIKKIM HIMALAYA, alt. 11-12,000 ft., J. D. H. W. BHOTAN, Cummins.

Stems 1-1 $\frac{1}{2}$ ft., tufted, nodes 2-3 uppermost towards the middle, smooth except (usually) below the panicle. *Leaves* setaceous, or cauline rarely flat, very narrow ($\frac{3}{10}$ in.), subacute, smooth, nerves 5 green strong above, obscure beneath, marginal and carinal bands of sclerenchyma very slender; sheaths of innovs. open far beyond the middle, smooth, subsistent, of the cauline leaves tight; ligule short, auricles usually long and acute. *Panicle* with scabrid rachis; branches usually solitary, dividing from near the base, scabrid; lateral pedicels shorter than the spikelets or very short. *Spikelets* pale green or purple, more or less scaberulous; I $\frac{1}{10}$ - $\frac{1}{7}$ in., 1-nerved; II lanceolate, acute, $\frac{1}{4}$ - $\frac{1}{2}$ in., 3-nerved; flg. gls. $\frac{1}{2}$ - $\frac{1}{4}$ in., awn half as long to as long as the gl.; palea as long as the gl., conspicuously 2-fid, more or less scabrid. *Lodicules* 2-lobed. *Ovary* glabrous. *Grain* linear-oblong, $\frac{1}{8}$ - $\frac{1}{10}$ in., ventrally grooved, hilum slightly exceeding the middle.

3. **F. polycolea**, Stapf; densely tufted, leaves setaceous, sheaths of innovs. crowded open to the base, panicle 2-3 in. open or contracted rigidly erect, rachis scabrid rarely nodding, branches subsolitary, spikelets $\frac{1}{2}$ - $\frac{1}{3}$ in., glumes scabrid, flg. gls. oblong-lanceolate awned, palea 2-fid, anthers linear $\frac{1}{17}$ - $\frac{1}{14}$ in., grain free. F. duriuscula, Herb. Ind. Or. Hf. & T. (in part).

NEPAL, Wallich. SIKKIM, alt. 12-16,000 ft., J. D. H., &c.

Stems $\frac{3}{4}$ -1 $\frac{1}{2}$ ft., nodes 2 in the lower half or third, smooth or scabrid below the panicle. *Leaves* rather rigid, of the innovations up to 6-8 in., subacute, smooth, not or obscurely sulcate, 5-nerved, bands of sclerenchyma continuous beneath or nearly so; sheaths persistent, pale, shining, of the stem tight smooth; ligule very short, obtusely auricled. *Panicle* ovate or narrower; lower branches scabrid, sometimes 2-nate, $\frac{1}{2}$ -rarely 1 $\frac{1}{2}$ in., very sparingly divided from near the base, upper with 1-2 spikelets; lateral pedicels shorter than the spikelets. *Spikelets* greenish; glumes firmly membranous; I $\frac{1}{10}$ in., subulate-lanceolate, 1-nerved; II $\frac{3}{8}$ - $\frac{3}{10}$ in.,

lanceolate, acute; flg. gls. $\frac{1}{3}$ – $\frac{2}{3}$ in., strongly involute, nerves 5 faint; awn from $\frac{1}{2}$ to as long as the gl.; palea as long as the gl., scabrid or puberulous. *Lodicules* 2-lobed. *Ovary* glabrous. *Grain* $\frac{1}{10}$ in., linear-oblong, deeply grooved, hilum slightly exceeding the middle.

Var. *brevis*, Stapf; stems 4–6 in. often shorter than the leaves, sheaths open to the middle only, panicle $\frac{1}{2}$ –1½ in. contracted, flg. gls. $\frac{1}{4}$ in., anthers $\frac{1}{2}$ – $\frac{1}{4}$ in.—Sikkim Himalaya, alt. 11–13,000 ft.—Referred by Hackel (*Monogr. Festuc. Eur.* 89) to *F. ovina*, var. *supina*, but evidently only a dwarfed state of *F. polycolea*.

** Flg. gls. glabrous or nearly so except sometimes towards the tip, thin, more or less shining; ovary very rarely glabrous.—Innovations intra-vaginal, their sheaths closed to beyond the middle, except in *nitidula*.

† Flg. gls. $\frac{1}{5}$ – $\frac{1}{7}$ in.; anthers minute; panicle usually very flexuous and flaccid.

4. **F. nitidula**, Stapf; stems tufted, node solitary near the base, leaves 1–2 in. very narrow, panicle $1\frac{1}{2}$ –3 in., ovate open or contracted, branches usually spreading flexuous naked to beyond the middle, spikelets $\frac{1}{5}$ – $\frac{1}{4}$ in. 2–5-fld., margins of gls. narrowly hyaline, flg. gls. $\frac{1}{7}$ in. oblong-lanceolate, awn half as long as the gl., anthers elliptic $\frac{1}{50}$ – $\frac{1}{40}$ in., ovary top sparsely hispidulous. *F. pumila*, Duthie Grass. *N.W. Ind.* 42 (non Vill.); *Herb. Strach. & Winterb.*—*Festuca*, n. 10, *Herb. Ind. Or. H. f. & T*

WESTERN TIBET; Nubra, alt. 12–14,000 ft., Thomson. N. of Kumaon, alt. 15,000 ft., Strachey & Winterbottom.

Stems $\frac{1}{2}$ –1½ ft., far exerted beyond the uppermost sheath, smooth. Leaves complicate, rather thick, green, 5–7-nerved, smooth, bands of sclerenchyma hardly any; sheaths of innovs. closed to about $\frac{1}{2}$, smooth; ligule very short, ciliolate, more or less auricled. Panicle flexuous, sometimes flaccid; rachis smooth below; branches up to $\frac{1}{2}$ in., solitary or lowest 2-nate, subcapillary, sparingly divided; lateral pedicels often very short. Spikelets elliptic to lanceolate, green or purplish; gls. thinly membranous, I $\frac{1}{17}$ – $\frac{1}{10}$ in., lanceolate; II $\frac{1}{4}$ in., lanceolate, distinctly 3-nerved; flg. gls. smooth, very minutely scaberulous below the tip; awn $\frac{1}{2}$ as long as the gl.; palea about as long as the gl., keels scaberulous. *Lodicules* 2-lobed. *Grain* $\frac{1}{10}$ in., free or adherent to the base of the palea, linear-oblong, hilum $\frac{1}{3}$ of the grain.—Thomson's specimens are tall and very slender, Strachey & Winterbottom's only 3–5 in. high.

5. **F. undata**, Stapf; stems tufted erect or base geniculate sheathed beyond the middle or almost to the panicle, nodes 2–3, uppermost about median, leaves subsetaceous subacute complicate or the cauline flat tapering to a fine point, panicle 4–6 in. flaccid flexuous, branches few subcapillary flexuous, spikelets $\frac{1}{4}$ – $\frac{1}{3}$ in. 2–4-fld. lanceolate, gls. thinly membranous, flg. gls. oblong-lanceolate, awn 0 or very short, anthers not $\frac{1}{25}$ in., top of ovary hispidulous rarely glabrous.—*Bromus*, No. 16, *Herb. Ind. Or. H. f. & T*.

SIKKIM HIMALAYA, alt. 12,000 ft., J. D. H.

Stems 1–2 ft. Leaves glabrous or puberulous above, 7–9-nerved, green; sheaths tight, basal thin brown rarely finely hairy; ligule very short, truncate, scarcely auricled, glabrous or sparsely ciliolate. Panicle often more or less secund; rachis smooth or scabrid, very slender; branches simple or very sparingly divided, solitary or the lowest binate up to 3 in. Spikelets pale green, somewhat shining; rachilla scantily scabrid, internodes very short; gl. I $\frac{1}{15}$ in., lanceolate, 1-nerved; II $\frac{1}{8}$ in., broadly lanceolate, acuminate, 3-nerved; palea oblong-lanceolate, about equal the gl., obscurely 2-toothed. *Lodicules* obliquely ovoid, sub-2-lobed. *Anthers* violet. *Styles* terminal.

Var. *aristata*, Stapf; awn as long as the gl. or rather longer very slender, anthers $\frac{11}{10}$ – $\frac{13}{10}$ in., ovary (very young) glabrous.—*Bromus*?, No. 15, *Herb. Ind. Or.* Hf. & T.—Sikkim, alt. 11,000 ft.

†† Flg. gls. $\frac{1}{5}$ – $\frac{3}{10}$ in.; anthers linear, $\frac{1}{12}$ – $\frac{1}{8}$ in.; panicle less wavy or flaccid.

6. **F. kashmiriana**, Stapf; stems tufted, nodes 1–2 rarely 3 uppermost below the middle, leaves of the innovs. hexagonal, panicle 2–5 in., branches solitary lowest rarely geminate, spikelets $\frac{1}{3}$ – $\frac{2}{5}$ in. elliptic-oblong 3–5-fld., gls. thinly membranous, flg. gls. oblong-lanceolate $\frac{1}{2}$ – $\frac{3}{4}$ in., awn = $\frac{1}{2}$ gl. or longer, top of ovary densely hispid, grain loosely adherent to the palea. F. *duriuscula*, Duthie Grass. N.W. Ind. 41; *Herb. Royle & Hook. f. & T. in part.*

TEMPERATE and ALPINE HIMALAYA; from Kashmir to Kumaon, alt. 8–14,000 ft.

Stem 1–2 ft., innovations always apo-geotropic; sheaths of (always?) intravaginal shoots, tight, smooth, closed to the middle or $\frac{3}{4}$, rarely higher. Leaves (cauline) setaceous, usually shorter than of the innovations, rarely flat, more or less puberulous above, smooth beneath, green, sulcate between the 5–7 nerves, bands of sclerenchyma distinct; ligule short, truncate, ciliolate, scarcely auricled. Panicle usually contracted, rather stiff or flexuous; rachis scaberulous or smooth below; branches erect or spreading, filiform, scaberulous, sparingly divided from below the middle; lateral pedicels = $\frac{1}{2}$ the spikelet or shorter. Spikelets green or tinged with purple or violet; gls. smooth or obscurely scaberulous; internodes of rachilla $\frac{1}{10}$ in., minutely scaberulous; gl. I $\frac{1}{12}$ – $\frac{1}{10}$ in., lanceolate, 1-nerved; II $\frac{1}{4}$ in., lanceolate or ovate-lanceolate, acute, 3-nerved; flg. gls. faintly 5-nerved. Lodicules obliquely oblong, 2-lobed. Anthers $\frac{1}{12}$ – $\frac{1}{8}$ in., linear. Grain $\frac{1}{8}$ in., linear-oblong, grooved, hilum nearly as long as the grain.—I have seen only one specimen amongst all the forms of *F. kashmiriana* with apparently (but by no means typical) extravaginal innovations. Variegated specimens of the type resemble var. *nigricans* (*F. nigricans*, Schleich.) of *F. violacea*, and *F. rubra* var. *fallax*, forma *alpestris* (*F. nigrescens*, Lam.) from which they differ in absence of extravaginal shoots, more open sheaths, and more hispid ovary with a slightly developed constriction below the top.

Var. *ligulata*, Stapf; more flaccid, leaves up to 1 ft., ligule up to $\frac{1}{12}$ in. with more or less acute auricles. F. *violacea*, var. *virescens*, and *F. rubra* genuina, Hack. mss.—Kashmir, alt. 11–13,000 ft., Duthie.

Var. *debilis*, Stapf; very flaccid, cauline leaves up to 8 by $\frac{1}{10}$ in. pubescent above, nerves very prominent beneath, panicle flaccid, spikelets green, awn long or short. F. *heterophylla*, Lamk. ex Hack. mss.; Griseb. in Goett. Nachr. (1868) 73. —Kashmir, alt. 8–12,000 ft., Duthie.—Approaches closely shade forms of *F. heterophylla*, differing only in the structure of the leaves.

Var. *simlensis*, Stapf; taller, more robust, cauline leaves up to 1 ft. by $\frac{1}{10}$ in. almost flat, ligule short, panicle 6–12 in., spikelets $\frac{1}{2}$ – $\frac{3}{4}$ in., internodes of rachilla up to $\frac{1}{3}$ in., gl. I $\frac{1}{4}$ – $\frac{1}{2}$ in., II $\frac{1}{5}$ – $\frac{1}{4}$ in., flg. gls. up to $\frac{1}{4}$ in., awn = the gl. or rather shorter. F. *duriuscula*, Herb. H. f. & T. (in part). ? F. *ovina*; Griseb. in Goett. Nachr. (1868) 73.—Simla, alt. 7–8000 ft., Thomson, Duthie.—Habit rather of *F. duriuscula*, differing in the more closed sheaths and hairy tip of ovary. Distinguished from certain forms of *F. rubra*, L., by the hairy ovary and absence of stolons.

7. **F. altaica**, Trin. ex Ledeb. Fl. Alt. i. 109, Fl. Ross. iv. 354, Ic. t. 228; stems tufted, nodes 1–2, leaves up to 9 in. subsetaceous, sheaths crowded open to the middle latterly to the base, ligule very short, panicle 4–6 in. very loose, lower branches 2-nate long slender with 1–2 subterminal spikelets, lateral pedicels equal to or longer than the 3–6-fld. variegated spikelets which are $\frac{1}{3}$ – $\frac{1}{2}$ in. long, glumes thin tips and margins hyaline,

fig. gls. $\frac{1}{4}$ - $\frac{3}{10}$ in., awns shorter or gl. mucronate, ovary pyriform tip hispidulous. *Kunth Enum. Pl.* i. 411; *Steud. Syn. Gram.* 315. *F. Duthiei*, Hack. mss.

WESTERN TIBET; Dras, alt. 11-12,000 ft., *Duthie*; Karakoram, alt. 14,500 ft., *Clarke*.—DISTRIB. Central Asia, Siberia.

Stems $1\frac{1}{2}$ -2 $\frac{1}{2}$ ft., smooth. *Leaves* subrigid, complicate, smooth, margin obscurely scabrid, nerves 7-9 slightly prominent, bands of sclerenchyma distinct, cauline sometimes flat, short; sheaths of innovs. open to the middle, soon splitting to the base; ligule very short. *Panicle* ovate, rachis slender smooth, branches up to 3 in. subcapillary flexuous. *Spikelets* oblong, internodes $\frac{2}{10}$ in., scaberulous; gl. I $\frac{1}{4}$ - $\frac{1}{2}$ in. lanceolate, acute, 1-nerved, II $\frac{1}{4}$ - $\frac{1}{2}$ in., distinctly 3-nerved; fig. gls. oblong-lanceolate, smooth or subscaberulous towards the acute tip, nerves 5 faint; palea = the gl., linear-oblong, keels minutely scaberulous. *Lodicules* obliquely ovate. *Anthers* $\frac{1}{8}$ in., linear. *Styles* terminal.—Very near the American *F. scabrella*, Torr. Trinins describes the rhizome as stoloniferous, but I find no trace of stolons.

*** Flg. gls. glabrous or pubescent; top of ovary glabrous, rarely minutely hairy. Innovations intra- and extravaginal, their leaf-sheaths closed almost to the mouth, the extravaginal often stoloniferous.

8. *F. Levingei*, *Stapf*; stems smooth, nodes 2, upper in $\frac{1}{2}$ of stem, cauline leaves up to 4 in. very narrow, sheaths of innovs. open to middle, glabrous or minutely puberulous above, ligule very short obscurely auricled, panicle 2-3 in. linear strict, branches usually binate erect, lower naked for $\frac{1}{2}$, spikelets $\frac{1}{2}$ - $\frac{1}{4}$ in. 4-5-fld. compact, internodes of rachilla very short minutely scaberulous, fig. gls. $\frac{1}{5}$ - $\frac{3}{10}$ in. oblong acute awnless or mucronate, anthers oblong, ovary glabrous or nearly so.

KASHMIR, *Levinge*.

Stems $1\frac{1}{2}$ ft., extravaginal innovations present very slender, their leaves finely setiform, flaccid, green, 5-nerved, bands of sclerenchyma fine. *Panicle* striate, branches often appressed to the rachis, lowermost up to $1\frac{1}{2}$ in.; lateral pedicels short, thick. *Spikelets* green; rachilla minutely scaberulous; gls. membranous, glabrous or minutely puberulous or scaberulous; I $\frac{1}{10}$ in., lanceolate, acute; II broadly oblong-lanceolate, acute or subobtuse; palea linear-oblong, almost = gls., keels ciliate. *Lodicules* oblong, sub-2-lobed. *Anthers* $\frac{1}{10}$ - $\frac{1}{8}$ in. *Grain* $\frac{1}{12}$ in., loosely adherent to the palea, linear-oblong, grooved, hilum almost = the grain.

9. *F. rubra*, *Linn. Sp. Pl.* 74; stems smooth, nodes 2, extravaginal innovations frequent ascending or stoloniferous, leaves subsetaceous, ligule very short truncate exauricled, panicle 3-5 in., rachis scabrid, branches solitary or lowest binate divided from or near the base, spikelets $\frac{2}{5}$ - $\frac{2}{3}$ in. oblong loose 4-9-fld., fig. gls. strongly involute oblong-lanceolate margin above broadly hyaline awned, anthers linear, ovary glabrous. *Host Gram. Austr.* ii. 59, t. 82; *Engl. Bot.* t. 2056; *Kunth Enum. Pl.* i. 401, *Suppl.* 334; *Steud. Syn. Gram.* 308; *Ledeb. Fl. Ross.* iv. 352; *Boiss. Fl. Orient.* v. 62; *Duthie Grass. N.W. Ind.* 42 (in part); ? *Griseb. in Goett. Nachr.* (1868) 74.

TEMP. and SUBALPINE HIMALAYA, alt. 6-13,500 ft. KHASIA HILLS, alt. 5-6000 ft. (var. *Clarkei*).—DISTRIB. Temp. and Arctic Europe and Asia.

Stems $1\frac{1}{2}$ -2 $\frac{1}{2}$ ft., erect or geniculate below, striate. *Leaves* 3-5 in., all subsetaceous or cauline linear flat, rather thick, green, 3-7-nerved, subacute or almost obtuse, smooth; sheaths of innovs. tight, smooth, closed almost to the mouth. *Panicle* very variable, narrow, nodding and secund or erect, rather dense and ovate, longest branches 2 in.; pedicels short. *Spikelets* green or variegated, glabrous or hairy and ciliate; rachilla scabrid, internodes $\frac{2}{5}$ in.; gl. I $\frac{1}{4}$ in., lanceolate, acuminate, nerve

percurrent or subexcurrent; II $\frac{2}{3}$ in., ovate-lanceolate; flg. gls. up to $\frac{1}{2}$ in., nerves 5, faint; awn slender, up to $\frac{1}{10}$ in.; palea = the gls., linear-oblong, shortly 2-fid, keels ciliate. *Lodicules* obliquely ovate, sub-2-lobed. *Anthers* $\frac{1}{2}$ in. *Ovary* with rarely 1-2 minute hairs. *Grain* $\frac{1}{2}$ in., linear-oblong, grooved, sometimes adherent to both gl. and palea, hilum nearly equal the grain.—It is impossible to separate the hairy glumed from the glabrous forms; these vary in specimens from different localities, and Clarke has found them growing in the same spot in the Karakoram Mts. To make a comparative analysis of the Indian forms with the European and Oriental would involve a most minute examination of all the latter and lead to the creation of a number of new varieties and subvarieties with ephemeral characters. Most of the Indian specimens fall into Hackel's subsp. *eur. rubra* var. *genuina*, and var. *fallax* (Monogr. Festuc. Europ. 138, 142). The glabrous stoloniferous specimens answer more or less to his subvar. *vulgaris*; those with short erect or ascending innovations to var. *fallax* and mostly to forma *alpestris*, which has thicker leaves and highly variegated spikelets; the pubescent to his-subvar. *E. barbata*. The principal synonyms cited by Hackel for these forms are:—*F. alpestris*, Wulf. Fl. Nor. Phan. Ed. Fenzl, & Graf, 151. *F. barbata*, Schrank Prim. Fl. Salisb. 46. *F. heterophylla*, Hænke in Jacq. Collect. ii. 93. *F. hirsuta*, Fl. Dan. t. 1627? (non Host). *F. Kitaibeliana*, Schult. Mant. ii. 398 (for var. *genuina*). *F. longifolia*, Hegetsch. & Heer Fl. Schw. 91. *F. nigrescens*, Lam. Encycl. ii. 460. *F. pubescens*, Willd. Enum. Pl. 6. *F. repens*, Hegetsch. & Heer l. c. 92. *F. rubra*, var. *baikalensis*, Griseb. in Goett. Nachr. (1868) 74, is probably this. The true *F. baikalensis* is not found in India.

Var. *Clarkei*, Stapf; extravaginal innovations very rare slender, leaves sub-setaceous cauline rarely flat, panicle 3-5 in. nodding, branches few subsecund lowest up to 3 in. rigid or flexuous mostly obliquely erect, spikelets $\frac{1}{2}$ in. pale green, gl. I $\frac{1}{2}$ in., II $\frac{1}{2}$ in., flg. gls. $\frac{1}{10}$ in., awn = $\frac{1}{2}$ to nearly all gl., anthers $\frac{1}{2}$ in., grain $\frac{1}{2}$ in.—Kangra and Dalhousie, alt. 7-8000 ft., Clarke. Khasia Hills, alt. 4-6000 ft., Clarke (a form with setaceous leaves and very long anthers).

B. Venation of leaves convolute, at length flat or subconvolute $\frac{1}{10}$ — $\frac{7}{10}$ in. broad.

* Flowers hermaphrodite; innovations (when known) extravaginal.

† Flg. gls. awned, awn as long as the gl. or longer, very slender.

10. **F. gigantea**, Vill. Hist. Pl. Dauph. ii. 110; leaves amplexicaul, panicle 4-16 in., branches rather distant undivided to the middle, spikelets about $\frac{1}{2}$ in., flg. gls. $\frac{3}{10}$ — $\frac{1}{2}$ in., awn twice as long, anthers linear. Kunth Enum. Pl. i. 407, Suppl. 339; Reichb. Ic. Fl. Germ. t. 358; Engl. Bot. t. 1820; Ledeb. Fl. Ross. iv. 354, Boiss. Fl. Orient. v. 621; Duthie Grass. N.W. Ind. 41; Griseb. in Goett. Nachr. (1868) 74 (in part). *F. aristata*, C. Koch in Linnæa, xxi. (1848) 412. *F. triflora*, Sm. Engl. Bot. t. 1918; Desf. Fl. Atlant. 6, t. 20. *Bromus giganteus*, Linn. Sp. Pl. 77; Fl. Dan. t. 1630; Reichb. l. c. t. 76; Knapp Gram. Britt. t. 87; Host Gram. Austr. 87, t. 6. *B. triflorus*, Linn. Sp. Pl. Ed. ii. 115; Fl. Dan. t. 440.

TEMP. HIMALAYA; from Kashmir to Kumaon, alt. 5-9500 ft.—DISTRIB. Europe, N. Asia.

Rootstock very short, roots fibrous. Stems loosely tufted, 2-4 ft., smooth, nodes 3-5. Leaves 5-12 by $\frac{1}{2}$ — $\frac{1}{2}$ in., linear to linear-lanceolate, finely acuminate, flat, flaccid, dark green, loosely many-nerved, smooth, margins minutely scaberulous; sheaths of innovs. terete, open to the base, smooth or asperulous below the mouth; ligule very short, truncate, glabrous. Panicle ovate or oblong-ovate, nodding, branches solitary or the lowermost binate, spreading, flexuous, scabrid; branchlets few-fld. spreading or appressed, pedicels short or the lower sometimes = the spikelet. Spikelets linear-lanceolate, pale green, rachilla scabrid; gls. membranous, I $\frac{1}{10}$ — $\frac{1}{2}$ in.,

subulate-lanceolate, 1- or obscurely 3-nerved at the base, margin white-hyaline; II $\frac{1}{2}$ in., lanceolate; flg. gls. $\frac{3}{10}$ – $\frac{1}{2}$ in., oblong-lanceolate, acute or tip obscurely 2-fid, margins narrowly hyaline, minutely puberulous below the tip, nerves faint; awn subterminal, straight or flexuous; palea oblong-lanceolate, 2-toothed, keels minutely scaberulous. *Lodicules* large, 2-3-fid. *Anthers* $\frac{1}{10}$ – $\frac{1}{7}$ in. *Ovary* quite glabrous. *Grain* $\frac{1}{2}$ in., linear-oblong, tightly adherent to the palea and usually the gl., groove flat; hilum nearly = the grain.

11. **F. leptopogon**, Stapf; leaf-base obtuse or rounded, panicle 6-12 in., branches distant dividing from near the base, spikelets $\frac{1}{4}$ in. or rather more, flg. gls. $\frac{1}{4}$ – $\frac{1}{3}$ in., tip 2-fid, awn in the sinus = the gl. or rather longer. *F. gigantea*, Griseb. in Goett. Nachr. (1868) 74 (in part). *Bromus*, No. 17 & 18, *Herb. Ind. Or. H.f. & T.*

SIKKIM HIMALAYA, alt. 8-11,000 ft., J. D. H. KHASIA HILLS, alt. 5-6000 ft., Hook. f. & T., Clarke.

Rootstock short, slender, roots fibrous. *Stems* 2-4 ft., loosely tufted, nodes 5-6. *Leaves*, sheaths and ligule as in *F. gigantea*, but blade smaller, 4-7 by $\frac{1}{4}$ – $\frac{1}{3}$ in., and base not amplexicaul. *Panicle* open or contracted, erect or nodding, branches scabrid; branchlets few, distant, more or less appressed, lateral pedicels very short. *Spikelets* linear-lanceolate, pale green; rachilla scabrid, internodes short; gls. membranous, I $\frac{1}{3}$ in., subulate-lanceolate, margins white-hyaline; II $\frac{1}{2}$ in., lanceolate; flg. gls. scaberulous below the tip, margins narrowly hyaline, nerves faint; palea linear-lanceolate, finely pointed, keels minutely scaberulous. *Lodicules* 2-fid. *Anthers* $\frac{1}{5}$ – $\frac{1}{10}$ in., elliptic. *Ovary* with the top minutely hispidulous. *Grain* $\frac{1}{4}$ in., linear-oblong, free or adherent to the base of the palea, groove very shallow, top hispid, hilum = $\frac{2}{3}$ of the grain.

†† Flg. gls. awnless, mucronate.

12. **F. asthenica**, Hook. f.; stems rather slender, nodes 3, leaves linear narrowed at the base, panicle 5-8 in., branches capillary rough sparingly divided beyond the middle, pedicels capillary, spikelets $\frac{3}{10}$ – $\frac{1}{3}$ in. lanceolate 2-4-fid., internodes of rachilla short, flg. gls. ovate-lanceolate acute 3-5-nerved.

KASHMIR, alt. 7-9000 ft., Clarke, Duthie.

Stem tall, up to 4 ft., smooth, innovations unknown. *Leaves* 6-11 by $\frac{1}{7}$ – $\frac{2}{5}$ in. linear, finely acuminate, flaccid, rough, pale green, many-nerved, flat, young convolute; sheaths smooth or the lower scabrid, striate; ligule $\frac{1}{10}$ – $\frac{1}{5}$ in., scarious, very obtuse, ciliolate, at length lacerate. *Panicle* more or less contracted, nodding, flexuous; rachis smooth below; lowermost branches up to 3 in., binate. *Spikelets* obovate when open, green; rachilla minutely scaberulous, internodes $\frac{1}{10}$ – $\frac{1}{5}$ in.; gls. thinly membranous; I $\frac{1}{2}$ – $\frac{1}{7}$ in., subulate-lanceolate, 1-nerved, hyaline except along the percurrent nerve; II $\frac{1}{2}$ – $\frac{1}{3}$ in., oblong-lanceolate, acute, 3-nerved; flg. gls. $\frac{1}{2}$ in., ovate-lanceolate, acute, 5-nerved (2 lateral nerves very faint), scaberulous, tip hyaline; palea linear-oblong, minutely 2-toothed, keels slightly scabrid. *Lodicules* obliquely ovate. *Anthers* $\frac{1}{10}$ in., linear. *Ovary* hispidulous on the top. *Grain* $\frac{1}{4}$ in., linear-oblong, dorsally flat and almost so ventrally, slightly adherent to the palea, hilum $\frac{1}{4}$ – $\frac{1}{2}$ in. shorter than the grain.

13. **F. modesta**, Steud. Syn. Gram. 316; stem tall rather stout, nodes 2-3, leaves of innovations linear finely acuminate, cauline smaller, panicle 6-12 in. loose open, rachis scabrid, lower branches very long binate sparingly divided beyond the middle, lateral pedicels short, spikelets about $\frac{1}{2}$ in. loosely 3-4-fid., internodes of rachilla long, flg. gls. oblong acute 5-7-nerved. *Duthie Grass. N.W. Ind.* 42. *F. elatior*, *Herb. Strachey & Winterb.* n. 3. *Schedonorus modestus*, Nees ex Steud. l. c.

WESTERN TEMPERATE HIMALAYA, from Jamu to Kumaon, alt. 7-8700 ft., Royle, &c.

Stems 4-5 ft., loosely tufted; innovations ascending or stoloniform. *Leaves* of innovs. up to 2 ft. by $\frac{1}{2}$ - $\frac{3}{4}$ in., flat, young convolute, rough or almost smooth, subrigid, many-nerved, cauline 4-6 by $\frac{1}{2}$ - $\frac{3}{10}$ in.; sheaths open to the base, smooth or the lower rough, strongly striate, at length brown; ligule $\frac{1}{4}$ in., truncate, ciliolate, at length lacerate. *Panicle* ovate, lower branches up to 8 in. *Spikelets* green, open obovate; rachilla scabrid, internodes up to $\frac{1}{10}$ in.; gls. thinly membranous, I $\frac{1}{4}$ in., subulate-lanceolate, hyaline except along the percurrent nerve; II $\frac{1}{2}$ in., oblong-lanceolate, acute, 3-nerved; flg. gls. $\frac{3}{10}$ - $\frac{1}{2}$ in., scaberulous, margins narrowly hyaline; palea linear-oblong, 2-dentate, keels scarcely scabrid. *Lodicules* broadly elliptic, very obtuse. *Anthers* $\frac{1}{10}$ in., linear. *Ovary* top hispid, styles terminal.

14. **F. lucida**, Stapf; stem tall, nodes 2, leaves linear glaucous, sheaths long loose white, panicle 6-7 in. broadly ovate, branchlets very scabrid, lateral pedicels long, spikelets $\frac{4}{5}$ - $\frac{9}{10}$ in. glistening, flg. gls. oblong acute or subobtuse mucronate 5-7-nerved, tips and margins hyaline, white.

WEST HIMALAYA; GARHWAL, Jaunsar, in the Deodar forest, alt. 9000 ft., Duthie.

Stem 2-3 ft., rather stout, smooth; internodes 2, elongate. *Leaves* 6-12 by $\frac{1}{2}$ - $\frac{3}{4}$ in., finely acuminate, flat except the involute scaberulous margins, firm, smooth, glaucous, many-nerved; basal sheaths of innovs. very long, cauline tighter pale glaucous; ligule $\frac{2}{3}$ - $\frac{3}{4}$ in., white, split to the middle into fine fibres. *Panicle* very lax; branches simple to beyond the middle, rough, lowest 4 in.; lateral pedicels $\frac{1}{2}$ - $\frac{1}{2}$ in. *Spikelets* pale green; rachilla scabrid, internodes $\frac{1}{10}$ - $\frac{1}{8}$ in.; gl. I $\frac{1}{2}$ in., ovate, acute or subacute, shortly 1-nerved, hyaline except at the base; II similar, $\frac{2}{3}$ - $\frac{1}{2}$ in., midrib percurrent, 2 side-nerves very short; flg. gls. $\frac{1}{2}$ - $\frac{3}{4}$ in., membranous, pale green, scaberulous, side-nerves prominent; palea linear-oblong, obscurely 2-fid, keels scabrid. *Lodicules* obliquely ovoid. *Anthers* $\frac{1}{2}$ in., linear. *Ovary* with a slightly oblique hispidulous top, styles just below the top.

** Flowers diœcious; innovations intravaginal.

15. **F. sibirica**, Hack. ex Boiss. *Fl. Orient.* v. 626; stem sheathed to the top, leaves linear firm, panicle 3-6 in. ovoid or linear, lower branches simple or divided beyond the middle with 1-4 ovate-oblong 4-6-fld. spikelets, flg. gls. $\frac{1}{2}$ - $\frac{1}{3}$ in. ovate or ovate-oblong subobtuse scaberulous, margins subciliolate or denticulate, awnless or tip setiform. *F. mutica*, Jacquem. mss. *Schedonorus transparens*, Munro mss. *Poa albida*, Turcz. ex Trin. in *Mem. Acad. Petersb. Ser. VI. i.* (1831) 387; *Kunth Enum. Pl. i.* 387. *P. pallida*, Jacquem. mss. *Leucopoa sibirica*, Griseb. in *Ledeb. Fl. Ross.* iv. 383, in *Goett. Nachr.* (1868) 76.—*Festuca*, n. 3, *Herb. H. f. & T.*—*Schedonorus*, n. 2, *Herb. Strackey & Winterb.*

WESTERN TIBET, alt. 13-15,000 ft., from Ladak to N. of Kumaon.—DISTRIB. Caucasus, Altai Mts., Dahuria.

Stems 1-2 ft., tufted, erect, smooth. *Leaves* 6-10 in., rarely more, by $\frac{1}{10}$ - $\frac{1}{2}$ in., linear, finely acuminate, smooth or scabrid, subconvolute, dull green, nerves many very prominent, lower cauline one 3 in.; sheaths of innovs. open to the base, terete, basal crowded, cauline smooth; ligule very short, membranous, truncate, ciliate. *Panicle* very narrow or expanded, stiff or flexuous; lower branches solitary or binate, erect or spreading, very variable in length; lateral pedicels very short. *Spikelets* pale green, $\frac{3}{10}$ - $\frac{4}{10}$ in., very broad when open; rachilla minutely scabrid, internodes $\frac{1}{10}$ in.; gls. thin, I $\frac{1}{10}$ - $\frac{1}{2}$ in., ovate to ovate-lanceolate, subacute, 1-nerved or 3-nerved at the very base, white and hyaline except along the green nerve; II about $\frac{1}{2}$ in., similar, but more oblong and usually distinctly 3-nerved; flg. gls.

5-nerved, tip and margins broadly hyaline; palea oblong acute or sub 2-dentate; keels scarid. *Lodicules* obliquely ovate, sometimes 2-lobed. *Anthers* $\frac{1}{2}$ – $\frac{3}{4}$ in., linear, reduced and empty in the fem. fl. *Ovary* pyriform, top slightly oblique, hispidulous; styles very short, subterminal; stigmas $\frac{1}{2}$ in., plumose, more or less filiform in the male fl. *Grain* $\frac{1}{2}$ in., linear-oblong, quite free, dorsally subconvex, ventrally flat, hilum reaching rather above the middle.

Sect. II. *VULPIA*. Annuals (the Indian species). *Spikelets* subsecund in spiciform or racemiform panicles; pedicels clavate, often very short. *Glumes* divergent, I minute or 0, II much shorter than the flg., long-awned. *Stamens* 1–3; anthers very short. *Ovary* glabrous. *Grain* linear, adherent to the palea.

16. **F. Myuros**, Linn. *Sp. Pl.* 74; panicle elongate branched below base usually embraced by the upper sheath, pedicels half the length of gl. II or longer, gl. I minute, flg. gls. 5–8 as long as their awns, stamens 1–3. *Host Gram. Austr.* ii. 66, t. 93; *Engl. Bot.* t. 1412; *Knapp Gram. Britt.* t. 70; *Kunth Enum. Pl.* i. 396, *Suppl.* 330; *Ledeb. Fl. Ross.* iv. 349. *F. Pseudomyuros*, Soyer Willem. in *Ann. Sc. Nat. Ser. I.* vii. (1826) 445. ? *F. uniglumis*, Griseb. in *Goett. Nachr.* (1868) 73 (non Soland.). *Vulpia Myuros*, Gmel. *Fl. Bad.* i. 215; *Reichb. Ic. Fl. Germ.* i. t. 60; *C. Koch in Linnæa*, xxi. (1848) 409; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 71; *Boiss. Fl. Orient.* v. 628. *V. Pseudo-myuros*, *Reichb. Fl. Germ. Excurs.* 37. *Mygalurus caudatus*, *Link Enum. Hort. Berol.* i. 92.

WESTERN HIMALAYA. from Kashmir to Garwhal, alt. 5–9000 ft. WESTERN TIBET, alt. 9–12,000 ft.—DISTRIB. Europe, N. Asia.

Stem 6–18 in., very slender, leafy, glabrous. *Leaves* setaceous, upper with rather tumid grooved sheaths embracing the base of the panicle; ligule short, bauricled. *Panicle* 4–10 in., strict or flexuous, glabrous or puberulous, rachis and branches smooth or scaberulous, lower branches appressed, upper very short. *Spikelets* with the awns $\frac{1}{2}$ – $\frac{3}{4}$ in.; rachilla smooth or ciliate; gls. I and II subulate; flg. smooth or more or less scaberulous, nerves obscure.—I have seen no specimen of *F. uniglumis*, Soland. from India, and suspect Grisebach's plant to be *E. Myuros*.

Sect. III. *NARDURUS*, Reichb. (Gen.). *Spikelets* spicate, solitary, sessile on the joints of the rachis or with very short flat pedicels. *Glumes* divergent, equal or unequal; flg. gls. awned or not. *Stamens* 3, anthers minute. *Ovary* glabrous. *Grain* oblong or subpyriform, obtuse, ventrally concave, glabrous, adherent to the palea.

17. **F. tenuiflora**, Schrad. *Fl. Germ.* i. 345; leaves very short filiform subflexuous convolute, spike simple, spikelets secund sessile 3–7-flid., gls. I = $\frac{1}{2}$ II linear-subulate acuminate keeled, flg. gls. linear-lanceolate mucronate or shortly awned smooth or hispidulous. *Kunth Enum. Pl.* i. 395, *Suppl.* 330. *F. maritima*, Linn. *Sp. Pl.* 75. *Nardurus tenuiflorus*, Boiss. *Voy. Bot. Espan.* ii. 667, *Fl. Orient.* v. 632. *N. unilateralis*, *Fries ex Linnæa*, xxix. (1857–8) 730; *Fourn. in Bull. Soc. Bot. Fr.* xiii. (1866) 181. *Catapodium unilaterale*, Griseb. in *Ledeb. Fl. Ross.* iv. 347. *Triticum hispanicum*, Willd. *Sp. Pl.* i. 479. *T. maritimum*, Willd. l.c. (in *Syn.*). *T. Nardus*, DC. *Fl. Franc.* iii. 87. *T. tenellum*, Viv. *Ann. Bot.* i. II. 154; *Host Gram. Austr.* ii. 20, t. 86 (excl. *Syn.*). *T. unilaterale*, Linn. *Mant.* i. 35. *Brachypodium tenuiflorum* & *tenellum*, Roem. & Sch. *Syst.* ii. 745 (ex *Kunth*).

KASHMIR; near Sirinagar, alt. 5–6000 ft., Duthie.—DISTRIB. Westwd. to Spain. *Stems* 3–16 in., tufted, slender, wiry erect, strict or curved, smooth. *Leaves*

1-3 in., erect, sometimes almost capillary, grooved between the prominent ribs, ligule 0. Spike 2-4 in., short or curved, rachis smooth, wiry, grooved, $\frac{1}{2}$ -terete, with a shallow groove opposite the spikelets. Spikelets $\frac{1}{2}$ - $\frac{3}{4}$ in., green; fl. gls. rigid, terete, nerves indistinct. Lodicules subcuneate, acutely 2-lobed.

DOUBTFUL SPECIES.

F. filiformis, Nees ex Duthie Grass. N.W. Ind. 42 is probably a *Tripogon*.

122. **BROMUS**, Linn. (O. Stapf).

Annual or perennial grasses. Leaves narrow, usually flat. Spikelets many-fl., panicle, laterally compressed; uppermost fls. usually imperfect; rachilla jointed below the flg. gls., not produced beyond the uppermost gl. Glumes many, I and II unequal, empty, acuminate, 1-5-nerved, persistent, flg. gls. acuminate or shortly cleft; 1-very rarely 3-awned, median awn erect or recurved sometimes twisted towards the base; palea 2-fid or 2-toothed, keels scabrid or ciliate. Lodicules 2, oblong or lanceolate, entire or cleft. Stamens 3. Ovary oblong or cuneiform, crown more or less enlarged and hairy or villous. Styles usually inserted ventrally below the tip of the ovary, short; stigmas plumose. Grain linear-oblong, usually concavo-convex and adherent to the palea.—Species about 40, natives of temp. regions.

B. unioloides, H. B. K. (*B. Schraderei*, Kunth; Duthie Grass. N.W. Ind. 43; Fodd. Grass. N. Ind. 67), a tall American species with many-nerved keeled gls. has been introduced into India as a fodder grass, and has been found at Darjiling and elsewhere as an escape.

Sect. I. FESTUCOIDES, Coss. & Dur. Perennial, usually tall. Gl. I 1-nerved; II 3-nerved; flg. gls. 5-7-nerved; awn terminal or nearly so or 0.

1. **B. inermis**, Leyss. Fl. Hall. 16; rootstock creeping, panicle large, spikelets up to 2 in., awn of flg. gls. minute or 0. Poll. Hist. Pl. Palat. i. 111; Schreb. Besch. Graes. i. 97, t. 13; Host Gram. Austr. i. 8, t. 9; Kunth Enum. Pl. i. 412, Suppl. 340; Ledeb. Fl. Ross. iv. 357; Steud. Syn. Gram. 321; Boiss. Fl. Orient. v. 642. *B. littoreus*, Georgi Besch. Russ. Reich. Nachtr. 257; Griseb. in Goett. Nachr. (1868) 74; Duthie Grass. N.W. Ind. 43. *B. purpurascens*, Turcz. ex Ledeb. l. c. *PB. variegatus*, Griseb. l. c. (non Bieb.). *Schedonorus inermis*, Beauv. Agrost. 99. *Festuca inermis*, DC. Fl. Fr. iii. 49; Reichb. Ic. Fl. Germ. t. 70. *F. Leysseri*, Moench Enum. Pl. Hass. 41. *F. poaeoides*, Thuill. Fl. Paris, Ed. II. 51. *F. poaeiformis*, Pers. Syn. ii. 94. *F. speciosa*, Schreb. Spicil. Fl. Lips. 59. *Tragus inermis*, Panz. in Denkschr. Akad. Muench. (1813) 296.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 9-13,000 ft.—DISTRIB. N. Europe, Reg. Caucas., N. Asia.

Stem 2-4 ft., often stoloniferous, nodes usually pubescent. Leaves 6-9 by $\frac{1}{4}$ - $\frac{1}{2}$ in., finely acuminate, glabrous or hairy above, smooth or scabulous beneath, many-nerved; sheaths tight, striate; ligule very short, truncate, toothed. Panicle 6-8 in., open or contracted, erect or nodding, rachis smooth; lower branches 2-5 in., 3-4-nate, simple or sparingly divided. Spikelets pale green, rarely purplish, linear-oblong, loosely 5-12-fl., rachilla pubescent; gl. I $\frac{1}{4}$ - $\frac{1}{2}$ in., lanceolate, keeled; II $\frac{1}{2}$ - $\frac{3}{4}$ in., oblong-lanceolate, subacute; flg. gls. $\frac{1}{2}$ - $\frac{3}{4}$ in., oblong-lanceolate, obtuse, 5-sub 7-nerved, glabrous or nearly so, tip and upper margins scarious; awn up to $\frac{1}{2}$ in.; keels of palea rigidly ciliate. Anthers $\frac{1}{2}$ - $\frac{3}{4}$ in. Grain $\frac{3}{10}$ - $\frac{1}{2}$ in., oblong, more or less folded.—*B. inermis* in N.E. Asia passes into *B. ciliatus*, L., a characteristic form in N. America where *B. inermis* is absent.

Var. *villosus*, Mert. & Koch in Rühl. Deutsch. Flor. i. 675; spikelets pubescent to villous, lower sheaths and leaves more or less hairy.—Kashmir and Gilgit. Europe.

Var. *confinis*, Stapf; stem $1\frac{1}{2}$ – $2\frac{1}{2}$ ft., leaves hardly $\frac{1}{2}$ in. broad hairy, panicle usually reduced to a raceme, spikelets densely pubescent. *B. confinis*, Nees ex Steud. Syn. Gram. 320; Duthie l. c. 42. *B. pubescens*, Jacquem. mss. *B. Munroi*, Boiss. Fl. Or. v. 643.—Kunawur and Gilgit.

2. **B. asper**, Murray Prodr. Stirp. Gotting. 42; rootstock short præmorse, panicle large, spikelets up to $1\frac{1}{2}$ in. awn of flg. gls. $\frac{1}{2}$ to nearly as long as the gl. straight. *Host Gram. Austr. i. 6, t. 7; Engl. Bot. t. 1172; Reichb. Ic. Fl. Germ. t. 76; Steud. Syn. Gram. 320; Ledeb. Fl. Ross. iv. 356; Boiss. Fl. Orient. v. 643; Griseb. in Goett. Nachr. (1868) 64; Duthie Grass. N. W. Ind. 42. B. altissimus, Weber in Wigg Prim. Fl. Holsat. 9 (non Pursh.). B. dumetorum, Lamk. Fl. Fr. iii. 605. B. giganteus, Vill. Hist. Pl. Dauph. ii. 118 (non Linn.). B. hirsutissimus, Cyrill. ex Roem. & Sch. Syst. ii. 643. B. hirsutus, Curt. Fl. Lond. fasc. ii. t. 8 (non Schrank.). B. montanus, Scop. Fl. Carn. Ed. II. i. 82. B. nemoralis, Hud. Fl. Angl. Ed. II. i. 51. B. nemorosus, Vill. l. c. 218. B. Pseudo-asper, Schur. Enum. Pl. Transs. 804. B. ramosus, Hud. Fl. Angl. 40 (non Linn.). B. serotinus, Benek. in Bot. Zeit. iii. (1845) 724; Steud. l. c. Festuca aspera, Mert. & Koch in Roehl. Deutsch. Flor. i. 672. F. scaberrima & Wightiana, Steud. l. c. 316. Schedonorus asper, Gaud. ex Roem. & Sch. l. c. S. Benekeni, Lange in Fl. Dan. t. 2826. S. serotinus, Rostoup in Kjoeb. Vidensk. Meddel. (1864) 119. S. bromoides, Wight & Ann. in Wight Cat. n. 1795.—*Bromus*, n. 10 (partim), Herb. Ind. Or. Hf. & T.*

TEMPERATE HIMALAYA, alt. 6–11,000 ft., from Kashmir to Sikkim. KHASIA HILLS, alt. 5000 ft., J. D. H. and T. T., Clarke. NILGHIRI and PULNEY HILLS, Wight; alt. 7000 ft., Clarke.—DISTRIB. Europe, N. Afr., W. and N. Asia.

Stems 2–6 ft., erect, smooth. Leaves $1\frac{1}{2}$ – $2\frac{1}{2}$ ft. by $\frac{1}{2}$ – $\frac{3}{4}$ in., finely acuminate, flaccid, hairy above, beneath and margins scabrid, nerves many; sheaths villous or retrorsely hirsute, upper glabrous; ligule short, obtuse, ciliate. Panicle up to 1 ft., loose, open or contracted, rachis rough or smooth below; branches 2-nate or lower 3–5-nate and unequal up to 7 in., spreading or deflexed, naked below. Spikelets linear to oblong, green, loosely 7–9-fld.; gls. rather firm; rachilla scabrid; gl. I $\frac{1}{8}$ – $\frac{1}{2}$ in., linear-lanceolate; II $\frac{1}{4}$ –nearly $\frac{1}{2}$ in., broader, more oblong; III $\frac{1}{2}$ –nearly $\frac{1}{2}$ in., oblong-lanceolate, keeled below the tip, glabrous pubescent scabrid or side nerved, scabrid to ciliate, 5–7-nerved, tip and margin more or less hyaline; awn terminal or subterminal; palea obtuse, keels rigidly ciliate. Anthers $\frac{1}{2}$ – $\frac{3}{8}$ in., linear. Grain $\frac{1}{2}$ in., linear-oblong, flat tightly adherent to the gl. and palea.—The Sikkim, Khasia and some Nilghiri specimens have more acute and strongly nerved gls. than most of the N.-Western ones; but they are linked by many intermediates, and similar variations occur all over Europe.

3. **B. himalaicus**, Stapf; rootstock very short, panicle usually reduced to a raceme, spikelets up to 1 in., awn of flg. gl. as long as the gl. or longer recurved. *B. asper*, & *Bromus* n. 9 & 10 (partim), Herb. Ind. Or. Hf. & T.

TEMPERATE HIMALAYA; E. Nepal, Sikkim and W. Bhotan, &c., alt. 8–12,000 ft., J. D. H.

Stems 2– $2\frac{1}{2}$ ft. Leaves 6–9 by $\frac{1}{2}$ – $\frac{1}{4}$ in., finely acuminate, flaccid, hairy above, beneath and margins scabrid, many-nerved; sheaths tight, glabrous or lowest hairy when young; ligule short, truncate, usually dark colored. Panicle 5–7 in., open or contracted; rachis rough, or smooth below; branches 2-nate, or the lower 3–5-nate, spreading or deflexed, unequal, lowest up to 3 in., simple or sparingly divided. Spikelets linear-oblong, green, loosely 9-fld.; rachilla subscaberulous; gl. I $\frac{1}{5}$ – $\frac{3}{10}$ in., narrowly lanceolate, 1-nerved, keeled; II longer ($\frac{3}{10}$ – $\frac{1}{2}$ in.) and broader;

III broader and thinner than in *B. asper*, glabrous pubescent or rigidly hairy towards the margins, 5-7-nerved, scarcely keeled below the tip, tip and margins hardly hyaline; callus large; palea obtuse, keels rigidly ciliate. *Anthers* linear-oblong, $\frac{5}{16}$ – $\frac{1}{12}$ in. *Grain* $\frac{1}{2}$ in., linear-oblong, plano-convex, adherent to the gl. and palea.

Var. *grandis*, Stapf; branches of panicle almost all simple and bearing a solitary villous spikelet, gls. larger. *B. confinis*, *Herb. Strach. & Winterb.*—Kumaon and Sikkim, alt. 11–12,000 ft.

Sect. II. STENOBROMUS, *Griseb.* Annuals. *Gl.* I 1- rarely 3-nerved; II 3-5-nerved; fig. gls. 5-7-nerved; internodes of rachilla slender.

4. *B. crinitus*, *Boiss. & Hoh. in Boiss. Diagn. Ser. I. xiii. 64, Fl. Orient. iii. 647*; panicle rather stiff, spikelets $\frac{1}{2}$ in. elliptic-oblong, fig. gls. clavate not imbricating. *Steud. Syn. Gram. 320*; *Griseb. in Goett. Nachr.* (1868) 74. *B. gracillimus*, *Bunge in Mem. Sav. Etr. Petersb. vii. (1851) 527*; *Duthie Grass. N.W. Ind. 42*. *Deschampsia aralensis*, *Regel in Bull. Soc. Nat. Mosc. xli. (1868) II. 300*.

WESTERN TIBET; alt. 10–14,000 ft.; Baltistan, &c., *Thomson, Duthie. Zanskar; Schlagintweit.* BRITISH BELUCHISTAN, alt. 4–5000 ft., *Duthie.*—DISTRIB. Westwd. to Persia, Turkestan.

Stem 6–18 in., erect, slender, smooth. *Leaves* $1\frac{1}{2}$ – $3\frac{1}{2}$ by $\frac{1}{12}$ – $\frac{1}{10}$ in., linear, flaccid, pilose or velvety; sheaths velvety; ligule ovate, lacerate. *Panicle* up to 4 in., oblong, erect or subnutant, rachis smooth; branches 3–5-nate, capillary, suberect or spreading, up to 2 in. *Spikelets* 3–6-fld., pale green; rachilla scabrid; gl. I $\frac{1}{2}$ in., lanceolate, acute, hyaline except along the middle; II $\frac{1}{2}$ – $\frac{1}{2}$ in., broadly lanceolate, tip and margins hyaline; fig. gls. $\frac{1}{2}$ in., oblong, obtuse, strongly involute, ciliate on or near the margin, faintly 5-nerved; awn $\frac{3}{4}$ in., capillary, straight, terminal or nearly so; keels of palea ciliate. *Anthers* $\frac{1}{2}$ – $\frac{1}{2}$ in. *Grain* $\frac{1}{2}$ in., linear-oblong, laterally compressed and folded; hilum as long as the grain.

5. *B. tectorum*, *Linn. Sp. Pl. 77*; panicle flaccid nodding often second, spikelets $\frac{1}{2}$ –1 in. cuneiform, fig. gls. long narrow. *Host Gram. Austr. i. 13, t. 15*; *Sibth. Fl. Græc. i. t. 82*; *Fl. Dan. t. 1806*; *Reichb. Ic. Fl. Germ. t. 73*; *Ledeb. Fl. Ross. iv. t. 359*; *Kunth Enum. Pl. i. 419, Suppl. 344*; *Boiss. Fl. Orient. v. 647*; *Steud. Syn. Gram. 318*; *Griseb. in Goett. Nachr.* (1868) 74; *Duthie Grass. N.W. Ind. 43*. *B. abortiflorus*, *St. Amans. Fl. Agen. 44*; *Steud. l. c.* *B. arenaceus*, *Pourr. in Mem. Acad. Toul. iii. (1788) 308*. *B. lateripronus*, *St. Laz. in Ann. Soc. Bot. Lyon. vii. (1880) 121*. ?*B. scabrifolius*, *Opiz. Natural. n. 9 (1825) 119*. *B. tectorium*, *Dulac Fl. Haut. Pyren. 96*. *Anisantha pontica*, *C. Koch in Linnæa, xxi. (1848) 394*; *Steud. l. c. 377*.

WESTERN HIMALAYA, from Gilgit to Kumaon, alt. 7–11,000 ft.; Baltistan, *Duthie.*—DISTRIB. Europe, N. Africa, N. and W. Asia.

Stems 6–18 in., erect or ascending, glabrous or pubescent. *Leaves* up to 3 by $\frac{1}{2}$ in., linear, acute, flaccid, hairy; sheaths hairy, rarely glabrous; ligule ovate, lacerate. *Panicle* up to 5 in., flaccid; rachis smooth or nearly so; branches 3–6-nate, capillary, flexuous, often decurved with erect tips, sparingly divided. *Spikelets* green, loosely few-many-fld., rachilla scabrid; gl. I $\frac{1}{2}$ – $\frac{1}{2}$ in., lanceolate, acute, 1- rarely 3-nerved, tip and margins hyaline; II $\frac{1}{2}$ – $\frac{1}{2}$ in., oblong-lanceolate, 3–5-nerved; fig. gls. $\frac{1}{2}$ –nearly $\frac{3}{4}$ in., thin, oblong-lanceolate, acutely 2-fld, 5–7-nerved, puberulous or scabrid above or all over, tip and margins hyaline; awn $\frac{1}{2}$ – $\frac{3}{4}$ in., from the tip or below it, straight or slightly recurved; keel of palea long and loosely ciliate. *Anthers* $\frac{1}{2}$ in. *Grain* $\frac{1}{2}$ – $\frac{2}{3}$ in., linear-oblong, dorsally compressed, ventrally concave or folded.—The form with a solitary fig. gl. (*B. abortiflorus*, *St. Amans*) may be expected to occur in N. India.

Sect. III. *SERRAFALCUS*, *Parl.* (Gen.) Annuals. *Gl.* I 3-5- rarely 1-nerved; II 5-9-nerved; *fig. gls.* 7-9-nerved; internodes of rachilla clavate above.

* *Flg. gls.* all 1-awned. *Panicle* compact, rarely loose, branches short.

6. *B. scoparius*, *Linn. Cent. Pl.* i. 6, *Sp. Pl.* 76; panicle very compact oblong to obovate, spikelets densely fascicled about $\frac{1}{2}$ - $\frac{1}{2}$ in., *fig. gls.* oblong obtuse, awn = the gl. at length spreading. *Kunth Enum. Pl.* i. 420; *Bory Exped. Morée*, t. 5; *Steud. Syn. Gram.* 318; *Boiss. Fl. Orient.* v. 650. *B. confertus*, *Bieb. Fl. Taur. Cauc.* i. 71; *Steud. l. c.* 324; *Duthie Grass. N.W. Ind.* 42. *B. chrysopogon*, *Viv. Fl. Lyb. Spec.* 4, t. 2; *Steud. l. c.* 327. *B. erectus*, *Moris Stirp. Sard. Elench.* i. 50 (non *Huds.*). *B. humilis*, *Cav. Ic.* vi. 65, t. 589. ?*B. rubens*, *Cav. l. c.* t. 45 (non *Linn.*). *Serrafalcus scoparius*, *Parl. Fl. Ital.* i. 19. *S. Cavanillesii*, *Willk. & Lange Prodr. Fl. Hisp.* i. 101.

KASHMIR, alt. 5-6000 ft., *Falconer, Duthie*.—*DISTRIB.* *Reg. Mediterr., Oriens.* Annual. *Stems* $\frac{1}{2}$ -1 $\frac{1}{2}$ ft., erect, slender, glabrous. *Leaves* 2-3 $\frac{1}{2}$ in. by $\frac{1}{2}$ in., linear, acute, hairs scattered stiff; sheaths tight, glabrous, mouth hairy; ligule short, truncate, toothed. *Panicle* 1-1 $\frac{1}{2}$ in., erect, compact; rachis smooth; branches solitary or binate, short, crowded, scaberulous. *Spikelets* $\frac{1}{10}$ - $\frac{1}{7}$ in. broad, pale green, densely 5-8-fld., rachilla scaberulous; glumes glabrous or hairy, nerves strong; gl. I $\frac{1}{2}$ in., ovate-lanceolate, acute or subacute, 3-5-nerved; II $\frac{1}{2}$ in., 5-7-nerved; *fig. gls.* $\frac{1}{2}$ in., minutely 2-fid, 7- sub 9-nerved; awn slender; keels of obtuse palea loosely long-ciliate. *Anthers* $\frac{2}{5}$ - $\frac{3}{5}$ in. *Grain* $\frac{1}{5}$ in., linear-oblong, flatly concavo-convex or folded.

7. *B. mollis*, *Linn. Sp. Pl. Ed.* II. 112; panicle compact or loose but contracted ovate to oblong branches distinct, spikelets $\frac{1}{2}$ - $\frac{3}{4}$ in. ovate-oblong or elliptic, awn about as long as the gl. straight. *Host Gram. Austr.* i. 16, t. 19; *Fl. Dan.* t. 1324; *Engl. Bot.* t. 1078; *Knapp Gram. Britt.* t. 77; *Reichb. Ic. Fl. Germ.* t. 74; *Schreb. Besch. Gram.* t. 6, f. 1; *Kunth Enum. Pl.* i. t. 413, *Suppl.* 340; *Steud. Syn. Gram.* 323; *Ledeb. Fl. Ross.* iv. 361; *Steud. Syn. Gram.* 323; *Boiss. Fl. Orient.* v. 653; *Duthie Grass. N.W. Ind.* (*Royle's plant only*) *B. arenarius*, *Thomine Desm. in Mem. Soc. Linn. Calv.* (1824) 40 (non *Labill.*). *B. atticus*, *Steud. ex Nym. Consp.* 823; *Syn. Gram.* 321. *B. compactus*, *Hort. ex Steud. Nom. Ed.* II. ii. 227. *B. Ferronii*, *Mabelli in Act. Soc. Linn. Bord.* xxv. (1864) 613. *B. glomeratus*, *Tausch in Flora*, xx. (1837) 125 (ex *Boiss.*); *Steud. l. c.* 328. *B. hordeaceus*, *Linn. Sp. Pl.* 77. *B. nausus*, *Weig. Obs.* 8. *B. patulus*, *Duthie Grass. N.W. Ind.* 42 (in part). *B. simplicissimus*, *Cesati ex Nym. l. c.* *Serrafalcus mollis*, *Parl. Rar. Pl. Sic.* ii. 16. *S. Thomini*, *Hard. in Congr. Sc. Fr. Sept.* I. (1833) 59.

NORTH-WEST INDIA, *Herb. Royle (Introduct. ?)*.—*DISTRIB.* *Europe, N. Afr., As. Min.*

Annual. *Stems* $\frac{1}{2}$ -3 ft., erect or ascending, villous to glabrous. *Leaves* 1 $\frac{1}{2}$ -4 in., linear, acute, flaccid, subhirsute above, pubescent beneath; sheaths velvety or softly hairy; ligule very short, denticulate, glabrous or hairy. *Panicle* 1-6 in., erect, rachis hairy; branches 3-6-nate, scabrid or softly pubescent. *Spikelets* $\frac{1}{2}$ - $\frac{1}{4}$ in. broad, pale green, densely 5-12-fld., rachilla scaberulous; gls. broad, hairy to velvety, rarely glabrescent, nerves strong, tips and margins scarious; I $\frac{1}{2}$ - $\frac{1}{5}$ in., ovate-lanceolate, acute or mucronate, 5-nerved, midrib percurrent; II $\frac{1}{2}$ in., elliptic-oblong, 7-9-nerved; *fig. gls.* $\frac{3}{5}$ - $\frac{1}{2}$ in., broadly subobovate, obtuse, shortly 2-lobed, 7-nerved; awn subterminal as long or rather shorter than the gl.; palea obtusely

2-lobed, keels loosely long-ciliate. *Anthers* $\frac{1}{2}$ in., oblong. *Grain* $\frac{1}{5}$ – $\frac{1}{4}$ in., linear-oblong, flatly concavo-convex or folded, tightly adherent to the gl. and palea.

** *Flg. gls. all 1-awned, or some 3-awned in B. macrostachys. Panicle loose, open or contracted.*

8. ***B. patulus***, Mert. & Koch in Röhl. *Deutsch. Flor.* i. 635; panicle linear-oblong usually nodding often second branches long slender up to 6 in., spikelets $\frac{3}{4}$ – $1\frac{1}{2}$ in. linear-oblong, awn about = the gl. usually recurved. *Kunth Enum. Pl.* i. 415; *Reichb. Ic. Fl. Germ.* t. 74; *Ledeb. Fl. Ross.* iv. 364; *Boiss Fl. Orient.* v. 655; *Steud. Syn. Gram.* 325; *Griseb. in Goett. Nachr.* (1868) 74; *Duthie Grass. N.W. Ind.* 43. *B. annuus*, *Herb. Jacquem.* *B. anatolicus*, *Boiss. et Heldr. in Boiss. Diagn. Ser. I.* xiii. 63. *B. arvensis*, *Duthie l.c.* 42 (non Linn.); *Herb. Ind. Or. Hf. & T.* *B. chapprianus*, *De Not. ex Nym. Consp.* 824. *B. commutatus*, *M. Bieb. Fl. Taur. Cauc.* iii. 77 (non Mert. & Koch.). *B. Cyri*, *C. A. Mey. Verz Pfl. Cauc.* 24. *B. japonicus*, *Thunb. Fl. Jap.* 51, t. 11; *Franch. & Sav. Enum. Pl. Japon.* ii. 181 (nom. prius). *B. Kochii*, *C. Gmel. Fl. Bad.* iv. 76, t. 6. *B. mollis*, *Duthie l.c.* *B. multiflorus*, *Host Gram. Austr.* i. (excl. exempl. *Royle*) t. 11 (nom. Sm.). *B. pendulus*, *Schk. in Verh. Siebend. Ver. Naturh.* iv. (1853) 90. *B. phrygius*, *Boiss. Diagn. Ser. II.* iv. 140. *B. polymorphus*, *Hoh. Enum. Pl. Talusch.* 19. *B. secalinus*, *M. Bieb. l.c.* i. 71 (non Linn.). *B. squarrosus*, *Herb. Royle*; *Herb. Strach. & Winterb.* (*Bromus*, n. 3); *Duthie l.c.* (non Linn.). *B. unilateralis*, *Schur. l.c.* *B. velutinns*, *Nocc. et Balb. Fl. Tic.* i. 54 (non Schrad.). *B. villiferus*, *Steud. Syn. Gram.* 326 (in part). *Serrafalcus patulus*, *Parl. Fl. Ital.* i. 394.

WESTERN HIMALAYA, alt. 6–14,000 ft. Bhotan, *Griffith.*—DISTRIB. Europe, W. and N. Asia, China, Japan.

Annual. *Stems* 1–2 ft., erect or ascending, glabrous or puberulous. *Leaves* up to 8 by $\frac{1}{4}$ in., linear, acute or subacute, green, flaccid, hairy especially above; sheaths rarely all glabrous or hairy; ligule short, ovate, toothed. *Panicle* up to 8 in., narrow or open; rachis glabrous or pubescent; branches solitary or 3–7-nate, unequal, 1–4-spiculate, slender, flexuous, lower up to 6 in. long, simple or racemose, suberect spreading or nodding, scabrid at least above. *Spikelets* densely or loosely 7–14-flid., pale green; rachilla scabrid; gls. rather narrow, thin between the prominent nerves; I $\frac{1}{5}$ – $\frac{1}{4}$ in., lanceolate, subacute, pubescent or scabrid, 3-nerved, tips and upper margins hyaline, II $\frac{3}{10}$ – $\frac{1}{2}$ in., oblong-lanceolate, 7-nerved; flg. gls. $\frac{1}{5}$ – $\frac{1}{4}$ in., elliptic-oblong or lanceolate, subacute or obtuse, 2-toothed, margins inflexed from the middle or above it; awn $\frac{1}{10}$ – $\frac{1}{4}$ in., infra-apical, base rather stout, not or obscurely twisted; keels of palea loosely long-ciliate. *Anthers* $\frac{1}{5}$ – $\frac{1}{2}$ in. *Grain* $\frac{1}{5}$ – $\frac{2}{7}$ in. linear-oblong, more or less concavo-convex, tightly adherent to the gl. and palea.—Griffiths' Bhotan specimen is a solitary one, probably introduced. The following are rather abnormal forms than varieties.

Var. Falconeri, Stapf; panicle very loose villous, gl. I narrowly lanceolate 1-nerved, II 5-nerved, flg. gls. 7-nerved.—*B. tomentellus*, *Duthie l.c.* 43 (non Boiss.).—N.W. India, *Falconer*.

Var. microstachya, Stapf; spikelets small few-flid., gls. broader, I $\frac{1}{4}$ in. 3–5-nerved, II $\frac{1}{4}$ in. 7–9-nerved, flg. gls. $\frac{1}{4}$ – $\frac{3}{10}$ by $\frac{1}{8}$ in. broad.—N.W. India, *Falconer*.

9. ***B. oxyodon***, *Schrenk Enum. Pl. Nov.* ii. 1; panicle usually stiff suberect oblong contracted, branches up to 2 in., spikelets $1\frac{1}{2}$ in. linear or linear-oblong, flg. gls. broadly hyaline. awn $\frac{3}{4}$ –1 in. *Steud. Syn. Gram.* 326. *B. macrostachys*, *var. oxyodon*, *Griseb. in Ledeb. Fl. Ross.* iv. 363. *B. multiflorus*, *Kar. & Kiril. in Bull. Soc. Nat. Mosc.* (1841) 865.

KASHMIR, DRAŞ, BALTISTAN, ZANSKAR, &c., alt. 9–12,000 ft., *Thomson*, &c.—DISTRIB.—Turkestan.

Annual. *Stems* 6-18 in., erect or ascending, pubescent or subvelutinous. *Leaves* 2-5 in., linear, narrow, subacute, hairy or velvety; young sheaths villous; ligule ovate, lacerate. *Panicle* up to 5 in., usually contracted, erect, rachis pubescent; branches 2-5-nate, unequal, suberect, rarely nodding, scabrid, simple 1-3-spiculate. *Spikelets* pale green, densely 5-10-fld.; rachilla puberulous; gls. rather narrow, glistening, scabrid with appressed hairs, tips long-hyaline, nerves prominent; I $\frac{1}{3}$ - $\frac{2}{5}$ in., lanceolate, 1-3-nerved; II $\frac{9}{20}$ - $\frac{11}{10}$ in., oblong-lanceolate, 5-nerved; flg. gls. $\frac{1}{2}$ - $\frac{3}{4}$ by $\frac{1}{8}$ - $\frac{1}{7}$ in., oblong-lanceolate, margins inflexed below the middle, subacute, 2-toothed, 7-9-nerved; awn $\frac{1}{2}$ -1 in., infra-apical, nearly straight or moderately recurved; keels of palea loosely long-ciliate. *Anthers* $\frac{3}{10}$ - $\frac{2}{5}$ in. *Grain* $\frac{1}{10}$ - $\frac{1}{8}$ in., linear-oblong, slightly concavo-convex.

10. **B. macrostachys**, Desf. *Fl. Atlant.* i. 96, t. 19, f. 2, var. *triaris-tatus*, Hack. in *Flora* (1879); panicle oblong or obovate-oblong loose or contracted, spikelets $1\frac{1}{2}$ - $1\frac{3}{4}$ in. elliptic to linear-oblong, flg. gls. all or the upper only with 2 straight slender lateral awns, median awn $\frac{1}{2}$ - $\frac{3}{4}$ in. finally twisted and strongly recurved. *B. Danthoniæ*, Trin. in *C. A. Mey. Verz. Pfl. Cauc.* 24; *Sp. Gram. Ic.* t. 353; *Duthie Grass. N.W. Ind.* 43. *Boissiera Danthoniæ*, A. Br. *Ind. Sem. Hort. Berol.* (1857) 3. *Triniusa Danthoniæ*, Steud. *Syn. Gram.* 328.

WESTERN TIBET; Spiti, alt. 12,000 ft., *Lance*.—DISTRIB. Afghan., Turkestan, As. Min. (of *B. macrostachys*, M.-diterranean regions, Persia).

Annual. *Stem* 6-18 in., erect or ascending, glabrous or pubescent. *Leaves* 2-6 in., narrowly linear, acute or subacute, more or less hairy or velvety; young sheaths villous or velvety; ligule ovate, lacerate. *Panicle* up to 5 in., sometimes reduced to a spikelet, rachis glabrous or pubescent; branches solitary or the lower 3-4-nate, unequal, rarely 1 in., simple, 1-2-spiculate, strict, suberect, scabrid, rarely flexuous. *Spikelets* pale green, densely 6-20-fld.; rachilla pubescent; gls. broad, villous velvety or scabrid, tips and margins usually scarious and dull white, nerves prominent or not; gl. I $\frac{1}{5}$ - $\frac{3}{10}$ in.; broadly lanceolate, 5-nerved; II about $\frac{1}{4}$ in., oblong, 7-9-nerved; flg. gls. $\frac{2}{5}$ -nearly $\frac{1}{2}$ in., elliptic to obovate-oblong, subacute, 2-toothed, 9-11-nerved, margins inflexed from or from above the middle; lateral awns $\frac{1}{8}$ - $\frac{1}{5}$ in, median $\frac{1}{2}$ - $\frac{3}{4}$ in., infra-apical, often purplish, base stout; keels of palea long-ciliate. *Anthers* nearly $\frac{1}{2}$ - $\frac{3}{5}$ in., rarely $\frac{1}{10}$ in. *Grain* $\frac{1}{10}$ - $\frac{1}{8}$ in., linear-oblong, slightly concavo-convex, tightly adherent to the gl. and palea; hilum almost as long as the gl.

DOUBTFUL SPECIES.

B. MEMBRANACEUS, Jacquem. mss.; Griseb. in Goett. *Nachr.* (1868) 74 *Duthie Grass. N.W. Ind.* 43 is *Duthiaea bromoides*, Hack. (see p. 282).

123. **DUTHIEA**, Hack. See p. 282.

124. **BRACHYPODIUM**, Beauv.

Perennial slender grasses. *Leaves* flat or convolute. *Spikelets* terete, many-fld., subsessile or in a long slender spike appressed to the rachis; rachilla elongate and jointed below the fl. gls. *Glumes* many, imbricate in fl., spreading in frt.; I and II persistent; empty, narrow; flg. gls. oblong-lanceolate, acuminate, with a terminal straight awn or mucro, 7-9-nerved; keels of palea pectinately ciliate. *Lodicules* ciliate. *Stamens* 2-3, anthers linear. *Ovary* and *grain* as in *Bromus*.—Species 5 or 6, of north temp. and mt. regions.

1. **B. sylvaticum**, Beauv. *Agrost.* 101; roots fibrous, leaves more or less hairy or scaberulous flat, spike drooping, awn as long as its gl. *Thw. Enum. Pl. Zeyl.* 374; *Trim. Cat. Ceyl. Pl.* 110; *Ledeb. Fl. Ross.* iv. 346;

Boiss. Fl. Orient. v. 657. *B. Fontanesianum*, *Nees Fl. Afr. Austr.* 457. *B. Fontanesii*, *Nees in Herb. Ind. Or. Hohenack.* n. 914. *B. gracile*, *Beauv. l. c.*; *Reichb. Ic. Fl. Germ.* t. 16. *B. nepalense*, *Nees ex Steud. Syn. Gram.* 316. *B. scaberrimum*, *Wight & Arn. in Wight Cat.* n. 1796; *Steud. Nomencl. Ed. II. i.* 221. *Bromus silvaticus*, *Pollich Hist. Pl. Palat.* i. 118; *Host Gram. Austr.* i. 17, t. 21; *Engl. Bot.* t. 729. *B. dumosus*, *Vill. Hist. Pl. Dauph.* ii. 119. *B. gracilis*, *Weig. Obs.* 15, t. 1, f. 11. *B. pinnatus*, *Fl. Dan.* t. 164 (non *Beauv.*). *Festuca gracilis*, *Moench Meth.* 191. *F. sylvatica*, *Huds. Fl. Angl. Ed. I.* 38; *Knapp Gram. Britt.* t. 76; *Steud. Syn. Gram.* 316. *Triticum sylvaticum*, *Moench Enum. Pl. Hass.* 54; *Kunth Enum. Pl. i.* 445. *T. gracile*, *Brot. Fl. Lusit.* 121. *T. scaberrimum*, *Steud. Nom. l. c.* 717. *Tragus gracilis*, *Panz. in Denkschr. Akad. Muench.* (1813) 296.—*Festuca*, *Wall. Cat.* n. 3800.

TEMPERATE HIMALAYA, alt. 6–12,000 ft., from Kashmir to Sikkim. The KHASIA and NAGA HILLS, alt. 4–6000 ft., *Clarke, &c.* NILGIRI HILLS, alt. 6000 ft., *Wight, &c.*—CEYLON, alt. 8000 ft., *Walker, &c.*—DISTRIB. Europe, N. Asia, S. Africa.

Stem 2–4 ft., very slender, simple or branched. *Leaves* $\frac{1}{2}$ – $\frac{2}{3}$ in. broad, usually flaccid, finely acuminate; sheaths more or less hairy; ligule short, obtuse. *Spikes* 2–6 in., or more, nodding; rachis compressed, glabrous, edges ciliate. *Spikelets* 8–18 by $\frac{2}{3}$ –1 in., green, glabrous sparsely hairy or scaberulous, nerves strong; gl. I and II strongly nerve; I subulate, $\frac{1}{2}$ shorter than II or less; II oblong-lanceolate, acute acuminate or shortly awned; flg. gls. about $\frac{1}{2}$ in. long, gradually narrowed into a slender erect awn, 7-nerved; awn $\frac{1}{2}$ – $\frac{3}{4}$ in. *Anthors* $\frac{1}{2}$ – $\frac{3}{4}$ as long as the palea.—The characters of the following varieties are far from constant.

Var. longe-aristatum, *Hook. f.*; flg. gl. $\frac{1}{2}$ in., awns $\frac{1}{2}$ – $\frac{3}{4}$ in.—N.W. Himalaya; Kumaon and Dalhousie, alt. 6–9000 ft.

Var. khasianum, *Hook. f.*; callus of fl. gl. villous awn up to $1\frac{1}{4}$ in.—Khasia Hills.

Var. Wattii, *Hook. f.*; stem stouter, lower spikelets pedicelled, pedicel of lowest half as long as the spikelet or less pubescent, awn about as long as the gl. *B. Wattii*, *Clarke in Journ. Linn. Soc.* xxv. (1887) 90, t. 40.—Naga Hills, alt. 5500–7500 ft., *Clarke.*

Var. Pseudo-distachyon, *Hook. f.*; stem short 10–18 in. strict, leaves very narrow erect, spikelets few closer together, awn = half the gl. or shorter.—Kashmir and Kumaon.

2. ***B. pinnatum***, *Beauv. Agrost.* 101, t. 19, f. 3; rootstock creeping, leaves convolute, spike erect, flg. gls. mucronate. *Ledeb. Fl. Ross.* iv. 345; *Boiss. Fl. Orient.* v. 658; *Reichb. Ic. Fl. Germ.* t. 16, 17; *T. Nees Gen. Fl. Germ. Monocot.* i. t. 70. *B. Barrelieri*, *Roem. & Sch. Syst.* ii. 741. *B. cœspitosum*, *Roem. & Sch. l. c.* 737; *Reichb. l. c.* t. 17; *Host Gram. Austr.* i. t. 22. *B. constrictum*, *Presl Cyp. & Gram. Sic.* 40. *B. corniculatum*, *DC. Fl. Franc.* v. 608. *B. rupestre*, *Roem. & Sch. l. c.* 736; *Host l. c.* iv. t. 17. *Bromus gracilis*, *Leys. Fl. Hal.* 26. *B. pinnatus*, *Linn. Sp. Pl.* 78; *Host Gram. Austr.* i. t. 22; *Engl. Bot.* t. 730. *Festuca pinnata*, *Moench. Meth.* 191; *Huds. Fl. Angl. Ed. II. i.* 48; *Knapp Gram. Britt.* t. 75. *Triticum bromoides*, *Weber ex Wigg. Prim. Fl. Holsat.* ii. *T. gracile*, *DC. Fl. Fr.* iii. 84. *T. macrourum*, *Turc. in Bull. Soc. Nat. Mosc.* (1838) 105. *T. phœnicioides*, *DC. l. c.* vi. 284. *T. pinnatum*, *Moench Enum. Pl. Hass.* 53; *Kunth Enum. Pl. i.* 445, *Suppl.* 364, t. 35. *Tragus pinnatus*, *Panz. in Denkschr. Acad. Muench.* (1813) 256. *Avena laeta*, *Salisb. Prodr.* 22.

KASHMIR; alt. 6000 ft., *Clarke.*—DISTRIB. Eastwd. to Europe, N. Asia.

Glabrous. *Stem* 1–3 ft., very slender, naked above, smooth. *Leaves* rigid, almost glabrous, rarely flat; ligule ciliate. *Spike* 1–6 in.; rachis flattened, smooth.

Spikelets $\frac{3}{4}$ –1½ in., erect, recurved from the rachis, glabrous or pubescent, green and purplish. *Glumes* coriaceous; I 5-nerved; II 7-nerved; flg. gls. oblong, mucronate, 5-nerved.

Tribe X. HORDEÆ. (See p. 8.)

125. **LOLIUM**, Linn

Erect annual or perennial grasses. *Leaves* flat or convolute. *Spikelets* many-fl'd., solitary, sessile in the alternating distichous hollows of a terminal inarticulate spike, with the back of the lowest fl. gl. towards the rachis, rachilla jointed. *Glumes* many, 10, except in the terminal spikelet; II erect, rigid, persistent, many-nerved, empty, margins not involute; flg. shorter than the empty, oblong, obtuse, acute or awned, dorsally rounded. 5– many-nerved; keels of palea ciliolate or serrulate. *Lodicules* 2, fleshy. *Stamens* 3. *Ovary* glabrous; styles terminal, feathery to the base, *Grain* glabrous, adherent to the palea.—Species few, of the temperate Old World.

The Italian Rye-grass. *L. multiflorum*, Lamk. (*italicum*, A. Br.) is a cultivated form of *L. perenne*.

1. **L. temulentum**, Linn. *Sp. Pl.* 83; annual, leaves flat, spikelets oblong-cuneate 3–8-fl'd., empty gl. linear many-nerved equalling or exceeding the rest of the spikelet, flg. gls. elliptic acute or awned. *Fl. Dan.* t. 160; *Host Gram. Austr.* t. 26; *Engl. Bot.* t. 1124; *Knapp Gram. Britt.* t. 101; *Reichb. Ic. Fl. Germ.* t. 5; *T. Nees Gen. Fl. Germ. Monocot.* 1. t. 78; *Steud. Syn. Gram.* 340; *Kunth Enum. Pl.* i. 437; *Ledeb. Fl. Ross.* iv. 345; *Boiss. Fl. Orient.* v. 681; *Benth. Fl. Austral.* vii. 667; *Aitchis. Cat. Panjab. Pl.* 171; *Wall. Cat.* n. 3790; *Duthie Grass. N.W. Ind.* 44, *Fodd. Grass. N. Ind.* 68. *L. annuum*, Lamk *Fl. Fr.* iii. 620. *L. arvense*, *With. Arr. Brit. Pl. Ed.* III. ii. 168. *Craepalia temulenta*, *Schrank Baier Fl.* i. 382.

The UPPER GANGETIC PLAIN, the PANJAB, SIND, and WESTERN HIMALAYA, alt. 4–6000 ft.—DISTRIB. Europe, N. Asia (introd. elsewhere).

Stem 6–18 in., erect, usually stout. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, and sheaths smooth or scaberulous; ligule very short. *Spike* 6–10 in., strict, rachis stout. *Spikelets* very variable in size and shape, longer or shorter than the internodes; gl. I $\frac{1}{2}$ – $\frac{2}{3}$ in., rigid, erect; fl. gls. $\frac{1}{2}$ – $\frac{3}{4}$ in., awn $\frac{1}{2}$ in. or shorter, or 0.

Var. *speciosum*, Griseb. in Ledeb. l. c.; spike very stout, gl. I large, flg. gls. short turgid obtuse. *L. speciosum*, *Stev. ex Bieb. Fl. Taur. Cauc.* i. 80. *L. robustum*, *Reichb. Ic. Fl. Germ.* xi. II. t. 4.—Western Himalaya (introd. ?).

2. **L. rigidum**, Gaud., var. *Duthiei*, Hack. mss.; annual, stem and spike very slender strict erect, leaves short narrow, spikelets narrowly oblong closely appressed to the rachis 3–6-fl'd., empty gl. rather shorter than the rest of the spikelet oblong-lanceolate subacute 5-ribbed, flg. gls. elliptic subacute 5-nerved scaberulous above the middle narrowed at the hyaline apex into a slender terminal awn or awn infra-apical.

KASHMIR; near Srinagar, alt. 5–6000 ft., *Duthie* (no. 10,846).—DISTRIB. of *L. rigidum*, westward to the Caucasus and S. Europe.

I adopt Hackel's determination of this grass, which differs from *L. rigidum* proper in the narrower spikelets closely appressed to the rachis of the spike, and in the awned glumes, a character to which there is no approach in any of the numerous

specimens of *L. rigidum* which I have examined. The awns are as long as the gls. or longer.

3. **L. perenne**, *Linn. Sp. Pl.* 83; perennial, leaves linear complicate in veneration, spikelets oblong 3-11-fl., empty gl. 3-5-ribbed, shorter than the rest of the spikelet, fl. gls. oblong-lanceolate obtuse or sub-acute 5-nerved awned or not. *Fl. Dan.* t. 747; *Host Gram. Austr.* i. t. 25; *Engl. Bot.* t. 315; *Knapp Gram. Britt.* t. 180; *Reichb. Ic. Fl. Germ.* t. 8; *T. Nees Gen. Fl. Germ. Monoc.* i. n. 78; *Kunth Enum. Pl.* i. 436, *Suppl.* 358, t. 33, f. 1; *Ledeb. Fl. Ross.* iv. 343; *Boiss. Fl. Orient.* v. 679; *Duthie Grass. N.W. Ind.* 44, *Fodd. Grass. N. Ind.* 68. *L. vulgare*, *Host l. c.* t. 25.

WESTERN TIBET, alt. 15,000 ft., *Stolizka* (*Duthie*); Sikkim Himalaya, alt. 7000 ft., *Clarke* (introduced).—DISTRIB. Europe, N. Asia.

Probably not indigenous in India, though likely to occur in temperate regions. Its perennial character and stoloniferous habit at once distinguish it.

126. LEPTURUS, Br.

Small slender grasses. *Leaves* flat or convolute. *Spikelets* 1-2-fl., sessile, solitary, $\frac{1}{2}$ immersed in hollows of the rachis of a simple terminal articulate or not-straight or incurved spike, with the back of the lowest fl. gl. opposite the rachis; rachilla jointed. *Glumes* 3 or 4, I minute or 0; II longer than the fl. gls., linear, rigid, acute, 5-nerved, erect or at length deflexed; III and IV much shorter than II, hyaline; palea 2-keeled. *Lodicules* 2, cuneate or lobed. *Stamens* 1-3. *Ovary* glabrous; styles short, distant. *Grain* narrow or oblong, glabrous, free.—Species 6, natives of the Old World.

1. **L. repens**, *Br. Prodr.* 207; perennial, creeping, spikes shortly peduncled fragile, gl. I 0, II acuminate or sub-aristate many-nerved much longer than the fl. gls. *Brongn. in Duperr. Voy. Bot.* 57, t. 16; *Kunth Enum. Pl.* i. 463, *Suppl.* 374; *Steud. Syn. Gram.* 357; *Trim. Cat. Ceyl. Pl.* 110; *Benth. Fl. Austral.* vii. 668. *L. aciculatus*, *Steud. l. c.*; *Miq. Fl. Ind. Bat.* iii. 403. *Rottboellia repens*, *Forst. Prodr.* 9. *Monerma repeps*, *Beauv. Agrost.* 117. *Lolium coelorachis*, *Forst. in Herb. Paris*, *Steud. Nom. Ed.* II. ii. 64.

CEYLON; near Colombo, *Trimen*.—DISTRIB. Malay and Pacific Islds., Australia. *Stem* elongate, woody branched and widely creeping below. *Leaves* 3-6 by $\frac{1}{4}$ - $\frac{1}{2}$ in., spreading or erect, acuminate, glaucous; sheaths glabrous or mouth ciliate; ligule inconspicuous. *Spikes* 2-6 in., strict, erect; rachis glabrous. *Spikelets* 2-fl., rachilla elongate bearing an upper imperfect fl.; empty gls. 1 (or 2 in the uppermost spikelet) flat, rigid, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, closely appressed to the rachis; fl. gls. much shorter than the empty, elliptic, concave, 3-nerved; palea 2-keeled. *Lodicules* fleshy, obliquely truncate or 2-lobed, glabrous. *Grain* oblong.

2. **L. Roxburghianus**, *Steud. Syn. Gram.* 357; annual, erect, spikes long-peduncled very slender inarticulate, gl. I minute ovate, II linear-oblong acute rather shorter than the fl. gls. *Rottboellia biflora*, *Roxb. Fl. Ind.* i. 357 (non *Roth.*); *Kunth Enum. Pl.* i. 467. *R.?* *Roxburghiana*, *Schult. Mant.* ii. 430.

DECCAN PENINSULA, *Roxburgh*. EASTERN PANJAB, dry hills in Hissar, *Herb. Duthie*.

Whole plant 8 in. high, densely tufted. *Leaves* 3-4 in., filiform or setaceous,

flexuous, flattened, margins ciliate with long strict hairs; sheath very short; ligule minute, 2-auricled. *Spikes* 2-3 in., as long as the filiform pedicels and hardly stouter, strict, erect. *Spikelets* $\frac{1}{10}$ – $\frac{1}{8}$ in. 2-fl., both fl. bisexual (always?); gl. I sunk in the hollow of the rachis, obliquely ovate, 1-nerved, hyaline; II linear-oblong, acute, coriaceous, dorsally smooth, convex with a broad undefined midrib; III hyaline, distinctly 3-nerved, oblong, truncate, callus penicillate; palea hyaline, keels smooth; IV narrower than III; rachilla slender, penicillate. *Lodicules* minute. *Anthers* very short; filaments long. *Ovary* short; styles short, bases remote, divergent.—There is in Roxburgh's unedited *Icones* an excellent drawing of a small state of this plant, of which I have no specimen but Mr. Duthie's; it is no doubt overlooked from its small size and habit.

127. **OROPETIUM**, Trin.

A very small densely tufted erect annual. *Leaves* filiform. *Spikelets* very minute, 1-fl., half immersed in the alternating distichous cavities of the rachis of a simple slender curved inarticulate spike; rachilla bearded. *Glumes* I and II empty, persistent, I very minute, hyaline; II linear-lanceolate, rigid, recurved in fruit, tip obtuse or emarginate; III shorter, broader, hyaline, obtuse or truncate, 1-nerved; palea narrow, keels smooth. *Lodicules* 0? *Stamens* 3. *Styles* short. *Grain* oblong, terete, free.

Nardus stricta, Linn., is, according to Stewart, "Panjab Plants," p. 257, a native of the Trans-Indus district, and at a considerable elevation in the Jelum basin. This is no doubt an error. Boissier gives as its Eastern limit, the Caucasus.

O. Thomaeum, Trin. *Fund. Agrost.* 98, t. 3; *Kunth Enum. Pl.* i. 464, *Suppl.* 375; *Miq. Fl. Ind. Bat.* iii. 403; *Thw. Enum. Pl. Zeyl.* 363; *Trim. Cat. Ceyl. Pl.* 110; *Wall. Cat. n.* 8869; *Wight Cat. n.* 1727; *Duthie Grass. N.W. Ind.* 45, *Fodd. Grass. N. Ind.* 69. *Rottboellia Thomæa*, Koenig in *Naturf.* xxiii. (1783) 210; *Willd. Sp. Pl.* i. 464; *Roxb. Pl. Corom.* ii. 17, t. 133, *Fl. Ind.* i. 357; *Dalz. & Gibs. Bomb. Fl.* 300. *R. pilosa*, *Willd. l. c.* 465. *Nardus Thomæa*, Linn. *f. Suppl.* 105; *Sm. in Trans. Linn. Soc.* i. 116.

PLAINS OF INDIA; from the Panjab to Bengal, Burma, and southward in the WESTERN PENINSULA. CEYLON, *Gardner*.

Whole plant 2-3 in. high, forming hard tufts, stems compressed. *Leaves* $\frac{1}{2}$ –1 in., erect, margins ciliate with long strict hairs; sheath short, open; ligule lacerate, not auricled. *Spikes* 1–1½ in., about $\frac{1}{30}$ in. diam., solitary or fascicled on very short branches, curved; rachis undulating, green, tetragonous, with a broad central nerve on the flat faces. *Spikelets* $\frac{1}{10}$ in., closely appressed to the rachis in the hollow of which the minute gl. I is sunk; gl. II slightly convex with a broad thickened centre; III semicircular in profile, excessively membranous, keel most minutely scabrid.

128. **TRITICUM**, Linn.

Annual or biennial grasses. *Leaves* flat. *Spikelets* few-fl., tumid, sessile, distichously spicate, solitary, with their sides opposite cavities in the articulate or inarticulate rachis; upper fl. male or neuter. *Glumes* rigid, often unequal-sided, I and II empty, obtuse or shortly awned, few-nerved, persistent; flg. gls. oblong or ventricose, dorsally rounded or keeled above, awnless or 1-3-awned, 5-9-nerved, lateral nerves not conniving with the central; keels of palea ciliate. *Lodicules* entire, ciliate. *Stamens* 3. *Styles* very short. *Grain* grooved ventrally, often hairy, free or adherent to the palea.—Species about 10, Oriental and Eastern Asiatic.

Sect. I. TRITICUM, proper. *Glumes keeled.*

T. VULGARE, Vill. *Hist. Pl. Dauph.* ii. 153; *Host Gram. Austr.* iii. 18, t. 26; *Wall. Cat.* n. 2334; *Kunth Enum. Pl.* i. 433, *Suppl.* 360, t. 34; *T. Nees Gen. Fl. Germ. Monoc.* i. t. 79; *Aitchis. Cat. Panjab Pl.* 171. *T. sativum*, DC. *Fl. Fr.* iii. 625; *Lam. Encycl.* ii. 554; *Duthie Grass. N.W. Ind.* 45, *Fodd. Grass. N. Ind.* 68. .

Cultivated in many parts of NORTHERN INDIA and the DECCAN PENINSULA, especially in the N.W., and up to 13,000 ft. in the HIMALAYA and TIBET.

It is beyond the scope of this work to detail the races of wheat cultivated in India, for which I must refer to Murray's article in Watts' "Dictionary of the Economic Products of India," and to Koernecke & Werner's "Handb. der Getreide Arten," ii. 209. All are believed to have been derived from *T. monococcum*, Linn., a native of the East from Greece to Mesopotamia. Hackel, the latest botanical writer on the wheats (in Engler & Prant. *Planzenfam.* ii. 80), regards all as referable to three species, *monococcum*, *sativum*, & *polonicum*, Linn. (the last is not cult. in India). According to Murray and others the following races are cultivated in India as elsewhere:—*T. æstivum*, Linn. *Sp. Pl.* 86; *Roxb. Fl. Ind.* i. 359; *Grak. Cat. Bomb. Pl.* 234; *Dalz. & Gibs. Bomb. Fl. Suppl.* 97. *T. amyleum*, Ser. *Mel. Bot.* i. 124. *T. compactum*, *Host Gram. Austr.* iv. 4, t. 7. *T. compositum*, Linn. *Sp. Pl. Ed.* II. 126. *T. dicoccum*, *Schrank. Fl. Baier*, i. 389. *T. durum*, *Desf. Fl. Atlant.* i. 114; *Stewart Panjab. Pl.* 262. *T. hybernium*, Linn. *Sp. Pl.* 80, *Roxb. l. c.* *T. Spelta*, Linn. *l. c.*; *Host l. c.* iii. 31, t. 30. *T. Zea*, *Host l. c.* t. 29. *T. turgidum*, Linn. *l. c.*; *Host. l. c.* t. 28.

Dalz. & Gibs. have also, as cultivated in the Concan, a *T. pilosum*, *Dalz. & Gibs. Bomb. Fl. Suppl.* 97, the "Buckshee wheat" with tomentose spikelets. I have seen no specimens of it.

Sect. II. ÆGILOPS. *Glumes dorsally rounded, not keeled.*

T. Ægilops, Beauv. *Agrost.* 180; annual, leaves linear flat, spike elongate cylindric fragile, spikelets oblong turgid 3-5-fld. half sunk in hollows of the rachis, gl. I and II similar oblong-quadrate many-nerved, fl. gls. rather longer awnless or in the upper spikelets with one strict erect awn. *Ægilops squarrosa*, Linn. *Sp. Pl.* 1051; *Tausch. in Flora*, xxxiv. (1837) 108; *Kunth Enum. Pl.* i. 458, *Suppl.* 371; *Jaub. & Spach. Ill. Pl. Or.* iv. 12, t. 310; *Schreb. Gram.* ii. t. 27, f. 2; *Cav. Ic.* t. 90; *Ledeb. Fl. Ross.* iv. 326; *Boiss. Fl. Orient.* v. 676. *Æ. cylindrica*, C. A. Mey. *Verz. Pl. Cauc.* 26 (non Linn.). *Æ. Tauschii*, Coss. *Notes Crit.* 69.

N.W. INDIA, Falconer; Wazuristan, alt. 4500 ft., *Stewart*.—DISTRIB. Westward to Spain and N. Africa.

Stem 6-18 in., erect or geniculately ascending, stiff, leafy. *Leaves* acuminate, smooth or slightly scabrid; sheaths smooth, upper subventricose; ligule very short. *Spike* 1½-5 in., strict; rachis stout. *Spikelets* ½-¾ in., alternating in close succession; gl. I and II coriaceous, tip truncate often crenulate; flg. gls. hardly longer, truncate or retuse; awns ½-1½ in.

DOUBTFUL SPECIES.

T. BENGHALENSE, *Host ex Steud. Nom. Ed.* II. ii. 715.

ÆGILOPS CILIARIS, Koen. ex Roem. et Sch. *Syst.* ii. 772 (genus *Manisuro proximus*) = *Rottboellia ciliaris*, Willd. ex Steud. *l. c.* 474 (*Ischæmi* sp., Trin.).

ÆG. CORDATA, Linn., *Aitch. Cat. Panjab. Pl.* 560.

129. AGROPYRON, J. Gærtn.

Annual or perennial grasses. *Leaves* flat or convolute. *Spikelets* 3-many-fld., solitary, sessile, distichously arranged opposite to hollows in the rachis of a simple spike, with the sides of the glumes opposite the rachis;

rachilla usually jointed between the fl. gls. *Gl.* I and II empty, opposite, (not collateral) narrow, unequal, persistent; fl. gls. rigid, awned or not; nerves 5-7, converging above; keels of palea ciliate. *Lodicules* entire or ciliate. *Stamens* 3. *Ovary* hispid at the top, styles short, distant. *Grain* narrow, grooved in front, adherent to the palea or not.—Species about 20, in all temp. climates.

The following arrangement and nomenclature of the Indian plants of this most puzzling genus is tentative only, and I cannot render these more worthy of confidence without undertaking a critical study of the whole genus. The characters given under the species must not be regarded as absolute, though founded on careful study of very large series of specimens; for the more of these that are studied, especially if they come from different localities, the more do exceptional characters and connecting forms present themselves. It would hence appear that all the members of the section *Eu-agropyrum* (perennials with dorsally convex not keeled fl. gls. to which all the Himalayan forms belong) will resolve themselves into a very few widely distributed species. A further difficulty is the distinguishing *Agropyrum* from *Elymus*, and indeed *E. sibiricus* from *A. longe-aristatum*, in which two plants the empty glumes are not placed side by side as in *Elymus* proper; added to which the spikelets are often solitary in *E. sibiricus*, and I think sometimes aggregated in *A. longe-aristatum*, var. *Aitchisoni*. *A. caninum*, Roem. & Sch.; Duthie Grass. N.W. Ind. 44, has according to Duthie's mss. been found at Simla, alt. 6500 ft., by Gamble; and by himself in Gaugotri, alt. 10-11,000 ft. I have seen no specimens.

* *Spikelets awned.*

1. *A. longe-aristatum*, Boiss. *Fl. Orient.* i. 660; stems leafy, leaves flat or convolute, spikelets loosely imbricate flattened laterally 6-12-fl., I and II long or short 3-5-nerved, fl. gls. spreading linear-lanceolate 3-5-nerved towards the tip narrowed into a long usually recurved awn 1-1½ in. long. *Brachypodium longearistatum*, Boiss. *Diagn. Ser.* i. vii. 127. *Griseb. in Goett. Nachr.* (1868) 73. *Triticum longearistatum*, *Jaub. & Sp. Ill. Pl. Orient.* ii. t. 199; *Steud. Syn. Gram.* 346. *T. elymoides*, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 440; *Steud. l. c.*

TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 5500-13,000 ft. EASTERN and WESTERN TIBET, alt. 12-17,000 ft.—DISTRIB. Affghan, Persia, Abyssinia.

Stem 1-3 ft., stout or slender, erect or ascending from a tufted base. *Leaves* 6-10 by ⅛-⅙ in., rarely convolute, and sheaths smooth; ligule very short. *Spikes* 3-5 in., erect or nodding, or horizontal from the decurved top of a very slender peduncle, rarely ovoid and very dense-fl.; rachis slender, smooth; margins of hollows scaberulous or ciliate. *Spikelets* sessile, remote or approximate, sometimes crowded and secund, ⅓-¾ in. long without the awns, green or blue-purple. *Gl.* I and II most variable in length, ¼-¾ the length of the lowest fl. gl., elliptic-ovate to narrowly setaceous, awned or not, tip sometimes notched on one side; fl. gls. narrowly lanceolate, smooth or scabrid, narrowed into a usually straight but sometimes recurved stout or slender scabrid awn, prominently 5-nerved above the middle rarely to the base, tip sometimes toothed unilaterally or on both sides of the awn; palea coriaceous, keels ciliate with erect teeth above the middle. *Lodicules* hyaline, ciliate. *Anthers* short. *Grain* oblong, compressed.—Except by the long awns I am at a loss how to diagnose this variable grass, some states of which approach *Elymus sibiricus* so closely that I can hardly distinguish them. The following varieties are represented amongst Persian specimens. I do not find that they affect definite localities or elevations in the Himalaya.

1. *Gl.* I and II very short oblong-lanceolate acute or acuminate usually strongly 3-nerved, fl. gls. glabrous or nearly so except towards the tip.

2. Gl. I and II as in 1, fl. gl. scabrid more or less throughout.
3. Gl. I and II long setaceously lanceolate or lanceolate and long-awned, fl. gls. smooth or scabrid towards the tip.
4. Gl. I and II as in 3, fl. gls. scabrid more or less throughout.

2. **A. semicostatum**, *Nees ex Steud. Syn. Gram.* 346; tall, slender, leaves flat, spike elongate, spikelets distant 7-8-flid., gl. I and II linear-lanceolate acuminate smooth or scaberulous strongly 5-7-nerved, flg. rather longer erect lanceolate scaberulous above tip entire or 1-2-toothed and narrowed into a straight rarely recurved slender awn twice as long as itself or shorter. *Boiss. Fl. Orient.* v. 662; *Duthie Grass. N.W. Ind.* 45.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 6-11,000 ft. (as low as 3000 ft. in the Sulej valley), *Thomson, Royle, Jacquemont, &c.*—DISTRIB. Affghan. Turkestan.

Stems 2-3 ft., tufted, erect, or longer, and up to 8 ft., then weak and inclined. *Leaves* narrow, rarely $\frac{1}{2}$ in. broad, acuminate, scaberulous or smooth; sheaths smooth; ligule very short. *Spikes* 3-8 in., rachis scabrid, slender or rather stout. *Spikelets* 1-2 in. including the awns, green; internodes of rachilla short; gls. scabrid as is the callus of the fl. gl.; empty gls. always large but very variable in size and nerves, $\frac{1}{4}$ - $\frac{2}{3}$ in. long; flg. gls. erect and appressed, not at all spreading, tip toothed on one or both sides; awn rarely 1 in. long.—As suggested by Boissier this is very closely allied to *A. caninum*. In a specimen from Kashmir (*Duthie*, No. 12,651) named *semicostatum* by Hackel, the awns are upwards of an inch long and reflexed as in *longe-aristatum*, to which it may be referable.

Var. *Thomsoni*, Hook. f.; leaves hairy, sheaths villous with reversed hairs.—Kunawur, alt. 11-12,000 ft., *Thomson*.

3. **A. striatum**, *Nees ex Steud. Syn. Gram.* 346; tall, robust, leaves flat or involute, spikelets many large imbricating, gls. I and II linear-oblong or oblong-lanceolate as long as gl. III acute or obtuse very strongly 7-many-nerved, flg. gls. ovate-lanceolate 5-nerved puberulous or glabrous margins usually ciliate, tip notched or entire, awn straight longer or shorter than the gl. *Triticum striatum*, *Steud. l. c.*

KASHMIR, alt. 8-12,000 ft., *Royle, Jacquemont, &c.*

Stem 2-4 ft., as thick as a goose's or swan's quill, or more slender. *Leaves* $\frac{1}{4}$ - $\frac{2}{3}$ in. broad, scaberulous above. *Spike* 3-8 in., rachis stout, glabrous with ciliolate margins of the hollows or puberulous. *Spikelets* $\frac{1}{2}$ -1 in. long, glumes not spreading; I and II subequal, very coriaceous, II $\frac{1}{3}$ - $\frac{2}{3}$ in. long, deeply channelled when dry; tip sometimes notched or obliquely truncate.—Probably a gigantic form of *A. semicostatum* or *caninum*.

4. **A. Jacquemontii**, *Hook. f.*; dwarf, leaves filiform flexuous, sheaths hyaline silvery, spikelets 2-5 cuneately obovate, glumes spreading, I and II small lanceolate acuminate, II 3-nerved awned, fl. gls. lanceolate smooth 5-nerved above the middle narrowed into a slender recurved awn many times longer than itself. *Bromus tataricus*, *Jacquem. mss.*

WESTERN TIBET; Bekar, *Jacquemont*; Nubra, alt. 17,000 ft., *Thomson*; plain N. of Kumaon, alt. 15,500 ft., *Strachey & Winterbottom*; Chimoreri, *Stoliczka*.

Stems 6-12 in., erect or ascending, densely tufted, thickened at the base and clothed with short shining sheaths. *Leaves* 1-3 in., convolute, glabrous, tip obtuse. *Spikelets* subterminal, close together, $\frac{1}{2}$ - $\frac{3}{4}$ in. long without the awns, 4-6-flid.; rachilla smooth; gls. I and II $\frac{1}{6}$ - $\frac{1}{4}$ in., margins hyaline, nerves very prominent; flg. with the outer pair of nerves marginal and produced to the base, the inner pair rarely reaching below the middle, tip sometimes 2-toothed; awn sometimes strongly recurved, rarely straight; palea obtuse, keels ciliate. *Anthers* very small.—I

should have taken Jacquemont's mss. specific name for this species, had it not been that it was taken up by Munro for another plant. (See *Elymus sibiricus*.)

5. *A. Thomsoni*, Hook. f.; lower sheaths villous, spikelets many ovoid erect, glumes erecto-patent, I and II ovate-oblong acute or acuminate 5-7-nerved margins hyaline, fig. gls. silkily villous ovate-lanceolate narrowed into an erect slender awn twice as long as the gl. or shorter.

WESTERN HIMALAYA, alt. 10-12,000 ft., from Kunawur and Piti, *Jacquemont*, *Thomson*, to Garwhal, *Strachey & Winterbottom*, *Duthie*.

Stem 2-3 ft., stout or slender, densely tufted. *Leaves* narrow, margins flat or involute, upper glabrous, lower more or less hairy. *Spikes* 3-6 in., rachis pubescent on the margins or all over. *Spikelets* $\frac{1}{2}$ - $\frac{3}{4}$ in. without the awns, 5-7-fl.; internodes of rachilla short, scaberulous; gls. I and II with scaberulous nerves; II sometimes toothed at the tip and mucronate; fig. gls. faintly nerved; keels of palea ciliate.

** Spikelets awnless (or very shortly awned in Indian specimens).

6. *A. repens*, Beauv. Agrost. 102 (the Indian form); stem very slender, leaves narrow, spike slender, spikelets rather distant 5-6-fl. oblong quite glabrous, gls. I and II unequal linear or linear oblong obtuse acute or notched at the tip strongly 3-5-nerved margins scarious, II much shorter than III, fig. gls. linear obtuse or obliquely retuse or notched strongly 3-5-nerved in the upper half. *Reichb. Ic. Fl. Germ. i. t. 20*; *T. Nees Ic. Fl. Germ. Monocot. i. n. 80*; *Steud. Syn. Gram. 343*; *Ledeb. Fl. Ross. iv. 341*; *?Boiss. Fl. Orient. v. 663*. *A. acutum*, *Roem. & Sch. Syst. ii. 751*; *Reichb. l. c. t. 22*. *Triticum repens*, *Linn. Sp. Pl. 86*; *Fl. Dan. t. 748*; *Host Gram. Austr. ii. 27, t. 21*; *Engl. Bot. t. 909*; *Knapp Gram. Britt. t. 111*; *Kunth Enum. Pl. i. 440, Suppl. 361*.

KASHMIR, alt. 9-12,000 ft., *Duthie*. WESTERN TIBET; Gilgit, alt. 8000 ft., *Giles*; Ladak, Zaskar and Karakoram, alt. 8-14,000 ft., *Thomson*, &c.

Stems 1-2 ft., densely tufted at the base, erect or ascending. *Leaves* flat, or convolute when dry, $\frac{1}{2}$ - $\frac{1}{3}$ in. broad, smooth, glabrous or puberulous above. *Spikes* 3-6 in., erect, rachis slender, margins of hollows quite glabrous. *Spikelets* $\frac{1}{2}$ - $\frac{3}{4}$ in., very pale, internodes of rachilla short nearly glabrous; glumes rather spreading, calli quite glabrous; keels of palea smooth.—I follow Munro, Clarke and Hackel (in litt.) in referring this species to *A. repens*, though it differs much from Boissier's description of that species in the leaves not being scabrid, in the unequal glumes, of which I and II are much shorter than the fig. and in the latter not being lanceolate.

7. *A. dentatum*, Hook. f.; root creeping, leaves flat, spike slender, spikelets imbricating 3-5-fl. quite glabrous or sparsely pubescent, gls. I and II large subequal oblong obtuse obliquely truncate unidentate or mucronate rarely awned very strongly 7-9-nerved, fl. gls. linear-oblong obtuse acute or acuminate strongly 5-nerved above the middle.

KASHMIR, alt. 9-12,000 ft., *Jacquemont*, *Thomson*, &c. WESTERN TIBET, Karakoram, alt. 14,000 ft., *Clarke*.

Habit of *A. repens*, to which specimens have been referred by Munro and Clarke, but the spikelets (which are green or purplish) are closely imbricating, the margins of the hollows of the rachis scaberulous or ciliolate, the empty gl. much larger broader and as long as the fig. or nearly so and many-nerved.—Under No. 12,432 of Duthie's Kashmir collections I find along with typical *A. dentatum*, and

apparently from the same plant, a specimen with scaberulous leaves and sheaths, ovate-lanceolate acuminate shortly awned 3-5-nerved empty gls. and fewer pubescent acuminate shortly awned flg. gls.

Var. *pelatum*, Hook. f.; stem 3-4 ft. stout, leaves $\frac{1}{2}$ in. broad, empty gl. $\frac{1}{2}$ - $\frac{1}{3}$ in. long ovate-lanceolate acuminate shortly awned entire or notched on one side 5-7-nerved, fl. gls. narrowed into a short awn.—Kashmir; Dras, alt. 12-13,000 ft., Thomson.—Perhaps this had better be referred to *semicostatum* or *striatum*. It was placed in *repens* by Munro.

130. **HORDEUM**, Linn.

Erect annual, rarely perennial grasses. *Leaves* flat. *Spikelets* 1-fl., 2-3-nate in the hollows or at the nodes of a simple cylindric spike, the lateral often imperfect; rachilla jointed at the base of the fl. gl. and produced above it with sometimes an imperfect gl. *Glumes* I and II empty, very narrow, rigid, persistent, the outer of each cluster of spikelets often together resembling an involucre; III dorsally rounded, 5-nerved above, narrowed into an erect or recurved awn; palea 2-keeled. *Lodicules* 2, ciliate. *Stamens* 3. *Styles* very short. *Grain* grooved in front, tip usually villous, adherent to the palea or free.—Species about 12, natives of temperate regions.

* *Annuals.*

H. **VULGARE**, Linn. *Sp. Pl.* 84; spikelets 2-6-ranked, fl. gl. long-awned. *Beauv. Agrost.* 114, t. 21, f. 1; *Host Gram. Austr.* iii. 23, t. 34; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 83; *Steud. Syn. Gram.* 357; *Duthie Grass. N.W. Ind.* 45, *Fodd. Grass. N. Ind.* 69, t. F. f. 32; *Nees Agrost. Bras.* 455; *Wall. Cat. n.* 3789; *Hack. in Engl. & Prantl Pflanzenfam.* ii. 80; *Koern. & Wern. Handb. der Getreideb.* ii. 600. H. *sativum*, Pers. *Syn.* i. 108. H. *coeleste*, *Viborg*; *Wight Cat. n.* 1772.

Cultivated, chiefly in N. INDIA and up to 13,000 ft. in the Himalaya.

Var. *hexastichon*, Aitchis. *Cat. Panjab. Pl.* 171; spikelets 6-ranked, H. *hexastichon* Linn. *Sp. Pl.* 85; *Beauv. l. c.* 114 (hexastachyon); *Kunth l. c.* 455, *Suppl.* 368; *Host l. c.* iii. 24, t. 35; *Gaertn. Carp.* ii. 10, t. 81, f. 3; *Roeb. Fl. Ind.* i. 358; *Grah. Cat. Bomb. Pl.* 234; *Dalz. & Gibs. Bomb. Fl. Suppl.* 96; *Nees Agrost. Bras.* 455; *Steud. l. c.*

Var. *distichon*; spikelets 2-ranked. H. *distichon*, Linn. *l. c.* 85; *Host l. c.* 35, t. 36; *Kunth l. c.* i. 455, *Suppl.* 369, t. 37; *Gaertn. Carp.* ii. 10, t. 81, f. 3; *Ledeb. Fl. Ross.* iv. 327; *Nees Agrost. Bras.* 454; *Steud. l. c.* 351. *Zeocriton disticum*, *Beauv. Agrost.* 115.—*Quetta, Stocks* (cult.).

Var. *Aegiceras*, Aitchis. *Cat. Panjab. Pl.* 171; spikelets 2-ranked, gl. III produced into a dilated 3-fid appendage with the lateral lobes deflexed. H. *Aegiceras*, *Royle Ill. Bot. Himal.* 418, t. 97; *Henslow in Hook. Kew Journ.* i. (1849) t. 2, 3; *Schlecht. in Bot. Zeit.* (1847) 768; *Lindl. Nat. Syst. Bot. Ed. II.* 372. H. *coeleste* var. *trifurcatum*, *Hort. Monsp.*; *Schlecht. in Linnæa*, xi. (1837) 543; *Sr. in Ann. Sc. Phys. & Nat. Soc. Agric. Lyon.* iv. ex *Bot. Zeit.* (1847) 768. H. *heterostachyum*, *Beauv. Agrost.* 114. H. *himalayense*, var. *trifurcatum*, *Hort. Monsp.*; ex *Irmisch in Linnæa*, xiii. (1839) 124, t. 4; *Steud. l. c.* 252. H. *nepalense*, *Sweet Hort. Brit. Ed. I.* 444. H. *trifurcatum*, *Fisch. & Mey. Ind. Sem. Hort. Petrop. fusc.* 3 (1837) 131; *Wender. in Flora* (1843) 233. H. *vulgare*, var. *cornutum*, *Schrad. in Linnæa*, xii. (1838) 471. H. *vulgare*, var. *trifurcatum*, *Koern. & Wern. l. c.* i. 170, t. 3, f. 26. *Critho Aegiceras*, *E. Mey. Ind. Sem. Hort. Region.* 1848, 5; in *Ann. Sc. Nat. Ser. III.* xi (1849) 253; *Linnæa*, xxiv. (1831) 195. *Triticum lordeiforme*, *Wall. ex Steud. Nomencl. Ed. II.* ii. 716.—*Thibet* *Barley*, *Hook. Lond. Journ.*

Bot. vii. (1843) 215.—Temp. and Alp. Himalaya, from Kashmir to Sikkim, Tibet and China.

Var. *nudum*; spikelets 2-ranked, grain free within the palea. *H. nudum*, *Arduini* in *Schult. Mant.* ii. 437. *H. gymnodistichum*, *Watt Dict. Econ. Prod. Ind.* iv. 274. *H. distichum*, *β. Kunth l. c.* i. 455; *Kew Bullet.* (1888) 271. *H. coeleste*, *Koern. et Wern. l. c.* i. 166, ii. 629. ?*H. himalayense*, *Rittig Besch. Himal. Gerste* (1822), *ex Schult. Mant.* ii. 481.—Cult. up to 14,000 ft. with brown or often purplish spikes.

1. *H. spontaneum*, *C. Koch in Linnæa*, xxi. (1848) 430; tall, densely tufted, leaves flat finely acuminate, spike narrow rachis fragile, spikelets 2-ranked lateral stipitate male awnless, flg. gl. lanceolate plumosely ciliate, awn very long flattened. *Steud. Syn. Gram.* 351. *H. ithaburense*, *Boiss. Diagn. Ser. I.* xiii. 20; *Fl. Orient.* v. 687; *Aitchis. in Trans. Linn. Soc. Ser. II.* iii. 127. *H. Decaisneanum*, *Hort.*

BRITISH BELUCHISTAN; Quetta, *Stocks*.—DISTRIB. Westwd. to Palestine.

Stems forming great clumps 3 ft. high, resembling cultivated barley, *Aitchis. l. c.* Leaves flaccid, narrowed into very long points; ligule short. Spikes $1\frac{1}{2}$ –3 in. Spikelets $\frac{1}{2}$ in., pedicel flat with villous margins; gls. linear-oblong. Awn 4–8 in.—The only truly wild Barley of the cultivated type, most nearly allied to *vulgare* var. *distichon*, but differing in the villous spikelets and jointed fragile spike. Grisebach, however (*in Ledeb. Fl. Ross.* iv. 317) says under the cultivated *H. distichum*, that he has found the spike to be fragile in some of its forms.

2. *H. murinum*, *Linn. Sp. Pl.* 85; stems ascending leafy, spike stout subcylindric fragile dense-fl., spikelets 3-nate lateral male or neuter, fl. gl. lanceolate awned ciliate below or glabrous. *Fl. Dan.* t. 629; *Host Gram. Austr.* i. 25, t. 32; *Engl. Bot.* t. 1971; *Knapp Gram. Britt.* 104; *Reichb. Ic. Fl. Germ.* t. xi.; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 83; *Kunth Enum. Pl.* i. 456, *Suppl.* 370; *Ledeb. Fl. Ross.* iv. 328; *Boiss. Fl. Orient.* v. 686; *Benth. Fl. Austral.* vii. 669; *Nees Agrost. Bras.* 453, *Fl. Afr. Austral.* 363; *Steud. Syn. Gram.* 352; *Duthie Grass. N.W. Ind.* 45. *H. leporinum*; *Link in Linnæa*, iv. (1835) 133. *H. vaginatum*, *C. Koch in Linnæa* xxi. (1848) 433; *Steud. l. c.* *Triticum murale*, *Salisb. Prodr.* 27. *Zeocriton murinum*, *Beauv. Agrost.* 125.

KASHMIR; alt. 5–6000 ft., *Jacquemont*, &c. PESHAWUR, *Stewart*.—DISTRIB. Westwd. to the Atlantic.

Stem 6–18 in., ascending from an often decumbent base. Leaves flat, glabrous or sparsely puberulous and scaberulous; sheaths inflated; ligule small, scarious. Spikes 1–2½ by $\frac{1}{2}$ – $\frac{2}{3}$ in., inclined, green. Spikelets with the awns 1 in.; empty gl. filiform; flg. gl. flattened, much shorter than the straight awn; keels of palea ciliate.

** *Perennials.*

3. *H. secalinum*, *Schreb. Spicil. Fl. Lips.* 148; stem erect leafy, spike narrow subcylindric dense-fl., spikelets 3-nate lateral male or neuter. *Host Gram. Austr.* i. 26, t. 33; *Trin. Sp. Gram. Ic.* t. 3 & 4; *Benth. Fl. Austral.* vii. 669; *Boiss. Fl. Orient.* v. 687. *H. pratense*, *Huds. Fl. Angl. Ed. II.* 56; *Engl. Bot.* t. 409; *Trin. l. c.* t. 4; *Knapp Gram. Britt.* t. 105; *Reichb. Ic. Fl. Germ.* i. t. xi.; *Ledeb. Fl. Ross.* iv. 328; *Steud. Syn. Gram.* 352; *Duthie Grass. N.W. Ind.* 45. *H. nodosum*, *Linn. Sp. Pl. Ed. II.* 126 (*excl. Syn. Ray.*). *H. brevisubulatum*, *Link in Linnæa*, xvii. (1843) 391. *H. maritimum*, *Roth Tent. Fl. Germ.* II. i. 150; *Fl. Dan.* t. 630. *Zeocriton secalinum*, *Beauv. Agrost.* 115.

KASHMIR & ISKARDO, alt. 7700 ft., *Clarke*, *Duthie*. WESTERN TIBET, alt. 10–15,000 ft., *Thomson*. Shichilam (N. of Kumaon) alt. 15,000 ft., *Strachey & Winterbottom*.—DISTRIB. Europe, N. Asia, temp. N. & S. America.

Stems densely tufted, 3-6 in., stout or slender, often geniculate at the base. Leaves short, linear, flat, glabrous or hairy beneath; ligule small. Spikes 2-3½ by ½-1 in., erect or inclined; rachis subfragile, green or purplish. Spikelets densely crowded, sub hexastichous, ½-1 in. long, awns longer or shorter than the gl.—Some of Dr. Thomson's Tibetan specimens are upwards of 3 ft. high with the stem nearly as thick as a goose-quill.

131. ELYMUS, Linn.

Characters of *Agropyrum*, but spikelets for the most part in pairs, threes, or fascicled in the nodes of the rachis, and empty gls. usually more or less collateral—Species about 20 enumerated, of N. and S. temperate regions.

Boissier (*Fl. Or.* v. 690) considers *Elymus* as too closely allied to *Hordeum*. To me it appears to be connected with *Agropyrum* through *E. sibiricus*, and *A. longe-aristatum*, in both which the empty glumes are opposite one another, not as in the other Indian *Elymi* placed more or less collaterally. It is as difficult to limit the species in one genus as in the other, and the more specimens one has of any species, the more difficult it is to limit it.

* Awn of fl. gl. much longer than the gl.

1. *E. sibiricus*, Linn. *Sp. Pl.* 3; spike short or elongate and flexuous, spikelets geminate and fascicled, empty gls. subopposite much shorter than the 5-7-fld. spikelet, fl. gls. lanceolate 5-nerved narrowed into a slender erect or recurved awn much longer than the gl. *Schreb. Gram.* i. t. 21, f. 1; *Kunth Enum. Pl.* i. 451, *Suppl.* 367; *Ledeb. Fl. Ross.* iv. 330; *Steud. Syn. Gram.* 348; *Duthie Grass. N.W. Ind.* 46. *E. glaucus*, *Burkl. in Proc. Acad. Sc. Philad.* 1862, 99. *E. nutans*, *Griseb. in Goett. Nachr.* (1868) 72. *E. tener*, *Linn. f. Suppl.* 114.

TEMPERATE & ALPINE HIMALAYA; from Kashmir to Sikkin, alt. 10-14,000 ft. EASTERN & WESTERN TIBET, alt. 10-15,000 ft. (15-18,000 ft., *Stoliczka*).—DISTRIB. Affghan., Abyssinia, N. Asia & America.

Stem 1-2 ft., densely tufted, ascending, smooth, erect inclined or decurved below the spike. Leaves ½-1 in. broad, nearly smooth; ligule very short. Spike very variable, 4-10 in. long, green or brownish, straight curved or flexuous; rachis smooth, or faintly scabrid, as are the margins of its hollows. Spikelets ½-1 in. long excluding the awns, sessile and pedicelled; rachilla slender, minutely scaberulous, its internodes long or short; gl. I and II most variable, II ¼-¾ the length of the lowest fl. gl., from narrowly oblong to ovate-oblong lanceolate or almost setaceous, acute acuminate or both or II only awned, quite entire (never notched), usually strongly 3-nerved; fl. gls. narrowly lanceolate, narrowed into the awn, quite entire or tip toothed on one or both sides at the base of the awn, glabrous smooth or faintly scaberulous, 5-nerved usually to the base; awn ¾-1 in.; palea linear, keels oiliate-toothed above the middle. Lodicules lacerate. Anthers short. Ovary pyriform, top hirsute; stigmas short.—A very abundant grass in Tibet and the higher Himalaya, states of which are with difficulty distinguished from *Agropyrum longe-aristatum* (which see), and just as variable, in the empty glumes especially, but the awns are usually shorter. A small very slender form with an inclined horizontal and upcurved spike of second purplish spikelets is var. *minor* of Hackel (*Duthie n.* 13,745) and *Agropyrum longe-aristatum* var. *Aitchisoni* of Boiss. (*Fl. Or.* v. 660) and *Brachypodium tataricum*, Munro in *Journ. Linn. Soc.* xviii. (1881) 109.—Another variety (*Bromus dubius*, Jacquem. mss.) has oblong very dense short sub-cylindric spikes. It is a very alpine form, found at 15-18,000 ft. elevation in Eastern and Western Tibet.

2. ***E. dahuricus***, *Turc. in Bull. Soc. Nat. Mosc.* (1838) 105, et xxix. I. (1867) 62; spike narrow strict or subflexuous, spikelets geminate 2-3-fld., empty gls. collateral linear-lanceolate acuminate or subaristate 5-7-nerved nearly as long as the spikelet, fl. gls. lanceolate scaberulous 5-nerved narrowed into a slender erect awn as long or twice as long as the gl. ?*Hordeum sylvaticum*, *Duthie Grass. N.W. Ind.* 45.

KASHMIR, *Falconer, &c.*; Iskardo, *Clarke*, alt. 7500 ft.; Sind Valley, 6000 ft., *Gammie*. WESTERN TIBET, alt. 11-14,000 ft., *Thomson*—DISTRIB. N. Asia.

Stem 2-3 ft., rather stout and leafy, or shorter more slender and leafy at the base chiefly. *Leaves* 3-8 by $\frac{1}{8}$ - $\frac{1}{2}$ in., flat, finely acuminate, nearly smooth or scaberulous above; sheaths smooth; ligule very short. *Spike* 3-8 in.; rachis glabrous or nodes pubescent. *Spikelets* $\frac{1}{2}$ - $\frac{1}{2}$ in. exclusive of the awns, green, imbricating; gl. I and II subequal, strongly 3-5-nerved, smooth or scaberulous, rarely toothed on one side towards the tip; fl. gls. lanceolate, more or less distinctly notched at the tip, 5-nerved, from nearly glabrous to scaberulous, and with minutely ciliolate nerves; awn $\frac{1}{2}$ - $\frac{1}{2}$ in.; keels of obtuse palea strongly shortly ciliate. *Grain* oblong, dorsally compressed, concavo-convex, tip villous.

Var. ? more robust, spike stouter, spikelets large, $\frac{1}{2}$ - $\frac{2}{3}$ in., more crowded, 3-5-fld., awns of fl. gl. $\frac{1}{2}$ - $\frac{2}{3}$ in.—*Karakoram*, alt. 12,000 ft., *Clarke*.

** *Awn of fl. gl. much shorter than the gl. I.*

3. ***E. dasystachys***, *Trin. in Ledeb. Fl. Alt. i.* 120, *Fl. Ross. iv.* 333, *l.c.* t. 249; spike stout strict, spikelets geminate 2-5-fld., empty gls. collateral unequal subulate-lanceolate 1-3-nerved aristately acuminate, II nearly as long as the lowest fl. gl., fl. gls. lanceolate more or less silky 5-nerved tip notched towards the subulate or shortly awned tip. *Steud. Syn. Gram.* 350; *Duthie Grass. N.W. Ind.* 46. *E. jenisseensis*, *Turc. in Bull. Soc. Nat. Mosc. xxix.* (1856) i. 64.

KASHMIR & KUNAWUR, alt. 8-12,000 ft., *Jacquemont, Clarke, &c.* WESTERN TIBET, alt. 10-14,000 ft., *Thomson, &c.* Laptal (N. of Kumaon) alt. 14,500 ft., *Strecke & Winterbottom*.—DISTRIB. Turkestan, Siberia.

Stem 2-5 ft., stout or slender. *Leaves* 6-12 in., flat and $\frac{1}{4}$ - $\frac{1}{2}$ in. broad, or narrow with margins involute, smooth or scaberulous. *Spike* 6-8 in., variable in breadth; rachis stout, pubescent sparsely villous or nearly glabrous. *Spikelets* $\frac{1}{2}$ in. long; gl. I and II very narrow, 1- rarely 3-nerved; fl. gls. notched at the base of the awn on both sides, 5-nerved, rarely almost glabrous; keels of obtuse palea stoutly ciliate.

4. ***E. ? Thomsoni***, *Hook. f.*; spike stout strict, spikelets 2-3-nate densely crowded sessile and pedicelled, glumes all scarious (in frt.) broadly oblong or ovate-oblong with hyaline margins or very stout midrib and 7-9 fainter lateral nerves suddenly ending in a short stout awn.

WESTERN TIBET; Dauskar, in Piti, alt. 13,000 ft., *Thomson*.

Stem 12-14 in., very stout, erect. *Leaves* 3-6 in., narrow, convolute, coriaceous, smooth, finely acuminate, subpungent; sheaths broad, striate; ligule very short. *Spike* 3-4 in., rachis very stout, smooth or subsilky on the angles. *Spikelets* $\frac{1}{2}$ - $\frac{1}{2}$ in., glabrous or faintly pubescent; rachilla very short and stout; glumes subpubescent, usually broadly notched below the awn often unequally, margins ciliolate, 7-9-nerved; palea very broad, pubescent, ciliate, 2-lobed, keels unequal more or less ciliate. *Grain* free, concavo-convex, top glabrous.—I have seen only two specimens of this plant, which resembles a wheat more than an *Elymus*, from which latter genus it differs in the free grain with a glabrous tip; both specimens are far advanced, and I doubt the grain being in a normal condition.

131.¹ **ASPERELLA**, *Humb.*

(Not in Clavis, p. 9.)

Tall perennial grasses. *Leaves* narrow, flat. *Spikelets* 1- or more-fl., 2-3-nate opposite hollows in the rachis of a terminal elongate simple slender spike, with the sides of the glumes opposite the rachis; rachilla jointed under the fig. gls. *Glumes* I and II 0, or in the lowest spikelets minute, subulate; fig. gls. rigid, lanceolate, convolute, narrowed into an awn, dorsally rounded, 5-nerved above the middle; palea 2-keeled. *Lodicules* 2, obovate or dimidiate-obovate, hairy. *Styles* very short, free, stigmas plumose. *Grain* narrowly oblong, ventrally grooved, adherent to the palea, tip villous.—Species 5, 1 Siberian, 2 American, 1 N. Zealand, and the following.

A. Duthiei, *Stapp in Hook. Ic. Pl. ined. f.*; spikelets 1-fl., rachilla produced.

WESTERN HIMALAYA; Tihri-Garwhal; alt. 7-8000 ft., *Duthie*.—DISTRIB. China.

Stem 3 ft., glabrous. *Leaves* 10 by $\frac{3}{4}$ in. lanceolate, setaceously acuminate, thinly membranous, scabrid on both surfaces; sheaths elongate, nodes thinly villous; ligule truncate, minutely ciliolate. *Spike* 6 in., very slender, rachis pubescent. *Spikelets* $\frac{1}{2}$ – $\frac{5}{8}$ in. long, nearly all 2-nate, pale; rachilla glabrous terminated by an awn; fig. gl. lanceolate, 7-nerved, narrowed into an awn almost twice as long as itself, nerves rough; palea about as long as the gl. *Lodicules* obovate, hairy.—Allied to *A. Hystrix*, Willd., and to *A. sibirica*, Trautv. differing from both in the 1-fl. spikelets. *Foliage* as in *A. Hystrix*, but spike not at all stiff. *A. sibirica* has narrower firmer leaves, more markedly nerved gls., and much shorter awns.—*Stapp*.

Tribe XI. BAMBUSEÆ. (See p. 91.)

By J. S. GAMBLE, M.A., F.L.S., Conservator of Forests, N.-W. Provs.

The following account of the Indian *Bambuseæ* is drawn up, almost verbatim, from Mr. Gamble's "Bamboos of British India," which forms part of vol. vii. of Dr. King's "Annals of the Royal Botanic Gardens of Calcutta," and of which Dr. King favoured me with a copy in advance, together with his and Mr. Gamble's permission to reproduce its contents in a form suited to the "Flora of British India." In doing this I have been obliged to curtail the descriptions. And in order to preserve the arrangement of matter adopted in this work, I have had to substitute for the Keys to the species employed by Mr. Gamble, specific characters selected according to my judgment from his detailed descriptions; and in a few cases to substitute synonymous technical terms for those he has used. I have added nothing; for it is obvious that a botanist of Mr. Gamble's ability and wide experience of so many of the Indian Bamboos in their native forests, having access also to the unrivalled collections in the Herbarium of the Calcutta Gardens, should have exhausted the subject in so far as materials were available. It must not be supposed that this work supersedes his "Bamboos of British India," which is indispensable to the student of the tribe, by reason of its fuller descriptions, and admirable plates and analyses. My cordial thanks are directly due to Dr. King and Mr. Gamble for this generous contribution to the "Flora of British India," and indirectly for the authentically named collection of specimens corresponding to Mr. Gamble's descriptions, which has been presented by the Government of India to the Herbarium of the Royal Gardens, Kew.

Since the above was written, Mr. Freeman Mitford's "The Bamboo Garden" has appeared, a work replete with valuable observations upon the habit, mode of growth, and other characters of the hardy species of Bamboo (including 5 Indian) cultivated by him. In it is pointed out (see *Arundinaria Simoni*, p. 60) for the

first time the true characters of the two types of sheath and blade that occur in *Bambuseæ*, and which do not obtain, so far as I know, in any other tribe of grasses. In a communication which Mr. Mitford has been good enough to make to me on this subject, he has formulated his views as follows, and has kindly allowed me to introduce them here.

"The sheath is an organ playing so important a part in the life of the Bamboo that it deserves something more than a cursory notice. In the grasses generally the sheath is regarded by botanists as taking the place of the petiole of the leaf. It happens, however, that the leaves of most Bamboos—indeed of all the hardy Bamboos—have a distinct continuation of the midrib of the leaf attaching it to the sheath and articulated, which continuation might perhaps be correctly termed a petiolule. The Bamboos, as it appears, bear sheaths of two types. There is first of all the series of sheaths which, borne one on each node and wrapped tightly round the culm or branch, as the case may be, protect it during growth. This form of sheath is divided or split transversely into two members, the ligule and the limbus or blade, the latter being what I would term a pseudophyll, or false leaf, sessile, lacking both midrib and petiole, varying in size in the different species, but always the first part to wither and disappear. In some Bamboos—those of the *Phyllostachys* group—this sheath falls away as soon as branching takes place; in others, of the *Arundinaria* group, it remains, and having guarded the tender growth of the parent culm or branch it springs aside with the young branches or branchlets, devoting the remainder of its life to their protection until they can stand alone.

"Then there is the second form of sheath bearing a true leaf with petiole and midrib. This is the form assumed by the two, three, or four sheaths at the top of each culm branch and branchlet above the topmost node where branching ends. This true leaf is persistent upon the sheath. The ligule is present, as in the first type, but the deciduous pseudophyll is replaced by an evergreen leaf.

"An interesting question arises as to whether there is any transition stage between the two types of blade, or whether the change is always sudden. I think that in many Bamboos I can trace such a transition stage; that is to say, that each successive pseudophyll on the stem becomes more and more like a true leaf, something of the nature of an arrested midrib being perceptible in the pseudophylls which are found near the top of the culm, though it is not until the last branching node has been passed that the true leaf-bearing sheaths occur. The principle remains inviolate (throughout the hardy species at any rate), and the distinction between the two classes of sheaths is absolutely maintained."—A. B. F. M.

I would remark in conclusion that Mr. Mitford's observations, extending to the nervation of the leaves of Bamboos, lead him to the conclusion that of those cultivated by him in the open air in the middle of England, the truly hardy only have tessellated leaves; the tender, such as *Arundinaria Falconeri* and *falcata*, having very inconspicuous transverse nervules, or none.—J. D. H.

Subtribe I. ARUNDINARIÆ. (See p. 91.)

132. **ARUNDINARIA**, Michx.

Erect or climbing shrubs. *Stems* slender, nodes usually prominent, internodes rather short, branches short fascicled. *Stem-sheaths* papery, straw-colrd., blade subulate. *Leaves* usually small, jointed on the sheath. *Infl.* on separate stems, or terminal, or on leafing branches. *Spikelets* 1- many-fl'd., compressed, usually all bisexual, except sometimes the terminal, often sheathed; empty gls. 2, unequal, membranous; flg. gls. longer, obtuse acute or mucronate, many-nerved; palea 2-keeled. *Lodicules* 3, ciliate. *Stamens* 3, rarely up to 6. *Ovary* globose above; style short, stigmas 2-3 plumose. *Grain* ovoid or narrowly oblong, dorsally furrowed, included in the gl. and palea.—Species about 50, 14 American, 1 African, the rest Asiatic.

A. Species of which the flowers are known.

Sect. 1. Erect shrubs; infl. on leafy branches; bracts of infl. small.
Stamens 3.

* Nodes of stem not spinous. See also *A. Pantlingi*.

† *Spikelets* many, in large terminal panicles.

1. **A. Walkeriana**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 21; leaves shortly stoutly petioled thick elliptic to oblong-lanceolate pungent acuminate tessellate base rounded margins cartilaginous recurved spinulose-serrate. *Bedd. Fl. Sylv., Forest. Man.* p. ccxxx.; *Gamble Bamb. Brit. Ind.* 3, t. 1; *Trim. Cat. Ceyl. Pl.* 110.

TRAVANCORE; Pulney Hills, *Beddome*. CEYLON; *Walker. Thwaites*.

Stems 1 in. diam., thickly clothed above with sheaths of fallen leaves, internodes about 15 in. *Leaves* 5-11 by 1-1½ in., base cucullate, midrib narrow, nerves 6-10 pairs; sheath glabrous, mouth truncate ciliate, margin with curved bristles; ligule short. *Panicle* 6-12 in., red-purple, branchlets filiform, lower axils glandular and upper sparsely hairy. *Spikelets* up to 1 in. when mature, narrow, glabrous, 3-4-fl.; rachilla flattened, ciliate; gl. I and II subequal $\frac{1}{10}$ - $\frac{1}{8}$ in., I usually 3-nerved; II, 5 or more-nerved, apiculate, ciliate; flg. gls. larger, with 2 prominent nerves and intermediate finer ones; keels of palea ciliate.—Probably flowers frequently.

2. **A. Wightiana**, *Nees in Linnæa*, ix. (1834) 482; shrubby, slender, leaves thin shortly petioled long-acuminate tessellate base rounded or narrowed margins incurved scabrid, spikelets 3-5-fl. in dense leafy spreading panicles long-pedicelled, fl. gls. obtuse. *Rupr. Bamb.* 26, t. 3, f. 10; *Munro in Trans. Linn. Soc.* xxvi. (1868) 19; *Bedd. Fl. Sylv., Forest. Man.* p. ccxxx., *Anal. Gen.* t. 28; *Brandis For. Fl.* 563; *Steud. Syn. Gram.* 335; *Thw. Enum. Pl. Zeyl.* 444; *Gamble Bamb. Brit. Ind.* 4, t. 2.

MALABAR & TRAVANCOR, alt. 6-8600 ft., *Wight*, &c. CEYLON; *Pedrotallagalla*, alt. 8000 ft., *Thwaites* (CP. 3860).

Gregarious, rhizomes branching. *Stems* 6-10 ft., or higher; nodes swollen, girt with a hairy ring; internodes 10-14 in., usually flattened on one side and rough, young strongly striate; branchlets whorled. *Stem-sheaths* 4-8 by 1-3 in., narrowed slightly upwards, base hispid with golden tubercle-based hairs, limb 1-1½ in., subulate, scabrid. *Leaves* 5-7 by $\frac{3}{4}$ -1 in., glabrous above, glaucous beneath, midrib usually glandular-pubescent, nerves 5-7 pairs; sheaths striate, keeled, often purple, sometimes hispid with tubercle-based hairs, mouth 5-8-setose, margins ciliate; ligule short, obtuse. *Spikelets* 3-5-fl., purple, glabrous or scabridly hirsute; gls. I and II ovate, acute; I 5-II 7-nerved; fl. gls. ovate, 9-11-nerved, mucronate, scabrously hispid; palea 2-cuspidate, 3-nerved and transversely nervuled, keels ciliate.—Flowers annually.

Var. *β. hispida*, *Gamble l. c.*; leaf-sheaths and stems thickly clothed with tubercle-based golden hairs, internodes more flattened on one side. *A. hispida*, *Steud. l. c.* *A. moliniformis*, *Hochst. in Herb. Hohenack.* n. 1282.

3. **A. floribunda**, *Thw. Enum. Pl. Zeyl.* 375; internodes retrorsely hirsute, leaves thin lanceolate acuminate spinulose-serrate tessellate narrowed into a very short 2-glandular petiole, spikelets 5-8-fl. minutely silky pubescent, fl. gls. acuminate. *Munro in Trans. Linn. Soc.* xxvi. (1868) 20; *Beddome Fl. Sylv., Forest. Man.* p. ccxxx.; *Trim. Cat. Ceyl. Pl.* 110; *Gamble Bamb. Brit. Ind.* 6, t. 3.

CEYLON; Maturatte district, alt. 5000 ft., *Thwaites* (CP. n. 2624).

Stems 2-5 ft., erect; internodes 2-4 in. *Leaves* glabrous, primary nerves 3-4 pairs; sheath sometimes hispid with tubercle-based hairs, ending in a ciliate mem-

brance below the petiole and short auricles with 5-8 twisted bristles; ligule short. *Panicle* large, with slender filiform branches appressed at first, axils glandular. *Spikelets* about 1 in., gl. I $\frac{1}{10}$ - $\frac{1}{8}$ in., acute, 3-nerved, tip ciliate; II longer, more nerved; fl. gls. 3 in., acuminate, 7-9-nerved, tip ciliate; keels of palea ciliate; grain $\frac{1}{5}$ in., red.

†† *Spikelets* few, in short panicles.

4. **A. elegans**, *Kurz in Journ. As. Soc. Beng.* xlii. (1873) 248; *For. Fl. Burma*, ii. 549; stems slender, internodes smooth, leaves linear-lanceolate long acuminate tessellately nerved, margins cartilaginous scabrid, spikelets long 7-8-fld. in a terminal interrupted panicle or raceme pedicelled flattened, fl. gls. distant acuminate. *Gamble Bamb. Brit. Ind.* 6, t. 4.

UPPER ASSAM; Naga Hills, alt. 5500 ft., *Rollo*. BURMA, Poncshee, *J. Anderson*; Tenasserim and Martaban, alt. 5-7500 ft., *Kurz*, &c.

Stems 12-20 ft. high by $\frac{3}{10}$ - $\frac{8}{10}$ in. diam.; internodes 7-9 in., flattened on one side, smooth; sheaths $\frac{1}{2}$ the length of the internodes, papery, hispidulous, upper $\frac{1}{2}$ narrowed to a truncate minutely auricled mouth; blade subulate, recurved. *Leaves* 4-5 by $\frac{1}{10}$ - $\frac{1}{2}$ in., base narrowed into a very short petiole, midrib yellow, primary nerves 4-6 pairs; sheath smooth, striate, tipped with a ciliate callus, auricles bristly; ligule very short. *Spikelets* 1 in. or more; gl. I and II $\frac{1}{2}$ in., ovate, acuminate, 3-5-nerved, keel ciliate; fl. gls. similar, 7-nerved and transversely nervuled; palea obovate, 2-fld, 2-nerved between the white-ciliate keels and 1-nerved on each side of them.

5. **A. polystachya**, *Kurz ex Gamble Bamb. Brit. Ind.* 7, t. 5; stems soft, leaves thin soft lanceolate acuminate with a twisted tip, rough above white hairy or smooth beneath not or rarely tessellately nerved margins scabrous ligule long, spikelets long 4-6-fld. in a large terminal or axillary racemose leafy panicle with papery bracts, fl. gls. distant ovate long-acuminate.

SIKKIM HIMALAYA & the KHASIA HILLS, alt. 3-5000 ft., *Griffith*, *Kurz*, *Mann*, &c.

A small shrubby bamboo; *stem-sheaths* unknown. *Leaves* 6-8 by $\frac{1}{10}$ -1 in., base rounded or narrowed, petiole very short, midrib rather broad, principal nerves 5 pairs, with lines of pellucid glands between the secondary, transverse nervules few or 0; sheath greenish yellow, striate, glabrous, ending in a broad 2-fld callus, and produced upwards to meet the long striate obtuse fimbriate ligule. *Spikelets* $\frac{1}{2}$ - $\frac{7}{10}$ in., rachilla clavate; gls. I and II ovate, acuminate, 5-7-nerved, keeled and ciliate above; fl. gls. about twice as long, 7-9-nerved, ciliate; palea longer, mucronate, tip 2-fld, 1-nerved between and 1-nerved on each side of the ciliate keels.

6. **A. debilis**, *Thw. Enum. Pl. Zeyl.* 375; shrubby, stems much branched, leaves small linear-lanceolate acute obscurely or not tessellate tip scabrous base acute or subtruncate, ligule short, spikelets short 3-fld., shortly pedicelled in a terminal short leafy panicle, fl. gls. imbricating ovate mucronate. *Munro in Trans. Linn. Soc.* xxvi. (1868) 24; *Bedd. Fl. Sylv.*, *Förest. Man.* p. ccxxx.; *Trim. Cat. Ceyl. Pl.* 110; *Gamble Bamb. Brit. Ind.* 7, t. 6.

CEYLON; Central Province, alt. 6-8000 ft., *Thwaites*, &c. (C.P. n. 1).

Stems elongate; nodes rather enlarged, internodes 2-6 in. by $\frac{1}{2}$ - $\frac{8}{10}$ in. diam., upper smooth yellow shining, lower glabrous or top hispid with long hairs. *Leaves* $1\frac{1}{2}$ -3 by $\frac{1}{2}$ - $\frac{1}{2}$ in., glaucous, glabrous, or hairy above glabrous beneath, one or both margins scabrous; midrib thick, primary nerves 2-3 pairs, obscure, transverse

nervules obscure or 0; sheath glabrous, striate, paleaceous, ending in a ciliate callus and shortly auricled, with 2-4 short bristles. *Spikelets* $\frac{1}{2}$ in., pedicels often obcuneate, glabrous or slightly pubescent; gls. I and II ovate, mucronate, 5-7-nerved; fl. gls. similar but longer; palea 2-cuspidate, hirsute, tip ciliate, keels smooth.

††† *Spikelets racemose.*

7. **A. densifolia**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 32; small, densely gregarious, leaves leathery densely imbricate subsessile lanceolate acute or long-acuminate spinulose-serrate tessellately nerved, base rounded or cordate, spikelets 1-fl. in a dense panicle of leafy branchlets bearing racemes of 5-6 spikelets, fl. gl. long-mucronate. *Trim. Cat. Ceyl. Pl.* 110; *Gamble Bamb. Brit. Ind.* 8, t. 7.

TRAVANCOR; on the Anamallay Hills, alt. 8500 ft., *Beddome*. CEYLON; Horton Plains, alt. 7200 ft., and Pedrotallagalla, *G. Thomson, Maxwell, Trimen, &c.*

Stem 6 in.-3 ft., with stiff strong leafy branches arising from a thick scaly rhizome; internodes $1\frac{1}{2}$ -3 in. by $\frac{1}{2}$ in. diam. or less, smooth, walls rather thick; stem-sheaths 1 in. or longer, striate, hirsute, narrowed to the truncate acutely 2-auricled top; blade short, ovate. *Leaves* $1-1\frac{1}{2}$ by $\frac{1}{2}$ - $\frac{3}{4}$ in., tip glabrous, margins broadly cartilaginous, midrib thick, primary nerves 1-2 obscure, secondary 4-5 regularly tessellate with nervules; sheath striate, ciliate with whitish stiff hairs above; ligule short, rounded, hairy. *Spikelets* $\frac{1}{10}$ - $\frac{1}{2}$ in., rachilla glabrous; gl. I short, lanceolate; II broader, 5-nerved, keel scabrous; palea 2-mucronate, with a faint nerve outside each scabrid keel. *Lodicules* obovate, fimbriate. *Anthers* long. *Ovary* ellipsoid.

8. **A. racemosa**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 17; stem erect from a long rhizome, internodes scabrous, leaves linear-lanceolate tessellate tip setaceous, margins scabrous-serrulate, spikelets 4-8-fl. on short racemes of a simple terminal panicle of close leafy whorled branches surrounded by persistent sheaths, fl. gls. caudate-acuminate from a broad base ciliate. *Gamble Bamb. Brit. Ind.* 9, t. 8; *Mitford, The Bamboo Garden*, 174. *A. Gammieana*, *Gamble mss.* (an Alpine form).

E. NEPAL and SIKKIM, alt. 6-12,000 ft.

Stems 5-15 ft. by $\frac{1}{10}$ -2 in. diam., walls thin, nodes a mere ring; internodes 12-15 in., blue-green when young; branches fascicled at the nodes; stem-sheaths usually 10 in., striate, covered with scattered stiff black hairs, narrowed convexly to the truncate tip; blade subulate, reflexed. *Leaves* 4-7 by $\frac{1}{2}$ - $\frac{2}{3}$ in., base rounded or narrowed into the very short petiole, glabrous or sparsely hairy above, midrib prominent, primary nerves 3-5 pairs, secondary 5-7; transverse nervules conspicuous; sheath 2-auricled with a ciliate membrane below the blade; ligule short, obtuse. *Panicle* with a glabrous rachis, pedicels $1-1\frac{1}{2}$ in., wavy, angular. *Spikelets* $1-1\frac{1}{2}$ in., rachilla clavate; gl. I and II very small, distant, acuminate; fl. gls. 7-9-nerved, setaceous, tip scabrid; palea shorter, 2-mucronate, tip scabrous, keels ciliate, nerves 0 or obscure.—Flowers rarely and only in the higher elevations, when the stem is sometimes reddish.

** Nodes of stem spinous (except *A. Pantlingi*).

9. **A. Griffithiana**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 20; gregarious, internodes furrowed, nodes girt with a ring of tawny hairs, leaves thin linear-lanceolate acuminate tessellate margins smooth, tips setaceous, spikelets 4-6-fl. in whorled clusters on a terminal panicle which is surrounded by sheathing bracts, pedicels hairy, fl. gls. lanceolate long-mucronate. *Gamble Bamb. Brit. Ind.* 10, t. 9.

BRITISH BUTAN, *Pantling*. KHASIA and JAINTIA HILLS, alt. 3-4500 ft., *Griffith, &c.*

Stems 10-30 ft. by $1-1\frac{1}{2}$ in. diam., olive-green; spines short, stout; internodes

7-9 in., stem-sheaths 6-9 in. by 4-5 in. broad at the base and $\frac{1}{10}$ in. at the top, with a basal belt of thick soft tawny hairs, narrowed upwards, tip with rounded auricles, thinly covered with stiff tubercle-based hairs; blade $\frac{1}{2}$ in., triangular, acute, hairy. *Leaves* 4-5 by $\frac{3}{4}$ in. or less, narrowed into a petiole, margins smooth, midrib shining, primary nerves 4-5 pairs, transverse nervules strong; sheaths striate, glabrous, ending in a narrow ring with a few stiff curved bristles; ligule rather broad, hairy. *Panicle* with a hairy rachis, laterally flattened. *Spikelets* 1- $\frac{1}{2}$ in., narrow; rachilla long, flattened, top clavate, ciliate; gls. I and II ovate-lanceolate, mucronate, 5-7-nerved, scabrous, dorsally hairy above; fl. gls. $\frac{1}{2}$ in., scabrous, hairy above, 7-nerved; palea 2-mucronate, keels ciliate. *Anthers* with bearded tips.—Only once seen in flower.

10. **A. Pantlingi**, *Gamble Bamb. Brit. Ind.* 129, t. 118; tall, spines 0? nodes with a hairy ring, leaves lanceolate petioled tessellate smooth above scabrid on one margin, tip long twisted scabrid, spikelets paniced surrounded by sheathing bracts, pedicels glabrous capillary, nodes glandular, spikelets very narrow curved 6-10-fl., rachilla clavate with a tuft of white hairs beneath the ovate acuminate long-mucronate flg. gls.

BRITISH BHOTAN; on Rechi La, alt. 11,000 ft., *Pantling*.

Stems upwards of $\frac{1}{2}$ in. diam., smooth; internodes 7-8 in. or more, cavity large; stem-sheaths about 10 in., smooth, striate, tapering to a convex top, margins long-ciliate; blade 3-4 by $\frac{1}{2}$ - $\frac{3}{4}$ in., glabrous, decurrent on the sheath into hairy auricles bearing 6-10 long curved bristles; ligule about $\frac{1}{10}$ in., toothed, faintly ciliate, dorsally pubescent. *Leaves* 5-7 by $\frac{1}{2}$ - $\frac{3}{4}$ in., base narrowed, petiole $\frac{1}{2}$ - $\frac{3}{4}$ in., midrib narrow pale shining, nerves 4-5 pairs with 7-9 intermediate pairs, cross-nervules very many, sheath glabrous, ending in a very hairy ring with a few twisted bristles, margins long-ciliate; ligule dorsally pubescent. *Panicles* 4-6 in., terminal and axillary on leafless branches; bracts like small stem-sheaths, glabrous. *Spikelets* 2 in. or more, subverticillate; uppermost flg. gls. usually empty; rachilla about $\frac{1}{2}$ in., white-pubescent; gls. I and II empty, I $\frac{1}{2}$ in.; II nearly $\frac{1}{2}$ in., 3-5-nerved, subciliate; flg. gls. prominently 7-nerved, keels scabrid; palea with 2-ciliate keels alternating with 3 nerves, tip 2-fid and 2-mucronate. *Lodicules* 3, ovate or obovate, acute, ciliate. *Anthers* linear, acute. *Ovary* glabrous, style short; stigmas 3, long, plumose. *Grain* oblong, dark brown, grooved, tipped with the style-base.—Differs from *A. Griffithiana* in wanting spines, in the different stem-sheaths, large leaves, longer spikelets, and glabrous anther tips.

11. **A. callosa**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 30; internodes smooth, nodes girt by the base of the fallen sheath, leaves thin oblong-lanceolate acuminate tessellate glandular-scabrid above pubescent beneath, margins scabrous-serrulate, spikelets bracteate 6-12-fl. in a branched axillary panicle ending in a leafy branchlet, flg. gls. ovate acute mucronate. *Gamble Bamb. Brit. Ind.* 12, t. 10.

EASTERN HIMALAYA; in the Duphla Hills, alt. 4500-6800 ft., *Lister*. KHASIA HILLS, alt. 6000 ft., *J. D. H. & T. T.*, &c.

Stem 12-20 ft. by $\frac{1}{2}$ -1 in. diam., smooth; nodes spinous and with a ring of soft brown hairs; internodes 6-10 in., walls above the spinous thickened nodes thin; stem-sheaths as long as the internodes or longer, thin, transversely nerved, narrowed from a softly hairy base to a narrow truncate tip; blade $\frac{1}{2}$ -1 in., subulate, hairy on both surfaces, auricles short fringed decurrent. *Leaves* 8-9 by $\frac{1}{2}$ - $\frac{1}{2}$ in., narrowed from a suboblique base to the very short petiole, tip scabrous, midrib hairy shining above, primary nerves 5-8 pairs, transverse nervules raised beneath with interposed pellucid glands; sheath densely tawny-pubescent, at length glabrous, tip with a ciliate callus and a few stiff curved bristles; ligule short, hairy. *Panicle* with the rachis striate, flattened on one side, and with a pubescent vertical line, terminal joints clavate, hairy; bracts narrow, straw-colord. *Spikelets* 2-3 in., rachilla very

prominent, glabrous; gl. I and II short, ovate, acute, glabrous, 1-3-nerved; flg gls. ovate, 3-7-nerved, tip ciliate; palea acute, thickly pubescent, keels ciliate. *Anthers* short, obtuse.

Sect. II. Erect shrubs. *Infl.* of fascicled racemes on leafless or on both leafy and leafless stems; bracts small.

12. **A. falcata**, *Nees in Linnæa*, ix. (1834) 478; stems annual, internodes smooth, nodes swollen, leaves small linear shortly petioled scabrid glandular between the nerves, above not tessellate tip setaceous twisted, infl. of fascicled falcate racemes at the nodes, bracts short narrow membranous, flg. gls. 1-2 subacute mucronate 7-9-nerved, tips ciliate. *Gamble Bamb. Brit. Ind.* 12, t. 11, 12; *Mitford, The Bamboo Garden*, 167. ? *A. utilis*, *Clegh. in Journ. Agr. Hort. Soc. Ind.* xiii. (1865) 388.

WESTERN HIMALAYA; from the Ravi to Nepal, alt. 4-12,000 ft. (rarely over 7000 ft.).

Stems 6-10 ft. from a woody rootstock, $\frac{1}{2}$ - $\frac{1}{2}$ in. diam., green, sometimes pruinose; nodes glabrous or hirsute; internodes 6-12 in., walls thin; stem-sheaths papery, often 12 by 3 in., glabrous and scaberulous above, hairy beneath above the middle, margins ciliate, tapering to a truncate tip; blade $\frac{1}{2}$ -2 in. by $\frac{1}{10}$ in., subulate recurved; ligule often $\frac{1}{2}$ in., toothed. *Leaves* about 3-4 by $\frac{1}{2}$ - $\frac{1}{2}$ in., or 12 by 1 in. on young shoots, glands in rows like nervules pellucid; sheath glabrous; ligule long. *Panicles* on separate stems. *Spikelets* $\frac{1}{2}$ - $\frac{2}{3}$ in.; rachilla cuneate, tip hairy; gl. I $\frac{1}{2}$ in., 3-5-nerved; II longer, 7-9-nerved, tip acute ciliate; fl. gls. $\frac{1}{2}$ in., mucronate, scabrous; palea = fl. gl. or rather longer (margins of gl. and palea often black).—There are two vars.: *a. typica*, Gamble, spikelets distant in filiform falcate racemes; *B. glomerata*, Gamble, spikelets 3-4 together in close racemes or panicles.—*A. utilis*, *Clegh.*, may be *falcata* or *spathiflora*.

13. **A. khasiana**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 28; stems annual, dark green or blackish, nodes prominent, branchlets fascicle dark coldr., leaves 3-4 by $\frac{1}{2}$ in. linear-lanceolate glandular between the nerves not or hardly tessellate, infl. of fascicled falcate geniculate panicles at the nodes, bracts short ovate, fl. gl. mucronate, margins above and tip ciliate. *Gamble Bamb. Brit. Ind.* 15, t. 13.

KHASIA HILLS; alt. 5-6000 ft., common.

Most difficult to separate from *A. falcata*, but a stiffer stronger plant, panicle more dense and imbricated, flowers shorter, rachilla of spikelet hairy.

14. **A. intermedia**, *Munro in Trans. Linn. Soc.* xvi. (1868) 28; stems 8-12 ft. slender, nodes swollen with a prominent ring and whitish line below them, leaves very variable 8 by 1 in. (in young shoots to 3-4 by $\frac{1}{2}$ in.) linear- or oblong-lanceolate setaceous acuminate, base narrowed into a swollen petiole, nerves 3-7 pairs with 6-7 intermediates, sparingly tessellate with interposed pellucid glands, sheath ciliate with falcate auricles, infl. of whorled racemose panicles, bracts axillary triangular, spikelets 3-5-fld., fl. gls. 7-9-nerved. *Gamble Bamb. Brit. Ind.* 15, t. 14.

SIKKIM HIMALAYA, alt. 4-7000 ft., *J. D. H.*, &c.

Stems greyish-green; internodes 5-10 in., walls $\frac{1}{10}$ - $\frac{1}{2}$ in. thick; stem-sheaths 8-10 by 1-2 in. at base, glabrous, striate, narrowed upwards and truncate, ciliate below the small subulate blade. *Leaves* bright green, upper surface and margins scabrid, midrib prominent; sheath with long marginal hairs, a minute ciliate callus below the petiole and on each side a falcate auricle bordered by stiff curved bristles; ligule long. *Infl.* on leafless stems. *Spikelets* $\frac{1}{2}$ -1 in., yellow or purplish, nodes of rachilla clavate long-ciliate; gl. I and II ovate, membranous.—The long ciliate leaf-sheath is an excellent character.

15. **A. Hookeriana**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 29; stems 15–20 ft. slender, nodes not much swollen ringed by the base of the sheath, leaves 6–12 by $\frac{1}{2}$ – $1\frac{1}{2}$ in. narrowed into a swollen petiole, nerves 4–8 pairs with oblique transverse pellucid glands not tessellate, sheath glabrous minutely ciliate, ligule long, infl. of loosely fascicled falcate bracteate panicles, spikelets drooping 1-fl., fl. gl. large broadly ovate 3-nerved. *Gamble Bamb. Brit. Ind.* 17, t. 15.

EASTERN HIMALAYA, alt. 4–7000 ft.; Sikkim and W. Bhotan, *J. D. H., Gammie, &c.*

Stems 15–20 coespitose, glaucous green, with white scurf when young; older internodes 8 by $\frac{2}{3}$ – $1\frac{1}{2}$ in., with a dark blueish ring at the top, often striped green and yellow, walls $\frac{1}{10}$ in. thick; stem-sheaths often 12–24 in. by 3–6 in. broad at the base, narrowed upwards and truncate; blade 3–6 in., linear; ligule $\frac{1}{10}$ – $\frac{1}{8}$ in., depressed in the middle. *Leaves* glaucous green when young, upper surface and margins scabrid; sheath ending in a broad callus and thin naked membrane. *Infl.* loose, on separate stems. *Spikelets* about $\frac{1}{2}$ in., pedicelled; gl. I $\frac{1}{10}$ in., 3-nerved, tip hairy; II $\frac{1}{2}$ in. 5-nerved, mucronate; fl. gl. hard, involute, angled, scabrous between the nerves; palea glabrous, tip hirsute. *Grain* ellipsoid.

Sect. III. Erect shrubs. Inflorescence usually in leafy panicles; bracts large.

16. **A. spathiflora**, *Trin. in Mem. Acad. Petersb. Ser. VI* iii. II. (1835) 617, *Sp. Gram. Ic.* t. 350; stem-sheaths oblong tip rounded, leaves 2–4 at the end of the branches, 3–5 by $\frac{1}{2}$ – $\frac{3}{4}$ in. linear-lanceolate tessellate, sheath loose, bracts enclosing 2–3 compressed 4–8-fl. spikelets, gl. I short obtuse, II long-mucronate, flg. gls. 4–5 ovate long-acuminate, palea very short. *Ruprecht. Bamb.* 24, t. 2, f. 5; *Steud. Syn. Gram.* 334; *Brandis in Ind. Forester*, xii. 206; *Gamble Bamb. Brit. Ind.* 17, t. 16; *Mitford, The Bamboo Garden*, 172. *A. procera*, *Wall. mss.* *Thamnocalamus spathiflorus*, *Munro in Trans. Linn. Soc.* xxvi. (1868) 34, partly; *Brandis For. Flor.* 563. *Bambusa macro*, *Wall. in Herb. Hook. (ex Munro)*.—*Gen. Nov. Wall. Cat.* n. 5041.

WESTERN HIMALAYA; from the Sutlej to Nepal, alt. 7–9000 ft., *Wallich, &c.*

A gregarious shrub 12–20 ft. high. *Stem* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., smooth, young glaucous green and scurfy, older yellow or reddish-brown, nodes prominent, internodes 6–15 in., branchlets chiefly from the upper nodes, leafing branches with loose yellow sheaths 3–5 by $\frac{1}{2}$ – $\frac{3}{4}$ in. *Stem-sheaths* loose, glabrous, margins ciliate, mouth $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, with a few stiff bristles; ligule $\frac{1}{10}$ in., fimbriate. *Leaves* shortly petioled, base narrowed, tip acute hairy; sheath 2–3 in., truncate, auricles bristly callus narrow, ciliate; ligule long-ciliate. *Infl.* usually on leafless stems, branches fascicled drooping, with narrow papery sheaths, $1\frac{1}{2}$ –3 in. long. *Spikelets* 1–2½ in., pedicelled; rachilla long, clavate, tip hairy; gl. I and II linear-lanceolate, glabrous; fl. gls. $\frac{1}{2}$ –1 in. scabrous.—Distinguished from *A. falcata* by the tessellate leaves, and from *jaunsarensis* by the short rhizomes and tufted habit.

17. **A. aristata**, *Gamble Bamb. Brit. Ind.* 18, t. 17; stem-sheaths narrowed to a broad rounded top, leaves fascicled on jointed purple branchlets oblong-lanceolate tessellate, sheath loose keeled with a thickened spongy callus below the petiole, bracts of infl. broad enclosing 3–5 compressed 4–8-fl. spikelets, gl. I and II oblong-lanceolate scabrous 5–7-nerved, fl. gls. ovate long acuminate, palea nearly as long. *Thamnocalamus spathiflorus*, *Munro in Trans. Linn. Soc.* xxvi. (1868) 34, partly.

SIKKIM and BHOTAN HIMALAYA, alt. 9500–11,000 ft., *Griffith's Collectors, Kurz, &c.*

A gregarious shrub 8–12 ft. high, very closely allied to *A. spathiflora*, of which it is the Eastern representative, distinguished from that species in having broader bracts enclosing more spikelets, shorter leaves, a hairy callus below the longer petiole, longer mucros of the flg. gls. and a long more acuminate palea. It is readily recognized by its yellow stems and reddish branchlets. The stems are leafing only, or flowering only, or both.

18. **A. Falconeri**, *Benth. in Gen. Plant.* iii. 1208; stem-sheaths oblong top narrowed truncate, leaves 3–6 by $\frac{1}{2}$ – $\frac{3}{4}$ in. oblong-lanceolate soft thin petioled not tessellate but with a few pellucid glands, sheath glabrous with ciliate margins and a minute narrow ciliate callus below the petiole, ligule long hairy, bracts of large leafy panicles ovate-lanceolate, spikelets 1-fl., gl. I and II oblong acute or mucronate 3–5-nerved, fl. gl. ovate-lanceolate mucronate 5–7-nerved, palea as long or longer. *Gamble Bamb. Brit. Ind.* 20, t. 18; *Mitford, The Bamboo Garden*, 169. *Thamnocalamus Falconeri*, *Hook. f. ex Munro in Trans. Linn. Soc.* xxvi. (1868) 1834; *Brandis For. Fl.* 563. *Bambusa floribunda*, *Munro in Herb. Trin. Coll. Dublin.*—*Bambusoides*, *Wall. Cat.* n. 5040.

TEMPERATE HIMALAYA; from Kumaon to Bhotan, alt. 7–9000 ft., *Wallich, &c.*

Tall, shrubby. Stem $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., young smooth, old scurfy-white, often striped yellow and green; nodes raised, base of sheath persistent; internodes 8–15 in., walls $\frac{1}{2}$ in. thick; branches many at the nodes with bracteate sheaths. Stem-sheaths 8–12 by 2–3 in.; ligule narrow, dark, hairy. Leaves smooth on both sides, ligule rounded hairy. Rachis of raceme flexuous, flattened. Spikelets with a terminal free rachilla, and a ring of hairs below the flg. gl.; keels of palea glabrous except at the tip, 1-nerved on each side.—The small sheaths enclosing short sinuous racemes, and the absence of transverse nervules in the leaves characterize this species.

Sect. IV. Climbing shrubs. Stamens 6 or fewer.

19. **A. Prainii**, *Gamble Bamb. Brit. Ind.* 21, t. 19; stem slender wiry, leaves 2–4 by $\frac{1}{3}$ – $\frac{1}{2}$ in. not tessellate, sheath with a glabrous callus below the petiole, spikelets distant pedicelled on a wiry rachis, gl. I lanceolate keeled ciliate, II ovate acute 5-nerved, flg. gls. 3–6 on a flexuous clavate rachilla triangular acute 9–11-nerved. *Microcalamus Prainii*, *Gamble in Journ. As. Soc. Beng.* lix. ii. (1891) 207, t. 7.

ASSAM; on the Naga and Jaintea Hills, alt. 3500–7870 ft., *Prain, &c.*

Stem up to 30 ft. long, yellowish, $\frac{1}{2}$ – $\frac{1}{3}$ in. diam.; nodes swollen, solid or walls thick; branches fascicled. Stem-sheaths 2–6 by $\frac{1}{2}$ – $\frac{3}{4}$ in., narrowed to a point in the upper half with an acicular blade. Leaves 2–4 in. thin, quite glabrous, base rounded petioled, tip curved setaceous; sheath smooth; ligule long, rounded. Infl. of axillary and terminal panicles of spikelets in the axils of sheathing bracts. Spikelets 1–1½ in., pedicels slender; empty gls. 2–3, nodes of rachilla clavate flattened; gl. I margins ciliate; II tip ciliate; fl. gls. falcate, strongly nerved; palea as long, falcate; keels minutely ciliate. Stamens 6.

B. Species of which the flowers are unknown.

* Stem-sheaths 2–8 in., imperfect blade generally recurved.

† Leaves tessellate with transverse nervules.

§ Stems tufted on a short rootstock.

20. **A. microphylla**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 32;

stems 2-4 ft., leaves $\frac{1}{2}$ -1 by $\frac{1}{10}$ - $\frac{1}{8}$ in. linear-lanceolate acute mucronate tessellate, sheath hairy above tip long-fimbriate. *Gamble Bamb. Brit. Ind.* 22. *Bambusa microphylla*, *Griff. Journ.* i. 242, 259, &c.

BHUTAN, alt. 6-10,000 ft., *Griffith*.

A gregarious low shrub, forming large patches in wet places; internodes 2-3 in., glabrous; branches $\frac{1}{2}$ -whorled at the nodes. *Leaves* with almost membranous fimbriate or glabrous margins, nerves 2 pairs; sheath often dark; ligule obscure.—*Descript.* after Munro.

21. **A. hirsuta**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 30; stems 4-8 ft. solitary from the rhizome often strigosely hairy above, leaves 3-5 by $\frac{1}{2}$ - $\frac{3}{4}$ in. tessellate strigosely hairy beneath, sheath strigosely bristly ending in a hairy callus and reflexed spinescently bristly auricle. *Gamble Bamb. Brit. Ind.* 22, t. 20.

KHASIA and NAGA HILLS, alt. 5000-9500 ft., *Griffith*, &c.

Stems greyish-green, $\frac{1}{5}$ - $\frac{1}{3}$ in. diam., nodes glabrous; internodes up to 13 in., walls rather thin. *Stem-sheaths* 6 in. by 1 in. broad at the base, top rounded with large recurved long-ciliate auricles; blade subulate, recurved; ligule narrow, pubescent. *Leaves* tessellate, smooth above, hairs white beneath, margins cartilaginous scabrous-serrate, midrib narrow shining, nerves 4-6 pairs; ligule long, hairy.—Resembles *A. Wightiana*, differing in the well marked auricles and bristles of both stem- and leaf-sheaths.

22. **A. Gallatlyi**, *Gamble Bamb. Brit. Ind.* 23, t. 21; stems thin, leaves 3-4 by $\frac{1}{2}$ - $\frac{3}{4}$ in. tessellate whitish beneath base narrowed into a short petiole sheath ending in a narrow callus with about 3 long stiff bristles.

TENASSERIM; Moolyet Hill, alt. 6000 ft., *Gallatly*.

A gregarious shrub. *Branches* smooth, glabrous, striate, sometimes channelled. *Sheaths* of branchlets narrow, with imperfect blades and long ligules. *Leaves* pale green, tessellate, tips setaceous, scabrid, smooth above, one margin scabrid, nerves 3 pairs; ligule triangular, pubescent.

§§ *Stems distant on elongated rhizomes.*

23. **A. jaunsarensis**, *Gamble Bamb. Brit. Ind.* 23, t. 22; stems slender reed-like, leaves 4-6 by $\frac{1}{2}$ - $\frac{3}{4}$ in. lanceolate acuminate tessellate base obliquely cuneate, sheath ending in falcate auricles with a few bristles.

WESTERN HIMALAYA; hills of Jaunsar in Garwhal, alt. 7-8000 ft., *Gamble*.

Rhizome long, creeping, clothed with shining imbricate ovate acute scales. *Stems* 2-3 ft. apart, 10-15 ft. high, $\frac{1}{2}$ in. diam., young glaucous, old greenish-brown, internodes 9-11 in. *Stem-sheaths* 6-10 in. by $1\frac{1}{2}$ -2 in. broad at the base, narrowed to a truncate 2-auricled bristly tip; blade 1-3 in., subulate, recurved; ligule short, pubescent. *Leaves* thin, smooth above, scaberulous beneath, margins scabrous-serrate, tessellate, nerves 4-5 pairs; sheath with falcate auricles that bear 5-6 stiff bristles; ligule short, truncate, pubescent.—Nearest to *A. spathiflora*, distinguished by its rhizome, solitary green stems, auricled sheath, and thinner leaves.

24. **A. Rolloana**, *Gamble Bamb. Brit. Ind.* 24, t. 23; stems rather rough somewhat flattened on one side, lower nodes rooting, leaves 6-8 by $1-1\frac{1}{2}$ in. oblong-lanceolate acute tessellate base rounded sparsely hairy beneath, sheath ending in a rounded long-ciliate auricle.

ASSAM; Naga Hills, alt. 5-7000 ft., *J. Rollo*.

Rhizome at first clothed with imbricating scales, afterwards jointed, joints about $\frac{1}{2}$ in. long. *Stems* 8 ft. by $\frac{1}{5}$ - $\frac{1}{4}$ in. diam., green then yellow, lower nodes rooting;

internodes 10-12 in., walls thin. *Stem-sheaths* 4-6 by 1-2 in., covered with at length deciduous bristles, shining, margins ciliate, auricles falcate and with long bristles, blade subulate recurved. *Leaves* glabrous above, tessellate, margins cartilaginous spinulose-scabrous, nerves 8-10 pairs; petiole broad, flat; ligule long, membranous, deeply cleft. Remarkable for its broad leaves.

25. **A. armata**, *Gamble Bamb. Brit. Ind.* 130, t. 119; rootstock creeping, stems solitary, nodes smooth slightly thickened, leaves oblong-lanceolate long-acuminate tessellate smooth above slightly rough beneath, margins scabrid, midrib pubescent above.

Hills of UPPER BURMA, alt. 5500 ft., *Oliver*.

Evergreen. *Stems* about 20 ft. by 1-1½ in. diam., green, straight, smooth, walls very thin; nodes with a belt of straight smooth spines, internodes about 8 in.; stem-sheaths 6-8 in. by 2½-3 in. broad at the base, thin, tapering to a very narrow tip, smooth or with scattered hairs above the middle, margins ciliate; blade about 1/10 in., triangular, pubescent; ligule very narrow, ciliate. *Leaves* 6-9 by ¾-1¼ in., bright green, base narrowed, petiole 1/10-½ in., tip twisted scabrid, midrib narrow pale shining, nerves 6 pairs with 5-7 intermediate, transverse nervules very many irregularly spaced; leaf-sheaths striate, ending in small calli and bearing 10-12 stiff bristles; ligule very short, ciliate. *Inflorescence* unknown.—Near *A. callosa*, Munro, but quite distinct.

†† Leaves not or inconspicuously tessellate by transverse nervules.

26. **A. suberecta**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 32; stems cœspitose wiry erect, leaves narrow 2-4 by 1/5-1/3 in. subsessile linear not or hardly tessellate, base narrowed margins revolute, sheath ending in a callus with a few deciduous bristles. *Gamble Bamb. Brit. Ind.* 25, t. 24.

SIKKIM HIMALAYA, *Kennedy*. KHASIA and JAINTIA HILLS, alt. 4000-5000 ft. *Griffith, &c.*

Stems 10-15 ft. by ½ in. diam., olive-green, smooth; nodes slightly swollen; internodes 6-10 in., walls thick; branchlets short, whorled. *Stem-sheaths* 2-6 by ½ in. broad at base, glabrous, gradually narrowed to a naked or fimbriate mouth; blade ½-1½ in., subulate, recurved; ligule long, tip fimbriate. *Leaves* pale beneath, with many pellucid glands, tip setaceous, margins scabrous-serrate, nerves 3-4-pair; ligule rather long, pubescent.

27. **A. Kurzii**, *Gamble Bamb. Brit. Ind.* 25, t. 25; nodes with a thick ring bearing very many long wiry geniculate branches, leaves 2-4 by 1/5-1/3 in. subsessile very thin linear-lanceolate acute obscurely tessellate, base unequally narrowed, sheath slender striate, ending in a small callus and a few thin cilia.

SOUTHERN BURMA; on the coast, *Kurz*.

Apparently a bushy shrub. *Stem* smooth, 3/8-½ in. diam. *Leaves* acute with a short point, smooth on both surfaces with a few long tubercle-based hairs on the nerves beneath, costa thin pale, nerves 2 pairs, transverse nervules very few and inconspicuous; ligule short sometimes ciliate.—Remarkable for its thin leaves and geniculate pale branchlets.

** *Stem-sheaths* 12-18 in. long, blade long.

28. **A. Mannii**, *Gamble Bamb. Brit. Ind.* 26, t. 26; stem tufted climbing wiry solid, blade of stem-sheath 6-10 in. linear, leaves 6-9 by ¾-1 in. petioled lanceolate hirsute beneath not tessellate.

ASSAM; Jaintia Hills, alt. about 3000 ft., *Mann*.

Stems 30 ft., much branched, nodes thickened, branches many geniculate; internodes 3 ft. smooth. *Stem-sheaths* 12-18 in., convolute, slender; rough with

appressed bristles; ligule narrow, toothed. *Leaves* papery, base narrowed or rounded, tip thickened hirsute surmounted by a capillary bristle; sheath ending on one side in a round shining exauricled callus, on the other in a short pointed auricle with a few bristles; petiole wrinkled; ligule small, hairy, ciliate.—A curious species resembling *A. Prainii*, remarkable by its long narrow sheaths; its leaves resemble those of *Cephalostachyum*.

133. **PHYLLOSTACHYS**, Sieb. & Zucc.

Cœspitose shrubs. *Stems* smooth, flattened on one side, branches fasciated at the nodes. *Stem-sheaths* rounded above, blade subulate. *Leaves* jointed on the sheath, spinulose on one margin, tessellate, sheath loose. *Infl.* of spicate branchlets in a leafy terminal panicle with imbricating bracts. *Spikelets* 2-3, 1-4-fl. with a terminal imperfect rachilla jointed between the fls.; empty gls. 2-3, many-nerved, often bearing an imperfect blade; flg. gls. ovate-lanceolate, acuminate, many-nerved; palea 2-keeled, many-nerved. *Lodicules* 2. *Stamens* 3. *Ovary* stipitate, rounded, glabrous, style long, stigmas 3.—Species about 20, Eastern Asiatic.

1. **P. bambusoides**, Sieb. & Zucc. in *Abh. Akad. Münch.* iii. (1843) 745, t. 5, f. 3; leaves thin, mouth of sheaths with long bristles. *Steud. Syn. Gram.* 339; *Munro in Trans. Linn. Soc.* xxvi. (1868) 36; *Franch. & Sav. Enum. Pl. Jap.* ii. 182; *Gamble Bamb. Brit. Ind.* 27, t. 27; *Mitford, The Bamb. Gard.* 155. *P. megastachya*, *Steud. l. c.* *Bambusa reticulata*, *Rupr. Bamb.* 58. *B. bifolia*; Sieb. mss. ex Munro.

UPPER ASSAM; Mishmi Hills (without flowers), *Griffith*.—DISTRIB. China, Japan.

Stems 10-12 ft., $\frac{1}{2}$ - $\frac{2}{3}$ in. diam., graceful, smooth, yellow, nodes glabrous, internodes short, branches semiverticillate. *Stem-sheaths* 6-10 in., thin, top contracted into a short neck then rounded and truncate, margins produced to meet the ligule with a few bristles; blade subulate; ligule long, toothed. *Leaves* 3-4 by $\frac{1}{2}$ - $\frac{2}{3}$ in., oblong-lanceolate, tip setaceous, glaucous and with stiff white hairs beneath, nerves 5-6 pairs; petiole black, hairy; sheath keeled, ciliate on one margin, mouth with bristles on a short auricle; ligule rounded. *Bracts of infl.* short, obtuse, sheathing 3-5 spikelets and with an imperfect blade. *Spikelets* 1-1 $\frac{1}{2}$ in.; gl. I very large, sheath-like, truncate, with a green cordate blade; II oblique, keeled, few-nerved, keels ciliate; flg. gls. $\frac{3}{4}$ in., ovate, acuminate, many-nerved; palea as long.—Description from Hongkong specimens.

2. **P. Mannii**, *Gamble Bamb. Brit. Ind.* 28, t. 28; leaves thick, mouth of sheath nearly naked.

KHASIA HILLS, alt. 5000 ft., cult. (said to have come from the Naga Hills), *Mann*.

Stems 15-20 ft. by 1-1 $\frac{1}{4}$ in. diam.; internodes 8 in., yellow. *Stem-sheaths* papery, 8-9 by 1-2 in., top rounded and truncate; blade 2-3 in., subulate; ligule broad, pectinate. *Leaves* 4-5 by $\frac{1}{2}$ - $\frac{2}{3}$ in., base rounded, tip shortly acuminate, glabrous or nearly so, one margin spinulose-serrate, costa prominent, nerves 5 pairs; sheath loose, ending in a narrow ciliate callus with a few bristles; ligule broad, long-pectinate. *Infl.* unknown.

134. **BAMBUSA**, Schreb.

Shrubs or trees, usually large and cœspitose, rarely climbing; stem-sheaths broad, blade often triangular. *Leaves* shortly petioled not tessellate by nervules, but sometimes by pellucid glands, sheaths variously

anricled. *Infl.* generally a large leafless panicle bearing heads on spiciform branches, or of leafy panicles, or panicle spikes. *Spikelets* 1- many-fl.; lower gls. 1-4, empty or gemmiferous; fl. gls. ovate-lanceolate, uppermost imperfect; palea 2-keeled. *Lodicules* 2-3, membranous, ciliate, rarely 0. *Stamens* 6. *Ovary* oblong or obovate, tip hairy; style long or short, stigmas 2-3. *Grain* oblong or linear-oblong, furrowed on one side; pericarp thin, adherent.—Species about 50, Eastern Asiatic, Malayan, and one Australian.

In enumerating the nerves of the leaves the principal ones on each side of the midrib alone are given.

A. Species of which the flowers are known.

Sect. I. Arborescent (except *B. nana* and *affinis*). *Stem* not spinous. *Spikelets* cylindric, except *B. Balcooa*. *Lodicules* 3.

* *Spikelets* in loose heads.

† *Stem-sheaths* with a triangular reniform or cordate blade, auricles large.

§ *Keels of palea more or less ciliate or toothed.*

1. **B. Tulda**, *Roxb. Fl. Ind.* ii. 193; leaves linear-oblong or -lanceolate, spikelets 1-3 in. in interrupted clusters mixed with chaffy bracts usually 1-2 bracteolate 4-6-fl., lowest 3-4 gls. acute many-nerved usually gemmiparous, flg. gls. $\frac{1}{2}$ -1 in. ovate acute acuminate or mucronate, palea shorter cymbiform, anthers obtuse glabrous purple, ovary obovate-oblong. *Munro in Trans. Linn. Soc.* xxvi. (1868) 91; *Brand. For. Flor.* 566; *Kurz For. Fl. Burm.* ii. 552; *Gamble Bamb. Brit. Ind.* 30, t. 29. *B. Macala*, *Ham. ex Wall. Cat. n.* 5026 A. *B. trigyna*, *Roxb. mss. in Herb. Mus. Brit.* *Dendrocalamus Tulda*, *Voigt Hort. Suburb. Calcutt.* 718.—*Bambusa*, *Wall. Cat. n.* 5026 A, 5027, 5030 B, C.

BENGAL, ASSAM, the NORTHERN CIRCARS, and BURMA, wild and cult.

Gregarious. *Stems* 20-70 ft., 2-4 in. diam.; nodes not swollen; internodes 1-2 ft., white-ringed below the nodes, walls $\frac{1}{4}$ - $\frac{1}{2}$ in. thick. *Stem-sheaths* 6-9 by 6-10 in. broad below, narrowed upwards, tip rounded or subtriangular, glabrous hairy or white-powdered; blade hairy within, auricles long-fringed. *Leaves* 6-10 by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., base usually rounded, tip subulate twisted, beneath glaucescent and puberulous, pellucid glands faint, nerves 6-10 pairs; petiole often hairy; sheath glabrous, ending in a smooth callus and oblong long-fringed auricle; ligule narrow, obscure. *Infl.* variable, from an immense radical leafless panicle to a short leafy panicle or spiciform branch; rachilla clavate, flattened, fragile; palea 5-7-nerved between the keels, tip penicillate. *Lodicules* 3.—Flowers gregariously and in single clumps.

2. **B. nutans**, *Wall. Cat. n.* 5031; stems solitary from a creeping rhizome, leaves linear-lanceolate tessellate with pellucid glands, ligule long obtuse hairy, spikelets in bracteate fascicles many empty or gemmiparous, fertile few $\frac{3}{4}$ -1 in., 2-3 lowest gls. neuter 3-7 fertile all ovate acute mucronate many-nerved puberulous within, palea shorter ovate flattened keels overlapping long ciliate, anther-tips long apiculate or slightly penicillate, ovary subovoid. *Munro in Trans. Linn. Soc.* xxvi. (1868) 92; *Brand. For. Flor.* 567; *Gamble Bamb. Brit. Ind.* 32, t. 30. *B. crinita*, *Thoms. ex Munro l. c.* 157. *Bambusa Falconeri*, *Munro l. c.* 95 in part.—*Bambusa*, *Wall. Cat. n.* 5030 A.

LOWER HIMALAYA; from the Jumna to Assam and Eastern Bengal, ascending to 5000 ft. in Sikkim.

Stems 20–40 ft. by $1\frac{1}{2}$ –3 in. diam., graceful, naked below, straight, nodes not much raised often hairy, lower rooting; internodes 15–18 in., not shining, white-ringed below the nodes, thick-walled. *Stem-sheaths* 6–9 in., top roundly truncate, dorsally clothed with black hairs, base with a ring of soft deciduous hairs; blade of lower nodes and uppermost shoots 6–9 in., of middle nodes shorter, acute, black-hairy within, margins recurved, base rounded decurrent on the top of the sheath with large waved densely bristly auricles, bristles long curved. *Leaves* 6–12 by $1-1\frac{1}{2}$ in., white beneath when dry, tip twisted scabrid, midrib and margins scabrid, nerves 7–10; sheath ending in a smooth callus and falcate auricle with long bristles. *Infl.* a stiff panicle with spiciform branches. *Lodicules* 3, long-fimbriate.—Difficult to distinguish from *B. Tulda* without flowers, except by the rhizome. *B. Falconeri*, Munro, was founded on flower of *B. nutans* and leaves of *Dendrocalamus Hamiltoni*.

3. ***B. teres***, *Ham. ex Wall. Cat. n. 5026 B*; stems cæspitose, leaves large oblong-lanceolate tessellate by pellucid glands, spikelets 1–2 in. in bracteate heads neuter and fertile, 1–2 lowest gls. empty or gemmiparous ovate acute mucronate, flg. gls. 5–6 ovate-lanceolate from a broad base acute many-nerved tip sometimes foliaceous, palea ovate acute scaberrulous 5–6-nerved between the toothed keels, anthers narrow tips penicillate. *Munro in Trans. Linn. Soc. xxvi. (1868) 95*; *Gamble Bamb. Brit. Ind. 33, t. 31*.

EASTERN BENGAL; Gongachora, *Hamilton*. ASSAM, *Jenkins*.

Stems 60 ft. by 3 in. diam., nodes ringed by the bases of fallen sheaths; internodes 20 in., walls $\frac{3}{10}-\frac{4}{10}$ in. thick. *Stem-sheaths* 8–10 in. long and broad, hardly narrowed upwards, top rounded, nearly glabrous; blade 4–6 in., triangular, cuspidate, base rounded and decurrent in broad wavy fringed auricles, appressed-hairy beneath; ligule narrow, white-hairy. *Leaves* 12–14 by $1\frac{1}{2}-1\frac{3}{4}$ in., tip long-acuminate twisted scabrid, base unequally narrowed shortly pubescent beneath, nerves 10–16, pellucid glands many; sheath ending in a broad shining callus; ligule short. *Infl.* a large compound panicle with spiciform branches bearing fascicles of spikelets and chaffy bracts. *Lodicules* sub-obovate, fimbriate, many-nerved.

4. ***B. Ridleyi***, *Gamble Bamb. Brit. Ind. 34, t. 32*; leaves 12–14 by $1\frac{1}{2}$ in. margins smooth, sheath exauricled, ligule deeply 2-lobed, spikelets 1–2 in. few in distant clusters 3–5-fld. many neuter, empty gls. 2–4 ovate acuminate, fl. gls. ovate-lanceolate mucronate many-nerved, palea shorter oblong keels minutely ciliate near the 2-fld tip, anthers long narrow setosely apiculate.

SINGAPORE, at Bukit Timah, *Ridley*.

Leaves oblong-lanceolate, tip subulate scabrid with its margins recurved, scaberrulous above, smooth beneath, nerves 10–12 pair, petiole broad; sheath appressed hairy, subcarinate, ending in a narrow callus, margins truncate at the ligule which has long stiffy ciliate lobes. *Infl.* on long spiciform leafy branches bearing very distant clusters of few spikelets. *Rachilla* short. *Palea* many-nerved between the keels. *Lodicules* 3, many-nerved, long-fimbriate.—Habit and stem-sheaths unknown.

5. ***B. burmanica***, *Gamble Bamb. Brit. Ind. 35, t. 33*; leaves of young plants 10–12 by $\frac{1}{2}$ –2 in. white-hairy on both surfaces of older smaller smooth above hairy beneath, ligule short, spikelets 1 in. or less in spiciform branches of a panicle each in the axil of a long narrow truncate bract, empty gls. 2 mucronate, flg. gls. 5–6 ovate acute many-nerved, palea elliptic-ovate keels ciliate, anthers narrow tips apiculate.

UPPER BURMA; Katha district, *Oliver*.

Stems 50–60 ft., 4 in. diam., dull green, nearly solid, internodes 12 in. with a ring of white hairs below the not much swollen nodes. *Stem-sheaths* green with yellow margins, rather broader than long, top rounded, sides with appressed golden hairs; blade broadly cordate, cuspidate, base dilated into large rounded fringed auricles; ligule short. *Leaves* oblong-lanceolate, base unequally narrowed or rounded, tip with a twisted scabrous point, pellucid glands many, nerves 5–8 pair; sheath reddish-brown, keeled, tip truncate with a small deciduous auricle and deciduous cilia; ligule short, denticulate. *Infl.* a panicle of spiciform branches; rachis wiry. *Palea* with overlapping margins and 4–5 nerves between the keels; rachilla short, thick. *Lodicules* 3, 5–6-nerved, ciliate. *Ovary* stipitate. *Grain* oblong, top hairy.—A large handsome species.

§§ *Keels of palea eciliate.*

6. **B. polymorpha**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 98; leaves small linear at first hairy on both surfaces, ligule very short, spikelets about $\frac{1}{2}$ in. few together in many bracteate fascicles born on the long spiciform branches of a large panicle, shining, each in the axil of a long bract, empty gls. 1–3 ovate acuminate, flg. 2–3 ovate mucronate many-nerved, palea rather longer lanceolate, anthers obtuse or apiculate. *Kurz For. Fl. Brit. Burm.* ii. 553; *Gamble Bamb. Brit. Ind.* 36, t. 34. *Bambusa cyanostachya*, *Kurz MS. in Herb. Kew.*

EASTERN BENGAL, PEGU & MARTABAN, *Brandis, &c.*

Evergreen, tufted, sometimes deciduous; stems attaining 50–80 ft. by 3–6 in. diam., curving outward, young white-scurfy, nodes thickened; internodes 15–24 in. *Stem-sheaths* 6–7 in. by 12–14 broad, thick, dorsally densely white-pubescent, narrowed upwards and curved; blade reniform, 3 in. long, plaited and long ciliate below, base rounded and dilating into a broad band lining the top of the sheath, auricles falcate, the whole fringed with bristles; ligule narrow, entire. *Leaves* 3–7 by $\frac{1}{2}$ – $\frac{1}{4}$ in., base rounded or narrowed, nerves 4–6 pairs; sheath compressed, hairy, ending in a callus and minute auricle with deciduous bristles. *Spikelets* often brownish, subpedicelled, enclosed in a long curved glabrous bract. *Lodicules* 3, suborbicular. *Anthers* purple. *Grain* $\frac{1}{2}$ in., ovate, plano-convex, top hairy.

†† *Stem-sheaths* with a very long or narrow or imperfect blade, auricles 0 or minute; keels of palea ciliate.

7. **B. pallida**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 97; caespitose, blade of stem-sheaths very long auricles small, leaves linear-lanceolate glabrous above often white-hirsute beneath, spikelets 1–1 $\frac{1}{2}$ in. fertile and neuter on the spiciform branches of a large panicle, 1 or 2 lowest gls. ovate acute empty, then one male or gemmiparous followed by 3–8 flg. and 3–5 imperfect, flg. gls. ovate acute many-nerved, palea much shorter acute, anther-tip 1–2-setose or naked, ovary narrowed into the hairy style. *Gamble Bamb. Brit. Ind.* 37, t. 35. *B. critica*, *Kurz in Journ. As. Soc. Beng.* xlii. (1873) ii. 250. *Dendrocalamus criticus*, *Kurz For. Flor. Brit. Burm.* ii. 559.

SIKKIM HIMALAYA, N. & E. BENGAL, the KHASIA HILLS, ASSAM, UPPER BURMA & PEGU, alt. 5–6000 ft. (cult. in the plains below).

Stems graceful, 40–60 ft. by 2–3 in. diam., olive green; nodes not prominent; internodes 18–30 in., walls thin. *Stem-sheaths* 7–12 by about 10 in. broad, top straightly truncate, young more rounded, glabrous or hairy; blade up to 14 in., triangular, acuminate, sparsely hairy, margins and very small auricles bristly; ligule very narrow. *Leaves* 4–8 by $\frac{1}{2}$ – $\frac{3}{4}$ in., tip subulate scabrid twisted, nerves 4–6;

sheath glabrous, ending in a smooth callus and a rounded erect fringed auricle; ligule very short. *Panicle* very large, pale. *Spikelets* pale, sometimes curved; rachilla short, clavate; palea 3-5-nerved between the keels. *Lodicules* 3. *Stigmas* 3. —Very like *B. Tulda*, but distinguished by the stem-sheaths, smaller narrow leaves, and ovary.

8. *B. affinis*, *Munro in Trans. Linn. Soc.* xxvi. (1868) 93; shrubby, blade of stem-sheaths small lanceolate, leaves lanceolate or oblong-lanceolate scabrid beneath tessellate by pellucid glands, sheath setose keeled, ligule broad, spikelets about 1 in. in small distant whorls on terminal leafy spikes or panicles 6-10-fl. coriaceous shining, flg. gls. acuminate very-many-nerved folded at the base, palea much narrower, ovary sub-obovoid. *Kurz For. Fl. Brit. Burm.* ii. 551; *Gamble Bamb. Brit. Ind.* 39, t. 36.

Forests of MARTABAN & BURMA E. of the Sittang river, *Kurz, Brandis*.

Stems 15-20 ft. by 1-1½ in. diam., pale green or striped with white, appressed-pubescent; internodes 1-2 in., tubular, with black hairs below the slightly thickened nodes. *Stem-sheaths* 4-6 in. long and broad, green, later straw-colrd., glabrous or with patches of appressed hairs, top rounded; blade 1-2 in., longer in young shoots, usually recurved, appressed hairy within, base decurrent as a narrow terminal wing of the sheath; ligule narrow. *Leaves* 6-10 by 1-1½, petiole rather long, points twisted scabrid, nerves 8-10; sheath ending in a short callus. *Spikelets* in small whorls; rachilla short, top bearded; palea 7-nerved between the keels, 4-nerved beyond them. *Lodicules* 3, many-nerved. *Stigmas* 3.

9. *B. khasiana*, *Munro in Trans. Linn. Soc.* xxvi. (1868) 97; stem solitary from a creeping rootstock, blade of stem-sheaths with large inflated wings above the contracted base, leaves lanceolate or oblong-lanceolate and sheaths glabrous, spikelets sterile (short) and flg. (long) $\frac{8}{10}$ - $\frac{8}{10}$ in. in distant heads on the spiciform branches of a long panicle 1-4 lowest gls. empty or gemmiparous ovate mucronate strongly nerved, flg. gls. 2-3-fl. 11-13-nerved, tip hairy within, palea as long as the gl. or longer many-nerved, anthers obtuse, ovary narrowed into the style. *Gamble Bamb. Brit. Ind.* 39, t. 37.

KHASIA to the MUNNEPORE HILLS, alt. 1-4000 ft., *J. D. H. & T. T.*, &c.

Stems 30-40 ft. by 1-1½ in. diam., graceful, fistular, rather soft, dull olive green, young golden hairy; internodes 5-15 in. with a whitish ring below the not prominent nodes and bluish ring above them; walls $\frac{1}{10}$ - $\frac{3}{10}$ in. *Stem-sheaths* 5-6 by 4-5 in., tawnily hairy, straight top truncate; blade as long as the sheath or longer, cuspidately acuminate, auricles 0; ligule narrow. *Leaves* 4-9 by 1-1½ in., pale, tip setaceous shaggy, nerves 6-8 obscure; sheath ending in a broad callus and minute setose auricle; ligule elongate, truncate. *Spikelets* cylindric, at length flattened. *Branches of panicle* fistular. *Lodicules* short, broad, fimbriate. *Stigmas* 3.

9*. *B. NANA*, *Roxb. Fl. Ind.* ii. 190; dwarf, shrubby, blade of stem-sheaths linear, leaves small linear-lanceolate, spikelets ½-1½ in. few clustered or solitary on the branches of short diffuse panicles, gls. 5 or more all flg. rarely the lowest empty ovate acute many-nerved, palea shorter than the gl. keels minutely ciliate at or near the tip only, anthers obtuse or sub-apiculate yellow, ovary obovoid. *Wall. Cat. n.* 5036; *Munro in Trans. Linn. Soc.* xxvi. (1868) 89; *Kurz For. Fl. Burma*, ii. 551; *Ind. Forester*, i. 339; *Trim. Cat. Ceyl. Pl.* 110; *Gamble Bamb. Brit. Ind.* 41, t. 38. *B. caesia*, *Sieb. & Zucc. fid. Munro*, *B. glauca*, *Lodd. Cat.*; *Lindl. in Penny Cycl.* iii.

(1835) 357. *B. glaucescens*, Sieb. *Cat. fid. Munro*. *B. sterilis*, Kurz in *Miq. Ann. Bot. Lugd. Bat.* ii. 285. *B. viridi-glaucescens*, Carr. in *Rev. Horti.* 1869, 292. *Arundinaria glaucescens*, Beauv. *Agrost.* 144; *Nees Agrost. Bras.* 526; *Kunth Enum. Pl.* i. 426; *Rupr. Bamb.* 23, t. i. p. 3; *Steud. Syn. Gram.* 334; *Miq. Fl. Ind. Bat.* iii. 413; *Munro l.c.* 22. *Ischurochloa floribunda*, Büse in *Miq. Pl. Jungh.* 390; *Fl. Ind. Bat.* iii. 422. *Ludolfia glaucescens*, Willd. in *Ges. Naturf. Fr. Berl. Mag.* ii. (1808) 320. *Panicum arborescens*, Lamk. *Encycl.* iv. 749. *Triglossum arundinaceum*, Fisch. ex Roem. & Sch. *Syst. Veg.* 846.

MALAYAN PENINSULA; Pahang, alt. 7000 ft., Wray (wild?). Cultivated in Ceylon (CP. n. 4022) and in many parts of India.—Native of China and Japan.

Stems 6–10 ft., $\frac{1}{4}$ –1 in. diam., densely tufted, hard, green then yellow, branched from the base; nodes thickened; internodes 8–15 in. *Stem-sheaths* 4–6 by 2–3 in. broad, stiff, glabrous, narrowed upwards, top rounded; blade 2–3 in., acuminate, decurrent on the sheath, ciliate, appressed-hairy or glabrous above; ligule narrow, entire. *Leaves* 2–4 by $\frac{1}{2}$ in., distichous, tip subulate twisted, not tessellate, costa faint, nerves 3–6; sheath ending in a prominent callus, auricle fringed; ligule short. *Spikelets* straw-colrd.; rachilla flattened, glabrous; palea many-nerved. *Lodicules* linear. *Style* very short. *Grain* elliptic, furrowed, shortly beaked, top hairy.

** Spikelets ovate-lanceolate in dense heads, flattened.

10. **B. Balcooa**, Roxb. *Fl. Ind.* ii. 196; stem-sheaths dimorphic, leaves oblong-lanceolate base rounded, sheath hairy, heads of spikelets bracteate, spikelets $\frac{1}{2}$ – $\frac{1}{2}$ in. or more, empty gls. 0–2 ovate acute many-nerved, fig. gls. 4–6 larger margins ciliate, palea as long as the gl. ovate acute keels long-ciliate, anthers glabrous connective produced, ovary broadly ovoid. *Munro in Trans. Linn. Soc.* xxvi. (1868) 100; *Brandis For. Fl. Brit. Burm.* 567; *Gamble Bamb. Brit. Ind.* 42, t. 39. *B. capensis*, *Rupr. Bamb.* 54, t. 13, f. 54; *Steud. Syn. Gram.* 330. *B. Vasaria*, Ham. ex Wall. *Cat. n.* 5025. *Dendrocalamus Balcooa*, Voigt *Hort. Suburb. Calcutt.* 718.

BENGAL, from the Gogra, eastwd. to BEHAR and ASSAM.

Stems 50–70 ft., 3–6 in. diam., cœspitose, branched from the base, lower branches stiff leafless; internodes 8–18 in. with a whitish ring below and a hairy one above the swollen nodes, walls thick. *Stem-sheaths* of two forms; lower short, broad, ciliate, top rounded; blade short triangular decurrent into short fringed auricles; upper 10–14 by 8–10 in., almost glabrous, ciliate, truncate, blade 6–8 by 3–4 in., closely hairy above, margins recurved, base rounded and decurrent as a narrow band; ligule broad toothed. *Leaves* 6–12 by 1–2 in., pellucidly tessellate with glands, tip twisted scabrid, margins scabrous-ciliate, nerves 7–11; sheath appressed, hairy, truncate above with a narrow callus, bristly or not; ligule broadly triangular, membranous. *Panicle* compound, rachis pubescent or scurfy, swollen above; palea obscurely nerved. *Lodicules* 3, ovate or obovate, fimbriate. *Anthers* glabrous, pointed. *Stigmas* 3, long.

Sect. II. Arborescent or shrubby. *Stems* not spinous. *Spikelets* flattened; fig. gls. few or many. *Lodicules* 2–3.

10*. **B. VULGARIS**, Schrad. in *Wendl. Collect.* ii. 26, t. 47; nodes with a hairy ring, leaves linear-lanceolate petioled glabrous tessellate by pellucid glands, sheath laxly hairy, callus smooth, auricle ciliate, ligule short, spikelets $\frac{6}{10}$ – $\frac{8}{10}$ in. in bracteate clusters of 3–10 oblong acute bifid, empty gls. 1–2 ovate acute many-nerved tip ciliate, fig. gls. 6–10 larger, palea as long as the gl. keels white-ciliate, anthers obtuse hairy apiculate purple, ovary narrow hairy, style long. *Roth Nov. Sp.* 198 (excl. *Syn.*

R. & S.); *Ruprecht in Mem. Acad. Petersb. Ser. VI. v.* (1839) 140, *Bamb.* 47, t. 11, f. 47; *Steud. Syn. Gram.* 329; *Dalz. & Gibs. Bomb. Fl.* 299; *Munro in Trans. Linn. Soc. xxvi.* (1868) 106; *Beddome Fl. Sylv., Forest. Man. p. cccxxii.*; *Brandis For. Flor.* 568; *Kurz For. Fl. Brit. Burm. ii.* 551, *Ind. Forester. i.* 339; *Miq. Fl. Ind. Bat. iii.* 417; *Griseb. Fl. Brit. W. Ind.* 528; *Rivière, Les Bambous*, 191, f. 18, 19; *Trim. Cat. Ceyl. Pl.* 110; *Gamble Bamb. Brit. Ind.* 44, t. 40. *B. arundinacea*, *Ait. Hort. Kew Ed. II.* 316; *Moon Cat. Ceyl. Pl.* 26 (*non Willd.*). *B. humilis*, *Reichb. fid. Rupr. l. c.* 50. *B. Sieberi*, *Griseb. l. c.* 5. *B. striata*, *Lodd ex Munro l. c.* 121; *Bot. Mag. t.* 6079. *B. surinamensis*, *Rupr. l. c.* 49, t. 11, f. 49; *Steud. l. c.* 329. *B. Thouarsii*, *Kunth in Journ. de Phys.* (1822) 148; *Rev. Gram. i.* 323, t. 73, 74, *Enum. Pl. i.* 431, *Suppl.* 356; *Rupr. Bamb.* 48, t. 11, f. 48; *Steud. l. c.* 329; *Nees in Linnæa*, 466; *Thwaites Enum. Pl. Ceyl.* 375. *Nastus Thouarsii*, *Spreng. Syst. ii.* 113.

Cultivated throughout tropical INDIA and in all hot countries. (Wild in Java, *Kurz*).

Stems 20–50 ft., by 2–4 in. diam., rather distant, green yellow or striped, polished; nodes hardly raised, with usually a ring of brown hairs; internodes 10–18 in., walls rather thin. *Stem-sheaths* 6–10 in. by 7–9 in. broad, often streaked with yellow, thickly hairy above, top rounded retuse; blade 2–6 by 4 in., appressed hairy on both surfaces, base rounded decurrent with rounded falcate fimbriate auricles; ligule broad, toothed or fimbriate. *Leaves* 6–10 by $\frac{3}{4}$ –1 $\frac{1}{2}$ in., pale, petioled, tip twisted scabrid, nerves 6–8; sheath loosely hairy, callus ciliate, auricle rounded; ligule short, ciliate. *Panicle* large, leafy, clusters of spikelets largest at the nodes, rachis scurfy. *Lodicules* 3, winged, ciliate.

11. **B. Oliveriana**, *Gamble Bamb. Brit. Ind.* 130, t. 116; stems cœspitose, leaves small linear thin, auricles unequal, panicle of drooping unilateral spikes with distant bracteate clusters of 1–3 flattened spikelets about $\frac{1}{2}$ in. long, empty gls. 1–2 ovate-lanceolate, flg. gls. 3–4 9-nerved, rachilla long flattened, palea as long as the gl. acute tip penicillate keels glabrous, anthers obtuse, ovary elongate ovoid, style short, stigmas 2.

UPPER BURMA, *Oliver, Rogers*.

Stems graceful, 40–45 ft., 1–2 in. diam.; glossy green, branching from the base, internodes about 14 in. *Stem-sheaths* thin, pale, 8–10 in. by 4–5 broad, narrowed upwards to a mouth 2–3 in. broad, glabrous; blade 4–8 in., triangular-lanceolate, cordate, sparsely hairy on both surfaces; auricles unequal long fringed, one $\frac{1}{10}$ – $\frac{1}{3}$ in. rounded, the other decurrent; ligule $\frac{1}{10}$ in. broad, serrate. *Leaves* 4–7 by $\frac{3}{4}$ – $\frac{3}{2}$ in., petioled, glabrous, nerves 4–5 pair; sheath glabrous, callus emarginate; ligule rather long. *Bracts* of infl. truncate, glabrous. *Palea* 3-nerved between and on either side of the keels. *Lodicules* 3, rounded, fimbriate. *Grain* ovoid. *Anthers* striped red and yellow, then purple.

12. **B. Binghami**, *Gamble Bamb. Brit. Ind.* 45, t. 41; stems wiry, leaves linear or linear-lanceolate base rounded tip long twisted glabrous, panicle terminal short leafy, spikelets few in scattered fascicles about $\frac{1}{2}$ in. long, empty gls. 1–2 striate mucronate, flg. gls. 5–6 ovate acute mucronate smooth many-nerved, palea as long as the gl. or longer keels fringed with long hairs, anthers obtuse or with an apical hair, ovary elongate, style short.

LOWER BURMA; Tenasserim, *Bingham*.

Leaves 3–6 by $\frac{1}{4}$ – $\frac{3}{4}$ in., subsessile or petiole very short, smooth on both surfaces, nerves 5–6 pairs. *Panicle* with short rachis; joints sometimes geniculate clavate. *Spikelets* with distichous gls., rachilla evident broad clavate flexuous; palea conspicuous. *Lodicules* rounded, long-ciliate. *Grain* linear-oblong, beak hairy.—Appears not to differ very greatly from the Chinese *B. flexuosa*, *Munro*.

13. **B. Kingiana**, *Gamble Bamb. Brit. Ind.* 46, t. 42; leaves linear-lanceolate tessellate by pellucid glands base unequally rounded, petiole flat, sheath smooth, ligule broad toothed or fimbriate, spikelets $\frac{1}{2}$ in. few in regularly spaced clusters ovate flattened, empty gls. 2 ovate acute margins ciliate, fl. gls. 4-6 similar but larger, palea oblong keels long-ciliate, anthers penicillate, ovary stipitate broadly ovoid, style short stout.

UPPER BURMA; Katha district, *Oliver*.

Stems 60-70 ft., up to 4 in. diam. *Leaves* 10-12 by 1-2 $\frac{1}{2}$ in., tip scabrid, at first sparsely hairy beneath, nerves 10-15 pairs; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in.; sheath smooth, margins ciliate, callus broad shining, auricle small naked; ligule unequal-sided. *Panicle* large, compound, rachis of spiciform branchlets flexuous, joints flattened on one side, bracts small. *Spikelets* purplish, rachilla clavate flattened. *Lodicules* 3, long-fimbriate. *Stigmas* 3.—Habit of a *Dendrocalamus*. *Stem-sheaths* not known.

Sect. III. Shrubby, not spinous. *Spikelets* ovate, flattened, many-fl., long-mucronate. *Lodicules* 0.

14. **B. lineata**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 118; stems reed-like, leaves large stiff brittle ovate to linear-lanceolate, ligule short stiffly fimbriate, inf. of spikes or panicles terminating leafy branchlets and bearing bracteate clusters of often spirally twisted spikelets about $\frac{1}{2}$ in., bracts large, empty gls. 1-2 ovate long acuminate 5-7-nerved, flg. longer white-ciliate, palea narrow keels minutely ciliate, anther-tips penicillate, ovary oblong pubescent. *Gamble Bamb. Brit. Ind.* 46, t. 43. *B. Rumphiana. Kurz in Journ. As. Soc. Beng.* xxxix. (1870) 86, *Ind. Forester*, i. 341. *B. Amahussana*, *B. atra*, *B. picta*, *B. prava*, *Lindl. in Penny Cyclop.* iii. (1835) 357. *Leleba Rumphiana*, *Kurz in Cat. Hort. Bogor.* (1866) 20. *L. lineata*, *Rumph. Herb. Amb.* vi. 5, t. 1.

ANDAMAN ISLDS., *Prairie*, in marshy coast forests.—DISTRIB. Malay Archipelago.

Stems short, always flowering, $\frac{1}{2}$ -1 in. diam., green or striped with yellow, young much branched, sparsely bristly; nodes ringed by the bases of the fallen sheaths; internodes 16-24 in., rough. *Stem-sheaths* about 6 by 3-4 in., truncate, young strigose with golden hairs; blade usually as long as the sheath, ovate, cuspidate, erect, many-nerved, base rounded then dilating into a hairy long ciliate band on the sheath. *Leaves* very variable, up to 15 by 3 in. on the shoots, shorter on the branches, dull green, pale beneath, tessellate by pellucid glands, tips and margins scabrid, nerves 8-12; sheath hairy, keeled, truncate, callus minute or 0; auricles long, falcate, bristly, deciduous; ligule stiffly fimbriate. *Spikelets* sessile; bracts truncate; rachilla short, glabrous. *Stigmas* 3.—A very remarkable species with *Bromus*-like spikelets. *Kurz* enumerates 5 varieties in the "Indian Forester." (*B. atra* is its earliest name.—J. D. H.)

Sect. IV. Arborescent, not spinous. *Spikelets* cylindric, few-fl. *Lodicules* 0-3.

15. **B. schizostachyoides**, *Kurz ex Gamble Bamb. Brit. Ind.* 48, t. 44; leaves lanceolate to linear-lanceolate, sheath at first hispid truncate, callus 0, auricle falcate bearing long twisted stiff bristles, ligule long, panicle terminal spiciform, spikelets about $\frac{1}{2}$ in. few in bracteate clusters, empty gls. 1-2 ovate mucronate many-nerved, flg. gls. 2-3 longer rough above, palea narrow keels ciliate, anthers long-apiculate, ovary elliptic-oblong, style long. *Cephalostachyum schizostachyoides*, *Kurz For. Fl. Burm.* 565. *Melocanna*? *Kurzii*, *Munro in Trans. Linn. Soc.* xxvi. (1868) 134. *Teinostachyum schizostachyoides*, *Kurz in Journ. As. Soc. Beng.* xxxix. (1870) ii. 89.

SOUTH ANDAMAN ISLDS., Kurz.

Stems tufted, 20–30 ft. by 3–4 in. diam., green, glossy, nodes not thickened; internodes $1\frac{1}{2}$ –2 ft., walls thin; branches 1–4 from each node, leafy below, flowering above. *Leaves* 4–7 by $\frac{1}{2}$ – $1\frac{1}{4}$ in., tip twisted scabrous, glabrous and pale beneath, nerves 5–6. *Bracts* of infl., narrow, truncate or acuminate, smooth, rachis pubescent, joints about 1 in. *Palea* membranous, acuminate, dorsally 3-nerved. *Lodicules* if present lanceolate, ciliate. *Anthers* purple, cells unequal. *Ovary* narrowed into the style. *Grain* obliquely oblong, smooth, beak long stiff.—Stem-sheaths not known.

• Remarkable for the narrow membranous acuminate palea.

Sect. V. Subscandent, not spinous. *Spikelets* cylindric, fl. gl. solitary.

16. **B. Griffithiana**, Munro in *Trans. Linn. Soc.* xxvi. (1868) 99; leaves large lanceolate glaucous beneath base unequal cuneate tessellate by pellucid glands, sheath glabrous keeled callus narrow, auricles falcate reflexed strongly bristly, ligule elongate ciliate, spikelets about $\frac{1}{2}$ in. in distant heads on a hollow soft rachis ovate-lanceolate acute, empty gls. 2 ovate acute many-nerved, flg. gl. larger mucronate, palea membranous acute keels glabrous, anthers obtuse tip 2-fid, ovary ovoid glabrous. *Gamble Bamb. Brit. Ind.* 49, t. 45. *Dendrocalamus Griffithianus*, Kurz *For. Fl. Brit. Burm.* ii. 562.—*Bambusa*, *Griff. Journ.* 90.

UPPER BURMA; banks of Mogaung River, Griffith.

Stems soft, slender, hollow. *Leaves* 1– $1\frac{1}{2}$ by 2–3 in., tip subulate, twisted, scabrid, nerves 13–17, petiole $\frac{1}{2}$ in., stout; auricles of sheath up to $\frac{3}{4}$ in., bristles long; ligule obtuse or triangular, often cleft. *Panicle* terminal, of spiciform branches bearing heads at intervals of 1–4 in. *Spikelets* cylindric; flg. gl. convolute; rachilla glabrous, clavate, much shorter than its imperfect terminal gl.; palea many-nerved. *Lodicules* 3, long-fimbriate, one much smaller. *Style* very short, stigmas long, plumose.

17. **B. Wrayi**, Stapf in *Kew Bulletin*, 1893, 14, in *Hook. Ic. Pl.* t. 2253; stems decurved, leaves linear-lanceolate narrowly acuminate, auricles of sheath small, ligule short truncate bristles long, panicle large leafy, spikelets in short bracteate spikes, within each bract is a keeled bracteole, then 2 imperfect spikelets in the axils of lanceolate glabrous gls. each subtended by a 2-keeled ciliate scale, fertile spikelet with ovate-lanceolate acute many-nerved, gls. keels of palea rough or faintly-ciliate, anthers obtuse glabrous, ovary ovoid glabrous. *Gamble Bamb. Brit. Ind.* 50, t. 46.

MALAY PENINSULA; Perak, alt. 4500–5500 ft., Wray.

Stems 40–60 ft., 1 in. diam., semiscandent, tips decurved to the ground, yellow, glabrous, shining, 3rd or 4th lower internodes up to 7 ft. *Leaves* 8–10 by 1 in., glabrous, petiole short narrow, nerves 7–8; sheath pale, glabrous, callus shining; hairs of ligule up to $\frac{1}{2}$ in. *Panicle* large, leafy, clusters of spikelets at the nodes or in spiciform branches, rachis smooth. *Empty gl.* convolute, rachilla as long as its imperfect terminal gl. *Lodicules* narrow, minutely ciliate. *Ovary* narrowed into a very short style, stigmas long, plumose. *Grain* oblong, beak cylindric.

Sect. VI. Arborescent, spinous.

18. **B. Blumeana**, Schult. f. *Syst.* vii. 1343; stem-sheaths short, leaves fascicled linear-lanceolate sheath appressed hairy, ligule fimbriate, clusters of many imperfect and few perfect spikelets, perfect spikelets 1– $1\frac{1}{2}$ in. slender compressed, empty gls. 2–3 ovate acute 3–7-nerved, flg. gl. ovate acuminate 7–8-nerved, palea broad obtuse concave keels ciliate, anthers obtuse, ovary ovoid, style very short. *Kunth Enum.*

Pl. i. 431; *Munro in Trans. Linn. Soc.* xxvi. (1868) 101; *Kurz Ind. Forester*, i. 340; *Gamble Bamb. Brit. Ind.* 50, t. 47. *B. spinosa*, *Blume ex Nees in Bot. Zeit.* (1825) 580. *Ischurochloa spinosa*, *Büse in Miq. Pl. Jungh.* 389. *Schizostachyum Durie, Rupr. Bamb.* 46.

MALAY PENINSULA; Pahang, *Ridley*.—DISTRIB. Malay Islds.

Stems 30–60 ft. or more, 3–4 in. diam., hard, smooth, glossy, nodes not prominent, walls thick; branches many, yellowish, copiously armed; spines short ternate, recurved. *Stem-sheaths* 5–6 by 3–4 in. broad, narrowed to a broad convex mouth, thick, coriaceous, hispid with stiff tawny bristles, young striped violet-brown and yellow; blade nearly as broad as the sheath, triangular, cuspidate, convolute, sides covered with tawny bristles, decurrent as a broad band ending in a rounded auricle, both lined with long stiff bent bristles; ligule narrow, toothed, long-fimbriate. *Leaves* 3–6 by $\frac{1}{2}$ – $\frac{1}{2}$ in., glabrous, base rounded, tip twisted scabrous, glaucous beneath, nerves 5–7; sheath appressed hairy, callus recurved ciliate, mouth sparsely bristly; ligule truncate, fimbriate. *Panicle* large, terminal, branches spiciform. *Lodicules* 3, long-ciliate. *Grain* obovoid, shining above, tipped with the three stigmas.

19. ***B. arundinacea*, Willd. *Sp. Pl.* 245;** stem-sheaths long blade with felted hairs within, leaves linear or linear-lanceolate glabrous or slightly pubescent beneath, ligule short, spikelets $\frac{1}{2}$ –1 in. sessile lanceolate acute, empty gls. 0–2 ovate-lanceolate acute or mucronate many-nerved, fl. gls. 3–7 like the empty lower bisexual upper male with 2 or 3 uppermost imperfect, keels of palea ciliate, anthers yellow obtuse, ovary elliptic-oblong style short. *Retz. Obs.* v. 24 (*Bambos*); *Roxb. Cor. Pl.* i. 56, t. 79, *Fl. Ind.* ii. 191; *Poir. Encycl.* viii. 701; *Kunth Enum. Pl.* i. 431; *Rupr. Bamb.* 51, t. 13, f. 50; *Grah. Cat. Bomb. Pl.* 239; *Dalz. & Gibb. Bomb. Fl.* 299; *Munro in Trans. Linn. Soc.* xxvi. (1868) 103; *Brand. For. Fl.* 564; *Beddome Fl. Sylv.* t. ccxxi., *Forest. Man.* p. ccxxxi.; *Kurz For. Fl. Brit. Burm.* ii. 554; *Thw. Enum. Pl. Zeyl.* 375; *Trim. Cat. Ceyl. Pl.* 110; *Wall. Cat. n.* 5023 A; *Duthie Fodd. Grass. N. Ind.* 70; *Gamble Bamb. Brit. Ind.* 51, t. 48. *B. Arundo*, *Klein ex Nees in Linnæa*, ix. (1834) 471; *Rupr. Bamb.* 53, t. 13, f. 53; *Wight ex Steud. Nom. Ed.* II. i. 183. *B. Neesiana*, *Arn. ex Munro l. c.* *B. orientalis*, *Nees l. c.* 475; *Rupr. l. c.* 52, t. 13, f. 51; *Munro l. c.* 105; *Beddome l. c.* p. ccxxxi. *B. pungens*, *Blanco Fl. Filip. Ed.* I. 270. *B. spinosa*, *Roxb. Fl. Ind.* ii. 198; *Ham. in Trans. Linn. Soc.* xiii. (1822) 480; *Wall. Cat. n.* 5024; *Nees l. c.*; *Rupr. l. c.* 52, t. 12, f. 52, t. 13, f. 52; *Munro l. c.* 104; *Beddome l. c.*; *Brandis l. c.* 566; *Steud. Syn. Gram.* 329; *Benth. Fl. Hongk.* 434. *Arundo Bambos*, *Linn. Sp. Pl.* 81. 'Ily,' *Rheede Hort. Malab.* i. t. 16.

Throughout the Plains and low hills of INDIA and CEYLON, wild and cultivated. (Cultivated only in the lower Himalaya and in the valleys of the Ganges and Indus.)

Stems from a stont rootstock, 80–100 ft. and 6–7 in. diam., graceful and curving (or short and thickly branched), branched from the base; nodes prominent, lower with long horizontal shoots armed with 2–3 recurved spines; internodes up to 18 in., often subangular, the smaller flattened on one side, walls 1–2 in. thick. *Stem-sheaths* 12–15 by 9–12 in., coriaceous, young orange-yellow often striped green or red, top rounded, edges plaited, young thickly clothed with golden hairs; blade triangular, up to 4 in., acuminate, concave, glabrous without, matted within with dark bristles; margins involute, decurrent on the sheath, wavy, long and thickly ciliate, hardly auricled; ligule narrow, entire, or fringed with white hairs. *Leaves* up to 8 by 1 in., tip sharp stiff, base rounded ciliate, subtessellate by pellucid glands; sheath glabrous or nearly so, callus thick ciliate, auricle short. *Panicle* enormous, often occupying the whole stem; rachis usually stiff, shining, sometimes soft and angular. *Lodicules* 3, small, fimbriate. *Anthers* sometimes apiculate.—Flowers

gregariously and in small clumps. The following species of most authors are here united. The two first scarcely differ, the last seems more nearly a separate species and the remarkable rachis justifies its admission as a variety.—Further *B. arundinacea* shows two distinct varieties of habit, a tall handsome large stemmed one of the valleys of the Circars and hills of S. India (often cult. elsewhere); and an almost dwarf gregarious thick branched very thorny small-stemmed one 20 ft. high (probably Roxburgh's *B. spinosa*) which grows gregariously in the low hills and laterite downs of Orissa, Ganjam, Lower Bengal and Burma.

B. ARUNDINACEA; rachis of infl. very glabrous shining hard, spikelets few long 6–12-fld., rachilla evident hirsute, leaves smooth, sheath hairy.

B. SPINOSA, rachis striate hard not shining, spikelets many shorter 4–6-fld., rachilla obscure, leaves glabrous above hairy beneath, sheath hairy, then subglabrous.

B. ORIENTALIS; rachis glaucous green angled almost soft, spikelets membranous 5–8-fld., leaf-sheath hairy with white cilia, petiole hairy.

B. Species of which the flowers are unknown.

20. *B. auriculata*, Kurz in Journ. As. Soc. Beng. xxxix. (1870) 86; cœspitose, stem-sheaths strigose on the back, leaves lanceolate tessellate by pellucid glands, sheath smooth polished, auricle naked shining. Gamble *Bamb. Brit. Ind.* 55, t. 49. *Gigantochloa auriculata*, Kurz *For. Fl. Brit. Burm.* ii. 557.

ASSAM, SYLHET, CHITTAGONG & BURMA, Mann, Kurz, &c.

Evergreen. Stems 40–50 ft., 2–2½ in. diam., glossy, old yellow, young scurfy, branches decurved, nodes hardly thickened; internodes 18–30 in., lower shorter, walls thick. Stem-sheaths 10–12 in. by 9–10 in., base broad, convexly truncate where 4 in. broad; blade 6–9 in., triangular, acute, base slightly rounded decurrent and forming a rounded auricle; blade and sheath densely strigose except along the middle; ligule sharply toothed. Leaves 8–16 by 1–2½ in., petiole 1½–½ in., point twisted scabrid, nerves 8–12, shining; callus of sheath smooth; auricle thick, rounded, glossy.—Referred by Munro to *B. vulgaris*, but very distinct, and easily recognizable by the two hairy patches on the stem-sheath, and the thin blade.

21. *B. villosula*, Kurz *For. Fl. Brit. Burm.* ii. 553; stems solitary, stem-sheaths glabrous truncate ciliate blade 0, leaves linear glaucous beneath tessellate by pellucid glands, callus of sheath shining, auricle solitary long-fringed. Gamble *Bamb. Brit. Ind.* 56.

MARTABAN & UPPER TENASSERIM, on limestone hills, Brandis.

Stems about 3 in. diam., nodes hardly raised, internodes 12–15 in. Leaves 5–8 by ½–¾ in., tip cuspidate setaceous twisted scabrid, nerves 6–12 inconspicuous; sheath minutely villous, then glabrescent, margins whitish-ciliate; ligule short.

22. *B. Mastersii*, Munro in Trans. Linn. Soc. xxvi. (1868) 113; stem scandent reed-like, leaves oblong-lanceolate narrowed into a glandular (wrinkled?) often hairy petiole tessellate by oblique pellucid glands, tip beaked acuminate hairy, callus of sheath narrow, auricles with long stiff folded bristles. Gamble *Bamb. Brit. Ind.* 56.

ASSAM; at Dibrugarh, Masters.

Leaves 10–13 by about 1½ in., base yellowish, glaucous beneath, costa yellowish shining, nerves 10–12 pairs; sheath striate, margins ciliate, sides appressed-bristly; ligule very short.

23. *B. marginata*, Munro in Trans. Linn. Soc. xxvi. (1868) 114; stems tall scandent dark-colrd. fistular, branches deflexed, branchlets bracteate geniculate, lower internodes hirsute, leaves oblong-lanceolate margins towards the setaceous acuminate tip shaggy with thick silky

hairs, callus ciliate, ligule truncate toothed hairy outside. *Gamble Bamb. Brit. Ind.* 57.

TENASSERIM; top of Daunat range, alt. 5000 ft., *Brandis*.

Leaves 6-7 by 1-1½ in., glabrous, base rounded, petiole $\frac{1}{10}$ - $\frac{1}{3}$ in., costa yellowish, nerves 4-7 pairs, pellucid glands few; sheath striate, keeled, glabrous.—Perhaps a *Dinochloa*.

UNDETERMINABLE SPECIES.

B. ARISTATA, *Lodd. ex Lindl. in Penny Cyclop.* iii. 357.

135. **THYRSOSTACHYS**, *Gamble*.

Arborescent erect bamboos. *Stem-sheaths* elongate, thin, persistent; blade long, narrow. *Leaves* small or moderate sized. *Panicle* compound. *Spikelets* prominently bracteate, loose, pale, 2-3-fl., upper gl. fertile, terminal rudimentary on a produced rachilla; empty gls. 1-2, striate; fig. similar; palea of lower gl. 2-cleft, lobes caudiform, keels ciliate, of upper entire, elongate, not keeled; rachilla hairy. *Lodicules* 0-3, long-acuminate. *Stamens* 6, anthers mucronate. *Ovary* depressed-turbinate, style long, stigmas 2-3 feathery. *Grain* cylindric, long-beaked, glabrous, top shining, side grooved; pericarp crustaceous, adherent to the seed.

1. **T. Oliveri**, *Gamble Bamb. Brit. Ind.* 58, t. 50; stem-sheaths transversely truncate not auricled blade, long subulate, leaves long linear-lanceolate, panicle thyrsoid curved, spikelets $\frac{1}{2}$ -1 in., empty gls. 2 ovate acute sparsely hairy many-nerved, nerves trabeculate, fig. gls. similar, palea 3-5-nerved hairy between the keels.

UPPER BURMA, alt. 2000 ft., in moist forests, *Oliver*; Shan Hills, *Abdul Huk*.

Cæspitose. *Stems* straight from a stout rootstock, 50-80 ft. by 1-2½ in. diam., bright green, young silkily-downy old dull green or yellowish, nodes thickened; internodes 16-24 in., walls rather thin. *Stem-sheaths* persistent, shorter than the internodes, green to orange and brown, dorsally thickly pubescent, margins ciliate, not auricled; blade 8-9 by $\frac{3}{4}$ in., recurved, hairy above; ligule serrate. *Leaves* 7-8 by $\frac{1}{2}$ - $\frac{3}{4}$ in., roughish, base rounded, hairy beneath, nerves 6 pairs, pellucid glands irregular; sheath hairy, keeled; callus glabrous or hairy. *Thyrus* bracteate at the nodes; rachis flexuous, hairy, top swollen; bracts $\frac{1}{2}$ - $\frac{2}{3}$ in., narrow, obtuse, sometimes foliiferous. *Spikelets* long and short, rachilla hairy. *Lodicules* 2, lanceolate, ciliate. *Filaments* purple, anthers yellow, connective obtuse. *Ovary* depressed turbinate, pedicelled, yellow, stigmas 3.

2. **T. siamensis**, *Gamble Bamb. Brit. Ind.* 59, t. 51; deciduous, stem-sheaths waved and truncate at top, auricles short triangular, blade narrowly triangular, leaves small narrow linear, panicle large, spikelets pedicelled fertile and sterile mixed, empty gl. solitary ovate acute 8-nerved base white-pubescent, fig. gls. 3 larger uppermost alone fruiting base and tip pubescent 14-16-nerved. *Bambusa regia*, *Thoms. ex Munro in Trans. Linn. Soc.* xxvi. (1868) 116 (non Kurz). B. siamensis, *Kurz mss.*

BURMA, from Mandalay to Tenasserim, *Brandis*, *Oliver*.—DISTRIB. Siam.

Stems cæspitose, very graceful, 25-30 ft., 1½-3 in. diam., branching towards the top only, branches after flowering often producing small-leaved tufts of wiry branchlets; nodes not prominent; internodes 8-11 in., with a white ring below the nodes. *Stem-sheaths* very persistent, 9-11 by 4½-8 in., thin, soft, white-pubescent; blade

4-5 in., margins recurved; ligule narrow, glabrous, ciliate. *Leaves* 3-6 by $\frac{1}{3}$ - $\frac{1}{2}$ in., glabrous or young puberulous, tips short twisted, costa narrow, nerves 3-5 pairs; sheath white pubescent and ciliate, truncate, callus glabrous; ligule short, ciliate. *Panicle* graceful, pale; branchlets many, thin, bearing bracteate clusters of few fertile spikelets mixed with sterile; bracts cymbiform, glabrous, tip truncate; rachis fine, wiry, curved, smooth, clavate. *Spikelets* whitish. *Palea* of upper fl. gl. longer than the gl., not keeled, concave, striate, glabrous, 2-mucronate, narrowed into a beak. *Lodicules* 0. *Ovary* at first ovoid, then depressed, flattened; style glabrous.

136. **GIGANTOCHLOA**, Kurz.

Arborescent or scandent. *Stems* unbranched below. *Stem-sheaths* usually stiff, hairy above, auricled. *Leaves* long. *Panicle* compound, branches long spiciform, bearing heads of few usually fertile and sterile spikelets. *Empty gls.* 2-3; fl. gls. similar. *Palea* of all the fl. 2-keeled, keels ciliate. *Lodicules* 1-3 or 0. *Stamens* 6, filaments connate into a short thick at length elongate membranous tube. *Ovary* hairy, stigmas 1-3 hairy. *Grain* usually oblong or linear and furrowed, pericarp membranous. Species about 11, chiefly Malayan.

* Spikelets oblong or ovoid, rounded, or flattened in *G. Scortechinii*.

1. ***G. verticillata***, Munro in *Trans. Linn. Soc.* xxvi. (1868) 124; spikelets 2-4-fld. $\frac{3}{10}$ - $\frac{4}{10}$ in. ovate subacute glabrous, empty gls. 2-3 broadly ovate ciliolate, flg. gls. 3-4 similar many-nerved mucronate. *Gamble Bamb. Brit. Ind.* 61, t. 52. *G. maxima*, Kurz in *Tidschr. Ned. Ind.* xxvii. (1864) 226, *Ind. Forester*, i. 343. *Bambusa verticillata*, Willd. *Sp. Pl.* ii. 245. *B. pseudarundinacea*, Steud. *Syn. Gram.* 330.

MALAY PENINSULA, wild and cultivated:—DISTRIB. Malay Archipelago.

Stems tufted, 80-100 ft., 4-5 in. diam., young striped yellow, mealy and with appressed brown deciduous bristles; old gray-green; nodes hairy, not prominent; internodes 18 in., walls rather thin. *Stem-sheaths* 12 in. long, as broad or broader, rounded to the mouth with rounded ciliate auricles, clothed without with golden brown hairs, glabrous and shining within; blade short, recurved, ovate, acuminate, narrowly decurrent; ligule narrow. *Leaves* 10-15 by $1\frac{1}{4}$ - $2\frac{1}{2}$, base narrowed, top setaceous twisted scabrid, young hairy beneath, nerves 8-12; sheath truncate, young hairy, callus narrow, auricle short glabrous; ligule minute. *Rachis* and branchlets glabrous, smooth, slender. *Palea* of flg. gl. shorter than the gl. sometimes 2-mucronate, 3-5-nerved, ciliate on and between the keels. *Lodicules* variable. *Anthers* yellow. *Ovary* suborbicular, very hairy; style pubescent, stigmas 2-3.

2. ***G. Scortechinii***, *Gamble Bamb. Brit. Ind.* 62, t. 53; spikelets trimorphous larger fertile, medium rigid, small sterile, fertile spikelet $\frac{7}{10}$ - $\frac{9}{10}$ in. ovate acute flattened densely clothed with silvery grey hairs, empty gls. 2-3 ovate mucronate, fl. gls. longer.

MALAY PENINSULA, *Scortechinii*, &c., alt. 400-600 ft.

Gregarious, forming forests. *Stems* 40-80 ft., 4-6 in. diam. *Leaves* linear-lanceolate, 12-16 by $1-1\frac{1}{2}$ in., often unequal sided, base narrowed, tip acuminate twisted scabrid, softly hairy beneath, tessellate by pellucid glands; sheath densely pubescent, callus pubescent; auricle small, rounded, fringed with bristles; ligule short, hairy. *Panicle* compound, of curved spiciform branchlets bearing whorls of distichous heads 1-2 in. apart. *Spikelets* 2-5 fertile in each head mixed with sterile, rachis pubescent; uppermost flg. gl. convolute; palea shorter than the gl., 6-nerved

between the 2 ciliate keels, top 2-fid. *Lodicules* 0. *Anthers* yellow, long-apiculate. *Ovary* rounded, style glabrous. *Grain* obtuse, glabrous.

** Spikelets narrow, cylindric, acute.

† *Leaf-ligule* short.

3. **G. macrostachya**, *Kurz Flor. Fl. Burm.* ii. 557; nodes hairy, leaves lanceolate whitish and softly puberulous beneath, spikelets 1-2 in. linear-subulate, gls. fringed with black hairs, empty gls. 2-3 ovate mucronate dorsally many-nerved with a few bristles, fig. gls. 2-3 longer linear-lanceolate convolute, palea very narrow keels white-ciliate dorsally 3-5-nerved. *Gamble Bamb. Brit. Ind.* 63, t. 54.

ASSAM; Garrow Hills, *Mann.* CHITTAGONG, ARRACAN, & BURMA, *Kurz, &c.*

Evergreen. *Stems* 30-50 ft., $2\frac{1}{2}$ -4 in. diam., fistular, young glaucous, old dark green, sometimes striped; nodes scarcely thickened; internodes 16-30 in., lower shorter, walls $\frac{2}{10}$ - $\frac{3}{10}$ in. thick. *Stem-sheaths* 5-8 in. long, up to 14 broad, top truncate, densely covered with blackish hairs; blade as long or shorter, reniform, acute, appressed hairy beneath, base rounded dilated into a long-fringed band $\frac{1}{2}$ -1 in. broad with rounded auricles; ligule narrow. *Leaves* thin, lanceolate, 6-15 by $\frac{1}{2}$ -2 in., tip setaceous scabrid, margins scabrous, midrib narrow, nerves 5-13; sheath hairy, at length glabrous; callus rounded, auricles 1 or 2 ciliate; ligule short. *Panicle* large, leafy, branchlets spicate; spikelets 1-2 in., clustered, fertile and sterile. *Lodicules* 0. *Anthers* purple, tips setaceous. *Ovary* ellipsoid, style long curved hairy, stigma undivided. *Grain* linear, puberulous above.—The leaves resemble *Bamb. Tulda*; the sheaths *B. nutans* and *teres*; the spikelets *Oxytenanthera nigro-ciliata*.

4. **G. Wrayi**, *Gamble Bamb. Brit. Ind.* 64, t. 55; branchlets scurfy glaucous, leaves large oblong-lanceolate cuspidate shortly petioled strigose beneath, spikelets $\frac{3}{4}$ in. conical acute, gls. fringed with black hairs, empty gls. 2-3 ovate mucronate striate, fig. gls. 3-4 longer narrower, palea narrowly oblanceolate keels faintly ciliate 5-7-nerved.

MALAYA; Perak, at Bukit Gantang, *L. Wray*.

Stems 3 in. diam. *Leaves* 12-15 by 2-2 $\frac{1}{2}$ in., tip setaceous, scabrous, midrib broad yellow, nerves 10-12 pairs, nervules of pellucid glands; sheath smooth, keeled, mouth and short auricle fringed with long stiff white bristles, callus narrow; ligule short, puberulous. *Panicle* compound, branchlets spiciform, fertile spikelets few, sterile shortly bracteate, rachis curved. *Spikelets* subcompressed; empty gls. 2-3, fig. gls. narrower. *Lodicules* 0. *Anthers* long, narrow, tips elongate setaceous hairy. *Ovary* hairy, style slender pubescent, stigma broadly plumose.

5. **G. Kurzii**, *Gamble Bamb. Brit. Ind.* 65, t. 56; leaves linear-lanceolate base cuneate petioled sparsely hairy beneath, spikelets $\frac{1}{2}$ in. acute, gls. fringed with brown hairs, empty gls. 2-3 ovate mucronate many-nerved, fig. gls. 2-3 longer narrower terminal imperfect, palea linear obtuse 3-5-nerved keels ciliate.

TENASSERIM, *Kurz.* PERAK, *Ridley*.

Stem-sheaths 6 by 3 in., cylindric, truncate, glabrous; blade longer, recurved, lanceolate, decurrent in a narrow black band lining the top of the sheath, ending in a naked round auricle. *Leaves* 8-13 by $\frac{1}{4}$ -1 $\frac{1}{2}$ in., petiole $\frac{1}{8}$ in., midrib narrow, nerves 9-11 pairs; young sheath appressed hairy, truncate, auricles rounded; ligule short. *Panicle* leafy, branchlets spicate. *Spikelets* 2-3 in. in heads with narrow bracts. *Anthers* obtuse, apiculate. *Ovary* stipitate, puberulous, style long, stigma plumose. *Grain* (young) glabrous.

†† *Leaf-ligule* long.

6. **G. heterostachya**, *Munro in Trans. Linn. Soc. xxvi.* (1868) 125; subscandent, leaves linear-lanceolate base rounded shortly petioled tip setaceous twisted scabrous sparsely hairy on the midrib beneath, spikelets dimorphic sterile $\frac{1}{2}$ – $\frac{3}{4}$ in., flg. 1– $1\frac{1}{2}$ in. oblong compressed, empty gls. 1–3 ovate glabrous, flg. gls. 4–5 with 1–2 imperfect convolute. palea short obtuse 4–8-nerved keels ciliate. *Kurz Ind. Forester, i.* 345: *Gamble Bamb. Brit. Ind.* 66, t. 57. *Bambusa hetirostachya*, *Munro in Herb. Trin. Coll. Dublin, fide Munro l. c.* 126.

MALAY PENINSULA; near Ayer Punas, about houses, *Griffith*.

Stems 30 ft., graceful, thin-walled. *Leaves* 4–11 by $\frac{1}{2}$ –1 in., midrib narrow shining, nerves 6–8; sheath striate, auricle and callus rounded glabrous; ligule long, toothed, sometimes long-ciliate. *Panicle* large, leafy, branches spiciform, heads of spikelets $\frac{1}{2}$ – $\frac{1}{4}$ in. apart, in the axils of chaffy glabrous bracts, rachis smooth, upper joints puberulous; flg. spikelets sometimes solitary, empty gls. with sometimes an imperfect fl. *Lodicules* 2 (or 3?) ovate or oblong, long-fimbriate. *Anthers* nearly $\frac{1}{2}$ in., tip apiculate penicillate. *Ovary* ellipsoid, very hairy; style often curved, hairy; stigmas 2–3, plumose.

7. **G. ligulata**, *Gamble Bamb. Brit. Ind.* 67, t. 58; leaves large oblong-lanceolate base wrinkled unequal narrowed into a flat petiole, tip acuminate with reflexed margins scabrous, ligule long 2-fid, spikelets $\frac{1}{2}$ – $\frac{3}{4}$ in., conical acuminate, gls. ciliate with brown hairs, empty gls. 2–4 ovate acute mucronate many-nerved, flg. gls. longer, palea short 5-nerved keels long-ciliate.

MALAY PENINSULA; Perak, *Wray*; Pahang, *Ridley*.

Leaves 12–16 by 2–3 in., beneath pale and smooth except the scabrid tip, midrib broad yellow beneath, nerves 12–14 pairs, cross-nervules of pellucid glands; sheaths smooth, shining, brown, striate; callus rounded, shining, often ciliate; ligule up to 1 in., glabrous, lobes long-acuminate, membranous. *Panicle* terminal, long, of spiciform branchlets bearing distant heads on leafy branches, each with 5–8 fertile spikelets in the axils of long yellow glabrous bracts $\frac{1}{2}$ – $1\frac{1}{2}$ in. long, mouth of bracts truncate, furnished with round dark naked auricles and long fimbriate ligules, rachis fistular, glaucous, lower joints 3 in. *Lodicules* 0. *Anthers* long-apiculate, tip hairy. *Ovary* long-stipitate, depressed ovoid, shining, hairy, style slender, stigma short plumose.

8. **G. latispiculata**, *Gamble Bamb. Brit. Ind.* 67, t. 59; leaves broadly lanceolate petioled base cuneate glabrous except the scabrid tips, ligule broad cleft, spikelets over 1 in., nearly glabrous, empty gls. 2–3, lower foliiferous ovate-lanceolate mucronate, fl. gls. 7–9 ovate-lanceolate long-acuminate hairy within margins faintly ciliate, palea shorter obtuse 7-nerved keels ciliate.

MALACCA, *Alwis*.

Stems 50 ft. *Leaves* 12–14 by 1– $1\frac{1}{4}$ in., pale, midrib prominent shining, nerves 8–9 pairs obscure; sheath smooth, glabrous, keeled, callus narrow. *Panicle* terminal, of spiciform branchlets bearing distinct heads 1–3 in. apart, of 1–4 very large flattened spikelets $\frac{1}{4}$ – $\frac{1}{2}$ in. broad, rachis smooth striate; bracts very small. *Lodicules* small, obovate, 3–5-nerved, fimbriate. *Anthers* narrow, tips apiculate, penicillate. *Ovary* narrowly ovoid, pubescent, style slender, stigmas 3 plumose.

137. **OXYTENANTHERA**, *Munro*.

Arborescent or scandent unarmed Bamboos, with a stout usually creeping and stoloniferous rootstock. *Stem-sheaths* various. *Leaves* large or small, shortly petioled. *Panicle* large, branches with few or many heads of whorled or capitate spikelets. *Spikelets* elongate, cylindric or

conical, 1-3-fl'd., terminal fl. usually fertile; empty gls. 1-3; fl. gls. elongate, mucronate. *Palea* of lower fls. 2-keeled, of uppermost convolute keel 0 or obscure. *Lodicules* 0. *Stamens* as in *Gigantochloa*. *Ovary* ovoid, style slender, stigmas 1-3 more or less plumose. *Grain* elongate, beaked, smooth.—Species the following and a tropical African.

* *Heads usually of few spikelets.* (Burmese and Malay species.)

1. **O. nigrociliata**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 228; auricles of stem-sheaths naked, spikelets 1 in., gls. fringed with black or purple cilia many-nerved, empty gls. 2-3 ovate acute and mucronate, flg. gls. 2-3 and a terminal imperfect lanceolate acuminate long mucronate, palea narrow 2-3-nerved between the ciliate keels, anther tips elongate slender hirsute. *Beddome Fl. Sylvat., Forest. Man.* p. cccxxiii.; *Gamble Bamb. Brit. Ind.* 69, t. 60. *Bambusa nigrociliata*, *Büse in Pl. Jungh.* i. 389; *Miquel Fl. Ind. Bat.* iii. 416. *B. Bitung, Hassk. Pl. Jav. Rar.* 42. *B. gracilis*, *Wall. Cat. n.* 5033. *Gigantochloa nigro-ciliata*, *Kurz Ind. Forest.* i. 345. *G. andamanica*, *Kurz For. Fl. Burma*, ii. 566.

ORISSA, CHITTAGONG, BURMA, the MALAY PENINSULA, and the ANDAMAN ISLS. ? GARROW HILLS.—DISTRIB. Sumatra, Java.

Stem 30-40 ft. by $\frac{1}{2}$ -2 in. diam., sometimes striped with yellow, internodes scabrous. *Stem-sheaths* about 6 in., margins ciliate, narrowed to the truncate tip, dorsally strigose; blade ovate-lanceolate, decurrent; auricle bright green, rounded, naked, hairy within; ligule narrow. *Leaves* 6-12 by 1-2 in., lanceolate, tip subulate twisted, base unequal and rounded or narrowed, scabrous above, pale and at first pubescent beneath, midrib prominent, nerves 9-12, glands like nervules; sheath stiff, hairy at first only, margins ciliate, auricles rounded naked; ligule narrow. *Panicle* large, compressed; rachis of branches pubescent. *Spikelets* in distant whorls of 3-6. *Anthers* $\frac{1}{4}$ - $\frac{1}{2}$ in., narrow, purple. *Ovary* pubescent. *Grain* linear-oblong, dorsally grooved, beak penicillate.

2. **O. albo-ciliata**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 129; spikelets $\frac{6}{10}$ - $\frac{8}{10}$ in., often curved mixed with yellow chaffy white-ciliate bracts fertile and a few sterile together, gls. white-ciliate, empty gls. 1-2 ovate acute, flg. gls. elliptic acute or faintly notched many-nerved convolute 2-3 lowest male, upper 1 or 2 bisexual, anthers with long hirsute tips. *Gamble Bamb. Brit. Ind.* 70, t. 61. *Gigantochloa albo-ciliata*, *Kurz For. Fl. Burma*, ii. 555.

Throughout BURMA, *Falconer, &c.*

Stems 20-30 ft. by $\frac{1}{2}$ -1 in. diam., densely tufted, greyish-green, curved, nodes raised; internodes 6-15 in., hispid above, walls $\frac{1}{2}$ - $\frac{3}{4}$ in. thick. *Stem-sheaths* 4-8 by 6 in., tawny strigose, then glabrous, base coriaceous folded, mouth narrow ending in a slightly auricled naked band; blade lanceolate, base rounded and decurrent; ligule $\frac{1}{2}$ -1 in., toothed. *Leaves* 6-8 by $\frac{3}{4}$ -1 in., linear-lanceolate, tip setaceous, base rounded, shortly petioled, glabrous on both surfaces, nerves 6-8, pellucid glands like nervules; sheath smooth, striate, truncate, callus smooth; ligule rather long. *Panicle* large, spreading; branches smooth, slender, with distant whorls of 10-20 spikelets. *Ovary* acuminate, pubescent. *Grain* oblong, acuminate.

3. **O. sinuata**, *Gamble Bamb. Brit. Ind.* 71, t. 62; leaves large softly pubescent beneath, panicle-branches softly tomentose, spikelets sterile and fertile mixed, $\frac{2}{10}$ - $\frac{3}{10}$ in. in small heads conical puberulous, gls. ciliate many-nerved, empty gls. 2-3 ovate mucronate, fl. gls. 2-3 longer fertile uppermost convolute, lower paleæ 2-3-nerved between the ciliate keels, tip of narrow anthers slender hairy.

MALAYA; Sunjei Ulong. **JOHORE**, *Ridley* (var. with glabrous spikelets).

Leaves 10–12 by $1\frac{1}{4}$ – $1\frac{1}{2}$ in., oblong-lanceolate, acuminate, base rounded or subcordate, petiole broad hairy, tip setaceous scabrid twisted scaberulous above, midrib faint, nerves 10–12 pair; sheath glabrous or puberulous, keeled, striate, ending in a narrow ciliate callus; ligule rather short, thickly pubescent. *Panicle* with slender sinuous branches, internodes $\frac{1}{2}$ – $1\frac{1}{2}$ in. *Ovary* broadly ovoid, style hairy, stigma plumose.

4. ***O. parvifolia***, *Brandis ex Gamble Bamb. Brit. Ind.* 72, t. 63; leaves 3–5 by $\frac{1}{2}$ in. linear-lanceolate puberulous beneath, spikelets narrow $\frac{2}{3}$ – $\frac{3}{4}$ in. 4–10 in a whorl with polished bracts, rachis slender wiry, gls. eciliate fertile and sterile mixed, empty gls. 2–3 ovate mucronate glabrous, fl. gls. similar but longer usually 2 fertile and 1 imperfect, palea 2–3-nerved between the shortly ciliate keels, anthers short obtuse.

BURMA; in the Yónzalin Valley, *Brandis*.

Stems up to 3 in. diam. *Stem-sheaths* 8–9 by 8–10 in., strigose with brown hairs, top truncate striate; blade 2–3 by 1 in., base rounded and decurrent in a narrow naked subauricled band; ligule long, rather broad. *Leaves* shortly petioled, base rounded, tip subulate twisted, pale and puberulous beneath; sheath at first hairy, ending in a prominent callus bristly at the top. *Panicle* of long glabrous branches, with internodes 1–2 in. *Spikelets* glabrous; empty gls. striate towards the tip. *Ovary* hairy, style long slender, stigmas 1–2 plumose.

** *Heads of many spikelets*.—South Indian species.

5. ***O. Thwaitesii***, *Munro in Trans. Linn. Soc.* xxvi. (1868) 129; stem reed-like straggling, leaves up to 8–12 by $1\frac{1}{2}$ in., spikelets $\frac{1}{4}$ – $\frac{1}{2}$ in. in dense heads with ovate bracts acute pale usually 1-fl., rachis smooth, gls. with more or less ciliate margins, empty gls. 2–3 ovate mucronate many-nerved, flg. gl. ovate acute cuspidate pubescent above, palea convolute, anther-tips long hairy, stigmas 3. *Beddome Fl. Sylv.* t. cccxxii.; *Forest. Man.* p. cccxxii.; *Trim. Cat. Ceyl. Pl.* 110; *Gamble Bamb. Brit. Ind.* 73, t. 64. *Dendrocalamus monadelphus*, *Thwaites Enum. Pl. Ceyl.* 376.

NILGHIRI and TRAVANCORE HILLS, alt. 3500–6000 ft. **CEYLON**, alt. 4–6000 ft.

Stems 10–12 ft. by 1 in. diam., gregarious, straggling or subscandent, smooth; branches whip-like, branchlets whorled and sheathed, nodes prominent, internodes 12–18 in. rough, young hirsute, walls $\frac{1}{10}$ – $\frac{2}{10}$ in. thick. *Stem-sheaths* about 6 by 3–4 in., of young shoots glabrous yellow shining, of old strigose with light brown hairs, ending in a coriaceous separable ciliate ring; blade 3–5 by 1 in., base rounded decurrent in rounded falcate auricles, pectinately ciliate with long curved bristles; ligule of old sheaths long-fimbriate, of young narrow erose. *Leaves* with twisted setaceous tips, sparsely hairy beneath, midrib narrow yellow, nerves 4–5 pairs, pellucid glands few; sheath often hirsute keeled, callus rounded, young with falcate bristly auricles; ligule long. *Panicle* very large, leafy; lower heads $1\frac{1}{2}$ –2 in. diam., upper smaller with fewer spikelets. *Ovary* ovoid and style pubescent. *Grain* $\frac{1}{2}$ – $\frac{3}{4}$ in., glabrous, mucronate.—Easily recognized by the whip-like climbing branches and long-ciliate sheaths.

6. ***O. monostigma***, *Beddome Fl. Sylv. Forest. Man.* p. cccxxiii., and *Id. Pl. Ind. Or.* i. 56, t. 234; stem solid velvety-tomentose pale yellow, leaves 6–8 by $1\frac{1}{2}$ in. linear-lanceolate, spikelets $\frac{3}{4}$ –1 in. in globose heads fertile and sterile spinescent, glabrous, empty gls. mucronate 2–3 lower small ovate, upper ovate-lanceolate, flg. long linear-lanceolate long-mucronate convolute, palea concave not keeled obtuse, anthers tipped with a long hairy bristle, stigma 1. *Gamble Bamb. Brit. Ind.* 74, t. 65. *Bambusa Ritcheyi*,

Munro in Trans. Linn. Soc. xxvi. (1868) 113. *Schizostachyum hindostanicum*, *Kurz in Journ. Beng. As. Soc.* xlii. (1873) II. 252

WESTERN GHATS, from the Concan to the Anamalai Hills.

Stems 10–15 ft. or more by 1 in. diam., internodes long. *Stem-sheaths* 6–9 by 3 in. broad at the base, narrowed from the base up to the 2-lobed tip; blade in the sinus, 3 in., linear-lanceolate; ligule long, fimbriate. *Leaves* variable, shortly petioled, pale green, tip setaceous twisted, base unequal rounded, sparsely hairy beneath, midrib beneath yellow shining, nerves 7–12; sheaths striate; ligule long. *Panicle* large, terminal, rachis smooth, heads of spikelets up to 2½ in. diam. *Ovary* ovoid, acuminate and style glabrous, stigma thickened. *Grain* narrow, tipped with the conic style-base.

7. *O. Stocksii*, *Munro in Trans. Linn. Soc.* xxvi. (1868) 130; stems glabrous or softly pubescent, leaves 4–8 by ½–¾ in., spikelets ½ in. in globose heads spinescent glabrous fertile and sterile, empty gls. 2 ovate mucronate 5–7-nerved, fl. gls. 2 ovate subacute dorsally mucronate, anthers short acute, stigma 1. *Beddome Fl. Sylvat., Forest. Man.* p. ccxxxiii.; *Gamble Bamb. Brit. Ind.* 75, t. 66.

The CONCAN, *Stocks*, &c. (usually cultivated).

Stems slender, grey-green, solid, or tube slender, nodes with a softly pubescent ring; internodes 6–12 in. *Stem-sheaths* 6–9 in. by 3–7 at the base, tapering upwards to a retuse tip, densely brown, strigose, margins ciliate; blade subulate, base dilated into a rounded fringed auricle; ligule ½ in., deeply fimbriate. *Leaves* very shortly petioled, tip setaceous, base rounded or cuneate, beneath glabrous or hairy, midrib narrow, nerves 5–6; sheath striate; ligule rather long, toothed. *Panicle* large; heads 1 in. diam., mixed with chaffy bracts, rachis smooth, internodes 1–2 in. *Anthers* short, acute. *Ovary* and long style hairy, stigma simple, plumose.

8. *O. Bourdillonii*, *Gamble Bamb. Brit. Ind.* 76, t. 67; stem-sheaths coriaceous nearly glabrous, leaves 6–9 by 1–1½ in., mouth of leaf-sheath with 2 shining calli, spikelets ¾–1 in. in globose heads glabrous, rachis soft, empty gls. 2 ovate mucronate many-nerved, fl. gls. 3, mucronate lowest much longer than the next, rachilla ciliate and bearing a setaceous gl., anthers apiculate, stigmas 3, short.

TRAVANCORE; on the Ghats, alt. 3–4000 ft., *Bourdillon*.

Stem in open clumps of straggling habit, soft, internodes long. *Stem-sheaths* 6–12 by often 6 in., glabrous, except a few black bristles below, slightly narrowed upwards, tip truncate; blade 2–3 in., triangular, decurrent and forming two rounded recurved entire wings that line the upper edge of the sheath; ligule short. *Leaves* shortly petioled, thin, tip twisted, scabrous covered above with scabrid papillæ near the margins and midrib, smooth beneath; midrib narrow, nerves 7–8; sheath soft, striate; ligule long, serrate. *Panicle* large spikelets in globose heads 1½–2 in. diam., rachis fistular. *Palea* of lower fls. 3-nerved between the ciliate keels, rachilla ciliate with a terminal imperfect gl. *Ovary* and style hairy. *Grain* linear-oblong, tipped with the thickened style-base.

138. **DENDROCALAMUS**, *Nees*.

Arborescent unarmed Bamboos, with densely branching rootstocks. *Leaves* shortly petioled, transverse nervules represented by pellucid glands. *Spikelets* in globose clusters on the long branches of a compound panicle, ovate, 2–6-flid.; empty gls. 2–3, ovate, acute, many-nerved; flg. gls. like the empty; palea of lower fls. keeled, of upper dorsally rounded eciliate. *Lodicules* 0 or rare. *Stamens* 6, filaments free. *Ovary* hairy above, often

depressed, stigma usually simple. *Grain* small, pericarp coriaceous or crustaceous.—Species 16 known.

Sect. I. *Spikelets* hard, spinescent, crowded in spicate heads.—Leaves usually narrow.

1. **D. strictus**, *Nees in Linnæa*, ix. (1834) 476; leaves up to 10 by $1\frac{1}{4}$ in., shortly suddenly petioled softly hairy beneath, spikelets $\frac{1}{4}$ – $\frac{1}{2}$ in. hairy spinescent fertile and smaller sterile mixed, empty gls. 2 or more ovate spinescent many-nerved, flg. gls. ovate tip spinescent and pubescent, palea of lower 6–7-nerved between the ciliate keels, anthers apiculate. *Miq. Fl. Ind. Bat.* iii. 421; *Munro in Trans. Linn. Soc.* xxvi. (1868) 147; *Beddome Fl. Sylvat.* t. cccxxv., *Forest. Man.* p. cccxxv.; *Brandis For. Fl.* 569, t. 70; *Kurz For. Flor. Burma*, ii. 558, *Ind. Forester*, i. 346; *Aitchis. Cat. Panjab. Pl.* 171; *Duthie Fodd. Grass. N. Ind.* 71; *Gamble Bamb. Brit. Ind.* 78, t. 68, 69. *Bambos stricta*, *Roxb. Corom. Pl.* i. 58, t. 80. *Bambusa stricta*, *Roxb. Fl. Ind.* ii. 193; *Kunth in Journ. Phys.* xlv. (1822) 148; *Enum. Pl.* i. 431; *Ruprecht Bamb.* 56, t. 12, f. 56; *Steud. Syn. Gram.* 330; *Dalz. & Gibs. Bomb. Fl.* 299. *B. verticillata*, *Rottl. ex Munro l. c.* *B. pubescens*, *Lodd. ex Lindl. in Penny Cyclop.* iii. (1835) 357. *B. Tanæa*, *Ham. ex Wall. Cat. n.* 5038 A.—*Bambusa*, *Wall. Cat. n.* 5038.

Dry hills of N. INDIA, from Garwhal to Nepal and southward from the PANJAB to BEHAR, the CONCAN, CENTRAL and S. INDIA, BURMA, and GREAT COCOS ISLD. (Not in Ceylon).—DISTRIB. Java.

Stems 20–50 ft. by 1–3 in. diam., hollow in moist climates, solid in dry, young glaucous green, old yellowish, nodes swollen, lower often rooting, internodes 12–18 in., upper branches decurved. *Stem-sheaths* variable, lower 3–12 in., glabrous or strigose with yellow-brown hairs, striate, top rounded ciliate, slightly auricled; blade triangular, hairy, especially within; ligule narrow. *Leaves* deciduous, narrowed from the rounded petioled base to the twisted tip, midrib prominent, nerves 3–6 pairs with interposed pellucid glands; sheath striate hairy, callus prominent, auricle short ciliate with flexuous deciduous hairs; ligule narrow, serrate. *Panicle* large, heads dense, 1– $1\frac{1}{2}$ in., much smaller in S. Indian forms; rachis smooth, internodes $1\frac{1}{2}$ –2 in. *Spikelets* usually hairy. *Ovary* stipitate, turbinate, style long, stigma simple feathery. *Grain* broadly ovoid, shining, beaked, hairy above.

Var. *Praianiana*, Gamble l. c. 80, t. 69, fig. A.; spikelets smaller, fls. fewer, fl. gls. nearly glabrous. Great Cocos Isld., *Praia*.

2. **D. sericeus**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 148; characters of *D. strictus*, but spikelets silkily hairy, anther-tips obtuse. *Gamble Bamb. Brit. Ind.* 81, t. 70.

BEHAR, summit of Parus-nath, alt. 4000 ft., *J. D. H.*, &c.

(I should regard this as a variety of *D. strictus* had it not been retained by Munro & Gamble. The latter describes the empty gls. as obtuse, but they are acute in the plate referred to.—*J. D. H.*)

3. **D. membranaceus**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 149; stems scurfy when young, leaves 5–10 by $\frac{1}{2}$ – $\frac{3}{4}$ in. hispid above, spikelets $\frac{1}{2}$ in., glossy nearly glabrous, empty gls. 2 ovate obtuse or acute, fl. gls. 2–3 ovate mucronate glabrous margins often ciliate, anthers apiculate. *Kurz For. Fl. Burma*, ii. 560; *Gamble Bamb. Brit. Ind.* 81, t. 71.

EASTERN BURMA, *Wallich*, &c.

Closely resembles glabrous forms of *D. strictus*, but stem-sheaths with waved hairy auricles, leaves thinner, base less rounded, grain more elongate, and grooved.

Sect. II. *Spikelets* in large soft congested heads. *Leaves* usually broad.

4. **D. sikkimensis**, Gamble in Hook. Ic. Pl. t. 1770, *Bamb. Brit. Ind.* 82, t. 72; stem-sheaths felted with golden brown hairs, leaves 6–10 by $1\frac{1}{2}$ –2 in. oblong-lanceolate strigosely hirsute and rough beneath, mouth of leaf-sheaths fringed, spikelets $\frac{1}{2}$ – $\frac{2}{3}$ in. in large globose red-brown heads lanceolate subobtuse glabrous, empty gls. 3–4 ovate keeled keels ciliate, flg. gls. 2–3 ovate mucronate glabrous margins ciliate, anthers acute. *Gard. Chron.* (1890), i. 792, fig. 130, II. 279 (1892), ii. 675 *cum* Ic.

EASTERN HIMALAYA; Sikkim and Bhotan, alt. 4–6000 ft. GARROW HILLS, on Tura Peak, alt. 3500 ft.

Stem 50–60 ft. by 5–7 in. diam., naked below, dark green, nodes ringed, internodes 18 in., rough. *Stem-sheaths* 12 by 15 in., top broad; blade lanceolate, recurved, hairy on both surfaces, decurrent into two large falcate recurved auricles fringed with long curved pale bristles; ligule sharply serrate. *Leaves* variable, tip black twisted, base rounded, smooth above, midrib prominent, nerves about 10 pairs; sheath smooth, callus small ciliate, auricles fringed with stiff bristles; ligule short, fimbriate. *Panicle* large, branches nodose, heads of spikelets $1\frac{1}{2}$ in. diam., rachis dull brown puberulous, internodes about 2 in. *Palea* of lower fl. obtuse, keels shaggy many-nerved. *Ovary* subglobose, hairy; style short, thick, and clavate stigma hairy. *Grain* depressed obovoid, apiculate, wrinkled below.

5. **D. Hookeri**, Munro in Trans. Linn. Soc. xxvi. (1868) 151; stem-sheaths felted with black or brown hairs, leaves 10–12 by 2 in. or more oblong-lanceolate rough beneath, mouth of leaf-sheath not fringed, spikelets about $\frac{1}{2}$ in. in large heads ovate acute puberulous, empty gls. 2 ovate obtuse, flg. gls. 2–3 ovate acute many-nerved uppermost mucronate, anthers long tips penicillate. *Brandis For. Flor.* 570; *Gamble Bamb. Brit. Ind.* 84, t. 73. *Bambusa globifera*, Griseb. in Goett. Nachr. (1868), 72.

SIKKIM HIMALAYA, Anderson, &c. ASSAM, the KHASIA, JAINTIA, and DUPHLA HILLS, alt. 2–5000 ft., J. D. H. & T. T., &c. BURMA; Bhamo district, Oliver.

Stem 50–60 ft. by 4–6 in. diam., naked below, internodes 18–20 in., lower somewhat rough and hairy, walls about 1 in. thick; branches long, curving. *Stem-sheaths* large, old very broad, younger about 16 in. by 8–12 broad at the base, top 2–3 in. broad; auricles 2, rounded, ciliate with stiff hairs; blade 3–7 in., triangular, hairy above; ligule $\frac{1}{2}$ – $\frac{1}{3}$ in., sharply serrate. *Leaves* oblong-lanceolate, tip long twisted hispid, base rounded very shortly petioled, midrib very prominent yellow, nerves 8–16 pairs, tessellate by pellucid glands (seen when dry); sheath hairy below, shining above, truncate, sometimes sparingly hairy, callus large; ligule conspicuous, glabrous. *Panicle* large, internodes 2–3 in., dull grey-green, somewhat hirsute; heads of spikelets 1 in. diam.; fl. gls. with transverse nervules. *Ovary* ovoid, acuminate, hairy, style twisted, stigma plumose.

6. **D. Hamiltonii**, Nees & Arn. ex Munro in Trans. Linn. Soc. xxvi. (1868) 151; stem-sheaths glabrous, leaves broadly lanceolate cuspidate, spikelets nearly $\frac{1}{2}$ in. long ovoid depressed purple glabrous, empty gls. usually 2 short rounded nerved, flg. gls. 2–4 orbicular margins ciliate, anthers purple with a long black hairy twisted point. *Brandis For. Fl.* 570. *Bambusa monogyna*, Griff. Notul. 63, Ic. Pl. Asiat. t. 2. *B. maxima*, Ham. ex Wall. Cat. n. 5039. *B. Falconeri*, Munro l. c. 95, *in part*.

TROPICAL HIMALAYA; from Garwhal (cult. ?) to Sikkim, ASSAM, the KHASIA HILLS, and SILHET.

Stems up to 80 ft. by 4–7 in. diam., much branched above, young appressedly white-pubescent, nodes with root-scars; internodes 12–20 in., walls $\frac{1}{2}$ in. thick.

Stem-sheaths glabrous or with patches of appressed hairs, tip truncate, auricles acute; blade lanceolate, acute, with a small glabrous triangular point on each side, often 12 in., glabrous, margin incurved, with black bristles at the base within; ligule $\frac{1}{2}$ in., smooth, entire. *Leaves* variable, small on side branches, up to 15 by $2\frac{1}{2}$ in. in new shoots, base rounded shortly petioled, tips scabrous twisted, margin finely serrate, midrib very narrow, nerves 6-17 pairs with nervules of pellucid glands; sheaths glabrous above, below clothed with white appressed stiff hairs, subkeeled below the shining callus; ligule broad. *Panicle* very large, branches scabrous and white-pruinose, furrowed on one side; internodes 1 in. or less, thick, fistular, scabrid; heads hemispheric, $\frac{1}{2}$ -1 $\frac{1}{2}$ in. diam.; spikelets usually all fertile, surrounded with rounded scarious bracts. *Ovary* subglobose, hairy, style long, stigma 3-fid feathery. *Grain* broadly ovoid, beaked, glabrous or hairy above.

7. **D. patellaris**, *Gamble Bamb. Brit. Ind.* 86, t. 75; stem-sheaths long cylindric margins above with a broad membranous fimbriate wing, leaves 8-16 by 1-4 in. lanceolate base narrow, spikelets depressed-ovoid obtuse, gls. all orbicular cuspidate many-nerved and palea tomentose within, empty gls. 1-2 membranous, flg. 3-5, anthers purple tip conical hairy. *Bambusa patellaris*, *Kurz in Herb. Calcutt.*

SIKKIM HIMALAYA; below Tonglo, alt. 4000 ft., *Anderson, &c.* NAGA HILLS, *Mann.*

Stems 20-30 ft. by 1-1 $\frac{1}{2}$ in. diam., dull green, striate, nodes with a hairy belt, internodes 12-18 in., walls thin. *Stem-sheaths* very persistent, 10-12 in. by 3 in. broad, sparsely strigose, glabrous within, narrowed in upper third to a truncate top, margins winged for 1-2 in.; limb 6 in., lanceolate; ligule fringed. *Leaves* persistent, petioled, variable, soft, tip twisted scabrid, midrib stout, nerves 8-10 pairs; sheath striate, keeled, truncate, or produced into a narrow callus, margins fringed; ligule very large, fimbriate. *Panicle* very large, rachis of branches rough, fistular; heads distant, distichous, $\frac{1}{2}$ -1 in. diam., bearing hard shining bracts. *Spikelets* many, dark brown, rachilla produced with a terminal imperfect gl. *Lodicules* 0 or 2, narrow, long-ciliate. *Ovary* ovoid, style hairy, stigmas 3.

Sect. III. Spikelets few, in small heads, many sterile.

* *Spikelets long, ovate, acute.*

8. **D. giganteus**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 150; stem-sheaths very large nearly glabrous, leaves up to 20 by 4 in. oblong young hairy beneath, spikelets $\frac{1}{2}$ in. ovoid acute spinescent puberulous, empty gls. ovate mucronate striate, fl. gls. 3-6 thin mucronate many-nerved, anthers acuminate. *Kurz Ind. Forester*, i. 346; *Gamble Bamb. Brit. Ind.* 88, t. 76. *Bambusa gigantea*, *Wall. Cat. Bot. Gard. Calc.* 79; *Voigt Hort. Suburb. Calc.* 719.

TENASSERIM, the MALAY PENINSULA, and PENANG (cult. in Assam and elsewhere in India).

Stems 80-100 ft. by 8-10 in. diam., branched above, nodes hairy, internodes rather short, grey-green, young with waxy scurf, walls thin. *Stem-sheaths* 20 in., as broad at the base, deciduous, thinly strigose with golden hairs, top depressed; blade 5-15 by 3 $\frac{1}{2}$ in., decurrent into glabrous stiff brown wavy auricles, narrowed above into a short point; ligule 2-5 in., stiff, black, margin serrate. *Leaves* cuspidately acuminate, tips twisted, young hairy beneath, midrib strong, nerves 12-16 pairs, with pellucid cross bars. *Panicle* very large, branchlets slender curved; heads up to 1 in. diam. $\frac{1}{2}$ -1 in. apart. *Spikelets* sometimes all flowering, rachilla produced with an imperfect gl. *Ovary* ovoid and long style hairy, stigma simple. *Grain* oblong, obtuse, hairy above.

9. **D. calostachyus**, *Kurz For. Fl. Burma*, ii. 562; stem-sheaths truncate tawny-strigose, leaves 9-12 by 1-2½ in. broadly lanceolate softly hairy beneath, spikelets about ½ in. ovate acute faintly pubescent, empty gls. 2-3 broadly ovate acute many-nerved, flg. gls. 4-6 rather longer, anthers yellow mucro smooth. *Gamble Bamb. Brit. Ind.* 89, t. 77. *Bambusa calostachya*, *Kurz in Journ. Beng. As. Soc.* xlii. (1873) 249.

UPPER BURMA; Bhamo and Kachin Hills up to 3500 ft., *J. Anderson*.

Stems with appressed silvery hairs; nodes thickened, annulate. *Stem-sheaths* truncate; ligule narrow, subentire. *Leaves* shortly petioled, base rounded, nerves 9-13 pairs, sheaths white-ciliate, mouth truncate, callus small; ligule broad, truncate. *Panicle* of long whip-like curved spikes; rachis flattened on alternate sides, glaucous, subpuberulous: heads of 2-5 spikelets, bracts few small. *Spikelets* subcompressed; flg. gls. with conspicuous transverse nervules; palea 5-nerved and transversely nerved between the ciliate keels and 1-nerved outside the keels. *Ovary* broadly ovoid, subhemispheric and long style hairy, stigma simple fringed.

10. **D. latiflorus**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 152, t. 6; leaves 7-10 by 1-2 in. broadly lanceolate long-acuminate, spikelets ½-¾ in. few in a head ovate-oblong compressed, gls. many-nerved pubescent, empty gls. 2 short broad acute ciliate, fl. gls. 6-8 broadly ovate suddenly narrowed to a subobtusate point, margins dark cold. ciliate, anthers pale tipped by a hairy mucro. *Gamble Bamb. Brit. Ind.* 131, t. 117. *Bambusa latiflora*, *Kurz in Journ. As. Soc. Beng.* xlii. (1873) II. 250. *B. verticillata*, *Benth. Fl. Hongk. (ex Munro)*.

UPPER BURMA; Southern Shan States, *King's Collector*.—DISTRIB. China, Formosa.

A very large Bamboo. *Stems* tall, fistular, internodes short, 5 in. diam., cavity large, striate, glabrous. *Leaves* shortly petioled, glabrous, midrib prominent, nerves 9 pairs, transverse nervules many obscure; sheath sulcate, glabrous or hairy between the lines, ligule truncate. *Panicle* large, uppermost spikelets followed by leaf-like bracts 1-1½ in. long, rachis softly hairy, flattened on one side, white-ringed above. *Ovary* ovoid from a broad base and long style hairy, stigmas 1-2.

** *Spikelets short, obtuse.*

11. **D. longispathus**, *Kurz For. Fl. Burma*, ii. 561; stem-sheaths persistent papery strigose with patches of brown hair, leaves oblong to linear-lanceolate narrowed to the base rough almost white beneath, spikelets ½-¾ in. in small heads obtuse nearly glabrous, empty gls. 2-3 obovate obtuse, flg. gls. 2-3 obovate cucullate margins ciliate many-nerved, anthers short tip mucronate black. *Gamble Bamb. Brit. Ind.* 89, t. 78. *Bambusa longispatha*, *Kurz in Beng. As. Soc. Journ.* xlii. (1873) II. 249.

SILHET, Mann. CHITTAGONG, *Lister*, &c. ARRACAN, *Schlich*. BURMA, *Brandis*, &c.

Stems 60 ft., leafy above only, nodes often rooting; internodes 10-24 in. by 3-4 diam., grey-green, walls ½ in. thick. *Stem-sheaths* fragile, 15-20 by 5-7 in., sides parallel till near the depressed sometimes 1-auricled top; blade 12-18 in., lanceolate, dorsally hairy; ligule broad, serrate and often fimbriate. *Leaves* acuminate midrib thick yellow, nerves 8-10 pairs; sheath smooth, glabrous; ligule narrow. *Panicle* large, sometimes leafy, of interruptedly spicate clusters ½-¾ in. broad, with hard polished bracts at the base. *Spikelets* few or many-fl. *Ovary* broadly ovoid, subacute; style rather short, stigma short. *Grain* ovoid, yellow, beaked.

12. **D. Brandisii**, *Kurz For. Fl. Burma*, ii. 560; stem-sheaths thickly coriaceous white-pubescent, leaves 9-12 by 1-2 in. oblong-lanceolate softly

hairy beneath, spikelets $\frac{1}{5}$ – $\frac{1}{3}$ in. depressed ovate puberulous, empty gls. 1–2 broadly ovate mucronate, flg. gls. 2–4 similar few-nerved margins ciliate hairy below the tip, anthers short apiculate or penicillate greenish-yellow. *Gamble Bamb. Brit. Ind.* 90, t. 79. *Bambusa Brandisii*, *Munro in Trans. Linn. Soc.* xxvi. (1868) 209.

BURMA; Pegu, Martaban Hills, and Ruby-mines district, *Kurz, &c.*

Stems 60–100 ft. by 5–8 in. diam., tufted; nodes slightly swollen, internodes ashy-grey, 12–15 in., walls thick. *Stem-sheaths* up to 2 ft. by 12–14 in., top depressed; blade 6–18 in., linear-lanceolate, strigose within, decurrent in small plaited auricles; ligule $\frac{1}{2}$ – $\frac{3}{4}$ in., lacerate. *Leaves* base narrowed, petiole wrinkled, midrib stout shining, nerves 10–12 with transverse pellucid glands; young sheaths pubescent, mouth with a few long cilia, callus large, glabrous. *Panicle* large, branches whip-like, rachis densely pubescent flattened on one side, internodes 1–1 $\frac{1}{2}$ in.; heads $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., bracteate; palea with 3-nerved side wings. *Lodicules* 1, 2, or 0, 3-nerved, long-ciliate. *Filaments* short. *Ovary* ellipsoid, hairy, style short, stigmas 2 plumose. *Grain* ovoid, mucronate, hairy above.—Perhaps not different specifically from *D. flagellifer*.

13. ***D. flagellifer***, *Munro in Trans. Linn. Soc.* xxvi. (1868) 150; very near *D. Brandisii*, but leaf-base more rounded, rachis of spikes more hairy, heads with fewer spikelets. *Gamble Bamb. Brit. Ind.* 91, t. 80. *Bambusa flagellifera*, *Griff. mss.* ? *B. Bitung*, *Schult. Syst.* vii. II. 1354.

TENASSERIM; on Moolyet, alt. 2000 ft., *Beddome*. SINGAPORE, *Ridley*.

A little known species, probably only *D. Brandisii*.

14. ***D. longifimbriatus***, *Gamble Bamb. Brit. Ind.* 92, t. 81; leaves 12–14 by 2–3 in. oblong acuminate, auricles of sheath long falcate stiffly ciliate with curved bristles, spikelets very small glabrous, empty gls. broadly ovate striate, flg. gls. 1–2 ovate acute keeled often mucronate, anthers short apiculate.

BURMA; in the extreme south of the Mergui district (*Herb. Calcutt.*).

Leaves very large, base rounded unequal, petiole $\frac{1}{2}$ in. wrinkled, pale and smooth beneath, midrib hairy beneath, nerves 12–18 pairs, transverse nervules of pellucid glands; sheath shining, callus narrow; ligule short, very hairy. *Panicle* large, branchlets solid, short; rachis slender, flexuous, glabrous; heads (young only seen) bracteate. *Ovary* ovoid, glabrous, style hairy, stigma plumose.—An imperfectly known species, best distinguished by the falcate long-fringed auricles of the leaves.

IMPERFECTLY KNOWN SPECIES.

15. ***D. Parishii***, *Munro in Trans. Linn. Soc.* xxvi. (1868) 149; panicle of globose interrupted dense heads, spikelets about $\frac{1}{2}$ in. ovoid subobtusely nearly glabrous compressed, empty gls. 1–2 ovate acute many-nerved ciliate, flg. gls. 2–3 similar glabrous. upper mucronate tessellately nerved ciliate, anther tip obtusely acute. *Brandis For. Fl.* 570; *Gamble Bamb. Brit. Ind.* 93, t. 82.

The PANJAB HIMALAYA, *Parish*.

Flowers nearest *D. Hookeri* (of which it is possibly a planted specimen), differing in the glabrous gls. and obtusely acute anthers.

16. ***D. Collettianus***, *Gamble Bamb. Brit. Ind.* 93, t. 83; heads of spikelets $\frac{1}{2}$ –1 in. diam. bracteate with 6–12 fertile and a few sterile fls. rachis pubescent, spikelets $\frac{1}{2}$ – $\frac{3}{4}$ in. soft white-pubescent, empty gls. 2 ovate acute many-nerved midrib thickened, flg. gls. 2–4 and an imperfect ovate-

lanceolate shortly mucronate pubescent many-nerved, palea larger than the flg. gl., keels long-ciliate with white hairs, anthers obtusely apiculate.

UPPER BURMA; Fort Stedman, *Abdul Huk*.
The softly white-hairy spikelets are diagnostic.

139. **MELOCALAMUS**, *Benth.*

Stem semiscandent from a stout rootstock. *Stem-sheaths* hard, cylindric, auricled. *Leaves* large, petioled, transverse nervules 0. *Panicle* large. *Spikelets* in dense heads, very small, rachilla continuous and produced beyond the upper gl.; empty gls. 2, broad, obtuse, many-nerved; flg. gls. 2, bisexual but one only fertile; palea very broad, cymbiform, membranous. *Lodicules* 3, large, ciliate. *Stamens* 6, filaments short, free, anthers obtuse. *Ovary* glabrous, style short, stigmas 2-3 plumose. *Grain* very large, depressed-globose, pericarp tough; seed large, fleshy.

M. compactiflorus, *Benth.* in *Journ. Linn. Soc.* xix. (1881) 134; *Gamble Bamb. Brit. Ind.* 94, t. 84. *Pseudostachyum compactiflorum*, *Kurz For. Fl. Burm.* ii. 567; *Ind. Forester*, i. t. II. fig. 13.

EASTERN BENGAL and BURMA; from Silhet to Arracan, Martaban, and the Ruby Mines district.

Stems 15-100 ft. by $\frac{1}{2}$ -1 in. diam., rough, spreading and arching over tall trees, nodes thickened; internodes grey green, 14-24 in. *Stem-sheaths* about 6 by 3 in., smooth or strigose, mouth dilated; blade long-acuminate, dilating into a narrow dark reflexed crescentic auricle fringed with stiff bristles, hispid towards the base; ligule narrow, entire. *Leaves* 6-10 by 1-2 in., oblong-lanceolate, tip subulate penicillate twisted, base rounded, petiole hairy, midrib narrow, nerves 8-12 pairs; sheath striate, young strigose, mouth truncate, auricle lunate reflexed; ligule narrow. *Panicle* interrupted, often leafy, heads $\frac{1}{3}$ - $\frac{1}{2}$ in. diam., subglobose, rachis flexuous pubescent, laterally flattened. *Spikelets* $\frac{1}{10}$ in., or rather more, obtuse or truncate, 2-cleft; empty gls. ventricose; fl. gls. similar, often ciliate. *Grain* 1- $\frac{1}{2}$ in. diam., seated in the persistent glumes.

140. **PSEUDOSTACHYUM**, *Munro.*

Shrubby, rootstock creeping. *Stem-sheaths* short. *Leaves* large, tessellately nerved. *Panicle* with drooping spikes. *Spikelets* small, solitary in the axils of narrow bracts, 1-fl., rachilla produced with imperfect gls.; empty gl. usually solitary, broad, mucronate, about 7-nerved; flg. gl. similar; palea thin, convolute, 2-keeled. *Lodicules* 3-5, large, ciliate. *Stamens* 6, anthers apiculate. *Ovary* linear-oblong, glabrous, style long rigid, stigmas 2 hairy. *Grain* depressed-globose.

P. polymorphum, *Munro* in *Trans. Linn. Soc.* xxvi. (1868) 142, t. 4; *Gamble Bamb. Brit. Ind.* 96, t. 85.

SIKKIM HIMALAYA, ASSAM, the GARROW HILLS, MUNNIPORE & BURMA, *Griffith*, &c.

Stems up to 50 ft., by 7-12 in. diam., arising singly from the rootstock, often subscandent, nodes hardly swollen, internodes 7-12 in. by 1 in. diam., at first glaucous, walls very thin. *Stem-sheaths* shorter than the internodes, triangular, truncate, strigose with brown hairs, auricle very short with a tuft of stiff bristles; blade long-acuminate in young shoots, base as broad as the truncate top of the sheath; ligule short. *Leaves* 4-14 by 1-2 in., narrowed into the stout $\frac{1}{2}$ - $\frac{1}{2}$ in.

petiole, midrib pale, nerves 7-11, nervules oblique; ligule short. *Panicle* large, leafy, branches fascicled, rachis wiry angled. *Grain* subtended by the gls. and lodicules, pericarp crustaceous.—Spikelets in diseased specimens converted into rounded softly hairy masses.

141. **TEINOSTACHYUM**, Munro.

Shrubby or arborescent; stems thin, arching. *Stem-sheaths* usually thin. *Leaves* various. *Panicle* spiciform, on leafy branches. *Spikelets* in bracteate whorls, long, narrow, many-fl., upper and lower fls. imperfect; empty gls. 1-2, mucronate; fl. gls. similar, mucros longer; palea convolute, keels ciliate. *Lodicules* 3, 3-9-nerved. *Stamens* 6, filaments free, slender. *Anthers* obtuse or obtusely apiculate. *Ovary* ovoid or depressed-globose, apex produced enclosing the style, stigmas 2-3 plumose. *Grain* ovoid, acuminate, beaked, pericarp crustaceous.—Species the following.

1. **T. Griffithii**, Munro in *Trans. Linn. Soc.* xxvi. (1868) 143, t. 3; stem-sheaths auricled, leaves 6-10 by $\frac{3}{4}$ - $1\frac{1}{2}$ in. oblong-lanceolate glaucous beneath, spikelets 2-3 in. linear puberulous, empty gls. 1 or 2 (the second sterile) narrowly ovate mucronate, fl. gls. 3-5 ovate acute mucronate 9-11-nerved, lodicules glabrous. *Gamble Bamb. Brit. Ind.* 98, t. 86. *Cephalostachyum Griffithii*, *Kurz For. Fl. Burma*, ii. 566.

The KHASIA HILLS, ASSAM, CHITTAGONG & BURMA.

Stems 25-50 by $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., slender, arching, straggling or subscandent, branches whorled, internodes 18-26 in., walls thin. *Stem-sheaths* 6 by $1\frac{1}{2}$ in. or more, strigose with white hairs above; blade 3-4 in., dilated into large auricles fringed with long curved reflexed bristles, shaggy within; ligule short. *Leaves* cuspidate, base rounded, petiole wrinkled, midrib with clusters of long hairs at the base, nerves 8-10 pairs with transverse pellucid glands; sheath keeled, auricles falcate and short ligule ciliate with deciduous hairs. *Panicle* leafy, branches often whip-like with few often pedicelled spikelets or axillary fascicles, rachis smooth striate; rachilla jointed between the gls. *Palea* longer than the fl. gl., keels fringed half way down, 4-nerved on each side. *Lodicules* ovate-lanceolate, glabrous, 7-9-nerved. *Anthers* yellow. *Ovary* stipitate, glabrous, style triquetrous. *Grain* obliquely ovoid, tapering at both ends, beaked, glossy.

2. **T. Wightii**, *Beddome Fl. Sylvat.* t. cccxxiii.; *Forest. Man.* p. ccxxxiii. (*excl. Syn.*) stem-sheaths papery hirsute top truncate not auricled, leaves 6-15 by 1-2 in. oblong-lanceolate, panicle with spiciform drooping branchlets, spikelets $\frac{1}{2}$ -1 in., empty gl. 1 ovate mucronate 5-7-nerved dorsally hirsute, fl. gls. 1 or 2 mucronate nerved transversely, lodicules short ciliate. *Gamble Bamb. Brit. Ind.* 99, t. 87.

WESTERN GHATS, alt. 3-5000 ft., from N. Canara to Cape Comorin.

Stem 10-20 ft., by $1-1\frac{1}{4}$ in., semi-scandent, branches pendulous, nodes narrowly ringed; internodes bright green, rough above, walls thin. *Stem-sheaths* 10-12 by $1-1\frac{1}{4}$ in., hairs black-brown; blade subulate, 5-7 in., decurrent on the sheath; ligule $\frac{1}{10}$ in. *Leaves* acuminate, tip scabrous twisted, whitish and sparsely hairy beneath, midrib broad yellowish, nerves 6-7 pair, tessellate by glands; sheath glabrous; ligule narrow. *Panicle* large, spiciform branches bracteate, rachis smooth, slender. *Rachilla* of spikelets slender, flattened and concave below, thickened and ciliate above. *Lodicules* ovate, 3-5-nerved. *Ovary* stipitate, depressed-globose, smooth, style included in the long beak of the ovary. *Grain* stoutly stipitate, ovoid, beaked, glabrous.

3. **T. attenuatum**, Munro in *Trans. Linn. Soc.* xxvi. (1868) 143;

stem- and leaf-sheaths not auricled pale strigose, leaves 3-6 by $\frac{1}{2}$ -1 in., panicle leafy, spikelets 1 in. clustered at the nodes of simple stiff terminal spikes, empty gl. 1 ovate mucronate 7-nerved ciliate, fl. gls. 2-3 longer 9-11-nerved and 1-2 terminal imperfect, lodicules lanceolate tip ciliate. *Beddome Fl. Sylvat. Forest. Man.* p. ccxxxiv.; *Trim. Cat. Ceyl. Pl.* 110; *Gamble Bamb. Brit. Ind.* 100, t. 88. *Bambusa attenuata*, *Thwaites Enum. Pl. Zeyl.* 375.

CEYLON; Central Province, alt. 4-6000 ft., *Thwaites*, &c.

Stems 12-25 ft. by $\frac{1}{2}$ -1 in. diam., tufted, tips filiform, wiry, nodes with many branches. *Leaves* smooth and pale beneath, tip subulate twisted scabrous, midrib faint, nerves 3-4 pairs; sheath sparingly strigose, margins ciliate, mouth truncate, fringed with deciduous bristles; ligule short. *Panicle* leafy, usually of short spikes clustered at the nodes, clusters bracteate composed of several barren spikelets and a few longer often curved fertile, rachis smooth swollen above. *Lodicules* 3-nerved. *Filaments* long, twisted. *Ovary* ovoid, acuminate, glabrous, style long, stigmas 3. *Grain* narrowed at both ends, beaked, glabrous.

4. **T. Dullooa**, *Gamble Bamb. Brit. Ind.* 101, t. 89; stem-sheaths not auricled, leaves variable, spikelets $\frac{1}{2}$ -1 in. in a panicle of spiciform branches subtended by long truncate bracts softly pubescent, empty gls. 2 small truncate, flg. gls. $\frac{1}{2}$ in. acuminate hairy 10-nerved, palea as long glabrous convolute not keeled, rachilla jointed produced into a long point.

BHOTAN, ASSAM, SILHET and the hills eastwd. to CHITTAGONG and UPPER BURMA.

Stems 20-30 ft. by 1-3 in. diam., tufted, sometimes scandent; nodes dark green, little prominent; internodes 16-40 in., dark green with a few whitish hairs; glossy, white beneath the nodes. *Stem-sheaths* variable, 4-12 in., strigose with white hairs, top concavely truncate loosely fringed with stiff bristles; blade 3-6 in., narrow, convolute, very hairy within, base rounded; ligule long, fimbriate. *Leaves* oblong-lanceolate, subciliate acuminate, tip twisted scabrid, base rounded, petiole $\frac{1}{2}$ - $\frac{1}{4}$ in., pubescent or glabrescent beneath, midrib pale, nerves 6-10 pairs, tessellate by pellucid dots; sheath striate, margins ciliate, mouth with stiff deciduous bristles, callus ciliate or glabrous; ligule long-fimbriate. *Ovary* glabrous; style, long reddish.

5. **T. Helfer**, *Gamble Bamb. Brit. Ind.* 102, t. 90; stem-sheaths thick brittle top truncate with a narrow long-fringed band, leaves 6-18 by 1-3 in. oblong-lanceolate, panicle of long terminal whip-like densely hairy flexuous spikes bearing distant heads of few sterile spikelets which consist of 2-3 striate mucronate hairy empty gls. *Bambusa Helfer*, *Munro in Trans. Linn. Soc.* xxvi. (1868) 114. *Pseudostachyum Helfer*, *Kurz in Journ. As. Soc. Beng.* xlii. (1872) ii. 253, *For. Fl. Burm.* ii. 568.

GARROW, KHASIA and JAINTIA HILLS, alt. 3500 ft., PEGU and MARTABAN.

Stems bushy or climbing, 20-40 ft. by 1-1 $\frac{1}{2}$ in. diam. arching to the ground and rooting, young strigose with white hairs, nodes thickened whitish; internodes 20-50 in., young white-velvety, old with a white band, walls very thin. *Stem-sheaths* 8-10 in., persistent, sparsely strigose with white bristles; blade lanceolate, glabrous or shortly hispid, decurrent on a fringed band on the top of the sheath; ligule narrow, fringed with stiff white hairs. *Leaves* very variable, unequal-sided, cuspidately acuminate, glabrous and glaucescent beneath, midrib stout, nerves 7-15 pairs, tessellate by pellucid glands; sheath glabrous, auricle long-fringed deciduous, callus smooth; ligule narrow, fringed with fragile hairs.—Very near *T. Griffithii*.

142. CEPHALOSTACHYUM, Munro.

Shrubby bamboos. *Stems* slender, straight. *Stem-sheaths* auricled. *Leaves* various, shortly petioled. *Spikelets* 2, in terminal globose heads, or

a panicle of bracteate heads, 1-fld., elongate, rachilla produced beyond the fl.; empty gls. 2-3, broad, chaffy, many-nerved, usually long-awned; fig. gls. more membranous, convolute, awns shorter; palea thin, many-nerved, keels 2 approximate. *Lodicules* 3, 3-5-nerved. *Stamens* 6, free, anthers long. *Ovary* stipitate, ovoid, narrowed into a long thickened style, stigmas 2-3, plumose. *Grain* oblong, beaked, pericarp separable.—*Species* all Indian.

* *Spikelets in a solitary head.*

1. ***C. capitatum***, Munro in *Trans. Linn. Soc.* xxvi. (1868) 139; leaves 4-8 by 1-2 in. ovate-lanceolate base unequally rounded, head 1-1½ in. diam., bracts broad long-awned glabrous, spikelets ½-¾ in. terminating short spikes, palea obtusely mucronate tip entire, anthers obtuse. *Gamble Bamb. Brit. Ind.* 104, t. 91. *Bambusa capitata*, Wall. *Cat.* n. 8913.

SIKKIM and BHOTAN HIMALAYA, alt. 2-8000 ft., KHASIA, JAINTEA, and NAGA HILLS.

Stems 12-30 ft. by 1-1½ in., semi-scandent; nodes not prominent, internodes often 3 ft. or more, walls thin. *Stem-sheaths* of young stems papery, 6-12 by 2-3 in., strigose with pale brown hairs, mouth triangular, of the longer upper truncate, of the shorter lower retuse; blade long, hairy within, base rounded, decurrent into rounded sometimes fringed auricles; ligule narrow. *Leaves* pale green, whitish beneath, glabrous on both surfaces, midrib prominent, nerves 4-10 pairs, pellucid dots oblique; sheaths smooth, shining, auricle short with curved cilia. *Empty gls.* softly hairy below; lower 1-3 fig. gls. sterile; palea hairy between the keels, rachilla produced. *Lodicules* ovate-lanceolate, 3-5-nerved, shortly ciliate. *Anthers* long, tips emarginate. *Ovary* ovoid, style often twisted, stigmas 2 hairy. *Grain* depressed-ovoid, beaked, shining, pericarp crustaceous.

Var. *decompositum*, Gamble l.c. 105; spikelets in spicate almost paniculate clusters, many fertile.—Sikkim and Khasia Hills.

2. ***C. pallidum***, Munro in *Trans. Linn. Soc.* xxvi. (1868) 139; leaves 1-5 by ½-1 in. base unequally rounded, heads about 1 in., bracts broad rounded, spikelets ¾-1 in., palea 2-fld, anthers long-apiculate. *Kurz For. Fl. Burma*, ii. 563; *Gamble Bamb. Brit. Ind.* 105, t. 92. *Bambusa andropogonifolia*, Griffith *Itin. Notes*, 124, No. 417.

KHASIA, MISHMI, PATKOY and MUNNIPORE HILLS, ascending to 5000 ft., Griffith, &c.

Shrubby or subarborescent, branches whorled. *Leaves* pale green, tip capillary, glabrous or puberulous beneath, not tessellate, midrib pale; nerves 4-6 pairs; sheath striate, margins ciliate, auricle rounded with a few deciduous cilia; ligule long. *Head* in the axil of a leaf, of many- long-awned empty gls. or sterile fl. gls. or with a few exserted fertile spikelets, all bracteate at the base; empty gls. concave, awned, many-nerved; fig. gls. similar, awn shorter than the gl.; palea many-nerved, tip and base hairy, rachilla shortly produced. *Lodicules* pubescent and ciliate. *Ovary* ovoid-lanceolate, style long conical, stigmas 2 hairy. *Grain* globosely ovoid, top conical and beaked, wrinkled.

3. ***C. latifolium***, Munro in *Trans. Linn. Soc.* xxvi. (1868) 140; stem sheaths linear, oblong top narrow, leaves 10-16 by 1-4 in. ovate or ovate-lanceolate base unequal cuneate or rounded, sheaths not fringed, heads 1½-2 in. diam. of clustered sterile and 1-fld., fertile spikelets ½-1 in. long with broad awned bracteoles, tip of palea entire, anthers obtusely mucronate. *Gamble Bamb. Brit. Ind.* 106, t. 93.

BHOTAN and MUNNIPORE HILLS, alt. 5-7000 ft., Griffith, &c.

Shrubby semi-scandent. *Stems* thin, rough, dark green, whitish below the nodes which are conspicuously ringed. *Stem-sheaths* 6-9 by 2-3 in., papery, sides

parallel, top concave with sub-acute triangular glabrous auricles; blade 4-5 by $\frac{1}{4}$ - $\frac{1}{2}$ in., subulate; ligule broad. *Leaves* glabrous, base cuneate or rounded, petiole wrinkled, midrib pale prominent, nerves 8-18 pairs, pellucid dots distant; sheath striate, margins ciliate produced up to the broad ligule; callus broad, thick, emarginate. *Spikelets* glabrous, empty gls. ovate-lanceolate, glabrous, long-awned; fig. gls. acuminate, awn shorter; palea obtuse, tip hairy, nerves reticulate; rachilla shortly produced. *Lodicules* 3-nerved. *Ovary* ovoid, style long flattened, stigmas 2 short plumose. *Grain* broadly ovoid, stipitate, curved above, beaked, pericarp crustaceous.

4. **C. Fuchsianum**, *Gamble Bamb. Brit. Ind.* 107, t. 94; stem-sheaths thin top deeply concave with a bristly fringe in the sinus, leaves 8-14 by 2-4 in., ovate-lanceolate, head $2\frac{1}{2}$ in. diam., simple globose or compound elongate and lobed, spikelets $\frac{3}{4}$ -1 in. glabrous sterile and fertile mixed with awned bracts, palea 2-fid anther tip apiculate or forked.

BHUTAN and the DUFHLA HILLS, alt. 6-8000 ft., *Fuchs, Lister, Gammie, &c.*

Arborescent, semi-scandent; stems small, soft, thin-walled, pale, branches whorled. *Stem-sheaths* 12 by 4 in., strigose with light brown hairs, sides nearly parallel, margins reticulately nerved, young cylindric; blade in the base of the sinus, 6-8 in., subulate, pubescent below; ligule small. *Leaves* cuspidately acuminate, base angled or rounded, midrib shining, nerves 7-10 pairs, tessellate by pellucid dots; sheath soft, margins thickly long-ciliate, auricle elongate thickly clothed with white bristles $\frac{1}{2}$ - $\frac{3}{4}$ in. long; ligule moderate, ciliate. *Empty gls.* ovate, long-awned, glabrous, 17-19-nerved; fig. gl. longer, awn shorter, 21-23-nerved and cross-nerved; palea pubescent, 2-keeled and 5-6-nerved on each side; rachilla shortly produced. *Lodicules* 3-5-nerved, ciliate. *Ovary* narrowly ellipsoid, style thick, stigmas 2 short. *Grain* as in *C. latifolium*, but tip more rounded, pericarp crustaceous.

** *Spikelets in panicked or spicate heads or fascicles.*

5. **C. pergracile**, *Munro in Trans. Linn. Soc.* xxvi. (1863) 141; stem-sheaths very short 2-auricled strigose with black deciduous hairs afterwards polished, leaves 6-14 by 1-2 $\frac{1}{2}$ in. linear-lanceolate rough on both surfaces, spikelets $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. bracteate clusters forming filiform drooping spikes, gls. 3-4, empty gls. 0, lower 1-2 sterile, fertile solitary densely hairy with a terminal sterile, palea long 2-fid, anthers obtuse purple. *Kurz For. Fl.* ii. 564; *Gamble Bamb. Brit. Ind.* 108, t. 95.

Throughout BURMA, ASSAM, The NAGA HILLS and CHOTA NAGPORE.

Arboreal, deciduous. *Stems* 30-40 ft. by 2-3 in. diam., tufted, erect, glaucous, whitish below the scarcely thickened nodes; internodes 12-18 in., walls very thin. *Stem-sheaths* 4-6 by 6-8 in.; blade 2 in., densely hairy within, decurrent in a waved fringe bordering the top of the sheath and fringed auricles; ligule very narrow. *Leaves* thin, base rounded or cuneate, subglaucous beneath, midrib conspicuous, nerves 7-13 pairs, sparingly tessellate; sheath glabrous, mouth auricled, callus small ciliate; ligule very narrow. *Panicle* large; heads $1\frac{1}{2}$ -2 in. apart, bracts small chaffy, rachis wiry. *Lodicules* narrow, tip ciliate. *Ovary* smooth, base subglobose, narrowed into a trigonous style, stigmas 2-3 stout. *Grain* $\frac{1}{4}$ in., obovate-oblong, grooved on one side, beak as long as itself.

6. **C. flavescens**, *Kurz in Journ. As. Soc. Beng.* xlii. (1873) ii. 252, *For. Fl. Burm.* ii. 564; stem-sheaths short, top triangular truncate smooth or strigose with white or pale brown hairs, leaves 3-6 by $\frac{1}{2}$ - $\frac{3}{4}$ in. linear, sheath with narrow auricles, spikelets $\frac{1}{2}$ in. long linear acuminate hairy, empty gls. 1-2 ovate-lanceolate mucronate hairy 7-9-nerved, fl. gl. solitary similar, palea 2-mucronate, anthers obtuse or acute yellow.

Gamble Bamb. Brit. Ind. 109, t. 96. *Melocanna lutescens*, *Kurz in Herb. Calcutt.*

BURMA; Pegu? (cult. in Calcutta and Madras gardens).

Evergreen, subarborescent. *Stems* 10–20 ft. by 1–1½ in. diam., smooth, dull green, at length yellow, nodes not prominent; internodes rather long. *Stem-sheaths* 4–5 by about 5 in., smooth or strigose with pale or brown hairs; blade 1–1½ in., erect, base cordate decurrent as a waved fringe with pointed long auricles edged with stiff curved bristles; ligule narrow. *Leaves* acuminate, glabrous or sparsely hairy beneath, base contracted, midrib narrow, nerves 4–6 pairs; sheath smooth, glabrous, callus very narrow, auricles long narrow; ligule narrow. *Panicle* of few whorled slender branches with clusters of spikelets 2–2½ in. apart; palea with hairy margins. *Lodicules* oblong, tip ciliate, 3–5-nerved. *Ovary* ovoid, acuminate, smooth; style trigonous, stigmas white-hairy.

7. *C. virgatum*, *Kurz For. Fl. Burma*, ii. 565; panicle leafless drooping, branchlets fascicled bearing lax distant heads of few nearly glabrous fertile and sterile spikelets, rachis smooth flattened on one side, spikelets ½ in. nearly glabrous narrow acute with 2 small sterile fls. at the base, empty gl. short ovate mucronate, flg. gl. convolute coriaceous mucronate, palea 2-mucronate, anthers obtuse. *Gamble Bamb. Brit. Ind.* 110, 132, t. 97. *Melocanna virgata*, *Munro in Trans. Linn. Soc.* xxvi. (1868) 133.

UPPER BURMA; on the Mogaung river, *Griffith*; Bhamo district, *Oliver*.

A medium-sized, slender, tufted Bamboo. *Stems* erect, dark green, young white scurfy, nodes not thickened; internodes 18–24 by 4 in. diam., regular, walls thin. *Stem-sheaths* 6–8 by 7–10 in. broad at the base, pale, narrowed to a nearly straight top 5–6 in. broad, strigose with golden hairs; blade 4–5 in., usually recurved, decurrent along the top of the sheath in a narrow straight band bordered with stiff recurved bristles, glabrous above, strigose beneath; base 1–1½ in. broad cordate, tip cuspidate, margins incurved; ligule narrowed, fimbriate. *Leaves* rather variable, thin, 6–12 by 1¼–2¾ in., oblong- to linear-lanceolate, cuspidately acuminate, rough on both surfaces, tip and margins scabrous, pale beneath and slightly hairy, mid-rib pale broad, nerves 10 pairs with 5–7 intermediate, cross-nervules few; sheath smooth, striate, keeled, ending in a narrow ciliate callus, and bearing short bristly auricles; ligule very short, fimbriate. *Panicles* large, heads bracteate; bracts narrow chaffy. *Lodicules* lanceolate, acuminate, shortly ciliate, faintly 3-nerved. *Ovary* ovoid, glabrous, style thickened; stigmas 2–3, purple, plumose.

143. **DINOCHLOA**, Büse.

Lofty evergreen scandent Bamboos. *Stems* zigzag, usually covered with persistent sheaths; nodes with a broad leathery ring left by the sheath. *Stem-sheaths* thick, loosely clasping, base wrinkled. *Leaves* large, rather soft, transverse nervules of pellucid glands. *Panicle* large, compound, of slender spicate clusters of spikelets. *Spikelets* very many, minute, in subglobose sessile heads on short branchlets. 1-fl'd.; rachilla inarticulate, not produced; empty gls. 1–4 broad, very obtuse, upper gradually larger; fl. gl. similar; palea convolute, not keeled, as long or longer than the gl. *Lodicules* 0. *Stamens* 6, free short. *Ovary* ovoid, glabrous, style short. *Grain* ovoid, acuminate.—Species, the following.

1. *D. Tjankorreh*, *Büse in Mig. Pl. Jungh.* 388; stem-sheaths narrowed to the mouth, leaves 6–10 by 1–1½ in. *Mig. Fl. Ind. Bat.* iii. 415; *Munro in Trans. Linn. Soc.* xxvi. 153, t. 5; *Kurz Ind. Forester*, 352; *Gamble Bamb. Brit. Ind.* 112. *Bambusa scandens*, *Blume ex Nees in*

Flora, vii. (1824) 291. *Nastus Tjangkorreh*, *Schultes Syst. Veg.* vii. 1358; *Kunth Enum. Pl.* i. 430; *Steud. Syn. Gram.* 333. *Chusquea amplexipaniculata*, *Steud. l.c.* 337; *Miq. l.c.* 415.

MALAY PENINSULA; Perak, *Ridley*.—DISTRIB. Malay and Molucca Islds.

Stems 100 ft. by 1 in. diam. or more, green, glossy, nodes swollen, of the branches often thorny; internodes 9–18 in., hairy above, walls thin. *Stem-sheaths* loose, leathery, cylindric, narrowed to the non-auricled mouth, sparsely bristly; blade ovate-lanceolate, minutely hispid above; ligule rather broad. *Leaves* lanceolate, rather soft, base narrowed, petiole very hairy, smooth on both surfaces, mid-rib conspicuous, nerves 7–9 pairs; sheaths strigose at length glabrous, mouth rounded with long white bristles; ligule rather broad, long-ciliate. *Panicle* compound, branches thin, wiry; rachis curved, striate, flattened on one side; nodes with a ring formed by the base of the fallen bracts; clusters with few fertile and many empty gls. *Spikelets* $\frac{1}{10}$ in. or less, ovoid, glossy, brown, glabrous; empty gls. with 1–2 smaller at the base, convolute, 5–7-nerved; flg. gl. similar. *Stamens* included, anthers acute. *Stigma* 2-fid, not plumose. *Grain* $\frac{1}{10}$ – $\frac{1}{5}$ in., fleshy.

Var. *andamanica*, Gamble l. c. t. 98; spikelets straw-colored, leaves up to 12 by 2 in. softly ovate-lanceolate, mouth of sheaths more ciliate, ligule more fimbriate. *D. andamanica* Kurz in *Journ. As. Soc. Beng.* xlii. (1873) ii. 253, *For. Fl. Burm.* ii. 570.—Andaman and Nicobar Islds., *Sieber*, Kurz, &c.

2. **D. M'Clellandi**, Kurz in *Journ. As. Soc. Beng.* xlii. (1873) ii. 253, *For. Flor. Burm.* ii. 371 (Maclellandi); stem-sheaths truncate at the mouth, leaves 6–18 by 1–4 in. *Gamble Bamb. Brit. Ind.* 113, t. 99. *Bambusa M'Clellandi*, Munro in *Trans. Linn. Soc.* (1868) 114.

CHITTAGONG, PEGU and MARTABAN, Kurz, &c.

Stem climbing, 100 ft., or short and straggling, 1–2 in. diam., grey green, nodes swollen; internodes 6–8 in., young often angled, strigose with brown pungent hairs. *Stem-sheaths* 6–9 in. by 7–9 in. at the base and 2–3 at the top, cylindric, leathery, strigose with golden-brown hairs ending in a narrow dark glabrous margin and top; blade lanceolate, glabrous without, densely hairy within, base rounded decurrent on the sheath; ligule entire or subserrate. *Leaves* broadly oblong-lanceolate, base unequally rounded, narrowed into a broad thick petiole $\frac{1}{2}$ in. long or less, glabrous on both surfaces, one or both margins retrorsely scabrid, mid-rib prominent, nerves 10–18 pairs; sheath transversely nerved, keeled, at first strigose, mouth produced into a rounded naked auricle; ligule entire or serrate.

144. **SCHIZOSTACHYUM**, Nees.

Erect or climbing, arborescent or shrubby Bamboos; stems usually slender, smooth, walls thin. *Stem-sheaths* short, cylindric, auricles small. *Leaves* broad, petioled. *Panicle* terminal, of spicate branches bearing heads of spikelets, often reduced to a spike of heads, rachis slender. *Spikelets* slender, fascicled, peduncled or 2–3-nate; empty gls. 1–3, narrow, usually mucronate, rachilla elongate between them and much beyond with a rudimentary gl.; fl. gls. 1–2, articulate below, convolute; palea like its gl., convolute, not keeled. *Lodicules* 0–4, narrow. *Stamens* 6, exserted, anthers narrow, filaments free. *Ovary* narrow, pericarp produced as a tubular beak enclosing the style, stigmas 3 short plumose. *Grain* ovoid, beaked, beak inclined, pericarp crustaceous; seed rounded.—Species 16, trop. Asia and Pacific.

* *Heads of spikelets in terminal simple spikes.*

1. **S. tenue**, Gamble *Bamb. Brit. Ind.* 114, t. 100; leaves 4–6 by

$\frac{1}{3}$ – $\frac{1}{2}$ in. linear-lanceolate, heads 1–3 in a spike bracteate, spikelets few about $\frac{1}{2}$ in. long, empty gls. 1–2 ovate acute 5–7-nerved, flg. gl., longer.
 2. *S. elegantissimum*, *Kurz Ind. Forester*, i. 348. (*Bambusa elegantissima*, *Hassk. Pl. Jav. Rar.* 42. *Beesha elegantissima*, *Kurz ex Munro in Trans. Linn. Soc.* xxvi. (1808) 146).

MALAY PENINSULA; Pahang, Malacca and Johore, *Ridley*.

Stems graceful, slender, scandent. *Leaves* narrowed into a rather long petiole, smooth and glabrous on both surfaces, midrib shining; nerves 3–5 pairs, distantly tessellate by glands, sheaths smooth truncate, callus broad; ligule very narrow. *Rachis* of spikelets slender, curved; bracts chaffy, mucronate, yellowish. *Spikelets* narrow, acuminate; palea longer than its gl., 2-keeled, glabrous, 2-mucronate. *Lodicules* ovate, acute, 3–5-nerved. *Stamens* exserted, anthers linear tips rounded.

2. *S. chilanthum*, *Kurz in Journ. As. Soc. Beng.* xxxix. (1870) II. 88, *Ind. Forester*, i. 348; leaves 6–10 by $\frac{3}{4}$ –1 in. linear-lanceolate, heads 3–6 in a spike, spikelets about $\frac{1}{2}$ in. long, empty gls. ovate mucronate striate glabrous, flg. gl. longer. *Gamble Bamb. Brit. Ind.* 115, t. 101. *Chloothamnus chilanthus*, *Buse in Pl. Jungh.* 387; *Miq. Fl. Ind. Bat.* ii. 415. *Melocanna gracilis*, *Kurz ex Munro in Trans. Linn. Soc.* xxvi. (1868) 133.—*Bambusa*, *Wall. Cat.* n. 5032.

Stem 6–8 ft. by $\frac{1}{4}$ – $\frac{3}{4}$ in. diam., smooth, glossy, nodes not prominent; internodes fistular, glabrous; flowering and leafing branches together half-whorled at the nodes with many bract-like sheaths; branchlets slender, curved, smooth. *Stem-sheaths* glabrous, smooth, truncate, margins ciliate; blade narrowly lanceolate, base rounded, hairy, decurrent in a long fringed band, auricles narrow long-fringed; ligule narrow long-fringed. *Leaves* long acuminate, setaceous point sometimes $1\frac{1}{2}$ in., midrib not prominent, nerves 4–6 pairs, tessellate by pellucid glands; sheath glabrous, mouth truncate bearing about 10 stiff white deciduous bristles, auricles short, callus narrow. *Heads* about $\frac{1}{2}$ in. broad, rachis slender, grooved, glabrous. *Spikelets* acuminate. *Paleæ* 2, mucronate, keeled above only. *Lodicules* 3, 3–5-nerved, ciliate. *Ovary* oblong, stigmas 3 plumose purple. *Grain* nearly $\frac{1}{2}$ in., beak inclined.

** *Heads of spikelets in panicle spikes.*

3. *S. Blumei*, *Nees Agrost. Bras.* 535; leaves 9–10 by $1\frac{1}{4}$ – $1\frac{3}{4}$ in. on sterile branches up to 16 in. oblong-lanceolate, spikelets under $\frac{2}{3}$ in. cylindric, rachilla ciliate, empty gls. 2 oblong long-mucronate glabrous, flg. gl. longer, paleæ 1 or 2 inner convolute, lodicules 0, anthers obtuse. *Kunth Enum. Pl.* i. 435; *Rupr. Bamb.* 43, t. 16, 17, f. 4; *Stend. Syn. Gram.* 332; *Miq. Fl. Ind. Bat.* iii. 424; *Munro in Trans. Linn. Soc.* xxvi. (1868) 136; *Kurz Ind. Forester*, i. 350; *Gamble Bamb. Brit. Ind.* 116, t. 102. *Melocanna tenuispiculata*, *Kurz in Hort. Buitenz. and Calc.*

SINGAPORE, *Ridley*.—DISTRIB. Java.

Stems 30 ft., hollow, fragile, glabrous. *Stem-sheaths* cylindric, slightly narrowed to the ciliate truncate mouth, strigose with white bristles; blade leafy, erect; ligule narrow. *Leaves* acuminate, base rounded or narrowed, rough on both surfaces, pubescent beneath, midrib narrow, nerves 5–6; sheath smooth, keeled, mouth truncate and margins ciliate with white bristles; ligule short fimbriate. *Spikes* of panicle with long spreading erect or deflexed spikelets $\frac{1}{2}$ – $\frac{2}{3}$ in. long and chaffy bracts, rachis very slender; empty gls. 2, striate. *Anthers* green, obtuse. *Ovary* narrowly ellipsoid.

4. *S. latifolium*, *Gamble Bamb. Brit. Ind.* 117, t. 103; leaves 9–12 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in. oblong acuminate, spikelets 1– $1\frac{1}{2}$ in. long acuminate, empty

gls. 2 oblong long-mucronate, fig. gls. 1 much larger ovate-lanceolate long mucronate convolute, lodicules 3-4, anthers obtuse tip penicillate.

MALAY PENINSULA; Pahang, *Ridley*.

Leaves smooth on both surfaces, base rounded, petiole $\frac{1}{2}$ in. wrinkled, midrib prominent beneath, nerves 10-12 pairs; sheath keeled, smooth, callus broad, auricle large falcate bearing long bristles; ligule short, long-ciliate. *Panicle* 6-12 in. *Spikelets* mixed with ovate-lanceolate glabrous bracts, shortly pedicelled; empty gls. distant at the base; margins of fig. gl. often ciliate; palea lanceolate, 2-mucronate, dorsally keeled or channelled. *Lodicules* 3-4, $\frac{1}{10}$ - $\frac{1}{8}$ in., 4th longer (a modified stamen?). *Anthers* long, narrow. *Ovary* narrowly lanceolate.—Near *S. longispiculatum*, Kurz Ind. Forester, i. 351, but differs in the presence of lodicules and in the penicillate anther-tips.

5. ***S. aciculare***, Gamble *Bamb. Brit. Ind.* 117, t. 104; leaves 6-9 by $1\frac{1}{2}$ -2 in. ovate-oblong cuspidate, petiole pubescent, spikelets $1\frac{1}{4}$ - $1\frac{1}{2}$ in. needle-like, empty gls. 2 oblong mucronate pubescent, fig. gl. linear convolute appressedly hairy long-mucronate, lodicule 1, anthers obtuse tip penicillate.

MALACCA; at Rupayoong, *Alwis*.

A small bamboo. *Leaves* almost elliptic, base rounded or narrowed, tip an obtuse scabrous hairy point, pale and smooth beneath, midrib hardly prominent, nerves 10 pairs; sheath smooth, mouth with a few long bristles, callus rounded. *Spikes* slender, rachis flattened on one side; bracts few, short. *Spikelets* very long, narrow, on short bracteate peduncles; empty gls. 2, pubescent, oblong, mucronate; palea as long as the fig. gl., mucronate, glabrous; rachilla short, grooved, glabrous. *Lodicule* 1, narrowly lanceolate, glabrous. *Anthers* very long, narrow. *Ovary* narrowly ovoid, glabrous.

145. **MELOCANNA**, Trin.

Arborescent unarmed Bamboos. *Stems* solitary on the branches of a rhizome, distant. *Stem-sheaths* short, brittle, shortly auricled, blade very long. *Leaves* broad, petioled, smooth. *Panicle* large, compound, of spicate one-sided spikelets. *Spikelets* 2-3, fascicled in bracts in the axils of the spikes, acuminate with 1 fertile and 1 or more sterile fls.; empty gls. indefinite, acuminate, mucronate, striate; fl. gl. similar; palea like its gl. convolute not keeled. *Lodicules* 2, narrow. *Stamens* 5-7, free or irregularly connate. *Ovary* glabrous, style elongate, stigmas 2-4 shortly hairy. *Fruit* very large, pyriform, long-beaked, pericarp very thick.—Species 1 or 2.

1. ***M. bambusoides***, Trin. in Spreng. *Neue Enterdeck.* ii. 43, *Syst.* ii. 113 (excl. *Syn. Lour.*); stem-sheaths 5-6 in. strigose with whitish hairs abruptly truncate with rounded auricles, leaves 6-14 by 1-3 in. lanceolate or oblong-lanceolate, spikelets about $\frac{1}{2}$ in. spinous glabrous, empty gls. 2-4 lanceolate, fig. gl. similar but thinner. *Rupr. Bamb.* 65; *Steud. Syn. Gram.* 331; *Miq. Fl. Ind. Bat.* iii. 423; *Munro in Trans. Linn. Soc.* xxvi (1868) 132; *Kurz For. Fl. Burm.* ii. 569; *Gamble Bamb. Brit. Ind.* 119, t. 105. *Bambusa baccifera*, Roxb. *Corom. Pl.* iii. 38, t. 243, *Fl. Ind.* ii. 197. *Beesha Rheedii*, Kunth in *Journ. de Phys.* xlv. (1822) 4; *Revis. Gram.* i. 141; *Enum. Pl.* i. 434 (excl. *Syn.*). *B. baccifera*, Schult. *Syst.* vii. 11. 1336. *Nastus baccifera*, Roxb. ex Rasp. in *Ann. Sc. Nat. Ser. I.* v. (1825) 442.

ASSAM, the KHASIA and GARROW HILLS, CHITTAGONG, ARRACAN, and TENASSERIM.

Evergreen. *Stems* solitary on branches of the rhizome, 50-70 ft. by $1\frac{1}{2}$ -3 in. diam., green, straight, unbranched till near the top, nodes a thin ring; internodes

12–20 in., walls thin. *Stem-sheaths* 5–6 in. by 6–12 at the base, yellow, margins straight for $\frac{2}{3}$ up, then waved, auricles often long-fringed; blade up to 1 ft., base 1 in. broad, decurrent in a narrow strip along the top of the sheath; ligule very narrow, serrate. *Leaves* from fascicled branches, tip long twisted scabrous, glaucescent beneath, young hairy, margins ciliate, inner and 2–3 adjoining nerves scabrous, midrib prominent, nerves 8–12 pairs, tessellate by pellucid glands; sheath glabrous, auricles pointed, ciliate and bearing 10–12 large whitish bristles; ligule very short. *Panicle* with drooping branches. *Spikelets* about $\frac{1}{2}$ in., glabrous; empty gls. with sometimes abortive buds. *Lodicules* rose, 3–5-nerved. *Fruit* up to 3–5 by 2–3 in.

2. *M. humilis*, Kurz For. Fl. Burm. ii. 569; stem-sheaths very short glabrous? mouth much produced rounded inflated and sinuate, leaves 4–6 by $\frac{2}{3}$ –1 in. lanceolate to linear-lanceolate roughish puberulous beneath, base obtuse, petiole about $\frac{1}{8}$ in., sheath glabrous mouth minutely auricled deciduously long-fringed. Gamble Bamb. Brit. Ind. 120, t. 106.

ARRACAN and PEGU, Kurz.

Known chiefly from the leaves and sheath. *Stems* 8–15 by 1 in. diam.; nodes hardly thickened, internodes about 1 ft. *Blade of stem-sheath* linear, erect, decurrent in a narrow nude green strip bordering the sinuses; ligule very narrow, entire.

146. *OCHLANDRA*, Thwaites.

Shrubby, gregarious, reed-like Bamboos. *Stems* erect, internodes rather long, thin-walled. *Stem-sheaths* thin, persistent, auricles small. *Leaves* as in *Bambusa*, margins cartilaginous, nerves many; sheath striate, fringed; ligule (except in one sp.) short. *Spikelets* fertile and sterile mixed, or whorled on terminal spikes or spicate panicles from a leafy branchlet, often very large, 1-fl.; empty gls. 2–5, usually mucronate; fig. gl. like the uppermost empty, mucronate; palea membranous, not or faintly 2-keeled. *Lodicules* 1 or more, usually appressed to the filaments. *Stamens* 6–120, filaments free or monadelphous, exserted; anthers long, narrow. *Ovary* narrow, style elongated, stigmas 3–6. *Fruit* large, ovoid, long-beaked, pericarp fleshy.—Species the following.

* *Stamens many, ligules short, filaments free.*

1. *O. Rheedii*, Benth. ex Gamble Bamb. Brit. Ind. 121, t. 107; leaves 4–10 by $\frac{1}{2}$ –1 $\frac{1}{4}$ in. linear-lanceolate, sheath smooth, auricles falcate fringed with bristles, spikelets cylindric acute glabrous, sterile $\frac{1}{2}$ – $\frac{2}{3}$ in., fertile 1–1 $\frac{1}{4}$ in., empty gls. 2–3 broadly ovate mucronate many-nerved, fig. gl. larger subacute, anthers mucronate. Beesia Rheedii, Kunth Enum. Pl. i. 434 (excl. all cit. but Rheedee); Rupr. Bamb. 65; Munro in Trans. Linn. Soc. xxvi. (1863) 144; Beddome Fl. Sylvat. Forest. Man. p. cccxxiv. Melocanna Rheedii, Steud. Syn. Gram. 332. Bambusa scriptoria, Dennst. Schuess. Hort. Malab. 31.—Rheede Hort. Mal. v. t. 60.

COCHIN and TRAVANCORE, White, Johnstone, &c.

Stems erect, up to 16 ft. by 1 in. diam.; nodes somewhat raised; internodes about 17 in., walls $\frac{1}{2}$ in. thick. *Stem-sheaths* 4–6 in., purplish-green, young hairy, margins ciliate, top rounded-truncate, auricles falcate long-ciliate; blade subulate, base hairy within; ligule short, ciliate. *Leaves* usually small, base rounded, smooth on both surfaces, midrib narrow, nerves 5–10 pairs. *Spikes* or spicate panicles terminal or axillary on leafy branchlets. *Palea* convolute, long-mucronate, base membranous. *Lodicules* many, $\frac{1}{3}$ – $\frac{1}{2}$ in., acute, glabrous, 1–7-nerved. *Stamens* 15–18. *Ovary* oblong, style embraced by the enlarged perigynium, stigmas 3, plumose. *Fruit* oblong, long-beaked.

Var. *sivagiriana*, Gamble l. c. 122, t. 108; spikelets rather larger, stamens up to 60, leaves generally larger.—Pulney and Sivagiri Hills, *Beddome*.

2. **O. stridula**, *Thw. Enum. Pl. Zeyl.* 376; leaves 8–12 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in. oblong-lanceolate, young sheath hirsute, auricles falcate fringed with bristles, spikelets 1 in. cylindro-conical sparsely hairy, empty gls. 2–3 convolute mucronate ciliate, fig. gl. larger, anther tips 2-fid and mucronate. *Trimen Cat. Ceyl. Pl.* 110; *Gamble Bamb. Brit. Ind.* 123, t. 109. Beesha stridula, *Munro in Trans. Linn. Soc. xxvi.* (1868) 145; *Beddome Fl. Sylvat. Forest. Man. p.* cccxxiv. *Bambusa stridula*, *Moon-Cat. Ceyl. Pl.* 26.

CEYLON; in the southern parts of the Island, *Thwaites*.

Stems 6–18 ft. by $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., tufted, light green, geniculate, nodes ringed; internodes 12–14 in., scabrous. *Stem-sheaths* persistent, cylindric, glabrous, young purple, tip rounded with falcate small fringed auricles; blade subulate. *Leaves* broad, somewhat rough beneath, base rounded, petiole broad, midrib slender, nerves 10–12 pairs, tessellate by pellucid glands. *Spikelets* in a terminal panicle, whorled, few fertile, rachis of spike long, rough, glaucous. *Lodicules* 6–12 or more, lanceolate, 1– many-nerved, convolute. *Stamens* up to 30, filaments free, flat. *Ovary* narrow, beak trigonous; stigmas 4–5, plumose, at first twisted. *Fruit* 1 in., ovoid, beak 1 in.

Var. *maculata*, Gamble l. c. 124; stem greyish-green mottled with dark purplish blotches. *Teinostachyum*? *maculatum*, *Trim. in Journ. Bot. xxiii.* (1885) 273, *Cat. Ceyl. Pl.* 110.—Ceylon, *Ferguson*.

3. **O. Beddomei**, *Gamble Bamb. Brit. Ind.* 124, t. 110; leaves 6–8 by $1\frac{1}{2}$ in. oblong-lanceolate margins revolute, auricles decurrent fringed with bristles, spikelets $1\frac{1}{2}$ in. hirsute, empty gls. 2 ovate long-mucronate many-nerved, fig. gl. $1\frac{1}{2}$ in. ovate-lanceolate mucronate many-nerved glabrous, anther tips 2-fid and mucronate.

NILGHIRI HILLS; in the Wynaad district, *Beddome*.

Leaves long-acuminate, base unequally rounded, subglaucous beneath, midrib slender, nerves about 8 pairs; sheaths puberulous, margins ciliate, callus narrow. *Panicle* short, spicate, terminating a leafy branchlet; rachis stiff, puberulous. *Spikelets* few together, cylindric-conical, 2–3-bracteate, hairs tuberos-based, brown, spreading; palea 1 in., membranous, acute or obtuse. *Lodicules* 5, all different, 3–7-nerved, entire or 2-fid. *Stamens* about 32. *Ovary* subglobose, beak embracing the style, stigmas 5–6 plumose.

**** Stamens many, ligule short, filaments coherent.**

4. **O. travancorica**, *Benth. ex Gamble Bamb. Brit. Ind.* 125, t. 111; leaves 6–18 by $2\frac{1}{2}$ in. broadly oblong-lanceolate, auricles short falcate spikelets 2– $2\frac{1}{2}$ in. ovoid or ovoid-oblong, glabrous, empty gls. usually 3, lowest truncate tip subulate upper 2 in. long-acuminate, fig. gl. like the upper empty, anther-tips penicillate. *Gamble Bamb. Brit. Ind.* 125, t. 111. Beesha travancorica, *Beddome Fl. Sylvat. t.* cccxxiv. *Forest. Man. p.* cccxxiv.

TRAVANCORE and TINNEVELLY. alt. 2–5000 ft., *Beddome*, &c. (monopolizing miles of country).

An erect gregarious reed-like bamboo. *Stems* 6–20 ft. by 1–2 in. diam., nodes swollen and scarred; internodes $1\frac{1}{2}$ –5 ft., rough; walls very thin. *Stem-sheaths* 6–8 in., thin, vertically wrinkled, young strigose with tuberos-based hairs, tip truncately rounded, fringed with bristles; blade subulate. *Leaves* glabrous or scabrous, base rounded, petiole broad, midrib thick below, nerves 12–17 pairs, tessellate by pellucid glands; sheath glabrous, keeled, margins ciliate, callus shining; ligule short, truncate. *Spikelets* a few fertile and a few much smaller sterile together in the axils of ovate-lanceolate smooth bracts with subulate deciduous tips; single

spikelets with 2-4 small sheathing bracts; gls. all many-nerved; palea acute, faintly 2-keeled. *Lodicules* 3, $\frac{1}{2}$ in., membranous, 3-7-nerved. *Stamens* up to 120, filaments coherent. *Ovary* narrow, tip 4-angled, stigmas 5-6 plumose spirally twisted together. *Fruit* 2 in. by $\frac{1}{2}$ in. diam., ovoid-oblong, beak 2 in., pericarp fleshy.

Var. *hirsuta*, Gamble l. c. 126, t. 112; spikelets densely brown velvety, leaves thicker, margins more cartilaginous, leaf-sheaths with appressed tuberos-based hairs. —Travancore Hills, *Beddome*.

*** *Stamens many, ligule 1 in. or more, filaments free.*

5. **O. Brandisii**, Gamble *Bamb. Brit. Ind.* 126, t. 113; leaves 10-20 by $1\frac{1}{2}$ -3 in. oblong-lanceolate acuminate, auricles short fringed, spikelets 1- $1\frac{1}{2}$ in. conical glabrous bracteolate with chaffy scales, gls. all many-nerved, 3-4 lower empty thick ovate truncate tip subulate, upper thinner, flg. gl. membranous, anthers long-apiculate. *Bambusa* Wightii, Munro in *Trans. Linn. Soc.* xxvi. (1868) 111.—*Wight Cat.* n. 1009.

TINNEVELLY GHATS; at Courtallam, *Wight, Brandis*.

Leaves thick, base narrowed, glabrous on both surfaces, whitish beneath, petiole short broad wrinkled beneath, midrib stout, nerves 10-13 pairs strong, tessellate by pellucid glands; sheath striate, callus smooth rounded. *Spike* terminal, rachis thick, whorls of spikelets several in the axils of ovate glabrous bracts; palea like the flg. gl. but smaller. *Lodicule* solitary, $\frac{1}{2}$ - $\frac{3}{10}$ in.; many-nerved, truncate and retuse. *Stamens* up to 60. *Ovary* glabrous, stigmas 5, plumose.

**** *Stamens 6 or fewer, unequal, filaments free or coherent, ligule short.*

6. **O. Ridleyi**, Gamble *Bamb. Brit. Ind.* 127, t. 114; leaves 9-10 by 1- $1\frac{1}{2}$ in. oblong-lanceolate cuspidately acuminate, auricles rounded or falcate long-ciliate, spikelets about 1 in. appressedly hairy, empty gls. 1-2 ovate truncate long mucronate, flg. gls. 1-2 longer, rachilla produced beyond the upper, palea 2 not keeled.

SINGAPORE, *Ridley & Feilding*.

Leaves smooth above except the marginal nerves, scaberulous beneath, base rounded, petiole short broad, midrib slender, nerves 10-12 pairs; sheath short, smooth, striate, callus narrow. *Spike* or spicate *panicle* 3-4 in., terminating a leafy branchlet; heads subdistichous, bracteate; bracts with imperfect blades, ovate, truncate, fimbriate. *Spikelets* several sterile, few fertile; outer palea narrow, convolute, bimucronate, tip hairy, inner shorter tip rounded glabrous. *Lodicules* 6-10, many-nerved, entire or forked. *Stamens* 6, 3 longer obtuse, 3 shorter acute. *Ovary* linear; style long embraced by the enlarged perigynium, stigma plumose.

Flowers unknown.

7. **O. setigera**, Gamble *Bamb. Brit. Ind.* 128, t. 115; stem-sheaths papery sparsely strigose narrowed to a truncate top, blade subulate hair-like, leaves 6-9 by $\frac{3}{4}$ - $1\frac{1}{4}$ in. oblanceolate acuminate puberulous beneath, sheath smooth, auricles decurrent, ligule very narrow erose.

NILGHIRI HILLS; ravines above Gudalur, alt. about 3000 ft., *Gamble*.

A small tufted erect or straggling reed-like Bamboo. *Stem* 20 ft. by $\frac{1}{2}$ - $\frac{3}{8}$ in. diam., naked below, nodes hardly swollen; internodes 10-12 in., very smooth, walls $\frac{1}{10}$ - $\frac{1}{8}$ in. thick. *Stem-sheaths* 6-7 in., persistent tessellately wrinkled towards the top, blade $\frac{3}{4}$ -1 in., hairy within, margins incurved, top very narrow; blade $\frac{3}{4}$ -1 in., hairy within, margin incurved. *Leaves* smooth above, puberulous beneath, tip capillary, midrib narrow, nerves 6-7 pairs, tessellate by pellucid glands; auricles of sheath fringed with long curved bristles

ADDITIONS AND CORRECTIONS TO VOL. VII.

- p. 4. After 41. *ARTHRAOXON*, insert:
 Spikes solitary, rachis flattened, spikelets of each
 pair both 2-flid. and bisexual 41¹. *ISCHNOCHLOA*.
- p. 5. After 52. *GERMAINIA*, insert:
 Spike solitary, joints clavate hollow, spikelets
 secund 2-nate lower 1-flid., upper neuter . . . 52¹. *COELARTHEON*.
- „ After 55. *ISEILEMA*, insert:
 Spikelets as in *Anthistiria* but lower in spike not
 whorled and neuter 55¹. *PSEUDANTHISTIRIA*.
- „ For Subtribe VI. read Tribe VI.
- „ 66. *PHIPPSIA*, see *Catabrosa himalaica*, p. 311.
- p. 6. After 67. *CYATHOPUS*, insert:
 Spikelets compressed, fls. diandrous, gls. 1-nerved,
 III 2-lobed awned in the sinus 67¹. *WOODROVIA*.
- „ Subtribes *Aireæ* and *Euaveneæ* are distinguished from one another by the
 very inconstant characters of the rachilla, which in *Aira caryophyllea* is
 produced with a minute seta beyond the fl. gl.
- „ After 83. *DANTHONIA*, insert:
 Spikelets of *Danthonia*, but lodicules 0, style
 single very long 83¹. *DUTHIEA*.
- p. 7. After 97. *PHRAGMITIS*, insert:
 Rachilla elongate bearded, lateral nerves only
 of flg. gls. with long silky hairs 97¹. *NEYRAUDIA*.
- „ 103. *CATABROSA*. This genus includes 66. *PHIPPSIA* and 119. *COLPODIUM*,
 the position of which latter it should occupy on p. 8.
- p. 8. The characters of 105. *MYRIOSTACHYS* and 106. *HALOPYRUM* are partly
 transposed and erroneous; read:
 Infl. pyramidal dense-flid., empty gls. long-
 awned, grain ovoid 105. *MYRIOSTACHYS*.
 Infl. a lax panicle, empty gls. not awned, 13-
 nerved, grain broad deeply concave ventrally 106. *HALOPYRUM*.
- „ Dele 107. *COELACHYRUM* (see p. 328).
- „ 119. *COLPODIUM*, see p. 311 under *CATABROSA*.
- „ For *DUTHIEA* read *DUTHIEA*, and transfer to p. 6 after 83. *DANTHONIA*.
- p. 9. After *ELYMUS*, insert:
 Spikelets 2- or more-flid., empty gls. 0 or minute 131¹. *ASPERELLA*.
- „ 135. For *THYRSACANTHUS*, read *THYRSOSTACHYS*.
- p. 99. In character of *Zoysia*, line 5, dele “nerveless”; line 6, the palea is not
 always nerveless.
- p. 100. Under *COIX LACHRYMA-JOBI*, var. *stenocarpa*, after Stapf. insert: “in
Hook. Ic. Pl. t. 1764, in Kew Bulletin (1888) 144.”
- „ Under var. *Ma-yuen*, insert as synonym, *C. gigantea*, *Kew Bulletin (1893) 76*.

- p. 167. Under habitats for *A. fastigiatus*, for Berar, read Behar.
- p. 186. For Subgen. VI., read Subgen. VII.
- p. 187. ,, VII., ,, VIII.
- p. 203, line 8 from bottom, for eriophorus, read eriophorus.
- p. 272. In generic character of *Aira*, the rachilla is described as not produced beyond gl. IV, but it is so in *A. caryophyllea* as a very minute setiform process.
- p. 282. For 84. DUTHIÆA, read 83¹. DUTHIÆA.
- p. 311, line 8 from top, for $\frac{1}{3}$, read $\frac{1}{30}$.
- ,, ,, 14 ,, for *angusta*, read *angusta*.
- p. 312, line 9 from top, for Graphaphorum, read Graphephorum.
- ,, ,, 13, dele sheaths of innovations . . . to mouth.
- ,, Under 6. *C. Wallichii*, for $\frac{1}{10}$, read $\frac{1}{7}$.
- p. 357, line 6, Festuca filiformis, Nees, is correctly referred to Tripogon abyssinicus at p. 287.

GENERAL INDEX.

GENERAL INDEX.*

Orders, suborders, tribes and sections in capital type; genera and species in roman type; synonyms and species incidentally mentioned in italic type.

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